

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

Report Period: January 2012 – March 2012

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Table of Contents

CHAPTER-1: Introduction

- I. Background
- II. Objectives and Methodology

CHAPTER-2: Executive Summary

- I. Preface
- II. Findings from Quality of Service Audit (Operator wise for each parameter)

(A) Cellular Mobile Telephone Service Providers

- 3 days Live Data Audit
- One Month Data Audit
- Operator Assisted Drive Test
- Independent Drive Test

(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

- I. Cellular Mobile Telephone Service
- II. Basic Service (Wire Line) Service
 - *Not conducted for this quarter*
- III. Broadband Service
 - *Not conducted for this quarter*

CHAPTER-4: Detailed Findings & Analysis

I. Cellular Mobile Telephone Service

(A) MSC audit

- 1) 3 days live measurement data assessment & summarized findings
- 2) One month audit data report & summarized findings
- 3) Sample coverage
- 4) Performance (Graphical Representation)
- 5) Critical Analysis

(B) Redressal

- 1) Sample coverage
- 2) Performance based on live calling for billing complaints
- 3) Live calling to call center
- 4) Level 1 calling
- 5) Critical Analysis

(C) Inter operator call assessment

- 1) Sample coverage
- 2) Performance based on live calling
- 3) Critical Analysis

(D) Drive test of the mobile network of service providers

- 1) Sample Coverage
- 2) Performance (for the respective cities)
- 3) Critical Analysis

(E) Independent Drive Test

- 1) Sample coverage
- 2) Performance (for the respective cities)
- 3) Critical Analysis

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

- II. Basic Telephone Service (Wireline) Providers
- *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 lay 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) calls testing.

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

Systems audited:-

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

Facilities audited:-

1. Billing documents.
2. Customer Care records.

Field data collections carried out:-

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

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

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

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

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 1th quarter (January – March 2012). The primary data collection and verification of records (PMR data verification – quarterly) maintained by various operators was undertaken for the period July – September 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	Feb-2012	1900-2000 Hrs
2	Airtel Ltd	Jan-2012	1900-2000 Hrs
3	BSNL	Jan-2012	2000-2100 Hrs
4	Idea	Jan-2012	1900-2000 Hrs
5	Loop	Jan-2012	2100-2200 Hrs
6	Reliance Communication	Feb-2012	1900-2000 Hrs
7	Tata Communications	Jan-2012	1800-1900 Hrs
8	Videocon	Jan-2012	2000-2100 Hrs
9	Vodafone	Jan-2012	1900-2000 Hrs
CDMA Operators			
10	MTS	Jan-2012	1900-2000 Hrs
11	Reliance Communication	Feb-2012	1900-2000 Hrs
12	Tata Communications	Jan-2012	1900-2000 Hrs

Note: During Audit & Drive Test, it was found that:

1. Aircel is on ICR with Tata GSM in Jind, Kaithal & Yamuna Nagar while Videocon is on ICR with Tata GSM in Narnaul.
2. Loop is under roll out obligation, functional only in Kalka and Narayangarh with a total of 6 nos. of BTS only.
3. Etisalat closed all the service in Haryana Circle.

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

(A) Cellular Mobile Telephone Services

3 days Live Data Audit		Bench-mark	Aircel	Airtel	BSNL	Idea	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%	0.07%	0.05%	1.90%	0.16%	0.61%	0.09%	0.02%	0.02%	0.05%	0.11%	0.10%	0.02%
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.00%	0.02%	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%	98.43%	99.21%	97.97%	98.67%	99.01%	99.84%	99.06%	99.02%	98.40%	99.54%	99.35%	99.99%
	d) SDCCH/PAGING congestion	<=1%	0.00%	0.11%	0.33%	0.55%	0.11%	0.00%	0.00%	0.01%	0.54%	0.00%	0.00%	0.00%
e) TCH congestion	<=2%	0.00%	0.15%	1.25%	0.30%	0.00%	0.01%	0.04%	0.22%	0.72%	0.00%	0.23%	0.00%	
2	Connection maintenance (retainability)													
	a) CDR	<=2%	0.79%	0.62%	1.84%	0.83%	0.00%	0.41%	0.66%	0.69%	0.75%	0.40%	0.63%	0.65%
	b) Worst affected cells>3% TCH drop	<=3%	3.27%	0.80%	3.17%	2.76%	5.56%	0.00%	4.79%	1.18%	2.28%	1.68%	1.04%	5.81%
	c) Good voice quality	>=95%	98.13%	98.65%	-	96.86%	100.00%	99.32%	97.02%	98.52%	97.67%	99.45%	99.32%	-
3	No. of POI having congestion >0.5%	<0.5%	1	0	0	8	0	0	3	0	2	0	0	0
4	Response time to customers for assistance													
	a) Accessibility of call centre/Customer Care (IVR)	>=95%	61.47%	100.00%	100.00%	99.43%	100%	99.10%	100.00%	95.00%	100.00%	98.45%	99.60%	100.00%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	96.71%	53.84%	95.17%	90.68%	100.00%	94.75%	98.50%	94.47%	98.56%	95.55%	92.92%	97.67%
NA: Not Applicable, NR: Not Received														

From the 3 days live data assessment, it is found that all the operators are meeting most of the network parameters except for Aircel, BSNL, LOOP, Tata GSM & Tata CDMA for “Worst affected cells>3% TCH drop” parameter.

Performance related to customer care data is found to be satisfactory for most of the operators for the parameter “calls answered by operators (voice-to-voice)” except for Airtel. Aircel are showing a below benchmark value for the parameter “accessibility of call centre (IVR)”.

One Month Data Audit		Bench-mark	AIRCEL	AIRTEL	BSNL	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													
	a) BTS Accumulated Downtime	<=2%	0.04%	0.04%	1.28%	0.15%	0.12%	0.08%	0.05%	0.04%	0.06%	0.16%	0.08%	0.02%
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.08%	1.91%	0.00%	0.00%	0.00%	0.06%	0.00%	0.30%	0.00%	0.00%	0.00%
2	Connection Establishment (Accessibility)													
	a) CSSR (Call Setup Success Rate)	>=95%	98.47%	99.19%	98.60%	99.33%	99.01%	99.84%	99.08%	98.94%	98.45%	99.60%	99.37%	99.69%
	b) SDCCH/PAGING congestion	<=1%	0.01%	0.12%	0.38%	0.33%	0.08%	0.01%	0.01%	0.01%	0.39%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	0.00%	0.15%	0.82%	0.33%	0.00%	0.01%	0.17%	0.25%	0.84%	0.01%	0.19%	0.07%
3	Connection maintenance (retainability)													
	a) CDR	<=2%	0.80%	0.56%	1.74%	0.76%	0.00%	0.41%	0.61%	0.66%	0.71%	0.41%	0.69%	0.63%
	b) Worst affected cells>3% TCH drop	<=3%	2.52%	0.85%	2.94%	2.33%	0.00%	0.02%	4.54%	1.26%	1.99%	1.29%	0.83%	2.27%
	c) Good voice quality	>=95%	98.23%	98.64%	-	96.95%	100.00%	99.30%	97.01%	98.52%	97.70%	99.45%	99.30%	-
4	No of POI having congestion>0.5%	<0.5%	1	0	0	8	0	0	3	0	2	0	0	0
(B)	Customer Service Quality Parameters													
5	Metering/billing credibility-Post paid	<= 0.1%	0.07%	0.01%	0.00%	0.17%	NA	0.10%	0.42%	NA	0.00%	NA	0.10%	0.46%
6	Metering /billing credibility-Pre paid	<= 0.1%	0.01%	0.00%	0.00%	0.00%	0.00%	0.06%	0.05%	0.03%	0.01%	0.01%	0.04%	0.05%
7	Resolution of billing/ charging complaints	100% within 4 weeks	100%	99.93%	NP	100%	NA	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%	NA	100%	100%	100%	100%	100%	100%	100%
8	Response time to customers for assistance													
	a) Accessibility of call centre/Customer Care (IVR)	>=95%	61%	100%	100%	99%	100%	99%	100%	95%	100%	97%	100%	100%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	94.53%	90.04%	95.39%	92.50%	100.0%	91.93%	81.93%	94.80%	97.24%	95.57%	92.07%	94.32%
9	Termination/closure of service	<=7days	NA	100%	100%	100%	NA	100%	100%	NA	100%	NA	100%	100%
10	Time taken for refunds of deposits after closures.	100% within 60 days	NA	100%	100%	100%	NA	100%	100%	NA	100%	NA	100%	100%

NA: Not Applicable, NR: Not Received

From the month data assessment, it is found that all the operators are meeting most of the network parameters except for Tata GSM for the parameter "Worst affected cells>3% TCH drop".

Performance related to customer care data is found to be satisfactory for most of the operators for the parameter "calls answered by operators (voice-to-voice)", with only Tata GSM are not meeting the 90% benchmark. A below benchmark performance is observed in case of Aircel for "accessibility of call centre (IVR)" parameter. Under "Metering/Billing Credibility (Post-Paid)" section, Idea, Tata GSM & Tata CDMA is not meeting the prescribed benchmark.

Operator-Assisted Drive Test

The Operator Assisted Drive Test was conducted in Haryana for all the operators. The main agenda of this Drive Test was to capture the actual picture of all Service Providers on ground level and for that cities to be drive are Jind, Kaithal & Yamuna Nagar. During Drive, Route covered was about around 100-110 Km depending on city areas within the speed limit of 30Km/hr. In all the cities, zones were selected for covering different density areas (High, Medium & Low dense areas).

