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Enabling Industrial IoT

Delta 2D

2G/3G/4G/5G 51MM RIGHT ANGLE STUBBY ANTENNA

Key Features

- Supports 5G NR / 4G LTE / 3G UMTS / 2G GSM
- Supports some LTE Cat M, LTE Cat NB, NR Cat NB bands
- Ground plane independent

General Description

The Delta 2D is a low cost direct connect, stubby antenna tuned to the GPRS / GSM (2G), 3G, with support for some 4G/5G LTE band frequencies.. Despite its small size, it performs at a high level that most stubby antennas cannot compete with.

It is commonly used for applications such as: car park ticketing, utilities metering, road traffic monitoring and numerous other IoT applications.

Additional Considerations

- Point-to-Point and Point-to-Multipoint applications
- Does not rely on mounting on metallic surface
- Meets all EU compliance criteria for electronic goods

D Direct | 2G GSM | 3G UMTS | 4G LTE | 5G New Radio

LTE Cat M | LTE NB IoT | NR NB IoT

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Electrical Specifications

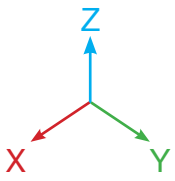
Impedance:	50 Ohm
Polarization:	Linear
Max Input Power:	50 W
Ground plane independent:	Yes

Environmental Specifications

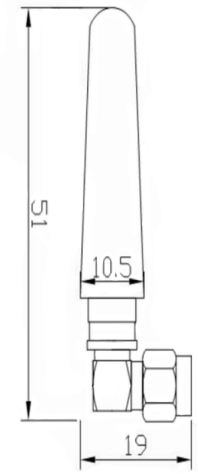
Operating Temperature range:	-40 to +85 °C
Storage Temperature range:	-40 to +85 °C

Mechanical Specifications

Dimensions:	51 mm height x 10.5 mm diameter
Weight:	6.4 g
Connector:	SMA male at right angle
Mounting method:	Direct connect
Housing materials:	ABS



orientation



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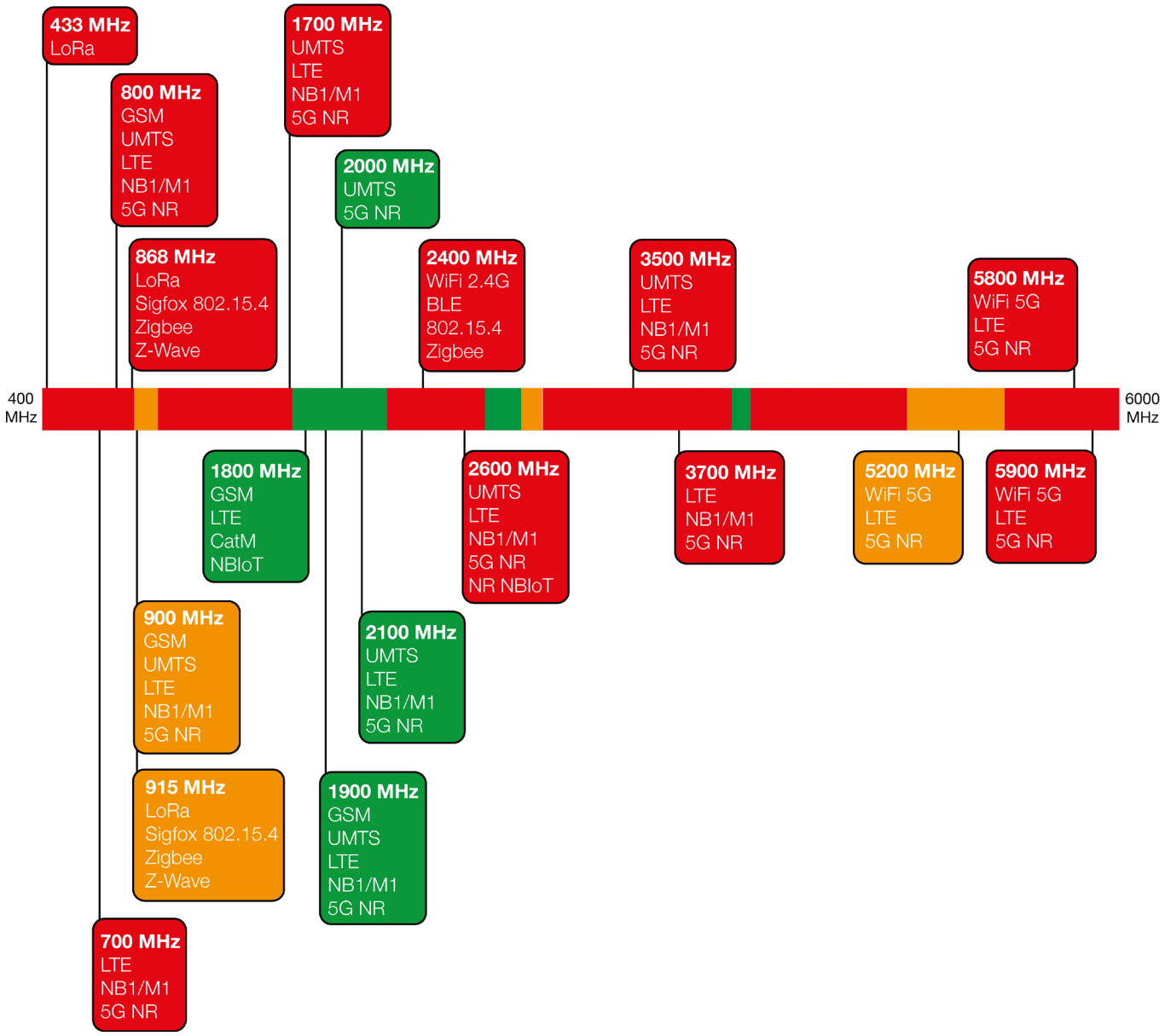
Spectrum Coverage



