

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

Report Period: July 2011 – September 2011

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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.

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 3rd quarter (July- September 2011). The primary data collection and verification of records (PMR data verification – quarterly) maintained by various operators was undertaken during the period January - March 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	July-2011	1900-2000 hrs
2	Airtel Ltd	July-2011	1900-2000 hrs
3	BSNL	July-2011	1900-2000 hrs
4	Etisalat	July-2011	1900-2000 hrs
5	Idea	July-2011	1900-2000 hrs
6	Reliance Communication (GSM)	July-2011	1900-2000 hrs
7	Tata Communications (GSM)	July-2011	1900-2000 hrs
8	Uninor	July-2011	2000-2100 hrs
9	Videocon	July-2011	1900-2000 hrs
10	Vodafone	July-2011	1900-2000 hrs
CDMA Operators			
11	MTS	July-2011	1900-2000 hrs
12	Reliance Communication (CDMA)	July-2011	2000-2100 hrs
13	Tata Communications (CDMA)	July-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	Etisala t	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%	0.33%	0.05%	0.28%	0.00%	0.01%	0.25%	0.06%	0.03%	0.04%	0.03%	0.10%	0.26%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.01%	0.02%	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%	99.94%	98.03%	98.91%	99.54%	99.63%	99.80%	99.25%	99.20%	98.62%	98.15%	98.90%	99.79%	99.17%
	b) SDCCH/PAGING congestion	<=1%	0.66%	0.87%	0.05%	0.00%	0.02%	0.00%	0.21%	0.04%	0.01%	0.57%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	0.71%	0.35%	0.03%	0.00%	0.03%	0.70%	0.32%	0.10%	0.01%	1.09%	0.00%	0.03%	0.53%
3	Connection maintenance (retainability)														
	a) CDR	<=2%	0.47%	0.94%	0.87%	0.40%	0.43%	0.24%	0.54%	1.16%	0.91%	0.74%	1.10%	0.38%	0.63%
	b) Worst affected cells>3% TCH drop	<=3%	2.37%	5.17%	6.06%	4.97%	1.21%	0.88%	3.61%	1.90%	9.97%	3.73%	2.66%	0.40%	0.82%
	c) Good voice quality	>=95%	95.60%	97.03%	98.04%	98.60%	98.23%	99.32%	98.65%	98.67%	98.04%	97.19%	100%	NA	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%	68.0%	NP	100%	96.3%	99.3%	98.2%	INCLU DED IN THE TN CIRCLE	98.2%	99.7%	69.3%	99.5%	97.3%	99.0%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	76.7%	NP	59.1%	96.3%	85.8%	63.9%		79.5%	99.2%	95.1%	90.7%	85.7%	97.5%

NA: Not Applicable, NP: Data Not Provided

From the 3 days live data assessment, it is found that most of the operators are meeting the network parameters. AIRTEL, BSNL, ETISALAT, TATA GSM, VIDEOCON, & VODAFONE are not meeting the benchmark "worst affected cells >3% TCH drop". Customer care data of all the operators is found meeting the benchmark. AIRCEL & VODAFONE are not meeting the benchmark for the parameter "Accessibility of call centre/Customer Care". AIRCEL, BSNL, IDEA, RCOM GSM & CDMA & UNINOR are not meeting the benchmark "calls answered by operators (voice-to-voice)".

One Month Data Audit		Benchmark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Unin or	Vi-con	V-fone	MT S	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%	0.35%	0.05%	0.35%	0.15%	0.02%	0.02%	0.04%	0.02%	0.05%	0.02%	0.05%	0.03%	0.01%	
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.13%	1.40%	0.00%	0.00%	0.00%	0.00%	0.00%	0.20%	0.03%	0.00%	0.00%	0.00%	
	c) Total no. of BTSs in the licensed service area		6009	8519	5161	51	3312	2805	3083	2437	2962	6630	1144	1751	731	
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		15621	3371	13379	57	399	510	947	319	1116	1057	425	331	32	
	e) No. of BTSs having accumulated downtime of >24 hours in a month		22	11	72	0	0	0	0	0	6	2	0	0	0	
2	Connection Establishment (Accessibility)															
	a) CSSR (Call Setup Success Rate)	>=95%	99.95%	98.36%	98.90%	99.44%	98.88%	99.78%	99.27%	99.24%	98.53%	98.43%	99.05%	99.78%	99.00%	
	b) SDCCH/PAGING congestion	<=1%	0.66%	0.56%	0.04%	0.00%	0.03%	0.07%	0.23%	0.03%	0.02%	0.35%	0.00%	0.00%	0.00%	
	c) TCH congestion	<=2%	0.73%	0.33%	0.04%	0.00%	0.07%	0.70%	0.30%	0.08%	0.04%	1.01%	0.00%	0.03%	0.57%	
3	Connection maintenance (retainability)															
	a) CDR	<=2%	0.47%	0.94%	0.88%	0.45%	0.48%	0.25%	0.55%	1.06%	0.94%	0.74%	0.95%	0.40%	0.64%	
	b) Worst affected cells>3% TCH drop	<=3%	2.36%	4.63%	5.32%	3.92%	1.36%	0.86%	3.76%	1.84%	9.94%	3.57%	2.22%	0.40%	0.82%	
	c) Good voice quality	>=95%	95.60%	97.07%	98.05%	98.49%	98.22%	99.30%	98.63%	98.72%	98.00%	97.16%	100.00%	NA	NA	
4	No of POI having congestion >=5%	<=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%	0.09%	0.03%	0.09%	NA	0.10%	0.10%	0.00%	NA	NA	0.35%	NA	0.05%	0.16%	
6	Metering /billing credibility-Pre paid	<= 0.1%	0.09%	0.11%	0.02%	0.00%	0.10%	0.09%	0.00%	0.00%	0.09%	0.04%	0.01%	0.01%	0.40%	
7	Resolution of billing/ charging complaints	100% within 4 weeks	100%	100%	100%	NA	100%	100%	INCLUDED IN THE TN CIRCLE	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%	NA	100%	100%		100%	100%	100%	100%	100%	100%	100%
8	Response time to customers for assistance															
	a) Accessibility of call centre/Customer Care	>=95%	78.73%	100.00%	100.00%	98.55%	97.62%	98.23%		96.98%	99.48%	68.87%	99.32%	97.75%	99.00%	
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	75.52%	92.38%	79.51%	98.55%	78.46%	67.95%		79.11%	97.73%	84.84%	90.06%	88.09%	96.98%	
9	Termination/closure of service	<=7days	100%	100%	100%	NA	100%	100%	NA	0%	100%	NA	100%	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%	100%		

NA: Not Applicable, NP: Data Not Provided

From the month data assessment, it is found that all the operators are meeting the network parameters .

Deviations are found under the Network Parameter for the parameter 'Worst affected cells>3% TCH drop' for AIRTEL, BSNL, ETISALAT, TATA GSM, VIDEOCON & VODAFONE only.

Performance related to customer care data, it is found to be just 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)" AIRCEL, BSNL, IDEA, RCOM GSM & CDMA, UNINOR & VODAFONE are not meeting the benchmark performance.

Vodafone , Airtel & TATA CDMA have low Billing/Metering Credibility in case of Post-Paid & Pre-Paid connections respectively.

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 Salem, Tirunelveli and Tiruppur. 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%)	Salem	0	0	0.78	0	0	0.63	0	0.59	0.61	0	0	0.52
		Tirunelveli	0	0.61	4.50	0	0	0.54	0	2.06	0	0	0	0
		Tiruppur	0	0	0	0	0	1.29	3.92	1.29	0.68	0	0	0
1.2	Dropped Call Rate (<=2%)	Salem	0	0	0	0	0	0	0.64	0	0	0	0	0
		Tirunelveli	0	0	2.00	0	0	0	0	0.52	0	0	0	0
		Tiruppur	0	0	1.46	0	0	0	0.65	0	0	0	0	0
1.3	Percentage of connections with good voice quality (>=95%)													
	(i) 0-4 (w/o frequency hopping)	Salem	0	0	0	0	0	0	0	0	0	99.00	97.97	99.75
		Tirunelveli	0	0	0	0	0	0	0	0	0	99.65	99.00	99.75
		Tiruppur	0	0	0	0	0	0	0	0	0	99.10	98.25	99.81
	(ii) 0-5 (with frequency hopping)	Salem	95.10	90.20	96.74	95.23	95.80	96.22	96.80	95.00	93.70	0	0	0
		Tirunelveli	95.20	92.64	96.70	95.08	97.00	95.65	97.63	93.00	96.50	0	0	0
Tiruppur		95.10	96.34	96.54	95.30	97.93	97.63	95.63	93.47	94.30	0	0	0	
1.4	Call Setup Success Rate (>=95%)	Salem	100	100	99.22	100	100	99.32	100	97.64	99.39	100	100	99.55
		Tirunelveli	100	99.39	97.00	100	100	99.29	100	97.94	100.00	100	100	100
		Tiruppur	100	100	100	100	100	98.74	96.73	98.06	99.32	100	100	100

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

- Blocked call rate parameter is not met by BSNL in Tirunelveli & UNINOR in Tiruppur..
- Good Voice Quality parameter is not met by Airtel in Salem & Tirunelveli, Videocon in Tirunelveli & Tiruppur and Vodafone in Salem & Tiruppur.
- All other parameters are found to be in order in all the three cities for all the Operators.

