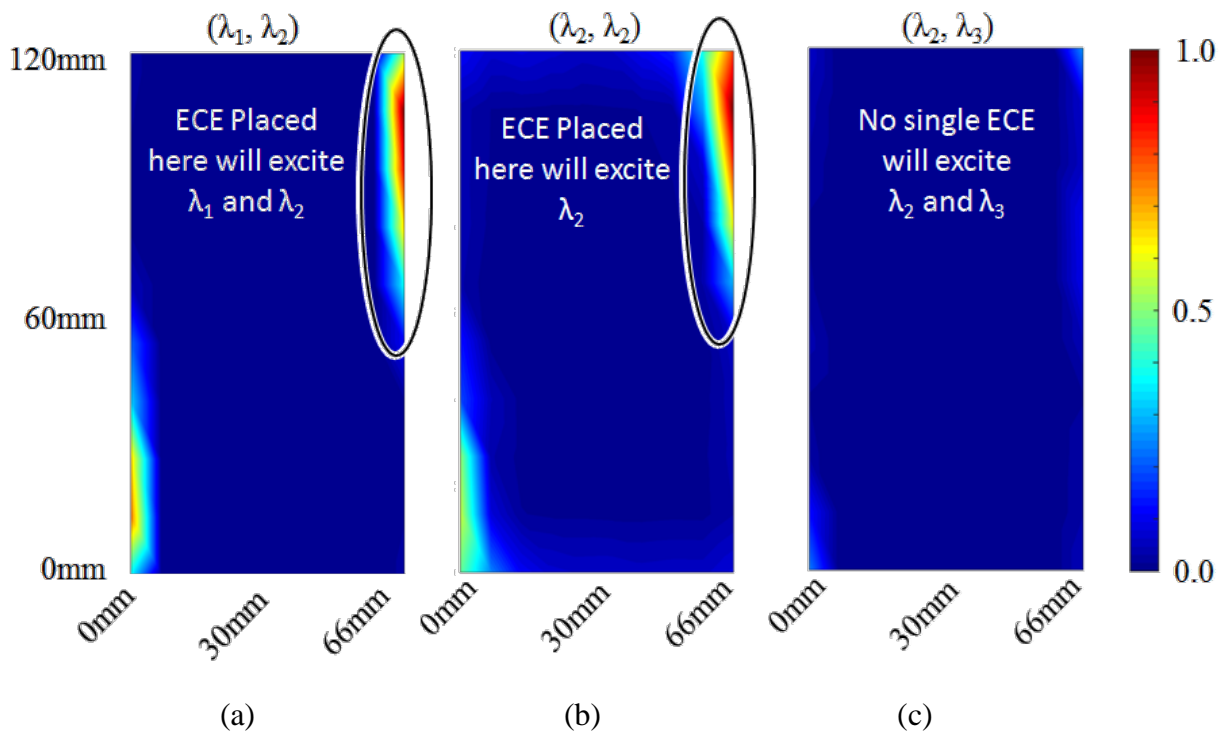


Antenna Design Using Characteristic Modes and Related Techniques.

Comment on the presentation by Miers et al. “Effect of Internal Components on Designing MIMO terminal antennas Using Characteristic Modes,” in EuCAP’16 Special Session on Theory and Application of Characteristic Modes, convened on Monday, April 11, 2016.

In this and a companion presentation in the Sp. Session the authors assert, and we quote: “CM should be the *Go To* first step” while designing antennas. But, after listening to their presentations, we found that we still have many questions that remain unanswered. For instance, they show the distributions on a rectangular plate (see Fig.2 below) and then argue that Electrical Coupling Elements (ECEs) placed at the indicated locations will excite (a) Modes 1 and 2; and (b) Mode 2. No clue is given as to how the Modes 2 and 3 would be excited



. Figure No. 2.1

Comments and Questions

1. First of all, typical antennas used to excite mobile phones are PIFA's, or variations thereof, which the manufacturer of the phone typically specifies and wants us to use. It is not at all obvious that by placing an antenna (the authors did not discuss what type of antennas are acceptable as ECEs) would excite a single mode as the authors appear to imply.
2. Second, there are two high current regions in Fig.2(a). Why should we just choose only the one in upper right? Furthermore, at which location should we choose to excite the chassis, since the high current region is distributed over a region and not confined to a very small region around a certain point?
3. No clue is provided by the authors as to how we excite the Modes 2 and 3. Also, it is not clear what the radiation pattern would look like, if we try to excite the pure modes, but fail to do so with our choice of ECEs. Also, if the desired radiation pattern calls for a certain number of modes with different weights, and if we are unable to excite them by using the ECEs we have on hand, at a limited set of points, as a practical matter, where do we go then?
4. If we are to design the ECEs ourselves, then what guidelines should we use?

We believe it would be counterproductive to “go to” CM's as a first step, as the authors recommend, until and unless we have clear answers to the above questions.

Submitted by: A CM interest group member.

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