

**REPORT**  
**ON**  
**AUDIT & ASSESSMENT OF QUALITY OF SERVICE**  
**OF**  
**CELLULAR MOBILE TELEPHONE SERVICE**  
**FOR**  
**NORTH ZONE – UP (WEST) CIRCLE**

***Report Period: Jan 2011 – March 2011***

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*- Not conducted for this quarter*

III. Broadband Service Providers

*- Not conducted for this quarter*

## CHAPTER-1: INTRODUCTION

### I. Background

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

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

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

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

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

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

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

## 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 UP (West) 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 UP (West) Circle in 1<sup>st</sup> quarter (January – March 2011). The primary data collection and verification of records (PMR data verification – quarterly) maintained by various operators was undertaken for the period July – September 2010.

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

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

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

### (A) Cellular Mobile Telephone Services

3 days Live Data Audit		Bench- mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	V-fone	Rcom CDMA	Tata CDMA
S/N	Name of Parameter		GSM Operators										CDMA Operators	
1	<b>Connection Establishment (Accessibility)</b>													
	a) CSSR (Call Setup Success Rate)	>=95%	98.66%	97.80%	98.53%	99.19%	99.89%	99.49%	97.94%	97.50%	99.37%	97.90%	98.74%	99.67%
	b) SDCCH/PAGING congestion	<=1%	0.12%	0.63%	0.21%	0.03%	1.07%	0.15%	0.05%	0.32%	0.04%	0.45%	0.01%	0.00%
	c) TCH congestion	<=2%	0.37%	0.75%	0.31%	0.03%	1.58%	0.74%	0.17%	1.41%	0.00%	1.31%	0.76%	0.00%
2	<b>Connection maintenance (retainability)</b>													
	a) CDR	<=2%	0.64%	0.87%	1.50%	0.75%	0.83%	0.36%	1.19%	1.71%	1.68%	1.11%	0.96%	0.24%
	b) Worst affected cells>3% TCH drop	<=5%	4.98%	4.97%	3.35%	0.56%	3.45%	3.28%	10.55%	5.68%	4.11%	3.58%	1.30%	0%
	c) Good voice quality	>=95%	97.32%	98.22%	97.23%	98.47%	96.23%	97.75%	96.08%	95.96%	97.94%	96.49%	NP	NP
3	<b>No of POI having &gt;=0.5% POI Congestion</b>	<=0.5%	0	0	3	0	0	0	0	0	1	0	0	0
4	<b>Response time to customers for assistance</b>													
	a) Accessibility of call centre/Customer Care	>=95%	75%	100%	98.37%	100%	100%	98%	99%	100%	100%	100%	100%	100%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	57%	97%	96.24%	97%	95%	95%	49%	95%	97%	100%	98.9%	89%

NA: Not Applicable, NP: Not Provided

From the 3 days live data assessment, it is found that all the operators are meeting the network parameters by and large, except for Idea not meeting the benchmark for SDCCH congestion (1.07%) and Tata GSM & Uninor not meeting the benchmark for “Worst affected cells>3% TCH drop” with the value of 10.55% & 5.68% respectively. POIs with >=0.5% congestion were found in case of BSNL & Videocon in 3 & 1 POI respectively.

Performance related to customer care data is found to be satisfactory for most of the operators except Aircel that is not meeting the requirement for both "accessibility of call centre" (75%) and "calls answered by operators (voice-to-voice)" within 60sec (57%). Tata GSM & CDMA do not meet the benchmark for the parameter “calls answered by operators (voice-to-voice)”.



One Month Data Audit		Bench- mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	V-fone	Rcom CDMA	Tata CDMA
S/N	Name of Parameter													
(A)	<b>Network Service Quality Parameter</b>													
1	<b>Network Availability</b>													
	a) BTS Accumulated Downtime	<=2%	0.13%	0.38%	0.89%	1.11%	0.04%	0.27%	0.05%	0.26%	0.26%	0.16%	0.37%	0.02%
	b) Worst affected BTSs due to downtime	<=2%	0%	0.27%	1.90%	0%	0.02%	0.69%	0%	0.27%	0.74%	0.69%	0.13%	0.00%
2	<b>Connection Establishment (Accessibility)</b>													
	a) CSSR (Call Setup Success Rate)	>=95%	98.76%	97.39%	98.50%	99.23%	99.87%	99.50%	97.64%	97.15%	98.78%	97.87%	98.70%	99.87%
	b) SDCC/PAGING congestion	<=1%	0.11%	0.72%	0.09%	0.02%	0.81%	0.17%	0.31%	0.35%	0.20%	0.57%	0.03%	0.01%
	c) TCH congestion	<=2%	0.45%	1.12%	0.42%	0.04%	1.57%	0.75%	0.24%	1.52%	0.30%	1.17%	0.69%	0.00%
3	<b>Connection maintenance (retainability)</b>													
	a) CDR	<=2%	0.57%	0.96%	1.52%	0.64%	0.87%	0.40%	1.18%	1.77%	1.50%	1.06%	0.95%	0.27%
	b) Worst affected cells>3% TCH drop	<=5%	4.57%	5.48%	3.53%	1.67%	3.88%	3.32%	10.48%	6.40%	4.35%	3.66%	1.45%	0%
	c) Good voice quality	>=95%	97.58%	96.63%	97.24%	98.56%	96.51%	97.81%	96%	95.97%	97.91%	96.59%	NP	NP
4	<b>No of POI having &gt;=0.5% POI Congestion</b>	<=0.5%	0	0	3	0	0	0	0	0	1	0	0	0
(B)	<b>Customer Service Quality Parameters</b>													
5	<b>Metering/billing credibility-Post paid</b>	<= 0.1%	0.09%	0.02%	0%	NA	0.09%	0.10%	0%	NA	NA	0.09%	0.09%	0%
6	<b>Metering /billing credibility-Pre paid</b>	<= 0.1%	0.02%	0.01%	0.07%	0.10%	0%	0.09%	0%	0.64%	0%	0.18%	0.10%	0.07%
7	<b>Resolution of billing/ charging complaints( within 4 weeks)</b>	100%	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	≤1week	≤1week	≤1week	≤1 week	≤1week	≤1week	≤1week	≤1week	≤1 week	≤1 week	≤1week	≤1week
8	<b>Response time to customers for assistance</b>													
	a) Accessibility of call centre/Customer Care	>=95%	77%	92%	98.61%	98%	95%	97%	99%	100%	95%	95%	100%	100%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	64%	88%	97%	99%	99%	94%	99%	94.4%	92%	77.30%	96%	85%
9	<b>Termination/closure of service</b>	<=7days	100%	95%	100%	NA	100%	100%	35%	NA	NA	100%	100%	94%
10	<b>Time taken for refunds of deposits after closures.( within 60 days)</b>	100%	100%	100%	100%	NA	100%	100%	100%	NA	NA	100%	100%	100%

NA: Not Applicable, NP: Not Provided

From the month data assessment, it is found that all the operators are meeting the network parameters by and large, except for Airtel, Tata GSM & Uninor not meeting the benchmark for “Worst affected cells>3% TCH drop” with the value of 5.48%, 10.48% & 6.4% respectively. BSNL & Videocon are having >=0.5% POI congestion in 3 & 1 POIs respectively.

Performance related to customer care data is found to be satisfactory for most of the operators. Aircel & Airtel have deviated from the benchmark for both "accessibility of call centre" and "calls answered by operators (voice-to-voice)". Vodafone & Tata CDMA do not meet the benchmark for “calls answered by operators (voice-to-voice)”. Uninor & Vodafone are not meeting the benchmark for "Metering/Billing Credibility (Pre-Paid)". Airtel, Tata GSM & CDMA are not meeting the benchmark of 7 days time for "termination/closure of service".

## Operator-Assisted Drive Test

The Operator Assisted Drive Test was conducted in UP (West). Route covered was about around 80-100Km depending on city areas within the speed limit of 30Km/hr. The cities covered were Meerut, Haridwar & Dehradun. In all the cities, zones were selected for covering different density areas (High, Medium & Low dense areas).

