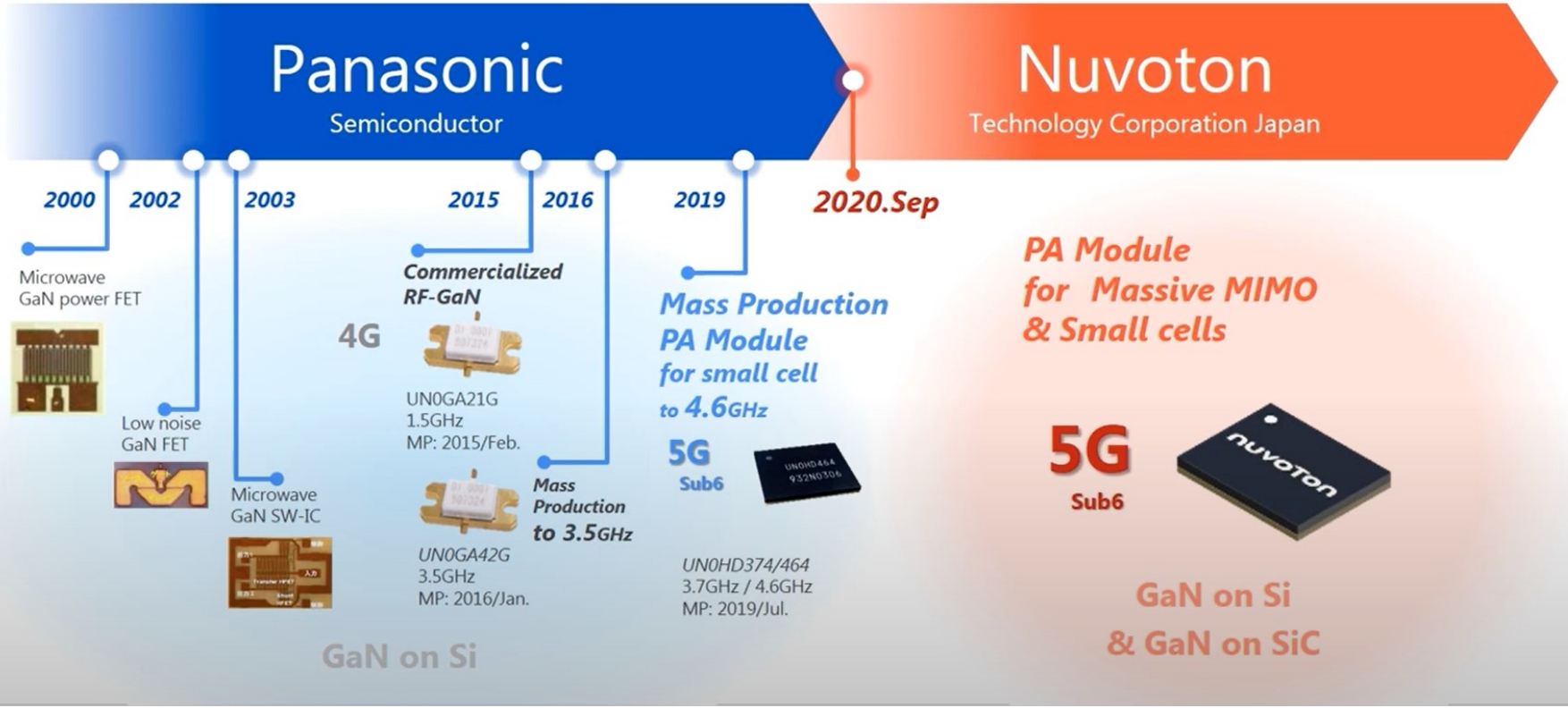
Nuvoton (Panasonic)

Nuvoton RF-GaN History

(former Panasonic Semiconductor)

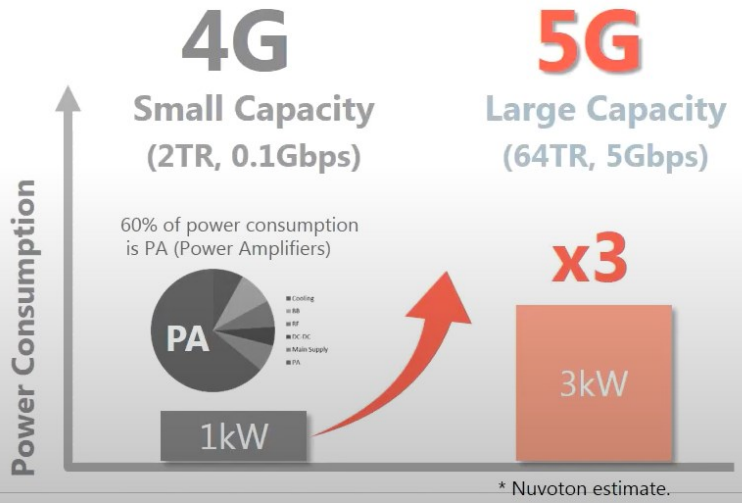


Proposal - ❶ Capacity

✓ 5G RAN issue

Large capacity requires high power consumption

3x power consumption.

