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Response to the inquiry

1. There is no problem with the compatibility of 6 MHz channel bandwidth and 60 Hz frequency on the network.

2. The modulation is based on OFDM (Orthogonal Frequency Division Multiplex) technology. It is possible to select the modulation for sub-carrier among QPSK, 16QAM, 64QAM and DQPSK.
   In the typical circumstances, hierarchical transmission is adopted. 64 QAM is used for the fixed reception and QPSK is used for the portable reception.

3. The maximum transmit rate is 23.234Mbps. However, it depends on the transmission parameters such as modulation, the parameter for the forward error correction etc. The table 1 shows the relation between useful bit rate and transmission parameters.

Table 1 Transmission Parameters of ISDB-T (6MHz bandwidth)

	Mode1 (2k)	Mode2 (4k)	Mode3 (8k)
Useful bandwidth	5.575MHz	5.573MHz	5.572MHz
Carrier spacing	3.968kHz	1.984kHz	0.992kHz
Total carriers	1405	2809	4992
Modulation	QPSK, 16QAM, 64QAM, DQPSK		
Active symbol duration	252 μs	504 μs	1.008 ms
Guard interval duration	1/4, 1/8, 1/16, 1/32 of active symbol duration		
Inner code	Convolutional code (1/2, 2/3, 3/4, 5/6, 7/8)		
Outer code	RS (204,188)		
Time interleave	0 ~ 0.5 s		
Useful bit rate	3.651 ~ 23.234 Mbps		

4. Yes, it can transmit video in both SD and HD.
   It allows both 1080i and 720p for HDTV.

5. Yes, it does.
   The number of programs depends on the quality of the video picture and video compression technology. When the video compression of MPEG-4 is adopted, it is possible to transmit either more than 6 SDTV programs or 2 HDTV programs simultaneously.

6. The video compression of both MPEG-4 and MPEG-2 are used. It is possible to select the appropriate video compression for fixed and mobile.
   From the consideration of the penetration of the standard in the South American countries, it is desirable to select MPEG-4 for fixed and mobile.

7. It is possible to transmit three different hierarchical layers in one frequency channel.
   As explained in the above 5, when the video compression of MPEG-4 is adopted, it is possible to transmit either more than 6 SDTV programs or 2 HDTV programs simultaneously.

8. The tolerance level on interference related to ISDB-T is shown in the ANNEX 3 of the recommendation ITU-R BT.1368-4 (Planning criteria for digital terrestrial television services in the VHF/UHF bands)

9. The performance is excellent.
   In order to keep the robustness against multipath, noise and other interference, the technology of OFDM (Orthogonal Frequency Division Multiplex) and time interleave are adopted in ISDB-T.

10. The difference is the attenuation of TV signal from the walls, floors of the building. Therefore, the indoor reception is not as good as outdoor reception.
    In typical circumstances, Yagi antenna is used for outdoor reception and loop antenna is used for indoor reception.

11. The relationship between transmit power and coverage area depends on the

geography where the transmitters are located. In general, the coverage area of ISDB-T is wider than that of other standards thanks to the adopted technology such as OFDM, time interleave.

In other words, if you keep the same coverage among the different standards, ISDB-T will show the best performance with regard to energy saving.

12. SFN is easy to install. As long as the synchronization between the different transmitters is kept, SFN can be implemented.

13. The cost for introducing various terminals is going down rapidly and steadily. The price for ISDB-T in Japan is shown in Table 2.

Table 2 ISDB-T TV in Japan

manufacturer	Dynaconnective Co,.Ltd	PIXELA CORPORATION	EAGLE WORLD DEVELOPMENT CO LTD
photography and model name	 DY-32SDK200	 PRD-LA103-16	
size	32V-inches	16V-inches	MPEG4 STB
price	385 USD	193 USD	19 USD(FOB)

14. Many global manufacturing companies have already sold STB of ISDB-T in Japan as well as South American countries. It is not necessary to be worried about the availability of STB when Costa Rica adopts ISDB-T as the standard for the digital terrestrial TV.