Suitable band Adequate band in good signal conditions Likely to be unsuitable

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Usable Cellular Frequency Support (410 MHz – 1900 MHz)

	410	450	600	700	800	850	900	1500	1600	1700	1800	1900
GSM Bands:											●	●
UMTS Bands:										●	●	●
LTE Bands:										●	●	●
LTE Cat M Bands:										●	●	●
LTE Cat NB Bands:										●	●	●
5G NR Bands:										●	●	●
NR Cat NB Bands:										●	●	●

Usable Cellular Frequency Support (2000 MHz – 5900 MHz)

	2000	2100	2300	2400	2500	2600	3300	3500	3700	4700	5200	5900
GSM Bands:												
UMTS Bands:		●										
LTE Bands:	●	●										
LTE Cat M Bands:		●										
LTE Cat NB Bands:		●										
5G NR Bands:	●	●										
NR Cat NB Bands:		●										

Usable ISM Frequency Support (433 MHz - 5800 MHz)

	433	868	915	2450	5800
Bluetooth					
IEEE 802.15.4					
LoRa					
Sigfox					
WiFi 2.4G					
WiFi 5G					
Zigbee					
Z-Wave					

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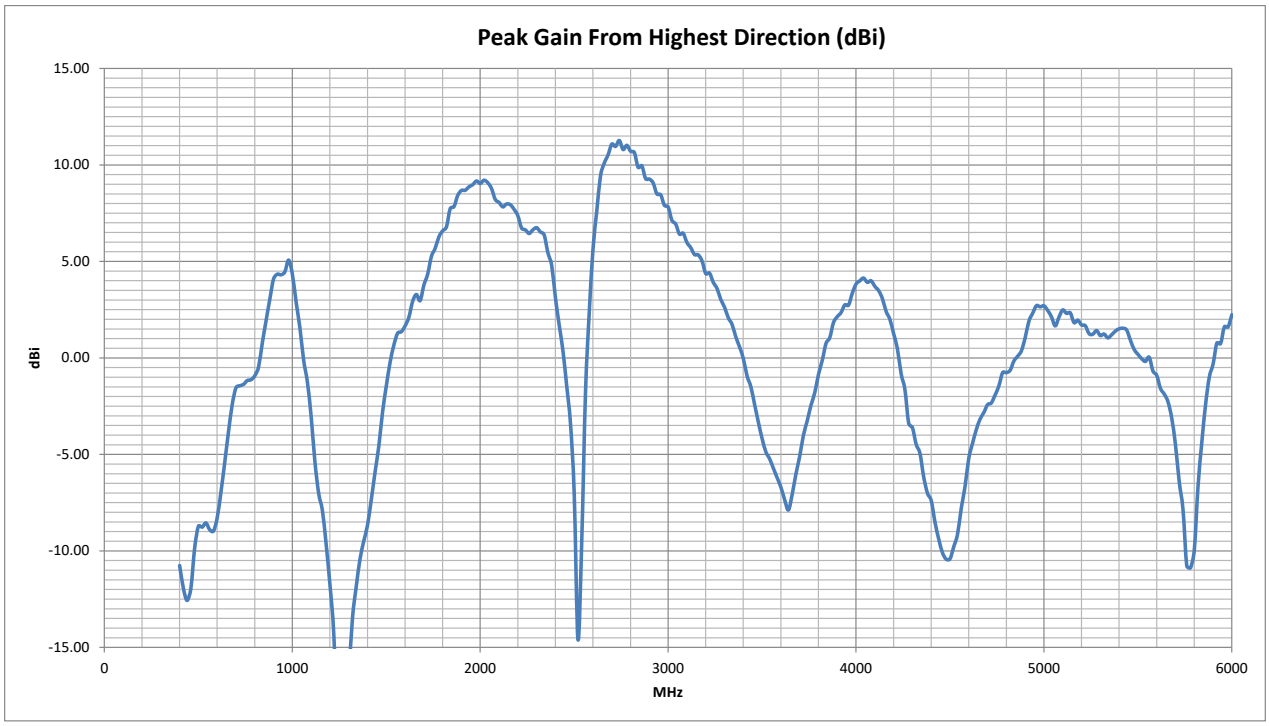
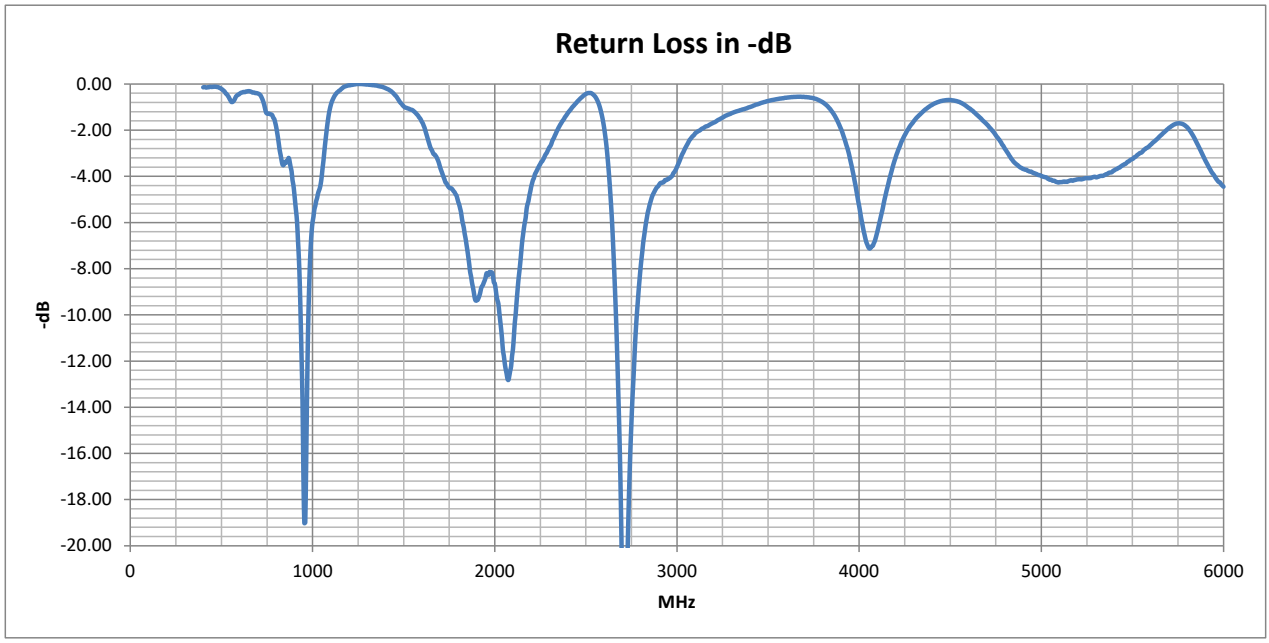
Peak Gain vs. Frequency



