



**Audit & Assessment of Quality of Service  
Of  
Cellular Mobile Telephone Service  
For  
Telecom Regulatory Authority of India  
North Zone – Haryana Service Area  
(January 2015 – March 2015)**

**Prepared by:-  
TÜV SÜD SOUTH ASIA PVT. LTD,  
C-153/1, Okhla Industrial Estate,  
Phase-1, New Delhi – 110020  
Telephone 011- 30889611  
Fax: 011-30889595**

## 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:.....	17
5.1 MONTHLY PMR:.....	17
5.1.1 BUSY HOUR OF VARIOUS SERVICE PROVIDERS: .....	17
5.1.2 SWITCHES/BSC/BTS DETAILS OF SERVICE PROVIDERS: .....	17
5.1.3 QOS PERFORMANCE OF MONTHLY PMR – JANUARY 15 MONTH:.....	18
5.1.4 QOS PERFORMANCE OF MONTHLY PMR – FEBRUARY 15 MONTH: .....	19
5.1.5 QOS PERFORMANCE OF MONTHLY PMR – MARCH 15 MONTH:.....	20
5.1.6 QOS PERFORMANCE OF QUARTERLY PMR –AVERAGE OF QE- MARCH 15 (JAN- FEB- MAR 2015 MONTHS AUDITED DATA).....	21
5.1.7 KEY FINDINGS ON MONTHLY PMR AUDIT REPORTS: .....	22
5.2 LIVE MEASUREMENT DATA (3-DAYS) FOR CELLULAR MOBILE SERVICE PROVIDERS (NETWORK SERVICE QUALITY PARAMETER): .....	25
5.2.1 LIVE MEASUREMENT DATA (3-DAYS) – JANUARY 15 MONTH:.....	25
5.2.2 LIVE MEASUREMENT DATA (3-DAYS) – FEBRUARY 15 MONTH: .....	26
5.2.3 LIVE MEASUREMENT DATA (3-DAYS) – MARCH 15 MONTH:.....	27
5.2.4 QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT AUDITED DATA (AVERAGE OF JAN – FEB – MAR 2015 MONTHS AUDITED DATA) .....	28
5.2.5 KEY FINDING ON 3 DAYS LIVE MEASUREMENTS: .....	28
5.2.6 DETAILED NETWORK DATA ASSESSMENT OF CELLULAR MOBILE TELEPHONE SERVICES:.....	29
5.3 CUSTOMER SERVICE QUALITY PARAMETERS MEASUREMENT FOR CMTS - QE MARCH-15:.....	36
5.3.1 QUARTERLY CUSTOMER SERVICE DELIVERY (CSD) AUDITED DATA FOR CELLULAR MOBILE SERVICES (JANUARY TO MARCH 2015 MONTHS AUDITED DATA): .....	36
5.3.2 3 DAYS LIVE CSD AUDITED DATA FOR CELLULAR MOBILE SERVICES (QE-MARCH 2015): .....	38
5.3.3 KEY FINDINGS ON CUSTOMER SERVICE DELIVERY (CSD) PARAMETERS.....	39
6. LIVE CALLING ASSESSMENT: .....	41
6.1 INTER OPERATOR CALLS ASSESSMENT: .....	41
6.2 CUSTOMER CARE / HELPLINE ASSESSMENT: .....	42
6.3 LIVE CALLING ASSESSMENT FOR BILLING COMPLIANTS: .....	43
6.4 LEVEL -1 CALLING ASSESSMENT: .....	44
7. OPERATOR ASSESTID DRIVE TEST.....	46



7.1 DETAIL OF THE ROUTES COVERED DURING THE DRIVE TESTS:.....54

7.2 SSA WISE DRIVE TEST OBSERVATION: .....55

7.3 KEY FINDINGS ON DRIVE TEST:.....63

8. GRAPHICAL REPRESENTATION (CMTS): .....65



## **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**

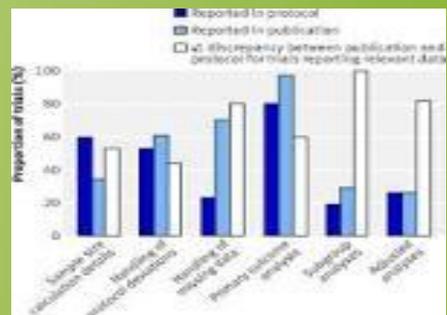
The primary objective is to audit and assess the Quality of Service being rendered by Basic, Cellular Mobile & Broadband service providers against the parameters notified by TRAI.

The audit and assessment of Quality of Service was carried out by **TUV SUD South Asia across all the Circles/Service areas of North and West Zones for Cellular Mobile Service. Apart from this, QoS audit for Basic (Wire line) and Broadband Services was also undertaken for Himanchal Pradesh, J&K and Maharashtra & Goa circles during the quarter January 2015 – March 2015.**

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
		January-15	February-15	March-15	
<b>GSM Operators</b>					
1	AIRCEL	21 to 23 Jan-15	11 to 13 Feb-15	18 to 20 Mar-15	Green Buleward Building, NSN office, Sector-62, Noida (UP)
2	AIRTEL	13 to 15 Jan-15	9 to 11 Feb-15	16 to 18 Mar-15	Bharti Airtel Ltd, Plot No. 21, Rajiv Gandhi Chandigarh Technology Park, Chandigarh.
3	BSNL	14 to 16 Jan-15	14 to 16 Feb-15	20, 21 & 23 Mar-15	AGM (PG) Cum Nodal Officer (TRAI) O/o CGMT Haryana, Ambala (HR)
4	VIDEOCON	20 to 22 Jan-15	19, 20 & 23 Feb-15	19, 20 & 23 Mar-15	Videocon Telecommunication Ltd, Golden Palace, Near Vita Milk Plant, Jasmeet Nagar, Ambala City-134007
5	TATA GSM	19 to 21 Jan-15	18 to 20 Feb-15	19, 20 & 23 Mar-15	Tata Teleservices Limited, 5 - Jasmeet Nagar, Near Vita Milk Plant Gt Road, Ambala, Ambala-134001, India
6	IDEA	7 to 9 Jan-15	24 to 26 Feb-15	17 to 19 Mar-15	Idea Cellular Limited, E-5, Sector-63, Noida (UP)
7	RCOM GSM	2, 5 & 6 Jan-15	9 to 11 Feb-15	16 to 18 Mar-15	Reliance Communication Limited, NH-1, VPO-Mohari, Kuruskhetra, Near Hasari Pouthry Farm, Milestone 188.
8	VODAFONE	14 to 16 Jan-15	6, 9 & 10 Feb-15	11 to 13 Mar-15	Vodafone Digilink Limited, 173 HSIDC Industrial Area, Sector-3, Karnal (Har.)
<b>CDMA Operators</b>					
9	RCOM CDMA	2, 5 & 6 Jan-15	9 to 11 Feb-15	16 to 18 Mar-15	Reliance Communication Limited, NH-1, VPO-Mohari, Kuruskhetra, Near Hasari Pouthry Farm, Milestone 188.
10	TATA CDMA	19 to 21 Jan-15	18 to 20 Feb-15	19, 20 & 23 Mar-15	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 March 2015.

**The data generated by monthly PMR and 3-days live measurements audit for the period January 2015 to March 2015 has been successfully uploaded to the server located at TRAI premises.**

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

- The QoS audit for basic (wire line) service is to be done for the number of exchanges spread over in about 10% of SDCAs with each service providers in specified circles only **once in a year. Based on this criterion, QoS audit for basic (wire line) service was not required to be done for Haryan Circle in the quarter ended March- 2015, as the same has already been done during QE December 2014.**

### 3.3 SAMPLING FOR BROADBAND SERVICE PROVIDERS

- TUV–SUD South Asia has to conduct the audit and assessment of Quality of Service of Broadband Service only in respect of the service providers who are having broadband subscriber base of more than 10,000 subscribers in their licensed service area, for 5% of Point of Presence (PoPs) spread over in 10% SDCAs in specified Telecom Circle only **once in a year. Based on this criterion, the QoS audit for Broadband service was not required to be done for Haryana Circle in the quarter ended March- 2015, as the same has already been done during QE December 2014.**

## **4. EXECUTIVE SUMMARY**



## 4. EXECUTIVE SUMMARY

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

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

### Cellular Mobile:

(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 **Call Drop Rate (CDR)** with its quarterly average performance as **4.04%**. Whereas, **Aircel, Tata (GSM) and Tata (CDMA)** remained non-complied for the parameters ‘**Worst affected Cells > 3% TCH drops**’ with their average performance as **3.92%, 4.56% and 5.06%** respectively.

(ii) From three days assessment, the performance of all operators was found satisfactory as they were largely meeting the benchmarks except the parameter ‘**Worst affected cells> 3 % TCH drops**’, which could not be complied with by **Aircel, Tata (GSM), Tata (CDMA)** in all the three months of the quarter. The average performance of **Aircel, Tata (GSM) and Tata (CDMA)** for parameter ‘**Worst affected cells> 3 % TCH drops**’ was **3.70%, 4.46% and 5.21%** respectively. **Aircel** also failed to meet the benchmark of **Call Drop rate (3.47%)**.

**The similar non-compliance of Aircel, Tata (GSM) and Tata (CDMA) was also observed for monthly audit of the quarter.**

(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.

All service providers were in compliance with respect to the parameter 'Accessibility of call center' and '% Calls answered by operator (voice to voice)' except **BSNL, RCOM GSM and Tata GSM**. **BSNL, RCOM GSM and Tata GSM** have not met the benchmark of parameter **calls answered by Operators (voice to voice) within 90 seconds with their performance as 57.89%, 92.03% and 94.11%** against the benchmark of  $\geq 95\%$ . The performance of BSNL was way below the benchmark.

The results for three days live measurements reveal that all operators have met the benchmarks for the parameters 'Accessibility to call center' and call connection to operators (Voice to voice) within 90 seconds. Only **Aircel** failed to meet the benchmark of **Accessibility of Call center** with its performance as **93.06%** whereas, **Airtel and BSNL** remained short of benchmark of '**Call answered by operator (Voice to Voice) within 90 seconds**' with their performance of **93.91% and 49.55%** respectively.

(iv) With regard to **Drive Tests**, the overall performance of the service providers was satisfactory as they were largely meeting the benchmarks. **Only BSNL remained non-compliant** with respect to the parameters '**Call Drop Rate and Voice Quality**', in **Jind, Karnal and Ambala SSAs** where the drive tests were conducted. The **BSNL** needs to improve its network performance in respect of these parameters.

## **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	March-15	20:00 - 21:00
2	AIRTEL	March-15	19:00 - 20:00
3	BSNL	March-15	19:00 - 20:00
4	VIDEOCON	March-15	20:00 - 21:00
5	TATA GSM	March-15	19:00 - 20:00
6	IDEA	March-15	19:00 - 20:00
7	RCOM GSM	March-15	20:00 - 21:00
8	VODAFONE	March-15	20:00 - 21:00
<b>CDMA Operators</b>			
9	RCOM CDMA	March-15	20:00 - 21:00
10	TATA CDMA	March-15	19:00 - 20:00

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	2810	Ericsson	Ericsson
3	BSNL	9	29	2032	Ericsson & ZTE	Ericsson, NSN & ZTE
4	IDEA	6	31	3191	NSN	NSN
5	RCOM GSM	1	8	901	Huawei	Huawei
6	TATA GSM	2	12	1499	NSN	NSN
7	VIDEOCON	1	8	1402	Huawei	Huawei
8	VODAFONE	7	47	2988	NSN	NSN
<b>CDMA Operators</b>						
9	RCOM CDMA	3	NA	551	Lucent & ZTE	Lucent
10	TATA CDMA	4	6	400	Ericsson & Huawei	ZTE & Motorola

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

5.1.3 QOS PERFORMANCE OF MONTHLY PMR – JANUARY 15 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES HARYANA CIRCLE - JANUARY 15 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%	Jan-15	0.12%	0.04%	1.07%	0.12%	0.02%	0.00%	0.40%	0.02%	0.27%	0.08%
	b) Worst affected BTSs due to downtime	<=2%	Jan-15	0.00%	0.04%	1.21%	0.29%	0.00%	0.00%	1.66%	0.00%	0.72%	0.25%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Jan-15	98.82%	99.28%	97.23%	98.94%	98.78%	99.98%	99.68%	99.76%	97.80%	98.37%
	b) SDCCH/PAGING Channel congestion	<=1%	Jan-15	0.00%	0.10%	0.28%	0.05%	0.04%	0.19%	0.01%	0.12%	0.00%	0.00%
	c) TCH congestion	<=2%	Jan-15	0.00%	0.16%	1.03%	0.03%	0.32%	0.36%	0.01%	0.24%	0.29%	0.09%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Jan-15	1.93%	0.30%	1.29%	0.53%	0.68%	0.56%	0.22%	0.76%	0.03%	0.14%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Jan-15	3.34%	0.79%	1.53%	0.65%	3.75%	1.49%	0.03%	2.30%	0.07%	4.25%
	c) Connections with good voice quality	>=95%	Jan-15	98.94%	99.11%	NP	97.60%	97.26%	98.10%	99.20%	97.76%	99.75%	NP
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Jan-15	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 – FEBRUARY 15 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES HARYANA CIRCLE - FEBRUARY 15 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%	Feb-15	0.04%	0.04%	1.15%	0.13%	0.01%	0.00%	0.35%	0.01%	0.57%	0.05%
	b) Worst affected BTSs due to downtime	<=2%	Feb-15	0.00%	0.00%	1.59%	0.22%	0.00%	0.00%	1.11%	0.00%	0.91%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Feb-15	99.51%	99.19%	97.74%	98.87%	98.68%	99.98%	99.52%	99.65%	98.35%	98.61%
	b) SDCCH/PAGING Channel congestion	<=1%	Feb-15	0.00%	0.15%	0.17%	0.08%	0.06%	0.18%	0.01%	0.09%	0.00%	0.00%
	c) TCH congestion	<=2%	Feb-15	0.00%	0.16%	0.95%	0.06%	0.36%	0.36%	0.02%	0.35%	0.16%	0.02%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Feb-15	6.68%	0.29%	1.30%	0.57%	0.71%	0.69%	0.23%	0.77%	0.04%	0.52%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Feb-15	4.51%	0.69%	1.68%	0.70%	4.38%	1.86%	0.08%	2.54%	0.16%	5.23%
	c) Connections with good voice quality	>=95%	Feb-15	99.24%	99.08%	NP	97.41%	97.14%	98.00%	99.17%	97.49%	99.74%	NP
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Feb-15	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 – MARCH 15 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES HARYANA CIRCLE - MARCH 15 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%	Mar-15	0.14%	0.05%	1.21%	0.15%	0.04%	0.01%	0.33%	0.04%	0.59%	0.09%
	b) Worst affected BTSs due to downtime	<=2%	Mar-15	0.00%	0.00%	1.40%	0.50%	0.00%	0.00%	0.67%	0.00%	1.63%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Mar-15	99.38%	99.17%	97.85%	98.89%	97.91%	99.97%	99.69%	99.64%	98.70%	98.25%
	b) SDCCH/PAGING Channel congestion	<=1%	Mar-15	0.09%	0.15%	0.23%	0.08%	0.07%	0.35%	0.01%	0.21%	0.00%	0.00%
	c) TCH congestion	<=2%	Mar-15	0.00%	0.17%	0.74%	0.04%	0.89%	0.51%	0.03%	0.36%	0.08%	0.03%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Mar-15	3.51%	0.28%	1.35%	0.62%	0.97%	0.62%	0.22%	0.82%	0.05%	0.54%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Mar-15	3.92%	0.72%	1.91%	0.99%	5.54%	1.78%	0.05%	2.73%	0.14%	5.69%
	c) Connections with good voice quality	>=95%	Mar-15	99.51%	99.03%	NP	97.31%	96.98%	97.90%	99.15%	97.41%	99.74%	NP
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Mar-15	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- MARCH 15 (JAN- FEB- MAR 2015 MONTHS AUDITED DATA)**

QUARTERLY QOS PERFORMANCE (AVERAGE OF QE - MARCH 15) OF HARYANA CIRCLE													
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%	Quarterly	0.10%	0.04%	1.14%	0.13%	0.02%	0.00%	0.36%	0.02%	0.48%	0.07%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	0.00%	0.01%	1.40%	0.34%	0.00%	0.00%	1.15%	0.00%	1.09%	0.08%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	99.24%	99.21%	97.61%	98.90%	98.46%	99.98%	99.63%	99.68%	98.28%	98.41%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.03%	0.13%	0.23%	0.07%	0.06%	0.24%	0.01%	0.14%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.00%	0.16%	0.91%	0.04%	0.52%	0.41%	0.02%	0.32%	0.18%	0.05%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	4.04%	0.29%	1.31%	0.57%	0.79%	0.62%	0.22%	0.78%	0.04%	0.40%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	3.92%	0.73%	1.71%	0.78%	4.56%	1.71%	0.05%	2.52%	0.12%	5.06%
	c) Connections with good voice quality	>=95%	Quarterly	99.23%	99.07%	NP	97.44%	97.13%	98.00%	99.17%	97.55%	99.74%	NP
4	No. of POI's having >=0.5% POI congestion	<=0.5%	Quarterly	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.

