



REPORT
ON
AUDIT & ASSESSMENT OF QUALITY OF SERVICE
OF
CELLULAR MOBILE TELEPHONE SERVICE
FOR
TELECOM REGULATORY AUTHORITY OF INDIA
NORTH ZONE – PUNJAB SERVICE AREA
(JANUARY 2014 – MARCH 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 **Punjab circle** against the QoS bench marks laid down by TRAI in the respective regulations.



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1. BACKGROUND





1. BACKGROUND

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

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

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

TRAI, the regulatory watch dog for the Quality of Service for the telecom services – Basic (Wire line), Cellular Mobile (Wireless) and Broadband has commissioned **M/s TUV-SUD South Asia Pvt. Ltd.** for conducting audit and assessment of quality of service of service providers, in terms of the benchmarks specified in the “The Standards of Quality of Service of Basic Telephone Service (Wire line) and Cellular Mobile Telephone Service Regulations, 2009 (7 of 2009) dated 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

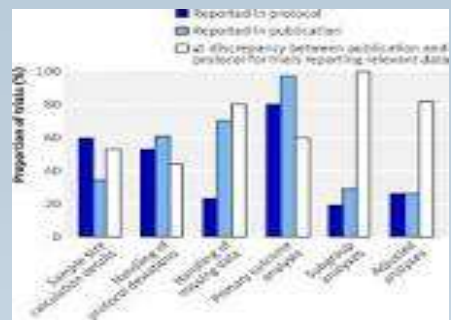
The primary objective is to audit and assess the Quality of Service being rendered by Basic, Cellular Mobile & Broadband service providers against the parameters notified by TRAI.

The audit and assessment of Quality of Service is 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) is undertaken for J&K , Himachal Pradesh & Mumbai circles and for Broadband service, the audit is done for J&K , Himachal Pradesh, Haryana, Delhi & Mumbai Circles during the quarter January – March 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



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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 Punjab circle

Sl. No.	Name of Service Provider	Dates of live measurement Audit			Audit Location
		Jan-14	Feb-14	March-14	Address
1	AIRCEL	12,13,14 Jan	10,11,12 Feb	11,12,13 March	Dishnet Wireless Ltd Office ,Phase -7 Industrial Area,Mohali
2	AIRTEL	7,8,9 Jan	8,9,10 Feb	9,10,11 March	Bharti Airtel Campus, Plot No 21, Rajiv Gandhi Information and Technology Park, Chandigarh, 160101
3	TATA GSM	14,15,16 Jan	11,12,13 Feb	10,11,12 March	TTSL Office Phase-8,Industrial area Mohali
4	BSNL	17,18,19 Jan	8,10,11 Feb	9,10,11 March	BSNL Exchange Sector-49 Chandigarh
5	VIDEOCON	14,15,16 Jan	11,12,13 Feb	11,12,13 March	QTL Office Phase -7 Industrial Area, Mohali
6	RCOM GSM	12,13,14 Jan	8,9,10 Feb	7,8,9 March	Reliance Communications Ltd. Phase-8,Industrial area Mohali
7	IDEA	6,7,8 Jan	10,11,12 Feb	10,11,12 March	Idea Office Phase -7 Industrial Area,Mohali
8	VODAFONE	11,12,13 Jan	6,7,8 Feb	6,7,8 March	Vodafone Office Phase-8,Industrial area Mohali
CDMA Operators					
9	TATA CDMA	14,15,16 Jan	11,12,13 Feb	10,11,12 March	TTSL Office Phase-8,Industrial area Mohali
10	RCOM CDMA	12,13,14 Jan	8,9,10 Feb	7,8,9 March	Reliance Communications Ltd. Phase-8,Industrial area Mohali

For all the above operators, audit was conducted in all the three months of the Quarter ended March 2014.

Transfer of data generated by monthly PMR and 3-days live measurements audit for the period Jan-2014 to Mar-2014 has been successfully uploaded to the server located at TRAI premises.



3.2 SAMPLING FOR BASIC (WIRE LINE) SERVICES

- The QoS audit for basic (wire line) service is to be done for the number of exchanges spread over in about 10% of SDCAs with each service providers in specified circles. **However, QoS audit for basic (wire line) service was not required to be done for Punjab Circle in the quarter ended March 2014.**

3.3 SAMPLING FOR BROADBAND SERVICE PROVIDERS

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

4. EXECUTIVE SUMMARY





4. EXECUTIVE SUMMARY

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

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

**4.1 MONTHLY DATA VERIFICATION FOR CELLULAR
MOBILE SERVICE PROVIDERS
(NETWORK SERVICE QUALITY PARAMETER)**





4.1 SERVICE PROVIDER PERFORMANCE REPORT BASED ON MONTHLY DATA VERIFICATION: NETWORK SERVICE QUALITY PARAMETER- CELLULAR MOBILE SERVICES.

BUSY HOUR OF VARIOUS SERVICE PROVIDERS:

Sl. No.	Name of Service Provider	Month of Audit	Network TCBH Hour
GSM Operators			
1	AIRCEL	March-14	20:00 - 21:00
2	AIRTEL	March-14	20:00 - 21:00
3	BSNL	March-14	19:00 - 20:00
4	IDEA	March-14	20:00 - 21:00
5	RCOM GSM	March-14	19:00 - 20:00
6	TATA GSM	March-14	19:00 - 20:00
7	QUADRANT TELEVENTURES LTD	March-14	20:00 - 21:00
8	VODAFONE	March-14	19:00 - 20:00
CDMA Operators			
9	RCOM CDMA	March-14	19:00 - 20:00
10	TATA CDMA	March-14	19:00 - 20:00

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

SWITCHES/BSC/BTS DETAILS OF OPERATORS:

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	6	602	NSN	NSN
2	AIRTEL	24	56	4954	Ericsson	Ericsson
3	BSNL	15	51	3004	Ericsson & ZTE	Ericsson, ZTE & NSN
4	IDEA	9	52	4543	ZTE	ZTE & Huawei
5	RCOM GSM	3	8	1670	Huawei & Ericsson	ZTE
6	TATA GSM	2	12	1636	NSN	NSN
7	QTL	2	12	2037	Huawei & NSN	Huawei
8	VODAFONE	9	50	4471	Ericsson	Ericsson
CDMA Operators						
9	RCOM CDMA	4	3	900	Lucent, ZTE & Ericsson	Lucent & ZTE
10	TATA CDMA	4	5	459	Ericsson	Huawei & Motorola



TABLES OF MONTHLY QoS PERFORMANCE:

TABLE: 1

CELLULAR MOBILE TELEPHONE SERVICES PUNJAB CIRCLE- JAN-14 MONTH													
PMR Generation Data		Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	QTL	VODAFONE	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%	Jan-14	0.11%	0.05%	0.23%	0.04%	0.12%	0.03%	0.04%	0.02%	0.09%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	Jan-14	0.00%	0.06%	0.74%	0.00%	0.18%	0.00%	0.00%	0.02%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Jan-14	98.45%	99.39%	97.04%	98.42%	99.70%	99.23%	97.57%	99.84%	98.94%	98.81%
	b) SDCCH/PAGING Channel congestion	<=1%	Jan-14	0.01%	0.06%	1.00%	0.07%	0.05%	0.01%	0.07%	0.02%	0.00%	0.00%
	c) TCH congestion	<=2%	Jan-14	0.04%	0.14%	1.42%	0.34%	0.02%	0.05%	0.49%	0.16%	0.00%	0.13%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Jan-14	0.75%	0.47%	1.60%	0.55%	0.27%	0.53%	0.91%	0.59%	0.01%	0.47%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Jan-14	1.25%	0.86%	11.13%	0.53%	0.02%	3.89%	1.10%	1.41%	0.07%	3.86%
	c) Connections with good voice quality	>=95%	Jan-14	98.04%	98.68%	NP	96.95%	99.06%	97.91%	97.70%	98.07%	99.70%	99.03%
4	No. of POI's having >=0.5% POI congestion		Jan-14	0	0	0	0	0	0	0	0	0	0



TABLE: 2

CELLULAR MOBILE TELEPHONE SERVICES PUNJAB CIRCLE- FEB-14 MONTH													
PMR Generation Data		Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	QTL	VODAFONE	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%	Feb-14	0.13%	0.05%	0.32%	0.03%	0.09%	0.04%	0.08%	0.03%	0.10%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	Feb-14	0.00%	0.06%	0.74%	0.02%	0.06%	0.00%	0.00%	0.04%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Feb-14	98.41%	99.40%	96.25%	98.87%	99.69%	99.18%	97.46%	99.84%	99.01%	98.85%
	b) SDCCH/PAGING Channel congestion	<=1%	Feb-14	0.01%	0.04%	0.97%	0.08%	0.01%	0.01%	0.07%	0.03%	0.00%	0.00%
	c) TCH congestion	<=2%	Feb-14	0.05%	0.14%	1.44%	0.19%	0.03%	0.06%	0.49%	0.16%	0.00%	0.08%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Feb-14	0.83%	0.47%	1.50%	0.50%	0.28%	0.56%	0.96%	0.58%	0.01%	0.47%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Feb-14	1.00%	0.77%	8.67%	0.52%	0.04%	3.96%	1.36%	1.28%	0.07%	4.51%
	c) Connections with good voice quality	>=95%	Feb-14	97.84%	98.63%	NP	98.17%	99.05%	97.77%	97.59%	98.07%	99.70%	99.03%
4	No. of POI's having >=0.5% POI congestion		Feb-14	0	0	0	0	0	0	0	0	0	0



TABLE: 3

CELLULAR MOBILE TELEPHONE SERVICES PUNJAB CIRCLE- MAR-14 MONTH													
PMR Generation Data		Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	QTL	VODAFONE	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%	Mar-14	0.09%	0.05%	0.36%	0.05%	0.09%	0.07%	0.06%	0.03%	0.09%	0.02%
	b) Worst affected BTSS due to downtime	<=2%	Mar-14	0.17%	0.06%	1.36%	0.02%	0.06%	0.00%	0.05%	0.11%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Mar-14	98.40%	99.28%	97.47%	97.78%	99.65%	99.08%	97.98%	99.61%	98.86%	98.24%
	b) SDCCCH/PAGING Channel congestion	<=1%	Mar-14	0.04%	0.11%	0.98%	0.13%	0.02%	0.03%	0.08%	0.02%	0.00%	0.00%
	c) TCH congestion	<=2%	Mar-14	0.16%	0.15%	0.98%	0.28%	0.04%	0.11%	0.40%	0.39%	0.00%	0.45%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Mar-14	0.84%	0.50%	1.51%	0.60%	0.30%	0.53%	0.86%	0.55%	0.01%	0.54%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Mar-14	1.22%	0.83%	9.90%	0.67%	0.02%	4.46%	0.84%	1.28%	0.05%	4.91%
	c) Connections with good voice quality	>=95%	Mar-14	97.74%	98.56%	NP	97.57%	99.00%	97.55%	97.51%	98.09%	99.70%	99.00%
4	No. of POI's having >=0.5% POI congestion		Mar-14	0	0	0	0	0	0	0	0	0	0



TABLE OF QUARTERLY QOS PERFORMANCE:

TABLE: 4

QUARTERLY QOS PERFORMANCE (AVERAGE OF QE-MARCH-14) – PUNJAB CIRCLE													
PMR Generation Data		Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	QTL	VODAFONE	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	0.11%	0.05%	0.30%	0.04%	0.10%	0.05%	0.06%	0.03%	0.09%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	0.06%	0.06%	1.05%	0.01%	0.10%	0.00%	0.02%	0.06%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	98.42%	99.36%	97.26%	98.36%	99.68%	99.16%	97.67%	99.76%	98.94%	98.63%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.02%	0.07%	0.98%	0.09%	0.03%	0.02%	0.07%	0.02%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.08%	0.14%	1.28%	0.27%	0.03%	0.07%	0.46%	0.24%	0.00%	0.22%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	0.81%	0.48%	1.54%	0.55%	0.28%	0.54%	0.91%	0.57%	0.01%	0.49%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	1.22%	0.82%	9.90%	0.57%	0.03%	4.10%	1.10%	1.32%	0.06%	4.43%
	c) Connections with good voice quality	>=95%	Quarterly	97.87%	98.62%	NP	97.56%	99.04%	97.74%	97.60%	98.08%	99.70%	99.02%
4	No. of POI's having >=0.5% POI congestion		Quarterly	0	0	0	0	0	0	0	0	0	0

KEY FINDINGS: CELLULAR MOBILE SERVICES

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

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 Punjab circle, all the operators were found meeting benchmark on 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 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.

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 (0.03 %) 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 met the benchmark for this parameter except **BSNL, Tata (GSM) and Tata (CDMA)**. The quarterly averaged performance of BSNL, Tata (GSM) and Tata (CDMA) for this parameter was 9.90 %, 4.10% and 4.43% respectively.

Aircel has provided the data on monthly basis but not on daily basis. For audit purpose, data was required on daily basis.

iii. Connections with good voice quality:

Some of the Operators are measuring this parameter through the system generated data at their switches whereas some are measuring through their periodic drive tests. The audit results for this parameter indicates that all operators have met the bench mark successfully during the quarter. BSNL is not getting the data generated by the system for this parameter, so not provided the data for this parameter.

4.2 CUSTOMER SERVICE QUALITY (CSD) PARAMETERS





4.2 CUSTOMER SERVICE QUALITY PARAMETERS MEASUREMENT-QE MARCH-14:

CSD DATA FOR CELLULAR MOBILE TELEPHONE SERVICES-QE MARCH-14

Quarterly CSD Audit Data		Bench- mark	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	QTL	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		Punjab	12411	522717	39734	610602	33759	54297	NA	380896	59200	22739
	B) No. of bills disputed including billing complaints during the quarter		Punjab	0	273	23	212	30	0	NA	84	54	0
	C)% of billing complaints during the quarter	<= 0.1%	Punjab	0.00%	0.05%	0.06%	0.03%	0.09%	0.00%	NA	0.02%	0.09%	0.00%
2 Metering & Billing Credibility -Pre Paid													
	A) Total No. of Pre-paid customers at the end of the quarter		Punjab	882974	6912855	45044536	5234241	2535439	1701098	2122026	4286539	299803	359317
	B) Total No. of complaints relating to charging, Credit and Validity during the quarter		Punjab	273	122	163	364	2514	0	25	170	289	0
	C) % of Pre-paid Charging Complaints	<= 0.1%	Punjab	0.03%	0.00%	0.00%	0.01%	0.10%	0.00%	0.00%	0.00%	0.10%	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		Punjab	273	395	186	576	2544	0	25	254	343	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		Punjab	273	395	186	576	2544	0	25	254	343	0
	C) % of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 4 weeks	100 % within 4 week	Punjab	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	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	Punjab	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%	NA
4 Response time to customers for assistance													
	A) Accessibility of call centre/Customer Care	>=95%	Punjab	98.25%	100.00%	100.00%	99.91%	98.95%	99.12%	95.74%	100.00%	98.94%	98.18%
	B) % call answered by operators(voice to voice) within 60 sec.	>=90%	Punjab	92.40%	93.35%	25.49%	98.50%	89.31%	92.69%	91.49%	95.54%	92.52%	95.46%



5	Termination/closure of service												
	A) Total No. of requests for Termination / Closure of service received during the quarter		Punjab	109	3586	300	7267	345	534	NA	2323	199	318
	B) No. of requests for Termination / Closure of service complied within 7 days during the quarter		Punjab	109	3586	300	7267	345	534	NA	2323	199	318
	C) % of Termination/ Closure of service within 7 days	<=7days	Punjab	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%
6	Time taken for refunds of deposits after closures.												
	A) No. of Payments/ Refunds due during the quarter		Punjab	16	559	200	278	292	170	NA	501	379	118
	B) No. of Payments/ Refunds Cleared during the quarter		Punjab	16	559	200	278	292	170	NA	501	379	118
	C) Time taken for refunds of deposits after closures.	100% within 60 days	Punjab	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%

NA: Not Applicable

KEY FINDINGS:

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 <=0.1 %. Quadrant Televentures Ltd (QTL) has no post-paid customers, so not provided the data for billing related parameters applicable for post-paid subscribers.

