

**REPORT**  
**ON**  
**AUDIT & ASSESSMENT OF QUALITY OF SERVICE**  
**OF**  
**CELLULAR MOBILE TELEPHONE SERVICE**  
**FOR**  
**NORTH ZONE – HARYANA CIRCLE**

***Report Period: July 2011 – September 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.

## 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 Haryana 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 Haryana Circle in 3<sup>rd</sup> quarter (July – September 2011). The primary data collection and verification of records (PMR data verification – quarterly) maintained by various operators was undertaken for the period Jan. – March 2011.

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

Sl.	Name of Service Provider	Month of Audit	TCBH Hour
<b>GSM Operators</b>			
1	Aircel Ltd	July-2011	1900-2000 Hrs
2	Airtel Ltd	July-2011	1900-2000 Hrs
3	BSNL	July-2011	1900-2000 Hrs
4	Etisalat	July-2011	1900-2000 Hrs
5	Idea	July-2011	1900-2000 Hrs
6	Reliance Communication	July-2011	1900-2000 Hrs
7	Tata Communications	July-2011	1900-2000 Hrs
8	Loop Cellular	August-2011	1900-2000 Hrs
9	Videocon	July-2011	1900-2000 Hrs
10	Vodafone	July-2011	1900-2000 Hrs
<b>CDMA Operators</b>			
11	MTS	July-2011	1900-2000 Hrs
12	Reliance Communication	July-2011	1900-2000 Hrs
13	Tata Communications	July-2011	1900-2000 Hrs

**II. Findings from Quality of Service Audit (Operator wise for each parameter)**  
**(A) Cellular Mobile Telephone Services**

<b>3 days Live Data Audit</b>		<b>Bench-mark</b>	<b>Aircel</b>	<b>Airtel</b>	<b>BSNL</b>	<b>Etisalat</b>	<b>Idea</b>	<b>Reliance</b>	<b>Loop</b>	<b>TATA</b>	<b>V-fone</b>	<b>Videocon</b>	<b>TATA</b>	<b>MTS</b>	<b>Rcom</b>
<b>S/N</b>	<b>Name of Parameter</b>		<b>GSM Operators</b>										<b>CDMA Operators</b>		
<b>1</b>	<b>Network Service Quality Parameter</b>														
	<b>Network Availability</b>														
	a) BTS Accumulated Downtime	<=2%	0.05%	0.32%	0.47%	0.00%	0.16%	0.05%	0.00%	0.01%	0.18%	0.15%	0.01%	0.01%	0.04%
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.23%	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.66%	0.00%	0.00%	0.00%	0.00%
	<b>Connection Establishment (Accessibility)</b>														
	c) CSSR (Call Setup Success Rate)	>=95%	98.3%	99.2%	95.3%	99.9%	98.6%	99.3%	99.4%	98.7%	97.8%	98.6%	100.0%	99.7%	99.6%
	d) SDCCH/PAGING congestion	<=1%	0.10%	0.16%	0.04%	0.00%	0.50%	0.16%	0.63%	0.01%	0.39%	0.01%	0.00%	0.00%	0.00%
e) TCH congestion	<=2%	0.00%	0.21%	0.39%	0.00%	0.74%	0.22%	0.00%	0.45%	1.37%	0.50%	0.00%	0.01%	0.08%	
<b>2</b>	<b>Connection maintenance (retainability)</b>														
	a) CDR	<=2%	1.27%	0.67%	1.98%	0.78%	0.93%	0.21%	0.00%	0.83%	1.01%	1.29%	0.63%	0.18%	0.31%
	b) Worst affected cells>3% TCH drop	<=3%	1.81%	0.81%	<b>4.50%</b>	0.53%	2.91%	0.82%	0.00%	<b>7.04%</b>	<b>3.97%</b>	1.28%	<b>5.12%</b>	0.50%	0.34%
	c) Good voice quality	<=95%	98.4%	98.7%	NR	98.0%	96.1%	99.2%	<b>88.3%</b>	97.0%	96.8%	98.7%	NA	100.0%	NA
<b>3</b>	<b>No. of POI having congestion &gt;=5%</b>	>=0.5%	0	0	0	0	NR	0	0	NR	2	0	0	0	0
<b>4</b>	<b>Response time to customers for assistance</b>														
	a) Accessibility of call centre/Customer Care	>=95%	95.0%	NR	100.0%	96.0%	99.3%	99.3%	100.0%	100.0%	100.0%	100.0%	100.0%	99.4%	99.9%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	<b>89.2%</b>	98.9%	94.8%	100.0%	95.6%	<b>66.5%</b>	100.0%	92.5%	98.4%	99.8%	98.7%	95.2%	93.8%

NA: Not Applicable, NR: Not Received

Findings from the 3 days live data assessment are as below:

"Worst affected cell>3% TCH Drop" is not meeting by BSNL(4.5%), Tata GSM(7.0%), Vodafone(4.0%) & Tata CDMA(5.1%).

"Good Voice Quality" is not meeting by Loop Telecom (88.3%). CDMA operators like RCom and TATA have reported that the same is not system generated.

"% call answered by operators (voice to voice) within 60 sec." is not meeting by Aircel (89.2%) and Reliance GSM (66.5%).



One Month Data Audit		Bench- mark	Aircel	Airtel	BSNL	Etisalat	Idea	Reliance	Loop	TATA DOCO MO	V-fone	Video con	TATA	MTS	Rcom	
S/N	Name of Parameter		GSM Operators										CDMA Operators			
(A)	<b>Network Service Quality Parameter</b>															
1	<b>Network Availability</b>															
	a) BTS Accumulated Downtime	<=2%	0.16%	0.16%	1.42%	0.19%	0.14%	0.15%	0.00%	0.02%	0.13%	0.09%	0.02%	0.03%	0.13%	
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.46%	1.93%	0.00%	0.00%	0.00%	0.00%	0.00%	0.62%	0.16%	0.00%	0.00%	0.00%	
2	<b>Connection Establishment (Accessibility)</b>															
	a) CSSR (Call Setup Success Rate)	>=95%	98.43%	99.21%	95.83%	99.25%	98.77%	99.71%	99.45%	98.73%	97.83%	98.45%	100.00%	99.55%	99.35%	
	b) SDCCH/PAGING congestion	<=1%	0.22%	0.15%	0.06%	0.02%	0.47%	0.18%	0.37%	0.03%	0.36%	0.05%	0.00%	0.00%	0.00%	
	c) TCH congestion	<=2%	0.03%	0.21%	0.39%	0.01%	0.67%	0.08%	0.00%	0.51%	1.32%	0.56%	0.00%	0.01%	0.13%	
3	<b>Connection maintenance (retainability)</b>															
	a) CDR	<=2%	1.18%	0.67%	1.91%	1.64%	0.92%	0.20%	1.37%	0.82%	0.99%	1.27%	0.62%	0.20%	0.33%	
	b) Worst affected cells>3% TCH drop	<=3%	2.09%	0.79%	4.70%	1.59%	2.90%	0.80%	0.00%	6.60%	3.81%	1.37%	5.23%	0.72%	0.33%	
	c) Good voice quality	>=95%	98.45%	98.69%	96.72%	98.20%	96.42%	99.15%	98.09%	97.03%	96.82%	98.65%	NA	100.00%	NA	
4	<b>No. of POI having &gt;=0.5% congestion</b>	<=0.5%	0	0	0	0	7	0	0	4	2	0	0	0	0	
(B)	<b>Customer Service Quality Parameters</b>															
5	<b>Metering/billing credibility-Post paid</b>	<= 0.1%	0.04	0.03	0.00	NA	0.15	0.09	NA	0.34	0.02	NA	0.27	0.0%	0.08	
6	<b>Metering /billing credibility-Pre paid</b>	<= 0.1%	0.00	0.01	0.00	0.01	0.01	0.02	0.00	0.04	0.02	0.08	0.08	0.10	0.02	
7	<b>Resolution of billing/ charging complaints</b>	100% within 4 weeks	100%	100%	100%	100%	100%	100%	NA	100%	100%	100%	100%	100%	100%	
	a) Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	<=1 week	100%	100%	NA	NA	100%	100%	NA	100%	100%	100%	100%	100%	100%	
8	<b>Response time to customers for assistance</b>															
	a) Accessibility of call centre/Customer Care	>=95%	88.61%	NR	100.00%	98.13%	99.00%	98.77%	100.00%	NR	100.00%	100.00%	99.00%	NR	99.42%	
	b) % call answered by operators(voice to voice) within 60	>=90%	NR	90.75%	92.67%	99.78%	96.05%	74.88%	100.00%	99.34%	97.24%	99.53%	98.69%	91.38%	94.21%	

	sec.														
<b>9</b>	<b>Termination/closure of service</b>	<i>&lt;=7 days</i>	100%	100%	100%	NA	100%	100%	NA	100%	100%	NA	100%	100%	100%
<b>10</b>	<b>Time taken for refunds of deposits after closures.</b>	<i>100% within 60 days</i>	100%	100%	100%	NA	100%	100%	NA	100%	100%	NA	100%	NA	100%
NA: Not Applicable, NR: Not Received															

Findings from the month data assessment are as below:

"Worst affected cells>3% TCH drop" is not meeting by BSNL, Tata GSM, Vodafone & Tata CDMA.

