



**Audit & Assessment of Quality of Service  
Of  
Cellular Mobile Telephone Service  
For  
Telecom Regulatory Authority of India  
North Zone – Himachal Pradesh Service Area  
(October 2014 – December 2014)**

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## PREFACE

The Telecom Regulatory Authority of India (TRAI) was established in 1997 by an Act of Parliament, called the Telecom Regulatory Authority of India Act, 1997, to regulate telecom services. The Authority's mission is to ensure that the interest of consumers are protected and at the same time to nurture conditions for growth of telecommunications, broadcasting and cable services in a manner and at a pace which will enable India to play a leading role in emerging global information society.

The Authority, in exercise of its functions as per the provisions in the TRAI Act, has been entrusted to measure the Quality of Service provided by the Service Providers from time to time and to compare them with the benchmarks so as to assess the level of performance. In pursuance of this, TRAI has appointed **M/s TUV-SUD South Asia Pvt. Ltd.** to carry out "Audit and Assessment of Quality of Service" provided by Basic (Wire line), Cellular Mobile and Broadband service providers in terms of the benchmarks specified in the respective regulations, in North and West Zones.

TUV-SUD South Asia carried out QoS audit as per the norms of TRAI in all the eight circles / services areas of the North Zone and four circles of the West Zone. This report details the performance of the various service providers in **Himachal Pradesh circle** against the QoS bench marks laid down by TRAI in the respective regulations.

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## **1. BACKGROUND**



## 1. BACKGROUND

Telecom Regulatory Authority of India has been entrusted to “lay down the standards of quality of service to be provided by the service providers and ensure the quality of service and conduct the periodical survey of such service provided by the service providers so as to protect interest of the consumers of telecommunication services” vide sub-clause (v) of clause (b) of sub-section (1) of section 11 of the Telecom Regulatory Authority of India Act, 1997 (24 of 1997).

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, the regulatory watch dog for the Quality of Service for the telecom services – Basic (Wire line), Cellular Mobile (Wireless) and Broadband has commissioned **M/s TUV-SUD South Asia Pvt. Ltd.** for conducting audit and assessment of quality of service of service providers, in terms of the benchmarks specified in the “The Standards of Quality of Service of Basic Telephone Service (Wire line) and Cellular Mobile Telephone Service Regulations, 2009 (7 of 2009) dated 20<sup>th</sup> March, 2009 and the Quality of Service of Broadband Service Regulations, 2006 (11 of 2006) dated 6<sup>th</sup> October, 2006 on zonal basis for **North Zone and West Zone** comprising of the following Telecom Circles/Metro Service Areas:

**North Zone:** Delhi, Jammu & Kashmir, Himachal Pradesh, Punjab, Haryana, Rajasthan, Uttar Pradesh-East and Uttar Pradesh-West (including Uttarakhand). For the cellular mobile telephone service the service area of Delhi includes Ghaziabad, Faridabad, Noida and Gurgaon.

**West Zone:** Mumbai, Maharashtra (including Goa and excluding Mumbai), Gujarat and Madhya Pradesh (including Chhattisgarh).

The Audit exercise would assess the Quality of Service of telecom operators providing Basic (Wire line), Cellular Mobile (Wireless) and Broadband services by auditing the relevant QoS records maintained by the operators, conducting drive tests as well as live measurements and comparing them with quality of service benchmarks stipulated by TRAI. The audit would be carried out by **TUV-SUD South Asia** every quarter across all the Circles/Service areas of North and West Zones for Cellular Mobile Service. However, in respect of Basic telephone service (wireline) and Broadband service, a circle would be audited once in a year.

## **2. OBJECTIVES AND METHODOLOGY**





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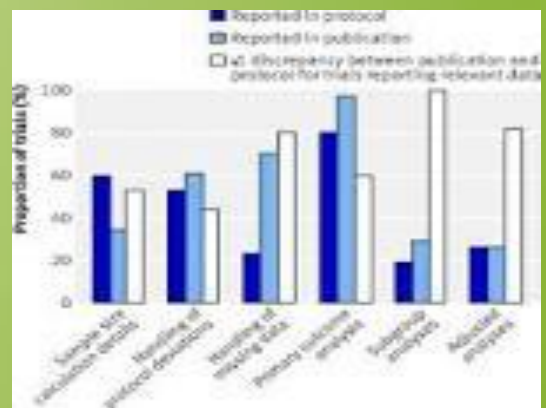
The primary objective is to audit and assess the Quality of Service being rendered by Basic, Cellular Mobile & Broadband service providers against the parameters notified by TRAI.

The audit and assessment of Quality of Service was carried out by **TUV SUD South Asia across all the Circles/Service areas of North and West Zones for Cellular Mobile Service. Apart from this, QoS audit for Basic (Wire line) and Broadband Services was also undertaken for Delhi, Haryana and Mumbai circles during the quarter October – December 2014.**

The Scope of work as per the Terms of Reference (TOR) includes the following:

- i) Preparation of Performance Monitoring reports (PMRs) and uploading in the system.
- ii) Live measurements of the performance of Service Providers (SPs) against the benchmarks for three days during each audit.
- iii) Monthly audit based on one month data of the SPs.
- iv) Drive test of the RF networks.
- v) Audit of the performance of call centers with respect to their accessibility and percentage of calls answered by the operators and random customer feedback by calling the customers to get feedback of the services provided by the service providers.
- vi) Transfer of data generated by the RF drive test/Live measurements / PMR/ monthly audit to the server located at TRAI premises on real time basis.

### 3. SAMPLE SIZE



### 3. SAMPLE SIZE

#### 3.1 SAMPLING FOR CELLULAR MOBILE (WIRELESS) SERVICE PROVIDERS

- 100% of the Gateway MSC's (GMSC's) and Mobile Switching Centers (MSC's) of all the Cellular Mobile Service Providers or Unified Access Service Providers (UASP) were covered for audit in specified circles/service areas. Following are the various operators covered in Himachal Pradesh circle

Sl. No.	Name of Service Provider	Dates of live measurement Audit			Audit Location/Address
		October-14	November-14	December-14	
<b>GSM Operators</b>					
1	AIRCEL	11, 13 & 14 Oct-14	12 to 14 Nov-14	4 to 6 Dec-14	3rd Floor Keothal Complex Khalini Shimla.
2	AIRTEL	13 to 15 Oct-14	12 to 14 Nov-14	8 to 10 Dec-14	Bharti Airtel Campus, Plot No 21, Rajiv Gandhi Information and Technology Park, Chandigarh, 160101
3	BSNL	18, 20 & 21 Oct-14	13 to 15 Nov-14	11 to 13 Dec-14	BSNL Shimla
4	IDEA	13 to 15 Oct-14	5 to 7 Nov-14	5, 8 & 9 Dec-14	Idea Cellular Limited, Phase -7 Industrial Area, Mohali
5	RCOM GSM	8 to 10 Oct-14	5 to 7 Nov-14	5, 8 & 10 Dec-14	Reliance Communications Ltd., Phase-8, Industrial Area, Mohali
6	TATA GSM	15 to 17 Oct-14	10 to 12 Nov-14	8 to 10 Dec-14	Tata Teleservices Ltd Charu sood Building Chota Shimla, Kasumpti
7	VODAFONE	8 to 10 Oct-14	5 to 7 Nov-14	1 to 3 Dec-14	130 durga cottage SDA complex Kasumpti Shimla
<b>CDMA Operators</b>					
8	RCOM CDMA	8 to 10 Oct-14	5 to 7 Nov-14	5, 8 & 10 Dec-14	Reliance Communications Ltd., Phase-8, Industrial Area, Mohali
9	TATA CDMA	6 to 8 Oct-14	6 to 8 Nov-14	8 to 10 Dec-14	Tata Teleservices Ltd Charu sood Building Chota Shimla, Kasumpti

- For all the above operators, audit was conducted in all the three months of the Quarter ended Dec - 2014.
- The data generated by monthly PMR and 3-days live measurements audit for the period October 2014 to December 2014 has been successfully uploaded to the server located at TRAI premises.

### 3.2 SAMPLING FOR BASIC (WIRE LINE) SERVICES

- The QoS audit for basic (wire line) service is to be done for the number of exchanges spread over in about 10% of SDCAs with each service providers in specified circles only **once in a year**. **Based on this criterion, QoS audit for basic (wire line) service was not required to be done for HP Circle in the quarter ended December- 2014.**

### 3.3 SAMPLING FOR BROADBAND SERVICE PROVIDERS

- TUV–SUD South Asia has to conduct the audit and assessment of Quality of Service of Broadband Service only in respect of the service providers who are having broadband subscriber base of more than 10,000 subscribers in their licensed service area, for 5% of Point of Presence (PoPs) spread over in 10% SDCAs in specified Telecom Circle **once in a year**. **Based on this criterion, the QoS audit for Broadband service was not required to be done for HP Circle in the quarter ended December- 2014.**

## **4. EXECUTIVE SUMMARY**



#### 4. EXECUTIVE SUMMARY

The executive summary put in a nutshell the key findings of the Audit by providing: -

- “Service provider performance report” for Cellular mobile, Basic (wire line) and Broadband services , which gives a foretaste of the performance of various operators against the benchmark specified by TRAI, during the months in which the Audit was carried out by TUV-SUD Auditors.
- “Parameter wise critical findings” for Cellular mobile, Basic (wire line) and Broadband services: This indicates key observations and findings from different activities carried out during the Audit process.
- TUV-SUD conducted audit involved a 3 stage verification process which consisted of auditing the records of the service providers and verifying the data submitted to TRAI. The second step involved a three day live measurement of all the network parameters. On the basis of the three days live measurement, the auditors checked the busy hour of the day for the service provider and collected the data for this busy hour for the month in which the audit was conducted Finally, the performance of the service providers was also gauged by conducting drive tests in three select SSAs per service provider per quarter.
- The three stage audit / verification viz audit of the records, live measurements and drive tests of all the cellular mobile operators was repeated every month. In case of Basic (Wire line) and Broadband, this exercise is required to be carried out on quarterly basis.
- **Essence of compliance report of service providers with respect to the QoS:**

(i) From monthly PMR audit it was concluded that on an average, performance of the operators in the Himachal Pradesh service area was satisfactory for Network related Parameters. However, the audit with respect to the parameter **‘Worst affected cell> 3% TCH Drop’** revealed that the performance of **Aircel and Tata (GSM)** on an average was **13.58%** and **19.42%**, which was way beyond the benchmark. In fact, Tata (GSM) was having only five sites with 15 cells resulting in poor performance, remaining network was on ICR with other service provider (RCOM-GSM).

(ii) The three days live assessment, revealed that the performance of all operators (except **BSNL, Aircel and Tata GSM**) was within the benchmarks for all the three months of the quarter. **BSNL** failed to meet the benchmarks of the parameter **‘TCH congestion’**, whereas **Aircel and Tata (GSM)** could not meet the benchmark of the parameter **‘Worst affected cells> 3 % TCH drops’**. The average performance of **BSNL** for three months of quarter for parameters **TCH congestion** was **3.59%**. Further, in respect of parameter **‘Worst affected cells> 3 % TCH drops’**, average performance of **Aircel and Tata (GSM)** was **12.17%** and **17.04%**, way beyond the benchmark of <3%.

Similar non-compliance of **Aircel and Tata (GSM)** was also observed during monthly audit

(iii) With regard to the **Customer Service Quality Parameters**, all service providers were in compliance with most of the parameters. However, **BSNL and RCOM (GSM)** have not met the benchmark of '**calls answered by Operators (voice to voice) within 90 seconds**' with their achieved performance as **59.38% and 91.70%** respectively. The performance of BSNL was way below the benchmark of >95%.

In case of live measurements, **Tata (GSM)** has not met the benchmark of '**calls answered by Operators (voice to voice) within 90 seconds (91.22%)**' against the benchmark of >=95%.

(iv) The performance of the service providers with respect to drive test revealed that **Voice Quality** and **Call drop rate** were the area of concern for some of the service providers namely **BSNL, Idea, RCOM(GSM), Tata(GSM) and Vodafone** across Kullu, Hamirpur and Solan SSAs where drive tests were conducted. The defaulting Service providers need to take corrective actions to improve their network quality.

## **5. PMR AUDIT REPORT**





## 5. PMR AUDIT REPORTS:

### 5.1 MONTHLY PMR:

#### 5.1.1 BUSY HOUR OF VARIOUS SERVICE PROVIDERS:

Sl. No.	Name of Service Provider	Month of Audit	Network TCBH Hour
<b>GSM Operators</b>			
1	AIRCEL	Dec.-14	20:00 - 21:00
2	AIRTEL	Dec.-14	20:00 - 21:00
3	BSNL	Dec.-14	19:00 - 20:00
4	IDEA	Dec.-14	20:00 - 21:00
5	VODAFONE	Dec.-14	19:00 - 20:00
6	RCOM GSM	Dec.-14	19:00 - 20:00
7	TATA GSM	Dec.-14	20:00 - 21:00
<b>CDMA Operators</b>			
8	RCOM CDMA	Dec.-14	19:00 - 20:00
9	TATA CDMA	Dec.-14	12:00 - 13:00

The TCBH reported by all the service providers matched the network busy hour calculated by TUV auditors for the Himachal Pradesh circle.

#### 5.1.2 SWITCHES/BSC/BTS DETAILS OF SERVICE PROVIDERS:

Sl. No.	Name of Service Provider	No. of MSC + GMSC	No. of BSC	No. of BTS	NSS make	BSS make
<b>GSM Operators</b>						
1	AIRCEL	1	8	662	Ericsson	Ericsson
2	AIRTEL	5	16	1440	Ericsson	Ericsson
3	BSNL	6	18	1158	Ericsson	Ericsson, NSN & ZTE
4	VODAFONE	1	9	790	NSN	NSN
5	IDEA	2	7	940	Ericsson	Ericsson
6	RCOM GSM	3	12	752	Huawei & Ericsson	ZTE
7	TATA GSM	1	1	5	NSN	NSN
<b>CDMA Operators</b>						
8	RCOM CDMA	1	NA	282	Lucent	Lucent
9	TATA CDMA	1	1	131	Ericsson	ZTE

5.1.3 QOS PERFORMANCE OF MONTHLY PMR – OCTOBER 14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES HIMACHAL PRADESH CIRCLE - OCTOBER 14 MONTH												
PMR Generation Data		Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	VODAFONE	IDEA	RCOM GSM	TATA GSM	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators						CDMA Operators		
<b>Network Service Quality Parameter</b>												
<b>Network Availability</b>												
1	a) BTS Accumulated Downtime	<=2%	Oct-14	0.33%	0.03%	1.87%	0.03%	0.08%	0.19%	0.00%	0.30%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	Oct-14	1.51%	0.00%	1.85%	0.00%	0.00%	0.27%	0.00%	1.06%	0.00%
<b>Connection Establishment (Accessibility)</b>												
2	a) CSSR (Call Setup Success Rate)	>=95%	Oct-14	99.48%	98.90%	98.38%	97.37%	98.86%	98.57%	98.61%	99.07%	97.87%
	b) SDCCH/PAGING Channel congestion	<=1%	Oct-14	0.07%	0.16%	0.76%	0.02%	0.11%	0.04%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Oct-14	0.29%	0.30%	1.61%	0.14%	0.42%	0.03%	0.00%	0.00%	0.03%
<b>Connection maintenance (Retainability)</b>												
3	a) CDR (Call Drop Rate)	<=2%	Oct-14	1.42%	0.63%	1.46%	0.52%	1.24%	0.69%	1.77%	0.08%	0.15%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Oct-14	12.87%	1.74%	2.87%	2.26%	2.33%	0.01%	19.78%	0.22%	1.42%
	c) Connections with good voice quality	>=95%	Oct-14	95.13%	98.78%	NP	98.06%	95.78%	98.10%	97.80%	99.76%	98.20%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Oct-14	0	0	0	0	0	0	0	0	0

NP- Not Provided: BSNL having no direct counter to provide the data for the parameter "Connections with good voice quality", hence they have not provided data for this parameter.

