

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

Report Period: April 2012 – June 2012

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- *Not conducted for this quarter*
- III. Broadband Service Providers
- *Not conducted for this quarter*

CHAPTER-1: INTRODUCTION

I. Background

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

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

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

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

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

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

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

II. Objectives and Methodology

The primary objective is to audit and assess the Quality of Service being rendered by Basic, Cellular Mobile & Broadband services against the parameters notified by TRAI. The audit and assessment of Quality of Service is conducted for all the basic service providers, unified access service providers, cellular mobile service providers and ISPs (Internet Service Provider) for basic Wireline, Cellular Mobile Telephone Services and broadband service. TCIL has undertaken the following audit works as per the Terms of Reference (TOR):

- i) Verification of the data submitted by the service providers to TRAI as part of QoS monitoring reports i.e. Quarterly Performance Monitoring Reports (PMRs) and monthly Point of Interconnection (POI) Congestion Reports with reference to the records maintained by the service provider.
- ii) Verification of the performance of service providers against the Quality of Service benchmarks laid down by TRAI using live measurement for 3 days during the month in which the audit and assessment is carried out.
- iii) Verification of the performance of service providers against the Quality of Service benchmarks 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. 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 2nd quarter (April – June 2012). The primary data collection and verification of records (PMR data verification – quarterly) maintained by various operators was undertaken for the period October – December 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	May-2012	2000-2100 Hrs
2	Airtel Ltd	May-2012	1900-2000 Hrs
3	BSNL	May-2012	2000-2100 Hrs
4	Idea	May-2012	2000-2100 Hrs
5	Reliance Communication	May-2012	1900-2000 Hrs
6	TATA	May-2012	2000-2100 Hrs
7	Videocon	May-2012	2100-2200 Hrs
8	Vodafone	May-2012	2000-2100 Hrs
CDMA Operators			
9	MTS	May-2012	1900-2000 Hrs
10	Reliance Communication	May-2012	2000-2100 Hrs
11	TATA	May-2012	2000-2100 Hrs

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

1. Aircel is on ICR with Tata GSM in Jhajjar & Karnal Town.
2. Tata GSM is on ICR with Aircel in Fatehabad Town.
3. MTS is on ICR with Tata CDMA in Fatehabad & Jhajjar Town.
4. Loop telecom has closed their services 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	Rcom GSM	Tata GSM	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA
S/N	Name of Parameter		GSM Operators							CDMA Operators			
1	Network Availability												
	a) BTS Accumulated Downtime	<=2%	0.07%	0.04%	1.66%	0.05%	0.17%	0.15%	0.07%	0.18%	0.37%	0.07%	0.08%
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.00%	0.06%	0.00%	0.00%	0.00%	0.00%	0.04%	0.00%	0.00%	0.00%
	Connection Establishment (Accessibility)												
	a) CSSR (Call Setup Success Rate)	>=95%	98.42%	99.62%	96.30%	99.61%	99.84%	99.03%	98.25%	98.84%	99.52%	98.90%	98.50%
	b) SDCCH/PAGING congestion	<=1%	0.00%	0.08%	0.18%	0.28%	0.01%	0.05%	0.09%	0.36%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	0.00%	0.13%	0.53%	0.50%	0.02%	0.30%	0.13%	0.38%	0.02%	0.02%	0.10%
2	Connection maintenance (Retainability)												
	a) CDR	<=2%	0.61%	0.52%	1.79%	0.56%	0.36%	0.57%	0.80%	0.72%	0.35%	0.04%	0.57%
	b) Worst affected cells>3% TCH drop	<=3%	2.81%	0.74%	2.40%	1.40%	0.08%	3.72%	1.98%	2.02%	1.15%	0.08%	5.30%
	c) Good voice quality	>=95%	98.36%	98.97%	NA	97.91%	99.37%	97.51%	98.38%	97.80%	100.00%	99.78%	NA
3	No. of POI's having congestion >0.5%		1	0	0	0	0	0	0	0	0	0	0
4	Response time to customers for assistance												
	a) Accessibility of call centre/Customer Care	>=95%	75%	100%	100.00%	95.81%	99.47%	100%	96.60%	100%	98.51%	99.73%	96.96%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	60.57%	97.54%	10.69%	96.24%	93.78%	51.94%	94.69%	99.00%	94.21%	92.02%	84.23%

NA: Not Applicable, NR: Not Received

From the 3 days live data assessment, it is found that operators are meeting most of the network parameters except for Tata GSM and Tata CDMA 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)” except for Aircel. Similarly, Aircel, BSNL, Tata GSM & Tata CDMA are showing a below benchmark value for the parameter “accessibility of call centre”.

One Month Data Audit		Bench- mark	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA
S/N	Name of Parameter												
(A)	Network Service Quality Parameter												
1	Network Availability												
	a) BTS Accumulated Downtime	<=2%	0.07%	0.05%	1.62%	0.21%	0.10%	0.08%	0.08%	0.10%	0.40%	0.10%	0.07%
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.00%	1.21%	0.00%	0.00%	0.06%	0.00%	0.26%	0.51%	0.00%	0.00%
2	Connection Establishment (Accessibility)												
	a) CSSR (Call Setup Success Rate)	>=95%	98.32%	99.52%	96.56%	99.64%	99.82%	99.01%	97.40%	98.86%	99.38%	98.97%	98.70%
	b) SDCCH/PAGING congestion	<=1%	0.08%	0.07%	0.28%	0.42%	0.02%	0.04%	0.06%	0.31%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	0.01%	0.06%	0.50%	0.53%	0.01%	0.30%	0.12%	0.38%	0.01%	0.03%	0.23%
3	Connection maintenance (Retainability)												
	a) CDR	<=2%	0.63%	0.46%	1.84%	0.58%	0.36%	0.54%	0.70%	0.73%	0.35%	0.02%	0.54%
	b) Worst affected cells>3% TCH drop	<=3%	2.61%	0.70%	2.66%	1.46%	0.05%	0.85%	1.95%	1.00%	1.31%	0.08%	2.33%
	c) Good voice quality	>=95%	98.31%	98.95%	NA	97.85%	99.36%	97.47%	98.46%	97.76%	100%	99.78%	NA
4	No. of POI's having congestion >0.5%		1	0	0	0	0	0	0	0	0	0	0
(B)	Customer Service Quality Parameters												
5	Metering/billing credibility-Post paid	<= 0.1%	0.00%	0.00%	0.00%	0.08%	0.04%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%
6	Metering /billing credibility-Pre paid	<= 0.1%	0.00%	0.01%	0.00%	0.00%	0.02%	0.00%	0.03%	0.01%	0.01%	0.03%	0.00%
7	Resolution of billing/ charging complaints	100% within 4 weeks	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%
8	Response time to customers for assistance												
	a) Accessibility of call centre/Customer Care	>=95%	66%	100%	100%	99.43%	99.41%	100%	98.96%	100%	98.50%	100%	100%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	98.33%	93.92%	20.88%	97.51%	92.36%	56.33%	95.39%	99.00%	95.93%	91.35%	88.34%
9	Termination/closure of service	<=7days	NA	100%	100%	100%	100%	100%	NA	100%	100%	100%	100%
10	Time taken for refunds of deposits after closures.	100% within 60 days	NA	100%	100%	100%	100%	100%	NA	100%	100%	100%	100%

NA: Not Applicable, NR: Not Received

From the month data assessment, it is found that all the operators are meeting all the network parameters. 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 Aircel is not meeting the 90% benchmark. Similarly, BSNL, Tata GSM & Tata CDMA are not meeting benchmark for the parameter “Accessibility of call centre”.