15. The price of the transmission equipment does not depend on the standard but the configuration, performance and quality of the equipment.

However, it is possible to transmit the programs for both fixed TV and portable reception in a single channel one at the system of ISDB-T. In this regard, the

cost of the transmission equipment is cheaper in comparison with other systems.

16. This standard has adopted the following remarkable technologies which contribute to the market requirement for the digital terrestrial TV;
    - OFDM (Orthogonal Frequency Division Multiplex)
      It is the technology which realizes the robustness against interference. It also enables the introduction of SFN which is useful for the efficient spectrum utilization.
    - Band segment structure
      It realizes partial reception, what is called one-seg. It should be noted that the number of one-seg TV receivers are bigger than that of fixed TV receivers. It is much attractive from the business point of views.
    - Time interleave
      It is required for mobile reception, indoor reception, and also robustness.
    - TMCC (Transmission and Multiplexing Configuration Control)
      It assures flexible configuration such as hierarchical transmission in accordance with the market requirement.
    - Interactivity
      It is the key technology for the data broadcasting. Harmonization with internet is taken into account.

17. The standard which has adopted all of the technologies indicated in question 16 is only ISDB-T. In this respect, both hierarchical transmission and time interleave are feasible in ISDB-T.
    Hierarchical transmission is the key technology for mobile and portable reception without C/N degradation.
    It should be noted that DVB-T has low and high profile transmission as hierarchical transmission. However, when this profile of DVB-T is used, you cannot avoid accepting some C/N degradation.
    Time interleave is the key technology for the improvement of mobile and indoor reception. This technology is not adopted in DVB-T.

18. Yes, the programs for both fixed and mobile reception are transmitted in same frequency channel.

19. It is possible to handle any of SD, HD or stereo 3D.

20. It is feasible to manage the SFN. It is already operated as normal service in Brazil and Japan without any problem.

21. The use of SFN is essential for the efficient usage of the frequency.

22. Yes, it is necessary to equip the synchronization mechanism between the different transmitter cites which operate the SFN.

23. Yes, it does.

24. Yes, free mobile reception of TV program is one of the most significant features in ISDB-T.

25. The rate of transmission is shown in Table 1 in the relation with various transmission parameters.

26. Yes, 5.1 surround stereo is usually provided in the digital terrestrial broadcasting.

27. The number of the repeaters depends on the geographical situations.

28. No, it is not necessary to change the polarity of the antennas.

29. Yes, it can.

30. It is possible for Japan to make an appropriate arrangement for the transfer of the new technology.
It already invited the trainees from the countries which decided ISDB-T as the standard for the digital terrestrial TV so that they could learn the new technology in Japan. It also dispatched the experts to advice for the implementation of the digital terrestrial TV in the adopted countries.
If Costa Rica decides ISDB-T as the standard, the technology transfer will be made through above personnel exchange.

31. Yes, it is possible for Costa Rica to use the essential patent of the standard free of charge under the appropriate arrangement if it decides ISDB-T as the standard for

the digital terrestrial broadcasting TV.

32. There is no specific weakness to be referred in this standard.

33. Because the standard is open to the public, any manufacturing companies in the world can enter the market to sell the equipment. Thanks to the competitive market, TV broadcasting companies can select the most desirable product at the reasonable price.

34. It is possible to remove the effect on the quality of signal from multipath, thank to the technology of ODFM.

35. The minimum field strength for ISDB-T is indicated at Table 49 (Deviation by the voltage method ISDB-T 6 MHz system) of the recommendation ITU BT.1368-4.

36. The level of contour protection inside the coverage area is defined the area where the field strength at the altitude of 10 meter is greater than 60 dBμV/m in Japan.

37. In the circumstance of SFN, the propagation time difference from the different transmitter sites must be retained within the guard interval at any reception points.

38. No, it has nothing to restrict the transmission of any kind of content.

39. No, it doesn't.

40. The standard will contribute to the exchange of the material of audiovisual content between producers. It results in the effective and efficient production of the program.