The New Zealand Association of Radio Transmitters Incorporated

SHORT RANGE DEVICES:

A Submission to the Ministry of Economic Development in response to the Ministry's Engineering Discussion Paper: *Spectrum Allocations for Short Range Devices*, *August 2004*

Introduction

This Submission is made on behalf of the NZART Council and is in response to the Ministry's Engineering Discussion Paper on *Spectrum Allocations for Short Range Devices, August 2004*.

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The NZART view

Each of the Ministry's proposals will be considered here in turn.

It is noted that no mention or reference is made anywhere in the Ministry's document to the Amateur Service or to the Amateur Satellite Service or to any consideration of the probable impact of the proposals on these two services.

As at 18 September 2004, a search of the New Zealand amateur radio licensing information at: http://spectrumonline.med.govt.nz/other-reports.html shows that there are 4747 current Amateur Radio Operator licences, with 353 Beacon and Repeater licences, a total of 5100 current licences.

These licences are shown to be spread nation-wide, concentrated where the members of the population live and where Short Range Devices are and seem to be increasingly found. This distribution brings the expectation of a high interference impact from these pervasive non-licensed Short Range Devices on the operations of licensed stations in the Amateur and Amateur Satellite Services.

Each of these Amateur Radio Operator licensees is licensed to operate on all frequency bands available to New Zealand's radio amateurs so the potential interference and nuisance impact to many licensed stations from Short Range Devices is high and is already happening and known.

The Frequency Allocation Table for amateur radio and amateur satellite activity in New Zealand is given in ***Schedule 3*** attached to each amateur radio licence. From that Schedule and from the

GURL for Short Range Devices, the bands where there is conflict with Short Range Devices are identified.

Schedule 3 is obtained from:
http://www.med.govt.nz/rsm/licensing/schedules/schedule3.pdf

The bandplans developed for use and followed by New Zealand's radio amateurs have been developed over many years and are found at:
http://www.nzart.org.nz/nzart/Repeaters/

The bands with particular interference potential and concern are considered in the detailed responses following.

Unfortunately, as the discussion paper points out, the frequency usage in the three Regions of the ITU is often chaotic. Furthermore, major countries such as the USA and Australia do not conform to the ITU Regional usage when it suits their domestic purposes.

This behaviour is regrettable and should not be copied by New Zealand. In trying to align with our trading partners, New Zealand risks allocating a larger proportion of the scarce radio spectrum to Short Range Devices than do our trading partners. This is at the expense of other more important users of the radio spectrum.

NZART therefore advocates a more moderate approach, better suited to the interests of non-SRD spectrum users in New Zealand than that proposed by the Ministry.

The amateur band at 430 to 440 MHz

As will be seen from the responses following below, Short Range Devices at 433.05 to 434.79 MHz are particularly bothersome. The name "Short Range Device" is a misnomer. That may be its well-meaning intention and some may perform as such, but others have seemingly limit-less ranges out to horizon distances.

The interference problem is further exacerbated by the supposedly low-power devices that position themselves on the input frequencies of established licensed repeater stations. They then become Wide-Area-Interferers.

The GURL provides for devices at 433.05 to 434.79 MHz to be Telemetry/Telecommand only with Peak Power 25 mW e.i.r.p. Illegal devices other than Telemetry/Telecommand are found operating there. Being constant-transmission, they exhibit high and repeatedly-interrupting interference to licensed users over wide areas.

The present regulatory position is clear. The GURL: "*Radiocommunications Regulations (General User Radio Licence for Short Range Devices) Notice 2003*", contains the following words:

> (4) Should interference occur to services licensed pursuant to a radio licence or a spectrum licence, the chief executive reserves the right to require and ensure that any transmission pursuant to this General User Radio Licence change frequency, reduce power, or cease operation.

It is customary in most countries for licensed radio services to be afforded protection from low power unlicensed devices parading under any or many different names.

