



STAR WAVES
YOUR DIGITAL WORLD

To: TRAI

From: STARWAVES GmbH

In response to Consultation Paper No 14/2024 dated 30th September 2024 on
'formulating a Digital Radio Broadcast Policy for private Radio broadcasters'.

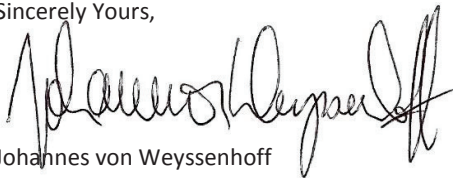
11.11.2024

Dear Madam, Dear Sir,

STARWAVES would like to thank TRAI for the opportunity to participate in this democratic process of public discussion of the digital radio standard that India is going to choose. This is a very momentous process – as this matter does not only concern the broadcasting or automotive industry. Digital Radio can play a vital role in bridging the digital divide, it can create jobs, empower communities, it can propel skills development and economic growths of local industries.

We trust that TRAI will consider the different voices and understand who is responding in the interest of India or in their own interest. In some of the previous responses we also spotted some misinformation which we would like to draw your attention to. We are looking forward to your informed decision. If you have any further questions we are at your service at any time.

Sincerely Yours,



Johannes von Weysenhoff



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PART 2 – COUNTER ARGUMENTS

1. To responses on Question 1, we have noted that in this point almost all submission are unisonous. Obviously any multi-standard receiver will be more costly than a single standard receiver, specifically if the two standards originate from two different technology worlds. So this is where the DRM and HD parties agree.

Following this conclusion, this would lead to only 2 possible options:

- a) Supplement the existing DRM-AM system with DRM in the FM-Band;
- b) Demolish the AM transmitter network and rely only on HD-Radio in the FM Band (losing all AM listeners and large digital coverage consequently).

We can see that if option b) was considered, there must be very strong and fundamental reasons against option a) to justify the abandonment of the well operating DRM network in the AM Band which is by the way also considered one the most powerful components for a reliable nation-wide emergency warning system.

2. Analyzing the responses to the second questions, a few major statements are predominant which we would like to address:

- a) Starting with the most prominent argument on HD side, claiming HD radio was a “*Proven and implemented Technology*” – a statement obviously distributed by Xperi to a variety of entities asking for a more or less copy and paste action to emphasize this statement. But is it really true?

Xperi explains in their submission: “*From a manufacturing and product perspective, the HD Radio system has developed a mature ecosystem over the past 20 years. With over 5000 different models of receivers certified and 110 million receiver products sold, **the consumer market is well established with over 40 major product manufacturers leading innovations in product design and cost optimizations.** The HD Radio platform is standard on major automotive manufacturers, **established in home and portable solutions, and integrated into feature phones and smartphones at affordable prices.** The Indian market will benefit from this robust manufacturing support and locally-designed radios will have a strong market in other countries.*”

However, the reality draws the exact opposite picture: **From almost 30 suppliers offering HD Radio desktop or portable receivers around 2010**, including prominent names such as SONY or YAMAHA (*Wikipedia*), **only 2-3 manufacturers are still offering HD Radio home or portable devices today**, and only one of them more than a single model. We would like everyone to see for yourselves, just check on Amazon USA! Even starting at the HD Radio website, they are already listing only very few devices there, but many of them are already discontinued. Also, everything that is left is quite high-priced and definitely not suitable for the average Indian budget. Here it is:

<https://hdradio.com/get-a-radio/home-radios/>

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WHY HD RADIO?

FIND A STATION GET A RADIO BROADCASTERS FAQs

- NEW CARS
- CAR RADIOS
- HOME RADIOS
- PORTABLES

HOME RADIOS

11 PRODUCTS

TYPE ▾

- RECEIVER (5)
- TUNER (3)

BRANDS ▾

- SANGEAN (5)
- SPARC (3)
- VIEWQUEST (2)

FEATURES ▾

<p>\$999</p> <p>OUTLAW AUDIO RR2160MKII</p>	<p>\$72</p> <p>SANGEAN HDR-15</p>	<p>\$187</p> <p>SANGEAN HDT-20</p>
<p>\$107</p> <p>SANGEAN HDR-16</p>	<p>\$73</p> <p>SANGEAN HDR-14</p>	<p>OUT OF STOCK</p>
<p>\$80</p> <p>VIEWQUEST RETRO MINI</p>	<p>X</p> <p>SPARC HD RADIO RECEIVER W/BLUETOOTH AND EMERGENCY ALERTS</p>	<p>\$147</p> <p>SANGEAN HDR-18</p>
<p>X</p> <p>SPARC AM/FM RADIO W/ ALARM</p>	<p>X</p> <p>SPARC FM RADIO W/ DUAL ALARM</p>	

