

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

Report Period: OCT 2011 – DEC 2011

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

CHAPTER-1: INTRODUCTION

I. Background

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

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

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

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

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

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

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

II. Objectives and Methodology

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

- i) Verification of the data submitted by the service providers to TRAI as part of QoS monitoring reports i.e. Quarterly Performance Monitoring Reports (PMRs) and monthly Point of Interconnection (POI) Congestion Reports with reference to the records maintained by the service provider.
- ii) Verification of the performance of service providers against the Quality of Service benchmarks laid down by TRAI using live measurement for 3 days during the month in which the audit and assessment is carried out.
- iii) Verification of the performance of service providers against the Quality of Service benchmarks laid down by TRAI using the data for the entire month during which the live measurement is carried out.
- iv) Drive tests of the mobile networks both operators assisted and independent drive test (as and where required).
- v) Billing and call center's data verification.
- vi) Live testing of the efficiency of the call center / customer care help line.
- vii) Emergency Level-1 live calling

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 HP 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 HP Circle in 4th quarter (Oct – Dec 2011). The primary data collection and verification of records (PMR data verification – quarterly) maintained by various operators was undertaken during the period April – June 2011.

Following are the various operators covered in HP 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	Oct	20 Hrs - 21 Hrs
2	Airtel Ltd	Oct	19 Hrs - 20 Hrs
3	Idea	Oct	20 Hrs - 21 Hrs
4	Stel	Oct	21 Hrs - 22 Hrs
5	BSNL	Oct	20 Hrs – 21 Hrs
6	RTL(GSM)	Nov	20 Hrs - 21 Hrs
7	TTSL (GSM)	Oct	20 Hrs- 21Hrs
8	Videocon	Oct	19 Hrs- 20Hrs
9	Vodafone	Oct	20 Hrs - 21 Hrs
CDMA Operators			
10	MTS	Oct	19 Hrs- 20 Hrs
11	Reliance Communication (CDMA)	Nov	20 Hrs - 21 Hrs
12	TTSL (CDMA)	Oct	19 Hrs - 20 Hrs

All the NSS and BSS systems were considered for audit and assessment for the TCBH hours of individual operators.

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	Idea	Stel	BSNL	Rcom GSM	TTSL GSM	Videoc on	Vodafon e	MTS	Rcom CDMA	Tata CDMA
S/ N	Name of Parameter		GSM Operators							CDMA Operators				
(A) 1	Network Service Quality Parameter													
	BTS Accumulated Downtime	<=2%	0.10%	0.09%	0.12%	0.10%	1.88%	0.32%	ICR with Aircel	0.00%	0.06%	3.54%	0.11%	0.01%
	Worst affected BTS due to downtime	<=2%	0%	0.09%	0%	0%	1.80%	0.00%		0%	0%	0%	0%	0%
1	Connection Establishment (Accessibility)													
	a) CSSR (Call Setup Success Rate)	>=95 %	99.58%	99.68 %	99.04 %	99.94%	97.49 %	99.78%		99.92 %	98.95%	100.00%	99.91%	99.86%
	b) SDCCH/PAGING congestion	<=1%	0.01%	0.11%	0.17%	0.05%	0.71%	0.02%		0.08%	0.38%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	0.41%	0.21%	0.79%	0.01%	1.80%	0.20%		0.00%	0.67%	0.00%	0.09%	0.14%
2	Connection maintenance (retainability)													
	a) CDR	<=2%	1.04%	1.00%	0.97%	0.63%	1.84%	0.70%		0.67%	0.94%	1.11%	1.00%	0.25%
	b) Worst affected cells>3% TCH drop	<=3%	13.41%	2.80%	2.09%	4.07%	4.90%	0.63%		0.00%	2.71%	3.03%	0.36%	1.61%
	c) Good voice quality	>=95 %	95.80%	98.62 %	96.15 %	96.51%	96.25 %	98.03%		99.19 %	97.30%	NA	NA	NA
3	No of POI having > 0.5% congestion	<=0.5 %	0	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 %	100%	NP	100%	NP	100%	99%	100%	100%	100%	No calls on call centre	96%	100%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90 %	93.25%	99.86 %	97.18 %	95.26%	95.58 %	87.82%	98.16 %	100.00 %	96.27%		97.89%	94.07%

From the 3 days live data assessment, it is found that all the operators are meeting the network parameters, except MTS in BTS accumulated downtime parameter and Aircel, Stel, BSNL & MTS for “Worst affected cells>3% TCH drop”. Performance related to customer care data is found to be satisfactory for most of the operators except RCOM (GSM), for “calls answered by operators (voice-to-voice)”, However In "accessibility of call centre” Parameter Airtel & STEL has not provided the data, due to not generating IVR report from system. TTSL GSM is having an ICR agreement with Aircel. In customer care part, MTS has not reported any data because it has very small base and that is his own.

One Month Data Audit		Bench- mark	Aircel	Airtel	Idea	Stel	BSNL	Rcom GSM	TTSL GSM	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA	
S/N	Name of Parameter		GSM Operators									CDMA Operators			
(A)	Network Service Quality Parameter														
1	Network Availability														
	a) BTS Accumulated Downtime	<=2%	0.10%	0.03%	0.10%	0.39%	1.89%	0.28%	ICR with Aircel	0.00%	0.04%	0.45%	0.16%	0.04%	
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.26%	0.00%	1.14%	1.90%	1.10%		0.00%	0.00%	0.00%	0.00%	0.55%	
2	Connection Establishment (Accessibility)														
	a) CSSR (Call Setup Success Rate)	>=95%	99.71%	99.66%	97.71%	99.92%	97.45%	99.83%		99.86%	99.29%	100%	99.86%	99.85%	
	b) SDCCH/PAGING congestion	<=1%	0.03%	0.13%	0.61%	0.03%	0.75%	0.03%		0.14%	0.10%	0.00%	0.00%	0.00%	
	c) TCH congestion	<=2%	0.26%	0.21%	1.68%	0.05%	1.80%	0.14%		0.00%	0.61%	0.00%	0.14%	0.15%	
3	Connection maintenance (retainability)														
	a) CDR	<=2%	0.98%	1.06%	1.16%	0.61%	1.81%	0.69%		0.69%	0.86%	0.58%	1.04%	0.26%	
	b) Worst affected cells>3% TCH drop	<=3%	12.81%	2.77%	2.39%	4.19%	4.83%	0.47%		0.00%	2.75%	3.03%	0.36%	1.97%	
	c) Good voice quality	>=95%	95.77%	98.63%	95.82%	96.44%	95.50%	98.07%		98.53%	97.31%	0.00%	0.00%	0.00%	
4	No of POI having > 0.5% congestion	<=0.5%	0	0	0	0	0	0	0	0	0	0	0	0	
(B)	Customer Service Quality Parameters														
5	Metering/billing credibility-Post paid	<= 0.1%	0.00%	0.01%	0.00%	NA	0.02%	0.05%	0.00%	NA	0.00%	NA	0.05%	0.07%	
6	Metering /billing credibility-Pre paid	<= 0.1%	0.01%	0.00%	0.01%	0.03%	0.02%	0.04%	0.01%	0.00%	0.02%	0.00%	0.01%	0.01%	
7	Resolution of billing/ charging complaints	100% within 4 weeks	100%	100%	100%	100%	100%	100%	100%	NA	100%	NA	100%	100%	
	a) Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	<=1 week	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
8	Response time to customers for assistance														
	a) Accessibility of call centre/Customer Care	>=95%	100%	98%	97%	NP	100%	99%	100%	100%	100%	No calls on call centre	99%	100%	
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	90.34%	98.89%	98.86%	90.64%	96.41%	92.31%	96.61%	100.00%	97.22%		96.43%	97.44%	
9	Termination/closure of service	<=7days	100%	100%	100%	100%	100%	100%	100%	NA	100%	0%	100%	100%	
10	Time taken for refunds of deposits after closures.	100% within 60 days	100%	100%	100%	NA	100%	100%	100%	NA	100%	NA	100%	100%	

From the month data assessment, it is observed that all the operators are meeting the network parameters, except Aircel (12.81%), STel (4.19%), BSNL (4.83%) & MTS (3.03%) which are not meeting the benchmark for "Worst affected cells>3% TCH drop". However TTSL GSM is having an ICR agreement with Aircel in HP. Videocon has reported its own base RF data.

