Audit & Assessment of Quality of Service

Of

Cellular Mobile Telephone Service

For

Telecom Regulatory Authority Of India

North Zone – Rajasthan Service Area

(October 2014 – December 2014)

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PREFACE

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

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

TUV-SUD South Asia carried out QoS audit as per the norms of TRAI in all the eight circles / services areas of the North Zone and four circles of the West Zone. This report details the performance of the various service providers in **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 Delhi, Haryana and Mumbai circles during the quarter October – December 2014.**

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

i)   Preparation of Performance Monitoring reports (PMRs) and uploading in the system.

ii)   Live measurements of the performance of Service Providers (SPs) against the benchmarks for three days during each audit.

iii)   Monthly audit based on one month data of the SPs.

iv)   Drive test of the RF networks.

v)   Audit of the performance of call centers with respect to their accessibility and percentage of calls answered by the operators and random customer feedback by calling the customers to get feedback of the services provided by the service providers.

vi)   Transfer of data generated by the RF drive test/Live measurements / PMR/ monthly audit to the server located at TRAI premises on real time basis.

3. SAMPLE SIZE
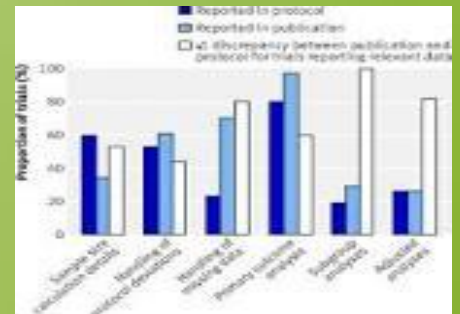
3. SAMPLE SIZE

3.1 SAMPLING FOR CELLULAR MOBILE (WIRELESS) SERVICE PROVIDERS

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

Sl. No.	Service Provider	Dates of live measurement Audit			Audit Location
	GSM Operators	October-14	November-14	December-14	
1	AIRCEL	20 to 22 Oct-14	7, 10 & 11 Nov-14	4, 5 & 8 Dec-14	Aircel limited, 1st & 2nd Floor, Navajyoti, Amrapali Circle,C-Block,Vaishali Nagar, Jaipur-302021
2	AIRTEL	13 to 15 Oct-14	10 to 12 Nov-14	8 to 10 Dec-14	Bharti Hexacom Limited, K-21, Malviya Marg, c-scheme , Jaipur-302001
3	BSNL	13 to 15 Oct-14	6 to 8 Nov-14	8 to 10 Dec-14	Bharat Sanchar Nigam Ltd. (BSNL) Room no. 116, Bajaj Nagar MSC, First Floor, BSNL Bajaj Nagar, JLN marg, Jaipur- 302015
4	IDEA	13 to 15 Oct-14	6 to 8 Nov-14	9 to 11 Dec-14	Idea Cellular Ltd. Plot-C, Sahkar Marg, Jaipur-302001
5	RCOM GSM	14 to 16 Oct-14	4 to 6 Nov-14	8 to 10 Dec-14	Reliance Communications Ltd. F-161, E-170, Road No-12, VKIA, Jaipur-302013
6	TATA GSM	17, 20 & 21 Oct-14	10 to 12 Nov-14	4, 5 & 8 Dec-14	Tata Teleservices Limited, The Guman-1, Amrapali circle, Vaishali nagar, jaipur-302021
7	VODAFONE	13 to 15 Oct-14	12 to 14 Nov-14	3 to 5 Dec-14	Vodafone Ltd. 5th Floor,Gaurav Tower,Malviya Nagar jaipur,-302017
	CDMA Operators				
8	MTS	16 to 18 Oct-14	19 to 21 Nov-14	3 to 5 Dec-14	Sistema Shyam Teleservices Ltd. 3, MTS Tower, Amrapali Circle Vaishali Nagar, Jaipur.
9	RCOM CDMA	14 to 16 Oct-14	4 to 6 Nov-14	8 to 10 Dec-14	Reliance Communications Ltd. F-161, E-170, Road No-12, VKIA, Jaipur-302013
10	TATA CDMA	17, 20 & 21 Oct-14	10 to 12 Nov-14	4, 5 & 8 Dec-14	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 December 2014.

The data generated by monthly PMR and 3-days live measurements audit for the period October 2014 to December 2014 has been successfully uploaded to the server located at TRAI premises.

3.2 SAMPLING FOR BASIC (WIRE LINE) SERVICES

- The QoS audit for basic (wire line) service is to be done for the number of exchanges spread over in about 10% of SDCAs with each service providers in specified circles **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 December- 2014.**

3.3 SAMPLING FOR BROADBAND SERVICE PROVIDERS

- TUV–SUD South Asia has to conduct the audit and assessment of Quality of Service of Broadband Service only in respect of the service providers who are having broadband subscriber base of more than 10,000 subscribers in their licensed service area, for 5% of Point of Presence (PoPs) spread over in 10% SDCAs in specified Telecom Circle **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 December- 2014.**

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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' which could not be met by **Tata Tele Services (TTSL). Tata (GSM)** and **Tata (CDMA)** could not meet the benchmark of this parameter with their achievement as **4.69% and 6.55%** respectively.

(ii) From **three days live measurement assessment**, it was found that the performance of all operators were satisfactory as they have largely met the benchmarks except the parameter '**Worst affected cells> 3 % TCH drops**", which could not be complied with by **Tata (GSM)** and **Tata (CDMA)** in all the three months of this quarter. The average performance of **Tata (GSM)** and **Tata (CDMA)** for this parameter was **4.40% and 6.12%** respectively
The similar non-compliance of Tata (GSM) and Tata (CDMA) was also observed for 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. However, **performance of Vodafone** remained non-complied for parameter **'Billing Complaints – Prepaid'** with its achieved value as **0.11%.**

All operators have 100 % resolved the billing complaints within stipulated period of 4 weeks and 6 weeks **except BSNL**. The performance of **BSNL** with respect to this parameter remained **short of benchmark** as they could resolve the complaints **62 .72% and 86.41%** within **4weeks and within 6 weeks**. Regarding accessibility to call center, only **Aircel** failed to meet the benchmark with its achieved value as **87.80%.**

The results of three days live measurements reveal that all **operators have met the benchmarks** for the parameter accessibility except **Aircel** remained **short of benchmark** with its performance as **51.99%.**

Regarding calls answered by operator (Voice to voice) within 90 seconds, **Aircel, BSNL, Tata (GSM) and Vodafone** remained **non-complied** with their performance as **68.36%, 59.54%, 92.73% and 89.53% respectively**.

(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 the above SSAs. Apart from this,* ***Idea*** *also could not meet the benchmark of* ***Voice Quality*** *in Indoor locations in Sawaimadhopur SSA.*

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	Dec- 2014	19:00 - 20:00
2	AIRTEL	Dec- 2014	20:00 - 21:00
3	BSNL	Dec- 2014	19:00 - 20:00
4	IDEA	Dec- 2014	19:00 - 20:00
5	RCOM GSM	Dec- 2014	20:00 - 21:00
6	TATA GSM	Dec- 2014	20:00 - 21:00
7	VODAFONE	Dec- 2014	19:00 - 20:00
CDMA Operators			
8	MTS	Dec- 2014	20:00 - 21:00
9	RCOM CDMA	Dec- 2014	19:00 - 20:00
10	TATA CDMA	Dec- 2014	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	13	1846	NSN	NSN
2	AIRTEL	44	84	8000	Ericsson	Ericsson
3	BSNL	17	56	3991	Ericsson	NSN & Ericsson
4	IDEA	11	42	6065	Ericsson	Ericsson
5	RCOM GSM	4	15	2077	Huawei	Huawei
6	TATA GSM	3	12	1397	Huawei	Huawei
7	VODAFONE	12	90	7012	NSN	NSN
CDMA Operators						
8	MTS	2	6	1632	ZTE	ZTE
9	RCOM CDMA	6	6	944	Huawai, Lucent, Ericsson & ZTE	Huawai & Lucent
10	TATA CDMA	5	6	693	Ericsson & Huawei	Huawai & Motorola

5.1.3 QOS PERFORMANCE OF MONTHLY PMR – OCTOBER-14 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 - OCTOBER 14 MONTH													
S/N	Name of Parameter			GSM Operators							CDMA Operators		
	Network Service Quality Parameter												
	Network Availability												
1	a) BTS Accumulated Downtime	<=2%	Oct-14	0.19%	0.07%	1.63%	0.06%	0.18%	0.12%	0.03%	0.20%	0.05%	0.08%
	b) Worst affected BTSs due to downtime	<=2%	Oct-14	0.56%	0.15%	1.81%	0.05%	0.34%	0.21%	0.14%	0.42%	0.06%	0.00%
	Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	>=95%	Oct-14	97.13%	99.02%	98.69%	98.95%	99.61%	98.48%	99.67%	99.06%	98.62%	97.85%
	b) SDCCH/PAGING Channel congestion	<=1%	Oct-14	0.22%	0.17%	0.49%	0.36%	0.03%	0.09%	0.19%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Oct-14	0.85%	0.29%	1.63%	0.65%	0.06%	0.06%	0.33%	0.01%	0.49%	1.31%
	Connection maintenance (Retainability)												
3	a) CDR (Call Drop Rate)	<=2%	Oct-14	0.79%	0.86%	1.45%	1.08%	0.37%	0.70%	0.74%	0.08%	0.64%	0.54%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Oct-14	2.76%	1.30%	2.34%	2.28%	0.03%	**4.66%**	2.31%	0.36%	0.58%	**4.80%**
	c) Connections with good voice quality	>=95%	Oct-14	97.03%	98.98%	98.45%	96.12%	98.63%	98.36%	97.02%	99.73%	99.19%	98.86%
4	No. of POI's having >=0.5% POI congestion		Oct-14	0	0	0	0	0	0	0	0	0	0

5.1.4 QOS PERFORMANCE OF MONTHLY PMR – NOVEMBER 14 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 – NOVEMBER 14 MONTH													
S/N	**Name of Parameter**			GSM Operators							CDMA Operators		
Network Service Quality Parameter													
Network Availability													
1	a) BTS Accumulated Downtime	<=2%	Nov-14	0.20%	0.07%	1.67%	0.08%	0.25%	0.17%	0.05%	0.30%	0.03%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	Nov-14	0.50%	0.13%	1.81%	0.05%	0.63%	0.00%	0.09%	0.74%	0.00%	0.00%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Nov-14	97.46%	99.09%	98.71%	99.20%	99.62%	98.44%	99.85%	99.04%	99.20%	97.47%
	b) SDCCH/PAGING Channel congestion	<=1%	Nov-14	0.14%	0.15%	0.47%	0.33%	0.02%	0.07%	0.10%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Nov-14	0.28%	0.29%	1.79%	0.49%	0.05%	0.08%	0.15%	0.01%	0.15%	1.72%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Nov-14	0.73%	0.84%	1.41%	0.96%	0.36%	0.74%	0.72%	0.07%	0.42%	0.52%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Nov-14	2.25%	0.99%	2.35%	2.21%	0.04%	**4.65%**	2.25%	0.34%	0.44%	**7.33%**
	c) Connections with good voice quality	>=95%	Nov-14	97.25%	99.06%	98.57%	96.22%	98.63%	98.41%	97.21%	99.73%	99.22%	98.89%
4	No. of POI's having >=0.5% POI congestion		Nov-14	0	0	0	0	0	0	0	0	0	0

5.1.5 QOS PERFORMANCE OF MONTHLY PMR – DECEMBER- 14 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 – DECEMBER 14 MONTH													
S/N	Name of Parameter			GSM Operators							CDMA Operators		
	Network Service Quality Parameter												
	Network Availability												
1	a) BTS Accumulated Downtime	<=2%	Dec-14	0.13%	0.05%	1.61%	0.05%	0.20%	0.17%	0.03%	0.18%	0.02%	0.13%
	b) Worst affected BTSs due to downtime	<=2%	Dec-14	0.65%	0.11%	1.80%	0.02%	0.48%	0.21%	0.10%	0.64%	0.00%	0.14%
	Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	>=95%	Dec-14	97.39%	99.18%	98.64%	99.50%	99.64%	98.35%	99.90%	99.02%	99.23%	98.10%
	b) SDCCH/PAGING Channel congestion	<=1%	Dec-14	0.25%	0.12%	0.59%	0.19%	0.02%	0.06%	0.07%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Dec-14	0.32%	0.25%	1.65%	0.16%	0.04%	0.09%	0.10%	0.01%	0.15%	1.09%
	Connection maintenance (Retainability)												
3	a) CDR (Call Drop Rate)	<=2%	Dec-14	0.69%	0.79%	1.37%	0.94%	0.35%	0.79%	0.72%	0.07%	0.38%	0.53%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Dec-14	2.52%	1.05%	2.17%	2.54%	0.06%	**4.75%**	2.29%	0.37%	0.14%	**7.51%**
	c) Connections with good voice quality	>=95%	Dec-14	96.83%	99.10%	98.52%	96.36%	98.66%	98.39%	97.20%	99.73%	99.23%	99.09%
4	No. of POI's having >=0.5% POI congestion		Dec-14	0	0	0	0	0	0	0	0	0	0

5.1.6 QOS PERFORMANCE OF QUARTERLY PMR –AVERAGE OF QE- DECEMBER 14 (OCTOBER TO DECEMBER 2014 MONTHS AUDITED DATA)

				AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	MTS	TATA CDMA
	PMR Generation Data	Bench- mark	Audit Period										
S/N	Name of Parameter						GSM Operators				CDMA Operators		
	Network Service Quality Parameter												
	Network Availability												
1	a) BTS Accumulated Downtime	<=2%	Quarterly	0.17%	0.06%	1.64%	0.06%	0.21%	0.15%	0.04%	0.23%	0.03%	0.07%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	0.57%	0.13%	1.81%	0.04%	0.48%	0.14%	0.11%	0.60%	0.02%	0.05%
	Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	97.33%	99.10%	98.68%	99.22%	99.62%	98.42%	99.81%	99.04%	99.02%	97.81%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.20%	0.15%	0.52%	0.29%	0.02%	0.07%	0.12%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.48%	0.28%	1.69%	0.43%	0.05%	0.08%	0.19%	0.01%	0.26%	1.37%
	Connection maintenance (Retainability)												
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	0.74%	0.83%	1.41%	0.99%	0.36%	0.74%	0.73%	0.07%	0.48%	0.53%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	2.51%	1.11%	2.29%	2.34%	0.04%	**4.69%**	2.28%	0.36%	0.39%	**6.55%**
	c) Connections with good voice quality	>=95%	Quarterly	97.04%	99.05%	98.51%	96.23%	98.64%	98.39%	97.14%	99.73%	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 <u>Paging Channel Occupancy Ratio</u>   (**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 quite 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 .07%) was for RCOM (CDMA) during the quarter.