Even worse: <https://hdradio.com/get-a-radio/portables/>

- NEW CARS
- CAR RADIOS
- HOME RADIOS
- PORTABLES

PORTABLES

2 PRODUCTS

BRANDS ▾

- SPARC (2)

FEATURES ▾

- DIGITAL SOUND (2)
- MULTICAST (2)
- PROGRAM INFO (2)

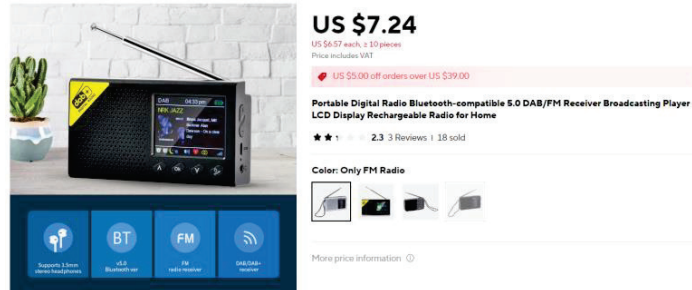
<p>X</p> <p>SPARC AM/FM PORTABLE RADIO</p>	<p>X</p> <p>SPARC PORTABLE FM RADIO W/ SPEAKER</p>
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Coming back to HD-Radio, so the consumer market comprises of 3, perhaps one or two more suppliers offering a handful of high priced solutions. Calling this **“well established with over 40 major product manufacturers leading innovations in product design and cost optimizations”** is not only overexaggerated, it is **profoundly misleading** and **irresponsible to claim in such an important decision making process!**

In comparison, e.g. DAB radios are available for under 20, even 10 US\$:



So **why are HD Radio sets 10x more expensive than DAB radios?** This question leads directly to the second point:

- b) The fact that HD Radio is a “proprietary standard” – has often been verbalized, but not really been explained what this really means. Here are a few considerations:
- If you are planning to do business with the current owner of HD Radio, Xperi (let’s say you are a receiver manufacturer – and we made this experience **personally**) they will first ask you to sign a very strict NDA what will forbid you to disclose e.g. any royalty related information to other parties or the public. But before you have signed this NDA, no pricing information will be given to you. As a result, **the real pricing policies of HD radio remain in darkness and will be kept as secret**. So if they claim there were no hidden costs or their solution would not add any costs to the manufacturers or the consumers, there is no evidence if this is true or not. The market prices speak a different language. In contrary, open standards like DRM or DAB don’t require the signing of license contracts even to gain technology access, upfront license fees etc., and information about all associated royalty costs (e.g. for the MPEG codec) are publicly available – and specifically for India they are in the range of a few cents.
 - But not only HD Radio royalties are a secret. The technology itself remains kept in the hands of the owners. For receiver manufacturers this means that for adding HD Radio to their products they have to integrate “black box” software components into their products without a chance to improve the code or make it more suitable for their solutions. Unfortunately, the software components provided by HD Radio (before iBiquity, later Xperi) have not seen any significant improvement since a long time. For example, if operating in pure digital mode, the **time-to-audio** (this is the time from selecting the channel until the first audible sound comes out of the speaker) for an SPS channel in HD Radio **is at least 5 seconds** – half a lifetime for a consumer! This was already the case in 2018 and has not changed until today. In comparison, in **DRM (FM-Band)** this used to be around just under 3 seconds in 2018 and is now **less than 1 second** depending on the solution (**This huge performance gap alone should disqualify HD Radio over DRM!**). This was possible because it could be developed



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freely based on publicly available documentation – one visible result of the fact that since DRM is an open standard it has enabled startups globally and also in India to innovate and develop solutions. With HD, all these innovations will never be possible and it will only be a mere integrators and controlled by XPERI.

