

REPORT
ON
AUDIT & ASSESSMENT OF QUALITY OF SERVICE
OF
CELLULAR MOBILE TELEPHONE SERVICE
FOR
SOUTH ZONE – TAMILNADU CIRCLE
Report Period: Jan 2012 – Mar 2012

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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.
- vii) Emergency (level 1) calls testing.

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 Tamilnadu 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. This has resulted in high value for ‘Cell exceeding 3% TCH drop’ parameter for some of the service providers.

CHAPTER 2: EXECUTIVE SUMMARY

I. Preface

This report highlights the findings for the audit & assessment of Quality of Service of Cellular Mobile Services in Tamil Nadu Circle in 1stquarter (January - March 2012). The primary data collection and verification of records (PMR data verification – quarterly) maintained by various operators was undertaken during the period July- September 2011.

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

Sl.	Name of Service Provider	Month of Audit	TCBH Hour
GSM Operators			
1	Aircel Ltd	February - 2012	1900-2000 hrs
2	Airtel Ltd	February - 2012	1900-2000 hrs
3	BSNL	February - 2012	1900-2000 hrs
4	Etisalat	No Audit	
5	Idea	February - 2012	1900-2000 hrs
6	Reliance Communication (GSM)	February - 2012	1900-2000 hrs
7	Tata Communications (GSM)	February - 2012	1900-2000 hrs
8	Uninor	February - 2012	1900-2000 hrs
9	Videocon	February - 2012	1900-2000 hrs
10	Vodafone	February - 2012	1900-2000 hrs
CDMA Operators			
11	MTS	February - 2012	1900-2000 hrs
12	Reliance Communication (CDMA)	February - 2012	2000-2100 hrs
13	Tata Communications (CDMA)	February - 2012	1900-2000 hrs

- Etisalat has stopped his services.

All the NSS and BSS systems were considered for audit and assessment for the TCBH hours of individual operators.

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	Idea	Rcom GSM	TATA GSM	Uninor	Vi- con	V- fone	MTS	Rcom CDMA	TATA CDMA
S/N	Name of Parameter		GSM Operators									CDMA Operators		
1	Network Availability													
	a) BTS Accumulated Downtime	<=2%	1.22%	0.34%	1.47%	0.00%	0.04%	0.00%	0.04%	0.38%	0.05%	0.03%	0.35%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	0.12%	0.30%	0.42%	0.00%	0.00%	0.00%	0.00%	0.07%	0.00%	0.00%	0.00%	0.00%
2	Connection Establishment (Accessibility)													
	a) CSSR (Call Setup Success Rate)	>=95%	98.31%	98.15%	98.60%	99.72%	99.89%	99.33%	99.32%	98.80%	98.13%	99.09%	99.42%	98.72%
	b) SDCCH/PAGING congestion	<=1%	0.73%	0.56%	0.14%	0.03%	0.03%	0.12%	0.07%	0.09%	0.53%	0.00%	NP	NP
	c) TCH congestion	<=2%	1.26%	0.49%	1.20%	0.08%	0.01%	0.25%	0.01%	0.06%	1.15%	0.00%	0.14%	0.05%
3	Connection maintenance (retainability)													
	a) CDR	<=2%	0.58%	0.98%	1.05%	0.39%	0.26%	0.61%	1.06%	0.73%	0.82%	0.91%	0.43%	0.73%
	b) Worst affected cells>3% TCH drop	<=3%	3.14%	4.82%	7.39%	0.69%	0.01%	4.91%	1.52%	1.68%	3.45%	1.31%	0.70%	1.62%
	c) Good voice quality	>=95%	95.33%	96.89%	97.59%	98.16%	99.50%	98.67%	98.74%	98.04%	97.35%	100.00%	98.86%	NA
4	No of POI having congestion	>=0.5%	0	0	0	0	0	0	0	0	0	0	0	0
5	Response time to customers for assistance													
	a) Accessibility of call centre/Customer Care	>=95%	97.00%	100%	90.49%	99.20%	98.93%	INCLUDED IN CHENNAI REPORT	96.12%	95.35%	70.88%	99.95%	97.65%	INCLUDED IN CHENNAI REPORT
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	88.06%	90.19%	91.67%	88.08%	90.10%		91.24%	91.24%	97.04%	92.47%	95.22%	

NA: Not Applicable, NP: Data Not Provided

From the 3 days live data assessment, it is found that all the operators are meeting the network parameters .However deviation is found with AIRCEL, AIRTEL, BSNL, TATA GSM, & VODAFONE in respect of parameter "worst affected cells >3% TCH drop".

Customer care data is found to be satisfactory. However deviations are found with

1. BSNL & VODAFONE in respect of the parameter "Accessibility of call centre/Customer Care".
2. AIRCEL & IDEA in respect of the parameter “% calls answered by operators (voice-to-voice)”.

One Month Data Audit		B-mark	Aircel	Airtel	BSNL	Idea	Rcom GSM	TATA GSM	Uninor	Vi-con	V-fone	MTS	Rcom CDMA	TATA CDMA
S/N	Name of Parameter		GSM Operators									CDMA Operators		
(A)	Network Service Quality Parameter													
1	Network Availability													
	a) BTS Accumulated Downtime	<=2%	1.93%	0.06%	0.46%	0.01%	0.08%	0.13%	0.04%	0.23%	0.07%	0.07%	0.16%	0.02%
	b) Worst affected BTSs due to downtime	<=2%	1.34%	0.41%	1.59%	0.00%	0.11%	1.08%	0.00%	1.55%	0.26%	0.00%	0.64%	0.00%
	c) Total no. of BTSs in the licensed service area		6039	8604	5272	3356	2830	3145	2396	2911	6875	1232	1718	737
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		80925	3355	16798	349	1573	2751	639	4696	3356	594	1920	80
	e) No. of BTSs having accumulated downtime of >24 hours in a month		81	35	84	0	3	34	0	45	18	0	11	0
2	Connection Establishment (Accessibility)													
	a) CSSR (Call Setup Success Rate)	>=95%	98.09%	99.70%	98.69%	99.59%	99.88%	99.37%	99.30%	98.79%	98.44%	99.01%	99.37%	98.72%
	b) SDCCH/PAGING congestion	<=1%	0.88%	0.10%	0.19%	0.06%	0.01%	0.15%	0.04%	0.04%	0.40%	0.00%	NP	NP
	c) TCH congestion	<=2%	1.47%	0.11%	1.51%	0.10%	0.01%	0.22%	0.03%	0.06%	0.97%	0.00%	0.19%	0.18%
3	Connection maintenance (retainability)													
	a) CDR	<=2%	0.60%	0.51%	1.08%	0.41%	0.27%	0.60%	1.07%	0.72%	0.80%	0.99%	0.45%	1.08%
	b) Worst affected cells>3% TCH drop	<=3%	2.86%	4.96%	7.50%	0.72%	0.01%	5.11%	1.53%	1.57%	3.69%	1.41%	0.70%	1.58%
	c) Good voice quality	>=95%	95.24%	98.01%	97.49%	98.00%	99.48%	98.68%	98.73%	98.08%	97.34%	100%	98.86%	NA
4	No of POI having congestion	>=0.5%	0	0	1	0	0	0	0	0	0	0	0	0
(B)	Customer Service Quality Parameters													
5	Metering/billing credibility-Post paid	<= 0.1%	0.16%	0.01%	0.10%	0.07%	0.10%		NA	NA	0.01%	NA	0.10%	
6	Metering /billing credibility-Pre paid	<= 0.1%	0.05%	0.02%	0.01%	0.03%	0.04%		0.01%	0.05%	0.01%	0.00%	0.01%	
7	Resolution of billing/ charging complaints	100% within 4 weeks	100%	100%	100%	100%	100%		100%	100%	100%	100%	100%	
	a) Period of applying credit/waiver/adjustment to the customer's account from the date of resolutions of complaints	<=1 week	100%	100%	100%	100%	100%		100%	100%	100%	100%	100%	
8	Response time to customers for assistance													
	a) Accessibility of call centre/Customer Care	>=95%	83.00%	100%	92.17%	97.16%	99.07%		96.35%	95.38%	70.32%	99.92%	97.73%	
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	81.17%	91.96%	96.43%	84.89%	88.72%		90.68%	90.68%	95.58%	90.29%	92.85%	
9	Termination/closure of service	<=7days	100%	100%	100%	100%	100%		NA	NA	100%	NA	100%	

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10	Time taken for refunds of deposits after closures.(within 60 days)	100%	100%	100%	100%	100%	100%		NA	NA	100%	NA	100%	
NA: Not Applicable, NP: Data Not Provided														
<p>From the month data assessment, it is found that all the operators are meeting the network parameters. However deviations are found with 1. AIRTEL, BSNL, TATA GSM & VODAFONE in respect of parameter "worst affected cells >3% TCH drop" & 2. BSNL in respect of "POI having congestion >=0.5%".</p> <p>Performance related to customer care, data is found to be satisfactory for most of the operators.</p> <p>For the parameter "Accessibility of call centre/Customer Care "AIRCEL, BSNL & VODAFONE and for "calls answered by operators (voice-to-voice)" AIRCEL, IDEA & RCOM GSM are not meeting the benchmark.</p>														

Operator-Assisted Drive Test

The Operator Assisted Drive Test was conducted at Tamilnadu for all the operators. Route covered was about around 100-122 Kms depending on city areas within the speed limit of 30Km/hr. The cities covered were Kancheepuram, Pondicherry and Viluppuram. In all the cities, zones were selected for covering different density areas (High, Medium & Low dense areas).