Independent Drive Test

---- submitted as a separate report

CHAPTER-3: AUDIT- PMR VERIFICATION

S/N	PMR Name of Parameter	Bench- mark	Audit	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																
	BTS Accumulated Downtime	<=2%	Reported	0.08%	0.09%	0.36%	0.04%	0.01%	0.04%	0.01%	0.01%	0.06%	0.04%	0.04%	0.02%	0.01%	
			Verified	0.10%	0.09%	0.36%	0.04%	0.01%	0.04%	0.01%	0.01%	0.06%	0.02%	0.04%	0.02%	0.01%	
	Worst affected BTSs due to downtime	<=2%	Reported	0.01%	0.27%	1.40%	0.00%	0.00%	0.05%	0.01%	0.00%	0.08%	0.11%	0.00%	0.00%	0.00%	
			Verified	0.01%	0.27%	1.40%	0.00%	0.00%	0.05%	0.01%	0.00%	0.08%	0.03%	0.00%	0.00%	0.00%	
2	Connection Establishment (Accessibility)																
	CSSR (Call Setup Success Rate)	>=95%	Reported	97.62%	98.30%	98.13%	99.57%	99.23%	99.77%	98.59%	99.32%	94.99%	98.20%	99.20%	99.69%	99.79%	
			Verified	98.47%	98.30%	98.13%	99.57%	99.23%	99.77%	98.59%	99.32%	94.99%	98.13%	99.20%	99.69%	99.79%	
	SDCCH/PAGING congestion	<=1%	Reported	0.34%	0.45%	0.12%	0.02%	0.11%	0.07%	0.10%	0.02%	0.19%	0.35%	0.00%	0.00%	0.00%	
			Verified	0.48%	0.45%	0.12%	0.02%	0.08%	0.07%	0.12%	0.02%	0.19%	0.25%	0.00%	0.00%	0.00%	
TCH congestion	<=2%	Reported	0.48%	0.46%	0.51%	0.00%	0.11%	0.04%	0.11%	0.01%	0.55%	0.98%	0.00%	0.04%	0.00%		
		Verified	0.72%	0.46%	0.51%	0.00%	0.09%	0.04%	0.11%	0.01%	0.55%	1.29%	0.00%	0.04%	0.00%		
3	Connection maintenance (retainability)																
	CDR	<=2%	Reported	0.88%	0.93%	0.69%	0.39%	0.76%	0.43%	0.51%	0.41%	1.26%	0.90%	0.52%	0.51%	0.13%	
			Verified	0.43%	0.93%	0.69%	0.39%	0.76%	0.43%	0.51%	0.41%	1.26%	0.83%	0.52%	0.51%	0.13%	
	Worst affected cells>3% TCH drop	<=5%	Reported	3.47%	2.22%	2.58%	3.90%	5.77%	3.26%	1.62%	0.29%	3.59%	2.47%	1.70%	1.64%	0.00%	
			Verified	1.70%	2.22%	2.58%	3.90%	5.36%	3.26%	1.62%	0.29%	3.59%	2.37%	1.70%	1.64%	0.00%	
Good voice quality	>=95%	Reported	97.04%	97.06%	99.00%	98.72%	98.48%	98.30%	98.62%	98.86%	97.53%	96.96%	99.41%	98.75%	99.85%		
		Verified	95.88%	97.06%	99.00%	98.72%	98.45%	98.30%	98.62%	98.86%	97.53%	96.96%	99.41%	98.75%	99.85%		
4	POI congestion	<=0.5%	Reported	0	0	0	0	0	0	0	4.00	1.00	0	0	0	0	
			Verified	0	0	0	0	0	0	0	4.00	1.00	0	0	0	0	
(B)	Customer Service Quality Parameters																
5	Metering/billing credibility-Post paid	<= 0.1%	Reported	0.07%	0.01%	0.00%	NA	NR	0.00%	0.01%	NA	NA	0.00%	0.00%	0.00%	0.02%	
			Verified	0.07%	0.01%	0.02%	NA	0.06%	0.00%	0.01%	NA	NA	0.00%	0.00%	0.00%	0.00%	
6	Metering /billing credibility-Pre paid	<= 0.1%	Reported	0.18%	0.11%	0.00%	0.00%	NR	0.03%	0.00%	0.00%	0.05%	0.03%	0.09%	0.03%	0.17%	
			Verified	0.18%	0.11%	0.03%	0.00%	0.06%	0.03%	0.00%	0.00%	0.05%	0.01%	0.09%	0.03%	0.05%	
7	Resolution of billing/ charging complaints	100% within 4 weeks	Reported	100%	100%	100%	100%	NR	100%	100%	100%	100%	100%	100%	100%	100%	
			Verified	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
	Period of applying credit/waiver/adjustment to the customer's account from the date of resolutions of complaints	<=1 week	Reported	100%	100%	100%	NA	NR	100%	100%	NA	100%	100%	100%	100%	100%	
		Verified	100%	100%	100%	NA	100%	100%	100%	NA	100%	100%	100%	100%	100%	100%	
8	Response time to customers for assistance																
	Accessibility of call centre/Customer Care	>=95%	Reported	100%	100%	100%	87.79%	NR	100%	100%	96.43%	95.33%	100%	99.00%	100%	97.00%	
			Verified	100%	100%	100%	87.79%	99.24%	100%	100%	96.43%	95.33%	100%	99.00%	100%	97.00%	
	% call answered by operators(voice to voice) within 60 sec.	>=90%	Reported	46.84%	70.00%	94.00%	98.95%	NR	90.00%	89.00%	90.44%	92.00%	85.00%	91.30%	95.00%	95.00%	
		Verified	46.84%	70.00%	94.00%	98.95%	51.00%	90.00%	89.00%	90.44%	92.00%	85.00%	91.30%	95.00%	94.00%		
9	Termination/closure of service																
	No.of requests for Termination / Closure of service complied within 7 days during the quarter	<=7days	Reported	100%	100%	100%	NA	NR	100%	100%	NA	NA	100%	0.00%	100%	100%	
			Verified	100%	100%	100%	NA	100.00%	100%	100%	NA	NA	100%	0.00%	100%	100%	
10	Time taken for refunds of deposits after closures.	100% within 60 days	Reported	100%	100%	100%	NA	NR	100%	63.00%	NA	NA	100%	0.00%	100%	97.00%	
			Verified	100%	100%	100%	NA	NA	100%	63.00%	NA	NA	100%	0.00%	100%	99.00%	

Critical Analysis (PMR Verification):

- The figures proved to be matching with the data obtained from all the operators for verification.
- IDEA is not meeting the benchmark for the parameter "Worst affected cells>3% TCH drop" with high margins.
- In case of POI congestion, UNINOR (4) & VIDOCONE (1) are not meeting the benchmark.
- AIRCEL, AIRTEL & Tata CDMA are not meeting the benchmark for "Metering/Billing Credibility-Pre-paid".
- ETISALAT is not meeting the bench mark of "Accessibility of call centre/Customer Care".
- AIRCEL, AIRTEL, IDEA, Tata GSM & VODAFONE are not meeting the benchmark of "% call answered by operators (voice to voice) within 60 sec.
- Tata-GSM & CDMA both are not meeting the 60 days' benchmark for "Refund of deposits after closure of connection".

CHAPTER-4: DETAILED FINDINGS & ANALYSIS

Cellular Mobile Telephone Service.

