



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

**PREPARED FOR:**

TELECOM REGULATORY AUTHORITY OF INDIA  
MAHANAGAR DOORSANCHAR BHAWAN  
JAWAHAR LAL NEHRU MARG  
NEW DELHI-110002

**SUBMITTED BY:**

TÜV SÜD SOUTH ASIA PVT LTD.  
C-153/1, OKHLA INDUSTRIAL AREA  
PHASE – 1, NEW DELHI - 110020  
TEL: +91 11 30889611, FAX: +91-11-30889595

## 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 **Haryana circle** against the QoS bench marks laid down by TRAI in the respective regulations.



**Table of Contents**

1. BACKGROUND.....6

2. OBJECTIVES AND METHODOLOGY .....9

3. SAMPLE SIZE .....11

    3.1 SAMPLING FOR CELLULAR MOBILE (WIRELESS) SERVICE PROVIDERS.....11

    3.2 SAMPLING FOR BASIC (WIRE LINE) SERVICES .....12

    3.3 SAMPLING FOR BROADBAND SERVICE PROVIDERS .....12

4. EXECUTIVE SUMMARY.....14

5. PMR AUDIT REPORTS: .....16

5.1 MONTHLY PMR: .....16

    5.1.1 BUSY HOUR OF VARIOUS SERVICE PROVIDERS:.....16

    5.1.2 SWITCHES/BSC/BTS DETAILS OF SERVICE PROVIDERS: .....16

    5.1.3 QOS PERFORMANCE OF MONTHLY PMR – APRIL-14 MONTH:.....17

    5.1.4 QOS PERFORMANCE OF MONTHLY PMR – MAY-14 MONTH:.....18

    5.1.5 QOS PERFORMANCE OF MONTHLY PMR – JUNE-14 MONTH: .....19

    5.1.6 QOS PERFORMANCE OF QUARTERLY PMR –AVERAGE OF QE- JUNE-14  
(APRIL TO JUNE MONTHS AUDITED DATA).....20

    5.1.7 KEY FINDINGS ON MONTHLY PMR AUDIT REPORTS:.....21

5.2 LIVE MEASUREMENT DATA (3-DAYS) FOR CELLULAR MOBILE SERVICE  
PROVIDERS (NETWORK SERVICE QUALITY PARAMETER): .....24

    5.2.1 LIVE MEASUREMENT DATA (3-DAYS) – APRIL-14 MONTH: .....24

    5.2.2 LIVE MEASUREMENT DATA (3-DAYS) – MAY-14 MONTH:.....25

    5.2.3 LIVE MEASUREMENT DATA (3-DAYS) – JUNE-14 MONTH: .....26

    5.2.4 QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT  
AUDITED DATA (AVERAGE OF APRIL TO JUNE).....27

    5.2.5 KEY FINDING ON 3 DAYS LIVE MEASUREMENTS: .....27

    5.2.6 DETAILED NETWORK DATA ASSESSMENT OF CELLULAR MOBILE  
TELEPHONE SERVICES: .....28

5.3 CUSTOMER SERVICE QUALITY PARAMETERS MEASUREMENT FOR CMTS-QE  
JUNE-14: .....35

    5.3.1 CUSTOMER SERVICE DELIVERY (CSD) AUDITED DATA FOR CELLULAR  
MOBILE SERVICES (QE-JUNE 2014):.....35

    5.3.2 3 DAYS LIVE CSD AUDITED DATA FOR CELLULAR MOBILE SERVICES  
(QE-JUNE 2014):.....37

    5.3.3 KEY FINDINGS ON CUSTOMER SERVICE DELIVERY (CSD) PARAMETERS  
.....38



6. LIVE CALLING ASSESSMENT:.....	40
6.1 INTER OPERATOR CALLS ASSESSMENT: .....	40
6.2 CUSTOMER CARE / HELPLINE ASSESSMENT:.....	41
6.3 LIVE CALLING ASSESSMENT FOR BILLING COMPLIANTS: .....	41
6.4 LEVEL -1 CALLING ASSESSMENT:.....	42
7. OPERATOR ASSISTED DRIVE TEST .....	44
7.1 DETAIL OF THE ROUTES COVERED DURING THE DRIVE TESTS: .....	53
7.2 SSA WISE DRIVE TEST OBSERVATION: .....	55
7.3 KEY FINDINGS ON DRIVE TEST: .....	58
8. GRAPHICAL REPRESENTATION:.....	60



## **1. BACKGROUND**



## 1. BACKGROUND

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

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

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

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

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

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



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

## **2. OBJECTIVES AND METHODOLOGY**





## **2. OBJECTIVES AND METHODOLOGY**

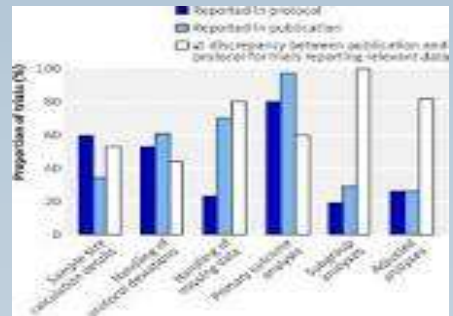
The primary objective is to audit and assess the Quality of Service being rendered by Basic, Cellular Mobile & Broadband service providers against the parameters notified by TRAI.

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) and Broadband Services is also undertaken for Punjab, Rajasthan & Gujarat circles during the quarter April – June 2014.**

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

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

### 3. SAMPLE SIZE



### 3. SAMPLE SIZE

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

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

Sl. No.	Name of Service Provider	Dates of live measurement Audit			Audit Location
		April-14	May-14	June-14	
<b>GSM Operators</b>					
1	AIRCEL	22 to 24 April-14	12 to 14 May-14	5 to 6, 9 June-14	Green Buleward Building, NSN office, Sector-62, Noida (UP)
2	AIRTEL	8 to 10 April-14	12 to 14 May-14	9 to 11 June-14	Bharti Airtel Ltd, Plot No. 21, Rajiv Gandhi Chandigarh Technology Park, Chandigarh.
3	BSNL	9, 10 to 11 April-14	10, 12 to 13 May-14	9 to 11 June-14	AGM (PG) Cum Nodal Officer (TRAI) O/o CGMT Haryana, Ambala (HR)
4	VIDEOCON	15 to 17 April-14	13 to 15 May-14	7 to 9 June-14	Videocon Telecommunication Ltd, Golden Palace, Near Vita Milk Plant, Jasmeet Nagar, Ambala City-134007
5	TATA GSM	8 to 9, 11 April-14	5 to 7 May-14	4 to 6 June-14	Tata Teleservices Limited, 5 - Jasmeet Nagar, Near Vita Milk Plant Gt Road, Ambala, Ambala-134001, India
6	IDEA	17, 21 to 22 April-14	12 to 14 May-14	20, 23 to 24 June-14	Idea Cellular Limited, E-5, Sector-63, Noida (UP)
7	RCOM GSM	11, 14 to 15 April-14	7 to 9 May-14	10 to 12 June-14	Reliance Communication Limited, NH-1, VPO-Mohari, Kuruskhetra, Near Hasari Poultry Farm, Milestone 188.
8	VODAFONE	7 to 9 April-14	13 to 15 May-14	9 to 11 June-14	Videocon Telecommunication Ltd, Golden Palace, Near Vita Milk Plant, Jasmeet Nagar, Ambala City-134007
<b>CDMA Operators</b>					
9	RCOM CDMA	11, 14 to 15 April-14	7 to 9 May-14	10 to 12 June-14	Reliance Communication Limited, NH-1, VPO-Mohari, Kuruskhetra, Near Hasari Poultry Farm, Milestone 188.
10	TATA CDMA	8 to 9, 11 April-14	5 to 7 May-14	4 to 6 June-14	Tata Teleservices Limited, 5, Jasmeet Nagar, Near Vita Milk Plant Gt Road, Ambala, Ambala-134001, India

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

**Transfer of data generated by monthly PMR and 3-days live measurements audit for the period April 2014 to June 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 was to be done for the number of exchanges spread over in about 10% of SDCAs with each service providers in specified circles. **However, QoS audit for basic (wire line) service was not required to be done for Haryana Circle in the quarter ended June 2014.**

### 3.3 SAMPLING FOR BROADBAND SERVICE PROVIDERS

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

## **4. EXECUTIVE SUMMARY**



#### 4. EXECUTIVE SUMMARY

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

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

##### Essence of compliance report of service providers with respect to the QoS:

(i) Based on monthly audit, it was concluded that the performance of the service providers was fairly satisfactory for **Network Parameters** in Haryana service area as they were found to have largely met the benchmarks of the parameters during the quarter. However, **Aircel** failed to meet the benchmark of the parameters ‘**Worst affected BTS due to down Time**’ and ‘**Call Drop rate**’ with its performance as **2.38% and 9.58%** (way beyond the benchmark of  $\leq 2\%$ ), whereas **Tata (GSM)** and **Tata (CDMA)** could not meet the benchmark of parameter ‘**Worst affected Cell**’ with their quarterly performance of **3.41%** and **5.64%** respectively.

(ii) From three days assessment, it is found that the performance of all operators is satisfactory as they have largely met the benchmarks except the parameter ‘**Worst affected cells > 3 % TCH drops**’, which could not be complied with by **Tata (GSM)** and **Tata (CDMA)** in all the three months of this quarter. The performance of **Tata (GSM)** and **Tata (CDMA)** for this parameter, taking average of three months was **3.26%** and **5.21%** respectively. **The similar non-compliance of Tata (GSM) and Tata (CDMA)** were also observed for monthly audit of the quarter.

**Aircel** was having **Call drop rate (CDR) 7.27%** on taking average of three months of the quarter. **Aircel was having similar non-compliance for the parameter CDR in monthly audit.**

(iii) With regard to the **Customer Service Quality Parameters**, the service providers were found in well compliance of most of the parameters on Metering and Billing Credibility, Response Time to Customers, Termination of Service and Time taken for refunds. However, with regard to the parameter ‘**% Calls answered by operator (voice to voice) within 60 seconds**’, the performance of **BSNL** and **Tata (GSM)** remained non-complied with their performance as **27.13%** (way below the benchmark) and **79.37%** respectively, against the benchmark of  $\geq 90\%$ .

(iv) With regard to **Drive Tests**, **BSNL, RCOM (GSM), (CDMA)** and **Idea Cellular** were non-compliant with respect to one or the other parameters in the three SSAs namely Narnaul, Rohtak and Jind. The underperformed operators need to improve their network performance in respect of the parameters which were not complied with.

## **5. PMR AUDIT REPORT**



## 5. PMR AUDIT REPORTS:

### 5.1 MONTHLY PMR:

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

Sl. No.	Name of Service Provider	Month of Audit	Network TCBH Hour
<b>GSM Operators</b>			
1	AIRCEL	June-14	20:00 - 21:00
2	AIRTEL	June-14	20:00 - 21:00
3	BSNL	June-14	19:00 - 20:00
4	VIDEOCON	June-14	21:00 - 22:00
5	TATA GSM	June-14	20:00 - 21:00
6	IDEA	June-14	20:00 - 21:00
7	RCOM GSM	June-14	19:00 - 20:00
8	VODAFONE	June-14	20:00 - 21:00
<b>CDMA Operators</b>			
9	RCOM CDMA	June-14	20:00 - 21:00
10	TATA CDMA	June-14	20:00 - 21:00

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

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

Sl. No.	Name of Service Provider	No. of MSC + GMSC	No. of BSC	No. of BTS	NSS make	BSS make
<b>GSM Operators</b>						
1	AIRCEL	NA*	1	28	NSN	NSN
2	AIRTEL	4	24	2747	Ericsson	Ericsson
3	BSNL	8 (7+1)	28	1814	Ericsson & ZTE	Ericsson, NSN & ZTE
4	IDEA	5	29	3031	NSN	NSN
5	RCOM GSM	1	8	897	Huawei	Huawei
6	TATA GSM	2	12	1503	NSN	NSN
7	VIDEOCON	1	8	1302	Huawei	Huawei
8	VODAFONE	7 (5+2)	45	2750	NSN	NSN
<b>CDMA Operators</b>						
9	RCOM CDMA	3 (2+1)	NA	552	Lucent & ZTE	Lucent
10	TATA CDMA	4	6	455	Ericsson & Huawei	ZTE & Motorola

NA\*: Aircel is having one MSC at Gurgaon (NCR)



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

CELLULAR MOBILE TELEPHONE SERVICES HARYANA CIRCLE- APRIL-14 MONTH													
PMR Generation Data		Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	VIDECON	TATA GSM	IDEA	RCOM GSM	VODAFONE	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators								CDMA Operators	
<b>Network Service Quality Parameter</b>													
<b>Network Availability</b>													
1	a) BTS Accumulated Downtime	<=2%	Apr-14	0.61%	0.06%	1.06%	0.16%	0.04%	0.00%	0.22%	0.03%	0.18%	0.04%
	b) Worst affected BTSS due to downtime	<=2%	Apr-14	0.00%	0.00%	1.47%	0.46%	0.00%	0.00%	0.59%	0.00%	0.52%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Apr-14	98.38%	98.95%	97.32%	98.88%	98.45%	99.99%	99.59%	99.79%	98.29%	96.44%
	b) SDCCH/PAGING Channel congestion	<=1%	Apr-14	0.02%	0.34%	0.26%	0.12%	0.05%	0.34%	0.06%	0.09%	0.00%	0.00%
	c) TCH congestion	<=2%	Apr-14	0.00%	0.23%	0.88%	0.06%	0.63%	0.48%	0.03%	0.21%	0.18%	2.12%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Apr-14	1.65%	0.28%	1.03%	0.52%	0.62%	0.57%	0.19%	0.65%	0.17%	0.42%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Apr-14	1.35%	0.55%	0.81%	0.76%	3.14%	1.53%	0.03%	1.36%	0.13%	5.27%
	c) Connections with good voice quality	>=95%	Apr-14	99.59%	99.17%	NP	98.26%	97.49%	98.30%	99.18%	97.84%	99.76%	NP
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Apr-14	0	0	0	0	0	0	0	0	0	0

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



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

CELLULAR MOBILE TELEPHONE SERVICES HARYANA CIRCLE- MAY-14 MONTH													
PMR Generation Data		Bench-mark	Audit Period	AIRCEL	AIRTEL	BSNL	VIDECON	TATA GSM	IDEA	RCOM GSM	VODAFONE	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators							CDMA Operators		
<b>Network Service Quality Parameter</b>													
<b>Network Availability</b>													
1	a) BTS Accumulated Downtime	<=2%	May-14	0.74%	0.08%	1.27%	0.31%	0.05%	0.01%	0.49%	0.05%	0.38%	0.18%
	b) Worst affected BTSs due to downtime	<=2%	May-14	3.57%	0.07%	1.72%	0.92%	0.00%	0.00%	0.93%	0.04%	0.65%	0.22%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	May-14	96.41%	99.07%	97.14%	98.79%	98.28%	99.99%	99.53%	99.77%	97.86%	97.95%
	b) SDCCH/PAGING Channel congestion	<=1%	May-14	0.01%	0.24%	0.38%	0.15%	0.10%	0.60%	0.03%	0.16%	0.00%	0.00%
	c) TCH congestion	<=2%	May-14	0.00%	0.22%	1.06%	0.07%	0.74%	0.36%	0.05%	0.23%	0.25%	0.60%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	May-14	5.90%	0.28%	1.13%	0.55%	0.66%	0.55%	0.27%	0.63%	0.18%	0.47%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	May-14	1.77%	0.63%	0.99%	0.96%	3.56%	1.62%	0.03%	1.43%	1.17%	6.19%
	c) Connections with good voice quality	>=95%	May-14	99.47%	99.18%	NP	98.23%	97.32%	98.33%	99.10%	97.82%	99.77%	NP
4	No. of POI's having >=0.5% POI congestion	<=0.5%	May-14	0	0	0	0	0	0	0	0	0	0