SN	Parameter	City Name	Airtel	BSNL	Idea	Reliance	Tata	Videocon	Vodafone	MTS	Reliance	Tata
			GSM Operators						CDMA Operators			
1	Blocked Call Rate (<=3%)	Jind	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	4.47%	0.00%	0.00%	0.00%
		Kaithal	0.87%	2.22%	2.08%	0.00%	0.91%	0.00%	0.00%	0.00%	0.00%	0.00%
		Yamuna Nagar	1.04%	3.57%	0.00%	2.38%	0.00%	0.00%	0.00%	0.00%	1.16%	0.00%
2	Dropped Call Rate (<=2%)	Jind	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.03%	0.00%	0.00%
		Kaithal	0.00%	1.14%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Yamuna Nagar	0.00%	2.78%	0.00%	0.58%	0.00%	0.00%	0.00%	1.03%	0.58%	0.00%
3	Percentage of connections with good voice quality (>=95%) (i) 0-4 (w/o frequency hopping) for CDMA services	Jind								95.43%	100.00%	97.90%
		Kaithal								96.95%	99.00%	92.79%
		Yamuna Nagar								96.60%	97.00%	82.53%
	(ii) 0-5 (with frequency hopping) for GSM services	Jind	100.00%	94.60%	96.18%	96.00%	95.27%	96.00%	96.60%			
		Kaithal	100.00%	91.60%	94.41%	97.00%	95.17%	95.11%	96.40%			
		Yamuna Nagar	100.00%	91.20%	96.67%	95.00%	95.03%	96.11%	95.23%			
4	Call Setup Success Rate (>=95%)	Jind	100.00%	100%	100.00%	100.00%	100.00%	100.00%	95.53%	100.00%	100.00%	100.00%
		Kaithal	99.13%	97.8%	97.92%	100.00%	99.09%	100.00%	100.00%	100.00%	100.00%	100.00%
		Yamuna Nagar	98.96%	96.4%	100.00%	97.62%	100.00%	100.00%	100.00%	100.00%	98.84%	100.00%

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

- ✚ Blocked call rate parameter is not met by Vodafone in Jind and BSNL in Yamuna Nagar.
- ✚ Dropped call rate parameter is not met by MTS in Jind and BSNL in Yamuna Nagar.
- ✚ Good Voice quality parameter is not met by Idea in Kaithal, Tata CDMA in Kaithal & Yamuna Nagar and BSNL in all three cities.

Independent Drive Test

The independent drive test activity was conducted in Haryana Circle for various service providers in three different cities namely “Narnaul & Kaithal”.

SN	Parameter	Videocon (Narnaul)	Vodafone (Narnaul)	Idea (Kaithal)
		GSM Operators		
1.1	Blocked Call Rate (<=3%)	0.00%	0.00%	0.00%
1.2	Dropped Call Rate (<=2%)	0.00%	0.00%	0.00%
1.3	Percentage of connections with good voice quality (= >95%)			
	(i) 0-4 (w/o frequency hopping)	NA		
	(ii) 0-5 (with frequency hopping)	97.59%	96.87%	94.16%
1.4	Call Setup Success Rate (>=95%)	100%	100%	100%

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

- Most of the Operators meeting the TRAI Benchmark for all the parameters except Idea in Kaithal for the parameter “Percentage of connections with good voice quality 0-5 (with frequency hopping)”.

(B) Basic Telephone Service (Wireline) Providers.
- Not conducted for this quarter

(C) Broadband Service Providers
- Not conducted for this quarter

CHAPTER-3: AUDIT-PMR VERIFICATION

I. Cellular Mobile Telephone Service

PMR		Bench-mark	Audit	Aircel	Airtel	BSNL	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	0.05%	0.11%	1.41%	0.15%	0.01%	0.15%	0.02%	0.10%	0.17%	0.09%	0.14%	0.03%	
			Verified	0.05%	0.11%	1.41%	0.15%	0.01%	0.15%	0.02%	0.10%	0.17%	0.09%	0.14%	0.03%	
	Worst affected BTSs due to downtime	<=2%	Reported	0.00%	0.36%	1.92%	0.00%	0.01%	0.00%	0.00%	0.22%	0.93%	0.00%	0.00%	0.00%	
Verified			0.00%	0.36%	1.92%	0.00%	0.01%	0.00%	0.00%	0.22%	0.93%	0.00%	0.00%	0.00%		
2	Connection Establishment (Accessibility)															
	CSSR (Call Setup Success Rate)	>=95%	Reported	97.43%	99.2%	97.64%	99.72%	100%	99.73%	98.55%	98.49%	97.7%	99.53%	99.38%	99.82%	
			Verified	97.43%	99.2%	97.64%	99.72%	100%	99.73%	98.55%	98.49%	97.7%	99.53%	99.38%	99.82%	
	SDCCH/PAGING congestion	<=1%	Reported	0.19%	0.18%	0.45%	0.56%	0.07%	0.17%	0.02%	0.04%	0.39%	0.00%	0.04%	0.00%	
			Verified	0.19%	0.18%	0.45%	0.56%	0.07%	0.17%	0.02%	0.04%	0.39%	0.00%	0.04%	0.00%	
	TCH congestion	<=2%	Reported	0.03%	0.20%	0.55%	0.72%	0.00%	0.14%	0.46%	0.44%	1.45%	0.00%	0.13%	0.71%	
Verified			0.03%	0.20%	0.55%	0.72%	0.00%	0.14%	0.46%	0.44%	1.45%	0.00%	0.13%	0.71%		
3	Connection maintenance (retainability)															
	CDR	<=2%	Reported	1.21%	0.67%	1.84%	0.98%	0.45%	0.19%	0.77%	0.78%	1.01%	0.34%	0.32%	0.90%	
			Verified	1.21%	0.67%	1.84%	0.98%	0.45%	0.19%	0.77%	0.78%	1.01%	0.34%	0.32%	0.90%	
	Worst affected cells>3% TCH drop	<=3%	Reported	3.35%	0.83%	3.59%	2.98%	0.00%	0.81%	1.80%	0.64%	2.28%	1.33%	0.40%	1.98%	
			Verified	3.35%	0.83%	3.59%	2.98%	0.00%	0.81%	1.80%	0.64%	2.28%	1.33%	0.40%	1.98%	
	Good voice quality	>=95%	Reported	98.25%	98.7%	96.75%	96.09%	97.10%	99.18%	96.93%	98.58%	96.8%	100.0%	99.24%	95.95%	
Verified			98.25%	98.7%	96.75%	96.09%	97.10%	99.18%	96.93%	98.58%	96.8%	100.0%	99.24%	95.95%		
4	No. of POI having congestion>0.5%	<0.5%	Reported	0	0	0	0	0	0	0	0	0	0	0		
			Verified	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%	0.04%	0.10%	0.14%	0.00%	0.10%	0.09%	0.00%	0.01%	0.00%	0.09%	0.00%
			Verified	0.00%	0.04%	0.10%	0.14%	0.00%	0.10%	0.09%	0.00%	0.01%	0.00%	0.09%	0.00%
6	Metering /billing credibility- Pre paid	<= 0.1%	Reported	0.05%	0.01%	0.10%	0.01%	0.00%	0.04%	0.00%	0.09%	0.01%	0.00%	0.03%	0.01%
			Verified	0.05%	0.01%	0.10%	0.01%	0.00%	0.04%	0.00%	0.09%	0.01%	0.00%	0.03%	0.01%
7	Resolution of billing/ charging complaints	100% within 4 weeks	Reported	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
			Verified	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	<=1 week	Reported	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
			Verified	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
8	Response time to customers for assistance														
			Accessibility of call centre/ Customer Care	>=95%	Reported	100%	99.0%	100%	99.0%	100%	98.9%	99.0%	95.3%	100%	99.2%
	Verified	100%			99.0%	100%	99.0%	100%	98.9%	99.0%	95.3%	100%	99.2%	94.7%	97.0%
	% call answered by operators(voice to voice) within 60 sec.	>=90%	Reported	88.61%	89.0%	96.0%	80.3%	100%	87.0%	95.0%	94.0%	96.7%	91.4%	94.5%	97.0%
Verified			88.61%	89.0%	96.0%	80.3%	100%	87.0%	95.0%	94.0%	96.7%	91.4%	94.5%	97.0%	
9	Termination/closure of service														
			No.of requests for Termination / Closure of service complied within 7 days during the quarter	<=7days	Reported	100%	100%	100%	100%	NA	100%	100%	NA	100%	NA
	Verified	100%			100%	100%	100%	100%	100%		100%				
	Time taken for refunds of deposits after closures.	100% within 60 days	Reported	100%	100%	100%	100%	NA	100%	100%	NA	100%	NA	100%	100%
Verified			100%	100%	100%	100%	100%		100%	100%					

✚ No Deviation is found when compared with Operator reported data.

