



## **Free to Air Satellite Receiver Requirements Profile**

### **For New Zealand Free to Air Digital Broadcasting**

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# 1 Introduction

## 1.1 Proposition

This baseline Profile, which is based upon open standards, is for a Digital Satellite TV receiver for reception of free to air or unencrypted services. The service Freeview/DTH+(working title) will build on the existing services already broadcast unencrypted by TVNZ to receivers deployed for the Sky Network Television (pay-tv) service (Sky) and to a small existing population of FTA receivers. The newly created Freeview digital television services will represent NZ Free-to-Air broadcasters and will primarily broadcast to a branded Freeview receiver.

Freeview/DTH will enhance the existing TVNZ FTA offering by adding newly created channels and services that will generally be broadcast with the same digital transmission parameters and be operationally compatible with the proprietary Sky receiver population. The EPG and interactive services however will be provided by a middleware application programme interface that is different from that provided as part of the Sky subscription services.

Items in this specification are divided into Required and Optional categories. Where a feature is stated as Required its inclusion is necessary for the achievement of a minimum compliance with Freeview transmission requirements. Additional Optional functions may be added by the vendor to enhance the consumer proposition and these will be welcomed by Freeview. In order to be compliant, where a feature is Optional and is included in an offered receiver design, the optional feature must be implemented in accordance with the associated referenced specifications.

This specification is not a comprehensive list of all relevant standards relating to consumer equipment that can provide digital satellite reception but rather a list of those standards considered relevant to Freeview requirements.

The profile is based upon the UK DTG D-Book which references open standards, such as DVB, or includes open implementations which are in use on the UK DTT platform. Changes and additions have been made in this document to suit the required digital satellite platform in New Zealand.

## 1.2 Purpose

The purpose of this document is to describe the requirements for a Freeview branded Free to Air satellite receiver for New Zealand and to refer to detailed specifications that are required for conformant implementation. The profile is in the form of a hardware specification outline, together with an overview of software requirements. The software is to be routinely capable of being upgraded via through-the-air-download



### 1.3 Scope

The document sets out to identify the baseline functional specification of an MPEG-2 standard definition Freeview digital satellite receiver. It does not cover cosmetic or manufacturing design, nor does it cover any possible further requirements for extension. This document covers traditional set-top boxes only. It is recognised that other receiver types, including integrated Digital TVs and Personal Video Recorders, are feasible however these are outside the scope of this document.

It is intended that a satellite receiver conforming to this profile should comprise part of a domestic installation, in conjunction with an external, fixed satellite antenna and LNB (together ~~the~~ the outdoor unit) connected to the receiver input. The receiver output(s) will connect to the television display (and possibly other domestic equipment).

The Freeview service will make use of transmissions from the Optus D1 satellite to be located at 160\_ East. The transmissions may be either vertically or horizontally polarised and will be defined within the NIT tables via the `satellite_delivery_system_descriptor` (tag 0x43).

### 1.4 Glossary

D-Book	See technical standards listed elsewhere in this document
DTT	Digital Terrestrial Television
DVB	Digital Video Broadcast organisation
DTG	Digital Television Group . a UK digital television industry organisation
EPG	Electronic Programme Guide
Freeview	Working title for the service proposition in NZ
FTA	Free to Air
LNB	Low-Noise Block downconverter
LO	Local Oscillator
MHEG-5	A standard devised for the middleware for interactive services. MHEG stands for <del>M</del> Multimedia and Hypermedia information coding Expert Group+
May	Indicates an event or provision which is permitted, but not mandatory
Must	Indicates that a third party must comply to ensure correct operation
(present tense)	Indicates an existing provision
Region	A bouquet as defined in the Bouquet Association Table
STB	Set-Top-Box, which is equivalent to a digital satellite receiver
Shall	Indicates a mandatory provision
Should	Indicates a desirable, but not mandatory, provision

Transport Stream (TS)	A data structure defined in ISO/IEC 13818-1
Will	Indicates an assumption about existing states or future events

## 1.5 References

[D-BOOK]	Digital Television Group: Digital Terrestrial Television, Requirements for Interoperability, Issue 4.0
[ETSI-MHEG]	MHEG Broadcast Profile ETSI ES 202 184 v1.1.1
Logical Channel Numbering	The logical channel numbering specification used is the Australian variation to the UK specification. It is titled %Free TV Australia Operational Practice OP-41+and can be viewed at < <a href="http://www.freetvaust.com.au/SiteMedia/w3svc087/Uploads/Documents/18efb4b4-cd30-4da4-a3ae-5fb4f4b64884.pdf">http://www.freetvaust.com.au/SiteMedia/w3svc087/Uploads/Documents/18efb4b4-cd30-4da4-a3ae-5fb4f4b64884.pdf</a> >

## 2 Overview

This specification uses the UK DTG D-BOOK(V4) as its primary reference, in particular Chapter 22, Receiver Requirements, and Chapters 23-27 relating to receiver behaviour and diagnostics with changes/modifications to suit digital satellite broadcasting in New Zealand.

