

# RadioText Plus (RT+)

## Specification

(Version 2.1)

### 1. Foreword

RT+ has been developed jointly by the Westdeutscher Rundfunk WDR, Nokia and the Institut für Rundfunktechnik IRT. WDR is a broadcaster, Nokia is manufacturer for mobile phones and IRT is a research institute.

The RT+ specification was edited by IRT and Nokia and is maintained by IRT. If a company applies this specification in its devices, it is obliged to indicate this to IRT (contact [richter@irt.de](mailto:richter@irt.de)), so it can be informed about the latest status of the specification. The application of the specification is free of charge.

### 2. Introduction

RT+ is designed to let the listener (or user) take additional benefit from the RDS RadioText service, by enabling receivers to offer him/her direct access to specific elements of RadioText messages (e.g. to the title of the currently broadcast song, to news, to telephone numbers such as those used for voting, to web addresses for browsing web content offered by the radio programme provider etc.). These **RT+ information elements** carried in the **RDS RadioText (RT) messages**, are identified by their location within the RT messages and by the class code of their **Content Type**. So a receiver is able to store the different RT+ information elements and the listener may then select and request a specific content type from the storage at any instant in time that fits the listener's needs. The advantage of this method is that the listener is no longer forced to watch a lot of information passing by. He/she rather gets the opportunity to select specifically his/her favourite information to be shown on a static display. Moreover RT+ gives the possibility to present selected RT message elements to car drivers on a quasi static display without any major risk of distracting the attention of the driver. Furthermore RT+ is well suited for mobile phones with built-in RDS FM receivers: telephone numbers may be routed directly from the RT to the dialer. Last but not least RT+ can also be used for radio broadcasting via DVB-S (see 6). It may be useful for DRM and DAB, as well.

RT+ is based on RDS RT messages and is completely backwards compatible to the RT. All additional information necessary for implementing the RT+ service is carried in the RDS group 3A and in an appropriate RDS ODA group (see Figure 1).

RT+ information elements		
RT Message	RT+ identification	RT+ tags
RDS group 2A/B	RDS group 3A	RDS ODA group xA

*Figure 1: RT+ information elements*

### 3. RT+ tag

When an RT message like "You are listening to "House of the rising sun" by Eric Burdon" is sent out, the RT+ information elements Title and Artist are marked by two RT+ tags.

An **RT+ tag** consists of three elements

- RT Content Type
- Start Marker pointing to the position (inside the RT message) of the first character of that RT+ information element
- Length Marker indicating the additional length (in addition to the character at the start position) of that RT+ information element

The Content Type is taken from a list with 64 entries (see Table 1).  
For the example given above the two tags are as follows:

RT Content Type	ITEM.TITLE
Start Marker	22
Length Marker	22

RT Content Type	ITEM.ARTIST
Start Marker	50
Length Marker	10

Start Marker and Length Marker can be derived from the following scheme below:

```
You are listening to "House of the rising sun" by Eric Burdon
0----0----1----1----2----2----3----3----4----4----5----5----6----
0----5----0----5----0----5----0----5----0----5----0----5----0----
```

**Note:**

The addresses of the RT characters range from 0 to 63, so the start marker can take the same values.  
The length marker is ranging from 0 to 63 and from 0 to 31 respectively (see 5.2).  
If two RT+ elements are contained in the RT, they shall not overlap.  
The tag information sent out shall not change during the lifetime of the associated RT.

## 4. RT+ information elements and data model

The content of RT+ information elements is carried in RDS RT messages. Their content is classified as content type and is given as a code in the RT+ tag.

### 4.1. List of RT Content Types

The list of defined Content Types is given in Table 1. There are 64 classes of Content Types available which a programme service provider can offer and the listener can select from, each with a specific class code. The classes can be grouped in the following **categories**:

- **Item**  
The programme is made up of a sequence of programme items<sup>1</sup>, corresponding to an entry in a programme schedule. A programme item may consist again of several programme elements. For all programme elements which can be designated by RT+ classes of the category Item in Table 1 this specification uses the term "Item". In popular music programmes an Item is a song, in a programme with classical music it may be a complete symphony. A speech based programme item may also be assembled from different Items.<sup>2</sup> Programme elements like "News" and "Talk" as shown in 4.3 (example 2 and example 3) are not Items, as there do not exist any appropriate RT+ classes of the category item in Table 1.  
An Item can be described by one, several or even all classes of this category, but for the duration of the Item, the associated RT+ information element of each class can only have a single value, e.g. the RT+ information element classified as Title will remain fixed to "House of the rising sun" until the start of the next song.
- **Info**  
RT+ information elements of this category carry textual service information that is more or less unrelated to the audio service, but is offering important additional information to the listener, including info about alarms, advertisements and events.
- **Programme**  
Content types of this category are describing the programme service.

