



(11) **EP 1 921 776 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
14.05.2008 Bulletin 2008/20

(51) Int Cl.:
H04H 1/00 (2008.01)

(21) Application number: **06291965.9**

(22) Date of filing: **09.11.2006**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR MK RS

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Remarks:
Amended claims in accordance with Rule 137(2) EPC.

(54) **Method of updating a mobile receiver device for accessing digital video broadcast services, mobile receiver device, master update message, and communication system**

(57) A method of updating a mobile receiver device for accessing digital video broadcast services, comprises receiving at a mobile receiver device a master update message comprising master update information for digital video broadcast services available to the receiver device and processing the master update message to determine the master update information. The processing of the master update message is stopped when the de-

termined master update information indicates there is no change to the digital video information broadcast services available to the mobile receiver device. When the determined master update information indicates a change to the available digital video broadcast services, the master update message is processed further to identify the changes and to obtain information for updating the mobile receiver device in response to the identified changes.

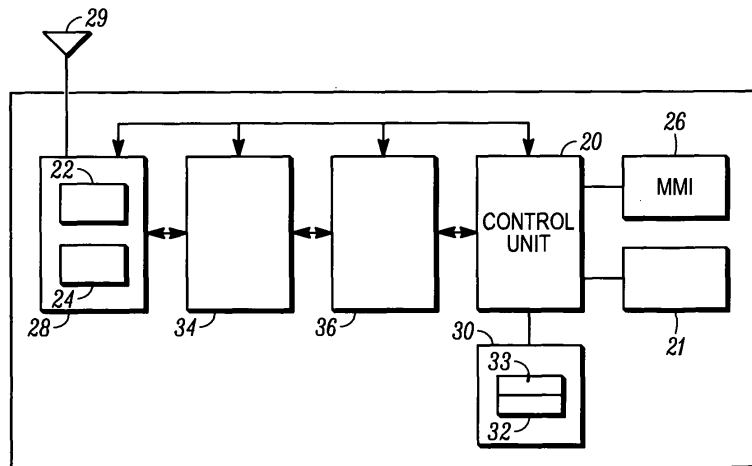


FIG. 2

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Description

Field of the Disclosure

5 **[0001]** This disclosure relates to a method of updating a mobile receiver device for accessing digital video broadcast services, a mobile receiver device, a master update message for providing information to a mobile receiver device for accessing digital video broadcast services, a digital video broadcast network for providing a master update message for providing information to a mobile receiver device for accessing digital video broadcast services and a communication system.

10 Background of the Disclosure

[0002] A standard for Digital Video Broadcast for Handheld devices, known as DVB-H, has been developed that allows for digital video broadcast type services to be received by handheld, mobile devices. DVB-H has been formally adopted as an ETSI standard and is based on the standard for Digital Video Broadcast for Terrestrial digital TV, known as DVB-T but operates in an Internet (IP) environment and has special features to account for the fact that the DVB-H receivers are battery powered devices and are mobile.

[0003] DVB services, whether DVB-T MPEG-2 or DVB-H IP-based services, are multiplexed together and the multiplex is carried on a Transport Stream (TS). The TS may be carried on different radio signals (DVB) signals within a DVB network.

20 **[0004]** In order to enable the DVB-H receiver devices to be configured to access the various DVB-H IP-based services, the DVB-H standards specify a set of messages which are to be broadcast to the DVB-H devices and which provide signalling information. The set of messages are known as Program Specific Information (PSI) tables and Service Information (SI) tables. PSI tables provide information enabling the DVB-H device to de-multiplex the DVB services and the SI tables provide information enabling the DVB-H device to identify the DVB services and information about the DVB network(s) providing the services.

25 **[0005]** These PSI and SI tables are segmented into Multiprotocol Encapsulation (MPE) sections as defined in the DVB-H standard and are inserted into Transport Stream packets, some of the tables with predetermined packet identifiers (PIDs) and others with network operator defined PIDs.

30 PSI tables include:

[0006] Program Association Table (PAT) which table provides a mapping between a program number which is the numeric label associated with a DVB service and the PID of the Program Map Table (PMT);

35 **[0007]** Program Map Table (PMT) which table provides mappings between program numbers and the program elements which are associated with the program numbers (i.e. the program elements which form the DVB service);

[0008] Transport Stream Description Table (TSDDT) which table provides information about the entire Transport Stream, for example the type of target receiver (DVB, Advanced Television System Committee (ATSC) digital television) or the kind of application (e.g. satellite contribution link).

40 **[0009]** Other PSI tables are defined in the DVB-H standard. See for example, section 4.4 of the IP Datacast over DVB-H:PSI/SI specification, DVB Document A079 Rev. 1, November 2005.

SI tables include:

45 **[0010]** Network Information Table (NIT) which table provides information relating to the physical organisation of the multiplexes and Transport Streams within a given DVB network and the characteristics of the DVB network;

[0011] IP/MAC Notification Table (INT) which table is used to signal the availability and location of IP streams within the Transport Streams in DVB networks. In DVB-H, the INT is considered as a service and so it has its own PMT.

[0012] Other SI tables are defined in the DVB-H standard. See for example, section 4.5 of the IP Datacast over DVB-H:PSI/SI specification, DVB Document A079 Rev. 1, November 2005.

50 **[0013]** Once a DVB-H device has set up communication in a DVB network by tuning to the appropriate frequency and starting to receive PSI/SI tables, the device has to regularly check for any update of or changes in the PSI/SI tables. Changes to PSI/SI tables could indicate a change in the DVB services available to the DVB-H device. For example, there may be a change in how the device accesses the DVB services, new DVB services may be available, there may be a change in the IP/MAC address of a service, the start time of a given service may change, and/or there may be a network change such as in the radio interface.

