

7th August 2009

Tracey Black
Ministry of Economic Development
33 Bowen Street
PO Box 1473
Wellington
New Zealand

Dear Tracey

Submission to the Ministry of Economic Development on 806-960 MHz Band Replanning Options

Arc Innovations is pleased to make submissions on the Ministry of Economic Development's 806-960 MHz Banding Replanning Options paper issued May 2009.

Arc Innovations is a business unit of Meridian Energy Ltd and has installed over 110,000 'smart' electricity meters. These meters contain an integrated RF mesh system which operates within the confines of local 900 MHz SRD band. Arc Innovations continues to see interest from other parties throughout New Zealand for further deployments of this type of technology.

Substantial investment has already been made in the development and deployment of the RF mesh network on the basis that the current 900 MHz SRD band is largely unencumbered by high powered RF devices. It is likely that the final number of devices that will ultimately be deployed in the RF mesh network will be significantly higher as this technology platform supports; gas and water metering services, distributed load control, demand-side management and other 'smart grid' initiatives. Trials for the provision of some of these services have already begun. The RF mesh network will also provide the basis for initiatives such as; real-time pricing, smart appliances, in-home displays and smart energy management systems.

Summary

Arc Innovations detailed response to the questions issued by the Ministry is **attached** to this letter. In that response we make the following key submissions:

(1) 820 MHz SRD Band

The 819-824 MHz SRD band is inconsistent with that of our major trading partners and therefore only a very limited number of SRD devices will be available to operate within this spectrum. Arc Innovations recommends that this band should be reassigned to LMR and STL use as appropriate. This will allow current users of the 868-869 MHz band to transition. This will also give these users full protection from potential interference.

(2) 860 MHz SRD Band

Arc Innovations is of the view that New Zealand should harmonize as far as is practicable with the European 862-870 MHz SRD band. However given that it will prove difficult to reallocate current LMR use from 857-864 MHz full harmonization of this band is unlikely.

Our recommendations for this band are as follows:

- (a) Adopt a band from 864-870 MHz;
- (b) Allow an EIRP of 1W for digital modulation or frequency hopping transmitters compliant with AS/NZS 4268;
- (c) Allow analogue transmitter types at a maximum EIRP of 25 mW; and
- (d) Move existing simplex LMR users in the 868-869 MHz TX band to another band (such as reallocating part of the existing 820 MHz SRD band to these users).

(3) 900 MHz SRD Band

With respect to SRD allocations in the 806-960 MHz band, we support harmonization with the Australian 900 MHz SRD band but with some modification to the licensing arrangements proposed by the Ministry.

Our recommendations for this band are as follows:

- (a) To adopt a position consistent with the frequency limits of the Australian SRD band (915-928 MHz);
- (b) In respect of 915-928 MHz, allow an EIRP of 1W for digital modulation or frequency hopping transmitters compliant with AS/NZS 4268;
- (c) In respect of 915-928 MHz, allow analogue transmitter types at a maximum EIRP of 25 mW;
- (d) In respect of 920-926 MHz – 4W EIRP, for digital modulation or frequency hopping transmitters allow on request to and subject to approval by the MED (this approval could be on either a site-by-site or a regional basis);
- (e) In respect of 920-926 MHz – 4W EIRP, allow only after the entire 915-928 MHz band has been freely accessible to users for at least 12 months (This would allow for existing low power SRD devices to be reconfigured to operate across the 915-928 MHz band before any undue influences from 4W devices);
- (f) In respect of 920-926 MHz, the use of 4 W EIRP devices should not be restricted to RFID, but allowed for bespoke applications subject to (d) above; and
- (g) In respect of 928-929 MHz, reallocate to other uses. The 928-929 MHz part of the existing SRD band is inconsistent with the Australian and North American band allocations and our view is consequently of limited value for SRD devices. Most readily available chipsets are designed for operation in the North American SRD band and so are limited to an upper frequency of 928 MHz. This top 1 MHz of the current band could be reassigned to the existing 929-935 MHz STL band in exchange for 1 MHz of SRD spectrum elsewhere in the 806-960 MHz band.

(4) Unused Management Rights

Arc Innovations suggests that the Crown could reacquire unused spectrum management rights and put these to use for other services using digital modulation or frequency hopping technologies.

Thank you for the opportunity to make submissions. Please do not hesitate to contact us should you have any questions around our comments.

