DARE MRO Expedition:
Deployment and Initial Measurements

03/2012
Signal from DARE front end amplified with a Minicircuits amplifier and connected to a spectrum analyzer.
Spectrum taken at the Output of the receiver

**Configuration:** Antenna → Front-End → Coax → Receiver → 31dB Attenuation → Spectrum Analyzer

**Channel Power:**
Total Power in the 200MHz Bandwidth Corrected for spectrum Analyzer Noise:

-31.66 dBm
(or about 0dBm At the output of The receiver)
Spectrum taken at the Output of the FRONT END (or INPUT of RECEIVER)

Configuration: Antenna → Front-End → Coax → Spectrum Analyzer

Measurement sensitive only to Strong signals since the signal is dominated by the noise of the analyzer as shown on Fig 1 and 2.

**Channel Power:**
Total Power in the 200MHz Bandwidth
Corrected for spectrum Analyzer Noise:

-59 dBm

The receiver Gain can be computed as
\[ P_{out} - P_{in} = 0 - (-59) = 59 dB \]
Self generated RFI: No indication of RF leakage from the Instruments Hut to the Antenna

A Spectrum was taken when all the digital electronics were turned on and another spectrum was taken after shutting down all electronics ( 2 PCs, Digital Spectrometer, LCD screen, Ethernet switch and Ethernet fiber to copper converter): there is no decrease in the level of RFI when the digital instruments were turned OFF.
Decreasing the gain of the receiver by lowering the bias voltage: No sign of intermod
Replacing the DARE receiver with a Mini circuits high dynamic range Amplifier

**Figure 1**

**Figure 2**

**ZKL-1R5**

- **50Ω Medium Power**
- **10 to 1500 MHz**

**Features**
- Wideband, 10 to 1500 MHz
- High IP3, +1 dBm typ.
- Low noise, 3 dB typ.
- High gain, 40 dB typ.
- Protected by US Patent, 6,088,599

**Applications**
- Communication systems
- Cellular
- Satellite distribution
- GMS/ISM

**Amplifier Electrical Specifications**

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>FREQUENCY (MHz)</th>
<th>GAIN (dB)</th>
<th>MAXIMUM POWER (dBm)</th>
<th>DYNAMIC RANGE</th>
<th>VSWR (1) Typ.</th>
<th>DC POWER</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZKL-1R5+</td>
<td>10</td>
<td>36</td>
<td>±0.5</td>
<td>±13</td>
<td>1.4</td>
<td>1.6</td>
</tr>
<tr>
<td>ZKL-1R5</td>
<td>1500</td>
<td>38</td>
<td>±0.5</td>
<td>±15</td>
<td>1.4</td>
<td>1.6</td>
</tr>
</tbody>
</table>

With no load, denoted max input power by 60 dB.
HIGHER FREQUENCY RESOLUTION
(10KHz)

Figure 1

Figure 2

Figure 3