



REPORT
ON
AUDIT & ASSESSMENT OF QUALITY OF SERVICE
OF
CELLULAR MOBILE TELEPHONE SERVICE
FOR
TELECOM REGULATORY AUTHORITY OF INDIA
NORTH ZONE – HIMACHAL PRADESH SERVICE AREA
(APRIL 2014 – JUNE 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.

Table of Contents

1. BACKGROUND.....	6
2. OBJECTIVES AND METHODOLOGY	9
3. SAMPLE SIZE.....	11
3.1 SAMPLING FOR CELLULAR MOBILE (WIRELESS) SERVICE PROVIDERS	11
3.2 SAMPLING FOR BASIC (WIRE LINE) SERVICES	12
3.3 SAMPLING FOR BROADBAND SERVICE PROVIDERS	12
4. EXECUTIVE SUMMARY	14
5. PMR AUDIT REPORTS:.....	16
5.1 MONTHLY PMR:	16
5.1.1 BUSY HOUR OF VARIOUS SERVICE PROVIDERS:.....	16
5.1.2 SWITCHES/BSC/BTS DETAILS OF SERVICE PROVIDERS:	16
5.1.3 QOS PERFORMANCE OF MONTHLY PMR – APRIL-14 MONTH:.....	17
5.1.4 QOS PERFORMANCE OF MONTHLY PMR – MAY-14 MONTH:.....	18
5.1.5 QOS PERFORMANCE OF MONTHLY PMR – JUNE-14 MONTH:	19
5.1.6 QOS PERFORMANCE OF QUARTERLY PMR –AVERAGE OF QE- JUNE-14 (APRIL TO JUNE MONTHS AUDITED DATA).....	20
5.1.7 KEY FINDINGS ON MONTHLY PMR AUDIT REPORTS:.....	21
5.2 LIVE MEASUREMENT DATA (3-DAYS) FOR CELLULAR MOBILE SERVICE PROVIDERS (NETWORK SERVICE QUALITY PARAMETER):	24
5.2.1 LIVE MEASUREMENT DATA (3-DAYS) – APRIL-14 MONTH:	24
5.2.2 LIVE MEASUREMENT DATA (3-DAYS) – MAY-14 MONTH:.....	25
5.2.3 LIVE MEASUREMENT DATA (3-DAYS) – JUNE-14 MONTH:	26
5.2.4 QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT AUDITED DATA (AVERAGE OF APRIL TO JUNE).....	27
5.2.5 KEY FINDING ON 3 DAYS LIVE MEASUREMENTS:	27
5.2.6 DETAILED NETWORK DATA ASSESSMENT OF CELLULAR MOBILE TELEPHONE SERVICES:	28
5.3 CUSTOMER SERVICE QUALITY PARAMETERS MEASUREMENT FOR CMTS-QE JUNE-14:	35
5.3.1 CUSTOMER SERVICE DELIVERY (CSD) AUDITED DATA FOR CELLULAR MOBILE SERVICES (QE-JUNE 2014):.....	35
5.3.2 3 DAYS LIVE CSD AUDITED DATA FOR CELLULAR MOBILE SERVICES (QE-JUNE 2014):.....	37
5.3.3 KEY FINDINGS ON CUSTOMER SERVICE DELIVERY (CSD) PARAMETERS	38

6.	LIVE CALLING ASSESSMENT:.....	40
6.1	INTER OPERATOR CALLS ASSESSMENT:.....	40
6.2	CUSTOMER CARE / HELPLINE ASSESSMENT:.....	41
6.3	LIVE CALLING ASSESSMENT FOR BILLING COMPLIANTS:	41
6.4	LEVEL -1 CALLING ASSESSMENT:	42
7.	OPERATOR ASSISTED DRIVE TEST	44
7.1	OPERATOR ASSISTED DRIVE TEST: KULLU SSA (APRIL-14)	45
7.2	OPERATOR ASSISTED DRIVE TEST: SHIMLA SSA (MAY-14)	48
7.3	OPERATOR ASSISTED DRIVE TEST: SOLAN SSA (JUNE-14).....	51
7.4	DETAIL OF THE ROUTES COVERED DURING THE DRIVE TESTS:	54
7.5	SSA WISE DRIVE TEST OBSERVATION:	55
7.6	KEY FINDINGS ON DRIVE TEST:.....	58
8.	GRAPHICAL REPRESENTATION:	60



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 20th March, 2009 and the Quality of Service of Broadband Service Regulations, 2006 (11 of 2006) dated 6th 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



2. OBJECTIVES AND METHODOLOGY

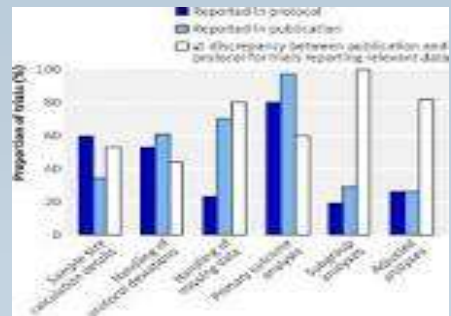
The primary objective is to audit and assess the Quality of Service being rendered by Basic, Cellular Mobile & Broadband service providers against the parameters notified by TRAI.

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 Punjab, Rajasthan & Gujarat circles during the quarter April – June 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
		April-14	May-14	June-14	
GSM Operators					
1	AIRCEL	21 to 23 April-14	12 to 14 May-14	9 to 11 June-14	3rd Floor Keothal Complex Khalini Shimla.
2	AIRTEL	8 to 10 April-14	12 to 14 May-14	9 to 11 June-14	Bharti Airtel Campus, Plot No 21, Rajiv Gandhi Information and Technology Park, Chandigarh, 160101
3	BSNL	1 to 3 April-14	21 to 23 May-14	5 to 7 June-14	BSNL Shimla
4	IDEA	13 to 15 April-14	11 to 13 May-14	9 to 11 June-14	Idea Cellular Limited, Phase -7 Industrial Area, Mohali
5	RCOM GSM	6 to 8 April-14	8 to 10 May-14	4 to 6 June-14	Reliance Communications Ltd., Phase-8, Industrial Area, Mohali
6	TATA GSM	10 to 12 April-14	14 to 16 May-14	12 to 13, 16 June-14	Tata Teleservices Ltd Charu sood Building Chota Shimla, Kasumpti
7	VODAFONE	15 to 17 April-14	7 to 9 May-14	17 to 19 June-14	130 durga cottage SDA complex Kasumpti Shimla
CDMA Operators					
8	RCOM CDMA	7 to 9 April-14	8 to 10 May-14	4 to 6 June-14	Reliance Communications Ltd., Phase-8, Industrial Area, Mohali
9	TATA CDMA	7 to 9 April-14	12 to 14 May-14	12 to 13, 16 June-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 June 2014.

The data generated by monthly PMR and 3-days live measurements audit for the period April 2014 to June 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. **However, QoS audit for basic (wire line) service was not required to be done for Himachal Pradesh Circle in the quarter ended June 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. **However, the QoS audit for Broadband service was not required to be done for Himachal Pradesh Circle in the quarter ended June 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 is 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 **8.78%** and **17.13%**, which was way beyond the benchmark. In fact, Tata (GSM) is having only five sites with 15 cells which is resulting in poor performance, remaining network is 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 **1.83%, 2.50%** and **2.46%** respectively. Further, in respect of parameter **‘Worst affected cells> 3 % TCH drops’**, average performance of **Aircel and Tata (GSM)** was **5.51% and 15.56%**, 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, **BSNL and RCOM (GSM)** have not met the benchmark of **‘calls answered by Operators (voice to voice)’**. They have achieved their performance as **28.63% (very poor) and 82.29%** respectively. In case of live measurements also the performance of **BSNL** was very poor as they could connect only **39.17 %** of calls to operator within 60 seconds.

(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. 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
GSM Operators			
1	AIRCEL	Jun-14	20:00 - 21:00
2	AIRTEL	Jun-14	20:00 - 21:00
3	BSNL	Jun-14	19:00 - 20:00
4	IDEA	Jun-14	21:00 - 22:00
5	VODAFONE	Jun-14	20:00 - 21:00
6	RCOM GSM	Jun-14	19:00 - 20:00
7	TATA GSM	Jun-14	20:00 - 21:00
CDMA Operators			
8	RCOM CDMA	Jun-14	20:00 - 21:00
9	TATA CDMA	Jun-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
GSM Operators						
1	AIRCEL	1	8	662	Ericsson	Ericsson
2	AIRTEL	5	16	1408	Ericsson	Ericsson
3	BSNL	5	18	1096	Ericsson	Ericsson, NSN & ZTE
4	VODAFONE	1	9	789	NSN	NSN
5	IDEA	2	6	849	Ericsson	Ericsson
6	RCOM GSM	3	12	861	Huawei & Ericsson	ZTE
7	TATA GSM	1	1	5	NSN	NSN
CDMA Operators						
8	RCOM CDMA	1	NA	282	Lucent	Lucent
9	TATA CDMA	1	1	282	Ericsson	ZTE

5.1.3 QOS PERFORMANCE OF MONTHLY PMR – APRIL-14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES HIMACHAL PRADESH CIRCLE- APRIL-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		
Network Service Quality Parameter												
1	Network Availability											
	a) BTS Accumulated Downtime	<=2%	Apr-14	0.48%	0.02%	1.95%	0.04%	0.26%	0.13%	0.00%	0.07%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	Apr-14	1.81%	0.00%	1.85%	0.00%	0.00%	0.11%	0.00%	0.00%	0.00%
2	Connection Establishment (Accessibility)											
	a) CSSR (Call Setup Success Rate)	>=95%	Apr-14	99.56%	99.21%	98.70%	98.29%	98.75%	98.70%	99.00%	99.21%	98.95%
	b) SDCCH/PAGING Channel congestion	<=1%	Apr-14	0.07%	0.04%	0.63%	0.01%	0.13%	0.05%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Apr-14	0.21%	0.13%	1.35%	0.08%	0.52%	0.06%	0.00%	0.01%	0.03%
3	Connection maintenance (Retainability)											
	a) CDR (Call Drop Rate)	<=2%	Apr-14	1.15%	0.59%	0.71%	0.60%	1.25%	0.66%	1.61%	0.06%	0.16%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Apr-14	2.69%	1.96%	2.81%	1.87%	2.45%	0.05%	14.44%	0.19%	1.21%
	c) Connections with good voice quality	>=95%	Apr-14	95.06%	98.83%	NP	98.47%	95.24%	98.06%	98.07%	99.79%	98.22%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Apr-14	0	0	0	0	0	0	0	0	0

*NP: Data not provided

5.1.4 QOS PERFORMANCE OF MONTHLY PMR – MAY-14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES HIMACHAL PRADESH CIRCLE – MAY -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		
Network Service Quality Parameter												
1	Network Availability											
	a) BTS Accumulated Downtime	<=2%	May-14	0.45%	0.01%	1.94%	0.02%	0.13%	0.17%	0.00%	0.11%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	May-14	1.66%	0.00%	1.72%	0.00%	0.00%	0.23%	0.00%	0.00%	0.00%
2	Connection Establishment (Accessibility)											
	a) CSSR (Call Setup Success Rate)	>=95%	May-14	99.45%	99.05%	98.47%	98.31%	98.65%	98.67%	98.78%	99.17%	98.13%
	b) SDCCH/PAGING Channel congestion	<=1%	May-14	0.08%	0.13%	0.87%	0.03%	0.09%	0.02%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	May-14	0.33%	0.16%	1.53%	0.15%	0.69%	0.08%	0.09%	0.00%	0.12%
3	Connection maintenance (Retainability)											
	a) CDR (Call Drop Rate)	<=2%	May-14	1.13%	0.57%	0.86%	0.62%	1.23%	0.67%	1.48%	0.07%	0.19%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	May-14	11.68%	1.86%	2.78%	2.03%	2.42%	0.04%	17.63%	0.29%	1.52%
	c) Connections with good voice quality	>=95%	May-14	95.20%	98.81%	NP	98.45%	95.41%	98.09%	97.89%	99.78%	98.16%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	May-14	0	0	0	0	0	0	0	0	0