Performance related to customer care data is found to be satisfactory for all the operators, except MTS, which has its own small base of customer, and not provided any data for these parameter. STEL has provided Customer care IVR(electronically) data in Live and Month of audit.

Operator-Assisted Drive Test

The Operator Assisted Drive Test was conducted at HP Circle for all the operators. Route covered was about around 30-40 Km depending on city areas within the speed limit of 30-35 Km/hr. The cities covered were Dharamshala, Chamba and Kullu. 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	RTL GSM	STEL	Vodafone	TTSL CDMA	Rcom CDMA
1.1	Blocked Call Rate (<=3%)	Dharamshala	0.0%	0.0%	3.03%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Chamba	0.0%	0.0%	5.26%	0.0%	0.0%	NS	0.0%	0.0%	0.0%
		Kullu	0.0%	0.0%	1.61%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1.2	Dropped Call Rate (<=2%)	Dharamshala	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Chamba	0.0%	0.0%	0.0%	0.0%	0.0%	NS	0.0%	0.0%	0.0%
		Kullu	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1.3	Percentage of connections with good voice quality (>=95%)										
	(i) 0-4 (w/o frequency hopping)	Dharamshala								98.55%	99%
		Chamba								100%	100%
		Kullu								99.33%	100%
	(ii) 0-5 (with frequency hopping)	Dharamshala	96.40%	96.10%	96.00%	95.20%	97.00%	97.50%	96.80%		
		Chamba	98.40%	95.30%	96.80%	97.00%	99.00%	NS	98.00%		
		Kullu	98.20%	97.60%	95.10%	97.50%	98.00%	98.50%	98.10%		
1.4	Call Setup Success Rate (>=95%)	Dharamshala	100%	100%	96.97%	100%	100%	100%	100%	100%	100%
		Chamba	100%	100%	94.76%	100%	100%	NS	100%	100%	100%
		Kullu	100%	100%	98.39%	100%	100%	100%	100%	100%	100%

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

NS—No Service

- 'Blocked Call Rate' benchmark is not met by BSNL in Dharamshala (3.03%) and Chamba (5.26%).
- For the parameter ' Call Setup Success rate ' it is found that only BSNL in Chamba (94.76%) is not meeting the benchmark respectively.
 - . STEL has no services offered in Chamba.

NOTE-- TTSL (GSM) and VIDEOCON have an ICR agreement with AIRCEL in HP Circle.

Independent Drive Test:- The Independent Drive Test was conducted at HP circle. Route covered was about around 25-30 Km depending on city areas within the speed limit of 25-30 Km/hr Nahan, Hamirpur & Mandi. Here again, zones were selected for covering different density areas (High, Medium & Low dense areas) .

SN	Parameter	RTL (Nahan)	S Tel (Hamirpur)	Vodafone (Mandi)
1.1	Call Attempts	24	24	31
1.2	Blocked Call Rate (<=3%)	0%	0%	0%
1.3	Dropped Call Rate (<=2%)	0%	0%	0%
1.4	Percentage of connections with good voice quality (=>95%)			
	(i) 0-5 (with frequency hopping)	98%	98.60%	99.50%
1.5	Service Coverage(%)			
	In door (>= -75dBm)	76%	95.59%	88.40%
	In-vehicle (>= -85dBm)	99%	99.54%	98.90%
	Out door- in city (>= -95dBm)	100%	100%	100%
1.6	Call Setup Success Rate (>=95%)	100%	100%	100%
1.7	Handover Success Rate (%)	100%	100%	100%

CHAPTER-3: AUDIT-PMR VERIFICATION (April 2011—June 2011)

I. Cellular Mobile Telephone Service

PMR		Bench-mark	Audit	Aircel	Airtel	BSNL	IDEA	RTL GSM	STEL	Vi-Con	V-fone	MTS	RCOM CDMA	TTSL CDMA	
S/N	Name of Parameter			GSM Operators								CDMA Operators			
(A)	Network Service Quality Parameter														
1	Network Availability														
	BTS Accumulated Downtime	<=2%	Reported	0.05%	0.04%	1.87%	0.31%	0.00%	0.00%	0.28%	0.01%	0.00%	0.00%	0.00%	
			Verified	0.05%	0.04%	1.87%	0.31%	0.00%	0.00%	0.28%	0.01%	0.00%	0.00%	0.00%	
	Worst affected BTSs due to downtime	<=2%	Reported	0.00%	0.09%	1.83%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Verified			0.00%	0.09%	1.83%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
2	Connection Establishment (Accessibility)														
	CSSR (Call Setup Success Rate)	>=95%	Reported	99%	99%	95%	99%	99%	99%	98%	100%	66%	100%	100%	
			Verified	99%	99%	95%	99%	99%	99%	98%	100%	66%	100%	100%	
	SDCCH/PAGING congestion	<=1%	Reported	0.07%	0.12%	0.70%	0.53%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
			Verified	0.07%	0.12%	0.70%	0.53%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
	TCH congestion	<=2%	Reported	0.41%	0.27%	1.87%	0.90%	0.00%	0.00%	0.56%	0.00%	0.00%	0.00%	0.06%	
Verified			0.41%	0.27%	1.87%	0.90%	0.00%	0.00%	0.56%	0.00%	0.00%	0.00%	0.06%		
3	Connection maintenance (retainability)														
	CDR	<=2%	Reported	0.90%	1.02%	1.90%	1.66%	0.00%	0.00%	0.90%	0.01%	0.40%	0.00%	0.17%	
			Verified	0.90%	1.02%	1.90%	1.66%	0.00%	0.00%	0.90%	0.01%	0.40%	0.00%	0.17%	
	Worst affected cells>3% TCH drop	<=5%	Reported	0.13%	0.03%	4.87%	2.62%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.82%	
			Verified	0.13%	0.03%	4.87%	2.62%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.82%	
	Good voice quality	>=95%	Reported	95%	99%	96%	96%	97%	97%	100%	97%	66%	96%	100%	
Verified			95%	99%	96%	96%	97%	97%	100%	97%	66%	96%	100%		
4	No of POI congestionhaving >0.5%	>=0.5%	Reported	0	0	0.02	0	2	0	0	0	0	0	0	
			Verified	0	0	0.02	0	2	0	0	0	0	0	0	
(B)	Customer Service Quality Parameters														
5	Metering/billing credibility-Post paid	<= 0.1%	Reported	0.00%	0.00%	0.10%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
			Verified	0.00%	0.00%	0.10%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	

PMR		Bench-mark	Audit	Aircel	Airtel	BSNL	IDEA	RTL GSM	STEL	Vi-Con	V-fone	MTS	RCOM CDMA	TTSL CDMA
S/N	Name of Parameter			GSM Operators							CDMA Operators			
6	Metering /billing credibility-Pre paid	<= 0.1%	Reported	0.07%	0.00%	0.10%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
			Verified	0.07%	0.00%	0.10%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	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													
	Accessibility of call centre/Customer Care	>=95%	Reported	100%	100%	100%	99%	88%	100%	98%	100%	100%	100%	95%
			Verified	100%	100%	100%	99%	88%	100%	98%	100%	100%	100%	95%
	% call answered by operators(voice to voice) within 60 sec.	>=90%	Reported	85%	92%	96%	87%	95%	95%	96%	98%	100%	94%	96%
Verified			85%	92%	96%	87%	95%	95%	96%	98%	100%	94%	96%	
9	Termination/closure of service													
	No.of requests for Termination / Closure of service complied within 7 days during the quarter	<=7days	Reported	100%	100%	100%	100%	100%	0%	0%	100%	NA	100%	100%
Verified			100%	100%	100%	100%	100%	0%	0%	100%	NA	100%	100%	
10	Time taken for refunds of deposits after closures.	100% within 60 days	Reported	100%	100%	100%	100%	100%	0%	0%	100%	NA	100%	100%
			Verified	100%	100%	100%	100%	100%	0%	0%	100%	NA	100%	100%

