

Specification

Part No.	:	TG.45.8113W
Product Name :		Apex III Ultra-Wideband 4G LTE
		Dipole Terminal Antenna with 450MHz band
		90° Hinged R/A SMA(M) Connector
Features	:	Highest efficiency for worldwide LTE and Wi-Fi
		LTE / HSPA / GSM / CDMA / DCS /PCS / WCDMA
		UMTS / GPRS / EDGE / GPS / Wi-Fi
		Dipole Swivel Terminal Antenna
		Hinged 90° termination with SMA(M) Connector
		Enhanced hinge design for vibration environments
		Dimensions: 218 * 58mm
		Connector Customizable
		RoHS Compliant





1. Introduction

The hinged Apex III TG.45 Ultra-Wideband Dipole Antenna has been designed to cover all Cellular, ISM and Wi-Fi working frequencies in the 696 to 6000MHz spectrum and includes LTE Band 31 at 450MHz. Evolved from the already highly successful Apex II TG.35, the TG.45 has the highest wideband efficiency in its range of any terminal antenna on the market today. The extended lower frequency coverage at 450MHz makes the TG.45 ideal for IoT applications, such as remote monitoring of smart utilities.

The Apex III has been primarily designed for use with 4G LTE modules and devices that require the highest possible efficiency and peak gain to deliver best in class throughput on all major worldwide cellular bands (4G/3G/2G) for access points, terminals and routers. High efficiency is vital for applications such as high speed video and real-time streaming or high capacity MIMO networks on public transportation.

This attractive slim-line antenna is ground plane independent, meaning it does not need to be connected to the ground-plane of a device to radiate efficiently. On the other hand, neither is it seriously detuned by connecting to a ground-plane, thus avoiding a problem notorious to smaller antennas.

It comes with a SMA(M) connector and swivel mechanism that allows the antenna to be rotated to fit in tight environments. The 90° hinge structure has been improved and strengthened so that the antenna in a 90° position would not drop down if used in environments prone to vibration.

The Apex III is backward compatible with 3G and 2G cellular applications such as HSPA, GSM, GPRS, UMTS, Wi-Fi and even has GPS included for Assisted GPS and/or E911 applications.

In summary, the Apex III is the ideal solution for any device requiring high, reliable performance. It will meet most type approval or carrier certification requirements from an efficiency standpoint. The antenna also makes an excellent reference antenna for test purposes. It has been designed as an omni-directional antenna and the radiation patterns prove this, being stable across all bands.



Connector type is customizable and the housing is also available in black. Contact Taoglas regional sales office for more information.





2. Specification

ELECTRICAL													
Standard	LTE 450	LTE 700	LTE 800	GSM 850	GSM 900	GPS/ GLON- ASS/ BEIDO U	DCS	PCS	UMTS1	LTE 2300	LTE 2600	LTE 3500	WIFI 5G
Frequency (MHz)	450 ~470	698 ~806	703 ~803	824 ~894	880 ~960	1561 ~1602	1710 ~1880	1850 ~1990	1920 ~2170	2305 ~2360	2300 ~2690	3400 ~3600	4900 ~5850
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Straight	64.47	74.08	79.22	73.61	66.84		71.46		64.54	58.02	65.96	23.51	61.35
Bent	60.92	75.72	78.56	59.62	58.46		72.00	57.09	64.21	55.38	65.54	23.39	61.37
	1 16	2.07	2.07	2.26		k Gain (4 4 7	4.05	2.02	4.4.5	0.00	2.00
Straight	1.46	2.87 2.77	2.87	3.26	3.58	0.75	3.95	4.17	4.85	2.82	4.16	0.26	3.88 4.24
Bent	1.17	2.77	2.77 2.77 2.48 3.12 0.56 2.82 3.63 4.57 2.50 3.76 -0.12 4.24 Average Gain (dBi)							4.24			
Straight	-1.93	-1.36	-1.04	-1.35	-1.75	-5.39	. ,	-2.53	-2.05	-2.42	-1.84	-6.29	-2.17
Bent	-2.16	-1.23	-1.06	-2.28	-2.38	-5.31		-2.58	-2.07	-2.61	-1.88	-6.31	-2.16
Impedanc	ce		50Ω										
Polarizatio	on						Lin	ear					
Radiation Pa	ttern		Omnidirectional										
Input Pow	rer						5	W					
					MEC	CHANI	CAL						
Cas	ing						UV Res	sistant F	PC/ABS				
Conne	ector		SMA Male Hinged 90°										
Wei	ght		75g										
Recommende Mour		e for	0.9 N·m										
Max torque f	Nax torque for Mounting1.176 N·m												
ENVIRONMENTAL													
Temperatu	ure Rang	je	-40°C to 85°C										
Humi	idity		Non-condensing 65°C 95% RH										

