



Specification

SPECIFICATION

Part No. : **TG-09**

Specification No : TG-09-Multi-Band

Product Name : **Multi-band Monopole Antenna for Mobile Phone Bands
GSM/GPRS/EDGE/UMTS/CDMA/WCDMA/HSPA**

Features : Monopole Multi-Band Antenna
R/A-SMA Hinged 180°
70*10*10mm
RoHS Complaint

Photo :



VERSION	DATE	PAGE	DESCRIPTION	CENTRE	APPROVED
A	12/09/2008	All	Antenna Specifications	Taiwan	Ruben F. Cuadras



TABLE OF CONTENT

I. OVERVIEW	3
II. ANTENNA CHARACTERISTICS	3
III. TEST SET UP.....	4
IV. ANTENNA PARAMETERS.....	5
A. Return Loss Data.....	5
B. VSWR Data.....	5
C. Peak Gain Data.....	6
D. Average Gain Data.....	6
E. Efficiency Data.....	7
F. Radiation Pattern Data.....	8
G. Raw Data from ETS Chamber.....	9
V. Drawing and Dimensions.....	10



Specification

I. OVERVIEW

The TG-09 Multi Band Hinged R/A SMA antenna is a high quality antenna with efficient electrical performance. The unique hinged design allows the user to rotate the antenna 180° for optimal cellular signal reception – without damage to the antenna itself like traditional hinged products experience.

With the hardened casing, this antenna is the ideal for environmentally demanding M2M applications.

II. ANTENNA CHARACTERISTICS

Parameter	Data				
Cellular Band	AMPS	GSM	DCS	PCS	UMTS
Frequency Range	824 ~ 896	880~960	1710~1880	1850~1990	1710~2170
Efficiency	45%	64%	72%	57%	62%
Gain	3.3dBi	4.1dBi	4.8dBi	5.5dBi	5.0dBi
Return Loss	-8dB	-11dB	-12dB	-11dB	-10dB
VSWR	2.32:1	1.78:1	1.67:1	1.78:1	1.92:1
Impedance	50 Ohms				
Polarization	Linear				
Radiation Pattern	Omni-Directional Properties				
Dimensions	70*10*10mm				
Power Handled	2W				
Weight	8gr				
Operation Temperature	-40°C to + 85°C				
Storage Temperature	-40°C to + 85°C				
Relative Humidity	40% to 95%				
Connector	Hinged 180° R/A SMA				



Specification

III. TEST SET UP

An ETS 3D Chamber System was used to test the electromagnetic antenna characteristics as described on next Figure 1 and a Rohde & Schwarz RVB8 Vector Network Analyzer was used for the Return Loss and VSWR test.

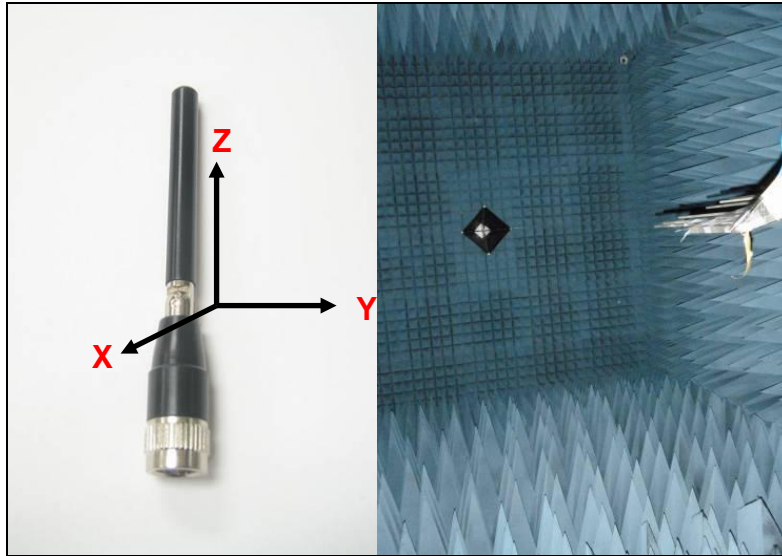


Figure 1 ETS3D System



Figure 2 VNA for Return Loss and VSWR

IV. ANTENNA PARAMETERS

The next antenna parameter graphs like Return Loss and VSWR were measured in the Agilent 5071C Vector Network Analyzer. The Gain, Efficiency and Radiation Pattern were measured in the reliable ETS 3D Chamber.

