

FCC Part 15 Antenna Gain Test Report - Wi-Fi

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1. Test Personnel

Test personnel are valued team members. Their expertise insures accurate test results. Their identities are considered confidential by Tesla Inc.

2. Test Equipment

Test Equipment	Critical Specifications	Calibration Due Date
Antenna Measurement System	0.86m anechoic OTA chamber with dual-polarized measurement antenna, mechanical positioners of Theta and Phi axes, and RF path switching. Frequency Range	01/21/2026
Rhode & Schwarz ZNA	Frequency range, multi-ports	01/01/2027

3. Commercial Test Software

The test equipment operates under the control of commercial test software, sold by R&S.

4. Test Method

EIRP measurement is based on industry-standard method described in CTIA OTA test plan (current version 6.0.4). Peak gain (Horizontal and Vertical Polarization) is measured by comparing the signal strength received by the antenna under test (AUT) with that of a reference antenna with a known gain. Testing is performed with antenna integrated in the product. Below is the

measurement summary from the specification (CTIA Test Plan for Wireless Device Over-the-Air Performance):

Figure 4.1-2 shows a typical real-world configuration for measuring the path loss. In this case, a reference antenna with known gain is used in place of the theoretical isotropic source. The path loss may then be determined from the power into the reference antenna by adding the gain of the reference antenna. That is:

$$P_{ISO} = P_{RA} + G_{RA} \quad \text{Equation 4.1-2}$$

where P_{RA} is the power radiated by reference antenna, and G_{RA} is the gain of the reference antenna, so that:

$$PL = P_{RA} + G_{RA} - P_{TE} \quad \text{Equation 4.1-3}$$

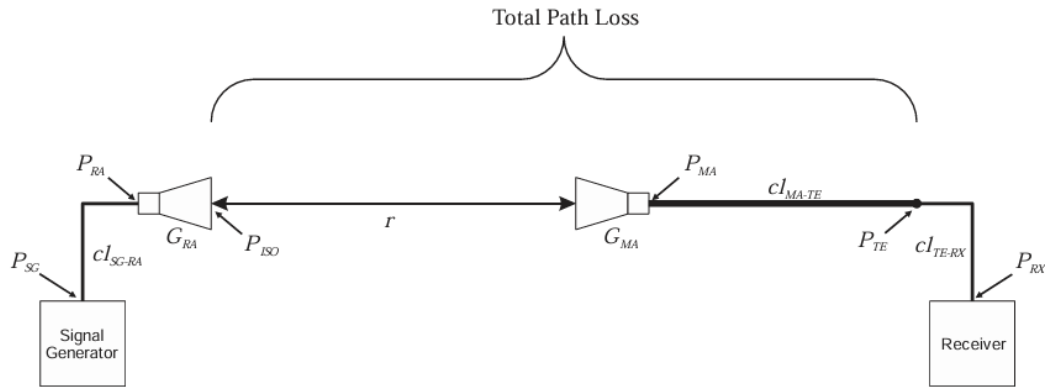
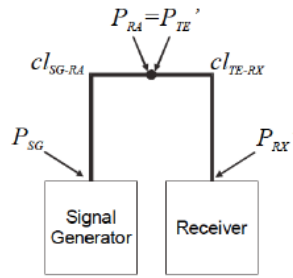


Figure 4.1-2 Typical Configuration for Measuring Path Loss

In order to determine P_{RA} , it is necessary to perform a cable reference measurement to remove the effects of the cable loss between signal generator and reference antenna cl_{SG-RA} , and between the test equipment port and the receiver. This establishes a reference point at the input to the reference antenna. Figure 4.1-3 illustrates the cable reference measurement configuration. Assuming the power level at the signal generator is fixed, it is easy to show that the difference between P_{RA} and P_{TE} in Figure 4.1-2 is given by:

$$P_{RA} - P_{TE} = P_{RX}' - P_{RX} \quad \text{Equation 4.1-4}$$

FIGURE 4-3 CABLE REFERENCE CALIBRATION CONFIGURATION



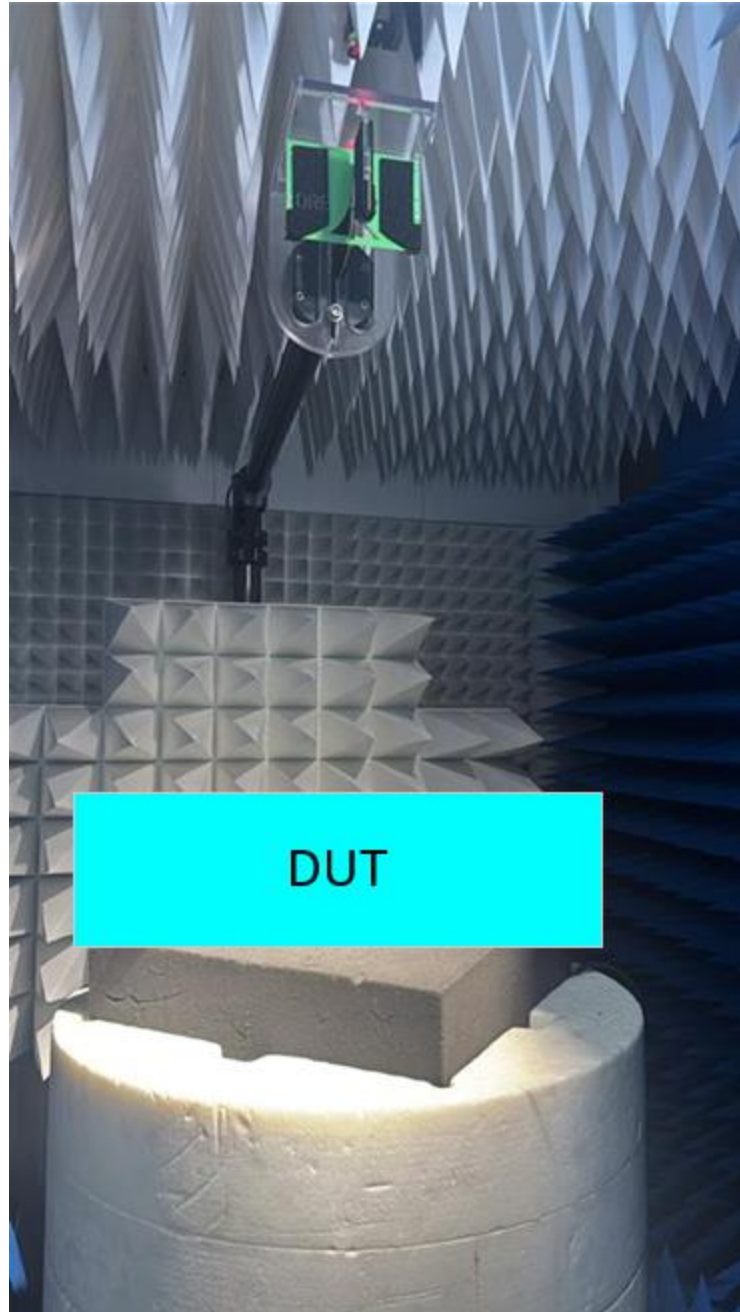
where P_{RX}' is the power measured at the receiver during the cable reference test, and P_{RX} is the power measured at the receiver during the range path loss measurement in Figure 4-2. Note that this formulation assumes that the effects of the reference antenna VSWR are accounted for in the gain of the reference antenna. For more information on this subject, refer to [1]. Thus, the path loss is then just given by:

EQUATION 4.5

$$PL = G_{RA} + P_{RX}' - P_{RX}$$

5. Typical Test Setup

The device containing the integral antenna is placed in the center of turntable with absorber around (inside the OTA chamber) as pictured below.



DUT on turntable with gantry dual pol probe antenna

6. Test Results

See antenna gain exhibit

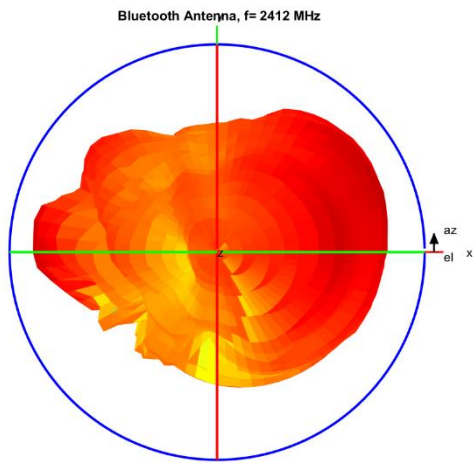
Technology	Frequency range (MHz)	Wi-Fi0	Wi-Fi1	BT
		Peak Gain (dBi)	Peak Gain (dBi)	Peak Gain (dBi)
BT	2402-2480			1.8
WLAN 2.4G	2412-2462	3.0	2.9	
WLAN 5G UNII1	5150-5250	4.4	3.2	
WLAN 5G UNII2A	5250-5350	4.4	3.5	
WLAN 5G UNII2C	5470-5725	5.3	4.5	
WLAN 5G UNII3	5725-5850	4.7	3.5	
WLAN 6E B5	5925-6425	3.7	2.9	
WLAN 6E B6	6425-6525	2.2	2.2	
WLAN 6E B7	6525-6875	2.8	2.8	
WLAN 6E B8	6875-7125	3.2	3.2	