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

CHAPTER-4: DETAILED FINDINGS & ANALYSIS

I. Cellular Mobile Telephone Service

(A) MSC Audit

(1) 3 Days Live Data Assessment & Summarized Findings

S/N	Name of Parameter	Bench mark	Aircel	Airtel	Idea	Stel	BSNL	Rcom GSM	TTSL GSM	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA	
			GSM Operators								CDMA Operators				
1	Network Service Quality Parameter														
	BTS Accumulated Downtime	<=2%	0.10%	0%	0%	0.10%	1.88%	0.32%	ICR with Aircel	0.00%	0.06%	3.54%	0.11%	0.01%	
	Worst affected BTS due to downtime	<=2%	0%	0.09%	0%	0%	1.80%	0.00%		0%	0%	0%	0%	0%	0%
	c) Total no. of BTSs in the licensed service area		617	1,152	561	525	950	634		3	698	11	370	183	
	Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		45.05	72	48	37	1289	145		0	30	28	45	1	
	No. of BTSs having accumulated downtime of >24 hours in a month		0	3	0	0	3	0		0	0	0	0	0	
2	Connection Establishment (Accessibility)														
	a) CSSR	>=95%	99.57%	99.68%	99.04%	100%	97.49%	99.78%		99.92%	98.95%	100.00%	99.91%	99.86%	
	b) SDCCH/PAGING congestion	<=1%	0.02%	0.11%	0.17%	0.05%	0.71%	0.02%		0.08%	0.38%	0.00%	0.01%	0.00%	
	c) TCH congestion	<=2%	0.41%	0.21%	0.79%	0.01%	1.80%	0.20%		0.00%	0.67%	0.00%	0.09%	0.14%	
3	Connection maintenance														
	a) CDR	<=2%	1.02%	1.00%	0.97%	0.63%	1.84%	0.70%	0.67%	0.94%	1.11%	1.00%	0.25%		
	b) Cells having > 3% TCH drop	<=5%	13.41%	2.80%	2.09%	4.07%	4.90%	0.63%	0.00%	2.71%	3.03%	0.36%	1.61%		
	c) Good voice quality	>=95%	95.80%	98.62%	96.15%	96.51%	96.25%	98.03%	99.19%	97.30%	NA	NA	NA		
	d) No. of cells > 3% TCH drop		246	93	35	64	133	12	0	57	1	4	9		
	e) Total no. of cells in the network		1,835	3,320	1,671	1,574	2,713	1,902	9	2,106	33	1,110	558		
4	No of POI having > 0.5% congestion	>=0.5%	0	0	0	0	0	0	0	0	0	0	0		
	a) Name of POI not meeting the benchmark		Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil		
	b) Total No. of circuits on POI		11,204	36,842	13,343	6,945	14,723	19,474	9,879	2,011	15,284	746	79,920	9,879	
	c) Avg No. of call attempts on POI		1,576,328	13,500	199,301	95,966	210,117	180,627	86,666	162	70,414	14	22,484	100,019	
	d) Avg traffic served on POI (Erlang)		4,917	431	6,215	2,306	9,994	6,077	1,721	5	2,403	0.58	825	1,721	
	e) Total number of working POI Service Area wise		40	38	31	20	39	16	62	16	42	19	15	62	
	f) Equipped Capacity of Network in respect of Traffic in erlang		33,838	70,733	18,208	11,758	42,000	32,000	33,005	9,000	15,948	4,200	28,000	33,005	
	g) Total traffic handled in TCBH in erlang		3010	220728	124228	6	81951	NP	25288	15108	115057	0.02	NP	23782	
(B)	Customer Service Quality Parameters														
5	Response time to customers for assistance														
	a) Accessibility of call centre	>=95%	100%	NP	100%	NP	100%	99%	100%	100.00%	100%	No calls on call centre, since max customer is of its own employee	95.90%	100%	
	b) % of call answered by operators(voice to voice) within 60 sec	>=90%	93.25%	99.86%	97.18%	95%	95.58%	87.82%	98.16%	100.00%	96.27%		97.89%	94.07%	
	c) No. of call attempts to call centre / customer care nos. during TCBH (Avg)		5,981	18,312	3,824	2,111	4,551	28,394	762	16	1,315		663	337	
	d) No. of calls connected and answered successfully to call centre / customer care nos. during TCBH (Avg)		5,577	18,287	3,716	2,011	4,350	24,935	748	16	1,266		649	317	

NA: Not Applicable, NP: Data Not Provided

Parameter-wise Findings (Live Data Assessment):

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

- **BTS Accumulated downtime (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0% and 1.88%, except MTS with a value 3.54%.
- **Worst affected BTSs due to downtime (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0% and 1.8%.
- **Call Setup Success Rate (CSSR) (benchmark $\geq 95\%$):** All operators are meeting the benchmark with values lying between 97.49% and 100%.
- **SDCCH/PAGING Channel congestion (benchmark $\leq 1\%$):** All operators are meeting the benchmark with values lying between 0% and 0.71%
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 1.80%.
- **Call Drop Rate (CDR) (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0.25% and 1.84%.
- **Cell exceeding 3% TCH drop (benchmark $\leq 5\%$):** Aircel, STel, BSNL & MTS are not satisfying the benchmark, rest all the operators are meeting the benchmark.
- **Connections with good voice quality (benchmark $\geq 95\%$):** CDMA service providers have declared that the parameter is not system generated. All operators are meeting the benchmark.
- **No of POI > 0.5% Congestion (benchmark $\geq 0.5\%$):** No operator is having any POI with more than 0.5% congestion. There was congestion found on the POIs in general, but was under the benchmark of 0.5%. Cases were found where individual POIs were showing high utilization/usage and some were 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 $>95\%$):** All the operators are meeting the benchmark with values lying between 0% to 100% respectively. Airtel & STEL has no provision of capturing 3 days live from system. Although MTS has few customer base and in that base maximum of its own employee, so no calls occurred on call centre during that period of audit.
- **%age of call answered by operator (Voice to voice) (benchmark $>90\%$):** All operators are meeting the benchmarks except RCOM (GSM) respectively.

(2) Month Data Assessment & Summarized Findings

S/N	Name of Parameter	Benchmark	Aircel	Airtel	Idea	Stel	BSNL	Rcom GSM	TTSL 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%	0.10%	0.03%	0.10%	0.39%	1.89%	0.28%	ICR with Aircel	0.00%	0.04%	0.45%	0.16%	0.04%	
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.26%	0.00%	1.14%	1.90%	1.10%		0.00%	0.00%	0.00%	0.00%	0.55%	
	c) Total no. of BTSs in the licensed service area		617	1,152	561	525	950	634		3	698	11	370	183	
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		445	270	418	1,518	13,329	1,313		0	218	37	447	52	
e) No. of BTSs having accumulated downtime of >24 hours in a month		0	3	0	6	18	7	0		0	0	0	1		
2	Connection Establishment (Accessibility)														
	a) CSSR (Call Setup Success Rate)	>=95%	99.71%	99.66%	97.71%	99.92%	97.45%	99.83%		99.86%	99.29%	100%	99.86%	99.85%	
	b) SDCCH/PAGING congestion	<=1%	0.03%	0.13%	0.61%	0.03%	0.75%	0.03%		0.14%	0.10%	0%	0.00%	0.00%	
	c) TCH congestion	<=2%	0.26%	0.21%	1.68%	0.05%	1.80%	0.14%		0.00%	0.61%	0%	0.14%	0.15%	
3	Connection maintenance (retainability)														
	a) CDR	<=2%	0.98%	1.06%	1.16%	0.61%	1.81%	0.69%	0.69%	0.86%	0.58%	1.04%	0.26%		
	b) Worst affected cells>3% TCH drop	<=3%	12.81%	2.77%	2.39%	4.19%	4.83%	0.47%	0.00%	2.75%	3.03%	0.36%	1.97%		
	c) Good voice quality	>=95%	95.77%	98.63%	95.82%	96.44%	95.50%	98.07%	98.53%	97.31%	NA	NA	NA		
	d) Total No. of cells exceeding 3% TCH drop (call drop)		235	92	40	66	131	9	0	58	1	4	11		
	e) Total no. of cells in the network		1,835	3,320	1,671	1,574	2,713	1,902	9	2,106	33	1,110	558		
4	No of POI having > 0.5% congestion	>=0.5%	0	0	0	0	0	0	0	0	0	0	0	0	
	a) Name of POI not meeting the benchmark		NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	
	b) Total No. of call attempts on POI (Avg.)		1,601,144	15,444	221,401	113,966	213,789	165,311	100,019	196	82,109	19	18,833	100,019	
	c) Total traffic served on POI (Erlang) (Avg.)		4,825	487	6,889	2,694	9,737	5,604	1,893	5	2,347	1	700	1,893	
	d) Total No. of circuits on POI		11,204	36,842	13,343	6,945	14,723	19,474	9,879	2,011	15,284	746	79,920	9,879	
	e) Total number of working POI Service Area wise		40	38	31	20	39	16	62	16	42	19	15	62	
	f) Capacity of POI		9,036	35,478	12,558	6,547	13,251	18,111	9,741	1,551	10,301	521	70,593	9,741	
5	Network Data														
	a) Equipped Capacity of Network Erlang		33,838	70,733	18,208	11,758	42,000	32,000	33,005	9,000	15,948	4,200	28,000	33,005	