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 chosen were Fatehabad, Jhajjar & Karnal. During test drive, route covered was about around 50-100 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	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA
			GSM Operators						CDMA Operators				
1.1	Blocked Call Rate (<=3%)	Fatehabad	2.15	1.13	2.04	0.00	0.00	ICR (Aircel)	0.00	0.00	ICR (Tata CDMA)	0.00	0.00
		Jhajjar	ICR (Tata GSM)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ICR (Tata CDMA)	0.00	0.00
		Karnal	ICR (Tata GSM)	0.00	0.00	0.00	0.00	4.55	1.24	0.00	1.61	1.02	0.92
1.2	Dropped Call Rate (<=2%)	Fatehabad	0.00	0.00	0.00	0.00	0.00	ICR (Aircel)	0.00	0.00	ICR (Tata CDMA)	0.00	0.00
		Jhajjar	ICR (Tata GSM)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ICR (Tata CDMA)	0.00	0.00
		Karnal	ICR (Tata GSM)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.02	0.00
1.3	Percentage of connections with good voice quality (=>95%)												
	(i) 0-4 (w/o frequency hopping)	Fatehabad									ICR (Tata CDMA)	99.97	98.73
		Jhajjar									ICR (Tata CDMA)	99.62	96.77
		Karnal									96.24	98.48	95.58
	(ii) 0-5 (with frequency hopping)	Fatehabad	96.50	100.00	95.00	96.09	98.00	ICR (Aircel)	96.00	95.69			
		Jhajjar	ICR (Tata GSM)	100.00	95.00	95.14	99.35	97.09	95.67	95.88			
Karnal		ICR (Tata GSM)	96.12	95.40	95.96	97.12	95.10	95.55	95.68				
1.4	Call Setup Success Rate (>=95%)	Fatehabad	97.85	98.87	97.96	100	100	ICR (Aircel)	100	100	ICR (Tata CDMA)	100	100
		Jhajjar	ICR (Tata GSM)	100	100	100	100	100	100	100	ICR (Tata CDMA)	100	100
		Karnal	ICR (Tata GSM)	100	100	100	100	95.45	98.76	100	98.39	98.98	99.08

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

- ✚ Tata GSM is not meeting the benchmark for the parameter “Blocked Call Rate” in Karnal Town.

Independent Drive Test

SN	Parameter	Idea	Vodafone	RCOM GSM	RCOM CDMA
		Rewari		Panipat	
1.1	Blocked Call Rate (<=3%)	1.75	0.00	0.00	0.00
1.2	Dropped Call Rate (<=2%)	0.00	0.00	0.00	0.00
1.3	Percentage of connections with good voice quality (>=95%)				
	(i) 0-4 (w/o frequency hopping)				99.9
	(ii) 0-5 (with frequency hopping)	97.6	94.88	98.22	
1.4	Call Setup Success Rate (>=95%)	98.25	100	100	100

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

- ✚ Vodafone is not meeting the benchmark for the parameter “Good Voice Quality” in Rewari Town.

(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

PMR		Bench-mark	Audit	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	V-con	V-fone	MTS	Rcom CDMA	Tata CDMA
S/N	Name of Parameter													
				GSM Operators							CDMA Operators			
(A)	Network Service Quality Parameter													
1	Network Availability													
	BTS Accumulated Downtime	<=2%	Reported	0.07%	0.05%	1.37%	0.14%	0.15%	0.08%	0.02%	0.11%	0.14%	0.14%	0.03%
			Verified	0.07%	0.05%	1.37%	0.14%	0.15%	0.08%	0.02%	0.11%	0.14%	0.14%	0.03%
	Worst affected BTSs due to downtime	<=2%	Reported	0.40%	0.12%	1.93%	0.00%	0.00%	0.02%	0.00%	0.61%	0.00%	0.00%	0.00%
Verified			0.40%	0.12%	1.93%	0.00%	0.00%	0.02%	0.00%	0.61%	0.00%	0.00%	0.00%	
2	Connection Establishment (Accessibility)													
	CSSR (Call Setup Success Rate)	>=95%	Reported	97.40%	99.13%	99.00%	99.65%	99.79%	99.00%	98.78%	98.55%	99.36%	99.32%	99.99%
			Verified	97.40%	99.13%	99.00%	99.65%	99.79%	99.00%	98.78%	98.55%	99.36%	99.32%	99.99%
	SDCCH/PAGING congestion	<=1%	Reported	0.57%	0.14%	0.17%	0.51%	0.26%	0.02%	0.02%	0.31%	0.00%	0.00%	0.00%
			Verified	0.57%	0.14%	0.17%	0.51%	0.26%	0.02%	0.02%	0.31%	0.00%	0.00%	0.00%
	TCH congestion	<=2%	Reported	0.01%	0.20%	0.63%	0.32%	0.06%	0.20%	0.18%	0.76%	0.00%	0.25%	0.04%
			Verified	0.01%	0.20%	0.63%	0.32%	0.06%	0.20%	0.18%	0.76%	0.00%	0.25%	0.04%
	3	Connection maintenance (Retainability)												
CDR		<=2%	Reported	0.95%	0.66%	1.87%	0.82%	0.77%	0.64%	0.71%	0.80%	0.45%	0.89%	0.64%
			Verified	0.95%	0.66%	1.87%	0.82%	0.77%	0.64%	0.71%	0.80%	0.45%	0.89%	0.64%
Worst affected cells>3% TCH drop		<=3%	Reported	2.61%	0.92%	2.93%	2.61%	0.45%	0.95%	1.01%	1.17%	0.93%	0.55%	1.85%
			Verified	2.61%	0.92%	2.93%	2.61%	0.45%	0.95%	1.01%	1.17%	0.93%	0.55%	1.85%
Good voice quality		>=95%	Reported	98.27%	98.66%	93.60%	96.74%	99.16%	96.90%	98.51%	97.50%	100%	98.75%	99.01%
			Verified	98.27%	98.66%	93.60%	96.74%	99.16%	96.90%	98.51%	97.50%	100%	98.75%	99.01%
4		No. of POI's having congestion >0.5%		Reported	0	0	0	0	0	0	0	0	0	0
	Verified			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%	0.08%	0.09%	0.00%	0.00%	0.01%	0.00%	0.10%	0.00%
			Verified	0.00%	0.04%	0.10%	0.08%	0.09%	0.00%	0.00%	0.01%	0.00%	0.10%	0.00%
6	Metering /billing credibility-Pre paid	<= 0.1%	Reported	0.08%	0.00%	0.10%	0.00%	0.08%	0.00%	0.09%	0.03%	0.00%	0.08%	0.00%
			Verified	0.08%	0.00%	0.10%	0.00%	0.08%	0.00%	0.09%	0.03%	0.00%	0.08%	0.00%
7	Resolution of billing/ charging complaints	100% within 4 weeks	Reported	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
			Verified	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%
			Verified	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
8	Response time to customers for assistance		Reported											
			Verified											
	Accessibility of call centre/Customer Care	>=95%	Reported	100%	97.04%	100%	99.58%	99.01%	99.00%	97.76%	100%	99.49%	99.37%	97%
			Verified	100%	97.04%	100%	99.58%	99.01%	99.00%	97.76%	100%	99.49%	99.37%	97%
% call answered by operators(voice to voice) within 60 sec.	>=90%	Reported	93.13%	96.74%	94.00%	86.11%	91.42%	91.00%	98.36%	96.37%	96.47%	91.22%	96.00%	
		Verified	93.13%	96.74%	94.00%	86.11%	91.42%	91.00%	98.36%	96.37%	96.47%	91.22%	96.00%	
9	Termination/closure of service		Reported											
			Verified											
10	No.of requests for Termination / Closure of service complied within 7 days during the quarter	<=7days	Reported	100%	100%	100%	100%	100%	100%	NA	100%	NA	100%	100%
			Verified	100%	100%	100%	100%	100%	100%	NA	100%	NA	100%	100%
	Time taken for refunds of deposits after closures.	100% within 60 days	Reported	100%	100%	100%	100%	100%	100%	NA	100%	NA	100%	99%
			Verified	100%	100%	100%	100%	100%	100%	NA	100%	NA	100%	99%

