



**Audit & Assessment of Quality of Service
Of
Cellular Mobile Telephone Service
For
Telecom Regulatory Authority Of India
North Zone – Rajasthan Service Area
(July 2015 – September 2015)**

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

PREFACE

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

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

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

Table of Contents

1. BACKGROUND..... 6

2. OBJECTIVES AND METHODOLOGY..... 9

3. SAMPLE SIZE..... 11

 3.1 SAMPLING FOR CELLULAR MOBILE (WIRELESS) SERVICE PROVIDERS 11

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

 3.3 SAMPLING FOR BROADBAND SERVICE PROVIDERS 12

4. EXECUTIVE SUMMARY 14

5. PMR AUDIT REPORTS: 17

 5.1 MONTHLY PMR:..... 17

 5.1.1 BUSY HOUR OF VARIOUS SERVICE PROVIDERS: 17

 5.1.2 SWITCHES/BSC/BTS DETAILS OF SERVICE PROVIDERS: 17

 5.1.3 QOS PERFORMANCE OF MONTHLY PMR – JULY-15 MONTH: 18

 5.1.4 QOS PERFORMANCE OF MONTHLY PMR – AUGUST- 15 MONTH:..... 19

 5.1.5 QOS PERFORMANCE OF MONTHLY PMR – SEPTEMBER- 15 MONTH:..... 20

 5.1.6 QOS PERFORMANCE OF QUARTERLY PMR –AVERAGE OF QE- SEPTEMBER- 15 (JULY- 15 TO SEPTEMBER 2015 MONTHS AUDITED DATA) 21

 5.1.7 KEY FINDINGS ON MONTHLY PMR AUDIT REPORTS:..... 22

 5.2 LIVE MEASUREMENT DATA (3-DAYS) FOR CELLULAR MOBILE SERVICE PROVIDERS (NETWORK SERVICE QUALITY PARAMETER):..... 25

 5.2.1 LIVE MEASUREMENT DATA (3-DAYS) – JULY- 15 MONTH: 25

 5.2.2 LIVE MEASUREMENT DATA (3-DAYS) – AUGUST- 15 MONTH:..... 26

 5.2.3 LIVE MEASUREMENT DATA (3-DAYS) – SEPTEMBER- 15 MONTH: 27

 5.2.4 QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT AUDITED DATA (AVERAGE OF JULY-2015 TO SEPTEMBER- 2015) 28

 5.2.5 KEY FINDING ON 3 DAYS LIVE MEASUREMENTS: 28

 5.2.6 DETAILED NETWORK DATA ASSESSMENT OF CELLULAR MOBILE TELEPHONE SERVICES: 29

 5.3 CUSTOMER SERVICE QUALITY PARAMETERS MEASUREMENT FOR CMTS-QE-SEPT-15:.. 36

 5.3.1 QUARTERLY CUSTOMER SERVICE DELIVERY (CSD) AUDITED DATA FOR CELLULAR MOBILE SERVICES (JULY TO SEPTEMBER- 2015 MONTHS AUDITED DATA):..... 36

 5.3.2 3 DAYS LIVE CSD AUDITED DATA FOR CELLULAR MOBILE SERVICES (QE– SEPT - 2015): 39

 KEY FINDINGS: CUSTOMER SERVICE DELIVERY PARAMETERS..... 40

6. LIVE CALLING ASSESSMENT:..... 42

 6.1 INTER OPERATOR CALLS ASSESSMENT: 42

 6.2 CUSTOMER CARE / HELPLINE ASSESSMENT: 43

 6.3 LIVE CALLING ASSESSMENT FOR BILLING COMPLAINTS:..... 43

 6.4 LEVEL -1 CALLING ASSESSMENT: 44

7.	OPERATOR ASSESTID DRIVE TEST	46
	7.1 DETAIL OF THE ROUTES COVERED DURING THE DRIVE TESTS:	56
	7.2 SSA WISE DRIVE TEST OBSERVATION:	58
	7.3 KEY FINDINGS ON DRIVE TEST:.....	61
8.	GRAPHICAL REPRESENTATION (CMTS):.....	63
9.	PMR VERIFICATION TABLE:	67



1. BACKGROUND



1. BACKGROUND

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

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

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

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

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

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

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

2. OBJECTIVES AND METHODOLOGY



2. OBJECTIVES AND METHODOLOGY

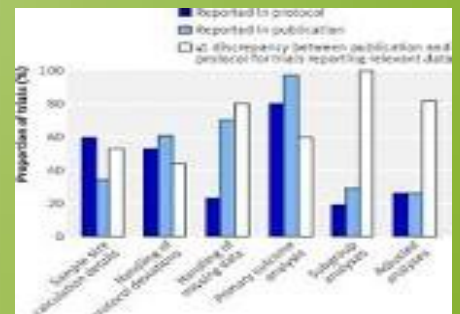
The primary objective is to audit and assess the Quality of Service being rendered by Basic, Cellular Mobile & Broadband service providers against the parameters notified by TRAI.

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 UP (E), UP (W), and MP&CG circles during the quarter July 2015 – September 2015.**

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

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

3. SAMPLE SIZE



3. SAMPLE SIZE

3.1 SAMPLING FOR CELLULAR MOBILE (WIRELESS) SERVICE PROVIDERS

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

Sl. No.	Service Provider	Dates of live measurement Audit			Audit Location
		July-15	August-15	September-15	
GSM Operators					
1	AIRCEL	8 to 10 Jul-15	12 to 14 Aug-15	9 to 11 Sep-15	Aircel limited, 1st & 2nd Floor, Navajyoti, Amrapali Circle,C-Block,Vaishali Nagar, Jaipur-302021
2	AIRTEL	13 to 15 Jul-15	19 to 21 Aug-15	16 to 18 Sep-15	Bharti Hexacom Limited, K-21, Malviya Marg, c-scheme , Jaipur-302001
3	BSNL	13 to 15 Jul-15	24 to 26 Aug-15	14 to 16 Sep-15	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 Jul-15	17 to 19 Aug-115	16 to 18 Sep-15	Idea Cellular Ltd. Plot-C, Sahkar Marg, Jaipur- 302001
5	RCOM GSM	15 to 17 Jul-15	5 to 7 Aug-15	16 to 18 Sep-15	Reliance Communications Ltd. F-161, E-170, Road No-12, VKIA, Jaipur-302013
6	TATA GSM	15 to 17 Jul-15	11 to 13 Aug-15	8 to 10 Sep-15	Tata Teleservices Limited, The Guman-1, Amrapali circle, Vaishali nagar, jaipur-302021
7	VODAFONE	15 to 17 Jul-15	12 to 14 Aug-15	14 to 16 Sep-15	Vodafone Ltd. 5th Floor,Gaurav Tower,Malviya Nagar jaipur,-302017
CDMA Operators					
8	MTS	8 to 10 Jul-15	11 to 13 Aug-15	7 to 9 Sep-15	Sistema Shyam Teleservices Ltd. 3, MTS Tower, Amrapali Circle Vaishali Nagar, Jaipur.
9	RCOM CDMA	15 to 17 Jul-15	5 to 7 Aug-15	16 to 18 Sep-15	Reliance Communications Ltd. F-161, E-170, Road No-12, VKIA, Jaipur-302013
10	TATA CDMA	15 to 17 Jul-15	11 to 13 Aug-15	8 to 10 Sep-15	Tata Teleservices Limited, The Guman-1, Amrapali circle, Vaishali nagar, jaipur-302021

For all the above operators, audit was conducted in all the three months of the Quarter ended September 2015.

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

3.2 SAMPLING FOR BASIC (WIRE LINE) SERVICES

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

3.3 SAMPLING FOR BROADBAND SERVICE PROVIDERS

- TUV–SUD South Asia has to conduct the audit and assessment of Quality of Service of Broadband Service only in respect of the service providers who are having broadband subscriber base of more than 10,000 subscribers in their licensed service area, for 5% of Point of Presence (PoPs) spread over in 10% SDCAs in specified Telecom Circle **only 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 September- 2015, as the same has already been done during QE June 2015.**

4. EXECUTIVE SUMMARY



4. EXECUTIVE SUMMARY

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

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

Cellular Mobile Service:

(i) From the **monthly audit**, it was revealed that the performance of the service providers in Rajasthan Service area was satisfactory for network related parameters except for one parameter namely **‘Worst affected cells having > 3% TCH drop**. The benchmark for this parameter could not be complied with by **Aircel, Tata (GSM) and Tata (CDMA)** with their average achievement as **3.46%, 4.67% and 7.14%** respectively.

(ii) From three days live measurement assessment, it was found that the performance of all operators was satisfactory as they have largely met the benchmarks except the parameter **‘Worst affected cells> 3 % TCH drops’**, which could not be complied with by **Aircel, Tata (GSM) and Tata (CDMA)**. The average performance of **Aircel, Tata (GSM) and Tata (CDMA)** on this parameter was **3.73%, 4.77% and 6.83%** respectively. The similar non-compliance of Aircel, Tata (GSM) and Tata (CDMA) was also observed during monthly PMR audit of the quarter.

(iii) With regard to the **Customer Service Quality Parameters**, it is revealed that most of the operators are in well compliance of the parameters on Metering and Billing Credibility, Response Time to Customers, Termination of Service and Time taken for refunds except few cases of non-compliance for some of the parameters. However, **Vodafone** could not meet the benchmark with its performance as **0.13%** (for post paid) and **0.102%** (for pre-paid), while **BSNL** and **Idea** failed to meet the benchmark for pre-paid with their performance as **0.26% and 0.18%** respectively.

Regarding the parameters related to Response time to customers, all service providers are in compliance with respect to the parameter accessibility of call center. In case of **Calls answered by operator (Voice to Voice)**, **BSNL** has not met the benchmark of >95% with its performed level as **83.14%**.

Regarding parameter Termination / Closure of Service within 7 days, all operators have met the benchmark. Whereas, in case of parameter Time taken for refund of deposits, **RCOM CDMA** lagged behind the benchmark of 100% refunds with its performance as **99.18%**.

The results of **three days live measurements** reveal that all **operators have met the benchmarks** for the parameters Accessibility of Call Center and Calls answered by operator (Voice to voice) within 90 seconds.

(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** has not provided the report of drive test conducted across these SSAs despite best efforts. So their performance could not be assessed.

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	September -15	20:00 - 21:00
2	AIRTEL	September -15	20:00 - 21:00
3	BSNL	September -15	
4	IDEA	September -15	20:00 - 21:00
5	RCOM GSM	September -15	20:00 - 21:00
6	TATA GSM	September -15	21:00 - 22:00
7	VODAFONE	September -15	20:00 - 21:00
CDMA Operators			
8	MTS	September -15	20:00 - 21:00
9	RCOM CDMA	September -15	19:00 - 20:00
10	TATA CDMA	September -15	20:00 - 21:00

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

5.1.2 SWITCHES/BSC/BTS DETAILS OF SERVICE PROVIDERS:

Sl. No.	Name of Service Provider	No. of MSC + GMSC	No. of BSC	No. of BTS	NSS make	BSS make
GSM Operators						
1	AIRCEL	3	14	2318	NSN	NSN
2	AIRTEL	44	80	8331	Ericsson	Ericsson
3	BSNL				Ericsson	NSN & Ericsson
4	IDEA	13	50	6602	Ericsson	Ericsson
5	RCOM GSM	4	15	2061	Huawei	Huawei
6	TATA GSM	2	12	1391	Huawei	Huawei
7	VODAFONE	12	94	7318	NSN	NSN
CDMA Operators						
8	MTS	2	7	1629	ZTE	ZTE
9	RCOM CDMA	6	6	931	Huawei, Lucent, Ericsson & ZTE	Huawei & Lucent
10	TATA CDMA	5	6	690	Ericsson & Huawei	Huawei & Motorola

5.1.3 QOS PERFORMANCE OF MONTHLY PMR – JULY-15 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES - RAJASTHAN CIRCLE - JULY 15 MONTH													
PMR Generation Data		Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	MTS	TATA CDMA
S/ N	Name of Parameter			GSM Operators							CDMA Operators		
Network Service Quality Parameter													
Network Availability													
1	a) BTS Accumulated Downtime	<=2%	July-15	0.26%	0.17%	1.50%	0.13%	0.21%	0.22%	0.12%	0.24%	0.11%	0.35%
	b) Worst affected BTSs due to downtime	<=2%	July-15	1.67%	0.41%	1.74%	0.16%	0.29%	0.43%	0.53%	0.54%	0.06%	2.46%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	July-15	97.04%	97.32%	98.64%	99.34%	99.62%	98.16%	99.65%	98.76%	99.13%	98.66%
	b) SDCCCH/PAGING Channel congestion	<=1%	July-15	0.21%	0.65%	0.54%	0.32%	0.16%	0.36%	0.16%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	July-15	0.69%	1.59%	1.41%	0.35%	0.05%	0.12%	0.35%	0.02%	0.11%	0.36%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	July-15	0.83%	0.79%	1.47%	0.95%	0.28%	0.84%	0.81%	0.17%	0.38%	0.45%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	July-15	3.75%	1.15%	2.10%	2.30%	0.03%	4.74%	2.67%	0.78%	0.63%	7.17%
	c) Connections with good voice quality	>=95%	July-15	96.97%	98.97%	98.71%	96.08%	98.82%	98.59%	96.99%	99.70%	99.16%	98.83%
4	No. of POI's having >=0.5% POI congestion		July-15	0	0	0	0	0	0	0	0	0	0

5.1.4 QOS PERFORMANCE OF MONTHLY PMR – AUGUST- 15 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES - RAJASTHAN CIRCLE – AUGUST-15 MONTH													
PMR Generation Data		Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	MTS	TATA CDMA
S/ N	Name of Parameter			GSM Operators						CDMA Operators			
Network Service Quality Parameter													
Network Availability													
1	a) BTS Accumulated Downtime	<=2%	Aug-15	0.12%	0.11%	1.48%	0.06%	0.11%	0.12%	0.05%	0.13%	0.05%	0.10%
	b) Worst affected BTSs due to downtime	<=2%	Aug-15	0.53%	0.26%	1.69%	0.03%	0.00%	0.14%	0.21%	0.00%	0.12%	0.58%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Aug-15	97.02%	97.34%	98.63%	99.29%	99.60%	98.26%	99.79%	98.46%	99.05%	98.95%
	b) SDCCH/PAGING Channel congestion	<=1%	Aug-15	0.26%	0.34%	0.34%	0.23%	0.02%	0.07%	0.11%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Aug-15	0.86%	1.46%	1.29%	0.34%	0.05%	0.07%	0.21%	0.00%	0.11%	0.23%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Aug-15	0.84%	0.85%	1.48%	1.08%	0.24%	0.88%	0.88%	0.18%	0.42%	0.44%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Aug-15	3.65%	1.05%	1.71%	2.52%	0.03%	5.06%	2.72%	0.68%	0.65%	7.46%
	c) Connections with good voice quality	>=95%	Aug-15	96.79%	98.90%	98.61%	95.80%	98.79%	98.53%	96.71%	99.70%	99.16%	98.81%
4	No. of POI's having >=0.5% POI congestion		Aug-15	0	0	0	0	0	0	0	0	0	0

