

REPORT
ON
AUDIT & ASSESSMENT OF QUALITY OF SERVICE
OF
CELLULAR MOBILE TELEPHONE SERVICE
FOR
SOUTH ZONE – TAMILNADU CIRCLE

Report Period: October 2011 – December 2011

Telecommunications Consultants India Ltd.
TCIL Bhawan, Greater Kailash Part – I
New Delhi – 110048
Phone: +91-11-26202020 Fax: +91-1126242266
Internet: <http://www.tcil-india.com>

Table of Contents

CHAPTER-1: Introduction

- I. Background
- II. Objectives and Methodology

CHAPTER-2: Executive Summary

- I. Preface
- II. Findings from Quality of Service Audit (Operator wise for each parameter)
 - (A) Cellular Mobile Telephone Service Providers
 - 3 days Live Data Audit
 - One Month Data Audit
 - Operator Assisted Drive Test
 - Independent Drive Test
 - (B) Basic Telephone Service (Wireline) Providers
 - *Not conducted for this quarter*
 - (C) Broadband Service Providers
 - *Not conducted for this quarter*

CHAPTER-3: Audit-PMR data verification results

- I. Cellular Mobile Telephone Service
- II. Basic Telephone Service (Wireline) Providers
 - *Not conducted for this quarter*
- III. Broadband Service Providers
 - *Not conducted for this quarter*

CHAPTER-4: Detailed Findings & Analysis

- I. Cellular Mobile Telephone Service
 - (A) **MSC audit**
 - 1) 3 days live measurement data assessment & summarized findings
 - 2) One month audit data report & summarized findings
 - 3) Sample coverage
 - 4) Performance (Graphical Representation)
 - 5) Critical Analysis
 - (B) **Redressal**
 - 1) Sample coverage
 - 2) Performance based on live calling for billing complaints
 - 3) Live calling to call centre
 - 4) Level 1 Calling
 - 5) Critical Analysis

(C) Inter operator call assessment

- 1) Sample coverage
- 2) Performance based on live measurement
- 3) Critical Analysis

(D) Drive test of the mobile network of service providers

- 1) Sample Coverage
- 2) Performance (for the respective cities)
- 3) Critical Analysis

(E) Independent Drive Test

- 1) Sample coverage
- 2) Performance (for the respective cities)
- 3) Critical Analysis

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

II. Basic Telephone Service (Wireline) Providers

- 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.
- vii) Emergency (Level 1) Call Testing done.

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 Tamilnadu Circle in 4th quarter (October - December 2011). The primary data collection and verification of records (PMR data verification – quarterly) maintained by various operators was undertaken during the period April- June 2011.

Following are the various operators covered in Mumbai circle (West 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	November-2011	1900-2000 hrs
2	Airtel Ltd	November-2011	1900-2000 hrs
3	BSNL	November-2011	1900-2000 hrs
4	Etisalat	November-2011	1900-2000 hrs
5	Idea	November-2011	1900-2000 hrs
6	Reliance Communication (GSM)	November-2011	2000-2100 hrs
7	Tata Communications (GSM)	November-2011	1900-2000 hrs
	Uninor	November-2011	1900-2000 hrs
8	Videocon	November-2011	1900-2000 hrs
9	Vodafone	November-2011	1900-2000 hrs
CDMA Operators			
12	MTS	November-2011	1900-2000 hrs
13	Reliance Communication (CDMA)	November-2011	2000-2100 hrs
14	Tata Communications (CDMA)	November-2011	1900-2000 hrs

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	Etisalat	Idea	Rcom GSM	TATA GSM	Uninor	Vi- con	V- fone	MTS	Rcom CDMA	TATA CDMA
S/N	Name of Parameter														
1	Network Availability														
	a) BTS Accumulated Downtime	<=2%	0.80%	0.05%	1.01%	0.10%	0.01%	0.01%	0.04%	0.04%	0.01%	0.04%	0.07%	0.02%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	0.02%	0.02%	0.34%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
2	Connection Establishment (Accessibility)														
	a) CSSR (Call Setup Success Rate)	>=95%	99.00%	98.54%	98.58%	99.30%	99.70%	99.84%	99.31%	99.29%	98.56%	98.47%	99.40%	99.47%	98.29%
	b) SDCCH/PAGING congestion	<=1%	0.51%	0.26%	0.06%	0.33%	0.01%	0.05%	0.11%	0.39%	0.02%	0.29%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	0.61%	0.32%	0.47%	0.00%	0.04%	0.01%	0.27%	0.31%	0.08%	0.99%	0.00%	0.13%	0.22%
3	Connection maintenance (retainability)														
	a) CDR	<=2%	0.58%	1.09%	1.12%	0.52%	0.45%	0.35%	0.65%	1.18%	0.97%	0.85%	0.61%	0.56%	0.89%
	b) Worst affected cells>3% TCH drop	<=3%	3.25%	6.13%	8.04%	3.27%	0.95%	0.06%	5.93%	1.51%	1.55%	4.15%	2.05%	0.24%	1.09%
	c) Good voice quality	>=95%	95.30%	96.73%	97.81%	98.14%	98.15%	99.37%	98.51%	98.70%	97.97%	97.06%	100.00%	NA	
4	No of POI having congestion	>=0.5%	0	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%	92%	100%	100%	100%	99%	98%	INCLUDED IN CHENNAI REPORT	97%	100%	64%	100%	98%	INCLUDED IN CHENNAI REPORT
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	85%	81%	92%	97%	67%	90%		99%	100%	76%	97%	98%	

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 by and large. However deviation was found with AIRCEL, AIRTEL, BSNL, ETISALAT, TATA GSM, & VODAFONE in respect of parameter "worst affected cells >3% TCH drop".

Customer care data is found to be satisfactory.

1. AIRCEL & VODAFONE are not meeting the benchmark for the parameter "Accessibility of call centre/Customer Care".

2. AIRCEL, AIRTEL, IDEA & VODAFONE are not meeting the benchmark for the parameter "calls answered by operators (voice-to-voice)".

One Month Data Audit		B-mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	TATA GSM	Uninor	Vi-con	V-fone	MTS	Rcom CDMA	TATA CDMA
S/N	Name of Parameter														
(A)	Network Service Quality Parameter														
1	Network Availability														
	a) BTS Accumulated Downtime	<=2%	0.78%	0.08%	0.54%	0.03%	0.01%	0.06%	0.07%	0.04%	0.02%	0.04%	0.07%	0.08%	0.02%
	b) Worst affected BTSs due to downtime	<=2%	0.55%	0.26%	1.98%	0.00%	0.00%	0.04%	0.00%	0.00%	0.00%	0.13%	0.00%	0.00%	0.00%
	c) Total no. of BTSs in the licensed service area		6031	8560	5250	51	3329	2821	3133	2416	2968	6786	1169	1699	732
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		34068	4718	20343	13	266	1259	1532	781	458	2096	612	1001	125
	e) No. of BTSs having accumulated downtime of >24 hours in a month		33	22	104	0	0	1	0	0	0	9	0	0	0
2	Connection Establishment (Accessibility)														
	a) CSSR (Call Setup Success Rate)	>=95%	98.92%	98.35%	98.61%	99.30%	99.65%	99.85%	99.28%	99.27%	98.51%	98.42%	99.30%	99.39%	98.66%
	b) SDCCH/PAGING congestion	<=1%	0.48%	0.38%	0.09%	1.01%	0.02%	0.06%	0.14%	0.08%	0.03%	0.35%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	0.63%	0.33%	0.46%	0.00%	0.06%	0.02%	0.28%	0.01%	0.07%	1.00%	0.00%	0.20%	0.21%
3	Connection maintenance (retainability)														
	a) CDR	<=2%	0.60%	1.20%	1.13%	0.55%	0.45%	0.34%	0.68%	1.22%	1.03%	0.90%	0.71%	0.59%	0.81%
	b) Worst affected cells>3% TCH drop	<=3%	2.94%	7.81%	8.50%	1.31%	1.12%	0.07%	6.25%	1.70%	1.65%	4.49%	2.07%	0.26%	1.04%
	c) Good voice quality	>=95%	95.09%	96.57%	98.18%	98.37%	98.02%	99.40%	98.44%	98.68%	97.93%	96.99%	100.00%	NA	NA
4	No of POI having congestion	>=0.5%	0	0	0	0	0	0	0	0	0	0	0	0	0
(B)	Customer Service Quality Parameters														
5	Metering/billing credibility-Post paid	<= 0.1%	0.07%	0.01%	0.06%	NA	0.06%	0.10%	INCLUDED IN CHENNAI REPORT	NA	NA	0.03%	NA	0.07%	INCLUDED IN CHENNAI REPORT
6	Metering /billing credibility-Pre paid	<= 0.1%	0.04%	0.02%	0.01%	0.00%	0.03%	0.05%		0.00%	0.03%	0.03%	0.01%	0.01%	
7	Resolution of billing/ charging complaints	100% within 4 weeks	100%	100%	100%	NA	100%	100%		100%	100%	100%	100%	100%	
	a) Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	<=1 week	100%	100%	100%	NA	100%	100%		100%	100%	100%	100%	100%	
8	Response time to customers for assistance														
	a) Accessibility of call centre/Customer Care	>=95%	84%	100%	100%	100%	98%	98%		97%	100%	65%	100%	98%	
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	92%	84%	99%	100%	61%	88%		98%	100%	84%	94%	98%	
9	Termination/closure of service	<=7days	100%	100%	100%	NA	100%	100%		NA	NA	100%	NA	100%	
10	Time taken for refunds of deposits after closures.(within 60 days)	100%	100%	100%	100%	NA	100%	100%		NA	NA	100%	NA	100%	

NA: Not Applicable, NP: Data Not Provided

From the month data assessment, it is found that most of the operators are meeting the network parameters by and large. However deviation was found with AIRTEL, BSNL, TATA GSM & VODAFONE in respect of parameter "worst affected cells >3% TCH drop". Performance related to customer care, data is found to be satisfactory for most of the operators.

