



**Audit & Assessment of Quality of Service  
Of  
Cellular Mobile Telephone Service  
For  
Telecom Regulatory Authority of India  
North Zone – Himachal Pradesh Service Area  
(July 2014 – September 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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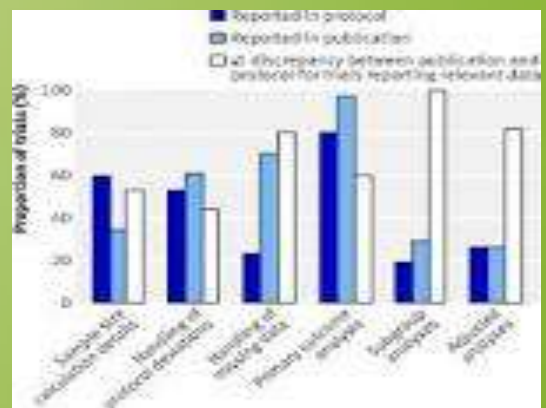
The primary objective is to audit and assess the Quality of Service being rendered by Basic, Cellular Mobile & Broadband service providers against the parameters notified by TRAI.

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 UP (E), UP (W) and MP&CG circles during the quarter July – September 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
		July-14	August-14	September-14	
<b>GSM Operators</b>					
1	AIRCEL	11 to 13 Jul-14	4 to 6 Aug-14	9 to 11 Sep-14	3rd Floor Keothal Complex Khalini Shimla.
2	AIRTEL	13 to 15 Jul-14	8, 11 to 12 Aug-14	8 to 10 Sep-14	Bharti Airtel Campus, Plot No 21, Rajiv Gandhi Information and Technology Park, Chandigarh, 160101
3	BSNL	14 to 16 Jul-14	7 to 9 Aug-14	4 to 6 Sep-14	BSNL Shimla
4	IDEA	9 to 11 Jul-14	6 to 8 Aug-14	5, 8 to 9 Sep-14	Idea Cellular Limited, Phase -7 Industrial Area, Mohali
5	RCOM GSM	8 to 10 Jul-14	6 to 8 Aug-14	3 to 4 & 8 Sep-14	Reliance Communications Ltd., Phase-8, Industrial Area, Mohali
6	TATA GSM	17 to 18 & 21 Jul-14	18 to 20 Aug-14	11 to 12 & 15 Sep-14	Tata Teleservices Ltd Charu sood Building Chota Shimla, Kasumpti
7	VODAFONE	16 to 18 Jul-14	21 to 23 Aug-14	1 to 3 Sep-14	130 durga cottage SDA complex Kasumpti Shimla
<b>CDMA Operators</b>					
8	RCOM CDMA	8 to 10 Jul-14	6 to 8 Aug-14	3 to 4 & 8 Sep-14	Reliance Communications Ltd., Phase-8, Industrial Area, Mohali
9	TATA CDMA	21 to 23 Jul-14	11 to 13 Aug-14	8 to 10 Sep-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 September 2014.

The data generated by monthly PMR and 3-days live measurements audit for the period July 2014 to September 2014 has been successfully uploaded on the server located at TRAI premises.

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

- The QoS audit for basic (wire line) service was to be done for the number of exchanges spread over in about 10% of SDCAs with each service providers in specified circles once a year. **However, QoS audit for basic (wire line) service was not required to be done for Himachal Pradesh Circle in the quarter ended September 2014, as it has already been done in QE March 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 a year . **However, the QoS audit for Broadband service was not required to be done for Himachal Pradesh Circle in the quarter ended September 2014, as it has already been done in QE March 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 month audit it was concluded that on an average, performance of the operators in the Himachal Pradesh service area was satisfactory for Network related Parameters, audited for monthly PMR data. 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 parameters **‘TCH congestion’**, **‘SDCCH congestion’** and **‘Call drop rate’**, whereas **Aircel and Tata (GSM)** could not meet the benchmarks of the parameters **‘Worst affected cells> 3 % TCH drops’**. The average performance of **BSNL** for three months of quarter for parameters **SDCCH Congestion, TCH congestion and CDR** was **1.46%**, **3.30%** and **2.21%** respectively. Further, in respect of parameter **‘Worst affected cells> 3 % TCH drops’**, average performance of **Aircel and Tata (GSM)** was **13.74%** and **19.26%**, way beyond the benchmark of <3%.

(iii) With regard to the **Customer Service Quality Parameters**, all service providers were in compliance with most of the parameters. However, **RCOM (GSM)** could not meet the benchmark of '**Billing Complaints – Prepaid**', with its performance as **0.27%**. With respect to the parameter '**Calls answered by Operators (voice to voice) within 60 seconds**', **RCOM (CDMA)** has not met the benchmark with its performance as **89.69%**.

In case of live measurements also the performance of **RCOM (CDMA)** was poor as it could connect only **61.42%** of calls to operator within 60 seconds whereas **Tata (GSM)** have not met the benchmark of 'calls answered by Operators (voice to voice) within **90 seconds (93.53%)** against the benchmark of  $\geq 95\%$ .

(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** and **Tata (GSM)** across the three SSAs namely Kangra, Shimla and Mandi. The named 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	Sept-14	20:00 - 21:00
2	AIRTEL	Sept -14	20:00 - 21:00
3	BSNL	Sept -14	19:00 - 20:00
4	IDEA	Sept -14	21:00 - 22:00
5	VODAFONE	Sept -14	20:00 - 21:00
6	RCOM GSM	Sept -14	19:00 - 20:00
7	TATA GSM	Sept -14	20:00 - 21:00
<b>CDMA Operators</b>			
8	RCOM CDMA	Sept -14	20:00 - 21:00
9	TATA CDMA	Sept -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	1418	Ericsson	Ericsson
3	BSNL	6	18	1125	Ericsson	Ericsson, NSN & ZTE
4	VODAFONE	1	9	790	NSN	NSN
5	IDEA	2	6	902	Ericsson	Ericsson
6	RCOM GSM	3	12	750	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 – JULY 14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES HIMACHAL PRADESH CIRCLE - JULY 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%	July-14	0.45%	0.02%	1.93%	0.02%	0.06%	0.17%	0.00%	0.07%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	July-14	1.51%	0.00%	1.91%	0.00%	0.00%	0.13%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>												
2	a) CSSR (Call Setup Success Rate)	>=95%	July-14	99.43%	99.17%	97.26%	97.90%	98.64%	98.54%	99.12%	98.91%	98.63%
	b) SDCCH/PAGING Channel congestion	<=1%	July-14	0.07%	0.04%	0.80%	0.01%	0.05%	0.02%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	July-14	0.35%	0.16%	1.49%	0.30%	0.58%	0.08%	0.07%	0.01%	0.05%
<b>Connection maintenance (Retainability)</b>												
3	a) CDR (Call Drop Rate)	<=2%	July-14	1.23%	0.59%	1.95%	0.62%	1.41%	0.70%	1.43%	0.07%	0.17%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	July-14	13.60%	1.88%	2.91%	2.35%	2.03%	0.04%	18.71%	0.35%	1.47%
	c) Connections with good voice quality	>=95%	July-14	95.03%	98.81%	NP	98.30%	95.85%	98.22%	98.21%	99.80%	98.20%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	July-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 – AUGUST 14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES HIMACHAL PRADESH CIRCLE – AUGUST 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%	Aug-14	0.40%	0.03%	1.86%	0.01%	0.09%	0.15%	0.00%	0.09%	0.02%
	b) Worst affected BTSs due to downtime	<=2%	Aug-14	1.51%	0.00%	1.97%	0.00%	0.00%	0.40%	0.00%	0.35%	0.00%
<b>Connection Establishment (Accessibility)</b>												
2	a) CSSR (Call Setup Success Rate)	>=95%	Aug-14	99.09%	98.91%	98.46%	97.90%	98.43%	98.58%	98.72%	98.93%	98.49%
	b) SDCCH/PAGING Channel congestion	<=1%	Aug-14	0.12%	0.24%	0.75%	0.03%	0.21%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Aug-14	0.68%	0.20%	1.54%	0.26%	0.80%	0.05%	0.00%	0.01%	0.11%
<b>Connection maintenance (Retainability)</b>												
3	a) CDR (Call Drop Rate)	<=2%	Aug-14	1.30%	0.58%	1.27%	0.65%	1.41%	0.71%	1.72%	0.07%	0.19%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Aug-14	<b>13.46%</b>	1.64%	2.89%	2.27%	2.26%	0.06%	<b>20.43%</b>	0.30%	1.61%
	c) Connections with good voice quality	>=95%	Aug-14	95.14%	98.81%	NP	98.29%	95.95%	98.23%	97.21%	99.78%	98.20%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Aug-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 – SEPTEMBER 14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES HIMACHAL PRADESH CIRCLE – SEPTEMBER 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%	Sep-14	0.46%	0.03%	1.88%	0.02%	0.07%	0.11%	0.00%	0.07%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	Sep-14	1.36%	0.00%	1.96%	0.00%	0.00%	0.40%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>												
2	a) CSSR (Call Setup Success Rate)	>=95%	Sep-14	98.18%	99.03%	98.22%	97.69%	98.55%	98.55%	98.11%	99.04%	98.29%
	b) SDCCH/PAGING Channel congestion	<=1%	Sep-14	0.09%	0.09%	0.76%	0.02%	0.12%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Sep-14	1.57%	0.23%	1.78%	0.11%	0.71%	0.05%	0.00%	0.00%	0.10%
<b>Connection maintenance (Retainability)</b>												
3	a) CDR (Call Drop Rate)	<=2%	Sep-14	1.38%	0.60%	1.76%	0.58%	1.29%	0.71%	1.41%	0.07%	0.19%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Sep-14	13.69%	1.62%	2.88%	2.26%	2.26%	0.02%	19.11%	0.20%	1.63%
	c) Connections with good voice quality	>=95%	Sep-14	95.03%	98.81%	NP	98.18%	95.89%	98.09%	97.62%	99.80%	98.15%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Sep-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- SEPTEMBER 14 (JULY TO SEPTEMBER 2014 MONTHS AUDITED DATA)**

QUARTERLY QOS PERFORMANCE (AVERAGE OF QE-SEPTEMBER-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	0.44%	0.03%	1.89%	0.02%	0.07%	0.14%	0.00%	0.08%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	1.46%	0.00%	1.95%	0.00%	0.00%	0.31%	0.00%	0.12%	0.00%
2	Connection Establishment (Accessibility)											
	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	98.90%	99.04%	97.98%	97.83%	98.54%	98.56%	98.65%	98.96%	98.47%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.09%	0.12%	0.77%	0.02%	0.13%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.87%	0.20%	1.60%	0.22%	0.70%	0.06%	0.02%	0.01%	0.09%
3	Connection maintenance (Retainability)											
	a) CDR (Call Drop Rate)	<=2%	Quarterly	1.30%	0.59%	1.66%	0.62%	1.37%	0.71%	1.52%	0.07%	0.18%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	13.58%	1.71%	2.89%	2.29%	2.18%	0.04%	19.42%	0.28%	1.57%
	c) Connections with good voice quality	>=95%	Quarterly	95.07%	98.81%	NP	98.26%	95.90%	98.18%	97.68%	99.79%	98.18%
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.