✚ 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	Rcom GSM	Tata GSM	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA
			GSM Operators							CDMA Operators			
A	Network Service Quality Parameter												
1	Network Availability												
	a) BTS Accumulated Downtime	<=2%	0.07%	0.04%	1.66%	0.05%	0.17%	0.15%	0.07%	0.18%	0.37%	0.07%	0.08%
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.00%	0.06%	0.00%	0.00%	0.00%	0.00%	0.04%	0.00%	0.00%	0.00%
	c) Total no. of BTSs in the licensed service area		166	2621	1571	2361	1313	1578	1236	2713	195	837	527
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		9	83	1876	90	159	169	62	354	53	45	30
	e) No. of BTSs having accumulated downtime of >24 hours in a month		0	0	1	0	0	0	0	1	0	0	0
	c) CSSR	>=95%	98.42%	99.62%	96.30%	99.61%	99.84%	99.03%	98.25%	98.84%	99.52%	98.90%	98.50%
	d) SDCCH/PAGING congestion	<=1%	0.00%	0.08%	0.18%	0.28%	0.01%	0.05%	0.09%	0.36%	0.00%	0.00%	0.00%
	e) TCH congestion	<=2%	0.00%	0.13%	0.53%	0.50%	0.02%	0.30%	0.13%	0.38%	0.02%	0.02%	0.10%
2	Connection maintenance												
	a) CDR	<=2%	0.61%	0.52%	1.79%	0.56%	0.36%	0.57%	0.80%	0.72%	0.35%	0.04%	0.57%

	b) Cells having > 3% TCH drop	<=3%	2.81%	0.74%	2.40%	1.40%	0.08%	3.72%	1.98%	2.02%	1.15%	0.08%	5.30%
	c) Good voice quality	>=95%	98.36%	98.97%	NA	97.91%	99.37%	97.51%	98.38%	97.80%	100.00%	99.78%	NA
	d) No. of cells > 3% TCH drop		14	58	113	100	3	176	74	166	7	2	84
	e) Total no. of cells in the network		499	7808	4703	7119	3939	4728	3743	8216	611	2511	1586
3	No. of POI's having congestion >0.5%		1	0	0	0	0	0	0	0	0	0	0
	a) Name of POI not meeting the benchmark		BSNL NLD	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	b) Total No. of circuits on POI		6,382	62,226	34,466	62,868	900	5,856	5,646	62,887	4,381	17,525	45,132
	c) Avg No. of call attempts on POI		145443	1,204,982	583266	1,479,221	346	132,148	143,514	2,194,753	32,268	197,435	577,274
	d) Avg traffic served on POI (Erlang)		3392	38,748	9857	36,327	18	3,396	4,149	35,820	608	5,128	18,195
	e) Total number of working POI Service Area wise		21	43	30	52	17	11	16	25	36	17	139
	f) Capacity of POI		5932	60139	33256	62878	528	5497	5632	62645	3868	15665	41674
	g) Equipped Capacity of Network in respect of Traffic in erlang		6136	89116	126464	91984	50000	99492	45756	140827	12600	56000	148640
	h) Total traffic handled in TCBH in erlang		1176	57490	45298	86234	40236	35953	18120	122214	1282	4322	32306
(B)	Customer Service Quality Parameters												
4	Response time to customers for assistance												
	a) Accessibility of call centre	>=95%	74.69%	100%	100%	95.81%	99.47%	100%	96.60%	100%	98.51%	99.73%	96.96%
	b) % of call answered by operators(voice to voice) within 60 sec	>=90%	60.57%	97.54%	10.69%	96.24%	93.78%	51.94%	94.69%	99.00%	94.21%	92.02%	84.23%
	c) No. of call attempts to call centre / customer care nos. during TCBH (Avg)		17,478	181,886	200	257,342	619,118	112,661	2	1,206,430	99,930	105,076	30,168
	d) No. of calls connected and answered successfully to call centre / customer care nos. during TCBH (Avg)		17,478	180,716	200	241,684	612,104	79,062	2	1,206,430	98,385	103,476	19,972

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 the operators are meeting benchmark with values lying between 0.04% and 1.66%.
- **Worst affected BTSs due to downtime (benchmark $\leq 2\%$):** All the operators are meeting benchmark with values lying between 0% and 0.06%.
- **Call setup success rate (benchmark $\geq 95\%$):** All operators are meeting the benchmark with values lying between 96.30% and 99.84%.
- **SDCCH/PAGING Channel congestion (benchmark $\leq 1\%$):** All operators are meeting the benchmark with values lying between 0% and 0.36%.
Note: CDMA operators have provided the data for Paging Channel congestion and GSM operators provided SDCCH Channel congestion.
- **TCH congestion (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0% and 0.53%.
- **Call drop rate (benchmark $\leq 2\%$):** All other operators are meeting the benchmark with values lying between 0.04% and 1.79%.
- **Cell exceeding 3% TCH drop (benchmark $\leq 3\%$):** Except for Tata GSM & Tata CDMA, rest of the operators are satisfying the benchmark with value in between 0.08% and 2.81%.
- **Connections with good voice quality (benchmark $\geq 95\%$):** All operators are meeting the benchmark with values lying between 97.51% 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 BSNL with 1 POI having calls failures $>0.5\%$. 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 is meeting the benchmark with values lying between 95.81% and 100%.
- **%age of call answered by operator (Voice to voice) (benchmark $>90\%$):** Except for Aircel, BSNL, Tata GSM & Tata CDMA, rest of the operator are meeting the benchmark with value in between 92.02% and 100%.

(2) One month audit Data report & Summarized Findings

S/N	Name of Parameter	Benchmark	Aircel	Airtel	BSNL	Idea	Recom GSM	Tata GSM	Videocon	Vodafone	MTS	Recom CDMA	Tata CDMA
			GSM Operators							CDMA Operators			
(A)	Network Service Quality Parameter												
1	Network Availability												
	a) BTS Accumulated Downtime	<=2%	0.07%	0.05%	1.62%	0.21%	0.10%	0.08%	0.08%	0.10%	0.40%	0.10%	0.07%
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.00%	1.21%	0.00%	0.00%	0.06%	0.00%	0.26%	0.51%	0.00%	0.00%
	c) Total no. of BTSs in the licensed service area		166	2,621	1,571	2,361	1,313	1,578	1,236	2,713	195	837	527
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		81.26	1012.27	18933	3745.91	947	989	716	1979	574.33	626	276.11
e) No. of BTSs having accumulated downtime of >24 hours in a month		0	0	19	0	0	1	0	7	1	0	0	
2	Connection Establishment (Accessibility)												
	a) CSSR (Call Setup Success Rate)	>=95%	98.32%	99.52%	96.56%	99.64%	99.82%	99.01%	97.40%	98.86%	99.38%	98.97%	98.70%
	b) SDCCH/PAGING congestion	<=1%	0.08%	0.07%	0.28%	0.42%	0.02%	0.04%	0.06%	0.31%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	0.01%	0.06%	0.50%	0.53%	0.01%	0.30%	0.12%	0.38%	0.01%	0.03%	0.23%
3	Connection maintenance (Retainability)												
	a) CDR	<=2%	0.63%	0.46%	1.84%	0.58%	0.36%	0.54%	0.70%	0.73%	0.35%	0.02%	0.54%
	b) Worst affected cells>3% TCH drop	<=3%	2.61%	0.70%	2.66%	1.46%	0.05%	0.85%	1.95%	1.00%	1.31%	0.08%	2.33%

