

THE STATE OF MOBILE VOICE APP EXPERIENCE

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Authors

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Opensignal active userbase:



Total Devices
23,822,550



Total Measurements
57,564,535,468



Data Collection Period
Jun 1 – Aug 30, 2019

Opensignal is the independent global standard for analyzing consumer mobile experience. Our industry reports are the definitive guide to understanding the true experience consumers receive on wireless networks.

Key Findings

Voice apps are changing the way we communicate.

The insatiable growth in smartphone use along with the increasing ubiquity of data connections means that apps such as WhatsApp, Skype and Facebook Messenger are offering an entirely new platform for users to talk to each other.

Europe dominates Opensignal's new measure of mobile Voice App Experience.

Of the 19 countries who achieved a Good rating (80 to 87), only six were from outside Europe. And all of these six were relatively highly developed Asian markets, including Singapore, South Korea and Taiwan.

It is difficult to have a decent Voice App Experience using 3G networks – but it's not impossible.

Nine countries had a difference of less than 5 points between their 3G and 4G Voice App Experience scores, with all ranking Acceptable for 3G. And many of these were highly mature markets, including Germany, Hong Kong, Singapore and Switzerland – an indicator of what the mobile network experience will be in the future for markets where 4G Availability is rising and is replacing 3G.

3G-only Voice App Experience scores were much lower than 4G scores in every country.

Over a third of the countries we analyzed ranked as Good or above for 4G Voice App Experience – over 50% more countries than rated Good for overall Voice App Experience. But most of these countries gained Acceptable 3G ratings. At the other end of the table, all the countries that ranked Poor or below for 4G Voice App Experience rated Very Poor or lower for 3G.

There is a clear voice experience divide between mature markets and developing countries.

Nearly two-thirds of Latin American countries, along with the vast majority of African and Middle Eastern markets, rated Poor or below. But all the European markets we analyzed, along with the U.S. and Canada, ranked as Acceptable or above for Voice App Experience.

In over two-thirds of the countries we analyzed users experienced a ranking of Poor or below in 3G Voice App Experience.

This highlights the importance of 4G Availability to enjoying a decent Voice App Experience.

There were a few interesting anomalies to the 3G/4G pattern.

Indonesian users were the only ones to experience a Poor rating on both network types, while Hong Kong's users had the closest Voice App Experience, with just 1.4 points separating the 3G and 4G scores.

Voice App Experience is calculated on a scale from 0 to 100:

95-100	Excellent – Most users are very satisfied.
87-95	Very Good – Most users are satisfied.
80-87	Good – Many users are satisfied.
74-80	Acceptable – Users are satisfied.
66-74	Poor – Many users dissatisfied.
60-66	Very Poor – Most users dissatisfied.
45-60	Unintelligible – Nearly all users dissatisfied.
0-45	Impossible to communicate.

From phone to app, consumer communications have evolved

The spread of mobile data networks is changing the way we communicate with each other. The world of telecom was transformed [when Alexander Graham Bell made the first voice call](#) in 1876, followed by the first cellular call nearly a century later. For over 100 years, voice was the primary way of communicating via telephone. But just as cellular signalled the beginning of the decline of copper public switched telephone networks (PSTNs), so voice apps and voice over Internet protocol (VoIP) have [triggered a drop](#) in traditional cellular telephone calls.

Voice apps such as WhatsApp, Skype and Facebook Messenger offer an entirely new platform for users to call each other, bypassing the traditional cellular channels and offering a true online experience. Voice apps offer flexibility across a number of devices and networks, and have soared in popularity as smartphones become more and more ubiquitous. WhatsApp has an estimated [1.6 billion users](#) worldwide, Facebook Messenger boasts [1.3 billion](#), while Skype has an estimated [300 million users](#) – including its paid-for Business arm. But what's the mobile user experience like on these voice apps on today's mobile networks?

As voice apps grow in popularity, their performance will contribute to a customer's overall satisfaction with their network provider. Despite the importance of these apps, it's difficult to get a clear picture of the experience customers receive when using them and it certainly can't be properly judged from looking at just network speeds or latency tests.

Voice App Experience is a unique measure of users' perceived experience for over-the-top (OTT) voice services

In order to measure the true quality of app-based voice-over-IP (VoIP) calls, Opensignal has begun analyzing how consumers experience these apps and services which they use on their mobile phones. We inaugurate this pioneering approach with an analysis of Voice App Experience. It seeks to answer a simple but exceedingly relevant question for today's mobile

consumers: How good or bad does a call on voice apps like WhatsApp, Skype, and Facebook Messenger render on my operator's network?