S/N	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	Rcom CDMA	Tata CDMA
			GSM Operators									CDMA Operators	
1.1	Blocked Call Rate (<=3%)	Meerut	0%	0%	0%	0%	0%	0%	0%	1.96%	0%	0%	0%
		Haridwar	3.08%	0%	3.81%	1.75%	0%	0%	0%	1.72%	3.03%	3.33%	0%
		Dehradun	0%	0%	16.39%	0%	2.81%	0%	0%	1.35%	1.56%	0%	0%
1.2	Dropped Call Rate (<=2%)	Meerut	0%	0%	0%	0%	4.34%	0%	0%	1.96%	0%	2.32%	0%
		Haridwar	0%	0%	0%	1.75%	0%	0%	0%	1.72%	0%	3.33%	0%
		Dehradun	0%	0%	1.64%	0%	0%	0%	0%	4.05%	0%	0%	0%
1.3	Percentage of connections with good voice quality (>=95%)												
	(i) 0-4 (w/o frequency hopping)	Meerut										78%	98.31%
		Haridwar										84%	97.77%
		Dehradun										89%	97.42%
	(ii) 0-5 (with frequency hopping)	Meerut	98%	95.5%	96%	97%	91%	93.90%	93%	97.30%	96.23%		
Haridwar		99%	96.6%	92.92%	96%	90%	94.2%	92%	98%	93.25%			
Dehradun		98%	97.7%	92.55%	98%	93%	98%	94%	95.70%	96.50%			
1.4	Call Setup Success Rate (>=95%)	Meerut	100%	100%	100%	100%	100%	100%	100%	98.04%	100%	100%	100%
		Haridwar	96.92%	100%	96.19%	98.25%	100%	100%	100%	98.28%	96.97%	96.67%	100%
		Dehradun	100%	100%	83.61%	100%	97.19%	100%	100%	98.65%	98.44%	100%	100%

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

- Blocked Call Rate benchmark is not met by Aircel (3.08%), Vodafone (3.03%) and Reliance CDMA (3.33%) in Haridwar. Special attention can be paid to BSNL having very high blocked call rate (16.39% in Dehradun and 3.81% in Haridwar).
- Dropped Call Rate benchmark is not met by Reliance GSM in Meerut (4.34%), Videocon in Dehradun (4.05%) and Reliance CDMA in Haridwar (3.33%).
- Reliance GSM & CDMA, Uninor do not meet the benchmark for "%age of connections with good voice quality" in any of the cities. Similar results were found for Tata GSM in Meerut & Haridwar, Vodafone in Haridwar and BSNL in Haridwar & Dehradun.
- Below benchmark performance for CSSR is found for Reliance GSM in Meerut & Dehradun, Reliance CDMA in Meerut, Vodafone in Haridwar and BSNL in Dehradun.

## Independent Drive Test

The Independent Drive Test was conducted at UP (West) in Meerut, Haridwar & Dehradun for most of the GSM operators. Here again, zones were selected for covering different density areas (High, Medium & Low dense areas).

S/N	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Videocon	V-fone
			GSM Operators							
1	Blocked Call Rate (<=3%)	Meerut	0%	0%	1.66%	0%	0%	0%	2.22%	0%
		Haridwar	0%	0%	0.96%	0%	7.14%	0%	4.00%	0%
		Dehradun	0%	0%	0%	0%	2.70%	0%	7.04%	0%
1	Dropped Call Rate (<=2%)	Meerut	0%	0%	1.66%	0%	0%	0%	4.44%	0%
		Haridwar	0%	0%	0%	0%	0%	0%	2.00%	0%
		Dehradun	0%	0%	0%	0%	0%	0%	2.70%	0%
1	Percentage of connections with good voice quality (=>95%)									
	(i) 0-4 (w/o frequency hopping)	Meerut								
		Haridwar								
		Dehradun								
	(ii) 0-5 ( with frequency hopping)	Meerut	97.80%	95.50%	96.50%	97.60%	90%	92.20%	97.12%	95.7%
		Haridwar	98.02%	95.60%	95.50%	98%	85%	95.70%	98.10%	96%
Dehradun		97.80%	97.05%	96.49%	96.60%	85%	97.80%	95.70%	95.16%	
1	Call Setup Success Rate (>=95%)	Meerut	100%	100%	98.34%	100%	100%	100%	97.78%	100%
		Haridwar	100%	100%	99.04%	100%	92.86%	100%	96.00%	100%
		Dehradun	100%	100%	100%	100%	97.30%	100%	92.96%	100%

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

- Reliance GSM is deviating for almost all the parameters. It is having a below benchmark performance for "connections with Good Voice Quality" parameter in all the three cities. It is also deviating from the benchmark for "Blocked call rate" (7.14%) and CSSR (92.85%) in Haridwar.
- Tata GSM is not meeting the benchmark for "connections with Good Voice Quality" parameter in Meerut (92.2%).
- Deviation is found for Videocon for Blocked Call Rate in both Haridwar & Dehradun (4% & 7.04% respectively) and Dropped Call Rate in Meerut & Dehradun (4.44% & 2.70% respectively).

## CHAPTER-3 : AUDIT-PMR VERIFICATION

PMR		Bench- mark	Audit	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	V-fone	Rcom CDMA	Tata CDMA
S/N	Name of Parameter			GSM Operators										CDMA Operators	
(A)	<b>Network Service Quality Parameter</b>														
1	<b>Network Availability</b>														
	BTS Accumulated Downtime	<=2%	Reported	0.26%	0.37%	1.70%	1.76%	0.12%	0.41%	0.07%	0.92%	0.43%	0.39%	0.27%	0.06%
			Verified	0.26%	0.37%	1.70%	1.76%	0.12%	0.41%	0.07%	0.92%	0.43%	0.39%	0.27%	0.06%
	Worst affected BTSs due to downtime	<=2%	Reported	0.21%	0.86%	6.55%	11.67%	0.45%	1.24%	0%	0.63%	0%	1.43%	0.29%	0%
			Verified	0.21%	0.86%	6.55%	11.67%	0.45%	1.24%	0%	0.63%	0%	1.43%	0.29%	0%
2	<b>Connection Establishment (Accessibility)</b>														
	CSSR (Call Setup Success Rate)	>=95%	Reported	98.66%	97.34%	96.52%	96.76%	99.83%	99.46%	99.42%	96.79%	98.51%	96.91%	98.95%	99.73%
			Verified	98.66%	97.34%	96.52%	96.76%	99.83%	99.46%	99.42%	96.79%	98.51%	96.91%	98.95%	99.73%
	SDCCH/PAGING congestion	<=1%	Reported	0.35%	0.44%	1.03%	0.35%	0.66%	0.14%	0%	0.11%	0.53%	0.74%	0%	0%
			Verified	0.35%	0.44%	1.03%	0.35%	0.66%	0.14%	0%	0.11%	0.53%	0.74%	0%	0%
	TCH congestion	<=2%	Reported	0.21%	0.87%	2.27%	0.19%	1.42%	0.52%	0%	0.65%	0%	1.79%	0.51%	0.05%
			Verified	0.21%	0.87%	2.27%	0.19%	1.42%	0.52%	0%	0.65%	0%	1.79%	0.51%	0.05%
3	<b>Connection maintenance (retainability)</b>														
	CDR	<=2%	Reported	0.62%	0.92%	2.56%	0.32%	1%	0.39%	1.20%	1.89%	1.26%	1.27%	1.06%	0.46%
			Verified	0.62%	0.92%	2.56%	0.32%	1%	0.39%	1.20%	1.89%	1.26%	1.27%	1.06%	0.46%
	Worst affected cells>3% TCH drop	<=5%	Reported	3.66%	4.52%	12.59%	0.24%	4.95%	2.21%	2.80%	5.51%	0%	3.97%	1.55%	0.24%
			Verified	3.66%	4.52%	12.59%	0.24%	4.95%	2.21%	2.80%	5.51%	0%	3.97%	1.55%	0.24%
	Good voice quality	>=95%	Reported	97.96%	97.81%	97.13%	98.95%	99.82%	97.91%	96.48%	95.55%	99.56%	96.62%	97.50%	99.60%
		Verified	97.96%	97.81%	97.13%	98.95%	99.82%	97.91%	96.48%	95.55%	99.56%	96.62%	97.50%	99.60%	
4	<b>No of POI having &gt;=0.5% POI Congestion</b>	<=0.5%	Reported	0	0	1	0	0	0	0	7	0	0	0	0
			Verified	0	0	1	0	0	0	0	7	0	0	0	0
(B)	<b>Customer Service Quality Parameters</b>														
5	<b>Metering/billing credibility-Post paid</b>	<= 0.1%	Reported	0.22%	0.03%	0%	NA	0.08%	0.07%	0.07%	NA	NA	0.12%	0.06%	0.05%
			Verified	0.22%	0.03%	0%	NA	0.08%	0.07%	0.07%	NA	NA	0.12%	0.06%	0.05%
6	<b>Metering /billing credibility-Pre paid</b>	<= 0.1%	Reported	0.01%	0.01%	0%	0.44%	0%	0.05%	0.00%	0.15%	0%	0.01%	0.06%	0.03%
			Verified	0.01%	0.01%	0%	0.44%	0%	0.05%	0.00%	0.15%	0%	0.01%	0.06%	0.03%

