

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

Report Period: January 2012 – March 2012

Telecommunications Consultants India Ltd.
TCIL Bhawan, Greater Kailash Part – I
New Delhi – 110048
Phone: +91-11-26202020 Fax: +91-1126242266
Internet: <http://www.tcil-india.com>

Table of Contents

CHAPTER-1: Introduction

- I. Background
- II. Objectives and Methodology

CHAPTER-2: Executive Summary

- I. Preface
- II. Findings from Quality of Service Audit (Operator wise for each parameter)
 - (A) Cellular Mobile Telephone Service Providers
 - 3 days Live Data Audit
 - One Month Data Audit
 - Operator Assisted Drive Test
 - Independent Drive Test
 - (B) Basic Telephone Service (Wireline) Providers
 - *Not conducted for this quarter*
 - (C) Broadband Service Providers
 - *Not conducted for this quarter*

CHAPTER-3: Audit-PMR data verification results

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

CHAPTER-4: Detailed Findings & Analysis

- I. Cellular Mobile Telephone Service
 - (A) **MSC audit**
 - 1) 3 days live measurement data assessment & summarized findings
 - 2) One month audit data report & summarized findings
 - 3) Sample coverage
 - 4) Performance (Graphical Representation)
 - 5) Critical Analysis
 - (B) **Redressal**
 - 1) Sample coverage
 - 2) Performance based on live calling for billing complaints
 - 3) Live calling to call center
 - 4) Level 1 calling
 - 5) Critical Analysis

(C) Inter operator call assessment

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

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

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

(E) Independent Drive Test

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

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

- II. Basic Telephone Service (Wireline) Providers
- *Not conducted for this quarter*
- III. Broadband Service Providers
- *Not conducted for this quarter*

CHAPTER-1: INTRODUCTION

I. Background

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

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

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

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

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

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

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

II. Objectives and Methodology

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

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

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

Systems audited:-

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

Facilities audited:-

1. Billing documents.
2. Customer Care records.

Field data collections carried out:-

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

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

- ✓ TCIL auditors visited all the NSS (Network Sub System) and BSS (Base-station Sub System) to check data for all the operators in their respective service area.
- ✓ All the NSS and BSS data for the relevant details were collected either directly from the centralized NOC or through a remote access to the NOC.
- ✓ The Radio parameters were audited/verified from the data collected from OMC-R (Operation and Maintenance Center – Radio, as part of BSS data).
- ✓ The Drive test was conducted in high, low and medium dense areas including highways, commercial complex and residential areas and special attention was paid for the areas for which TRAI has received complaints.
- ✓ The POI and other network related parameters were audited/verified from the data collected from the OMC-S (Operation and Maintenance Center – Switch as part of NSS data).
- ✓ The data related to Billing and Customer care was checked for the previous month and verified with the customers by calling them on random basis. The process of registration and handling of the complaints was also studied for the various operators. Call centre number were called for measuring the efficiency of the call centre.
- ✓ The inter operator call assessment test was carried out during the time period as is specified in the tender document. TCBH (Time Consistent Busy Hour) is taken after observation of the traffic consistently for 3 days prior to the audit activity.
- ✓ Data has been collected for busy hour of network in case of live assessment & month of audit for all service providers & verified that service providers are providing busy hour data only for QoS service. We found that TCBH hour is matching with network busy hour as provided by service providers for Himachal Pradesh 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 Himachal Pradesh Circle in 1st quarter (January-March 2012). The primary data collection and verification of records (PMR data verification – quarterly) maintained by various operators was undertaken for the period July – September 2011.

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

| Sl. | Name of Service Provider | Month of Audit | TCBH Hour |
|-----------------------|--------------------------|----------------|---------------|
| GSM Operators | | | |
| 1 | Aircel Ltd | Feb-2012 | 2000-2100 Hrs |
| 2 | Airtel Ltd | Feb-2012 | 1900-2000 Hrs |
| 3 | BSNL | Feb-2012 | 1900-2000 Hrs |
| 4 | Idea | Feb-2012 | 2000-2100 Hrs |
| 5 | Reliance Communication | Feb-2012 | 1900-2000 Hrs |
| 6 | Tata | Jan-2012 | 2000-2100 Hrs |
| 7 | Videocon | Feb-2012 | 1900-2000 Hrs |
| 8 | Vodafone | Feb-2012 | 2000-2100 Hrs |
| CDMA Operators | | | |
| 9 | MTS | Feb-2012 | 1900-2000 Hrs |
| 10 | Reliance Communication | Feb-2012 | 2000-2100 Hrs |
| 11 | Tata | Feb-2012 | 2000-2100 Hrs |

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

1. Both Tata GSM & Videocon is on ICR with Aircel in Himachal Pradesh Circle. However Videocon is having 8 nos. of BTS in the circle.
2. S-Tel Telecom has closed their services in Himachal Pradesh 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 GSM | |
|-------------------------------|--|----------------|---------------|--------|--------|--------|-------------|-----------------|----------|----------------|--------|--------------|-------------|--|
| S/N | Name of Parameter | | GSM Operators | | | | | | | CDMA Operators | | | | |
| 1 | Network Availability | | | | | | | | | | | | | |
| | a) BTS Accumulated Downtime | <=2% | 0.06% | 0.00% | 0.77% | 0.24% | 0.28% | ICR (Aircel) | 0.00% | 0.03% | 0.00% | 0.08% | 0.00% | |
| | b) Worst affected BTSs due to downtime | <=2% | 0.00% | 0.00% | 0.32% | 0.00% | 0.00% | | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | |
| | Connection Establishment (Accessibility) | | | | | | | | | | | | | |
| | a) CSSR (Call Setup Success Rate) | >=95% | 98.75% | 99.23% | 98.36% | 98.32% | 98.73% | | 99.82% | 98.93% | 98.56% | 99.38% | 98.80% | |
| | b) SDCCH/PAGING congestion | <=1% | 0.01% | 0.09% | 0.77% | 0.38% | 0.01% | | 0.07% | 0.18% | 0.00% | 0.00% | 0.00% | |
| | c) TCH congestion | <=2% | 0.13% | 0.14% | 1.90% | 0.78% | 0.09% | | 0.00% | 1.07% | 1.00% | 0.11% | 0.25% | |
| | | | | | | | | | | | | | | |
| 2 | Connection maintenance (Retainability) | | | | | | | | | | | | | |
| | a) CDR | <=2% | 1.04% | 0.78% | 1.64% | 1.21% | 0.64% | 0.91% | 1.26% | 0.00% | 0.91% | 0.00% | | |
| | b) Worst affected cells>3% TCH drop | <=3% | 11.87% | 2.49% | 2.88% | 2.77% | 0.15% | 0.00% | 2.76% | 0.00% | 0.78% | 1.19% | | |
| | c) Good voice quality | >=95% | 95.70% | 98.94% | NA | 95.37% | 98.10% | 98.49% | 97.07% | 99.37% | 98.49% | NA | | |
| 3 | No. of POI's having congestion >0.5% | | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | | |
| 4 | Response time to customers for assistance | | | | | | | | | | | | | |
| | a) Accessibility of call centre/Customer Care | >=95% | 100% | 100% | 95.57% | 100% | 98.98% | 100% | 95.24% | 100% | 100% | 99.91% | 100% | |
| | b) % call answered by operators(voice to voice) within 60 sec. | >=90% | 92.79% | 96.16% | 85.28% | 99.78% | 99.76% | 96.54% | 92.00% | 98.44% | 100% | 95.34% | 98.53% | |

NA: Not Applicable, NR: Not Received

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

Performance related to customer care data is found to be satisfactory for most of the operators for the parameter “calls answered by operators (voice-to-voice)” except for BSNL.

In case of MTS for the Customer care parameters live calling data is shown as because there data base is significantly low.

| One Month Data Audit | | Bench- mark | Aircel | Airtel | BSNL | Idea | Rcom GSM | Tata GSM | Videocon | Vodafone | MTS | Rcom CDMA | Tata GSM |
|----------------------|--|---------------------------|---------------|--------|--------|--------|-------------|-----------------|----------|----------------|--------|--------------|-------------|
| S/N | Name of Parameter | | GSM Operators | | | | | | | CDMA Operators | | | |
| (A) | Network Service Quality Parameter | | | | | | | | | | | | |
| 1 | Network Availability | | | | | | | ICR (Aircel) | | | | | |
| | a) BTS Accumulated Downtime | <=2% | 0.06% | 0.01% | 2.02% | 0.13% | 0.38% | | 0.24% | 0.06% | 0.24% | 0.17% | 0.00% |
| | b) Worst affected BTSs due to downtime | <=2% | 0.00% | 0.00% | 1.89% | 0.00% | 1.62% | | 0.00% | 0.00% | 0.00% | 0.27% | 0.00% |
| 2 | Connection Establishment (Accessibility) | | | | | | | | | | | | |
| | a) CSSR (Call Setup Success Rate) | >=95% | 98.38% | 99.21% | 98.20% | 98.32% | 98.77% | | 99.31% | 99.08% | 95.89% | 99.40% | 98.84% |
| | b) SDCCH/PAGING congestion | <=1% | 0.02% | 0.08% | 0.80% | 0.25% | 0.01% | | 0.13% | 0.11% | 0.00% | 0.00% | 0.00% |
| | c) TCH congestion | <=2% | 0.42% | 0.15% | 1.80% | 1.00% | 0.08% | | 0.04% | 0.92% | 2.84% | 0.10% | 0.21% |
| 3 | Connection maintenance (Retainability) | | | | | | | | | | | | |
| | a) CDR | <=2% | 1.08% | 0.85% | 1.80% | 1.23% | 0.65% | | 1.14% | 1.23% | 0.49% | 0.98% | 0.28% |
| | b) Worst affected cells>3% TCH drop | <=3% | 12.39% | 2.53% | 2.83% | 2.87% | 0.05% | | 0.00% | 2.73% | 0.00% | 0.99% | 1.43% |
| | c) Good voice quality | >=95% | 95.63% | 98.86% | NA | 95.18% | 98.11% | 98.08% | 96.96% | 99.23% | 98.47% | NA | |
| 4 | No. of POI's having congestion >0.5% | | 0 | 0 | 1 | 0 | 4 | 0 | 1 | 0 | 0 | 0 | |
| (B) | Customer Service Quality Parameters | | | | | | | | | | | | |
| 5 | Metering/billing credibility-Post paid | <= 0.1% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | NA | 0.45% | NA | 0.00% | 0.00% |
| 6 | Metering /billing credibility-Pre paid | <= 0.1% | 0.00% | 0.00% | 0.00% | 0.00% | 0.02% | 0.00% | 0.00% | 0.01% | 0.00% | 0.01% | 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 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 | >=95% | 100% | 99.22% | 95.36% | 100% | 98.98% | 99.33% | 96.83% | 100% | NR | 99.83% | 97.30% |
| | b) % call answered by operators(voice to voice) within 60 sec. | >=90% | 88.98% | 98.29% | 91.36% | 98.23% | 96.81% | NR | 94.67% | 97.52% | NR | 95.27% | NR |
| 9 | Termination/closure of service | <=7days | 100% | 100% | 100% | 100% | 100% | 100% | NA | 100% | NA | 100% | 100% |
| 10 | Time taken for refunds of deposits after closures. | 100% within 60 days | 100% | 100% | 100% | 100% | 100% | 100% | NA | 100% | NA | 100% | 100% |

