

Shri S K Gupta
Pr Advisor (B&CS)
Telecom Regulatory Authority of India
Mahanagar Doorsanchar Bhawan
Jawahar Lal Nehru Marg
New Delhi 11002

Email: pradvbcs@traf.gov.in and vk.agarwal@traf.gov.in

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Dear Shri Gupta

WorldDAB response to Consultation Paper on Issues related to Digital Radio Broadcasting in India, Consultation Paper No.7 /2017

Please find attached the response to issues identified in the TRAI consultation paper No.7 /2017 issued on the 10th of July 2017 (www.traf.gov.in).

WorldDAB herewith provides detailed responses to the questions raised in this consultation, and is pleased to offer further engagement to TRAI and the Indian broadcast radio community by offering a comprehensive workshop to the TRAI and the Indian broadcasting industry which can be tailored to the industry's requirements.

WorldDAB offers also to coordinate a technical demonstration of DAB+ in conjunction with TRAI, and the relevant authorities, to provide a comprehensive experience of the DAB+ system. The demonstration can be for an agreed time period and form part of pre-trial activities.

We will be happy to discuss this proposal with your appropriate representatives, and we request that TRAI formally responds to our offer to ensure that we may proceed in a positive manner.

WorldDAB thanks TRAI for the opportunity to respond to this important consultation and we remain available for further discussions.

Yours sincerely



Patrick Hannon
President
WorldDAB

5.1 Is there a need to encourage or facilitate introduction of digital radio transmission at present? If so, what measures do you suggest and in which market?

Radio, like other media, is living and competing in a digital world. To secure a prosperous long term future for the medium and to meet the needs of consumers, India should consider its digital options.

FM is a relatively recent introduction to the Indian media landscape – predominantly in urban areas. It has already achieved significant success in terms of audiences, devices and advertising revenues. FM as an analogue platform faces limitations which need to be recognised and addressed. In particular, spectrum constraints limit the number of FM services which can be made available, limiting the types of programs which can be delivered in terms of music genres, languages, news and current affairs.

DAB+ offers Free To Air (FTA) content via robust transmission technology that is purpose designed to provide high quality programs in medium to high density population areas. The provision of FTA digital radio also provides an alternative to global technology companies who dominate the Internet and provide audio streaming services, but not local radio. Through the provision of high capacity digital radio in the form of DAB+, Indian broadcasters have the best opportunity to provide state of the art services and features to ensure the best opportunities for the economic success of radio as well as a range of content appropriate to the listening audience.

In order to move DAB+ digital radio forward, broadcasters, regulators and the public must all benefit, hence the following measures should be considered:

- Development of coverage plans
 - WorldDAB suggests that TRAI undertake some initial coverage planning to obtain a clear understanding of spectrum efficiency and capacity, this may be limited to some specific scenarios such as a selection of major cities in the first instance;
 - Some initial planning will provide broadcasters and listeners with examples of the number of services which could be available and areas covered;
 - For example the initial planning could focus on the larger population areas (e.g the 8 most populous cities which have populations greater than 4M people) and then be used as a starting point for regional and country wide plans.
- Technical trials
 - To demonstrate capabilities to broadcasters and the TRAI;
 - Trials have been shown to provide an important stepping stone towards deployment in many countries. These may start as technical trials and then migrate into a larger commercial trial as part of a deployment strategy.

- Development of a regulatory framework which incentivises commercial broadcasters to actively support DAB+, e.g.
 - To provide a clear and positive basis for broadcasters and network providers to engage in the planning and deployment process;
 - Incentives can include the following dependent on TRAI requirements
 - Free spectrum for FM broadcasters who support DAB+ deployment
 - E.g. in Australia each existing FM broadcaster was provided 128kbps¹ of DAB+ capacity free for the initial deployment in the 5 main capital cities. Subsequent capacity was then auctioned between the existing DAB+ service providers.
 - automatic renewal of FM licences for broadcasters who simulcast services on both platforms;
 - relaxation of ownership rules;
 - relaxation of format / advertising rules.