SN	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Uninor	Vi-con	V-fone	MTS	Rcom CDMA	Tata CDMA	
			GSM Operators						CDMA Operators						
1.1	Blocked Call Rate (<=3%)	Kancheepuram	0	0	0	1.14	0	0	1.16	1.59	0	0	0	0	
		Pondicherry	0	0	0.62	1.18	0	0	1.09	1.72	0.63	0	0	1.14	
		Viluppuram	0	0	1.40	1.88	0	0	0	0.61	0.63	0	0	1.14	
1.2	Dropped Call Rate (<=2%)	Kancheepuram	0	0	0	0	0	0	1.73	0	0	0	0	0	
		Pondicherry	0	0	0.62	0	0.55	0	0	0	0	0	0	0.55	1.14
		Viluppuram	0	0	0.70	0	0	0	0	0	0	0	0	0	1.14
1.3	Percentage of connections with good voice quality (=>95%)														
	(i) 0-4 (w/o frequency hopping)	Kancheepuram	0	0	0	0	0	0	0	0	0	0	99.63	98.35	99.66
		Pondicherry	0	0	0	0	0	0	0	0	0	0	99.35	96.69	97.26
		Viluppuram	0	0	0	0	0	0	0	0	0	0	99.32	98.05	99.67
	(ii) 0-5 (with frequency hopping)	Kancheepuram	97.00	95.60	97.31	95.00	97.98	98.72	88.01	95.08	93.40	0	0	0	0
		Pondicherry	97.80	95.40	97.40	95.00	96.48	96.87	97.27	96.31	95.70	0	0	0	0
Viluppuram		95.10	95.20	97.20	96.00	98.04	96.93	96.89	95.00	95.20	0	0	0	0	
1.4	Call Setup Success Rate (>=95%)	Kancheepuram	100	100	100	98.86	100	100	100	98.41	100.00	100	100	100	
		Pondicherry	100	100	99.38	98.80	100	100	98.91	98.28	99.38	100	100	98.17	
		Viluppuram	100	100	98.60	98.12	100	100	100.00	99.39	99.37	100	100	99.21	

Independent Drive Test

The Independent Drive Test was conducted in three cities / towns in Tamilnadu for the Q1 - 2012 as directed by TRAI . The cities/ towns covered were Virudunagar (Vodafone), Sivaganga (Tata GSM) & Nagarcoil (MTS). In Ramanathapuram Videocon is having connectivity through ICR. Route covered varies from place to place varying 45 Kms to 107 Kms depending on city area within the speed limit of 30Km/hr. In all the cities / towns, zones were selected for covering different density areas (High, Medium & Low dense areas).

SN	Parameter	Vodafone (Virudunagar)	Tata GSM (Sivaganga)	MTS (Nagarcoil)
1.1	Call Attempts	117	56	163
1.2	Blocked Call Rate (<=3%)	0	1.79	0
1.3	Dropped Call Rate (<=2%)	0	0	0
	Percentage of connections with good voice quality (=>95%)			
1.4	(i) 0-4 (w/o frequency hopping)			99.86
	(ii) 0-5 (with frequency hopping)	95.10	99.35	
	Service Coverage			
	In door (>= -75dBm)	78.54	31.55	61.75
	In-vehicle (>= -85dBm)	97.42	70.63	94.60
1.5	Outdoor- in city (>= -95dBm)	99.96	97.47	100
1.6	Call Setup Success Rate (>=95%)	100	98.21	100

CHAPTER-3: AUDIT-PMR VERIFICATION

I. Cellular Mobile Telephone Service

PMR		Bench- mark	Audit	Aircel	Airtel	BSNL	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	0.42%	0.05%	0.37%	0.01%	0.02%	0.02%	0.03%	0.11%	0.02%	0.05%	0.03%	0.02%
			Verified	0.42%	0.05%	0.37%	0.01%	0.02%	0.02%	0.03%	0.11%	0.02%	0.05%	0.03%	0.02%
	Worst affected BTSs due to downtime	<=2%	Reported	0.23%	0.12%	1.53%	0.00%	0.00%	0.00%	0.00%	0.58%	0.03%	0.00%	0.00%	0.00%
			Verified	0.23%	0.12%	1.53%	0.00%	0.00%	0.00%	0.00%	0.58%	0.03%	0.00%	0.00%	0.00%
2	Connection Establishment (Accessibility)														
	CSSR (Call Setup Success Rate)	>=95%	Reported	99.01%	98.32%	0.99%	99.28%	99.79%	97.77%	99.14%	98.72%	98.29%	99.45%	99.24%	98.75%
			Verified	99.01%	98.32%	0.99%	99.28%	99.79%	97.77%	99.14%	98.72%	98.29%	99.45%	99.24%	98.75%
	SDCCH/PAGING congestion	<=1%	Reported	0.53%	0.53%	0.00%	0.04%	0.07%	0.21%	0.03%	0.04%	0.33%	0.00%	0.06%	0.00%
			Verified	0.53%	0.53%	0.00%	0.04%	0.07%	0.21%	0.03%	0.04%	0.33%	0.00%	0.06%	0.00%
	TCH congestion	<=2%	Reported	0.62%	0.38%	0.23%	0.07%	0.07%	0.31%	0.10%	0.05%	1.10%	0.00%	0.16%	0.74%
Verified			0.62%	0.38%	0.23%	0.07%	0.07%	0.31%	0.10%	0.05%	1.10%	0.00%	0.16%	0.74%	
3	Connection maintenance (retainability)														
	CDR	<=2%	Reported	0.49%	0.99%	1.03%	0.46%	0.23%	0.61%	1.10%	0.93%	0.78%	0.64%	0.48%	0.76%
			Verified	0.49%	0.99%	1.03%	0.46%	0.23%	0.61%	1.10%	0.93%	0.78%	0.64%	0.48%	0.76%
	Worst affected cells>3% TCH drop	<=3%	Reported	1.46%	2.51%	3.13%	1.22%	0.82%	1.72%	1.72%	1.01%	2.13%	1.94%	0.40%	0.83%
			Verified	1.46%	2.51%	3.13%	1.22%	0.82%	1.72%	1.72%	1.01%	2.13%	1.94%	0.40%	0.83%
	Good voice quality	>=95%	Reported	95.49%	96.95%	99%	98.17%	99.30%	98.56%	98.72%	97.96%	97.09%	99.87%	99.38%	99.47%
Verified			95.49%	96.95%	99%	98.17%	99.30%	98.56%	98.72%	97.96%	97.09%	99.87%	99.38%	99.47%	
4	POI congestion	<=0.5%	Reported	0	0	0	0	0	0	2	0	0	0	0	0
			Verified	0	0	0	0	0	0	0	2	0	0	0	0
(B)	Customer Service Quality Parameters														

5	Metering/billing credibility-Post paid	<= 0.1%	Reported	0.09%	0.01%	0.00%	0.02%	0.10%	0.02%	0.00%	0.00%	0.09%	0.00%	0.07%	0.00%
			Verified	0.09%	0.01%	0.00%	0.02%	0.10%	0.02%	0.00%	0.00%	0.00%	0.09%	0.00%	0.07%
6	Metering /billing credibility-Pre paid	<= 0.1%	Reported	0.25%	0.06%	0.00%	0.02%	0.08%	0.00%	0.04%	0.07%	0.03%	0.00%	0.01%	0.01%
			Verified	0.25%	0.06%	0.00%	0.02%	0.08%	0.00%	0.04%	0.07%	0.03%	0.00%	0.01%	0.01%
7	Resolution of billing/ charging complaints	100% within 4 weeks	Reported	100%	100%	100%	100%	100%	100%	100.00%	100%	100%	100%	100%	99%
			Verified	100%	100%	100%	100%	100%	100%	100%	100.00%	100%	100%	100%	100%
	Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	<=1 week	Reported	100%	100%	100%	100%	100%	100%	0.00%	100%	100%	100%	100%	100%
			Verified	100%	100%	100%	100%	100%	100%	100%	0.00%	100%	100%	100%	100%
8	Response time to customers for assistance		Reported												
			Accessibility of call centre/Customer Care	>=95%	Reported	100%	100%	100%	98.90%	98.24%	0.00%	97.89%	97.98%	100%	99.36%
	% call answered by operators(voice to voice) within 60 sec.	>=90%	Reported	73.26%	92%	93%	70.65%	74%	97%	86.42%	97.60%	93.38%	91.91%	89.23%	96%
			Verified	74.53%	92%	93%	70.65%	74%	97%	88.00%	97.60%	93.38%	91.91%	89.23%	96%
9	Termination/closure of service		Reported												
			No.of requests for Termination / Closure of service complied within 7 days during the quarter	<=7days	Reported	100%	100%	100%	100%	100%	100%	0.00%	0.00%	100%	0.00%
10	Time taken for refunds of deposits after closures.	100% within 60 days	Reported	100%	100%	100%	100%	100%	90%	0.00%	0.00%	100%	0.00%	100%	98%
			Verified	100%	100%	100%	100%	100%	100%	90%	0.00%	0.00%	100%	0.00%	100%

✚ No Deviation is found when compared with Operator reported data.