Kind Regards

Neil Fletcher - General Manager - Technology Services

Arc Innovations

	Question	Comment
Question 1	<i>Do you consider that the Ministry should investigate any other options for further rationalization of spectrum for cellular applications in the 806-960 MHz band? If so, please explain.</i>	Yes. Please refer to the answers below, and the summary at the beginning of this document.
Question 2	<i>If your organization uses the KK band (806-812 MHz and 851-857 MHz), do you consider that the Ministry's assessment of utilization of the band is accurate? If not, please explain.</i>	Not applicable
Question 3	<i>If your organization has STL licenses, do you consider that the Ministry's assessment of the Utilization of the sub-bands (849-851 MHz, 915-921 MHz and 929-935 MHz) is accurate? If not, please explain.</i>	Not applicable.
Question 4	<i>If your organization uses any of the land mobile radio sub-bands (812-819 MHz and 857-864 MHz, and 868-869 MHz), do you consider the Ministry's assessment of current usage to be accurate? If not, please explain.</i>	Not applicable
Question 5	<i>With respect to the harmonization of New Zealand's SRD spectrum in the 806-960 MHz band, do you have a preferred ITU Region or trading partner with which New Zealand's allocation should be harmonized? Please explain your preference.</i>	Arc Innovations believes that it would be preferable to align the 900 MHz SRD band with the Region 3 allocation in Australia. This will give New Zealand based companies access to technology without modification and leverage off regional volumes. At present manufacturers are required to develop or modify their equipment to be compatible with the New Zealand spectrum allocations and the limited bandwidth available currently impacts the usability of the SRD technologies and complicates deployments, both of these factors ultimately affect the end-user.

	Question	Comment
Question 6	<i>Are there significant SRD-type applications that are presently precluded from being deployed, or are more expensive to deploy, in New Zealand due to the lack of full harmonization with one or more trading partners in the 806-960 MHz band? Please provide an indication of additional SRD product costs being incurred when supplied on frequencies currently allocated for this purpose in New Zealand.</i>	Arc Innovations has invested significant sums of money to have technologies modified to work within the New Zealand 900 MHz SRD band. Arc Innovations has incurred further costs in gaining the relevant compliance and certifications for SRD equipment that would have been reduced if the band was aligned with our trading partners. As further deployments are undertaken, these additional costs (over the standard unit costs) continue to be borne by Arc Innovations due to the lack of harmonization.
Question 7	<i>Does your organization wish to supply or deploy high-powered SRDs in New Zealand in the 915-929 MHz band? If so, what are the technical parameters of the equipment and spectrum usage?</i>	Arc Innovations has no current plans to deploy equipment with an EIRP over 1W. Arc Innovations' experience in this band (over 110K points deployed) indicates that equipment with high power levels create excessive RF noise and undermine the principles of the low power SRD. Arc Innovations notes the proposal to allow 4W RFID equipment into the band and would suggest that the application at this power level be widened to include metering applications, enabling Arc Innovations to deploy smart meter systems more widely across New Zealand.
Question 8	<i>Does your organization suffer from insufficient spectrum in the 806-960 MHz band at present or do you see a future need for spectrum in this band that is not currently allowed for? If so, please provide details.</i>	Yes. The platform that we are deploying operates natively in a single 26 MHz band, subdivided into two 13 MHz units. We currently only have access to 7 MHz of shared spectrum, which is restrictive. Globally, the number of devices operating in these SRD bands is increasing, and will result in further competition for the limited bandwidth available
	Question	Comment
Question 9	<i>Is the band 841-849 MHz a viable option for STL</i>	No comment.

	<i>use? If not, please explain.</i>	
Question 10	<i>Are there services or applications other than STLs for which the spectrum at 841-849 MHz would be better allocated? If so, please provide details.</i>	No comment.
Question 11	<i>Is the proposed expansion of the SRD allocation to 915-929 MHz, along with an increase in power from 1 watt to 4 watts for RFIDs operating at 920-926 MHz, viable and appropriate in New Zealand? If not, please explain.</i>	<p>No, Arc Innovations view is that the proposed arrangement which allows unrestricted 4W EIRP only for RFIDs is overly restrictive and inappropriate. It is important that the introduction of 4W devices into this band is well managed; the potential disruption to other users of the band is significant given the power level and allocation of frequencies in the middle of the band. Our recommendations to mitigate this are set out in the covering letter attached.</p> <p>The expansion of this SRD band from 915 MHz upwards is welcome as numerous technologies are becoming available to utilities that would operate in this band. These would allow for initiatives like smart grid, smart home, in home displays and demand side management in the electricity industry.</p>
Question 12	<i>In regards to the interface between GSM/W-CDMA and SRDs at 915 MHz, would you suggest any mitigation measures for this interface? If so, please provide details.</i>	<p>Arc Innovations suggests the following measures for this interface:</p> <ol style="list-style-type: none"> (1) allow an EIRP of 1W for digital modulation or frequency hopping transmitters compliant with AS/NZS 4268 in the expanded 900 MHz SRD band; (2) allow analogue transmitter types at a maximum EIRP of 25 mW; and (3) follow the Australian LIPD Class License which makes the entire 915-928 MHz band available to digital modulation or frequency hopping transmitters with a 1W EIRP limit.

