



**Government of Samoa  
Office of the Regulator**

**POLICY GUIDELINES**

**ASSIGNMENT OF TV FREQUENCY ASSIGNMENTS IN SAMOA**

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**21 June 2008**

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# Management of Television Frequency Spectrum in Samoa

## **1 Introduction**

This paper provides a summary of VHF and UHF TV frequency licensing policies and procedures and is intended to serve as a general guideline for those considering applying for TV spectrum licenses. Prior licensing of new services may affect the availability of TV channels in any given area. It is therefore recommended that those considering applying for TV licenses discuss requirements with members of the Spectrum Management Division of the Office of the Regulator prior to submitting application forms.

All parties considering applying for radio frequencies for television transmission are also reminded that Broadcast licences must be obtained from the Ministry of Communications and Information Technology before radio licenses can be granted.

## **2 General**

Samoa has a significant number of companies providing television broadcasts of various types but only the SBC offers anything close to national coverage. This fact was brought to public attention and local news media in mid 2007 when another broadcaster acquired exclusive rights to broadcast a program of national interest but whose audience was largely limited to those in the greater Apia area due to limited network coverage.

Since then, several applications have been received from broadcasters to add new VHF<sup>1</sup> stations to their networks to improve coverage areas; however, the limited number of TV channels available in the VHF band currently used in Samoa present major problems in accommodating these requests. The new applications, plus the need to cater to more than one broadcaster with national coverage, prompted a review of current practices for assignment of TV channels in Samoa to determine what alternatives exist for meeting current and future needs in this area. .

## **3 Review of Current Licensing Practices**

A full review of current TV licenses and licensing practices has been undertaken by the Office of the Regulator as a result of the public demand for more choice in TV programs and the number of applications from new and existing broadcasters for new TV licences. The review confirmed the fact that some changes to TV channel assignment policies will be needed if the national interest is to be best served over the long term. The review process included consideration of a number of areas including:

1. VHF channels are in high demand due to the greater coverage provided by a single transmitter when compared to similar UHF installations;
2. There are not enough VHF channels in the existing band plan to meet current and forecast demand for new frequency assignments;
3. Additional VHF channels need to be made available for additional Free to Air TV channels providing nation-wide coverage if consumers in many rural areas are to have a choice of programming to watch;
4. Government policy indicates that at least three sets of VHF channels should identified for free-to-air programming on a nation-wide basis;

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<sup>1</sup> VHF = Very High Frequency; UHF = Ultra High Frequency

5. Consideration must be given to minimizing inter-network interference problems in areas with overlapping coverage from TV transmitters;
6. The advent of digital TV needs to be addressed in order to cater to the cost effective introduction of this type of service in the future.

#### 4 Background information

TV frequency assignments in Samoa are governed by ITU-R radio frequency recommendations for Region 3 (Asia Pacific) which generally provide for 11 VHF channels and 49 UHF channels. There are some significant differences in frequencies and types of TV transmission used in the region as indicated in the following table:

**Table 1: Regional VHF TV Channels**

Band 1		Band II		Band III	
Chan Nbrs	Frequencies	Chan Nbrs	Frequencies	Chan Nbrs	Frequencies
<b><i>New Zealand (PAL Standard)</i></b>					
1	44 - 51	Not used for TV		4	174 - 181
2	54 - 61			5	181 - 188
3	61 - 68			6	188 - 195
				7	195 - 202
				8	202 - 209
				9	209 - 216
				10	216 - 223
				11	223 - 230
<b><i>Australia (PAL Standard)</i></b>					
0	46 - 52	4	94 - 101	5A	137 - 144
1	56 - 63	5	101 - 108	6	174 - 181
2	63 - 70			7	181 - 188
				8	188 - 195
<i>Band II is assigned to FM Radio Broadcasting in Samoa. Australian Channel 5A is outside ITU Band III limits</i>				9	195 - 202
				10	202 - 209
				11	209 - 216
				12	216 - 223
				13	223 - 230
<b><i>American Samoa (NTSC Standard)</i></b>					
2	54 - 60	Not used for TV		7	174 - 180
3	60 - 66			8	180 - 186
4	66 - 72			9	186 - 192
5	76 - 82			10	192 - 198
6	82 - 88			11	198 - 204
<i>Only Channels 2, 4 and 5 are currently in use.</i>				12	204 - 210
				13	210 - 216

