



भारतीय दूरसंचार विनियामक प्राधिकरण
Telecom Regulatory Authority of India
[भारत सरकार / Government of India]



Dated: 22nd November 2024

DIRECTION

Subject: Direction under section 13, read with sub-clauses (i) and (v) of clause (b) of sub-section (1) of section 11, of the Telecom Regulatory Authority of India Act, 1997 (24 of 1997) and the Standards of Quality of Service of Access (Wireline and Wireless) and Broadband (Wireline and Wireless) Service Regulations, 2024 (06 of 2024) dated 02nd August 2024, regarding publication of service wise geospatial coverage map.

F. No. RG-17/(3)/2022-QoS ---- Whereas the Telecom Regulatory Authority of India (hereinafter referred to as the "Authority"), established under sub-section (1) of section 3 of the Telecom Regulatory Authority of India Act, 1997 (24 of 1997) (hereinafter referred to as "TRAI Act"), has been entrusted with discharge of certain functions, *inter alia*, to regulate the telecommunication services; ensure compliance of terms and conditions of license; ensure technical compatibility and effective inter-connection between different service providers; 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 services provided by the service providers so as to protect the interest of the consumers of telecommunication service;

2. And whereas the Authority, in exercise of the powers conferred upon it under section 36, read with sub-clauses (i) and (v) of clause (b) of sub-section (1) of section 11, of the TRAI Act, made the Standards of Quality of Service of Access (Wireline and Wireless) and Broadband (Wireline and Wireless) Service Regulations, 2024 (06 of 2024) dated the 2nd August 2024 (hereinafter referred to as "the regulations"), which came into force with effect from 1st October 2024;

3. And whereas sub-regulation (3) of regulation 15 of the regulations provides for publication of service wise geospatial coverage maps by the service providers and the said regulation reads as under:-

“15. Publication.– (1) *The Authority may publish, in such manner and in such format, as may be decided by the Authority from time to time–*

- (a) the compliance reports of benchmarks of each QoS parameter reported to it by the service providers under regulation 13;*
- (b) the results of the customer satisfaction surveys undertaken by the Authority under regulation 11;*
- (c) the results of drive tests undertaken by the Authority under sub-regulation (3) of regulation 7;*
- (d) the findings of audit undertaken by the Authority under regulation 14;*

through its website or through press releases or through advertisements in the print or electronic media, for the information to the public.

(2) Every service provider shall publish, for the information of the consumers, its performance with respect to the benchmark of QoS parameters specified in regulation 4, regulation 6, regulation 7, regulation 9 and regulation 10, as applicable, in such manner and format, as may be directed by the Authority from time to time.

(3) Every service provider providing access service (wireless) shall publish on its website the service wise geospatial coverage maps in such a manner and format, as may be directed by the Authority from time to time, for the geographical areas where wireless voice or wireless broadband service is available for subscription by consumers.”

4. And whereas the Authority, vide its letter No. RG-17/(3)/2022-QoS dated 13th August 2024, requested all the service providers to furnish inputs, *inter-alia*, on the format, manner and timeline for publication of service wise geospatial coverage maps by the service provider on its website, latest by 23rd August 2024;

5. And whereas a meeting was held with service providers on 21st August 2024 to discuss, *inter alia*, the key aspects of the regulations and during the said meeting, on the request of service providers, the last date for submission of inputs, as sought vide letter dated 13th August 2024, was extended till 27th August 2024 and the same was conveyed to all service providers, vide the Minutes of Meeting dated 27th August 2024;

6. And whereas the Authority observed that the service providers have not furnished their inputs by the extended date of submission i.e., 27th August 2024, and therefore, one-to-one meetings were held with the service providers on 26th - 27th September 2024 and 7th October 2024 to discuss the matter;

7. And whereas, subsequent to the said meetings, M/s. Bharat Sanchar Nigam Limited submitted additional inputs vide letter No. BSNLCO-RGLN/26/3/2020-REGLN dated 8th October 2024;

8. And whereas based upon the inputs received from the service providers the Authority has made a comprehensive guidelines for publication of service wise geospatial coverage map by service providers on their website

9. Now, therefore, the Authority, in exercise of the powers conferred upon it under section 13, read with sub-clauses (i) and (v) of clause (b) of sub-section (1) of section 11, of the Telecom Regulatory Authority of India Act, 1997 (24 of 1997), hereby directs all service providers providing access service (wireless), to publish on their website the service wise (2G/ 3G/ 4G/ 5G) geospatial coverage maps for the geographical areas where wireless voice or wireless broadband service is available for subscription by consumers, as per the guidelines as attached as **annexure** to this Direction.