NA: Not Applicable, NR: Not Received

From the month data assessment, it is found that all the operators are meeting most of the network parameters except for BSNL for the parameter “BTS Accumulated Downtime”, MTS for “TCH Congestion” & Aircel for "Worst affected cells>3% TCH drop".

Performance related to customer care data is found to be satisfactory for most of the operators for the parameter “calls answered by operators (voice-to-voice)”, with only Aircel is not meeting the 90% benchmark. Under "Metering/Billing Credibility (Post-Paid)" section, Vodafone is not meeting the prescribed benchmark.

In case of MTS for the Customer care parameters subscriber data base is significantly low hence month figure is not recorded.

Operator-Assisted Drive Test

The Operator Assisted Drive Test was conducted in Himachal Pradesh for all the operators. The main agenda of this Drive Test was to capture the actual picture of all Service Providers on ground level and for that cities to be chosen were Mandi, Hamirpur & Shri Una. During Drive, Route covered was about around 30-50 Km depending on city areas within the speed limit of 15-20Km/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 | Vodafone | Rcom CDMA | Tata CDMA |
|-----|---|---------------------------------|---------------|--------|-------|-------|----------|----------|----------------|-----------|
| | | | GSM Operators | | | | | | CDMA Operators | |
| 1.1 | Blocked Call Rate (<=3%) | Mandi | 0.00 | 0.00 | 2.63 | 2.27 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Hamirpur | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Una | 0.00 | 0.00 | 0.00 | 2.44 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.2 | Dropped Call Rate (<=2%) | Mandi | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Hamirpur | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Una | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.3 | Percentage of connections with good voice quality (>=95%) | | | | | | | | | |
| | | (i) 0-4 (w/o frequency hopping) | | | | | | | 99.86 | 99.96 |
| | | | | | | | | | 99.94 | 99.90 |
| | (ii) 0-5 (with frequency hopping) | Mandi | 95.30 | 98.10 | 95.30 | 95.10 | 98.72 | 99.30 | | |
| | | Hamirpur | 97.70 | 96.20 | 95.10 | 95.90 | 97.05 | 98.40 | | |
| | | Una | 98.90 | 95.60 | 98.20 | 96.40 | 98.16 | 99.10 | | |
| 1.4 | Call Setup Success Rate (>=95%) | Mandi | 100 | 100 | 97.37 | 97.73 | 100 | 100 | 100 | 100 |
| | | Hamirpur | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | | Una | 100 | 100 | 100 | 97.56 | 100 | 100 | 100 | 100 |

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

- All Operators are meeting the TRAI Benchmark in all 3 towns.

Independent Drive Test

| SN | Parameter | Airtel | Videocon |
|-----|---|--------|----------|
| | | Una | Bilaspur |
| 1.1 | Blocked Call Rate (<=3%) | 0.00 | 0.00 |
| 1.2 | Dropped Call Rate (<=2%) | 0.00 | 0.00 |
| 1.3 | Percentage of connections with good voice quality (>=95%) | | |
| | (i) 0-4 (w/o frequency hopping) | | |
| | (ii) 0-5 (with frequency hopping) | 96.70 | 96.83 |
| 1.4 | Call Setup Success Rate (>=95%) | 100.00 | 100.00 |

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

- ✚ Both the operators are meeting the TRAI benchmark in their respective town.

Note: Videocon is on ICR with Aircel in Bilaspur 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 VERIFICATION

I. Cellular Mobile Telephone Service

| PMR | | Bench-mark | Audit | Aircel | Airtel | BSNL | Idea | Recom GSM | Tata GSM | V-con | V-fone | MTS | Recom 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% | 1.88% | 0.17% | 0.00% | ICR (Aircel) | 0.11% | 0.01% | 0.11% | 0.12% | 0.00% | |
| | | | Verified | 0.07% | 0.05% | 1.88% | 0.17% | 0.00% | | 0.11% | 0.01% | 0.11% | 0.12% | 0.00% | |
| | Worst affected BTSs due to downtime | <=2% | Reported | 0.05% | 0.26% | 1.83% | 0.00% | 0.00% | | 0.00% | 0.00% | 0.00% | 0.08% | 0.00% | |
| Verified | | | 0.05% | 0.26% | 1.83% | 0.00% | 0.00% | 0.00% | | 0.00% | 0.00% | 0.08% | 0.00% | | |
| 2 | Connection Establishment (Accessibility) | | | | | | | | | | | | | | |
| | CSSR (Call Setup Success Rate) | >=95% | Reported | 99.37% | 99.12% | 95.23% | 98.01% | 99.15% | | 99.35% | 99.45% | 100% | 99.74% | 98.45% | |
| | | | Verified | 99.37% | 99.12% | 95.23% | 98.01% | 99.15% | | 99.35% | 99.45% | 100% | 99.74% | 98.45% | |
| | SDCCH/PAGING congestion | <=1% | Reported | 0.07% | 0.12% | 0.73% | 0.69% | 0.01% | | 0.00% | 0.28% | 0% | 0.03% | 0% | |
| | | | Verified | 0.07% | 0.12% | 0.73% | 0.69% | 0.01% | | 0.00% | 0.28% | 0% | 0.03% | 0% | |
| | TCH congestion | <=2% | Reported | 0.27% | 0.23% | 1.87% | 1.40% | 0.22% | | 0.08% | 0.45% | 0.00% | 0.04% | 0.62% | |
| | | | Verified | 0.27% | 0.23% | 1.87% | 1.40% | 0.22% | | 0.08% | 0.45% | 0.00% | 0.04% | 0.62% | |
| | 3 | Connection maintenance (retainability) | | | | | | | | | | | | | |
| CDR | | <=2% | Reported | 1.09% | 1.08% | 1.90% | 1.74% | 0.40% | 0.40% | 0.90% | 0.00% | 0.42% | 0.29% | | |
| | | | Verified | 1.09% | 1.08% | 1.90% | 1.74% | 0.40% | 0.40% | 0.90% | 0.00% | 0.42% | 0.29% | | |
| Worst affected cells>3% TCH drop | | <=3% | Reported | 11.61% | 2.76% | 4.84% | 2.80% | 0.40% | 0.00% | 2.81% | 0.00% | 0.96% | 1.81% | | |
| | | | Verified | 11.61% | 2.76% | 4.84% | 2.80% | 0.40% | 0.00% | 2.81% | 0.00% | 0.96% | 1.81% | | |
| Good voice quality | | >=95% | Reported | 94.90% | 98.61% | 95.57% | 95.60% | 97.82% | 99.19% | 97.22% | 100% | 98.14% | 99.97% | | |
| | Verified | | 94.90% | 98.61% | 95.57% | 95.60% | 97.82% | 99.19% | 97.22% | 100% | 98.14% | 99.97% | | | |
| 4 | No. of POI's having congestion >0.5% | Reported | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| | | Verified | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |

| S/N | Name of Parameter | Bench-mark | Audit | Aircel | Airtel | BSNL | Idea | Rcom GSM | Tata GSM | V-con | V-fone | MTS | Rcom CDMA | Tata CDMA | |
|---|---|----------------------------|----------|---------------|--------|--------|--------|----------|----------|----------------|--------|--------|-----------|-----------|-------|
| | | | | GSM Operators | | | | | | CDMA Operators | | | | | |
| (B) | Customer Service Quality Parameters | | | | | | | | | | | | | | |
| 5 | Metering/billing credibility-Post paid | $\leq 0.1\%$ | Reported | 0.00% | 0.01% | 0.00% | 0.00% | 0.02% | 0.00% | 0.00% | 0.00% | NA | 0.07% | 0.05% | |
| | | | Verified | 0.00% | 0.01% | 0.00% | 0.00% | 0.02% | 0.00% | 0.00% | 0.00% | 0.00% | NA | 0.07% | 0.05% |
| 6 | Metering /billing credibility-Pre paid | $\leq 0.1\%$ | Reported | 0.03% | 0.00% | 0.00% | 0.01% | 0.03% | 0.00% | 0.00% | 0.01% | 0.00% | 0.01% | 0.00% | |
| | | | Verified | 0.03% | 0.00% | 0.00% | 0.01% | 0.03% | 0.00% | 0.00% | 0.01% | 0.00% | 0.01% | 0.00% | |
| 7 | Resolution of billing/ charging complaints | <i>100% within 4 weeks</i> | Reported | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | NR | 100% | 100% | |
| | | | Verified | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | NR | 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% | NR | 100% | 100% |
| | | | Verified | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | NR | 100% | 100% |
| 8 | Response time to customers for assistance | | Reported | | | | | | | | | | | | |
| | | | Verified | | | | | | | | | | | | |
| | Accessibility of call centre/Customer Care | $\geq 95\%$ | Reported | 100% | 99.00% | 100% | 98.42% | 98.52% | 99.00% | 95.89% | 100% | NR | 99.36% | 88% | |
| | | | Verified | 100% | 99.00% | 100% | 98.42% | 98.52% | 99.00% | 95.89% | 100% | NR | 99.36% | 88% | |
| % call answered by operators(voice to voice) within 60 sec. | $\geq 90\%$ | Reported | 85.45% | 85.00% | 97.00% | 85.62% | 92.00% | 97.00% | 96.00% | 97.26% | NR | 98.12% | 98.00% | | |
| | | Verified | 85.45% | 85.00% | 97.00% | 85.62% | 92.00% | 97.00% | 96.00% | 97.26% | NR | 98.12% | 98.00% | | |
| 9 | Termination/closure of service | | | | | | | | | | | | | | |
| | No. of requests for Termination / Closure of service complied within 7 days during the quarter | ≤ 7 days | Reported | 100% | 100% | 100% | 100% | 100% | 100% | NA | 100% | NR | 100% | 100% | |
| | | | Verified | 100% | 100% | 100% | 100% | 100% | 100% | NA | 100% | NR | 100% | 100% | |
| 10 | Time taken for refunds of deposits after closures. | <i>100% within 60 days</i> | Reported | 100% | 100% | 100% | 100% | 100% | 100% | NA | 100% | NR | 100% | 100% | |
| | | | Verified | 100% | 100% | 100% | 100% | 100% | 100% | NA | 100% | NR | 100% | 100% | |

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

II. Basic Service (Wireline) Service

-Not conducted for this quarter

III. Broadband Service

-Not conducted for this quarter

CHAPTER-4: DETAILED FINDINGS & ANALYSIS

I. Cellular Mobile Telephone Service

(A) MSC Audit

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

| S/N | Name of Parameter | Benchmark | Aircel | Airtel | BSNL | Idea | 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% | 0.06% | 0.00% | 0.77% | 0.24% | 0.28% | ICR(Aircel) | 0.00% | 0.03% | 0.00% | 0.08% | 0.00% | |
| | b) Worst affected BTSs due to downtime | <=2% | 0% | 0% | 0.32% | 0.00% | 0.00% | | 0.00% | 0% | 0% | 0% | 0% | |
| | c) Total no. of BTSs in the licensed service area | | 642 | 1165 | 952 | 579 | 681 | | 8 | 698 | 11 | 369 | 184 | |
| | d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month | | 28 | 3 | 531 | 99 | 139 | | 0 | 16 | 0 | 20 | 0 | |
| | e) No. of BTSs having accumulated downtime of >24 hours in a month | | 0 | 0 | 3 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | |
| | c) CSSR | >=95% | 98.75% | 99.23% | 98.36% | 98.32% | 98.73% | | 99.82% | 98.93% | 98.56% | 99.38% | 98.80% | |
| | d) SDCCH/PAGING congestion | <=1% | 0.01% | 0.09% | 0.77% | 0.38% | 0.01% | | 0.07% | 0.18% | 0.00% | 0.00% | 0.00% | |
| | e) TCH congestion | <=2% | 0.13% | 0.14% | 1.90% | 0.78% | 0.09% | | 0.00% | 1.07% | 1.00% | 0.11% | 0.25% | |
| 2 | Connection maintenance | | | | | | | | | | | | | 0.00% |
| | a) CDR | <=2% | 1.04% | 0.78% | 1.64% | 1.21% | 0.64% | | 0.91% | 1.26% | 0.00% | 0.91% | 0.23% | |
| | b) Cells having > 3% TCH drop | <=3% | 11.87% | 2.49% | 2.88% | 2.77% | 0.15% | 0.00% | 2.76% | 0.00% | 0.78% | 1.19% | | |
| | c) Good voice quality | >=95% | 95.70% | 98.94% | NA | 95.37% | 98.10% | 98.49% | 97.07% | 99.37% | 98.49% | NA | | |
| | d) No. of cells > 3% TCH drop | | 681 | 251 | 235 | 143 | 9 | 0 | 174 | 0 | 26 | 20 | | |

| S/N | Name of the Parameter | Benchmark | Aircel | Airtel | BSNL | Idea | Rcom GSM | Tata GSM | Videocon | Vodafone | MTS | Rcom CDMA | Tata CDMA |
|------------|---|-----------|---------------|---------|------------|---------|----------|---------------------|----------|----------------|--------|-----------|-----------|
| | | | GSM Operators | | | | | | | CDMA Operators | | | |
| | e) Total no. of cells in the network | | 1913 | 3359 | 2722 | 1723 | 2043 | ICR (Aircel) | 24 | 2104 | 33 | 1107 | 560 |
| 3 | No. of POI's having congestion >0.5% | | 0 | 0 | 1 | 0 | 0 | | 0 | 1 | 0 | 0 | 0 |
| | a) Name of POI not meeting the benchmark | | Nil | Nil | MSC1 XIDG1 | Nil | Nil | | Nil | Cellone Shimla | Nil | Nil | Nil |
| | b) Total No. of circuits on POI | | 11,935 | 38,376 | 17,494 | 14,315 | 10,393 | | 1,008 | 14,879 | 751 | 2,958 | 9,710 |
| | c) Avg No. of call attempts on POI | | 1,859,877 | 603,677 | 245,426 | 216,362 | 197,247 | | 1,432 | 239,997 | 15 | 20,479 | 80,810 |
| | d) Avg traffic served on POI (Erlang) | | 5,297 | 21,206 | 10,537 | 7,583 | 6,176 | | 42 | 7,848 | 0 | 711 | 1,795 |
| | e) Total number of working POI Service Area wise | | 40 | 37 | 41 | 31 | 15 | | 16 | 44 | 20 | 10 | 65 |
| | f) Capacity of POI | | 9625 | 36711 | 15745 | 13494 | 9587 | | 775 | 14161 | 522 | 2613 | 9641 |
| | g) Equipped Capacity of Network in respect of Traffic in erlang | | 35163 | 71463 | 42000 | 19023 | 40000 | | 9000 | 17957 | 4200 | 28000 | 33005 |
| | h) Total traffic handled in TCBH in erlang | | 11229 | 54675 | 33466 | 11317 | 29425 | | 3 | 11842 | 1 | 4972 | 4937 |
| (B) | Customer Service Quality Parameters | | | | | | | | | | | | |
| 4 | Response time to customers for assistance | | | | | | | | | | | | |
| | a) Accessibility of call centre | >=95% | 100% | 100% | 95.57% | 100% | 98.98% | 100% | 95.24% | 100% | 100% | 99.91% | 100% |
| | b) % of call answered by operators(voice to voice) within 60 sec | >=90% | 92.79% | 96.16% | 85.28% | 99.78% | 99.76% | 96.54% | 92.00% | 98.44% | 100% | 95.34% | 98.53% |
| | 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 Himachal Pradesh Service Area are as given below:-

- **BTS accumulated downtime (benchmark $\leq 2\%$):** All operators are meeting benchmark with values lying between 0% and 0.77%.
- **Worst affected BTSS due to downtime (benchmark $\leq 2\%$):** All operators are meeting benchmark with values lying between 0% and 0.32%.
- **Call setup success rate (benchmark $\geq 95\%$):** All operators are meeting the benchmark with values lying between 98.32% and 99.82%.
- **SDCCH/PAGING Channel congestion (benchmark $\leq 1\%$):** All operators are meeting the benchmark with values lying between 0% and 0.77%.
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 1.90%.
- **Call drop rate (benchmark $\leq 2\%$):** All other operators are meeting the benchmark with values lying between 0% and 1.64%.
- **Cell exceeding 3% TCH drop (benchmark $\leq 3\%$):** Except for Aircel (11.87%), rests of the operators are satisfying the benchmark with value in between 0% and 2.88%.
- **Connections with good voice quality (benchmark $\geq 95\%$):** All operators are meeting the benchmark with values lying between 95.37% and 99.37%. 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 & Vodafone having calls failures $>0.5\%$ with nos. 1 & 1 respectively. It was also observed that some are in the range of over 100% though causing no traffic failure due to overflow technique i.e. the extra traffic is carried over by some other operating POI as has been designed to do so.
- **%age of call answered by operator (electronically) (benchmark >95):** All the operators are meeting the benchmark with values lying between 95.24% and 100%.
- **%age of call answered by operator (Voice to voice) (benchmark $>90\%$):** Except for BSNL, rest of the operator are meeting the benchmark with value in between 92.00% and 100%.

Note: In case of MTS for the Customer care parameters live calling data is shown as because there data base is significantly low.