CHAPTER-4: DETAILED FINDINGS & ANALYSIS

Cellular Mobile Telephone Service

(A) MSC Audit

(1) 3 Days Live Data Assessment & Summarized Findings

S/N	Name of Parameter	Benchmark	Aircel	Airtel	BSNL	Idea	Rcom GSM	TATA GSM	Uninor	Vi- con	V- fone	MTS	Rcom CDMA	TATA CDMA
			GSM Operators									CDMA Operators		
A	Network Service Quality Parameter													
1	Network Availability													
	a) BTS Accumulated Downtime	<=2%	1.22%	0.34%	1.47%	0.00%	0.04%	0.00%	0.04%	0.38%	0.05%	0.03%	0.35%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	0.12%	0.30%	0.42%	0.00%	0.00%	0.00%	0.00%	0.07%	0.00%	0.00%	0.00%	0.00%
	c) Total no. of BTSs in the licensed service area		6039	8604	5272	3356	2830	3145	2396	2911	6875	1232	1718	737
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		5303	2122	5590	3	87	0	71	797	246	30	436	2
	e) No. of BTSs having accumulated downtime of >24 hours in a month		7	26	22	0	0	0	0	2	0	0	0	0
	Connection Establishment (Accessibility)													
	a) CSSR	>=95%	98.31%	98.15%	98.60%	99.72%	99.89%	99.33%	99.32%	98.80%	98.13%	99.09%	99.42%	98.72%
	b) SDCCH/PAGING congestion	<=1%	0.73%	0.56%	0.14%	0.03%	0.03%	0.12%	0.07%	0.09%	0.53%	0.00%	NP	NP
	c) TCH congestion	<=2%	1.26%	0.49%	1.20%	0.08%	0.01%	0.25%	0.01%	0.06%	1.15%	0.00%	0.14%	0.05%
2	Connection maintenance													
	a) CDR	<=2%	0.58%	0.98%	1.05%	0.39%	0.26%	0.61%	1.06%	0.73%	0.82%	0.91%	0.43%	0.73%
	b) Cells having > 3% TCH drop	<=3%	3.14%	4.82%	7.39%	0.69%	0.01%	4.91%	1.52%	1.68%	3.45%	1.31%	0.70%	1.62%
	c) Good voice quality	>=95%	95.33%	96.89%	97.59%	98.16%	99.50%	98.67%	98.74%	98.04%	97.35%	100%	98.86%	NA
	d) No. of cells > 3% TCH drop		559	1,229	1,158	70	1	462	109	147	708	52	36	36
	e) Total no. of cells in the network		17,826	25,516	15,673	10,107	8,490	9,415	7,192	8,731	20,510	3,970	5,154	2,221
3	No of POI having congestion	>=0.5%	0	0	0	0	0	0	0	0	0	0	0	0
	a) Name of POI not meeting the benchmark		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	b) Total No. of call attempts on POI (Avg.)		111,717	4,309,206	1,584,329	1,000,676	453,690	269,917	1,357,838	331,966	147,680	75,929	426,418	560,785
	c) Total traffic served on POI (Erlang) (Avg.)		1,906	169,563	60,303	27,160	11,307	5,433	19,534	8,282	2,887	1,595	15,139	10,056
	d) Total No. of circuits on POI		122,545	274,531	81,618	46,666	27,826	7,793	34,494	14,211	293,560	19,287	42,182	18,254

	e) Total number of working POI Service Area wise		41	224	38	83	NP	10	19	55	62	60	NP	33
	f) Equipped Capacity of Network in respect of Traffic in erlang		398,662	433,366	225,864	76,790	60,000	125,584	79,357	61,200	296,138	86,000	116,000	102,281
	g) Total traffic handled in TCBH in erlang		329,991	307,588	123,462	37,432	NP	38,401	22,972	20,644	298,905	28,596	NP	9,045
(B)	Customer Service Quality Parameters													
4	Response time to customers for assistance													
	a) Accessibility of call centre	>=95%	97.00%	100%	90.49%	99.20%	98.93%	INCLUDED IN CHENNAI REPORT	96.12%	95.35%	70.88%	99.95%	97.65%	INCLUDED IN CHENNAI REPORT
	b) % of call answered by operators(voice to voice) within 60 sec	>=90%	88.06%	90.19%	91.67%	88.08%	90.10%		91.24%	91.24%	97.04%	92.47%	95.22%	
	c) No. of call attempts to call centre / customer care nos. during TCBH (Avg)		64,219	56,049	84	520	5,495		445	445	1,990	651	2,761	
	d) No. of calls connected and answered successfully to call centre / customer care nos. during TCBH (Avg)		56,549	50,548	77	458	4,951		406	406	1,931	602	2,629	
NA: Not Applicable, NP: Data Not Provided														

Parameter-wise Findings (Live Data Assessment):

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

- **BTS accumulated downtime (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values laying between 0% and 1.47%.
- **Worst affected BTSs due to downtime (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values laying between 0% and 0.42%.
- **Call setup success rate (benchmark $\geq 95\%$):** All operators are meeting the benchmark with values laying between 98.13% and 99.89%.
- **SDCCH/PAGING Channel congestion (benchmark $\leq 1\%$):** All operators are meeting the benchmark with values laying between 0.00% and 0.73%.
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 laying between 0% and 1.26%.
- **Call drop rate (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values laying between 0.26% and 1.06%.
- **Cell exceeding 3% TCH drop (benchmark $\leq 3\%$):** Aircel, Airtel, BSNL, Tata GSM, & Vodafone with a value of 3.14%, 4.82%, 7.39%, 4.91%, & 3.45 respectively are not meeting the benchmark. Other operators are satisfying the benchmark with values laying between 0.01% and 1.68%.
- **Connections with good voice quality (benchmark $\geq 95\%$):** Tata CDMA service provider has declared that the parameter is not system generated. Rest of the GSM operators are meeting the benchmark with values laying between 95.33% and 99.50%.
- **POI Congestion (benchmark $\leq 0.5\%$):** All the operators are meeting the benchmark with value of 0.5%. There was no congestion found overall on the POI, but cases were found where individual POIs are showing high utilization/usage. Some are in the range of over 100% though causing no traffic failure due to overflow technique i.e. the extra traffic is carried over by some other operating POI as has been designed to do so.
- **%age of call answered by operator (electronically) (benchmark >95):** BSNL (90.49%) & Vodafone (70.88%) are not meeting the benchmark. All other operators are meeting the benchmark with values laying between 95.35% and 100%.
- **%age of call answered by operator (Voice to voice) (benchmark >90): %):** Aircel (88.06%) & Idea (88.08%) are not meeting the benchmark. All other operators are meeting the benchmark with values laying between 90.10% and 97.04%

	b) Total No. of call attempts on POI (Avg.)		109,916	4,521,720	1,534,993	1,072,723	448,940	260,114	1,374,416	323,691	144,515	74,190	409,490	539,153
	c) Total traffic served on POI (Erlang) (Avg.)		1,877	174,555	58,727	28,727	11,061	5,359	19,740	8,118	2,872	1,534	14,681	9,749
	d) Total No. of circuits on POI		122,514	275,024	81,618	47,760	27,826	8,785	35,058	14,302	293,560	19,287	41,915	17,882
	e) Total number of working POI Service Area wise		41	224	38	83	NP	10	19	55	62	60	NP	33
5	Network Data													
	a) Equipped Capacity of Network Erlang		398,662	433,366	225,864	76,790	60,000	125,584	79,357	61,200	296,138	86,000	116,000	102,281
	b) Total traffic in TCBH in erlang (Avg.)		327,136	321,302	118,549	39,572	52,114	38,066	22,784	19,723	298,584	27,540	40,733	8,747
	c) Total no. of customers served (as per VLR) on last day of the month		9,454,971	9,190,694	3,431,166	1,361,257	1,532,628	1,331,292	916,346	528,318	8,950,988	851,488	1,444,346	440,507
(B)	Customer Service Quality Parameters													
6	Metering/billing credibility-Post paid	$\leq 0.1\%$	0.16%	0.01%	0.10%	0.07%	0.10%		NA	NA	0.01%	NA	0.10%	
	a) No. of bills issued during the period		285,502	269,000	154,753	23,308	61,834		NA	NA	224,227	NA	146,601	
	b) No. of bills disputed including billing complaints during the period		464	30	151	16	61		NA	NA	26	NA	146	
7	Metering /billing credibility-Pre paid	$\leq 0.1\%$	0.05%	0.02%	0.01%	0.03%	0.04%		0.01%	0.05%	0.01%	0.00%	0.01%	
	a) No. of charging / credit / validity complaints during the quarter		8,142	2,809	721	555	1,993		259	630	843	33	335	
	b) Total no. of pre-paid customers at the end of the quarter		17,662,014	12,838,105	6,057,618	2,030,540	4,438,434		1,838,818	1,248,902	9,804,147	1,588,418	2,777,918	
8	Resolution of billing/ charging complaints	100% within 4 weeks	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		8,606	8,945	872	571	2,054		259	630	869	33	481	
	b) Total no. of billing (post paid) and charging, credit / validity (pre paid) complaints received during the quarter		8,606	8,945	872	571	2,054		259	630	869	33	481	