"Metering/billing credibility-Post paid" is not meeting by Idea, Tata GSM & Tata CDMA .

"Accessibility of call centre/Customer Care" is not meeting by Aircel.

"% call answered by operators (voice to voice) within 60 sec." is not meeting by Reliance GSM.

### Operator-Assisted Drive Test

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

SN	Parameter	City Name	Airtel	BSNL	Idea	Reliance	Tata	V-fone	Videocon	TATA	MTS	Rcom
1.1	Blocked Call Rate (<=3%)	Sonepat	0.00%	2.08%	0.00%	0.00%	3.27%	2.27%	0.76%	0.00%	0.00%	0.00%
		Hisar	1.63%	0.94%	1.38%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Rohtak	0.00%	7.53%	0.83%	0.00%	0.00%	0.00%	0.74%	1.15%	0.00%	0.00%
1.2	Dropped Call Rate (<=2%)	Sonepat	0.00%	0.00%	0.00%	0.00%	2.45%	0.00%	0.00%	0.00%	1.05%	0.00%
		Hisar	0.00%	1.90%	1.38%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Rohtak	0.00%	1.16%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
1.3	Percentage of connections with good voice quality (=>95%)											
	(i) 0-4 (w/o frequency hopping)	Sonepat	NA	NA	NA	NA	NA	NA	NA	88.62%	95.64%	99.00%
		Hisar	NA	NA	NA	NA	NA	NA	NA	83.32%	91.52%	99.00%
		Rohtak	NA	NA	NA	NA	NA	NA	NA	85.57%	91.88%	99.00%
	(ii) 0-5 ( with frequency hopping)	Sonepat	95.10%	93.90%	92.96%	97.00%	95.00%	94.96%	95.88%	NA	NA	NA
		Hisar	100%	91.50%	92.96%	98.00%	96.54%	96.16%	97.08%	NA	NA	NA
		Rohtak	100%	91.70%	93.68%	96.00%	95.43%	96.09%	95.22%	NA	NA	NA
1.4	Call Setup Success Rate (>=95%)	Sonepat	100%	97.92%	100%	100%	96.73%	97.73%	99.24%	100%	100%	100%
		Hisar	98.37%	99.06%	98.62%	100%	100%	100%	100%	100%	100%	100%
		Rohtak	100%	92.47%	99.17%	100%	100%	99.26%	98.85%	100%	100%	100%

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

" Blocked Call Rate" is not meeting by Tata GSM in Sonepat & BSNL in Rohtak.

" Dropped Call Rate" is not meeting by Tata GSM in Sonepat.

" Percentage of connections with good voice quality 0-4" is not meeting by Tata CDMA in Sonepat, Hisar, Rohtak and MTS in Hisar, Rohtak.

" Percentage of connections with good voice quality 0-5" is not meeting by BSNL and IDEA in all 3 cities and Vodafone in Sonepat.

" Call Setup Success Rate" is not meeting by BSNL in Rohtak.

## Chapter -3 Audit PMR Data Verification Results

PMR		Bench-mark	Audit	Aircel	Airtel	BSNL	Etisalat	Idea	Reliance	Loop	TATA DOCOMO	V-fone	Videocon	TATA	MTS	Rcom
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	0.05%	0.05%	1.42%	1.4%	0.1%	0.2%	0.0%	0.0%	0.1%	0.1%	0.01%	0.16%	0.24%
			Verified	0.05%	0.05%	1.42%	1.42%	0.10%	0.22%	0.00%	0.02%	0.06%	0.10%	0.01%	0.16%	0.24%
	Worst affected BTSs due to downtime	<=2%	Reported	0.00%	0.06%	1.86%	14.29%	0.0%	0.2%	0.0%	0.0%	0.3%	0.2%	0.00%	0.00%	0.22%
			Verified	0.00%	0.06%	1.86%	14.29%	0.00%	0.19%	0.00%	0.00%	0.31%	0.23%	0.00%	0.00%	0.22%
2	<b>Connection Establishment (Accessibility)</b>															
	CSSR (Call Setup Success Rate)	>=95%	Reported	97.6%	99.3%	96.1%	98.7%	100%	100%	96%	99%	99%	97%	100.0%	99.1%	99.42%
			Verified	97.6%	99.3%	96.1%	98.7%	99.9%	99.7%	96.0%	98.6%	98.8%	97.4%	100.0%	99.1%	99.4%
	SDCCH/PAGING congestion	<=1%	Reported	0.35%	0.1%	0.3%	0.0%	0.3%	0.2%	0.1%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%
			Verified	0.35%	0.13%	0.27%	0.04%	0.34%	0.19%	0.10%	0.02%	0.21%	0.04%	0.00%	0.00%	0.00%
TCH congestion	<=2%	Reported	0.04%	0.2%	1.0%	0.1%	0.6%	0.1%	0.1%	0.3%	0.7%	0.9%	0.0%	0.0%	0.27%	
		Verified	0.04%	0.23%	1.01%	0.08%	0.59%	0.08%	0.07%	0.33%	0.69%	0.91%	0.04%	0.00%	0.27%	
3	<b>Connection maintenance (retainability)</b>															
	CDR	<=2%	Reported	1.1%	0.6%	1.9%	0.8%	0.9%	0.4%	0.1%	1.0%	0.9%	0.9%	0.2%	0.6%	0.8%
			Verified	1.1%	0.6%	1.9%	0.8%	0.9%	0.4%	0.1%	1.0%	0.9%	0.9%	0.2%	0.6%	0.8%
	Worst affected cells>3% TCH drop	<=5%	Reported	0.4%	0.8%	4.8%	15.4%	4.7%	2.3%	0.0%	2.6%	2.1%	1.7%	0.1%	3.5%	0.6%
			Verified	0.4%	0.8%	4.8%	15.4%	4.7%	2.3%	0.0%	2.6%	2.1%	1.7%	0.1%	3.5%	0.6%
Good voice quality	>=95%	Reported	96.1%	98.7%	96.4%	98%	97%	98%	98%	97%	98%	98%	99.9%	99.3%	98.3%	
		Verified	96.1%	98.7%	96.4%	98.4%	97.1%	97.9%	97.7%	96.9%	97.6%	97.8%	99.9%	99.3%	98.3%	
4	<b>No. of POI having &gt;=0.5% congestion</b>	<=0.5%	Reported	0	0	0	0	0	0	0	0	0	1	0	0	0
			Verified	0	0	0	0	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%	Reported	0.00%	0.04%	0.00%	NA	NR	0%	0.00%	0.0%	0.0%	NA	0.15%	0.00%	0.00%
			Verified	0.00%	0.04%	0.00%	NA	NR	0.00%	0.00%	0.00%	0.00%	NA	0.15%	0.00%	0.00%
6	<b>Metering /billing credibility-Pre paid</b>	<= 0.1%	Reported	0.06%	0.02%	0.10%	0.1%	NR	0%	0.0%	0.0%	0.0%	0.1%	0.11%	0.08%	0.00%
			Verified	0.06%	0.02%	0.10%	0.10%	NR	0.05%	0.00%	0.00%	0.01%	0.06%	0.11%	0.08%	0.00%
7	<b>Resolution of billing/</b>	100%	Reported	100%	100%	100%	100%	NR	100%	NIL	100%	100%	100%	100.0%	100%	100.0%

	<b>charging complaints</b>	<i>within 4 weeks</i>	Verified	100%	100%	100%	100%	NR	100%	NIL	100%	100%	100%	100%	100%	100%
	Period of applying credit/waiver/adjustment to the customer's account from the date of resolutions of complaints	<i>&lt;=1 week</i>	Reported	100%	100%	100%	NA	NR	100%	0%	100%	100%	100%	100.0%	100%	100.0%
			Verified	100%	100%	100%	NA	NR	100%	0%	100%	100%	100%	100%	100%	100%
<b>8</b>	<b>Response time to customers for assistance</b>															
	Accessibility of call centre/Customer Care	<i>&gt;=95%</i>	Reported	100%	99%	100%	99%	NR	100%	100%	100%	100%	97%	<b>89%</b>	96%	100%
			Verified	100%	99%	100%	99%	NR	100%	100%	100%	100%	97%	<b>89%</b>	96%	100%
	% call answered by operators(voice to voice) within 60 sec.	<i>&gt;=90%</i>	Reported	<b>82%</b>	<b>78%</b>	96%	99%	NR	91%	100%	83%	<b>89%</b>	92%	<b>64%</b>	92%	95%
			Verified	<b>82%</b>	<b>78%</b>	96%	99%	NR	91%	100%	83%	<b>89%</b>	92%	<b>64%</b>	92%	95%
<b>9</b>	<b>Termination/closure of service</b>															
	No.of requests for Termination / Closure of service complied within 7 days during the quarter	<i>&lt;=7days</i>	Reported	0%	100%	NIL	NA	NR	100%	NIL	100%	100%	NA	100%	100%	100%
			Verified	0%	100%	NIL	NA	NR	100%	NIL	100%	100%	NA	100%	100%	100%
<b>10</b>	<b>Time taken for refunds of deposits after closures.</b>	<i>100% within 60 days</i>	Reported	0%	100%	NIL	NA	NR	100%	NIL	100%	100%	NA	<b>86%</b>	100%	100%
			Verified	0%	100%	NIL	NA	NR	100%	NIL	100%	100%	NA	<b>86%</b>	100%	100%

Critical Analysis (PMR Verification):

The figures proved by all the operators match the figures obtained on verification hence there is no discrepancy found:

" Worst affected BTSs due to downtime" is not meeting by Etisalat (14.29%).

