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For Attention: Mr Manyapelolo R Makgotlho

Date: 28 September 2012

**BANZINET RESPONSE TO:**  
**DRAFT FREQUENCY MIGRATION REGULATION AND FREQUENCY MIGRATION PLAN**  
**AUGUST 2012**

Dear Sir,

Your notice in the Government Gazette No 35598 dated 17 August 2012 refers:

Thank you for offering BanziNET an opportunity to give comments on the above document. We are a 68% BEE owned telecommunications company and are pleased to make a formal response to the Draft Migration Regulation Plan and Frequency Migration Plan.

We request an opportunity to make an oral representation regarding the above during the period 8th-11th October 2012 as stated in the Government Gazette.

Due to the complexity and vastness of the proposed plans on which ICASA requires comments, BanziNET proposes the following:

- a) Collate the inputs from industry by making use of a standardised spreadsheet with fixed cell sizes for inputs & comments on each paragraph.
- b) Specific comments should be requested relating to "broadcasting", "PMR", "IMT", and "Broadband".

BanziNET would furthermore welcome a session with an ICASA Private Mobile Radio (PMR) technical / engineering committee to propose a system for high site channel allocation that will alleviate intermodulation interference problems.

We trust you find our submission constructive for finalising the new frequency plans.

Kind Regards



Portia Ntuli  
Director

## **BANZINET's VIEWS ON:**

### **DRAFT FREQUENCY MIGRATION REGULATION AND FREQUENCY MIGRATION PLAN AUGUST 2012**

#### **1 GENERAL**

Please note that Banzinet has only responded to specific areas of interest, and not to all paragraphs referred to in the migration plan.

##### **1.1 Enforce Spectral Efficiency**

ICASA should enforce the use of the most spectrally efficient technologies, allowing more services in a given bandwidth. This would include technologies such as LTE, TETRA, 2 slot TDMA and (FDMA 6.25kHz) PMR services, along with DVB-T2, DVB-T2 Lite, T-DAB in the broadcasting domain

##### **1.2 Promote Shared High Sites and Shared High Site Backhaul**

Banzinet is of the opinion that further sharing of high sites should be promoted by ICASA as much as possible. Together with this, a high site engineering standard practise should be compiled and enforced for all high site developments and installations. Shoddy shared high sites and installations are causing interference and reliability issues for operators who are attempting to provide high quality services to end-users.

We further believe ICASA should promote the delivery of Broadband connections to each shared high site by using licensed point to point microwave or fibre. The reasons are:

- a) Most of the technologies such as GSM, LTE, PMR, broadcasting, TETRA have the ability to connect directly to an IP network for the delivery of a particular service using Virtual Private Networks (VPN) connections in the IP domain;
- b) The use of simplex links for multi-site linking is avoided, as is often used in PMR networks;
- c) A broadband IP link would replace multiple traditional narrowband point-to-point links.

##### **1.3 Shared High-Site Interference**

Interference at hi-sites is becoming worse and the use and deployment of Wi-Fi systems in the wrong part of networks is becoming a concern. At a significant number of hi-sites the deployment of unlicensed 2.4GHz and 5.8GHz WI-Fi equipment is causing interference to licenced frequency users. This interference has increased the general noise floor of radio High-sites, thus making the receivers operating in licensed bands less capable of receiving weak signals, reducing the coverage for this particular customer.

This problem has primarily arisen because there has been an extremely long delay in the awarding of radio spectrum that should be used for broadband delivery where in fact Wi-Fi is now being used.

Wi-Fi should be used at the edges of networks where hot spots are created. In reality Wi-Fi is being used as backhaul, and in many instances the maximum EIRP is being exceeded and should be of serious concern to ICASA.

## **1.4 Detailed Planning of PMR Radio Channel Allocation**

The use of ½ channel frequency off-set for the receivers at a hi-site needs to be investigated because this is one technique to minimise intermodulation products affecting the high-site receivers. The other technique is to provide planned guard bands that occupy the same amount of spectrum as the required band for the channels, this eliminates 2nd order intermodulation falling into the receiver band. This may at first seem wasteful of spectrum but the technique allows for these guard band to be used at other high sites so in fact you have more than one frequency plan which is dependent on minimal interference at all times. The areas for the specific band plans are based on hi-site locations and overall coverage areas rather than a general plan. This plan should also allow for “Simulcast” wide area coverage solutions where a common frequency is used to increase a customer’s coverage area.