### 5.1.7 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 found meeting benchmark on the above parameters** i.e. 'BTS accumulated downtime' and 'worst affected BTSs due to down time' in all the three months of the quarter.

- **Connection Establishment (Accessibility)**

- i. Call Set-up Success Rate(CSSR)

CSSR includes complete signaling in the call set up process and does not aim to measure the performance of the called exchange or that of the Point of Interconnection (POI). CSSR was established as the ratio of total number of successful call attempts (establishment) to the total number of call attempts made.

**All the operators were 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.**

▪ **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 (except **Aircel**) met the benchmark for this parameter. **Aircel** failed to meet the benchmark with its quarterly average performance as **4.04%**.

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 **Aircel and Tata Tele Services (TTSL)**. **Aircel, Tata GSM** and **Tata CDMA** failed to meet the benchmark in all the three months of the quarter with their quarterly average performance as **3.92%, 4.56%** and **5.06%** respectively.

iii. Connections with good voice quality:

Most of the Operators were measuring this parameter through the system generated data at their switches. BSNL & Tata CDMA have not provided the data for this parameter. **The audit results for this parameter indicate that all operators have met the bench mark during the quarter.**

iv. POI's having  $\geq 0.5\%$  POI congestion

**All operators** were having congestion less than 0.5% on individual POI, thus met the benchmark.

**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) – JANUARY 15 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES - HARYANA CIRCLE - JAN 15 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	0.52%	0.01%	1.82%	0.08%	0.02%	0.01%	0.61%	0.02%	0.45%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.45%	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	100%	99.33%	97.43%	98.98%	98.74%	99.97%	99.81%	99.74%	98.54%	98.44%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.00%	0.08%	0.16%	0.04%	0.04%	0.11%	0.01%	0.13%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.00%	0.14%	0.95%	0.01%	0.37%	0.26%	0.01%	0.26%	0.12%	0.02%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Live data	2.10%	0.28%	1.28%	0.52%	0.67%	0.54%	0.19%	0.76%	0.05%	0.50%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	5.56%	0.86%	1.76%	0.54%	3.77%	1.62%	0.01%	2.34%	0.06%	5.12%
	c) Connections with good voice quality	>=95%	Live data	98.80%	99.11%	NP	97.63%	97.27%	98.12%	99.22%	97.70%	99.76%	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) – FEBRUARY 15 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES HARYANA CIRCLE - FEBRUARY 15 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%	0.01%	1.77%	0.07%	0.01%	0.00%	0.29%	0.01%	0.65%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.35%	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	100%	99.29%	97.53%	98.92%	98.59%	99.98%	99.78%	99.76%	98.70%	98.53%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.00%	0.12%	0.10%	0.06%	0.07%	0.39%	0.01%	0.11%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.00%	0.13%	0.79%	0.05%	0.39%	0.37%	0.02%	0.24%	0.09%	0.01%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Live data	3.76%	0.28%	1.27%	0.56%	0.78%	0.89%	0.23%	0.71%	0.03%	0.52%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	3.17%	0.67%	1.65%	0.60%	4.12%	1.57%	0.02%	2.39%	0.22%	5.19%
	c) Connections with good voice quality	>=95%	Live data	99.60%	99.11%	NP	97.38%	97.13%	97.84%	99.15%	97.61%	99.75%	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) – MARCH 15 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES HARYANA CIRCLE- DECEMBER 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%	0.01%	1.60%	0.12%	0.01%	0.01%	0.26%	0.02%	0.55%	0.03%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.20%	0.07%	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	97.78%	99.30%	97.78%	98.87%	97.96%	99.98%	99.79%	99.73%	98.00%	98.54%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.00%	0.11%	0.20%	0.07%	0.05%	0.18%	0.01%	0.13%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.00%	0.14%	0.70%	0.04%	0.84%	0.43%	0.02%	0.27%	0.23%	0.01%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Live data	4.55%	0.25%	1.31%	0.63%	0.88%	0.55%	0.20%	0.89%	0.06%	0.52%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	2.38%	0.60%	1.78%	0.99%	5.48%	1.51%	0.04%	3.93%	0.20%	5.31%
	c) Connections with good voice quality	>=95%	Live data	99.53%	99.06%	NP	97.18%	96.87%	97.98%	99.15%	97.16%	99.73%	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 JAN – FEB – MAR 2015 MONTHS AUDITED DATA)**

QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT (AVERAGE OF THREE MONTHS) – 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	0.17%	0.01%	1.73%	0.09%	0.01%	0.01%	0.39%	0.02%	0.55%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	0.00%	0.00%	0.33%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	99.26%	99.31%	97.58%	98.92%	98.43%	99.98%	99.79%	99.74%	98.41%	98.50%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.00%	0.10%	0.15%	0.06%	0.05%	0.23%	0.01%	0.12%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.00%	0.14%	0.81%	0.03%	0.53%	0.35%	0.02%	0.26%	0.15%	0.01%
<b>Connection maintenance (Retainability)</b>													
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	3.47%	0.27%	1.29%	0.57%	0.78%	0.66%	0.21%	0.79%	0.05%	0.51%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	3.70%	0.71%	1.73%	0.71%	4.46%	1.57%	0.02%	2.89%	0.16%	5.21%
	c) Connections with good voice quality	>=95%	Quarterly	99.31%	99.09%	NP	97.40%	97.09%	97.98%	99.17%	97.49%	99.75%	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, the performance of all operators was found satisfactory as they were largely meeting the benchmarks except the parameter ‘Worst affected cells> 3 % TCH drops”, which could not be complied with by **Aircel, Tata (GSM), Tata (CDMA)** in all the three months of the quarter. The average performance of **Aircel, Tata (GSM)** and **Tata (CDMA)** for parameter ‘Worst affected cells> 3 % TCH drops” was **3.70%, 4.46%** and **5.21%** respectively. **Aircel** also failed to meet the benchmark of **Call Drop rate (3.47%)**.

The similar non-compliance of **Aircel, Tata (GSM)** and **Tata (CDMA)** was also observed during monthly audit 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 - January 15 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		Jan-15	28	2785	1989	1377	1494	3191	901	2938	552	401
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Jan-15	25.21	752.48	15882.90	1266.33	276.96	99.55	2694.37	492.51	1114.00	238.17
	c) BTS Accumulated Downtime	<=2%	Jan-15	0.12%	0.04%	1.07%	0.12%	0.02%	0.00%	0.40%	0.02%	0.27%	0.08%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Jan-15	0	1	24	4	0	0	15	0	4	1
	e) Worst affected BTSs due to downtime	<=2%	Jan-15	0.00%	0.04%	1.21%	0.29%	0.00%	0.00%	1.66%	0.00%	0.72%	0.25%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Jan-15	98.82%	99.28%	97.23%	98.94%	98.78%	99.98%	99.68%	99.76%	97.80%	98.37%
	b) SDCCH/PAGING Congestion	<=1%	Jan-15	0.00%	0.10%	0.28%	0.05%	0.04%	0.19%	0.01%	0.12%	0.00%	0.00%
	c) TCH congestion	<=2%	Jan-15	0.00%	0.16%	1.03%	0.03%	0.32%	0.36%	0.01%	0.24%	0.29%	0.09%
<b>Connection Maintenance (Retainability)</b>													
3	a) Call Drop Rate (CDR)	<=2%	Jan-15	1.93%	0.30%	1.29%	0.53%	0.68%	0.56%	0.22%	0.76%	0.03%	0.14%
	b) Worst affected cells>3% TCH drop	<=3%	Jan-15	3.34%	0.79%	1.53%	0.65%	3.75%	1.49%	0.03%	2.30%	0.07%	4.25%
	c) % of connections with good voice quality	>=95%	Jan-15	98.94%	99.11%	NP	97.60%	97.26%	98.10%	99.20%	97.76%	99.75%	NP
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Jan-15	3	66	91	27	164	144	1	205	1	52
	e) Total no. of cells (Sector) in the licensed service area		Jan-15	84	8364	5911	4186	4373	9650	2697	8907	1656	1230
<b>No. of POI's having &gt;=0.5% POI congestion</b>													
4	No. of POI's having >=0.5% POI congestion		Jan-15	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Jan-15	0	0	0	0	0	0	0	0	0	0
<b>Network Data</b>													
5	a) Equipped Capacity of Network in Erlang		Jan-15	212	75759	240000	62172	94089	106270	50000	139945	56000	62072
	b) Total traffic in TCBH in erlang (Avg.)		Jan-15	2	59641	79379	25369	39175	112655	34546	124239	10661	12821
	c) Total no. of customers served (as per VLR) on last day of the month		Jan-15	249	2361295	1569509	956125	1695387	4452301	1549752	4883699	344250	170709

TABLE: 2

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live measurements-Haryana Circle- January 15 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	2792	1984	1370	1494	3171	901	2917	552	401
	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	10.40	21.02	2595.65	81.59	16.39	18.30	395.48	31.54	180.43	0
	c) BTS Accumulated Downtime	<=2%	Live data	0.52%	0.01%	1.82%	0.08%	0.02%	0.01%	0.61%	0.02%	0.45%	0.00%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	9	0	0	0	0	0	0	0
e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.45%	0.00%	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%	99.33%	97.43%	98.98%	98.74%	99.97%	99.81%	99.74%	98.54%	98.44%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.00%	0.08%	0.16%	0.04%	0.04%	0.11%	0.01%	0.13%	0.00%	0.00%
c) TCH congestion	<=2%	Live data	0.00%	0.14%	0.95%	0.01%	0.37%	0.26%	0.01%	0.26%	0.12%	0.02%	
3	<b>Connection Maintenance (Retainability)</b>												
	a) Call Drop Rate (CDR)	<=2%	Live data	2.10%	0.28%	1.28%	0.52%	0.67%	0.54%	0.19%	0.76%	0.05%	0.50%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	5.56%	0.86%	1.76%	0.54%	3.77%	1.62%	0.01%	2.34%	0.06%	5.12%
	c) % of connections with good voice quality	>=95%	Live data	98.80%	99.11%	NP	97.63%	97.27%	98.12%	99.22%	97.70%	99.76%	NP
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	5	72	104	23	165	157	0	206	1	63
e) Total no. of cells (Sector) in the licensed service area		Live data	84	8392	5931	4198	4373	9665	2697	8829	1656	1230	
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- February 15 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		Feb-15	28	2801	2017	1391	1489	3191	901	2973	551	401
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Feb-15	8.16	791.99	15526.19	1228.85	143.29	105.09	2114.65	297.18	2115.82	129.66
	c) BTS Accumulated Downtime	<=2%	Feb-15	0.04%	0.04%	1.15%	0.13%	0.01%	0.00%	0.35%	0.01%	0.57%	0.05%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Feb-15	0	0	32	3	0	0	10	0	5	0
	e) Worst affected BTSs due to downtime	<=2%	Feb-15	0.00%	0.00%	1.59%	0.22%	0.00%	0.00%	1.11%	0.00%	0.91%	0.00%
<b>Connection Establishment (Accessibility)</b>													
2	a) CSSR (Call Setup Success Rate)	>=95%	Feb-15	99.51%	99.19%	97.74%	98.87%	98.68%	99.98%	99.52%	99.65%	98.35%	98.61%
	b) SDCCH/PAGING Congestion	<=1%	Feb-15	0.00%	0.15%	0.17%	0.08%	0.06%	0.18%	0.01%	0.09%	0.00%	0.00%
	c) TCH congestion	<=2%	Feb-15	0.00%	0.16%	0.95%	0.06%	0.36%	0.36%	0.02%	0.35%	0.16%	0.02%
<b>Connection Maintenance (Retainability)</b>													
3	a) Call Drop Rate (CDR)	<=2%	Feb-15	6.68%	0.29%	1.30%	0.57%	0.71%	0.69%	0.23%	0.77%	0.04%	0.52%
	b) Worst affected cells>3% TCH drop	<=3%	Feb-15	4.51%	0.69%	1.68%	0.70%	4.38%	1.86%	0.08%	2.54%	0.16%	5.23%
	c) % of connections with good voice quality	>=95%	Feb-15	99.24%	99.08%	NP	97.41%	97.14%	98.00%	99.17%	97.49%	99.74%	NP
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Feb-15	4	58	100	29	192	180	2	229	3	63
	e) Total no. of cells (Sector) in the licensed service area		Feb-15	84	8392	5960	4235	4384	9691	2697	9009	1655	1201
<b>No. of POI's having &gt;=0.5% POI congestion</b>													
4	No. of POI's having >=0.5% POI congestion		Feb-15	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Feb-15	0	0	0	0	0	0	0	0	0	0
<b>Network Data</b>													
5	a) Equipped Capacity of Network in Erlang		Feb-15	212	76828	240000	62616	94724	105970	50000	139507	56000	58605
	b) Total traffic in TCBH in erlang (Avg.)		Feb-15	2	73962	82561	28983	41547	115003	38914	130519	11144	12919
	c) Total no. of customers served (as per VLR) on last day of the month		Feb-15	247	2191709	1573285	983373	1985394	4511551	1584700	4974373	342539	175089

TABLE: 4

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live measurements-Haryana Circle- Feb 15 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	2799	2013	1380	1489	3191	901	2965	552	401
	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	0.00	12.91	2564.66	69.36	5.73	3.61	190.42	23.37	259.67	2.93
	c) BTS Accumulated Downtime	<=2%	Live data	0.00%	0.01%	1.77%	0.07%	0.01%	0.00%	0.29%	0.01%	0.65%	0.01%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	7	0	0	0	0	0	0	0
e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.35%	0.00%	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%	99.29%	97.53%	98.92%	98.59%	99.98%	99.78%	99.76%	98.70%	98.53%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.00%	0.12%	0.10%	0.06%	0.07%	0.39%	0.01%	0.11%	0.00%	0.00%
c) TCH congestion	<=2%	Live data	0.00%	0.13%	0.79%	0.05%	0.39%	0.37%	0.02%	0.24%	0.09%	0.01%	
3	<b>Connection Maintenance (Retainability)</b>												
	a) Call Drop Rate (CDR)	<=2%	Live data	3.76%	0.28%	1.27%	0.56%	0.78%	0.89%	0.23%	0.71%	0.03%	0.52%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	3.17%	0.67%	1.65%	0.60%	4.12%	1.57%	0.02%	2.39%	0.22%	5.19%
	c) % of connections with good voice quality	>=95%	Live data	99.60%	99.11%	NP	97.38%	97.13%	97.84%	99.15%	97.61%	99.75%	NP
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	3	56	99	25	180	152	1	214	4	62
e) Total no. of cells (Sector) in the licensed service area		Live data	84	8422	6022	4233	4373	9691	2697	8972	1656	1201	
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: 5**