But, the following entry appears in Schedule 3 attached to amateur licences:

3. The frequencies:
   27.12 MHz (26.957 – 27.283 MHz),

433.92 MHz (433.05 – 434.79 MHz),
921.5 MHz (915 – 928 MHz),
2.45 GHz (2.4 – 2.5 GHz),
5.8 GHz (5.725 – 5.875 GHz),
24.125 GHz (24.00 – 24.25 GHz),
122.5 GHz (122 – 123 GHz), and
245 GHz (244 – 246 GHz),

are designated for industrial, scientific and medical (ISM) purposes. These frequencies may also be allocated to Short Range Device (SRD) services. Amateur licensees operating on amateur allocations within these frequency ranges must accept interference from ISM and SRD services.

The *Schedule 3* is for *Amateur **Operator*** licensees. It is certainly worthy that mutual tolerance be shown by all users of the radio frequency spectrum. This may be so where individual licensed radio amateurs being spread throughout and a part of the populated areas of the country may experience local interference from these pervasive Short Range Devices.

However, *Schedule 3* also contains the following:

6. Amateur beacons, repeaters and fixed links may not be established pursuant to this licence.

The situation is different with installations established under an amateur ***Repeater*** licence. Here there is potential for wide areas of the country to experience interference from a lone unlicensed device positioned on the input frequency of a repeater. The position is serious when a repeater is involved with an emergency event for Amateur Radio Emergency Communications, AREC.

Amateur repeater installations, being established and operated in amateur bands and operating under amateur ***Repeater*** licences, expect to receive protection from Short Range Devices with implementation of (4) of the GURL and with compliance enforcement.

Wireless LANs (Section 4)

Proposal 4.a

The Ministry invites comment on the anticipated demand for the 915 to 921 MHz band by Studio Transmitter Links and Short Range Devices. In particular comment is invited on the proposal to freeze future licences for STL in this band.

The NZART view:

NZART supports the proposal to freeze the issuance of further licences for STLs in this band and suggests that the Ministry should also encourage existing licensees to move to higher frequency bands and to more spectrally-efficient modulation modes.

NZART has commented on other occasions that the use of analogue modulated STLs in the 440 MHz, 900 MHz and other bands is a waste of spectrum. This is particularly so with the concentration of “big city” commercial AM and FM broadcast Management Rights in only a few hands.

An inspection of the Ministry’s “SpectrumOnLine” web site shows many instances of multiple STL licences in the 900 MHz band between a particular studio site and an associated transmitter site. Multiplexing the multiple programmes on to one carrier, on a much higher carrier frequency, would allow re-deployment of the UHF STL frequencies to more appropriate services and take the pressure off other UHF frequencies.

New Zealand’s radio amateurs have access to the 921 to 929 MHz part of the ISM band on a restricted-power-level local arrangement as shown in Schedule 3 attached to the amateur radio

licence. Please see the response to ***Proposal 5.b*** below about the concerns with frequency migration of STL installations. .

Proposal 4.b

The Ministry invites comment on the assessment of the 2.4 GHz spectrum demand. Of particular interest are indications of the demand for higher power point-to-point systems in this band.

The NZART view:

NZART opposes any increase in SRD transmitter power in this band as it will inevitably lead to a transmitter "power race" and ultimately to the same signal-to-interference ratios as at present but at a higher cost to New Zealand.

The combination of high power transmitters and low gain antennas already produces high levels of co-channel interference over a wide area.

A more sensible approach is to reduce the permitted transmitter output power, and permit the e.i.r.p. to be increased to any achievable level by the use of high gain and highly directional antennas. The use of highly directional transmit and receive antennas at randomly located sites, leads on average, to improved signal-to-interference ratios at lower cost and less interference to all spectrum users.