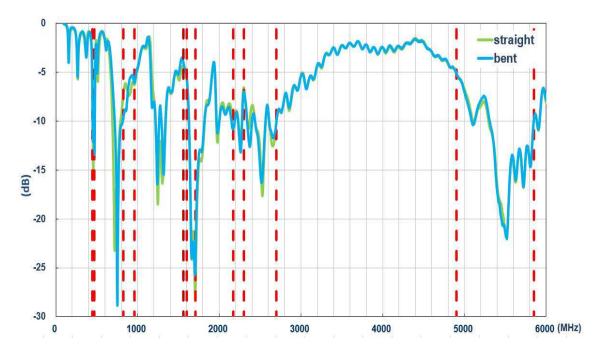


Band Number LTE / LTE / AUX=NCED / WCDMA / HSPA / HSPA + / TO-SCUMA Upink Downlink Covered Covered 1 UL: 1920 to 1980 DL: 2110 to 2170 ✓ ✓ 2 UL: 1850 to 1910 DL: 1930 to 1990 ✓ ✓ 3 UL: 1710 to 1785 DL: 1805 to 1880 ✓ ✓ 4 UL: 1710 to 1755 DL: 2110 to 2155 ✓ ✓ 5 UL: 820 to 2570 DL: 2620 to 2590 ✓ ✓ 8 UL: 880 to 915 DL: 925 to 960 ✓ ✓ 9 UL: 1749.9 to 1784.9 DL: 1844.9 to 1879.9 ✓ ✓ 11 UL: 1279.to 1447.9 DL: 1745.9 to 1495.9 ✓ ✓ 12 UL: 690 to 16 DL: 729 to 746 ✓ ✓ 13 UL: 77 to 787 DL: 746 to 756 ✓ ✓ 14 UL: 788 to 788 DL: 768 to 780 ✓ ✓ 15 UL: 30 to 845 DL: 875 to 890 ✓ ✓ 14 UL: 78 to 820 DL: 147.9	LTE BANDS							
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18UL: 815 to 830DL: 860 to 875 (LET only)✓✓19UL: 830 to 845DL: 875 to 890✓✓20UL: 832 to 862DL: 791 to 821✓✓21UL: 1447.9 to 1462.9DL: 1495.9 to 1510.9✓✓22UL: 3410 to 3490DL: 3510 to 3590✓✓23UL: 2000 to 2020DL: 180 to 2200 (LTE only)✓✓24UL: 1625.5 to 1660.5DL: 1525 to 1559 (LTE only)✓✓25UL: 1850 to 1915DL: 930 to 1995✓✓26UL: 807 to 824DL: 852 to 869 (LTE only)✓✓27UL: 807 to 824DL: 758 to 803 (LTE only)✓✓28UL: 703 to 748DL: 758 to 803 (LTE only)✓✓30UL: 2305 to 2315DL: 4250 to 2360 (LTE only)✓✓31UL: 452.5 to 457.5DL: 462.5 to 467.5 (LTE only)✓✓35IL: -DL: 1850 to 1910✓✓36UL: -DL: 1850 to 2360 (LTE only)✓✓37UL: 452.5 to 457.5DL: 462.5 to 467.5 (LTE only)✓✓36IL: -IL: 1850 to 1910✓✓37IL: -IL: 1850 to 1910✓✓38IL: -IL: 800 to 200✓✓39IL: -IL: 800 to 200✓✓40IL: -IL: 800 to 200✓✓39IL: -IL: 800 to 200✓✓41IL: -IL: 9100 to 200<	14	UL: 788 to 798	DL: 758 to 768	✓	\checkmark			
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22 UL: 3410 to 3490 DL: 3510 to 3590 ✓ ✓ 23 UL: 2000 to 2020 DL: 2180 to 2200 (LTE only) ✓ ✓ 24 UL:1625.5 to 1660.5 DL: 1525 to 1559 (LTE only) ✓ ✓ 25 UL: 1850 to 1915 DL: 1930 to 1995 ✓ ✓ 26 UL: 814 to 849 DL: 859 to 894 ✓ ✓ 27 UL: 807 to 824 DL: 758 to 803 (LTE only) ✓ ✓ 28 UL: 703 to 748 DL: 758 to 803 (LTE only) ✓ ✓ 29 UL: - DL: 717 to 728 (LTE only) ✓ ✓ 30 UL: 2305 to 2315 DL: 2350 to 2360 (LTE only) ✓ ✓ 31 UL: 452.5 to 457.5 DL: 462.5 to 467.5 (LTE only) ✓ ✓ 32 UL: - DL: 1452 - 1496 ✓ ✓ ✓ 34 UL: - DL: 1452 - 1496 ✓ ✓ ✓ 35 IES0 to 1910 ✓ ✓ ✓ ✓ 36 UE: - DL: 1452 - 1496 ✓ ✓ ✓ 38 IES0 to 2300 to 2400 <t< th=""><td>20</td><td>UL: 832 to 862</td><td>DL: 791 to 821</td><td>✓</td><td>\checkmark</td></t<>	20	UL: 832 to 862	DL: 791 to 821	✓	\checkmark			