A unique, first-of-its-kind measurement, Opensignal's Voice App Experience measures the quality of experience for over-the-top (OTT) voice services – mobile voice apps such as WhatsApp, Skype, Facebook Messenger etc. – using a model derived from the International Telecommunication Union (ITU)-based approach for quantifying overall voice call quality with a series of calibrated technical parameters. Other companies may be doing similar things on a small scale (e.g. a provider tracking their own voice delivery, or small-scale drive tests), but this is the industry's largest, independent measure to date, offering the greatest amount of service-agnostic, comparative data. [Read more about our methodology.](#)

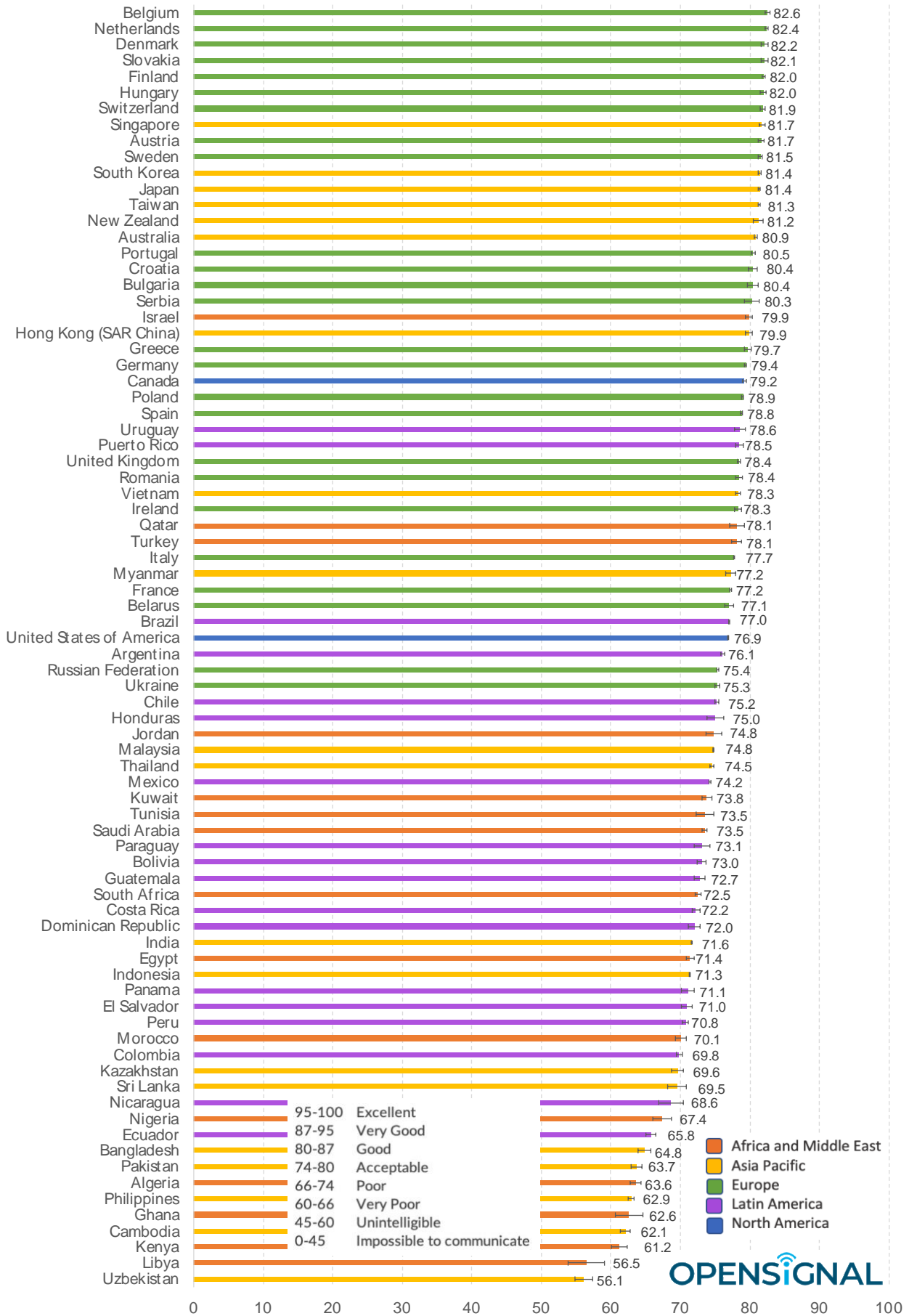
For this report, we've analyzed 80 countries from across the globe, drawn on our active user base of over 57 billion measurements from over 23 million Android and iOS smartphones, to see how users' Voice App Experience compares in different mobile markets.

Europe dominates our Good Voice App Experience rankings

Of the 80 countries we analyzed for overall Voice App Experience, 19 achieved a Good rating (80 to 87) – and only six were from outside Europe. These six included some of the usual high-flyers that appear [in the top tens](#) for our other metrics, including Singapore, South Korea and Taiwan.

Among the European countries who gained a Good ranking in Voice App Experience were some of the most mature mobile markets including Belgium, the Netherlands, Denmark and Hungary. But some other smaller European markets also achieved Good ratings, including Slovakia, Croatia and Serbia. Interestingly, none of the "big five" European countries – France, Germany, Italy, Spain and the U.K. – gained Good rankings, with all of these in the Acceptable bracket (74 – 80) for Voice App Experience.

