REPORT

ON

AUDIT & ASSESSMENT OF QUALITY OF SERVICE

OF

CELLULAR MOBILE TELEPHONE SERVICE

FOR

NORTH ZONE – HARYANA CIRCLE

Report Period: October 2011 – December 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 was 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 done.

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 4th quarter (October – December 2011). The primary data collection and verification of records (PMR data verification – quarterly) maintained by various operators was undertaken for the period Apr. – June 2011.

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

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

II. Findings from Quality of Service Audit (Operator wise for each parameter): 3 Days Live data Audit

3 days Live Data Audit		Bench-mark	Aircel	Airtel	BSNL	Etisalat	Idea	Loop	Reliance	TATA	Videocon	V-fone	MTS	Reliance	Tata
S/N	Name of Parameter		GSM Operators										CDMA Operators		
1	**Network Service Quality Parameter**														
	Network Availability														
	a) BTS Accumulated Downtime	<=2%	0.08%	0.02%	1.34%	0.00%	0.12%	0.00%	0.13%	0.02%	0.01%	0.06%	0.07%	0.18%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.00%	0.19%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Connection Establishment (Accessibility)														
	c) CSSR (Call Setup Success Rate)	*>=95%*	97.90%	99.12%	97.61%	99.49%	99.44%	100.00%	99.77%	99.05%	98.62%	97.83%	99.98%	99.23%	99.99%
	d) SDCCH/PAGING congestion	*<=1%*	0.00%	0.18%	0.39%	0.00%	0.23%	0.00%	0.14%	0.01%	0.02%	0.24%	0.00%	0.00%	0.00%
	e) TCH congestion	*<=2%*	0.00%	0.21%	1.73%	0.00%	0.33%	0.00%	0.09%	0.35%	0.14%	1.46%	0.02%	0.41%	0.01%
2	**Connection maintenance (retainability)**														
	a) CDR	*<=2%*	1.25%	0.71%	1.85%	1.17%	0.76%	0.00%	0.51%	0.60%	0.64%	0.89%	0.26%	0.77%	0.79%
	b) Worst affected cells>3% TCH drop	*<=3%*	**3.28%**	0.95%	**3.77%**	1.59%	2.50%	0.00%	0.16%	**4.52%**	1.25%	2.96%	1.42%	0.36%	**6.48%**
	c) Good voice quality	*>=95%*	98.16%	98.74%	NA	98.23%	96.50%	100.00%	99.33%	96.87%	98.39%	97.41%	100.00%	NA	NA
3	**No. of POI having congestion >0.5%**	*<0.5%*	3	0	0	0	9	0	0	2	0	2	0	0	0
4	**Response time to customers for assistance**														
	a) Accessibility of call centre/Customer Care	*>=95%*	**65%**	100%	100%	96%	99%	100%	99%	100%	100%	100%	100%	98%	100%
	b) % call answered by operators(voice to voice) within 60 sec.	*>=90%*	**75%**	100%	96%	100%	99%	100%	93%	98%	100%	99%	95%	93%	100%
NA: Not Applicable, NR: Not Received															

According to the live data findings Operators like Aircel, BSNL, Tata GSM & Tata CDMA are found not meeting the benchmark for the parameter named "Worst affected cells >3% TCH drops" with values having (3.28%, 3.77%, 4.52%, 6.49%). And under Response time to customers for assistance Aircel is not meeting benchmark for “Accessibility of call centre/Customer care” & “% of call answered by operators (Voice to Voice) within 60 sec. BSNL, Reliance CDMA and Tata CDMA not reported Parameter named "Good Voice Quality" as data is not fetched by there systems.

One Month Data Audit:

One Month Data Audit															
S/N	Name of Parameter	Bench-mark	AIRCEL	AIRTEL	BSNL	ETISALAT	IDEA	LOOP	RELIANCE	TATA	VIDEOCON	V-FONE	MTS	RELIANCE	TATA
			GSM Operators										CDMA Operators		
(A)	**Network Service Quality Parameter**														
1	**Network Availability**														
	a) BTS Accumulated Downtime	*<=2%*	0.05%	0.04%	1.34%	0.00%	0.13%	0.00%	0.14%	0.02%	0.03%	0.13%	0.08%	0.14%	0.03%
	b) Worst affected BTSs due to downtime	*<=2%*	0.00%	0.12%	1.98%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.90%	0.00%	0.00%	0.00%
2	**Connection Establishment (Accessibility)**														
	a) CSSR (Call Setup Success Rate)	*>=95%*	98.22%	99.15%	97.65%	99.58%	99.15%	99.98%	99.80%	98.97%	98.27%	98.66%	99.98%	99.30%	99.85%
	b) SDCCH/PAGING congestion	*<=1%*	0.00%	0.17%	0.45%	0.02%	0.45%	0.02%	0.06%	0.01%	0.03%	0.24%	0.00%	0.00%	0.00%
	c) TCH congestion	*<=2%*	0.00%	0.22%	1.66%	0.01%	0.40%	0.00%	0.06%	0.30%	0.20%	0.74%	0.02%	0.24%	0.15%
3	**Connection maintenance (retainability)**														
	a) CDR	*<=2%*	1.05%	0.71%	1.84%	0.88%	0.88%	0.00%	0.51%	0.65%	0.72%	0.87%	0.22%	0.83%	0.78%
	b) Worst affected cells>3% TCH drop	*<=3%*	2.74%	0.92%	**4.23%**	1.59%	2.98%	0.00%	0.21%	**5.38%**	1.51%	2.98%	0.89%	0.37%	**7.19%**
	c) Good voice quality	*>=95%*	98.24%	98.73%	NA	98.41%	96.23%	99.27%	99.27%	96.89%	98.40%	97.39%	100%	NA	NA
4	**No of POI having congestion>0.5%**	*<0.5%*	3	0	0	0	9	0	0	2	0	2	0	2	0
(B)	**Customer Service Quality Parameters**														
5	**Metering/billing credibility-Post paid**	*<= 0.1%*	0.03%	0.06%	0.00%	NA	0.06%	NA	0.10%	**0.62%**	NA	0.01%	0.00%	0.09%	**0.32%**
6	**Metering /billing credibility-Pre paid**	*<= 0.1%*	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.03%	0.01%	0.03%	0.04%	0.04%	0.04%
7	**Resolution of billing/ charging complaints**	*100% within 4 weeks*	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	a) Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	*<=1 week*	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
8	**Response time to customers for assistance**														
	a) Accessibility of call centre/Customer Care	*>=95%*	100%	99%	100%	99.37%	99.32%	100%	98.95%	100%	100%	100%	96.26%	99%	100%
	b) % call answered by operators(voice to voice) within 60 sec.	*>=90%*	93.37%	96.72%	96.28%	99.29%	99.00%	100%	93.92%	99.28%	97.38%	95.00%	94.87%	88.32%	96.47%
9	**Termination/closure of service**	*<=7days*	100%	100%	100%	NA	100%	100%	100%	100%	100%	100%	100%	100%	100%
10	**Time taken for refunds of deposits after closures.**	*100% within 60 days*	100%	100%	100%	NA	100%	NA	100%	100%	100%	100%	100%	100%	100%

NA: Not Applicable, NR: Not Received

According to the month data findings Benchmark for "Worst affected cells > 3% TCH Drops" is not meet by BSNL, Tata GSM & Tata CDMA, and Under Customer Service Quality Parameters "Metering/Billing Credibility-Postpaid" is not meet by Tata GSM & Tata CDMA. BSNL, RelianceCDMA and Tata CDMA not reported for the Parameter named "Good Voice Quality" as data is not fetched by there systems.

Operator assisted drive test

The Operator Assisted Drive Test was conducted in and around Haryana for all the operators. Route covered was about around 60-85Km and for all the operators the same route was followed. The speed limit of 20-30Km/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	Aircel	Airtel	BSNL	Idea	Reliance	Tata	Videocon	Vodafone	MTS	Reliance	Tata
			GSM Operators								CDMA Operators		
1.1	Blocked Call Rate (<=3%)	Bhiwani	ICR with Tata GSM	0.00%	0.00%	0.00%	1.40%	0.00%	0.00%	0.00%	ICR with Tata CDMA	0.00%	0.00%
		Rewari		0.00%	0.00%	0.00%	2.13%	0.00%	ICR with Tata GSM	0.00%	0.00%	2.04%	2%
		Sirsa	0.00%	0.00%	2.53%	0.00%	0.00%	ICR with Aircel	0.00%	0.00%	ICR with Tata CDMA	0.00%	0.00%
1.2	Dropped Call Rate (<=2%)	Bhiwani	ICR with Tata GSM	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	ICR with Tata CDMA	0.00%	1.80%
		Rewari		0.00%	**2.44%**	0.00%	0.00%	0.00%	ICR with Tata GSM	0.00%	0.00%	0.00%	0.00%
		Sirsa	0.00%	0.00%	0.00%	0.00%	0.00%	ICR with Aircel	0.00%	0.00%	ICR with Tata CDMA	0.00%	1.88%
1.3	Percentage of connections with good voice quality (=>95%)												
	(i) 0-4 (w/o frequency hopping)	Bhiwani	NA								ICR with Tata CDMA	99.44%	98.06%
		Rewari									95.14%	99.00%	98.28%
		Sirsa									ICR with Tata CDMA	99.00%	98.87%
	(ii) 0-5 (with frequency hopping)	Bhiwani	ICR with Tata GSM	100%	93.17%	93.78%	95.34%	95.04%	96.50%	96%	NA		
		Rewari		100%	89.70%	95.12%	97%	96.31%	ICR with Tata GSM	96%			
		Sirsa	94%	100%	95.70%	95.15%	96%	ICR with Aircel	96.55%	96%			
1.4	Call Setup Success Rate (>=95%)	Bhiwani	ICR with Tata GSM	100%	100%	100%	98.60%	100%	100%	100%	ICR with Tata CDMA	100%	100%
		Rewari		100%	100%	100%	97.87%	100%	ICR with Tata GSM	100%	100%	97.96%	98%
		Sirsa	100%	100%	97.47%	100%	100%	ICR with Aircel	100%	100%	ICR with Tata CDMA	100%	100%

According to the Operator Assisted Drive Test Findings Under :

1. Percentage of connections with good Quality "0-5 (frequency Hooping) is not meeting by Idea (Bhiwani) & BSNL (Rewari & Bhiwani).
2. Drop call Rate is not meeting by BSNL in Rewari.