Return Loss



Delta 2D

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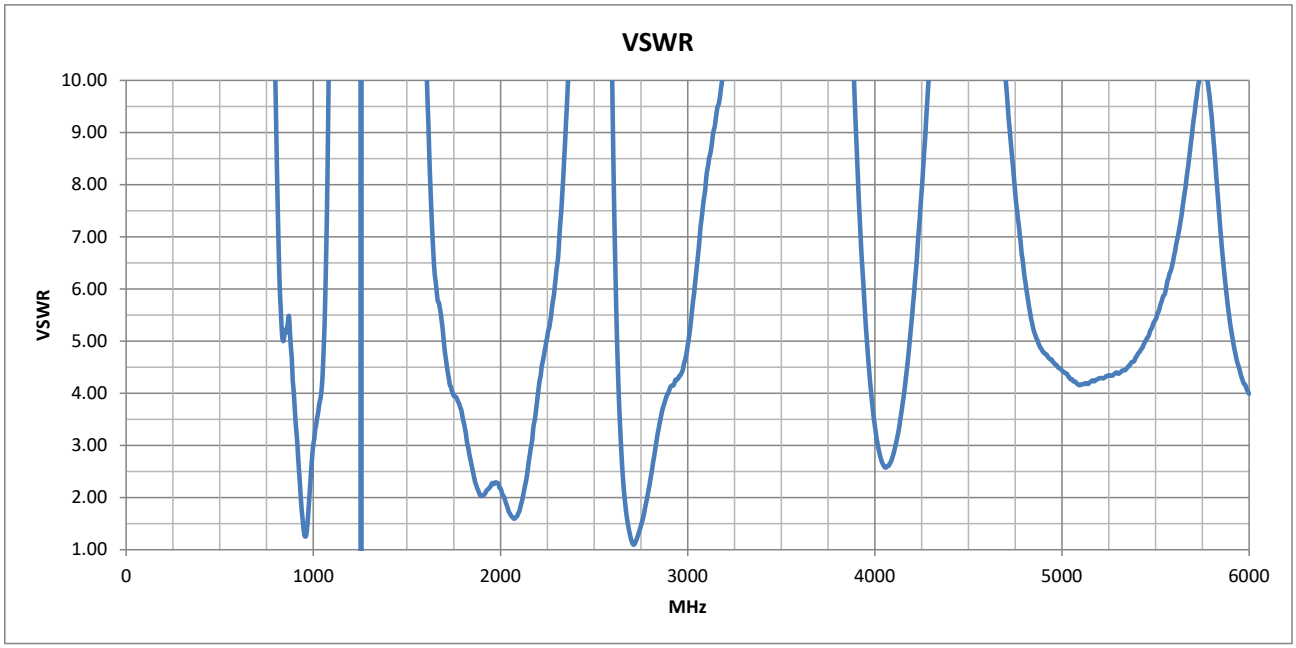
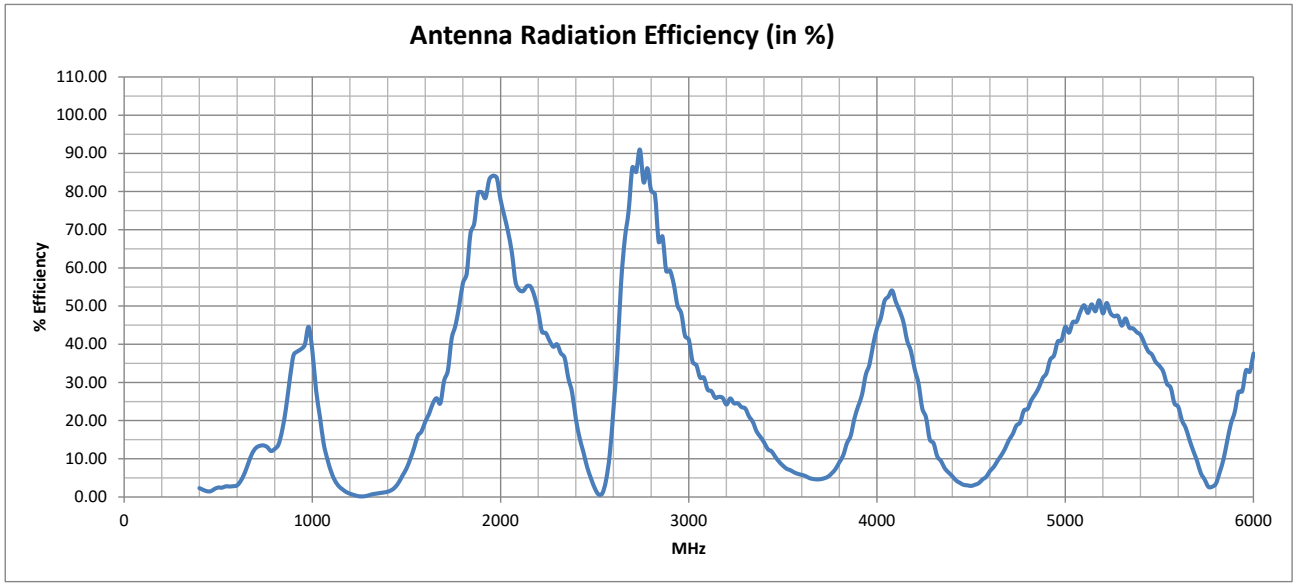
VSWR



