Local D-Star QRM to Packet and FM Repeaters

Being the Official Observer Coordinator (OOC) for the ARRL Santa Clara Valley (SCV) ARRL Section, on Nov 20 I was alerted by email to a strange QRM to packet communications observed by a RACES group. The report said "We operate a network of packet stations on 145.03, consisting of stations at the EOC, backup EOC, some mobile stations" etc. The report went on to say "As the sysop, I have observed occasional apparent deafness (failure to repeat packets) of the Oakland Hills repeater W6VOM-4 (alias ALCO4). This failure would be intermittent, lasting for a few seconds to many minutes … I observed a strange signal coming from the transceiver speaker (a Motorola Maxtrak MCX-100, an ex ALCO unit, reprogrammed for packet frequencies). I got out a hand held radio and tuned it to 145.03. I heard the same thing very strong on 145.015 (maybe actually 145.02). Not heard on 145.00 or above 145.03. The signal consisted of an opening tone burst, then white noise (digital signal) and ending with a second or two of buzz saw like noise. I was wondering if that's what D-Star sounds like, and Bob said he thought that's what it was and that it's a known issue with D-Star repeaters operating on nominally packet channels."

When I saw this report I immediately went to http://www.narcc.org and discovered that there are now several D-Star "repeaters" (declared as "uncoordinated"). The first four have outputs positioned between coordinated packet "channels" in the 144.900 through 145.100 range and inputs 400kHz lower in the 144.500 through 144.700 range. It so happens that these D-Star repeater inputs lie smack in between FM input frequencies of NARCC coordinated repeaters in the range 145.11 through 145.31 MHz, although so far only the following are declared at http://narcconline.org/ (click on "Repeaters" and then "D-STAR") in the 2m band – the first four

144.9200 144.5200 K6CHO Chico AREA Not Coordinated #olsx
144.9200 144.5200 KI6JUL San Jose AREA Not Coordinated #oelrsx
144.9600 144.5600 W6DHS Volcano N6RDE Not Coordinated #oelrx
145.0200 144.6200 K6MDD Concord K6MDD Not Coordinated #oelrsx

Then there are two other ones that lie in between "normal" repeater input/output pairs:

145.4400 144.8400 K6PIT Pittsburg K6PIT Not Coordinated #oelrs 145.5300 144.9300 W6HHD Mariposa W6HHD Not Coordinated #oelsx
147.6750 147.0750 KS6HRP Folsom SHARP Coordinated oex

D-Star is an exciting new digital voice technology with lots of interesting features, so one can understand why promoters of this new amateur radio opportunity would try to squeeze it into the very tight already highly occupied 2m spectrum in this San Francisco Greater Bay Area; however, after what happened to some N6NFI repeater users on Sunday Nov 30, it was a "disaster waiting to happen". Rick N6DQ was in a QSO with me and a few others on 145.23 and then announced he will QSY to the Mt Diablo D-Star machine. Right after he said that everybody began getting cut out of the QSO he left on the N6NFI repeater (including me, and I usually monitor myself with an HT to make sure I am not doubling). I investigated, as I usually do in such cases, and found what I at first thought was a full bars broadband signal on the 144.63 input frequency. Well, it was actually on 144.62, but my receiver picks up signals +-10 kHz most of the time. The fact that I got such a strong signal is no big deal since I am up in the hills above Redwood City fairly close to Rick's San Carlos home QTH, so then I did a test to see at what signal level I would drop out at the repeater using my continuously variable attenuator. I determined by the repeater's S-meter testing option that any signal below S9 was being dropped at the N6NFI repeater!

Over the next week or so there followed much testing with Rick trying various power levels and antennas and my measuring S-meter levels at the repeater where I would get cut out of the N6NFI repeater by Rick's signal on 144.62 (the input to the Mt Diablo K6MDD D-Star repeater) which was de-sensing the 144.63 Motorola receiver even though it was only 10kHz away. It ended up that Rick had to deploy a 9-elt

beam pointed at Mt Diablo and reduce his power down to 100mW before he could avoid de-sensing the weakest of N6NFI repeater users, typically running HT's either at home or mobile and getting typical S-meter readings of S2-S5 at the N6NFI repeater! This is a totally unacceptable situation.

After many more emails between myself, the trustee of the K6NDD D-star repeater, the NARCC folks, the Northern California Packet Association (NCPA) folks, ARRL HQ that I report to, etc, the upshot is that the offending D-Star machine on Mt Diablo has been shut down on its VHF side – you can still access it on other bands like 70cm and higher frequencies. I also volunteered to help the D-Star promoters find a 2m repeater pair – I have known some repeater owners for decades whose machines are hardly used these days, so I am trying to get in contact to "twist some arms" to possibly catch their interest in making some kind of a deal with a D-Star equipment investor like Tim (the K6MDD trustee) by access to their precious 2m repeater frequency pairs.

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