



- CCSI RF Interference Testing and Mitigation solution includes isolation of the internal or external RF interference source and mitigation of that source to reduce or eliminate it, such that the performance of radio equipment is no longer affected.
- CCSI will use a combination of spectrum analyzers, PIM test and sweep test equipment to isolate the source of the interference. For external interference sources that are determined to be off site this may include walk or drive tests to isolate the interferer.
- If the source of the interference is identified as the customer's own equipment, CCSI will recommend the necessary steps for remediation of the identified interference and implement the approved work and provide complete documentation of all pre and post testing.
- If the source of the interference is identified as external to the customer's own equipment, we will notify the customer of the cause and recommend the necessary steps for remediation of the identified interference source, then on behalf of the customer we contact the owners of the interfering equipment and work with them to mitigate the source and provide complete documentation of all pre and post testing.
- All of CCSI test results will include a copy of the technician certification for the test equipment, test equipment verification and calibration measurements and both pre and post measurements of the affected antenna system or RF path.
- CCSI technicians are certified on a large array of test equipment and bring to each site the combined expertise of RF testing on tens of thousands of cell sites and DAS systems.
- When required to provide replacement of a component as part of interference remediation CCSI technicians can leverage our regional warehouse resources which enables us to keep inventory of equipment close to the work site.
- CCSI technical resources provide expertise throughout the project from RF engineering, through ground and tower testing and optimization.
- Industry leading project management support provides reporting on key milestones and project completion.
- Ability to quickly deploy multiple crews of experienced tower technicians and engineers provides quick ramp up on our customer's critical projects.
- Best in class closeout documentation includes all required test results and robust photo documentation of any repaired or installed equipment as well as data upload to the customer's selected repository.
- At CCSI safety, quality and on-time delivery are our top priorities and all of our processes and procedures are designed with these metrics in mind allowing us to deploy quickly, accurately and safely.
- With multiple locations throughout North America CCSI has the ability to support the wireless carrier in large national or regional roll outs.
- CCSI has vast experience with the equipment supplied by all of the major radio and antenna manufacturers ensuring that interfering equipment is isolated quickly and mitigated effectively.



SPECIFICATIONS

Infrastructure Testing

Interference Testing & Mitigation

Overview

CCI Services (CCSI) RF Interference Testing and Mitigation solution leverages CCSI's years of experience in RF testing and troubleshooting on thousands of sites. In addition to the interference source, we will leverage our expertise to recommend steps to eliminate or minimize the interference.

CCI can provide corrective actions onsite to bring the site up to optimal performance. Often the interference is caused by the customer's own equipment and as simple as a bad connector or jumper and by replacing these elements the interference can be remediated. Other times passive devices such as antennas, duplexer or bias-Ts can be the cause of the interference. CCI can also isolate the problem to devices such as Power Amplifiers, Filters and Radios.

Recommended remediation can include:

- Replacing connectors on hard lines or jumpers.
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- Swapping out and re-commissioning equipment such as filters, radios, TMAs or power amplifiers that prove to cause interference.
- Identifying and replacing other possible sources such as Bias-Ts and Lightning Arrestors.
- Identifying outside sources contributing to interference.
- Working with 3rd party equipment owner causing the interference to eliminate the source.

All testing is performed by CCI's team of experienced and certified RF Technicians trained in cable and antenna system testing. Our technicians are equipped with state of the art equipment that enables them perform testing quickly and effectively. This allows for multiple tests to be performed simultaneously and lowers cost considerably.

CCSI is capable of providing interference testing and mitigation services throughout North America. CCSI continues to provide both national and regional services supporting several of the major carriers for their 4G rollouts. We've become a trusted partner and CCSI can always be expected to deliver high quality services, safely and on time.



Deliverables

- Inventory of equipment and deliver to site sufficient components and equipment to repair or replace most internal causes of interference.
- Isolation of the internal or external RF interference source.
- For internal sources of interference CCSI will recommend and perform all approved work including replacement of faulty components such as connectors, cabling, filters, combiners amplifiers and radio elements such as Remote Radio Units (RRU) or Base Band Units (BBU).
- For external sources of interference CCSI will on behalf of the customer work with the equipment owner to mitigate.
- CCSI will re-test affected RF paths in order to show pre and post mitigation results.
- Dedicated project and construction managers provide timely progress reporting and project tracking.
- Comprehensive closeout documentation includes all test results and complete photo documentation of replaced or installed equipment and includes digital upload services.
- As needed RF engineering a troubleshooting expertise.