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

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

The audit with respect to this parameter revealed that all the operators met the benchmark for this parameter except **Tata Tele Services (TTSL). Tata (GSM)** and **Tata (CDMA)** could not meet the benchmark of this parameter with their average achievement as **4.69% and 6.55%** 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 indicate 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) – OCTOBER 14 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES RAJASTHAN CIRCLE - OCTOBER 14 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	0.19%	0.07%	1.70%	0.08%	0.20%	0.08%	0.04%	0.24%	0.06%	0.07%
	b) Worst affected BTSs due to downtime	**<=2%**	Live data	0.00%	0.01%	0.18%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	**>=95%**	Live data	97.53%	99.15%	98.91%	99.56%	99.62%	98.54%	99.80%	98.92%	99.01%	97.73%
	b) SDCCH/PAGING Channel congestion	**<=1%**	Live data	0.10%	0.14%	0.51%	0.09%	0.02%	0.10%	0.05%	0.00%	0.00%	0.00%
	c) TCH congestion	**<=2%**	Live data	0.16%	0.25%	1.46%	0.13%	0.07%	0.04%	0.20%	0.01%	0.21%	1.49%
	Connection maintenance (Retainability)												
3	a) CDR (Call Drop Rate)	**<=2%**	Live data	0.69%	0.82%	1.48%	1.05%	0.38%	0.71%	0.76%	0.10%	0.63%	0.49%
	b) Worst affected cells>3% TCH drop (Call drop) rate	**<=3%**	Live data	2.15%	1.31%	2.27%	2.34%	0.03%	**4.41%**	2.29%	0.37%	0.58%	**3.98%**
	c) Connections with good voice quality	**>=95%**	Live data	97.25%	99.01%	99.00%	96.17%	98.55%	98.39%	97.30%	99.74%	99.20%	98.88%
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) – NOVEMBER 14 MONTH:

				AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	MTS	TATA CDMA
CELLULAR MOBILE TELEPHONE SERVICES RAJASTHAN CIRCLE- NOVEMBER 14 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	0.25%	0.07%	1.74%	0.06%	0.19%	0.07%	0.03%	0.21%	0.04%	0.03%
	b) Worst affected BTSs due to downtime	**<=2%**	Live data	0.00%	0.03%	0.15%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%
Connection Establishment (Accessibility)
2	a) CSSR (Call Setup Success Rate)	**>=95%**	Live data	97.44%	99.12%	98.65%	99.58%	99.62%	98.44%	99.87%	99.17%	99.16%	97.13%
	b) SDCCH/PAGING Channel congestion	**<=1%**	Live data	0.12%	0.14%	0.64%	0.38%	0.01%	0.05%	0.04%	0.00%	0.00%	0.00%
	c) TCH congestion	**<=2%**	Live data	0.22%	0.27%	1.80%	0.12%	0.05%	0.10%	0.13%	0.00%	0.22%	**2.06%**
Connection maintenance (Retainability)
3	a) CDR (Call Drop Rate)	**<=2%**	Live data	0.72%	0.87%	1.40%	0.95%	0.37%	0.75%	0.73%	0.08%	0.38%	0.51%
	b) Worst affected cells>3% TCH drop (Call drop) rate	**<=3%**	Live data	2.26%	1.08%	2.29%	2.14%	0.05%	**4.35%**	2.39%	0.34%	0.30%	**6.65%**
	c) Connections with good voice quality	**>=95%**	Live data	97.33%	99.04%	99.00%	96.19%	98.63%	98.40%	97.22%	99.72%	99.23%	98.90%
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) – DECEMBER 14 MONTH:

				AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	MTS	TATA CDMA
CELLULAR MOBILE TELEPHONE SERVICES RAJASTHAN CIRCLE- DECEMBER 14 MONTH													
Live measurement Data		Bench- mark	Average of 3 Days										
S/N	Name of Parameter						GSM Operators				CDMA Operators		
	Network Service Quality Parameter												
	Network Availability												
1	a) BTS Accumulated Downtime	**<=2%**	Live data	0.07%	0.04%	1.73%	0.04%	0.15%	0.11%	0.02%	0.11%	0.02%	0.03%
	b) Worst affected BTSs due to downtime	**<=2%**	Live data	0.06%	0.01%	0.13%	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	97.36%	99.14%	98.31%	99.47%	99.62%	98.41%	99.90%	99.17%	99.18%	98.42%
	b) SDCCH/PAGING Channel congestion	**<=1%**	Live data	0.20%	0.14%	0.62%	0.11%	0.02%	0.05%	0.09%	0.00%	0.00%	0.00%
	c) TCH congestion	**<=2%**	Live data	0.30%	0.26%	1.86%	0.19%	0.06%	0.07%	0.10%	0.00%	0.18%	0.71%
	Connection maintenance (Retainability)												
3	a) CDR (Call Drop Rate)	**<=2%**	Live data	0.70%	0.81%	1.40%	0.94%	0.36%	0.78%	0.70%	0.06%	0.36%	0.51%
	b) Worst affected cells>3% TCH drop (Call drop) rate	**<=3%**	Live data	2.71%	1.09%	2.14%	2.83%	0.02%	**4.44%**	2.12%	0.27%	0.23%	**7.74%**
	c) Connections with good voice quality	**>=95%**	Live data	96.83%	99.10%	98.33%	96.38%	98.60%	98.54%	97.20%	99.74%	99.22%	99.09%
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 OCTOBER TO DECEMBER 2014)

								GSM Operators					CDMA Operators		
QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT (AVERAGE OF QE - DEC 14) – 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	0.17%	0.06%	1.72%	0.06%	0.18%	0.09%	0.03%	0.19%	0.04%	0.04%
	b) Worst affected BTSs due to downtime	**<=2%**	Quarterly	0.02%	0.02%	0.15%	0.00%	0.00%	0.02%	0.01%	0.00%	0.00%	0.00%
	Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	**>=95%**	Quarterly	97.44%	99.14%	98.62%	99.54%	99.62%	98.46%	99.86%	99.09%	99.12%	97.76%
	b) SDCCH/PAGING Channel congestion	**<=1%**	Quarterly	0.14%	0.14%	0.59%	0.19%	0.02%	0.07%	0.06%	0.00%	0.00%	0.00%
	c) TCH congestion	**<=2%**	Quarterly	0.23%	0.26%	1.71%	0.15%	0.06%	0.07%	0.14%	0.00%	0.20%	1.42%
	Connection maintenance (Retainability)												
3	a) CDR (Call Drop Rate)	**<=2%**	Quarterly	0.70%	0.83%	1.43%	0.98%	0.37%	0.75%	0.73%	0.08%	0.46%	0.50%
	b) Worst affected cells>3% TCH drop (Call drop) rate	**<=3%**	Quarterly	2.37%	1.16%	2.23%	2.44%	0.03%	**4.40%**	2.27%	0.33%	0.37%	**6.12%**
	c) Connections with good voice quality	**>=95%**	Quarterly	97.14%	99.05%	98.78%	96.25%	98.59%	98.44%	97.24%	99.73%	99.22%	98.96%
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 **Tata (GSM)** and **Tata (CDMA)** in all the three months of this quarter. The average performance of **Tata (GSM)** and **Tata (CDMA)** for this parameter was **4.40% and 6.12%** respectively. **The similar non-compliance of Tata (GSM) and Tata (CDMA) was also observed for monthly 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													
1	**Network Availability**												
	a) Total no. of BTSs in the licensed service area		Oct-14	1784	7921	3967	5887	2076	1397	6897	943	1625	693
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Oct-14	2466.08	4186.92	48192.17	2422.72	2866.45	1244.53	1602.75	1385.02	613.44	407.40
	c) BTS Accumulated Downtime	<=2%	Oct-14	0.19%	0.07%	1.63%	0.06%	0.18%	0.12%	0.03%	0.20%	0.05%	0.08%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Oct-14	10	12	72	3	7	3	10	4	1	0
	e) Worst affected BTSs due to downtime	<=2%	Oct-14	0.56%	0.15%	1.81%	0.05%	0.34%	0.21%	0.14%	0.42%	0.06%	0.00%
2	**Connection Establishment (Accessibility)**												
	a) CSSR (Call Setup Success Rate)	>=95%	Oct-14	97.13%	99.02%	98.69%	98.95%	99.61%	98.48%	99.67%	99.06%	98.62%	97.85%
	b) SDCCH/PAGING Congestion	<=1%	Oct-14	0.22%	0.17%	0.49%	0.36%	0.03%	0.09%	0.19%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Oct-14	0.85%	0.29%	1.63%	0.65%	0.06%	0.06%	0.33%	0.01%	0.49%	1.31%
3	**Connection Maintenance (Retainability)**												
	a) Call Drop Rate (CDR)	<=2%	Oct-14	0.79%	0.86%	1.45%	1.08%	0.37%	0.70%	0.74%	0.08%	0.64%	0.54%
	b) Worst affected cells>3% TCH drop	<=3%	Oct-14	2.76%	1.30%	2.34%	2.28%	0.03%	**4.66%**	2.31%	0.36%	0.58%	**4.80%**
	c) % of connections with good voice quality	>=95%	Oct-14	97.03%	98.98%	98.45%	96.12%	98.63%	98.36%	97.02%	99.73%	99.19%	98.86%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Oct-14	146	309	230	411	2	195	486	10	30	107
	e) Total no. of cells (Sector) in the licensed service area		Oct-14	5294	23692	9823	17994	6206	4192	20990	2825	5268	2219
4	**No. of POI's having >=0.5% POI congestion**												
	No. of POI's having >=0.5% POI congestion		Oct-14	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Oct-14	0	0	0	0	0	0	0	0	0	0
5	**Network Data**												
	a) Equipped Capacity of Network in Erlang		Oct-14	93846	440666	265400	247600	102000	66038	274922	116000	122000	171585
	b) Total traffic in TCBH in erlang (Avg.)		Oct-14	87855	392194	105131	162588	74450	28395	240071	27134	61326	26591
	c) Total no. of customers served (as per VLR) on last day of the month		Oct-14	3414699	15575726	2629681	6618767	4915337	599668	10113849	920422	1290470	364882

Title: Detailed Network Data Assessment of Cellular Mobile Telephone Services- Rajasthan Circle- October-14 month

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
	Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Rajasthan Circle- Oct-14 month												
						GSM Operators					CDMA Operators		
Network Service Quality Parameter													
1	**Network Availability**												
	a) Total no. of BTSs in the licensed service area		Live data	1781	7912	3949	5834	2076	1397	6870	943	1620	693
	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	247.31	423.60	4827.80	327.07	299.42	80.09	205.39	164.53	68.59	33.40
	c) BTS Accumulated Downtime	<=2%	Live data	0.19%	0.07%	1.70%	0.08%	0.20%	0.08%	0.04%	0.24%	0.06%	0.07%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	1	7	0	0	0	0	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.01%	0.18%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
2	**Connection Establishment (Accessibility)**												
	a) CSSR (Call Setup Success Rate)	>=95%	Live data	97.53%	99.15%	98.91%	99.56%	99.62%	98.54%	99.80%	98.92%	99.01%	97.73%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.10%	0.14%	0.51%	0.09%	0.02%	0.10%	0.05%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.16%	0.25%	1.46%	0.13%	0.07%	0.04%	0.20%	0.01%	0.21%	1.49%
3	**Connection Maintenance (Retainability)**												
	a) Call Drop Rate (CDR)	<=2%	Live data	0.69%	0.82%	1.48%	1.05%	0.38%	0.71%	0.76%	0.10%	0.63%	0.49%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	2.15%	1.31%	2.27%	2.34%	0.03%	**4.41%**	2.29%	0.37%	0.58%	**3.98%**
	c) % of connections with good voice quality	>=95%	Live data	97.25%	99.01%	99.00%	96.17%	98.55%	98.39%	97.30%	99.74%	99.20%	98.88%
	d) d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	114	311	223	421	2	185	481	10	31	88
	e) Total no. of cells (Sector) in the licensed service area		Live data	5313	23682	9823	17984	6203	4192	20980	2825	5270	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

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
Detailed Network Data Assessment of Cellular Mobile Telephone Services- Rajasthan Circle- November 14 month
							GSM Operators					CDMA Operators		
Network Service Quality Parameter
	Network Availability												
1	a) Total no. of BTSs in the licensed service area		Nov-14	1811	7945	3975	5950	2077	1397	6950	943	1628	693
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Nov-14	2581.74	3491.32	47884.47	3606.57	3665.60	1681.28	2260.64	2014.35	306.34	324.10
	c) BTS Accumulated Downtime	<=2%	Nov-14	0.20%	0.07%	1.67%	0.08%	0.25%	0.17%	0.05%	0.30%	0.03%	0.00%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Nov-14	9	10	72	3	13	0	6	7	0	0
	e) Worst affected BTSs due to downtime	<=2%	Nov-14	0.50%	0.13%	1.81%	0.05%	0.63%	0.00%	0.09%	0.74%	0.00%	0.00%
	Connection Establishment (Accessibility)												
2	a) CSSR (Call Setup Success Rate)	>=95%	Nov-14	97.46%	99.09%	98.71%	99.20%	99.62%	98.44%	99.85%	99.04%	99.20%	97.47%
	b) SDCCH/PAGING Congestion	<=1%	Nov-14	0.14%	0.15%	0.47%	0.33%	0.02%	0.07%	0.10%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Nov-14	0.28%	0.29%	1.79%	0.49%	0.05%	0.08%	0.15%	0.01%	0.15%	1.72%
	Connection Maintenance (Retainability)												
3	a) Call Drop Rate (CDR)	<=2%	Nov-14	0.73%	0.84%	1.41%	0.96%	0.36%	0.74%	0.72%	0.07%	0.42%	0.52%
	b) Worst affected cells>3% TCH drop	<=3%	Nov-14	2.25%	0.99%	2.35%	2.21%	0.04%	4.65%	2.25%	0.34%	0.44%	7.33%
	c) % of connections with good voice quality	>=95%	Nov-14	97.25%	99.06%	98.57%	96.22%	98.63%	98.41%	97.21%	99.73%	99.22%	98.89%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Nov-14	120	235	231	403	2	195	476	10	23	163
	e) Total no. of cells (Sector) in the licensed service area		Nov-14	5359	23759	9823	18205	6208	4192	21158	2825	5305	2219
	No. of POI's having >=0.5% POI congestion												
4	No. of POI's having >=0.5% POI congestion		Nov-14	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Nov-14	0	0	0	0	0	0	0	0	0	0
	Network Data												
5	a) Equipped Capacity of Network in Erlang		Nov-14	95123	440323	265400	252626	102000	66038	275940	116000	122000	171585
	b) Total traffic in TCBH in erlang (Avg.)		Nov-14	87841	409991	106502	167843	78565	29069	246181	27801	62053	26584
	c) Total no. of customers served (as per VLR) on last day of the month		Nov-14	3564676	15651813	2636060	6606863	5154653	578590	9875790	890761	1301091	360513