For the parameter "Accessibility of call centre/Customer Care" AIRCEL & VODAFONE and for "calls answered by operators (voice-to-voice)" AIRTEL, IDEA, RCOM GSM & VODAFONE are not meeting the benchmark performance.

Operator-Assisted Drive Test

The Operator Assisted Drive Test was conducted at Tamilnadu for all the operators. Route covered was about around 100-130Km depending on city areas within the speed limit of 30Km/hr. The cities covered were Erode, Tanjore and Vellore. 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%)	Erode	0.68	0	0	1.12	0	0	0.71	1.11	1.59	0	0	0
		Tanjore	0	0	0.74	0.56	0	0	0	1.11	0.60	0	0	0
		Vellore	0.65	0	2.04	1.14	0	0	2.31	0.56	0.62	0	0	0
1.2	Dropped Call Rate (<=2%)	Erode	0	0	0	0.56	0	0	0	1.67	0	0	0	1.16
		Tanjore	0	0	0	1.12	0	0	0	0	0	0	0	0
		Vellore	0	0	0	0	0	0	1.16	1.11	0	0	0	0
1.3	Percentage of connections with good voice quality (=>95%)													
	(i) 0-4 (w/o frequency hopping)	Erode	NA									98.95	97.99	98.16
		Tanjore	NA									99.79	99.26	99.93
		Vellore	NA									98.86	95.96	99.47
	(ii) 0-5 (with frequency hopping)	Erode	95.20	95.30	98.10	95.72	96.28	97.34	97.09	95.88	94.30	NA		
		Tanjore	95.40	95.10	91.79	95.00	96.35	97.20	95.75	96.69	96.20	NA		
Vellore		95.80	95.10	95.00	95.00	96.26	96.59	95.81	94.45	94.00	NA			
1.4	Call Setup Success Rate (>=95%)	Erode	99	100	100	99	100	100	100	97.78	98.41	100	100	100
		Tanjore	100	100	99.26	95	100	100	100	98.89	99.40	100	100	100
		Vellore	99	100	98	99	100	100	97.69	99.77	99.40	100	100	100

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

Good Voice Quality parameter is not met by VODAFONE in ERODE, BSNL in TANJORE and VIDEOCON & VODAFONE in VELLORE. All other parameters are found in order.

CHAPTER-3: Audit PMR data verification results

I. Cellular Mobile Telephone Service

PMR		Bench- mark	Audit	Aircel	Airtel	BSNL	Etisala t	Idea	Rcom	Tata	Unino r	Vi-con	Vo- fone	MTS	Rcom	Tata
S/N	Name of Parameter								GSM	GSM					CDM A	CDM A
									GSM Operators							
(A)	Network Service Quality Parameter															
1	Network Availability															
	BTS Accumulated Downtime	<=2%	Reported	0.26%	0.08%	0.43%	0.04%	0.01%	0.00%	0.02%	0.02%	0.07%	0.02%	0.15%	0.00%	0.02%
			Verified	0.26%	0.08%	0.43%	0.20%	0.01%	0.00%	0.00%	0.02%	0.07%	0.02%	0.06%	0.00%	0.02%
	Worst affected BTSs due to downtime	<=2%	Reported	0.23%	0.18%	1.53%	0.01%	0.00%	0.00%	0.00%	0.00%	0.01%	0.07%	0.41%	0.00%	0.00%
Verified			0.23%	0.18%	1.53%	0.65%	0.00%	0.00%	0.00%	0.00%	0.01%	0.05%	0.00%	0.00%	0.00%	
2	Connection Establishment (Accessibility)															
	CSSR (Call Setup Success Rate)	>=95%	Reported	99.00%	98%	99.00%	99%	99%	100%	98%	99%	99%	98%	99%	100%	98%
			Verified	99.00%	98%	99.00%	99%	99%	100%	98%	99%	99%	98%	99%	100%	98%
	SDCCH/PAGING congestion	<=1%	Reported	0.52%	0.51%	0.19%	0.25%	0.03%	0.00%	0.11%	0.04%	0.11%	0.00%	0.00%	0.00%	0.00%
			Verified	0.52%	0.51%	0.13%	0.25%	0.03%	0.00%	0.11%	0.04%	0.11%	0.31%	0.00%	0.00%	0.00%
	TCH congestion	<=2%	Reported	0.65%	0.38%	0.59%	0.00%	0.08%	0.00%	0.14%	0.02%	0.23%	0.01%	0.06%	0.00%	1.09%
Verified			0.65%	0.38%	0.48%	0.00%	0.08%	0.00%	0.14%	0.02%	0.23%	1.30%	0.00%	0.00%	1.09%	
3	Connection maintenance (retainability)															
	CDR	<=2%	Reported	0.47%	0.90%	0.71%	0.18%	0.64%	0.00%	0.56%	0.90%	1.06%	0.01%	0.85%	0.00%	1.25%
			Verified	0.47%	0.90%	0.71%	0.46%	0.64%	0.00%	0.56%	0.90%	1.06%	0.70%	0.67%	0.00%	1.25%
	Worst affected cells>3% TCH drop	<=3%	Reported	0.01%	0.02%	2.43%	1.46%	2.27%	0.00%	1.58%	0.82%	1.83%	0.02%	2.11%	0.00%	1.12%
			Verified	1.20%	1.87%	2.60%	4.28%	2.27%	0.00%	0.90%	0.82%	1.83%	1.59%	1.30%	0.00%	1.12%
	Good voice quality	>=95%	Reported	96%	97%	99%	98%	98%	99%	99%	99%	98%	97%	99%	99%	99%
Verified			96%	97%	99%	98%	98%	99%	99%	99%	98%	97%	99%	99%	99%	
4	POI congestion	<=0.5%	Reported	0	0	0	0	0	0	0	5.33	0.67	0	0	0	0
			Verified	0	0	0	0	0	0	0	0	5.33	0.67	0	0	0

(B)	Customer Service Quality Parameters															
5	Metering/billing credibility-Post paid	$\leq 0.1\%$	Reported	0.10%	0.00%	0.02%	0%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Verified			0.10%	0.01%	0.02%	0%	0.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.07%	0.00%	0.00%	0.00%
6	Metering /billing credibility-Pre paid	$\leq 0.1\%$	Reported	0.24%	0.00%	0.01%	0%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%
Verified			0.24%	0.04%	0.01%	0%	0.07%	0.00%	0.00%	0.00%	0.01%	0.06%	0.01%	0.00%	0.01%	
7	Resolution of billing/ charging complaints	100% within 4 weeks	Reported	100%	100%	100%	1%	83%	100%	100%	0.00%	100%	100%	100%	100%	100%
			Verified	100%	100%	100%	100%	100%	100%	100%	100%	0.00%	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%	0%	100%	100%	100%	0.00%	100%	100%	100%	100%	100%
			Verified	100%	100%	100%	0%	100%	100%	100%	100%	0.00%	100%	100%	100%	100%
8	Response time to customers for assistance															
Accessibility of call centre/Customer Care	$\geq 95\%$	Reported	100%	100%	100%	1%	99%	100%	99%	97%	96%	100%	100%	100%	100%	99%
		Verified	100%	100%	100%	98.87%	99%	100%	99%	97%	96%	100%	100%	100%	100%	99%
% call answered by operators(voice to voice) within 60 sec.	$\geq 90\%$	Reported	33%	91%	93%	1%	91%	89%	91%	97%	91%	73%	92%	91%	95%	
		Verified	33%	91%	93%	99.72%	91%	89%	91%	97%	91%	73%	92%	91%	95%	
9	Termination/closure of service															
No. of requests for Termination / Closure of service complied within 7 days during the quarter	≤ 7 days	Reported	100%	100%	100%	0.00%	100%	100%	100%	0.00%	0.00%	100%	NA	100%	100%	
		Verified	100%	100%	100%	0.00%	100%	100%	100%	0.00%	0.00%	100%	NA	100%	100%	
10	Time taken for refunds of deposits after closures.	100% within 60 days	Reported	100%	100%	100%	0.00%	100%	100%	79%	0.00%	0.00%	100%	NA	100%	99%
			Verified	100%	100%	100%	0.00%	100%	100%	79%	0.00%	0.00%	100%	NA	100%	99%

