

# TRAI Digital Radio Broadcasting Consultation Paper

## Comments on Response from Industry

This note has been prepared by colleagues based on public information available on the web. Source of information has been referenced in every case.

The basic purpose is not to oppose any digital radio technology but to present information (which is already in public domain) in one place. In this region, information about the other two competing digital radio systems is widely available and it has been so for quite a while. This additional information on HD Radio may enable the reader to assess all the digital radio systems in a more informed manner.

The purpose of this note is not to advocate any system but to provide information in a totally technology neutral manner.

HD Radio is a proprietary system restricted to the FM and medium wave bands and specifically designed for the regulatory framework in the USA<sup>1</sup>. HD Radio technology is currently owned by Xperi Corporation<sup>2</sup> in the USA (formerly USA Digital Radio and Lucent Digital Radio, then iBiquity Digital Corporation<sup>3</sup>, then DTS Inc.<sup>4</sup>, then Tessera Holding Corporation<sup>5</sup>), mainly licensing technology and intellectual property.<sup>6</sup>

1. In 2003 the HD Radio technology introduced the proprietary and undisclosed<sup>7</sup> “HDC” audio codec owned by DTS/Xperi Corporation, which is a form of HE-AAC<sup>8</sup>, one of the outdated and quality-restricted predecessors of the latest xHE-AAC codec used by DRM.

Therefore, HD Radio in the medium wave band can only carry a single digital programme.<sup>9</sup> If HD Radio is operated in hybrid mode (similar to DRM’s analogue-digital simulcast from a single transmitter), the digital main audio channel must carry the identical content as the analogue signal portion.<sup>10</sup> For medium wave transmissions, this results in an HD Radio signal carrying the identical single programme in analogue and digital form, while additional digital audio programmes are not possible.

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<sup>1</sup> <https://hdradio.com/broadcasters/us-regulatory/nrsc-standard-and-evaluation-program>

<sup>2</sup> [http://www.insideradio.com/free/hd-radio-owner-tessera-changes-name-vision/article\\_367caa76-f995-11e6-bb3c-778f9b7d5f5b.html](http://www.insideradio.com/free/hd-radio-owner-tessera-changes-name-vision/article_367caa76-f995-11e6-bb3c-778f9b7d5f5b.html)

<sup>3</sup> <https://en.wikipedia.org/wiki/iBiquity>

<sup>4</sup> <http://rbr.com/how-much-debt-did-dts-take-on-to-buy-ibiquity/>

<sup>5</sup> <http://gadgets.ndtv.com/tv/news/patent-licensing-firm-tessera-to-buy-audio-equipment-maker-dts-1464242>

<sup>6</sup> <https://en.wikipedia.org/wiki/Xperi>

<sup>7</sup> “NAB Radio Board Supports Leaving Codec Out of IBOC Standard”, <http://www.radioworld.com/news-and-business/0002/nab-radio-board-supports-leaving-codec-out-of-iboc-standard/306224>, and <http://www.nrscstandards.org/SG/NRSC-5-C.pdf>, clause 3.3.1

<sup>8</sup> [http://www.itu.int/dms\\_pubrec/itu-r/rec/bs/R-REC-BS.1514-2-201103-!!!PDF-E.pdf](http://www.itu.int/dms_pubrec/itu-r/rec/bs/R-REC-BS.1514-2-201103-!!!PDF-E.pdf), Annex 2, clause 1.1.1

<sup>9</sup> <http://www.nrscstandards.org/SG/NRSC-5-C.pdf>, clause 5.2.1, and [https://www.itu.int/dms\\_pubrec/itu-r/rec/bs/R-REC-BS.1514-2-201103-!!!PDF-E.pdf](https://www.itu.int/dms_pubrec/itu-r/rec/bs/R-REC-BS.1514-2-201103-!!!PDF-E.pdf), table 1 and Annex 2

<sup>10</sup> <http://www.nrscstandards.org/SG/NRSC-5-C.pdf>, clause 5.1.1, and [https://www.itu.int/dms\\_pubrec/itu-r/rec/bs/R-REC-BS.1514-2-201103-!!!PDF-E.pdf](https://www.itu.int/dms_pubrec/itu-r/rec/bs/R-REC-BS.1514-2-201103-!!!PDF-E.pdf), Annex 2, clause 1.1.4

2. Besides prototype announcements in 2012<sup>11</sup>, there are no mobile phones of any major brand available today with HD Radio functionality built-in (Reference HD Radio website<sup>12</sup>).
3. According to web sources, broadcasters in the USA who wish to place HD Radio transmissions on-air are reportedly required to pay an initial license fee covering the audio transmission and some basic data for the primary audio channel (directly or through the equipment manufacturers), plus revenue shares for any additional audio channel or data transmissions.<sup>13</sup> Given the closed-system proprietary nature of certain components of the HD Radio technology,<sup>14</sup> manufacturers may not have unrestricted freedom to implement products and solutions.
4. On the receiver side, all HD Radio component manufacturers along the production chain (from chipset manufacturer to receiver manufacturer/market brand) need to acquire a license from DTS/Xperi Corporation (i.e. a permission to access and implement proprietary information) and pay certain amounts of license fees, which eventually sum up to a significant portion of the cost of the final product.<sup>15</sup>
5. FCC's<sup>16</sup> decision to base the US digital radio standard on a non-open proprietary technology controlled by a single company caused controversies when HD Radio was originally introduced in the USA.<sup>17</sup>
6. Truly phenomenal global growth of technologies such as AM, FM, the Internet, TCP/IP, UMTS, WiFi, USB, HTML or mp3 amply demonstrates that standards must be published and openly accessible, making the technology freely available for everybody to build solutions and for the services based on that technology to thrive – even if small IP royalties are charged in the initial years to allow the original technology owners to at least recover their development efforts and cost.

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<sup>11</sup> "HD Radio smartphone prototype lands with a thud": <http://www.radiosurvivor.com/2012/04/26/hd-radio-smartphone-prototype-lands-with-a-thud/>

<sup>12</sup> <https://hdradio.com/get-a-radio>

<sup>13</sup> [https://en.wikipedia.org/wiki/HD\\_Radio#Overview](https://en.wikipedia.org/wiki/HD_Radio#Overview) and <http://www.radioworld.com/Portals/0/rw-tlr-sheet.jpg>

<sup>14</sup> "iBiquity: How a closed-source model is killing HD Radio", <https://gravitymedium.com/2008/03/17/ibiquity-how-a-closed-source-model-is-killing-hd-radio/>

<sup>15</sup> <http://www.nrcstandards.org/SG/NRSC-5-B/04-13-05%20iBiquity%20IP%20Disclosure.pdf>

<sup>16</sup> Federal Communications Commission (FCC), US American regulator: <http://www.fcc.gov>

<sup>17</sup> <http://www.nrcstandards.org/nrsc/NRSCFiles/DRB%20Subcommittee/DRB%20archive/050321%20NRSC-5-comments.pdf>