



Arnolds Court, Arnolds Farm Lane, Brentwood, Essex, CM13 1UT, UK

Antenna Testing for Caspian 4G antenna performance

Applicant	Monitor Audio Group
Equipment Name	Antenna 1 = Antenna Part Number: 116559 A.1 10/28/2025 Antenna 2 = Antenna Part Number: 104699 A.5 08/12/2023
Date of assessment	23rd - 24th October 2025

Test Engineer
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Date: 2025.11.14 14:44:59 Z

Approved by:
Radio Approvals Manager



Digitally signed by: Daniel Sims
DN: CN = Daniel Sims email = Daniel.Sims@kiwa.com C = GB O = Kiwa Electrical Compliance - Brentwood
Date: 2025.11.14 14:43:23 Z

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2 Methodology

Method

The antennas (EUT) were tested in a semi anechoic chamber. High frequency absorber was in place on the chamber floor. The EUT was positioned on a turntable 1.5m high and the measuring antenna was placed at a distance of 3 metres.

5 tests were performed:

Test 1a: Antenna 1 fitted to Caspian 4G Streaming unit's rear panel (rear panel not fitted to Caspian 4G Product) measurements made on BluOS positioned Antenna.

Test 1b: Antenna 2 fitted to Caspian 4G Streaming unit's rear panel (rear panel not fitted to Caspian 4G Product) measurements made on BTC positioned Antenna. Note: Antenna 2 is 90° difference in position to

Test 2a: Antenna 1 fitted to Caspian 4G Streaming unit's rear panel with rear panel Fitted to Caspian 4G Product) measurements made on BluOS positioned Antenna.

Test 2b: Antenna 2 fitted to Caspian 4G Streaming unit's rear panel with rear panel Fitted to Caspian 4G Product) measurements made on BTC positioned Antenna.

Test 3a: Antenna 1 fitted facing down in Caspian 4G chassis (used for ESP32 (BLE/2.4 WiFi) so the Caspian 4G amplifier was positioned on its side to enable testing (See photos). Note: this antenna is the same as Antenna tested in test 1b above, but the antenna is fitted facing down in to the Caspian 4G chassis, so was only tested in the chassis.

Each of the antennas in turn was fed via a coaxial cable with an RF power level of -20dBm at the signal generator output. The EUT backplane with Antennas fitted was positioned in its normal use position while being rotated 360° (azimuth) and aligned with boresight of the measuring horn Antenna. For tests where the EUT backplane was fitted into EUT chassis the same position and azimuth rotation was performed- unless stated. Refer to photo section for photos of rear panel/EUT antennas positions. The "Standard" antenna (2) is mounted such that it is cross polarised in relation to the "Standard -5 dB antenna" (1). This necessitates horizontal results on one antenna be compared to vertical results on the other antenna and vice versa. Measurements were made with the measuring antenna in vertical polarisation and then repeated for horizontal polarisation. In all cases the EUT was adjusted in elevation angle to ensure maximised Gain measurement – maximised elevation position was directly in line with the Antenna (i.e. 0 degrees elevation). The EUT was then replaced with a calibrated horn antenna and using a calibrated cable and signal generator a substitution measurement was made at the required frequencies to determine all cable, connector, amplifier, antenna and free space path losses. These losses were then applied as an offset to the antenna measurements to provide Gain results in dBi.

The following conditions were applied: -

- The EUT was fed via a coaxial cable with an RF power level of -20 dBm at the signal generator.
- The turntable was always rotated from 0 to 360 degrees clockwise.
- 0 degrees is with the EUT facing the measurement antenna.
- The measuring antenna was at a fixed height, level with the centre of the EUT.
- The resultant antenna gain is referenced to an isotropic antenna (dBi).

3 Polar plots and Antenna Gain (dBi)

3.1 Antenna 1, Test 1a

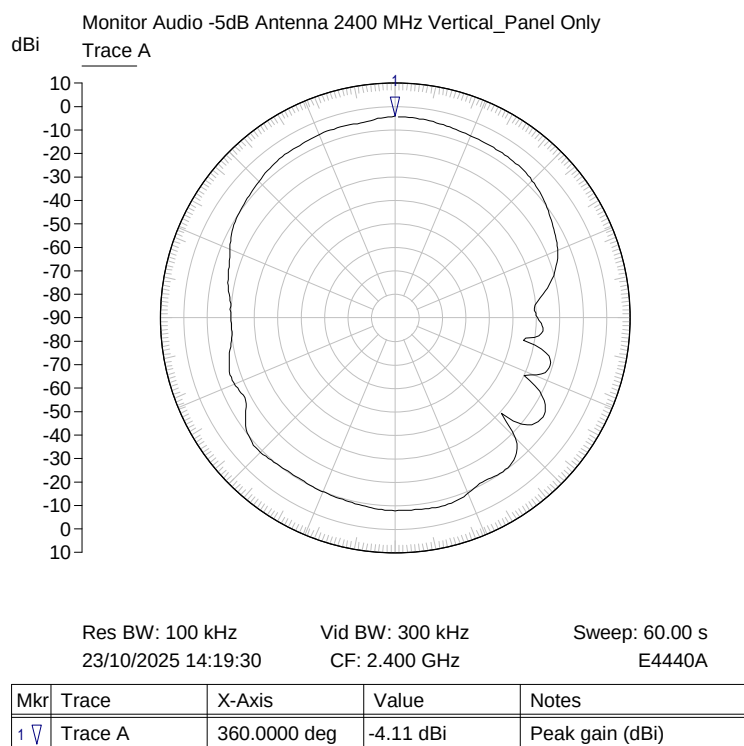
Test 1a, Antenna 1 fitted to Caspian 4G Streaming unit's rear panel (rear panel not fitted to Caspian 4G Product) measurements made on BluOS positioned Antenna.

Panel out of unit:

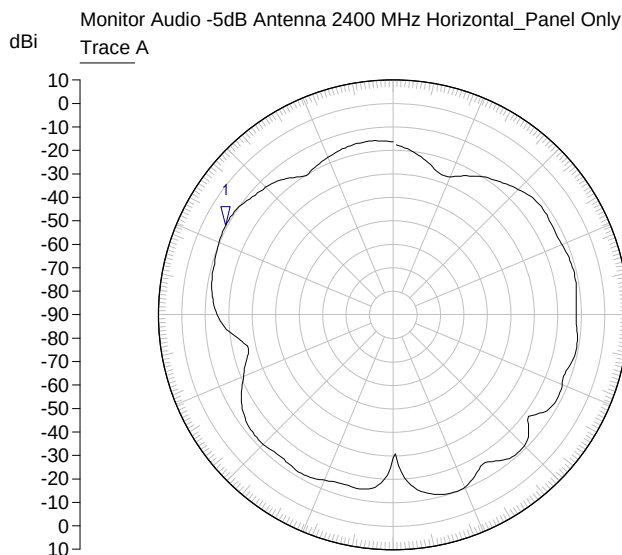
Frequency (MHz)	Antenna 1 (Standard -5 dB in BluOS location) panel out of unit	
	Vertical	Horizontal
2400	-4.11	-9.08
2440	-2.54	-8.07
2480	-0.9	-10.56
5150	-10.45	0.55
5470	-6.48	-3.47
5850	-8.11	-3.02

Denotes maximum gain measured.

Polar plots 2.4GHz Band:

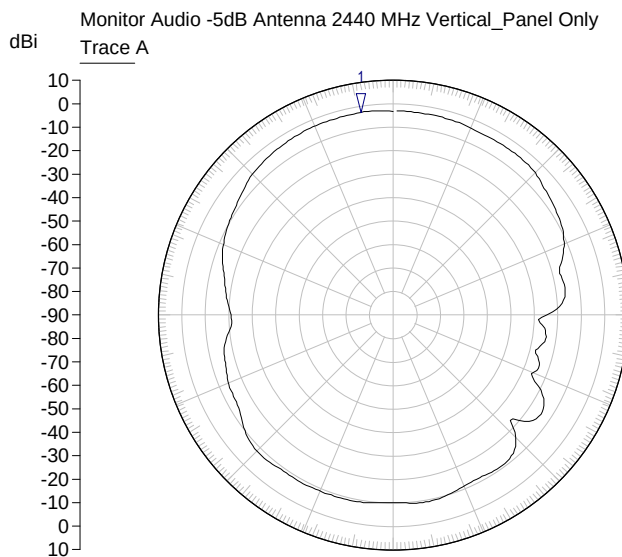


Monitor Audio -5dB Antenna 2400 MHz Vertical_Panel Only



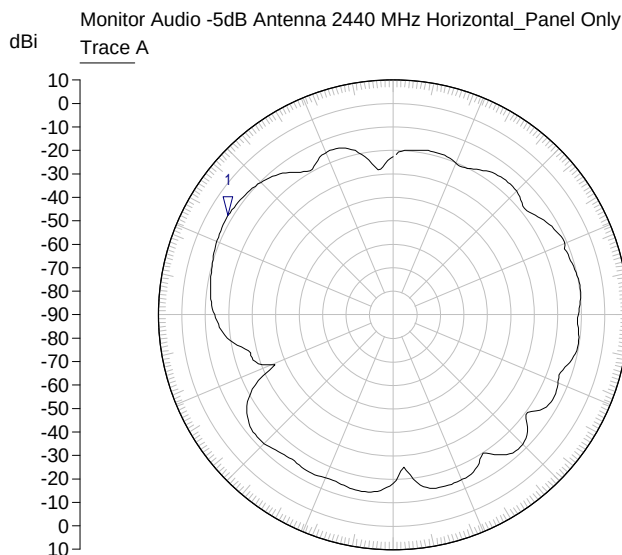
Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s	
23/10/2025 14:31:03		CF: 2.400 GHz		E4440A	
Mkr	Trace	X-Axis	Value	Notes	
1 ▽	Trace A	298.0000 deg	-9.08 dBi	Peak gain (dBi)	

Monitor Audio -5dB Antenna 2440 MHz Horizontal_Panel Only



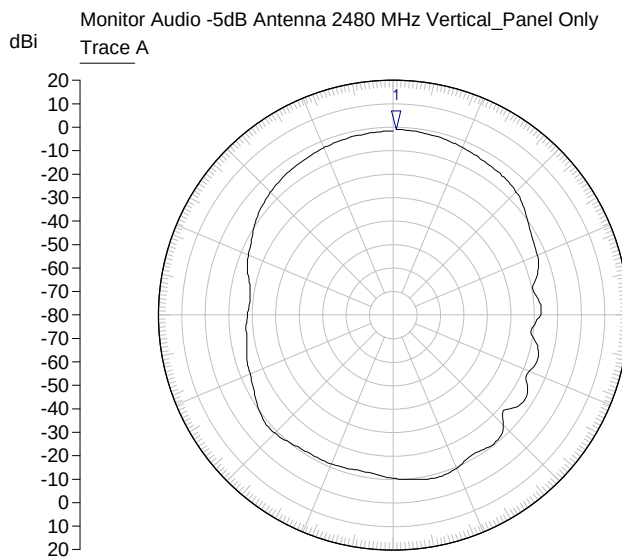
Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s	
23/10/2025 14:15:09		CF: 2.440 GHz		E4440A	
Mkr	Trace	X-Axis	Value	Notes	
1 ▽	Trace A	351.0000 deg	-2.54 dBi	Peak gain (dBi)	

Monitor Audio -5dB Antenna 2440 MHz Vertical_Panel Only



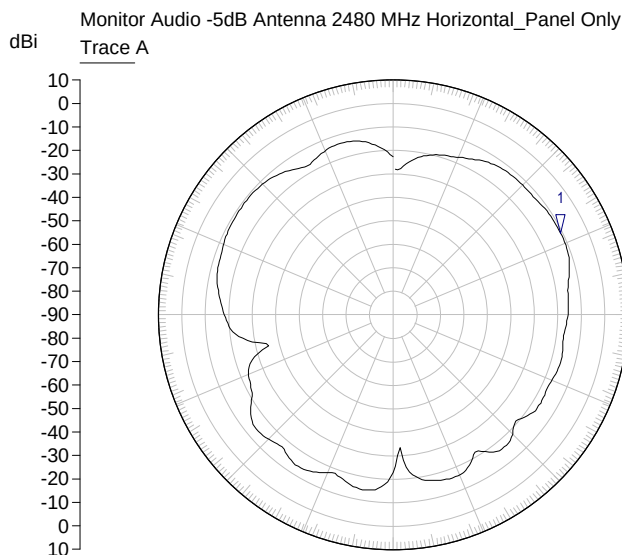
Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s	
23/10/2025 14:10:19		CF: 2.440 GHz		E4440A	
Mkr	Trace	X-Axis	Value	Notes	
1 ▽	Trace A	301.0000 deg	-8.07 dBi	Peak gain (dBi)	

Monitor Audio -5dB Antenna 2440 MHz Horizontal_Panel Only



Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s	
23/10/2025 13:56:24		CF: 2.480 GHz		E4440A	
Mkr	Trace	X-Axis	Value	Notes	
1 ▽	Trace A	1.0000 deg	-0.90 dBi	Peak gain (dBi)	

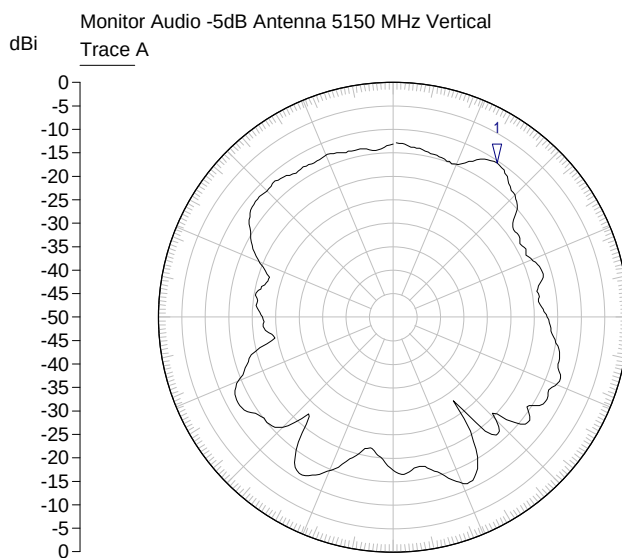
Monitor Audio -5dB Antenna 2480 MHz Vertical_Panel Only



Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s	
23/10/2025 14:02:03		CF: 2.480 GHz		E4440A	
Mkr	Trace	X-Axis	Value	Notes	
1 ▾	Trace A	64.0000 deg	-10.56 dBi	Peak gain (dBi)	

Monitor Audio -5dB Antenna 2480 MHz Horizontal_Panel Only

Polar plots 5GHz Band:

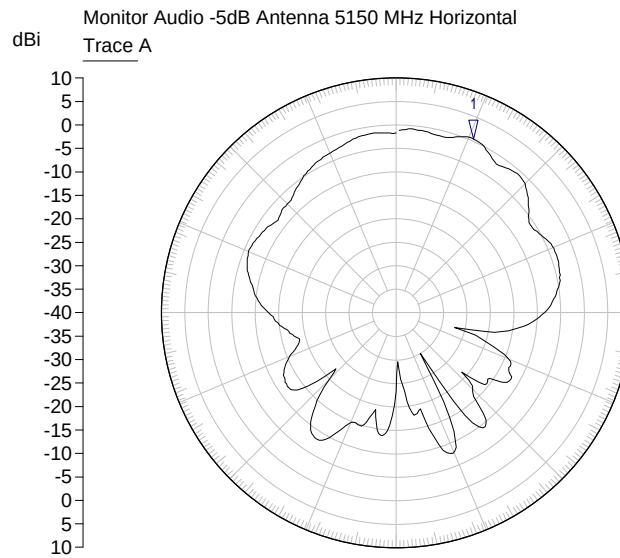


Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s	
23/10/2025 14:44:47		CF: 5.150 GHz		E4440A	
Mkr	Trace	X-Axis	Value	Notes	
1 ▾	Trace A	34.0000 deg	-10.45 dBi	Peak gain (dBi)	