**Detailed Network Data Assessment of Cellular Mobile Telephone Services- Haryana Circle - March 15 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		Mar-15	28	2810	2001	1402	1519	3191	901	2988	551	400
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Mar-15	28.99	985.40	17974.32	1577.68	467.42	126.83	2183.80	792.73	2415.25	264.51
	c) BTS Accumulated Downtime	<=2%	Mar-15	0.14%	0.05%	1.21%	0.15%	0.04%	0.01%	0.33%	0.04%	0.59%	0.09%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Mar-15	0	0	28	7	0	0	6	0	9	0
e) Worst affected BTSs due to downtime	<=2%	Mar-15	0.00%	0.00%	1.40%	0.50%	0.00%	0.00%	0.67%	0.00%	1.63%	0.00%	
2	<b>Connection Establishment (Accessibility)</b>												
	a) CSSR (Call Setup Success Rate)	>=95%	Mar-15	99.38%	99.17%	97.85%	98.89%	97.91%	99.97%	99.69%	99.64%	98.70%	98.25%
	b) SDCCH/PAGING Congestion	<=1%	Mar-15	0.09%	0.15%	0.23%	0.08%	0.07%	0.35%	0.01%	0.21%	0.00%	0.00%
c) TCH congestion	<=2%	Mar-15	0.00%	0.17%	0.74%	0.04%	0.89%	0.51%	0.03%	0.36%	0.08%	0.03%	
3	<b>Connection Maintenance (Retainability)</b>												
	a) Call Drop Rate (CDR)	<=2%	Mar-15	3.51%	0.28%	1.35%	0.62%	0.97%	0.62%	0.22%	0.82%	0.05%	0.54%
	b) Worst affected cells>3% TCH drop	<=3%	Mar-15	3.92%	0.72%	1.91%	0.99%	5.54%	1.78%	0.05%	2.73%	0.14%	5.69%
	c) % of connections with good voice quality	>=95%	Mar-15	99.51%	99.03%	NP	97.31%	96.98%	97.90%	99.15%	97.41%	99.74%	NP
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Mar-15	3	61	112	42	252	173	1	247	2	68
e) Total no. of cells (Sector) in the licensed service area		Mar-15	84	8432	5892	4272	4541	9691	2696	9056	1655	1198	
4	<b>No. of POI's having &gt;=0.5% POI congestion</b>												
	No. of POI's having >=0.5% POI congestion		Mar-15	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Mar-15	0	0	0	0	0	0	0	0	0	0
5	<b>Network Data</b>												
	a) Equipped Capacity of Network in Erlang		Mar-15	212	78143	240000	62965	94246	105001	50000	140928	56000	56350
	b) Total traffic in TCBH in erlang (Avg.)		Mar-15	2	66378	81598	28078	40453	117338	40475	131117	10885	11544
c) Total no. of customers served (as per VLR) on last day of the month		Mar-15	192	2481093	1567798	1017357	1659930	4615835	1589771	4917144	336323	166868	

TABLE: 6

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live measurements-Haryana Circle- Mar 15 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	2803	2028	1393	1531	3191	901	2977	551	400
	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	0.00	13.40	2337.18	124.18	16.49	12.88	166.90	51.94	218.70	8.70
	c) BTS Accumulated Downtime	<=2%	Live data	0.00%	0.01%	1.60%	0.12%	0.01%	0.01%	0.26%	0.02%	0.55%	0.03%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	4	1	0	0	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.20%	0.07%	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	97.78%	99.30%	97.78%	98.87%	97.96%	99.98%	99.79%	99.73%	98.00%	98.54%
	b) SDCCCH/PAGING Congestion	<=1%	Live data	0.00%	0.11%	0.20%	0.07%	0.05%	0.18%	0.01%	0.13%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.00%	0.14%	0.70%	0.04%	0.84%	0.43%	0.02%	0.27%	0.23%	0.01%
<b>Connection Maintenance (Retainability)</b>													
3	a) Call Drop Rate (CDR)	<=2%	Live data	4.55%	0.25%	1.31%	0.63%	0.88%	0.55%	0.20%	0.89%	0.06%	0.52%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	2.38%	0.60%	1.78%	0.99%	5.48%	1.51%	0.04%	3.93%	0.20%	5.31%
	c) % of connections with good voice quality	>=95%	Live data	99.53%	99.06%	NP	97.18%	96.87%	97.98%	99.15%	97.16%	99.73%	NP
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	2	51	107	42	251	146	1	354	3	64
	e) Total no. of cells (Sector) in the licensed service area		Live data	84	8437	5977	4270	4583	9690	2697	9002	1653	1198
<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 MARCH-15:

#### 5.3.1 QUARTERLY CUSTOMER SERVICE DELIVERY (CSD) AUDITED DATA FOR CELLULAR MOBILE SERVICES (JANUARY TO MARCH 2015 MONTHS AUDITED DATA):

#### QUARTERLY CSD DATA FOR CELLULAR MOBILE TELEPHONE SERVICES - QE MARCH 15

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>Metering &amp; Billing Credibility -Post Paid</b>													
1	A) No. of bills issued during the quarter		Haryana	12	290980	57464	724224	47069	158993	NA	496427	98253	70895
	B) No. of bills disputed including billing complaints during the quarter		Haryana	0	80	40	453	42	2	NA	159	63	0
	C) % of billing complaints during the quarter	<= 0.1%	Haryana	0.00%	0.03%	0.07%	0.06%	0.09%	0.001%	NA	0.03%	0.06%	0.00%
<b>Metering &amp; Billing Credibility -Pre Paid</b>													
2	A) Total No. of Pre-paid customers at the end of the quarter		Haryana	3046	2405952	2730716	4337342	1593430	2769746	1918899	5095222	348994	359501
	B) Total No. of complaints relating to charging, Credit and Validity during the quarter		Haryana	0	30	528	1678	1411	4	20	175	191	0
	C) % of Pre-paid Charging Complaints	<= 0.1%	Haryana	0.00%	0.001%	0.02%	0.04%	0.09%	0.0001%	0.001%	0.003%	0.05%	0.00%
<b>Resolution of Billing/Charging Complaints and Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints</b>													
3	A) No. of Billing/Charging/Credit/Validity Complaints received during the quarter		Haryana	0	110	568	9208	1453	4784	20	334	254	175
	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	110	568	9208	1453	4784	20	334	254	175
	C) No. of billing complaints for Post paid customers/Charging/Credit/Validity complaints for pre-paid customers resolved within 6 weeks during the quarter		Haryana	0	110	568	9208	1453	4784	20	334	254	175
	D) % of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 4 weeks	>=98% within 4 weeks	Haryana	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
	E) % of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 6 weeks	100% within 6 weeks	Haryana	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

**QUARTERLY CSD DATA FOR CELLULAR MOBILE TELEPHONE SERVICES - QE MARCH 15**

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	
	F) % of Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints	<=1 week	Haryana	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
<b>Response time to customers for assistance</b>													
	A) Total no of calls attempted to customer care/Call center		Haryana	3666	800699	292868	11683197	3974277	791100	429577	12629789	545691	52065
	B) Total no. of calls successfully established to customer care/Call center.		Haryana	3532	800699	292868	11682156	3934490	785255	429577	12629770	539701	50648
4	C) % Accessibility of Call centre /customer Care (Total calls successfully established *100/ Total call attempts)	>=95%	Haryana	96.34%	100.00%	100.00%	99.99%	99.00%	99.26%	100.00%	100.00%	98.90%	97.28%
	D) Total Calls reached to operator for Voice to Voice (Total call attempts)		Haryana	801	1541679	1367196	3286906	183552	1426339	1275266	3764390	58395	65503
	E) Total number of calls answered by the operator (Voice to voice) within 90 seconds		Haryana	795	1467992	791434	3256008	168917	1342306	1229701	3732471	56010	64944
	F) % age of calls answered by operator (voice to voice) (Total calls successfully established within 90 Sec.*100 / Total call attempts )	>=95%	Haryana	99.25%	95.22%	57.89%	99.06%	92.03%	94.11%	96.43%	99.15%	95.92%	99.15%
<b>Termination/closure of service</b>													
5	A) Total No. of requests for Termination / Closure of service received during the quarter		Haryana	0	681	244	8639	357	1663	NA	1702	997	705
	B) No. of requests for Termination /Closure of service complied within 7 days during the quarter		Haryana	0	681	244	8639	357	1663	NA	1702	997	705
	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>Time taken for refunds of deposits after closures.</b>													
6	A) No. of Payments/ Refunds due during the quarter		Haryana	0	200	313	1665	530	413	NA	7991	658	469
	B) No. of Payments/ Refunds Cleared during the quarter		Haryana	0	200	313	1665	530	413	NA	7991	658	469
	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\* Videocon has no post paid subscribers, so no billing complaints.

**5.3.2 3 DAYS LIVE CSD AUDITED DATA FOR CELLULAR MOBILE SERVICES (QE-MARCH 2015):**

CSD 3 DAYS LIVE DATA FOR CELLULAR MOBILE TELEPHONE SERVICES – QE - DECEMBER 14													
3 days live CSD Audit Data		Bench- mark	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	VIDEOCON	VODAFONE	RCOM (CDMA)	TATA (CDMA)
S/ N	Name of Parameter			GSM Operators									CDMA Operators
<b>Response time to customers for assistance</b>													
1	A) Total no of calls attempted to customer care/Call center		Haryana	72	26728	15605	368167	107301	26020	14388	414630	16323	1675
	B) Total no. of calls successfully established to customer care/Call center.		Haryana	67	26728	15605	368167	106446	25810	14388	414630	16141	1641
	C) % Accessibility of Call centre /customer Care (Total calls successfully established *100/ Total call attempts)	>=95%	Haryana	93.06%	100.00%	100.00%	100.00%	99.20%	99.19%	100.00%	100.00%	98.89%	97.97%
2	D) Total Calls reached to operator for Voice to Voice (Total call attempts)		Haryana	33	47573	99131	106617	5534	43012	47937	124890	1932	2150
	E) Total number of calls answered by the operator (Voice to voice) within 90 seconds		Haryana	33	44676	49117	106020	5298	42207	46566	124203	1877	2145
	F) % age of calls answered by operator (voice to voice) (Total calls successfully established within 90 Sec.*100 / Total call attempts )	>=95%	Haryana	100.00%	93.91%	49.55%	99.44%	95.74%	98.13%	97.14%	99.45%	97.15%	99.77%

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

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

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

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

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

All operators have 100% resolved the billing complaints within stipulated period of 4 weeks and 6 weeks. In all cases where customers were due for credit / adjustment, all the service providers have met the benchmark of 100 % adjustments 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 '% Calls answered by operator (voice to voice)' except **BSNL, RCOM GSM and Tata GSM**. **BSNL, RCOM GSM and Tata GSM** have not met the benchmark of parameter **calls answered by Operators (voice to voice) within 90 seconds with their performance as 57.89%, 92.03% and 94.11%** against the benchmark of  $\geq 95\%$ . The performance of BSNL was way below the benchmark.

#### 4. Termination/Closure of Service

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

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

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

#### Live Measurements

The results for three days live measurements reveal that all operators have met the benchmarks for the parameters 'Accessibility to call center' and call connection to operators (Voice to voice) within 90 seconds. Only **Aircel** failed to meet the benchmark of 'Accessibility of Call center' with its performance as **93.06%** whereas, **Airtel and BSNL** remained short of benchmark of 'Call answered by operator (Voice to Voice) within 90 seconds' with their performance of **93.91% and 49.55%** respectively.

## **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	AIRTEL	BSNL	IDEA	RCOM GSM	RCOM CDMA	TATA GSM	TATA CDMA	VIDEOCON	VODAFONE
AIRTEL	Haryana	---	100%	100%	100%	100%	100%	100%	100%	100%
BSNL	Haryana	100%	---	100%	100%	100%	100%	100%	100%	100%
IDEA	Haryana	100%	100%	---	100%	100%	100%	100%	100%	100%
RCOM GSM	Haryana	100%	100%	100%	---	100%	100%	100%	100%	100%
RCOM CDMA	Haryana	100%	100%	100%	100%	---	100%	100%	100%	100%
TATA GSM	Haryana	100%	100%	100%	100%	100%	---	100%	100%	100%
TATA CDMA	Haryana	100%	100%	100%	100%	100%	100%	---	100%	100%
VIDEOCON	Haryana	100%	100%	100%	100%	100%	100%	100%	---	100%
VODAFONE	Haryana	100%	100%	100%	100%	100%	100%	100%	100%	---

The result of the testing revealed that the inter connection performance among the operators was quite satisfactory. Thus there was no 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	96	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%	96.00%	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	96	100	100	100	100	100	100	100	100
Total number of calls answered by the operator (Voice to voice) within 90 seconds	Haryana	100	92	96	100	100	100	96	100	100	100
% age of calls answered by operator(voice to voice) (Total call successfully established within 90 Sec.*100 / Total calls attempts)	Haryana	100.00%	95.83%	96.00%	100.00%	100.00%	100.00%	96.00%	100.00%	100.00%	100.00%

In case of calls answered by operators (voice to voice) within 90 seconds when test calls were made to the call centers Airtel, BSNL and Videocon could connect 95.83%, 96% and 96% of calls to the operator.

**6.3 LIVE CALLING ASSESSMENT FOR BILLING COMPLIANTS:**

TELEPHONIC INTERVIEW FOR BILLING COMPLAINTS											
Parameter	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	VIDEOCON	VODAFONE	RCOM (CDMA)	TATA (CDMA)
<b>Total No. of calls Attempted</b>	Haryana	0	110	168	117	130	120	20	134	141	110
<b>Total No. of calls Answered</b>	Haryana	0	99	100	100	100	100	20	100	100	100
<b>Cases resolved within 4 weeks</b>	Haryana	0	99	100	100	100	100	20	100	100	100
<b>%age of cases resolved</b>	Haryana	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

To test the Service Providers performance on billing related complaints and their resolutions, TUV-SUD auditors conducted a customer feedback calling for about random 100 nos. of customers. However, in some cases, the number of customers contacted for verification was very less due to less number of billing complaints. During live calling, some of the customers did not attend the calls, so shortfall was made good by taking other complaints to make verification of 100 Complaints where the complaints were more than 100.

Some of the complainants reported that they didn't exactly remember about the duration of resolution of complaints. However, the customers reported that the billing complaints were resolved to their satisfaction.

**6.4 LEVEL -1 CALLING ASSESSMENT:**

LEVEL 1 LIVE CALLING												
Emergency no.	SSA Name	SDCA Name	No. of calls made	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	VIDEOCON	VODAFONE	RCOM (CDMA)	TATA (CDMA)
1091, 1098, 100,101,102/108	Jind	Jind	6	√	√	√	√	√	√	√	√	√
		Narwana	6	√	√	√	√	√	√	√	√	√
		Saffidon	6	√	√	√	√	√	√	√	√	√
		Julana	6	√	√	√	√	√	√	√	√	√
		Assandh	6	√	√	√	√	√	√	√	√	√
		Cheeka	6	√	√	√	√	√	√	√	√	√
		Gharundha	6	√	√	√	√	√	√	√	√	√
		Kaithal	6	√	√	√	√	√	√	√	√	√
1091, 1098, 100,101,102/108	Kamal	Kamal	6	√	√	√	√	√	√	√	√	√
		Kurkshetra	6	√	√	√	√	√	√	√	√	√
		Nilokherai	6	√	√	√	√	√	√	√	√	√
		Pehowa	6	√	√	√	√	√	√	√	√	√
		Panipat	6	√	√	√	√	√	√	√	√	√
1091, 1098, 100,101,102/108	Ambala	Ambala	6	√	√	√	√	√	√	√	√	√
		Jagadri	6	√	√	√	√	√	√	√	√	√
		yamunanagar	6	√	√	√	√	√	√	√	√	√
		Barara	6	√	√	√	√	√	√	√	√	√
		Chhichhrauli	6	√	√	√	X	√	X	√	X	√
		Naraingarh	6	√	√	√	√	√	√	√	√	√
		Kalka	6	√	√	√	√	√	√	√	√	√

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 RCOM (GSM), Videocon and RCOM (CDMA) at Chhichhrauli SDCA only.