(2) One month audit Data report & 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% | 0.06% | 0.01% | 2.02% | 0.13% | 0.38% | ICR(Aircel) | 0.24% | 0.06% | 0.24% | 0.17% | 0.00% |
| | b) Worst affected BTSs due to downtime | <=2% | 0.00% | 0.00% | 1.89% | 0.00% | 1.62% | | 0.00% | 0.00% | 0.00% | 0.27% | 0.00% |
| | c) Total no. of BTSs in the licensed service area | | 642 | 1,165 | 952 | 579 | 681 | | 8 | 698 | 11 | 369 | 184 |
| | d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month | | 254.28 | 51.31 | 13380 | 506.72 | 1791 | | 13.64 | 299.81 | 18.05 | 445 | 6 |
| | e) No. of BTSs having accumulated downtime of >24 hours in a month | | 0 | 0 | 18 | 0 | 11 | | 0 | 0 | 0 | 1 | 0 |
| | | | | | | | | | | | | | |
| 2 | Connection Establishment (Accessibility) | | | | | | | | | | | | |
| | a) CSSR (Call Setup Success Rate) | >=95% | 98.38% | 99.21% | 98.20% | 98.32% | 98.77% | 99.31% | 99.08% | 95.89% | 99.40% | 98.84% | |
| | b) SDCCH/PAGING congestion | <=1% | 0.02% | 0.08% | 0.80% | 0.25% | 0.01% | 0.13% | 0.11% | 0.00% | 0.00% | 0.00% | |
| | c) TCH congestion | <=2% | 0.42% | 0.15% | 1.80% | 1.00% | 0.08% | 0.04% | 0.92% | 2.84% | 0.10% | 0.21% | |
| 3 | Connection maintenance (Retainability) | | | | | | | | | | | | |
| | a) CDR | <=2% | 1.08% | 0.85% | 1.80% | 1.23% | 0.65% | 1.14% | 1.23% | 0.49% | 0.98% | 0.28% | |
| | b) Worst affected cells>3% TCH drop | <=3% | 12.39% | 2.53% | 2.83% | 2.87% | 0.05% | 0.00% | 2.73% | 0.00% | 0.99% | 1.43% | |
| | c) Good voice quality | >=95% | 95.63% | 98.86% | NA | 95.18% | 98.11% | 98.08% | 96.96% | 99.23% | 98.47% | NA | |
| | d) Total No. of cells exceeding 3% TCH drop (call drop) | | 6872 | 2467 | 2237 | 1436 | 29 | 0 | 1668 | 0 | 317 | 233 | |
| | e) Total no. of cells in the network | | 1913 | 3359 | 2722 | 1723 | 2043 | 24 | 2104 | 33 | 1107 | 560 | |
| 4 | No. of POI's having congestion >0.5% | <=0.5% | 0 | 0 | 1 | 0 | 4 | 0 | 1 | 0 | 0 | 0 | |

| | | | | | | | | | | | | | |
|------------|---|----------------------------|-----------|-----------|---------------|---------|--|--------------------|--------|-------------------|-----------------|---------|--------|
| | a) Name of POI not meeting the benchmark | | Nil | Nil | MSC1 XIDG2 | Nil | Aircel, Cellone, Cellone 2, Idea HP | | Nil | Cellone Shimla | Nil | Nil | Nil |
| | b) Total No. of call attempts on POI (Avg.) | | 1,777,375 | 831,823 | 234,080 | 215,053 | 189,217 | ICR(Aircel) | 1,260 | 240,800 | 16 | 19,839 | 78,015 |
| | c) Total traffic served on POI (Erlang) (Avg.) | | 5,051 | 19,844 | 10,116 | 7,337 | 5,929 | | 38 | 7,682 | 0 | 693 | 1,714 |
| | d) Total No. of circuits on POI | | 11,935 | 38,376 | 17,494 | 13,811 | 10,220 | | 1,008 | 14,879 | 751 | 2,958 | 9,710 |
| | e) Total number of working POI Service Area wise | | 40 | 37 | 41 | 31 | 15 | | 16 | 44 | 20 | 10 | 65 |
| | f) Capacity of POI | | 9,625 | 36,711 | NR | 13,001 | 9,429 | | 775 | 14,161 | 522 | 2,613 | 9,641 |
| | | | | | | | | | | | | | |
| 5 | Network Data | | | | | | | | | | | | |
| | a) Equipped Capacity of Network Erlang | | 35163 | 71463 | 42000 | 19023 | 40000 | | 9000 | 17957 | 4200 | 28000 | 33005 |
| | b) Total traffic in TCBH in erlang (Avg.) | | 10753 | 55400 | 32615 | 10953 | 28121 | | 3 | 11315 | 1 | 4845 | 4638 |
| | c) Total no. of customers served (as per VLR) on last day of the month | | 419845 | 1717384 | 1028528 | 408953 | 963492 | | 9756 | 420348 | 66 | 166738 | 54005 |
| (B) | Customer Service Quality Parameters | | | | | | | | | | | | |
| 5 | Metering/billing credibility-Post paid | $\leq 0.1\%$ | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | NA | 0.45% | NA | 0.00% | 0.00% |
| | a) No. of bills issued during the period | | 2502 | 34578 | 51319 | 346 | 2701 | 1437 | NA | 1122 | NA | 7942 | 12322 |
| | b) No. of bills disputed including billing complaints during the period | | 0 | 1 | 0 | 0 | 0 | 0 | NA | 5 | NA | 0 | 0 |
| 6 | Metering /billing credibility-Pre paid | $\leq 0.1\%$ | 0.00% | 0.00% | 0.00% | 0.00% | 0.02% | 0.00% | 0.00% | 0.01% | 0.00% | 0.01% | 0.00% |
| | a) No. of charging / credit / validity complaints during the quarter | | 16 | 80 | 0 | 13 | 277 | 0 | 1 | 23 | 0 | 23 | 0 |
| | b) Total no. of pre-paid customers at the end of the quarter | | 717,150 | 2,245,423 | 1,594,329 | 428,699 | 1,525,526 | 289,474 | 79,015 | 420,720 | 58 | 336,259 | 92,618 |
| 7 | Resolution of billing/ charging complaints | <i>100% within 4 weeks</i> | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | No Complains | 100% | 100% |
| | a) No. of billing/(post paid) and charging, credit/validity (pre paid) complaints resolved within 4 | | 16 | 1669 | 281 | 13 | 457 | 21 | 1 | 64 | | 75 | 71 |

| | | | | | | | | | | | | | |
|-----------|---|---------------------|---------|---------|--------|---------|-----------|--------|--------|--------|-----------------|---------|--------|
| | weeks during the quarter | | | | | | | | | | | | |
| | b) Total no. of billing (post paid) and charging, credit / validity (pre paid) complaints received during the quarter | | 16 | 1669 | 281 | 13 | 457 | 21 | 1 | 64 | No Complains | 75 | 71 |
| | c) No. of billing complaints (post paid) and charging, credit/ validity complaints (pre paid) resolved in favour of the customer during the quarter | | 16 | 81 | 0 | 13 | 277 | 0 | 1 | 28 | | 23 | 0 |
| | d) No. of complaints disposed on account of not considered as valid complaints during the quarter | | 0 | 1588 | 281 | 0 | 180 | 21 | 0 | 36 | | 52 | 71 |
| | 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 | >=95% | 100% | 99.22% | 95.36% | 100% | 98.98% | 99.33% | 97% | 100% | No Records | 99.83% | 97.30% |
| | b) % call answered by operators(voice to voice) within 60 sec. | >=90% | 88.98% | 98.29% | 91.36% | 98.23% | 96.81% | NR | 94.67% | 97.52% | | 95.27% | NR |
| | c) Total no. of call attempts to call centre & customer care nos. during TCBH (Avg.). | | 719,750 | 194,252 | 19,984 | 471,410 | 4,025,924 | 22,663 | 1,262 | 23,503 | | 254,576 | 5,860 |
| | d) No. of calls connected and answered successfully to call centre & customer care nos. during TCBH (Avg.). | | 719,750 | 192,742 | 19,057 | 471,410 | 3,984,732 | 22,511 | 1,222 | 23,503 | | 254,140 | 5,702 |
| 9 | Termination/closure of service | <=7days | 100% | 100% | 100% | 100% | 100% | 100% | NA | 100% | No cases | 100% | 100% |
| | a) Total No. of requests for Termination / Closure of service received during the quarter | | 27 | 245 | 1,934 | 10 | 29 | 13 | NA | 56 | | 9 | 256 |
| | b) No. of requests for Termination / Closure of service complied within 7 days during the quarter | | 27 | 245 | 1,934 | 10 | 29 | 13 | NA | 56 | | 9 | 256 |
| 10 | Time taken for refunds of deposits after closures. | 100% within 60 days | 100% | 100% | 100% | 100% | 100% | 100% | NA | 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 Himachal Pradesh Service Area are as given below:-

