The D-CSR3604 is a channelised Class A repeater or Band selective Class B product that utilised DSP Software Defined Radio filter techniques to provide up to 8 RF channel frequencies within the range of: 421.0-430.0MHz.

In normal operation the repeater would consist of a number of narrow band filters that have been duplexed together to form a common input or output port for single antenna operation. The purpose of the filter / duplexer is to ensure that the equipment operating bandwidth is limited to the band of frequencies required to be amplified/repeater. The filter ensures that noise and any Intermodulation is limited to within the operating transmission band. The filter must prevent any noise reaching the antenna port at the receiver frequencies as any noise at this point will affect the ability to receive. The receiver input filter is used to ensure that only the required input band of frequencies is presented to the DSP module. The filter also ensures that the high level transmit output does not cause overload damage of blocking of the receiver ability to detect the wanted input frequencies.

This document will detail the operation for each of the components and provide explanatory drawings of the system and its application.

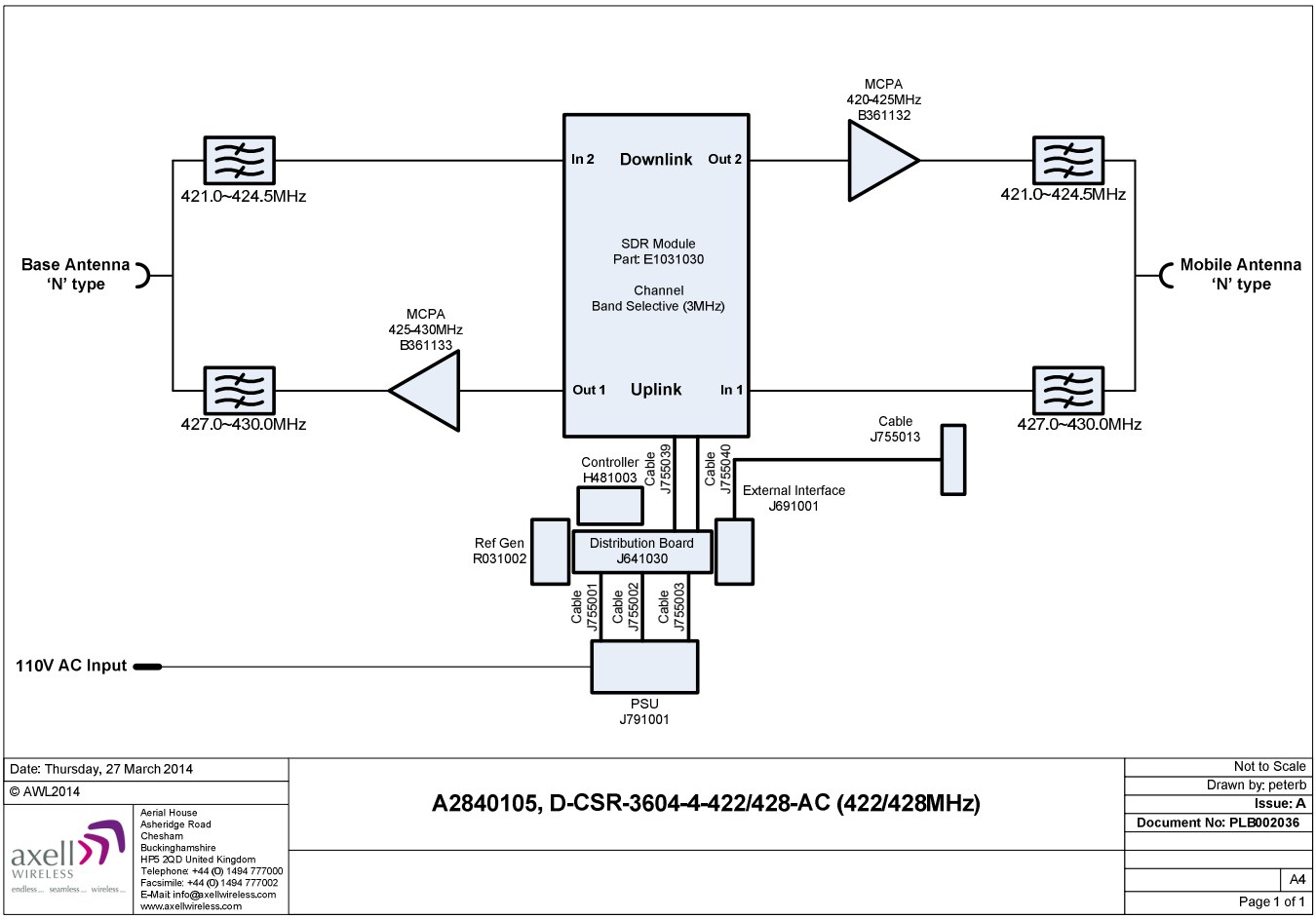

Figure 1. UHF D-CSR3604 for Type approval – Part number A2840005.

The UHF CSR3604 consists of 4 major components to perform RF amplification of the DL and UL paths.

1. DSP controlled Digital filtering for channel selectivity
2. Downlink amplifier
3. Uplink Amplifier
4. Input and output spectrum defining band pass filters for band selectivity.

There are also a number of supporting Power and Control modules including:

5. PSU
6. Distribution Board
7. Alarm interface
8. Controller
9. Reference Generator
10. Antenna Fault Detector

Module Function

1. The DSP controlled digital filter module provides up to 8 channel selectivity in both the DL and UL directions. The channel filter has 2 bandwidth options. The bandwidth of each channel filter can be set between 10kHz and 3.5MHz.The module consists on a 30dB gain low noise input amplifier feeding into an analogue to digital convertor which digitises a block of the 3-3.5MHz input spectrum.
   The digitised signal is filtered into the up to 8 channel windows as set by the frequency and bandwidth information entered. A digital squelch with adjustable threshold is set to enable the signal output above a predetermined input signal level over the range of -60dBm to -108dBm. The digitised filtered output is then fed via a Digital to analogue convertor into a 30dB gain pre driver amplifier to feed the output amplifier.

2. The Downlink output amplifier provides 37dB of gain and has a P1dB of 47dBm and an IP3 of 68dBm. The amplifier utilises high linearity class A techniques to minimise Intermodulation generation in the presence of multiple carriers. The amplifier output power is limited to 37dBm (5W) composite power to ensure high linearity to keep spurious products to a minimum.

3. The Uplink output amplifier provides 37dB of gain and has a P1dB of 47dBm and an IP3 of 68dBm. The amplifier utilises high linearity class A techniques to minimise Intermodulation generation in the presence of multiple carriers. The amplifier output power is limited to 37dBm (5W) composite power to ensure high linearity to keep spurious products to a minimum.

4. Band pass filters are fitted at the input and output of the DL and UL RF chains, these filters are used to limits the out of band noise and prevents out-of-band signals from overloading the DSP module.

5. The PSU is a high efficiency 300w switched mode module that converts the 110v AC input to 2 DC output voltages of 24v, 15v and 6.45v.

6. The Distribution board is used to connect the DC power and the RS485 control signals between the associated modules and the PSU / Controller card.

7. The Alarm interface card is used to connect the 4 external alarms into the controller card.

8. The Controller is based upon a Linux processor and software, which is used to control and monitor the active components within the repeater. A Web browser accessed GUI allows the operator to enter the required channel frequencies and to adjust the Gain and Squelch settings. The controller also provides a summary alarm output upon the failure of any active device.

9. The Reference Generator is used to provide an accurate stable 10MHz Reference signal to the DSP to ensure that the channel selectivity is centred on the wanted channel frequency.