*NP: Data not provided

5.1.5 QOS PERFORMANCE OF MONTHLY PMR – JUNE-14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES HIMACHAL PRADESH CIRCLE - JUNE - 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		
Network Service Quality Parameter												
1	Network Availability											
	a) BTS Accumulated Downtime	<=2%	Jun-14	0.46%	0.01%	1.92%	0.01%	0.34%	0.16%	0.00%	0.09%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	Jun-14	1.51%	0.00%	2.19%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
2	Connection Establishment (Accessibility)											
	a) CSSR (Call Setup Success Rate)	>=95%	Jun-14	99.30%	99.04%	98.08%	98.15%	98.80%	98.62%	99.07%	99.06%	98.65%
	b) SDCCH/PAGING Channel congestion	<=1%	Jun-14	0.14%	0.15%	0.67%	0.01%	0.09%	0.14%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Jun-14	0.46%	0.18%	1.94%	0.27%	0.52%	0.15%	0.00%	0.01%	0.15%
3	Connection maintenance (Retainability)											
	a) CDR (Call Drop Rate)	<=2%	Jun-14	1.16%	0.57%	1.68%	0.59%	1.26%	0.68%	1.53%	0.09%	0.19%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Jun-14	11.97%	1.96%	2.92%	2.31%	1.89%	0.04%	19.33%	0.27%	1.17%
	c) Connections with good voice quality	>=95%	Jun-14	95.28%	98.86%	NP	98.42%	95.97%	98.18%	97.89%	99.79%	98.19%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Jun-14	0	0	0	0	0	0	0	0	0

*NP: Data not provided

5.1.6 QOS PERFORMANCE OF QUARTERLY PMR –AVERAGE OF QE- JUNE-14 (APRIL TO JUNE MONTHS AUDITED DATA)

QUARTERLY QOS PERFORMANCE (AVERAGE OF QE-JUNE-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	0.46%	0.01%	1.94%	0.02%	0.24%	0.15%	0.00%	0.09%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	1.66%	0.00%	1.92%	0.00%	0.00%	0.11%	0.00%	0.00%	0.00%
2	Connection Establishment (Accessibility)											
	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	99.44%	99.10%	98.42%	98.25%	98.73%	98.66%	98.95%	99.15%	98.58%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.10%	0.11%	0.72%	0.02%	0.10%	0.07%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.33%	0.16%	1.61%	0.17%	0.58%	0.10%	0.03%	0.01%	0.10%
3	Connection maintenance (Retainability)											
	a) CDR (Call Drop Rate)	<=2%	Quarterly	1.15%	0.58%	1.08%	0.60%	1.25%	0.67%	1.54%	0.07%	0.18%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	8.78%	1.93%	2.84%	2.07%	2.25%	0.04%	17.13%	0.25%	1.30%
	c) Connections with good voice quality	>=95%	Quarterly	95.18%	98.83%	NP	98.45%	95.54%	98.11%	97.95%	99.79%	98.19%
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Quarterly	0	0	0	0	0	0	0	0	0

*NP: Data not provided

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 **8.78%** and **17.13%** 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) – APRIL-14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES HIMACHAL PRADESH CIRCLE- APRIL-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		
Network Service Quality Parameter												
Network Availability												
1	a) BTS Accumulated Downtime	<=2%	Live data	0.60%	0.01%	1.96%	0.02%	0.43%	0.25%	0.00%	0.15%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.77%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.70%	99.25%	96.72%	98.36%	98.76%	98.75%	98.82%	98.88%	99.17%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.01%	0.03%	1.16%	0.00%	0.22%	0.17%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.09%	0.13%	3.28%	0.15%	0.53%	0.04%	0.00%	0.02%	0.01%
Connection maintenance (Retainability)												
3	a) CDR (Call Drop Rate)	<=2%	Live data	1.13%	0.58%	3.39%	0.67%	1.30%	0.63%	0.99%	0.05%	0.14%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	2.74%	2.01%	2.94%	1.81%	2.49%	0.00%	15.56%	0.17%	0.00%
	c) Connections with good voice quality	>=95%	Live data	95.18%	98.84%	NP	98.44%	95.10%	98.05%	98.05%	99.78%	98.23%
4	No. of POI having >=0.5% congestion		Live data	0	0	0	0	0	0	0	0	0

*NP: Data not provided

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

CELLULAR MOBILE TELEPHONE SERVICES HIMACHAL PRADESH CIRCLE- MAY-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		
Network Service Quality Parameter												
Network Availability												
1	a) BTS Accumulated Downtime	<=2%	Live data	0.63%	0.01%	1.94%	0.02%	0.70%	0.10%	0.00%	0.07%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.80%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.64%	99.14%	95.64%	98.35%	98.55%	98.58%	98.87%	99.20%	97.56%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.03%	0.09%	2.28%	0.06%	0.06%	0.04%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.14%	0.15%	2.00%	0.08%	0.83%	0.07%	0.00%	0.00%	0.24%
Connection maintenance (Retainability)												
3	a) CDR (Call Drop Rate)	<=2%	Live data	1.22%	0.58%	2.05%	0.63%	1.19%	0.66%	0.90%	0.07%	0.17%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	2.72%	1.90%	2.73%	2.27%	2.54%	0.01%	15.56%	0.17%	1.88%
	c) Connections with good voice quality	>=95%	Live data	95.06%	98.80%	NP	98.48%	95.27%	98.09%	98.38%	99.78%	98.18%
4	No. of POI having >=0.5% congestion		Live data	0	0	0	0	0	0	0	0	0

*NP: Data not provided

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

CELLULAR MOBILE TELEPHONE SERVICES HIMACHAL PRADESH CIRCLE- JUNE-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		
Network Service Quality Parameter												
Network Availability												
1	a) BTS Accumulated Downtime	<=2%	Live data	0.77%	0.00%	1.95%	0.00%	0.39%	0.11%	0.00%	0.06%	0.02%
	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%
Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.52%	99.09%	98.00%	98.19%	98.82%	98.69%	99.30%	99.15%	98.71%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.08%	0.11%	2.04%	0.01%	0.05%	0.55%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.23%	0.20%	2.22%	0.18%	0.55%	0.15%	0.00%	0.00%	0.12%
Connection maintenance (Retainability)												
3	a) CDR (Call Drop Rate)	<=2%	Live data	1.26%	0.54%	1.93%	0.61%	1.24%	0.66%	0.79%	0.08%	0.19%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	11.08%	1.65%	2.91%	2.32%	2.26%	0.06%	15.56%	0.32%	0.94%
	c) Connections with good voice quality	>=95%	Live data	95.34%	98.89%	NP	98.40%	95.28%	98.10%	98.29%	99.78%	98.18%
4	No. of POI having >=0.5% congestion		Live data	0	0	0	0	0	0	0	0	0

*NP: Data not provided

5.2.4 QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT AUDITED DATA (AVERAGE OF APRIL TO JUNE)

QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT (AVERAGE OF QE - JUNE-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		
Network Service Quality Parameter												
Network Availability												
1	a) BTS Accumulated Downtime	<=2%	Quarterly	0.67%	0.01%	1.95%	0.01%	0.51%	0.15%	0.00%	0.09%	0.01%
	b) Worst affected BTSS due to downtime	<=2%	Quarterly	0.00%	0.00%	0.95%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	99.62%	99.16%	96.79%	98.30%	98.71%	98.67%	99.00%	99.08%	98.48%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.04%	0.08%	1.83%	0.02%	0.11%	0.25%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.15%	0.16%	2.50%	0.14%	0.64%	0.09%	0.00%	0.01%	0.12%
Connection maintenance (Retainability)												
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	1.20%	0.57%	2.46%	0.64%	1.24%	0.65%	0.89%	0.07%	0.17%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	5.51%	1.85%	2.86%	2.13%	2.43%	0.02%	15.56%	0.22%	0.94%
	c) Connections with good voice quality	>=95%	Quarterly	95.19%	98.84%	NP	98.44%	95.22%	98.08%	98.24%	99.78%	98.20%
4	No. of POI having >=0.5% congestion		Quarterly	0	0	0	0	0	0	0	0	0

*NP: Data not provided

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 '**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 **1.83%, 2.50%** and **2.46%** respectively. Further, in respect of parameter '**Worst affected cells> 3 % TCH drops**', average performance of **Aircel and Tata (GSM)** was **5.51%** and **15.56%**, way beyond the benchmark of 3%.

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- Apr-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		
Network Service Quality Parameter												
Network Availability												
1	a) Total no. of BTSs in the licensed service area		Apr-14	662	1399	1081	780	849	885	5	397	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		Apr-14	2293	154	15150	221	1589	848	0	187	0
	c) BTS Accumulated Downtime	<=2%	Apr-14	0.48%	0.02%	1.95%	0.04%	0.26%	0.13%	0.00%	0.07%	0.00%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Apr-14	12	0	20	0	0	1	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Apr-14	1.81%	0.00%	1.85%	0.00%	0.00%	0.11%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	>=95%	Apr-14	99.56%	99.21%	98.70%	98.29%	98.75%	98.70%	99.00%	99.21%	98.95%
	b) SDCCCH/PAGING Congestion	<=1%	Apr-14	0.07%	0.04%	0.63%	0.01%	0.13%	0.05%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Apr-14	0.21%	0.13%	1.35%	0.08%	0.52%	0.06%	0.00%	0.01%	0.03%
Connection Maintenance (Retainability)												
3	a) Call Drop Rate (CDR)	<=2%	Apr-14	1.15%	0.59%	0.71%	0.60%	1.25%	0.66%	1.61%	0.06%	0.16%
	b) Worst affected cells>3% TCH drop	<=3%	Apr-14	2.69%	1.96%	2.81%	1.87%	2.45%	0.05%	14.44%	0.19%	1.21%
	c) % of connections with good voice quality	>=95%	Apr-14	95.06%	98.83%	NP	98.47%	95.24%	98.06%	98.07%	99.79%	98.22%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Apr-14	53	80	90	44	62	1	2	2	5
	e) Total no. of cells (Sector) in the licensed service area		Apr-14	1974	4062	3213	2338	2539	2683	15	1191	426
No. of POI's having >=0.5% POI congestion												
4	No. of POI's having >=0.5% POI congestion		Apr-14	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Apr-14	0	0	0	0	0	0	0	0	0
Network Data												
5	a) Equipped Capacity of Network in Erlang		Apr-14	32530	65064	74000	20672	29003	40000	165	28000	17466
	b) Total traffic in TCBH in erlang (Avg.)		Apr-14	12497	57456	36464	11801	14208	30855	8.46	3149	2240
	c) Total no. of customers served (as per VLR) on last day of the month		Apr-14	471334	2139600	1093911	504870	594042	1243361	NP	121701	NP