- But the black box technology leads to another massive issue: If India intends to use digital radio as a key component for emergency warning, it will have to rely on its absolute trustability without any control. In other words: **The security of a crucial national key point would be laid into the hands of a foreign private entity** – which is at least technically able to undertake any type of manipulation or sabotage without the possibility to make sure that the code is “clean” – because nobody will ever be able to see it. Specifically in the current political context we would see this **extremely critically**. But even a receiver manufacturer would not be able to give hundred percent warranty on the reliability of a technology that he is not able to at least review the code.
 - In this context the ownership of HD-Radio is very important. It was developed by the private company iBiquity and later obtained by DTS which belongs to Xperi which is a commercial entity mainly owned by institutional investors. It is fully revenue-orientated and there is no guarantee that it may not again change the owner. Any entity in any country could develop an interest once India is dependent on the technology. For DRM on the other hand all technical specifications are published and accessible to everyone. DRM is not owned by anybody, but rather was developed and is maintained by the non-profit DRM Consortium, an open forum of broadcasters, receiver manufacturers and broadcast industry stakeholders worldwide.
 - Finally, HD Radio comes at high costs also on broadcasters side. The costs of installing the system, including fees, vary from station to station, according to the station's size and existing infrastructure. Typical costs are at least several tens of thousands of dollars at the outset plus **per-channel annual fees (3% of the station's annual revenue) to be paid to Xperi** for HD-2 and HD-3 services (*Wikipedia*). On the other hand, of course no annual fees have ever to be paid to DRM, and a **reduced priced one-box migration solution for small DRM broadcasters like community radio stations will be available for under 3000 US\$**.
- c) Response to “Noise”: It is nice to hear that Nexxbase Marketing is happy about a technology that it can potentially fit into their Bluetooth speakers or other products. Any technology can be built into Bluetooth Speakers, and we at **STARWAVES have also adopted DRM in a Bluetooth speaker successfully**. But this is not an argument to favor a technology over another one. It is just a statement of a personal experience. Also the idea of an export market of HD Radios to Northern America is a pretty intention. Unfortunately, as mentioned before, the sales of HD Radio receivers in USA have declined dramatically within the past years. So starting a business that all others dropped is perhaps not such a good idea. Rather invest in an emerging market like Indonesia (which has a similar population as USA) has just adopted the DRM/DAB standards offering huge opportunities for Indian exporters. Opposite to HD Radio, DRM and DAB are both open standards allowing any manufacturer designing their own devices without having to pay license fees to a commercial company.



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d) Response to Mercedes-Benz: Also here we read a repetition of the mantra-like “widely available and proven standard” statement imposed by Xperi. Yes, HD Radio is available for a number of infotainment systems in new cars. However, **the brands listed on HD Radio website** are mostly premium brands, together making a minority of **less than one third** of market share in India. On the opposite, **brands in India with ready DRM solutions have over 67% market share** (source: <https://www.godigit.com/motor-insurance/car-insurance/find/top-car-manufacturers-in-india>). And most of HD Radio capable infotainment systems are based on common chipset solutions like NXP which are all multi-standard as the same cars are also designed for markets with other digital radio standards such as DAB+ or DRM. So **every car using an NXP digital tuner chipset has 100% hardware compatibility with DRM (in both AM and FM Band)**, DAB+ and HD Radio as well as analogue FM and AM. This means that **today nearly every car brand sold in India can offer a DRM capable solution based on their hardware used.**

For Mercedes-Benz with a market share of way less than 1% in India, it might be beneficial to just expand their North American software profile to India and call this economy of scale. For India it is definitely not.

e) Addressing Submission No. 3 (Aroi): You have requested to summarize some facts in table format. We have prepared a KPI table with some facts that we found important:

Summarizing the KPI's:

	DRM	HD-Radio
Time-to-Audio in full digital mode	1s	5s
Max. audio channels in 400 kHz in full digital mode	16	8
Max. audio channels in 400 kHz in hybrid mode	8 +1 analogue	4 (one of them hybrid)
Minimal required bandwidth for a digital signal	100 kHz	400 kHz
Cheapest desktop radio available today	60\$	71\$*
Cheapest commercial solution to listener	20\$**	71\$*
Cheapest desktop radio after 12 months	25\$	80\$***
Migration cost for small community radio station	<3000\$	>10000\$
Manufacturers offering portable or desktop radios	3	2
Modules available for manufacturers to build low-cost receivers off the shelf (no contract required!)	3	0
Cars with respective standard in India	6,000,000	0
Population exposed to signal worldwide	>4,000 Mio	<800 Mio.
Countries adopted standard	ca. 17	4
Countries using standard	ca. 25	ca. 8

*) Price in USA. In India probably much more expensive due to logistics and customs (e.g. price in Philippines: 120\$)

***) SDR-dongle plus software app for Android device (apart from zero add-on cost in car receivers as already deployed in India)

****) Assuming the price curve being constant as it was for the past years in its “mature” market

Both DRM and HD Radio have demonstrated functional mobile phone prototypes with built-in digital radio tuner and decoder at this year’s BES Expo. To allow the mass market to implement this, price or volume predictions like requested from Aroi are difficult to make as they all depend on the actual demand. However, as explained before, the



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probability for such products to appear on the market is by far higher if manufacturers are free in their design and able to use openly available resources as provided by DRM as open standard.

Conclusion

The world has become a very complex place, and in many circumstances it is difficult to make the right choices nowadays. However, in our opinion there is no doubt that there is a very clear answer to name the right standard for digitizing the FM Band in India: DRM.

DRM scores in all important categories, specifically

- Technical Performance
- Spectrum Efficiency
- Transparency
- Costs
- Sustainability
- Potential economy of scale
- Compatibility to existing infrastructure
- Compatibility to spectrum and regulations