- **BTS accumulated downtime (benchmark $\leq 2\%$):** Except BSNL, rest of the operators are meeting the benchmark with values lying between 0.00% and 0.38%.
- **Worst affected BTSs due to downtime (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0% and 1.89%.
- **Call setup success rate (benchmark $\geq 95\%$):** All operators are meeting the benchmark with values lying between 95.89% and 99.40%.
- **SDCCH/PAGING Channel congestion (benchmark $\leq 1\%$):** All operators are meeting the benchmark with values lying between 0% and 0.80%.
Note: CDMA operators have provided the data for Paging Channel congestion and GSM operators provided SDCCH Channel congestion.
- **TCH congestion (benchmark $\leq 2\%$):** Except MTS, rest of the operators are meeting the benchmark with values lying between 0.04% and 1.80%.
- **Call drop rate (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0.28% and 1.80%.
- **Cell exceeding 3% TCH drop (benchmark $\leq 3\%$):** Except for Aircel (12.39%), rests of the operators are satisfying the benchmark with value in between 0% and 2.87%.
- **Connections with good voice quality (benchmark $\geq 95\%$):** All the GSM operators are meeting the benchmark with values lying between 95.18% and 99.23%. 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, RCOM GSM & Vodafone having call failures $>0.5\%$ with nos. 1,4,1 respectively. It was also observed that some operators are in the range of over 100% though causing no traffic failure due to overflow technique i.e. the extra traffic is carried over by some other operating POI as has been designed to do so.
- **%age of call answered by operator (electronically) (benchmark >95):** All the operators are meeting the benchmark with values lying between 95.36% and 100%.
- **%age of call answered by operator (Voice to voice) (benchmark $>90\%$):** Except for Aircel, rests of the operators are meeting the benchmark with values lying between 91.36% and 98.29%.
Note: In case of MTS for the Customer care parameters subscriber data base is significantly low hence month figure is not recorded.
- **Metering and billing credibility-Postpaid (benchmark $\leq 0.1\%$):** Except Vodafone, rest of 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 0.02%.
- **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 | 1 | 7 | 642 |
| 2 | Airtel Ltd | 5 | 15 | 1165 |
| 3 | BSNL | 3 | 14 | 952 |
| 4 | Idea | 1 | 5 | 579 |
| 6 | Reliance Communication | 3 | 12 | 681 |
| 7 | Videocon | 1 | 1 | 8 |
| 8 | Vodafone | 1 | 9 | 698 |
| 9 | TATA GSM | ICR with Aircel | | |
| CDMA Operators | | | | |
| 10 | MTS | 1 | 1 | 11 |
| 11 | Reliance Communication | 1 | Nil | 369 |
| 12 | Tata | 1 | 1 | 183 |

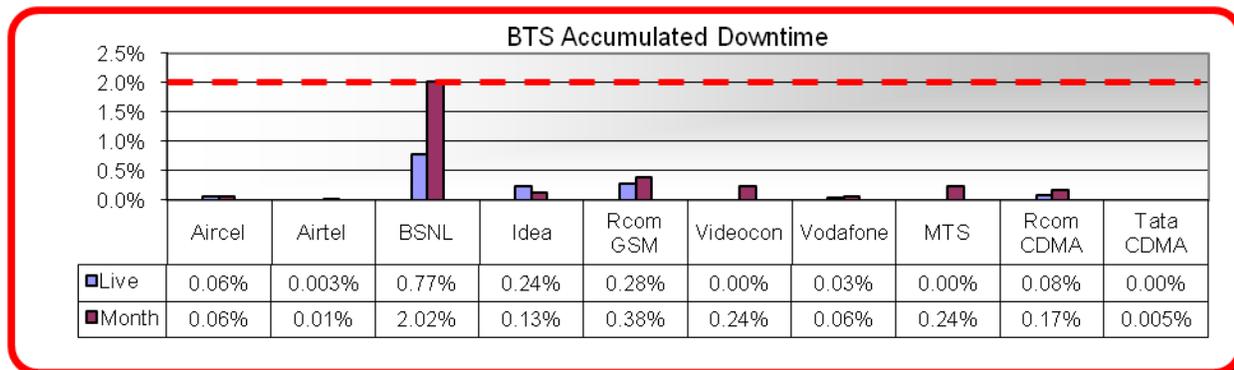
Note: Reliance CDMA is running on Lucent System, therefore no BSC is installed.

4) Performance (Graphical Representation)

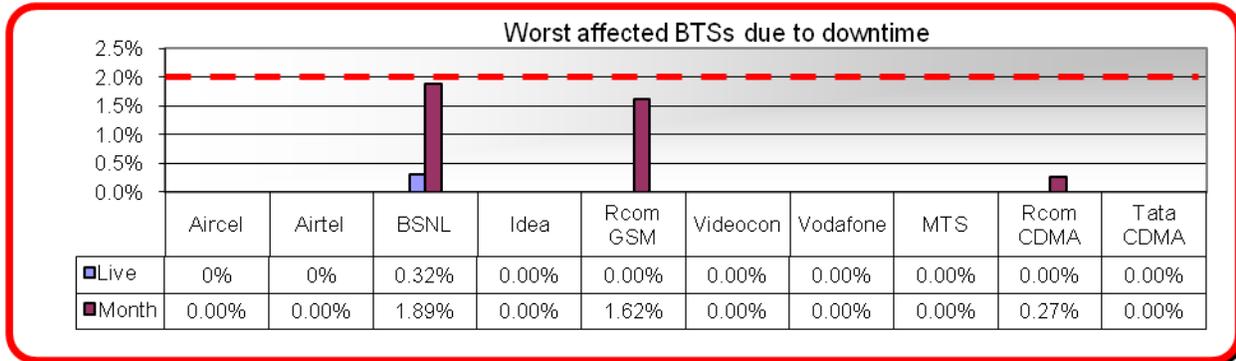
Comparison between Live measurements and One month data Audit – Cellular Mobile Telephone Services

A) NETWORK PERFORMANCE

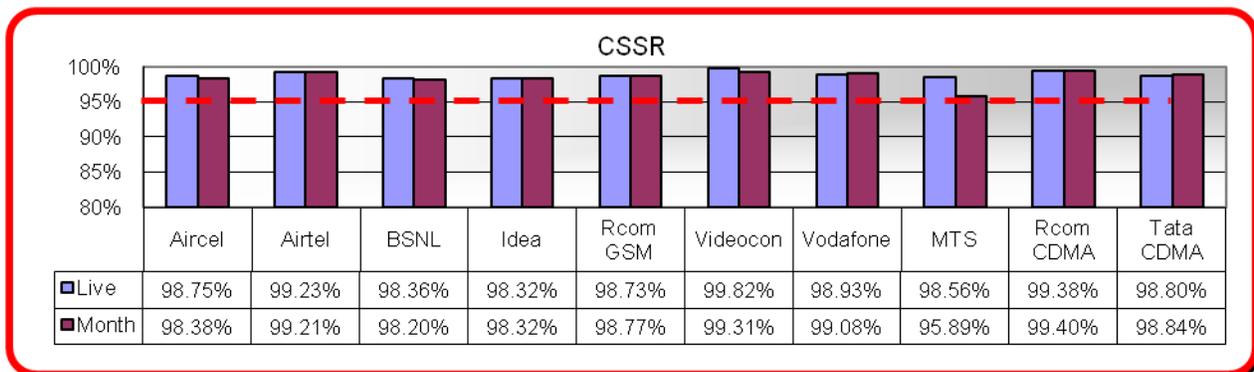
BTS accumulated downtime: Except BSNL for month audit data, rest of the operators are meeting the TRAI benchmarks ($\geq 2\%$) for both one month data and 3 days live data taken in the month of audit.



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

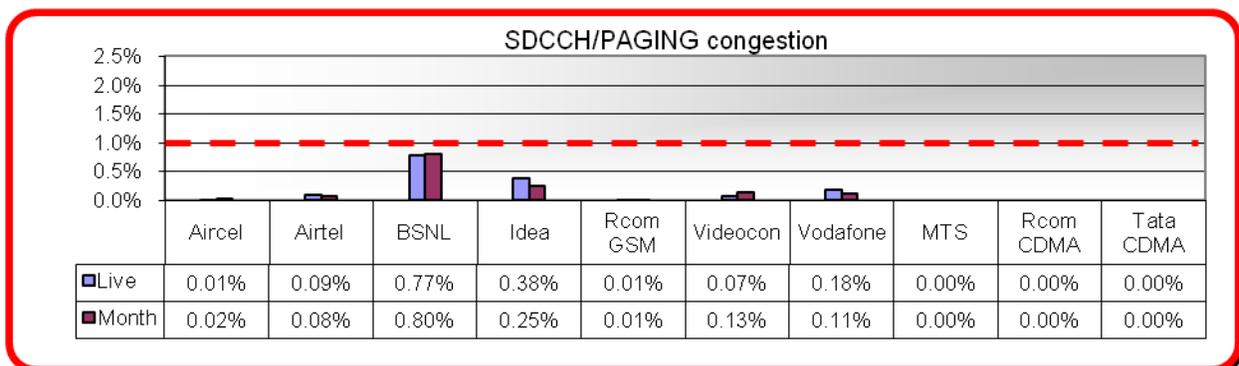


Call Setup Success Rate (CSSR): All operators are meeting the TRAI benchmarks ($\geq 95\%$) for both one month data and 3 days live data taken in the month of audit.

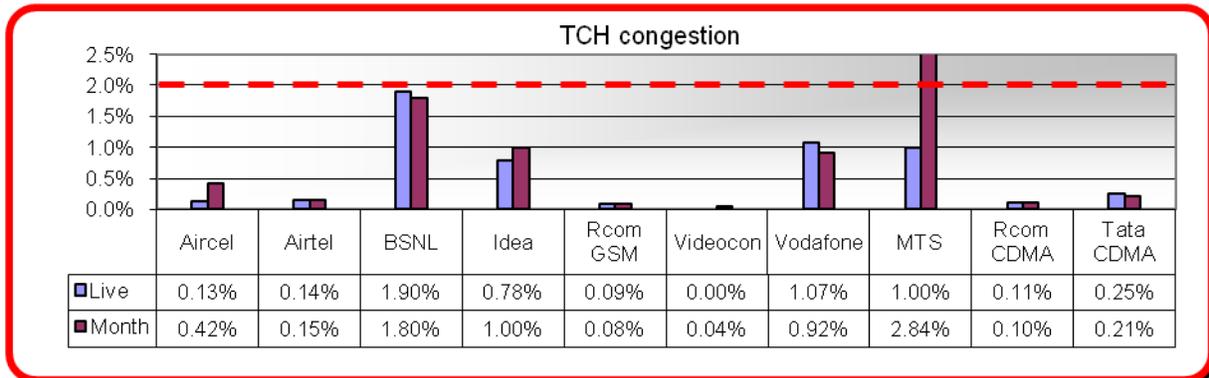


Blocked call rate:

