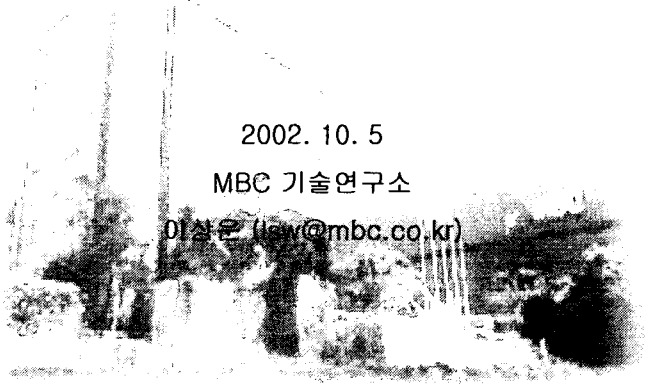
DAB 용 데이터서비스



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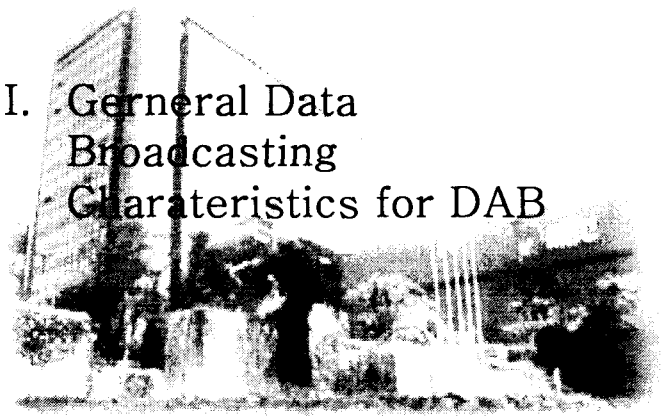
MBC 기술연구소
이상윤 (lsw@mbc.co.kr)

Contents

I. Gerneral Data Broadcasting Charateristics for DAB



Data Service using Broadcasting System

- Merits
  - High Transmission Power (***W ~ *Kw)
  - Excellent Transmission Site (highest mountain or special tower)
  - No battle-neck and less delay for the transmission
  - No limit for the number of recipients who receive the data simultaneously
- Demerit
  - One way transmission

The Data Service for DAB

- Multimedia Broadcasting (DMB)
- Traffic Information (ITS, TPEG)
- Broadcasting files and streams
- Stock and shares information
- Band and artist information
- The title of the track
- Programme information
- News, Sports headlines (+ scores)
- Contact telephone numbers

The Characteristics of Data Broadcasting for Eureka-147

- provides reliable reception with fixed, portable and mobile receivers
- operates at any frequences – up to 3GHz for mobile reception on terrestrial, satellite, hybrid and cable network
- Within 1.5MHz frequency block, ***1.824 Mbps*** available depending on level of protection
- Using SFN the transmission of programs or data over several transmitters, nation wide

The Characteristics of Data Broadcasting for Eureka-147

- a wide range of sources, channel coding options, and data services
- incoporates Conditional Access

(encrytion and addressing, enabling transmission to secluded groups)