II. Basic Service (Wireline) Service

-Not conducted for this quarter

III. Broadband Service

-Not conducted for this quarter

CHAPTER-4: DETAILED FINDINGS & ANALYSIS

I. Cellular Mobile Telephone Service

(A) MSC Audit

(1) 3 Days Live measurement Data assessment & Summarized Findings

S/N	Name of Parameter	Benchmark	Aircel	Airtel	BSNL	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%	0.07%	0.05%	1.90%	0.16%	0.61%	0.09%	0.02%	0.02%	0.05%	0.11%	0.10%	0.02%	
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.00%	0.02%	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	2596	1569	2311	16	1315	1559	1236	2698	194	839	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	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	
	Connection														

	Establishment (Accessibility)													
	c) CSSR	>=95 %	98.43 %	99.21%	97.97 %	98.67%	99.01 %	99.84 %	99.06%	99.02 %	98.40%	99.54 %	99.35 %	100%
	d) SDCCH/PAGING congestion	<=1%	0.00%	0.11%	0.33%	0.55%	0.11%	0.00%	0.00%	0.01%	0.54%	0.00%	0.00%	0.00%
	e) TCH congestion	<=2%	0.00%	0.15%	1.25%	0.30%	0.00%	0.01%	0.04%	0.22%	0.72%	0.00%	0.23%	0.00%
2	Connection maintenance													
	a) CDR	<=2%	0.79%	0.62%	1.84%	0.83%	0.00%	0.41%	0.66%	0.69%	0.75%	0.40%	0.63%	0.65%
	b) Cells having > 3% TCH drop	<=3%	3.27%	0.80%	3.17%	2.76%	5.56%	0.00%	4.79%	1.18%	2.28%	1.68%	1.04%	5.81%
	c) Good voice quality	>=95 %	98.13 %	98.65%	-	96.86%	100%	99.32 %	97.02%	98.52 %	97.67%	99%	99.32 %	-
	d) Avg. No. of cells > 3% TCH drop		16	62	149	192	1	0	224	44	186	10	26	92
	e) Total no. of cells in the network		499	7,731	4,695	6,962	18	3,945	4,680	3,719	8,165	596	2,517	1,583
3	No of POI having congestion>0.5%	<0.5%	1	0	0	8	0	0	3	0	2	0	0	0
	a) Name of POI not meeting the benchmark		BSNL	NIL	NIL	Tata; BTSOLNL D; IDEA; RIL; HUTCH; SSTL; Etisalat; Vodafone	NIL	NIL	TCL; Reliance; RCOM	NIL	VSNL; Reliance	NIL	NIL	NIL
	b) Total No. of circuits on POI		5,791	67,153	32,670	65,654	388	870	3,320	6,458	69,527	4,381	17,082	35,521
	c) Avg No. of call attempts on POI		319,269	1,185,011	517,412	1,270,653	5	984	58,474	91,986	2,137,039	32,891	151,693	600,368
	d) Avg traffic served on POI (Erlang)		7,272	38,798	9,897	32,495	0	0	1,449	3,358	39,247	595	6,411	23,070
	e) Total number of working POI		21	42	30	53	14	NP	10	22	26	36	NP	127

	Service Area wise													
	f) Equipped Capacity of Network in respect of Traffic in erlang		6,137	87,552	126,464	90,451	133	50,000	96,626	45,274	125,902	12,600	56,000	143,640
	g) Total traffic handled in TCBH in erlang		1,176	57,933	44,267	80,670	0	43,479	29,170	12,961	118,338	1,312	28,969	37,570
(B)	Customer Service Quality Parameters													
4	Response time to customers for assistance													
	a) Accessibility of call centre	>=95 %	61.47 %	100%	100%	99.43%	100%	99.10 %	100%	95.00 %	100%	98.45 %	100%	100%
	b) % of call answered by operators(voice to voice) within 60 sec	>=90 %	96.71 %	53.84%	95.17 %	90.68%	100%	94.75 %	98.50%	94.47 %	98.56%	95.55 %	92.92 %	97.67 %
	c) No. of call attempts to call centre / customer care nos. during TCBH (Avg)		19,700	80,263	48,304	142,635	1	33,729	68,342	1,428	11,458	607	13,888	16,291
	d) No. of calls connected and answered successfully to call centre / customer care nos. during TCBH (Avg)		19,052	43,217	45,971	129,338	1	31,959	67,320	1,349	11,293	580	12,905	15,912
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:-

- **BTS accumulated downtime (benchmark $\leq 2\%$):** All operators are meeting benchmark with values laying between 0.02% and 1.90%.
- **Worst affected BTSs due to downtime (benchmark $\leq 2\%$):** All operators are meeting benchmark with values laying between 0% and 0.02%.
- **Call setup success rate (benchmark $\geq 95\%$):** All operators are meeting the benchmark with values laying between 97.97% and 100%.
- **SDCCH/PAGING Channel congestion (benchmark $\leq 1\%$):** All operators are meeting the benchmark with values laying between 0.00% and 0.55%.
Note: CDMA operators have provided the data for Paging Channel congestion and GSM operators provided SDCCH Channel congestion.
- **TCH congestion (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values laying between 0.00% and 1.25%.
- **Call drop rate (benchmark $\leq 2\%$):** All other operators are meeting the benchmark with values laying between 0.00% and 1.84%.
- **Cell exceeding 3% TCH drop (benchmark $\leq 3\%$):** Except for Aircel(3.27%), BSNL (3.17%), Loop Telecom(5.56%), Tata GSM(4.79%) & Tata CDMA(5.81%) rests of the operators are satisfying the benchmark with value in between 0.00% and 2.76%.
- **Connections with good voice quality (benchmark $\geq 95\%$):** All operators are meeting the benchmark with values laying between 96.86% and 100%. For this parameter, BSNL & Tata CDMA values are not system generated.
- **No. of POI's having Congestion $>0.5\%$:** For this parameter, mostly Operators found overall no congestion, However few cases are observed for some operators like Aircel, Idea, Tata GSM & Vodafone having calls failures $>0.5\%$ with nos. 1, 8, 3 & 2 respectively. It was also observed that 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, rest of the operators are meeting the benchmark with values laying between 95.00% to 100%.
- **%age of call answered by operator (Voice to voice) (benchmark $>90\%$):** Except for Airtel, rest of the operator are meeting the benchmark with value in between 92.92% and 100%.

(2) Month Data Assessment & Summarized Findings

S/N	Name of Parameter	Benchmark	Aircel	Airtel	BSNL	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%	0.04%	0.04%	1.28%	0.15%	0.12%	0.08%	0.05%	0.04%	0.06%	0.16%	0.08%	0.02%
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.08%	1.91%	0.00%	0.00%	0.00%	0.06%	0.00%	0.30%	0.00%	0.00%	0.00%
	c) Total no. of BTSs in the licensed service area		166	2,596	1,569	2,311	16	1,315	1,559	1,236	2,698	194	839	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		51	721	14,954	2,525	14	780	568	332	1,258	236	496	85
	e) No. of BTSs having accumulated downtime of >24 hours in a month		0	2	30	0	0	0	1	0	8	0	0	0
2	Connection Establishment (Accessibility)													
	a) CSSR (Call Setup Success Rate)	>=95%	98.47%	99.19%	99%	99.33%	99%	99.84%	99.08%	98.94%	98.45%	99.60%	99.37%	100%
	b) SDCCH/PAGING congestion	<=1%	0.01%	0.12%	0.38%	0.33%	0.08%	0.01%	0.01%	0.01%	0.39%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	0.00%	0.15%	0.82%	0.33%	0.00%	0.01%	0.17%	0.25%	0.84%	0.01%	0.19%	0.07%
3	Connection maintenance (retainability)													
	a) CDR	<=2%	0.80%	0.56%	1.74%	0.76%	0.00%	0.41%	0.61%	0.66%	0.71%	0.41%	0.69%	0.63%
	b) Worst affected cells>3% TCH drop	<=3%	2.52%	0.85%	2.94%	2.33%	0.00%	0.02%	4.54%	1.26%	1.99%	1.29%	0.83%	2.27%
	c) Good voice quality	>=95%	98.23%	98.64%	-	96.95%	100%	99.30%	97.01%	98.52%	97.70%	99%	99.30%	-
	d) Avg. No. of cells exceeding 3% TCH drop (call drop)		13	66	138	162	0	1	213	47	163	8	21	36
	e) Total no. of cells in the network		499	7,731	4,695	6,962	18	3,945	4,680	3,719	8,165	596	2,517	1,583
4	No of POI having congestion>0.5%	<0.5%	1	0	0	8	0	0	3	0	2	0	0	0
	a) Name of POI not meeting the benchmark		BSNL	NIL	NIL	Tata; BTSOLNL D; IDEA; RIL; HUTCH; SSTL;	NIL	NIL	TCL; Reliance ; RCOM	NIL	VSNL; Reliance	NIL	NIL	NIL

					Etisalat: Vodafone									
	b) Total No. of call attempts on POI (Avg.)		3,026,319	1,973,188	492,974	1,443,480	3	10,057	61,491	99,433	2,018,645	30,443	145,420	577,608
	c) Total traffic served on POI (Erlang) (Avg.)		72,188	37,113	9,542	35,686	0	3	1,467	3,439	36,937	585	6,251	22,269
	d) Total No. of circuits on POI		5,791	67,153	32,670	65,654	388	870	3,320	6,458	69,527	4,381	17,082	35,521
	e) Total number of working POI Service Area wise		21	42	30	53	14	NP	10	22	26	36	NP	127
	f) Capacity of POI		5,285	63,805	23,182	65,228	191	511	3,064	5,961	69,247	3,869	15,755	32,591
5	Network Data													
	a) Equipped Capacity of Network Erlang		6,137	87,552	126,464	90,451	133	50,000	96,626	45,274	125,902	12,600	56,000	143,640
	b) Total traffic handled in TCBH in erlang		1,106	53,406	44,275	81,920	0	43,479	29,986	13,429	120,142	1,244	28,969	35,419
	c) Total no. of customers served (as per VLR) on last day of the month		200,656	2,120,658	1,509,282	3,128,307	14	1,561,703	1,269,558	355,031	3,978,872	56,166	639,264	450,677
(B)	Customer Service Quality Parameters													
6	Metering/billing credibility-Post paid	<= 0.1%	0.07%	0.01%	0.00%	0.17%	NA	0.10%	0.42%	NA	0.00%	NA	0.10%	0.46%
	a) No. of bills issued during the period		2,705	70,975	22,068	71,308	0	9,055	21,681	0	121,156	0	68,963	60,993
	b) No. of bills disputed including billing complaints during the period		2	4	0	123	0	9	92	0	6	0	68	280
7	Metering /billing credibility-Pre paid	<= 0.1%	0.01%	0.00%	0.00%	0.00%	0.00%	0.06%	0.05%	0.03%	0.01%	0.01%	0.04%	0.05%
	a) No. of charging / credit / validity complaints during the quarter		53	83	0	54	0	1,847	1,029	295	436	11	423	357
	b) Total no. of pre-paid customers at the end of the quarter		559,344	2,851,006	2945609	3340358	93	3,157,627	2,280,558	852,165	4,267,633	217,618	1,026,619	709,544
8	Resolution of billing/ charging complaints	100% within 4 weeks	100%	100%	NP	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		55	4,230	0	795		1,856	1,121	295	442	11	491	637
	b) Total no. of billing (post paid) and charging, credit / validity (pre paid) complaints received during the quarter		55	4,233	0	795	NA	1,856	1,121	295	442	11	491	637
	c) No. of billing complaints (post paid) and charging, credit/ validity complaints (pre paid) resolved in favour of the customer during the quarter		15	87	0	177		363	11	295	150	6	142	2