### 3 Receiver Profile

Item No.	Resources	Reference/Detail	Notes	
1		The processing power and memory configuration of the receiver must be suitable for the routine operation of FTA digital satellite reception, (DVB-S), together with the embedded operation of MHEG-5 Version 1.06 NZ-variant applications, and the provision of the routine replacement of all software via <del>through-the-air-download</del> . The related parameter limits specified in this section are believed to be the minimum necessary to achieve these requirements; however vendors are invited to vary these parameters if they can demonstrate that all functional requirements can be met with their own varied configuration.		
1	<b>DRAM</b>	16 MBytes minimum	Suggested for minimum baseline functionality	
1.1	Flash	4 Mbytes Minimum . single bank (foreground download)	Suggested for minimum baseline functionality	
1.2	NVM	256 KBytes - may be part of 4Mbyte Flash using flash file system	Suggested for storage of application data/cookies etc.	
1.3	CPU power	120 MIPS minimum	Suggested for minimum baseline functionality	
2	<b>Services Summary</b>	<p>The receiver must give access to all NZ free-to-view broadcast digital satellite television, radio and enhanced/interactive television services. This must include the capability to efficiently handle Teletext and DVB subtitles, Digital Text and Enhanced Broadcast elements of all services. It must present subtitles when broadcast and if requested by the viewer; manage the output video in both widescreen 16:9 and 4:3 picture formats to suit the connected display.</p> <p>Where possible receivers should be able to present both subtitles and interactive graphics simultaneously. However, not all receivers may be able to do this, the result being that interactive content will not always be available to viewers that wish subtitles to be presented.</p> <p>Support for Audio Description is optional. If included, function shall be in accordance with D-Book, Section 4.5</p> <p>The receiver shall also be capable of utilising DVB Bouquet Association Tables and Logical Channel Numbering that may be broadcast within the Freeview DVB-SI transport streams, in order to be able to implement the Freeview regional services requirement. This regional services requirement is described in Section 5 of this document.</p>		
2.1	<b>Time-exclusive services</b>	The receiver shall handle the transition between the active and inactive states of a time exclusive service in an orderly fashion, presenting clean transitions into and out of video, audio and interactive content streams without presentation of any content or application not intended for the selected service.		
<b>3.0</b>	<b>Functions</b>			
3.1	MPEG2 audio, video	D-Book Sections 2, 3 and 4 . ISO/IEC 13818 . MPEG2 MP@ML, Video resolution 720x576 (PAL), Audio MPEG/Musicam Layer 1&2, audio mode stereo. Sampling rate 32, 44.1 & 48 KHz	Req	
3.2	Subtitles	D-Book Section 5	Req	ETSI EN 300 743
3.3	Display of subtitles during enhanced programming	Where both are components of a service, ability to simultaneously present both Subtitles and interactive application graphics if required by viewer preferences. (D-Book sections 17.4 and 15.2)	Opt	Receivers that are capable of simultaneously presenting both subtitles and interactive application graphics must observe the rules enabling applications to suspend presentation of Subtitles where editorially required.

Item No.	Resources	Reference/Detail	Notes	
3.4	Teletext	<p>A receiver shall either:</p> <p>a/ have the facility to acquire teletext as defined in EN 300 472 (DVB: Specification conveying ITU-R System B Teletext in DVB Bitstreams) and reinsert it in the vertical blanking interval (VBI) of the composite video output according to specification ITU-R BT.653-2, Teletext Systems</p> <p>and / or</p> <p>b/ include a Teletext decoder as defined by ETSI standard 300 706 Enhanced Teletext Specification including up to Teletext V1.5 and display Teletext pages on the attached TV or video monitor via an on-screen-display (OSD) that can be viewed via all available video output interface signals. A suitable remote control button other than the <math>\text{EXT}</math> button must be provided to launch the Teletext OSD display</p>	Req	<p>Receivers must support Teletext either via OSD or VBI pass-through mechanisms. Providing the alternative mechanism as well is optional.</p> <p>The <math>\text{EXT}</math> button is under MHEG control</p>
3.5	Audio Descriptors	<p>D-Book Section 4</p> <p>Receivers that are capable of presenting audio description shall provide at least the minimum user controls. (D-Book 4.0 section 4.5)</p>	Opt	<p>Integration in silicon required before function is a baseline requirement.</p> <p>Design of controls should take into account that many users of audio description are visually impaired.</p>
3.6	Widescreen	D-Book V4 Section 3.4 and Section 24.2	Req	
3.7	Active Format Descriptors	Ability to handle 16:9 widescreen and 4:3 picture format changes as detailed in the $\text{D}$ Book including support for correct aspect ratio and Active Format Descriptors (D-Book Section 24)	Req	Receiver to <u>not</u> support WSS insertion on Y and RF outputs
3.8	14x9 processing	Receiver <u>may</u> offer the option of a 14:9 (letter box) format when working with 4:3 displays (D-Book section 24.)	Opt	