55 **[0014]** The IP Datacast over DVB-H:PSI/SI specification, TS 102470 V1.1.1 (2006-04), specifies that a DVB-H receiver shall keep track of at least four kinds of PSI/SI tables: the NIT (broadcasted at least every 10 seconds), the PAT (broadcasted at least every 100 milliseconds), the PMTs (one per service and broadcasted at least every 100 milliseconds)

and the INT (broadcasted every 30 seconds). In fact, once a device has acquired the INT at least once, it need only monitor the version number of the INT which is also available in the PMT dedicated to the INT. Whether the DVB-H receiver monitors the other PSI/SI tables is optional. In order to monitor these PSI/SI tables, the DVB-H receiver comprises PID filters each of which are assigned to monitor a particular PID of a PSI or SI table. In an example situation in which a multiplex has only ten DVB services available, the requirement that the DVB-H receiver must regularly check the four kinds of PSI/SI tables in order to keep up-to-date, means that the receiver should reserve every 100 milliseconds a minimum of thirteen PID filters to acquire new instances of these tables and check on their version number.

[0015] PID filters are also required to monitor for DVB service messages as well as other signalling messages. However, the DVB-H receiver is limited in the number of PID filters that can be active at the same time. If a sub-set of the receiver PID filtering capabilities was to be reserved permanently for monitoring the PSI/SI tables, this could have a detrimental effect on the DVB services themselves. Thus, the PID filters are not permanently reserved for the PSI/SI signalling information which can result in missing updates and changes to the PSI/SI tables.

[0016] The DVB-H receiver is arranged to monitor for the PSI/SI tables and then parse regularly each of the received PSI/SI tables in order to determine whether updates to the tables has occurred. For example, every 100 milliseconds a PAT table is monitored and the PAT version number checked in order to determine whether the PAT table has been updated since the PAT table last received by the DVB-H receiver. If the version number has changed, the entire PAT table should be parsed and each PMT table referenced in the PAT should be acquired and their version numbers checked to localise precisely the reason for the PAT version number change. The parsing of each of the PSI/SI tables requires processing overhead. For battery operated devices, it is desirable to reduce processing overhead in order to save battery power.

[0017] There is therefore a need for improving how a mobile receiver device is updated for accessing available digital video broadcast services.

Summary of the Disclosure

[0018] In accordance with one aspect of the disclosure, there is provided a method of updating a mobile receiver as recited in claim 1 of the accompanying claims.

Brief Description of the Drawings

[0019] A method of updating a mobile receiver device for accessing digital video broadcast services, a mobile receiver device, a master update message and a communication system, in accordance with the disclosure will now be described, by way of example only, with reference to the accompanying drawings in which:

- FIG. 1 is a block schematic diagram of a DVB communication system;
- FIG. 2 is a block schematic diagram of a mobile receiver device in accordance with an embodiment of the present disclosure; and
- FIGs. 3a-3c is a simplified exemplary process flow diagram showing a method of updating a mobile receiver device for accessing DVB services in accordance with an embodiment of the present disclosure.

Detailed Description of the Drawings

[0020] Referring firstly to FIG. 1, a DVB communication system 2 comprises a DVB network 3 and DVB receivers 14, 16 and 18. The DVB network 3 comprises a television content provider 4 for providing DVB services for digital televisions in the form of MPEG-2 Transport Streams, and a DVB-H content provider which provides DVB services for mobile receiver devices in the form of IP datagrams conveyed on Transport Streams. The DVB-H services are multiplexed with the DVB-T services at multiplexer 8, which may be a broadcast provider, and the multiplexes are provided to a broadcast network operator 10 which distributes the multiplexes on Transport Streams to DVB-T/H transmitters 12. The DVB-T/H transmitters 12 transmits the DVB services and associated signalling information on Transport Streams carried on radio links 13 to DVB-T receivers such as a set-top box 16, and a digital television 14 and to DVB-H mobile receiver devices 18. The mobile receiver device 18 may be a portable or handheld or mobile telephone, a Personal Digital Assistant (PDA), a portable computer, portable television and/or similar devices.

[0021] FIG. 1 shows a shared DVB communication system in which a network of DVB-T transmitters is serving both DVB-H and DVB-T receivers. In an alternative arrangement (not shown), the MPEG-2 services from the television content provider 4 and the DVB-H IP services from the DVB-H content provider 6 may be provided separately and directly to the DVB-T transmitters. In another arrangement (not shown), a dedicated DVB-H communication system having DVB-H transmitters may provide DVB-H services to DVB-H receivers. It will be appreciated that it is not intended to limit the disclosure to the particular arrangement of the DVB communication system of FIG. 1.

[0022] Such DVB communication systems are well known in the art, and therefore the specifics of such systems will not be described in detail, apart from where appropriate for the understanding of the disclosure as described herein.

[0023] FIG. 2 is a partial schematic block diagram of an exemplary mobile receiver device 18. As will be apparent to a skilled person, only those functional components of the mobile receiver device that are necessary for an understanding of the disclosure have been shown and will be described.

[0024] The mobile receiver device 18 comprises a control unit 20 for configuration and control of the mobile receiver device 18. The control unit 20 is communicably coupled to a receiver unit 22 and in the example shown in FIG. 2, also to a transmitter unit 24, to a modulation/demodulation section 34, to a coding/decoding section 36, to a memory 21 and to a Man Machine Interface (MMI) 26. The MMI 26 includes elements such as a key pad, microphone, speaker, display screen, for providing an interface between the mobile receiver device 18 and the user of the mobile receiver device 18. The receiver unit 22 and the transmitter unit 24 are shown in FIG. 2 as part of a transceiver 28 coupled to an antenna 29 but it will be appreciated that the receiver unit 22 and the transmitter unit 24 may be separate components of the mobile receiver device 18.