5.1.5 QOS PERFORMANCE OF MONTHLY PMR – SEPTEMBER- 15 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES - RAJASTHAN CIRCLE – SEPTEMBER - 15 MONTH													
PMR Generation Data		Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	MTS	TATA CDMA
S/ N	Name of Parameter			GSM Operators						CDMA Operators			
Network Service Quality Parameter													
Network Availability													
1	a) BTS Accumulated Downtime	<=2%	Sep-15	0.14%	0.15%	1.50%	0.07%	0.15%	0.17%	0.07%	0.20%	0.05%	0.13%
	b) Worst affected BTSs due to downtime	<=2%	Sep-15	0.30%	0.31%	1.73%	0.02%	0.10%	0.14%	0.25%	0.21%	0.12%	0.58%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Sep-15	97.25%	97.78%	98.67%	99.00%	99.62%	98.32%	99.68%	98.31%	98.97%	98.93%
	b) SDCCH/PAGING Channel congestion	<=1%	Sep-15	0.31%	0.63%	0.50%	0.38%	0.02%	0.07%	0.20%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Sep-15	1.05%	1.16%	1.29%	0.63%	0.06%	0.11%	0.32%	0.01%	0.10%	0.27%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Sep-15	0.79%	0.76%	1.50%	1.10%	0.28%	0.78%	0.82%	0.21%	0.39%	0.41%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Sep-15	2.99%	0.76%	2.07%	2.27%	0.02%	4.22%	2.46%	0.78%	0.75%	6.80%
	c) Connections with good voice quality	>=95%	Sep-15	96.67%	99.06%	98.60%	95.90%	98.84%	98.69%	96.75%	99.72%	99.19%	98.83%
4	No. of POI's having >=0.5% POI congestion		Sep-15	0	0	0	0	0	0	0	0	0	0

5.1.6 QOS PERFORMANCE OF QUARTERLY PMR –AVERAGE OF QE- SEPTEMBER- 15 (JULY-15 TO SEPTEMBER 2015 MONTHS AUDITED DATA)

QUARTERLY QOS PERFORMANCE (AVERAGE OF QE- SEPTEMBER 15) - RAJASTHAN CIRCLE													
PMR Generation Data		Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	MTS	TATA CDMA
S/ N	Name of Parameter			GSM Operators						CDMA Operators			
Network Service Quality Parameter													
Network Availability													
1	a) BTS Accumulated Downtime	<=2%	Quarterly	0.17%	0.14%	1.49%	0.09%	0.16%	0.17%	0.08%	0.19%	0.07%	0.19%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	0.83%	0.33%	1.71%	0.07%	0.13%	0.24%	0.33%	0.25%	0.10%	1.21%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Quarterly	97.10%	97.48%	98.65%	99.21%	99.61%	98.25%	99.71%	98.51%	99.05%	98.85%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.26%	0.54%	0.46%	0.31%	0.07%	0.17%	0.16%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.87%	1.40%	1.33%	0.44%	0.05%	0.10%	0.29%	0.01%	0.11%	0.29%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	0.82%	0.80%	1.48%	1.04%	0.27%	0.83%	0.84%	0.19%	0.40%	0.43%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	3.46%	0.99%	1.96%	2.36%	0.03%	4.67%	2.62%	0.75%	0.68%	7.14%
	c) Connections with good voice quality	>=95%	Quarterly	96.81%	98.98%	98.64%	95.93%	98.82%	98.60%	96.82%	99.71%	99.17%	98.82%
4	No. of POI's having >=0.5% POI congestion		Quarterly	0	0	0	0	0	0	0	0	0	0

5.1.7 KEY FINDINGS ON MONTHLY PMR AUDIT REPORTS:

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

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

Network Service Quality Parameters:

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

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

In Rajasthan circle, **all the operators were found meeting benchmark on the above parameters i.e.** 'BTS accumulated downtime' and 'worst affected BTSs due to down time' in all the three months of the quarter.

- **Connection Establishment (Accessibility)**
 - i. Call Set-up Success Rate(CSSR)

CSSR includes complete signaling in the call set up process and does not aim to measure the performance of the called exchange or that of the Point of Interconnection (POI). CSSR was established as the ratio of total number of successful call attempts (establishment) to the total number of call attempts made. All the operators were found to be calculating the parameter as per the TRAI's specified norms.

PMR audit revealed that all operators met the benchmark, prescribed for this parameter.

- **Parameters related to Network Congestion:**

The parameters namely SDCCH / Paging Channel Congestion, TCH and POI are prescribed with the aim of measuring the congestion in the network.

In CDMA system, there is no direct counter defined for reporting Paging Channel Congestion as reported by Tata Teleservices. However, they have a defined counter for Paging Channel Occupancy Ratio (**PCH Average Using Ratio**) which is used to determine the Paging Channel Occupancy which on an average is < 50% on all sites in the network. When the value of this parameter is less than 100%, it is counted as 0% congestion. Thus, there is no congestion on the paging channel in CDMA system.

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

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

- **Connection Maintenance (Retainability)**

- i. Call Drop Rate:

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

The audit of this parameter revealed that all the service providers were measuring this parameter as per the TRAI guidelines. Also, **all the service providers were found to be meeting the TRAI specified benchmark**. The lowest call drop rate (average 0.19%) was for RCOM (CDMA) during the quarter.

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

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

The audit with respect to this parameter revealed that all the operators met the benchmark for this parameter except **Aircel, Tata (GSM) and Tata (CDMA)** which could not meet the benchmark of this parameter with their average achievement as **3.46%, 4.67% and 7.14%** respectively.

- iii. Connections with good voice quality:

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

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



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

5.2.1 LIVE MEASUREMENT DATA (3-DAYS) – JULY- 15 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES RAJASTHAN CIRCLE - JULY 15 MONTH													
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	MTS	TATA CDMA
S/N	Name of Parameter			GSM Operators						CDMA Operators			
Network Service Quality Parameter													
Network Availability													
1	a) BTS Accumulated Downtime	<=2%	Live data	0.17%	0.09%	1.58%	0.06%	0.17%	0.13%	0.03%	0.19%	0.07%	0.47%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.15%	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	96.87%	97.65%	98.63%	99.47%	99.61%	98.24%	99.88%	99.01%	98.98%	98.58%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.18%	0.23%	0.54%	0.13%	0.32%	0.07%	0.05%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.73%	1.27%	1.41%	0.23%	0.05%	0.07%	0.12%	0.01%	0.21%	0.57%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.88%	0.77%	1.45%	0.93%	0.28%	0.84%	0.75%	0.15%	0.38%	0.43%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	4.12%	1.02%	2.24%	2.19%	0.04%	4.71%	2.71%	0.90%	0.58%	6.74%
	c) Connections with good voice quality	>=95%	Live data	96.94%	98.99%	98.33%	96.17%	98.82%	98.58%	97.05%	99.71%	99.16%	98.85%
4	No. of POI having >=0.5% congestion		Live data	0	0	0	0	0	0	0	0	0	0

5.2.2 LIVE MEASUREMENT DATA (3-DAYS) – AUGUST- 15 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES RAJASTHAN CIRCLE- AUGUST 15 MONTH													
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	MTS	TATA CDMA
S/N	Name of Parameter			GSM Operators						CDMA Operators			
Network Service Quality Parameter													
Network Availability													
1	a) BTS Accumulated Downtime	<=2%	Live data	0.10%	0.09%	1.51%	0.07%	0.14%	0.22%	0.09%	0.15%	0.07%	0.08%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.01%	0.15%	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	96.85%	97.71%	98.63%	99.37%	99.60%	98.08%	99.85%	99.06%	98.99%	99.03%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.14%	0.26%	0.26%	0.15%	0.02%	0.10%	0.09%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	0.67%	1.13%	1.06%	0.29%	0.05%	0.09%	0.15%	0.00%	0.11%	0.14%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.90%	0.82%	1.52%	1.08%	0.19%	0.96%	0.94%	0.17%	0.46%	0.46%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	4.17%	1.00%	2.13%	2.59%	0.04%	5.46%	2.64%	0.88%	0.61%	6.92%
	c) Connections with good voice quality	>=95%	Live data	96.69%	98.92%	98.00%	95.78%	98.77%	98.46%	96.54%	99.70%	99.15%	98.82%
4	No. of POI having >=0.5% congestion		Live data	0	0	0	0	0	0	0	0	0	0

5.2.3 LIVE MEASUREMENT DATA (3-DAYS) – SEPTEMBER- 15 MONTH:

CELLULAR MOBILE TELEPHONE SERVICES RAJASTHAN CIRCLE- SEPTEMBER - 15 MONTH													
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	MTS	TATA CDMA
S/N	Name of Parameter			GSM Operators						CDMA Operators			
Network Service Quality Parameter													
Network Availability													
1	a) BTS Accumulated Downtime	<=2%	Live data	0.13%	0.41%	1.46%	0.07%	0.12%	0.05%	0.05%	0.14%	0.02%	0.02%
	b) Worst affected BTSs due to downtime	<=2%	Live data	0.04%	0.00%	0.15%	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	97.19%	96.74%	98.92%	99.18%	99.62%	98.18%	99.55%	98.32%	98.90%	99.05%
	b) SDCCH/PAGING Channel congestion	<=1%	Live data	0.46%	0.71%	0.71%	0.21%	0.02%	0.07%	0.20%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Live data	1.00%	1.51%	1.45%	0.49%	0.06%	0.08%	0.45%	0.00%	0.16%	0.13%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Live data	0.80%	0.75%	1.52%	1.03%	0.27%	0.79%	0.79%	0.21%	0.38%	0.46%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Live data	2.90%	0.76%	2.70%	2.15%	0.01%	4.15%	2.40%	0.74%	0.40%	6.83%
	c) Connections with good voice quality	>=95%	Live data	96.80%	99.09%	98.33%	95.99%	98.86%	98.68%	96.81%	99.72%	99.19%	98.65%
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 JULY-2015 TO SEPTEMBER- 2015)

QUARTERLY QOS PERFORMANCE OF 3-DAYS LIVE MEASUREMENT (AVERAGE OF QE – SEPT. 15) – RAJASTHAN CIRCLE													
Live measurement Data		Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	MTS	TATA CDMA
S/N	Name of Parameter			GSM Operators						CDMA Operators			
Network Service Quality Parameter													
Network Availability													
1	a) BTS Accumulated Downtime	<=2%	Quarterly	0.13%	0.09%	1.52%	0.07%	0.14%	0.13%	0.06%	0.16%	0.05%	0.19%
	b) Worst affected BTSs due to downtime	<=2%	Quarterly	0.01%	0.01%	0.15%	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%	Quarterly	96.97%	97.37%	98.73%	99.34%	99.61%	98.17%	99.76%	98.80%	98.96%	98.89%
	b) SDCCH/PAGING Channel congestion	<=1%	Quarterly	0.26%	0.40%	0.50%	0.16%	0.12%	0.08%	0.11%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Quarterly	0.80%	1.30%	1.31%	0.34%	0.05%	0.08%	0.24%	0.00%	0.16%	0.28%
Connection maintenance (Retainability)													
3	a) CDR (Call Drop Rate)	<=2%	Quarterly	0.86%	0.78%	1.50%	1.01%	0.25%	0.86%	0.83%	0.18%	0.41%	0.45%
	b) Worst affected cells>3% TCH drop (Call drop) rate	<=3%	Quarterly	3.73%	0.93%	2.36%	2.31%	0.03%	4.77%	2.58%	0.84%	0.53%	6.83%
	c) Connections with good voice quality	>=95%	Quarterly	96.81%	99.00%	98.22%	95.98%	98.82%	98.57%	96.80%	99.71%	99.17%	98.77%
4	No. of POI having >=0.5% congestion		Quarterly	0	0	0	0	0	0	0	0	0	0

5.2.5 KEY FINDING ON 3 DAYS LIVE MEASUREMENTS:

From three days live measurement assessment, it was found that the performance of all operators was satisfactory as they have largely met the benchmarks except the parameter ‘Worst affected cells> 3 % TCH drops”, which could not be complied with by Aircel, Tata (GSM) and Tata (CDMA). The average performance of Aircel, Tata (GSM) and Tata (CDMA) on this parameter was 3.73%, 4.77% and 6.83% respectively. The similar non-compliance of Aircel, Tata (GSM) and Tata (CDMA) was also observed during monthly PMR audit of the quarter.

5.2.6 DETAILED NETWORK DATA ASSESSMENT OF CELLULAR MOBILE TELEPHONE SERVICES:

TABLE: 1

Detailed Network Data Assessment of Cellular Mobile Telephone Services- Rajasthan Circle- July-15 month													
S/N	Name of Parameter	Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	MTS	TATA CDMA
				GSM Operators						CDMA Operators			
Network Service Quality Parameter													
Network Availability													
1	a) Total no. of BTSs in the licensed service area		July-15	2220	8286	4091	6305	2066	1390	7306	933	1657	690
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		July-15	4213.12	10785.47	45707.17	6026.10	3166.52	2282.66	6328.96	1653.00	1308.55	1789.68
	c) BTS Accumulated Downtime	<=2%	July-15	0.26%	0.17%	1.50%	0.13%	0.21%	0.22%	0.12%	0.24%	0.11%	0.35%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		July-15	37	34	71	10	6	6	39	5	1	17
	e) Worst affected BTSs due to downtime	<=2%	July-15	1.67%	0.41%	1.74%	0.16%	0.29%	0.43%	0.53%	0.54%	0.06%	2.46%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	July-15	97.04%	97.32%	98.64%	99.34%	99.62%	98.16%	99.65%	98.76%	99.13%	98.66%
	b) SDCCH/PAGING Congestion	<=1%	July-15	0.21%	0.65%	0.54%	0.32%	0.16%	0.36%	0.16%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	July-15	0.69%	1.59%	1.41%	0.35%	0.05%	0.12%	0.35%	0.02%	0.11%	0.36%
Connection Maintenance (Retainability)													
3	a) Call Drop Rate (CDR)	<=2%	July-15	0.83%	0.79%	1.47%	0.95%	0.28%	0.84%	0.81%	0.17%	0.38%	0.45%
	b) Worst affected cells>3% TCH drop	<=3%	July-15	3.75%	1.15%	2.10%	2.30%	0.03%	4.74%	2.67%	0.78%	0.63%	7.17%
	c) % of connections with good voice quality	>=95%	July-15	96.97%	98.97%	98.71%	96.08%	98.82%	98.59%	96.99%	99.70%	99.16%	98.83%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		July-15	246	286	210	443	2	198	595	22	36	159
	e) Total no. of cells (Sector) in the licensed service area		July-15	6572	24789	10009	19236	6190	4181	22322	2812	5711	2216
No. of POI's having >=0.5% POI congestion													
4	No. of POI's having >=0.5% POI congestion		July-15	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		July-15	0	0	0	0	0	0	0	0	0	0
Network Data													
5	a) Equipped Capacity of Network in Erlang		July-15	110368	445073	265400	276847	102000	66059	297310	116000	132000	170839
	b) Total traffic in TCBH in erlang (Avg.)		July-15	107588	391154	101067	193841	66233	30843	252876	31048	54240	22563
	c) Total no. of customers served (as per VLR) on last day of the month		July-15	3760927	17069354	2508416	7382490	5421762	416637	10304816	999692	1280024	295660