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	c) No. of billing complaints (post paid) and charging, credit/ validity complaints (pre paid) resolved in favour of the customer during the quarter		1,427	2,839	872	571	692	259	537	869	6	271
	d) No. of complaints disposed on account of not considered as valid complaints during the quarter		7,179	6,106	0	2,317	1,362	0	93	0	27	210
	e) Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	<i><=1 week</i>	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
9	Response time to customers for assistance											
	a) Accessibility of call centre/Customer Care	<i>>=95%</i>	83.00%	100%	92.17%	97.16%	99.07%	96.35%	95.38%	70.32%	99.92%	97.73%
	b) % call answered by operators(voice to voice) within 60 sec.	<i>>=90%</i>	81.17%	91.96%	96.43%	84.89%	88.72%	90.68%	90.68%	95.58%	90.29%	92.85%
	c) Total no. of call attempts to call centre & customer care nos. during TCBH (Avg.).		72,793	55,028	84	569	5,912	354	354	1,945	721	2,784
	d) No. of calls connected and answered successfully to call centre & customer care nos. during TCBH (Avg.).		59,088	50,601	81	483	5,245	321	321	1,859	651	2,585
10	Termination/closure of service	<i><=7days</i>	100%	100%	100%	100%	100%	NA	NA	100%	NA	100%
	a) Total No. of requests for Termination / Closure of service received during the quarter		981	812	3,056	241	285	NA	NA	726	NA	595
	b) No.of requests for Termination / Closure of service complied within 7 days during the quarter		981	812	3,056	241	285	NA	NA	726	NA	595
11	Time taken for refunds of deposits after closures.	<i>100% within 60 days</i>	100%	100%	100%	100%	100%	NA	NA	100%	NA	100%

NA: Not Applicable, NP: Data Not Provided

Parameter-wise Findings (Month Data Assessment):

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

- **BTS accumulated downtime (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values laying between 0.01% and 1.93%.
- **Worst affected BTSs due to downtime (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values laying between 0% and 1.59%.
- **Call setup success rate (benchmark $\geq 95\%$):** All operators are meeting the benchmark with values laying between 98.09% and 99.88%.
- **SDCCH/PAGING Channel congestion (benchmark $\leq 1\%$):** All operators are meeting the benchmark with values laying between 0.00% and 0.88%.
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 laying between 0% and 1.51%.
- **Call drop rate (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values laying between 0.27% and 1.08%.
- **Cell exceeding 3% TCH drop (benchmark $\leq 3\%$):** Airtel, BSNL, Tata GSM, & Vodafone with a value of 4.96%, 7.50%, 5.11% & 3.69% respectively are not meeting the benchmark. Rests of the operators are satisfying the benchmark with value in between 0.01% and 2.86%.
- **Connections with good voice quality (benchmark $\geq 95\%$):** Tata CDMA service provider has declared that the parameter is not system generated. Rest of the GSM operators are meeting the benchmark with values lying between 95.24% and 100%
- **POI Congestion (benchmark $\leq 0.5\%$):** All the operators are meeting the benchmark with Except BSNL which is not meeting the required benchmark by exceeding in one POI. Here POI congestion indicates that there were call failure greater than 0.5% on that particular POI. The calls here indicate only those calls which have been seized by the switch and processed. But cases are found where individual POIs are showing high utilization/usage which are managed by overflow technique i.e. extra traffic is carried over by some other operating POI as has been designed to do so.
- **%age of call answered by operator (electronically) (benchmark >95):** Airtel (83%), BSNL (92.17%)& Vodafone (70.32%) are not meeting the benchmark. All other operators are meeting the benchmark with values laying between 95.38% and 100%.
- **%age of call answered by operator (Voice to voice) (benchmark >90):** Airtel (81.17%), Idea (84.89%) & Rcom GSM (88.72%) are not meeting the benchmark. Other operators are meeting the benchmark with values laying between 90.29% and 96.43%.
- **Metering and billing credibility-Post paid (benchmark $\leq 0.1\%$):** All operators are meeting the benchmark with values laying between 0.01% and 0.10% except Airtel (0.16%).
- **Metering and billing credibility-Pre paid (benchmark $\leq 0.1\%$):** All the operators are meeting the benchmark with values laying between 0% and 0.05%.
- **Resolution of billing/ charging complaints (benchmark 100% within 4 weeks):** All operators are meeting the benchmark.
- **Termination/Closure of service (Benchmark ≤ 7 days):** All operators have satisfied the benchmark.
- **Time taken for refunds of deposits after closures (benchmark 100% within ≤ 60 days):** All operators have satisfied the benchmark.

3) Sample Coverage

Switches/BSC/BTS details of operators:

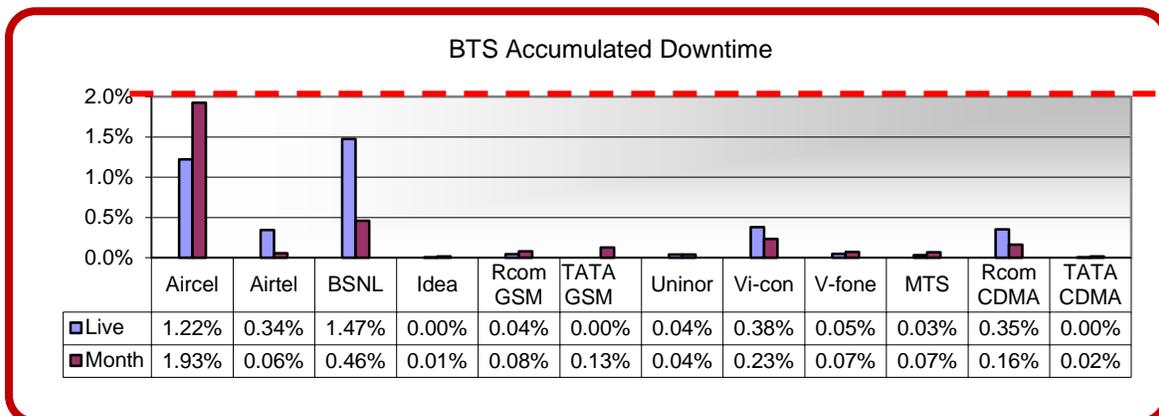
Sl.	Name of Service Provider	No. of MSC/GMSC	No. of BSC	No. of BTS
GSM Operators				
1	Aircel Ltd	10	62	6039
2	Airtel Ltd	34	88	8604
3	BSNL	21	76	5272
4	Etisalat	No Audit		
5	Idea	2	17	3356
6	Reliance Communication (GSM)	3	14	2830
7	Tata Communications (GSM)	3	18	3145
8	Uninor	8	16	2396
9	Videocon	1	17	2911
10	Vodafone	14	98	6875
CDMA Operators				
11	MTS (CDMA)	2	5	1232
12	Reliance Communication (CDMA)	6	5	1718
13	Tata Communications (CDMA)	2	12	737

4) Performance (Graphical Representation)

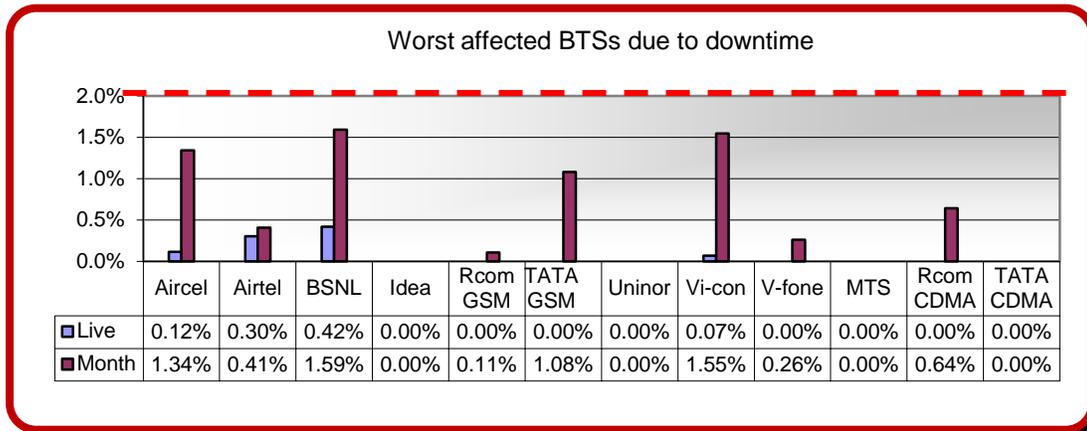
Comparison between Live measurements and One month data Audit – Cellular Mobile Telephone Services

A) NETWORK PERFORMANCE

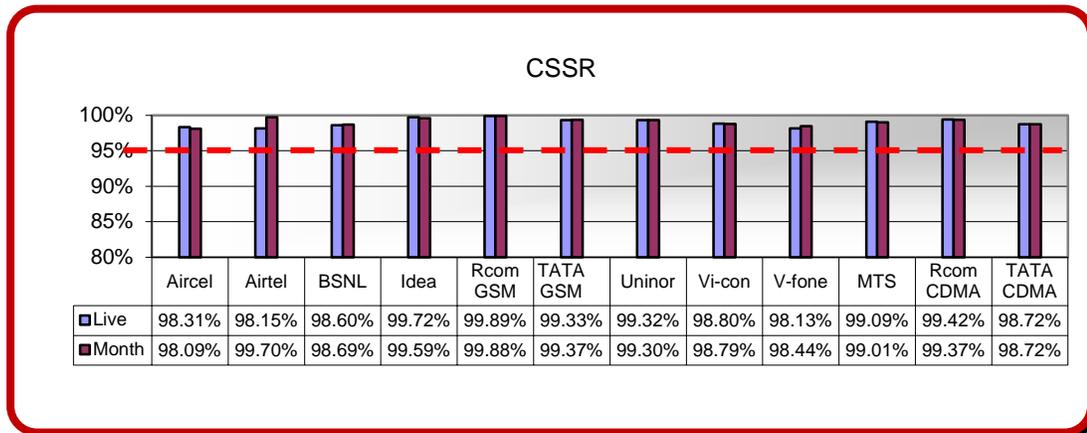
BTS Accumulated Downtime: All operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data taken in the month of audit.