- **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, 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 **13.58%** and **19.42%** 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) – JULY 14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES HIMACHAL PRADESH CIRCLE - JULY 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	0.59%	0.04%	1.95%	0.07%	0.06%	0.14%	0.00%	0.05%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	1.29%	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	99.54%	99.20%	98.00%	97.86%	98.63%	98.57%	99.59%	99.13%	98.76%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.05%	0.02%	1.18%	0.00%	0.03%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.24%	0.15%	2.31%	0.23%	0.60%	0.10%	0.00%	0.00%	0.05%
<b>Connection maintenance (Retainability)</b>												
3	a) CDR (Call Drop Rate)	<=2%	Live data	1.20%	0.61%	2.04%	0.62%	1.42%	0.67%	1.33%	0.08%	0.16%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	14.38%	1.99%	2.92%	2.30%	1.93%	0.01%	17.78%	0.24%	0.70%
	c) Connections with good voice quality	>=95%	Live data	95.04%	98.82%	NP	98.29%	95.80%	98.21%	98.84%	99.77%	98.21%
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) – AUGUST 14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES HIMACHAL PRADESH CIRCLE- AUGUST 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	0.51%	0.02%	1.96%	0.01%	0.07%	0.19%	0.00%	0.13%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	1.87%	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	99.44%	98.39%	96.59%	97.98%	98.61%	98.58%	99.18%	99.13%	98.45%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.16%	0.72%	1.66%	0.00%	0.07%	0.02%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.36%	0.20%	3.41%	0.13%	0.53%	0.07%	0.00%	0.00%	0.10%
<b>Connection maintenance (Retainability)</b>												
3	a) CDR (Call Drop Rate)	<=2%	Live data	1.18%	0.56%	1.90%	0.64%	1.57%	0.71%	2.21%	0.08%	0.22%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	12.51%	1.55%	2.89%	2.29%	2.42%	0.04%	20.00%	0.24%	1.33%
	c) Connections with good voice quality	>=95%	Live data	95.18%	98.81%	NP	98.32%	95.74%	98.22%	95.96%	99.77%	98.16%
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) – SEPTEMBER 14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES HIMACHAL PRADESH CIRCLE- SEPTEMBER 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	0.80%	0.04%	1.95%	0.02%	0.09%	0.11%	0.00%	0.14%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	1.97%	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	99.22%	99.02%	95.82%	97.78%	98.73%	98.50%	98.91%	99.21%	98.23%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.22%	0.12%	1.53%	0.07%	0.12%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.56%	0.21%	4.18%	0.19%	0.52%	0.04%	0.00%	0.00%	0.05%
<b>Connection maintenance (Retainability)</b>												
3	a) CDR (Call Drop Rate)	<=2%	Live data	1.43%	0.60%	2.68%	0.55%	1.25%	0.71%	1.52%	0.07%	0.20%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	14.34%	1.80%	2.98%	2.31%	2.05%	0.04%	20.00%	0.12%	2.11%
	c) Connections with good voice quality	>=95%	Live data	95.04%	98.81%	NP	98.30%	95.75%	98.13%	97.68%	99.78%	98.13%
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 JULY TO SEPTEMBER 2014)**

QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT (AVERAGE OF QE – SEPT 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	0.63%	0.03%	1.95%	0.03%	0.07%	0.15%	0.00%	0.11%	0.00%
	b) Worst affected BTSS due to downtime	<=2%	Quarterly	0.00%	0.00%	1.71%	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	99.40%	98.87%	96.80%	97.87%	98.66%	98.55%	99.23%	99.16%	98.48%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.14%	0.29%	1.46%	0.02%	0.07%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.39%	0.19%	3.30%	0.18%	0.55%	0.07%	0.00%	0.00%	0.07%
<b>Connection maintenance (Retainability)</b>												
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	1.27%	0.59%	2.21%	0.60%	1.41%	0.70%	1.69%	0.08%	0.19%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	13.74%	1.78%	2.93%	2.30%	2.13%	0.03%	19.26%	0.20%	1.38%
	c) Connections with good voice quality	>=95%	Quarterly	95.09%	98.81%	NP	98.30%	95.76%	98.19%	97.49%	99.77%	98.17%
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 parameters '**SDCCH congestion**', '**TCH congestion**', and '**Call drop rate**', whereas **Aircel** and **Tata (GSM)** could not meet the benchmarks of the parameters '**Worst affected cells> 3 % TCH drops**'. The average performance of **BSNL** for three months of quarter for parameters **SDCCH Congestion**, **TCH congestion** and **CDR** was **1.46%**, **3.30%** and **2.21%** respectively. Further, in respect of parameter '**Worst affected cells> 3 % TCH drops**', average performance of **Aircel** and **Tata (GSM)** was **13.74%** and **19.26%**, 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- July 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		July-14	661	1415	1097	790	853	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		July-14	2193	190	15722	132	379	946	5	152	1
	c) BTS Accumulated Downtime	<=2%	July-14	0.45%	0.02%	1.93%	0.02%	0.06%	0.17%	0.00%	0.07%	0.00%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		July-14	10	0	21	0	0	1	5	0	0
	e) Worst affected BTSs due to downtime	<=2%	July-14	1.51%	0.00%	1.91%	0.00%	0.00%	0.13%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>												
2	a) CSSR (Call Setup Success Rate)	>=95%	July-14	99.43%	99.17%	97.26%	97.90%	98.64%	98.54%	99.12%	98.91%	98.63%
	b) SDCCCH/PAGING Congestion	<=1%	July-14	0.07%	0.04%	0.80%	0.01%	0.05%	0.02%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	July-14	0.35%	0.16%	1.49%	0.30%	0.58%	0.08%	0.07%	0.01%	0.05%
<b>Connection Maintenance (Retainability)</b>												
3	a) Call Drop Rate (CDR)	<=2%	July-14	1.23%	0.59%	1.95%	0.62%	1.41%	0.70%	1.43%	0.07%	0.17%
	b) Worst affected cells>3% TCH drop	<=3%	July-14	13.60%	1.88%	2.91%	2.35%	2.03%	0.04%	18.71%	0.35%	1.47%
	c) % of connections with good voice quality	>=95%	July-14	95.03%	98.81%	NP	98.30%	95.85%	98.22%	98.21%	99.80%	98.20%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		July-14	268	78	94	56	52	1	3	1	6
	e) Total no. of cells (Sector) in the licensed service area		July-14	1971	4117	3240	2380	2540	2367	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		July-14	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		July-14	0	0	0	0	0	0	0	0	0
<b>Network Data</b>												
5	a) Equipped Capacity of Network in Erlang		July-14	32449	64299	74000	15615	30226	40000	158	53000	17466
	b) Total traffic in TCBH in erlang (Avg.)		July-14	13041	58788	35114	12553	14724	29762	8	12837	2377
	c) Total no. of customers served (as per VLR) on last day of the month		July-14	505092	2211977	1099572	531398	658742	1223589	--	310003	39332

TABLE: 2

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live measurement - HP Circle- July 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	661	1408	1088	789	849	861	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	281	37	1530	40	36	86	0	10	1
	c) BTS Accumulated Downtime	<=2%	Live data	0.59%	0.04%	1.95%	0.07%	0.06%	0.14%	0.00%	0.05%	0.01%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	14	0	0	0	5	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	1.29%	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	99.54%	99.20%	98.00%	97.86%	98.63%	98.57%	99.59%	99.13%	98.76%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.05%	0.02%	1.18%	0.00%	0.03%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.24%	0.15%	2.31%	0.23%	0.60%	0.10%	0.00%	0.00%	0.05%
<b>Connection Maintenance (Retainability)</b>												
3	a) Call Drop Rate (CDR)	<=2%	Live data	1.20%	0.61%	2.04%	0.62%	1.42%	0.67%	1.33%	0.08%	0.16%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	14.38%	1.99%	2.92%	2.30%	1.93%	0.01%	17.78%	0.24%	0.70%
	c) % of connections with good voice quality	>=95%	Live data	95.04%	98.82%	NP	98.29%	95.80%	98.21%	98.84%	99.77%	98.21%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	283	81	94	55	49	0	3	2	3
	e) Total no. of cells (Sector) in the licensed service area		Live data	1971	4096	3236	2379	2539	2580	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: 3

Detailed Network Data Assessment of Cellular Mobile Telephone Services- Himachal Pradesh Circle - August 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		Aug-14	662	1422	1115	790	880	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		Aug-14	1980	268	15435	61	606	848	0	187	19
	c) BTS Accumulated Downtime	<=2%	Aug-14	0.40%	0.03%	1.86%	0.01%	0.09%	0.15%	0.00%	0.09%	0.02%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Aug-14	10	0	22	0	0	3	0	1	0
	e) Worst affected BTSs due to downtime	<=2%	Aug-14	1.51%	0.00%	1.97%	0.00%	0.00%	0.40%	0.00%	0.35%	0.00%
<b>Connection Establishment (Accessibility)</b>												
2	a) CSSR (Call Setup Success Rate)	>=95%	Aug-14	99.09%	98.91%	98.46%	97.90%	98.43%	98.58%	98.72%	98.93%	98.49%
	b) SDCCH/PAGING Congestion	<=1%	Aug-14	0.12%	0.24%	0.75%	0.03%	0.21%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Aug-14	0.68%	0.20%	1.54%	0.26%	0.80%	0.05%	0.00%	0.01%	0.11%
<b>Connection Maintenance (Retainability)</b>												
3	a) Call Drop Rate (CDR)	<=2%	Aug-14	1.30%	0.58%	1.27%	0.65%	1.41%	0.71%	1.72%	0.07%	0.19%
	b) Worst affected cells>3% TCH drop	<=3%	Aug-14	13.46%	1.64%	2.89%	2.27%	2.26%	0.06%	20.43%	0.30%	1.61%
	c) % of connections with good voice quality	>=95%	Aug-14	95.14%	98.81%	NP	98.29%	95.95%	98.23%	97.21%	99.78%	98.20%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Aug-14	266	68	95	54	58	1	3	3	7
	e) Total no. of cells (Sector) in the licensed service area		Aug-14	1974	4137	3268	2382	2579	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		Aug-14	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Aug-14	0	0	0	0	0	0	0	0	0
<b>Network Data</b>												
5	a) Equipped Capacity of Network in Erlang		Aug-14	32488	64386	74000	16525	30931	40000	158	28000	17466
	b) Total traffic in TCBH in erlang (Avg.)		Aug-14	13489	60519	35084	12919	15208	29475	7	2069	2036
	c) Total no. of customers served (as per VLR) on last day of the month		Aug-14	510303	2223082	1090837	523002	652933	1223919	--	107424	--

TABLE: 4

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live measurement - HP Circle- August 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	1415	1108	790	857	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	243.40	16.67	1564	3.06	40.70	102.77	0	27.12	0
	c) BTS Accumulated Downtime	<=2%	Live data	0.51%	0.02%	1.96%	0.01%	0.07%	0.19%	0.00%	0.13%	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%	1.87%	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	99.44%	98.39%	96.59%	97.98%	98.61%	98.58%	99.18%	99.13%	98.45%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.16%	0.72%	1.66%	0.00%	0.07%	0.02%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.36%	0.20%	3.41%	0.13%	0.53%	0.07%	0.00%	0.00%	0.10%
<b>Connection Maintenance (Retainability)</b>												
3	a) Call Drop Rate (CDR)	<=2%	Live data	1.18%	0.56%	1.90%	0.64%	1.57%	0.71%	2.21%	0.08%	0.22%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	12.51%	1.55%	2.89%	2.29%	2.42%	0.04%	20.00%	0.24%	1.33%
	c) % of connections with good voice quality	>=95%	Live data	95.18%	98.81%	NP	98.32%	95.74%	98.22%	95.96%	99.77%	98.16%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	247	64	94	55	62	1	3	2	6
	e) Total no. of cells (Sector) in the licensed service area		Live data	1974	4117	3263	2382	2559	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- Sept 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		Sep-14	662	1418	1125	790	902	750	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		Sep-14	2209	277	15235	102	459	592	0	144	0
	c) BTS Accumulated Downtime	<=2%	Sep-14	0.46%	0.03%	1.88%	0.02%	0.07%	0.11%	0.00%	0.07%	0.00%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Sep-14	9	0	22	0	0	3	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Sep-14	1.36%	0.00%	1.96%	0.00%	0.00%	0.40%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>												
2	a) CSSR (Call Setup Success Rate)	>=95%	Sep-14	98.18%	99.03%	98.22%	97.69%	98.55%	98.55%	98.11%	99.04%	98.29%
	b) SDCCH/PAGING Congestion	<=1%	Sep-14	0.09%	0.09%	0.76%	0.02%	0.12%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Sep-14	1.57%	0.23%	1.78%	0.11%	0.71%	0.05%	0.00%	0.00%	0.10%
<b>Connection Maintenance (Retainability)</b>												
3	a) Call Drop Rate (CDR)	<=2%	Sep-14	1.38%	0.60%	1.76%	0.58%	1.29%	0.71%	1.41%	0.07%	0.19%
	b) Worst affected cells>3% TCH drop	<=3%	Sep-14	13.69%	1.62%	2.88%	2.26%	2.26%	0.02%	19.11%	0.20%	1.63%
	c) % of connections with good voice quality	>=95%	Sep-14	95.03%	98.81%	NP	98.18%	95.89%	98.09%	97.62%	99.80%	98.15%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Sep-14	270	67	95	54	60	0	3	2	7
	e) Total no. of cells (Sector) in the licensed service area		Sep-14	1974	4150	3293	2383	2649	2247	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		Sep-14	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Sep-14	0	0	0	0	0	0	0	0	0
<b>Network Data</b>												
5	a) Equipped Capacity of Network in Erlang		Sep-14	32460	64348	74000	16118	31893	40000	158	28000	17466
	b) Total traffic in TCBH in erlang (Avg.)		Sep-14	14065	61502	34742	13126	16058	30126	6	2891	806
	c) Total no. of customers served (as per VLR) on last day of the month		Sep-14	516985	2256638	1113235	540115	666586	1246758	643	104896	35608

