**Audit & Assessment of Quality of Service**

**Of**

**Cellular Mobile Telephone Service**

**For**

**Telecom Regulatory Authority Of India**

**North Zone – Rajasthan Service Area**

**(January 2015 – March 2015)**

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## PREFACE

The Telecom Regulatory Authority of India (TRAI) was established in 1997 by an Act of Parliament, called the Telecom Regulatory Authority of India Act, 1997, to regulate telecom services. The Authority's mission is to ensure that the interest of consumers are protected and at the same time to nurture conditions for growth of telecommunications, broadcasting and cable services  in a manner and at a pace which will enable India to play a leading role in emerging global information society.

The Authority, in exercise of its functions as per the provisions in the TRAI Act, has been entrusted to measure the Quality of Service provided by the Service Providers from time to time and to compare them with the benchmarks so as to assess the level of performance. In pursuance of this, TRAI has appointed **M/s TUV-SUD South Asia Pvt. Ltd**. to carry out "Audit and Assessment of Quality of Service" provided by Basic (Wire line), Cellular Mobile and Broadband service providers in terms of the benchmarks specified in the respective regulations, in **North and West** Zones.

TUV-SUD South Asia carried out QoS audit as per the norms of TRAI in all the eight circles / services areas of the North Zone and four circles of the West Zone. This report details the performance of the various service providers in **Rajasthan circle** against the QoS bench marks laid down by TRAI in the respective regulations.

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# 1. BACKGROUND

## 1. BACKGROUND

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

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

i) Create conditions for consumer satisfaction by making known the quality of service, which the Service provider is required to provide, and the user has a right to expect.

ii) Measure the Quality of Service provided by the Service Providers from time to time and to compare them with the norms so as to assess the level of performance.

iii) Generally protect the interests of consumers of telecommunication services.

TRAI, the regulatory watch dog for the Quality of Service for the telecom services – Basic (Wire line), Cellular Mobile (Wireless) and Broadband has commissioned **M/s TUV-SUD South Asia Pvt. Ltd**. for conducting audit and assessment of quality of service of service providers, in terms of the benchmarks specified in the "The Standards of Quality of Service of Basic Telephone Service (Wire line) and Cellular Mobile Telephone Service Regulations, 2009 (7 of 2009) dated 20th March, 2009 and the Quality of Service of Broadband Service Regulations, 2006 (11 of 2006) dated 6thOctober, 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 (wire line) 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
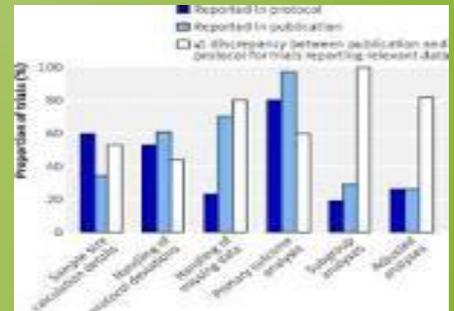
## 3. SAMPLE SIZE

### 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 operators were covered for QoS audit in Rajasthan circle.

| Sl. No. | Service Provider | Dates of live measurement Audit | | | Audit Location |
|---------|-----------------|------------|------------|----------|----------------|
| **GSM Operators** | | January-15 | February-15 | March-15 | |
| 1 | AIRCEL | 6 to 8 Jan-15 | 4 to 6 Feb-15 | 11 to 13 Mar-15 | Aircel limited, 1st & 2nd Floor, Navajyoti, Amrapali Circle,C-Block,Vaishali Nagar, Jaipur-302021 |
| 2 | AIRTEL | 7 to 9 Jan-15 | 6, 7 & 9 Feb-15 | 11 to 13 Mar-15 | Bharti Hexacom Limited, K-21, Malviya Marg, c-scheme , Jaipur-302001 |
| 3 | BSNL | 10, 12 & 13 Jan-15 | 9 to 11 Feb-15 | 16 to 18 Mar-15 | Bharat Sanchar Nigam Ltd. (BSNL) Room no. 116, Bajaj Nagar MSC, First Floor, BSNL Bajaj Nagar, JLN marg, Jaipur- 302015 |
| 4 | IDEA | 7 to 9 Jan-15 | 9 to 11 Feb-15 | 16 to 18 Mar-15 | Idea Cellular Ltd. Plot-C, Sahkar Marg, Jaipur-302001 |
| 5 | RCOM GSM | 12, 13 & 15 Jan-15 | 9 to 11 Feb-15 | 11 to 13 Mar-15 | Reliance Communications Ltd. F-161, E-170, Road No-12, VKIA, Jaipur-302013 |
| 6 | TATA GSM | 6 to 8 Jan-15 | 4 to 6 Feb-15 | 11 to 13 Mar-15 | Tata Teleservices Limited, The Guman-1, Amrapali circle, Vaishali nagar, jaipur-302021 |
| 7 | VODAFONE | 6 to 8 Jan-15 | 11 to 13 Feb-15 | 16 to 18 Mar-15 | Vodafone Ltd. 5th Floor,Gaurav Tower,Malviya Nagar jaipur,-302017 |
| **CDMA Operators** | | | | | |
| 8 | MTS | 6 to 8 Jan-15 | 4 to 6 Feb-15 | 11 to 13 Mar-15 | Sistema Shyam Teleservices Ltd. 3, MTS Tower, Amrapali Circle Vaishali Nagar, Jaipur. |
| 9 | RCOM CDMA | 12, 13 & 15 Jan-15 | 9 to 11 Feb-15 | 11 to 13 Mar-15 | Reliance Communications Ltd. F-161, E-170, Road No-12, VKIA, Jaipur-302013 |
| 10 | TATA CDMA | 6 to 8 Jan-15 | 4 to 6 Feb-15 | 11 to 13 Mar-15 | Tata Teleservices Limited, The Guman-1, Amrapali circle, Vaishali nagar, jaipur-302021 |

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 **once in a year. Based on this criterion, QoS audit for basic (wire line) service was not required to be done for Rajasthan Circle in the quarter ended March-2015.**

## 3.3 SAMPLING FOR BROADBAND SERVICE PROVIDERS

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

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# 4. EXECUTIVE SUMMARY

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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 Service:**

(i) From the **monthly audit**, it was revealed that the performance of the service providers in Rajasthan Service area was satisfactory for network related parameters except for one parameter namely 'Worst affected cells having > 3% TCH drop. The benchmark for this parameter could not be complied with by **Aircel, Tata (GSM)** and **Tata (CDMA)** with their average achievement as **3.15%, 4.70% and 7.47%** respectively**.**

(ii) From three days live measurement / assessment, the performance of all operators was satisfactory as they largely met the benchmarks except the parameter '**Worst affected cells> 3 % TCH drops**", which could not be complied with by **Aircel, Tata (GSM)** and **Tata (CDMA)**. The average performance of **Aircel, Tata (GSM)** and **Tata (CDMA)** on this parameter was **3.03%, 4.71% and 7.43%** respectively. **The similar non-compliance of Aircel, Tata (GSM) and Tata (CDMA) was also observed during monthly audit of the quarter.**

(iii) With regard to the **Customer Service Quality Parameters,** it is revealed that all operators are in well compliance of the parameters on Metering and Billing Credibility, Response Time to Customers, Termination of Service and Time taken for refunds except few cases of non-compliance for some of the parameters.

Regarding the parameters related to Response time to customers, all service providers are in compliance with respect to the parameter accessibility of call center except **Aircel with its achieved value as 85.08%.** In case of parameter Calls answered by operator (Voice to Voice), **Aircel, Airtel, BSNL and Vodafone** have not met the benchmark of >95% with their performed level as **84.38%, 93.90%, 90.26% and 91.71%** respectively.

Regarding parameter Termination / Closure of Service within 7 days, only **Idea** failed to meet the benchmark with its achieved level as **99.56%.** Whereas, in case of parameter Time taken for refund of Deposits, **Vodafone and Tata CDMA** lagged behind the benchmark with their performance as **96.13% and 99.63% respectively.**

The results of three days live measurements reveal that **Airtel** could not meet the benchmark of parameter Calls answered by operator (Voice to voice) within 90 seconds, with its performed value as **93.02%**

(iv)The performance of the service providers with regard to the Drive Test revealed that all the service providers performed well within the QoS norms. **BSNL** was the only operator which could not meet the benchmarks of the prime network parameters namely **Call Drop Rate, Voice Quality and Call Setup Success rate** across Alwar, Banswara and Bharatpur SSAs.

# 5. PMR AUDIT REPORT

# 5. PMR AUDIT REPORTS:

## 5.1 MONTHLY PMR:

### 5.1.1 BUSY HOUR OF VARIOUS SERVICE PROVIDERS:

| Sl. No. | Name of Service Provider | Month of Audit | Network TCBH Hour |
|---------|--------------------------|----------------|-------------------|
| GSM Operators | | | |
| 1 | AIRCEL | March-15 | 20:00 - 21:00 |
| 2 | AIRTEL | March-15 | 20:00 - 21:00 |
| 3 | BSNL | March-15 | 19:00 - 20:00 |
| 4 | IDEA | March-15 | 20:00 - 21:00 |
| 5 | RCOM GSM | March-15 | 20:00 - 21:00 |
| 6 | TATA GSM | March-15 | 20:00 - 21:00 |
| 7 | VODAFONE | March-15 | 20:00 - 21:00 |
| CDMA Operators | | | |
| 8 | MTS | March-15 | 20:00 - 21:00 |
| 9 | RCOM CDMA | March-15 | 19:00 - 20:00 |
| 10 | TATA CDMA | March-15 | 20:00 - 21:00 |

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

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

| Sl. No. | Name of Service Provider | No. of MSC + GMSC | No. of BSC | No. of BTS | NSS make | BSS make |
|---------|--------------------------|-------------------|------------|------------|----------|----------|
| GSM Operators | | | | | | |
| 1 | AIRCEL | 2 | 14 | 2086 | NSN | NSN |
| 2 | AIRTEL | 44 | 84 | 8134 | Ericsson | Ericsson |
| 3 | BSNL | 17 | 56 | 4022 | Ericsson | NSN & Ericsson |
| 4 | IDEA | 11 | 47 | 6187 | Ericsson | Ericsson |
| 5 | RCOM GSM | 4 | 15 | 2065 | Huawei | Huawei |
| 6 | TATA GSM | 2 | 12 | 1389 | Huawei | Huawei |
| 7 | VODAFONE | 12 | 93 | 7072 | NSN | NSN |
| CDMA Operators | | | | | | |
| 8 | MTS | 2 | 6 | 1637 | ZTE | ZTE |
| 9 | RCOM CDMA | 6 | 6 | 945 | Huawai, Lucent, Ericsson & ZTE | Huawai & Lucent |
| 10 | TATA CDMA | 5 | 6 | 687 | Ericsson & Huawei | Huawai & Motorola |

### 5.1.3 QOS PERFORMANCE OF MONTHLY PMR – JANUARY-15 MONTH:

| CELLULAR MOBILE TELEPHONE SERVICES -  RAJASTHAN CIRCLE - JANUARY 15 MONTH | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PMR Generation Data** | | Bench-mark | Audit Period | AIRCEL | AIRTEL | BSNL | IDEA | RCOM GSM | TATA GSM | VODAFONE | RCOM CDMA | MTS | TATA CDMA |
| **S/N** | **Name of Parameter** | | | GSM Operators | | | | | | | CDMA Operators | | |
| | **Network Service Quality Parameter** | | | | | | | | | | | | |
| | **Network Availability** | | | | | | | | | | | | |
| 1 | a) BTS Accumulated Downtime | <=2% | Jan-15 | 0.12% | 0.05% | 1.60% | 0.05% | 0.14% | 0.14% | 0.03% | 0.17% | 0.02% | 0.07% |
| | b) Worst affected BTSs due to downtime | <=2% | Jan-15 | 0.50% | 0.15% | 1.80% | 0.07% | 0.29% | 0.36% | 0.09% | 0.53% | 0.00% | 0.14% |
| | **Connection Establishment (Accessibility)** | | | | | | | | | | | | |
| 2 | a) CSSR (Call Setup Success Rate) | >=95% | Jan-15 | 97.30% | 99.14% | 98.62% | 99.33% | 99.64% | 98.38% | 99.78% | 98.94% | 99.17% | 97.79% |
| | b) SDCCH/PAGING Channel congestion | <=1% | Jan-15 | 0.16% | 0.12% | 0.57% | 0.14% | 0.01% | 0.07% | 0.13% | 0.00% | 0.00% | 0.00% |
| | c) TCH congestion | <=2% | Jan-15 | 0.40% | 0.26% | 1.73% | 0.30% | 0.04% | 0.09% | 0.22% | 0.01% | 0.18% | 1.35% |
| | **Connection maintenance (Retainability)** | | | | | | | | | | | | |
| 3 | a) CDR (Call Drop Rate) | <=2% | Jan-15 | 0.76% | 0.76% | 1.37% | 1.06% | 0.35% | 0.77% | 0.71% | 0.10% | 0.36% | 0.54% |
| | b) Worst affected cells>3% TCH drop (Call drop) rate | <=3% | Jan-15 | 2.97% | 1.12% | 1.96% | 2.25% | 0.01% | **4.69%** | 2.13% | 0.35% | 0.29% | **7.66%** |
| | c) Connections with good voice quality | >=95% | Jan-15 | 96.79% | 99.04% | 98.42% | 96.30% | 98.65% | 98.38% | 97.18% | 99.72% | 99.22% | 99.10% |
| 4 | No. of POI's having >=0.5% POI congestion | | Jan-15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

### 5.1.4 QOS PERFORMANCE OF MONTHLY PMR – FEBRUARY 15 MONTH:

| PMR Generation Data | | Bench-mark | Audit Period | AIRCEL | AIRTEL | BSNL | IDEA | RCOM GSM | TATA GSM | VODAFONE | RCOM CDMA | MTS | TATA CDMA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CELLULAR MOBILE TELEPHONE SERVICES - RAJASTHAN CIRCLE – FEBRUARY 15 MONTH** | | | | | | | | | | | | | |
| S/N | Name of Parameter | | | GSM Operators | | | | | | | CDMA Operators | | |
| | **Network Service Quality Parameter** | | | | | | | | | | | | |
| | **Network Availability** | | | | | | | | | | | | |
| 1 | a) BTS Accumulated Downtime | <=2% | Feb-15 | 0.11% | 0.06% | 1.65% | 0.08% | 0.09% | 0.13% | 0.02% | 0.15% | 0.04% | 0.04% |
| | b) Worst affected BTSs due to downtime | <=2% | Feb-15 | 0.39% | 0.07% | 1.77% | 0.05% | 0.05% | 0.14% | 0.04% | 0.53% | 0.00% | 0.00% |
| | **Connection Establishment (Accessibility)** | | | | | | | | | | | | |
| 2 | a) CSSR (Call Setup Success Rate) | >=95% | Feb-15 | 97.04% | 98.41% | 98.64% | 99.22% | 99.64% | 98.27% | 99.63% | 98.97% | 99.11% | 97.24% |
| | b) SDCCH/PAGING Channel congestion | <=1% | Feb-15 | 0.40% | 0.28% | 0.53% | 0.37% | 0.02% | 0.10% | 0.12% | 0.00% | 0.00% | 0.00% |
| | c) TCH congestion | <=2% | Feb-15 | 0.62% | 0.59% | 1.79% | 0.42% | 0.05% | 0.12% | 0.37% | 0.01% | 0.20% | 1.93% |
| | **Connection maintenance (Retainability)** | | | | | | | | | | | | |
| 3 | a) CDR (Call Drop Rate) | <=2% | Feb-15 | 0.81% | 0.89% | 1.34% | 0.92% | 0.35% | 0.73% | 0.71% | 0.07% | 0.34% | 0.50% |
| | b) Worst affected cells>3% TCH drop (Call drop) rate | <=3% | Feb-15 | 2.92% | 1.13% | 1.99% | 1.94% | 0.03% | **4.71%** | 2.17% | 0.29% | 0.23% | **7.15%** |
| | c) Connections with good voice quality | >=95% | Feb-15 | 96.56% | 98.95% | 98.36% | 96.32% | 98.60% | 98.52% | 97.08% | 99.72% | 99.21% | 98.88% |
| 4 | No. of POI's having >=0.5% POI congestion | | Feb-15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## 5.1.5 QOS PERFORMANCE OF MONTHLY PMR – MARCH- 15 MONTH:

| PMR Generation Data | | Bench- mark | Audit Period | AIRCEL | AIRTEL | BSNL | IDEA | RCOM GSM | TATA GSM | VODAFONE | RCOM CDMA | MTS | TATA CDMA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S/N | Name of Parameter | | | GSM Operators | | | | | | | CDMA Operators | | |
| | **Network Service Quality Parameter** | | | | | | | | | | | | |
| | **Network Availability** | | | | | | | | | | | | |
| 1 | a) BTS Accumulated Downtime | <=2% | Mar-15 | 0.15% | 0.08% | 1.55% | 0.07% | 0.13% | 0.18% | 0.05% | 0.13% | 0.06% | 0.07% |
| | b) Worst affected BTSs due to downtime | <=2% | Mar-15 | 0.67% | 0.11% | 1.77% | 0.08% | 0.00% | 0.14% | 0.16% | 0.11% | 0.00% | 0.15% |
| | **Connection Establishment (Accessibility)** | | | | | | | | | | | | |
| 2 | a) CSSR (Call Setup Success Rate) | >=95% | Mar-15 | 96.88% | 98.47% | 98.67% | 98.68% | 99.62% | 98.37% | 99.68% | 98.90% | 99.15% | 98.09% |
| | b) SDCCH/PAGING Channel congestion | <=1% | Mar-15 | 0.35% | 0.21% | 0.53% | 0.35% | 0.02% | 0.07% | 0.19% | 0.00% | 0.00% | 0.00% |
| | c) TCH congestion | <=2% | Mar-15 | 0.71% | 0.58% | 1.64% | 0.94% | 0.05% | 0.10% | 0.32% | 0.01% | 0.14% | 1.08% |
| | **Connection maintenance (Retainability)** | | | | | | | | | | | | |
| 3 | a) CDR (Call Drop Rate) | <=2% | Mar-15 | 0.84% | 0.86% | 1.36% | 0.97% | 0.32% | 0.74% | 0.73% | 0.09% | 0.34% | 0.48% |
| | b) Worst affected cells>3% TCH drop (Call drop) rate | <=3% | Mar-15 | **3.55%** | 1.09% | 2.01% | 1.95% | 0.01% | **4.70%** | 2.38% | 0.44% | 0.22% | **7.61%** |
| | c) Connections with good voice quality | >=95% | Mar-15 | 96.55% | 98.95% | 98.48% | 96.06% | 98.61% | 98.84% | 96.96% | 99.72% | 99.19% | 98.87% |
| 4 | No. of POI's having >=0.5% POI congestion | | Mar-15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

The title row for this table reads: **CELLULAR MOBILE TELEPHONE SERVICES -  RAJASTHAN CIRCLE – MARCH 15 MONTH**

### 5.1.6 QOS PERFORMANCE OF QUARTERLY PMR –AVERAGE OF QE- MARCH- 15 (JANUARY-15 TO MARCH- 2015 MONTHS AUDITED DATA)

| S/N | PMR Generation Data / Name of Parameter | Bench- mark | Audit Period | AIRCEL | AIRTEL | BSNL | IDEA | RCOM GSM | TATA GSM | VODAFONE | RCOM CDMA | MTS | TATA CDMA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | GSM Operators | | | | | | | CDMA Operators | | |
| | **Network Service Quality Parameter** | | | | | | | | | | | | |
| | **Network Availability** | | | | | | | | | | | | |
| 1 | a) BTS Accumulated Downtime | <=2% | Quarterly | 0.13% | 0.06% | 1.60% | 0.07% | 0.12% | 0.15% | 0.03% | 0.15% | 0.04% | 0.06% |
| | b) Worst affected BTSs due to downtime | <=2% | Quarterly | 0.52% | 0.11% | 1.78% | 0.07% | 0.11% | 0.21% | 0.10% | 0.39% | 0.00% | 0.10% |
| | **Connection Establishment (Accessibility)** | | | | | | | | | | | | |
| 2 | a) CSSR (Call Setup Success Rate) | >=95% | Quarterly | 97.07% | 98.67% | 98.64% | 99.08% | 99.63% | 98.34% | 99.70% | 98.94% | 99.14% | 97.71% |
| | b) SDCCH/PAGING Channel congestion | <=1% | Quarterly | 0.30% | 0.20% | 0.54% | 0.29% | 0.02% | 0.08% | 0.15% | 0.00% | 0.00% | 0.00% |
| | c) TCH congestion | <=2% | Quarterly | 0.58% | 0.48% | 1.72% | 0.55% | 0.05% | 0.10% | 0.30% | 0.01% | 0.17% | 1.45% |
| | **Connection maintenance (Retainability)** | | | | | | | | | | | | |
| 3 | a) CDR (Call Drop Rate) | <=2% | Quarterly | 0.80% | 0.84% | 1.36% | 0.98% | 0.34% | 0.75% | 0.72% | 0.09% | 0.35% | 0.51% |
| | b) Worst affected cells>3% TCH drop (Call drop) rate | <=3% | Quarterly | **3.15%** | 1.11% | 1.99% | 2.05% | 0.02% | **4.70%** | 2.23% | 0.36% | 0.25% | **7.47%** |
| | c) Connections with good voice quality | >=95% | Quarterly | 96.63% | 98.98% | 98.42% | 96.23% | 98.62% | 98.58% | 97.07% | 99.72% | 99.21% | 98.95% |
| 4 | No. of POI's having >=0.5% POI congestion | | Quarterly | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## 5.1.7 KEY FINDINGS ON MONTHLY PMR AUDIT REPORTS:

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

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

**Network Service Quality Parameters:**

- **Network Availability**

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

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

In Rajasthan circle, **all the operators were 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 found to be calculating the parameter as per the TRAI's specified norms.