The New Zealand channelization shown above fully complies with ITU-R Region 3 recommendations and is comprised of 3 channels in Band I and 8 in Band III. Samoa has traditionally followed New Zealand band plans; however, this has not been the case in regard to assignment of VHF TV channels where licensing has been restricted to only Band III channels due to potential interference to or from Band I TV broadcasts originating in American Samoa. This policy has effectively restricted Samoa to a total of eight VHF TV channels as shown in Table 2 below:

**Table 2 – VHF TV Channel Assignments in Samoa at 30 June 2007**

<b>Channel Number</b>	<b>Licensee</b>	<b>Transmitter Locations</b>
4	SBC	Lufilufi and Mt Tafua Upolu
5	SBC	Mt Fiamoe and Lepiu-Tai
6	SBC	Taga
7	SBC	Fagaloa and Lepa
8	SBC	Mt Vaea
9	SBC	Siumu and Masamasa
10	SBC	Reserved for future expansion
11	Lau TV <sup>2</sup>	Mt Fiamoe

Limiting TV licensing to only the eight VHF channels noted above has served reasonably well until 2007 since there was little demand for new VHF assignments. The situation has now changed with several broadcasting companies seeking new VHF assignments to establish or expand their coverage areas. Some of these requests could be partly accommodated by re-use of channels as has been done for the SBC; however, there is a distinct limit to the number of times channels can be re-used in a relatively small geographic area such as Samoa. The situation has also been compounded by most of the applicants seeking VHF channels due to the substantially wider coverage that VHF offers when compared to a UHF transmitter station of similar design.

Applications have been received for licensing a total of 15 new VHF TV transmitters. These include 3 applications for transmitters at Mt. Fiamoe, three at Mt. Vaea, two at Luatuanuu, and the remainder at other individual sites in Upolu and Savaii. Other applications are also expected to follow in due course. It is simply not possible to accommodate all of the new applications under the existing 8 channel VHF assignment system without causing significant interference problems.

There are still a significant number of UHF channels available for assignment; however, the applicants for VHF licenses have advised that use of these channels would place those wanting wide area coverage at a distinct disadvantage due to the increased number of transmitter stations that would be required. This leaves no alternative but to consider increasing the number of VHF TV channels that can be licensed for use in Samoa. Options in this regard are outlined in the following section of this report.

## **5 VHF Licensing Options**

The study considered a number of options for alleviating the shortage of VHF TV channels. These included:

### a. Reallocation of Existing VHF Channel Assignments

The reallocation of existing VHF channel assignments (e.g. moving the use of specific frequencies from one location to another) might allow the introduction of a second nationwide channel without excessive co-channel or adjacent channel interference problems; however, this option would not provide sufficient channel capacity to cater to a third free-to-air channel nor would it cater to the establishment of new transmitter site that may be required to enhance national TV coverage. It would also incur added costs for current licensees that would be required to change frequencies at various sites to accommodate this type of program. This concept was therefore considered to offer little benefit.

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<sup>2</sup> Lau TV is no longer trading but another broadcaster has applied for a license to continue operation of this channel.

## b. Use of Low Band VHF Channels

The use of some of the lower frequency VHF Band I channels (44-68 MHz) was considered as another alternative. This concept produces some problems because American Samoa has issued TV broadcast licences for channels 2, 4 and 5 - with power levels up to 19 kilowatts. These lower frequencies provide an improvement in range over the Band III channels in a similar fashion to that noted above between VHF and UHF. Unfortunately this means that the potential for interference to and/or from American Samoa must be considered if frequencies in these bands are to be used here.

Initial studies indicate that channels 1 and 3 could be licensed in Samoa provided that care was taken in selecting appropriate sites in order to minimize current and/or future interference problems with American Samoa. Any applications for use of these channels will need to be supported by detailed propagation studies to confirm that use of the channel(s) will not result in transmissions being received in American Samoa. Use of these frequencies may also require coordination with the FCC.

Channels 1 and 3 will generally be considered for use in areas on the Western side of Upolu and Savaii or other areas where adequate shielding of American Samoa is provided by mountain ranges. These channels may be used in Apia area provided that the transmitters involved are relatively low in power and that the transmitters are located at a site not higher than Mt. Vaea. (Mt. Fiamoe is not considered an appropriate site for low band transmitters due to the possibility of interfering with TV reception in the western part of American Samoa.) The use of channel 2 will not be considered until fully detailed propagation studies have been carried out to analyse the possibility of interference to and from American Samoa.