TABLE: 6

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live measurement - HP Circle- Sept 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	1422	1115	790	880	750	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	382	37	1568	14	55	58	0	29	0
	c) BTS Accumulated Downtime	<=2%	Live data	0.80%	0.04%	1.95%	0.02%	0.09%	0.11%	0.00%	0.14%	0.00%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	22	0	0	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	1.97%	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	99.22%	99.02%	95.82%	97.78%	98.73%	98.50%	98.91%	99.21%	98.23%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.22%	0.12%	1.53%	0.07%	0.12%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.56%	0.21%	4.18%	0.19%	0.52%	0.04%	0.00%	0.00%	0.05%
<b>Connection Maintenance (Retainability)</b>												
3	a) Call Drop Rate (CDR)	<=2%	Live data	1.43%	0.60%	2.68%	0.55%	1.25%	0.71%	1.52%	0.07%	0.20%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	14.34%	1.80%	2.98%	2.31%	2.05%	0.04%	20.00%	0.12%	2.11%
	c) % of connections with good voice quality	>=95%	Live data	95.04%	98.81%	NP	98.30%	95.75%	98.13%	97.68%	99.78%	98.13%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	283	74	98	55	54	1	3	1	9
	e) Total no. of cells (Sector) in the licensed service area		Live data	1974	4137	3282	2382	2631	2247	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 SEPT-14:

#### 5.3.1 QUARTERLY CUSTOMER SERVICE DELIVERY (CSD) AUDITED DATA FOR CELLULAR MOBILE SERVICES (JULY TO SEPTEMBER 2014 MONTHS AUDITED DATA):

QUARTERLY CSD DATA FOR CELLULAR MOBILE TELEPHONE SERVICES- QE SEPTEMBER 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>												
1	<b>Metering &amp; Billing Credibility -Post Paid</b>											
	A) No. of bills issued during the quarter		HP	4798	100168	148446	6925	25470	9561	27789	16208	14234
	B) No. of bills disputed including billing complaints during the quarter		HP	0	74	5	3	18	0	4	13	1
	C)% of billing complaints during the quarter	<= 0.1%	HP	0.00%	0.07%	0.003%	0.04%	0.07%	0.00%	0.01%	0.08%	0.01%
2	<b>Metering &amp; Billing Credibility -Pre Paid</b>											
	A) Total No. of Pre-paid customers at the end of the quarter		HP	874849	2261926	1348486	629342	1259880	55947	588996	167176	35125
	B) Total No. of complaints relating to charging, Credit and Validity during the quarter		HP	6	17	NP	299	3487	1	174	87	0
	C) % of Pre-paid Charging Complaints	<= 0.1%	HP	0.001%	0.001%	NP	0.05%	0.27%	0.000%	0.03%	0.05%	0.00%
3	<b>Resolution of Billing/Charging Complaints and Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints</b>											
	A) No. of Billing/Charging/Credit/Validity Complaints received during the quarter		HP	6	91	NP	530	3505	30	178	100	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	6	91	NP	530	3505	30	178	100	27
	C) % of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 4 weeks	100 % within 4 week	HP	100.00%	100.00%	NP	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
	D) % of Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints	<=1 week	HP	100.00%	100.00%	NP	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
4	<b>Response time to customers for assistance</b>											
	A) Total no of calls attempted to customer care/Call center		HP	2042354	574679	NP	1332827	3689429	18300	1176931	185562	2902

QUARTERLY CSD DATA FOR CELLULAR MOBILE TELEPHONE SERVICES- QE SEPTEMBER 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) Total no. of calls successfully established to customer care/Call center		HP	2022308	557129	NP	1316984	3651316	18131	1176931	183362	2843
	C) % Accessibility of Call centre /customer Care (Total call successfully established*100 / Total call attempt )	>=95%	HP	99.02%	96.95%	NP	98.81%	98.97%	99.08%	100.00%	98.81%	97.97%
	D) Total Calls reached to agent desk for Voice to Voice (Total call attempt)		HP	369240	1251884	NP	468669	1101541	14761	324675	89980	9312
	E) Total number of calls answered by the operator (Voice to voice) within 60/90 seconds		HP	344007	1220058	NP	452069	1041339	14651	322534	80700	9110
	F) % age of calls answered by operator (voice to voice) (Total call successfully established within 60 Sec./ 90 sec*100 /Total call attempts.)	>=90% (60 Sec.) & >=95% (90 Sec.)	HP	93.17%	97.46%	NP	96.46%	94.53%	*99.25%	99.34%	89.69%	*97.83%
5	<b>Termination/closure of service</b>											
	A) Total No. of requests for Termination / Closure of service received during the quarter		HP	37	280	1361	160	9	186	182	8	216
	B) No. of requests for Termination / Closure of service complied within 7 days during the quarter		HP	37	280	1361	160	9	186	182	8	216
	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%
6	<b>Time taken for refunds of deposits after closures.</b>											
	A) No. of Payments/ Refunds due during the quarter		HP	50	104	528	37	65	60	16	57	142
	B) No. of Payments/ Refunds Cleared during the quarter		HP	50	104	528	37	65	60	16	57	142
	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%

(i) NP: Data Not Provided, The call centre service of BSNL was non operational during the quarter due to vendor issue therefore the relevant data is not available.

(ii) \* indicates % calls answered by operator within 90 seconds (Voice to Voice) as per TRAI QoS Regulation (Third amendment) dated 21<sup>st</sup> August 2014.

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

CSD 3 DAYS LIVE DATA FOR CELLULAR MOBILE TELEPHONE SERVICES - QE-SEPTEMBER 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	Total no of calls attempted to customer care/Call center		HP	59820	20216	NP	37650	97971	535	35723	5031	30
	Total no. of calls successfully established to customer care/Call center		HP	59528	20216	NP	37325	96952	529	35723	4975	30
	% Accessibility of Call centre /customer Care (Total call successfully established *100 / Total call attempt)	>=95%	HP	99.51%	100.00%	NP	99.14%	98.96%	98.88%	100.00%	98.89%	100.00%
2	Total Calls reached to agent desk for Voice to Voice (Total call attempt)		HP	10920	36376	NP	14540	31112	433	9636	3966	340
	Total number of calls answered by the operator (Voice to voice) within 60/90 seconds		HP	10177	35612	NP	14481	29776	405	9613	2436	324
	% age of calls answered by operator(voice to voice) (Total call successfully established within 60 Sec / 90 sec.*100 / Total call attempt)	>=90% (60 Sec.) & >=95% (90 Sec.)	HP	93.20%	97.90%	NP	*99.59%	95.71%	<b>*93.53%</b>	99.76%	<b>61.42%</b>	*95.29%

(i) NP: Data Not Provided, The call centre service of BSNL was non operational during the quarter due to vendor issue therefore the relevant data is not available.  
(ii) \* indicates % calls answered by operator within 90 seconds as per TRAI QoS Regulation (Third amendment) dated 21<sup>st</sup> August 2014.

### 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  $\leq 0.1$  %. However, **RCOM (GSM)** could not meet the benchmark of '**Billing Complaints – Prepaid**', with its performance as **0.27%**.

#### 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. Also, where customers were due for credit / adjustment, in all such cases, all the service providers have met the benchmark of 100% refund in one week.

#### 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, **RCOM (CDMA)** has not met the benchmark of '**calls answered by Operators (voice to voice) within 60 seconds**'. It has achieved its performance as **89.69%**.

#### 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 60 seconds**' except **RCOM (CDMA)** which could perform with only **61.42%** of calls connected to operator within 60 seconds whereas **Tata (GSM)** have not met the benchmark of '**calls answered by Operators (voice to voice) within 90 seconds (93.53%)**' 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	98	100	98	100	100	100	100	100	100
% Accessibility of Call centre /customer Care (Total call successfully established * 100 /Total call attempts)	HP	98.00%	100.00%	98.00%	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	98	100	98	100	100	100	100	100	100
Total number of calls answered by the operator (Voice to voice) within 90 seconds	HP	98	96	48	100	98	100	100	100	100
% age of calls answered by operator (voice to voice) (Total call successfully established within 90 Sec.*100 / Total call attempts)	HP	100.00%	96.00%	49.00%	100.00%	98.00%	100.00%	100.00%	100.00%	100.00%

In case of calls answered by operators (voice to voice) within 60 seconds when test calls were made to the call centers, all operators were able to connect the calls with their call center operators/agents successfully except BSNL with its performance as 49.00% (way below the benchmark).