A separate sub-committee would be required to discuss further details of this concept that has been adopted in other telecommunications markets.

## 2 COMMENTS ON DRAFT MIGRATION PLAN

### 2.1 138MHz-144MHz (Ref Par 4.11.2)

#### Discussion

With specific regard to alarms and single frequency requirements. The need for more spectrum is acknowledged but should be balanced with the view that new alarm systems are becoming available that use data networks such as ADSL/3G/4G, thus allowing the customer and the alarm company far better control this solution should be actively promoted by ICASA.

### 2.2 156.4875MHz-156.5625MHz (Ref Par 4.11.4)

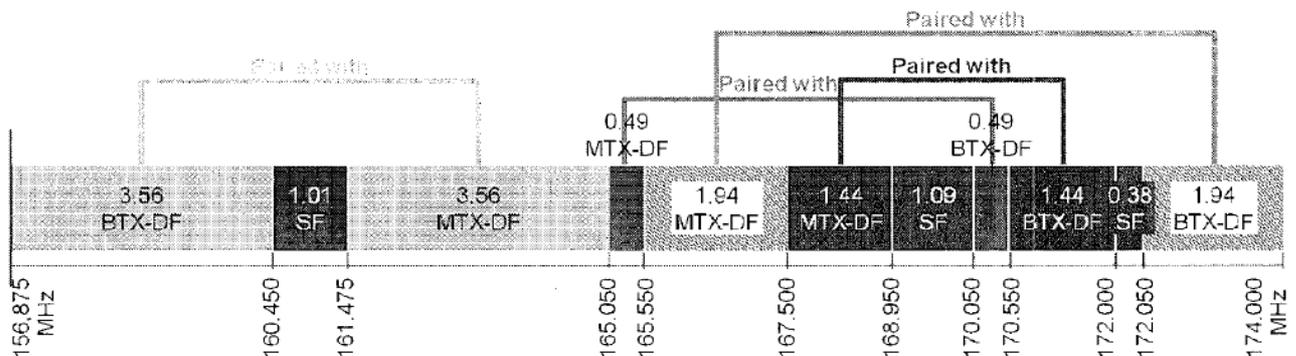
Please refer to next paragraph regarding simplex frequency use.

### 2.3 156.875MHz-174.0MHz (Ref Par 4.11.5)

#### Discussion

Banzinet supports this plan for aligning the Repeater Transmitters and Repeater Receivers into “nested” Spectrum. This is a good move and we would recommend further steps be taken to make provision for the inclusion of DMR/TDMA and FDMA solutions now available.

As can be seen from the diagram below, there is a mix of offset repeater pairings and single frequency allocations mixed into this band. Banzinet is of the opinion there should be an overall re-planning of this band to develop a common TX/Rx split. This would however form part of a separate technical discussion document.



**Figure 3 Proposed Allocation 156.875MHz – 174MHz**

Simplex frequencies should not be used to provide point-to-point / point-to-multipoint fixed services or be located at fixed locations where other radio services’ (such as land mobile repeaters) operate, as the probability of interference within licenced land mobile frequency bands is increased and should be addressed as more and more possibly interfering channels will be introduced with 12.5kHz and 6.25kHz channel assignments as an example.

#### Problem

- a) The number of channels becoming available (with 12.5kHz and 6.25kHz channel assignments) may increase or in some cases double, but this does not directly convert to doubling the number of services at a given high-site. A distinction must be drawn

between the overall number of interference free frequencies or channels and the specific frequency plan for a given high-site, or more correctly, an area, which might well include a number of high-sites. All of the frequencies that are available and interference free must be planned for the site/area up front. Once again there is a very strong case for trunking to make maximum use of available spectrum. This can be either single site or multi-site trunking.

- b) Most of the spectrum for push-to-talk users is now divided down to 12.5KHz and the introduction of yet another division down to 6.25KHz poses more challenges in an existing 12.5KHz plan with 3<sup>rd</sup> and 5<sup>th</sup> order intermodulation interference.