II. Basic Service (Wire Line) Service
- Not conducted for this quarter

III. Broadband Service
- Not conducted for this quarter

CHAPTER-4: DETAILED FINDINGS & ANALYSIS

I. Cellular Mobile Telephone Service

(A) MSC Audit

(1) 3 Days Live Measurement Data Assessment & Summarized Findings

S/N	Name of Parameter	Benchmark	Aircel	Airtel	BSNL	Etisalat	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%	0.80%	0.05%	1.01%	0.10%	0.01%	0.01%	0.04%	0.04%	0.01%	0.04%	0.07%	0.02%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	0.02%	0.02%	0.34%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	c) Total no. of BTSs in the licensed service area		6031	8560	5250	51	3329	2821	3133	2416	2968	6786	1169	1699	732
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		3486	291	3806	3.68	13.77	26	83	70	26	174	61	21	1
	e) No. of BTSs having accumulated downtime of >24 hours in a month		1	2	18	0	0	0	0	0	0	0	0	0	0
1	Connection Establishment (Accessibility)														
	a) CSSR	>=95%	99.00%	98.54%	98.58%	99.30%	99.70%	99.84%	99.31%	99.29%	98.56%	98.47%	99.40%	99.47%	98.29%
	b) SDCCH/PAGING congestion	<=1%	0.51%	0.26%	0.06%	0.33%	0.01%	0.05%	0.11%	0.39%	0.02%	0.29%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	0.61%	0.32%	0.47%	0.00%	0.04%	0.01%	0.27%	0.31%	0.08%	0.99%	0.00%	0.13%	0.22%
2	Connection maintenance														
	a) CDR	<=2%	0.58%	1.09%	1.12%	0.52%	0.45%	0.35%	0.65%	1.18%	0.97%	0.85%	0.61%	0.56%	0.89%
	b) Cells having > 3% TCH drop	<=3%	3.25%	6.13%	8.04%	3.27%	0.95%	0.06%	5.93%	1.51%	1.55%	4.15%	2.05%	0.24%	1.09%
	c) Good voice quality	>=95%	95.30%	96.73%	97.81%	98.14%	98.15%	99.37%	98.51%	98.70%	97.97%	97.06%	100.00%	NA	
	d) No. of cells > 3% TCH drop		579	1,553	1,255	5	96	5	549	109	138	842	75	12	24
	e) Total no. of cells in the network		17,807	25,353	15,607	153	10,073	8,463	9,258	7,225	8,898	20,266	3,663	5,097	2,206
3	No of POI having congestion	>=0.5%	0	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	NA
	b) Total No. of call attempts on POI (Avg.)		99,454	4,164,230	837,256	462	819,549	450,869	175,440	409,570	310,047	119,208	359,229	403,097	459,206
	c) Total traffic served on POI (Erlang) (Avg.)		1,589	153,691	33,470	13	22,334	10,775	3,513	13,732	8,089	2,500	7,104	15,461	8,699
	d) Total No. of circuits on POI		119,035	269,360	49,501	1,897	39,264	27,821	6,875	27,115	14,362	279,804	19,009	43,843	17,634

	e) Total number of working POI Service Area wise		41	221	18	55	76	NP	10	60	54	64	59	NP	33
	f) Equipped Capacity of Network in respect of Traffic in erlang		395,408	431,886	228,701	1,132	75,286	60,000	124,660	79,357	62,769	276,668	66,600	202,000	95,311
	g) Total traffic handled in TCBH in erlang		285,474	297,592	111,090	16	32,102	NP	32,503	22,972	18,891	264,120	24,215	NP	16,179
(B)	Customer Service Quality Parameters														
4	Response time to customers for assistance														
	a) Accessibility of call centre	>=95%	92.00%	100%	100%	100%	98.78%	98.07%	INCLUDED IN CHENNAI REPORT	97.02 %	100%	64.12%	99.52 %	97.99%	INCLU ED IN CHENN AI REPORT
	b) % of call answered by operators(voice to voice) within 60 sec	>=90%	85.49%	81.43%	92.48%	97.49%	67.33%	90.49%		98.54 %	100%	76.19%	96.57 %	97.79%	
	c) No. of call attempts to call centre / customer care nos. during TCBH (Avg)		78,567	146,443	2,393	598	3,704	3,556		10,595	145	57,798	875	1,723	
	d) No. of calls connected and answered successfully to call centre / customer care nos. during TCBH (Avg)		67,166	119,251	2,213	583	2,494	3,218		10,440	145	44,034	845	1,685	

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 lying between 0% and 1.01%.
- **Worst affected BTSs due to downtime (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0% and 0.34%.
- **Call setup success rate (benchmark $\geq 95\%$):** All operators are meeting the benchmark with values lying between 98.29% and 99.84%.
- **SDCCH/PAGING Channel congestion (benchmark $\leq 1\%$):** All operators are meeting the benchmark with values lying between 0.00% and 0.51%.
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 0.99%.
- **Call drop rate (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0.35% and 1.18%.
- **Cell exceeding 3% TCH drop (benchmark $\leq 3\%$):** Aircel, Airtel, BSNL, Etisalat, Tata GSM, & Vodafone with a value of 3.25%, 6.13%, 8.04%, 3.27%, 5.93% & 4.15 respectively are not meeting the benchmark. Rests of the operators are satisfying the benchmark with value in between 0.06% and 2.05%.
- **Connections with good voice quality (benchmark $\geq 95\%$):** CDMA service providers have declared that the parameter is not system generated. Rest of the GSM operators are meeting the benchmark with values lying between 95.30% and 100%.
- **POI Congestion (benchmark $\leq 0.5\%$):** All the operators are meeting the benchmark with value of 0%. 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):** Aircel (92%) & Vodafone (64%) are not meeting the benchmark. All other operators are meeting the benchmark with values lying between 97.02% and 100%.
- **%age of call answered by operator (Voice to voice) (benchmark $>90\%$):** Aircel (85.45%), Airtel (81.43%), Idea (67.33%) & Vodafone (76.19%) are not meeting the benchmark. All other operators are meeting the benchmark with values lying between 90.49% and 100%

(2) One Month Audit Data Report & Summarized Findings

S/N	Name of Parameter	Benchmark	Aircel	Airtel	BSNL	Etisalat	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%	0.78%	0.08%	0.54%	0.03%	0.01%	0.06%	0.07%	0.04%	0.02%	0.04%	0.07%	0.08%	0.02%
	b) Worst affected BTSs due to downtime	<=2%	0.55%	0.26%	1.98%	0.00%	0.00%	0.04%	0.00%	0.00%	0.00%	0.13%	0.00%	0.00%	0.00%
	c) Total no. of BTSs in the licensed service area		6,031	8,560	5,250	51	3,329	2,821	3,133	2,416	2,968	6,786	1,169	1,699	732
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		34,068	4,718	20,343	13	266	1,259	1,532	781	458	2,096	612	1,001	125
	e) No. of BTSs having accumulated downtime of >24 hours in a month		33	22	104	0	0	1	0	0	0	9	0	0	0
2	Connection Establishment (Accessibility)														
	a) CSSR (Call Setup Success Rate)	>=95%	98.92%	98.35%	98.61%	99.30%	99.65%	99.85%	99.28%	99.27%	98.51%	98.42%	99.30%	99.39%	98.66%
	b) SDCCCH/PAGING congestion	<=1%	0.48%	0.38%	0.09%	1.01%	0.02%	0.06%	0.14%	0.08%	0.03%	0.35%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	0.63%	0.33%	0.46%	0.00%	0.06%	0.02%	0.28%	0.01%	0.07%	1.00%	0.00%	0.20%	0.21%
3	Connection maintenance (retainability)														
	a) CDR	<=2%	0.60%	1.20%	1.13%	0.55%	0.45%	0.34%	0.68%	1.22%	1.03%	0.90%	0.71%	0.59%	0.81%
	b) Worst affected cells>3% TCH drop	<=3%	2.94%	7.81%	8.50%	1.31%	1.12%	0.07%	6.25%	1.70%	1.65%	4.49%	2.07%	0.26%	1.04%
	c) Good voice quality	>=95%	95.09%	96.57%	98.18%	98.37%	98.02%	99.40%	98.44%	98.68%	97.93%	96.99%	100.00%	NA	
	d) Total No. of cells exceeding 3% TCH drop (call drop)		523	1,979	1,327	2	113	6	579	123	147	909	76	13	23
	e) Total no. of cells in the network		17,807	25,353	15,607	153	10,073	8,463	9,258	7,225	8,898	20,266	3,663	5,097	2,206
4	No of POI having congestion	>=0.5%	0	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.)		94,415	3,986,215	808,167	403	780,774	425,801	171,626	414,288	314,629	120,262	381,087	356,241	456,120