"Worst affected cells>3% TCH drop "is not meeting by Etisalat (15.4%).

"Metering/billing credibility-Post paid "is not meeting by Tata CDMA (0.15%).

"Metering/billing credibility-Pre paid "is not meeting by Tata CDMA (0.11%).

"Accessibility of call centre/Customer Care " is not meeting by Tata CDMA (89%).

"% call answered by operators (voice to voice) within 60 sec. " is not meeting by Aircel (82%), Airtel (78%), Vodafone (89%) & Tata CDMA (64%).

"Time taken for refunds of deposits after closures " is not meeting by Tata CDMA (86%).

## 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	Benchmark	Aircel	Airtel	BSNL	Etisalat	Idea	Reliance	Loop	TATA DOCOMO	V-fone	Videocon	TATA	MTS	Rcom	
			GSM Operators									CDMA Operators				
<b>A</b>	<b>Network Service Quality Parameter</b>															
<b>1</b>	<b>Network Availability</b>															
	a) BTS Accumulated Downtime	<=2 %	0.05%	0.32%	0.47%	0.00%	0.16%	0.05%	0.00%	0.01%	0.18%	0.15%	0.01%	0.01%	0.04%	
	b) Worst affected BTSs due to downtime	<=2 %	0.00%	0.23%	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.66%	0.00%	0.00%	0.00%	0.00%	
	1) No. of BTSs having accumulated downtime of >24 hours in 3 days		6.19	588.6	529.8	0	245.75	45.54	0	7.80	328.3	133.72	3.25	1	28.09	
	2) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		0	6	1	4	0	0	0	0	17	0	0	0	0	
	<b>Connection Establishment (Accessibility)</b>															
	c) CSSR	>=9 5%	98.3%	99.2%	95.3%	99.9%	98.6%	99.3%	99.4%	98.7%	97.8%	98.6%	100.0%	99.7%	99.6%	
	d) SDCCH/PAGING congestion	<=1 %	0.10%	0.16%	0.04%	0.00%	0.50%	0.16%	0.63%	0.01%	0.39%	0.01%	0.00%	0.00%	0.00%	
	e) TCH congestion	<=2 %	0.00%	0.21%	0.39%	0.00%	0.74%	0.22%	0.00%	0.45%	1.37%	0.50%	0.00%	0.01%	0.08%	
<b>2</b>	<b>Connection maintenance</b>															
	a) CDR	<=2 %	1.27%	0.67%	1.98%	0.78%	0.93%	0.21%	0.00%	0.83%	1.01%	1.29%	0.63%	0.18%	0.31%	
	b) Cells having > 3% TCH drop	<=3 %	1.81%	0.81%	<b>4.50%</b>	0.53%	2.91%	0.82%	0.00%	<b>7.04%</b>	<b>3.97%</b>	1.28%	<b>5.12%</b>	0.50%	0.34%	
	c) Good voice quality	>=9 5%	98.4%	98.7%	NR	98.0%	96.1%	99.2%	<b>88.3%</b>	97.0%	96.8%	98.7%	NA	100.0 %	NA	
	d) No. of cells > 3% TCH drop		9	62	210	1	192	31	0	307	299	47	81	2	3	
	e) Total no. of cells in the network		498	7,682	4,664	63	6,600	3,738	18	4,359	7,841	3,691	1,583	468	894	
<b>3</b>	<b>No of POI having congestion &gt;.5%</b>	<=0. 5%	0	0	0	0	NR	0	0	NR	2	0	0	0	0	
	a) Name of POI not meeting the benchmark		NIL	NIL	NIL	NIL	NR	NIL	NIL	NR	AMBALA OCB; RELIANCE NLD	NIL	NIL	NIL	NIL	

	b) Total No. of circuits on POI		6,550	28,584	37,202	1,306	54,954	18,908	390	2,899	61,294	9,764	40,647	3,487	18,908
	c) Avg No. of call attempts on POI		197,804	608,689	20,066	2,187	NR	228,461	0	NR	NR	76,145	539,744	17,181	228,461
	d) Avg traffic served on POI (Erlang)		6,743	15,504	37,202	77	NR	7,046	0	NR	NR	2,903	16,353	330	7,046
	e) Total number of working POI Service Area wise		24	30	47	43	54	30	14	10	26	25	107	34	30
	f) Equipped Capacity of Network in respect of Traffic in erlang		5,618	84,789	126,464	517	83,542	NR	119	83,814	120,400	46,062	92,057	12,600	NR
	g) Total traffic handled in TCBH in erlang		530	190,319	NR	19	76,736	NR	NR	NR	113,462	NR	NR	NR	NR
<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%	95.00%	NR	100.00%	96.04%	99.28%	99.29%	100.00%	100.00%	100.00%	100.00%	100.00%	99.36%	99.92%
	b) % of call answered by operators(voice to voice) within 60 sec	>=90%	<b>89.22%</b>	98.94%	94.82%	100.00%	95.64%	<b>66.45%</b>	100.00%	92.55%	98.39%	99.79%	98.73%	95.21%	93.81%
	c) No. of call attempts to call centre / customer care nos. during TCBH (Avg)		23,657	73,962	53,668	34	109,689	29,458	3	731,008	11,865	18,238	25,759	2,985	17,689
	d) No. of calls connected and answered successfully to call centre / customer care nos. during TCBH (Avg)		21,107	73,179	50,886	34	104,909	19,576	3	676,535	11,674	18,200	25,433	2,842	16,594
NA: Not Applicable, NR: Not Received															

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

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

1. **BTS accumulated downtime (benchmark  $\leq 2\%$ ):** All operators are meeting the benchmark with values lying between 0.00% and 0.47%.
2. **Worst affected BTSs due to downtime (benchmark  $\leq 2\%$ ):** All operators are meeting the benchmark with values lying between 0.00% and 0.66%.
3. **Call setup success rate (benchmark  $\geq 95\%$ ):** All operators are meeting the benchmark with values lying between 95.3% and 100%.
4. **SDCCH/PAGING Channel congestion (benchmark  $\leq 1\%$ ):** All operators 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.*
5. **TCH congestion (benchmark  $\leq 2\%$ ):** All operators are meeting the benchmark with values lying between 0.0% and 1.37%.
6. **Call drop rate (benchmark  $\leq 2\%$ ):** All operators are meeting the benchmark with values lying between 0.0% and 1.98%.
7. **Cell exceeding 3% TCH drop (benchmark  $\leq 3\%$ ):** Except for BSNL, Tata GSM, Vodafone & Tata CDMA with a value of 4.50%, 7.04%, 3.97% & 5.12% respectively, rest of the operators are satisfying the benchmark with value in between 0.0% and 2.91%.
8. **Connections with good voice quality (benchmark  $\geq 95\%$ ):** Except for Loop with a value of 88.3%, rest all operators are meeting the benchmark with values lying between 96.11% and 100%.  
*Note: Rcom and Tata CDMA data is not system generated.*
9. **No. of POI having Congestion  $>0.5\%$ :** Vodafone was found to have two (2) nos. of POIs with  $\geq 0.5\%$  congestion. For rest of the operators there was no congestion found overall on the POI, but cases were found where individual POIs are showing high utilization/usage. Some are in the range of over 100% though causing no traffic failure due to overflow technique i.e. the extra traffic is carried over by some other operating POI as has been designed to do so.
10. **%age of call answered by operator (electronically) (benchmark  $>95\%$ ):** All operators are meeting the benchmark with values lying between 95% to 100%.
11. **%age of call answered by operator (Voice to voice) (benchmark  $>90\%$ ):** Except Aircel & Reliance GSM with values of 89.22% & 66.45% respectively, rest all the operators meeting the benchmark with values lying between 92.55% to 100%.