TABLE: 2

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Rajasthan Circle- July-15 month													
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	MTS	TATA CDMA
				GSM Operators						CDMA Operators			
Network Service Quality Parameter													
1	Network Availability												
	a) Total no. of BTSs in the licensed service area		Live data	2186	8275	4085	6233	2065	1390	7290	932	1656	690
	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	261.52	509.00	4657.34	282.50	245.60	132.41	150.36	128.47	84.72	232.45
	c) BTS Accumulated Downtime	<=2%	Live data	0.17%	0.09%	1.58%	0.06%	0.17%	0.13%	0.03%	0.19%	0.07%	0.47%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	0	6	0	0	0	0	0	0	0
e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.00%	0.15%	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	96.87%	97.65%	98.63%	99.47%	99.61%	98.24%	99.88%	99.01%	98.98%	98.58%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.18%	0.23%	0.54%	0.13%	0.32%	0.07%	0.05%	0.00%	0.00%	0.00%
c) TCH congestion	<=2%	Live data	0.73%	1.27%	1.41%	0.23%	0.05%	0.07%	0.12%	0.01%	0.21%	0.57%	
3	Connection Maintenance (Retainability)												
	a) Call Drop Rate (CDR)	<=2%	Live data	0.88%	0.77%	1.45%	0.93%	0.28%	0.84%	0.75%	0.15%	0.38%	0.43%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	4.12%	1.02%	2.24%	2.19%	0.04%	4.71%	2.71%	0.90%	0.58%	6.74%
	c) % of connections with good voice quality	>=95%	Live data	96.94%	98.99%	98.33%	96.17%	98.82%	98.58%	97.05%	99.71%	99.16%	98.85%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	269	253	224	420	2	197	604	25	33	149
e) Total no. of cells (Sector) in the licensed service area		Live data	6534	24794	10009	19222	6190	4181	22309	2789	5703	2216	
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

Detailed Network Data Assessment of Cellular Mobile Telephone Services- Rajasthan Circle- August 15 month													
S/N	Name of Parameter	Bench- mark	Audit Period	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	MTS	TATA CDMA
				GSM Operators						CDMA Operators			
Network Service Quality Parameter													
Network Availability													
1	a) Total no. of BTSs in the licensed service area		Aug-15	2275	8314	4093	6438	2065	1391	7315	932	1628	690
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Aug-15	1970.31	6898.55	45168.35	2935.37	1742.37	1213.99	2610.95	915.85	625.67	505.68
	c) BTS Accumulated Downtime	<=2%	Aug-15	0.12%	0.11%	1.48%	0.06%	0.11%	0.12%	0.05%	0.13%	0.05%	0.10%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Aug-15	12	22	69	2	0	2	15	0	2	4
	e) Worst affected BTSs due to downtime	<=2%	Aug-15	0.53%	0.26%	1.69%	0.03%	0.00%	0.14%	0.21%	0.00%	0.12%	0.58%
Connection Establishment (Accessibility)													
2	a) CSSR (Call Setup Success Rate)	>=95%	Aug-15	97.02%	97.34%	98.63%	99.29%	99.60%	98.26%	99.79%	98.46%	99.05%	98.95%
	b) SDCCH/PAGING Congestion	<=1%	Aug-15	0.26%	0.34%	0.34%	0.23%	0.02%	0.07%	0.11%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Aug-15	0.86%	1.46%	1.29%	0.34%	0.05%	0.07%	0.21%	0.00%	0.11%	0.23%
Connection Maintenance (Retainability)													
3	a) Call Drop Rate (CDR)	<=2%	Aug-15	0.84%	0.85%	1.48%	1.08%	0.24%	0.88%	0.88%	0.18%	0.42%	0.44%
	b) Worst affected cells>3% TCH drop	<=3%	Aug-15	3.65%	1.05%	1.71%	2.52%	0.03%	5.06%	2.72%	0.68%	0.65%	7.46%
	c) % of connections with good voice quality	>=95%	Aug-15	96.79%	98.90%	98.61%	95.80%	98.79%	98.53%	96.71%	99.70%	99.16%	98.81%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Aug-15	246	262	171	493	2	212	609	19	35	165
	e) Total no. of cells (Sector) in the licensed service area		Aug-15	6735	24883	10001	19611	6190	4184	22402	2793	5351	2216
No. of POI's having >=0.5% POI congestion													
4	No. of POI's having >=0.5% POI congestion		Aug-15	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Aug-15	0	0	0	0	0	0	0	0	0	0
Network Data													
5	a) Equipped Capacity of Network in Erlang		Aug-15	111418	480016	265400	282380	102000	66124	295026	116000	132000	170839
	b) Total traffic in TCBH in erlang (Avg.)		Aug-15	110784	399971	101997	196937	72403	31368	257351	53057	55626	21137
	c) Total no. of customers served (as per VLR) on last day of the month		Aug-15	3765886	17176688	2570122	7521550	5492144	409985	10403924	1027616	1239448	285469

TABLE: 4

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Rajasthan Circle- August 15 month													
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	MTS	TATA CDMA
				GSM Operators						CDMA Operators			
Network Service Quality Parameter													
1	Network Availability												
	a) Total no. of BTSs in the licensed service area		Live data	2250	8299	4093	6362	2065	1391	7311	931	1655	690
	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	162.50	529.68	4461.65	331.60	212.67	225.12	464.49	100.30	81.11	38.15
	c) BTS Accumulated Downtime	<=2%	Live data	0.10%	0.09%	1.51%	0.07%	0.14%	0.22%	0.09%	0.15%	0.07%	0.08%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	0	1	6	0	0	0	0	0	0	0
e) Worst affected BTSs due to downtime	<=2%	Live data	0.00%	0.01%	0.15%	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	96.85%	97.71%	98.63%	99.37%	99.60%	98.08%	99.85%	99.06%	98.99%	99.03%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.14%	0.26%	0.26%	0.15%	0.02%	0.10%	0.09%	0.00%	0.00%	0.00%
c) TCH congestion	<=2%	Live data	0.67%	1.13%	1.06%	0.29%	0.05%	0.09%	0.15%	0.00%	0.11%	0.14%	
3	Connection Maintenance (Retainability)												
	a) Call Drop Rate (CDR)	<=2%	Live data	0.90%	0.82%	1.52%	1.08%	0.19%	0.96%	0.94%	0.17%	0.46%	0.46%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	4.17%	1.00%	2.13%	2.59%	0.04%	5.46%	2.64%	0.88%	0.61%	6.92%
	c) % of connections with good voice quality	>=95%	Live data	96.69%	98.92%	98.00%	95.78%	98.77%	98.46%	96.54%	99.70%	99.15%	98.82%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	280	248	213	508	2	228	591	25	33	153
e) Total no. of cells (Sector) in the licensed service area		Live data	6718	24882	10001	19596	6190	4184	22404	2789	5392	2216	
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: 5

Detailed Network Data Assessment of Cellular Mobile Telephone Services- Rajasthan Circle- September 15 month													
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		Sep-15	2318	8331	4096	6602	2061	1391	7318	932	1629	690
	b) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		Sep-15	2257.32	8508.55	44123.93	3203.23	2199.70	1668.14	3691.10	1320.95	574.83	633.77
	c) BTS Accumulated Downtime	<=2%	Sep-15	0.14%	0.15%	1.50%	0.07%	0.15%	0.17%	0.07%	0.20%	0.05%	0.13%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Sep-15	7	26	71	1	2	2	18	2	2	4
	e) Worst affected BTSs due to downtime	<=2%	Sep-15	0.30%	0.31%	1.73%	0.02%	0.10%	0.14%	0.25%	0.21%	0.12%	0.58%
2	Connection Establishment (Accessibility)												
	a) CSSR (Call Setup Success Rate)	>=95%	Sep-15	97.25%	97.78%	98.67%	99.00%	99.62%	98.32%	99.68%	98.31%	98.97%	98.93%
	b) SDCCH/PAGING Congestion	<=1%	Sep-15	0.31%	0.63%	0.50%	0.38%	0.02%	0.07%	0.20%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	Sep-15	1.05%	1.16%	1.29%	0.63%	0.06%	0.11%	0.32%	0.01%	0.10%	0.27%
3	Connection Maintenance (Retainability)												
	a) Call Drop Rate (CDR)	<=2%	Sep-15	0.79%	0.76%	1.50%	1.10%	0.28%	0.78%	0.82%	0.21%	0.39%	0.41%
	b) Worst affected cells>3% TCH drop	<=3%	Sep-15	2.99%	0.76%	2.07%	2.27%	0.02%	4.22%	2.46%	0.78%	0.75%	6.80%
	c) % of connections with good voice quality	>=95%	Sep-15	96.67%	99.06%	98.60%	95.90%	98.84%	98.69%	96.75%	99.72%	99.19%	98.83%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Sep-15	205	189	209	454	1	177	552	22	40	151
	e) Total no. of cells (Sector) in the licensed service area		Sep-15	6899	24954	10093	19995	6178	4184	22421	2795	5288	2216
4	No. of POI's having >=0.5% POI congestion												
	No. of POI's having >=0.5% POI congestion		Sep-15	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Sep-15	0	0	0	0	0	0	0	0	0	0
5	Network Data												
	a) Equipped Capacity of Network in Erlang		Sep-15	113233	480061	265400	288836	102000	66124	292669	116000	132000	170839
	b) Total traffic in TCBH in erlang (Avg.)		Sep-15	124641	403292	107707	207981	73043	31448	261392	52769	58804	20917
	c) Total no. of customers served (as per VLR) on last day of the month		Sep-15	3846914	54538791	2573201	7581700	5268868	411325	10352750	1050315	1239079	279621

TABLE: 6

Detailed Network Data Assessment of Cellular Mobile Telephone Services-3 days live- Rajasthan Circle- September-15 month													
S/N	Name of Parameter	Bench- mark	Average of 3 Days	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	TATA GSM	VODAFONE	RCOM CDMA	MTS	TATA CDMA
				GSM Operators						CDMA Operators			
Network Service Quality Parameter													
1	Network Availability												
	a) Total no. of BTSs in the licensed service area		Live data	2282	8321	4096	6492	2061	1391	7317	933	1628	690
	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	212.96	2462.12	4308.40	318.60	183.32	51.27	274.56	91.58	24.53	8.63
	c) BTS Accumulated Downtime	<=2%	Live data	0.13%	0.41%	1.46%	0.07%	0.12%	0.05%	0.05%	0.14%	0.02%	0.02%
	d) No. of BTSs having accumulated downtime of >24 hours in a month		Live data	1	0	6	0	0	0	0	0	0	0
e) Worst affected BTSs due to downtime	<=2%	Live data	0.04%	0.00%	0.15%	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	97.19%	96.74%	98.92%	99.18%	99.62%	98.18%	99.55%	98.32%	98.90%	99.05%
	b) SDCCH/PAGING Congestion	<=1%	Live data	0.46%	0.71%	0.71%	0.21%	0.02%	0.07%	0.20%	0.00%	0.00%	0.00%
c) TCH congestion	<=2%	Live data	1.00%	1.51%	1.45%	0.49%	0.06%	0.08%	0.45%	0.00%	0.16%	0.13%	
3	Connection Maintenance (Retainability)												
	a) Call Drop Rate (CDR)	<=2%	Live data	0.80%	0.75%	1.52%	1.03%	0.27%	0.79%	0.79%	0.21%	0.38%	0.46%
	b) Worst affected cells>3% TCH drop	<=3%	Live data	2.90%	0.76%	2.70%	2.15%	0.01%	4.15%	2.40%	0.74%	0.40%	6.83%
	c) % of connections with good voice quality	>=95%	Live data	96.80%	99.09%	98.33%	95.99%	98.86%	98.68%	96.81%	99.72%	99.19%	98.65%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		Live data	198	189	273	429	1	174	539	21	21	151
e) Total no. of cells (Sector) in the licensed service area		Live data	6822	24955	10093	19989	6178	4184	22421	2797	5272	2216	
4	No. of POI's having >=0.5% POI congestion												
	No. of POI's having >=0.5% POI congestion		Live data	0	0	0	0	0	0	0	0	0	0
	Name of POI not meeting the benchmark		Live data	0	0	0	0	0	0	0	0	0	0

CUSTOMER SERVICE QUALITY (CSD) PARAMETERS



5.3 CUSTOMER SERVICE QUALITY PARAMETERS MEASUREMENT FOR CMTS-QE-SEPT-15:

5.3.1 QUARTERLY CUSTOMER SERVICE DELIVERY (CSD) AUDITED DATA FOR CELLULAR MOBILE SERVICES (JULY TO SEPTEMBER- 2015 MONTHS AUDITED DATA):

QUARTERLY CSD AUDITED DATA FOR CELLULAR MOBILE TELEPHONE SERVICES

Quarterly CSD Audit Data		Bench- mark	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	VODAFONE	MTS	RCOM (CDMA)	TATA (CDMA)
S / N	Name of Parameter			GSM Operators							CDMA Operators		
Metering & Billing Credibility -Post Paid													
1	A) No. of bills issued during the quarter		RAJ	177085	911619	404627	378469	123993	NA	1643314	234317	160031	106794
	B) No. of bills disputed including billing complaints during the quarter		RAJ	2	96	206	178	110	NA	2183	150	125	0
	C)% of billing complaints during the quarter	<= 0.1%	RAJ	0.001%	0.01%	0.05%	0.05%	0.09%	NA	0.13%	0.06%	0.08%	0.00%
Metering & Billing Credibility -Pre Paid													
2	A) Total No. of Pre-paid customers at the end of the quarter		RAJ	6249078	17532289	3243376	7339159	5277376	754588	10837039	2117141	999360	585760
	B) Total No. of complaints relating to charging, Credit and Validity during the quarter		RAJ	0	52	8583	13069	4894	0	11089	1142	871	0
	C) % of Pre-paid Charging Complaints	<= 0.1%	RAJ	0.00%	0.00%	0.26%	0.18%	0.09%	0.00%	0.102%	0.05%	0.09%	0.00%
Resolution of Billing/Charging Complaints and Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints													
3	A) No. of Billing/Charging/Credit/Validity Complaints received during the quarter		RAJ	2	148	8583	18447	5004	0	13272	1292	996	0
	B) No. of billing complaints for Post paid customers/Charging/Credit/ Validity complaints for pre-paid customers resolved within 4 weeks during the quarter		RAJ	2	148	8583	18447	5004	0	13272	1292	996	0

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		
	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	2	148	8583	18447	5004	0	13272	1292	996	0
	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%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	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%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	F) % of Period of applying credit/Waiver/Adjustment to customers account from the date of resolution of complaints	<=1 week	RAJ	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Response time to customers for assistance													
	A) Total no of calls attempted to customer care/Call center		RAJ	19539902	4298811	257091	21551808	2595015	100657	20344248	6519766	704112	62409
	B) Total no. of calls successfully established to customer care/Call center.		RAJ	19094153	4298808	256038	21256658	2548677	99224	20344248	6307384	693355	61260
4	C) % Accessibility of Call centre /customer Care (Total calls successfully established *100/ Total call attempts)	>=95%	RAJ	97.72%	100.00%	99.59%	98.63%	98.21%	98.58%	100.00%	96.74%	98.47%	98.16%
	D) Total Calls reached to operator for Voice to Voice (Total call attempts)		RAJ	3824629	8422165	147237	7402338	1097609	113007	7951690	2100296	305700	87811
	E) Total number of calls answered by the operator (Voice to voice) within 90 seconds		RAJ	3695290	8190430	122418	7350906	1067925	109228	7593138	2009961	299995	84764

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		
	F) % age of calls answered by operator (voice to voice) (Total calls successfully established within 90 Sec.*100 / Total call attempts)	>=95%	RAJ	96.62%	97.25%	83.14%	99.31%	97.30%	96.66%	95.49%	95.70%	98.13%	96.53%
Termination/closure of service													
5	A) Total No. of requests for Termination / Closure of service received during the quarter		RAJ	1962	2751	4417	3581	719	NA	8696	5395	990	1355
	B) No. of requests for Termination / Closure of service complied within 7 days during the quarter		RAJ	1962	2751	4417	3581	719	NA	8696	5395	990	1355
	C) % of Termination/ Closure of service within 7 days	<=7days	RAJ	100%	100%	100%	100%	100%	NA	100%	100%	100%	100%
Time taken for refunds of deposits after closures.													
6	A) No. of Payments/ Refunds due during the quarter		RAJ	1189	1167	1245	2092	420	NA	29433	32	610	956
	B) No. of Payments/ Refunds Cleared during the quarter		RAJ	1189	1167	1245	2092	420	NA	29433	32	605	956
	C) Time taken for refunds of deposits after closures.	100% within 60 days	RAJ	100%	100%	100%	100%	100%	NA	100%	100%	99.18%	100%

NA: Not applicable as Tata (GSM) has any post-paid connections.