	d) No. of complaints disposed on account of not considered as valid complaints during the quarter		40	4,146	0	618		1,493	1,110	0	292	5	349	635
	e) Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	<i><=1 week</i>	100%	100%	100%	100%		100%	100%	100%	100%	100%	100%	100%
9	Response time to customers for assistance													
	a) Accessibility of call centre/Customer Care	<i>>=95%</i>	61.27%	100.00 %	100.00 %	99.37%	100 %	99.10%	100.00 %	95%	100.00 %	97.27 %	99.60%	100.00 %
	b) % call answered by operators(voice to voice) within 60 sec.	<i>>=90%</i>	94.53%	90.04%	95.39%	92.50%	100 %	91.93%	81.93%	94.80 %	97.24%	95.57 %	92.07%	94.32%
	c) Total no. of call attempts to call centre & customer care nos. during TCBH (Avg.).		209,504	867,236	48,291	1,307,315	1	289,682	847,333	14,153	118,979	5,774	136,494	175,845
	d) No. of calls connected and answered successfully to call centre & customer care nos. during TCBH (Avg.).		198,048	780,821	46,065	1,209,272	1	266,317	694,214	13,417	115,694	5,518	125,666	165,851
10	Termination/closure of service	<i><=7 days</i>		100%	100%	100%		100%	100%		100%		100%	100%
	a) Total No. of requests for Termination / Closure of service received during the quarter			506	480	379		61	485		366		240	1673
	b) No.of requests for Termination / Closure of service complied within 7 days during the quarter		NA	506	480	379	NA	61	485	NA	366	NA	240	1673
11	Time taken for refunds of deposits after closures.	<i>100% within 60 days</i>		100%	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 laying between 0.02% and 1.28%.
- **Worst affected BTSs due to downtime (benchmark <= 2%):** All operators are meeting the benchmark with values laying between 0.00% and 1.91%.
- **Call setup success rate (benchmark >= 95%):** All operators are meeting the benchmark with values laying between 98.45% and 100%.
- **SDCCH/PAGING Channel congestion (benchmark <= 1%):** All operators are meeting the benchmark with values laying between 0.00% and 0.39%.
Note: CDMA operators have provided the data for Paging Channel congestion and GSM operators provided SDCCH Channel congestion.
- **TCH congestion (benchmark <= 2%):** All operators are meeting the benchmark with values laying between 0.00% and 0.84%.
- **Call drop rate (benchmark <= 2%):** All operators are meeting the benchmark with values laying between 0.00% and 1.74%.
- **Cell exceeding 3% TCH drop (benchmark <= 3%):** Except for Tata GSM (4.54%), rests of the operators are satisfying the benchmark with value in between 0.00% and 2.94%.
- **Connections with good voice quality (benchmark >= 95%):** All the GSM operators are meeting the benchmark with values laying between 96.95% and 100%. For this parameter, BSNL & Tata CDMA values are not system generated.
- **No. of POI's having Congestion >0.5%:** For this parameter, mostly Operators found overall no congestion, However few cases are observed for some operators like Aircel, Idea, Tata GSM & Vodafone having call failures >0.5% with nos. 1, 8, 3, 2 respectively. It was also observed that some operators 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, rest of the operators are meeting the benchmark with values laying between 95.00% to 100%.
- **%age of call answered by operator (Voice to voice) (benchmark >90%):** Except for Tata GSM, rests of the operators are meeting the benchmark with values laying between 90.04% to 100%.
- **Metering and billing credibility-Postpaid (benchmark <= 0.1%):** Except Idea, Tata GSM & Tata CDMA, rest of the operators are meeting the benchmark.
- **Metering and billing credibility-Pre paid (benchmark <= 0.1%):** All the operators are meeting the benchmark with values laying between 0.00% and 0.06%.
- **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:

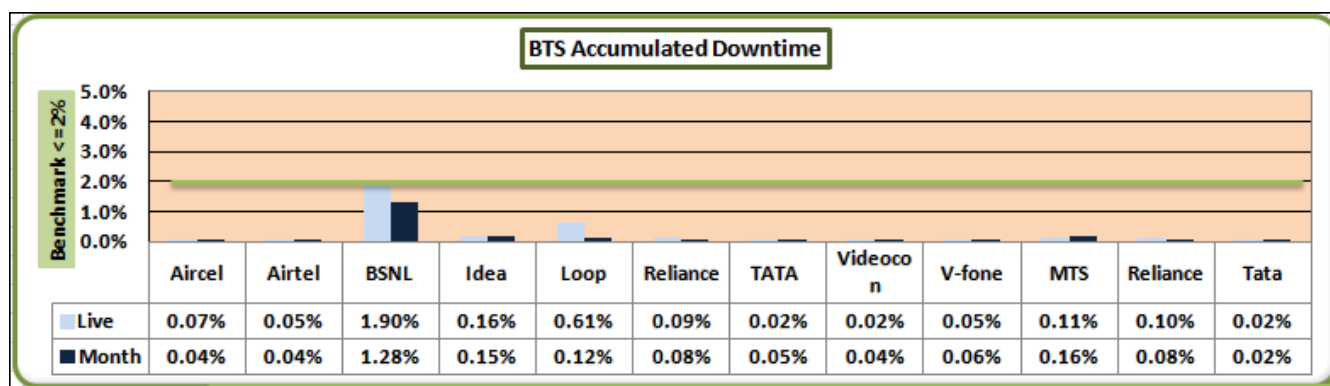
Sl.	Name of Service Provider	No. of MSC/GMSC	No. of BSC	No. of BTS
GSM Operators				
1	Aircel Ltd	2	2	166
2	Airtel Ltd	7	23	2596
3	BSNL	7	24	1569
4	Idea	6	26	2311
5	Reliance Communication	1	8	1315
6	Tata Communications	2	12	1559
7	Loop	1	1	6
8	Videocon	1	8	1236
9	Vodafone	9	47	2698
CDMA Operators				
10	MTS	1	1	194
11	Reliance Communication	3	-	839
12	Tata Communications	5	10	528

4) Performance (Graphical Representation)

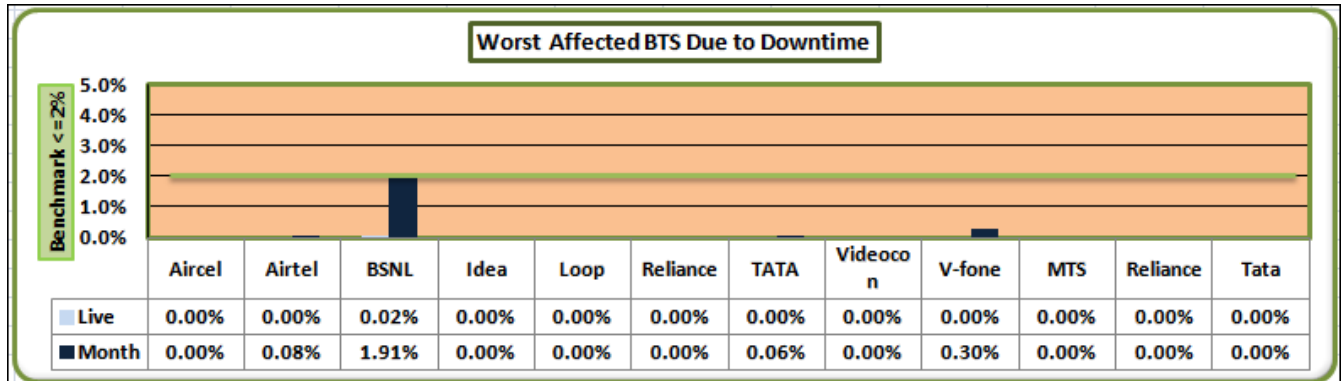
Comparison between Live measurements and One month data Audit – Cellular Mobile Telephone Services

A) NETWORK PERFORMANCE

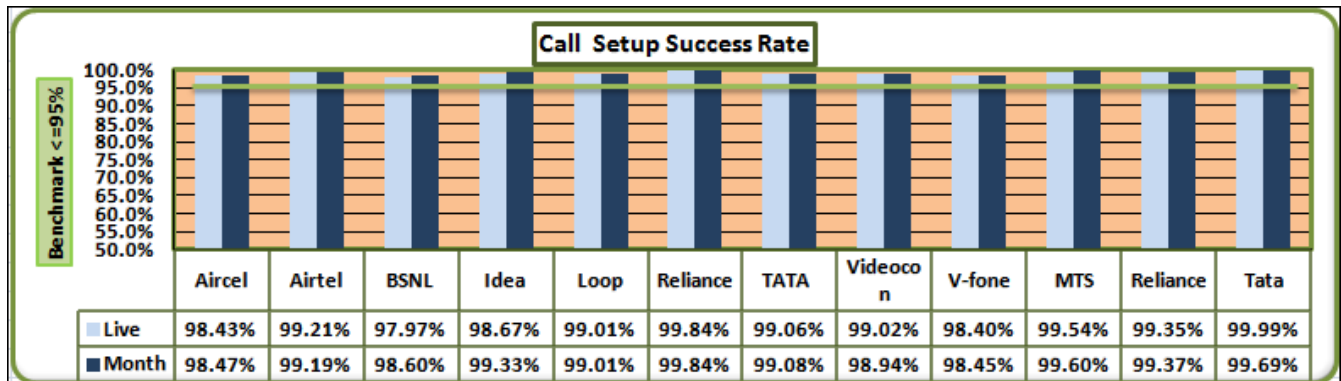
BTS accumulated downtime: All operators are meeting the TRAI benchmarks ($\geq 2\%$) for both one month data and 3 days live data taken in the month of audit.