## (2) Month Data Assessment & Summarized Findings

S/N	Name of Parameter	Benchmark	Aircel	Airtel	BSNL	Etisalat	Idea	Reliance	Loop	TATA DOCOMO	V-fone	Videocon	TATA	MTS	Rcom	
			GSM Operators									CDMA Operators				
(A)	<b>Network Service Quality Parameter</b>															
1	<b>Network Availability</b>															
	a) BTS Accumulated Downtime	<=2%	0.16%	0.16%	1.42%	0.19%	0.14%	0.15%	0.00%	0.02%	0.13%	0.09%	0.02%	0.03%	0.13%	
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.46%	1.93%	0.00%	0.00%	0.00%	0.00%	0.00%	0.62%	0.16%	0.00%	0.00%	0.00%	
	c) Total no. of BTSs in the licensed service area		166	2,584	1,556	21	2,194	1,246	6	1,453	2,590	1,230	528	154	894	
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		192	3,143	16,425	29	2,325	1,412	0	242	2,433	797	88	44	871	
e) No. of BTSs having accumulated downtime of >24 hours in a month		0	12	30	0	0	0	0	0	16	2	0	0	0		
2	<b>Connection Establishment (Accessibility)</b>															
	a) CSSR (Call Setup Success Rate)	>=95%	98.43%	99.21%	95.83%	99.25%	98.77%	99.71%	99.45%	98.73%	97.83%	98.45%	100.00%	99.55%	99.35%	
	b) SDCCH/PAGING congestion	<=1%	0.22%	0.15%	0.06%	0.02%	0.47%	0.18%	0.37%	0.03%	0.36%	0.05%	0.00%	0.00%	0.00%	
c) TCH congestion	<=2%	0.03%	0.21%	0.39%	0.01%	0.67%	0.08%	0.00%	0.51%	1.32%	0.56%	0.00%	0.01%	0.13%		
3	<b>Connection maintenance (retainability)</b>															
	a) CDR	<=2%	1.18%	0.67%	1.91%	1.64%	0.92%	0.20%	1.37%	0.82%	0.99%	1.27%	0.62%	0.20%	0.33%	
	b) Worst affected cells>3% TCH drop	<=3%	2.09%	0.79%	4.70%	1.59%	2.90%	0.80%	0.00%	6.60%	3.81%	1.37%	5.23%	0.72%	0.33%	
	c) Good voice quality	>=95%	98.45%	98.69%	96.72%	98.20%	96.42%	99.15%	98.09%	97.03%	96.82%	98.65%	NA	100.00%	NA	
	d) Total No. of cells exceeding 3% TCH drop (call drop)		10	61	219	1	196	30	0	287	312	50	83	3	3	
e) Total no. of cells in the network		498	7,682	4,664	63	6,600	3,738	18	4,359	7,841	3,691	1,583	468	894		
4	<b>No of POI having congestion &gt;=0.5%</b>	<=0.5%	0	0	0	0	7	0	0	4	2	0	0	0	0	
	a) Name of POI not meeting the benchmark		NIL	NIL	NIL	NIL	NGN IDEA; RIL-LOCAL; BSNL-NLD; AIRTEL- LOCAL; HUTCH- LOCAL; VSNL- NLD; NGN	NIL	NIL	TCL ILD; Reliance Local; Rcom NLD; TCL ILD	AMBALA OCB; RELIANCE NLD	NIL	NIL	NIL	NIL	
	b) Total No. of call attempts on POI (Avg.)		2,259,492	622,740	28,698,627	2,468	1,492,171	233,583	3	38,201	33,582	97,687	570,667	15,035	233,583	
	c) Total traffic served on POI (Erlang) (Avg.)		72,725	15,593	371,345	83	34,848	7,282	0	812	1,964,785	2,609,124	16,826	282	7,282	
	d) Total No. of circuits on POI		6,550	28,584	37,202	1,306	54,954	18,908	390	2,899	61,294	9,764	40,647	3,487	18,908	
	e) Total number of working POI Service Area wise		24	30	47	43	54	30	14	10	26	25	107	34	30	
f) Capacity of POI		6,161	26,520	40,973	985	55,366	17,409	229	2,656	60,959	9,208	37,758	290	17,409		
5	<b>Network Data</b>															
	a) Equipped Capacity of Network Erlang		5,618	84,789	126,464	517	83,542	NR	119	83,814	120,400	46,062	92,057	12,600	NR	
b) Total traffic in TCBH in erlang (Avg.)		NR	60,865	65,750	NR	78,157	NR		26,442	113,877	8,894	42,987	274			

	c) Total no. of customers served (as per VLR) on last day of the month		147,952	1,998,793	1,414,807	1,532	2,846,448		14	1,092,314	3,622,007	267,704	519,308	31,457	
(B)	<b>Customer Service Quality Parameters</b>														
6	<b>Metering/billing credibility-Post paid</b>	<= 0.1%	0.04%	0.03%	0.00%	NA	0.15%	0.09%	NA	0.34%	0.02%	NA	0.27%	0.00%	0.08%
	a) No. of bills issued during the period		8,088	54,563	24,157		74,149	8,986	NA	13,092	53,540		112,414	16	63,322
	b) No. of bills disputed including billing complaints during the period		3	17	0		111	8	NA	45	11		302	0	53
7	<b>Metering /billing credibility-Pre paid</b>	<= 0.1%	0.00%	0.01%	0.00%	0.01%	0.01%	0.02%	0.00%	0.04%	0.02%	0.08%	0.08%	0.10%	0.02%
	a) No. of charging / credit / validity complaints during the quarter		2	285	0	1	382	532	0	729	651	668	1,420	186	247
	b) Total no. of pre-paid customers at the end of the quarter		533,049	2,957,070	2,978,709	9,930	3,180,216	2,880,924	95	1,919,207	4,136,514	833,570	1,784,218	195,050	1,084,657
8	<b>Resolution of billing/ charging complaints</b>	100% within 4 weeks	100%	100%	100%	100%	100%	100%	NA	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		251	2,935	0	1	1,099	540	NA	774	662	668	1,722	10	300
	b) Total no. of billing (post paid) and charging, credit / validity (pre paid) complaints received during the quarter		251	2,935	0	1	1,099	540	NA	774	662	668	1,722	10	300
	c) No. of billing complaints (post paid) and charging, credit/ validity complaints (pre paid) resolved in favour of the customer during the quarter		68	302	0	0	493	36	NA	4	573	100	57	10	60
	d) No. of complaints disposed on account of not considered as valid complaints during the quarter		183	2,633	0	1	606	504	NA	770	89	568	1,665	0	240
	e) Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	<=1 week	100%	100%	NA	NA	100%	100%	NA	100%	100%	100%	100%	100%	100%
9	<b>Response time to customers for assistance</b>														
	a) Accessibility of call centre/Customer Care	>=95%	88.61%	NR	100.00%	98.13%	99.00%	98.77%	100.00%	NR	100.00%	100.00%	99.00%	NR	99.42%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	NR	90.75%	92.67%	99.78%	96.05%	74.88%	100.00%	99.34%	97.24%	99.53%	98.69%	91.38%	94.21%
	c) Total no. of call attempts to call centre & customer care nos. during TCBH (Avg.).			804,724	652,201	449	1,131,176	307,100	7	220,648	118,864	2,553	269,288	2,239	178,201
d) No. of calls connected and answered successfully to call centre & customer care nos. during TCBH (Avg.).		730,275		604,371	448	1,086,455	229,956	7	219,202	115,589	2,541	265,768	2,046	167,885	
10	<b>Termination/closure of service</b>	<=7days	100%	100%	100%	NA	100%	100%	NA	100%	100%	NA	100%	100%	100%
	a) Total No. of requests for Termination / Closure of service received during the quarter		35	840	236		457	98	NA	302	353		2999	4	296
	b) No.of requests for Termination / Closure of service complied within 7 days during the quarter		35	840	236		457	98	NA	302	353		2999	4	296
11	<b>Time taken for refunds of deposits after closures.</b>	100% within 60 days	100%	100%	100%		100%	100%	NA	100%	100%		100%	NA	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 Haryana Service Area are as given below:-

- **BTS accumulated downtime (benchmark  $\leq 2\%$ ):** All operators are meeting the benchmark with values lying between 0.0% and 1.42%.
- **Worst affected BTSs due to downtime (benchmark  $\leq 2\%$ ):** All operators are meeting the benchmark with values lying between 0.0% and 1.93%.
- **Call setup success rate (benchmark  $\geq 95\%$ ):** All operators are meeting the benchmark with values lying between 95.83% and 100%.
- **SDCCH/PAGING Channel congestion (benchmark  $\leq 1\%$ ):** All operators are meeting the benchmark with values lying between 0.0% and 0.47%.  
*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 0.0% and 1.32%.
- **Call drop rate (benchmark  $\leq 2\%$ ):** All operators are meeting the benchmark with values lying between 0.20% and 1.91%.
- **Cell exceeding 3% TCH drop (benchmark  $\leq 3\%$ ):** Except for BSNL, Tata GSM, Vodafone & Tata CDMA with a value of 4.70%, 6.60%, 3.81% & 5.23%, all the operators are satisfying the benchmark with value in between 0.0% and 2.90%.
- **Connections with good voice quality (benchmark  $\geq 95\%$ ):** All operators are meeting the benchmark with values lying between 96.42% and 100%.  
*Note: Rcom and Tata CDMA data is not system generated.*
- **No. of POI having Congestion  $>0.5\%$ :** Idea, Tata Docomo and Vodafone were found to have 7, 4 and 2 nos. of POIs with  $\geq 0.5\%$  congestion. Rest of the operators were found to have no congestion overall on the POI, but cases were found where individual POIs are showing high utilization/usage. Some are in the range of over 100% though causing no traffic failure due to overflow technique i.e. the extra traffic is carried over by some other operating POI as has been designed to do so.
- **%age of call answered by operator (electronically) (benchmark  $>95\%$ ):** Except for Aircel with 88.61% rest of the operators are meeting the benchmark with values lying between 98.13% and 100%.
- **%age of call answered by operator (Voice to voice) (benchmark  $>90\%$ ):** Except RCom-GSM with a values of 74.88%, rest all the operators are meeting the bench mark with values lying between 90.75% to 100%.
- **Metering and billing credibility-Post paid (benchmark  $\leq 0.1\%$ ):** Except for Idea, Tata GSM & Tata CDMA with values of 0.15%, 0.34% & 0.27% respectively, all other operators are meeting the benchmark with values lying between 0.00% to 0.09%.
- **Metering and billing credibility-Pre paid (benchmark  $\leq 0.1\%$ ):** All the operators are meeting the benchmark with values lying between 0% and 0.10%.
- **Resolution of billing/ charging complaints (benchmark 100% within 4 weeks):** All operators are meeting the benchmark.
- **Termination/Closure of service (Benchmark  $\leq 7$  days):** All operators have satisfied the benchmark.
- **Time taken for refunds of deposits after closures (benchmark 100% within  $\leq 60$  days):** All operators have satisfied the benchmark.