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25 UL: 1850 to 1915 DL: 1930 to 1995 ✓ ✓ 26 UL: 814 to 849 DL: 859 to 894 ✓ ✓ 27 UL: 807 to 824 DL: 852 to 869 (LTE only) ✓ ✓ 28 UL: 703 to 748 DL: 758 to 803 (LTE only) ✓ ✓ 29 UL: - DL: 717 to 728 (LTE only) ✓ ✓ 30 UL: 2305 to 2315 DL: 2350 to 2360 (LTE only) ✓ ✓ 31 UL: 452.5 to 457.5 DL: 1452 - 1496 ✓ ✓ 32 UL: - DL: 1452 - 1496 ✓ ✓ 38 2570 to 2620 ✓ ✓ ✓ 39 1880 to 1920 ✓ ✓ ✓ 40 2300 to 2400 ✓ ✓ ✓ 41 2496 to 2690 ✓ ✓ ✓ 42 3400 to 3600 ✓ ✓ ✓	23	UL:2000 to 2020	DL: 2180 to 2200 (LTE only)	✓	\checkmark			
26UL: 814 to 849DL: 859 to 894Image: Constraint of the sector of the s	24	UL:1625.5 to 1660.5	DL: 1525 to 1559 (LTE only)	√	\checkmark			
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28UL: 703 to 748DL: 758 to 803 (LTE only)Image: Comparison of the comparison	26	UL: 814 to 849	DL: 859 to 894	√	\checkmark			
29UL: -DL: 717 to 728 (LTE only) \checkmark 30UL: 2305 to 2315DL: 2350 to 2360 (LTE only) \checkmark \checkmark 31UL: 452.5 to 457.5DL: 462.5 to 467.5 (LTE only) \checkmark \checkmark 32UL: -DL: 1452 - 1496 \checkmark \checkmark 38 2570 ± 2620 \checkmark \checkmark 39 1880 ± 1920 \checkmark \checkmark 40 2300 ± 2400 \checkmark \checkmark 41 2496 ± 2690 \checkmark \checkmark 42 3400 ± 3600 \checkmark \checkmark	27	UL: 807 to 824	DL: 852 to 869 (LTE only)	√	\checkmark			
30 UL: 2305 to 2315 DL: 2350 to 2360 (LTE only) Image: Margin and	28	UL: 703 to 748	DL: 758 to 803 (LTE only)	✓	\checkmark			
31 UL: 452.5 to 457.5 DL: 462.5 to 467.5 (LTE only) Image: Constraint of the state o	29	UL: -	DL: 717 to 728 (LTE only)	✓	\checkmark			
32 UL: - DL: 1452 - 1496 \checkmark \checkmark 35 4^{-1} 4^{-1} 4^{-1} 4^{-1} 38 2^{-1} 2^{-1} 4^{-1} 4^{-1} 39 4^{-1} 4^{-1} 4^{-1} 4^{-1} 40 2^{-1} 2^{-1} 4^{-1} 4^{-1} 41 2^{-1} 2^{-1} 4^{-1} 4^{-1} 42 4^{-1} 3^{-1} 4^{-1} 4^{-1}	30	UL: 2305 to 2315	DL: 2350 to 2360 (LTE only)	✓	\checkmark			
351850 to 1910 \checkmark \checkmark 382570 to 2620 \checkmark \checkmark 391880 to 1920 \checkmark \checkmark 402300 to 2400 \checkmark \checkmark 412496 to 2690 \checkmark \checkmark 423400 to 3600 \checkmark \checkmark	31	UL: 452.5 to 457.5	DL: 462.5 to 467.5 (LTE only)	√	\checkmark			
38 12570 to 2620 ✓ ✓ 39 1880 to 1920 ✓ ✓ 40 2300 to 2400 ✓ ✓ 41 2496 to 2690 ✓ ✓ 42 3400 to 3600 ✓ ✓	32	UL: -	DL: 1452 - 1496	✓	\checkmark			
39 √ √ 40 2300 to 2400 √ √ 41 2496 to 2690 √ √ 42 3400 to 3600 √ √	35	1850 t	o 1910	√	\checkmark			
40 2300 to 2400 ✓ ✓ 41 2496 to 2690 ✓ ✓ 42 3400 to 3600 ✓ ✓	38	2570 t	✓	\checkmark				
41 2496 to 2690 ✓ ✓ 42 3400 to 3600 ✓ ✓	39	1880 t	o 1920	✓	\checkmark			
42 3400 to 3600 ✓ √	40	2300 t	o 2400	✓	✓			
	41	2496 t	✓	✓				
43 3600 to 3800 ✓ ✓	42	3400 t	o 3600	✓	✓			
	43	3600 t	o 3800	✓	✓			