## c. Introduction of Additional VHF Frequencies

In view of the limitations on use of low band VHF frequencies noted above, consideration has been given to the use of one or more non-standard VHF frequencies in order to allow up to three broadcasters to provide something approaching national coverage. This approach has been taken by Australia with the introduction of channel 5A as shown in Table 2. A similar approach has also been taken by some countries in southern Africa that have added 2 or 3 more TV channels using the frequency spectrum immediately above the current Band III assignments<sup>3</sup>. While these approaches are not in keeping with the standard ITU-R recommendations for this region, it would be possible to use these additional frequencies in Samoa if it is considered to be in the national interest. *Note: Application for the use of frequencies outside the current ITU Band III will only be considered on the basis that the applicant will be fully responsible for ensuring TV sets currently used in Samoa have the capability of tuning to the requested channel(s).*

## **6 Other Factors Affecting VHF Channel Assignments**

### a. Mt Fiamoe and Mt Vaea

Another area of concern in the VHF band is the preference for broadcasters to have transmitters located on both Mt. Fiamoe and Mt Vaea. These sites are very close to each other and therefore provide very wide areas of overlapping coverage. This is considered a waste of a valuable frequency resource therefore future VHF TV licensing at Mt. Vaea will be restricted to Channels 1 and 3. Only UHF assignments will be considered for this site once

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<sup>3</sup> Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe use the bands 230-238 MHz and 246-254 MHz for television broadcasting service on a primary basis.

these two channels are in use since these channels can readily be utilized to provide coverage in the immediate vicinity of Apia where long range coverage is not a requirement.

**b. Restriction of Assignment of the Nation-wide Frequencies**

The frequency plan shown in table 3 will only function in the long term if the frequencies shown for each site are retained as separate groups. Licensing of the national coverage channels will therefore be restricted to those companies that are prepared to make a commitment to provide wide area coverage of free-to-air general interest<sup>4</sup> programming within a 5 to 10 year period. *(Note: This will not require licensing of all frequencies from the outset but the remaining channels in a group will be reserved for the applicant based on the assurance of future network expansion. Any agreement of this nature would be subject to review with the applicant at 3 year intervals to monitor progress and determine if unused frequencies are still required.)*

Failure for the applicant to meet any expansion program established in the initial license for nation-wide coverage channels could result assignment of new frequencies with the national group of channels being returned to the common pool for re-assignment to other companies wishing to provide national coverage.

**c. Assignment of VHF channels at other sites**

Applications for VHF channels at other sites will be considered on an individual basis provided that the requested channels will not interfere with the national coverage plan set forth in section 7 below.

**7 VHF TV Band Plan**

Initial studies indicate that four additional VHF channels will cater to the establishment of at least three sets of national frequencies without the need for re-assignment of currently used channels. This will provide a total of 12 VHF high band frequencies as shown in Table 3:

**Table 3 – Proposed VHF TV Frequencies**

Channel Number	Frequency Range (MHz)	
	From	To
4	174	181
5	181	188
5A	137	144
6	188	195
7	195	202
8	202	209
9	209	216
10	216	223
11	223	230
12	230	237
13	237	244
14	244	251

denotes new frequencies

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<sup>4</sup> General interest programming is considered to include broadcasts of interest to the general public. Programming intended only for closed user groups such as members of a specific organization would not generally be included in this category. Such organizations would, of course, be at liberty to apply for individual VHF channels per paragraph 6.c above.

A typical national channel assignment plan is depicted in Table 4 below. Note that this plan caters to providing three sets of frequencies at each of the ten existing transmitter locations as well as four additional sites that may be required to expand network coverage in future. The table includes transmit frequencies as well as showing those frequencies used for off-air repeating of broadcasts.