Radiation Efficiency



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2G/3G/4G/5G 51MM RIGHT ANGLE STUBBY ANTENNA

Cellular Standards Band Support

GSM (2G) Band	UMTS (3G) Band	E-UTRA (4G) Band	Cat M E-UTRA Band	Cat NB E-UTRA Band	NR (5G) Band	Cat NB NR (5G) Band	Uplink	Downlink	Average Upload Efficiency (%)	Average Download Efficiency (%)	Maximum Upload VSWR	Maximum Download VSWR	Use Indicator
	1	1	1	1	n1	n1	1920 - 1980 MHz	2110 - 2170 MHz	82.75	54.65	2.29	3.11	●
PCS-1900	2	2	2	2	n2	n2	1850 - 1910 MHz	1930 - 1990 MHz	76.84	83.18	2.55	2.29	●
DCS-1800	3	3	3	3	n3	n3	1710 - 1785 MHz	1805 - 1880 MHz	41.83	67.43	4.61	3.42	●
	4	4	4	4			1710 - 1755 MHz	2110 - 2155 MHz	38.05	54.65	4.61	2.77	●
GSM-850	5	5	5	5	n5	n5	824 - 849 MHz	869 - 894 MHz	17.03	31.16	5.77	5.48	●
	6						830 - 840 MHz	875 - 885 MHz	16.59	30.75	5.31	5.18	●
	7	7	7	7	n7	n7	2500 - 2570 MHz	2620 - 2690 MHz	2.27	62.41	44.39	5.42	●
E-GSM-900	8	8	8	8	n8	n8	880 - 915 MHz	925 - 960 MHz	35.50	38.96	4.88	2.45	●
	9	9					1749.9 - 1784.9 MHz	1844.9 - 1879.9 MHz	46.92	73.46	3.96	2.63	●
	10	10					1710 - 1770 MHz	2110 - 2170 MHz	39.93	54.65	4.61	3.11	●
	11	11	11	11			1427.9 - 1447.9 MHz	1475.9 - 1495.9 MHz	2.54	6.23	58.67	23.57	●
	12	12	12	12	n12	n12	699 - 716 MHz	729 - 746 MHz	13.06	13.48	42.16	23.09	●
	13	13	13	13	n13	n13	777 - 787 MHz	746 - 756 MHz	12.14	13.28	12.95	13.97	●
	14	14	14	14	n14		788 - 798 MHz	758 - 768 MHz	12.40	12.93	11.59	13.57	●
		17		17			704 - 716 MHz	734 - 746 MHz	13.12	13.48	40.60	19.67	●
		18	18	18	n18	n18	815 - 830 MHz	860 - 875 MHz	14.33	26.11	6.74	5.48	●
	19	19	19	19			830 - 845 MHz	875 - 890 MHz	17.15	31.57	5.31	5.18	●
	20	20	20	20	n20	n20	832 - 862 MHz	791 - 821 MHz	19.66	12.98	5.30	11.25	●
	21	21	21	21			1447.9 - 1462.9 MHz	1495.9 - 1510.9 MHz	3.62	7.91	39.43	18.58	●
	22	22					3410 - 3490 MHz	3510 - 3590 MHz	11.06	6.74	22.88	28.71	●
		24	24	24	n24		1626.5 - 1660.5 MHz	1525 - 1559 MHz	24.56	13.17	7.88	16.37	●
	25	25	25	25	n25	n25	1850 - 1915 MHz	1930 - 1995 MHz	77.00	82.93	2.55	2.29	●
	26	26	26	26	n26		814 - 849 MHz	859 - 894 MHz	16.11	29.34	6.90	5.48	●
		27	27				807 - 824 MHz	852 - 869 MHz	13.54	23.64	8.07	5.46	●
		28	28	28	n28	n28	703 - 748 MHz	758 - 803 MHz	13.34	12.49	40.93	13.57	●

● Suitable band ● Adequate band in good signal conditions ● Likely to be unsuitable

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Cellular Standards Band Support