5.1.4 QOS PERFORMANCE OF MONTHLY PMR – NOVEMBER 14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES HIMACHAL PRADESH CIRCLE – NOVEMBER 14 MONTH												
PMR Generation Data		Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	VODAFONE	IDEA	RCOM GSM	TATA GSM	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators						CDMA Operators		
<b>Network Service Quality Parameter</b>												
<b>Network Availability</b>												
1	a) BTS Accumulated Downtime	<=2%	Nov-14	0.30%	0.03%	1.53%	0.02%	0.04%	0.15%	0.00%	0.12%	0.02%
	b) Worst affected BTSs due to downtime	<=2%	Nov-14	1.51%	0.00%	1.91%	0.00%	0.00%	0.27%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>												
2	a) CSSR (Call Setup Success Rate)	>=95%	Nov-14	98.96%	99.21%	97.60%	97.50%	98.88%	98.60%	98.90%	99.10%	98.03%
	b) SDCCH/PAGING Channel congestion	<=1%	Nov-14	0.09%	0.07%	0.64%	0.02%	0.24%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Nov-14	0.80%	0.15%	<b>2.40%</b>	0.09%	0.49%	0.05%	0.00%	0.00%	0.17%
<b>Connection maintenance (Retainability)</b>												
3	a) CDR (Call Drop Rate)	<=2%	Nov-14	1.40%	0.60%	1.54%	0.79%	1.17%	0.68%	1.26%	0.07%	0.14%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Nov-14	<b>12.49%</b>	1.54%	2.33%	2.29%	2.48%	0.04%	<b>11.78%</b>	0.24%	1.21%
	c) Connections with good voice quality	>=95%	Nov-14	95.12%	98.78%	NP	97.96%	96.30%	98.08%	97.57%	99.78%	98.21%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Nov-14	0	0	0	0	0	0	0	0	0

NP- Not Provided: BSNL having no direct counter to provide the data for the parameter "Connections with good voice quality", hence they have not provided data for this parameter.

5.1.5 QOS PERFORMANCE OF MONTHLY PMR – DECEMBER 14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES HIMACHAL PRADESH CIRCLE – DECEMBER 14 MONTH												
PMR Generation Data		Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	VODAFONE	IDEA	RCOM GSM	TATA GSM	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators						CDMA Operators		
<b>Network Service Quality Parameter</b>												
<b>Network Availability</b>												
1	a) BTS Accumulated Downtime	<=2%	Dec-14	0.28%	0.04%	1.66%	0.40%	0.27%	0.22%	0.00%	0.09%	0.06%
	b) Worst affected BTSs due to downtime	<=2%	Dec-14	1.36%	0.14%	1.99%	2.66%	0.00%	0.66%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>												
2	a) CSSR (Call Setup Success Rate)	>=95%	Dec-14	99.37%	99.19%	98.01%	97.62%	98.57%	98.60%	98.77%	99.05%	97.80%
	b) SDCCH/PAGING Channel congestion	<=1%	Dec-14	0.06%	0.05%	0.62%	0.03%	0.18%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Dec-14	0.35%	0.18%	1.75%	0.11%	0.77%	0.03%	0.00%	0.00%	0.29%
<b>Connection maintenance (Retainability)</b>												
3	a) CDR (Call Drop Rate)	<=2%	Dec-14	1.40%	0.58%	1.57%	0.57%	1.33%	0.68%	1.49%	0.06%	0.15%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Dec-14	12.78%	1.42%	2.51%	2.29%	2.46%	0.03%	18.92%	0.24%	1.30%
	c) Connections with good voice quality	>=95%	Dec-14	95.17%	98.80%	NP	98.07%	95.86%	98.10%	97.99%	99.78%	98.16%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Dec-14	0	0	0	0	0	0	0	0	0

NP- Not Provided: BSNL having no direct counter to provide the data for the parameter "Connections with good voice quality", hence they have not provided data for this parameter.

**5.1.6 QOS PERFORMANCE OF QUARTERLY PMR –AVERAGE OF QE- DECEMBER 14 (OCT. TO DEC. 2014 MONTHS AUDITED DATA)**

QUARTERLY QOS PERFORMANCE (AVERAGE OF QE-DECEMBER-14) OF HIMACHAL PRADESH CIRCLE												
PMR Generation Data		Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	VODAFONE	IDEA	RCOM GSM	TATA GSM	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators						CDMA Operators		
	Network Service Quality Parameter											
1	Network Availability											
	a) BTS Accumulated Downtime	<=2%	Quarterly	0.30%	0.03%	1.69%	0.15%	0.13%	0.19%	0.00%	0.17%	0.03%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	1.46%	0.05%	1.92%	0.89%	0.00%	0.40%	0.00%	0.35%	0.00%
2	Connection Establishment (Accessibility)											
	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	99.27%	99.10%	98.00%	97.50%	98.77%	98.59%	98.76%	99.07%	97.90%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.07%	0.09%	0.67%	0.02%	0.18%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.48%	0.21%	1.92%	0.11%	0.56%	0.04%	0.00%	0.00%	0.16%
3	Connection maintenance (Retainability)											
	a) CDR (Call Drop Rate)	<=2%	Quarterly	1.41%	0.60%	1.52%	0.63%	1.25%	0.68%	1.51%	0.07%	0.15%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	12.71%	1.57%	2.57%	2.28%	2.42%	0.03%	16.83%	0.23%	1.31%
	c) Connections with good voice quality	>=95%	Quarterly	95.14%	98.79%	NP	98.03%	95.98%	98.09%	97.79%	99.77%	98.19%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Quarterly	0	0	0	0	0	0	0	0	0

NP- Not Provided: BSNL having no direct counter to provide the data for the parameter "Connections with good voice quality", hence they have not provided data for this parameter.

### 5.1.7 KEY FINDINGS ON MONTHLY PMR AUDIT REPORTS:

The audit of network related parameters for cellular mobile service providers was conducted at their respective MSCs in the circle.

TUV conducted audit for cellular mobile operators based on **three stage audit / verification viz audit of the records, live measurements and drive tests. This exercise has been repeated every month for CMSPs.**

#### **Network Service Quality Parameters:**

- **Network Availability**
  - i. BTS Accumulated Downtime (Not Available for Service):
  - ii. Worst affected BTSs due to downtime

For measuring the performance against the benchmark for this parameter, down time of each BTS lasting for more than 1 hour at a time in a day during the period of a month has been taken for computation.

In Himachal Pradesh circle, **all the operators were found meeting benchmarks** of the above parameters 'BTS accumulated downtime' and 'worst affected BTSs due to down time' in all the three months of the quarter. Only **Vodafone (2.66%)** failed to meet the benchmark of the parameter 'Worst affected BTSs due to down time' in the month of December- 2014. However, its average performance for the quarter was within the benchmark.

- **Connection Establishment (Accessibility)**
  - i. Call Set-up Success Rate(CSSR)

CSSR includes complete signaling in the call set up process and does not aim to measure the performance of the called exchange or that of the Point of Interconnection (POI). CSSR was established as the ratio of total number of successful call attempts (establishment) to the total number of call attempts made. All the operators were found to be calculating the parameter as per the TRAI's specified norms.

**All the operators were found meeting the benchmark on this parameter.**

- **Parameters related to Network Congestion:**

The parameters namely SDCCH / Paging Channel Congestion, TCH and POI are prescribed with the aim of measuring the congestion in the network.

In CDMA system, there is no direct counter defined for reporting Paging Channel Congestion as reported by Tata Teleservices. However, they have a defined counter for Paging Channel Occupancy Ratio (PCH Average Using Ratio) which is used to determine the Paging Channel Occupancy which on an average is < 50% on all sites in the network. When the value of this parameter is less than 100%, it is counted as 0% congestion. Thus, there is no congestion on the paging channel in CDMA system.

With respect to this parameter, the performance of the operators is quite satisfactory as **all operators met the TRAI specified benchmarks on the congestion parameters.** There was no congestion on individual POI links between a service provider vis-à-vis other service providers.

- **Connection Maintenance (Retainability)**

- i. Call Drop Rate:

This parameter gives a reliable measurement of the mobile network used by the service provider for maintaining a call once it has been correctly established. Failures in coverage, network congestion and network failures have important impact on this parameter.

The audit of this parameter revealed that all the service providers were measuring this parameter as per the TRAI guidelines. Also, **all the service providers were found to be meeting the TRAI specified benchmark**. The lowest call drop rate (average 0.07 %) was for RCOM (CDMA) during the quarter.

- ii. Worst affected cells having more than 3% TCH drops

Worst affected cells are defined as cells in which the call drop rate exceeds 3% during cell Bouncing Busy Hour (CBBH) or at any other hour of a day.

The audit with respect to this parameter revealed that all the operators (except **Aircel and Tata GSM**) met the benchmark for this parameter in all the three months of the quarter. The performance of **Aircel and Tata (GSM)** on an average for three months was **12.71%** and **16.83%** respectively, which was way beyond the benchmark. In fact, Tata (GSM) is having only five sites with 15 cells which are resulting in poor performance, remaining network are on ICR with other service provider (RCOM-GSM).

- (iii) Connections with good voice quality:

The audit results for this parameter indicates that **all operators have met the benchmark during the quarter**. BSNL has not provided the data for this parameter as they are not able to fetch the system generated data.

**3-DAYS LIVE MEASUREMENT DATA VERIFICATION FOR  
CELLULAR MOBILE SERVICE PROVIDERS  
(NETWORK SERVICE QUALITY PARAMETER)**





## 5.2 LIVE MEASUREMENT DATA (3-DAYS) FOR CELLULAR MOBILE SERVICE PROVIDERS (NETWORK SERVICE QUALITY PARAMETER):

### 5.2.1 LIVE MEASUREMENT DATA (3-DAYS) – OCTOBER 14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES HIMACHAL PRADESH CIRCLE - OCTOBER 14 MONTH												
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	VODAFONE	IDEA	RCOM GSM	TATA GSM	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators						CDMA Operators		
<b>Network Service Quality Parameter</b>												
<b>Network Availability</b>												
1	a) BTS Accumulated Downtime	<=2%	Live data	0.45%	0.02%	1.92%	0.08%	0.06%	0.24%	0.00%	0.06%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	1.85%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>												
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.71%	99.14%	97.34%	97.66%	98.93%	98.62%	98.49%	99.07%	98.92%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.02%	0.06%	0.88%	0.01%	0.04%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.05%	0.20%	<b>2.66%</b>	0.07%	0.34%	0.02%	0.00%	0.01%	0.03%
<b>Connection maintenance (Retainability)</b>												
3	a) CDR (Call Drop Rate)	<=2%	Live data	1.38%	0.61%	1.45%	0.50%	1.20%	0.66%	<b>2.04%</b>	0.07%	0.15%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	<b>12.92%</b>	1.65%	2.96%	2.23%	2.37%	0.04%	<b>17.78%</b>	0.16%	1.41%
	c) Connections with good voice quality	>=95%	Live data	95.17%	98.79%	NP	98.15%	95.68%	98.10%	98.58%	99.76%	98.22%
4	No. of POI having >=0.5% congestion		Live data	0	0	0	0	0	0	0	0	0

NP- Not Provided: BSNL having no direct counter to provide the data for the parameter "Connections with good voice quality", hence they have not provided data for this parameter.

**5.2.2 LIVE MEASUREMENT DATA (3-DAYS) – NOVEMBER 14 MONTH:**

CELLULAR MOBILE TELEPHONE SERVICES HIMACHAL PRADESH CIRCLE- NOVEMBER 14 MONTH												
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	VODAFONE	IDEA	RCOM GSM	TATA GSM	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators						CDMA Operators		
<b>Network Service Quality Parameter</b>												
<b>Network Availability</b>												
1	a) BTS Accumulated Downtime	<=2%	Live data	0.21%	0.03%	2.06%	0.03%	0.02%	0.16%	0.00%	0.29%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.87%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>												
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.50%	99.26%	95.37%	97.71%	99.11%	98.55%	98.51%	99.19%	99.11%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.02%	0.03%	0.65%	0.00%	0.10%	0.02%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.23%	0.14%	4.63%	0.10%	0.29%	0.05%	0.00%	0.00%	0.03%
<b>Connection maintenance (Retainability)</b>												
3	a) CDR (Call Drop Rate)	<=2%	Live data	1.42%	0.60%	1.50%	0.67%	1.07%	0.68%	1.74%	0.06%	0.13%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	12.43%	1.42%	2.80%	2.29%	2.14%	0.04%	11.11%	0.12%	0.70%
	c) Connections with good voice quality	>=95%	Live data	95.15%	98.76%	NP	97.99%	95.54%	98.06%	96.41%	99.77%	98.22%
4	No. of POI having >=0.5% congestion		Live data	0	0	0	0	0	0	0	0	0

NP- Not Provided: BSNL having no direct counter to provide the data for the parameter “Connections with good voice quality”, hence they have not provided data for this parameter.

5.2.3 LIVE MEASUREMENT DATA (3-DAYS) – DECEMBER 14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES HIMACHAL PRADESH CIRCLE- DECEMBER 14 MONTH												
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	VODAFONE	IDEA	RCOM GSM	TATA GSM	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators							CDMA Operators	
<b>Network Service Quality Parameter</b>												
<b>Network Availability</b>												
1	a) BTS Accumulated Downtime	<=2%	Live data	0.20%	0.02%	1.51%	0.00%	0.02%	0.05%	0.00%	0.04%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.26%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>												
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.53%	99.28%	96.53%	97.79%	98.79%	98.62%	98.82%	99.05%	93.24%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.03%	0.06%	0.57%	0.00%	0.14%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.20%	0.12%	3.47%	0.04%	0.58%	0.02%	0.00%	0.00%	0.19%
<b>Connection maintenance (Retainability)</b>												
3	a) CDR (Call Drop Rate)	<=2%	Live data	1.34%	0.56%	1.92%	0.53%	1.17%	0.64%	0.84%	0.06%	0.15%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	11.16%	1.14%	2.75%	2.29%	2.45%	0.00%	22.22%	0.16%	1.02%
	c) Connections with good voice quality	>=95%	Live data	95.29%	98.82%	NP	98.13%	95.78%	98.07%	98.02%	99.78%	98.11%
4	No. of POI having >=0.5% congestion		Live data	0	0	0	0	0	0	0	0	0

NP- Not Provided: BSNL having no direct counter to provide the data for the parameter "Connections with good voice quality", hence they have not provided data for this parameter.

**5.2.4 QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT AUDITED DATA (AVERAGE OF OCTOBER TO DECEMBER 2014)**

QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT (AVERAGE OF QE – DEC 14) – HP CIRCLE												
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	VODAFONE	IDEA	RCOM GSM	TATA GSM	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators						CDMA Operators		
<b>Network Service Quality Parameter</b>												
<b>Network Availability</b>												
1	a) BTS Accumulated Downtime	<=2%	Quarterly	0.29%	0.02%	1.83%	0.04%	0.03%	0.15%	0.00%	0.13%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	0.00%	0.00%	0.99%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>												
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	99.58%	99.23%	96.41%	97.72%	98.94%	98.60%	98.66%	99.10%	97.09%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.02%	0.05%	0.70%	0.00%	0.09%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.16%	0.15%	3.59%	0.07%	0.40%	0.03%	0.00%	0.00%	0.08%
<b>Connection maintenance (Retainability)</b>												
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	1.38%	0.59%	1.62%	0.57%	1.15%	0.66%	1.54%	0.06%	0.14%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	12.17%	1.40%	2.84%	2.27%	2.32%	0.03%	17.04%	0.15%	1.04%
	c) Connections with good voice quality	>=95%	Quarterly	95.20%	98.79%	NP	98.09%	95.67%	98.08%	97.67%	99.77%	98.18%
4	No. of POI having >=0.5% congestion		Quarterly	0	0	0	0	0	0	0	0	0

NP- Not Provided: BSNL having no direct counter to provide the data for the parameter "Connections with good voice quality", hence they have not provided data for this parameter.

**5.2.5 KEY FINDING ON 3 DAYS LIVE MEASUREMENTS:**

The three days live assessment, revealed that the performance of all operators (except **BSNL, Aircel** and **Tata GSM**) was within the benchmarks for all the three months of the quarter. **BSNL** failed to meet the benchmarks of the parameter 'TCH congestion', whereas **Aircel** and **Tata (GSM)** could not meet the benchmark of the parameter 'Worst affected cells> 3 % TCH drops'. The average performance of **BSNL** for three months of quarter for parameters TCH congestion was 3.59%. Further, in respect of parameter 'Worst affected cells> 3 % TCH drops', average performance of **Aircel** and **Tata (GSM)** was 12.17% and 17.04%, way beyond the benchmark of <3%.