(A) MSC Audit. 3 Days Live Data Assessment & Summarized Findings

S/N	Name of Parameter	Benchmark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom	TTSL	Uninor	Vi-con	V-fone	MTS	Rcom	TTSL
			GSM Operators										CDMA Operators		
A	Network Service Quality Parameter														
1	Network Availability														
	a) BTS Accumulated Downtime	<=2%	0.33%	0.05%	0.28%	0.00%	0.01%	0.25%	0.06%	0.03%	0.04%	0.03%	0.10%	0.26%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.01%	0.02%	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		6009	8519	5161	51	3312	2805	3083	2437	2962	6630	1144	1751	731
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		1418	291	1032	0	13	510	125	50	84	144.61	83	331	1
	e) No. of BTSs having accumulated downtime of >24 hours in a month		0	1	1	0	0	0	0	0	0	0	0	0	0
1	Connection Establishment (Accessibility)														
	a) CSSR	>=95%	99.94%	98.03%	98.91%	99.54%	99.63%	99.80%	99.25%	99.20%	98.62%	98.15%	98.90%	99.79%	99.17%
	b) SDCCH/PAGING congestion	<=1%	0.66%	0.87%	0.05%	0.00%	0.02%	0.00%	0.21%	0.04%	0.01%	0.57%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	0.71%	0.35%	0.03%	0.00%	0.03%	0.70%	0.32%	0.10%	0.01%	1.09%	0.00%	0.03%	0.53%
2	Connection maintenance														
	a) CDR	<=2%	0.47%	0.94%	0.87%	0.40%	0.43%	0.24%	0.54%	1.16%	0.91%	0.74%	1.10%	0.38%	0.63%
	b) Cells having > 3% TCH drop	<=3%	2.37%	5.17%	6.06%	4.97%	1.21%	0.88%	3.61%	1.90%	9.97%	3.73%	2.66%	0.40%	0.82%
	c) Good voice quality	>=95%	95.60%	97.03%	98.04%	98.60%	98.23%	99.32%	98.65%	98.67%	98.04%	97.19%	100.00%	NP	NP
	d) No. of cells > 3% TCH drop		421	1,304	929	8	121	74	326	138	885	736	92	7	18
	e) Total no. of cells in the network		17,730	25,213	15,332	153	9,990	8,415	9,018	7,280	8,880	19,757	3,461	1,751	2,205
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		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	b) Total No. of call attempts on POI (Avg.)		93,402	3,975,224	1,230,686	678	10,221	855,432	175,110	360,648	406,884	61,992	366,525	855,432	449,605
	c) Total traffic served on POI (Erlang) (Avg.)		1,560	151,031	48,454	18	275	28,171	3,479	10,360	9,643	144,694	6,957	28,171	8,367
	d) Total No. of circuits on POI		119,684	259,726	79,853	1,959	36,593	72,491	6,865	19,006	37,420	261,015	16,123	72,491	17,481
	e) Total number of working POI Service Area wise		41	216	37	53	76	NP	10	70	78	64	56	NP	33
	f) Equipped Capacity of Network in respect of Traffic in erlang		388,517	430,144	223,009	1,132	72,294	NP	119,936	79,746	62,555	269,631	66,600	NP	83,477
	g) Total traffic handled in TCBH in erlang		278,508	284,313	98,281	21	28,753	NP	31,982	19,947	17,285	251,276	25,260	NP	10,497
(B)	Customer Service Quality Parameters														
4	Response time to customers for assistance														
	a) Accessibility of call centre	>=95%	68.00%	NP	100.00%	96.30%	99.28%	98.20%	INCLUDED IN THE TN CIRCLE	98.24%	99.69%	69.27%	99.50%	97.34%	99.00%
	b) % of call answered by operators(voice to voice) within 60 sec	>=90%	76.71%	NP	59.05%	96.30%	85.78%	63.94%		79.53%	99.16%	95.06%	90.69%	85.66%	97.50%
	c) No. of call attempts to call centre / customer care nos. during TCBH (Avg)		16,185	NP	486	108	3,115	5,873		10,651	3,201	3,848	1,569	3,458	2,038
	d) No. of calls connected and answered successfully to call centre / customer care nos. during TCBH (Avg)		12,415	NP	287	104	2,672	3,755		8,471	3,174	3,658	1,423	2,962	1,987

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 0.28%.
- **Worst affected BTSs due to downtime (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values laying between 0% and 0.02%.
- **Call setup success rate (benchmark $\geq 95\%$):** All operators are meeting the benchmark with values laying between 98.03% and 99.94%.
- **SDCCH/PAGING Channel congestion (benchmark $\leq 1\%$):** All operators are meeting the benchmark with values laying between 0% and 0.87%.
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 1.09%.
- **Call drop rate (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values laying between 0.24% and 1.16%.
- **Cell exceeding 3% TCH drop (benchmark $\leq 3\%$):** Airtel, BSNL, Etisalat, Tata GSM, Videocon & Vodafone with a value of 5.17%, 6.06%, 4.97%, 3.61%, 9.97% & 3.73 respectively are not meeting the benchmark. Rests of the operators are satisfying the benchmark with value in between 0.40% and 2.66%.
- **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 laying between 95.60% 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 (68%) & VODAFONE (69.27%) are not meeting the benchmark. All other operators are meeting the benchmark with values laying between 96.30% and 100%.
- **%age of call answered by operator (Voice to voice) (benchmark $>90\%$):** AIRCEL (76.71%), BSNL (59.05%), IDEA (85.78%), RCOM GSM (63.94%) & CDMA (85.66%), & UNINOR (79.53%) are not meeting the benchmark. All other operators are meeting the benchmark with values laying between 90.69% and 99.16%

(2) Month Data Assessment & Summarized Findings

S/N	Name of Parameter	Bench mark	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%	0.35%	0.05%	0.35%	0.15%	0.02%	0.02%	0.04%	0.02%	0.05%	0.02%	0.05%	0.03%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.13%	1.40%	0.00%	0.00%	0.00%	0.00%	0.00%	0.20%	0.03%	0.00%	0.00%	0.00%
	c) Total no. of BTSs in the licensed service area		6,009	8,519	5,161	51	3,312	2,805	3,083	2,437	2,962	6,630	1,144	1,751	731
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		15,621	3,371	13,379	57	399	510	947	319	1,116	1,057	425	331	32
	e) No. of BTSs having accumulated downtime of >24 hours in a month		22	11	72	0	0	0	0	0	6	2	0	0	0
2	Connection Establishment (Accessibility)														
	a) CSSR (Call Setup Success Rate)	>=95%	99.95%	98.36%	98.90%	99.44%	98.88%	99.78%	99.27%	99.24%	98.53%	98.43%	99.05%	99.78%	99.00%
	b) SDCCH/PAGING congestion	<=1%	0.66%	0.56%	0.04%	0.00%	0.03%	0.07%	0.23%	0.03%	0.02%	0.35%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	0.73%	0.33%	0.04%	0.00%	0.07%	0.70%	0.30%	0.08%	0.04%	1.01%	0.00%	0.03%	0.57%
3	Connection maintenance (retainability)														
	a) CDR	<=2%	0.47%	0.94%	0.88%	0.45%	0.48%	0.25%	0.55%	1.06%	0.94%	0.74%	0.95%	0.40%	0.64%
	b) Worst affected cells>3% TCH drop	<=3%	2.36%	4.63%	5.32%	3.92%	1.36%	0.86%	3.76%	1.84%	9.94%	3.57%	2.22%	0.40%	0.82%
	c) Good voice quality	>=95%	95.60%	97.07%	98.05%	98.49%	98.22%	99.30%	98.63%	98.72%	98.00%	97.16%	100%	NA	NA
	d) Total No. of cells exceeding 3% TCH drop (call drop)		419	1,168	816	6	136	72	339	134	883	705	77	7	18
	e) Total no. of cells in the network		17,730	25,213	15,332	153	9,990	8,415	9,018	7,280	8,880	19,757	3,461	1,751	2,205