PMR		Bench- mark	Audit	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	V-fone	Rcom CDMA	Tata CDMA		
S/N	Name of Parameter			GSM Operators											CDMA Operators		
7	Resolution of billing/ charging complaints	100% within 4 weeks	Reported	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
			Verified	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	<=1 week	Reported	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
			Verified	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
8	Response time to customers for assistance																
	Accessibility of call centre/Customer Care	>=95%	Reported	100%	100%	100%	98.94%	97%	100%	100%	65.87%	100%	100%	100%	100%	98%	
			Verified	100%	100%	100%	98.94%	97%	100%	100%	65.87%	100%	100%	100%	100%	98%	
	% call answered by operators(voice to voice) within 60 sec.	>=90%	Reported	91.97%	90.3%	94%	99.45%	96.69%	87%	86.16%	82.95%	100%	96.39%	80%	91.88%		
Verified			91.97%	90.3%	94%	99.45%	96.69%	87%	86.16%	82.95%	100%	96.39%	80%	91.88%			
9	Termination/closure of service																
	No. of requests for Termination / Closure of service complied within 7 days during the quarter	<=7days	Reported	NA	100%	100%	NA	100%	100%	100%	NA	NA	100%	100%	100%		
			Verified	NA	100%	100%	NA	100%	100%	100%	NA	NA	100%	100%	100%		
10	Time taken for refunds of deposits after closures.	100% within 60 days	Reported	NA	100%	100%	NA	100%	100%	NA	NA	NA	100%	100%	95%		
			Verified	NA	100%	100%	NA	100%	100%	100%	NA	NA	100%	100%	95%		

### Critical Analysis (PMR Verification):

- The figures proved by all the operators match the figures obtained on verification.
- Only BSNL & Etisalat are not meeting the benchmark for the parameter "Worst affected BTS" with high margins.
- BSNL is not meeting the benchmarks for SDCCH & TCH congestion and CDR.
- Only BSNL & Uninor are not meeting the benchmark for the parameter "Worst affected cells>3% TCH drop" and "No. of POI congestion having >=POI congestion".
- Aircel & Vodafone is not meeting the benchmark for "Metering/Billing Credibility-Postpaid", while Etisalat & Uninor are not meeting the benchmark for "Metering/Billing Credibility-Prepaid".
- Tata CDMA is not meeting the benchmark for "time taken for refunds of deposits after closure within 60 days".
- Accessibility of Uninor's Customer Care Centre is very poor (65.87%).
- "% call answered by operators (voice to voice) within 60 sec." benchmark is not met by Reliance GSM & CDMA, Tata GSM and Uninor

## 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	B-mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	V-fone	Rcom CDMA	Tata CDMA
			GSM Operators										CDMA Operators	
<b>A</b>	<b>Network Service Quality Parameter</b>													
<b>1</b>	<b>Connection Establishment (Accessibility)</b>													
	a) CSSR	>=95%	98.66%	97.80%	98.53%	99.19%	99.89%	99.49%	97.94%	97.50%	99.37%	97.90%	98.74%	99.67%
	b) SDCCH/PAGING congestion	<=1%	0.12%	0.63%	0.21%	0.03%	1.07%	0.15%	0.05%	0.32%	0.04%	0.45%	0.01%	0%
	c) TCH congestion	<=2%	0.37%	0.75%	0.31%	0.03%	1.58%	0.74%	0.17%	1.41%	0.00%	1.31%	0.76%	0%
<b>2</b>	<b>Connection maintenance</b>													
	a) CDR	<=2%	0.64%	0.87%	1.50%	0.75%	0.83%	0.36%	1.19%	1.71%	1.68%	1.11%	0.96%	0.24%
	b) Cells having > 3% TCH drop	<=5%	4.98%	4.97%	3.35%	0.56%	3.45%	3.28%	10.55%	5.68%	4.11%	3.58%	1.30%	0.00%
	c) Good voice quality	>=95%	97.32%	98.22%	97.23%	98.47%	96.23%	97.75%	96.08%	95.96%	97.94%	96.49%	NP	NP
	d) No. of cells > 3% TCH drop		374	922	7	1	537	203	521	378	50	604	19	0
	e) Total no. of cells in the network		7487	18556	7680	60	15481	6216	4951	6647	1194	16839	1488	2529
<b>3</b>	<b>No of POI having &gt;=0.5% POI Congestion</b>	<=0.5%	0	0	3	0	0	0	0	0	1	0	0	0
	a) Name of POI having >=0.5% POI Congestion		Nil	Nil	Airtel,Uninor, BSNL	Nil	Nil	Nil	Nil	Nil	Idea	Nil	Nil	Nil
	b) Total No. of circuits on POI		18379	103969	1195	114	112096	48833	1144	34555	126637	97972	48833	85958
	c) Avg No. of call attempts on POI		308567	5060473	16888	8207	4277144	1016525	16894	1277645	93925	1888711	1016525	1126258
	d) Avg traffic served on POI (Erlang)		6991.42	126729	267.3	151	72546	32633	650	15754	3851	58199	32633	39237
	e) Total number of working POI Service Area wise		56	57	37	23	111	119	28	52	55	61	119	129
	f) Equipped Capacity of Network in respect of Traffic in erlang		82462	209372	4630	7699	196432	189110	88710	76416	98,327	218829	189110	125173
	g) Total traffic handled in TCBH in erlang		19509	125109	1231	41.89	222703	65539	21791	63538	32,876	204036	65539	35266
<b>(B)</b>	<b>Customer Service Quality Parameters</b>													
<b>4</b>	<b>Response time to customers for assistance</b>													
	a) Accessibility of call centre	>=95%	75%	100%	98.37%	100%	100%	100%	99%	100%	100%	100%	100%	100%
	b) % of call answered by operators(voice to voice) within 60 sec	>=90%	57%	97%	96.24%	97%	95%	95%	49%	95%	97%	100%	98.9%	89%
	c) No. of call attempts to call centre / customer care nos. during TCBH (Avg)		100	100	100	100	100	100	100	100	100	100	100	100
	d) No. of calls connected and answered successfully to call centre / customer care nos. during TCBH (Avg)		57	97	96	97	95	95	49	95	97	100	99	89

NA: Not Applicable, NP: Not Provided

### **Parameter-wise Findings (Live Data Assessment):**

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

- **Call setup success rate (benchmark  $\geq 95\%$ ):** All operators are meeting the benchmark with values lying between 97.5% and 99.89%.
- **SDCCH/PAGING Channel congestion (benchmark  $\leq 1\%$ ):** All operators, except Idea (1.07%), are meeting the benchmark with values lying between 0% and 0.63%.  
*Note: CDMA operators have provided the data for Paging Channel congestion and GSM operators provided SDCCH Channel congestion.*
- **TCH congestion (benchmark  $\leq 2\%$ ):** All operators are meeting the benchmark with values lying between 0% and 1.58%.
- **Call drop rate (benchmark  $\leq 2\%$ ):** All operators are meeting the benchmark with values lying between 0.24% and 1.71%.
- **Cell exceeding 3% TCH drop (benchmark  $\leq 5\%$ ):** Except for Tata GSM & Uninor with a value of 10.55% & 5.68% respectively, rest of the operators are satisfying the benchmark with value in between 0% and 4.98%.
- **Connections with good voice quality (benchmark  $\geq 95\%$ ):** CDMA service providers have declared that the parameter is not system generated. Rest of the GSM operators are meeting the benchmark with values lying between 95.96% and 98.47%.
- **No. of POI having  $\geq 5\%$  POI Congestion:** BSNL and Videocon have 3 and 1 POI respectively with more than 0.5% congestion. Here POI congestion indicates that there were call failure greater than 0.5% on that particular POI. The call here indicates only those calls which have been already being seized by the switch and processed. But cases were found where individual POIs are showing high utilization/usage which is managed by overflow technique i.e. extra traffic is carried over by some other operating POI as has been designed to do so.
- **%age of call answered by operator (electronically) (benchmark  $>95$ ):** Except for Aircel, all operators are meeting the benchmark with values lying between 98.37% to 100%.
- **%age of call answered by operator (Voice to voice) (benchmark  $>90$ ): %):** Except for Aircel, Tata GSM & CDMA, all other operators are meeting the benchmark with values 95% to 100%.

## (2) Month data Assessment & Summarized Findings

S/N	Name of Parameter	Benchmark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	V-fone	Rcom CDMA	Tata CDMA
			GSM Operators											CDMA Operators
(A)	<b>Network Service Quality Parameter</b>													
1	<b>Network Availability</b>													
	a) BTS Accumulated Downtime	<=2%	0.13%	0.38%	0.89%	1.11%	0.04%	0.27%	0.05%	0.26%	0.26%	0.16%	0.37%	0.02%
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.27%	1.90%	0.00%	0.02%	0.69%	0.00%	0.27%	0.74%	0.69%	0.13%	0.00%
	c) Total no. of BTSs in the licensed service area		2519	6239	2049	20	5222	2072	1642	2223	403	5645	1488	818
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		2220	15783	12286	149	1461	4015	539.74	3820	698	6153	3702	98.26
	e) No. of BTSs having accumulated downtime of >24 hours in a month		0	17	39	0	1	14	0	6	3	39	2	0
2	<b>Connection Establishment (Accessibility)</b>													
	a) CSSR (Call Setup Success Rate)	>=95%	98.76%	97.39%	98.50%	99.23%	99.87%	99.50%	97.64%	97.15%	98.78%	97.87%	98.70%	99.87%
	b) SDCCH/PAGING congestion	<=1%	0.11%	0.72%	0.09%	0.02%	0.81%	0.17%	0.31%	0.35%	0.20%	0.57%	0.03%	0.01%
	c) TCH congestion	<=2%	0.45%	1.12%	0.42%	0.04%	1.57%	0.75%	0.24%	1.52%	0.30%	1.17%	0.69%	0.00%
3	<b>Connection maintenance (retainability)</b>													
	a) CDR	<=2%	0.57%	0.96%	1.52%	0.64%	0.87%	0.40%	1.18%	1.77%	1.50%	1.06%	0.95%	0.27%
	b) Worst affected cells>3% TCH drop	<=5%	4.57%	5.48%	3.53%	1.67%	3.88%	3.32%	10.48%	6.40%	4.35%	3.66%	1.45%	0.00%
	c) Good voice quality	>=95%	97.58%	96.63%	97.24%	98.56%	96.51%	97.81%	96.00%	95.97%	97.91%	96.59%	NP	NP
	d) Total No. of cells exceeding 3% TCH drop (call drop)		343	1016.14	203	1	600	200	517	425	52	617	22	0
	e) Total no. of cells in the network		7487	18556	7680	60	15481	6216	4951	6647	1194	16839	1488	2529
4	<b>No of POI having &gt;=0.5% POI Congestion</b>	<=0.5%	0	0	3	0	0	0	0	0	1	0	0	0
	a) Name of POI having >=0.5% POI Congestion		Nil	Nil	Airtel, Uninor, BSNL	Nil	Nil	Nil	Nil	Nil	Idea	Nil	Nil	Nil