Operators having ICR with other operators are as:

1. Aircel is on ICR in Bhiwani & Rewari with Tata GSM.
2. Tata GSM is on ICR in Sirsa with Aircel.
3. Videocon is on ICR in Rewari with Tata GSM.
4. MTS is on ICR in Bhiwani & Sirsa with Tata CDMA.

Independent Drive Test

SN	Parameter	Videocon (Jind)	BSNL (Kurukshetra)	Sistema Shyam (Ambala)
		GSM Operators		CDMA Operators
1.1	Call Attempts	55	73	74
1.2	Blocked Call Rate (<=3%)	0.00%	1.37%	0.00%
1.3	Dropped Call Rate (<=2%)	0.00%	0.00%	0.00%
1.4	Percentage of connections with good voice quality (=>95%)			
	(i) 0-4 (w/o frequency hopping)	NA		95.00%
	(ii) 0-5 (with frequency hopping)	99.09%	**91.70%**	NA
1,5	Service Coverage			
	In door (>= -75dBm)	88.64	40.43	80.41
	In-vehicle (>= -85dBm)	99.66	59.56	98.52
	Outdoor- in city (>= -95dBm)	100	100	100
1.6	Call Setup Success Rate (>=95%)	100%	98.63%	100%

- The drive test data was found to be satisfactory for all the parameters except percentage of connections for good voice quality for BSNL
- Drive test was done for Videocon in JIND, BSNL in Kurukshetra and Sistema Shyam in Ambala.

(B) Basic Telephone Service (Wireline) Providers

- Not conducted for this quarter

(C) Broadband Service Providers

- Not conducted for this quarter

CHAPTER-3: Audit-PMR data verification results

PMR		Bench-mark	Audit	Aircel	Airtel	BSNL	Etisalat	Idea	Loop	Reliance	TATA	Videocon	V-Fone	MTS	Reliance	Tata
S/N	Name of Parameter			GSM Operators										CDMA Operators		
(A)	**Network Service Quality Parameter**															
1	**Network Availability**															
	BTS Accumulated Downtime	*<=2%*	Reported	0.90%	0.09%	1.38%	0.13%	0.15%	0.01%	0.00%	0.04%	0.16%	0.14%	0.12%	0.00%	0.02%
			Verified	0.90%	0.09%	1.38%	0.13%	0.15%	0.01%	0.00%	0.04%	0.16%	0.14%	0.12%	0.00%	0.02%
	Worst affected BTSs due to downtime	*<=2%*	Reported	0.40%	0.22%	1.95%	0.00%	0.03%	0.00%	0.00%	0.05%	0.30%	0.75%	0.03%	0.00%	0.00%
			Verified	0.40%	0.22%	1.95%	0.00%	0.03%	0.00%	0.00%	0.05%	0.30%	0.75%	0.03%	0.00%	0.00%
2	**Connection Establishment (Accessibility)**															
	CSSR (Call Setup Success Rate)	*>=95%*	Reported	98.0%	99.0%	96.0%	99.0%	100%	100%	100%	98%	98%	98%	99.0%	99.0%	100%
			Verified	98.0%	99.0%	96.0%	99.0%	100%	100%	100%	98%	98%	98%	99.0%	99.0%	100%
	SDCCH/PAGING congestion	*<=1%*	Reported	0.25%	0.13%	0.27%	0.04%	0.43%	0.17%	0.00%	0.02%	0.05%	0.00%	0.00%	0.00%	0.00%
			Verified	0.25%	0.13%	0.27%	0.04%	0.43%	0.17%	0.00%	0.02%	0.05%	0.00%	0.00%	0.00%	0.00%
	TCH congestion	*<=2%*	Reported	0.31%	0.23%	0.68%	0.00%	0.54%	0.00%	0.00%	0.50%	0.82%	0.01%	0.18%	0.00%	0.07%
			Verified	0.31%	0.23%	0.68%	0.00%	0.54%	0.00%	0.00%	0.50%	0.82%	0.01%	0.18%	0.00%	0.07%
3	**Connection maintenance (retainability)**															
	CDR	*<=2%*	Reported	1.15%	0.62%	1.91%	0.46%	0.80%	0.00%	0.00%	0.77%	0.74%	0.01%	0.62%	0.00%	0.28%
			Verified	1.15%	0.62%	1.91%	0.46%	0.80%	0.00%	0.00%	0.77%	0.74%	0.01%	0.62%	0.00%	0.28%
	Worst affected cells>3% TCH drop	*<=3%*	Reported	0.01%	0.01%	**4.63%**	**5.33%**	2.94%	0.00%	0.00%	1.69%	0.87%	0.02%	1.11%	0.01%	0.82%
			Verified	0.01%	0.01%	**4.63%**	**5.33%**	2.94%	0.00%	0.00%	1.69%	0.87%	0.02%	1.11%	0.01%	0.82%
	Good voice quality	*>=95%*	Reported	98.0%	100%	97.0%	98.0%	97.0%	100%	98.0%	97.0%	98.0%	97.0%	100.0%	99.0%	98.0%
			Verified	98.0%	100%	97.0%	98.0%	97.0%	100%	98.0%	97.0%	98.0%	97.0%	100.0%	99.0%	98.0%
4	**No. of POI having congestion >0.5%**	*<0.5%*	Reported	0	0	0	0	0	0	0	0	0	0	0	0	0
			Verified	0	0	0	0	0	0	0	0	0	0	0	0	0
(B)	**Customer Service Quality Parameters**															
5	**Metering/billing credibility-Post paid**	*<= 0.1%*	Reported	0.00%	0.00%	0.10%	0.00%	0.0%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
			Verified	0.00%	0.00%	0.10%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

6	**Metering /billing credibility-Pre paid**	*<= 0.1%*	Reported	0.09%	0.00%	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	0.00%	0.00%
			Verified	0.09%	0.00%	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	0.00%	0.00%
7	**Resolution of billing/ charging complaints**	*100% within 4 weeks*	Reported	100%	100%	100%	100%	100%	NR	100%	100%	100%	100%	100%	100%	100%
			Verified	100%	100%	100%	100%	100%	NR	100%	100%	100%	100%	100%	100%	100%
	Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	*<=1 week*	Reported	100%	100%	100%	0%	100%	0%	100%	100%	100%	100%	100%	100%	100%
			Verified	100%	100%	100%	0%	100%	0%	100%	100%	100%	100%	100%	100%	100%
8	**Response time to customers for assistance**															
	Accessibility of call centre/Customer Care	*>=95%*	Reported	100%	100%	100%	100%	99%	100%	100%	99%	98%	100%	97%	100%	96%
			Verified	100%	100%	100%	100%	99%	100%	100%	99%	98%	100%	97%	100%	96%
	% call answered by operators(voice to voice) within 60 sec.	*>=90%*	Reported	91%	**80%**	95%	100%	**82%**	100%	**82%**	**88%**	97%	95%	91%	92%	94%
			Verified	91%	**80%**	95%	100%	**82%**	100%	**82%**	**88%**	97%	95%	91%	92%	94%
9	**Termination/closure of service**															
	No. Of requests for Termination / Closure of service complied within 7 days during the quarter	*<=7days*	Reported	100%	100%	0%	0%	100%	0%	100%	100%	0%	100%	NA	100%	100%
			Verified	100%	100%	0%	0%	100%	0%	100%	100%	0%	100%	NA	100%	100%
10	**Time taken for refunds of deposits after closures.**	*100% within 60 days*	Reported	100%	100%	0%	0%	100%	0%	100%	100%	0%	100%	NA	100%	100%
			Verified	100%	100%	0%	0%	100%	0%	100%	100%	0%	100%	NA	100%	100%

NA: Not Applicable, NR: Not Received

- **No deviation found when compared to Operators reported data.**

II. Basic Telephone Service (Wireline) Providers

- Not conducted for this quarter

III. Broadband Service Providers

- Not conducted for this quarter

CHAPTER-4: DETAILED FINDINGS & ANALYSIS:

(A) MSC Audit

(I) 3 days live measurement data assessment & summarized findings:

S/N	Name of Parameter	Benchmark	Aircel	Airtel	BSNL	Etisalat	Idea	Loop	Reliance	TATA	Videocon	V-fone	MTS	Reliance	Tata
			GSM Operators										CDMA Operators		
A	**Network Service Quality Parameter**														
1	**Network Availability**														
	a) BTS Accumulated Downtime	<=2%	0.08%	0.02%	1.34%	0.00%	0.12%	0.00%	0.13%	0.02%	0.01%	0.06%	0.07%	0.18%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.00%	0.19%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	1) Total no. of BTSs in the licensed service area		166	2591	1564	21	2215	6	1301	1506	1235	2675	160	826	528
	2) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		9.99	44.37	1504.06	0	184.2	0	1321	18.88	4.99	112	7.5	851	5.42
	3) No. of BTSs having accumulated downtime of >24 hours in a month		0	0	3	0	0	0	0	0	0	0	0	0	0
	Connection Establishment (Accessibility)														
	c) CSSR	*>=95%*	97.90%	99.12%	97.61%	99.49%	99.44%	100%	99.77%	99.05%	98.62%	97.83%	99.98%	99.23%	100%
	d) SDCCH/PAGING congestion	*<=1%*	0.00%	0.18%	0.39%	0.00%	0.23%	0.00%	0.14%	0.01%	0.02%	0.24%	0.00%	0.00%	0.00%
	e) TCH congestion	*<=2%*	0.00%	0.21%	1.73%	0.00%	0.33%	0.00%	0.09%	0.35%	0.14%	1.46%	0.02%	0.41%	0.01%
2	**Connection maintenance**														
	a) CDR	*<=2%*	1.25%	0.71%	1.85%	1.17%	0.76%	0.00%	0.51%	0.60%	0.64%	0.89%	0.26%	0.77%	0.79%
	b) Cells having > 3% TCH drop	*<=3%*	**3.28%**	0.95%	**3.77%**	1.59%	2.50%	0.00%	0.16%	**4.52%**	1.25%	2.96%	1.42%	0.36%	**6.48%**
	c) Good voice quality	*>=95%*	98.16%	98.74%	NA	98.23%	96.50%	100%	99.33%	96.87%	98.39%	97.41%	100%	NA	NA

