1. Test Information

Applicant: SAGEMCOM BROADBAND SAS

Address: 250 Route de l'Empereur - 92848 RUEIL MALMAISON CEDEX- FRANCE

Equipment: Residential Cable Gateway

Model No.: F@ST3896 XXXXXXXXXX (XXXXXXXXXX, X can be A~Z, space and other presentation, XXXXXXXXXX can be replaced by LLA and other presentation, it is various by different marketing)

Brand Name: SAGEMCOM

Test Date: 2023-03-21 ~ 2023-03-24

Test by: Shenzhen Haiyun Testing Co., Ltd.

2. Test Location

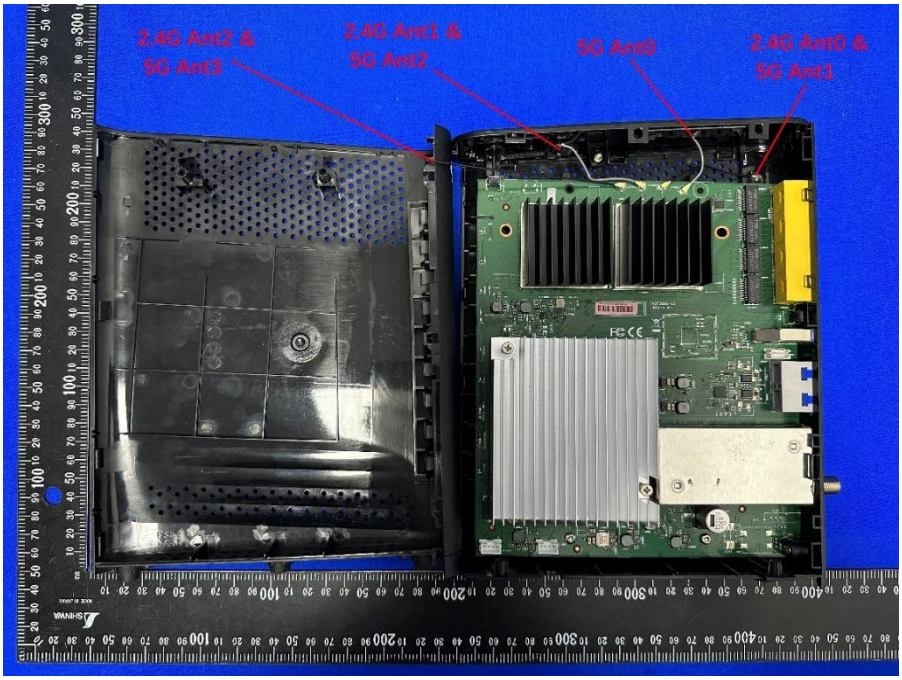
Test Lab: Shenzhen Haiyun Testing Co., Ltd.

Address: No. 2 Danzi North Road, Kengzi Street, Pingshan District, Shenzhen, Guangdong, China

3. Test Frequency

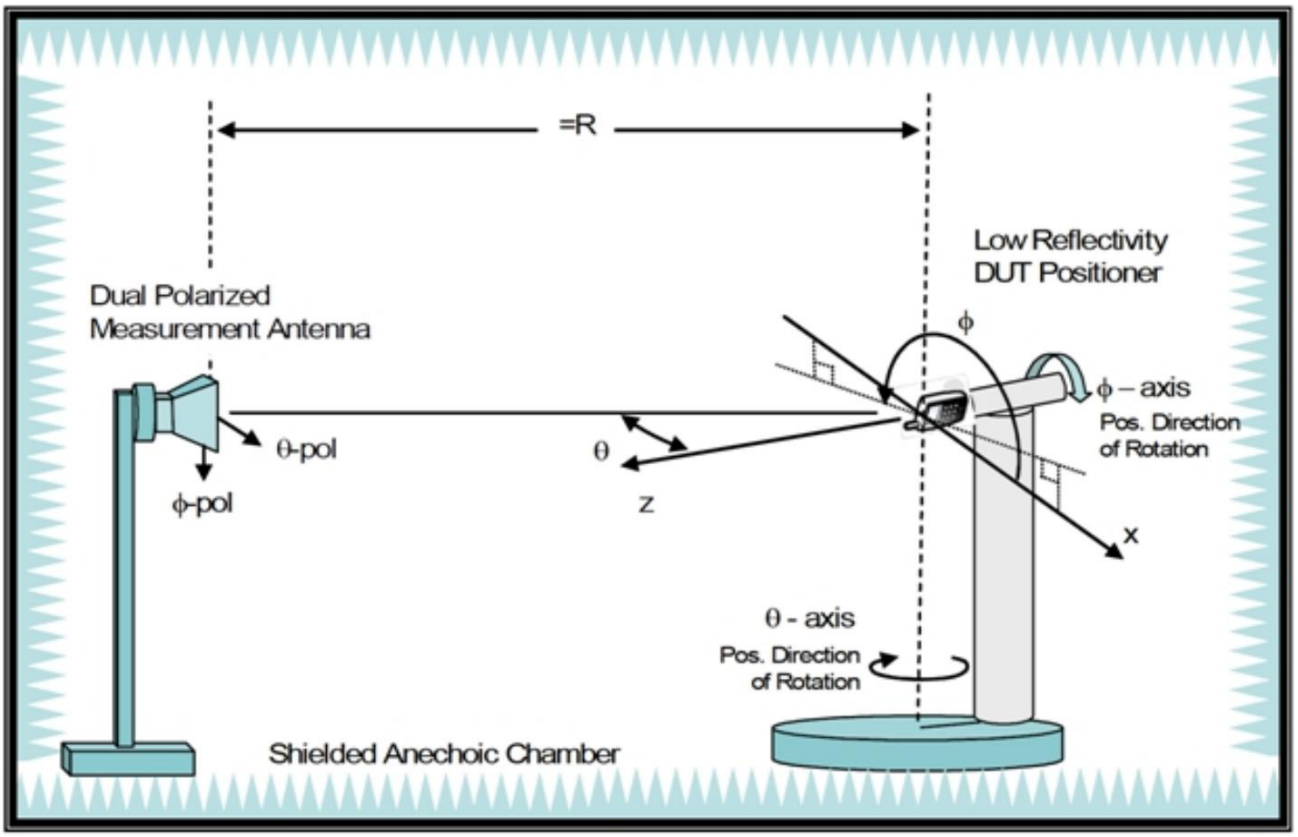
Band (MHz)	Test Frequency (MHz)
2412 ~ 2462	2450
5150 ~ 5250	5150
5250 ~ 5350	5350
5470 ~ 5725	5470, 5725
5725 ~ 5850	5850