Similar non-compliance of **Aircel** and **Tata (GSM)** was also observed during monthly audit

5.2.6 DETAILED NETWORK DATA ASSESSMENT OF CELLULAR MOBILE TELEPHONE SERVICES:

TABLE: 1

Detailed Network Data Assessment of Cellular Mobile Telephone Services- Himachal Pradesh Circle- October 14 month												
S/N	Name of Parameter	Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	VODAFONE	IDEA	RCOM GSM	TATA GSM	RCOM CDMA	TATA CDMA
				GSM Operators						CDMA Operators		
<b>Network Service Quality Parameter</b>												
<b>Network Availability</b>												
1	a) Total no. of BTSs in the licensed service area		Oct-14	662	1429	1137	790	917	751	5	282	131
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Oct-14	1644.18	289.44	15810.00	167.69	569.56	1044.48	0	619.53	0
	c) BTS Accumulated Downtime	<=2%	Oct-14	0.33%	0.03%	1.87%	0.03%	0.08%	0.19%	0.00%	0.30%	0.00%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Oct-14	10	0	21	0	0	2	0	3	0
	e) Worst affected BTSs due to downtime	<=2%	Oct-14	1.51%	0.00%	1.85%	0.00%	0.00%	0.27%	0.00%	1.06%	0.00%
<b>Connection Establishment (Accessibility)</b>												
2	a) CSSR (Call Setup Success Rate)	>=95%	Oct-14	99.48%	98.90%	98.38%	97.37%	98.86%	98.57%	98.61%	99.07%	97.87%
	b) SDCCH/PAGING Congestion	<=1%	Oct-14	0.07%	0.16%	0.76%	0.02%	0.11%	0.04%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Oct-14	0.29%	0.30%	1.61%	0.14%	0.42%	0.03%	0.00%	0.00%	0.03%
<b>Connection Maintenance (Retainability)</b>												
3	a) Call Drop Rate (CDR)	<=2%	Oct-14	1.42%	0.63%	1.46%	0.52%	1.24%	0.69%	1.77%	0.08%	0.15%
	b) Worst affected cells>3% TCH drop	<=3%	Oct-14	12.87%	1.74%	2.87%	2.26%	2.33%	0.01%	19.78%	0.22%	1.42%
	c) % of connections with good voice quality	>=95%	Oct-14	95.13%	98.78%	NP	98.06%	95.78%	98.10%	97.80%	99.76%	98.20%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Oct-14	254	73	95	54	63	0	3	2	6
	e) Total no. of cells (Sector) in the licensed service area		Oct-14	1974	4184	3311	2394	2713	2249	15	845	426
<b>No. of POI's having &gt;=0.5% POI congestion</b>												
4	No. of POI's having >=0.5% POI congestion		Oct-14	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Oct-14	0	0	0	0	0	0	0	0	0
<b>Network Data</b>												
5	a) Equipped Capacity of Network in Erlang		Oct-14	32478	64023	74000	16844	33624	40000	165	28000	17466
	b) Total traffic in TCBH in erlang (Avg.)		Oct-14	13142	59115	35600	12398	15275	28905	6	2891	1996
	c) Total no. of customers served (as per VLR) on last day of the month		Oct-14	506951	2227966	1099550	519529	652374	1252870	584	104896	26928

TABLE: 2

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live measurement - HP Circle- Oct 14 month												
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	VODAFONE	IDEA	RCOM GSM	TATA GSM	RCOM CDMA	TATA CDMA
				GSM Operators						CDMA Operators		
<b>Network Service Quality Parameter</b>												
1	<b>Network Availability</b>											
	a) Total no. of BTSs in the licensed service area		Live data	662	1418	1133	790	904	751	5	282	131
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Live data	215.22	19.79	1570.00	45.78	36.81	129.53	0	12.48	0
	c) BTS Accumulated Downtime	<=2%	Live data	0.45%	0.02%	1.92%	0.08%	0.06%	0.24%	0.00%	0.06%	0.00%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	21	0	0	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	1.85%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
2	<b>Connection Establishment (Accessibility)</b>											
	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.71%	99.14%	97.34%	97.66%	98.93%	98.62%	98.49%	99.07%	98.92%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.02%	0.06%	0.88%	0.01%	0.04%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.05%	0.20%	2.66%	0.07%	0.34%	0.02%	0.00%	0.01%	0.03%
3	<b>Connection Maintenance (Retainability)</b>											
	a) Call Drop Rate (CDR)	<=2%	Live data	1.38%	0.61%	1.45%	0.50%	1.20%	0.66%	2.04%	0.07%	0.15%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	12.92%	1.65%	2.96%	2.23%	2.37%	0.04%	17.78%	0.16%	1.41%
	c) % of connections with good voice quality	>=95%	Live data	95.17%	98.79%	NP	98.15%	95.68%	98.10%	98.58%	99.76%	98.22%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	255	69	98	53	64	1	3	1	6
	e) Total no. of cells (Sector) in the licensed service area		Live data	1974	4150	3309	2394	2705	2249	15	845	426
4	<b>No. of POI's having &gt;=0.5% POI congestion</b>											
	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0

TABLE: 3

Detailed Network Data Assessment of Cellular Mobile Telephone Services- Himachal Pradesh Circle - Nov 14 month												
S/N	Name of Parameter	Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	VODAFONE	IDEA	RCOM GSM	TATA GSM	RCOM CDMA	TATA CDMA
				GSM Operators						CDMA Operators		
<b>Network Service Quality Parameter</b>												
<b>Network Availability</b>												
1	a) Total no. of BTSs in the licensed service area		Nov-14	662	1433	1150	790	925	751	5	282	131
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Nov-14	1417.10	298.00	12686.00	116.41	214.97	819.85	0	248.38	14.98
	c) BTS Accumulated Downtime	<=2%	Nov-14	0.30%	0.03%	1.53%	0.02%	0.04%	0.15%	0.00%	0.12%	0.02%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Nov-14	10	0	22	0	0	2	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Nov-14	1.51%	0.00%	1.91%	0.00%	0.00%	0.27%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>												
2	a) CSSR (Call Setup Success Rate)	>=95%	Nov-14	98.96%	99.21%	97.60%	97.50%	98.88%	98.60%	98.90%	99.10%	98.03%
	b) SDCCH/PAGING Congestion	<=1%	Nov-14	0.09%	0.07%	0.64%	0.02%	0.24%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Nov-14	0.80%	0.15%	2.40%	0.09%	0.49%	0.05%	0.00%	0.00%	0.17%
<b>Connection Maintenance (Retainability)</b>												
3	a) Call Drop Rate (CDR)	<=2%	Nov-14	1.40%	0.60%	1.54%	0.79%	1.17%	0.68%	1.26%	0.07%	0.14%
	b) Worst affected cells>3% TCH drop	<=3%	Nov-14	12.49%	1.54%	2.33%	2.29%	2.48%	0.04%	11.78%	0.24%	1.21%
	c) % of connections with good voice quality	>=95%	Nov-14	95.12%	98.78%	NP	97.96%	96.30%	98.08%	97.57%	99.78%	98.21%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Nov-14	247	64	77	55	68	1	2	2	5
	e) Total no. of cells (Sector) in the licensed service area		Nov-14	1974	4187	3311	2400	2757	2250	15	845	426
<b>No. of POI's having &gt;=0.5% POI congestion</b>												
4	No. of POI's having >=0.5% POI congestion		Nov-14	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Nov-14	0	0	0	0	0	0	0	0	0
<b>Network Data</b>												
5	a) Equipped Capacity of Network in Erlang		Nov-14	32359	63601	74000	17846	33548	40000	165	28000	17466
	b) Total traffic in TCBH in erlang (Avg.)		Nov-14	13785	57994	35536	12358	15542	29774	6	2719	1987
	c) Total no. of customers served (as per VLR) on last day of the month		Nov-14	524173	2246298	1107727	516620	681713	1243470	13607	99212	29270

TABLE: 4

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live measurement - HP Circle- Nov 14 month												
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	VODAFONE	IDEA	RCOM GSM	TATA GSM	RCOM CDMA	TATA CDMA
				GSM Operators							CDMA Operators	
<b>Network Service Quality Parameter</b>												
<b>Network Availability</b>												
1	a) Total no. of BTSs in the licensed service area		Live data	662	1431	1144	790	917	751	5	282	131
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Live data	101.15	27.15	1698.00	16.16	12.67	85.95	0	58.13	0.27
	c) BTS Accumulated Downtime	<=2%	Live data	0.21%	0.03%	<b>2.06%</b>	0.03%	0.02%	0.16%	0.00%	0.29%	0.00%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	10	0	0	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.87%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>												
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.50%	99.26%	95.37%	97.71%	99.11%	98.55%	98.51%	99.19%	99.11%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.02%	0.03%	0.65%	0.00%	0.10%	0.02%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.23%	0.14%	<b>4.63%</b>	0.10%	0.29%	0.05%	0.00%	0.00%	0.03%
<b>Connection Maintenance (Retainability)</b>												
3	a) Call Drop Rate (CDR)	<=2%	Live data	1.42%	0.60%	1.50%	0.67%	1.07%	0.68%	1.74%	0.06%	0.13%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	<b>12.43%</b>	1.42%	2.80%	2.29%	2.14%	0.04%	<b>11.11%</b>	0.12%	0.70%
	c) % of connections with good voice quality	>=95%	Live data	95.15%	98.76%	NP	97.99%	95.54%	98.06%	96.41%	99.77%	98.22%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	245	60	93	55	59	1	2	1	3
	e) Total no. of cells (Sector) in the licensed service area		Live data	1974	4191	3334	2398	2738	2250	15	845	426
<b>No. of POI's having &gt;=0.5% POI congestion</b>												
4	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0



TABLE: 5

Detailed Network Data Assessment of Cellular Mobile Telephone Services- Himachal Pradesh Circle- Dec 14 month												
S/N	Name of Parameter	Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	VODAFONE	IDEA	RCOM GSM	TATA GSM	RCOM CDMA	TATA CDMA
				GSM Operators						CDMA Operators		
<b>Network Service Quality Parameter</b>												
<b>Network Availability</b>												
1	a) Total no. of BTSs in the licensed service area		Dec-14	662	1440	1158	790	940	752	5	282	131
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Dec-14	1360.52	475.60	14296.52	2332.02	1868.67	1256.93	0	189.63	63.14
	c) BTS Accumulated Downtime	<=2%	Dec-14	0.28%	0.04%	1.66%	0.40%	0.27%	0.22%	0.00%	0.09%	0.06%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Dec-14	9	2	23	21	0	5	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Dec-14	1.36%	0.14%	1.99%	<b>2.66%</b>	0.00%	0.66%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>												
2	a) CSSR (Call Setup Success Rate)	>=95%	Dec-14	99.37%	99.19%	98.01%	97.62%	98.57%	98.60%	98.77%	99.05%	97.80%
	b) SDCCH/PAGING Congestion	<=1%	Dec-14	0.06%	0.05%	0.62%	0.03%	0.18%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Dec-14	0.35%	0.18%	1.75%	0.11%	0.77%	0.03%	0.00%	0.00%	0.29%
<b>Connection Maintenance (Retainability)</b>												
3	a) Call Drop Rate (CDR)	<=2%	Dec-14	1.40%	0.58%	1.57%	0.57%	1.33%	0.68%	1.49%	0.06%	0.15%
	b) Worst affected cells>3% TCH drop	<=3%	Dec-14	<b>12.78%</b>	1.42%	2.51%	2.29%	2.46%	0.03%	<b>18.92%</b>	0.24%	1.30%
	c) % of connections with good voice quality	>=95%	Dec-14	95.17%	98.80%	NP	98.07%	95.86%	98.10%	97.99%	99.78%	98.16%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Dec-14	252	60	84	55	69	1	3	2	6
	e) Total no. of cells (Sector) in the licensed service area		Dec-14	1974	4201	3331	2402	2786	2253	15	845	426
<b>No. of POI's having &gt;=0.5% POI congestion</b>												
4	No. of POI's having >=0.5% POI congestion		Dec-14	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Dec-14	0	0	0	0	0	0	0	0	0
<b>Network Data</b>												
5	a) Equipped Capacity of Network in Erlang		Dec-14	32393	61682	74000	17745	33901	40000	165	28000	17466
	b) Total traffic in TCBH in erlang (Avg.)		Dec-14	13332	53964	34847	12242	15724	28220	7	2613	2220
	c) Total no. of customers served (as per VLR) on last day of the month		Dec-14	532580	2302497	1109140	560801	713279	1276332	621	96480	26702

TABLE: 6

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live measurement - HP Circle- Dec 14 month												
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	VODAFONE	IDEA	RCOM GSM	TATA GSM	RCOM CDMA	TATA CDMA
				GSM Operators							CDMA Operators	
<b>Network Service Quality Parameter</b>												
<b>Network Availability</b>												
1	a) Total no. of BTSs in the licensed service area		Live data	662	1438	1153	790	925	752	5	282	131
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Live data	96.78	17.47	1251.00	1.18	11.53	26.75	0	9.02	0.57
	c) BTS Accumulated Downtime	<=2%	Live data	0.20%	0.02%	1.51%	0.00%	0.02%	0.05%	0.00%	0.04%	0.01%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	3	0	0	0	0	0	
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.26%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>												
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.53%	99.28%	96.53%	97.79%	98.79%	98.62%	98.82%	99.05%	<b>93.24%</b>
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.03%	0.06%	0.57%	0.00%	0.14%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.20%	0.12%	<b>3.47%</b>	0.04%	0.58%	0.02%	0.00%	0.00%	0.19%
<b>Connection Maintenance (Retainability)</b>												
3	a) Call Drop Rate (CDR)	<=2%	Live data	1.34%	0.56%	1.92%	0.53%	1.17%	0.64%	0.84%	0.06%	0.15%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	<b>11.16%</b>	1.14%	2.75%	2.29%	2.45%	0.00%	<b>22.22%</b>	0.16%	1.02%
	c) % of connections with good voice quality	>=95%	Live data	95.29%	98.82%	NP	98.13%	95.78%	98.07%	98.02%	99.78%	98.11%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	220	48	92	55	68	0	3	1	4
	e) Total no. of cells (Sector) in the licensed service area		Live data	1974	4210	3339	2402	2762	2252	15	845	426
<b>No. of POI's having &gt;=0.5% POI congestion</b>												
4	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0

## **CUSTOMER SERVICE QUALITY (CSD) PARAMETERS**



**5.3 CUSTOMER SERVICE QUALITY PARAMETERS MEASUREMENT FOR CMTS-QE DEC-14:**

**5.3.1 QUARTERLY CUSTOMER SERVICE DELIVERY (CSD) AUDITED DATA FOR CELLULAR MOBILE SERVICES (OCTOBER TO DECEMBER 2014 MONTHS AUDITED DATA):**

QUARTERLY CSD DATA FOR CELLULAR MOBILE TELEPHONE SERVICES - QE DECEMBER 14												
Quarterly CSD Audit Data		Bench- mark	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	VODAFONE	RCOM (CDMA)	TATA (CDMA)
S/ N	Name of Parameter			GSM Operators							CDMA Operators	
<b>Customer Service Quality Parameters</b>												
<b>Metering &amp; Billing Credibility -Post Paid</b>												
1	A) No. of bills issued during the quarter		HP	4605	104030	148173	7956	22680	12252	30708	13908	13824
	B) No. of bills disputed including billing complaints during the quarter		HP	0	54	33	3	6	0	4	3	0
	C) % of billing complaints during the quarter	<= 0.1%	HP	0.00%	0.05%	0.02%	0.04%	0.03%	0.00%	0.01%	0.02%	0.00%
<b>Metering &amp; Billing Credibility -Pre Paid</b>												
2	A) Total No. of Pre-paid customers at the end of the quarter		HP	905723	2311282	1348185	668852	1344521	53010	578850	167984	34685
	B) Total No. of complaints relating to charging, Credit and Validity during the quarter		HP	1	18	871	221	1186	0	107	56	0
	C) % of Pre-paid Charging Complaints	<= 0.1%	HP	0.00%	0.001%	0.06%	0.03%	0.09%	0.000%	0.02%	0.03%	0.00%
<b>Resolution of Billing/Charging Complaints and Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints</b>												
3	A) No. of Billing/Charging/Credit/Validity Complaints received during the quarter		HP	1	72	904	587	1192	38	111	59	27
	B) No. of billing complaints for Post paid customers/Charging/Credit/Validity complaints for pre-paid customers resolved within 4 weeks during the quarter		HP	1	72	904	587	1192	38	111	59	27
	C) No. of billing complaints for Post paid customers/Charging/Credit/Validity complaints for pre-paid customers resolved within 6 weeks during the quarter		HP	1	72	904	587	1192	38	111	59	27
	D) % of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 4 weeks	>=98% within 4 weeks	HP	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
	E) % of billing complaints (for post paid customer) / Charging /Credit/Validity (for Pre paid customer) resolved within 6 weeks	100% within 6 weeks	HP	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