### **Solution Proposal**

- a) A number of techniques can be introduced to mitigate 3<sup>rd</sup> and 5<sup>th</sup> order intermodulation which remains a significant source of interference at high-sites. We do not underestimate the challenges involved with this and in fact all of the migration processes that are currently going on. This process is going to take some time to implement but has to be done, and will eventually have the desired result. Our proposal has some far reaching implications and needs to be addressed separately. This is a deep technical proposal and we feel is too detailed to include in this document. We suggest this topic be part of a separate technical subcommittee appointed after the hearing.
- b) The use of FDMA (frequency Division Multiple Access) proposal where there are now 2 voice channels on separate RF carrier frequencies each occupying 6.25KHz of band width. This extra carrier will produce more intermodulation. The introduction of this will have to be addressed in terms of overall band planning for the inclusion of 6.25KHz channels.
- c) The TDMA proposal uses the existing 12.5KHz plan but multiplexes 2 voice services into this on a time slot basis. This can work alongside 12.5KHz single analogue voice channel services or new TDMA services. If 6.25KHz channels are added in this makes for less efficient use of a block of frequencies because a guard band has to be included

## **2.4 174MHz-223MHz (Ref Par 4.11.6)**

Banzinet is in agreement with this.

## **2.5 235MHz-267MHz (Ref Par 4.11.8)**

### **Solution Proposal**

- a) Banzinet would propose that frequencies from 230-238MHz be included in this band, as this forms a complete 8MHz DVB-T2 Channel.
- b) 238-242.95MHz paired with 254-267MHz should be retained and opened up for SADC regional deployment as this is the only national trunking service. The possibility of upgrading this service to a more spectrum efficient technology i.e. TDMA should be considered in conjunction with the current systems owners and also the worldwide demand for DMR products in this band.
- c) TV Channel 13 should be removed from high power TV broadcasting services after ASO. This bandwidth should be reallocated to additional bandwidth for low power TV SFN/MFN services or DVB-T2 lite as this would appear to outperform DAB+ for expanded sound and TV broadcasting services.

## **2.6 335.4MHz-387MHz (Ref Par 4.11.8)**

Banzinet supports the freeing up of this spectrum 335.4-380MHz for rural Broadband.

## **2.7 380MHz-400MHz (Ref Par 4.11.10)**

### **Discussion**

Banzinet is fully supportive of this band being entirely devoted to PPDR services and that the sole technology used, be TETRA, allowing for TETRA II including Enhanced Data services.

## **2.8 405MHz-430MHz (Ref Par 4.11.11)**

### **Discussion**

BanziNET fully supports the allocation of this band for public trunking. Currently the SAPS analogue services are in part of this band, but with the adoption of 380-400MHz as the sole PPDR band, SAPS would eventually migrate/change their entire national network to the 380-400 MHz band thus freeing up more of the 405Mhz-430MHz spectrum.

The band in total must be planned so that it can accommodate all the various standards of trunking that are becoming available. This planning would form part of the technology committee undertakings mentioned earlier. This would ensure ICASA remains as technology neutral in its frequency planning as possible. Special mention is made here of allowing the various technologies to be deployed with minimal interference. We feel this needs to be discussed separately within a technical sub-committee.

## **2.9 440MHz-450MHz (Ref Par 4.11.12)**

Banzinet is in agreement with this but would like a more expanded frequency plan to analyse the implications of DMR in both the TDMA and FDMA modes. Further discussion is required

## **2.10 450MHz-470MHz (Ref Par 4.11.13)**

### **Problem**

This spectrum has also been allocated to Mobile IMT (WRC07) and current services suggested to be migrated to 3GHz? This is far from ideal and hardly practical.

The current allocation in the 450-470MHz band is for push to talk services and many of them via a repeater. No push to talk technology is currently available in the 3GHz band, also the required number of base stations would be 3-4 times the current number to provide the same coverage. We also note that by losing this band of 20MHz, 1600 single voice services are lost or 3200 TDMA or FDMA voice channels. This is halved where repeaters are used, but new bands have to be found to accommodate existing users and future users.

### **Possible Solutions/Proposals**

- a) Banzinet proposed (as part of our Digital Migration presentation) to ICASA which identified the band 470-530MHz be made available for rural broadband (rather than to Broadcasting). This band could be further split up with some of the lower portion 470-485MHz becoming 12.5KHz spectrum /10MHz pairing into some spectrum set aside for Transnet and other users, with particular emphasis on the use of trunking technology.