S/N	Name of Parameter	Bench mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	TATA GSM	Uninor	Vi-con	V-fone	MTS	Rcom CDMA	TATA CDMA
			GSM Operators											CDMA Operators	
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		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	b) Total No. of call attempts on POI (Avg.)		96,976	4,162,849	1,260,141	433	10,495	768,100	172,325	390,905	409,812	116,674	374,965	768,100	427,938
	c) Total traffic served on POI (Erlang) (Avg.)		1,592	149,103	48,437	21	275	25,717	3,409	10,329	9,593	152,075	6,676	25,717	7,850
	d) Total No. of circuits on POI		119,684	259,726	79,853	1,959	36,588	68,885	6,865	19,006	37,420	261,976	16,123	68,885	17,481
	e) Total number of working POI Service Area wise		41	216	37	53	76	NP	10	70	78	64	56	NP	33
5	Network Data														
	a) Equipped Capacity of Network Erlang		388,517	430,144	223,009	1,132	72,294	NP	119,936	79,746	62,555	269,631	66,600	NP	83,477
	b) Total traffic in TCBH in erlang (Avg.)		281,894	285,773	88,854	24	28,352	NP	30,879	19,351	17,201	256,680	24,852	NP	10,382
	c) Total no. of customers served (as per VLR) on last day of the month		8,868,897	8,744,794	3,147,071	2,339	1,023,541	NP	1,166,979	0	539,860	7,993,208	818,532	NP	516,863
(B)	Customer Service Quality Parameters														
6	Metering/billing credibility-Post paid	<= 0.1%	0.09%	0.03%	0.09%	NA	0.10%	0.10%	INCLUDED IN THE TN CIRCLE	NA	NA	0.35%	NA	0.05%	0.16%
	a) No. of bills issued during the period		256,583	123,580	160,332	NA	20,528	48,268		NA	NA	193,237	NA	143,048	53,519
	b) No. of bills disputed including billing complaints during the period		234	36	143	NA	21	48		NA	NA	681	NA	74	83
7	Metering /billing credibility-Pre paid	<= 0.1%	0.09%	0.11%	0.02%	0.00%	0.10%	0.09%		0.00%	0.09%	0.04%	0.01%	0.01%	0.40%
	a) No. of charging / credit / validity complaints during the quarter		14,750	10,022	981	0	1,518	4,270		11	1,427	4,166	106	349	923
	b) Total no. of pre-paid customers at the end of the quarter		16,358,482	9,255,568	6,408,983	24,991	1,548,043	4,540,737		1,092,000	1,522,515	10,386,637	1,397,753	2,799,568	231,469

S/N	Name of Parameter	Bench mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	TATA GSM	Uninor	Vi-con	V-fone	MTS	Rcom CDMA	TATA CDM A
			GSM Operators									CDMA Operators			
8	Resolution of billing/ charging complaints	100% within 4 weeks	100%	100%	100%	NA	100%	100%	INCL ED IN THE TN CIRCLE	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		14,984	10,058	1,124	NA	1,539	4,318		2,573	1,427	4,847	106	423	1,006
	b) Total no. of billing (post paid) and charging, credit / validity (pre paid) complaints received during the quarter		14,984	10,058	1,124	NA	1,539	4,318		2,573	1,427	4,847	106	423	1,006
	c) No. of billing complaints (post paid) and charging, credit/ validity complaints (pre paid) resolved in favour of the customer during the quarter		2,751	10,058	193	NA	632	80		11	42	3,260	14	47	63
	d) No. of complaints disposed on account of not considered as valid complaints during the quarter		12,233	7,737	931	NA	907	4,238		2,562	1,385	1,587	92	376	943
	e) 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%	100%
9	Response time to customers for assistance														
	a) Accessibility of call centre/Customer Care	>=95%	78.73%	100%	100%	98.55%	97.62%	98.23%	96.98%	99.48%	68.87%	99.32%	97.75%	99.00%	
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	75.52%	92.38%	79.51%	98.55%	78.46%	67.95%	79.11%	97.73%	84.84%	90.06%	88.09%	96.98%	
	c) Total no. of call attempts to call centre & customer care nos. during TCBH (Avg.).		13,577	124,686	283	1,105	25,077	5,579	10,371	19,837	41,709	16,625	3,309	1,952	
	d) No. of calls connected and answered successfully to call centre & customer care nos. during TCBH (Avg.).		10,254	115,183	225	1,089	19,675	3,791	8,205	19,387	35,385	14,973	2,915	1,893	

S/N	Name of Parameter	Bench mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	TATA GSM	Uninor	Vi-con	V-fone	MTS	Rcom CDMA	TATA CDM A
			GSM Operators									CDMA Operators			
10	Termination/closure of service	<=7days	100%	100%	100%	NA	100%	100%	INCLUDED IN THE TN CIRCLE	NA	0%	100%	NA	100%	100%
	a) Total No. of requests for Termination / Closure of service received during the quarter		1,137	1,376	4,516	0	148	334		NA	NA	669	NA	643	2,911
	b) No.of requests for Termination / Closure of service complied within 7 days during the quarter		1,137	1,376	4,516	0	148	334		NA	NA	669	NA	643	2,911
11	Time taken for refunds of deposits after closures.	100% within 60 days	100%	100%	100%	NA	100%	100%		NA	NA	100%	NA	100%	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 0.35%.
- **Worst affected BTSs due to downtime (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values laying between 0% and 1.40%.
- **Call setup success rate (benchmark $\geq 95\%$):** All operators are meeting the benchmark with values laying between 98.36% and 99.95%.
- **SDCCH/PAGING Channel congestion (benchmark $\leq 1\%$):** All operators are meeting the benchmark with values laying between 0% and 0.66%.
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 1.01%.
- **Call drop rate (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values laying between 0.25% and 1.06%.
- **Cell exceeding 3% TCH drop (benchmark $\leq 3\%$):** Airtel, BSNL, Etisalat, Tata GSM, Videocon & Vodafone with a value of 4.63%, 5.32%, 3.92%, 3.76%, 9.94% & 3.57 respectively are not meeting the benchmark. Rests of the operators are satisfying the benchmark with value in between 0.40% and 2.36%.
- **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 laying between 95.60% 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 (78.73%) & VODAFONE (68.87%) are not meeting the benchmark. All other operators are meeting the benchmark with values laying between 96.30% and 100%.
- **%age of call answered by operator (Voice to voice) (benchmark $>90\%$):** AIRCEL (75.52%), BSNL (79.51%), IDEA (78.46%), RCOM GSM (67.95%) & CDMA (88.09%), & UNINOR (79.11%) & VODAFONE (84.84%) are not meeting the benchmark. Other operators are meeting the benchmark with values laying between 90.06% and 98.55%
- **Metering and billing credibility-Post paid (benchmark $\leq 0.1\%$):** All operators are meeting the benchmark with values laying between 0.0% and 0.10% except VODAFONE (0.35%) & TATA CDMA(0.16%)
- **Metering and billing credibility-Pre paid (benchmark $\leq 0.1\%$):** Except for AIRTEL (0.11%) & TATA CDMA(0.40%) all the operators are meeting the benchmark with values laying between 0% and 0.09%.
- **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:

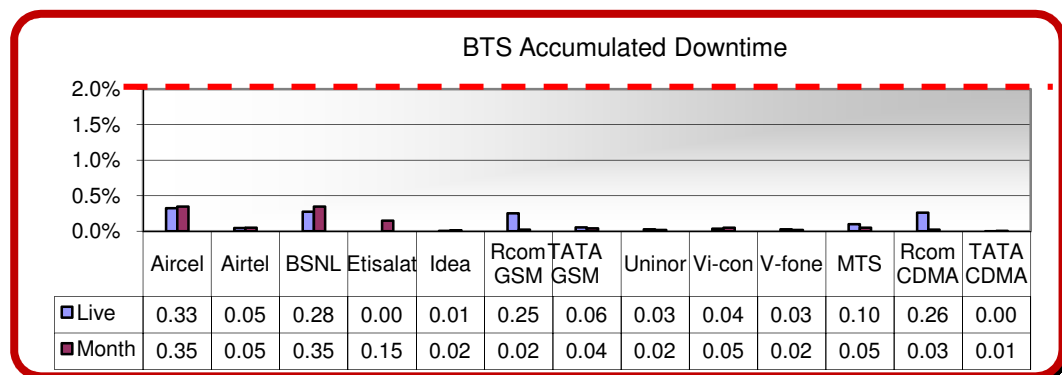
Sl.	Name of Service Provider	No. of MSC/GMSC	No. of BSC	No. of BTS
GSM Operators				
1	Aircel Ltd	10	62	6009
2	Airtel Ltd	34	88	8519
3	BSNL	21	76	5161
4	Etisalat	3	6	51
5	Idea	2	17	3312
6	Reliance Communication (GSM)	3	14	2805
7	Tata Communications (GSM)	2	20	3083
8	Uninor	8	17	2437
9	Videocon	1	17	2962
10	Vodafone	14	98	6630
CDMA Operators				
11	MTS (CDMA)	1	4	1144
12	Reliance Communication (CDMA)	7	5	1751
13	Tata Communications (CDMA)	2	11	731