QUARTERLY CSD DATA FOR CELLULAR MOBILE TELEPHONE SERVICES - QE DECEMBER 14												
Quarterly CSD Audit Data		Bench- mark	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	VODAFONE	RCOM (CDMA)	TATA (CDMA)
S/ N	Name of Parameter			GSM Operators						CDMA Operators		
	F) % of Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints	<=1 week	HP	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
<b>Response time to customers for assistance</b>												
	A) Total no of calls attempted to customer care/Call center		HP	1928210	592164	101607	1115672	3446597	16142	1155884	162693	1097
	B) Total no. of calls successfully established to customer care/Call center.		HP	1916967	584589	101607	1105780	3410843	15990	1155884	161877	1071
4	C) % Accessibility of Call centre /customer Care (Total calls successfully established *100/ Total call attempts)	>=95%	HP	99.42%	98.72%	100.00%	99.11%	98.96%	99.06%	100.00%	99.50%	97.63%
	D) Total Calls reached to operator for Voice to Voice (Total call attempts)		HP	359868	1099397	484704	488194	863005	12362	323690	97994	8268
	E) Total number of calls answered by the operator (Voice to voice) within 90 seconds		HP	350811	1076044	287812	484451	791409	12055	323060	94808	8172
	F) % age of calls answered by operator (voice to voice) (Total calls successfully established within 90 Sec.*100 / Total call attempts)	>=95%	HP	97.48%	97.88%	59.38%	99.23%	91.70%	97.52%	99.81%	96.75%	98.84%
<b>Termination/closure of service</b>												
5	A) Total No. of requests for Termination / Closure of service received during the quarter		HP	43	175	878	154	9	171	215	41	164
	B) No. of requests for Termination /Closure of service complied within 7 days during the quarter		HP	43	175	878	154	9	171	215	41	164
	C) % of Termination/ Closure of service within 7 days	<=7days	HP	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
<b>Time taken for refunds of deposits after closures.</b>												
6	A) No. of Payments/ Refunds due during the quarter		HP	43	96	411	28	87	16	29	32	47
	B) No. of Payments/ Refunds Cleared during the quarter		HP	43	96	411	28	87	16	29	32	47
	C)Time taken for refunds of deposits after closures.	100% within 60 days	HP	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

**5.3.2 3 DAYS LIVE CSD AUDITED DATA FOR CELLULAR MOBILE SERVICES (QE -DEC 2014):**

**CSD 3 DAYS LIVE DATA FOR CELLULAR MOBILE TELEPHONE SERVICES - QE-DECEMBER 14**

3 days live CSD Audit Data		Bench- mark	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	VODAFONE	RCOM (CDMA)	TATA (CDMA)
S/ N	Name of Parameter			GSM Operators						CDMA Operators		
<b>Response time to customers for assistance</b>												
1	A) Total no of calls attempted to customer care/Call center		HP	62085	20600	4392	41679	104091	546	42814	5582	30
	B) Total no. of calls successfully established to customer care/Call center.		HP	61766	20600	4392	41176	103013	538	42814	5563	30
	C) % Accessibility of Call centre /customer Care (Total calls successfully established *100/ Total call attempts)	>=95%	HP	99.49%	100.00%	100.00%	98.79%	98.96%	98.53%	100.00%	99.66%	100.00%
2	D) Total Calls reached to operator for Voice to Voice (Total call attempts)		HP	11769	33168	11875	16587	27325	490	12558	3575	328
	E) Total number of calls answered by the operator (Voice to voice) within 90 seconds		HP	11504	32536	11449	16021	26992	447	12467	3512	323
	F) % age of calls answered by operator (voice to voice) (Total calls successfully established within 90 sec.*100 / Total call attempts )	>=95%	HP	97.75%	98.09%	96.41%	96.59%	98.78%	91.22%	99.28%	98.24%	98.48%

### 5.3.3 KEY FINDINGS ON CUSTOMER SERVICE DELIVERY (CSD) PARAMETERS

#### 1. Metering and billing credibility-(Post paid & Pre-paid)

The performance of the service providers with respect to the parameter metering and billing credibility for both post-paid and pre-paid is well within the prescribed bench mark of  $\leq 0.1\%$ .

#### 2. Resolution of Billing complaints and applying credits

- i. Resolution of billing /charging complaints
- ii. Period of applying credit/waiver/adjustment to customer's account from the date of resolution of complaints

All operators were found to have 100 % resolved the billing complaints within stipulated period of 4 weeks and within 6 weeks.

#### 3. Response Time to the Customer for assistance

- i. Accessibility of call centre/customer care
- ii. Percentage of calls answered by Operators (Voice to Voice)

All service providers are in compliance with respect to the parameter accessibility of call center. However, **BSNL and RCOM (GSM)** have not met the benchmark of 'calls answered by Operators (voice to voice) within 90 seconds' with their achieved performance as **59.38% and 91.70%** respectively. The performance of BSNL was way below the benchmark of  $>95\%$ .

#### 4. Termination/Closure of Service

In case of this parameters also, all service providers have settled the closure/termination within the benchmark of 7 days.

#### 5. Time Taken for Refund of deposits after closures

All operators were found to have complied with the benchmark of 100% refund of deposits within 60 days of closure.

#### Live Measurement

The results for three days live measurements reveal that all operators have met the benchmark for the parameter 'Call connection to operators (Voice to voice) within 90 seconds' except **Tata (GSM)** not met the benchmark of **(91.22%)** against the benchmark of  $\geq 95\%$ .

## **6. LIVE CALLING ASSESSMENT**





## 6. LIVE CALLING ASSESSMENT:

### 6.1 INTER OPERATOR CALLS ASSESSMENT:

Inter operator call assessment with a sample of 2x50 test calls for each Service provider operating in Himachal Pradesh service area during the time 1100 to 1400 Hrs and 1600 to 1900 was carried out by TUV auditors. The test calls were made from one operator to another within the same licensed area to judge the ease of connectivity amongst the operators. While doing this exercise, the radio part, the switch part and POI in between the two operators are involved. Congestion in any of these network elements could result in congestion in the network.

INTER OPERATOR CALL ASSESSMENT BASED ON LIVE MEASUREMENT										
CALLING OPERATORS	CIRCLE NAME	AIRCEL	AIRTEL	BSNL	IDEA	VODAFONE	RCOM GSM	TATA GSM	RCOM CDMA	TATA CDMA
AIRCEL	HP	--	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
AIRTEL	HP	100.0%	--	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
BSNL	HP	100.0%	100.0%	--	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
IDEA	HP	100.0%	100.0%	100.0%	--	100.0%	100.0%	100.0%	100.0%	100.0%
VODAFONE	HP	100.0%	100.0%	100.0%	100.0%	--	100.0%	100.0%	100.0%	100.0%
RCOM GSM	HP	100.0%	100.0%	100.0%	100.0%	100.0%	--	100.0%	100.0%	100.0%
TATA GSM	HP	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	--	100.0%	100.0%
RCOM CDMA	HP	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	--	100.0%
TATA CDMA	HP	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	--

The result of the testing revealed that the inter connection performance among the operators were comfortably meeting the benchmark.

## 6.2 CUSTOMER CARE / HELPLINE ASSESSMENT:

LIVE CALLING TO CALL CENTRE										
Parameter	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	VODAFONE	RCOM (CDMA)	TATA (CDMA)
Total No. of calls Attempted	HP	100	100	100	100	100	100	100	100	100
Total no of calls attempted to customer care/Call center	HP	100	100	100	100	100	100	100	100	100
Total no. of calls successfully established to customer care/Call center	HP	100	100	100	100	100	100	100	100	100
% Accessibility of Call centre /customer Care (Total call successfully established * 100 /Total call attempts)	HP	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Total Calls reached to agent desk for Voice to Voice (Total calls attempt)	HP	100	100	100	100	100	100	100	100	100
Total number of calls answered by the operator (Voice to voice) within 90 seconds	HP	98	100	98	100	96	100	100	96	100
% age of calls answered by operator (voice to voice) (Total call successfully established within 90 Sec.*100 / Total call attempts)	HP	98.00%	100.00%	98.00%	100.00%	96.00%	100.00%	100.00%	96.00%	100.00%

In case of calls answered by operators (voice to voice) within 90 seconds when test calls were made to the call centers, 100% calls were connected to the Operator within 90 seconds except for Aircel, BSNL, RCOM (GSM) and RCOM (CDMA), the calls answered by operators were 98%, 98%, 96% and 96% respectively.

## 6.3 LIVE CALLING ASSESSMENT FOR BILLING COMPLAINTS:

TELEPHONIC INTERVIEW FOR BILLING COMPLAINTS										
Parameter	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	VODAFONE	RCOM (CDMA)	TATA (CDMA)
Total No. of calls Attempted	HP	1	72	100	100	100	38	100	59	27
Total No. of calls Answered	HP	1	45	42	69	71	18	64	23	10
Cases resolved within 4 weeks	HP	1	45	42	69	71	18	64	23	10
%age of cases resolved	HP	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

To test the Service Providers performance on billing related complaints and their resolutions, TUV-SUD auditors conducted a customer feedback calling for about random 100 nos. of customers. However, in some cases, the number of customers contacted for verification was very less due to less number of billing complaints. During live calling, most of the subscribers reported that there complaints have been resolved satisfactorily.

**6.4 LEVEL -1 CALLING ASSESSMENT:**

LEVEL 1 LIVE CALLING													
Emergency no.	Circle Name	SSA Name	Name of SDCA	No. of calls made	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	RCOM CDMA	TATA GSM	TATA CDMA	VODAFONE
100, 101, 108, 1073, 1091, 1098	HP	Kullu	Kullu	12	√	√	√	√	√	√	√	√	√
			Banjar	12	√	√	√	√	√	√	√	√	√
			Lahul	12	√	√	√	√	√	√	√	√	√
100, 101, 108, 1073, 1091, 1098	HP	Hamirpur	Hamirpur	12	√	√	√	√	√	√	√	√	√
			Bilaspur	12	√	√	√	√	√	√	√	√	√
			Amb	12	√	√	√	√	√	√	√	√	√
			Una	12	√	√	√	√	√	√	√	√	√
100, 101, 108, 1073, 1091, 1098	HP	Solan	Solan	12	√	√	√	√	√	√	√	√	√
			Arki	12	√	√	√	√	√	√	√	√	√
			Nahan	12	√	√	√	√	√	√	√	√	√
			Ponta Sahib	12	√	√	√	√	√	√	√	√	√

To assess the availability and efficiency of level 1 services such as police, fire, ambulance (emergency services) offered by various mobile service providers, the calls were made from mobile phones provided by the service providers during drive test. In these SDCAs of Himachal Pradesh service area, these services were found functional in the networks of all the service providers.

## 7. DRIVE TEST



## **7. OPERATOR ASSISTED DRIVE TEST**

In terms of TRAI's letter dated 21<sup>st</sup> January, 2014, the drive tests were conducted for three consecutive days in one select SSA each month in each service area. Thus, the drive tests were carried out in three SSA's namely **Kullu, Hamirpur and Solan** in the months of October, November and December 2014 respectively. The total route Kms covered during the drive tests in the respective SSAs was **440 Kms, 495 Kms and 460 Kms** respectively. The performance of the operators has been highlighted below in the tables. The drive test was conducted simultaneously for all the operators following the same route of drive tests. The holding period for all test calls was 120 seconds. The drive test vehicle across all routes plied at a speed of about 30-50 km per hour.

For measuring voice quality, Rx Qual samples on a scale from 0 to 7 for GSM operators and Frame Error Rate (FERs) for CDMA service providers were measured. As per the QoS norms, Rx Qual between 0- 5 for GSM operators and between 0-4% FER value for CDMA operators FERs is considered to be good, where as Rx Qual beyond this benchmark is considered to be bad. Call drops were measured by the number of calls that were dropped to the total number of calls established during the drive test. Similarly CSSR was measured as the ratio of total calls established to the total call attempts made. Signal strength was measured in dBm at street level with strength  $\geq -75$  dBm for in-door coverage and  $\geq -85$  dBm for in-vehicle.

7.1 OPERATOR ASSISTED DRIVE TEST: KULLU SSA (OCTOBER-14)

DRIVE TEST TABLE: 1

S/N	Parameter	Classification of routes covered	AIRCEL		AIRTEL		BSNL		IDEA		TATA GSM		RCOM GSM		VODAFONE		RCOM CDMA		TATA CDMA		
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	
1	Call Attempts	Major Roads	142	27	133	25	111	25	102	26	122	25	141	25	105	25	67	25	27	26	
		Highways	139	31	117	30	107	30	104	30	125	31	151	30	120	30	98	30	70	16	
		Within City	119	30	107	30	74	30	104	32	101	30	133	30	124	30	112	NC	54	NC	
		<b>Overall SSA</b>	<b>400</b>	<b>88</b>	<b>357</b>	<b>85</b>	<b>292</b>	<b>85</b>	<b>310</b>	<b>88</b>	<b>348</b>	<b>86</b>	<b>425</b>	<b>85</b>	<b>349</b>	<b>85</b>	<b>277</b>	<b>55</b>	<b>151</b>	<b>42</b>	
2	Blocked Call Rate	Major Roads	0.00%	0.00%	1.50%	0.00%	2.70%	0.00%	5.88%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Highways	0.00%	0.00%	0.00%	0.00%	1.87%	0.00%	3.85%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Within City	0.00%	0.00%	0.00%	0.00%	2.70%	3.33%	0.96%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	NC	0.00%	NC	
		<b>Overall SSA</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.56%</b>	<b>0.00%</b>	<b>2.40%</b>	<b>1.18%</b>	<b>3.55%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>
3	Dropped Call Rate (<=2%)	Major Roads	0.00%	0.00%	0.00%	0.00%	2.78%	4.00%	6.25%	0.00%	0.82%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Highways	0.00%	0.00%	0.00%	0.00%	0.95%	3.33%	1.00%	0.00%	0.80%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Within City	0.00%	0.00%	0.00%	0.00%	1.39%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	NC	0.00%	NC	
		<b>Overall SSA</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>1.75%</b>	<b>2.38%</b>	<b>2.34%</b>	<b>0.00%</b>	<b>0.57%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>
4	Percentage connections with good voice quality (=>95%)																				
	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Major Roads	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.36%	100%	98.88%	99.90%
		Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.68%	100%	99.41%	100%
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.74%	NC	99.66%	NC
		<b>Overall SSA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>99.63%</b>	<b>100%</b>	<b>99.41%</b>	<b>99.94%</b>

