

REPORT
ON
AUDIT & ASSESSMENT OF QUALITY OF SERVICE
OF
CELLULAR MOBILE TELEPHONE SERVICE

FOR

GUJARAT CIRCLE
(WEST ZONE)

Report Period: JAN. 2012 – MAR. 2012.

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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

CHAPTER-3: Audit-PMR data verification results

- I. Cellular Mobile Telephone Service

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 measurement for three days
- 3) Live Calling to Call Centre
- 4) Level 1 Live 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)

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 I) calls testing

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

Systems audited:-

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

Facilities audited:-

1. Billing documents.
2. Customer Care records.

Field data collections carried out:-

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

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

- ✓ TCIL auditors visited all the NSS (Network Sub System) and BSS (Base-station Sub System) to check data for all the operators in their respective service area.

- ✓ All the NSS and BSS data for the relevant details were collected either directly from the centralized NOC or through a remote access to the NOC.
- ✓ The Radio parameters were audited/verified from the data collected from OMC-R (Operation and Maintenance Center – Radio, as part of BSS data).
- ✓ The Drive test was conducted in high, low and medium dense areas including highways, commercial complex and residential areas and special attention was paid for the areas for which TRAI has received complaints.
- ✓ The POI and other network related parameters were audited/verified from the data collected from the OMC-S (Operation and Maintenance Center – Switch as part of NSS data).
- ✓ The data related to Billing and Customer care was checked for the previous month and verified with the customers by calling them on random basis. The process of registration and handling of the complaints was also studied for the various operators. Call centre number were called for measuring the efficiency of the call centre.
- ✓ The inter operator call assessment test was carried out during the time period as is specified in the tender document. TCBH (Time Consistent Busy Hour) is taken after observation of the traffic consistently for 3 days prior to the audit activity.
- ✓ Data has been collected for busy hour of network in case of live assessment & month of audit for all service providers & verified that service providers are providing busy hour data only for QoS service. We found that TCBH hour is matching with network busy hour as provided by service providers for Gujarat circle. But for parameters such as ‘Worst affected cell exceeding 3% TCH drop’ and ‘BTs 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 Gujarat Circle in 1st quarter (Jan2012 – Mar 2012). The primary data collection and verification of records (PMR data verification – quarterly) maintained by various operators was undertaken during the period Jul2011 –Sep 2011.

Following are the various operators covered in Gujarat 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	Feb.2012	2000-2100 hrs
2	Airtel Ltd	Feb.2012	1900-2000 hrs
3	BSNL	Feb.2012	1900-2000 hrs
4	Reliance Communication	Feb.2012	2000-2100 hrs
5	TATA Communications	Feb.2012	1900-2000 hrs
6	Vodafone	Feb.2012	1900-2000 hrs
7	Uninor	Feb.2012	2000-2100hrs
8	Etisalat	Operation closed	
9	Idea	Feb.2012	1900-2000 hrs
10	Videocon	Feb.2012	2000-2100hrs
CDMA operators			
11	MTS	Feb.2012	2000-2100hrs
12	Reliance Communication	Feb.2012	2000-2100 hrs
13	TATA Communications	Feb.2012	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	Idea	Rcom GSM	TATA GSM	Uninor	Video con	Voda fone	Rcom CDMA	MTS CDMA	TATA CDMA
S/N	Name of Parameter		GSM Operators									CDMA Operators		
1	Network Availability													
	a) BTS Accumulated Downtime	<=2%	0.02%	0.03%	0.45%	0.02%	0.08%	0.01%	0.00%	0.02%	0.02%	0.07%	0.02%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.00%	0.18%	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%	98.68%	99.29%	98.62%	99.43%	99.70%	99.18%	97.16%	99.18%	98.83%	99.47%	99.51%	99.04%
	b) SDCCH/PAGING congestion	<=1%	0.01%	0.06%	0.19%	0.15%	0.01%	0.04%	0.23%	0.10%	0.36%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	0.01%	0.09%	1.85%	0.17%	0.03%	0.20%	0.37%	0.20%	0.29%	0.09%	0.00%	0.00%
3	Connection maintenance (retainability)													
	a) CDR	<=2%	0.44%	1.07%	1.63%	1.05%	0.43%	0.92%	1.49%	0.55%	0.88%	0.24%	0.23%	0.45%
	b) Worst affected cells>3% TCH drop	<=3%	0.74%	1.43%	2.24%	2.13%	0.00%	6.00%	2.09%	0.41%	2.12%	0.42%	1.55%	2.31%
	c) Good voice quality	>=95%	97.78%	97.40%	NA	95.70%	98.82%	97.18%	96.76%	98.58%	97.45%	98.81%	99.53%	NA
4	No of POI having congestion	>=0.5%	0	0	0	0	0	0	0	0	0	0	0	0
5	Response time to customers for assistance													
	a) Accessibility of call centre/Customer Care	>=95%	99.00%	100.00%	100.00%	100.00%	98.90%	100.00%	91.00%	100%	100%	97.30%	100.00%	100.00%
	b) % call answered by operators (voice to voice) within 60 sec.	>=90%	87.50%	98%	100.00%	100.00%	83.00%	100.00%	91.00%	96.20%	100.00%	95.00%	100.00%	100.00%

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. However, exceptions have been found in case of TATA GSM not meeting "worst affected cells >3% TCH drop".

Customer care data is found to be satisfactory for most of the operators except for Rcom GSM and Aircel missing the 90% benchmark for the parameter "%age of calls answered by operator". Uninor have not met the benchmark for the parameter 'Accessibility to call center'.

One Month Data Audit		Bench- mark	Aircel	Airtel	BSNL	Idea	Rcom GSM	TATA GSM	Uninor	Video con	Voda fone	Rcom CDMA	MTS CDMA	TATA CDMA
S/N	Name of Parameter		GSM Operators									CDMA Operators		
(A) 1	Network Service Quality Parameter													
	Network Availability													
	a) BTS Accumulated Downtime	<=2%	0.05%	0.04%	0.60%	0.03%	0.08%	0.02%	0.03%	0.04%	0.04%	0.08%	0.06%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	0.06%	0.06%	1.42%	0.02%	0.10%	0.04%	0.00%	0.00%	0.26%	0.06%	0.00%	0.00%
	c) Total no. of BTSs in the licensed service area		896	6368	4354	5516	3077	2347	2313	1757	7165	1751	555	841
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		289.2	1959	18249	1049	1765	280.4	529.05	547	2044	963	238	12.25
	e) No. of BTSs having accumulated downtime of >24 hours in a month		0	4	62	1	3	1	0	0	19	1	0	0
2	Connection Establishment (Accessibility)													
	a) CSSR (Call Setup Success Rate)	>=95%	98.64%	99.22%	98.56%	99.38%	99.70%	99.06%	97.16%	99.10%	98.53%	99.38%	99.48%	98.98%
	b) SDCCH/PAGING congestion	<=1%	0.01%	0.14%	0.29%	0.18%	0.01%	0.13%	0.22%	0.08%	0.56%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	0.01%	0.17%	1.84%	0.22%	0.03%	0.35%	0.36%	0.22%	0.41%	0.21%	0.00%	0.05%
3	Connection maintenance (retainability)													
	a) CDR	<=2%	0.49%	1.04%	1.83%	1.03%	0.43%	1.00%	1.46%	0.56%	0.86%	0.25%	0.27%	0.47%
	b) Worst affected cells>3% TCH drop	<=3%	0.74%	1.61%	2.41%	2.15%	0.10%	2.57%	1.98%	0.49%	1.17%	0.41%	1.73%	1.27%
	c) Good voice quality	>=95%	97.76%	97.39%	NA	95.70%	98.84%	97.10%	96.86%	98.54%	97.48%	98.81%	99.00%	NA
4	No of POI having congestion	>=0.5%	0	0	0	0	0	0	0	1	0	0	0	0

(B)	Customer Service Quality Parameters													
5	Metering/billing credibility- Post paid	<= 0.1%	0.00%	0.03%	0.01%	0.02%	0.1	0.00%	NA	NA	0.06%	0.09	0.00%	0.08%
6	Metering /billing credibility- Pre paid	<= 0.1%	0.01%	0.01%	0.06%	0.00%	0	0.00%	0.11%	0.01%	0.00%	0.09	0.00%	0.04%
7	Resolution of billing/ charging complaints	100% within 4 weeks	100%	100%	100%	100%	100%	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%	100%	100%	100%	100%	100%	100%	100	100%	100%
8	Response time to customers for assistance													
	a) Accessibility of call centre/Customer Care	>=95%	93.70%	100.00%	100.00%	98.93%	98.90%	100.00%	99.85%	96%	100.00%	97.80%	99.98%	100.00%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	89.60%	73.00%	91.30%	95.58%	91.90%	89.50%	99.85%	96.35%	75.00%	96.00%	99.98%	93.50%
9	Termination/closure of service	<=7days	100%	100%	100%	100%	100%	100%	NA	NA	100%	100%	100%	100%
10	Time taken for refunds of deposits after closures.	100% within 60 days	100%	100%	100%	100%	100%	100%	NA	NA	100%	100%	100%	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. In Gujarat circle it is seen that for the parameter "worst affected cells >3% TCH drop" all the operators are meeting the benchmark. Videocon is having one no. of POI with congestion more than 0.5% congestion.