**Table 4 – VHF Channel Assignment Plan**

Transmitter Locations	Broadcaster					
	SBC		TV 3		Spare Channel	
<b><i>Upolu</i></b>	<b>Reserved Channels</b>					
	TX	RX	TX	RX	TX	RX
Mt Vaea	8		3	5A	1	
Mt Fiamoe	5	8	5A		11	
Mt Tafua Upolu	4	8	10	5A	6	
Siumu	9	5	12	5A	4	
Lalomanu	11		5	12	14	
Lepa	7		12		5A	
Lufilufi	4	8	12	3	10	
Fagaloa Pass	7	4	9	12	5	
Richardson Rd	4		12		10	
Fagaloa Bay	6		11		8	
Luatuanuu	4		6		13	
<b><i>Savaii</i></b>						
Leipu Tai	5	8	14	5A	12	
Masamasa Area	9	5	13	14	11	
Olomanu/Taga	6	8	14	5A	12	
Mt Tagotala	6		11	5A	13	

Denotes existing channel assignments  
 Denotes new transmitter locations  
 Rx = broadcast channel used for off-air repeating

It should be noted that detailed propagation studies must be undertaken prior to assignment of channels for those sites where channels would be adjacent to those in a neighbouring site. These studies are to be conducted by the applicant and will need to confirm that proposed antenna patterns and/or power levels will not create interference in overlapping coverage areas or with off-air repeating operations.

**8 UHF TV**

There are a large number of the 49 UHF channels currently licensed in Samoa as shown in Table 5. These channels are used to provide programming by closed interest groups, pay TV and general free to air broadcasts. At this point, there are still a reasonable number of spare channels available and the situation is not as critical as the VHF band; however, a review of Table 5 indicates that a significant number of the UHF TV channels are being used for point-to-point links between the TV transmitter and the studio (STL links). This effectively prevents use of the link channel for broadcasting in the area thus limiting the number of UHF channels available.

There are other frequency bands that can be used for point-to-point use therefore no further applications will be considered for licensing UHF TV channels for studio links. It is expected



existing STL links will remain in service until the end of their useful service life at which time they would need to be replaced with equipment utilizing other frequency bands.

**Table 5 – UHF TV Channel Assignments at 1 May 2008**

Channel	Frequency	Licensee	Location	Usage
22	478 - 486	Procom Sky TV New	Mt Vaea	Broadcasting
24	494 - 502	Procom Sky TV	Mt Vaea	Broadcasting
25	502 - 510	GBN	Mt Vaea	Broadcasting
26	510 - 518	GBN	Afiam - Vaea	Fixed Link
27	518 - 526	GBN	Levili - Vaea	Studio Link
28	526 - 534	SBC	Mulinuu/Vaea	Studio Link
29	534 - 542	Worship Centre	Sogi	Broadcasting
30	542 - 550	GBN/LAUTV	Levili	Broadcasting
31	550 - 558	Vaiala Beach Digital TV	Afiamalu - Levili	Studio Link
32	558 - 566	Procom Sky TV	Mt Vaea	Broadcasting
33	566 - 574	GBN	Mt Vaea	Broadcasting
34	574 - 582	SBC	Vaea/OB	Studio Link
35	582 - 590	Vaiala Beach Digital TV	Levili	Broadcasting
36	590 - 598	Procom Sky TV	Mt Vaea	Broadcasting
37	598 - 606	Worship Centre	Mt Fiamoe	Broadcasting
38	606 - 614	Procom Sky TV	Mt Vaea	Broadcasting
40	622 - 630	SBC	Mulinuu - Vaea	Studio Link
41	630 - 638	Procom Sky TV	Mt Vaea	Broadcasting
43	646 - 654	SBC/CCTV	Mt Vaea	Broadcasting
46	670 - 678	Procom Sky TV	Mt Vaea	Broadcasting
48	686 - 694	Procom Sky TV	Mt Vaea	Broadcasting
50	702 - 710	TV3 (Apia Broadcasting)	Fiamoe	Broadcasting
57	758 - 766	TV3 (Apia Broadcasting)	Taga	Broadcasting
59	774 - 782	TV3 (Apia Broadcasting)	BYU/Vaea	Broadcasting
61	790 - 798	TV3 (Apia Broadcasting)	Mt Vaea	Broadcasting
64	814 - 822	TV3 (Apia Broadcasting)	Lepiu	Broadcasting

**Note:** There are 40 UHF TV channels numbered from 21 to 69 inclusive. Only licensed channels are shown in Table 5 in order to minimize table size.