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 meeting the benchmarks of the above parameters

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. **BSNL and RCOM (GSM)** have not met the benchmark of 'calls answered by Operators (voice to voice) within 60 seconds'. They could achieve their performance level as **25.49%** and **89.31%** respectively against the benchmark of >=90%.The performance of **BSNL** with respect to this parameter (**25.49%**) was very poor which needs special attention of BSNL.



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.

**4.3 3-DAYS LIVE MEASUREMENT DATA VERIFICATION FOR
CELLULAR MOBILE SERVICE PROVIDERS
(NETWORK SERVICE QUALITY PARAMETER)**





4.3 SERVICE PROVIDER PERFORMANCE REPORT BASED ON 3-DAYS LIVE MEASUREMENT DATA VERIFICATION CONDUCTED IN EACH MONTH OF THE QUARTER:

A) NETWORK SERVICE QUALITY PARAMETER- CELLULAR MOBILE SERVICES

TABLE: 1

CELLULAR MOBILE TELEPHONE SERVICES PUNJAB CIRCLE- JAN-14 MONTH													
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	QTL	VODAFONE	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	0.10%	0.03%	0.22%	0.01%	0.13%	0.04%	0.08%	0.01%	0.06%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.10%	0.00%	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	98.30%	99.49%	97.12%	98.58%	99.71%	99.28%	97.85%	99.85%	99.11%	99.00%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.01%	0.04%	0.56%	0.05%	0.12%	0.00%	0.05%	0.02%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.02%	0.10%	1.46%	0.34%	0.02%	0.02%	0.43%	0.15%	0.00%	0.04%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.69%	0.45%	1.51%	0.55%	0.27%	0.49%	0.87%	0.56%	0.01%	0.45%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	4.38%	0.94%	12.88%	0.50%	0.00%	3.91%	1.05%	1.44%	0.04%	3.44%
	c) Connections with good voice quality	>=95%	Live data	98.14%	98.71%	NP	96.86%	99.08%	97.98%	97.75%	98.04%	99.70%	99.04%
4	No. of POI having >=0.5% congestion		Live data	0	0	0	0	0	0	0	0	0	0



TABLE: 2

CELLULAR MOBILE TELEPHONE SERVICES PUNJAB CIRCLE- FEB-14 MONTH													
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	QTL	VODAFONE	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	0.14%	0.02%	0.36%	0.03%	0.10%	0.02%	0.03%	0.05%	0.15%	0.03%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.06%	0.00%	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	98.40%	99.40%	97.25%	98.96%	99.67%	99.23%	97.64%	99.85%	98.92%	98.83%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.00%	0.03%	0.95%	0.09%	0.01%	0.01%	0.05%	0.01%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.01%	0.13%	1.49%	0.17%	0.03%	0.05%	0.44%	0.15%	0.00%	0.08%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.76%	0.48%	1.50%	0.46%	0.29%	0.52%	1.03%	0.58%	0.01%	0.46%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	4.84%	0.84%	8.84%	0.50%	0.00%	3.70%	1.70%	1.33%	0.06%	4.01%
	c) Connections with good voice quality	>=95%	Live data	97.86%	98.61%	NP	98.35%	99.03%	97.88%	97.62%	98.05%	99.71%	99.04%
4	No. of POI having >=0.5% congestion		Live data	0	0	0	0	0	0	0	0	0	0



TABLE: 3

CELLULAR MOBILE TELEPHONE SERVICES PUNJAB CIRCLE- MAR-14 MONTH													
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	QTL	VODAFONE	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	0.22%	0.03%	0.86%	0.14%	0.10%	0.14%	0.19%	0.01%	0.06%	0.03%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.33%	0.00%	0.00%	0.00%	0.05%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	98.35%	99.35%	96.95%	98.78%	99.67%	99.10%	97.81%	99.86%	98.97%	98.35%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.17%	0.05%	0.97%	0.11%	0.02%	0.00%	0.11%	0.05%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.03%	0.17%	1.34%	0.26%	0.04%	0.06%	0.45%	0.14%	0.00%	0.14%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.83%	0.47%	1.80%	0.56%	0.29%	0.52%	0.89%	0.52%	0.00%	0.48%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	4.69%	0.87%	14.25%	0.73%	0.00%	4.37%	0.88%	1.13%	0.01%	3.82%
	c) Connections with good voice quality	>=95%	Live data	97.78%	98.59%	NP	97.88%	99.00%	97.76%	97.56%	98.14%	99.70%	99.05%
4	No. of POI having >=0.5% congestion		Live data	0	0	0	0	0	0	0	0	0	3



TABLES OF QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT DATA:

TABLE: 4

QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT (AVERAGE OF QE-MARCH-14) – PUNJAB CIRCLE													
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	QTL	VODAFONE	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	0.15%	0.03%	0.48%	0.06%	0.11%	0.07%	0.10%	0.02%	0.09%	0.02%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	0.00%	0.00%	0.16%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	98.35%	99.41%	97.11%	98.77%	99.68%	99.20%	97.77%	99.85%	99.00%	98.73%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.06%	0.04%	0.83%	0.08%	0.05%	0.00%	0.07%	0.03%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.02%	0.13%	1.43%	0.26%	0.03%	0.04%	0.44%	0.15%	0.00%	0.09%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	0.76%	0.47%	1.60%	0.52%	0.28%	0.51%	0.93%	0.55%	0.01%	0.46%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	4.64%	0.88%	11.99%	0.58%	0.00%	3.99%	1.21%	1.30%	0.04%	3.76%
	c) Connections with good voice quality	>=95%	Quarterly	97.93%	98.64%	NP	97.70%	99.04%	97.87%	97.64%	98.08%	99.70%	99.04%
4	No. of POI having >=0.5% congestion		Quarterly	0	0	0	0	0	0	0	0	0	1

KEY FINDING ON 3 DAYS LIVE MEASUREMENTS:

From three days live measurement assessment, it was found that the performance of all operators was satisfactory as they were largely meeting the benchmarks except for the parameter ‘Worst affected cells> 3 % TCH drops’. The benchmark for this parameter was not met by **Aircel, BSNL, Tata (GSM) and Tata (CDMA)** during the live measurements in all three months of the Quarter ended March-2014. The quarterly average performance of **Aircel, BSNL, Tata (GSM) and Tata (CDMA)** was 4.64%, 11.99%, 3.99% and 3.76% respectively, during the live measurements in three months of the quarter. *The similar non-compliance of BSNL, Tata (GSM) and Tata (CDMA) has been observed in monthly audit. Tata (CDMA) was having congestion on three individual POIs namely Vodafone, BSNL (Malerkotla tandem) and BSNL- Ferozpur tandem in the month of March-2014.*

*From the above analysis, it is concluded that the performance of **Aircel, BSNL, Tata (GSM) and Tata (CDMA)** is not satisfactory in respect of the parameter “Worst affected cells> 3 % TCH drops”.*



B) CUSTOMER SERVICE QUALITY PARAMETER- CELLULAR MOBILE SERVICES

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

3 days live CSD Audit Data		Bench- mark	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	VIDEOCON	VODAFONE	RCOM (CDMA)	TATA (CDMA)
S/ N	Name of Parameter			GSM Operators									
RESPONSE TIME TO CUSTOMERS FOR ASSISTANCE													
1	Total no of calls attempted to customer care/Call center		Punjab	1948	21688	2857	15460	77967	5759	2499	118177	3795	752
	Total no. of calls successfully established to customer care/Call center		Punjab	1944	21688	2857	15460	77024	5706	2499	118177	3741	750
	% Accessibility of Call centre /customer Care (Total call successfully established*100 / Total call attempt)	>=95%	Punjab	99.79%	100.00%	100.00%	100.00%	98.79%	99.08%	100.00%	100.00%	98.58%	99.73%
	Total Calls reached to agent desk for Voice to Voice (Total call attempt)		Punjab	5065	48269	5145	38265	24305	7279	27863	28454	1095	489
	Total number of calls answered by the operator (Voice to voice) within 60 seconds		Punjab	4831	45609	772	37799	23828	6839	25296	27919	1023	474
	% age of calls answered by operator(voice to voice) (Total call successfully established within 60 Sec.*100 / Total call attempt)	>=90%	Punjab	95.38	94.49%	15.00%	98.78%	98.04%	93.96%	90.79%	98.12%	93.42%	96.93%



CUSTOMER CARE / HELPLINE ASSESSMENT

LIVE CALLING TO CALL CENTRE

Parameter	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	VIDEOCON	VODAFONE	RCOM (CDMA)	TATA (CDMA)
Total No. of calls Attempted	Punjab	100	100	100	100	100	100	100	100	100	100
Total no of calls attempted to customer care/Call center	Punjab	100	100	100	100	100	100	100	100	100	100
Total no. of calls successfully established to customer care/Call center	Punjab	100	100	100	100	100	100	100	100	100	100
% Accessibility of Call centre / customer Care (Total call successfully established *100 / Total call attempt)	Punjab	100.00%	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)	Punjab	100	100	100	100	100	100	100	100	100	100
Total number of calls answered by the operator (Voice to voice) within 60 seconds	Punjab	100	100	60	100	100	92	100	92	100	100
% age of calls answered by operator(voice to voice) (Total call successfully established within 60 Sec.*100 / Total call attempt)	Punjab	100.00%	100.00%	60.00%	100.00%	100.00%	92.00%	100.00%	92.00%	100.00%	100.00%

KEY FINDINGS: The results for three days live measurements reveal that all operators have met the benchmarks for the parameters 'Accessibility to call center and call connection to operators (Voice to voice) within 60 seconds except **BSNL** which have performed with **15%** of calls connected to operator within 60 seconds. **Thus performance of BSNL is very poor with respect to this parameter and similar to the quarterly audit.**

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, Tata (GSM) and Vodafone**, they can achieve its performance as 60%, 92% and 92%, respectively.

INTER OPERATOR CALLS ASSESSMENT





INTER OPERATOR CALLS ASSESSMENT

Inter operator call assessment with a sample of 2x50 test calls for each Service provider operating in Punjab 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	RCOM (GSM)	TATA (GSM)	QTL	VODAFONE	RCOM (CDMA)	TATA (CDMA)
AIRCEL	<i>Punjab</i>	--	100%	100%	100%	100%	100%	100%	100%	100%	100%
AIRTEL	<i>Punjab</i>	100%	--	100%	100%	100%	100%	100%	100%	100%	100%
BSNL	<i>Punjab</i>	100%	100%	--	100%	100%	100%	100%	100%	100%	100%
IDEA	<i>Punjab</i>	100%	100%	100%	--	100%	100%	100%	100%	100%	100%
RCOM (GSM)	<i>Punjab</i>	100%	100%	100%	100%	--	100%	100%	100%	100%	100%
TATA (GSM)	<i>Punjab</i>	100%	100%	100%	100%	100%	--	100%	100%	100%	100%
QTL	<i>Punjab</i>	100%	100%	100%	100%	100%	100%	--	100%	100%	100%
VODAFONE	<i>Punjab</i>	100%	100%	100%	100%	100%	100%	100%	--	100%	100%
RCOM (CDMA)	<i>Punjab</i>	100%	100%	100%	100%	100%	100%	100%	100%	--	100%
TATA (CDMA)	<i>Punjab</i>	100%	100%	100%	100%	100%	100%	100%	100%	100%	--

The result of the testing revealed that the inter connection performance among the operators was quite satisfactory as there was hardly any problem in interconnection from one operator to other operators which indicated there was no congestion on the individual POIs of the service providers.

LEVEL-1 LIVE CALLING





LEVEL-1 LIVE CALLING

LEVEL 1 LIVE CALLING													
Emergency no.	Circle Name	SDCA Name	No. of calls made	AIRCEL	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	QTL	VODAFONE	RCOM (CDMA)	TATA (CDMA)
100,101,108	Punjab	Amritsar City	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101,108	Punjab	Amritsar Outer	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101,108	Punjab	Ajnala	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101,108	Punjab	Patti	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101,108	Punjab	Taran Taran	5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101,108	Punjab	Raiyya	5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101,108	Punjab	Bathinda	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101,108	Punjab	Mansa	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101,108	Punjab	Phulmandi	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101,108	Punjab	Raman	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101,108	Punjab	Sardulgarh	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101,108	Punjab	Hoshiarpur	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101,108	Punjab	Tanda	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101,108	Punjab	Dasuya	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101,108	Punjab	Balachaur	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100,101,108	Punjab	Garhshankar	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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 SSA of Punjab service areas, the emergency services as mentioned in the above table were found functional in the networks of all the service providers.

5. DRIVE TEST





5. 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 Amritsar, Bhatinda and Hosiarpur** in the months of January, February and March 2014 respectively, covering minimum 300 Km distance in each SSA. 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.

