

Date: March 26, 2023

Dr. P. D. Vaghela,
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New Delhi - 110002.

Sub: Response to TRAI's Consultation Paper on "Regulating Converged Digital Technologies and Services – Enabling Convergence of Carriage of Broadcasting and Telecommunication services"

Dear Dr Vaghela,

This is with reference to the TRAI consultation paper on Regulating Converged Digital Technologies and Services – Enabling Convergence of Carriage of Broadcasting and Telecommunication services, released on Jan 30, 2023.

The road to convergence in broadcast and broadband can very well become a pivotal opportunity for India to open new opportunities. There are quite a lot of underlying (underused or unused) infrastructure that can be leveraged (e.g., BharatNet and Doordarshan infrastructure), along with an opportunity to leverage existing telecom services provider (TSP) infrastructure and broadcast infrastructure from Prasar Bharathi in offering converged services.

While the spectrum in the UHF range is already identified as a converged band in India for 5G and Broadcasting¹, the spectrum allocated for broadcast in India is in the 470-582 MHz range (14 channels of 8 MHz) however is well below the broadcast spectrum employed in the rest of the world (470-694/698 MHz). Even when the underlying technologies to offer converged services (e.g., DVB-T/T2, ATSC 3.0, 5G Broadcast, etc.) are very mature, the ecosystem for devices is yet to be developed. The lack of a device ecosystem had resulted in Prasar Bharati fail in its previous effort of offering DVB-T2 services. India is amongst the largest market in the world consuming open market devices. The ability to develop the devices ecosystem and then broadcasting to the tens of millions of mobile devices from the open market will eventually define the success of this convergence.

It is also very important for TRAI to ensure that the ability of Doordarshan to offer citizen-centric free-to-air services are not hampered, while simultaneously ensuring private investment is allowed to enter this field for the development of the ecosystem over time. Qualcomm also notes that the convergence does not stop with broadcast and broadband alone. Broadcast services offered using the 3GPP 5G Broadcast technology are also capable of supporting Emergency Alert (EA) Services, which are handled by the different PPDR agencies in India. Since the value of EA Services cannot be quantified, we need specialized approaches in the assignment to agencies along with broadcast spectrum to roll out a potential national wide 5G Broadcast based Emergency Alert (5GB-EA) service

¹ Refer to Annex 1.1 (DoT Reference Letter dated 13th September 2021 regarding the availability of spectrum for 5G/IMT) of TRAI consultation paper number 8/2021 dated 30 Nov 2021 on Auction of Spectrum in Frequency Bands identified for IMT/5G.

for India. TRAI needs to consider such use cases during this consultation and further come up with QoS parameters for such converged services, to maximize consumer experience.

In this submission, our endeavor has been one of a technology provider, offering an approach for the expansion of the ecosystem in India along with global best practices, to expedite such transformation. The responses have been drafted keeping in view the status of the technology, indicative trends of its evolution, the ecosystem availability and of viable business models that are applicable for this convergence.

To ensure that the benefit from this convergence reach the citizens and to maximize on the revenue to the exchequer, we recommend that,

- DoT manages and administers licenses and access regulations, along with the handling of associated test and certification, network deployment guidelines, etc.
- MIB manages regulations on content, and
- TRAI manages the associated QoS/QoE and setup the associated licensing norms.

To help ensure that this convergence is seamlessly enabled, TRAI should further ensure that an enabling framework in the lines of Ease of Doing Business (EoDB) be put in place. We further recommend that TRAI as the common regulator review the challenges holistically and frame the business rules in consultation of the respective ministries (DoT and MIB) and their associated engineering bodies (TEC and BECIL) - through the respective ministries.

To ensure that the ecosystem of networks and devices gets developed, private players need to be allowed to enter into this opportunity and permission be given to run services through the offering of incentives. On the lines of the FM licensing model, a framework can be developed to auction the broadcast channels (or at least a majority of the 14 channels available) and left for private innovation to drive the utility value of the underlying spectrum, along with the possibility of leveraging infrastructure from Prasar Bharati in running the service. Doordarshan can continue to offer free-to-air services on the remaining channels and benefit from the device ecosystem to be created by the private players. The administration can reap the gains using an appropriate revenue sharing arrangement with the operator of the broadcast service.

To further ensure that TSPs are allowed to offer converged services by leveraging their existing investments, it must be explicitly clarified that the (UASL) license condition covers for that. The TSPs should also be permitted to partner with non-telecom players (e.g., content providers) to share their telecom infrastructure in offering converged services.

The field of broadcast broadband convergence has also seen a wealth of innovation in the past, and specialized standards development bodies like the 3GPP have developed converged standards (aka, 5G Broadcast) that are general purpose like in addressing the needs of such convergence. The value of leveraging such a general-purpose technology to offer specialized citizen-centric and state-centric services remains unbounded (e.g., EA, NTN). The corresponding standards from 3GPP have also been adopted by the TEC into National Standards and continue to evolve. Since the ecosystem of standards development, research and development and skilling are very mature, it will be prudent for TRAI to create technology-neutral guidelines/regulations and leave it to the market forces to further develop this opportunity.



