

**REPORT**

**ON**

**AUDIT & ASSESSMENT OF QUALITY OF SERVICE**

**OF**

**CELLULAR MOBILE TELEPHONE SERVICE**

**FOR**

**NORTH ZONE – UP (WEST) CIRCLE**  
**(North Zone)**

*Report Period: April 2012 - June 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 assessment & summarized findings
- 3) Sample coverage
- 4) Performance (Graphical Representation)
- 5) Critical Analysis

#### **(B) Redressal**

- 1) Sample coverage
- 2) Performance based on live calling for billing complaints
- 3) Live Calling to Call Centre
- 4) Level 1 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-1) call 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 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.

## 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 2<sup>nd</sup> quarter (April 2012 - June 2012). The primary data collection and verification of records (PMR data verification – quarterly) maintained by various operators was undertaken during the period Oct - Dec 2011.

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 Ltd	May-2012	19 - 20 Hrs
2	Airtel Ltd	May-2012	19 - 20 Hrs
3	BSNL	May-2012	19 - 20 Hrs
4	Idea	May-2012	19 - 20 Hrs
5	Tata Communications (GSM)	May-2012	19 - 20 Hrs
6	Vodafone	May-2012	19 - 20 Hrs
7	Reliance Communication (GSM)	May-2012	19 - 20 Hrs
8	Uninor	May-2012	19 - 20 Hrs
9	Videocon	May-2012	19 - 20 Hrs
<b>CDMA Operators</b>			
10	MTS (CDMA)	May-2012	19 - 20 Hrs
11	Reliance Communication (CDMA)	May-2012	19 - 20 Hrs
12	Tata Communications (CDMA)	May-2012	19 - 20 Hrs

**Note:** Etisalat has stopped its operation in UP (West) Circle.

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

### (A) Cellular Mobile Telephone Services

3 days Live Data Audit														
S/N	Name of Parameter	B-mark	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Uninor	Videocoin	V-fone	MTS	Rcom CDMA	Tata CDMA
			GSM Operators							CDMA Operators				
1	Network Availability													
	a) BTS Accumulated Downtime	≤2%	0.88%	0.05%	1.69%	0.20%	0.21%	0.17%	0.79%	0.15%	0.62%	0.30%	0.17%	0.03%
	b) Worst affected BTSs due to downtime	≤2%	0.00%	0.00%	0.45%	0.02%	0.00%	0.00%	0.00%	0.00%	0.05%	0.00%	0.00%	0.00%
2	Connection Establishment (Accessibility)													
	a) CSSR (Call Setup Success Rate)	≥95%	98.41%	99.72%	97.45%	99.73%	99.56%	99.03%	97.12%	98.28%	97.11%	99.46%	97.52%	97.46%
	b) SDCCH/PAGING congestion	≤1%	0.36%	0.09%	0.51%	0.95%	0.02%	0.08%	0.49%	0.09%	0.77%	0.00%	0.01%	0.00%
	c) TCH congestion	≤2%	0.55%	0.25%	0.94%	1.16%	0.07%	0.36%	2.14%	0.00%	1.38%	0.00%	0.02%	0.16%
3	Connection maintenance (retainability)													
	a) CDR	≤2%	0.50%	0.45%	1.40%	0.99%	0.46%	0.76%	1.15%	0.00%	1.14%	0.64%	0.05%	0.64%
	b) Worst affected cells>3% TCH drop	≤3%	2.87%	0.54%	4.88%	2.92%	0.00%	4.35%	2.35%	0.00%	2.96%	0.99%	0.00%	0.84%
	c) Good voice quality	≥95%	97.25%	99.34%	97.81%	95.99%	98.87%	97.32%	96.09%	97.99%	96.70%	99.87%	99.79%	NA
4	Number of POI having ≥0.5% POI congestion		0	0	2	0	0	0	5	0	0	0	0	0
5	Response time to customers for assistance													
	a) Accessibility of call centre/Customer Care	≥95%	44.28%	97.02%	97.16%	99.02%	98.98%	99.49%	96.26%	100.0%	100.0%	96.49%	97.96%	99.19%
	b) % call answered by operators(voice to voice) within 60 sec.	≥90%	5.39%	90.69%	96.21%	91.91%	95.78%	88.18%	99.03%	100.0%	95.36%	95.87%	95.15%	95.13%

NA: Not Applicable, NP: Not Provided

From the above 3 days live data assessment table, it is found that all operators are meeting most of the network parameters. Exception is for “Worst affected cells >3% TCH drop”, as seen for BSNL & Tata (GSM) are not satisfying the benchmark. Among the Technical Parameters it is also found that for BSNL & Uninor are having 2 & 5 nos. of POI with congestion > 0.5% respectively and for parameter “TCH congestion” Uninor is not satisfying the benchmark. In case of “Good voice quality” Tata (CDMA) reported that the data is not system generated. Rest of the operators are satisfying the benchmark successfully.

In case of performance related to Customer Care data it is seen that for the parameters “Accessibility of call centre/Customer Care” & “call answered by operators (voice to voice) within 60 sec” Aircel & Tata-GSM performance are showing values below benchmark.





One Month Data Audit		Bench- mark	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Uninor	Videoc on	V-fone	MTS	RCom CDMA	Tata CDMA
S/N	Name of Parameter		GSM Operators									CDMA Operators		
8	Response time to customers for assistance													
	a) Accessibility of call centre/Customer Care	≥95%	39.77%	96.87%	96.83%	99.08%	98.48%	99.48%	96.38%	100.0%	100.0%	96.23%	97.48%	99.17%
	b) % call answered by operators(voice to voice) within 60 sec.	≥90%	7.52%	87.63%	97.69%	97.84%	94.79%	69.65%	95.59%	97.37%	94.09%	95.53%	94.70%	89.32%
9	Termination/closure of service	≤7days	100.0%	100.0%	62.28%	100.0%	100.0%	100.0%	NA	NA	100.0%	100.0%	100.0%	100.0%
10	Time taken for refunds of deposits after closures (within 60 days).	100%	100.0%	NP	100.0%	100.0%	100.0%	98.18%	NA	NA	100.0%	100.0%	100.0%	59.79%

**NA:** Not Applicable, **NP:** Not Provided

From the above month data assessment table, it is found that the operators are meeting most of the Network Parameters except for, the parameter “*Worst affected BTSs due to downtime*” benchmark is not met by BSNL & in case of “*Worst affected cells > 3% TCH drop*” BSNL is found not satisfying the benchmark. Among the Technical Parameters it is also found that “*Number of POI having ≥0.5% POI congestion*” is not met by BSNL & Uninor, having congestion in 5 & 5 nos. of POIs respectively. In case of “*Good voice quality*” Tata (CDMA) reported that the data is not system generated. Rests of the operators are satisfying the benchmark successfully.

For parameters “*Accessibility of call centre/Customer Care (IVR)*” & “*% calls answered by operators (voice-to-voice) within 60 sec*” it is found that Aircel, Airtel, Tata-GSM & Tata-CDMA are not satisfying the benchmark.

In case of “*Termination/closure of service*” it is seen that BSNL is not meeting the benchmark and for parameter “*Time taken for refunds of deposits after closures (within 60 days)*” benchmark is not met by Tata (GSM & CDMA)

## Operator-Assisted Drive Test

The Operator assisted Drive Test was conducted at UP (West) for all the operators. Route covered was around 80-100Km depending on city areas within the speed limit of 25Km/hr. The cities covered were Rudraprayag, Etah & Pillbhit. In all the cities, zones were selected for covering different density areas (High, Medium & Low).

S/N	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Uninor	V-fone	RCom CDMA	Tata CDMA
			GSM Operators								CDMA Operators	
1.1	Blocked Call Rate ( $\leq 3\%$ )	Rudraprayag	ICR (Tata)	0.00%	7.14%	0.00%	No Service	2.27%	No Service	3.90%	No Service	No Service
		Etah	1.64%	0.00%	12.82%	0.00%	3.23%	0.00%	0.00%	2.86%	0.00%	0.00%
		Pillbhit	0.00%	0.66%	3.50%	0.00%	0.69%	2.11%	0.90%	4.55%	0.00%	0.00%
1.2	Dropped Call Rate ( $\leq 2\%$ )	Rudraprayag	ICR (Tata)	0.00%	3.57%	0.00%	No Service	0.00%	No Service	0.00%	No Service	No Service
		Etah	0.00%	0.00%	1.28%	0.00%	6.45%	0.00%	0.00%	0.00%	0.00%	0.00%
		Pillbhit	0.00%	0.66%	0.00%	0.00%	0.69%	0.00%	0.00%	1.52%	2.01%	0.00%
1.3	% of connections with good voice quality ( $\geq 95\%$ )											
	(i) 0-4 (w/o frequency hopping)	Rudraprayag									No Service	No Service
		Etah									98.00%	98.20%
		Pillbhit									86.47%	98.30%
	(ii) 0-5 (with frequency hopping)	Rudraprayag	ICR (Tata)	95.20%	74.10%	98.30%	No Service	97.78%	No Service	94.70%		
		Etah	99.42%	97.10%	94.20%	96.50%	87.90%	96.30%	95.60%	97.00%		
Pillbhit		99.10%	98.20%	89.30%	97.80%	94.59%	97.30%	95.10%	93.40%			
1.4	Call Setup Success Rate ( $\geq 95\%$ )	Rudraprayag	ICR (Tata)	100.0%	92.86%	100.0%	No Service	97.73%	No Service	96.10%	No Service	No Service
		Etah	98.36%	100.0%	87.18%	100.0%	96.77%	100.0%	100.0%	97.14%	100.0%	100.0%
		Pillbhit	100.0%	99.34%	96.50%	100.0%	99.31%	97.89%	100.0%	95.45%	100.0%	100.0%