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S/N	Parameter	Classification of routes covered	AIRCEL		AIRTEL		BSNL		IDEA		TATA GSM		RCOM GSM		VODAFONE		RCOM CDMA		TATA CDMA	
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
(b) 0-5 ( with frequency hopping for GSM Operators)	Major Roads		99.09%	99.77%	96.94%	98.82%	95.88%	<b>94.36%</b>	98.96%	99.04%	<b>93.54%</b>	99.46%	99.44%	100%	98.13%	97.60%	NA	NA	NA	NA
	Highways		98.17%	98.37%	96.11%	99.14%	96.12%	96.61%	97.14%	99.29%	98.80%	99.71%	99.19%	99.95%	<b>94.48%</b>	97.32%	NA	NA	NA	NA
	Within City		98.65%	99.57%	96.66%	99.39%	96.56%	99.87%	96.49%	99.40%	98.68%	99.68%	99.39%	99.78%	96.29%	99.84%	NA	NA	NA	NA
	Overall SSA		<b>98.61%</b>	<b>99.28%</b>	<b>96.59%</b>	<b>99.08%</b>	<b>96.14%</b>	<b>97.06%</b>	<b>97.42%</b>	<b>99.26%</b>	<b>97.23%</b>	<b>99.61%</b>	<b>99.33%</b>	<b>99.90%</b>	<b>96.20%</b>	<b>98.32%</b>	NA	NA	NA	NA
<b>Service Coverage</b>																				
5	In door (>= -75dBm)	Major Roads	28.33%	86.14%	58.22%	98.59%	29.12%	43.40%	31.24%	15.40%	40.95%	64.62%	29.98%	81.64%	33.80%	16.27%	33.68%	77.05%	22.85%	96.43%
		Highways	53.46%	22.79%	84.04%	87.01%	43.49%	83.90%	49.57%	90.40%	38.96%	18.44%	62.23%	53.98%	43.35%	94.78%	51.40%	86.30%	58.14%	100%
		Within City	61.86%	18.26%	90.13%	97.75%	61.93%	34.60%	66.03%	55.90%	61.72%	68.44%	62.88%	73.91%	56.34%	84.88%	74.76%	NC	80.58%	NC
		Overall SSA	<b>48.26%</b>	<b>41.44%</b>	<b>78.24%</b>	<b>94.62%</b>	<b>42.75%</b>	<b>66.76%</b>	<b>49.62%</b>	<b>53.72%</b>	<b>46.67%</b>	<b>54.46%</b>	<b>51.82%</b>	<b>69.15%</b>	<b>45.09%</b>	<b>68.39%</b>	<b>57.07%</b>	<b>82.06%</b>	<b>59.84%</b>	<b>97.82%</b>
	In-vehicle (>= -85dBm)	Major Roads	60.55%	98.63%	81.47%	100%	61.90%	98.20%	68.01%	86.80%	60.62%	96.88%	61.05%	98.27%	60.53%	90.99%	57.13%	99.15%	42.55%	100%
		Highways	86.61%	83.08%	97.89%	99.92%	77.76%	99.60%	89.07%	99.80%	95.67%	96.75%	93.80%	99.59%	79.97%	99.77%	81.82%	100%	83.05%	100%
		Within City	91.51%	68.66%	98.69%	100%	93.04%	99.60%	91.30%	98.90%	95.48%	98.82%	94.73%	98.90%	90.69%	99.95%	96.25%	NC	96.50%	NC
		Overall SSA	<b>79.85%</b>	<b>82.75%</b>	<b>93.00%</b>	<b>99.97%</b>	<b>75.66%</b>	<b>99.39%</b>	<b>83.21%</b>	<b>95.41%</b>	<b>85.38%</b>	<b>97.62%</b>	<b>83.31%</b>	<b>98.96%</b>	<b>77.96%</b>	<b>97.28%</b>	<b>82.12%</b>	<b>99.61%</b>	<b>80.63%</b>	<b>100%</b>
	Outdoor- in city (>= -95dBm)	Major Roads	90.86%	99.93%	98.28%	100%	90.36%	99.40%	95.18%	99.90%	87.22%	99.13%	91.67%	99.93%	92.81%	99.91%	92.47%	100%	94.06%	100%
		Highways	99.24%	99.88%	99.96%	100%	94.68%	100%	99.29%	100%	98.80%	99.20%	99.76%	100%	96.61%	100%	97.09%	100%	99.11%	100%
		Within City	99.61%	99.95%	99.98%	100%	99.60%	100%	99.65%	100%	98.78%	99.20%	99.86%	100%	99.46%	100%	99.98%	NC	99.99%	NC
		Overall SSA	<b>96.63%</b>	<b>99.92%</b>	<b>99.43%</b>	<b>100%</b>	<b>94.30%</b>	<b>99.91%</b>	<b>98.12%</b>	<b>99.97%</b>	<b>95.41%</b>	<b>99.22%</b>	<b>97.13%</b>	<b>99.97%</b>	<b>96.48%</b>	<b>99.97%</b>	<b>97.23%</b>	<b>100%</b>	<b>98.53%</b>	<b>100%</b>
6	Call Setup Success Rate (>=95%)	Major Roads	100%	100%	98.50%	100%	97.30%	100%	<b>94.12%</b>	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
		Highways	100%	100%	100%	100%	98.13%	100%	96.15%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
		Within City	100%	100%	100%	100%	97.30%	96.67%	99.04%	100%	100%	100%	100%	100%	100%	100%	100%	NC	100%	NC

S/N	Parameter	Classification of routes covered	AIRCEL		AIRTEL		BSNL		IDEA		TATA GSM		RCOM GSM		VODAFONE		RCOM CDMA		TATA CDMA		
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	
			Overall SSA	100%	100%	99.44%	100%	97.60%	98.82%	96.45%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
7	Hand Over Success Rate (HOSR)	Major Roads	100%	100%	100%	100%	98.33%	98.04%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Highways	100%	100%	100%	100%	100%	100%	100%	100%	97.71%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Within City	99.48%	100%	100%	100%	98.79%	100%	99.42%	100%	98.99%	100%	100%	100%	100%	100%	100%	NC	100%	NC	100%
		Overall SSA	99.79%	100%	100%	100%	99.07%	99.35%	99.75%	100%	98.55%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

NA: Not Applicable

NC: No Coverage

Note: The service providers having block call rate more than 3% have been shaded in yellow colour.



7.2 OPERATOR ASSISTED DRIVE TEST: HAMIRPUR SSA (NOVEMBER-14)

DRIVE TEST TABLE: 2

S/N	Parameter	Classification of routes covered	AIRCEL		AIRTEL		BSNL		IDEA		TATA GSM		RCOM GSM		VODAFONE		RCOM CDMA		TATA CDMA		
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR
1	Call Attempts	Major Roads	92	26	164	25	124	26	81	26	97	25	173	25	132	26	200	25	69	26	
		Highways	128	25	109	25	146	25	135	26	132	25	182	25	141	26	161	25	101	26	
		Within City	90	26	80	25	54	26	77	25	98	25	103	25	99	25	116	25	93	25	
		<b>Overall SSA</b>	<b>310</b>	<b>77</b>	<b>353</b>	<b>75</b>	<b>324</b>	<b>77</b>	<b>293</b>	<b>77</b>	<b>327</b>	<b>75</b>	<b>458</b>	<b>75</b>	<b>372</b>	<b>77</b>	<b>477</b>	<b>75</b>	<b>263</b>	<b>77</b>	
2	Blocked Call Rate	Major Roads	0.00%	0.00%	0.61%	0.00%	3.23%	0.00%	2.47%	0.00%	0.00%	0.00%	0.00%	0.00%	0.76%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Highways	0.00%	0.00%	0.00%	0.00%	1.37%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Within City	0.00%	0.00%	1.25%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		<b>Overall SSA</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.57%</b>	<b>0.00%</b>	<b>1.85%</b>	<b>0.00%</b>	<b>0.68%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.27%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	
3	Dropped Call Rate (<=2%)	Major Roads	0.00%	0.00%	0.00%	0.00%	1.67%	0.00%	1.27%	0.00%	1.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		
		Highways	0.00%	0.00%	0.00%	0.00%	2.78%	0.00%	0.74%	0.00%	2.27%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		
		Within City	0.00%	0.00%	0.00%	0.00%	1.85%	0.00%	0.00%	0.00%	1.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.08%		
		<b>Overall SSA</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>2.20%</b>	<b>0.00%</b>	<b>0.69%</b>	<b>0.00%</b>	<b>1.53%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.38%</b>		
4	Percentage connections with good voice quality (=>95%)																				
	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Major Roads	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	96.74%	100%	96.38%	95.84%
		Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	97.15%	100%	95.35%	99.97%
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.82%	100%	97.84%	99.29%
		<b>Overall SSA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>97.39%</b>	<b>100%</b>	<b>96.51%</b>	<b>98.37%</b>
(b) 0-5 ( with	Major Roads	97.41%	97.72%	95.81%	97.71%	93.37%	99.78%	90.90%	98.05%	95.99%	99.23%	92.64%	99.90%	95.71%	94.92%	NA	NA	NA	NA		

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S/N	Parameter	Classification of routes covered	AIRCEL		AIRTEL		BSNL		IDEA		TATA GSM		RCOM GSM		VODAFONE		RCOM CDMA		TATA CDMA	
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
	frequency hopping for GSM Operators)	Highways	96.31%	98.49%	95.75%	97.65%	<b>92.78%</b>	99.33%	<b>91.23%</b>	97.68%	<b>92.34%</b>	99.54%	<b>92.92%</b>	99.91%	<b>93.69%</b>	99.43%	NA	NA	NA	NA
		Within City	97.08%	99.29%	96.30%	99.35%	<b>93.08%</b>	99.71%	<b>93.54%</b>	99.47%	98.64%	98.14%	95.91%	100%	96.14%	99.66%	NA	NA	NA	NA
		<b>Overall SSA</b>	<b>96.94%</b>	<b>98.55%</b>	<b>95.91%</b>	<b>98.22%</b>	<b>93.10%</b>	<b>99.61%</b>	<b>91.83%</b>	<b>98.41%</b>	<b>96.01%</b>	<b>98.97%</b>	<b>93.51%</b>	<b>99.94%</b>	<b>95.12%</b>	<b>98.00%</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>
5	<b>Service Coverage</b>																			
	In door (>= -75dBm)	Major Roads	19.93%	65.00%	71.86%	98.75%	34.05%	16.00%	27.22%	38.20%	53.28%	88.69%	30.82%	72.65%	42.16%	61.75%	33.92%	71.49%	18.68%	25.95%
		Highways	34.34%	99.40%	79.40%	86.57%	38.28%	14.90%	36.42%	55.30%	54.78%	20.28%	40.07%	74.68%	50.66%	90.93%	44.53%	73.53%	41.83%	4.80%
		Within City	40.77%	32.50%	80.53%	88.09%	56.76%	60.30%	40.09%	55.20%	74.61%	0.00%	45.79%	56.48%	62.08%	87.12%	63.50%	72.00%	54.07%	16.91%
		<b>Overall SSA</b>	<b>30.25%</b>	<b>62.83%</b>	<b>76.14%</b>	<b>89.85%</b>	<b>39.28%</b>	<b>30.39%</b>	<b>34.71%</b>	<b>49.44%</b>	<b>62.03%</b>	<b>36.39%</b>	<b>37.82%</b>	<b>68.11%</b>	<b>50.61%</b>	<b>78.40%</b>	<b>44.81%</b>	<b>72.36%</b>	<b>40.28%</b>	<b>15.80%</b>
	In-vehicle (>= -85dBm)	Major Roads	69.74%	98.20%	92.19%	100%	73.60%	97.20%	70.27%	93.70%	89.55%	99.15%	74.82%	100%	75.57%	95.82%	71.74%	99.52%	59.10%	83.43%
		Highways	75.34%	100%	97.45%	99.85%	80.00%	97.06%	71.13%	96.00%	91.40%	99.30%	77.24%	99.97%	84.47%	96.14%	82.93%	100%	79.37%	71.09%
		Within City	80.96%	78.60%	97.56%	99.77%	88.16%	100%	87.97%	97.00%	97.93%	57.98%	87.92%	96.17%	90.35%	99.88%	87.74%	95.99%	85.23%	93.51%
		<b>Overall SSA</b>	<b>74.51%</b>	<b>92.40%</b>	<b>95.02%</b>	<b>99.86%</b>	<b>78.33%</b>	<b>98.09%</b>	<b>75.58%</b>	<b>95.55%</b>	<b>93.34%</b>	<b>85.47%</b>	<b>78.79%</b>	<b>98.75%</b>	<b>82.75%</b>	<b>97.40%</b>	<b>79.44%</b>	<b>98.56%</b>	<b>76.27%</b>	<b>82.53%</b>
	Outdoor- in city (>= -95dBm)	Major Roads	93.41%	99.80%	98.99%	100%	97.35%	100%	94.95%	100%	98.87%	99.15%	96.13%	100%	94.56%	99.81%	98.50%	100%	97.59%	99.92%
		Highways	95.61%	100%	99.74%	100%	96.45%	100%	94.80%	100%	98.61%	99.30%	96.22%	100%	96.38%	98.80%	99.00%	100%	98.58%	100%
		Within City	97.88%	96.90%	99.72%	100%	99.11%	100%	99.23%	100%	98.88%	99.30%	98.37%	100%	97.79%	98.80%	98.22%	100%	99.48%	100%
		<b>Overall SSA</b>	<b>95.30%</b>	<b>98.93%</b>	<b>99.38%</b>	<b>100%</b>	<b>97.30%</b>	<b>100%</b>	<b>96.08%</b>	<b>99.93%</b>	<b>98.80%</b>	<b>98.09%</b>	<b>96.69%</b>	<b>99.94%</b>	<b>96.09%</b>	<b>99.63%</b>	<b>98.60%</b>	<b>99.98%</b>	<b>98.65%</b>	<b>99.95%</b>
6	Call Setup Success Rate (>=95%)	Major Roads	100%	100%	99.39%	100%	96.77%	100%	97.53%	100%	100%	100%	100%	100%	99.24%	100%	100%	100%	100%	
		Highways	100%	100%	100%	100%	98.63%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Within City	100%	100%	98.75%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		<b>Overall SSA</b>	<b>100%</b>	<b>100%</b>	<b>99.43%</b>	<b>100%</b>	<b>98.15%</b>	<b>100%</b>	<b>99.32%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>99.73%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

S/N	Parameter	Classification of routes covered	AIRCEL		AIRTEL		BSNL		IDEA		TATA GSM		RCOM GSM		VODAFONE		RCOM CDMA		TATA CDMA		
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	
7	Hand Over Success Rate (HOSR)	Major Roads	99.52%	100%	99.45%	100%	97.03%	100%	100%	100%	97.25%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Highways	100%	100%	99.38%	100%	96.28%	100%	97.50%	100%	96.72%	100%	100%	100%	97.67%	100%	100%	100%	100%	100%	100%
		Within City	100%	100%	100%	100%	97.81%	100%	99.25%	100%	96.74%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	99.81%	100%	99.55%	100%	96.88%	100%	98.79%	100%	96.90%	100%	100%	100%	99.04%	100%	100%	100%	100%	100%	100%

NA: Not Applicable

Note: The service providers having block call rate more than 3% have been shaded in yellow colour.