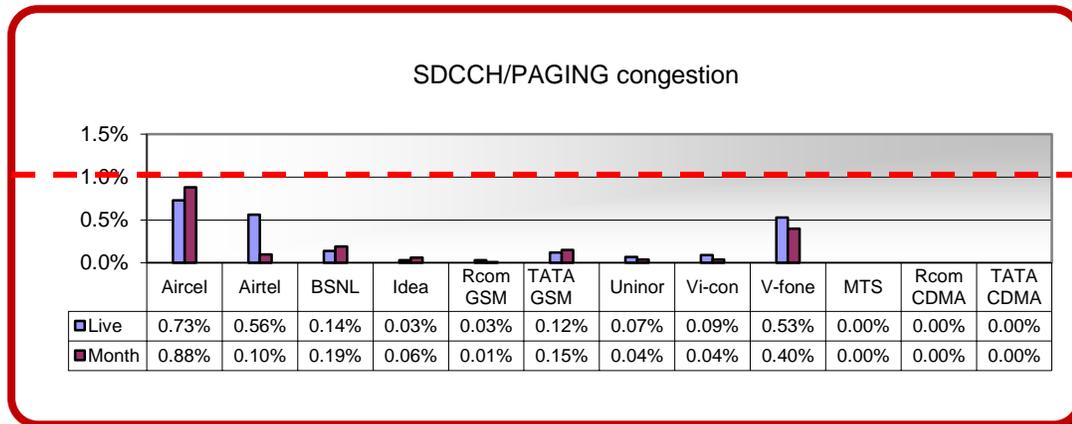
Worst affected BTSs due to downtime: All operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data taken in the month of audit



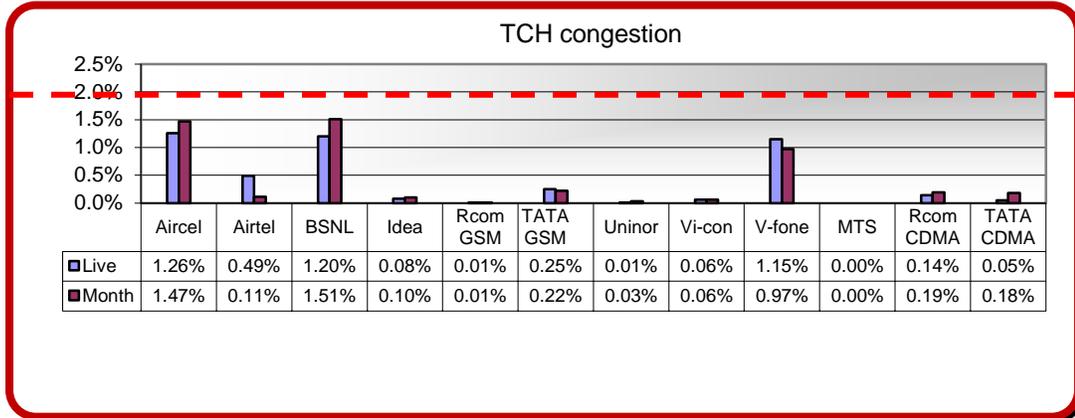
Call setup success rate($\geq 95\%$): All operators are meeting the TRAI benchmarks ($\geq 95\%$) for both one month data and 3 days live data taken in the month of audit.



Blocked call rate:
SDCCH congestion (1%): 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.

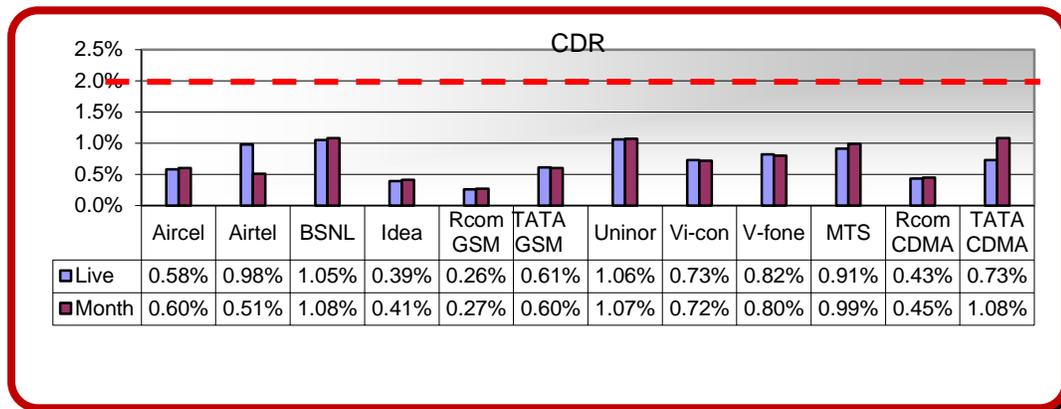


TCH congestion (2%): All operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data taken in the month of audit.

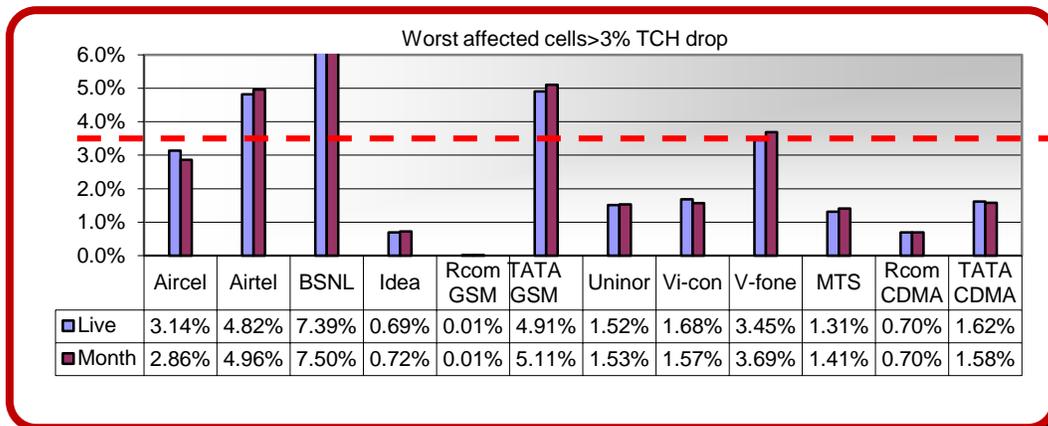


Connection Maintainability (Retainability):

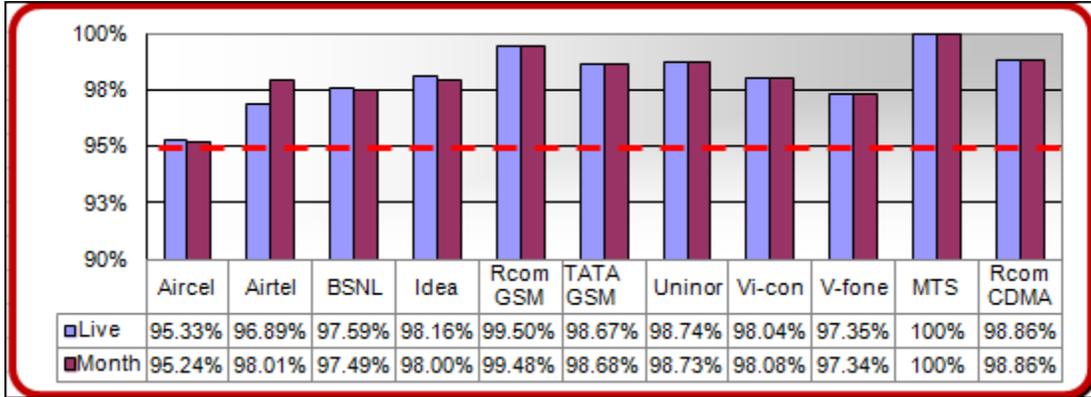
Call drop rate (2%): All operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data taken in the month of audit.



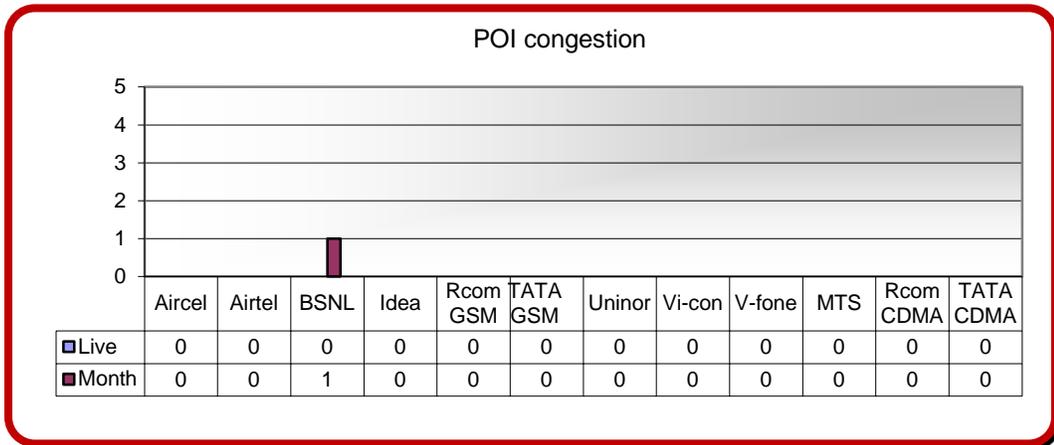
Worst affected Cell exceeding 3% TCH Drop: Aircel for live and Airtel, BSNL, Tata GSM & Vodafone for both live and month data are found not meeting the benchmark of $\leq 3\%$.



