FETI DDM methodologies for the simulation of High Gain Ka-Band Transmit arrays(single and dual band)

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Keywords—Ka-band transmit-array, lens, FETI domain decomposition

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The single band lens is composed of 4524 phase-shifting cells chosen from 63 different constitutive unit cells. These unit cells are composed by five metallized layers of concentric squared patches on four substrate layers of Rogers Duroid 5880 (ε_r=2.2 and tan δ = 0.0009).The in-plane width of the unit cell is *P*= 2.5 mm. The periodic simulation methods are therefore unusable here, whereas conventional full wave simulators require very important computing times as well as RAM memory.

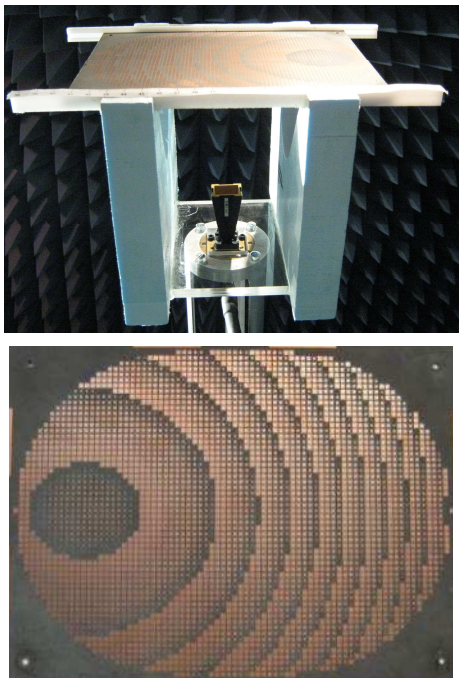

Fig. 1. Single band 30 dBi lens antenna (DOI: 10.1109/TAP.2015.2484419)

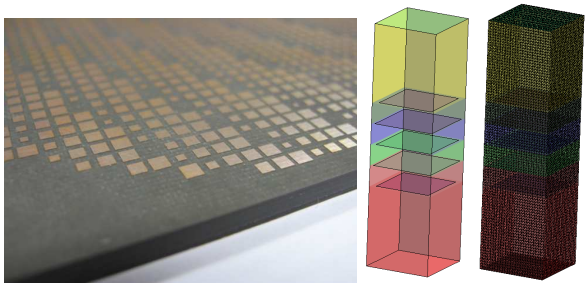

Fig. 2. Zoom of the single band transmit array, geometry and mesh of cell 63

The dual band lens operating at 20 GHz and 30 GHz (Fig. 3) is composed of 2352 cells. The 31 dual band unit cells designed in [2] (Fig. 4) are properly arranged to provide beam collimation. These unit cells are composed by seven metallized layers of concentric squared patches and strip loops printed on six substrate layers of Rogers Duroid 5880 (ε_r=2.2 and tan δ = 0.0009). The metallization can be modelled by a perfect electromagnetic conductor (PEC) with zero thickness. The thickness of each dielectric layer is s = 1.617 mm. The in-plane width of the unit cell is P= 3.5 mm.

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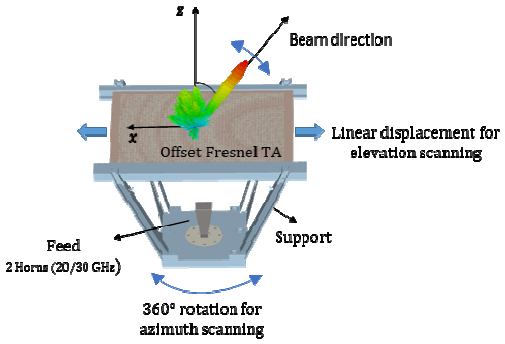

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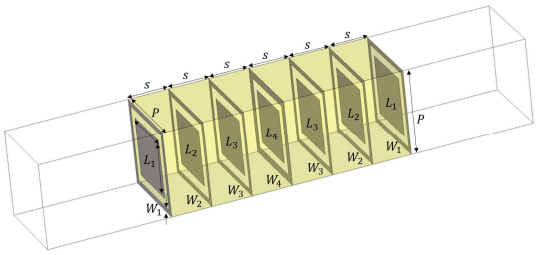