## (3) Sample Coverage

Switches/BSC/BTS details of operators:

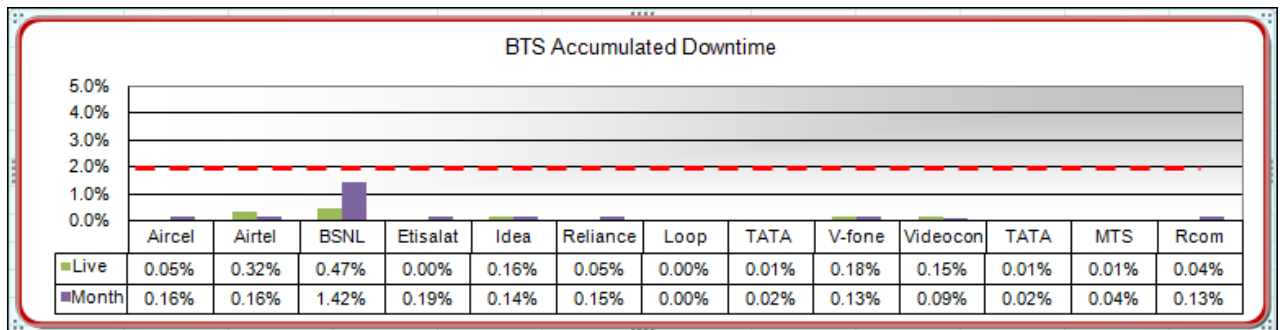
Sl.	Name of Service Provider	No. of MSC	No. of BSC	No. of BTS
<b>GSM Operators</b>				
1	Aircel Ltd	1	1	166
2	Airtel Ltd	7	23	2584
3	BSNL	7	24	1556
4	Etisalat	0	1	21
5	Idea	6	26	2213
6	Reliance Communication	1	8	1243
7	Tata Communications	2	12	1453
8	Loop	1	1	6
9	Videocon	1	8	1230
10	Vodafone	12	46	2590
<b>CDMA Operators</b>				
11	MTS	1	1	155
12	Reliance Communication	2	-	894
13	Tata Communications	6	13	528

## (4) Performance (Graphical Representation)

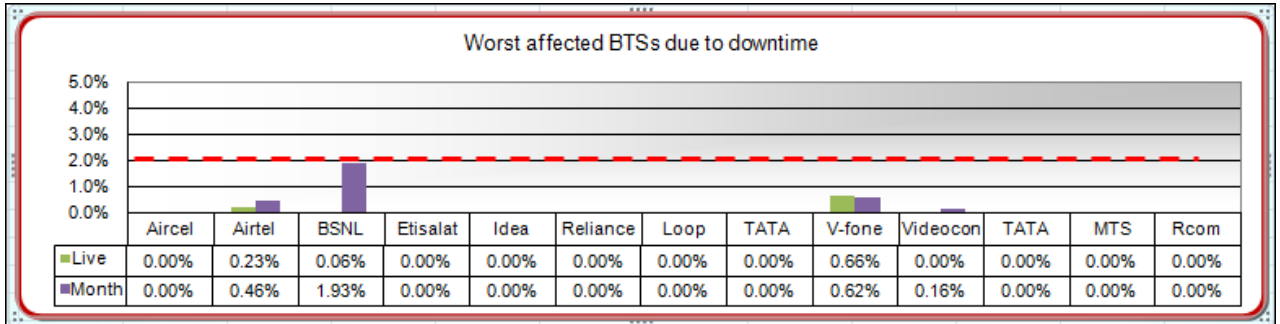
**Comparison between Live measurements and One month data Audit – Cellular Mobile Telephone Services**

## A) NETWORK PERFORMANCE

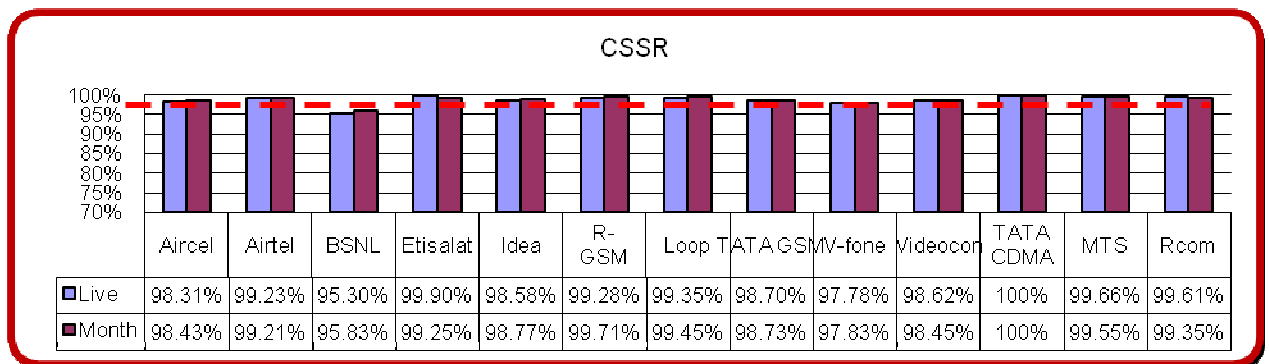
- I. BTS accumulated downtime:** All operators are meeting the TRAI benchmarks ( $\geq 2\%$ ) for both one month data and 3 days live data taken in the month of audit.



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

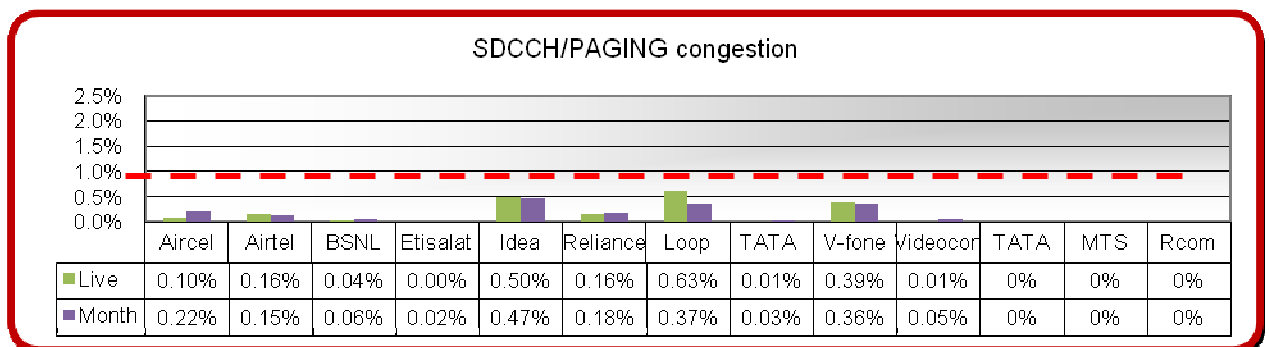


**III. Call setup success rate:** All operators are meeting the TRAI benchmarks ( $\geq 95\%$ ) for both one month data and 3 days live data taken in the month of audit.

