

A photograph of two dolphins leaping from the ocean at sunset. The dolphins are in mid-air, their bodies curved as they move from left to right. The sun is low on the horizon, creating a bright, golden glow that illuminates the sky and the water. The sky is filled with soft, wispy clouds. The overall mood is serene and dynamic.

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Innovative Antenna Solutions

Mobile Devices | Wireless Infrastructure | **Embedded**

Belkin Jade/Pearl/Ruby MX4200/MX4300 Antenna Performance Report

Galtronics Project: 7671

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Jan 7th , 2022

Introduction



W E ' R E M A K I N G W A V E S ™

- » Galtronics developed an antenna solution for Belkin Jade/Pearl/Ruby MX4200v2/MX4300.
- » There are 6-7 antennas such as two PCB Dual Band Antennas (DB1 and DB2) , four 5GHz PCB antennas (5G1, 5G2, 5G3, and 5G4) and only for Jade one PCB-launched Metal BT antenna (BT)
- » No modifications were made to the existing antenna carrier.
- » LC matching component values:
 - BT (Metal Onboard) : Add a shunt capacitor (1 pF) on Antenna side
- » The operating frequency of the Dual band antennas is 2.4 GHz-2.5 GHz and 5.15 GHz-5.35 GHz.
- » The operating frequency of 5 GHz antennas is 5.50 GHz- 5.85 GHz.
- » The operating frequency of BT antenna is 2.4 GHz-2.5 GHz.
- » Measured return loss, isolation, peak gain, efficiency, and gain patterns of the antennas

BT Antenna Gain and Efficiency



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BT	Freq (MHz)	Peak Gain (dBi)	Directivity (dB)	Efficiency
	2400	5.08	6.36	74.39 %
	2450	5.25	6.52	74.75 %
	2500	5.30	6.48	76.21 %
	Average			75.12 %

WiFi Antenna Gain and Efficiency



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DB 1	Freq (MHz)	Peak Gain (dBi)	Directivity (dB)	Efficiency
	2400	1.93	2.77	82.47 %
	2450	2.44	2.99	88.02 %
	2500	2.45	3.08	86.48 %
Average				85.66 %

5GHz 1	Freq (MHz)	Peak Gain (dBi)	Directivity (dB)	Efficiency
	5500	5.01	6.28	74.75 %
	5725	4.97	6.38	72.21 %
	5850	5.13	6.51	72.73 %
Average				73.23 %

DB 2	Freq (MHz)	Peak Gain (dBi)	Directivity (dB)	Efficiency
	2400	1.93	2.77	82.47 %
	2450	2.44	2.99	88.02 %
	2500	2.45	3.08	86.48 %
Average				85.66 %

5GHz 2	Freq (MHz)	Peak Gain (dBi)	Directivity (dB)	Efficiency
	5500	5.20	6.64	71.73 %
	5725	5.08	6.51	71.87 %
	5850	5.65	7.02	72.84 %
Average				72.15 %

DB1	Freq (MHz)	Peak Gain (dBi)	Directivity (dB)	Efficiency
	5150	3.67	4.76	77.76 %
	5250	4.00	4.90	81.29 %
	5350	4.07	5.02	80.35 %
Average				79.80 %

5GHz 3	Freq (MHz)	Peak Gain (dBi)	Directivity (dB)	Efficiency
	5500	5.12	6.51	72.61 %
	5725	5.02	6.46	71.83 %
	5850	5.09	6.47	72.66 %
Average				72.37 %

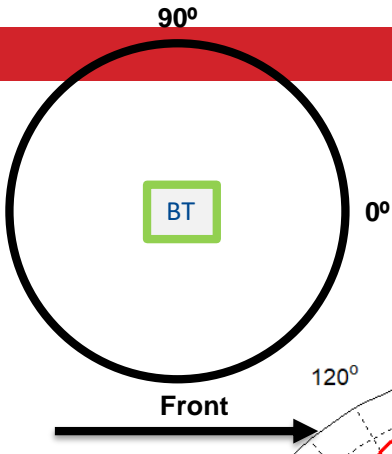
DB 2	Freq (MHz)	Peak Gain (dBi)	Directivity (dB)	Efficiency
	5150	3.67	4.76	77.76 %
	5250	4.00	4.90	81.29 %
	5350	4.07	5.02	80.35 %
Average				79.80 %

5GHz 4	Freq (MHz)	Peak Gain (dBi)	Directivity (dB)	Efficiency
	5500	5.20	6.64	71.73 %
	5725	5.08	6.51	71.87 %
	5850	5.65	7.02	72.84 %
Average				72.15 %