## 7. DRIVE TEST



## **7. OPERATOR ASSESTID 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 **Jind, Karnal and Ambala** in the months of January, February and March 2015 respectively. The total route Kms covered during the drive tests in respective SSAs was **445 Kms, 610 Kms and 515 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- MARCH-2015 - HARYANA CIRCLE**

**DRIVE TEST TABLE – 1**  
**OPERATOR ASSISTED DRIVE TEST AT JIND SSA IN JANUARY 15 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	NC	NC	110	25	126	25	92	25	116	25	92	25	95	26	120	25	28	25	95	25	
		Highways	NC	NC	159	25	125	26	155	25	160	25	94	25	168	25	203	25	68	25	94	25	
		Within City	NC	NC	205	25	207	28	202	25	191	26	207	25	191	25	173	25	162	25	208	26	
		<b>Overall SSA</b>	NC	NC	<b>474</b>	<b>75</b>	<b>458</b>	<b>79</b>	<b>449</b>	<b>75</b>	<b>467</b>	<b>76</b>	<b>393</b>	<b>75</b>	<b>454</b>	<b>76</b>	<b>496</b>	<b>75</b>	<b>258</b>	<b>75</b>	<b>397</b>	<b>76</b>	
2	Blocked Call Rate	Major Roads	NC	NC	0.00%	0.00%	0.79%	0.00%	1.09%	0.00%	0.86%	0.00%	1.09%	0.00%	0.00%	0.00%	0.83%	0.00%	<b>3.57%</b>	0.00%	0.00%	0.00%	
		Highways	NC	NC	0.00%	0.00%	1.60%	0.00%	0.65%	0.00%	0.63%	0.00%	0.00%	0.00%	1.19%	0.00%	1.97%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Within City	NC	NC	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.16%	0.00%	0.00%	0.00%	0.48%	0.00%	
		<b>Overall SSA</b>	NC	NC	<b>0.00%</b>	<b>0.00%</b>	<b>0.66%</b>	<b>0.00%</b>	<b>0.45%</b>	<b>0.00%</b>	<b>0.43%</b>	<b>0.00%</b>	<b>0.25%</b>	<b>0.00%</b>	<b>0.44%</b>	<b>0.00%</b>	<b>1.41%</b>	<b>0.00%</b>	<b>0.39%</b>	<b>0.00%</b>	<b>0.25%</b>	<b>0.00%</b>	
3	Dropped Call Rate (<=2%)	Major Roads	NC	NC	0.00%	0.00%	<b>4.84%</b>	0.00%	0.00%	0.00%	0.00%	0.00%	1.10%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		
		Highways	NC	NC	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.06%	0.00%	0.00%	0.00%	0.00%	0.00%	1.47%	0.00%	<b>2.13%</b>	0.00%	
		Within City	NC	NC	0.00%	0.00%	0.00%	<b>3.57%</b>	0.50%	0.00%	0.00%	0.00%	0.97%	0.00%	0.53%	0.00%	0.00%	0.00%	1.23%	0.00%	0.97%	0.00%	
		<b>Overall SSA</b>	NC	NC	<b>0.00%</b>	<b>0.00%</b>	<b>1.33%</b>	<b>1.30%</b>	<b>0.22%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>1.02%</b>	<b>0.00%</b>	<b>0.22%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>1.17%</b>	<b>0.00%</b>	<b>1.01%</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	NC	NC	NA	95.48%	95.99%	99.74%	100%														
		Highways	NC	NC	NA	<b>94.88%</b>	95.37%	99.85%	100%														
		Within City	NC	NC	NA	96.02%	99.67%	99.99%	100%														
		<b>Overall SSA</b>	NC	NC	<b>NA</b>	<b>95.71%</b>	<b>97.05%</b>	<b>99.90%</b>	<b>100%</b>														
	(b) 0-5 (with frequency hopping for GSM Operators)	Major Roads	NC	NC	97.19%	96.36%	96.78%	95.17%	95.56%	97.35%	95.91%	99.21%	97.06%	96.56%	96.72%	97.66%	97.72%	100%	NA	NA	NA	NA	
		Highways	NC	NC	96.44%	98.05%	95.51%	97.66%	96.25%	98.20%	95.36%	98.72%	97.58%	99.05%	97.74%	98.72%	97.57%	100%	NA	NA	NA	NA	
		Within City	NC	NC	96.73%	96.03%	96.55%	<b>92.13%</b>	96.59%	97.57%	96.57%	97.92%	99.02%	98.89%	97.40%	99.28%	98.27%	99.31%	NA	NA	NA	NA	
		<b>Overall SSA</b>	NC	NC	<b>96.75%</b>	<b>96.73%</b>	<b>96.33%</b>	<b>94.97%</b>	<b>96.26%</b>	<b>97.70%</b>	<b>96.04%</b>	<b>98.66%</b>	<b>98.26%</b>	<b>98.16%</b>	<b>97.38%</b>	<b>98.60%</b>	<b>97.85%</b>	<b>99.57%</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	
5	Service Coverage																						
	In door	Major Roads	NC	NC	74.22%	60.69%	44.77%	25.78%	68.45%	95.47%	83.56%	100%	44.25%	2.34%	85.30%	95.81%	88.80%	100%	47.68%	11.87%	94.55%	100%	

**AUDIT & ASSESSMENT OF QOS FOR QE- MARCH-2015 - HARYANA CIRCLE**

**DRIVE TEST TABLE – 1**  
**OPERATOR ASSISTED DRIVE TEST AT JIND SSA IN JANUARY 15 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	
6	(>= - 75dBm)	Highways	NC	NC	64.77%	99.00%	38.98%	96.02%	73.66%	99.97%	81.49%	100%	36.02%	99.45%	85.56%	83.45%	86.75%	34.48%	46.95%	6.55%	95.08%	100%	
		Within City	NC	NC	59.06%	45.01%	65.89%	94.92%	78.72%	99.99%	94.95%	100%	57.53%	1.65%	93.71%	99.99%	83.57%	100%	31.23%	93.93%	98.63%	99.77%	
		<b>Overall SSA</b>	NC	NC	<b>64.66%</b>	<b>64.88%</b>	<b>53.42%</b>	<b>73.26%</b>	<b>75.13%</b>	<b>98.45%</b>	<b>87.89%</b>	<b>100%</b>	<b>49.72%</b>	<b>32.97%</b>	<b>88.98%</b>	<b>93.46%</b>	<b>86.16%</b>	<b>60.34%</b>	<b>36.70%</b>	<b>37.18%</b>	<b>96.88%</b>	<b>99.94%</b>	
	In-vehicle (>= - 85dBm)	Major Roads	NC	NC	95.34%	99.01%	92.58%	83.14%	92.50%	99.98%	97.80%	100%	77.24%	98.14%	94.46%	100%	99.42%	100%	81.72%	99.73%	96.08%	100%	
		Highways	NC	NC	93.53%	99.98%	88.82%	100%	93.50%	100%	99.60%	100%	68.44%	100%	92.92%	99.65%	98.78%	96.75%	87.66%	84.54%	97.63%	100%	
		<b>Overall SSA</b>	NC	NC	<b>92.46%</b>	<b>97.94%</b>	<b>92.93%</b>	<b>94.61%</b>	<b>91.70%</b>	<b>99.99%</b>	<b>99.22%</b>	<b>100%</b>	<b>80.63%</b>	<b>94.74%</b>	<b>95.84%</b>	<b>99.89%</b>	<b>99.21%</b>	<b>98.03%</b>	<b>89.11%</b>	<b>94.74%</b>	<b>98.47%</b>	<b>100%</b>	
	Outdoor-in city (>= - 95dBm)	Major Roads	NC	NC	99.82%	100%	92.58%	83.14%	99.44%	100%	99.78%	100%	97.18%	100%	99.20%	100%	99.95%	100%	97.75%	99.97%	99.16%	100%	
		Highways	NC	NC	99.96%	100%	88.82%	100%	99.87%	100%	99.91%	100%	94.85%	100%	97.85%	99.94%	99.96%	99.97%	97.44%	98.43%	99.82%	100%	
		<b>Overall SSA</b>	NC	NC	<b>99.88%</b>	<b>100%</b>	<b>92.93%</b>	<b>94.61%</b>	<b>99.06%</b>	<b>100%</b>	<b>99.91%</b>	<b>100%</b>	<b>96.75%</b>	<b>100%</b>	<b>99.02%</b>	<b>99.98%</b>	<b>99.95%</b>	<b>99.98%</b>	<b>97.95%</b>	<b>99.47%</b>	<b>99.77%</b>	<b>100%</b>	
	6	Call Setup Success Rate (>=95%)	Major Roads	NC	NC	100%	100%	98.41%	100%	98.91%	100%	99.14%	100%	98.91%	100%	100%	100%	99.17%	100%	96.43%	100%	100%	100%
			Highways	NC	NC	100%	100%	96.80%	100%	99.35%	100%	99.38%	100%	100%	100%	98.81%	100%	<b>93.10%</b>	100%	100%	100%	100%	100%
			Within City	NC	NC	100%	100%	99.03%	100%	100%	100%	100%	100%	100%	100%	99.48%	100%	98.84%	100%	100%	100%	99.52%	100%
<b>Overall SSA</b>			NC	NC	<b>100%</b>	<b>100%</b>	<b>98.25%</b>	<b>100%</b>	<b>99.55%</b>	<b>100%</b>	<b>99.57%</b>	<b>100%</b>	<b>99.75%</b>	<b>100%</b>	<b>99.34%</b>	<b>100%</b>	<b>96.57%</b>	<b>100%</b>	<b>99.61%</b>	<b>100%</b>	<b>99.75%</b>	<b>100%</b>	
7	Hand Over Success Rate (HOSR)	Major Roads	NC	NC	99.48%	100%	97.45%	100%	100%	100%	100%	100%	100%	100%	100%	99.18%	100%	100%	100%	100%	100%	100%	
		Highways	NC	NC	100%	100%	98.22%	100%	100%	100%	100%	100%	98.85%	100%	99.19%	100%	94.27%	100%	100%	100%	100%	100%	
		Within City	NC	NC	98.96%	100%	99.73%	98.28%	100%	50.00%	100%	100%	100%	100%	99.51%	100%	100%	100%	100%	100%	100%	100%	
		<b>Overall SSA</b>	NC	NC	<b>99.44%</b>	<b>100%</b>	<b>98.71%</b>	<b>99.00%</b>	<b>100%</b>	<b>75.00%</b>	<b>100%</b>	<b>100%</b>	<b>99.79%</b>	<b>100%</b>	<b>99.50%</b>	<b>100%</b>	<b>97.53%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

- NC-No Coverage
- NA-Not Applicable
- The service providers having block call rate more than 3% have been shaded in yellow colour.

**AUDIT & ASSESSMENT OF QOS FOR QE- MARCH-2015 - HARYANA CIRCLE**

**DRIVE TEST TABLE – 2  
OPERATOR ASSISTED DRIVE TEST AT KARNAL SSA IN FEBRUARY 15 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	NC	NC	137	26	145	27	106	25	150	25	147	25	159	25	175	25	67	25	147	25	
		Highways	NC	NC	102	25	123	25	119	25	119	25	123	25	126	25	131	25	93	25	123	25	
		Within City	NC	NC	274	26	325	27	269	25	305	25	288	26	299	25	311	25	274	25	290	26	
		<b>Overall SSA</b>	NC	NC	<b>513</b>	<b>77</b>	<b>593</b>	<b>79</b>	<b>494</b>	<b>75</b>	<b>574</b>	<b>75</b>	<b>558</b>	<b>76</b>	<b>584</b>	<b>75</b>	<b>617</b>	<b>75</b>	<b>434</b>	<b>75</b>	<b>560</b>	<b>76</b>	
2	Blocked Call Rate	Major Roads	NC	NC	0.73%	0.00%	4.83%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.63%	0.00%	1.14%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Highways	NC	NC	0.00%	0.00%	2.44%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.79%	0.00%	0.76%	0.00%	2.15%	0.00%	0.00%	0.00%	
		Within City	NC	NC	0.00%	0.00%	2.46%	0.00%	0.74%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.96%	0.00%	0.36%	0.00%	0.00%	0.00%	
		<b>Overall SSA</b>	NC	NC	<b>0.19%</b>	<b>0.00%</b>	<b>3.04%</b>	<b>0.00%</b>	<b>0.40%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.34%</b>	<b>0.00%</b>	<b>0.97%</b>	<b>0.00%</b>	<b>0.69%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	
3	Dropped Call Rate (<=2%)	Major Roads	NC	NC	0.00%	0.00%	2.17%	0.00%	0.94%	0.00%	0.00%	0.00%	0.68%	0.00%	0.00%	0.00%	0.00%	0.00%	1.52%	0.00%	0.68%	0.00%	
		Highways	NC	NC	0.00%	0.00%	2.50%	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%	
		Within City	NC	NC	0.00%	0.00%	2.52%	0.00%	1.12%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.47%	0.00%	0.00%	0.00%	
		<b>Overall SSA</b>	NC	NC	<b>0.00%</b>	<b>0.00%</b>	<b>2.43%</b>	<b>0.00%</b>	<b>0.81%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.18%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>1.16%</b>	<b>0.00%</b>	<b>0.18%</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	NC	NC	NA	96.26%	99.67%	99.93%	100%														
		Highways	NC	NC	NA	95.98%	98.24%	99.95%	100%														
		Within City	NC	NC	NA	95.52%	99.37%	99.98%	100%														
		<b>Overall SSA</b>	NC	NC	<b>NA</b>	<b>95.75%</b>	<b>99.08%</b>	<b>99.96%</b>	<b>100%</b>														
	(b) 0-5 (with frequency hopping for GSM Operators)	Major Roads	NC	NC	95.80%	96.99%	88.52%	96.95%	95.02%	93.87%	94.58%	98.20%	97.90%	98.98%	95.31%	95.98%	94.74%	98.92%	NA	NA	NA	NA	
		Highways	NC	NC	96.66%	96.45%	90.93%	95.56%	96.09%	92.57%	94.87%	99.04%	98.65%	98.50%	95.58%	95.17%	95.25%	98.27%	NA	NA	NA	NA	
		Within City	NC	NC	95.99%	97.08%	94.01%	96.40%	95.75%	97.88%	95.56%	97.94%	97.62%	99.51%	95.09%	98.83%	95.62%	98.43%	NA	NA	NA	NA	
		<b>Overall SSA</b>	NC	NC	<b>96.09%</b>	<b>96.83%</b>	<b>91.86%</b>	<b>96.35%</b>	<b>95.68%</b>	<b>95.02%</b>	<b>95.16%</b>	<b>98.38%</b>	<b>97.93%</b>	<b>99.00%</b>	<b>95.26%</b>	<b>96.61%</b>	<b>95.30%</b>	<b>98.54%</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	
5	<b>Service Coverage</b>																						
	In door	Major Roads	NC	NC	80.09%	99.97%	72.05%	99.97%	38.41%	2.18%	95.63%	100%	57.01%	91.90%	87.34%	99.96%	94.54%	97.17%	31.73%	80.88%	97.19%	100%	

