MAY 25, 2026

NYC Radio Shootout

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Introduction: Half Wave Technology supported a training evolution conducted in New York City in early April for a customer seeking access to one of the most challenging operational RF environments available. New York City was selected due to its exceptionally dense electromagnetic environment, which includes extensive land mobile radio, cellular, broadcast, and other commercial and public-sector RF systems.

Prior to the event, Half Wave Technology contacted Epiq Solutions to inquire about the availability of radios for loan to conduct over the air testing in this environment. During an Epiq offsite event in Tampa, a presentation was provided that outlined several of the key tradeoffs between the NV800 and the NDR318. The NDR318 has long been recognized as a reliable, high-performance platform. However, the NV800 offers the same channel count with reduced size, weight, power consumption, and approximately half the cost. This naturally raises the question of what operational or technical tradeoffs are introduced by selecting the lower SWaP, lower cost option.

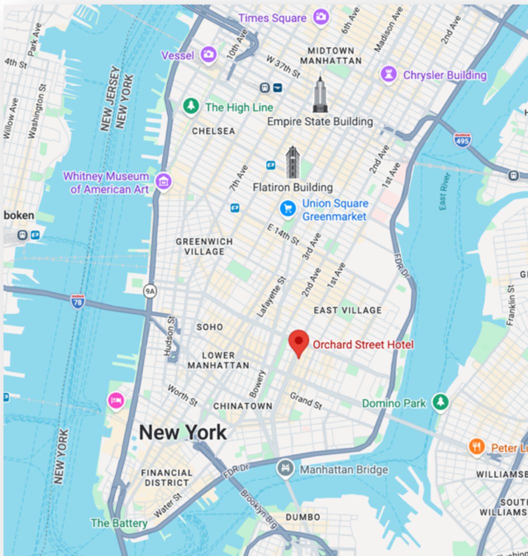
The Tampa presentation addressed many of the engineering considerations associated with this comparison and referenced topics also discussed in Epiq Solutions' white paper, *More Dollars, More SWaP*. With the primary engineering considerations already well covered, the remaining question was how these differences would present themselves to an operator using the radios in a real-world environment. Specifically, under what conditions does one platform become the clear operational choice over the other?

The following information is provided to present the observed data and operator-level perspective from testing conducted in one of the most challenging terrestrial RF environments available.

System Components: The test configuration included the following hardware and software components:

CyberRadio / Epiq NDR318	Provided for testing by Epiq Solutions
Epiq Solutions NV800	Provided for testing by Epiq Solutions
3dB Labs SCEPTRE Software	Signal collection, processing, and analysis software
Gabil GRA-D220 Discone Antennas	Wideband antennas used for 100MHz – 1GHz
Cradlepoint Cellular Antennas	Antennas for testing above 1GHz
6 ft LMR-240 RF Cable Assemblies	Cable runs from antenna outputs to radio inputs

Location: Testing was conducted from the 11th floor of the Orchard Street Hotel, located on the Lower East Side of New York City. The room provided an advantageous collection position, with a west facing balcony and a largely unobstructed line of sight toward central Manhattan and the surrounding urban RF environment.



The full test system was transported to the room in a rolling suitcase, assembled, operated, recorded, repacked, and removed in less than one hour. This short setup and teardown window demonstrated the portability of the configuration and its suitability for rapid deployment in dense urban environments.

Recordings Collected: For each frequency band, two recordings were collected: one from each radio platform. In total, the test produced 42 recordings across 21 frequency stares.

94 MHz	160 MHz	400 MHz	460 MHz
500 MHz	590 MHz	740 MHz	770 MHz
800 MHz	860 MHz	915 MHz	950 MHz
1090 MHz	1620 MHz	1930 MHz	1970 MHz
2430 MHz	2790 MHz	3540 MHz	5180 MHz
5550 MHz			

These frequencies were selected to cover a representative range of technologies across multiple RF bands. The resulting dataset exercises several internal filter and amplifier configurations within each radio, providing a practical basis for comparing performance across different operating regions.

For recordings from **94 MHz through 1090 MHz**, the test used the Gabil GRA-D220 discone antenna. This antenna was selected for its broad frequency coverage, relatively flat gain profile, and consistent response across the tested bands.

For recordings above **1090 MHz**, the test used Cradlepoint cellular blade antennas. While these antennas do not provide the same flat response as the discone, they are designed and tuned for several of the higher-frequency bands included in the test.

For each recording, gain was adjusted so that the peak sample levels remained approximately **12 dB below saturation**. This approach helped preserve dynamic range while reducing the likelihood of clipping or ADC overload during collection.

Comparisons: Max-hold spectral traces were generated using the following:

Parameter	Value
FFT Size	16k bins
Window Function	Hann
FFT Averages per Spectrum	40
NV800 Bin Spacing	2.441 kHz
NDR318 Bin Spacing	3.125 kHz
Average Collection Length	Approximately 15 seconds

Due to a software issue identified on site, linked recordings could not be executed programmatically as originally planned. As a result, the recordings were started and stopped manually in sequence. The NV800 recording was started first, followed by the NDR318. At the end of each collection, the NDR318 recording was stopped first, followed by the NV800.