7.3 OPERATOR ASSISTED DRIVE TEST: SOLAN SSA (DECEMBER-14)

DRIVE TEST TABLE: 3

S/N	Parameter	Classification of routes covered	AIRCEL		AIRTEL		BSNL		IDEA		TATA GSM		RCOM GSM		VODAFONE		RCOM CDMA		TATA CDMA		
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	
1	Call Attempts	Major Roads	76	25	130	25	93	25	106	25	98	25	126	25	92	25	121	25	53	26	
		Highways	111	25	97	25	94	25	104	25	124	25	157	25	101	25	136	25	84	26	
		Within City	141	25	162	25	98	25	145	25	149	25	156	25	166	25	161	25	136	25	
		<b>Overall SSA</b>	<b>328</b>	<b>75</b>	<b>389</b>	<b>75</b>	<b>285</b>	<b>75</b>	<b>355</b>	<b>75</b>	<b>371</b>	<b>75</b>	<b>439</b>	<b>75</b>	<b>359</b>	<b>75</b>	<b>418</b>	<b>75</b>	<b>273</b>	<b>77</b>	
2	Blocked Call Rate	Major Roads	0.00%	0.00%	0.00%	0.00%	2.15%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Highways	0.00%	0.00%	1.03%	0.00%	2.13%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Within City	0.00%	0.00%	0.00%	0.00%	2.04%	0.00%	1.38%	0.00%	0.67%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		<b>Overall SSA</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.26%</b>	<b>0.00%</b>	<b>2.11%</b>	<b>0.00%</b>	<b>0.56%</b>	<b>0.00%</b>	<b>0.27%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	
3	Dropped Call Rate (<=2%)	Major Roads	0.00%	0.00%	0.00%	0.00%	<b>2.20%</b>	<b>4.00%</b>	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Highways	0.00%	0.00%	0.00%	0.00%	1.09%	0.00%	0.00%	0.00%	0.81%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.19%	0.00%	
		Within City	0.00%	0.00%	0.00%	0.00%	<b>3.13%</b>	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		<b>Overall SSA</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>2.15%</b>	<b>1.33%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.27%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.37%</b>	<b>0.00%</b>
4	Percentage connections with good voice quality (=>95%)																				
	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Major Roads	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	97.76%	99.93%	97.94%	97.13%
		Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.02%	100%	96.84%	99.88%
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.56%	99.97%	98.62%	99.57%
		<b>Overall SSA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>98.91%</b>	<b>99.97%</b>	<b>97.94%</b>	<b>98.85%</b>
(b) 0-5 ( with	Major Roads	97.06%	96.76%	95.64%	97.53%	<b>92.39%</b>	99.27%	<b>93.65%</b>	99.28%	96.15%	99.23%	97.59%	99.50%	<b>94.44%</b>	99.33%	NA	NA	NA	NA		

AUDIT & ASSESSMENT OF QOS FOR QE-DECEMBER - 2014 -HIMACHAL PRADESH CIRCLE



S/N	Parameter	Classification of routes covered	AIRCEL		AIRTEL		BSNL		IDEA		TATA GSM		RCOM GSM		VODAFONE		RCOM CDMA		TATA CDMA		
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	
			frequency hopping for GSM Operators)	Highways	96.84%	95.58%	97.62%	95.11%	91.05%	99.23%	93.52%	96.48%	92.68%	99.54%	97.97%	99.54%	95.23%	99.01%	NA	NA	NA
	Within City	97.26%	99.47%	95.77%	99.67%	93.91%	95.10%	94.19%	96.01%	94.66%	98.14%	97.79%	98.49%	95.00%	99.25%	NA	NA	NA	NA		
	Overall SSA	97.08%	97.33%	96.41%	97.48%	92.53%	98.00%	93.82%	97.23%	94.53%	98.97%	97.79%	99.19%	94.92%	99.19%	NA	NA	NA	NA		
5	Service Coverage																				
	In door (>= -75dBm)	Major Roads	48.96%	80.90%	67.18%	73.13%	55.76%	87.20%	43.47%	37.30%	62.50%	48.09%	42.16%	69.47%	46.26%	34.43%	59.78%	99.77%	66.29%	71.81%	
		Highways	67.62%	62.20%	76.22%	94.50%	60.23%	39.40%	65.52%	97.00%	70.71%	20.29%	44.95%	62.19%	44.26%	81.38%	72.07%	100%	55.95%	99.80%	
		Within City	62.35%	81.80%	78.77%	95.28%	67.96%	97.20%	81.46%	98.60%	50.97%	0.00%	60.40%	99.20%	60.75%	81.39%	89.92%	100%	69.04%	99.97%	
		Overall SSA	60.30%	74.30%	74.66%	87.51%	61.82%	70.00%	64.11%	82.23%	63.00%	22.82%	49.88%	76.49%	52.44%	67.96%	76.47%	99.92%	64.48%	90.46%	
	In-vehicle (>= -85dBm)	Major Roads	79.17%	99.70%	90.08%	99.93%	88.77%	99.10%	78.98%	93.90%	88.24%	96.82%	84.74%	99.17%	77.33%	81.80%	89.51%	100%	97.51%	99.95%	
		Highways	90.74%	95.20%	92.96%	99.78%	94.13%	56.50%	89.55%	100%	95.95%	99.31%	89.14%	98.66%	78.23%	99.52%	96.08%	100%	86.78%	100%	
		Within City	91.74%	99.20%	96.35%	100%	94.63%	100%	97.90%	100%	89.58%	57.98%	94.39%	100%	93.00%	98.69%	98.39%	100%	93.43%	100%	
		Overall SSA	88.13%	97.84%	93.40%	99.90%	92.72%	81.37%	89.14%	98.43%	91.40%	84.70%	89.80%	99.26%	84.86%	94.13%	95.32%	100%	92.17%	99.98%	
	Outdoor- in city (>= -95dBm)	Major Roads	95.10%	99.90%	98.38%	100%	98.09%	100%	98.62%	99.90%	98.25%	99.15%	98.21%	100%	95.70%	99.51%	99.52%	100%	100%	99.97%	
		Highways	98.89%	99.90%	98.25%	100%	99.67%	100%	98.59%	100%	98.46%	99.31%	99.34%	100%	96.08%	99.97%	100%	100%	99.55%	100%	
		Within City	99.40%	100%	99.59%	100%	99.85%	100%	99.84%	100%	98.04%	99.31%	99.67%	100%	99.65%	99.97%	99.98%	100%	99.97%	100%	
		Overall SSA	98.12%	99.94%	98.77%	100%	99.27%	100%	99.07%	99.97%	98.28%	98.09%	99.13%	100%	97.64%	99.85%	99.86%	100%	99.84%	99.99%	
	6	Call Setup Success Rate (>=95%)	Major Roads	100%	100%	100%	100%	97.85%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
			Highways	100%	100%	98.97%	100%	97.87%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
			Within City	100%	100%	100%	100%	97.96%	100%	98.62%	100%	99.33%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Overall SSA			100%	100%	99.74%	100%	97.89%	100%	99.44%	100%	99.73%	100%	100%	100%	100%	100%	100%	100%	100%	100%	

S/N	Parameter	Classification of routes covered	AIRCEL		AIRTEL		BSNL		IDEA		TATA GSM		RCOM GSM		VODAFONE		RCOM CDMA		TATA CDMA		
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	
7	Hand Over Success Rate (HOSR)	Major Roads	100%	100%	100%	100%	98.14%	100%	99.26%	100%	97.98%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Highways	99.16%	100%	100%	100%	97.40%	100%	100%	100%	98.55%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Within City	100%	100%	99.11%	100%	98.80%	100%	99.49%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		<b>Overall SSA</b>	<b>99.63%</b>	<b>100%</b>	<b>99.66%</b>	<b>100%</b>	<b>98.07%</b>	<b>100%</b>	<b>99.58%</b>	<b>100%</b>	<b>98.71%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

NA: Not Applicable

**7.4 DETAIL OF THE ROUTES COVERED DURING THE DRIVE TESTS:**

**DRIVE TEST TABLE: 4**

DRIVE TEST ROUTE OF OCTOBER TO DECEMBER 14 – HIMACHAL PRADESH CIRCLE							
Name of SSA	Drive test Period	Day 1		Day 2		Day 3	
		Name of SDCA & KM Covered	Route Covered	Name of SDCA & KM Covered	Route Covered	Name of SDCA & KM Covered	Route Covered
KULLU	29 to 31 Oct 2014	Lahul, Kullu/ <b>140KM</b>	HIGHWAY- Kullu to naggar, Naggar To Manali, solang nala To gulaba, Old Manali to Patlipul  MAJOR ROAD- Solang Nala ,kothi,Old Manali, Manali Bustand Road, Naggar,Panogi, Raison, Katrain, prini, jagatsukh  WITH IN CITY- Kullu to Gemon Bridge, Manali Market , Naggar Market, Palchan to manali, Solangnala ,Gulaba  <b>Indoor:</b> Hotel Paradise (near patlikul)	Kullu/ <b>150KM</b>	HIGHWAY- Patlikul to Kullu, Kullu to Bhunter, kasol To manikaran  MAJOR ROAD- Bhunter To kasol, Dhaboi, Jari, Baradha, Manikaran Bus Stand Road And Temple Road, Lyagi, Malana village Road, Mohal  WITH IN CITY- Kullu Market, Akhada Bazar VIA( Dc office And BSNL exchange Road) ,Shastri Nagar, Manikaran Market, Bhunter Market.  <b>Indoor:</b> Shobla Hotel (Kullu) and Manikaran Market	Banzar/ <b>150KM</b>	HIGHWAY-Bhunter to Dhalpur, Dhalpur to Shamsi, Shamsi to Bajwara, Bajwara To aut (near Tunnel) Aut to Hydro Project Area  MAJOR ROAD- Largi, jibhi, Balichowki, Sainj, Dhabhai, Bajwara Village Road, Nagwain, Takoli, Pinarsa, Banzar Bus Stand Road, Bali chowki Village  WITH IN CITY- Aut Market, Banzar, Kullu Via Left Bank, Shamsi Market, Bali chowki, Bajwara, Sainj.  <b>Indoor:</b> Laxmi Restaurant (sainj)
HAMIRPUR	19 to 21 Nov 2014	Una, Amb/ <b>175KM</b>	1) UNA- HIGHWAY- Chalera to Pandoga Bareer, Pandoga to Panjawaar, Panjawaar To Gaagret, bharwain to Aloh,Kalruhi To Mubarikpur, Mubarikpur To BPS  MAJOR ROAD- Mubarikpur to amlehar,dangoh,Rora , Upper Banehra, Bhadarkali, Daulatpur, Pirthipur,Bhater  WITH IN CITY-UNA Market , Una To Chalera, Gagret, , Gagret Market, Daulatpur	Amb/Hamirpur / <b>180KM</b>	1) AMB :HIGHWAY- Kaloh to Tiswa, Tiswa to Chamethi, Chamethi To Nadaun  MAJOR ROAD:- Nehriyan, Kaloha, Nand pur Road,  WITH IN CITY:-Amb City, Nehriyan,  2) HAMIRPUR- HIGHWAY- Nadaun To Hamirpur, Bangana To Barmoh, Barmoh To Una MAJOR ROAD-Thanaklan, Dhneti, Piplu, Thanaklan, Basaral, Baranda,	Bilaspur/ <b>140KM</b>	HIGHWAY- Bangana To Lathyani, Lathyani to Barsar, Barthi To Ghumarwin, Bilaspur To Ghagas  MAJOR ROAD- Shahtlai To Barthi, Bagehr, Diyotsidh Road, Dundla, Cheru Baddu, Ghmarwin Bus Stand road, Barthi Link road to village  WITH IN CITY- Barsar, Shahtalai Market, Shahtalai City, Bilaspur City, Bilaspur Dc Office Road , Bilaspur Market, Ghagas,Barthin, Ghumarwin. <b>Indoor:</b> Bhadur Restaurant (Ghagas)

			<p>2) AMB- HIGHWAY:- bharwain to Aloh,Kalruhi To Mubarikpur, Mubarikpur To BPS                  MAJOR ROAD:-Jorbar, Kalu Di Bar, Shitla, Dharmsal Mahantan, Nari, Suhi,takoli, Lohara, Salohi,Chani Devi, Amba Da Padda , Koharchan                  WITH IN CITY-Chintpurani , Bharwain, Karluhi,Mubarikpur City  <b>Indoor:</b> Bombay Picnic Spot (Near Mubarikpur)</p>		<p>Pansai, Lamlehri Samoor                  WITH IN CITY-Nadaun City, nadaun Market,Hamirpur City, Hamirpur Market, Bangana, Thanakla.  <b>Indoor:</b> Green Palace ( near Una)</p>		
SOLAN	17 to 19 Dec 2014	Nalagarh / 160KM	<p>Solan:-A)Highway:-Nalagarh to New Nalagarh, New nalagarh To Baddi, Baddi To Parwano, Parwano to Dharpur Dharpur To kasauli                  B) MAJOR ROAD:- Kheda, Nalagarh Bus Stand, Nalagrah Degree College Road, Kheda Village Road, Nalagarh Bypass ( Ghanauli road), Kasuli Link Road, BarotiwalaVillage( Parwanoo Road,                  C) WITH IN CITY:- Nalagarh City, baddi Industrial Area, Baddi City, Badi vardhman chownk, Baddi university, Barotiwala city,Parwano city,kasauli,Dharpur,Kharuni, Kishanpura  <b>Indoor:</b> Hotel Sumryam (Kasuli)</p>	Arki & Solan/ 150 KM	<p>1) ARKI-A) Highway-Dharpur to Chakroli,Kunihar to arki, Subathu to Kunihar.                  B) MAJOR ROAD-Kunihar busstand, Arki degree college, Arki Bus Stand, Uchagaun,Khudiyan,Chakroli,                  C) Kunihar Market, Arki Market, Arki Village, Subathu, Chakroli,                  2) SOLAN A) HIGHWAY- Subathu To Denothi, Denothi to Solan, Solan to barog, Baog to kumarhatti.                  B) MAJOR ROAD: subhatu chownk, kallar,deothi,chaproli,subhathu,kunela gambherpul,                  C) WITH IN CITY-Mall road, bus stand, champa ghat,dc office, police line,Lakkar Bazar Pawan Bihar, Kumarhatti market, Barog market.  <b>Indoor:</b> Modern Restaurant Near Solan Bus Stand</p>	Nahan /Ponta Sahib/150KM	<p>1) NAHAN- A) HIGHWAY-HIGHWAY-Banethi to Dosarka, Dosarka to nahan,vikaram Bag, ,Dhaulta kuan, Dausarka To Kala Amb                  B)-MAJOR ROAD- Bus Stand, ghanu Ghat, Chira Wali Colony Raza Bag, Old Market,housing colony,gandhi village,ladu,disarray,judge da johar, Kala Amb College                  C) WITH IN CITY-Nahan Market, mall road,delhi gate,degree college, Dosarka Market,Civil hospital ,housing Colony,Kala Amb Market , Kala Amb industrial Area                  2) Ponta Sahib- A)- HIGHWAY- Kollar to Dhaulta kuan, Dhaulta Kuan to Bata bridge , Bata Bridge To badri chownk,                  B) MAJOR ROAD-Bangran Road, Sainwala,,moginand,Surajpur,satiwala,majra                  c) WITH IN CITY- Ponta Sahib Market, Poantasahib Gurdwara Road, Dhaultakuan city, badri matket  <b>Indoor:</b> Hotel Kashyap (Ponta Sahib)</p>



**7.5 SSA WISE DRIVE TEST OBSERVATION:**

**DRIVE TEST TABLE: 5**

**DRIVE TEST OBSERVATION OF KULLU SSA – OCTOBER 14**

S. No	Name of SP	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRCEL	Lahul, Kullu	Poor Level near Patalikuhul, Manali outer, Kothi	Kullu	Poor Level between Bhunter to Manikaran	Banzar	Poor Level near Sainj, Bhunter
2	AIRTEL		Poor Level & Quality at Kullu outer, Kothi		Poor Level & Quality near Bhunter, Kasoli, Malana		Poor Level & Quality near Bali chowk, Banjar, Larji
3	BSNL		Poor Level & Quality near Palchahan, Kakhnal, Katrain		Poor Level & Quality near Jari, Bhunter, Jalugran, Kasul		Poor Level & Quality near Devgarh
4	TATA GSM		---		No coverage at Manikaran, Mullana, Jari, Kasol		---
5	TATA CDMA		No Coverage at Kothi, Solang Nala, Gulaba, Rohtang road, Poor Level & Quality near Patalikuhul		No coverage at Manikaran, Mullana, Jari, Kasol		No coverage at Aut, Banjaar, Zibhi, Larji, Sainj
6	IDEA		Poor Level near Palchahan, Kakhnal		Poor Level & Quality near Jari, Bhunter, Jalugran, Kasul		Poor Level & Quality near Panjgayi
7	RCOM GSM		Poor Level between Palchahan to Gulaba, Klath to PataliKuhul		Poor Level near Raisen, Chong, Chowrnala		Poor Level near Aut
8	RCOM CDMA		Poor Level between Palchahan to Gulaba, Klath to PataliKuhul		Poor Level near Raisen, Chong, Chowrnala		Poor Level near Aut
9	VODAFONE		Poor Level & Quality near Patalikuhul, Kullu outer, Manali outer		Poor Level & Quality near Jari, Bhunter, Jalugran, Kasul		Poor Level & Quality near Aut, Sainj, Bhalai, Bhanjar, Jibhi