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

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

CELLULAR MOBILE TELEPHONE SERVICES HARYANA CIRCLE- JUNE-14 MONTH													
PMR Generation Data		Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	VIDECON	TATA GSM	IDEA	RCOM GSM	VODAFONE	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators									CDMA Operators
<b>Network Service Quality Parameter</b>													
<b>Network Availability</b>													
1	a) BTS Accumulated Downtime	<=2%	Jun-14	0.54%	0.07%	1.21%	0.19%	0.06%	0.00%	0.65%	0.05%	0.27%	0.08%
	b) Worst affected BTSs due to downtime	<=2%	Jun-14	3.57%	0.07%	1.34%	0.61%	0.00%	0.00%	1.78%	0.00%	0.91%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Jun-14	97.95%	99.06%	97.02%	98.64%	98.30%	99.99%	99.67%	99.76%	97.60%	98.32%
	b) SDCCH/PAGING Channel congestion	<=1%	Jun-14	0.00%	0.20%	0.36%	0.18%	0.08%	0.39%	0.03%	0.15%	0.00%	0.00%
	c) TCH congestion	<=2%	Jun-14	0.00%	0.24%	1.04%	0.09%	0.72%	0.35%	0.06%	0.24%	0.26%	0.10%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Jun-14	21.20%	0.28%	1.19%	0.55%	0.63%	0.57%	0.29%	0.64%	0.23%	0.55%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Jun-14	1.27%	0.70%	1.11%	0.94%	3.52%	1.84%	0.04%	1.72%	1.30%	5.47%
	c) Connections with good voice quality	>=95%	Jun-14	98.80%	99.14%	NP	98.13%	97.12%	98.25%	99.06%	97.66%	99.75%	NP
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Jun-14	0	0	0	0	0	0	0	0	0	0

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



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

QUARTERLY QOS PERFORMANCE (AVERAGE OF QE-JUNE-14) OF HARYANA CIRCLE													
PMR Generation Data		Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	VIDEON	TATA GSM	IDEA	RCOM GSM	VODAFONE	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators								CDMA Operators	
<b>Network Service Quality Parameter</b>													
<b>Network Availability</b>													
1	a) BTS Accumulated Downtime	<=2%	Quarterly	0.63%	0.07%	1.18%	0.22%	0.05%	0.00%	0.45%	0.04%	0.28%	0.10%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	2.38%	0.05%	1.51%	0.66%	0.00%	0.00%	1.10%	0.01%	0.69%	0.07%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	97.58%	99.03%	97.16%	98.77%	98.34%	99.99%	99.60%	99.77%	97.92%	97.57%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.01%	0.26%	0.33%	0.15%	0.08%	0.44%	0.04%	0.13%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.00%	0.23%	0.99%	0.07%	0.70%	0.40%	0.05%	0.23%	0.23%	0.94%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	9.58%	0.28%	1.12%	0.54%	0.64%	0.56%	0.25%	0.64%	0.19%	0.48%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	1.46%	0.63%	0.97%	0.89%	3.41%	1.66%	0.03%	1.50%	0.87%	5.64%
	c) Connections with good voice quality	>=95%	Quarterly	99.29%	99.16%	NP	98.21%	97.31%	98.29%	99.11%	97.77%	99.76%	NP
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Quarterly	0	0	0	0	0	0	0	0	0	0

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

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

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

#### Network Service Quality Parameters:

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

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

In Haryana circle, all the operators (**except Aircel**) 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. **Aircel** lagged behind in meeting the benchmark for parameter '**worst affected BTSs due to down time**' with its performance as **2.38%** against the benchmark of  $\leq 2\%$ .

- **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 well performed 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 have met the TRAI specified benchmarks on TCH congestion parameters.** However, Tata (CDMA) was out of benchmark (2.12%) in the month of April-14.

▪ **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 with respect to this parameter revealed that all the operators met the benchmark for this parameter except **Aircel**. **Aircel** failed to meet the benchmark in May and June months with its performance as **5.90% (May)** and **21.2% (June)**. The performance of **Aircel** for this parameter, calculated taking average of three months was **9.58%**. Thus the performance of Aircel remained way beyond the benchmark.

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 Tata Tele Services (TTSL). **Tata GSM** and **CDMA** failed to meet the benchmark in all the three months of the quarter ended June-2014.

**Tata (GSM)** with its performance of **3.14% (Apr-14)**, **3.56% (May-14)** & **3.52% (Jun-14)** and **Tata (CDMA)** with its performance of **5.27%**, **6.19%** and **5.47%** during the respective months of the quarter could not meet the benchmark. The performance of **Tata (GSM)** and **Tata (CDMA)** for this parameter, when calculated taking average of three months was **3.41%** and **5.64%** respectively.

iii. Connections with good voice quality:

Most of the Operators were measuring this parameter through the system generated data at their switches whereas BSNL & Tata CDMA were measuring through their periodic drive tests. Hence, BSNL & Tata CDMA have not provided the data for this parameter. **The audit results for this parameter indicate that all operators have met the benchmark during the quarter.**

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



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

**5.2.1 LIVE MEASUREMENT DATA (3-DAYS) – APRIL-14 MONTH:**

CELLULAR MOBILE TELEPHONE SERVICES HARYANA CIRCLE- APRIL-14 MONTH													
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	VIDEOCON	TATA GSM	IDEA	RCOM GSM	VODAFONE	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators							CDMA Operators		
<b>Network Service Quality Parameter</b>													
<b>Network Availability</b>													
1	a) BTS Accumulated Downtime	<=2%	Live data	0.44%	0.04%	1.43%	0.32%	0.04%	0.00%	0.19%	0.03%	0.11%	0.02%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.55%	0.31%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	100.0%	99.05%	97.41%	98.89%	98.75%	99.99%	99.66%	99.87%	99.00%	98.69%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.00%	0.32%	0.35%	0.12%	0.03%	0.31%	0.16%	0.06%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.00%	0.17%	0.80%	0.06%	0.43%	0.51%	0.02%	0.13%	0.05%	0.03%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Live data	4.17%	0.28%	1.03%	0.52%	0.57%	0.55%	0.16%	0.59%	0.05%	0.45%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	2.78%	0.57%	0.94%	0.73%	3.12%	1.26%	0.01%	1.18%	0.24%	3.86%
	c) Connections with good voice quality	>=95%	Live data	99.92%	99.16%	NP	98.31%	97.58%	98.42%	99.20%	97.97%	99.99%	NP
4	No. of POI having >=0.5% congestion	<0.5%	Live data	0	0	0	0	0	0	0	0	0	0

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



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

CELLULAR MOBILE TELEPHONE SERVICES HARYANA CIRCLE- MAY-14 MONTH													
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	VIDEOCON	TATA GSM	IDEA	RCOM GSM	VODAFONE	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators								CDMA Operators	
<b>Network Service Quality Parameter</b>													
<b>Network Availability</b>													
1	a) BTS Accumulated Downtime	<=2%	Live data	0.58%	0.04%	1.81%	0.20%	0.06%	0.01%	0.38%	0.05%	0.19%	0.07%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.27%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	97.14%	99.14%	96.96%	98.78%	98.47%	99.99%	99.39%	99.83%	97.46%	97.18%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.00%	0.18%	0.22%	0.23%	0.14%	0.99%	0.03%	0.05%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.00%	0.21%	0.99%	0.10%	0.59%	0.46%	0.04%	0.17%	0.31%	1.38%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Live data	17.65%	0.29%	1.10%	0.55%	0.62%	0.56%	0.24%	0.63%	0.19%	0.44%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	1.98%	0.70%	0.77%	1.12%	3.25%	1.69%	0.05%	1.48%	1.16%	6.51%
	c) Connections with good voice quality	>=95%	Live data	98.72%	99.16%	NP	98.11%	97.42%	98.27%	99.11%	97.72%	99.77%	NP
4	No. of POI having >=0.5% congestion	<0.5%	Live data	0	0	0	0	0	0	0	0	0	0

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

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

CELLULAR MOBILE TELEPHONE SERVICES HARYANA CIRCLE- JUNE-14 MONTH													
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	VIDEOCON	TATA GSM	IDEA	RCOM GSM	VODAFONE	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators									CDMA Operators
<b>Network Service Quality Parameter</b>													
<b>Network Availability</b>													
1	a) BTS Accumulated Downtime	<=2%	Live data	0.00%	0.04%	1.75%	0.14%	0.04%	0.00%	0.64%	0.05%	0.20%	0.05%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.43%	0.08%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	96.00%	99.04%	96.05%	98.88%	98.03%	99.99%	99.60%	99.82%	96.91%	98.02%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.00%	0.25%	0.31%	0.08%	0.16%	0.23%	0.03%	0.09%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.00%	0.23%	1.20%	0.05%	0.84%	0.23%	0.05%	0.18%	0.41%	0.02%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.00%	0.26%	1.15%	0.51%	0.58%	0.58%	0.23%	0.58%	0.22%	0.57%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	0.40%	0.49%	1.12%	0.89%	3.41%	2.08%	0.06%	1.55%	1.64%	5.26%
	c) Connections with good voice quality	>=95%	Live data	98.78%	99.16%	NP	98.11%	97.11%	98.21%	99.12%	97.72%	99.78%	NP
4	No. of POI having >=0.5% congestion	<0.5%	Live data	0	0	0	0	0	0	0	0	0	0

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

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

QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT (AVERAGE OF QE-JUNE-14) – HARYANA CIRCLE													
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	VIDEOCON	TATA GSM	IDEA	RCOM GSM	VODAFONE	RCOM CDMA	TATA CDMA
S/N	Name of Parameter			GSM Operators									CDMA Operators
<b>Network Service Quality Parameter</b>													
<b>Network Availability</b>													
1	a) BTS Accumulated Downtime	<=2%	Quarterly	0.34%	0.04%	1.66%	0.22%	0.05%	0.00%	0.40%	0.04%	0.17%	0.05%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	0.00%	0.00%	0.42%	0.13%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	97.71%	99.08%	96.81%	98.85%	98.42%	99.99%	99.55%	99.84%	97.79%	97.96%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.00%	0.25%	0.29%	0.14%	0.11%	0.51%	0.07%	0.07%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.00%	0.20%	1.00%	0.07%	0.62%	0.40%	0.04%	0.16%	0.26%	0.48%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	7.27%	0.28%	1.09%	0.53%	0.59%	0.56%	0.21%	0.60%	0.15%	0.49%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	1.72%	0.59%	0.94%	0.91%	3.26%	1.68%	0.04%	1.40%	1.01%	5.21%
	c) Connections with good voice quality	>=95%	Quarterly	99.14%	99.16%	NP	98.18%	97.37%	98.30%	99.14%	97.80%	99.85%	NP
4	No. of POI having >=0.5% congestion	<0.5%	Quarterly	0	0	0	0	0	0	0	0	0	0

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

From three days assessment, it is found that the performance of all operators is satisfactory as they have largely met the benchmarks except the parameter ‘Worst affected cells> 3 % TCH drops”, which could not be complied with by Tata (GSM) and Tata (CDMA) in all the three months of this quarter. The performance of **Tata (GSM)** and **Tata (CDMA)** for this parameter, taking average of three months was **3.26%** and **5.21%** respectively. **The similar non-compliance of Tata (GSM) and Tata (CDMA) was also observed for monthly audit of the quarter.**

**Aircel** was having Call drop rate **4.17%** & **17.65%** in the month of April14 and May 14 respectively, however the same was **7.27%** on taking average of three months of the quarter.



5.2.6 DETAILED NETWORK DATA ASSESSMENT OF CELLULAR MOBILE TELEPHONE SERVICES:

TABLE: 1

Detailed Network Data Assessment of Cellular Mobile Telephone Services- Haryana Circle- April-14 month

S/N	Name of Parameter	Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	VIDEOCON	TATA GSM	IDEA	RCOM GSM	VODAFONE	RCOM CDMA	TATA CDMA
				GSM Operators								CDMA Operators	
<b>Network Service Quality Parameter</b>													
<b>Network Availability</b>													
1	a) Total no. of BTSs in the licensed service area		Apr-14	28	2801	1840	1296	1503	2991	1182	2754	773	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		Apr-14	122	1273	14018	1487	473	53	1875	584	1015	139
	c) BTS Accumulated Downtime	<=2%	Apr-14	0.61%	0.06%	1.06%	0.16%	0.04%	0.00%	0.22%	0.03%	0.18%	0.04%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Apr-14	0	0	27	6	0	0	7	0	4	0
	e) Worst affected BTSs due to downtime	<=2%	Apr-14	0.00%	0.00%	1.47%	0.46%	0.00%	0.00%	0.59%	0.00%	0.52%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Apr-14	98.38%	98.95%	97.32%	98.88%	98.45%	99.99%	99.59%	99.79%	98.29%	96.44%
	b) SDCCH/PAGING Congestion	<=1%	Apr-14	0.02%	0.34%	0.26%	0.12%	0.05%	0.34%	0.06%	0.09%	0.00%	0.00%
	c) TCH congestion	<=2%	Apr-14	0.00%	0.23%	0.88%	0.06%	0.63%	0.48%	0.03%	0.21%	0.18%	2.12%
<b>Connection Maintenance (Retainability)</b>													
3	a) Call Drop Rate (CDR)	<=2%	Apr-14	1.65%	0.28%	1.03%	0.52%	0.62%	0.57%	0.19%	0.65%	0.17%	0.42%
	b) Worst affected cells>3% TCH drop	<=3%	Apr-14	1.35%	0.55%	0.81%	0.76%	3.14%	1.53%	0.03%	1.36%	0.13%	5.27%
	c) % of connections with good voice quality	>=95%	Apr-14	99.59%	99.17%	NP	98.26%	97.49%	98.30%	99.18%	97.84%	99.76%	96.00%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Apr-14	1	45	44	30	143	137	1	114	3	72
	e) Total no. of cells (Sector) in the licensed service area		Apr-14	84	8320	5476	3952	4549	8968	3568	8346	2319	1363
<b>No. of POI's having &gt;=0.5% POI congestion</b>													
4	No. of POI's having >=0.5% POI congestion		Apr-14	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Apr-14	0	0	0	0	0	0	0	0	0	0
<b>Network Data</b>													
5	a) Equipped Capacity of Network in Erlang		Apr-14	212	79874	200000	57758	100872	104371	50000	138757	56000	94054
	b) Total traffic in TCBH in erlang (Avg.)		Apr-14	0.50	64657	85970	23129	38904	113754	45479	128271	16194	19414
	c) Total no. of customers served (as per VLR) on last day of the month		Apr-14	170	2365025	1610212	774998	1469610	4142861	1687479	4697300	445915	234888