Item No.	Resources	Reference/Detail	Notes	
3.9	OSD	Support for 3 graphics layer model:- <ul style="list-style-type: none"> <li>Image Layer (a full colour layer to display I-Frame stills captured from the video decoder) Layer to support: Y=8 bit, Cb=8 bit, Cr=8 bit Chroma to be sub-sampled to either 4:2:0 or 4:2:2 Alpha blending need not be supported, but the layer may be shown or hidden.</li> <li>Video Layer (a full colour layer displaying the output of the MPEG video decoder) Layer to support: Y=8 bit, Cb=8 bit, Cr=8 bit Chroma to be sub-sampled to either 4:2:0 or 4:2:2 Alpha blending need not be supported, but the layer may be shown or hidden.</li> <li>OSD/Graphics Layer (an 8-bit palletised layer which can display region-based graphics) Each CLUT palette entry to support: Y=6 bit, Cb=4 bit, Cr=4 bit Chroma to be sub-sampled to either 4:2:0 or 4:2:2 Alpha blending to be either 6 bit across the entire layer, or 2 bit per pixel</li> </ul>	Req	Background Image shall be I-Frame only
3.10	Font	The embedded font of the receiver shall be capable of displaying macronised vowels	Opt	This is desirable, but it is understood that not all receivers will support this
<b>4.0</b>	<b>Tuner / Decoder</b>			
4.1	RF input connector	F-type female	Req	
4.2	RF loop-through connector	F-type female	Req	
4.3	RF/IF Frequency Range	950MHz to 2150MHz	Req	
4.4	Input impedance	75 ohm nominal	Req	
4.5	Input Signal Level / Receiver Sensitivity	-65dBm to -25dBm	Req	
4.6	Loop-Through Gain	0 dB typical	Req	
4.7	Supply LNB current	Up to a maximum of 500mA with overload protection; with a minimum capability of 300 mA	Req	
4.8	Supply LNB volts	Vertical polarisation : 13Vdc Horizontal polarisation : 18Vdc	Req	
4.9	Signalling	13/18V and 22kHz tone switching	Req	
4.10	DiSEqCī	Support for 1.0 or 1.1	Req	
4.11	Demodulation	QPSK - DVB-S standard, EN 300 421	Req	
4.12	Input Symbol Rates	2 MS/s to 45 MS/s	Req	

Item No.	Resources	Reference/Detail	Notes	
4.13	Spectral Inversion	Auto	Req	
4.14	Forward Error Correction Codes	½, 2/3, ¾, 5/6 7/8, Auto	Req	
4.15	Freeview Transponders	<p>Freeview services are transmitted on the Optus D1 Satellite (160 degrees east). The primary carriers for Freeview services are as follows, however Freeview services may be available from any carrier on this satellite:</p> <p>The relevant parameters of the two carriers are:</p> <p>1) Freq : 12.456V GHz , S.R: 22.500Msys/s, FEC: ¾, Vertical polarisation</p> <p>2) Freq : 12.483V GHz, S.R: 22.500Msys/s, FEC: ¾, Vertical polarisation</p> <p>The Freeview Network ID is 0x2F</p>		
4.16	LNB L.O.	The default LO frequency shall be 11.300GHz. The user may change the LNB LO of the receiver to 10.750GHz if required (via set up menu)	Req	The default LO of FTA satellite dish LNBs in New Zealand is 11.300GHz, There is an increasing presence, however, of LNBs with LO of 10.750GHz.
5.0	<b>Over-Air Software Download</b>	The receiver shall support DVB System Software Update (SSU) to at least the simple profile. ETSI TS 102 006 refers.	Req	
6.0	<b>Service Information &amp; Selection Summary</b>	<p>As soon as a receiver is installed it must offer the viewer all services that may be received in that geographic region compliant with the Freeview regional advertising requirement. The services being broadcast may change over time. To ensure that the viewer is always able to access all services being broadcast to the selected region, the receiver must detect and reflect to the viewer any such changes with minimal viewer involvement.</p> <p>All services have an associated (Logical) Channel Number. Use of the DVB logical channel number standard ensures that the viewer becomes familiar with a specific remote control unit button number for each channel</p> <p>Access to, and use of, accurate service information is essential if the viewer is to enjoy all of the content being broadcast. Receivers must offer a complete list of available unencrypted services and information as carried in 'DVB S.I. EIT present/following' about the current and following programmes. A comprehensive multi-day programme schedule will be broadcast as an EPG service to an MHEG-5 V1.06 NZ-variant software application resident in the receiver.</p>		
6.1	Scanning for Services	The STB shall be capable of automatically detecting changes in the services configuration of each broadcast transport stream provided that such changes are implemented by the broadcaster in accordance and are compliant with the DVB-SI standards, [ETSI EN 300 468], [TR 101 211]. The intent of this requirement is to allow the broadcaster to vary the services offering within the relevant broadcast transport stream(s) without the viewer needing to rescan the STB.	Req	
6.2	Logical channel numbers	Ability to locate, store and handle services with Logical Channel Numbers (LCNs) within the ranges of 1 to 799.	Req	
6.3	Identification of service changes	Automatic identification / storage of services or service changes, without the need for user intervention, by reference to the NIT and/or SDT within 24 hours in the presence of correct NIT signalling. Should preferably be without disturbance to the viewer.	Req	
6.4	Selection via service list	The initial displayed service list following a full NIT scan must present services in ascending order of LCN.	Req	