To ensure a valid comparison, the data presented in this report is limited to the overlapping time regions where both radios were actively recording the same RF environment. The average collection duration for these overlapping regions was approximately 15 seconds.

NV800 Green - - - NDR318 Orange

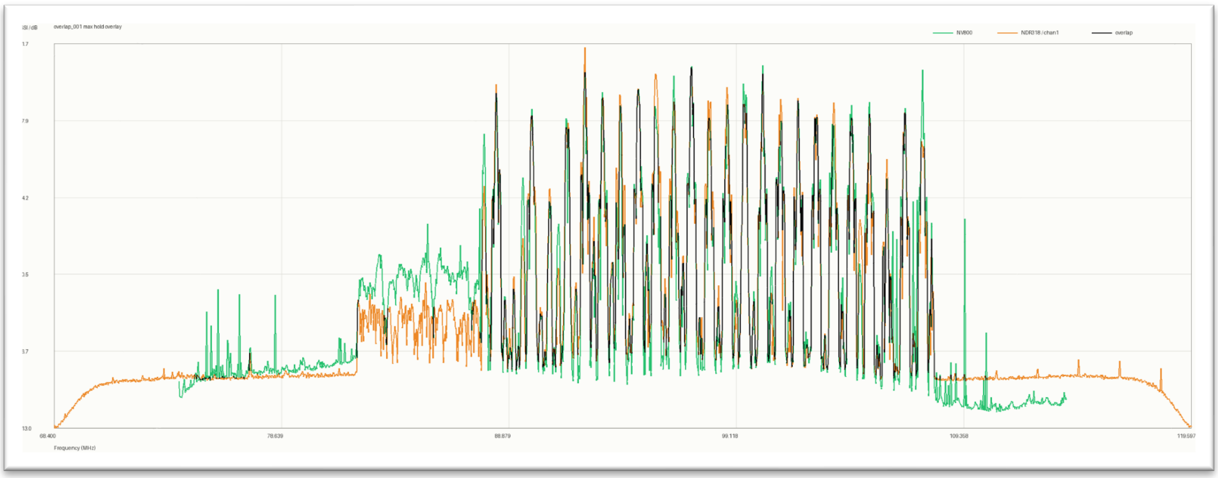


Figure 1: 94 MHz – FM Broadcast Stations