	c) Total traffic served on POI (Erlang) (Avg.)		1,535	153,491	32,990	12	21,338	10,328	3,391	14,159	8,166	2,477	7,406	13,990	8,434
	d) Total No. of circuits on POI		119,441	269,360	49,501	1,897	39,854	27,821	6,875	27,115	14,362	279,804	19,009	41,367	17,634
	e) Total number of working POI Service Area wise		41	221	18	55	76	NP	10	60	54	64	59	NP	33
5	Network Data														
	a) Equipped Capacity of Network Erlang		395,408	431,886	228,701	1,132	75,286	60,000	124,660	79,357	62,769	276,668	66,600	202,000	95,311
	b) Total traffic in TCBH in erlang (Avg.)		282,870	288,397	105,167	15	31,166	51,751	31,904	22,784	17,984	262,594	25,577	49,963	14,785
	c) Total no. of customers served (as per VLR) on last day of the month		9,065,957	8,920,657	3,304,200	1,656	1,200,202	2,526,986	1,197,600	789,179	512,509	8,649,557	834,500	1,485,920	485,462
(B)	Customer Service Quality Parameters														
6	Metering/billing credibility-Post paid	$\leq 0.1\%$	0.07%	0.01%	0.06%	NA	0.06%	0.10%		NA	NA	0.03%	NA	0.07%	
	a) No. of bills issued during the period		272,164	264,859	283,335	NA	23,290	57,223		NA	NA	212,390	NA	141,824	
	b) No. of bills disputed including billing complaints during the period		201	29	170	NA	15	57		NA	NA	72	NA	100	
7	Metering /billing credibility-Pre paid	$\leq 0.1\%$	0.04%	0.02%	0.01%	0.00%	0.03%	0.05%		0.00%	0.03%	0.03%	0.01%	0.01%	
	a) No. of charging / credit / validity complaints during the quarter		7,368	2,150	760	0	543	2,260		46	368	2,737	93	325	
	b) Total no. of pre-paid customers at the end of the quarter		16,847,836	12,383,202	5,113,344	27,754	1,856,082	4,398,485		1,383,236	1,080,789	9,694,995	1,570,125	2,796,258	
8	Resolution of billing/ charging complaints	<i>100% within 4 weeks</i>	100%	100%	100%	NA	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		7,569	14,335	930	NA	558	2,317		46	368	2,809	93	425	
	b) Total no. of billing (post paid) and charging, credit / validity (pre paid) complaints received during the quarter		7,569	14,335	930	NA	2,112	2,317		46	368	2,809	93	425	
	c) No. of billing complaints (post paid) and charging, credit/ validity complaints (pre paid) resolved in favour of the customer during the quarter		1,464	2,179	112	NA	558	481		46	27	2,809	8	155	
									INCLU ED IN CHENNA I REPORT						INCLU DED IN CHEN NAI REPOR T

	d) No. of complaints disposed on account of not considered as valid complaints during the quarter		6,105	12,156	818	NA	1,554	1,836	0	341	0	85	270
	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%	NA	100%	100%	100%	100%	100%	100%	100%
9	Response time to customers for assistance												
	a) Accessibility of call centre/Customer Care	<i>>=95%</i>	84.00%	100%	100%	100%	98.46%	97.88%	97.04%	99.99%	65.47%	99.60%	97.95%
	b) % call answered by operators(voice to voice) within 60 sec.	<i>>=90%</i>	92.38%	83.72%	98.98%	100%	60.53%	88.41%	98.08%	99.52%	84.18%	93.95%	97.83%
	c) Total no. of call attempts to call centre & customer care nos. during TCBH (Avg.).		11,191	133,211	2,152	253	29,537	4,261	10,419	1,242	51,879	860	2,026
	d) No. of calls connected and answered successfully to call centre & customer care nos. during TCBH (Avg.).		10,338	111,528	2,130	253	17,880	3,767	10,219	1,236	43,671	808	1,982
10	Termination/closure of service	<i><=7days</i>	100%	100%	100%	NA	100%	100%	NA	NA	100%	NA	100%
	a) Total No. of requests for Termination / Closure of service received during the quarter		1,240	1,041	18,481	0	180	101	NA	NA	757	NA	444
	b) No. of requests for Termination / Closure of service complied within 7 days during the quarter		1,240	1,041	18,481	0	180	101	NA	NA	757	NA	444
11	Time taken for refunds of deposits after closures.	<i>100% within 60 days</i>	100%	100%	100%	NA	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 lying between 0.01% and 0.78%.
- **Worst affected BTSs due to downtime (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0% and 1.98%.
- **Call setup success rate (benchmark $\geq 95\%$):** All operators are meeting the benchmark with values lying between 98.35% and 99.85%.
- **SDCCH/PAGING Channel congestion (benchmark $\leq 1\%$):** All operators are meeting the benchmark with values lying between 0.00% and 0.48%.
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 1.0%.
- **Call drop rate (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0.34% and 1.22%.
- **Cell exceeding 3% TCH drop (benchmark $\leq 3\%$):** Airtel, BSNL, Tata GSM, & Vodafone with a value of 7.81%, 8.5%, 6.25% & 4.49% respectively are not meeting the benchmark.
Rests of the operators are satisfying the benchmark with value in between 0.07% and 2.94%.
- **Connections with good voice quality (benchmark $\geq 95\%$):** CDMA service providers have declared that the parameter is not system generated. Rest of the GSM operators are meeting the benchmark with values lying between 95.09% and 100%.
- **No. of POI having Congestion (benchmark $\leq 0.5\%$):** All the operators are meeting the benchmark with value of 0%. 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 $>95\%$):** Airtel (84%) & Vodafone (65%) are not meeting the benchmark. All other operators are meeting the benchmark with values lying between 97.04% and 100%.
- **%age of call answered by operator (Voice to voice) (benchmark $>90\%$):** Airtel (84%), Idea (61%), Rcom GSM (88%) & Vodafone (84%) are not meeting the benchmark. Other operators are meeting the benchmark with values lying between 92.38% and 100%.
- **Metering and billing credibility-Post paid (benchmark $\leq 0.1\%$):** All operators are meeting the benchmark with values lying between 0.01% and 0.10%.
- **Metering and billing credibility-Pre paid (benchmark $\leq 0.1\%$):** All the operators are meeting the benchmark with values lying 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.

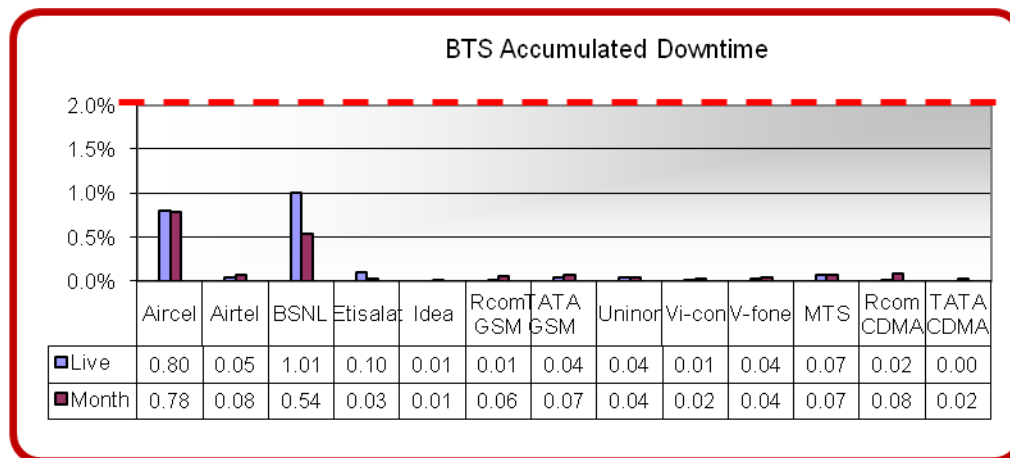
(3) Sample Coverage

Switches/BSC/BTS details of operators:

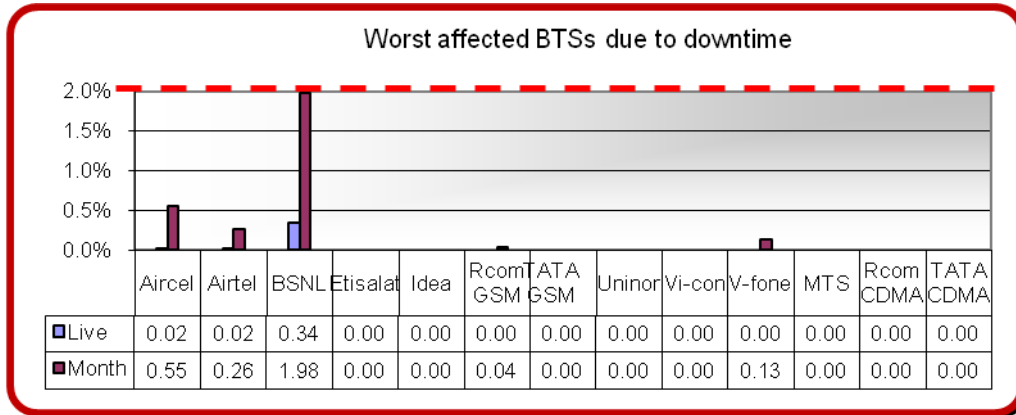
Sl.	Name of Service Provider	No. of MSC/GMSC	No. of BSC	No. of BTS
GSM Operators				
1	Aircel Ltd	10	62	6031
2	Airtel Ltd	34	88	8560
3	BSNL	21	76	5250
4	Etisalat	3	1	51
5	Idea	2	17	3329
6	Reliance Communication (GSM)	3	14	2821
7	Tata Communications (GSM)	2	20	3133
8	Uninor	8	16	2416
9	Videocon	1	17	2968
10	Vodafone	14	98	6786
CDMA Operators				
11	MTS (CDMA)	1	4	1169
12	Reliance Communication (CDMA)	6	5	1699
13	Tata Communications (CDMA)	2	11	732

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

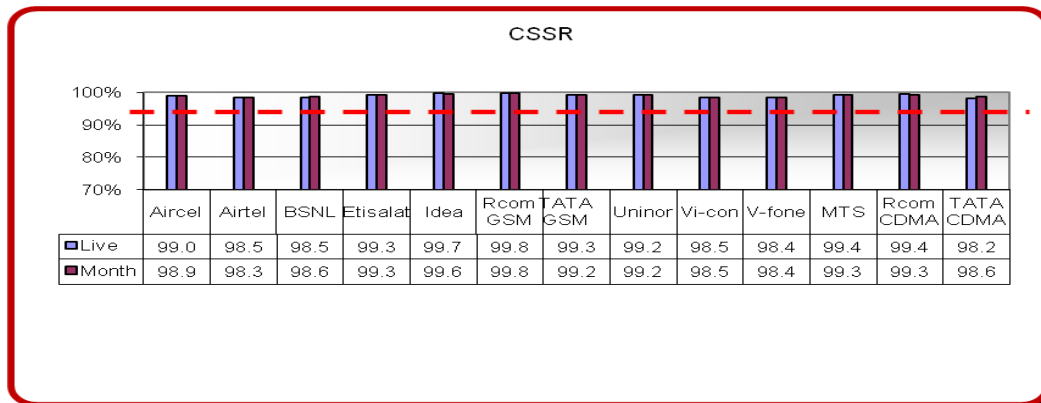
BTS Accumulated Downtime: All operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data taken in the month of audit.



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

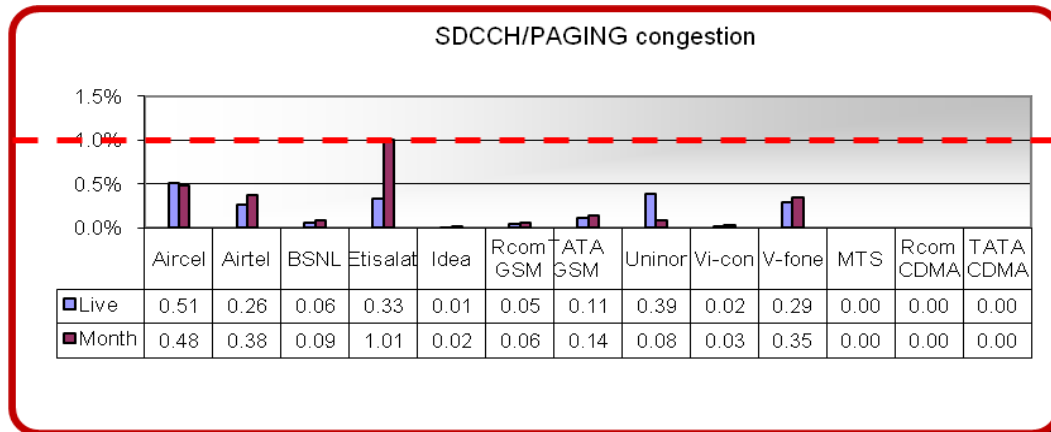


Call setup success rate ($\geq 95\%$): All operators are meeting the TRAI benchmarks ($\geq 95\%$) for both one month data and 3 days live data taken in the month of audit.

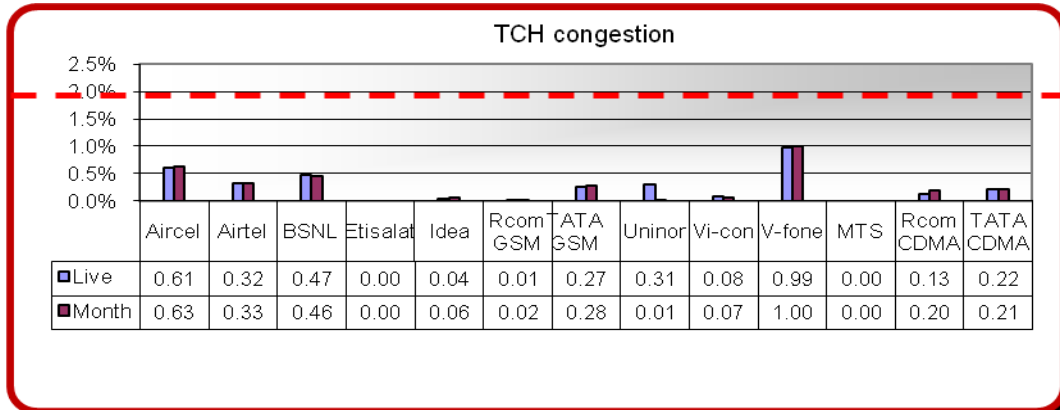


Blocked call rate:

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.

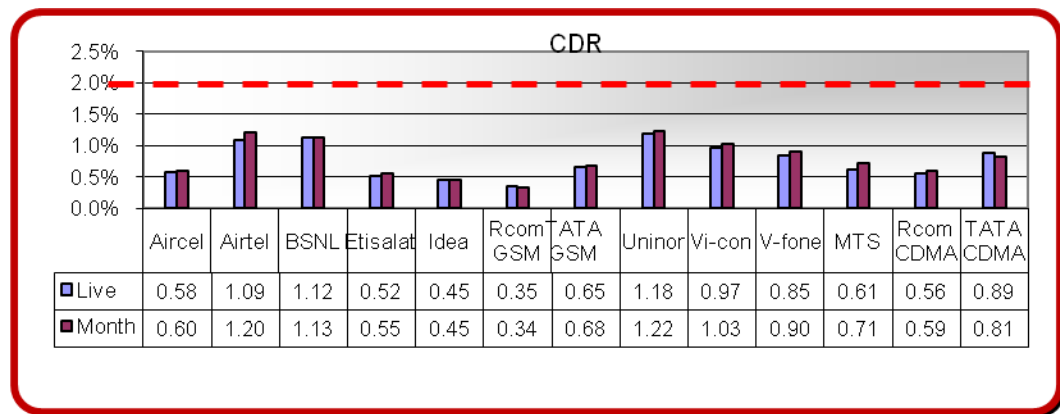


TCH congestion (2%): All operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data taken in the month of audit.