NB: Accessibility of call center / Customer care data of RCOM (GSM & CDMA) are based on two months average data i.e. August 15 & September 15 as July-15 month data were not provided by RCOM (GSM & CDMA) due to TTI server issue.

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

CSD 3 DAYS LIVE DATA FOR CELLULAR MOBILE TELEPHONE SERVICES - QE-SEPTEMBER 15													
3 days live CSD Audit Data		Bench- mark	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	VODAFONE	MTS	RCOM (CDMA)	TATA (CDMA)
S/ N	Name of Parameter			GSM Operators						CDMA Operators			
RESPONSE TIME TO CUSTOMERS FOR ASSISTANCE													
1	Total no of calls attempted to customer care/Call center		Rajasthan	672500	173506	7905	714999	18632	3187	598987	246479	19667	2422
	Total no. of calls successfully established to customer care/Call center		Rajasthan	659029	173506	7861	711387	18365	3183	598987	237555	19434	2417
	% Accessibility of Call centre /customer Care (Total call successfully established *100 / Total call attempt)	>=95%	Rajasthan	98.00%	100.00%	99.44%	99.49%	98.57%	99.87%	100.00%	96.38%	98.82%	99.79%
	Total Calls reached to Operator for Voice to Voice (Total call attempts)		Rajasthan	130254	279329	4782	245675	10264	3164	266836	66127	12529	2408
	Total number of calls answered by the operator (Voice to voice) within 90 seconds		Rajasthan	125078	275885	4756	245224	10250	3146	257565	63213	12509	2408
	% age of calls answered by operator(voice to voice) (Total call successfully established within 90 Sec.*100 / Total call attempts)	>=95%	Rajasthan	96.03%	98.77%	99.46%	99.82%	99.86%	99.43%	96.53%	95.59%	99.84%	100.00%

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 $\leq 0.1\%$ for most of the operators. However, **Vodafone** could not meet the benchmark with its performance as **0.13%** (for post paid) and **0.102%** (for pre-paid), while **BSNL** and **Idea** failed to meet the benchmark for pre-paid with their performance as **0.26%** and **0.18%** respectively.

2. Resolution of Billing complaints and applying credits -

- i. Resolution of billing /charging complaints ($\geq 98\%$ within 4 weeks and 100% within 6 weeks)
- ii. Period of applying credit/waiver/adjustment to customer's account from the date of resolution of complaints

All operators have 100 % resolved the billing complaints within stipulated period of 4 weeks and 6 weeks.

In all cases where customers were due for credit / adjustment, all the service providers have met the benchmark of 100 % refund in one week.

3. Response Time to the Customer for assistance

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

All service providers are in compliance with respect to the parameter accessibility of call center.

Regarding Calls answered by operator (Voice to Voice), **BSNL** has not met the benchmark of $>95\%$ with its performed level as **83.14%**.

4. Termination/Closure of Service

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

5. Time Taken for Refund of deposits after closures

All operators (**except RCOM-CDMA**) were found to have complied with the benchmark of 100% refund of deposits within 60 days of closure. The performance of **RCOM CDMA** remained **99.18%**.

Live Measurements:

The results of three days live measurements reveal that all operators have met the benchmarks for the parameter Accessibility of Call Center and Calls answered by operator (Voice to voice) within 90 seconds.

6. LIVE CALLING ASSESSMENT



6. LIVE CALLING ASSESSMENT:

6.1 INTER OPERATOR CALLS ASSESSMENT:

Inter operator call assessment with a sample of 2x50 test calls for each Service provider operating in Rajasthan service area during the time 1100 to 1400 Hrs and 1600 to 1900 was carried out by TUV auditors. The test calls were made from one operator to another within the same licensed area to judge the ease of connectivity amongst the operators. While doing this exercise, the radio part, the switch part and POI in between the two operators are involved. Congestion in any of these network elements could result in congestion in the network.

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

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

6.2 CUSTOMER CARE / HELPLINE ASSESSMENT:

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

In case of calls answered by operators (voice to voice) within 90 seconds when test calls were made to the call centers, 100% calls were connected to the Operator within 90 seconds except for BSNL, Idea, RCOM GSM , Tata GSM, RCOM CDMA and Tata (CDMA), the calls answered by operators were 97%, 97.96%, 97.96%, 98.99%, 97.98% and 98.99% respectively.

6.3 LIVE CALLING ASSESSMENT FOR BILLING COMPLAINTS:

Performance (live calling for billing complaints)											
	Circle Name	AIRCEL	AIRTEL	BSNL	IDEA	RCOM (GSM)	TATA (GSM)	VODAFONE	MTS	RCOM (CDMA)	TATA (CDMA)
Total No. of calls Attempted	Rajasthan	2	148	150	150	110	0	110	130	115	0
Total No. of calls Answered	Rajasthan	2	80	120	100	100	0	100	100	100	0
Cases resolved within 4 weeks	Rajasthan	2	80	120	100	100	0	100	100	100	0
%age of cases resolved	Rajasthan	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

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

6.4 LEVEL -1 CALLING ASSESSMENT:

LEVEL 1 LIVE CALLING																
Month	SSA Name	Name of SDCA	Emergency No.	No. of calls made	AIRCEL	AIRTEL	BSNL	IDEA	RCOM GSM	RCOM CDMA	TATA GSM	TATA CDMA	MTS	VODAFONE		
July'15	Jodhpur	Bilara, Bhopalgarh, Piaprcity, Dantiwara	100	5	√	√	√	√	√	√	√	√	√	√		
			101	5	√	√	√	√	√	√	√	√	√	√	√	
			102, 108	5	√	√	√	√	√	√	√	√	√	√	√	√
		Mathania, Deechu	100	5	√	√	√	√	√	√	√	√	√	√	√	√
			101	5	√	√	√	√	√	√	√	√	√	√	√	√
			102, 108	5	√	√	√	√	√	√	√	√	√	√	√	√
		Jodhpur	100	5	√	√	√	√	√	√	√	√	√	√	√	√
			101	5	√	√	√	√	√	√	√	√	√	√	√	√
			102, 108	5	√	√	√	√	√	√	√	√	√	√	√	√
Aug'15	Nagaur	Deedwana, Nagaur, Ladnun, Jayal	100	5	√	√	√	√	√	√	√	√	√	√		
			101	5	√	√	√	√	√	√	√	√	√	√	√	
			102, 108	5	√	√	√	√	√	√	√	√	√	√	√	√
		Mundwa, Gotan, Merta	100	5	√	√	√	√	√	√	√	√	√	√	√	√
			101	5	√	√	√	√	√	√	√	√	√	√	√	√
			102, 108	5	√	√	√	√	√	√	√	√	√	√	√	√
		Kuchman City, Nawa,	100	5	√	√	√	√	√	√	√	√	√	√	√	√
			101	5	√	√	√	√	√	√	√	√	√	√	√	√
			102, 108	5	√	√	√	√	√	√	√	√	√	√	√	√
Sep'15	Pali	Pali, Rohat	100	5	√	√	√	√	√	√	√	√	√	√	√	
			101	5	√	√	√	√	√	√	√	√	√	√	√	
			102, 108	5	√	√	√	√	√	√	√	√	√	√	√	√
		Sumerpur, Bali, Desuri	100	5	√	√	√	√	√	√	√	√	√	√	√	√
			101	5	√	√	√	√	√	√	√	√	√	√	√	√
			102, 108	5	√	√	√	√	√	√	√	√	√	√	√	√
		Marwar Junction City, Sojat, Jaitaran.	100	5	√	√	√	√	√	√	√	√	√	√	√	√
			101	5	√	√	√	√	√	√	√	√	√	√	√	√
			102, 108	5	√	√	√	√	√	√	√	√	√	√	√	√

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.

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 **Jodhpur, Nagaur and Pali** in the months of July, August and September 2015 respectively .The total route Kms covered during the drive tests in the respective SSAs was **465Kms, 581Kms and 423Kms**. 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.

DRIVE TEST TABLE – 1
OPERATOR ASSISTED DRIVE TEST AT JODHPUR SSA IN JULY 15 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	106	30	92	30	NP	NP	56	30	145	30	114	30	88	30	135	30	119
		Highways	205	30	268	30	NP	NP	101	30	180	30	192	30	219	30	153	30	111	30	71	30
		Within City	141	30	117	30	NP	NP	112	30	103	32	142	30	113	30	98	30	74	30	119	30
		Overall SSA	452	90	477	90	NP	NP	269	90	428	92	448	90	420	90	386	90	304	90	302	90
2	Blocked Call Rate	Major Roads	0.00%	0.00%	0.00%	0.00%	NP	NP	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%	NP	NP	0.00%	0.00%	0.00%	0.00%	1.04%	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%	NP	NP	0.00%	0.00%	0.00%	0.00%	0.70%	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%	NP	NP	0.00%	0.00%	0.00%	0.00%	0.67%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
3	Dropped Call Rate (<=2%)	Major Roads	0.00%	0.00%	0.00%	0.00%	NP	NP	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.84%	0.00%	0.00%	0.00%
		Highways	0.00%	0.00%	0.00%	0.00%	NP	NP	0.00%	0.00%	0.00%	0.00%	0.53%	0.00%	0.00%	0.00%	0.00%	0.00%	0.90%	0.00%	0.00%	0.00%
		Within City	0.00%	0.00%	0.00%	0.00%	NP	NP	0.00%	0.00%	0.00%	0.00%	0.71%	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%	NP	NP	0.00%	0.00%	0.00%	0.00%	0.45%	0.00%	0.00%	0.00%	0.00%	0.00%	0.66%	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	99.37%	99.90%	97.37%	99.83%	99.38%	100%
		Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.35%	100%	96.82%	98.80%	98.78%	100%
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.10%	99.92%	97.16%	99.88%	99.84%	100%

AUDIT & ASSESSMENT OF QOS FOR QE-SEPTEMBER-2015-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
			Overall SSA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.29%	99.94%	97.11%	99.51%
Operators)	Major Roads		96.26%	98.92%	97.95%	99.44%	NP	NP	94.99%	99.46%	95.17%	99.36%	97.15%	98.38%	96.57%	99.61%	NA	NA	NA	NA	NA	NA
	Highways		95.73%	99.65%	97.30%	99.49%	NP	NP	99.10%	100%	95.77%	98.07%	96.84%	97.18%	96.52%	98.61%	NA	NA	NA	NA	NA	NA
	Within City		96.78%	97.35%	97.46%	99.87%	NP	NP	97.84%	98.46%	96.59%	95.53%	98.18%	99.45%	96.03%	96.96%	NA	NA	NA	NA	NA	NA
	Overall SSA		96.22%	98.64%	97.46%	99.61%	NP	NP	97.49%	98.92%	95.76%	97.61%	97.33%	98.34%	96.39%	98.39%	NA	NA	NA	NA	NA	NA
(b) 0-5 (with frequency hopping for GSM Operators)	Major Roads		96.26%	98.92%	97.95%	99.44%	NP	NP	94.99%	99.46%	95.17%	99.36%	97.15%	98.38%	96.57%	99.61%	NA	NA	NA	NA	NA	NA
	Highways		95.73%	99.65%	97.30%	99.49%	NP	NP	99.10%	100%	95.77%	98.07%	96.84%	97.18%	96.52%	98.61%	NA	NA	NA	NA	NA	NA
	Within City		96.78%	97.35%	97.46%	99.87%	NP	NP	97.84%	98.46%	96.59%	95.53%	98.18%	99.45%	96.03%	96.96%	NA	NA	NA	NA	NA	NA
	Overall SSA		96.22%	98.64%	97.46%	99.61%	NP	NP	97.49%	98.92%	95.76%	97.61%	97.33%	98.34%	96.39%	98.39%	NA	NA	NA	NA	NA	NA
Service Coverage																						
5	In door (>= -75dBm)	Major Roads	46.89%	23.40%	97.98%	100%	NP	NP	80.15%	99.70%	56.05%	32.19%	58.58%	34.30%	84.71%	60.90%	69.52%	98.37%	90.89%	99.90%	71.77%	99.70%
		Highways	48.30%	0.70%	96.12%	100%	NP	NP	71.38%	98.86%	47.72%	75.04%	52.80%	33.16%	66.93%	98.48%	47.54%	98.14%	71.92%	98.89%	55.34%	96.61%
		Within City	38.06%	53.00%	98.03%	100%	NP	NP	82.47%	99.93%	45.84%	67.36%	81.30%	18.89%	83.96%	99.96%	83.51%	98.54%	92.06%	100%	82.45%	96.65%
		Overall SSA	44.59%	25.75%	96.95%	100%	NP	NP	77.85%	99.49%	50.29%	61.22%	62.95%	28.77%	76.63%	83.77%	64.60%	98.34%	84.10%	99.60%	72.49%	97.70%
In-vehicle (>= -85dBm)	Major Roads	97.33%	94.47%	99.86%	100%	NP	NP	98.87%	100%	99.51%	99.56%	81.29%	99.73%	98.60%	99.97%	97.29%	99.27%	98.71%	100%	94.28%	100%	
	Highways	87.83%	80.58%	99.65%	100%	NP	NP	96.36%	100%	89.22%	99.89%	76.22%	84.81%	97.38%	100%	94.14%	99.25%	82.24%	100%	92.22%	96.72%	
	Within City	87.72%	98.31%	99.83%	100%	NP	NP	98.62%	100%	94.06%	99.13%	94.38%	99.98%	98.40%	100%	98.68%	99.48%	96.79%	100%	97.13%	96.87%	
	Overall SSA	90.41%	91.13%	99.73%	100%	NP	NP	97.88%	100%	94.28%	99.45%	83.08%	94.84%	98.00%	99.99%	96.43%	99.33%	92.03%	100%	94.99%	97.91%	
Outdoor-in city (>= -95dBm)	Major Roads	99.98%	99.93%	100%	100%	NP	NP	99.97%	100%	99.98%	100%	97.13%	100%	99.99%	100%	99.98%	99.79%	99.99%	100%	98.87%	100%	
	Highways	98.66%	99.82%	100%	100%	NP	NP	99.89%	100%	99.37%	100%	94.83%	99.90%	99.96%	100%	99.89%	99.89%	96.41%	100%	98.66%	96.72%	
	Within City	97.43%	100%	100%	100%	NP	NP	100%	100%	99.82%	100%	99.06%	100%	99.96%	100%	100%	100%	99.83%	100%	98.64%	96.87%	
	Overall SSA	98.62%	99.92%	100%	100%	NP	NP	99.95%	100%	99.71%	100%	96.74%	99.97%	99.97%	100%	99.95%	99.89%	98.61%	100%	98.73%	97.91%	

AUDIT & ASSESSMENT OF QOS FOR QE-SEPTEMBER-2015-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	
6	Call Setup Success Rate (>=95%)	Major Roads	100%	100%	100%	100%	NP	NP	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Highways	100%	100%	100%	100%	NP	NP	100%	100%	100%	100%	98.96%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Within City	100%	100%	100%	100%	NP	NP	100%	100%	100%	100%	99.30%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	100%	100%	100%	100%	NP	NP	100%	100%	100%	100%	99.33%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
7	Hand Over Success Rate (HOSR)	Major Roads	100%	100%	100%	100%	NP	NP	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Highways	100%	100%	100%	100%	NP	NP	100%	100%	100%	100%	99.10%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Within City	100%	100%	100%	100%	NP	NP	97.50%	100%	100%	100%	99.55%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	100%	100%	100%	100%	NP	NP	98.96%	100%	100%	100%	99.64%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

NA: Not Applicable, NP: Not Provided: BSNL has not provided the drive test report despite best efforts.