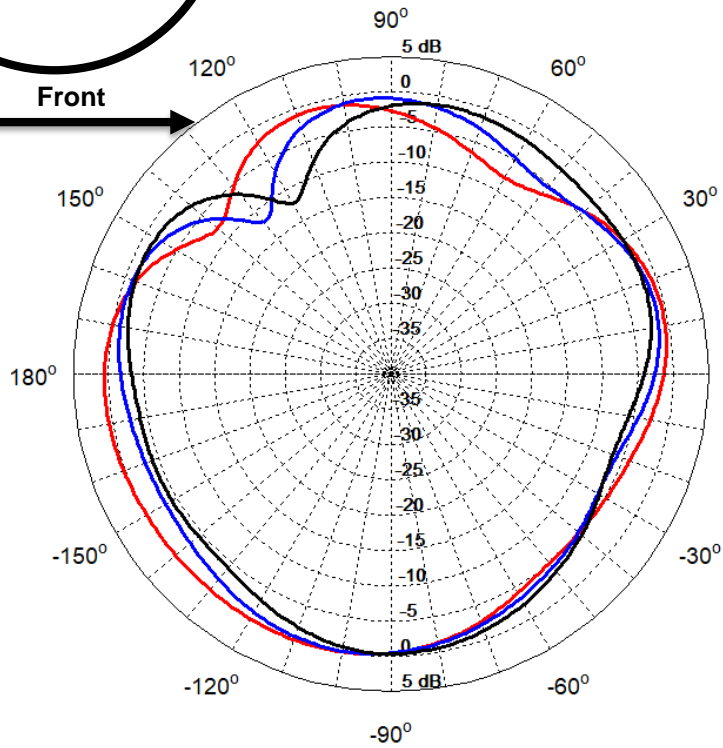
BT Antenna Power Sum Gain Patterns



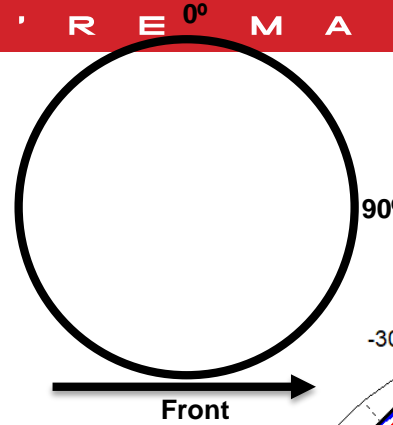
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BT
Azimuth Cut, held at $\theta = 90^\circ$:
 E_{TOTAL} (Power Σ) Component