DRIVE TEST TABLE: 6

DRIVE TEST OBSERVATION OF HAMIRPUR SSA – NOVEMBER 14

S. No	Name of SP	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRCEL	Una	Poor Level & Quality near Gagret, Dolatpur, Mubarakpur	Hamirpur & Una	Poor Level & Quality near Tiswa, Baranda, Thana Kalan		Poor Level & Quality near Dundla, Cheru, Barthin, Baddu
2	AIRTEL		Poor Level & Quality near Badhnana Bharwein, Mubarakpur, Una Outer		Poor Level & Quality patches near Amb, Baranda, Pansai		Poor Level & Quality near Cheru, Bagher, Shahtalai
3	BSNL		Poor Level & Quality near Doulatpur, Govindpur Benerh		Poor Level & Quality near Amb outer, Panjpeeri, Kakrana, Dhundla, Panyali		Poor Level & Quality near Daroh, Pirthan
4	TATA GSM		---		---		---
5	TATA CDMA		No Coverage at Daulatpur, Jobbad,		---		---
6	IDEA		Poor Level & Quality near Kinnu, Panjawar, Una outer, Doulatpur, Mubarakpur		Poor Level & Quality at Nadoun outer, bangana, Lathiyani, Saloni, Bhota, Thana Kalyan		Poor Level near Berthi, Ghumarvi, Shahtalai
7	RCOM GSM		Poor Level & Quality near Panjawar, Ishpur		Poor Level & Quality near Panjawar, Kaloh, Dhaneta, Nalti		Poor Level & Quality near ShahtalaiBerthin, Chandpur
8	RCOM CDMA		No coverage between Mubarpur to Amlehar, Poor Level & Quality Barsali		Poor Level & Quality near Kaloha, Lamlehri		Poor Level & Quality near Sunhani, Shahtalai
9	VODAFONE		Poor Level & Quality near Panjawar, Una outer, near Kunera, Deharvi, Bharwein		Poor Level & Quality near Nehrian, Amb, Nadaun		Poor Level & Quality near Bangana, Ghaumarwin, Mehartown

DRIVE TEST TABLE: 7

DRIVE TEST OBSERVATION OF SOLAN SSA – DECEMBER 14

S. No	Name of SP	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRCEL	Nalagarh	---	Arki /Solan	Poor Level near Kunihar, Arki, Subathu	Nahan / Ponta Sahib	Poor Level near Nahan outer, Ponta outer
2	AIRTEL		Poor Level near Kasauli, Barotiwala, Poor Quality at Baddi outer, Nalagarh outer		Poor Level & Quality near Chaprauli, Barog, Dharkibel, Kundla		Poor Level & Quality near Nawni, Nahan outer, Pipliwala, Maira
3	BSNL		Poor Level & Quality near Dharampur, Poor Quality near Baddi Bus Stand, Chitkarauni, Parwanoo, Kasauli		Poor Level & Quality from Arki to Kunihar, Kunihar to Subhathu, Poor Quality near Barog, Dhobhighat		Poor Level & Quality near Nahan outer, Pipliwala, Jogiban, Majra, Badripur
4	TATA GSM		Poor Level near Jabli, Datyaal		Poor Level near Dharkibel		No Coverage between Kala Amb to Nahan
5	TATA CDMA		Poor Quality near Dharampur		No coverage at Nayagram,Subathu,Ghanghut,Ghamjihun,Barog Bypass, beetween Arki to Kunihar		No coverage Kolar, Ambwala, Sainwala, Banethi, Ladu, Judda Da Johar
6	IDEA		Poor Level & Quality near Kasauli, Poor Quality near Baddi Bus Stand		Poor Level from Arki to Kunihar, Kunihar to Subhathu		Poor Level & Quality near Nawni, Nahan outer, Pipliwala, Maira
7	RCOM GSM		No coverage near Parwanoo, Dharampur, Kasauli		Poor Level near Arki, Kunihar, Jabli, Sabathu, Dharampur, Barog Bypass		Poor Level at Nahan outer
8	RCOM CDMA		No coverage at Makhu Majra, between Gunai to Parwano		No coverage between Arki to Kunihar, Barog Bypass, Poor Level near Dharampur		No coverage between Nahan to Ponta, Poor Level at Nahan outer
9	VODAFONE		Poor Level at Baddi outer, Barotiwala outer, Parwanoo, Rajri, Kasauli, Poor Quality near Khera, Kasauli, Rajri		Poor Level from Arki to Kunihar, Kunihar to Khundian, Poor & Quality near Dharampur, Chaproli, Deothi, Barog		No coverage between Banethi to Nahan, Poor Level near Banethi, Nahan to Ponta HW

DRIVE TEST TABLE: 8

**NO NETWORK COVERAGE STATUS OF DRIVE TEST – OCTOBER TO DECEMBER 14**

S No	Month of Drive Test	Circle	Name of Operators	SSA	SDCA Covered	Status of no network coverage area	ICR Status
1	Oct'14	Himachal Pradesh	AIRCEL	Kullu	Kullu, Lahul, Banzar	Near Churroure Nallah towards Bhunter to Manikaran	NO
			AIRTEL			Near Churroure Nallah towards Bhunter to Manikaran	NO
			BSNL			Near Churroure Nallah towards Bhunter to Manikaran, Near gulaba Toward rohtang	NO
			IDEA			Gulaba , Malana, Near Kasol,Near Churroure Nallah towards Bhunter to Manikaran,	NO
			RCOM (GSM)			Largi,chong,Churroure Nallah, Kasol, jari	NO
			VODAFONE			'Near Churroure Nallah towards Bhunter to Manikaran, Near Kasol, Near Sainj, Balichowki	NO
			TATA (GSM)			Largi,chong,Churroure Nallah, Kasol, jari, Near Balichowki	ICR with Reliance GSM
			RCOM (CDMA)			Palchan To Gulaba, Kalath to Patlikul, Fogal , Haripur, Raison,Chong,Churroure Nallah	NO
			TATA (CDMA)			Koithi, Solang nala, gulaba, Near Patlikul, Manikaran Malana , Jari, Kasol,Aut, Largi, Sainj, Banzar, Jibhi,Balichowki	NO
2	Nov'14	Himachal Pradesh	AIRCEL	Hamirpur	Una, Amb, Hamirpur, Bilaspur	No Coverage at Bhater, Shitla, Aloha	NO
			AIRTEL			No Coverage at Bhater, Shitla, Amba da paddar,	NO
			BSNL			No coverage atPanjeeri Near Kaloha, Dhundla to Kakarna, Arnla( BANGANA UNA HIGHWAY)	NO
			IDEA			No Coverage at Bhater,Pirthipur, Aloha, Amba DA Paddar, Channi Devi , Lohara, Koharchan, Salohi,.	NO
			RCOM (GSM)			No Coverage at Bhater, Shitla, Aloha, Krluhi,Lohara, Chani devi, Pirthipur, Hari Ka taal,Panjawar, ishpur,near Neheriyen, Near Kaloh,Nalti , Chandpur	NO
			VODAFONE			Lathayani,Pirthipur,Bhater,Jorbar, Near Nehriyan, Kaloha To Nadaun, Galod, Shahtalai	ICR with Reliance GSM (Bangana to Barsar)
			TATA GSM			No Coverage at Bhater, Shitla, Aloha, Krluhi,Lohara, Chani devi, Pirthipur, Hari Ka taal,Panjawar, ishpur,near Neheriyen, Near Kaloh,Nalti , Chandpur	ICR with Reliance CDMA
			RCOM (CDMA)			Mubarakpur to Amlehar ,Barsali To Punjawar, Near Kaloha, Lamlehri, Masoor, Suhmani	NO
			TATA (CDMA)			No coverage in Amled, Panjal, Nakloh,Daulatpur chowk,Jodbad,Chambi,Jawar, Kaloha, Rakker, Kuhna,Piplu,Dumkhar,Bangana,Lathyani,Shahtalai, Ghagas	NO

S No	Month of Drive Test	Circle	Name of Operators	SSA	SDCA Covered	Status of no network coverage area	ICR Status
3	Dec'14	Himachal Pradesh	AIRCEL	Solan	Solan, Arki, Nahan, Ponta Sahib	Near Barotiwala, Near Kasauli, Ganghut	NO
			AIRTEL			banethi, Near Nawni,	NO
			BSNL			near kasauli, dharmpur, Badog Bypass	NO
			IDEA			Near Barotiwala, Near Kasauli	NO
			RCOM (GSM)			Near kasauli, Near parwanu, Near kunihar, jabbali, Badog Bypass, Nahan (Nahan Ponta sahib road)	NO
			VODAFONE			Near Barotiwala, No Coverage in kasauli Road, khudiyan, near ucha gaun, dosarka	NO
			TATA GSM			near kasauli, Near parwanu, Near kunihar, jabbali, Badog Bypass, Nahan (Nahan Ponta sahib road)	ICR with Reliance GSM
			RCOM (CDMA)			kunhai, kolar, dharmpur, Near kunihar, j Badog Bypas	NO
			TATA (CDMA)			Nayangar, subathu, Ganghut, Gamjhun, Kunihaar. Arki, Barog Bypass	NO

## 7.6 KEY FINDINGS ON DRIVE TEST:

The key observations that could be derived from the results of the drive tests are as under –

- (i) Tata (GSM), is operating its services with its own 05 no. of BTSs only, however is on ICR with Reliance (GSM) in most of the HP licensed service area.
- (ii) **Drive test in October-14:** Drive tests were conducted across the **Kullu SSA** covering Lahul, Kullu & Banzar SDCAs. The drive test results revealed that performance of the service providers was satisfactory as most of the service providers were found meeting the benchmarks of most of the parameters during the drive tests across the **Kullu SSA**. However, **BSNL** failed to meet the benchmark of **Call Drop Rate (2.38% - Indoor)**, whereas **Idea** could not meet the benchmark of **'CDR' and Blocked Call Rate** with its performance as **2.34% and 3.55% respectively**.
- (iii) **Drive Test in November-14:** Drive tests were conducted in **Hamirpur SSA** covering Una, Amb, Hamirpur & Bilaspur SDCAs. The **BSNL** lagged behind in meeting the benchmarks for parameters **Call Drop Rate and Voice Quality** with its performance as **2.20% and 93.10%** respectively. **Idea** and **RCOM GSM** also failed to meet the benchmark of the parameter **Voice Quality** with their overall achieved value as **91.83%** and **93.51%**.
- (iv) **Drive Test in December-14:** Drive tests were conducted in **Solan SSA** covering Nalagarh, Arki , Solan Nahan and Ponta Sahib SDCAs. In this SSA, **BSNL** could not meet the benchmark of the parameters **'Call drop rate' (2.15%) and Voice Quality (92.53% - Outdoor)**. Further, **Idea, Tata GSM and Vodafone** also failed to meet the benchmark of **Voice Quality** with their achievement as **93.82% (Outdoor), 94.53% (Outdoor) and 94.92% (Outdoor) respectively**.

The deficiencies with respect to inadequate coverage and voice quality, encountered by different Service providers at various places as shown in the drive tests plots, are detailed in the above drive test table.-5, 6 & 7.

**The detail of Network coverage and Intra Circle Roaming (ICR) status of different service providers at various locations in the three SSAs is given in table-8.**

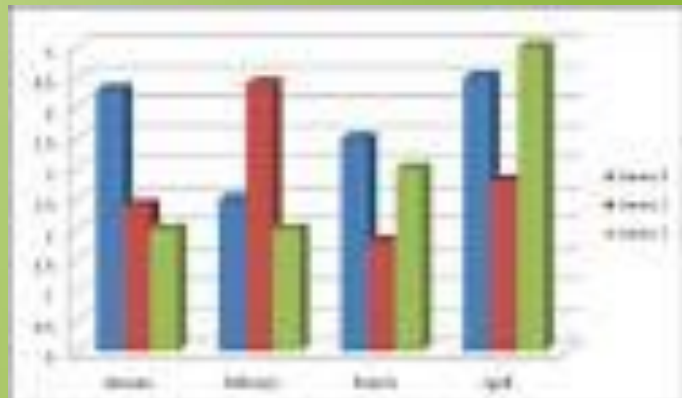
*Thus from the above, it is concluded that **Voice Quality** and **Call drop rate** were the area of concern for some of the service providers namely **BSNL, Idea, RCOM(GSM), Tata(GSM)and Vodafone** across the above SSAs. The defaulting Service providers need to take corrective actions to improve their network quality.*

## 8. GRAPHICAL REPRESENTATION (CELLULAR MOBILE SERVICE PROVIDERS)

### AVERAGED QUARTERLY PMR

V/S

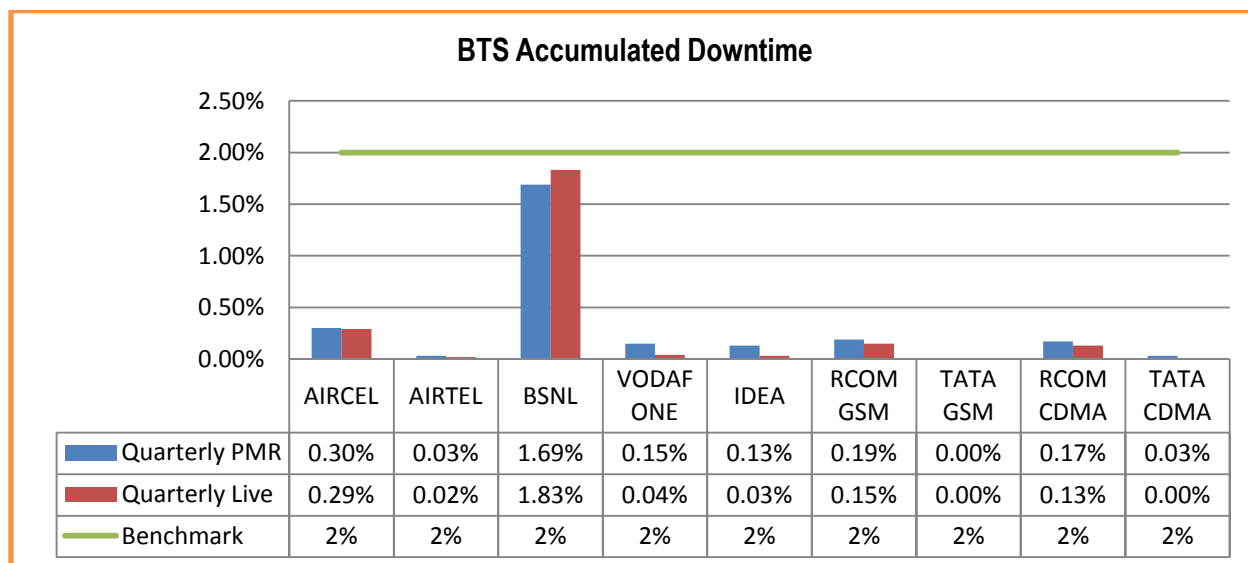
### AVERAGED QUARTERLY 3-DAYs LIVE MEASURMENT



## 8. GRAPHICAL REPRESENTATION:

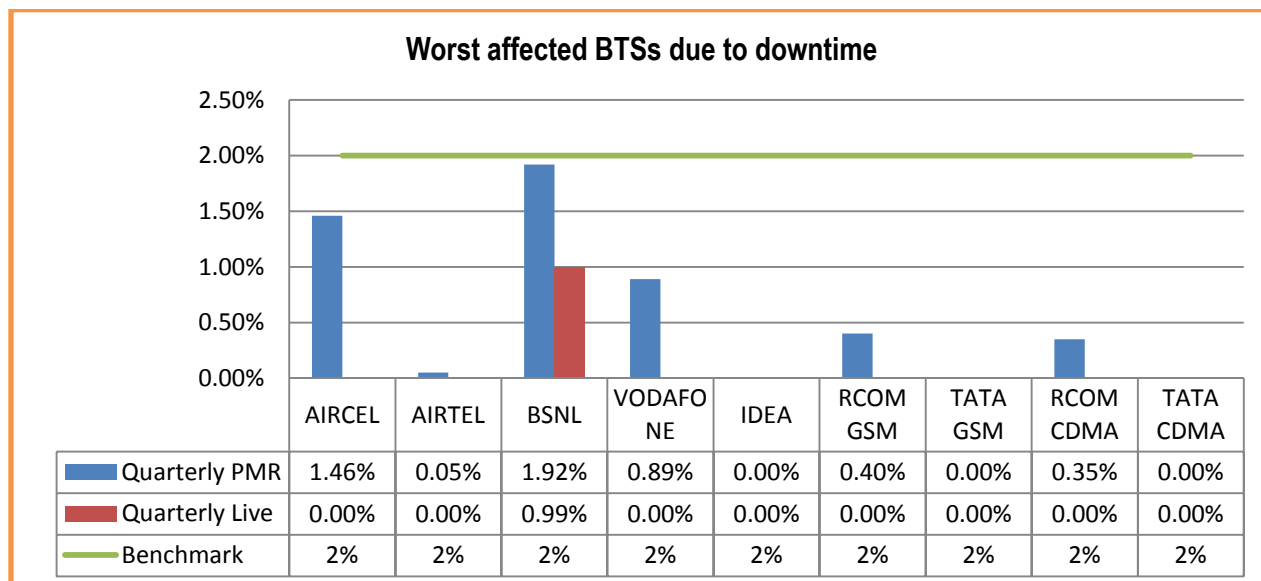
Graphical Representation of Performance of the Cellular Mobile Service Providers (PMR) V/S 3-Days Live Measurement (Quarterly Average Data):

### 1) BTS ACCUMULATED DOWNTIME :



All operators are meeting the benchmarks.