	Question	Comment
Question 13	<i>Are the proposed two-phase licensing arrangements for STLs and SRDs in the 915–921 MHz band suitable? If not, please explain.</i>	No. Arc Innovations recommends that a maximum 4W EIRP should only be made available to devices in the 920-926 MHz range after the entire 915-928 MHz band has been freely accessible to users for at least 12 months. This would allow for existing low power SRD devices to be reconfigured to operate across the 915-928 MHz band before any undue influences from 4W devices.
Question 14	<i>In Phase 2 of the licensing arrangements for STLs and SRDs in the 915-921 MHz band, would the utility of the band for SRD use be significantly degraded by permitting STLs to remain?</i>	Yes. Coexistence of low power SRD devices along with high power analogue STL devices will be an issue for both types of devices – the SRD devices will degrade the service of the STLs, and the STLs will deny access to part of the band for the SRDs. Low power digital STL devices (up to 1W EIRP) could easily coexist with SRD devices in the band.
Question 15	<i>Do you agree with the creation of management rights in the 841-849 MHz band, and the subsequent allocation of management rights to private parties? If not, what is your preferred alternative and why?</i>	No, Arc Innovations recommends that the Crown should retain management rights within the 841-849 MHz band. This should facilitate the transition of all STLs from the 915-921 MHz band. STL users that cannot conform to the power restrictions of the SRD band would therefore have the option to apply for licensed use within the 841-849 MHz band.
Question 16	<i>Do you agree with the proposal that the Crown retains and commercially manages 2 MHz of spectrum in a management right in the 841-849 MHz band in order to allocate licenses for STLs to non-right holders? If not, what portion if any do you consider should be retained and how should it be allocated? Please explain your reasons.</i>	No, Arc Innovations recommends that the Crown should retain management rights within the 841-849 MHz band. This should facilitate the transition of all STLs from the 915-921 MHz band. STL users that cannot conform to the power restrictions of the SRD band would therefore have the option to apply for licensed use within the 841-849 MHz band.

	Question	Comment
Question 17	<i>Do you agree with the proposed 0.5 MHz lot size if management rights are sold in the 841-849 MHz band? If not, what lot size would you prefer and why?</i>	No, Arc Innovations recommends the Crown retain management rights within the 841-849 MHz band.
Question 18	<i>Do you agree that the boundaries of proposed management rights in the 841-849 MHz band should be conditioned to enable digital STL use? If not, what boundary conditions would you prefer and why?</i>	No comment.
Question 19	<i>Do you agree with the proposed 2.5 MHz initial acquisition limit for parties buying management rights in the 841-849 MHz band and retention of this limit for a five-year period? If not, what limits and time period do you prefer and why?</i>	No, Arc Innovations recommends the Crown retain management rights within the 841-849 MHz band.
Question 20	<i>What are your views in general on the Ministry's base proposal for replanning the 806-960 MHz band and the impacts? Are there other replanning options that you believe the Ministry should consider, and why do you prefer them?</i>	Please refer to comments set out in the covering letter attached..
Question 21	<i>If your organization has licenses in the TX band (868-869 MHz) for simplex land mobile radio, do you still require access to spectrum for this purpose? If so, how long does your organization intend to use this technology (do you have any plans to transition to different technology)? Is there any other band that could you use for your land mobile radio services instead?</i>	Not applicable.

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	Question	Comment
Question 22	<i>If the simplex LMR use was not relocated from 868-869 MHz, would use of the full 864-870 MHz band by SRDs be practicable by acknowledging the risk of potential interference to land mobile radio usage?</i>	No. Arc Innovations recommends that the band from 819-825 MHz be reassigned to LMR and STL use as appropriate. This will allow current users of the 868-869 MHz band to transition. This will also give these users full protection from potential interference. The 819-824 MHz SRD band is inconsistent with that of our major trading partners and therefore only a very limited number of SRD devices will be available to operate within this spectrum.
Question 23	<i>What, if any, provisions might be necessary to protect the cellular services operating in the private management right above 870 MHz from interference from SRDs if they operated up to 870 MHz?</i>	We would adopt the same principles described in question 12: (1) allow an EIRP of 1W for digital modulation or frequency hopping transmitters compliant with AS/NZS 4268 in the expanded 864-870 MHz SRD band; and (2) allow analogue transmitter types at a maximum EIRP of 25 mW.
Question 24	<i>If your organization currently uses the 819-824 MHz band, are you able to retune your equipment to use different spectrum?</i>	Not applicable.
Question 25	<i>What alternative uses could be made of the 819-824 MHz band currently allocated to SRDs?</i>	The 819-824 MHz SRD band is inconsistent with that of our major trading partners and therefore only a very limited number of SRD devices will be available to operate within this spectrum. The band from 819-825 MHz should be reassigned to LMR and STL use as appropriate. This will allow current users of the 868-869 MHz band to transition. This will also give these users full protection from potential interference.

	Question	Comment
Question 26	<i>How can the unused spectrum (held in management rights) at 840-841 MHz and 885-890 MHz best be used? For example, are there technologies compatible with the adjacent cellular use that might be deployed?</i>	Arc Innovations suggests that the Crown could reacquire both of these bands and reallocate for services as required. Applications employing digital modulation or frequency hopping technologies can be used in these bands to minimize any impact on adjacent bands.