Item No.	Resources	Reference/Detail	Notes	
6.5	Selection via numeric entry	Service selection via numeric entry shall always select a service with a corresponding LCN regardless of any viewer favourites	Req	
6.6	Hidden services	Services identified as %hidden+shall not appear in the service list presented to the viewer. In addition such services may also be identified as not selectable by numeric entry. D-Book Section 8.	Req	
6.7	ESG %Now/Next+	<del>Now / Next</del> screen guide shall be derived using information from DVB SI EIT p/f tables.	Req	This shall be launched using the i (info) button on the remote control
6.8	EPG	Receivers may include a resident EIT-based 8-day EPG application. If a resident EPG is included then it must be launched from either:  a/ a Remote Control key that is in the receiver's group (i.e. a key which is never under the control of an MHEG application)  b/ an appropriate system menu	Opt	The RC EPG key is under MHEG control and is reserved for launching the MHEG EPG application  The MHEG-5 EPG application must be the default EPG which is launched from the EPG RC button.
<b>7.0</b>	<b>Set-up and I/O</b>			
7.1	Easy to use and simple documentation	Receivers shall be simple to set up and operate and be provided with clear easy to understand user documentation in line with that requirement.  D-Book Section 26.	Req	
7.2	Support package	The following peripheral items should be included within a baseline receiver package: <ul style="list-style-type: none"> <li>◆ An RF lead/cable for connection of loop-through connector to a second receiver (500mm min length; male F-connectors each end)</li> <li>◆ Composite (CVBS) and stereo audio RCA cable. (1m min length)</li> <li>◆ Component video and stereo audio RCA cable(s) (1m min length)</li> <li>◆ SCART cable (1m min length, secure fixing type, fully connected; internal screening on appropriate connections. EN 50049); (set-top box only)</li> <li>◆ Remote control and batteries</li> <li>◆ User Manual</li> </ul>	Opt  Opt  Req  Opt  Req  Req	
7.3	Display of signal quality	To include the ability to display the signal quality of a user-selected channel.	Opt	
<b>8.0</b>	<b>Outputs</b>			
8.1	Primary output	RCA (phono) providing: Component YPbPr	Req	
8.2	Secondary output	RCA (phono) providing composite (CVBS) video	Req	
8.3	Secondary output	TV SCART with both composite (CVBS) and RGB or YPbPr.selectable Audio output (L,R).  SCART shall support widescreen switching on pin 8.	Opt	
8.4	Secondary Output	HDMI	Opt	
8.5	Phono Audio	Audio left & Right	Req	



Item No.	Resources	Reference/Detail	Notes	
10.3	Energy standards	A new Australian and New Zealand energy standard for digital television receivers will be introduced in October 2007. Receivers accepted for use by Freeview will need to eventually comply with this standard, Details can be viewed at <a href="http://www.energyrating.gov.au/library/details200408-mepsstb.html">http://www.energyrating.gov.au/library/details200408-mepsstb.html</a>	Opt	Optional now, but will become Req at the date indicated.
10.4	EN55013	EMC emissions broadcast receivers	Req	
10.5	EN55020	Broadcast receiver product immunity	Req	
10.6	EN60065	Safety for mains operated domestic electrical equipment	Req	
10.7	EN6100-3-2	Harmonic current emissions	Req	
10.8	EN6100-3-3	Emission voltage fluctuations and flicker	Req	
10.9	EN6100-4-2	Immunity to ESD	Req	
10.10	EN6100-4-4	Immunity to fast transients	Req	
10.11	EN6100-4-5	Immunity from surge	Req	
10.12	EN6100-4-11	Immunity to voltage dips and interruptions	Req	

## 4 Key Elements of Software

A number of software elements, in addition to those required for basic services, will need to be available or developed prior to launch. They are:

### 4.1 EPG

An 8-day EPG service will be broadcast on all Freeview multiplexes as an MHEG-5 application. The MHEG-5 API will enable the user to navigate through all platform services. The user experience should be consistent across all receivers.

### 4.2 Subtitles

According to [D-BOOK] Section 5.

### 4.3 Interactive Services

These services will be developed utilising the MHEG-5 V1.06 NZ-variant API

### 4.4 Software Upgrades

A service for providing firmware updates to receivers will be available on the home transport stream using the DVB specification for SSU.