DRIVE TEST TABLE – 2

OPERATOR ASSISTED DRIVE TEST AT NAGOUR SSA IN AUGUST 15 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	62	30	76	30	NP	NP	66	29	60	33	57	30	81	30	110	30	39	30	40	30	
		Highways	172	30	282	30	NP	NP	188	33	124	32	135	31	255	30	197	30	149	31	99	30	
		Within City	105	30	100	30	NP	NP	100	30	104	30	142	30	118	30	94	30	117	30	136	30	
		Overall SSA	339	90	458	90	NP	NP	354	92	288	95	334	91	454	90	401	90	305	91	275	90	
2	Blocked Call Rate	Major Roads	0.00%	0.00%	0.00%	0.00%	NP	NP	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%	NP	NP	0.00%	0.00%	0.00%	0.00%	0.74%	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%	NP	NP	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Overall SSA	0.00%	0.00%	0.00%	0.00%	NP	NP	0.00%	0.00%	0.00%	0.00%	0.30%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
3	Dropped Call Rate (<=2%)	Major Roads	0.00%	0.00%	0.00%	0.00%	NP	NP	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%	NP	NP	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.67%	0.00%	0.00%	0.00%	
		Within City	0.00%	0.00%	0.00%	0.00%	NP	NP	0.00%	0.00%	0.00%	0.00%	0.70%	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%	NP	NP	0.00%	0.00%	0.00%	0.00%	0.30%	0.00%	0.00%	0.00%	0.00%	0.00%	0.33%	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	NA	98.19%	99.85%	99.50%	99.97%	99.22%	99.81%
		Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.71%	99.90%	98.70%	99.55%	98.93%	99.83%
Within City		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.33%	100%	99.29%	100%	99.38%	99.89%	

AUDIT & ASSESSMENT OF QOS FOR QE-SEPTEMBER-2015-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
			Overall SSA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.71%	99.92%	99.03%	99.81%	99.20%
Operators)	(b) 0-5 (with frequency hopping for GSM Operators)	Major Roads	97.09%	100%	97.65%	99.50%	NP	NP	97.81%	98.86%	97.45%	96.15%	98.09%	97.84%	96.68%	99.39%	NA	NA	NA	NA	NA	NA
	Highways	96.57%	99.90%	98.31%	96.49%	NP	NP	97.82%	99.43%	96.85%	99.28%	95.58%	100%	96.48%	98.96%	NA	NA	NA	NA	NA	NA	
	Within City	97.94%	100%	98.41%	99.31%	NP	NP	97.18%	100%	97.33%	99.97%	97.73%	98.40%	96.25%	98.99%	NA	NA	NA	NA	NA	NA	
	Overall SSA	97.09%	99.97%	98.22%	98.47%	NP	NP	97.64%	99.14%	97.16%	98.40%	96.93%	98.72%	96.47%	99.11%	NA	NA	NA	NA	NA	NA	
Service Coverage																						
5	In door (>= -75dBm)	Major Roads	46.69%	100%	93.84%	98.39%	NP	NP	66.90%	76.74%	58.21%	9.59%	57.38%	100%	72.18%	99.99%	78.68%	17.51%	68.19%	89.51%	73.11%	96.25%
		Highways	36.54%	95.30%	94.91%	99.81%	NP	NP	49.42%	53.69%	46.02%	36.00%	41.12%	72.08%	65.13%	64.15%	56.27%	12.24%	59.29%	83.67%	47.23%	75.98%
		Within City	63.34%	78.90%	95.65%	99.92%	NP	NP	58.24%	99.81%	66.60%	54.60%	46.09%	100%	84.83%	94.42%	69.58%	100%	69.05%	100%	66.08%	21.95%
		Overall SSA	46.69%	91.38%	94.90%	99.36%	NP	NP	54.75%	76.13%	56.14%	31.75%	46.16%	90.93%	71.35%	86.22%	65.80%	41.59%	64.18%	89.21%	60.41%	64.87%
	In-vehicle (>= -85dBm)	Major Roads	89.65%	100%	99.28%	100%	NP	NP	96.65%	99.26%	91.25%	86.09%	85.59%	100%	98.75%	100%	98.87%	99.61%	84.28%	100%	91.03%	100%
		Highways	63.78%	99.88%	99.03%	100%	NP	NP	88.90%	99.22%	84.02%	91.46%	65.27%	98.58%	97.60%	99.21%	92.33%	100%	72.41%	100%	78.54%	100%
		Within City	94.76%	99.80%	99.39%	100%	NP	NP	93.26%	100%	95.52%	96.54%	78.67%	100%	99.37%	99.90%	99.64%	100%	90.27%	100%	94.18%	74.32%
		Overall SSA	78.11%	99.89%	99.15%	100%	NP	NP	91.39%	99.48%	89.76%	90.97%	74.52%	99.54%	98.28%	99.71%	95.95%	99.87%	80.73%	100%	88.26%	91.55%
	Outdoor-in city (>= -95dBm)	Major Roads	99.41%	100%	100%	100%	NP	NP	99.98%	99.99%	99.44%	99.71%	96.39%	100%	99.98%	100%	100%	100%	98.20%	100%	99.12%	100%
		Highways	90.66%	100%	100%	100%	NP	NP	98.97%	99.99%	98.56%	99.90%	91.16%	100%	99.89%	100%	100%	100%	92.83%	100%	99.15%	100%
		Within City	99.81%	100%	100%	100%	NP	NP	99.42%	100%	99.94%	99.88%	98.32%	100%	100%	100%	100%	100%	99.03%	100%	99.87%	99.67%
		Overall SSA	95.10%	100%	100%	100%	NP	NP	99.26%	99.99%	99.25%	99.82%	95.07%	100%	99.94%	100%	100%	100%	95.89%	100%	99.51%	99.89%
6	Call Setup Success	Major Roads	100%	100%	100%	100%	NP	NP	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	

AUDIT & ASSESSMENT OF QOS FOR QE-SEPTEMBER-2015-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	
7	Rate (>=95%)	Highways	100%	100%	100%	100%	NP	NP	100%	100%	100%	100%	99.26%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Within City	100%	100%	100%	100%	NP	NP	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	100%	100%	100%	100%	NP	NP	100%	100%	100%	100%	99.70%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Major Roads	100%	100%	100%	100%	NP	NP	100%	100%	100%	100%	98.04%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
7	Hand Over Success Rate (HOSR)	Highways	100%	100%	100%	100%	NP	NP	100%	100%	100%	100%	99.11%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Within City	100%	100%	100%	100%	NP	NP	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	100%	100%	100%	100%	NP	NP	100%	100%	100%	100%	99.34%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Major Roads	100%	100%	100%	100%	NP	NP	100%	100%	100%	100%	98.04%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

NA: Not Applicable, NP: Not Provided: BSNL has not provided the drive test report despite best efforts.

DRIVE TEST TABLE - 3
OPERATOR ASSISTED DRIVE TEST AT PALI SSA IN SEPTEMBER 15 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	153	30	77	30	NP	NP	100	31	69	30	68	30	66	30	81	30	68	31	113	31	
		Highways	63	30	168	30	NP	NP	155	32	74	30	132	30	165	30	133	30	124	30	82	34	
		Within City	161	30	155	30	NP	NP	171	31	139	31	165	30	196	30	165	30	162	30	183	33	
		Overall SSA	377	90	400	90	NP	NP	426	94	282	91	365	90	427	90	379	90	354	91	378	98	
2	Blocked Call Rate	Major Roads	0.00%	0.00%	0.00%	0.00%	NP	NP	0.00%	0.00%	0.00%	0.00%	1.47%	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%	NP	NP	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%	NP	NP	0.00%	3.23%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Overall SSA	0.00%	0.00%	0.00%	0.00%	NP	NP	0.23%	1.06%	0.00%	0.00%	0.27%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
3	Dropped Call Rate (<=2%)	Major Roads	0.00%	0.00%	0.00%	0.00%	NP	NP	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%	NP	NP	0.00%	0.00%	0.00%	0.00%	0.76%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
		Within City	0.00%	0.00%	0.00%	0.00%	NP	NP	0.00%	0.00%	0.00%	0.00%	0.61%	0.00%	0.00%	0.00%	0.00%	0.00%	0.62%	0.00%	0.00%	0.00%	
		Overall SSA	0.00%	0.00%	0.00%	0.00%	NP	NP	0.00%	0.00%	0.00%	0.00%	0.55%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.28%	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	NA	96.20%	99.90%	99.63%	100%	98.18%	98.61%
		Highways	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.29%	99.94%	96.94%	100%	97.86%	99.52%
		Within City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99.16%	99.73%	99.13%	100%	98.94%	98.74%

AUDIT & ASSESSMENT OF QOS FOR QE-SEPTEMBER-2015-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	
			Overall SSA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.54%	99.85%	98.55%	100%	98.47%
	(b) 0-5 (with frequency hopping for GSM Operators)	Major Roads	98.66%	98.18%	97.48%	99.50%	NP	NP	97.98%	99.22%	97.52%	99.01%	97.75%	98.48%	96.00%	98.59%	NA	NA	NA	NA	NA	NA	NA
		Highways	97.85%	99.49%	97.76%	96.49%	NP	NP	98.25%	93.40%	98.72%	99.60%	95.44%	99.90%	96.14%	98.98%	NA	NA	NA	NA	NA	NA	NA
		Within City	97.77%	99.39%	97.65%	99.31%	NP	NP	98.59%	99.22%	98.33%	98.40%	97.47%	99.80%	97.27%	99.64%	NA	NA	NA	NA	NA	NA	NA
		Overall SSA	97.98%	99.02%	97.66%	98.47%	NP	NP	98.34%	95.55%	98.23%	98.99%	96.81%	99.40%	96.64%	99.07%	NA	NA	NA	NA	NA	NA	NA
Service Coverage																							
	In door (>= - 75dBm)	Major Roads	86.50%	37.40%	96.22%	95.92%	NP	NP	58.78%	61.80%	76.41%	41.59%	65.56%	99.52%	73.60%	64.18%	75.29%	100%	81.68%	100%	52.98%	25.15%	
		Highways	61.70%	73.10%	95.03%	96.13%	NP	NP	31.76%	99.75%	62.45%	53.73%	44.43%	100%	63.17%	98.26%	60.55%	99.45%	55.75%	77.63%	59.10%	75.43%	
		Within City	82.10%	89.20%	96.31%	93.79%	NP	NP	37.40%	45.75%	66.53%	61.40%	76.48%	99.97%	70.60%	72.37%	78.85%	100%	89.42%	100%	61.88%	99.18%	
		Overall SSA	75.81%	66.66%	95.75%	95.29%	NP	NP	39.73%	67.77%	67.95%	53.13%	63.02%	99.83%	68.17%	78.22%	72.40%	99.85%	77.08%	90.18%	58.67%	66.94%	
5	In-vehicle (>= - 85dBm)	Major Roads	93.42%	94.33%	99.79%	100%	NP	NP	88.94%	99.81%	98.30%	98.94%	93.97%	100%	97.09%	98.60%	98.31%	100%	95.34%	100%	91.79%	99.63%	
		Highways	85.71%	98.86%	99.72%	100%	NP	NP	71.82%	100%	95.29%	98.78%	70.80%	100%	94.37%	99.90%	93.45%	100%	66.90%	100%	86.01%	98.67%	
		Within City	97.53%	95.86%	99.87%	100%	NP	NP	77.64%	89.75%	95.83%	96.77%	95.43%	100%	96.71%	98.77%	97.75%	100%	98.25%	100%	94.23%	100%	
		Overall SSA	92.51%	96.35%	99.79%	100%	NP	NP	77.84%	96.39%	96.31%	97.98%	86.44%	100%	95.86%	99.09%	96.55%	100%	87.72%	100%	91.61%	99.43%	
	Outdoor-in city (>= - 95dBm)	Major Roads	99.54%	99.96%	100%	100%	NP	NP	99.34%	100%	100%	100%	97.59%	100%	99.91%	100%	100%	100%	98.61%	100%	99.46%	100%	
		Highways	96.20%	100%	100%	100%	NP	NP	96.52%	100%	99.85%	100%	93.19%	100%	99.85%	100%	100%	100%	83.34%	100%	99.90%	100%	
		Within City	99.97%	99.80%	100%	100%	NP	NP	97.73%	99.88%	99.89%	99.98%	99.28%	100%	99.86%	99.99%	100%	100%	99.88%	100%	99.86%	100%	
		Overall SSA	98.55%	99.92%	100%	100%	NP	NP	97.62%	99.96%	99.91%	99.99%	96.80%	100%	99.86%	100%	100%	100%	94.38%	100%	99.75%	100%	

AUDIT & ASSESSMENT OF QOS FOR QE-SEPTEMBER-2015-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	
6	Call Setup Success Rate (>=95%)	Major Roads	100%	100%	100%	100%	NP	NP	100%	100%	100%	100%	98.53%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Highways	100%	100%	100%	100%	NP	NP	99.35%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Within City	100%	100%	100%	100%	NP	NP	100%	96.77%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	100%	100%	100%	100%	NP	NP	99.77%	98.94%	100%	100%	99.73%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
7	Hand Over Success Rate (HOSR)	Major Roads	100%	100%	100%	100%	NP	NP	100%	100%	100%	100%	99.42%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Highways	100%	100%	100%	100%	NP	NP	100%	100%	100%	100%	98.73%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Within City	100%	100%	100%	100%	NP	NP	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Overall SSA	100%	100%	100%	100%	NP	NP	100%	100%	100%	100%	99.50%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

- i) NA: Not Applicable.
- ii) NP: Not Provided: BSNL has not provided the drive test report despite best efforts
- iii) The service providers having block call rate more than 3% have been shaded in yellow color.