Monitor Audio -5dB Antenna 5150 MHz Vertical_Panel Only

File Name: Monitor Audio Group.14745-22 Summary Issue 01

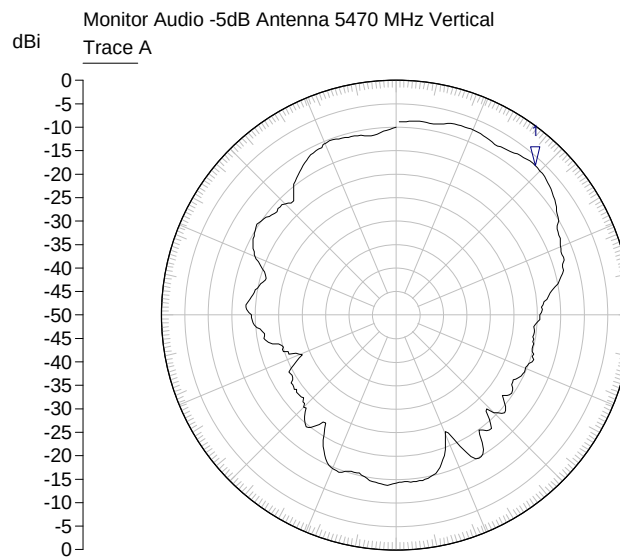
QMF21J - Issue 05 - KEC Issue 02



Res BW: 100 kHz Vid BW: 300 kHz Sweep: 60.00 s
23/10/2025 14:34:03 CF: 5.150 GHz E4440A

Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	24.0000 deg	0.55 dBi	Peak gain (dBi)

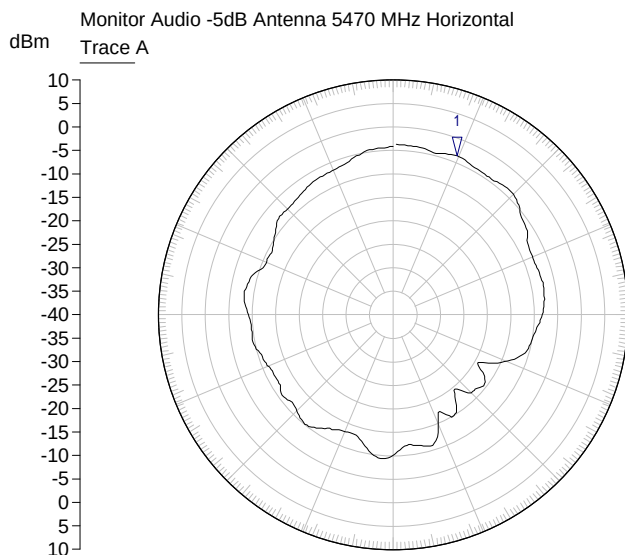
Monitor Audio -5dB Antenna 5150 MHz Horizontal_Panel Only



Res BW: 100 kHz Vid BW: 300 kHz Sweep: 60.00 s
23/10/2025 14:41:04 CF: 5.470 GHz E4440A

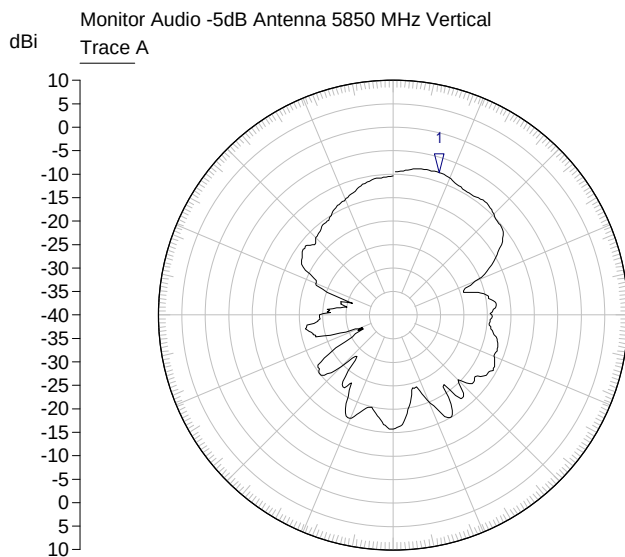
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	43.0000 deg	-6.48 dBi	Peak gain (dBi)

Monitor Audio -5dB Antenna 5470 MHz Vertical_Panel Only



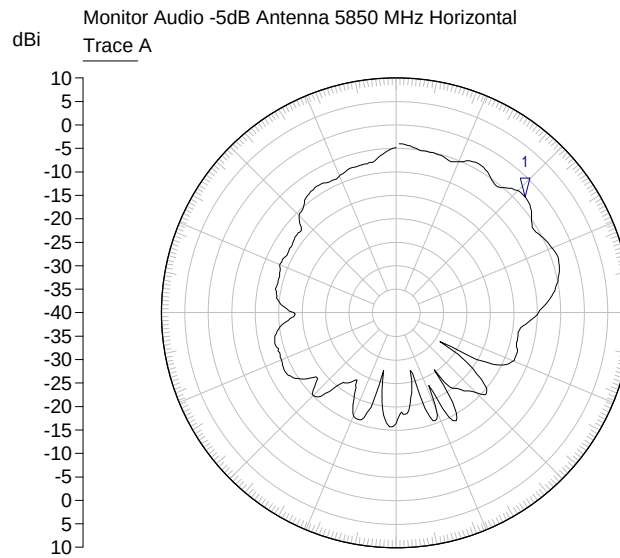
Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s	
23/10/2025 14:37:45		CF: 5.470 GHz		E4440A	
Mkr	Trace	X-Axis	Value	Notes	
1 ▾	Trace A	22.0000 deg	-3.47 dBm	Peak gain (dBi)	

Monitor Audio -5dB Antenna 5470 MHz Horizontal_Panel Only



Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s	
23/10/2025 12:33:46		CF: 5.850 GHz		E4440A	
Mkr	Trace	X-Axis	Value	Notes	
1 ▾	Trace A	18.0000 deg	-8.11 dBi	Peak gain (dBi)	

Monitor Audio -5dB Antenna 5850 MHz Vertical_Panel Only



Res BW: 100 kHz
 23/10/2025 12:29:05

Vid BW: 300 kHz
 CF: 5.850 GHz

Sweep: 60.00 s
 E4440A

Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	48.0000 deg	-3.02 dBi	Peak gain (dBi)

Monitor Audio -5dB Antenna 5850 MHz Horizontal_Panel Only

3.2 Antenna 2, Test 1b

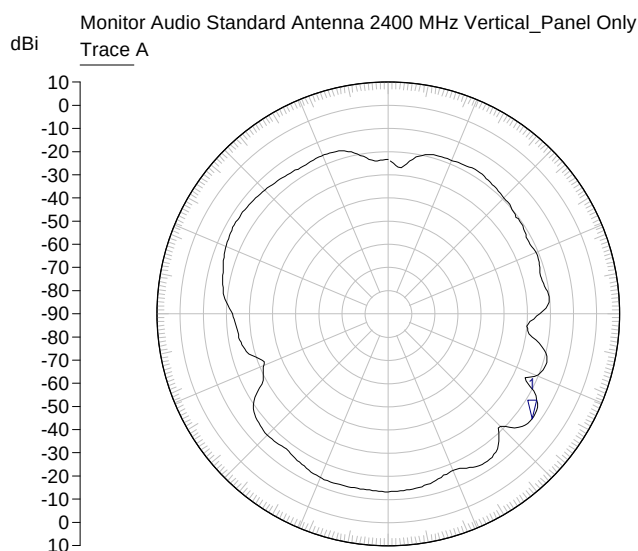
Test 1b, Antenna 2 fitted to Caspian 4G Streaming unit's rear panel (rear panel not fitted to Caspian 4G Product) measurements made on BTC positioned Antenna.

Panel out of unit:

Frequency (MHz)	Antenna 2 (Standard antenna in BTC location) panel out of unit	
	Vertical	Horizontal
2400	-12.88	2.28
2440	-7.73	2.66
2480	-8.87	1.68
5150	2.37	-3.2
5470	1.71	-1.89
5850	1.31	-1.05

Denotes maximum gain measured.

Polar plots 2.4GHz Band:



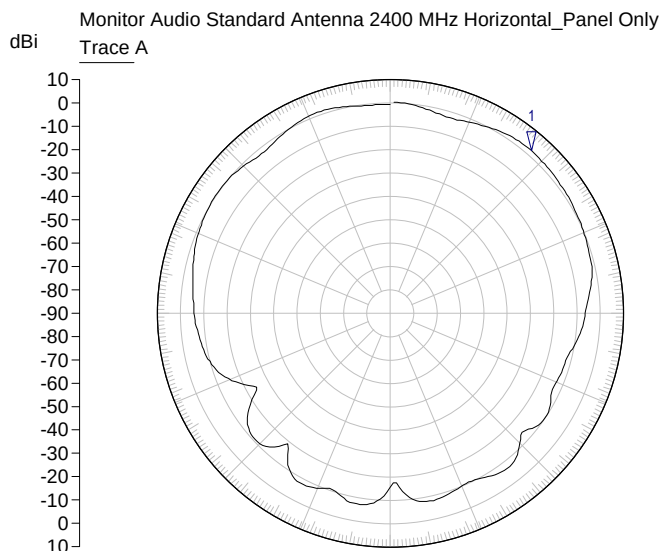
Res BW: 100 kHz
23/10/2025 14:58:27

Vid BW: 300 kHz
CF: 2.400 GHz

Sweep: 60.00 s
E4440A

Mkr	Trace	X-Axis	Value	Notes
1	Trace A	126.0000 deg	-12.88 dBi	Peak gain (dBi)

Monitor Audio Standard Antenna 2400 MHz Vertical_Panel Only



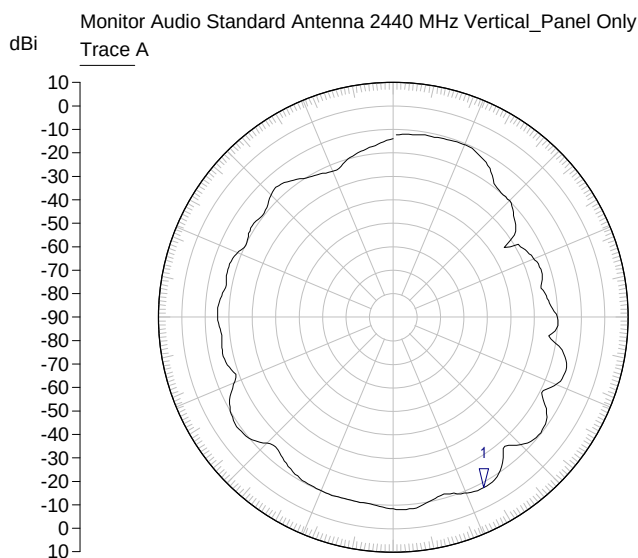
Res BW: 100 kHz
23/10/2025 15:33:19

Vid BW: 300 kHz
CF: 2.400 GHz

Sweep: 60.00 s
E4440A

Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	41.0000 deg	2.28 dBi	Peak gain (dBi)

Monitor Audio Standard Antenna 2440 MHz Horizontal_Panel Only



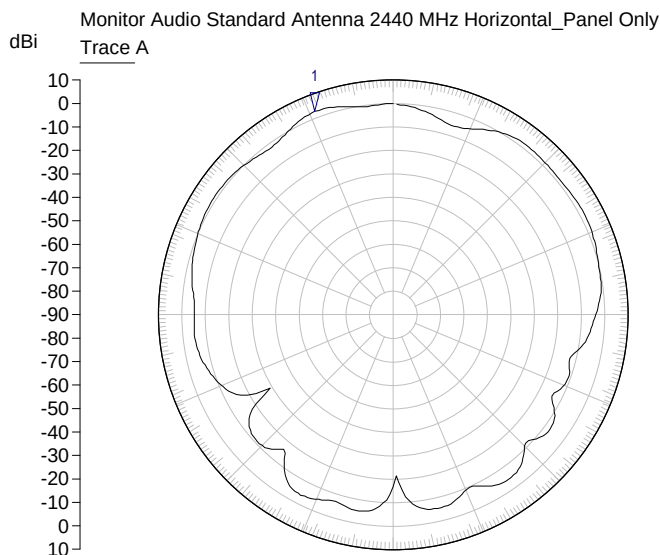
Res BW: 100 kHz
23/10/2025 15:02:23

Vid BW: 300 kHz
CF: 2.440 GHz

Sweep: 60.00 s
E4440A

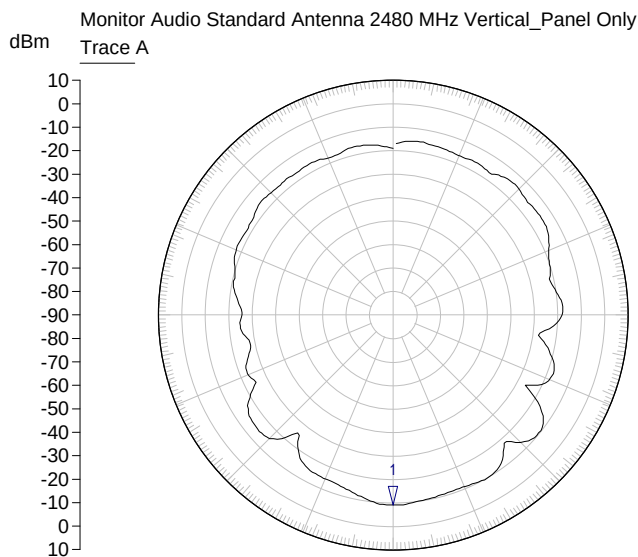
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	152.0000 deg	-7.73 dBi	Peak gain (dBi)

Monitor Audio Standard Antenna 2440 MHz Vertical_Panel Only



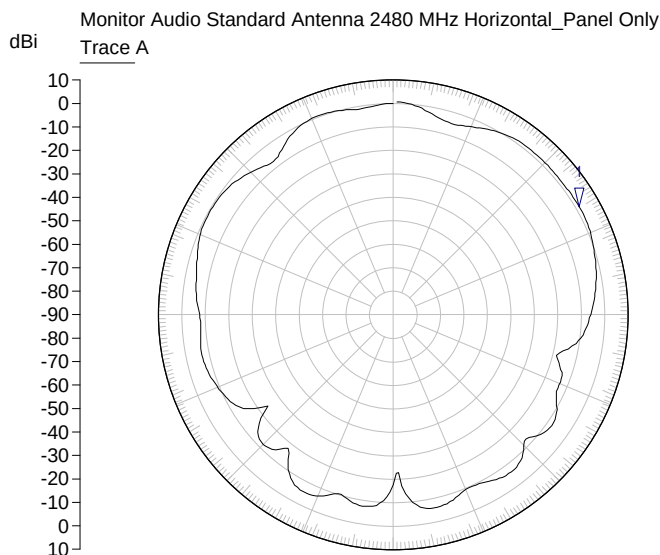
Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s
23/10/2025 15:30:22		CF: 2.440 GHz		E4440A
Mkr	Trace	X-Axis	Value	Notes
1 ▾	Trace A	339.0000 deg	2.66 dBi	Peak gain (dBi)

Monitor Audio Standard Antenna 2440 MHz Horizontal_Panel Only



Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s
23/10/2025 15:05:04		CF: 2.480 GHz		E4440A
Mkr	Trace	X-Axis	Value	Notes
1 ▾	Trace A	180.0000 deg	-8.87 dBm	Peak gain (dBi)