TABLE: 2

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live measurements-Haryana Circle- April-14 month													
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	VIDEOCON	TATA GSM	IDEA	RCOM GSM	VODAFONE	RCOM CDMA	TATA CDMA
				GSM Operators								CDMA Operators	
<b>Network Service Quality Parameter</b>													
1	<b>Network Availability</b>												
	a) Total no. of BTSs in the licensed service area		Live data	28	2801	1823	1290	1504	2971	1194	2752	773	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	9	77	1874	298	42	3	166	67	61	7
	c) BTS Accumulated Downtime	<=2%	Live data	0.44%	0.04%	1.43%	0.32%	0.04%	0.00%	0.19%	0.03%	0.11%	0.02%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	10	4	0	0	0	0	0	0
e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.55%	0.31%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
2	<b>Connection Establishment (Accessibility)</b>												
	a) CSSR (Call Setup Success Rate)	>=95%	Live data	100.0%	99.05%	97.41%	98.89%	98.75%	99.99%	99.66%	99.87%	99.00%	98.69%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.00%	0.32%	0.35%	0.12%	0.03%	0.31%	0.16%	0.06%	0.00%	0.00%
c) TCH congestion	<=2%	Live data	0.00%	0.17%	0.80%	0.06%	0.43%	0.51%	0.02%	0.13%	0.05%	0.03%	
3	<b>Connection Maintenance (Retainability)</b>												
	a) Call Drop Rate (CDR)	<=2%	Live data	4.17%	0.28%	1.03%	0.52%	0.57%	0.55%	0.16%	0.59%	0.05%	0.45%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	2.78%	0.57%	0.94%	0.73%	3.12%	1.26%	0.01%	1.18%	0.24%	3.86%
	c) % of connections with good voice quality	>=95%	Live data	99.92%	99.16%	NP	98.31%	97.58%	98.42%	99.20%	97.97%	99.99%	NP
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	2	48	51	29	142	113	0	99	6	53
e) Total no. of cells (Sector) in the licensed service area		Live data	84	8353	5467	3950	4550	8993	3576	8340	2319	1363	
4	<b>No. of POI's having &gt;=0.5% POI congestion</b>												
	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0	0



TABLE: 3

Detailed Network Data Assessment of Cellular Mobile Telephone Services- Haryana Circle- May-14 month

S/N	Name of Parameter	Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	VIDEOCON	TATA GSM	IDEA	RCOM GSM	VODAFONE	RCOM CDMA	TATA CDMA
				GSM Operators								CDMA Operators	
<b>Network Service Quality Parameter</b>													
1	<b>Network Availability</b>												
	a) Total no. of BTSs in the licensed service area		May-14	28	2741	1859	1300	1499	3027	1182	2750	773	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		May-14	154	1553	17605	3012	597	241	4306	1057	2191	614
	c) BTS Accumulated Downtime	<=2%	May-14	0.74%	0.08%	1.27%	0.31%	0.05%	0.01%	0.49%	0.05%	0.38%	0.18%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		May-14	1	2	32	12	0	0	11	1	5	1
e) Worst affected BTSs due to downtime	<=2%	May-14	3.57%	0.07%	1.72%	0.92%	0.00%	0.00%	0.93%	0.04%	0.65%	0.22%	
2	<b>Connection Establishment (Accessibility)</b>												
	a) CSSR (Call Setup Success Rate)	>=95%	May-14	96.41%	99.07%	97.14%	98.79%	98.28%	99.99%	99.53%	99.77%	97.86%	97.95%
	b) SDCCH/PAGING Congestion	<=1%	May-14	0.01%	0.24%	0.38%	0.15%	0.10%	0.60%	0.03%	0.16%	0.00%	0.00%
c) TCH congestion	<=2%	May-14	0.00%	0.22%	1.06%	0.07%	0.74%	0.36%	0.05%	0.23%	0.25%	0.60%	
3	<b>Connection Maintenance (Retainability)</b>												
	a) Call Drop Rate (CDR)	<=2%	May-14	5.90%	0.28%	1.13%	0.55%	0.66%	0.55%	0.27%	0.63%	0.18%	0.47%
	b) Worst affected cells>3% TCH drop	<=3%	May-14	1.77%	0.63%	0.99%	0.96%	3.56%	1.62%	0.03%	1.43%	1.17%	6.19%
	c) % of connections with good voice quality	>=95%	May-14	99.47%	99.18%	NP	98.23%	97.32%	98.33%	99.10%	97.82%	99.77%	NP
	d) Total No. of cells exceeding 3% TCH drop (call drop)		May-14	1	51	55	38	162	147	1	120	27	84
e) Total no. of cells (Sector) in the licensed service area		May-14	84	8180	5534	3976	4547	9128	3540	8331	2319	1363	
4	<b>No. of POI's having &gt;=0.5% POI congestion</b>												
	No. of POI's having >=0.5% POI congestion		May-14	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		May-14	0	0	0	0	0	0	0	0	0	0
5	<b>Network Data</b>												
	a) Equipped Capacity of Network in Erlang		May-14	212	78302	200000	58267	100688	105288	50000	138460	56000	94054
	b) Total traffic in TCBH in erlang (Avg.)		May-14	0.40	64291	81796	22808	40643	110700	39177	127353	14750	18217
c) Total no. of customers served (as per VLR) on last day of the month		May-14	168	2504372	1603256	756545	1469610	4178926	1586220	4603953	414910	234164	



TABLE: 4

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live measurements-Haryana Circle- May-14 month													
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	VIDEOCON	TATA GSM	IDEA	RCOM GSM	VODAFONE	RCOM CDMA	TATA CDMA
				GSM Operators								CDMA Operators	
<b>Network Service Quality Parameter</b>													
<b>Network Availability</b>													
1	a) Total no. of BTSs in the licensed service area		Live data	28	2788	1846	1298	1503	3014	1182	2747	773	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	12	70	2401	190	60	15	321	96	108	23
	c) BTS Accumulated Downtime	<=2%	Live data	0.58%	0.04%	1.81%	0.20%	0.06%	0.01%	0.38%	0.05%	0.19%	0.07%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	5	0	0	0	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.27%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	97.14%	99.14%	96.96%	98.78%	98.47%	99.99%	99.39%	99.83%	97.46%	97.18%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.00%	0.18%	0.22%	0.23%	0.14%	0.99%	0.03%	0.05%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.00%	0.21%	0.99%	0.10%	0.59%	0.46%	0.04%	0.17%	0.31%	1.38%
<b>Connection Maintenance (Retainability)</b>													
3	a) Call Drop Rate (CDR)	<=2%	Live data	17.65%	0.29%	1.10%	0.55%	0.62%	0.56%	0.24%	0.63%	0.19%	0.44%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	1.98%	0.70%	0.77%	1.12%	3.25%	1.69%	0.05%	1.48%	1.16%	6.51%
	c) % of connections with good voice quality	>=95%	Live data	98.72%	99.16%	NP	98.11%	97.42%	98.27%	99.11%	97.72%	99.77%	NP
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	2	58	42	45	148	154	2	123	27	89
	e) Total no. of cells (Sector) in the licensed service area		Live data	84	8320	5522	3975	4550	9124	3540	8323	2319	1363
<b>No. of POI's having &gt;=0.5% POI congestion</b>													
4	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0	0



TABLE: 5

Detailed Network Data Assessment of Cellular Mobile Telephone Services- Haryana Circle- June-14 month													
S/N	Name of Parameter	Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	VIDEOCON	TATA GSM	IDEA	RCOM GSM	VODAFONE	RCOM CDMA	TATA CDMA
				GSM Operators									CDMA Operators
<b>Network Service Quality Parameter</b>													
1	<b>Network Availability</b>												
	a) Total no. of BTSs in the licensed service area		Jun-14	28	2747	1868	1302	1504	3031	897	2750	552	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		Jun-14	109	1406	16284	1759	631	93	4189	1027	1068	256
	c) BTS Accumulated Downtime	<=2%	Jun-14	0.54%	0.07%	1.21%	0.19%	0.06%	0.00%	0.65%	0.05%	0.27%	0.08%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Jun-14	1	2	25	8	0	0	16	0	5	0
e) Worst affected BTSs due to downtime	<=2%	Jun-14	3.57%	0.07%	1.34%	0.61%	0.00%	0.00%	1.78%	0.00%	0.91%	0.00%	
2	<b>Connection Establishment (Accessibility)</b>												
	a) CSSR (Call Setup Success Rate)	>=95%	Jun-14	97.95%	99.06%	97.02%	98.64%	98.30%	99.99%	99.67%	99.76%	97.60%	98.32%
	b) SDCCH/PAGING Congestion	<=1%	Jun-14	0.00%	0.20%	0.36%	0.18%	0.08%	0.39%	0.03%	0.15%	0.00%	0.00%
c) TCH congestion	<=2%	Jun-14	0.00%	0.24%	1.04%	0.09%	0.72%	0.35%	0.06%	0.24%	0.26%	0.10%	
3	<b>Connection Maintenance (Retainability)</b>												
	a) Call Drop Rate (CDR)	<=2%	Jun-14	21.20%	0.28%	1.19%	0.55%	0.63%	0.57%	0.29%	0.64%	0.23%	0.55%
	b) Worst affected cells>3% TCH drop	<=3%	Jun-14	1.27%	0.70%	1.11%	0.94%	3.52%	1.84%	0.04%	1.72%	1.30%	5.47%
	c) % of connections with good voice quality	>=95%	Jun-14	98.80%	99.14%	NP	98.13%	97.12%	98.25%	99.06%	97.66%	99.75%	NP
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Jun-14	1	57	61	38	160	169	1	143	26	75
e) Total no. of cells (Sector) in the licensed service area		Jun-14	84	8193	5493	3983	4544	9179	3052	8332	1962	1363	
4	<b>No. of POI's having &gt;=0.5% POI congestion</b>												
	No. of POI's having >=0.5% POI congestion		Jun-14	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Jun-14	0	0	0	0	0	0	0	0	0	0
5	<b>Network Data</b>												
	a) Equipped Capacity of Network in Erlang		Jun-14	212	77279	200000	58394	100331	108684	50000	137979	56000	94054
	b) Total traffic in TCBH in erlang (Avg.)		Jun-14	0	62732	80385	22286	39250	105837	37002	122112	13296	15761
c) Total no. of customers served (as per VLR) on last day of the month		Jun-14	149	2334937	1662416	747487	1493458	4123883	1464615	4604599	394247	218351	





TABLE: 6

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live measurements-Haryana Circle- June-14 month													
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	VIDEOCON	TATA GSM	IDEA	RCOM GSM	VODAFONE	RCOM CDMA	TATA CDMA
				GSM Operators								CDMA Operators	
<b>Network Service Quality Parameter</b>													
<b>Network Availability</b>													
1	a) Total no. of BTSs in the licensed service area		Live data	28	2741	1866	1300	1499	3029	1165	2748	765	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	0	73	2354	134	43	10	540	97	108	16
	c) BTS Accumulated Downtime	<=2%	Live data	0.00%	0.04%	1.75%	0.14%	0.04%	0.00%	0.64%	0.05%	0.20%	0.05%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	8	1	0	0	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.43%	0.08%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Live data	96.00%	99.04%	96.05%	98.88%	98.03%	99.99%	99.60%	99.82%	96.91%	98.02%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.00%	0.25%	0.31%	0.08%	0.16%	0.23%	0.03%	0.09%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.00%	0.23%	1.20%	0.05%	0.84%	0.23%	0.05%	0.18%	0.41%	0.02%
<b>Connection Maintenance (Retainability)</b>													
3	a) Call Drop Rate (CDR)	<=2%	Live data	0.00%	0.26%	1.15%	0.51%	0.58%	0.58%	0.23%	0.58%	0.22%	0.57%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	0.40%	0.49%	1.12%	0.89%	3.41%	2.08%	0.06%	1.55%	1.64%	5.26%
	c) % of connections with good voice quality	>=95%	Live data	98.78%	99.16%	NP	98.11%	97.11%	98.21%	99.12%	97.72%	99.78%	NP
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	0	40	62	35	155	191	2	129	38	72
	e) Total no. of cells (Sector) in the licensed service area		Live data	84	8180	5581	3982	4538	9173	3523	8323	2303	1363
<b>No. of POI's having &gt;=0.5% POI congestion</b>													
4	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0	0

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



### 5.3 CUSTOMER SERVICE QUALITY PARAMETERS MEASUREMENT FOR CMTS-QE JUNE-14:

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

QUARTERLY AVERAGED CSD DATA FOR CELLULAR MOBILE TELEPHONE SERVICES-QE JUNE-14													
Quarterly Averaged 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								CDMA Operators	
<b>Customer Service Quality Parameters</b>													
<b>1</b>	<b>Metering &amp; Billing Credibility -Post Paid</b>												
	A) No. of bills issued during the quarter		Haryana	6	88757	20230	171173	25322	49396	NA	147543	43339	28453
	B) No. of bills disputed including billing complaints during the quarter		Haryana	0	93	18	77	21	0	NA	11	38	0
	C)% of billing complaints during the quarter	<= 0.1%	Haryana	0.00%	0.10%	0.09%	0.05%	0.08%	0.00%	NA	0.01%	0.09%	0.00%
<b>2</b>	<b>Metering &amp; Billing Credibility -Pre Paid</b>												
	A) Total No. of Pre-paid customers at the end of the quarter		Haryana	4046	2290064	3215554	4027362	1563975	2092213	1566900	4818759	368030	460104
	B) Total No. of complaints relating to charging, Credit and Validity during the quarter		Haryana	0	79	162	226	1545	1	18	188	175	0
	C) % of Pre-paid Charging Complaints	<= 0.1%	Haryana	0.00%	0.00%	0.01%	0.01%	0.10%	0.00%	0.00%	0.00%	0.05%	0.00%
<b>3</b>	<b>Resolution of Billing/Charging Complaints and Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints</b>												
	A) No. of Billing/Charging/Credit/Validity Complaints received during the quarter		Haryana	0	172	180	1789	1565	1	18	199	213	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		Haryana	0	172	180	1789	1565	1	18	199	213	0
	C) % of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 4 weeks	100 % within 4 week		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
	D) % of Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints	<=1 week		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
<b>4</b>	<b>Response time to customers for assistance</b>												
	A) Total no of calls attempted to customer care/Call center		Haryana	3147	224297	95389	327886	1435481	226647	36292	4709521	172668	21713

**AUDIT & ASSESSMENT OF QOS FOR QE-JUNE-2014-HARYANA CIRCLE**



	B) Total no. of calls successfully established to customer care/Call center		Haryana	3044	224297	95389	327886	1417210	225007	36292	4709513	170404	21090
	C) % Accessibility of Call centre /customer Care (Total call successfully established *100/ Total call attempt)	>=95%		96.71%	100.00%	100.00%	100.00%	98.73%	99.28%	100.00%	99.99%	98.69%	97.13%
	D) Total Calls reached to agent desk for Voice to Voice (Total call attempt)			371	631983	222481	1131766	210205	351808	415079	1244567	44543	33018
	E) Total number of calls answered by the operator (Voice to voice) within 60 seconds			355	571725	60354	1094830	199876	279246	383137	1208877	42070	30951
	F) % age of calls answered by operator (voice to voice) (Total call successfully established within 60 Sec *100/ Total call attempt.)	>=90%		95.86%	90.47%	27.13%	96.74%	95.09%	79.37%	92.30%	97.13%	94.45%	93.74%
<b>5</b>	<b>Termination/closure of service</b>												
	A) Total No. of requests for Termination / Closure of service received during the quarter		Haryana	0	688	74	1501	167	246	NA	501	196	168
	B) No. of requests for Termination / Closure of service complied within 7 days during the quarter		Haryana	0	688	74	1501	167	246	NA	501	196	168
	C) % of Termination/ Closure of service within 7 days	<=7days	Haryana	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%
<b>6</b>	<b>Time taken for refunds of deposits after closures.</b>												
	A) No. of Payments/ Refunds due during the quarter		Haryana	0	105	90	436	226	230	NA	116	155	328
	B) No. of Payments/ Refunds Cleared during the quarter		Haryana	0	105	90	436	226	230	NA	116	155	328
	C)Time taken for refunds of deposits after closures.	100% within 60 days	Haryana	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%