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

- “Blocked Call Rate” benchmark is not met by BSNL (all 3 cities), RCom-GSM (Etah), V-fone (Rudraprayag & Pillbhit)
- “Dropped Call Rate” benchmark is not met by BSNL (Rudraprayag), RCom-GSM (Etah) & RCom-CDMA (Pillbhit).
- “% of connection with good voice quality” benchmark is not met by BSNL (all 3 cities), RCom-GSM (Etah & Pillbhit) & V-fone (Rudraprayag & Pillbhit) & RCom-CDMA (Pillbhit).
- “Call Setup Success Rate” benchmark is not met by BSNL (Rudraprayag & Etah).

**Note:** Aircel is on ICR with Tata in Rudraprayag Town and Videocon & MTS has no service (Spectrum) in Rudraprayag, Etah & Pillbhit towns.

## Independent Drive Test

The Independent Drive Test was conducted at UP (West) in Nainital Town. Route covered was about around 40 -60 Km depending on city area within the speed limit of 25Km/hr. Here again, zones were selected for covering different density areas (High, Medium & Low dense areas).

Operators Name	City	Blocked Call Rate ( $\leq 3\%$ )	Dropped Call Rate ( $\leq 2\%$ )	% of connections with good voice quality ( $\geq 95\%$ )		Call Setup Success Rate ( $\geq 95\%$ )
				(i) 0-4 (w/o frequency hopping)	(ii) 0-5 ( with frequency hopping)	
Vodafone	Nainital	2.22%	0.00%		95.00%	100.0%

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

- “Blocked Call Rate” is met by Vodafone (Nainital).
- In case of “Dropped Call Rate” no deviation were found against Vodafone (Nainital).
- “% of connection with good voice quality” benchmark is met by Vodafone (Nainital).
- In case of “Call Setup Success Rate” it is found that there were no deviations against Vodafone (Nainital).

PMR		B-mark	Audit	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA
S/N	Name of Parameter			GSM Operators									CDMA Operators		
(A)	<b>Network Service Quality Parameter</b>														
1	<b>Network Availability</b>														
	BTS Accumulated Downtime	≤2%	Reported	0.63%	0.12%	1.34%	0.05%	0.39%	0.05%	0.57%	0.71%	0.27%	0.06%	0.31%	0.03%
			Verified	0.63%	0.12%	1.34%	0.05%	0.39%	0.05%	0.57%	0.71%	0.27%	0.06%	0.31%	0.03%
	Worst affected BTSs due to downtime	≤2%	Reported	1.80%	0.22%	7.53%	0.13%	1.20%	0.09%	1.21%	0.60%	1.35%	0.00%	0.32%	0.00%
Verified			1.80%	0.22%	7.53%	0.13%	1.20%	0.09%	1.21%	0.60%	1.35%	0.00%	0.32%	0.00%	
2	<b>Connection Establishment (Accessibility)</b>														
	CSSR (Call Setup Success Rate)	≥95%	Reported	98.44%	98.03%	98.10%	99.88%	99.44%	98.50%	97.15%	98.24%	97.50%	99.33%	98.72%	98.73%
			Verified	98.44%	98.03%	98.10%	99.88%	99.44%	98.50%	97.15%	98.24%	97.50%	99.33%	98.72%	98.73%
	SDCCH/PAGING congestion	≤1%	Reported	0.25%	0.50%	0.86%	0.93%	0.15%	0.08%	0.47%	0.47%	0.73%	0.00%	0.00%	0.00%
Verified			0.25%	0.50%	0.86%	0.93%	0.15%	0.08%	0.47%	0.47%	0.73%	0.00%	0.00%	0.00%	
TCH congestion	≤2%	Reported	0.34%	0.70%	1.94%	1.42%	0.43%	0.23%	1.89%	0.16%	1.19%	0.00%	0.59%	0.02%	
		Verified	0.34%	0.70%	1.94%	1.42%	0.43%	0.23%	1.89%	0.16%	1.19%	0.00%	0.59%	0.02%	
3	<b>Connection maintenance (retainability)</b>														
	CDR	≤2%	Reported	0.61%	1.20%	2.28%	1.05%	0.98%	0.87%	1.21%	1.36%	1.34%	0.47%	1.04%	0.74%
			Verified	0.61%	1.20%	2.28%	1.05%	0.98%	0.87%	1.21%	1.36%	1.34%	0.47%	1.04%	0.74%
	Worst affected cells>3% TCH drop	≤3%	Reported	2.74%	2.46%	9.02%	2.89%	0.95%	1.96%	3.56%	1.12%	2.93%	1.13%	0.61%	1.89%
Verified			2.74%	2.46%	9.02%	2.89%	0.95%	1.96%	3.56%	1.12%	2.93%	1.13%	0.61%	1.89%	
Good voice quality	≥95%	Reported	96.92%	97.14%	97.33%	99.80%	98.66%	97.01%	95.93%	97.01%	96.55%	99.38%	98.59%	99.00%	
		Verified	96.92%	97.14%	97.33%	99.80%	98.66%	97.01%	95.93%	97.01%	96.55%	99.38%	98.59%	99.00%	
4	Number of POI having ≥ 0.5% POI congestion		Reported	0	0	0	0	0	0	7	0	0	0	0	0
			Verified	0	0	0	0	0	0	7	0	0	0	0	0
(B)	<b>Customer Service Quality Parameters</b>														
5	Metering/billing credibility-Post paid	≤0.1%	Reported	0.03%	0.04%	0.05%	0.06%	0.09%	0.08%	NA	NA	0.19%	0.00%	0.09%	0.00%
			Verified	0.03%	0.04%	0.05%	0.06%	0.09%	0.08%			0.19%	0.00%	0.09%	0.00%
6	Metering /billing credibility-Pre paid	≤0.1%	Reported	0.01%	0.00%	0.00%	0.00%	0.10%	0.00%	0.14%	0.00%	0.02%	0.00%	0.06%	0.02%
			Verified	0.01%	0.00%	0.00%	0.00%	0.10%	0.00%	0.14%	0.00%	0.02%	0.00%	0.06%	0.02%

PMR		Bench- mark	Audit	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA	
S/N	Name of Parameter			GSM Operators									CDMA Operators			
7	Resolution of billing/ charging complaints (within 4 weeks)	100%	Reported	100%	100%	100%	100%	100%	100%	99.98%	100%	100%	100%	100%	100%	
			Verified	100%	100%	100%	100%	100%	100%	99.98%	100%	100%	100%	100%	100%	
	Period of applying credit/waiver/adjustment to the customer's A/C from the date of resolutions of complaints	≤1week	Reported	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
			Verified	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%	99.51%	100%	97.79%	98.79%	99.00%	97.17%	99.25%	100%	98.50%	97.84%	98.00%	
			Verified	100%	99.51%	100%	97.79%	98.79%	99.00%	97.17%	99.25%	100%	98.50%	97.84%	98.00%	
	% call answered by operators(voice to voice) within 60 sec.	≥90%	Reported	91.60%	92.29%	81.25%	68.97%	94.59%	96.00%	94.17%	99.11%	96.74%	95.00%	96.07%	97.00%	
Verified			91.60%	92.29%	81.25%	68.97%	94.59%	96.00%	94.17%	99.11%	96.74%	95.00%	96.07%	97.00%		
9	Termination/closure of service															
	No. of requests for Termination / Closure of service complied within 7 days during the quarter	≤7days	Reported	100%	100%	100%	100%	100%	100%	NA	NA	100%	100%	100%	100%	
			Verified	100%	100%	100%	100%	100%	100%			100%				
	Time taken for refunds of deposits after closures.(within 60 days)	100%	Reported	100%	100%	100%	100%	100%	100%			100%	100%	100%	100%	100%
Verified			100%	100%	100%	100%	100%	100%	100%			100%	100%	100%		

**Critical Analysis (PMR Verification):**

No deviations were found in compare to operators reported data.