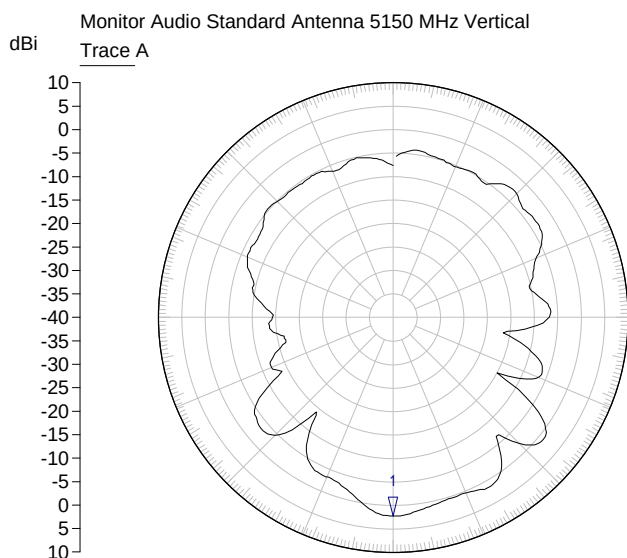
Monitor Audio Standard Antenna 2480 MHz Vertical_Panel Only



Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s
23/10/2025 15:27:27		CF: 2.480 GHz		E4440A
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	60.0000 deg	1.68 dBi	Peak gain (dBi)

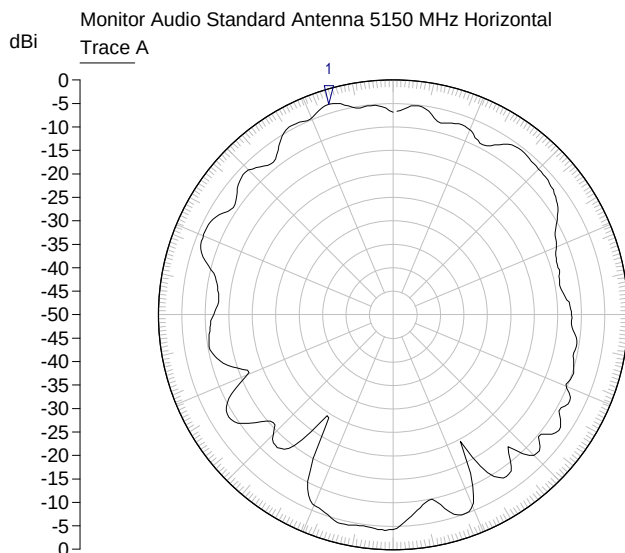
Monitor Audio Standard Antenna 2480 MHz Horizontal_Panel Only

Polar plots 5GHz Band:



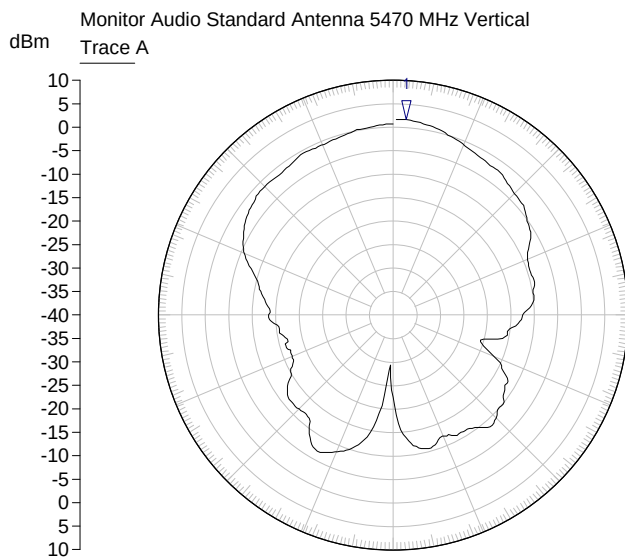
Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s
23/10/2025 15:07:11		CF: 5.150 GHz		E4440A
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	180.0000 deg	2.37 dBi	Peak gain (dBi)

Monitor Audio Standard Antenna 5150 MHz Vertical_Panel Only



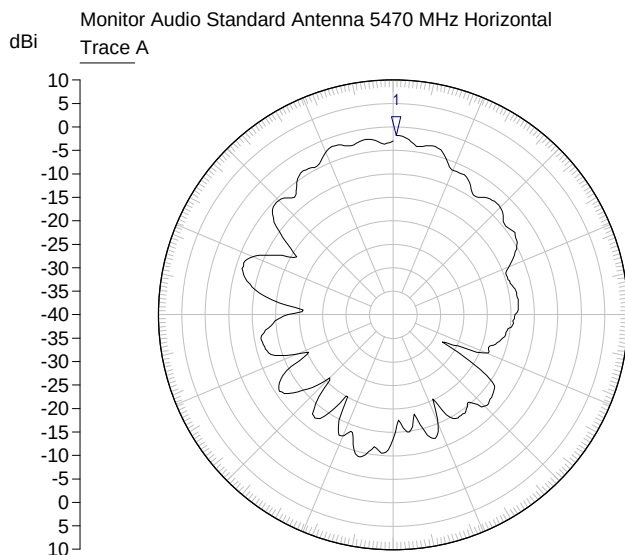
Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s
23/10/2025 15:23:05		CF: 5.150 GHz		E4440A
Mkr	Trace	X-Axis	Value	Notes
1 ▾	Trace A	343.0000 deg	-3.20 dBi	Peak gain (dBi)

Monitor Audio Standard Antenna 5150 MHz Horizontal_Panel Only



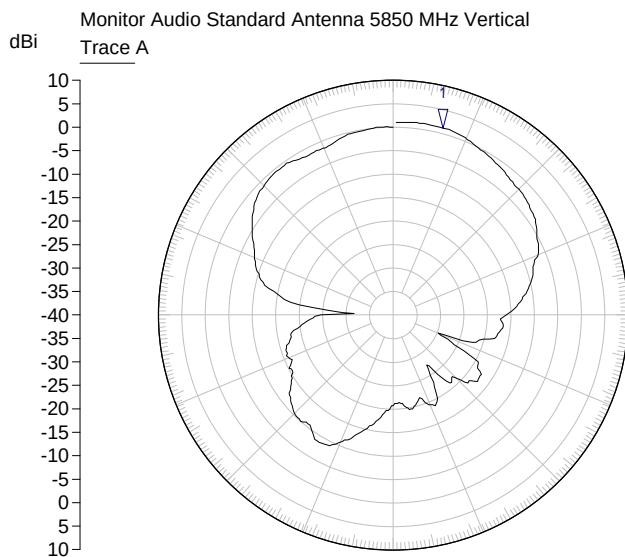
Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s
23/10/2025 15:09:42		CF: 5.470 GHz		E4440A
Mkr	Trace	X-Axis	Value	Notes
1 ▾	Trace A	4.0000 deg	1.71 dBm	Peak gain (dBi)

Monitor Audio Standard Antenna 5470 MHz Vertical_Panel Only



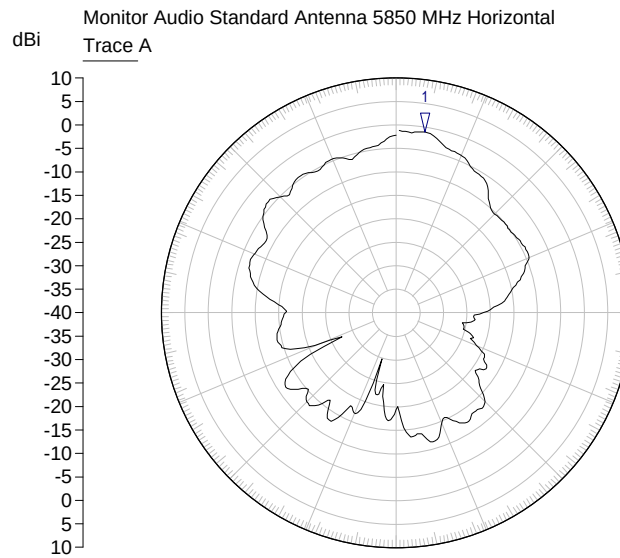
Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s
23/10/2025 15:20:22		CF: 5.470 GHz		E4440A
Mkr	Trace	X-Axis	Value	Notes
1 ▾	Trace A	1.0000 deg	-1.89 dBi	Peak gain (dBi)

Monitor Audio Standard Antenna 5470 MHz Horizontal_Panel Only



Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s
23/10/2025 15:12:55		CF: 5.850 GHz		E4440A
Mkr	Trace	X-Axis	Value	Notes
1 ▾	Trace A	15.0000 deg	1.31 dBi	Peak gain (dBi)

Monitor Audio Standard Antenna 5850 MHz Vertical_Panel Only



Res BW: 100 kHz
 23/10/2025 15:17:29

Vid BW: 300 kHz
 CF: 5.850 GHz

Sweep: 60.00 s
 E4440A

Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	9.0000 deg	-1.05 dBi	Peak gain (dBi)

Monitor Audio Standard Antenna 5850 MHz Horizontal_Panel Only

3.3 Antenna 1, Test 2a

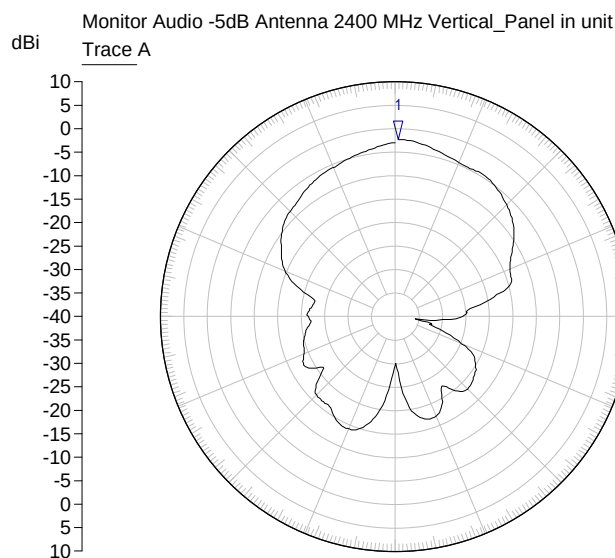
Test 2a, Antenna 1 fitted to Caspian 4G Streaming unit's rear panel with rear panel Fitted to Caspian 4G Product) measurements made on BluOS positioned Antenna.

Panel in unit:

Frequency (MHz)	Antenna 1 (Standard -5 dB in BluOS location) in unit	
	Vertical	Horizontal
2400	-2.28	-10.99
2440	-1.09	-7.47
2480	-1.45	-8.23
5150	-7.91	-0.52
5470	-7.32	-0.47
5850	-6.31	-2.46

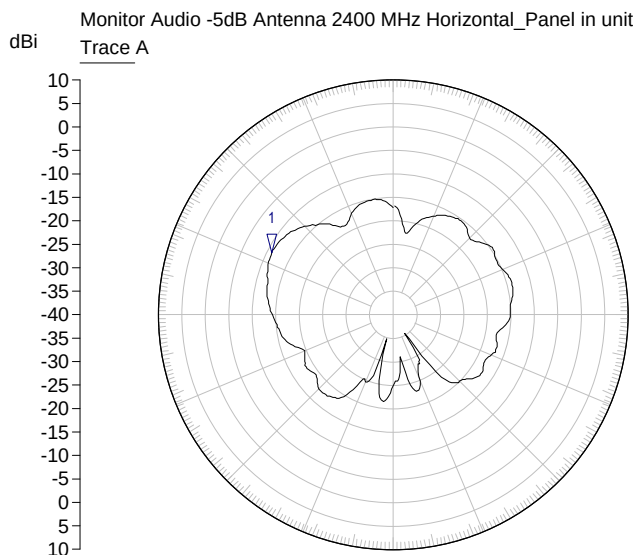
Denotes maximum gain measured.

Polar plots 2.4GHz Band:



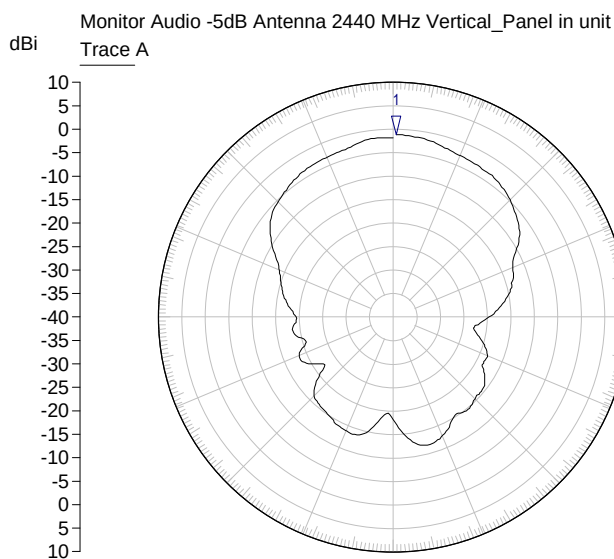
Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s	
24/10/2025 13:15:53		CF: 2.400000 GHz		E4440A	
Mkr	Trace	X-Axis	Value	Notes	
1 ▾	Trace A	1.0000 deg	-2.28 dBi	Peak gain (dBi)	

Monitor Audio -5dB Antenna 2400 MHz Vertical_Panel in unit



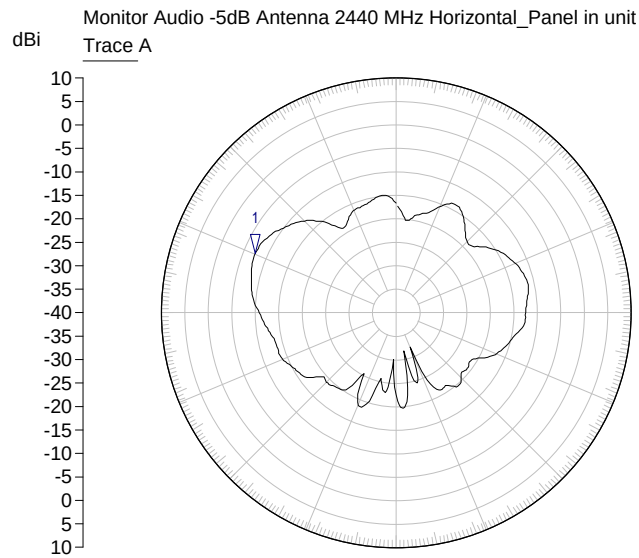
Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s
24/10/2025 14:10:52		CF: 2.400000 GHz		E4440A
Mkr	Trace	X-Axis	Value	Notes
1	Trace A	297.0000 deg	-10.99 dBi	Peak gain (dBi)

Monitor Audio -5dB Antenna 2400 MHz Horizontal_Panel in unit



Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s
24/10/2025 13:29:54		CF: 2.440000 GHz		E4440A
Mkr	Trace	X-Axis	Value	Notes
1	Trace A	1.0000 deg	-1.09 dBi	Peak gain (dBi)

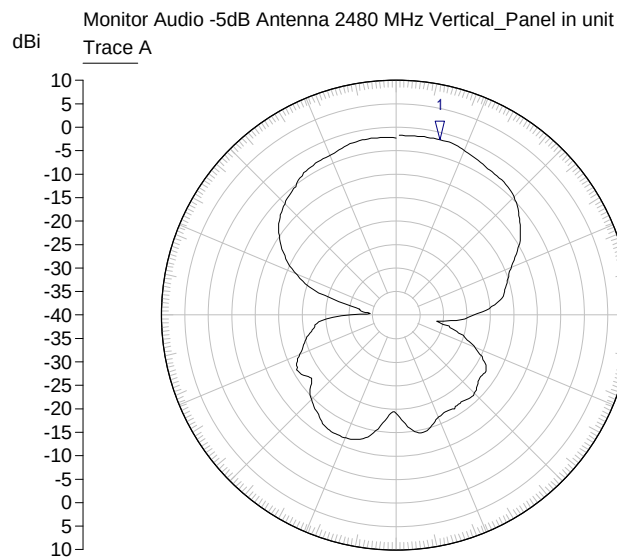
Monitor Audio -5dB Antenna 2440 MHz Vertical_Panel in unit



