

## Miniature Stubby SMA

### Features

- 824-960/1710-1990/2170MHz
- 1/4 Wave Monopole Antenna
- Omni-Directional
- VSWR <3.0
- SMA Connector
- 50Ω Impedance
- 0dBi Gain
- ABS / Rubber Housing
- Operates from -40 to+70°C



### Applications

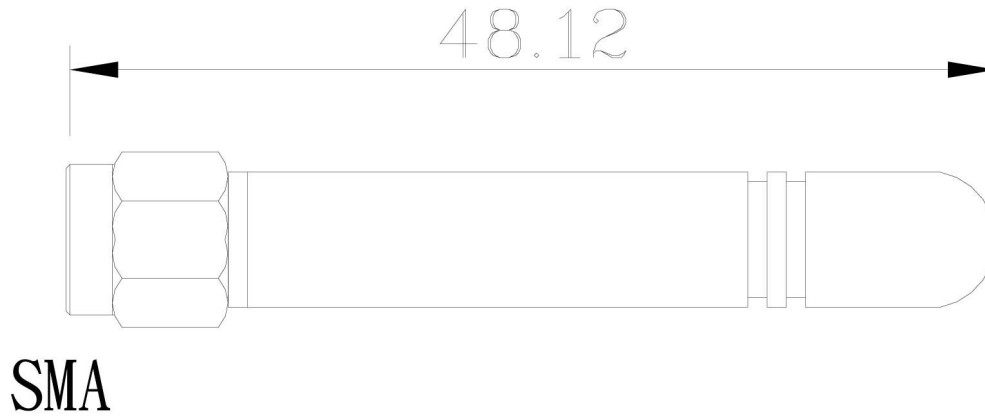
- General Low Power Radio
- M2M Applications
- Telemetry

A Miniature antenna for demanding applications. This antenna provides operation a high performance across a broad spectrum of frequencies. Housed in a rugged low profile ABS, this antenna is compact and resistant to Vandalism.