## 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	6	91	5	100	100	30	100	100	27
Total No. of calls Answered	HP	5	62	3	81	66	19	77	63	22
Cases resolved within 4 weeks	HP	5	62	3	81	66	19	77	63	22
%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, 1098, 1091, 1073	HP	Dharmshala	Dehra	12	√	√	√	√	√	√	√	√	√
			Palampur	12	√	√	√	√	√	√	√	√	√
			Kangra	12	√	√	√	√	√	√	√	√	√
			Dharamshala	12	√	√	√	√	√	√	√	√	√
			Nurpur	12	√	√	√	√	√	√	√	√	√
			Chamba	12	√	√	√	√	√	√	√	√	√
			Bharmaur	12	√	√	√	√	√	√	√	√	√
100, 101, 108, 1098, 1091, 1073	HP	Shimla	Shimal	12	√	√	√	√	√	√	√	√	√
			Theoge	12	√	√	√	√	√	√	√	√	√
			Rohru	12	√	√	√	√	√	√	√	√	√
			Rampur	12	√	√	√	√	√	√	√	√	√
			Bhusahar	12	√	√	√	√	√	√	√	√	√
100, 101, 108, 1098, 1091, 1073	HP	Mandi	Mandi	12	√	√	√	√	√	√	√	√	√
			Joginder Nagar	12	√	√	√	√	√	√	√	√	√
			Sunder Nagar	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 **Kangra (Dharamsala), Shimla and Mandi** in the months of July, August and September 2014 respectively. The total route Kms covered during the drive tests in the respective SSAs was **475 Kms, 450 Kms and 485 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: KANGRA SSA (JULY-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	69	16	81	25	146	25	69	25	120	26	93	24	80	26	89	25	63	25	
		Highways	263	14	195	26	199	25	149	25	161	31	240	24	261	27	277	25	86	24	
		Within City	60	26	92	15	109	25	102	NC	130	25	120	25	127	34	89	25	91	NC	
		<b>Overall SSA</b>	<b>392</b>	<b>56</b>	<b>368</b>	<b>66</b>	<b>454</b>	<b>75</b>	<b>320</b>	<b>50</b>	<b>411</b>	<b>82</b>	<b>453</b>	<b>73</b>	<b>468</b>	<b>87</b>	<b>455</b>	<b>75</b>	<b>240</b>	<b>49</b>	
2	Blocked Call Rate	Major Roads	0.00%	0.00%	0.00%	0.00%	1.37%	0.00%	10.14%	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%	0.51%	0.00%	1.01%	0.00%	0.67%	0.00%	0.00%	0.00%	0.00%	0.00%	1.15%	0.00%	0.00%	0.00%	1.16%	0.00%	
		Within City	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.98%	NC	0.00%	0.00%	0.00%	0.00%	0.79%	0.00%	0.00%	0.00%	0.00%	NC	
		<b>Overall SSA</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.27%</b>	<b>0.00%</b>	<b>0.88%</b>	<b>0.00%</b>	<b>2.81%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.85%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.42%</b>	<b>0.00%</b>	
3	Dropped Call Rate (<=2%)	Major Roads	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.61%	0.00%	1.67%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.59%	0.00%
		Highways	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.62%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.53%	0.00%
		Within City	0.00%	0.00%	1.09%	0.00%	0.00%	0.00%	2.97%	NC	0.77%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	NC	
		<b>Overall SSA</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>1.29%</b>	<b>0.00%</b>	<b>0.97%</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>1.67%</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	97.52%	100%	95.72%	100%
		Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	96.05%	100%	96.02%	99.13%
		Within City	NA	NA	NA	NA	NA	NA	NA	NC	NA	NA	NA	NA	NA	NA	NA	96.36%	100%	97.72%	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>96.40%</b>	<b>100%</b>	<b>96.60%</b>	<b>99.61%</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		98.21%	98.78%	95.92%	99.70%	94.06%	99.87%	91.64%	99.77%	97.72%	99.62%	96.57%	98.54%	96.77%	99.50%	NA	NA	NA	NA
	Highways		97.48%	99.30%	96.82%	99.18%	97.01%	98.41%	93.30%	99.51%	92.75%	99.49%	96.12%	99.73%	97.16%	99.40%	NA	NA	NA	NA
	Within City		97.67%	99.57%	95.78%	97.56%	96.52%	98.75%	91.93%	NC	98.24%	99.76%	96.48%	99.83%	97.33%	99.31%	NA	NA	NA	NA
	Overall SSA		97.64%	99.28%	96.23%	99.00%	96.37%	99.07%	92.51%	99.64%	96.30%	99.62%	96.29%	99.36%	97.14%	99.41%	NA	NA	NA	NA
<b>Service Coverage</b>																				
5	In door (>= -75dBm)	Major Roads	37.94%	60.70%	81.49%	92.10%	36.20%	48.80%	37.99%	5.70%	48.21%	0.00%	37.08%	23.41%	56.58%	90.60%	38.39%	36.96%	37.11%	0.14%
		Highways	30.40%	1.93%	73.14%	95.86%	37.54%	33.97%	30.23%	58.07%	9.09%	68.04%	37.58%	57.58%	38.33%	20.80%	33.15%	32.56%	33.45%	8.78%
		Within City	34.49%	0.00%	74.44%	66.39%	45.84%	83.84%	44.81%	NC	42.94%	0.00%	48.88%	31.37%	63.55%	28.66%	52.94%	48.86%	61.80%	NC
		Overall SSA	32.27%	17.39%	75.97%	87.24%	39.73%	53.75%	36.55%	31.31%	33.23%	22.80%	40.38%	37.32%	47.89%	47.26%	37.83%	39.30%	45.36%	4.05%
	In-vehicle (>= -85dBm)	Major Roads	67.53%	99.95%	95.41%	100%	90.87%	100%	73.46%	83.10%	84.97%	95.14%	79.56%	90.36%	87.92%	97.54%	67.77%	37.22%	75.75%	23.64%
		Highways	63.99%	33.67%	91.11%	99.93%	91.85%	97.90%	62.76%	94.87%	81.93%	99.28%	76.80%	95.45%	73.30%	91.25%	60.35%	97.45%	70.25%	80.95%
		Within City	76.03%	73.43%	96.98%	99.80%	93.81%	95.22%	79.69%	NC	84.66%	16.59%	87.89%	83.04%	89.95%	73.57%	71.25%	83.00%	93.06%	NC
		Overall SSA	66.18%	70.97%	94.09%	99.93%	92.24%	98.30%	70.43%	88.86%	83.85%	70.31%	80.12%	89.63%	80.02%	87.84%	63.84%	72.39%	80.51%	49.60%
	Outdoor- in city (>= -95dBm)	Major Roads	93.20%	100%	99.26%	100%	100%	100%	94.14%	99.99%	98.48%	99.27%	95.44%	99.93%	100%	99.92%	94.55%	100%	98.01%	99.98%
		Highways	91.25%	99.70%	98.51%	100%	100%	100%	91.78%	99.80%	98.56%	99.28%	96.41%	99.86%	100%	99.04%	95.51%	99.94%	98.06%	99.38%
		Within City	99.16%	99.95%	99.71%	100%	100%	100%	95.34%	NC	98.95%	99.01%	98.77%	98.94%	100%	100%	92.13%	99.93%	99.64%	NC
		Overall SSA	92.62%	99.90%	99.08%	100%	100%	100%	93.41%	99.90%	98.70%	99.19%	96.84%	99.58%	100%	99.64%	94.70%	99.96%	98.65%	99.71%
6	Call Setup Success Rate (>=95%)	Major Roads	100%	100%	100%	100%	98.63%	100%	89.86%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
		Highways	100%	100%	99.49%	100%	98.99%	100%	99.33%	100%	100%	100%	100%	100%	98.85%	100%	100%	100%	98.84%	100%
		Within City	100%	100%	100%	100%	100%	100%	99.02%	NC	100%	100%	100%	100%	99.21%	100%	100%	100%	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%	99.73%	100%	99.12%	100%	97.19%	100%	100%	100%	100%	100%	100%	99.15%	100%	100%	100%	99.58%
7	Hand Over Success Rate (HOSR)	Major Roads	100%	100%	99.42%	100%	100%	100%	96.70%	100%	95.18%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Highways	99.39%	100%	99.56%	100%	100%	100%	99.24%	100%	100%	100%	100%	100%	100%	99.02%	100%	100%	100%	100%	100%
		Within City	100%	100%	99.43%	100%	100%	100%	97.30%	NC	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	NC
		Overall SSA	99.64%	100%	99.48%	100%	100%	100%	97.84%	100%	98.76%	100%	100%	100%	100%	99.55%	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: SHIMLA SSA (AUGUST-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	
1	Call Attempts	Major Roads	83	16	113	35	176	38	141	30	91	50	171	30	84	30	167	40	62	40	
		Highways	160	18	157	31	181	40	128	43	121	50	210	31	145	36	131	30	75	29	
		Within City	119	40	133	25	87	25	139	24	128	25	176	25	109	30	130	25	108	NC	
		<b>Overall SSA</b>	<b>362</b>	<b>74</b>	<b>403</b>	<b>91</b>	<b>444</b>	<b>103</b>	<b>408</b>	<b>97</b>	<b>340</b>	<b>125</b>	<b>557</b>	<b>86</b>	<b>338</b>	<b>96</b>	<b>428</b>	<b>95</b>	<b>245</b>	<b>69</b>	
2	Blocked Call Rate	Major Roads	0.00%	0.00%	1.77%	0.00%	2.27%	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%	
		Highways	0.00%	0.00%	0.00%	0.00%	2.76%	0.00%	2.34%	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%	0.75%	0.00%	1.15%	0.00%	1.44%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	NC	
		<b>Overall SSA</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.74%</b>	<b>0.00%</b>	<b>2.25%</b>	<b>0.00%</b>	<b>1.96%</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%	0.90%	0.00%	2.33%	0.00%	0.00%	0.00%	1.10%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Highways	0.00%	0.00%	1.27%	0.00%	2.27%	0.00%	0.00%	0.00%	1.65%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.35%	0.00%	
		Within City	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.56%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	NC	
		<b>Overall SSA</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.75%</b>	<b>0.00%</b>	<b>1.84%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>1.47%</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>0.41%</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	98.19%	100%	98.80%	99.96%
		Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	97.76%	100%	97.89%	99.41%
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.53%	100%	98.96%	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>98.52%</b>	<b>100%</b>	<b>98.59%</b>	<b>99.73%</b>
(b) 0-5 ( with	Major Roads	96.68%	99.15%	97.01%	98.68%	90.09%	98.06%	95.11%	99.62%	89.45%	93.73%	96.85%	99.92%	98.09%	99.73%	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	97.67%	98.29%	92.58%	98.73%	91.32%	98.63%	95.64%	99.59%	92.76%	98.14%	94.94%	99.95%	98.06%	99.61%	NA	NA	NA	NA	
		Within City	96.56%	99.56%	96.38%	99.61%	91.69%	99.93%	94.72%	99.70%	96.19%	99.79%	97.99%	100%	98.32%	98.95%	NA	NA	NA	NC	
		Overall SSA	97.05%	99.15%	95.84%	98.95%	90.93%	98.75%	95.17%	99.63%	93.34%	97.26%	96.50%	99.95%	98.15%	99.45%	NA	NA	NA	NA	
5	Service Coverage																				
	In door (>= -75dBm)	Major Roads	40.84%	64.60%	65.38%	88.44%	46.83%	45.10%	26.15%	63.10%	53.87%	58.39%	30.71%	40.08%	37.99%	95.50%	26.68%	99.98%	46.16%	79.98%	
		Highways	37.73%	59.70%	36.17%	52.98%	56.13%	87.70%	32.16%	78.10%	39.94%	95.10%	46.78%	67.72%	42.75%	80.80%	46.28%	100%	54.79%	50.17%	
		Within City	51.59%	41.10%	76.29%	38.40%	84.16%	93.90%	52.40%	96.10%	29.98%	24.66%	60.82%	65.22%	68.81%	92.20%	63.80%	99.68%	63.64%	NC	
		Overall SSA	43.11%	52.05%	64.19%	62.69%	58.68%	73.21%	36.78%	75.39%	39.44%	58.00%	46.58%	57.41%	49.79%	88.92%	45.07%	99.91%	56.40%	67.51%	
	In-vehicle (>= -85dBm)	Major Roads	76.54%	94.10%	85.68%	99.88%	85.50%	100%	58.71%	81.00%	88.17%	80.37%	74.36%	91.19%	68.36%	99.70%	67.45%	100%	80.00%	97.93%	
		Highways	70.01%	87.00%	56.36%	78.06%	84.90%	100%	79.22%	99.70%	74.75%	99.25%	85.61%	99.29%	79.22%	100%	81.80%	100%	82.13%	99.92%	
		Within City	85.39%	80.20%	86.81%	95.46%	95.01%	100%	86.60%	99.90%	75.06%	45.75%	94.06%	99.75%	89.58%	99.90%	87.38%	100%	92.69%	NC	
		Overall SSA	76.70%	85.59%	80.35%	91.34%	87.32%	100%	74.80%	91.55%	78.63%	74.04%	85.02%	96.62%	79.71%	99.87%	78.44%	100%	86.18%	98.76%	
	Outdoor- in city (>= -95dBm)	Major Roads	95.36%	99.80%	99.16%	100%	96.60%	100%	82.92%	99.80%	98.61%	98.46%	95.92%	99.62%	100%	100%	98.57%	100%	98.25%	100%	
		Highways	94.48%	99.70%	97.46%	99.95%	98.05%	100%	97.35%	100%	91.52%	99.25%	98.74%	100%	100%	100%	99.60%	100%	98.53%	100%	
		Within City	98.41%	99.30%	99.70%	99.99%	98.68%	100%	98.82%	100%	89.95%	82.44%	98.89%	100%	100%	100%	99.66%	100%	99.46%	NC	
		Overall SSA	96.01%	99.53%	99.05%	99.98%	97.63%	100%	93.03%	99.91%	92.81%	93.02%	97.83%	99.87%	100%	100%	99.24%	100%	98.86%	100%	
6	Call Setup Success Rate (>=95%)	Major Roads	100%	100%	98.23%	100%	97.73%	100%	97.87%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
		Highways	100%	100%	100%	100%	97.24%	100%	97.66%	100%	100%	100%	100%	100%	100%	100%	100%	100%	98.67%	100%	
		Within City	100%	100%	99.25%	100%	98.85%	100%	98.56%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	NC	
		Overall SSA	100%	100%	99.26%	100%	97.75%	100%	98.04%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99.59%	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%	98.37%	100%	99.33%	100%	92.62%	97.73%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Highways	100%	100%	98.60%	100%	99.35%	100%	98.09%	100%	100%	100%	100%	100%	98.97%	100%	100%	100%	100%	100%	100%
		Within City	99.46%	100%	98.07%	100%	98.33%	100%	97.46%	100%	98.68%	100%	100%	100%	100%	100%	100%	100%	100%	100%	NC
		Overall SSA	99.80%	100%	98.84%	100%	98.76%	100%	98.15%	100%	98.16%	98.77%	100%	100%	99.56%	100%	100%	100%	100%	100%	100%