(4) Performance (Graphical Representation)

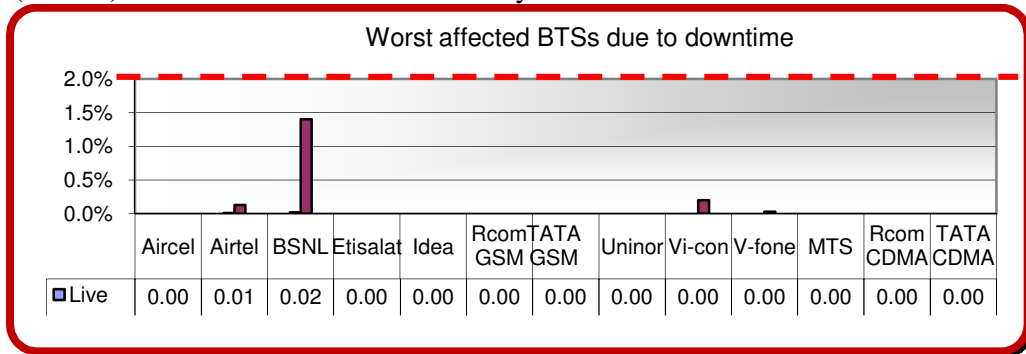
Comparison between Live measurements and One month data Audit – Cellular Mobile Telephone Services

A) NETWORK PERFORMANCE

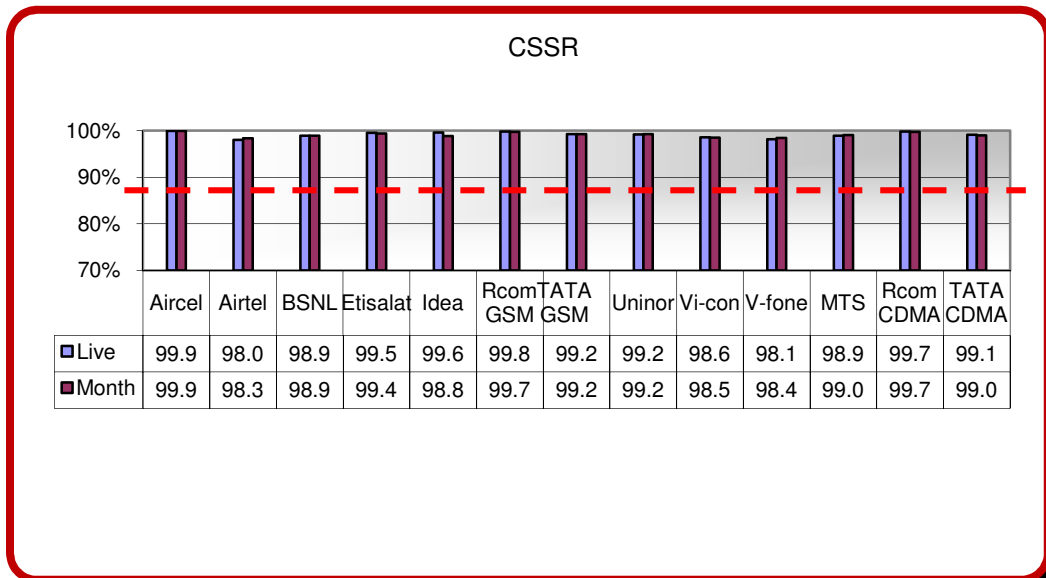
- I. **BTS Accumulated Downtime:** All operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data taken in the month of audit.



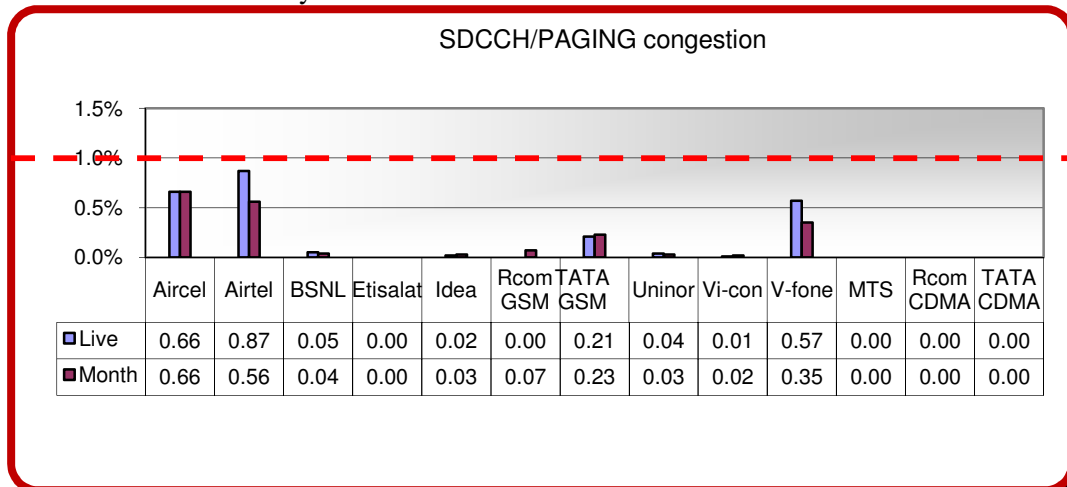
Worst affected BTSs due to downtime: All operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data taken in the month of audit



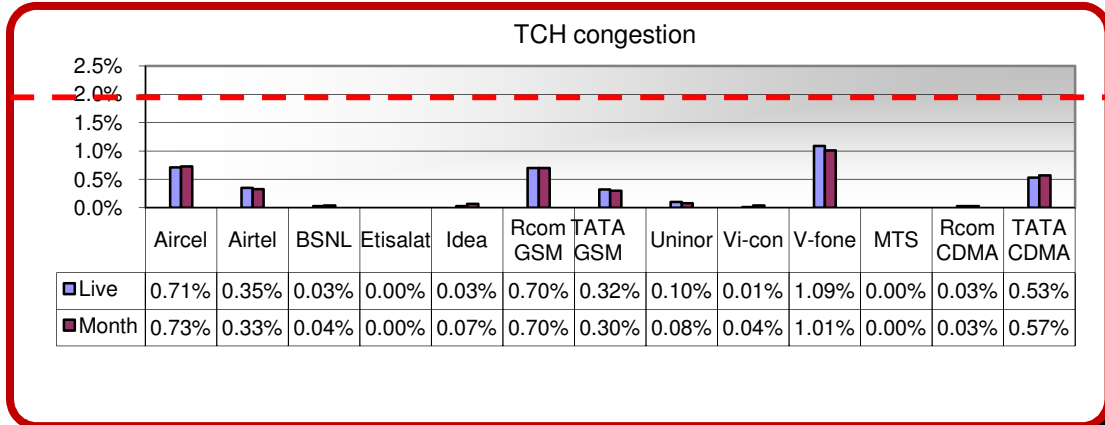
II. Call setup success rate ($\geq 95\%$): All operators are meeting the TRAI benchmarks ($\geq 95\%$) for both one month data and 3 days live data taken in the month of audit.



III. 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.

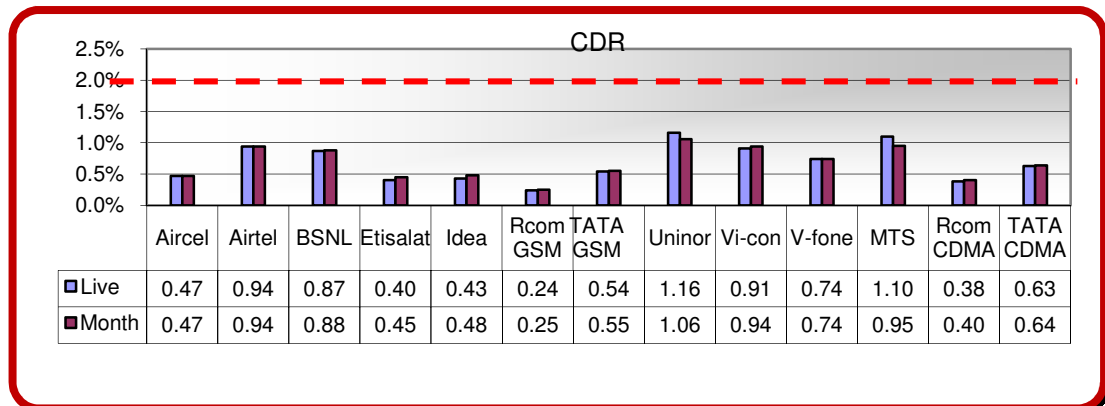


TCH congestion (2%): All operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data taken in the month of audit.