	d) No. of cells > 3% TCH drop		16	73	176	1	167	0	6	204	46	240	7	9	103
	e) Total no. of cells in the network		498	7,713	4,683	63	6,674	18	3,903	4,517	3,709	8,100	494	2,478	1,583
3	**No of POI having congestion>0.5%**	*<0.5%*	3	0	0	0	9	0	0	2	0	2	0	0	0
	a) Name of POI not meeting the benchmark		VSNL; BTSOL; BSNL	NIL	NIL	NIL	Cellone; Bsnl; Hutch; Ril; Idea; Airtel; Tata; Loop; Vsnl	NIL	NIL	TCL; Reliance;	NIL	Reliance; VSNL	NIL	NIL	NIL
	b) Total No. of circuits on POI		5,601	49,700	77,089	1,058	56,566	388	870	2,917	10,038	68,812	4,248	543,348	38,543
	c) Avg No. of call attempts on POI		250,535	21,751	17,772	2,449	1,381,649	1	1,426	47,216	111,302	1,605,208	33,153	597,488	529,820
	d) Avg traffic served on POI (Erlang)		5,973	48,148	857,607	74	34,877	0	0	954	3,540	32,648	773	22,946	15,050
	e) Total number of working POI Service Area wise		21	42	47	36	55	14	29	10	31	26	36	29	102
	f) Equipped Capacity of Network in respect of Traffic in erlang		6,097	86,124	126,464	517	89,243	133	50,000	89,980	45,514	126,435	12,600	56,000	143,705
	g) Total traffic handled in TCBH in erlang		732	55,292	67,466	18	82,983	0	43,229	27,222	10,471	119,387	642	28,448	45,103
(B)	**Customer Service Quality Parameters**														
4	**Response time to customers for assistance**														
	a) Accessibility of call centre	*>=95%*	65%	100%	100%	95.83%	99%	100%	98.92%	100%	100%	100%	99.88%	98%	100%
	b) % of call answered by operators(voice to voice) within 60 sec	*>=90%*	74.87%	99.80%	95.67%	100%	98.64%	100%	93.05%	97.66%	99.59%	98.99%	95.07%	92.94%	99.54%
	c) No. of call attempts to call centre / customer care nos. during TCBH (Avg)		20,111	74,985	32,425	18	105,052	0	28,112	60,536	16,214	15,009	345	14,524	15,486
	d) No. of calls connected and answered successfully to call centre / customer care nos. during TCBH (Avg)		15,057	74,832	31,020	18	103,624	0	26,158	59,118	16,148	14,858	328	13,499	15,414

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 <=2%):** All operators are meeting the benchmark with values lying between 0.00% and 0.14%.
2. **Worst affected BTSs due to downtime (benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0.00% and 0.00%.
3. **Call setup success rate (benchmark >= 95%):** All operators are meeting the benchmark with values lying between 97.61% and 100%.
4. **SDCCH/PAGING Channel congestion (benchmark <= 1%):** All operators are meeting the benchmark with values lying between 0.00% and 0.31%.
   Note: CDMA operators have provided the data for Paging Channel congestion and GSM Operators provided SDCCH Channel congestion.
5. **TCH congestion (benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0.00% and 1.73%.
6. **Call drop rate (benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0.0% and 1.85%.
7. **Cell exceeding 3% TCH drop (benchmark <= 3%):** Except for Aircel, BSNL, Tata GSM & Tata CDMA with a value of 3.28%, 3.77%, 4.52% & 6.49% respectively, rest of the operators are satisfying the benchmark with value in between 0.0% and 2.96%.
8. **Connections with good voice quality (benchmark >= 95%):** All operators are meeting the benchmark with values lying between 96.50% and 100%.
   Note: *BSNL, Reliance CDMA and Tata CDMA data is not system generated.*
9. **No. of POI having Congestion >0.5%:** Most of the operators found no congestion overall on the POI. However in few cases, Aircel, Idea, Tata GSM & Vodafone were found to have POIs with >0.5% congestion with nos.3, 9, 2, 2 respectively. 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):** Except for Aircel with a value of 65% rest of the operators are meeting the benchmark with values lying between 95.83% to 100%.
11. **%age of call answered by operator (Voice to voice) (benchmark >90%):** Except for Aircel with a value of 74.87% rest of the operators meeting the benchmark with values lying between 92.94% to 100%.

One Month audit data report & summarized findings:

S/N	Name of Parameter	Bench mark	Aircel	Airtel	BSNL	Etisalat	Idea	Loop	Reliance	TATA	Videocon	V-fone	MTS	Reliance	Tata
			GSM Operators										CDMA Operators		
(A)	**Network Service Quality Parameter**														
1	**Network Availability**														
	a) BTS Accumulated Downtime	*<=2%*	0.05%	0.04%	1.34%	0.00%	0.13%	0.00%	0.14%	0.02%	0.03%	0.13%	0.08%	0.14%	0.03%
	b) Worst affected BTSs due to downtime	*<=2%*	0.00%	0.12%	1.98%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.90%	0.00%	0.00%	0.00%
	c) Total no. of BTSs in the licensed service area		166	2,591	1,564	21	2,215	6	1,301	1,506	1,235	2,675	160	826	528
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		64	785	15,542	0	2,182	0	1,321	204	259	2,586	95	851	119
	e) No. of BTSs having accumulated downtime of >24 hours in a month		0	3	31	0	0	0	0	0	0	24	0	0	0
2	**Connection Establishment (Accessibility)**														
	a) CSSR (Call Setup Success Rate)	*>=95%*	98.22%	99.15%	98%	99.58%	99.15%	100%	99.80%	98.97%	98.27%	98.66%	99.98%	99.30%	100%
	b) SDCCH/PAGING congestion	*<=1%*	0.00%	0.17%	0.45%	0.02%	0.45%	0.02%	0.06%	0.01%	0.03%	0.24%	0.00%	0.00%	0.00%
	c) TCH congestion	*<=2%*	0.00%	0.22%	1.66%	0.01%	0.40%	0.00%	0.06%	0.30%	0.20%	0.74%	0.02%	0.24%	0.15%
3	**Connection maintenance (Retainability)**														
	a) CDR	*<=2%*	1.05%	0.71%	1.84%	0.88%	0.88%	0.00%	0.51%	0.65%	0.72%	0.87%	0.22%	0.83%	0.78%
	b) Worst affected cells>3% TCH drop	*<=3%*	2.74%	0.92%	**4.23%**	1.59%	2.98%	0.00%	0.21%	**5.38%**	1.51%	2.98%	0.89%	0.37%	**7.19%**
	c) Good voice quality	*>=95%*	98.24%	98.73%	NA	98.41%	96.23%	99.27%	99.27%	96.89%	98.40%	97.39%	100%	NA	NA
	d) Total No. of cells exceeding 3% TCH drop (call drop)		14	71	198	1	199	0	8	243	56	241	4	9	114
	e) Total no. of cells in the network		498	7,713	4,683	63	6,674	18	3,903	4,517	3,709	8,100	494	2,478	1,583
4	**No of POI having congestion>0.5%**	*<0.5%*	3	0	0	0	9	0	0	2	0	2	0	2	0
	a) Name of POI not meeting the benchmark		VSNL; BTSOL; BSNL	NIL	NIL	NIL	Cellone; Bsnl; Hutch; Ril; Idea; Airtel; Tata; Loop; Vsnl	NIL	NIL	TCL; Reliance;	NIL	Reliance; VSNL	NIL	Airtel; Idea	NIL

	b) Total No. of call attempts on POI (Avg.)		2662633	785,158	888,981	2,458	1,905,171	7	13,566	48,722	99,719	1,602,442	34,616	5727069	576,023
	c) Total traffic served on POI (Erlang) (Avg.)		63,125	23,892	18,741	79	37,264	0	1	974	3,611	32,277	760	219,726	16,655
	d) Total No. of circuits on POI		5,601	49,700	77,089	1,058	56,566	388	870	2,917	10,038	68,812	4,248	543,348	38,543
	e) Total number of working POI Service Area wise		21	42	47	36	55	14	29	10	31	26	36	29	102
	f) Capacity of POI		6,088	48,144	77,151	731	55,371	228	511	2,668	9,380	68,529	7,624	502,484	35,856
5	**Network Data**														
	a) Equipped Capacity of Network Erlang		6,097	86,124	126,464	517	89,091	133	50,000	89,980	45,514	126,435	12,600	56,000	143,705
	b) Total traffic handled in TCBH in erlang		720	56,288	67,466	21	81,396	0	43,569	28,286	11,003	118,290	705	28,671	45,742
	c) Total no. of customers served (as per VLR) on last day of the month		180,315	2,058,012	1,461,753	1,615	3,094,750	14	1,601,651	1,142,925	293759	3,902,227	55,755	656,470	485,405
(B)	**Customer Service Quality Parameters**														
6	**Metering/billing credibility-Post paid**	*<= 0.1%*	0.03%	0.06%	0.00%	NA	0.06%	NA	0.10%	**0.62%**	NA	0.01%	0.00%	0.09%	**0.32%**
	a) No. of bills issued during the period		3,190	62,675	22,416	0	64,330	0	9,447	16,377	0	158,154	16	61,372	67,669
	b) No. of bills disputed including billing complaints during the period		1	35	0	0	41	0	9	101	0	17	0	53	218
7	**Metering /billing credibility-Pre paid**	*<= 0.1%*	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.03%	0.01%	0.03%	0.04%	0.04%	0.04%
	a) No. of charging / credit / validity complaints during the quarter		184	31	0	0	106	0	962	473	72	1,247	88	376	503
	b) Total no. of pre-paid customers at the end of the quarter		535,000	2795408	2893605	12,065	3,579,715	90	3080740	1,874,076	809124	4,273,926	234,391	1050499	1,395,533
8	**Resolution of billing/ charging complaints**	*100% within 4 weeks*	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	a) No. of billing/(post paid) and charging, credit/validity (pre paid) complaints resolved within 4 weeks during the quarter		185	5,201	0	0	549	0	971	574	72	1,264	106	429	721
	b) Total no. of billing (post paid) and charging, credit / validity (pre paid) complaints received during the quarter		185	5,201	0	0	549	0	971	574	72	1,264	106	429	721
	c) No. of billing complaints		98	66	0	0	147	0	412	1	72	1,048	104	162	2