¹ At EEP-3A, this allows 2x 64kbps services to be provided, one simulcast of the current analogue service and the other a new digital only service

5.2 Is there a need to frame a roadmap for migration to digital radio broadcasting for private FM broadcasters? If yes, which approach, mentioned in para 4.7, should be adopted? Please give your suggestions with justification.

In most countries, e.g. Norway, Denmark, UK, Australia, The Netherlands, Switzerland and Germany both the public broadcaster(s) and the commercial broadcasters undertake the conversion to digital radio together. This provides the maximum number of services to the listeners and encourages the most rapid take-up of the medium.

The three generalised approaches all have their own advantages and the choice is quite dependent on how and why the government wishes to move forward. The three approaches all require the same basic activities of coverage planning, stakeholder engagement, receiver provisioning but have slightly different business based approaches.

- Market-based approach
 - This approach is essentially an industry led approach where the maximum freedom is given to the broadcasters and network/tower providers to plan and deploy the DR system themselves with limited guidance and control from the regulator. No countries to date have taken this approach in its entirety, with a more representative situation being broadcaster led with regulator support. The deployment in the UK is an example of such a mixed market led approach. While this approach looks attractive and can result in additional incentives to help rollout the networks quicker, there can be issues where the regulator could provide guidance to ensure the best outcome. For example the use of current standards updates, in the UK case the introduction of DAB+ audio coding, would have arguably improved the UK broadcasting environment. The UK is only now overcoming significant DAB service congestion and the resulting lower audio quality through the gradual introduction of additional ensembles and DAB+ audio. If the regulator had at the time (2007) mandated the inclusion of DAB+ audio in all radio products the transition would have been quicker and the radio industry would have been able to deliver higher quality audio sooner encouraging quicker take up.
 - So while this approach can promise quicker take up due to additional freedoms for the broadcaster sometimes the regulator may need to provide guidance to ensure on-going success. In the case of the UK this included introducing guaranteed renewal of FM licences for DAB participants as well as some funding to support infrastructure rollout.

- Managed introduction
 - In a managed introduction the regulator provides a clear licencing and operating environment. For example in Australia the commercial broadcasters agreed to fund the rollout of DAB+ in the five major capital (metropolitan) cities (Sydney,

Melbourne, Brisbane, Adelaide, Perth) in return for a number of incentives including:

- Free access to the digital spectrum (1/9 of an ensemble per existing AM/FM station)
 - No new entrants to the digital market for 7 years – this was to allow the existing broadcasters to achieve a return on investment before new broadcasters could enter the market and take advantage of the audience that they had built
 - Limited capacity for wide area community broadcasters (2/9 of each commercial ensemble), again this was to provide protection to the commercial broadcasters
- The metropolitan deployments were followed by (long term) trial services in Canberra and Darwin;
 - The Australian radio industry is now working with the regulator, the Australian Communications and Media Authority (ACMA) and the government to plan regional Australia with new deployments starting in late 2017 and with approximately 15 regional areas expected to be covered by the end of 2019 increasing the national population coverage to around 80%;
 - This approach provides safeguards to the commercial industry but also does not promote additional competition through the availability of capacity to new entrants and the opportunity for licencing fees for the government. We note that, in general, licence fees for DAB+ are low to encourage broadcasters to undertake the development of the audience and a positive business case as unlike Digital Terrestrial Television the DSO period is generally quite long, typically 20 years or more from introduction instead of 5 years. This is primarily due to the slow conversion of cars to digital radio.
- Full conversion
 - This approach is based on a government/regulator mandate to move to a full DSO but also requires a prerequisite level of digital radio use and hence also deployed coverage of population and area as well as receiver penetration. As such it generally depends on the first two approaches to reach the critical “tipping point” when a DSO decision can be made;
 - Norway put in place clear decision criteria for the DSO which required greater than 50% of radio listening to be via digital means. Once this target was reached a date for DSO was established, with the DSO process starting in January 2017 and being complete by the end of 2017. The process so far has gone well with 70% of the Norwegian population being switched over by September 2017. The process showed that many people wait till the last minute to make the radio purchases needed and has also accelerated the development and supply of DAB+ car adapters;
 - The DSO in Norway was particularly motivated by the fact that the majority of existing FM transmitters were at end-of-life. The decision was made to move to

DAB+ which cost less than the replacement of FM transmitters, provides more than double the number of services and has around 1/10 of the operating cost.