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DRIVE TEST TABLE: 1

OPERATOR-ASSISTED DRIVE TEST ATAMRITSAR SSA IN JAN-14 MONTH- PUNJAB CIRCLE													
S/N	Parameter	SSA Name: Amritsar	Drive Test Period	AIRCEL	AIRTEL	BSNL	TATA GSM	IDEA	RCOM GSM	VIDEOCON	VODAFONE	TATA CDMA	RCOM CDMA
				GSM Operators								CDMA Operators	
1	Call Attempts	Day 1	Jan-14	117	127	123	108	171	179	178	139	132	148
		Day 2	Jan-14	111	138	86	91	113	129	120	100	93	108
		Day 3	Jan-14	131	149	115	94	141	121	149	124	103	119
		Overall SSA	Total	359	414	324	203	425	429	447	363	328	375
2	Blocked Call Rate	Day 1	Jan-14	1.71%	0.00%	2.44%	3.70%	0.58%	22.35%	0.00%	0.00%	0.00%	2.03%
		Day 2	Jan-14	0.00%	0.00%	1.16%	1.10%	0.00%	15.50%	0.00%	0.00%	0.00%	0.00%
		Day 3	Jan-14	0.76%	0.00%	2.61%	1.06%	0.71%	0.83%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	Total	0.84%	0.00%	2.16%	2.05%	0.47%	14.22%	0.00%	0.00%	0.00%	0.80%
3	Dropped Call Rate (<=2%)	Day 1	Jan-14	1.74%	0.00%	2.50%	1.92%	0.00%	2.88%	0.00%	0.00%	0.00%	0.69%
		Day 2	Jan-14	0.00%	0.00%	0.00%	0.00%	0.00%	0.92%	0.00%	0.00%	0.00%	0.00%
		Day 3	Jan-14	0.00%	0.00%	0.00%	0.00%	0.00%	0.83%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	Total	0.56%	0.00%	0.95%	0.70%	0.00%	1.63%	0.00%	0.00%	0.00%	0.27%
PERCENTAGE CONNECTIONS WITH GOOD VOICE QUALITY (=>95%)													
4	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Day 1	Jan-14	NA	NA	NA	NA	NA	NA	NA	NA	99.30%	98.97%
		Day 2	Jan-14	NA	NA	NA	NA	NA	NA	NA	NA	99.49%	99.70%
		Day 3	Jan-14	NA	NA	NA	NA	NA	NA	NA	NA	99.75%	98.45%
		Overall SSA	Total	NA	NA	NA	NA	NA	NA	NA	NA	99.49%	99.00%
	(b) 0-5 (with frequency hopping for GSM Operators)	Day 1	Jan-14	95.01%	95.78%	89.82%	94.66%	95.26%	96.65%	95.34%	97.53%	NA	NA
		Day 2	Jan-14	97.87%	96.59%	91.73%	96.53%	96.81%	96.34%	97.54%	98.94%	NA	NA
		Day 3	Jan-14	98.53%	95.82%	97.42%	98.97%	98.80%	96.92%	97.01%	98.98%	NA	NA
		Overall SSA	Total	96.19%	96.05%	93.76%	96.68%	96.86%	96.64%	96.49%	98.36%	NA	NA
SERVICE COVERAGE													
5	In door (>= -75dBm)	Day 1	Jan-14	38.97%	95.05%	82.89%	70.14%	98.74%	50.60%	70.71%	97.63%	77.21%	85.60%
		Day 2	Jan-14	29.31%	87.08%	76.66%	29.83%	90.51%	21.13%	41.18%	85.35%	26.56%	75.20%
		Day 3	Jan-14	59.23%	90.31%	89.78%	72.28%	93.07%	25.12%	42.73%	94.54%	28.19%	78.51%
		Overall SSA	Total	42.99%	90.93%	84.74%	59.94%	94.65%	33.82%	53.36%	93.59%	47.63%	80.65%
5	In-vehicle (>= -85dBm)	Day 1	Jan-14	92.20%	99.89%	97.28%	91.69%	99.98%	82.61%	96.18%	99.76%	95.10%	94.34%
		Day 2	Jan-14	84.25%	99.10%	98.58%	87.91%	99.65%	67.07%	87.87%	97.75%	71.55%	89.71%
		Day 3	Jan-14	88.08%	99.25%	99.26%	94.17%	99.96%	69.08%	84.88%	99.82%	72.20%	92.36%
		Overall SSA	Total	88.76%	99.42%	98.53%	91.54%	99.88%	73.74%	90.16%	99.27%	81.31%	92.50%
5	Outdoor- in city (>= -95dBm)	Day 1	Jan-14	99.66%	99.99%	100.00%	99.44%	100.00%	96.57%	99.83%	100.00%	99.74%	99.94%
		Day 2	Jan-14	99.35%	99.99%	100.00%	99.78%	100.00%	94.77%	99.57%	100.00%	96.83%	98.86%
		Day 3	Jan-14	98.09%	100.00%	100.00%	99.88%	100.00%	95.10%	99.00%	100.00%	98.83%	99.54%
		Overall SSA	Total	99.07%	99.99%	100.00%	99.69%	100.00%	95.57%	99.48%	100.00%	98.64%	99.53%
6	Call Setup	Day 1	Jan-14	98.29%	100.00%	97.56%	96.30%	99.42%	77.65%	100.00%	100.00%	100.00%	97.97%

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	Success Rate (>=95%)	Day 2	Jan-14	100.00%	100.00%	98.84%	98.90%	100.00%	84.50%	100.00%	100.00%	100.00%	100.00%
		Day 3	Jan-14	99.24%	100.00%	97.39%	98.94%	99.29%	99.17%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	Total	99.16%	100.00%	97.84%	97.95%	99.53%	85.78%	100.00%	100.00%	100.00%	99.20%
7	Hand Over Success Rate (HOSR)	Day 1	Jan-14	100.00%	100.00%	96.20%	97.63%	98.82%	100.00%	97.58%	99.49%	100.00%	100.00%
		Day 2	Jan-14	100.00%	99.51%	99.26%	97.92%	99.52%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 3	Jan-14	97.22%	100.00%	99.18%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	Total	99.17%	99.85%	97.56%	98.09%	99.38%	100.00%	98.75%	99.77%	100.00%	100.00%

*NA: Not Applicable.

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DRIVE TEST TABLE: 2

OPERATOR-ASSISTED DRIVE TEST ATAMRITSAR SSA IN JAN-14 MONTH- PUNJAB CIRCLE - INDOOR

S/N	Parameter	Amritsar SSA	Drive Test Period	Indoor Location	AIRCEL	AIRTEL	BSNL GSM	TATA GSM	IDEA	RCOM GSM	QTL	VODAFONE	TATA CDMA	RCOM CDMA	
					GSM Operators								CDMA Operators		
1	Call Attempts	Day 1	Jan-14	Thrilum Mall	11	12	17	4	21	11	18	9	15	11	
		Day 2	Jan-14	Bus Stand Majethia	6	12	6	5	7	9	7	7	8	9	
		Day 3	Jan-14	Khalsa Auto Works	9	9	9	5	9	9	9	10	9	9	
		Overall SSA	Jan-14		26	33	32	14	37	29	34	26	32	29	
2	Blocked Call Rate	Day 1	Jan-14	Thrilum Mall	0.00%	0.00%	5.88%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Day 2	Jan-14	Bus Stand Majethia	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Day 3	Jan-14	Khalsa Auto Works	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Overall SSA	Jan-14		0.00%	0.00%	3.13%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
3	Dropped Call Rate (<=2%)	Day 1	Jan-14	Thrilum Mall	9.09%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Day 2	Jan-14	Bus Stand Majethia	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Day 3	Jan-14	Khalsa Auto Works	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Overall SSA	Jan-14		3.85%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
Percentage connections with good voice quality (=>95%)															
4	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Day 1	Jan-14	Thrilum Mall	NA	NA	NA	NA	NA	NA	NA	NA	99.74%	99.19%	
		Day 2	Jan-14	Bus Stand Majethia	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.20%	99.78%
		Day 3	Jan-14	Khalsa Auto Works	NA	NA	NA	NA	NA	NA	NA	NA	NA	100.00%	99.89%
		Overall SSA	Jan-14		NA	NA	NA	NA	NA	NA	NA	NA	NA	99.67%	99.50%
	(b) 0-5 (with frequency hopping for GSM Operators)	Day 1	Jan-14	Thrilum Mall	92.65%	98.39%	58.34%	96.54%	98.04%	98.98%	98.20%	98.41%	NA	NA	
		Day 2	Jan-14	Bus Stand Majethia	99.82%	96.86%	81.87%	99.29%	99.16%	92.56%	98.22%	98.68%	NA	NA	
		Day 3	Jan-14	Khalsa Auto Works	98.95%	97.95%	99.29%	95.96%	99.44%	99.44%	99.36%	99.45%	NA	NA	
		Overall SSA	Jan-14		95.97%	97.80%	90.82%	97.21%	98.61%	97.15%	98.51%	98.86%	NA	NA	
Service Coverage															
5	In door (>= -75dBm)	Day 1	Jan-14	Thrilum Mall	27.57%	96.52%	14.85%	11.09%	99.60%	83.32%	74.21%	99.69%	99.78%	97.97%	
		Day 2	Jan-14	Bus Stand	21.12%	80.07%	80.69%	18.80%	64.44%	41.51%	6.47%	47.67%	8.23%	80.68%	

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			Majethia											
		Day 3	Jan-14	Khalsa Auto Works	13.22%	89.13%	98.49%	9.56%	46.40%	26.48%	1.71%	67.33%	44.11%	71.97%
		Overall SSA	Jan-14		22.18%	89.57%	87.39%	13.00%	79.31%	52.37%	42.33%	77.55%	60.94%	87.66%
	In-vehicle (>= - 85dBm)	Day 1	Jan-14	Thrilum Mall	91.83%	100.00%	78.90%	58.65%	100.00%	99.29%	99.60%	100.00%	100.00%	100.00%
		Day 2	Jan-14	Bus Stand Majethia	87.66%	99.29%	99.18%	91.20%	97.31%	73.28%	67.51%	93.78%	50.60%	94.57%
		Day 3	Jan-14	Khalsa Auto Works	55.75%	99.24%	100.00%	61.35%	99.33%	86.39%	45.40%	98.64%	68.95%	99.73%
		Overall SSA	Jan-14		80.93%	99.59%	97.44%	70.10%	99.31%	87.17%	79.29%	98.17%	78.75%	98.47%
	Outdoor-in city (>= - 95dBm)	Day 1	Jan-14	Thrilum Mall	100.00%	100.00%	100.00%	97.86%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 2	Jan-14	Bus Stand Majethia	99.79%	100.00%	100.00%	100.00%	100.00%	100.00%	98.61%	100.00%	99.45%	100.00%
		Day 3	Jan-14	Khalsa Auto Works	95.36%	99.96%	100.00%	99.53%	100.00%	99.72%	97.06%	100.00%	99.65%	100.00%
		Overall SSA	Jan-14		98.67%	99.99%	100.00%	99.16%	100.00%	99.91%	98.97%	100.00%	99.76%	100.00%
6	Call Setup Success Rate (>=95%)	Day 1	Jan-14	Thrilum Mall	100.00%	100.00%	94.12%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 2	Jan-14	Bus Stand Majethia	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 3	Jan-14	Khalsa Auto Works	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	Jan-14		100.00%	100.00%	96.87%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
7	Hand Over Success Rate (HOSR)	Day 1	Jan-14	Thrilum Mall	100.00%	100.00%	99.03%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 2	Jan-14	Bus Stand Majethia	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 3	Jan-14	Khalsa Auto Works	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	Jan-14		100.00%	100.00%	99.11%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

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DRIVE TEST TABLE: 3

OPERATOR-ASSISTED DRIVE TEST AT BHATINDA SSA IN FEB-14 MONTH- PUNJAB CIRCLE

S/N	Parameter	SSA Name: Bhatinda	Drive Test Period	AIRCEL	AIRTEL	BSNL	TATA GSM	IDEA	RCOM GSM	VIDEOCON	VODAFONE	TATA CDMA	RCOM CDMA
				GSM Operators								CDMA Operators	
1	Call Attempts	Day 1	Feb-14	ICR	155	150	161	161	162	180	151	177	163
		Day 2	Feb-14	ICR	117	118	114	113	117	99	107	80	116
		Day 3	Feb-14	ICR	106	122	102	120	114	115	126	98	114
		Overall SSA	Total	ICR	378	390	377	394	393	394	384	355	393
2	Blocked Call Rate	Day 1	Feb-14	ICR	0.00%	0.67%	0.00%	0.00%	1.23%	0.56%	0.00%	0.00%	1.84%
		Day 2	Feb-14	ICR	0.85%	0.00%	0.00%	0.00%	0.85%	0.00%	0.00%	0.00%	0.00%
		Day 3	Feb-14	ICR	0.00%	0.00%	0.00%	0.00%	0.88%	0.00%	0.00%	0.00%	1.75%
		Overall SSA	Total	ICR	0.26%	0.26%	0.00%	0.00%	1.02%	0.25%	0.00%	0.00%	1.27%
3	Dropped Call Rate (<=2%)	Day 1	Feb-14	ICR	0.00%	0.67%	0.62%	0.00%	1.25%	0.00%	0.00%	0.00%	0.63%
		Day 2	Feb-14	ICR	0.00%	0.00%	0.00%	0.00%	0.86%	0.00%	0.00%	0.00%	4.31%
		Day 3	Feb-14	ICR	0.00%	0.00%	0.00%	0.00%	0.88%	0.00%	0.00%	0.00%	1.79%
		Overall SSA	Total	ICR	0.00%	0.26%	0.27%	0.00%	1.03%	0.00%	0.00%	0.00%	2.06%
PERCENTAGE CONNECTIONS WITH GOOD VOICE QUALITY (=>95%)													
4	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Day 1	Feb-14	NA	NA	NA	NA	NA	NA	NA	NA	98.95%	99.49%
		Day 2	Feb-14	NA	NA	NA	NA	NA	NA	NA	NA	99.94%	99.63%
		Day 3	Feb-14	NA	NA	NA	NA	NA	NA	NA	NA	99.37%	99.50%
		Overall SSA	Total	NA	NA	NA	NA	NA	NA	NA	NA	99.29%	99.53%
	(b) 0-5 (with frequency hopping for GSM Operators)	Day 1	Feb-14	ICR	96.11%	95.47%	96.60%	98.34%	95.34%	96.95%	97.25%	NA	NA
		Day 2	Feb-14	ICR	98.07%	96.49%	99.04%	99.08%	98.72%	98.06%	99.17%	NA	NA
		Day 3	Feb-14	ICR	95.46%	95.12%	96.88%	99.16%	96.91%	97.50%	98.92%	NA	NA
Overall SSA	Total	ICR	96.56%	95.65%	97.41%	98.80%	96.79%	97.40%	98.34%	NA	NA		
SERVICE COVERAGE													
5	In door (>= -75dBm)	Day 1	Feb-14	ICR	53.97%	94.89%	80.71%	79.74%	57.57%	57.96%	90.06%	37.62%	90.89%
		Day 2	Feb-14	ICR	44.64%	81.78%	69.13%	51.52%	33.91%	46.22%	72.71%	33.56%	84.53%
		Day 3	Feb-14	ICR	48.10%	89.14%	67.03%	74.44%	36.23%	46.10%	77.55%	18.19%	83.02%
		Overall SSA	Total	ICR	49.23%	89.38%	73.46%	69.87%	44.30%	51.37%	81.05%	31.27%	86.95%
	In-vehicle (>= -85dBm)	Day 1	Feb-14	ICR	87.53%	99.75%	98.45%	98.49%	88.05%	88.70%	99.75%	85.44%	97.50%
		Day 2	Feb-14	ICR	80.42%	98.64%	91.68%	96.77%	73.41%	83.11%	97.68%	75.01%	94.44%
		Day 3	Feb-14	ICR	81.12%	98.73%	88.27%	98.64%	71.77%	88.02%	97.82%	49.66%	90.12%
		Overall SSA	Total	ICR	83.33%	99.12%	93.61%	98.02%	79.10%	87.03%	98.53%	73.07%	94.63%
	Outdoor- in city (>= -95dBm)	Day 1	Feb-14	ICR	98.02%	99.99%	99.73%	100.00%	99.44%	99.57%	100.00%	99.69%	99.94%
		Day 2	Feb-14	ICR	99.00%	99.99%	99.38%	100.00%	96.82%	96.49%	99.96%	98.05%	99.69%
		Day 3	Feb-14	ICR	98.06%	99.92%	99.58%	100.00%	97.30%	99.11%	99.97%	95.68%	99.85%
		Overall SSA	Total	ICR	98.35%	99.97%	99.58%	100.00%	98.06%	98.61%	99.98%	98.20%	99.84%
	6	Call Setup	Day 1	Feb-14	ICR	100.00%	99.33%	100.00%	100.00%	98.77%	99.44%	100.00%	98.16%