**AUDIT & ASSESSMENT OF QOS FOR QE- MARCH-2015 - HARYANA CIRCLE**

**DRIVE TEST TABLE – 2  
OPERATOR ASSISTED DRIVE TEST AT KARNAL SSA IN FEBRUARY 15 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	
6	(>= - 75dBm)	Highways	NC	NC	84.93%	37.53%	81.63%	20.04%	57.19%	2.72%	95.76%	100%	69.04%	0.04%	90.21%	91.01%	96.01%	99.87%	24.66%	2.37%	98.43%	95.87%	
		Within City	NC	NC	85.88%	99.16%	94.00%	100%	78.32%	98.67%	98.49%	100%	84.67%	98.50%	96.19%	98.77%	99.29%	100%	43.26%	95.64%	99.53%	100%	
		<b>Overall SSA</b>	NC	NC	<b>83.96%</b>	<b>76.75%</b>	<b>85.63%</b>	<b>75.78%</b>	<b>64.95%</b>	<b>41.64%</b>	<b>97.17%</b>	<b>100%</b>	<b>74.30%</b>	<b>60.64%</b>	<b>92.38%</b>	<b>96.44%</b>	<b>97.27%</b>	<b>99.00%</b>	<b>36.43%</b>	<b>56.79%</b>	<b>98.74%</b>	<b>98.38%</b>	
	In-vehicle (>= - 85dBm)	Major Roads	NC	NC	98.80%	100%	96.36%	100%	80.79%	93.53%	99.50%	100%	91.41%	100%	96.94%	100%	99.19%	99.51%	76.40%	99.91%	99.72%	100%	
		Highways	NC	NC	99.58%	98.24%	98.68%	95.22%	91.19%	91.11%	99.35%	100%	93.33%	65.51%	97.47%	99.98%	99.11%	99.97%	68.34%	44.93%	99.90%	100%	
		Within City	NC	NC	99.52%	99.99%	99.93%	100%	97.52%	100%	99.82%	100%	98.69%	100%	99.58%	99.86%	99.77%	100%	92.08%	99.82%	99.90%	100%	
	Outdoor-in city (>= - 95dBm)	<b>Overall SSA</b>	NC	NC	<b>99.32%</b>	<b>99.35%</b>	<b>98.72%</b>	<b>98.55%</b>	<b>92.52%</b>	<b>95.29%</b>	<b>99.64%</b>	<b>100%</b>	<b>95.68%</b>	<b>87.38%</b>	<b>98.37%</b>	<b>99.95%</b>	<b>99.47%</b>	<b>99.82%</b>	<b>83.22%</b>	<b>80.06%</b>	<b>99.86%</b>	<b>100%</b>	
		Major Roads	NC	NC	99.98%	100%	99.98%	100%	98.66%	100%	99.96%	100%	99.74%	100%	99.74%	100%	99.75%	100%	96.78%	100%	100%	100%	
		Highways	NC	NC	99.99%	99.97%	100%	100%	99.53%	100%	99.88%	100%	99.92%	100%	99.82%	100%	99.70%	100%	96.42%	99.73%	100%	100%	
		Within City	NC	NC	100%	100%	100%	100%	99.75%	100%	99.94%	100%	100%	100%	99.94%	99.98%	99.90%	100%	98.88%	99.89%	99.99%	100%	
	6	Call Setup Success Rate (>=95%)	<b>Overall SSA</b>	NC	NC	<b>99.99%</b>	<b>99.99%</b>	<b>100%</b>	<b>100%</b>	<b>99.47%</b>	<b>100%</b>	<b>99.93%</b>	<b>100%</b>	<b>99.92%</b>	<b>100%</b>	<b>99.85%</b>	<b>99.99%</b>	<b>99.82%</b>	<b>100%</b>	<b>97.89%</b>	<b>99.87%</b>	<b>99.99%</b>	<b>100%</b>
			Major Roads	NC	NC	99.27%	100%	95.17%	100%	100%	100%	100%	100%	100%	100%	99.37%	100%	98.86%	100%	98.51%	100%	100%	100%
Highways			NC	NC	100%	100%	97.56%	100%	100%	100%	100%	100%	100%	100%	99.21%	100%	99.24%	100%	98.92%	100%	100%	100%	
Within City			NC	NC	100%	100%	97.54%	100%	99.26%	100%	100%	100%	100%	100%	100%	100%	99.04%	100%	99.64%	100%	100%	100%	
7	Hand Over Success Rate (HOSR)	<b>Overall SSA</b>	NC	NC	<b>99.81%</b>	<b>100%</b>	<b>96.96%</b>	<b>100%</b>	<b>99.60%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>99.66%</b>	<b>100%</b>	<b>99.03%</b>	<b>100%</b>	<b>99.31%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	
		Major Roads	NC	NC	98.17%	100%	90.34%	100%	98.95%	100%	100%	100%	100%	100%	100%	100%	99.02%	100%	100%	100%	100%	100%	
		Highways	NC	NC	99.25%	100%	96.56%	99.28%	100%	100%	99.70%	100%	99.33%	100%	100%	100%	99.20%	100%	100%	100%	100%	100%	
		Within City	NC	NC	99.48%	100%	97.60%	100%	98.85%	100%	100%	100%	99.82%	100%	100%	100%	99.39%	100%	100%	100%	100%	100%	

NC-No Coverage; NA-Not Applicable

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

**AUDIT & ASSESSMENT OF QOS FOR QE- MARCH-2015 - HARYANA CIRCLE**

**DRIVE TEST TABLE – 3  
OPERATOR ASSISTED DRIVE TEST AT AMBALA SSA IN MARCH 15 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	NC	NC	126	25	141	26	58	25	110	26	78	26	74	25	175	25	84	25	78	26	
		Highways	NC	NC	152	27	164	26	81	25	173	25	114	25	137	25	163	25	81	25	114	25	
		Within City	NC	NC	164	25	148	27	209	25	166	25	177	25	163	25	202	25	185	25	177	25	
		<b>Overall SSA</b>	NC	NC	<b>442</b>	<b>77</b>	<b>453</b>	<b>79</b>	<b>348</b>	<b>75</b>	<b>449</b>	<b>76</b>	<b>369</b>	<b>76</b>	<b>374</b>	<b>75</b>	<b>540</b>	<b>75</b>	<b>350</b>	<b>75</b>	<b>369</b>	<b>76</b>	
2	Blocked Call Rate	Major Roads	NC	NC	0.00%	0.00%	3.55%	0.00%	0.00%	0.00%	0.91%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.19%	0.00%	0.00%	0.00%	
		Highways	NC	NC	0.00%	0.00%	0.61%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.23%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Within City	NC	NC	0.61%	0.00%	1.35%	0.00%	1.91%	0.00%	0.00%	0.00%	0.56%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		<b>Overall SSA</b>	NC	NC	<b>0.23%</b>	<b>0.00%</b>	<b>1.77%</b>	<b>0.00%</b>	<b>1.15%</b>	<b>0.00%</b>	<b>0.22%</b>	<b>0.00%</b>	<b>0.27%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.37%</b>	<b>0.00%</b>	<b>0.29%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	
3	Dropped Call Rate (<=2%)	Major Roads	NC	NC	0.00%	0.00%	4.41%	0.00%	0.00%	0.00%	0.00%	0.00%	1.28%	0.00%	0.00%	0.00%	0.57%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Highways	NC	NC	0.00%	0.00%	3.07%	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%	1.75%	0.00%	
		Within City	NC	NC	0.00%	0.00%	2.05%	0.00%	0.98%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.08%	0.00%	0.00%	0.00%	
		<b>Overall SSA</b>	NC	NC	<b>0.00%</b>	<b>0.00%</b>	<b>3.15%</b>	<b>0.00%</b>	<b>0.58%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.27%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.19%</b>	<b>0.00%</b>	<b>0.57%</b>	<b>0.00%</b>	<b>0.54%</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	NC	NC	NA	96.08%	96.98%	99.98%	100%														
		Highways	NC	NC	NA	95.71%	95.65%	99.86%	100%														
		Within City	NC	NC	NA	97.92%	99.24%	99.98%	100%														
		<b>Overall SSA</b>	NC	NC	<b>NA</b>	<b>97.21%</b>	<b>97.27%</b>	<b>99.95%</b>	<b>100%</b>														
	(b) 0-5 (with frequency)	Major Roads	NC	NC	95.95%	96.14%	92.74%	98.88%	96.18%	97.77%	95.77%	99.01%	96.60%	100%	96.43%	96.63%	96.93%	97.34%	NA	NA	NA	NA	
Highways	NC	NC	95.66%	99.36%	92.99%	94.94%	95.40%	98.22%	95.37%	98.39%	97.34%	98.29%	97.33%	95.85%	97.62%	99.23%	NA	NA	NA	NA			

**AUDIT & ASSESSMENT OF QOS FOR QE- MARCH-2015 - HARYANA CIRCLE**

**DRIVE TEST TABLE – 3  
OPERATOR ASSISTED DRIVE TEST AT AMBALA SSA IN MARCH 15 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
			NC	NC	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
	hopping for GSM Operators)	Within City	NC	NC	95.34%	96.09%	91.13%	96.12%	95.48%	95.39%	95.99%	99.02%	96.71%	99.83%	95.65%	100%	97.73%	99.74%	NA	NA	NA	NA
		Overall SSA	NC	NC	95.62%	97.01%	92.27%	95.85%	95.57%	97.15%	95.71%	98.80%	96.88%	99.37%	96.42%	97.40%	97.52%	98.90%	NA	NA	NA	NA
<b>Service Coverage</b>																						
5	In door (>= - 75dBm)	Major Roads	NC	NC	88.58%	98.09%	79.29%	99.92%	39.86%	98.23%	94.75%	100%	64.20%	99.90%	88.91%	100%	93.73%	99.95%	29.61%	0.00%	98.41%	99.98%
		Highways	NC	NC	83.69%	100%	60.49%	99.87%	41.40%	100%	95.10%	100%	49.17%	99.97%	89.85%	100%	96.30%	98.24%	14.40%	56.35%	97.56%	100%
		Within City	NC	NC	96.19%	99.99%	82.14%	100%	60.38%	96.09%	99.33%	100%	88.87%	98.69%	98.16%	100%	98.23%	100%	61.82%	100%	99.87%	100%
		Overall SSA	NC	NC	90.16%	99.27%	73.43%	99.93%	51.05%	98.62%	96.72%	100%	72.06%	99.52%	93.24%	100%	96.89%	99.32%	42.14%	55.94%	98.95%	99.99%
	In-vehicle (>= - 85dBm)	Major Roads	NC	NC	97.40%	100%	96.53%	100%	78.52%	100%	98.39%	100%	86.81%	99.90%	97.11%	100%	94.77%	100%	77.76%	22.99%	99.89%	100%
		Highways	NC	NC	98.57%	100%	95.00%	100%	74.06%	100%	99.73%	100%	86.36%	100%	97.07%	100%	97.51%	100%	53.15%	100%	99.29%	100%
		Within City	NC	NC	99.65%	100%	96.58%	100%	85.50%	99.23%	99.83%	100%	98.77%	100%	99.70%	100%	98.85%	100%	93.85%	100%	100%	100%
		Overall SSA	NC	NC	98.66%	100%	95.99%	100%	80.75%	99.81%	99.47%	100%	92.66%	99.97%	98.22%	100%	97.74%	100%	79.23%	78.86%	99.78%	100%
	Outdoor-in city (>= - 95dBm)	Major Roads	NC	NC	99.59%	100%	99.50%	100%	97.30%	100%	99.71%	100%	99.01%	100%	99.55%	100%	98.57%	100%	95.59%	99.73%	100%	100%
		Highways	NC	NC	99.96%	100%	99.87%	100%	96.26%	100%	99.96%	100%	99.69%	100%	99.53%	100%	99.00%	100%	96.42%	100%	100%	100%
		Within City	NC	NC	99.99%	100%	100%	100%	96.79%	99.99%	99.88%	100%	100%	100%	99.86%	100%	99.73%	100%	99.45%	100%	100%	100%
		Overall SSA	NC	NC	99.87%	100%	99.81%	100%	96.70%	100%	99.87%	100%	99.71%	100%	99.68%	100%	99.33%	100%	97.84%	99.92%	100%	100%
6	Call Setup Success Rate (>=95%)	Major Roads	NC	NC	100%	100%	96.45%	100%	100%	100%	99.09%	100%	100%	100%	100%	100%	100%	100%	98.81%	100%	100%	100%
		Highways	NC	NC	100%	100%	99.39%	100%	100%	100%	100%	100%	100%	100%	100%	100%	98.77%	100%	100%	100%	100%	100%
		Within City	NC	NC	99.39%	100%	98.65%	100%	98.09%	100%	100%	100%	99.44%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	NC	NC	99.77%	100%	98.23%	100%	98.85%	100%	99.78%	100%	99.73%	100%	100%	100%	99.63%	100%	99.71%	100%	100%	100%

**AUDIT & ASSESSMENT OF QOS FOR QE- MARCH-2015 - HARYANA CIRCLE**

**DRIVE TEST TABLE – 3  
OPERATOR ASSISTED DRIVE TEST AT AMBALA SSA IN MARCH 15 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
			7	Hand Over Success Rate (HOSR)	Major Roads	NC	NC	100%	100%	95.34%	100%	100%	100%	99.66%	100%	100%	100%	100%	100%	99.32%	100%	100%
		Highways	NC	NC	99.46%	99.47%	93.48%	100%	99.26%	100%	99.57%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Within City	NC	NC	99.69%	100%	95.65%	99.33%	98.74%	100%	99.80%	100%	99.44%	100%	99.68%	100%	98.62%	100%	100%	100%	100%	100%
		Overall SSA	NC	NC	99.72%	99.67%	94.98%	99.63%	99.18%	100%	99.68%	100%	99.60%	100%	99.81%	100%	99.26%	100%	100%	100%	100%	100%

NC-No Coverage; NA-Not Applicable

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

**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 & KM Covered	Route Covered	Name of SDCA & KM Covered	Route Covered	Name of SDCA & KM Covered	Route Covered
JIND	Jan-15	Jind, Julana/175km	Bsnl Exchange, Rani Talab, Bus Stand, Sec 10,11,Urban State,Patiyala Chowk, Railway Station, Kaithal Road,Sabji Mandi, Tanga Chowk, Rohtak Road,Bishanpura,Kinana,Gatuli,Kasola,Julana,Anaj mandi Julana <b>Indoor:</b> Mini sectraite Jind	Jind Saffidon/ 130KM	Bsnl Exchange, Rani Talab, Bus stand, Gohana Road,Pindara, Radhana,Nidani,Nidana,Ludana,Bhambawa,Malsari khera,Morkhi,Gangoli,Kalwa,Kalawati, Butani,Hatth,Karkhana,Saffido,Bahadurgarh,Budda khera,Pillukhera,Lohchab,Manoherpur, Nirjan <b>Indoor:</b> Civil hospital Saffidon	Jind, Narwana/ 140KM	Bsnl Exchange, Patiyala Chowk,Jhanj Khurd,Khatkar,Baroda,Uchana City, Ghaso Kala, Dumarkha kalan, Narwana,Bus stand, Patiala Chowk, Anaj Mandi Premnagar,Dharodi,Loan,Damtan Sahab,Julhera,Amar garh, Frian khurd,Bhikewala, Sacha khera <b>Indoor:</b> Civil Hospital Narwana
KARNAL	Feb-15	Karnal, Panipat/210km	BSNL Exchange,kunjpura Road,Sec 6,7,8,9,13,Devilal Chowk,Namaste Chowk,Madhuban,Gharunda,kohand,babarpur,Sec 13,17, Noorwala,Civil hospital,Bus stand,Sanoli ,Road,Nh1, Dadllana,MUNAK,SALWAN, Assandh,Jhabhlana,JALMANA,S HEIKPURA,PEONT <b>Indoor:</b> Panipat Civil Hospital	Karnal, Kurkshetra/ 185KM	BSNL Exchange,Kunjpura Road,Model town,ITI Chowknk,Uchana,Shamgarh,Tarori,Nilokherai,Raipur Roaran,Samana Bahu,Kurkshetra,Sec3,7,Sec 13,Bus Stand,GrainMarket,University, Jyotisar,Sarsa,bhor Saidan,Pehowa,Dhand,Kaul,Sitamai, Sambholi,Kacawa,Kalampur,Saidpur <b>Indoor:</b> Kurksetra University	Karnal ,Pehowa,Kaithal / 215KM	Sec 13,Sec 14 , Hiraghati,Sec 3, Chan Sanai,Hansi road,Railway road, Shakti colony,Fatehpur,Pundri kaithal city,Pehowa <b>Indoor:</b> Super mall sec 12 karnal, Civil Hospital Kaithal
AMBALA	Mar-15	Ambala, Barara/180km	BSNL Exchange, Mall Road, Kalka Chowk, Manav Chowk, Sec-9, Model Town, Manji Sahib, Adarsh Nagar,Prem Nagar, Sec-7, Dhakia, Muntheri, Jansui, Mohra, Kesari,Saha, Mulana, Barara, Farakpur, Mithapur,Brahmkumari Chowk, SD College, Sadar Bazar, Sigri Mohalla, Ambala Cantt. <b>Indoor:</b> Mullana University	Yamuna nagar, chharroli/ 175KM	Jgadhari Bus Stand, Bheetal, Bilaspur, Ledi, Khizrabad, Chachrauli,Manakpur, Chachrauli Road, Buria Chowk, Agrasen Chowk, Sec-18, Kanhaya Chok,Fountain Chowk, Vishwakarma Chowk, Saharanpur Road, Sagar Mill, kamani Chowk,Sector 18, Sector 17, Durga Garden, Professor Colony, Thana Chappar, Mustafabad <b>Indoor:</b> Ganpati plaza	Kalka, Naraingarh /160km	Chajumajra, Bharog, Patvi, Dharana, Shahzadpur, Chhoti Bassi, Naraingarh, Bus Stand Naraingarh, Sec-4, Grain Market, Lachha, Burewala, Raipur Rani,Tabar, barwala, Sultanpur, Maggai, ITBP Bhanu, Ramgarh, Lower Bazar,Gandhi Chowk, Railway Chowk, Modal Town, Lohargarh, Jangipur, Kona <b>Indoor:</b> Pinjore Garden