[0025] The control unit 20 may be a single processor or may comprise two or more processors carrying out all processing required for the operation of the mobile receiver device 18. The memory 21 may be part of the control unit 20 or a separate element. The number of processors and the allocation of processing functions to the processor is a matter of design choice for a skilled person. The mobile receiver device 18 also has a program memory 30 in which is stored a program 32 containing processor instructions for operation of the mobile receiver device 18. The program 32 may contain a number of different program elements or subroutines containing processor instructions for a variety of different tasks, for example, for: communicating with the user via the MMI 26; and processing signalling messages received from the DVB-T/H transmitters 12. A specific PID filter program element 33 is arranged to assign PID filters to monitor for specific PID in received messages.

[0026] As discussed in the introduction, the mobile receiver device 18 is arranged to monitor signalling messages, such as the PSI/SI tables, transmitted by the DVB-T/H transmitters 12. For a signalling message for a particular DVB service, the PID filter program element 33 activates a PID filter for a specific PID associated with the signalling message so that the mobile receiver device 18 can monitor for the signalling message having the specific PID. When a signalling message is received by the mobile receiver device 18, the signalling message is demodulated in modulation/demodulation section 34, the PID of the received signalling message is identified and when a received signalling message having the specific PID is identified, the received signalling message is then decoded in coding/decoding section 36 and passed to the control unit 20 for further processing, including parsing of the message to extract data from the signalling message. The extracted data is stored in memory 21 and will be used to configure the mobile receiver device 18 to receive the DVB service.

[0027] The operation of the mobile receiver device 18 may need to be updated or reconfigured whenever there is a change to the DVB services available to the mobile receiver device 18 in order for the mobile receiver device 18 to receive the DVB services. A change to the digital video broadcast services available to the mobile receiver device may include a change to the DVB services themselves or a change in how the mobile receiver device 18 is to access the DVB services. A change may include for example, new DVB services being made available, existing DVB services being terminated, the start time of a given service being changed, changes in any of the parameters for accessing the existing services, such as changes in PIDs for DVB services and/or PSI/SI tables, changes in the radio links between the DVB-T/H transmitters 12 and the mobile receiver device 18, such as a change in communication channel, other changes in the network 3, such as new neighbour network descriptions when the mobile receiver device 18 roams.

[0028] Changes in the available DVB services will result in changes in the signalling messages. Thus, when there is a change in a DVB service, new versions of the PSI/SI tables associated with the DVB service will be transmitted by the DVB-T/H transmitters 12. The new versions of the PSI/SI tables need to be received, decoded and acted upon in order that the mobile receiver 18 can be reconfigured to receive the changed DVB services.

[0029] In order to avoid the problems associated with having a limited number of PID filters that can be activated at a given time and to reduce the processing overhead for processing of the received messages, the inventors of the present disclosure have created a new signalling message or a master update message which indicates whether the transmitted signalling messages, such as the PSI/SI tables, have been changed or updated.

[0030] In an embodiment, the master update message is a SI table, called the Master Version Table (MVT), that is generated by the network 3 by, for example, the broadcast network operator 10, and transmitted on a known PID, such as the PID of the NIT table or the PAT table, periodically at a predetermined time. For example, every 100 milliseconds.

[0031] The master update message or MVT comprises master update information that is used to determine whether there have been any changes to the digital video broadcast services available to the mobile receiver device 18: in other words to indicate whether there have been any changes to the PSI/SI tables previously received by the mobile receiver device. In an embodiment, the master update information comprises a master version number. If the master version number of the MVT previously received by the mobile receiver device 18 matches the master version number of the most recently received MVT then the mobile receiver device 18 determines that no changes have been made. If there

is a match, the processing of the MVT can then be stopped to save processing overhead.

[0032] The master update information of the MVT further comprises update parameters for each of the transmitted signalling messages, such as the broadcasted PSI/SI tables. The MVT includes the version numbers for all the PSI/SI tables indicated as mandatory in the DVB-H Technical Specification (see above): that is, the NIT, PAT, certain PMTs and INT. The version numbers for the optional PSI/SI tables may or may not be included in the MVT at the option of the broadcast network operator 10. In an embodiment, the update parameter of a PSI/SI table is a version number for that table. As with the master version number, if the version number of a PSI/SI previously received by the mobile receiver device 18 matches the version number of the PSI/SI table in the most recently received MVT then the mobile receiver device 18 determines that no changes have been made to that PSI/SI table. The mobile receiver device 18 need not then monitor for and update that particular PSI/SI table.