While we note that every country is different it is clear that DAB+ provides many benefits to the greater radio industry, broadcasters, listeners and regulators. The path to full conversion will be different for each country, however the success of the Norwegian DSO to date indicates that the declaration of a DSO process is a valuable tool to show the industry (including auto manufacturers) and listeners alike that the conversion to digital is happening and encourages more rapid take up so that all can experience the benefits. Having a DSO process also helps formulate strategic roadmap for each country e.g. the UK Digital Radio Action Plan².

² <https://www.gov.uk/government/publications/digital-radio-action-plan>

5.3 Should the date for digital switch over for radio broadcasting in India need to be declared? If yes, please suggest the date with suitable justification. If no, please give reason to support your view.

Generally, markets have not set a fixed date for DSO at the beginning of the launch of DAB+ although having a long term vision and a basic DSO process is helpful in demonstrating that the end goal is full digital radio.

Norway is a good example with the decision to move to full DAB+ digital radio taken in 2007, 10 years after initial launch, with the conditions for FM switch off being set in the 2011 white paper, Report to the Storting No.8, (2010-2011)³. Note that Norway has also converted from DAB MP2 audio to DAB+ MP4 audio in this period.

The three conditions that were applied were:

- *Digital coverage for the NRK's radio services must correspond to that of NRK P1 on FM.*
- *The multiplex that carries commercial national services (Riksblokka) must cover at least 90 per cent of the population.*
- *The digital radio offer must represent added value to the listeners.*

The above three conditions, as well as the two following conditions, had to be fulfilled by 1 January 2015 for the switch-off to take place in 2017:

- *Affordable and technically satisfactory solutions for in-car radio reception must be available.*
- *At least 50 per cent of daily radio listeners must employ digital platforms, exclusively or in combination with FM radio.*

In 2015 the Government decided that the conditions set in the White Paper were fulfilled and the switch-off date was set to 2017.

A key point in the digitization of radio has been that the process should be industry driven. This includes the choice of broadcast technology. The role of the authorities in the migration process has been merely of a facilitative nature. The main tasks of the Norwegian Media Authority (NMA) have been to:

- *Issue necessary licenses.*
- *Provide the Ministry of Culture with annual reports regarding the fulfilment of the switch-off conditions.*
- *Survey on the digital radio listening and knowledge of the digitization process in cooperation with the broadcasters.*
- *Manage an information campaign directed at the general public.*

³ <http://www.medietilsynet.no/en/about-medietilsynet/digital-radio/>

The major broadcasters in Norway have been responsible for developing the national DAB+ networks. The broadcasters have chosen to use DAB+ technology (Eureka 147) to replace the current FM technology.

This standard comprises DAB+ (Digital Audio Broadcasting), DAB+ and DMB (Digital Multimedia Broadcasting). In Norway, most radio channels in the DAB+ networks will be transmitted using DAB+.

The Swiss and UK approaches are very similar requiring set coverage and listening criteria to be achieved before a DSO date is set.

Critical items in this process are

- Strong support from the regulator/government even if they are not the primary driver of the process;
- Clear understanding by the commercial broadcasters of how the DSO will positively impact their business, this may include regulatory incentives;
- A clear plan and understanding of how listeners will migrate to new platforms, this is particularly important for vehicles and may be supported by legislation of DAB+ receivers in cars.

5.4 Is present licencing framework or regulatory framework is restrictive for migration to digital radio broadcasting? Please explain with justification.

Digital Radio, particularly multichannel digital radio where more than one service is carried on each channel, will necessarily require some regulatory adjustments. These may be within the scope of the regulator, e.g. the TRAI, or need government approvals through legislation. For example, regulations regarding analogue services (AM/FM) do not cover how multiple radio services should be licensed on a common carrier, similarly there will be no guidance on the number of services or the quality that should be provided (if any).