S/N	Name of Parameter	Benchmark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	V-fone	Rcom CDMA	Tata CDMA
			GSM Operators										CDMA Operators	
	b) Total No. of call attempts on POI (Avg.)		308863	4453197	529481	83445	4223157	877146	16035	15235	1,026,047	1981962	877146	1,153,259
	c) Total traffic served on POI (Erlang) (Avg.)		6883.3	119428	8200	1604	73538	27868	655	15235	30652	58540	27868	38955
	d) Total No. of circuits on POI		18379	103969	1195	114	112096	48833	1144	34555	126637	97972	48833	85958
	e) Total number of working POI Service Area wise		56	57	37	23	111	119	28	52	55	61	119	129
	f) Capacity of POI		16581	179895	1193	97	108475	45086	10532	23230	103585	95600	45086	90462
5	<b>Network Data</b>													
	a) Equipped Capacity of Network Erlang		82462	209372	4630	7699	196432	189110	88710	76416	98,327	218829	189110	125173
	b) Total traffic in TCBH in erlang (Avg.)		19509	125109	1231	41.89	222703	65539	21791	63538	32,876	204036	65539	35266
	c) Total no. of customers served (as per VLR) on last day of the month		936502	3915083	NP	4819	7263771	NP	950502	1155934	4972	6509016	NP	1130337
(B)	<b>Customer Service Quality Parameters</b>													
5	<b>Metering/billing credibility-Post paid</b>	$\leq 0.1\%$	0.09%	0.02%	0.00%	NA	0.09%	0.10%	0.00%	NA	NA	0.09%	0.09%	0.00%
	a) No. of bills issued during the period		3349	96355	43459	NA	230792	9042	5063	NA	NA	110818	139471	36110
	b) No. of bills disputed including billing complaints during the period		3	17	0	NA	201	9	31	NA	NA	98	123	0
6	<b>Metering /billing credibility-Pre paid</b>	$\leq 0.1\%$	0.02%	0.01%	0.07%	0.10%	0.00%	0.09%	0.00%	0.64%	0.00%	0.18%	0.10%	0.07%
	a) No. of charging / credit / validity complaints during the quarter		399	1037	2093	20	1	469	1007	1762	0	1509	340	603
	b) Total no. of pre-paid customers at the end of the quarter		1752613	7683833	2928617	19075	7461346	5141868	2421882	2753068	9750	8218171	3264190	913951
7	<b>Resolution of billing/ charging complaints(within 4 weeks)</b>	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	a) No. of billing/(post paid) and charging, credit/validity (pre paid) complaints resolved within 4 weeks during the quarter		402	1054	2149	0	927	478	1038	1787	0	1607	463	645

S/N	Name of Parameter	Benchmark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	V-fone	Rcom CDMA	Tata CDMA
			GSM Operators										CDMA Operators	
	b) Total no. of billing (post paid) and charging, credit / validity (pre paid) complaints received during the quarter		402	1054	2149	0	927	478	1038	1787	0	1607	463	645
	c) No. of billing complaints (post paid) and charging, credit/ validity complaints (pre paid) resolved in favour of the customer during the quarter		40	1049	1934	0	202	93	4	0	0	611	93	603
	d) No. of complaints disposed on account of not considered as valid complaints during the quarter		362	5	215	20	725	385	1034	1787	0	330	370	42
	e) Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	<=1 week	100%	100%	100%	100%	100%	<=1week	100%	<=1week	<=1week	100%	100%	100%
<b>8</b>	<b>Response time to customers for assistance</b>													
	a) Accessibility of call centre/Customer Care	>=95%	77%	92%	98.61%	98%	95%	97%	99%	100%	95%	95%	100%	100%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	64%	88%	97%	99%	99%	92.91%	99%	94.4%	94.44%	77.3%	96%	85%
	c) Total no. of call attempts to call centre & customer care nos. during TCBH (Avg.).		462827	1088469	3741	1557	2598804	49,874	341975	1548737	18	254205	662269	320650
	d) No. of calls connected and answered successfully to call centre & customer care nos. during TCBH (Avg.).		338459	939407	3628	1552	2585289	46342	339981	1462585	17	196382	635677	261504
<b>9</b>	<b>Termination/closure of service</b>	<=7days	100%	95%	100%	NA	100%	100%	35%	NA	NA	100%	100%	94%
	a) Total No. of requests for Termination / Closure of service received during the quarter		38	1577	123	NA	2665	102	71	NA	NA	1681	700	125
	b) No.of requests for Termination / Closure of service complied within 7 days during the quarter		38	1500	123	NA	2665	102	25	NA	NA	1681	700	118
<b>10</b>	<b>Time taken for refunds of deposits after closures.</b>	100% within 60 days	100%	100%	100%	NA	100%	100%	100%	NA	NA	100%	100%	100%

NA: Not Applicable, NR: Not Received

### Parameter-wise Findings (Month Data Assessment):

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

- **BTS accumulated downtime (benchmark  $\leq 2\%$ ):** All operators are meeting the benchmark with values lying between 0.02% and 1.11%.
- **Worst affected BTSs due to downtime (benchmark  $\leq 2\%$ ):** All operators are meeting the benchmark with values lying between 0% and 1.9%.
- **Call setup success rate (benchmark  $\geq 95\%$ ):** All operators are meeting the benchmark with values lying between 97.15% and 99.87%.
- **SDCCH/PAGING Channel congestion (benchmark  $\leq 1\%$ ):** All operators are meeting the benchmark with values lying between 0% and 0.81%.  
*Note: CDMA operators have provided the data for Paging Channel congestion and GSM operators provided SDCCH Channel congestion.*
- **TCH congestion (benchmark  $\leq 2\%$ ):** All operators are meeting the benchmark with values lying between 0% and 1.57%.
- **Call drop rate (benchmark  $\leq 2\%$ ):** All operators are meeting the benchmark with values lying between 0.27% and 1.77%.
- **Cell exceeding 3% TCH drop (benchmark  $\leq 5\%$ ):** Except for Airtel (5.48%), Tata GSM (10.48%) and Uninor (6.4%), all the operators are satisfying the benchmark with value in between 0% and 4.57%.
- **Connections with good voice quality (benchmark  $\geq 95\%$ ):** CDMA service providers have declared that the parameter is not system generated. Rest of the GSM operators are meeting the benchmark with values lying between 95.97% and 98.56%.
- **No. of POI having  $\leq 5\%$  POI Congestion:** BSNL and Videocon have 3 and 1 POI respectively with more than 0.5% congestion. Here POI congestion indicates that there were call failure greater than 0.5% on that particular POI. The call here indicates only those calls which have been already being seized by the switch and processed. But cases were found where individual POIs are showing high utilization/usage which is managed by overflow technique i.e. extra traffic is carried over by some other operating POI as has been designed to do so.
- **%age of call answered by operator (electronically) (benchmark  $>95\%$ ):** Except for Aircel (77%) and Airtel (92%), all operators are meeting the benchmark with values lying between 95% to 100%.
- **%age of call answered by operator (Voice to voice) (benchmark  $>90\%$ ):** Only Aircel, Airtel, Vodafone & Tata CDMA are not meeting the benchmark with values of 64%, 88%, 77.3% & 85% respectively. Rest of the operators comply to this requirement with values ranging 94.4% to 99%.
- **Metering and billing credibility-Post paid (benchmark  $\leq 0.1\%$ ):** All the operators are meeting the benchmark.
- **Metering and billing credibility-Pre paid (benchmark  $\leq 0.1\%$ ):** Except for Uninor and Vodafone with value of 0.64% & 0.18% respectively, all the operators are meeting the benchmark with values lying between 0% and 0.1%.
- **Resolution of billing/ charging complaints (benchmark 100% within 4 weeks):** All operators are meeting the benchmark.
- **Termination/Closure of service (Benchmark  $\leq 7$  days):** Airtel, Tata GSM & CDMA are not meeting the benchmark with values of 64%, 35% and 94% respectively.
- **Time taken for refunds of deposits after closures (benchmark 100% within  $\leq 60$  days):** All operators have satisfied the benchmark.