**PMR audit revealed that all operators met the benchmark, prescribed for 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 pegging channel in CDMA system.

With respect to this parameter, the performance of the operators is also satisfactory as **all operators met the TRAI specified benchmarks on the congestion parameters.**

**POI Congestion:** With respect to this parameter, all operators were found having congestion within the prescribed benchmark of < 0.5%.

▪ **Connection Maintenance (Retainability)**

    i.    Call Drop Rate:

This parameter gives a reliable measurement of the mobile network used by the service provider for maintaining a call once it has been correctly established. Failures in coverage, network congestion and network failures have important impact on this parameter.

The audit of this parameter revealed that all the service providers were measuring this parameter as per the TRAI guidelines. Also, **all the service providers were found to be meeting the TRAI specified benchmark.** The lowest call drop rate (average 0 .09%) was for RCOM (CDMA) during the quarter.

    ii.    Worst affected cells having more than 3% TCH drops

Worst affected cells are defined as cells in which the call drop rate exceeds 3% during cell Bouncing Busy Hour (CBBH) or at any other hour of a day.

The audit with respect to this parameter revealed that all the operators met the benchmark for this parameter except **Aircel, Tata (GSM)** and **Tata (CDMA)** which could not meet the benchmark of this parameter with their average achievement as **3.15%, 4.70% and 7.47%** respectively**.**

    iii.    Connections with good voice quality:

Some of the Operators are measuring this parameter through the system generated data at their switches whereas some are measuring through their periodic drive tests. The audit results for this parameter reveal that **all operators have met the bench mark during the quarter.**

**3-DAYS LIVE MEASUREMENT DATA VERIFICATION FOR**

**CELLULAR MOBILE SERVICE PROVIDERS**

**(NETWORK SERVICE QUALITY PARAMETER)**

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

### 5.2.1 LIVE MEASURMENT DATA (3-DAYS) – JANUARY 15 MONTH:

| CELLULAR MOBILE TELEPHONE SERVICES RAJASTHAN CIRCLE - JANUARY 15 MONTH | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Live measurement Data** | | **Bench- mark** | **Average of 3 Days** | **AIRCEL** | **AIRTEL** | **BSNL** | **IDEA** | **RCOM GSM** | **TATA GSM** | **VODAFONE** | **RCOM CDMA** | **MTS** | **TATA CDMA** |
| **S/N** | **Name of Parameter** | | | GSM Operators | | | | | | | CDMA Operators | | |
| | **Network Service Quality Parameter** | | | | | | | | | | | | |
| | **Network Availability** | | | | | | | | | | | | |
| **1** | a) BTS Accumulated Downtime | **<=2%** | Live data | 0.14% | 0.05% | 1.65% | 0.07% | 0.11% | 0.18% | 0.02% | 0.10% | 0.03% | 0.08% |
| | b) Worst affected BTSs due to downtime | **<=2%** | Live data | 0.05% | 0.04% | 0.13% | 0.00% | 0.00% | 0.07% | 0.00% | 0.00% | 0.00% | 0.00% |
| | **Connection Establishment (Accessibility)** | | | | | | | | | | | | |
| **2** | a) CSSR (Call Setup Success Rate) | **>=95%** | Live data | 97.30% | 99.22% | 98.34% | 99.26% | 99.65% | 98.27% | 99.83% | 99.17% | 99.16% | 98.07% |
| | b) SDCCH/PAGING Channel congestion | **<=1%** | Live data | 0.13% | 0.10% | 0.40% | 0.20% | 0.01% | 0.09% | 0.08% | 0.00% | 0.00% | 0.00% |
| | c) TCH congestion | **<=2%** | Live data | 0.36% | 0.23% | 1.74% | 0.35% | 0.04% | 0.14% | 0.17% | 0.01% | 0.20% | 1.12% |
| | **Connection maintenance (Retainability)** | | | | | | | | | | | | |
| **3** | a) CDR (Call Drop Rate) | **<=2%** | Live data | 0.79% | 0.78% | 1.36% | 1.15% | 0.34% | 0.80% | 0.79% | 0.12% | 0.38% | 0.52% |
| | b) Worst affected cells>3% TCH drop (Call drop) rate | **<=3%** | Live data | 2.87% | 1.27% | 1.96% | 2.56% | 0.01% | **4.96%** | 2.53% | 0.35% | 0.27% | **7.74%** |
| | c) Connections with good voice quality | **>=95%** | Live data | 96.81% | 99.05% | 98.33% | 96.30% | 98.65% | 98.38% | 97.18% | 99.73% | 99.23% | 99.09% |
| **4** | No. of POI having >=0.5% congestion | | Live data | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## 5.2.2 LIVE MEASURMENT DATA (3-DAYS) – FEBRUARY 15 MONTH:

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CELLULAR MOBILE TELEPHONE SERVICES RAJASTHAN CIRCLE- FEBRUARY 15 MONTH** | | | | | | | | | | | | | |
| Live measurement Data | | Bench- mark | Average of 3 Days | AIRCEL | AIRTEL | BSNL | IDEA | RCOM GSM | TATA GSM | VODAFONE | RCOM CDMA | MTS | TATA CDMA |
| S/N | Name of Parameter | | | GSM Operators | | | | | | | CDMA Operators | | |
| | **Network Service Quality Parameter** | | | | | | | | | | | | |
| | **Network Availability** | | | | | | | | | | | | |
| 1 | a) BTS Accumulated Downtime | **<=2%** | Live data | 0.09% | 0.06% | 1.59% | 0.05% | 0.07% | 0.19% | 0.03% | 0.08% | 0.10% | 0.05% |
| | b) Worst affected BTSs due to downtime | **<=2%** | Live data | 0.00% | 0.01% | 0.12% | 0.00% | 0.00% | 0.07% | 0.03% | 0.00% | 0.00% | 0.00% |
| | **Connection Establishment (Accessibility)** | | | | | | | | | | | | |
| 2 | a) CSSR (Call Setup Success Rate) | **>=95%** | Live data | 97.15% | 98.72% | 98.69% | 99.37% | 99.62% | 98.33% | 99.64% | 99.32% | 99.08% | 97.83% |
| | b) SDCCH/PAGING Channel congestion | **<=1%** | Live data | 0.21% | 0.19% | 0.33% | 0.16% | 0.02% | 0.22% | 0.09% | 0.00% | 0.00% | 0.00% |
| | c) TCH congestion | **<=2%** | Live data | 0.50% | 0.47% | 1.83% | 0.29% | 0.05% | 0.15% | 0.36% | 0.00% | 0.25% | 1.34% |
| | **Connection maintenance (Retainability)** | | | | | | | | | | | | |
| 3 | a) CDR (Call Drop Rate) | **<=2%** | Live data | 0.74% | 0.88% | 1.31% | 0.92% | 0.35% | 0.75% | 0.73% | 0.05% | 0.34% | 0.54% |
| | b) Worst affected cells>3% TCH drop (Call drop) rate | **<=3%** | Live data | 2.92% | 1.11% | 1.82% | 1.98% | 0.01% | **5.21%** | 2.19% | 0.12% | 0.17% | **7.29%** |
| | c) Connections with good voice quality | **>=95%** | Live data | 96.61% | 98.97% | 98.67% | 96.34% | 98.57% | 98.46% | 97.11% | 99.72% | 99.21% | 98.86% |
| 4 | No. of POI having >=0.5% congestion | | Live data | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## 5.2.3 LIVE MEASURMENT DATA (3-DAYS) – MARCH- 15 MONTH:

| CELLULAR MOBILE TELEPHONE SERVICES RAJASTHAN CIRCLE- MARCH 15 MONTH | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Live measurement Data | | Bench- mark | Average of 3 Days | AIRCEL | AIRTEL | BSNL | IDEA | RCOM GSM | TATA GSM | VODAFONE | RCOM CDMA | MTS | TATA CDMA |
| S/N | Name of Parameter | | | GSM Operators | | | | | | | CDMA Operators | | |
| | Network Service Quality Parameter | | | | | | | | | | | | |
| | Network Availability | | | | | | | | | | | | |
| 1 | a) BTS Accumulated Downtime | <=2% | Live data | 0.15% | 0.06% | 1.45% | 0.05% | 0.07% | 0.15% | 0.06% | 0.06% | 0.03% | 0.06% |
| | b) Worst affected BTSs due to downtime | <=2% | Live data | 0.00% | 0.01% | 0.12% | 0.00% | 0.00% | 0.07% | 0.01% | 0.00% | 0.00% | 0.00% |
| | Connection Establishment (Accessibility) | | | | | | | | | | | | |
| 2 | a) CSSR (Call Setup Success Rate) | >=95% | Live data | 97.00% | 98.62% | 98.72% | 99.14% | 99.55% | 98.45% | 99.70% | 99.00% | 99.11% | 97.47% |
| | b) SDCCH/PAGING Channel congestion | <=1% | Live data | 0.26% | 0.13% | 0.57% | 0.26% | 0.01% | 0.05% | 0.08% | 0.00% | 0.00% | 0.00% |
| | c) TCH congestion | <=2% | Live data | 0.58% | 0.56% | 1.75% | 0.45% | 0.05% | 0.09% | 0.30% | 0.01% | 0.15% | 1.70% |
| | Connection maintenance (Retainability) | | | | | | | | | | | | |
| 3 | a) CDR (Call Drop Rate) | <=2% | Live data | 0.82% | 0.87% | 1.40% | 1.04% | 0.32% | 0.68% | 0.75% | 0.09% | 0.34% | 0.48% |
| | b) Worst affected cells>3% TCH drop (Call drop) rate | <=3% | Live data | 3.29% | 1.09% | 1.99% | 2.06% | 0.01% | 3.95% | 2.62% | 0.48% | 0.19% | 7.25% |
| | c) Connections with good voice quality | >=95% | Live data | 96.64% | 98.97% | 98.33% | 95.88% | 98.61% | 98.90% | 96.93% | 99.73% | 99.20% | 98.87% |
| 4 | No. of POI having >=0.5% congestion | | Live data | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## 5.2.4 QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT AUDITED DATA (AVERAGE OF JANUARY 2015 TO MARCH 2015)

| QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT  (AVERAGE OF QE - MAR 15) – RAJASTHAN CIRCLE | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Live measurement Data | | Bench- mark | Average of 3 Days | AIRCEL | AIRTEL | BSNL | IDEA | RCOM GSM | TATA GSM | VODAFONE | RCOM CDMA | MTS | TATA CDMA |
| S/N | Name of Parameter | | | GSM Operators | | | | | | | CDMA Operators | | |
| | **Network Service Quality Parameter** | | | | | | | | | | | | |
| | **Network Availability** | | | | | | | | | | | | |
| 1 | a) BTS Accumulated Downtime | **<=2%** | Quarterly | 0.13% | 0.06% | 1.56% | 0.06% | 0.08% | 0.17% | 0.04% | 0.08% | 0.05% | 0.06% |
| | b) Worst affected BTSs due to downtime | **<=2%** | Quarterly | 0.02% | 0.02% | 0.12% | 0.00% | 0.00% | 0.07% | 0.01% | 0.00% | 0.00% | 0.00% |
| | **Connection Establishment (Accessibility)** | | | | | | | | | | | | |
| 2 | a) CSSR (Call Setup Success Rate) | **>=95%** | Quarterly | 97.15% | 98.85% | 98.58% | 99.26% | 99.61% | 98.35% | 99.72% | 99.16% | 99.12% | 97.79% |
| | b) SDCCH/PAGING Channel congestion | **<=1%** | Quarterly | 0.20% | 0.14% | 0.43% | 0.21% | 0.01% | 0.12% | 0.08% | 0.00% | 0.00% | 0.00% |
| | c) TCH congestion | **<=2%** | Quarterly | 0.48% | 0.42% | 1.77% | 0.36% | 0.05% | 0.13% | 0.28% | 0.01% | 0.20% | 1.39% |
| | **Connection maintenance (Retainability)** | | | | | | | | | | | | |
| 3 | a) CDR (Call Drop Rate) | **<=2%** | Quarterly | 0.78% | 0.84% | 1.36% | 1.04% | 0.34% | 0.74% | 0.76% | 0.09% | 0.35% | 0.51% |
| | b) Worst affected cells>3% TCH drop (Call drop) rate | **<=3%** | Quarterly | **3.03%** | 1.16% | 1.92% | 2.20% | 0.01% | **4.71%** | 2.45% | 0.32% | 0.21% | **7.43%** |
| | c) Connections with good voice quality | **>=95%** | Quarterly | 96.69% | 99.00% | 98.44% | 96.17% | 98.61% | 98.58% | 97.07% | 99.73% | 99.21% | 98.94% |
| 4 | No. of POI having >=0.5% congestion | | Quarterly | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## 5.2.5 KEY FINDING ON 3 DAYS LIVE MEASUREMENTS:

From three days live measurement assessment, it was found that the performance of all operators was satisfactory as they have largely met the benchmarks except the parameter '**Worst affected cells> 3 % TCH drops**", which could not be complied with by **Aircel, Tata (GSM)** and **Tata (CDMA)**. The average performance of **Aircel, Tata (GSM)** and **Tata (CDMA)** on this parameter was **3.03%, 4.71% and 7.43%** respectively. **The similar non-compliance of Aircel, Tata (GSM) and Tata (CDMA) was also observed during monthly PMR audit of the quarter.**

## 5.2.6 DETAILED NETWORK DATA ASSESSMENT OF CELLULAR MOBILE TELEPHONE SERVICES:

**TABLE: 1**

| S/N | Name of Parameter | Bench- mark | Audit Period | AIRCEL | AIRTEL | BSNL | IDEA | RCOM GSM | TATA GSM | VODAFONE | RCOM CDMA | MTS | TATA CDMA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | GSM Operators | | | | | CDMA Operators | | |
| **Network Service Quality Parameter** | | | | | | | | | | | | | |
| | **Network Availability** | | | | | | | | | | | | |
| 1 | a) Total no. of BTSs in the licensed service area | | Jan-15 | 2011 | 8060 | 4005 | 6137 | 2070 | 1389 | 7049 | 945 | 1633 | 691 |
| | 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 | 1823.02 | 2697.62 | 47819.52 | 2454.72 | 2152.83 | 1473.84 | 1346.98 | 1202.52 | 275.41 | 365.73 |
| | c) BTS Accumulated Downtime | <=2% | Jan-15 | 0.12% | 0.05% | 1.60% | 0.05% | 0.14% | 0.14% | 0.03% | 0.17% | 0.02% | 0.07% |
| | d) No. of BTSs having accumulated downtime of >24 hours in a month | | Jan-15 | 10 | 12 | 72 | 4 | 6 | 5 | 6 | 5 | 0 | 1 |
| | e) Worst affected BTSs due to downtime | <=2% | Jan-15 | 0.50% | 0.15% | 1.80% | 0.07% | 0.29% | 0.36% | 0.09% | 0.53% | 0.00% | 0.14% |
| | **Connection Establishment (Accessibility)** | | | | | | | | | | | | |
| 2 | a) CSSR (Call Setup Success Rate) | >=95% | Jan-15 | 97.30% | 99.14% | 98.62% | 99.33% | 99.64% | 98.38% | 99.78% | 98.94% | 99.17% | 97.79% |
| | b) SDCCH/PAGING Congestion | <=1% | Jan-15 | 0.16% | 0.12% | 0.57% | 0.14% | 0.01% | 0.07% | 0.13% | 0.00% | 0.00% | 0.00% |
| | c) TCH congestion | <=2% | Jan-15 | 0.40% | 0.26% | 1.73% | 0.30% | 0.04% | 0.09% | 0.22% | 0.01% | 0.18% | 1.35% |
| | **Connection Maintenance (Retainability)** | | | | | | | | | | | | |
| 3 | a) Call Drop Rate (CDR) | <=2% | Jan-15 | 0.76% | 0.76% | 1.37% | 1.06% | 0.35% | 0.77% | 0.71% | 0.10% | 0.36% | 0.54% |
| | b) Worst affected cells>3% TCH drop | <=3% | Jan-15 | 2.97% | 1.12% | 1.96% | 2.25% | 0.01% | **4.69%** | 2.13% | 0.35% | 0.29% | **7.66%** |
| | c) % of connections with good voice quality | >=95% | Jan-15 | 96.79% | 99.04% | 98.42% | 96.30% | 98.65% | 98.38% | 97.18% | 99.72% | 99.22% | 99.10% |
| | d) Total No. of cells exceeding 3% TCH drop (call drop) | | Jan-15 | 177 | 269 | 197 | 423 | 1 | 196 | 459 | 10 | 16 | 170 |
| | e) Total no. of cells (Sector) in the licensed service area | | Jan-15 | 5962 | 24071 | 10058 | 18809 | 6205 | 4178 | 21533 | 2831 | 5389 | 2219 |
| | **No. of POI's having >=0.5% POI congestion** | | | | | | | | | | | | |
| 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 |
| | **Network Data** | | | | | | | | | | | | |
| 5 | a) Equipped Capacity of Network in Erlang | | Jan-15 | 104585 | 435414 | 265400 | 262083 | 102000 | 66026 | 282251 | 116000 | 122000 | 171585 |
| | b) Total traffic in TCBH in erlang (Avg.) | | Jan-15 | 91225 | 390181 | 103247 | 177919 | 73301 | 28864 | 246603 | 34569 | 59771 | 25188 |
| | c) Total no. of customers served (as per VLR) on last day of the month | | Jan-15 | 3599327 | 16522049 | 2557760 | 6930594 | 5139469 | 505054 | 10203874 | 884788 | 1324554 | 332651 |