TABLE: 4

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	1791	7931	3967	5892	2076	1397	6909	943	1626	693
	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	319.31	400.67	4962.83	233.62	280.15	66.67	144.59	142.73	49.36	14.15
	c) BTS Accumulated Downtime	<=2%	Live data	0.25%	0.07%	1.74%	0.06%	0.19%	0.07%	0.03%	0.21%	0.04%	0.03%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	2	6	0	0	0	1	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.03%	0.15%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%
2	**Connection Establishment (Accessibility)**												
	a) CSSR (Call Setup Success Rate)	>=95%	Live data	97.44%	99.12%	98.65%	99.58%	99.62%	98.44%	99.87%	99.17%	99.16%	97.13%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.12%	0.14%	0.64%	0.38%	0.01%	0.05%	0.04%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.22%	0.27%	1.80%	0.12%	0.05%	0.10%	0.13%	0.00%	0.22%	**2.06%**
3	**Connection Maintenance (Retainability)**												
	a) Call Drop Rate (CDR)	<=2%	Live data	0.72%	0.87%	1.40%	0.95%	0.37%	0.75%	0.73%	0.08%	0.38%	0.51%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	2.26%	1.08%	2.29%	2.14%	0.05%	**4.35%**	2.39%	0.34%	0.30%	**6.65%**
	c) % of connections with good voice quality	>=95%	Live data	97.33%	99.04%	99.00%	96.19%	98.63%	98.40%	97.22%	99.72%	99.23%	98.90%
	d) d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	121	258	225	389	3	182	505	10	16	148
	e) Total no. of cells (Sector) in the licensed service area		Live data	5348	23753	9823	18151	6206	4189	21116	2825	5309	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- Nov 14 month

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
	Detailed Network Data Assessment of Cellular Mobile Telephone Services- Rajasthan Circle- December 14 month												
								GSM Operators			CDMA Operators		
Network Service Quality Parameter													
1	**Network Availability**												
	a) Total no. of BTSs in the licensed service area		Dec-14	1846	8000	3991	6065	2077	1397	7012	944	1632	693
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Dec-14	1717.46	2646.30	47943.16	2149.00	3134.38	1807.82	1707.52	1296.83	267.20	677.64
	c) BTS Accumulated Downtime	<=2%	Dec-14	0.13%	0.05%	1.61%	0.05%	0.20%	0.17%	0.03%	0.18%	0.02%	0.13%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Dec-14	12	9	72	1	10	3	7	6	0	1
	e) Worst affected BTSs due to downtime	<=2%	Dec-14	0.65%	0.11%	1.80%	0.02%	0.48%	0.21%	0.10%	0.64%	0.00%	0.14%
2	**Connection Establishment (Accessibility)**												
	a) CSSR (Call Setup Success Rate)	>=95%	Dec-14	97.39%	99.18%	98.64%	99.50%	99.64%	98.35%	99.90%	99.02%	99.23%	98.10%
	b) SDCCH/PAGING Congestion	<=1%	Dec-14	0.25%	0.12%	0.59%	0.19%	0.02%	0.06%	0.07%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Dec-14	0.32%	0.25%	1.65%	0.16%	0.04%	0.09%	0.10%	0.01%	0.15%	1.09%
3	**Connection Maintenance (Retainability)**												
	a) Call Drop Rate (CDR)	<=2%	Dec-14	0.69%	0.79%	1.37%	0.94%	0.35%	0.79%	0.72%	0.07%	0.38%	0.53%
	b) Worst affected cells>3% TCH drop	<=3%	Dec-14	2.52%	1.05%	2.17%	2.54%	0.06%	**4.75%**	2.29%	0.37%	0.14%	**7.51%**
	c) % of connections with good voice quality	>=95%	Dec-14	96.83%	99.10%	98.52%	96.36%	98.66%	98.39%	97.20%	99.73%	99.23%	99.09%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Dec-14	138	250	213	471	4	199	490	11	8	167
	e) Total no. of cells (Sector) in the licensed service area		Dec-14	5459	23877	9823	18512	6209	4189	21359	2828	5338	2219
4	**No. of POI's having >=0.5% POI congestion**												
	No. of POI's having >=0.5% POI congestion		Dec-14	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Dec-14	0	0	0	0	0	0	0	0	0	0
5	**Network Data**												
	a) Equipped Capacity of Network in Erlang		Dec-14	95747	439689	265400	258982	102000	66038	277923	116000	122000	171585
	b) Total traffic in TCBH in erlang (Avg.)		Dec-14	87178	390900	101547	167174	68984	28292	240869	37140	58677	25554
	c) Total no. of customers served (as per VLR) on last day of the month		Dec-14	3559090	16154966	2618384	6738555	5047820	576918	9969866	881849	1313329	337266

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													
	Network Availability												
1	a) Total no. of BTSs in the licensed service area		Live data	1818	7961	3975	5979	2076	1397	6970	944	1628	693
	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	86.69	245.95	4956.69	157.73	218.37	107.21	102.46	71.57	19.26	15.96
	c) BTS Accumulated Downtime	<=2%	Live data	0.07%	0.04%	1.73%	0.04%	0.15%	0.11%	0.02%	0.11%	0.02%	0.03%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	1	1	5	0	0	1	1	0	0	0
	e) Worst affected BTSs due to downtime	<=2%	Live data	0.06%	0.01%	0.13%	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	97.36%	99.14%	98.31%	99.47%	99.62%	98.41%	99.90%	99.17%	99.18%	98.42%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.20%	0.14%	0.62%	0.11%	0.02%	0.05%	0.09%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.30%	0.26%	1.86%	0.19%	0.06%	0.07%	0.10%	0.00%	0.18%	0.71%
	Connection Maintenance (Retainability)												
3	a) Call Drop Rate (CDR)	<=2%	Live data	0.70%	0.81%	1.40%	0.94%	0.36%	0.78%	0.70%	0.06%	0.36%	0.51%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	2.71%	1.09%	2.14%	2.83%	0.02%	**4.44%**	2.12%	0.27%	0.23%	**7.74%**
	c) % of connections with good voice quality	>=95%	Live data	96.83%	99.10%	98.33%	96.38%	98.60%	98.54%	97.20%	99.74%	99.22%	99.09%
	d) d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	147	260	210	521	1	186	452	8	12	172
	e) Total no. of cells (Sector) in the licensed service area		Live data	5426	23834	9823	18413	6209	4189	21311	2828	5316	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

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Rajasthan Circle- Dec-14 month

CUSTOMER SERVICE QUALITY (CSD) PARAMETERS

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

5.3.1 QUARTERLY CUSTOMER SERVICE DELIVERY (CSD) AUDITED DATA FOR CELLULAR MOBILE SERVICES (OCTOBER TO DECEMBER 2014 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	140800	870496	391963	215464	105532	NA	1499226	215956	173815	115978
	B) No. of bills disputed including billing complaints during the quarter		RAJ	0	145	175	175	66	NA	976	157	130	0
	C)% of billing complaints during the quarter	<= 0.1%	RAJ	**0.00%**	**0.02%**	**0.04%**	**0.08%**	**0.06%**	**NA**	**0.07%**	**0.07%**	**0.07%**	**0.00%**
2	**Metering & Billing Credibility -Pre Paid**												
	A) Total No. of Pre-paid customers at the end of the quarter		RAJ	5399125	16313981	3217305	6424990	5220185	833273	10112394	2138926	905316	619540
	B) Total No. of complaints relating to charging, Credit and Validity during the quarter		RAJ	167	89	2913	4060	4623	0	10892	565	778	0
	C) % of Pre-paid Charging Complaints	<= 0.1%	RAJ	**0.003%**	**0.001%**	**0.09%**	**0.06%**	**0.09%**	**0.00%**	**0.11%**	**0.03%**	**0.09%**	**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	167	234	971	7225	4689	51	11868	722	908	65
	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	167	234	609	7225	4689	51	11868	722	908	65

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		
	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	167	234	839	7225	4689	51	11868	722	908	65
	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%	62.72%	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%	86.41%	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	22484354	5476714	310915	20964773	19457168	166519	18927433	5983762	1714578	80589
	B) Total no. of calls successfully established to customer care/Call center.		RAJ	19740709	5474884	296773	20708904	19249497	164504	18927433	5734783	1679159	79316
4	C) % Accessibility of Call centre /customer Care (Total calls successfully established *100/ Total call attempts)	>=95%	RAJ	87.80%	99.97%	95.45%	98.78%	98.93%	98.79%	100.00%	95.84%	97.93%	98.42%
	D) Total Calls reached to operator for Voice to Voice (Total call attempts)		RAJ	4911406	9478742	163685	6767342	1153919	161829	7410376	2556954	184354	131402
	E) Total number of calls answered by the operator (Voice to voice) within 90 seconds		RAJ	4671863	9304084	157849	6731904	1150085	155716	7279395	2494552	183251	128069

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	95.12%	98.16%	96.43%	99.48%	99.67%	96.22%	98.23%	97.56%	99.40%	97.46%
	Termination/closure of service												
5	A) Total No. of requests for Termination / Closure of service received during the quarter		RAJ	1043	1572	5168	2256	925	NA	8549	4157	904	872
	B) No. of requests for Termination / Closure of service complied within 7 days during the quarter		RAJ	1043	1572	5168	2256	925	NA	8549	4157	904	872
	C) % of Termination/ Closure of service within 7 days	<=7days	RAJ	100.00%	100.00%	100.00%	100.00%	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	547	1565	1628	1749	745	NA	14699	78	1164	230
	B) No. of Payments/ Refunds Cleared during the quarter		RAJ	547	1565	1628	1749	745	NA	14699	78	1164	230
	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	100.00%	100.00%	100.00%	100.00%

NA: Tata (GSM) has no post-paid connections.

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

CSD 3 DAYS LIVE DATA FOR CELLULAR MOBILE TELEPHONE SERVICES-QE-DECEMBER 14												
3 days live CSD Audit Data		**Bench-mark**	**Circle Name**	**AIRCEL**	**AIRTEL**	**BSNL**	**IDEA**	**RCOM (GSM)**	**TATA (GSM)**	**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	1592140	175133	19695	778383	605596	8474	649019	204878	88413	4614
	Total no. of calls successfully established to customer care/Call center		Rajasthan	827764	175133	18758	775039	599347	8319	649019	198542	87453	4585
	% Accessibility of Call centre /customer Care (Total call successfully established *100 / Total call attempt)	>=95%	Rajasthan	**51.99%**	**100.00%**	**95.24%**	**99.57%**	**98.97%**	**98.17%**	**100.00%**	**96.91%**	**98.91%**	**99.37%**
	Total Calls reached to Operator for Voice to Voice (Total call attempts)		Rajasthan	169723	298049	8583	229808	34744	6329	223658	80146	4828	4527
	Total number of calls answered by the operator (Voice to voice) within 90 seconds		Rajasthan	116021	284251	5110	228348	34653	5869	200236	79683	4790	4452
	% age of calls answered by operator(voice to voice) (Total call successfully established within 90 Sec.*100 / Total call attempts)	>=95%	Rajasthan	**68.36%**	**95.37%**	**59.54%**	**99.36%**	**99.74%**	**92.73%**	**89.53%**	**99.42%**	**99.21%**	**98.34%**

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 except **Vodafone. The performance of Vodafone** remained non-complied for parameter **'Billing Complaints – Prepaid'** with its achieved value as **0.11%.**

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 **except BSNL**. The performance of **BSNL** with respect to this parameter remained **short of benchmark** as they could resolve the complaints **62 .72% and 86.41%** within **4weeks and within 6 weeks respectively**.

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 87.80%.**

Regarding Calls answered by operator (Voice to Voice), all operators have met the benchmark of >95%.

4. Termination/Closure of Service

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

5. Time Taken for Refund of deposits after closures

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

Live Measurements:

The results of three days live measurements reveal that all **operators have met the benchmarks** for the parameter accessibility. Only **Aircel** remained **short of benchmark** for parameter **Accessibility** to call center with its performance as **51.99%.**

Regarding calls answered by operator (Voice to voice) within 90 seconds, **Aircel, BSNL, Tata (GSM) and Vodafone** remained non-**complied** with their performance as **68.36%, 59.54%, 92.73% and 89.53% respectively**.

6. LIVE CALLING ASSESSMENT

6. LIVE CALLING ASSESSMENT:

6.1 INTER OPERATOR CALLS ASSESSMENT:

Inter operator call assessment with a sample of 2x50 test calls for each Service provider operating in 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%	96%	97%	100%	100%	100%	100%
AIRTEL	*Rajasthan*	100%	--	100%	100%	100%	100%	100%	100%	100%	100%
BSNL	*Rajasthan*	95%	100%	--	100%	100%	100%	100%	100%	100%	100%
IDEA	*Rajasthan*	100%	100%	100%	--	100%	100%	100%	95%	100%	100%
RCOM (GSM)	*Rajasthan*	100%	100%	100%	96%	--	100%	100%	100%	100%	100%
TATA (GSM)	*Rajasthan*	94%	100%	100%	100%	97%	--	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. However, in case where calls attempted from Aircel to RCOM GSM & Tata GSM, successful interconnection was 96.0% and 97%, BSNL to Aircel was 95%, Idea to MTS was 95%, RCOM GSM to Idea was 96% and Tata (GSM) to Aircel & RCOM GSM was 94% and 97%, respectively. 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	100	100	99	99	100	98	99	99
% Accessibility of Call centre /customer Care (Total call successfully established *100 / Total call attempt)	Rajasthan	100.00%	100.00%	100.00%	100.00%	99.00%	99.00%	100.00%	98.00%	99.00%	99.00%
Total Calls reached to agent desk for Voice to Voice (Total call attempt)	Rajasthan	100	100	100	100	99	99	100	98	99	99
Total number of calls answered by the operator (Voice to voice) within 90 seconds	Rajasthan	100	100	100	100	99	98	100	96	99	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%	100.00%	100.00%	100.00%	98.99%	100.00%	97.96%	100.00%	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 Tata (GSM), MTS and Tata (CDMA), the calls answered by operators were 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	100	100	100	100	100	51	100	100	100	65
Total No. of calls Answered	Rajasthan	41	62	33	55	48	28	76	39	30	29
Cases resolved within 4 weeks	Rajasthan	41	62	33	55	48	28	76	39	30	29
%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 less due to less number of billing complaints. During live calling, there was mix type of the feedback. Some of the customers reported that there complaints have been resolved but not remember of duration of their resolution. However, the customers generally reported their satisfaction on resolution of the billing complaints.

