CELLULAR MOBILE OPERATORS' QUARTERLY QUALITY OF SERVICE SURVEY RESULTS - 2018

In the year 2018, Pakistan Telecommunication Authority (PTA) has conducted quarterly Quality of Service (QoS) survey jointly with Cellular Mobile Operators (CMOs) using NEMO automated QoS tool. During the period, a total of twenty seven (27) cities of Pakistan including AJK, have been surveyed. The names of these cities are as under:

S. No.	Name	S. No.	Name	S. No.	Name
1	Rawalpindi	10	Mirpur	19	Nathia Gali
2	Islamabad	11	Karachi	20	Malam Jabba
3	Chakwal	12	Hyderabad	21	Quetta
4	Jhelum	13	Dadu	22	Ziarat
5	Lahore	14	Sukkur	23	Lodhran
6	Faisalabad	15	Bahrain	24	Multan
7	T. T. Singh	16	Madyan	25	Peshawar
8	Sargodha	17	Kalam	26	Mirpurkhas
9	Muzaffarabad	18	Naran	27	Badin

DATA – KEY PERFORMANCE INDICATORS

The performance of data services of CMOs has been checked by measuring User Data Throughput and Signal Strength Key Performance Indicators (KPIs).
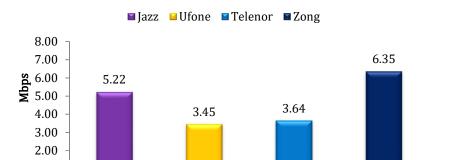
USER DATA THROUGHPUT

This KPI defines user data rate (Internet speed) to be provided by NGMS operators to mobile users across the coverage areas. The data throughput results of all NGMS licensees are as under:

Throughput (3G)

User Data Throughput (3G)
(Threshold: > 256 kbps = 0.25 Mbps)

■ Jazz ■ Ufone ■ Telenor ■ Zong

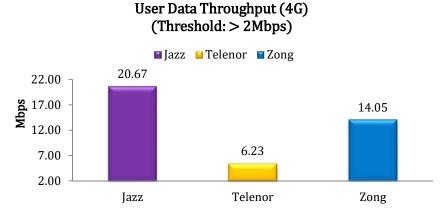| Operator	Mbps
Jazz	5.22
Ufone	3.45
Telenor	3.64
Zong	6.35

User data "throughput" of 3G services is higher than the benchmark set in their respective licenses. Data throughput of ZonG is the highest followed by Jazz, whereas data throughput of Ufone is the lowest among all NGMS operators

Throughput (4G)

User Data Throughput (4G)
(Threshold: > 2Mbps)
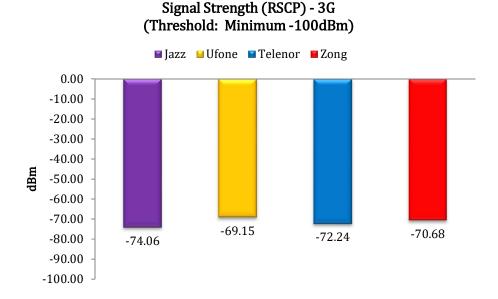
■ Jazz ■ Telenor ■ Zong

User data "throughput" of 4G services is higher than the benchmark set in their respective licenses. Data throughput of Jazz is the highest followed by ZonG, whereas data throughput of Telenor is the lowest among all NGMS operators
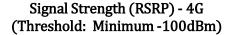
SIGNAL STRENGTH

This KPI defines Received Signal Code Power (RSCP) for 3G and Received Signal Receive Power (RSRP) for 4G and denotes the power measured by a receiver on a particular physical communication channel. It is used as an indication of signal strength, as a handover criterion, in downlink power control, and to calculate path loss". The Signal Strength for NGMS licensees are as under:
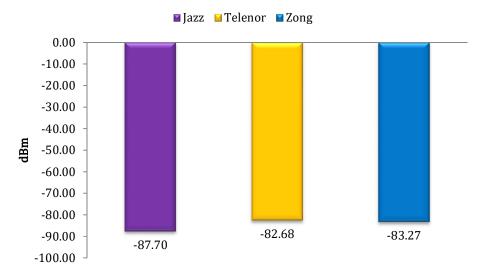
Received Signal Code Power (RSCP)

Signal Strength (RSCP) - 3G
(Threshold: Minimum -100dBm)

■ Jazz ■ Ufone ■ Telenor ■ Zong

The Signal Strength (RSCP) of 3G network has been observed higher than the threshold value in the areas traversed during surveys, for all CMOs

Received Signal Receive Power (RSRP)

Signal Strength (RSRP) - 4G
(Threshold: Minimum -100dBm)