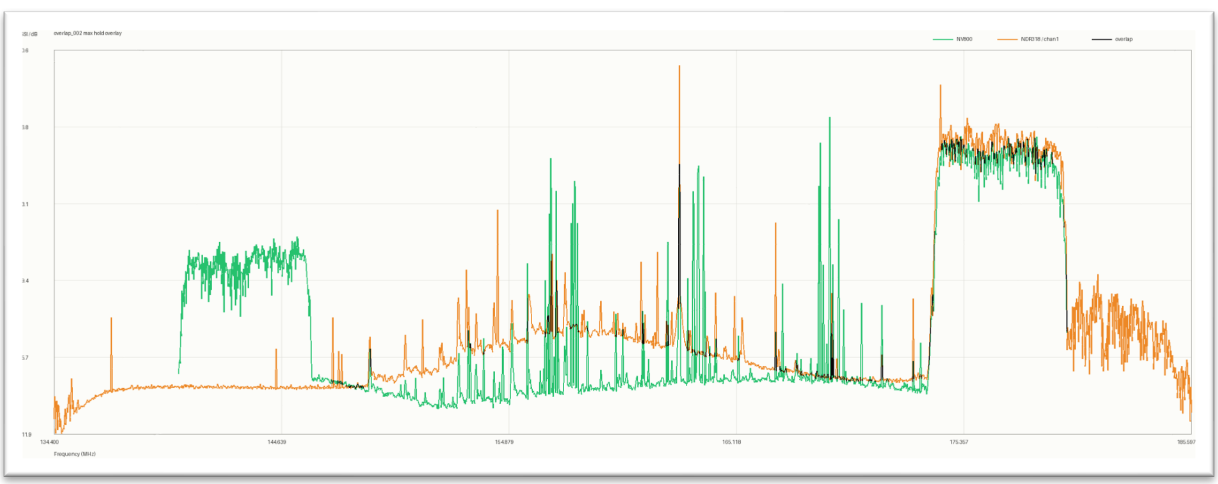


Figure 2: 160 MHz – VHF LMR and Maritime

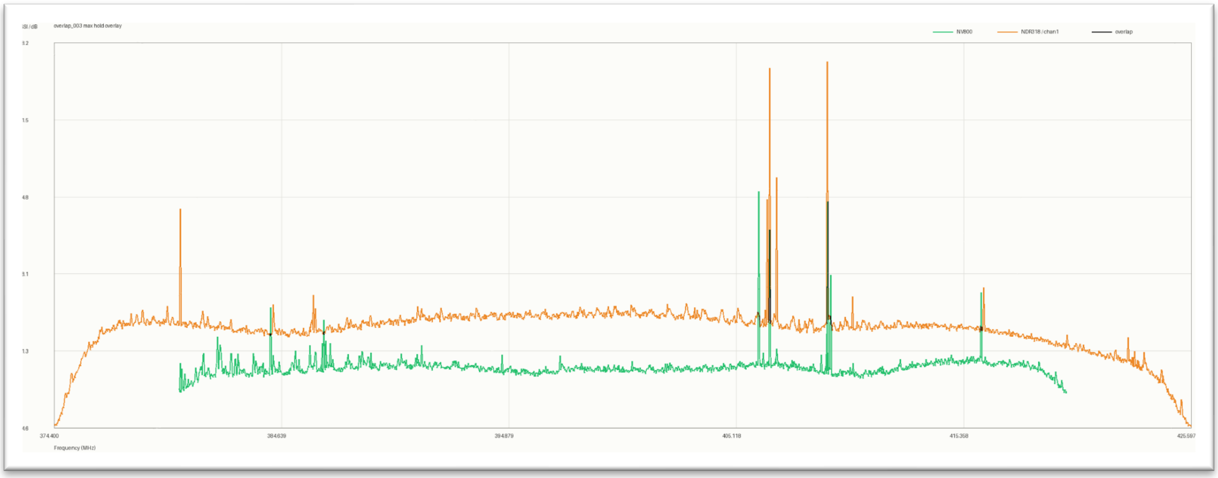


Figure 3: 400 MHz – Low UHF LMR

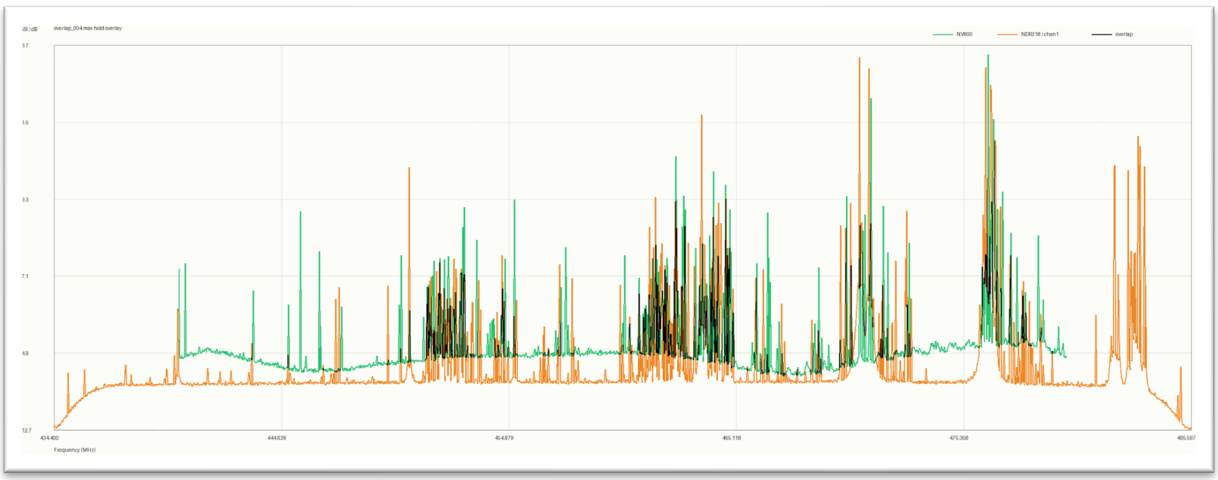


Figure 4: 460 MHz – Mid UHF LMR

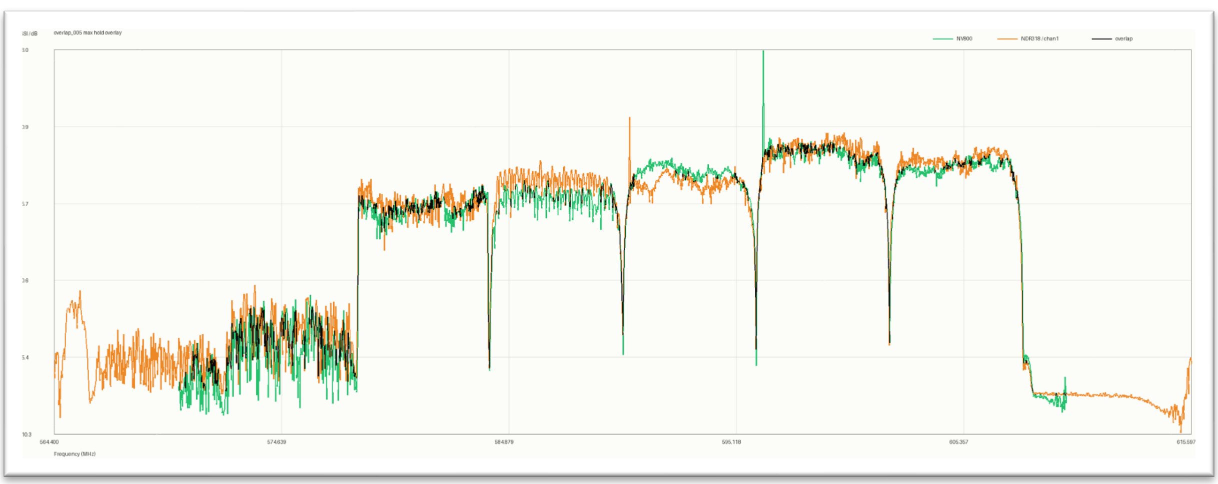


Figure 5: 590 MHz – Broadcast TV Stations

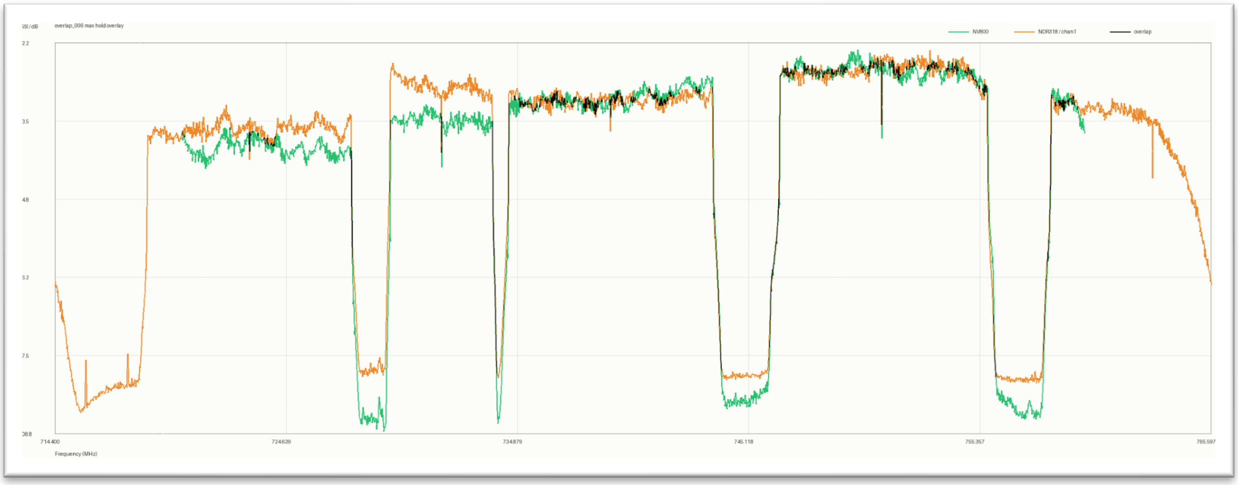


Figure 6: 740 MHz – Cellular