	c) Good voice quality	>=95%	98.31%	98.95%	NA	97.85%	99.36%	97.47%	98.46%	97.76%	100.00%	99.78%	NA
	d) Total No. of cells exceeding 3% TCH drop (call drop)		13	55	125	104	2	40	73	82	8	2	37
	e) Total no. of cells in the network		499	7808	4703	7119	3939	4728	3743	8216	611	2511	1586
4	No. of POI's having congestion >0.5%	<=0.5%	1	0	0	0	0	0	0	0	0	0	0
	a) Name of POI not meeting the benchmark		BSNL NLD	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	b) Total No. of call attempts on POI (Avg.)		151842	1,204,810	578730	1,577,633	343	121,114	127,808	2,192,738	32,152	204,054	868,841
	c) Total traffic served on POI (Erlang) (Avg.)		3466	32,456	9709	37,480	18	2,965	3,822	36,056	662	5,517	26,793
	d) Total No. of circuits on POI		6,382	62,226	34,466	62,868	900	5,856	5,646	62,887	4,381	18,400	59,447
	e) Total number of working POI Service Area wise		21	43	30	52	17	11	16	25	36	17	153
	f) Capacity of POI		5,932	60,139	33,256	62,878	528	5,497	5,632	62,645	3,868	16,576	51,739
5	Network Data												
	a) Equipped Capacity of Network Erlang		6136	89116	126464	91984	50000	99492	45756	140827	12600	56000	148640
	b) Total traffic in TCBH in erlang (Avg.)		1106	56547	72569	87901	41613	35831	17749	123520	1296	4703	37263
	c) Total no. of customers served (as per VLR) on last day of the month		200656	2259673	1531722	3387192	1521353	1346235	413240	4152231	59891	590648	414710
(B)	Customer Service Quality Parameters												
5	Metering/billing credibility-Post paid	<= 0.1%	0.00%	0.00%	0.00%	0.08%	0.04%	0.00%	0.00%	0.01%	NA	0.00%	0.00%
	a) No. of bills issued during the period		2071	81591	22066	77232	9178	27505	0	68684	0	57534	57997
	b) No. of bills disputed including billing complaints during the period		0	1	0	63	4	0	0	6	0	1	1
6	Metering /billing credibility-Pre paid	<= 0.1%	0.00%	0.01%	0.00%	0.00%	0.02%	0.00%	0.03%	0.01%	0.01%	0.03%	0.00%
	a) No. of charging / credit / validity complaints during the quarter		17	180	0	61	648	0	282	246	30	265	0
	b) Total no. of pre-paid customers at the end of the quarter		559,344	3,285,214	2,954,963	3,759,661	3,151,009	2,232,463	965,965	4,451,116	234,403	1,035,144	799,230
7	Resolution of billing/ charging complaints	100% within 4 weeks	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		49	7121	0	918	1007	732	282	491	262	516	849
	b) Total no. of billing (post paid) and charging, credit / validity (pre paid) complaints received during the quarter		49	7121	0	918	1007	732	282	491	262	516	849
	c) No. of billing complaints (post paid) and charging, credit/ validity complaints (pre paid) resolved in favour of the customer during the quarter		17	181	0	124	652	0	282	252	30	266	1
	d) No. of complaints disposed on account of not considered as valid complaints during the quarter		32	6940	0	794	355	732	0	239	232	250	848
	e) Period of applying credit/waiver/adjustment to the customer's account from the date of resolutions of complaints	≤ 1 week	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	$\geq 95\%$	65.74%	100%	100%	99.43%	99.41%	100%	98.96%	100%	98.50%	99.68%	100%
	b) % call answered by operators(voice to voice) within 60 sec.	$\geq 90\%$	98.33%	93.92%	20.88%	97.51%	92.36%	56.33%	95.39%	99.00%	95.93%	91.35%	88.34%
	c) Total no. of call attempts to call centre & customer care nos. during TCBH (Avg.).		651,490	180,479	125,999	375,238	2,072,188	3,246,189	109,152	4,595,151	24,086	954,658	667,168
	d) No. of calls connected and answered successfully to call centre & customer care nos. during TCBH (Avg.).		428,299	180,475	125,999	373,096	2,059,982	3,246,189	108,018	4,595,151	23,724	951,618	667,168
9	Termination/closure of service	≤ 7 days	NA	100%	100%	100%	100%	100%	NA	100%	100%	100%	100%
	a) Total No. of requests for Termination / Closure of service received during the quarter		0	957	285	132	99	587	0	167	1	220	1,043
	b) No.of requests for Termination / Closure of service complied within 7 days during the quarter		0	957	285	132	99	587	0	167	1	220	1,043
10	Time taken for refunds of deposits after closures.	100% within 60 days	NA	100%	100%	100%	100%	100%	NA	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 $\leq 2\%$):** All the operators are meeting the benchmark with values lying between 0.05% and 1.62%.
- **Worst affected BTSs due to downtime (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0.00% and 1.21%.
- **Call setup success rate (benchmark $\geq 95\%$):** All operators are meeting the benchmark with values lying between 96.56% and 99.82%.
- **SDCCH/PAGING Channel congestion (benchmark $\leq 1\%$):** All operators are meeting the benchmark with values lying between 0% and 0.42%.
Note: CDMA operators have provided the data for Paging Channel congestion and GSM operators provided SDCCH Channel congestion.
- **TCH congestion (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0.01% and 0.53%.
- **Call drop rate (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0.02% and 1.84%.
- **Cell exceeding 3% TCH drop (benchmark $\leq 3\%$):** All operators are satisfying the benchmark with value in between 0.05% and 2.66%.
- **Connections with good voice quality (benchmark $\geq 95\%$):** All the GSM operators are meeting the benchmark with values lying between 97.47% 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 BSNL with 1 POI's were having call failures >0.5 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 Aircel, rest of the operators are meeting the benchmark with values lying between 98.5% and 100%.
- **%age of call answered by operator (Voice to voice) (benchmark $>90\%$):** Except for BSNL, Tata GSM & Tata CDMA, rests of the operators are meeting the benchmark with values lying between 91.35% and 99.42%.
- **Metering and billing credibility-Postpaid (benchmark $\leq 0.1\%$):** All the operators are meeting the benchmark.
- **Metering and billing credibility-Pre paid (benchmark $\leq 0.1\%$):** All the operators are meeting the benchmark with values lying between 0% and 0.10%.
- **Resolution of billing/ charging complaints (benchmark 100% within 4 weeks):** All operators are meeting the benchmark.
- **Termination/Closure of service (Benchmark ≤ 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:

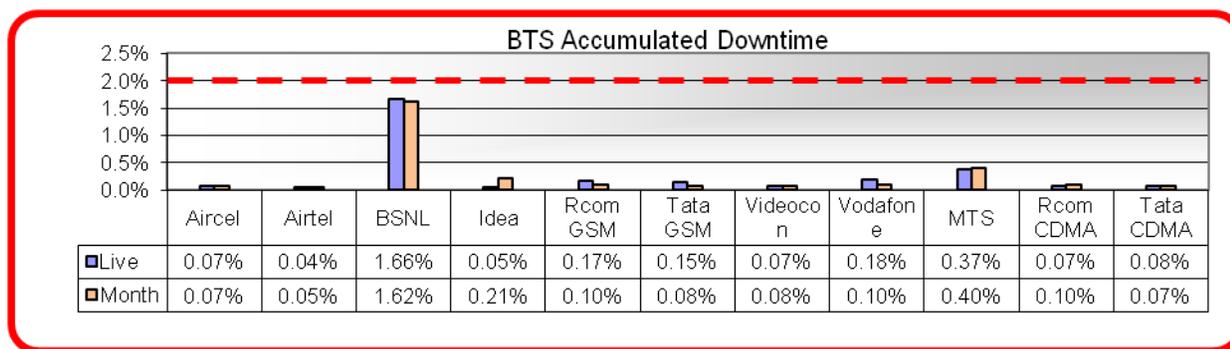
Sl.	Name of Service Provider	No. of MSC/GMSC	No. of BSC	No. of BTS
GSM Operators				
1	Aircel Ltd	2	2	166
2	Airtel Ltd	7	23	2621
3	BSNL	7	24	1571
4	Idea	7	27	2361
5	Reliance Communication	1	8	1313
6	Tata	2	12	1578
7	Videocon	1	8	1236
8	Vodafone	7	47	2713
CDMA Operators				
9	MTS	1	1	195
10	Reliance Communication	3	Nil	837
11	Tata	5	10	527

4) Performance (Graphical Representation)

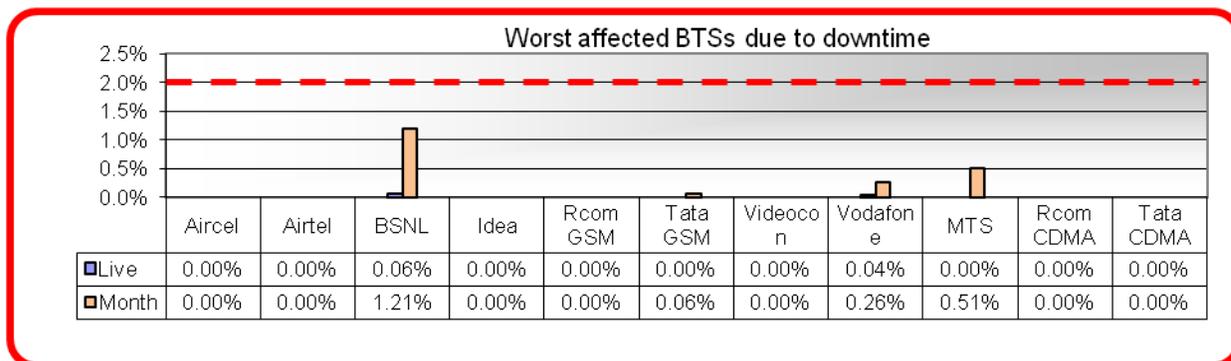
Comparison between Live measurements and One month data Audit – Cellular Mobile Telephone Services