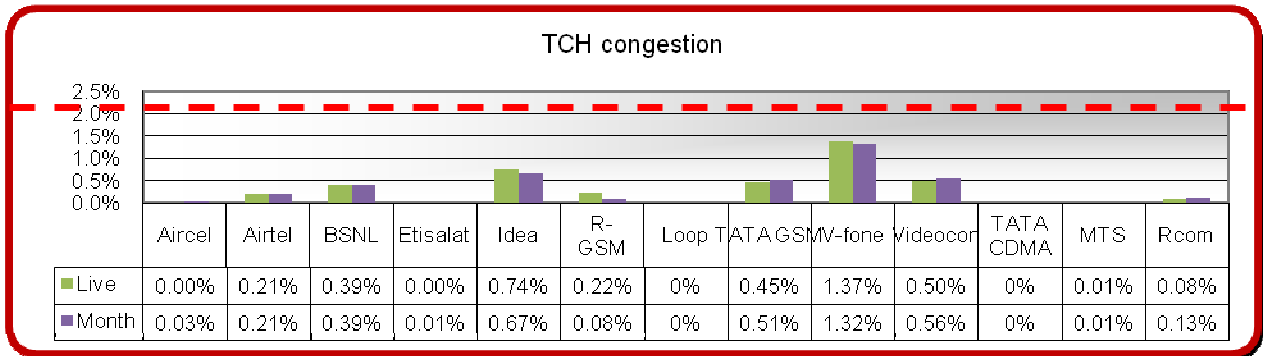


**IV. Blocked call rate:**

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

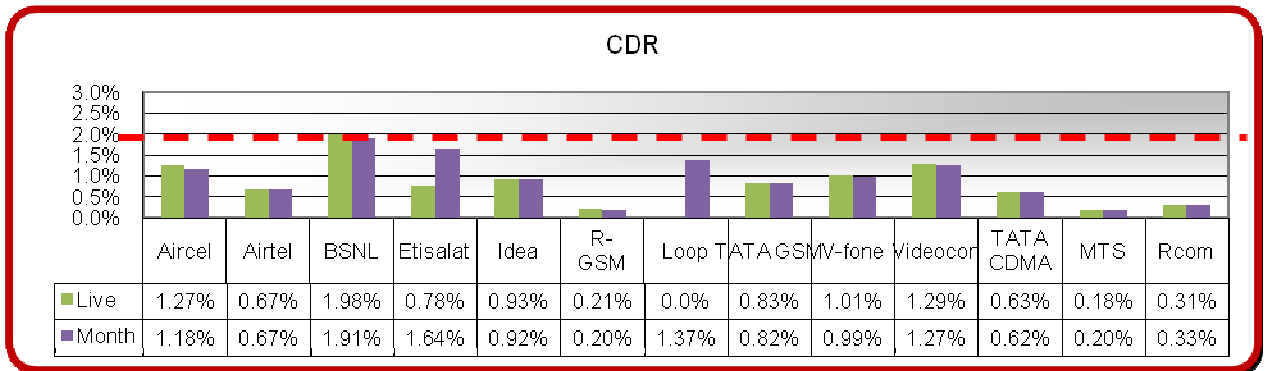


**TCH congestion (%):** All operators are meeting the TRAI benchmarks ( $\leq 2\%$ ) for both one month data and 3 days live data taken in the month of audit.

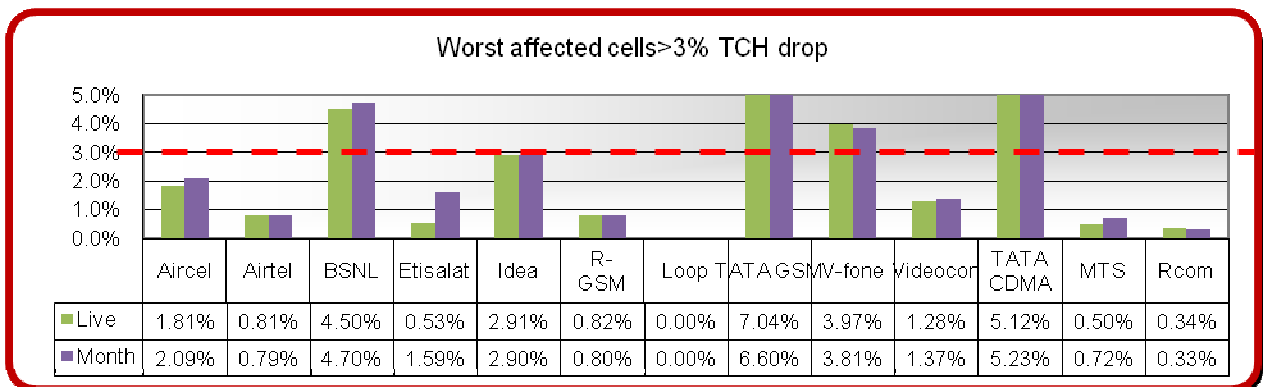


**V. Connection Maintainability (Retainability):**

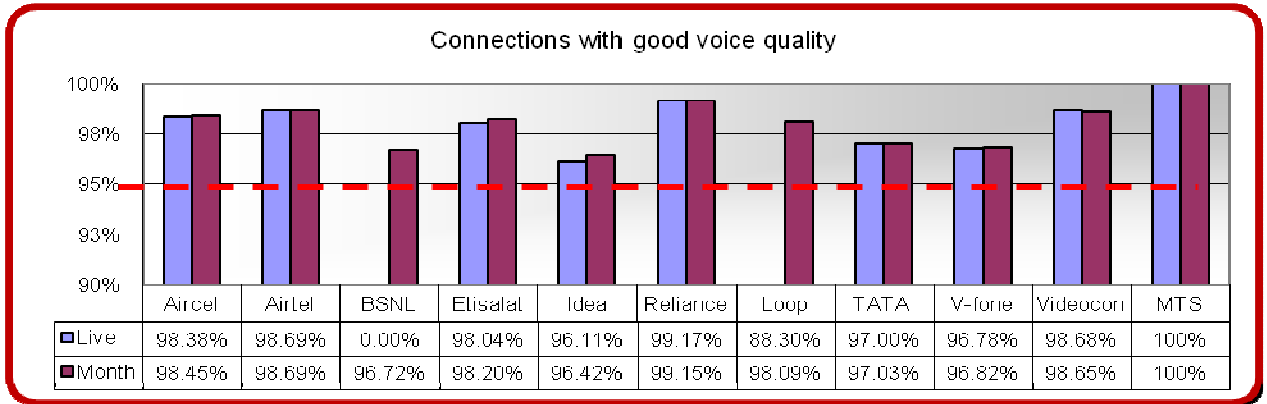
**Call drop rate (%):** All operators are meeting the TRAI benchmarks ( $\leq 2\%$ ) for both one month data and 3 days live data taken in the month of audit.



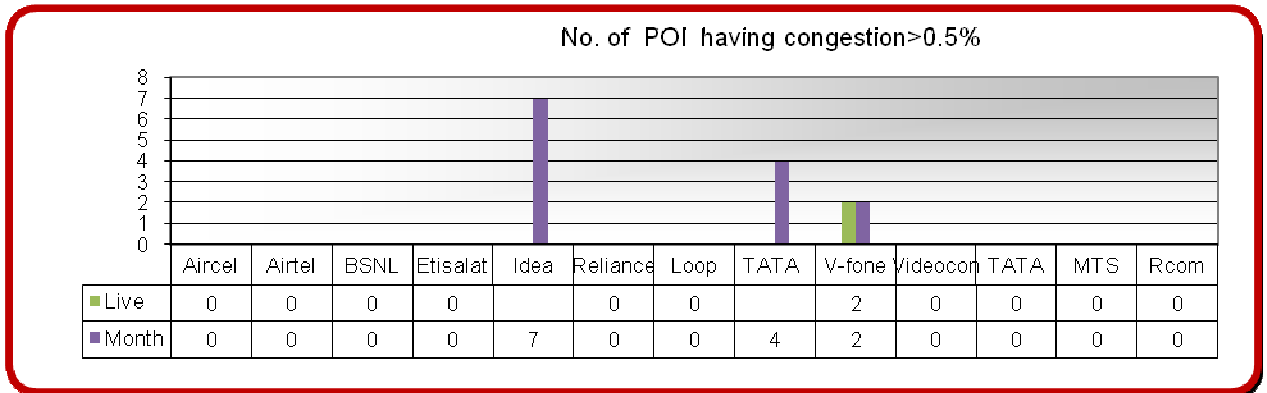
**Worst affected Cell exceeding 3% TCH Drop:** For both live and month data BSNL, Tata Docomo, Vodafone & Tata CDMA with a value of 4.50%, 4.70%; 7.04%, 6.60%; 3.97%, 3.81%; 5.12%, 5.23% respectively found not meeting the benchmark of  $\leq 3\%$ . Rest of the operators is meeting the benchmark for both cases.



**Percentage of connections with good voice quality (benchmark  $\geq 95\%$ ):** Except Loop for Live data with value of 88.30%, not meeting the benchmark rest all operators are found meeting the benchmarks for both one month data and 3 days live data taken in the month of audit.



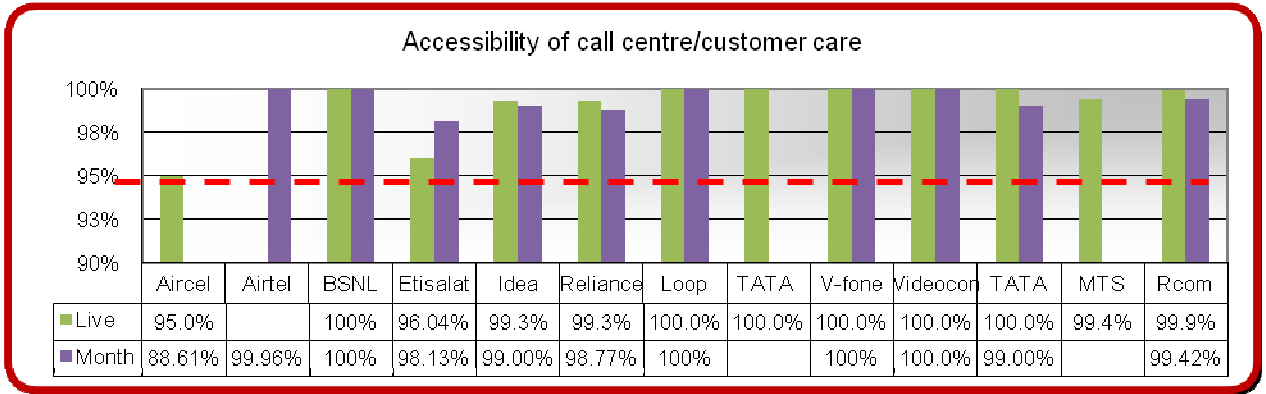
**POI Congestion:** All operators are meeting the TRAI benchmarks ( $\geq 0.5\%$ ) for both one month data and 3 days live data taken in the month of audit.