<sup>1</sup> In RDS we can identify those with PIN codes

<sup>2</sup> A programme item may consist of only one element (e.g. radio play) and can also be designated by RT+ classes of the category Item in Table 1

- **Interactivity**  
Telephone numbers, SMS numbers, e-mail addresses or web addresses (URLs) are given. The listener may send contributions to chat conversations to a chat center. These contributions may be broadcast by the radio station. Questions for voting may be sent as RT+ content. The listener may send his/her response back to the vote center.
- **Private classes**  
While all other classes describe precisely the Content Type, also to permit their interpretation by automatic routines within the receiver terminal or by a human user, the Private classes can be freely defined just as required for a specific programme service provider. The interpretation is then dependent on the programme service and does require a template on the receiver terminal. A program provider may supply his customers with special receivers where the facilities to interpret his own Private classes are built in. In this case no template is required.
- **Descriptors**  
An RT+ information element belonging to one of the categories above, can be complemented by an information element of the category descriptor. Both, shall always be transmitted in the same RT just as the corresponding tags in the same application group.  
As an example: the descriptor GET\_DATA contains the url-address or the SMS number for retrieving more data describing the RT+ element the descriptor is referring to. So the listener can get access to more information for the music item, special news, events etc.

## 4.2. Structures of RT+ information elements

For some classes, RT+ information elements may be structured by the programme service provider following a general pattern: e.g. results of football matches may be given as Content Type INFO.Sport with two parts, one indicating the match and the other the result.

*"Bayern München:AC Milano 5:5"*

This specification generalises the scheme given above as follows:

The different parts are separated by two or more consecutive space/blank characters<sup>3</sup> – i.e. redundant spaces. The redundant spaces serve as a delimiter between these parts. The first part is called the "Key Word" and will be used primarily for explanation of the text which follows.

The key word carries an explanation for the user, whereas the second part may also carry a phone number, the SMS- or MMS-number or the email address to be contacted.

This scheme permits an advanced receiver to accumulate all information (carried in the sequence of RT+ information elements of the same Content Type) and then to build one table for presentation to the user.

This scheme may be used for the categories "Info", "Programme" and "Interactivity", primarily for the denoted classes (see Table 1). It shall not be used for the categories "Item" and "Descriptor".

For explanation the following examples are given for different Classes, first lines indicating the structure, and then a line giving a specific example:

- INFO.STOCKMARKET  
[Name\_\_Latest value in €] or more extended:  
[Name\_\_Latest value in €\_\_Change\_\_High\_\_Low\_\_Volume] e.g.  
*"Nokia\_\_12.27\_\_0.41\_\_12.31\_\_12.15\_\_23,332,238"*
- INFO.SPORT  
[Match\_\_Result] or more extended:  
[Kind of Sport\_\_Match\_\_Result] e.g.  
*"Fussball\_\_Bayern München:AC Milano\_\_5:5"*
- INFO.WEATHER  
[Description\_\_Temperature] e.g.  
*"Raining\_\_16 Grad C"* or  
*"Munich\_\_23 Grad C"*

<sup>3</sup> In the examples given in this text a blank is notated with " \_ "

- INTERACTIVITY.PhoneOther  
[Description\_ Phone Number] e.g.  
"Deutsches Museum\_089323990"

If it makes sense, elements may be omitted from the right in a given structure (e.g. INFO.STOCKMARKET: "Nokia\_12.27\_0.41\_12.31\_12.15")

Alternatively the description of the classes PHONE.OTHER, SMS.OTHER, EMAIL.OTHER and MMS.OTHER may be put into tag 1 and the second part, i.e. the phone number or the address, will be put into tag 2. This gives then the text editor more freedom to introduce some additional glue words in the RT message.