GSM (2G) Band	UMTS (3G) Band	E-UTRA (4G) Band	Cat M E-UTRA Band	Cat NB E-UTRA Band	NR (5G) Band	Cat NB NR (5G) Band	Uplink	Downlink	Average Upload Efficiency (%)	Average Download Efficiency (%)	Maximum Upload VSWR	Maximum Download VSWR	Use Indicator
		28A					703 - 733 MHz	758 - 788 MHz	13.28	12.50	40.93	13.57	🔴
		29			n29		N/A	717 - 728 MHz	N/A	13.40	N/A	32.84	🔴
		30			n30		2305 - 2315 MHz	2350 - 2360 MHz	38.83	32.46	7.02	9.91	🔴
		31	31	31			452.5 - 457.5 MHz	462.5 - 467.5 MHz	1.52	1.66	142.70	144.58	🔴
	32	32					N/A	1452 - 1496 MHz	N/A	5.19	N/A	36.43	🔴
		33					1900 - 1920 MHz	1900 - 1920 MHz	79.07	79.07	2.09	2.09	🟢
		34			n34		2010 - 2025 MHz	2010 - 2025 MHz	74.14	74.14	2.06	2.06	🟢
		35					1850 - 1910 MHz	1850 - 1910 MHz	76.84	76.84	2.55	2.55	🟢
		36					1930 - 1990 MHz	1930 - 1990 MHz	83.18	83.18	2.29	2.29	🟢
		37					1910 - 1930 MHz	1910 - 1930 MHz	79.13	79.13	2.15	2.15	🟢
		38			n38		2570 - 2620 MHz	2570 - 2620 MHz	20.91	20.91	20.59	20.59	🔴
		39	39		n39		1880 - 1920 MHz	1880 - 1920 MHz	79.39	79.39	2.14	2.14	🟢
		40	40		n40		2300 - 2400 MHz	2300 - 2400 MHz	32.56	32.56	13.66	13.66	🔴
		41	41	41	n41	n41	2496 - 2690 MHz	2496 - 2690 MHz	28.79	28.79	44.39	44.39	🔴
		42	42	42			3400 - 3600 MHz	3400 - 3600 MHz	8.93	8.93	29.07	29.07	🔴
		43	43	43			3600 - 3800 MHz	3600 - 3800 MHz	5.58	5.58	31.40	31.40	🔴
		44					703 - 803 MHz	703 - 803 MHz	12.95	12.95	40.93	40.93	🔴
		45					1447 - 1467 MHz	1447 - 1467 MHz	3.75	3.75	40.17	40.17	🔴
		46			n46		5150 - 5925 MHz	5150 - 5925 MHz	28.91	28.91	10.23	10.23	🔴
		47			n47		5855 - 5925 MHz	5855 - 5925 MHz	20.83	20.83	6.79	6.79	🔴
		48			n48		3550 - 3700 MHz	3550 - 3700 MHz	5.40	5.40	31.40	31.40	🔴
		49					3550 - 3700 MHz	3550 - 3700 MHz	5.40	5.40	31.40	31.40	🔴
		50			n50		1432 - 1517 MHz	1432 - 1517 MHz	5.38	5.38	54.43	54.43	🔴
		51			n51		1427 - 1432 MHz	1427 - 1432 MHz	2.18	2.18	59.43	59.43	🔴
		52					3300 - 3400 MHz	3300 - 3400 MHz	18.49	18.49	17.33	17.33	🔴

🟢 Suitable band 🟠 Adequate band in good signal conditions 🔴 Likely to be unsuitable

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Cellular Standards Band Support

GSM (2G) Band	UMTS (3G) Band	E-UTRA (4G) Band	Cat M E-UTRA Band	Cat NB E-UTRA Band	NR (5G) Band	Cat NB NR (5G) Band	Uplink	Downlink	Average Upload Efficiency (%)	Average Download Efficiency (%)	Maximum Upload VSWR	Maximum Download VSWR	Use Indicator
		53			n53		2483.5 - 2495 MHz	2483.5 - 2495 MHz	3.72	3.72	37.67	37.67	🔴
		65		65	n65	n65	1920 - 2010 MHz	2110 - 2200 MHz	81.62	53.58	2.29	3.98	🟢
		66	66	66	n66	n66	1710 - 1780 MHz	2110 - 2200 MHz	41.19	53.58	4.61	3.98	🟠
		67			n67		N/A	738 - 758 MHz	N/A	13.35	N/A	17.19	🔴
		68					698 - 728 MHz	753 - 783 MHz	13.18	12.66	42.42	13.57	🔴
		69					N/A	2570 - 2620 MHz	N/A	20.91	N/A	20.59	🔴
		70		70	n70	n70	1695 - 1710 MHz	1995 - 2020 MHz	30.67	76.28	5.08	2.19	🟢
		71	71	71	n71		663 - 698 MHz	617 - 652 MHz	11.22	5.77	51.20	55.73	🔴
		72	72	72			451 - 456 MHz	461 - 466 MHz	1.52	1.62	140.57	145.57	🔴
		73	73	73			450 - 455 MHz	460 - 465 MHz	1.52	1.59	139.16	146.23	🔴
		74	74	74	n74		1427 - 1470 MHz	1475 - 1518 MHz	3.23	7.30	59.43	23.90	🔴
		75			n75		N/A	1432 - 1517 MHz	N/A	5.38	N/A	54.43	🔴
		76			n76		N/A	1427 - 1432 MHz	N/A	2.18	N/A	59.43	🔴
					n77		3300 - 4200 MHz	3300 - 4200 MHz	21.15	21.15	31.40	31.40	🔴
					n78		3300 - 3800 MHz	3300 - 3800 MHz	9.50	9.50	31.40	31.40	🔴
					n79		4400 - 5000 MHz	4400 - 5000 MHz	17.38	17.38	25.06	25.06	🔴
					n80		1710 - 1785 MHz	N/A	41.83	N/A	4.61	N/A	🟠
					n81		880 - 915 MHz	N/A	35.50	N/A	4.88	N/A	🔴
					n82		832 - 862 MHz	N/A	19.66	N/A	5.30	N/A	🔴
					n83		703 - 748 MHz	N/A	13.34	N/A	40.93	N/A	🔴
					n84		1920 - 1980 MHz	N/A	82.75	N/A	2.29	N/A	🟢
		85	85	85	n85		698 - 716 MHz	728 - 746 MHz	13.04	13.47	42.42	23.83	🔴
					n86		1710 - 1780 MHz	N/A	41.19	N/A	4.61	N/A	🟠
		87	87	87			410 - 415 MHz	420 - 425 MHz	2.05	1.83	125.28	121.63	🔴
		88	88	88			412 - 417 MHz	422 - 427 MHz	2.00	1.80	119.83	121.63	🔴

