

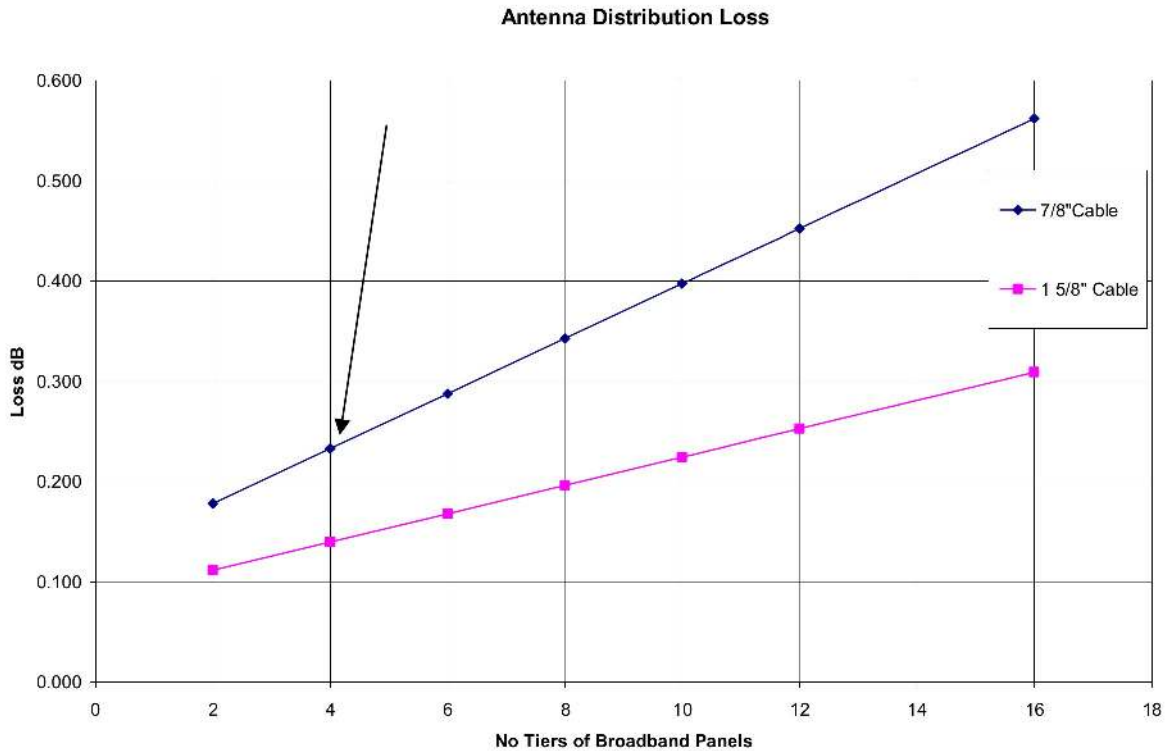
Antenna Distribution Loss and Impedance Compensation

In our antenna design it is standard practise to locate a power divider at each Tier, typically a four exit equal power divider. This ensures that there is a minimum distance from each power divider output to the panel input, typically <math><1\text{m}</math>.

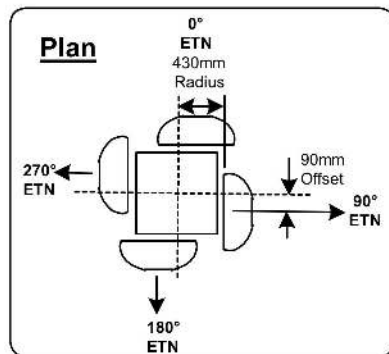
The cable from each Tier power divider to the bottom of the antenna can be fed by a larger cable to handle 4X the power. This also has a lower insertion loss.

In the graph below the cables are assumed to be all 7/8", or 7/8 Panel cables with 1 5/8" Tier cables.

In the case of the 4 Tier antenna using two eight exit power dividers the loss is 0.233dB, whilst using a 7/8" panel cables with 1 5/8" Tier cable the loss is 0.14dB

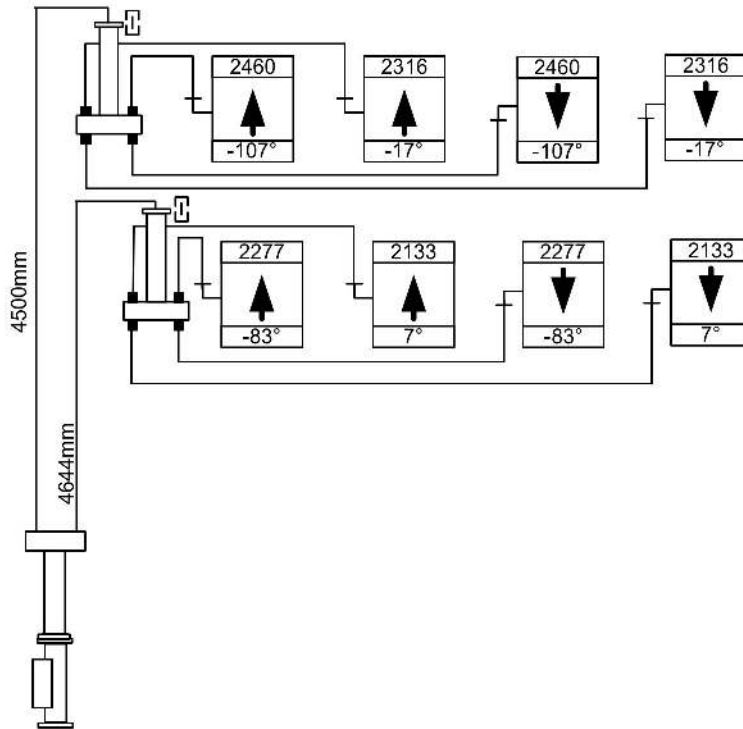


A further benefit is that any mismatches in the cables and panels can be compensated for at the tier power divider, by using offset quadrature compensation of the panels.



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Secondly the mismatch errors introduced by the Tier power dividers (< 3%) can be compensated for to improve the overall impedance compensation by feeding the tier power dividers in quadrature. In the schematic below (half antenna) the tier cable are 144mm different in length (quarter wave at mid band). This is compensated for in the panel cables



Conclusion

- Improved impedance bandwidth
- Lower Distribution cable Loss
- More space within spine for access & maintenance
- Shorter installation time

Summary of benefits

	2 Exit + 2 x 4 Exit	8 Exit Power Divider
Input Power rating	same	same
Input Voltage rating	same	same
Insertion loss	1	1.66X
Impedance bandwidth	Higher	Lower
Cable Length	1	3 X
Cable clamp qty	1	3 X
Power Divider Costs	Higher	Lower
Free space for maintenance	Higher	Lower
Installation Time	Lower	Higher