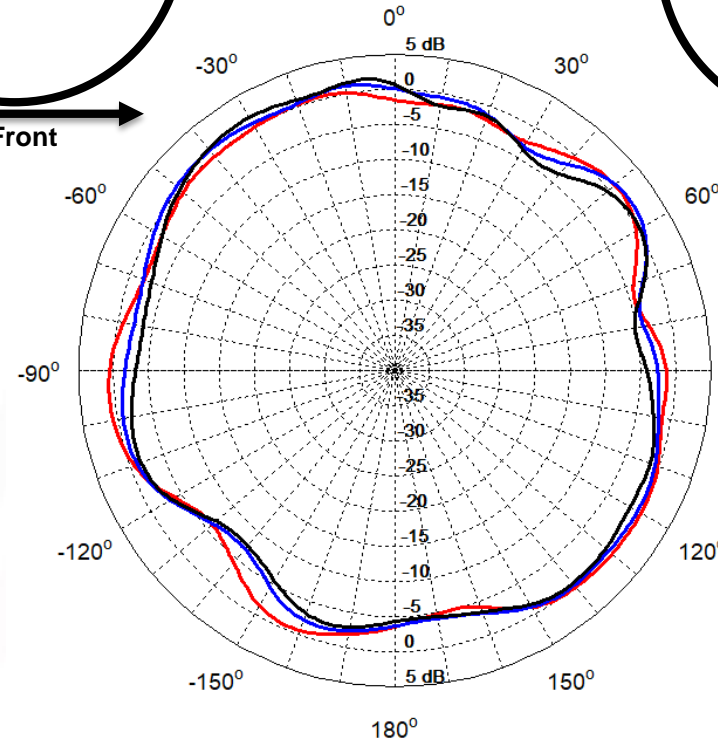


Azimuth Cut

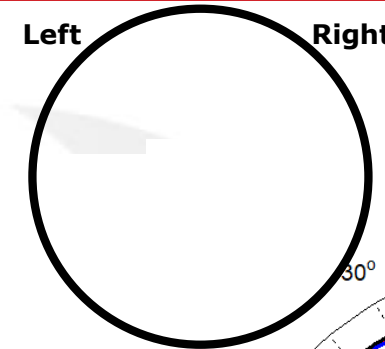


— 2400 MHz
— 2450 MHz
— 2500 MHz

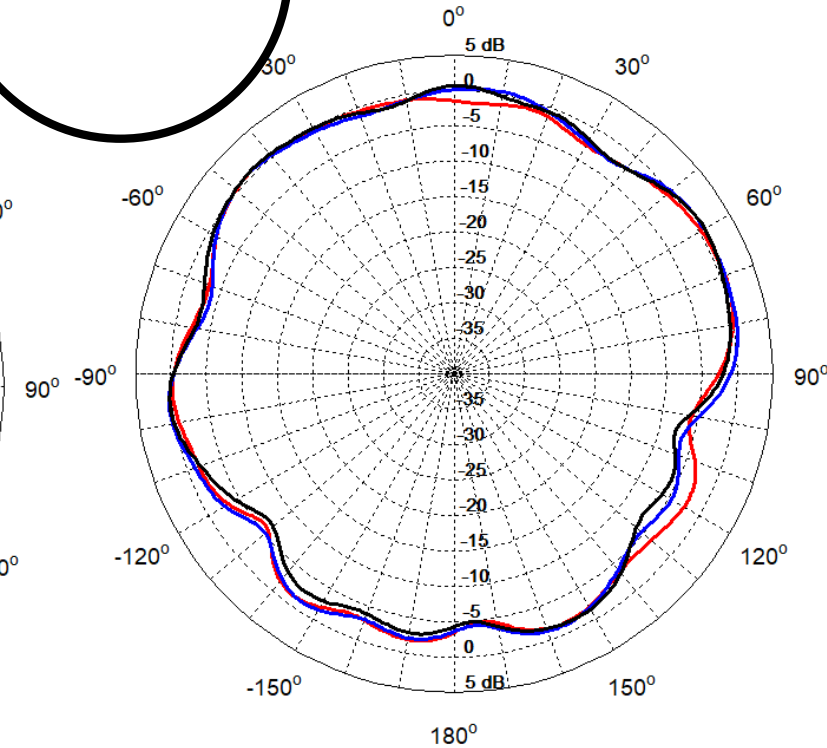
E_{TOTAL} (Power Σ) Component



Elevation
(Front to Back) Cut



BT
Elevation Cut, held at $\phi = 90^\circ$:
 E_{TOTAL} (Power Σ) Component



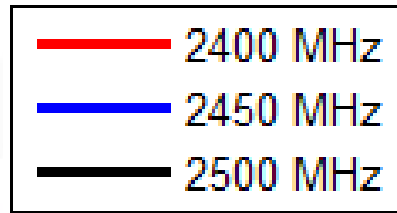
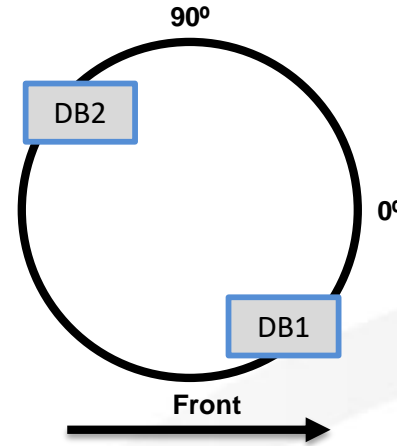
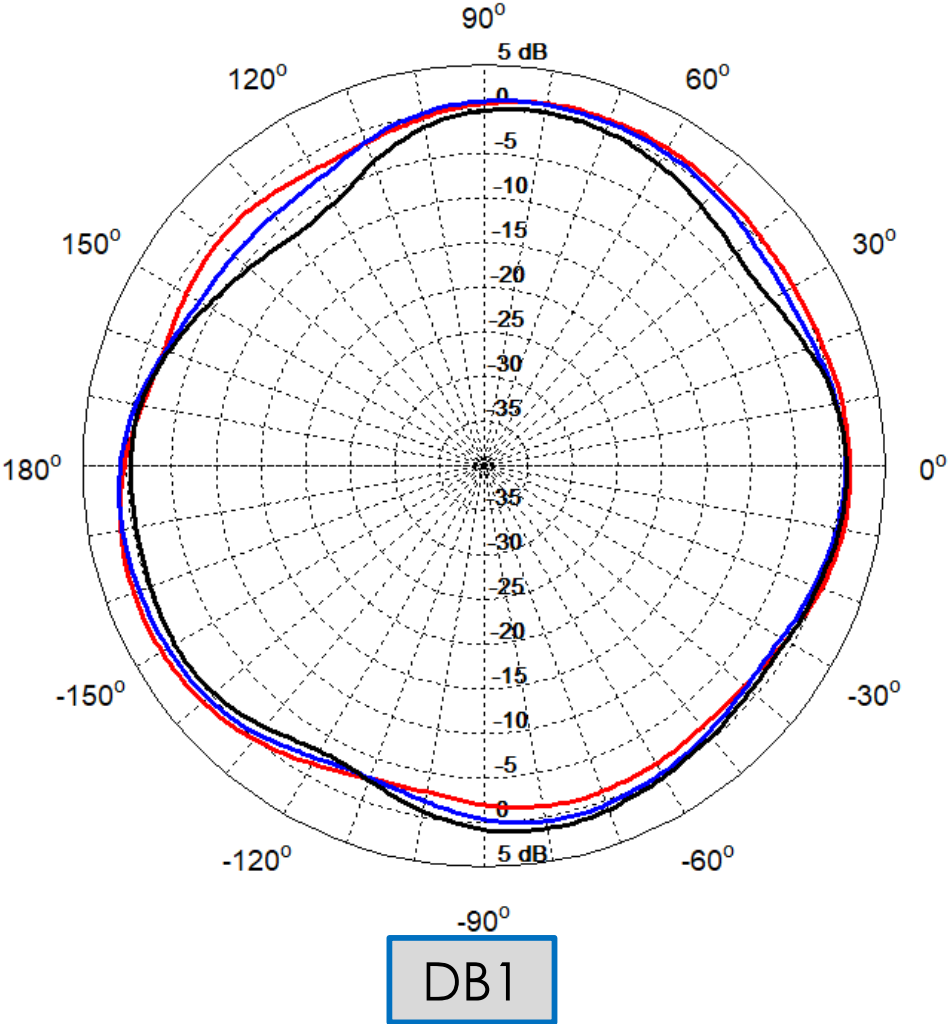
Elevation
(Side to Side) Cut