Performance related to customer service data is found to be satisfactory for most of the operators except for Aircel, Airtel, TATA GSM and Vodafone for "response time for assistance" parameters. Aircel did not achieve the benchmark for the parameter "Accessibility to call centre (IVR)" and "percentage call answered by operators (voice to voice) within 60 sec".

Operator-Assisted Drive Test

The Operator Assisted Drive Test was conducted in Gujarat circle for all the operators. Route covered was about around 80-100Km and for all the operators the same route was followed. The speed limit of 30-35Km/hr was mentioned throughout the Drive Test. Zones were selected for covering different density areas (High, Medium & Low dense areas).

SN	Parameter	City Name	Aircel	Airtel	BSNL	Idea GSM	Rcom	TATA GSM	Uninor	Videocon	Vodafone	MTS CDMA	Rcom CDMA	TATA	
			GSM Operators									CDMA Operators			
1.1	Blocked Call Rate (<=3%)	Gandhinagar	ICR with TATA	0.00	1.75	1.23	0.00	0.00	1.40	0.00	0.00	0.00	0.00	0.00	
		Junagad		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	0.00	0.00
		Bhuj		0.00	1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.2	Dropped Call Rate (<=2%)	Gandhinagar	ICR with TATA	0.00	0.00	0.00	0.00	0.00	0.00	1.40	0.00	0.00	0.00	0.00	
		Junagad		1.04	0.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	0.00	0.00
		Bhuj		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.3	Percentage of connections with good voice quality (=>95%)														
	(i) 0-4 (w/o frequency hopping)	Gandhinagar										99.38	98.55	99.88	
		Junagad										NA	99.50	97.77	
		Bhuj										99.70	97.50	99.97	
	(ii) 0-5 (with frequency hopping)	Gandhinagar	ICR with TATA	92.10	95.60	98.10	98.20	96.06	95.83	97.00	96.58				
		Junagad		97.15	96.70	98.20	97.70	96.74	96.70	97.18	97.86				
Bhuj		96.74		94.34	98.70	97.57	97.06	98.74	98.25	97.27					
1.4	Call Setup Success Rate (>=95%)	Gandhinagar	ICR with TATA	100.00	98.25	98.77	100.00	100.00	98.60	100.00	100.00	100.00	100.00	100.00	
		Junagad		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	ICR	100.00	100.00	
		Bhuj		100.00	98.70	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	

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

- 'Dropped Call Rate' and 'Block call rate' benchmark is meet by all the operators in all the three cities.
- For the parameter '%age of connections with good voice quality', it is found that all the operators are meeting the benchmark except Airtel (Gandhinagar)
- Aircel is in ICR with TATA GSM in all the three cities i.e. Gandhinagar, Junagadh and Bhuj,. Similarly, MTS is in ICR with TATA in Junagadh.

Independent Drive Test: The Independent Drive Test was conducted at Himmatnagar, Palanpur & Amreli for Reliance, Uninor and Idea respectively. In all the cities, zone were selected for covering different density areas (High, Medium & Low dense areas). The result of the drive test is shown in the table below. The result shows satisfactory result for all the operators.

SN	Parameter	Rcom	Uninor	Idea	Rcom CDMA
		Himmatnagar	Palanpur	Amreli	Himmatnagar
1.1	Blocked Call Rate (<=3%)	0	0.02	0	0
1.2	Dropped Call Rate (<=2%)	0	0	1.75	0
1.3	Percentage of connections with good voice quality (=>95%)				
	(i) 0-4 (w/o frequency hopping)				98.05
	(ii) 0-5 (with frequency hopping)	99.57	95.5	96.6	
1.4	Call Setup Success Rate (>=95%)	100	98.5	100	100

I. Cellular Mobile Telephone Service

PMR		Bench- mark	Audit	Aircel	Airtel	BSNL	Idea	Rcom GSM	TATA GSM	Uninor	Video con	Voda fone	MTS	Rcom CDMA	TATA CDMA	
S/N	Name of Parameter			GSM Operators									CDMA Operators			
1	Network Service Quality Parameter															
	Network Availability															
	BTS Accumulated Downtime	<=2%	Reported	0.00%	0.08%	0.44%	0.04%	0.08%	0.02%	0.05%	0.07%	0.04%	0.12%	0.08%	0.00%	
			Verified	0.00%	0.08%	0.44%	0.04%	0.08%	0.02%	0.05%	0.07%	0.04%	0.12%	0.08%	0.00%	
	Worst affected BTSs due to downtime	<=2%	Reported	0.00%	0.34%	1.13%	0.02%	0.06%	0.00%	0.00%	0.15%	0.08%	0.47%	0.02%	0.00%	
Verified			0.00%	0.34%	1.13%	0.02%	0.06%	0.00%	0.00%	0.15%	0.08%	0.47%	0.02%	0.00%		
2	Connection Establishment (Accessibility)															
	CSSR (Call Setup Success Rate)	>=95%	Reported	99.30%	99.17%	98.29%	99.27%	99.69%	97.75%	98.20%	97.90%	99.07%	98.38%	99.61%	99.72%	
			Verified	99.30%	99.17%	98.29%	99.27%	99.69%	97.75%	98.20%	97.90%	99.07%	98.38%	99.61%	99.72%	
	SDCCH/PAGING congestion	<=1%	Reported	0.04%	0.14%	0.31%	0.24%	0.02%	0.08%	0.00%	0.19%	0.26%	0.00%	0.00%	0.00%	
			Verified	0.04%	0.14%	0.31%	0.24%	0.02%	0.08%	0.00%	0.19%	0.26%	0.00%	0.00%	0.00%	
	TCH congestion	<=2%	Reported	0.20%	0.31%	1.25%	0.26%	0.08%	0.61%	0.06%	0.36%	0.30%	0.00%	0.07%	0.00%	
			Verified	0.20%	0.31%	1.25%	0.26%	0.08%	0.61%	0.06%	0.36%	0.30%	0.00%	0.07%	0.00%	
3	Connection maintenance (retainability)															
	CDR	<=2%	Reported	0.28%	1.20%	1.72%	1.07%	0.32%	0.90%	1.42%	0.86%	1.07%	0.55%	0.42%	0.22%	
			Verified	0.28%	1.20%	1.72%	1.07%	0.32%	0.90%	1.42%	0.86%	1.07%	0.55%	0.42%	0.22%	
	Worst affected cells>3% TCH drop	<=5%	Reported	3.19%	1.79%	3.57%	11.96%	3.49%	1.94%	4.37%	0.90%	2.87%	3.59%	0.61%	0.04%	
			Verified	3.19%	1.79%	3.57%	11.96%	3.49%	1.94%	4.37%	0.90%	2.87%	3.59%	0.61%	0.04%	
Good voice quality	>=95%	Reported	98.13%	96.74%	100%	96.24%	97.63%	98.00%	97.67%	97.36%	97.14%	98.60%	98.65%	99.34%		
		Verified	98.13%	96.74%	100%	96.24%	97.63%	98.00%	97.67%	97.36%	97.14%	98.60%	98.65%	99.34%		
4	POI congestion	<=0.5%	Reported	0	0	5	0	0	0	0	3	0	0	0	0	

