TESCOM

Measuring Instruments for Wireless Communications

TC-2300A/B DAB/DMB Tester

Application Note 002

Packet Mode Test Using TC-2300A/B

Version 1.0

(S/W Version 1.400)

2006 / 06 / 09

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TC-2300A Packet Data mode

Overview

The packet mode allows different data service components to be carried within the same sub-channel. The permissible data rates for the sub-channel shall be multiples of 8 kbit/s. Data may be carried in data groups ([1], see clause 5.3.3) or transported using only packets, Fig. 1. The value of the DG flag ([1], see clause 6.3.2) indicates the mode used.

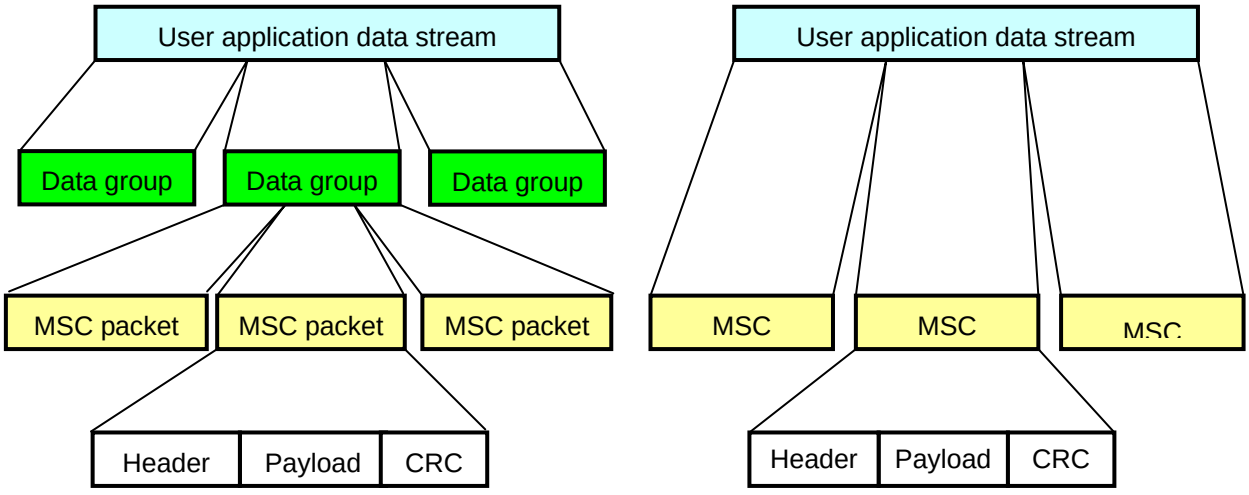


Fig. 1. Packet data with and without data groups.

Within the MSC sub-channel frame, several packets from different applications can be transmitted simultaneously, Fig. 2. Padding packets are inserted if the current packet does not fit into the space left in the sub-channel frame or when application data is unavailable. However, ***at present, TC-2300A supports only one application per service component***.

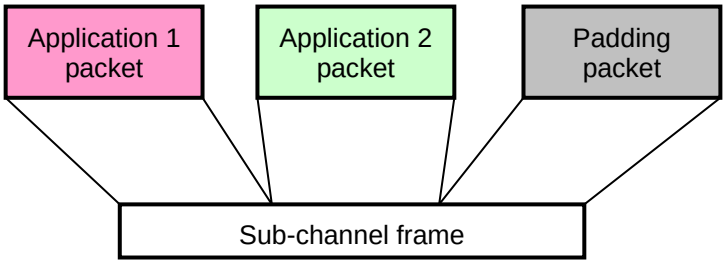


Fig. 2. Sub-channel frame structure

MSC data service in packet mode is allowed to have bit rate multiples of 8 kbit/s. As frames are transmitted in bursts with periods of 24 ms, the sub-channel frame length for a given bit rate *BR* (in units of kbit/s) can be found as follows:

$$FL = BR \times t = BR\left[\frac{kbit}{s}\right] \times t\left[\frac{s}{frame}\right] = BR\left[\frac{kbit}{s}\right] \times 0.024\left[\frac{s}{frame}\right] = 3 \times BR\,\frac{bytes}{frame}.$$

For example, at a bit rate of 32 kbit/s, the sub-channel frame length is 3×32 = 96 bytes. Four packet lengths are defined: 24, 48, 72, and 96 bytes. Therefore, in the just mentioned example, the sub-channel frame may carry four packets that are each 24 bytes long, two packets that are 48 bytes long, two packets that are 24 bytes long and one packet that is 48 bytes long, etc.

The beginning of a packet (either data or padding packet) must coincide with the beginning of the MSC sub-channel frame. The packet may not be split between sub-channel frames.

Tester operation

TC-2300A is capable of transmitting user supplied data files. Data files must contain properly formatted sequences of sub-channel frames. Application programs and testers must ensure that frames will properly map onto the sub-channel.

User application settings

Select the “Packet” check box. If the data stream does not contain repetitions of the service, it is a good idea to check the “Repeat” option also. From the drop-down list located in the bottom part of the screen, select the appropriate bit rate of the service component.