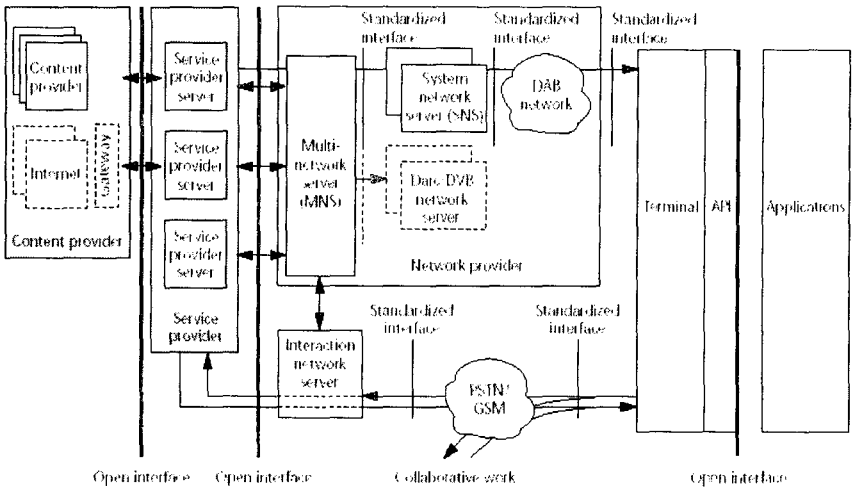
- MOT for multimedia objects in DAB

MOT : Multimedia Object Transfer Protocol

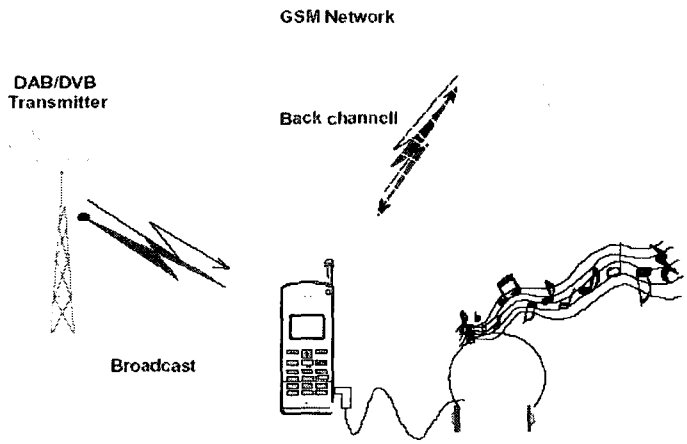
MOT (Multimedia Object Transfer Protocol)

- supports transporting objects and files
- segments the objects, interleaving on different levels
- links objects in different data streams
- lets the terminal identify different types of objects as JPEG, MPEG or ASCII
- includes otional parameters to support applications

: time stamps, creating file name, providing alternative display mode



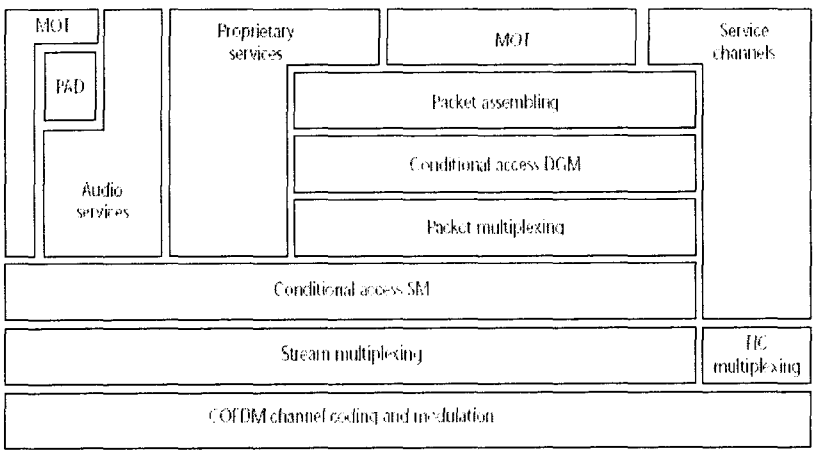
System model for a mobile multimedia system with return channel



Combined Service Model with communication system

The Protocol Stack for the Eureka-147

- A stream multiplex and *Fast Information Channel (FIC)* build the DAB stream
- FIC handles multiplex configuration information
- such as the number of available audio or data channels ,the labels indentifying the channels
- descriptions of whether certain channels should link together in the receiver to creat a full service
- also carries service information describing each service



The Protocol Stack for the Eureka-147

Interactive Channel

- *Open loop, Closed loop*
- Two Subgroups in Closed loop
- One uses interactive channel for transmission purpose

  ex : Acknodgement or request for resending the information for error
- The other uses the channel for application purposes

  ex : End users order information to download from the service provider
- Quality of service, number of recipients, system load, security determines whether broadband broadcsting or narrow point-to-point broadcasting
- The interactive channel may have a smaller capacity and be more expensive

Other Considerations for Data Broadcasting

- A Specific Capacity
- A Specific coverage area and transmission over a selected area
- A probability of reception

  - *the level of protection, segmentation, repetition ration*
- Different transmission channels

  - *stream mode, packet mode, FIC, PAD, AIC*
- Validity time for the information
- Triggering and activation of the service
- Identification of the content format of the object