TABLE: 2

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live measurement - HP Circle- Apr-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		
Network Service Quality Parameter												
Network Availability												
1	a) Total no. of BTSs in the licensed service area		Live data	662	1394	1079	774	848	896	5	397	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	286	11	1523	12	263	160	0	43	0
	c) BTS Accumulated Downtime	<=2%	Live data	0.60%	0.01%	1.96%	0.02%	0.43%	0.25%	0.00%	0.15%	0.00%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	8	0	0	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.77%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.70%	99.25%	96.72%	98.36%	98.76%	98.75%	98.82%	98.88%	99.17%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.01%	0.03%	1.16%	0.00%	0.22%	0.17%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.09%	0.13%	3.28%	0.15%	0.53%	0.04%	0.00%	0.02%	0.01%
Connection Maintenance (Retainability)												
3	a) Call Drop Rate (CDR)	<=2%	Live data	1.13%	0.58%	3.39%	0.67%	1.30%	0.63%	0.99%	0.05%	0.14%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	2.74%	2.01%	2.94%	1.81%	2.49%	0.00%	15.56%	0.17%	0.00%
	c) % of connections with good voice quality	>=95%	Live data	95.18%	98.84%	NP	98.44%	95.10%	98.05%	98.05%	99.78%	98.23%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	54	81	94	42	63	0	2	2	0
	e) Total no. of cells (Sector) in the licensed service area		Live data	1974	4048	3200	2335	2539	2685	15	1191	426
No. of POI's having >=0.5% POI congestion												
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- May-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		
Network Service Quality Parameter												
Network Availability												
1	a) Total no. of BTSs in the licensed service area		May-14	662	1399	1088	782	849	885	5	397	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		May-14	2205	147	15672	133	823	1145	0	332	3
	c) BTS Accumulated Downtime	<=2%	May-14	0.45%	0.01%	1.94%	0.02%	0.13%	0.17%	0.00%	0.11%	0.00%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		May-14	11	0	19	0	0	2	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	May-14	1.66%	0.00%	1.72%	0.00%	0.00%	0.23%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	>=95%	May-14	99.45%	99.05%	98.47%	98.31%	98.65%	98.67%	98.78%	99.17%	98.13%
	b) SDCCH/PAGING Congestion	<=1%	May-14	0.08%	0.13%	0.87%	0.03%	0.09%	0.02%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	May-14	0.33%	0.16%	1.53%	0.15%	0.69%	0.08%	0.09%	0.00%	0.12%
Connection Maintenance (Retainability)												
3	a) Call Drop Rate (CDR)	<=2%	May-14	1.13%	0.57%	0.86%	0.62%	1.23%	0.67%	1.48%	0.07%	0.19%
	b) Worst affected cells>3% TCH drop	<=3%	May-14	11.68%	1.86%	2.78%	2.03%	2.42%	0.04%	17.63%	0.29%	1.52%
	c) % of connections with good voice quality	>=95%	May-14	95.20%	98.81%	NP	98.45%	95.41%	98.09%	97.89%	99.78%	98.16%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		May-14	231	76	90	48	61	1	3	3	6
	e) Total no. of cells (Sector) in the licensed service area		May-14	1974	4069	3224	2352	2537	2652	15	1190	426
No. of POI's having >=0.5% POI congestion												
4	No. of POI's having >=0.5% POI congestion		May-14	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		May-14	0	0	0	0	0	0	0	0	0
Network Data												
5	a) Equipped Capacity of Network in Erlang		May-14	32541	64560	74000	15411	30281	40000	158	28000	17466
	b) Total traffic in TCBH in erlang (Avg.)		May-14	12699	58149	37637	12298	14230	29060	8.42	3044	2383
	c) Total no. of customers served (as per VLR) on last day of the month		May-14	484048	2201003	1106692	537131	623765	1257083	NP	121694	39729

TABLE: 4

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live measurement - HP Circle- May-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	
Network Service Quality Parameter												
Network Availability												
1	a) Total no. of BTSs in the licensed service area		Live data	662	1399	1088	779	849	885	5	397	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	300	9	1523	9	428	61	0	19	0
	c) BTS Accumulated Downtime	<=2%	Live data	0.63%	0.01%	1.94%	0.02%	0.70%	0.10%	0.00%	0.07%	0.00%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	8	0	0	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.80%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.64%	99.14%	95.64%	98.35%	98.55%	98.58%	98.87%	99.20%	97.56%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.03%	0.09%	2.28%	0.06%	0.06%	0.04%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.14%	0.15%	2.00%	0.08%	0.83%	0.07%	0.00%	0.00%	0.24%
Connection Maintenance (Retainability)												
3	a) Call Drop Rate (CDR)	<=2%	Live data	1.22%	0.58%	2.05%	0.63%	1.19%	0.66%	0.90%	0.07%	0.17%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	2.72%	1.90%	2.73%	2.27%	2.54%	0.01%	15.56%	0.17%	1.88%
	c) % of connections with good voice quality	>=95%	Live data	95.06%	98.80%	NP	98.48%	95.27%	98.09%	98.38%	99.78%	98.18%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	54	77	88	53	64	1	2	2	8
	e) Total no. of cells (Sector) in the licensed service area		Live data	1974	4062	3224	2350	2536	2652	15	1190	426
No. of POI's having >=0.5% POI congestion												
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- June-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		
Network Service Quality Parameter												
Network Availability												
1	a) Total no. of BTSs in the licensed service area		Jun-14	662	1408	1096	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		Jun-14	2202	135	15136	82	2056	992	0	183	10
	c) BTS Accumulated Downtime	<=2%	Jun-14	0.46%	0.01%	1.92%	0.01%	0.34%	0.16%	0.00%	0.09%	0.01%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Jun-14	10	0	24	0	0	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Jun-14	1.51%	0.00%	2.19%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	>=95%	Jun-14	99.30%	99.04%	98.08%	98.15%	98.80%	98.62%	99.07%	99.06%	98.65%
	b) SDCCH/PAGING Congestion	<=1%	Jun-14	0.14%	0.15%	0.67%	0.01%	0.09%	0.14%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Jun-14	0.46%	0.18%	1.94%	0.27%	0.52%	0.15%	0.00%	0.01%	0.15%
Connection Maintenance (Retainability)												
3	a) Call Drop Rate (CDR)	<=2%	Jun-14	1.16%	0.57%	1.68%	0.59%	1.26%	0.68%	1.53%	0.09%	0.19%
	b) Worst affected cells>3% TCH drop	<=3%	Jun-14	11.97%	1.96%	2.92%	2.31%	1.89%	0.04%	19.33%	0.27%	1.17%
	c) % of connections with good voice quality	>=95%	Jun-14	95.28%	98.86%	NP	98.42%	95.97%	98.18%	97.89%	99.79%	98.19%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Jun-14	236	80	95	55	48	1	3	3	5
	e) Total no. of cells (Sector) in the licensed service area		Jun-14	1974	4096	3233	2361	2541	2635	15	1110	426
No. of POI's having >=0.5% POI congestion												
4	No. of POI's having >=0.5% POI congestion		Jun-14	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Jun-14	0	0	0	0	0	0	0	0	0
Network Data												
5	a) Equipped Capacity of Network in Erlang		Jun-14	32492	64203	74000	14750	30278	28000	158	40000	17466
	b) Total traffic in TCBH in erlang (Avg.)		Jun-14	13038	59870	36252	13019	14230	466	9	29473	2511
	c) Total no. of customers served (as per VLR) on last day of the month		Jun-14	496631	2198980	1113479	522286	630358	110091	NA	1246788	40832

TABLE: 6

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live measurement - HP Circle- June -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	
Network Service Quality Parameter												
Network Availability												
1	a) Total no. of BTSs in the licensed service area		Live data	662	1399	1088	782	849	885	5	397	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	368	4	1530	2	239	73	0	17	2
	c) BTS Accumulated Downtime	<=2%	Live data	0.77%	0.00%	1.95%	0.00%	0.39%	0.11%	0.00%	0.06%	0.02%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	14	0	0	0	0	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%
Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	99.52%	99.09%	98.00%	98.19%	98.82%	98.69%	99.30%	99.15%	98.71%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.08%	0.11%	2.04%	0.01%	0.05%	0.55%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.23%	0.20%	2.22%	0.18%	0.55%	0.15%	0.00%	0.00%	0.12%
Connection Maintenance (Retainability)												
3	a) Call Drop Rate (CDR)	<=2%	Live data	1.26%	0.54%	1.93%	0.61%	1.24%	0.66%	0.79%	0.08%	0.19%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	11.08%	1.65%	2.91%	2.32%	2.26%	0.06%	15.56%	0.32%	0.94%
	c) % of connections with good voice quality	>=95%	Live data	95.34%	98.89%	NP	98.40%	95.28%	98.10%	98.29%	99.78%	98.18%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	219	67	94	55	57	2	2	4	4
	e) Total no. of cells (Sector) in the licensed service area		Live data	1974	4069	3224	2359	2540	2652	15	1190	426
No. of POI's having >=0.5% POI congestion												
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 JUNE-14:

5.3.1 CUSTOMER SERVICE DELIVERY (CSD) AUDITED DATA FOR CELLULAR MOBILE SERVICES (QE-JUNE 2014):

CSD DATA FOR CELLULAR MOBILE TELEPHONE SERVICES-QE JUNE-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	
Customer Service Quality Parameters												
1	Metering & Billing Credibility -Post Paid											
	A) No. of bills issued during the quarter		HP	1692	33519	48667	1990	8249	4120	7724	5792	3604
	B) No. of bills disputed including billing complaints during the quarter		HP	0	27	30	1	5	0	0	3	0
	C)% of billing complaints during the quarter	<= 0.1%	HP	0.00%	0.08%	0.06%	0.02%	0.06%	0.00%	0.00%	0.06%	0.00%
2	Metering & Billing Credibility -Pre Paid											
	A) Total No. of Pre-paid customers at the end of the quarter		HP	827654	2192657	1334498	574742	1249815	59638	546684	177720	38508
	B) Total No. of complaints relating to charging, Credit and Validity during the quarter		HP	1	22	70	51	1136	0	48	67	0
	C) % of Pre-paid Charging Complaints	<= 0.1%	HP	0.00%	0.00%	0.01%	0.01%	0.09%	0.00%	0.01%	0.04%	0.00%
3	Resolution of Billing/Charging Complaints and Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints											
	A) No. of Billing/Charging/Credit/Validity Complaints received during the quarter		HP	1	49	100	189	1141	0	48	70	0
	B) No. of billing complaints for Post paid customers/Charging/Credit/Validity complaints for pre-paid customers resolved within 4 weeks during the quarter		HP	1	49	100	189	1141	0	48	70	0
	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%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	NA
	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%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	NA
4	Response time to customers for assistance											
	A) Total no of calls attempted to customer care/Call center		HP	654738	175149	37213	40755	1568547	3829	346878	67067	3841

CSD DATA FOR CELLULAR MOBILE TELEPHONE SERVICES-QE JUNE-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	649484	174653	37213	40412	1552468	3773	348678	65781	3743
	C) % Accessibility of Call centre /customer Care (Total call successfully established*100 / Total call attempt)	>=95%	HP	99.20%	99.72%	100.00%	99.16%	98.97%	98.54%	100.00%	98.08%	97.45%
	D) Total Calls reached to agent desk for Voice to Voice (Total call attempt)		HP	118095	386063	15766	139568	377967	4605	94001	5542	3440
	E) Total number of calls answered by the operator (Voice to voice) within 60 seconds		HP	111560	355346	4514	136998	311035	4482	93772	5377	3278
	F) % age of calls answered by operator (voice to voice) (Total call successfully established within 60 Sec.*100 /Total call attempts.)	>=90%	HP	94.47%	92.04%	28.63%	98.16%	82.29%	97.33%	99.76%	97.02%	95.29%
5	Termination/closure of service											
	A) Total No. of requests for Termination / Closure of service received during the quarter		HP	5	174	325	54	1	43	36	9	36
	B) No. of requests for Termination / Closure of service complied within 7 days during the quarter		HP	5	174	325	54	1	43	36	9	36
	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	Time taken for refunds of deposits after closures.											
	A) No. of Payments/ Refunds due during the quarter		HP	21	28	401	4	9	19	5	10	39
	B) No. of Payments/ Refunds Cleared during the quarter		HP	21	28	401	4	9	19	5	10	39
	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%

*NA: Not Applicable

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

CSD 3 DAYS LIVE DATA FOR CELLULAR MOBILE TELEPHONE SERVICES-QE-JUNE-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	
Response time to customers for assistance												
1	Total no of calls attempted to customer care/Call center		HP	22656	5824	1268	1323	46616	130	13102	2024	156
	Total no. of calls successfully established to customer care/Call center		HP	22478	5824	1268	1299	46137	128	13102	2021	155
	% Accessibility of Call centre /customer Care (Total call successfully established *100 / Total call attempt)	>=95%	HP	99.21%	100.00%	100.00%	98.19%	98.97%	98.46%	100.00%	99.85%	99.36%
2	Total Calls reached to agent desk for Voice to Voice (Total call attempt)		HP	3923	14650	3786	4850	11844	167	3726	129	129
	Total number of calls answered by the operator (Voice to voice) within 60 seconds		HP	3718	13626	1483	4782	11624	163	3706	128	122
	% age of calls answered by operator(voice to voice) (Total call successfully established within 60 Sec.*100 / Total call attempt)	>=90%	HP	94.77%	93.01%	39.17%	98.60%	98.14%	97.60%	99.46%	99.22%	94.57%

5.3.3 KEY FINDINGS ON CUSTOMER SERVICE DELIVERY (CSD) PARAMETERS

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

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

2. Resolution of Billing complaints and applying credits

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

All operators were found to have 100 % resolved the billing complaints within stipulated period of 4 weeks. 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, **BSNL** and **RCOM (GSM)** have not met the benchmark of 'calls answered by Operators (voice to voice) within 60 seconds'. They have achieved their performance as **28.63%** and **82.29%** respectively.