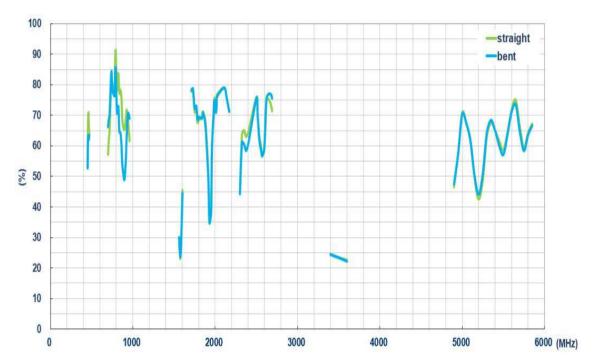


3. Antenna Characteristics

3.1. Return Loss

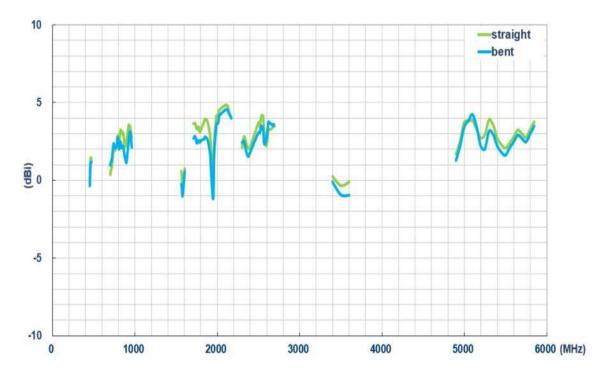


3.2. Efficiency

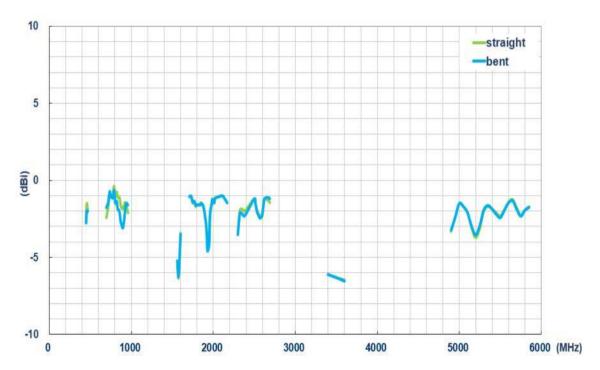




3.3. Peak Gain

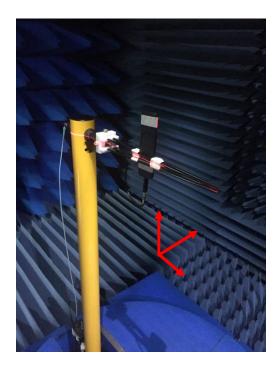


3.4. Average Gain



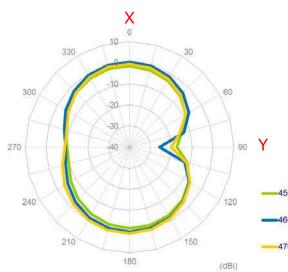


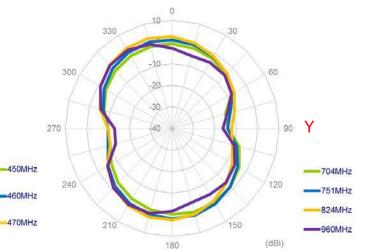
4. Antenna Radiation Patterns 4.1. Antenna Setup (Straight Position)