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.

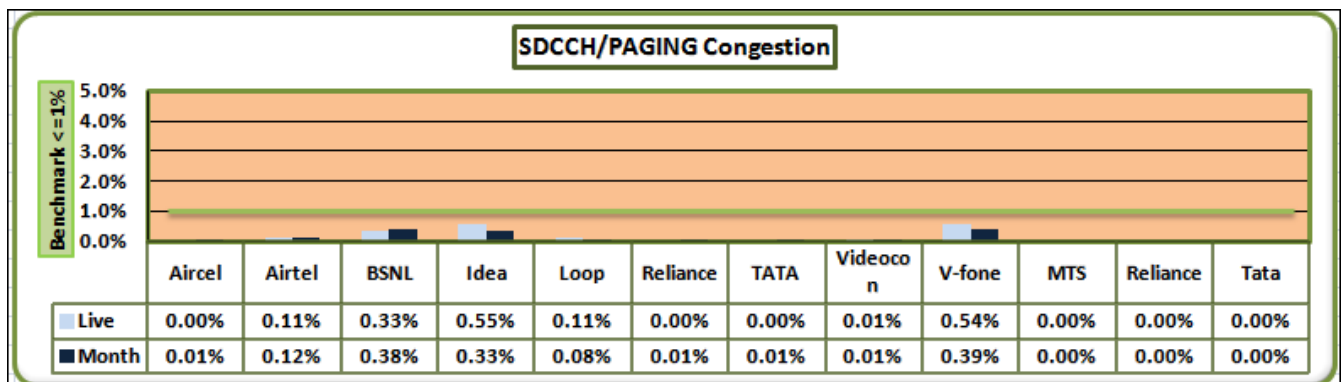


Call Setup Success Rate (CSSR): All operators are meeting the TRAI benchmarks ($\geq 95\%$) for both one month data and 3 days live data taken in the month of audit.

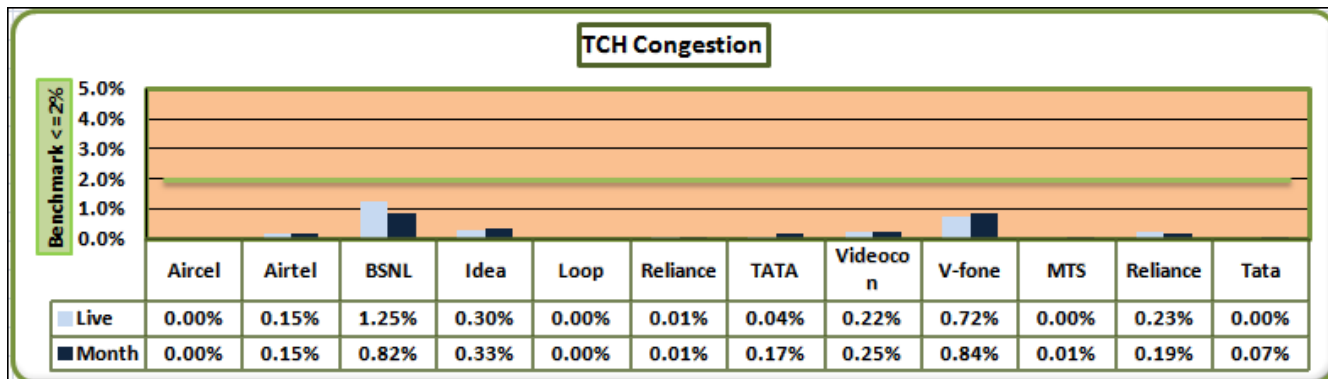


Blocked call rate:

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

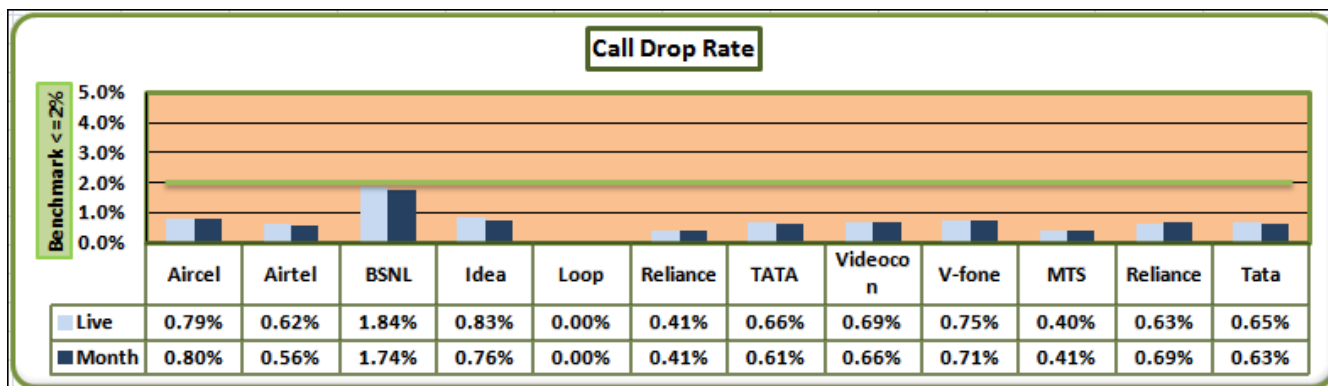


TCH congestion (%): All operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data.

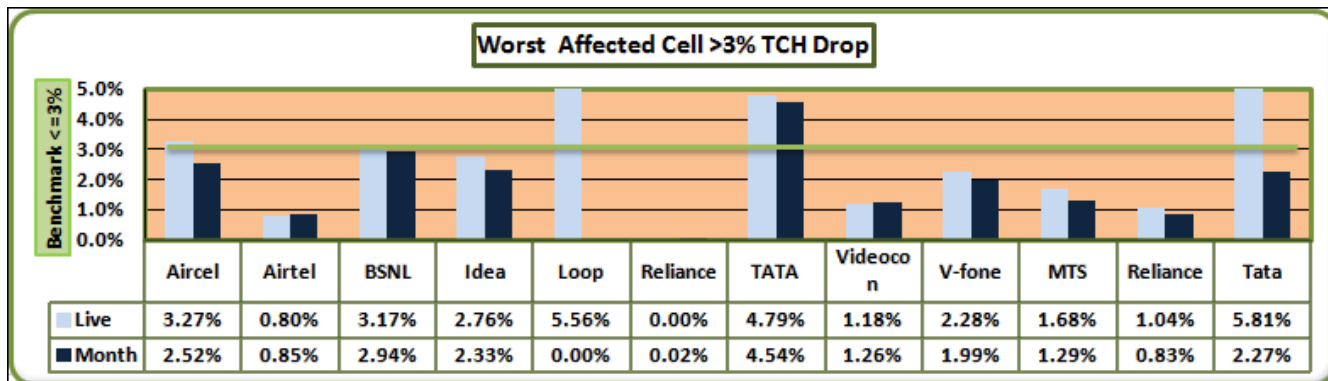


Connection Maintainability (Retainability):

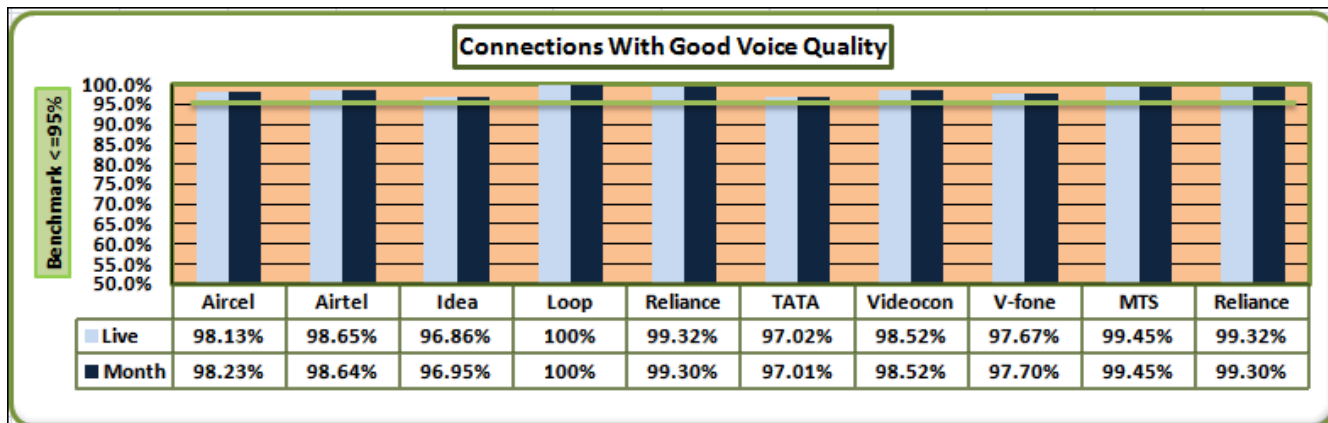
Call Drop Rate (CDR) (%): All operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data.