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



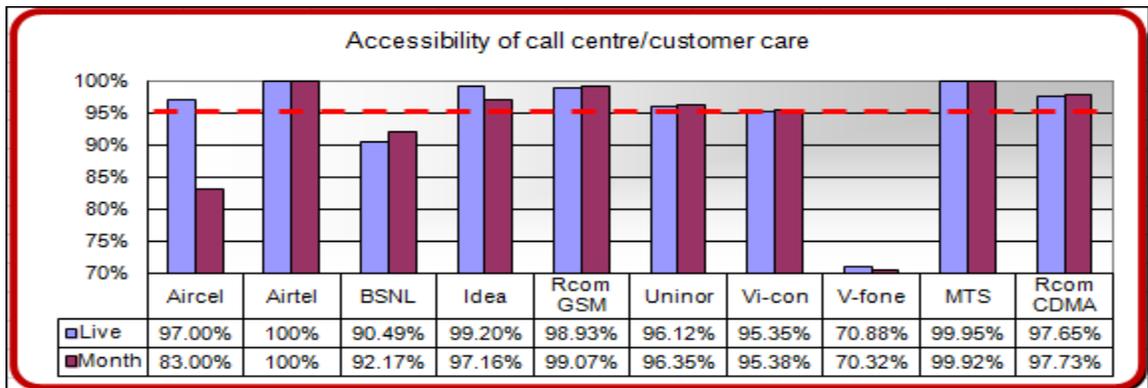
POI Congestion: BSNL not meeting this benchmark ($\leq 0.5\%$) for month audit. Other operators are meeting the benchmark for both one month data and 3 days live data taken in the month of audit.



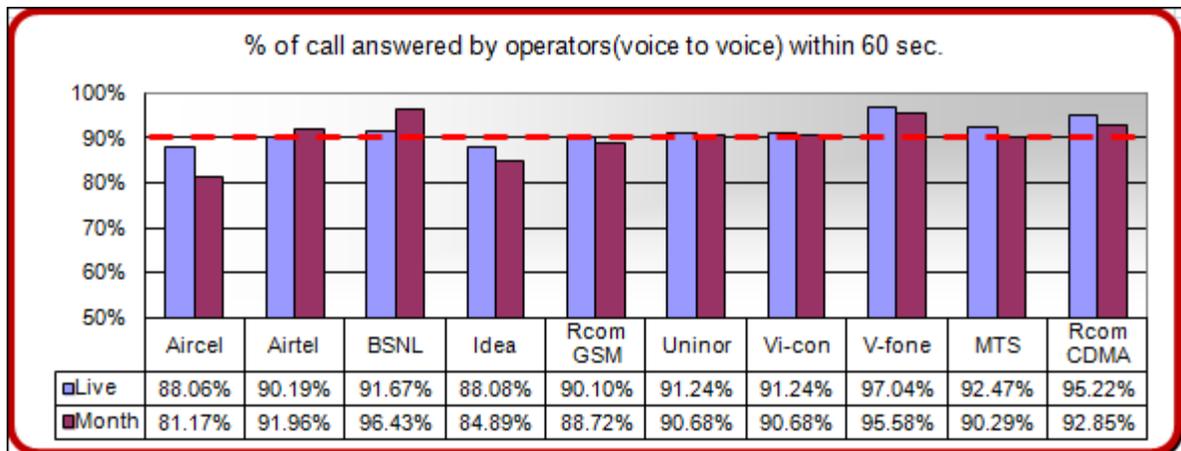
B) CUSTOMER SERVICE QUALITY PARAMETERS

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 except for Aircel for month audit and BSNL & Vodafone for both live and month data audit. Tata GSM and CDMA included in Chennai.



Percentage of call answered by operators (Voice to voice) within 60 sec: Rcom GSM for month audit and Aircel & Idea for both live both Live and month audit are not meeting the benchmark. Tata GSM and CDMA included in Chennai.



5) Critical Analysis

The above comparative study between live data & month data shows similar trends in both the cases. However, inconsistency in live & month data was found for certain parameters like “BTS Accumulated Downtime” (Aircel & BSNL), “Worst affected BTSs due to downtime” (Aircel & BSNL), “Accessibility of call centre/Customer Care (Aircel).

(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)

Q1 - 2012 Tamil Nadu Circle Billing Complaints Customer Feedback Calls												
Calling Operator	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA
Total No. of Calls Attempted	124	130	120	110	118	NA	106	109	136	33	116	NA
Total No. of calls Answered	100	100	100	100	100	NA	100	100	100	30	100	NA
Cases resolved with 4 weeks	100	100	100	100	100	NA	100	100	100	30	100	NA
%age of cases resolved	100%	100%	100%	100%	100%	-	100%	100%	100%	100%	100%	-
Note: During the verification in some cases we could not get answer from subscriber. However, those whom we contacted have confirmed their complaint and subsequently solved by the operator. Tata GSM and CDMA complaints included in Chennai Circle. For MTS total number of complaints only 33.												

3) Performance (live calling to Call Centre)

Q1 - 2012 Tamil Nadu Circle Call Centre Test Calls												
Calling Operator	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA
Call Centre No.	121	121	1503	12345	333	*121	198	121	111	155	*333	*121
Total No. of Calls Attempted	200	200	200	200	200	200	100	100	200	100	200	200
Total No. of calls connected to IVR	200	200	200	200	200	200	100	100	200	100	200	200
Calls got connected to agent within 60 Sec	200	200	198	200	200	200	100	100	200	100	200	200
%age of calls got answered	100%	100%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%
NOTE: Calls were made from the Operators place. All the calls were connected within 60 seconds except BSNL (198). 200 calls total made i.e. 100 each for Prepaid and Post paid except Uninor, Videocon & MTS who have only Prepaid services.												

4) Performance (level 1 calling)

Q1-2012 Tamil Nadu Circle Level 1 calling														
Emergency calls were made at Chennai and Coimbatore at Operators office for all the category . However, 100 &101 were taken in Kancheepuram, Pondicherry &Viluppuram and and below given is the success rate.														
Mobile														
Emergency no.	No. of calls made	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA	
Kancheepuram														
100	4	4	4	4	4	4	4	4	4	4	4	4	4	Police
101	4	4	4	4	4	4	4	4	4	4	4	4	4	Fire service
102	1	1	1	1	1	1	1	1	1	1	1	1	1	Ambulance
108	1	1	1	1	1	1	1	1	1	1	1	1	1	Emergency Ambulance
139	2	2	2	2	2	2	2	2	2	2	2	2	2	Railway Enquiry
Pondicherry														
100	4	4	4	4	4	4	4	4	4	4	4	4	4	Police
101	4	4	4	4	4	4	4	4	4	4	4	4	4	Fire service
102	1	1	1	1	1	1	1	1	1	1	1	1	1	Ambulance
108	1	1	1	1	1	1	1	1	1	1	1	1	1	Emergency Ambulance
139	2	2	2	2	2	2	2	2	2	2	2	2	2	Railway Enquiry
Viluppuram														
100	4	4	4	4	4	4	4	4	4	4	4	4	4	Police
101	4	4	4	4	4	4	4	4	4	4	4	4	4	Fire service
102	1	1	1	1	1	1	1	1	1	1	1	1	1	Ambulance
108	1	1	1	1	1	1	1	1	1	1	1	1	1	Emergency Ambulance
139	2	2	2	2	2	2	2	2	2	2	2	2	2	Railway Enquiry

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 100% in most of the cases as claimed by their records. For Tata CDMA and Tata GSM it is already included in Chennai.

Calls were made from Operators office at Chennai and Coimbatore for Call Centre test calls. 200 calls total made i.e. 100 each for Prepaid and Post paid except Uninor, Videocon & MTS as these operators are having prepaid services only. Call centre calls were successfully connected within the 60 seconds time for all the operators.

All the level 1 calls were also answered by the agent and found as per requirement. It was confirmed from the called party that the location was nearer to the calling place. However there were occasion calls were not answered in case of Level-1 calling for emergency nos. 100, 101 & 102.

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

A sample of 2x50 test calls per Service Providers with in the licensed service area (Tamilnadu Circle) were made between 1100 to 1400 hrs and between 1600 to 1900 hrs so that TCBH hours for all the operators were covered.

2) Performance based on live measurement

Calling Operator	Aircel	Airtel	BSNL	Idea	Reliance (GSM)	Tata (GSM)	Uninor	Videocon	Vodafone	MTS	Reliance (CDMA)	Tata (CDMA)
Aircel	-	100%	100%	100%	100%	100%	98%	100%	100%	100%	100%	100%
Airtel	100%	-	100%	100%	100%	100%	100%	100%	100%	99%	100%	100%
BSNL	100%	100%	-	100%	99%	100%	100%	100%	100%	100%	100%	100%
Idea	100%	100%	100%	-	100%	100%	100%	100%	100%	100%	100%	100%
Reliance (GSM)	100%	100%	100%	100%	-	100%	100%	100%	100%	100%	100%	100%
Tata (GSM)	100%	100%	100%	100%	100%	-	100%	100%	100%	100%	100%	100%
Uninor	100%	100%	100%	99%	100%	100%	-	100%	100%	100%	100%	100%
Videocon	100%	100%	100%	100%	100%	100%	100%	-	100%	100%	100%	99%
Vodafone	100%	100%	100%	100%	100%	100%	100%	100%	-	100%	100%	100%
MTS	100%	100%	100%	100%	100%	100%	100%	100%	100%	-	100%	100%
Reliance (CDMA)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	-	100%
Tata (CDMA)	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 Tamilnadu for all the operators. Route covered was about around 100-125Km depending on city areas within the speed limit of 30Km/hr.