**TABLE: 2**

| S/N | Name of Parameter | Bench-mark | Average of 3 Days | AIRCEL | AIRTEL | BSNL | IDEA | RCOM GSM | TATA GSM | VODAFONE | RCOM CDMA | MTS | TATA CDMA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | GSM Operators | | | CDMA Operators | | |
| **Network Service Quality Parameter** | | | | | | | | | | | | | |
| 1 | **Network Availability** | | | | | | | | | | | | |
| | a) Total no. of BTSs in the licensed service area | | Live data | 1982 | 8025 | 3991 | 6077 | 2077 | **1389** | 7033 | 945 | 1632 | 691 |
| | 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 | 194.28 | 308.20 | 4729.05 | 313.40 | 166.78 | 182.71 | 91.47 | 71.43 | 38.93 | 39.73 |
| | c) BTS Accumulated Downtime | <=2% | Live data | 0.14% | 0.05% | 1.65% | 0.07% | 0.11% | 0.18% | 0.02% | 0.10% | 0.03% | 0.08% |
| | d) No. of BTSs having accumulated downtime of >24 hours in a month | | Live data | 1 | 3 | 5 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| | e) Worst affected BTSs due to downtime | <=2% | Live data | 0.05% | 0.04% | 0.13% | 0.00% | 0.00% | 0.07% | 0.00% | 0.00% | 0.00% | 0.00% |
| 2 | **Connection Establishment (Accessibility)** | | | | | | | | | | | | |
| | a) CSSR (Call Setup Success Rate) | >=95% | Live data | 97.30% | 99.22% | 98.34% | 99.26% | 99.65% | 98.27% | 99.83% | 99.17% | 99.16% | 98.07% |
| | b) SDCCH/PAGING Congestion | <=1% | Live data | 0.13% | 0.10% | 0.40% | 0.20% | 0.01% | 0.09% | 0.08% | 0.00% | 0.00% | 0.00% |
| | c) TCH congestion | <=2% | Live data | 0.36% | 0.23% | 1.74% | 0.35% | 0.04% | 0.14% | 0.17% | 0.01% | 0.20% | 1.12% |
| 3 | **Connection Maintenance (Retainability)** | | | | | | | | | | | | |
| | a) Call Drop Rate (CDR) | <=2% | Live data | 0.79% | 0.78% | 1.36% | 1.15% | 0.34% | 0.80% | 0.79% | 0.12% | 0.38% | 0.52% |
| | b) Worst affected cells>3% TCH drop | <=3% | Live data | 2.87% | 1.27% | 1.96% | 2.56% | 0.01% | **4.96%** | 2.53% | 0.35% | 0.27% | **7.74%** |
| | c) % of connections with good voice quality | >=95% | Live data | 96.81% | 99.05% | 98.33% | 96.30% | 98.65% | 98.38% | 97.18% | 99.73% | 99.23% | 99.09% |
| | d) d) Total No. of cells exceeding 3% TCH drop (call drop) | | Live data | 170 | 305 | 197 | 479 | 0 | 207 | 544 | 10 | 14 | 172 |
| | e) Total no. of cells (Sector) in the licensed service area | | Live data | 5928 | 24019 | 10058 | 18739 | 6202 | 4178 | 21518 | 2831 | 5365 | 2219 |
| 4 | **No. of POI's having >=0.5% POI congestion** | | | | | | | | | | | | |
| | No. of POI's having >=0.5% POI congestion | | Live data | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Name of POI not meeting the benchmark | | Live data | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Rajasthan Circle- Jan-15 month**

**TABLE: 3**

| S/N | Name of Parameter | Bench-mark | Audit Period | AIRCEL | AIRTEL | BSNL | IDEA | RCOM GSM | TATA GSM | VODAFONE | RCOM CDMA | MTS | TATA CDMA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | GSM Operators | | | | | CDMA Operators | | |
| **Network Service Quality Parameter** | | | | | | | | | | | | | |
| **1** | **Network Availability** | | | | | | | | | | | | |
| | a) Total no. of BTSs in the licensed service area | | Feb-15 | 2047 | 8102 | 4016 | 6162 | 2070 | 1389 | 7068 | 947 | 1634 | 687 |
| | 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 | 1499.25 | 3089.87 | 44443.11 | 3254.10 | 1243.22 | 1229.29 | 991.31 | 959.53 | 404.13 | 178.94 |
| | c) BTS Accumulated Downtime | <=2% | Feb-15 | 0.11% | 0.06% | 1.65% | 0.08% | 0.09% | 0.13% | 0.02% | 0.15% | 0.04% | 0.04% |
| | d) No. of BTSs having accumulated downtime of >24 hours in a month | | Feb-15 | 8 | 6 | 71 | 3 | 1 | 2 | 3 | 5 | 0 | 0 |
| | e) Worst affected BTSs due to downtime | <=2% | Feb-15 | 0.39% | 0.07% | 1.77% | 0.05% | 0.05% | 0.14% | 0.04% | 0.53% | 0.00% | 0.00% |
| **2** | **Connection Establishment (Accessibility)** | | | | | | | | | | | | |
| | a) CSSR (Call Setup Success Rate) | >=95% | Feb-15 | 97.04% | 98.41% | 98.64% | 99.22% | 99.64% | 98.27% | 99.63% | 98.97% | 99.11% | 97.24% |
| | b) SDCCH/PAGING Congestion | <=1% | Feb-15 | 0.40% | 0.28% | 0.53% | 0.37% | 0.02% | 0.10% | 0.12% | 0.00% | 0.00% | 0.00% |
| | c) TCH congestion | <=2% | Feb-15 | 0.62% | 0.59% | 1.79% | 0.42% | 0.05% | 0.12% | 0.37% | 0.01% | 0.20% | 1.93% |
| **3** | **Connection Maintenance (Retainability)** | | | | | | | | | | | | |
| | a) Call Drop Rate (CDR) | <=2% | Feb-15 | 0.81% | 0.89% | 1.34% | 0.92% | 0.35% | 0.73% | 0.71% | 0.07% | 0.34% | 0.50% |
| | b) Worst affected cells>3% TCH drop | <=3% | Feb-15 | 2.92% | 1.13% | 1.99% | 1.94% | 0.03% | 4.71% | 2.17% | 0.29% | 0.23% | 7.15% |
| | c) % of connections with good voice quality | >=95% | Feb-15 | 96.56% | 98.95% | 98.36% | 96.32% | 98.60% | 98.52% | 97.08% | 99.72% | 99.21% | 98.88% |
| | d) Total No. of cells exceeding 3% TCH drop (call drop) | | Feb-15 | 178 | 272 | 199 | 368 | 2 | 197 | 469 | 8 | 13 | 158 |
| | e) Total no. of cells (Sector) in the licensed service area | | Feb-15 | 6098 | 24203 | 10033 | 18983 | 6202 | 4178 | 21626 | 2837 | 5515 | 2213 |
| **4** | **No. of POI's having >=0.5% POI congestion** | | | | | | | | | | | | |
| | 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 |
| **5** | **Network Data** | | | | | | | | | | | | |
| | a) Equipped Capacity of Network in Erlang | | Feb-15 | 105060 | 434055 | 265400 | 263890 | 102000 | 66026 | 289831 | 116000 | 122000 | 171585 |
| | b) Total traffic in TCBH in erlang (Avg.) | | Feb-15 | 99292 | 444039 | 104662 | 195212 | 81048 | 30923 | 269441 | 39965 | 66540 | 24983 |
| | c) Total no. of customers served (as per VLR) on last day of the month | | Feb-15 | 3666850 | 16631689 | 2548657 | 7055846 | 5188805 | 575927 | 10201419 | 868370 | 1347346 | 332895 |

**TABLE: 4**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Rajasthan Circle- Feb 15 month** |

| S/N | Name of Parameter | Bench-mark | Average of 3 Days | AIRCEL | AIRTEL | BSNL | IDEA | RCOM GSM | TATA GSM | VODAFONE | RCOM CDMA | MTS | TATA CDMA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | GSM Operators | | | | | | | CDMA Operators | | |
| **Network Service Quality Parameter** |
| | **Network Availability** | | | | | | | | | | | | |
| 1 | a) Total no. of BTSs in the licensed service area | | Live data | 2035 | 8072 | 4005 | 6143 | 2070 | 1389 | 7062 | 947 | 1633 | 691 |
| | 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 | 131.61 | 359.33 | 4571.13 | 212.50 | 110.17 | 201.09 | 134.71 | 55.47 | 116.83 | 25.43 |
| | c) BTS Accumulated Downtime | <=2% | Live data | 0.09% | 0.06% | 1.59% | 0.05% | 0.07% | 0.19% | 0.03% | 0.08% | 0.10% | 0.05% |
| | d) No. of BTSs having accumulated downtime of >24 hours in a month | | Live data | 0 | 1 | 5 | 0 | 0 | 1 | 2 | 0 | 0 | 0 |
| | e) Worst affected BTSs due to downtime | <=2% | Live data | 0.00% | 0.01% | 0.12% | 0.00% | 0.00% | 0.07% | 0.03% | 0.00% | 0.00% | 0.00% |
| | **Connection Establishment (Accessibility)** | | | | | | | | | | | | |
| 2 | a) CSSR (Call Setup Success Rate) | >=95% | Live data | 97.15% | 98.72% | 98.69% | 99.37% | 99.62% | 98.33% | 99.64% | 99.32% | 99.08% | 97.83% |
| | b) SDCCH/PAGING Congestion | <=1% | Live data | 0.21% | 0.19% | 0.33% | 0.16% | 0.02% | 0.22% | 0.09% | 0.00% | 0.00% | 0.00% |
| | c) TCH congestion | <=2% | Live data | 0.50% | 0.47% | 1.83% | 0.29% | 0.05% | 0.15% | 0.36% | 0.00% | 0.25% | 1.34% |
| | **Connection Maintenance (Retainability)** | | | | | | | | | | | | |
| 3 | a) Call Drop Rate (CDR) | <=2% | Live data | 0.74% | 0.88% | 1.31% | 0.92% | 0.35% | 0.75% | 0.73% | 0.05% | 0.34% | 0.54% |
| | b) Worst affected cells>3% TCH drop | <=3% | Live data | 2.92% | 1.11% | 1.82% | 1.98% | 0.01% | 5.21% | 2.19% | 0.12% | 0.17% | 7.29% |
| | c) % of connections with good voice quality | >=95% | Live data | 96.61% | 98.97% | 98.67% | 96.34% | 98.57% | 98.46% | 97.11% | 99.72% | 99.21% | 98.86% |
| | d) d) Total No. of cells exceeding 3% TCH drop (call drop) | | Live data | 178 | 268 | 183 | 376 | 0 | 218 | 473 | 3 | 9 | 162 |
| | e) Total no. of cells (Sector) in the licensed service area | | Live data | 6077 | 24173 | 10033 | 18974 | 6202 | 4178 | 21618 | 2837 | 5452 | 2219 |
| | **No. of POI's having >=0.5% POI congestion** | | | | | | | | | | | | |
| 4 | No. of POI's having >=0.5% POI congestion | | Live data | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Name of POI not meeting the benchmark | | Live data | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**TABLE: 5**

| S/N | Name of Parameter | Bench-mark | Audit Period | AIRCEL | AIRTEL | BSNL | IDEA | RCOM GSM | TATA GSM | VODAFONE | RCOM CDMA | MTS | TATA CDMA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | GSM Operators | | | | | CDMA Operators | | |
| **Network Service Quality Parameter** | | | | | | | | | | | | | |
| 1 | **Network Availability** | | | | | | | | | | | | |
| | a) Total no. of BTSs in the licensed service area | | Mar-15 | 2086 | 8134 | 4022 | 6171 | 2065 | 1389 | 7072 | 945 | 1637 | 687 |
| | 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 | 2269.24 | 4934.98 | 46501.40 | 3398.17 | 1986.03 | 1812.13 | 2390.14 | 893.62 | 698.89 | 362.06 |
| | c) BTS Accumulated Downtime | <=2% | Mar-15 | 0.15% | 0.08% | 1.55% | 0.07% | 0.13% | 0.18% | 0.05% | 0.13% | 0.06% | 0.07% |
| | d) No. of BTSs having accumulated downtime of >24 hours in a month | | Mar-15 | 14 | 9 | 71 | 5 | 0 | 2 | 11 | 1 | 0 | 1 |
| | e) Worst affected BTSs due to downtime | <=2% | Mar-15 | 0.67% | 0.11% | 1.77% | 0.08% | 0.00% | 0.14% | 0.16% | 0.11% | 0.00% | 0.15% |
| 2 | **Connection Establishment (Accessibility)** | | | | | | | | | | | | |
| | a) CSSR (Call Setup Success Rate) | >=95% | Mar-15 | 96.88% | 98.47% | 98.67% | 98.68% | 99.62% | 98.37% | 99.68% | 98.90% | 99.15% | 98.09% |
| | b) SDCCH/PAGING Congestion | <=1% | Mar-15 | 0.35% | 0.21% | 0.53% | 0.35% | 0.02% | 0.07% | 0.19% | 0.00% | 0.00% | 0.00% |
| | c) TCH congestion | <=2% | Mar-15 | 0.71% | 0.58% | 1.64% | 0.94% | 0.05% | 0.10% | 0.32% | 0.01% | 0.14% | 1.08% |
| 3 | **Connection Maintenance (Retainability)** | | | | | | | | | | | | |
| | a) Call Drop Rate (CDR) | <=2% | Mar-15 | 0.84% | 0.86% | 1.36% | 0.97% | 0.32% | 0.74% | 0.73% | 0.09% | 0.34% | 0.48% |
| | b) Worst affected cells>3% TCH drop | <=3% | Mar-15 | **3.55%** | 1.09% | 2.01% | 1.95% | 0.01% | **4.70%** | 2.38% | 0.44% | 0.22% | **7.61%** |
| | c) % of connections with good voice quality | >=95% | Mar-15 | 96.55% | 98.95% | 98.48% | 96.06% | 98.61% | 98.84% | 96.96% | 99.72% | 99.19% | 98.87% |
| | d) Total No. of cells exceeding 3% TCH drop (call drop) | | Mar-15 | 220 | 265 | 202 | 370 | 1 | 196 | 515 | 12 | 13 | 168 |
| | e) Total no. of cells (Sector) in the licensed service area | | Mar-15 | 6186 | 24321 | 10043 | 19041 | 6187 | 4178 | 21643 | 2831 | 5570 | 2207 |
| 4 | **No. of POI's having >=0.5% POI congestion** | | | | | | | | | | | | |
| | 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 | **Network Data** | | | | | | | | | | | | |
| | a) Equipped Capacity of Network in Erlang | | Mar-15 | 108208 | 441966 | 265400 | 271202 | 102000 | 66026 | 300246 | 116000 | 122000 | 170601 |
| | b) Total traffic in TCBH in erlang (Avg.) | | Mar-15 | 99748 | 437541 | 101539 | 196021 | 77284 | 30570 | 273314 | 38179 | 64132 | 24018 |
| | c) Total no. of customers served (as per VLR) on last day of the month | | Mar-15 | 3637866 | 17748946 | 2533452 | 7164426 | 5164904 | 563983 | 10201419 | 854770 | 1342437 | 325185 |

**TABLE: 6**

| S/N | Name of Parameter | Bench-mark | Average of 3 Days | AIRCEL | AIRTEL | BSNL | IDEA | RCOM GSM | TATA GSM | VODAFONE | RCOM CDMA | MTS | TATA CDMA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | GSM Operators | | | | | CDMA Operators | | |
| **Network Service Quality Parameter** | | | | | | | | | | | | | |
| 1 | **Network Availability** | | | | | | | | | | | | |
| | a) Total no. of BTSs in the licensed service area | | Live data | 2071 | 8118 | 4016 | 6169 | 2065 | 1389 | 7069 | 945 | 1634 | 687 |
| | 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 | 229.83 | 339.22 | 4186.05 | 209.50 | 99.92 | 149.66 | 318.39 | 40.47 | 37.19 | 31.22 |
| | c) BTS Accumulated Downtime | <=2% | Live data | 0.15% | 0.06% | 1.45% | 0.05% | 0.07% | 0.15% | 0.06% | 0.06% | 0.03% | 0.06% |
| | d) No. of BTSs having accumulated downtime of >24 hours in a month | | Live data | 0 | 1 | 5 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| | e) Worst affected BTSs due to downtime | <=2% | Live data | 0.00% | 0.01% | 0.12% | 0.00% | 0.00% | 0.07% | 0.01% | 0.00% | 0.00% | 0.00% |
| 2 | **Connection Establishment (Accessibility)** | | | | | | | | | | | | |
| | a) CSSR (Call Setup Success Rate) | >=95% | Live data | 97.00% | 98.62% | 98.72% | 99.14% | 99.55% | 98.45% | 99.70% | 99.00% | 99.11% | 97.47% |
| | b) SDCCH/PAGING Congestion | <=1% | Live data | 0.26% | 0.13% | 0.57% | 0.26% | 0.01% | 0.05% | 0.08% | 0.00% | 0.00% | 0.00% |
| | c) TCH congestion | <=2% | Live data | 0.58% | 0.56% | 1.75% | 0.45% | 0.05% | 0.09% | 0.30% | 0.01% | 0.15% | 1.70% |
| 3 | **Connection Maintenance (Retainability)** | | | | | | | | | | | | |
| | a) Call Drop Rate (CDR) | <=2% | Live data | 0.82% | 0.87% | 1.40% | 1.04% | 0.32% | 0.68% | 0.75% | 0.09% | 0.34% | 0.48% |
| | b) Worst affected cells>3% TCH drop | <=3% | Live data | **3.29%** | 1.09% | 1.99% | 2.06% | 0.01% | **3.95%** | 2.62% | 0.48% | 0.19% | **7.25%** |
| | c) % of connections with good voice quality | >=95% | Live data | 96.64% | 98.97% | 98.33% | 95.88% | 98.61% | 98.90% | 96.93% | 99.73% | 99.20% | 98.87% |
| | d) Total No. of cells exceeding 3% TCH drop (call drop) | | Live data | 203 | 265 | 200 | 392 | 1 | 165 | 566 | 14 | 11 | 160 |
| | e) Total no. of cells (Sector) in the licensed service area | | Live data | 6175 | 24309 | 10043 | 19051 | 6187 | 4178 | 21643 | 2831 | 5554 | 2207 |
| 4 | **No. of POI's having >=0.5% POI congestion** | | | | | | | | | | | | |
| | No. of POI's having >=0.5% POI congestion | | Live data | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 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 AUDITED DATA FOR CELLULAR MOBILE TELEPHONE SERVICES | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Quarterly CSD Audit Data** | **Bench-mark** | **Circle Name** | **AIRCEL** | **AIRTEL** | **BSNL** | **IDEA** | **RCOM (GSM)** | **TATA (GSM)** | **VODAFONE** | **MTS** | **RCOM (CDMA)** | **TATA (CDMA)** |
| **S/N** / **Name of Parameter** | | | GSM Operators | | | | | | | CDMA Operators | | |
| **1** Metering & Billing Credibility -Post Paid | | | | | | | | | | | | |
| A) No. of bills issued during the quarter | | RAJ | 151818 | 926994 | 393510 | 316947 | 112940 | NA | 1583142 | 220569 | 166410 | 112082 |
| B) No. of bills disputed including billing complaints during the quarter | | RAJ | 2 | 136 | 165 | 170 | 95 | NA | 1121 | 144 | 135 | 0 |
| C)% of billing complaints during the quarter | <= 0.1% | RAJ | **0.001%** | **0.01%** | **0.04%** | **0.05%** | **0.08%** | **NA** | **0.07%** | **0.07%** | **0.08%** | **0.00%** |
| **2** Metering & Billing Credibility -Pre Paid | | | | | | | | | | | | |
| A) Total No. of Pre-paid customers at the end of the quarter | | RAJ | 5672823 | 17097537 | 3061164 | 6834594 | 5495960 | 806206 | 10686522 | 2125141 | 892962 | 587671 |
| B) Total No. of complaints relating to charging, Credit and Validity during the quarter | | RAJ | 21 | 81 | 1451 | 4136 | 4859 | 0 | 9105 | 636 | 659 | 0 |
| C) % of Pre-paid Charging Complaints | <= 0.1% | RAJ | **0.00%** | **0.00%** | **0.05%** | **0.06%** | **0.09%** | **0.00%** | **0.09%** | **0.03%** | **0.07%** | **0.00%** |
| **3** Resolution of Billing/Charging Complaints and Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints | | | | | | | | | | | | |
| A) No. of Billing/Charging/Credit/Validity Complaints received during the quarter | | RAJ | 23 | 217 | 1616 | 8355 | 4954 | 48 | 10226 | 780 | 794 | 70 |
| B) No. of billing complaints for Post paid customers/Charging/Credit/Validity complaints for pre-paid customers resolved within 4 weeks during the quarter | | RAJ | 23 | 217 | 1616 | 8355 | 4954 | 48 | 10226 | 780 | 794 | 70 |