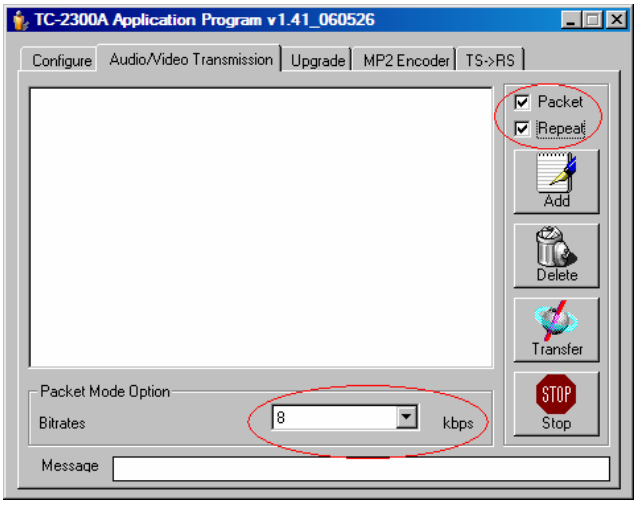


Fig. 3. User application settings.

Tester settings

In the MCI screen for Service Component 1 (SC1) or Service Component 2 (SC2), select:

- TYPE: PACKET.
- SOURCE: EXTERNAL
- BIT RATE: according to prepared file.

Other settings are defined as follows.

DSCTy (Data Service Component Type) should contain a decimal number describing the type of service. According to [2], the following settings are defined:

Dec	DSCTy types
0	Unspecified data
1	Traffic message Channel (TMC)
2	Emergency Warning System (EWS)
3	Interactive Text Transmission System (ITTS)
4	Paging
5	Transparent Data Channel (TDC)
24	MPEG-2 Transport Stream, see [30]
59	Embedded IP packets
60	Multimedia Object Transfer (MOT)
61	Proprietary service: no DSCTy signaled
62	Not used
63	Not used

Table 1: DSCTy types

NOTE: BWS uses DSCTy equal to 60 (MOT).

ADDRESS. This field must contain the address used for data packet encoding.

DG. Data group flag. ON if data groups are used. This must correspond to the settings of the user file encoding.

AppType. User Application type (see [1], clause 8.1.20). The following settings are currently defined:

User Application Type (hexadecimal)	User Application	Reference
0x000	Reserved for future definition	
0x001	Not used	
0x002	MOT Slideshow	TS 101 499 [22]
0x003	MOT Broadcast Web Site	TS 101 498 [21]
0x004	TPEG	

0x005	DGPS	
0x006	TMC	TS 102 368 [23]
0x007	EPG	TS 102 818 [24]
0x008	DAB	Java TS 101 993 [25]
0x009	DMB	TS 102 428 [31]
0x00a to 0x3ff	Reserved for future definition	
0x400 to 0x449	Reserved for proprietary applications	
0x44a	Journaline®	Fraunhofer IIS
0x44b to 0x7ff	Reserved for proprietary applications	

Table 2 User Application types

AppData. Used to signal application specific information. The interpretation of these fields is determined by the user application as identified by the User Application Type. At present, TC-2300A supports only one user application and user application data is limited to 1 byte, whose value is assigned by this setting.

For application type MOT BWS, user application data defines ProfileId as follows ([3]):

ProfileId	Description	Specification reference
0x00	Reserved	
0x01	Basic Integrated Receiver	Profile see 7.2.1
0xFF	Unrestricted (PC)	Profile see 7.2.2

Table 3 Registered BWS profiles

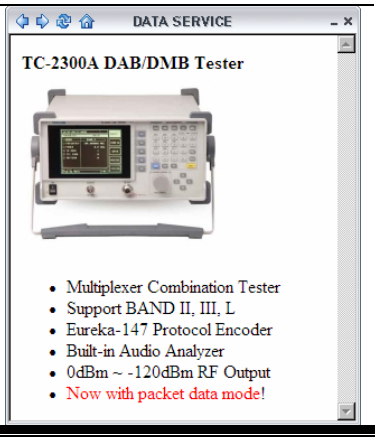
Built-in packet data mode service component

TC-2300A firmware contains a built-in prerecorded packet data service component. This is “Service Component 10”. Its parameters are set as follows:

Parameter	Value
Bit rate	32 kbps
Error protection	EEP A-3
DSCTy	MOT
User Application Type	MOT BWS
ProfileId	0x01 (Basic Integrated Receiver)

NOTE: The “service component 10” can be linked to “Service 1” or “Service 2” through the MCI/Service menu. This service component is also hardlinked to “Service 6”. By default, this service is off. It can be turned on through the MCI/ENSMBL menu.

Built-in service component broadcasts BWS application. It consists of 3 web-pages:

Home	About	TC-2300A
		

The total size of the broadcasted stream is 6,692 bytes; the files broadcasted are:

File	Size, bytes
About.html	355
Index.html	286
tc-2300a.html	498
img\logo_main.gif	2007
img\tc_2300a.jpg	3546
Total	6692

The stream combines data groups of types 3, 4, and 6. More specifically, it broadcasts both MOT headers and the MOT directory. The MOT header of “index.html” also contains a “Label” parameter that allows pilot receivers to identify the default start object.

References

[1] ETSI EN 300 401: "Radio broadcasting systems; Digital Audio Broadcasting (DAB) to mobile, portable and fixed receivers".

[2] ETSI TS 101 756: "Digital Audio Broadcasting (DAB); Registered Tables".

[3] ETSI TS 101 498-1: "Digital Audio Broadcasting (DAB); Broadcast website; Part 1: User application specification".