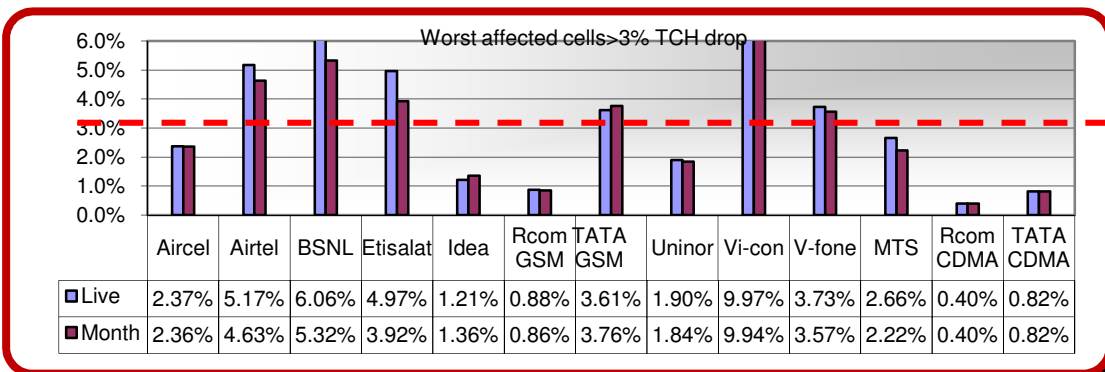


IV. Connection Maintainability (Retainability):

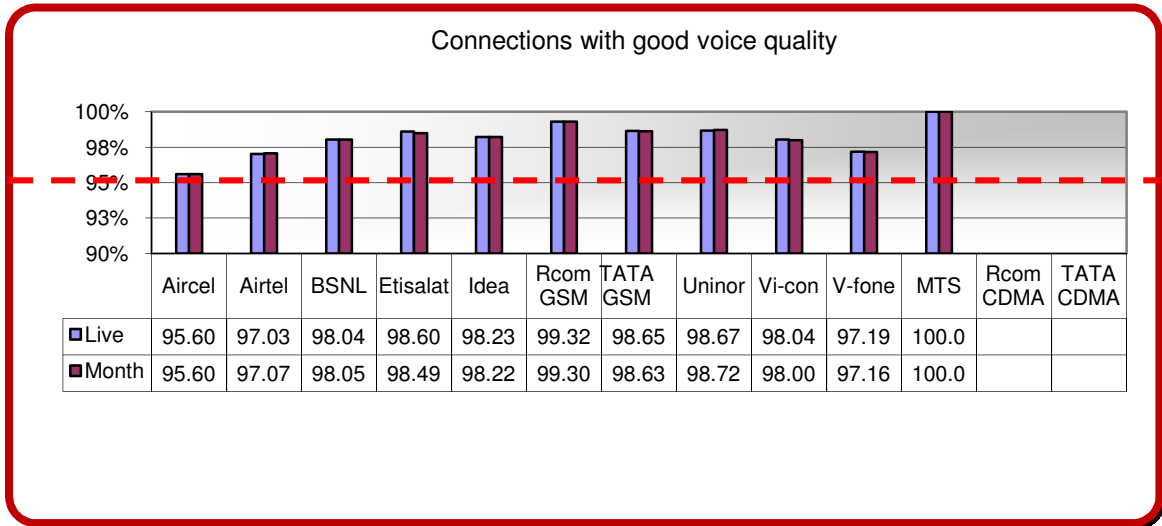
Call drop rate (2%): All operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data taken in the month of audit.



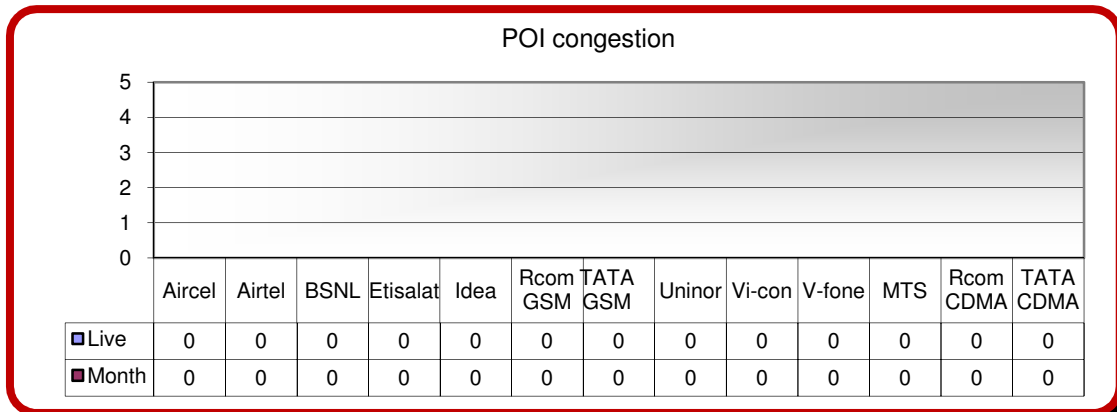
Worst affected Cell exceeding 3% TCH Drop: For both live and month data, **Airtel, BSNL, Etisalat, Tata GSM, Videocon & Vodafone** are found not meeting the benchmark of $\leq 3\%$. Rests of the seven operators are meeting the benchmark for both cases.



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.



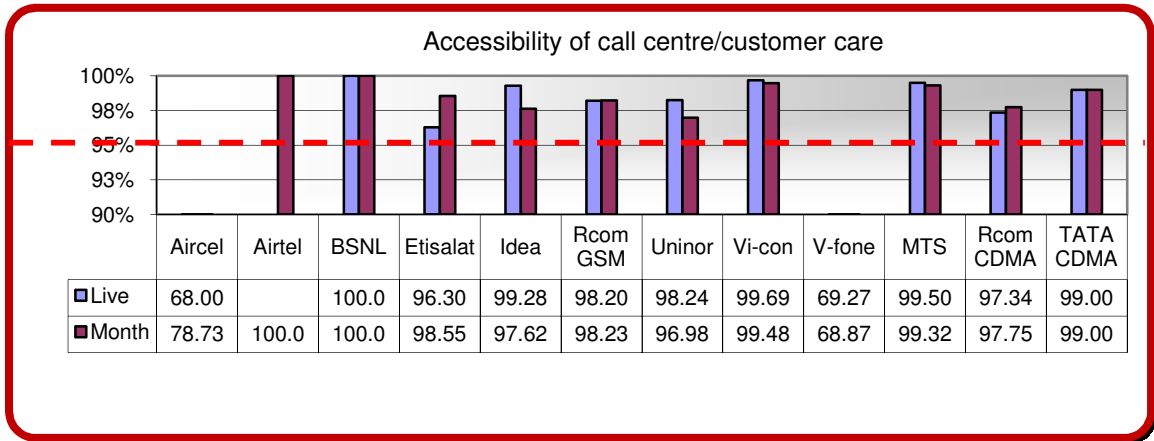
POI Congestion: All operators are meeting the TRAI benchmarks ($\leq 0.5\%$) for both one month data and 3 days live data taken in the month of audit.