6.4 LEVEL -1 CALLING ASSESSMENT:

Emergency no.	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, 108, 1090	KOTA	Ladpura (KOTA)	8	√	√	√	√	√	√	√	√	√	√
		Digod (Sultanpur)	8	√	√	√	√	√	√	√	√	√	√
		Baran	8	√	√	√	√	√	√	√	√	√	√
		Kishanganj (Bhanwargarh)	8	√	√	√	√	√	√	√	√	√	√
		Atru	8	√	√	√	√	√	√	√	√	√	√
		Chhipaborad	8	√	√	√	√	√	√	√	√	√	√
		Ramganj Mandi	8	√	√	√	√	√	√	√	√	√	√
		Sangod	8	√	√	×	√	√	√	√	√	√	√
100, 101, 108, 1090	SAWAIMADHOPUR	Sawaimadhopur,	8	√	√	√	√	√	√	√	√	√	√
		Khandar,	8	√	√	√	√	√	√	√	√	√	√
		Bonli,	8	√	√	√	√	√	√	√	√	√	√
		Gangapur,	8	√	√	√	√	√	√	√	√	√	√
		Bamanwas,	8	√	√	√	√	√	√	√	√	√	√
		Karauli,	8	√	√	√	√	√	√	√	√	√	√
		Hindaun	8	√	√	√	√	√	√	√	√	√	√
100, 101, 108, 1090	SIROHI	Sirohi,	8	√	√	√	√	√	√	√	√	√	√
		Sheoganj (Posaliyan),	8	√	√	√	√	√	√	√	√	√	√
		Ahore.	8	√	√	√	√	√	√	√	√	√	√
		Bhinmal (N),	8	√	√	√	√	√	√	√	√	√	√
		Jalore,	8	√	√	√	√	√	√	√	√	√	√
		Jalore (W) (Sayla)	8	√	√	√	√	√	√	√	√	√	√
		Abu Road,	8	√	√	√	√	√	√	√	√	√	√
		Pindwara.	8	√	√	√	√	√	√	√	√	√	√

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 **BSNL** in **Sangod SDCA** of Kota SSA.

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 **Kota, Sawaimadhopur and Sirohi** in the months of October, November and December 2014 respectively .The total route Kms covered during the drive tests in the respective SSAs was **536Kms, 485Kms and 422Kms**. The performance of the operators has been highlighted below in the tables. The drive test was conducted simultaneously for all the operators following the same route of drive tests. The holding period for all test calls was 120 seconds. The drive test vehicle across all routes plied at a speed of about 30-50 km per hour.

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

OPERATOR ASSISTED DRIVE TEST AT KOTA SSA IN OCTOBER 14 MONTH- RAJASTHAN CIRCLE

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
1	Call Attempts	Major Roads	43	30	40	30	20	32	41	31	44	32	27	31	49	30	40	33	29	31	49	32
		Highways	192	30	288	30	191	49	197	30	204	30	207	31	266	30	227	32	182	31	80	32
		Within City	217	30	228	30	149	26	211	31	194	31	181	31	215	30	200	31	184	32	230	31
		Overall SSA	**452**	**90**	**556**	**90**	**360**	**107**	**449**	**92**	**442**	**93**	**415**	**93**	**530**	**90**	**467**	**96**	**395**	**94**	**359**	**95**
2	Blocked Call Rate	Major Roads	0.00%	0.00%	0.00%	0.00%	15.00%	15.63%	0.00%	0.00%	0.00%	0.00%	3.70%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Highways	0.00%	0.00%	0.00%	0.00%	10.99%	6.12%	0.00%	0.00%	0.00%	0.00%	1.93%	0.00%	0.38%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Within City	0.00%	0.00%	0.00%	0.00%	4.03%	7.69%	0.00%	3.23%	0.00%	0.00%	0.55%	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%**	**8.33%**	**9.35%**	**0.00%**	**1.09%**	**0.00%**	**0.00%**	**1.45%**	**0.00%**	**0.19%**	**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%	5.00%	4.00%	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%	5.33%	0.00%	0.00%	0.00%	0.00%	0.00%	2.46%	0.00%	0.00%	0.00%	0.00%	0.00%	2.75%	0.00%	1.25%	0.00%
		Within City	0.00%	0.00%	0.00%	0.00%	3.23%	0.00%	0.00%	0.00%	0.00%	0.00%	0.56%	0.00%	0.00%	0.00%	0.00%	0.00%	0.54%	0.00%	0.00%	0.00%
		Overall SSA	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**4.42%**	**1.30%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**1.47%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**1.52%**	**0.00%**	**0.28%**	**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	98.87%	99.94%	99.74%	99.92%	99.86%	100%
		Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.46%	99.96%	97.57%	100%	98.86%	99.97%
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.57%	99.96%	99.88%	100%	99.67%	99.97%

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	99.46%	99.95%	99.02%	99.96%	99.52%	99.98%
	(b) 0-5 (with frequency hopping for GSM Operators)	Major Roads	95.60%	98.86%	95.21%	98.00%	72.87%	84.47%	95.85%	99.57%	96.04%	99.79%	94.35%	98.76%	95.88%	98.65%	NA	NA	NA	NA	NA	NA
		Highways	96.34%	99.26%	94.96%	98.53%	87.64%	66.27%	98.06%	97.62%	97.75%	99.28%	94.88%	92.53%	95.60%	98.40%	NA	NA	NA	NA	NA	NA
		Within City	96.50%	99.02%	96.60%	97.40%	87.38%	84.95%	97.72%	92.52%	97.20%	99.87%	98.52%	98.93%	95.95%	95.39%	NA	NA	NA	NA	NA	NA
		Overall SSA	96.32%	99.05%	95.65%	97.97%	86.49%	77.36%	97.69%	95.66%	97.35%	99.65%	96.61%	96.75%	95.78%	97.48%	NA	NA	NA	NA	NA	NA
5	Service Coverage																					
	In door (>= -75dBm)	Major Roads	34.20%	42.70%	95.06%	99.90%	68.08%	93.66%	94.47%	99.99%	76.39%	85.33%	94.02%	99.89%	94.98%	80.31%	82.59%	99.85%	88.68%	99.83%	74.35%	100%
		Highways	24.36%	92.80%	83.71%	98.58%	44.05%	84.47%	74.83%	86.14%	53.76%	96.07%	64.37%	27.99%	69.04%	99.51%	60.25%	99.97%	63.61%	99.87%	48.10%	94.57%
		Within City	38.08%	32.80%	96.46%	97.43%	71.82%	99.57%	86.94%	96.53%	63.60%	44.12%	81.44%	0.76%	85.82%	94.06%	81.55%	99.92%	80.17%	99.97%	80.11%	100%
		Overall SSA	32.29%	53.96%	89.75%	98.63%	58.06%	91.84%	82.42%	94.38%	60.22%	74.95%	75.40%	42.80%	79.04%	91.25%	71.57%	99.91%	75.10%	99.87%	72.42%	98.21%
	In-vehicle (>= -85dBm)	Major Roads	66.50%	98.00%	99.74%	100%	95.93%	99.98%	99.85%	100%	96.94%	99.95%	97.38%	100%	99.94%	99.95%	99.93%	100%	98.45%	100%	99.61%	100%
		Highways	59.52%	100%	98.96%	99.84%	72.90%	99.78%	98.03%	99.32%	88.55%	100%	85.58%	91.00%	96.83%	100%	93.33%	100%	79.89%	100%	91.77%	99.92%
		Within City	76.17%	94.00%	99.79%	99.92%	92.74%	100%	99.47%	99.99%	93.35%	99.90%	95.47%	4.24%	99.36%	100%	98.66%	100%	96.59%	100%	97.30%	100%
		Overall SSA	68.52%	97.40%	99.36%	99.92%	83.35%	99.91%	98.88%	99.78%	91.46%	99.95%	91.49%	64.93%	98.24%	99.98%	96.25%	100%	90.71%	100%	96.42%	99.97%
	Outdoor-in city (>= -95dBm)	Major Roads	99.40%	99.90%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99.65%	100%	100%	100%
		Highways	93.36%	100%	100%	100%	100%	100%	99.88%	100%	99.58%	100%	98.31%	99.95%	99.92%	100%	99.99%	100%	92.93%	100%	99.86%	100%
		Within City	98.39%	100%	99.97%	100%	100%	100%	99.99%	100%	99.86%	100%	99.72%	99.95%	99.99%	100%	100%	100%	99.35%	100%	99.64%	100%
		Overall SSA	96.58%	99.96%	99.99%	100%	100%	100%	99.94%	100%	99.74%	100%	99.15%	98.13%	99.96%	100%	100%	100%	97.04%	100%	99.74%	100%
6	Call Setup Success	Major Roads	100%	100%	100%	100%	85.00%	78.13%	100%	100%	100%	100%	96.30%	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%	78.53%	59.18%	100%	100%	100%	100%	98.07%	100%	99.62%	100%	100%	100%	100%	100%	100%	100%
		Within City	100%	100%	100%	100%	83.22%	88.46%	100%	96.77%	100%	100%	99.45%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	100%	100%	100%	100%	80.83%	71.96%	100%	98.91%	100%	100%	98.55%	100%	99.81%	100%	100%	100%	100%	100%	100%	100%
7	Hand Over Success Rate (HOSR)	Major Roads	100%	100%	100%	100%	92.55%	100%	100%	100%	98.72%	100%	98.37%	100%	98.85%	100%	100%	100%	100%	100%	100%	100%
		Highways	100%	100%	100%	100%	96.24%	93.43%	100%	100%	100%	100%	97.42%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Within City	100%	100%	100%	100%	96.78%	98.55%	100%	100%	99.29%	100%	99.43%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	100%	100%	100%	100%	96.04%	95.56%	100%	100%	99.52%	100%	98.65%	100%	99.89%	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 SAWAIMADHOPUR SSA IN NOVEMBER 14 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	37	30	40	30	29	33	30	30	68	30	53	30	42	30	42	31	34	30	47	32
		Highways	182	30	419	30	263	30	155	30	21	31	199	30	292	30	219	30	126	30	68	31
		Within City	192	30	243	30	226	31	161	30	120	30	196	30	164	30	181	30	186	30	208	30
		Overall SSA	**411**	**90**	**702**	**90**	**518**	**94**	**346**	**90**	**209**	**91**	**448**	**90**	**498**	**90**	**442**	**91**	**346**	**90**	**323**	**93**
2	Blocked Call Rate	Major Roads	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.89%	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%	1.14%	0.00%	0.65%	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%	2.21%	0.00%	0.00%	0.00%	0.00%	0.00%	1.02%	3.33%	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%**	**1.54%**	**0.00%**	**0.29%**	**0.00%**	**0.00%**	**0.00%**	**0.67%**	**1.11%**	**0.00%**	**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%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.92%	0.00%	0.00%	0.00%	0.00%	0.00%	2.94%	0.00%	0.00%	0.00%
		Highways	0.00%	0.00%	0.00%	0.00%	3.85%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Within City	0.00%	0.00%	0.00%	0.00%	1.81%	0.00%	0.00%	0.00%	0.00%	0.00%	1.03%	0.00%	0.00%	0.00%	0.00%	0.00%	1.61%	0.00%	0.00%	0.00%
		Overall SSA	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**2.75%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.67%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**1.16%**	**0.00%**	**0.00%**	**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	99.15%	99.98%	98.79%	100%	99.72%	99.83%
		Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.43%	99.85%	99.44%	100%	99.40%	99.97%
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.03%	99.85%	99.77%	98.50%	99.39%	99.97%

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	99.24%	99.89%	99.57%	99.62%	99.44%	99.92%
	(b) 0-5 (with frequency hopping for GSM Operators)	Major Roads	95.07%	97.49%	96.78%	99.27%	97.95%	94.35%	97.19%	93.16%	97.68%	98.15%	89.77%	97.77%	95.59%	97.97%	NA	NA	NA	NA	NA	NA
		Highways	96.20%	99.24%	97.33%	98.52%	90.61%	97.74%	98.98%	97.91%	96.96%	99.55%	95.46%	99.56%	96.95%	98.56%	NA	NA	NA	NA	NA	NA
		Within City	96.91%	100%	97.20%	98.69%	95.85%	98.73%	96.06%	98.36%	95.74%	100%	95.92%	96.33%	96.43%	99.14%	NA	NA	NA	NA	NA	NA
		Overall SSA	96.46%	98.94%	97.25%	98.82%	93.50%	96.73%	97.60%	94.71%	96.44%	99.19%	95.06%	97.84%	96.65%	98.57%	NA	NA	NA	NA	NA	NA
	Service Coverage																					
	In door (>= -75dBm)	Major Roads	33.90%	52.30%	95.37%	95.90%	95.24%	93.40%	73.27%	95.71%	30.10%	76.10%	73.65%	100%	66.70%	97.76%	86.48%	99.79%	46.77%	74.90%	49.66%	74.46%
		Highways	18.46%	66.10%	96.28%	98.36%	40.38%	67.76%	53.61%	86.08%	49.27%	10.40%	62.88%	100%	41.38%	99.66%	57.94%	100%	64.92%	76.30%	55.24%	19.72%
		Within City	37.58%	99.00%	96.91%	95.12%	60.65%	69.78%	69.57%	97.56%	41.27%	55.30%	72.85%	100%	68.67%	34.74%	78.30%	96.52%	62.83%	100%	61.27%	94.45%
		Overall SSA	29.50%	73.02%	96.43%	96.49%	53.25%	78.18%	62.33%	93.29%	39.07%	50.73%	69.79%	100%	52.70%	77.79%	69.04%	98.72%	62.25%	81.72%	58.28%	61.38%
5	In-vehicle (>= -85dBm)	Major Roads	81.20%	99.30%	100%	99.27%	100%	100%	98.50%	100%	86.70%	99.70%	93.15%	100%	95.80%	99.99%	99.44%	100%	68.69%	75.84%	91.44%	100%
		Highways	50.90%	98.90%	99.46%	99.98%	78.83%	100%	92.10%	99.97%	86.89%	96.70%	84.81%	100%	85.22%	100%	92.86%	100%	83.05%	99.22%	92.65%	100%
		Within City	82.80%	100%	99.63%	98.60%	95.89%	99.04%	96.08%	100%	90.75%	98.90%	90.29%	100%	95.55%	99.59%	99.38%	100%	86.64%	100%	87.42%	100%
		Overall SSA	69.74%	99.41%	99.55%	99.30%	88.26%	99.71%	94.46%	99.99%	89.24%	98.60%	88.89%	100%	89.60%	99.86%	96.19%	100%	83.89%	89.00%	89.11%	100%
	Outdoor-in city (>= -95dBm)	Major Roads	99.10%	100%	100%	100%	100%	100%	99.97%	100%	99.70%	99.90%	99.29%	100%	99.92%	100%	100%	100%	93.88%	100%	99.94%	100%
		Highways	92.80%	100%	99.90%	100%	99.13%	100%	99.81%	100%	99.30%	100%	98.10%	100%	99.33%	100%	100%	100%	92.22%	100%	99.44%	100%
		Within City	98.40%	100%	99.99%	100%	99.87%	100%	99.92%	100%	99.65%	100%	98.39%	100%	99.69%	100%	100%	100%	98.14%	100%	99.91%	100%
		Overall SSA	96.19%	100%	99.94%	100%	99.54%	100%	99.87%	100%	99.63%	99.96%	98.40%	100%	99.50%	100%	100%	100%	95.69%	100%	99.82%	100%
6	Call Setup Success	Major Roads	100%	100%	100%	100%	100%	100%	100%	100%	95.59%	100%	98.11%	100%	100%	100%	100%	100%	100%	100%	100%	100%