Other Considerations for Data Broadcasting

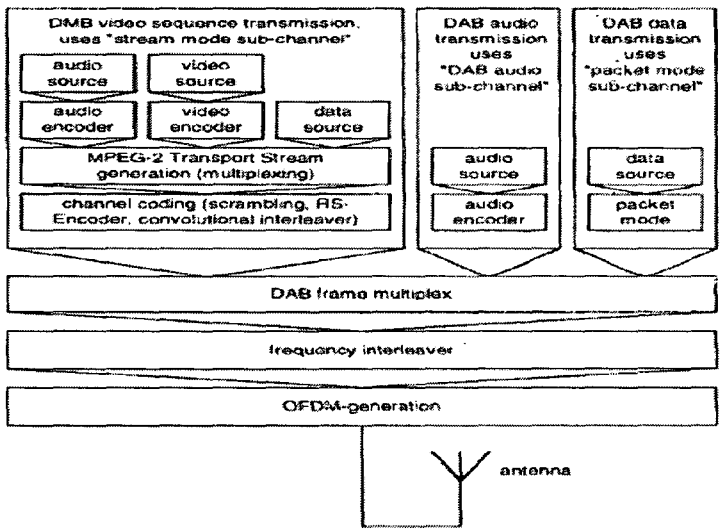
- Alternative display mode
- Defining other parameters for the future
  - *priority for memory handling or capacity allocation in a receiver*
- Time of transmission
- Priority of transmission
- Encrytion
- Conditional Access
- Cyclic Transmission and repetion of data objects

II. MPEG-4 based DMB

(Digital Multimedia Broadcasting)

MPEG-4 based DMB (Digital Multimedia Broadcasting)

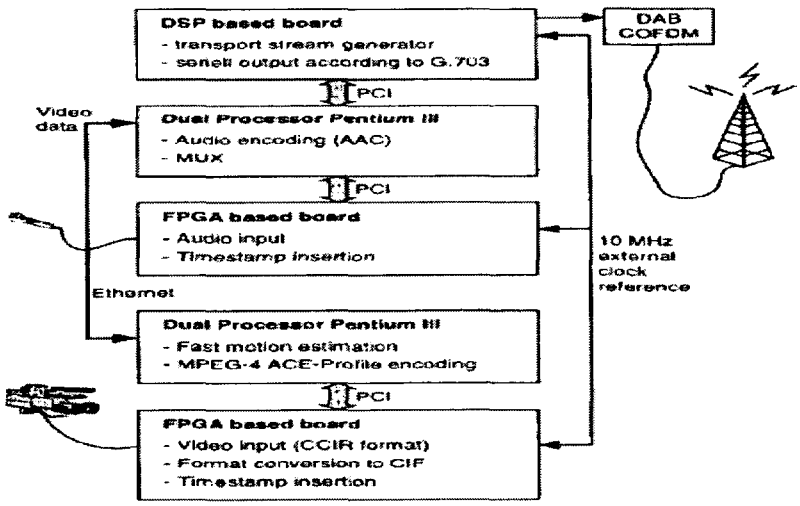
- Studied and developed by Robert Bosch GmbH
- The elementmentary streams resulting MPEG-4 are wrapped into an MPEG-2 TS
- Main work items are MPEG-4 audio, vedio codec
- which are highly optimised to achieve real-time performance
- Good coding efficiency was essential for the limited bandwidth
- DBM improves the error protection with the additional bolcks
  : scrambling, RS encoder and convolutional interleaver



The DAB/DMB Transmission System

MPEG-4 based DMB Encoder

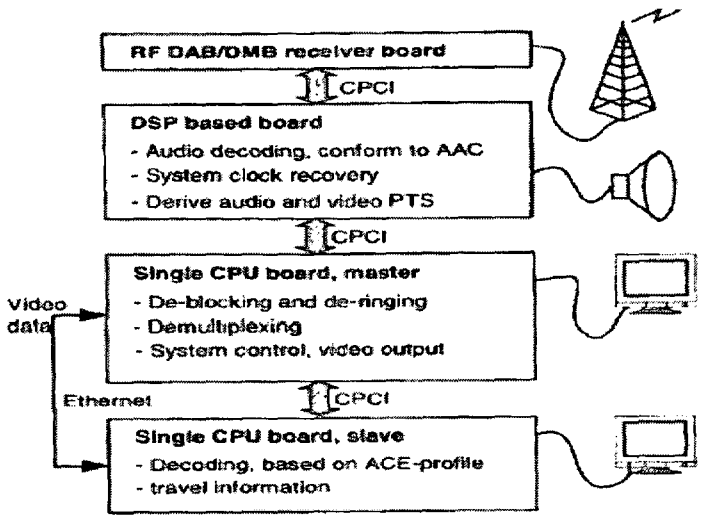
- Modularity and expandability
- The processing of audio and video signals is done in two different subsystems
- Eathernet for dual PIII systems
- Universal interface board for the connection of external sources
- Both audio and video signals are synchronized by timestamps based on 10MHz external clock reference
- To cope with the real-time processing demands, the OS on both subsystems is SMP-Linux with a real time extension