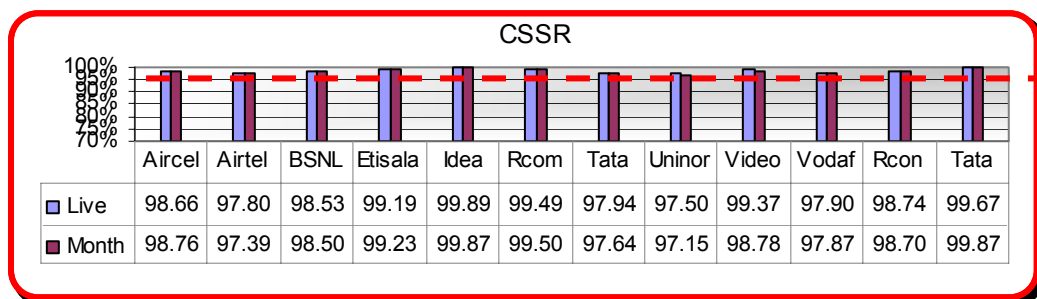
**(1) Sample Coverage**

Switches/BSC/BTS details of operators:

S/N	Name of Service Provider	No. of MSC	No. of BSC	No. of BTS
<b>GSM Operators</b>				
1	Aircel Ltd	2	20	2519
2	Airtel Ltd	15	64	6239
3	BSNL	12	31	2049
4	Etisalat	1	8	20
5	Idea	13	41	5222
6	Reliance (GSM)	3	12	2339
7	Tata (GSM)	2	15	1642
8	Uninor	4	12	2250
9	Videocon	1	5	403
10	Vodafone		87	5645
<b>CDMA Operators</b>				
11	Reliance (CDMA)	5	4	1468
12	Tata (CDMA)	4	6	810

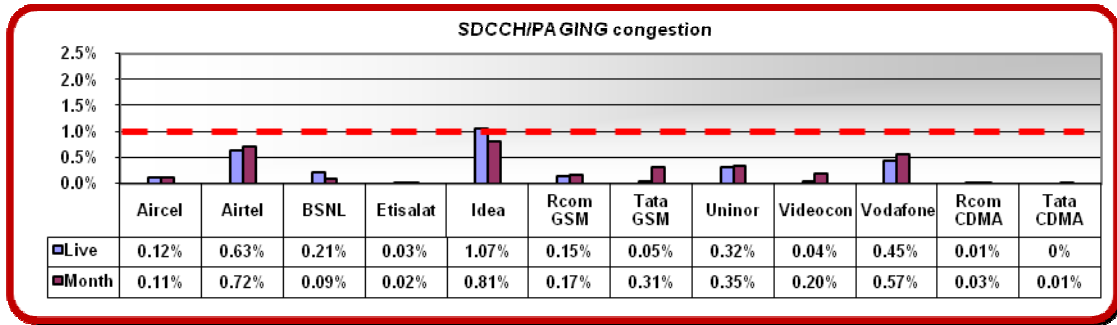
**(2) Performance (Graphical Representation)****Comparison between Live measurements and One month data Audit – Cellular Mobile Telephone Services****A) NETWORK PERFORMANCE**

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

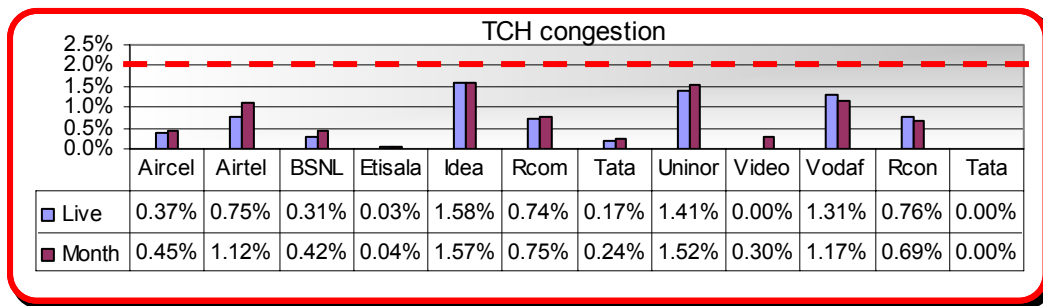


**II. Blocked call rate:**

**SDCCH congestion (%):** All operators, except Idea (1.07% for 3 days live data), are meeting the TRAI benchmarks ( $\leq 1\%$ ) for both one month data and 3 days live data taken in the month of audit.

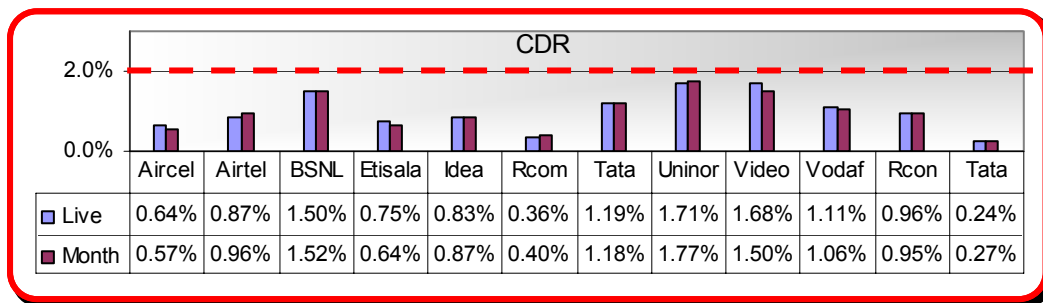


**TCH congestion (%):** All operators are meeting the TRAI benchmarks ( $\leq 2\%$ ) for both one month data and 3 days live data taken in the month of audit.

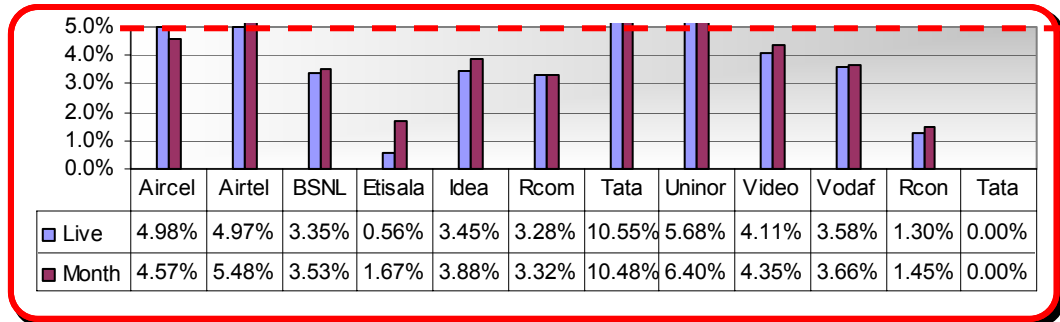


**III. Connection Maintainability (Retainability):**

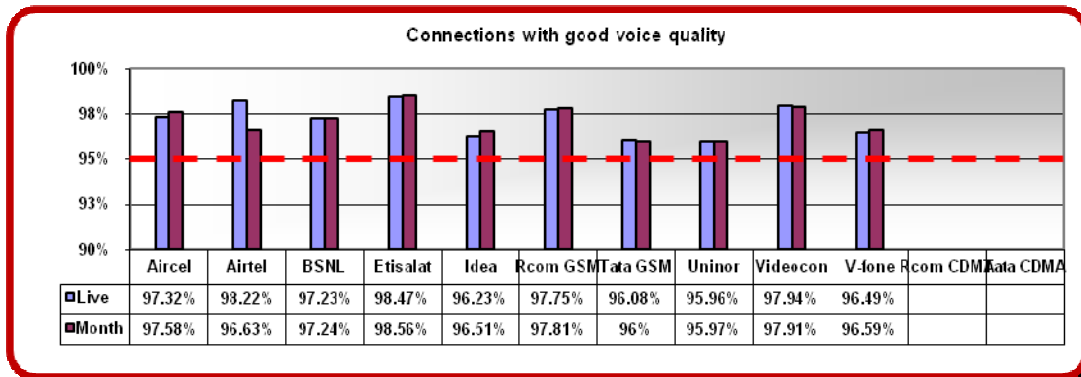
**Call drop rate (%):** All operators are meeting the TRAI benchmarks ( $\leq 2\%$ ) for both one month data and 3 days live data taken in the month of audit.