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	Success Rate (>=95%)	Day 2	Feb-14	ICR	99.15%	99.15%	100.00%	100.00%	99.15%	100.00%	100.00%	100.00%	100.00%	
		Day 3	Feb-14	ICR	100.00%	100.00%	100.00%	100.00%	99.12%	100.00%	100.00%	100.00%	100.00%	98.25%
		Overall SSA	Total	ICR	99.74%	99.49%	100.00%	100.00%	98.98%	99.75%	100.00%	100.00%	100.00%	98.73%
7	Hand Over Success Rate (HOSR)	Day 1	Feb-14	ICR	99.63%	97.86%	96.83%	100.00%	99.66%	98.32%	100.00%	100.00%	100.00%	
		Day 2	Feb-14	ICR	100.00%	98.48%	100.00%	98.59%	100.00%	100.00%	100.00%	100.00%	100.00%	
		Day 3	Feb-14	ICR	99.45%	98.17%	100.00%	99.03%	100.00%	100.00%	100.00%	100.00%	100.00%	
		Overall SSA	Total	ICR	99.70%	98.06%	98.32%	99.40%	99.79%	99.12%	100.00%	100.00%	100.00%	

*NA: Not Applicable, ICR: Intra Circle Roaming

* Aircel did not turn up for drive test.



DRIVE TEST TABLE: 4

OPERATOR-ASSISTED DRIVE TEST AT BHATINDA SSA IN FEB-14 MONTH- PUNJAB CIRCLE - INDOOR

S/N	Parameter	Bhatinda SSA	Drive Test Period	Indoor Location	AIRCEL	AIRTEL	BSNL GSM	TATA GSM	IDEA	RCOM GSM	QTL	VODAFONE	TATA CDMA	RCOM CDMA	
					GSM Operators							CDMA Operators			
1	Call Attempts	Day 1	Feb-14	Patiala Lab Bucho Mandi	ICR	13	8	12	11	12	12	13	12	12	
		Day 2	Feb-14	Civil Hospital	ICR	13	12	12	13	14	12	12	13	13	
		Day 3	Feb-14	Mansa Indoor	ICR	12	12	12	12	14	12	12	12	13	
		Overall SSA	Feb-14		ICR	38	32	36	36	40	36	37	37	38	
2	Blocked Call Rate	Day 1	Feb-14	Patiala Lab Bucho Mandi	ICR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Day 2	Feb-14	Civil Hospital	ICR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Day 3	Feb-14	Mansa Indoor	ICR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Overall SSA	Feb-14		ICR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
3	Dropped Call Rate (<=2%)	Day 1	Feb-14	Patiala Lab Bucho Mandi	ICR	0.00%	0.00%	0.00%	0.00%	8.33%	0.00%	0.00%	0.00%	0.00%	
		Day 2	Feb-14	Civil Hospital	ICR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Day 3	Feb-14	Mansa Indoor	ICR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Overall SSA	Feb-14		ICR	0.00%	0.00%	0.00%	0.00%	2.50%	0.00%	0.00%	0.00%	0.00%	
Percentage connections with good voice quality (=>95%)															
4	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Day 1	Feb-14	Patiala Lab Bucho Mandi	NA	NA	NA	NA	NA	NA	NA	NA	100.00%	100.00%	
		Day 2	Feb-14	Civil Hospital	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.93%	100.00%
		Day 3	Feb-14	Mansa Indoor	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.75%	99.82%
		Overall SSA	Feb-14		NA	NA	NA	NA	NA	NA	NA	NA	NA	99.89%	99.92%
	(b) 0-5 (with frequency hopping)	Day 1	Feb-14	Patiala Lab Bucho Mandi	ICR	96.00%	95.01%	99.72%	99.79%	99.07%	99.69%	98.12%	NA	NA	

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	for GSM Operators)	Day 2	Feb-14	Civil Hospital	ICR	99.16%	96.24%	99.89%	99.10%	99.82%	99.59%	99.65%	NA	NA
		Day 3	Feb-14	Mansa Indoor	ICR	96.19%	95.42%	97.19%	99.68%	97.78%	98.29%	99.43%	NA	NA
		Overall SSA	Feb-14		ICR	97.24%	95.64%	98.93%	99.50%	98.87%	99.19%	99.06%	NA	NA
Service Coverage														
5	In door (>= - 75dBm)	Day 1	Feb-14	Patiala Lab Bucho Mandi	ICR	23.11%	98.33%	49.92%	8.47%	2.85%	0.00%	49.14%	19.86%	57.55%
		Day 2	Feb-14	Civil Hospital	ICR	45.22%	93.43%	90.79%	18.33%	17.94%	52.60%	89.57%	63.65%	99.88%
		Day 3	Feb-14	Mansa Indoor	ICR	49.56%	97.58%	4.12%	24.51%	1.69%	22.10%	12.40%	0.00%	48.13%
		Overall SSA	Feb-14		ICR	39.08%	96.17%	48.27%	17.10%	7.54%	24.85%	50.39%	28.30%	67.01%
	In-vehicle (>= - 85dBm)	Day 1	Feb-14	Patiala Lab Bucho Mandi	ICR	65.34%	99.17%	97.76%	91.46%	24.97%	46.33%	99.26%	98.15%	92.86%
		Day 2	Feb-14	Civil Hospital	ICR	95.99%	99.93%	98.88%	89.95%	96.72%	97.64%	99.64%	99.24%	100.00%
		Day 3	Feb-14	Mansa Indoor	ICR	77.19%	99.46%	52.75%	93.58%	25.01%	98.30%	84.61%	0.00%	48.61%
		Overall SSA	Feb-14		ICR	80.25%	99.57%	83.09%	91.66%	49.23%	80.68%	94.56%	65.63%	76.92%
	Outdoor-in city (>= - 95dBm)	Day 1	Feb-14	Patiala Lab Bucho Mandi	ICR	85.59%	100.00%	100.00%	100.00%	97.75%	98.43%	100.00%	100.00%	100.00%
		Day 2	Feb-14	Civil Hospital	ICR	99.94%	100.00%	99.96%	100.00%	100.00%	99.94%	99.97%	100.00%	100.00%
		Day 3	Feb-14	Mansa Indoor	ICR	98.44%	99.62%	98.31%	100.00%	88.08%	99.88%	99.79%	98.14%	99.09%
		Overall SSA	Feb-14		ICR	94.70%	99.85%	99.42%	100.00%	95.11%	99.42%	99.92%	99.38%	99.62%
6	Call Setup Success Rate (>=95%)	Day 1	Feb-14	Patiala Lab Bucho Mandi	ICR	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 2	Feb-14	Civil Hospital	ICR	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 3	Feb-14	Mansa Indoor	ICR	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	Feb-14		ICR	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
7	Hand Over Success Rate (HOSR)	Day 1	Feb-14	Patiala Lab Bucho Mandi	ICR	100.00%	93.55%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 2	Feb-14	Civil Hospital	ICR	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 3	Feb-14	Mansa Indoor	ICR	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	Feb-14		ICR	100.00%	96.43%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

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DRIVE TEST TABLE: 5

OPERATOR-ASSISTED DRIVE TEST AT HOSHIARPUR SSA IN MAR-14 MONTH- PUNJAB CIRCLE

S/N	Parameter	SSA Name: Hoshiarpur	Drive Test Period	AIRCEL	AIRTEL	BSNL	TATA GSM	IDEA	RCOM GSM	VIDEOCON	VODAFONE	TATA CDMA	RCOM CDMA
				GSM Operators								CDMA Operators	
1	Call Attempts	Day 1	Mar-14	121	106	152	134	166	179	123	183	126	181
		Day 2	Mar-14	103	147	102	118	144	133	142	137	113	121
		Day 3	Mar-14	119	132	135	144	142	139	142	143	136	139
		Overall SSA	Total	343	385	389	396	452	451	407	463	375	441
2	Blocked Call Rate	Day 1	Mar-14	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.81%	0.00%	0.79%	0.00%
		Day 2	Mar-14	0.00%	0.00%	2.94%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Day 3	Mar-14	0.00%	0.00%	0.74%	0.00%	0.00%	0.00%	0.00%	0.00%	0.74%	0.00%
		Overall SSA	Total	0.00%	0.00%	1.03%	0.00%	0.00%	0.00%	0.00%	0.25%	0.00%	0.53%
3	Dropped Call Rate (<=2%)	Day 1	Mar-14	0.00%	0.00%	0.00%	0.00%	0.00%	1.12%	0.00%	0.00%	0.00%	0.55%
		Day 2	Mar-14	0.00%	0.00%	0.00%	0.00%	0.00%	0.75%	0.00%	0.00%	0.00%	0.83%
		Day 3	Mar-14	0.00%	0.00%	0.00%	0.69%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Overall SSA	Total	0.00%	0.00%	0.00%	0.25%	0.00%	0.67%	0.00%	0.00%	0.00%	0.45%
PERCENTAGE CONNECTIONS WITH GOOD VOICE QUALITY (=>95%)													
4	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Day 1	Mar-14	NA	NA	NA	NA	NA	NA	NA	NA	98.32%	99.95%
		Day 2	Mar-14	NA	NA	NA	NA	NA	NA	NA	NA	99.52%	99.99%
		Day 3	Mar-14	NA	NA	NA	NA	NA	NA	NA	NA	99.26%	99.96%
		Overall SSA	Total	NA	NA	NA	NA	NA	NA	NA	NA	99.01%	99.98%
	(b) 0-5 (with frequency hopping for GSM Operators)	Day 1	Mar-14	96.63%	96.33%	92.20%	96.31%	97.93%	99.40%	95.41%	97.92%	NA	NA
		Day 2	Mar-14	97.81%	96.71%	92.36%	97.60%	98.23%	99.29%	98.21%	98.69%	NA	NA
		Day 3	Mar-14	98.39%	97.64%	93.00%	98.86%	98.98%	99.68%	97.33%	98.53%	NA	NA
		Overall SSA	Total	97.51%	96.90%	92.51%	97.63%	98.36%	99.45%	97.03%	98.34%	NA	NA
SERVICE COVERAGE													
5	In door (>= -75dBm)	Day 1	Mar-14	78.02%	99.43%	69.57%	75.08%	94.62%	83.01%	54.28%	87.63%	33.52%	99.10%
		Day 2	Mar-14	55.86%	97.45%	42.35%	60.28%	81.18%	84.11%	32.80%	76.40%	45.82%	98.13%
		Day 3	Mar-14	53.60%	94.29%	55.12%	57.71%	81.85%	82.46%	41.09%	82.82%	36.22%	81.47%
		Overall SSA	Total	64.28%	97.11%	56.71%	64.31%	86.32%	83.22%	42.32%	82.77%	38.20%	96.26%
	In-vehicle (>= -85dBm)	Day 1	Mar-14	93.07%	99.97%	97.19%	97.01%	99.90%	91.50%	91.76%	97.93%	79.74%	99.92%
		Day 2	Mar-14	83.52%	99.78%	84.25%	88.64%	99.51%	91.60%	66.91%	97.09%	73.32%	99.56%
		Day 3	Mar-14	85.99%	99.59%	95.47%	90.03%	99.32%	93.05%	86.64%	98.14%	71.02%	92.51%
		Overall SSA	Total	88.24%	99.79%	92.76%	91.95%	99.59%	91.99%	81.36%	97.75%	74.68%	98.76%
	Outdoor- in city (>= -95dBm)	Day 1	Mar-14	98.58%	100.00%	99.93%	99.96%	100.00%	98.36%	99.19%	99.95%	99.89%	100.00%
		Day 2	Mar-14	97.90%	99.88%	98.54%	99.07%	100.00%	97.76%	96.74%	99.94%	98.76%	100.00%
		Day 3	Mar-14	97.25%	99.98%	99.93%	99.22%	100.00%	98.68%	99.62%	99.95%	95.53%	99.95%
		Overall SSA	Total	97.97%	99.95%	99.52%	99.43%	100.00%	98.25%	98.48%	99.95%	97.99%	99.99%
6	Call Setup	Day 1	Mar-14	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.19%	100.00%	99.21%	100.00%

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	Success Rate (>=95%)	Day 2	Mar-14	100.00%	100.00%	99.02%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 3	Mar-14	100.00%	100.00%	99.26%	100.00%	100.00%	100.00%	100.00%	100.00%	99.26%	100.00%
		Overall SSA	Total	100.00%	100.00%	99.49%	100.00%	100.00%	100.00%	99.75%	100.00%	99.47%	100.00%
		Day 1	Mar-14	100.00%	100.00%	100.00%	95.65%	100.00%	100.00%	98.95%	99.74%	100.00%	100.00%
7	Hand Over Success Rate (HOSR)	Day 2	Mar-14	100.00%	100.00%	100.00%	97.33%	100.00%	99.01%	98.90%	100.00%	100.00%	100.00%
		Day 3	Mar-14	100.00%	100.00%	100.00%	100.00%	99.62%	100.00%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	Total	100.00%	100.00%	100.00%	97.21%	99.88%	99.78%	99.23%	99.89%	100.00%	100.00%

*NA: Not Applicable.