| | **Quarterly CSD Audit Data** | **Bench-mark** | **Circle Name** | **AIRCEL** | **AIRTEL** | **BSNL** | **IDEA** | **RCOM (GSM)** | **TATA (GSM)** | **VODAFONE** | **MTS** | **RCOM (CDMA)** | **TATA (CDMA)** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | GSM Operators | | | | | CDMA Operators | |
| **S/N** | **Name of Parameter** | | | | | | | | | | | | |
| | C) No. of billing complaints for Post paid customers/Charging/Credit/Validity complaints for pre-paid customers resolved within 6 weeks during the quarter | | *RAJ* | 23 | 217 | 1616 | 8355 | 4954 | 48 | 10226 | 780 | 794 | 70 |
| | D) % of billing complaints (for post paid customer) / Charging/Credit/Validity (for Pre paid customer) resolved within 4 weeks | *>=98% within 4 weeks* | *RAJ* | 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* | *RAJ* | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |
| | F) % of Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints | *<=1 week* | *RAJ* | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |
| | **Response time to customers for assistance** | | | | | | | | | | | | |
| | A) Total no of calls attempted to customer care/Call center | | *RAJ* | 24890957 | 5168041 | 261934 | 22902151 | 15242042 | 143290 | 20726811 | 5897944 | 2186299 | 79234 |
| | B) Total no. of calls successfully established to customer care/Call center. | | *RAJ* | 21176565 | 5167823 | 259317 | 22722699 | 15079640 | 141115 | 20726811 | 5851598 | 2159982 | 77923 |
| **4** | C) % Accessibility of Call centre /customer Care (Total calls successfully established *100/ Total call attempts) | *>=95%* | *RAJ* | 85.08% | 100.00% | 99.00% | 99.22% | 98.93% | 98.48% | 100.00% | 99.21% | 98.80% | 98.35% |
| | D) Total Calls reached to operator for Voice to Voice (Total call attempts) | | *RAJ* | 4611908 | 8721842 | 147363 | 6730050 | 861844 | 154252 | 7006539 | 2479482 | 125766 | 118460 |
| | E) Total number of calls answered by the operator (Voice to voice) within 90 seconds | | *RAJ* | 3891419 | 8189719 | 133003 | 6610116 | 847060 | 147723 | 6426035 | 2455046 | 123776 | 116368 |

**QUARTERLY CSD AUDITED DATA FOR CELLULAR MOBILE TELEPHONE SERVICES**

| S/N | Quarterly CSD Audit Data / Name of Parameter | Bench-mark | Circle Name | AIRCEL | AIRTEL | BSNL | IDEA | RCOM (GSM) | TATA (GSM) | VODAFONE | MTS | RCOM (CDMA) | TATA (CDMA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | GSM Operators | | | | | CDMA Operators | | |
| | F) % age of calls answered by operator (voice to voice) (Total calls successfully established within 90 Sec.*100 / Total call attempts ) | >=95% | RAJ | 84.38% | 93.90% | 90.26% | 98.22% | 98.28% | 95.77% | 91.71% | 99.01% | 98.42% | 98.23% |
| | **Termination/closure of service** | | | | | | | | | | | | |
| 5 | A) Total No. of requests for Termination / Closure of service received during the quarter | | RAJ | 1095 | 1872 | 3904 | 2756 | 1041 | NA | 7647 | 4339 | 1028 | 1284 |
| | B) No. of requests for Termination / Closure of service complied within 7 days during the quarter | | RAJ | 1095 | 1872 | 3904 | 2744 | 1041 | NA | 7647 | 4339 | 1028 | 1284 |
| | C) % of Termination/ Closure of service within 7 days | <=7days | RAJ | 100.00% | 100.00% | 100.00% | 99.56% | 100.00% | NA | 100.00% | 100.00% | 100.00% | 100.00% |
| | **Time taken for refunds of deposits after closures.** | | | | | | | | | | | | |
| 6 | A) No. of Payments/ Refunds due during the quarter | | RAJ | 702 | 1215 | 944 | 1669 | 807 | NA | 20527 | 141 | 935 | 538 |
| | B) No. of Payments/ Refunds Cleared during the quarter | | RAJ | 702 | 1215 | 944 | 1669 | 807 | NA | 19732 | 141 | 935 | 536 |
| | C) Time taken for refunds of deposits after closures. | 100% within 60 days | RAJ | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | NA | 96.13% | 100.00% | 100.00% | 99.63% |

NA: Not Applicable as Tata (GSM) has no post-paid connections.

## 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-MARCH 15 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **3 days live CSD Audit Data** | | **Bench-mark** | **Circle Name** | **AIRCEL** | **AIRTEL** | **BSNL** | **IDEA** | **RCOM (GSM)** | **TATA (GSM)** | **VODAFONE** | **MTS** | **RCOM (CDMA)** | **TATA (CDMA)** |
| **S/N** | **Name of Parameter** | | | GSM Operators | | | | | | | CDMA Operators | | |
| **RESPONSE TIME TO CUSTOMERS FOR ASSISTANCE** | | | | | | | | | | | | | |
| 1 | Total no of calls attempted to customer care/Call center | | Rajasthan | 683092 | 168684 | 8059 | 817437 | 240848 | 4203 | 677439 | 199495 | 47951 | 3625 |
| | Total no. of calls successfully established to customer care/Call center | | Rajasthan | 672810 | 168684 | 7703 | 810381 | 237562 | 4191 | 677439 | 197987 | 46781 | 3611 |
| | % Accessibility of Call centre /customer Care (Total call successfully established *100 / Total call attempt) | >=95% | Rajasthan | 98.49% | 100.00% | 95.58% | 99.14% | 98.64% | 99.71% | 100.00% | 99.24% | 97.56% | 99.61% |
| | Total Calls reached to Operator for Voice to Voice (Total call attempts) | | Rajasthan | 152726 | 297419 | 5251 | 234236 | 34360 | 4164 | 242942 | 80992 | 5586 | 3572 |
| | Total number of calls answered by the operator (Voice to voice) within 90 seconds | | Rajasthan | 149783 | 276664 | 5089 | 227453 | 34294 | 4146 | 233250 | 80067 | 5561 | 3558 |
| | % age of calls answered by operator(voice to voice) (Total call successfully established within 90 Sec.*100 / Total call attempts) | >=95% | Rajasthan | 98.07% | 93.02% | 96.91% | 97.10% | 99.81% | 99.57% | 96.01% | 98.86% | 99.55% | 99.61% |

## KEY FINDINGS: CUSTOMER SERVICE DELIVERY 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 <=0.1 % for all the operators.

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

> i. *Resolution of billing /charging complaints ( >=98% within 4 weeks and 100% within 6 weeks)*
>
> 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 % refund in one week.**

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

> i. Accessibility of call centre/customer care (>95%)
> ii. Percentage of calls answered by Operators (Voice to Voice) (>95%)

All service providers are in compliance with respect to the parameter accessibility of call center except **Aircel with its achieved value as 85.08%.**

Regarding Calls answered by operator (Voice to Voice), **Aircel, Airtel, BSNL and Vodafone** have not met the benchmark of >95% with their performed level as **84.38%, 93.90%, 90.26% and 91.71%** respectively**.**

### 4. *Termination/Closure of Service*

In case of this parameters also, all service providers (**except Idea**) have settled the closure/termination within the benchmark of 7 days. **Idea** remained short of benchmark with its performance as **99.56%.**

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

All operators (**except Vodafone and Tata CDMA)** were found to have complied with the benchmark of 100% refund of deposits within 60 days of closure. The performance of **Vodafone and Tata CDMA** remained **96.13% and 99.63%** respectively.

### *Live Measurements:*

The results of three days live measurements reveal that all **operators have met the benchmarks** for the parameter Accessibility of Call Center.
Regarding calls answered by operator (Voice to voice) within 90 seconds, **Airtel** remained **non-complied** with its performance as **93.02%**.

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# 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 Rajasthan service area during the time 1100 to 1400 Hrs and 1600 to 1900 was carried out by TUV auditors. The test calls were made from one operator to another within the same licensed area to judge the ease of connectivity amongst the operators. While doing this exercise, the radio part, the switch part and POI in between the two operators are involved. Congestion in any of these network elements could result in congestion in the network.

| INTER OPERATOR CALL ASSESSMENT BASED ON LIVE MEASUREMENT | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Calling Operators | Circle Name | AIRCEL | AIRTEL | BSNL | IDEA | RCOM (GSM) | TATA (GSM) | VODAFONE | MTS | RCOM (CDMA) | TATA (CDMA) |
| AIRCEL | *Rajasthan* | -- | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| AIRTEL | *Rajasthan* | 100% | -- | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| BSNL | *Rajasthan* | 100% | 100% | -- | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| IDEA | *Rajasthan* | 100% | 100% | 100% | -- | 100% | 100% | 100% | 100% | 100% | 100% |
| RCOM (GSM) | *Rajasthan* | 100% | 100% | 100% | 100% | -- | 100% | 100% | 100% | 100% | 100% |
| TATA (GSM) | *Rajasthan* | 100% | 100% | 100% | 100% | 100% | -- | 100% | 100% | 100% | 100% |
| VODAFONE | *Rajasthan* | 100% | 100% | 100% | 100% | 100% | 100% | -- | 100% | 100% | 100% |
| MTS | *Rajasthan* | 100% | 100% | 100% | 100% | 100% | 100% | 100% | -- | 100% | 100% |
| RCOM (CDMA) | *Rajasthan* | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | -- | 100% |
| TATA (CDMA) | *Rajasthan* | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | -- |

The result of the testing revealed that the inter connection performance among the operators was quite satisfactory. Thus there was no remarkable problem in interconnection from one operator to other operators.

## 6.2 CUSTOMER CARE / HELPLINE ASSESSMENT:

| LIVE CALLING TO CALL CENTRE | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | Circle Name | AIRCEL | AIRTEL | BSNL | IDEA | RCOM (GSM) | TATA (GSM) | VODAFONE | MTS | RCOM (CDMA) | TATA (CDMA) |
| Total No. of calls Attempted | Rajasthan | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Total no of calls attempted to customer care/Call center | Rajasthan | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Total no. of calls successfully established to customer care/Call center | Rajasthan | 100 | 100 | 98 | 98 | 99 | 99 | 100 | 99 | 98 | 99 |
| % Accessibility of Call centre /customer Care (Total call successfully established *100 / Total call attempt) | Rajasthan | 100.00% | 100.00% | 98.00% | 98.00% | 99.00% | 99.00% | 100.00% | 99.00% | 98.00% | 99.00% |
| Total Calls reached to agent desk for Voice to Voice (Total call attempt) | Rajasthan | 100 | 100 | 98 | 98 | 99 | 99 | 100 | 99 | 98 | 99 |
| Total number of calls answered by the operator (Voice to voice) within 90 seconds | Rajasthan | 100 | 100 | 96 | 97 | 98 | 98 | 100 | 99 | 96 | 98 |
| % age of calls answered by operator(voice to voice) (Total call successfully established within 90 Sec.*100 / Total call attempt) | Rajasthan | 100.00% | 100.00% | 97.96% | 98.98% | 98.99% | 98.99% | 100.00% | 100.00% | 97.96% | 98.99% |

In case of calls answered by operators (voice to voice) within 90 seconds when test calls were made to the call centers, 100% calls were connected to the Operator within 90 seconds except for BSNL, Idea, RCOM GSM , Tata GSM,  RCOM CDMA and Tata (CDMA), the calls answered by operators were  97.96%, 98.98%, 98.99%, 97.96% and 98.99% respectively.

## 6.3 LIVE CALLING ASSESSMENT FOR BILLING COMPLIANTS:

| TELEPHONIC INTERVIEW FOR BILLING COMPLAINTS | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | Circle Name | AIRCEL | AIRTEL | BSNL | IDEA | RCOM (GSM) | TATA (GSM) | VODAFONE | MTS | RCOM (CDMA) | TATA (CDMA) |
| Total No. of calls Attempted | Rajasthan | 23 | 117 | 116 | 155 | 154 | 48 | 126 | 140 | 134 | 70 |
| Total No. of calls Answered | Rajasthan | 23 | 100 | 100 | 100 | 100 | 48 | 100 | 100 | 100 | 70 |
| Cases resolved within 4 weeks | Rajasthan | 23 | 100 | 100 | 100 | 100 | 48 | 100 | 100 | 100 | 70 |
| %age of cases resolved | Rajasthan | 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. However, most of the customers reported their satisfaction on resolution of the billing complaints

## 6.4 LEVEL -1 CALLING ASSESSMENT:

| Emergency no. | Circle Name | SSA Name | Name of SDCA | No. of calls made | AIRCEL | AIRTEL | BSNL | IDEA | RCOM GSM | RCOM CDMA | TATA GSM | TATA CDMA | MTS | VODAFONE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | LEVEL 1 LIVE CALLING | | | | | | | | | | |
| 100, 101,102 108 | Rajasthan | Alwar | RAMGARH | 8 | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| | | | ALWAR | 8 | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| | | | BEHROR | 8 | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| | | | BANSUR | 8 | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| | | | MUNDAWAR | 8 | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| | | | KISHANGARH | 8 | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| | | | KHAIRTHAL | 8 | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| | | | TIJARA | 8 | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| | | | BHIWADI | 8 | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| 100, 101,102 108 | Rajasthan | Banswara | AASPUR | 8 | √ | √ | √ | √ | NC | NC | √ | √ | √ | √ |
| | | | BANSWARA | 8 | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| | | | BAGIDORA | 8 | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| | | | SAGWARA | 8 | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| | | | DUNGARPUR | 8 | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| | | | GARHI | 8 | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| | | | GHATOL | 8 | √ | √ | √ | √ | NC | NC | √ | √ | √ | √ |
| | | | KUSHAL GARH | 8 | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| 100, 101,102 108 | Rajasthan | Bharatpur | BHARATPUR | 8 | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| | | | DEEG | 8 | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| | | | KAMAN | 8 | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| | | | NADBAI | 8 | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| | | | DHAULPUR | 8 | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| | | | BARI | 8 | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| | | | BASERI | 8 | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| | | | RUPBAS | 8 | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| | | | BAYANA | 8 | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |

NC: No Coverage

To assess the availability and efficiency of level 1 services such as police, fire, ambulance (emergency services) offered by various mobile service providers in the SDCAs of the three SSAs where drive tests were conducted, the calls were made from mobile phones provided by the service providers during the drive test. In these SSA of Rajasthan service areas, the emergency services as mentioned in the above table were found functional in the networks of all the service providers except at **Aaspur and Ghatol** where there was no coverage of **RCOM (GSM) / RCOM (CDMA).**

# 7. DRIVE TEST

## 7. OPERATOR ASSESTID DRIVE TEST

In terms of TRAI's letter dated 21st January, 2014, the drive tests were conducted for three consecutive days in one select SSA each month in each service area. Thus, the drive tests were carried out in three SSA's namely **Alwar, Banswara and Bharatpur** in the months of January, February and March 2015 respectively .The total route Kms covered during the drive tests in the respective SSAs was **386Kms, 354Kms and 400Kms**. The performance of the operators has been highlighted below in the tables. The drive test was conducted simultaneously for all the operators following the same route of drive tests. The holding period for all test calls was 120 seconds. The drive test vehicle across all routes plied at a speed of about 30-50 km per hour.


For measuring voice quality, Rx Qual samples on a scale from 0 to 7 for GSM operators and Frame Error Rate (FERs) for CDMA service providers were measured. As per the QoS norms, Rx Qual between 0- 5 for GSM operators and between 0-4% FER value for CDMA operators FERs is considered to be good, where as Rx Qual beyond this benchmark is considered to be bad. Call drops were measured by the number of calls that were dropped to the total number of calls established during the drive test. Similarly CSSR was measured as the ratio of total calls established to the total call attempts made. Signal strength was measured in dBm at street level with strength $\geq$ -75 dBm for in-door coverage and $\geq$ -85 dBm for in-vehicle.
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## DRIVE TEST TABLE – 1