			Verified	0	0	5	0	0	0	0	3	0	0	0	0
(B)	Customer Service Quality Parameters														
5	Metering/billing credibility-Post paid	<= 0.1%	Reported	0.52%	0.01%	0.05%	NR	0.00%	0.05%	NA	NA	0.00%	0.00%	0.00%	0.03%
			Verified	0.52%	0.01%	0.05%	NR	0.00%	0.05%	NA	NA	0.00%	0.00%	0.00%	0.03%
6	Metering /billing credibility-Pre paid	<= 0.1%	Reported	0.14%	0.04%	0.01%	NR	0.09%	0.00%	0.00%	0.03%	0.01%	0.04%	0.04%	0.17%
			Verified	0.14%	0.04%	0.01%	NR	0.09%	0.00%	0.00%	0.03%	0.01%	0.04%	0.04%	0.17%
7	Resolution of billing/charging complaints	100% within 4 weeks	Reported	100%	100%	100%	NR	100%	100%	100%	100%	100%	100%	100%	100%
			Verified	100%	100%	100%	NR	100%	100%	100%	100%	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%	NR	100%	100%	NA	100%	100%	100%	100%	100%
			Verified	100%	100%	100%	NR	100%	100%	NA	100%	100%	100%	100%	100%
8	Response time to customers for assistance	>=95%	Reported	100%	97%	95%	NR	96%	100%	98.46%	100%	100%	99%	100%	96%
			Verified	100%	97%	95%	NR	96%	100%	98.46%	100%	100%	99%	100%	96%
	% call answered by operators(voice to voice) within 60 sec.	>=90%	Reported	47.10%	87%	91%	NR	92%	74%	74.73%	91%	80%	96.76%	95%	85%
			Verified	47.10%	87%	91%	NR	92%	74%	74.73%	91%	80%	96.76%	95%	85%
9	Termination/closure of service	<=7days	Reported	100%	100%	100%	NR	100%	100%	NA	NA	100%	0%	100%	100%
			Verified	100%	100%	100%	NR	100%	100%	NA	NA	100%	100%	100%	100%
10	Time taken for refunds of deposits after closures.	100% within 60 days	Reported	100%	100%	100%	NR	100%	100%	NA	NA	100%	0%	100%	92%
			Verified	100%	100%	100%	NR	100%	100%	NA	NA	100%	100%	100%	92%

Critical Analysis (PMR Verification):

No deviation found as compared to the reported data provided by the operators.

CHAPTER-4: DETAILED FINDINGS & ANALYSIS

I. Cellular Mobile Telephone Service

(A) MSC Audit

(1) 3 Days Live Data Assessment & Summarized Findings

S/N	Name of Parameter	Benchmark	Aircel	Airtel	BSNL	Idea	Rcom GSM	TATA GSM	Uninor	Video con	Voda fone	Rcom CDMA	MTS	TATA CDMA
			GSM Operators								CDMA Operators			
A	Network Service Quality Parameter													
1	Network Availability													
	a) BTS Accumulated Downtime	<=2%	0.02%	0.03%	0.45%	0.02%	0.08%	0.01%	0.00%	0.02%	0.02%	0.07%	0.02%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.00%	0.18%	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		896	6368	4354	5516	3077	2347	2313	1757	7165	1751	555	841
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		15.57	1517	1444	71	170	23.22	25	25	140.5	82	8.55	1.23
	e) No. of BTSs having accumulated downtime of >24 hours in a month		0	0	8	0	0	0	0	0	0	0	0	0
1	Connection Establishment (Accessibility)													
	a) CSSR	>=95%	98.68%	99.29%	98.62%	99.43%	99.70%	99.18%	97.16%	99.18%	98.83%	99.47%	99.51%	99.04%
	b) SDCCH/PAGING congestion	<=1%	0.01%	0.06%	0.19%	0.15%	0.01%	0.04%	0.23%	0.10%	0.36%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	0.01%	0.09%	1.85%	0.17%	0.03%	0.20%	0.37%	0.20%	0.29%	0.09%	0.00%	0.00%
2	Connection maintenance													
	a) CDR	<=2%	0.44%	1.07%	1.63%	1.05%	0.43%	0.92%	1.49%	0.55%	0.88%	0.24%	0.23%	0.45%
	b) worst affected Cells > 3% TCH drop	<=3%	0.74%	1.43%	2.24%	2.13%	0.00%	6.00%	2.09%	0.41%	2.12%	0.42%	1.55%	2.31%
	c) Good voice quality	>=95%	97.78%	97.40%	NA	95.70%	98.82%	97.18%	96.76%	98.58%	97.45%	98.81%	99.53%	99.97%
	d) No. of cells > 3% TCH drop		20	274	284	351	1	378	147	22	457	22	26	58
	e) Total no. of cells in the network		2687	19449	12730	16484	9,231	6734	7038	5269	21569	5,253	1675	2523

3	No of POI having congestion	$\geq 0.5\%$	0	0	0	0	0	0	0	0	0	0	0	0
	a) Name of POI not meeting the benchmark		0	0	0	0	0	0	0	0	0	0	0	0
	b) Total No. of call attempts on POI (Avg.)		189377	3366441	727665	2818536	358,952	19395	1009805	4383	3440301	449,864	40966	4166
	c) Total traffic served on POI (Erlang) (Avg.)		6502	81948	26832	72686	341,211	664	25497	4369	52526	13,117	1334	95
	d) Total No. of circuits on POI		12831	133248	41093	110829	1,760,265	29213	57827	9545	230665	1,007,065	4989	44195
	e) Total number of working POI Service Area wise		46	172	31	156	104	22	68	36	128	73	49	169
	f) Equipped Capacity of Network in respect of Traffic in erlang		33599	235800	150000	228137	NP	108092	84533	75794	499747	NP	21000	238251
	g) Total traffic handled in TCBH in erlang		6502	146053	56653	171854	NP	39309	71040	19795	387611	NP	3495	46500
(B)	Customer Service Quality Parameters													
4	Response time to customers for assistance													
	a) Accessibility of call centre	$\geq 95\%$	99.00%	100.00%	100.00%	100.00%	98.90%	100.00%	91.00%	100%	100%	97.30%	100.00%	100.00%
	b) % of call answered by operators(voice to voice) within 60 sec	$\geq 90\%$	87.50%	98%	100.00%	100.00%	83.00%	100.00%	91.00%	96.20%	100.00%	95.00%	100.00%	100.00%
	c) No. of call attempts to call centre / customer care nos. during TCBH (Avg)		200	200	200	200	85,433	200	100	158	200	25,702	200	200
	d) No. of calls connected and answered successfully to call centre / customer care nos. during TCBH (Avg)		175	195	200	200	59,382	200	91	152	200	24,417	200	200

Parameter-wise Findings (Live Data Assessment):

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

- **BTS accumulated downtime (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values laying between 0.00% and 0.45%.
- **Worst affected BTSs due to downtime (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values laying between 0% and 0.18%.
- **Call setup success rate (benchmark $\geq 95\%$):** All operators are meeting the benchmark with values laying between 97.16% and 99.54%.
- **SDCCH/PAGING Channel congestion (benchmark $\leq 1\%$):** All operators are meeting the benchmark with values laying between 0.0% and 0.36%.
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% to 1.856%.
- **Call drop rate (benchmark $\leq 2\%$):** All operators, are meeting the benchmark with values laying between 0.0 % and 1.63%.
- **Cell exceeding 3% TCH drop (benchmark $\leq 3\%$):** All the operators are meeting the benchmark except TATAGSM, with value 6 %
- **Connections with good voice quality (benchmark $\geq 95\%$):** All operators are meeting the benchmark with values laying between 95.70% and 99.97%. TATA CDMA & BSNL have declared that this parameter is not system generated.
- **POI Congestion (benchmark $\leq 0.5\%$):** None of the operators were found having POI with more than 0.5% congestion. But cases were found where individual POIs are showing high utilization/usage 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 $>95\%$):** All operators Except Uninor with 91% are meeting the benchmark in the range of 91% to 100%.
- **%age of call answered by operator (Voice to voice) (benchmark $>90\%$):** Except for Aircel rest of the operators are meeting the benchmark with values laying between 87.50% and 100%.