A. Return Loss Data

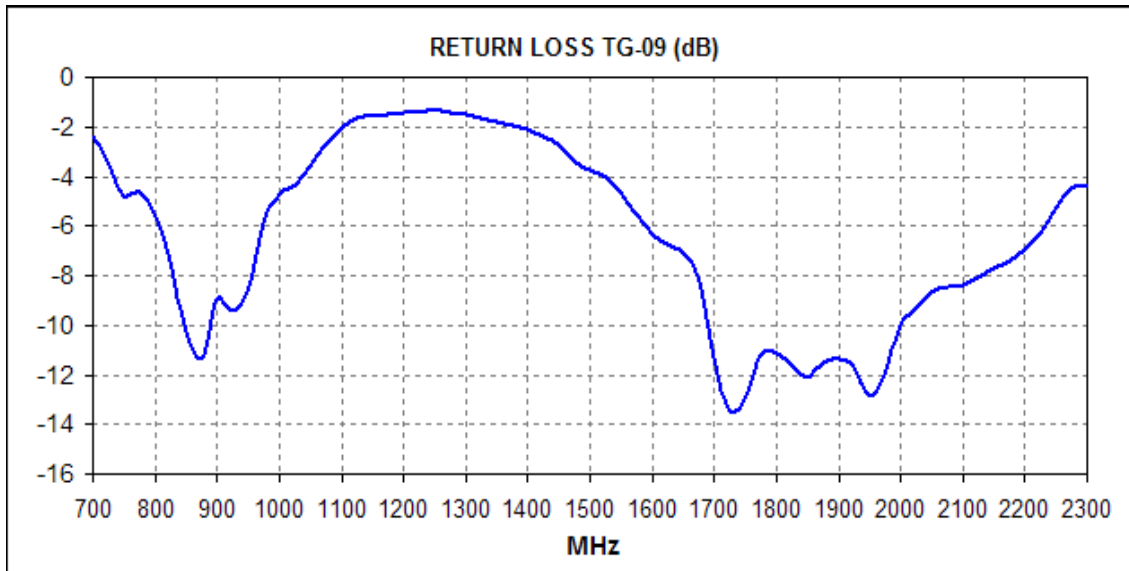


Figure 3 Return Loss for the TG-09 Antenna.