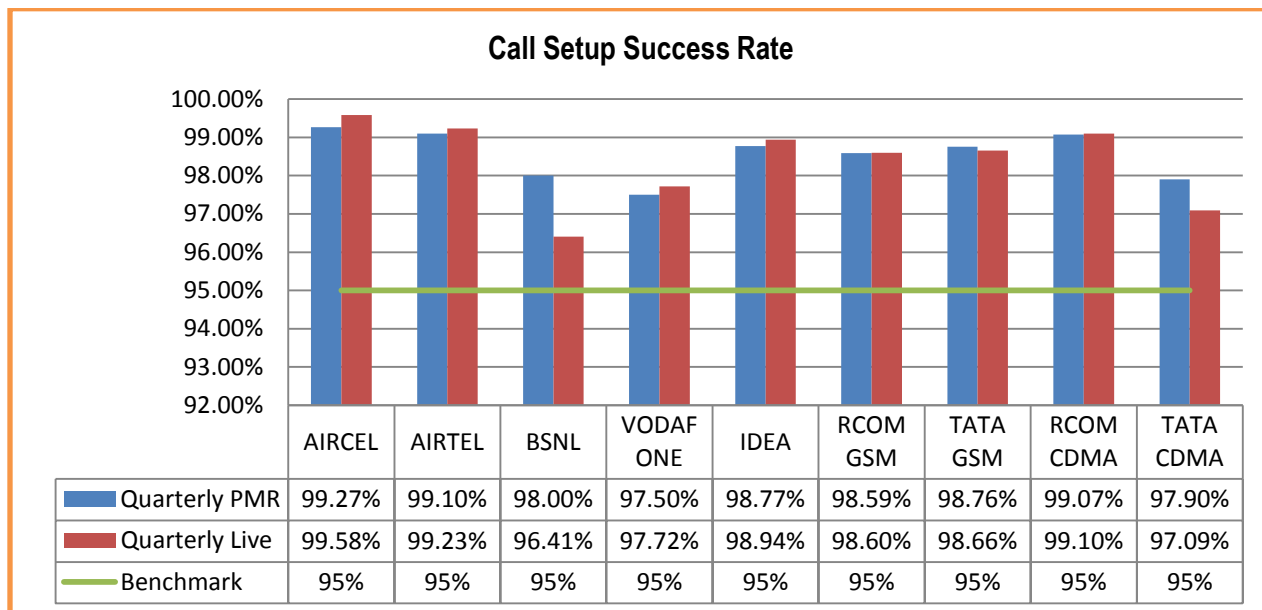
### 2) WORST AFFECTED BTSS DUE TO DOWNTIME :



All operators are meeting the benchmarks.

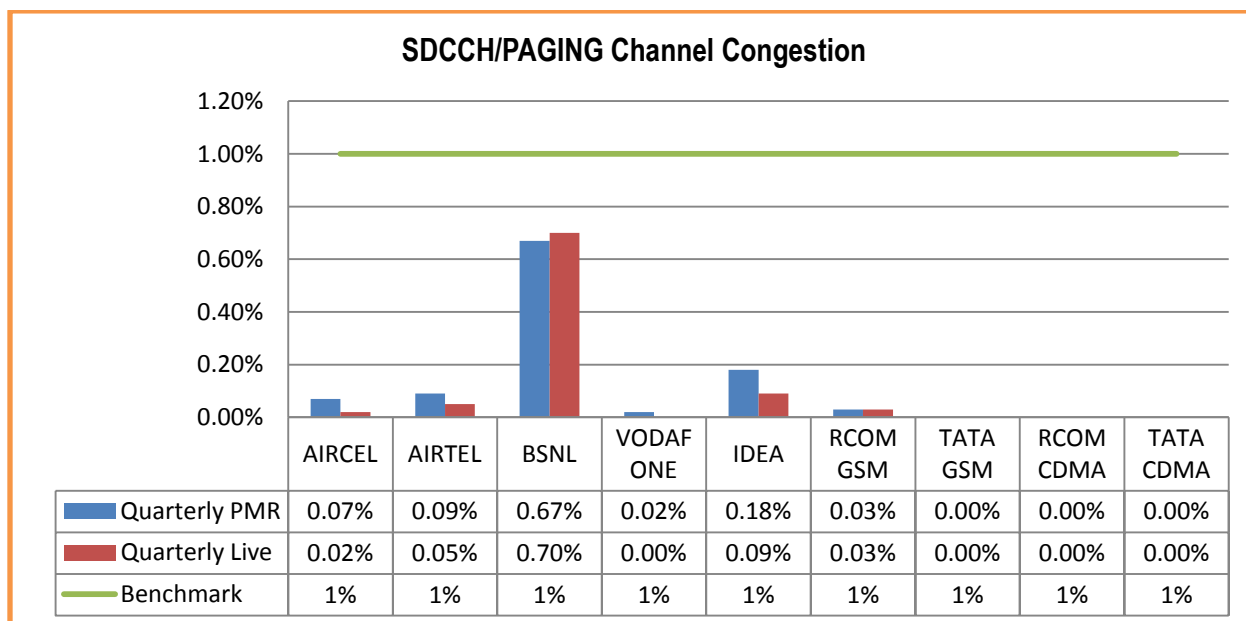


3) CALL SETUP SUCCESS RATE :



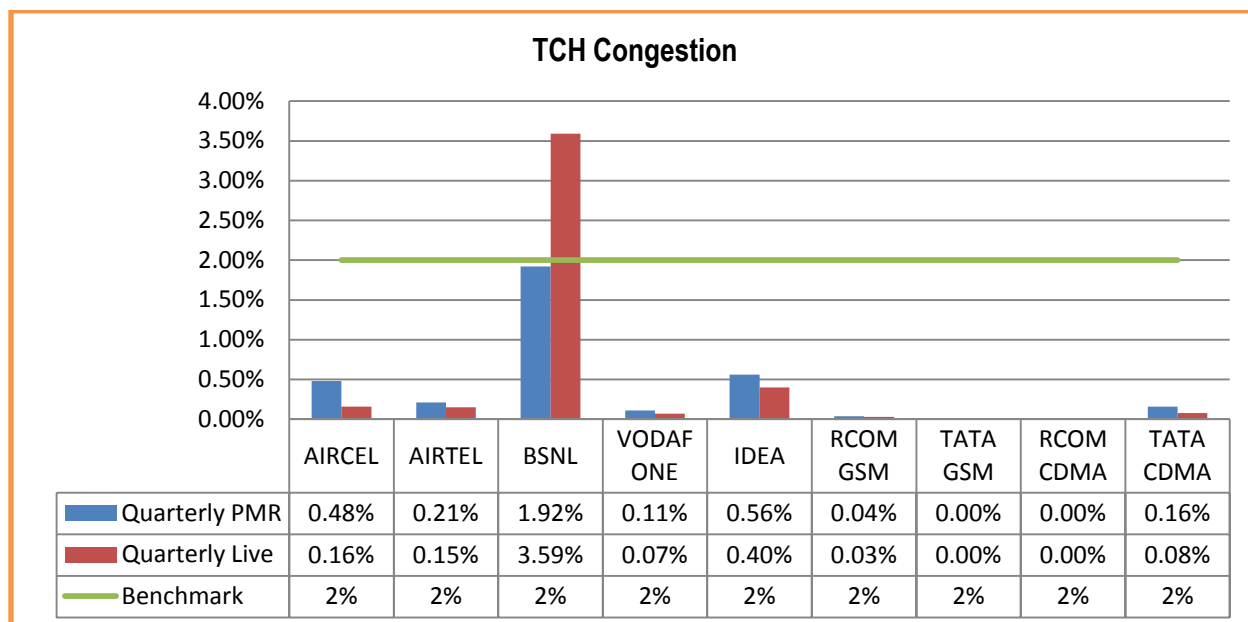
All operators are meeting the benchmarks.

4) SDCCH/PAGING CHANNEL CONGESTION :



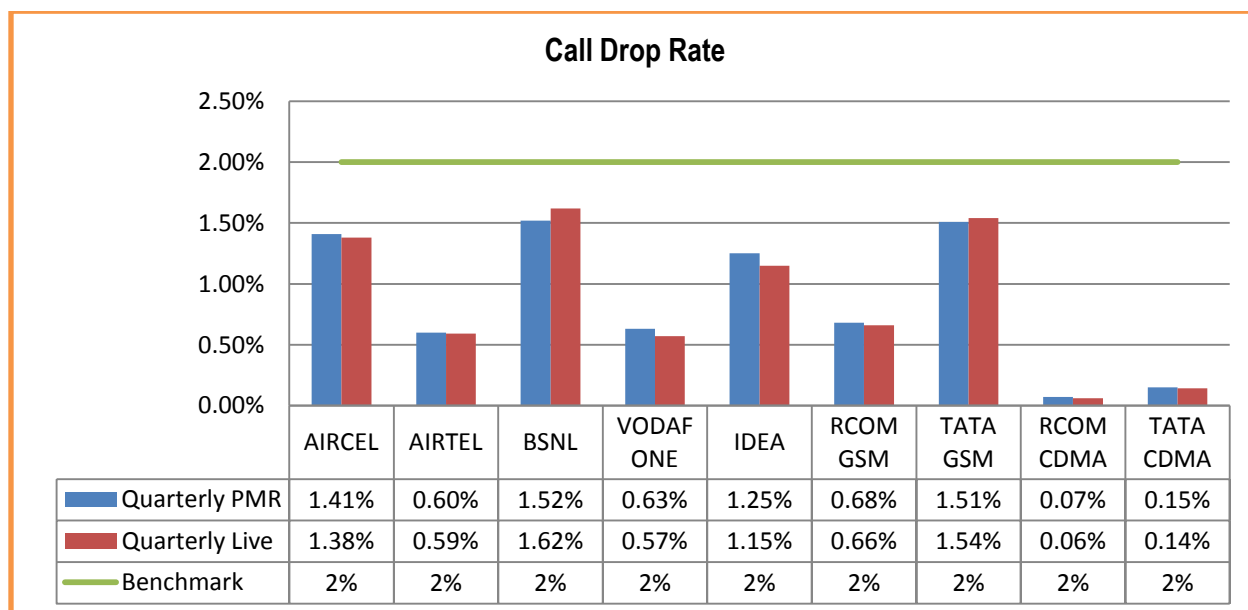
All operators are meeting the benchmarks.

5) TCH CONGESTION :



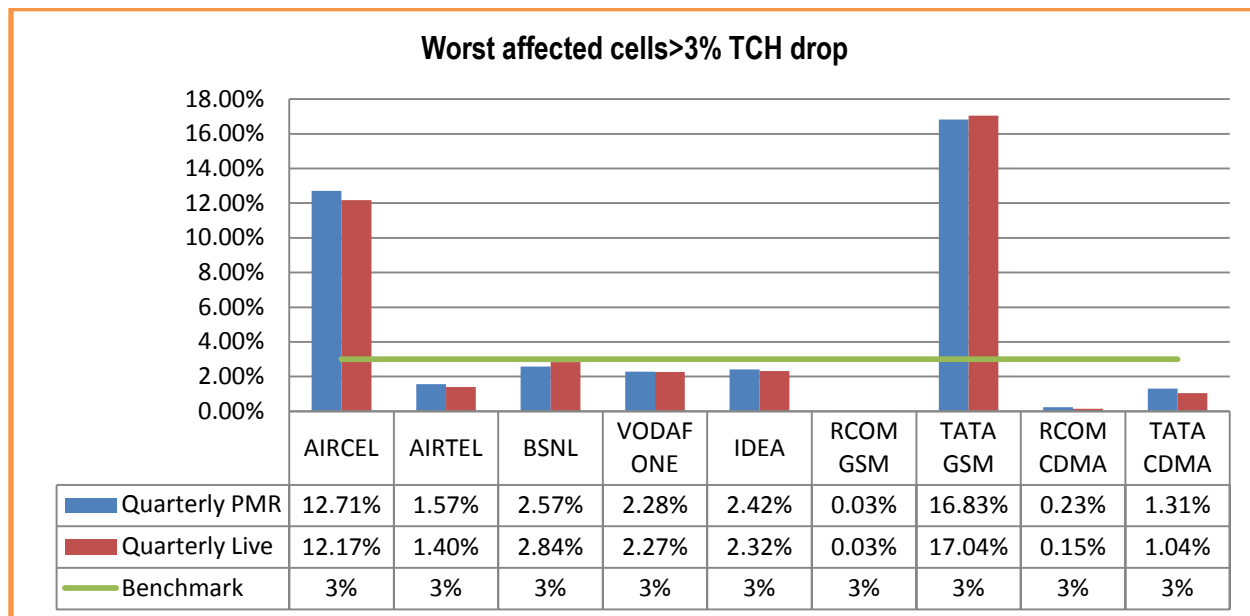
All operators are meeting the benchmarks except BSNL during 3 day live measurement.

6) CALL DROP RATE :



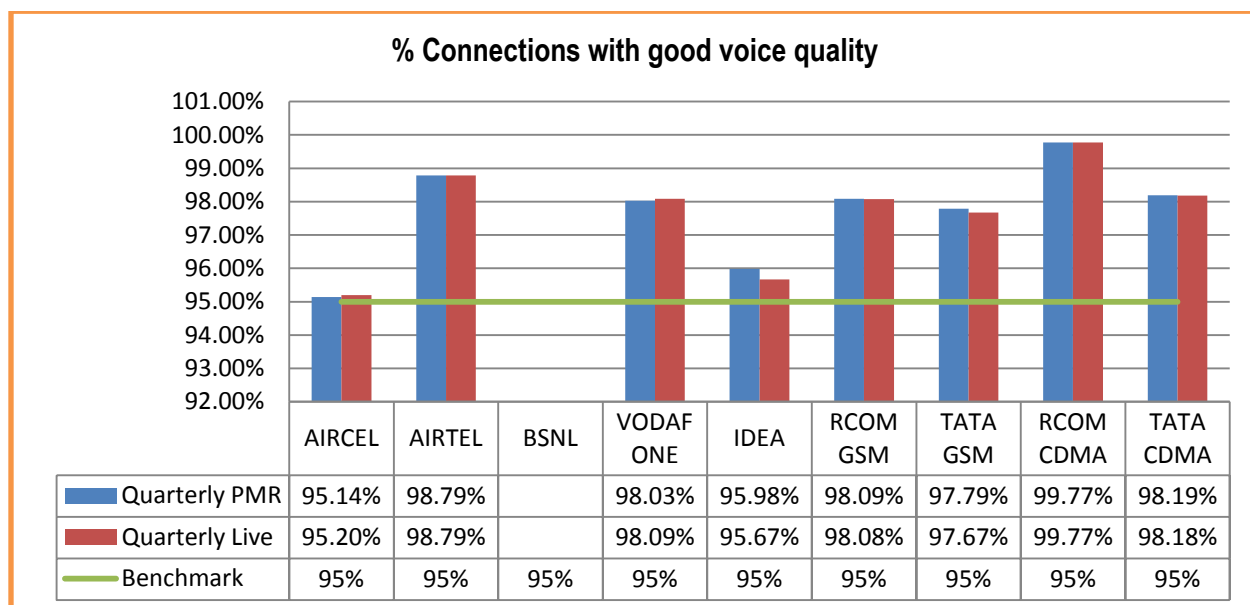
All operators are meeting the benchmarks.

7) WORST AFFECTED CELLS>3% TCH DROP :



All operators are meeting the benchmarks except Aircel and TATA (GSM).

8) PERCENTAGE OF CONNECTIONS WITH GOOD VOICE QUALITY :



All operators are meeting the benchmarks. BSNL has not provided the data as they are not able to fetch the system generated data.