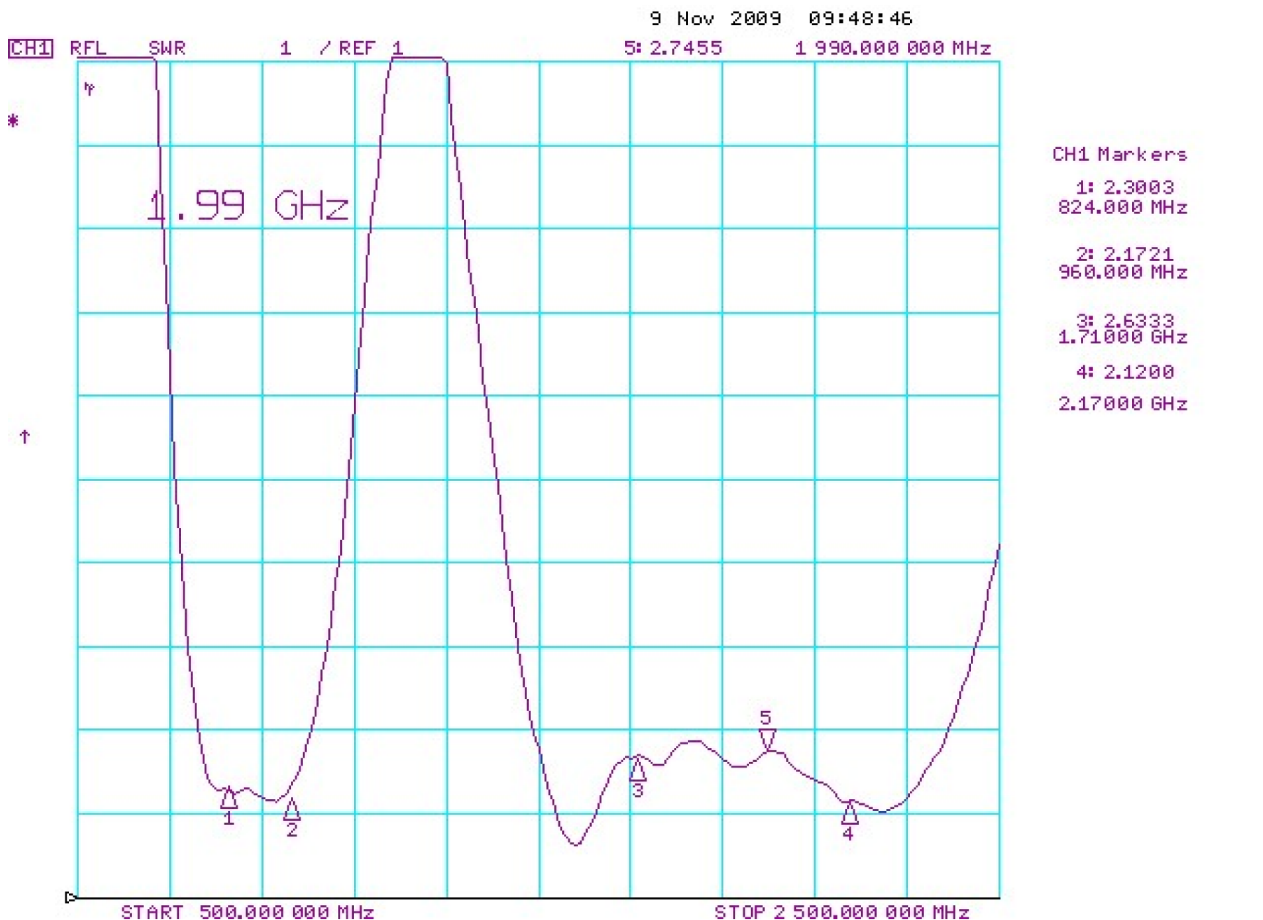
### Ordering Information

Part No	Description
ANT-MSTUB-SMAF	Stubby Antenna LTE 824-960/1710-1990/2170MHz SMA(Female)
ANT-MSTUBR-SMAM	Stubby Antenna LTE 824-960/1710-1990/2170MHz SMA(Male)

## Mechanical Detail—Straight Version

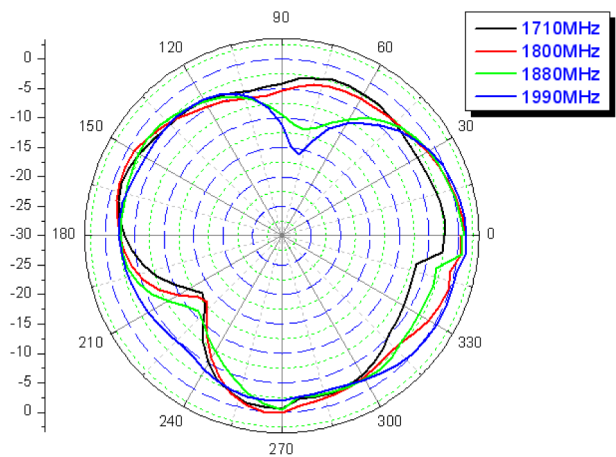
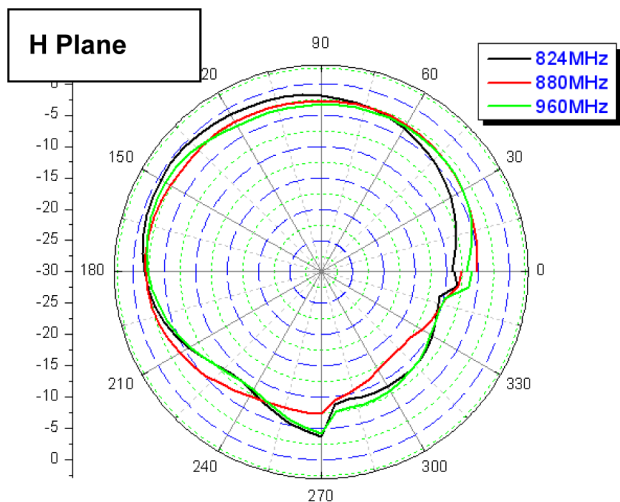
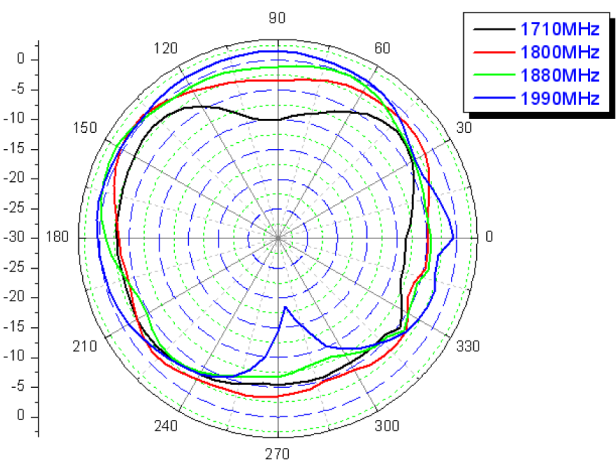
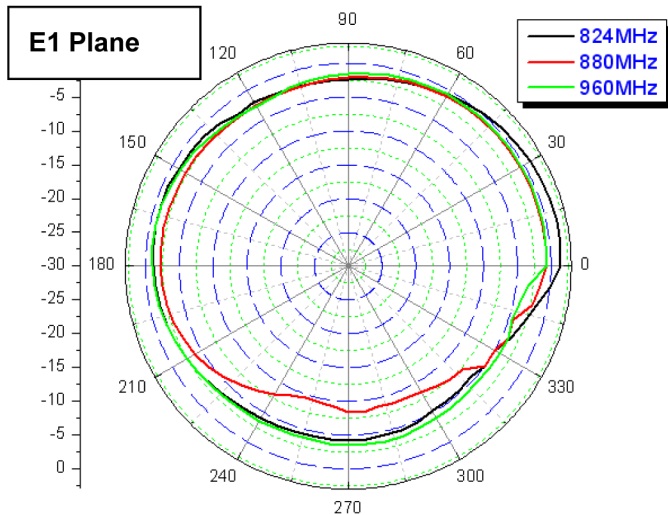