S/N	Name of Parameter	Benchmark	Aircel	Airtel	Idea	Stel	BSNL	Rcom GSM	TTSL GSM	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA
			GSM Operators										CDMA Operators	
	b) Total traffic in TCBH in erlang (Avg.)		10,186	52,988	9,705	5,322	33,094	25,215	3,326	2	10,286	0	5,013	3,326
	c) Total no. of customers served (as per VLR) on last day of the month		388,971	1,616,329	349,411	191,585	1,013,033	886,983	82,791	392	363,785	42	166,828	57,904
(B)	Customer Service Quality Parameters													
5	Metering/billing credibility-Post paid	$\leq 0.1\%$	0.00%	0.01%	0.00%	NA	0.02%	0.05%	0.00%	NA	0.00%	NA	0.05%	0.07%
	a) No. of bills issued during the period		2,126	34,026	314	NA	52,774	2,178	1,255	NA	1,170	NA	7,824	10,214
	b) No. of bills disputed including billing complaints during the period		0	5	0	NA	8	1	0	NA	0	NA	4	7
6	Metering /billing credibility-Pre paid	$\leq 0.1\%$	0.01%	0.00%	0.01%	0.03%	0.02%	0.04%	0.01%	0.00%	0.02%	0.00%	0.01%	0.01%
	a) No. of charging / credit / validity complaints during the quarter		34	61	27	124	291	569	16	0	78	0	49	14
	b) Total no. of pre-paid customers at the end of the quarter		669,817	2,090,217	408,038	443,742	1,605,859	1,516,412	187,570	89,671	400,139	55	330,281	121,835
7	Resolution of billing/ charging complaints	<i>100% within 4 weeks</i>	100%	100%	100%	100%	100%	100%	100%	NA	100%	NA	100%	100%
	a) No. of billing/(post paid) and charging, credit/validity (pre paid) complaints resolved within 4 weeks during the quarter		100%	100%	100%	100%	100%	100%	100%	NA	100%	NA	100%	100%
	b) Total no. of billing (post paid) and charging, credit / validity (pre paid) complaints received during the quarter		34	66	27	124	299	570	16	0	78	0	53	21
	c) No. of billing complaints (post paid) and charging, credit/ validity complaints (pre paid) resolved in favour of the customer during the quarter		34	66	27	29	0	355	16	0	34	0	32	0
	d) No. of complaints disposed on account of not considered as valid complaints during the quarter		0	0	0	95	299	215	0	0	44	0	21	21
	e) Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	≤ 1 week	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
8	Response time to customers for assistance													
	a) Accessibility of call centre/Customer Care	$\geq 95\%$	100%	98%	97%	NP	100%	99%	100%	100%	100%	Since customer is of own employee, so no call on call centre	99%	100%
	b) % call answered by operators(voice to voice) within 60 sec.	$\geq 90\%$	90.34%	98.89%	98.86%	90.64%	96.41%	92.31%	96.61%	100.00%	97.22%		96.43%	97.44%
	c) Total no. of call attempts to call centre & customer care nos. during TCBH (Avg.).		7,161	19,230	3,612	2,041	5,816	28,750	945	9	16,304		896	352

S/N	Name of Parameter	Benchmark	Aircel	Airtel	Idea	Stel	BSNL	Rcom GSM	TTSL GSM	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA
			GSM Operators										CDMA Operators	
	d) No. of calls connected and answered successfully to call centre & customer care nos. during TCBH (Avg.).		6,469	19,016	3,571	1,850	5,607	26,540	913	9	15,850		864	343
9	Termination/closure of service	<i><=7days</i>	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	a) Total No. of requests for Termination / Closure of service received during the quarter		36	296	1	NA	399	1	13	NA	43	NA	3	167
	b) No.of requests for Termination / Closure of service complied within 7 days during the quarter		36	296	1	NA	399	1	13	NA	43	NA	3	167
10	Time taken for refunds of deposits after closures.	<i>100% within 60 days</i>	100%	100%	100%	NA	100%	100%	100%	NA	100%	NA	100%	100%

NA: Not Applicable, NP: Data Not Provided

NOTE—Performance found in customer care parameter STEL has not reported IVR (Electronically) data in month and live measurement, due to not generating in system. MTS has not reported any data of this parameter, because it has his own small base in HP circle. i.e. out of its base , maximum is of its employee, so no calls occurred in call centre in month and 3 days live audit in that month.

Parameter-wise Findings (Month Data Assessment):

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

- **BTS accumulated downtime (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0% and 1.89%.
- **Worst affected BTSs due to downtime (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0% and 1.90%.
- **Call setup success rate (benchmark $\geq 95\%$):** All operators are meeting the benchmark with values lying between 97.45% and 100%.
- **SDCCH/PAGING Channel congestion (benchmark $\leq 1\%$):** All operators are meeting the benchmark with values lying between 0% and 0.75%.
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 1.80%.
- **Call drop rate (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0.26% and 1.81%.
- **Cell exceeding 3% TCH drop (benchmark $\leq 5\%$):** All operators are meeting the benchmark, except Aircel (12.81%), Stel (4.19%), BSNL (4.83%) & MTS (3.03%) respectively.
- **Connections with good voice quality (benchmark $\geq 95\%$):** All operators are meeting the benchmark. CDMA service Provider has declared that the parameter is not system generated.
- **No of POI > 0.5% Congestion (benchmark $\geq 0.5\%$):** No operator is having POI with more than 0.5% congestion. There was congestion found on the POIs in general, but was under the benchmark of 0.5%. Cases were found where individual POIs were showing high utilization/usage and some were 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 $>95\%$):** All operators are meeting the benchmark respectively. STEL has not provided the data.
- **%age of call answered by operator (Voice to voice) (benchmark $>90\%$):** All operators are meeting the benchmark respectively.
- **Metering and billing credibility-Post paid (benchmark $\leq 0.1\%$):** All operators are meeting the benchmark.
- **Metering and billing credibility-Pre paid (benchmark $\leq 0.1\%$):** All operators are meeting the benchmark.
- **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 respectively.
- **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	1	7	617
2	Airtel Ltd	5	15	1152
3	Idea	1	5	561
4	Stel	1	4	525
5	BSNL	3	14	950
6	RTL(GSM)	3	12	634
7	TTSL (GSM)	1	7	617
8	Videocon	1	1	3
9	Vodafone	1	8	698
CDMA Operators				
10	MTS	1	1	11
11	Reliance Communication (CDMA)	1	0	370
12	TTSL(CDMA)	1	1	190

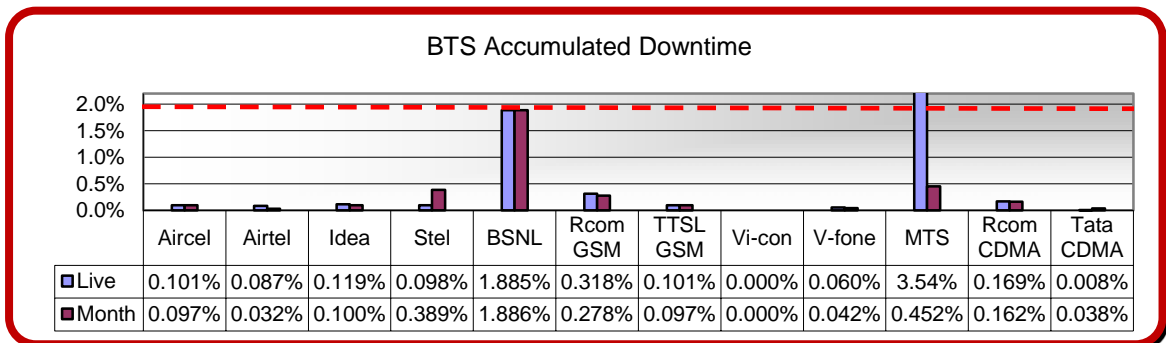
TTSL & Videocon are on ICR with Aircel in HP circle.