Similarly the technical planning guidelines and regulations will need to be updated as digital radio has many differences to analogue including the required classes of coverage field strength and interference protection ratios.

The most important aspect in the licencing framework is for the regulator to work with the broadcasters wherever possible. This may be difficult in some cases due to historical ways of working, e.g. in some countries broadcasters believe that the regulator should tell them what to do and how to do it, to the opposite where the broadcasters ask the regulator to provide the licencing framework in a particular way to ensure appropriate incentives to move forward, as was the case in Australia.

Ideally, there will be a level playing field and all parties will be open to some degree of compromise to get the framework established and working. As time goes by, there will often be a need to adjust the licencing and operating framework to make it more appropriate, e.g. the Australian framework was established in 2008 for metropolitan city rollout, when examining that framework in a regional context a number of requirements did not make sense and needed adjustment, a number of those are in the process of amendment through legislative changes at the time of writing.

5.5 Should single digital radio technology be adopted for entire country or choice of technology should be left to radio broadcasters? Support your reply with Justification.

While DAB+ is the world's most widely adopted digital broadcast system bringing significant benefits to users, broadcasters and manufacturers (including significant economies of scale) the system was designed for medium to high service demand, typically for areas where there will (eventually) be 9 or more services required. This model fits medium to high density populations and it has been shown that DAB+ clearly provides the most economical solution, e.g. see the GatesAir paper on the economic advantages of DAB+⁴.

However, WorldDAB understands that some areas have low population densities and consequent low service demands. Those locations should be serviced by appropriate technology which may be wide area terrestrial such as DRM30 or by satellite broadcasting.

This approach is supported by the European Broadcasting Union (EBU) recommendation R 138⁵ which recommends that:

- 1. The needs of all radio services in a country be considered when making plans for the digitisation of radio, including future service expansion, the available spectrum, and the cost effectiveness of different standards for different services;*
- 2. Immediate deployment be done using DAB+ transmission as defined in ETSI EN 300 401 with DAB+ services as defined in ETSI TS 102 563 for digital radio broadcasting in VHF Band III;*
- 3. When DAB+ coverage is not possible, to use DRM as defined in ETSI ES 201 980 for digital radio broadcasting in the frequency bands currently used for analogue radio broadcasting;*
- 4. Digitisation is accompanied by the deployment of enhanced features, such as text, images and programme guides to keep radio relevant in the digital age;*
- 5. Hybrid radio services are deployed with digital broadcasting systems (for example using RadioDNS);*
- 6. Harmonisation in the timetable for deployment of digital radio across Europe, including a target date for the switch-off of analogue radio, would create a greater momentum and market take-up.*

⁴ http://www.worlddab.org/public_document/file/556/economic-advantages-of-dab-jens-stockmann-gatesair.pdf?1429721538

⁵ <https://tech.ebu.ch/docs/r/r138.pdf>

Similar recommendations have been published by the Asia-Pacific Broadcasting Union (ABU) and the Indonesian Ministry for Communication and Information Technology.

Another critical consideration is the availability of receivers. It is difficult to convince broadcasters to adopt a new DR platform when there are few or no receivers available. Indeed, the development of new receivers while also establishing a new DR technology rollout will inevitably lead to high initial prices and slow the adoption of the new DR medium significantly. This applies to all types of receivers from home to cars to handheld. The Australian rollout of DAB+ in 2009 was very soon after the establishment of the DAB+ audio standard (2007) and only 20 DAB+ receiver models were available with the minimum price of 100USD. The Australian and international industries then led a strong campaign to expand the number of models and reduce the price. This led to rapid growth in the Australian DAB+ take-up with the then critical price barrier of \$100AUD (\$120USD in 2010) being broken in 2010. Today there are over 500 DAB+ digital radio models available worldwide with prices under 20USD. This has led to very rapid take-up of services in countries adopting DAB+ such as the Netherlands and Belgium as well as Italy and France⁶⁷. Regarding DAB+ in cars, Norway today has 98% of new cars sold with DAB+ line-fitted as standard, UK has 87% and Switzerland 66%. A wide range of DAB+ digital radio car adaptors are also available to convert cars already on the road.