- b) For Rail Operators, who are currently occupying some of this band, to move to a new technology such GSM-R which has been set aside for Train/Rail network operators (876-880MHz + 921-925MHz). Although originating in Europe this ETSI standard is being adopted across the world by many national rail networks.
- c) Other users of the 450-470MHz band would have to be accommodated in new bands and or by new technology either TDMA or FDMA PMR services. With the proposed allocation of 410-430MHz for public trunking there could be a good reason to migrate these users to this type of service.
- d) In general it would be more efficient for ICASA to promote the establishment of trunking in whatever form, as this type of service gives far better spectrum utilisation than single channel allocations. It would also allow much better spectrum planning and thus interference reduction. It is also possible to give customers a tailored solution to their particular coverage requirements.

### **2.11 890-942MHz 4.(Reference Par 11.17)**

Banzinet supports the allocation of GSM-R (876-880MHz + (921-925MHz) to the Rail operators on a regional basis as this is clearly a tailor made solution.

### **2.12 1350-1375 (1492-1517) – 1400 (1427-1452) MHz (Ref Par 4.11.19)**

#### **Solution Proposal**

Banzinet supports this plan but would put emphasis on the allocation to Rural Broadband.

From our knowledge there are not many links still functional using this spectrum for PtP services.

### **2.13 1452-1492 MHz (Ref Par 4.11.20)**

#### **Discussion**

With the introduction of DVB-T2 Lite which performs significantly better and carries more programmes than DAB+, it may be possible to put all services in the current TV Band III especially if Channel 13 is removed. This is mentioned in the appropriate band references above.

### **2.14 1980-2010/ 2170-2200 MHz (Par Ref 4.11.25)**

Banzinet supports this plan for the allocation to Rural Broadband (BFWA).

### **2.15 2025 -2110 paired with 2200 - 2285 MHz (Par Ref 4.11.26)**

Banzinet supports this plan for the allocation to Rural Broadband (BFWA).

### **2.16 2290 - 2300 MHz (Par Ref 4.11.27)**

Banzinet supports this plan for the allocation to Rural Broadband (BFWA).

### 3 CONCLUSION

BanziNET generally supports the migration plan as published by ICASA, but with specific alternative proposals as indicated above.

Direct BFWA gains (excluding our additional proposals in the UHF bands above) are significant, and could go a long way to alleviate pressure on providing rural broadband services.

We are furthermore in support of the establishment of wholesale last-mile radio networks which is accordance with proposals BanziNET has been making to ICASA since 2007.

Frequency Band (MHz)	Notes on migration/ usage
141 – 141.5	Migrate SF Mobile out of this band and allocate for SF alarms.
141 – 142	Migrate remote controlled industrial apparatus to ISM Band.
380 – 400	Allocated for public safety/ government services. Migrate all such users into this band.
410 – 430	Allocated for Digital Public Trunking.
440 – 440.1 paired with 445 – 445.1	Allocated for Short-range Business Radio; all other users migrate out of band.
921 – 925	Allocated for GSM-R; migrate other users out of this band.
1350 – 1375 paired with 1492-1517 1375 – 1400 paired with 1427 – 1452	Allocate for Rural BFWA; migrate existing fixed duplex links out of this band.

Frequency Band (MHz)	Notes on migration/ usage
1452 - 1492	Change allocation to include FIXED, MOBILE except aeronautical mobile. Use for BFWA/ PTP/ PMP depending upon availability of equipment.
1518 – 1559	Allocate for links for LMR repeaters; Migrate in outside-broadcasting links currently operating in 2300 – 2450 MHz.
1668 – 1675	Change allocation in line with ITU Region 1 allocations to include FIXED and Mobile except aeronautical mobile within the allocations.
1980 – 2010 paired with 2170-2200	Migrate in Fixed links (DF) from other bands; allocate for BFWA.
2025 – 2110 paired with 2200 - 2285	Migrate in Fixed links (DF) from other bands; allocate for BFWA.
2300 – 2450	Migrate outside broadcasting links to the 1518 – 1559 MHz band.

END