[0033] An example of a MVT in accordance with the disclosure is given below.

```

MVT (Master Version Table)
{
15   table_id:8;
      section_syntax_indicator:1;
      version_number:5;
      current_next_indicator:1;
      section_number:8;
20   last_section_number:8;
      section_length:12;
      transport_stream_id:16;
      descriptor_loop_length:12
      for (i=0;i<N;i++)
      {
25         table_id:8;
           version_number:5;
           descriptor()
      }
      CRC32:32;
30 }

```

[0034] The descriptor appearing in the descriptor loop of the MVT is a new descriptor, known as the *table_version_descriptor*. An example is given below.

```

35 table_version_descriptor()
   {

      descriptor_tag:8;
      descriptor_length:8;

40   if(table_id==0x002){
         pid:13;
         change_type:2;
      }
      else{ /*For other tables indicate only the version number
45         and the pid*/
         pid:13;
      }
   }

```

```

50 OR:
MVT (Master Version Table)
{
      table_id:8;
      section_syntax_indicator:1;
55   version_number:5;
      current_next_indicator:1;
      section_number:8;
      last_section_number:8;

```

```

    section_length:12;
    transport_stream_id:16;
    descriptor_loop_length:12
    for (i=0;i<N;i++)
5      {
          descriptor()
      }
    CRC32:32;
}

```

10 **[0035]** With two possible descriptors:

```

mandatory_table_version_descriptor()
{
    descriptor_tag:8;
    descriptor_length:8;
15    for(i=0;i<M;i++)
        {
            if(table_id==0x002) {
                pid:13;
20                change_type:2;
            }
            else{ /*For other tables indicate only the version
                number and the pid*/
                version_number:5;
25                pid:13;
            }
        }
}

optional_table_version_descriptor() {
30    descriptor_tag:8;
    descriptor_length:8;
}

```

Where:

35 The master version number is the field 'version number:5'. The parameter table_id identifies the type of table: 0x000 for PAT, 0x002 for PMT, 0x040 for NIT, 0x04C for INT, etc.; The parameter version_number in the descriptor is the update parameter or version number of the table;
The parameter pid is the PID number on which the table is broadcasted;
The parameter change_type is only applicable to PMT tables. If n is the version number of the MVT, change_type indicates the type of change that occurred between MVT version n-1 and MVT version n.
40 Thus, as an illustration:

change_type=0x00 could indicate an update of the PMT table (previously announced);
change_type=0x01 could indicate a new PMT table; and
45 change_type=0x10 could indicate that a PMT table has been removed.

[0036] The MVT only references PMT tables that have been updated/removed/added between the MVT previously (i.e. version n-1) received and the MVT most recently received (i.e. version n). If no change occurred at all to the PMT tables, there will be no mention of any PMT table in the MVT.

50 **[0037]** The MVT also includes a PID for each of the PSI/SI tables so that in the event a change has occurred and the mobile receiver device 18 is required to acquire the updated version of the PSI/SI table, the PID of the updated PSI/SI table is known and so the mobile receiver device 18 can active the appropriate PID filter at the appropriate time.

[0038] If the version numbers of the optional PSI/SI tables are included in the MVT, they may be included as an optional descriptor that would include an optional table loop descriptor.

55 **[0039]** A method of updating a mobile receiver device 18 in accordance with an embodiment of the disclosure will now be described with reference to FIGs. 1-3a-3c. The steps of the method of FIGs. 3a-3c will be performed in the mobile receiver device 3 under the control of one or more program elements or sub routines of the program 32.

[0040] The method starts at block 40 with the mobile receiver device 18 powering up. At block 42, the mobile receiver

device 18 acquires the PSI/SI tables, including the MVT, transmitted by the network 13 and stores the data extracted from the tables in memory 21. The extracted data includes the version numbers of the PSI/SI tables, including the master version number of the MVT and the PID of the MVT. The PID filter for the PID of the MVT is activated at block 44. The mobile receiver device 18 removes the PID filters for all the PSI/SI tables other than the MVT PID filter. In other words, the mobile receiver device 18 sets a PID filter to monitor for the PID of the MVT and is further arranged so that it does not monitor the PIDs of the other PSI/SI tables.

[0041] At block 46 and periodically every 100 milliseconds say, a new MVT is received by the mobile receiver device 18. The new MVT comprises master update information comprising a master version number, and the update parameters or version numbers of the PSI/SI tables, other than the MVT, being transmitted currently by the network 3. The mobile receiver device 18 processes the new MVT to determine the master version number of the new MVT. If the determined master version number of the new MVT matches the master version number of the MVT previously received by the mobile receiver device 18, as determined in block 48, there has been no change in the PSI/SI tables and the mobile receiver device 18 stops processing the new MVT and waits 100 milliseconds at block 50 before returning to block 46 to receive a new MVT. During this 100 millisecond period, the mobile receiver device 18 may be powered off to conserve battery power.

[0042] If the determined master version number of the new MVT does not match the master version number of the MVT previously received by the mobile receiver device 18, the mobile receiver device 18 processes further, at block 52, the MVT to identify the changes to the available DVB services and to obtain information (that is signalling information relating to the changes to the PSI/SI tables) in order to update or reconfigure the mobile receiver device 18. The mobile receiver device 18 identifies the changes by going through the table_version_descriptor loop in the MVT. More particularly, at block 52, the mobile receiver device 18 begins parsing the MVT in order to determine the version numbers of the PSI/SI, other than the MVT, being transmitted by the network 3.

[0043] First, the mobile receiver device 18 determines whether there is a change in the version number of the NIT table by determining whether the version number of the NIT table in the MVT matches the version number of the NIT table previously received by the mobile receiver device 18, at block 54. If there is a match, there is no change and the flow proceeds to block 56. If there is no match, there is a change in the NIT table and the flow returns to block 42 without processing the rest of the MVT so that the mobile receiver device 13 acquires the PSI/SI tables, including the MVT, currently being transmitted by the network 13 and stores the data extracted from the tables in memory 21 and the process continues to block 44.

[0044] At block 56, the mobile receiver device 18 determines whether there is a change in the version number of the PAT table by determining whether the version number of the PAT table in the MVT matches the version number of the PAT table previously received by the mobile receiver device 18. If there is a match, there is no change and the flow proceeds to block 58. If there is no match, there is a change in the PAT table and there are two options: in option 1, the flow proceeds to block 60 and in option 2, the flow proceeds to block 58. In option 1, the mobile receiver device 18 activates a PID filter for the PID of the PAT table as indicated in the MVT, block 62. The PAT table is received, parsed and the data extracted from the PAT table is stored in memory 21, block 64. The mobile receiver device 18 then activates the PID filters for the PIDs of the required PMT tables as indicated in the parsed PAT table, block 66. The activated PID filter for the PAT table is then removed, block 68.