DRIVE TEST TABLE: 6

OPERATOR-ASSISTED DRIVE TEST AT HOSHIARPUR SSA IN MAR-14 MONTH- PUNJAB CIRCLE - INDOOR

S/N	Parameter	Hoshiarpur SSA	Drive Test Period	Indoor Location	AIRCEL	AIRTEL	BSNL GSM	TATA GSM	IDEA	RCOM GSM	QTL	VODAFONE	TATA CDMA	RCOM CDMA	
					GSM Operators								CDMA Operators		
1	Call Attempts	Day 1	Mar-14	Civil Hospital Tanda	10	12	13	12	12	13	13	14	13	13	
		Day 2	Mar-14	Sr Sec School Balchaur	12	12	11	12	12	11	12	12	12	11	
		Day 3	Mar-14	BSNL Exchange Mukeriyian	12	12	12	12	12	12	12	13	12	12	
		Overall SSA	Mar-14		34	36	36	36	36	36	36	37	39	37	36
2	Blocked Call Rate	Day 1	Mar-14	Civil Hospital Tanda	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Day 2	Mar-14	Sr Sec School Balchaur	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Day 3	Mar-14	BSNL Exchange Mukeriyian	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Overall SSA	Mar-14		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%)	Day 1	Mar-14	Civil Hospital Tanda	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Day 2	Mar-14	Sr Sec School Balchaur	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Day 3	Mar-14	BSNL Exchange Mukeriyian	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Overall SSA	Mar-14		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
4	Percentage connections with good voice quality (=>95%)														
	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Day 1	Mar-14	Civil Hospital Tanda	NA	NA	NA	NA	NA	NA	NA	NA	NA	100.00%	100.00%
		Day 2	Mar-14	Sr Sec School Balchaur	NA	NA	NA	NA	NA	NA	NA	NA	NA	100.00%	100.00%
		Day 3	Mar-14	BSNL Exchange Mukeriyian	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.01%	100.00%
		Overall SSA	Mar-14		NA	NA	NA	NA	NA	NA	NA	NA	NA	99.78%	100.00%
(b) 0-5 (with frequency hopping for GSM)	Day 1	Mar-14	Civil Hospital Tanda	99.68%	98.50%	98.01%	99.00%	99.97%	99.83%	99.76%	99.78%	NA	NA		
	Day 2	Mar-14	Sr Sec School Balchaur	97.80%	97.52%	98.85%	98.65%	99.94%	98.31%	99.50%	95.75%	NA	NA		

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	Operators)	Day 3	Mar-14	BSNL Exchange Mukeriyian	98.98%	99.56%	98.44%	99.49%	99.87%	100.00%	99.75%	99.66%	NA	NA
	Overall SSA	Mar-14			98.76%	98.53%	98.41%	99.04%	99.93%	99.18%	99.67%	98.53%	NA	NA
Service Coverage														
5	In door (>= - 75dBm)	Day 1	Mar-14	Civil Hospital Tanda	50.40%	99.93%	44.33%	31.13%	94.46%	72.56%	44.42%	96.42%	10.45%	99.25%
		Day 2	Mar-14	Sr Sec School Balchaur	0.00%	96.34%	67.90%	5.43%	14.59%	90.60%	0.15%	7.16%	0.00%	100.00%
		Day 3	Mar-14	BSNL Exchange Mukeriyian	18.06%	98.98%	51.87%	32.47%	36.83%	73.55%	5.46%	99.29%	21.31%	98.76%
		Overall SSA	Mar-14		20.84%	98.29%	54.07%	22.85%	49.40%	81.03%	17.00%	70.64%	10.68%	99.68%
	In-vehicle (>= - 85dBm)	Day 1	Mar-14	Civil Hospital Tanda	97.96%	100.00%	98.30%	93.12%	100.00%	80.58%	97.73%	99.97%	67.24%	99.97%
		Day 2	Mar-14	Sr Sec School Balchaur	27.11%	100.00%	99.80%	58.84%	98.45%	90.98%	19.36%	75.72%	11.40%	100.00%
		Day 3	Mar-14	BSNL Exchange Mukeriyian	81.06%	99.81%	98.82%	90.55%	99.81%	97.29%	88.90%	99.91%	99.47%	99.97%
		Overall SSA	Mar-14		66.68%	99.95%	98.93%	80.63%	99.43%	89.34%	68.97%	92.69%	60.00%	99.99%
	Outdoor-in city (>= - 95dBm)	Day 1	Mar-14	Civil Hospital Tanda	99.88%	100.00%	100.00%	100.00%	100.00%	98.75%	99.91%	100.00%	100.00%	100.00%
		Day 2	Mar-14	Sr Sec School Balchaur	93.60%	100.00%	100.00%	96.56%	100.00%	95.16%	97.17%	99.54%	100.00%	100.00%
		Day 3	Mar-14	BSNL Exchange Mukeriyian	97.32%	100.00%	99.97%	99.97%	100.00%	99.98%	99.85%	100.00%	100.00%	100.00%
		Overall SSA	Mar-14		96.73%	100.00%	99.99%	98.82%	100.00%	97.40%	98.99%	99.86%	100.00%	100.00%
6	Call Setup Success Rate (>=95%)	Day 1	Mar-14	Civil Hospital Tanda	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 2	Mar-14	Sr Sec School Balchaur	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 3	Mar-14	BSNL Exchange Mukeriyian	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	Mar-14		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
7	Hand Over Success Rate (HOSR)	Day 1	Mar-14	Civil Hospital Tanda	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 2	Mar-14	Sr Sec School Balchaur	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Day 3	Mar-14	BSNL Exchange Mukeriyian	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
		Overall SSA	Mar-14		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%



DETAIL OF THE ROUTES COVERED DURING THE DRIVE TESTS:

DRIVE TEST TABLE: 7

Name of SSA	Date of Drive Test	Day 1		Day 2		Day 3	
		Name of SDCA Covered	Route Covered	Name of SDCA Covered	Route Covered	Name of SDCA Covered	Route Covered
AMRITSAR	29th to 31th Jan-14	Amritsar city (122 Km)	Albert road,Hall gate,Singh Shaheeda Gurdwara,Batala road,Majitha road,Jail road,Airport Bypass,Fatehgarh churia road,Khasa ,Attari	Amritsar outer,Ajnala,Raiya (115 Km)	Raja Sansi, Ajnala, Ramdas, Majitha city, Raya highway, Raya town	Patti,Tarantaran (113 Km)	Taran Taran city, Bhikhiwind town, Patti city
BHATINDA	19th to 21th Feb-14	Bathinda, Phulmandi, Bhucho mandi (117 Km)	Bharat nagar, model town 1,2&3,100 ft road,bibiwala chowk,ITI,jassipawwali,eng coll,railway station,sirki bazar,ambuja,NFL,Bhucho city,bhucho rampura highway,phulmandi village & city	Raman,Sardulgarh, (105 Km)	Sangat,pakha kalan,raman city,talwandi sabo city & gurdwara,sardulgarh city,fattu maluka,civil hospital,Main Bazar, Fattu Maluka to Jhuneer Highway	Mansa (102 Km)	Bathinda to kotshamir,mor city,ghuman kalan,bhiki city and village,mansa city, coveribg both sides around flyover, across railway line,Main market, DC road, Mall road,Model Town
HOSIARPUR	24th to 26th Mar-14	Hoshiarpur city, Tanda (135 Km)	Parbhat chowk,Jalandhar bypass,phagwara bypass,chandigarh bypass,Bajwara road,Una road,bharvayi road,Tanda road,Govt chowk,rahimpur chowk, fatehgarh chungi,DAV College,civil line,mall road,session chowk,clock tower,bus stand,model towl,hitel presidency,civil hospital road ,govt coll chowk,sessin chowk,railway station,parbhat chowk	Garhshankar Balachaur (124 Km)	Bohan,chagra,chabewal town,Mahilpur town,Saila,Garhshankar town,samundra majari,Balachaur town,khalsa college,chandigarh chowk,	Dasuya (100 Km)	Hariana vill,Bhunga vill,Gardiwala town,Dasuya town, jall road,railway road mukeria, uchi bassi, chal ala baksh, Mukeria city, railway road,dav coll,pathankot road, bus stand,police city road , talwara road,municipal office,baj wala chowk,kala manjh colony, bus stand.



SSA WISE DRIVE TEST OBSERVATION:

DRIVE TEST TABLE: 8

DRIVE TEST OBSERVATION OF AMRITSAR SSA - JAN-14

S NO	Name of SP	Month	SSA Covered	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	Jan-14	Amritsar	Amritsar	Poor Coverage near Gharunda, Poor Quality patch near Gharunda, Puttighar, Valla Villages	Amritsar Outer, Ajnala & Raiya	---	Patti & Tarantaran	Poor Level at Outer of Tarantalan, No highway coverage between SDCA
2	AIRTEL				Poor Quality patch near Gharunda, Valla Villages		---		Poor Level at Outer of Patti city
3	BSNL				Poor Quality patch near Gharunda, Puttighar, Valla Villages		---		---
4	TATA GSM				Poor Coverage near Gharunda, Poor Level & Quality Balkhera Housing (Amritsar)		---		---
5	TATA CDMA				Poor Coverage near Gharunda, Balkhera Housing (Amritsar)		Poor Level at outer of all SDCA/ Villages covered in Day 2		Poor Level at outer of all SDCA/ Villages covered in Day 3
6	IDEA				Poor Quality near Bus stand, Ranjit Avenue, Danamandi, Kabir Park (Amritsar)		Poor Quality near Dera Road Anjala		---
7	RCOM GSM				Poor Coverage near Gharunda, Poor Level & Quality Balkhera Housing, Mirakot Chowk & Harikishan Nagar (Amritsar)		Poor Level at outer of all SDCA/ Villages covered in Day 2		Poor Level & Quality at outer of all SDCA/ Villages covered in Day 3
8	RCOM CDMA				Poor Coverage near Gharunda, Poor Level & Quality Balkhera Housing, Mirakot Chowk & Harikishan Nagar (Amritsar)		Poor Level & Quality at outer of all SDCA/ Villages covered in Day 2		Poor Level & Quality at outer of all SDCA/ Villages covered in Day 3
9	QTL				Poor Quality near Sehchander Village & No Coverage at Rangarh		Poor Level & Quality near Nawan Kot		Poor Level at outer of all SDCA/ Villages covered in Day 3
10	VODAFONE				Poor Quality patch near Muradpura, No Coverage at Rangarh		---		Poor Quality at Outer of Tarantaran



DRIVE TEST TABLE: 9

DRIVE TEST OBSERVATION OF BHATINDA SSA - FEB-14

S NO	Name of SP	Month	SSA Covered	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	Feb-14	Bhatinda	Bhatinda & Phulmandi	Not Joined the Drive Test	Raman, Sardulgarh	Not Joined the Drive Test	Mansa	Not Joined the Drive Test
2	AIRTEL				Poor Level near Bucho Kalan, Outer of Rampur Phool City towards Bucho Kalan		Poor Level & Quality near Talwandi Sabo, Rama Mandi & Sangat Mandi		Poor Quality & Level near Mour Village & Bhatinda to Mour Road
3	BSNL				Rx Quality Poor due to underground bridge and Handover failure, Rx Quality Poor due to no site nearby cant area		Rx Quality Poor due to dense vegetation.		---
4	TATA GSM				Poor Quality near Bhatinda Station		---		Poor Quality at outer of all SDCA/ Villages covered in Day 3
5	TATA CDMA				---		---		---
6	IDEA				---		---		---
7	RCOM GSM				Poor Level near Bucho Kalan, Outer of Rampur Phool City towards Bucho Kalan & Outer of Bhatinda City		Poor Level at Outer of All SDCA Covered in Day 2 & near Fatta Maluka		Poor Level at Outer of All SDCA Covered in Day 3
8	RCOM CDMA				Poor Level near Bucho Kalan, Outer of Rampur Phool City towards Bucho Kalan & Outer of Bhatinda City		Poor Level at Outer of All SDCA Covered in Day 2 & near Fatta Maluka		Poor Level at Outer of All SDCA Covered in Day 3
9	QTL				No Coverage at Bhatinda Cantonment, Poor Level near Lehra Baga & Outer of Rampur Phool mandi		No Coverage between Sangat Mandi to Raman, between Sardulgarh to Juhnir, Poor Level at sangat mandi Railway crossing		Poor Level at outer of Bikhi & Maur Mandi, No Coverage between Kot Shamir to Maur Mandi
10	VODAFONE				Poor Quality at Bhatinda Bypass Ring Road, No Coverage at Bhatinda Cantonment, Poor Quality near Bhatinda Station		---		Poor Quality near Bikhi Outer



DRIVE TEST TABLE: 10

DRIVE TEST OBSERVATION OF HOSIARPUR SSA - MAR-14

S NO	Name of SP	Month	SSA Covered	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	Mar-14	Hoshiarpur	Hoshiarpur & Tanda	Poor Rx level near Khandla Jatan Village, Poor Quality near Civil lines (Hoshiarpur)	Garhashankar Balachaur	---	Dasuya	Poor Rx level near Dhoot Kalan Village
2	AIRTEL				Poor Quality between Hoshiarpur to Bullowal Road		---		Poor Quality at outer of Dasuya City
3	BSNL				Poor Qaulilty near DAV School Tand, kandhala Jattan & near Lochwal Village		Poor Level & Quality near Khera Mahipalpur, between Panam village to Balachaur Outer		Poor Quality near Mukerian Railway Station, Hardo Kharipur, Gama Sahib Village
4	TATA GSM				No Coverage between Hoshiarpur to Bullowal & Bullowal to Tanda, Poor Quality at Outer of Tanda		Poor Level & Quality near Mahipur, garhShanker, Dhoot Kalan Village		Poor Level & Quality near Hariana Village
5	TATA CDMA								
6	IDEA				Poor Quality on Hoshiarpur Bypass near Prabhat Chowk		Poor Quality near Mahalpur, Majari		---
7	RCOM GSM				Poor Rx level near Khandla Jatan Village, Poor Level & Quality near between Hoshiarpur to Bullowal		Poor Level & Quality near Mahipur, garhShanker, Dhoot Kalan Village		Poor Level & Quality near Hariana Village
8	RCOM CDMA				Poor Rx level near Khandla Jatan Village, Poor Level & Quality near between Hoshiarpur to Bullowal		Poor Level & Quality near Mahipur, garhShanker, Dhoot Kalan Village		Poor Level & Quality near Hariana Village
9	QTL				No Coverage between Hoshiarpur to Tanda Road, Poor Quality near Rampur Camp, Poor Level near Bijwara Village		No Coverage at Ibharpur Village, Poor Level Tatu Majra & Outer of Balachaur City toward Garhshankar		Poor Level near Kang, Durowal & Hariana Village Outer
10	VODAFONE				Poor Quality on Hoshiarpur Bypass towards Tanda		---		---



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

- (i) (a) Aircel is on ICR with Tata (GSM) at Bhatinda SSA and not turned up for drive test.
- (ii) **In the Month of Jan-14**, drive tests were conducted in Amritsar SSA covering Amritsar City, Amritsar Outer, Ajnala, Raiya, Patti and Tarantaran SDCAs . The performance of **BSNL** on SSA level for parameter **Voice Quality** was **93.76%**, whereas the performance of **RCOM(GSM)** for parameters Block Call rate and Call setup success rate was **14.22% and 85.78% (very poor)** respectively. BSNL and RCOM (GSM) also remained non-compliant for parameter Call Drop Rate with their performance as **2.50% and 2.88%** respectively on first day of drive test. All other operators were found satisfactory in their performance during the drive tests.
- In case of indoor drive test, **Aircel** could not meet the benchmark for the parameter 'Call Drop Rate (CDR)' with its performance as **3.85%** and **BSNL** was under performed for parameter 'Blocked Call Rate' and 'Good voice quality' with its performance as **3.13%** and **90.82%** respectively.
- (iii) **In the Month of Feb-14**, drive tests were conducted in Bhatinda SSA covering Bhatinda, Phulmandi, Bhucho, Raman, Sardulgarh and Mansa SDCAs. The performance of the Service Providers in Bhatinda SSA was found satisfactory as all operators were meeting the benchmarks. Only RCOM (CDMA) was found having problems with respect to the parameter Call Drop rate (CDR). On day 2 drive test, it suffered with CDR of 4.31%.
- In case of indoor drive test, **RCOM (GSM)** could not meet the parameter 'Call Drop Rate (CDR)' with its performance as **2.50%**.
- (iv) **In the month of March-14**, drive tests were conducted in Hosiarpur covering Hosiarpur city, Tanda, Garhshankar, Balachaur and Dasuya SDCAs. The performance of the service providers was satisfactory as the they were largely meeting the benchmarks in Hosiarpur SSA. Only **BSNL** remained under performed for parameter voice quality with its performance as **92.51%** on SSA level.