Azimuth Cut - Power Sum 2.45 GHz Band Antennas

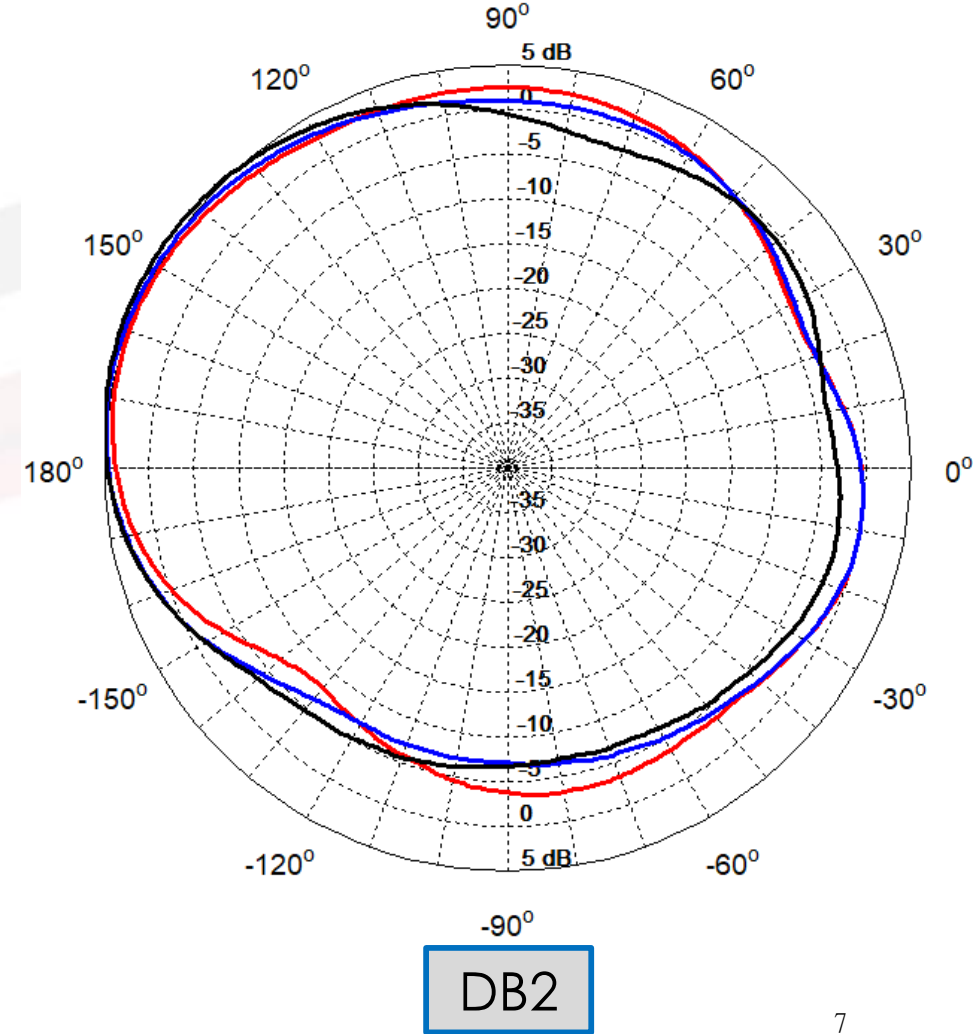


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DB1_LB
Azimuth Cut, held at $\theta = 90^\circ$:
 E_{TOTAL} (Power Σ) Component