NA-Not Applicable

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

CSD 3 DAYS LIVE DATA FOR CELLULAR MOBILE TELEPHONE SERVICES-QE-JUNE-14													
3 days live CSD Audit Data		Bench- mark	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	VIDEOCON	VODAFONE	RCOM (CDMA)	TATA (CDMA)
S/ N	Name of Parameter			GSM Operators							CDMA Operators		
<b>Response time to customers for assistance</b>													
1	Total no of calls attempted to customer care/Call center		Haryana	126	8671	2973	9501	51746	7996	1200	164858	6057	777
	Total no. of calls successfully established to customer care/Call center		Haryana	116	8671	2973	9501	51117	7936	1200	164857	6030	756
	% Accessibility of Call centre /customer Care (Total calls successfully established*100/ Total call attempt)	>=95%	Haryana	91.56%	100.00%	100.00%	100.00%	98.78%	99.25%	100.00%	100.00%	99.55%	97.25%
2	Total Calls reached to agent desk for Voice to Voice (Total call attempt)		Haryana	26	20446	8431	37238	4954	12621	13428	44100	1576	1185
	Total number of calls answered by the operator (Voice to voice) within 60 seconds		Haryana	23	19183	3058	35863	4796	11101	12248	43006	1513	1149
	% age of calls answered by operator(voice to voice) (Total calls successfully established within 60 Sec. *100/ Total call attempt)	>=90%	Haryana	89.61%	93.83%	36.27%	96.31%	96.82%	87.95%	91.21%	97.52%	96.04%	96.96%

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

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

The performance of the service providers with respect to the parameter metering and billing credibility for both post-paid and pre-paid is well within the prescribed bench mark of  $\leq 0.1\%$ . Videocon is not having the post-paid customer in Haryana circle.

#### 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 have 100 % resolved the billing complaints within stipulated period of 4 weeks. In all cases where customers were due for credit / adjustment, all the service providers have met the benchmark of 100 % refund in one week.

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

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

All service providers were in compliance with respect to the parameter 'Accessibility of call center' and with regard to the parameter '% Calls answered by operator (voice to voice)' within 60 seconds, the performance of **BSNL** and **Tata (GSM)** remained non-complied with the benchmark with their performance as **27.13% (way below the benchmark)** and **79.37%%** respectively, against the benchmark of  $\geq 90\%$ .

#### 4. Termination/Closure of Service

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

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

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

The results for three days live measurements reveal that all operators have met the benchmarks for the parameters 'Accessibility to call center'. However, in case of call connection to operators (Voice to voice) within 60 seconds only **Aircel**, **BSNL** and **Tata (GSM)** could not met the benchmark with their performance as **89.61%**, **36.27%** and **87.95%** respectively. Thus the performance of **BSNL** was way below the benchmark.

## **6. LIVE CALLING ASSESSMENT**



## 6. LIVE CALLING ASSESSMENT:

### 6.1 INTER OPERATOR CALLS ASSESSMENT:

Inter operator call assessment with a sample of 2x50 test calls for each Service provider operating in Haryana 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	VIDEOCON	VODAFONE	RCOM CDMA	TATA CDMA
AIRCEL	Haryana	--	100.0%	93.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
AIRTEL	Haryana	100.0%	--	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
BSNL	Haryana	91.0%	100.0%	--	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
IDEA	Haryana	100.0%	100.0%	100.0%	--	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
RCOM GSM	Haryana	100.0%	100.0%	100.0%	100.0%	--	99.0%	100.0%	100.0%	100.0%	100.0%
TATA GSM	Haryana	100.0%	100.0%	98.0%	100.0%	100.0%	--	100.0%	100.0%	100.0%	100.0%
VIDEOCON	Haryana	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	--	100.0%	100.0%	100.0%
VODAFONE	Haryana	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	--	100.0%	100.0%
RCOM CDMA	Haryana	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	--	100.0%
TATA CDMA	Haryana	100.0%	100.0%	100.0%	100.0%	99.0%	100.0%	100.0%	100.0%	100.0%	--

The result of the testing revealed that the inter connection performance among the operators was quite satisfactory. However, in case where Calls attempted from Aircel to BSNL successful interconnection was 93.0%, BSNL to Aircel was 91%, RCOM GSM to Tata GSM, was 99%, Tata GSM to BSNL was 98% and Tata CDMA to RCOM GSM was 99%. Thus there was no remarkable problem in interconnection from one operator to other operators.



## 6.2 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	Haryana	100	100	100	100	100	100	100	100	100	100
Total no of calls attempted to customer care/Call center	Haryana	100	100	100	100	100	100	100	100	100	100
Total no. of calls successfully established to customer care/Call center	Haryana	100	100	100	100	100	100	100	100	100	100
% Accessibility of Call centre /customer Care (Total calls successfully established * 100 / Total call attempts)	Haryana	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)	Haryana	100	100	100	100	100	100	100	100	100	100
Total number of calls answered by the operator (Voice to voice) within 60 seconds	Haryana	96	100	60	100	100	100	100	98	100	100
% age of calls answered by operator(voice to voice) (Total call successfully established within 60 Sec.*100 / Total calls attempts)	Haryana	95.00%	100.00%	60.00%	100.00%	100.00%	100.00%	100.00%	94.00%	100.00%	100.00%

In case of calls answered by operators (voice to voice) within 60 seconds when test calls were made to the call centers. Aircel, BSNL and Vodafone could connect 95%, 60% and 94% of calls to the operator within 60 Seconds.

## 6.3 LIVE CALLING ASSESSMENT FOR BILLING COMPLAINTS:

TELEPHONIC INTERVIEW FOR BILLING COMPLAINTS							
Parameter	Circle Name	AIRTEL	BSNL	IDEA	RCOM (GSM)	VODAFONE	RCOM (CDMA)
Total No. of calls Attempted	Haryana	100	100	100	100	100	100
Total No. of calls Answered	Haryana	70	82	88	79	90	81
Cases resolved within 4 weeks	Haryana	70	82	88	79	90	81
%age of cases resolved	Haryana	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

To test the Service Providers performance on billing related complaints and their resolutions, TUV-SUD auditors conducted a customer feedback calling for about random 100 nos. of customers. During live calling, some of the customers did not attend the calls while few others reported that they don't exactly remember about the resolution of complaints. However, Majority of the customers reported that the billing complaints were resolved to their satisfaction.

**6.4 LEVEL -1 CALLING ASSESSMENT:**

LEVEL 1 LIVE CALLING													
Emergency no.	Circle Name	SSA Name	SDCA Name	No. of calls made	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	VIDEOCON	VODAFONE	RCOM (CDMA)	TATA (CDMA)
100, 101, 102, 1091	Haryana	Rewari	Rewari	25	√	√	√	√	√	√	√	√	√
100, 101, 102, 1091	Haryana	Rewari	Narnaul	25	√	√	√	√	√	√	√	√	√
100, 101, 102, 1091	Haryana	Rewari	Mahendargarh	25	√	√	√	√	√	√	√	√	√
100, 101, 102, 1091	Haryana	Rohtak	Rohtak	25	√	√	√	√	√	√	√	√	√
100, 101, 102, 1091	Haryana	Rohtak	BHIWANI	25	√	√	√	√	√	√	√	√	√
100, 101, 102, 1091	Haryana	Rohtak	Bahadurgarh	25	√	√	√	√	√	√	√	√	√
100, 101, 102, 1091	Haryana	Rohtak	Jhajjar	25	√	√	√	√	√	√	√	√	√
100, 101, 102, 1091	Haryana	Jind	Jind	25	√	√	√	√	√	√	√	√	√
100, 101, 102, 1091	Haryana	Jind	Saffidon	25	√	√	√	√	√	√	√	√	√
100, 101, 102, 1091	Haryana	Jind	Narwana	25	√	√	√	√	√	√	√	√	√

To assess the availability and efficiency of level 1 services such as police, fire, ambulance (emergency services) offered by various mobile service providers, the calls were made from mobile phones provided by the service providers. In Haryana service area, these services were found functional in the networks of all the service providers except in some of the SDCAs where they don't have their services. Detail of no coverage areas given in Table-5 of Drive Test.

## 7. DRIVE TEST



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

In terms of TRAI's letter dated 21<sup>st</sup> January, 2014, the drive tests were conducted for three consecutive days in one select SSA each month in each service area. Thus, the drive tests were carried out in three SSA's namely **Narnaul, Rohtak and Jind** in the months of April, May and June 2014 respectively. The total route Kms covered during the drive tests in respective SSAs was **379 Kms, 655 Kms and 425 Kms**. 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 is considered to be good, where as Rx Qual beyond this benchmark is considered to be bad. Call drops were measured by the number of calls that were dropped to the total number of calls established during the drive test. Similarly CSSR was measured as the ratio of total calls established to the total call attempts made. Signal strength was measured in dBm at street level with strength  $\geq -75$  dBm for in-door coverage and  $\geq -85$  dBm for in-vehicle.

**AUDIT & ASSESSMENT OF QOS FOR QE-JUNE-2014-HARYANA CIRCLE**

**DRIVE TEST TABLE – 1**

**OPERATOR-ASSISTED DRIVE TEST AT NARNAUL SSA IN APR-14 MONTH- HARYANA CIRCLE**

S/N	Parameter	Days of drive test	Indoor locations	AIRCEL		AIRTEL		BSNL		TATA GSM		IDEA		RCOM GSM		VIDEOCON		VODAFONE		TATA CDMA		RCOM CDMA			
				OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
1	Call Attempts	Day 1	BMG Mall	NS	NS	154	19	125	31	98	24	141	28	127	24	82	28	108	31	114	24	123	24		
		Day 2	Civil Hospital Narnaul	NS	NS	140	22	161	20	79	24	133	21	91	14	60	20	124	20	78	16	91	14		
		Day 3	Court Kosli	NS	NS	112	25	136	30	87	24	100	30	112	26	61	30	116	33	71	24	114	26		
		Overall SSA		NS	NS	406	66	422	81	264	72	374	79	330	64	203	78	348	84	263	64	328	64		
2	Blocked Call Rate	Day 1	BMG Mall	NS	NS	0.00%	0.00%	0.80%	0.00%	0.00%	0.00%	0.00%	0.00%	2.36%	0.00%	1.22%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.63%	0.00%	
		Day 2	Civil Hospital Narnaul	NS	NS	0.00%	0.00%	1.24%	0.00%	1.27%	0.00%	0.00%	0.00%	0.00%	0.00%	1.67%	0.00%	0.81%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Day 3	Court Kosli	NS	NS	0.00%	0.00%	4.41%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.28%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Overall SSA		NS	NS	0.00%	0.00%	2.13%	0.00%	0.38%	0.00%	0.00%	0.00%	0.91%	0.00%	1.97%	0.00%	0.29%	0.00%	0.00%	0.00%	0.61%	0.00%		
3	Dropped Call Rate (<=2%)	Day 1	BMG Mall	NS	NS	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.61%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.65%	0.00%	
		Day 2	Civil Hospital Narnaul	NS	NS	0.00%	0.00%	0.63%	0.00%	0.00%	0.00%	0.00%	0.00%	1.10%	0.00%	0.00%	0.00%	0.81%	0.00%	0.00%	0.00%	1.10%	0.00%		
		Day 3	Court Kosli	NS	NS	0.00%	0.00%	7.69%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		
		Overall SSA		NS	NS	0.00%	0.00%	2.69%	0.00%	0.00%	0.00%	0.00%	0.00%	0.92%	0.00%	0.00%	0.00%	0.29%	0.00%	0.00%	0.00%	0.92%	0.00%		
4	Percentage connections with good voice quality (=>95%)																								
	(a) 0-4 (w/o frequenc	Day 1	BMG Mall	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	95.80%	96.60%	99.39%	99.74%	
		Day 2	Civil Hospital	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	95.45%	95.18%	98.42%	99.87%	

## AUDIT & ASSESSMENT OF QOS FOR QE-JUNE-2014-HARYANA CIRCLE

y hopping for CDMA Operator s)	Narnaul																					
	Day 3	Court Kosli	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Overall SSA		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(b) 0-5 ( with frequency hopping for GSM Operator s)	Day 1	BMG Mall	NS	NS	95.05%	96.60%	88.10%	88.93%	96.42%	98.66%	91.60%	97.61%	98.46%	99.10%	97.86%	98.86%	95.84%	97.50%	NA	NA	NA	NA
	Day 2	Civil Hospital Narnaul	NS	NS	96.61%	95.22%	97.32%	98.35%	97.71%	98.06%	94.48%	97.15%	98.86%	96.57%	98.54%	98.55%	95.75%	97.43%	NA	NA	NA	NA
	Day 3	Court Kosli	NS	NS	96.05%	99.04%	94.89%	95.11%	98.14%	98.65%	94.81%	97.58%	99.56%	99.40%	99.21%	97.11%	95.60%	98.29%	NA	NA	NA	NA
	Overall SSA		NS	NS	95.86%	97.33%	90.90%	90.67%	97.37%	98.50%	93.51%	97.58%	98.78%	98.67%	98.47%	98.19%	95.74%	97.79%	NA	NA	NA	NA
<b>Service Coverage</b>																						
In door (>= - 75dBm)	Day 1	BMG Mall	NS	NS	76.38%	66.41%	76.02%	42.62%	66.13%	39.66%	98.92%	99.80%	58.97%	28.20%	92.53%	89.64%	96.25%	90.15%	51.58%	44.84%	83.11%	68.09%
	Day 2	Civil Hospital Narnaul	NS	NS	63.49%	35.21%	80.31%	40.98%	67.88%	40.27%	94.86%	36.49%	50.66%	0.12%	90.23%	86.24%	70.64%	62.25%	47.26%	40.51%	82.79%	89.72%
	Day 3	Court Kosli	NS	NS	75.40%	84.04%	77.74%	57.89%	59.03%	52.23%	96.28%	98.53%	47.72%	25.28%	90.39%	84.27%	81.99%	90.71%	39.14%	40.20%	67.41%	97.55%
	Overall SSA		NS	NS	71.57%	66.21%	76.33%	43.11%	64.98%	41.32%	96.76%	98.60%	54.49%	20.87%	91.14%	87.01%	83.89%	84.64%	48.66%	41.73%	80.11%	82.47%
In-vehicle (>= - 85dBm)	Day 1	BMG Mall	NS	NS	95.50%	88.04%	96.99%	96.23%	98.37%	98.67%	99.85%	100.0%	86.38%	58.31%	98.01%	95.65%	99.45%	99.81%	54.38%	90.24%	96.79%	99.17%
	Day 2	Civil Hospital Narnaul	NS	NS	93.54%	80.58%	97.08%	81.35%	90.47%	71.08%	99.45%	98.50%	81.67%	91.49%	96.07%	94.64%	94.78%	94.42%	50.46%	43.14%	88.82%	99.61%
	Day 3	Court Kosli	NS	NS	95.28%	95.87%	96.99%	97.47%	78.71%	61.69%	99.47%	99.99%	85.09%	52.65%	96.66%	87.83%	97.54%	99.54%	73.04%	92.44%	79.66%	100.0%
	Overall SSA		NS	NS	94.75%	89.86%	97.00%	95.91%	92.66%	85.71%	99.60%	99.98%	84.85%	63.24%	96.96%	92.78%	97.40%	98.59%	55.85%	80.94%	91.52%	99.53%
Outdoor-in city (>= - 95dBm)	Day 1	BMG Mall	NS	NS	99.91%	100.0%	99.84%	99.99%	99.89%	99.94%	99.95%	100.0%	99.34%	98.68%	99.91%	100.0%	99.86%	100.0%	95.79%	100.0%	100.0%	100.0%
	Day 2	Civil Hospital Narnaul	NS	NS	99.68%	99.23%	99.95%	99.15%	99.92%	98.08%	99.84%	100.0%	97.38%	97.40%	99.79%	99.98%	99.70%	99.57%	96.20%	96.65%	96.61%	100.0%
	Day 3	Court Kosli	NS	NS	99.87%	99.90%	99.83%	100.0%	99.10%	98.55%	99.94%	100.0%	99.61%	94.96%	99.80%	99.61%	99.82%	100.0%	96.27%	99.95%	92.63%	100.0%
	Overall SSA		NS	NS	99.82%	99.72%	99.84%	99.97%	99.73%	99.20%	99.91%	100.0%	98.86%	96.88%	99.84%	99.87%	99.80%	99.91%	96.06%	99.24%	97.74%	100.0%
6 Call Setup Success Rate	Day 1	BMG Mall	NS	NS	100.0%	100.0%	96.00%	100.0%	100.0%	100.0%	100.0%	100.0%	97.64%	100.0%	98.78%	100.0%	100.0%	100.0%	100.0%	100.0%	98.37%	100.0%
	Day 2	Civil Hospital Narnaul	NS	NS	100.0%	100.0%	98.76%	100.0%	98.73%	100.0%	100.0%	100.0%	100.0%	100.0%	98.33%	100.0%	99.19%	100.0%	100.0%	100.0%	100.0%	100.0%