**7.2 SSA WISE DRIVE TEST OBSERVATION:**

**DRIVE TEST TABLE: 5**

**DRIVE TEST OBSERVATION OF JIND SSA (JAN-15)**

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 Rx Level Near Bibipur Jind, Julana Mandi. Poor Rx Quality Near Buwana, Jai Dharamshala-Jind.	Jind & Safidon	Poor Rx Quality Near Saffidon, Mandi, Pillukhera, Morkhi.	Jind & Narwana	Poor Rx Quality Near Dharodi, Kharal, Bhongra Baroda.
2	BSNL		Poor Rx Level and Rx Quality Jai Dharamshala, Govindpura, Om Nagar, Bibipur, Kinana. Poor Rx Quality Near Butano, Nindana.		Poor Rx Level and Rx Quality Near Butani, Darauli-Jind, Ludhana.		Poor Rx Level and Rx Quality Near Uchana, Dhamtan Sahib. Poor Rx Quality Near Loan, Baroda.
3	TATA GSM		Poor Rx Quality Near Govindpura, Urban Estate, Kihana, Julana.		Poor Rx Quality Near Saffidon, Butani, Karkhana, Nirjan,		Poor Rx Quality Near Dharodi, Belarkha, Pipaltha, Uchana Khurd, Khatkar.
4	TATA CDMA		Poor Rx Quality Near Patiala Chowk, Julana.		Poor Rx Quality Near Gangoli.		Poor Rx Quality Near Pialtha, Dumrakha, Khtkar.
5	IDEA		Poor Rx Quality Near Urban Estate, Buwana.		Poor Rx Quality Near Pillokhera, Bdkhera, Butani.		Poor Rx Quality Near Kaithal Road, Uchana.
6	RCOM GSM		Poo Coverage and Quality Near Kinana, Jind- Julana Road.		Poor Rx Level and Rx Quality Near Jind-Gohana Road. Poor Rx Quality Near Jmani-Bhambera Road, Golden Hutt.		Poor Rx Level and Rx Quality Near Dharodi, Dumarkhan Kalan.
7	RCOM CDMA		Poor Rx Level and Rx Quality Near Jind-Julana Road.		Poor Rx Level and Rx Quality Near jind-Saffidon road.		Poor Rx Level and Rx Quality Near Narwana.
8	VIDEOCON		Poor Rx Quality Near Govindpura.		Poor Rx Quality Near Nirjan, karkhana.		Poor Rx Quality Near Loan, Dharodi, Bhongra Baroda.
9	VODAFONE		Poor Rx Quality and Coverage Near Julana.		Poor Rx Quality and Coverage Near Lakheri. Poor Rx Quality Near Gangoli.		Poor Rx Quality Near Pipaltha, Dumrakha.
10	AIRCEL		No Coverage		No Coverage		No Coverage

DRIVE TEST TABLE: 6

DRIVE TEST OBSERVATION OF KARNAL SSA (FEB 15)

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	Karnal, Gharaunda & Panipat	Poor Rx Quality Near Peont, Kabri Road, Assandh City, Jalmana.	Karnal & Kurushetra	Poor Rx Quality Near Pipli, Amunpur, Bhorsadan.	Karnal, Kaithal & Pheowa	Poor Rx Quality Near Kaithal City.
2	BSNL		Poor Rx Quality Near JaiSinghpura, Seikhupura, Jundla, Munak.		Poor Rx Quality Near Bhorsadan, Sarsa, Kacchwa.		Poor Rx Quality Near Sandholi, Sakra.
3	TATA GSM		Poor Rx Level and Rx Quality Near Peont, Salwan, Balla. Poor Rx Quality Near Rajiv Colony, Gharaunda, Azad Nagar.		Poor Rx Level and Rx Quality Near Kachuwa Road. Poor Rx Quality Near Jyotisar, Jhanjhari, sabhli.		Poor Rx Quality Near Pedal, Siwan, Nissing, Rasina, Rajiv Colony, Bhainai Majra, Mundri.
4	TATA CDMA		Poor Rx Level and Rx Quality Near Jalorana, Babarpur, Salwan. Poor Rx Quality Near Sec-12, Darpan Cinema, Madel Town.		Poor Rx Level and Rx Quality Near Pipli Chowk, Nilokheri.		They have coverage Only In SDCA's & Major Towns with Poor Level and Quality at Outers.
5	IDEA		Poor Rx Quality Near Peont, Jundla.		Poor Rx Quality Near Sandholi, Bhorsadan, Thanesar, Pipli, Kacchwa, Shamgarh.		Poor Rx Quality Near Seonsar, Sanasadan, Manjura.
6	RCOM GSM		They have coverage Only In SDCA's & Major Towns with Poor Level and Quality at Outers.		They have coverage Only In SDCA's & Major Towns with Poor Level and Quality at Outers.		They have coverage Only In SDCA's & Major Towns with Poor Level and Quality at Outers.
7	RCOM CDMA		They have coverage Only In SDCA's & Major Towns with Poor Level and Quality at Outers.		They have coverage Only In SDCA's & Major Towns with Poor Level and Quality at Outers.		They have coverage Only In SDCA's & Major Towns with Poor Level and Quality at Outers.
8	VIDEOCON		Poor Rx Level and Rx Quality Near Phushgarh. Poor Rx Quality Near Madanpur, Bazida, Kohand, Dadlana, Assandh, Dopedi, Balla.		Poor Rx Quality Near Bhorsadan, Thanesar, Palwal Village, Khaspur.		Poor Rx Level and Rx Quality Near Manjura. Poor Rx Quality Near Mundri, Phushgarh.
9	VODAFONE		Poor Rx Quality Near Chirao, Jundla, Jaisinghpura, Salwan.		Poor Rx Quality Near Sandholi, Dhand, Kacchwa.		Poor Rx Quality Near Bhagal, Dusherpur, Khrodi.
10	AIRCEL		No Coverage		No Coverage		No Coverage

DRIVE TEST TABLE: 7

DRIVE TEST OBSERVATION OF AMBALA SSA (MARCH 15)

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	Ambala, Barara, Mullana & Saha	Poor Rx Quality Near Dorana, Ambala Cant Station, Samalkhi, Mulana.	Yamunanagar & Jagadhri	Poor Rx Level and Quality Near Bilpura, Hachrauli. Poor Rx Quality Near Mahlanwali, Khera, Buria Chowk.	Pinjore & Kalka	Poor Rx Quality Near Dhamala, Bitna.
2	BSNL		Poor Rx Quality Near Mithapur, Badakhuda, Behta, Nagla, Matehri, Sahzadpur Patti.		Poor Rx Quality Near Mahlanwali, Malakpur, Khera.		Poor Rx Quality Near Nargis Service Station, Barwala, Chotikhori, Sahzadpur.
3	TATA GSM		They have coverage Only In SDCA's & Major Towns with Poor Level and Quality at Outers.		They have coverage Only In SDCA's & Major Towns with Poor Level and Quality at Outers.		They have coverage Only In SDCA's & Major Towns with Poor Level and Quality at Outers.
4	TATA CDMA		They have coverage Only In SDCA's & Major Towns with Poor Level and Quality at Outers.		They have coverage Only In SDCA's & Major Towns with Poor Level and Quality at Outers.		They have coverage Only In SDCA's & Major Towns with Poor Level and Quality at Outers.
5	IDEA		Poor Rx Quality Near Ambala Cantt, Khuda Kalan, Mulana.		Poor Rx Quality Near Mahlanwali, Khera, Govindpuri.		Poor Rx Quality Near Dhamala, Gandhi Chowk, Banaundi.
6	RCOM GSM		They have coverage Only In SDCA's & Major Towns with Poor Level and Quality at Outers.		They have coverage Only In SDCA's & Major Towns with Poor Level and Quality at Outers.		They have coverage Only In SDCA's & Major Towns with Poor Level and Quality at Outers.
7	RCOM CDMA		They have coverage Only In SDCA's & Major Towns with Poor Level and Quality at Outers.		They have coverage Only In SDCA's & Major Towns with Poor Level and Quality at Outers.		They have coverage Only In SDCA's & Major Towns with Poor Level and Quality at Outers.
8	VIDEOCON		Poor Rx Level and Quality Near Dourana. Poor Rx Quality Near Indernagar, Adarsh Nagar, Mulana, Vatika Sahbad, Mohra.		Poor Rx Level and Quality Near Jarauda. Poor Rx Quality Near Mahlanwali, Khera.		They have coverage Only In SDCA's & Major Towns with Poor Level and Quality at Outers.
9	VODAFONE		Poor Rx Quality Near Duchana, Saraswati Vihar, Nagla.		Poor Rx Quality Near Chachrauli, Dedi, Bundakhera, Bhamroli, Khera.		No Poor Rx Level and Quality.
10	AIRCEL		No Coverage		No Coverage		No Coverage

DRIVE TEST TABLE: 8

**NO NETWORK COVERAGE STATUS OF DRIVE TEST – JANUARY TO MARCH 15**

S No	Month	Name of Operators	SSA	SDCA	Status of No Network Coverage Area	ICR Status
1	Jan'15	RCOM GSM	Jind	Jind	Hatt-Kalwa Road	ICR with Tata GSM - Rajan Kalan, Budhakhera, Bahadurgarh - Safidon Road
				Julana	No Coverage Issue	ICR with Tata GSM - Julana-Gatuali Road
				Narwana	Morkhi-Ludana, Jamni -Bambhera Road	ICR with Tata GSM - Kinana, Nirjan, Manoharpur, Lohach, Jhanj Khurd, Pindara
				Safidon	No Coverage Issue	ICR with Tata GSM - Dhamtan Sahib, Dharodi, Ujhana, Barakhan, Dumarkhan, Kheri Saffa, Uchana, Barola & Khatkar
		RCOM CDMA	Jind	Jind	Pilukhera-Budhakhera Road, Bahadurgarh-Safidon Road, Hatt-Kalwa Road	NO
				Julana	Julana-Gatuali Road	NO
				Narwana	Bishanpura-Kinana Road, Niranjan-Pilukhera Road, Jhanj Khurd-Khatkar road, Pindara- Gohana, Morkhi-Ludana, Jamni -Bambhera Road	NO
				Safidon	Dhamtan Sahib-Dharodi Road, Ujhana-Belarakha Road, Dumarkhan-Uchana Road, Barola-Khatkar Road	NO
		VODAFONE	Jind	Jind	No Coverage Issue	NO
				Narwana	No Coverage Issue	NO
				Saffidon	No Coverage Issue	NO
				Julana	No Coverage Issue	NO
		AIRTEL	Jind	Jind	No Coverage Issue	NO
				Narwana	No Coverage Issue	NO
				Saffidon	No Coverage Issue	NO
				Julana	No Coverage Issue	NO
		IDEA	Jind	Jind	No Coverage Issue	NO
				Narwana	No Coverage Issue	NO
				Saffidon	No Coverage Issue	NO
				Julana	No Coverage Issue	NO
		BSNL	Jind	Jind	No Coverage Issue	NO
				Narwana	No Coverage Issue	NO
				Saffidon	No Coverage Issue	NO
				Julana	No Coverage Issue	NO
		TATA GSM	Jind	Jind	Loan, Damtan, Sahib, Julhera, Frian, Bhikewala, Sacha Khera, Not Covered	NO
				Narwana	Nyolo Kalan, Jhang Khurd, Khatkar, Baroda	NO
				Saffidon	Bhambheva, Nidani, Pindara, Ludana, Budhakhera, Pillukhera, Lohchab	NO
				Julana	Gatoli, Karsola	NO

S No	Month	Name of Operators	SSA	SDCA	Status of No Network Coverage Area	ICR Status		
		TATA CDMA	Jind	Jind	Loan, Damtan, Sahib, Julhera, Frian, Bhikewala, Sacha Khara, I Not Covered	NO		
				Narwana	Nyolo Kalan, Jhang Khurd, Khatkar, Baroda	NO		
				Saffidon	Bhambheva, Nidani, Pindara, Ludana, Budhakhera, Pillukhera, Lohchab	NO		
				Julana	Gatoli, karsola	NO		
		VIDEOCON	Jind	Jind	No Coverage Issue	NO		
				Narwana	Karamgarh, Loan, Rasidan to dabhi teksingh	ICR with Tata GSM - Jhanj khurd, Ghaso Khurd, Pipaltha		
				Saffidon	Morkhi, Kalawati to Butani, Karkhana	ICR with Tata GSM - Lohchab, Manoharpur		
				Julana	No Coverage Issue	ICR with Tata GSM - Kinana, Karsola		
		2	Feb'15	RCOM GSM	Karnal	Karnal	No Coverage Issue	ICR with Tata GSM - Kachhwa, Sambhali, Kuchhpura, Karnal, Dadpur and Jundla
						Kaithal	Kaithal-Cheeka Road	ICR with Tata GSM - Pundri, Teontha, Rasina
						Kurukshetra	No Coverage Issue	NO
						Asandh	No Coverage Issue	ICR with Tata GSM - Jundla, Sekhupura, Nissang, Jalmana, Assand, Balla & Dadlana
Nilokheri	No Coverage Issue					ICR with Tata GSM - Samana Bahu & Raipur Ruran		
Pehowa	No Coverage Issue					ICR with Tata GSM - Chikka Road, Nand Colony, Bhor Saidan, Diwana, Baghal & Pabnawa		
Gharaunda	No Coverage Issue					Icr with Tata GSM - Near Liberty Hospital, Bastada, Hasanpur & Arpana Hospital		
Cheeka	No Coverage Issue					Icr with Tata GSM - Cheeka, Pedal & Baghal		
Panipat	No Coverage Issue					NO		
RCOM CDMA	Jind					Karnal	Kachhwa to Sambhali, Karnal to Kuchhpura, Karnal to Jundlla	NO
				Kaithal	Kaithal-Cheeka Road, Pundri-Teontha Road, Teontha -Rasina Road	NO		
				Kurukshetra	No Coverage Issue	NO		
				Asandh	Jundla-Jalmana Road, Asandh to Dadlana	NO		
				Nilokheri	Samana Bahu to Raipur Ruran	NO		
				Pehowa	Chikka Road and Bhor Saidan, Diwana to Baghal, Bhor Saidan to Pabnawa Road	NO		
				Gharaunda	Between Liberty Factory & Arpana Hospital	NO		
				Cheeka	Cheeka-Pedal Road, Cheeka-Baghal Road	NO		
TATA GSM	Karnal			Gharundha	No Coverage Issue	NO		
				Kaithal	No Coverage Issue	NO		