4. Performance (Graphical Representation)

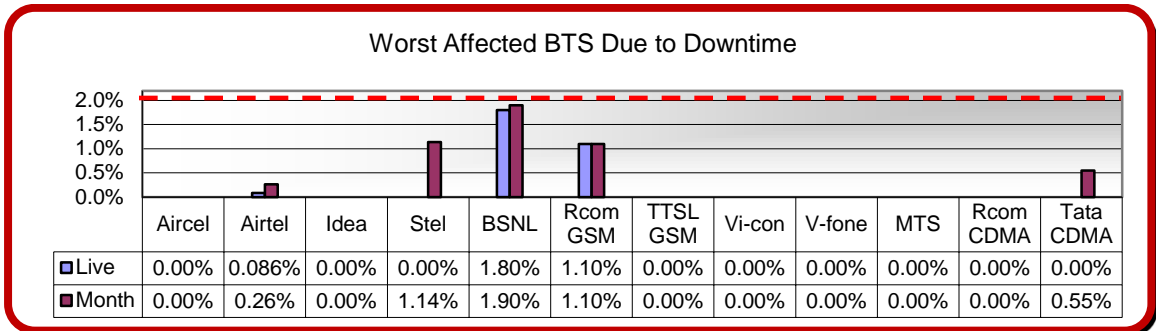
Comparison between Live measurements and One month data Audit – Cellular Mobile Telephone Services

A) NETWORK PERFORMANCE

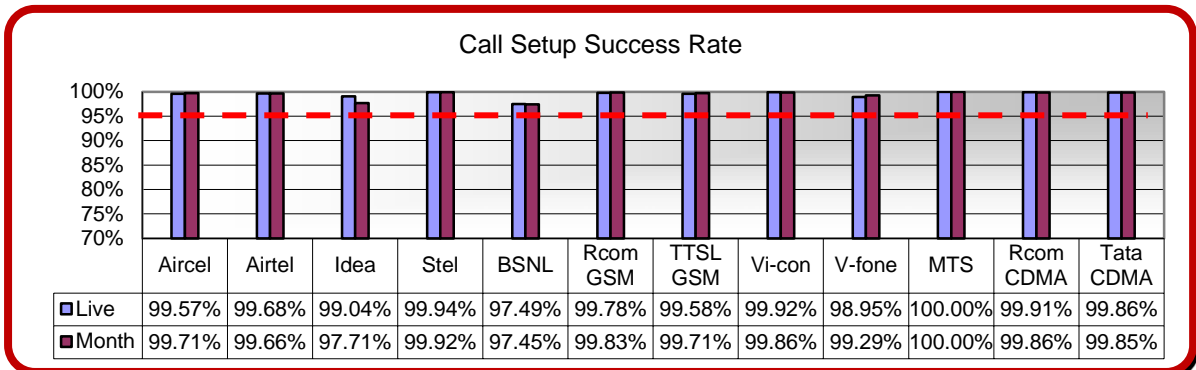
BTS Accumulated Downtime: All operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data taken in the month of audit except MTS in live data.



Worst Affected BTS Due to Downtime: All operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data taken in the month of audit.

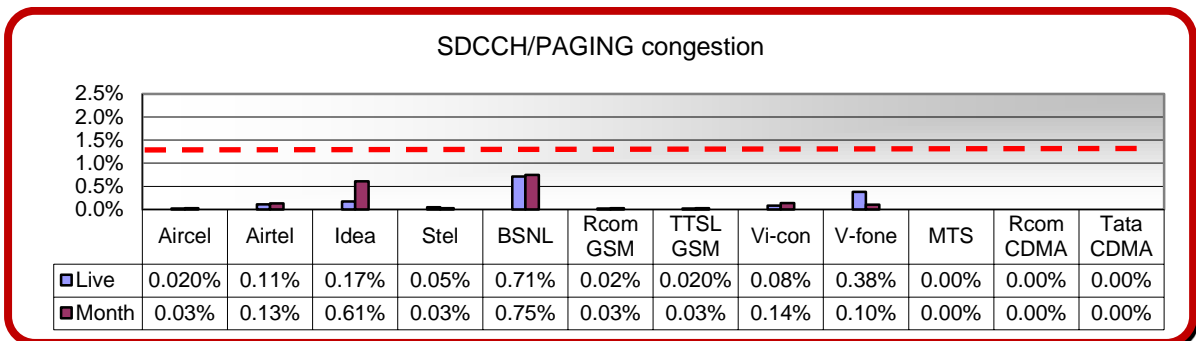


Call Setup Success Rate (CSSR): All operators are meeting the TRAI benchmarks ($\geq 95\%$) for both one month data and 3 days live data taken in the month of audit

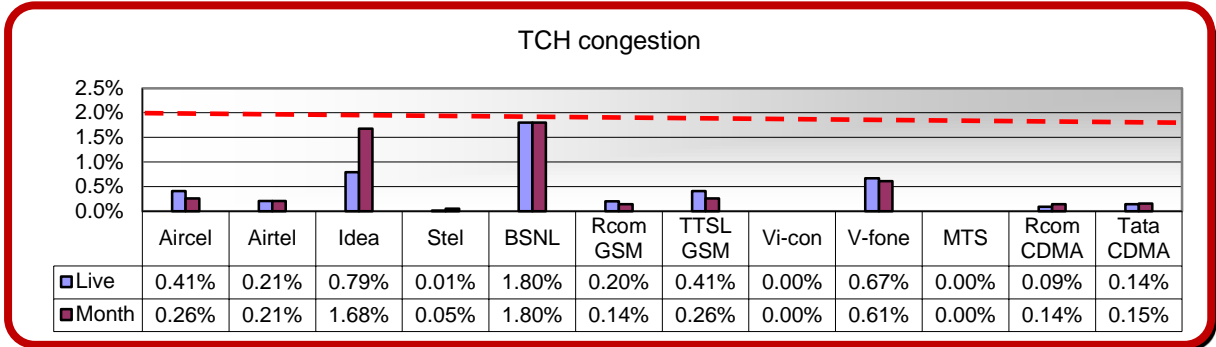


Blocked call rate:

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

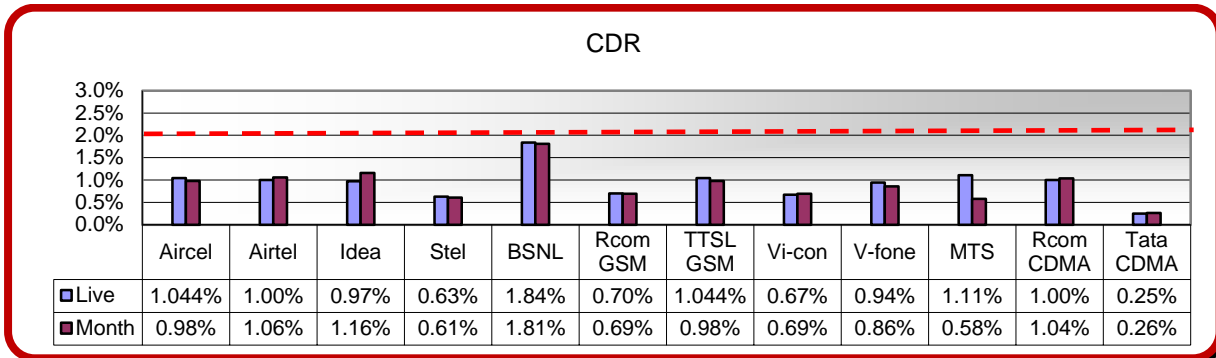


TCH congestion (%): All operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data.