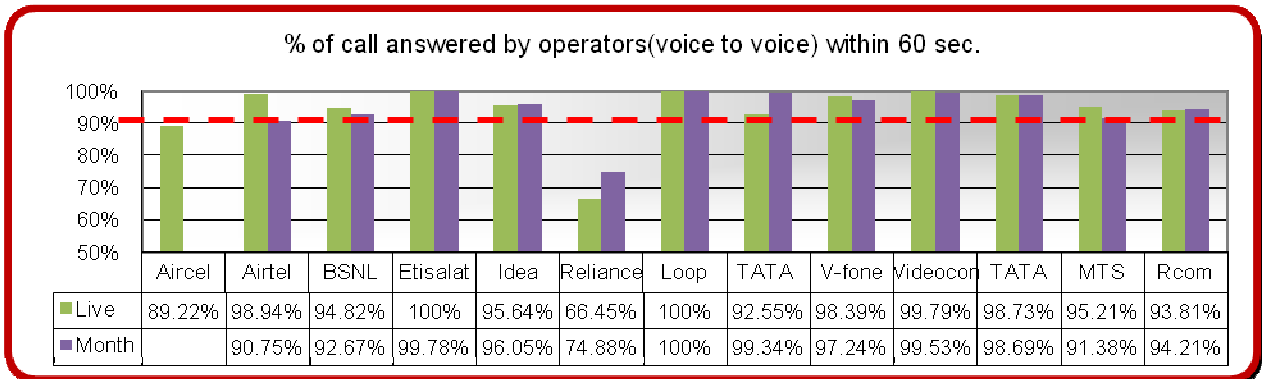
**CUSTOMER SERVICE QUALITY PARAMETERS**

**Response time to the customer for assistance:**

**Percentage of call answered (Electronically) (benchmark >= 95%):** Except Aircel for month data, rest all operators are meeting the TRAI benchmarks (>= 95%) for both one month data and 3 days live data.



**Percentage of call answered by operators (Voice to voice) within 60 sec (benchmark >= 90%):** Except Aircel for Live data and RCom-GSM for both Live and Month data, rest of the operators were found meeting the benchmark.



**(5) Critical Analysis**

The above comparative study between live data & month data shows similar trends in both the cases. However, inconsistency in live & month data was found for parameters like “worst affected cells >3% TCH drop” (BSNL, Tata-GSM, Vodafone & Tata CDMA), and “%age of calls answered by operator” (Aircel & RCom-GSM).



**(A) 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)	Loop	Videocon	Vodafone	MTS	Reliance (CDMA)	Tata (CDMA)
Total No. of Call attempted	2	15	0	0	12	12	15	0	12	15	12	14	15
Total No. of calls	1	10	0	0	10	10	10	0	10	10	10	10	10
Cases resolved with 4 weeks	1	10	0	0	10	10	10	0	10	10	10	10	10
%age of cases resolved	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	Etisalat	Idea	Rcom GSM	Tata GSM	LOOP	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA
Total No. of Calls Attempted	100	100	100	100	100	100	100	100	100	100	100	100	100
Total No. of calls connected to IVR	95	98	96	93	92	90	95	94	96	97	91	93	91
Calls got connected to agent within 60 Sec	95	98	96	93	92	90	95	94	96	97	91	93	91
%age of calls got answered	95%	98%	96%	93%	92%	90%	95%	94%	96%	97%	91%	93%	91%

**(4) Level 1 Live Calling:**

Emergency no.	No. of calls made	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	LOOP	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA	
		<b>Ambala</b>													
100	Police	2	2	2	2	2	2	2	2	2	2	2	2	2	
101	Fire	2	2	2	2	2	2	2	2	2	2	2	2	2	
102	Ambulance	2	2	2	2	2	2	2	2	2	2	2	2	2	
139	Railway	2	2	2	2	2	2	2	2	2	2	2	2	2	
		<b>Panipat</b>													
100	Police	2	2	2	2	2	2	2	2	2	2	2	2	2	
101	Fire	2	2	2	2	2	2	2	2	2	2	2	2	2	
102	Ambulance	2	2	2	2	2	2	2	2	2	2	2	2	2	
139	Railway	2	2	2	2	2	2	2	2	2	2	2	2	2	
		<b>Hisar</b>													
100	Police	2	2	2	2	2	2	2	2	2	2	2	2	2	
101	Fire	2	2	2	2	2	2	2	2	2	2	2	2	2	
102	Ambulance	2	2	2	2	2	2	2	2	2	2	2	2	2	
139	Railway	2	2	2	2	2	2	2	2	2	2	2	2	2	

**(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% in most of the cases as claimed by their records.

From Call center calling table above it is to be noted that in Haryana circle call getting connected to IVR also gets connected to the agent within 60 sec, benchmark as set by TRAI. Here the blockage is found to be at the IVR level only.

Emergency calls were made in Ambala and Panipat and it was found that calls were getting connected for all the operators.

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

A sample of 2x50 test calls per Service Providers with in the licensed service area (Haryana Circle) were made between 1100 to 1400 hrs and between 1600 to 1900 hrs so that TCBH hours for all the operators were covered.

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

Calling Operator	Aircel	Airtel	BSNL	Etisalat	Idea	Reliance (GSM)	Tata (GSM)	Loop	Videocon	Vodafone	MTS	Reliance (CDMA)	Tata (CDMA)
<b>Aircel</b>	-	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
<b>Airtel</b>	100%	-	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%	100%
<b>Etisalat</b>	100%	100%	100%	-	100%	100%	100%	100%	100%	100%	100%	100%	100%
<b>Idea</b>	100%	100%	100%	100%	-	100%	100%	100%	100%	100%	100%	100%	100%
<b>Reliance (GSM)</b>	100%	100%	100%	100%	100%	-	100%	100%	100%	100%	100%	100%	100%
<b>Tata (GSM)</b>	100%	100%	100%	100%	100%	100%	-	100%	100%	100%	100%	100%	100%
<b>Loop</b>	100%	100%	100%	100%	100%	100%	100%	-	100%	100%	100%	100%	100%
<b>Videocon</b>	100%	100%	100%	100%	100%	100%	100%	100%	-	100%	100%	100%	100%
<b>Vodafone</b>	100%	100%	100%	100%	100%	100%	100%	100%	100%	-	100%	100%	100%
<b>MTS</b>	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	-	100%	100%
<b>Reliance (CDMA)</b>	100%	100%	100%	100%	100%	100%	100%	98%	100%	100%	100%	-	100%
<b>Tata (CDMA)</b>	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	-

**(3) Critical Analysis**

In the inter-operator call assessment test, calls were made from one operator to other operators so as to check congestion on both the operators' network. In such cases, the radio part, switch part & the POI in-between the operators are involved and hence if any congestion is found in the network, it may be due to any of these parts. The result shows that there is no congestion on the operator networks.

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

The Operator Assisted Drive Test was conducted at Haryana for all the operators. Route covered was about around 80 Km for Sonapat and 90 Km for Hisar and Rohtak depending on city areas within the speed limit of 30Km/hr.

**Drive Test Locations*****Sonapat***

LOW DENSE: Atlas road, Rohtak Road, sec 23, teachers colony, murthal adda, delhi road, Narela Road, kachha qtr market, mayur vihar.

MEDIUM DENSE: Sonapat Sec-15, Sonapat Geeta Bhawan.

HIGH DENSE: Huda civil hospital, bus stand, main exchange, Rly station.

***Hisar***

LOW DENSE: NH10, jindal chowk, fawara chowk, jat college, sec 9, sec16, jindal hospital, main bazar, gju, HAU.

MEDIUM DENSE: Mini secretariat, dogra mohalla, mela ground.

HIGH DENSE: Hissar MTE\_Hissar, bus stand, sirsa road, kath mandi, auto market.

***Rohtak***

LOW DENSE: DLF colony-circular road, chiyot colony, housing board, shivaji colony, kath mandi, Rly rd, industrial area, indra colony, sukhpua chowk, prem colony, sanipura-sec 1.