S No	Month	Name of Operators	SSA	SDCA	Status of No Network Coverage Area	ICR Status
				Karnal	No Coverage Issue	NO
				Kurukshetra	No Coverage Issue	NO
				Nilokherai	No Coverage Issue	NO
				Pehowa	No Coverage Issue	NO
				Panipat	No Coverage Issue	NO
				Assandh	Jundla-Jalmana Road	NO
				Cheeka	No Coverage Issue	NO
		TATA CDMA	Karnal	Gharundha	No Coverage Issue	NO
				Kaithal	No Coverage Issue	NO
				Karnal	No Coverage Issue	NO
				Kurukshetra	No Coverage Issue	NO
				Nilokherai	No Coverage Issue	NO
				Pehowa	No Coverage Issue	NO
				Panipat	No Coverage Issue	NO
				Assandh	Jundla-Jalmana Road	NO
				Cheeka	Cheeka-Baghal Road	NO
		AIRTEL	Karnal	Gharundha	No Coverage Issue	NO
				Kaithal	No Coverage Issue	NO
				Karnal	No Coverage Issue	NO
				Kurukshetra	No Coverage Issue	NO
				Nilokherai	No Coverage Issue	NO
				Pehowa	No Coverage Issue	NO
				Panipat	No Coverage Issue	NO
				Assandh	No Coverage Issue	NO
				Cheeka	No Coverage Issue	NO
		BSNL	Karnal	Gharundha	No Coverage Issue	NO
				Kaithal	No Coverage Issue	NO
				Karnal	No Coverage Issue	NO
				Kurukshetra	No Coverage Issue	NO
				Nilokherai	No Coverage Issue	NO
				Pehowa	No Coverage Issue	NO
				Panipat	No Coverage Issue	NO
				Assandh	No Coverage Issue	NO
				Cheeka	No Coverage Issue	NO
		IDEA	Karnal	Gharundha	No Coverage Issue	NO
				Kaithal	No Coverage Issue	NO
				Karnal	No Coverage Issue	NO
				Kurukshetra	No Coverage Issue	NO
				Nilokherai	No Coverage Issue	NO
				Pehowa	No Coverage Issue	NO
				Panipat	No Coverage Issue	NO
				Assandh	No Coverage Issue	NO
				Cheeka	No Coverage Issue	NO
		VODAFONE	Karnal	Gharundha	No Coverage Issue	NO

S No	Month	Name of Operators	SSA	SDCA	Status of No Network Coverage Area	ICR Status
				Kaithal	No Coverage Issue	NO
				Karnal	No Coverage Issue	NO
				Kurukshetra	No Coverage Issue	NO
				Nilokherai	No Coverage Issue	NO
				Pehowa	No Coverage Issue	NO
				Panipat	No Coverage Issue	NO
				Assandh	No Coverage Issue	NO
				Cheeka	No Coverage Issue	NO
		VIDEOCON	Karnal	Gharundha	No Coverage Issue	NO
				Kaithal	No Coverage Issue	NO
				Karnal	No Coverage Issue	NO
				Kurukshetra	No Coverage Issue	NO
				Nilokherai	No Coverage Issue	NO
				Pehowa	No Coverage Issue	NO
				Panipat	No Coverage Issue	NO
				Assandh	Jundla-Jalmana Road	NO
				Cheeka	Cheeka-Baghal Road	NO
3	Mar'15	RCOM GSM	Ambala	Ambala	Durana-Mohra road	ICR with Tata GSM - Khuddi, Mithapur & Tepla, Mathedi, Bihta & Kesari
				Kalka	No Coverage Issue	NO
				Naraingarh	No Coverage Issue	ICR with Tata GSM - Chandi Mandir, Ramgarh, ITBP, Barwala Ind Area, Chhoti Basi, Danana, Chhajumajra
				Barara	No Coverage Issue	Icr with Tata GSM - Saha, Kalpi & Mulana
				Kurukshetra	No Coverage Issue	ICR with Tata GSM - Dau Majra
				Jagadhari	No Coverage Issue	ICR with Tata GSM - Thana Chhappar, Jgadhari , Khera
				Chhachrauli	No Coverage Issue	NO
		RCOM CDMA		Ambala	Between Industrial Area Ambala and Saha, Durana -Mohra road, Ambala-Kaithal Highway, Saha-Kesari road	NO
				Kalka	No Coverage Issue	NO
				Naraingarh	Himshikha to Bana-Madanpur, Bana Madanpur to Raipur rani, Naraingarh to Panjokhra	NO
				Barara	Saha to Mulana	NO
				Kurukshetra	Dau Majra	NO
				Jagadhari	Between Jgadhari & Mustafabad	NO
				Chhachrauli	No Coverage Issue	NO
		BSNL		Ambala	No Coverage Issue	NO
				Kalka	No Coverage Issue	NO
				Naraingarh	No Coverage Issue	NO
Barara	No Coverage Issue		NO			
Kurukshetra	No Coverage Issue		NO			
Jagadhari	No Coverage Issue		NO			
Chhachrauli	No Coverage Issue	NO				

S No	Month	Name of Operators	SSA	SDCA	Status of No Network Coverage Area	ICR Status
		AIRTEL		Ambala	No Coverage Issue	NO
				Kalka	No Coverage Issue	NO
				Naraingarh	No Coverage Issue	NO
				Barara	No Coverage Issue	NO
				Kurukshetra	No Coverage Issue	NO
				Jagadhari	No Coverage Issue	NO
				Chhachrauli	No Coverage Issue	NO
		IDEA		Ambala	No Coverage Issue	NO
				Kalka	No Coverage Issue	NO
				Naraingarh	No Coverage Issue	NO
				Barara	No Coverage Issue	NO
				Kurukshetra	No Coverage Issue	NO
				Jagadhari	No Coverage Issue	NO
				Chhachrauli	No Coverage Issue	NO
		VODAFONE		Ambala	No Coverage Issue	NO
				Kalka	No Coverage Issue	NO
				Naraingarh	No Coverage Issue	NO
				Barara	No Coverage Issue	NO
				Kurukshetra	No Coverage Issue	NO
				Jagadhari	No Coverage Issue	NO
				Chhachrauli	No Coverage Issue	NO
		VIDEOCON		Ambala	No Coverage Issue	NO
				Kalka	kalka baddi road	NO
				Naraingarh	No Coverage Issue	NO
				Barara	No Coverage Issue	NO
				Kurukshetra	No Coverage Issue	NO
				Jagadhari	No Coverage Issue	ICR with Tata GSM - Gokulgarh to Kosli
				Chhachrauli	Ledhi,khizrabad,Chachrauli Road	NO
		TATA GSM	Ambala	No Coverage Issue	NO	
			Kalka	No Coverage Issue	NO	
			Naraingarh	No Coverage Issue	NO	
			Barara	Batheri,Majra,dhrkhera	NO	
			Kurukshetra	No Coverage Issue	NO	
			Jagadhari	Budiya,Aggrasian	ICR with Videocon - Gokulgarh to Kosli	
			Chhachrauli	Ledhi,khizrabad,Chachrauli Road	NO	
		TATA CDMA	Ambala	No Coverage Issue	NO	
			Kalka	No Coverage Issue	NO	
			Naraingarh	No Coverage Issue	NO	
			Barara	Batheri,Majra,dhrkhera	NO	
			Kurukshetra	No Coverage Issue	NO	
			Jagadhari	Budiya,Aggrasian	NO	
			Chhachrauli	Ledhi,khizrabad,Chachrauli Road	NO	

### 7.3 KEY FINDINGS ON DRIVE TEST:

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

Aircel has no coverage 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.

- (i) **In the Month of January -15** drive tests were conducted across **Jind SSA** covering Jind, Julana, Jind Saffidon and Narwana SDCAs during three consecutive days. The overall performance of the service providers was satisfactory as they were largely meeting the benchmarks. Only **BSNL** failed to meet the benchmark of parameter **Voice Quality** with its achieved value as **94.97%** (Indoor).
- (ii) **In the Month of February-15**, drive tests were conducted across **Karnal SSA** covering Karnal, Panipat, Kurkeshetra, Pehowa and Kaithal SDCAs during three consecutive days. In this SSA also, the overall performance of the service providers was satisfactory as they were largely meeting the benchmarks. Only **BSNL** remained non-complied for parameters **Call Drop Rate** and **Good Voice Quality** with its performance **2.43%** and **91.86%** respectively.
- (iii) **In the month of March-15**, drive tests were conducted across **Ambala SSA** covering Ambal, Barara, Yamunanagar, Chharoli, Kalka and Naraingarh SDCAs. In **Ambala SSA** also, **BSNL** failed to meet the benchmarks for parameters **Call Drop Rate (3.15%)** and **Voice Quality (92.27%)**. Other service providers were well within the compliance range of the benchmarks.

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.

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

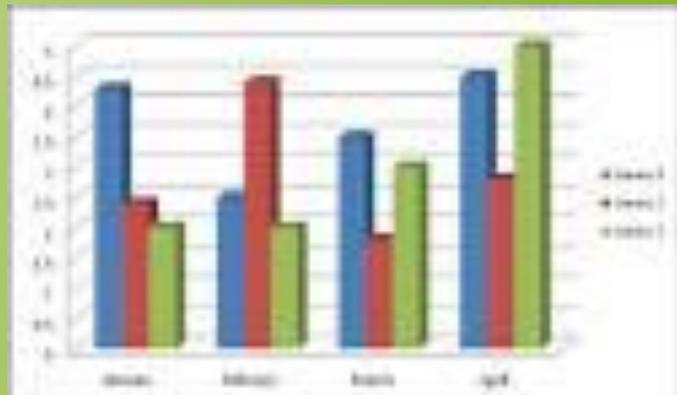
*Thus overall performance of the service providers was satisfactory as they were largely meeting the benchmarks. Only BSNL remained non-compliant with respect to the parameters 'Call Drop Rate and Voice Quality', in the above SSAs. The BSNL needs to improve its network performance in respect of these parameters.*

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

**AVERAGED QUARTERLY PMR**

**V/S**

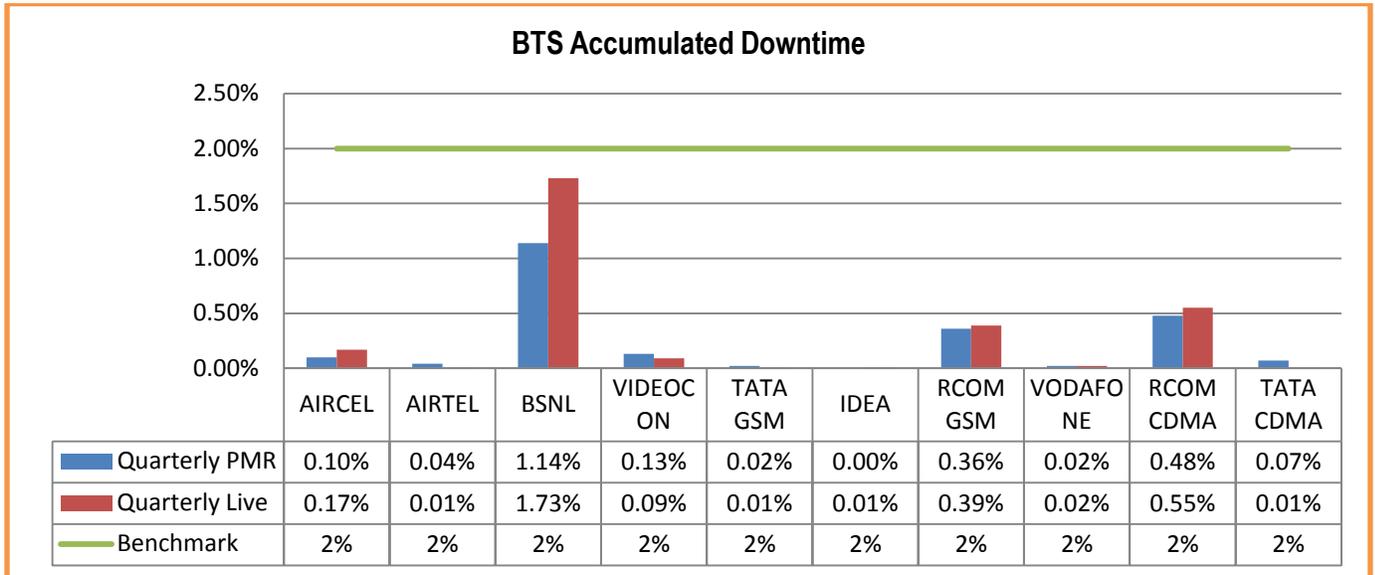
**AVERAGED QUARTERLY 3-DAYs LIVE MEASURMENT**



**8. GRAPHICAL REPRESENTATION (CMTS):**

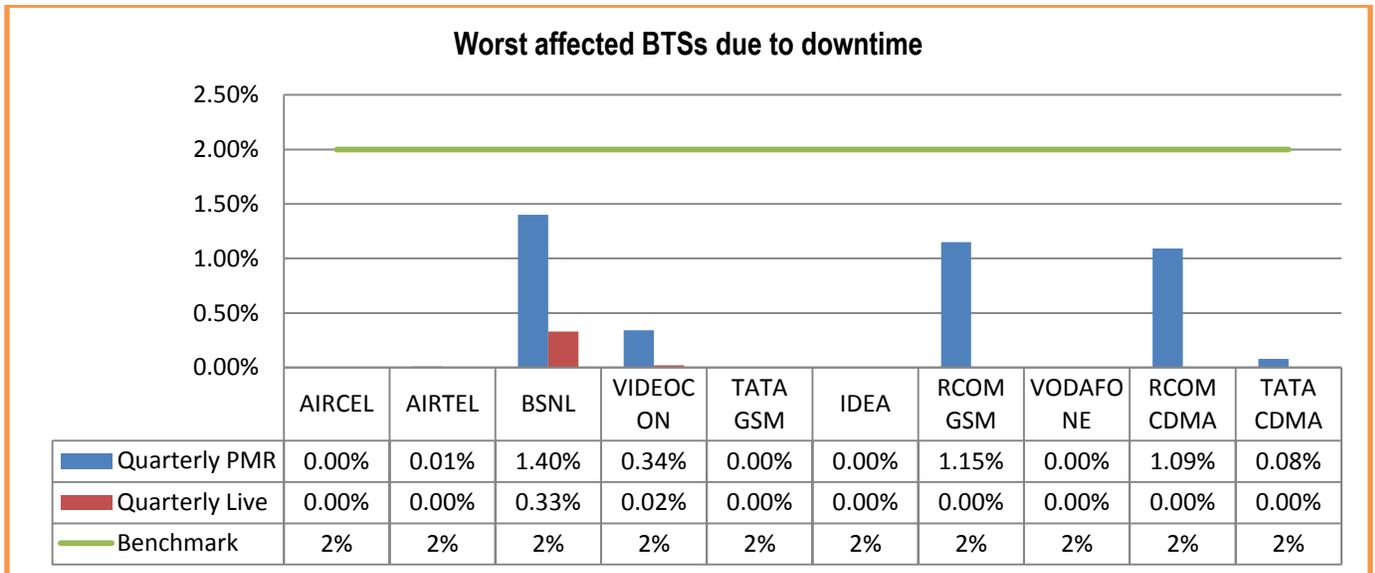
Graphical Representation of Performance of the Cellular Mobile Service Providers (PMR) V/S 3-Days Live Measurement (Quarterly Average Data):

**1) BTS ACCUMULATED DOWNTIME:**



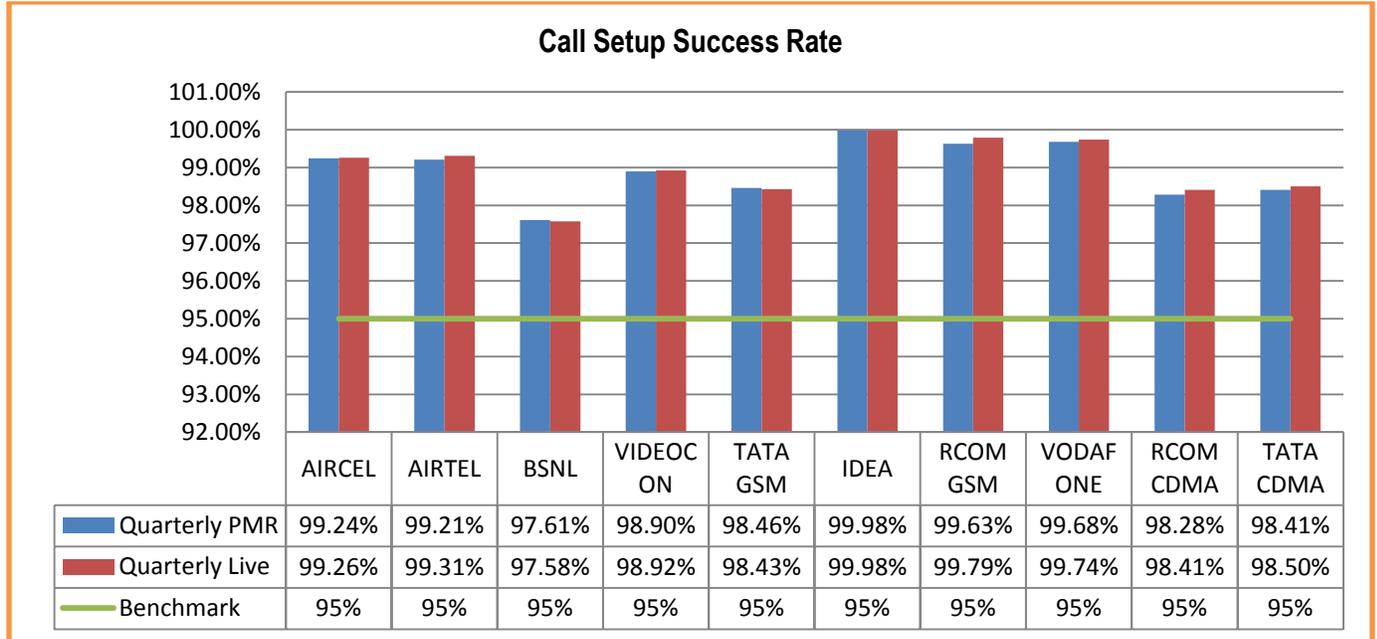
All operators are meeting the benchmarks.