Drive Test Locations***KANCHEEPURAM***

LOW DENSE: KEELAMBI, THIRUMALAI ENGG COLLEGE, N.H ROAD, GANDHIROAD, SEVILIMEDU, PSK NAGAR, THIRUMETRALEESWAR TEMPLE, KAILASANATHAR TEMPLE, PERIYA KANCHEEPURAM

MEDIUM DENSE: OLIMUHAMMED PETTAI, MADA VEEDHI, T.K. NAMBI THERU, MUTHIYALPET, AALADI, VELLAIKULAM, WEST RAJA STREET, LINGAPPA STREET, YEGAMBARAM MADHAVEEDHI.

HIGH DENSE: BSNL OFFICE, MALIGAI STREET, JAWAHARLAL ST., RAILWAY ROAD, GANDHI ROAD, KUMARASAMY LAYOUT, NELLUKARA STREET. PANDAVAR PERUMAL KOIL ST., VANEEGAR VEETHI, KAMARAJ SALAI

PONDICHERRY

LOW DENSE: AJEEZ NAGAR, ECR ROAD, CUDDALUR ROAD, AYYANGUTTIPALAYAM, SIVAJI STATUE ROAD, ARIYUR

MEDIUM DENSE: PONDICHERRY UNIVERSITY, INDIRA GANDHI MEDICAL COLLEGE, ARAVIND ASHRAMAM, ARIYANKUPPAM, VUILLIYANUR

HIGH DENSE: BSNL OFFICE, LENIN STREET, ANNA SALAI, NEHRU STREET, BEACH ROAD, SIVAJI STATUE ROAD,

VILUPPURAM

LOW DENSE: IFET, KOLIYANUR, PIDAGAM, ARASUR, IRUVELPATTU, E.S ENGG COLLEGE, BYEPASS, TOWARDS CHENNAI BYEPASS

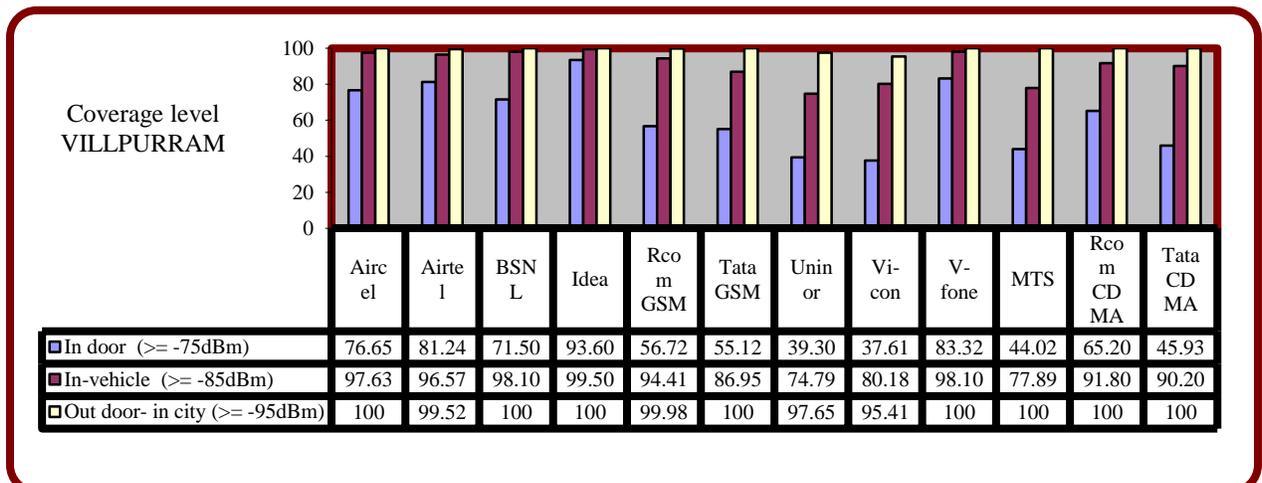
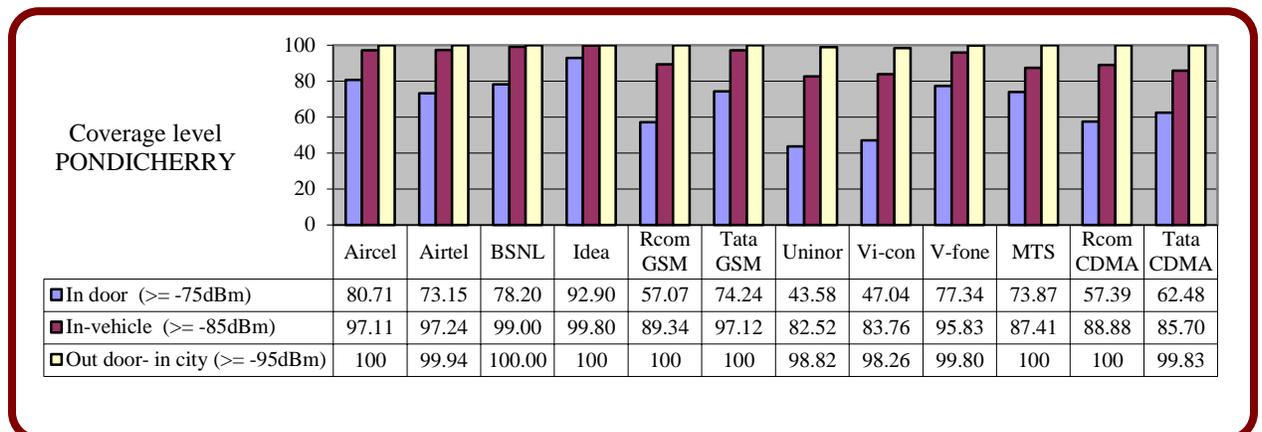
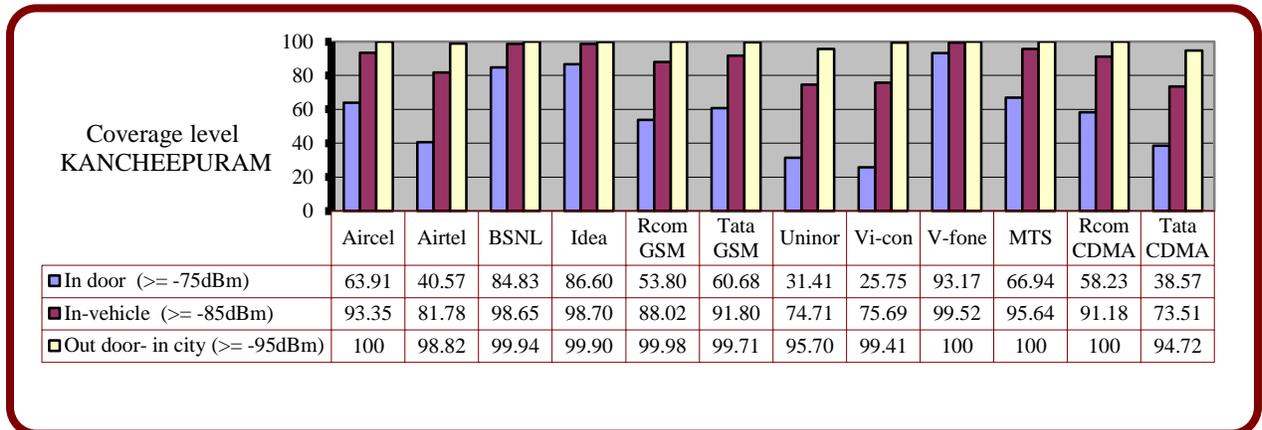
MEDIUM DENSE: ELUMALAI POLYTECHNIC COLLEGE, ESP COLONY, ARTS COLLEGE, TOWARDS THIRUKOVILUR ROAD, TOWARDS SENJI ROAD

HIGH DENSE: RAILWAY OVER BRIDGE, K.K ROAD, BUS STAND, COURT ROAD, DPTC, ARCHANA HOTEL, THIRUKOVILUR ROAD

2) Performance (for the respective cities)