⁶ <http://www.content-technology.com/radio/?p=486>

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https://www.worlddab.org/public_document/file/869/WorldDAB_Infographic_Q4_2016_FINAL_web.pdf?1490697947. The full GfK report is available to WorldDAB members.

5.6 In case a single digital radio broadcast technology is to be adopted for the entire country, which technology should be adopted for private FM radio broadcasting? Please give your suggestions with detailed justification.

As per item 5.5 above, WorldDAB does not propose that DAB+ should be adopted in isolation, rather that it should be used in circumstances where it is most appropriate, typically when the demand is for approximately 9 or more services.

For India that situation would apply to the majority of cities, indeed there are at least 46 cities included in 53 agglomerations in India with more than 1M people⁸. It is not uncommon for cities of 1M people to require 30-40 radio services to provide the full range of services (e.g. different music genres, news, talk back/current affairs, multiple languages). Larger cities generally have more services due to demand and competition, e.g. Sydney, Australia has 5M people and 63 digital radio services available (including the simulcast of 20 analogue stations)

In Australia, cities with more than 5,000 people are being planned to have 2 ensembles with a total of 20 to 30 public, commercial and community services.

The economic business case for DAB+ is further supported by the recent EBU technical review paper from Marcello Lombardo⁹ which compares DAB+, FM and broadband and comes to the clear conclusion that DAB+ provides the most economic digital radio solution. His paper further reinforces the need to ensure that radio remains Free To Air. Further it highlights the case for hybrid radio where DAB+ is used to provide the majority of audio content along with multimedia metadata and the internet is used to cover black spots where broadcast is not available and to provide interactive features.

⁸ https://en.wikipedia.org/wiki/List_of_cities_in_India_by_population

⁹ https://tech.ebu.ch/publications/tr_2017_radio

5.7 How issues of interference and allocation of appropriate spectrum allocation can be settled in case the option to choose technology is left to radio broadcasters?

In order to prevent interference, whether Co-Channel Interference (CCI) or Adjacent Channel Interference (ACI) the requirements for minimum coverage field strengths to be protected must be defined as well as the Protection Ratios (PRs) for the CCI and ACI cases. If multiple technologies are to be used in the same frequency band, whether analogue or digital, then those requirements must be defined for both self-interference, e.g. DAB+ to/from DAB+ as well as between the different technologies e.g. DAB+ to/from the other technology.

The requirements must be defined by the regulator, i.e. the TRAI, and should be similar to internationally used values as defined by the ITU noting that each country has its own slight variations.

In general, the regulator is responsible for resolving interference disputes and consequently does planning studies and public consultations for all new transmission services including broadcasting. In this way disputes are minimised and efficient spectrum use maximised.

So, in the case where a broadcaster chooses a different technology from one which is already established in an area, it is generally the regulator (often in conjunction with the broadcaster requesting the licence for the new service) to provide proof that the proposed new transmission will not interfere with existing services. We note that the area to be analysed may be up to 300 or more km in radius from the new service transmission site depending on the transmission powers of the new and existing services and their consequent coverage areas.

5.8 Should the permission for operating FM channel be delinked from technology used for radio broadcasting? If yes, please provide a detailed framework with justification.

Currently the Indian regulations require the use of FM technology in VHF Band II. This band has been planned for analogue FM transmissions. The use of DR technology in this band can be used simultaneously with FM as long as the appropriate planning is undertaken to ensure that interference does not occur between all service types.

Having a mixture of transmission technologies does complicate the planning of the frequency band and hence some regulations and guidelines should be established regarding the use of the different technologies.