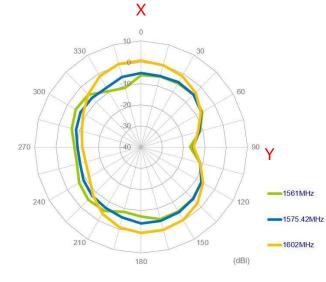


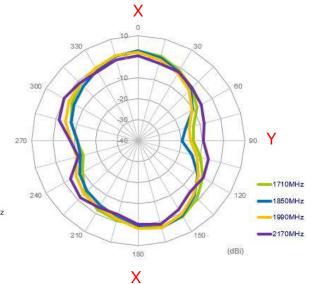
4.2. Radiation Patterns

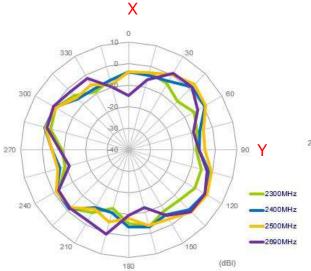


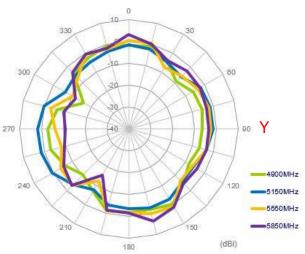


Х

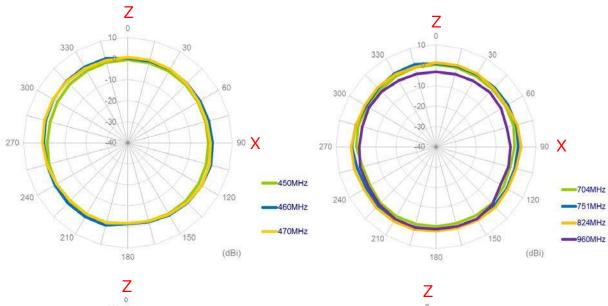


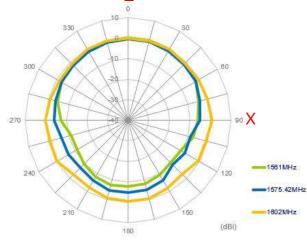


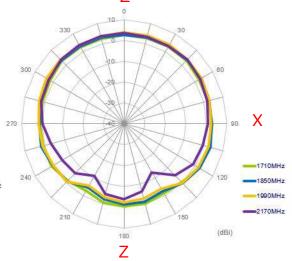


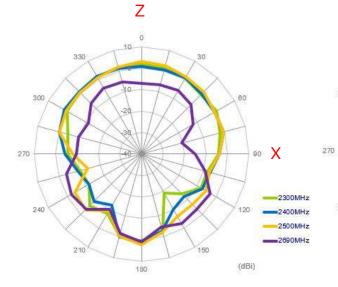


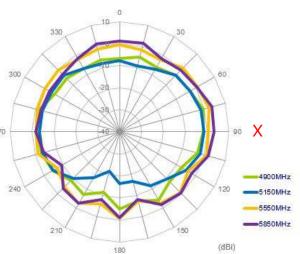




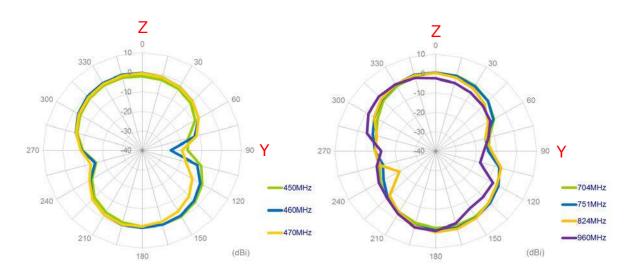


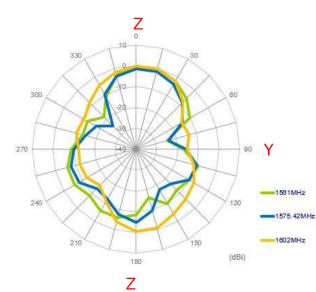


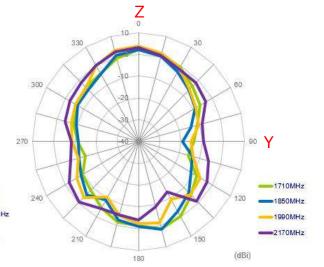


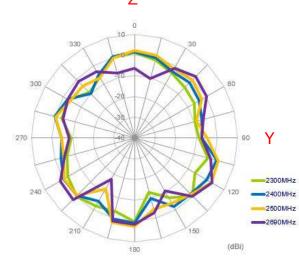


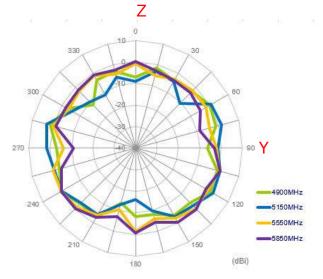