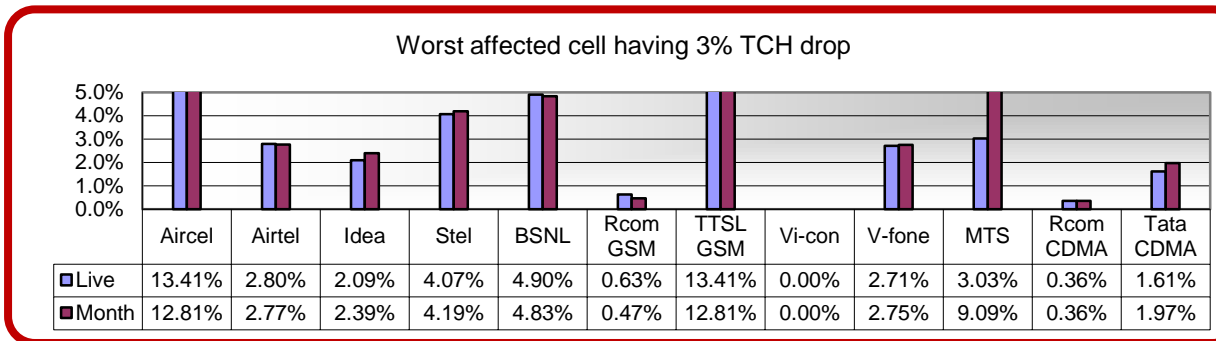


Connection Maintainability (Retainability):

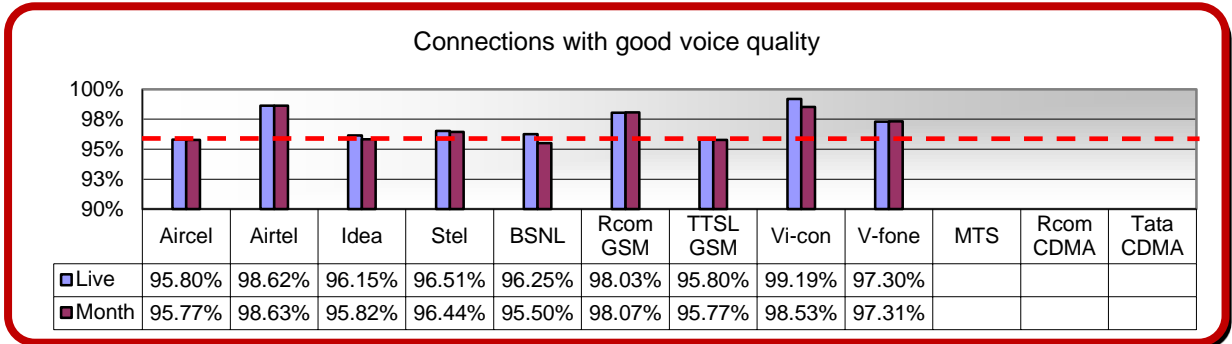
Call Drop Rate (CDR) (%): All operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data taken in the month of audit.



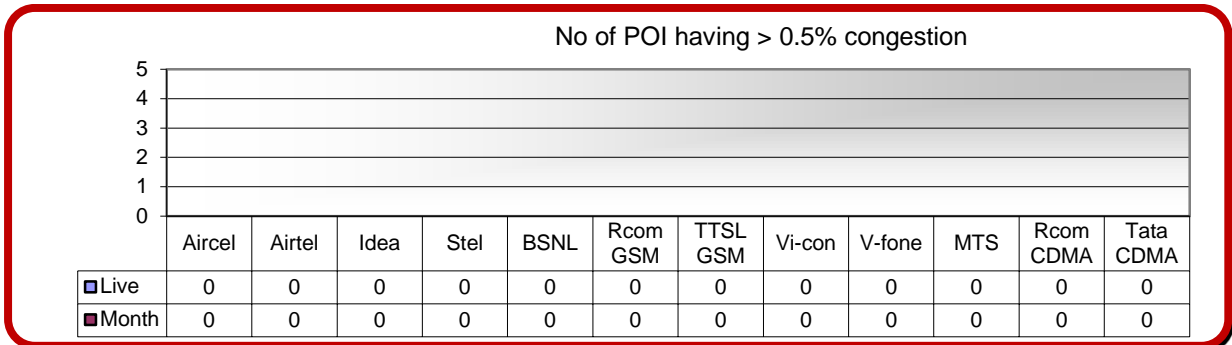
Worst affected Cell exceeding 3% TCH Drop: For both live and month data, Aircel, Stel, BSNL, TTSL GSM & MTS are found not meeting the benchmark of $\leq 3\%$. Rest of the operators is meeting the benchmark for both cases.



Percentage of connections with good voice quality (benchmark $\geq 95\%$): 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 .CDMA Service provided has not provided the data due to not generating in system.



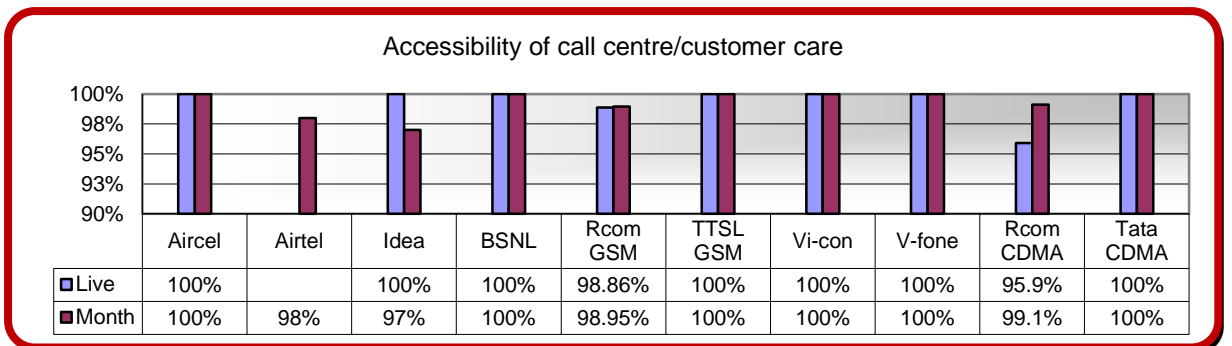
No of POI having $> 0.5\%$ Congestion: All operators are not having POIs above 0.5% congestion ($\geq 0.5\%$) for both one month data and 3 days live data taken in month of audit.



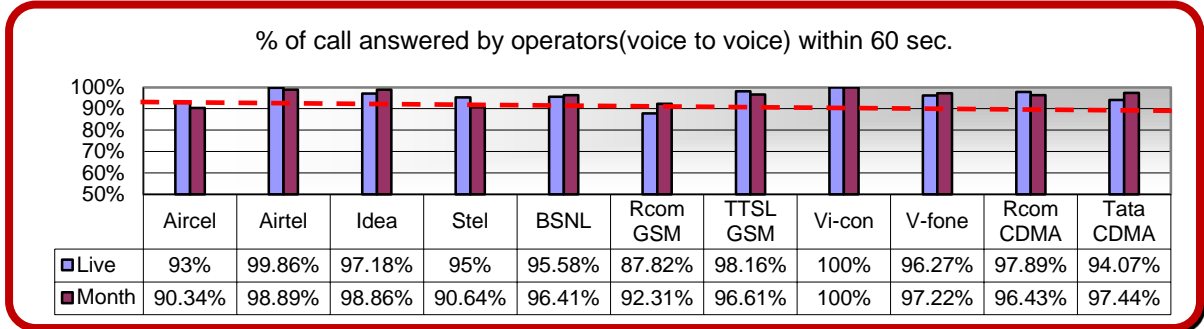
B) CUSTOMER SERVICE QUALITY PARAMETERS

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. In Live part only Airtel has not provided the data. STEL has not provided the data, due to not fetching from system. MTS has not provided the data, because it has its own small base and in that customer base, maximum are employee, so no calls occurred on call centre during the month.