- 4.4.1. All conforming receivers shall be capable of a systems software update using the simple profile defined in . ETSI TS 102 006. An UNT advanced profile will also be offered by Freeview in due course.
- 4.4.2. Manufacturers shall ensure that the receiver offered shall only respond to a unique OUI code, (Organisation Unique Identifier). This means that the STB offered shall not react to any other OUI from any other manufacturer nor react to any other OUI from the same company which relates to a different model STB.
- 4.4.3. The DVB-SSU process involving the download of new software to receivers should not interfere with television viewing and should preferably be a background activity. This may be controlled by waiting until the receiver is switched to a %Standby+mode.
- 4.4.4. The default DVB-SSU mode for receivers shall be with DVB-SSU %enabled+.
- 4.4.5. For Conformance testing manufacturers will be required to deliver two ASI transport streams containing relevant converted binary image files, together with all relevant NIT

and PMT data necessary for their STB to properly undergo a successful DVB-SSU operation. One stream will replace the software in the STB as demonstrated by a new version number, or some other visible indicator, the other will restore the STB to its then current configuration.

#### **4.5 Logical Channel Numbering**

The logical channel numbering specification used is the Australian variation to the UK specification. It is titled **Free TV Australia Operational Practice OP-41+** and can be viewed at <http://www.freetvaust.com.au/SiteMedia/w3svc087/Uploads/Documents/18efb4b4-cd30-4da4-a3ae-5fb4f4b64884.pdf>

#### **4.6 Region Specific Reception**

As defined in Section 5

#### **4.7 Additions to MHEG 1.06 UK Profile**

As defined in section 6

## **5 Region Service Functionality**

### **5.1 Background**

TVNZ transmits multiple versions of its channels in order to provide regional advertising, since revenues can be enhanced per hour of programming by selling the same time slot more than once to different advertisers who target different geographic regions. The Freeview/DTH satellite service intends to at least replicate the capability to deliver separately to the six geographic regions to which TVNZ currently deploys its terrestrial analogue advertising. Over time other Freeview broadcasts may also wish to utilise this regional functionality to target services to specific geographic locations.

The Service Information associated with all channels will be designed to allow identification of the region for which they are intended. Receivers will be set up on installation with a code that enables the delivery of the appropriate set of regional services for its location. This will entail the use of DVB-BAT tables.

### **5.2 The Technology**

The DVB standards provide for this functionality routinely within the set of data tables that can be broadcast along with the video and audio signals. The relevant tables for this purpose are called Bouquet Association Tables (BAT)+. The concept to be adopted here is simply the creation of a separate bouquet for each different geographic region within the Freeview service.

### **5.3 The Process**

When a new Freeview receiver is turned on, the viewer will be presented with an attractive screen on their TV set which asks, "Where are you?" The viewer will choose from the following list of place names that is displayed on their TV set to indicate where they are located. By choosing one of these places they will effectively configure their receiver to receive the associated bouquet of channels. The list of place names in the general order from north to south of New Zealand is;

Northland  
Auckland  
Waikato  
Rotorua  
Bay of Plenty  
Taupo

Gisborne  
Napier  
Hastings  
Taranaki  
Wanganui  
Manawatu  
Wairarapa  
Wellington  
West Coast  
Canterbury  
Southern Lakes  
Otago  
Southland

Whichever of these place names is selected by the viewer, that selection will then cause that particular receiver to relate to just one regional bouquet.

The regions are known as;

Auckland  
Waikato  
Central  
Wellington  
Christchurch  
Dunedin

If the viewer moves house, or for any other reason wishes to become part of another viewing region, the flexibility will exist to enable the viewer to make that change.