We shall be more than happy to provide further inputs on these or any other aspects of use for broadcast-broadband convergence.

Sincerely,

Parag Kar

Vice President, GA, Qualcomm India & South Asia.

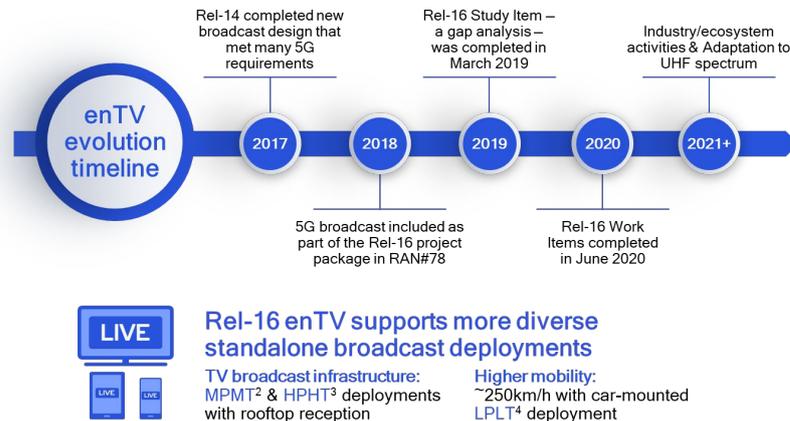
Annexure: Brief on the 5G Broadcast Technology

5G Broadcast

The 5G technology promises new business opportunities beyond conventional mobile communication. It brings new broadcast and multicast capabilities allowing for new applications. The [5G broadcast technology](#) brings new opportunities for the broader cellular and broadcast ecosystem. [Built on the 3GPP Rel-16 feature-set](#), the 5G Broadcast solution operates within the UHF spectrum on a Receive-Only Mode (ROM), Free-To-Air (FTA) and without the need for a SIM card (SIM-free reception).

Technology & standards readiness

The [5G standalone broadcast](#) is a dedicated broadcast-only network (i.e., independent of cellular networks) that can address the emerging needs of broadcasters and content providers, giving them access to broader audiences via efficient content delivery to both fixed and mobile devices. Release 16 5G Broadcast (then called enhanced TV) builds on the new end-to-end system and radio access design in Release 14, and meets all the major 5G broadcast requirements defined in [TR 38.913](#). It can be deployed in existing UHF spectrum (i.e., 470 to 698 MHz) that broadcasters already own or have access to, and its design allows the reuse of existing cellular modem building blocks, thereby allowing for entry into mobile handsets.



For more information on the 5G Broadcast standards refer to the following references:

- [ETSI TS 103 720](#): 5G Broadcast System for linear TV and radio services; LTE-based 5G terrestrial broadcast systems – a profile of 3GPP specification containing the necessary parts to deploy 5G broadcast developed by EBU
- [3GPP TR 36.976](#): Overall description of LTE-based 5G broadcast (Release 16) – the overall description of enhanced TV (enTV) for 5G broadcast
- Various 3GPP specifications of 5G PHY supporting broadcast together with unicast in TS [36.211](#), [36.212](#), [36.213](#). The Telecom Engineering Center (TEC) has [adopted them into Indian standards](#)
- [TSDSI TR 6015](#): Service Delivery using 5G Broadcast for TV, Radio, IPTV and File-casting.

