

Narrative: FCC Form 442 - File Number

Dated: 05/31/2009

The County of Cape May, NJ (the applicant) has entered into an agreement with the National Law Enforcement & Corrections Technology Center Communications Technologies Center of Excellence (COE), to **demonstrate, exercise, and derive lessons learned from the application of multi-band/software defined radio (SDR), technology to address multi-band voice interoperability in a public safety environment. This project has been facilitated to demonstrate and test multi-band (SDR) end user radio equipment not currently available to FCC Part 90 users** (currently not Part-90 type accepted). Specifically, the purpose of this project is to demonstrate technology as outlined in

- CFR47 §5.3(d); Technical demonstrations of equipment or techniques and
- CFR47 §5.3(k); Types of experiments that are not specifically covered under paragraphs (a) through (j).

For the purposes of this application, **all of the requested frequencies associated with this application are already coordinated and authorized by the FCC.** The applicant is currently an FCC Part-90 licensee, and all agencies that are associated with this project via cooperative agreements (MOU's) are also currently Part-90 licensees. No new frequencies are being requested. Frequency sharing agreements, for the purpose of mutual aid, are authorized cooperatively by way of inter-agency written cooperative agreements or memorandum of understanding (MOU) as outlined in FCC rules: FCC CFR47 §90.421 – Operation of mobile station units not under the control of the licensee. All operations will be in compliance with existing FCC Part-90 authorizations and rules, as if Part-90 type accepted end user equipment was being employed (see attached for current FCC license information associated with these inter-agency agreements.)

The research project associated with this application is sponsored through the Department of Justice (DOJ), specifically, via a cooperative agreement sponsored by the National Institute of Justice (NIJ), via the National Law Enforcement and Corrections Technology Center, Communications Technologies Center of Excellence (COE). The NIJ authorized the COE for this activity through the funding of technical support, manpower, and materials to demonstrate the potential of this technology in regard to public safety interoperability. As a result, Harris RF Communications and the County of Cape May, NJ will execute a formal Contract/Statement of Work for this pilot, or demonstration program with the COE named as a third party beneficiary. The COE will document the results of this program in the form of an operational assessment for the benefit of the public safety community and the NIJ CommTech Technical Working Group (TWG). The TWG is comprised of a group of public safety practitioners that define key topics/areas of

interest for the NIJ CommTech program. For reference and additional information in regard to NIJ CommTech and COE programs:

- NIJ CommTech Program
<http://www.ojp.usdoj.gov/nij/topics/technology/communication/welcome.htm>
- National Law Enforcement & Corrections Technology Center
Communications Technologies Center of Excellence (COE)
<http://www.commtechcoe.org>

The CommTech TWG, has recognized multi-band and/or multi-band SDR technology as a technological category with significant potential to solve many current public safety interoperability problems. This application is submitted for the purpose of demonstrating, multi-band radio technology in a public safety environment. Specifically, a new multiband radio product will be demonstrated; The Harris Unity XG-100P radio is one example of end user portable radio technology that provides semi continuous coverage from 136-870 MHz. Multiband capabilities (multi-band, in the sense of current Part-90 public safety allocations) represent a significant technological advantage when considering many of the impediments radio interoperability between public safety agencies that currently employ end user equipment limited to operation a single public safety band. The multi-band technology demonstrated in this project will eliminate many of the cross-band voice interoperability issues associated with existing, single-band, Part-90 end user equipment Multi-band radio technology is a well-proven technology for many Federal users, specifically as a tactical communications tool for the Department of Defense and other Federal agencies operating under NTIA authorization.

As a project participant, the County of Cape May, NJ has agreed to apply for an experimental, FCC Part-5, authorization for use of this technology for the purpose of technology demonstration in an otherwise FCC Part-90 public safety environment. Note that it is **not** the intent of the applicant to seek authorization to transmit on all Part-90 frequencies that this radio is capable of operating on, but rather to apply multi-band radio technology to Part-90 channels that are already coordinated, and authorized by the FCC directly to the applicant or authorized to nearby cooperative agencies (via existing inter-agency MOU's).

Access to these specific frequencies/channels shall be made available only through pre-configured radios via memory channels. Field programming of equipment by the end users is not envisioned. Radio configuration will be limited to qualified project support personnel.

Initial vision of this project may include limited operational front line use of the equipment, but operational scope will be defined solely by the County of Cape May, NJ

Project Background

Work in this area was initially begun in mid-2005, shortly after this technology was put into service by Federal users. In June 2005 Mr. Philip Harris, representing the NIJ CommTech program, participated in a telephone conference with the FCC Experimental Bureau (Mr. Jim Burtle, Chief) to introduce the concept and the overall goals associated with the project. Mr. Burtle discussed the concept and provided some general guidelines for application submittal.

General guidelines & assumptions are as follows:

- **Use of Federal/NTIA frequencies is not part of this request.** Direct, routine, interoperation with Federal Law Enforcement Agencies is beyond the scope of this project and request.
- FCC Part-90 land-mobile radio channels included in this request are located in the 148-174 MHz (High-Band VHF), and in the 450-470 MHz bands (UHF), and 769 – 860 MHz bands.
- FCC Part-90 land mobile radio channels currently licensed to the applicant.
- FCC Part-90 interoperability/mutual aid channels authorized to all Part-90 licensees, and not specifically to any one user.
- FCC Part-90 land-mobile radio frequencies/channels licensed to public safety agencies, which are authorized to the applicant via cooperative regional interoperability/mutual aid. This includes frequency sharing agreements for emergency intercommunication between State, County and Municipal Public Safety agencies facilitated via authorization and governance guidelines provided through regional inter-agency agreements or Memoranda of Understanding (MOU) - ref: FCC CFR47 §90.421 (see attached for copies of supporting inter-agency agreements).
- Interoperability with the US Coast Guard, if required, should be facilitated via standard channels in the FCC marine band. This will require operation within the bands regulated through CFR 47 Part 80 rules.
- Use of this technology for emergency communications, will be limited to operations specifically defined within the FCC and NTIA rules.