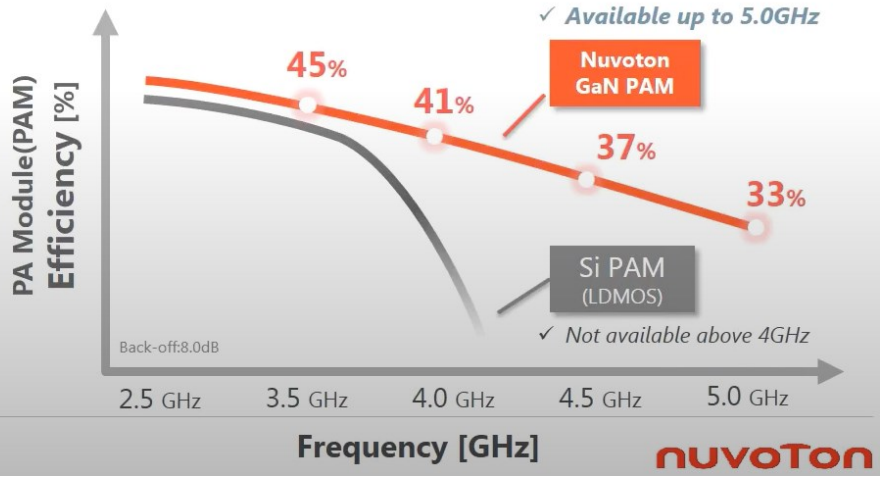


* Nuvoton estimate.

✓ Nuvoton Proposal

Reduce power consumption

Helps reduce power consumption.



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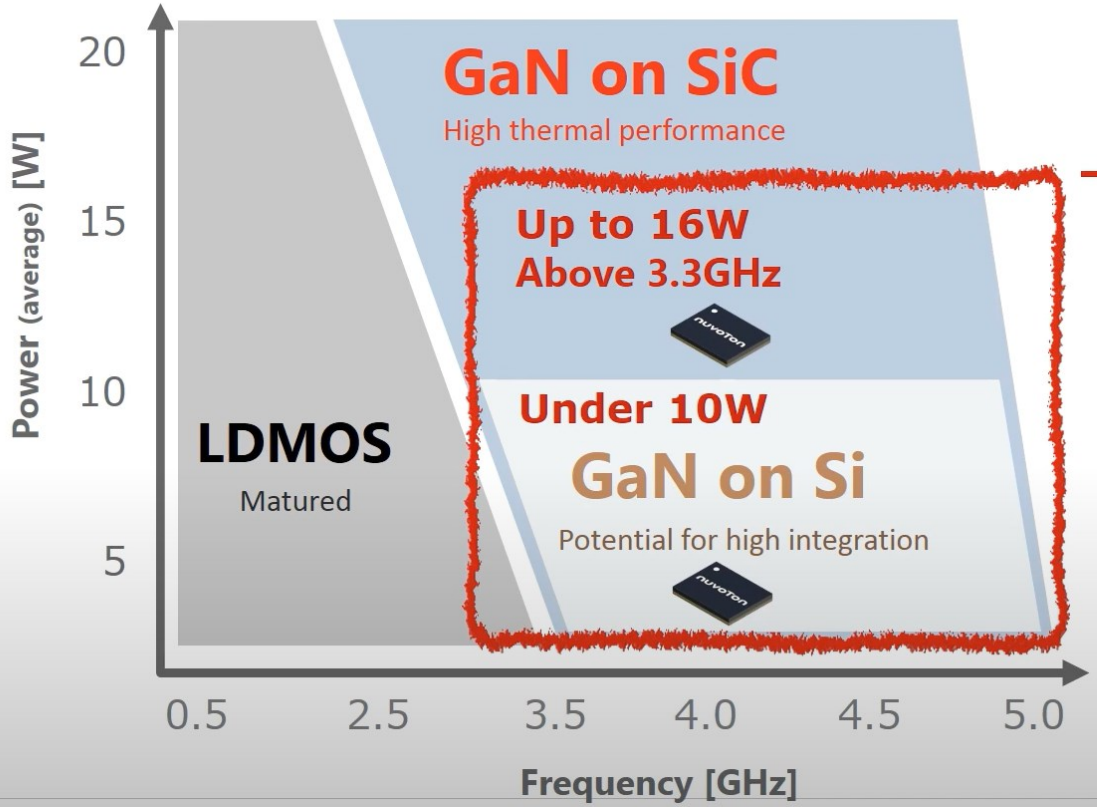
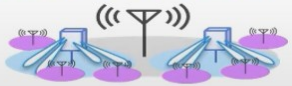
RF-GaN Target Application