## 5.4 The Detail

### 5.4.1 Bouquets

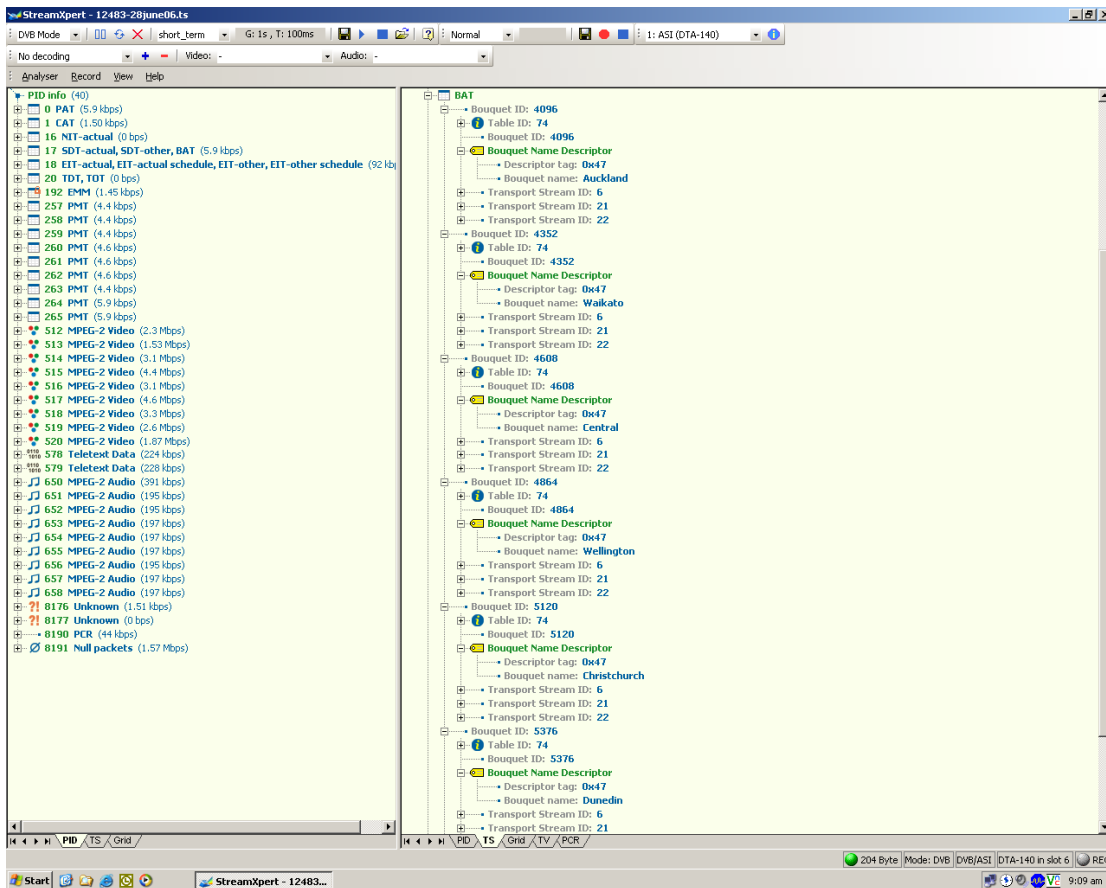
<u>Place Names</u>	<u>Bouquet Name</u>	<u>Bouquet ID</u> (HEX)	<u>Bouquet ID</u> (Decimal)
Northland	Auckland	1000	4096
Auckland	Auckland	1000	
Waikato	Waikato	1100	4352
Rotorua	Waikato	1100	

Bay of Plenty	Central	1200	4608
Taupo	Central	1200	
Gisborne	Central	1200	
Napier	Central	1200	
Hastings	Central	1200	
Taranaki	Central	1200	
Wanganui	Central	1200	
Manawatu	Central	1200	
Wairarapa	Wellington	1300	4864
Wellington	Wellington	1300	
West Coast	Christchurch	1400	5120
Canterbury	Christchurch	1400	
Southern Lakes	Dunedin	1500	5376
Otago	Dunedin	1500	
Southland	Dunedin	1500	
	Region 7	1600	5632
	Region 8	1700	5888
	Region 9	1800	6144
	Region 10	1900	6400
All Free Channels	All FTA	2000	8192

Each Bouquet region will need to be able to accommodate up to 45 services or channels within its bouquet.

The bouquet regions 7 . 10 are specified for future potential growth activities and will be spare at the launch of Freeview.

Bouquet Region 11 is specified for those few viewers who will insist upon having the full viewing flexibility of DVB compliant receivers, where they will be able to view all FTA programme streams.



**Figure 1.** DVB-S Transport Stream image of Specified BAT tables

Note: Bouquet 11 with ID=0x2000 (decimal 8192) is outside of the screen capture image and is not visible.

### 5.4.2 Button Assignments (on remote control units)

In general the button numbers of FTA receiver RCUs directly relate to the position of a channel within the channels list of the receiver. The channel at the top of the list will normally be tuned by the receiver when button %#+ on the RCU is selected.

In a totally unmanaged digital FTA satellite environment, the position of a channel within the list of channels contained in a single carrier, or transponder, will be determined solely by the value of its %Service ID+. The sequence in which individual carriers or transponders are scanned will determine the relative listing sequence of all of the channels within that carrier relative to any other carrier.

