

Doordarshan Digital Terrestrial Television (DTT)

In analogue terrestrial television broadcasting only one signal is transmitted on a given frequency channel. However, Digital Terrestrial Television (DTT) broadcasting allows the transmission of about 10 or more digital services in a single frequency channel, depending on the technical parameters used and the quality of services desired. This creates the opportunity to bundle services and transmit in smaller amount of spectrum than is currently needed for analogue broadcasting. It offers higher efficiency, robustness and flexibility, enabling efficient use of valuable terrestrial spectrum for the delivery of audio, video and data services to fixed, portable and mobile devices. Many developed countries are already fully switched-over to the digital and switched off their analog services completely. Thus, lagging behind to switch off-analogue television broadcasting will result in investing on and importing obsolete analogue TV transmission and reception equipment.

DTT Standards: There are many DTT broadcasting standards world over, such as Advanced Television Systems Committee: ATSC(USA), Digital Terrestrial Multimedia Broadcasting: DTMB(China), Digital Video Broadcasting-Terrestrial: DVB-T(Europe) and Integrated Services Digital Broadcasting-Terrestrial :ISDB-T (Japan) focus on stationary reception with home TV sets and high-mounted rooftop antennas. Digital Multimedia Broadcasting (DMB), 1-Seg , DVB-H and DVB-T2 Lite are mobile TV standards. To ensure high visual qualities and to account for the large screen sizes of stationary TV sets, the video signals are compressed and high image resolutions are used. The video formats and bit rates for mobile are different from those required for fixed reception by normal TV. India has adopted DVB-T2 Standard, which is second generation of DVB and has highest data capacity. The DVB-T2 system is an OFDM-based broadcasting standard used not only for stationary reception, but also for mobile applications. Orthogonal Frequency Division Multiplexing is a form of signal modulation that divides a high data rate modulating stream placing them onto many slowly modulated narrowband close-spaced subcarriers and in this way is less sensitive to frequency selective fading. The new DVB-T2 specification provides the facility to select a variety of different options to match the requirements of the network operator. As DVB-T2 offers additional facilities, it will enable the broadcasters the possibility of offering new and captivating services to ensure that they are able to keep their viewers. Building on the success of the existing digital television services, DVB-T2 is bound to see a significant level of take-up over the coming years.

Some Frequently Asked Questions (FAQ) on DTT are as below:

1. Why is Doordarshan going into digital terrestrial broadcasting?

Doordarshan is transmitting all free-to-air channels in analog format since 15th September 1959. It is necessary to migrate to digital terrestrial broadcasting as the world is moving away from analogue to digital broadcasting. Going digital will provide multiple programme channels , better video and audio quality, provide signals for mobile and portable devices like mobiles/tablets/PC etc. and other value added services, besides it will allow the government to free up frequency spectrum which can be used for new services like mobile, wireless broadband and potentially more TV services and channels.

Some advantages of DTT Transmission are as below:

- a. Analog TV (ATV) is subject to interference, such as ghosting and snow, depending on the distance and geographical location of the TV receiving the signal. In DTT the viewer will either receive excellent quality of video and audio or no signal at all. There is no gradual signal loss as distance from the transmitter increases like analog transmission.
- b. The pictures of conventional analogue TV broadcasting provide a maximum of 720 (horizontal) x 576 (vertical) pixels (number of small dots used to form a picture on the TV screen). The usual format of conventional analogue TV pictures is square screen (aspect ratio 4:3). But the digital television is capable of transmitting High Definition quality images and with aspect ratio 16:9 (Widescreen). Actually, digital TV supports Standard Digital TV (SDTV) High Definition TV (HDTV) and Ultra High Definition TV (UHDTV).
- c. SDTV pictures are free from "ghosting" and "snowing", which are commonly found in analogue TV pictures. HDTV broadcasting doubles the resolution of conventional analog TV in both the horizontal and vertical directions. In addition, because of better compression techniques in the digital television, it will be possible to offer several channels of programming in spectrum that previously was only able to transmit a single analogue channel.
- d. The DTT will provide signals for **portable and mobile devices** and also provide signals for Vehicles etc.
- e. **Opportunity with the creation of local content** : The digital transition offers an opportunity to increase the production of local content. This in turn creates job opportunity and increase creativity and entrepreneurship.
- f. The Digital terrestrial TV is all **weather reliable mode** and unlike DTH there is no risk of catastrophic failure of total network. It provide alternative distribution platform.
- g. **Creates the opportunity for convergence** : Broadcasting and telecommunications are in many countries treated as separate, vertical markets. But the digital technology creates the possibility of service convergence, infrastructure convergence, terminal and service provider convergence. In future LTE A+ Overlay can facilitate signals from same transmitter for all receiving devices. The digital dividend at the UHF band has a potential to provide mobile internet broadband services to the rural and that will help greatly to fulfill one of the millennium development goals of bridging the digital divide.