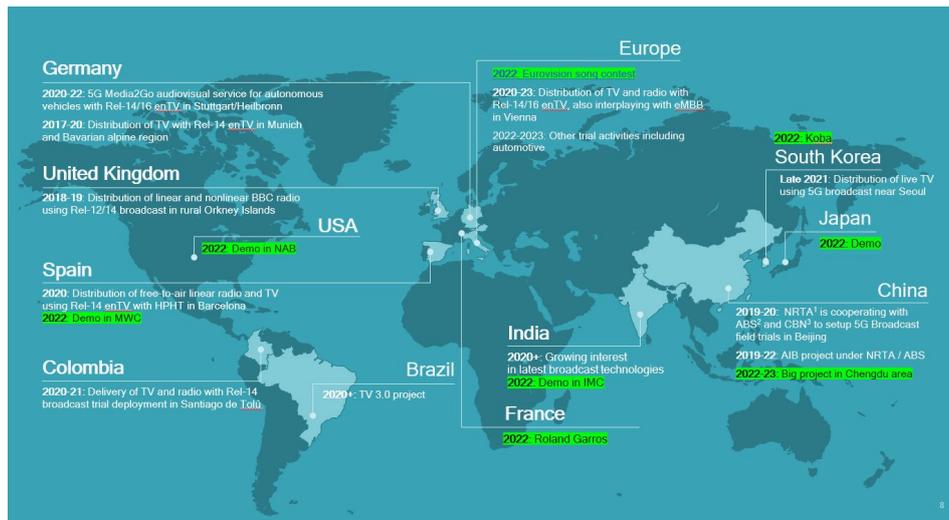
Technology Demonstrations

There are several technology demonstrations happening now within Asia, Europe and America in which Qualcomm has partnered with Rohde & Schwarz (R&S) for the [network trials, showcasing Broadcast / Multicast capabilities over 5G](#). The live 5G Broadcast streaming demonstration is formed by R&S's end-to-end 3GPP compliant solution, comprising a 5G Broadcast RAN enabled with R&S TLU9 transmitter and the Broadcast/Multicast Core Network powered by the Broadcast Service and Control Center (BSCC2.0). These demonstrations also leverage the ecosystem players involved in a particular demo. For example, a live signal was transmitted over-the-air from the Rohde & Schwarz booth, using Kathrein antenna systems to a smartphone form-factor test device powered using Qualcomm Technologies.



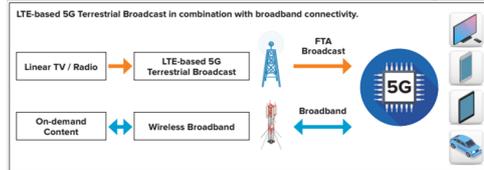
Over the span of two years, there had been several [5G Broadcast trials done across the world](#) that are rapidly setting the stage for virtually seamless rich media content delivery to 5G devices. A select list of trials that QC participated in is as below:

- Claro, Rohde & Schwarz, Qualcomm show [live 5G Broadcast streaming to smartphones at Rio Open 2023](#)
- ORS presents [TV transmission innovation at Mobile World Congress 2023](#)
- Rohde & Schwarz targets a [sustainable and connected future with 5G Broadcast at MWC23](#)
- MWC 2023: Rohde & Schwarz, China's Academy of Broadcasting Science and Qualcomm to [Showcase 5G Broadcast Applications at MWC Barcelona](#)
- Rohde & Schwarz and Qualcomm spearhead [live 5G Broadcast streaming to smartphones at BES Expo 2023](#)
- IMC 2022: Qualcomm, Rohde & Schwarz Unveiled [India's First Live End-to-End Operational 5G Broadcast System at IMC22](#)
- MWC 2022: First end-to-end [live 5G Broadcast streaming to smartphones at MWC Barcelona 2022](#) with Qualcomm and Rohde & Schwarz
- 5G-TOURS partners have in Nov 2021 completed a [trial for large scale 5G Broadcast solution](#) to deliver video content to massive audiences using a High-Power High-Tower (HPHT) infrastructure. This Trial is compliant to 3GPP Release 16 related to EnTV Broadcast
- IBC 2022: [Live 5G Broadcast streaming to smartphones](#) demonstrates the potential of 5G Broadcast/Multicast to redefine content delivery and create new revenue streams
- NAB Show 2022: Rohde & Schwarz and Qualcomm [demonstrated full end-to-end live 5G broadcast/multicast](#) streaming
- Eurovision song contest 5G Broadcast trials: the first European multi-site 5G Broadcast showcase [delivering the Eurovision Song Contest \(ESC\) live](#) to 5G Broadcast enabled personal phones
- France Télévisions and Orange, along with a group of select companies including OPPO mobiles, Ateame, Enensys, IETR, Qualcomm Technologies Inc., Rohde & Schwarz, towerCast, Viaccess-Orca [tested new broadcast distribution modes, both in Broadcast and Multicast mode](#) at the 2022 Roland-Garros tournament.



The support for 5G broadcast across the broader mobile and broadcast ecosystem has grown significantly over time. There is currently interest from broadcasters and regulators across the world in developing the framework for broadcast modernization (e.g., the [TV3.0 project](#) in Brazil) that are evaluating the 5G Broadcast performance.

5G data and 5G Broadcast Convergence



Re-use 4G/5G building blocks

- Coding
- Tone Mapping
- Searcher
- Etc.

Service Layer Integration

Allows Broadcaster apps, DVB-I¹, CMAF², DASH/HLS³, as well as unicast to be deployed with/on top of 5G broadcast



1 Digital Video Broadcasting;
2 Common Media Application Format
3 Dynamic Adaptive Streaming over HTTP and HTTP Live Streaming;

Standards Based Ecosystem



5G Broadcast reuses the 4G/5G building blocks, the technology currently commoditized. Such commonality and a standards-based implementation are key to facilitate the mass market adoption of technology into industry verticals. This ensures wider stakeholder participation and the creation of an ecosystem that are critical for bringing down the cost to consumers at a global level. The 3GPP 5G Broadcast technology is already in that path. The technology is designed to reuse 3GPP silicon to optimize on cost and performance. The integration with the 3GPP stack also allows for advanced features such as emergency notifications², interactive broadcast, etc. The 3GPP standards continue to evolve and will add more features as the requirements and use cases arise.

² Sending an **emergency message directly to handsets** when the cellular network is damaged due to disaster.