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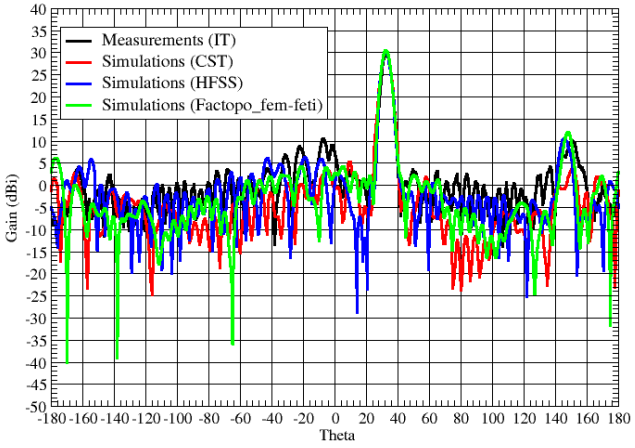

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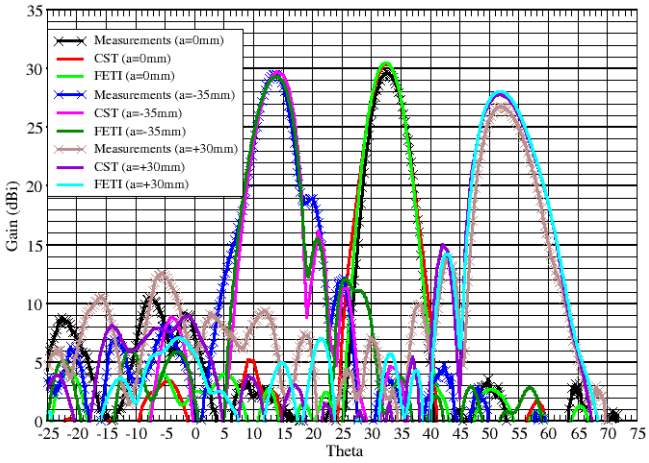

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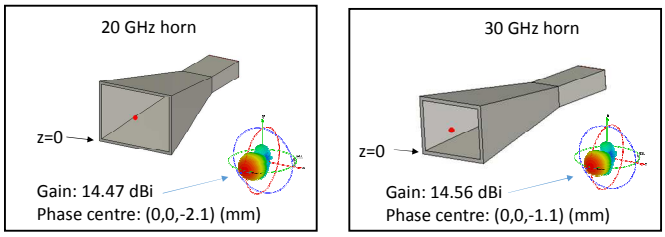

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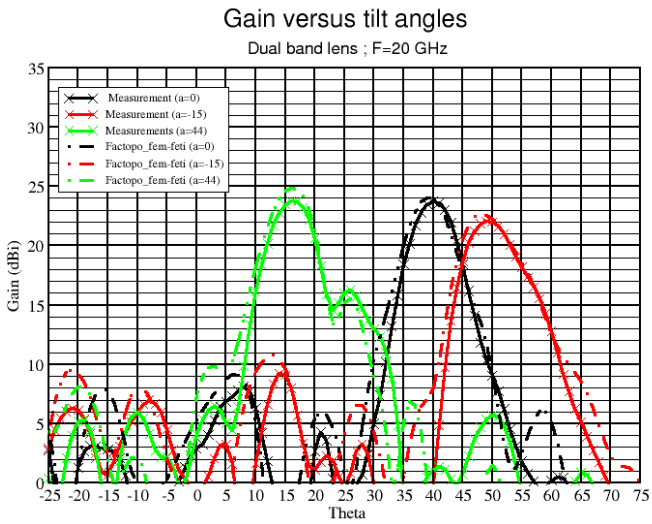