It may be worth examining the availability of digital receivers for the FM band before deciding to allow DR technology to be used due to:

- The need to update technical planning guidelines with respect to permitted interference levels and protection ratios, this process will be further complicated if there are multiple DR standards permitted;
- The licencing regime which will be used and how the frequency re-use distance for the different technologies will influence the licence fees and planning practices;
- The potential disruption to the existing FM band plan;
- The likely economic benefit of promoting multiple DR technologies as the use of DRM+ in the FM band will compete with the more efficient DAB+ system in Band III. While multi-standard receivers may become available in the future it is also important not to confuse the listener when deploying digital radio solutions.

5.9 Should the existing operational FM radio channels be permitted to migrate to digital broadcasting within assigned radio frequency? If yes, should there be any additional charges as number of available channels in digital broadcasting will increase? Please provide a detailed framework for migration with justification.

The 'retro-fitting' of DR simulcasting has challenges with respect to existing channel planning. This is due to the additional signals that will be broadcast along with the existing analogue service. These signals can in some cases increase interference to other existing services and hence need to be very carefully managed. Alternatively an existing FM station may simply switch to a new technology, however such a change without a simulcast period would not generally be viable for commercial services due to the loss of listeners during the transition period. With respect to licencing charges, if the simulcast analogue/digital or digital-only service only occupies the same spectrum and does not impact other services in anyway then it would be reasonable for the same licence fee to be applied. Indeed if the change is directly from analogue to digital with no simulcast period within the existing allocated spectrum then there may be a case for licence fee reduction while the broadcaster builds a new listener base. For DAB+ it is normal for existing FM services to be simulcast on the DAB+ band for a period of time to allow the listeners to gradually migrate to the digital service. It is not uncommon for that simulcast period to be 10 or more years, e.g. the UK has had a number of BBC services in simulcast for 20 years and will likely continue with that arrangement until a DSO occurs. Consequently it is important to avoid licencing fees for new DR services as these are in addition to the costs of deployment and operation, e.g. transmission, distribution, new content and marketing. Minimising the cost of establishing DR will provide an incentive while additional costs such as licencing will act as a disincentive.

5.10 Should the future auction of remaining FM channels of Phase-III be done delinking it from technology adopted for radio broadcasting? Please give your suggestions with detailed justification.

The delinking of technology from the FM band may be undertaken with the technical steps indicated in the answer to question 5.8. When the VHF Band II spectrum is then auctioned there are a number of DR standards that could then be used, e.g. DRM+, HD-FM. The auction price would then be for the channel bandwidth that is normally available for FM. FM is typically planned on the basis of 800kHz channel spacing in an area or in some cases less, even as low as 300 or 400kHz although this can result in interference if not carefully planned. The use of simulcast technologies in HD or DRM will complicate the auction process due to the lack of differentiation between simulcast FM/DR or DR only services. In either case the presumption is that the bidding is for a 200kHz block within an established frequency raster for the region that the auction being conducted.

If the decision to delink the technology from the spectrum is taken TRAI must provide very clear technical operating and planning requirements well before the auction to ensure that the broadcasters are fully aware of the implications.

5.11 In case future auction of remaining FM channels of Phase-III is done delinking it from technology, should the present auction process be continued? If no, what should be the alternate auction process? Please give your suggestions with detailed justification.

While the auction process itself may not need to be changed, the rules and requirements associated with the establishment of non-FM services would need to be updated. This may require legislative and internal TRAI process changes, as discussed in items 5.8 – 5.10, and will likely take some time, possibly delaying the FM auction. Such delays may not be in the best interest of the broadcasting industry or the listening public.

5.12 What modifications need to be done in FM radio policy to use allocated FM radio channels in technology neutral manner for Radio broadcasting?

WorldDAB submit that rather than complicate the final deployment of FM radio, which is limited in scope in the major population areas as shown in Annexure IV for Category A+ and A transmissions, that the TRAI could instead consider the use of DAB+ in VHF Band III.

Investigations conducted by WorldDAB indicate that the rollout of DVB-T2 for Digital Terrestrial Television (DTT) is in progress¹⁰ in the UHF band (channels 21-48 (470-694MHz)) and is likely to be complete around the end of 2017. The subsequent Analogue Switch Off (ASO) of the legacy ATV transmissions will then be conducted (if it has not already started) with an initial target of 2020¹¹, clearing VHF Band III.

