

# Calibration Results



Certificate No : IC-2024-057635

Calibration No : C-2024-067804

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## 1. Antenna Factor & Gain

| Frequency<br>(GHz) | AF<br>[dB(1/m)] | Gain<br>(dBi) | Frequency<br>(GHz) | AF<br>[dB(1/m)] | Gain<br>(dBi) | Frequency<br>(GHz) | AF<br>[dB(1/m)] | Gain<br>(dBi) |
|--------------------|-----------------|---------------|--------------------|-----------------|---------------|--------------------|-----------------|---------------|
| 60.00              | 43.6            | 22.2          | 63.70              | 43.8            | 22.5          | 67.40              | 44.0            | 22.8          |
| 60.10              | 43.6            | 22.2          | 63.80              | 43.8            | 22.5          | 67.50              | 44.0            | 22.8          |
| 60.20              | 43.6            | 22.2          | 63.90              | 43.8            | 22.5          | 67.60              | 44.0            | 22.8          |
| 60.30              | 43.7            | 22.2          | 64.00              | 43.8            | 22.6          | 67.70              | 44.1            | 22.8          |
| 60.40              | 43.7            | 22.2          | 64.10              | 43.8            | 22.6          | 67.80              | 44.1            | 22.8          |
| 60.50              | 43.7            | 22.2          | 64.20              | 43.8            | 22.6          | 67.90              | 44.1            | 22.8          |
| 60.60              | 43.7            | 22.2          | 64.30              | 43.8            | 22.6          | 68.00              | 44.1            | 22.7          |
| 60.70              | 43.7            | 22.2          | 64.40              | 43.8            | 22.7          | 68.10              | 44.2            | 22.7          |
| 60.80              | 43.7            | 22.2          | 64.50              | 43.7            | 22.7          | 68.20              | 44.2            | 22.7          |
| 60.90              | 43.7            | 22.2          | 64.60              | 43.7            | 22.7          | 68.30              | 44.2            | 22.7          |
| 61.00              | 43.7            | 22.3          | 64.70              | 43.7            | 22.7          | 68.40              | 44.3            | 22.7          |
| 61.10              | 43.6            | 22.3          | 64.80              | 43.8            | 22.7          | 68.50              | 44.3            | 22.6          |
| 61.20              | 43.6            | 22.4          | 64.90              | 43.8            | 22.7          | 68.60              | 44.3            | 22.6          |
| 61.30              | 43.6            | 22.4          | 65.00              | 43.8            | 22.6          | 68.70              | 44.4            | 22.6          |
| 61.40              | 43.5            | 22.4          | 65.10              | 43.9            | 22.6          | 68.80              | 44.4            | 22.6          |
| 61.50              | 43.5            | 22.5          | 65.20              | 43.9            | 22.6          | 68.90              | 44.4            | 22.6          |
| 61.60              | 43.5            | 22.5          | 65.30              | 44.0            | 22.6          | 69.00              | 44.4            | 22.6          |
| 61.70              | 43.5            | 22.5          | 65.40              | 44.0            | 22.5          | 69.10              | 44.3            | 22.7          |
| 61.80              | 43.5            | 22.5          | 65.50              | 44.0            | 22.5          | 69.20              | 44.3            | 22.7          |
| 61.90              | 43.6            | 22.5          | 65.60              | 44.0            | 22.5          | 69.30              | 44.3            | 22.7          |
| 62.00              | 43.6            | 22.5          | 65.70              | 44.0            | 22.5          | 69.40              | 44.3            | 22.8          |
| 62.10              | 43.6            | 22.5          | 65.80              | 44.0            | 22.5          | 69.50              | 44.3            | 22.8          |
| 62.20              | 43.7            | 22.4          | 65.90              | 44.1            | 22.5          | 69.60              | 44.2            | 22.8          |
| 62.30              | 43.7            | 22.4          | 66.00              | 44.1            | 22.6          | 69.70              | 44.2            | 22.9          |
| 62.40              | 43.7            | 22.4          | 66.10              | 44.1            | 22.6          | 69.80              | 44.2            | 22.9          |
| 62.50              | 43.7            | 22.4          | 66.20              | 44.1            | 22.6          | 69.90              | 44.2            | 22.9          |
| 62.60              | 43.7            | 22.4          | 66.30              | 44.1            | 22.6          | 70.00              | 44.2            | 22.9          |
| 62.70              | 43.8            | 22.4          | 66.40              | 44.1            | 22.6          | 70.10              | 44.2            | 22.9          |
| 62.80              | 43.8            | 22.4          | 66.50              | 44.1            | 22.6          | 70.20              | 44.2            | 22.9          |
| 62.90              | 43.8            | 22.4          | 66.60              | 44.0            | 22.7          | 70.30              | 44.3            | 22.9          |
| 63.00              | 43.8            | 22.4          | 66.70              | 44.0            | 22.7          | 70.40              | 44.3            | 22.9          |
| 63.10              | 43.9            | 22.4          | 66.80              | 44.0            | 22.7          | 70.50              | 44.3            | 22.9          |
| 63.20              | 43.9            | 22.4          | 66.90              | 44.0            | 22.7          | 70.60              | 44.3            | 22.9          |
| 63.30              | 43.9            | 22.4          | 67.00              | 44.0            | 22.8          | 70.70              | 44.4            | 22.8          |
| 63.40              | 43.9            | 22.4          | 67.10              | 44.0            | 22.8          | 70.80              | 44.4            | 22.8          |
| 63.50              | 43.9            | 22.4          | 67.20              | 44.0            | 22.8          | 70.90              | 44.4            | 22.8          |
| 63.60              | 43.8            | 22.4          | 67.30              | 44.0            | 22.8          | 71.00              | 44.5            | 22.8          |