Voice App Experience scores by country and geography



The brackets represent confidence intervals. [Read why confidence intervals are important.](#)

There is clear evidence of a global divide between more mature countries, fast growing ones and developing countries when it comes to Voice App Experience. None of the European markets we analyzed scored less than an Acceptable ranking, while the vast majority of the African and Middle Eastern nations rated Poor or lower. This pattern was mirrored in the Americas, where the U.S. and Canada ranked Acceptable, while barely a third of the Latin American markets (including Brazil) we analyzed achieved this rating.

Asia was a slightly different story, with countries ranking all the way from Good to Unintelligible. But the divide between mature and less developed markets was still visible, with Australia, Japan, New Zealand, Singapore, South Korea and Taiwan all gaining Good ratings, while developing mobile countries including India, Indonesia and Cambodia were all firmly in the bottom third of the table – with Cambodia drifting into Very Poor territory.

Opensignal's Voice App Experience quantifies the overall Voice App Experience on a scale from 0 to 100		
Score range	Classification	Interpretation
95 - 100	Excellent	Most users are very satisfied. Operator provides consistently good over-the-top (OTT) voice quality experience across the customer base.
87 - 95	Very Good	Most users are satisfied. Operator generally provides good OTT voice quality experience. Occasionally, there may be some impairments to the call, primarily related to level of loudness.
80 - 87	Good	Many users are satisfied. Minor quality impairments experienced by some users. Sometimes the background is not quite clear, it can be either hazy or not loud enough. Clicking sounds or distortion are very occasionally present.
74 - 80	Acceptable	Users are satisfied. Perceptible call quality impairments experienced by some users. Short duration of clicking sounds or distortion can be heard, and/or the volume may not be sufficiently loud. Listener is generally able to comprehend without repetition.
66 - 74	Poor	Many users dissatisfied. Call quality impairments experienced by many users. Distortion, clicking sounds or silence experienced during the call, which is perceptible and can be annoying.
60 - 66	Very Poor	Most users dissatisfied. Significant call quality impairments experienced by most users. Occasional instances of distortion, clicking sounds or silence experienced during the call. It can be difficult to understand parts of the conversation without repetition.
45 - 60	Unintelligible	Nearly all users are dissatisfied. Frequent instances of long pauses, clicking sounds or distortion can be heard during the call. Frequent repetition is required to be comprehensible, or there are frequent conversation overlaps.
0 - 45	Impossible to communicate	

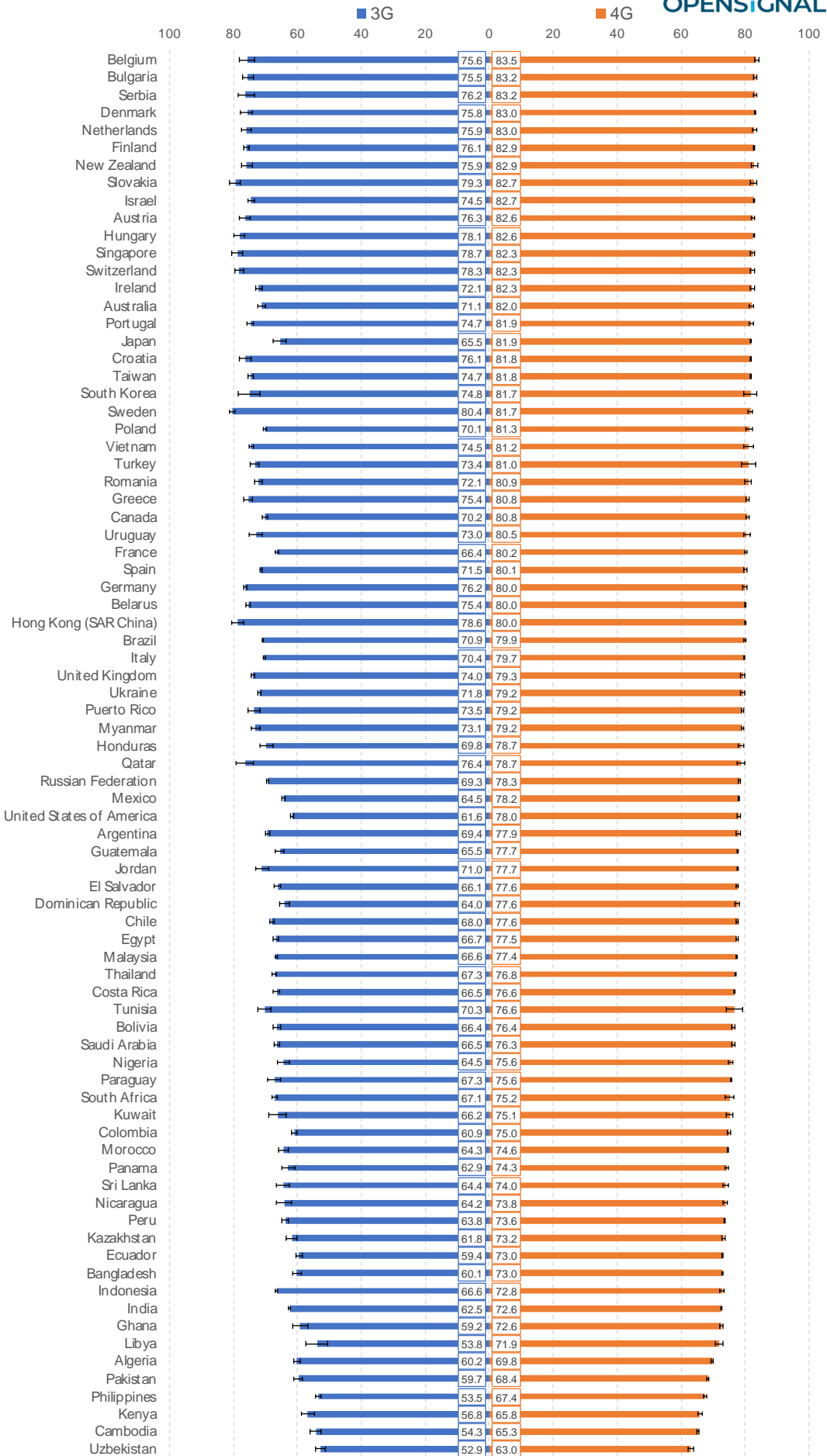
Voice App Experience will be added to our key award metrics in all of Opensignal's country-specific national reports going forward, alongside 4G Availability, Video Experience, Download and Upload Speed Experience, and Latency Experience – just like our recent [Mobile Network Experience report on Malaysia](#). We will also publish two supporting metrics for the overall Voice App Experience scores: 3G and 4G Voice App Experience.