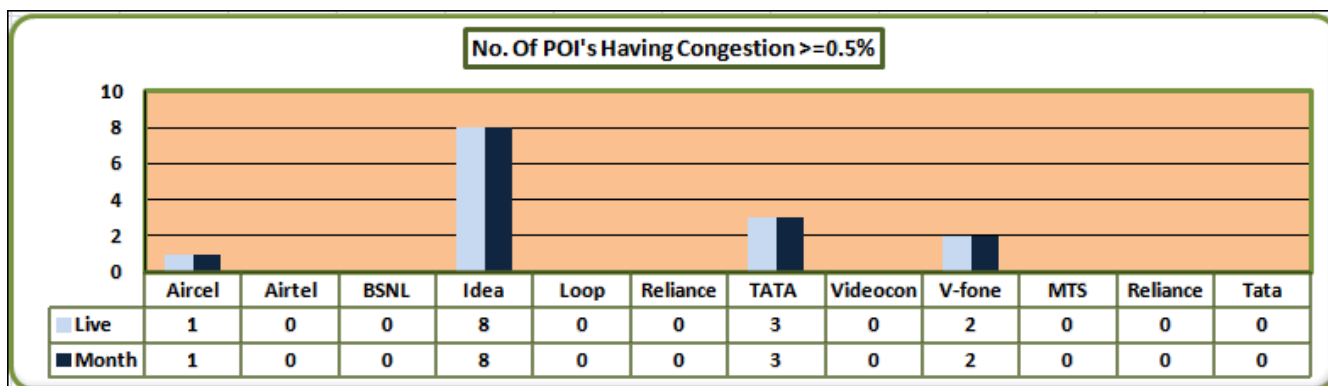
Worst affected Cell exceeding 3% TCH Drop: For live data, Aircel, BSNL, Loop, Tata GSM & Tata CDMA while Tata GSM for month data were not meeting the benchmark of $\leq 3\%$. Rests of the operators are meeting the benchmark for both cases.



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. For BSNL and Tata CDMA values are not system generated.



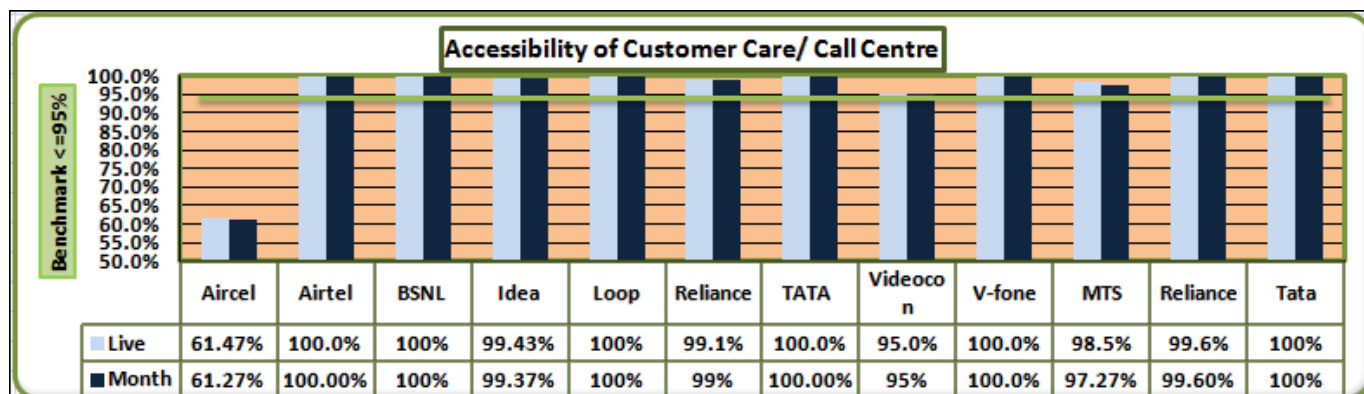
No of POI's having Congestion >0.5%: For both Live and month audit, Aircel (1), Idea (8), Tata GSM (3) & Vodafone (3) respectively were having call failures >0.5% on their respective POI's.



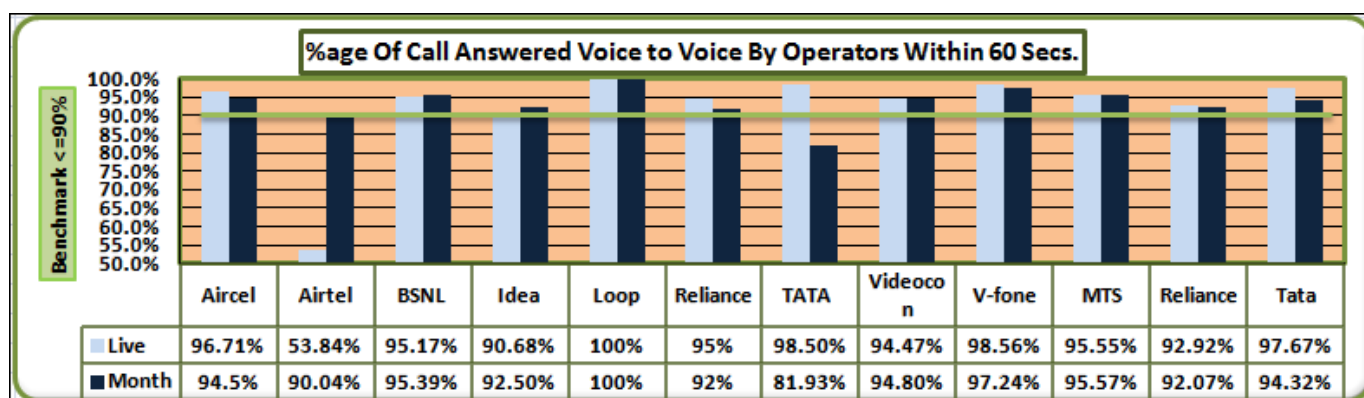
B) CUSTOMER SERVICE QUALITY PARAMETERS

Response time to the customer for assistance:

Percentage of call answered (Electronically): Except for Aircel for both Live & Month rest of the 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: For Live data, only Airtel, while Tata GSM for Month Data were not meeting the benchmark. Rest all operators are meeting benchmark for both cases.



5) Critical Analysis

From the data table it can be seen that from Live data Aircel, BSNL, Loop, Tata GSM & Tata CDMA and from Month data only Tata GSM are not meeting the benchmark for the parameter of 'Worst affected cells having more than 3% TCH drop rate' with high margins. This may have happened due to mainly in the change adopted for calculating the parameter considering CBBH instead of TCBH, which reflects more practical way of calculating TCH drop keeping in view customer satisfaction.

Regarding %age of connections with good voice quality all the operators are found to be performing quite well in terms of meeting the benchmark ($\leq 95\%$).

In case of POI congestion, except for Aircel, Idea, Tata GSM & Vodafone rest of the operators are found to be performing quite well in terms of meeting the benchmark ($\leq 0.5\%$). It is noticed that most of the operators are having individual POI satisfying the benchmark. But in some case overflows on individual POI are noticed causing traffic diversions to obtain the net result for POI congestion.

Response time to the customer for assistance, Percentage of call answered (Electronically), Aircel for both Live & Month and For Live data, only Airtel, while Tata GSM for Month Data were not meeting the benchmark.

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

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

2) Performance (live calling for billing complaints)

Calling Operator	Aircel	Airtel	Idea	Rcom GSM	Tata GSM	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA
Total No. of Calls Attempted	55	87	100	100	100	100	100	11	100	100
Total No. of calls Answered	52	80	95	96	98	94	95	11	94	96
Cases resolved with 4 weeks	52	80	95	96	98	94	95	11	94	96
%age of cases resolved	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

3) Live calling to call center:

Fifty nos. of calls were made in each half and below given no. of calls got connected to the call center within 60 sec.

Calling Operator	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Vodafone	Vodafone	MTS	Rcom CDMA	Tata CDMA
Total No. of Calls Attempted	100	100	100	100	100	100	100	100	100	100	100
Total No. of calls connected to IVR	100	100	100	100	100	100	100	100	100	100	100
Calls got connected to agent within 60 Sec	96	98	95	95	100	100	100	96	97	99	99
%age of calls got answered	96%	98%	95%	95%	100%	100%	100%	96%	97%	99%	99%

- 4) **Level 1 Calling:** Level 1 calling such as calling at emergency no. (Police, Fire, and Hospital), Railway enquiry systems etc were made as shown in table below so as to check the service of such short codes. In all 3 cities, it was found to be functional for respective providers.

Emergency no.		Calls attempted	Airtel	BSNL	Idea	RCOM GSM	Tata GSM	Vodafone	Videocon	MTS	RCOM CDMA	Tata CDMA
Jind												
100	Police	1	1	1	1	1	1	1	1	1	1	1
101	Fire	1	1	1	1	1	1	1	1	1	1	1
102	Ambulance	1	1	1	1	1	1	1	1	1	1	1
139	Railway	2	2	2	2	2	2	2	2	2	2	2
Kaithal												
100	Police	1	1	1	1	1	1	1	1	1	1	1
101	Fire	1	1	1	1	1	1	1	1	1	1	1
102	Ambulance	1	1	1	1	1	1	1	1	1	1	1
139	Railway	2	2	2	2	2	2	2	2	2	2	2
Yamuna Nagar												
100	Police	1	1	1	1	1	1	1	1	1	1	1
101	Fire	1	1	1	1	1	1	1	1	1	1	1
102	Ambulance	1	1	1	1	1	1	1	1	1	1	1
139	Railway	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% cases as claimed by their records. In case of Airtel and MTS total valid complains were found to be 55 and 11 only.

Similarly, 50-50 live calls were made to call center in each half i.e. 11 to 1pm and 4 to 7pm and it was found that all the operators are meeting the 90% benchmark.

Level 1 call testing was done in all the three drive test cities (Jind, Kaithal & Yamuna Nagar) to the Telephone numbers (100, 101, 102 & 139) emergency calls were landing to their local centers, Overall result was satisfactory for all service providers.