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.

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 **BSNL** which could perform with only **39.37%** of calls connected to operator within 60 seconds. Hence the performance of **BSNL** with respect to this parameter was extremely poor.

6. LIVE CALLING ASSESSMENT



6. LIVE CALLING ASSESSMENT:

6.1 INTER OPERATOR CALLS ASSESSMENT:

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

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

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

6.2 CUSTOMER CARE / HELPLINE ASSESSMENT:

LIVE CALLING TO CALL CENTRE										
Parameter	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	VODAFONE	RCOM (CDMA)	TATA (CDMA)
Total No. of calls Attempted	HP	100	100	100	100	100	100	100	100	100
Total no of calls attempted to customer care/Call center	HP	100	100	100	100	100	100	100	100	100
Total no. of calls successfully established to customer care/Call center	HP	100	100	100	100	100	100	100	100	100
% Accessibility of Call centre /customer Care (Total call attempt*100/ Total call successfully established)	HP	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Total Calls reached to agent desk for Voice to Voice (Total call attempt)	HP	100	100	100	100	100	100	100	100	100
Total number of calls answered by the operator (Voice to voice) within 60 seconds	HP	100	92	0	100	100	100	100	100	100
% age of calls answered by operator (voice to voice) (Total call attempt*100/ Total call successfully established within 60 Sec.)	HP	100.00%	92.00%	0.00%	100.00%	100.00%	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 and Airtel as they have achieved their performance as 0.00% (Calls either not attended by Operator or attended beyond 60 seconds) and 92.0% respectively.

6.3 LIVE CALLING ASSESSMENT FOR BILLING COMPLAINTS:

TELEPHONIC INTERVIEW FOR BILLING COMPLAINTS								
Parameter	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	RCOM (GSM)	VODAFONE	RCOM (CDMA)
Total No. of calls Attempted	HP	3	100	100	100	100	100	100
Total No. of calls Answered	HP	3	86	81	85	89	89	83
Cases resolved within 4 weeks	HP	3	86	81	85	89	89	83
%age of cases resolved	HP	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, some of the customers did not attend the calls while few others 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	HP	Kullu	Banzar	25	✓	✓	✓	✓	✓	✓	✓	✓	✓
100, 101, 108, 1098	HP	Kullu	Kullu	25	✓	✓	✓	✓	✓	✓	✓	✓	✓
100, 101, 108, 1098	HP	Kullu	Lahul	25	✓	✓	✓	✓	✓	✓	✓	✓	✓
100, 101, 108, 1098	HP	Shimla	Shimla	25	✓	✓	✓	✓	✓	✓	✓	✓	✓
100, 101, 108, 1098	HP	Shimla	Theoge	25	✓	✓	✓	✓	✓	✓	✓	✓	✓
100, 101, 108, 1098	HP	Shimla	Rampur Busshar	25	✓	✓	✓	✓	✓	✓	✓	✓	✓
100, 101, 108, 1098	HP	Shimla	Kalpa	25	✓	✓	✓	✓	✓	✓	✓	✓	✓
100, 101, 108, 1098	HP	Solan	Nalagarh	25	✓	✓	✓	✓	✓	✓	✓	✓	✓
100, 101, 108, 1098	HP	Solan	Nahan	25	✓	✓	✓	✓	✓	✓	✓	✓	✓
100, 101, 108, 1098	HP	Solan	Solan	25	✓	✓	✓	✓	✓	✓	✓	✓	✓
100, 101, 108, 1098	HP	Solan	Arki	25	✓	✓	✓	✓	✓	✓	✓	✓	✓

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. 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 21st January, 2014, the drive tests were conducted for three consecutive days in one select SSA each month in each service area. Thus, the drive tests were carried out in three SSA's namely **Kullu , Shimla and Solan** in the months of April, May and June 2014 respectively. The total route Kms covered during the drive tests in the respective SSAs was **410 Kms, 480 Kms and 385 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 ≥ -75 dBm for in-door coverage and ≥ -85 dBm for in-vehicle.

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

DRIVE TEST TABLE: 1

S/N	Parameter	Days of drive test	Indoor locations	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	Day 1	Kullu Bustand	79	7	119	8	74	7	100	8	72	7	109	8	71	9	123	7	15	15
		Day 2	Gulaba Bag	132	10	84	8	117	7	120	9	112	7	138	14	137	7	147	14	72	15
		Day 3	Balichowk Market	75	8	81	7	72	7	76	8	79	7	97	7	63	7	75	7	28	NS
		Overall SSA		286	25	284	23	263	21	296	25	263	21	344	29	271	23	345	28	115	30
2	Blocked Call Rate	Day 1	Kullu Bustand	1.27%	0.00%	0.84%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 2	Gulaba Bag	0.00%	0.00%	0.00%	0.00%	1.71%	0.00%	0.83%	0.00%	1.79%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 3	Balichowk Market	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.21%	0.00%	0.00%	0.00%	1.59%	0.00%	0.00%	0.00%	0.00%	NS
		Overall SSA		0.35%	0.00%	0.35%	0.00%	0.76%	0.00%	0.34%	0.00%	1.14%	0.00%	0.00%	0.00%	0.37%	0.00%	0.00%	0.00%	0.00%	0.00%
3	Dropped Call Rate (<=2%)	Day 1	Kullu Bustand	0.00%	0.00%	0.85%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 2	Gulaba Bag	0.00%	0.00%	0.00%	0.00%	1.74%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.46%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 3	Balichowk Market	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.59%	0.00%	0.00%	0.00%	0.00%	NS
		Overall SSA		0.00%	0.00%	0.35%	0.00%	0.77%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.11%	0.00%	0.00%	0.00%	0.00%	0.00%

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



S/N	Parameter	Days of drive test	Indoor locations	AIRCEL		AIRTEL		BSNL		IDEA		TATA GSM		RCOM GSM		VODAFONE		RCOM CDMA		TATA CDMA		
				OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR
Percentage connections with good voice quality (=>95%)																						
4	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Day 1	Kullu Bustand	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.17%	100.0%	99.75%	99.88%	
		Day 2	Gulaba Bag	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.82%	100.0%	99.05%	100.0%
		Day 3	Balichowk Market	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	96.04%	100.0%	99.77%	NS
		Overall SSA		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.81%	100.0%	99.31%	99.94%
	(b) 0-5 (with frequency hopping for GSM Operators)	Day 1	Kullu Bustand	98.28%	99.52%	97.22%	98.91%	95.67%	99.83%	98.74%	99.80%	99.38%	99.79%	99.54%	99.78%	96.59%	99.66%	NA	NA	NA	NA	
		Day 2	Gulaba Bag	98.91%	99.83%	93.64%	98.71%	95.34%	97.89%	97.22%	98.33%	99.25%	98.18%	99.40%	99.94%	97.55%	99.26%	NA	NA	NA	NA	
		Day 3	Balichowk Market	98.51%	99.61%	97.14%	99.40%	96.24%	98.37%	97.71%	99.67%	99.24%	92.64%	99.21%	100.0%	98.15%	100.0%	NA	NA	NA	NS	
Overall SSA		98.66%	99.65%	96.00%	98.98%	95.69%	98.84%	97.88%	99.32%	99.29%	96.89%	99.40%	99.64%	97.42%	99.63%	NA	NA	NA	NA			
Service Coverage																						
5	In door (>= - 75dBm)	Day 1	Kullu Bustand	34.76%	98.32%	58.78%	92.79%	28.87%	93.18%	24.25%	98.32%	27.09%	31.78%	47.63%	48.38%	91.32%	0.00%	57.65%	1.46%	95.59%	99.97%	
		Day 2	Gulaba Bag	49.96%	18.07%	81.83%	83.07%	75.55%	58.84%	27.39%	42.85%	51.04%	25.31%	57.73%	34.39%	95.45%	65.43%	81.95%	45.53%	58.26%	98.64%	
		Day 3	Balichowk Market	42.81%	14.54%	54.60%	61.48%	52.22%	21.08%	26.89%	2.15%	43.75%	0.00%	42.99%	50.69%	90.52%	36.57%	57.38%	67.09%	87.74%	NS	
		Overall SSA		45.10%	15.86%	64.63%	82.04%	42.51%	61.18%	26.18%	35.61%	41.29%	19.13%	50.35%	42.39%	93.14%	33.44%	67.84%	39.74%	70.09%	99.29%	
	In-vehicle (>= - 85dBm)	Day 1	Kullu Bustand	68.53%	100.0%	89.82%	99.91%	71.77%	99.82%	45.99%	99.91%	84.19%	97.89%	84.03%	99.49%	93.87%	99.17%	81.72%	100.0%	100.0%	100.0%	
		Day 2	Gulaba Bag	86.07%	93.61%	96.05%	99.11%	95.87%	84.23%	69.36%	83.33%	90.40%	97.80%	91.40%	95.83%	98.75%	94.19%	97.15%	98.28%	80.07%	100.0%	

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



S/N	Parameter	Days of drive test	Indoor locations	AIRCEL		AIRTEL		BSNL		IDEA		TATA GSM		RCOM GSM		VODAFONE		RCOM CDMA		TATA CDMA			
				OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
				Day 3	Balichowk Market	74.73%	61.75%	84.16%	82.32%	85.05%	98.70%	52.24%	37.18%	79.81%	89.92%	85.78%	95.53%	95.57%	95.18%	72.41%	99.20%	95.98%	NS
Overall SSA		79.94%	73.66%	90.11%	95.25%	83.07%	95.01%	56.98%	66.26%	85.56%	95.24%	87.40%	96.75%	96.69%	96.26%	86.34%	98.95%	86.43%	100.0%				
Outdoor-in city (>= 95dBm)	Day 1	Kullu Bustand	96.99%	100.0%	100.0%	100.0%	100.0%	100.0%	88.79%	100.0%	97.08%	99.93%	95.22%	100.0%	98.94%	100.0%	99.99%	100.0%	100.0%	100.0%			
	Day 2	Gulaba Bag	98.87%	99.92%	100.0%	100.0%	100.0%	100.0%	96.75%	99.86%	99.06%	99.91%	99.80%	99.83%	99.96%	100.0%	100.0%	100.0%	99.89%	100.0%			
	Day 3	Balichowk Market	93.88%	99.57%	100.0%	100.0%	100.0%	100.0%	92.98%	99.62%	97.52%	100.0%	98.71%	100.0%	98.31%	100.0%	99.97%	100.0%	100.0%	NS			
	Overall SSA		96.96%	99.70%	100.0%	100.0%	100.0%	100.0%	93.05%	99.78%	98.01%	99.95%	97.96%	99.92%	99.28%	100.0%	99.99%	100.0%	99.93%	100.0%			
	6	Call Setup Success Rate (>=95%)	Day 1	Kullu Bustand	98.73%	100.0%	98.32%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Day 2			Gulaba Bag	100.0%	100.0%	100.0%	100.0%	98.29%	100.0%	99.17%	100.0%	98.21%	100.0%	100.0%	100.0%	98.54%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Day 3			Balichowk Market	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	98.73%	100.0%	100.0%	100.0%	98.41%	100.0%	100.0%	100.0%	100.0%	NS		
Overall SSA				99.65%	100.0%	99.30%	100.0%	99.24%	100.0%	99.66%	100.0%	98.86%	100.0%	100.0%	100.0%	98.89%	100.0%	100.0%	100.0%	100.0%	100.0%		
7	Hand Over Success Rate (HOSR)	Day 1	Kullu Bustand	100.0%	100.0%	100.0%	100.0%	99.10%	100.0%	98.41%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%		
		Day 2	Gulaba Bag	100.0%	100.0%	100.0%	100.0%	99.51%	100.0%	99.13%	100.0%	100.0%	100.0%	100.0%	100.0%	98.71%	100.0%	100.0%	100.0%	100.0%	100.0%		
		Day 3	Balichowk Market	100.0%	100.0%	100.0%	100.0%	99.11%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	NS		
		Overall SSA		100.0%	100.0%	100.0%	100.0%	99.30%	100.0%	99.26%	100.0%	100.0%	100.0%	100.0%	100.0%	99.38%	100.0%	100.0%	100.0%	100.0%	100.0%		