## Performance Data – VSWR



## Performance Data – RETURN LOSS

Frequency (MHz)	H Plane			E1 Plane		
Unit dBi	Max.	Min.	Avg.	Max.	Min.	Avg.
824	1.52	-5.61	-1.64	-0.45	-10.65	-4.09
880	-0.60	-9.54	-2.94	-1.88	-12.53	-4.42
960	-0.42	-4.52	-2.06	-1.36	-10.19	-4.47
1710	-1.89	-10.09	-3.62	-0.65	-13.31	-3.39
1800	0.79	-9.60	-2.60	1.20	-13.02	-2.30
1880	1.16	-10.93	-2.54	1.03	-11.55	-2.98
1990	1.57	-18.53	-1.21	1.44	-15.88	-2.22



# ANT-MSTUB Antenna



## Performance Data

Total Frequency (MHz)	824	960	1710	1990	2170
Point Values					
Ant. Port Input Pwr. (dBm)	0	0	0	0	0
Tot. Rad. Pwr. (dBm)	-3.02158	-4.53846	-3.43015	-3.35456	-2.55152
Peak EIRP (dBm)	-0.273484	-2.20475	-0.31156	-0.177191	0.578211
Directivity (dBi)	2.7481	2.33372	3.11859	3.17737	3.12973
Efficiency (dB)	-3.02158	-4.53846	-3.43015	-3.35456	-2.55152
Efficiency (%)	49.8703	35.1685	45.3925	46.1896	55.571
Gain (dBi)	-0.273484	-2.20475	-0.31156	-0.177191	0.578211
NHPRP i/4 (dBm)	-4.7446	-6.37139	-4.52182	-4.23522	-3.53953
NHPRP i/6 (dBm)	-6.34653	-7.99471	-5.92586	-5.58046	-4.96417
NHPRP i/8 (dBm)	-7.517	-9.23127	-7.02402	-6.7178	-6.12253
Upper Hem. PRP (dBm)	-5.74067	-7.0721	-5.69479	-6.16282	-4.67429
Lower Hem. PRP (dBm)	-6.34403	-8.08427	-7.34124	-6.57675	-6.67857
NHPRP4 / TRP Ratio (dB)	-1.72302	-1.83292	-1.09167	-0.880662	-0.988006
NHPRP4 / TRP Ratio (%)	67.2509	65.5704	77.7738	81.6458	79.6525
Near Horz. TRP for i/4 (dBm)	-3.23945	-4.86624	-3.01667	-2.73007	-2.03438
NHPRP6 / TRP Ratio (dB)	-3.32495	-3.45624	-2.49571	-2.2259	-2.41265
NHPRP6 / TRP Ratio (%)	46.5055	45.1207	56.2897	59.8977	57.3767
Near Horz. TRP for i/6 (dBm)	-3.33623	-4.98441	-2.91556	-2.57016	-1.95387
NHPRP8 / TRP Ratio (dB)	-4.49542	-4.69281	-3.59387	-3.36324	-3.57101
NHPRP8 / TRP Ratio (%)	35.5188	33.9406	43.7133	46.0974	43.9439
Near Horz. TRP for i/8 (dBm)	-3.34539	-5.05967	-2.85242	-2.54619	-1.95093
UHPRP / TRP Ratio (dB)	-2.71909	-2.53364	-2.26463	-2.80827	-2.12277
UHPRP / TRP Ratio (%)	53.4676	55.8003	59.3659	52.381	61.3371
Upper Hem. Total Radiated Pwr (dBm)	-2.73037	-4.0618	-2.68449	-3.15252	-1.66399
LHPRP / TRP Ratio (dB)	-3.32245	-3.5458	-3.91109	-3.22219	-4.12705
LHPRP / TRP Ratio (%)	46.5324	44.1997	40.6341	47.619	38.6629
Lower Hem. Total Radiated Pwr (dBm)	-3.33373	-5.07397	-4.33094	-3.56645	-3.66827
Front/Back Ratio (dB)	2.08198	2.04379	5.71434	2.40834	5.19069
Phi BW (?)	282	125	194	151	238
+ Phi BW (?)	63	61	138	112	103