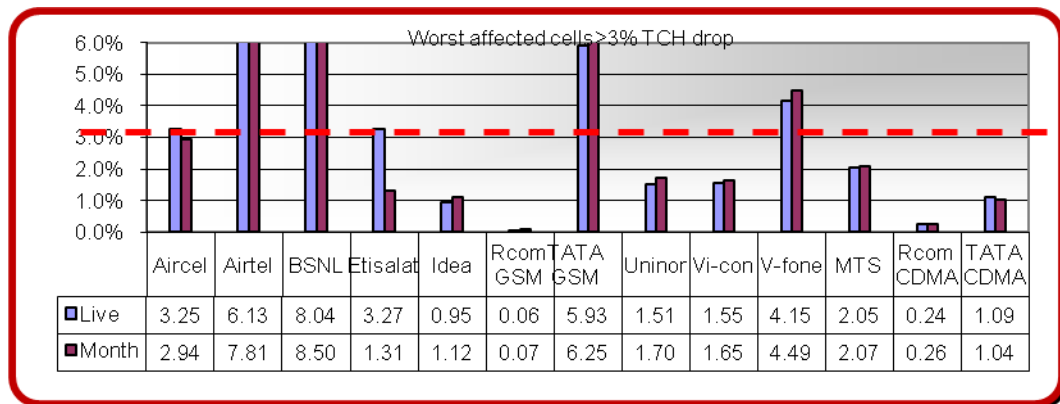


Connection Maintainability (Retainability):

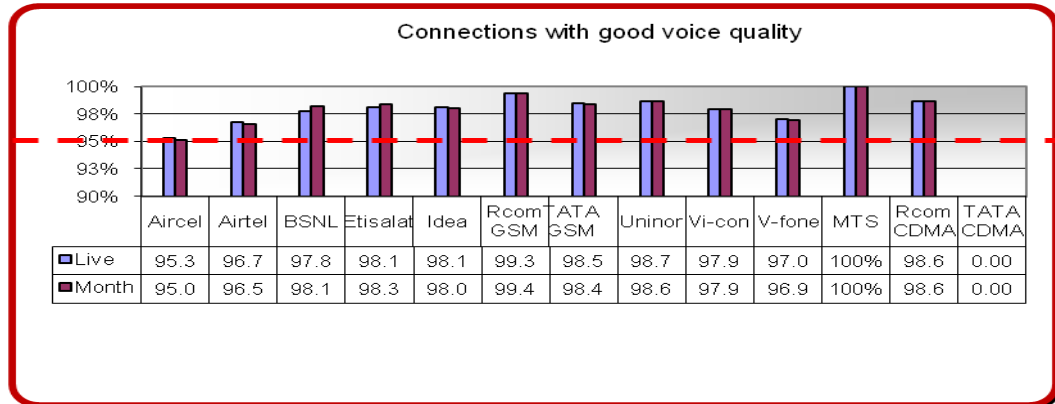
Call drop rate (2%): All operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data taken in the month of audit.



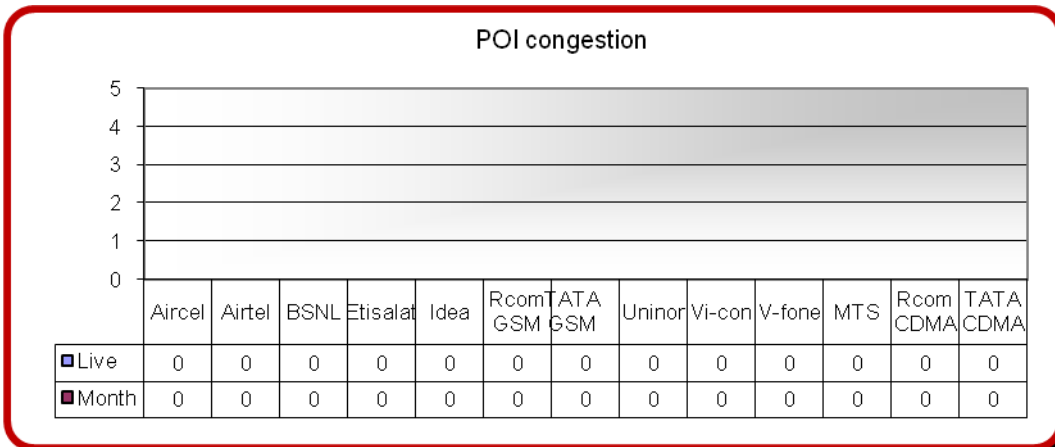
Worst affected Cell exceeding 3% TCH Drop: Aircel & Etisalat for live and Airtel, BSNL, Tata GSM & Vodafone for both live and month data are found not meeting the benchmark of $\leq 3\%$.



Percentage of connections with good voice quality (benchmark $\geq 95\%$): 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.



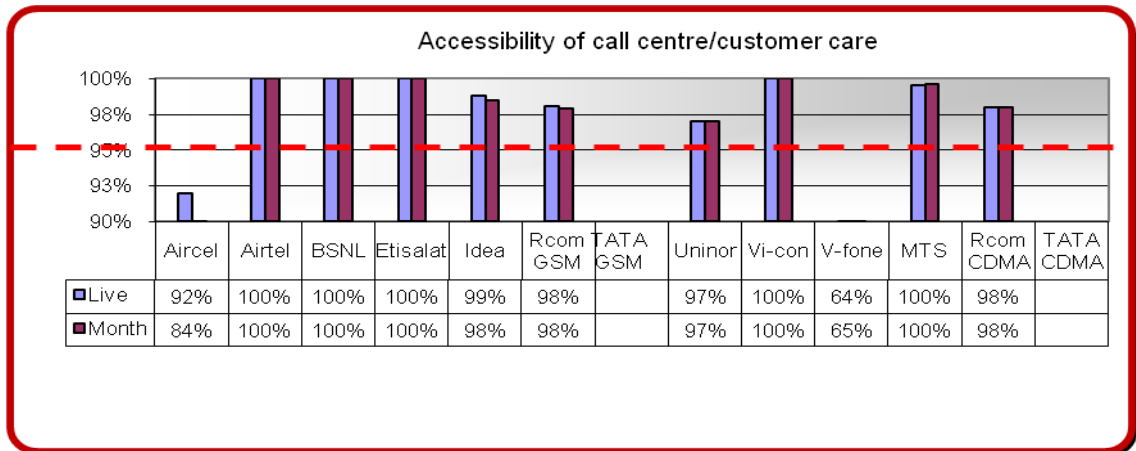
No of POI having Congestion: All operators are meeting the TRAI benchmarks ($\leq 0.5\%$) for both one month data and 3 days live data taken in the month of audit.



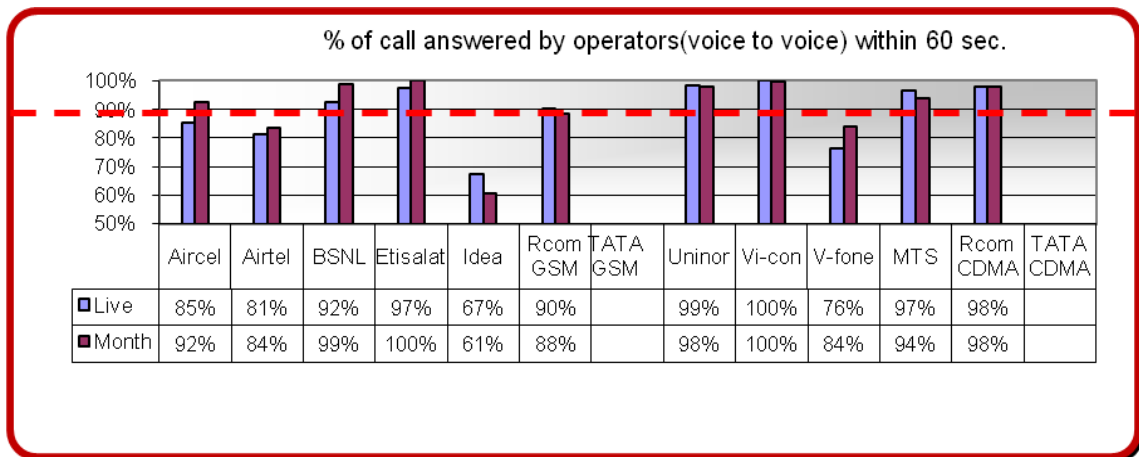
B) CUSTOMER SERVICE QUALITY PARAMETERS

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 & 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: For live Aircel, for month Rcom GSM and for both Live and month audit Airtel, Idea, & Vodafone 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 parameters like “BTS Accumulated Downtime” (BSNL) “Worst affected BTSS due to downtime” (Airtel), SDCCH Congestion (Etisalat), “Accessibility of call centre/Customer Care (Aircel) and “% call answered by operators(voice to voice) within 60 sec” (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 based on live calling for billing complaints:

Calling Operator	Aircel	Airtel	BSNL	Etisalat	Idea	Tata GSM	Uninor	Videocon	Vodafone	MTS	Tata CDMA
Total No. of Calls Attempted	115	108	20	NA	60	NA	15	15	122	8	NA
Total No. of calls Answered	100	100	18	NA	55	NA	15	15	100	8	NA
Cases resolved with 4 weeks	100	100	18	NA	55	NA	15	15	100	8	NA
%age of cases resolved	100%	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. Rcom GSM & CDMA did not provide data for verification.

3). Live calling to call centre:

Calling Operator	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA
Total No. of Calls Attempted	200	200	200	100	200	200	200	100	100	200	100	200	200
Total No. of calls connected to IVR	200	200	200	100	200	200	200	100	100	200	100	200	200
Calls got connected to agent within 60 Sec	200	200	199	100	200	200	200	100	100	200	100	200	200
%age of calls got answered	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

NOTE: Calls were made from the Operators place. 200 calls total made i.e. 100 each for Prepaid and Post paid except Etisalat, Uninor, Videocon & MTS who have only Prepaid services .