B. VSWR Data

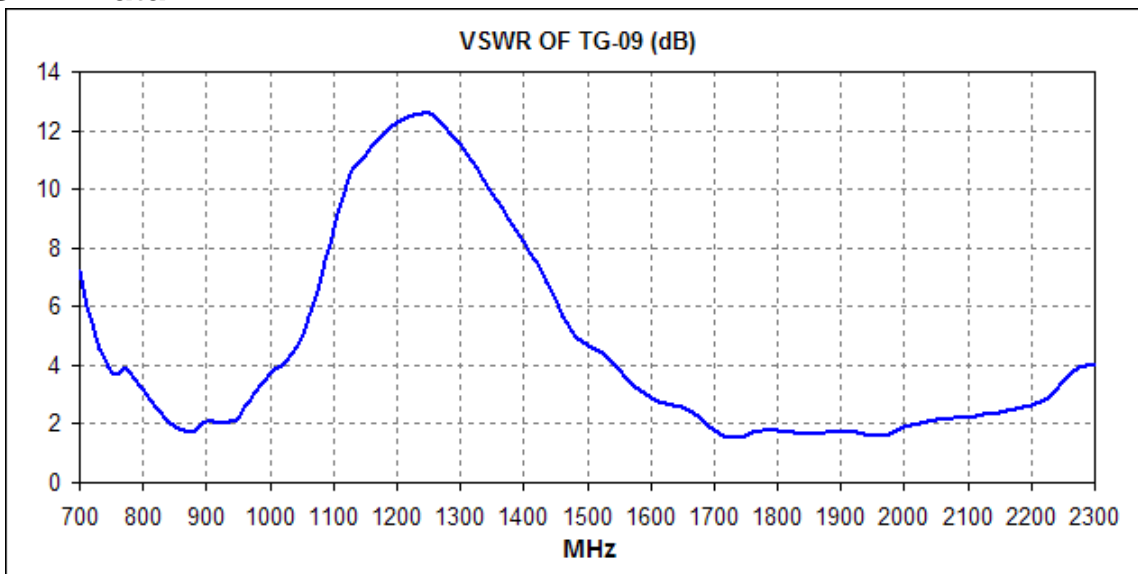


Figure 4. VSWR for the TG-09 Antenna.



C. Peak Gain Data

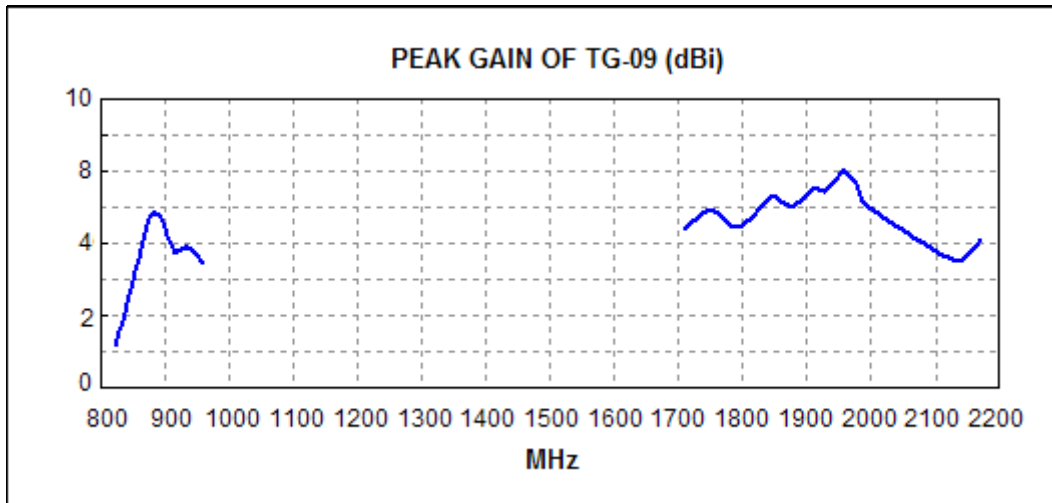


Figure 5. Peak Gain for the TG-09 Antenna.

D. Average Gain Data

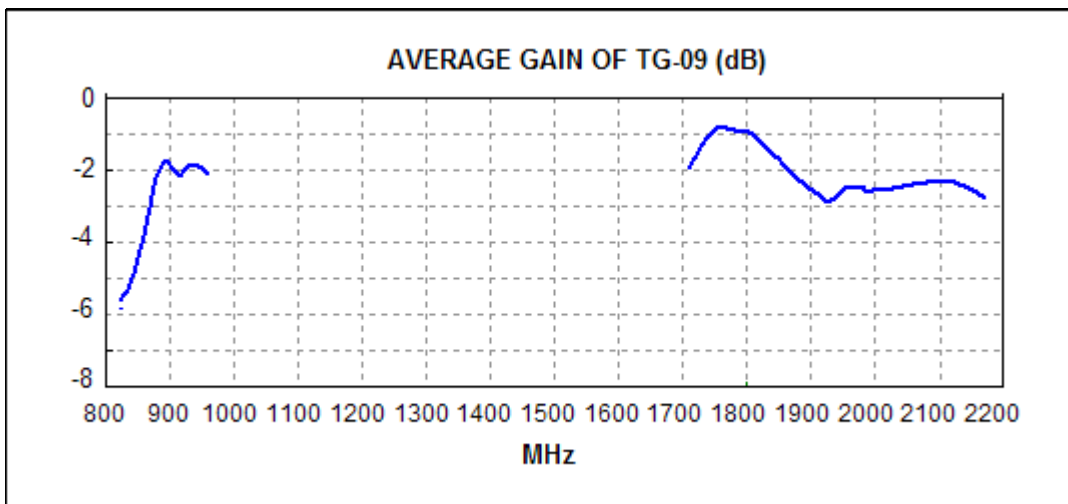


Figure 6. Average Gain for the TG-09 Antenna.