A) NETWORK PERFORMANCE

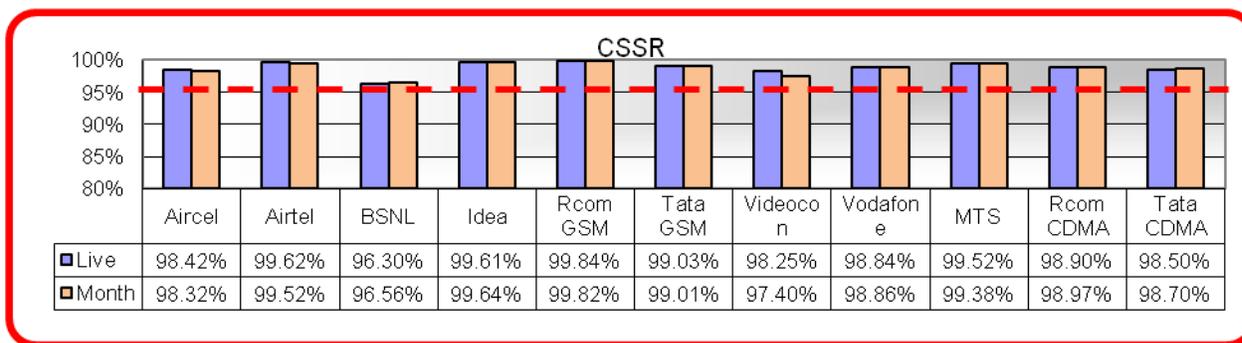
BTS accumulated downtime: All the operators are meeting the TRAI benchmarks ($\geq 2\%$) for both one month data and 3 days live data taken in the month of audit.



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

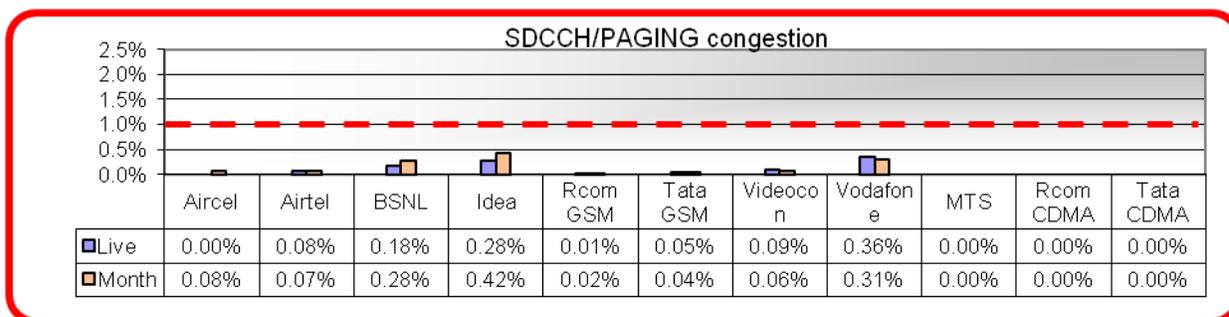


Call Setup Success Rate (CSSR): All operators are meeting the TRAI benchmarks ($\geq 95\%$) for both one month data and 3 days live data taken in the month of audit.

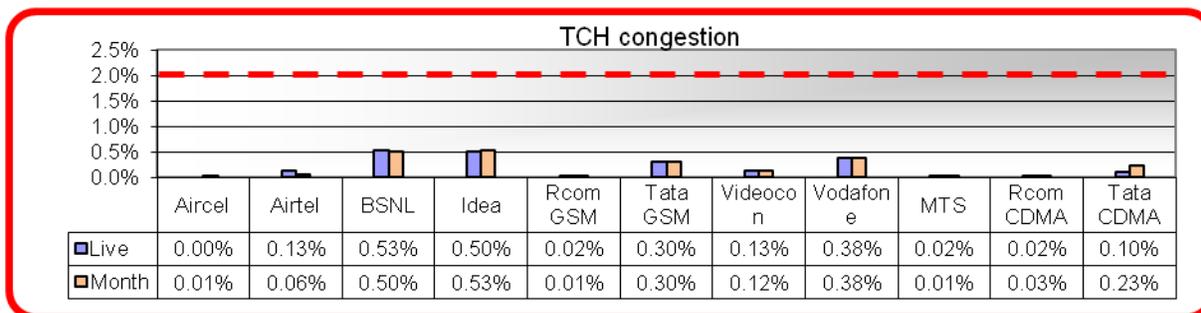


Blocked call rate:

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

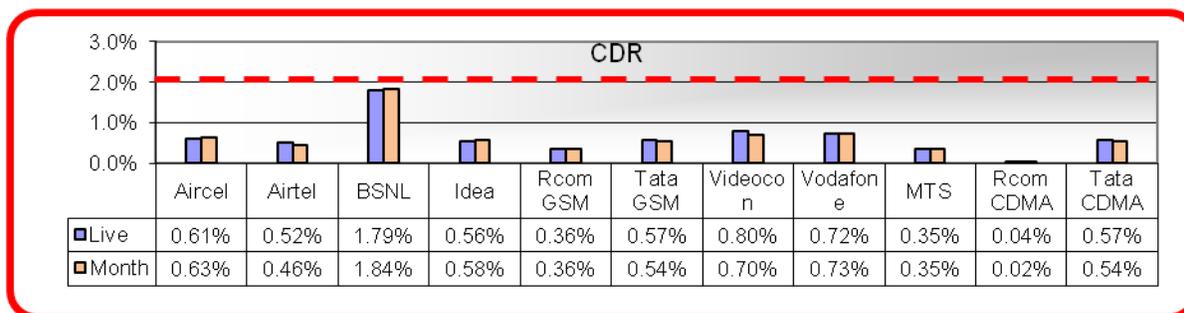


TCH congestion (%): All operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data.

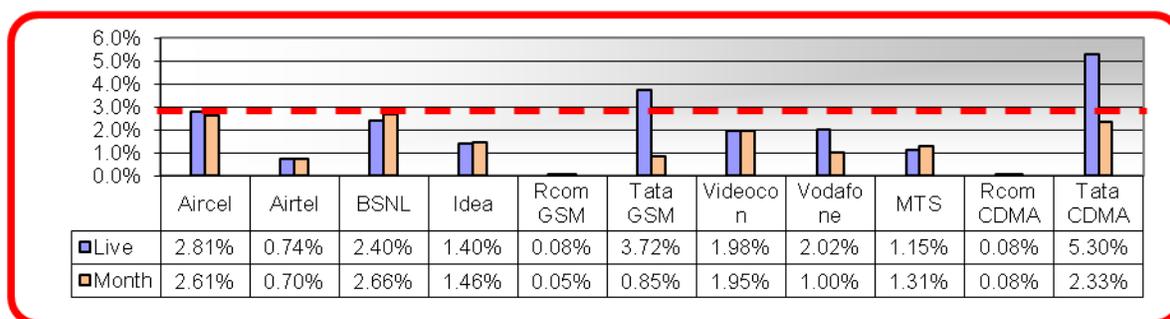


Connection Maintainability (Retainability):

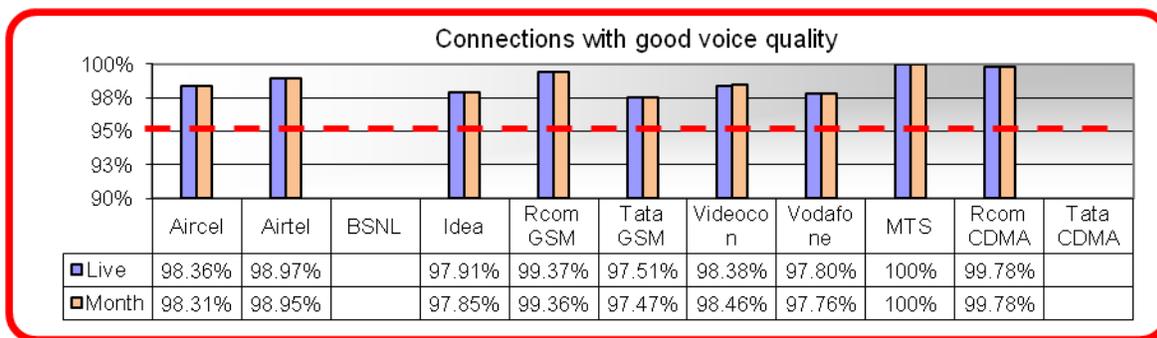
Call Drop Rate (CDR) (%): All the operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data.