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
	Rate (>=95%)	Highways	100%	100%	100%	100%	98.86%	100%	99.35%	100%	100%	96.77%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Within City	100%	100%	100%	100%	97.79%	100%	100%	100%	97.50%	100%	98.98%	96.67%	100%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	**100%**	**100%**	**100%**	**100%**	**98.46%**	**100%**	**99.71%**	**100%**	**97.13%**	**98.90%**	**99.33%**	**98.89%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
7	Hand Over Success Rate (HOSR)	Major Roads	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Highways	100%	100%	100%	100%	96.68%	100%	100%	100%	100%	100%	99.39%	100%	99.83%	100%	100%	100%	1000.00%	100%	100%	100%
		Within City	100%	100%	100%	100%	96.53%	100%	100%	100%	100%	100%	98.41%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	**100%**	**100%**	**100%**	**100%**	**96.96%**	**100%**	**100%**	**100%**	**100%**	**100%**	**99.06%**	**100%**	**99.89%**	**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 SIROHI SSA IN DECEMBER 14 MONTH- RAJASTHAN CIRCLE

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
1	Call Attempts	Major Roads	13	30	48	30	4	33	25	32	35	33	42	30	47	30	37	30	42	30	30	30
		Highways	168	30	217	30	158	NP	146	32	36	30	230	30	225	30	179	30	116	30	73	31
		Within City	219	30	225	30	232	29	194	31	149	30	230	30	247	30	208	30	254	30	187	33
		Overall SSA	400	90	490	90	394	62	365	95	220	93	502	90	519	90	424	90	412	90	290	94
2	Blocked Call Rate	Major Roads	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.38%	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%	11.39%	NP	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.44%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Within City	0.00%	0.00%	0.00%	0.00%	9.05%	0.00%	0.00%	0.00%	0.00%	0.00%	1.30%	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%	9.90%	0.00%	0.00%	0.00%	0.00%	0.00%	0.80%	0.00%	0.19%	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%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	7.14%	0.00%	0.00%	0.00%
		Highways	0.00%	0.00%	0.00%	0.00%	3.01%	NP	0.00%	0.00%	0.00%	0.00%	1.30%	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%	0.47%	0.00%	0.00%	0.00%	0.00%	0.00%	2.20%	0.00%	0.00%	0.00%	0.00%	0.00%	0.79%	0.00%	0.00%	0.00%
		Overall SSA	0.00%	0.00%	0.00%	0.00%	1.44%	0.00%	0.00%	0.00%	0.00%	0.00%	1.61%	0.00%	0.00%	0.00%	0.00%	0.00%	1.21%	0.00%	0.00%	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	99.74%	99.91%	99.61%	100%	99.70%	100%
		Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.52%	99.75%	98.23%	100%	99.44%	99.83%
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.78%	99.54%	99.37%	100%	99.88%	99.49%

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	99.67%	99.73%	99.07%	100%	99.76%	99.77%
	(b) 0-5 (with frequency hopping for GSM Operators)	Major Roads	95.44%	99.07%	96.00%	99.02%	96.93%	98.94%	99.20%	98.87%	96.62%	98.82%	95.60%	100%	96.15%	98.93%	NA	NA	NA	NA	NA	NA
		Highways	95.62%	97.51%	95.63%	96.58%	94.60%	NP	99.07%	98.95%	97.55%	97.31%	95.79%	99.98%	95.65%	99.19%	NA	NA	NA	NA	NA	NA
		Within City	96.43%	99.72%	95.91%	99.35%	96.61%	98.47%	98.40%	98.86%	96.46%	99.74%	96.41%	98.23%	96.11%	98.55%	NA	NA	NA	NA	NA	NA
		Overall SSA	96.11%	98.82%	95.80%	98.27%	95.83%	98.72%	98.80%	98.90%	96.67%	98.62%	96.12%	99.40%	95.90%	98.89%	NA	NA	NA	NA	NA	NA
	Service Coverage																					
	In door (>= -75dBm)	Major Roads	48.10%	55.40%	95.90%	95.44%	85.48%	98.48%	67.32%	42.23%	42.44%	38.44%	53.07%	100%	93.01%	76.29%	81.26%	96.17%	68.76%	100%	98.48%	99.95%
		Highways	24.54%	99.40%	96.50%	100%	44.30%	NP	58.07%	98.66%	49.51%	95.96%	50.14%	100%	53.73%	99.14%	55.83%	100%	61.68%	94.68%	74.64%	99.72%
		Within City	50.50%	41.40%	96.39%	99.53%	69.44%	66.03%	61.55%	38.69%	45.91%	28.35%	69.96%	0.00%	82.00%	46.24%	74.96%	89.96%	76.61%	84.73%	70.75%	7.28%
		Overall SSA	42.32%	60.54%	96.39%	98.40%	59.85%	83.20%	60.00%	59.51%	46.02%	55.27%	61.44%	66.64%	70.37%	73.91%	67.77%	95.46%	71.72%	94.73%	74.23%	69.14%
5	In-vehicle (>= -85dBm)	Major Roads	92.20%	99.30%	99.78%	99.94%	99.52%	100.00%	93.28%	92.60%	96.18%	96.13%	83.33%	100%	99.88%	99.37%	99.97%	99.88%	85.64%	100%	100%	100%
		Highways	63.31%	100%	99.84%	100%	72.50%	NP	90.26%	100%	89.20%	98.88%	80.97%	100%	91.31%	99.97%	89.33%	100%	82.27%	100%	95.15%	99.92%
		Within City	89.80%	96.70%	99.84%	100%	92.58%	98.92%	92.95%	99.73%	91.76%	88.47%	95.21%	98.75%	98.65%	98.88%	98.56%	100%	93.19%	100%	91.54%	95.30%
		Overall SSA	81.73%	98.40%	99.84%	99.98%	84.86%	99.49%	91.53%	97.40%	91.97%	94.75%	89.11%	99.58%	95.48%	99.41%	94.94%	99.96%	89.46%	100%	93.17%	98.41%
	Outdoor-in city (>= -95dBm)	Major Roads	99.90%	100%	100%	100%	100.00%	100.00%	99.82%	99.95%	100%	99.97%	96.02%	100%	100%	100%	100%	100%	93.89%	100%	100%	100%
		Highways	91.30%	100%	100%	100%	100.00%	NP	99.58%	100%	99.18%	99.95%	96.57%	100%	99.63%	100%	100%	100%	94.92%	100%	99.67%	100%
		Within City	99.41%	99.90%	100%	100%	99.98%	0.00%	99.81%	100%	99.81%	99.95%	99.39%	100%	99.98%	100%	100%	100%	99.12%	100%	99.91%	100%
		Overall SSA	96.92%	99.96%	100%	100%	99.99%	100.00%	99.69%	99.98%	99.73%	99.79%	98.11%	100%	99.83%	100%	100%	100%	97.49%	100%	99.86%	100%
6	Call Setup Success	Major Roads	100%	100%	100%	100%	100.00%	100.00%	100%	100%	97.14%	100%	97.62%	100%	100%	100%	100%	100%	100%	100%	100%	100%

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
	Rate (>=95%)	Highways	100%	100%	100%	100%	84.18%	NP	100%	100%	100%	100%	100%	100%	99.56%	100%	100%	100%	100%	100%	100%	100%
		Within City	100%	100%	100%	100%	90.95%	100.00%	100%	100%	97.32%	100%	98.70%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	100%	100%	100%	100%	88.32%	100.00%	100%	100%	97.73%	100%	99.20%	100%	99.81%	100%	100%	100%	100%	100%	100%	100%
7	Hand Over Success Rate (HOSR)	Major Roads	100%	100%	100%	100%	100.00%	100.00%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Highways	100%	100%	100%	100%	87.98%	NP	100%	100%	100%	100%	99.35%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Within City	100%	100%	100%	100%	99.25%	100.00%	100%	100%	100%	100%	99.01%	100%	99.40%	100%	100%	100%	100%	100%	82.37%	100%
		Overall SSA	100%	100%	100%	100%	94.90%	100.00%	100%	100%	100%	100%	99.26%	100%	99.69%	100%	100%	100%	100%	100%	90.66%	100%

NA: Not Applicable

NP: Data not provided – BSNL has not provided data for indoor due to TEMS Log files was not generating reports, files looks corrupted, Therefore report has not generated.

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
KOTA	Ladpura (KOTA), Digod (Sultanpur)/ **115 KM**	1) Ladpura (KOTA) (A) Major Road – Railway Station – Bhim mandi – Khedeli fatak – Civil line area – Kota military area – Gov. Collage – JDB girls collage – Katdi circle – chhavni – Airodram circle – vigyan nagar – City Mall - Anand pura circle. Kanha restaurant – Jaipur road – ST John's School – Naya pura bus stand – Naya pura – BARA bus stand – SP Office – Police line – Bor khera – Agriculture university – Sanik Colony – BARA Highway (B) Within City- Ganesh Nagar – Rang wadi – Bansal Public School – Kota University – Swami Vivekanand Nagar – Ahilya Circle – Ghattotkachh circle – City mall – Narcotics colony – Rajiv Gandhi Nagar – ALLEN Coaching – INOX mall – Mahaveer Nagar – Teacher Colony – Keshapura Circle – basant Vihar – Dada wadi – Partap Nagar – CAD circle – Nagar nigam – Police control room Kota – ST Public School – DCM – sale tax office – Vigyan nagar – Dakaniya Railway station – Ford Show room – Indra prasth industrial area – Kota university – R.K Puram – Shree Nath Puram – Gov. Eng. Collage – Chambal Garden – Thermal power plant – Dusshera Ground – Tipta – Kota DAM – Thermal colony – Punadi thana- Housing Board Colony – Kanha restrotant. (C) Highway - - > Ladpura (KOTA) to	Baran, Kishanganj (Bhanwargarh), Chhipaborad, Atru. / **190 KM**	1.) BARAN-(A) Within City- Gajan pura – Court – Collect rate – Jonel Hospital – Honda Show room – Krishi mandi – Gov. Collage Baran – Mangrol road - BSNL Exchange – Gov. girls collage – Gov. hospital – Swami Vivekananda Garden – Adarsh Sen. Sec. School – B.O.B – Railway station – Police station – Nagar Parishad – Jhalawar Road – Central Jail – Atru Circle – Kishanganj Road. (B) Highway-KOTA TO BARAN highway- Kota – Naya nohra – Borkhandi – Jaganath pura – Jheilpura – Tather – Polaikolen – Karadiya – Simliya - Bhawera – Gadepan – Ruggi – Palaytha – Antha – Bamuliya – Bijora – Batawada – Baran. 2)KISHANGANJ(BHANWARGARH)- (A) Within City- HDFC Bank – H.P Petrol pump – Panchayat Samiti – Tehsil – J.V.V.N.L – Gov. School – Bus stand – Baran road. (B) Highway- BARAN TO KISHANGANJ(BHANWARGARH) HIGHWAY- BARAN – Bawarikhera – Fatehpura – Sambalpur - KISHANGANJ 3.) ATRU- (A) City-Atru Main market – Railway Station – Tehsil – Gov. hospital – Panchayat samiti – SBBJ Bank – Gov. Girls school – B.O.B – Krishi Mandi – BSNL Exchange – J.V.V.N.L – Police Station – Court – Gov. school. (B) Highway-BARAN TO ATRU	Ramganj Mandi, Sangod. / **231 KM**	1) RAMGANJ MANDI- (A) City-Panchayat Samiti Kherabad – Collect rate – Railway Station – Court – Dak Bangla – Jail –PWD Office – BSNL Exchange –SBBJ Bank –Narain Talkies – B.O.B – Hero Show room. (B) Highway- Kota To Ramganj Mandi Highway - - >Kota - RTO office – Jagpura – Kewal Nagar - Allniya – Career University – Kasar – Mandana – Police station mandana – Gov. School mandana – Gov. Hospital Mandana – Gopal pura – Dara – Kamal pura – Sarawda – Dhabadheh – Modek – Birla Cement Plant – Saledikala – Kherabad – Ramganj Mandi. 2) SANGOD- (A) Within City -Gov. School Laxmipura – Main Market – Gandhi Circle – Gov. Hospital – Tehsil - J.V.V.N.L – Panchayat samiti – Hera Showroom - Mahindra Show Room – Bapawar Road – Bus Stand – Court – P.H.D Office. (B) Highway-Ramganj Mandi To Sangod Highway - - > Ramganj Mandi – Kudayala – Satehkhera – Suket – Kanwas – Hingoniya – Mamor – Ghanahara – Sangod. Sangod to Kota Highway-Sangod – Dheehahodi – Moliheda – uinodkala – Adusa – Rajgarh – Palayata – Kota. **Indoor:** City Mall, Kota

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
		Digod (Sultanpur) Highway - - > Kota - Naya nohara – B.P.C – Parampara oil factory – Marwar - Mondla village – Kasampura – Digod – Kanwapura – Sultanpur. 2) Digod (Sultanpur) -(A) Within City-Krishi mandi – Main market – Gram panchayat – Bus stand – Police station – Gov. sen sec school – Gov. hospital – Etawa road – BSNL Exchange – Gaushala – Bara Road. **Indoor**: Kanha restaurant, KOTA		HIGHWAY - - > Baran – Mandola – Barana – udend – Gov. School Udend – Bedkiya – Atru. 4) CHHIPABORAD-(A) City-Tehsil – Court – Krishi mandi – Main market – Police station – Gov. school – Gov. Hospital – Panchayat samiti – B.O.B – Honda Show room. (B) HIGHWAY-ATRU TO CHHIPABORAD HIGHWAY-Atru – Adani power plant – Kawai – Police station Kawai – BSNL Ex. Kawai – Salpura – Kohni – CHHIPABORAD. **Indoor:** Gov. Bus stand, Baran		
SAWAIMADHOPUR	Sawaimadhopur, Khandar / **145KM**	1) Sawaimadhopur- (A) Major Road-BSNL office – ICICI Bank – Sawaimadhopur bypass – Meena colony – Doordarshan kendra – Nagar Parishad – Collect rate – Court – Rajnagar colony – BSNL Store Sawaimadhopur – civil line – Railway station – Railway police station – Ranthambore circle – Ranthambore road – F.C.I - saras dairy – RICCO Industrial area – PG Collage Sawaimadhopur – Bus stand – Income tax office – Circuit house – Electricity Board – Gov. Hospital. (B) Within city-Gov. Hospital – Sawaimadhopur city main market – Police check post – SBBJ Bank – Gov. School – Rajbagh colony – Nagar palika – City Bus Stand. (C) Highway- Sawaimadhopur to Khandar Highway- Sawaimadhopur - Kushalpura – bodel – Jetpur – Chhan – baharbanka khurda – Panchayat Samiti – school – Police station baharbanka khurda- Kheda – Khandar.	Gangapur, Bamanwas, Bonli/ **165KM**	1) Bonli -(A) Within city- Gram Panchayat – Honda showroom – Main Market – BSNL Exchange – Newai Road – Gram Panchayat – Gov. Girls school - Panchayat Samiti– Court – J.V.V.N.L – Jastana Road – P.W.D. office – Piplda road – PNB bank. (B) Highway-Sawaimadhopur to Bonli Highway - - > Sawaimadhopur – Surwal – maintura – Ajnoti – Devli – bhadhoti – khiarni – hersota – Bonli. 2) Gangapur-(A) Within city- Gov. School Mirjapura – Post office – Gangapur Jail – Private Bus stand – Honda showroom – Gov. Hospital – Riya Hospital – Hindaun Road – Power House – Industrial Area – F.C.I – B.O.B – Karauli Road – Hero Showroom – Main market – State bank – Bus stand – Court – Railway Station – Gov. School – Gov. Hospital – Dausa Road. (B) Highway-Bonli to Gangapur Highway - - > Bonli – bhadhoti – Gov.	Karauli, Hindaun / **175 KM**	1) Karauli- (A) With in city- Sawaimadhopur Road – I.T.I collage – Gov. School – Mahindra Showroom – Main Market road – Collect rate – Court – Doordarshan kendra – Gov. School – Circuit House – Gov. Girls Collage – Police Station – P.N.B bank – Bus stand – Private bus stand – Stadium – Dholpur Road. (B) Highway-Sawaimadhopur to Karauli Highway - - > Sawaimadhopur – Gangapur – sulempur – Kudgaon – Mehmedpur – Mach - Asthal – Ata – Keladevi road – Pedawa – Karsaj – Rajor – Atewa – Mohanpura – Keladevi temple – Karauli. 2) Hindaun-(A) With in city- Gov. Collage – Police station – Tulsi colony – Swami Vivekanand school – Suzuki Showroom – Bus stand – Gov. Sen. Sec. School – Sabji mandi – court – Gov. Hospital – J.V.V.N.L – Byana Road – Railway Station - Shri Mahaveer ji Road. (B) Highway-Karauli to Hindaun Highway-Karauli – Machi – Mandhai – Gudla – Ghadhi – Bandwa – Todupura – Pheli ka pura – Jamalpura – Khera – Kanchroli – Hindaun.