**AUDIT & ASSESSMENT OF QOS FOR QE-JUNE-2014-HARYANA CIRCLE**

	(>=95%)	Day 3	Court Kosli	NS	NS	100.0%	100.0%	95.59%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		<b>Overall SSA</b>		<b>NS</b>	<b>NS</b>	<b>100.0%</b>	<b>100.0%</b>	<b>96.92%</b>	<b>100.0%</b>	<b>99.62%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>99.09%</b>	<b>100.0%</b>	<b>98.03%</b>	<b>100.0%</b>	<b>99.71%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>99.39%</b>	<b>100.0%</b>
7	<b>Hand Over Success Rate (HOSR)</b>	Day 1	BMG Mall	NS	NS	99.73%	100.0%	98.10%	100.0%	100.0%	100.0%	99.36%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		Day 2	Civil Hospital Namaul	NS	NS	98.63%	100.0%	97.96%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		Day 3	Court Kosli	NS	NS	99.13%	100.0%	94.69%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		<b>Overall SSA</b>		<b>NS</b>	<b>NS</b>	<b>99.27%</b>	<b>100.0%</b>	<b>97.12%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>99.72%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>99.84%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

- NS-No Service
- NA-Not Applicable

**AUDIT & ASSESSMENT OF QOS FOR QE-JUNE-2014-HARYANA CIRCLE**

**DRIVE TEST TABLE – 2**  
**OPERATOR-ASSISTED DRIVE TEST AT ROHTAK SSA IN MAY-14 MONTH- HARYANA CIRCLE**

S/N	Parameter	Classification of routes covered	Indoor locations	AIRCEL		AIRTEL		BSNL		TATA GSM		IDEA		RCOM GSM		VIDEOCON		VODAFONE		TATA CDMA		RCOM CDMA	
				OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR
1	Call Attempts	Major Roads	AGRO MALL SEC 14	NS	NS	126	26	290	13	178	25	208	25	267	27	186	26	209	25	188	25	265	26
		Highways	RAILWAY STN. LOHARU	NS	NS	232	25	66	25	135	25	127	26	129	26	153	25	147	25	140	25	131	26
		Within City	CIVIL HOSPITAL B'GARH	NS	NS	207	26	268	25	244	25	196	25	186	26	191	25	210	25	205	25	193	27
		Overall SSA		NS	NS	565	77	624	63	557	75	531	76	582	79	530	76	566	75	533	75	589	79
2	Blocked Call Rate	Major Roads	AGRO MALL SEC 14	NS	NS	0.79%	0.00%	7.59%	0.00%	0.56%	0.00%	0.48%	0.00%	0.75%	7.41%	1.08%	0.00%	0.00%	0.00%	0.53%	0.00%	0.00%	0.00%
		Highways	RAILWAY STN. LOHARU	NS	NS	0.86%	0.00%	7.58%	0.00%	0.00%	0.00%	0.00%	0.00%	0.78%	0.00%	1.96%	0.00%	0.68%	0.00%	0.71%	0.00%	0.00%	0.00%
		Within City	CIVIL HOSPITAL B'GARH	NS	NS	0.97%	0.00%	8.21%	0.00%	0.82%	0.00%	1.02%	0.00%	0.00%	0.00%	0.52%	0.00%	0.48%	0.00%	0.00%	0.00%	1.04%	0.00%
		Overall SSA		NS	NS	0.88%	0.00%	7.85%	0.00%	0.54%	0.00%	0.56%	0.00%	0.52%	2.53%	1.13%	0.00%	0.35%	0.00%	0.38%	0.00%	0.34%	0.00%
3	Dropped Call Rate (<=2%)	Major Roads	AGRO MALL SEC 14	NS	NS	0.00%	0.00%	3.45%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.75%	0.00%
		Highways	RAILWAY STN. LOHARU	NS	NS	0.00%	0.00%	4.55%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.44%	0.00%	2.29%	0.00%



## AUDIT & ASSESSMENT OF QOS FOR QE-JUNE-2014-HARYANA CIRCLE

	Within City	CIVIL HOSPITAL B'GARH	NS	NS	0.00%	0.00%	5.97%	0.00%	0.83%	0.00%	0.00%	0.00%	0.00%	3.85%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.57%	0.00%
	<b>Overall SSA</b>		<b>NS</b>	<b>NS</b>	<b>0.00%</b>	<b>0.00%</b>	<b>4.65%</b>	<b>0.00%</b>	<b>0.36%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>1.30%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.38%</b>	<b>0.00%</b>	<b>1.36%</b>	<b>0.00%</b>	
<b>Percentage connections with good voice quality (=&gt;95%)</b>																								
4	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Major Roads	Agro Mall Sec 14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	96.16%	99.21%	97.11%	100.0%	
		Highways	Railway Stn. Loharu	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	96.92%	99.47%	98.20%	100.0%
		Within City	Civil Hospital B'garh	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	96.66%	99.84%	98.50%	100.0%
		<b>Overall SSA</b>		<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>96.54%</b>	<b>99.48%</b>	<b>98.01%</b>	<b>100.0%</b>
5	(b) 0-5 (with frequency hopping for GSM Operators)	Major Roads	Agro Mall Sec 14	NS	NS	95.67%	99.57%	89.23%	99.55%	95.89%	97.84%	92.56%	89.91%	97.98%	99.20%	96.29%	97.49%	95.76%	95.80%	NA	NA	NA	NA	
		Highways	Railway Stn. Loharu	NS	NS	95.81%	99.80%	89.14%	99.62%	95.22%	99.37%	94.70%	98.04%	98.25%	100.0%	96.61%	99.73%	95.38%	98.99%	NA	NA	NA	NA	
		Within City	Civil Hospital B'garh	NS	NS	96.01%	99.78%	91.88%	98.46%	95.03%	99.53%	94.73%	99.28%	97.91%	100.0%	96.71%	99.02%	95.63%	99.37%	NA	NA	NA	NA	
		<b>Overall SSA</b>		<b>NS</b>	<b>NS</b>	<b>95.85%</b>	<b>99.72%</b>	<b>90.36%</b>	<b>99.25%</b>	<b>95.32%</b>	<b>98.95%</b>	<b>93.53%</b>	<b>95.94%</b>	<b>98.02%</b>	<b>99.73%</b>	<b>96.55%</b>	<b>98.72%</b>	<b>95.63%</b>	<b>98.62%</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	
<b>Service Coverage</b>																								
5	In door (>= -75dBm)	Major Roads	Agro Mall Sec 14	NS	NS	86.56%	93.20%	51.96%	99.58%	66.07%	100.0%	85.92%	98.42%	56.66%	78.09%	88.32%	98.13%	78.10%	87.69%	38.37%	89.22%	69.80%	100.0%	
		Highways	Railway Stn. Loharu	NS	NS	71.59%	96.29%	61.88%	99.88%	71.00%	100.0%	91.85%	71.49%	52.93%	100.0%	91.70%	99.60%	82.07%	96.49%	65.39%	100.0%	75.64%	99.94%	
		Within City	Civil Hospital B'garh	NS	NS	89.66%	50.65%	84.62%	24.50%	91.20%	100.0%	85.36%	100.0%	60.72%	93.52%	96.87%	100.0%	92.97%	100.0%	57.10%	99.93%	88.70%	36.01%	
		<b>Overall SSA</b>		<b>NS</b>	<b>NS</b>	<b>82.21%</b>	<b>80.00%</b>	<b>67.19%</b>	<b>69.46%</b>	<b>79.24%</b>	<b>100.0%</b>	<b>87.17%</b>	<b>90.55%</b>	<b>57.53%</b>	<b>90.40%</b>	<b>92.70%</b>	<b>99.23%</b>	<b>84.42%</b>	<b>95.86%</b>	<b>54.17%</b>	<b>96.13%</b>	<b>79.68%</b>	<b>77.06%</b>	
5	In-vehicle (>= -85dBm)	Major Roads	Agro Mall Sec 14	NS	NS	98.35%	99.74%	78.94%	99.58%	84.21%	100.0%	98.70%	100.0%	78.45%	97.93%	95.18%	100.0%	95.09%	99.87%	77.15%	99.74%	87.66%	100.0%	
		Highways	Railway Stn. Loharu	NS	NS	88.29%	99.89%	90.19%	100.0%	93.51%	100.0%	99.03%	99.42%	89.36%	100.0%	96.07%	100.0%	97.60%	99.97%	91.34%	100.0%	92.83%	100.0%	
		Within City	Civil Hospital B'garh	NS	NS	98.59%	98.79%	94.68%	82.83%	98.78%	100.0%	99.75%	100.0%	92.87%	99.97%	99.36%	100.0%	98.36%	100.0%	78.82%	99.96%	95.70%	96.38%	
		<b>Overall</b>		<b>NS</b>	<b>NS</b>	<b>94.73%</b>	<b>99.48%</b>	<b>87.05%</b>	<b>92.99%</b>	<b>93.30%</b>	<b>100.0%</b>	<b>99.01%</b>	<b>99.82%</b>	<b>87.79%</b>	<b>99.29%</b>	<b>97.11%</b>	<b>100.0%</b>	<b>96.84%</b>	<b>99.96%</b>	<b>80.67%</b>	<b>99.90%</b>	<b>92.58%</b>	<b>98.70%</b>	

## AUDIT & ASSESSMENT OF QOS FOR QE-JUNE-2014-HARYANA CIRCLE

		SSA																						
Outdoor - in city (>= - 95dBm)	Major Roads	Agro Mall Sec 14	NS	NS	99.90%	100.0%	96.43%	99.58%	97.25%	100.0%	99.96%	100.0%	97.18%	100.0%	99.29%	100.0%	99.62%	99.93%	95.36%	99.88%	98.70%	100.0%		
	Highways	Railway Stn. Loharu	NS	NS	97.64%	99.99%	98.84%	100.0%	99.75%	100.0%	99.99%	100.0%	98.84%	100.0%	99.01%	100.0%	99.87%	100.0%	96.58%	100.0%	99.71%	100.0%		
	Within City	Civil Hospital B'garh	NS	NS	99.98%	99.99%	99.90%	99.41%	99.79%	100.0%	100.0%	100.0%	99.76%	100.0%	99.98%	100.0%	99.92%	100.0%	94.80%	99.96%	97.37%	100.0%		
	<b>Overall SSA</b>		<b>NS</b>	<b>NS</b>	<b>99.10%</b>	<b>99.99%</b>	<b>98.21%</b>	<b>99.66%</b>	<b>99.03%</b>	<b>100.0%</b>	<b>99.98%</b>	<b>100.0%</b>	<b>98.78%</b>	<b>100.0%</b>	<b>99.49%</b>	<b>100.0%</b>	<b>99.79%</b>	<b>99.98%</b>	<b>95.25%</b>	<b>99.95%</b>	<b>98.38%</b>	<b>100.0%</b>		
6 Call Setup Success Rate (>=95%)	Major Roads	Agro Mall Sec 14	NS	NS	99.21%	100.0%	92.41%	100.0%	99.44%	100.0%	99.52%	100.0%	99.25%	92.59%	97.31%	100.0%	100.0%	100.0%	99.47%	100.0%	100.0%	100.0%		
	Highways	Railway Stn. Loharu	NS	NS	99.14%	100.0%	92.42%	100.0%	100.0%	100.0%	100.0%	100.0%	99.22%	100.0%	97.39%	100.0%	99.32%	100.0%	99.29%	100.0%	100.0%	100.0%		
	Within City	Civil Hospital B'garh	NS	NS	99.03%	100.0%	90.67%	100.0%	99.18%	100.0%	98.98%	100.0%	100.0%	100.0%	99.48%	100.0%	99.52%	100.0%	100.0%	100.0%	98.96%	100.0%		
	<b>Overall SSA</b>		<b>NS</b>	<b>NS</b>	<b>99.12%</b>	<b>100.0%</b>	<b>91.67%</b>	<b>100.0%</b>	<b>99.46%</b>	<b>100.0%</b>	<b>99.44%</b>	<b>100.0%</b>	<b>99.48%</b>	<b>97.47%</b>	<b>98.11%</b>	<b>100.0%</b>	<b>99.65%</b>	<b>100.0%</b>	<b>99.62%</b>	<b>100.0%</b>	<b>99.66%</b>	<b>100.0%</b>		
7 Hand Over Success Rate (HOSR)	Major Roads	Agro Mall Sec 14	NS	NS	98.87%	100.0%	43.59%	100.0%	100.0%	100.0%	99.94%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%		
	Highways	Railway Stn. Loharu	NS	NS	99.54%	100.0%	88.37%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	98.96%	100.0%	100.0%	100.0%	100.0%	100.0%		
	Within City	Civil Hospital B'garh	NS	NS	99.46%	100.0%	99.20%	100.0%	100.0%	100.0%	100.0%	100.0%	98.84%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%		
	<b>Overall SSA</b>		<b>NS</b>	<b>NS</b>	<b>99.30%</b>	<b>100.0%</b>	<b>84.49%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>99.97%</b>	<b>100.0%</b>	<b>99.32%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>99.75%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>		