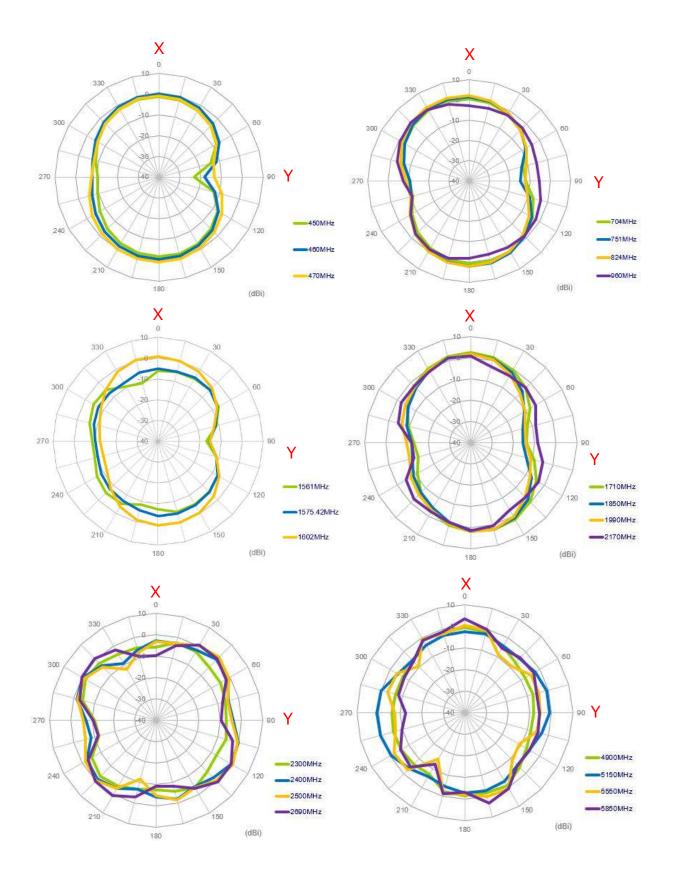


4.3 Antenna Setup (Right Angle Position)

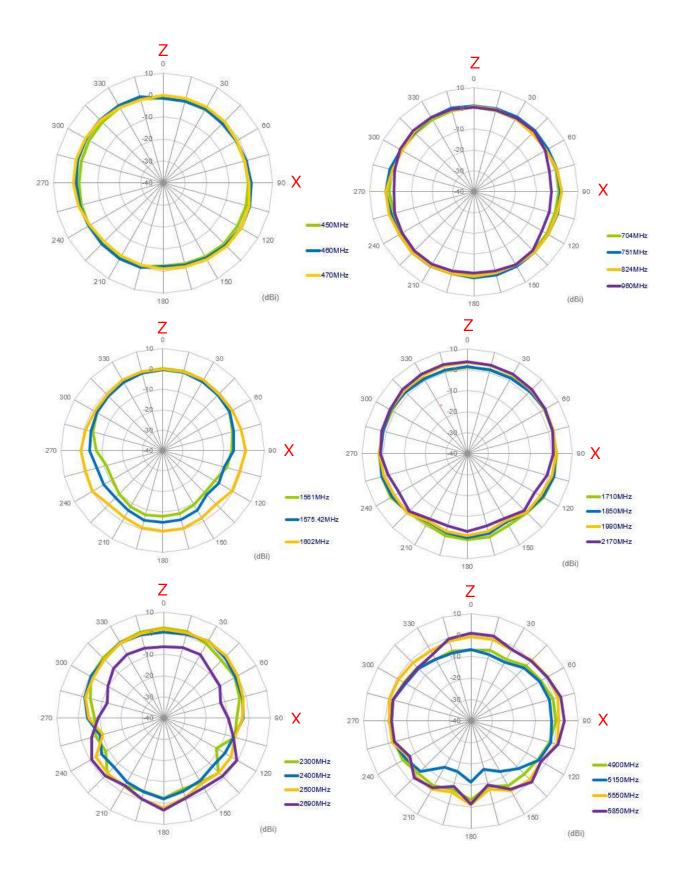




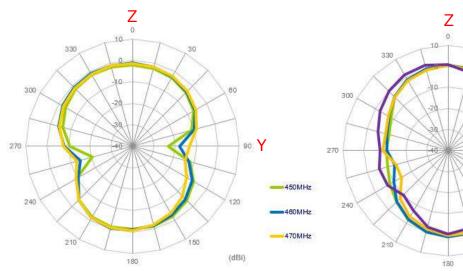
4.4 Radiation Patterns

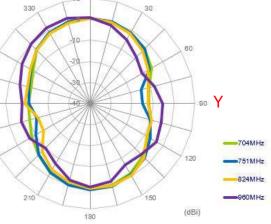


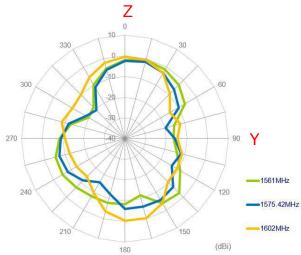


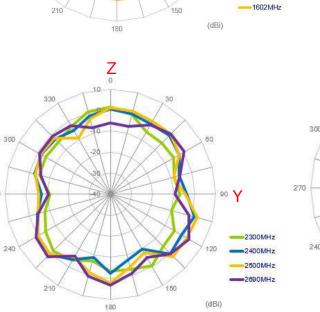




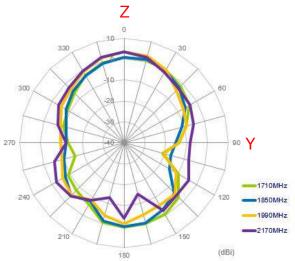


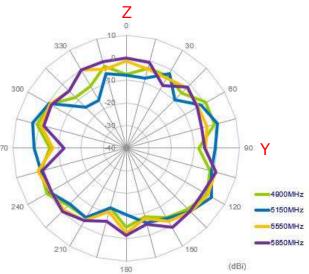






270





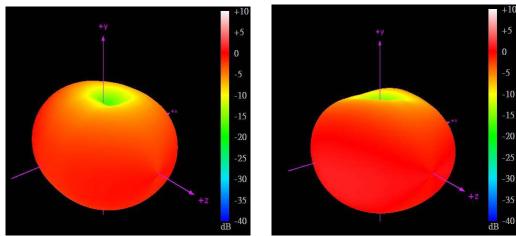


-10 -15

-25 -30 -35

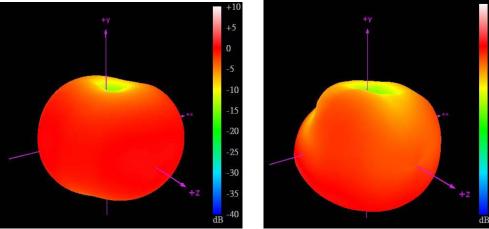
40

4.5 3D Radiation Patterns (Straight Position)



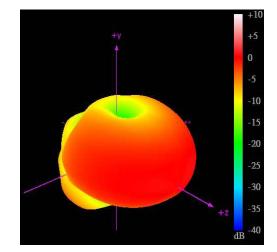