Res BW: 100 kHz Vid BW: 300 kHz Sweep: 60.00 s
24/10/2025 14:08:24 CF: 2.440000 GHz E4440A

Mkr	Trace	X-Axis	Value	Notes
1 ▾	Trace A	293.0000 deg	-7.47 dBi	Peak gain (dBi)

Monitor Audio -5dB Antenna 2440 MHz Horizontal_Panel in unit

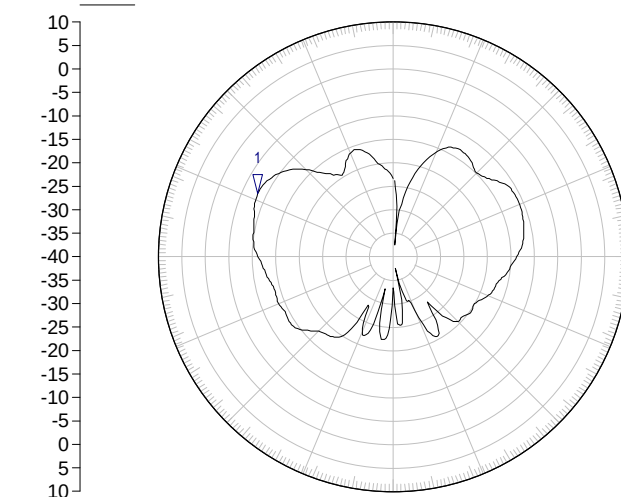


Res BW: 100 kHz Vid BW: 300 kHz Sweep: 60.00 s
24/10/2025 13:32:26 CF: 2.480000 GHz E4440A

Mkr	Trace	X-Axis	Value	Notes
1 ▾	Trace A	14.0000 deg	-1.45 dBi	Peak gain (dBi)

Monitor Audio -5dB Antenna 2480 MHz Vertical_Panel in unit

Monitor Audio -5dB Antenna 2480 MHz Horizontal_Panel in unit
Trace A

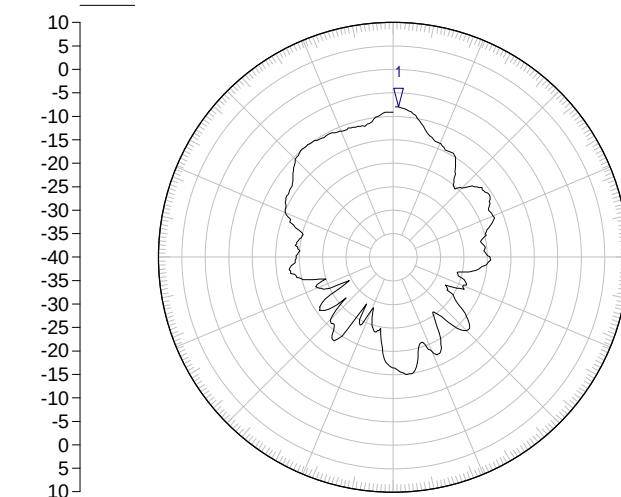


Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s	
24/10/2025 14:05:51		CF: 2.480000 GHz		E4440A	
Mkr	Trace	X-Axis	Value	Notes	
1 ▾	Trace A	295.0000 deg	-8.23 dBi	Peak gain (dBi)	

Monitor Audio -5dB Antenna 2480 MHz Horizontal_Panel in unit

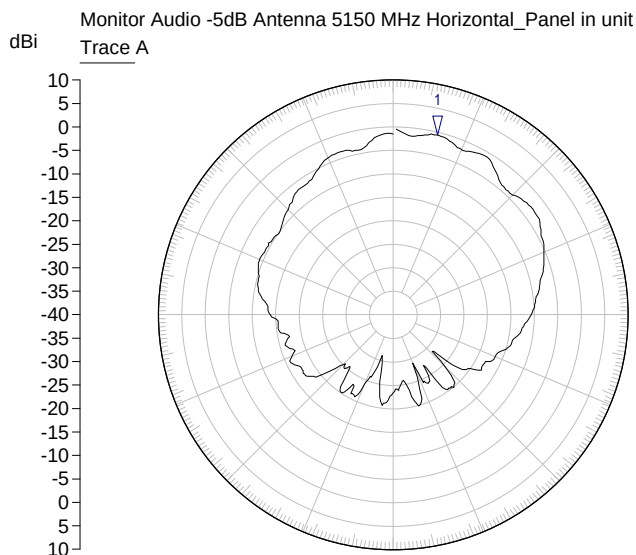
Polar plots 5GHz Band:

Monitor Audio -5dB Antenna 5150 MHz Vertical_Panel in unit
Trace A



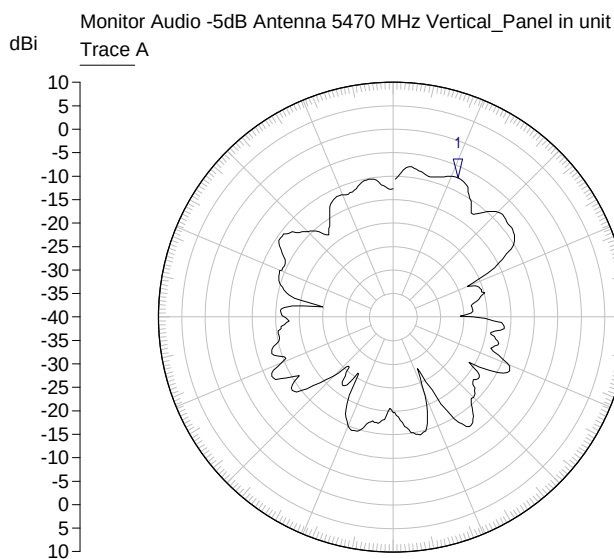
Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s	
24/10/2025 13:38:19		CF: 5.150000 GHz		E4440A	
Mkr	Trace	X-Axis	Value	Notes	
1 ▾	Trace A	2.0000 deg	-7.91 dBi	Peak gain (dBi)	

Monitor Audio -5dB Antenna 5150 MHz Vertical_Panel in unit



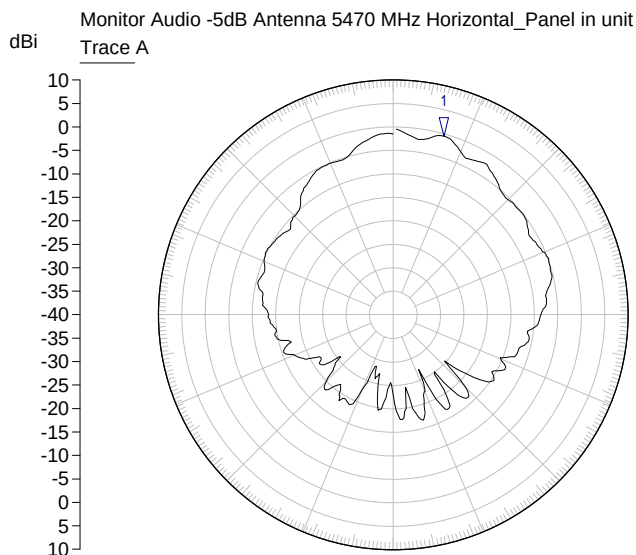
Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s
24/10/2025 14:02:30		CF: 5.150000 GHz		E4440A
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	14.0000 deg	-0.52 dBi	Peak gain (dBi)

Monitor Audio -5dB Antenna 5150 MHz Horizontal_Panel in unit



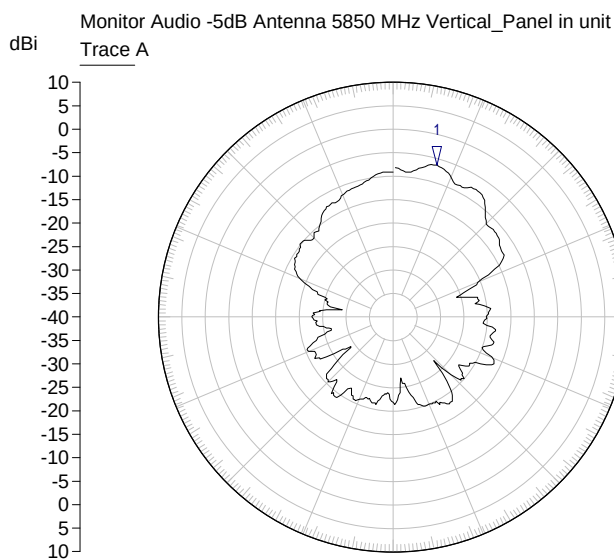
Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s
24/10/2025 13:41:50		CF: 5.470000 GHz		E4440A
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	25.0000 deg	-7.32 dBi	Peak gain (dBi)

Monitor Audio -5dB Antenna 5470 MHz Vertical_Panel in unit



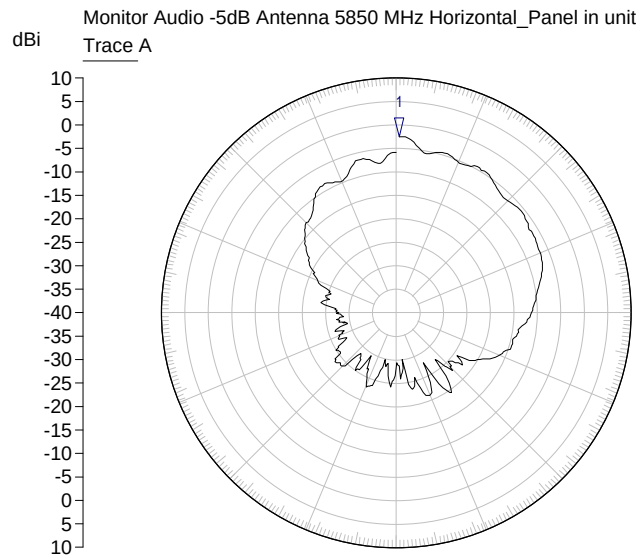
Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s
24/10/2025 14:00:05		CF: 5.470000 GHz		E4440A
Mkr	Trace	X-Axis	Value	Notes
1 ▾	Trace A	16.0000 deg	-0.47 dBi	Peak gain (dBi)

Monitor Audio -5dB Antenna 5470 MHz Horizontal_Panel in unit



Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s
24/10/2025 13:44:37		CF: 5.850000 GHz		E4440A
Mkr	Trace	X-Axis	Value	Notes
1 ▾	Trace A	16.0000 deg	-6.31 dBi	Peak gain (dBi)

Monitor Audio -5dB Antenna 5850 MHz Vertical_Panel in unit



Res BW: 100 kHz Vid BW: 300 kHz Sweep: 60.00 s
 24/10/2025 13:56:47 CF: 5.850000 GHz E4440A

Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	1.0000 deg	-2.46 dBi	Peak gain (dBi)

Monitor Audio -5dB Antenna 5850 MHz Horizontal_Panel in unit

3.4 Antenna 2, Test 2b

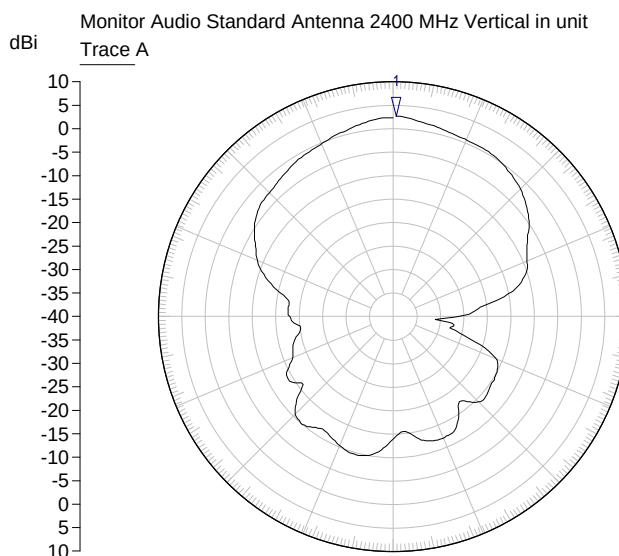
Test 2b, Antenna 2 fitted to Caspian 4G Streaming unit's rear panel with rear panel Fitted to Caspian 4G Product) measurements made on BTC positioned Antenna.

Panel in unit:

Frequency (MHz)	Antenna 2 (Standard antenna in BTC location) in unit	
	Vertical	Horizontal
2400	-7.17	2.7
2440	-3.43	3.65
2480	-4.08	2.77
5150	4.4	-2.99
5470	3.17	-3.52
5850	4.8	-1.09

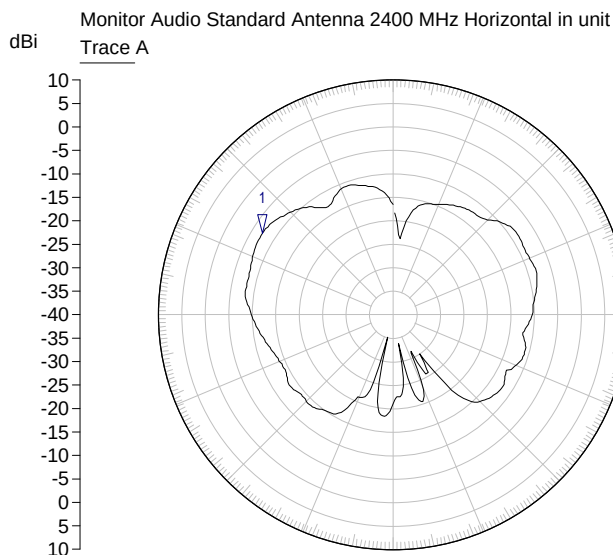
Denotes maximum gain measured.