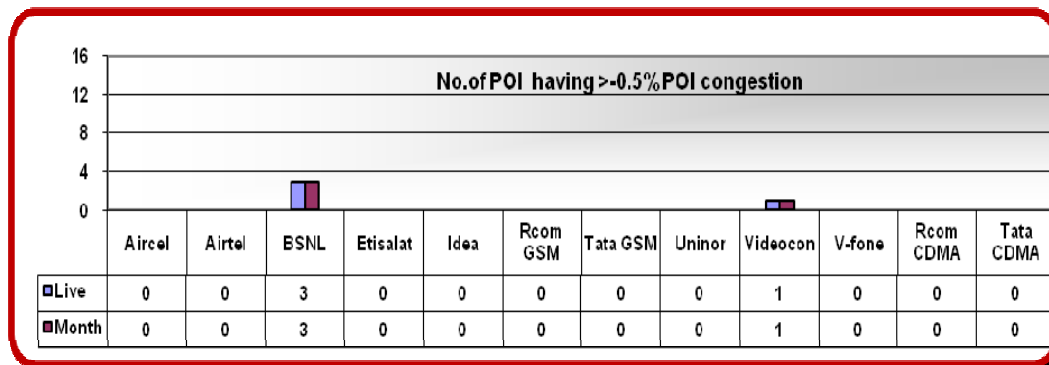
**Worst affected Cell exceeding 3% TCH Drop:** For both live and month data, Tata GSM & Uninor are found to be not meeting the benchmark of  $\leq 5\%$ . Airtel is not meeting the benchmark in month data with a value of 5.48%. Rest of the operators are meeting the benchmark for both cases.



**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.



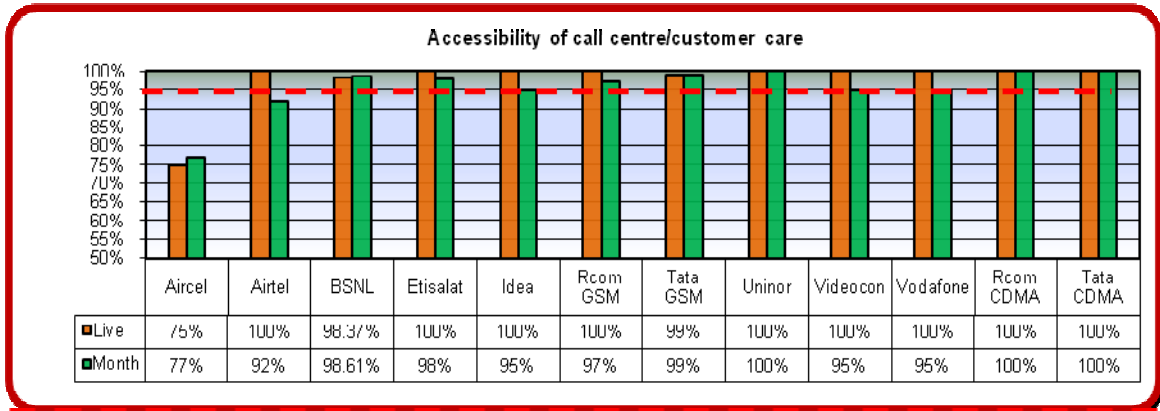
**No. of POI having  $\leq 5\%$  POI Congestion:** All the operators, except BSNL and Videocon are not satisfied benchmark with 3 and 1 POI respectively in both live & month data verification.



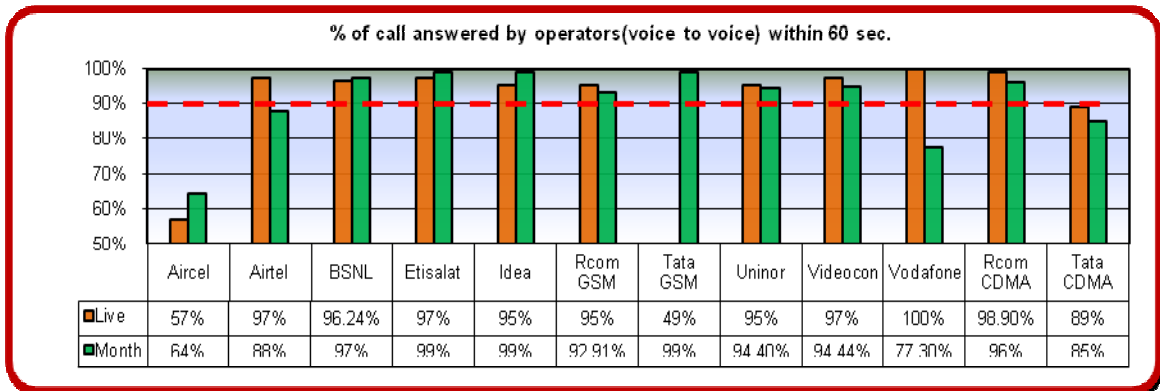
B) CUSTOMER SERVICE QUALITY PARAMETERS

(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 Airtel in month data audit (92%) and Aircel for both cases (77% for month data audit & 75% for live data audit).



**Percentage of call answered by operators (Voice to voice) within 60 sec:** For Live data, Aircel, Tata GSM & CDMA are not meeting the benchmark. For month data, Aircel, Airtel, Vodafone & Tata CDMA are not meeting the benchmark.



(3) 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 “accessibility of call centre” (Airtel) and “%age of calls answered by operator” (Airtel, Tata GSM and Vodafone).

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

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

**(2) Performance (live calling for billing complaints)**

Calling Operator	Aircel	Airtel	BSNL	Etisalat	Idea	Reliance (GSM)	Tata (GSM)	Uninor	Videocon	Vodafone	Reliance (CDMA)	Tata (CDMA)
Total No. of calls	10	7	8	5	11	6	8	-	-	11	7	8
Cases resolved with 4 weeks	10	7	8	5	11	6	8	-	-	11	7	8
%age of cases resolved	100%	100%	100%	100%	100%	100%	100%	-	-	100%	100%	100%

**(3) Live calling to Call center:** Fifty nos. of calls were made at Meerut in each half and below given no. of calls got connected to the call center within 60 Sec.

	OPERATORS NAME											
	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom	TATA	UNINOR	Videocon	Vodafone	Rcom	Tata
	GSM										CDMA	
1ST HALF (10AM TO 01 PM)	36	43	47	45	44	45	46	48	45	46	47	48
2ND HALF (04PM TO 07 PM)	22	35	43	42	47	35	44	44	47	36	44	39
In % age	58.00	78.00	90.00	87.00	91.00	80.00	90.00	92.00	92.00	82.00	91.00	87.00

**(4) Level 1 Calling:** Level 1 calling such as calling at emergency no. (Police, Fire, Hospital), Railway enquiry system etc were made so as to check the service of such short codes. In Meerut it was found to be functional.

**(5) Critical Analysis**

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



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

A sample of 2x50 test calls per Service Providers with in the licensed service area (UP (West) Circle) were made between 1900 to 2000 hrs and between 2000 to 2100 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	Reliance (CDMA)	Tata (CDMA)
<b>Aircel</b>	-	97%	98%	100%	100%	100%	100%	100%	100%	100%	100%	100%
<b>Airtel</b>	100%	-	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
<b>BSNL</b>	100%	100%	-	100%	100%	100%	100%	100%	100%	100%	100%	100%
<b>Etisalat</b>	100%	100%	100%	-	100%	100%	100%	100%	100%	100%	100%	99%
<b>Idea</b>	100%	100%	100%	100%	-	100%	100%	100%	98%	100%	100%	100%
<b>Reliance (GSM)</b>	100%	100%	100%	100%	100%	-	100%	100%	100%	100%	100%	100%
<b>Tata (GSM)</b>	100%	100%	96%	100%	100%	100%	-	100%	100%	100%	100%	100%
<b>Uninor</b>	99%	100%	100%	100%	100%	100%	100%	-	100%	100%	100%	100%
<b>Videocon</b>	100%	100%	100%	100%	100%	100%	100%	100%	-	100%	100%	100%
<b>Vodafone</b>	100%	100%	100%	100%	100%	100%	98%	100%	100%	-	100%	100%
<b>Reliance (CDMA)</b>	100%	100%	100%	100%	100%	100%	100%	100%	97%	100%	-	100%
<b>Tata (CDMA)</b>	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 UP (West) for all the operators. Route covered was about around 80-100Km depending on city areas within the speed limit of 30Km/hr.