4. Antenna System

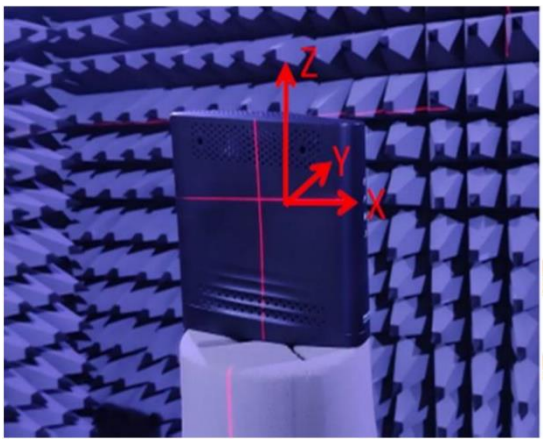


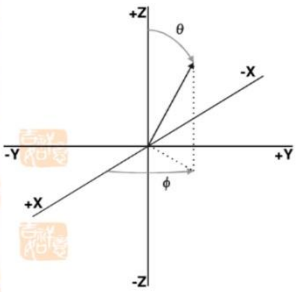
5. Test Configuration

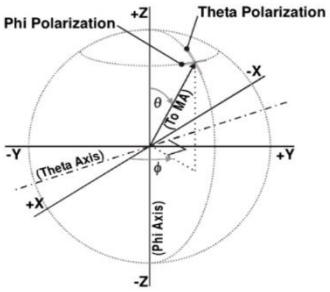
Reference to CTIA "ctia-test-plan-for-wireless-device-over-the-air-performance-ver-3-7-1



6. Test Setup







7. Test Method

The EUT set on multi-axis positioner. Measurement antenna set at phi polarization and 1.5 meter height. Port 1 of Network analyzer connect to antenna of EUT. Record S21 value every 5 degree 0 to 355 degree on Phi angle and 0 to 180 on theta angle of multi-axis positioner. Then set measurement antenna to theta polarization and repeat process. Repeat process to each antenna of EUT

8. Summary of Test Result

Calculate directional gain of 4TX antennas by same angle according to FCC KDB662911 D01 Multiple Transmitter Output v02r01 The maximum DG gain was selected and recorded in following table

Spatial Multiplexing DG calculations
If antenna gains are not equal & each transmit antenna is driven by only one spatial strean

$$DG = 10 \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

Antenna Type	Frequency Band (GHz)	Antenna Gain (dBi)				Directional Gain (dBi)
		Ant 0	Ant 1	Ant 2	Ant 3	
Wi-Fi Internal Antenna (2.4GHz 3*3 MIMO, 5GHz 4*4 MIMO)						
PCB Antenna	2400 ~ 2483.5	1.48	4.27	4.27	--	6.72
	5150 ~ 5250	4.68	4.84	3.96	2.90	8.04
	5250 ~ 5350	4.49	4.04	4.57	3.43	7.98
	5470 ~ 5725	4.55	4.08	4.9	3.77	8.77
	5725 ~ 5850	4.55	4.08	4.9	3.77	8.77
Note 1: The EUT supports Cyclic Delay Diversity (CDD) mode for 802.11a/b/g/n/ac/ax and SISO Mode (Ant 0) for 802.11a/b. Note 2: If transmit signals are correlated, then Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + … + $10^{GN/20}$)^2 /N_{ANT}] dBi [Note the "20"s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]						

9. RAW DATA and Calculation DATA