The deficiencies with respect to inadequate coverage and voice quality, encountered by different Service providers at the various places as shown in the drive tests plots, are detailed in the above table.-8, table-9 and table-10.

From the analysis of drive tests results , it was revealed that the service providers need to improve their networks in respect of the parameter Call Drop rate, Block Call rate, and Voice Quality in some areas of the above three SSAs.

6. ESSENCE OF COMPLIANCE REPORT OF SERVICE PROVIDERS WITH RESPECT TO THE QOS





6. ESSENCE OF COMPLIANCE REPORT OF SERVICE PROVIDERS WITH RESPECT TO THE QOS

From month audit & 3 days live findings, it can be concluded that on an average, performance of the operators in the Punjab Service Area is satisfactory for **Network Parameters** except for one parameter namely '**Worst affected cells having > 3% TCH drop**' which could not be met by **BSNL, Tata (GSM) and Tata (CDMA)**. The quarterly averaged performance of BSNL, Tata (GSM) and Tata (CDMA) for this parameter was **9.90 %, 4.10% and 4.43%** respectively. Similar non-compliance was observed for Aircel, **BSNL, Tata (GSM) and Tata (CDMA)** during the live measurements in all three months of the Quarter ended March-2014. The quarterly average performance of **Aircel, BSNL, Tata (GSM) and Tata (CDMA)** was **4.64%, 11.99%, 3.99% and 3.76%** respectively.

With regard to the **Customer Service Quality Parameters**, it is revealed that all operators are in well compliance of the parameters on Metering and Billing Credibility, Response Time to Customers, Termination of Service and Time taken for refunds. However, **BSNL and RCOM (GSM)** have not met the benchmark of 'calls answered by Operators (voice to voice) within 60 seconds'. They could achieve their performance level as **25.49% and 89.31%** respectively against the benchmark of $\geq 90\%$. The performance of **BSNL** with respect to this parameter (**25.49%**) was very poor which needs special attention of BSNL.

With regard to the results of drive tests conducted in three SSAs namely Amritsar, Bhatinda and Hosiarpur, it was concluded that the service providers need to improve their networks in respect of the parameter Call Drop rate, Block Call rate, and Voice Quality in some areas of the above three SSAs.

Thus taking cognizance on overall performance of the service providers, it is concluded that service providers specially BSNL, Tata (GSM), Tata (CDMA) and RCOM(GSM) need to improve their performance for one or the other parameter in Punjab Service Area..

7. DETAILED NETWORK DATA ASSESSMENT OF CELLULAR MOBILE TELEPHONE SERVICES





7. DETAILED NETWORK DATA ASSESSMENT OF CELLULAR MOBILE TELEPHONE SERVICES PUNJAB CIRCLE:

TABLE: 1

Detailed Network Data Assessment of Cellular Mobile Telephone Services- Punjab Circle- Jan14 month													
S/N	Name of Parameter	Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	QTL	VODAFONE	RCOM CDMA	TATA CDMA
				GSM Operators								CDMA Operators	
Network Service Quality Parameter													
1	Network Availability												
	a) Total no. of BTSs in the licensed service area		Jan-14	602	4886	2979	4523	1669	1652	2027	4471	900	454
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Jan-14	503.21	1838	5124.48	1259.54	1536	389.72	639	656.44	630	38.32
	c) BTS Accumulated Downtime	<=2%	Jan-14	0.11%	0.05%	0.23%	0.04%	0.12%	0.03%	0.04%	0.02%	0.09%	0.01%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Jan-14	0	3	22	0	3	0	0	1	0	0
e) Worst affected BTSs due to downtime	<=2%	Jan-14	0.00%	0.06%	0.74%	0.00%	0.18%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%
2	Connection Establishment (Accessibility)												
	a) CSSR (Call Setup Success Rate)	>=95%	Jan-14	98.45%	99.39%	97.04%	98.42%	99.70%	99.23%	97.57%	99.84%	98.94%	98.81%
	b) SDCCH/PAGING Congestion	<=1%	Jan-14	0.01%	0.06%	1.00%	0.07%	0.05%	0.01%	0.07%	0.02%	0.00%	0.00%
c) TCH congestion	<=2%	Jan-14	0.04%	0.14%	1.42%	0.34%	0.02%	0.05%	0.49%	0.16%	0.00%	0.13%	
3	Connection Maintenance (Retainability)												
	a) Call Drop Rate (CDR)	<=2%	Jan-14	0.75%	0.47%	1.60%	0.55%	0.27%	0.53%	0.91%	0.59%	0.01%	0.47%
	b) Worst affected cells>3% TCH drop	<=3%	Jan-14	1.25%	0.86%	11.13%	0.53%	0.02%	3.89%	1.10%	1.41%	0.07%	3.86%
	c) % of connections with good voice quality	>=95%	Jan-14	98.04%	98.68%	NP	96.95%	99.06%	97.91%	97.70%	98.07%	99.70%	99.03%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Jan-14	25	126	995	71	1	194	70	194	2	55
e) Total no. of cells (Sector) in the licensed service area		Jan-14	1806	14653	8937	13578	4966	4992	6363	13762	2700	1430	
4	No. of POI's having >=0.5% POI congestion												
	No. of POI's having >=0.5% POI congestion		Jan-14	0	0	0	0	0	0	0	0	0	0

AUDIT & ASSESSMENT OF QOS FOR QE-MARCH-2014-PUNJAB CIRCLE



	Name of POI not meeting the benchmark		Jan-14	0	0	0	0	0	0	0	0	0	0
5	Network Data												
	a) Equipped Capacity of Network in Erlang		Jan-14	24340	245051	283000	195429	72000	108200	80397	149109	53000	84091
	b) Total traffic in TCBH in erlang (Avg.)		Jan-14	8257	217155	103973	154042	63815	29682	38197	119155	14804	20331
	c) Total no. of customers served (as per VLR) on last day of the month		Jan-14	434559	7042441	2408897	5756480	2491015	1215079	1106535	4386680	351065	253966

AUDIT & ASSESSMENT OF QOS FOR QE-MARCH-2014-PUNJAB CIRCLE



TABLE: 2

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Punjab Circle- Jan-14 month													
S/N	Name of Parameter	Bench-mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	QTL	VODAFONE	RCOM CDMA	TATA CDMA
				GSM Operators									
Network Service Quality Parameter													
Network Availability													
1	a) Total no. of BTSs in the licensed service area		Live data	601	4823	2969	4519	1670	1652	2025	4471	900	562
	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	43.5	115.79	472.87	40.9	157	52.56	120	22.97	42	4.11
	c) BTS Accumulated Downtime	<=2%	Live data	0.10%	0.03%	0.22%	0.01%	0.13%	0.04%	0.08%	0.01%	0.06%	0.01%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	3	0	0	0	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.10%	0.00%	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	98.30%	99.49%	97.12%	98.58%	99.71%	99.28%	97.85%	99.85%	99.11%	99.00%
	b) SDCCCH/PAGING Congestion	<=1%	Live data	0.01%	0.04%	0.56%	0.05%	0.12%	0.00%	0.05%	0.02%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.02%	0.10%	1.46%	0.34%	0.02%	0.02%	0.43%	0.15%	0.00%	0.04%
Connection Maintenance (Retainability)													
3	a) Call Drop Rate (CDR)	<=2%	Live data	0.69%	0.45%	1.51%	0.55%	0.27%	0.49%	0.87%	0.56%	0.01%	0.45%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	4.38%	0.94%	12.88%	0.50%	0.00%	3.91%	1.05%	1.44%	0.04%	3.44%
	c) % of connections with good voice quality	>=95%	Live data	98.14%	98.71%	NP	96.86%	99.08%	97.98%	97.75%	98.04%	99.70%	99.04%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	79	136	1150	68	0	195	67	198	1	62
	e) Total no. of cells (Sector) in the licensed service area		Live data	1803	14468	8926	13566	4969	4993	6351	13760	2700	1810
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	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0	0

AUDIT & ASSESSMENT OF QOS FOR QE-MARCH-2014-PUNJAB CIRCLE



TABLE: 3

Detailed Network Data Assessment of Cellular Mobile Telephone Services- Punjab Circle- Feb 14 month

S/N	Name of Parameter	Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	QTL	VODAFONE	RCOM CDMA	TATA CDMA
				GSM Operators								CDMA Operators	
Network Service Quality Parameter													
1	Network Availability												
	a) Total no. of BTSs in the licensed service area		Feb-14	602	4916	2992	4527	1670	1654	2034	4471	900	458
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Feb-14	509.89	1766.17	6506.9	822.89	983	453.1	1123	962.99	630	36.28
	c) BTS Accumulated Downtime	<=2%	Feb-14	0.13%	0.05%	0.32%	0.03%	0.09%	0.04%	0.08%	0.03%	0.10%	0.01%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Feb-14	0	3	22	1	1	0	0	2	0	0
	e) Worst affected BTSs due to downtime	<=2%	Feb-14	0.00%	0.06%	0.74%	0.02%	0.06%	0.00%	0.00%	0.04%	0.00%	0.00%
2	Connection Establishment (Accessibility)												
	a) CSSR (Call Setup Success Rate)	>=95%	Feb-14	98.41%	99.40%	96.25%	98.87%	99.69%	99.18%	97.46%	99.84%	99.01%	98.85%
	b) SDCCH/PAGING Congestion	<=1%	Feb-14	0.01%	0.04%	0.97%	0.08%	0.01%	0.01%	0.07%	0.03%	0.00%	0.00%
	c) TCH congestion	<=2%	Feb-14	0.05%	0.14%	1.44%	0.19%	0.03%	0.06%	0.49%	0.16%	0.00%	0.08%
3	Connection Maintenance (Retainability)												
	a) Call Drop Rate (CDR)	<=2%	Feb-14	0.83%	0.47%	1.50%	0.50%	0.28%	0.56%	0.96%	0.58%	0.01%	0.47%
	b) Worst affected cells>3% TCH drop	<=3%	Feb-14	1.00%	0.77%	8.67%	0.52%	0.04%	3.96%	1.36%	1.28%	0.07%	4.51%
	c) % of connections with good voice quality	>=95%	Feb-14	97.84%	98.63%	NP	98.17%	99.05%	97.77%	97.59%	98.07%	99.70%	99.03%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Feb-14	18	114	778	70	2	198	87	176	2	65
	e) Total no. of cells (Sector) in the licensed service area		Feb-14	1806	14758	8976	13603	4969	4997	6397	13766	2700	1440
4	No. of POI's having >=0.5% POI congestion												
	No. of POI's having >=0.5% POI congestion		Feb-14	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Feb-14	0	0	0	0	0	0	0	0	0	0

AUDIT & ASSESSMENT OF QOS FOR QE-MARCH-2014-PUNJAB CIRCLE



Network Data													
5	a) Equipped Capacity of Network in Erlang		Feb-14	23194	244098	317286	191696	72000	108297	83994	148751	53000	84583
	b) Total traffic in TCBH in erlang (Avg.)		Feb-14	8552	223463	103603	157566	63443	30557	42292	127725	15016	20181
	c) Total no. of customers served (as per VLR) on last day of the month		Feb-14	434622	7095052	2415320	5805145	2506747	1212870	1143813	4468680	344233	254445

AUDIT & ASSESSMENT OF QOS FOR QE-MARCH-2014-PUNJAB CIRCLE



TABLE: 4

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Punjab Circle- Feb-14 month													
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	QTL	VODAFONE	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	602	4886	2979	4526	1670	1654	2027	4471	900	455
	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	62.83	87.4	779.82	81.9	124.68	25.51	46	148.39	99.4	9.87
	c) BTS Accumulated Downtime	<=2%	Live data	0.14%	0.02%	0.36%	0.03%	0.10%	0.02%	0.03%	0.05%	0.15%	0.03%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	2	0	0	0	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.06%	0.00%	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	98.40%	99.40%	97.25%	98.96%	99.67%	99.23%	97.64%	99.85%	98.92%	98.83%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.00%	0.03%	0.95%	0.09%	0.01%	0.01%	0.05%	0.01%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.01%	0.13%	1.49%	0.17%	0.03%	0.05%	0.44%	0.15%	0.00%	0.08%
Connection Maintenance (Retainability)													
3	a) Call Drop Rate (CDR)	<=2%	Live data	0.76%	0.48%	1.50%	0.46%	0.29%	0.52%	1.03%	0.58%	0.01%	0.46%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	4.84%	0.84%	8.84%	0.50%	0.00%	3.70%	1.70%	1.33%	0.06%	4.01%
	c) % of connections with good voice quality	>=95%	Live data	97.86%	98.61%	NP	98.35%	99.03%	97.88%	97.62%	98.05%	99.71%	99.04%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	87	123	790	68	0	185	108	183	2	58
	e) Total no. of cells (Sector) in the licensed service area		Live data	1806	14653	8937	13603	4969	5000	6363	13765	2700	1438
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	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0	0