Example: "The match Bayern München:AC Milano ended 5:5"

Note:

RT messages may contain several space characters for optimizing the layout in static displays. However if the RT messages are used in context with a RT+ service, redundant spaces in parts marked by RT+, are only allowed for the purpose of delimiting two or more parts of the RT+ content.

### 4.3. Receiver data model

The RT+ feature is designed to allow a broad range of receiver models with different display capabilities and memory complexity to be used. The broadcaster may provide special radio skins (templates) for presenting RT+ information on the receiver display. Each programme provider may deposit various templates for different programme types on a web server<sup>4</sup>. This web server can be addressed by the receiver for downloading a particular template (see also 5.1). This requires the receiver to be able to download actively external data (pull information by unicast, e.g. using a telephone connection).

A simple receiver will store a small selection of RT+ information classes only. The storage will contain only the current content of the RT+ classes. The storage of a given Class will be overwritten by a new version of that same Class. The receiver may offer a choice to the listener to enable a selection of any particular, RT+ Class to be presented to him/her on the display. For example a listener may want to see one or several RT+ information classes of the category Item simultaneously, i.e. Title and Artist of the currently received Item.

More complex receivers will store not only the current content of several classes, but will use a memory to keep the information collected during the past. For reviewing then the list of earlier received Items, it is essential for the receiver that it can combine the different RT+ information elements (received at different times) correctly so that elements of different Items are not mixed. For that purpose an Item toggle bit changes every time a new Item starts and the Item running bit indicates whether the Item is still running. Both bits are sent continuously together with every pair of the RT+ tags.

The following examples show the setting of the Item toggle bit and the Item running bit for different audio sequences.

Example 1:

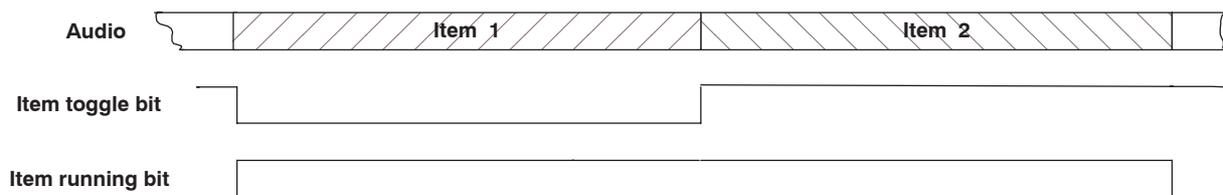


Figure 2: RT+ information of the category Item (see Table 1) will be attached to the programme elements Item 1 and Item 2

<sup>4</sup> To be defined

### Example 2:

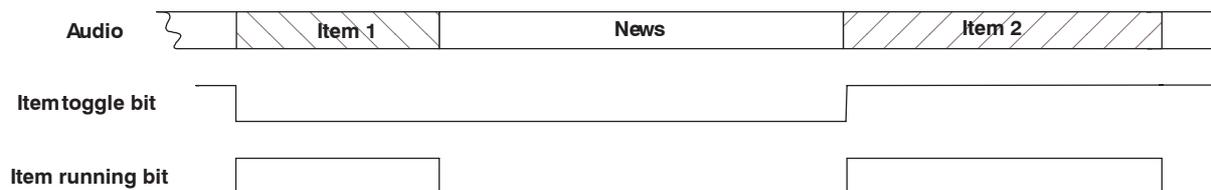


Figure 3: RT+ information of the category Item will be attached to the programme elements Item 1 and Item 2, but not to the programme element News

### Example 3:

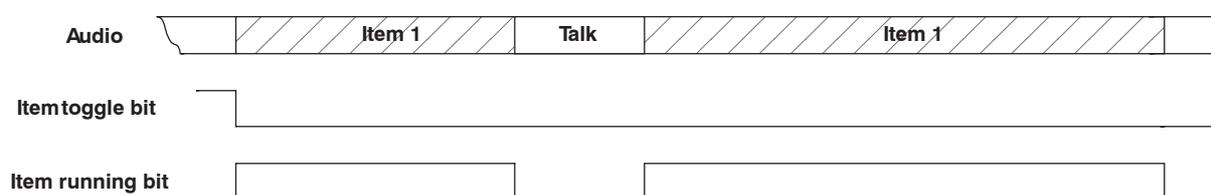


Figure 4: RT+ information of the category Item will be attached only to the programme element Item 1, but not to the programme element Talk

Receivers can provide more convenience by assembling an ordered cumulative list of all RT+ elements of a specific class, e.g. the class INFO.SPORT may be displayed as list of the football match results. This is easy to implement for those classes of the category INFO, that use redundant space characters as a delimiter between several parts of the text. The first part, the keyword, can be then used to establish a table which is ordered according to the keywords. Updating is also possible, if the keyword is not changed.