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
Jodhpur	Bilara, Bhopalgarh, Piaprcity, Dantiwara/185 Km	Highway To Bilada – Ratanada Circle, Shikargarh,Dangiyawas, Dantiwara,Kaparda,Bhavi,Pichiyak,Bilara. Bilada With In City : Govt. Hospital,Phed Office,Bhdher Chowk Bus Stand, Govt.Girls College,Bavna Ro Highway To Pipar City : Pipar Govt. Hospital, Pipar Bus Stand, Pipar Sabji Mandi, Pipar Old Bus Stand Road,Indira Colony, Main Market Road, Sindhipura Road With In City Bhopalgarh- Lalsa Baba Dargah,Shri Jain Ratan Secondry School, Sadar Bazar Road, Govt. Hospital Road, Police Station Road, Sabji Mandi Choraha	Mathania, Deechu/199 Km	Highway To Matha Niya : Pavta, Mandor, 9 Mile, Daijar, Manaklav, Rampura Bhatiyani ,Mathaniya. Highwat To Balesar : Palri, Kaliberi, Badli, Lordi, Bambor, Agolai, Balesar, Highwat To Dechuu : Dheerpura , Jawaharnagar , Khanori , Sitarva, Khiyasariya , Hotel Sansara , Dhechu With In City Dechu : Police Station Dhechu , Bus Stand , Govt College , Sabji Mandi , Phalodi Road	Jodhpur/ 81 Km	Major Road Jodhpur : Jda Circle , Ratanada Circle , Airport Road , Airport Circle , Riktyabheruji Circle , Pali Road , Jhalamand , lit Hostel , Sector6 , Kudi Hosing Bord , Aims Circle , Shastri Circle. With In City Jodhpur : Jalori Gate , Sojti Gate , Bombay Motor Circle , First Puliya , Mudit Mention , Mansapurn Balaji , Andaram School , Chopasni School , Aakhaliya Circle , 5Th Road.
Nagaur	Deedwana, Nagaur, Ladnun, Jayal/ 260 Km	Major Road Nagaur – Mirdha College , Manasar , Jodhpur Road , Hotel Kurja , Bypass Road , Sheetla Mata Ka Mandir , Rotary Circle, Rico Office , Ckt House , Collectrate , Sujan Singh Circle Within City Nagaur – Bhutra Hospital , Naya Darwaja, Mahi Darwaja, Luharpura, Tarkin Dargah, Deedwana Road, Hanuman Bagh, Laxmitra Cinema, Mundwa Circle, Pwd Circle, Ajmeri Gate ,Kumahari Darwaja,Rampal, Nakkas Gate , Manasar Major Road Ladnu – Deedwan Road, Sujangarh Choraha, Hotel Nirmal Palace, Court ,Salasar Railway Patahk, Bus Stand, Bsnl Ofice, Jamunasagar Mandir Within City Deedwan – Sbbj Bank Circle, Bangad College, Bus Stand , Petrol Pump, Shiv Misthan, Masjid, Bhagat Singh Choraha , Sbi, Gori Complex, Kot Mohallah, Main Market , Goodri Market , Nagar Palika ,	Mundwa, Gotan, Merta/ 150 Km	Within City Merta – Raj Borana Hotel, Ajmer Nagore Chourah, Pwd Office, Court, Bsnl Quarters, Bus Stand , Cinema Hall, Nagar Palika, Mohan Plaza, Krishi Vibhag, Krishi Mandi, Yadav Tent House, Bsnl Office, Kishan Hostel, Maheswari Panchayat, Ladhon Ki Pole, Meera Mandir . Highway To Merta City – Bikaner Road Phatak, Manasar, Mundwa Chouraha, Athiyasan, Mundwa,Bhudhana, Junjala, Kuchera, Butati, Rajod, Ren, Merta City. Major Road Gotan – Merta Road, Railway Phatak, Bombay Chemical, Jk Industry, Jk Education Center Within City Mundwa – Rly Phatak, Gandhi Circle, Temple, Kuchera Bypass, Nagaur Road, Rly Station, Bus Stand .	Kuchman City, Nawa / 171 Km	Kuchaman City Major Road – Balaji Mandir, Vt Foundation, Shankar Vatika, Bsf Canteen, Bus Stand, Basant Vihar, Jagdamba Jeweller. Within City Kuchaman City – Shri Ram Bagichi, Jagdamba Trading Company, Vinayak Mall, Post Office, Vikas Vidya Mandir, Vikas Nagar, Jan Upyogi Bhawan, Shri Kuwon K Balaji Temple, Kuchaman College, Maruti Suzuki Showroom. Highway To Nawa – Narayanpur, Meethri, Kansera, Nawa City. Within City Nawa – Rajstahli School, Panchyat Samiti, Pwd, Adarsh Nagar, Govt. Hospital, Tehsil Office.

AUDIT & ASSESSMENT OF QOS FOR QE-SEPTEMBER-2015-RAJASTHAN CIRCLE



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
		Keshav Tower, Rly Phatak, Honda Agency ...				
Pali	Pali, Rohat/ 102 Km	<p>Within City Pali – Baliya School,Ramdev Road, Ummed Mil , Manthan Cinema,Gandhi Murti Circle,Surajpole,Gandhi Nagar ,Mandiya Road ,New Bus Stand,Mahaveer Nagar ,Talak Nagr , Tagore Nagar,Collectrate Circle,Bangar College, Sainath Mandir ,Housing Bord Old,Housing Bord New, Jay Nagar , Pancham Nagar,Vande Matram School,Saraswati Vidya Mandir .</p> <p>Within City Rohat – Sbbj Bank , Phd Office ,Rohat Gadh ,Rohat Main Market,Govt School,Bus Stand Rohat.</p> <p>Highway To Rohat – Ghumti, Gajangadh Toll ,Om Banna Temple, Mukundpura, Jalore Circle</p> <p>Major Road Pali – Mahaveer Nagar,Mandiya Road,Old Bus Stand,New Bus Stand,Surajpole Road,Sojat Road,Bajarang Bagh Road,Ummed Mil Road,Sardar Samand Road,Jodhpur Road.</p>	Sumerpur, Bali, Desuri/ 170 Km	<p>Within City Sumerpur – Vivekanand Colony,City Main Road ,Koliwara Road,Transport Nagar ,City Court,Shri Abhinav Mahaveer Dham ,Kalapura ,Sulaxmi Colony ,New Mahaveer Colony , Adarsh Colony,Gokul Wadi, Sumerpur Krishi Upaj Mandi ,Jawai Bandh Road, Angoor, Rajpoot Colony , Ram Nagar , Baldevsingh Cpolony , Choudhary Colony, Friends Colony, Bheru Chouk ,Aarya Samaj Road , Harijan Basti,Meeno Ka Bas, Shiv Nagri</p> <p>Within City Bali- Boya, Sewari Road,Azad Colony,Mahaveer Nagar , Vivek School, Phed Office ,Bali Govt Hospital, Bajrang Chaat Bhandar, Dr.Shobha Verma Hospital, Prathvi Raj Chouhan Chowk, Radawa, Aai Mata Temple, Holi Chowk, Jain Temple , Sbbj Bank.</p> <p>Highway To Sumerpur – Gundoj, Kirwa, Dhola, Birami, Sanderao, Sindhru, Netra, Sumerpur.</p> <p>Highway To Desuri – Kotbaliyan, Mundara, Sadri, Sutharo Ka Gudha, Jonban, Ghanerao, Desuri.</p> <p>Major Road Desuri – Ghanerao Road, Petrol Pump Desuri , Udaipur Road,Sadri Road,Nadole Nartai Road, Panota Jojwar Road , Poolic Station Desuri ,Badla Kuldevi Mandir ,Sbbj Atm.</p>	Marwar Junction City, Sojat, Jaitaran./151 Km	<p>With In City Marwar Juction:- Marwar Hospital,Neetu Computer,Icici Bank, Marwar Juction Railway Station,Bus Stand ,Main Market Marwar Juction,Adarsh Credit Co, Society Office,New Maa Diagnostic Centre.</p> <p>Within City Jaitaran:- Jaitaran Main Market Road, Sbbj Bank, Eye Hospital, Bus Stand, Nobel Internation School, Raj Public School, Lic India Office, Parsi Computer, Bajaj Showroom,Safal College, Post Office,Police Station, Jaitaran Court.</p> <p>Major Road Sojat:- Sojat Road,Pali Highway Road,Jailroad,Police Thana Road,Delhi Darwaza Road,Phed Office Road, Bar Highway Road.</p> <p>Highway Pali To Marwar Juction:- Sojat Road,Naya Gaon Road,Transport Nagar, Math Vilege, Indira Nagar, Jadan,Khrdi, Chawadiya, Marwar Juction.</p> <p>Highway To Marwar Juction To Sojat Road: - Hemaliyawas Kalla, Dudor, Bhisana, Sojat Road. Highway</p> <p>Sojat To Jaitaran: - Sardarpura, Khokhara, Sandiya, Chandawal, Rampura Kalan, Chawandiya, Agewa, Jaitaran.</p>

7.2 SSA WISE DRIVE TEST OBSERVATION:

DRIVE TEST TABLE: 5

DRIVE TEST OBSERVATION OF JODHPUR SSA: JULY 15

S. No	Name of SP	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRTEL	Bilara, Bhopalgarh, Piaprcity, Dantiwara,	Overall Good Coverage and Good Quality in Covered SDCA on Day 1.	Mathania, Deechu,	Poor Rx Quality Near Beenj Wariya.	Jodhpur,	Poor Rx Quality Near BJS Colony, Rai Ka Bagh, Prithviraj Nagar.
2	BSNL		NP		NP		NP
3	TATA GSM		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.		Poor Rx Quality in Most of the Covered SDCA's on Day 3.
4	TATA CDMA		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.		Poor Rx Level and Rx Quality Near Sursagar Road, Bhaskar Circle.
5	IDEA		They Have Good Rx Level and Rx Quality in Covered SDCA's.		They Have Good Rx Level and Rx Quality in Covered SDCA's.		Poor Rx Quality Near Chungi Naka, Basni Ind. Area, Pal Road.
6	RCOM GSM		Poor Rx Level and Rx Quality Near Pipar City, Bilara.		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.		Poor Rx Quality Near Malviya Nagar, Basni Bridge, Air Force Colony, Jhalmand Over Bridge.
7	RCOM CDMA		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.		Poor Rx Quality Near Military Hospital, Jhalmand Chowk, Sangariya Phata, Basni.
8	MTS		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.
9	VODAFONE		Poor Rx Quality Near Kanawas Ka Pana, Ratkauri.		They Have Good Rx Level and Rx Quality in Covered SDCA's.		Poor Rx Quality in Most of the Covered SDCA's on Day 3.
10	AIRCEL		Poor Rx Level and Rx Quality Near Kosana, Kaproda, Dantiwara.		Poor Rx Level Near Barwali, Balesa.		Overall Good Coverage and Good Quality in Covered SDCA on Day 3.

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

DRIVE TEST TABLE: 6

DRIVE TEST OBSERVATION OF NAGOUR SSA: AUGUST 15

S. No	Name of SP	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRTEL	Deedwana, Nagaur, Ladnun, Jayal	Overall Good Coverage and Good Quality in Covered SDCA on Day 1.	Mundwa, Gotan, Merta	Overall Good Coverage and Good Quality in Covered SDCA on Day 2.	Kuchman City, Nawa,	Poor Rx Quality Near Khatu Khurd, Unchbaira.
2	BSNL		NP		NP		NP
3	TATA GSM		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.
4	TATA CDMA		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.
5	IDEA		Poor Rx Quality Near Amar Singh Colony, Tehsil (Nagaur),		They Have Good Rx Level and Rx Quality in Covered SDCA's.		They Have Good Rx Level and Rx Quality in Covered SDCA's.
6	RCOM GSM		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.
7	RCOM CDMA		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.
8	MTS		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.
9	VODAFONE		Poor Rx Quality Near Sarpalia, Nimbijodhan, Jayal.		Poor rx Level and Rx Quality Near Butati, Mundwa, Gotan.		Poor Rx Quality Near Binivad, Palara.
10	AIRCEL		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.

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

DRIVE TEST TABLE: 7

DRIVE TEST OBSERVATION OF PALI SSA: SEPTEMBER 15

S. No	Name of SP	SDCA Covered in Day 1	Day 1 Observation	SDCA Covered in Day 2	Day 2 Observation	SDCA Covered in Day 3	Day 3 Observation
1	AIRTEL	Pali, Rohat	Overall Good Coverage and Good Quality in Covered SDCA on Day 1.	Sumerpur, Bali, Desuri	Overall Good Coverage and Good Quality in Covered SDCA on Day 2.	Marwar Junction City, Sojat, Jaitaran.	Overall Good Coverage and Good Quality in Covered SDCA on Day 3.
2	BSNL		NP		NP		
3	TATA GSM		Poor Rx Quality Near Oancham Nagar, Mahaveer Nagar, Sardar Patel Nagar.		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.
4	TATA CDMA		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.
5	IDEA		Poor Rx Level and Rx Quality Near Housing Board, Mahaveer Nagar, Pancham Nagar.		Poor Rx Level and Rx Quality Near Pali Road Sumerpur, Ganesh Marg, Kotbaliyan.		Poor Rx Level and Rx Quality Near Jadan Khalsa, Railway Colony Marwar Junction.
6	RCOM GSM		Poor Rx Level and Rx Quality Kharda. Poor rx Quality Near Agrasen Chowk,		Poor Rx level and Rx Quality Near Gundoj, Ghanerao Road, Sumerpur.		Poor Rx Level and Rx Quality in Most of the Covered SDCA's on Day 3.
7	RCOM CDMA		Poor Rx Level and Rx Quality Between Rohat to Pali Residential Area.		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.
8	MTS		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.
9	VODAFONE		Poor Rx Quality Near Mandaleshwar Market, Pali Bus Stand.		Overall Good Coverage and Good Quality in Covered SDCA on Day 2.		Overall Good Coverage and Good Quality in Covered SDCA on Day 3.
10	AIRCEL		Poor Rx Level and Rx Quality Near Keshav Nagar.		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.		They Have Coverage Only In Major SDCA's with Poor Level and Quality at Outers.

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

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 July -15**, drive tests were conducted across **Jodhpur** SSA covering Bilara, Bhopalgarh, Piaprcity, Dantiwara, Mathania, Deechu and Jodhpur SDCAs for three consecutive days. The performance of the service providers in general was satisfactory as all operators met the benchmarks on SSA level. **BSNL** has not provided the drive test report despite best efforts.
- (ii) **In the Month of August -15**, drive tests were conducted across **Nagaur SSA** covering Deedwana, Nagaur, Ladnun, Jayal, Mundwa, Gotan, Merta, Kuchman City and Nawa 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. **BSNL** has not provided the drive test report despite best efforts.
- (iii) **In the month of September -15**, drive tests were conducted across **Pali SSA** covering Pali, Rohat, Sumerpur, Bali, Desuri, Marwar Junction City, Sojat and Jaitaran SDCAs. In Pali SSA also, all operators were doing well within the QoS norms on overall SSA basis.
- (iv) 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**.