## CHAPTER-4: DETAILED FINDINGS &amp; ANALYSIS

## I. Cellular Mobile Telephone Service

## (A) MSC Audit

## (1) 3 Days Live Data Assessment &amp; Summarized Findings

S/N	Name of Parameter	B-mark	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	V-fone	MTS	Rcom CDMA	Tata CDMA
			GSM Operators									CDMA Operators		
A	Network Service Quality Parameter													
	Network Availability													
1	a) BTS Accumulated Downtime	≤2%	0.88%	0.05%	1.69%	0.20%	0.21%	0.17%	0.79%	0.15%	0.62%	0.30%	0.17%	0.03%
	b) Worst affected BTSs due to downtime	≤2%	0.00%	0.00%	0.45%	0.02%	0.00%	0.00%	0.00%	0.00%	0.05%	0.00%	0.00%	0.00%
	c) Total no. of BTSs in the licensed service area		2556	6493	2872	6025	2314	1811	2714	91	6065	323	1331	820
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		1615	241	3500	876	358	222	1549	10	2727	69	161	15
	e) No. of BTSs having accumulated downtime of >24 hours in a month		0	0	13	1	0	0	0	0	3	0	0	0
2	Connection Establishment (Accessibility)													
	a) CSSR	≥95%	98.41%	99.72%	97.45%	99.73%	99.56%	99.03%	97.12%	98.28%	97.11%	99.46%	97.52%	97.46%
	b) SDCCH/PAGING congestion	≤1%	0.36%	0.09%	0.51%	0.95%	0.02%	0.08%	0.49%	0.09%	0.77%	0.00%	0.01%	0.00%
	c) TCH congestion	≤2%	0.55%	0.25%	0.94%	1.16%	0.07%	0.36%	2.14%	0.00%	1.38%	0.00%	0.02%	0.16%
3	Connection maintenance													
	a) CDR	≤2%	0.50%	0.45%	1.40%	0.99%	0.46%	0.76%	1.15%	0.00%	1.14%	0.64%	0.05%	0.64%
	b) Cells having > 3% TCH drop	≤3%	2.87%	0.54%	4.88%	2.92%	0.00%	4.35%	2.35%	0.00%	2.96%	0.99%	0.00%	0.84%
	c) Good voice quality	≥95%	97.25%	99.34%	97.81%	95.99%	98.87%	97.32%	96.09%	97.99%	96.70%	99.87%	99.79%	NA
	d) No. of cells > 3% TCH drop		658	315	1,311	1,584	0	714	576	0	1,620	30	0	64
	e) Total no. of cells in the network		7653	19344	8952	18097	6942	5465	8170	273	18256	1009	3993	2545
4	Number of POI having ≥0.5% POI congestion		0	0	2	0	0	0	5	0	0	0	0	0
	a) Name of POI not meeting the benchmark		Nil	Nil	Aircel, Idea	Nil	Nil	Nil	Reliance, Airtel, BSNL, V-fone, Tata	Nil	Nil	Nil	Nil	Nil
	b) Total No. of circuits on POI		21791	128509	51076	38192	33263	13988	75455	53	2025	18308	34531	99262

S/N	Name of Parameter	Bench mark	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	V-fone	MTS	Rcom CDMA	Tata CDMA
			GSM Operators										CDMA Operators	
	c) Avg No. of call attempts on POI		615589	2515075	1259907	3254820	302349	837812	1016951	2	43989	258912	411581	1077848
	d) Avg traffic served on POI (Erlang)		11387	85652	28705	58801	9995	24852	44651	5	1128	5174	9940	41433
	e) Total number of working POI Service Area wise		52	60	40	115	31	13	11	13	61	43	31	136
	f) Equipped Capacity of Network in respect of Traffic in erlang		98597	219638	236990	251434	122000	112548	111361	2910	263261	21000	116000	251740
	g) Total traffic handled in TCBH in erlang		366738	146461	134871	252128	108291	40907	107810	5	244760	7412	44445.14	70281
<b>(B)</b>	<b>Customer Service Quality Parameters</b>													
	<b>Response time to customers for assistance</b>													
<b>5</b>	a) Accessibility of call centre	≥95%	44.28%	97.02%	97.16%	99.02%	98.98%	99.49%	96.26%	100.0%	100.0%	96.49%	97.96%	99.19%
	b) % of call answered by operators(voice to voice) within 60 sec	≥90%	5.39%	90.69%	96.21%	91.91%	95.78%	88.18%	99.03%	100.0%	95.36%	95.87%	95.15%	95.13%
	c) No. of call attempts to call centre / customer care nos. during TCBH (Avg)		113643	173557	5299	249222	72169	117340	164467	14	294615	1745	32722	33521
	d) No. of calls connected and answered successfully to call centre / customer care nos. during TCBH (Avg)		6121	157394	5098	229066	69123	103473	162876	14	280950	1673	31135	31887

**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 is as given below:-

- ***BTS accumulated downtime (benchmark  $\leq 2\%$ ):***  
All operators are satisfying the benchmark Value.
- ***Worst affected BTSs due to downtime (benchmark  $\leq 2\%$ ):***  
All operators are satisfying the benchmark value.
- ***Call setup success rate (benchmark  $\geq 95\%$ ):*** All operators are satisfying the benchmark value.
- ***SDCCH/PAGING Channel congestion (benchmark  $\leq 1\%$ ):*** All operators are satisfying the benchmark .  
*Note: CDMA operators have provided the data for Paging Channel congestion and GSM operators provided SDCCH Channel congestion.*
- ***TCH congestion (benchmark  $\leq 2\%$ ):*** Except for Uninor, All the operators are satisfying the benchmark value.
- ***Call drop rate (benchmark  $\leq 2\%$ ):*** All operators are satisfying the benchmark value.
- ***Cell exceeding 3% TCH drop (benchmark  $\leq 3\%$ ):*** Except for BSNL & Tata (GSM), rest of the operators are satisfying the benchmark value..
- ***Connections with good voice quality (benchmark  $\geq 95\%$ ):*** Tata (CDMA) service providers have declared that the parameter is not system generated. Rests of operators are satisfying the benchmark value.
- ***Number of POI having  $\geq 0.5\%$  POI congestion:*** Most of the operators satisfying the benchmark except BSNL & Uninor showing POI congestion ( $>0.5\%$ ) for 2 & 5 nos. of POIs respectively.
- ***%age of call answered by operator (electronically) (benchmark  $>95\%$ ):*** Except Aircel, rest of the operators are satisfying the benchmark value.
- ***%age of call answered by operator (Voice to voice) (benchmark  $>90\%$ ):*** Except Aircel & Tata-GSM, rest of the operators are satisfying the benchmark value.



## (2) Month Data Assessment & Summarized Findings

S/N	Name of Parameter	Bench mark	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	V-fone	MTS	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%	0.52%	0.06%	1.29%	0.09%	0.32%	0.05%	1.02%	0.28%	0.43%	0.28%	0.31%	0.04%
	b) Worst affected BTSs due to downtime	≤2%	1.60%	0.02%	4.60%	0.35%	0.69%	0.00%	1.88%	0.00%	0.07%	0.00%	0.30%	0.00%
	c) Total no. of BTSs in the licensed service area		2556	6493	2872	6025	2314	1811	2714	91	6065	323	1331	820
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		9832	2784	27617	4219	5462	648	20571	187	19495	675	3042	240
	e) No. of BTSs having accumulated downtime of >24 hours in a month		41	1	132	21	16	0	51	0	4	0	4	0
2	<b>Connection Establishment (Accessibility)</b>													
	a) CSSR (Call Setup Success Rate)	≥95%	98.44%	99.69%	97.15%	99.74%	99.50%	99.01%	97.49%	98.99%	97.24%	99.28%	98.06%	98.80%
	b) SDCCH/PAGING congestion	≤1%	0.32%	0.10%	0.55%	0.88%	0.030%	0.12%	0.25%	0.19%	0.95%	0.00%	0.03%	0.04%
	c) TCH congestion	≤2%	0.66%	0.24%	1.15%	1.22%	0.06%	0.43%	1.91%	0.00%	1.31%	0.00%	0.01%	0.22%
3	<b>Connection maintenance (retainability)</b>													
	a) CDR	≤2%	0.51%	0.44%	0.89%	0.97%	0.47%	0.77%	1.17%	0.19%	1.16%	0.44%	0.06%	0.59%
	b) Worst affected cells>3% TCH drop	≤3%	2.86%	0.52%	4.89%	2.84%	0.00%	2.65%	2.02%	0.00%	2.86%	1.39%	0.00%	0.75%
	c) Good voice quality	≥95%	97.28%	99.41%	97.65%	96.13%	98.88%	97.36%	95.90%	97.62%	96.69%	99.61%	99.78%	NA
	d) Total No. of cells exceeding 3% TCH drop (call drop)		6,778	3,100	13,565	15,934	0	4,495	5,123	0	16,172	434	0	589
	e) Total no. of cells in the network		7653	19344	8952	18097	6942	5465	8170	273	18256	1009	3993	2545
4	<b>Number of POI having ≥0.5% POI congestion</b>		0	0	5	0	0	0	5	0	0	0	0	0
	a) Name of POI not meeting the benchmark		Nil	Nil	Reliance,Tata, V-fone,Idea,Airtel	Nil	Nil	Nil	Reliance,Airtel,BSNL,V-fone,Tata	Nil	Nil	Nil	Nil	Nil
	b) Total No. of call attempts on POI (Avg.)		590231	2529431	1256087	3224619	326383	809975	1066514	2	43388	250443	419264	1103132
	c) Total traffic served on POI (Erlang) (Avg.)		10790	83668	27972	57591	10840	19607	44913	4	1141	4986	10407	42471
	d) Total No. of circuits on POI		21791	128509	51076	38192	33263	13988	75455	53	2025	18308	34531	99262
	e) Total number of working POI Service Area wise		52	60	40	115	31	13	11	13	61	43	31	136
	f) Capacity of POI		19968	123163	44611	57501	31140	13235	67366	40	2120	17933	30824	93670