Legend: ■ Jazz ■ Telenor ■ Zong

Bar chart (dBm):
- Jazz: -87.70
- Telenor: -82.68
- Zong: -83.27

The Signal Strength (RSRP) of 4G network has been observed higher than the threshold value in the areas traversed during surveys
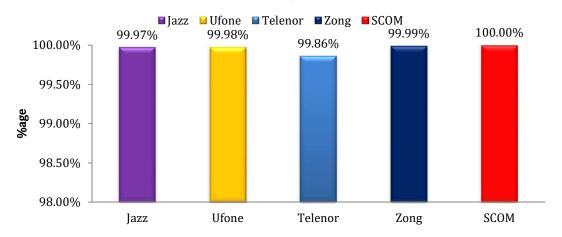
VOICE – KEY PERFORMANCE INDICATORS

The performance of voice services of CMOs has been checked by measuring Network Down Time/Network Accessibility, Grade of Service, Service Accessibility, Call Connection Time, Call Completion Ratio, End-to-End Speech Quality and Session Abnormal Release Rate Key Performance Indicators (KPIs).

NETWORK DOWN TIME

"The probability that mobile services are neither available to an end customer nor display of the network indicator on the mobile equipment".
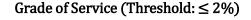
Network Accessibility (Threshold: >99%)

Legend: ■ Jazz ■ Ufone ■ Telenor ■ Zong ■ SCOM

Bar chart (%age):
- Jazz: 99.97%
- Ufone: 99.98%
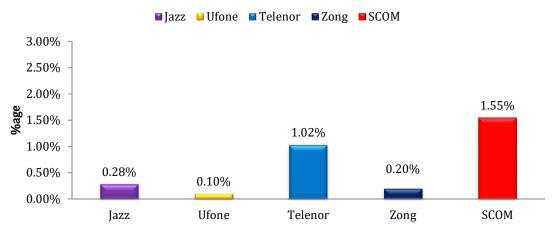- Telenor: 99.86%
- Zong: 99.99%
- SCOM: 100.00%

Network Accessibility is converse of Network Down Time and it is found above the threshold value of 99% of all the mobile operators

GRADE OF SERVICE (GOS)

"Grade of Service is probability that the end customer cannot access the mobile services when requested if it is offered by display of the network indicator on the mobile phone. In simple words, Grade of Service is Network Blocking".
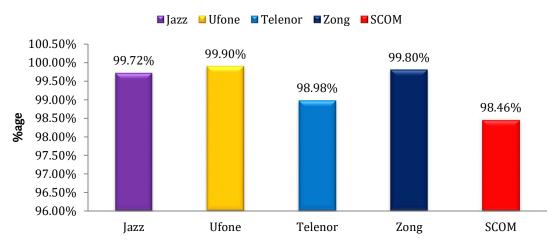
Grade of Service (Threshold: ≤ 2%)

■ Jazz ■ Ufone ■ Telenor ■ Zong ■ SCOM

Jazz: 0.28%
Ufone: 0.10%
Telenor: 1.02%
Zong: 0.20%
SCOM: 1.55%

All mobile operators are meeting the threshold value of Grade of Service

SERVICE ACCESSIBILITY

"Service Accessibility is the probability that the user can access the desired service. A given network accessibility is a precondition for this phase".
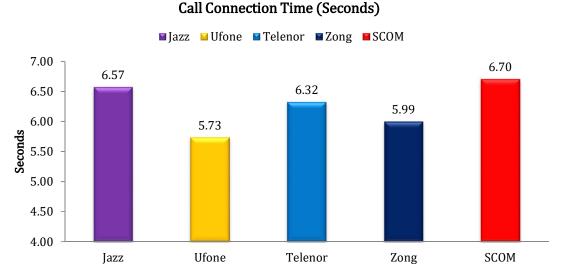
Service Accessibility (Threshold: > 98%)

■ Jazz ■ Ufone ■ Telenor ■ Zong ■ SCOM

Jazz: 99.72%
Ufone: 99.90%
Telenor: 98.98%
Zong: 99.80%
SCOM: 98.46%

All mobile operators are meeting the criteria of Service Accessibility
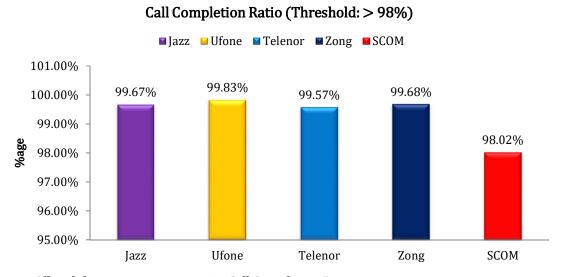
CALL CONNECTION TIME

"Call Connection Time is the time between sending of complete call initiation information by the caller and in return receipt of call setup notification. In simple words, it is time between dialing a number and hearing ring-back tone".