This project's discussions started in mid-2008. In the intervening timeframe, negotiations with interested public safety agencies were conducted, and the County of Cape May, NJ and COE came to an agreement on project goals and deliverables.

Once the County of Cape May, COE agreement was established, the County of Cape May, NJ Police Departments, began a process of documenting existing, and formally establishing inter-agency MOU's that allow frequency sharing among agencies that currently operate under FCC authorization via Part-90 rules. An additional agreement with the Atlantic County Department of Public Safety was also executed. These agreements are provided as exhibits, and for the basis for the frequencies that will be exercised in this demonstration program. These agreements facilitate cross-programming

and sharing of frequencies via existing subscriber equipment, for interoperability, regardless of the success or failure of this project.

Feasibility & Background

The stated scope of operation seeks to facilitate voice interoperation with State, County and local agencies within the Part 90 VHF High (148-174MHz), UHF (450-470 MHz) bands and the 769 – 860 MHz bands as defined by inter-agency MOU or FCC Part-90 Rules. ***Operation within all Part-90 public Safety bands noted is within the operational frequency range of the Harris Unity XG-100P radio.***

Figure 1 – FCC Part 90 Non-Federal Public Safety Bands.

Technical Evaluation

The HARRIS Unity XG-100P represents the state-of-the art in regard to multi-band (SDR-based) land-mobile portable radio technology, and represents technology that is not normally available to Public Safety Agencies. This multi-band radio device is currently not Part-90 type accepted for Public Safety use. ***The specific devices employed will be representative of a category of technology enabling multi-band voice communications interoperability, and this project will not be used to evaluate a specific product for commercial purposes.***

Note that the Harris Unity XG-100P radio being employed is compatible with some, but not all, systems in use by civilian public safety agencies. The Harris Unity XG-100P being employed operates in conventional Analog FM, Digital P25 conventional and Digital P25 trunking modes, so ***inter-operation with conventional radio systems, or trunked public safety radio systems will be possible with the current generation of this specific device.*** Because of the recent purchase of Tyco Wireless Systems by Harris, it is anticipated that future versions of the Harris Unity XG-100P will allow inter-operation with Tyco Wireless' EDACS and OpenSky trunking modes.

The applicant, and the COE team, understands that technology is rapidly changing, and that the specific device initially employed, the Harris Unity XG-100P, represents an SDR technology that is quickly maturing. The applicant may, at some time in the future modify/augment this evaluation with similarly mature but more technically capable products that are currently deployed in non Part-90 environments.

Project goals

This Experimental authorization will facilitate the demonstration of multi-band software defined radio technology within a public safety environment whereby candid operational feedback will be provided by the licensee to the National Institute of Justice, via COE, on behalf of the NIJ CommTech program. The equipment demonstrated via this Part-5 experimental authorization will be utilized and configured as if it were directly analogous to currently operational, licensed, Part-90 end user equipment (as if it were type certified .)

It is expected that non-technical operational issues will be discovered and documented, as well as specific technical issues associated with this particular radio device. For instance, the ability to configure the Harris Unity XG-100P to operate on virtually any authorized frequency associated with operational channels within the public safety bands between 136 and 870 MHz will potentially enhance the command and control capabilities, and situational awareness for the public safety users of this technology. Conversely, use may create unforeseen operational issues that will require additional operator training and awareness.

Potential lessons derived from this pilot program may include:

- Operational benefits associated with multi-band radio technology.
- Operational issues/limitations associated with multi-band radio technology.
- Information in regard to technical, operational, and regulatory matters.
- Operational issues associated with the user interface (configuring and using the radio) within public safety bands,
- Applying public safety channelization and associated channel access parameters to multi-band devices.
- Limitations associated with features and operational waveforms installed in the product.
- Performance trade-offs associated with multi-band antenna systems and
- Receiver/transmitter performance when compared to a device optimized for single-band operation.

- Feedback from the project team to both the public safety community and the technology suppliers will include future requirements for similar multi-band radio products that may be marketed directly to public safety in the future. The COE, during the process of formulating this pilot project, provided Harris with opportunities to discuss an initial “wish-list” of desired operational requirements for future generations of equipment that were not currently available with law enforcement officers from across the country.

Attachments:

- FCC Authorizations – the County of Cape May, NJ.
- Inter-agency cooperative agreements & associated Part 90 FCC Authorizations
 1. Borough of Avalon, NJ
 2. Cape May, City of, NJ
 3. Lower, Township of, NJ
 4. Middle, Township of, NJ
 5. North Wildwood, City of, NJ
 6. Ocean City, City of, NJ
 7. Sea Isle City, City of, NJ
 8. Stone Harbor, Borough of, NJ

9. Wildwood, City of, NJ
 10. Wildwood Crest, Boro of, NJ
 11. Atlantic County Department of Public Safety
- Specification Sheet for the Harris XG-100P radio