*NA: Not Applicable

*NS: No Service



7.2 OPERATOR ASSISTED DRIVE TEST: SHIMLA SSA (MAY-14)

DRIVE TEST TABLE: 2

S/N	Parameter	Classification of routes covered	Indoor locations	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 Road	Junga Market	90	9	163	7	119	21	78	15	78	8	166	8	126	7	103	8	29	31
		Highway	Degree College Rampur	116	17	119	32	139	30	95	18	74	17	161	15	137	35	104	15	61	34
		Within City	Saraharn Temple	109	20	120	19	78	20	159	42	91	20	148	20	161	20	111	20	89	NS
		Overall SSA		315	46	402	58	336	71	332	75	243	45	475	43	424	62	318	43	179	65
2	Blocked Call Rate	Major Road	Junga Market	0.00%	0.00%	0.00%	0.00%	2.52%	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%
		Highway	Degree College Rampur	0.00%	0.00%	0.00%	0.00%	2.16%	0.00%	2.11%	0.00%	1.35%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Within City	Saraharn Temple	0.00%	0.00%	0.00%	0.00%	1.28%	0.00%	0.63%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	NS
		Overall SSA		0.00%	0.00%	0.00%	0.00%	2.08%	0.00%	0.90%	0.00%	0.41%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
3	Dropped Call Rate (<=2%)	Major Road	Junga Market	0.00%	0.00%	0.00%	0.00%	3.45%	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%
		Highway	Degree College Rampur	0.00%	0.00%	0.00%	0.00%	2.21%	0.00%	1.08%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.64%	0.00%
		Within City	Saraharn Temple	0.00%	0.00%	0.00%	0.00%	2.60%	0.00%	0.63%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	NS
		Overall SSA		0.00%	0.00%	0.00%	0.00%	2.74%	0.00%	0.61%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.56%	0.00%

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



S/N	Parameter	Classification of routes covered	Indoor locations	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
Percentage connections with good voice quality (=>95%)																					
4	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Major Road	Junga Market	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.81%	100.0%	94.20%	100.0%
		Highway	Degree College Rampur	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.79%	100.0%	96.75%	100.0%
		Within City	Saraharn Temple	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.68%	99.92%	98.24%	NS
		Overall SSA		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.11%	99.96%	97.10%	100.0%
	(b) 0-5 (with frequency hopping for GSM Operators)	Major Road	Junga Market	97.14%	97.34%	97.36%	99.34%	88.58%	95.39%	94.97%	96.90%	82.59%	97.18%	97.73%	99.48%	98.22%	99.38%	NA	NA	NA	NA
		Highway	Degree College Rampur	96.75%	97.23%	96.39%	97.29%	88.45%	98.91%	93.20%	99.65%	74.56%	99.06%	97.49%	98.28%	98.71%	98.97%	NA	NA	NA	NA
		Within City	Saraharn Temple	97.11%	99.15%	94.61%	99.38%	94.55%	98.61%	95.38%	99.65%	64.30%	99.95%	98.37%	99.84%	98.71%	99.53%	NA	NA	NA	NS
		Overall SSA		97.00%	98.11%	96.30%	98.34%	90.81%	97.77%	94.63%	99.14%	74.73%	99.33%	97.87%	99.21%	98.57%	99.20%	NA	NA	NA	NA
Service Coverage																					
5	In door (>= - 75dBm)	Major Road	Junga Market	45.91%	87.80%	79.04%	56.91%	42.77%	100.0%	24.16%	0.20%	55.84%	70.23%	50.99%	30.07%	57.16%	99.80%	36.95%	47.70%	61.14%	70.98%
		Highway	Degree College Rampur	43.35%	79.30%	61.49%	97.73%	43.60%	74.28%	27.91%	40.10%	58.25%	66.25%	51.73%	55.05%	70.72%	91.00%	32.71%	92.17%	62.45%	74.50%
		Within City	Saraharn Temple	56.17%	38.70%	74.12%	71.38%	57.89%	13.14%	37.53%	82.60%	69.96%	54.44%	56.17%	61.96%	73.96%	93.00%	49.75%	99.55%	70.83%	NS
		Overall SSA		48.90%	62.55%	72.13%	79.91%	48.19%	65.68%	31.05%	55.40%	60.87%	60.26%	52.92%	53.88%	68.00%	91.91%	40.10%	87.16%	66.46%	72.77%
	In-vehicle (>= -	Major Road	Junga Market	80.35%	99.50%	95.37%	94.18%	90.20%	100.0%	59.55%	26.80%	75.68%	79.83%	91.66%	96.57%	89.59%	100.0%	76.34%	99.60%	89.86%	76.94%

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



S/N	Parameter	Classification of routes covered	Indoor locations	AIRCEL		AIRTEL		BSNL		IDEA		TATA GSM		RCOM GSM		VODAFONE		RCOM CDMA		TATA CDMA			
				OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
				85dBm)	Highway	Degree College Rampur	75.79%	99.10%	87.70%	100.0%	90.92%	99.78%	55.54%	95.30%	76.56%	94.36%	83.76%	98.28%	92.66%	99.00%	71.22%	100.0%	78.46%
	Within City	Saraharn Temple	85.44%	93.20%	90.27%	99.39%	94.94%	99.89%	76.17%	99.29%	90.93%	70.00%	93.19%	99.53%	94.84%	100.0%	77.81%	100.0%	92.57%	NS			
	Overall SSA		80.71%	96.52%	91.46%	98.66%	92.07%	99.88%	66.17%	84.68%	80.64%	80.33%	89.72%	98.56%	92.59%	99.40%	75.17%	99.92%	87.40%	88.37%			
Outdoor-in city (>= 95dBm)	Major Road	Junga Market	98.15%	99.90%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	94.80%	95.88%	99.41%	100.0%	98.97%	100.0%	98.58%	100.0%	99.52%	100.0%			
	Highway	Degree College Rampur	95.93%	99.80%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	94.09%	99.19%	99.68%	100.0%	99.21%	100.0%	97.74%	100.0%	98.22%	99.96%			
	Within City	Saraharn Temple	98.31%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	98.22%	92.45%	99.85%	99.96%	99.28%	100.0%	98.06%	100.0%	99.54%	NS			
	Overall SSA		97.46%	99.91%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	95.66%	95.36%	99.33%	99.98%	99.17%	100.0%	98.12%	100.0%	99.09%	99.98%			
6	Major Road	Junga Market	100.0%	100.0%	100.0%	100.0%	97.48%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%		
	Highway	Degree College Rampur	100.0%	100.0%	100.0%	100.0%	97.84%	100.0%	97.89%	100.0%	98.65%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%			
	Within City	Saraharn Temple	100.0%	100.0%	100.0%	100.0%	98.72%	100.0%	99.37%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	NS			
	Overall SSA		100.0%	100.0%	100.0%	100.0%	97.92%	100.0%	99.10%	100.0%	99.59%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%			
7	Major Road	Junga Market	100.0%	100.0%	100.0%	100.0%	98.11%	100.0%	99.12%	100.0%	99.15%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%			
	Highway	Degree College Rampur	99.08%	100.0%	100.0%	100.0%	97.93%	100.0%	99.39%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%			
	Within City	Saraharn Temple	100.0%	100.0%	99.29%	100.0%	97.54%	100.0%	97.04%	100.0%	99.39%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.87%	NS			
	Overall SSA		99.65%	100.0%	99.68%	100.0%	97.90%	100.0%	98.34%	100.0%	99.51%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.93%			

*NA: Not Applicable; *NS: No Service



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

DRIVE TEST TABLE: 3

S/N	Parameter	Classification of routes covered	Indoor locations	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 Road	Kumar Hatti Market	87	25	142	25	107	25	129	25	97	33	139	25	77	26	104	25	72	28
		Highway	Hotel Ranuka Ji	113	26	107	30	165	25	74	39	72	32	139	25	92	27	83	24	71	15
		Within City	Shalaghat Market	165	26	147	25	138	25	168	26	85	30	120	25	88	33	106	25	129	14
		Overall SSA		365	77	396	80	410	75	371	90	254	95	398	75	257	86	293	74	272	57
2	Blocked Call Rate	Major Road	Kumar Hatti Market	0.00%	0.00%	0.00%	0.00%	0.93%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Highway	Hotel Ranuka Ji	0.00%	0.00%	0.00%	0.00%	1.82%	4.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Within City	Shalaghat Market	0.61%	0.00%	0.00%	0.00%	1.45%	0.00%	0.60%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Overall SSA		0.27%	0.00%	0.00%	0.00%	1.46%	1.33%	0.27%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
3	Dropped Call Rate (<=2%)	Major Road	Kumar Hatti Market	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.78%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Highway	Hotel Ranuka Ji	0.00%	0.00%	0.00%	0.00%	3.70%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		
		Within City	Shalaghat Market	0.00%	0.00%	0.00%	0.00%	2.21%	0.00%	0.60%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		
		Overall SSA		0.00%	0.00%	0.00%	0.00%	2.23%	0.00%	0.54%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		

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



S/N	Parameter	Classification of routes covered	Indoor locations	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	
Percentage connections with good voice quality (=>95%)																						
4	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Major Road	Kumar Hatti Market	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.71%	100%	98.61%	99.22%	
		Highway	Hotel Ranuka Ji	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.78%	100%	97.98%	100%
		Within City	Shalaghat Market	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.58%	99.65%	99.56%	98.84%
		Overall SSA		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.06%	99.88%	98.90%	99.33%
	(b) 0-5 (with frequency hopping for GSM Operators)	Major Road	Kumar Hatti Market	96.54%	98.46%	97.07%	98.62%	97.09%	99.51%	93.89%	99.32%	93.49%	98.81%	96.20%	99.90%	94.84%	99.69%	NA	NA	NA	NA	
		Highway	Hotel Ranuka Ji	97.41%	99.39%	95.88%	98.60%	96.90%	98.79%	94.38%	94.73%	96.94%	98.54%	97.29%	99.90%	95.89%	99.29%	NA	NA	NA	NA	
		Within City	Shalaghat Market	96.41%	99.26%	96.13%	98.87%	96.17%	93.58%	94.23%	99.31%	98.06%	96.77%	97.36%	98.75%	97.17%	99.66%	NA	NA	NA	NA	
		Overall SSA		96.78%	99.03%	96.44%	98.65%	96.70%	96.73%	94.14%	97.57%	96.26%	98.21%	96.94%	99.52%	95.98%	99.55%	NA	NA	NA	NA	
Service Coverage																						
5	In door (>= - 75dBm)	Major Road	Kumar Hatti Market	29.93%	30.58%	58.93%	86.41%	75.38%	81.99%	36.60%	72.69%	38.50%	70.56%	42.69%	87.61%	63.86%	85.40%	46.54%	99.14%	55.94%	49.01%	
		Highway	Hotel Ranuka Ji	18.05%	35.06%	56.79%	81.67%	48.72%	70.72%	32.69%	64.40%	59.37%	82.45%	36.30%	62.15%	61.59%	67.60%	44.16%	94.41%	42.69%	95.20%	
		Within City	Shalaghat Market	43.63%	0.03%	81.54%	31.87%	72.49%	5.59%	55.53%	0.00%	31.20%	0.00%	60.15%	38.57%	87.58%	9.10%	70.45%	50.54%	87.69%	12.90%	
		Overall SSA		30.80%	22.40%	65.64%	79.93%	63.85%	51.10%	44.03%	46.94%	43.78%	60.73%	45.89%	63.31%	70.64%	50.62%	54.94%	81.42%	67.03%	52.18%	
	In-vehicle (>= - 85dBm)	Major Road	Kumar Hatti Market	58.75%	81.30%	83.27%	99.77%	93.16%	99.22%	72.58%	99.77%	68.99%	98.45%	81.68%	99.30%	87.20%	99.30%	83.73%	100%	89.54%	98.78%	
		Highway	Hotel Ranuka Ji	48.62%	72.48%	80.81%	89.80%	76.21%	70.75%	62.67%	97.98%	94.83%	99.14%	77.88%	94.90%	85.59%	28.80%	82.22%	100%	77.52%	100%	