Encoder System

MPEG-4 based DMB Decoder

- consists of two separate CPUs, connected by eathernet
- The OS is Windos NT for both CPU
- The master CPU reads the transport stream from the RF-module and de-multiplexes the audio and video elementary stream
- The audio stream is decoded in DSP-based decoder board
- The audio stream is transferred to the slave CPU, which decodes video data according to the ACE-profile (pre-processing)
- Master CPU finally presents the decoded video sigal
- additional task of slave CPU is to present of information data

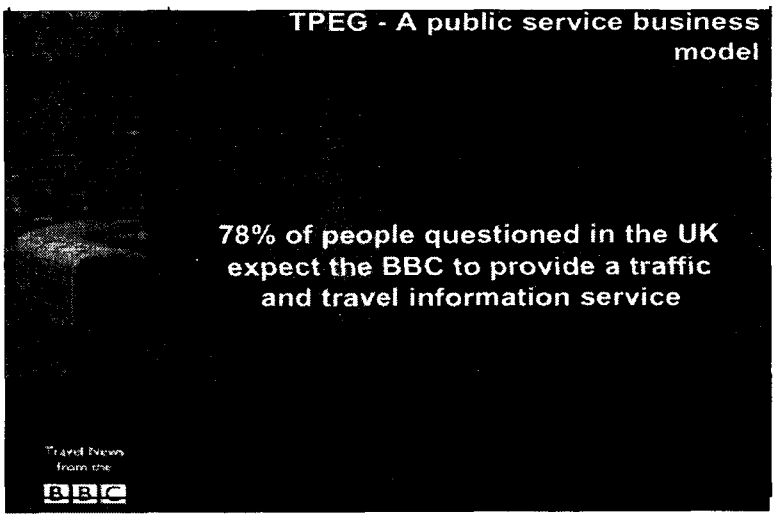


Decoder System

III. ITS Services and DAB

Needs for TTI (Traffic and Travel Information)

- *Where am I ?*
- *How do I get to where I want to go ?*
- *How can I go without getting caught traffic jamming ?*



The need for Traffic information Service using broadcasting : UK

Development of TEPG

- 1997, B/TPEG Project Group in EBU (supported by EC)
- One Message Generation Process – Various Delivery Technologies

  FM (RDS-TMC, DARC), Mobile Comm.System (GSM, CDMA,

  IMT 2000), Internet, DAB, DVB-T
- Wide Range of Receiver could be used for TPEG protocol
- Includes : *Broadcasters, Electronics manufacturers, Digital Mapping Companies, Service Providers, Transmission Operators*
- *RTM (Road Traffic Messages), PTI(Public Transport Information)*