S/N	Name of Parameter	Bench mark	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	V-fone	MTS	Rcom CDMA	Tata CDMA
			GSM Operators										CDMA Operators	
5	<b>Network Data</b>													
	a) Equipped Capacity of Network Erlang		98597	219638	236990	251434	122000	112548	111361	2910	263261	21000	116000	251740
	b) Total traffic in TCBH in erlang (Avg.)		366738	146461	134871	252128	108291	40907	107810	5	244760	7412	44445.14	70281
	c) Total no. of customers served (as per VLR) on last day of the month		1194685	5510874	2336248	9656572	4389607	1594074	2272900	37	8881106	237818	1832785	854852
(B)	<b>Customer Service Quality Parameters</b>													
5	<b>Metering/billing credibility-Post paid</b>	≤0.1%	0.09%	0.02%	0.003%	0.00%	0.08%	0.02%	NA	NA	0.03%	0.00%	0.00%	0.01%
	a) No. of bills issued during the period		6579	102879	59413	259356	13186	23504			127398	674	90511	71909
	b) No. of bills disputed including billing complaints during the period		6	24	2	0	10	4			40	0	0	5
6	<b>Metering /billing credibility-Pre paid</b>	≤0.1%	0.001%	0.003%	0.002%	0.000%	0.10%	0.00%	0.078%	0.00%	0.01%	0.002%	0.10%	0.00%
	a) No. of charging / credit / validity complaints during the quarter		35	217	107	0	6468	0	4,046	0	1,168	1	3310	4
	b) Total no. of pre-paid customers at the end of the quarter		2358699	7673933	4624797	10093529	6468045	1609221	5164131	6085	9457118	47131	3310349	545943
7	<b>Resolution of billing/ charging complaints(within 4 weeks)</b>	100%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	a) No. of billing/(post paid) and charging, credit/validity (pre paid) complaints resolved within 4 weeks during the quarter		2549	2616	393	292	6478	208	4046	0	1208	1	3310	9
	b) Total no. of billing (post paid) and charging, credit / validity (pre paid) complaints received during the quarter		2549	2616	393	292	6478	208	4046	0	1208	1	3310	9
	c) No. of billing complaints (post paid) and charging, credit/ validity complaints (pre paid) resolved in favour of the customer during the quarter		41	241	109	0	6478	4	4046	0	1208	1	3310	9
	d) No. of complaints disposed on account of not considered as valid complaints during the quarter		2508	2375	284	292	0	204	0	0	0	0	0	0
	e) Period of applying credit/waiver/adjustment to the customer's account from the date of resolutions of complaints (≤1week)		100.0%	97.69%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

S/N	Name of Parameter	Bench mark	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA
			GSM Operators										CDMA Operators	
(B)	Customer Service Quality Parameters													
8	Response time to customers for assistance													
	a) Accessibility of call centre/Customer Care	≥95%	39.77%	96.87%	96.83%	99.08%	98.48%	99.48%	96.38%	100.0%	100.0%	96.23%	97.48%	99.17%
	b) % call answered by operators(voice to voice) within 60 sec.	≥90%	7.52%	87.63%	97.69%	97.84%	94.79%	69.65%	95.59%	97.37%	94.09%	95.53%	94.70%	89.32%
	c) Total no. of call attempts to call centre & customer care nos. during TCBH (Avg.).		166572	1872281	48715	2471668	721693	86104	1841590	76	3033599	27229	327880	22958
	d) No. of calls connected and answered successfully to call centre & customer care nos. during TCBH (Avg.).		12529	1640694	47589	2418169	684081	59974	1760449	74	2854458	26013	310504	20507
9	Termination/closure of service	≤7days	100.0%	100.0%	62.28%	100.0%	100.0%	100.0%	NA	NA	100.0%	100.0%	100.0%	100.0%
	a) Total No. of requests for Termination / Closure of service received during the quarter		71	446	289	1136	72	648			143	46	189	1541
	b) No. of requests for Termination / Closure of service complied within 7 days during the quarter		71	446	180	1136	72	648			143	46	189	1541
10	Time taken for refunds of deposits after closures.( within 60 days)	100%	100.0%	NP	100.0%	100.0%	100.0%	98.18%					100.0%	100.0%

NA: Not Applicable, NP: Not Provided

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

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

### Network Parameters:

- ***BTS accumulated downtime (benchmark  $\leq 2\%$ ):***  
All operators are satisfying the benchmark value.
- ***Worst affected BTSs due to downtime (benchmark  $\leq 2\%$ ):***  
Except BSNL, rest of the operators are satisfying the benchmark value.
- ***Call setup success rate (benchmark  $\geq 95\%$ ):***  
All operators are satisfying the benchmark value.
- ***SDCCH/PAGING Channel congestion (benchmark  $\leq 1\%$ ):***  
All operators are satisfying the benchmark value.  
*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 satisfying the benchmark value.
- ***Call drop rate (benchmark  $\leq 2\%$ ):***  
All operators are satisfying the benchmark value.
- ***Cell exceeding 3% TCH drop (benchmark  $\leq 5\%$ ):***  
Except BSNL, rest of the operators are satisfying the benchmark value.
- ***Connections with good voice quality (benchmark  $\geq 95\%$ ):***  
Tata(CDMA) service providers have declared that the parameter is not system generated. Rest of the operators are satisfying the benchmark value.
- ***Number of POI having  $\geq 0.5\%$  POI congestion:***  
All the operators satisfying the benchmark except BSNL & Uninor showing POI congestion for 5 & 5 nos. of POIs respectively.

### Customer care and billing parameters:

- ***%age of call answered by operator (electronically) (benchmark  $>95\%$ ):***  
Except Aircel, rest of the operators are satisfying the benchmark value.
- ***%age of call answered by operator (Voice to voice) (benchmark  $>90\%$ ):***  
Except Aircel, Airtel, Tata-GSM & Tata-CDMA, rest of the operators are satisfying the benchmark value.
- ***Metering and billing credibility-Post paid (benchmark  $\leq 0.1\%$ ):***  
All the operators are satisfying the benchmark.
- ***Metering and billing credibility-Pre paid (benchmark  $\leq 0.1\%$ ):***  
All the operators are satisfying the benchmark.
- ***Resolution of billing/ charging complaints (benchmark 100% within 4 weeks):***  
All the operators are satisfying the benchmark.
- ***Termination/Closure of service (Benchmark  $\leq 7$  days):***  
Except BSNL, all the operators are satisfying the benchmark.
- ***Time taken for refunds of deposits after closures (benchmark 100% within  $\leq 60$  days):***  
Except Tata-GSM & Tata-CDMA, all the operators are satisfying the benchmark.

## (1) Sample Coverage

*Switches/BSC/BTS details of operators:*

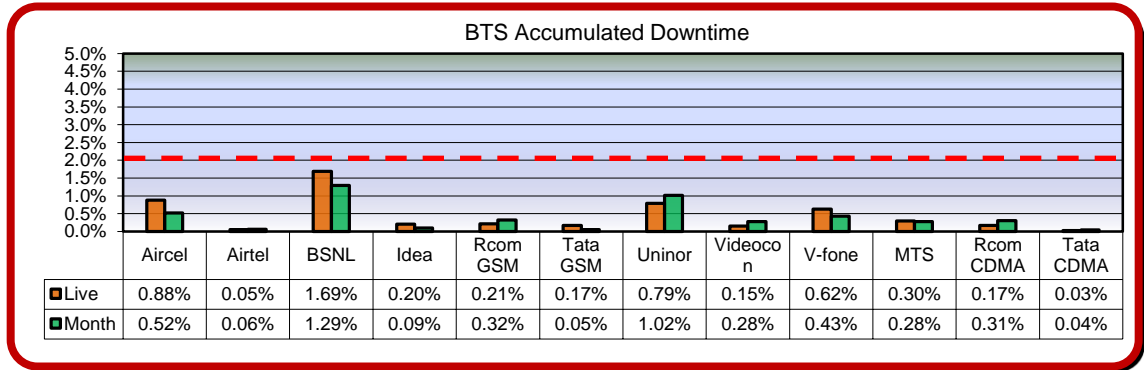
S/N	Name of Service Provider	No. of MSC	No. of BSC	No. of BTS
<b>GSM Operators</b>				
1	Aircel Ltd	3	23	2556
2	Airtel Ltd	18	65	6493
3	BSNL	15	44	2872
4	Idea	15	50	6041
5	Reliance Communication (GSM)	4	14	2314
6	Tata Communications (GSM)	3	18	1811
7	Vodafone	17	91	6065
8	Videocon	1	1	91
9	Uninor	7	17	2714
10	Etisalat	Service Closed		
<b>CDMA Operators</b>				
11	MTS (CDMA)	1	1	323
12	Reliance Communication (CDMA)	6	4	1331
13	Tata Communications (CDMA)	5	7	820