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



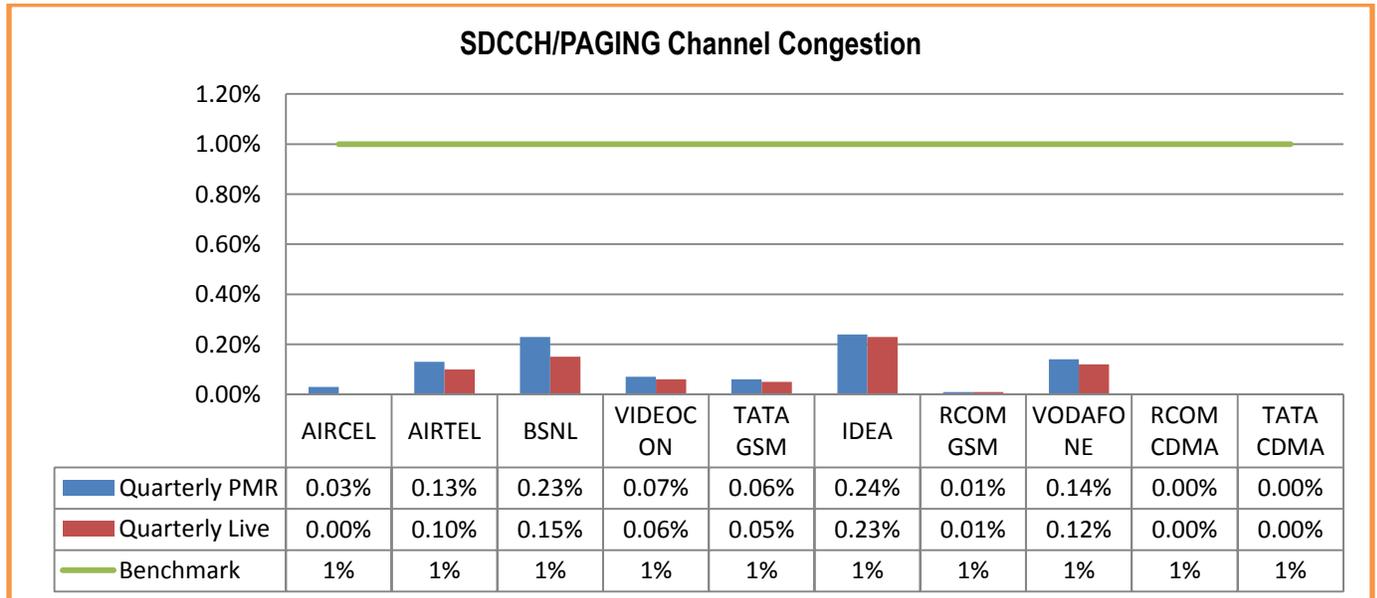
All operators are meeting the benchmarks.

3) CALL SETUP SUCCESS RATE:



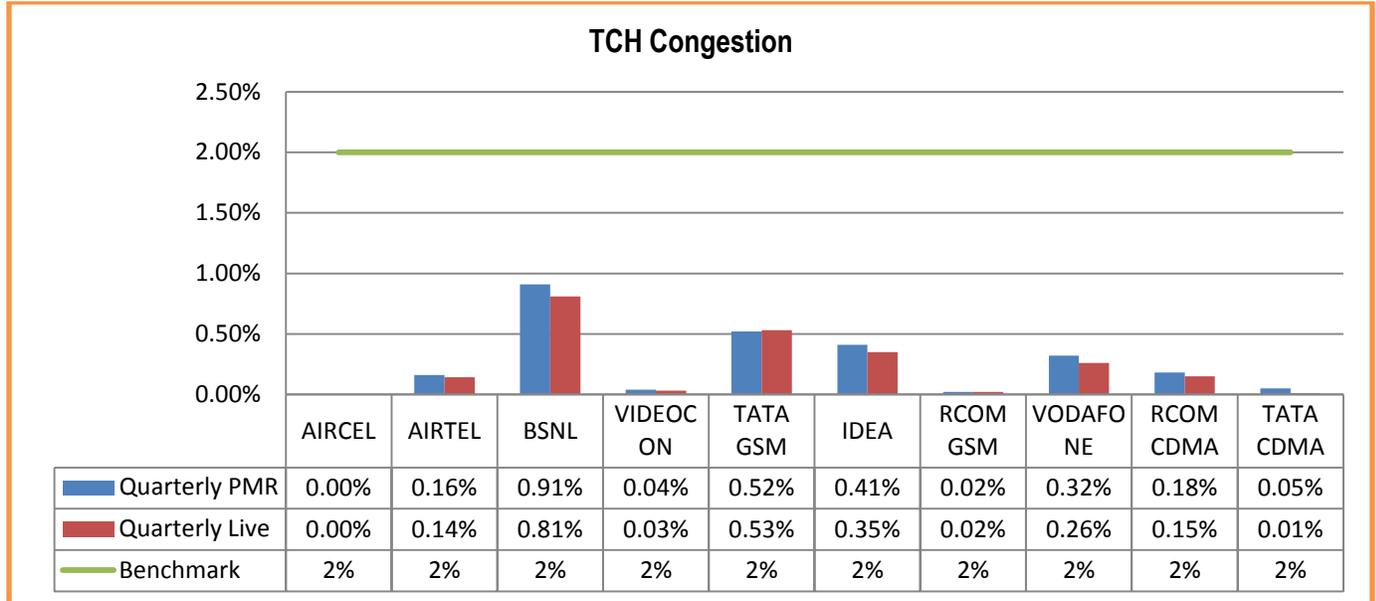
All operators are meeting the benchmarks.

4) SDCCH/PAGING CHANNEL CONGESTION:



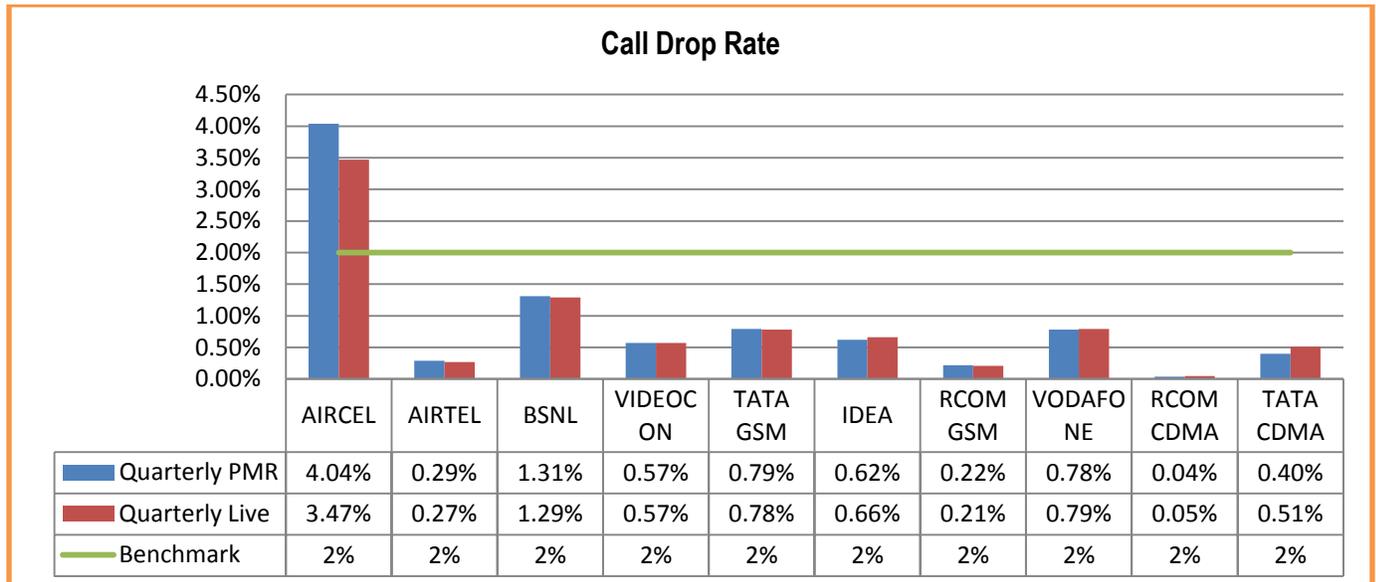
All operators are meeting the benchmarks.

**5) TCH CONGESTION:**



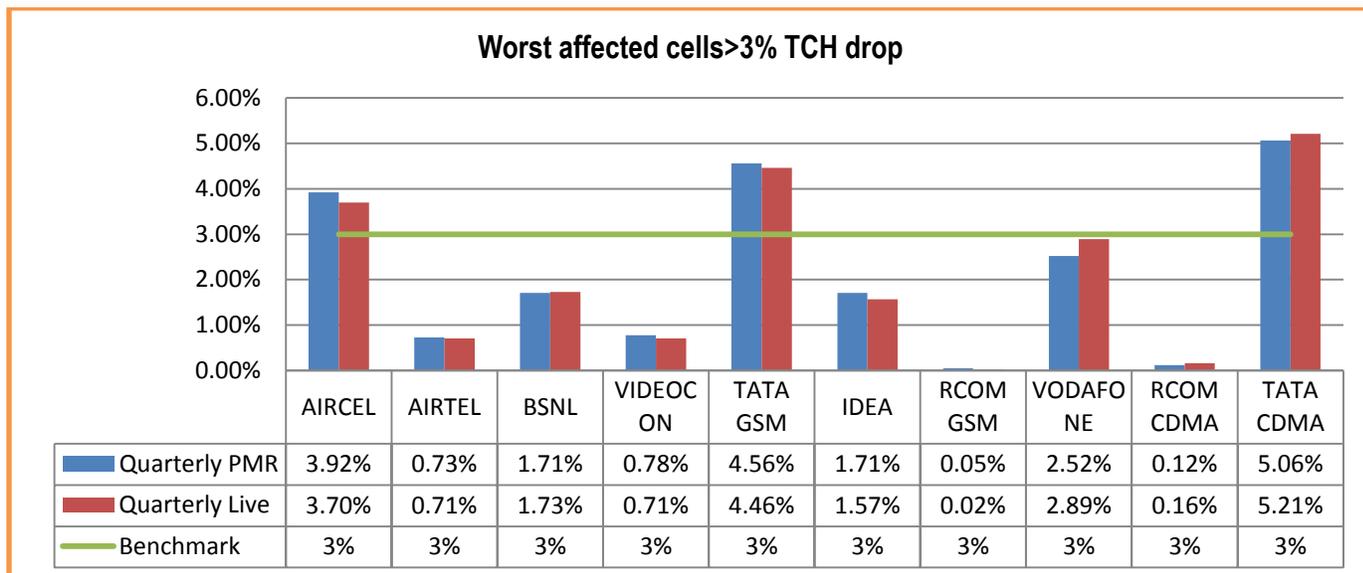
All operators are meeting the benchmarks.

**6) CALL DROP RATE:**



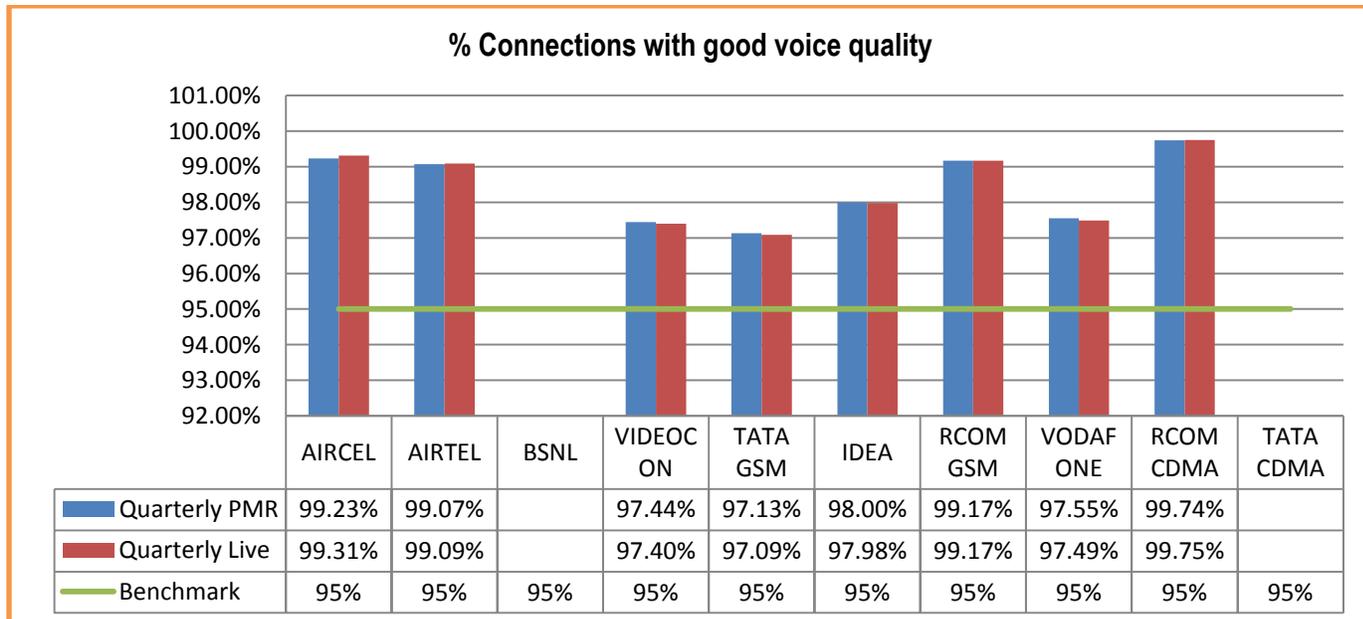
All operators are meeting the benchmarks except Aircel.

7) WORST AFFECTED CELLS>3% TCH DROP:



All operators are meeting the benchmarks except Aircel, 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.