The UHF band review indicated that limiting use of TV channels for Studio Links will allow for allocation of frequencies for at least three UHF nation-wide networks provided that due care and attention is paid to channel assignments in urban areas. There should also be sufficient UHF frequencies available to cater to any fill-in requirements that may arise in nation-wide networks employing primarily VHF channels as the main part of the network. As a result of these factors, no further changes to frequency assignment policies are being considered for the UHF TV band.

## 9 Digital TV

Digital TV broadcasts may not be that far away although implementation of Digital TV in Australia and elsewhere has been much slower than many experts had predicted. New Zealand is planning on using only UHF channels for this type of service but has received some criticism from broadcasters due to the reduced coverage provided by UHF systems. Australia is intending to use both bands VHF and UHF bands for digital TV with existing analogue VHF channels being converted to digital over a specified period of time.

The introduction of Digital TV to Samoa be addressed by the following paths:

1. The nation-wide VHF assignments referred to above could be licensed on a technology neutral basis. This would allow the licensee to install either analogue or digital TV transmitters in accordance with their business plan.
2. Any nation-wide VHF channel groups not licensed or reserved at the time of introduction of digital TV could be used for this purpose.
3. There are adequate UHF channels to allow up to three digital TV channels to be introduced on a nation-wide basis assuming careful selection of frequencies to avoid co-channel and adjacent channel interference.
4. A broadcaster operating a nation-wide analogue VHF network that opts to introduce digital TV via UHF channels will be required to cease broadcasting on the analogue network at some point in time following completion of the digital network. This will allow the related VHF channels to be returned to the common frequency pool for future re-assignment.

## 10 Sharing of transmitter site and tower facilities

The proliferation of transmitter towers in Samoa indicates that consideration needs to be given to sharing sites and towers to minimize both environmental impact and cost of site infrastructure installation and maintenance costs for service providers.

Sharing of transmitter sites and/or co-location of equipment is required by sub section 68(1) of the Telecommunications Act 2005 which states:

*68. Co-location-(1) Service providers with existing telecommunications network facilities shall allow other service providers to co-locate their telecommunications network facilities on those existing facilities, including but not limited to exchange premises and other switching equipment locations, land, roof tops, mast sites, towers, conduits and poles, where such co-location is economically feasible and no major additional construction work is required.*

It is obvious that a range of technical issues also need to be considered when establishing feasibility of site or tower sharing; however, in general terms, co-location will be required in all areas where it is both technically and physically feasible. Any new service provider may apply to an existing site or tower owner for co-location of equipment and, if the tower owner does not wish to offer co-location services, the tower owner shall provide the application with evidence of any reasons that would prohibit co-location of the equipment. This evidence must be provided to the applicant in writing within 14 days from date of application.

Where co-location is deemed feasible, rates for rental or lease of co-location facilities will generally be governed by the following general principles<sup>5</sup>:

- a. Rates for lease of rental of space shall be arranged by commercial agreement between the parties involved and shall be based on normal commercial practices used to establish fair and reasonable lease or rental rates in Samoa; and
- b. Rates shall be based on space and type of services provided and shall not discriminate between different types of services or contain any anti-competitive measures that might present a barrier to entry for new service providers.

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<sup>5</sup> Detailed policies on co-location of equipment are beyond the scope of this paper which is intended to primarily address assignment of TV frequencies. Full details of policy for telecom site development and co-location of equipment will be published under a separate Policy to be published in late 2008. The comments given herein are therefore only intended to provide general guidelines on co-location until such time as the Telecom Site Development Policy has been finalized.

Notwithstanding the foregoing, any party refused access to a site, or where unreasonable rates have been quoted, is at liberty to refer the dispute to the Office of the Regulator in accordance with the provisions sections 33 and 68 of the Telecommunications Act 2005.

## **11 Summary**

This paper has been prepared to summarize policy for assignment of VHF and UHF television frequencies in Samoa from 1 July 2008 under the powers conferred on the Office of the Regulator by section 22 of the Telecommunications Act 2005.

The policies are to be reviewed at intervals of not more than two years to confirm relevance to the changing conditions in the TV broadcast market. All parties interested in applying for TV radio licenses are there urged to contact the Regulator, Office of the Regulator, First Floor, G. Meredith Building, Beach Road, Tamaligi to ensure that they are aware of any changes in policy prior to making application for new radio frequency licenses.

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21 June 2008