(2) Month Data Assessment & Summarized Findings

S/N	Name of Parameter	Bench- mark	Aircel	Airtel	BSNL	Idea	Rcom GSM	TATA GSM	Uninor	Video	Vodafone	Rcom CDMA	MTS	TATA CDMA
			GSM Operators									CDMA Operators		
1	Network Service Quality Parameter													
	Network Availability													
	a) BTS Accumulated Downtime	<=2%	0.05%	0.04%	0.60%	0.03%	0.08%	0.02%	0.03%	0.04%	0.04%	0.07%	0.06%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	0.06%	0.06%	1.42%	0.02%	0.00%	0.04%	0.00%	0.00%	0.26%	0.00%	0.00%	0.00%
	c) Total no. of BTSs in the licensed service area		896	6368	4354	5516	3,077	2347	2313	1757	7165	1,751	555	841
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		289.2	1959	18249	1049	170	280.4	529.05	547	2044	82	238	12.25
	e) No. of BTSs having accumulated downtime of >24 hours in a month		0	4	62	1	0	1	0	0	19	0	0	0
2	Connection Establishment (Accessibility)													
	a) CSSR (Call Setup Success Rate)	>=95%	98.64%	99.22%	98.56%	99.38%	99.70%	99.06%	97.16%	99.10%	98.53%	99.38%	99.48%	98.98%
	b) SDCCH/PAGING congestion	<=1%	0.01%	0.14%	0.29%	0.18%	0.01%	0.13%	0.22%	0.08%	0.56%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	0.75%	0.18%	1.96%	0.14%	0.03%	0.34%	0.13%	0.05%	0.24%	0.21%	0.00%	0.01%
3	Connection maintenance (retainability)													
	a) CDR	<=2%	0.49%	1.04%	1.83%	1.03%	0.43%	1.00%	1.46%	0.56%	0.86%	0.25%	0.27%	0.47%
	b) Worst affected cells>3% TCH drop	<=3%	0.74%	1.61%	2.41%	2.15%	0.10%	2.57%	1.98%	0.49%	1.17%	0.41%	1.73%	1.27%
	c) Good voice quality	>=95%	97.76%	97.39%	NA	95.70%	98.84%	97.10%	96.86%	98.54%	97.48%	98.81%	99.00%	NA
	d) Total No. of cells exceeding 3% TCH drop (call drop)		97.76%	97.39%	NA	95.70%	21	97.10%	96.86%	98.54%	97.48%	21	99.00%	99.21%

	e) Total no. of cells in the network		2687	19449	12730	16484	9,231	6734	7038	5269	21569	5,253	1675	2523
4	No of POI having congestion	$\geq 0.5\%$	0	0	0	0	0	0	0	1	0	0	0	0
	a) Name of POI not meeting the benchmark		0	0	0	0	0	0	0	BSNL	0	0	0	0
	b) Total No. of call attempts on POI (Avg.)		214094	3281923	701616	2762506	368,660	20065	976290	7150	3338360	427,782	38557	3988
	c) Total traffic served on POI (Erlang) (Avg.)		7162	80788	26068	61831	0	686	24975	4391	50065	4,998	1289	90
	d) Total No. of circuits on POI		12831	133248	41093	110829	1,760,265	29213	57827	9545	230665	1,007,065	4989	44195
	e) Total number of working POI Service Area wise		46	172	31	156	104	22	68	36	128	73	49	169
5	Network Data													
	a) Equipped Capacity of Network Erlang		33599	235800	150000	228137	NP	108092	84533	75794	499747	NP	21000	238251
	b) Total traffic in TCBH in erlang (Avg.)		10594	139362	55000	169464	NP	38900	71087	19978	387611	NP	1088	45491
	c) Total no. of customers served (as per VLR) on last day of the month		546571	6082050	2434331	7250007	NP	1648211	2029812	620054	14008179	NP	61324	611723
(B)	Customer Service Quality Parameters													
6	Metering/billing credibility-Post paid	$\leq 0.1\%$	0.00%	0.03%	0.01%	0.02%	0.10%	0.00%	NA	NA	0.06%	0.09%	0.00%	0.08%
	a) No. of bills issued during the period		3114	325539	75235	330206	36,966	18703	NA	NA	1073314	305,414	5050	166691
	b) No. of bills disputed including billing complaints during the period		0	104	11	76	36	49	NA	NA	743	305	5	140
7	Metering /billing credibility-Pre paid	$\leq 0.1\%$	0.01%	0.01%	0.06%	0.00%	0.1	0.00%	0.11%	0.01%	0.00%	0.09%	0.00%	0.04%
	a) No. of charging / credit / validity complaints during the quarter		75	534	2515	268	5,150	1147	3689	139	1023	2,595	5	375
	b) Total no. of pre-paid customers at the end of the quarter		620913	6685930	3825673	7492887	5,215,870	2761563	3463080	1,318,783	14871502	2,613,374	131913	896395

8	Resolution of billing/ charging complaints	<i>100% within 4 weeks</i>	100%	100%	100%	100.00%	100%	100%	100%	100%	100%	100%	100%	100%
	a) No. of billing/(post paid) and charging, credit/validity (pre paid) complaints resolved within 4 weeks during the quarter		75	638	2526	344	5,186	1196	3689	139	1766	2,900	10	515
	b) Total no. of billing (post paid) and charging, credit / validity (pre paid) complaints received during the quarter		75	638	2526	344	5,186	1196	3689	139	1766	2,900	10	515
	c) No. of billing complaints (post paid) and charging, credit/ validity complaints (pre paid) resolved in favour of the customer during the quarter		75	638	162	344	5,186	0	3360	139	1169	2,604	4	1
	d) No. of complaints disposed on account of not considered as valid complaints during the quarter		0	0	2364	0	0	1196	329	0	597	296	6	514
	e) Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	<i><=1 week</i>	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
9	Response time to customers for assistance													
	a) Accessibility of call centre/Customer Care	<i>>=95%</i>	93.70%	100.00%	100.00%	98.93%	98.90%	100.00%	99.85%	96%	100.00%	97.80%	99.98%	100.00%
	b) % call answered by operators(voice to voice) within 60 sec.	<i>>=90%</i>	89.60%	73.00%	91.30%	95.58%	91.00%	89.50%	99.85%	96.35%	75.00%	96.00%	99.98%	93.50%
	c) Total no. of call attempts to call centre & customer care nos. during TCBH (Avg.).		433466	202623	30301	3068573	828,292	942864	131020	28,172	4296501	244,196	10436	181,918

	d) No. of calls connected and answered successfully to call centre & customer care nos. during TCBH (Avg.).		355574	118081	27684	2932892	709,465	852887	130830	27,143	3218044	233,493	10434	168,121
10	Termination/closure of service	<i><=7days</i>	100%	100%	100%	100%	100%	100%	NA	NA	100%	100%	100%	100%
	a) Total No. of requests for Termination / Closure of service received during the quarter		49	7831	2173	1800	273	1196	NA	NA	5133	1,628	5	515
	b) No .of requests for Termination / Closure of service complied within 7 days during the quarter		49	7831	2173	1800	273	1196	NA	NA	5133	1,628	5	515
11	Time taken for refunds of deposits after closures.	<i>100% within 60 days</i>	100%	100.%	100%	100%	100%	100%	NA	NA	100%	100%	100%	100%

Parameter-wise Findings (Month Data Assessment):