4) Level 1 calling:

Emergency calls were made at Erode, Tanjore and Vellore for each category and below given is the success rate.															
Mobile															
Emergency no.	No. of calls made	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA	
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Police
101	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Fire service
102	1	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	1	Emergency Ambulance
139	5	5	5	5	5	5	5	5	5	5	5	5	5	5	Railway Enquiry
1961	2	2	2	2	2	2	2	2	2	2	2	2	2	2	Tax related Enquiry
1091	2	2	2	2	2	2	2	2	2	2	2	2	2	2	Women helpline
1098	2	2	2	2	2	2	2	2	2	2	2	2	2	2	Child Help line
TOTAL NUMBER OF CALLS :180 (13*15)															

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. Rcom has not provided the data for verification.

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 Etisalat, 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.

(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	Etisalat	Idea	Reliance (GSM)	Tata (GSM)	Uninor	Videocon	Vodafone	MTS	Reliance (CDMA)	Tata (CDMA)
Aircel	-	98%	100%	100%	100%	100%	100%	98%	100%	100%	100%	100%	100%
Airtel	100%	-	98%	100%	100%	100%	100%	100%	100%	100%	99%	100%	100%
BSNL	100%	100%	-	100%	100%	98%	100%	100%	100%	100%	100%	100%	100%
Etisalat	100%	90%	100%	-	100%	100%	100%	100%	100%	100%	100%	100%	100%
Idea	100%	100%	100%	98%	-	100%	100%	100%	100%	97%	100%	100%	100%
Reliance (GSM)	100%	100%	100%	100%	100%	-	100%	100%	100%	100%	100%	100%	100%
Tata (GSM)	99%	96%	100%	100%	100%	97%	-	97%	98%	100%	100%	100%	100%
Uninor	97%	100%	97%	100%	96%	100%	100%	-	100%	100%	100%	100%	100%
Videocon	100%	98%	96%	99%	100%	98%	100%	100%	-	99%	100%	100%	99%
Vodafone	99%	100%	100%	100%	100%	95%	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%	98%	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 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***ERODE***

LOW DENSE:	four roads, Meridian road, Chatiram, Nasiyanoor road, EVR Street, Valayakara Street
MEDIUM DENSE:	Thindal malai, Mettukadai, Kongu College, Vellalar College, EVN road, Karur road, Moolapalayam, Nadarmedu, railway colony, Soorampatty valasu, Gandhi road
HIGH DENSE:	Brough road, market, karungal palayam, pallipalayam, R.K.V nagar, SPB road, Cauvery road, Sathy road, Central road, Collectorate, Teacher's colony, Bus stand

TANJORE

LOW DENSE:	Southrampari, Old bus stand, Hotel Gnanam, vadi vasal, Tholkapier square, TELC school, Karanthai, Byepass,
MEDIUM DENSE:	SM Road, NK Road, Anna Nagar, Vallam, ganapathy nagar, Melaveethi, Keela veethi
HIGH DENSE:	BSNL office, Villar road, Burma colony, Mary's corner, Filomina nagar, Aruna nagar, Blossom, Arul theatre, Old Bus stand, Srinivasa puram, Gandhiji road, Thillai nagar

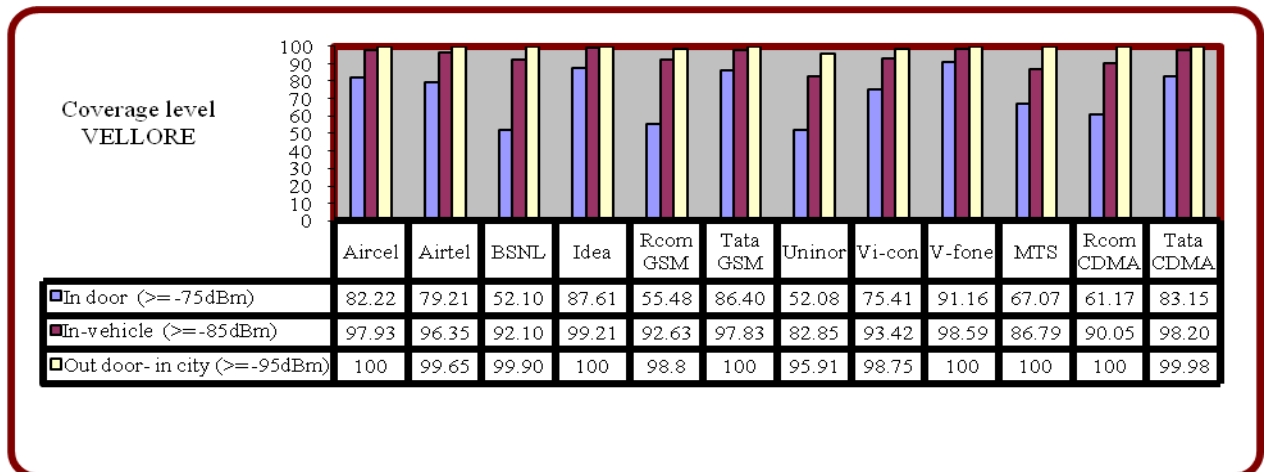
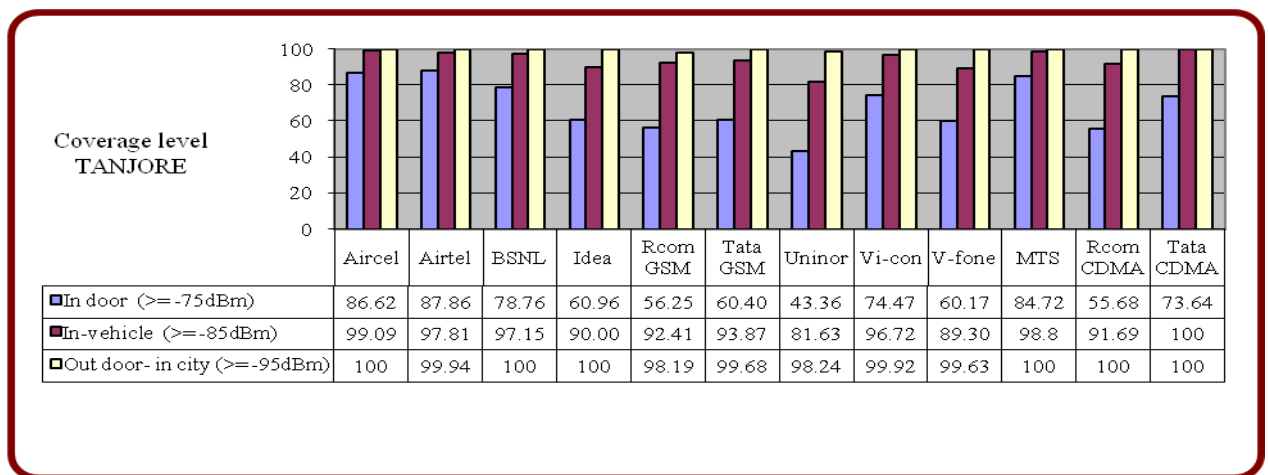
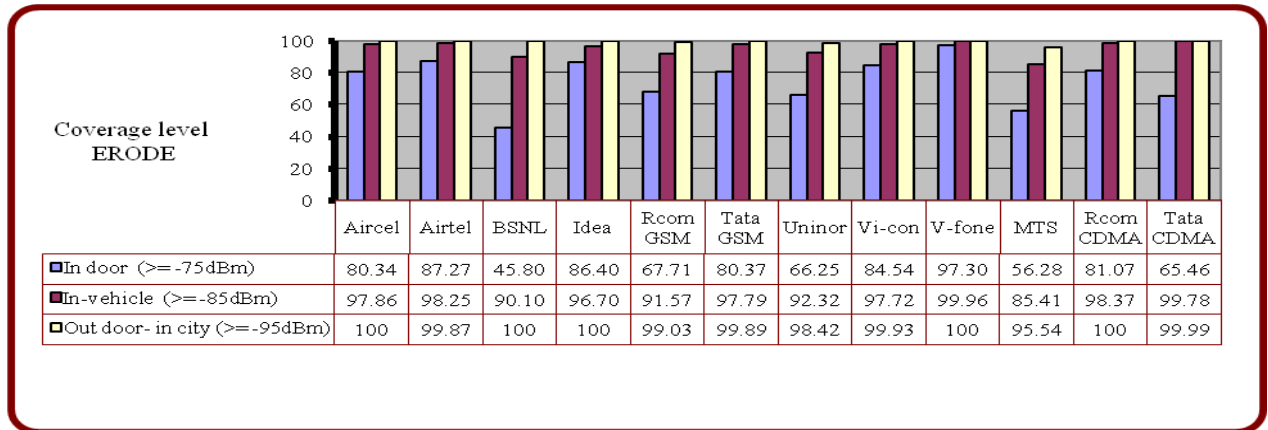
VELLORE