- NS-No Service
- NA-Not Applicable

**AUDIT & ASSESSMENT OF QOS FOR QE-JUNE-2014-HARYANA CIRCLE**

**DRIVE TEST TABLE – 3  
OPERATOR-ASSISTED DRIVE TEST AT JIND SSA IN JUNE-14 MONTH- HARYANA CIRCLE**

S/N	Parameter	Classification of routes covered	AIRCEL		AIRTEL		BSNL		TATA GSM		IDEA		RCOM GSM		VIDEOCON		VODAFONE		TATA CDMA		RCOM CDMA		
			OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	
1	Call Attempts	Major Roads	NS	NS	196	26	151	25	203	27	210	25	203	25	145	25	235	25	204	27	201	25	
		Highways	NS	NS	120	25	99	25	136	25	112	24	106	27	154	26	130	25	139	25	105	27	
		Within City	NS	NS	200	26	237	25	161	25	165	25	175	27	151	25	148	25	164	25	171	25	
		<b>Overall SSA</b>	<b>NS</b>	<b>NS</b>	<b>516</b>	<b>77</b>	<b>487</b>	<b>75</b>	<b>500</b>	<b>77</b>	<b>487</b>	<b>74</b>	<b>484</b>	<b>79</b>	<b>450</b>	<b>76</b>	<b>513</b>	<b>75</b>	<b>507</b>	<b>77</b>	<b>477</b>	<b>77</b>	
2	Blocked Call Rate	Major Roads	NS	NS	0.51%	0.00%	1.32%	0.00%	0.00%	0.00%	0.48%	0.00%	1.48%	0.00%	0.00%	0.00%	0.00%	0.00%	0.98%	0.00%	1.00%	0.00%	
		Highways	NS	NS	0.00%	0.00%	<b>3.03%</b>	0.00%	<b>3.68%</b>	0.00%	0.00%	0.00%	0.94%	0.00%	1.30%	0.00%	0.00%	0.00%	0.72%	0.00%	1.90%	0.00%	
		Within City	NS	NS	0.00%	0.00%	1.69%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	<b>3.70%</b>	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		<b>Overall SSA</b>	<b>NS</b>	<b>NS</b>	<b>0.19%</b>	<b>0.00%</b>	<b>1.85%</b>	<b>0.00%</b>	<b>1.00%</b>	<b>0.00%</b>	<b>0.21%</b>	<b>0.00%</b>	<b>0.83%</b>	<b>1.27%</b>	<b>0.44%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.59%</b>	<b>0.00%</b>	<b>0.84%</b>	<b>0.00%</b>	
3	Dropped Call Rate (<=2%)	Major Roads	NS	NS	0.00%	0.00%	1.34%	0.00%	0.99%	0.00%	0.00%	0.00%	0.50%	0.00%	0.00%	0.00%	0.43%	0.00%	0.50%	0.00%	0.51%	0.00%	
		Highways	NS	NS	0.00%	0.00%	0.00%	0.00%	0.76%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	<b>2.17%</b>	0.00%	0.97%	0.00%	
		Within City	NS	NS	0.00%	0.00%	0.00%	0.00%	0.62%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.58%	0.00%	
		<b>Overall SSA</b>	<b>NS</b>	<b>NS</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.42%</b>	<b>0.00%</b>	<b>0.81%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.21%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.19%</b>	<b>0.00%</b>	<b>0.79%</b>	<b>0.00%</b>	<b>0.64%</b>	<b>0.00%</b>	
Percentage connections with good voice quality (=>95%)																							
4	(a) 0-4 (w/o frequency hopping for CDMA Operators)	Major Roads	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	96.03%	98.56%	99.63%	100%	
		Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	97.22%	98.94%	99.61%	100%	
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.73%	99.27%	99.96%	100%	
		<b>Overall SSA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>97.32%</b>	<b>98.92%</b>	<b>99.76%</b>	<b>100%</b>	
	(b) 0-5 (	Major	NS	NS	96.04%	98.41%	96.80%	99.60%	95.06%	97.71%	<b>92.95%</b>	97.33%	96.73%	98.05%	95.04%	97.98%	95.85%	95.27%	NA	NA	NA	NA	

## AUDIT & ASSESSMENT OF QOS FOR QE-JUNE-2014-HARYANA CIRCLE

	with frequency hopping for GSM Operators)	Roads																				
		Highways	NS	NS	95.38%	97.19%	98.12%	99.32%	95.17%	99.16%	94.40%	98.59%	98.22%	98.76%	97.45%	99.46%	95.87%	94.75%	NA	NA	NA	NA
		Within City	NS	NS	96.76%	95.74%	97.90%	97.54%	95.15%	97.93%	95.87%	98.49%	98.74%	99.08%	97.53%	99.67%	96.74%	97.76%	NA	NA	NA	NA
		Overall SSA	NS	NS	96.16%	97.11%	97.58%	99.08%	95.13%	98.36%	94.56%	98.47%	97.94%	98.64%	96.72%	99.01%	96.13%	95.98%	NA	NA	NA	NA
<b>Service Coverage</b>																						
5	In door (>= -75dBm)	Major Roads	NS	NS	71.88%	82.34%	52.04%	97.69%	72.56%	99.88%	98.36%	97.50%	66.11%	55.51%	90.90%	98.58%	88.88%	94.96%	45.47%	61.72%	96.44%	96.75%
		Highways	NS	NS	63.76%	46.82%	60.18%	96.57%	58.11%	99.79%	98.17%	100%	59.50%	96.85%	81.64%	99.17%	88.64%	91.45%	34.30%	4.74%	96.16%	99.99%
		Within City	NS	NS	65.28%	42.43%	66.52%	95.84%	74.32%	100%	99.59%	100%	48.07%	0.55%	96.73%	99.73%	93.97%	100%	31.49%	19.78%	95.76%	84.53%
		Overall SSA	NS	NS	67.79%	57.10%	60.35%	96.66%	70.14%	99.89%	98.85%	99.86%	56.68%	51.50%	89.73%	99.15%	90.64%	95.28%	37.80%	29.01%	96.10%	95.31%
	In-vehicle (>= -85dBm)	Major Roads	NS	NS	93.15%	99.69%	88.37%	99.85%	94.88%	100%	99.76%	100%	88.30%	78.17%	97.53%	100%	97.08%	99.96%	64.65%	98.93%	98.22%	99.91%
		Highways	NS	NS	93.38%	93.61%	89.60%	98.76%	87.84%	100%	99.76%	100%	91.77%	100%	93.85%	99.61%	98.91%	99.98%	68.12%	49.88%	97.52%	100%
		Within City	NS	NS	94.06%	98.50%	95.94%	98.79%	87.70%	100%	99.98%	100%	88.44%	59.74%	99.74%	100%	99.28%	100%	83.78%	99.73%	98.70%	98.08%
		Overall SSA	NS	NS	93.52%	97.48%	92.06%	98.97%	89.82%	100%	99.86%	100%	89.08%	79.57%	97.03%	99.88%	98.29%	99.98%	71.95%	82.95%	98.28%	99.55%
	Outdoor-in city (>= -95dBm)	Major Roads	NS	NS	99.61%	100%	98.71%	99.90%	99.73%	100%	99.93%	100%	98.45%	100%	99.45%	100%	99.95%	100%	97.57%	99.91%	99.74%	100%
		Highways	NS	NS	99.83%	100%	98.81%	99.89%	98.88%	100%	99.94%	100%	99.47%	100%	99.41%	99.70%	99.80%	100%	95.91%	99.85%	99.54%	100%
		Within City	NS	NS	99.77%	100%	99.48%	99.58%	98.64%	100%	99.99%	100%	99.71%	99.42%	99.96%	100%	99.94%	100%	99.23%	99.94%	99.74%	100%
		Overall SSA	NS	NS	99.71%	100%	99.08%	99.84%	99.01%	100%	99.96%	100%	99.22%	99.81%	99.61%	99.91%	99.91%	100%	97.68%	99.90%	99.70%	100%
6	Call Setup Success Rate (>=95%)	Major Roads	NS	NS	99.49%	100%	98.68%	100%	100%	100%	99.52%	100%	98.52%	100%	100%	100%	100%	100%	99.02%	100%	98.51%	100%
		Highways	NS	NS	100%	100%	96.97%	100%	96.32%	100%	100%	100%	99.06%	100%	98.70%	100%	100%	100%	99.28%	100%	98.10%	100%
		Within City	NS	NS	100%	100%	98.31%	100%	100%	100%	100%	100%	100%	96.30%	100%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	NS	NS	99.81%	100%	98.15%	100%	99.00%	100%	99.79%	100%	99.17%	98.73%	99.56%	100%	100%	100%	99.41%	100%	98.95%	100%
7	Hand Over Success Rate (HOSR)	Major Roads	NS	NS	99.07%	100%	98.98%	100%	99.10%	100%	99.17%	100%	97.35%	100%	99.45%	100%	98.76%	100%	100%	100%	100%	100%
		Highways	NS	NS	100%	100%	98.26%	100%	96.15%	100%	99.56%	100%	99.32%	100%	100%	100%	99.02%	100%	100%	100%	100%	100%
		Within City	NS	NS	100%	100%	99.13%	100%	99.49%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	NS	NS	99.61%	100%	98.89%	100%	98.43%	100%	99.53%	100%	98.86%	100%	99.75%	100%	99.22%	100%	100%	100%	100%	100%

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

**DRIVE TEST TABLE: 4**

Name of SSA	Month 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
<b>NARNAUL</b>	Apr-14	Rewari /110KM	Sector-3, Rewari BMG Mall, Cicular Road, Uttam Nagar,Ramgarh Budana,Mirpur, Turkeyabad, Rozaka, Titerpur, Dharuhera, Sector-6 Dharuhera, Alwar Bypass, Nikhari, Rasiyawad Chanduwas, Karanwas, Bithwana, Rewari	Narnaul /127 KM	Sec 3, Khori,Kund, Basdooda, Nangal Jamalpur, Gomla, Bhojawas, Sundhra,Bewal Dongra, Atali, Seema Derruli, Hudina, Narnaul, Meerpur, Bachod, Ateli,Chanspur, Kund,Rewari	Mahendergarh /142 KM	Berli, Gudiani, Gord, Jatusana ,Kosli, Nahad,Lokhi, Kanina, Gudana, Unani, Signat, Dahina, Saranwas
<b>ROHTAK</b>	May-14	Rohtak, Bhiwani, Charkha Dadri/225KM	1) Rohtak-(A) Major Road--> ,Kila Road,Industrial Area,Madina,Maham (B) Within City--> Sector-14,D-Park, Mehan Bus Stand 2) Bhiwani- (A) Within City--> Bhiwani,Civil Hospital,Anaj Mandi 3) Charkhi Dadri- (A) Major Road--> Charki Dadri,Kalanaur,Rohtak (B) Within City--> Charkhi Dadri Civil Hospital, Bus Stand Kalanaur	Bhiwani, Loharu / 252KM	1) Bhiwani- (A) Major Road--> Bhiwani Khera,Tosam,Isarwal (B) Within City--> Bhiwani - Bus Stand - Tosam - Bsnl Office 2) Loharu- (A) Major Road--> Obera,Miran,Loharu Juhi,Lohani,Bhiwani (B) Within City--> Loharu Bsnl Exchange, Loharu Bus Stand 3) Kalanaur- (A) Major Road--> Ninan,Khara,Kalanaur (B) Within City--> Bsnl Office Kalanaur, Bus Stand Kalanaur, Ninha Bus Stand, Civil Hspital Road Kalanaur	Rohtak, Bahadurgarh, Jhajjar/178KM	1) Rohtak- (A) Major Road--> Railway Road,Kila Road (B) Within City--> Sec-14,Ashoka,Model Town,Pgi 2) Bhiwani- (A) Major Road-->Railway Road,Kila Road, (B) Within City--> Bhiwani Station 3) Bahadurgarh-(A) Major Road--> Bahadurgarh Rohtak Highway (B) Within City--> Sec-6,Sabzi Mandi 4) Jhajjar-(A) Major Road -->Sampla ,Jhajjar,Rohtak (B) Within City -->Sec-2 Jhajjar, Bsnl Office Jhajjar

**AUDIT & ASSESSMENT OF QOS FOR QE-JUNE-2014-HARYANA CIRCLE**

<p align="center"><b>JIND</b></p>	<p align="center">Jun-14</p>	<p align="center">Jind, Julana/<b>118 KM</b></p>	<p>1) Jind-(A) Major Road--&gt; District Court Road, Model Town, Railway Station Road (B) Within City--&gt; Bsnl Exchange-Pindara-Debonce Colony-Urban Estate-District Shopping Center, Sp Kothi-Rani Talab-Patiala Chowk-Railway Station-Jhang Gate</p> <p>2) Julana-(A) Major Road--&gt; Jind Main Road, Devilal Chowk-Kinana-Julana, Julana-Gatoli-Kinana-Bishanpura (B) Within City--&gt; Ram Rai Gate-Devilal Chowk, Bsnl Exchange</p>	<p align="center">Safidon/<b>137KM</b></p>	<p>1) Safidon-(A) Major Road--&gt; Kheri Talawadu-Pilukhera Mandi-Budhakhhera-Safidon Bypass Khansar Chowk-Safidon City-Civil Hospital-Anaj Mandi-Hatt Road (B) Within City--&gt; Bsnl Exchange-Patiala Chowk-Batla Chowk-Rupi Chowk-Iti Chowk-Naguran-Alewa Telephone Exchange Road-Safidon Road-Pilukhera-Jind Road-Safidon Bypass-Bsnl Exchange</p>	<p align="center">Narwana /<b>170KM</b></p>	<p>1) Narwana- (A) Major Road--&gt; Bsnl Exchange-Kathmandi-Janti Devi(Conal)-Patiala Chowk-Narwana Road Uchana-Doomerkhan-Dhakal (B) Within City--&gt;Narwana City-Model Town-Canal Road-Anaj Mandi-Court Road-Old Narwana Village</p>
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**7.2 SSA WISE DRIVE TEST OBSERVATION:**