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

- **BTS accumulated downtime (benchmark <=2%):** All operators are meeting the benchmark with values laying between 0% and 0.60%.
- **Worst affected BTSs due to downtime (benchmark <= 2%):** All operators are meeting the benchmark with values laying between 0% and 1.42%.
- **Call setup success rate (benchmark >= 95%):** All operators are meeting the benchmark with values laying between 97.16% and 99.485%.
- **SDCCH/PAGING Channel congestion (benchmark <= 1%):** All operators are meeting the benchmark with values laying between 0% and 0.56 %.
Note: CDMA operators have provided the data for Paging Channel congestion and GSM operators provided SDCCH Channel congestion.
- **TCH congestion (benchmark <= 2%):** All operators are meeting the benchmark with values laying between 0% and 1.96%..
- **Call drop rate (benchmark <= 2%):** All operators are meeting the benchmark with values laying between 0.0 % and 1.83%.
- **Cell exceeding 3% TCH drop (benchmark <= 3%):** All the operators are meeting the benchmark with values laying between 0.49 % to 2.57 %
- **Connections with good voice quality (benchmark >= 95%):** All operators are meeting the benchmark with values laying between 95.74% and 99.21%. CDMA operators & BSNL have declared that this KPI is not system generated.
- **POI Congestion (benchmark <= 0.5%):** Except for Videocon with 1 no. of POI having more than 0.5% congestion rest of the POIs were found having no congestion. Though no congestion found overall on the POI, but cases were found where individual POIs are showing high utilization/usage, 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%):** All operators, except Aircel are meeting the benchmark in the range of 96% to 100%.
- **%age of call answered by operator (Voice to voice) (benchmark >90%):** Except for Aircel, Airtel, TATA GSM and Vodafone rest of the operators are meeting the benchmark with values laying between 93% and 100%.
- **Metering and billing credibility-Post paid (benchmark <= 0.1%):** All operators are meeting the benchmark.
- **Metering and billing credibility-Pre paid (benchmark <= 0.1%):** All operators are meeting the benchmark.
- **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:

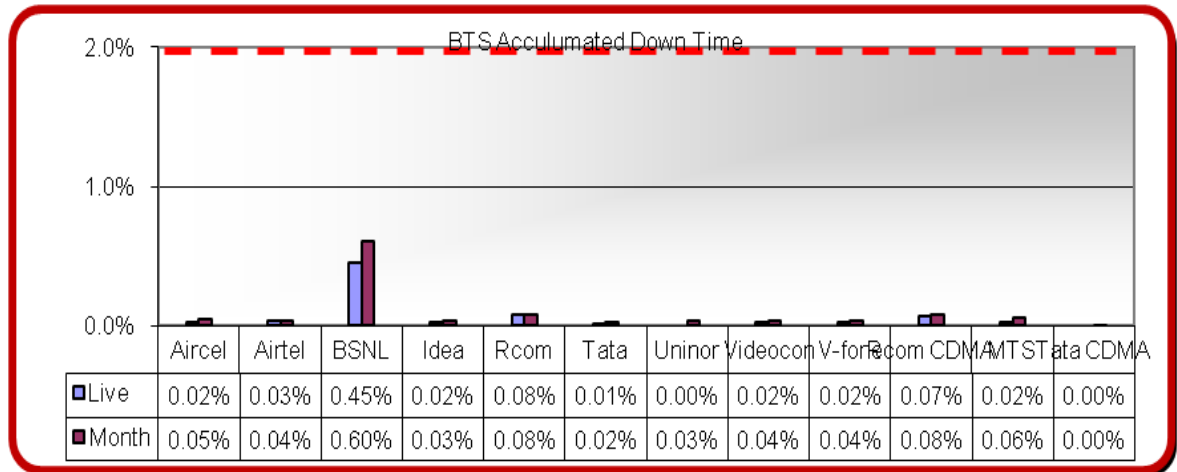
Sl.	Name of Service Provider	No. of MSC	No. of BSC	No. of BTS
GSM Operators				
1	Aircel Ltd	1	6	896
2	Airtel Ltd	14	102	6452
3	BSNL	9	102	4354
4	Idea	21	35	5516
5	Reliance Communication	5	18	3051
6	TATA Communications	3	17	2247
7	Uninor	3	15	2313
8	Videocon	2	11	1757
9	Vodafone	21	140	7165
10	Etisalat	Operation closed		
CDMA Operators				
11	Reliance Communication	7	4	1712
12	TATA Communications	7	9	841
13	MTS	1	2	555

(4) Performance (Graphical Representation)

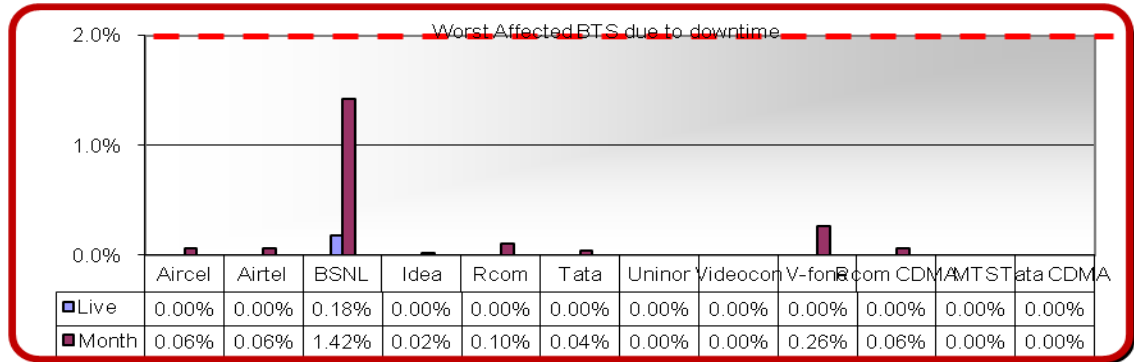
Comparison between Live measurements and One month data Audit – Cellular Mobile Telephone Services

A) NETWORK PERFORMANCE

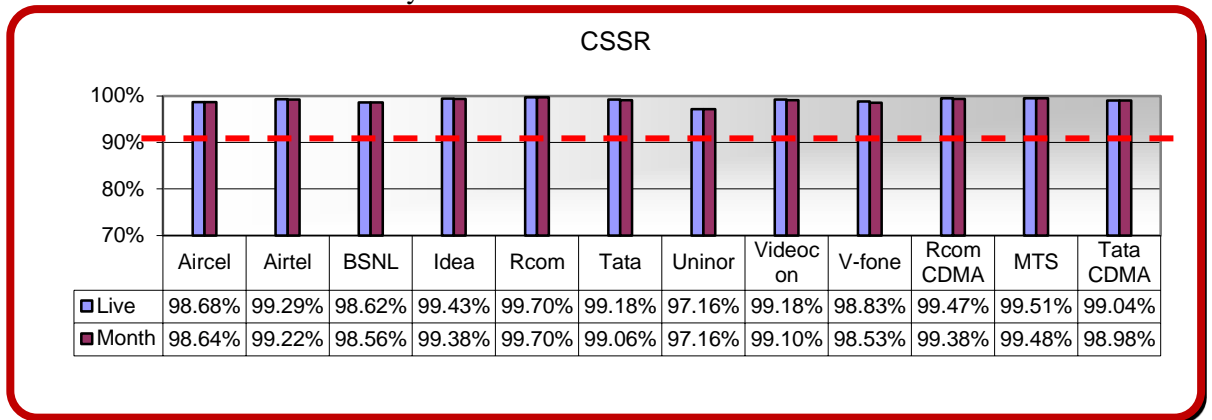
(a) **BTS accumulated downtime:** All operators are meeting the TRAI benchmarks in both one month & live data Audit.



(b) Worst affected BTSs due to downtime: All operators are meeting the TRAI benchmarks in both one month & live data Audit.

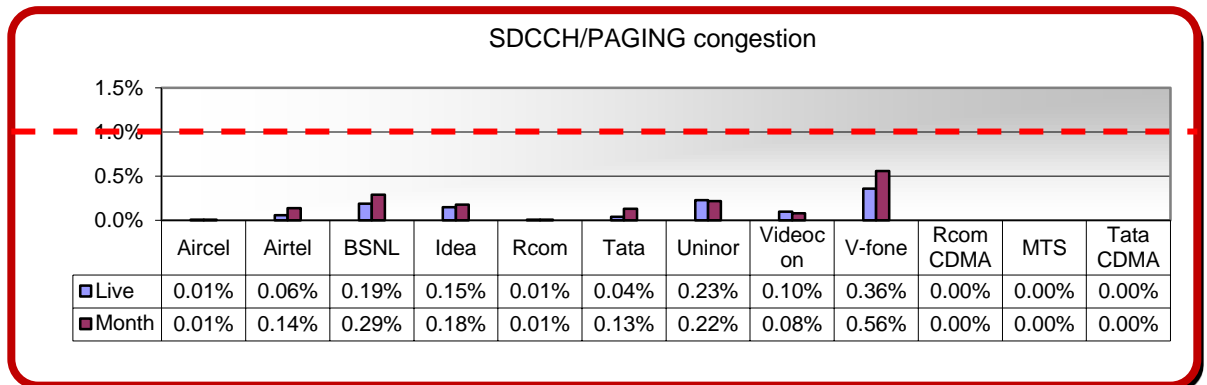


Call Setup Success Rate (CSSR): All operators are meeting the TRAI benchmarks ($\geq 95\%$) for both one month data and 3 days live data taken in the month of audit