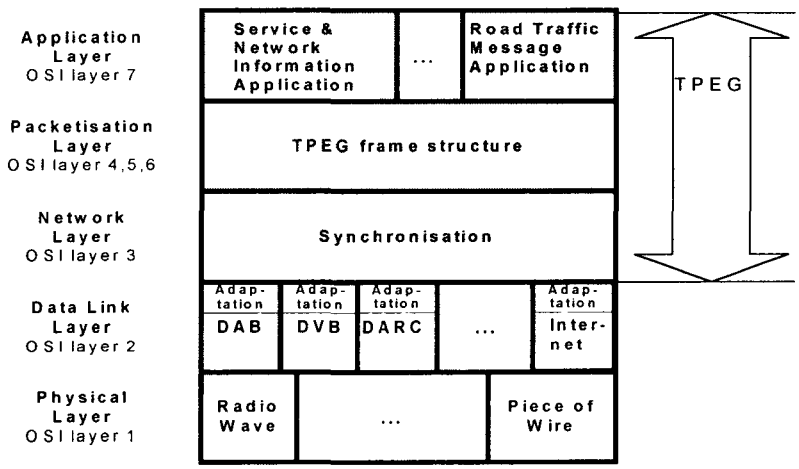
The 4 design goal for TPEG

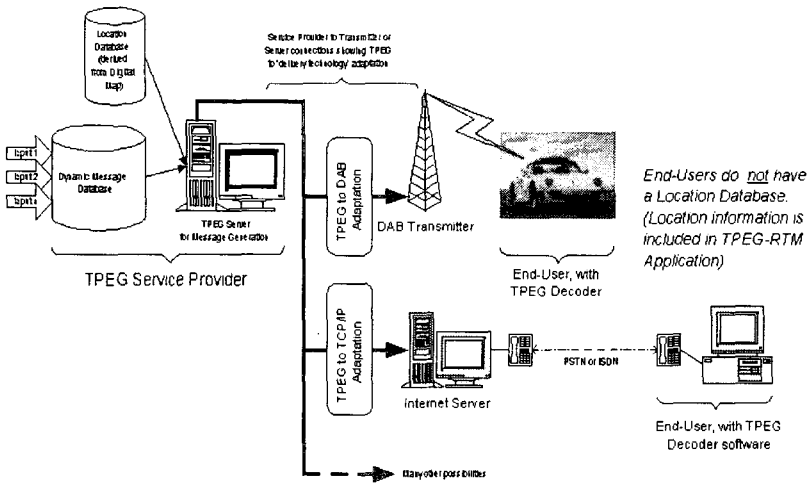
- *to be bearer independent broadcast protocol*
- *to be approapriate to low to high bit rate systems*
- *to provide a rich and flexible description of information*

  to support ITS
- *to be openly specified and appropriate to both commercial*

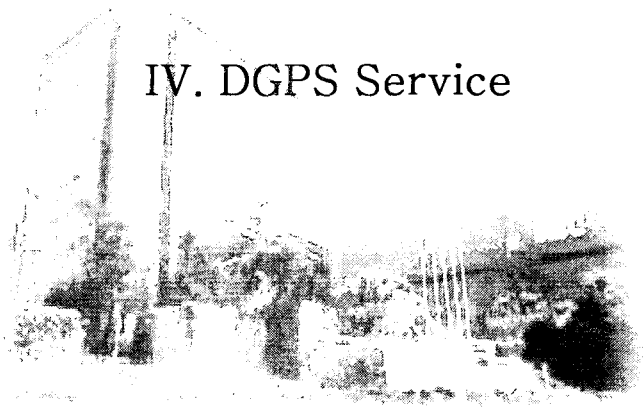
  and public service models of operation

TPEG Layer Model





TPEG System



IV. DGPS Service

Required Accuracy level for DGPS

- Navigation : 1-5 m

  5-10 m
- Construction, : cm
- Accurate Survey : mm
- Personal Mobile Terminal : m

Accuracy of GPS

- Usually under 30 m with fluctuation

  (after exclusion of SA error)

Operation of DGPS System

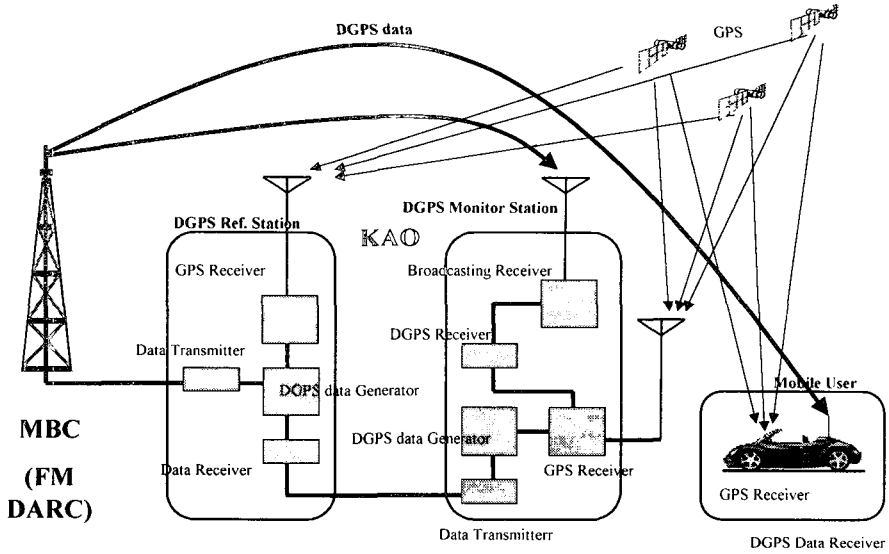
- DGPS referation system

  - receives GPS signal and calculates the errors compared with accurated surveyed points values