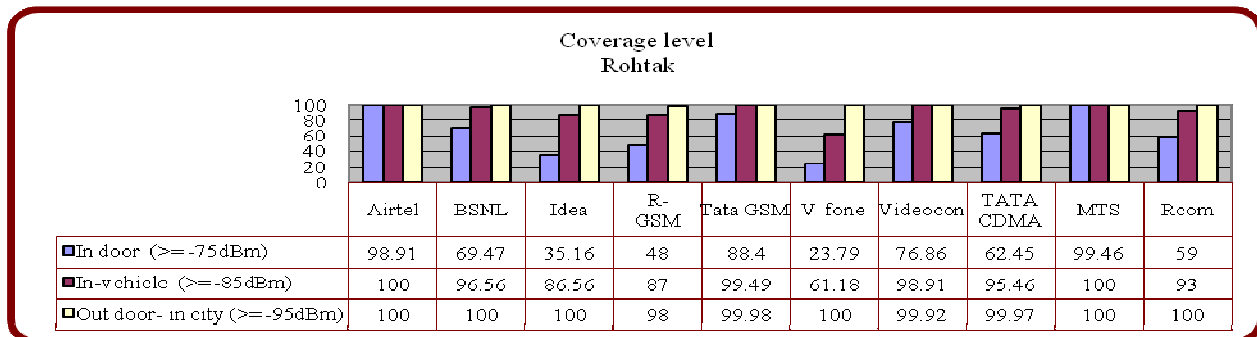
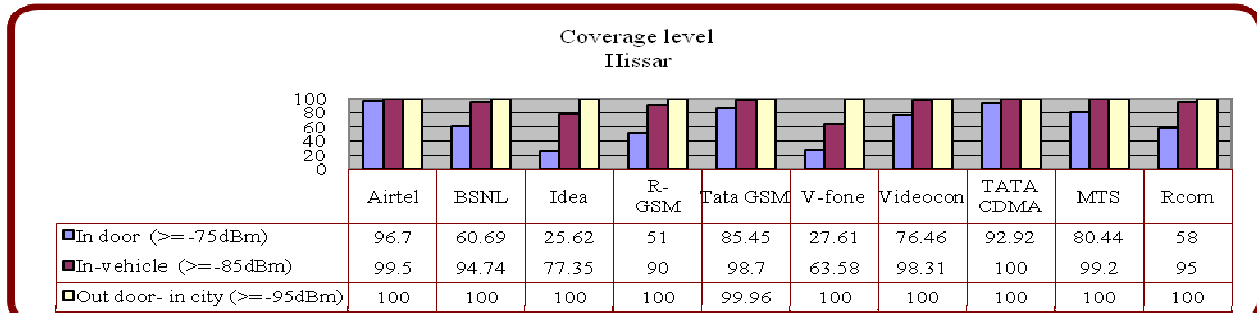
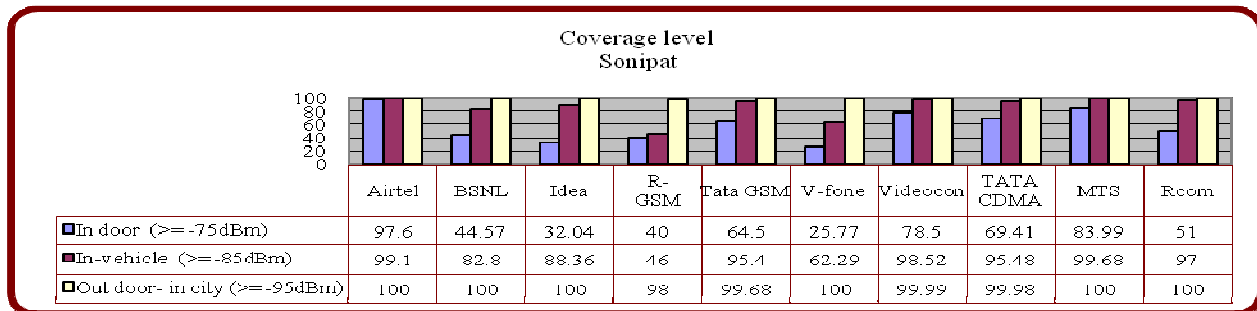
MEDIUM DENSE: ROHTAK MTE Rohtak, shastri nagar, arya nagar.

HIGH DENSE: MD University, vikas nagar , sheela bye-pass, sec 2 , sec14, PGI, janta colony,bhiwani-chungi,hissar\_road.

## 2) Dependent Drive Test (for Haryana)

SN	Parameter	City Name	Airtel	BSNL	Idea	Reliance	Tata	V-fone	Videocon	TATA	MTS	Rcom
			GSM Operators						CDMA Operators			
1.1	Call Attempts	Sonipat	87	96	92	118	122	88	132	88	95	120
		Hissar	61	106	72	98	79	107	78	73	78	97
		Rohtak	116	93	120	133	116	135	147	97	101	133
1.2	Blocked Call Rate (<=3%)	Sonipat	0.0%	2.08%	0.00%	0.00%	3.27%	2.27%	0.76%	0.00%	0.00%	0.00%
		Hissar	1.63%	0.94%	1.38%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Rohtak	0.00%	7.53%	0.83%	0.00%	0.00%	0.74%	1.15%	0.00%	0.00%	0.00%
1.3	Dropped Call Rate (<=2%)	Sonipat	0.0%	0.00%	0.00%	0.00%	2.45%	0.00%	0.00%	0.00%	1.05%	0.00%
		Hissar	0.0%	1.90%	1.38%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Rohtak	0.00%	1.16%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
1.4	Percentage of connections with good voice quality (=>95%)											
	(i) 0-4 (w/o frequency hopping)	Sonipat								88.62%	95.64%	99.00%
		Hissar								83.32%	91.52%	99.00%
		Rohtak								85.57%	91.88%	99.00%
	(ii) 0-5 (with frequency hopping)	Sonipat	95.10%	93.90%	92.96%	97.00%	95.00%	94.96%	95.88%			
		Hissar	100%	91.50%	92.96%	98.00%	96.54%	96.16%	97.08%			
Rohtak		100%	91.70%	93.68%	96.00%	95.43%	96.09%	95.22%				
1.5	Service Coverage											
	In door (>= -75dBm)	Sonipat	97.6%	44.57%	32.04%	40%	64.5%	25.77%	78.5%	69.41%	83.99%	51%
		Hissar	96.7%	60.69%	25.62%	51%	85.45%	27.61%	76.46%	92.92%	80.44%	58%
		Rohtak	98.91%	69.47%	35.16%	48%	88.4%	23.79%	76.86%	62.45%	99.46%	59%
	In-vehicle (>= -85dBm)	Sonipat	99.1%	82.8%	88.36%	46%	95.4%	62.29%	98.52%	95.48%	99.68%	97%
		Hissar	99.5%	94.74%	77.35%	90%	98.7%	63.58%	98.31%	100%	99.2%	95%
		Rohtak	100%	96.56%	86.56%	87%	99.49%	61.18%	98.91%	95.46%	100%	93%
	Out door- in city (>= -5dBm)	Sonipat	100%	100%	100%	98%	99.68%	100%	99.99%	99.98%	100%	100%
		Hissar	100%	100%	100%	100%	99.96%	100%	100%	100%	100%	100%
Rohtak		100%	100%	100%	98%	99.98%	100%	99.92%	99.97%	100%	100%	
1.6	Call Setup Success Rate (>=95%)	Sonipat	100%	97.9%	100%	100%	96.7%	97.7%	99.2%	100%	100%	100%
		Hissar	98.37%	99%	99%	100%	100%	100%	100%	100%	100%	100%
		Rohtak	100%	92%	99%	100%	100%	99%	99%	100%	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” is not meeting by Tata GSM in Sonapat & BSNL in Rohtak.
- “Dropped Call Rate” is not meeting by Tata GSM in Sonapat.
- “Percentage of connections with good voice quality 0-4” is not meeting by Tata CDMA in Sonapat, Hisar, Rohtak and MTS in Hisar, Rohtak.
- “Percentage of connections with good voice quality 0-5” is not meeting by BSNL, IDEA, and Tata CDMA in all 3 cities and Vodafone in Sonapat.
- “Call Setup Success Rate” is not meeting by BSNL in Rohtak.

**Note: Independent Drive report submitted separately for this Quarter.**

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

From live, month and PMR findings, it can be concluded that on an average, performance of the operators in the service area (Haryana) is satisfactory for **Network Parameters**. Only exceptional is found to be with worst effected cells having > 3% TCH drop parameter where operators like BSNL, TATA and Vodafone are found to have not meeting the benchmark. The trend is similar for both month and live measurements.

Parameters like ‘% call answered by operators (voice to voice) within 60 sec’ for Aircel, Airtel, Vodafone & Tata CDMA.

Under **Customer Service Quality Parameter** Aircel and Reliance GSM are found not meeting the benchmark for both parameters of operator answered calls IVR and voice-to-voice within 60 seconds.

Regarding **Metering/Billing Credibility** issues, Idea, Tata GSM & Tata CDMA shows below benchmark value for Pre-paid connections.

During **Drive Tests**, high Blocked Call Rates were found in case of BSNL (Rohtak) & Tata GSM (Sonapat). Similarly, dropped call rate benchmark was not met by Tata GSM (Sonapat) and %age of good voice quality was not met by BSNL (Sonapat, Hisar & Rohtak), Idea (Sonapat, Hisar & Rohtak), Vodafone (Sonapat), Tata CDMA (Sonapat, Hisar & Rohtak) & MTS (Hisar & Rohtak). For CSSR parameter BSNL (Rohtak) was found not meeting the benchmark. From Drive test result it can be concluded the most effected parameter is voice quality. Hence the same may be taken care of immediately.

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

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

**IV. Broadband Service Providers**

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