🟢 Suitable band 🟠 Adequate band in good signal conditions 🔴 Likely to be unsuitable

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Cellular Standards Band Support

GSM (2G) Band	UMTS (3G) Band	E-UTRA (4G) Band	Cat M E-UTRA Band	Cat NB E-UTRA Band	NR (5G) Band	Cat NB NR (5G) Band	Uplink	Downlink	Average Upload Efficiency (%)	Average Download Efficiency (%)	Maximum Upload VSWR	Maximum Download VSWR	Use Indicator
					n89		824 - 849 MHz	N/A	17.03	N/A	5.77	N/A	🔴
					n90	n90	2496 - 2690 MHz	2496 - 2690 MHz	28.79	28.79	44.39	44.39	🔴
					n91		832 - 862 MHz	1427 - 1432 MHz	19.66	2.18	5.30	59.43	🔴
					n92		832 - 862 MHz	1432 - 1517 MHz	19.66	5.38	5.30	54.43	🔴
					n93		880 - 915 MHz	1427 - 1432 MHz	35.50	2.18	4.88	59.43	🔴
					n94		880 - 915 MHz	1432 - 1517 MHz	35.50	5.38	4.88	54.43	🔴
					n95		2010 - 2025 MHz	N/A	74.14	N/A	2.06	N/A	🟢
					n97		2300 - 2400 MHz	N/A	32.56	N/A	13.66	N/A	🔴
					n98		1880 - 1920 MHz	N/A	79.39	N/A	2.14	N/A	🟢
					n99		1626.5 - 1660.5 MHz	N/A	24.56	N/A	7.88	N/A	🔴
					n101		1900 - 1910 MHz	1900 - 1910 MHz	79.44	79.44	2.04	2.04	🟢
				103			787 - 788 MHz	757 - 758 MHz	12.25	13.15	11.66	13.52	🔴

🟢 Suitable band 🟠 Adequate band in good signal conditions 🔴 Likely to be unsuitable

NOTE: For each frequency band, Siretta provides a traffic light indication to show the suitability of the antenna for use at that frequency band. Determination of exactly what makes an antenna good or bad at any frequency is subjective.

The view presented is that of Siretta's engineering team having taken into account the efficiency and VSWR measurements. The end user is advised to use their own criteria and/or testing to confirm suitability.

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ISM Standards Frequency Support

Application	Frequency Range	Efficiency (%)	Maximum VSWR	Peak Gain from highest direction (dBi)	Use Indicator
ISM 433 MHz	433.05 - 434.79 MHz	1.63	132.30	-12.3495	🔴
IMT 868 MHz	863 - 870 MHz	25.73	5.48	2.49	🔴
ISM 915 MHz	902 - 928 MHz	37.85	3.64	4.34	🟠
ISM 2.4 GHz	2400 - 2500 MHz	10.25	39.96	3.12	🔴
WiFi 2.4G	2401 - 2483 MHz	11.54	32.35	3.0495	🔴
WiFi 2.4G (USA)	2401 - 2473 MHz	12.42	28.58	3.0495	🔴
WiFi 2.4G (Japan)	2401 - 2495 MHz	10.55	37.67	3.0495	🔴
WiFi 5G (all channels)	5150 - 5990 MHz	29.08	10.23	2.085	🔴
WiFi 5G (Ch 32-48)	5150 - 5250 MHz	49.47	4.34	2.085	🟠
WiFi 5G (Ch 32-64)	5150 - 5330 MHz	48.17	4.44	2.085	🟠
WiFi 5G (Ch 32-161)	5150 - 5815 MHz	30.94	10.23	2.085	🔴
WiFi 5G (Ch 32-173)	5150 - 5875 MHz	29.32	10.23	2.085	🔴
ISM 5.8 GHz	5725 - 5875 MHz	6.79	10.23	-1.3475	🔴

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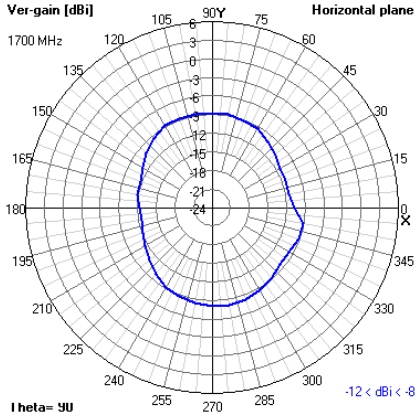
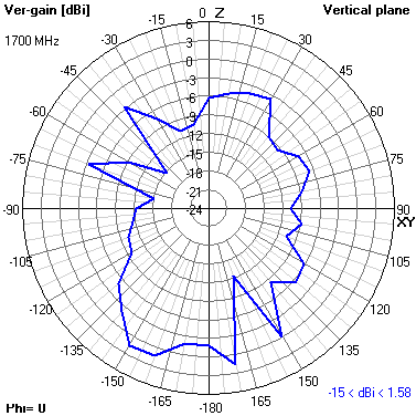
2D Radiation Plots