**DRIVE TEST TABLE: 5**

**DRIVE TEST OBSERVATION OF NARNAUL SSA (APRIL-14)**

S. No	Name of SP	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRTEL	Rewari, Bawal	Poor Level & Quality near Jaisingpur, Bawal Outer, Tekarwas, Meerpur, Rewari Police Line	Narnaul, Kosli	Poor Level & Quality near Neerpur, Bhojawas, Kund Outer	Mahendergarh, Jatusana	Poor Quality near Jatusana, Kishangarh, Dhaina
2	BSNL		Poor Quality near Jonawas, Tekarwas		Poor Level & Quality near Ateli Mandi, Kund outer		Poor Quality near Rewari Outer, Dhaina, Nangal Budhpur
3	TATA GSM		No coverage between Rewari to Jaliwash, Poor Level & Quality near Budla, Dharuheda		No coverage between Kund to Ateli Mandi and Poor Level near Kund		No coverage between Jatusana to Dhaina, Rewari to Jhagrol, Kanina to Lukhi
4	TATA CDMA		No coverage between Rewari to Jaliwash, Poor Level between Jaliwas to Dhruheda, Dharuheda to Rewari		No coverage between Kund to Narnaul, Narnaul to Bhojawas, Bhojawas to Kund		No coverage between Mahendergarh to Kanina, Kosli to Jatusana, Poor Quality near Nangal
5	IDEA		Poor Quality near Bawal, Rewari Outer, Dhruheda, Bolni		Poor Level & Quality near Neerpur, Silarpur		Poor Quality near Jhagrol, Murlipur, Berli
6	RCOM GSM		They have coverage only in SDCAs		They have coverage only in SDCAs		They have coverage only in SDCAs
7	RCOM CDMA		They have coverage only in SDCAs		They have coverage only in SDCAs		They have coverage only in SDCAs
8	VIDEOCON		No Coverage between Dodhai to Bawal, Rewari to Karnawas, Nikhari to Bhudla, Pidheri to Jonawas, Poor Quality patch near Dharuhera		No Coverage between Hasanpur to Kund, Padal to Lehroda and Poor Quality patch Narnaul Outer		No Coverage between Kanina to Mahendergarh, Lookhi to Kanina, Gudiyani to Kosli, Rewari to Jatusana, Kanina to Rewari
9	VODAFONE		Poor Level near Kharkharai		Poor Quality & Level near Khor, Chandpur		Poor Quality near Jarda, Nangal Mandi
10	AIRCEL		No Coverage		No Coverage		No Coverage

**DRIVE TEST TABLE: 6**

**DRIVE TEST OBSERVATION OF ROHTAK SSA (MAY-14)**

S. No	Name of SP	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRTEL	Rohtak, Charkhi Dadri, Bhiwani	Poor Quality near Sanwar	Bhiwani, Tosham, Loharu	Poor Level & Quality near Miran	Rohtak, Jhajjar	Poor Quality near Karbana, Dujana
2	BSNL		Poor Level & Quality near Bondkalan, Gujrani		Poor Level near Digawa, Miran, Kharkhari Makhan, Lohani		Poor Quality near Barwana
3	TATA GSM		Poor Quality near Rohtak Outer, Gujrani		Poor Level near Rodha, No coverage between Rodha to Khakhari Makhan		Poor Quality near Dujana, Bahadurgarh Outer
4	TATA CDMA		Poor Level between Bhiwani to Charkhi Dadri, Sanwar, Cheng		Poor Level between Loharu to Bhiwani, Loharu to Rodha, Rodha to Tosham		Poor Level & Quality near Bahadurgarh Outer
5	IDEA		Poor Quality near Charkhi Dadri Outer, Gujrani, Rohtak Puter		Poor Quality near Bhawani Khera, Kharak Kalan		Poor Quality near Chuliyana More, Bupania
6	RCOM GSM		They have coverag in SDCAs & Some major towns with Poor level & Quality at Outers		They have coverag in SDCAs & Some major towns with Poor level & Quality at Outers		They have coverag in SDCAs & Some major towns with Poor level & Quality at Outers
7	RCOM CDMA		They have coverag in SDCAs & Some major towns with Poor level & Quality at Outers		They have coverag in SDCAs & Some major towns with Poor level & Quality at Outers		They have coverag in SDCAs & Some major towns with Poor level & Quality at Outers
8	VIDEOCON		Poor Quality near Charkhi Dadri Outer		No Coverage at Saral, Khanak, Miran, Isherwal, Poor Quality near Karkari		Poor Quality near Jhajjar bypass
9	VODAFONE		Poor Level near Bondkalan, neemdiwali, Poor Quality Sanjherawas, Lahali		Poor Level near Khakhari Makhan, Jui Kalan and Poor Quality near Miran		Poor Quality near Asthal Bohar
10	AIRCEL		No Coverage		No Coverage		No Coverage



**DRIVE TEST TABLE: 7**  
**DRIVE TEST OBSERVATION OF JIND SSA (JUNE-14)**

S. No	Name of SP	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRTEL	Jind & Julana	Poor Level & Quality near Jind Outer, Kinana	Jind, Assandh & Safidon	Poor Level & Quality near ITI Chowk, Naguran, Pilu Kheda	Jind & Narwana	Poor Level & Quality near Uchana
2	BSNL		Poor Quality & Level near Julana,		---		
3	TATA GSM		Poor Level & Quality near Gatauli, Bharat Cinema		Poor Quality & Level near Dhatrath, Sani Dharmashala		Poor Level & Quality near Dharodi, Uchana
4	TATA CDMA		Poor Level & Quality near Durga Nagar, Kinana		Poor Level & Quality between Safidon to Phulukhera, near Nikuran		Poor Level & Quality between Jind to Uchana, between Uchana to Narwana, Poor Quality near Dhantam Sahib
5	IDEA		Poor Quality near Post office		Poor Quality near Jind Outer, Amarheri, Budhakhera		---
6	RCOM GSM		They have coverage only in SDCAs & some Towns		They have coverage only in SDCAs & some Towns		They have coverage only in SDCAs & some Towns
7	RCOM CDMA		They have coverage only in SDCAs & some Towns		They have coverage only in SDCAs & some Towns		They have coverage only in SDCAs & some Towns
8	VIDEOCON		Poor Level near Kaniyana, Poor Quality near Raliway Station		Poor Level & Quality near Niranjn Village		Poor Level near Uchana Village, No coverage between Dhantam Sahib to Faizan Khurd
9	VODAFONE		Poor Quality near Govindpura, Gatauli		---		---
10	AIRCEL		No Coverage		No Coverage		No Coverage

### 7.3 KEY FINDINGS ON DRIVE TEST:

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

- (i) Aircel is not operating its service in all the SSAs where drive tests were conducted during the quarter. In fact, Aircel is having its very limited presence in Haryana circle with only 28 BTSs in entire Haryana service area.
- (ii) Tata (GSM/CDMA), RCOM (GSM/CDMA), were having partial coverage in some of the SDCAs of three select SSAs.
- (i) **In the Month of April -14** drive tests were conducted across Narnaul SSA covering Bawal, Jatusana, Kosli, Mohindergarh, Narnaul and Rewari SDCAs for three consecutive days. The performance of **BSNL** with regard to the parameter **Call Drop rate** was way beyond the benchmark (7.69%) during the drive tests conducted on 3<sup>rd</sup> day with its overall performance on SSA level as **2.69%**. **BSNL** and **Idea** also remained under performed for parameter **Good Voice quality** with their performance of **90.90%** (outdoor) / **90.68%** (Indoor) and **93.54%** respectively on SSA level.
- (ii) **In the Month of May-14**, drive tests were conducted across Rohtak SSA covering Rohtak, Bahadurgarh, Bawanikhera, Bhiwani, Charkidadri, Jhajjar, Kalanaur, Loharu, Meham, Siwani and Tohsham SDCAs during three consecutive days of drive test. In this SSA, the performance of **BSNL** remained short of benchmarks of all the prime parameters namely **Call Drop rate, Good Voice Quality, Call setup success rate** and **Call Block Rate** with its achieved value of **4.65%, 90.36%, 91.67%** and **7.85%** respectively on SSA level. **Idea Cellular** remained underperformed for parameter **Voice Quality** with its performance as **93.53%** (Outdoor) and **89.91%** (Indoor on day 1).
- (iii) **In the month of June-14**, drive tests were conducted across Jind SSA covering Jind, Julana, Marwana and Safidon SDCAs. **Idea Cellular** was the only service provider that remained non-complied for the parameter **Good Voice Quality** with its performance as **94.56%** on SSA level.

The deficiencies with respect to adequate coverage and voice quality, observed on the drive tests plots, at the various places are summarized in the table-5, table-6 and table -7 (above) respectively for three SSAs.

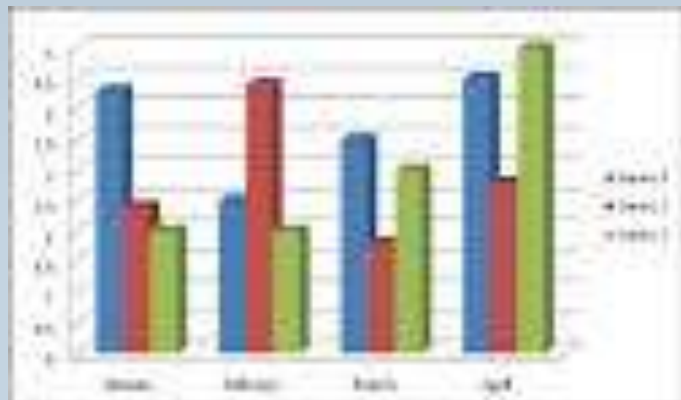
*Thus **BSNL, RCOM (GSM), (CDMA)** and **Idea Cellular** were **non-compliant** with respect to one or the other parameters in the above three SSAs. The underperformed operators need to improve their network performance in respect of the parameters as mentioned above.*

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

### AVERAGED QUARTERLY PMR

V/S

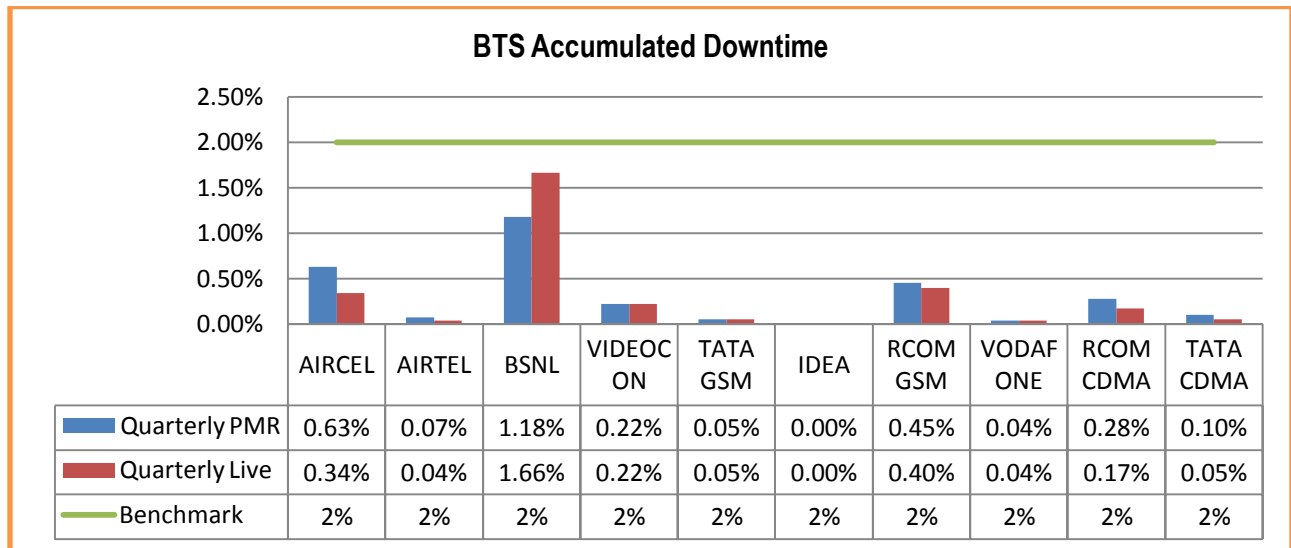
### AVERAGED QUARTERLY 3-DAYS LIVE MEASUREMENT



## 8. GRAPHICAL REPRESENTATION:

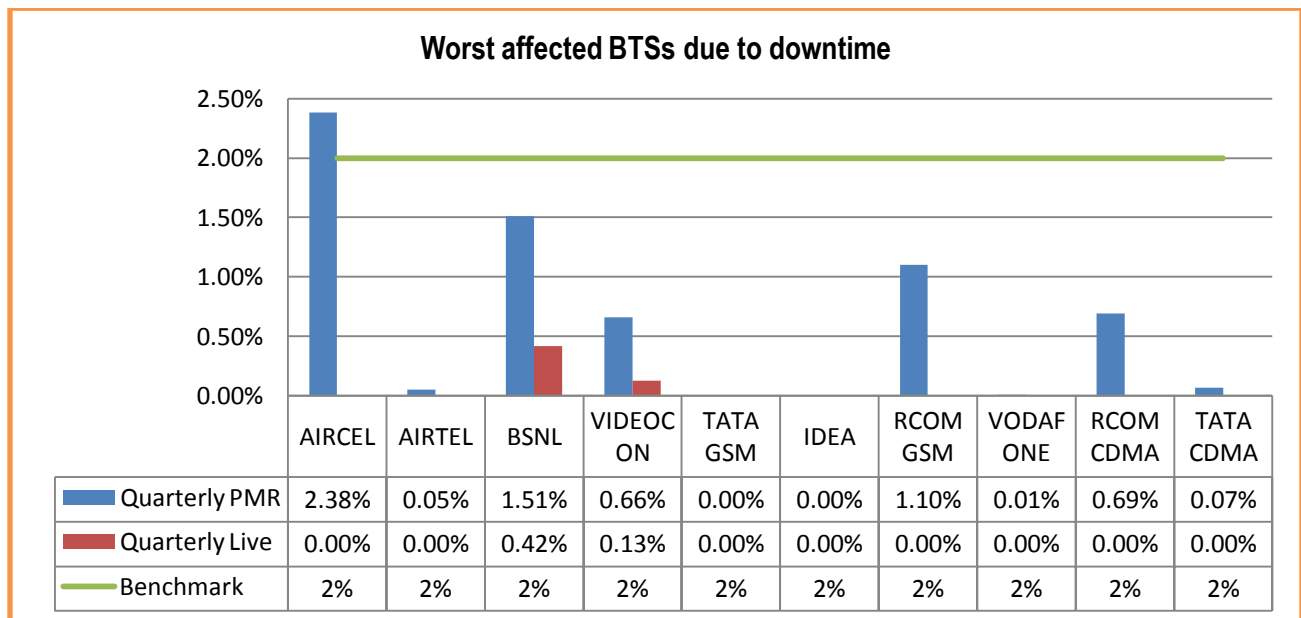
Graphical Representation of Performance of the Cellular Mobile Service Providers (PMR) V/S 3-Days Live Measurement (Quarterly Average Data):

### 1) BTS ACCUMULATED DOWNTIME:



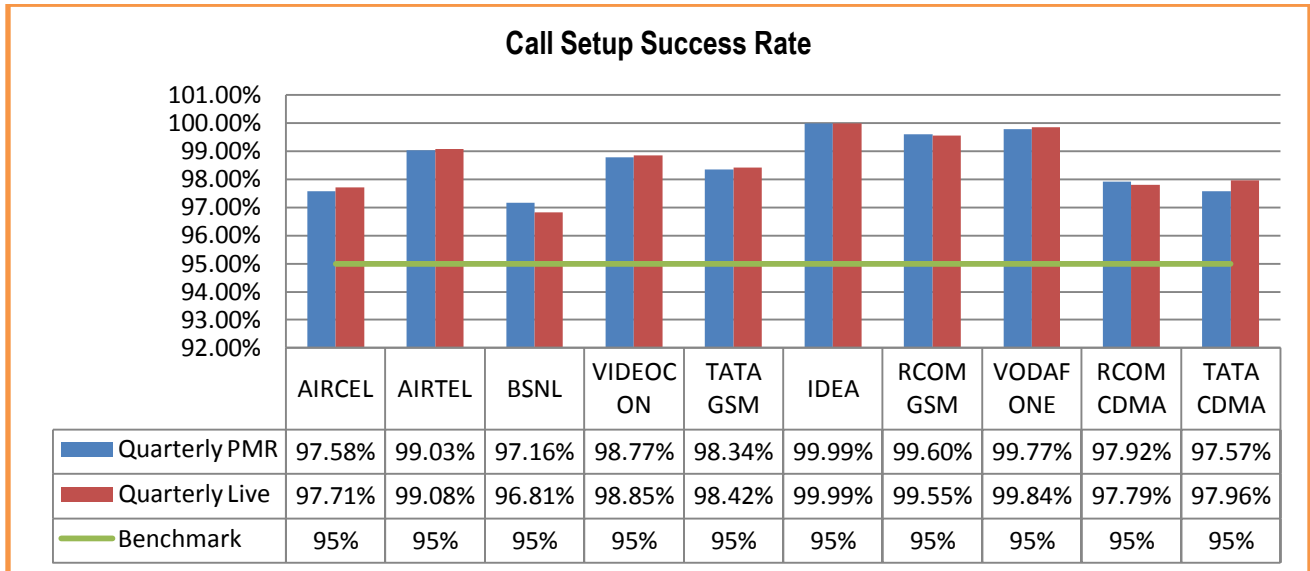
All operators are meeting the benchmarks.