Voice App Experience on 4G networks is most often Good, whereas on 3G it is Poor

When we look at the Voice App Experience by country divided between 3G and 4G networks, we can see the variation between the user experience by mobile technology. The 3G Voice App Experience scores are lower in every country compared with their 4G equivalents. But the difference between these scores is far from uniform.

Over a third of the countries we analyzed ranked as Good or above for 4G Voice App Experience – this is 50% more markets than we saw achieving this rating for overall Voice App Experience. By comparison, our users in only one country, Sweden, enjoyed a 3G Voice App Experience in the Good category. Less than 30% of the countries we analyzed secured an Acceptable ranking for users when connected on 3G networks, while the majority (38%) rated Poor.

Global comparison of 3G and 4G Voice App Experience scores

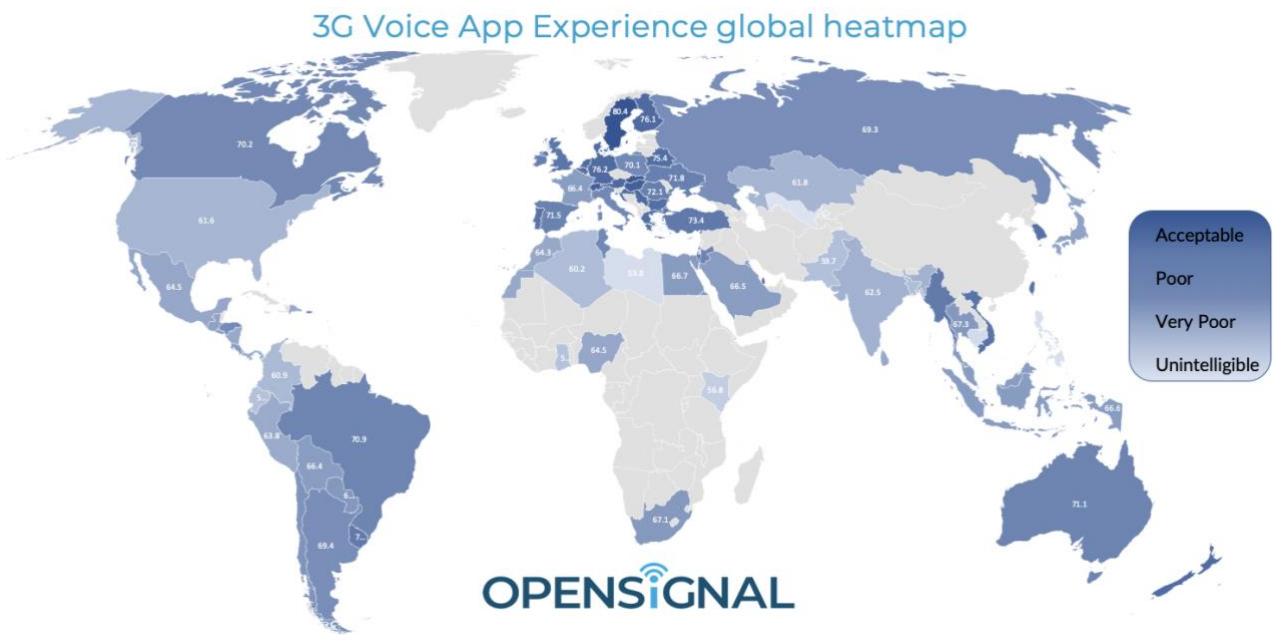


The brackets represent confidence intervals. [Read why confidence intervals are important.](#)

There was a degree of correlation between 3G and 4G scores: for instance, the majority of the countries which ranked Good for 4G Voice App Experience had users experiencing at least an Acceptable rating when connected using 3G. Likewise, at the other end of the table, in the countries that ranked Poor or below for 4G Voice App Experience users also had a Very Poor or lower experience using 3G.