This will provide the TRAI and the Indian broadcasting sector a significant opportunity to use the World's leading digital radio system, DAB+, to provide a path to increase available radio services as well as all the consequent advantages of digital audio quality, and multimedia metadata and of course much higher spectral efficiency.

Hence, WorldDAB suggest that any policy changes the TRAI make should not only address VHF Band II but should also include VHF Band III.

¹⁰ <http://www.ddindia.gov.in/Technical/Pages/Digital-Terrestrial-Television.aspx>

¹¹ http://www.trai.gov.in/sites/default/files/Consultation_Paper_24_june_2016.pdf

5.13 What measures should be taken to reduce the prices of digital radio receivers and develop ecosystem for migration to digital radio broadcasting?

DR receiver prices are driven by volume demand, the more sales the lower the prices. The latest DAB+ receiver figures gathered by WorldDAB from various sources show that over 55m DAB+ receivers have been sold with prices as low as \$16USD¹². Prices will continue to reduce to the level of FM receivers as the consumer volume demand increases. As India has a very large population of over 1.3B people, adoption of DAB+ in India will have a significant impact on demand, and hence help drive prices down.

The demand for receivers after commencement of DAB+ transmissions is also likely to be great enough to justify an economically viable local receiver manufacturing sector.

DAB+ receivers are available in all forms including home and portable receivers (over 500 models), car receivers (over 40 brands and 100s of models) and mobile phone handsets are now beginning to include DAB+ (LG stylus 2 DAB+).



Figure 1: Example car brands which include DAB+ radio

There are numerous products that can provide DAB+ reception in existing cars, and this number and range of products is increasing, driven by the imminent FM switch off completion in Norway, as well as decisions to switch FM off in Switzerland and northern Italy and an expected DSO plan in the UK in 2018.

¹² See www.worlddab.org for further details



Figure 2: Examples of the wide range of vehicle after-market products currently available

A number of countries are also implementing or looking at legislation to ensure that all receivers should have both FM and DAB+ capability; such an approach will very quickly deliver economies of scale and lower prices.

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 - Germany: government has proposed regulation that receivers should have FM and digital capability

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 - France: already has a digital receiver law*

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 - Italy: regulator AGCOM has called for government support

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 - Netherlands: Ministry of Economic Affairs has asked EU for regulation to require receivers to have FM and digital

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 - techUK – members supportive of regulation in favour of digital receivers

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Figure 3: Current legislative activity to ensure DAB+ radio inclusion

¹³ * www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000000248397#LEGIARTI000024041152

5.14 Stakeholders may also provide their comments on any other issue relevant to the present consultation.

WorldDAB are happy to offer a comprehensive workshop to the TRAI and the Indian broadcasting industry. World DAB has successfully conducted such workshops in many countries in Europe as well as Turkey, Singapore, Malaysia, Thailand, Vietnam, Indonesia, Jordan, Tunisia, and South Africa.

The workshop can be tailored to the industry's requirements and can include topics such as:

- The status of DAB+ worldwide
- DAB+ features and functionality
- Receivers
- Regulation and policy development
- The economic advantages of DAB+
- The technical structure of the DAB+ system
 - Multiplexing and headend system
 - Transmission
 - Monitoring and control
- Hybrid DAB+ digital radio features and functionality
- RF coverage and interference planning
- Network design and planning
- Systems deployment, operations and maintenance
- Marketing digital radio (retail, consumer)

WorldDAB also offers to coordinate a technical demonstration of DAB+ in conjunction with a local Indian broadcaster / tower operator to provide a comprehensive experience of the DAB+ system. The demonstration can be for an agreed time period and form part of pre-trial activities. The demonstration can address:

- Typical coverage for a range of reception environments;
- Audio quality and multimedia metadata delivery;
- Different propagation environments and DAB+ transmission performance
- Coverage planning and propagation model tuning using field trial measurements;
- Feature operation in a range of receiver types