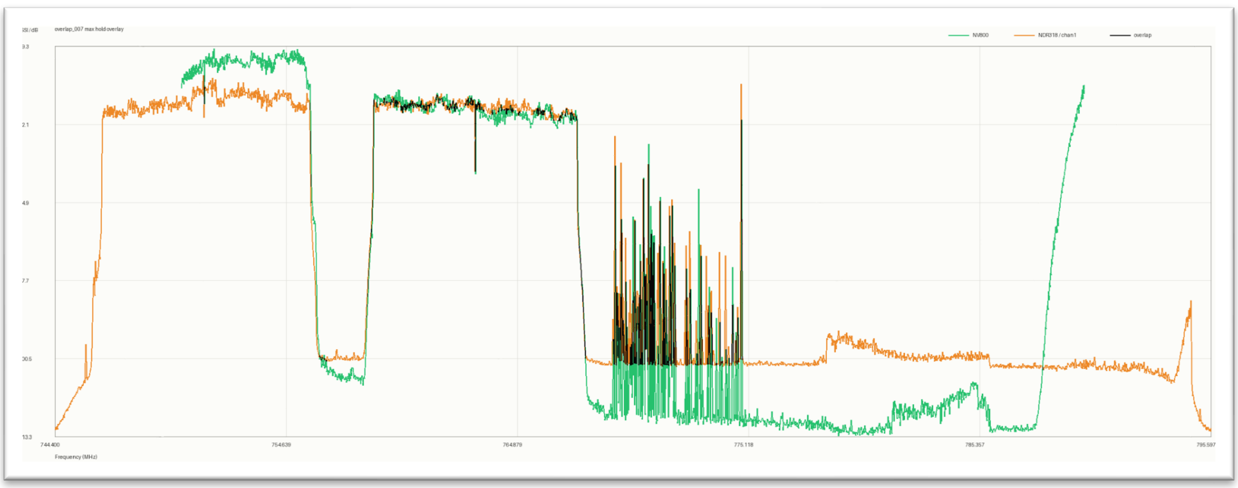


Figure 7: 770 MHz – Cellular and LMR

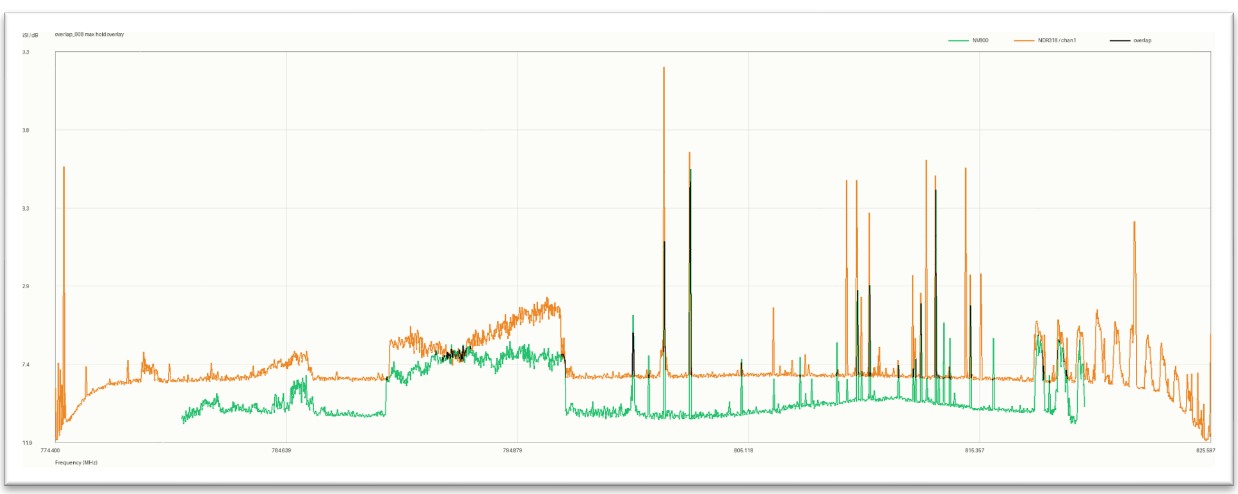


Figure 8: 800 MHz – Cellular and LMR

Figure 9: 860 MHz – Cellular and LMR

Figure 10: 915 MHz – ISM

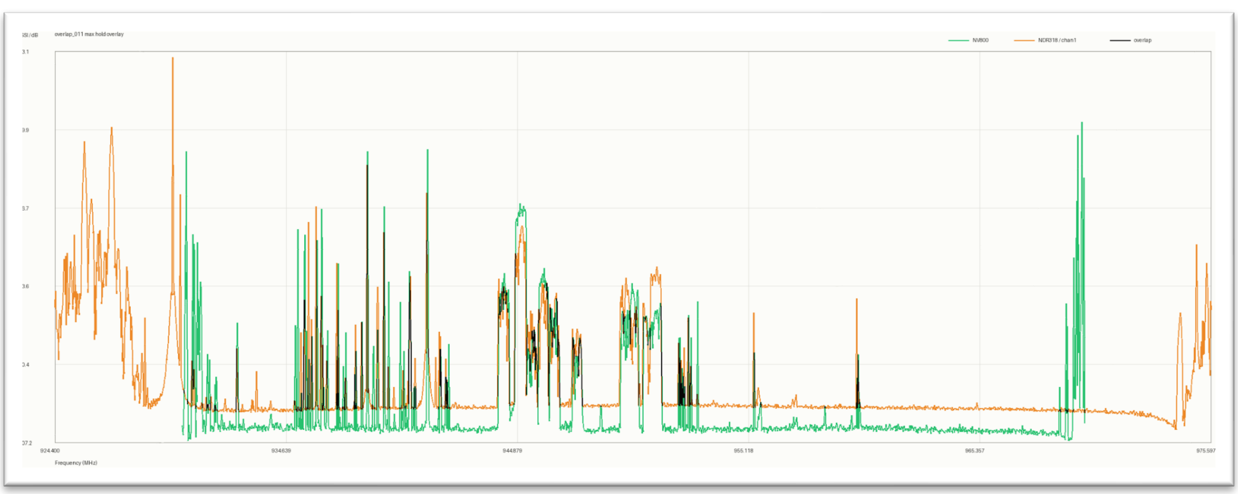


Figure 11: 950 MHz – Cellular and PCS

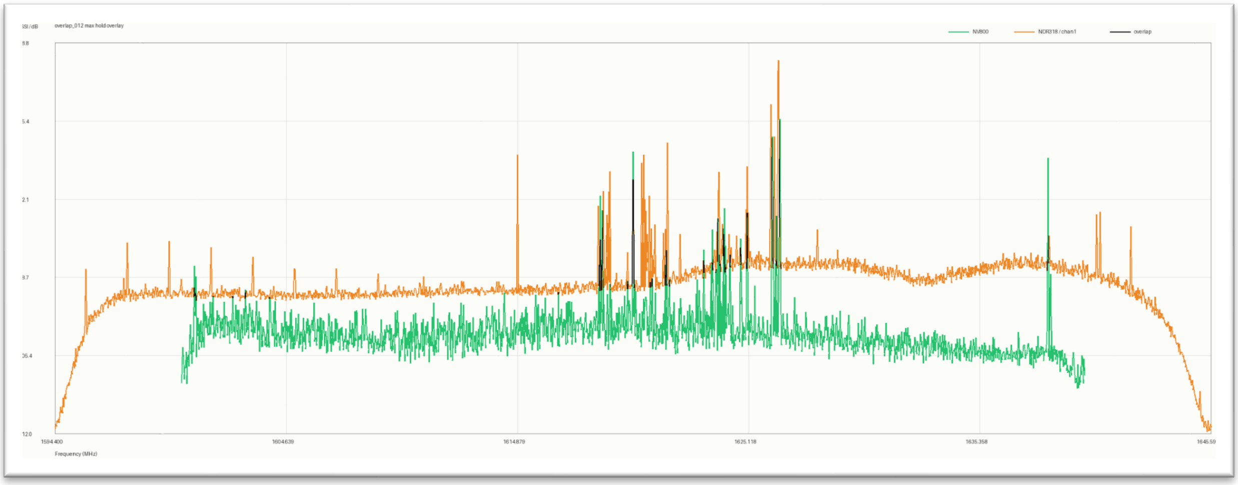


Figure 12: 1620 MHz – Satellite L-band uplinks