	(post paid) and charging, credit/ validity complaints (pre paid) resolved in favour of the customer during the quarter														
	d) No. of complaints disposed on account of not considered as valid complaints during the quarter		87	5,135	0	0	402	0	559	573	0	216	2	267	719
	e) Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	*<=1 week*	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
9	**Response time to customers for assistance**														
	a) Accessibility of call centre/Customer Care	*>=95%*	100.00%	99.00%	100.00%	99.37%	99.32%	100%	98.95%	100.00%	100%	100.00%	96.26%	99.00%	100.00%
	b) % call answered by operators(voice to voice) within 60 sec.	*>=90%*	93.37%	96.72%	96.28%	99.29%	99.00%	100%	93.92%	99.28%	97.38%	95.00%	94.87%	88.32%	96.47%
	c) Total no. of call attempts to call centre & customer care nos. during TCBH (Avg.).		205,504	811,434	364,030	423	1,192,144	1	313,152	245,841	21,735	149,044	7,647	165,953	71,935
	d) No. of calls connected and answered successfully to call centre & customer care nos. during TCBH (Avg.).		191,875	784,787	350,473	420	1,180,240	1	294,128	244,075	21,165	141,591	7,255	146,566	69,395
10	**Termination/closure of service**	*<=7days*	100%	100%	100%	NA	100%	100%	100%	100%	100%	100%	100%	100%	100%
	a) Total No. of requests for Termination / Closure of service received during the quarter		1	737	752	0	449	0	47	208	0	161	0	141	1958
	b) No.of requests for Termination / Closure of service complied within 7 days during the quarter		1	737	752	0	449	0	47	208	0	161	0	141	1958
11	**Time taken for refunds of deposits after closures.**	*100% within 60 days*	100%	100%	100%	0%	100%	NA	100%	100%	100%	100%	100%	100%	100%
NA: Not Applicable, NR: Not Received															

Parameter-wise Findings (Month Data Assessment):

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

- **BTS accumulated downtime (benchmark <=2%):** All operators are meeting the benchmark with values lying between 0.0% and 1.34%.
- **Worst affected BTSs due to downtime (benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0.0% and 1.98%.
- **Call setup success rate (benchmark >= 95%):** All operators are meeting the benchmark with values lying between 98.00% and 99.98%.
- **SDCCH/PAGING Channel congestion (benchmark <= 1%):** All operators are meeting the benchmark with values lying between 0.00% and 0.45%.
  Note: CDMA operators have provided the data for Paging Channel congestion and GSM operators provided SDCCH Channel congestion.
- **TCH congestion (benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0.0% and 1.66%.
- **Call drop rate (benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0.00% and 1.84%.
- **Cell exceeding 3% TCH drop (benchmark <= 3%):** Except for BSNL, Tata GSM & Tata CDMA with a value of 4.02%, 5.38% & 7.19% rest all the operators are satisfying the benchmark with value in between 0.00% and 2.98%.
- **Connections with good voice quality (benchmark >= 95%):** All operators are meeting the benchmark with values lying between 96.23% and 100%.
  Note: *BSNL, Reliance CDMA and Tata CDMA data is not system generated.*
- **No. of POI having Congestion >0.5%:** Most of the operators found no congestion overall on the POI. However in few cases, Aircel, Idea, Tata GSM, Vodafone & Reliance CDMA were found to have POIs with >0.5% congestion with nos. 3, 9, 2, 2 respectively. 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): A**ll operators are meeting the benchmark with values lying between 96.26% and 100%.
- **%age of call answered by operator (Voice to voice) (benchmark >90%):** Except Reliance CDMA with value of 88.32% rest all the operators are meeting the bench mark with values lying between 88.32% to 100%.
- **Metering and billing credibility-Post paid (benchmark <= 0.1%):** Except Tata GSM & Tata CDMA with values of (0.62% & 0.32%) rest all other operators are meeting the benchmark with values lying between 0.00% to 0.9%.
- **Metering and billing credibility-Pre paid (benchmark <= 0.1%):** All the operators are meeting the benchmark with values lying between 0% and 0.04%.
- **Resolution of billing/ charging complaints (benchmark 100% within 4 weeks):** All operators are meeting the benchmark.
- **Termination/Closure of service (Benchmark <= 7 days):** All operators have satisfied the benchmark.
- **Time taken for refunds of deposits after closures (benchmark 100% within <=60 days):** All operators have satisfied the benchmark.

(3). Sample Coverage

Switches/BSC/BTS details of operators:

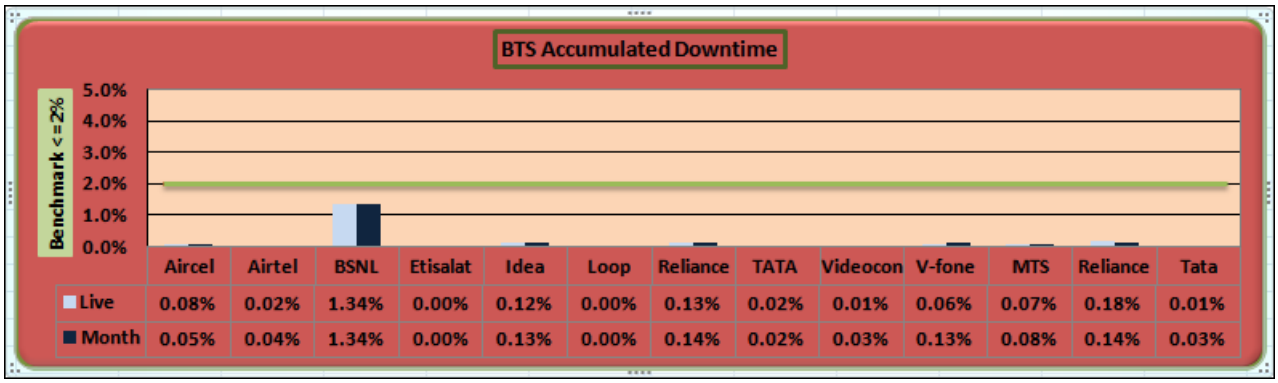
Sl.	Name of Service Provider	No. of MSC/GMSC	No. of BSC	No. of BTS
GSM Operators				
1	Aircel Ltd	2	2	166
2	Airtel Ltd	7	23	2591
3	BSNL	7	24	1564
4	Etisalat	1	1	21
5	Idea	6	26	2215
6	Reliance Communication	1	8	1301
7	Tata Communications	2	12	1506
8	Loop	1	1	6
9	Videocon	1	8	1235
10	Vodafone	13	48	2675
CDMA Operators				
11	MTS	1	1	154
12	Reliance Communication	3	-	826
13	Tata Communications	5	10	528

(4) Performance (Graphical Representation)

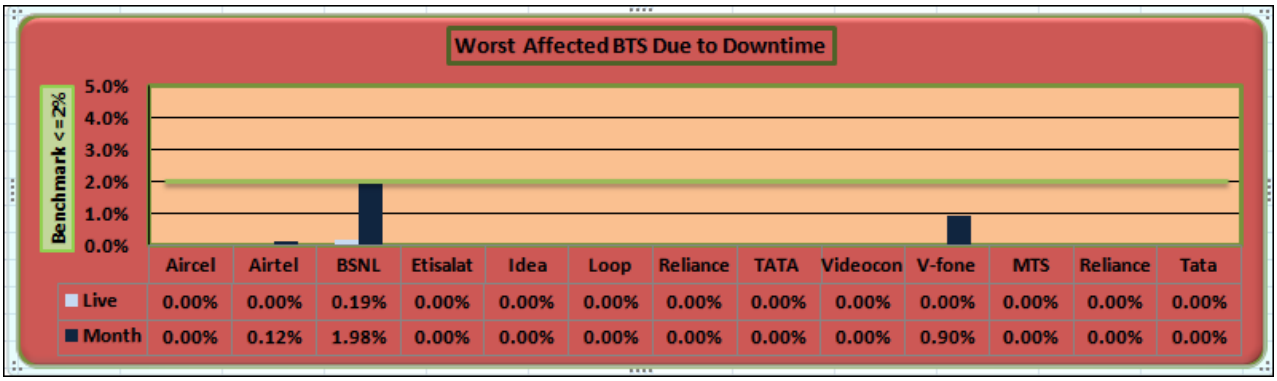
Comparison between Live measurements and One month data Audit – Cellular Mobile Telephone Services

NETWORK PERFORMANCE:

BTS accumulated downtime: All operators are meeting the TRAI benchmarks (>= 2%) for both one month data and 3 days live data taken in the month of audit.

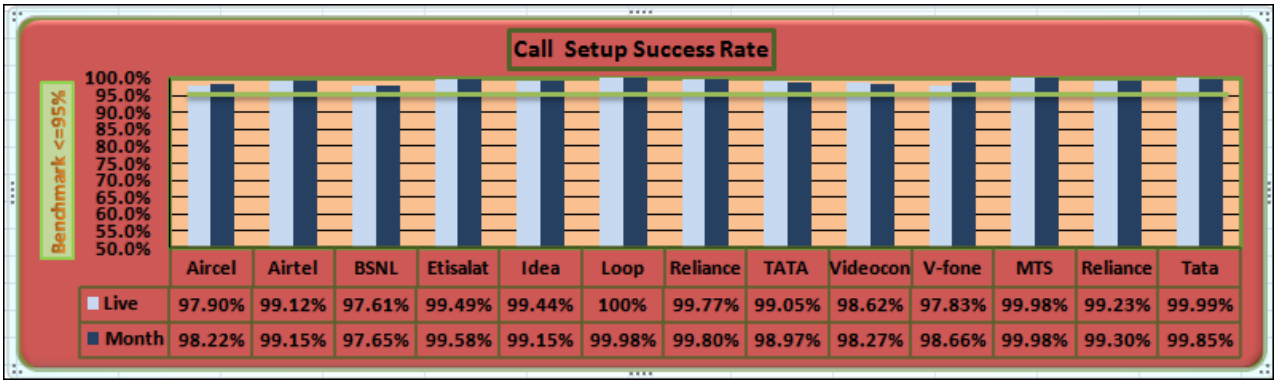


Worst affected BTSs due to downtime: All operators are meeting the TRAI benchmarks (>= 2%) for both one month data and 3 days live data taken in the month of audit.



