1. How to map hexagonal coverage cells to rectangular HCIS cells.

WGS84: Ellipsoid, \( a=6378137 \), \( 1/f=1/298.25723563 \)
Equatorial radius =6378.137 km
Polar radius\( a(1-(1/f)) =6356.752 \) km

WGS84 \( \sim \) GDA94
GDA94: Ellipsoid, \( a=6378137 \), \( 1/f =1/298.25722101 \) (US),
\( 1/f =1/298.257223563 \) (Global)
GRS80: Ellipsoid, \( a=6378137 \), \( 1/f =1/298.257222101 \)
GDA is new and AGD is old.

AGD66:a=6378160, \( 1/f=298.25 \) with origin \(-25^\circ 56'54.5515'', 133^\circ 12'30.0771''\), spheroid height=571.2m.
AGD66 differs from AGDB by 6m.

MGA is new and AMG is old. MGA will be used to display GDA geographic coordinates
and supercede AMG84 and AMG66. MGA is UTM projection of GDA geographic coordinates
from the GRS80 spheroid. Redfearn (1948) formulae must use geometric parameters of GRS80,
\( a=6378137, 1/f=298.2572221 \)

ACMA’s Australian Spectrum Map Grid (ASMG) is new.

ASMG Cell sizes: 3 deg, 1 deg, 15', 5' (No 7.5')

Metro Melbourne : 2.5F (~2x3 deg), Metro Sydney : 2.5H (~3x3 deg)

Metro Darwin : 2.5D (~1x1.5 deg), Regional East Aus: 2.5I (Large)

Remote Australia: 2.5K (Large), SRTM DEM resolution = 3" (~90m)

2. Exclusion zones near DTV transmitters: For low power transmitters with new technology
and sharp filters, the possibility of reducing the exclusion zone area may be considered.

   a. HAY, NSW TV site: AMG Zone 55, UTM 314920mE, 6185673mN
     (-34.452254, 144.986483), 90m ASL, Antenna height= 62-80m.
     (Hay, NSW has flat terrain with 9 KW transmitters.)
     TV Ch: SBS61, UHF band V Ch.61, Frq 760.5 MHz, OOB= \( (43+10\log(P)) \)
     TV Ch: AMN63, UHF band V Ch.63, Fr 772.198MHz, OOB= \( (76+10\log(P)) \)
     TV Ch: MTN57, UHF band V Ch.57, Fr 730.198MHz
     TV Ch: ABC55, UHF band V Ch.55, Frq 718.5 MHz

b. SOUTH YARRA, Melbourne, VIC TV site: -37 50' 25", 144 59' 43"
   TV Ch: HSV63, SEVEN NW, Ch.63 Fr 774.5MHz, Pol.V , OOB= \( (76+10\log(P)) \)

c. DANDNONG, Melbourne, VIC TV site: AMG55 354400mE 5810745mN
   ATV10, VHF55.625MHz (Ch 32), 15 KW Transmitter, Pol. V, ERP=1.5W (QPSK).

3. Exposure limits and Power limits: UE class 3 may be used for measurements.

   a. ARPANSA (Australia): RF exposure limits
      BTS EMF levels for (1) RF worker = 0.4 W/Kg (6 min ave, whole body)
      (2) General Public = 0.08 W/Kg (6 min ave, whole body)

   b. India
      General public = 1 W/m2 (2 - 300 GHz)

   c. ICNIRP (Intl): 900 MHz = 4.5W/m2 (880-915UL, 925-960DL, GSM)
      1800MHz = 9 W/m2 (1710-1785UL, 1805-1880DL)

   d. Specific Absorption Ratio (SAR) < 1.6W/Kg over 1 gm of tissue (UE Power = 125 mW)

   e. Spurious emissions
      1 GHz to 12.7GHz = -30 dBm/MHz
      30MHz to <1000MHz = -40dBm/MHz
      1GHz to <13.45GHz = -36dBm for 100kHz measurement BW
      1GHz to <13.45GHz = -30dBm(BW=30KHz if 2.5xBW<=fc.f<10xBW)
      (BW=300KHz if 10xBW<=fc.f<12xBW)
      (BW=1MHz if 12xBW<=fc.f )
Max interfering field strength $E_{i\text{(Max)}}=43\text{dBuV/m}$ (for Ch.52-69)

Base station parameters: ERP = $25.8\text{dBW}$, Antenna height = $150\text{m}$

Exclusion zone: Main beam clearance = $79\text{ km}$, Back of antenna = $43\text{ km}$.

FCC requirement for PSNB: OOB $E = -17\text{dBm/MHz}$ for mobiles.
$E = -24\text{dBm/MHz}$ for base stations.

ACMA Min wanted signal level $E = -102.5\text{dBm/MHz}$ for outdoor transmitter located within $200\text{m}$.

**RADIO**

Community radio frequencies: $102.7\text{ MHz}$, $103.5\text{MHz}$, $106.7\text{MHz}$ etc.

Commercial radio frequencies:
- **Melbourne**: $101.1\text{MHz}(56\text{KW})$, $101.9\text{MHz}$ etc.
- **Sydney**: $954\text{KHz}(5\text{KW}, 2\text{UE})$, $873\text{KHz}(5\text{kw}, 2\text{GB})$ etc, $9\text{A}(9\text{C})$ Multiplex @ $206.352\text{MHz}$.

**DTV**

Transmitter Examples

1. **TERX digital transmitter**
   - Input: $4\text{ ASI} + 2\text{ IP}$
   - RF output: VHF $174-240\text{ MHz}$, $10\text{ KW}$, $1970\text{ Kg}$
   - UHF $470-862\text{ MHz}$, $9.6\text{ KW}$, $1560\text{ Kg}$

2. **Thomson Elite 1000 Transmitter**
   - UHF $470-862\text{ MHz}$, MER $>33\text{dB}$, Shoulder $>36\text{dB}$
   - $9.6\text{KW}$ (OFDM) RMS, $14\text{KW}$ (ATSC) RMS
   - $6, 7, 8\text{ MHz BW}$