Specification

E. Efficiency Data

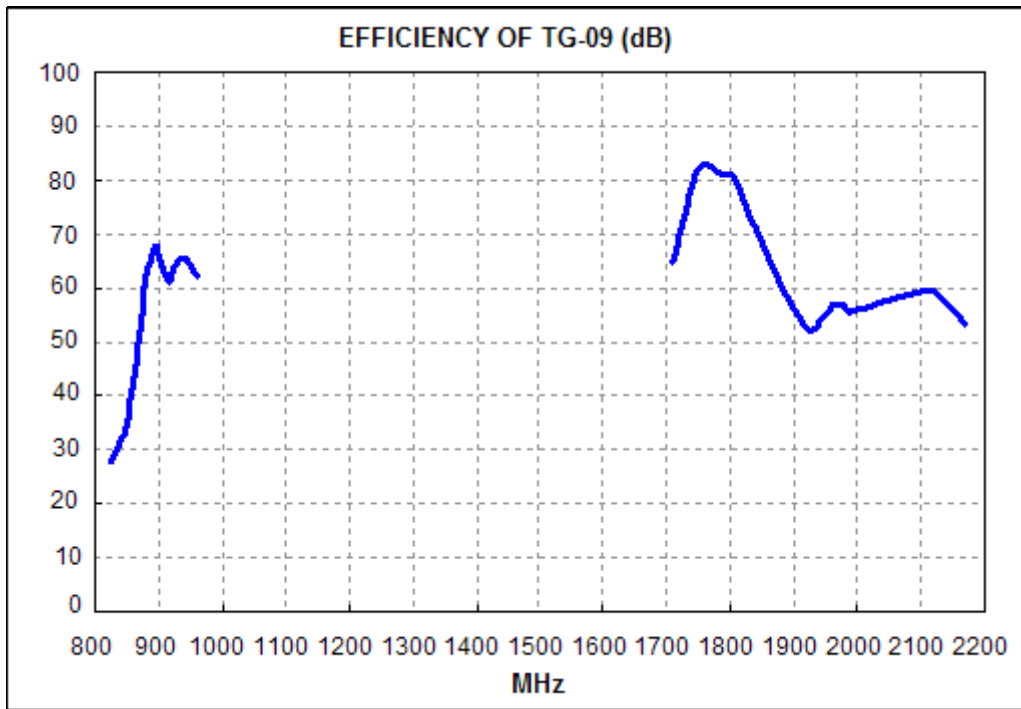


Figure 7 Efficiency for the TG-09 Antenna.



Specification

F. Radiation Pattern Data

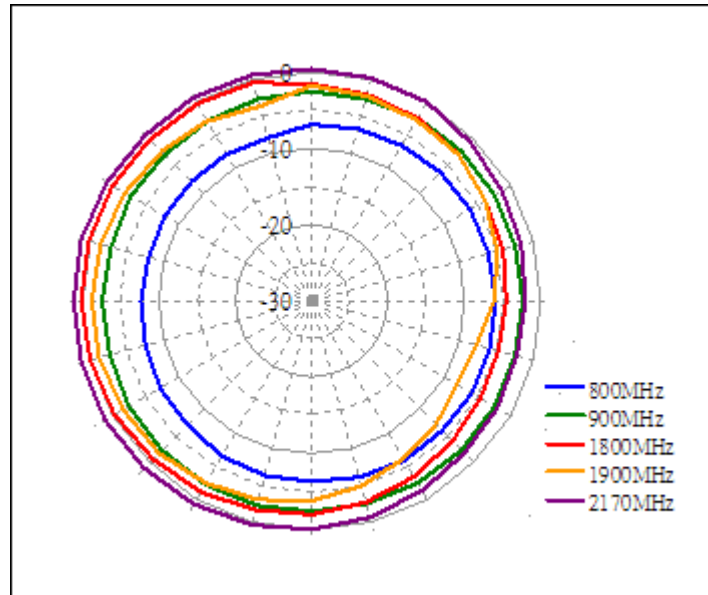


Figure 8 Radiation Pattern, Azimuth Plane (XY)