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
		2) Khandar- (A) Within city- Hero Show room – Panchayat Samiti - Main market – BSNL Exchange – Baler road – Bus stand – PWD Office – Adarsh Sen. Sec. School – Talawda road. **Indoor:** BSNL TDM Office, Sawaimadhopur.		School bhadhoti – Rasulpura – manoli – malana dunger – bhater – Bathoda (police station- Gov. School) – Talawda – Machipura – Amergarh – Gangapur. 3) Bamnawas- (A) With in city- Police station – Bus stand – Gov. Hospital – Lalsot Road – Gov. school. (B) Highway-Gangapur to Bamanwas Highway- Gangapur – Jalokhera – Khootla sluna – Koyla – Piplai – Bamanwas. **Indoor:** Green valley restaurant, Sawaimadhopur.		**Indoor:** Shri Mahaveer ji Temple.
SIROHI	Sirohi, Sheoganj (Posaliyan), Ahore/ **120 KM**	1) SIROHI- (A) Major road-Ramdev Hotel – ABU road highway – collect rate – SP office – Court – Woman police station – Reodar road – klandri road – police line – Ghandi Park – post office – Adarsh vidhya mandir school – jalore road – power house. (B) With in city - - > PWD colony – BSNL GMTD OFFICE – Gov. collage – Gov. Hospital – Main market – Bus stand – District Jail – Gov. girls collage – BSNL Ex. – housing board. (C) Highway-SIROHI TO SHEOGANJ (POSALIYAN)-SIROHI – NH62 – Paldi village – bagsin – arthwara – posaliyan – vera rampura - SHEOGANJ (POSALIYAN). 2) SHEOGANJ (POSALIYAN)- (A) Within city-RICCO Area – Police station – Panchayt smiti – Bus stand – Main market – Tehsil – Kanpura road – Post office – Gov. Sen. Sec. School – Gov. Collage – Modern defence school – SBI bank – Jain temple – post office – BSNL	Bhinmal (N), Jalore, Jalore (W) (Sayla) / **190 KM**	1) JALORE- (A) Within city-RTO office – Woman police station – TVS Showroom – Forest department – Jalore bypass – roadways depot – J.V.V.N.L – Surajpol circle – civil line – PWD office – Gov. hospital – Rajendra NAGAR – Nagar parisad – Gov. school – Gov. collage – power house – anaz mandi – circuit house – ahore road – Jalore stadium – police line – shivaji nagar colony – railway station – FCI – Santipura road – ITI colony – Bus stand – Honda showroom – industrial area – lal pol area – panchayt smiti. (B)Highway-SIROHI TO JALORE HIGHWAY- SIROHI – goyali – balwantgarh – mangarh – udd – jawal – barlut – barada – raipuriya – kandar – siyana – jalore. 2) JALORE (W) (SAYLA)- (A) Within city-Main market – Panchayt smiti – Bus stand – HP petrol pump – Bishangarh road – panchayt smiti – Jain temple – SBBJ Bank – Gov. Hospital – Police	Abu Road, Pindwara. / **112 KM**	1) PINDWARA-(A) Within city- Power House – T.V.S. Show room – Bus stand – Railway station – BSNL Ex. – State bank – police station – Tehsil – court – Gov. Sen. Sec. School – Nagar palika – Gov. hospital – Main market – Binani colony – Binani cement plant – Adarsh vidhya mandir school – F.C.I – Ajari Road – Bus stand – ABU ROAD highway. (B) Highway- SIROHI TO PINDWARA- SIROHI– undara – zadoli – PINDWARA. 2) ABU ROAD- (A) Within city- Axis Bank – B.S Memorial school – Gov. school – Bus stand – Gov. hospital – post office – railway station - Main market – RICCO industrial area – LIC office – RICCO colony – ST ANSELM'S School – Sirohi road. (B) Highway-PINDWARA to ABU ROAD - - > PINDWARA – kojra – pesua – kodarla – dhanari – swaroopganj – bhauri – Kacholi – Sangwara – bhujela – talhti – Manpur - ABU ROAD. **Indoor**: Rudra villa, mount ABU

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
		Ex. - Private bus stand. (B) Highway-SHEOGANJ (POSALIYAN) to AHORE- SHEOGANJ – Bedana khurd – Malpura – charli – AHORE. 3) AHORE- (A) Within city- Mahindra showroom – J.V.V.N.L – water house – main market – police station – Gov. hospital – Gov. school – Bus stand – SDM office – court – PWD office – bhadrajun road – Jain temple – Jalore road – Bus stand – Gov. primary school – BSNL Ex. – Ganpati colony. **Indoor:** Ramdev hotel, Sirohi		station – PWD Office – Tehsil – Power house – Gov. bus stand – BSNL Ex. – posana road. (B) Highway-JALORE to JALORE (W) (SAYLA)-Jalore – sanfana – keshwana – alasan – revtara - JALORE (W) (SAYLA). 3) BHINMAL (N)- (A) With in city- Bhateda circle – Bus stand – High school – Bagoda bus stand - khari road – Gayatri temple – karda circle – LIC Office – BSNL Telephone Ex. – Raniwara road – Gov. P.G Collage – BSNL Ex. – SDM Office – Nagar palika – tehsil – Jail – Magh circle – Mahaveer circle – Bus stand – Railway station. (B) Highway-JALORE (W) (SAYLA) TO BHINMAL (N)- SAYLA – chourau – maliyo ki wari – borwara – poshana – undi – panthidi – kora – daspa – nasoli – kushalpura – BHINMAL. **Indoor:** Man sarowar hotel, Jalore		

7.2 SSA WISE DRIVE TEST OBSERVATION:

DRIVE TEST TABLE: 5

DRIVE TEST OBSERVATION OF KOTA SSA: OCTOBER 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	Kota & Digod	---	Baran, Kishanganj, Atru & Chipabarod	---	Ramganjmandi & Sangod	---
2	BSNL		NP (GPS Problem)		NP (GPS Problem)		NP (GPS Problem)
3	TATA GSM		Poor Level & Quality near Naya Nohra, Khedrlli Phatak, Digod		No coverage between Atru to Chipabarod		They have Poor Level & Quality on Highway covered in day 3
4	TATA CDMA		They have coverage only in SDCA's & Major Towns with Poor Level & Quality		They have coverage only in SDCA's & Major Towns with Poor Level & Quality		They have coverage only in SDCA's & Major Towns with Poor Level & Quality
5	IDEA		They have coverage only in SDCA's & Major Towns		They have coverage only in SDCA's & Major Towns		They have coverage only in SDCA's & Major Towns
6	RCOM GSM		Poor Level & Quality near Naya Nohra, Khedrlli Phatak, Digod		They have coverage only in SDCA's & Major Towns with Poor Level & Quality		They have coverage only in SDCA's & Major Towns with Poor Level & Quality
7	RCOM CDMA		Poor Level & Quality near Naya Nohra, Khedrlli Phatak, Digod		They have coverage only in SDCA's & Major Towns with Poor Level & Quality		They have coverage only in SDCA's & Major Towns with Poor Level & Quality
8	MTS		---		---		No coverage between Darra to Ranpur, Modak, Sangod
9	VODAFONE		Poor Level & Quality near Digod, Samcore, Poor Quality near Ramnagar, Dadabadi, ,LVS School		Poor Level & Quality near Atru		Poor Level near Darra outer
10	AIRCEL		Poor Level near Digod		Poor Level & Quality at Baran outer		Poor Level at all SDCA's outer

NP: Data Not Provided

DRIVE TEST TABLE: 6

DRIVE TEST OBSERVATION OF SAWAIMADHOPUR SSA: NOVEMBER 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	Sawai Madhopur & Khandar	Poor Quality patches on Highway	Sawai Madhopur, Gangapur, Bolni & Bamanwas	---	Sawai Madhopur, Gangapur, Hindaun & Karoli	---
2	BSNL		Poor Level & Quality at Sawai Madhopur outer, near Baharawanda Khurd		Poor Level on Highway covered in day 2, Poor Quality near Bolni		Poor Level on Highway covered in day 3, Poor Quality near Barnala, Kudgaon
3	TATA GSM		They have coverage only in SDCA's with Poor Level & Quality at outer		They have coverage only in SDCA's with Poor Level & Quality at outer		They have coverage only in SDCA's with Poor Level & Quality at outer
4	TATA CDMA		They have coverage only in SDCA's with Poor Level & Quality at outer		They have coverage only in SDCA's with Poor Level & Quality at outer		They have coverage only in SDCA's with Poor Level & Quality at outer
5	IDEA		They have coverage only in SDCA's with Poor Level, Poor Quality near Civillines, Bajaj Finance		They coverage only in SDCA's or Major Towns with Poor Level at outers		They coverage only in SDCA's or Major Towns with Poor Level at outers
6	RCOM GSM		Poor Level & Quality near Kermoda, RIICO Ind Aarea, Civillines, Khandar outer		They coverage only in SDCA's or Major Towns with Poor Level & Quality at outers		They coverage only in SDCA's or Major Towns with Poor Level & Quality at outers
7	RCOM CDMA		Poor Level & Quality near Civillines, FCI, RIICO Ind Area, Khandar Outer		They coverage only in SDCA's or Major Towns with Poor Level at outers		They coverage only in SDCA's or Major Towns with Poor Level at outers
8	MTS		They have coverage only in SDCA's with Poor Level		They coverage only in SDCA's or Major Towns with Poor Level at outers		They coverage only in SDCA's or Major Towns with Poor Level at outers
9	VODAFONE		No coverage between Sawai Madhopur to Baharwanda Khurd, Poor Level patches on Highway, Poor Quality near Doorbhas, Kishanpura, Khandar outer		Poor Level on Highway covered in day 2, Poor Quality near Soorwal, Khirni		Poor Level on Highway covered in day 3
10	AIRCEL		They have coverage only in SDCA's with Poor Level		Poor Level on Highway covered in day 2		No coverage between Sawai Madhopur to Karoli, Karoli to Hindaun, Poor Level on Highway covered in day 3

DRIVE TEST TABLE: 7

DRIVE TEST OBSERVATION OF SIROHI SSA: DECEMBER 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	Sirohi, Sheoganj & Ahore	Poor Quality at Sirohi outer	Jalore, Bhinmal, Siyana & Batoda	---	Pindwara, Swaroopganj & Abu Road	Poor Quality at Pindwara outer, Abu Road outer
2	BSNL		Poor Level at Ahore outer, Sirohi outer		Poor Level & Quality near Warada, Keshwana, Jalore outer, Rewata		Poor Level & Quality at Abu Road, Pindwara outer
3	TATA GSM		They have coverage only in SDCA's & Major Towns with Poor Level & Quality		They have coverage only in SDCA's & Major Towns with Poor Level & Quality		They have coverage only in SDCA's & Major Towns with Poor Level & Quality
4	TATA CDMA		Poor Level at Sheoganj outer		They have coverage only in SDCA's & Major Towns with Poor Level		They have coverage only in SDCA's & Major Towns with Poor Level
5	IDEA		Poor Level & Quality near Bhatkarha Chowk, Anadara Chowk, Adarsh Nagar, Paldi, Sheoganj outer, Ahore outer		Poor Level near Akoli, Rampuriya, Warda, Padeev, Madalpura, Siyana outer, Posana, Rewatra, Nasoli		Poor Level near Veerwara, Dhana, Manpur, Poor Level & Quality near Telhati, Ambaji Ind Area
6	RCOM GSM		Poor Level & Quality at Ahore outer, Sheoganj Ind Area, Sirohi outer, District Forest Office		They have coverage only in SDCA's & Major Towns with Poor Level & Quality		Poor Level & Quality at Banas, Bhujla, Udvariya, Bus Stand Abu Road
7	RCOM CDMA		They have coverage only in SDCA's & Major Towns with Poor Level & Quality		They have coverage only in SDCA's & Major Towns with Poor Level & Quality		They have coverage only in SDCA's & Major Towns with Poor Level & Quality
8	MTS		Poor Level at Sirohi outer		No Coverage between Sirohi to Siyana, Bagrota to Jalore, Jalore to Siyana, Siyana to Bhinmal, Poor Level at Siyana outer, Jalore outer, Bagra, Keshwana		---
9	VODAFONE		Poor Level & Quality near Thakatgarh, Poor Quality near Bithura, Posaliyan, Mandawa		Poor Level & Quality near Chorau, Rewata, Poor Quality near Keshwana, Akoli, Siyana outer, Warada, Bhinmal outer		Poor Quality near Jhadoli, Swaroopganj outer, Bharia
10	AIRCEL		Poor Level at Sirohi outer, Sheoganj outer		They have coverage only in SDCA's & Major towns with Poor Level at outer		Poor Level on Highway covered in day 3, Abu Road outer