Note:

The broadcaster may set the Item toggle bit and the Item running bit as required. The default setting for both, the Item toggle bit and the Item running bit, is "0". However, in such a case no specific RT+ information can be attached to any of the Items by the receiver.

## 5. Coding RT+ in RDS groups

To transmit the RT+ tags the Open Data Application feature of RDS (ODA, see IEC 62106 sections 3.1.4 and 3.1.5.4) is used and the necessary details are being defined by this specification.

The Application Identification (AID) assigned to RT+ is 4BD7 (hex). The message bits of group 3A carry control data for the application. The tag information to identify the RT+ information elements within the RT is carried by the application group. Only type A groups can be used.

### 5.1. RT+ identification (RDS group 3A)

The coding of the message bits of group 3A (Application Identification for the ODA RT+) is shown in Figure 2.

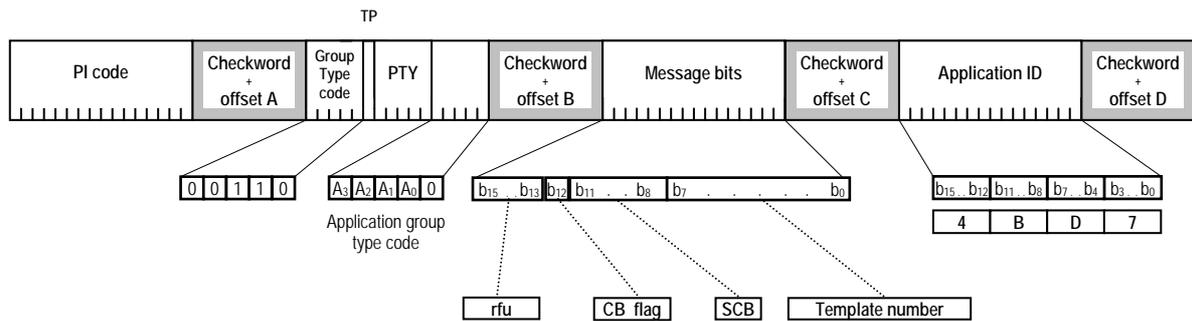


Figure 5: Bit allocation for group 3A (message bits and AID)

Application group type code:

The group type for transmitting the RT+ application data can be chosen from Table 6, IEC 62106 section 3.1.4.1. The group type code is signaled in block 2 of the 3A group.

The meaning of the message bits of group 3A is as follows:

- **rfu**  
Reserved for future use, and not affecting any of the functions of the other bits. The rfu bits shall be set to zero until they are defined.
- **CB flag**  
The CB flag gives the information if there is a template available for the ongoing programme. The template may already be present in the receiver (downloaded previously) or can be downloaded currently if the user wants it. The identification of the desired template is accomplished by sending back from the receiver terminal to the web server the PI code (and if possibly also the extended country code), the Server Control Bits and the template number. If the CB flag is set to "0", no special radio skin (template) is available and Server Control Bits and Template number bits are reserved for future use. If the CB flag is set to "1", a special radio skin (template) is available for the ongoing transmission.
- **Server Control Bits (SCB)**  
It may occur, that the same PI code is used repeatedly within a national area (e.g. for local programme stations far away from each other). In these cases the Server Control Bits are used to distinguish between programmes using the same PI code.  
Note:  
The Server Control Bits are allocated by the operator of the web server.
- **Template number**  
The Template number gives the number of a specific template out of a choice of templates provided by the broadcaster. Up to 256 templates per programme service can be addressed.