Polar plots 2.4GHz Band:



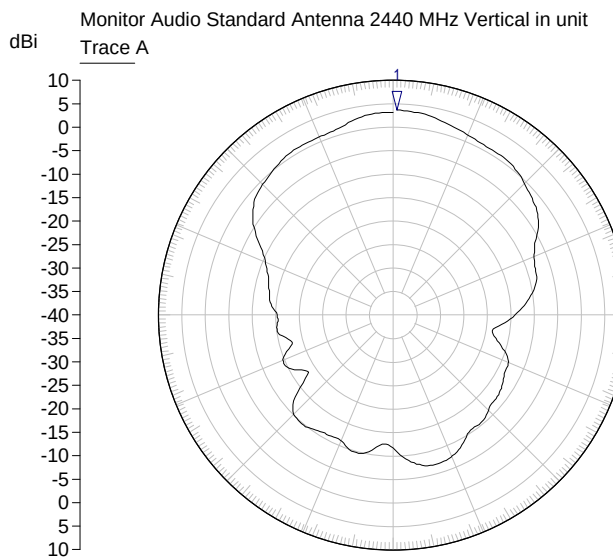
Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s
24/10/2025 12:28:20		CF: 2.400000 GHz		E4440A
Mkr	Trace	X-Axis	Value	Notes
1 ▾	Trace A	1.0000 deg	2.70 dBi	Peak gain (dBi)

Monitor Audio Standard Antenna 2400 MHz Vertical in unit



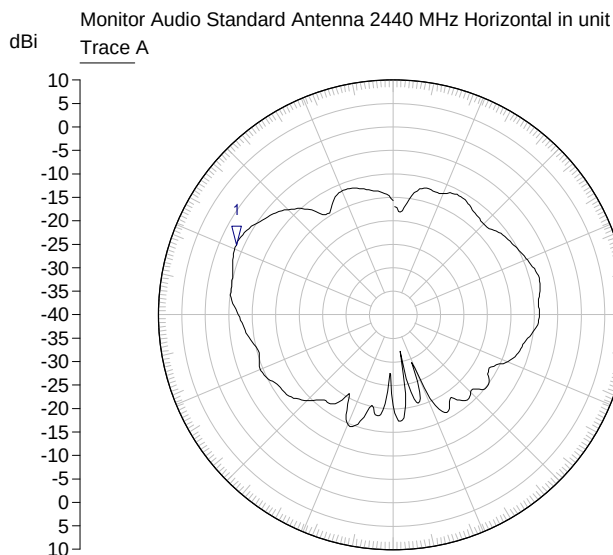
Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s
24/10/2025 11:52:08		CF: 2.400000 GHz		E4440A
Mkr	Trace	X-Axis	Value	Notes
1 ▾	Trace A	302.0000 deg	-7.17 dBi	Peak gain (dBi)

Monitor Audio Standard Antenna 2400 MHz Horizontal in unit



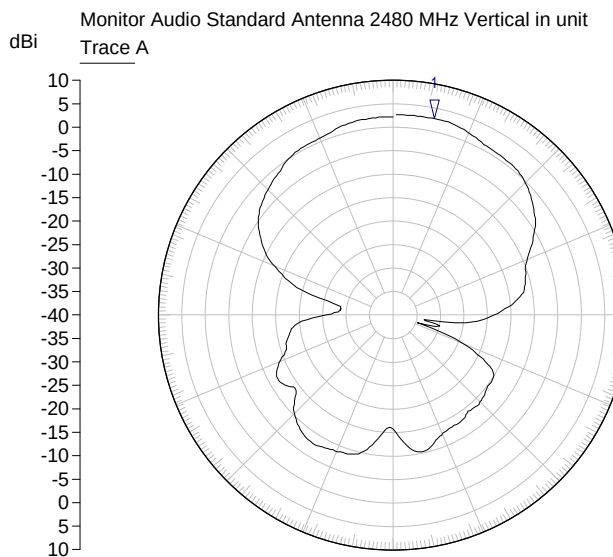
Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s
24/10/2025 12:24:27		CF: 2.440000 GHz		E4440A
Mkr	Trace	X-Axis	Value	Notes
1 ▾	Trace A	1.0000 deg	3.65 dBi	Peak gain (dBi)

Monitor Audio Standard Antenna 2440 MHz Vertical in unit



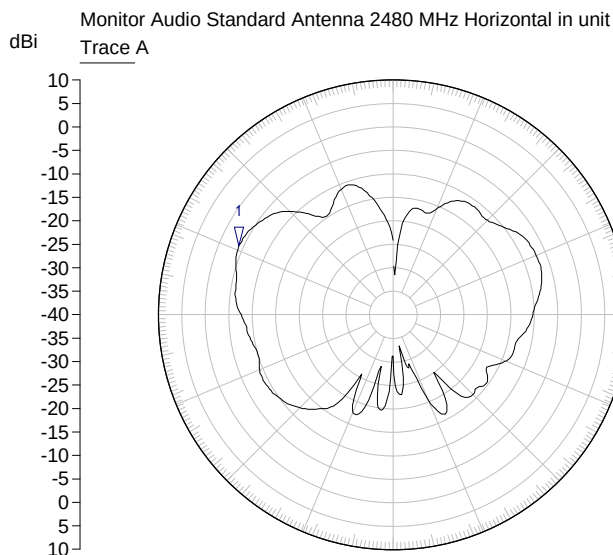
Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s
24/10/2025 11:56:29		CF: 2.440000 GHz		E4440A
Mkr	Trace	X-Axis	Value	Notes
1 ▾	Trace A	294.0000 deg	-3.43 dBi	Peak gain (dBi)

Monitor Audio Standard Antenna 2440 MHz Horizontal in unit



Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s
24/10/2025 12:31:38		CF: 2.480000 GHz		E4440A
Mkr	Trace	X-Axis	Value	Notes
1 ▾	Trace A	12.0000 deg	2.77 dBi	Peak gain (dBi)

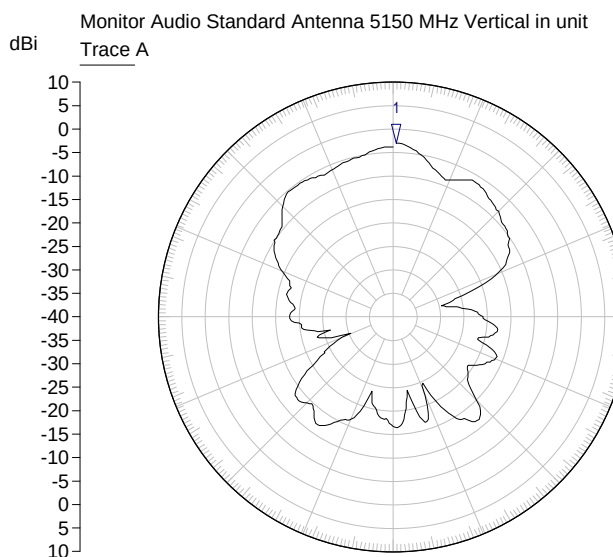
Monitor Audio Standard Antenna 2480 MHz Vertical in unit



Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s
24/10/2025 12:00:20		CF: 2.480000 GHz		E4440A
Mkr	Trace	X-Axis	Value	Notes
1 ▾	Trace A	294.0000 deg	-4.08 dBi	Peak gain (dBi)

Monitor Audio Standard Antenna 2480 MHz Horizontal in unit

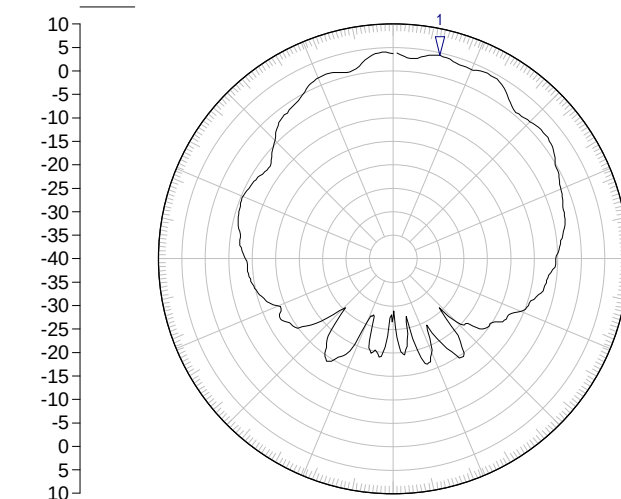
Polar plots 5GHz Band:



Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s
24/10/2025 12:20:02		CF: 5.150000 GHz		E4440A
Mkr	Trace	X-Axis	Value	Notes
1 ▾	Trace A	1.0000 deg	-2.99 dBi	Peak gain (dBi)

Monitor Audio Standard Antenna 5150 MHz Vertical in unit

Monitor Audio Standard Antenna 5150 MHz Horizontal in unit
Trace A

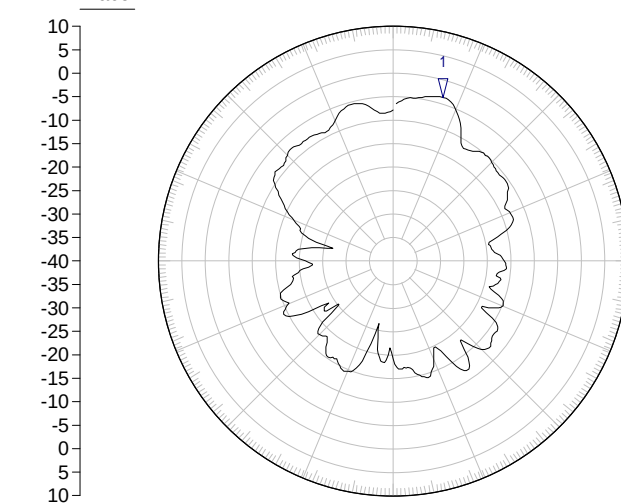


Res BW: 100 kHz Vid BW: 300 kHz Sweep: 60.00 s
24/10/2025 12:03:27 CF: 5.150000 GHz E4440A

Mkr	Trace	X-Axis	Value	Notes
1 ▾	Trace A	13.0000 deg	4.40 dBi	Peak gain (dBi)

Monitor Audio Standard Antenna 5150 MHz Horizontal in unit

Monitor Audio Standard Antenna 5470 MHz Vertical in unit
Trace A

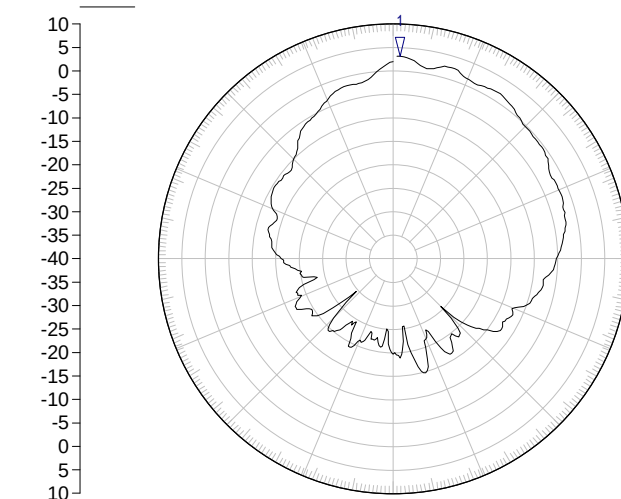


Res BW: 100 kHz Vid BW: 300 kHz Sweep: 60.00 s
24/10/2025 12:17:21 CF: 5.470000 GHz E4440A

Mkr	Trace	X-Axis	Value	Notes
1 ▾	Trace A	17.0000 deg	-3.52 dBi	Peak gain (dBi)

Monitor Audio Standard Antenna 5470 MHz Vertical in unit

Monitor Audio Standard Antenna 5470 MHz Horizontal in unit
Trace A

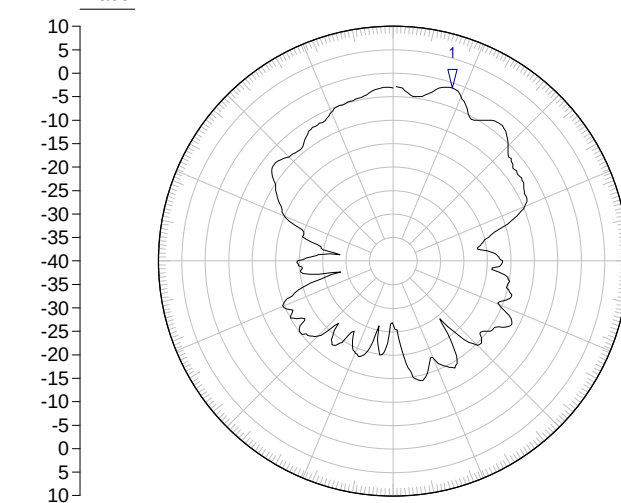


Res BW: 100 kHz Vid BW: 300 kHz Sweep: 60.00 s
24/10/2025 12:06:35 CF: 5.470000 GHz E4440A

Mkr	Trace	X-Axis	Value	Notes
1 ▾	Trace A	2.0000 deg	3.17 dBi	Peak gain (dBi)

Monitor Audio Standard Antenna 5470 MHz Horizontal in unit

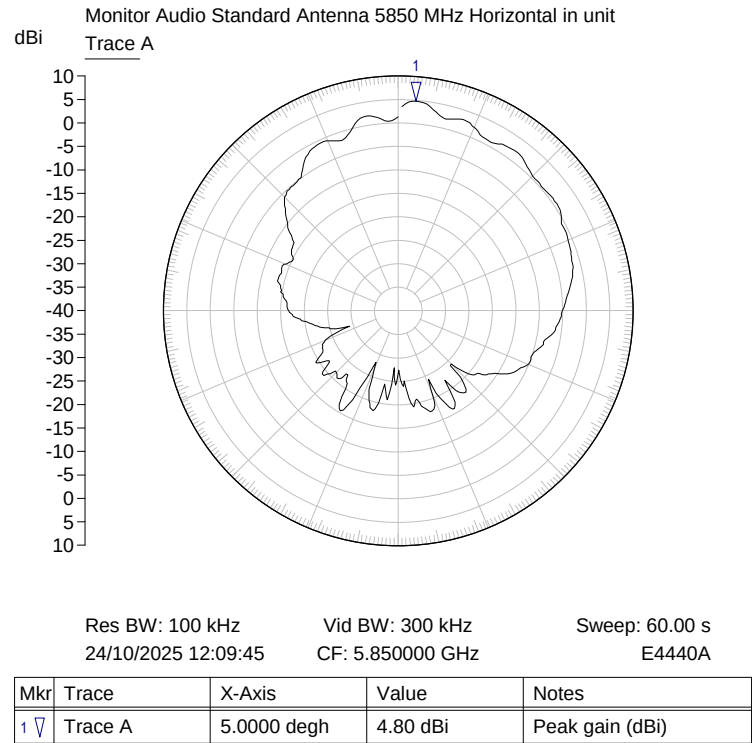
Monitor Audio Standard Antenna 5850 MHz Vertical in unit
Trace A



Res BW: 100 kHz Vid BW: 300 kHz Sweep: 60.00 s
24/10/2025 12:13:45 CF: 5.850000 GHz E4440A

Mkr	Trace	X-Axis	Value	Notes
1 ▾	Trace A	19.0000 deg	-1.09 dBi	Peak gain (dBi)

Monitor Audio Standard Antenna 5850 MHz Vertical in unit



Monitor Audio Standard Antenna 5850 MHz Horizontal in unit

3.5 Antenna 1, Test 3a

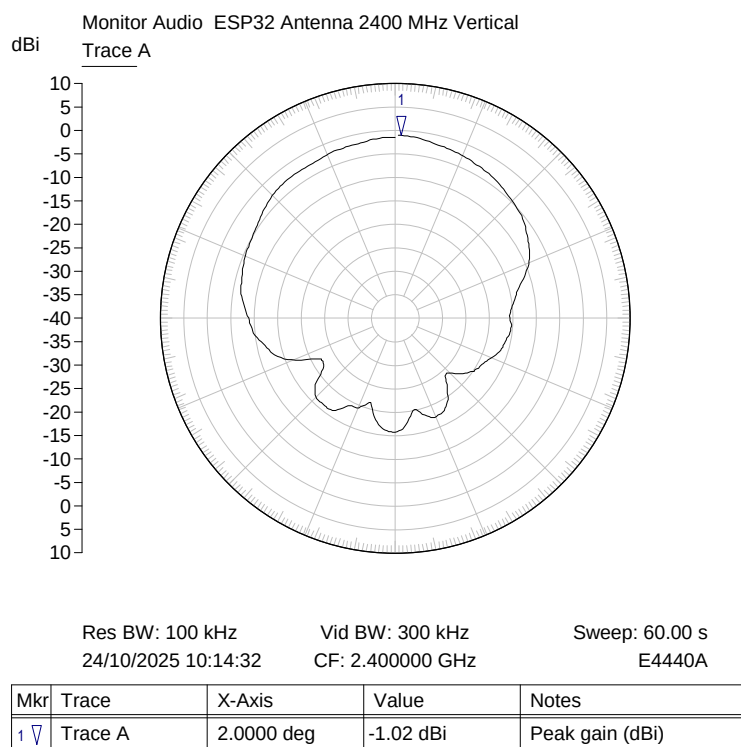
Test 3a, Antenna 1 fitted facing down in Caspian 4G chassis (used for ESP32 (BLE/2.4 WiFi) so the Caspian 4G amplifier was positioned on its side to enable testing.