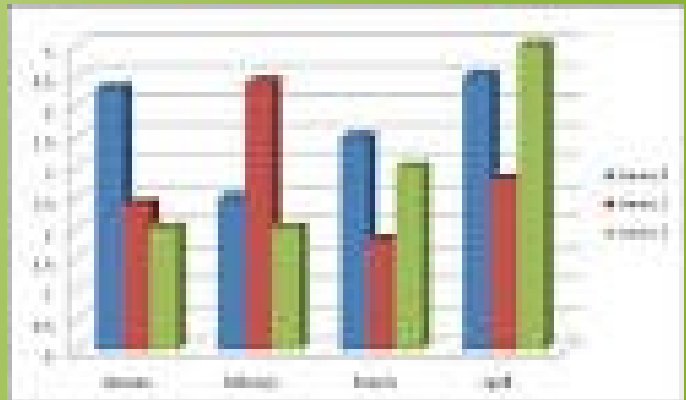
*The performance of the service providers with regard to the Drive Test revealed that all the service providers performed well within the QoS norms. **BSNL** has not provided the report of drive test conducted across these SSAs despite best efforts. So their performance could not be assessed.*

8. GRAPHICAL REPRESENTATION (CELLULAR MOBILE SERVICE PROVIDERS)

AVERAGED QUARTERLY PMR

V/S

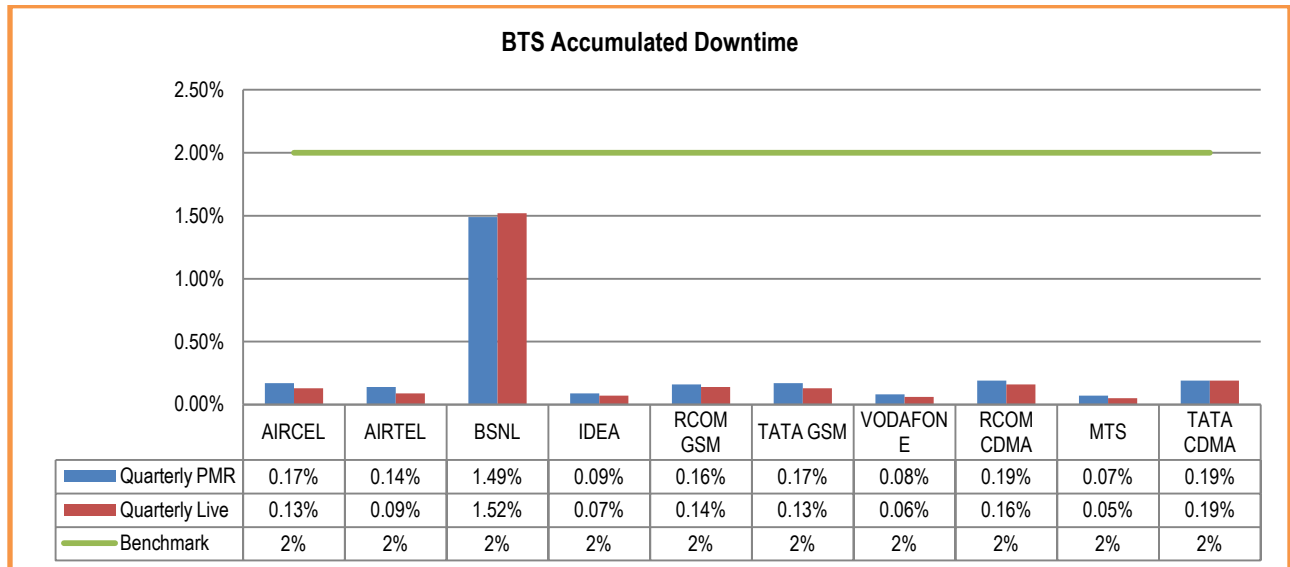
AVERAGED QUARTERLY 3-DAYs LIVE MEASUREMENT



8. GRAPHICAL REPRESENTATION (CMTS):

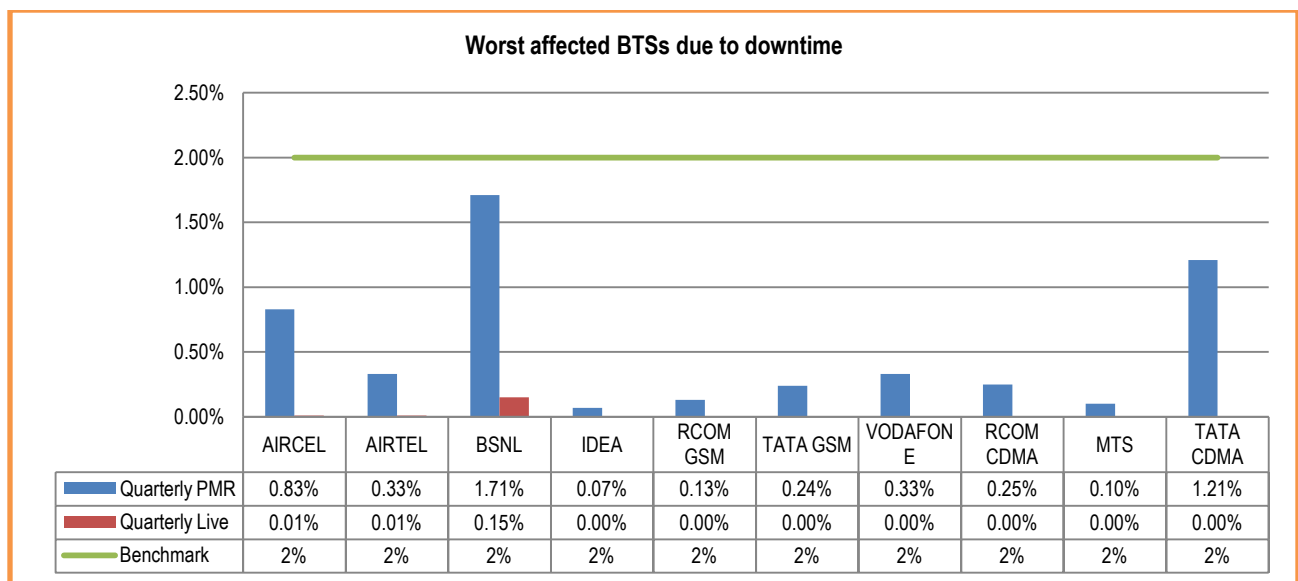
Graphical Representation of Performance of the Cellular Mobile Service Providers (PMR) V/S 3-Days Live Measurement (Quarterly Average Data):

1) BTS ACCUMULATED DOWNTIME



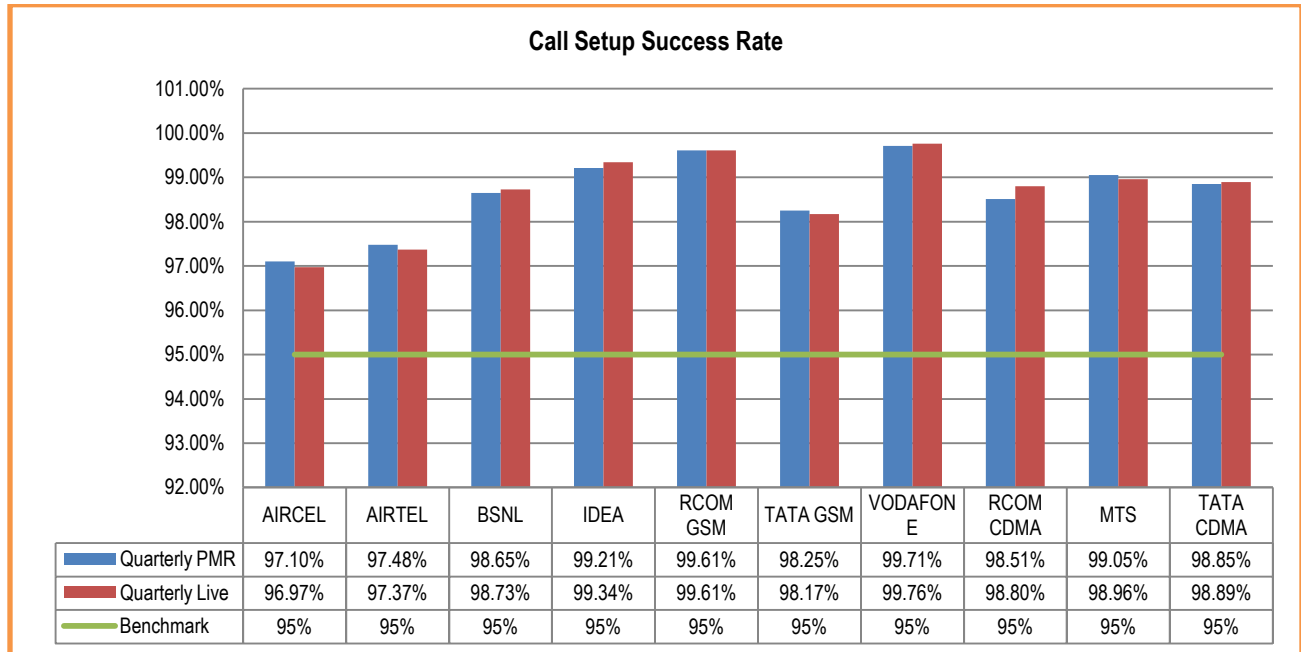
All operators are meeting the benchmarks.

2) WORST AFFECTED BTSS DUE TO DOWNTIME:



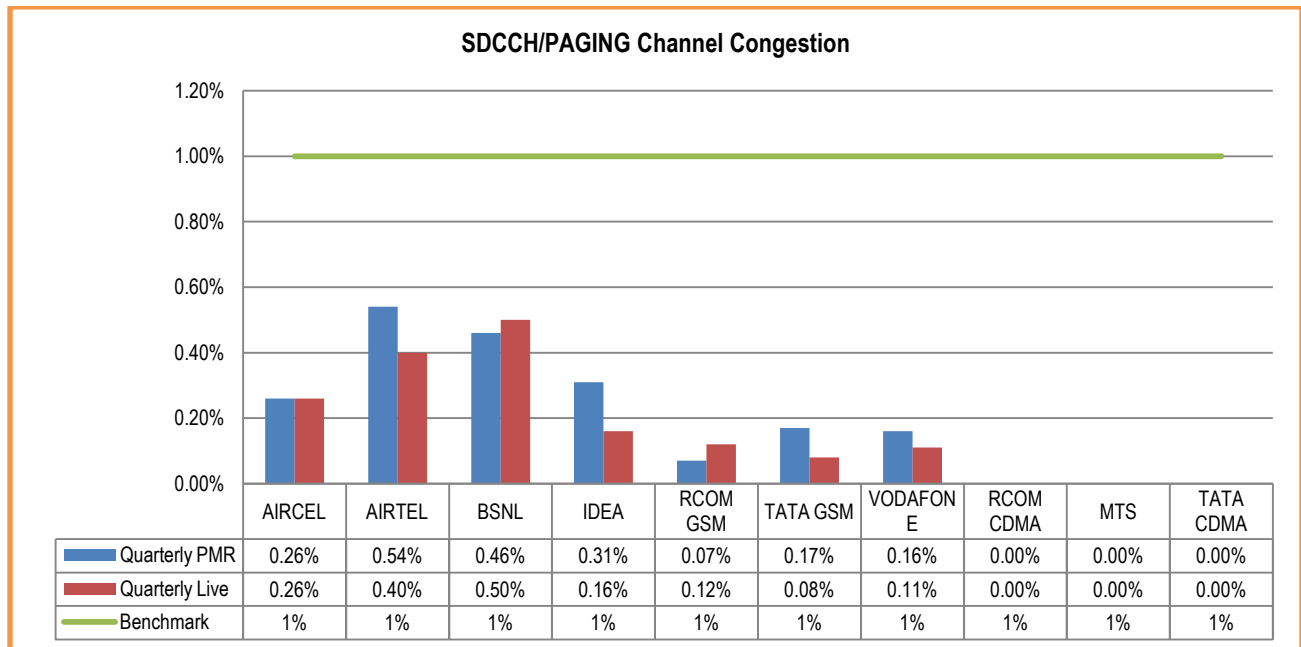
All operators are meeting the benchmarks.

3) CALL SETUP SUCCESS RATE:



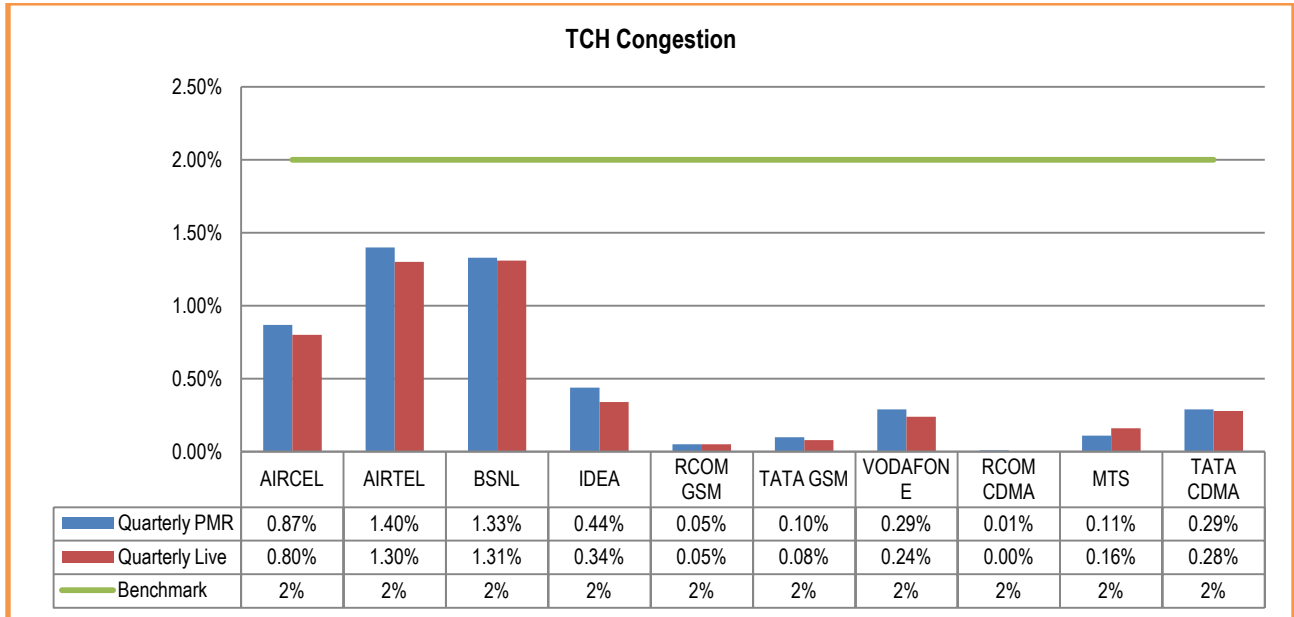
All operators are meeting the benchmarks.