There were a few interesting anomalies to this pattern though: Japan ranked Good for 4G but Very Poor for 3G likely because 4G completely dominates the market; Indonesia was the only country where users had a Poor rating for both types of networks; while Hong Kong's networks were the closest, with just 1.4 points separating users' 3G and 4G Voice App Experience scores.

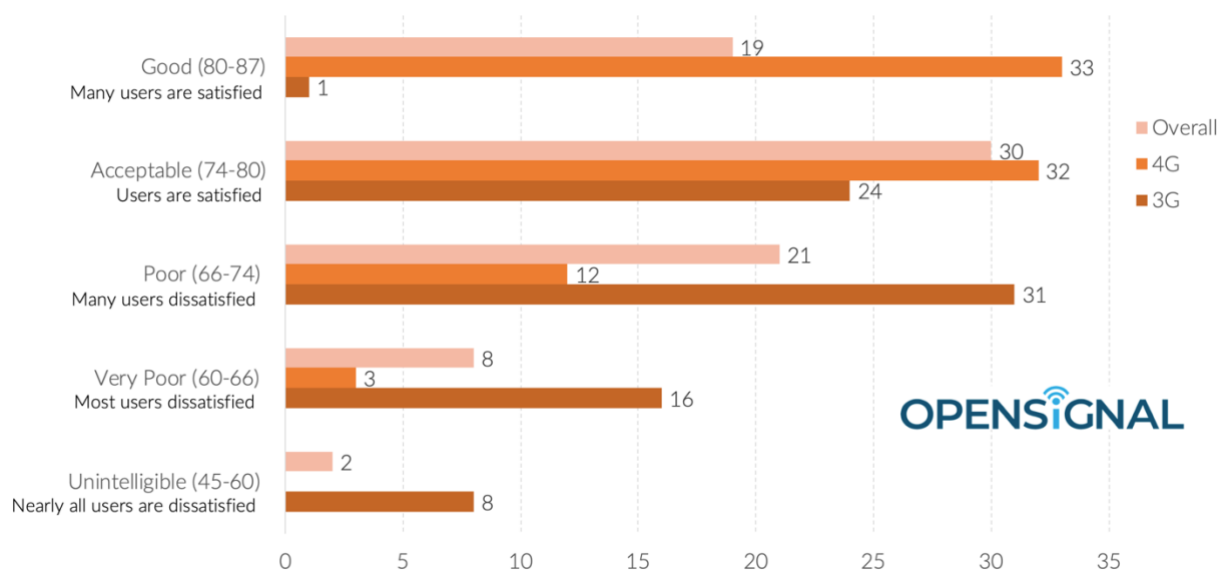
A look at our 3G Voice App Experience scores plotted on a global heatmap shows not only the large proportion of countries with rankings of Poor or below – shown in lighter blue – but also the wide distribution of these countries across the globe.



Voice App Experience rankings improve with access to 4G networks

When we look at the proportion of countries gaining Good rankings, we see it is much higher for 4G Voice App Experience. Our 4G users in 33 countries saw Good rankings – slightly more than the 32 countries that were rated Acceptable. Less than a third of the countries we analyzed ranked Poor or below for 4G Voice Experience. This highlights the importance of Opensignal’s 4G Availability measure – the proportion of time users spend connected to 4G – as an indicator of overall Voice App Experience.