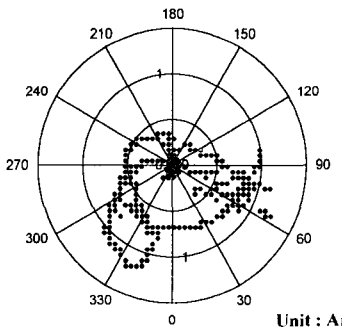
  - transports the calculated DGPS data to broadcasting station
- Broadcasting station

  - broadcasts received DGPS data with minimum time delay
- Mobile station (User)

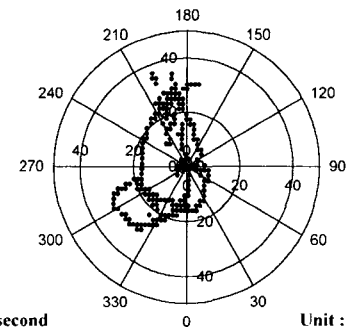
  - receives GPS signal and broadcasted DGPS data simultaneously and calculates the compensated points values



Korean DGPS System



Unit : Arc-second

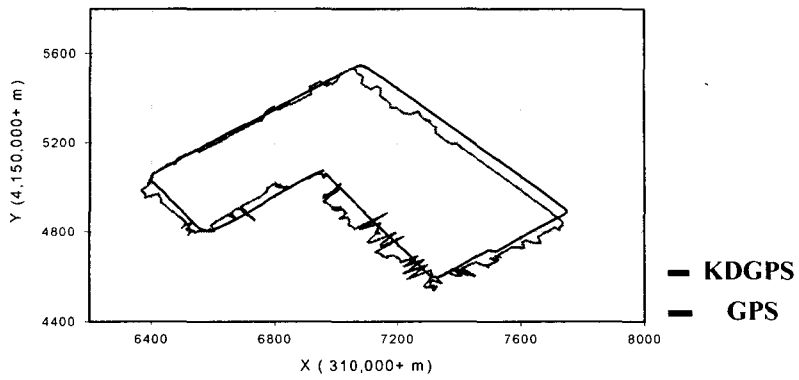


Unit : Meter

Test Site : KwaCheon (9.63Km)		GPS(■)	KDGPS(●)
Numbers of	Average Distance error (2D)	19.589 Meter	1.145 Meter
Observation : 1000	2 drms	32.6785 Meter	2.308 Meter

Stationary accuracy test with Korean DGPS

by MBC & KAO



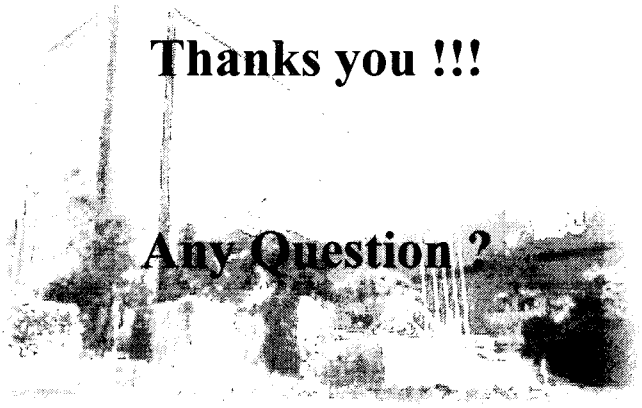
Dynamic accuracy test with Korean DGPS

by MBC & KAO

V. Conclusion

- Various data services will be available with new technology, DAB
- Digital broadcasting systems should not be viewed as competitors to exsisting mobile communication systems
- Combinig the broadcasting channel with mobile communication channel would give a new and efficient mobile service system
- Researches required to find out the service requirements before assigning the broadcasting channel capacity

Thanks you !!!



Any Question ?