450MHz

470MHz

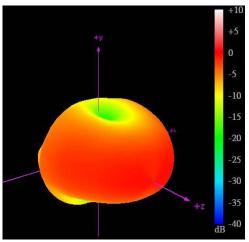


704MHz

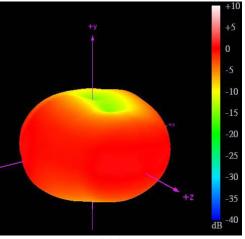
960MHz



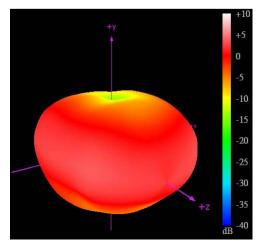




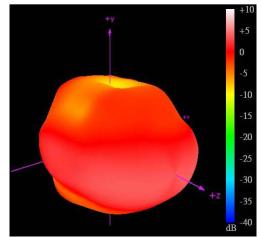
1575.42MHz



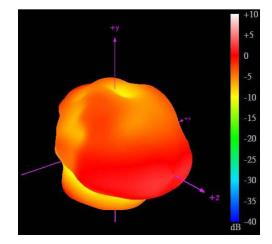
1602MHz



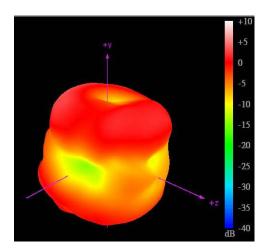
1710MHz



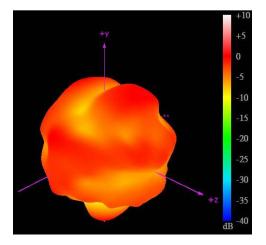
2170MHz



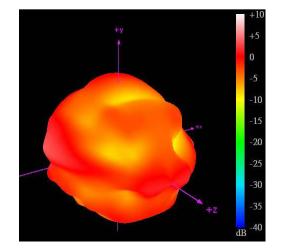






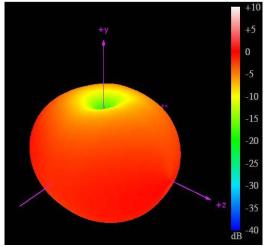


4900MHz

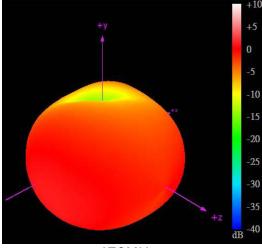




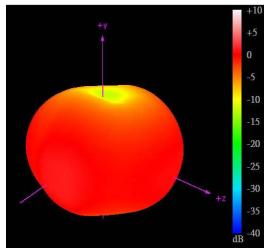
4.6 3D Radiation Patterns (Right Angle Position)