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



S/N	Parameter	Classification of routes covered	Indoor locations	AIRCEL		AIRTEL		BSNL		IDEA		TATA GSM		RCOM GSM		VODAFONE		RCOM CDMA		TATA CDMA			
				OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
6	Outdoor-in city (>= 95dBm)	Within City	Shalaghat Market	74.34%	44.02%	93.89%	74.55%	89.82%	62.66%	84.01%	14.60%	62.41%	81.80%	94.49%	95.09%	98.28%	76.80%	93.39%	58.43%	99.50%	67.22%		
		Overall SSA		60.89%	66.43%	86.04%	95.33%	85.31%	75.46%	75.52%	72.63%	76.32%	95.03%	84.34%	96.50%	90.16%	68.56%	86.96%	86.20%	90.96%	91.02%		
		Major Road	Kumar Hatti Market	88.75%	99.70%	100%	100%	99.80%	99.96%	93.26%	100%	94.84%	99.26%	97.30%	100%	100%	100%	96.88%	100%	99.50%	99.96%		
		Highway	Hotel Ranuka Ji	87.90%	92.86%	99.94%	100%	94.23%	83.18%	90.24%	100%	98.30%	99.15%	94.74%	99.97%	100%	100%	97.92%	100%	96.45%	100%		
	Call Setup Success Rate (>=95%)	Within City	Shalaghat Market	95.39%	95.29%	100%	100%	97.05%	99.29%	96.80%	91.60%	82.85%	99.07%	99.89%	99.80%	100%	100%	99.05%	100%	100%	98.15%		
		Overall SSA		90.85%	95.96%	99.98%	100%	96.65%	93.20%	94.18%	97.39%	92.24%	99.16%	97.22%	99.92%	100%	100%	98.00%	100%	98.93%	99.51%		
		Major Road	Kumar Hatti Market	100%	100%	100%	100%	99.07%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		
		Highway	Hotel Ranuka Ji	100%	100%	100%	100%	98.18%	96.00%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		
	Hand Over Success Rate (HOSR)	Within City	Shalaghat Market	99.39%	100%	100%	100%	98.55%	100%	99.40%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		
		Overall SSA		99.73%	100%	100%	100%	98.54%	98.67%	99.73%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		
		Major Road	Kumar Hatti Market	98.18%	100%	99.27%	100%	98.84%	100%	98.01%	100%	99.14%	100%	100%	100%	100%	100%	100%	100%	99.85%	100%		
		Highway	Hotel Ranuka Ji	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		
Hand Over Success Rate (HOSR)	Within City	Shalaghat Market	100%	100%	100%	100%	99.56%	100%	99.40%	100%	99.03%	100%	100%	100%	100%	100%	100%	100%	100%	100%			
	Overall SSA		99.53%	100%	99.77%	100%	99.60%	100%	99.01%	100%	99.26%	100%	100%	100%	100%	100%	100%	100%	99.95%	100%			
	Major Road	Kumar Hatti Market	98.18%	100%	99.27%	100%	98.84%	100%	98.01%	100%	99.14%	100%	100%	100%	100%	100%	100%	100%	99.85%	100%			
	Highway	Hotel Ranuka Ji	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%			

7.4 DETAIL OF THE ROUTES COVERED DURING THE DRIVE TESTS:

DRIVE TEST TABLE: 4

DRIVE TEST ROUTE OF APRIL TO JUNE - 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
KULLU	Apr-14	Kullu /130KM	Dhaboi,J Ari,Baradha, Manikaran, Lyagi,Malana, Bhuntar, Kasol, Mohal, Shastri Nagar, Bhunter,	Kullu, Lahul /120km	Panogi, Raison, Katrain, Patlipul, Naggar, Prini, Jagatsukh, Manali, Kothi, Solang Nala, Old Manali,	Banzar /160km	Dhalpur, Shamsi, Sadhabhai, Bajwara, Nagwain, Takoli, Pinarsa, Aut,Largi, Balichowki, Banzar, Jibhi
SHIMLA	May-14	Shimla /150KM	1 Shimla A) Major Road--> Ghannati, Ghannati B Ed College, Chakkar, Hp University, Sanjauli, Mehli Bells Institute, Junga B) With In City--> Shimla New Bus Stand, Lakkar Bazar, Victory Tunnel, Old Bus Stand, Himland, Timber House, Mehli Market, Sanjoui Chownk, Kasumpti, Kasumpti Chownk , Khalini Market, Toland, Chotta Shimla, Bcs, Vikas Nagar, C) Highway--> Shimla To Shoghi, (Solan -Shimla Highway), Baluganj, Tootu, Mashobra, Dadha, Sanjoli,	Theoge, Rampur Bushahr / 160km	1) Theoge- A) Major Road--> Snjauli Chownk, Kufri Tourist Camp, Theoge Bus Stop, Kumarsen , Shilaru B) With In City-->Kufri Market, Theoge Market, Cheoge, Sanjauli Market, Narkanda, Bus Stand, Oddi C) Highway--> Kufri To Cheoge, Cheoge To Theoge. Theoge To Shilaru, Shilaru To Narkanda, Narkanda To Oddi, Oddi To Kumar Sen, Kumarsen To Kingal 2) Rampur- A) Major Road-->Rampur Degree College, Nirath Bus Stop, Nogli Village, B) Within City--> Rampur Market, Bsnl Exchange Road Rampur, Nirath Market, Luhri Market C) Highway--> Kingal To Luhari, Luhari To Nirath , Nirath To Nogli, Nogli To Rampur	Rampur Bushahr, Kalpa /170km	1) 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 2) Kalpa- A) Major Road--> Wangtu Village Road, Wangtu Bus Stand, Tapri Bus Stand, B) With In City--> Wangtu Market, Tapri Market Area, C) Highway--> Jeori To Wangtu , Wangtu To Tapri
SOLAN	Jun-14	Nalagarh /110KM	A) Nalagarh-1) Major Road-> Kheda, Rajpura, Sainimazra, Chowkiwala, Nalagarh Bus Stand 2) Within City--> Nalagarh Market, Degree College, Nalagarh Market To Chowki Wal, Sai Road, Industrial Area Baddi, Housing Board Colony, Parwano Market, Kumarhatti Market 3) Highway--> Nalagarh, Kheda, Bagbania, Kharoni, Manpura, Bhud, Sandoli, Baddi, Bathiar, Kothi, Jawli, Dharpur, Kumarhatti	Nahan, Ponta /125 Km	1) Nahan-A) Highway--> Vikaram Bag, Misarwala, Kollar, Dhaula Kuan, Mazra, Puruwala, Batamandi B) With In City-->Nahan Market, Mall Road, Delhi Gate, Degree College, C) Major Road--> Bus Stand, Ghanu Ghat, Chira Wali Colony Raza Bag, Old Market, Housing Colony 2) Ponta-A) Highway--> Rajban, Nehalgarh, Sataun, Bhangani Sahib, B) Major Road--> Batripur, Kedarnagar, Silai Chownk, Chandnidadahu, Renuka, Andheri, C) Within City--> Ypoint, Ponta Market Ponta Gurdwara, Devinagar, Ponta Degree College, Renuka Ji Market	Solan, Arki /150km	A) Solan- 1) Highway--> Nauni, Ochghat, Pujari, Samti 2) Major Road--> Subhatu Chownk, Kallar, Deothi, Chaproli, Subhatu, Kunela Gambherpul, 3) With In City--> Nauni Market, Ochghat Market, Pawan Bihar, Lakkar Bazar, Mall Road, Bus Stand, Champa Ghat, Dc Office, Police Line B) Arki-1) With In City--> Kunihar Market, Arki Market, Shalaghat, Shalaghat Market, 2) Major Road--> Kunihar Busstand, Arki Degree College, Shalaghat Chownk, 3) Highway--> Arki To Shala Ghat, Kunihar To Arki

7.5 SSA WISE DRIVE TEST OBSERVATION:

DRIVE TEST TABLE: 5
DRIVE TEST OBSERVATION OF KULLU SSA - APRIL-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	Kullu	No coverage at Faggu, Chong, Poor Level near Malana	Kullu, Lahul	Poor Level near Haripur	Banzar	---
2	AIRTEL		Poor Level & Quality near Faggu, Chong, Poor Quality near Rajol		---		No coverage between Chanoun, Bhurah
3	BSNL		No coverage at Faggu, Chong, Poor Level & Quality near Malana RD		---		Poor Level near Bharuh
4	TATA GSM		No coverage at Kullu, Malana, Poor Level near Rajol		---		Poor Level & Quality near Bharuh
5	TATA CDMA		---		---		---
6	IDEA		Poor Level near malana, Rajol and No coverage at Faggu, Chong		Poor Level near Haripur		Poor level near Chanoun, Bhurah
7	RCOM GSM		Poor Level near Faggu, Chong, Rajol		Poor Level near Haripur		Poor level near Bhurah
8	RCOM CDMA		Poor Level near Faggu, Chong		---		Poor level & Quality near Chanoun, Bhurah
9	VODAFONE		No coverage at Faggu, Chong, Malana		---		Poor Quality at Kullu Outer

DRIVE TEST TABLE: 6
DRIVE TEST OBSERVATION OF SHIMLA SSA – MAY 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 , Shogi, Chakkar, Ghanatti, Sanjauli, Mehli, Mehli , Junga	Poor Level near Shegi, Kufri Outer	Kufri , Theog, Theog Narkanda, Narkanda Sainj, Sainj ,Rampur	Poor level near Shilaru, narkanda, Luhri	Rampur ,Jeori, Jeori Sarahan, Jeori ,Wangtu, Wangtu Tapri	Poor Level Jakhari, Sarahan
2	AIRTEL		Poor Level & Quality near village ODHI ,RAMPURA		Poor Quality Narkanda		Poor Quality near Jakhari
3	BSNL		Poor Level & Quality near Chakar, Jakhu, Taradevi RD		Poor Level & Qquality Fughu & Kufri		Poor Level & Quality Rampur, Rekongpeo
4	TATA GSM		--		--		--
5	TATA CDMA		Poor Level & Quality near Baluganj, Sogi		No coverage between Matiana, Narkanda, Bithal		No coverage at Jyuri, Sarahan, Nathpa, Jhakri, and Kinnour
6	IDEA		Poor Level near Tara Devi, Sankat Mochan, Circular RD		Poor Level near Bharda		Poor Level near Samgad Utri
7	RCOM GSM		Poor Level near Tara Devi, Sankat Mochan		No coverage between Narkanda to Auddi		Poor Level near Taranda
8	RCOM CDMA		Poor Level near Sanjauli		Poor Level near Bithal, Sonidhar		Poor Level near Kinnour
9	VODAFONE		Poor Level near Tara Devi, Sankat Mochan, Circular RD		Poor Level near Narkanda, Bharda, Rampur Outer		No coverage at Wangtu, Poor Level near Sarahan Outer