AUDIT & ASSESSMENT OF QOS FOR QE-MARCH-2014-PUNJAB CIRCLE



TABLE: 5

Detailed Network Data Assessment of Cellular Mobile Telephone Services- Punjab Circle- Mar 14 month

S/N	Name of Parameter	Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	QTL	VODAFONE	RCOM CDMA	TATA CDMA
				GSM Operators								CDMA Operators	
Network Service Quality Parameter													
1	Network Availability												
	a) Total no. of BTSs in the licensed service area		Mar-14	602	4954	3004	4543	1670	1636	2037	4471	900	459
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Mar-14	403.25	1750.48	8092.08	1644.24	1057.12	900.42	945	1039.80	579	70.87
	c) BTS Accumulated Downtime	<=2%	Mar-14	0.09%	0.05%	0.36%	0.05%	0.09%	0.07%	0.06%	0.03%	0.09%	0.02%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Mar-14	1	3	41	1	1	0	1	5	0	0
	e) Worst affected BTSs due to downtime	<=2%	Mar-14	0.17%	0.06%	1.36%	0.02%	0.06%	0.00%	0.05%	0.11%	0.00%	0.00%
2	Connection Establishment (Accessibility)												
	a) CSSR (Call Setup Success Rate)	>=95%	Mar-14	98.40%	99.28%	97.47%	97.78%	99.65%	99.08%	97.98%	99.61%	98.86%	98.24%
	b) SDCCH/PAGING Congestion	<=1%	Mar-14	0.04%	0.11%	0.98%	0.13%	0.02%	0.03%	0.08%	0.02%	0.00%	0.00%
	c) TCH congestion	<=2%	Mar-14	0.16%	0.15%	0.98%	0.28%	0.04%	0.11%	0.40%	0.39%	0.00%	0.45%
3	Connection Maintenance (Retainability)												
	a) Call Drop Rate (CDR)	<=2%	Mar-14	0.84%	0.50%	1.51%	0.60%	0.30%	0.53%	0.86%	0.55%	0.01%	0.54%
	b) Worst affected cells>3% TCH drop	<=3%	Mar-14	1.22%	0.83%	9.90%	0.67%	0.02%	4.46%	0.84%	1.28%	0.05%	4.91%
	c) % of connections with good voice quality	>=95%	Mar-14	97.74%	98.56%	NP	97.57%	99.00%	97.55%	97.51%	98.09%	99.70%	99.00%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Mar-14	22	124	892	92	1	222	54	177	1	71
	e) Total no. of cells (Sector) in the licensed service area		Mar-14	1806	14877	9012	13626	4969	4970	6405	13769	2700	1448
4	No. of POI's having >=0.5% POI congestion												
	No. of POI's having >=0.5% POI congestion		Mar-14	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Mar-14	0	0	0	0	0	0	0	0	0	0
5	Network Data												
	a) Equipped Capacity of		Mar-14	23189	249317	343000	195651	72000	107762	87764	146898	53000	84706

AUDIT & ASSESSMENT OF QOS FOR QE-MARCH-2014-PUNJAB CIRCLE



Network in Erlang													
b) Total traffic in TCBH in erlang (Avg.)		Mar-14	7985	224289	99472	159324	65164	29600	40546	126602	15366	20888	
c) Total no. of customers served (as per VLR) on last day of the month		Mar-14	430963	6796956	2436575	5797088	2511529	1094242	1194745	4446270	341524	206965	

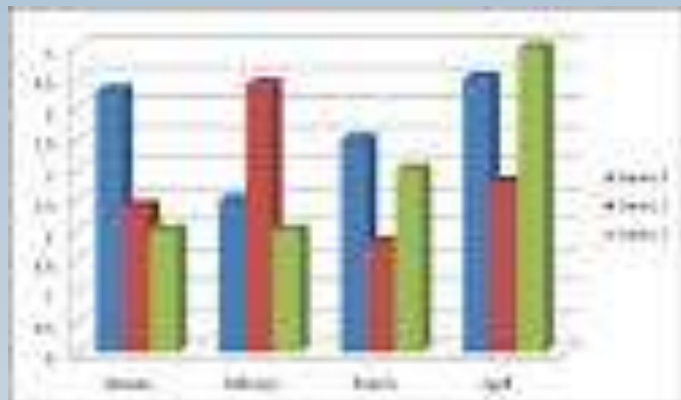
AUDIT & ASSESSMENT OF QOS FOR QE-MARCH-2014-PUNJAB CIRCLE



TABLE: 6

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Punjab Circle- Mar-14 month													
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	QTL	VODAFONE	RCOM CDMA	TATA CDMA
				GSM Operators								CDMA Operators	
Network Service Quality Parameter													
1	Network Availability												
	a) Total no. of BTSs in the licensed service area		Live data	602	4946	2992	4527	1670	1654	2034	4471	900	458
	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	93.6	94.6	1844.02	460.69	124	170.18	276	45.38	39	1013
	c) BTS Accumulated Downtime	<=2%	Live data	0.22%	0.03%	0.86%	0.14%	0.10%	0.14%	0.19%	0.01%	0.06%	0.03%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	10	0	0	0	1	0	0	0
e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.33%	0.00%	0.00%	0.00%	0.05%	0.00%	0.00%	0.00%	
2	Connection Establishment (Accessibility)												
	a) CSSR (Call Setup Success Rate)	>=95%	Live data	98.35%	99.35%	96.95%	98.78%	99.67%	99.10%	97.81%	99.86%	98.97%	98.35%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.17%	0.05%	0.97%	0.11%	0.02%	0.00%	0.11%	0.05%	0.00%	0.00%
c) TCH congestion	<=2%	Live data	0.03%	0.17%	1.34%	0.26%	0.04%	0.06%	0.45%	0.14%	0.00%	0.14%	
3	Connection Maintenance (Retainability)												
	a) Call Drop Rate (CDR)	<=2%	Live data	0.83%	0.47%	1.80%	0.56%	0.29%	0.52%	0.89%	0.52%	0.00%	0.48%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	4.69%	0.87%	14.25%	0.73%	0.00%	4.37%	0.88%	1.13%	0.01%	3.82%
	c) % of connections with good voice quality	>=95%	Live data	97.78%	98.59%	NP	97.88%	99.00%	97.76%	97.56%	98.14%	99.70%	99.05%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	85	129	1279	99	0	219	56	155	0	55
e) Total no. of cells (Sector) in the licensed service area		Live data	1806	14758	8976	13616	4969	5000	6397	13767	2700	1447	
4	No. of POI's having >=0.5% POI congestion												
	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0	3
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0	Vodafone, BSNL Malerkotla Tandem, BSNL Ferozpur Tandem

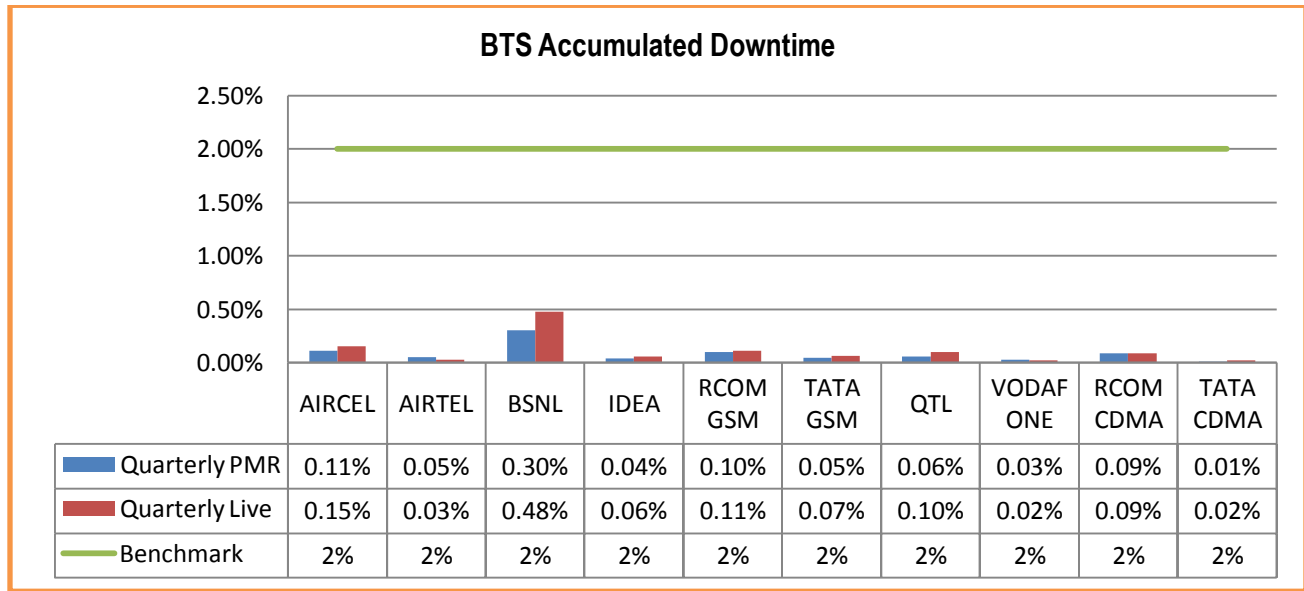
8. GRAPHICAL REPRESENTATION





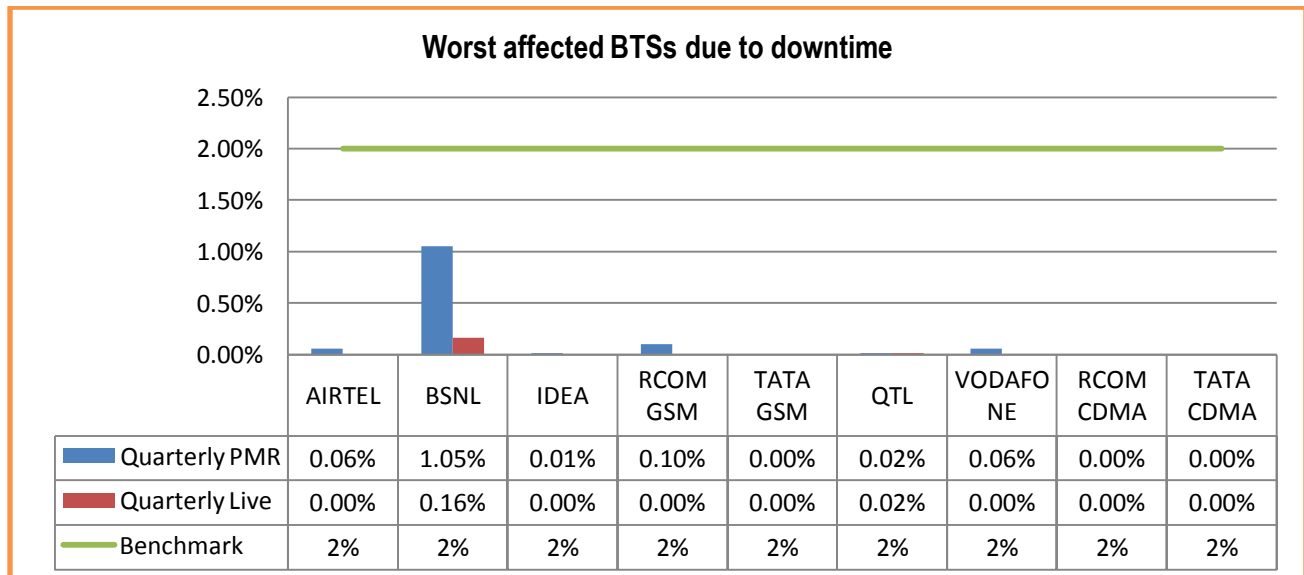
8. GRAPHICAL REPRESENTATION OF PERFORMANCE OF THE CELLULAR MOBILE SERVICE PROVIDERS- PMR V/S 3-DAYS LIVE MEASUREMENT (QUARTERLY AVERGED):

I. BTS ACCUMULATED DOWNTIME:



All operators are meeting the benchmarks.

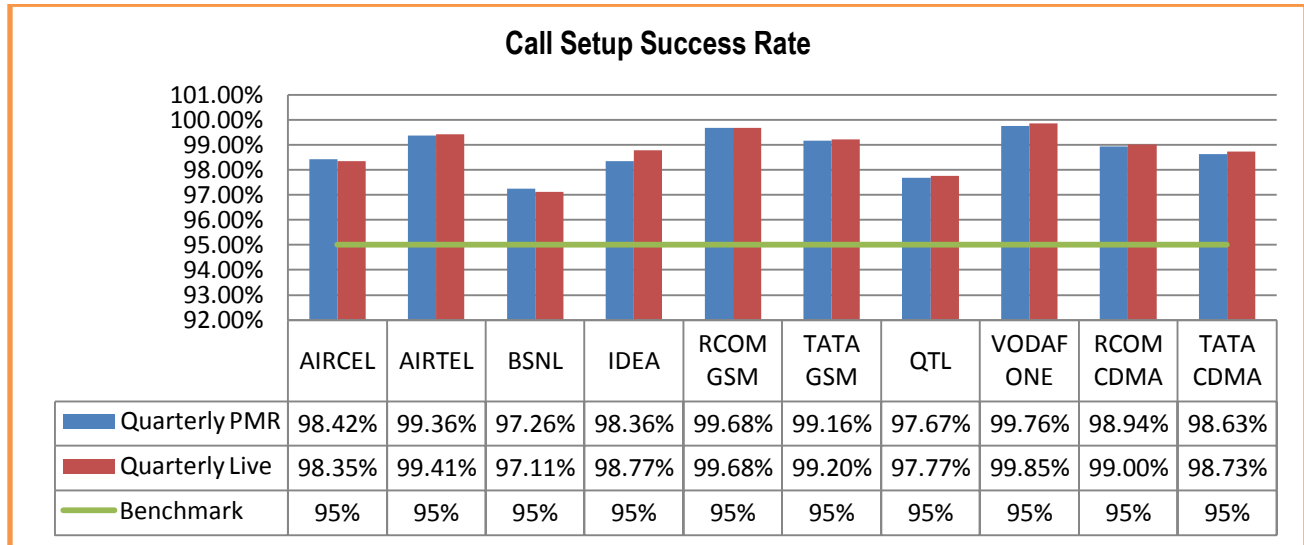
II. WORST AFFECTED BTSS DUE TO DOWNTIME :



All operators are meeting the benchmarks.