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

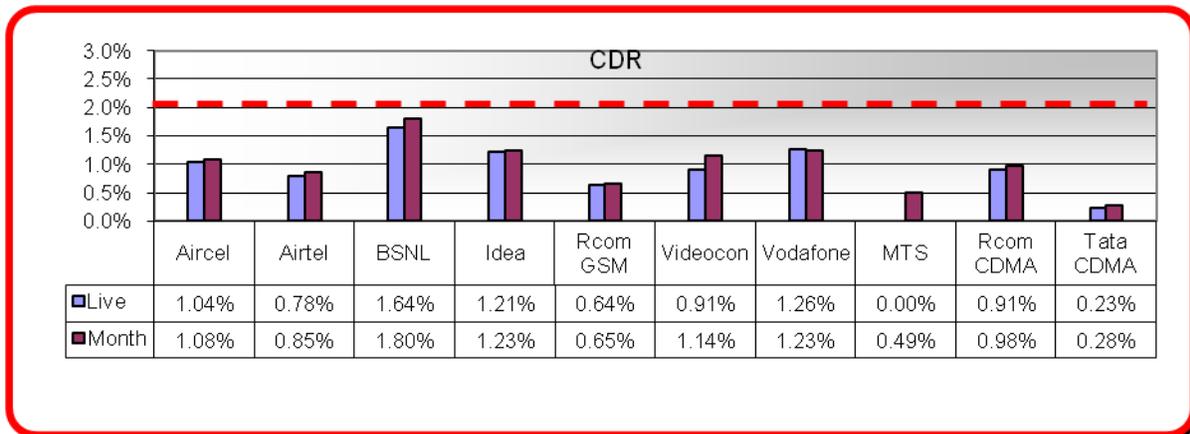


TCH congestion (%): Except MTS for month audit data, rest of the operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data.

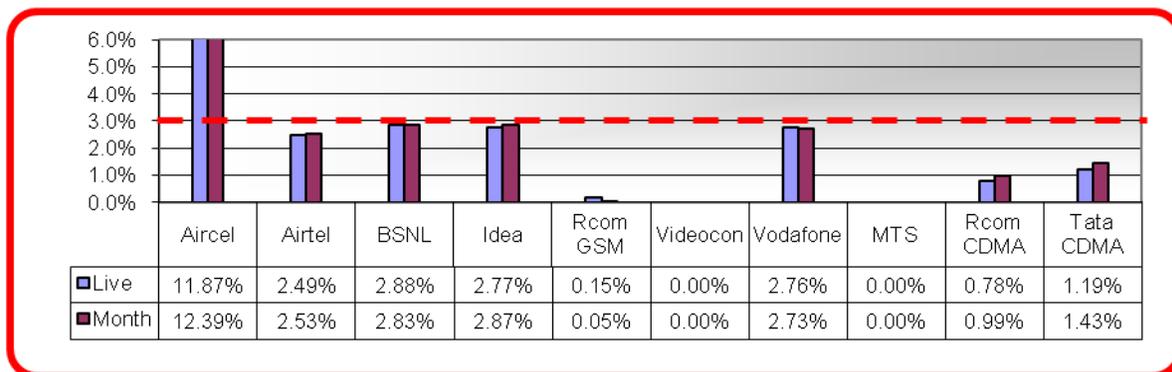


Connection Maintainability (Retainability):

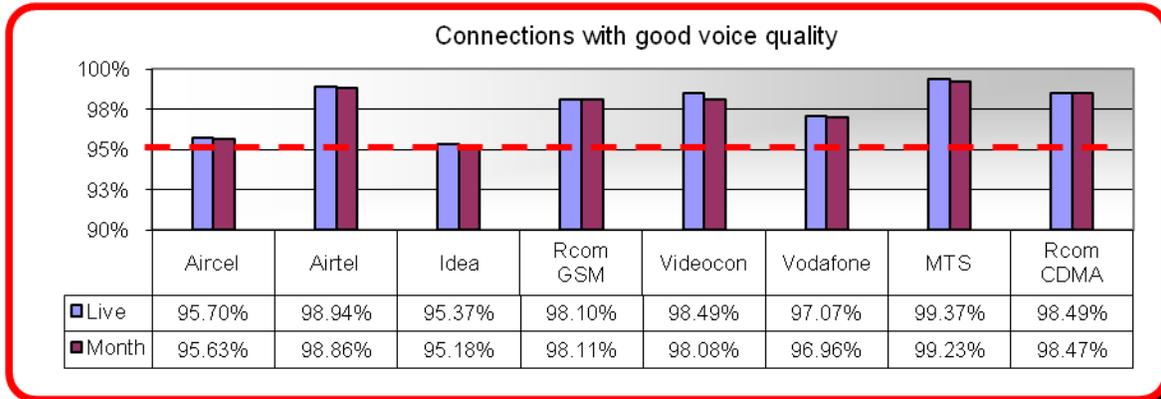
Call Drop Rate (CDR) (%): All the operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data.



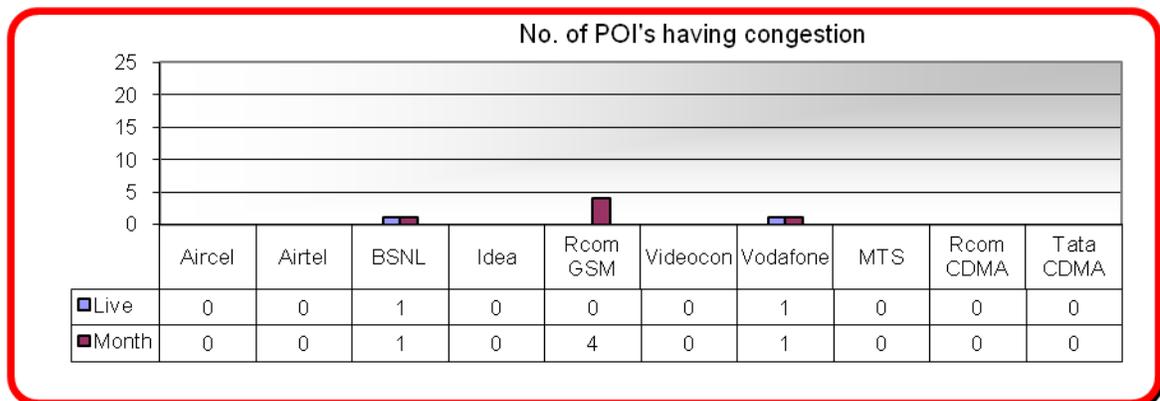
Worst affected Cell exceeding 3% TCH Drop: For both live & month audit data, Aircel with a value of 11.87 & 12.39% respectively is not meeting the benchmark of $\leq 3\%$. Rests of the operators are meeting the benchmark for both cases.



Percentage of connections with good voice quality (benchmark $\geq 95\%$): 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 and Tata CDMA values are not system generated.



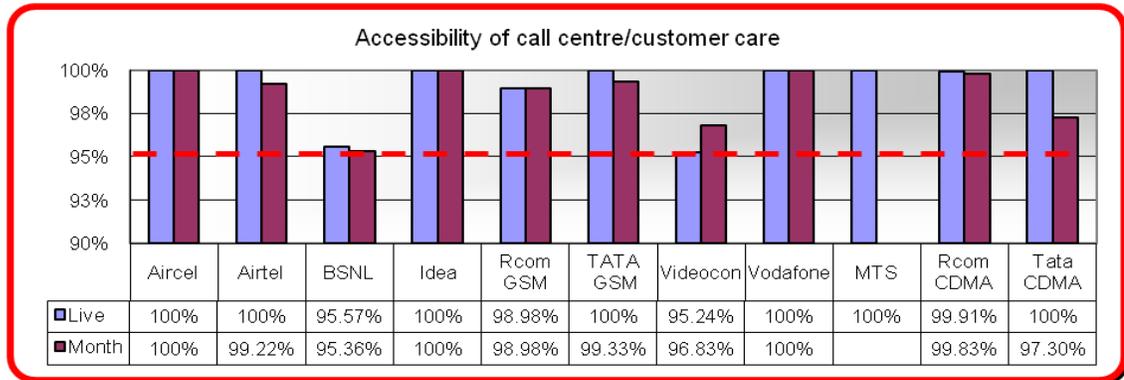
No of POI's having Congestion $>0.5\%$: For both Live and month audit, BSNL (1) & Vodafone (1) respectively while RCOM GSM (4) only for month audit were having call failures $>0.5\%$ on their respective POI's.



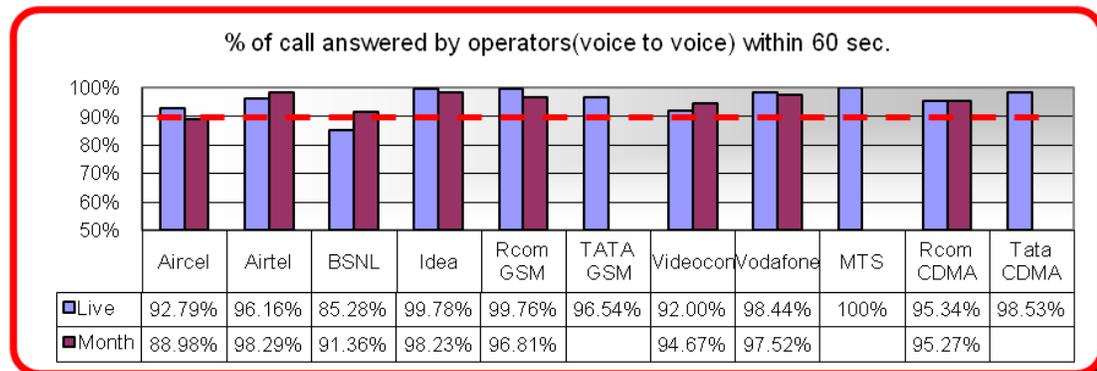
B) CUSTOMER SERVICE QUALITY PARAMETERS

Response time to the customer for assistance:

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



Percentage of call answered by operators (Voice to voice) within 60 sec: For Live data, only BSNL, while Aircel for month audit were not meeting the benchmark. Rest all operators are meeting benchmark for both cases.