2. How to receive DVB –T2 Signals? Do I need to change my TV set now to receive the DVB -T2 Signal?

It require ordinary antenna (Indoor or outdoor depending upon location of your site) as used in analogue TV. With the existing TV a Set Top Box compliant with DVB T2 Standard is required. But some integrated Digital TVs (iDTV) are available in market having in built set top box. Additional equipment required will be a 75-ohm coaxial cable and a HDMI cable if

you are using the DVB T2 set-top box. The following picture illustrates the reception method:



The existing analogue TV signals will continue to be broadcast alongside the digital TV signals, for at least another two years until Doordarshan

complete the switchover to digital broadcasting. Thus the DTT signals may be received in Laptop, tablets, Fixed TV and TV receivers and T2 Radio Receivers in fixed and in moving vehicles. The following picture gives a glimpse of receiving equipments:-



3. If one have two TV sets in his house, will he need two set top boxes?

Yes, if anyone wants to watch two different TV set in one home, and then to view different channels from two TV Sets one would need two STBs. Thus to watch different programmes on multiple TV's in their house, each individual TV will have to be connected to its own set top box.

4. How many TV Programme Channels can we receive from a DTT?

There is a Trade off for broadcaster between Capacity of DTT and its signal robustness/coverage area. Higher data can be achieved but with reduced coverage area and vice versa. Further compression technique is also important. For optimum coverage in MPEG-2 about 7 Standard Definition TV(SDTV) Channels or 2-3 High Definition TV (HDTV) can be relayed and in MPEG-4 about 14 Standard Definition TV(SDTV) Channels or 4-5 High Definition TV (HDTV) can be relayed . It is also possible to relay Radio Channels, Mobile TV etc. Mobile TV require different video format (Resolution and bit rate) compared to Fixed TV. In MPEG 4 about 10 TV Channels may be available for mobile and portable devices. Currently only 5 DD Channels are being relayed.

5. In which Cities DTT signal can be received?

DTT Transmitters have been installed in 19 Cities namely - Ahmadabad, Jalandhar, Aurangabad, Kolkata, Bangalore, Lucknow, Bhopal, Mumbai, Chennai, Patna, Cuttack, Raipur, Delhi, Ranchi, Guwahati, Indore, Srinagar, Hyderabad and Thiruvanathpuram. Test transmission in above cities except Srinagar, Hyderabad and Thiruvanathpuram has already been started. In these 3 cities it will start soon. The signal from these Transmitters will be

available up to about 60-70 KMs in all directions in fixed mode and 25-30 Kms in mobile mode from the TV Tower. In mobile reception there may be some gaps where signal may not be available at present.

6. Initially how many TV Channels will be available? Will HD Channels will also be available?

Doordarshan will begin with 5 TV Programmes in SDTV namely DD National, DD News, DD Sports, DD Bharati and one Regional channel. Some states either do not have regional channel or are having 3-4 hrs of regional services. In such cities like Delhi, Ranchi and Raipur, DD Kisan will be relayed and at Guwahati DD-North East service will be relayed.

7. Whether market is ready with receiving devices? How do I know if my TV is DVB T2 Ready?

TVs with compatible built-in tuners (Integrated Digital TVs or iDTVs) and set-top boxes are now available world over and in India as well. Dealers have to demonstrate the relevant DTV documents to establish that STB or iDTV offered for sale are capable to receive DVB T2 signals. Some of iDTV models are as below:

SIZE (INCHES)	LG	SAMSUNG	SONY	UV
32	32LF560T 32LF561D 40UF670T	H5570 J5570	KDL-32W700B	
40/42/43	40UF670T 42LF560T 43UF690T 43UF770T 43UF640T	H5570 J5570	KDL-42W700B	40K16
48/49/50	49UF670T 49UF690T 49UF770T 49UF850T 49UF640T	H5570 J5570 JU6470 JU6670 JU6670	KDL-48W600B	N50K310X3D
55	55EC930T 55EG960T 55UF670T 55UF680T	JU6470	KDL-55W950B	N55XT780XWAWU3D

	55UF770T 55UF850T 55UF950T			
60/65	60UF850T 65EC970T 65UF770T 65UF850T 65UF950T	JU6470 JU6470		N65XT780XWAWU3D
75/79/84/98/105	79UF770T 79UF950T 84UB980T 98UB980T 105UC9T			

8. Can DVB-T2 STB receive HD as well as SD?

The STB, for DVB T2 has a capability to receive/decode any both HDTV and SDTV.