Panel in unit:

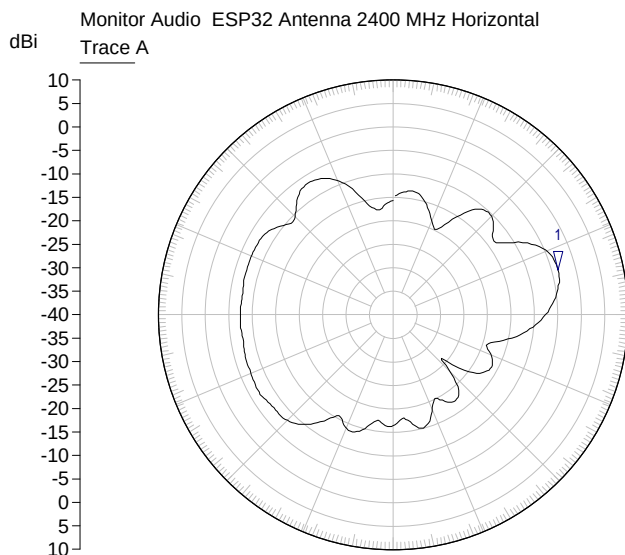
Frequency (MHz)	Antenna 1 – Fitted downwards in Chassis (ESP32 Antenna (in BLE/2.4 Wi-Fi location) in unit	
	Vertical	Horizontal
2400	-1.02	-3.57
2440	0.38	-2.99
2480	0.02	-4.13
5150	-5.9	2.25
5470	-2.97	3.36
5850	-2.16	1.75

Denotes maximum gain measured.

Polar plots 2.4GHz Band:

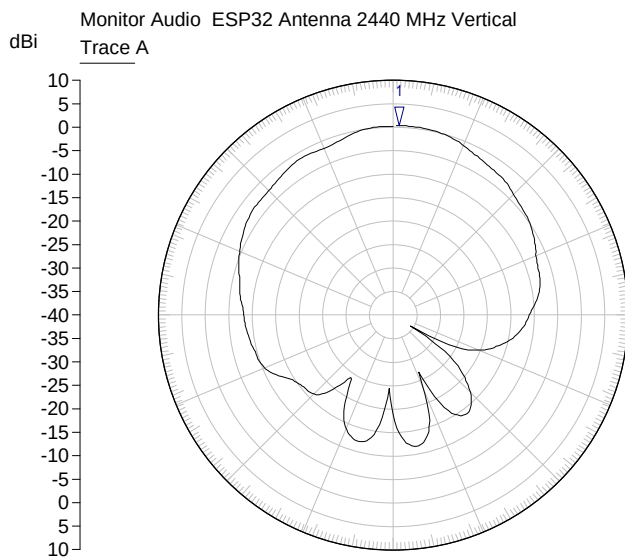


Monitor Audio ESP32 Antenna 2400 MHz Vertical



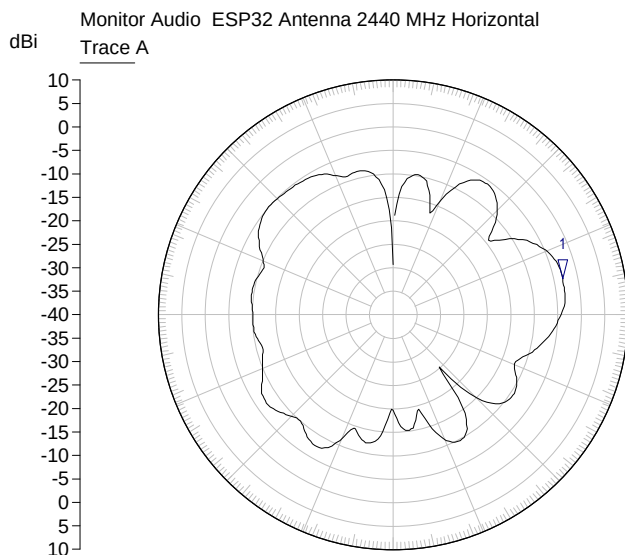
Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s
24/10/2025 11:03:05		CF: 2.400000 GHz		E4440A
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	75.0000 deg	-3.57 dBi	Peak gain (dBi)

Monitor Audio ESP32 Antenna 2400 MHz Horizontal



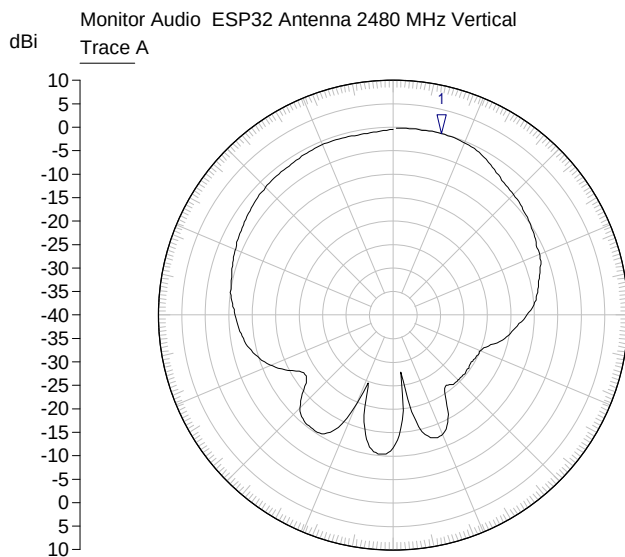
Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s
24/10/2025 10:28:08		CF: 2.440000 GHz		E4440A
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.0000 deg	0.38 dBi	Peak gain (dBi)

Monitor Audio ESP32 Antenna 2440 MHz Vertical



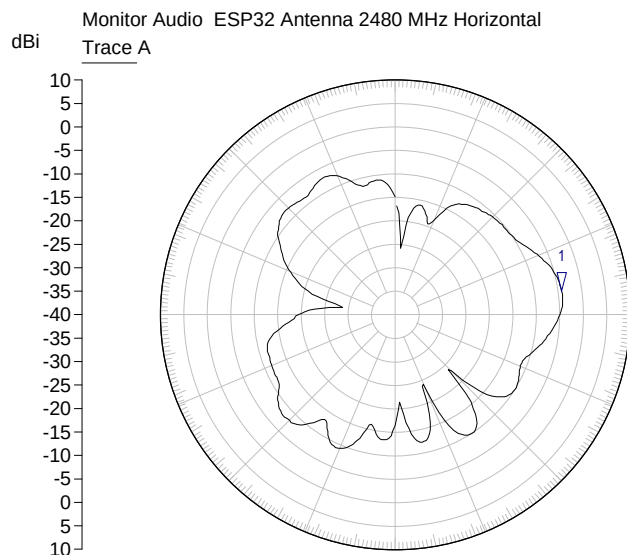
Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s
24/10/2025 11:00:32		CF: 2.440000 GHz		E4440A
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	78.0000 deg	-2.99 dBi	Peak gain (dBi)

Monitor Audio ESP32 Antenna 2440 MHz Horizontal



Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s
24/10/2025 10:33:24		CF: 2.480000 GHz		E4440A
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	15.0000 deg	0.02 dBi	Peak gain (dBi)

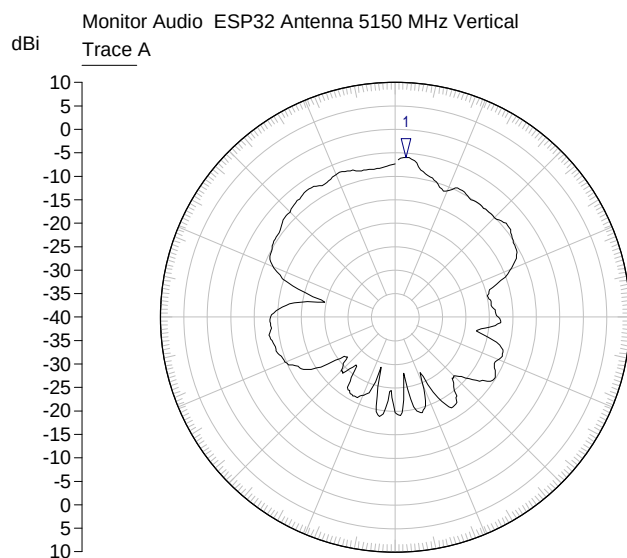
Monitor Audio ESP32 Antenna 2480 MHz Vertical



Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s
24/10/2025 10:58:03		CF: 2.480000 GHz		E4440A
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	82.0000 deg	-4.13 dBi	Peak gain (dBi)

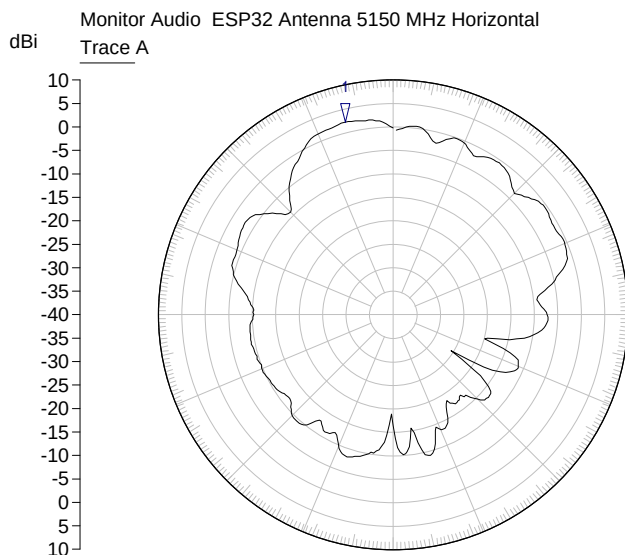
Monitor Audio ESP32 Antenna 2480 MHz Horizontal

Polar plots 5GHz Band:



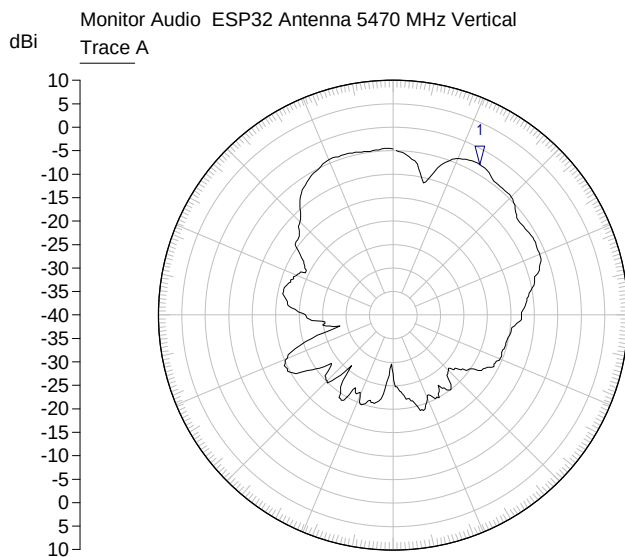
Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s
24/10/2025 10:38:06		CF: 5.150000 GHz		E4440A
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	4.0000 deg	-5.90 dBi	Peak gain (dBi)

Monitor Audio ESP32 Antenna 5150 MHz Vertical



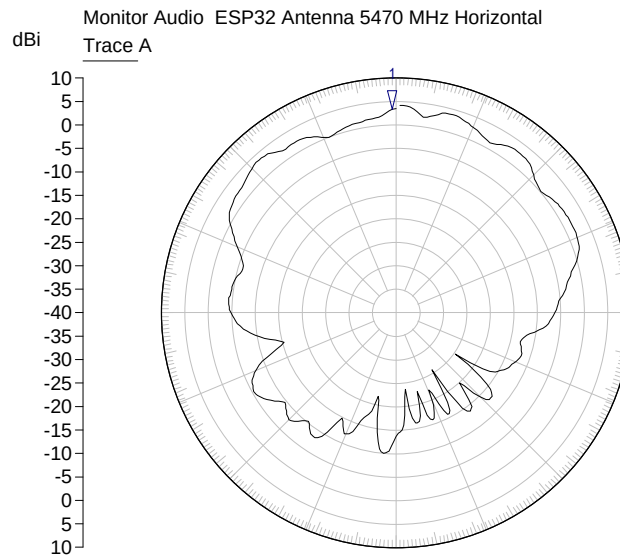
Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s
24/10/2025 10:55:45		CF: 5.150000 GHz		E4440A
Mkr	Trace	X-Axis	Value	Notes
1 ▾	Trace A	346.0000 deg	2.25 dBi	Peak gain (dBi)

Monitor Audio ESP32 Antenna 5150 MHz Horizontal



Res BW: 100 kHz		Vid BW: 300 kHz		Sweep: 60.00 s
24/10/2025 10:43:08		CF: 5.470000 GHz		E4440A
Mkr	Trace	X-Axis	Value	Notes
1 ▾	Trace A	30.0000 deg	-2.97 dBi	Peak gain (dBi)

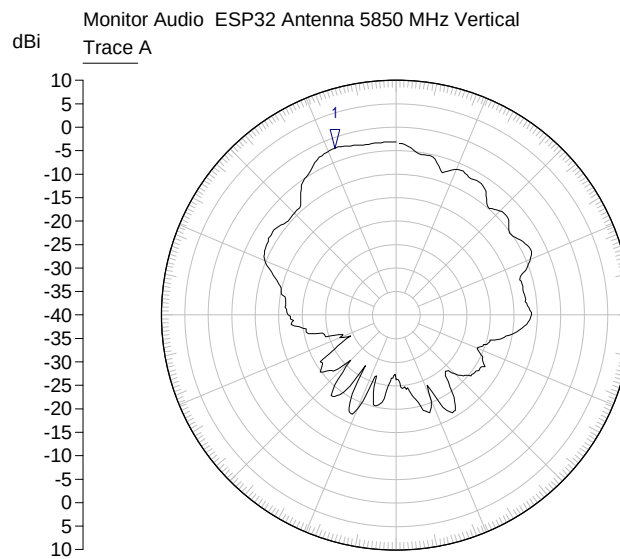
Monitor Audio ESP32 Antenna 5470 MHz Vertical



Res BW: 100 kHz Vid BW: 300 kHz Sweep: 60.00 s
24/10/2025 10:52:39 CF: 5.470000 GHz E4440A

Mkr	Trace	X-Axis	Value	Notes
1 ▾	Trace A	359.0000 deg	3.36 dBi	Peak gain (dBi)

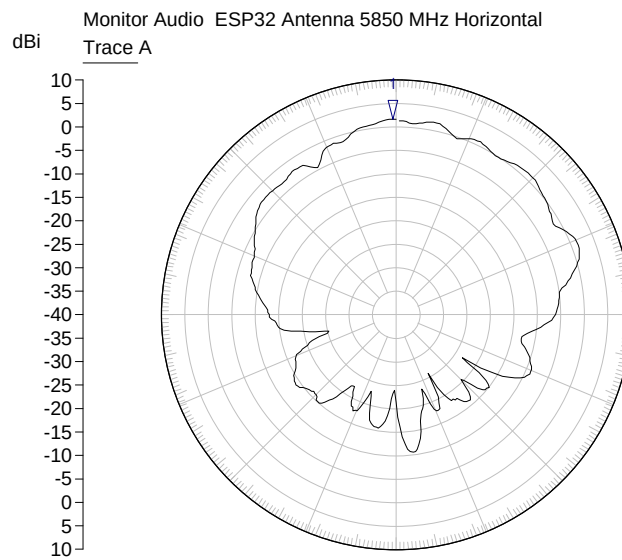
Monitor Audio ESP32 Antenna 5470 MHz Horizontal



Res BW: 100 kHz Vid BW: 300 kHz Sweep: 60.00 s
24/10/2025 10:46:50 CF: 5.850000 GHz E4440A