## 5.2. Coding of the RT+ tag

In the message bits of the RT+ application group two RT+ tags are conveyed. All RT+ Classes or Content Types can be put into the one or the other tag of the application group. If an RT+ information element contains more than 32 characters, the associated tag information shall be coded in tag 1. Content Types of the category Descriptor are always referring to the Content Type in the other tag (in the same application group) and this gives then additional information.

The start addresses in the tags may be chosen according to the needs during the RT generation. Therefore the sequence of the tags in the application group does not determine the sequence of the information elements in the RT.

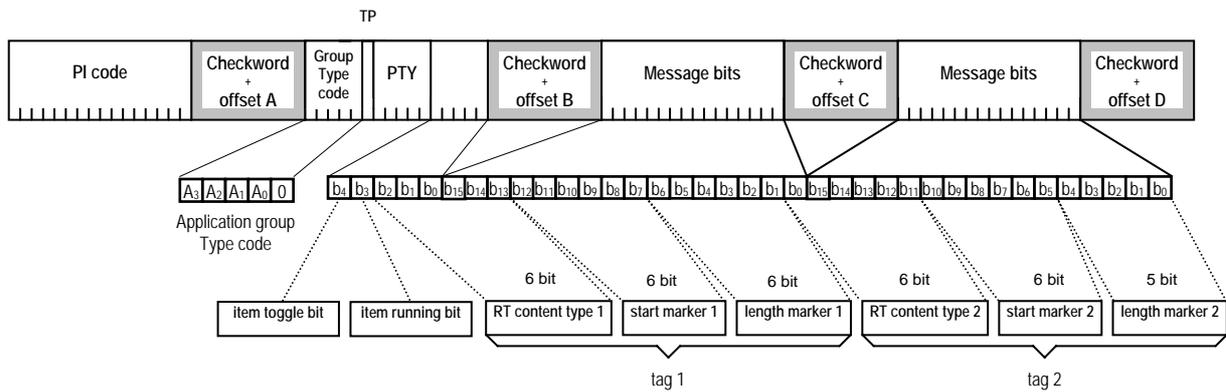


Figure 6: Coding of the message bits of the application group

The meaning of the message bits is as follows:

- Item toggle bit**  
 This bit shall be toggled when a new Item<sup>5</sup> starts.
- Item running bit**  
 This bit shall be set to 1 if an Item is running. Otherwise it shall be set to 0.  
Note:  
 The Item toggle bit and the Item running bit will be set or reset independently from the tag information sent out currently.  
 In the receiver these two bits may be used to group all Content Types of the category Item sent for one item and store them in memory (subsequently for several items) or, when storing and presenting information for only one Item, to delete all information belonging to the elapsed Item before starting to gather information for the new one. Even though not intended by this specification, these bits may be used for recording purposes.
- RT Content Type**  
 This 6 bit value specifies the tags by assigning to them a Content Type according to the Class codes given in Table 1.  
 If only one RT+ information element (tag) is used, then the Content Type in the second tag shall be set to "Dummy". If no RT+ information element is existing the Content Type in both tags shall be set to "Dummy". In both cases, the bits in the start and length markers are then undefined.
- Start marker**  
 This 6 bit value indicates the position of the first character of the RT+ information element within the RT.  
 (Start marker 0: means the first character in the RT)
- Length marker**  
 This 6 bit (or 5 bit for length marker in tag 2) value gives the additional length (number of characters following the first character at the start position) of the RT+ information element.  
Note:  
 As it is not permitted that RT+ information elements overlap, only one element can comprise more than 32 characters and 5 bits are then sufficient for coding the length marker in tag 2.

<sup>5</sup> Item means a specific programme element (see also 4.1 and Table 1)

There is no specific clear command. Clearing will be done by overwriting the content of a class with one or more blank(s) taken as “RT+ element” out of the current RT. This assumes, that the current RT contains at least one blank and at least one tag is unused and available to address the class to be cleared.

Example:

```
Hotline: 0123456677
0----0----1----1----2----2----3----3----4----4----5----5----6----
0----5----0----5----0----5----0----5----0----5----0----5----0----
```

RT Content Type	PHONE.HOTLINE
Start Marker	9
Length Marker	9

RT Content Type	INFO.NEWS
Start Marker	8
Length Marker	0

The second tag information (transmitted simultaneously with the RT “Hotline: 0123456677”) will cause to delete the previously sent message of the class INFO.NEWS

Note:

If a class of the category Item is cleared, all classes of category Item shall be cleared.