DB2_LB
Azimuth Cut, held at $\theta = 90^\circ$:
 E_{TOTAL} (Power Σ) Component

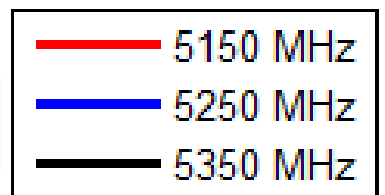
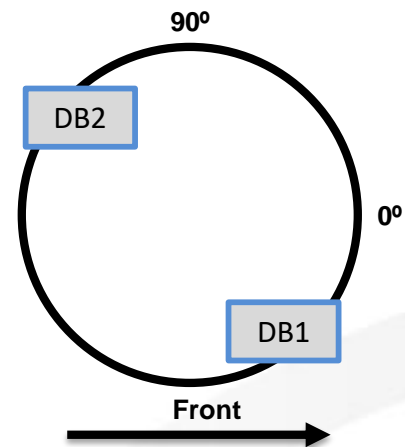
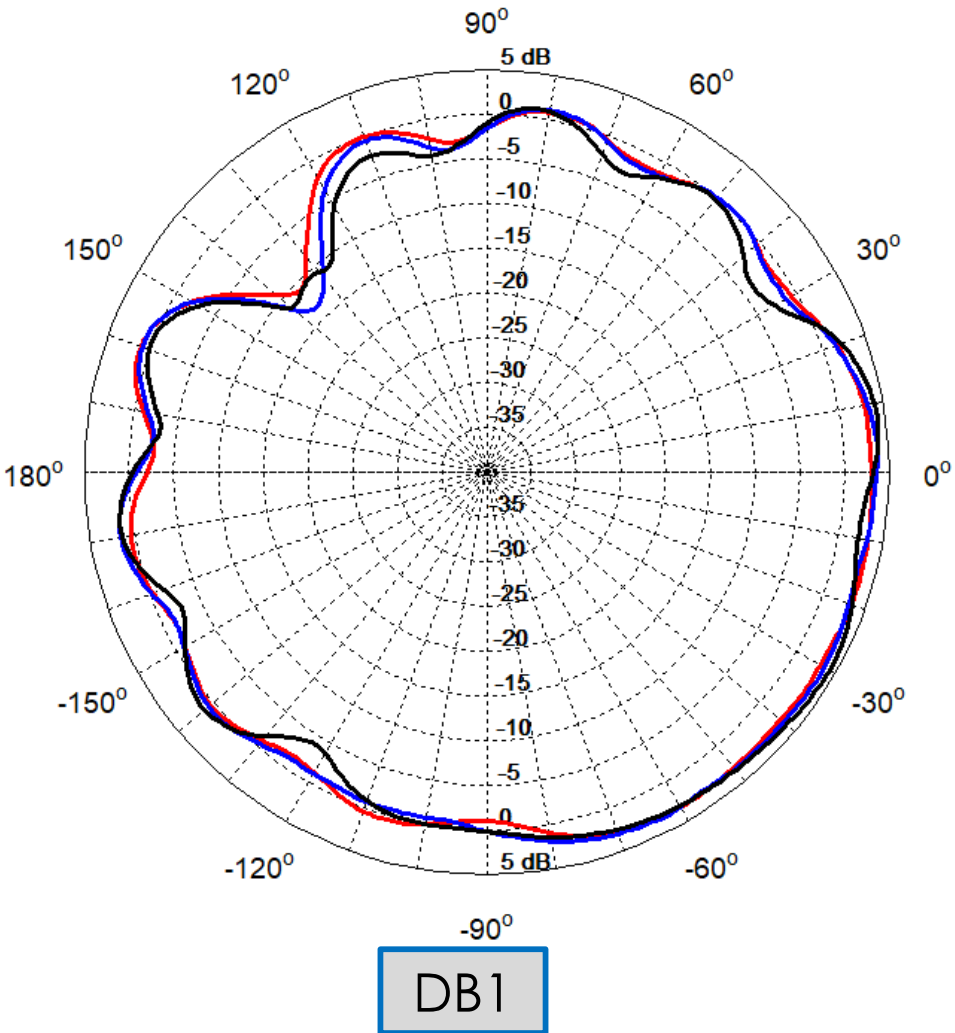


Azimuth Cut - Power Sum 5 GHz Band Antennas

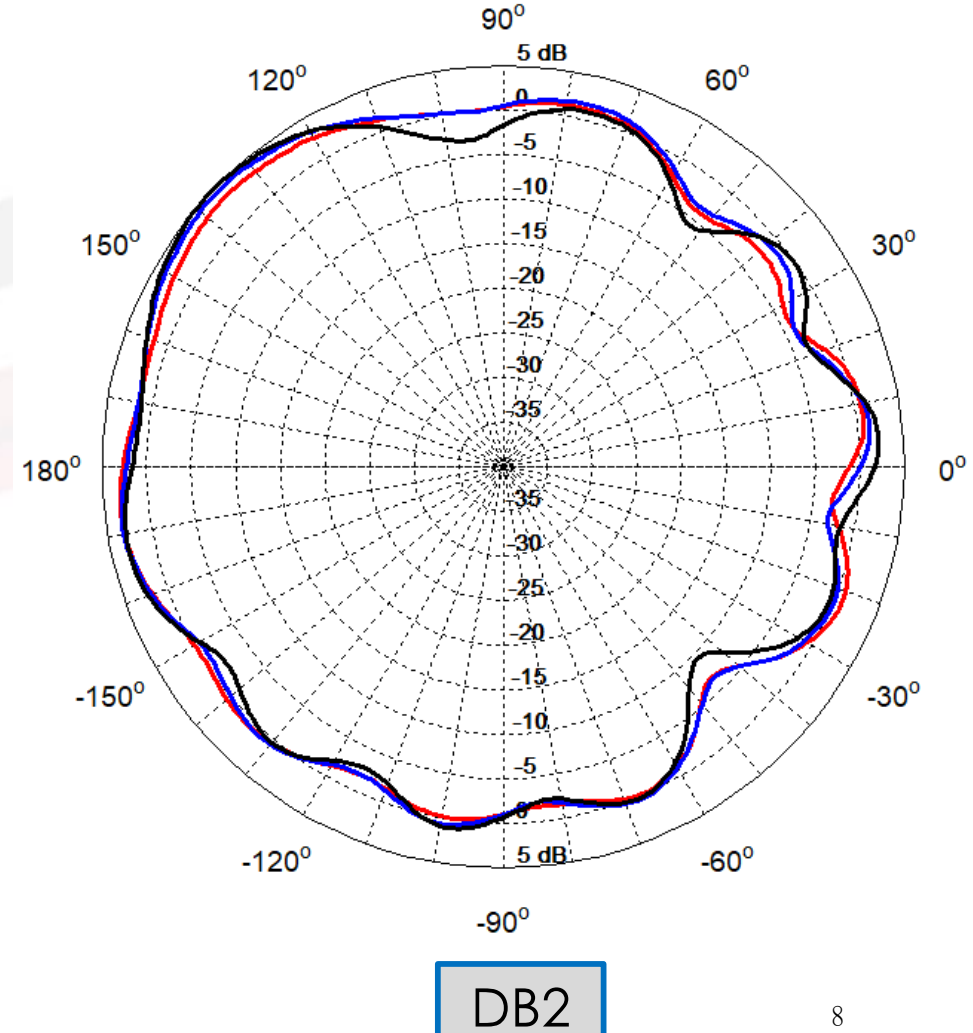


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DB1_HB
Azimuth Cut, held at $\theta = 90^\circ$:
 E_{TOTAL} (Power Σ) Component