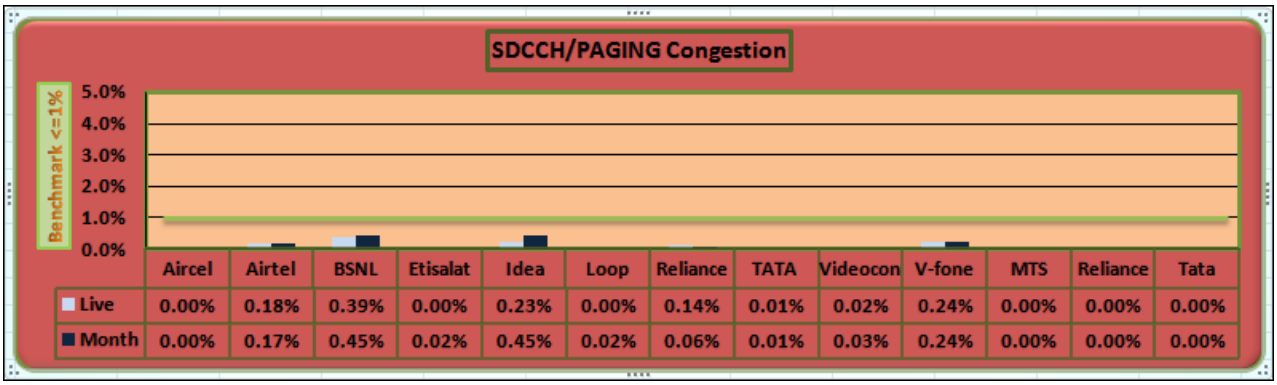
	Aircel	Airtel	BSNL	Etisalat	Idea	Loop	Reliance	TATA	Videocon	V-fone	MTS	Reliance	Tata
Live	0.00%	0.00%	0.19%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Month	0.00%	0.12%	1.98%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.90%	0.00%	0.00%	0.00%

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



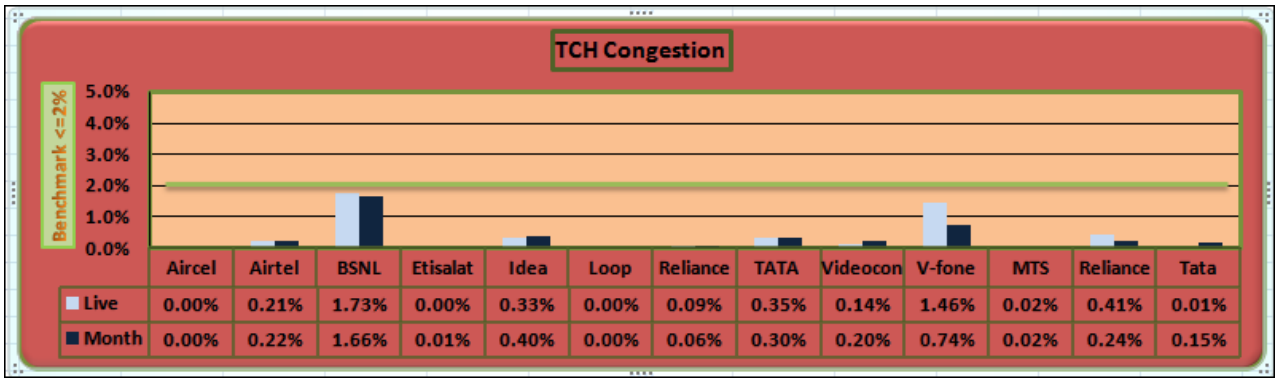
	Aircel	Airtel	BSNL	Etisalat	Idea	Loop	Reliance	TATA	Videocon	V-fone	MTS	Reliance	Tata
Live	97.90%	99.12%	97.61%	99.49%	99.44%	100%	99.77%	99.05%	98.62%	97.83%	99.98%	99.23%	99.99%
Month	98.22%	99.15%	97.65%	99.58%	99.15%	99.98%	99.80%	98.97%	98.27%	98.66%	99.98%	99.30%	99.85%

SDCCH/Paging congestion (%): All operators are meeting the TRAI benchmarks (<= 1 %) for both one month data and 3 days live data taken in the month of audit.



	Aircel	Airtel	BSNL	Etisalat	Idea	Loop	Reliance	TATA	Videocon	V-fone	MTS	Reliance	Tata
Live	0.00%	0.18%	0.39%	0.00%	0.23%	0.00%	0.14%	0.01%	0.02%	0.24%	0.00%	0.00%	0.00%
Month	0.00%	0.17%	0.45%	0.02%	0.45%	0.02%	0.06%	0.01%	0.03%	0.24%	0.00%	0.00%	0.00%

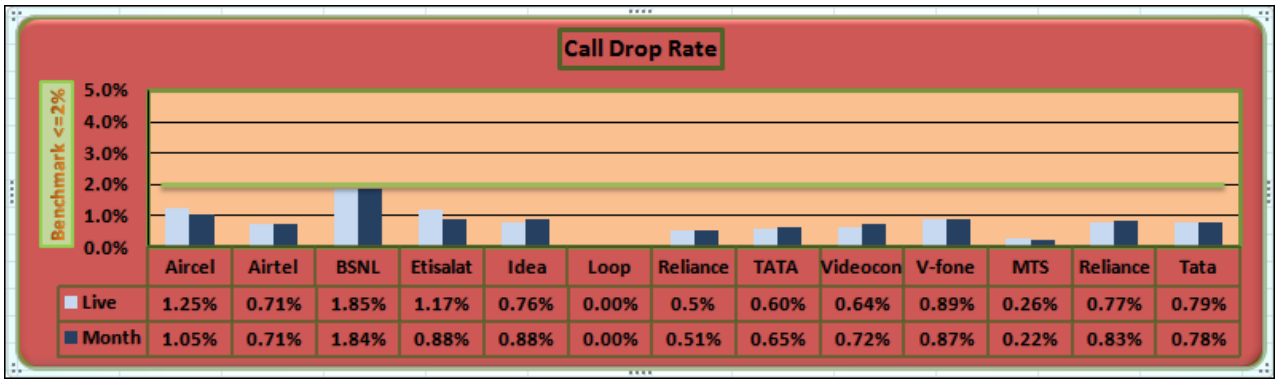
TCH congestion (%): All operators are meeting the TRAI benchmarks (<= 2%) for both one month data and 3 days live data taken in the month of audit.



	Aircel	Airtel	BSNL	Etisalat	Idea	Loop	Reliance	TATA	Videocon	V-fone	MTS	Reliance	Tata
Live	0.00%	0.21%	1.73%	0.00%	0.33%	0.00%	0.09%	0.35%	0.14%	1.46%	0.02%	0.41%	0.01%
Month	0.00%	0.22%	1.66%	0.01%	0.40%	0.00%	0.06%	0.30%	0.20%	0.74%	0.02%	0.24%	0.15%

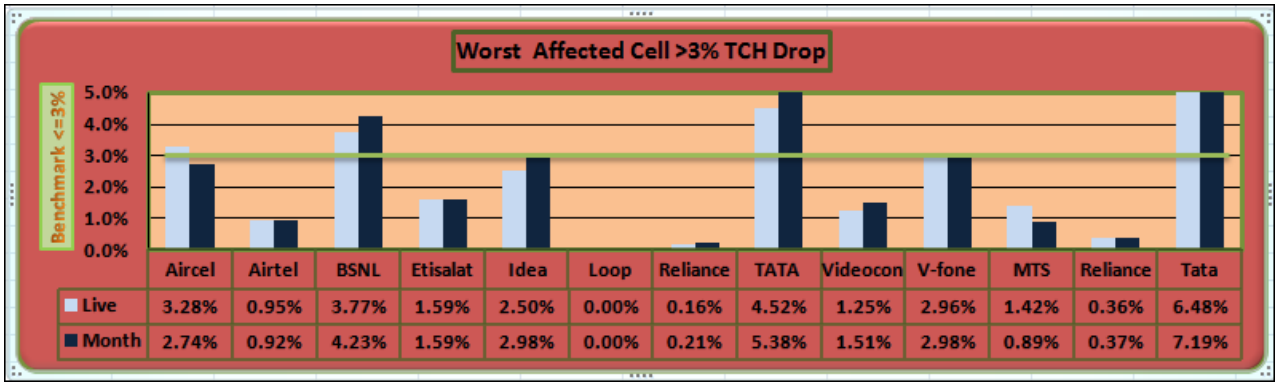
Connection Maintainability (Retainability):

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



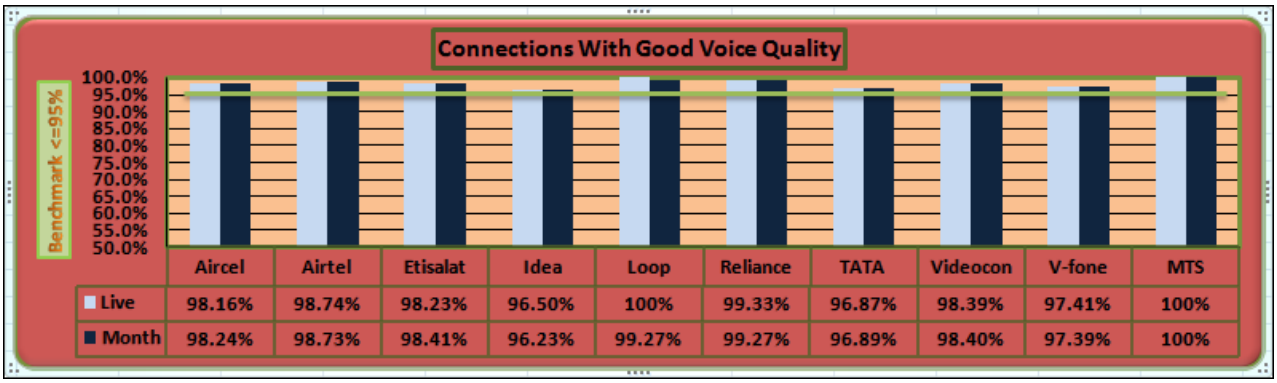
	Aircel	Airtel	BSNL	Etisalat	Idea	Loop	Reliance	TATA	Videocon	V-fone	MTS	Reliance	Tata
Live	1.25%	0.71%	1.85%	1.17%	0.76%	0.00%	0.5%	0.60%	0.64%	0.89%	0.26%	0.77%	0.79%
Month	1.05%	0.71%	1.84%	0.88%	0.88%	0.00%	0.51%	0.65%	0.72%	0.87%	0.22%	0.83%	0.78%

Worst affected Cell exceeding 3% TCH Drop: For both live and month data BSNL, Tata GSM & Tata CDMA with a value of 3.77%, 4.23%; 4.52%, 5.38%; & 6.49%,7.19% respectively and Aircel(3.28%) for Live Only found not meeting the benchmark of <=3%. Rest of the operators is meeting the benchmark for both cases.