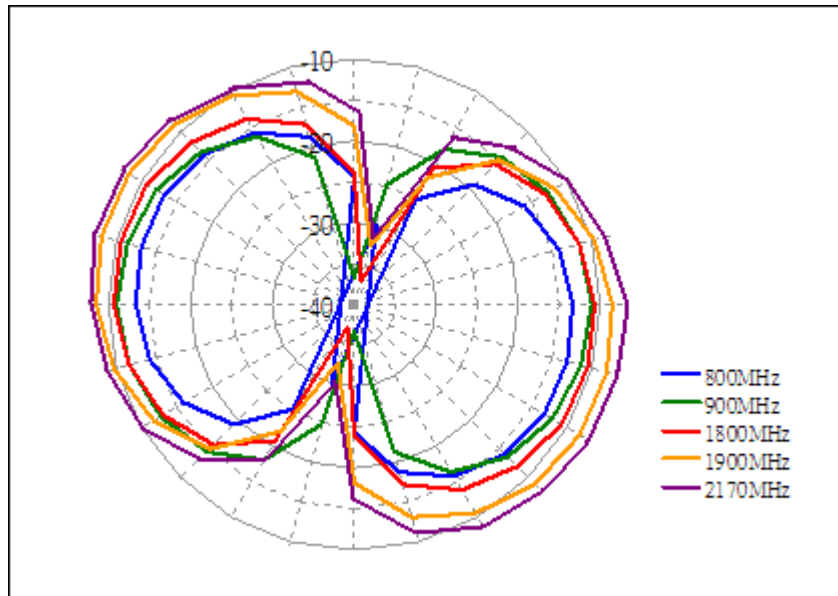


Figure 9 Radiation Pattern, Elevation Plane (YZ).



Specification

G. Raw Data from ETS Chamber

Table 1. Raw Data from ETS Chamber

Frequency (MHz)	824	900	1805	1910	2170
Ant. Port Input Pwr. (dBm)	0	0	0	0	0
Tot. Rad. Pwr. (dBm)	-5.56621	-1.82142	-0.93789	-2.65663	-2.71832
Peak EIRP (dBm)	1.21165	4.42165	4.57792	5.51365	4.12308
Directivity (dBi)	6.77786	6.24307	5.5158	8.17028	6.8414
Efficiency (dB)	-5.56621	-1.82142	-0.93789	-2.65663	-2.71832
Efficiency (%)	27.7574	65.7443	80.5771	54.2421	53.4771
Gain (dBi)	1.21165	4.42165	4.57792	5.51365	4.12308
NHPRP \pm Pi/4 (dBm)	-8.3118	-4.23648	-2.22688	-5.18188	-4.75607
NHPRP \pm Pi /6 (dBm)	-9.81271	-5.97669	-4.14735	-8.0768	-5.46426
NHPRP \pm Pi /8 (dBm)	-11.0395	-7.75594	-5.58711	-10.0089	-5.9975
Upper Hem. PRP (dBm)	-13.046	-8.36991	-6.6276	-11.9467	-8.86779
Lower Hem. PRP (dBm)	-6.42097	-2.9082	-2.30342	-3.20076	-3.92559
NHPRP4 / TRP Ratio (dB)	-2.74559	-2.41507	-1.28899	-2.52524	-2.03775
NHPRP4 / TRP Ratio (%)	53.1424	57.3447	74.3191	55.9082	62.5497
NHPRP6 / TRP Ratio (dB)	-4.2465	-4.15527	-3.20946	-5.42017	-2.74594
NHPRP6 / TRP Ratio (%)	37.6141	38.4125	47.7588	28.7067	53.1381
NHPRP8 / TRP Ratio (dB)	-5.47334	-5.93452	-4.64923	-7.35227	-3.27918
NHPRP8 / TRP Ratio (%)	28.3574	25.5005	34.2829	18.3981	46.9983
UHPRP / TRP Ratio (dB)	-7.4798	-6.54849	-5.68972	-9.29006	-6.14947
UHPRP / TRP Ratio (%)	17.8657	22.1386	26.9792	11.7759	24.2691
LHPRP / TRP Ratio (dB)	-0.85475	-1.08678	-1.36553	-0.54413	-1.20727
LHPRP / TRP Ratio (%)	82.1343	77.8614	73.0208	88.2241	75.7309
Front/Back Ratio (dB)	10.0708	6.58289	13.8086	13.1142	15.7983
Phi BW (°)	56	51	36	37	55
Theta BW (°)	27	27	19	19	25
Maximum Power (dBm)	1.21165	4.42165	4.57792	5.51365	4.12308
Minimum Power (dBm)	-14.1186	-12.3073	-16.3682	-19.538	-15.2546
Average Power (dBm)	-5.40464	-1.84635	-1.29901	-1.94721	-2.54463
Max/Min Ratio (dB)	15.3302	16.729	20.9461	25.0516	19.3777
Max/Avg Ratio (dB)	6.61629	6.268	5.87692	7.46086	6.66771
Min/Avg Ratio (dB)	-8.71392	-10.461	-15.0692	-17.5908	-12.71
Average Gain (dB)	-5.56621	-1.82142	-0.93789	-2.65663	-2.71832
E-Plane BW (°)	29	28	42	42	63
H-Plane BW (°)	60	55	38	40	57