[0045] At block 58, the mobile receiver device 18 determines whether the end of the PMT loop in the MVT has been reached. If the end has been reached (this will include the situation when there has been no change to the PMT table), the flow proceeds to block 70. If the end has not been reached, the flow proceeds to block 72. At block 72, the type of change to the PMT table is determined from the parameter change_type in the MVT. If the change_type parameter indicates that the PMT table has been removed, then the PID filter is removed, block 74. If the change_type parameter indicates that a new PMT table has been added or the existing PMT table has been updated, then first a PID filter for the PID of the PMT table as indicated in the MVT is activated, at block 76. The PMT table is received, parsed and the data extracted from the PMT table is stored in memory 21, block 78. The activated PID filter for the PMT table is then removed, block 80.

[0046] At block 70, the mobile receiver device 18 determines whether there is a change in the version number of a PSI/SI table other than a NIT, PAT, PMT table by determining whether the version number of the PSI/SI table in the MVT matches the version number of the PSI/SI table previously received by the mobile receiver device 18. If there is a match, there is no change and the flow proceeds to block 82 at which point it is determined whether the end of the MVT has been reached. If the end has been reached, the flow returns to block 46 after waiting 100 milliseconds at block 50. During this 100 millisecond period, the mobile receiver device 18 may be powered off. If the end has not been reached, the flow returns to block 70 to determine whether there is a change in the version number of a PSI/SI table other than a NIT, PAT, PMT table by determining whether the version number of the PSI/SI table in the MVT matches the version number of the PSI/SI table previously received by the mobile receiver device 18.

[0047] If, at block 70, it is determined that there is no match, there is a change in the relevant PSI/SI table and the flow moves to block 84 in which the mobile receiver device 13 activates the PID filter for the PID of the relevant PSI/SI

table as indicated in the MVT, receives, parses and extracts data from the relevant PSI/SI table and removes the activated PID filter for the relevant PSI/SI table. After block 84, the flow proceeds to block 82.

[0048] In the embodiment shown in FIGs. 3a-3c, the PSI/SI tables are considered in a particular order. For example, the NIT table is considered first due to the fact that a change in the NIT table identifies a network change which means that all the PSI/SI tables are required to be updated. It will be appreciated that the disclosure is not limited to the particular order shown in FIGs 3a-3c.

[0049] By having a master update message that provides information on whether the DVB services available to the mobile receiver device has been changed, the mobile receiver in accordance with the present disclosure is only required to monitor one master update message in order to keep track of updates to signalling information associated with the available DVB services instead of keeping track of several signalling messages.

[0050] This means that only one PID filter is required to be active which means that there are more PID filters available for the DVB services themselves. Moreover, since the master update message includes master update information for the master update message, if the master update information indicates there has been no change in the DVB services, then the processing of the master update message can be stopped which saves on processing overhead. In an embodiment, in which the master update information includes update parameters for each of the signalling messages, then again by determining whether changes have occurred to the signalling messages from the update parameters, appropriate steps can be taken which may not require the signalling messages themselves to be fully processed (e.g. parsed). This saves on processing overhead.

[0051] Saving processing overhead, and only requiring one master update message to be monitored periodically, provides significant saving in power consumption which can help prolong battery life.

Claims

1. A method of updating a mobile receiver device for accessing digital video broadcast services, the method comprising:

receiving at a mobile receiver device a master update message comprising master update information for digital video broadcast services available to the receiver device;

processing the master update message to determine the master update information;

stopping the processing of the master update message when the determined master update information indicates there is no change to the digital video broadcast services available to the mobile receiver device;

processing further the master update message when the determined master update information indicates a change to the available digital video broadcast services to identify the changes and to obtain information for updating the mobile receiver device in response to the identified changes.

2. A method according to claim 1, wherein the master update information comprises a master version number of the master update message, wherein the stopping the processing of the master update message step comprises stopping the processing when the master version number of the received master update message matches the master version number of a previously received master update message.

3. A method according to any preceding claim, wherein the master update message further comprises a predetermined identifier PID, and the method further comprises the step of:

monitoring for the predetermined identifier PID of the master update message at a predetermined time.

4. A method according to any preceding claim, wherein the monitoring step comprises activating a PID filter in the mobile receiver device corresponding to the predetermined identifier PID of the master update message to monitor for a master update message corresponding to the predetermined identifier PID.

5. A method according to any preceding claim, further comprising the steps of:

receiving by the mobile receiver device signalling messages relating to the digital video broadcast services available to the mobile receiver device and a master update message corresponding to the signalling information; and

storing information including the master update information of the received master update message and information from the received signalling messages.