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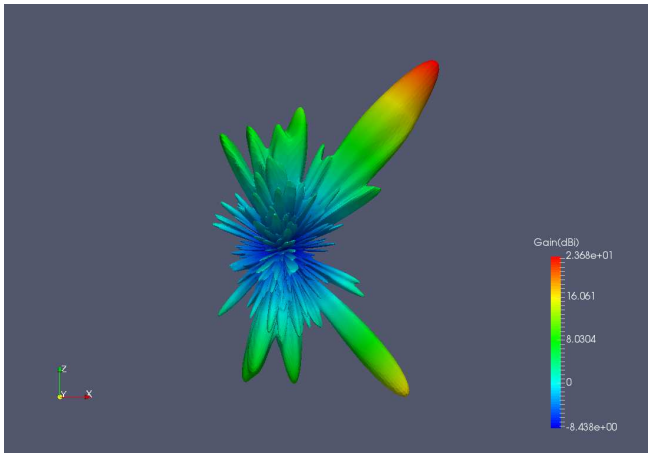

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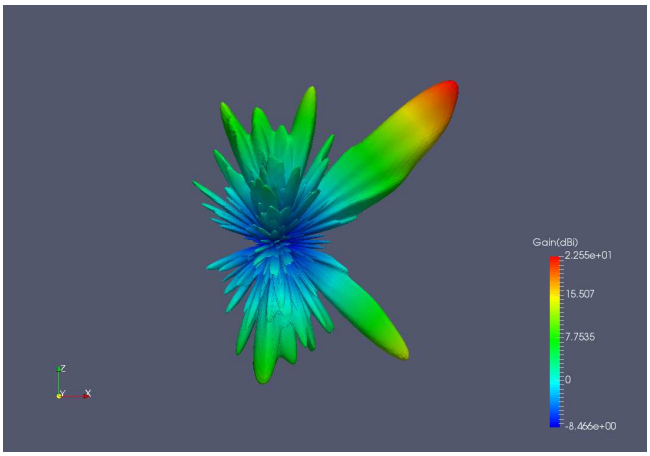

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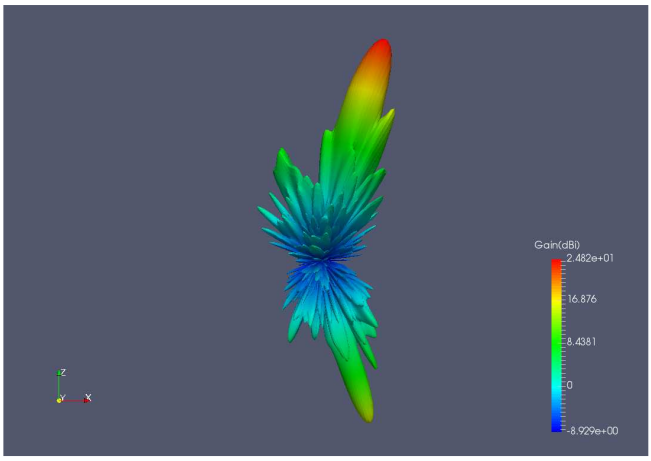

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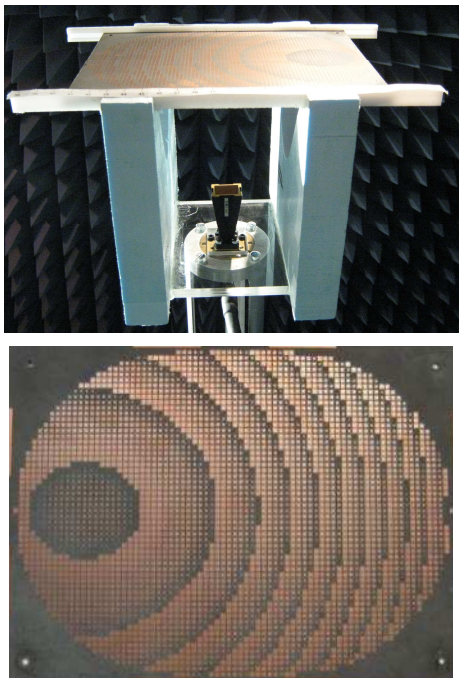