For example; say there are two satellite carriers with channels shown viz;

Carrier One:

TVONE	.	Service ID 001
TV2	-	Service ID 002
TV3	-	Service ID 003

Carrier Two:

MTS	-	Service ID 001
DWTV		Service ID 002
Prime	-	Service ID 003
CCTV9	-	Service ID 004

In an unmanaged FTA digital satellite environment, if Carrier One was scanned first and then Carrier Two, the buttons of the associated receiver RCU would be as follows;

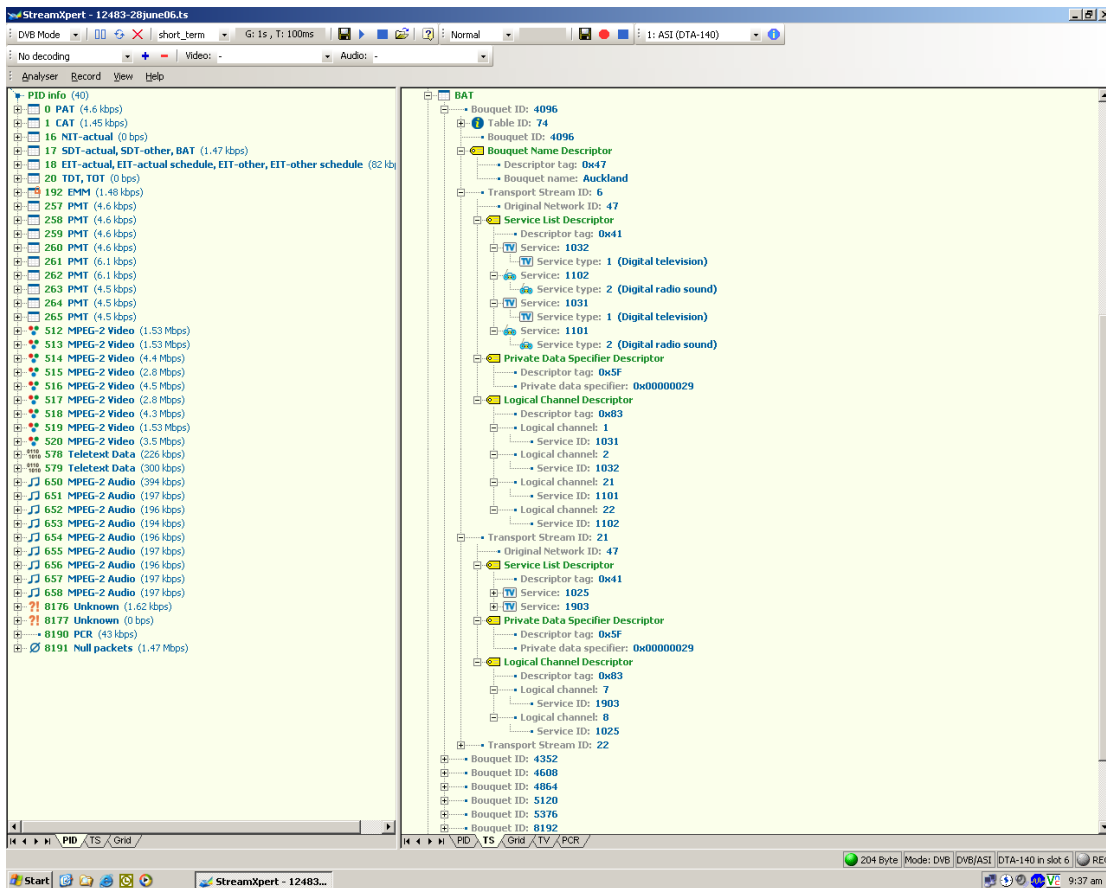
TVONE	-	button 1
TV2	-	button 2
TV3	-	button 3
MTS	-	button 4
DWTV	-	button 5
Prime	-	button 6
CCTV9	-	button 7

If Carrier Two was scanned first and then Carrier One, the buttons of the associated receiver RCU would be as follows;

MTS	-	button 1
DWTV	-	button 2
Prime	-	button 3
CCTV9	-	button 4
TVONE	-	button 5
TV2	-	button 6
TV3	-	button 7

Most FTA receivers currently available enable the viewer to manage the button assignment via the use of a %Favourites+ menu option, whereby the viewer can delete unwanted channels or services, and then re-order the sequence of channels so that particular channels will appear with particular RCU buttons.

The Freeview/ DTH satellite service will, in this context, be a managed service. The DVB SI (service information) system that will be used will provide the necessary level of %channels-to-RCU+button assignment control via use of logical channel number descriptors.



**Figure 2.** DVB-S Transport Stream image example of LCN descriptor data applied to the Auckland Region bouquet table.

The LCN specification used for Freeview is to be the Australian variation of the UK DTG Logical Channel Descriptor for Digital Terrestrial Television Broadcasting. Approval is being sought to use both standards. Copyright of the logical\_channel\_descriptor is vested in the Digital TV Group

## 5.5 Summary

The Freeview/ DTH satellite service will provide a Regional Service capability for its participating broadcasters based upon the existing six geographic regions deployed by TVNZ, with limited scope for additional regions to be added at some future time. The viewer or installer of participating FTA receiver products will identify the geographic region that is to be associated with each receiver at time of the initial power-up of the STB. Once set this process will not need to be repeated, but in the event that the receiver is relocated to another region, a setup menu option will exist which will enable the relevant geographic region to be re-defined.

The Freeview/ DTH satellite service will control which participating channels will use which particular RCU buttons for channel selection.