DRIVE TEST TABLE: 7
DRIVE TEST OBSERVATION OF SOLAN SSA – JUNE 14

S. No	Name of SP	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRCEL	Nalagarh	Poor Quality near Baddi	Nahan, Poanta & Rajgarh	Poor Level near Ranuka, Poanta Sahib Outer	Solan & Arki	Poor Level near between Arki to Sabathu
2	AIRTEL		---		Poor Level near Ranuka, Satun		Poor Level near Arki
3	BSNL		---		Poor Level near Ranuka, Satun		Poor Level near Arki
4	TATA GSM						
5	TATA CDMA		---		Poor Level at Nahan Outer, No coverage at Chandi & Renuka		No Coverage at Arki, Kunihar, Shalghat, Ganghat, Poor Level near Sapathu
6	IDEA		---		Poor Level near between Ranuka to Satun, near Nahan Outer		Poor Level & Quality near Arki
7	RCOM GSM		---		Poor Level near Nahan Bazar, Saidwal, Poor Level near Ranuka, Poanta Sahib Outer		Poor Level & Quality near Arki, Kunihar
8	RCOM CDMA		Poor Level near Jabli to Dharampur, Dharampur to Kumarhatti		Poor Level near Nahan, between Rajban to Satun		No coverage between Kunihar to Arki, Poor Level between Solan to nauni
9	VODAFONE		Poor Quality near Baddi & Nalagarh Outer		Poor Level between Phindi to Dhaulakuan, Poor Quality at Nahan Outer		Poor Level near Solan, Deothi, between Jadla to Arki

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 April-14:** Drive tests were conducted across the **Kullu SSA** covering Kullu, Banjar and Lahul, 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 Kullu SSA. Only **Airtel** and **Tata (GSM)** could not meet the benchmark of '**Voice quality**' on day 2 (**93.64% - outdoor**) and **Day 3 (92.64% - Indoor)** drive tests respectively. However their performance on overall SSA level was within the norms.
- (iii) **Drive Test in May-14:** Drive tests were conducted in **Simla SSA** covering Simla, Kalpa, Rampur-Bushahar and Theog, The drive tests results indicated that **BSNL** could not perform up to the benchmark for parameters **Call Drop rate (2.74%)** and **Voice quality (90.81%)**. **Idea** and **Tata (GSM)** also failed to meet the benchmark of '**Voice Quality**' with their performance of **94.63%** and **74.73%** respectively.
- (iv) **Drive Test in June-14:** Drive tests were conducted in **Solan SSA** covering Arki, Nahan, Nalagarh, Paonta, and Solan. In this SSA, **BSNL** and **Idea** could not meet the benchmark of the parameters '**Call drop rate**' (**2.23%**) and **Voice Quality (94.14%)** respectively.

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

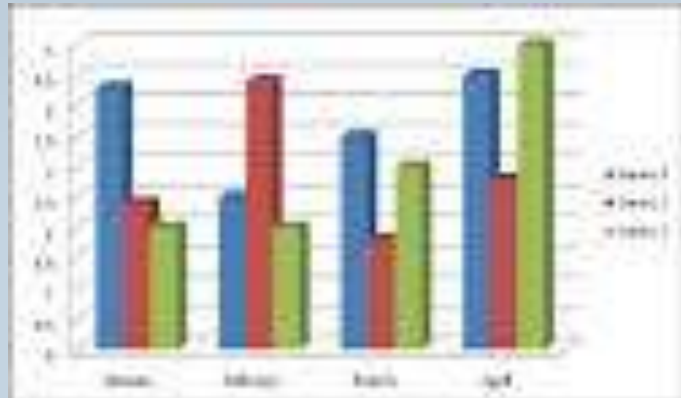
*Thus from the above, it is concluded that Voice Quality and Call drop rate were the area of concern for some of the service providers namely **BSNL, Idea** and **Tata(GSM)** across the above SSAs and the defaulting Service providers need to take corrective actions to improve their network quality.*

8. GRAPHICAL REPRESENTATION (CELLULAR MOBILE SERVICE PROVIDERS)

AVERAGED QUARTERLY PMR

V/S

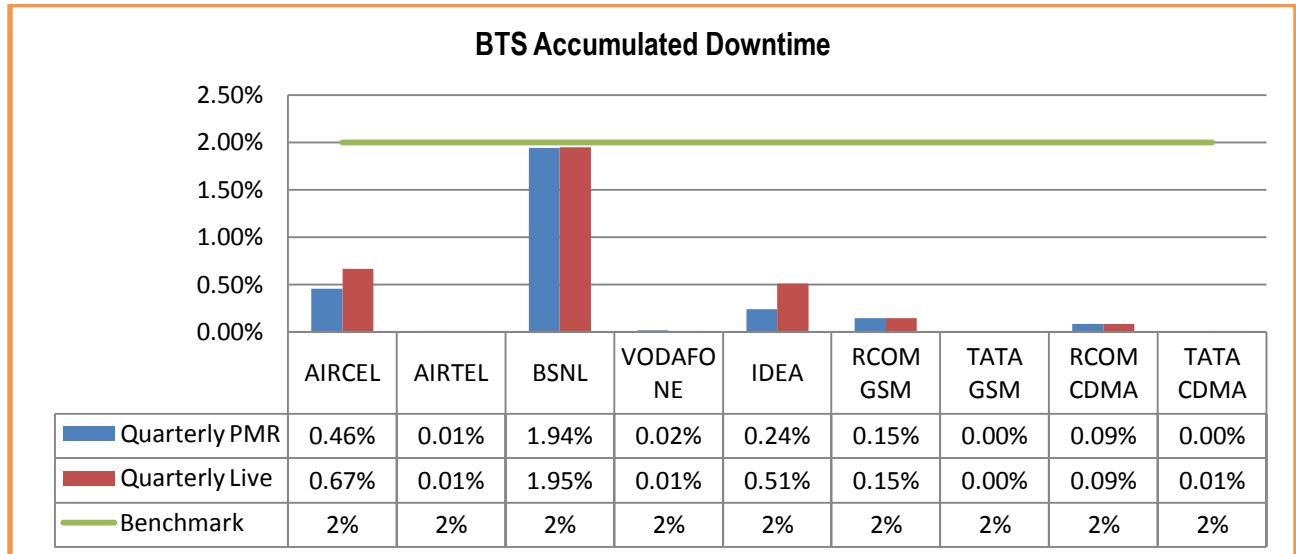
AVERAGED QUARTERLY 3-DAYs LIVE MEASURMENT



8. GRAPHICAL REPRESENTATION:

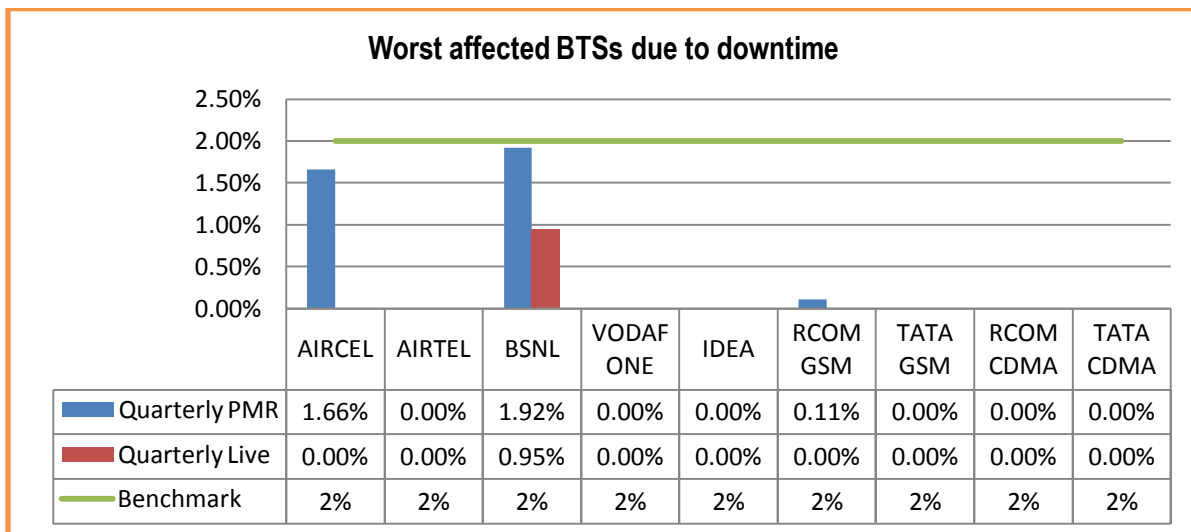
Graphical Representation of Performance of the Cellular Mobile Service Providers (PMR) V/S 3-Days Live Measurement (Quarterly Average Data):

1) BTS ACCUMULATED DOWNTIME :



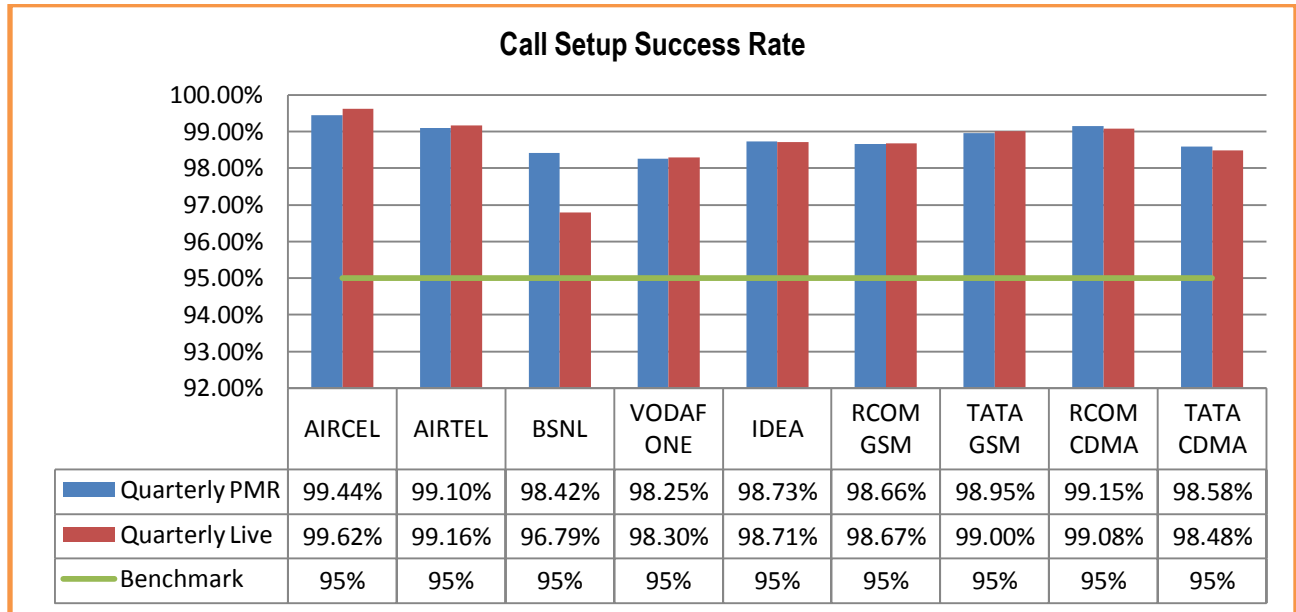
All operators are meeting the benchmarks.