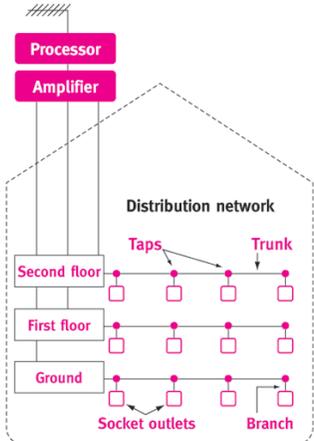
9. What type of antenna can be used for DVB-T2?

You will have to use a UHF antenna to receive DVB-T2 signals which will be broadcast in the UHF channels 21~48 (470~694 MHz). Try to position your UHF antenna for best reception. The reception capabilities of TV antennas vary considerably, so it is recommended that you consult the retail consultants and look at information on the packaging to make sure that any new antenna you may choose provides good reception of UHF channels. You may improve TV reception by using an active antenna. Active antennas are also available in India. One such vendor's contact detail is: Compatible Power Pvt. Ltd., Vadodara. Email: ushanair111@yahoo.com. Phone: +91-265-6580486. So any type of receiving existing receiving antenna will be sufficient to receive the DTT signal.



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10. Can I connect a single antenna to multiple digital receivers?



Splitters can be used to connect a single antenna to multiple digital receivers (IDTV and/or digital set-top box). However, such connections reduce the amount of signal available to each receiver. If you are having problems, check whether reception is improved without the splitter. In some cases, an active splitter that includes an amplifier can solve the problem. MATV stands for Master Antenna Television.

It is the means by which many apartment houses hotels, schools and other multi-unit buildings distribute TV signals to a number of receivers. An MATV system is basically a network of cables and specially designed components that process and amplify TV signals and distribute them from one central location. If there were 100 TV sets in a building, it would be extremely expensive to install and maintain 100 separate antennas. Not only would it be unsightly, but reception would suffer because that many antennas would interact with each other, causing interference problems. A mass of commercial premises including hotels, offices, housing developments and holiday parks, now utilize some form of structured cable system to supply an array of different programmes and information services to their end-user customers. In a typical MATV system the antenna is a conventional TV antenna for TV signals. Signals received by the antenna are then processed. In systems that have not been modified to carry digital, it is usually this processing that restricts or prevents the digital signals from being handled correctly, as the processors are only designed to handle analogue TV signals.

10. How do I place the indoor antenna for best reception?

The location of an indoor antenna is an important factor to have good signal reception. Here are some of the tips on the placement of antenna if you are unable to get good reception from its existing location. Try positioning the antenna:

- a. near a window
- b. at a higher position
- c. away from other electronic equipment that may introduce interference

For directional antenna, position the antenna facing appropriate window opening, away from area whereby the signal may be blocked.

11. How do I perform tuning?

Make sure your digital TV or set-top-box is connected to an antenna. Tuning may take a few minutes. Every model of digital TV or set-top-box will be a little bit different. Please refer to the user manual if you are unsure. Here are some general guidelines. Select the 'set up' or 'installation' option. Select digital tuning / Digital TV option. For full tuning, select the auto tuning option. This is sometimes called 'auto set-up' or 'first time installation'. Press 'OK' if the digital TV or set-top-box asks if you want to delete all your previous channels. Newly scanned Channels will automatically be

stored and you should receive all the free-to-air channels. Unless there is any change from Transmitting end, rescanning may not be required.

12. Can I view DD DTT channels in my vehicle?

Yes, using suitable DVB-T2 Receiver and preferably diversity antenna.