## 6 NZ specific additions to MHEG 1.06 UK Profile

### 6.1 Introduction

In order to ensure that MHEG components running on the Freeview NZ platform exhibit the requested behaviour a number of extensions to the MHEG 1.06 UK Profile are required. This document describes those extensions.

#### 6.1.1 Changes

0A - Initial draft  
0B - Post review (1)  
0C - First complete draft.

#### 6.1.2 Glossary

(present tense)	Indicates provision within the design
Service	An application available on a television channel
Transport Stream (TS)	A data structure defined in ISO/IEC 13818-1.
Region	A bouquet as defined in the Bouquet Association Table.

#### 6.1.3 References

[MHEG]	MHEG 1.06 UK Profile
[13818-1]	MPEG Transport/Program Streams: Systems layer

### 6.2 Overview and scope

Three extensions to the 1.06 profile are required in order to provide the functionality requested for the Launch version of the NZ Freeview MHEG service.

The NZ Freeview character-set as used at the MHEG layer shall include macronised vowels in order to support characters in the Maori alphabet. This document does not mandate that macronised vowels be incorporated into the receiver at any level other than that available to the MHEG engine text-rendering process.

It is a requirement that the EPG application, which is to be transmitted to the receiver by DSM-CC object carousel, be launched via an EPG key press. The behaviour of the EPG key must therefore be defined within the Freeview NZ MHEG profile. If the EPG key is to be given default behaviour by the receiver manufacturer that is outside the scope of MHEG it shall be possible for an MHEG application to override this behaviour using the methods defined in this document.

Receivers destined for the NZ Freeview platform must understand and handle regionality correctly when queried over the MHEG/DVB interface so that MHEG applications running on the engine are able to identify the region in which they are located/configured.

## 6.3 Maori Character Set

To support the local text requirements receivers shall use a revised embedded font ó Tiresias V7.5.1(NZ). This extended font is available from Bitstream Inc ([www.bitstream.com](http://www.bitstream.com)). This font shall be referenced from MHEG applications as òrec://font/nz1ö. Receivers shall use the same layout and rendering rules as defined in [MHEG].

The rec://font/nz1 font includes the following additional characters, which receivers shall support for all required text sizes:

UCS2	UTF8	Glyph	Unicode Name For Character
0100	C480		Latin Capital Letter A With Macron
0101	C481		Latin Small Letter A With Macron
0112	C492		Latin Capital Letter E With Macron
0113	C493		Latin Small Letter E With Macron
012A	C4AA		Latin Capital Letter I With Macron
012B	C4AB		Latin Small Letter I With Macron
014C	C58C		Latin Capital Letter O With Macron
014D	C58D		Latin Small Letter O With Macron
016A	C5AA		Latin Capital Letter U With Macron
016B	C5AB		Latin Small Letter U With Macron

## 6.4 EPG Key

### 6.4.1 Input register

In addition to the input registers defined in [MHEG], receivers shall support the following input registers:

All three input registers (13, 14 and 15) must be supported.

UserInput EventData	Function Name	Register Number		
		13	14	15
1	Up		✓	✓
2	Down		✓	✓
3	Left		✓	✓
4	Right		✓	✓
5-14	0,1,2,3,4,5,6,7,8,9 respectively		✓	
15	Select		✓	✓
16	Cancel / Exit	✓	✓	✓
100	Red	✓	✓	✓
101	Green	✓	✓	✓
102	Yellow	✓	✓	✓
103	Blue	✓	✓	✓
105	Text	✓	✓	✓
300	EPG	✓	✓	✓

### 6.4.2 EngineEvents

In addition to the EngineEvents defined in [MHEG], receivers shall support the EngineEvents:

EventData		Notes
Name	Value	
EPGKeyFunction	300	Generated when the user activates the EPG key and there is an active scene object. This event is raised independently of the InputEvent register selected at the current moment or whether any interactible has the InteractionStatus of True.  If a key press causes both the EngineEvent and the UserInput

		event then the EngineEvent shall be raised first.
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## 6.5 Regionality

The receiver shall, on first boot and/or as a viewer requested option, present a list of available regions as defined within the broadcast Transport Stream signalling and allow the viewer to select the region in which they are located. Once selected, the receiver shall present to the viewer only those services that are broadcast as part of the selected region. All services broadcast in the Transport Stream that are not defined as part of the currently selected region shall be hidden from the viewer. This is the basis of the proposed extension to [MHEG] Section 3.10.6.1 to include additional regional functionality as required within the New Zealand Freeview network.

### 6.5.1 *Request for Service Index given a service reference*

Calls to the SI\_GetServiceIndex ResidentProgram shall return a non-negative integer when the following are true:

1. The referenced service is signalled in the Bouquet Association Table for the currently selected region,

AND

2. the running status of the referenced service, defined in the Service Description Table, is either `running` or `undefined`.

If either of the above requirements is not met the ResidentProgram shall return a ServiceIndex value of -1.