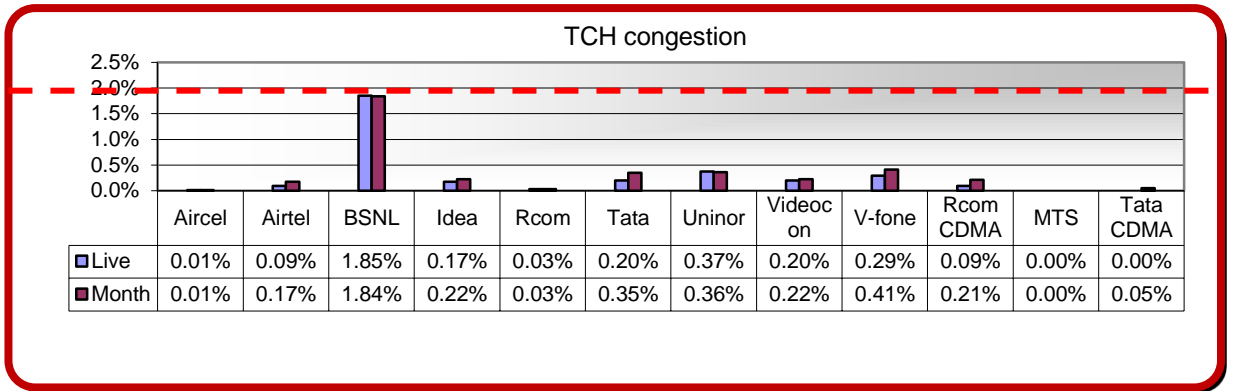


Blocked call rate:

SDCCH congestion (%): 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.

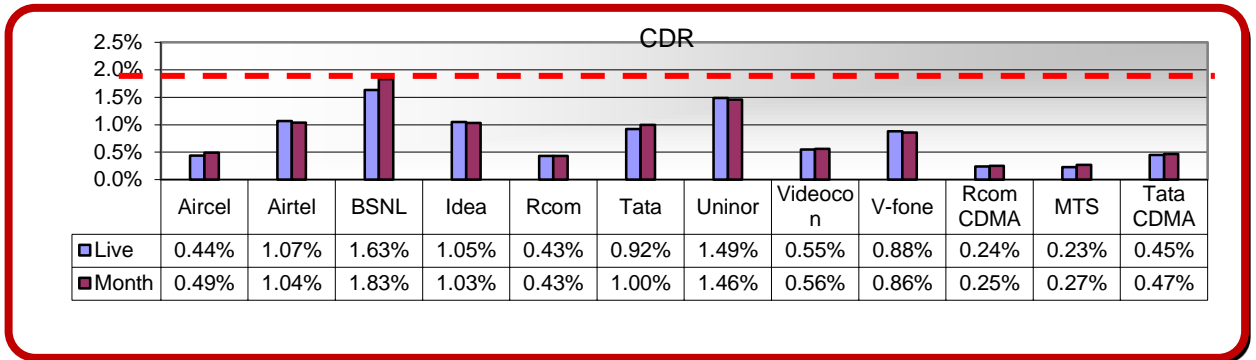


TCH congestion (%): All operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data taken in the month of audit.



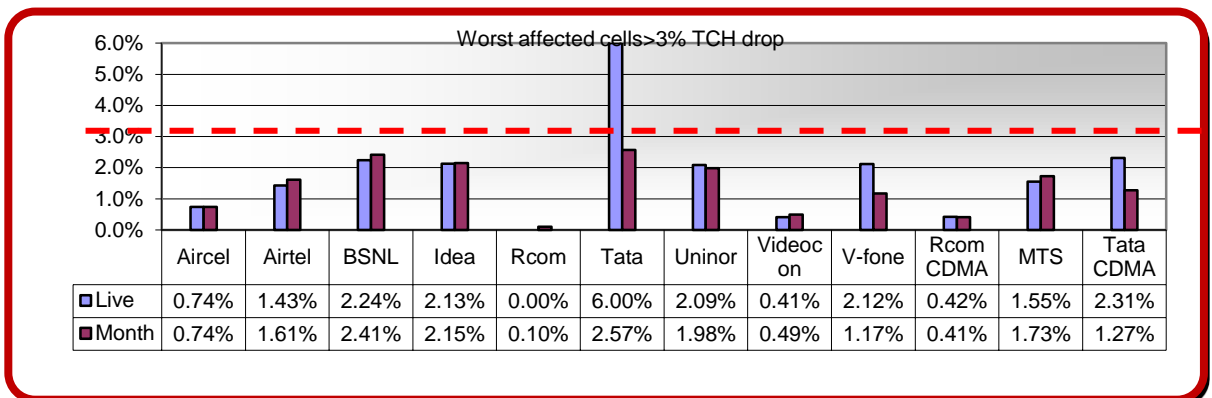
Connection Maintainability (Retainability):

Call Drop Rate (CDR) (%): 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 .



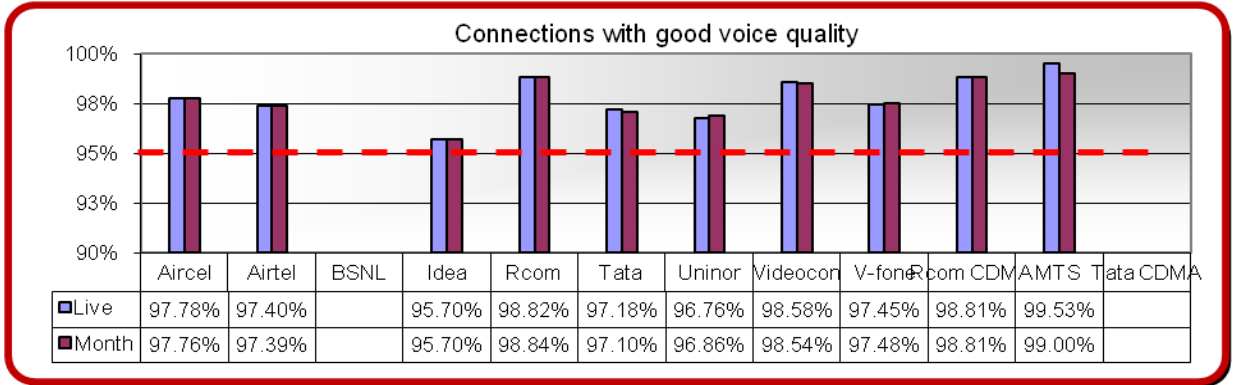
Worst affected Cell exceeding 3% TCH Drop: BM 3%.

All the operators are meeting the benchmark for 3% TCH Drop except TATA GSM has missed the benchmark for Live Tests.

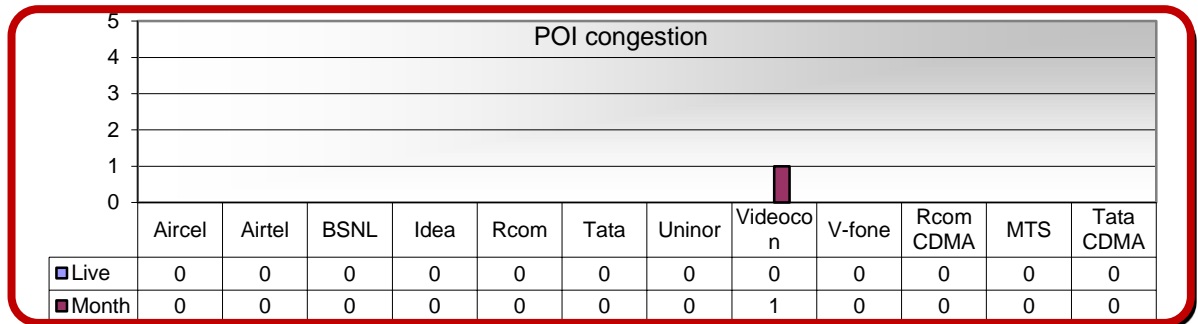


Percentage of connections with good voice quality (benchmark >= 95%):

BSNL & TATA CDMA has declared that this KPI is not system generated. All other operators meet the BM requirement.