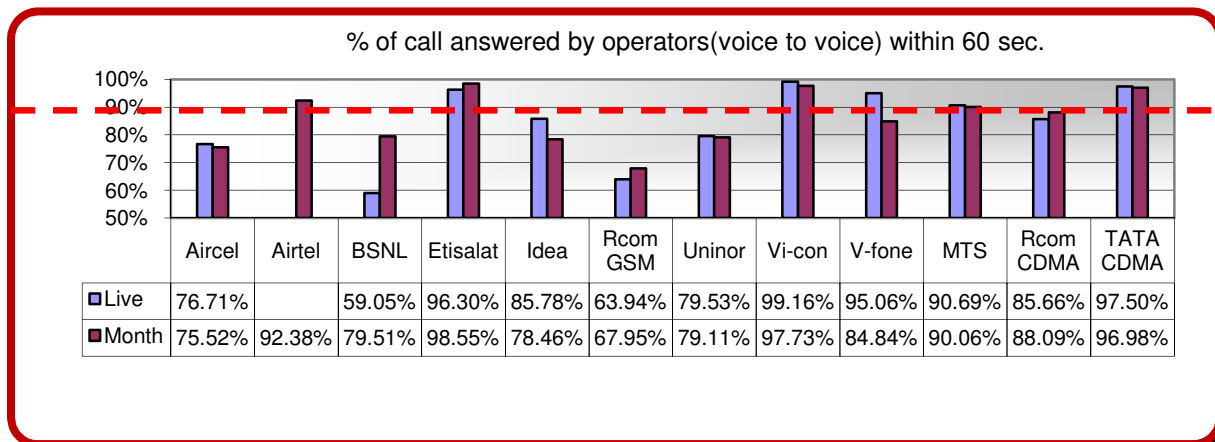
B) CUSTOMER SERVICE QUALITY PARAMETERS

(A) Response time to the customer for assistance:

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



Percentage of call answered by operators (Voice to voice) within 60 sec: For month audit VODAFONE & for both Live and month audit AIRCEL, BSNL, IDEA, RCOM GSM, UNINOR, RCOM CDMA are not meeting the benchmark.



(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 “Worst affected BTSs due to downtime” (BSNL & VIDEOCON), SDCCH Congestion (AIRTEL & VODAFONE) and “%age of calls answered by operator” (BSNL & VODAFONE).

(B) Redressal**i. Sample coverage**

resolution of billing/charging complaints within 4 weeks as claimed by the respective operators.

ii. Performance (live calling for billing complaints)

Calling Operator	Aircel	Airtel	BSNL	ETISAL AT	Idea	Rcom GSM	Tata GSIn	Uninor	VIDEO CON	Vodafone	MTS	Rcom CDMA	Tata CDMA
Total No. of Calls Attempted	100	100	100	No Complaints	100	100	INCLUDED IN THE TN CIRCLE	100	100	100	100	100	100
Total No. of calls Answered	96	95	93		94	95		92	91	95	92	96	96
Cases resolved with 4 weeks	96	95	93		94	93		90	90	94	91	95	96
%age of cases resolved	100%	100%	100%		100%	98%		98%	99%	99%	99%	99%	99%

iii. Live calling to call centre

Calling Operator	Aircel	Airtel	BSNL	Efsalat	Idea	Rcom GSM	Tata GSM	Uninor	Videcon	Vodafone	MTS	Rcom CDMA	Tata CDMA
Total No. of Calls Attempted	100	100	100	100	100	100	100	100	100	100	100	100	100
Total No. of calls connected to IVR	100	99	100	100	100	100	100	100	100	100	100	100	100
Calls got connected to agent within 60 Sec	100	99	87	100	100	100	98	100	100	100	100	100	100
%age of calls got answered	100%	99%	87%	100%	100%	100%	98%	100%	100%	100%	100%	100%	100%

iv. Level 1 calling

Emergency no.		No. of calls made	Aircel	Airtel	BSNL	ETISALAT	Idea	Rcom GSM	Tata GSm	Uninor	VIDEOCON	Vodafone	MTS	Rcom CDMA	Tata CDMA
		SALEM													
100	Police	5	5	5	5	5	5	5	5	5	5	5	5	5	5
101	Fire	5	5	5	5	5	5	5	5	5	5	5	5	5	5
102	Ambulance	5	5	5	5	5	5	5	5	5	5	5	5	5	5
139	Railway	5	5	5	5	5	5	5	5	5	5	5	5	5	5
		TIRUNELVELI													
100	Police	5	5	5	5	5	5	5	5	5	5	5	5	5	5
101	Fire	5	5	5	5	5	5	5	5	5	5	5	5	5	5
102	Ambulance	5	5	5	5	5	5	5	5	5	5	5	5	5	5
139	Railway	5	5	5	5	5	5	5	5	5	5	5	5	5	5
		TIRUPPUR													
100	Police	5	5	5	5	5	5	5	5	5	5	5	5	5	5
101	Fire	5	5	5	5	5	5	5	5	5	5	5	5	5	5
102	Ambulance	5	5	5	5	5	5	5	5	5	5	5	5	5	5
139	Railway	5	5	5	5	5	5	5	5	5	5	5	5	5	5

v. 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% in most of the cases as claimed by their records. During the live calling to call centre & Level 1 calling it is found that all calls are connected & responded with in time limits.

It is to be noted that performance of BSNL in live calling to call centre is not good as compared to other operators.

(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%	100%	100%	100%	100%	100%	100%
Airtel	100%	-	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
BSNL	100%	100%	-	100%	100%	98%	100%	100%	100%	100%	100%	100%	100%
Etisalat	100%	90%	100%	-	100%	100%	100%	100%	100%	100%	100%	100%	100%
Idea	100%	100%	100%	100%	-	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	100%	100%	100%	100%	100%	100%	100%	-	100%	100%	100%	100%	100%
Videocon	100%	98%	96%	100%	100%	98%	100%	100%	-	99%	100%	100%	99%
Vodafone	99%	100%	100%	100%	100%	95%	100%	100%	100%	-	100%	100%	100%
MTS	100%	98%	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 100-130Km depending on city areas within the speed limit of 30Km/hr.

Drive Test Locations***SALEM***

LOW DENSE:	Karuppur Eng. Road, Steel Plant road & Kondalampatti-Seelanaickenpatti Bypass Road
MEDIUM DENSE:	Adivaram road, Law college, Collector Bunglow, Chinna thirupati , Railway division office & M.gollapatty
HIGH DENSE:	Shevapet, Gugai, annathanapatti, Narayana nagar, fairlands, four Roads, five roads, chatram, Leibazaar, 1st & II nd agraharam, New bus stand

TIRUNELVELI

LOW DENSE:	MS University, VM Chatram, Ramayanpatty, Karaiyiruppu, Tuticorin road
MEDIUM DENSE:	Palayapettai, Thachanallur, Melapalayam, Thimmarajapuram, Pothigai nagar, PLC market
HIGH DENSE:	Sripuram, TVL Junction, Murugankurichi, Palayamkottai, Kulavanigarpuram, Samadhanapuram, Govt Hospital, High ground, Anbunagar, T.Nagar, Perumalpuram, NGO Colony, Town