(2) Performance (Graphical Representation)

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

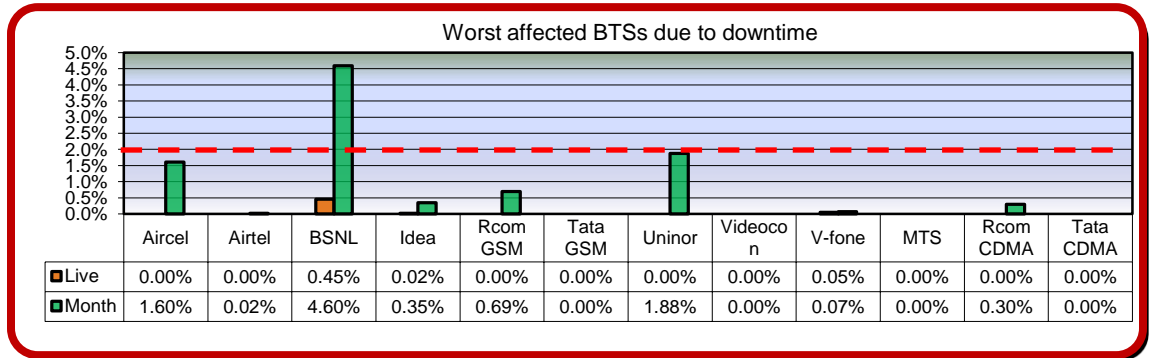
A) NETWORK PERFORMANCE

I. (a) *BTS Accumulated Downtime*: All operators are satisfying the TRAI benchmarks ( $\leq 2\%$ ) for both live & month audit.

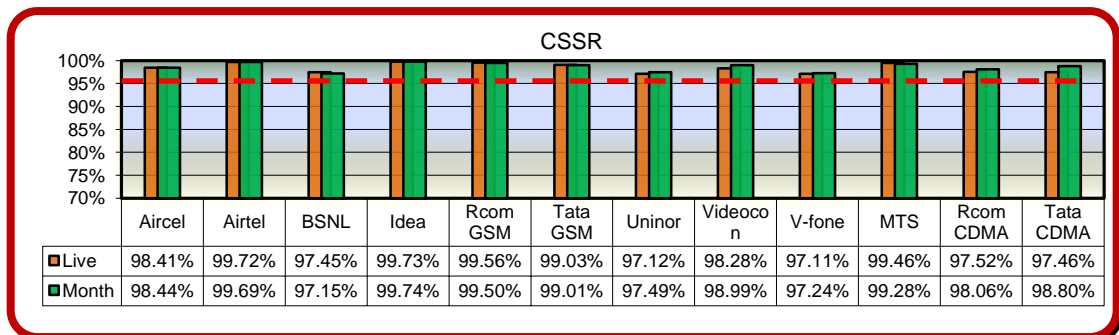


(b) *Worst affected BTSs due to downtime (benchmark  $\leq 2\%$ ):*

Except BSNL, All operators are satisfying the TRAI benchmarks ( $\leq 2\%$ ) for both live & month audit.

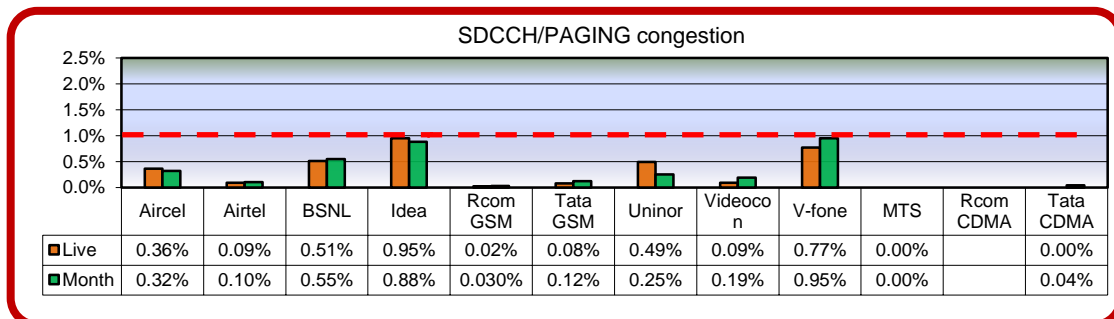


II. *Call setup success rate*: All operators are satisfying the TRAI benchmarks ( $\geq 95\%$ ) for both live & month audit.

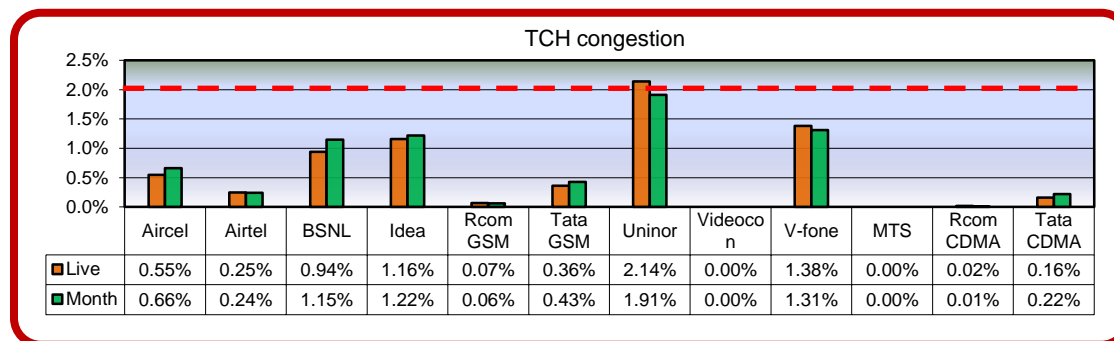


**III. Blocked call rate:**

**SDCCH congestion:** All operators are satisfying the TRAI benchmarks ( $\leq 1\%$ ) for both live & month audit.

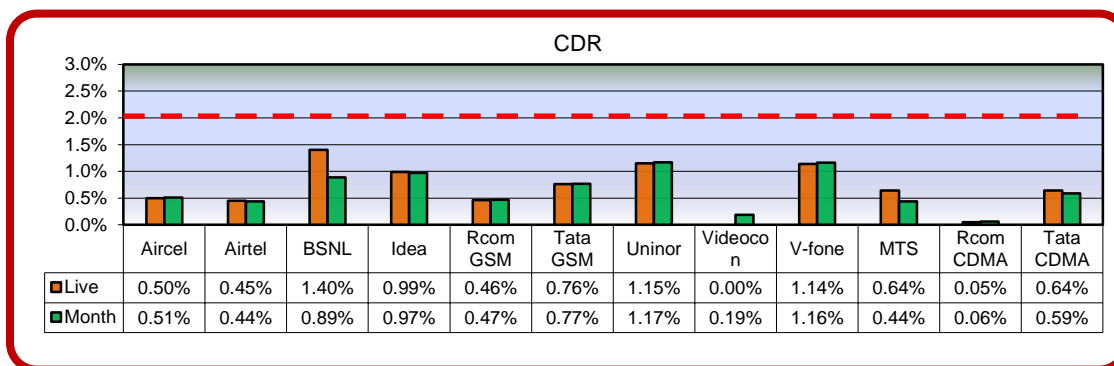


**TCH congestion:** Except Uninor, all operators are satisfying the TRAI benchmarks ( $\leq 2\%$ ) for both live & month audit.