7. Antenna Photos or Drawings

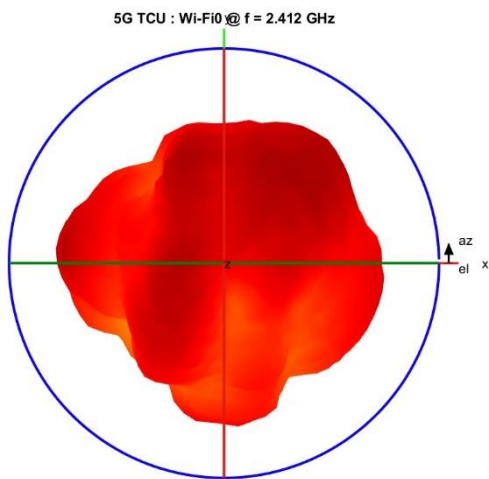
See internal photos exhibit

8. Antenna Description

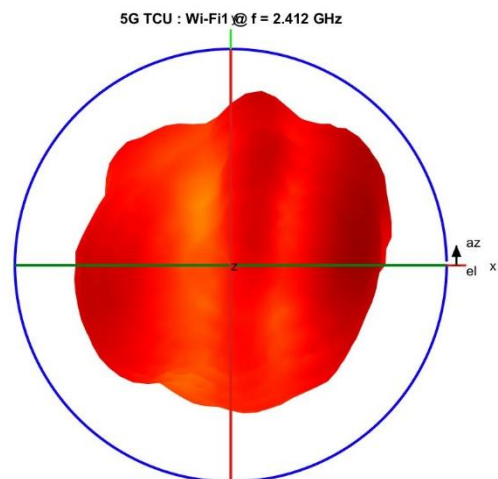
See antenna radiation patterns exhibit



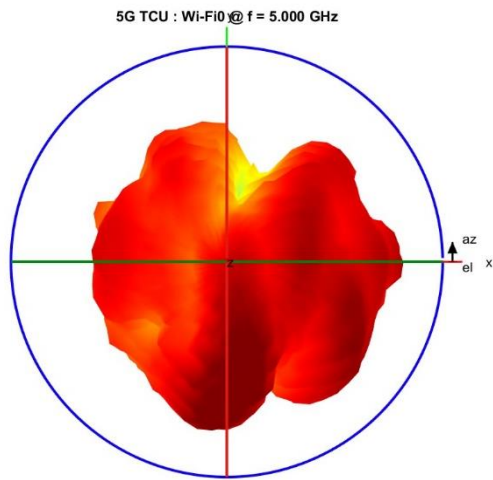
BlueTooth



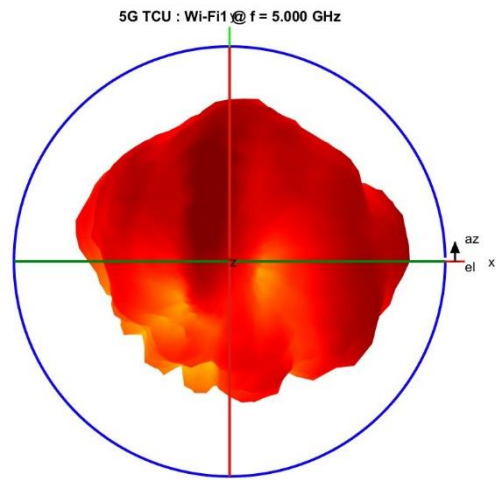
Wi-Fi0



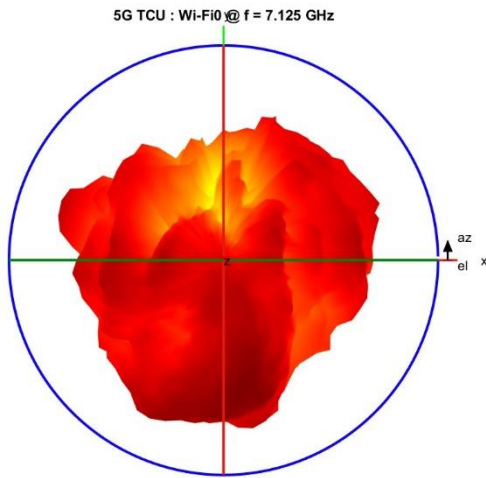
Wi-Fi1



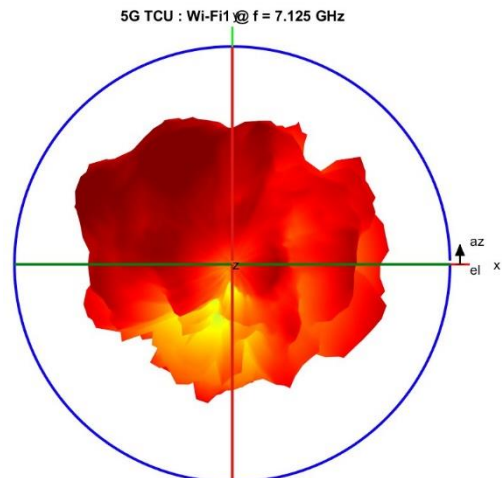
Wi-Fi0



Wi-Fi1



Wi-Fi0



Wi-Fi1

9. Revision History

Revision	Date	Description of Change
1.0	August 20 th 2025	Original