5) Critical Analysis

From the data table it can be seen that only Aircel is not meeting the benchmark for the parameter of 'Worst affected cells are having more than 3% TCH drop rate' with high margins. This may have happened due to mainly in the change adopted for calculating the parameter considering CBBH instead of TCBH, which reflects more practical way of calculating TCH drop keeping in view customer satisfaction. In Case of downtime, BSNL failed to meet benchmark with minimal margin.

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

(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 | BSNL | Idea | Rcom GSM | TATA GSM | Videocon | Vodafone | MTS | TATA CDMA | Rcom CDMA |
|------------------------------|--------|--------|---------------|------|----------|---------------|----------|----------|---------------|---------------|-----------|
| Total No. of Calls Attempted | 16 | 81 | No Complaints | 13 | 100 | No Complaints | 1 | 28 | No Complaints | No Complaints | 23 |
| Total No. of calls Answered | 15 | 75 | | 13 | 91 | | 1 | 26 | | | 20 |
| Cases resolved with 4 weeks | 15 | 75 | | 13 | 91 | | 1 | 26 | | | 20 |
| %age of cases resolved | 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. Since the Himachal Pradesh Circle Subscriber base is not so large therefore less no. of valid complaints registered. Except MTS, other operators which are have no complaints indicates valid complaints only.

3) Live calling to call center:

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

| Calling Operator | Aircel | Airtel | BSNL | Idea | Rcom GSM | Tata GSM | Vodafone | MTS | Rcom CDMA | Tata CDMA |
|--|--------|--------|------|------|----------|----------|----------|------|-----------|-----------|
| Total No. of Calls Attempted | 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 |
| Calls got connected to agent within 60 Sec | 100 | 96 | 92 | 100 | 100 | 100 | 98 | 100 | 100 | 100 |
| %age of calls got answered | 100% | 96% | 92% | 100% | 100% | 100% | 98% | 100% | 100% | 100% |

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. | | No. of calls made | Aircel | Airtel | BSNL | Idea | RCOM GSM | Vodafone | RCOM CDMA | TATA CDMA |
|---------------|-----------|-------------------|--------|--------|------|------|----------|----------|-----------|-----------|
| | | Mandi | | | | | | | | |
| 100 | Police | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 101 | Fire | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 108 | Ambulance | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 139 | Railway | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| | | Hamirpur | | | | | | | | |
| 100 | Police | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 101 | Fire | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 108 | Ambulance | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 139 | Railway | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| | | Una | | | | | | | | |
| 100 | Police | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 101 | Fire | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 108 | Ambulance | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 139 | Railway | 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 (Mandi, Hamirpur & Una) 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 (Himachal Pradesh 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) | Vodafone | Reliance (CDMA) | Tata (CDMA) |
|------------------|--------|--------|------|------|----------------|----------|-----------------|-------------|
| | Shimla | | | | | | | |
| Aircel | - | 100% | 98% | 100% | 99% | 100% | 100% | 100% |
| Airtel | 100% | - | 100% | 100% | 100% | 100% | 100% | 100% |
| BSNL | 100% | 100% | - | 100% | 100% | 96% | 99% | 100% |
| Idea | 100% | 98% | 98% | - | 100% | 100% | 100% | 100% |
| Reliance (GSM) | 98% | 100% | 97% | 97% | - | 100% | 100% | 100% |
| Vodafone | 100% | 100% | 97% | 100% | 100% | - | 100% | 100% |
| Reliance (CDMA) | 100% | 100% | 100% | 100% | 100% | 100% | - | 100% |
| Tata (CDMA) | 99% | 100% | 100% | 99% | 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 most of the operator networks. However few cases were found where operators like BSNL, Reliance GSM & Vodafone whose call failures was more than >2% on their some of the individual POI's.

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

The Operator Assisted Drive Test was conducted at Himachal Pradesh for all the operators. Route covered was about around 30-50Km depending on city areas within the speed limit of 15-20Km/hr.

DRIVE TEST LOCATIONS**MANDI**

LOW DENSE : Visco Resort, Kullu Road, Sundernagar Road.

MEDIUM DENSE : Gurudwara Road, Purana Mandir, Jail Road.

HIGH DENSE : Indira Market, Joginder nagar Road, Bus stand.

HAMIRPUR

LOW DENSE : Kukreja Institute, DC Office, Mandi H/W.

MEDIUM DENSE : Hira nagar, Mattan Sidh.

HIGH DENSE : Bbhota Chowk, Main Market, and Gandhi Chowk.

UNA

LOW DENSE : Hamirpur Road, Nangal Road, DAV School.

MEDIUM DENSE : Degree College, Rakkar Colony, Jhaleda.

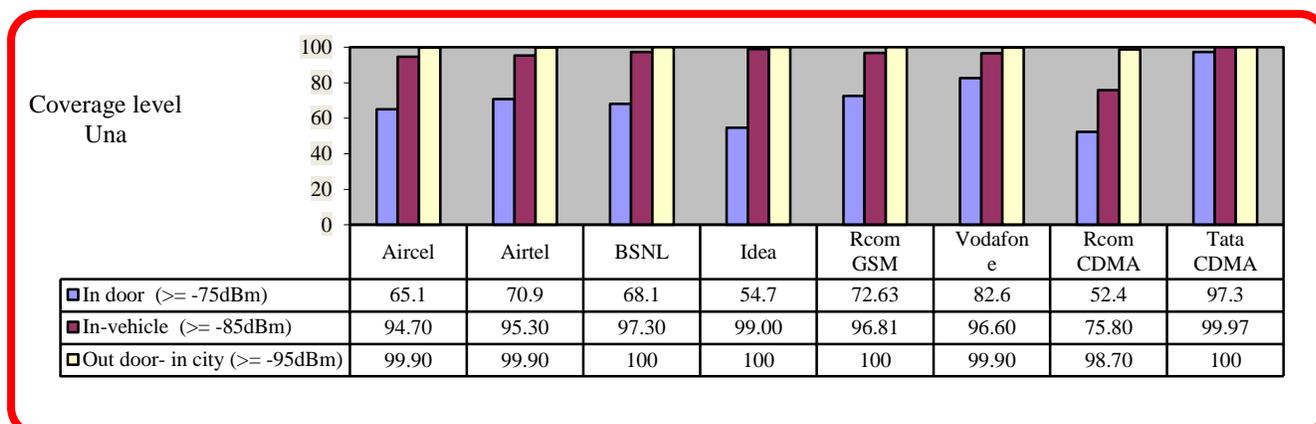
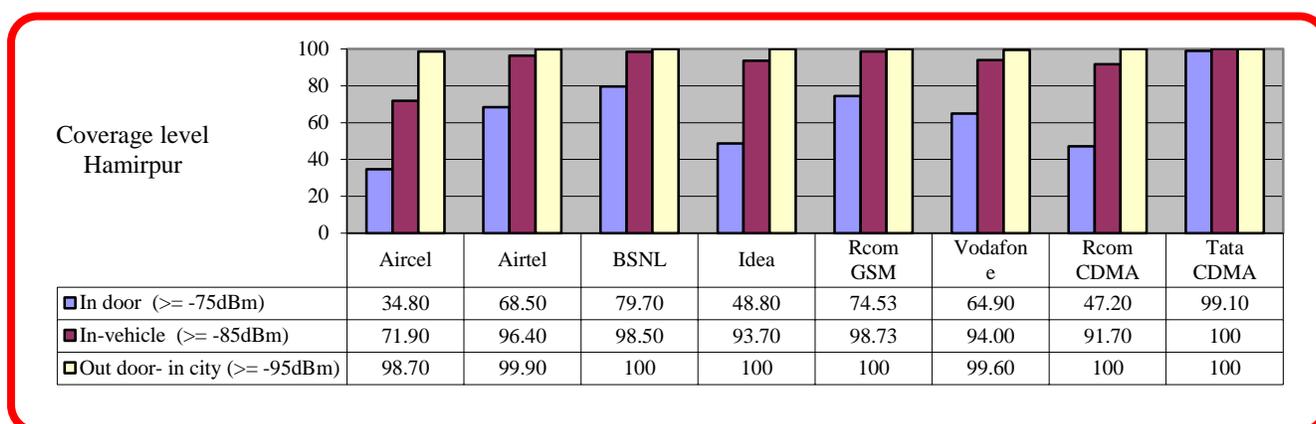
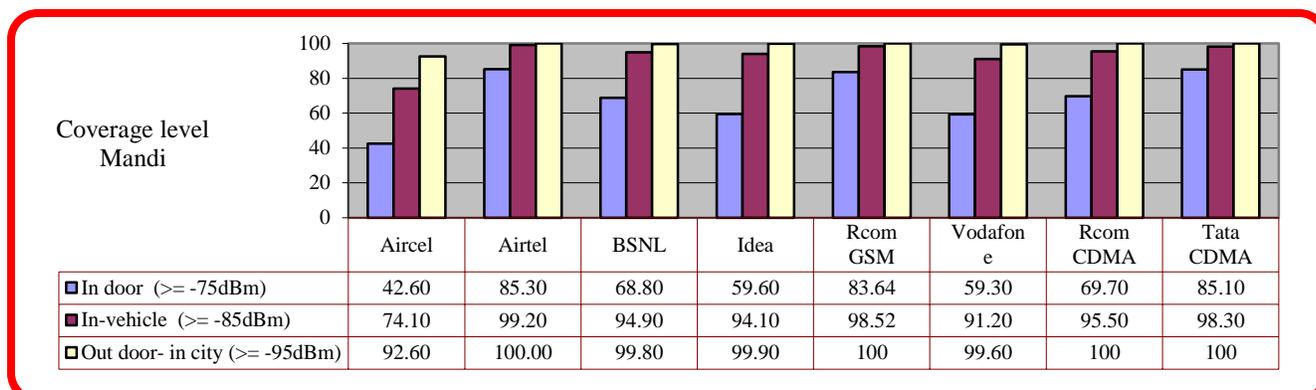
HIGH DENSE : Bus Stand, Main Market, and Railway Barrier.