# ANT-MSTUB Antenna



Total	Frequency (MHz)	824	960	1710	1990	2170
	Point Values					
	- Phi BW (?)	219	64	56	39	135
	Theta BW (?)	107	304	122	115	82
	+ Th. BW (?)	50	204	87	72	58
	- Th. BW (?)	57	100	35	43	24
	Boresight Phi (?)	33.65	53.4	304.1	42.05	56.7
	Boresight Th. (?)	45	60	60	75	45
	Maximum Power (dBm)	-0.273484	-2.20475	-0.31156	-0.177191	0.578211
	Minimum Power (dBm)	-15.3831	-20.1007	-16.2884	-15.7609	-14.7237
	Average Power (dBm)	-2.7917	-4.2109	-4.0649	-4.32296	-3.55684
	Max/Min Ratio (dB)	15.1096	17.896	15.9768	15.5837	15.3019
	Max/Avg Ratio (dB)	2.51822	2.00615	3.75334	4.14577	4.13505
	Min/Avg Ratio (dB)	-12.5914	-15.8898	-12.2235	-11.4379	-11.1669
	Average Gain (dB)	-3.02158	-4.53846	-3.43015	-3.35456	-2.55152
	E-Plane BW (?)	87	102	191	102	84
	+ E-Plane BW (?)	46	64	142	54	22
	- E-Plane BW (?)	41	38	49	48	62
	H-Plane BW (?)	360	360	97	81	102
	+ H-Plane BW (?)	360	360	51	36	57
	- H-Plane BW (?)	0	0	46	45	45

## 6. Measurement Setup

### (1) Reflection Coefficient Measurement :

(a) Instrument : Network Analyzer

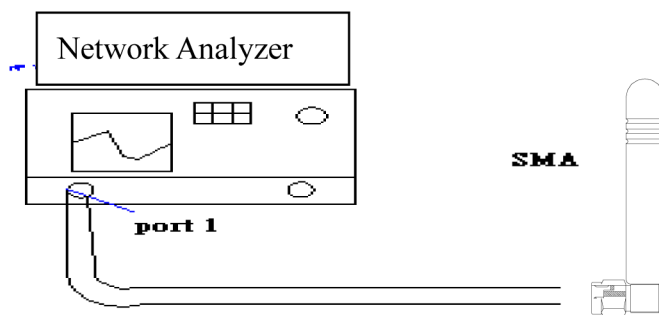
(b) Setup :

(I) Calibrate the Network Analyzer by one port calibration using O.S.L calibration kits.

(II) Connect the antenna under test to the Network Analyzer.

(III) Measure the S11(reflection coefficient) shown in Fig. 1.

(IV) Generally, the S11 is less than  $-10\text{dB}$  to ensure the 90% power into antenna and only less than 10% power back to system



### (2) Pattern measurement :

a . The anechoic chamber is a far-field measurement system with size of  $7\text{m} \times 3.3\text{m} \times 3.3\text{m}$ . The quiet zone region is  $30\text{cm} \times 30\text{cm} \times 30\text{cm}$  in the center of the rotator.