Massive MIMO

Area : 0.5 to 1.0 km

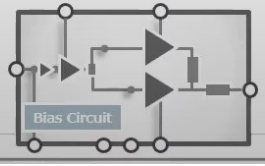
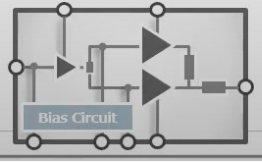
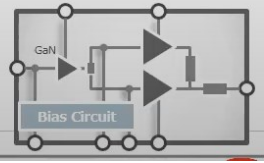
Small Cell / Local 5G



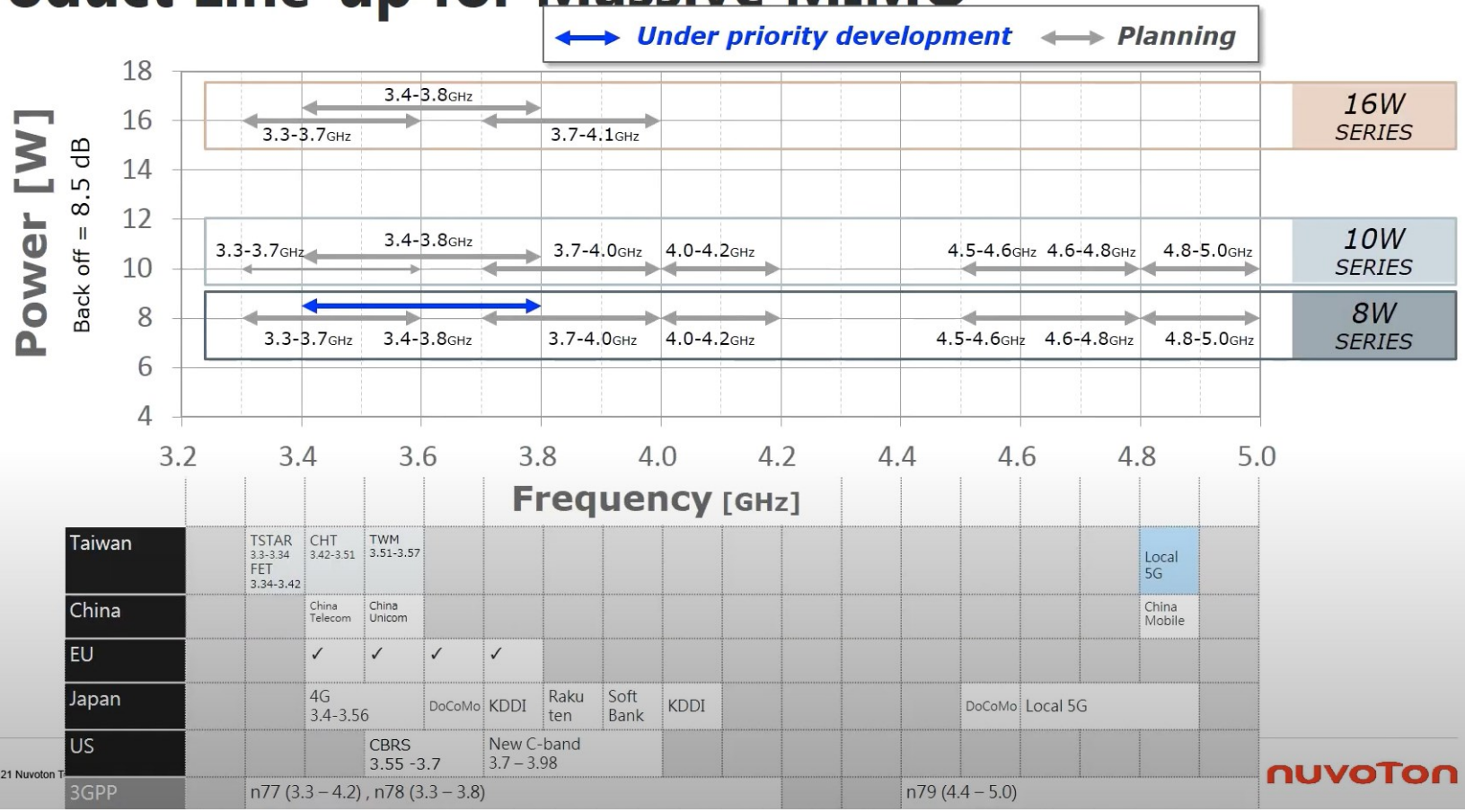
Area : 0.2 km

Nuvoton RF-GaN PA Module Line-up

2W for small cell, 8W to 16W for Massive MIMO.

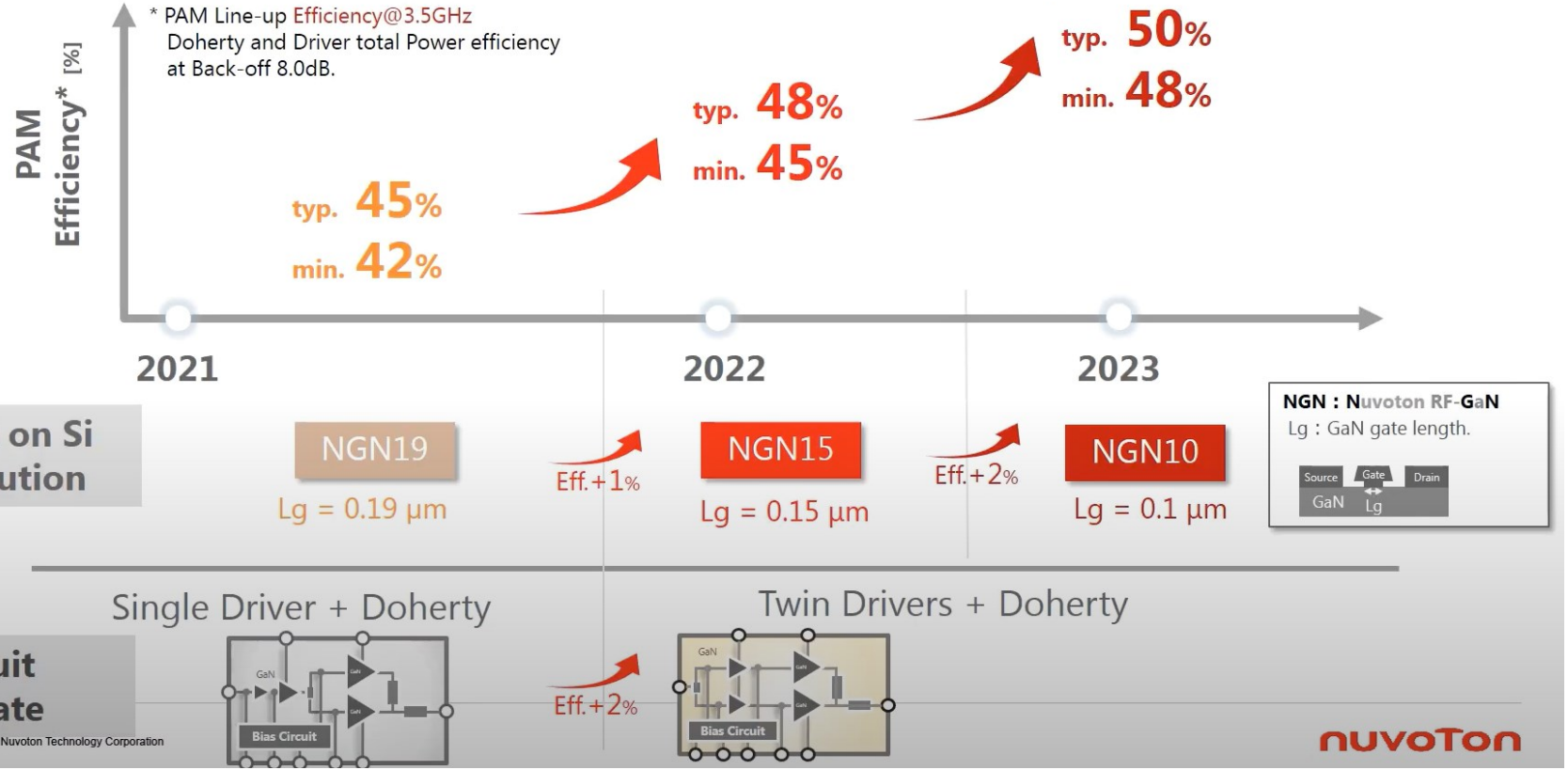
Application	Small Cell	Massive MIMO		
	5W/4TR, 10W/8TR	160W/32TR, 320W/64TR	200W/32TR, 400W/64TR	320W/32TR
Power (average)	**2W** (33dBm)	8W (39dBm)	10W (40dBm)	**16W** (42dBm)
Power (Saturation)	16W (42dBm)	63W (48dBm)	79W (49dBm)	126W (51dBm)
Module Size	**8.0 x 10.0 mm**	Pin compatible for each Power	8.0 x 12.0 mm	
Status	**Mass Production**	**Under Development**		
GaN	GaN on Si	GaN on Si		GaN on SiC
Vds	50V	28 V		
Block Diagram				