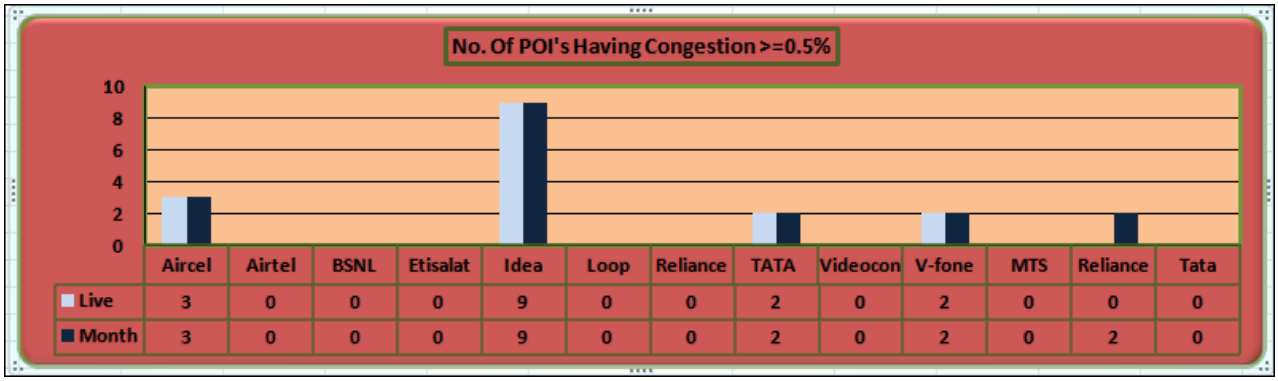
	Aircel	Airtel	BSNL	Etisalat	Idea	Loop	Reliance	TATA	Videocon	V-fone	MTS	Reliance	Tata
Live	3.28%	0.95%	3.77%	1.59%	2.50%	0.00%	0.16%	4.52%	1.25%	2.96%	1.42%	0.36%	6.48%
Month	2.74%	0.92%	4.23%	1.59%	2.98%	0.00%	0.21%	5.38%	1.51%	2.98%	0.89%	0.37%	7.19%

Percentage of connections with good voice quality (benchmark >= 95%): All operators are meeting the TRAI benchmarks (=> 95%) for both one month data and 3 days live data taken in the month of audit. BSNL Reliance CDMA and Tata CDMA not reported Parameter named "Good Voice Quality" as data is not fetched by their systems.



	Aircel	Airtel	Etisalat	Idea	Loop	Reliance	TATA	Videocon	V-fone	MTS
Live	98.16%	98.74%	98.23%	96.50%	100%	99.33%	96.87%	98.39%	97.41%	100%
Month	98.24%	98.73%	98.41%	96.23%	99.27%	99.27%	96.89%	98.40%	97.39%	100%

No. of POI having Congestion >=0.5%: For both Live and month Aircel, Idea ,Tata GSM, Vodafone, and Reliance CDMA for month only were found to have POIs with >=0.5% congestion. All the operators are meeting the benchmark. 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.

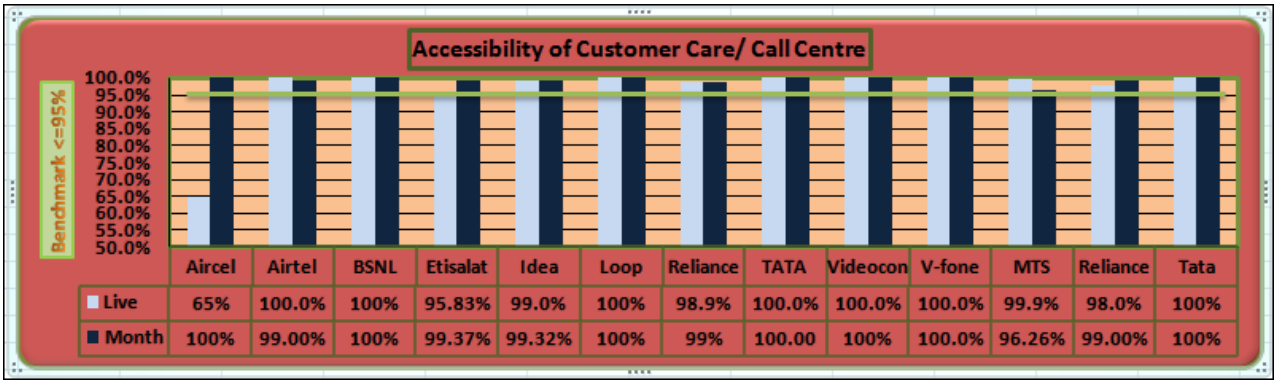


	Aircel	Airtel	BSNL	Etisalat	Idea	Loop	Reliance	TATA	Videocon	V-fone	MTS	Reliance	Tata
Live	3	0	0	0	9	0	0	2	0	2	0	0	0
Month	3	0	0	0	9	0	0	2	0	2	0	2	0

CUSTOMER SERVICE QUALITY PARAMETERS

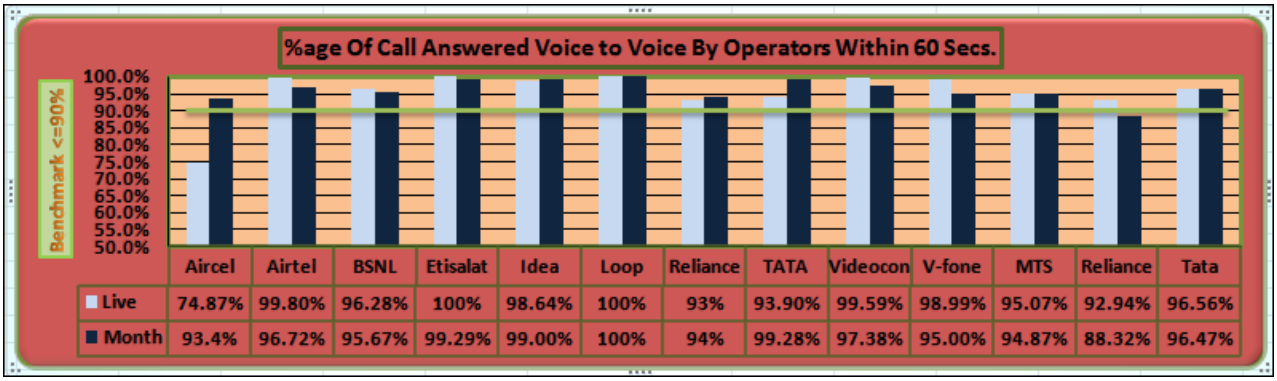
Response time to the customer for assistance:

Percentage of call answered (Electronically) (benchmark >= 95%): Except Aircel for Live data not meeting benchmark, rest all operators are meeting the TRAI benchmarks (>= 95%) for both one month data and 3 days live data.



	Aircel	Airtel	BSNL	Etisalat	Idea	Loop	Reliance	TATA	Videocon	V-fone	MTS	Reliance	Tata
Live	65%	100.0%	100%	95.83%	99.0%	100%	98.9%	100.0%	100.0%	100.0%	99.9%	98.0%	100%
Month	100%	99.00%	100%	99.37%	99.32%	100%	99%	100.00	100%	100.0%	96.26%	99.00%	100%

Percentage of call answered by operators (Voice to voice) within 60 sec (benchmark >= 90%): Except Aircel for Live data and R-GSM for month data found not meeting the benchmark, Rest all the operators meeting the benchmark.



	Aircel	Airtel	BSNL	Etisalat	Idea	Loop	Reliance	TATA	Videocon	V-fone	MTS	Reliance	Tata
Live	74.87%	99.80%	96.28%	100%	98.64%	100%	93%	93.90%	99.59%	98.99%	95.07%	92.94%	96.56%
Month	93.4%	96.72%	95.67%	99.29%	99.00%	100%	94%	99.28%	97.38%	95.00%	94.87%	88.32%	96.47%

(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 following parameters
Worst affected cells >3% TCH drop, are not meeting the benchmark by Aircel, BSNL, Tata-GSM, & Tata CDMA.
Under Response time to the customer for assistance: "Percentage of call answered (Electronically)" Aircel is not meeting benchmark.
For Percentage of call answered by operators (Voice to voice) within 60 sec" Aircel for Live data and Reliance CDMA for month data are not meeting benchmark.

(B). Redressal

(1) Sample coverage:

As given below 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 based on (live calling for billing complaints):

Calling Operator	Aircel	Airtel	Idea	RCOM GSM	Tata GSM	VIDEOCON	Vodafone	MTS	RCOM CDMA	Tata CDMA
Total No. of Calls Attempted	20	10	15	100	60	10	100	12	50	75
Total No. of calls Answered	20	7	15	97	58	8	100	9	43	73
Cases resolved with 4 weeks	20	7	15	97	58	8	100	9	43	73
%age of cases resolved	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

(3) Live Calling to Call Centre

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	100	100	100	100	100	100	100	100	100	100	100	100	100
Calls got connected to agent within 60 Sec	98	99	93	99	92	90	97	96	99	99	96	93	98
%age of calls got answered	98%	99%	93%	99%	92%	90%	97%	96%	99%	99%	96%	93%	98%

(4) Level-1 Calling

Places from where calling was done: Sirsa, Bhiwani and Rewari.