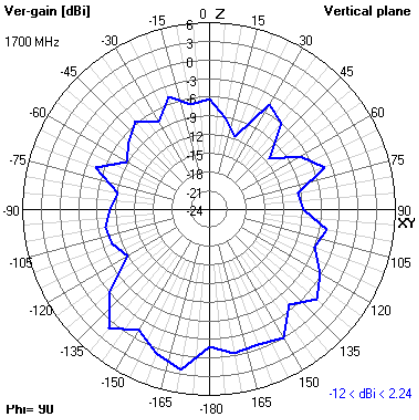
1700 MHz XY



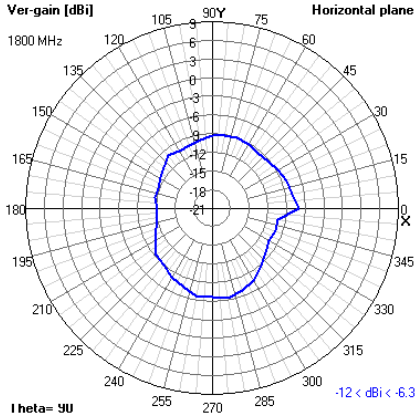
XZ



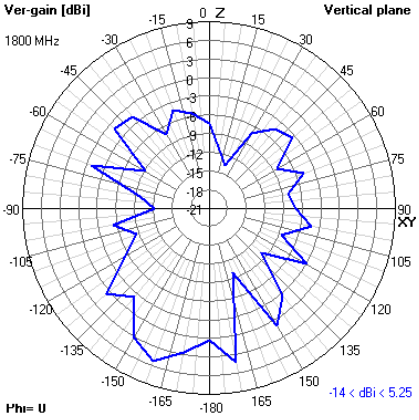
YZ



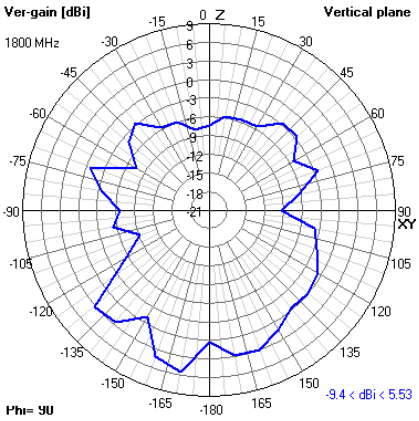
1800 MHz XY



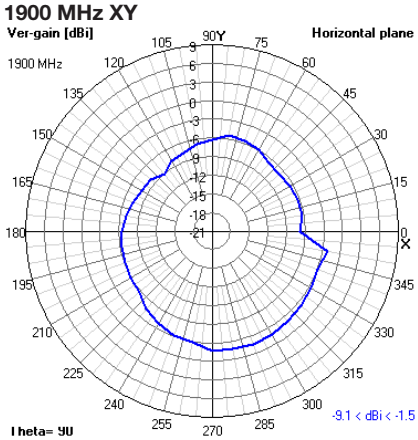
XZ



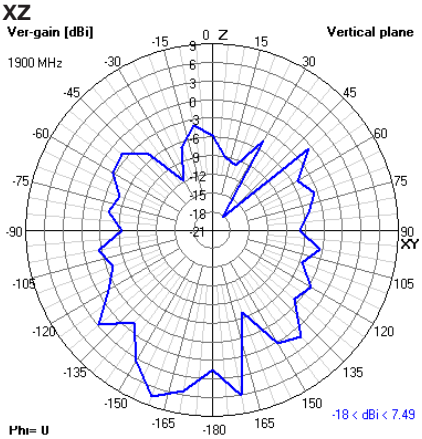
YZ



1900 MHz XY



XZ



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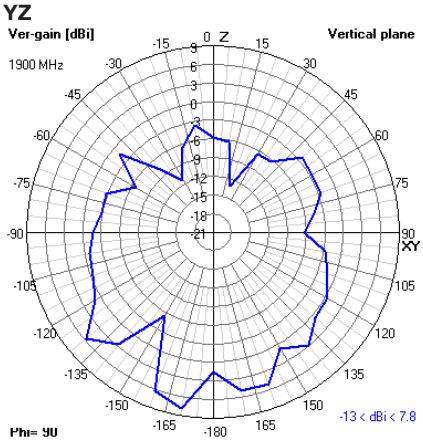


Siretta

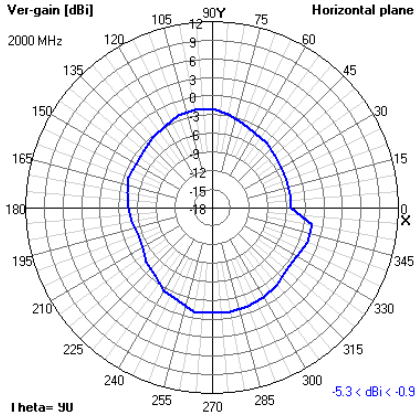
Enabling Industrial IoT

Delta 2D

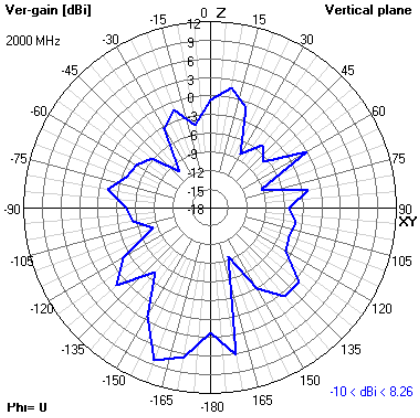
2G/3G/4G/5G 51MM RIGHT ANGLE STUBBY ANTENNA