## 6. Broadcasting conventions

When RT+ information is generally available, RDS 3A groups with AID = “4BD7” shall be transmitted at least every 10 seconds. During the lifetime of a RT containing RT+ information elements application groups carrying the tags, shall be sent with a minimum frequency of 0.5 groups per second. The tag information sent out shall not change during the period of the associated RT (Item toggle bit and Item running bit may change).

The RT A/B flag shall be toggled when the RT changes and the RT+ tag information for the application group shall be sent to the RDS encoder immediately after the new RT.

To transmit RDS data over DVB channels (e.g. for FM feeder link applications) the ancillary data field in the MPEG audio frame is used. The RT and RT+ information may also be decoded and displayed by DVB Set Top Boxes.

Data shall be encoded using the RDS Universal Encoder Communication Protocol (RDS Forum: UECP, SPB 490 Version 6.01). The transmission method is described in DVB-document TM-GBS0275 and will be incorporated in Specifications EN 300 468 and TR 101 154.

If RT+ information is not only intended for FM rebroadcasting, but also for DVB receivers, the associated ODA application data shall be transmitted with the UECP command “ODA data” (MEC 46). For RDS encoder requirements, MEC 40 and MEC 42 respectively may be used in addition.

## 7. Receiving conventions

When the receiver detects a change in the RT A/B flag (indicating a new message) RT decoding and decoding of RT+ tags may start simultaneously and RT+ information elements may be displayed or stored once the corresponding part of the RT is received completely error-free.

The different RT+ information (classes) may be stored and then be displayed automatically or when the user retrieves a certain Content Type. For certain Content Types it may make sense to save more

than the current or the last information in the memory ( e.g. a list of the titles belonging to the last 10 items).

Depending on the reception conditions it may be necessary to evaluate the tag information of a few application groups before decoding RT+ information.

## **8. Marking**

Equipment implementing RadioText Plus should be marked with the designation "RT+".

Table 1: List of RT+ Content Types (RT+ Classes)