The Bandplan for the amateur 2396 to 2450 MHz band is seen at:
http://www.nzart.org.nz/nzart/Repeaters/3_BP_.pdf

It should be noted that 2400 to 2450 MHz is also allocated to the Amateur Satellite Service by footnote. See RR 5.282:

> **5.282** In the bands …, 2 400-2 450 MHz, … the amateur-satellite service may operate subject to not causing harmful interference to other services operating in accordance with the Table.

The ISM provisions are recognized and accepted.

With the present known and intended intensive uses under existing provisions, any proposal for "*higher power point-to-point systems*" at this part of the spectrum can ***NOT*** be supported.

Proposal 4.c

The Ministry invites comment on the implications of a GURL being issued for FWA systems in the band 3650 to 3700 MHz. It is acknowledged that once the international position has been clarified there will need to be further consultation before the Ministry takes any action on this band.

The NZART view:

NZART has no comment on this proposal.

Proposal 4.d

The Ministry invites comment on the implications of the proposed change in radiated power level from 250 mW to 200 mW in the 5150 to 5250 MHz band.

The NZART view:

While having no interest in this frequency band, NZART supports the power reduction and conformity with ITU-R Recommendations and Resolutions in the interest of spectrum efficiency.

Proposal 4.e

The Ministry invites comment on the proposal to include the ITU-R Resolution 229 conditions of operation in the band 5250 to 5350 MHz band.

The NZART view:

While having no interest in this frequency band, NZART supports conformity with ITU-R Recommendations and Resolutions, in the interest of spectrum efficiency.

Proposal 4.f

The Ministry invites comment on the proposal to permit the operation of wireless LANs in the band 5470 to 5725 MHz.

The NZART view:

NZART has existing operations in this band and opposes any incursions by other users.

The Bandplan for the amateur band 5650 to 5850 MHz is shown at:
http://www.nzart.org.nz/nzart/Repeaters/3_BP_.pdf

Please note that the Amateur Satellite Service actively operates here in two bands. The lower band 5650 to 5670 MHz is Earth-to-space only under footnote RR 5.282:

> **5.282** In the bands … 5 650-5 670 MHz, the amateur-satellite service may operate subject to not causing harmful interference to other services operating in accordance with the Table. ... The use of the bands … 5650-5670 MHz by the amateur-satellite service is limited to the Earth-to-space direction.

The higher Amateur Satellite band at 5830 to 5850 MHz is space-to-Earth only but is a Table entry. See: **RR5-83.**

These two amateur satellite bands are popular and actively used.

NZART ***opposes*** any proposal for wireless LANs to be permitted to operate in the band 5650 to 5725 MHz.

Proposal 4.g

The Ministry proposes to monitor the developments of new FWA and DSRC standards and will review the conditions of use for the band 5725 to 5875 MHz band once these are finalised.

The NZART view:

Noted, but the Ministry is requested to consider the position of the Amateur and Amateur Satellite Services as explained in response to ***Proposal 4.f*** (above) with particular attention to the Amateur Satellite provisions.

There are existing amateur radio operations in this band and NZART opposes any incursions by other users.

Radio Frequency Identification Devices (Section 5)

Proposal 5.a

The Ministry proposes not to change the current allocations in the135 kHz, 13.56 MHz and 433 MHz bands as they make sufficient provision for RFID.

The NZART view:

There is amateur activity in the band 130 to 190 kHz, in particular around 137 kHz and 170 kHz. The amateur band at 430 to 440 MHz and its problems was discussed above.

NZART believes that the Ministry has made excessive provision for RFID and SRD so disagrees with the Ministry. In particular, the Ministry should move to reduce or eliminate ISM, RFID and SRD in the 433 MHz band.

There are existing amateur radio operations in two of these bands and these have on occasions suffered serious interference. In particular, the nation-wide amateur National System on 430 to 440 MHz, which links together operations of the various territorial Amateur Radio Emergency Communications (AREC) groups, has been paralysed for hours at a time by ISM, RFID and SRD.