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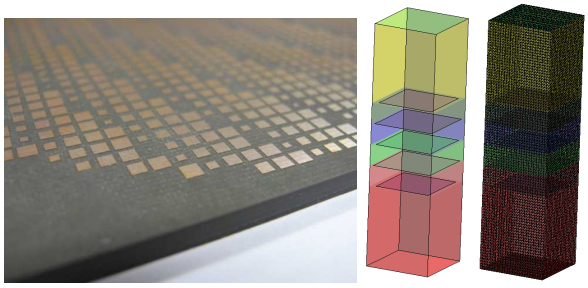

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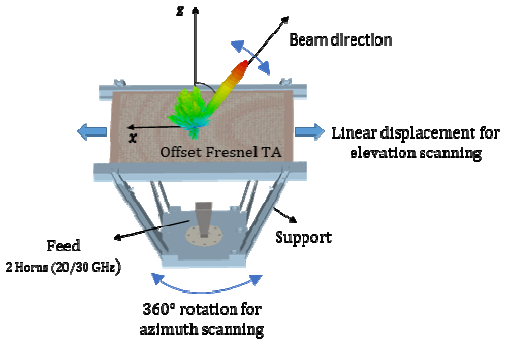

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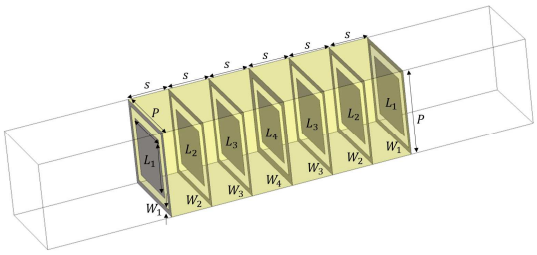

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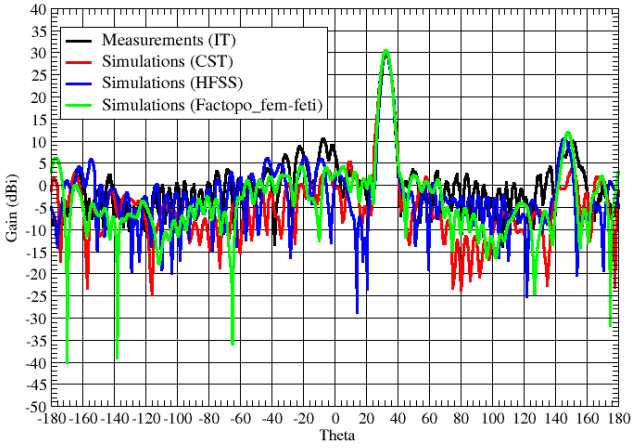

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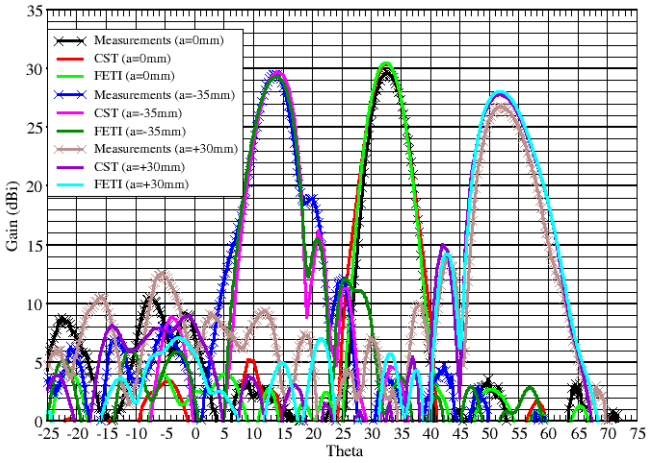

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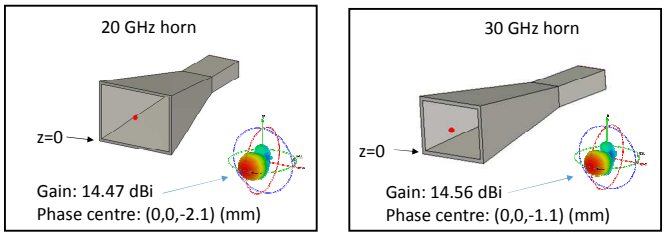