NA: Not Applicable



7.3 OPERATOR ASSISTED DRIVE TEST: MANDI SSA (SEPTEMBER-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	151	30	110	30	191	30	116	30	147	30	172	21	104	30	145	21	79	30	
		Highways	156	30	137	30	151	30	99	30	155	30	193	21	122	30	164	21	89	30	
		Within City	166	30	178	30	86	30	141	30	162	30	175	31	129	15	170	31	133	32	
		<b>Overall SSA</b>	<b>473</b>	<b>90</b>	<b>425</b>	<b>90</b>	<b>428</b>	<b>90</b>	<b>356</b>	<b>90</b>	<b>464</b>	<b>90</b>	<b>540</b>	<b>73</b>	<b>355</b>	<b>75</b>	<b>479</b>	<b>73</b>	<b>301</b>	<b>92</b>	
2	Blocked Call Rate	Major Roads	0.00%	0.00%	0.91%	0.00%	2.09%	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%	0.00%	0.00%	3.97%	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%	1.12%	0.00%	2.33%	3.33%	0.71%	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>0.71%</b>	<b>0.00%</b>	<b>2.80%</b>	<b>1.11%</b>	<b>0.28%</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%	2.14%	0.00%	0.00%	0.00%	0.68%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.27%	0.00%	
		Highways	0.00%	0.00%	0.73%	0.00%	2.07%	0.00%	1.01%	0.00%	1.94%	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%	2.38%	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>0.24%</b>	<b>0.00%</b>	<b>2.16%</b>	<b>0.00%</b>	<b>0.28%</b>	<b>0.00%</b>	<b>0.86%</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>0.33%</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	97.92%	99.96%	98.53%	99.12%
		Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.28%	99.96%	98.65%	100%
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.66%	100%	99.31%	99.90%
		<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>98.31%</b>	<b>99.98%</b>	<b>98.92%</b>	<b>99.71%</b>
(b) 0-5 ( with	Major Roads	96.78%	95.58%	98.28%	97.74%	90.40%	99.11%	94.49%	98.44%	97.96%	98.49%	95.92%	99.32%	98.03%	98.14%	NA	NA	NA	NA		

AUDIT & ASSESSMENT OF QOS FOR QE-SEPTEMBER 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	97.21%	98.29%	96.11%	96.68%	90.78%	90.43%	94.60%	98.20%	90.66%	99.55%	97.50%	99.59%	97.99%	95.28%	NA	NA	NA	NA
		Within City	96.30%	99.70%	96.74%	95.94%	94.47%	99.00%	95.58%	99.48%	98.64%	98.77%	98.87%	99.71%	97.28%	99.39%	NA	NA	NA	NA
		Overall SSA	96.78%	98.05%	97.24%	96.64%	91.48%	96.69%	94.96%	98.68%	95.99%	98.87%	97.46%	99.56%	97.74%	96.94%	NA	NA	NA	NA
		Service Coverage																		
5	In door (>= -75dBm)	Major Roads	45.34%	99.90%	73.58%	99.96%	37.97%	68.40%	19.44%	99.90%	49.59%	94.81%	37.53%	71.12%	27.84%	74.41%	51.09%	68.84%	38.62%	67.97%
		Highways	55.00%	99.60%	67.16%	98.91%	30.91%	99.20%	35.01%	52.80%	54.32%	88.78%	53.79%	83.48%	42.63%	74.11%	69.40%	72.27%	54.86%	100%
		Within City	68.17%	87.60%	76.74%	85.31%	51.44%	100%	34.25%	60.00%	71.49%	68.72%	66.77%	51.83%	39.38%	90.44%	75.83%	85.71%	65.87%	47.01%
		Overall SSA	55.67%	95.63%	73.34%	94.20%	39.19%	91.16%	29.64%	65.68%	58.59%	85.52%	53.04%	66.23%	37.21%	77.52%	66.20%	77.05%	55.55%	67.76%
	In-vehicle (>= -85dBm)	Major Roads	76.80%	100%	90.90%	100%	82.87%	99.70%	61.24%	99.91%	97.36%	98.34%	79.10%	97.88%	66.12%	99.70%	87.00%	96.48%	73.79%	92.33%
		Highways	79.77%	99.90%	89.74%	100%	77.07%	100%	74.40%	99.50%	79.44%	99.32%	86.43%	99.88%	76.73%	99.62%	90.86%	100%	78.98%	100%
		Within City	92.05%	99.90%	96.32%	99.00%	94.49%	100%	78.75%	99.20%	98.92%	98.54%	92.91%	95.63%	77.75%	99.71%	94.12%	88.52%	89.47%	99.76%
		Overall SSA	82.45%	99.93%	92.66%	99.64%	84.01%	99.92%	71.84%	99.49%	92.53%	98.68%	86.31%	97.47%	74.11%	99.66%	90.87%	94.09%	82.32%	97.75%
	Outdoor- in city (>= -95dBm)	Major Roads	96.64%	100%	99.19%	100%	98.33%	100%	94.36%	100%	98.83%	98.34%	96.61%	100%	91.59%	100%	99.62%	100%	96.21%	100%
		Highways	96.40%	100%	98.29%	100%	95.82%	100%	93.29%	100%	95.49%	99.32%	97.52%	100%	93.55%	100%	99.56%	100%	97.66%	100%
		Within City	99.50%	100%	99.85%	100%	100%	100%	97.90%	100%	98.92%	99.32%	99.72%	100%	95.91%	100%	99.88%	100%	99.05%	100%
		Overall SSA	97.41%	100%	99.23%	99.98%	98.02%	100%	95.47%	99.97%	97.86%	98.90%	97.98%	100%	93.88%	100%	99.69%	100%	97.90%	100%
6	Call Setup Success Rate (>=95%)	Major Roads	100%	100%	99.09%	100%	97.91%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Highways	100%	100%	100%	100%	96.03%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Within City	100%	100%	98.88%	100%	97.67%	96.67%	99.29%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	100%	100%	99.29%	100%	97.20%	98.89%	99.72%	100%	100%	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	99.32%	100%	98.73%	100%	98.27%	100%	100%	100%	98.87%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Highways	100%	100%	97.06%	100%	96.71%	100%	100%	100%	99.39%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Within City	99.18%	100%	100%	100%	98.54%	100%	98.88%	100%	99.46%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	99.46%	100%	99.02%	100%	97.86%	100%	99.40%	100%	99.24%	100%	100%	100%	100%	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.

7.4 DETAIL OF THE ROUTES COVERED DURING THE DRIVE TESTS:

DRIVE TEST TABLE: 4

DRIVE TEST ROUTE OF JULY TO SEPTEMBER 14 – HIMACHAL PRADESH CIRCLE							
Name of SSA	Drive test Period	Day 1		Day 2		Day 3	
		Name of SDCA Covered	Route Covered	Name of SDCA Covered	Route Covered	Name of SDCA Covered	Route Covered
KHANGRA (DHARMSHALA)	July-14	Dehra , Palampur, Kangra, Dharmshala / 165KM	1. Dehra- Within City- Dehra Chownk,Dehra Market,Sanot Market,Jawalmukhi Market,Jwalamukhi City,Dehra City B) Major Road>>Dehra Bus Stand Road,Siota,Kathog Badoli,Sakwal,Choran, C) Highway-Dehra To Jawalamukhi, Dehra To Kangara	Nurpur , Chamba/ 160KM	1) Nurpur- A) Within City-Jawahar Nagar,Gagal City, Yol,Chandaran,Hara City,Shahpur,Nurpur,Jassurcity,Sutrahara,Raja Ka Talab, B>>Major Road>>Nurpur, Bus Stand Road Draman,Badwal,Yol Village Road ,Jassur Bus Stand,,Shahpur Bus Stand C) Highway- Gagal To Shahpur, Shahpur To Nurpur, Nurpur To Jassur(Pathankot Highway)	Bharmaur- A) Highway-Chamba To Lona, Lona To Chatrahar,Chatrahar To Kharamukh, Khramukh To Bharmaur, B) Major Road- LONA Bus Stand, Chamba Bus Stand Road, Chatrahar Village,Kharamukh ,Lona Village Road, Bharmaur Bus Stand Road C) Within City- Chamba City, Chamba Chogan,Lona City, Lona Market,Kharmukh Market ,City Shiv Chorasi Mandir Hadsar, Bharmaur City, Bharmaur Market.  <b>INDOOR:</b> Thakur Dhaba Bahrmaur	Bharmaur/ 150KM
			2. Kangra- Major Road- Kohal,Sakwal,Sapri,Gumer,Gumbargharun Katiyal,Bane Di Hati B) Within City- Kangra City,Tanda Chownk,Power House Road,Daultpur City,Old Kangra, Kangra Fort Road C) Highway-Nagrota Bangwan, Kangra,Bagwan,Daultpur,Ranital,		2-Chamba- A) Within City- Sadwan Market, Chowari City, Jot City, Jot Market, B) Major Road- Sadwan College Road, Chowari Bus Stand Road, Sadwan Bus Stand Road, C) Highway-Nurpur To Sadwan, Sadwan To Chowari, Chowari To Jot, Jot To Chamba.		
			3.Palampur- Major Road- Tanda,Parour,Parour Bus Stand,Palampur,Palampur Bus Stand, Chamunda Bus Stand, Chamunda Ji Market, Gopalpur,Dar I B) Highway-Tanda To Palampur (Dharmshala Highway) - Palampur To Chamunda Ji. C) Within City- Palampur City,Parour City, Tanda City, Chamunda City,		<b>INDOOR:</b> Hotel Irawati Chamba		
			4. Dharmshala- Major Road- Dharmshal Bus Stand , Hpca Road Housing Board Colony,Meclodganj Road, B) Highway- Dharmshala To Gagal (Pathankot Highway) C) Within City>> Kotwali Bazar,Dharmshala Market, Meclodganj Market, Gagal Market.				