The bandplan for the 430 to 440 MHz band is given at:
http://www.nzart.org.nz/nzart/Repeaters/2_BP_.pdf

This band is very popular and is widely used throughout New Zealand. There are already problems with the co-existence with the GURL Telemetry/Telecommand devices at 433.05 to 434.79 MHz as explained above.

The GURL provides for devices at 433.05 to 434.79 MHz to be Telemetry/Telecommand only with Peak Power 25 mW e.i.r.p. Illegal devices other than Telemetry/Telecommand are found operating there. Being constant-transmission, they exhibit high and repeatedly-interrupting interference to the licensed users.

The approved power level shown on the GURL for the Telemetry/Telecommand devices here was recently raised.

NZART cannot support any further additions or more types of unlicensed device in this band. A reduction to the permitted power level shown on the GURL will be supported.

Proposal 5.b

The Ministry invites comment on the anticipated growth in the use of the band 860 to 960 MHz band for RFID, especially in the international distribution chain markets. The

Ministry also invites comment on the proposal to freeze the availability of mobile licences in the band 868 to 870 MHz and STL licences in the band 915 to 921 MHz with possible migration out of these bands in the future.

The NZART view:

NZART acknowledges that some provision should be made for RFID. In particular the transmit power should be limited to very low levels since RFID needs to operate only over a very short-range.

NZART supports the proposal to freeze the issuing of more licences in these bands and suggests that the Ministry should encourage the move of existing licences to higher frequency bands and to more spectrally-efficient modulation modes.

New Zealand's radio amateurs have access to the 921 to 929 MHz part of the ISM band on a restricted-power-level local arrangement as shown in Schedule 3 attached to the amateur radio licence. If the STL installations are to migrate they should do so to bands not shown on the Table in Schedule 3.

Proposal 5.c

The Ministry proposes not to change the current allocations in the 2400 to 2483.5 MHz band as they make sufficient provision for RFID.

The NZART view:

NZART believes that the Ministry has made excessive provision for RFID so disagrees with the Ministry. In particular, the transmit power should be limited to very low levels since RFID needs to operate only over a very short-range.

Please refer to the response to ***Proposal 4.b*** above.

Medical Telemetry (Section 6)

Proposal 6.a

The Ministry proposes to consider the demand for the operation of biomedical telemetry in the VHF or UHF TV bands and the implications of permitting such devices.

The NZART view:

NZART believes that this proposal and similar ones, indicates that the Ministry is prepared to tolerate unsatisfactory spectrum practices in New Zealand because our various trading partners have permitted a variety of incompatible and often proprietary, biomedical telemetry devices on a wide range of frequencies.

The Frequency Allocation Table for amateur radio and amateur satellite activity in New Zealand is given in ***Schedule 3*** attached to each amateur radio licence. Schedule 3 is obtained from: http://www.med.govt.nz/rsm/licensing/schedules/schedule3.pdf The band 614 to 622 MHz is listed as an amateur band. This increasingly popular amateur band is known in broadcasting circles as Channel E39.

The following power limit appears in Schedule 3:

7. Transmitter power output must not exceed 500 watts peak envelope power (pX), as defined in ITU Radio Regulation 1.157.

This is the power limit for all amateur stations. In amateur television (ATV), typical ATV transmitter output power is 100 watt PEP but is usually much less. Amateurs work with very low signal levels. The band 614 to 622 MHz is used for general amateur purposes in addition to ATV activities.

In view of the experimental nature of the activities of amateur stations and the low signal levels at which they work, the use of 614 to 622 MHz (Channel E39) anywhere in New Zealand for any other service, licensed or not, must be avoided.

NZART opposes this proposal, and notes that the Ministry's records appear to be incomplete. There are currently 32 licences for TV in the band 614 to 622 MHz which are not even mentioned in the discussion paper, compared with an average of 8 TV licences in each of the other three channels between 622 to 646 MHz. These Amateur Television stations are all low-power.