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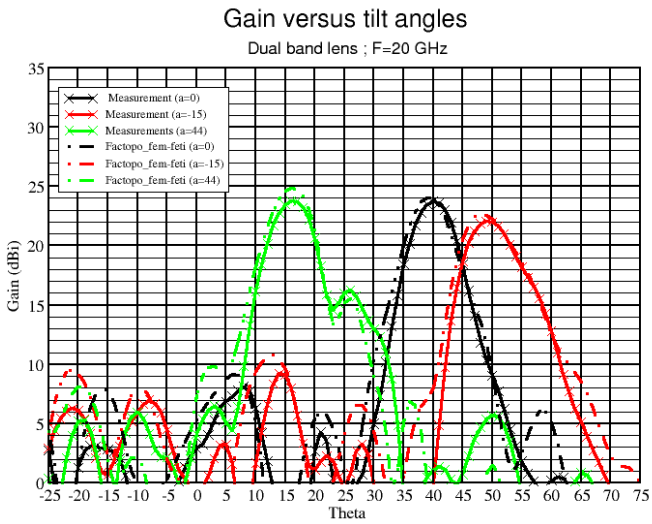

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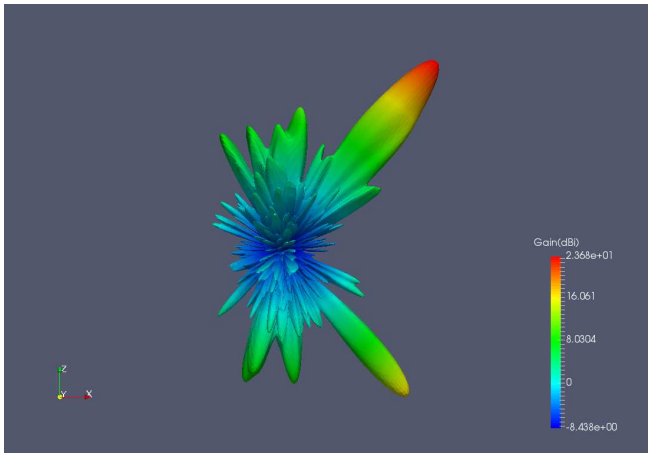

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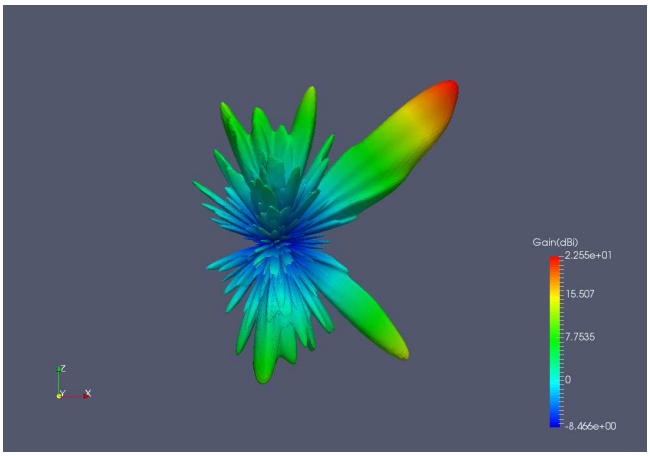

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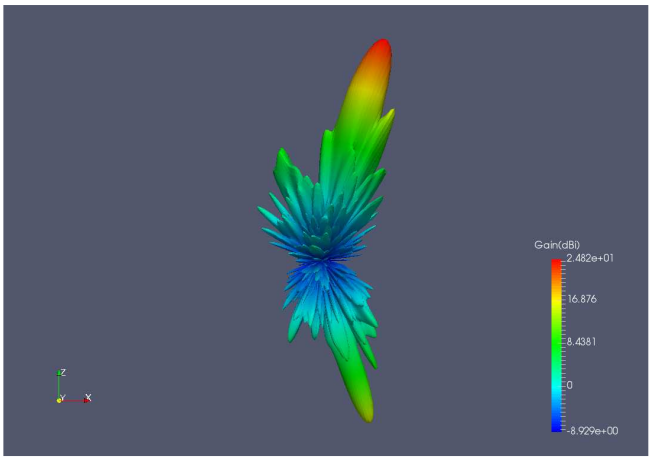

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