**Drive Test Locations*****Meerut***

LOW DENSE: Milange Mall, Pallavpuram, Baghpat By-pass, Crystal Palace  
 MEDIUM DENSE: Metro Plaza, Saket Chowk, Begum Bridge, Tez Garhi Chowk  
 HIGH DENSE: Krishna Plaza, Railway Station Bus Stand to Begum Bridge

***Haridwar***

LOW DENSE: Sidcul Industrial Area, Haridwar By-pass  
 MEDIUM DENSE: Prem Nagar, LG Road Ashram, BHEL Sector-1  
 HIGH DENSE: Railway Station, Bus Stand, Har ki Paudi

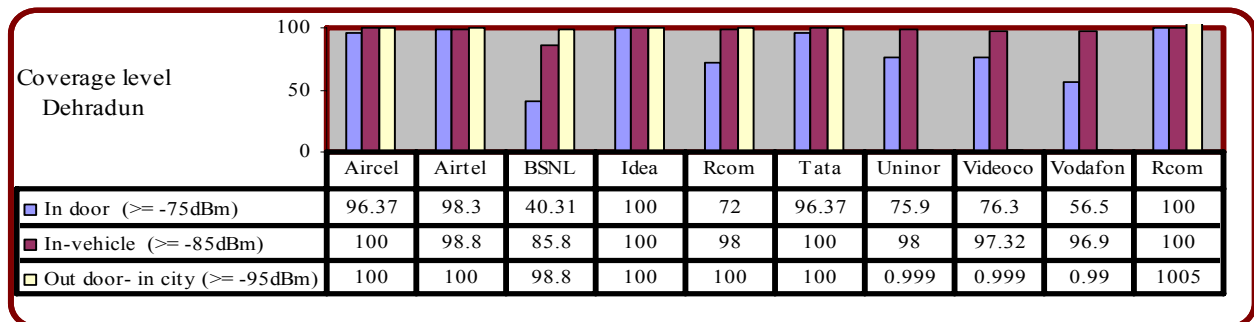
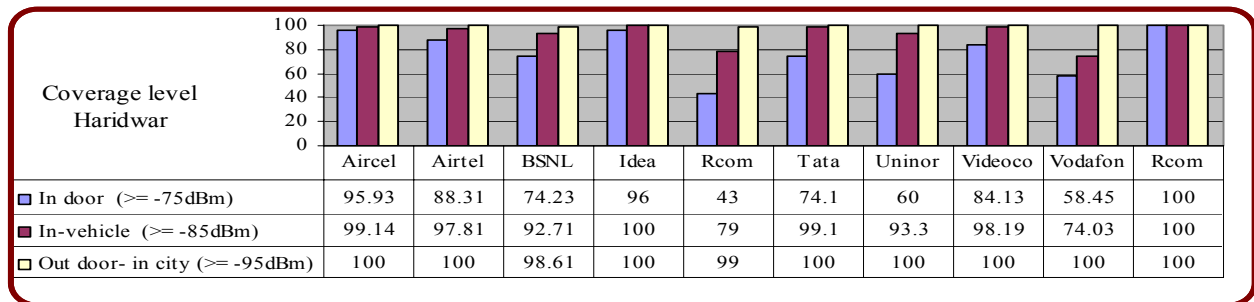
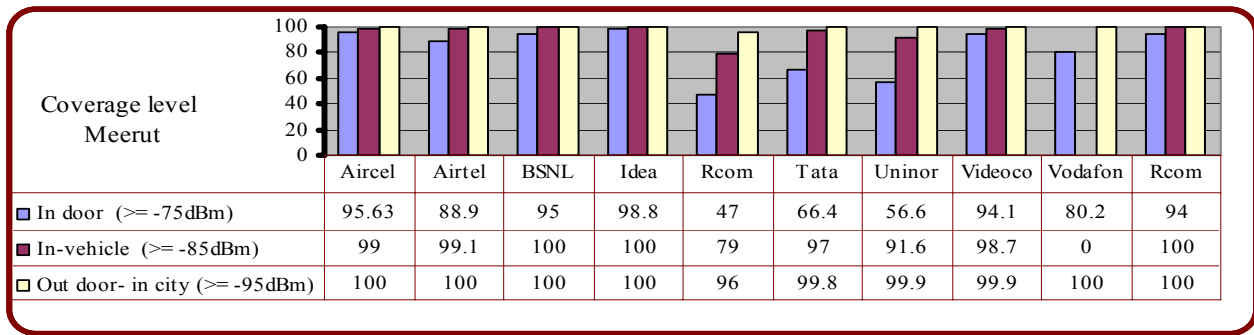
***Dehradun***

LOW DENSE: GMS Road, Mandi, ISBT, Dharampur, Survey Chwok  
 MEDIUM DENSE: Rajpur Road, Ashne Hall, Chakrata Road  
 HIGH DENSE: Clock Tower, Prince Chowk, Railway Station

## 2) Performance (for the respective cities) – Operator Assisted Drive Test

SN	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	Rcom CDMA	Tata CDMA
			GSM Operators										CDMA Operators
1.1	Call Attempts	Meerut	35	65	67	55	46	54	59	51	65	43	51
		Haridwar	65	53	105	57	28	55	55	58	66	30	51
		Dehradun	61	74	122	70	142	61	60	74	64	42	56
1.2	Blocked Call Rate (<=3%)	Meerut	0%	0%	0%	0%	0%	0%	0%	1.96%	0%	0%	0%
		Haridwar	3.08%	0%	3.81%	1.75%	0%	0%	0%	1.72%	3.03%	3.33%	0%
		Dehradun	0%	0%	16.39%	0%	2.81%	0%	0%	1.35%	1.56%	0%	0%
1.3	Dropped Call Rate (<=2%)	Meerut	0%	0%	0%	0%	4.34%	0%	0%	1.96%	0%	2.32%	0%
		Haridwar	0%	0%	0%	1.75%	0%	0%	0%	1.72%	0%	3.33%	0%
		Dehradun	0%	0%	1.64%	0%	0%	0%	0%	4.05%	0%	0%	0%
1.4	Percentage of connections with good voice quality (=>95%)												
	(i) 0-4 (w/o frequency hopping)	Meerut										78%	98.31%
		Haridwar										84%	97.77%
		Dehradun										89%	97.42%
	(ii) 0-5 ( with frequency hopping)	Meerut	98.00%	95.50%	96.00%	97%	91%	93.90%	93%	97.30%	96.23%		
		Haridwar	99.00%	96.60%	92.92%	96%	90%	94.20%	92%	98%	93.25%		
Dehradun		98.00%	97.70%	92.55%	98%	93%	98.00%	94%	95.70%	96.50%			
1.5	Service Coverage												
	In door (>= -75dBm)	Meerut	95.63	88.9	95	98.8	47	66.4	56.6	94.1	80.2	94	100
		Haridwar	95.93	88.31	74.23	96	43	74.1	60	84.13	58.45	100	100
		Dehradun	96.37	98.3	40.31	100	72	96.37	75.9	76.3	56.5	100	100
	In-vehicle (>= -85dBm)	Meerut	99	99.1	100	100	79	97	91.6	98.7	99/23	100	100
		Haridwar	99.14	97.81	92.71	100	79	99.1	93.3	98.19	74.03	100	100
		Dehradun	100	98.8	85.8	100	98	100	98	97.32	96.9	100	100
	Out door- in city (>= -95dBm)	Meerut	100	100	100	100	96	99.8	99.9	99.9	100	100	100
		Haridwar	100	100	98.61	100	99	100	100	100	100	100	100
Dehradun		100	100	98.8	100	100	100	0.999	0.999	0.99	1005	1	
1.6	Call Setup Success Rate (>=95%)	Meerut	100%	100%	100%	100%	100%	100%	100%	98.04%	100%	100%	100%
		Haridwar	96.92%	100%	96.19%	98.25%	100%	100%	100%	98.28%	96.97%	96.67%	100%
		Dehradun	100%	100%	83.61%	100%	97.19%	100%	100%	98.65%	98.44%	100%	100%

## Graphical Representation



### (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:

- Blocked Call Rate benchmark is not met by Airtel (3.08%), Vodafone (3.03%) and Reliance CDMA (3.33%) in Haridwar. Special attention can be paid to BSNL having very high blocked call rate (16.39% in Dehradun and 3.81% in Haridwar).
- Dropped Call Rate benchmark is not met by Reliance GSM in Meerut (4.34%), Videocon in Dehradun (4.05%) and Reliance CDMA in Haridwar (3.33%).
- Reliance GSM & CDMA, Uninor do not meet the benchmark for "%age of connections with good voice quality" in any of the cities. Similar results were found for Tata GSM in Meerut & Haridwar, Vodafone in Haridwar and BSNL in Haridwar & Dehradun.
- Below benchmark performance for CSSR is found for Reliance GSM in Meerut & Dehradun, Reliance CDMA in Meerut, Vodafone in Haridwar and BSNL in Dehradun.

**(E) Independent Drive Test****(1) Sample Coverage**

The Independent Drive Test was conducted at UP (West) after operators assisted drive test was over for respective operators. Route cover was about around 80-100Km depending on city areas within the speed limit of 30Km/hr.