## OPERATOR ASSISTED DRIVE TEST AT ALWAR SSA IN JANUARY 15 MONTH- RAJASTHAN CIRCLE

| S/N | Parameter | Classification of route covered | AIRCEL OUTDOOR | AIRCEL INDOOR | AIRTEL OUTDOOR | AIRTEL INDOOR | BSNL OUTDOOR | BSNL INDOOR | IDEA OUTDOOR | IDEA INDOOR | TATA GSM OUTDOOR | TATA GSM INDOOR | RCOM GSM OUTDOOR | RCOM GSM INDOOR | VODAFONE OUTDOOR | VODAFONE INDOOR | MTS CDMA OUTDOOR | MTS CDMA INDOOR | RCOM CDMA OUTDOOR | RCOM CDMA INDOOR | TATA CDMA OUTDOOR | TATA CDMA INDOOR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Call Attempts | Major Roads | 40 | 30 | 45 | 30 | 143 | 25 | 41 | 30 | 31 | 30 | 47 | 30 | 49 | 30 | 42 | 30 | 47 | 30 | 37 | 31 |
| | | Highways | 140 | 30 | 222 | 30 | 179 | 25 | 111 | 30 | 66 | 30 | 145 | 30 | 174 | 30 | 154 | 30 | 179 | 30 | 89 | 30 |
| | | Within City | 286 | 30 | 292 | 30 | 141 | 25 | 208 | 30 | 195 | 31 | 317 | 33 | 284 | 30 | 236 | 30 | 333 | 30 | 240 | 30 |
| | | **Overall SSA** | **466** | **90** | **559** | **90** | **463** | **75** | **360** | **90** | **292** | **91** | **509** | **93** | **507** | **90** | **432** | **90** | **559** | **90** | **366** | **91** |
| 2 | Blocked Call Rate | Major Roads | 0.00% | 0.00% | 0.00% | 0.00% | 4.20% | 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% |
| | | Highways | 0.00% | 0.00% | 0.00% | 0.00% | 2.79% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 1.38% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| | | Within City | 0.00% | 0.00% | 0.00% | 0.00% | 2.13% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.95% | 0.00% | 0.35% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| | | **Overall SSA** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **3.02%** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **0.98%** | **0.00%** | **0.20%** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **0.00%** |
| 3 | Dropped Call Rate (<=2%) | Major Roads | 0.00% | 0.00% | 0.00% | 0.00% | 2.88% | 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% |
| | | Highways | 0.00% | 0.00% | 0.00% | 0.00% | 2.86% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.70% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.56% | 0.00% | 0.00% | 0.00% |
| | | Within City | 0.00% | 0.00% | 0.00% | 0.00% | 1.44% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.32% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.90% | 0.00% | 0.83% | 0.00% |
| | | **Overall SSA** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **2.43%** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **0.40%** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **0.72%** | **0.00%** | **0.55%** | **0.00%** |
| 4 | **Percentage connections with good voice quality (=>95%)** | | | | | | | | | | | | | | | | | | | | | |
| | (a) 0-4 (w/o frequency hopping for CDMA) | Major Roads | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 98.66% | 99.54% | 99.85% | 99.98% | 98.58% | 99.72% |
| | | Highways | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 99.61% | 99.05% | 99.54% | 100% | 98.46% | 99.94% |
| | | Within City | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 99.28% | 94.37% | 99.77% | 100% | 98.92% | 99.65% |

| S/N | Parameter | Classification of route covered | AIRCEL | | AIRTEL | | BSNL | | IDEA | | TATA GSM | | RCOM GSM | | VODAFONE | | MTS CDMA | | RCOM CDMA | | TATA CDMA | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR |
| | Operators) | Overall SSA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 99.34% | 97.65% | 99.71% | 99.99% | 98.77% | 99.77% |
| | (b) 0-5 ( with frequency hopping for GSM Operators) | Major Roads | 95.46% | 99.30% | 97.40% | 97.58% | 90.09% | 95.31% | 96.22% | 96.95% | 95.52% | 99.42% | 95.51% | 96.78% | 95.25% | 98.17% | NA | NA | NA | NA | NA | NA |
| | | Highways | 95.59% | 97.03% | 98.18% | 98.90% | 91.25% | 99.48% | 97.08% | 99.05% | 97.74% | 99.48% | 97.36% | 98.39% | 95.66% | 95.18% | NA | NA | NA | NA | NA | NA |
| | | Within City | 96.76% | 95.83% | 97.87% | 97.10% | 94.35% | 98.79% | 97.22% | 99.18% | 97.60% | 95.98% | 96.59% | 100% | 95.79% | 99.07% | NA | NA | NA | NA | NA | NA |
| | | Overall SSA | 96.33% | 97.42% | 97.95% | 97.88% | 91.95% | 97.68% | 97.08% | 98.43% | 97.41% | 98.28% | 96.70% | 98.41% | 95.69% | 97.47% | NA | NA | NA | NA | NA | NA |
| 5 | Service Coverage | | | | | | | | | | | | | | | | | | | | | |
| | In door (>= - 75dBm) | Major Roads | 59.80% | 32.20% | 96.23% | 100% | 42.46% | 92.71% | 88.01% | 99.00% | 42.20% | 8.30% | 81.36% | 97.96% | 86.79% | 88.83% | 79.61% | 64.38% | 82.65% | 97.13% | 66.88% | 21.38% |
| | | Highways | 32.34% | 62.60% | 96.49% | 100% | 44.09% | 88.80% | 63.60% | 99.95% | 24.12% | 99.70% | 56.82% | 99.97% | 72.90% | 100% | 58.16% | 100% | 57.80% | 100% | 45.27% | 90.54% |
| | | Within City | 44.14% | 40.80% | 94.93% | 99.98% | 59.96% | 88.83% | 73.27% | 99.09% | 39.38% | 63.70% | 80.41% | 61.34% | 76.91% | 99.89% | 80.48% | 100% | 84.77% | 99.96% | 77.17% | 95.34% |
| | | Overall SSA | 42.46% | 45.33% | 95.62% | 99.99% | 48.85% | 90.27% | 71.76% | 99.34% | 36.28% | 56.37% | 73.94% | 85.94% | 76.49% | 96.26% | 72.60% | 88.18% | 76.86% | 98.68% | 68.12% | 67.95% |
| | In-vehicle (>= - 85dBm) | Major Roads | 90.00% | 99.20% | 99.87% | 100% | 82.28% | 100% | 99.74% | 100% | 90.50% | 82.10% | 97.41% | 100% | 99.58% | 99.94% | 97.92% | 100% | 96.26% | 100% | 98.52% | 100% |
| | | Highways | 68.50% | 99.80% | 99.85% | 100% | 83.65% | 100% | 95.26% | 100% | 70.28% | 100% | 86.10% | 100% | 94.64% | 100% | 95.28% | 100% | 75.50% | 100% | 87.17% | 100% |
| | | Within City | 83.18% | 98.80% | 99.40% | 100% | 90.87% | 100% | 97.86% | 100% | 85.93% | 93.10% | 95.64% | 97.11% | 97.98% | 100% | 99.18% | 100% | 93.66% | 100% | 98.33% | 98.99% |
| | | Overall SSA | 79.93% | 99.28% | 99.60% | 100% | 85.63% | 100% | 97.25% | 100% | 82.92% | 91.57% | 93.15% | 99.00% | 97.01% | 99.98% | 97.70% | 100% | 88.83% | 100% | 95.55% | 99.68% |
| | Outdoor-in city (>= - 95dBm) | Major Roads | 99.70% | 100% | 100% | 100% | 93.43% | 100% | 100% | 100% | 99.90% | 99.90% | 100% | 100% | 99.98% | 100% | 100% | 100% | 99.89% | 100% | 99.91% | 100% |
| | | Highways | 95.36% | 100% | 100% | 100% | 94.54% | 100% | 99.95% | 100% | 98.20% | 100% | 98.98% | 100% | 99.72% | 100% | 100% | 100% | 97.17% | 100% | 99.55% | 100% |
| | | Within City | 98.34% | 100% | 100% | 100% | 97.77% | 100% | 99.98% | 100% | 99.35% | 99.90% | 99.68% | 100% | 99.87% | 100% | 100% | 100% | 99.63% | 100% | 99.97% | 100% |
| | | Overall SSA | 97.68% | 100% | 100% | 100% | 95.29% | 100% | 99.98% | 100% | 99.15% | 99.93% | 99.51% | 100% | 99.83% | 100% | 100% | 100% | 98.97% | 100% | 99.86% | 100% |
| 6 | Call Setup Success | Major Roads | 100% | 100% | 100% | 100% | 95.80% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |

| S/N | Parameter | Classification of route covered | AIRCEL | | AIRTEL | | BSNL | | IDEA | | TATA GSM | | RCOM GSM | | VODAFONE | | MTS CDMA | | RCOM CDMA | | TATA CDMA | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR |
| | Rate (>=95%) | Highways | 100% | 100% | 100% | 100% | 97.21% | 100% | 100% | 100% | 100% | 100% | 98.62% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| | | Within City | 100% | 100% | 100% | 100% | 97.87% | 100% | 100% | 100% | 100% | 100% | 99.05% | 100% | 99.65% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| | | **Overall SSA** | **100%** | **100%** | **100%** | **100%** | **96.98%** | **100%** | **100%** | **100%** | **100%** | **100%** | **99.02%** | **100%** | **99.80%** | **100%** | **100%** | **100%** | **100%** | **100%** | **100%** | **100%** |
| 7 | Hand Over Success Rate (HOSR) | Major Roads | 100% | 100% | 100% | 100% | 98.60% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| | | Highways | 100% | 100% | 100% | 100% | 97.78% | 100% | 100% | 100% | 100% | 100% | 98.92% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| | | Within City | 100% | 100% | 100% | 100% | 97.97% | 100% | 100% | 100% | 100% | 100% | 100% | 98.78% | 99.75% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| | | **Overall SSA** | **100%** | **100%** | **100%** | **100%** | **98.09%** | **100%** | **100%** | **100%** | **100%** | **100%** | **99.70%** | **99.09%** | **99.87%** | **100%** | **100%** | **100%** | **100%** | **100%** | **100%** | **100%** |

NA: Not Applicable

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

## DRIVE TEST TABLE – 2

### OPERATOR ASSISTED DRIVE TEST AT BANSWARA SSA IN FEBRUARY 15 MONTH- RAJASTHAN CIRCLE

| S/N | Parameter | Classification of route covered | AIRCEL OUTDOOR | AIRCEL INDOOR | AIRTEL OUTDOOR | AIRTEL INDOOR | BSNL OUTDOOR | BSNL INDOOR | IDEA OUTDOOR | IDEA INDOOR | TATA GSM OUTDOOR | TATA GSM INDOOR | RCOM GSM OUTDOOR | RCOM GSM INDOOR | VODAFONE OUTDOOR | VODAFONE INDOOR | MTS CDMA OUTDOOR | MTS CDMA INDOOR | RCOM CDMA OUTDOOR | RCOM CDMA INDOOR | TATA CDMA OUTDOOR | TATA CDMA INDOOR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Call Attempts | Major Roads | NA | 30 | NA | 30 | NA | 33 | NA | 32 | NA | 34 | NA | 30 | NA | 30 | NA | 30 | NA | 30 | NA | 30 |
| | | Highways | 121 | 30 | 217 | 30 | 179 | 40 | 164 | 32 | 68 | 31 | 144 | 30 | 204 | 30 | 109 | 30 | 141 | 30 | 123 | 30 |
| | | Within City | 197 | 30 | 243 | 30 | 279 | 38 | 269 | 33 | 134 | 30 | 204 | 30 | 204 | 30 | 217 | 30 | 109 | 30 | 135 | 30 |
| | | **Overall SSA** | **318** | **90** | **460** | **90** | **458** | **111** | **433** | **97** | **202** | **95** | **348** | **90** | **408** | **90** | **326** | **90** | **250** | **90** | **258** | **90** |
| 2 | Blocked Call Rate | Major Roads | NA | 0.00% | NA | 0.00% | NA | 3.03% | NA | 0.00% | NA | 0.00% | NA | 0.00% | NA | 0.00% | NA | 0.00% | NA | 0.00% | NA | 0.00% |
| | | Highways | 0.00% | 0.00% | 0.00% | 0.00% | 6.15% | 0.00% | 0.61% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| | | Within City | 0.00% | 0.00% | 0.00% | 0.00% | 5.73% | 0.00% | 0.37% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| | | **Overall SSA** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **5.90%** | **0.90%** | **0.46%** | **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%** |
| 3 | Dropped Call Rate (<=2%) | Major Roads | NA | 0.00% | NA | 0.00% | NA | 0.00% | NA | 0.00% | NA | 0.00% | NA | 0.00% | NA | 0.00% | NA | 0.00% | NA | 0.00% | NA | 0.00% |
| | | Highways | 0.00% | 0.00% | 0.00% | 0.00% | 10.98% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.71% | 0.00% | 0.00% | 0.00% |
| | | Within City | 0.00% | 0.00% | 0.00% | 0.00% | 2.43% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.92% | 0.00% | 0.74% | 0.00% |
| | | **Overall SSA** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **5.84%** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **0.80%** | **0.00%** | **0.39%** | **0.00%** |
| 4 | Percentage connections with good voice quality (=>95%) | | | | | | | | | | | | | | | | | | | | | |
| | (a) 0-4 (w/o frequency hopping for CDMA | Major Roads | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 99.87% | NA | 100% | NA | 99.94% |
| | | Highways | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 99.44% | 99.74% | 99.72% | 99.96% | 99.05% | 99.92% |
| | | Within City | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 99.69% | 100% | 99.98% | 100% | 99.84% | 100% |

| S/N | Parameter | Classification of route covered | AIRCEL | | AIRTEL | | BSNL | | IDEA | | TATA GSM | | RCOM GSM | | VODAFONE | | MTS CDMA | | RCOM CDMA | | TATA CDMA | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR |
| | Operators) | Overall SSA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 99.61% | 99.88% | 99.83% | 99.99% | 99.46% | 99.95% |
| | (b) 0-5 ( with frequency hopping for GSM Operators) | Major Roads | NA | 99.34% | NA | 98.33% | NA | 84.60% | NA | 99.22% | NA | 99.50% | NA | 100% | NA | 99.25% | NA | NA | NA | NA | NA | NA |
| | | Highways | 95.83% | 99.12% | 97.06% | 98.68% | 87.94% | 90.09% | 97.06% | 99.93% | 98.69% | 99.70% | 96.93% | 99.70% | 95.91% | 98.97% | NA | NA | NA | NA | NA | NA |
| | | Within City | 97.82% | 99.22% | 97.16% | 97.14% | 95.78% | 99.20% | 98.14% | 99.97% | 98.15% | 99.82% | 98.78% | 99.75% | 96.68% | 99.04% | NA | NA | NA | NA | NA | NA |
| | | Overall SSA | 96.81% | 99.23% | 97.11% | 98.03% | 92.72% | 91.98% | 97.60% | 99.79% | 98.32% | 99.67% | 98.03% | 99.82% | 96.29% | 99.09% | NA | NA | NA | NA | NA | NA |
| 5 | Service Coverage | | | | | | | | | | | | | | | | | | | | | |
| | In door (>= -75dBm) | Major Roads | NA | 98.80% | NA | 96.94% | NA | 50.05% | NA | 44.91% | NA | 95.12% | NA | 100% | NA | 92.55% | NA | 0.00% | NA | 100% | NA | 72.95% |
| | | Highways | 62.37% | 99.30% | 96.12% | 97.25% | 47.05% | 65.29% | 35.23% | 92.16% | 43.23% | 99.73% | 63.53% | 100% | 52.66% | 98.71% | 62.17% | 24.17% | 61.75% | 98.38% | 64.35% | 22.89% |
| | | Within City | 63.74% | 99.60% | 96.80% | 99.81% | 26.00% | 41.21% | 51.69% | 81.83% | 39.39% | 97.02% | 77.36% | 99.87% | 74.90% | 99.90% | 70.93% | 100% | 54.70% | 81.73% | 72.28% | 99.11% |
| | | Overall SSA | 63.05% | 99.24% | 96.47% | 98.05% | 33.49% | 50.36% | 43.49% | 72.06% | 40.66% | 97.11% | 71.76% | 99.96% | 63.77% | 97.05% | 67.69% | 43.23% | 58.88% | 95.69% | 68.54% | 64.68% |
| | In-vehicle (>= -85dBm) | Major Roads | NA | 100% | NA | 100% | NA | 2.79% | NA | 99.60% | NA | 99.99% | NA | 100% | NA | 99.94% | NA | 96.45% | NA | 100% | NA | 96.14% |
| | | Highways | 79.52% | 100% | 99.55% | 100% | 78.33% | 3.64% | 77.50% | 100% | 81.62% | 100% | 76.71% | 100% | 89.51% | 99.98% | 95.18% | 99.73% | 79.88% | 99.75% | 89.38% | 92.49% |
| | | Within City | 87.02% | 100% | 99.82% | 100% | 58.65% | 5.89% | 89.18% | 100% | 83.22% | 99.93% | 93.98% | 100% | 97.24% | 100% | 98.22% | 100% | 71.12% | 100% | 94.29% | 99.79% |
| | | Overall SSA | 83.23% | 100% | 99.69% | 100% | 65.65% | 4.27% | 83.36% | 99.86% | 82.69% | 99.97% | 86.99% | 100% | 93.37% | 99.97% | 97.10% | 98.73% | 76.32% | 99.90% | 91.97% | 96.11% |
| | Outdoor-in city (>= -95dBm) | Major Roads | NA | 100% | NA | 100% | NA | 100% | NA | 100% | NA | 100% | NA | 100% | NA | 100% | NA | 100% | NA | 100% | NA | 99.82% |
| | | Highways | 96.81% | 100% | 100% | 100% | 100% | 100% | 98.37% | 100% | 97.89% | 100% | 94.71% | 100% | 99.24% | 100% | 100% | 100% | 88.78% | 100% | 99.82% | 100% |
| | | Within City | 98.42% | 100% | 100% | 100% | 100% | 100% | 99.66% | 100% | 98.80% | 100% | 99.45% | 100% | 99.95% | 100% | 100% | 100% | 93.48% | 100% | 99.98% | 100% |
| | | Overall SSA | 97.61% | 100% | 100% | 100% | 100% | 100% | 99.02% | 100% | 98.50% | 100% | 97.53% | 100% | 99.59% | 100% | 100% | 100% | 90.69% | 100% | 99.91% | 99.94% |
| 6 | Call Setup Success | Major Roads | NA | 100% | NA | 100% | NA | 93.94% | NA | 100% | NA | 100% | NA | 100% | NA | 100% | NA | 100% | NA | 100% | NA | 100% |

| S/N | Parameter | Classification of route covered | AIRCEL | | AIRTEL | | BSNL | | IDEA | | TATA GSM | | RCOM GSM | | VODAFONE | | MTS CDMA | | RCOM CDMA | | TATA CDMA | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR |
| | Rate (>=95%) | Highways | 100% | 100% | 100% | 100% | 91.62% | 80.00% | 99.39% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| | | Within City | 100% | 100% | 100% | 100% | 88.53% | 94.74% | 99.63% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| | | Overall SSA | 100% | 100% | 100% | 100% | 89.74% | 89.19% | 99.54% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| 7 | Hand Over Success Rate (HOSR) | Major Roads | NA | 100% | NA | 100% | NA | 97.65% | NA | 100% | NA | 100% | NA | 100% | NA | 100% | NA | 100% | NA | 100% | NA | 100% |
| | | Highways | 100% | 100% | 100% | 100% | 92.86% | 96.55% | 100% | 100% | 100% | 100% | 100% | 100% | 99.49% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| | | Within City | 100% | 100% | 100% | 100% | 99.24% | 100% | 100% | 100% | 100% | 100% | 99.61% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| | | Overall SSA | 100% | 100% | 100% | 100% | 97.03% | 97.37% | 100% | 100% | 100% | 100% | 99.71% | 100% | 99.72% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |

NA: Not Applicable

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

## DRIVE TEST TABLE - 3

### OPERATOR ASSISTED DRIVE TEST AT BHARATPUR SSA IN MARCH 15 MONTH- RAJASTHAN CIRCLE

| S/N | Parameter | Classification of route covered | AIRCEL OUTDOOR | AIRCEL INDOOR | AIRTEL OUTDOOR | AIRTEL INDOOR | BSNL OUTDOOR | BSNL INDOOR | IDEA OUTDOOR | IDEA INDOOR | TATA GSM OUTDOOR | TATA GSM INDOOR | RCOM GSM OUTDOOR | RCOM GSM INDOOR | VODAFONE OUTDOOR | VODAFONE INDOOR | MTS CDMA OUTDOOR | MTS CDMA INDOOR | RCOM CDMA OUTDOOR | RCOM CDMA INDOOR | TATA CDMA OUTDOOR | TATA CDMA INDOOR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Call Attempts | Major Roads | NA | 30 | NA | 30 | NA | 33 | NA | 30 | NA | 30 | NA | 31 | NA | 30 | NA | 30 | NA | 32 | NA | 30 |
| | | Highways | 227 | 30 | 336 | 30 | 321 | 34 | 212 | 30 | 99 | 32 | 262 | 30 | 289 | 30 | 215 | 30 | 252 | 30 | 175 | 30 |
| | | Within City | 173 | 30 | 206 | 30 | 200 | 29 | 201 | 30 | 99 | 31 | 206 | 30 | 149 | 30 | 202 | 30 | 227 | 31 | 205 | 30 |
| | | **Overall SSA** | **400** | **90** | **542** | **90** | **521** | **96** | **413** | **90** | **198** | **93** | **468** | **91** | **438** | **90** | **417** | **90** | **479** | **93** | **380** | **90** |
| 2 | Blocked Call Rate | Major Roads | NA | 0.00% | NA | 0.00% | NA | 0.00% | NA | 0.00% | NA | 0.00% | NA | 0.00% | NA | 0.00% | NA | 0.00% | NA | 0.00% | NA | 0.00% |
| | | Highways | 0.00% | 0.00% | 0.00% | 0.00% | 4.05% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 1.15% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| | | Within City | 0.00% | 0.00% | 0.00% | 0.00% | 3.00% | 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% | 0.00% |
| | | **Overall SSA** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **3.65%** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **0.64%** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **0.00%** |
| 3 | Dropped Call Rate (<=2%) | Major Roads | NA | 0.00% | NA | 0.00% | NA | 0.00% | NA | 0.00% | NA | 0.00% | NA | 0.00% | NA | 0.00% | NA | 0.00% | NA | 0.00% | NA | 0.00% |
| | | Highways | 0.00% | 0.00% | 0.00% | 0.00% | 1.41% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 1.54% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 1.59% | 0.00% | 0.00% | 0.00% |
| | | Within City | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.49% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.44% | 0.00% | 0.49% | 0.00% |
| | | **Overall SSA** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **0.87%** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **1.08%** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **0.00%** | **1.04%** | **0.00%** | **0.26%** | **0.00%** |
| 4 | Percentage connections with good voice quality (=>95%) | | | | | | | | | | | | | | | | | | | | | |
| | (a) 0-4 (w/o frequency hopping for CDMA) | Major Roads | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 99.97% | NA | 100% | NA | 99.97% |
| | | Highways | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 98.03% | 98.31% | 98.35% | 100% | 99.17% | 100% |
| | | Within City | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 99.73% | 99.82% | 99.86% | 100% | 99.39% | 99.94% |

| S/N | Parameter | Classification of route covered | AIRCEL | | AIRTEL | | BSNL | | IDEA | | TATA GSM | | RCOM GSM | | VODAFONE | | MTS CDMA | | RCOM CDMA | | TATA CDMA | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR |
| | Operators) | Overall SSA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 98.89% | 99.35% | 98.99% | 100% | 99.29% | 99.97% |
| | (b) 0-5 ( with frequency hopping for GSM Operators) | Major Roads | NA | 97.58% | NA | 97.78% | NA | 97.95% | NA | 98.82% | NA | 96.71% | NA | 99.05% | NA | 96.04% | NA | NA | NA | NA | NA | NA |
| | | Highways | 95.67% | 98.27% | 97.21% | 97.85% | 87.97% | 85.00% | 97.98% | 99.51% | 95.40% | 95.95% | 96.60% | 98.04% | 95.87% | 98.87% | NA | NA | NA | NA | NA | NA |
| | | Within City | 96.14% | 96.40% | 97.58% | 99.14% | 91.99% | 90.18% | 96.83% | 100% | 95.78% | 95.93% | 97.86% | 100% | 96.57% | 98.99% | NA | NA | NA | NA | NA | NA |
| | | Overall SSA | 95.89% | 97.43% | 97.35% | 98.25% | 89.48% | 91.11% | 97.50% | 99.40% | 95.60% | 96.17% | 97.15% | 99.16% | 96.10% | 97.96% | NA | NA | NA | NA | NA | NA |
| 5 | Service Coverage | | | | | | | | | | | | | | | | | | | | | |
| | In door (>= -75dBm) | Major Roads | NA | 99.90% | NA | 98.75% | NA | 70.46% | NA | 99.00% | NA | 94.83% | NA | 48.44% | NA | 97.51% | NA | 100% | NA | 88.02% | NA | 99.65% |
| | | Highways | 40.18% | 86.40% | 96.11% | 99.01% | 6.41% | 74.83% | 72.07% | 99.95% | 44.78% | 54.01% | 43.55% | 100% | 86.54% | 97.99% | 48.78% | 100% | 61.14% | 99.58% | 48.72% | 68.87% |
| | | Within City | 65.60% | 91.50% | 96.51% | 98.34% | 4.56% | 97.58% | 84.34% | 100% | 41.44% | 56.15% | 67.04% | 84.72% | 92.88% | 97.95% | 72.81% | 100% | 73.81% | 59.38% | 63.26% | 100% |
| | | Overall SSA | 51.97% | 92.50% | 96.26% | 98.70% | 5.72% | 80.08% | 77.15% | 99.64% | 43.05% | 67.12% | 53.93% | 78.57% | 88.64% | 97.82% | 60.89% | 100% | 66.53% | 81.50% | 56.63% | 89.49% |
| | In-vehicle (>= -85dBm) | Major Roads | NA | 100% | NA | 100% | NA | 93.75% | NA | 100% | NA | 100% | NA | 97.49% | NA | 99.97% | NA | 100% | NA | 99.97% | NA | 100% |
| | | Highways | 85.56% | 99.70% | 99.51% | 100% | 75.42% | 87.30% | 97.76% | 100% | 85.03% | 99.16% | 76.58% | 100% | 98.99% | 99.96% | 91.17% | 100% | 77.84% | 100% | 89.78% | 98.91% |
| | | Within City | 95.13% | 99.90% | 99.67% | 100% | 95.77% | 99.99% | 99.47% | 100% | 87.56% | 98.63% | 81.36% | 100% | 99.91% | 99.96% | 96.69% | 100% | 87.40% | 99.95% | 86.22% | 100% |
| | | Overall SSA | 90.00% | 99.86% | 99.57% | 100% | 83.09% | 93.39% | 98.47% | 100% | 86.34% | 99.21% | 78.69% | 99.27% | 99.29% | 99.97% | 93.96% | 100% | 81.90% | 99.97% | 87.84% | 99.64% |
| | Outdoor-in city (>= -95dBm) | Major Roads | NA | 100% | NA | 100% | NA | 100% | NA | 100% | NA | 100% | NA | 100% | NA | 100% | NA | 100% | NA | 100% | NA | 100% |
| | | Highways | 98.79% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 97.71% | 100% | 96.07% | 100% | 99.98% | 100% | 100% | 100% | 92.39% | 100% | 99.54% | 100% |
| | | Within City | 99.76% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 98.84% | 100% | 98.96% | 100% | 99.99% | 100% | 100% | 100% | 93.95% | 100% | 99.92% | 100% |
| | | Overall SSA | 99.24% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 98.29% | 100% | 97.35% | 100% | 99.98% | 100% | 100% | 100% | 93.05% | 100% | 99.75% | 100% |

| S/N | Parameter | Classification of route covered | AIRCEL | | AIRTEL | | BSNL | | IDEA | | TATA GSM | | RCOM GSM | | VODAFONE | | MTS CDMA | | RCOM CDMA | | TATA CDMA | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR | OUTDOOR | INDOOR |
| 6 | Call Setup Success Rate (>=95%) | Major Roads | NA | 100% | NA | 100% | NA | 90.91% | NA | 100% | NA | 100% | NA | 100% | NA | 100% | NA | 100% | NA | 100% | NA | 100% |
| | | Highways | 100% | 100% | 100% | 100% | 88.16% | 88.24% | 100% | 100% | 100% | 100% | 98.85% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| | | Within City | 100% | 100% | 100% | 100% | 87.50% | 93.10% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| | | Overall SSA | 100% | 100% | 100% | 100% | 87.91% | 90.63% | 100% | 100% | 100% | 100% | 99.36% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| 7 | Hand Over Success Rate (HOSR) | Major Roads | NA | 100% | NA | 100% | NA | 100% | NA | 100% | NA | 100% | NA | 100% | NA | 100% | NA | 100% | NA | 100% | NA | 100% |
| | | Highways | 100% | 100% | 100% | 100% | 90.99% | 100% | 98.45% | 100% | 100% | 100% | 98.49% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| | | Within City | 100% | 100% | 100% | 100% | 97.59% | 100% | 99.55% | 100% | 100% | 100% | 100% | 100% | 99.42% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| | | Overall SSA | 100% | 100% | 100% | 100% | 92.79% | 100% | 99.04% | 100% | 100% | 100% | 99.07% | 100% | 99.80% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |

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 | 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 |
| ALWAR | **ALWAR, RAMGARH /115KM** | **ALWAR -** Major Road: Bhagat Singh Chowk, Jail Circle, HKM crossing, Telco Circle, MITRC, Naman Hotel, Rajiv Gandhi hospital, Nagli Circle, Bhawani Top Katti Ghati, Within City: Malviya nagar, hope Circus, national college, shashtri nagar, Railway Station, Tez mandi, Keshav nagar, multan Nagar, Hanuman Circle, RICCO bus stand, MIA, IET college. Highway: Delhi Highway. <br><br> **RAMGARH:** Major Road: Lohiya ka tiwara, Toll gate, Agyara, Nuku, Raliway crossing. Within City: Bus stand, SBI Bank, Jai Hospital, Govind garh Road, Inlali, Govt. School, Dhowli. <br><br> **INDOOR:** Prem Pavitra Bhojnalya. | **BEHROR, MUNDAWAR, BANSUR / 148 KM** | **BEHROR** - Within City: BSNL exchange, Kotwali, Main Market, Senior Secondary School, Nain Sukh Mohalla, Post Office, RICCO, Hotel Highwar King. HIGHWAY TO MUNDAWAR: sodawas, Kukawas, Hatundi, Siyakhor. <br><br> **MUNDAWAR** - Within City: Sodawas Road, Civil Collectrate, Harsoli Road, JVVNL, Shayapur chauraha, phel, Balidhani, Tatarpur Chowk. <br><br> **BANSUR** – Major road: Tatarpur, Hanuman Mandir, Kala ghati, JVVNL, Bansur, Hazipur, Checkpost Bansur. Within City Bansur: Harshok Chowk, Yadav HOspital, Senior Secondary School, Kotputli Baipaas, BSNL Exchange, Power House, Main Bazar, Alwar Road <br><br> **INDOOR:** Cross Point Mall | **KISHANGARH, KHAIRTHAL, TIJARA, BHIWADI / 123KM** | **KISHANGARH** - Withincity: Busstand, Bas Kripal Nagar, Govt. Hospital, Highway to Khairthal: <br><br> **KHAIRTHAL:** within city: rumsa,toll gate, galaxy green  jvvnl, pnb bank atm, railway crossing, purani Anaj Mandi, Nai mandi, highway to tijara, kishangarh, chamroda, shahbad road ,toll plaza <br><br> **TIJARA:** within city: Senior Sec. School, Govt. Girls College, Govt. Hospital, Post Office, Mandi, Jain Temple, Busstand Tizara,  Highway To Bhiwadi: <br><br> **BHIWADI:** Busstand, Govt. Hospital, LIC, Senior Sec School. <br> **Indoor:** Jai Complex |
| BANSWARA | **GARHI, SAGWARA, DUNGARPUR / 124KM** | **GARHI**: BSNL Office, Polytechnic, Kupra, Shivpura, Talwara, Sagetta, Bhansaur, Partapur, Garhi; Within City Garhi: Tehsil Road, SDM Office, Police Station, SSC Garhi, Sadar Bazar, Panchayat Bhawan, P.Office., Satyam Hotel. Highway to Sagwara: Kumji Ka Pada, Agarpura, Mode, Mahipul, Biluda, Jethana, Sagwara. | **BANSWAR, KUSHAL GARH, BAGIDORA/ 128KM** | **BANSWARA**: BSNL Exch. Post Office Circle,  Nai Abadi, Jawahar Pul, Nagar Parishad, Vinod Talkies, Custom Circle, Chetak Complex, Bahubali Colony, Aditya Nath Nagar, Khandu Colony,  Syntex Mill, Riico Industrial Area, LIC Office, Manglam Complex, College Road, Pragati Nagar, Link Road, Circle, Nakshtra Marg, Pratap Circle, Sankalp   Hotel, Triupati Nagar, Adarsh Nagar, Bypass Road, Highway to | **GHATOL, ASPUR / 102KM** | **GHATOL**: Bypass Road Jaipur, Peeplwa, RTO Office, Tejpur, Jhatla, Sanawasa, Devda, Karjhasiya Ghatol. Within City Ghatol: Rajid Gandhi Seva Kendra, Ambedkar Govt. Hostel, Phd. Office, Patel Wada, Jain Mohalla, Laxmi Narayan Mandir, Sadar Bazar, Sabji Mandi, New Bus Stand, Idle Academy, Pratapgarh Road, Tehsil Road, Police Station, SDM Office, NASA Academy RSEB Office. |

| Name of SSA | 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 |
| | | **SAGWARA**: SBI, BSNL, Office, Surbhi Hotel, Main Market, Panchayat Samiti, Gamathwara Road, Gurkul college, Bus Stand, Purnvas Colony, Sidhivinayak Temple, Police Station. Highway to Dungarpur: Guwadi, Nandore, Tamtiya, Varda, Antri, Hirata, Teejwar Chouraha<br><br>**DUNGARPUR**: Gram Panchayat, Bilodi, Roadways Bus Stand, Govt.College, Bichhiwada Road, Qutbi Colony, PWD Office, LIC Office, New Hospital Chouraha, Police Station, Shivaji Nagar, BSNL Exchange Dungarpur.<br><br>**INDOOR:** BSNL EXCHANGE | | Kushalgarh: Dahood Road, Borvat Road, Sangdaur, Barodiya , Kalinzara, Tameshra, Luharia, Churadia, Kaushalgarh.<br><br>**KUSHALGARH**: Jal Sansadhan Vibhag, RECB, Forest Office, SDM Office, Court, Main Market, Govt. Hospital, Post Office, Dak Bungalow, SSC Office, Panchayat Samiti, BSNL Office, Highway to Bagidora: Kalinjzara , Rakho, Bagidora.<br><br>**BAGIDORA**: New  Bus Stand, Gandshi Hospitak SSC, Panchyati Bhawan, Main Bus Stand, govt. Hospital, Ranganiya, Forest Office, Civil Court, Veternary Hospital, Irrigation Deptt. Govt. School, Chinch.<br><br>**INDOOR:** MAIN BUS STAND | | Highway to Aaspur:  Haro Dam, Bamanpada, Ganoda, Luhariya, Patiya Mode, Toll Gate, Pindawal, Sabla, Khoti, Aaspur.<br><br>**AASPUR**:  Hotel Lakhan, BSNL Exchange, Primary School, Sunrise Public< Police chowky, Shrinagar Market, Main Market, Patwar Mandal, Ganesh Chowk, Tehsil Aaspur, Circuit House, Post Office, Old Petrol Pump.<br><br>**INDOOR:** HOUSING BOARD |
| **BHARATPUR** | **DEEG, KAMAN, NADBAI/ 127KM** | **DEEG**- collectrate, govt hospital, bharatpur military station, toll plaza, chaktiya, borai, madira, aau, With in city(DEEG)-central bank of india, swasthya Kendra, jal board office, bus stand, nagar road new BSNL exchange, jalmahal, laxman mandir chowk, railway crossing, Highaway to Kaman-dedawali, seu, khata, indroli.<br><br>**KAMAN:** Hari kripa asharam, radha colony, govt school, main bazaar, deeg bypass dak bangla, swasthya Kendra, Highway to Nad bai-panori, mahroli, januthar, bhadheera, uhassa , nadbai. | **DHOLPUR, BARI, BASERI, RUPWAS/ 131KM** | **DHOLPUR-** Toll gate bohra fuel pump siypura mania torpor dholpur, Within city(dholpur)- kant hari resort, over bridge, bus stand, ghanta ghar, post office, ladies hospital, pot pada mohalla, gurjar colony, royal hotel, Highway to bari-rajendra nagar, pach gaavn, kareempur, parvati pull, salepur, keledar ka nagla, kanchanpur, bari.<br><br>**BARI** –police chowki, umeth mohalla, bus stand, rana nagar, krishi mandi, BSNL exchange, Highway to baseri -khuavni, dhiwari,  link road, mamodhan, link road nadan pur.<br><br>**BASERI**-JVVNL, main bazaar,  P.H.E.D., | **BAYANA, BHARATPUR / 142 KM** | **BAYANA**-Bird century Ghana, unchain, mode par, unchain, negpur, jheel ka bara(kaladaji) salabad, railway crossing, bayana, Within city(bayana)- harnagar, JVVNL. BSNL exchange, panchayat samiti, mirana tiraha, ganesh market, sabji mandi, kabristan, subhash chowk, bus stand, adarsh nagar, RICCO industrial area, Highway to bharatpur-samraya wer, chokarwara halenna, bassi, sever, bharatpur.<br><br>**BHARAT  PUR**-sever  jail,  sarso anusandhan Kendra, lohagarh, stadium, top circle, red cross society, jagheena gate, kanni gurjar choraha, main bazaar |

| Name of SSA | 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 |
| | | **NADBAI-** SDM public school, bus stand-BSNL exchange, main market, railway crossing, BOB, railway station, anaj mandi, sant asharam<br><br>**INDOOR:** BSNL Office | | bus stand, DC market, timasiya mohalla, police station, Gandhi chowk, Highway to rupwas-inikapura khiroda jarga siyoli.<br><br>**RUPWAS**-railway station, main bazaar, BSNL exchange, railway crossing.<br><br>**INDOOR:** Shyam Hotel | | swarn jayanti nagar, rajendra nagar, collectrate ,BSNL exchnahge<br><br>**INDOOR:** BSNL Office |

## 7.2 SSA WISE DRIVE TEST OBSERVATION:

**DRIVE TEST TABLE: 5**

**DRIVE TEST OBSERVATION OF ALWAR SSA: JANUARY 14**

| S NO | Name of SP | SDCA Covered in Day 1 | Day 1 Observation | SDCA Covered in Day 2 | Day 2 Observation | SDCA Covered in Day 3 | Day 3 Observation |
|------|-----------|----------------------|-------------------|----------------------|-------------------|----------------------|-------------------|
| 1 | AIRTEL | | Poor Level & Quality at Ramgarh outer | | Poor Quality near Mundawar, Hamirpur, Behror outer | | Poor Quality at Tijara outer |
| 2 | BSNL | | NP | | NP | | NP |
| 3 | TATA GSM | | They have coverage only in SDCA's & Major Towns with Poor Level at outers, Poor Level & Quality at Ramgarh outer, Telco Chowk, Dholi Doob | | They have coverage only in SDCA's & Major Towns with Poor Level & Quality at outers | | They have coverage only in SDCA's & Major Towns with Poor Level & Quality at outers |
| 4 | TATA CDMA | | They have coverage only in SDCA's & Major Towns with Poor Level at outers | | They have coverage only in SDCA's & Major Towns with Poor Level at outers | | They have coverage only in SDCA's & Major Towns with Poor Level at outers |
| 5 | IDEA | Alwar & Ramgarh | Poor Quality near Scheme 2, 8, Jaipur Rd, NEB, Nangali Circle, No coverage between Baggad Mao to Ramgarh | Bansur, Mundawar & Behror | They have coverage only in SDCA's & Major Towns with Poor Level & Quality at outers, Poor Quality near Dehra, Bansur outer, Sodawas, Behror outer | Khairthal, Tijara & Bhiwadi | They have coverage only in SDCA's & Major Towns with Poor Level & Quality at outers |
| 6 | RCOM GSM | | They have coverage only in SDCA's & Major Towns, Poor Level & Quality at Ramgarh outer, Telco Chowk, Dholi Doob, Jaipur Rd, Scheme 2 | | They have coverage only in SDCA's & Major Towns with Poor Level & Quality at outers | | They have coverage only in SDCA's & Major Towns with Poor Level & Quality at outers |
| 7 | RCOM CDMA | | They have coverage only in SDCA's & Major Towns, Poor Level & Quality at Ramgarh outer, Telco Chowk, Dholi Doob | | They have coverage only in SDCA's & Major Towns with Poor Level at outers | | They have coverage only in SDCA's & Major Towns with Poor Level at outers |
| 8 | MTS | | They have coverage only in SDCA's & Major Towns with Poor Level at outers | | They have coverage only in SDCA's & Major Towns with Poor Level at outers | | They have coverage only in SDCA's & Major Towns with Poor Level at outers |
| 9 | VODAFONE | | Poor Quality near Telco Chowk, Ramgarh outer, Baggad Mao, Scheme 8 | | Poor Level & Quality near Sodawas, Tatarpur, Mundawar outer, Hamirpur | | Poor Quality at Khairthal outer |
| 10 | AIRCEL | | Poor Level near Telco Chowk, Ramgarh outer, Dholi Doob, Bus Stand | | Poor Level on Highway covered in Day 2 | | Poor Level at Khairthal outer, Kishangarh outer, Tijara outer |

NP: Drive test plots were not provided by the BSNL.