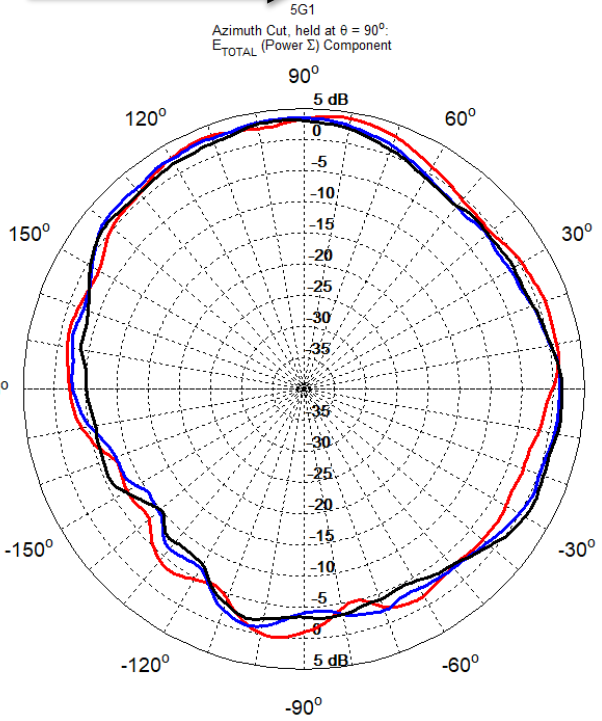
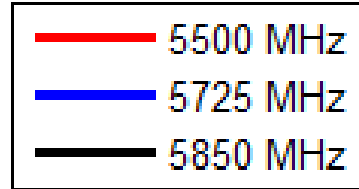
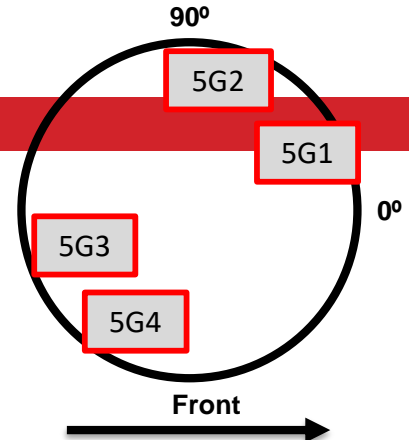
DB2_HB
Azimuth Cut, held at $\theta = 90^\circ$:
 E_{TOTAL} (Power Σ) Component