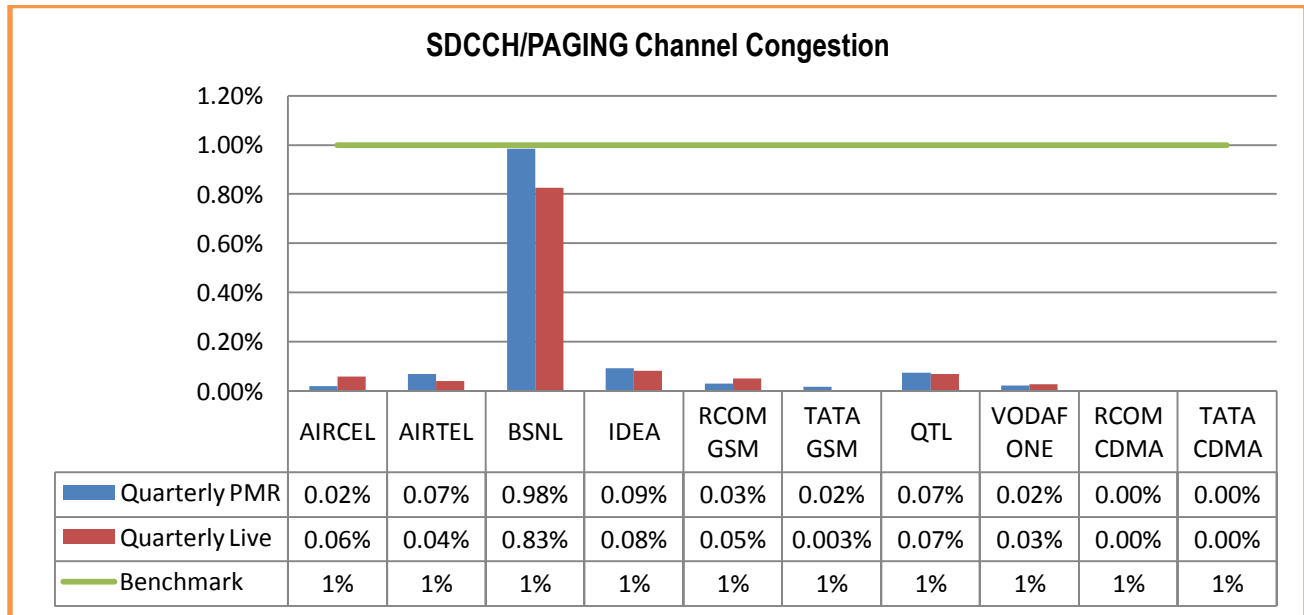


III. CALL SETUP SUCCESS RATE :



All operators are meeting the benchmarks.

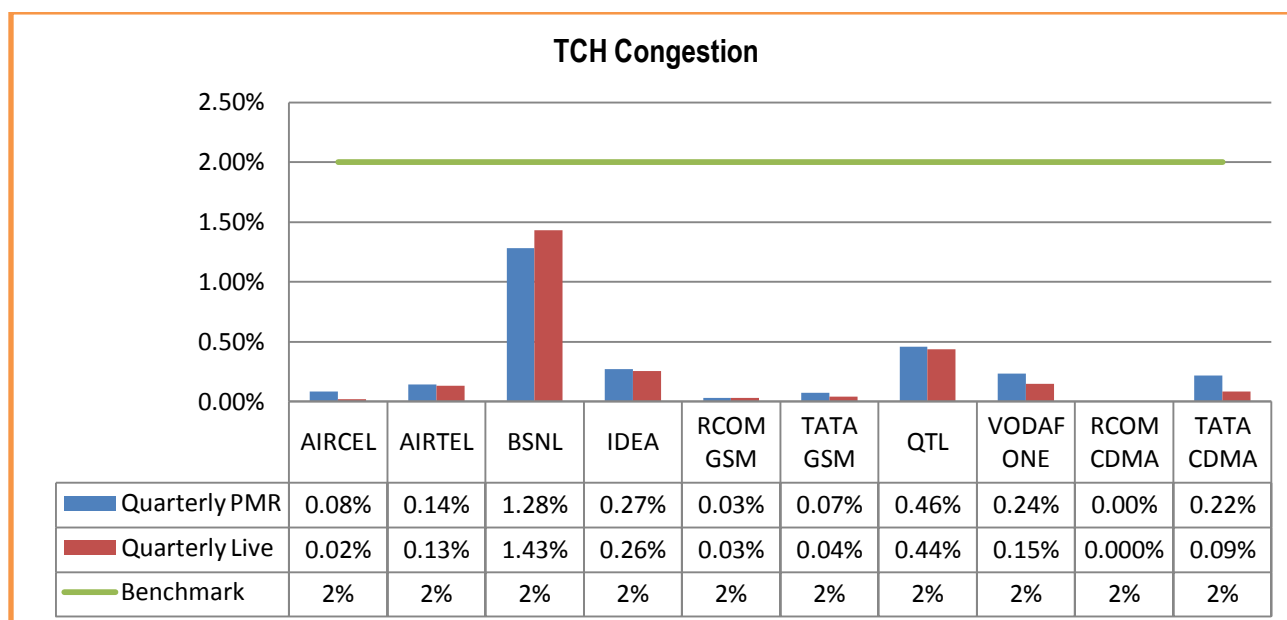
IV. SDCCH/PAGING CHANNEL CONGESTION



All operators are meeting the benchmarks.

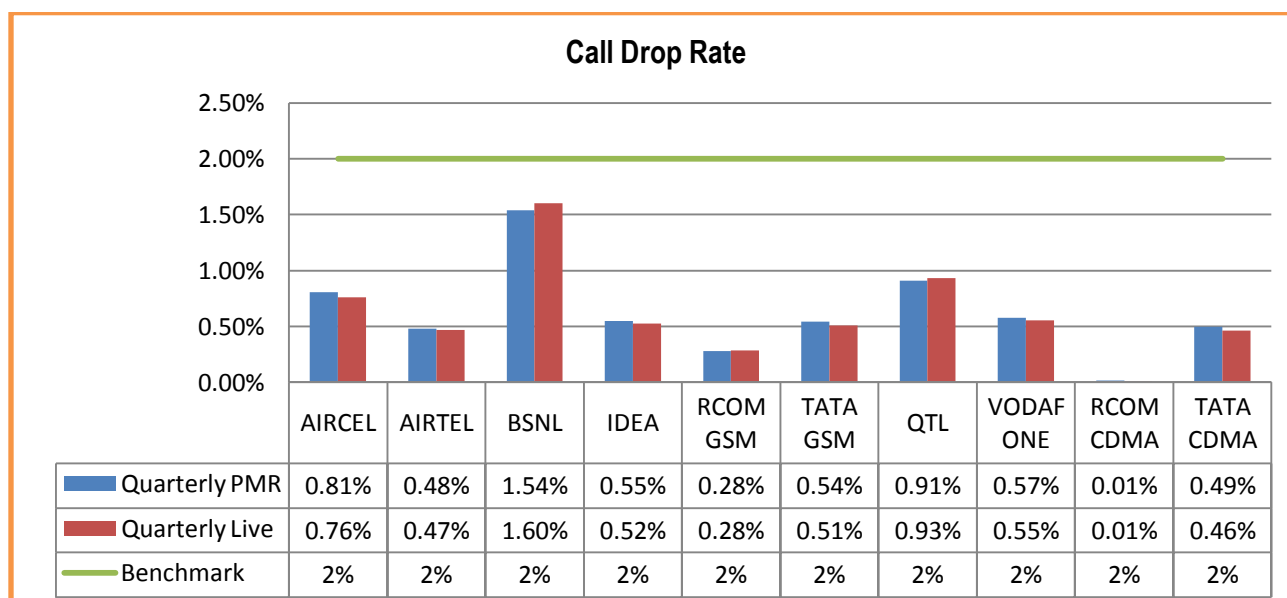


V. TCH CONGESTION :



All operators are meeting the benchmarks.

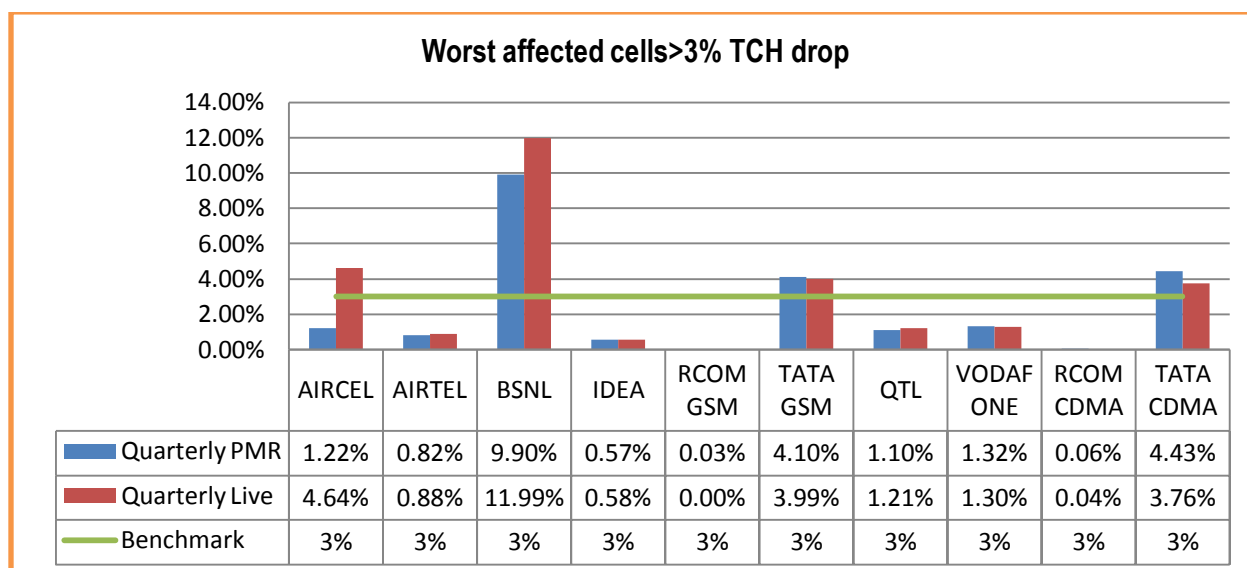
VI. CALL DROP RATE :



All operators are meeting the benchmarks.

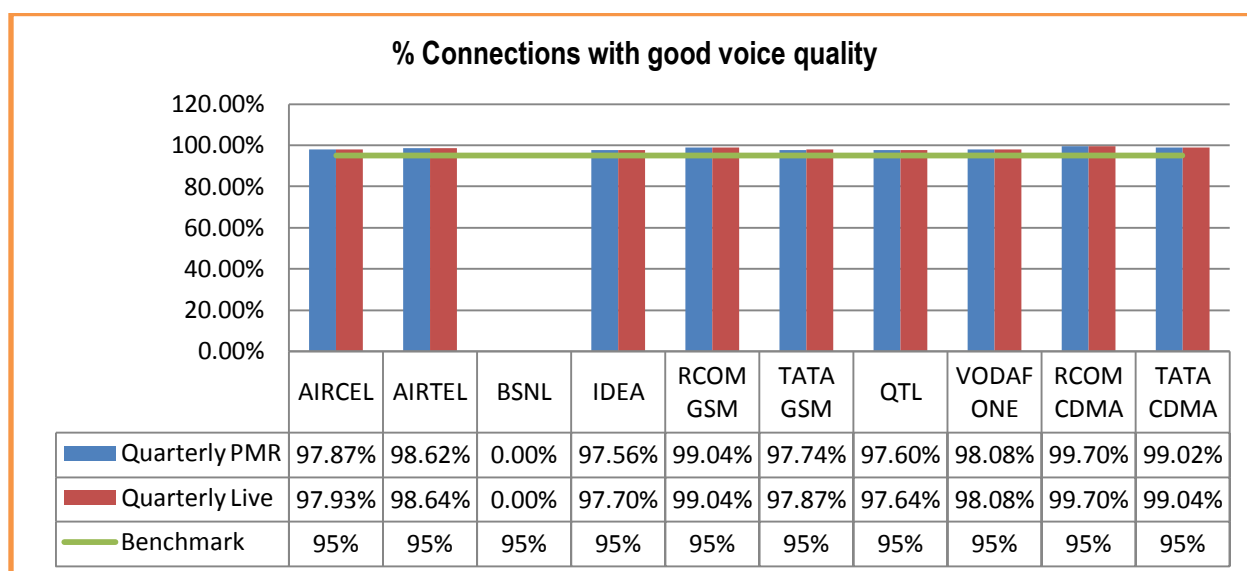


VII. WORST AFFECTED CELLS>3% TCH DROP:



BSNL, Tata (GSM), Tata (CDMA) and Aircel could not meet the benchmark.

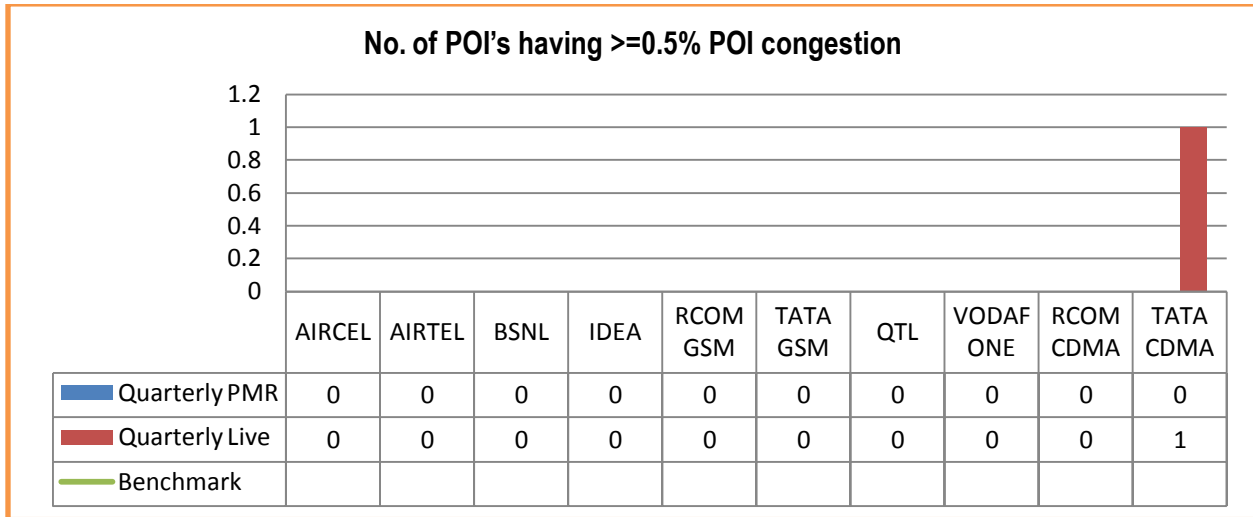
VIII. PERCENTAGE OF CONNECTIONS WITH GOOD VOICE QUALITY:



All operators are meeting the benchmarks. BSNL has no system generated data, so not provided the data for this parameter.



IX. NO. OF POI'S HAVING $\geq 0.5\%$ POI CONGESTION :



Tata (GSM) was found having congestion on two no. of POIs, one with Data Com Access and the other with TCL-NLD in the month of December-13.