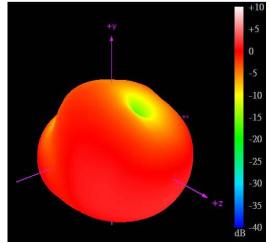


450MHz

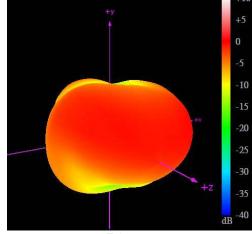


470MHz



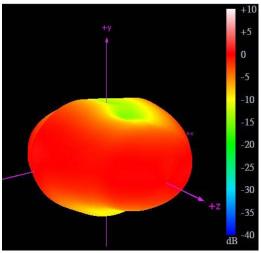


960MHz

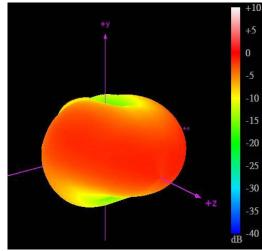


1561MHz

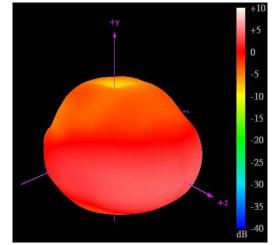




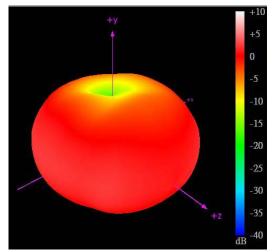
1602MHz



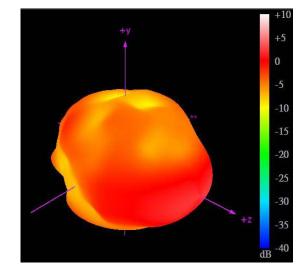
1575.42MHz



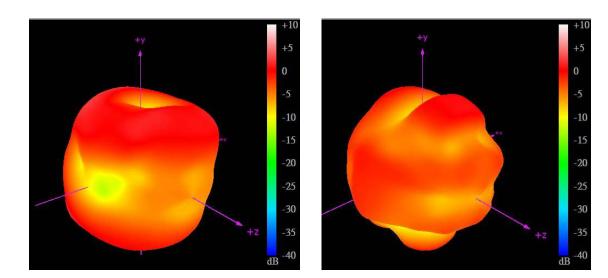
2170MHz



1710MHz

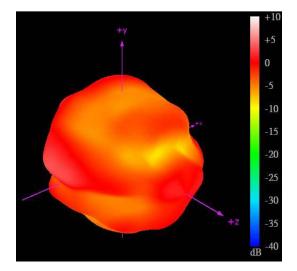






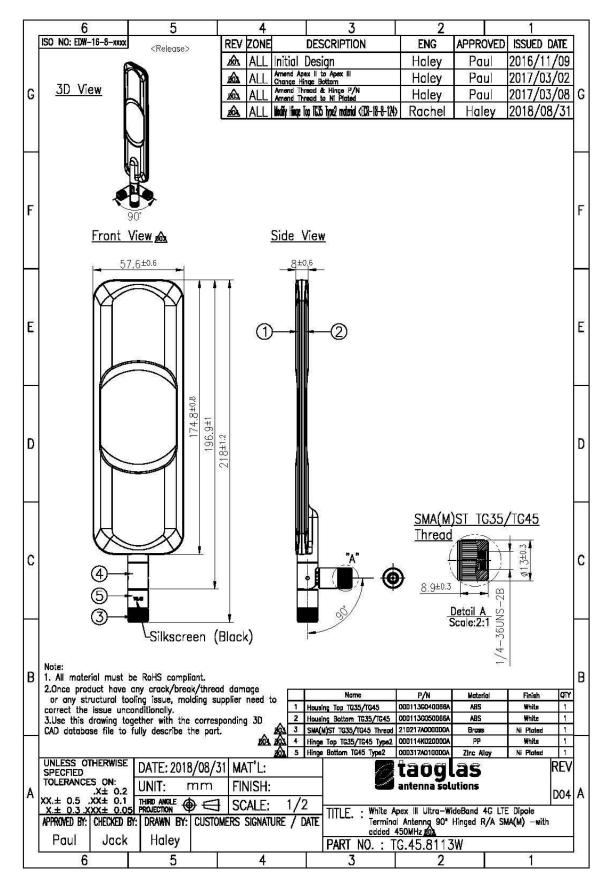
2690MHz

4900MHz





5. Mechanical Drawing (Unit: mm)





6. Installation Guide

TG.35/45 Installation Instructions

The TG.35/45 antenna has an independent rotating SMA connector, which enables users to install the antenna in a preferable direction. After tightening the SMA connector, the antenna will sit firmly on users' base/router either on a table or on a wall. This installation sheet illustrates using the TG.35/45 on a wall mounted device as an example.

Step 1.

Adjust the antenna to preferable direction, then mount the SMA(M) connector on devices SMA(F) connector. (See figure 1)

Step 2.

Hold the antenna housing with one hand, while rotating the SMA(M) connector with the other hand until the connector is tight. If the connector was tightened properly, the antenna will keep its position without slipping down. (See figure 2)

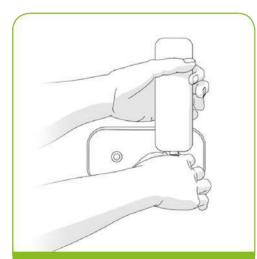


Figure 1. Place the TG.35/45 antenna onto the connector of the device and hold the antenna in the preferred orientation.



Figure 2. Fix the connector to the device by twisting the rotating head of the SMA connector until it is tight enough to hold the antenna in the correct position.

www.taoglas.com/tg35-tg45-installation-instructions/



7. Packaging

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1pc TG.35.8113W per Small PE Bag with Video Link labe Dimensions: 100*280mm Weight: 73.5g Ennine QC code: Use a pro-Ennine QC code: Use a

330mm

260mm



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