6. A method according to any preceding claim wherein the master update message is a master Service Information table.

- 5
7. A method according to any preceding claim, wherein the master update information comprises update parameters for signalling messages for the digital video broadcasting services, wherein the processing further step comprises processing the update parameter of at least one signalling message to determine whether the signalling message has changed.
- 10
8. A method according to claim 7, wherein the update parameter is a version number and wherein the processing further step comprises determining whether the version number of the signalling message in the master update message matches the version number of the signalling message previously received by the mobile receiver device.
- 15
9. A method according to claim 7 or 8, wherein the master update message further includes an identifier PID for each signalling message and the method further comprises when a signalling message has changed receiving and decoding a signalling message corresponding to a predetermined identifier PID for the changed signalling message.
- 20
10. A method according to claim 9, further comprising activating a PID filter in the mobile receiver device corresponding to the predetermined identifier PID to monitor for the signalling message corresponding to the predetermined identifier PID.
- 25
11. A method according to claim 10, wherein the signalling messages are Program Specific Information PSI tables and Service Information SI tables for the available digital video broadcast services.
- 30
12. A mobile receiver device for accessing digital video broadcast services, the mobile receiver device comprising:
- a receiver unit for receiving a master update message comprising master update information for digital video broadcast services available to the receiver device; and
- a control unit coupled to the receiver unit for processing the master update message to determine the master update information, for stopping the processing of the master update message when the determined master update information indicates there is no change to the digital video broadcast services available to the mobile receiver device and for processing further the master update message when the determined master update information indicates a change to the available digital video broadcast services to identify the changes and to obtain information for updating the mobile receiver device in response to the identified changes.
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13. A mobile receiver device arranged in operation to perform the steps as recited in any one of the claims 1-11.
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14. A master update message for providing information to a mobile receiver device for accessing digital video broadcast services, the master update message comprising:
- master update information comprising update parameters for a plurality of signalling messages for the digital video broadcast services, each of the update parameters including a version number of an associated signalling message of the plurality of signalling messages, wherein in operation the mobile receiver device is arranged to process the received master update message in order to determine whether there has been a change to the digital video broadcast services and when a change is determined, to process the update parameters in order to identify the changes and to obtain information for updating the mobile receiver device in response to the identified changes.
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15. A master update message according to claim 14, wherein the master update information further comprises a master version number of the master update message, and wherein in operation, the mobile receiver device is arranged to process the master update message to determine the master version number and to stop processing the master update message when the master version number of the received master update message matches the master version number of a previously received master update message.
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16. A master update message according to claim 14 or 15, further comprising a predetermined identifier PID, the mobile receiver device being further arranged in operation to monitor for the predetermined identifier PID of the master update message at a predetermined time.
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17. A network for generating and providing the master update message according to claim 14, 15 or 16.
18. A communication system for providing digital video broadcast services comprising:

a mobile receiver device according to any one of claims 12 and 13; and
a network for providing the master update message for providing information to the mobile receiver device for
accessing digital video broadcast services.

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Amended claims in accordance with Rule 137(2) EPC.

1. A method of updating a mobile receiver device for accessing digital video broadcast services according to signalling
messages including PMT signalling messages, the method comprising:

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receiving at a mobile receiver device a master update message comprising master update information for digital
video broadcast services available to the receiver device, the master update information comprising a change
type parameter for each changed PMT signalling message indicating how the PMT signalling message has
changed and an identifier PID for the changed PMT signalling message;

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processing the master update message to determine the master update information;
stopping the processing of the master update message when the determined master update information indicates
there is no change to the digital video broadcast services available to the mobile receiver device;

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processing further the master update message when the determined master update information indicates a
change to the available digital video broadcast services to identify the changes and to obtain information for
updating the mobile receiver device in response to the identified changes.

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2. A method according to claim 1, wherein the master update information comprises a master version number of
the master update message, wherein the stopping the processing of the master update message step comprises
stopping the processing when the master version number of the received master update message matches the
master version number of a previously received master update message.

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3. A method according to any preceding claim, wherein the master update message further comprises a predeter-
mined identifier PID, and the method further comprises the step of:

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monitoring for the predetermined identifier PID of the master update message at a predetermined time.

4. A method according to any preceding claim, wherein the monitoring step comprises activating a PID filter in the
mobile receiver device corresponding to the predetermined identifier PID of the master update message to monitor
for a master update message corresponding to the predetermined identifier PID.

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5. A method according to any preceding claim, further comprising the steps of:

receiving by the mobile receiver device signalling messages relating to the digital video broadcast services
available to the mobile receiver device and a master update message corresponding to the signalling messages;
and

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storing information including the master update information of the received master update message and infor-
mation from the received signalling messages.

6. A method according to any preceding claim wherein the master update message is a master Service Information
table.

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7. A method according to any preceding claim, wherein the master update information comprises update parameters
for signalling messages other than PMT signalling messages for the digital video broadcasting services, wherein
the processing further step comprises processing the update parameter of at least one signalling message to
determine whether the signalling message has changed.

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8. A method according to claim 7, wherein the update parameter of a signalling message is a version number and
wherein the processing further step comprises determining whether the version number of the signalling message
in the master update message matches the version number of the signalling message previously received by the
mobile receiver device.

9. A method according to claim 7 or 8, wherein the master update message further includes an identifier PID for
each signalling message and the method further comprises when a signalling message has changed receiving and

decoding a signalling message corresponding to a predetermined identifier PID for the changed signalling message.

5 **10.** A method according to claim 9, further comprising activating a PID filter in the mobile receiver device corresponding to the predetermined identifier PID to monitor for the signalling message corresponding to the predetermined identifier PID.

11. A method according to claim 10, wherein the signalling messages are Program Specific Information PSI tables and Service Information SI tables for the available digital video broadcast services.

10 **12.** A method according to any preceding claim, wherein when the change type parameter of a changed PMT signalling message indicates the PMT signalling message is new or has been updated, the method further comprises receiving and decoding the changed PMT signalling message corresponding to the identifier PID for the changed signalling message and when the change type parameter of a changed PMT signalling message indicates the PMT signalling message has been removed, then removing a PID filter in the mobile receiver device corresponding to the identifier PID of the removed PMT signalling message.