2) Performance (for the respective cities for Himachal Pradesh Circle)

| SN | Parameter | City Name | Aircel | Airtel | BSNL | Idea | Rcom GSM | Vodafone | Rcom CDMA | Tata CDMA |
|-----|--|-----------|---------------|--------|-------|-------|----------|----------|-----------|----------------|
| | | | GSM Operators | | | | | | | CDMA Operators |
| 1.1 | Call Attempts | Mandi | 32 | 36 | 38 | 44 | 40 | 42 | 36 | 36 |
| | | Hamirpur | 46 | 47 | 48 | 46 | 38 | 48 | 38 | 54 |
| | | Una | 47 | 41 | 44 | 41 | 34 | 43 | 32 | 47 |
| 1.2 | Blocked Call Rate (<=3%) | Mandi | 0.00 | 0.00 | 2.63 | 2.27 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Hamirpur | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Una | 0.00 | 0.00 | 0.00 | 2.44 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.3 | Dropped Call Rate (<=2%) | Mandi | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Hamirpur | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Una | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.4 | Percentage of connections with good voice quality (=>95%) (i) 0-4 (w/o frequency hopping) | Mandi | | | | | | | 99.86 | 99.96 |
| | | Hamirpur | | | | | | | 99.94 | 99.90 |
| | | Una | | | | | | | 99.32 | 99.02 |
| | (ii) 0-5 (with frequency hopping) | Mandi | 95.30 | 98.10 | 95.30 | 95.10 | 98.72 | 99.30 | | |
| | | Hamirpur | 97.70 | 96.20 | 95.10 | 95.90 | 97.05 | 98.40 | | |
| | | Una | 98.90 | 95.60 | 98.20 | 96.40 | 98.16 | 99.10 | | |
| 1.5 | Service Coverage (%) In door (>= -75dBm) | Mandi | 42.60 | 85.30 | 68.80 | 59.60 | 83.64 | 59.30 | 69.70 | 85.10 |
| | | Hamirpur | 34.80 | 68.50 | 79.70 | 48.80 | 74.53 | 64.90 | 47.20 | 99.10 |
| | | Una | 65.1 | 70.9 | 68.1 | 54.7 | 72.63 | 82.6 | 52.4 | 97.3 |
| | In-vehicle (>= -85dBm) | Mandi | 74.10 | 99.20 | 94.90 | 94.10 | 98.52 | 91.20 | 95.50 | 98.30 |
| | | Hamirpur | 71.90 | 96.40 | 98.50 | 93.70 | 98.73 | 94.00 | 91.70 | 100.00 |
| | | Una | 94.70 | 95.30 | 97.30 | 99.00 | 96.81 | 96.60 | 75.80 | 99.97 |
| | Out door- in city (>= -95dBm) | Mandi | 92.60 | 100.00 | 99.80 | 99.90 | 100 | 99.60 | 100 | 100 |
| | | Hamirpur | 98.70 | 99.90 | 100 | 100 | 100 | 99.60 | 100 | 100 |
| | | Una | 99.90 | 99.90 | 100 | 100 | 100 | 99.90 | 98.70 | 100 |
| 1.6 | Call Setup Success Rate (>=95%) | Mandi | 100 | 100 | 97.37 | 97.73 | 100 | 100 | 100 | 100 |
| | | Hamirpur | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | | Una | 100 | 100 | 100 | 97.56 | 100 | 100 | 100 | 100 |

Graphical Representation

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



(3) Critical Analysis

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

- ✚ All operators are satisfying the TRAI Benchmark in all 3 towns.
- ✚ RF Coverage Level was found be average for most of the operators in Himachal Pradesh Circle.

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

The independent drive test activity was conducted in Himachal Pradesh Circle for various service providers in two different cities namely “**Una & Bilaspur**”. 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 55 Km for both the cities depending upon the city areas within the speed limit of 15-20Km/hr.

Drive Test Locations and Service Provider’s name:

1. Una - Bharti Airtel (7 BTS)
2. Bilaspur - Videocon (4 BTS)

Note: Videocon is on ICR with Aircel in Bilaspur Town.

Area Coverage Details:**i) Una**

Hamirpur road, Railway barrier, Bus stand, Degree College, DAV school, Rakkar colony, Jhaleda, Chandigarh H/W.

ii) Bilaspur

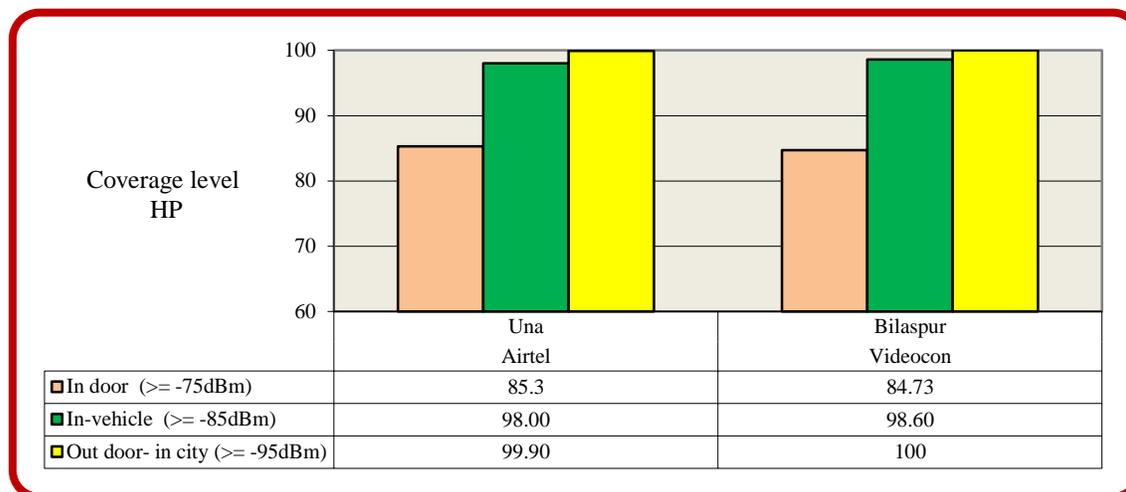
Housing Board, Bus Stand, Degree College, ITI, Vyas Hospital, Ghumarwin Road, ITI, Lunu Maidan, Laxmi Narayan Mandir, Bus Stand, Police Thana, Gurudwara Market, Bilaspur Upper Market, Lower Market, DC Office, Circuit House, Higher Education Office.

2) Performance (for the respective cities for Himachal Pradesh Circle)

| SN | Parameter | Airtel | Videocon |
|-----|---|--------|----------|
| | | Una | Bilaspur |
| 1.1 | Call Attempts | 55 | 36 |
| 1.2 | Blocked Call Rate (<=3%) | 0.00 | 0.00 |
| 1.3 | Dropped Call Rate (<=2%) | 0.00 | 0.00 |
| 1.4 | Percentage of connections with good voice quality (=>95%) | | |
| | (i) 0-4 (w/o frequency hopping) | | |
| | (i) 0-5 (with frequency hopping) | 96.70 | 96.83 |
| 1.5 | Service Coverage (%) | | |
| | In door (>= -75dBm) | 85.3 | 84.73 |
| | In-vehicle (>= -85dBm) | 98.00 | 98.60 |
| | Outdoor- in city (>= -95dBm) | 99.90 | 100 |
| 1.6 | Call Setup Success Rate (>=95%) | 100 | 100 |

Graphical Representation

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



(3) Critical Analysis

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

- ✚ **Airtel** performance in **Una Town** was found to be satisfactory for all parameter. The **RF coverage level** was found average throughout the town with **85.30% of samples** within **-75dBm Rx lev** and achieved no blocked or dropped calls. As far as **Voice quality parameter** concerned, operator achieved **96.70% of samples** within **0-5 number**. During testing, a total of **55 test calls** and **99 Handover attempts** were made and all were successfully connected & completed which results into **100% CSSR & HOSR** respectively.
- ✚ Performance of **Videocon** in **Bilaspur Town** found to be satisfactory for all parameters. A total of **36 test calls** were made and out of that all 36 calls got successfully established. The **RF coverage level** was found average for **Videocon** in the town, as **84.73% of samples** were within **-75dBm Rx lev**. **It is again to be noted that Videocon is on ICR with Airtel in Bilaspur 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 (Himachal Pradesh) is satisfactory for most of the **Network Parameters**. However, the benchmark of $\leq 3\%$ for “worst affected cells $> 3\%$ TCH drop” is not met by Aircel. Similarly, “BTS accumulated Downtime” and “TCH congestion” parameter was found below benchmark for BSNL & MTS respectively.

Under Drive Test section, all operators are meeting prescribed benchmark. However coverage level was found average as it is not much possible to cover all the areas due to the uncertain terrain. But overall network was good in all possible areas of 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 $\geq 90\%$.

Regarding **Metering/Billing Credibility** issues, only Vodafone shows below benchmark value for Post-paid connections.

II. Basic Telephone Service (Wireline) Providers

- Not conducted for this quarter

III. Broadband Service Providers

- Not conducted for this quarter