			<b>INDOOR:</b> Love Cafe Chamunda Ji				
<b>SHIMLA</b>	<b>Aug-14</b>	Shimla, theoge, Rohru / <b>130KM</b>	<p>1-Shimla A) Major Road- Sanjauli To Dhali, Kufri To Cheoge, Cheoge ,Cheoge To Theoge                      B) Within City- Shimla New Bus Stand, Lakkar Bazar,Victory Tunnel,Old Bus Stand, Himland, Timber House, Sanjouli Chownk, ,Toland,Chotta Shimla,                      C) Highway-Kufri To Theog ,(Shimla-Rampur Highway ),</p> <p>2- Rohru- A) Major Road- Kotkhai , Kyari Govt School,Kyari Bus Stand Road, Kotkhai Bus Stand Road,                      B) Within City- Kyari Village,Kyari Market,Kotkhai City,Kotkhai Market,                      C) Highway-Theoge To Kotkhai (Shimla - Rohru Highway)</p> <p><b>INDOOR:</b> Kyari hotel (near Bus stand)</p>	Shimla / <b>150KM</b>	<p>Shimla A) Major Road-Sanjauli To Naaldehra,Mashobra,Summer Hill, Ghannati,Ghannati B Ed College,Chakkar,HP University, Bells Institute, Junga                      B) Within City- Naal Dehara Shimla New Bus Stand,Mehli Market, Kasumpti, Kasumpti Chownk ,Khalini Market,Toland,BCS, Vikas Nagar,                      C) Highway-Shimla To Shoghi,(Solam -Shimla Highway), Naaldehra To Dhamai ,Baluganj,Tootu,Mashobra, Dadha,Sanjoli.</p> <p><b>INDOOR:</b> Bells Institute, Shimla</p>	Theoge, Rampur bushahr / <b>170KM</b>	<p>1- Theoge- A) Highway Road- Theoge To Shilaru, Shilaru To Narkanda, Narkanda To Oddi, Oddi To Kumar Sen, Kumarsen To Kingal                      B) With In City--Theoge Market,Cheoge, Narkanda Market,Narkanda, Bus Stand,Oddi                      C) Major Road-Theoge Bus Stop,Kumarsen ,Shilaru Village                      2- Rampur A) Major Road- Hydro Project,Jakhri Bus Stand ,Sarahan Bhima Kali Temple, Army Area Sarahan,DC Office Rampur, B)With In City- Jakhri Market, Jeori Village And Market, Sarahn Market                      C) Highway- Rampur To Jakhri, Jakhari To Jeauri,Jeauri To Sarahn Bhimakali Temple.</p> <p><b>INDOOR:</b> Hotel SriKhand</p>
<b>MANDI</b>	<b>Sep-14</b>	sundernagar, mandi/ <b>160KM</b>	<p>1-Sundernagar- A) Within City-Sunder Nagar City,Mlsm College,Baggi,Bus Stand Sundernagar, Chail Chownk,Gohar                      B- Major Road--Kaned To Chail Chownk,Gohar,Shiva Badhar To Pandoh ,                      C) Highway- Sundernagar To Kaned , Ner Chownk To Kaned, (Sundernagar- Mandi Highway)</p> <p>2- Mandi A) Within City -- Pandoh City,Mandi City, Indra Market, Tarna Devi, Iit Mandi, B) Major Road- Masawari, Mandi Bus Satand, Pandoh Dam ,                      C) Highway-Pandoh To Mandi( Mandi- Kullu Highway) Mandi To Ner Chowk.</p> <p><b>INDOOR:</b> Ashiana Guest House, Sundernagar</p>	Mandi, Jogindernagar/ <b>170KM</b>	<p>1- Mandi A) Within City-- Mandi Market, Khaliar, Tarna Devi, Kotli, Saiglu,                      B) Major Road-Mandi To Kotli, Tarna To Bassi, Bassi To Saiglu                      C) Highway- Katendi, Pakhri, Mehar, Bhanwar, Sadhala, Chipu,Khaliar, Mandi</p> <p>2) Jogindernagar A) Within City-Jogindernagar City, Jogindernagar Market,Batdhar, Bus Stand Market, Palli Market, Padhar Market,.                      B) Major Road-Saiglu To Batdhar, Batdhar To Jogindernagar, Palli, Kunnu                      C) Highway- Joginder Nagar To Padhar, Padhar To Saned, Saned To Kunnu, Kunnu To Shingari,Shingari To Pali (Joginder Nagar - Mandi Highway).</p> <p><b>INDOOR:</b> IIT Mandi College, MANDI</p>	Sundernagar / <b>155KM</b>	<p>Sunder Nagar- A) WithIn City- Ner Chownk City,Rewalsar, Gahar, Dhamrol City,Sarkaghat,Awah Devi,Jahu City,                      B) Major Road- Kalkhar To Rewalsar,Ratti,Cholthra, Sarkaghat Bus Stand,Gari Badarpur ,Sulgwam,Chamboh,Gahar.                      C) Highway- Ner Chownk To Kalkhar, Kalkhar To Gahar, Gahar To Jahu, Jahu To Sarkaghat.</p> <p><b>INDOOR:</b> Awah devi Water supply Office, Rewalsar lake view restaurant &amp; hotel, (near rewalsar market)</p>



**7.5 SSA WISE DRIVE TEST OBSERVATION:**

**DRIVE TEST TABLE: 5**

**DRIVE TEST OBSERVATION OF KANGRA SSA – JULY 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	Dehra, Kangra, Palampur & Dharamsala	Poor Level near Ranital, Dhari, Chamunda, Kangra Outer	Nurpur & Chamba	Poor Level near Chamba Outer, Uh, Sadwan, Chowari	Chamba & Bharmour	Poor Level near Bakani, Dharwala, Chatrarri Outer
2	AIRTEL		Poor Level & Quality near Kangra Outer, Dharamsala Outer, Palampur HW		Poor Level & Quality near Chowari, Chamba, Raja ka Talab, Nurpur Outer		Poor Level & Quality near Chhatrad, Kharamukh
3	BSNL		Poor Level & Quality near Kangra Outer, Dharamsala Outer, Palampur HW, Ranital, Arta Area		Poor Level & Quality near Jasur, Chowari, Jot, Nurpur Outer		Poor Level & Quality near Chhatrad, kharanmukh, Milah, Rona
4	TATA GSM		Poor Level near Kangra, Dehra Outer, Palampur		Poor Level near Jot, Nurpur		Poor Level Chhatrari Outer, Kharamukh
5	TATA CDMA		Poor Level near Darang, Sapdi, Dharamsala and No Coverage in Ranital		Poor Level & Quality near Rait, Chambi, Gagaj, Sadwan		NC
6	IDEA		Poor Level & Quality near Dehra Outer, near Kangra, Kalu di Hatti		Poor Level & Quality near Chamba, Jot, Chowari, Jasur, Nurpur Outer, Lahru		Poor Level near Lona, Bharmour, Lih, Milah
7	RCOM GSM		Poor Level near Ranital, Kangra Tunnel, Pyase		Poor Level & Quality near Jot, Buwan		Poor Level near Bakani, Chhatrari
8	RCOM CDMA		Poor Level & Quality patches near Kangra, Gharwalimata, Ranital		Poor Level & Quality near Buwan, Khajjar, Mamoan Ghurchal, Badhui, Nurpur Outer		Poor Level & Quality near Dharwala, Chamba Outer, Chhatrari
9	VODAFONE		Poor Level & Quality near Sapri, Khanwara, Dwahla, Ranital, Chamunda, Maranada		Poor Level & Quality near Sahpur, Draman Outer, Suryali Outer		Poor Level & Quality near Bakani, Dharwala, Chatrarri Outer

**DRIVE TEST TABLE: 6**

**DRIVE TEST OBSERVATION OF SHIMLA SSA – AUGUST 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	Shimla & Theog	Poor Level & Quality near Charbra, Kotkhai Outer, Kufri Outer	Shimla	Poor Level & Quality near Parhech, Basantpur, Sanjoli	Theog & Rampur	Poor Level & Quality near Rampur Outer, Srahna Outer, Shilaru
2	AIRTEL		Poor Level & Quality near Charbra, Kotkhai Outer, Theog		Poor Level & Quality near Parhench, Basnatpur Rd, Sanjoli		Poor Level & Quality near theog Outer
3	BSNL		Poor Level & Quality near Kufri, Theog, Mashobrate, Kotkhai Outer, Ghanahatti		Poor Level & Quality near Dhami, Kadrain, Basantpur		Poor Level & Quality near Soidhar, Tangru, Narkanda
4	TATA GSM		Poor Level & Quality near Kotkhai, Theog Outer		Poor Level near Dhami, Kadrain, Basantpur		Poor Level near Shilaru, Rampur
5	TATA CDMA		No Coverage in Kotkhai, Kiyari, Chilla, Poor Level & Quality near Shimla Outer		Poor Level & Quality near Mashobora, Baluganj, Devidhar		Poor Level & Quality near Jhakri, Matiyana
6	IDEA		Poor Level near Kufri, Theog, Mashobrate, Kotkhai Outer, Ghanahatti		Poor Level near Kadrain, Basantpur, Shimla Outer		Poor Level near Soidhar, Tangru, Narkanda
7	RCOM GSM		Poor Level near Kufri, Theog Outer		Poor Level near Kanchi, Seoni, Halog Rd		Poor Level & Quality near Shilaru, Rampur
8	RCOM CDMA		Poor Level near Kufri, Challa, Theog Outer		Poor Level & Quality patches near Kanchi, Seoni, Baldeha		Poor Level & Quality near Lathanda, Jhakri, Narkanda, Sainj, Dofda, Jhakri
9	VODAFONE		Poor Level & Quality near Kufri, Theog, Gumma, Kotkhai		Poor Level & Quality near Dhami, Kadrain, Basantpur		Poor Level & Quality near Narkanda, Soidhar

DRIVE TEST TABLE: 7

DRIVE TEST OBSERVATION OF MANDI SSA – SEPTEMBER 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	Mandi, Surendernagar & Pandoh	Poor Level & Quality near Pandoh Outer, Mandi Outer, Surendernagar Outer	Mandi & Jogindernagar	Poor Level & Quality near Jogindernagar Outer, Tara devi Outer	Sakraghat & Rewalsar	Poor Level & Quality near Sakraghat, Jahu
2	AIRTEL		Poor Level & Quality near Shiva Badhar, Chail Chowk, Kaned		Poor Level near Jogindernagar Outer, Shakrog, Batdhar		Poor Level near Dhamrol, Rewalsar, Chamboh
3	BSNL		Poor Level & Quality near Gharan, Pandoh Outer, Gohar, Sihan, Baggi, Chail Chowk		Poor Level & Quality near Ghatsani, Gogardhar, Pali		Poor Level & Quality near Bhareri, Jahu, Hadsar, Sadhiyani, Cholthra
4	TATA GSM		Poor Level near Gohar, Pandoh Outer, No Coverage in Gutgohar		Poor Level near Saigloo, Ghatsani		Poor Level near Rewalsar, Jahu, Sakraghat
5	TATA CDMA		Poor Level & Quality near Chail Chowk, Surahikhad, No Coverage in Gutgohar, Pandoh		Ho Highway Coverage and Poor Level & Quality near Kotli, Jogindernagar Outer		Poor Level & Quality near Bharedi, Ratti, Jahu, Kangru
6	IDEA		Poor Level & Quality near Pandoh, Chail Chowk, Baggi, Mandi Outer		Poor Level & Quality near Jogindernagar Outer, Mandi Outer, Kotli, Ghatsani		Poor Level & Quality near Rewalsar, Balt, Hadsar, Jahu, Sakraghat
7	RCOM GSM		Poor Level & Quality near Ramnagar, Sainj		Poor Level near Gumma, Kotli, Pali		Poor Level near Rakohai, Bambhala, Kalkhar, Poor Quality near Dhalwan
8	RCOM CDMA		Poor Level near Gharan, Chail Chowk, Pandoh Outer		Poor Level near Bhararu, Kunnu, Kotli, Maseran		Poor Level near Lakha, Jahu
9	VODAFONE		Poor Level near Kaned, Sundernagar, Ner Chowk, Gohar, Chail Chowk, Pandoh, Siva Badhar, Maswari		Poor Level near Saiglu, Mandi Outer, Jogindernagar, Shakrog, Katendi		Poor Level near Sakraghat, Chamboh, Jahu, Gohar, Ner Chowkrewalsar Outer, Gari Bhadarpur

## 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 July-14:** Drive tests were conducted across the **Kangra (Dharamshala) SSA** covering Dehra, Palampur, Kangra, Dharamshala, Nurpur, Chamba and Bharmaur SDCAs. The drive test results revealed that performance of the service providers was by and large satisfactory as most of the service providers were found meeting the benchmarks of most of the parameters during the drive tests across the Kangra SSA. Only **Idea** could not meet the benchmark of '**Voice quality**' with its overall performance as **92.51%**.
- (iii) **Drive Test in August-14:** Drive tests were conducted in **Shimla SSA** covering Simla, Theog, Rohru, and Rampur Bushahr SDCAs. The performance of the Service Providers in general was satisfactory as they were largely meeting the benchmarks. Only **BSNL** and **Tata (GSM)** could not perform up to the benchmark for parameters **Voice Quality** with their achieved values as **90.93% and 93.34%** respectively.
- (iv) **Drive Test in September-14:** Drive tests were conducted in **Mandi SSA** covering Sundernager, Mandi, Jogindernagar SDCAs. In this SSA, **BSNL** could not meet the benchmark of the parameters '**Call drop rate**' (**2.16%**) and **Voice Quality (91.48%)**. Further, **Idea** also failed to meet the benchmark of **Voice Quality** with its achievement as **94.96%**.

