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Referring to Docket 02-55,

It is well known that there is interference in the 800 MHz public safety bands resulting from ESMR (mainly Nextel) and other CMRS providers. Summitek has a product that can provide an objective evaluation of the level of threat at a location. This is achieved by first characterizing the local RF environment using the Summitek OASIS II product, and then evaluating the impact on the public safety radio by using a mathematical model of the receiver. The ITU-R SM.1009-1 model looks promising for this purpose, but would have to be adapted to model public safety receivers. Assuming the availability of a mathematical model for the public safety receivers of interest, Summitek is prepared to modify their existing solution to incorporate this model. The end result is ***a test instrument that can be taken to a spot, measure the RF emissions present at that spot and then, using the mathematical receiver model, quantify the potential for harmful interference.***

There are three primary interference threats to public safety radio:

1. Out-of-band-emissions. These are emissions from nearby active channels that exceed the FCC mandated limits.
2. ESMR to ESMR IM Interference generated in the front end of the receiver.
3. ESMR to A-Block Cellular IM Interference generated in the front end of the receiver.

The Summitek solution addresses all three threats.

To evaluate the potential for IM related interference, the basic analysis proceeds as follows.

1. Using a calibrated antenna and a spectrum analyzer, measure the level of RF emissions at the site over an operator selected frequency range, but typically 851 to 894 MHz. This would be done over an operator specified period of time and the data (amplitude vs. frequency vs. time vs. location) would be stored. In cases where the ESMR downlink is on all of the time, it can be characterized very quickly. Since the data is archived, a history of the emissions can be replayed at any later time to observe events of interest. There are a variety of ways this data can be evaluated and/or plotted depending upon the need.
2. This data is then entered into the model of the radio to determine what channels might experience interference. This channel set is determined on the basis of frequency and power. That is, if a combination of 2 or 3 active channels can create an IM product on a channel of interest, it will be considered a possible threat. The output is a list of IM Power vs. Frequency for all possible 2 and 3 carrier combinations that can impact a channel(s) of interest.
3. In order to calculate a C/I for a given channel of concern, at some point during the measurement, the public safety channel(s) of concern will have to be keyed up to produce a reference signal at the spot being evaluated. Since the data can be

filtered for maximum power received during the data-logging period, this level can be rapidly identified. It is even possible to compare signal levels at different times to identify fluctuations caused by fading and other propagation affects, if the data is monitored for a longer period of time then the minimum time necessary to characterize the ESMR signal levels.

4. Knowing the IM levels that can be generated on a channel of concern and the RF levels received when these channels are active, the Summitek solution can calculate the C/I that can be expected at that spot and highlight channels where public safety communication is likely to fail.
5. With the ESMR signal levels and frequencies known from measurement, it is then possible to determine and report what frequencies and power levels generated by an A-Block cellular provider could also generate channel blocking interference in the public safety receiver – even if the A-Block power level was not characterized during the monitoring process.

Evaluating the potential threat of Out of Band Emissions (OOBE) proceeds as follows.

1. The same data measured and archived for the IM analysis is used for OOBE analysis, so it is not necessary to take two different acquisitions.
2. This data is then used to build an emission mask for that location. The mask creates an emission envelope based on mandated emission levels intended to prevent adjacent channel interference.
3. The measured data is then checked for compliance to the standard. Non-compliant conditions are flagged. Since the data is logged, it can be readily replayed to observe the offending emissions as if you were there during the event.
4. Using the reference signal level generated in step 3 above, it is also possible to calculate C/I for this OOBE condition and determine if it will have an unacceptable impact on the public safety communication channel.

All of the measurement and logging of data necessary for this analysis already exists in the Summitek product. Therefore, by incorporating a mathematical model of the public safety receivers, Summitek is prepared to provide the integrated solution to evaluate the magnitude of the problem in an objective way using real world measurements.