Category	Code	RT+ Classes	MP3 id3v2		Description
Dummy	0	DUMMY_CLASS			To assign a class if the RadioText contains no RT+ information
Item	1	ITEM.TITLE	TIT2	TITLE	Title of item; e.g. track title of an album
	2	ITEM.ALBUM	TALB	ALBUM	The collection name to which this track belongs
	3	ITEM.TRACKNUMBER	TRCK	TRACKNUM	The track number of the item on the album on which it was originally released.
	4	ITEM.ARTIST	TPE1	ARTIST	A person or band/collective generally considered responsible for the work
	5	ITEM.COMPOSITION	TIT1	COMPOSITION	A complete composition (Classical Music broadcasters should use this item to identify the composition)
	6	ITEM.MOVEMENT	TIT3	MOVEMENT	A movement is a large division of a composition or musical form (Classical Music broadcasters should use this item to identify the movement)
	7	ITEM.CONDUCTOR	TPE3	CONDUCTOR	The artist(s) who performed the work. In classical music this would be the conductor
	8	ITEM.COMPOSER	TCOM	COMPOSER	Name of the original composer/author
	9	ITEM.BAND	TPE2	BAND	Band/orchestra/accompaniment/musician
	10	ITEM.COMMENT	COMM	COMMENT	Any comment related to the content
	11	ITEM.GENRE	TCOM	CONTENTTYPE	The main genre of the audio, e.g. "classical", "hip-hop", "jazz", "oldies", "drama", etc
Info	12	INFO.NEWS			Message / headline
	13	INFO.NEWS.LOCAL			Local news
	14	INFO.STOCKMARKET (4)			Quote information; either as one part or as several distinct parts: "name__latest value __change __high __low __volume" (1)
	15	INFO.SPORT (4)			Result of a game; either as one part or as several distinct parts: "match__result", e.g. "Bayern München : Borussia __5:5"
	16	INFO.LOTTERY (4)			Raffle / lottery: "key word __values"
	17	INFO.HOROSCOPE (4)			Horoscope; either as one part or as two distinct parts: "key word __text", e.g. "sign of the zodiac __blablabla"
	18	INFO.DAILY_DIVERSION			Daily tipp / diversion / joke ...
	19	INFO.HEALTH (4)			Information about health: "key word __info"
	20	INFO.EVENT			Info about an event
	21	INFO.SZENE			Information about scene (hot locations to be, ...)
	22	INFO.CINEMA			Information about movies in cinema
	23	INFO.TV			Information about TV-movies
	24	INFO.DATE_TIME			Information about date and time (receiver to chose between date and time). Not CT (Clock Time); shall not be used to set the internal clock of a device
	25	INFO.WEATHER (4)			Information about weather; either as one part or as two distinct parts: "key word __info", e.g. "Rain __17C"
	26	INFO.TRAFFIC			Information about traffic. This shall not replace TMC but rather alert users in case of exeptional traffic news
	27	INFO.ALARM			Alarm information
	28	INFO.ADVERTISEMENT			Info about an advertisement. May be in parallel to an audio advertisement
	29	INFO.URL (4)			Link to url; either as one part or as two distinct parts: "key word __url"
	30	INFO.OTHER (4)			Other information, not especially specified: "key word __info"
Programme	31	STATIONNAME.SHORT			Name describing the radio station (call letters)
	32	STATIONNAME.LONG			Name describing the radio station
	33	PROGRAMME.NOW			EPG info programme now
	34	PROGRAMME.NEXT			EPG info programme next
	35	PROGRAMME.PART			Part of the current radio show; e.g. one or more part of the PROGRAMME.NOW
	36	PROGRAMME.HOST			Name of the host of the radio show
	37	PROGRAMME.EDITORIAL_STAFF			Name of the editorial staff; e.g. name of editorial journalist
	38	PROGRAMME.FREQUENCY (4)			Information about radio shows. A link towards another frequency with other content (not AF list). May be one part or two distinct parts: "key word __frequency"
	39	PROGRAMME.HOMEPAGE	WORS	WWWRADIOPAGE	Link to radio station homepage
	40	PROGRAMME.SUBCHANNEL			For so-called multicasting applications; may be one part or two distinct parts: "key word __subchannel"
Interactivity	41	PHONE.HOTLINE			The telephone number of the radio station's hotline
	42	PHONE.STUDIO			The telephone number of the radio station's studio
	43	PHONE.OTHER (4)			Name and telephone number; either as one part or as two distinct parts: "key word __phone number"
	44	SMS.STUDIO			The sms number of the radio stations studio (to send directly a sms to the studio)
	45	SMS.OTHER (4)			Name and sms number; either as one part or as two distinct parts: "key word __sms number"
	46	EMAIL.HOTLINE			The email adress of the radio stations hotline
	47	EMAIL.STUDIO			The email adress of the radio stations studio
	48	EMAIL.OTHER (4)			Name and email adress; either as one part or as two distinct parts: "key word __email address"
	49	MMS.OTHER (4)			Name and mms number; either as one part or as two distinct parts: "key word __mms number"
	50	CHAT			chat content: sent by users to a specific adress and broadcasted by the radio station
	51	CHAT.CENTER			Address, where replies to the chat shall be sent (may be url or sms)
	52	VOTE.QUESTION			A question (typically binary) which can be answered by "yes" or "no" or "1" or "2"
	53	VOTE.CENTER			url or sms number to send the answer to
rfu	54			Classes are reserved for future usage	
	55				
Private classes (2)	56				
	57				
	58				
Descriptor (3)	59	PLACE			Adds info about a location
	60	APPOINTMENT			Adds info about date and time
	61	IDENTIFIER	TSRC	ISRC	For music it is the International Standard Recording Code ( <a href="http://www.ifpi.org/isrc/">http://www.ifpi.org/isrc/</a> )
	62	PURCHASE	WPAY	WWWPAYMENT	Address where item can be purchased, can be an url or a sms-number
	63	GET_DATA			Retrieves either via an sms or url-link more data about the other RT+ information element of the same RadioText message. (Info request via point to point - unicast)

(1) V = blank; two or more consecutive blanks act as a separator between several parts of the RT+ information element (see 4.2)

(2) Private classes may be defined by the service provider (see 4.1)

(3) Descriptor will always define the other RT+ information element of the same RadioText message

(4) For this classes the RT+ information element may be structured as described in 4.2