15 **13.** A mobile receiver device for accessing digital video broadcast services according to signalling messages including PMT signalling messages, the mobile receiver device comprising:

20 a receiver unit for receiving a master update message comprising master update information for digital video broadcast services available to the receiver device, the master update information comprising a change type parameter for each changed PMT signalling message indicating how the PMT signalling message has changed and an identifier PID for the changed PMT signalling message; and

25 a control unit coupled to the receiver unit for processing the master update message to determine the master update information, for stopping the processing of the master update message when the determined master update information indicates there is no change to the digital video broadcast services available to the mobile receiver device and for processing further the master update message when the determined master update information indicates a change to the available digital video broadcast services to identify the changes and to obtain information for updating the mobile receiver device in response to the identified changes.

30 **14.** A mobile receiver device arranged in operation to perform the steps as recited in any one of the claims 1-12.

35 **15.** A master update message for providing information to a mobile receiver device for accessing digital video broadcast services according to signalling messages including PMT signalling messages, the master update message comprising:

40 master update information comprising a change type parameter for each changed PMT signalling message indicating how the PMT signalling message has changed and an identifier PID for the changed PMT signalling message and update parameters for a plurality of signalling messages other than PMT signalling messages for the digital video broadcast services, each of the update parameters including a version number of an associated signalling message of the plurality of signalling messages, wherein in operation the mobile receiver device is arranged to process the received master update message in order to determine whether there has been a change to the digital video broadcast services and when a change is determined, to process the update parameters in order to identify the changes and to obtain information for updating the mobile receiver device in response to the identified changes.

45 **16.** A master update message according to claim 15, wherein the master update information further comprises a master version number of the master update message, and wherein in operation, the mobile receiver device is arranged to process the master update message to determine the master version number and to stop processing the master update message when the master version number of the received master update message matches the master version number of a previously received master update message.

50 **17.** A master update message according to claim 15 or 16, further comprising a predetermined identifier PID, the mobile receiver device being further arranged in operation to monitor for the predetermined identifier PID of the master update message at a predetermined time.

55 **18.** A network for generating and providing the master update message according to claim 15, 16 or 17.

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19. A communication system for providing digital video broadcast services comprising:

a mobile receiver device according to any one of claims 13 and 14; and
a network for providing the master update message for providing information to the mobile receiver device for
accessing digital video broadcast services.

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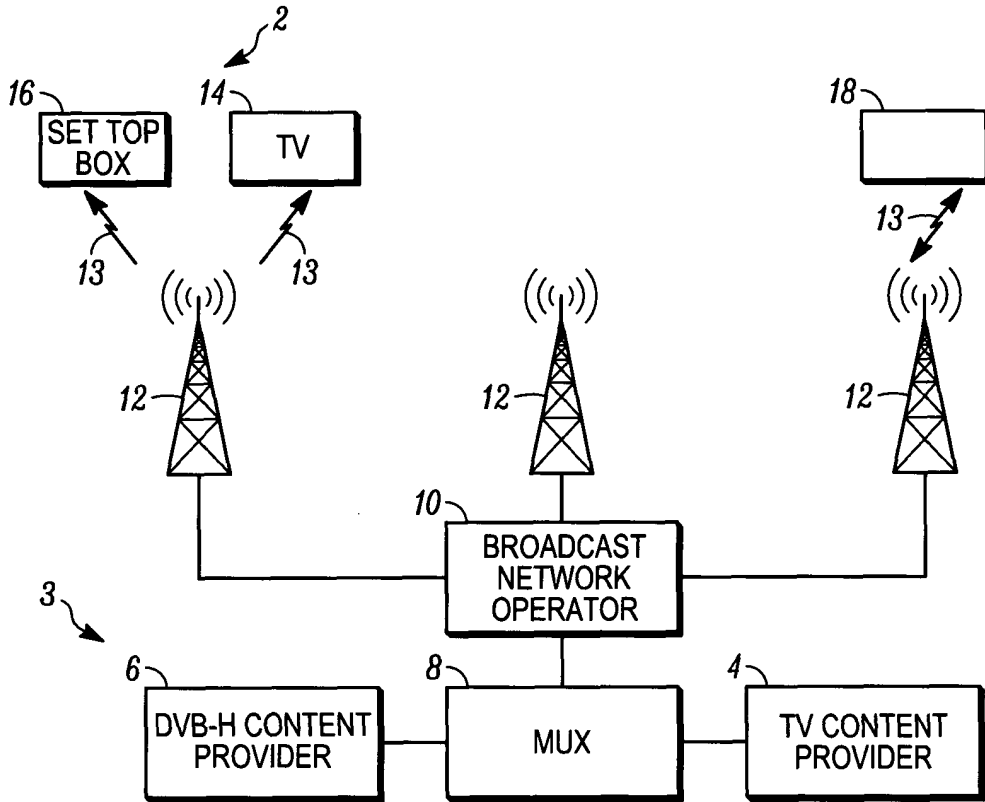