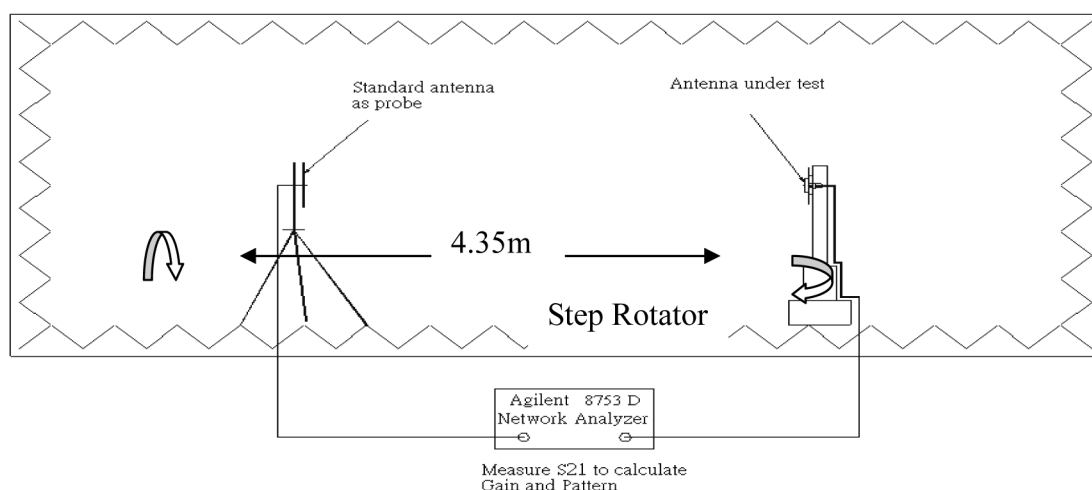


Fig.2 The interior components of the anechoic chamber

- b . The probing antenna is the BBHA 9120 LFA 700MHz ~ 6GHz module (9120D horn antenna), which is placed in the one side of the chamber room. And the antenna under testing (AUT) is placed in the other side of the chamber. The distance between the probing antenna and the AUT is about 4m.
- c . While we measure the radiation patterns by rotating AUT with 360 degrees and repeat again by replacing the AUT with the standard gain antenna under test, we compare both data and using a formula to obtain the gain of AUT. The standard gain antenna is a gain horn (BBHA 9120 LFA 700MHz~6GHZ).

$$G_{AUT} = G_{standard} + P_{AUT} - P_{standard}$$

$G_{AUT}$  : Gain of AUT

$G_{standard}$  : Gain of Standard Gain Antenna

$P_{AUT}$  : Measured Power of AUT

$P_{standard}$  : Measured Power of Standard Gain Antenna

- d . The scanning method is CW wave with 6 degree by one step.
- e . We measure the radiation pattern in the free space situation at the lowest, middle and highest frequency for the H(X-Y) 、E1(Y-Z) planes, which defined in figure next page.

### (3) Plane definition :

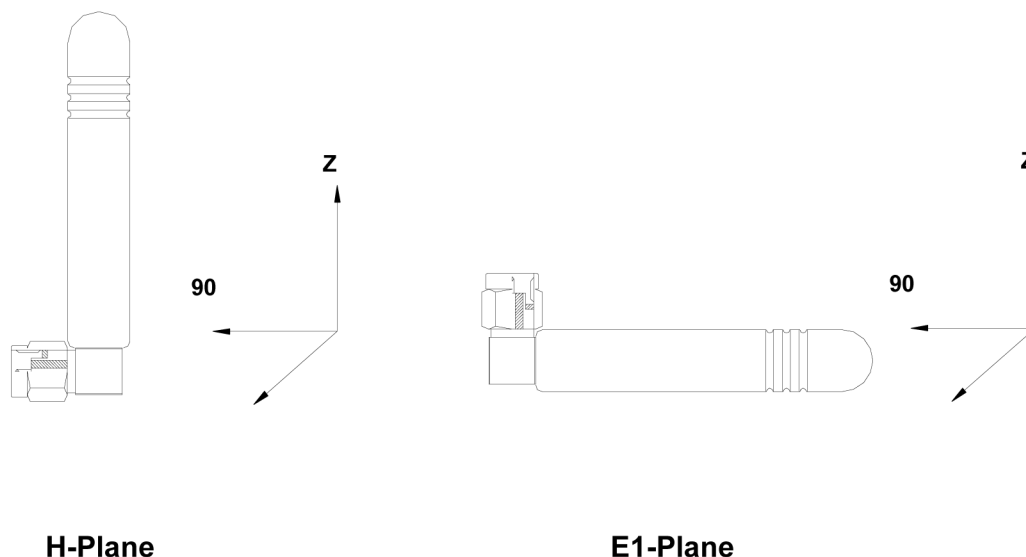


Fig.3 The plane definition for H and E1 planes.

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