Proposal 6.b

The Ministry proposes the allocation of the 402 to 406 MHz band for MICS and other low power medical telemetry in accordance with the ITU-R Recommendation SA.1346.

The NZART view:

NZART supports this proposal, in accordance with an ITU-R Recommendation.

Proposal 6.c

The Ministry invites comments on the anticipated future use of the current sub-bands within 410 to 470 MHz for medical telemetry.

The NZART view:

Proposal 6.b makes very generous provision for medical telemetry so NZART opposes this proposal.

As explained earlier, NZART has concern for the band 430 to 440 MHz. The bandplan for this band at is given at:
http://www.nzart.org.nz/nzart/Repeaters/2_BP_.pdf

This band is very popular and is widely used throughout New Zealand. There are already problems with the co-existence with the GURL Telemetry/Telecommand devices at 433.05 to 434.79 MHz.

As explained earlier and in the response to ***Proposal 5.a*** above and in view of the constant-changing and experimental activities of amateur stations, it would be very unwise to use the band 430 to 440 MHz for medical telemetry.

NZART cannot support the further addition of any specific type of unlicensed device in this band. A reduction in the permitted power level shown on the GURL will be supported.

Proposal 6.d

The Ministry invites comment on the anticipated demand for medical telemetry in the frequency bands 608 to 614, 1395 to 1400 and 1429 to 1432 MHz allocated in the USA. Comment is also invited from existing users on the feasibility of sharing these bands with medical telemetry.

The NZART view:

Proposal 6.b makes very generous provision for medical telemetry so NZART opposes this proposal.

Very Low Power Audio Senders (Section 7)

Proposal 7.a

The Ministry proposes to permit very low power audio sender devices in the band 88 to 108 MHz with a maximum radiated power of 0.02 µW.

The NZART view:

NZART has no comments on this proposal.

Audio Video Senders (Section 8)

Proposal 8.a

The Ministry proposes to permit the sharing of the band 614 to 646 MHz, currently allocated to AV Senders under the SRD GURL, with radio microphones.

The NZART view:

NZART opposes this proposal and notes that the Ministry's records appear to be incomplete. There are currently 32 licences for TV in the band 614 to 622 MHz which are not even mentioned in the discussion paper, compared with an average of 8 TV licences in each of the other three channels between 622 to 646 MHz. These Amateur Television stations are all low-power.

NZART also believes that AV Senders should be deleted from the band 614 to 646 MHz, since operation in the 2.4 GHz band is much more appropriate, and that radio microphones are more appropriate in the 88 to 108 MHz band, or in the "high power" TV channels from 646 to 806 MHz. This reduced frequency range does not disadvantage any of the potential users, since most manufacturers claim that their products are "frequency agile".

Please refer to the response to ***Proposal 6a*** above.

In view of the experimental nature of the activities of amateur stations and the low signal levels at which they work, the use of Channel E39 for any other service, licensed or not, and anywhere in New Zealand, must be avoided.

Ultra Wideband Applications (Section 9)

Proposal 9.a

The Ministry proposes to monitor the developments of spectrum allocation for UWB. Comment is invited on the future spectrum demand for applications using Ultra Wideband technologies and the implications of permitting allocations similar to those issued by the FCC in USA.

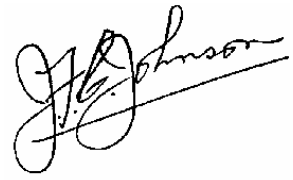
The NZART view:

NZART sees no immediate use for UWB and believes that the FCC allocations and operating conditions are ill-conceived. NZART will oppose any similar New Zealand proposals at the appropriate time.

Appreciation

The opportunity to make this submission to express the views and the concerns of the amateur radio fraternity on the Ministry's proposals is appreciated. Further information can be given on request.

Respectfully submitted,



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NZART Administration Liaison Officer 24 September 2004