13. How do I know if there are subtitles and how can I select the language that I want on my DVB-T2 set or set-top-box?

The availability of subtitles is indicated in the electronic program guide. To select your preferred language, press the 'subtitle' option on your remote control to enable your preferred subtitling language. Most receivers also allow the viewers to pre-set their preferred subtitle languages, providing a control option in selecting primary and secondary subtitling languages. Doordarshan may soon have subtitling facility in Delhi, Mumbai, Chennai and Kolkata initially in 5 languages.

14. Is the quality of DVB-T2 better?

DVB-T2 allows you to receive sound and picture with better quality. The number of television channels broadcasted in DVB-T2 is larger than in analog terrestrial broadcasting. Unlike analog broadcasting, digital terrestrial television has no unwanted "effects" such as "double image" or "snowfall".

15. How many countries have adopted DVB-T/T2 ?

The DVB T/T2 standards have extensively been adopted in Europe, Australia, South Africa, Russia and many Asian Countries. The details may be seen in the following link:

Link: <https://www.dvb.org/news/worldwide>

16. How to receive DTT Signals in mobile Phones/Tablets?

One can watch TV on smartphone/Tablet without data charges. The detail procedure is as below:



Dongles for Android & Apple Users

Android Users: TV-On-GO Micro USB Dongle (to be used with OTG Enabled Android Smartphone) with mini antenna

Buy at FLIPKART

<http://www.flipkart.com/tvongo-free-tv-otg-dongle-accessory-combo/p/itmexsvmbzg2amr?pid=MACEBXSJVJGAT8TFH&icmpid=recoppsamemobileaccessorymobileaccessoriescombo1&ppid=MACEB7GRWGP4BD82>

Link to Download App

Android Users

<https://play.google.com/store/apps/details?id=kr.co.tvongo.tivizen.darshantvongodvbt2dongle>

< Please open the above link on your android smartphones to install App >

Apple Users

iOS Version Dongles: Coming soon - Sample available

(For further detail, contact: **DEALER** <dealer@abinnovators.in>)



DiGi-Darshan Wi-Fi Router for Android &iOS

Use in your Car (power with USB Charger) with small Antenna
Use at Home/Office(Power with 220V) with small Antenna
and get Wifi-Zone for DVB-T2 for viewing TV Channels on a single device with
Android or iOS

Links for online Purchase of Digi-Darshan (Wi-Fi Router for iOS& Android)

BUY at FLIPKART

<http://www.flipkart.com/search?q=Digidarshan&as=off&as-show=off&otracker=start>

or

http://www.flipkart.com/digidarshan-wi-fi-router-dvbt2-receiver-watch-free-tv-accessory-combo/p/itmeb7gry5utq2gg?pid=MACEB7GRWGP4BD82&ref=L%3A1302608290694250570&srno=p_1&query=Digidarshan&otracker=from-search

BUY at Ebay

<http://www.ebay.in/itm/DIGIDARSHAN-WiFi-ROUTER-FOR-FREE-TV-AND-DVB-T2-RECEIVER-/181863170992?>

BUY at Snapdeal

<http://www.snapdeal.com/product/digi-darshan-wifi-router/660598340693#breadcrumbSearch:digi%20darshan>

Link to Download App

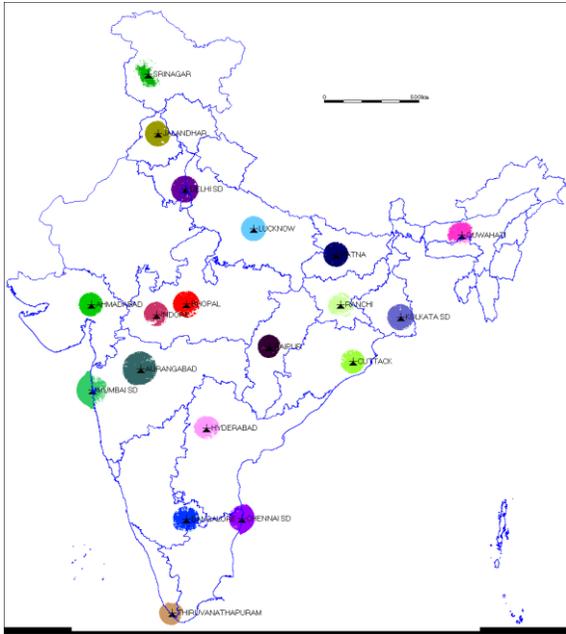
For android users

<https://play.google.com/store/apps/details?id=kr.co.digidarshan.tivizen.digidarshandvbt2wifi>