FIG. 1

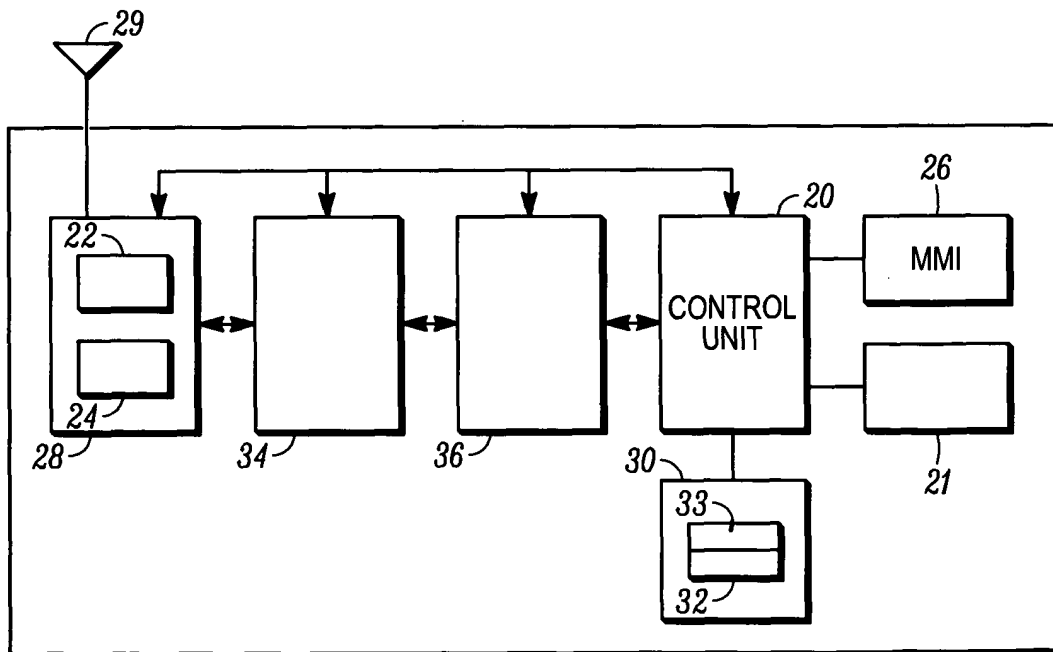


FIG. 2

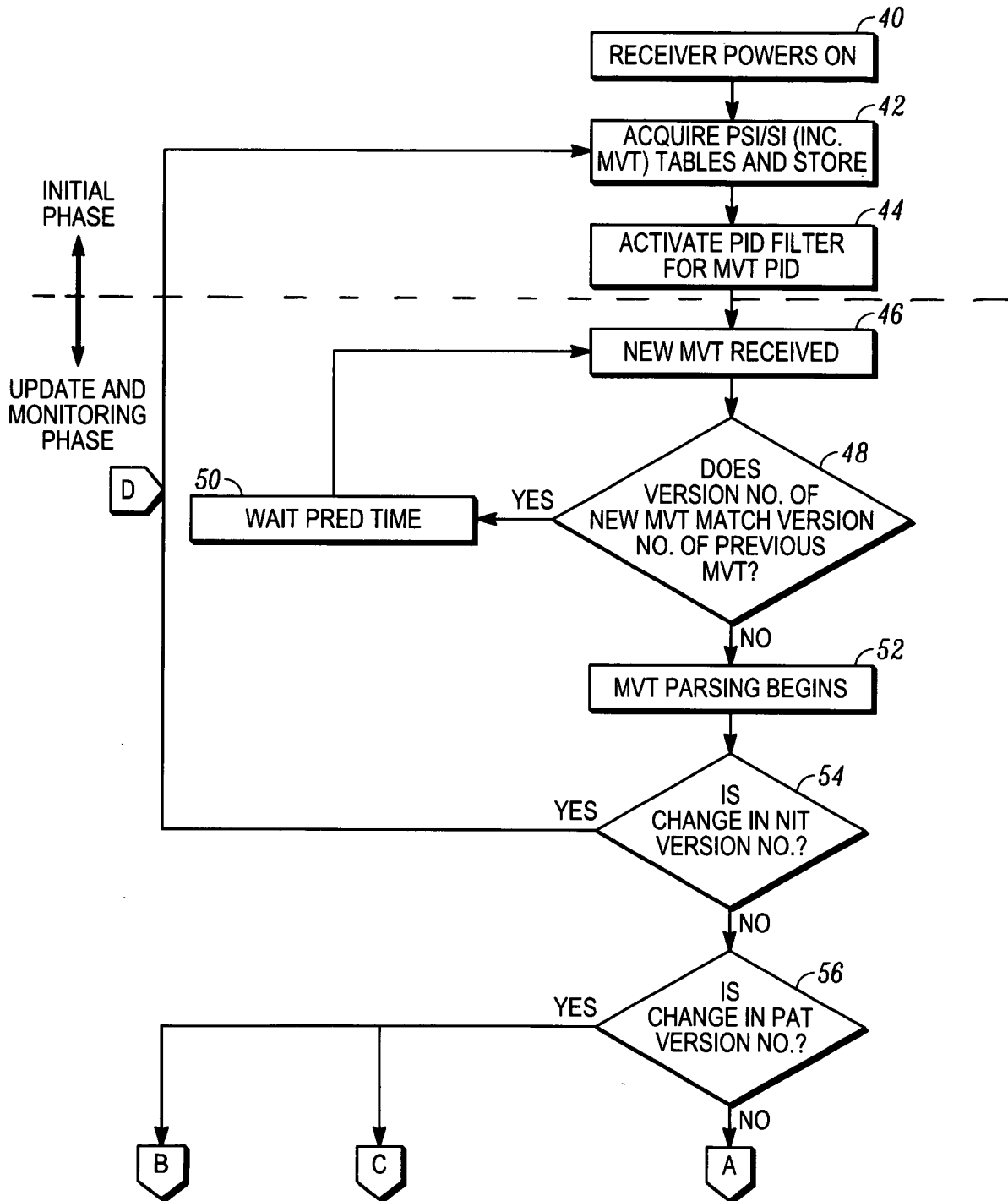


FIG. 3A



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			H04H H04N
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		28 March 2007	TORCAL SERRANO, C
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

28-03-2007

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82