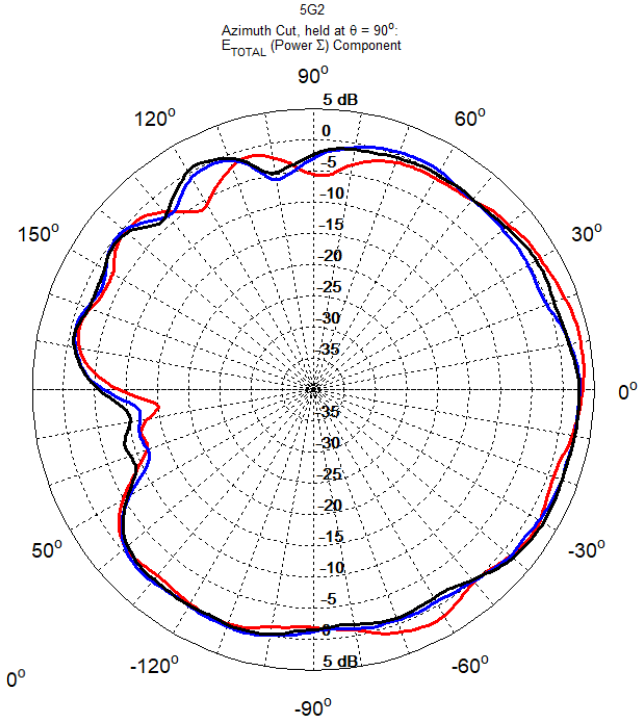
Azimuth Cut - Power Sum 5 GHz Antennas



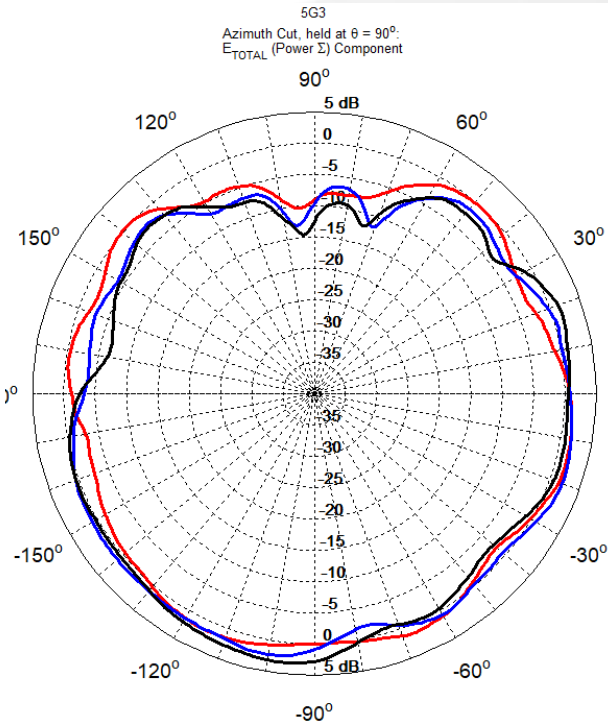
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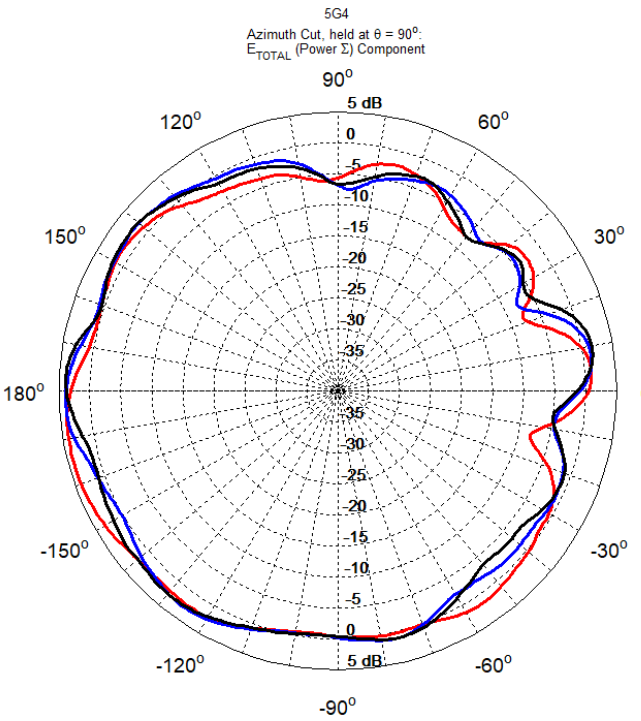
5G1



5G2



5G3

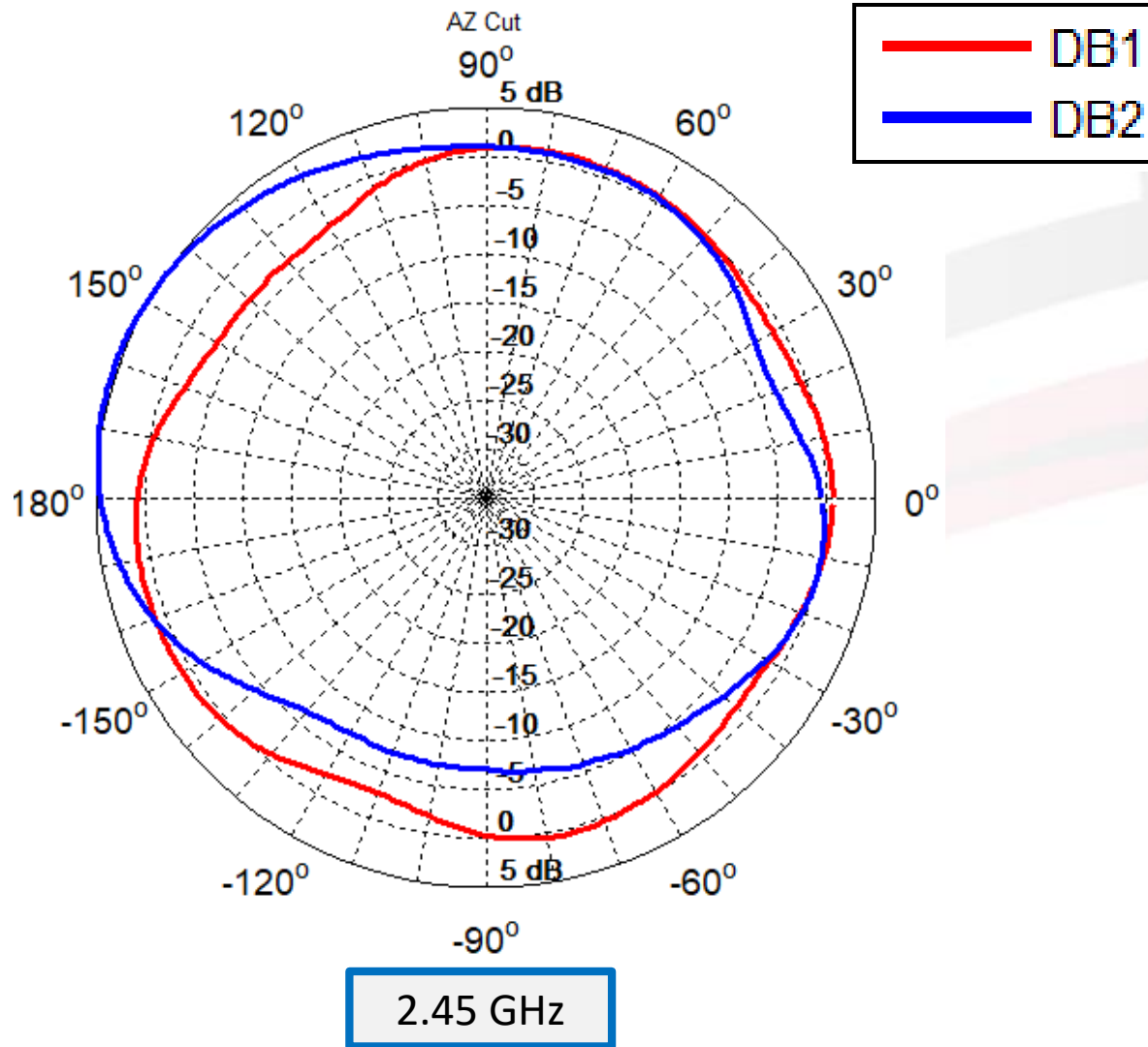
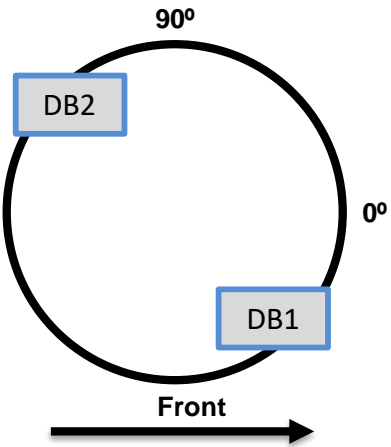