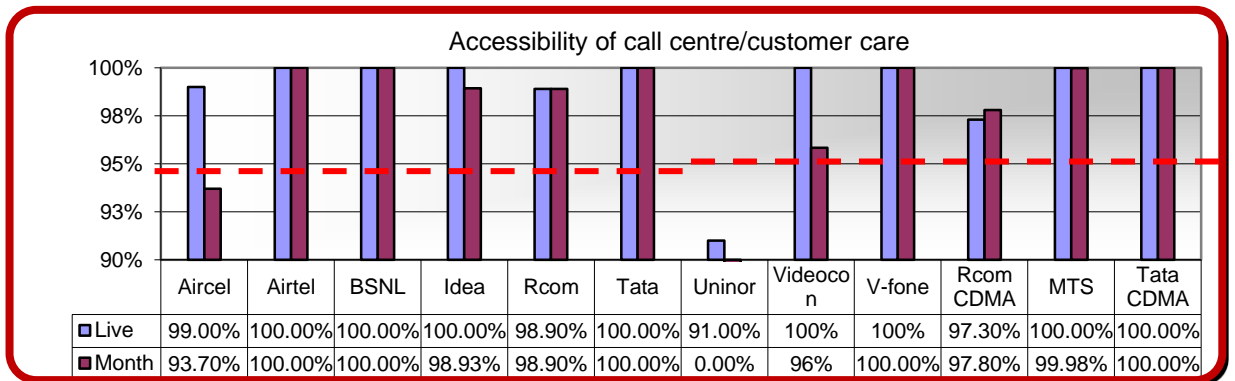
POI Congestion: Videocon have one POI facing congestion beyond BM. There is no congestion w.r.t. the other operators.



B) CUSTOMER SERVICE QUALITY PARAMETERS

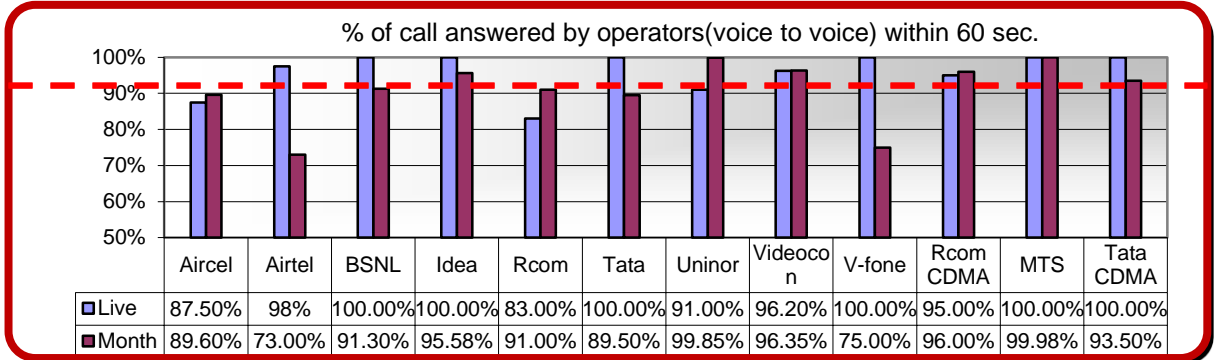
Response time to the customer for assistance:

Percentage of call answered (Electronically):BM:>=95% : Aircel and Uninor are not meeting the benchmark in case of live and month data. All other operators meet the BM requirements.



Percentage of call answered by operators (Voice to voice) within 60 sec. BM >=90%

Aircel, Airtel, TATA GSM and Vodafone do not meet the Bench mark for Live and month data.



5) Critical Analysis

From the data tables it is found that most of the operators are meeting the network parameters. However, a few deviations were found such as BSNL is showing high TCH drop.

The performance of TATA GSM is not satisfactory in case of Worst affected cells>3% TCH drop”.

Videocore show one POI with congestion >0.5%.

Aircel, Airtel, TATA GSM and Vodafone has a poor performance in case of “response time to customers for assistance parameters” and “calls answered by operator (voice to voice).

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

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

(2) Performance (live calling for billing complaints)

Calling Operator	Aircel	Airtel	BSNL	Idea	Reliance (GSM)	TATA GSM	Uninor	Vodafone	Videocon	Rcom CDMA	MTS. CDMA	TATA. CDMA
Total No. of Calls Attempted	75	100	100	100	100	100	100	100	100	100	10	100
Total No. of calls answered	67	82	76	78	80	79	81	74	72	76	9	79
Cases resolved with 4 weeks	67	82	76	78	80	79	80	74	72	76	9	79
%age of cases resolved	100%	100%	100%	100%	100%	100%	98.7%	100%	100%	100%	100%	100%

(3) Live Calling to Call Centre

Calling Operator	Aircel	Airtel	BSNL	Idea	Rcom GSM	TATA GSM	Videocon	Vodafone	MTS	Rcom CDMA	TATA CDMA
Calls Attempted	100	100	100	100	100	100	100	100	100	100	100
Calls connected to IVR	100	100	100	100	100	100	100	100	100	100	100
%age of calls connected to IVR	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Calls got connected to agent within 60 Sec	95	96	98	100	100	98	98	96	100	98	99
%age of calls got answered by agent in 60 sec.	95%	96%	98%	100%	100%	98%	98%	96%	100%	98%	99%

(4) Level-1 Live Calling.

Emergency Calls were made in **GANDHINAGAR** for each category and below is given the success rate.

Emergency Nos.	No. of Calls made	Aircel	Airtel	BSNL	Idea	Rcom GSM	TATA GSM	Uninor	Videocon	Vodafone	Rcom CDMA	MTS CDMA	TATA CDMA
100 P	2	2	2	2	2	2	2	2	2	2	2	2	2
101 F	2	2	2	2	2	2	2	2	2	2	2	2	2
102 M	2	2	2	Busy	2	2	2	2	2	2	2	2	2
139 Rly	2	2	2	2	2	2	2	2	2	2	2	2	2

Emergency Calls were made for each category at **JUNAGADH** and below is given the success rate.

Emergency Nos.	No. of Calls made	Aircel	Airtel	BSNL	Idea	Rcom GSM	TATA GSM	Uninor	Videocon	Vodafone	Rcom CDMA	MTS CDM	TATA CDM
100 P	2	Busy	Busy	Busy	Busy	Busy	Busy	Busy	Busy	Busy	Busy	Busy	Busy
101 F	2	Busy	Busy	Busy	Busy	Busy	Busy	Busy	Busy	Busy	Busy	Busy	Busy
102 M	2	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
108 M	2	2	2	2	2	2	2	2	2	2	2	2	2
139 Rly	2	2	2	2	2	2	2	2	2	2	2	2	2

Emergency calls were made for each category at **BHUJ** and below are given the success rate.

Emergency Nos.	No. of Calls made	Aircel	Airtel	BSNL	Idea	Rcom GSM	TATA GSM	Uninor	Videocon	Vodafone	Rcom CDMA	MTS CDM	TATA CDM
100 P	2	2	2	Busy	2	Busy	2	2	Busy	2	Busy	Busy	2
101 F	2	2	2	2	2	Busy	2	2	2	2	Busy		2
102 M	2	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
108 M	2	2	2	2	2	2	2	2	2	2	2	2	2
139 Rly	2	2	2	2	2	2	2	2	2	2	2	2	2

Note: At Junagadh and Bhuj Medical emergency is provided on Emergency no.108 instead of no.102. The Call lands at a Centralized Medical control room at Naroda (Ahmedabad) which in turn Informs about the emergency to the respective city.

P=Police. F= Fire. M=Medical assistance. Rly= Railway enquiry. NT= No tone

(5) Critical Analysis

Random numbers were selected from the operators' available database of billing/metering complaints and calls were made to the customers to get their feedback for complaint redressal. Majority of the calls were not successful for various reasons such as customer not reachable, number busy or switched off etc. Among the successful calls, it was found that the operators had made refunds 100% in most of the cases as claimed by their records. It may be noted that only 75 and 10 calls have been made for Aircel and MTS as they are having a total of 75 and 10 valid complains only. (ref. Ch-4.I.(A).(2)).