Figure 13: 1930 MHz – Cellular

Figure 14: 2430 MHz – WiFi

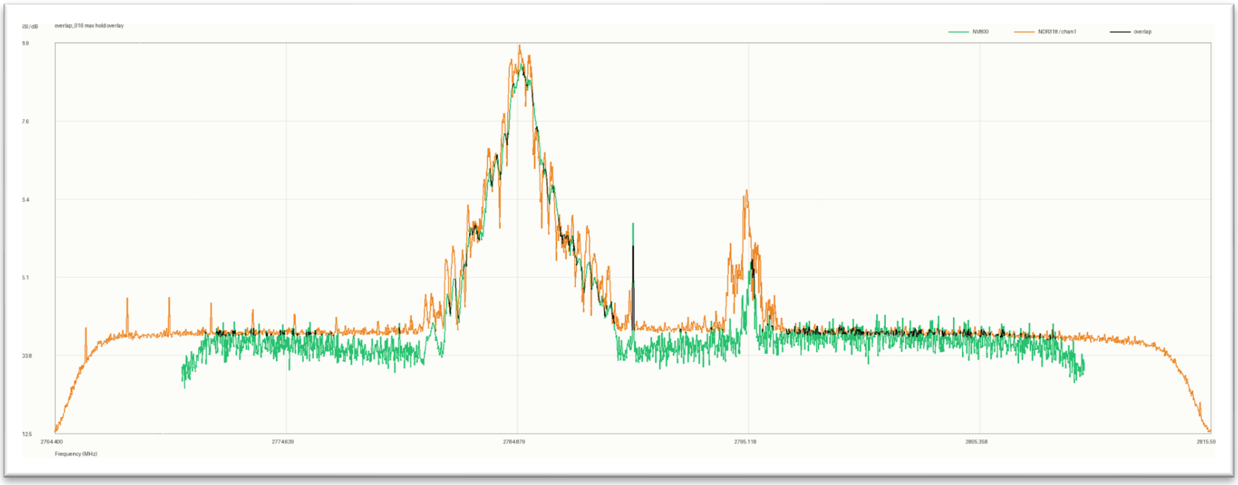


Figure 15: 2790 MHz – Air Radar

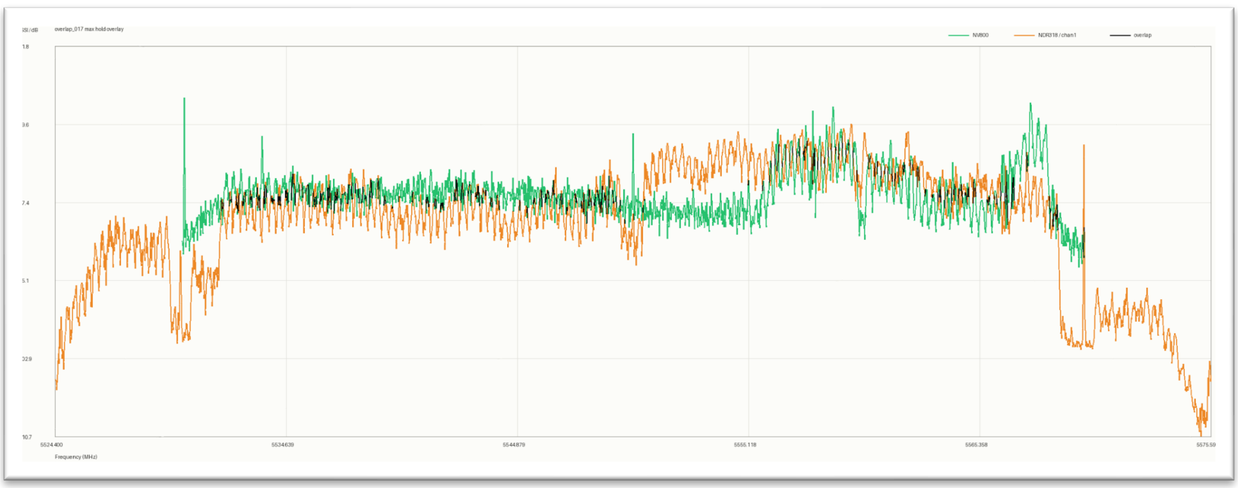


Figure 16: 5550 MHz – WiFI

In addition to visual spectral review, automated DSP processing was performed in 3dB Labs SCEPTRE using the same recording files and the same overlapping time regions used for the max-hold spectral trace analysis.

The following results were generated using the SCEPTRE DPTT detector. Detector output was filtered to include only voice intercepts, and detections were then counted by the unique recording filename and associated collector. This provided an automated, file-level comparison of voice activity detected from each radio platform under the same collection conditions.