5G4

Azimuth Cut - Power Sum System Coverage – 2.45 GHz Band



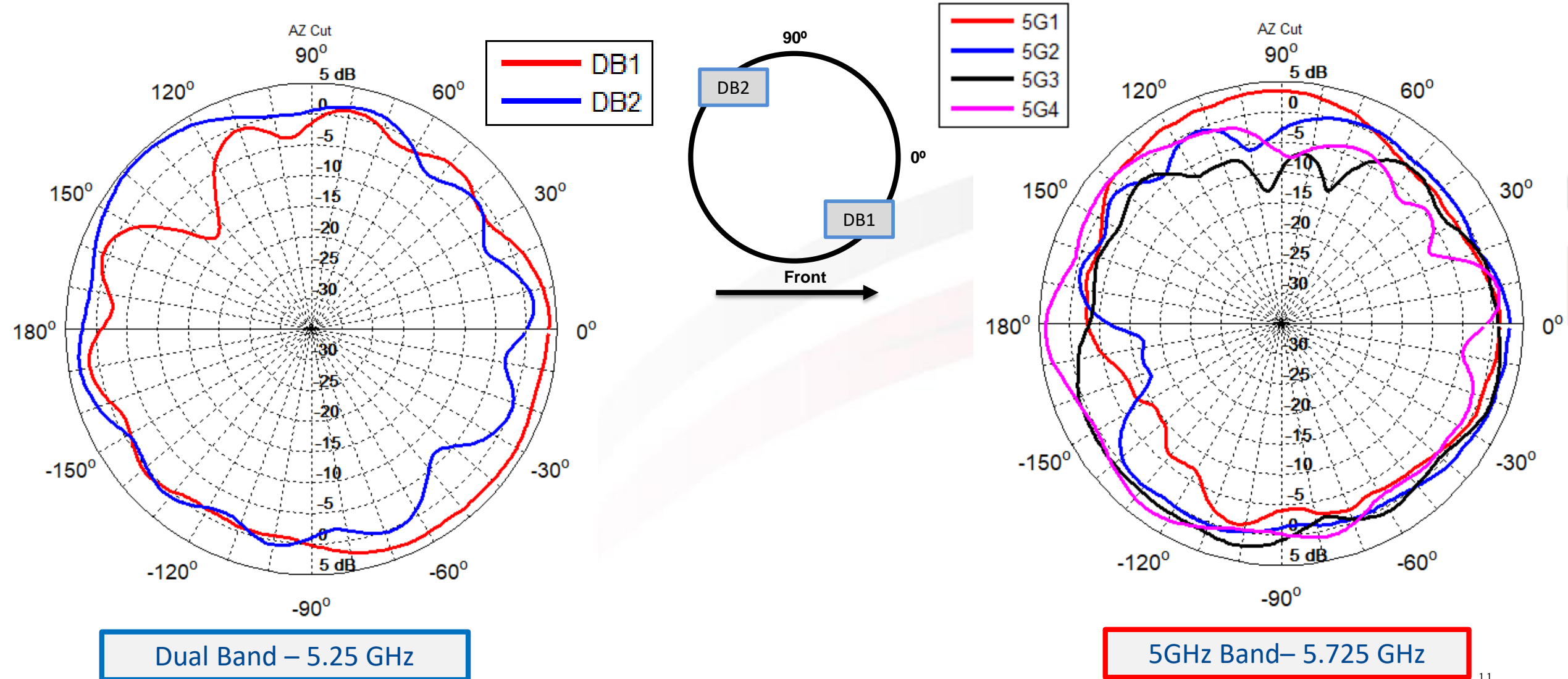
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Azimuth Cut - Power Sum System Coverage – 5GHz Band



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Thank You

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