Mkr	Trace	X-Axis	Value	Notes
1 ▾	Trace A	340.0000 deg	-2.16 dBi	Peak gain (dBi)

Monitor Audio ESP32 Antenna 5850 MHz Vertical



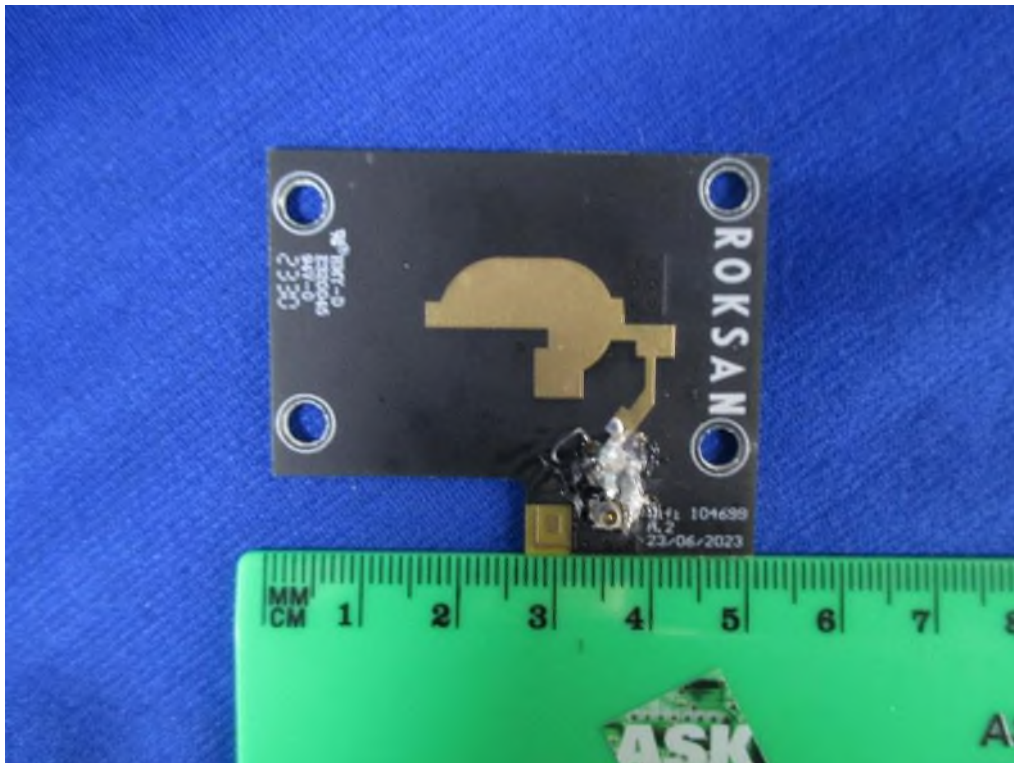
Res BW: 100 kHz Vid BW: 300 kHz Sweep: 60.00 s
 24/10/2025 10:49:51 CF: 5.850000 GHz E4440A

Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	359.0000 deg	1.75 dBi	Peak gain (dBi)

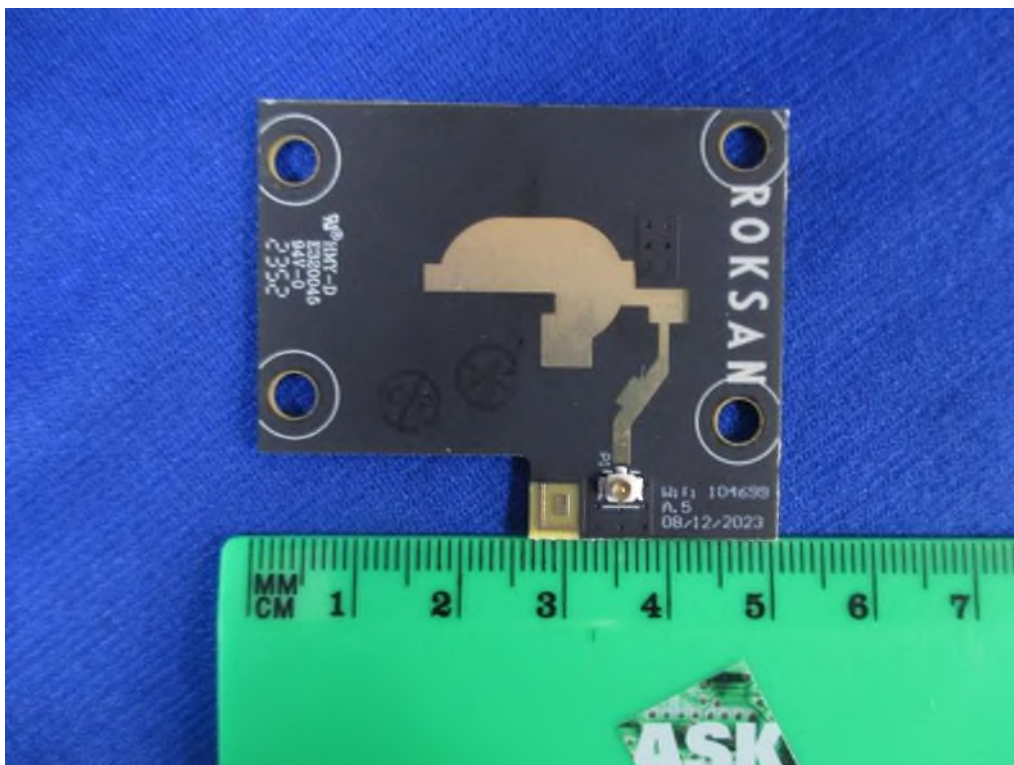
Monitor Audio ESP32 Antenna 5850 MHz Horizontal

4 – ID and test set-up photos

4.1 EUT Front View

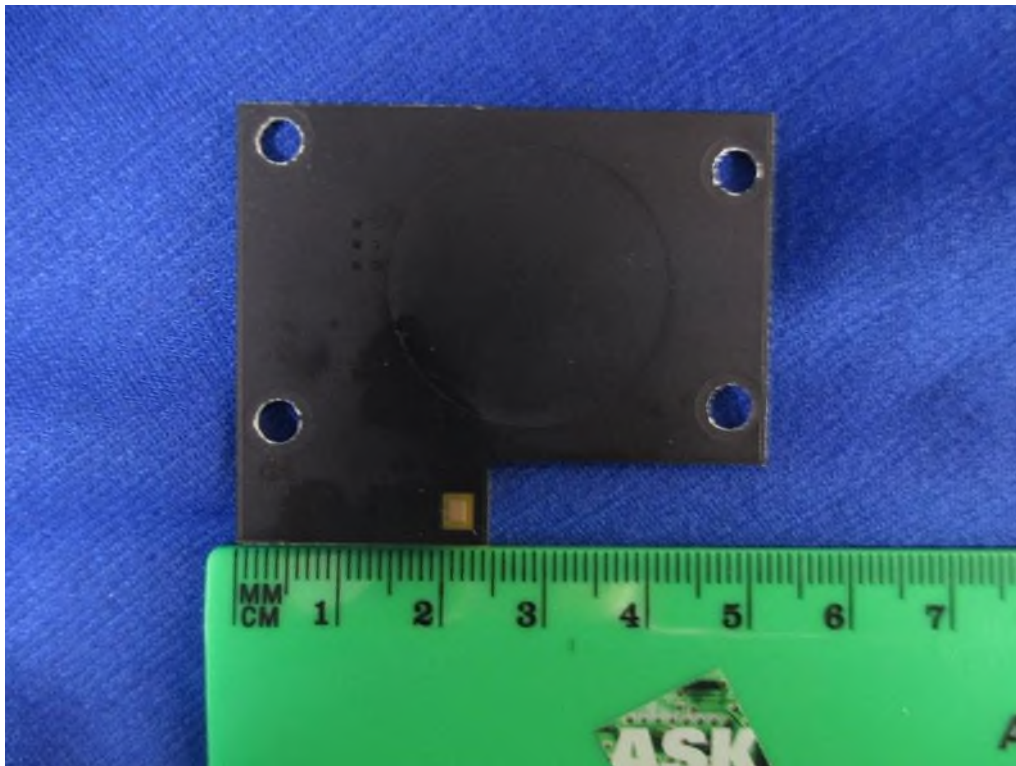


Antenna 1 = Antenna Part Number: 116559 A.1 10/28/2025 (-5dB modified antenna)

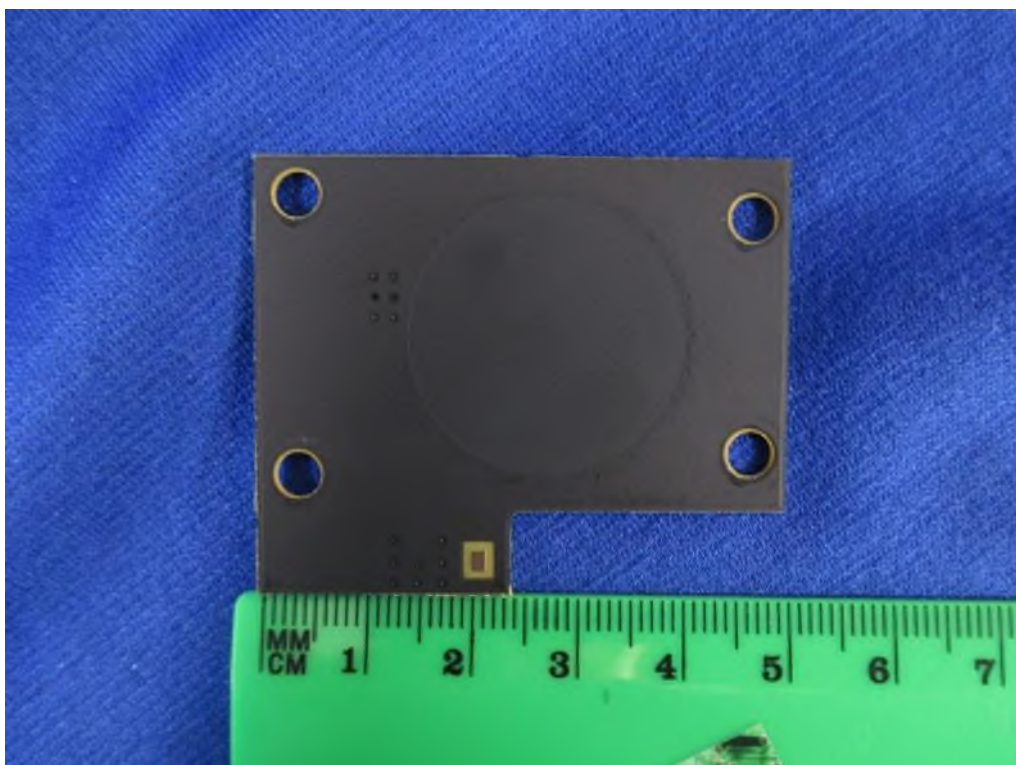


Antenna 2 = Antenna Part Number: 104699 A.5 08/12/2023

4.2 EUT Rear View



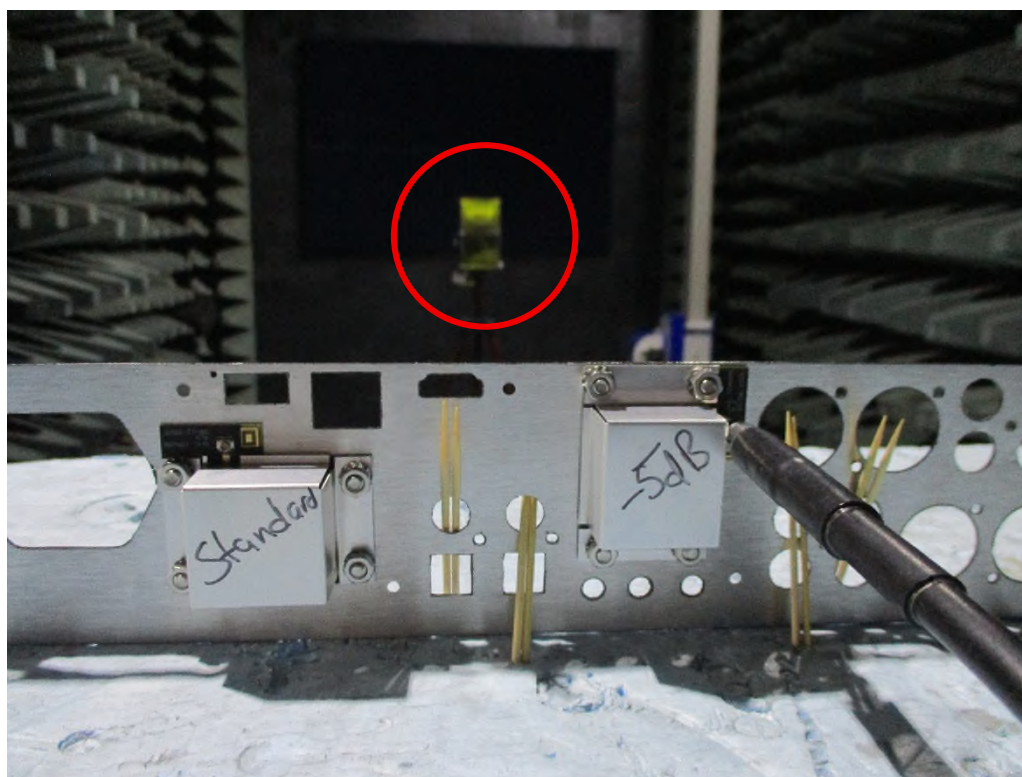
Antenna 1 = Antenna Part Number: 116559 A.1 10/28/2025 (-5dB modified antenna)

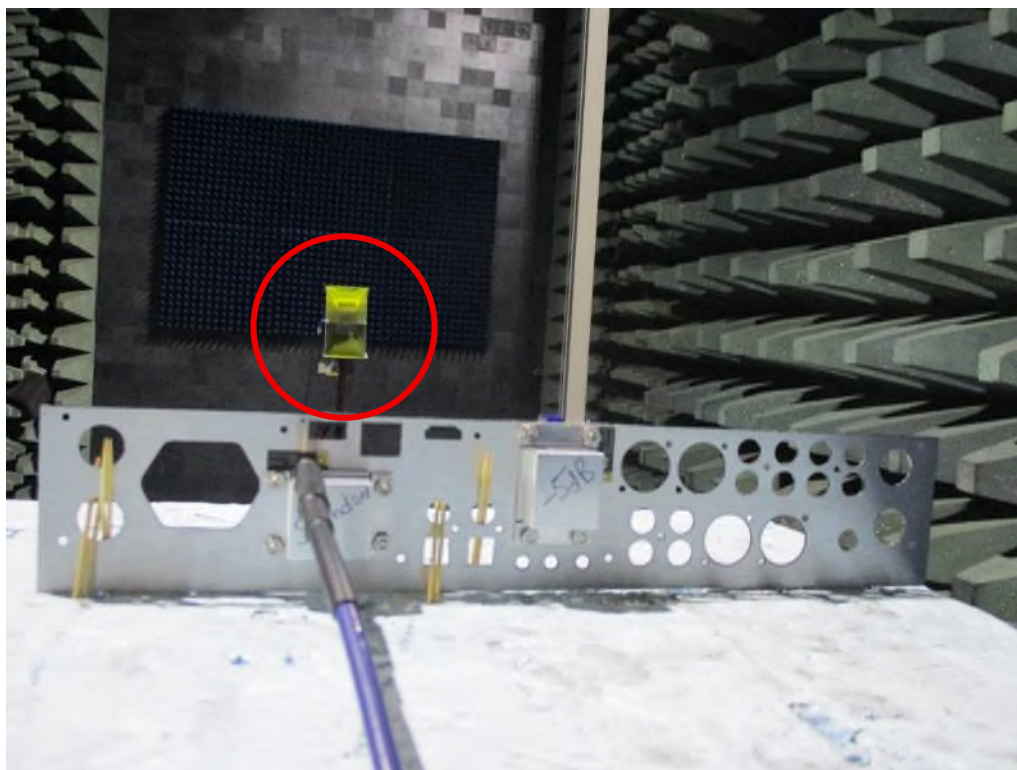


Antenna 2 = Antenna Part Number: 104699 A.5 08/12/2023

4.3 Antenna locations in rear panel







Panel out of unit (0 degrees position, measuring antenna circled). Antenna 2 under test



Panel in unit.