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.

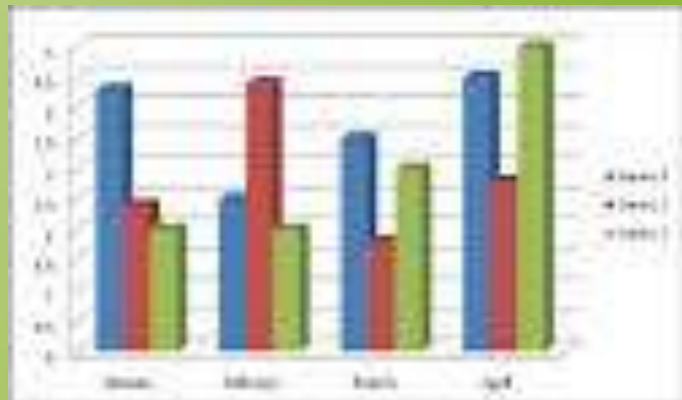
*Thus from the above, it is concluded that **Voice Quality** and **Call drop rate** were the area of concern for some of the service providers namely **BSNL, Idea** and **Tata(GSM)** across the above SSAs. The defaulting Service providers need to take corrective actions to improve their network quality.*

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

### AVERAGED QUARTERLY PMR

V/S

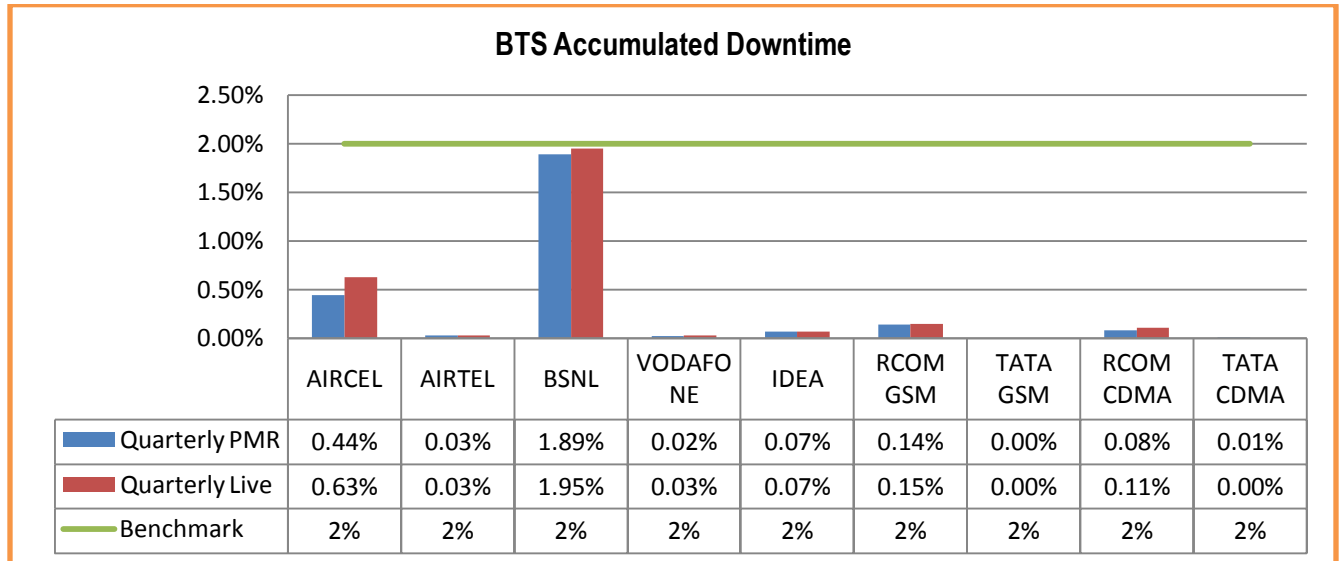
### AVERAGED QUARTERLY 3-DAYs LIVE MEASURMENT



## 8. GRAPHICAL REPRESENTATION:

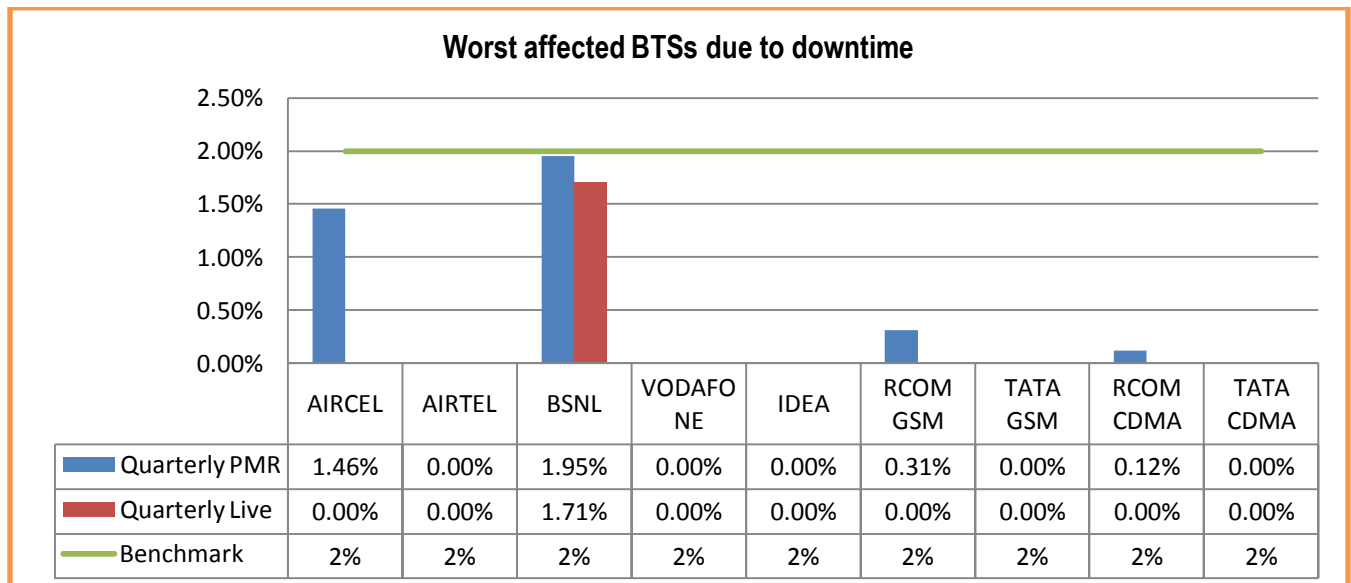
Graphical Representation of Performance of the Cellular Mobile Service Providers (PMR) V/S 3-Days Live Measurement (Quarterly Average Data):

### 1) BTS ACCUMULATED DOWNTIME :



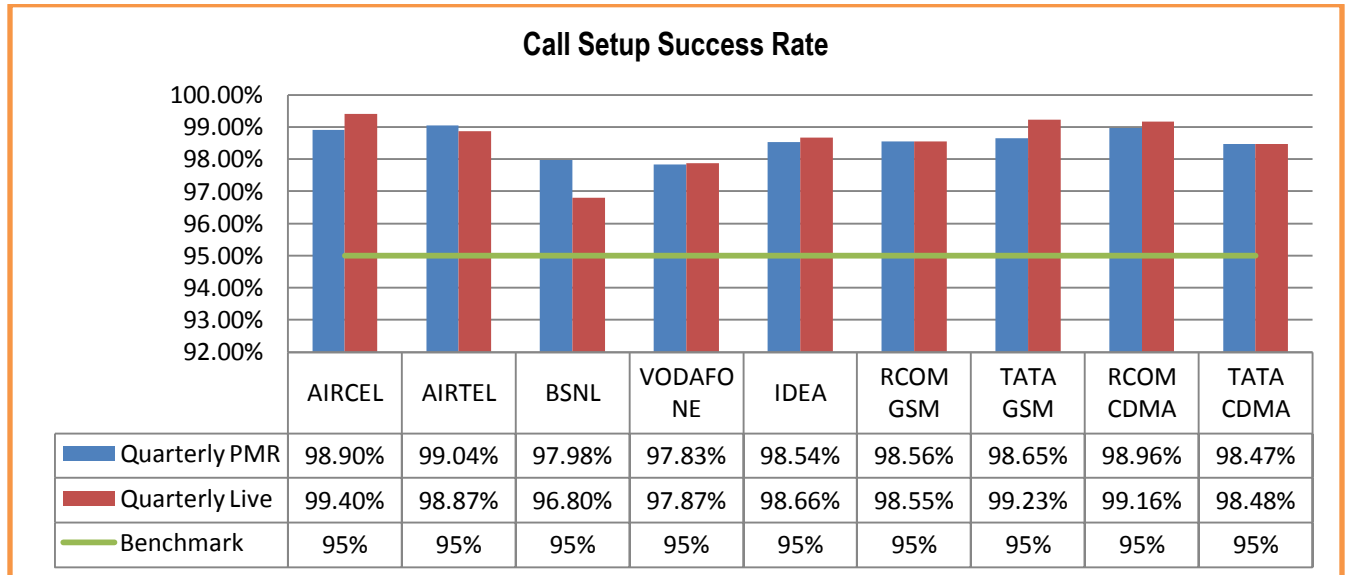
All operators are meeting the benchmarks.

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



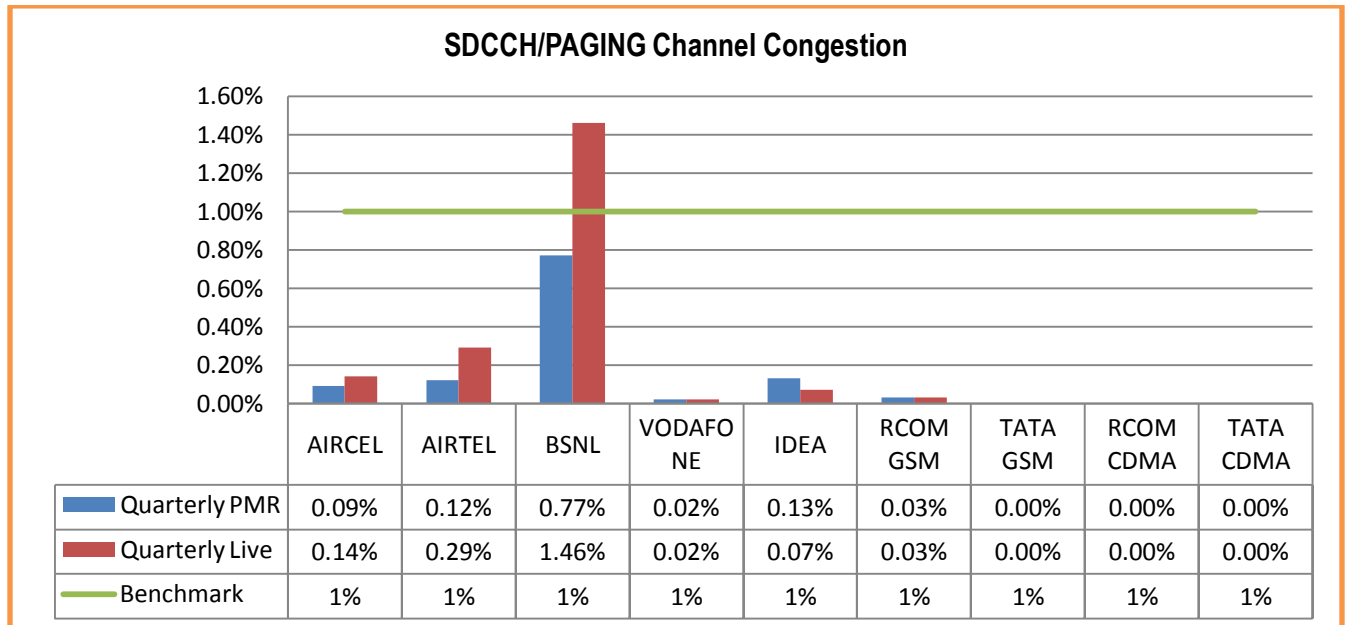
All operators are meeting the benchmarks.