**DRIVE TEST TABLE: 6**

**DRIVE TEST OBSERVATION OF BANSWARA SSA: FEBRUARY 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 | Garhi, Sagwara & Doongarpur | Poor Quality at Banswara outer, Hirata | Banswara, Kushalgarh & Bagidora | Poor Quality near Kushalgarh outer | Ghatol & Aspur | Poor Quality near Tejpur, Ghatol outer |
| 2 | BSNL | | NP | | NP | | NP |
| 3 | TATA GSM | | They have coverage only in SDCA's & Major Towns with Poor Level & Quality at outers | | They have coverage only in SDCA's & Major Towns with Poor Level & Quality at outers | | They have coverage only in SDCA's & Major Towns with Poor Level & Quality at outers |
| 4 | TATA CDMA | | They have coverage only in SDCA's & Major Towns with Poor Level & Quality at outers | | They have coverage only in SDCA's & Major Towns with Poor Level & Quality at outers | | They have coverage only in SDCA's & Major Towns with Poor Level & Quality at outers |
| 5 | IDEA | | They have coverage only in SDCA's & Major Towns with Poor Level & Quality at outers | | They have coverage only in SDCA's & Major Towns with Poor Level & Quality at outers | | They have coverage only in SDCA's & Major Towns with Poor Level & Quality at outers |
| 6 | RCOM GSM | | They have coverage only in SDCA's & Major Towns with Poor Level & Quality at outers | | They have coverage only in SDCA's & Major Towns with Poor Level & Quality at outers | | They have coverage only in SDCA's & Major Towns with Poor Level & Quality at outers |
| 7 | RCOM CDMA | | They have coverage only in SDCA's & Major Towns with Poor Level & Quality at outers | | They have coverage only in SDCA's & Major Towns with Poor Level & Quality at outers | | They have coverage only in SDCA's & Major Towns with Poor Level & Quality at outers |
| 8 | MTS | | They have coverage only in SDCA's & Major Towns with Poor Level at outers | | They have coverage only in SDCA's & Major Towns with Poor Level at outers | | They have coverage only in SDCA's & Major Towns with Poor Level at outers |
| 9 | VODAFONE | | No coverage between Doongarpur to Bhachadiya, Poor Level & Quality near Kheragarh, Thkarda | | Poor Level & Quality near Ghatigara, Bagidara, Temsera, Thummath | | Poor Level & Quality near Sabla, Lohariya, Kargasia |
| 10 | AIRCEL | | Poor Level at Doongarpur, Varda, Sagwara, Ghadi outers | | Poor Level Banswara outer, Bagidora outer | | Poor Level near Ghatol outer, Ganoda |

NP: Drive test plots were not provided by the BSNL.

**DRIVE TEST TABLE: 7**

**DRIVE TEST OBSERVATION OF BHARATPUR 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 | | --- | | Poor Quality near Kanchanpur, Rupwas | | Poor Quality near Bharatpur outer |
| 2 | BSNL | | Poor Level & Quality on Highway covered in Day 1 | | Poor Level & Quality on Highway covered in Day 2 | | Poor Level & Quality on Highway covered in Day 3 |
| 3 | TATA GSM | | They have coverage only in SDCA's & Major Towns with Poor Level & Quality at outers | | They have coverage only in SDCA's & Major Towns with Poor Level & Quality at outers | | They have coverage only in SDCA's & Major Towns with Poor Level & Quality at outers |
| 4 | TATA CDMA | Deeg, Kaman & Nadbai | They have coverage only in SDCA's & Major Towns with Poor Level at outers | Dholpur, Bari Baseri & Rupwas | They have coverage only in SDCA's & Major Towns with Poor Level at outers | Bharatpur & Bayana | They have coverage only in SDCA's & Major Towns with Poor Level at outers |
| 5 | IDEA | | Poor Quality at Kaman outer, Nadbai outer | | Poor Level & Quality near Maniyan, Puraini, Baseri outer | | Poor Level & Quality near Binauwa, Poor Quality near Bajrang Vihar, Arya Samaj Rd |
| 6 | RCOM GSM | | They have coverage only in SDCA's & Major Towns with Poor Level & Quality at outers | | They have coverage only in SDCA's & Major Towns with Poor Level & Quality at outers | | Poor Level & Quality near Bhuswar outer, Bharatpur outer, near Terhiya, Bayana, Weir |
| 7 | RCOM CDMA | | They have coverage only in SDCA's & Major Towns with Poor Level & Quality at outers | | They have coverage only in SDCA's & Major Towns with Poor Level & Quality at outers | | Poor Level & Quality on Highway covered in Day 3 |
| 8 | MTS | | They have coverage only in SDCA's & Major Towns with Poor Level at outers | | They have coverage only in SDCA's & Major Towns with Poor Level at outers | | Poor Level near Halena, Uchhain, Weir, No coverage between Bayana to Weir |
| 9 | VODAFONE | | Poor Level & Quality near Dhamari, Poor Quality at Deeg outer | | Poor Quality near Khanuwa, maniyan, Saipau, Baseri | | Poor Quality near Bharatpur outer, Uchhain |
| 10 | AIRCEL | | They have coverage only in SDCA's & Majo Towns with Poor Level, Poor Level at Deeg outer | | They have coverage only in SDCA's & Majo Towns with Poor Level | | Poor Level at Bayana outer, Bhusawar outer |

**DRIVE TEST TABLE: 8**

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

| S No | Month of Drive Test | Name of Operators | SSA Covered | SDCAs Covered | Status of no network coverage area | ICR Status |
|---|---|---|---|---|---|---|
| 1 | Jan-15 | AIRCEL | Alwar | Ramgarh, Mundawar, Behror, Bansur, Kishangarh, Kherthal,Tijara, Bhiwadi | Alwar to ramgarh- narka no coverage ,alwar to tatarpur naglasedo no coverage, mundawar to behror peepli no coverage | ICR With Tata in Tijara, Alwar , Bhiwadi |
| | | AIRTEL | | | Alwar-No coverage b/w tatarpur chouraha to Hameerpur root nearby Bhooriyawas village due to Hilly Terrain | NO |
| | | BSNL | | | No Coverage Issue | NO |
| | | IDEA | | | Hatundi, mundawar to peepli, alanpur to tatarpur, mundawar to pehal, pehal to tatarpur choraha, bhindisi to tijara, tijara to milakpuri, milakpuri to jagmalheri, bagad to ramgarh, Ghasoli to kishangarh, kishangarh to khairthal, jathaka to bagthala, bhindisi to tijara, villege rundh, bardod to sodawas, tatarpur choraha to hameerpur, hazipur to boopsera, boopsera to bansur, Katori wala tibara, Itarana, jai paltan,bagad to ramgarh, alwar to dehra, chandoli to jindoli, gajooki to chikani | NO |
| | | RCOM (GSM) | | | All SDCA Covered & week coverage on inter connecting highway | NO |
| | | TATA (GSM) | | | Partial Coverage in all SDCA's | ICR with Aircel in Mundawar, Behror, Bansur |
| | | MTS | | | **Alwar-**No coverage b/w Alwar To Ramgarh (Highway), **Tatarpur-** No coverage b/w Alwar to Tatarpur (Highway) ,No coverage b/w Tatarpur to Bansur (Highway) , **Behror -** No coverage b/w Tatarpur to Behror (Highway) and No coverage b/w Tatarpur to Mundawara Highway, **Bansur (S)** -No coverage b/w Hameerpur To Bansur (highway) ,No coverage b/w Jasrasar to Sardarshar(highway),No coverage b/w Sardarshar to thukariyasar(highway) | NO |
| | | VODAFONE | | | No Coverage Issue | NO |
| | | RCOM (CDMA) | | | All SDCA Covered & week coverage on inter connecting highway | NO |
| | | TATA (CDMA) | | | Partial Coverage in all SDCA's | ICR with MTS in Mundawar and Bansur |

| S No | Month of Drive Test | Name of Operators | SSA Covered | SDCAs Covered | Status of no network coverage area | ICR Status |
|---|---|---|---|---|---|---|
| 2 | Feb-15 | AIRCEL | Banswara | Banswara, Garhi, Sagwara, Dungarpur, Kushalgarh, Bagidora, Ghatol, Aspur | highway to garhi saggeta no coverage highway to sagwara agarpura mod,mahi pul jethana ,guwadi ,antri, hirata kalinzara , tameshra ,luhari, kushalgarh highway to bagidora recco no coverage | ICR with Tata |
| | | AIRTEL | | | Banswara- Week Coverage b/w PardaMoru(PDMU01) to MahdwawithChak(MHDW01) due to Hilly Terrain, Other well covered | NO |
| | | BSNL | | | No Coverage Issue | NO |
| | | IDEA | | | Loharia to Paloda,Paloda to Pindawal, Munger to Aspur, Paroli Gordan to Kargasia, Ghatol to Bamanpada, Borda to Ghanoda, Kalinjara to Bagidora, Bagidora to Cheech, Kalinjara to Ranaji,Ranaji to Kushalgarh, Varda to Dungarpur, Sagwara to Thakarda, Khera to Partapur, Garhi to Bhilura, Banswara to Kupra,Talwara to Wajwana, Banswara to Sagrod, Sagrod to Barodia, Barodia to Kalinjara | NO |
| | | RCOM (GSM) | | | No coverage in BAGIDORA, GERHI, ASPUR | NO |
| | | TATA (GSM) | | | No coverage in Kushalgarh | NO |
| | | MTS | | | No coverage between Kalinjara(Highway) to Kushalgarh(Highway), No coverage between Banswara to Sargod, No coverage b/w Alwar(Highway) to Sagwara (Highway), No coverage b/w Varda to Dungerpur (HIGHWAY) | NO |
| | | VODAFONE | | | Partial coverage b/w Pardamoru & Tijwar due to hilly terain | NO |
| | | RCOM (CDMA) | | | No coverage in Garhi, Kushalgarh, Bagidora, Ghatol, Aspur | NO |
| | | TATA (CDMA) | | | No coverage in Bagidora, Garhi | NO |
| 3 | Mar-15 | AIRCEL | Bharatpur | Deeg, Kaman, Nadbai, Dholpur, Bari, Baseri, Rupwas, Bayana | Bharatpur to deeg madira,aau, deeg to kaman seu khata kaman to nadbai panhori bhadheera, dhoulpur to baseri kareempur, parvati pul,sallepur, kanchanpur, baseri to roopwas jarga, siyoli, highway to bayana nekpur. | NO |
| | | AIRTEL | | | No Coverage Issue | NO |
| | | BSNL | | | No Coverage Issue | NO |
| | | IDEA | | | Nagla Karan singh to Borai, Belara khurd to nagla mainthna, didawali to tankoli, seu to indroli, Narena Katta to Panhori, siwara to Nahroli, Garoli to Bahramda, Chaina Ka Pura to kasganj, Dandoli to edalpur, Narpura to Umrara, ratanpura to kumheri, Hajipur to Mahua Khera, Hansai To Aligarh,Nidhara to Rampur,Poothpura Kalan to Hingota, Pattipura to | NO |

| S No | Month of Drive Test | Name of Operators | SSA Covered | SDCAs Covered | Status of no network coverage area | ICR Status |
|---|---|---|---|---|---|---|
| | | | | | Noharda,Ramnagar to Jheelra, Sukhawali to Jaichauli, Kharera to Ucchain Ucchain to Nekpur, Pana to beerampura, salawad to Bayan Rural, Bayan Rural to Kanawar, Gothra to Weir,Jagjiwanpur to Narharpur, Bhagwanpur to itamada, Chaintoli to mahtoli, Jhalatal to  moloni,Dhera Mod to Lulhara | |
| | | RCOM (GSM) | | | All SDCA Covered & week coverage on inter connecting highway | ICR with  Aircel in Bayana, Bharatpur,  Deeg, Dholpur,  Kaman, Nadbai |
| | | TATA (GSM) | | | Partial Coverage in all SDCA's | ICR with  Aircel in Deeg, Kaman,Nadbai, Rupwas, Bayana |
| | | MTS | | | **Baseri -**No coverage b/w  Bari to Baseri (Highway) ,  No coverage b/w  Heenta to Chhardiya(Highway),  **Dhaulpur  -**No coverage  b/w  Dhaulpur  ToTaseemo (Highway) ,No coverage b/w  Taseemo to Bari (Highway), **Nadbai -**No coverage b/w Kumher  to  Nadbai  (Highway),No coverage b/w Deegh to Nadbai(Highway), **Deeg -**No coverage b/w Deeg to Kaman Highway | NO |
| | | VODAFONE | | | No Coverage Issue | NO |
| | | RCOM (CDMA) | | | All SDCA Covered & week coverage on inter connecting highway | NO |
| | | TATA (CDMA) | | | Partial Coverage in all SDCA's | NO |

## 7.3 KEY FINDINGS ON DRIVE TEST:

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

(i) **In the Month of January-15**, drive tests were conducted across **Alwar** SSA covering Alwar, Ramgarh, Bansur, Mundawar, Behror, Khairthal, Tijara and Bhiwadi SDCAs for three consecutive days. The performance of the service providers in general was satisfactory as all operators largely met the benchmarks on SSA level **except BSNL**. **BSNL** could not meet the benchmark of parameters **Call Drop Rate (2.43%) and Voice Quality (91.95%)** on over all SSA basis.

(ii) **In the Month of February-15**, drive tests were conducted across **Banswara SSA** covering Garhi, Sagwara, Doongarpur, Banswara, Kushalgarh, Bagidora , Gahlot and Aspur SDCAs. The drive test results for this SSA also revealed that in general, all operators were doing well within the QoS norms on overall SSA basis except **BSNL. BSNL** remained non-compliant for parameters **Call Drop rate, Voice quality and Call Setup success rate** with its achieved values as **5.84%, 92.72% (Outdoor) / 91.98% (Indoor) and 89.74% (Outdoor) / 89.19% (Indoor)** respectively.

(iii) **In the month of March -15,** drive tests were conducted across **Bharatpur SSA** covering Deeg, Kaman, Nadbai, Dholpur, Bari, Baseri, Rupwas, Bharatpur and Bayana SDCAs. In  Bharatpur SSA also , only **BSNL** failed to meet the benchmark of parameter **Voice quality and  Call Setup success Rate** with its performance as **89.48% ( Outdoor) / 91.11% (Indoor) and  87.91% (Outdoor) / 90.63% (Indoor)** on overall SSA level. Other operators performed well within the benchmarks.

Though the Operators have shown good performance in general, but the deficiencies with respect to adequate coverage and voice quality, observed during the drive tests, at the various locations on the drive test plots  are detailed in the above **table -5, table 6 and  table 7** for the respective **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.**

*The performance of the service providers with regard to the Drive Test revealed that all the service providers performed well within the QoS norms.* **BSNL** *was the only operator which could not meet the benchmarks of the prime network parameters namely* **Call Drop Rate, Voice Quality and Call Setup Success rate** *across the above SSAs.*

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

**AVERAGED QUARTERLY PMR**

**V/S**

**AVERAGED QUARTERLY 3-DAYs LIVE MEASURMENT**
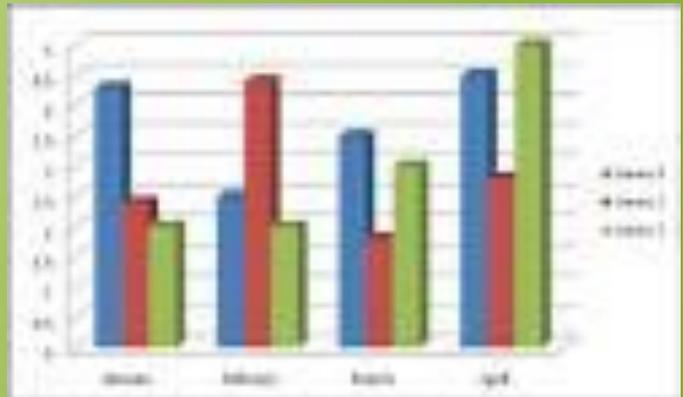
## 8. GRAPHICAL REPRESENTATION (CMTS):

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

### 1) BTS ACCUMULATED DOWNTIME

**BTS Accumulated Downtime**

| | AIRCEL | AIRTEL | BSNL | IDEA | RCOM GSM | TATA GSM | VODAFONE | RCOM CDMA | MTS | TATA CDMA |
|---|---|---|---|---|---|---|---|---|---|---|
| Quarterly PMR | 0.13% | 0.06% | 1.60% | 0.07% | 0.12% | 0.15% | 0.03% | 0.15% | 0.04% | 0.06% |
| Quarterly Live | 0.13% | 0.06% | 1.56% | 0.06% | 0.08% | 0.17% | 0.04% | 0.08% | 0.05% | 0.06% |
| Benchmark | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% |
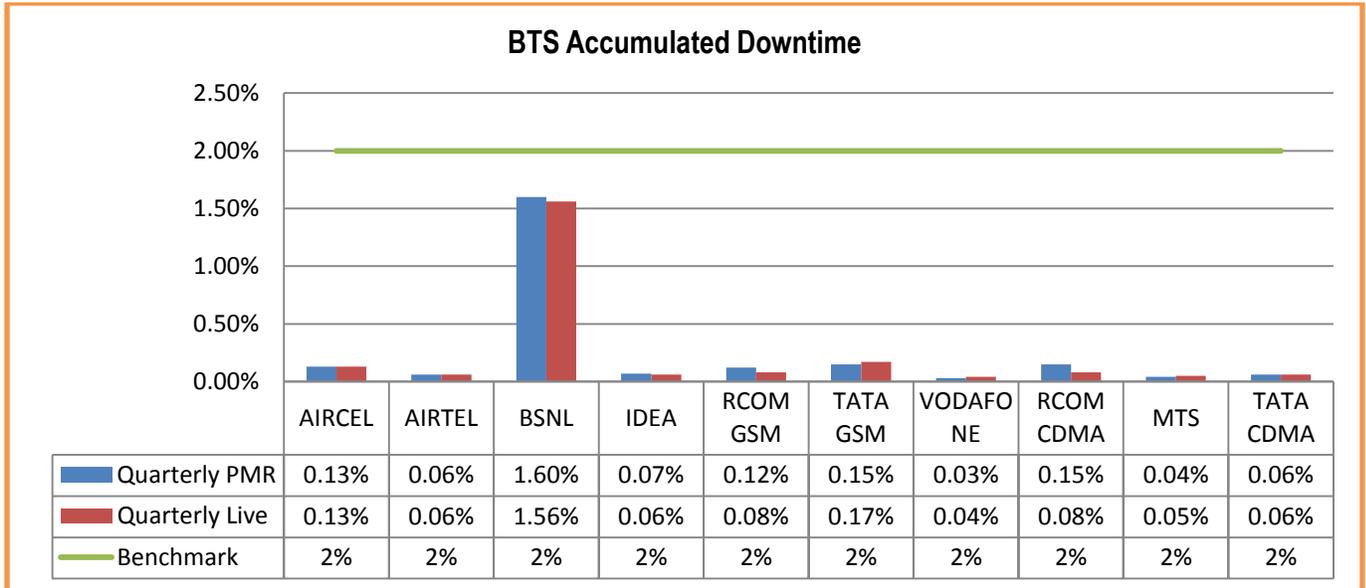
All operators are meeting the benchmarks.