2) WORST AFFECTED BTSS DUE TO DOWNTIME :



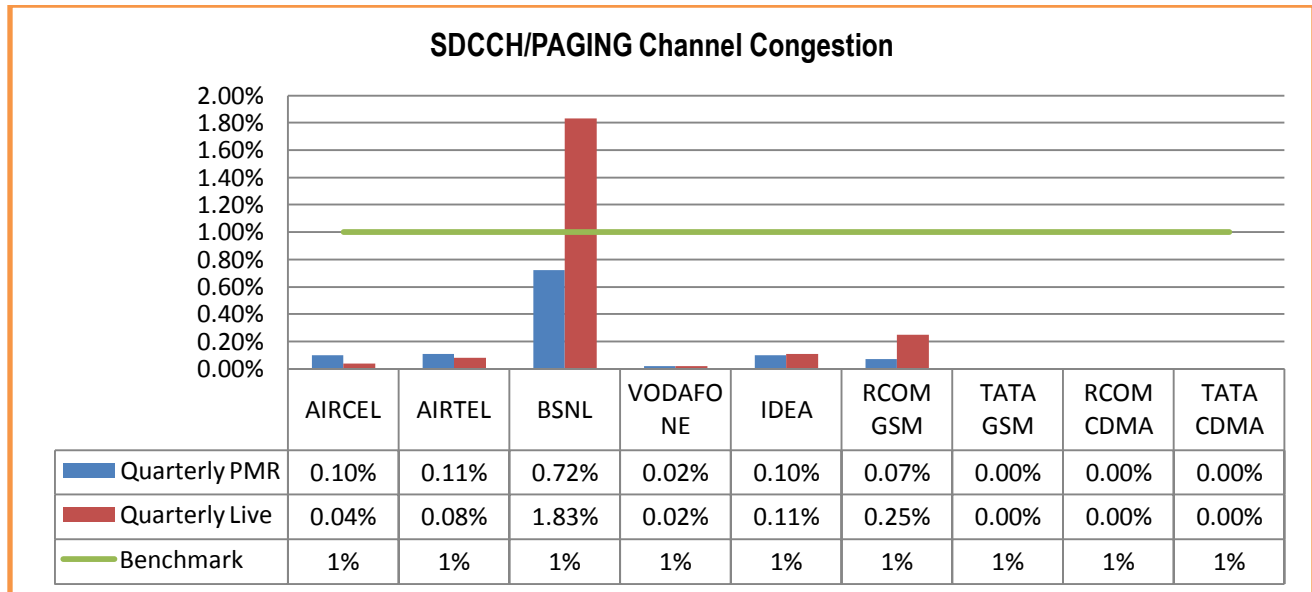
All operators are meeting the benchmarks.

3) CALL SETUP SUCCESS RATE :



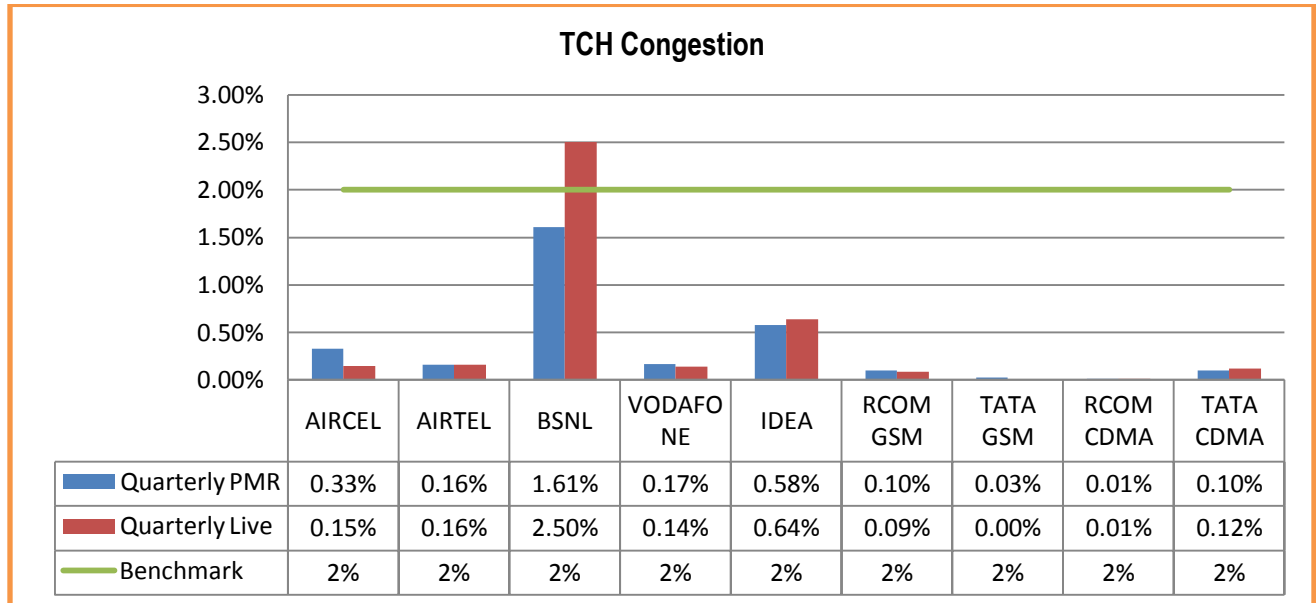
All operators are meeting the benchmarks.

4) SDCCH/PAGING CHANNEL CONGESTION :



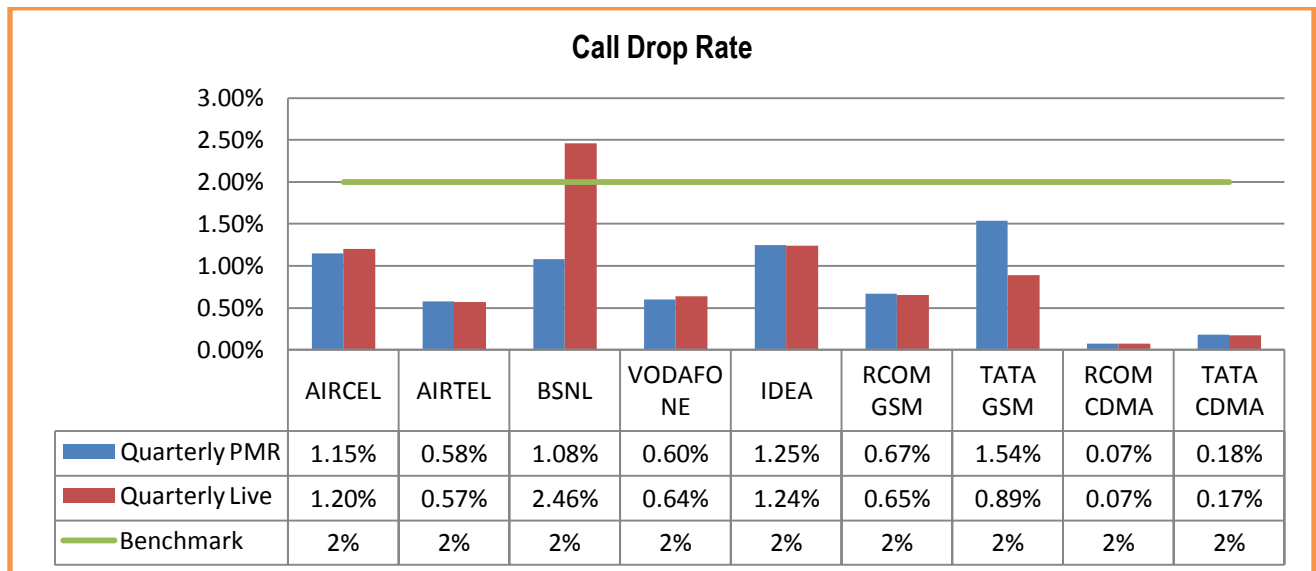
All operators are meeting the benchmarks except BSNL (3 days live).

5) TCH CONGESTION :



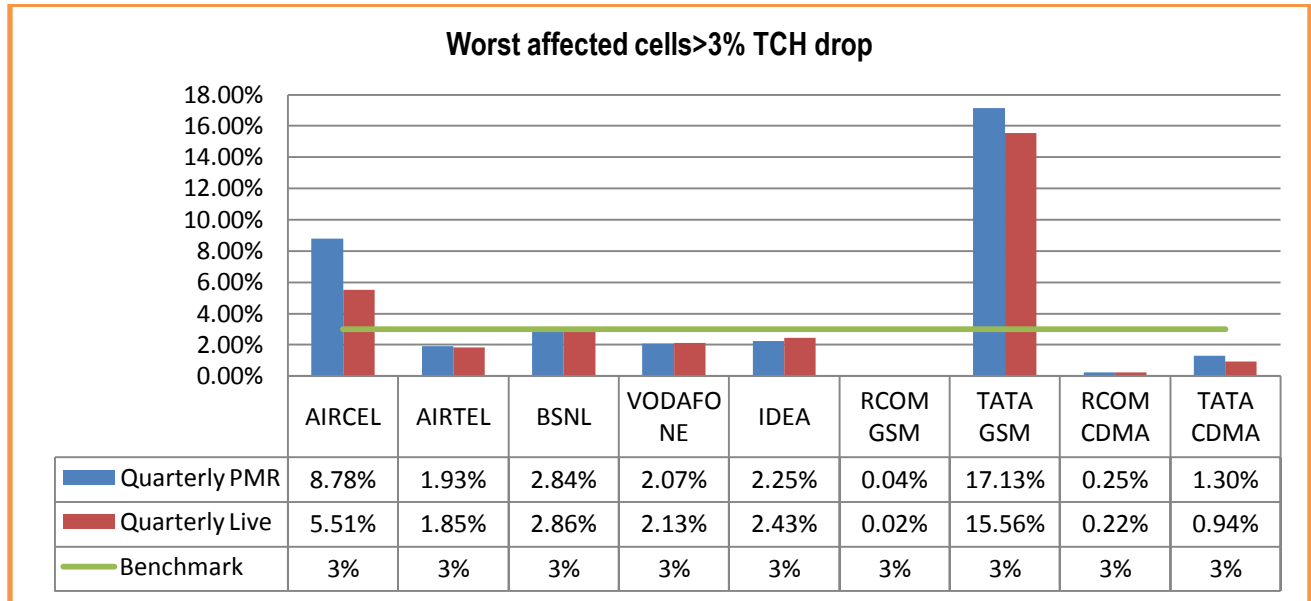
All operators are meeting the benchmarks except BSNL (3 days live data).

6) CALL DROP RATE :



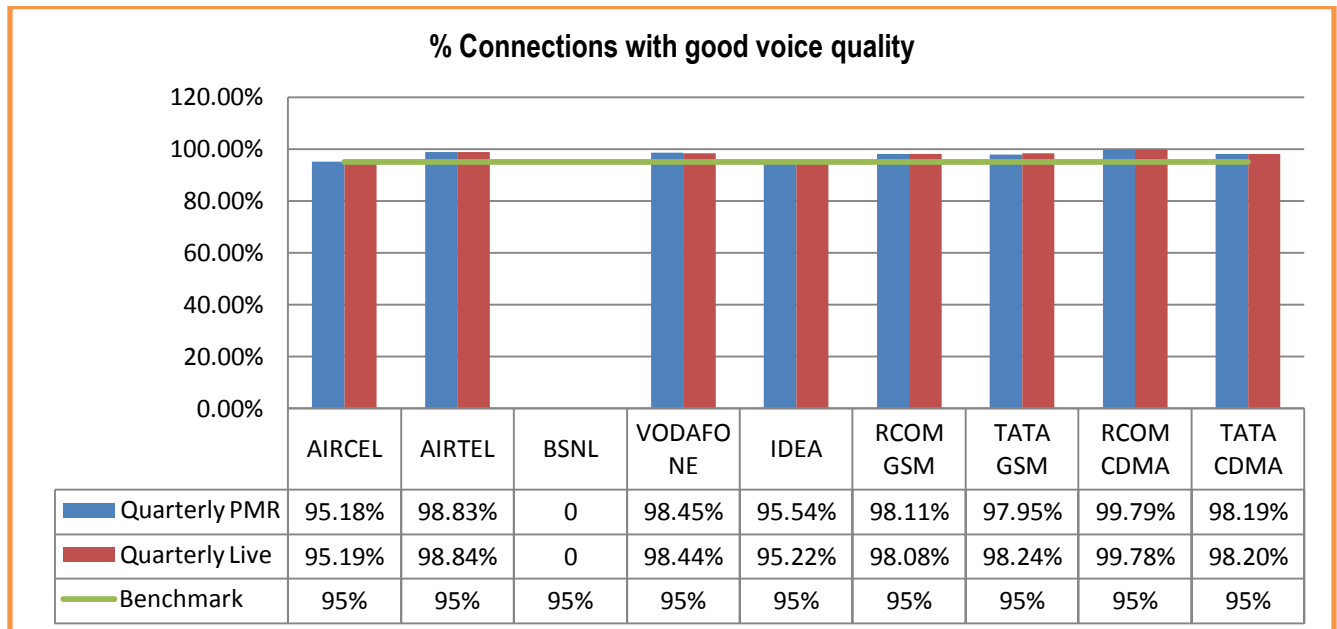
All operators are meeting the benchmarks except BSNL (3 days live data).

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.