(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 1900 to 2000 hrs and between 2000 to 2100 hrs so that TCBH hours for all the operators were covered.

(2) Performance based on live measurement

Calling Operator	Aircel	Airtel	BSNL	Idea	Reliance (GSM)	Tata (GSM)	Vodafone	Videocon	MTS	Reliance (CDMA)	Tata (CDMA)
	Ambala & Panipat										
Aircel	-	100%	98%	100%	99%	100%	100%	100%	100%	100%	100%
Airtel	100%	-	96%	100%	100%	100%	100%	100%	99%	100%	100%
BSNL	100%	100%	-	100%	100%	100%	100%	100%	95%	99%	100%
Idea	100%	98%	98%	-	100%	100%	100%	100%	99%	100%	100%
Reliance (GSM)	100%	100%	100%	100%	-	100%	100%	100%	100%	100%	100%
Tata (GSM)	99%	96%	94%	100%	97%	-	100%	100%	97%	100%	100%
Vodafone	100%	100%	100%	100%	100%	100%	-	100%	100%	100%	100%
Videocon	99%	98%	100%	99%	97%	100%	100%	-	99%	97%	100%
MTS	100%	97%	99%	100%	100%	100%	98%	98%	-	100%	100%
Reliance (CDMA)	100%	100%	100%	100%	100%	100%	100%	99%	100%	-	100%
Tata (CDMA)	98%	100%	100%	99%	100%	100%	100%	100%	100%	100%	-

(3) Critical Analysis

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

(D) 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 100-110Km depending on city areas within the speed limit of 30Km/hr.

DRIVE TEST LOCATIONS***KAITHAL***

LOW DENSE: Arjun Nagar, Huda Sec 20, Indian Oil, Cheeka Road, Huda Sector 21

MEDIUM DENSE: Model Town Kaithal, Balraj Nagar, Railway Line Road, Railway Station, Nh 65

HIGH DENSE: Nh 65, Bus Stand, Kaithal Railway Road, Pehowa Chowk, Indra Gandhi School, Siwan Gate, Railway Stn Colony, Main Bazar Kaitha, Rajshri Nagar, Rksd Pg College, Civil Hospital, Aggarwal Dharamshala

YAMUNA NAGAR

LOW DENSE: Yamuna Powerplant, Hec Jagadhari, Jagadhari, Buria Chowk, Jarauda Road, Ambala Road

MEDIUM DENSE: Nh73,Sec 17,Amar Mkt, Kanhaiya Chowk,, Isgec, Jammu Colony, Rana Mkt, Panasara, Saharanpur Road, Old Hamida

HIGH DENSE: Govindpuri, Jain Nagar,Shashtri Nagar, New Hamida,Bus Stand, Railway Station Area Model Town, Jain Mandir, State Highway 6, Nh 73a

JIND

LOW DENSE: Patyala Chowk, Veeta Plant, Seetapur Colony, Ch. Ramnarayan Partk, Hakikat Nagar, Cr Kisan Colony, Jind Railway Stn.

MEDIUM DENSE: Sh 10 , Shiv Colony, Govt. Hospital, New Krishna Colony,Herbal Vatika Park, Engg. Clg Jind, Police Line

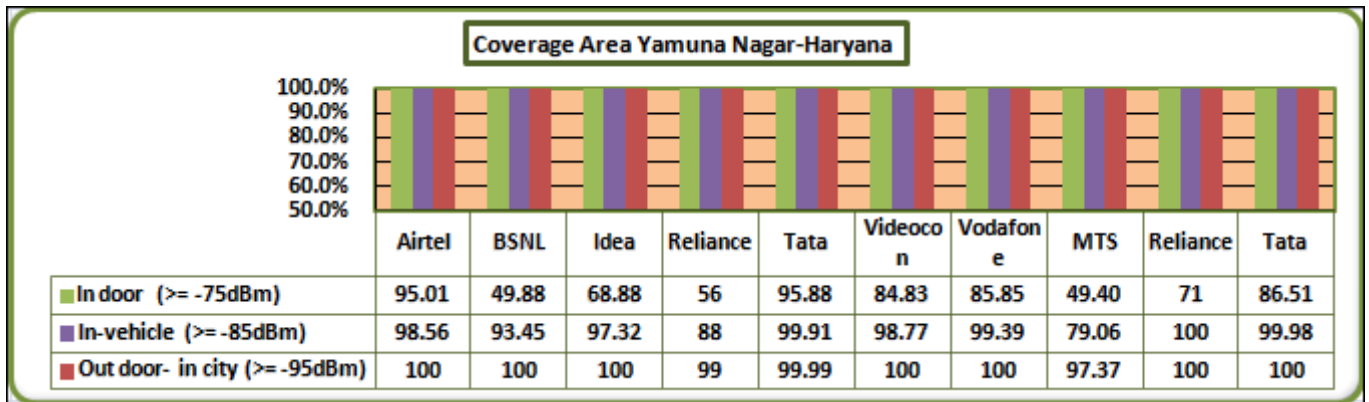
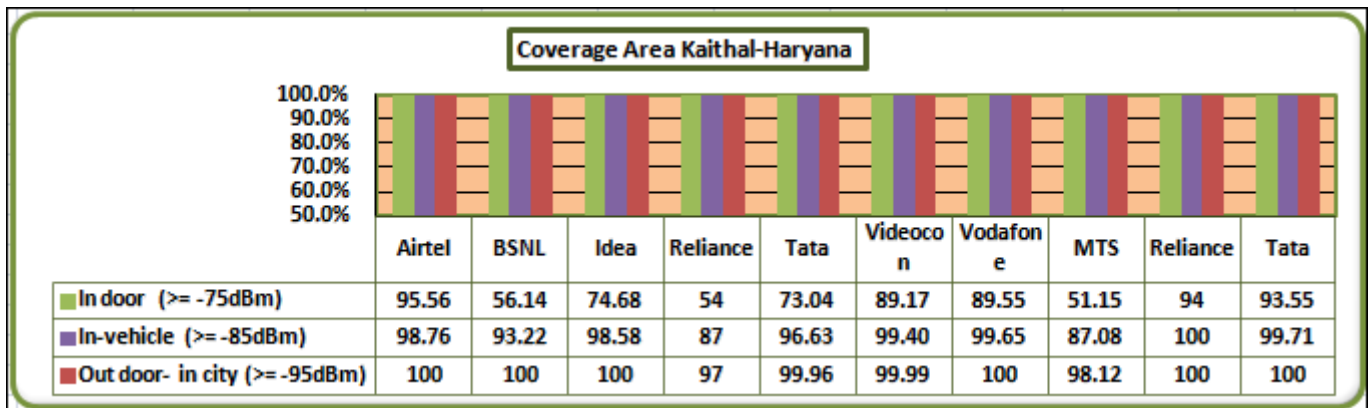
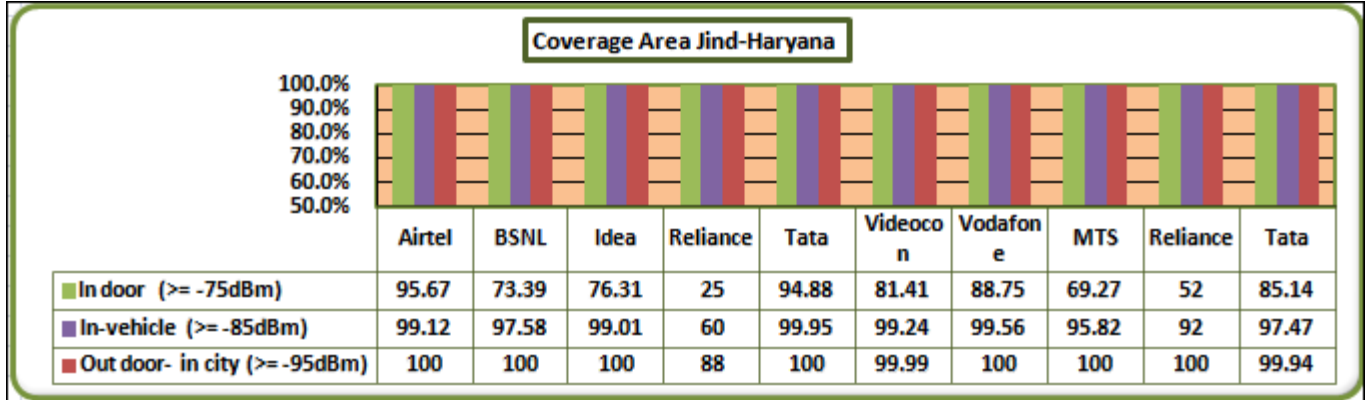
HIGH DENSE: Om Nagar, Fawara Chowk,Main Bazar,Gandhi Nagar, Govind Pura,Nh 71, Jhang Gate, Palika Bazar, Raghu Nath Mandir, Devi Lal Chowk , Rani Talab