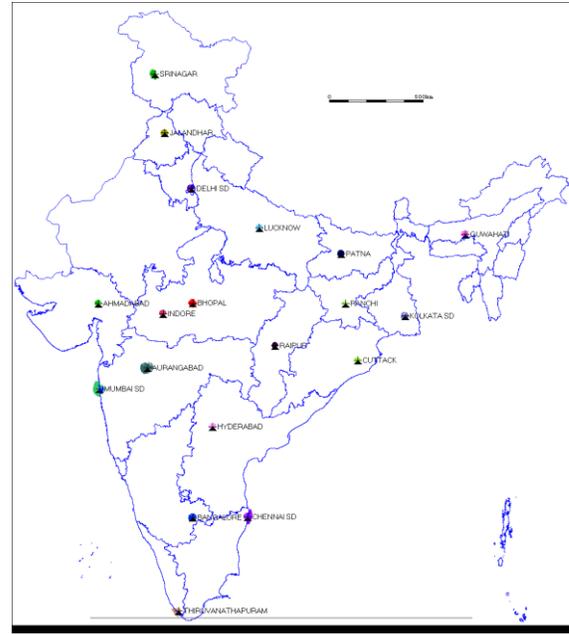
For Apple Users

<https://appsto.re/in/X0A83.i> (Apple iphone users)

17. Coverage Area of DVB T2 Transmitters?



Fixed Reception Coverage



Mobile Reception Coverage

S. No.	DTT Transmitter of Doordarshan	freq	Fixed reception		Mobile Reception	
			Pop. Served*	Area covered	Pop. Served*	Area covered
1	AHMADABAD	562.00 MHz	8095272	12303.25	1607309	944.25
2	AURANGABAD	490.00 MHz	6106441	24349.25	646333	3044.25
3	BANGALORE	498.00 MHz	10073416	12942	5467691	1359.25
4	BHOPAL	490.00 MHz	3752562	13816.75	1563050	1416.5
5	CHENNAI	538.00 MHz	9205954	15278	5062902	2179.5
6	CUTTACK	538.00 MHz	7637267	11594.25	867039	942.75
7	DELHI	578.00 MHz	25175309	15722.5	9041172	1352.25
8	GUWAHATI	538.00 MHz	5288396	10670.75	751699	879.75
9	INDORE	514.00 MHz	4384376	11224.5	1643730	1055
10	JALANDHAR	570.00 MHz	6585896	13446.5	1334560	1278.5
11	KOLKATA	482.00 MHz	29457734	14682.25	7214887	1287.5
12	LUCKNOW	562.00 MHz	9960751	13527.25	2145285	1118.5
13	MUMBAI	474.00 MHz	17214292	18964	10203527	3505.75
14	PATNA	498.00 MHz	16693813	13425.25	3258137	1207
15	RAIPUR	490.00 MHz	4133246	11231.25	926553	906
16	RANCHI	490.00 MHz	3639477	10908.5	630252	1122.25
17	HYDERABAD	498.00 MHz	8679308	11865	4404536	955.75
18	SRINAGAR	498.00 MHz	4210883	7189	1873401	1502
19	THIRUVANATHAPURAM	530.00 MHz	5302608	11291.75	1331640	1436

*Population based on Census 2001.

18. Contact details for queries on Doordarshan DTT?

CHENNAI	superddkch@yahoo.co.in
BANGALORE	sgeddkbg@gmail.com
MUMBAI	ddkmumen@gmail.com
AURANGABAD	aetvcentre@dataone.in
CUTTACK	hptcuttack@gmail.com
RAIPUR	ddkrai@yahoo.com
KOLKATA	doordarshan_kolkata@rediffmail.com
INDORE	ddindore@yahoo.com
RANCHI	seddkran@rediffmail.com
BHOPAL	ddkbhopal@gmail.com
AHMADABAD	sgeddkahm@yahoo.co.in
PATNA	seddkpatna@yahoo.co.in
GUWAHATI	sgeddk@yahoo.in
LUCKNOW	ddklkosg@rediffmail.com
DELHI	dehpt_ptp@rediffmail.com
JALANDHAR	sge@ddkjal.com
HYDERABAD	sgeddh@yahoo.com
SRINAGAR	sgeddsgr@gmail.com
THIRUVANATHAPURAM	supeddkvm@gmail.com
Doordarshan Directorate	archanagupta.dde@gmail.com msduhan.de@gmail.com