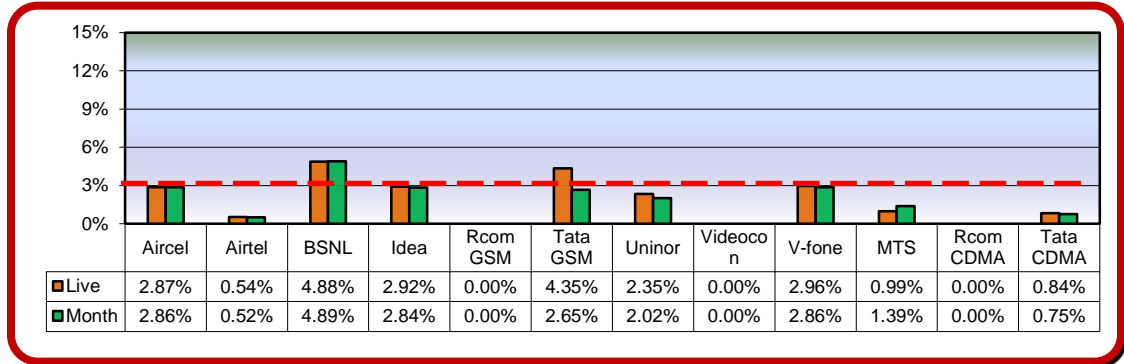


**IV. Connection Maintainability (Retainability):**

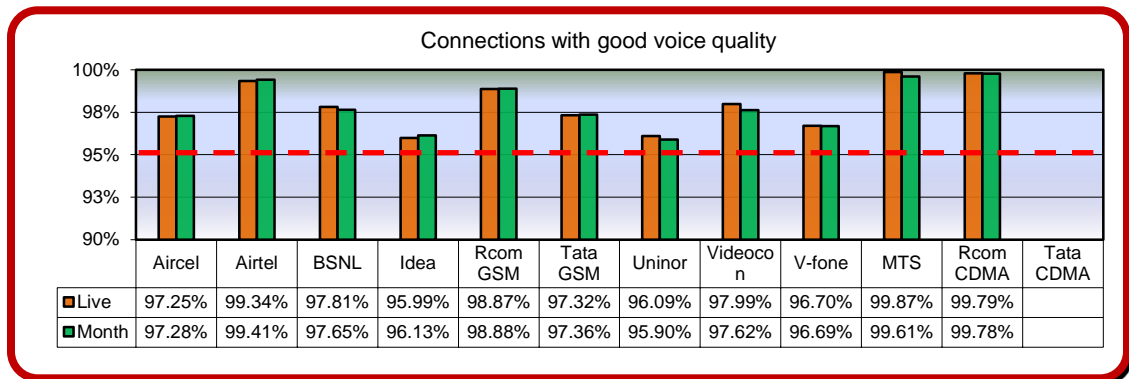
**Call drop rate:** All operators are satisfying the TRAI benchmarks ( $\leq 2\%$ ) for both live & month audit.



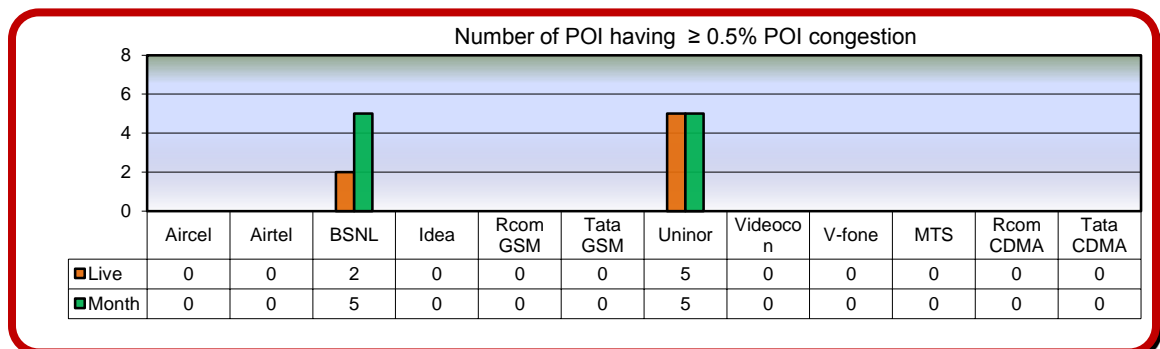
**Worst affected Cell exceeding 3% TCH Drop:** BSNL & Tata (GSM) are found not satisfying the benchmark of  $\leq 3\%$ . Rests of the operators are satisfying the benchmark for both cases.



**Percentage of connections with good voice quality:** All operators are satisfying the TRAI benchmarks ( $\geq 95\%$ ) for both live & month of audit. Tata (CDMA) reported that the data is not system generated.



**Number of POI having  $\geq 0.5\%$  POI Congestion:** For both live and month data, 2 & 5 nos. of POI for BSNL and 5 & 5 nos. of POI for Uninor are found not satisfying the benchmark  $\geq 0.5\%$  congestion. For rests of the operators no individual POIs was found having congestion for both live & month cases.

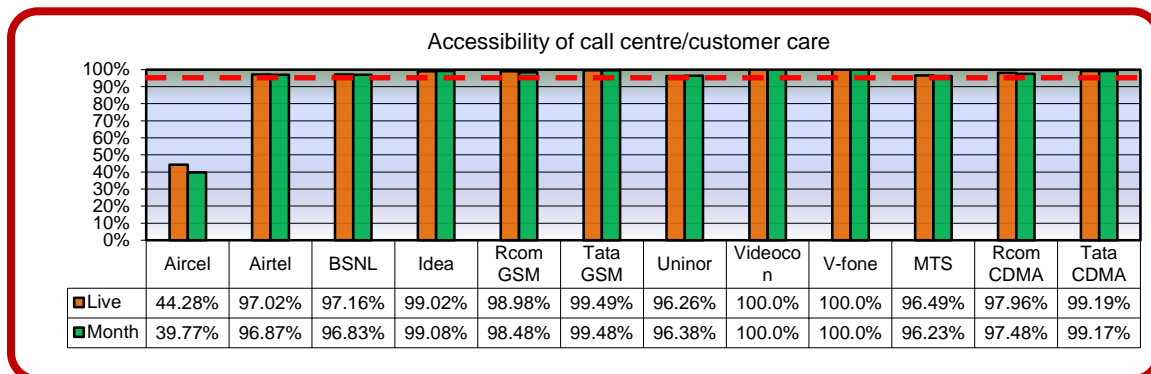




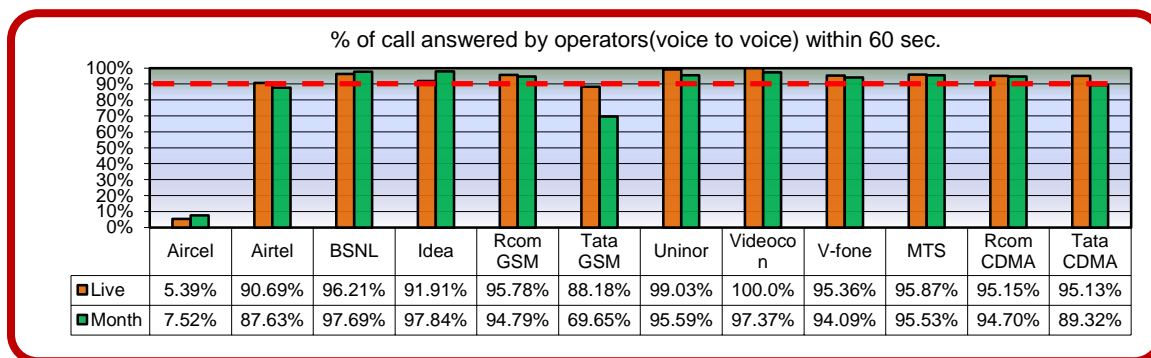
## B) CUSTOMER SERVICE QUALITY PARAMETERS

### (A) Response time to the customer for assistance:

**Percentage of call answered (Electronically):** Except Aircel, all operators are satisfying the TRAI benchmarks ( $\geq 95\%$ ) for both live & month audit.



**Percentage of call answered by operators (Voice to voice) within 60 sec:** Aircel, Airtel & Tata-GSM do not meet the 90% benchmark against this parameter.



### (3) Critical Analysis

The above comparative study between live data & month data shows mostly similar trends & consistency in live and month data. However, inconsistency in live & month data was found for parameter “*percentage of calls answered by operator*” for Aircel, Airtel & Tata-GSM.

Under the network parameters except for the parameter “*Worst affected cells > 3% TCH drop*”, where it is found that BSNL & Tata (GSM) are not satisfying the benchmark, rest of the operators are found having satisfactory performance.

In case of “*Number of POI having  $\geq 0.5\%$  POI congestion*” parameter is not met by BSNL & Uninor.

**(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	RCom GSM	Tata GSM	Uninor	V-fone	MTS	RCom CDMA	Tata CDMA
Total No. of Calls Attempted	100	100	100	100	100	100	100	100	1	100	9
Total No. of calls Answered	85	96	85	94	81	93	92	92	1	93	9
Cases resolved with 4 weeks	85	96	85	94	81	93	92	92	1	93	9
%age of cases resolved	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Note: The difference between call attempts and call answer is because of either Number busy, No response, or out of reach in the Network.