Product Line-up for Massive MIMO



Roadmap for efficiency improvement

High efficiency by GaN evolution and circuit update



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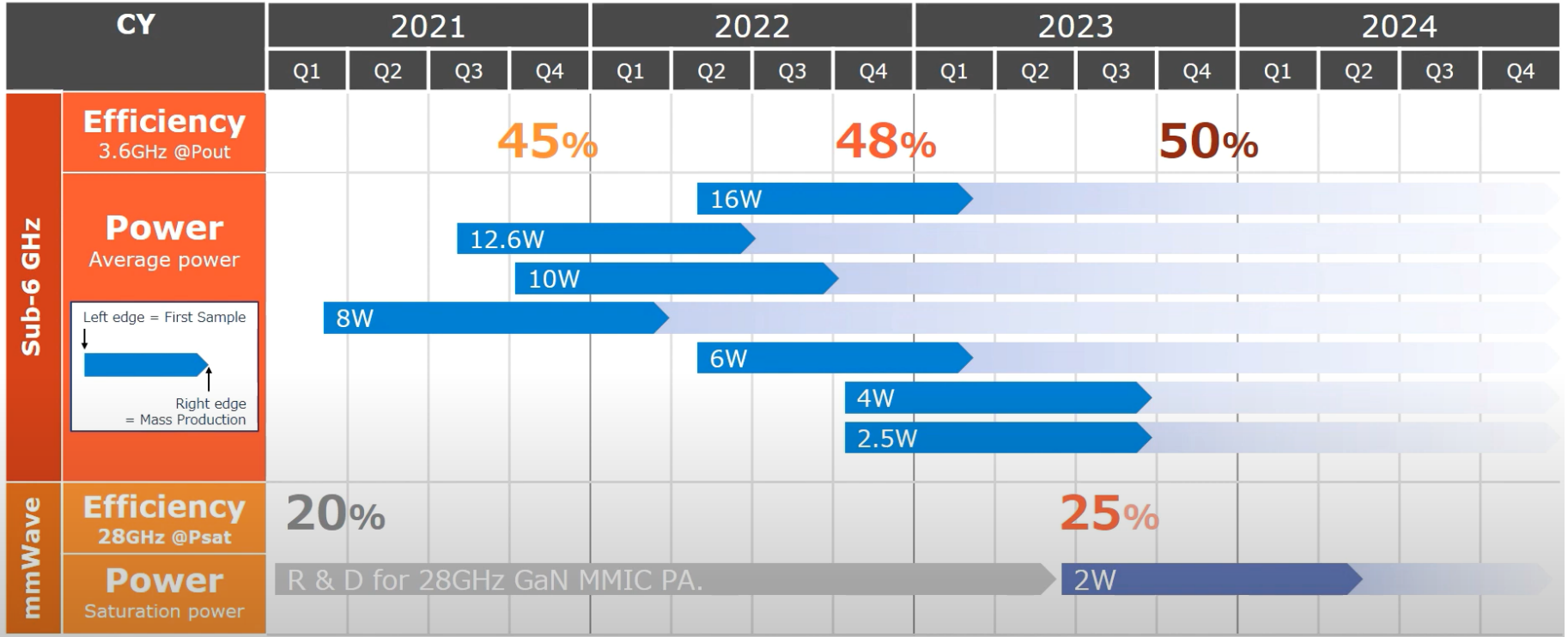
Roadmap for Product



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