Percentage of call answered by operators (Voice to voice) within 60 sec: Except for RCOM(GSM) in Live , Rest all operators are meeting the TRAI benchmarks ($\geq 90\%$) for both one month data and 3 days live data taken in the month of audit. . MTS has not provided the data, because it has its own small customer base and in that customer base, maximum are employee, so no calls occurred on call centre during the month.



5. Critical Analysis

From the above data table it can be observed that only Aircel, Stel, BSNL, Tata GSM & MTS are having higher value in comparison to other operators, so not meeting the benchmark for the parameter of 'Worst affected cells having more than 3% TCH drop rate'. 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.

In case of Voice quality & POI congestion parameters, all the operators are satisfying the benchmark. It is to be noted that most of the operators are having individual POI satisfying the benchmark, but in some cases like BSNL & RCOM (GSM), which has applied overflows techniques on individual POI, causing traffic diversions to obtain the net result for POI congestion. For the parameter % call answered by operator (voice to voice) are not met by RCOM (GSM) in live date measurement, rest all operators are performed well in customer care parameter for both live & Month data taken in month of audit. MTS has not provided the data, because it has its own small customer base and in that customer base, maximum are employee, so no calls occurred on call centre during the month.

TTSL (GSM) & Videocon are having an ICR agreement with Aircel; however Videocon has submitted its own BTS data for Himachal Pradesh Circle respectively.

(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	Stel	RCOM(GSM)	TTSL GSM	Vodafone	TTSL CDMA	RCOM(CDMA)
Total No. of calls attempted	34	40	27	60	70	16	50	21	21
Total No. of calls answered	28	33	20	47	60	14	43	17	20
Cases resolved with 4 weeks	28	33	20	47	60	14	43	17	20
%age of cases resolved	100%	100%	100%	100%	100%	100%	100%	100%	100%

(3) Live calling to call centre

Calling Operator	Aircel	Airtel	Idea	Stel	BSNL	Tata GSM	Rcom GSM	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA
Call Centre No.	121/198	121/198	198/12345	1212	1500	121	*222/*333	121/198	111/198	155	*222/*333	121
Total No. of Calls Attempted	100	100	100	100	100	100	100	100	100	100	100	100
Total No. of calls connected to IVR	100	100	100	100	100	100	100	100	100	100	100	100
Calls got connected to agent within 60 Sec	94	96	93	95	92	93	94	97	92	95	97	97
%age of calls got answered	94%	97%	93%	95%	92%	93%	94%	96%	92%	95%	97%	97%

(4) Level-1 live calling:-

Emergency no.		Calls attempted	Aircel	Airtel	Idea	Stel	BSNL	Tata GSM	Rcom GSM	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA
	Kullu													
100	Police	1	1	1	1	1	1	1	1	1	1	1	1	1
101	Fire	1	1	1	1	1	1	1	1	1	1	1	1	1
102/108	Ambulance	1	1	1	1	1	1	1	1	1	1	1	1	1
139	Railway	2	2	2	2	2	2	2	2	2	2	2	2	2
	Chamba													
100	Police	1	1	1	1	1	1	1	1	1	1	1	1	1
101	Fire	1	1	1	1	1	1	1	1	1	1	1	1	1
102/108	Ambulance	1	1	1	1	1	1	1	1	1	1	1	1	1
139	Railway	2	2	2	2	2	2	2	2	2	2	2	2	2
	Dharamshala													
100	Police	1	1	1	1	1	1	1	1	1	1	1	1	1
101	Fire	1	1	1	1	1	1	1	1	1	1	1	1	1
102/108	Ambulance	1	1	1	1	1	1	1	1	1	1	1	1	1
139	Railway	2	2	2	2	2	2	2	2	2	2	2	2	2

(3) Critical Analysis

Random numbers were selected (for whom refund were given) 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.

C) Inter operator call assessment:-

(1) Sample coverage

A sample of 2x50 test calls per Service Providers with in the licensed service area HP 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	Idea	Stel	BSNL	TTSL(GSM)	RTL GSM	Videocon	V- Fone	MTS	TATA CDMA	RCom CDMA
Aircel	-	96%	95%	100%	94%	98%	100%	97%	96%	100%	100%	99%
Airtel	100%	-	98%	96%	94%	100%	99%	95%	100%	97%	98%	100%
Idea	98%	100%	-	100%	95%	100%	100%	100%	99%	95%	100%	98%
Stel	96%	100%	100%	-	100%	100%	96%	100%	100%	100%	97%	95%
BSNL	93%	99%	99%	99%	-	97%	98%	97%	100%	93%	100%	100%
RTL GSM	97%	100%	100%	100%	98%	100%	-	96%	100%	97%	100%	96%
TTSL GSM	98%	96%	100%	98%	100%	-	100%	100%	93%	97%	95%	100%
Videocon	95%	98%	94%	100%	97%	100%	97%	-	97%	100%	100%	94%
V- Fone	99%	100%	96%	99%	100%	99%	100%	93%	-	98%	97%	100%
MTS	96%	98%	98%	95%	93%	100%	93%	96%	94%	-	100%	100%
TATA CDMA	97%	100%	100%	97%	100%	95%	97%	100%	98%	100%	-	97%
RCom CDMA	100%	95%	100%	100%	95%	100%	100%	98%	100%	100%	100%	-

(3) Critical Analysis

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

D) Drive test of the mobile network of service providers

(1) Sample Coverage

The Operator Assisted Drive Test was conducted at HP Circle for all the operators. Route covered was about around 25-30Km depending on city areas within the speed limit of 25Km/hr.

DRIVE TEST LOCATIONS

DHARAMSHALA

HIGH DENSE	Civil lines, Ram nagar, Shyam nagar
MEDIUM DENSE:	Dharpur, Uparli barol, Museum Road
LOW DENSE:	College Road, Himachal Board area, Uparlidar road.

CHAMBA

HIGH DENSE:	Chamba Bus Stand, Laxmi narayan Mandir, Chamba Market.
MEDIUM DENSE:	Oberi, Mangla Road
LOW DENSE:	Parel area, Sultanpur Road.

KULLU

HIGH DENSE:	Akhara Bazar, Dalpur, Gandhi nagar.
MEDIUM DENSE	Gharakar, Gammon bridge area, Puid area.
LOW DENSE:	Shashtri Nagar, Brahmin Road.

2) Performance (for respective cities)

SN	Parameter	City Name	Aircel	Airtel	BSNL	Idea	RTL GSM	STEL	Vodafone	TTSL CDMA	RCOM CDMA
			GSM Operators							CDMA Operators	
1.1	Call Attempts	Dharamshala	34	30	33	31	30	32	32	35	35
		Chamba	27	26	19	25	22	NS	27	28	27
		Kullu	31	34	62	25	23	30	26	32	23
1.2	Blocked Call Rate (<=3%)	Dharamshala	0.0%	0.0%	3.03%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Chamba	0.0%	0.0%	5.26%	0.0%	0.0%	NS	0.0%	0.0%	0.0%
		Kullu	0.0%	0.0%	1.61%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1.3	Dropped Call Rate (<=2%)	Dharamshala	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Chamba	0.0%	0.0%	0.0%	0.0%	0.0%	NS	0.0%	0.0%	0.0%
		Kullu	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1.4	Percentage of connections with good voice quality (>=95%)										
	(i) 0-4 (w/o frequency hopping)	Dharamshala								98.55%	99%
		Chamba								100%	100%
		Kullu								99.33%	100%
	(ii) 0-5 (with frequency hopping)	Dharamshala	96.40%	96.10%	96.00%	95.20%	97.00%	97.50%	96.80%		
		Chamba	98.40%	95.30%	96.80%	97.00%	99.00%	NS	98.00%		
		Kullu	98.20%	97.60%	95.10%	97.50%	98.00%	98.50%	98.10%		
1.5	Service Coverage										
	In door (>= -75dBm)	Dharamshala	96.40%	97.45%	89.70%	46.00%	83.00%	97.52%	80.70%	99.69%	82.00%
		Chamba	94.10%	96.78%	99.80%	44.20%	95.00%	NS	87.80%	98.94%	96.00%
		Kullu	93.20%	97.00%	94.91%	61.10%	95.00%	92.48%	91.20%	99.96%	82.00%
	In-vehicle (>= -85dBm)	Dharamshala	95.60%	98.27%	100.00%	89.80%	99.00%	99.96%	98.90%	100.00%	100.00%
		Chamba	98.40%	97.85%	100.00%	96.00%	100.00%	NS	99.50%	100.00%	100.00%
		Kullu	96.70%	98.00%	99.94%	96.70%	100.00%	99.78%	99.60%	100.00%	99.00%
	Outdoor- in city (>= -95dBm)	Dharamshala	100%	100%	100%	100%	100%	100%	100%	100%	100%
	Chamba	100%	99%	100%	100%	100%	NS	100%	100%	100%	
		Kullu	100%	100%	100%	100%	100%	100%	100%	100%	
1.6	Call Setup Success Rate (>=95%)	Dharamshala	100%	100%	96.97%	100%	100%	100%	100%	100%	100%
		Chamba	100%	100%	94.76%	100%	100%	NS	100%	100%	100%
		Kullu	100%	100%	98.39%	100%	100%	100%	100%	100%	100%