DRIVE TEST TABLE: 8

NO NETWORK COVERAGE STATUS OF DRIVE TEST – OCTOBER TO DECEMBER 14

Sr. No	Month of Drive Test	Circle	Name of Operators	SSA	SDCA Covered	Status of no network coverage area	ICR Status
1	Oct'14	Rajasthan	Aircel	KOTA	Ladpura (Kota), Digod (Sultanpur), Baran, Kishanganj (Bhanwargarh), Chhipaborad, Atru, Ramganj Mandi, Sangod	Salpura, barana, udend, gopalpura, hingoniya, mamorm, ghanahara, uinodkala, adusa, rajgarh.	ICR with TATA GSM
			Airtel			------	No
			Vodafone			------	No
			BSNL			------	No
			Idea			Jhalipura, tather to digod highway, jagpura, mukundpura, digod to sultanpur hw, jhalipura, dahra, morpa, cheensa, ruggi, bamuliya kalan,, sambalpur, sahalpura, amritkheri, harnawada jageer, gul kheri, mandola, barani, ardand, chhatarpura, neemoda, baldevpura, dholpura, dobara, beel kheri, ummedpura, amjhar, sarawada, goojariya kheri, fatehpur,pama kheri, ummedpura, vinod khurd, nagal heri, rajgarh, amalsara, ramgarh, moru kalan, sarola, mamor, naharly, ghana hera.	No
			MTS			No coverage between ranpur to darra highway, no coverage between darra to modak highway, no coverage between darra to sanggod highway , no coverage between sanggod to palvtha highway.	No
			RCOM CDMA			All sdca covered except kishanganj, digod & inter connecting highway (week coverage on highway), no coverage at digod (sultanpur) and kishanganj (bhanwargarh).	No
			RCOM GSM			All sdca covered except kishanganj & inter connecting highway (week coverage on highway), no coverage at kishanganj(bhanwargarh)	No
			TATA CDMA			Ladpura to digod (no coverage), kota to baran (partail coverage), baran to kishanganj (no coverage), kishanganj to chipaborad(no coverage), chipaborad to atru (partail coverage), kota to ramganj mandi (partail coverge), ramganj mandi to sangod (partail coverage) & sangod to kota partail coverage.	No

Sr. No	Month of Drive Test	Circle	Name of Operators	SSA	SDCA Covered	Status of no network coverage area	ICR Status
			TATA GSM			Kota to sultanpur partial coverage, baran to kisanganj no coverage area, atru to chhipaborad partial coverage, baran to atru no coverage area, kota to ramganjmandi partial coverage, ramganjmandi to sangod partial coverage.	No
2	Nov'14	Rajasthan	Aircel	Sawaimadhopur	Bamanwas, Bonli, Gangapur, Hindaun, Karauli, Khandar, Sawaimadhopur	Kushalpura, bodel, jetpur, chhan, baharbanka, khurda,sulempur, kudgaon, mehmadpur, atewa, mach.	No
			Airtel			Sawai madhopur- no coverage b/w kala khet ki talai to kushalidarra gaon due to hilly terrain & high vegetation	No
			BSNL			B/w ggp to bmws, swm to kndr highway, bhadoti to boli, krl to hindoun.	No
			Idea			No coverage b/w sawaimadhopur to chan. no coverage on highway-karmoda, no coverage b/w menpura to ajnoti, no coverage b/w taranpur to manoli, no coverage in barh goth., no coverage b/w phariya to rawra., no coverage on highway b/w jeewad to kari gaonri, no coverage b/w amargarh to salarpur,no coverage b/w hingotiya to barh bichla, no coverage b/w barh saloda to barh chhawa no. 1., no coverage on highway - b/w sarangpura to sitor., no coverage b/w harsoti to sotoli. , no coverage on highway-b/w mahmadpur to pator,no coverage b/w birhati to mamchari,no coverage b/w basai dulapura to khohri., no coverage on highway-b/w birwas to teekatpura,no coverage b/w jungeenpura to ruggapura.	No
			MTS			No coverage between sawai madhopur to chhan highway., no coverage between chhan to khandar highway, no coverage between malrana doonger to gangapur city highway , no coverage between gangapur city to karauli highway, no coverage between karauli to kachroli highway.	No
			RCOM-CDMA			All sdca covered except khandar & inter connecting highway (week coverage on highway), no coverage at khandar and bamanwas.	No

Sr. No	Month of Drive Test	Circle	Name of Operators	SSA	SDCA Covered	Status of no network coverage area	ICR Status
			RCOM-GSM			All sdca covered except khandar & inter connecting highway (week coverage on highway), no coverage at khandar and bamanwas.	ICR with Aircel
			TATA-CDMA			Sawimadhpur to khandar(no coverage), bonli to ganapur(partail coverage), gangapur to bamanwas(no covarage), sawimadhpur to bonli(partail coverage), sawimadhpur to karauli(no coverage), karauli to hindaun(partail coverage).	ICR with MTS
			TATA-GSM			Sawaimadhopur to khandar no coverage area, bonli to gangapur no coverage area, gangapur to bamanbas no coverage area, sawaimadhopur to bonli no coverage area, gangapur to karauli no coverage area, karauli to hindaun no coverage area.	ICR with Aircel
			Vodafone			No coverage on connecting road b/w chhan to gurudwara rd site due to hilly terain.	No
3	Dec'14	Rajasthan	Aircel	Sirohi	Sirohi, Sheoganj (Posaliyan), Ahore, Bhinmal (N), Jalore, Jalore (W) (Sayla), Abu Road, Pindwara.	Kandar, raipuriya, bedana khurd, malpura,charli , kora, daspa, nasoli, kushalpura, keshwana , chourau, maliyo ki wari, borwara, poshana, undi , panthidi.	No
			Airtel			-----	No
			Vodafone			-----	No
			BSNL			-----	No
			Idea			Adarsh nagar to paldi , goyli to padeev, padeep to jawal ,barlot to warda,siyana to akoli, bagra to mandalpura, jalore to keshwana keshwana to rewtra,sayla to chaurau,chaurau to posana ,posana to daspan,daspan to nasoli, sirohi to veerwara ,pindwara to dhanari,	No
			MTS			No coverage between sirohi to siyana highway.,no coverage between sayala to bhinmal highway., no coverage between bagrato jalore highway, no coverage between jalore to sayala highway.	No
			RCOM-CDMA			All sdca covered & week coverage on inter connecting highway, no coverage at jalore (w)(sayla).	No
			RCOM-GSM			All sdca covered & week coverage on inter connecting highway	ICR with Aircel

Sr. No	Month of Drive Test	Circle	Name of Operators	SSA	SDCA Covered	Status of no network coverage area	ICR Status
			TATA-CDMA			Sirohi to sheoganj partial coverage area, sheoganj to ahore partial coverage area, sirohi to bhinmal partial coverage area, bhinmal to jalore partial coverage area, sirohi to pindwara partial coverage area,pindwara to abu road partial coverage area. No coverage at jalore (w) (sayla)	ICR with MTS
			TATA-GSM			Sirohi to sheoganj partial coverage area, sheoganj to ahore partial coverage area, sirohi to bhinmal partial coverage area, bhinmal to jalore partial coverage area,jalore to sayla partial coverage area, sirohi to pindwara partial coverage area, pindwara to abu road partial coverage area	ICR with AIRCEL

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 October-14**, drive test was conducted across **Kota** SSA covering Ladpura (KOTA), Digod (Sultanpur), Baran, Kishanganj (Bhanwargarh), Chhipabroad, Atru, Ramganj Mandi and Sangod SDCAs. The performance of the service providers in general was satisfactory as all operators largely met the benchmarks on SSA level **except BSNL**, which could not meet the benchmark of parameters **Call Drop Rate (4.42%), Voice Quality (86.49%-Outdoor / 77.36%-Indoor), Call setup Success Rate (80.83%-Outdoor / 71.96%-Indoor) and Blocked Call Rate (8.33%-Outdoor / 9.35%-Indoor) on over all SSA basis. The performance of RCOM (GSM / CDMA) also remained under performed for parameters Call Drop Rate and Voice quality on High Ways.**

(ii)   **In the Month of November-14**, drive tests were conducted across **Sawaimadhopur SSA** covering Sawaimadhopur, Khandar, Gangapur, Bamanwas, Bonli, Karauli and Hindaun 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 and Idea**. BSNL remained non-compliant for parameters **Call Drop rate and Voice quality** with its achieved values as **2.75% and 93.50%** (Outdoor) respectively, whereas **Idea** remained under performed for the parameter Voice quality with its performance as **94.71%** (Indoor).

(iii)   **In the month of December-14,** drive test was conducted across **Sirohi SSA** covering Sirohi, Sheoganj (Posaliyan), Ahore , Bhinmal (N), Jalore, Jalore(W) (Sayla) , Aburoad and Pindwara SDCAs. In Sirohi SSA, **BSNL** failed to meet the benchmark of parameter **Call Setup success Rate / Call Blocked Rate with** its performance as **88.32% / 9.90%** 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. Apart from this, Idea also could not meet the benchmark of Voice Quality in Indoor locations in Sawaimadhopur SSA.

8. GRAPHICAL REPRESENTATION (CELLULAR MOBILE SERVICE PROVIDERS)

AVERAGED QUARTERLY PMR

V/S

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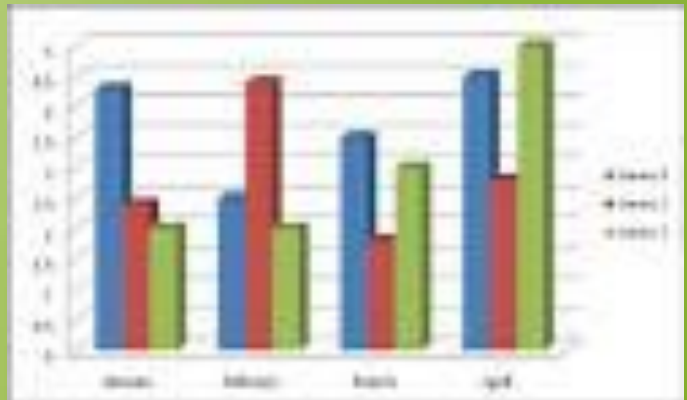
8. GRAPHICAL REPRESENTATION (CMTS):

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	VODAF ONE	RCOM CDMA	MTS	TATA CDMA
Quarterly PMR	0.17%	0.06%	1.64%	0.06%	0.21%	0.15%	0.04%	0.23%	0.03%	0.07%
Quarterly Live	0.17%	0.06%	1.72%	0.06%	0.18%	0.09%	0.03%	0.19%	0.04%	0.04%
Benchmark	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
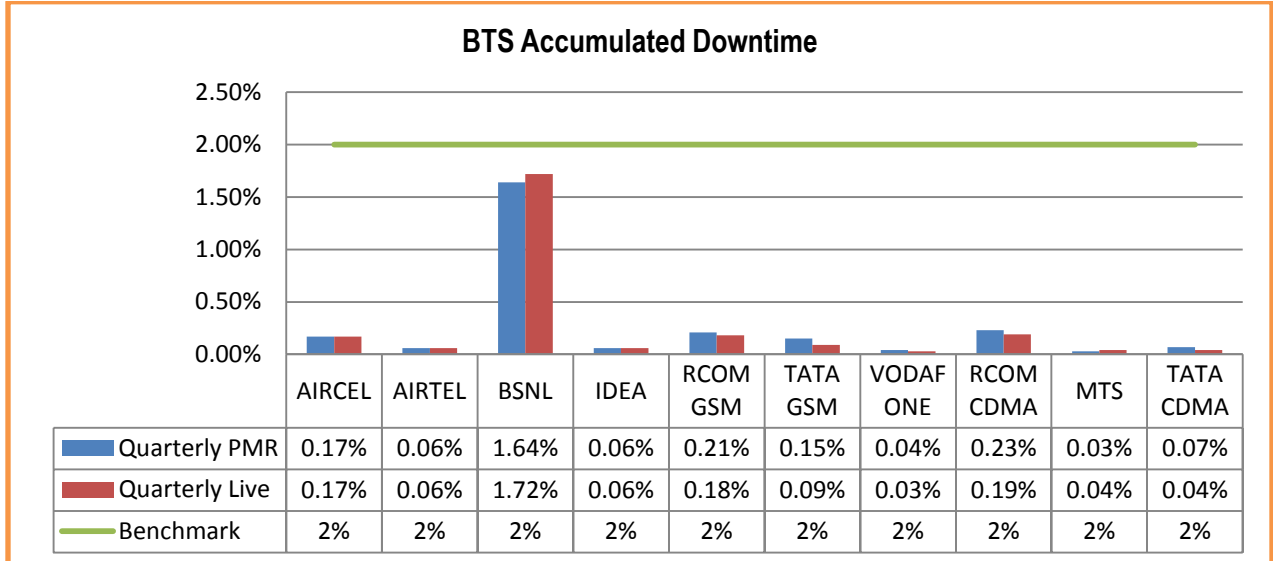
All operators are meeting the benchmarks.

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

Worst affected BTSs due to downtime

	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAF ONE	RCOM CDMA	MTS	TATA CDMA
Quarterly PMR	0.57%	0.13%	1.81%	0.04%	0.48%	0.14%	0.11%	0.60%	0.02%	0.05%
Quarterly Live	0.02%	0.02%	0.15%	0.00%	0.00%	0.02%	0.01%	0.00%	0.00%	0.00%
Benchmark	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
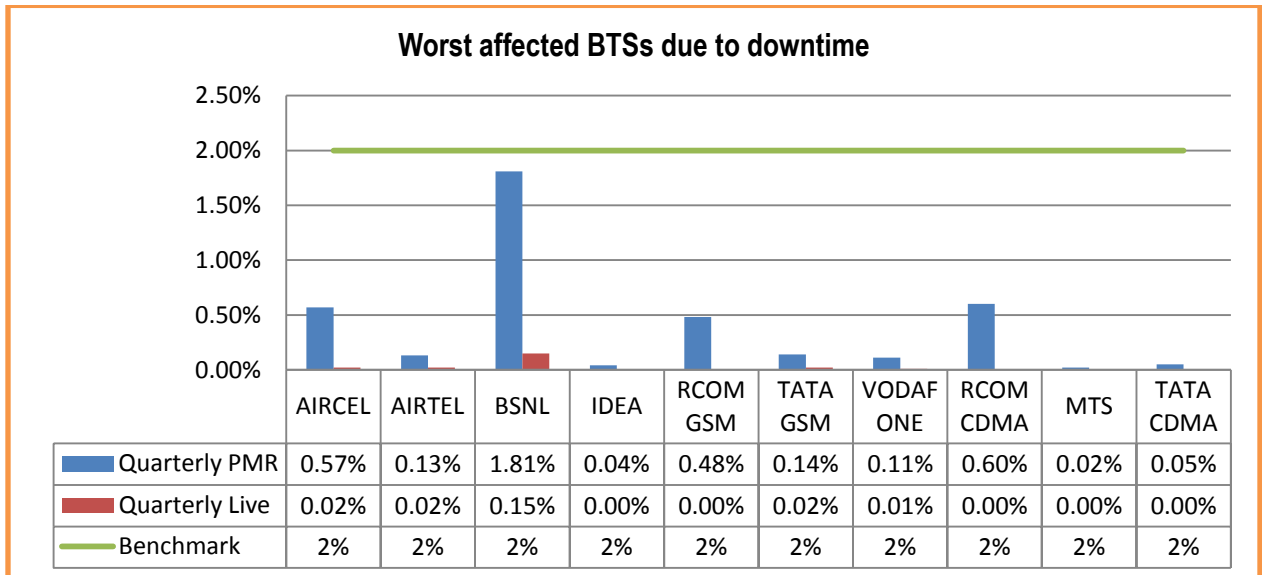
All operators are meeting the benchmarks.