LOW DENSE:	G.H road, Govt Medical College, Pagayam, CMC, Central jail, Corporation building, BSNL Bhavan, Fort round
MEDIUM DENSE:	Chattuvachari, CMC, Vellore fort, Old bus stand, New bus stand, Market, Voorheesh college, Golden temple,
HIGH DENSE:	BSNL office, Taulak office, chittor road, Kingston college, Vallimalai road, Railway station, VIT road, Axilium road, Katpadi Bridge

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	Erode	148	138	147	179	178	152	140	180	189	180	170	173	
		Tanjore	149	182	135	178	184	156	202	180	167	147	180	175	
		Vellore	154	144	147	176	167	180	173	180	161	175	166	163	
1.2	Blocked Call Rate (<=3%)	Erode	0.68	0	0	1.12	0	0	0.71	1.11	1.59	0	0	0	
		Tanjore	0	0	0.74	0.56	0	0	0	1.11	0.60	0	0	0	
		Vellore	0.65	0	2.04	1.14	0	0	2.31	0.56	0.62	0	0	0	
1.3	Dropped Call Rate (<=2%)	Erode	0	0	0	0.56	0	0	0	1.67	0	0	0	1.16	
		Tanjore	0	0	0	1.12	0	0	0	0	0	0	0	0	
		Vellore	0	0	0	0	0	0	1.16	1.11	0	0	0	0	
1.4	(i) 0-4 (w/o frequency hopping)	Erode										98.95	97.99	98.16	
		Tanjore										99.79	99.26	99.93	
		Vellore										98.86	95.96	99.47	
	(ii) 0-5 (with frequency hopping)	Erode	95.20	95.30	98.10	95.72	96.28	97.34	97.09	95.88	94.30				
		Tanjore	95.40	95.10	91.79	95.00	96.35	97.20	95.75	96.69	96.20				
		Vellore	95.80	95.10	95.00	95.00	96.26	96.59	95.81	94.45	94.00				
1.5	Service Coverage	Erode													
		In door (>= -75dBm)	Tanjore	80.34	87.27	45.80	86.40	67.71	80.37	66.25	84.54	97.30	56.28	81.07	65.46
			Vellore	86.62	87.86	78.76	60.96	56.25	60.40	43.36	74.47	60.17	84.72	55.68	73.64
	In-vehicle (>= -85dBm)	Erode	82.22	79.21	52.10	87.61	55.48	86.40	52.08	75.41	91.16	67.07	61.17	83.15	
		Tanjore	97.86	98.25	90.10	96.70	91.57	97.79	92.32	97.72	99.96	85.41	98.37	99.78	
		Vellore	99.09	97.81	97.15	90.00	92.41	93.87	81.63	96.72	89.30	98.8	91.69	100	
	Outdoor- in city (>= -95dBm)	Erode	97.93	96.35	92.10	99.21	92.63	97.83	82.85	93.42	98.59	86.79	90.05	98.20	
		Tanjore	100	99.87	100	100	99.03	99.89	98.42	99.93	100	95.54	100	99.99	
		Vellore	100	99.94	100	100	98.19	99.68	98.24	99.92	99.63	100	100	100	
1.6	Call Setup Success Rate (>=95%)	Erode	100	99.65	99.90	100	98.8	100	95.91	98.75	100	100	100	99.98	
		Tanjore	99.32	100	100	98.88	100	100	99.29	97.78	98.41	100	100	100	
		Vellore	100	100	99.26	94.94	100	100	100	98.89	99.40	100	100	100	
		Erode	99.35	100	97.95	98.86	100	100	97.69	99.77	99.40	100	100	100	

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 VODAFONE in ERODE, BSNL in TANJORE and VIDEOCON & VODAFONE in VELLORE.

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

The Independent Drive Test was conducted in Tamil Nadu for four Cities / towns namely Dindigul (MTS), Rameswaram (BSNL), Tuticorin (Aircel) and Udagamandalam (Airtel & Vodafone). The service provider's city wise radio coverage with call testing was performed individually through drive test activity on different days. Route covered was about 86 kms for MTS, 52 kms for BSNL, 121 Kms for Aircel and 55 Kms for both Airtel & Vodafone within the speed limit of 30Km/hr.

Drive Test Locations and Service provider's name:

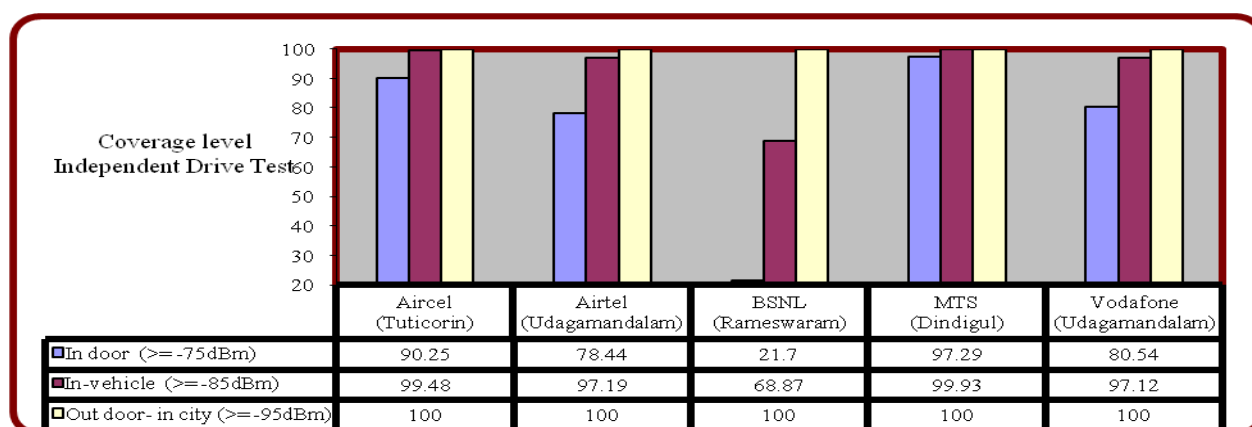
- | | | |
|------------------|---|-----------------------------------------|
| 1) Dindigul | - | <u>MTS</u> |
| 2) Rameswaram | - | <u>BSNL</u> |
| 3) Tuticorin | - | <u>Aircel</u> |
| 4) Udagamandalam | - | <u>Airtel, Vodafone</u> |

Area Coverage details:

- | | | |
|------------------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1) Dindigul | - | Nagal Nagar, Kullanampatti, Masilamanipuram, Sattampillai, begampur, VIP nagar , YMR patti. |
| 2) Rameswaram | - | Parvatham Road, RamarPatham, Sivakami Nagar, Dhanuskodi Road, KothandaRamar Temple, In and around Main Temple . |
| 3) Tuticorin | - | BSNL office, Chinna koil, Muthukrishna puram, KVK nagar, Alageshapuram, Vattakarai, Statebank colony, Ettayapuram Road, Pandiyapuram, Madurai Bypass, Collectorate office, Teacher's colony, Medical college, Govt hospital, Market, Corporation office, Old Busstand, Chattiram, Annanagar, Harbour, SPIC, Railway station |
| 4) Udagamandalam | - | Kotagiri Road, Gudalore Main Road, Coonnor Road & Kodapamand, Finger Post,Rose Garden,Boat House & Botanical Garden, Market,Bus Stand, Railway Station |

2). Performance (For the respective cities):

SN	Parameter	Aircel (Tuticorin)	Airtel (Udagamandalam)	BSNL (Rameswaram)	MTS (Dindigul)	Vodafone (Udagamandalam)
1.1	Call Attempts	120	96	75	147	98
1.2	Blocked Call Rate (<=3%)	0	0	1.33	0	0
1.3	Dropped Call Rate (<=2%)	0	0	1.33	0	0
1.4	Percentage of connections with good voice quality (=>95%)					
	(i) 0-4 (w/o frequency hopping)				99.2	
	(ii) 0-5 (with frequency hopping)	97.5	97.8	97.73		96.5
1.5	Service Coverage					
	In door (>= -75dBm)	90.25	78.44	21.7	97.29	80.54
	In-vehicle (>= -85dBm)	99.48	97.19	68.87	99.93	97.12
	Outdoor- in city (>= -95dBm)	100	100	100	100	100
1.6	Call Setup Success Rate (>=95%)	100	100	98.67	100	100

Graphical Representation

3) Critical Analysis

On verifying the data from the Independent drive test conducted in Tamilnadu 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 by and large 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 **Airtel & Etisalat** for live audit. These figures are slightly higher.

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

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 deviations are found in Good Voice Quality parameter is not met by Vodafone in ERODE, BSNL in TANJORE & Videocon, Vodafone in VELLORE. 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.

II. Basic Telephone Service (Wireline) Providers

- Not conducted for this quarter

III. Broadband Service Providers

- Not conducted for this quarter