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



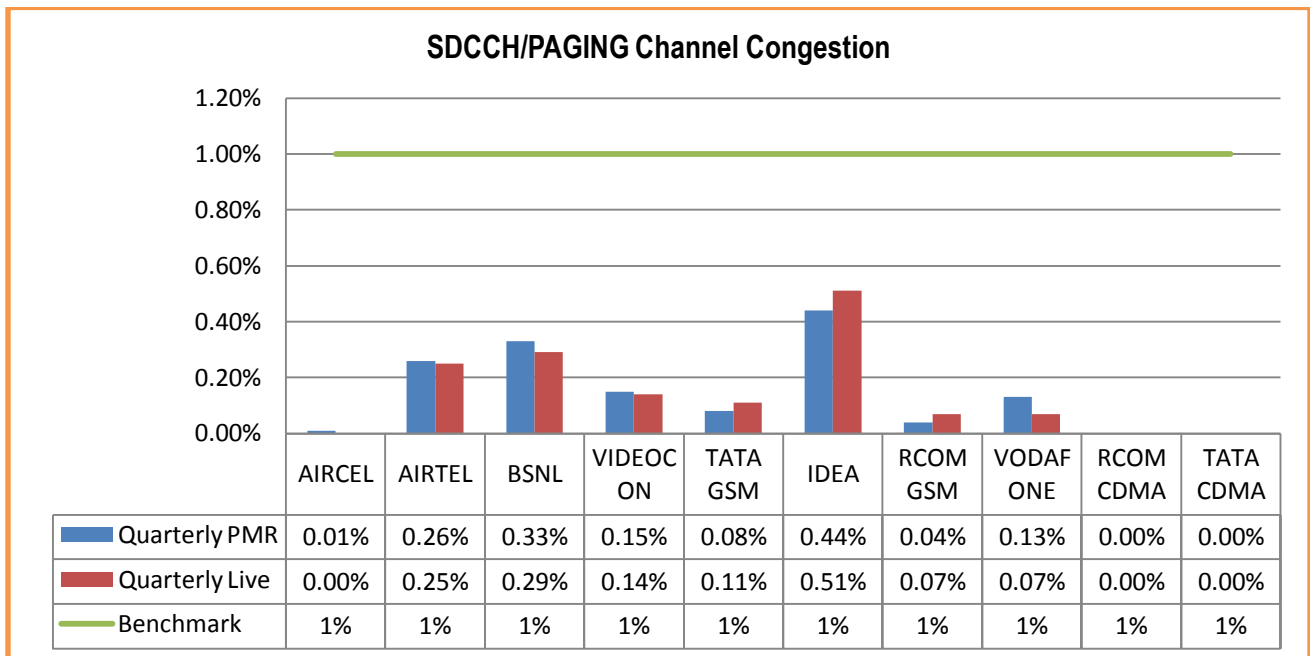
All operators are meeting the benchmarks except Aircel.

3) CALL SETUP SUCCESS RATE:



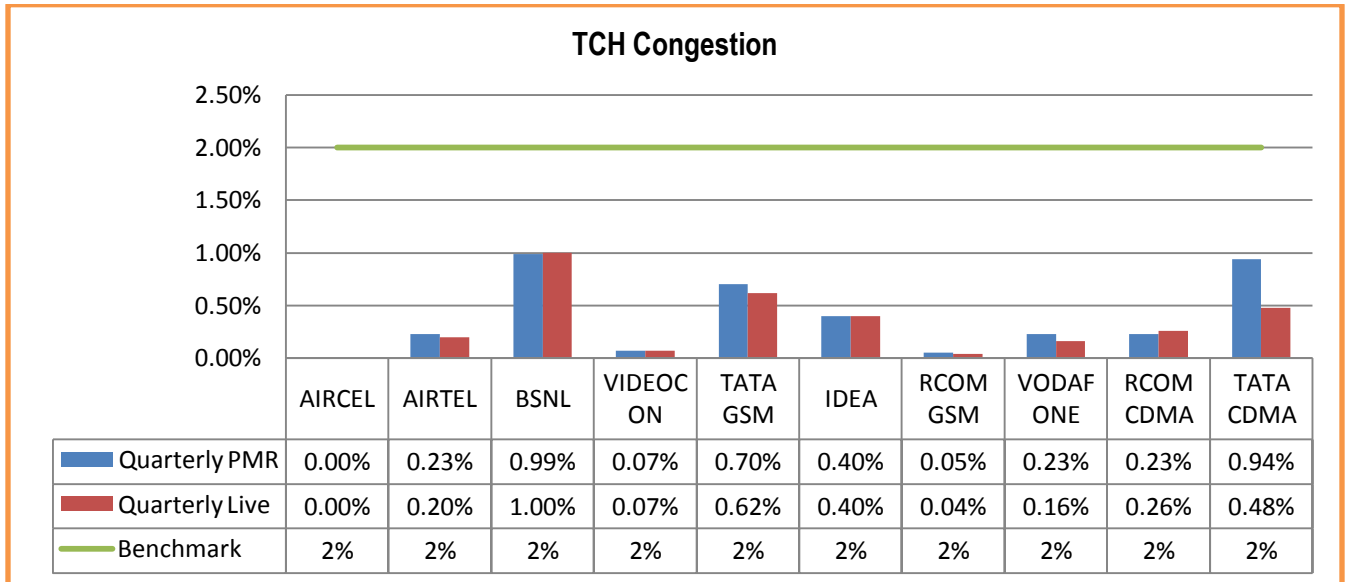
All operators are meeting the benchmarks.

4) SDCCH/PAGING CHANNEL CONGESTION:



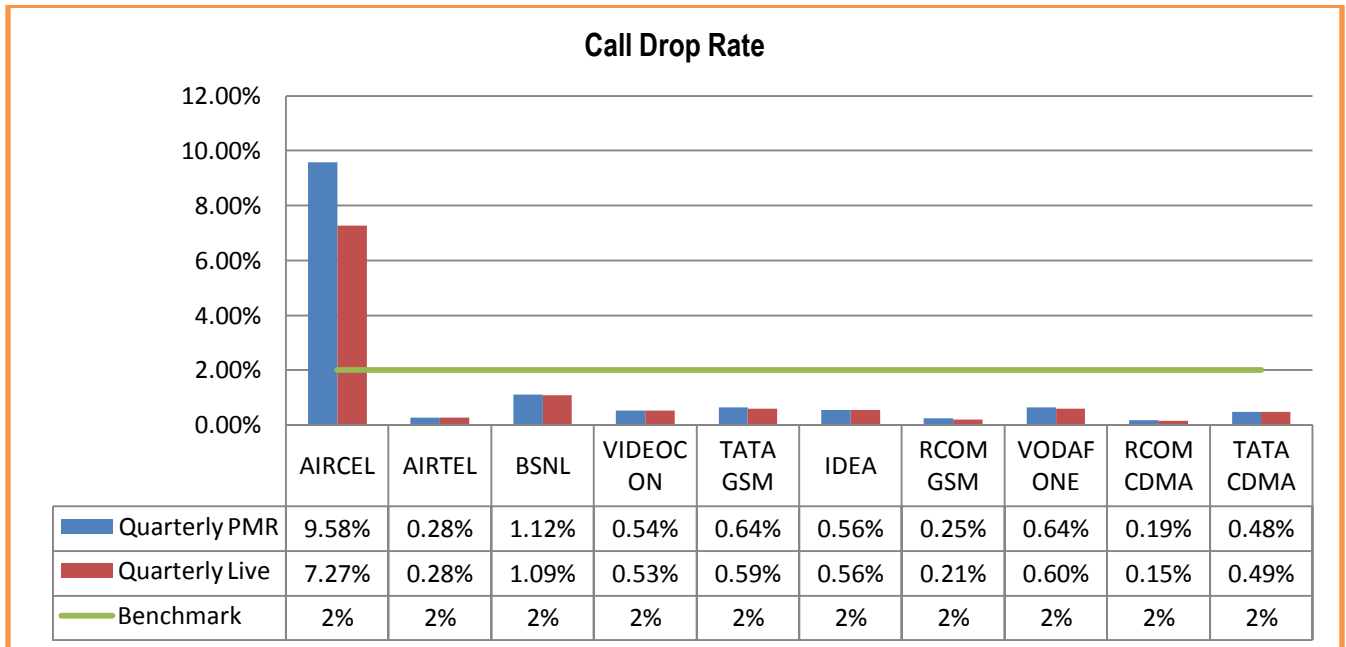
All operators are meeting the benchmarks.

5) TCH CONGESTION:



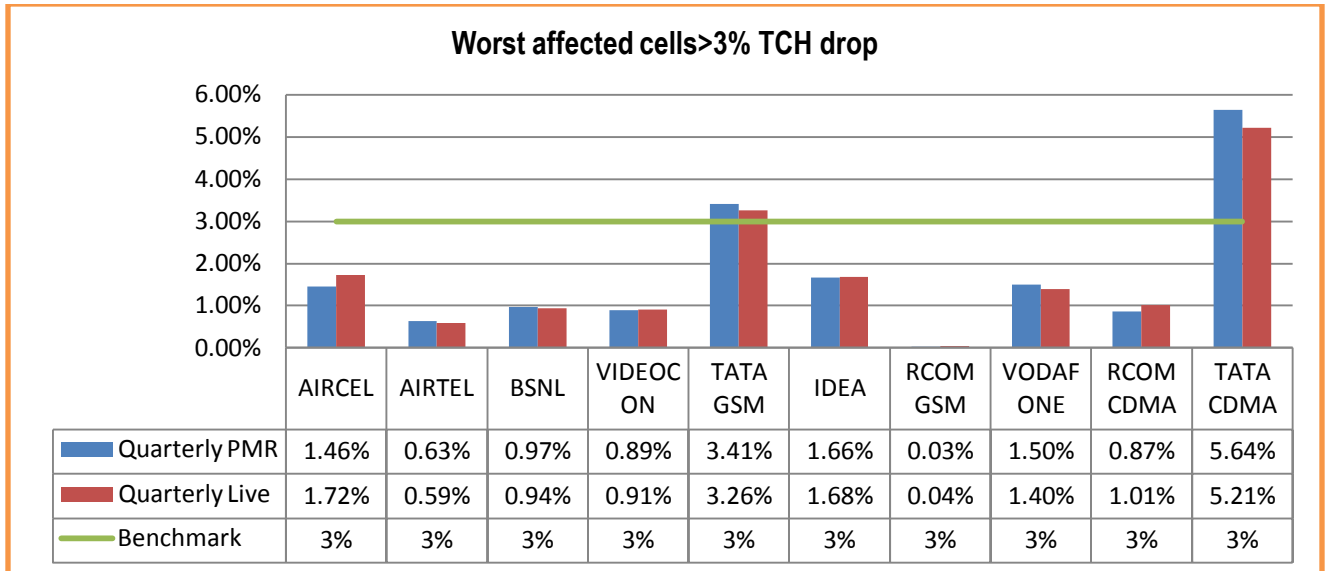
All operators are meeting the benchmarks.

6) CALL DROP RATE:



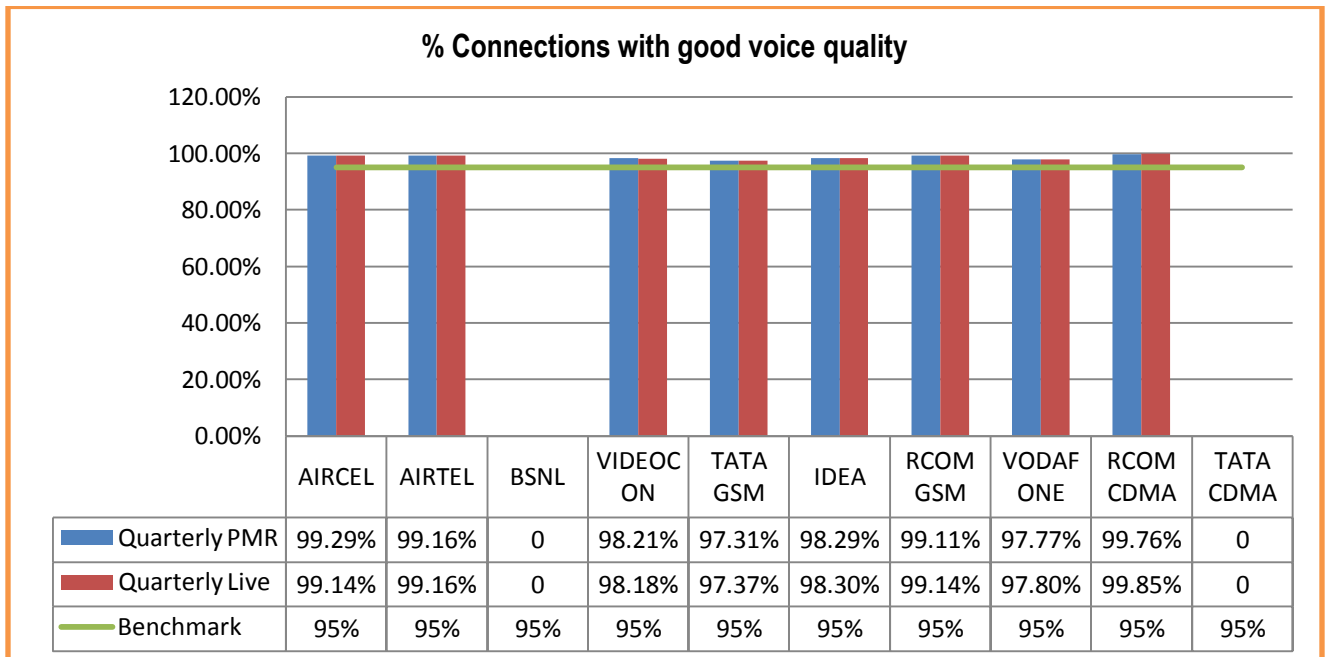
All operators are meeting the benchmarks except Aircel.

7) WORST AFFECTED CELLS>3% TCH DROP:



All operators are meeting the benchmarks except Tata GSM & Tata CDMA.

8) PERCENTAGE OF CONNECTIONS WITH GOOD VOICE QUALITY:



All operators are meeting the benchmarks. BSNL and Tata CDMA are not having the system generated data for VQ, so not provided the data.