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	97.33%	99.10%	98.68%	99.22%	99.62%	98.42%	99.81%	99.04%	99.02%	97.81%
Quarterly Live	97.44%	99.14%	98.62%	99.54%	99.62%	98.46%	99.86%	99.09%	99.12%	97.76%
Benchmark	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
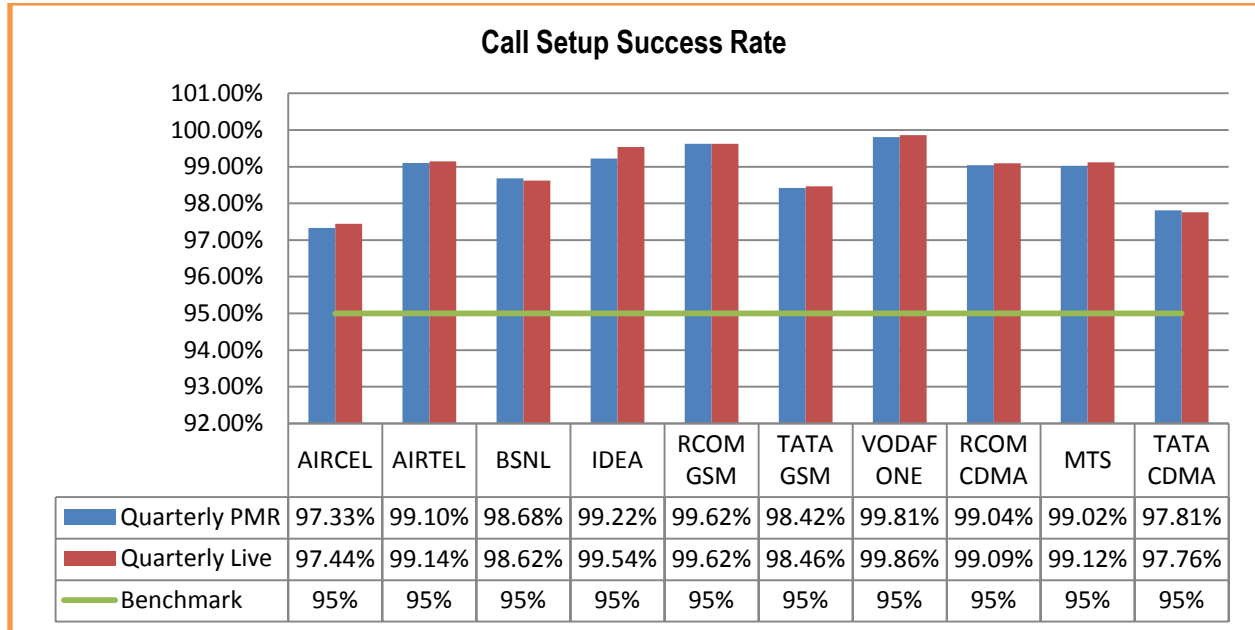
All operators are meeting the benchmarks.

4) SDCCH/PAGING CHANNEL CONGESTION:

SDCCH/PAGING Channel Congestion

	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAF ONE	RCOM CDMA	MTS	TATA CDMA
Quarterly PMR	0.20%	0.15%	0.52%	0.29%	0.02%	0.07%	0.12%	0.00%	0.00%	0.00%
Quarterly Live	0.14%	0.14%	0.59%	0.19%	0.02%	0.07%	0.06%	0.00%	0.00%	0.00%
Benchmark	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
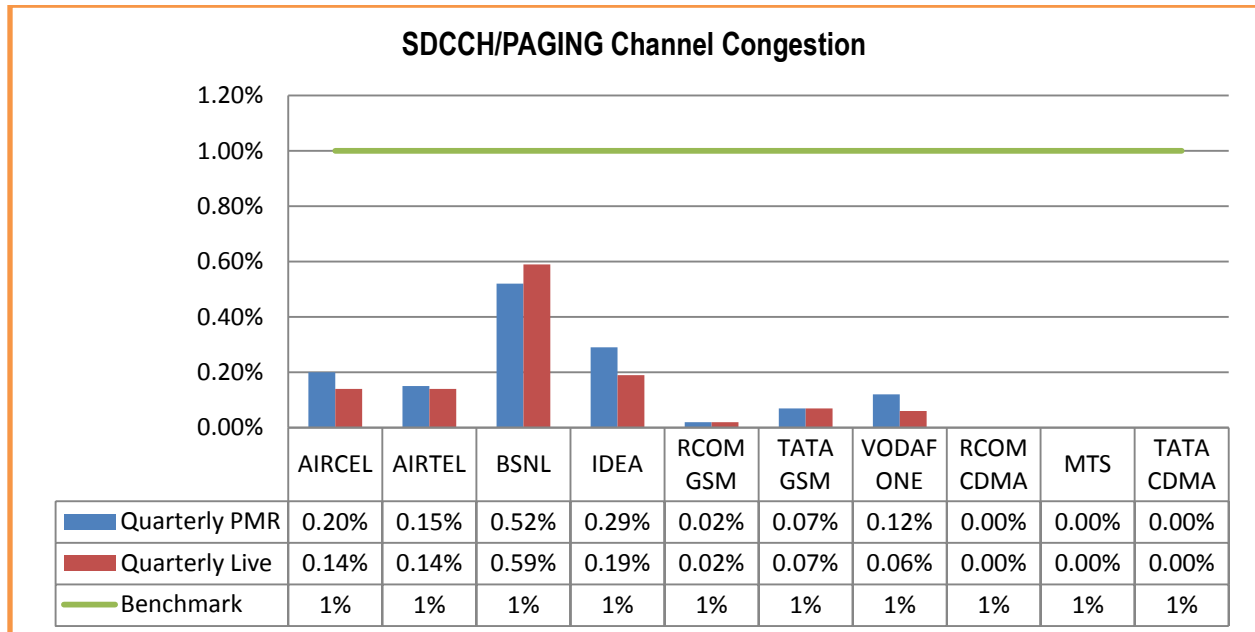
All operators are meeting the benchmarks.

5) TCH CONGESTION:

TCH Congestion

	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAF ONE	RCOM CDMA	MTS	TATA CDMA
Quarterly PMR	0.48%	0.28%	1.69%	0.43%	0.05%	0.08%	0.19%	0.01%	0.26%	1.37%
Quarterly Live	0.23%	0.26%	1.71%	0.15%	0.06%	0.07%	0.14%	0.00%	0.20%	1.42%
Benchmark	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
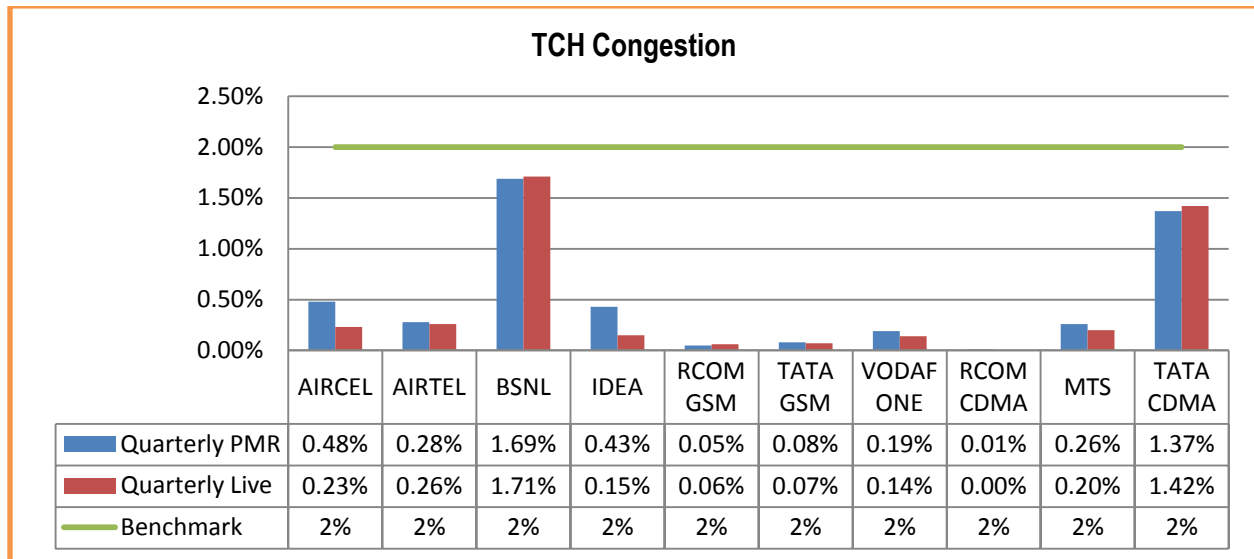
All operators are meeting the benchmarks.

6) CALL DROP RATE:

Call Drop Rate

	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAF ONE	RCOM CDMA	MTS	TATA CDMA
Quarterly PMR	0.74%	0.83%	1.41%	0.99%	0.36%	0.74%	0.73%	0.07%	0.48%	0.53%
Quarterly Live	0.70%	0.83%	1.43%	0.98%	0.37%	0.75%	0.73%	0.08%	0.46%	0.50%
Benchmark	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
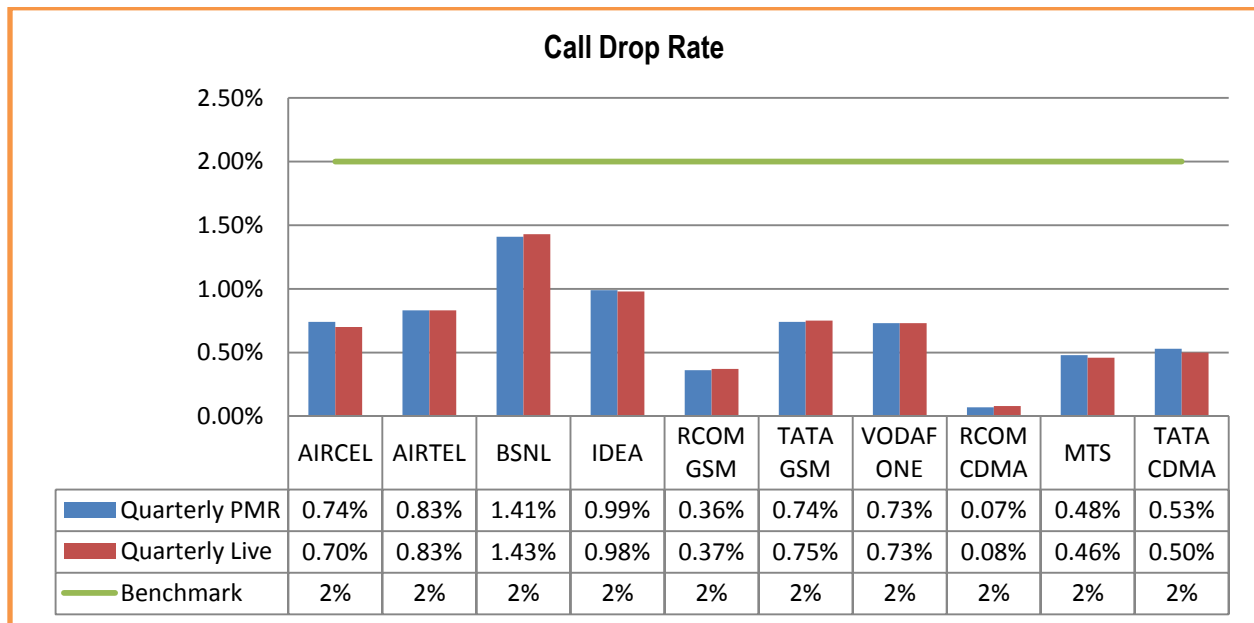
All operators are meeting the benchmarks.

7) WORST AFFECTED CELLS>3% TCH DROP:

Worst affected cells>3% TCH drop

	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAF ONE	RCOM CDMA	MTS	TATA CDMA
Quarterly PMR	2.51%	1.11%	2.29%	2.34%	0.04%	4.69%	2.28%	0.36%	0.39%	6.55%
Quarterly Live	2.37%	1.16%	2.23%	2.44%	0.03%	4.40%	2.27%	0.33%	0.37%	6.12%
Benchmark	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
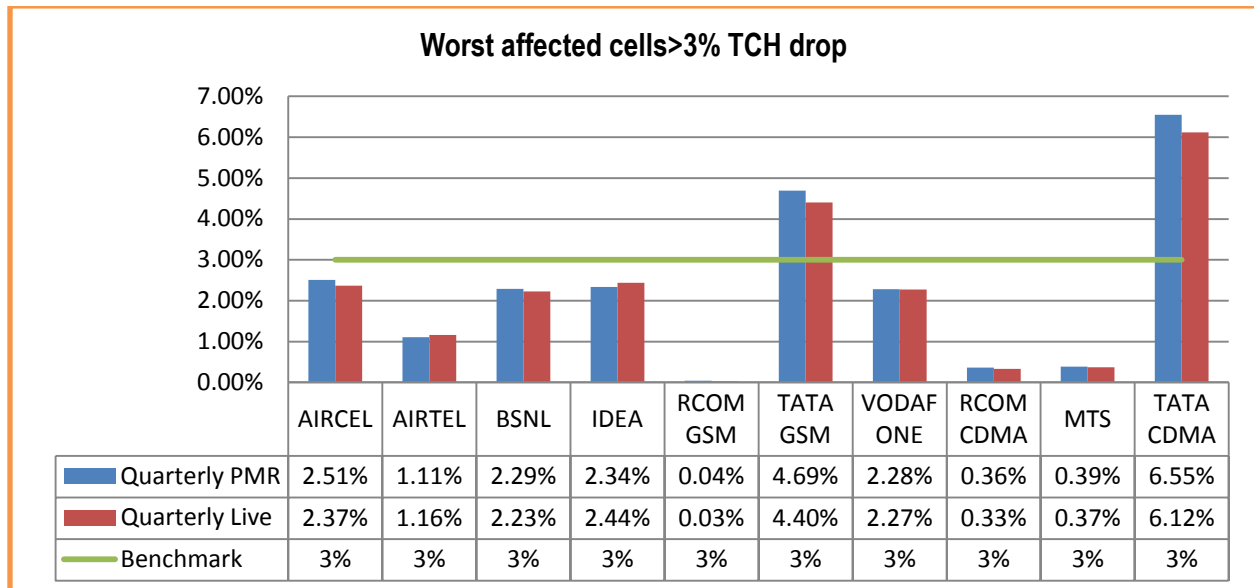
All operators are meeting the benchmarks except Tata GSM and Tata CDMA.

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	97.04%	99.05%	98.51%	96.23%	98.64%	98.39%	97.14%	99.73%	99.21%	98.95%
Quarterly Live	97.14%	99.05%	98.78%	96.25%	98.59%	98.44%	97.24%	99.73%	99.22%	98.96%
Benchmark	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%

All operators are meeting the benchmarks.