Enclosures: As above

Advisor (QoS-I)

To,

All Service Providers, providing access service (wireless), under:

- i. Unified Access Service License;
- ii. Unified License with authorization for Access Service;
- iii. Authorization under the Telecommunications Act, 2023 for providing Access Service.

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Annexure

Guidelines for publication of service wise geospatial coverage map by service providers on their website

1. Background

- 1.1. Telecom Regulatory Authority of India (TRAI) has notified revised Quality of Service (QoS) Regulations namely “The Standards of Quality of Service of Access (Wireline and Wireless) and Broadband (Wireline and Wireless) Service Regulations, 2024 (06 of 2024)” on 02.08.2024. The regulations have come into force w.e.f. 1st October 2024. These Regulations are applicable for both access and broadband services provided on wireline as well as wireless media.
- 1.2. Sub-regulation (3) of regulation 15 of the regulations mandate that “Every service provider providing access service (wireless) shall publish on its website the service wise geospatial coverage maps in such a manner and format, as may be directed by the Authority from time to time, for the geographical areas where wireless voice or wireless broadband service is available for subscription by consumers.”
- 1.3. Further, service providers are required to meet the benchmark of QoS parameter namely “Availability of service wise geospatial coverage map on service provider’s website for percentage of working cells (Benchmark \geq 99%)” with effective from 1st April 2025, for compliance of above-mentioned mandate.

2. Overview

- 2.1. Information on mobile network coverage is important from the perspective of QoS. One cannot expect good QoS in a non-coverage area.
- 2.2. The availability of a service wise geospatial coverage map on the service provider’s website will help consumers to make informed decisions.
- 2.3. These guidelines are issued to enable uniformity and transparency in publication of network coverage maps by telecom service providers (TSPs) providing access (wireless) service.

3. Guidelines to create coverage maps

- 3.1. The service provider shall display the network coverage maps based on actual measurement (physical or through network analytics) or using industry standard prediction methodology.
- 3.2. In case the network coverage maps are prepared using prediction tool(s), service provider shall make sample verification against the actual signal strength and apply suitable scaling or correction factor so that the coverage maps display network coverage close to actual user experience as far as possible.
- 3.3. The cell coverage of respective technology (2G/ 3G/ 4G/ 5G) shall be presented on the coverage map in prescribed colour scheme having minimum prescribed signal strength (measured in outdoor), as detailed below, at the cell edges considering 50% loading of the cell:





S. No.	Technology	Threshold level of signal strength at 50% cell loading
1	2G	RSSI \geq - 95 dBm
2	3G	RSCP \geq - 99 dBm
3	4G	RSRP \geq - 110 dBm
4	5G	RSRP \geq - 110 dBm

Note:

- (i) RSSI stands for Received Signal Strength Indicator
 - (ii) RSCP stands for Received Signal Code Power
 - (iii) RSRP stands for Reference Signals Received Power
- 3.4. Any area having signal strength below the above-mentioned threshold level at 50% cell loading may be considered as no coverage area for the respective technology.
- 3.5. The guidelines provide technology wise minimum signal strength to be used for showing outer boundaries of network coverage. However, the service providers may use better signal strength reference (than the minimum prescribed one against respective technology) for display of network coverage to factor effect of radio propagation, terrain and environmental conditions, if any.

4. Guidelines for display of coverage map on service provider website

- 4.1. Coverage map of each technology will be displayed in different colour as mentioned below:

S. No	Technology	Colour and Code	Sample colour
1	2G	Violet (#5b5bb0)	
2	3G	Green (#0c7e0c)	
3	4G	Purple (#800080)	
4	5G	Yellow (#dddd41)	

- 4.2. To enable better colour contrast, it may be ensured that background map or base layer used to display coverage map does not include above colours.
- 4.3. By default, unified coverage map, covering all available technologies in the areas, will be displayed.
- 4.4. Opacity of coverage map is to be kept at 80% at default level. However, to provide visibility of background map layer details like landmarks, road, streets etc. to the consumers, opacity may vary gradually up to minimum level of 30% with increase in zoom level.
- 4.5. To display the coverage in areas served with multiple technologies, the preference will be given to higher generation technology in unified coverage map. For example, if in any area, coverage (better than prescribed threshold limit) of all technologies i.e. 2G, 3G, 4G and 5G is available, then in unified coverage map, the area will be shown as covered with 5G.
- 4.6. While displaying the coverage map, the display of cell or base station location is optional.

5. Periodic updating of coverage map

- 5.1. To provide up to date status of mobile coverage to the consumers, coverage maps should be updated by the service providers at the earliest upon the cell being either commissioned or decommissioned or coverage is changed significantly due to any other reason in the Licensed or Authorized Service Area (LSA) network.
- 5.2. All the changes in network coverage, due to any action in month 'x', shall be reflected in coverage map as early as feasible but not later than 'x+3' months. For example, the change in network coverage for any technology resulting due to any activity, including cell commissioning, decommissioning, network optimization etc., in the month of March of the year should be reflected in the coverage maps as early as feasible and not later than by the end of month of June of the concerned year. Accordingly, network coverage at the end of

March is to be reported in the compliance report for the month of June, for which report is to be submitted latest by 15th July.