3) CALL SETUP SUCCESS RATE :



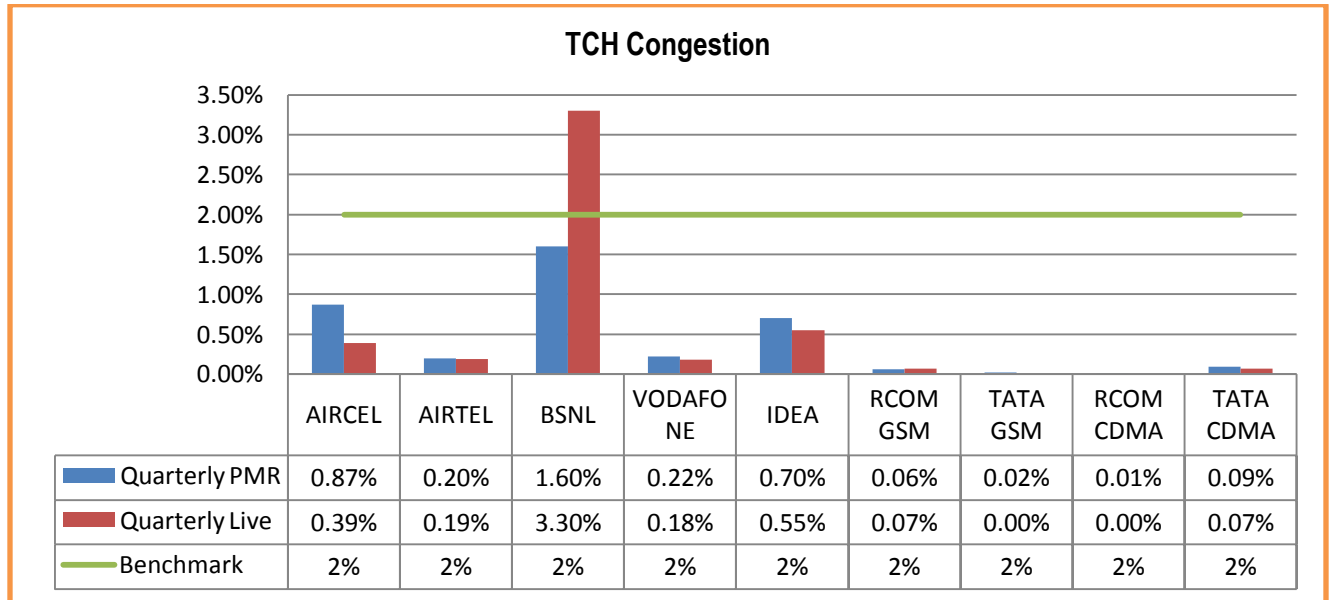
All operators are meeting the benchmarks.

4) SDCCH/PAGING CHANNEL CONGESTION :



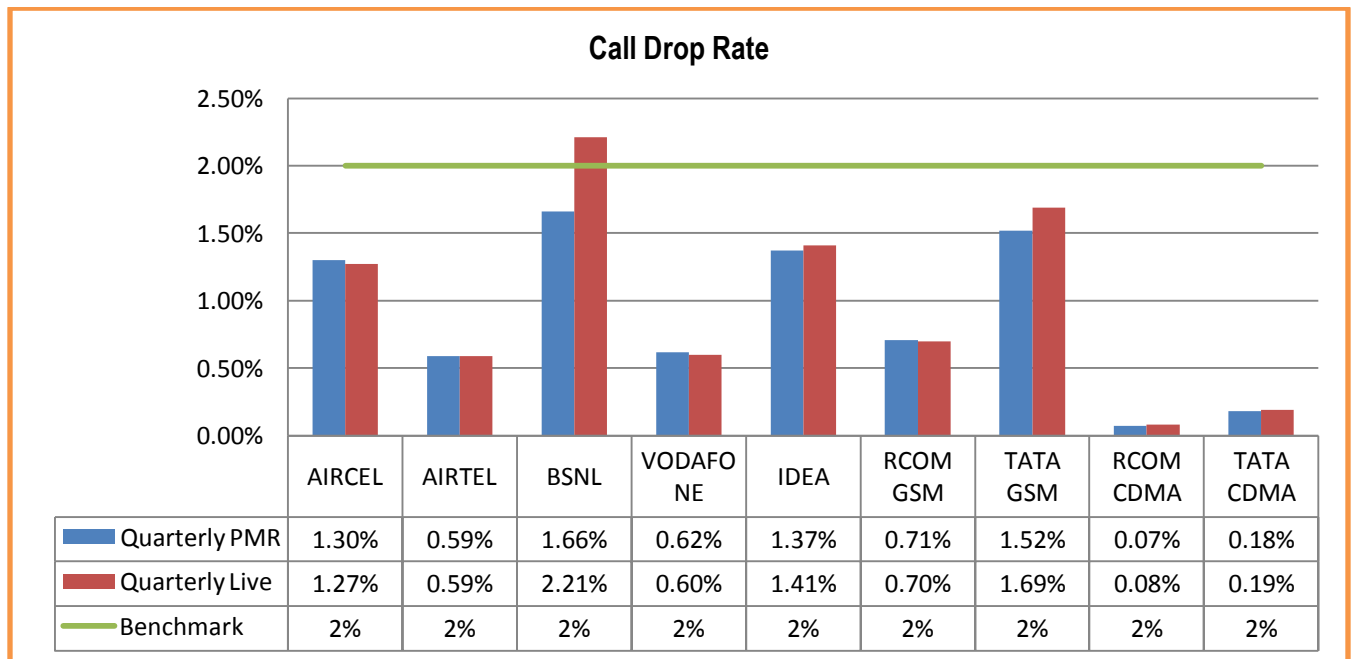
All operators are meeting the benchmarks except BSNL during 3 day live measurement.

5) TCH CONGESTION :



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

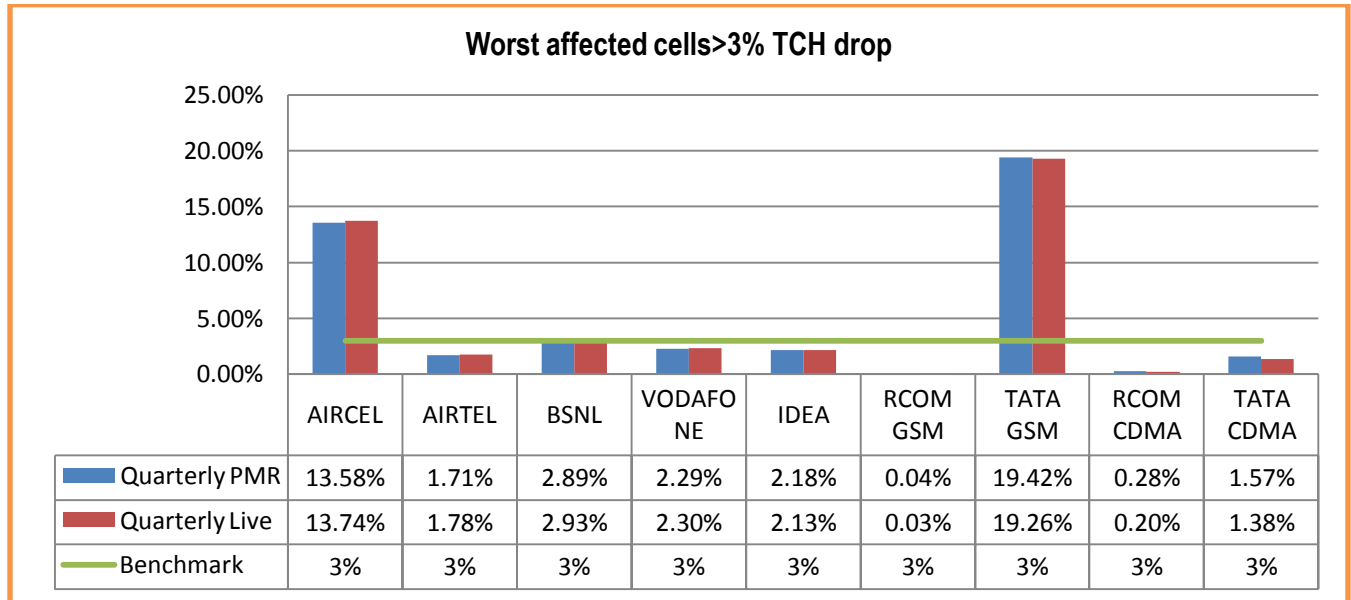
6) CALL DROP RATE :



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

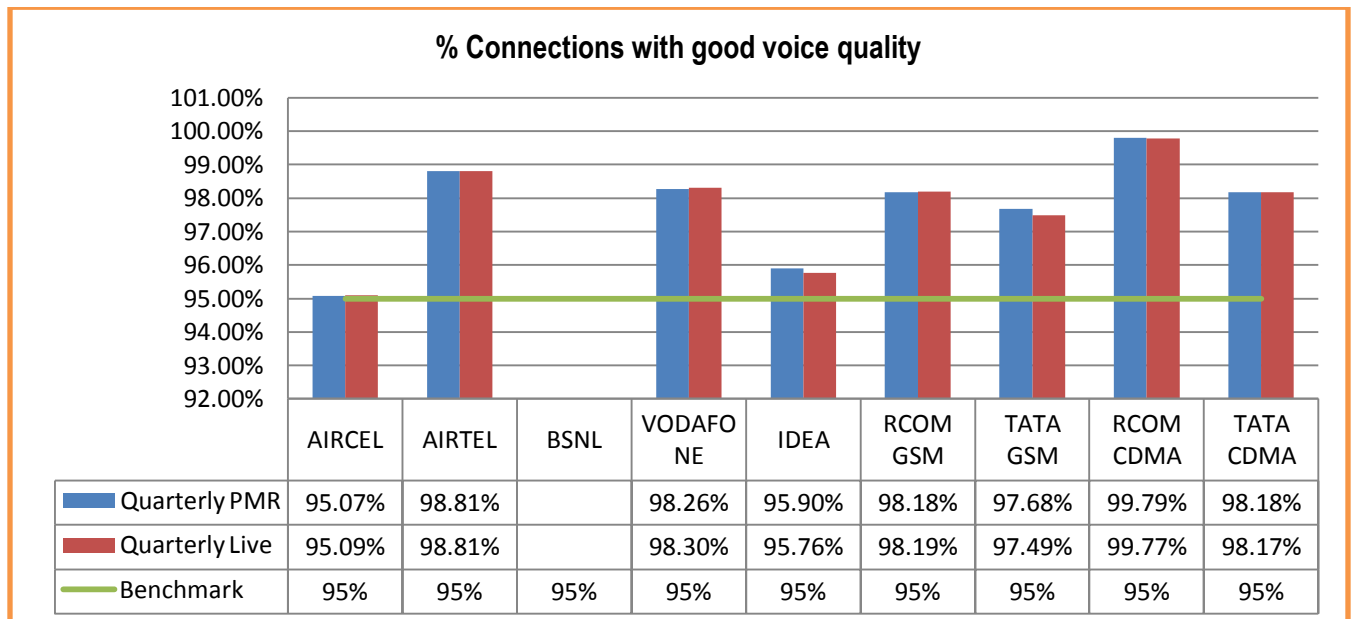


7) WORST AFFECTED CELLS>3% TCH DROP :



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.