**(3) Live calling to Call center**

Calling Operator	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA
Call Centre No.	121	121	1503	198/12345	333	121	198	No service in Meerut	111	155	*333	121
Total No. of Calls Attempted	100	100	100	100	100	100	100		100	100	100	100
Total No. of calls connected to IVR	100	100	100	100	100	100	100		100	100	100	100
Calls got connected to agent within 60 Sec	72	91	78	96	97	94	95		93	98	98	95
%age of calls got answered	72.00%	91.00%	78.00%	96.00%	97.00%	94.00%	95.00%		93.00%	98.00%	98.00%	95.00%

**(4) Level 1 live calling**

UP(West) Circle	Emergency no.	No. of calls made	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA
	Meerut													
	100	2	2	2	2	2	2	2	2	No service in Meerut	2	2	2	2
	101	2	2	2	2	2	2	2	2		2	2	2	2
	102	2	0	0	0	0	0	0	0		0	0	0	0
	139	5	5	5	5	5	5	5	5		5	5	5	5
Rudraprayag														
	100	2	ICR (Tata)	2	2	2	No service in Rudraprayag	2	No service in Rudraprayag	No service in Rudraprayag	2	2	No service in Rudraprayag	No service in Rudraprayag
	101	2		2	2	2		2						
	102	2		2	2	2		2						
	139	5		5	5	5		5						
Etah														
	100	2	2	2	2	2	2	2	2	No service in Etah	2	2	2	2
	101	2	2	2	2	2	2	2	2		2	2	2	2
	102	2	2	2	2	2	2	2	2		2	2	2	2
	139	5	5	5	5	5	5	5	5		5	5	5	5
Pillbhit														
	100	2	2	2	2	2	2	2	2	No service in Pillbhit	2	2	2	2
	101	2	2	2	2	2	2	2	2		2	2	2	2
	102	2	2	2	2	2	2	2	2		2	2	2	2
	139	5	5	5	5	5	5	5	5		5	5	5	5

**(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 in their records.

As per test Call result of operator's Call Center it was found that Aicel & BSNL performance are not satisfactory.

Level 1 calling i.e. emergency call are getting connected in UP (West) circle, in Meerut, Rudraprayag, Etah & Pillbhit cities but in case of Meerut 102 Service port is open from operator's side but call not getting connected. As per information 102 service is open from operators end but due to nonpayment issues between BSNL & 102 service for the same is not available in Meerut at present.

**(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 1100 to 1400 hrs and between 1600 to 1900 hrs.

**(2) Performance based on live measurement**

Calling Operator	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA
Aircel	-	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Airtel	100%	-	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
BSNL	100%	97%	-	96%	97%	99%	96%	100%	100%	100%	99%	97%
Idea	100%	100%	100%	-	100%	100%	100%	100%	100%	100%	100%	100%
Reliance (GSM)	98%	99%	97%	100%	-	97%	96%	100%	100%	100%	100%	100%
Tata (GSM)	98%	100%	100%	100%	100%	-	97%	100%	100%	100%	100%	100%
Uninor	96%	98%	96%	98%	97%	97%	-	98%	97%	100%	97%	98%
Videocon	96%	100%	100%	100%	96%	100%	100%	-	100%	100%	100%	99%
Vodafone	100%	100%	100%	100%	100%	100%	100%	100%	-	100%	100%	100%
MTS	100%	100%	100%	100%	100%	100%	100%	100%	100%	-	100%	100%
Reliance (CDMA)	96%	100%	97%	100%	100%	98%	98%	97%	100%	100%	-	96%
Tata (CDMA)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	-

**(3) Critical Analysis**

In the inter-operator call assessment test, calls were made from one operator to other operators so as to check congestion on both the operators' network. In such cases, the radio part, switch part & the POI in-between the operators are involved and hence if any congestion is found in the network, it may be due to any of these parts. The result shows that there is not much congestion on the operator networks.

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

The Operator Assisted Drive Test was conducted at UP (West) for all the operators. Route covered was around 80-100 Km depending on city areas within the speed limit of 25Km/hr.

**Drive Test Locations****Rudraprayag**

HIGH DENSE: Main market, BSNL Office, Post Office

MEDIUM DENSE: Guru Dwara Sahib, Supuri Road

LOW DENSE: Yamnotri Road, Bye Pass

**Etah**

HIGH DENSE: Potinagala, Ashok Nagar, Main Market.

MEDIUM DENSE: Etha Old, Gandhi Nagar, Alganj Chowk

LOW DENSE: Bogipura, Devinagar, Patyaligate, Agra Road

**Pillbhit**

HIGH DENSE: Chowk Bazar , Mohalla Punjabiyan , Saraf Market , Chatri Chauraha , Srafa Market

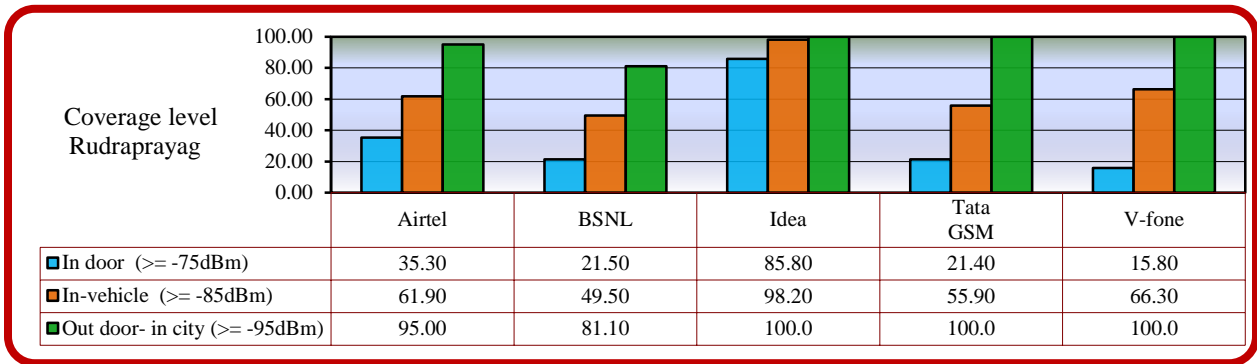
MEDIUM DENSE: Nav Colony, Joshi Mohall, Awas Vikas, Civil Line, Madhu Chowk

LOW DENSE: Ashok Colony, Asam Ckhok , Ekta Nagar, Ashok Colony, Chowk Bazar Chatri Chauraha Nav Colony Awas Vikas

## 2) Performance (for the respective cities)

S/N	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Uninor	V-fone	Rcom CDMA	Tata CDMA
			GSM Operators								CDMA Operators	
1.1	Call Attempts	Rudraprayag	ICR (Tata)	62	28	96	No Service	44	No Service	70	No Service	No Service
		Etah	61	40	78	76	31	55	39	70	32	59
		Pillbhit	112	152	143	207	144	142	111	132	149	111
1.2	Blocked Call Rate ( $\leq 3\%$ )	Rudraprayag	ICR (Tata)	0.00%	7.14%	0.00%	No Service	2.27%	No Service	3.90%	No Service	No Service
		Etah	1.64%	0.00%	12.82%	0.00%	3.23%	0.00%	0.00%	2.86%	0.00%	0.00%
		Pillbhit	0.00%	0.66%	3.50%	0.00%	0.69%	2.11%	0.90%	4.55%	0.00%	0.00%
1.3	Dropped Call Rate ( $\leq 2\%$ )	Rudraprayag	ICR (Tata)	0.00%	3.57%	0.00%	No Service	0.00%	No Service	0.00%	No Service	No Service
		Etah	0.00%	0.00%	1.28%	0.00%	6.45%	0.00%	0.00%	0.00%	0.00%	0.00%
		Pillbhit	0.00%	0.66%	0.00%	0.00%	0.69%	0.00%	0.00%	1.52%	2.01%	0.00%
1.4	% of connections with good voice quality ( $\geq 95\%$ )											
	(i) 0-4 (w/o frequency hopping)	Rudraprayag									No Service	No Service
		Etah									98.00%	98.20%
		Pillbhit									86.47%	98.30%
	(ii) 0-5 (with frequency hopping)	Rudraprayag	ICR (Tata)	95.20%	74.10%	98.30%	No Service	97.78%	No Service	94.70%		
		Etah	99.42%	97.10%	94.20%	96.50%	87.90%	96.30%	95.60%	97.00%		
Pillbhit		99.10%	98.20%	89.30%	97.80%	94.59%	97.30%	95.10%	93.40%			
1.5	Service Coverage											
	In door ( $\geq -75\text{dBm}$ )	Rudraprayag	ICR (Tata)	35.30	21.50	85.80	No Service	21.40	No Service	15.80	No Service	No Service
		Etah	87.70	66.10	53.70	96.70	16.00	36.20	78.10	53.50	76.40	91.40
		Pillbhit	81.40	65.10	33.50	95.20	28.18	44.70	59.20	44.80	12.89	93.30
	In-vehicle ( $\geq -85\text{dBm}$ )	Rudraprayag	ICR (Tata)	61.90	49.50	98.20	No Service	55.90	No Service	66.30	No Service	No Service
		Etah	98.90	93.40	64.90	99.90	50.00	89.50	98.60	94.50	18.90	99.80
		Pillbhit	94.90	91.60	83.80	99.80	67.68	90.70	99.00	89.60	40.36	100.0
	Outdoor- in city ( $\geq -95\text{dBm}$ )	Rudraprayag	ICR (Tata)	95.00	81.10	100.0	No Service	100.0	No Service	100.0	No Service	No Service
		Etah	100.00	94.70	65.20	100.0	81.00	100.0	99.90	100.0	23.50	100.0
Pillbhit		99.60	99.10	98.00	99.90	90.20	99.60	100.0	99.7	83.42	100.0	
1.6	CSSR ( $\geq 95\%$ )	Rudraprayag	ICR (Tata)	100.0%	92.86%	100.0%	No Service	97.73%	No Service	96.10%	No Service	No Service
		Etah	98.36%	100.0%	87.18%	100.0%	96.77%	100.0%	100.0%	97.14%	100.0%	100.0%
		Pillbhit	100.0%	99.34%	96.50%	100.0%	99.31%	97.89%	100.0%	95.45%	100.0%	100.0%