Call Connection Time (Seconds)

■ Jazz ■ Ufone ■ Telenor ■ Zong ■ SCOM

Only Jazz and SCOM are not meeting benchmark of Call Connection Time of 6.5 seconds

CALL COMPLETION RATIO

"Call Completion Ratio is the probability that a service, once obtained, will continue to be provided under given conditions for a given time duration or until deliberately terminated by either caller (A-party) or receiver (B-party). In simple words, this KPI provides information about Call Drops".
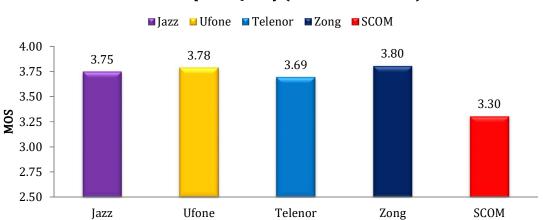
Call Completion Ratio (Threshold: > 98%)

■ Jazz ■ Ufone ■ Telenor ■ Zong ■ SCOM

All mobile operators are meeting Call Completion Ratio

END-TO-END SPEECH QUALITY

End-to-End Speech Quality is the degree of speech quality that a listener perceives at the terminal/mobile with a talker at the other end. In simple words, it provides information about clarity of voice.
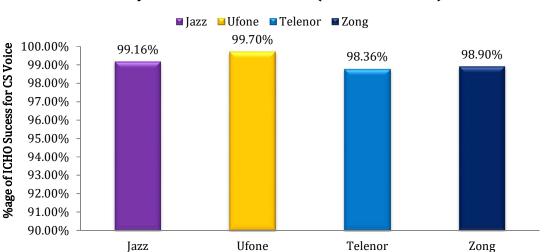
End to End Speech Quality (Threshold: MOS > 3)

■ Jazz ■ Ufone ■ Telenor ■ Zong ■ SCOM

Operator	MOS
Jazz	3.75
Ufone	3.78
Telenor	3.69
Zong	3.80
SCOM	3.30

End-to-End Speech Quality of all the mobile operators is above the standard value of 3

SESSION ABNORMAL RELEASE RATE

"A measurement that shows how often an end-user abnormally looses an Enhanced Radio Access Bearer (E-RAB) during the time the E-RAB is used."

Inter System Handover of CS Voice (Threshold: > 98%)

■ Jazz ■ Ufone ■ Telenor ■ Zong

Operator	%age of ICHO Success for CS Voice
Jazz	99.16%
Ufone	99.70%
Telenor	98.36%
Zong	98.90%

Inter System Handover of Circuit Switched Voice of all the mobile operators is above the standard value of 98%

SMS – KEY PERFORMANCE INDICATORS

The performance of SMS services of CMOs has been checked by measuring SMS Success Rate and End-to-End SMS Delivery Time Key Performance Indicators (KPIs).

SMS Success Rate

SMS Success Rate is the probability that the short message is delivered successfully, end-to-end when requested and display of the relevant information on the mobile phone. It provides information about successful delivery of SMS.
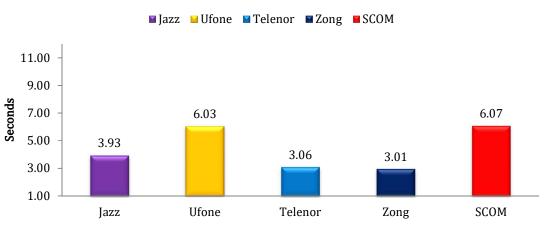
SMS Success Rate (Threshold: > 99%)

Legend: ■ Jazz ■ Ufone ■ Telenor ■ Zong ■ SCOM

CMO	SMS Success Rate
Jazz	99.83%
Ufone	99.78%
Telenor	99.03%
Zong	99.84%
SCOM	98.36%

Y-axis: %age (range 90.00% to 100.00%)

SMS Success Rate for SCOM is below the standard value of 99%

END-TO-END SMS DELIVERY TIME

End-to-End SMS Delivery Time is the time between sending a short message to a short message center and receiving the very same short message at intended mobile phone (receiver). It provides average time taken for delivery of short message from sender to recipient.

End to End Delivery Time (Threshold: ≤ 12 Sec)

Legend: ■ Jazz ■ Ufone ■ Telenor ■ Zong ■ SCOM

CMO	End to End Delivery Time (Seconds)
Jazz	3.93
Ufone	6.03
Telenor	3.06
Zong	3.01
SCOM	6.07

Y-axis: Seconds (range 1.00 to 11.00)

All CMOs are meeting the standard for End-to-End SMS Delivery Time.