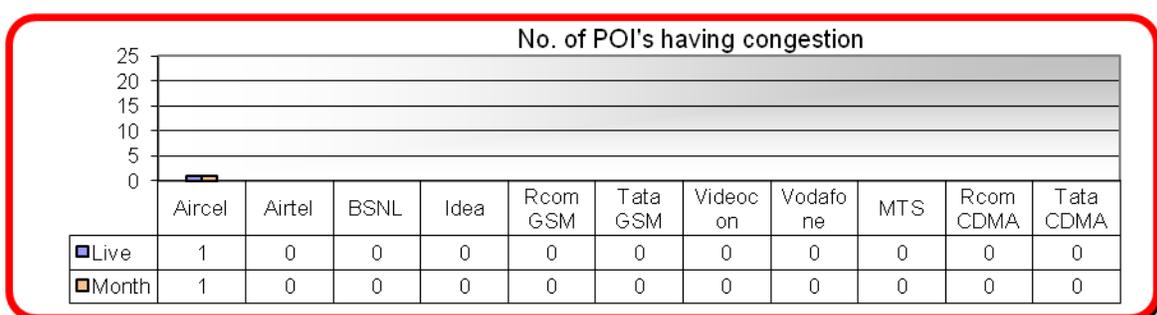
Worst affected Cell exceeding 3% TCH Drop: Except for Tata GSM & Tata CDMA for live audit, rests of the operators are meeting the benchmark for both cases.



Percentage of connections with good voice quality (benchmark $\geq 95\%$): All operators are meeting the TRAI benchmarks ($\geq 95\%$) for both one month data and 3 days live data taken in the month of audit. For BSNL & Tata CDMA values are not system generated.



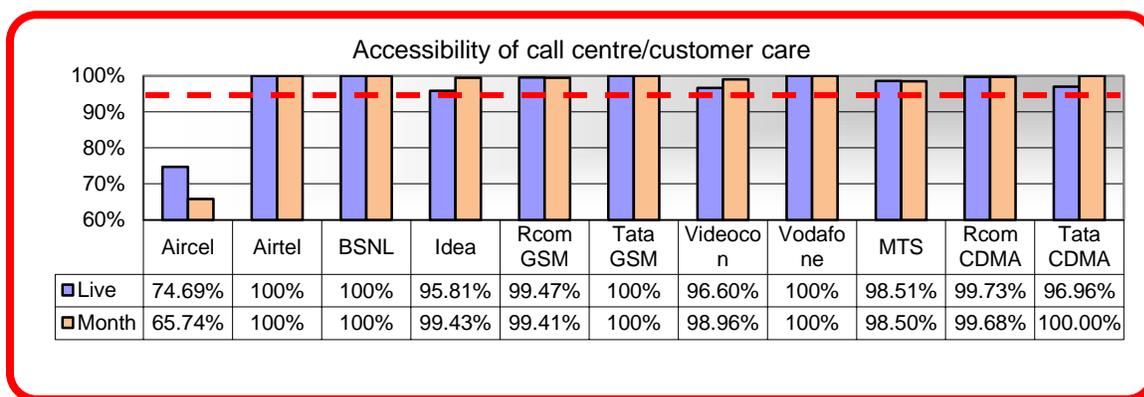
No of POI's having Congestion >0.5%: For both Live and month audit; only BSNL is not meeting the benchmark.



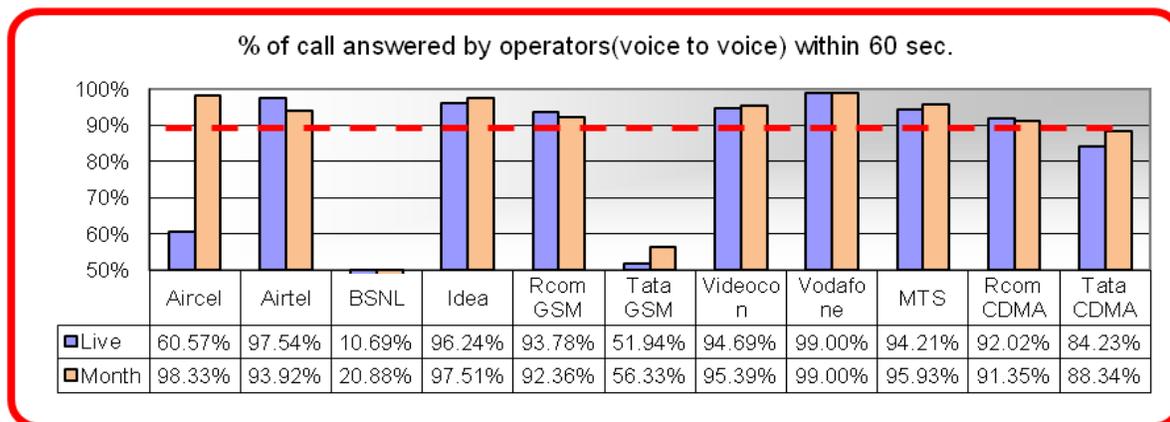
B) CUSTOMER SERVICE QUALITY PARAMETERS

Response time to the customer for assistance:

Percentage of call answered (Electronically): All operators are meeting the TRAI benchmarks ($\geq 95\%$) for both one month data and 3 days live data except for Aircel for both cases.



Percentage of call answered by operators (Voice to voice) within 60 sec: Except for Aircel, BSNL & Tata GSM, rest of the operators are meeting the benchmark.



5) Critical Analysis

From the data table it can be seen that most of the operators are meeting the TRAI benchmark except for Tata GSM & Tata CDMA for the parameter “worst affected cells >3% Drop”.

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 BSNL, 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.

In case of response time to customer assistance, Aircel is not meeting benchmark for parameter “Accessibility of call centre” while Aircel, BSNL & Tata GSM are not meeting in for the parameter “% call answered by voice-voice”.

(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 based on live calling for billing complaints

Calling Operator	Aircel	Airtel	Idea	Rcom GSM	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA
Total No. of Calls Attempted	49	100	100	100	100	100	100	100	100
Total No. of calls Answered	38	70	87	76	67	62	57	89	75
Cases resolved with 4 weeks	38	70	87	76	67	62	57	89	75
%age of cases resolved	100%	100%	100%	100%	100%	100%	100%	100%	100%

Note: The difference shows between the attempted and answered calls is because of the possibility of not reachable, switched off etc.

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	Videocon	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	95	92	95	97	93	94	98	94	97	95	94
%age of calls got answered	95%	92%	95%	97%	93%	94%	98%	94%	97%	95%	94%

- (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.		Aircel	Airtel	BSNL	Idea	RCOM GSM	Tata GSM	Vodafone	Video con	MTS	RCO M CDM A	Tata CDMA	
Fatehabad													
100	Police	1	1	1	1	1	ICR (Airtel)	1	1	ICR (Tata CDMA)	1	1	
101	Fire	1	1	1	1	1		1	1		1	1	1
102	Ambulance	1	1	1	1	1		1	1		1	1	1
139	Railway	2	2	2	2	2		2	2		2	2	2
Jhajjar													
100	Police	ICR (Tata GSM)	1	1	1	1	1	1	1	ICR (Tata CDMA)	1	1	
101	Fire		1	1	1	1	1	1	1		1	1	
102	Ambulance		1	1	1	1	1	1	1		1	1	
139	Railway		2	2	2	2	2	2	2		2	2	
Karnal													
100	Police	ICR (Tata GSM)	1	1	1	1	1	1	1	1	1	1	
101	Fire		1	1	1	1	1	1	1	1	1	1	
102	Ambulance		1	1	1	1	1	1	1	1	1	1	
139	Railway		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.

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. The values were lying between 92% and 100%.