### Graphical Representation (Rudraprayag):

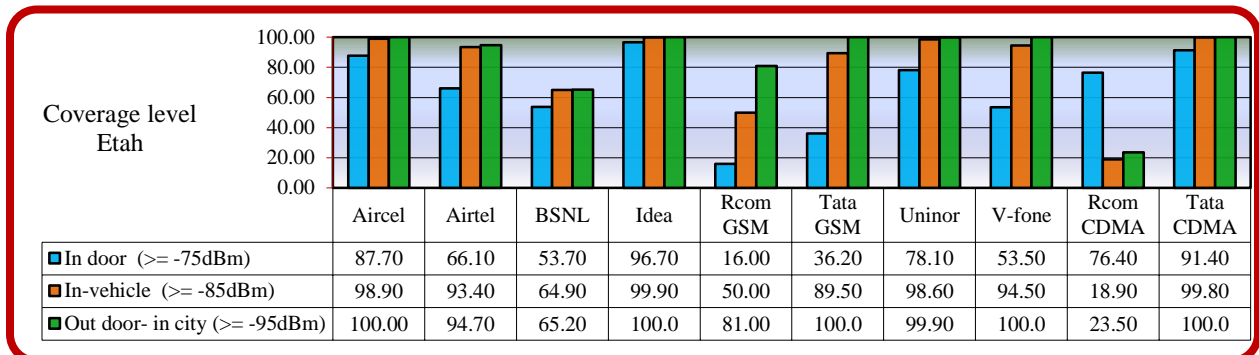


### Critical Analysis

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

- For parameter “Blocked Call Rate” BSNL & Vodafone are not satisfying the benchmark.
- For parameter “Dropped Call Rate” BSNL is not satisfying the benchmark.
- For parameter “Percentage of connections with good voice quality” BSNL & Vodafone are not satisfying the benchmark.
- For parameter “CSSR” BSNL is not satisfying the benchmark.

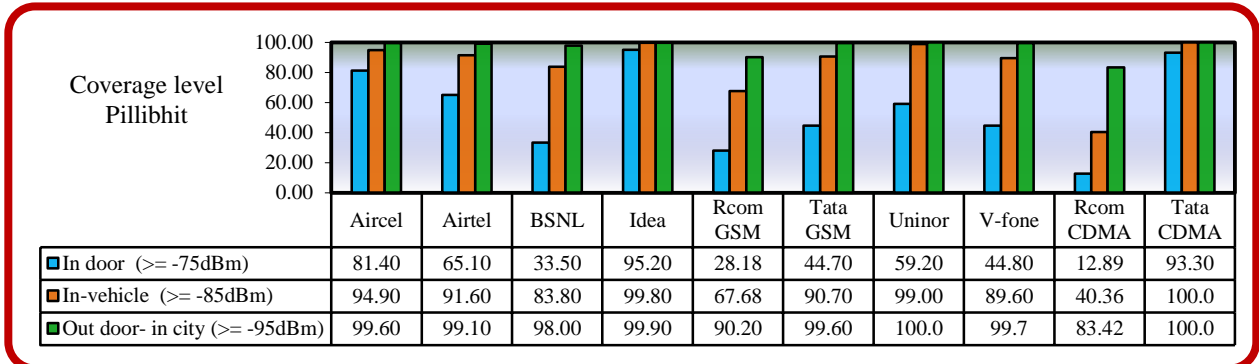
### Graphical Representation (Etah):



### Critical Analysis

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

- For parameter “Blocked Call Rate” BSNL & RCom-GSM are not satisfying the benchmark.
- For parameter “Dropped Call Rate” RCom-GSM is not satisfying the benchmark.
- For parameter “Percentage of connections with good voice quality” BSNL, RCom-GSM & RCom-CDMA are not satisfying benchmark.
- For parameter “CSSR” BSNL is not satisfying the benchmark.

**Graphical Representation (Pillbhit):****Critical Analysis**

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

- For parameter “*Blocked Call Rate*” BSNL & Vodafone are not satisfying benchmark.
- For parameter “*Dropped Call Rate*” RCom-CDMA is not satisfying benchmark.
- For parameter “*Percentage of connections with good voice quality*” BSNL, RCom-GSM, Vodafone & RCom (CDMA) are not satisfying the benchmark.

**Note:** Aircel is on ICR with Tata in Rudraprayag Town and Videocon & MTS has no service (Spectrum) in Rudraprayag, Etah & Pillbhit towns.



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

The Operator Assisted Drive Test was conducted at UP (West) for all the operators. Route covered was about around 40-60 Km depending on city areas within the speed limit of 25Km/hr.

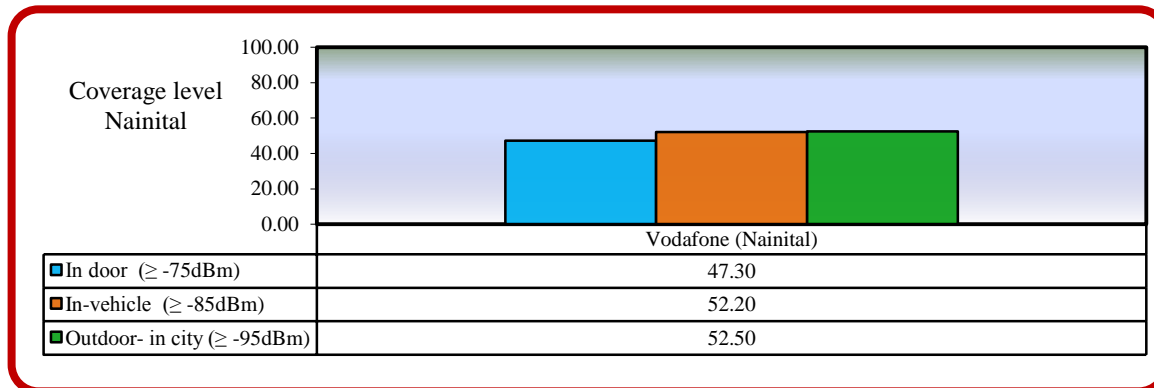
**Drive Test Locations****Nainital**

HIGH DENSE:	Mall Road, High Court
MEDIUM DENSE:	Tallitaal, Maal Road
LOW DENSE:	Tallitaal, Mallroad, Mallitaal

## 2) Performance (for the Independent respective city)

Operators Name	City	Call Attempts	Blocked Call Rate ( $\leq 3\%$ )	Dropped Call Rate ( $\leq 2\%$ )	% of connections with good voice quality ( $\geq 95\%$ )		Service Coverage			CSSR ( $\geq 95\%$ )
					(i) 0-4 (w/o frequency hopping)	(ii) 0-5 (with frequency hopping)	In door ( $\geq -75\text{dBm}$ )	In-vehicle ( $\geq -85\text{dBm}$ )	Outdoor- in city ( $\geq -95\text{dBm}$ )	
Vodafone	Nainital	45	2.22%	0.00%		95.00%	47.30	52.20	52.50	97.78%

### Graphical Representation



### Critical Analysis

The drive test data was found to be satisfactory.

- For parameter “Blocked Call Rate” is met by Vodafone.
- For parameter “Percentage of connections with good voice quality” is met by Vodafone.

## (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 satisfactory for **Network Parameters**.

Only exception is found for the parameter "*Worst affected cells > 3% TCH drop*" as operators like BSNL & Tata (GSM) performance are found below benchmark. Similar trend is also reflected in live data measurement & for parameter "*Worst affected BTSs due to downtime*" it is found that BSNL is not meeting the benchmark.

In case of "*Number of POI having  $\geq 0.5\%$  POI congestion*" it is found that BSNL & Uninor are showing congestion of  $> 0.5\%$ .

Under **Customer Service Quality Parameter** "*operator answered calls (voice-to-voice) within 60 sec*" parameter Aircel, Airtel, Tata-GSM & Tata-CDMA are not fulfilling TRAI benchmark of  $\geq 90\%$ .

### **During Drive Tests**

High "*Blocked Call Rates*" were found in case of BSNL, RCom-GSM & Vodafone.

High "*Dropped Call Rates*" were found in case of BSNL, RCom-GSM & RCom-CDMA.

"*Percentage of connections with good voice quality*" parameter is not met by BSNL, RCom (GSM), V-fone & RCom-CDMA.

"CSSR" parameter is not met by BSNL.