Emergency no.	Called to	No. of calls attempted	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	LOOP	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA
100	Police	2	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	2
102	Ambulance	2	2	2	2	2	2	2	2	2	2	2	2	2	2
139	Railway	4	4	4	4	4	4	4	4	4	4	4	4	4	4

(5) Critical Analysis

Random numbers were selected from the operators' database of billing/metering complaints and calls were made to the customers to get their feedback for complaint Redressal.
It was found that the operators had made refunds in 100% cases as claimed by their records. Good results were found for all the operators during live calling to their respective call centers.

Similar results were found in case of Level-1 calling for emergency Numbers 100, 101, 102 & 139 from various locations like Sirsa, Bhiwani and Rewari.

(C) 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)
Aircel	-	100%	100%	100%	100%	97%	100%	100%	97%	100%	100%	100%	98%
Airtel	98%	-	97%	99%	100%	96%	98%	98%	100%	99%	98%	100%	100%
BSNL	96%	100%	-	100%	97%	99%	97%	100%	96%	96%	98%	97%	97%
Etisalat	100%	100%	100%	-	100%	100%	100%	98%	100%	100%	100%	100%	100%
Idea	100%	99%	100%	100%	-	98%	100%	100%	98%	97%	99%	99%	99%
Reliance (GSM)	98%	100%	98%	96%	96%	-	95%	97%	99%	100%	99%	100%	100%
Tata (GSM)	100%	100%	100%	100%	100%	100%	-	100%	100%	98%	100%	97%	100%
Loop	100%	100%	100%	100%	100%	100%	100%	-	100%	100%	100%	100%	97%
Videocon	100%	99%	100%	100%	100%	100%	100%	100%	-	100%	100%	98%	100%
Vodafone	99%	100%	98%	100%	98%	98%	99%	96%	99%	-	97%	99%	97%
MTS	100%	100%	100%	98%	100%	100%	100%	100%	99%	99%	-	100%	100%
Reliance (CDMA)	100%	98%	100%	100%	100%	100%	98%	98%	100%	100%	100%	-	98%
Tata (CDMA)	100%	100%	98%	100%	98%	98%	100%	100%	99%	97%	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) Operator Assisted 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 65-90 Kms depending on city areas within the speed limit of 20-30Km/hr.

Drive Test Locations

Bhiwani:

LOW DENSE: Auto market, Haluwas, Residensial area, Charkhi dadri road

MEDIUM DENSE: City Center, Indira colony, Sec-13, Housing Board

HIGH DENSE: Naya market, Rohtak Gate, Temple, Residensial area, hansi gate, and Haluwas gate

Rewari:

LOW DENSE: Stadium, College, Residensial area, hudda club
MEDIUM DENSE: School, Hospital, Residential area, community hall
HIGH DENSE: Brass market, Model town, District court, Kanti bazar, Residensial area

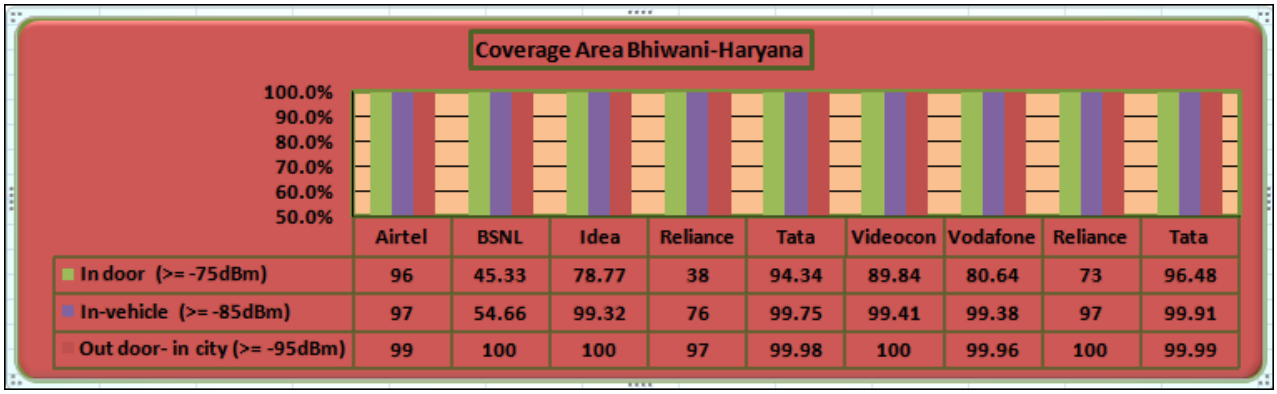
Sirsa:

LOW DENSE: NH-10, Airport, Railways
MEDIUM DENSE: Bharti School, Railways, Residential Area
HIGH DENSE: College, Temple, Anajmandi, Mills, and Residential-Area

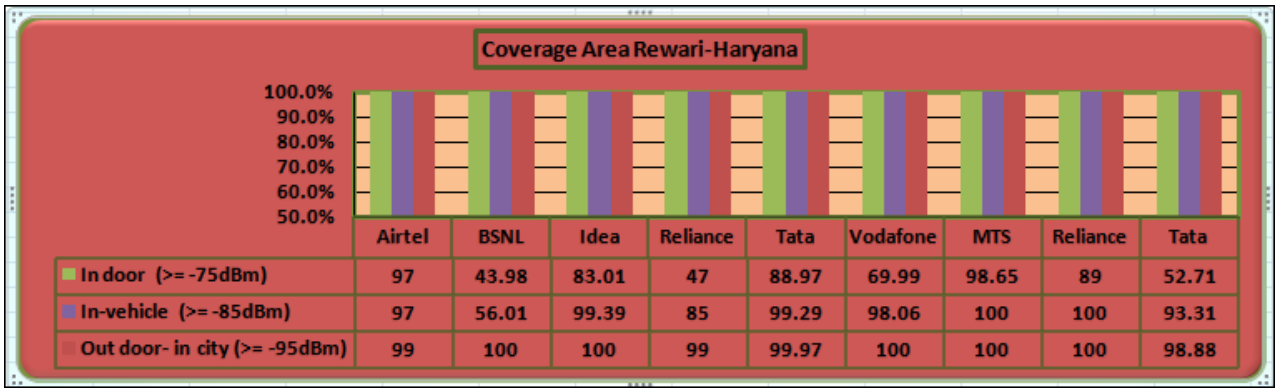
2) Performance for Operator Assisted Drive Test (for Haryana Circle):

SN	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Reliance	Tata	Videocon	Vodafone	MTS	Reliance	Tata
			GSM Operators								CDMA Operators		
1.1	Call Attempts	Bhiwani	ICR with Tata GSM	45	30	47	72	54	44	52	ICR with Tata CDMA	72	56
		Rewari		41	41	45	47	47	ICR with Tata GSM	56	48	49	50
		Sirsa	46	46	79	44	73	ICR with Aircel	53	53	ICR with Tata CDMA	73	54
1.2	Blocked Call Rate (<=3%)	Bhiwani	ICR with Tata GSM	0.0%	0.00%	0.0%	1.4%	0.0%	0.0%	0.0%	ICR with Tata CDMA	0.0%	0.0%
		Rewari		0.0%	0.00%	0.0%	2.13%	0.0%	ICR with Tata GSM	0.0%	0.0%	2.04%	2%
		Sirsa	0.0%	0.0%	2.53%	0.0%	0.0%	ICR with Aircel	0.0%	0.0%	ICR with Tata CDMA	0.0%	0.0%
1.3	Dropped Call Rate (<=2%)	Bhiwani	ICR with Tata GSM	0.0%	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	ICR with Tata CDMA	0.0%	1.80%
		Rewari		0.0%	**2.44%**	0.0%	0.0%	0.0%	ICR with Tata GSM	0.0%	0.0%	0.0%	0.0%
		Sirsa	0.0%	0.0%	0.00%	0.0%	0.0%	ICR with Aircel	0.0%	0.0%	ICR with Tata CDMA	0.0%	1.88%
	Percentage of connections with good voice quality (=>95%)												
	(i) 0-4 (w/o frequency hopping)	Bhiwani	NA								ICR with Tata CDMA	99.44%	98.06%
		Rewari									95.14%	99%	98.28%
		Sirsa									ICR with Tata CDMA	99%	98.87%
1.4	(ii) 0-5 (with frequency hopping)	Bhiwani	ICR with Tata GSM	100%	**93.17%**	**93.78%**	95.34%	95.04%	96.50%	96%	NA		
		Rewari		100%	**89.70%**	95.12%	97%	96.31%	ICR with Tata GSM	96%			
		Sirsa	94%	100%	95.70%	95.15%	96%	ICR with Aircel	96.55%	96%			
	Service Coverage												
	In door (>= -75dBm)	Bhiwani	ICR with Tata GSM	96	45.33	78.77	38	94.34	89.84	80.6	ICR with Tata CDMA	73	96.48
		Rewari		97	43.98	83.01	47	88.97	ICR with Tata GSM	70	98.65	89	52.71
		Sirsa	59.7	98	37.08	58.12	63	ICR with Aircel	83.12	86.2	ICR with Tata CDMA	73	99.62
	In-vehicle (>= -85dBm)	Bhiwani	ICR with Tata GSM	97	54.66	99.32	76	99.75	99.41	99.4	ICR with Tata CDMA	97	99.91
		Rewari		97	56.01	99.39	85	99.29	ICR with Tata GSM	98.1	100	100	93.31
		Sirsa	93.4	98	62.91	93.7	95	ICR with Aircel	97.66	99.5	ICR with Tata CDMA	100	100
1,5	Out door- in city (>= -95dBm)	Bhiwani	ICR with Tata GSM	99	100	100	97	99.98	100	100	ICR with Tata CDMA	100	99.99
		Rewari		99	100	100	99	99.97	ICR with Tata GSM	100	100	100	98.88
		Sirsa	99.6	99	100	100	100	ICR with Aircel	99.5	100	ICR with Tata CDMA	100	100
1.6	Call Setup Success Rate (>=95%)	Bhiwani	ICR with Tata GSM	100%	100%	100%	98.6%	100%	100%	100%	ICR with Tata CDMA	100%	100%
		Rewari		100%	100%	100%	98%	100%	ICR with Tata GSM	100%	100%	98%	98%
		Sirsa	100%	100%	97%	100%	100%	ICR with Aircel	100%	100%	ICR with Tata CDMA	100%	100%