Level 1 call testing was done in all the listed Drive test locations (Fatehabad, Jhajjar & Karnal) to the nos. (100, 101, 108 & 139) emergency calls were connecting to their local canter. 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 calling

Calling Operator	Aircel	Airtel	BSNL	Idea	Reliance (GSM)	Tata (GSM)	Video con	Vodafone	MTS	Reliance (CDMA)	Tata (CDMA)
	Karnal										
Aircel	-	100%	99%	100%	99%	100%	100%	100%	100%	100%	100%
Airtel	100%	-	100%	100%	100%	100%	100%	100%	100%	100%	100%
BSNL	100%	99%	-	98%	100%	100%	100%	100%	100%	100%	100%
Idea	100%	99%	99%	-	100%	100%	100%	100%	99%	100%	100%
Reliance (GSM)	100%	100%	100%	100%	-	100%	100%	100%	100%	100%	100%
Tata (GSM)	100%	100%	100%	100%	100%	-	100%	100%	100%	100%	100%
Videocon	100%	100%	100%	100%	100%	100%	-	100%	100%	100%	100%
Vodafone	100%	100%	100%	100%	100%	100%	100%	-	100%	100%	100%
MTS	100%	100%	100%	100%	100%	100%	100%	100%	-	100%	100%
Reliance (CDMA)	100%	100%	100%	100%	100%	100%	100%	100%	100%	-	100%
Tata (CDMA)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	-

(3) Critical Analysis

In the inter-operator call assessment test, calls were made from one operator to other operators so as to check congestion on both the operators' network. In such cases, the radio part, switch part & the POI in-between the operators are involved and hence if any congestion is found in the network, it may be due to any of these parts. The results are shown satisfactory.

(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 50-100Km depending on city areas within the speed limit of 30Km/hr.

DRIVE TEST LOCATIONS***FATEHABAD***

LOW DENSE: SECTOR 3,, SH 2, NH 10 , BIGHAD ROAD, PWO COLONY, MELA GROUND MINI SECRETARIAT
 MEDIUM DENSE: NAHAR COLONY, INDORA FILLING STN. GOVT. COLLEGE WOMEN, SH 21,
 HIGH DENSE: FATEHABAD CITY, MODEL TOWN FBT, MODEL TOWN, CHILLI LAKE, NH 10 , SH 21, GOVT. HOSP.,THANA ROAD, MANOHAR MEMOIAL COLLEGE

JHAJJAR

LOW DENSE: MALHAN CRICKET ACADEMY, PUMP HOUSE, GOVT. COLLEGE OF TECHNOLOGY, DC OFFICE
 MEDIUM DENSE: DEFENCE COLONY, NEW BUS STAND, MOHINDRA PUBLIC SCHOOL, GENERAL HOSPITAL, SHAHEEDI PARK, POST OFFICE
 HIGH DENSE: ARYA NAGAR, RANYA COLONY, BSNL EXCHANGE, KOSLI CHOWK, SHIKARA NAGAR, BUS STAND, CANAL REST HOUSE,NIMT, GOVT. BOYS SCHOOL, GOVT. GIRLS SCHOOL

KARNAL

LOW DENSE: NH 1, ITI CHOWK, PHUSGARH, SEC 8, SEC 6 , SEC 7, SEC 9, ATAL PART, KARNESHWAR MANDIR
 MEDIUM DENSE: GEETA COLONY, SHIV COLONY, PREM NAGAR, RAM NAGAR ,ASHOK HOTEL, NAYAI PURI, RAMESH NAGAR, NEW RAMESH NAGAR, SADAR BAZAR
 HIGH DENSE: MOODAL TOWN, SEC 12,, SEC 13, SEC 14, BUS STAND, KARAN GATE,ESCORTS AGENCYBANSO GATE, SEC 12KARNAL

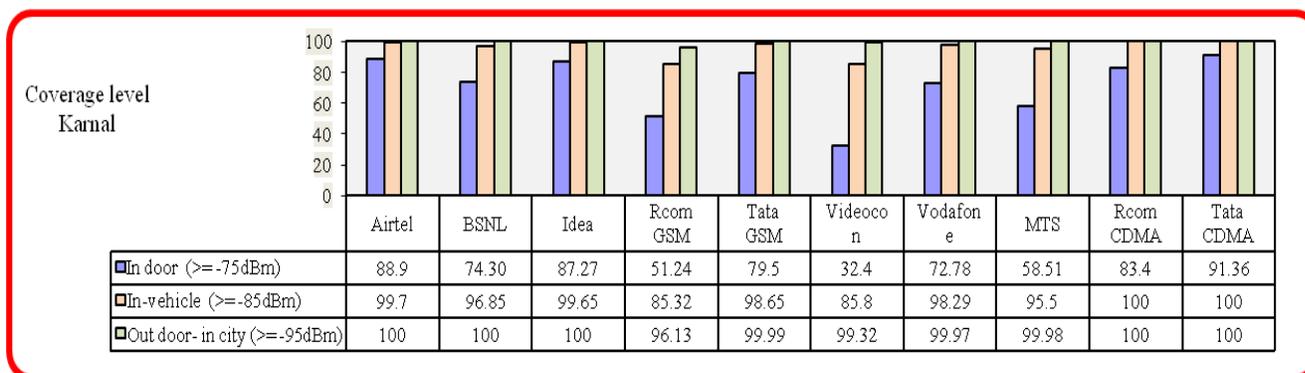
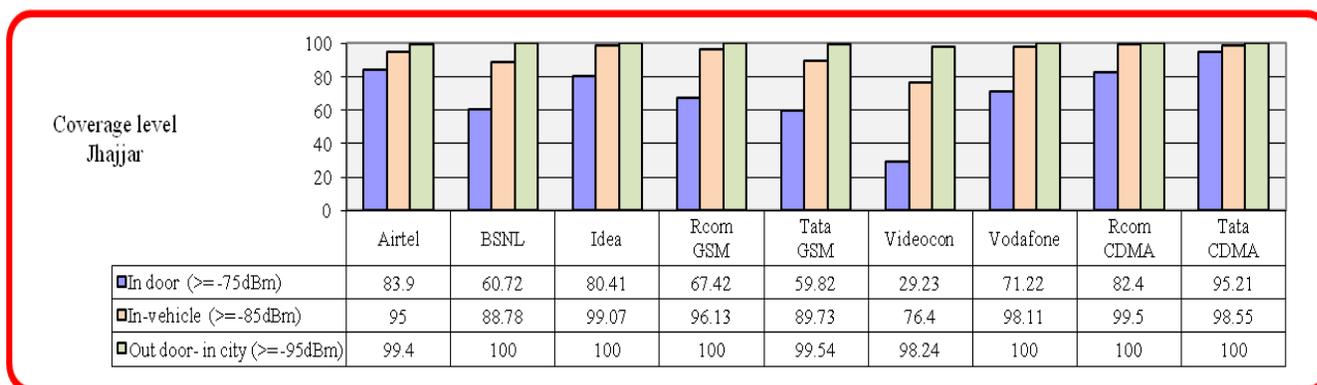
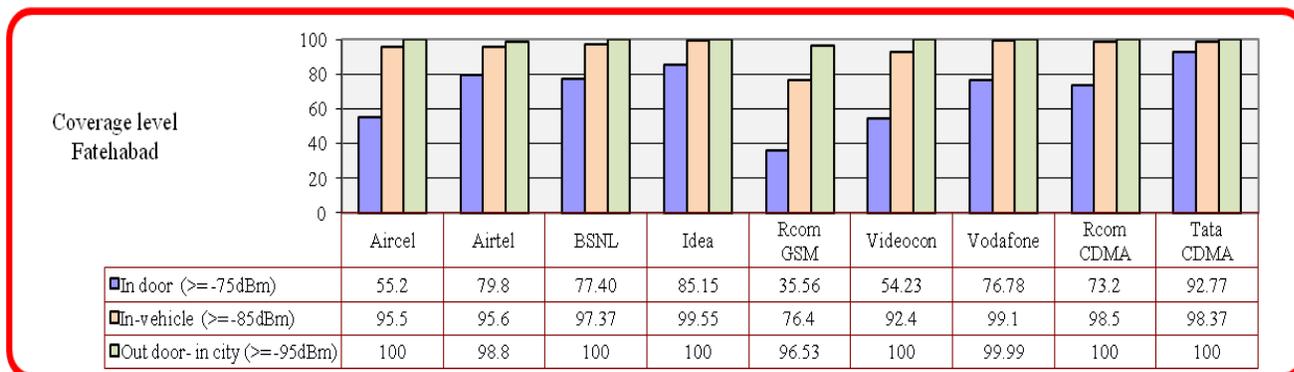
2) Performance (for the respective cities for Haryana Circle)