160 MHz file, 13 second overlap region

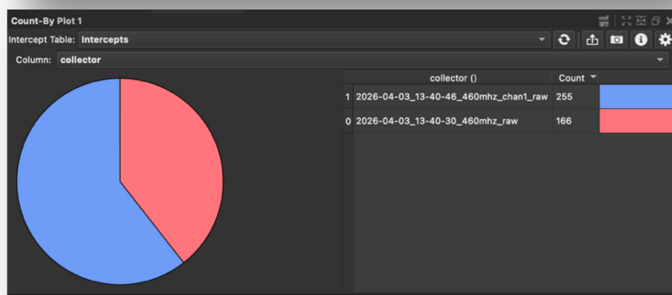
NV800 - 38 voice cuts

NDR318 - 8 voice cuts

460 MHz file, 13 second overlap region

NV800 - 166 voice cuts

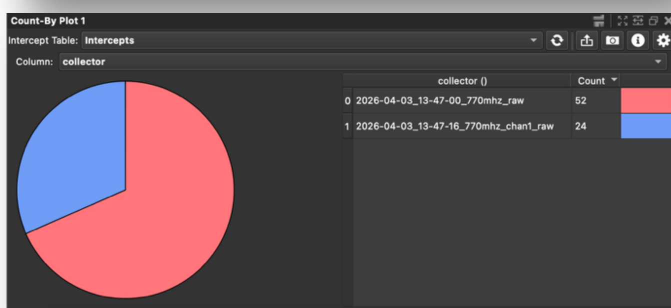
NDR318 – 255 voice cuts



770 MHz file, 13 second overlap region

NV800 - 52 voice cuts

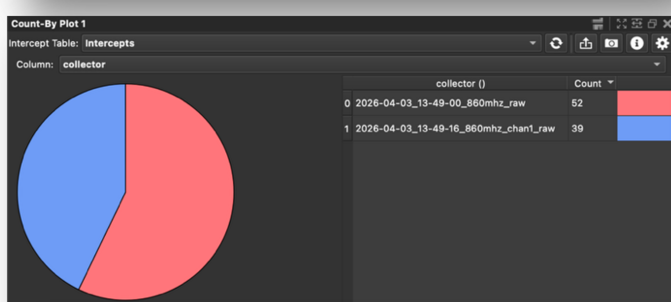
NDR318 - 24 voice cuts



860 MHz file, 13 second overlap region

NV800 - 52 voice cuts

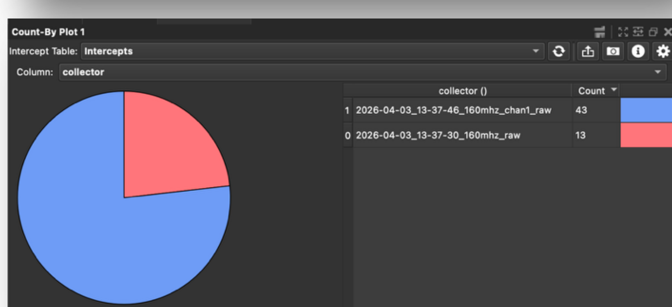
NDR318 – 39 voice cuts



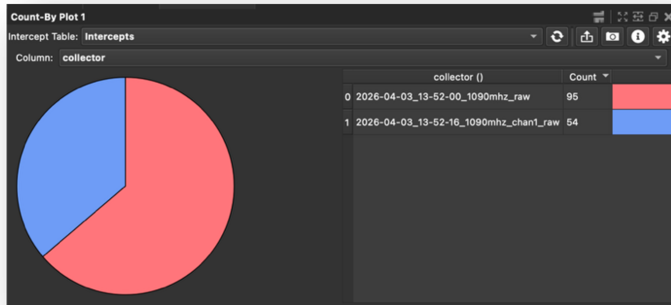
AIS (160 MHz file) same overlapping 13 seconds region as used for DPTT processing

NV800 - 13 ship messages

NDR318 - 43 ship messages.