NS: -- No Service

(3) Critical Analysis

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

- Blocked Call Rate is not met by BSNL in Dharamshala (3.03%) and Chamba (5.26%)
- Call Set up Success Rate is not met by BSNL in Chamba (94.76%).

During Drive Test of BSNL in Dharamshala & Chamba, some RF coverage issue was found in some areas like Dharpur, Chamba Bus Stand, and Mangla Road. Due to this reason Blocked call occurred there.

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

The independent drive test activity was conducted in Himachal Pradesh Circle for various service providers in three different cities namely “Nahan, Hamirpur & Mandi”. For testing the service provider performance on the ground level, TCIL auditor have carried out Drive Test and check the radio coverage along with different KPI parameters by making short call of 120 sec. in different areas of mentioned cities. During Drive test, Route was covered between 20 to 25 Km for all 3 cities depending upon the city area within the speed limit of 25 Km/hr.

Area Coverage Details:***NAHAN***

HIGH DENSE	Mall Road, Housing Board
MEDIUM DENSE:	Chota Chowk., Nahan Highway Road.
LOW DENSE:	Army Cantt Area, Majholi.

HAMIRPUR

HIGH DENSE	Main Bazaar, Hospital Chowk, Housing Board Colony.
MEDIUM DENSE:	Anoo Chowk, Nadaun Chowk, Police Station.
LOW DENSE:	Dugha, Dosarka, Hiranagar

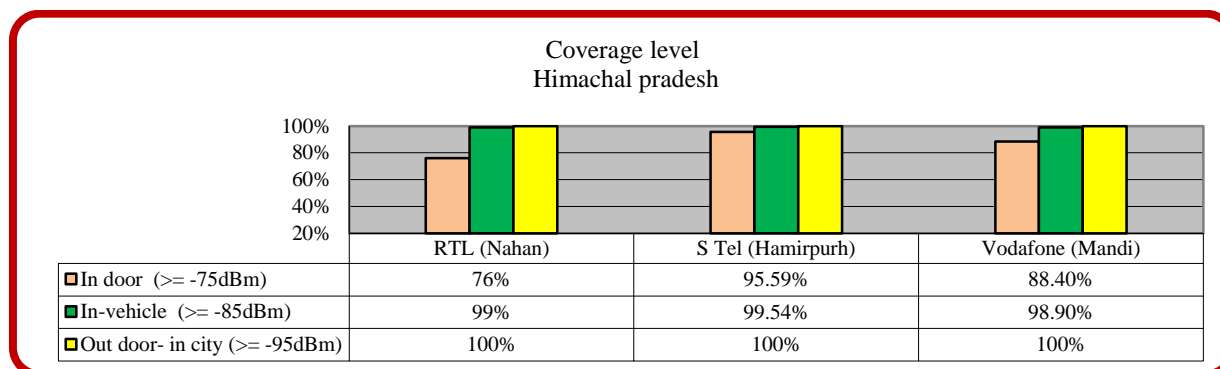
MANDI

HIGH DENSE	Mandi Bazaar, Indira Market.
MEDIUM DENSE:	Bheuili, Bus Stand Mandi.
LOW DENSE:	Baidyanath Road, Mandi bilaspur Road, Rewalsar Road.

2) Performance (for the respective cities)

SN	Parameter	RTL (Nahan)	S Tel (Hamirpur)	Vodafone (Mandi)
1.1	Call Attempts	24	24	31
1.2	Blocked Call Rate (<=3%)	0%	0%	0%
1.3	Dropped Call Rate (<=2%)	0%	0%	0%
1.4	Percentage of connections with good voice quality (=>95%)			
	(i) 0-5 (with frequency hopping)	98%	98.60%	99.50%
1.5	Service Coverage(%)			
	In door (>= -75dBm)	76%	95.59%	88.40%
	In-vehicle (>= -85dBm)	99%	99.54%	98.90%
	Out door- in city (>= -95dBm)	100%	100%	100%
1.6	Call Setup Success Rate (>=95%)	100%	100%	100%
1.7	Handover Success Rate (%)	100%	100%	100%

Graphical Representation:



(3) Critical Analysis

- Vodafone , Stel & Rcom are satisfied the TRAI benchmark for almost all the Parameter , such as Blocked call Rate , Drop call Rate , Voice Quality & Call Setup Success Rate Respectively.
- During Drive Test for Vodafone, area covered around 20-25 km and in that area, 31 calls were made and out of that all calls got connected but as far as RF coverage point of view it was found little bit weak in some areas (like Rewalsar Road), however no

blocked and Drop calls occurred as well as voice quality is also found satisfactory during testing at Mandi.

- For Drive Test at Hamirpur, area covered around 15-20 Km and out of 24 call attempts all calls have been established. The RF coverage level was found well in that covering area of hamirpur with more than 95% of samples in In-door, In-vehicle & Outdoor coverage, which results No Blocked call and Drop calls. Good voice quality is also found satisfactory.
- As far as Drive Test of RCOM at Nahan is concerned, area covered around 15-20 km and out of 24 call attempts all the calls got successfully connected, but in RF coverage was weak in some area like Cantt area and Chota chowk, which results 76% of samples within -75dbmRx lev. However No Blocked call and Drop calls occurred in that area. Voice quality and Call setup success rate are found satisfactory in covering area of Nahan.

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

From Live & Month findings, it can be observed that on an average, performance of the operators in the service area HP is satisfactory for **Network Parameters**. However, below benchmark values are found for a few parameters such as ‘worst affected cells >3% TCH drop’ in which operators like Aircel, Stel, BSNL, TTSL GSM & MTS are not meeting the value prescribed by TRAI. As far as Good voice quality parameter and Call Setup Success Rate are concerned, all the operators have performed well in HP circle.

POI congestion is found to be satisfactory for all the operators, although BSNL & RCOM has applied overflow technique to minimize congestion on individual POI.

Under **Customer Service Quality** section, benchmark for the parameter “operator answered calls (voice-to-voice) within 60 seconds” is being satisfied by all operators except RCOM(GSM), which is slightly deviating in live measurement and hence needs to improve in this regard. STEL has not provided the data for Live & Month measurement due to not generating in system for accessibility of IVR.

MTS has not provided the data, because it has its own small customer base and in that customer base, maximum are employees, so no calls occurred on call centre during the month.

Regarding **Metering/Billing Credibility** issues, all the operators are meeting the benchmark for Pre-paid services and Post-paid services in HP. For ‘Resolution of billing/ charging complaints’ parameters all the operators are meeting 100% benchmark within 4 weeks. Also for the parameter ‘Time taken for refunds of deposits after closures’ all operators are meeting the benchmark of 100% within 60 days.

During **Drive Tests**,

- Blocked Call Rate is not met by BSNL in Dharamshala (3.03%) and Chamba (5.26%)
- Call Set up Success Rate is not met by BSNL in Chamba (94.76%) only.