Specification

V. Drawing and Dimensions

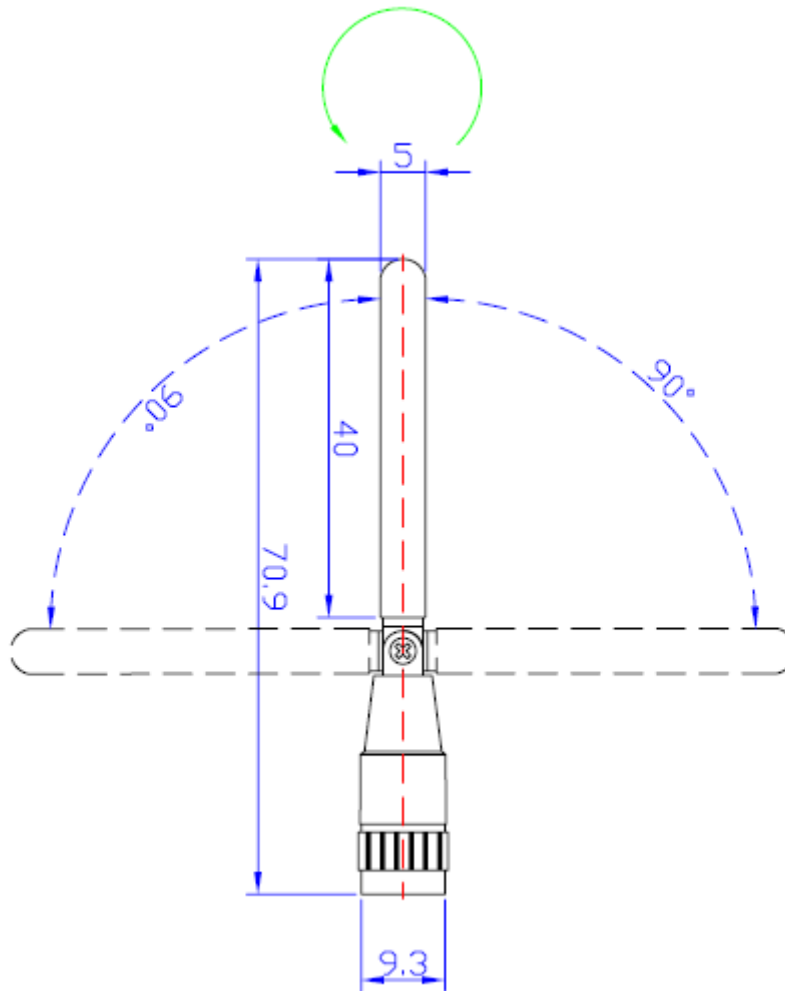


Figure 10 Mechanical drawing of TG-09 (unit mm)

Tolerances are:

Decimals

$x = \pm 0.50$

$.x = \pm 0.25$

$.xx = \pm 0.13$

Angles

$\pm 1/2$