Voice App Experience: number of countries by ranking

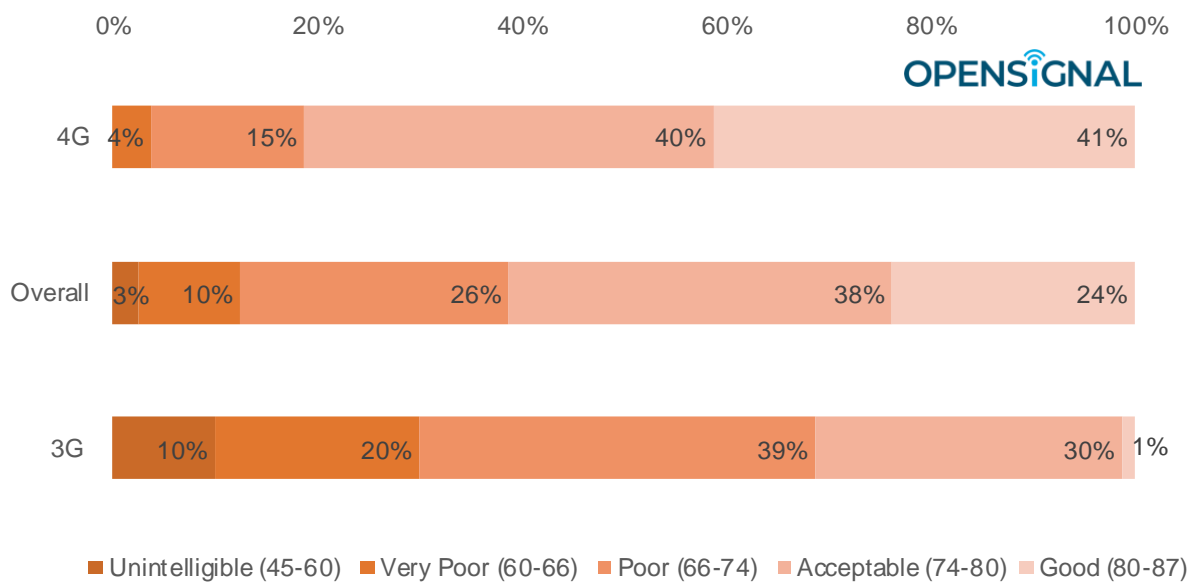


Looking at overall Voice App Experience, which combines users’ scores for both 3G and 4G networks, we see the highest number of countries – over a third of them – achieving an Acceptable ranking. This ranking was bracketed by a similar number of countries – around 20 – achieving both Good and Poor ratings. And just 10 countries ranked below Poor in overall Voice App Experience.

A Good 3G Voice App Experience is difficult, but not impossible

Our users in the majority of countries – 31 in total – saw Poor rankings and another 25 ranked Very Poor or lower. Meanwhile, there were users in just 25 countries gaining Acceptable, or above, for 3G Voice App Experience which demonstrates the challenges faced by operators offering a good experience without 4G connectivity.

Voice App Experience: Proportion of countries by rating



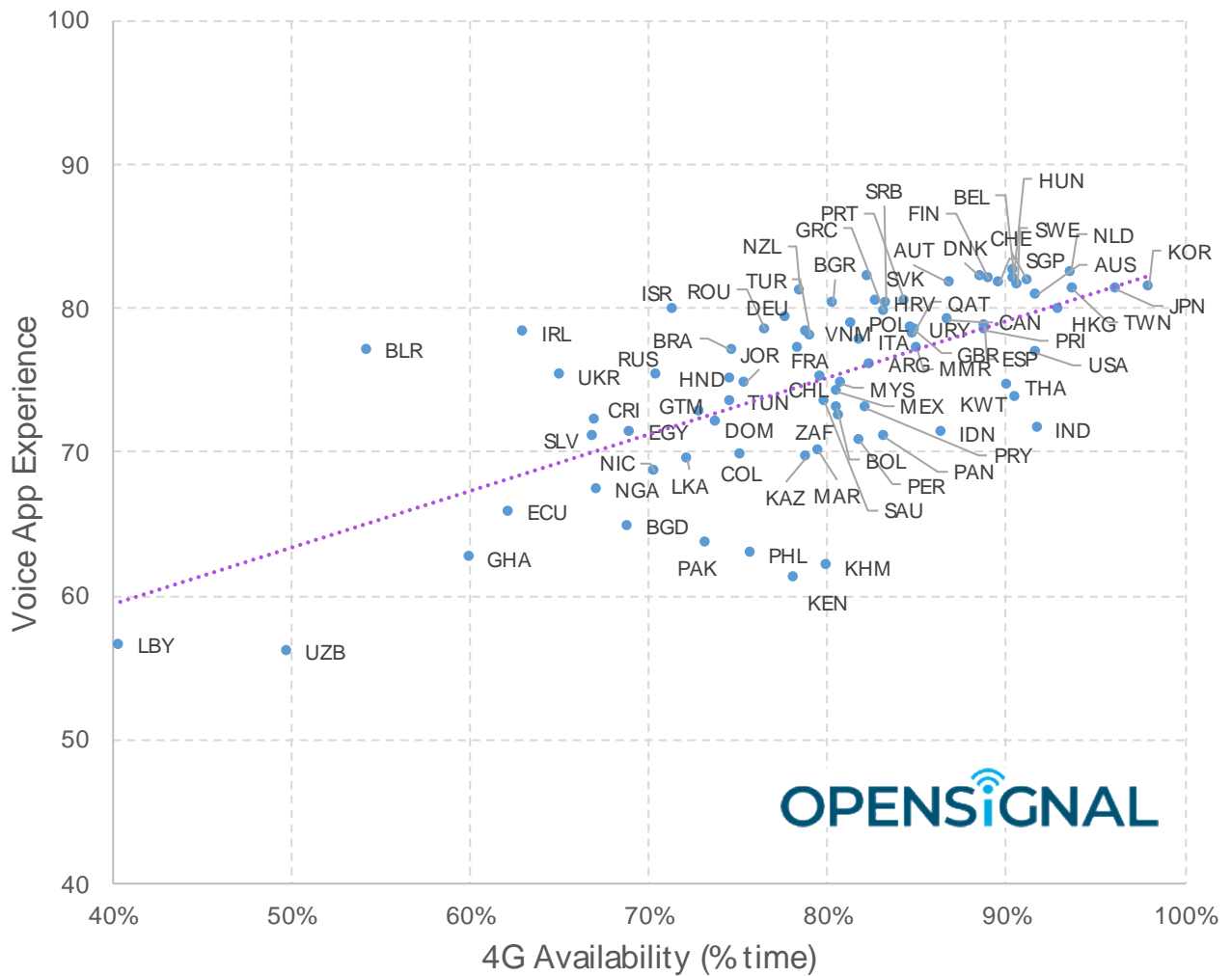
The spread of these Voice App Experience rankings by 3G and 4G technologies comes as little surprise. As we can see in the chart above, the ratio of countries scoring Poor rankings and below is significantly higher for 3G Voice App Experience. This serves to highlight how important 4G Availability is to our users when using voice apps. It's pretty hard for our users to get even an acceptable level of user experience using 3G technology.