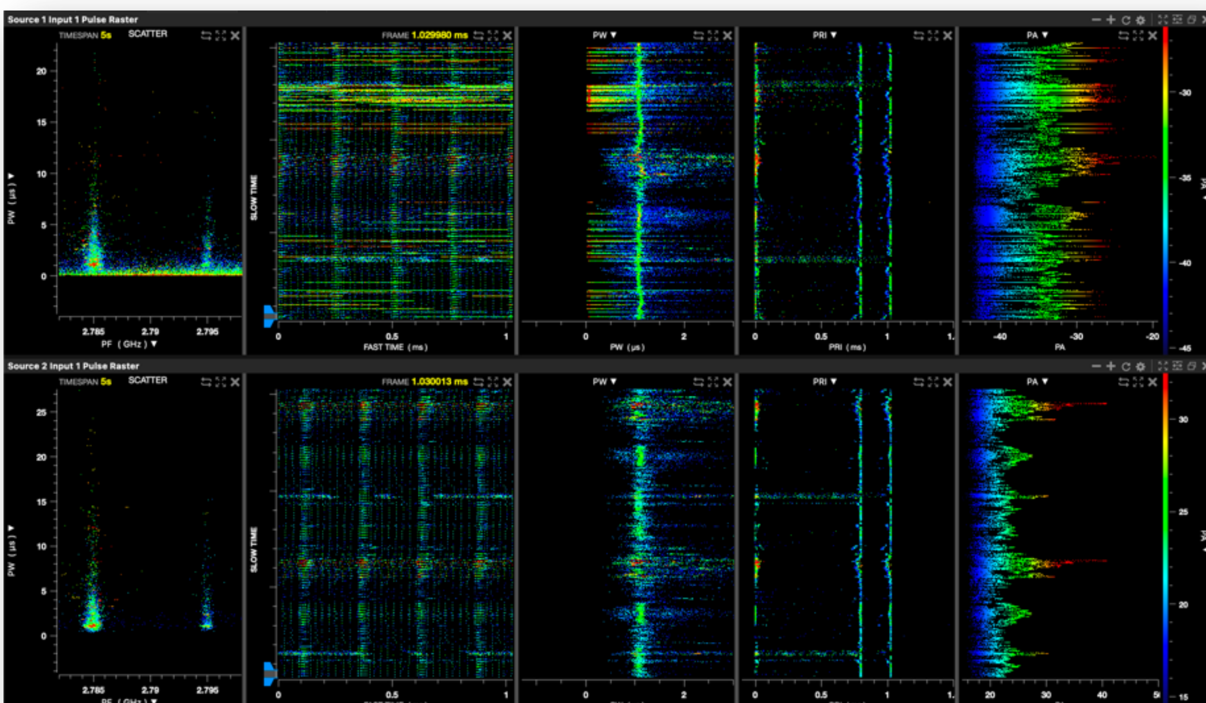


*ADSB *These are not overlapping time samples** *The ADSB files did not end up overlapping in time, however the durations were equal. A 15 second decode was done using Sceptre on both files just for completeness.*



Pulse analysis was also performed using 3dB Labs SCEPTRE. The plots below characterize detected pulse activity associated with an ASR radar system at one of the nearby airfields. Pulse parameters were evaluated by width/duration, amplitude, and pulse-to-pulse interval.

The upper set of plots corresponds to the **NV800**, while the lower set corresponds to the **NDR318**. In this analysis, the NDR318's dynamic range advantage was clearly observed. The pulses parameterized from the NDR318 recordings exhibited lower apparent noise and tighter clustering, particularly in the left scatter plot showing pulse width versus pulse frequency. This indicates that the NDR318 provided cleaner pulse characterization under the tested conditions, which can improve downstream radar analysis and parameter extraction.



Conclusions: The comparative performance of the NV800 and NDR318 was informative both during real time operation and during post processing of the collected data. The NDR318 demonstrated clear advantages in specific portions of the analysis, most notably in the radar pulse analysis and the 460 MHz collection. These results are consistent with the NDR318's established reputation for high dynamic range, performance, and reliability in demanding RF environments.

This evaluation was not intended to replicate the level of control or repeatability found in formal laboratory testing, such as the testing described in the Epiq Solutions white paper referenced earlier in this report. Instead, this effort was intended to assess how the radios performed from an operator's perspective in a realistic, highly congested RF environment. In that context, the test provided valuable insight into how each platform behaves under field conditions.

Prior to this event, Half Wave Technology held a favorable view of the NV800 based on several practical advantages, including Power over Ethernet support, frequency coverage above 6 GHz, reduced SWaP, and cost. At the same time, it was expected that the NV800 would not perform in the same class as the NDR318. The results from this collection challenged that assumption. Across the files processed for this report, the NV800 met or exceeded the performance expectations established for the test and demonstrated that it warrants direct consideration alongside the NDR318 in future evaluation matrices.

The data shows that each platform has clear operational value. In scenarios involving severe intermodulation, high signal density, or where maximum dynamic range is a primary requirement, the NDR318 remains the preferred platform. Where size, weight, power, cost, deployment flexibility, and wide frequency coverage are key considerations, the NV800 provides a highly capable and operationally compelling alternative. When jamming, phase coherency, frequency hopping, and increased ruggedness are the priority concern, the answer is still the NDR318 as it sets the standard against any radio tested by Half Wave Technology so far.

This testing did not evaluate timing coherence or phase coherence between radio channels. The NDR318 has already demonstrated strong performance in those areas, and Epiq Solutions has extensive experience with coherent radio architectures across other product lines. A future comparison focused specifically on timing and phase coherence would be valuable, but it was outside the scope and priority of this event.

This effort would not have been possible without the support of several organizations and individuals. Half Wave Technology would like to thank Epiq Solutions for providing the hardware used during the evaluation; 3dB Labs for the SCEPTRE software support, with specific appreciation to Mr. Armbruster for assistance with NDR and recording plugin troubleshooting, OTS for access to one of its exercise locations following the conclusion of the training evolution, and Mr. Nastvogel for his assistance during the data capture event.

For additional information or to request access to the data collected during this event, please contact Gerald Wilson at **gerald@halfwavetech.com**.