Panel in unit (0 degrees position, measuring antenna circled).

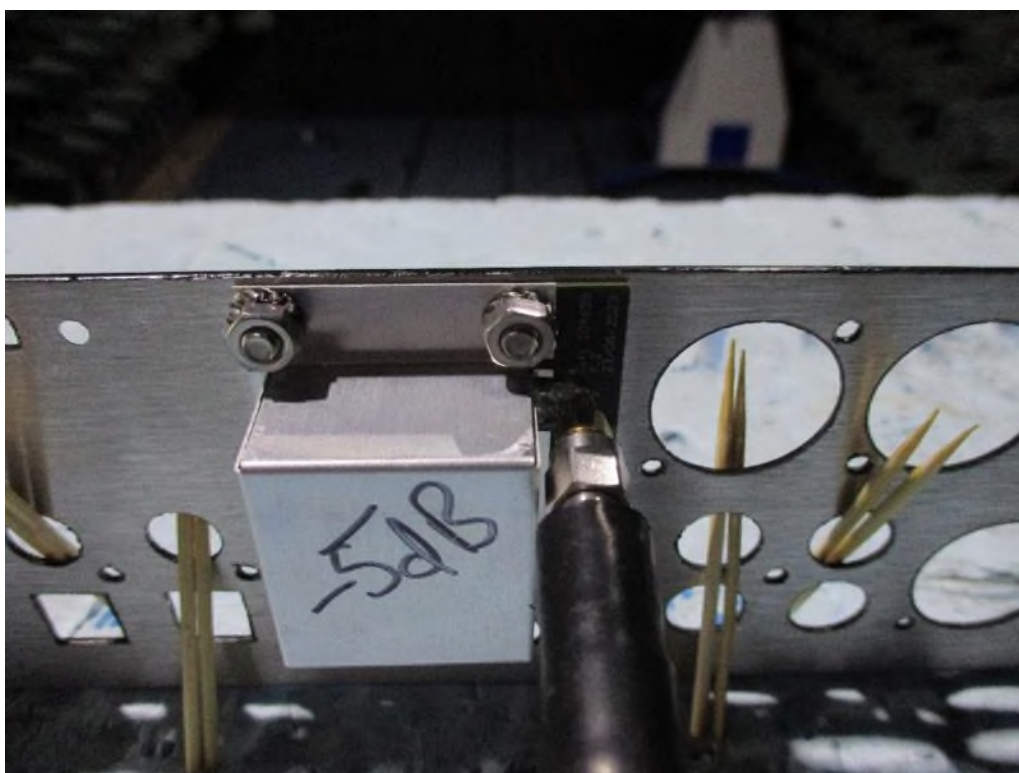


Caspian 4G amplifier orientation for ESP32 antenna tests only.

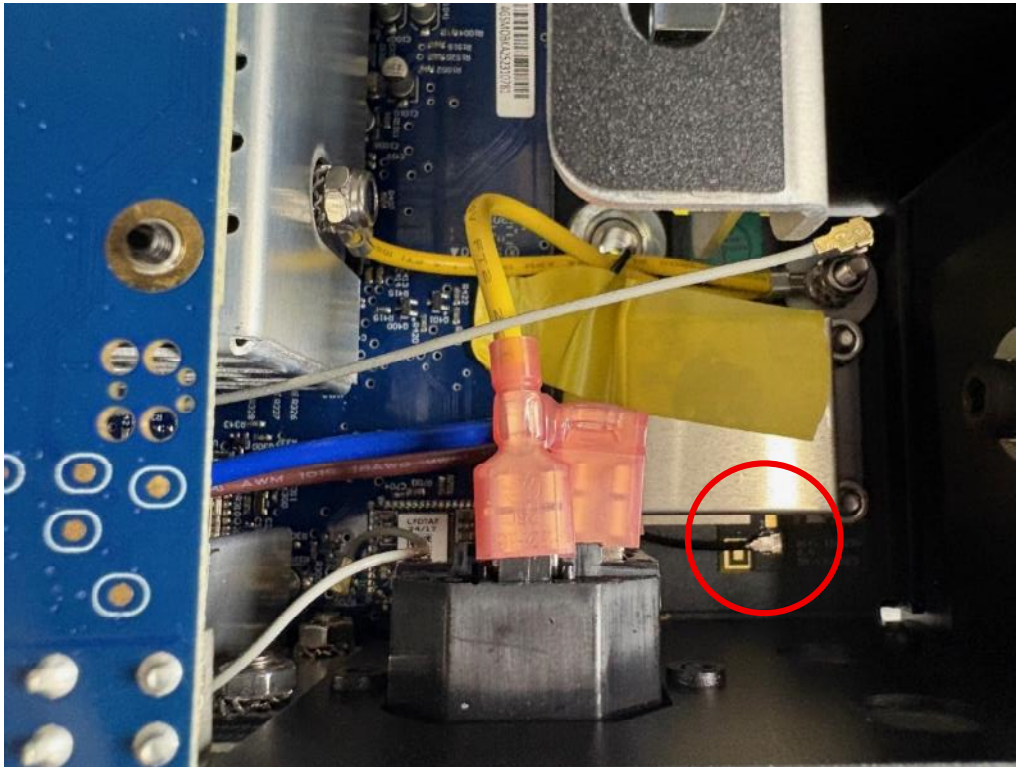
4.5 EUT Antenna Port



Antenna 2 - 'Standard' antenna port (in BTC location).

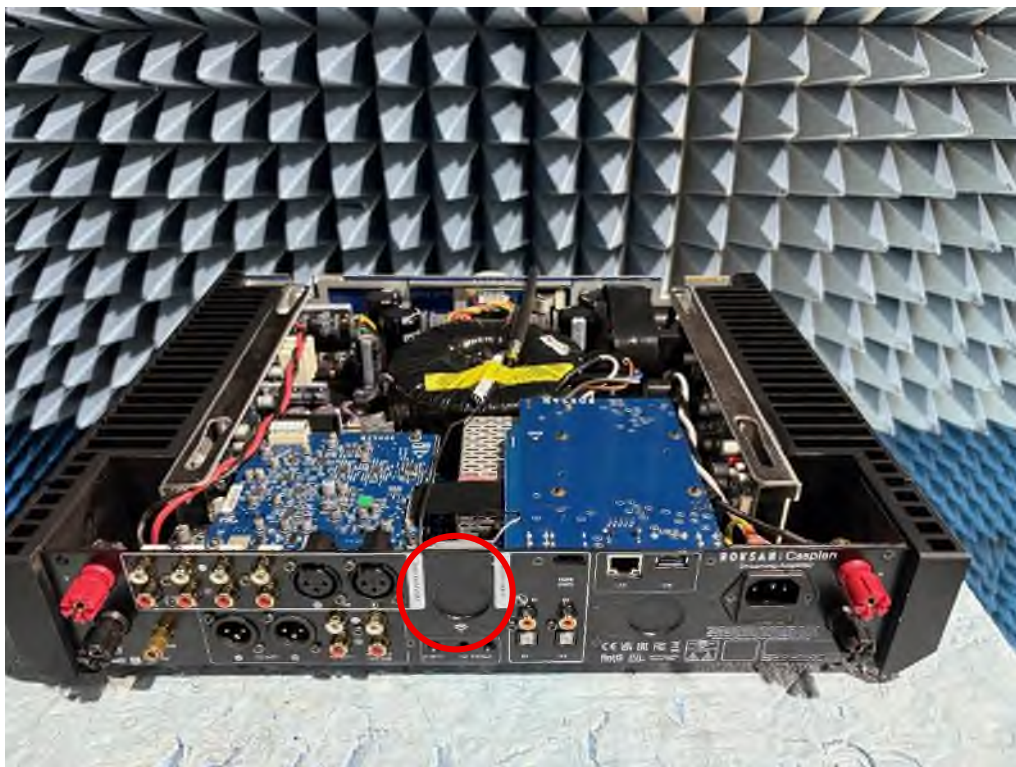


Antenna 1 - 'Standard -5dB' antenna port (in BluOS location).

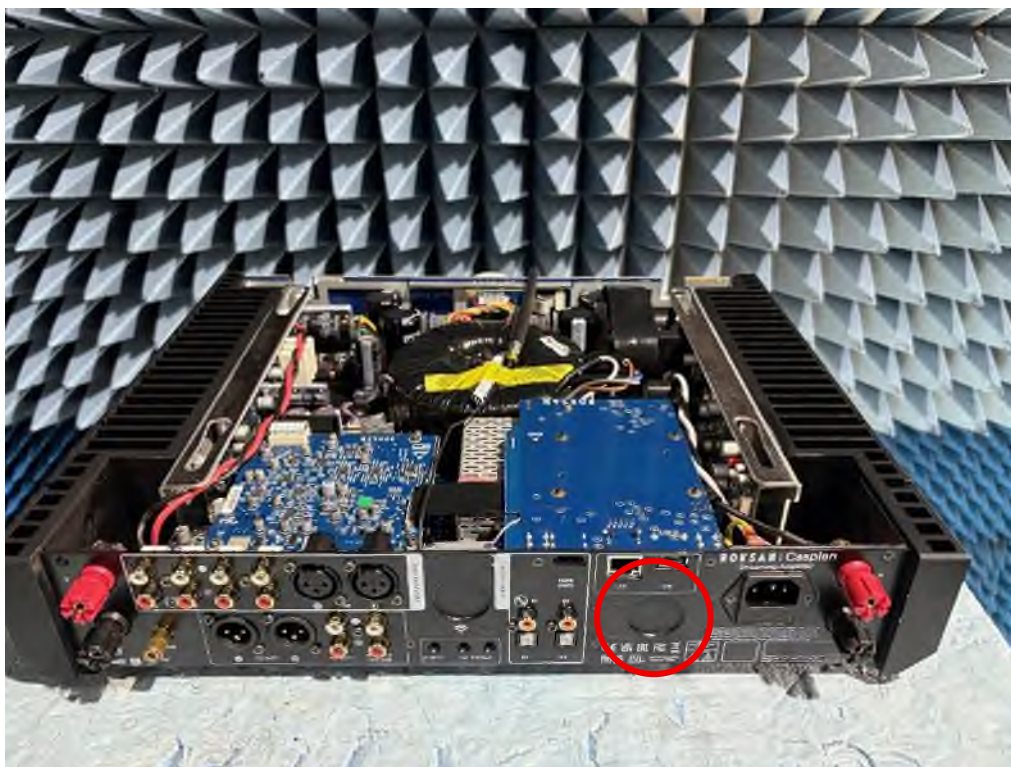


Antenna 1 - 'ESP32' antenna port (in BLE/2.4 WiFi location).

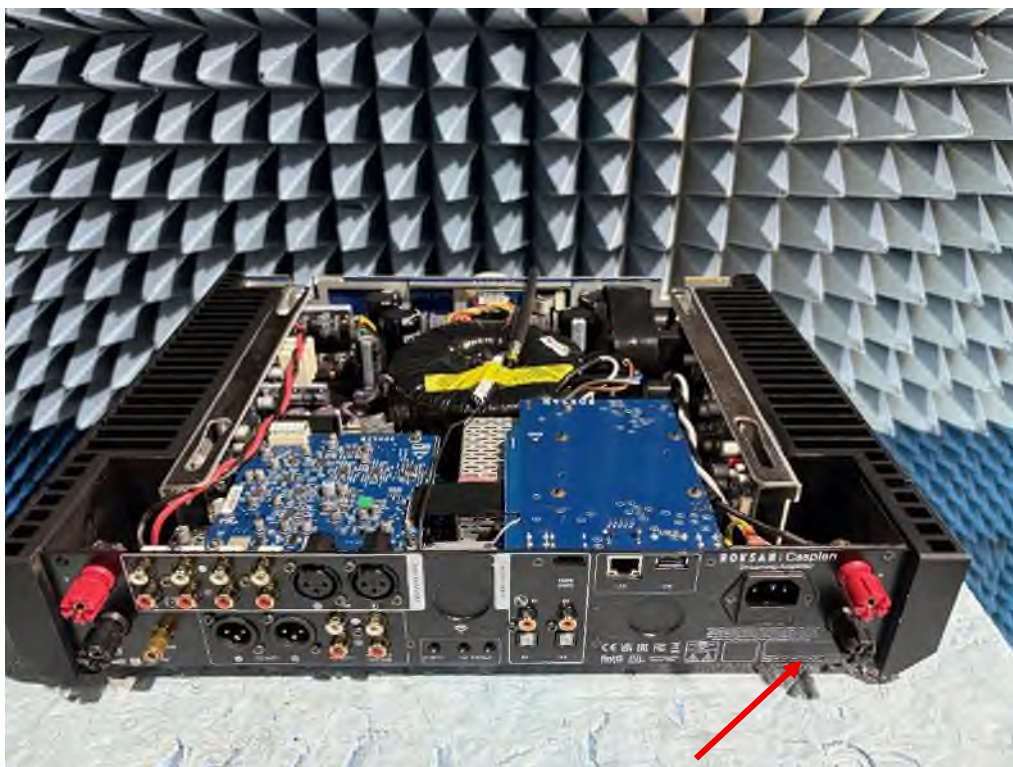
4.6 EUT Antenna Locations



BluOS antenna location (circled). (Antenna 1)



BTC antenna location (circled). (Antenna 2)



BLE/2.4 WiFi antenna location (arrowed).



BLE/2.4 WiFi antenna location (circled) - underside of chassis. (Antenna 1)

5 Test Equipment used

The following is a list of the test equipment used by Kiwa Electrical Compliance to test the Antennas detailed within this report. In line with our procedures, the test equipment was within calibration for the period during which testing was carried out.

KEC No	Model	Description	Manufacturer	Calibrated Date	Period
CAL08	MWX221	Cable N-Type-SMA Blue 2m (B)	Junflon	06-Nov-2024	12 months
E268	BHA9118	Horn Antenna 1 – 18 GHz	Schaffner	06-Jan-2025	12 months
E428	HF906	Horn Antenna 1 – 18 GHz	Rhode & Schwarz	23-May-2025	36 months
E653	MWX221	Cable N-Type-SMA Blue 2m (B)	Junflon	12-Dec-2024	12 months
E834	MWX221	Cable N-Type-SMA Blue 2m (B)	Junflon	27-Oct-2025	12 months
E904	5086-7805	Pre-Amplifier 1 GHz – 26.5 GHz	Hewlett Packard	04-Jul-2025	12 months
E932	N5181A	Signal Generator 100 kHz to 6 GHz	Agilent Technologies	06-Jun-2025	12 months
E412	E4440A	PSA 3Hz – 26.5 GHz	Agilent Technologies	22-Sep-2025	24 months
F424	ACO-035-510001-K4K4	Cable 2.92mm male to 2.92mm male 3.5m (B)	Etl systems	12-Dec-2024	12 months

6 Revision History

Issue Number	Revision History	Page Reference(s)
01	First Issue	-

===== END OF TEST REPORT =====