Our data shows it's difficult to get a decent Voice App Experience on 3G networks, but not impossible. Nine countries had a difference of less than five points between their users' 3G and 4G Voice App Experience scores, with all ranking Acceptable for 3G. And many of these were highly mature markets with legacy 3G networks supported by strong fixed-line infrastructure, including Germany, Hong Kong, Singapore and Switzerland.

Higher 4G Availability improves the Voice App Experience

As with our other metrics, such as speed and latency, the time users are connected to 4G networks – 4G Availability – has a marked effect on their Voice App Experience. Generally, the more time our users are connected to 4G, the higher their Voice App Experience scores. Of the 14 countries that scored over 90% 4G Availability, all but five were also ranked Good for Voice App Experience.

Comparing Voice App Experience and 4G Availability



However, this doesn't mean it's impossible to get an Acceptable 3G Voice App Experience. In some countries like Libya, Uzbekistan, and Belarus, where 4G Availability is lower, meaning our users are forced to spend more time on 3G networks, they were still able to get an Acceptable Voice App Experience on 3G networks.

There is little doubt that voice apps are here to stay, and they will only become more sophisticated and even more widespread as mobile data consumption increases and 5G networks arrive, heralding the next generation of the mobile network experience. And, as these communication apps become commonplace, it's all the more vital that users and operators alike are able to access a reliable and independent measure of the user Voice App Experience to understand the real mobile experience and how it compares across countries and across operators.

APPENDIX - DEFINITIONS

Opensignal's Voice App Experience measures the quality of experience for over-the-top (OTT) voice services – mobile voice apps such as WhatsApp, Skype, Facebook Messenger etc. – using a model derived from the International Telecommunication Union (ITU)-based approach for quantifying overall voice call quality and a series of calibrated technical parameters.

This model characterizes the exact relationship between the technical measurements and perceived call quality.

Voice App Experience is calculated on a scale from 0 to 100.

95-100	Excellent – Most users are very satisfied.
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80-87	Good – Many users are satisfied.
74-80	Acceptable – Users are satisfied.
66-74	Poor – Many users dissatisfied.
60-66	Very Poor – Most users dissatisfied.
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0-45	Impossible to communicate.

4G Voice App Experience

This metric quantifies the quality of experience over mobile voice services for each operator on LTE connections as experienced by Opensignal users.

3G Voice App Experience

This metric quantifies the quality of experience over mobile voice services for each operator on 3G connections as experienced by Opensignal users.

APPENDIX - COUNTRY DATA

	Overall Voice App Experience	3G Voice App Experience	4G Voice App Experience
Algeria	63.6	60.2	69.8
Argentina	76.1	69.4	77.9
Australia	80.9	71.1	82.0
Austria	81.7	76.3	82.6
Bangladesh	64.8	60.1	73.0
Belarus	77.1	75.4	80.0
Belgium	82.6	75.6	83.5
Bolivia	73.0	66.4	76.4
Brazil	77.0	70.9	79.9
Bulgaria	80.4	75.5	83.2
Cambodia	62.1	54.3	65.3
Canada	79.2	70.2	80.8
Chile	75.2	68.0	77.6
Colombia	69.8	60.9	75.0
Costa Rica	72.2	66.5	76.6
Croatia	80.4	76.1	81.8
Denmark	82.2	75.8	83.0
Dominican Republic	72.0	64.0	77.6
Ecuador	65.8	59.4	73.0
Egypt	71.4	66.7	77.5
El Salvador	71.0	66.1	77.6
Finland	82.0	76.1	82.9
France	77.2	66.4	80.2
Germany	79.4	76.2	80.0
Ghana	62.6	59.2	72.6
Greece	79.7	75.4	80.8
Guatemala	72.7	65.5	77.7
Honduras	75.0	69.8	78.7
Hong Kong (SAR China)	79.9	78.6	80.0

	Overall Voice App Experience	3G Voice App Experience	4G Voice App Experience
Hungary	82.0	78.1	82.6
India	71.6	62.5	72.6
Indonesia	71.3	66.6	72.8
Ireland	78.3	72.1	82.3
Israel	79.9	74.5	82.7
Italy	77.7	70.4	79.7
Japan	81.4	65.5	81.9
Jordan	74.8	71.0	77.7
Kazakhstan	69.6	61.8	73.2
Kenya	61.2	56.8	65.8
Kuwait	73.8	66.2	75.1
Libya	56.5	53.8	71.9
Malaysia	74.8	66.6	77.4
Mexico	74.2	64.5	78.2
Morocco	70.1	64.3	74.6
Myanmar	77.2	73.1	79.2
Netherlands	82.4	75.9	83.0
New Zealand	81.2	75.9	82.9
Nicaragua	68.6	64.2	73.8
Nigeria	67.4	64.5	75.6
Pakistan	63.7	59.7	68.4
Panama	71.1	62.9	74.3
Paraguay	73.1	67.3	75.6
Peru	70.8	63.8	73.6
Philippines	62.9	53.5	67.4
Poland	78.9	70.1	81.3
Portugal	80.5	74.7	81.9
Puerto Rico	78.5	73.5	79.2
Qatar	78.1	76.4	78.7
Romania	78.4	72.1	80.9
Russian Federation	75.4	69.3	78.3