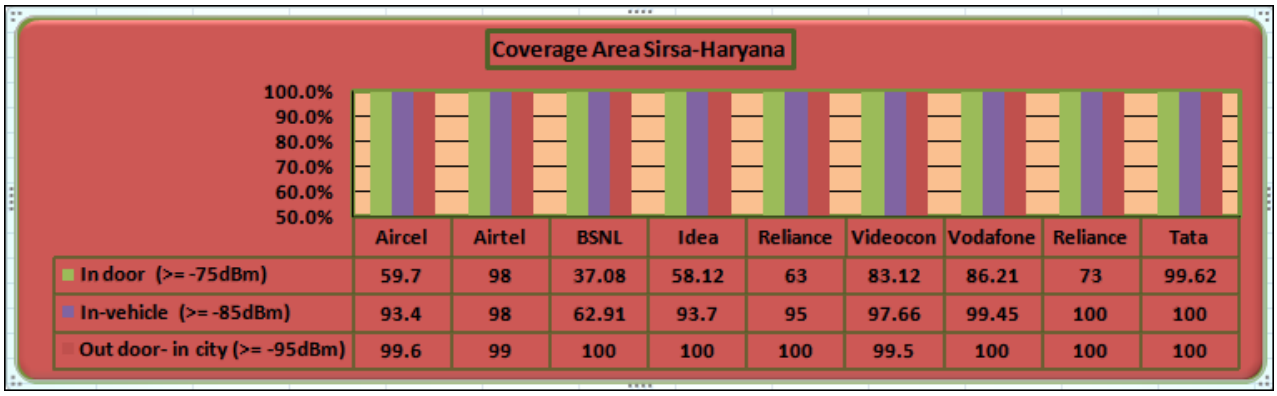
Graphical Representation



	Airtel	BSNL	Idea	Reliance	Tata	Videocon	Vodafone	Reliance	Tata
In door (>= -75dBm)	96	45.33	78.77	38	94.34	89.84	80.64	73	96.48
In-vehicle (>= -85dBm)	97	54.66	99.32	76	99.75	99.41	99.38	97	99.91
Out door- in city (>= -95dBm)	99	100	100	97	99.98	100	99.96	100	99.99



	Airtel	BSNL	Idea	Reliance	Tata	Vodafone	MTS	Reliance	Tata
In door (>= -75dBm)	97	43.98	83.01	47	88.97	69.99	98.65	89	52.71
In-vehicle (>= -85dBm)	97	56.01	99.39	85	99.29	98.06	100	100	93.31
Out door- in city (>= -95dBm)	99	100	100	99	99.97	100	100	100	98.88



	Aircel	Airtel	BSNL	Idea	Reliance	Videocon	Vodafone	Reliance	Tata
In door (>= -75dBm)	59.7	98	37.08	58.12	63	83.12	86.21	73	99.62
In-vehicle (>= -85dBm)	93.4	98	62.91	93.7	95	97.66	99.45	100	100
Out door- in city (>= -95dBm)	99.6	99	100	100	100	99.5	100	100	100

(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:

- In Bhiwani, Idea was found not meeting benchmark for the parameter "Percentage of connections with good voice quality "0-5 with frequency hopping".
- In Rewari, BSNL was found not meeting benchmark for the parameter "Drop call Rate", and Percentage of connections with good voice quality in Bhiwani & Rewari.
- Operators having ICR with other operators are as: Aircel is on ICR in Bhiwani & Rewari with Tata GSM, Tata GSM is on ICR in Sirsa with Aircel, Videocon is on ICR in Rewari with Tata GSM and MTS is on ICR in Bhiwani & Sirsa with Tata CDMA.

(E). Independent Drive test of the mobile network of service providers

(1). Sample Coverage

The Independent Drive Test was conducted at Haryana for the selected operators as per the TRAI Guidelines. Route covered was about around 50-75 Kms depending on city areas within the speed limit of 20-30Km/hr.

Drive Test Locations

Jind:

LOW DENSE:	Sd School, Rani Talab, Bulbul, Nehru Stadium.
MEDIUM DENSE:	Gohana Road, Pwd Colony, Jind Lab, Govt College, Ramrai Gate.
HIGH DENSE:	Bus Stand, Kundan Cinema, Civil Hospital Palika Bazar.

Kurukreshetra:

LOW DENSE:	Model Town, Harsh Ka Tila, Kalyan Nagar, Shanti Nagar.
MEDIUM DENSE:	Parvati Vihar, Jyoti Nagar, Grain Mandi, Distt Jail, Sec-3, Sec-4.
HIGH DENSE:	Brahma Sarovar, Panorama Museum, Fci, Nit.

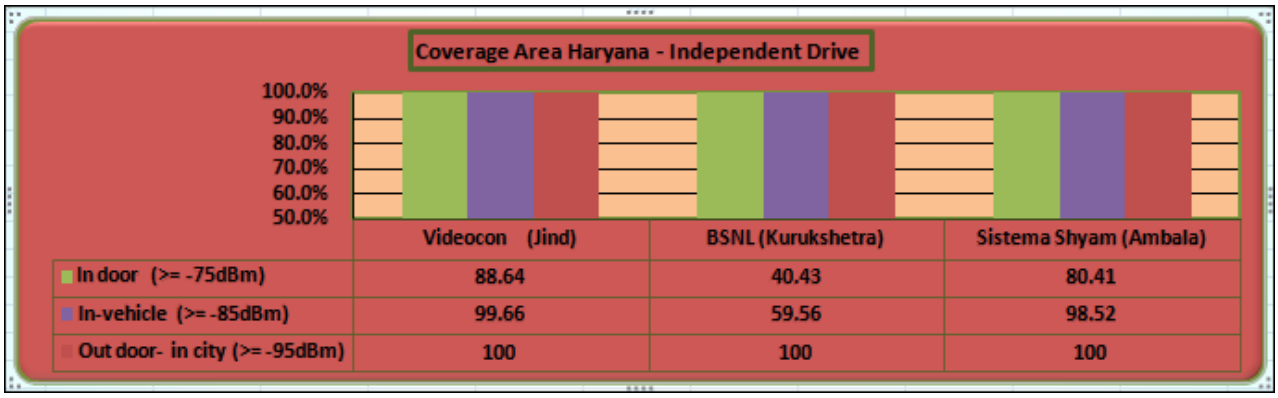
Ambala:

LOW DENSE:	Grain Market, Sector 7 Near Electricity Office, Sector 9,VPO Rattangarh Jalbera Rd Ambala.
MEDIUM DENSE:	City Vijay Cinema, City Shastri Colony, Cantt Durand Road Cantt. Ambala, Urbana Estate.
HIGH DENSE:	Model Town, Near Jangle Bridge, Sadar Bazaar , Luxmi Park, Court Road ,Jaggi Colony.

2)Independent Drive Test (for Haryana Circle)				
SN	Parameter	Videocon (Jind)	BSNL (Kurukshetra)	Sistema Shyam (Ambala)
		GSM Operators		CDMA Operators
1.1	Call Attempts	55	73	73
1.2	Blocked Call Rate (<=3%)	0.00%	1.37%	0.00%
1.3	Dropped Call Rate (<=2%)	0.00%	0.00%	0.00%
1.4	Percentage of connections with good voice quality (=>95%)			
	(i) 0-4 (w/o frequency hopping)	NA		95.00%
	(ii) 0-5 (with frequency hopping)	99.09%	91.70%	NA
1,5	Service Coverage			
	In door (>= -75dBm)	88.64	40.43	80.41
	In-vehicle (>= -85dBm)	99.66	59.56	98.52
	Outdoor- in city (>= -95dBm)	100	100	100
1.6	Call Setup Success Rate (>=95%)	100%	98.63%	100%

The drive test data was found to be satisfactory for all the parameters except percentage of connections for good voice quality for BSNL.
Drive test was done for Videocon in JIND, BSNL in Kurukshetra and Sistema Shyam in Ambala.

Graphical Representation:



(3) Critical Analysis

The drive test was done as short calls made of 120 secs with 10 secs delay time between calls in the all three cities, data was found to be satisfactory for all the parameters except percentage of connections for good voice quality for BSNL, drive test for Videocon was done in JIND, BSNL in Kurukshetra and Sistema Shyam in Ambala. BSNL's Quality was degraded nearby Sarovar's in Kurukreshetra.

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

From live, month, PMR findings, it can be concluded that on an average, performance of the operators in the service area (Haryana) is by satisfactory, some of the Operators lagging for particular parameter like:

1 Worst affected cells > 3% TCH Drops is not meeting by BSNL & Etisalat.
1. Under Response time to customers for assistance "% call answered by operators (voice to voice) within 60 sec. is not meeting by Airtel, Idea, Reliance-GSM and Tata GSM.

Under Live & Month findings, it can be concluded that on an average, is by satisfactory. Some of the Operators lagging for particular parameter like:

1. "Worst affected cells >3% TCH drops" is not meeting by Aircel for Live, and BSNL, Tata GSM & Tata CDMA for Month data.
2. Under Response time to customers for assistance "Accessibility of call centre/Customer care" & "% of call answered by operators (Voice to Voice) within 60 sec. for live data is not meeting by Aircel only.
3. Under Customer Service Quality Parameters "Metering/Billing Credibility-Postpaid" is not meeting by Reliance GSM, Tata GSM and Tata CDMA.
4. BSNL, Reliance CDMA and Tata CDMA not reported "Good Voice Quality" as data is not fetched by their systems.

During Operator Assisted Drive Test,

1. Under Percentage of connections with good Quality "0-5 (frequency Hooping)" is not meeting by Idea (Bhiwani) & BSNL (Bhiwani & Rewari).
2. Parameter of Drop Call Rate is also not meeting by BSNL in Rewari.

During Independent Drive Test,

1. Under Percentage of connections with good Quality "0-5 (frequency Hooping)" is not meeting by BSNL.
2. Drive test for Videocon is done in JIND, BSNL is done in Kurukshetra and Sistema Shyam is done in Ambala.

Operators having ICR with other operators are as:

1. Aircel is on ICR in Bhiwani & Rewari with Tata GSM.
2. Tata GSM is on ICR in Sirsa with Aircel.
3. Videocon is on ICR in Rewari with Tata GSM.
4. MTS is on ICR in Bhiwani & Sirsa with Tata CDMA.

II. Basic Telephone Service (Wireline) Providers

……..Audit not done for this quarter

III. Broadband Service Providers

……..Audit not done for this quarter