SN	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Uninor	Vi-con	V-fone	MTS	Rcom CDMA	Tata CDMA	
			GSM Operators									CDMA Operators			
1.1	Call Attempts	Kancheepuram	171	180	191	175	198	179	173	189	179	189	196	193	
		Pondicherry	162	187	161	169	182	179	183	174	160	175	182	176	
		Viluppuram	154	161	143	160	155	162	159	163	159	168	173	175	
1.2	Blocked Call Rate (<=3%)	Kancheepuram	0	0	0	1.14	0	0	1.16	1.59	0	0	0	0	
		Pondicherry	0	0	0.62	1.18	0	0	1.09	1.72	0.63	0	0	1.14	
		Viluppuram	0	0	1.40	1.88	0	0	0	0.61	0.63	0	0	1.14	
1.3	Dropped Call Rate (<=2%)	Kancheepuram	0	0	0	0	0	0	1.73	0	0	0	0	0	
		Pondicherry	0	0	0.62	0	0.55	0	0	0	0	0	0.55	1.14	
		Viluppuram	0	0	0.70	0	0	0	0.00	0	0	0	0	0	1.14
1.4	Percentage of connections with good voice quality (=>95%)														
	(i) 0-4 (w/o frequency hopping)	Kancheepuram											99.63	98.35	99.66
		Pondicherry											99.35	96.69	97.26
		Viluppuram											99.32	98.05	99.67
	(ii) 0-5 (with frequency hopping)	Kancheepuram	97.00	95.60	97.31	95.00	97.98	98.72	88.01	95.08	93.40				
		Pondicherry	97.80	95.40	97.40	95.00	96.48	96.87	97.27	96.31	95.70				
Viluppuram		95.10	95.20	97.20	96.00	98.04	96.93	96.89	95.00	95.20					
1.5	Service Coverage														
	In door (>= -75dBm)	Kancheepuram	63.91	40.57	84.83	86.60	53.80	60.68	31.41	25.75	93.17	66.94	58.23	38.57	
		Pondicherry	80.71	73.15	78.20	92.90	57.07	74.24	43.58	47.04	77.34	73.87	57.39	62.48	
		Viluppuram	76.65	81.24	71.50	93.60	56.72	55.12	39.30	37.61	83.32	44.02	65.20	45.93	
	In-vehicle (>= -85dBm)	Kancheepuram	93.35	81.78	98.65	98.70	88.02	91.80	74.71	75.69	99.52	95.64	91.18	73.51	
		Pondicherry	97.11	97.24	99.00	99.80	89.34	97.12	82.52	83.76	95.83	87.41	88.88	85.70	
		Viluppuram	97.63	96.57	98.10	99.50	94.41	86.95	74.79	80.18	98.10	77.89	91.80	90.20	
	Outdoor- in city (>= -95dBm)	Kancheepuram	100	98.82	99.94	99.90	99.98	99.71	95.70	99.41	100	100	100	94.72	
		Pondicherry	100	99.94	100	100	100	100	98.82	98.26	99.80	100	100	99.83	
Viluppuram		100	99.52	100	100	99.98	100	97.65	95.41	100	100	100	100		
1.6	Call Setup Success Rate (>=95%)	Kancheepuram	100	100	100	98.86	100	100	98.83	98.41	100	100	100	100	
		Pondicherry	100	100	99.38	98.80	100	100	98.91	98.28	99.38	100	100	98.17	
		Viluppuram	100	100	98.60	98.12	100	100	100	99.39	99.37	100	100	99.21	

Graphical Representation



(3) Critical Analysis

The drive test data is found to be good for most of the parameters for all the operators. However, deviations found in Good Voice Quality parameter, they are listed below:

Good Voice Quality parameter is not met by UNINOR & VODAFONE in KANCHEEPURAM.

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

The Independent Drive Test was conducted in three cities / towns in Tamilnadu for the Q1 - 2012 as directed by TRAI. The cities/ towns covered were Virudunagar (Vodafone), Sivaganga (Tata GSM) & Nagarcoil (MTS). Drive test in **Ramanathapuram** could not be conducted as Videocon is having connectivity through ICR arrangements with Tata GSM. Route covered varies from place to place varying 45 Kms to 107 Kms depending on city area within the speed limit of 30Km/hr. In all the cities / towns, zones were selected for covering different density areas (High, Medium & Low dense areas).

Drive Test Locations and Service provider's name:

- | | | |
|----------------|---|-----------------|
| 1) Nagarcoil | - | <u>MTS</u> |
| 2) Sivaganga | - | <u>Tata GSM</u> |
| 3) Virudunagar | - | <u>Vodafone</u> |

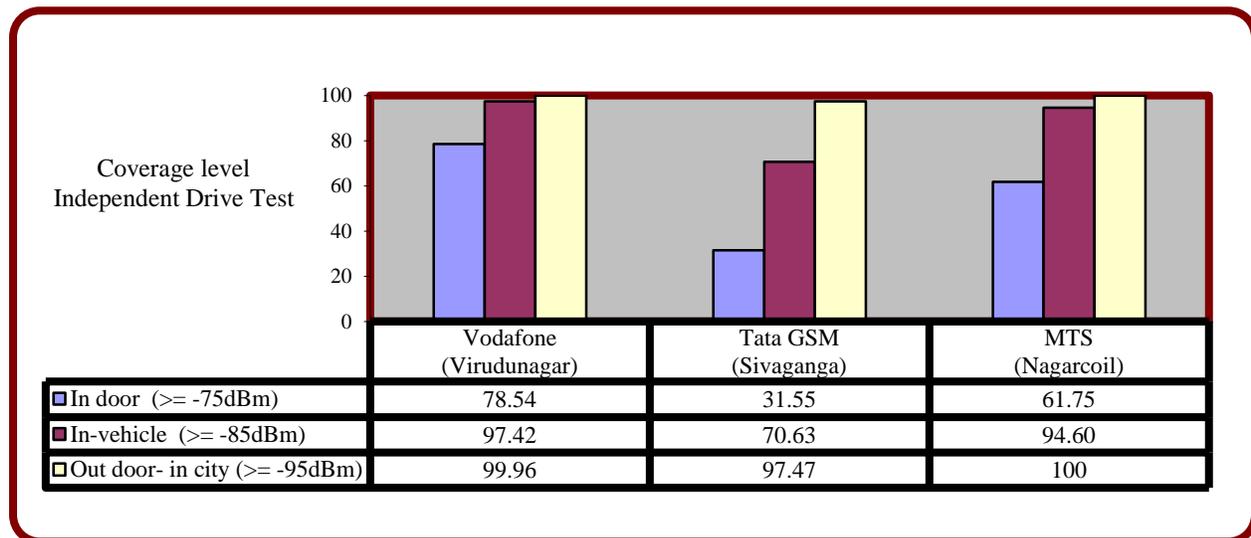
Area Coverage details:

- | | | |
|----------------|---|---|
| 1) Nagarcoil | - | SIMON NAGAR ,VADASERY,GANESHPURAM, PALLIVILA, ACHHARIPALLAM-SIMANNAGAR, PARAKAI JUNCTION, RAMAPURAM,ACHARIPALLAM |
| 2) Sivaganga | - | THONDI ROAD, POLICE QUARTERS, MADURAI ROAD, MANAMADURAI ROAD. DISTRICT COURT, COLLECTOR OFFICE, MELUR ROAD, RTO OFFICE, BAZAR, BUS STAND, MADURAI ROAD JUNCTION, TEPPAKULAM |
| 3) Virudunagar | - | OLD BUS STAND, BSNL OFFICE, KAMARAJ NAGAR, RAMAMOORTHY ROAD, BIG STREET, KATCHERY ROAD, UZHAVAR SANDHAI, RAILWAY FEEDER ROAD, TKSP NAGAR, RAMACHANDRA NAGAR, NANDHAVAN SALAI, ROSHALPATTY ROAD, LAKSHMI NAGAR, RADHAKRISHNAN ROAD, PARALI ROAD, ROSHALPATTY, KKSSN NAGAR, NPPV NAGAR, PANDIAN NAGAR |

2) Independent Drive Test (Performance)

SN	Parameter	Vodafone (Virudunagar)	Tata GSM (Sivaganga)	MTS (Nagarcoil)
1.1	Call Attempts	117	56	163
1.2	Blocked Call Rate (<=3%)	0	1.79	0
1.3	Dropped Call Rate (<=2%)	0	0	0
1.4	Percentage of connections with good voice quality (=>95%)			
	(i) 0-4 (w/o frequency hopping)			99.86
	(ii) 0-5 (with frequency hopping)	95.10	99.35	
1.5	Service Coverage			
	In door (>= -75dBm)	78.54	31.55	61.75
	In-vehicle (>= -85dBm)	97.42	70.63	94.60
	Outdoor- in city (>= -95dBm)	99.96	97.47	100
1.6	Call Setup Success Rate (>=95%)	100	100	98.67

Graphical Representation



3) Critical Analysis

On verifying the data from the Independent drive test conducted in Tamil Nadu it is found that all the operators are meeting the benchmark in all the four places.

F) 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 (Tamilnadu) is satisfactory for **Network Parameters**. However, the benchmark of $\leq 3\%$ for “worst affected cells $> 3\%$ TCH drop” is not met by **Airtel, BSNL, Tata GSM & Vodafone** for both live and month data and **Aircel** for live audit.

Under **Customer Service Quality Parameter** “operator answered calls (voice-to-voice) within 60 seconds” parameter it is found that **Aircel, Idea & Rcom GSM** are not fulfilling TRAI benchmark of $\geq 90\%$. Apart from this, the “accessibility of call centre” parameter benchmark is not met by **Aircel, BSNL & Vodafone**.

Regarding **Metering/Billing Credibility** issues, it is noticed improvement with all the operators. All the operators are meeting the benchmark for both Pre Paid and Post Paid except Aircel in Post paid..

During **Drive Tests (Operator Assisted)** it is noticed that most of the parameters were found to be in order in all the three cities for all the Operators. However slight deviation was found in Good Voice Quality parameter is not met by UNINOR & VODAFONE in KANCHEEPURAM. In the case of Independent Drive Test it is noticed that all the parameters were met by all those operators to whom the test was carried out within that city / town limit.