Good results were found for all the operators during live calling to their respective call centers.

Satisfactory results were found in case of Level-1 calling for emergency nos. 100, 101,102, 108 & 139. For Medical assistance no. 108 all the operators calls were connected to Centralized medical Control room at Naroda (Ahmadabad) who in turn conveys the emergency message to respective city.

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

A sample of 2x50 test calls per Service Providers with in the licensed service area (Gujarat Circle) were made between 1900 to 2000 hrs so that TCBH hours for all the operators were covered.

(2) Performance based on live measurement

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

(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 no 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 Gandhinagar, Junagadh & Bhuj for all the operators. Route covered was about around 80-125Km depending on city areas within the speed limit of 30Km/hr.

DRIVE TEST LOCATIONS***GANDHINAGAR***

LOW DENSE: Vayusena Circle, TATA Chowk,, Balchetnacircle, Akshardham, Anandnagar.

MEDIUM DENSE: City Bus stand, Santrolidas circle Takshshilavidyalaya,sector 7.

HIGH DENSE: .Kisan circle, Gaitri circle, Karma circle, Ahimsa circle.

JUNAGADH

LOW DENSE: Mahanagarपालिका, Bilkharoad,Circuithouse, Timbawadi, Pharmacy college

MEDIUM DENSE: Jhanjharda road Joshipura, Shambhunagar,Nandiniappt,Noble School

HIGH DENSE: Motibaugchowk, Gandhichowk, kalwachowk,Mandvichowk,Upperkot road.

BHUJ

LOW DENSE: GIDC, Madhapur town.

MEDIUM DENSE: Lohanamahajanwadi, Jubilee circle, Mirzapar, Shantiniketan School.

HIGH DENSE: .Bus Stand, Railway station, Wariyaward, Hanirsarlake, Gauravpath,

(3) Critical Analysis

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

BSNL, Idea, and Uninor observed one “Block Call” in Gandhinagar, But they could achieve the ‘Bench mark Set for ‘Block calls’ <=3%.

Airtel and Videocon observed one drop call each at Junagadh and Gandhinagar respectively but they could achieve the bench mark.

BSNL could not achieve the Bench mark for “Block Call” at Bhuj. With the Value of 4.1% against the benchmark of <=3%.

Airtel could not achieve the benchmark for “connection with good voice quality at Gandhinagar.

Also BSNL could not achieve the benchmark for “connection with good voice quality” at Junagadh and Bhuj.

E) Independent Drive Test**1) Sample coverage**

The independent Drive Test was conducted at different Stations for different Operators. The details are as below.

Name of the Operator	Station where drive test was conducted
1) Rcom GSM + CDMA	Himmatnagar.
2) Idea	Amerli
3) Uninor.	Palanpur

Note: Videocon is on ICR with TATA at Himmatnagar So Independent Drive test for Videocon was not Conducted at Himmatnagar.

Also Aircel is on ICR with TATA at Amerli So independent Drive test for Aircel was not conducted at Amerli.

Locations for Independent Drive Tests.

The area’s Covered in different cities during Independent drive tests are as below.

Himmatnagar:

Low Dense: Motipura Circle, Apana Cinema, Vinayak Nagar, Sarkari Jin Road

Medium Dense: Mahavir Nagar, Gaytri Road, KhodiyarSoc, RambaghSoc, Krishna Nagar.

High Dense: Bus Stand, Town Hall Polo Ground, Hajipura, Gandhi Road, Sabarkantha.

Amreli:

Low Dense: Circuit House, Guru Krupa Nagar, Bhavani Mata Mandir,Unity High School,

Medium Dense: JalaramTimber Market, Bhakti Nagar Waterworks, SarthiResidency, LiliyaRoad,

High Dense: Sardar Circle, Vegetable Market, Pani Darwaja, ChakkargadhRoad, Post Office.

Palanpur:

Low Dense: Ganesh Pura, GuruNanak Chowk, PWD Qtrs, CitilightCinema, Polytechnic Road,

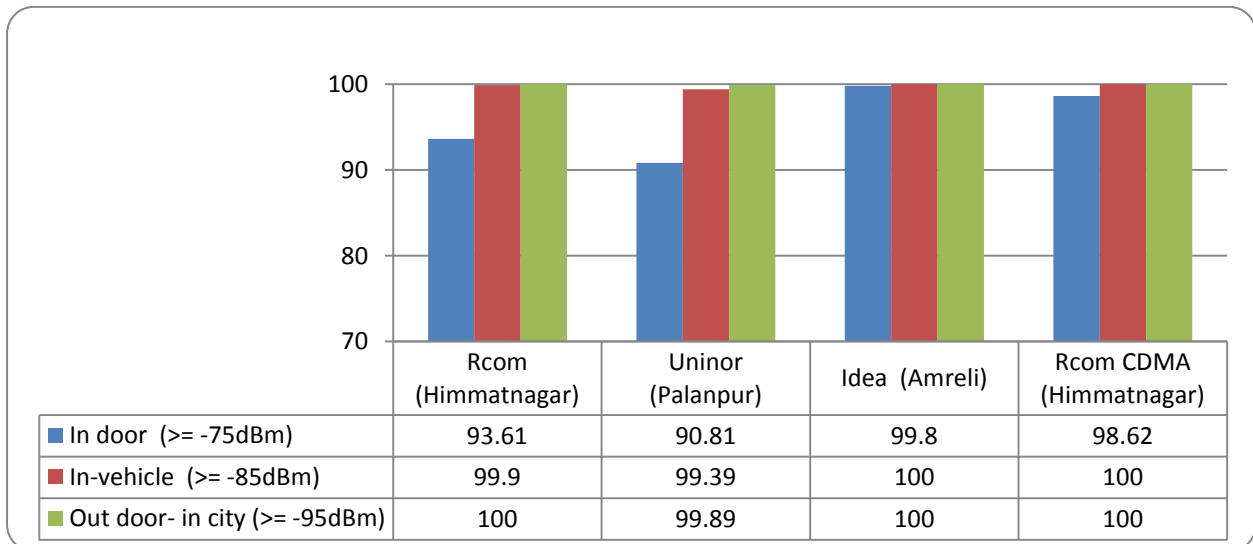
Medium Dense: KunwarbaiSchool, Silver Jubilee School, Govt Technical High School,

High Dense: Mehta Chowk, RTOOffice, Vegetable Market,Vivekanand Chowk .

2) Performance (for the respective cities)

SN	Parameter	Rcom	Uninor	Idea	Rcom CDMA
		Himmatnagar	Palanpur	Amreli	Himmatnagar
1.1	Call Attempts	39	63	57	39
1.2	Blocked Call Rate (<=3%)	0	0.02	0	0
1.3	Dropped Call Rate (<=2%)	0	0	1.75	0
1.4	Percentage of connections with good voice quality (>=95%)				
	(i) 0-4 (w/o frequency hopping)				98.05
	(ii) 0-5 (with frequency hopping)	99.57	95.5	96.6	
1.5	Service Coverage				
	In door (>= -75dBm) (%)	93.61%	90.81%	99.8%	98.62%
	In-vehicle (>= -85dBm) (%)	99.9%	99.39%	100%	100%
	Out door- in city (>= -95dBm) (%)	100%	99.89%	100%	100%
	Call Setup Success Rate (>=95%)	100%	98.5%	100%	100%

Graphical Representation



3) Critical Analysis

The independent Drive tests were conducted at different cities/towns for different operators. Maximum possible area of the city/town was covered during Drive tests. All most all the operators could achieve the benchmark.

Uninor had one “Block call” in Palanpur City however they could achieve the benchmark set for the parameters “Block Call”.

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

From live, month and PMR findings, it can be concluded that on an average, performance of the operators in the service area (Gujarat) is by and large satisfactory for **Network Parameters**. TATA GSM is having high TCH congestion & high %age of cells with >3% TCH drop.

POI congestion is found to be satisfying for all the operators for both month and live measurement except Videocon 1 POI with congestion.

Under **Customer Service Quality** section, benchmark for the parameter “operator answered calls (voice-to-voice) within 60 seconds” is found not satisfying for Aircel, Airtel, and Vodafone. The performance of Aircel is poor in terms of calls answered

Regarding **Metering/Billing Credibility** issues all the operators could achieve the benchmark.