

Spherical Near to Far Field Estimation from Amplitude Measurements

Andrew Roczniak

March 15, 1996

Characterization of radiated fields

- EMI/C, safety
- Direct far-field measurement
 - simple
 - need for open site
- Uniqueness of the radiated field
- Near-field measurement
 - amplitude and phase

Proposed approach

- Spherical wave expansion used for near- to far- field transformation
 - well documented
 - number of modes known
- Differences with existing implementations
 - far-field is not explicitly found
 - phase is not explicitly found

Coefficient estimation

- If coefficients (a,b) are known, the far-field can be calculated anywhere
- Equation to solve is of type $\mathbf{A}x = b$
- Heuristic method
- Calculation of bounds for the coefficients

Methodology

- MATLAB (with Optimization Toolbox)
 - calculation of fields
 - calculation of coefficients
 - optimization
- Results
 - known phase
 - calculated coefficients (first case)
 - calculated coefficients with added error (second case)

Observations and conclusions

- No comparable research
- Initial coefficient distribution dependent
- Calculation of bounds on coefficients
- More simulation results