

Land mobile and point-multipoint (FAQs)

The Government/Commercial/ Rail divide at 400 MHz

- [The Government bands](#)
- The original intent – to “harmonise” interoperability of radiocommunications services across state boundaries for law enforcement and emergency services
- But somehow law enforcement and emergency services morphed into all of government – except for local government
- Co-ordinated by the NCCGR – with [representatives](#) in each state
- Difficulties:
 - Inadequate definition of the extent of the NCCGR “sovereignty”
 - No significant cross-border planning evident – states operating largely in isolation
 - Commonwealth Government (Aust. wide) requirements hard to manage
 - arbitrary division of spectrum (too much in some situations, too little elsewhere)
 - a further layer of complexity and delay in the licensing process
 - massive industry cost in relocation to appropriate bands
- Rail –([FAP 7](#) / [Embargo 60](#)) an extension of earlier “exclusive spectrum for rail” arrangements, but;
 - No real interstate harmonisation evident
 - Rail allocation inadequate in many situations, requires dispensations and agreement for access to other spectrum
 - Yet another layer of complexity (approval of ARA required for every licensing activity)
- Our view –good intentions but badly executed?
 - Division should have been according to *purpose (i.e. use)*, not *user*
 - Needs a more “hands on” approach by a central regulator (ACMA) to succeed
- The bottom line – licensing can get complicated (and protracted) when applications don’t fit neatly into the appropriate Division, or when the appropriate Division is unclear.

Wide area channels for Land Mobile

- Generally speaking land mobile licences are either:
 - Site specific, or
 - Wide area

- Wide area definitions: ([See table](#)) Can be:
 - Australia wide
 - State wide
 - Other defined regions (e.g. “Coastal Areas”)
 - Defined metropolitan centres e.g. [Perth MD](#) (see Appendix F)

- Licensing arrangements documented in [FAP1](#)
 - Does not apply to “short term rental” channels
 - Applies to “Land Mobile System” and “Ambulatory”

- Could be assigned on any channel prior to 2012. Now rationalised to a defined sub-set of channels. Defined channels for:
 - VHF and UHF
 - Single frequency and two frequency
 - 12.5 and 25 kHz

- Special rules (in addition the normal rules LM8, embargos etc.)
 - For operations of “short term duration” (defined as typically less than one month)
 - Operation on a no “interference / no protection basis” (Condition 27)
 - Power restricted to 8.3 W eirp within HDA/MDA
 - Must not operate high power within 200 m of a “sited” service (Implies obligation to consult the RRL when setting up!)

DGPS licensing

- Differential GPS uses LM channels (usually UHF) to transmit GPS correction data from an accurately known location to field GPS receivers (rovers), sometimes via repeaters.
- Lots of good reference material:
 - The ACMA [DGPS Licensing Guide](#)
 - The ACMA [DGPS factsheet](#)
 - [The NSW surveyors/supplies fact sheet](#)
 - [The Spectrum Engineering info sheet](#)
- Decision points for licensing :
 - Site based (fixed long term location) or wide area (various short term locations)?
 - (If wide area see [FAP2](#))
 - 12.5 or 25 kHz bandwidth? (Equipment tuning issues)
 - Coverage - low power (8.3 W eirp) or full power (83 W eirp)?
- Licensing process is simple enough, but customer is usually “once-off” and unfamiliar with radiocommunications and the licensing process.
- Ascertaining antenna details can be a problem

Ongoing opportunities for 25 kHz at 400 MHz

(The “narrow-banding” requirements discussed here apply specifically to 403-520 MHz)

- A key element of the 2012 re-planning of the 400 MHz band was the move from 25 kHz to 12.5 kHz channelling (narrow banding)
- But there are exceptions. The documentation supporting such exceptions can be hard to find. It is scattered around various documents and it is difficult to be sure of the context of some rules.
- Land Mobile
According to [RALI MS22](#) (page 4), 25 kHz land mobile services are permitted to operate indefinitely as follows:
 - High power (>8.3W eirp) – anywhere except within [high or medium density areas](#) or within 100 km of the boundaries of such areas
 - Low power (<8.3W eirp) – anywhere except within [high or medium areas](#)
 - Anywhere, for systems that achieve spectrum efficiencies equal to or better than one communications channel per 12.5 kHz
- Point –Multipoint
[RALI FX16](#) (page 6) says
 - 25 kHz channelling is permitted provided that a data rate of at least 4.8 kbps is used
 - (The data rate requirement does apply in locations where the service area is contained entirely within Low Density and Remote Density geographic areas.)
- Point-Point
 - Analogue ([The Way Ahead: Timeframes and Implementation plans for the 400MHz band December 2010](#))
 - High/Medium density areas – 25 kHz only if providing two or more voice circuits
 - Low/Remote areas – can use 25 kHz (no constraint applies)
 - Digital ([RALI FX17](#))
 - All areas – bit rate should exceed 9.6 kBit/s for use of 25 kHz

Emission designators

- According to the [ACMA](#) :
“A method of accurately and concisely describing the characteristics of radiofrequency emissions”
- Defined by the [ITU](#) (See [examples](#) also)
- More realistically, a “shorthand” code to describe the principal characteristics of a radio emission, within the limitations of the system. It describes:
 - The bandwidth
 - The modulation method
 - The "content"

Usually of no practical use in the frequency assignment process for regular licence types (e.g. land mobile or fixed links) – but mandatory nevertheless!

- Struggles to cope with modern digital modulation schemes. Tendency is to settle on some “best fit” and everybody used that.

For example, what about systems that can operate in either analogue or digital mode e.g. some P25?

- So - does it need to be correct?
 - Well yes – within the limitations of the system
 - We have heard of an infringement notice having been issued quite recently because the emission designator for a land mobile system was not varied when the service was upgraded from analogue to digital, with no other changes that would affect the licence details!

Accuracy of site & antenna height information

- Very frequently asked questions
- Very hard questions to answer!

Site accuracy

- ACMA document ([Radiocommunications site data requirements](#)) – but sadly inadequate and out of date
- Traditionally a challenging task – should now be much simpler using GPS and visual mapping tools
- Rules still quite vague, but our observations are as follows:
 - Each antenna support structure (tower or pole) should have its own Site ID
 - But rooftops are problematic – usually defaults to a nominal central location
 - Use of established site records is generally acceptable - usually just too difficult to correct particularly if shared by many licensees
 - If services are actually co-located on a tower the use of a single Site ID slightly in error is probably preferable to having multiple separate sites all purporting to be accurate!
 - Now not too difficult to “get it right” when creating a new site – much easier than fixing it later! Please take care with the information you collect and supply! Verify against on-line mapping.
 - 10 metre accuracy should be readily achievable in most instances

Antenna height accuracy

- Unaware of any formal “rules”
- From a practical (frequency co-ordination perspective) +/- 5 metres is probably adequate – but we have heard suggestions of +/- 1 metre (or less!)
- The reference is “above ground level” (AGL) - but “ground level” could be difficult to ascertain in some situations (e.g. around a building).
- Our advice - do your best with a reasonable figure but don’t stress too much about this one!