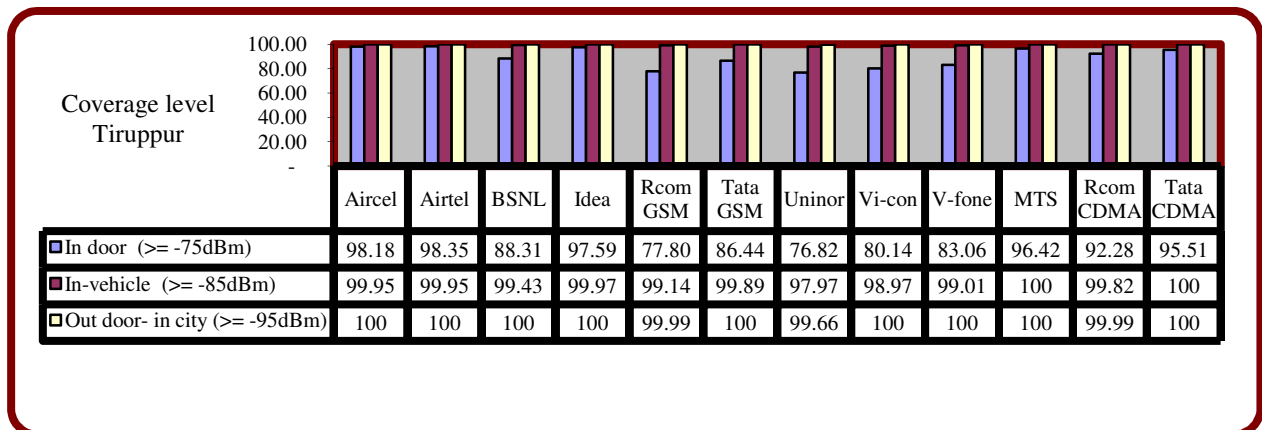
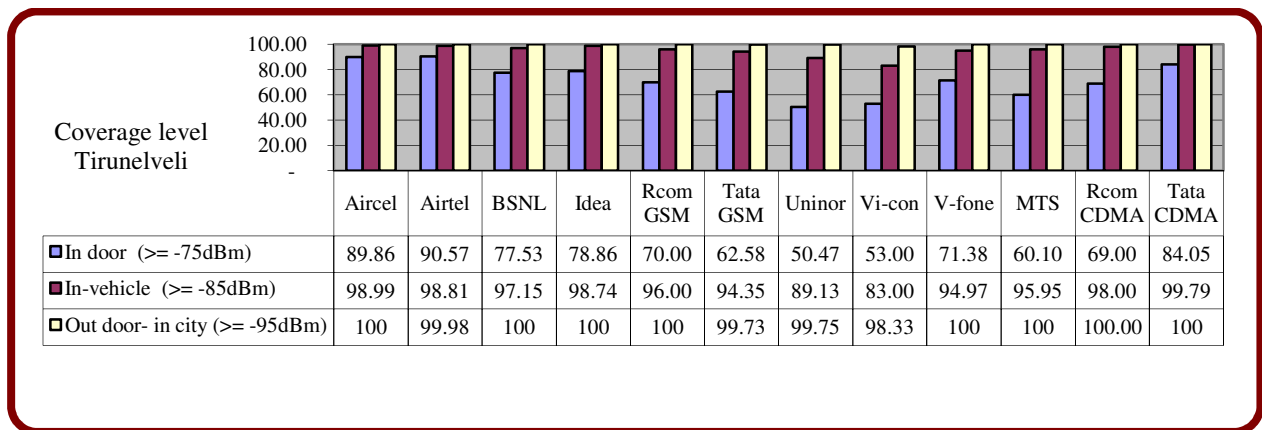
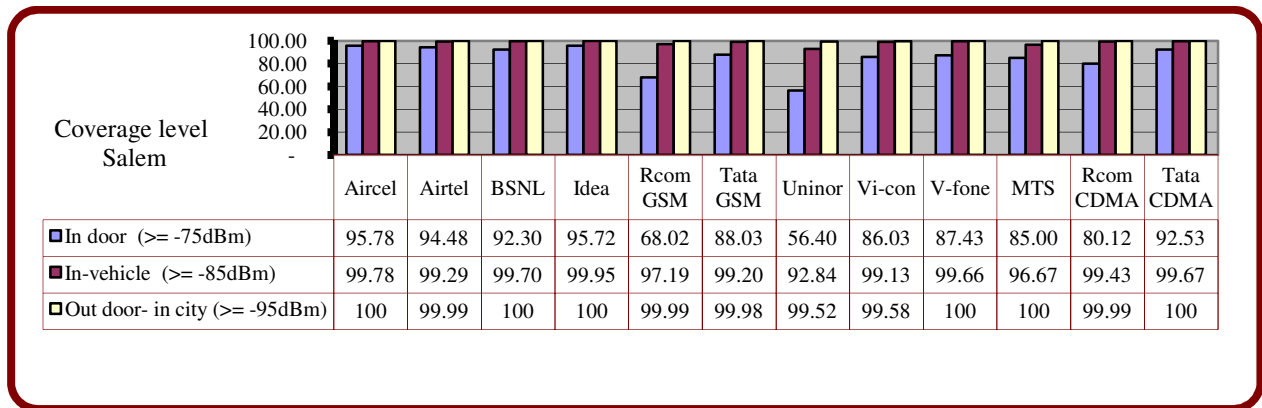
TIRUPPUR

LOW DENSE:	Arul Puram, SR Nagar Mangalam road, Ammapalayam, New Market road.
MEDIUM DENSE:	Rayapuram main road, Anuppurapalayam, Dharapuarum RD, Banglow stop, Gayathri Nagar.
HIGH DENSE:	Old Bus stand, Karuvambalayam, PN Road, New Bus stand.

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 CDM A
			GSM Operators									CDMA Operators		
1.1	Call Attempts	Salem	167	180	129	143	173	159	157	170	164	164	169	194
		Tirunelveli	162	163	200	149	186	184	167	194	195	189	188	206
		Tiruppur	157	147	137	133	162	155	153	155	147	168	153	164
1.2	Blocked Call Rate (<=3%)	Salem	0	0	0.78	0	0	0.63	0	0.59	0.61	0	0	0.52
		Tirunelveli	0	0.61	4.50	0	0	0.54	0	2.06	0	0	0	0
		Tiruppur	0	0	0	0	0	1.29	3.92	1.29	0.68	0	0	0
1.3	Dropped Call Rate (<=2%)	Salem	0	0	0	0	0	0	0.64	0	0	0	0	0
		Tirunelveli	0	0	2.00	0	0	0	0	0.52	0	0	0	0
		Tiruppur	0	0	1.46	0	0	0	0.65	0	0	0	0	0
1.4	Percentage of connections with good voice quality (=>95%) (i) 0-4 (w/o frequency hopping)	Salem										99.00	97.97	99.75
		Tirunelveli										99.65	99.00	99.75
		Tiruppur										99.10	98.25	99.81
	(ii) 0-5 (with frequency hopping)	Salem	95.10	90.20	96.74	95.23	95.80	96.22	96.80	95.00	93.70			
		Tirunelveli	95.20	92.64	96.70	95.08	97.00	95.65	97.63	93.00	96.50			
		Tiruppur	95.10	96.34	96.54	95.30	97.93	97.63	95.63	93.47	94.30			
1.5	Service Coverage In door (>= -75dBm)	Salem	95.78	94.48	92.30	95.72	68.02	88.03	56.40	86.03	87.43	85.00	80.12	92.53
		Tirunelveli	89.86	90.57	77.53	78.86	70.00	62.58	50.47	53.00	71.38	60.10	69.00	84.05
		Tiruppur	98.18	98.35	88.31	97.59	77.80	86.44	76.82	80.14	83.06	96.42	92.28	95.51
	In-vehicle (>= -85dBm)	Salem	99.78	99.29	99.70	99.95	97.19	99.20	92.84	99.13	99.66	96.67	99.43	99.67
		Tirunelveli	98.99	98.81	97.15	98.74	96.00	94.35	89.13	83.00	94.97	95.95	98.00	99.79
		Tiruppur	99.95	99.95	99.43	99.97	99.14	99.89	97.97	98.97	99.01	100	99.82	100
	Outdoor- in city (>= -95dBm)	Salem	100	99.99	100	100	99.99	99.98	99.52	99.58	100	100	99.99	100
		Tirunelveli	100	99.98	100	100	100	99.73	99.75	98.33	100	100	100.00	100
		Tiruppur	100	100	100	100	99.99	100	99.66	100	100	100	99.99	100
1.6	Call Setup Success Rate (>=95%)	Salem	100	100	99.22	100	100	99.32	100	97.64	99.39	100	100	99.55
		Tirunelveli	100	99.39	97.00	100	100	99.29	100	97.94	100	100	100	100
		Tiruppur	100	100	100	100	100	98.74	96.73	98.06	99.32	100	100	100

Graphical Representation



(3) Critical Analysis

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

- “Blocked Call Rate” parameter is not met by BSNL in Tirunelveli & UNINOR in Tiruppur.
- “Good Voice Quality” parameter is not met by Airtel in Salem & Tirunelveli, Videocon in Tirunelveli & Tiruppur and Vodafone in Salem & Tiruppur.

All other parameters are found to be in order in all the three cities for all the Operators.

(E) Independent Drive Test

.....NOT APPLICABLE

(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 $\leq 5\%$ for “worst affected cells $> 3\%$ TCH drop” is not met by **Airtel, BSNL, Etisalat, Tata GSM, Videocon & Vodafone** for both live and month data. These figures are slightly higher.

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

Regarding **Metering/Billing Credibility** issues, the value of VODAFONE (0.35%) & TATA CDMA (0.16%) shows below benchmark for Post-paid connections. AIRTEL (0.11%) & TATA CDMA (0.40%) are found to be below benchmark for pre-paid connections.

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 “Blocked Call Rate” parameter which was not met by BSNL in Tirunelveli & UNINOR in Tiruppur . Also “Good Voice Quality” parameter is not met by Airtel in Salem & Tirunelveli, Videocon in Tirunelveli & Tiruppur and Vodafone in Salem & Tiruppur.