4) SDCCH/PAGING CHANNEL CONGESTION:



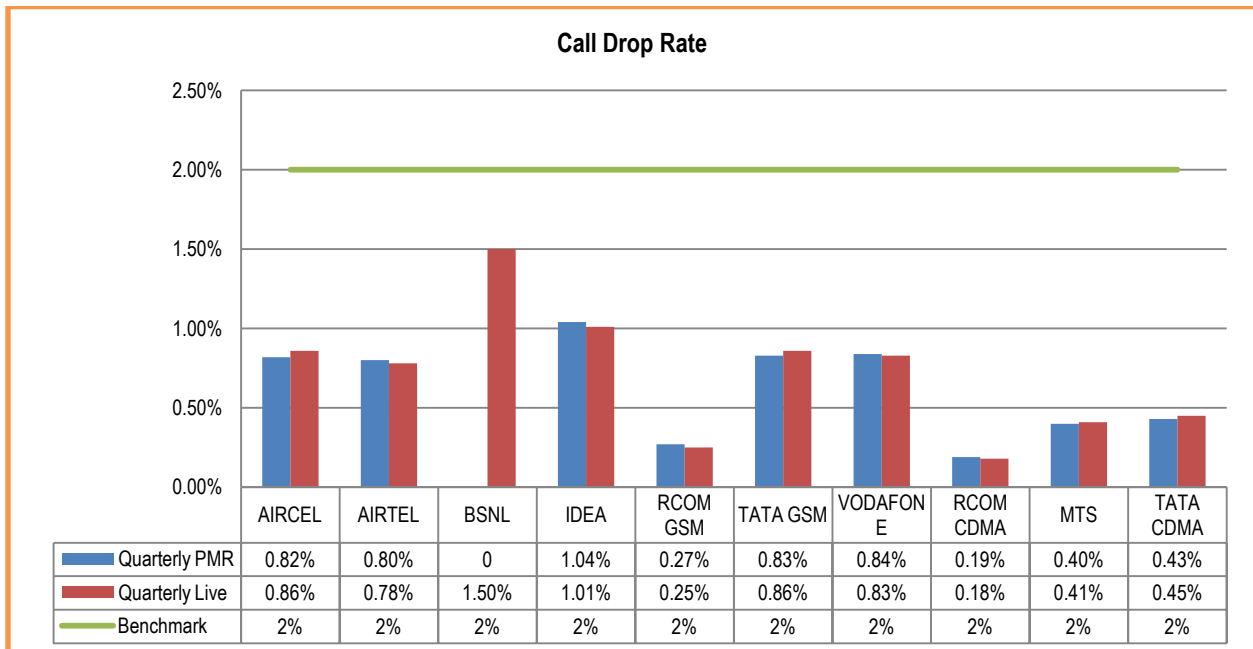
All operators are meeting the benchmarks.

5) TCH CONGESTION:



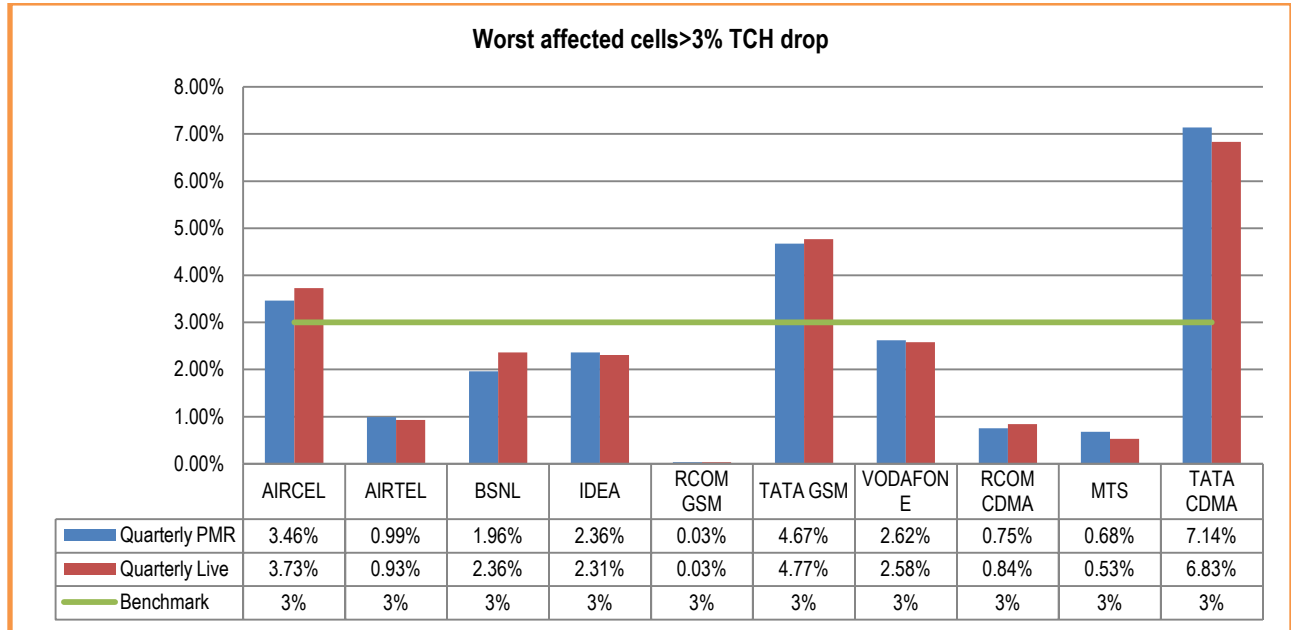
All operators are meeting the benchmarks.

6) CALL DROP RATE:



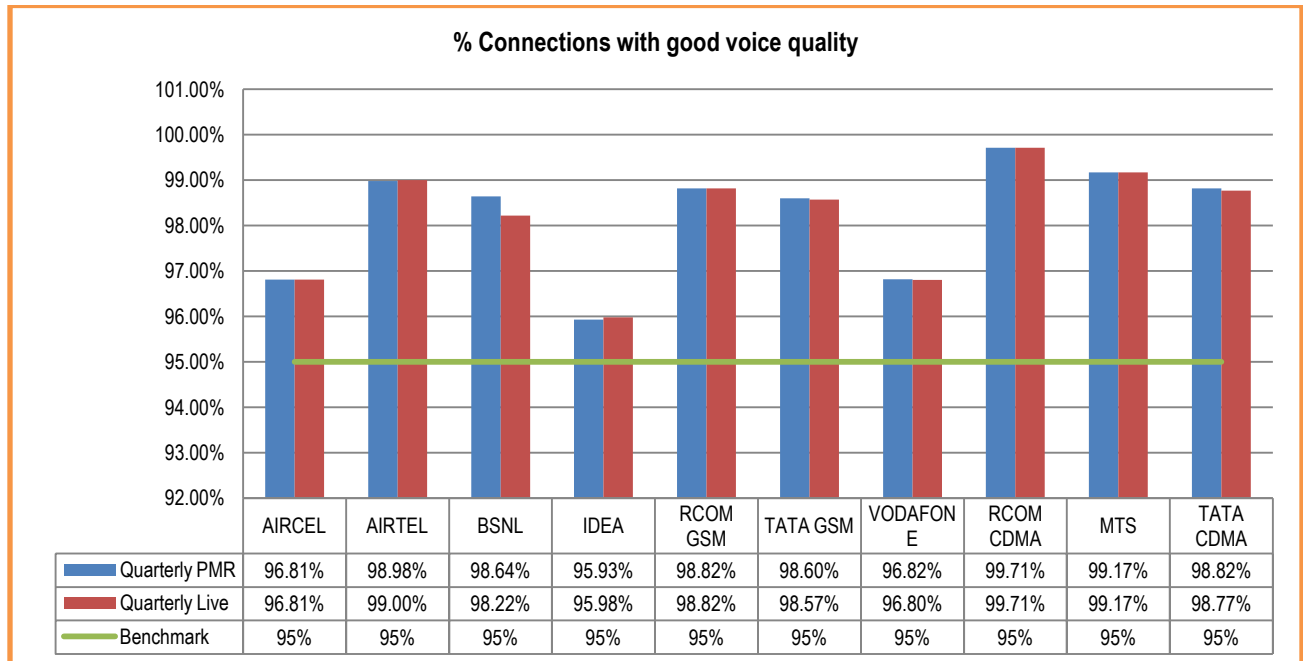
All operators are meeting the benchmarks.

7) WORST AFFECTED CELLS>3% TCH DROP:



All operators are meeting the benchmarks except Aircel, Tata GSM and Tata CDMA.

8) PERCENTAGE OF CONNECTIONS WITH GOOD VOICE QUALITY:



All operators are meeting the benchmarks.

9. PMR VERIFICATION TABLE:

(i) NETWORK RELATED PARAMETERS:

Name of Service Provider	Parameter	BTS Accumulated Downtime	Worst affected BTSs due to downtime	CSSR (Call Setup Success Rate)	SDCCH/PAGING Channel congestion	TCH congestion	CDR (Call Drop Rate)	Worst affected cells>3% TCH drop (Call drop) rate	Connections with good voice quality	No. of POI's having >=0.5% POI congestion
Benchmark		≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%	≤ 0.5%
AIRCEL	Reported	0.17	0.83	97.10	0.26	0.87	0.82	3.46	96.81	0
	Verified	0.17%	0.83%	97.10%	0.26%	0.87%	0.82%	3.46%	96.81%	0
AIRTEL	Reported	0.14	0.33	97.37	0.52	1.50	0.82	1.07	98.95	0
	Verified	0.14%	0.33%	97.48%	0.54%	1.40%	0.80%	0.99%	98.98%	0
BSNL	Reported	1.53	1.82	98.65	0.46	1.33	1.48	1.85	98.64	0
	Verified	1.49%	1.71%	98.65%	0.46%	1.33%	1.48%	1.96%	98.64%	0
IDEA	Reported	0.09	0.07	99.21	0.31	0.44	1.04	2.36	95.93	0
	Verified	0.09%	0.07%	99.21%	0.31%	0.44%	1.04%	2.36%	95.93%	0
RCOM GSM	Reported	0.16	0.13	99.61	0.07	0.05	0.27	0.03	98.82	0
	Verified	0.16%	0.13%	99.61%	0.07%	0.05%	0.27%	0.03%	98.82%	0
TATA GSM	Reported	0.17	0.00	98.25	0.17	0.10	0.83	4.67	98.60	0
	Verified	0.17%	0.24%	98.25%	0.17%	0.10%	0.83%	4.67%	98.60%	0
VODAFONE	Reported	0.08	0.33	99.71	0.16	0.29	0.84	2.61	96.82	0
	Verified	0.08%	0.33%	99.71%	0.16%	0.29%	0.84%	2.62%	96.82%	0
MTS	Reported	0.07	0.04	99.05	0.00	0.11	0.40	0.68	99.17	0
	Verified	0.07%	0.10%	99.05%	0.00%	0.11%	0.40%	0.68%	99.17%	0
RCOM CDMA	Reported	0.19	0.25	98.51	0.00	0.01	0.19	0.75	99.71	0
	Verified	0.19%	0.25%	98.51%	0.00%	0.01%	0.19%	0.75%	99.71%	0
TATA CDMA	Reported	0.19	0.00	98.85	0.00	0.29	0.43	7.14	98.82	0
	Verified	0.19%	1.21%	98.85%	0.00%	0.29%	0.43%	7.14%	98.82%	0

- The above data is averaged for three months of the quarter ending September-2015.
- The PMR data provided by the service providers is largely matching with verified (audited) data. However the variation in data has been indicated by yellow colour.
- Aircel, Tata GSM and Tata CDMA have not met the benchmark for the parameter “Worst affected cells>3% TCH drop”.

(ii) CUSTOMER SERVICE DELIVERY (CSD) RELATED PARAMETER:

Name of Service Provider	Parameter	Metering and billing credibility - post paid	Metering and billing credibility - pre paid	Resolution of billing /charging complaints	Resolution of billing /charging complaints	Period of applying credit/ waiver/ adjustment to customer's account from the date of resolution of complaints	Accessibility of call centre/ customer care	Percentage of calls answered by the operators (voice to voice) within 90 seconds	%age requests for Termination / Closure of service	Time taken for refund of deposits after closures
Benchmark		<= 0.1%	<= 0.1%	98% within 4 weeks	100% within 6 weeks	within 1 week of resolution of complaint	>=95%	≥ 95%	100% within <=7days	100% within 60 days
AIRCEL	Reported	0.00	0.00	100.00	100.00	100.00	97.72	96.62	100.00	100.00
	Verified	0.00%	0.00%	100%	100%	100%	97.72%	96.62%	100%	100%
AIRTEL	Reported	0.01	0.00	100.00	100.00	100.00	100.00	97.25	100.00	100.00
	Verified	0.01%	0.00%	100%	100%	100%	100.00%	97.25%	100%	100%
BSNL	Reported	0.05	0.49	99.89	100.00	100.00	97.65	74.51	100.00	100.00
	Verified	0.05%	0.26%	100%	100%	100%	99.59%	83.14%	100%	100%
IDEA	Reported	0.05	0.18	100.00	100.00	100.00	98.63	99.31	100.00	100.00
	Verified	0.05%	0.18%	100%	100%	100%	98.63%	99.31%	100%	100%
RCOM (GSM)	Reported	0.09	0.09	100.00	100.00	100.00	98.21	97.30	100.00	100.00
	Verified	0.09%	0.09%	100%	100%	100%	98.21%	97.30%	100%	100%
TATA (GSM)	Reported	0.00	0.00	100.00	100.00	100.00	98.58	96.66	100.00	100.00
	Verified	0.00%	0.00%	100%	100%	100%	98.58%	96.66%	100%	100%
VODAFONE	Reported	0.00	0.00	100.00	100.00	100.00	100.00	98.64	100.00	100.00
	Verified	0.13%	0.10%	100%	100%	100%	100.00%	95.49%	100%	100%
MTS	Reported	0.00	0.00	100.00	100.00	100.00	97.37	97.51	100.00	100.00
	Verified	0.06%	0.05%	100%	100%	100%	96.74%	95.70%	100%	100%
RCOM (CDMA)	Reported	0.08	0.09	100.00	100.00	100.00	98.47	98.13	100.00	99.18
	Verified	0.08%	0.09%	100%	100%	100%	98.47%	98.13%	100%	99.18%
TATA (CDMA)	Reported	0.00	0.00	100.00	100.00	100.00	98.16	96.53	100.00	100.00
	Verified	0.00%	0.00%	100%	100%	100%	98.16%	96.53%	100%	100%

- The above data is average for three months of the quarter ending September-2015.
- The PMR data provided by the service providers is largely matching with verified (audited) data. However the variation in data has been indicated by yellow colour.
- BSNL has not met the benchmark for the parameter “Percentage of calls answered by the operators (voice to voice) within 90 seconds”.
- RCOM CDMA has not met the benchmark for the parameter “Time taken for refund of deposits after closures”.
- Vodafone has not met the benchmark for the parameters “Metering and billing credibility - Post paid and Prepaid”.
- BSNL and Idea have not met the benchmark for the parameter “Metering and billing credibility - Pre paid”.