	Overall Voice App Experience	3G Voice App Experience	4G Voice App Experience
Saudi Arabia	73.5	66.5	76.3
Serbia	80.3	76.2	83.2
Singapore	81.7	78.7	82.3
Slovakia	82.1	79.3	82.7
South Africa	72.5	67.1	75.2
South Korea	81.4	74.8	81.7
Spain	78.8	71.5	80.1
Sri Lanka	69.5	64.4	74.0
Sweden	81.5	80.4	81.7
Switzerland	81.9	78.3	82.3
Taiwan	81.3	74.7	81.8
Thailand	74.5	67.3	76.8
Tunisia	73.5	70.3	76.6
Turkey	78.1	73.4	81.0
Ukraine	75.3	71.8	79.2
United Kingdom	78.4	74.0	79.3
United States of America	76.9	61.6	78.0
Uruguay	78.6	73.0	80.5
Uzbekistan	56.1	52.9	63.0
Vietnam	78.3	74.5	81.2

Our Methodology

Opensignal measures the real-world experience of consumers on mobile networks as they go about their daily lives.

We collect over 3 billion individual measurements every day from tens of millions of smartphones worldwide. Our measurements are collected at all hours of the day, every day of the year, under conditions of normal usage, including inside buildings and outdoors, in cities and the countryside, and everywhere in between. By analyzing on-device measurements recorded in the places where subscribers actually live, work and travel, we report on mobile network service the way users truly experience it. We continually adapt our methodology to best represent the changing experience of consumers on mobile networks and, therefore, comparisons of the results to past reports should be considered indicative only.

Confidence Intervals

For every metric we calculate statistical confidence intervals indicated on our graphs. When confidence intervals overlap, our measured results are too close to declare a winner. In those cases, we show a statistical draw. For this reason, some metrics have multiple operator winners.

In our bar graphs we represent confidence intervals as boundaries on either side of graph bars. In our supporting-metric charts we show [confidence intervals](#) as +/- numerical values.

Our Metrics

4G Availability

4G Availability shows the proportion of time Opensignal users with a 4G device have a 4G connection. 4G Availability is not a measure of coverage or the geographic extent of a network.

Video Experience

Video Experience quantifies the quality of mobile video experienced by Opensignal users on real-world video streams.

To calculate Video Experience, we directly measure video streams from end-user devices, using an ITU-based approach to quantify factors such as load times, stalling and video resolution over both an operator's 3G and 4G networks. Video Experience for each operator is calculated on a scale from 0 to 100.

4G Video Experience This metric quantifies the quality of mobile video for each operator on LTE connections as experienced by Opensignal users on real-world video streams.

3G Video Experience This metric quantifies the quality of mobile video for each operator on 3G connections as experienced by Opensignal users on real-world video streams.

Voice App Experience

Measures the quality of experience for over-the-top (OTT) voice services – mobile voice apps such as WhatsApp, Skype, Facebook Messenger etc. – using a model derived from the International Telecommunication Union (ITU)-based approach for quantifying overall voice call quality and a series of calibrated technical parameters. This model characterizes the exact relationship between the technical measurements and perceived call quality. Voice App Experience for each operator is calculated on a scale from 0 to 100.

4G Voice App Experience This metric quantifies the quality of experience over mobile voice services for each operator on LTE connections as experienced by Opensignal users.

3G Voice App Experience This metric quantifies the quality of experience over mobile voice services for each operator on 3G connections as experienced by Opensignal users.

Download Speed Experience

Download Speed Experience shows the average download speed experienced by Opensignal users across an operator's 3G and 4G networks.

It factors in 3G and 4G download speeds along with the availability of each technology.

4G Download Speed This metric shows the average download speed for each operator on LTE connections as measured by Opensignal users.

3G Download Speed This metric shows the average download speed for each operator on 3G connections as measured by Opensignal users.

Upload Speed Experience

Upload Speed Experience measures the average upload speeds experienced by Opensignal users across an operator's 3G and 4G networks.

It factors in 3G and 4G upload speeds along with the availability of each technology.

4G Upload Speed This metric shows the average upload speed for each operator on LTE connections as measured by Opensignal users.

3G Upload Speed This metric shows the average upload speed for each operator on 3G connections as measured by Opensignal users.

Latency Experience

Measured in milliseconds, latency refers to the delay users experience as data makes a round trip through the network.

Our Latency Experience metric is calculated as an average of the individual 3G and 4G latency measurements based on the proportion of time Opensignal users spend connected to each network type. A lower score in this metric is a sign of a more responsive network.

4G Latency This metric shows the average latency for each operator on LTE connections as measured by Opensignal users.

3G Latency This metric shows the average latency for each operator on 3G connections as measured by Opensignal users.