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

**Worst affected BTSs due to downtime**

| | AIRCEL | AIRTEL | BSNL | IDEA | RCOM GSM | TATA GSM | VODAFONE | RCOM CDMA | MTS | TATA CDMA |
|---|---|---|---|---|---|---|---|---|---|---|
| Quarterly PMR | 0.52% | 0.11% | 1.78% | 0.07% | 0.11% | 0.21% | 0.10% | 0.39% | 0.00% | 0.10% |
| Quarterly Live | 0.02% | 0.02% | 0.12% | 0.00% | 0.00% | 0.07% | 0.01% | 0.00% | 0.00% | 0.00% |
| Benchmark | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% |
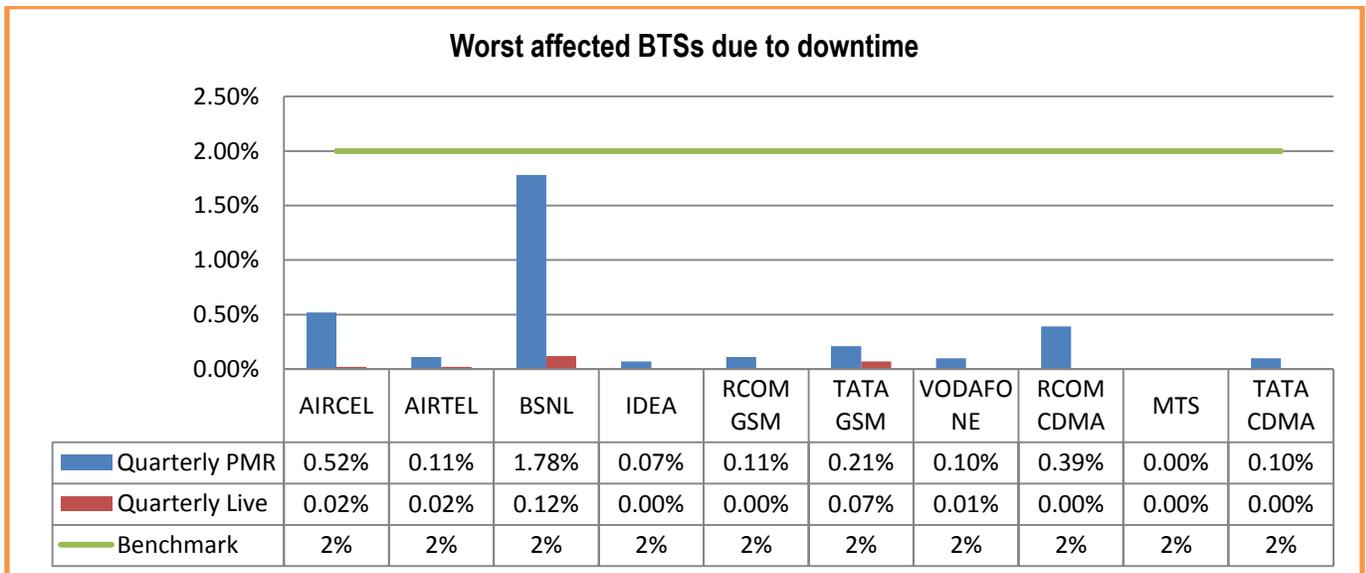
All operators are meeting the benchmarks.

**3) CALL SETUP SUCCESS RATE:**

**Call Setup Success Rate**

| | AIRCEL | AIRTEL | BSNL | IDEA | RCOM GSM | TATA GSM | VODAF ONE | RCOM CDMA | MTS | TATA CDMA |
|---|---|---|---|---|---|---|---|---|---|---|
| Quarterly PMR | 97.07% | 98.67% | 98.64% | 99.08% | 99.63% | 98.34% | 99.70% | 98.94% | 99.14% | 97.71% |
| Quarterly Live | 97.15% | 98.85% | 98.58% | 99.26% | 99.61% | 98.35% | 99.72% | 99.16% | 99.12% | 97.79% |
| Benchmark | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% |
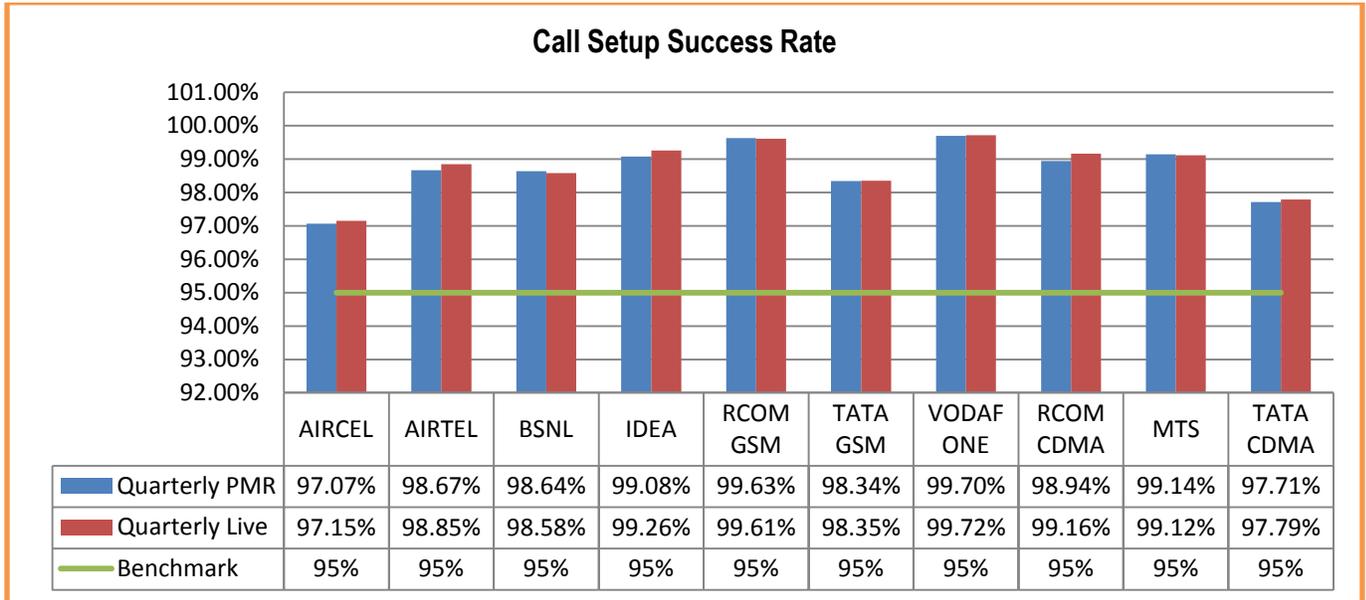
All operators are meeting the benchmarks.

**4) SDCCH/PAGING CHANNEL CONGESTION:**

**SDCCH/PAGING Channel Congestion**

| | AIRCEL | AIRTEL | BSNL | IDEA | RCOM GSM | TATA GSM | VODAFO NE | RCOM CDMA | MTS | TATA CDMA |
|---|---|---|---|---|---|---|---|---|---|---|
| Quarterly PMR | 0.30% | 0.20% | 0.54% | 0.29% | 0.02% | 0.08% | 0.15% | 0.00% | 0.00% | 0.00% |
| Quarterly Live | 0.20% | 0.14% | 0.43% | 0.21% | 0.01% | 0.12% | 0.08% | 0.00% | 0.00% | 0.00% |
| Benchmark | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% |
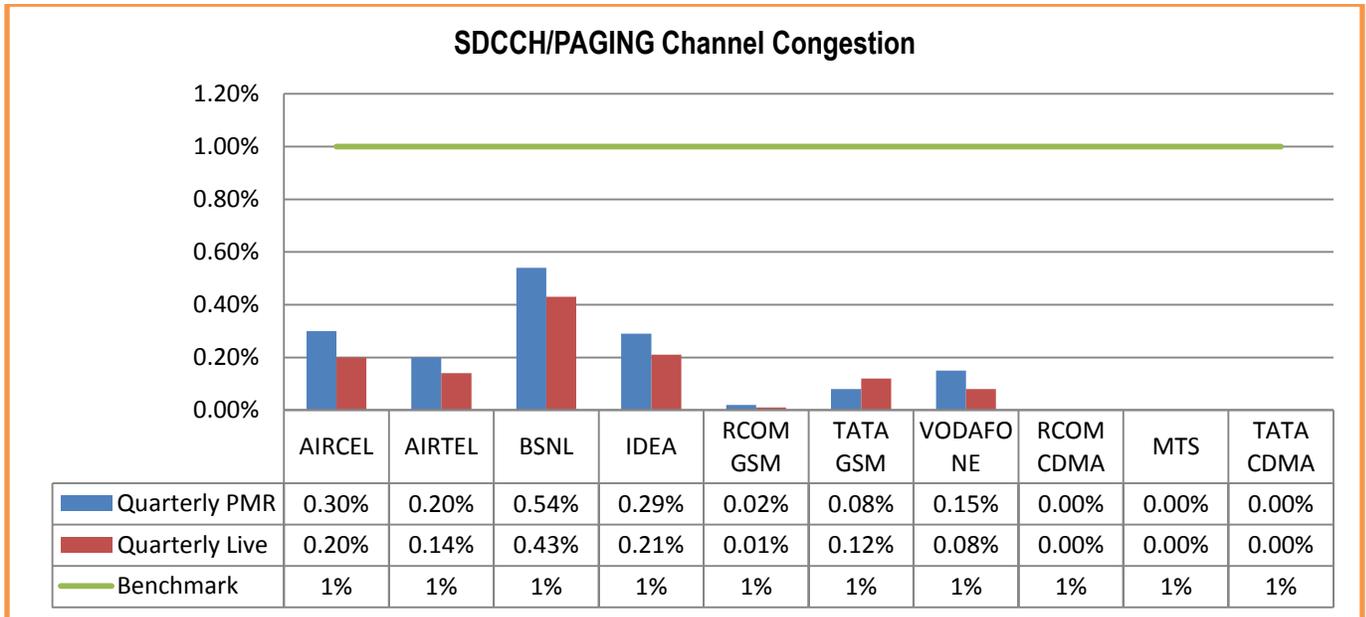
All operators are meeting the benchmarks.

**5) TCH CONGESTION:**

### TCH Congestion

|  | AIRCEL | AIRTEL | BSNL | IDEA | RCOM GSM | TATA GSM | VODAFONE | RCOM CDMA | MTS | TATA CDMA |
|---|---|---|---|---|---|---|---|---|---|---|
| Quarterly PMR | 0.58% | 0.48% | 1.72% | 0.55% | 0.05% | 0.10% | 0.30% | 0.01% | 0.17% | 1.45% |
| Quarterly Live | 0.48% | 0.42% | 1.77% | 0.36% | 0.05% | 0.13% | 0.28% | 0.01% | 0.20% | 1.39% |
| Benchmark | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% |
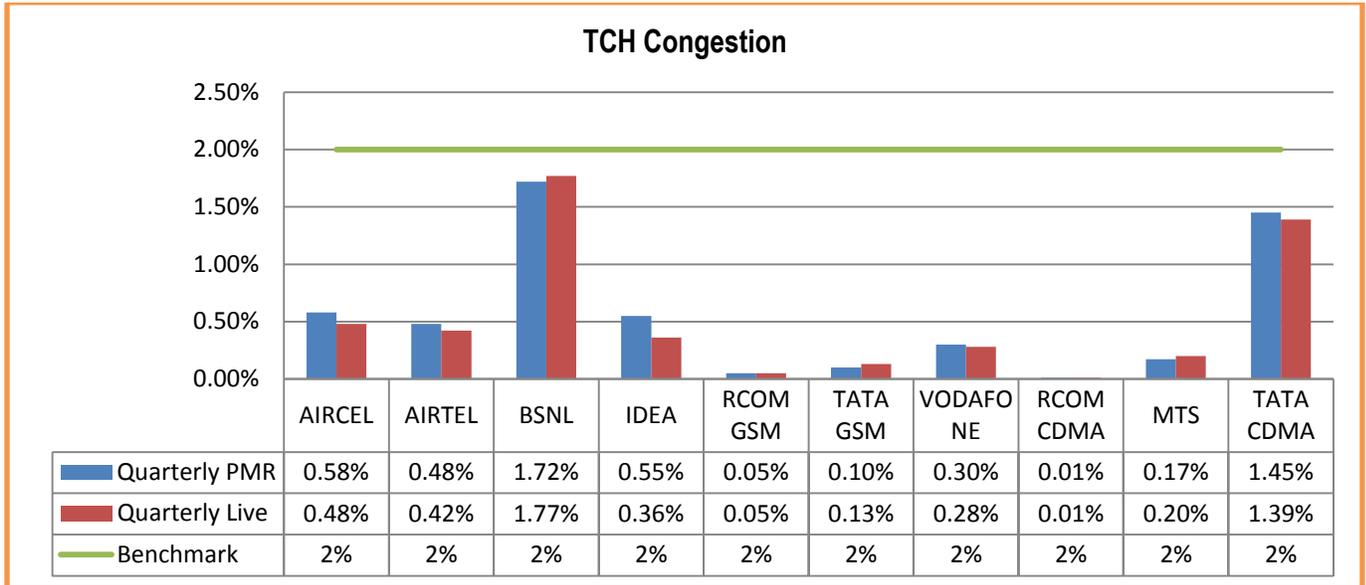
All operators are meeting the benchmarks.

**6) CALL DROP RATE:**

### Call Drop Rate

|  | AIRCEL | AIRTEL | BSNL | IDEA | RCOM GSM | TATA GSM | VODAFONE | RCOM CDMA | MTS | TATA CDMA |
|---|---|---|---|---|---|---|---|---|---|---|
| Quarterly PMR | 0.80% | 0.84% | 1.36% | 0.98% | 0.34% | 0.75% | 0.72% | 0.09% | 0.35% | 0.51% |
| Quarterly Live | 0.78% | 0.84% | 1.36% | 1.04% | 0.34% | 0.74% | 0.76% | 0.09% | 0.35% | 0.51% |
| Benchmark | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% |
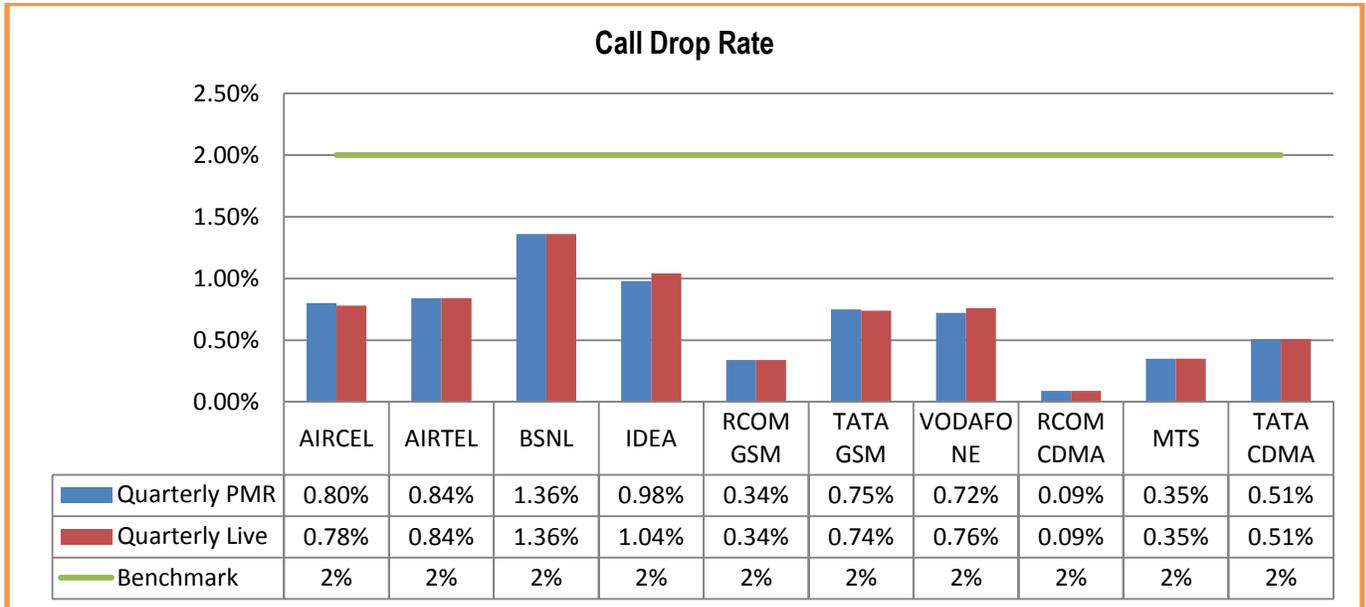
All operators are meeting the benchmarks.

## 7) WORST AFFECTED CELLS>3% TCH DROP:

### Worst affected cells>3% TCH drop

| | AIRCEL | AIRTEL | BSNL | IDEA | RCOM GSM | TATA GSM | VODAFO NE | RCOM CDMA | MTS | TATA CDMA |
|---|---|---|---|---|---|---|---|---|---|---|
| Quarterly PMR | 3.15% | 1.11% | 1.99% | 2.05% | 0.02% | 4.70% | 2.23% | 0.36% | 0.25% | 7.47% |
| Quarterly Live | 3.03% | 1.16% | 1.92% | 2.20% | 0.01% | 4.71% | 2.45% | 0.32% | 0.21% | 7.43% |
| Benchmark | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% |
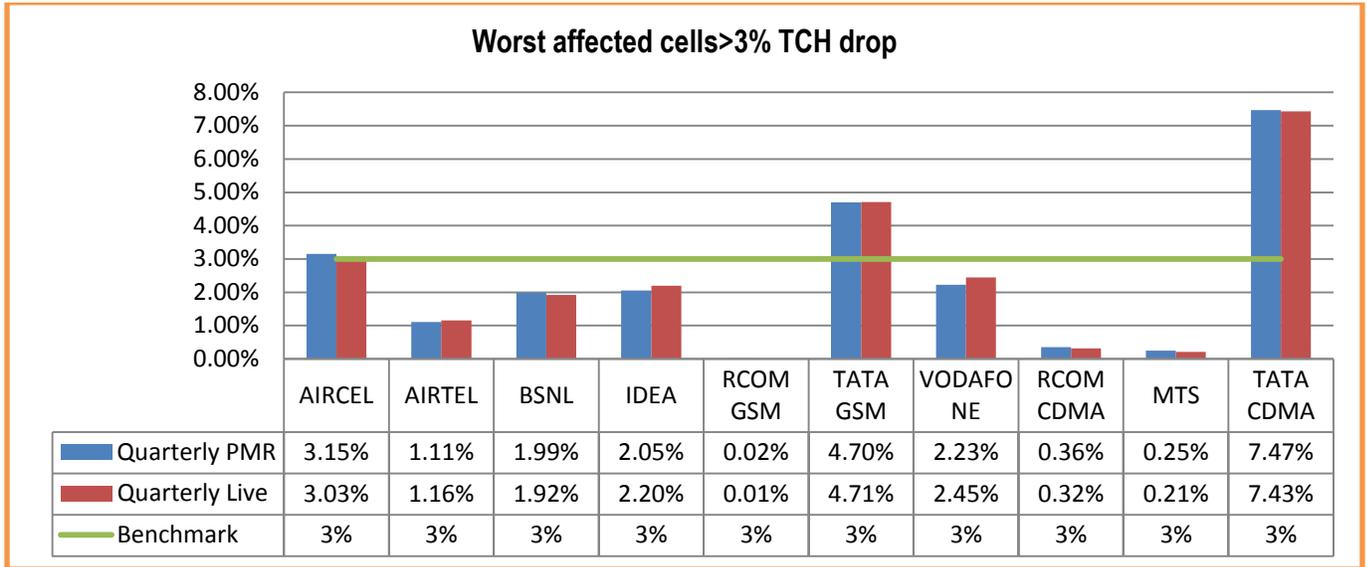
All operators are meeting the benchmarks except Aircel, Tata GSM and Tata CDMA.

## 8) PERCENTAGE OF CONNECTIONS WITH GOOD VOICE QUALITY:

### % Connections with good voice quality

| | AIRCEL | AIRTEL | BSNL | IDEA | RCOM GSM | TATA GSM | VODAF ONE | RCOM CDMA | MTS | TATA CDMA |
|---|---|---|---|---|---|---|---|---|---|---|
| Quarterly PMR | 96.63% | 98.98% | 98.42% | 96.23% | 98.62% | 98.58% | 97.07% | 99.72% | 99.21% | 98.95% |
| Quarterly Live | 96.69% | 99.00% | 98.44% | 96.17% | 98.61% | 98.58% | 97.07% | 99.73% | 99.21% | 98.94% |
| Benchmark | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% |

All operators are meeting the benchmarks.