2) Operator Assisted Drive Test (for Haryana Circle)												
SN	Parameter	City Name	Airtel	BSNL	Idea	Reliance	Tata	Videocon	Vodafone	MTS	Reliance	Tata
			GSM Operators						CDMA Operators			
1.	Call Attempts	Jind	58	80	67	96	59	60	67	67	96	61
		Kaithal	114	90	96	185	109	85	94	80	185	112
		Yamuna Nagar	96	112	85	171	130	92	123	97	172	129
1.2	Blocked Call Rate (<=3%)	Jind	0.00%	0.00%	0.00%	0.0%	0.00%	0.00%	4.47%	0.00%	0.00%	0.00%
		Kaithal	0.87%	2.22%	2.08%	0.00%	0.91%	0.00%	0.00%	0.00%	0.00%	0.00%
		Yamuna Nagar	1.04%	3.57%	0.00%	2.38%	0.00%	0.00%	0.00%	0.00%	1.16%	0.00%
1.3	Dropped Call Rate (<=2%)	Jind	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.00%	3.03%	0.00%	0.00%
		Kaithal	0.00%	1.14%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Yamuna Nagar	0.00%	2.78%	0.00%	0.58%	0.00%	0.0%	0.00%	1.03%	0.58%	0.00%
1.4	Percentage of connections with good voice quality (=>95%)											
		(i) 0-4 (w/o frequency hopping)	Jind							95.43%	100.00%	97.90%
			Kaithal							96.95%	99.00%	92.79%
	Yamuna Nagar							96.60%	97.00%	82.53%		
	(ii) 0-5 (with frequency hopping)	Jind	100%	94.60%	96.18%	96.0%	95.2%	96.0%	96.60%			
Kaithal		100%	91.6%	94.41%	97.0%	95.1%	95.1%	96.40%				
1.5	Service Coverage	Yamuna Nagar	100%	91.20%	96.67%	95.0%	95.0%	96.1%	95.23%			

	In door (>= -75dBm)	Jind	95.67	73.39	76.31	25	94.88	81.41	88.75	69.27	52	85.14	
		Kaithal	95.01	49.88	68.88	56	95.88	84.83	85.85	49.40	71	86.51	
		Yamuna Nagar	95.56	56.14	74.68	54	73.04	89.17	89.55	51.15	94	93.55	
	In-vehicle (>= -85dBm)	Jind	99.12	97.58	99.01	60	99.95	99.24	99.56	95.82	92	97.47	
		Kaithal	98.56	93.45	97.32	88	99.91	98.77	99.39	79.06	100	99.98	
		Yamuna Nagar	98.76	93.22	98.58	87	96.63	99.40	99.65	87.08	100	99.71	
	Out door- in city (>= -95dBm)	Jind	100	100	100	88	100	99.99	100	100	100	100	99.94
		Kaithal	100	100	100	99	99.99	100	100	97.37	100	100	100
		Yamuna Nagar	100	100	100	97	99.96	99.99	100	98.12	100	100	100
1.6	Call Setup Success Rate (>=95%)	Jind	100%	100%	100%	100%	100%	100%	95.53%	100%	100%	100%	
		Kaithal	99.13%	97.8%	97.92%	100%	99.09%	100%	100%	100%	100%	100%	100%
		Yamuna Nagar	98.96%	96.4%	100%	97.62%	100%	100%	100%	100%	100%	98.84%	100%

Graphical Representation

The Radio coverage level as was found in the operator assisted drive test result is shown graphical below:



(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:

- ✚ Performance of all Operators in **Jind town** was satisfactory for most of the KPI parameters except for BSNL for the parameter “Good voice quality”, Only Vodafone was not meeting benchmark for the parameter “Blocked call rate”, And MTS not meeting benchmark for “Dropped Call rate”. During Drive Test, route was covered about 75 Km and CSSR was observed between 95.53% and 100%. Under Voice Quality Section, Airtel among GSM and Reliance among CDMA Operator performed slightly better than others. As far as RF coverage level considered, Tata GSM & Airtel achieved max. nos. of percentage of samples within -75dBm.
- ✚ Performance in **Kaithal Town** was satisfactory for most of the operators except for BSNL, Idea & Tata CDMA which fails to meet benchmark for the KPI parameters namely “Good voice quality”. Under RF coverage level section, Airtel performed quite better than others. During Drive, route was covered about 100 Km and in that CSSR values were getting between 97.83% & 100%. Under Voice quality section, Airtel & Reliance CDMA showing performance slightly better than other service providers.
- ✚ Similarly, performance in **Yamunanagar Town** was satisfactory for all operators for the most of the KPI parameters, except for BSNL for the parameter “Good voice quality”, “Blocked Call” & “Dropped Call”. During drive, route was covered about 120 Km and in that CSSR was 96.4% to 100% for all operators. Under Voice quality section, Airtel & Reliance CDMA showing slightly higher values than others. As far as RF coverage level considered, Reliance, & Airtel performed quite better than other operators.

(E) Independent Drive test**1. Sample Coverage**

The independent drive test activity was conducted in Haryana Circle for various service providers in three different cities namely “**Narnaul & Kaithal**”. For testing the service provider performance on ground level, TCIL auditor carried out Drive Test and check the radio coverage along with different KPI parameters by making test calls of 120 sec. in different areas on different days. During Drive test, Route was covered about between 50 to 80 Km for all 3 cities depending upon the city areas within the speed limit of 25-30Km/hr.

Note: Videocon is on ICR with Tata GSM in Narnaul.

Drive Test Locations and Service Provider’s name:

1. Narnaul - Vodafone (6 BTS), Videocon (Tata with 10 BTS)
2. Kaithal - Idea (13 BTS)

Area Coverage Details:

1) **Narnaul** : Nasibpur, Subhash Park, State Highway 17, Purani Mandi, Railway Route, Narnaul City, Narnaul Station, Purani Mandi, Narnaul TV Tower, Singhana Road State Highway 26.

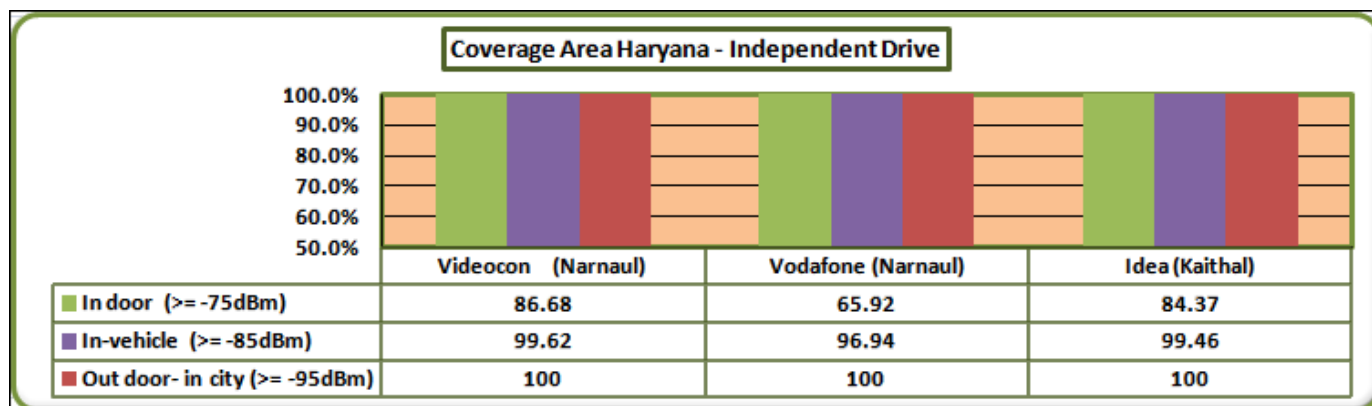
2) **Kaithal** : Nh 65, Bus Stand, Kaithal Railway Road, Pehowa Chowk, Indra Gandhi School, Siwan Gate, Railway Stn Colony, Main Bazaar, Kaithal, Rajshri Nagar, Rksd Pg College, Civil Hospital, Agarwal Dharamshala.

2) Performance (for the respective cities for Haryana Circle)

SN	Parameter	Videocon (Narnaul)	Vodafone (Narnaul)	Idea (Kaithal)
		GSM Operators		
1.1	Call Attempts	60	62	60
1.2	Blocked Call Rate (<=3%)	0.00%	0.00%	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	NA	NA
	(ii) 0-5 (with frequency hopping)	97.59%	96.87%	94.16%
1.5	Service Coverage			
	In door (>= -75dBm)	86.68	65.92	84.37
	In-vehicle (>= -85dBm)	99.62	96.94	99.46
	Out door- in city (>= -95dBm)	100	100	100
1.6	Call Setup Success Rate (>=95%)	100%	100%	100%

Graphical Representation

The Radio coverage level as was found in the operator assisted drive test result is shown graphical below:



(3) Critical Analysis

The drive test data was found to be satisfactory for most of the parameters

- ✚ During Drive Test for **Videocon and Vodafone in Narnaul Town**, a total of **60 and 62 test calls** were made and out of that **60 and 62 calls** got successfully established for respective service provider. Under **RF coverage level section**, **Videocon** performed better than **Vodafone** as they got 86.68% of samples within -75dBm . & in case of **Voice quality section**, Videocon showing better results than Vodafone as they achieving **97.59% of samples within 0-5 number** indicating good voice quality.
- ✚ **IDEA** performance in **Kaithal Town** was found to be satisfactory for all parameter. The **RF coverage level** was found average throughout the town with **84.37% of samples** within **-75dBm Rx lev.** and achieved no blocked or dropped calls. As far as **Voice quality parameter** concerned, It is not meeting TRAI Benchmark as operator achieved **94.16% of samples** within **0-5 number**. During testing, a total of **60 test calls** and **89 Handover attempts** were made and all were successfully connected & completed which results into **100% CSSR & HOSR** respectively.

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

From live, month, PMR and Drive Tests findings, it can be concluded that on an average, performance of the operators in the service area (Haryana) is for most of the **Network Parameters**. However, the benchmark of $\leq 3\%$ for “worst affected cells $> 3\%$ TCH drop” is not met by Aircel, BSNL, Loop, Tata GSM & Tata CDMA.

Under **Customer Service Quality Parameter** “accessibility of call centre” parameter it is found that most of the operators are fulfilling TRAI benchmark of $\geq 95\%$. Apart from this, the “operator answered calls (voice-to-voice) within 60 seconds” parameter benchmark is not met by Airtel & Tata GSM.

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

II. Basic Telephone Service (Wireline) Providers

- Not conducted for this quarter

III. Broadband Service Providers

- Not conducted for this quarter