2D Radiation Plots

2000 MHz XY



XZ



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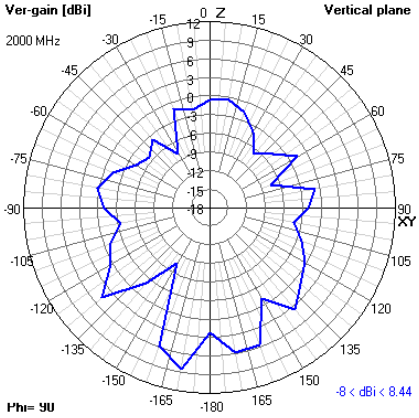
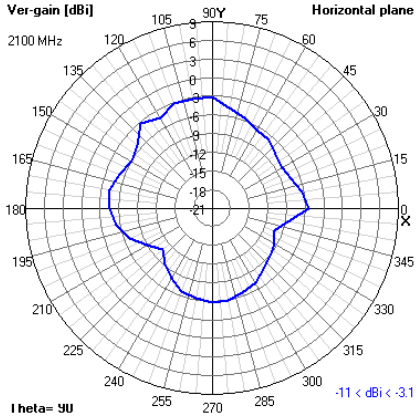


2100 MHz XY



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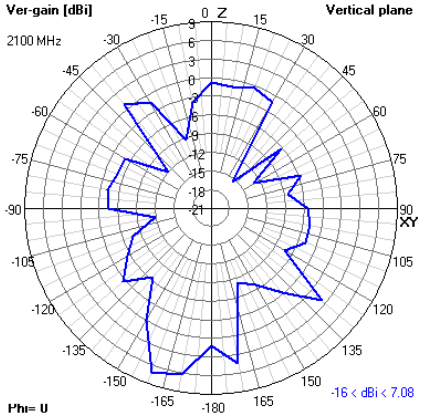
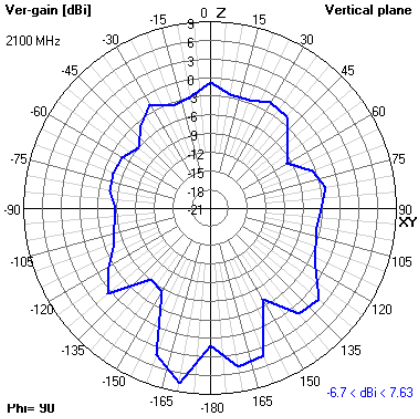


YZ



Siretta

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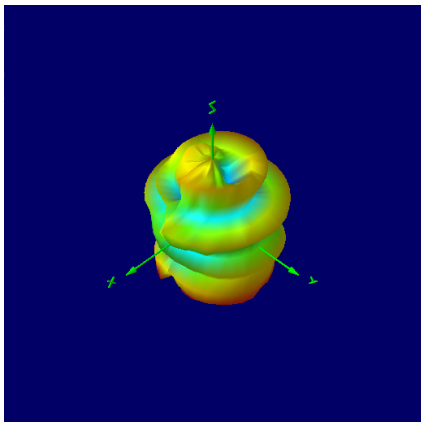
Delta 2D

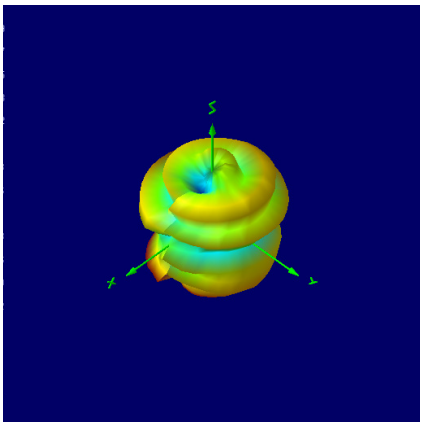
2G/3G/4G/5G 51MM RIGHT ANGLE STUBBY ANTENNA

3D Radiation Plots

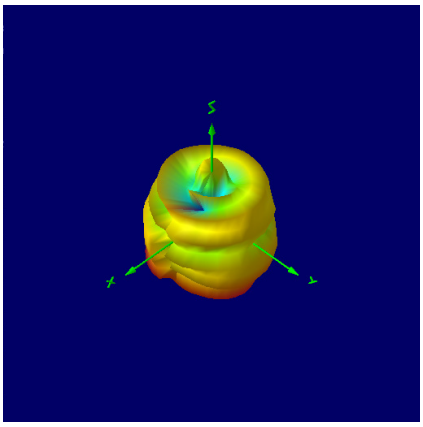
1700 MHz



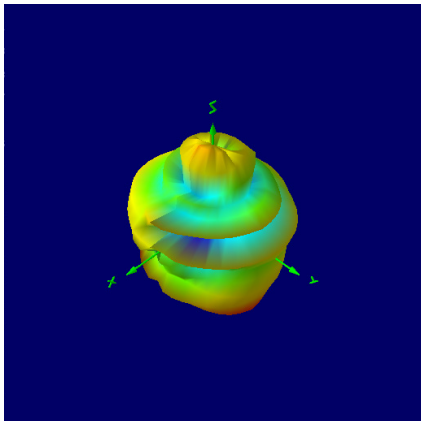
1800 MHz



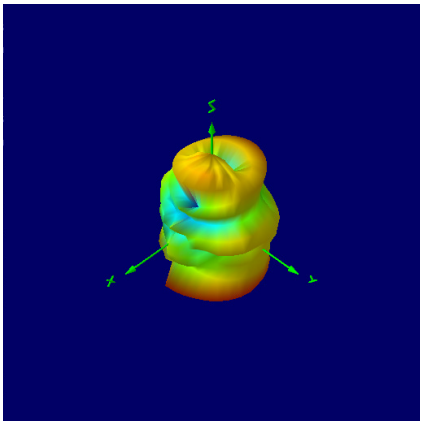
1900 MHz



2000 MHz



2100 MHz



NOTE: All 3D radiation plots are shown with Theta = 45 and Phi = 45.

Ordering Details:

Part Number	Description
DELTA2D/x/SMAM/S/RA/34	2G/3G/4G/5G 51MM RIGHT ANGLE STUBBY ANTENNA