SN	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA	
			GSM Operators								CDMA Operators			
1.1	Call Attempts	Fatehabad	93	89	49	76	112	ICR (Aircel)	84	97	ICR (Tata CDMA)	112	86	
		Jhajjar	ICR (Tata GSM)	59	37	51	84	61	51	70		84	54	
		Karnal	ICR (Tata GSM)	62	40	64	98	110	81	109	62	99	109	
1.2	Blocked Call Rate (<=3%)	Fatehabad	2.15	1.13	2.04	0	0	ICR (Aircel)	0	0	ICR (Tata CDMA)	0	0	
		Jhajjar	ICR (Tata GSM)	0	0	0	0	0	0	0		0	0	
		Karnal	ICR (Tata GSM)	0	0	0	0	4.55	1.24	0	1.61	1.02	0.92	
1.3	Dropped Call Rate (<=2%)	Fatehabad	0	0	0	0	0	ICR (Aircel)	0	0	ICR (Tata CDMA)	0	0	
		Jhajjar	ICR (Tata GSM)	0	0	0	0	0	0	0		0	0	
		Karnal	ICR (Tata GSM)	0	0	0	0	0	0	0	0	1.02	0	
1.4	Percentage of connections with good voice quality (=>95%)													
		(i) 0-4 (w/o frequency hopping)	Fatehabad									ICR (Tata CDMA)	99.97	98.73
		Jhajjar										99.62	96.77	
	Karnal									96.24	98.48	95.58		
	(ii) 0-5 (with frequency hopping)	Fatehabad	96.5	100	95.00	96.09	98	ICR (Aircel)	96	95.69				
		Jhajjar	ICR (Tata GSM)	100	95	95.14	99.35	97.09	95.67	95.88				
Karnal		ICR (Tata GSM)	96.12	95.4	95.96	97.12	95.1	95.55	95.68					

	Service Coverage (%)												
1.5	In door (>= -75dBm)	Fatehabad	55.2	79.8	77.40	85.15	35.56	ICR (Aircel)	54.23	76.78	ICR (Tata CDMA)	73.2	92.77
		Jhajjar	ICR (TATA GSM)	83.9	60.72	80.41	67.42	59.82	29.23	71.22		82.4	95.21
		Karnal	ICR (TATA GSM)	88.9	74.30	87.27	51.24	79.5	32.4	72.78	58.51	83.4	91.36
	In-vehicle (>= -85dBm)	Fatehabad	95.5	95.6	97.37	99.55	76.4	ICR (Aircel)	92.4	99.1	ICR (Tata CDMA)	98.5	98.37
		Jhajjar	ICR (TATA GSM)	95	88.78	99.07	96.13	89.73	76.4	98.11		99.5	98.55
		Karnal	ICR (TATA GSM)	99.7	96.85	99.65	85.32	98.65	85.8	98.29	95.5	100	100
	Outdoor- in city (>= -95dBm)	Fatehabad	100	98.8	100	100	96.53	ICR (Aircel)	100	99.99	ICR (Tata CDMA)	100	100
		Jhajjar	ICR (TATA GSM)	99.4	100	100	100	99.54	98.24	100		100	100
		Karnal	ICR (TATA GSM)	100	100	100	96.13	99.99	99.32	99.97	99.98	100	100
1.6	Call Setup Success Rate (>=95%)	Fatehabad	97.85	98.87	97.96	100	100	ICR (Aircel)	100	100	ICR (Tata CDMA)	100	100
		Jhajjar	ICR (Tata GSM)	100	100	100	100	100	100	100		100	100
		Karnal	ICR (Tata GSM)	100	100	100	100	95.45	98.76	100	98.39	98.98	99.08

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:

- ✚ Tata GSM is not meeting the benchmark for the parameter “Blocked Call Rate” in Karnal Town.

(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 “**Rewari & Panipat**”. For testing the service provider performance on ground level, TCIL auditors 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 30 to 60 Km for both cities depending upon the city areas within the speed limit of 30-40Km/hr.

Drive Test Locations and Service Provider’s name:

- | | | |
|------------|---|------------------------------|
| 1. Rewari | - | Idea, Vodafone |
| 2. Panipat | - | Reliance GSM , Reliance CDMA |

Area Coverage Details:**1) Rewari**

RAILWAY STATION, JAIN PUBLIC SCHOOL, DHARUHEDA CHUNGI, BUS STAND, BMG MALL, NAIWALA CHOWK, KIDZEE SCHOOL, GOKUL GATE, BAWAL CHOWK

2) Panipat

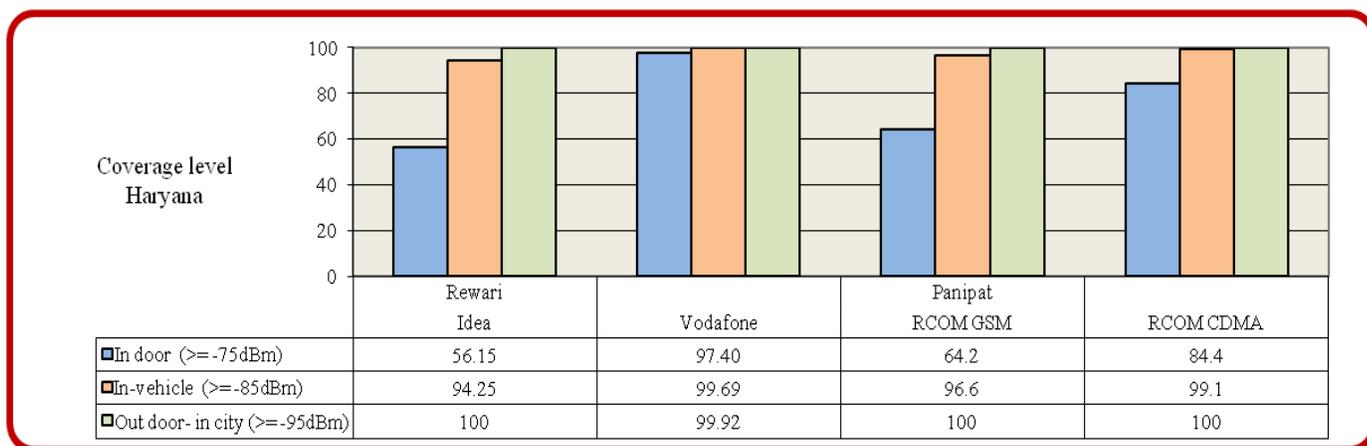
Churu fort, Bus Stand, Bhawani Resorts, Modern Public School, Railway Station, Gandhi Nagar, Agrasen Nagar, Loco Colony, Shekhawat Colony, Poonia Colony, Van Vihar.

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

SN	Parameter	Idea	Vodafone	RCOM GSM	RCOM CDMA
		Rewari		Panipat	
1.1	Call Attempts	57	71	171	171
1.2	Blocked Call Rate (<=3%)	1.75	0.00	0.00	0.00
1.3	Dropped Call Rate (<=2%)	0.00	0.00	0.00	0.00
1.4	Percentage of connections with good voice quality (=>95%)				
	(i) 0-4 (w/o frequency hopping)				99.9
	(i) 0-5 (with frequency hopping)	97.6	94.88	98.22	
1.5	Service Coverage (%)				
	In door (>= -75dBm)	56.15	97.40	64.2	84.4
	In-vehicle (>= -85dBm)	94.25	99.69	96.6	99.1
	Out door- in city (>= -95dBm)	100	99.92	100	100
1.6	Call Setup Success Rate (>=95%)	98.25	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

- Vodafone is not meeting the benchmark for the parameter “Good Voice Quality” in Rewari Town.

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

From live, month and Drive Tests findings, it can be concluded that on an average, performance of the operators in the service area (Haryana) is satisfactory for most of the Network Parameters except for Tata GSM & Tata CDMA for the parameter “worst affected cells for >3% drops”.

Under Drive Test section, Tata GSM failed to meet benchmark for “Blocked Call rate in Karnal Town.

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

Regarding **Metering/Billing Credibility** issues, all operators are meeting the benchmark.

II. Basic Telephone Service (Wireline) Providers

- Not conducted for this quarter

III. Broadband Service Providers

- Not conducted for this quarter