- 5.3. The service provider is free to update the map either on monthly basis or at some other frequency subject to meeting the above-mentioned requirement.
- 5.4. The log of changes made in coverage map for respective assessed month shall be maintained for the purpose of audit.
- 5.5. Service provider should publish the date of the last update on respective coverage map.

6. Placement of the map on service provider website

- 6.1. To ensure adequate visibility and ease of access for users, the link for coverage map (with suitable logo) should be provided on 'Home' or landing page of the service providers' website at a prominent location for single click navigation.
- 6.2. In addition, a tab namely 'Coverage map', should be provided prominently in the navigation bar of the website.
- 6.3. On selecting the 'Coverage Map', user should be navigated to the concerned page.

7. Minimum features to be provided for exploring the coverage map

- 7.1. The following minimal features should be made available to the users for exploring coverage maps. However, the service providers are free to provide more information and user-friendly features for enhancing the user experience:
 - (i) **Map base layer:** Map base layer shall have the name of street, road, highway etc. including village district and State/UT name with boundaries.
 - (ii) **Technology Toggle:** Users can select specific technologies (2G, 3G, 4G, 5G) to view coverage for the respective technology only. In addition, option is also to be provided to view the unified coverage map of all the technologies. However, by default, unified coverage map, covering all available technologies in the areas, will be displayed.
 - (iii) **Search:** User should be able to search the location by LSA/ State/ UT/ District/ City/ Village name or by entering latitude and longitude. When user enter any input, the map should be broadly centred on the searched location.
 - (iv) **Legend:** Suitable legends should be displayed to indicate the meaning of different colours or information displayed on the map or page including threshold signal strength and technology etc.
 - (v) **Navigation features:**
 - (a) **Zoom and Pan:** User should be able to explore the coverage map by zooming in, zooming out, and panning (allows users to move around to different areas of interest).
 - (b) **Home Tab:** Clicking 'Home' tab directs the map to the default position and zoom value.
 - (c) **Map orientation:** The current orientation of the map (red arrow points north) should be displayed for direction reference.
 - (d) **Full screen:** User should be able to switch to full screen mode.
 - (e) **My Location:** On clicking 'My Location', the coverage map will be centred at user location in accordance with the location of the device, if enabled or derived by the network.
 - (vi) **User Feedback Mechanism:** User should be able to provide feedback or challenge network coverage indicated on map or report issue observed in coverage through a feedback button on the map. To capture specific details, the user may be asked to

provide or auto-capture the minimum required details like location, phone number and option to upload screenshot of test undertaken with signal strength observed. The user feedback should be taken into consideration during optimisation of the network and coverage maps may be revised in next cycle if required. Further, the user responses may also be shared with TRAI through APIs.

8. Provision for sharing map data with TRAI

8.1. Each service provider shall make required secure Application Programmable Interfaces (APIs) or industry standards mechanism of GIS data exchange available to TRAI to be used by the central platform of TRAI for the presentation of a unified geospatial service coverage map at the pan-India level, as and when required.

9. Help

9.1. Help Section, elaborating the methodology used to prepare the coverage map, how to use the coverage map, explanation to the terminology used, limitation etc, is to be provided. The help section may also include some FAQs (frequently asked questions) with their reply.

10. Optional Features

10.1. Service provider can extend the availability of coverage map on their mobile apps, both for Android or iOS devices.

10.2. User may be able to download the coverage map of the interested area in downloadable format like pdf, jpeg etc. Similarly, there should be an option to print the coverage map.

10.3. Any other user-friendly features based on references provided in **Appendix**.

Appendix- Indicative references

Globally, many countries have introduced geospatial mobile and fixed line service coverage maps for the benefit of consumers. Some of such examples is given below.

- (i) <https://www.fcc.gov/BroadbandData/MobileMaps/mobile-map>
- (ii) <https://broadbandmap.fcc.gov/home>
- (iii) <https://www.telstra.com.au/coverage-networks/our-coverage>
- (iv) <https://www.vodafone.com.au/network/coverage-checker>
- (v) https://www.bell.ca/Mobility/Our_network_coverage
- (vi) <https://www.telus.com/en/mobility/network/coverage-map>
- (vii) <https://www.verizon.com/coverage-map/>
- (viii) <https://www.att.com/maps/wireless-coverage.html>
- (ix) <https://www.t-mobile.com/coverage/coverage-map>