**Drive Test Locations*****Meerut***

LOW DENSE:	Milange Mall, Pallavpuram, Baghpat By-pass, Crystal Palace
MEDIUM DENSE:	Metro Plaza, Saket Chowk, Begum Bridge, Tez Garhi Chowk
HIGH DENSE:	Krishna Plaza, Railway Station Bus Stand to Begum Bridge

***Haridwar***

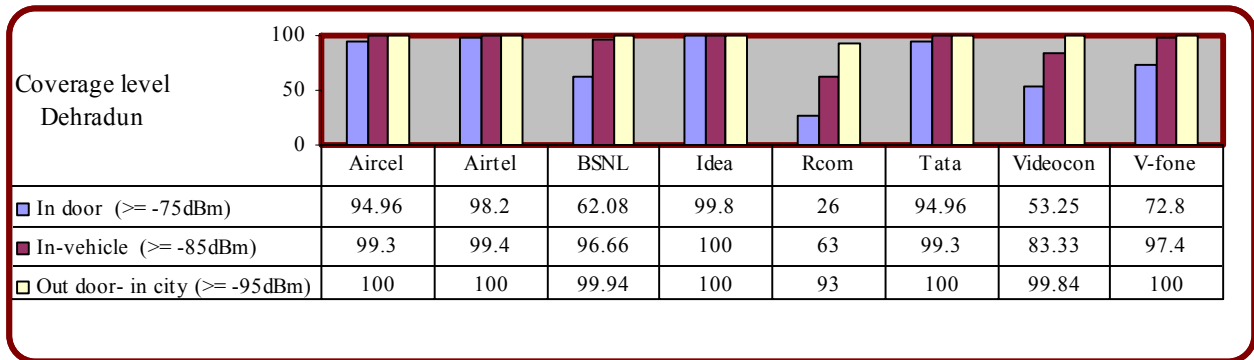
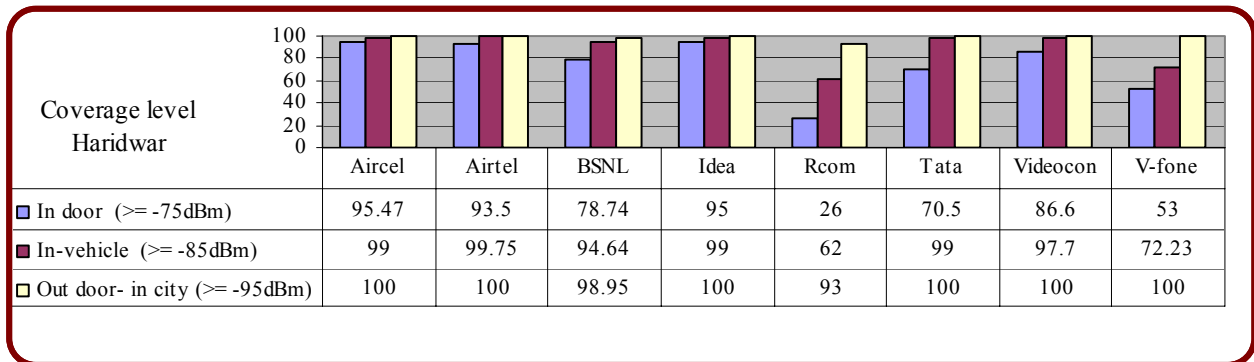
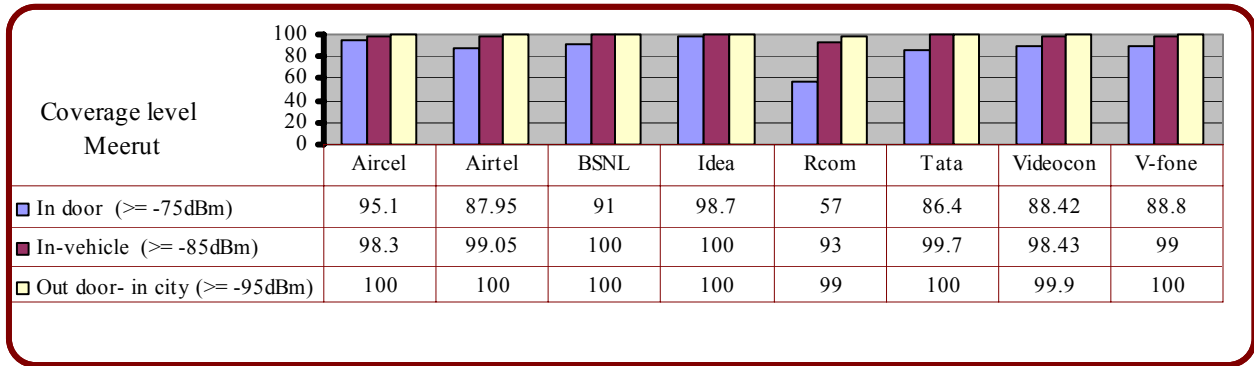
LOW DENSE:	Sidcul Industrial Area, Haridwar By-pass
MEDIUM DENSE:	Prem Nagar, LG Road Ashram, BHEL Sector-1
HIGH DENSE:	Railway Station, Bus Stand, Har ki Paudi

***Dehradun***

LOW DENSE:	GMS Road, Mandi, ISBT, Dharampur, Survey Chwok
MEDIUM DENSE:	Rajpur Road, Ashne Hall, Chakrata Road
HIGH DENSE:	Clock Tower, Prince Chowk, Railway Station

**Performance (for the respective cities) – Independent Drive Test**

SN	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Videocon	V-fone
			GSM Operators							
1.1	Call Attempts	Meerut	43	117	60	57	41	56	45	61
		Haridwar	65	111	104	94	28	49	50	54
		Dehradun	68	159	70	72	37	68	71	66
1.2	Blocked Call Rate (<=3%)	Meerut	0%	0%	1.66%	0%	0%	0%	2.22%	0%
		Haridwar	0%	0%	0.96%	0%	7.14%	0%	4.00%	0%
		Dehradun	0%	0%	0%	0%	2.70%	0%	7.04%	0%
1.3	Dropped Call Rate (<=2%)	Meerut	0%	0%	1.66%	0%	0%	0%	4.44%	0%
		Haridwar	0%	0%	0%	0%	0%	0%	2%	0%
		Dehradun	0%	0%	0%	0%	0%	0%	2.70%	0%
1.4	Percentage of connections with good voice quality (=>95%)									
	(i) 0-4 (w/o frequency hopping)	Meerut								
		Haridwar								
		Dehradun								
	(ii) 0-5 ( with frequency hopping)	Meerut	97.80%	95.50%	96.50%	97.60%	90%	92.20%	97.12%	95.70%
		Haridwar	98.02%	95.60%	95.50%	98%	85%	95.70%	98.10%	96%
Dehradun		97.80%	97.05%	96.49%	96.60%	85%	97.80%	95.70%	95.16%	
1.5	Service Coverage									
	In door (>= -75dBm)	Meerut	95.1	87.95	91	98.7	57	86.4	88.42	88.8
		Haridwar	95.47	93.5	78.74	95	26	70.5	86.6	53
		Dehradun	94.96	98.2	62.08	99.8	26	94.96	53.25	72.8
	In-vehicle (>= -85dBm)	Meerut	98.3	99.05	100	100	93	99.7	98.43	99
		Haridwar	99	99.75	94.64	99	62	99	97.7	72.23
		Dehradun	99.3	99.4	96.66	100	63	99.3	83.33	97.4
	Out door- in city (>= -95dBm)	Meerut	100	100	100	100	99	100	99.9	100
		Haridwar	100	100	98.95	100	93	100	100	100
Dehradun		100	100	99.94	100	93	100	99.84	100	
1.6	Call Setup Success Rate (>=95%)	Meerut	100%	100%	98.34%	100%	100%	100%	97.78%	100%
		Haridwar	100%	100%	99.04%	100%	92.86%	100%	96%	100%
		Dehradun	100%	100%	100%	100%	97.30%	100%	92.96%	100%

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

- Reliance GSM is deviating for almost all the parameters. It is having a below benchmark performance for "connections with Good Voice Quality" parameter in all the three cities. It is also deviating from the benchmark for Blocked call rate (7.14%) and CSSR (92.85%) in Haridwar.
- Tata GSM is not meeting the benchmark for "connections with Good Voice Quality" parameter in Meerut (92.2%).
- Deviation is found for Videocon for Blocked Call Rate in both Haridwar & Dehradun (4% & 7.04% respectively) and Dropped Call Rate in Meerut & Dehradun (4.44% & 2.7% respectively).

**(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 (UP (West)) is by and large satisfactory for **Network Parameters**. However, the benchmark of 1% for “SDCCH congestion” is not met by Idea (1.07% for live data. Similarly, the  $\leq 5\%$  benchmark for “worst affected cells  $>3\%$  TCH drop” is not met by Tata GSM (10.55% & 10.48% for live & month data respectively), Uninor (5.68% & 6.4% for live & month data respectively) and Airtel (5.48% for month data).

**POI congestion** is observed in case of BSNL in 3 POIs & Videocon in 1 POI .

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

Regarding **Metering/Billing Credibility** issues, Uninor and Vodafone show below benchmark value for Pre-paid. Airtel, Tata GSM & CDMA show deviation from the 7 days benchmark for “Termination/closure of services”.

During **Drive Tests**, high Blocked Call Rates were found in Haridwar in case of Aircel, Vodafone & Reliance CDMA. Similarly, dropped call rate benchmark was not met by Reliance GSM (Meerut), Videocon (Dehradun) and Reliance CDMA (Haridwar). Reliance GSM & CDMA and Uninor are having below benchmark performance in case of good voice quality connection in all the three cities. Similar results were found for Tata GSM in Meerut & Haridwar and Vodafone in Haridwar. The benchmark of 95% for CSSR was not met by Reliance GSM in Meerut (94%) & Dehradun (91.3%), Vodafone in Haridwar (90.3%) and Reliance CDMA in Meerut (94%).

**II. Basic Telephone Service (Wireline) Providers**

*.....Audit not done for this quarter*

**III. Broadband Service Providers**

*.....Audit not done for this quarter*