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## 1. Antenna Factor & Gain (cont.)

| Frequency<br>(GHz) | AF<br>[dB(1/m)] | Gain<br>(dBi) | Frequency<br>(GHz) | AF<br>[dB(1/m)] | Gain<br>(dBi) | Frequency<br>(GHz) | AF<br>[dB(1/m)] | Gain<br>(dBi) |
|--------------------|-----------------|---------------|--------------------|-----------------|---------------|--------------------|-----------------|---------------|
| 71.10              | 44.5            | 22.7          | 74.60              | 44.8            | 22.9          | 78.10              | 44.9            | 23.1          |
| 71.20              | 44.6            | 22.7          | 74.70              | 44.8            | 22.9          | 78.20              | 44.9            | 23.1          |
| 71.30              | 44.6            | 22.7          | 74.80              | 44.8            | 22.9          | 78.30              | 44.9            | 23.2          |
| 71.40              | 44.6            | 22.7          | 74.90              | 44.8            | 22.9          | 78.40              | 44.9            | 23.2          |
| 71.50              | 44.6            | 22.7          | 75.00              | 44.8            | 23.0          | 78.50              | 44.9            | 23.2          |
| 71.60              | 44.6            | 22.7          | 75.10              | 44.7            | 23.0          | 78.60              | 44.9            | 23.2          |
| 71.70              | 44.6            | 22.7          | 75.20              | 44.7            | 23.0          | 78.70              | 44.9            | 23.2          |
| 71.80              | 44.6            | 22.7          | 75.30              | 44.7            | 23.0          | 78.80              | 44.9            | 23.2          |
| 71.90              | 44.6            | 22.7          | 75.40              | 44.7            | 23.1          | 78.90              | 45.0            | 23.2          |
| 72.00              | 44.6            | 22.8          | 75.50              | 44.7            | 23.1          | 79.00              | 45.0            | 23.2          |
| 72.10              | 44.6            | 22.8          | 75.60              | 44.7            | 23.1          | 79.10              | 45.0            | 23.1          |
| 72.20              | 44.5            | 22.9          | 75.70              | 44.7            | 23.1          | 79.20              | 45.1            | 23.1          |
| 72.30              | 44.5            | 22.9          | 75.80              | 44.7            | 23.2          | 79.30              | 45.1            | 23.1          |
| 72.40              | 44.5            | 22.9          | 75.90              | 44.7            | 23.1          | 79.40              | 45.2            | 23.0          |
| 72.50              | 44.5            | 23.0          | 76.00              | 44.7            | 23.1          | 79.50              | 45.2            | 23.0          |
| 72.60              | 44.5            | 23.0          | 76.10              | 44.7            | 23.1          | 79.60              | 45.3            | 23.0          |
| 72.70              | 44.4            | 23.0          | 76.20              | 44.8            | 23.1          | 79.70              | 45.3            | 23.0          |
| 72.80              | 44.4            | 23.0          | 76.30              | 44.8            | 23.0          | 79.80              | 45.3            | 22.9          |
| 72.90              | 44.4            | 23.0          | 76.40              | 44.9            | 23.0          | 79.90              | 45.3            | 23.0          |
| 73.00              | 44.5            | 23.0          | 76.50              | 44.9            | 23.0          | 80.00              | 45.3            | 23.0          |
| 73.10              | 44.5            | 23.0          | 76.60              | 44.9            | 23.0          | 80.10              | 45.3            | 23.0          |
| 73.20              | 44.5            | 23.0          | 76.70              | 45.0            | 22.9          | 80.20              | 45.3            | 23.0          |
| 73.30              | 44.5            | 23.0          | 76.80              | 45.0            | 22.9          | 80.30              | 45.3            | 23.0          |
| 73.40              | 44.5            | 23.0          | 76.90              | 45.0            | 22.9          | 80.40              | 45.3            | 23.1          |
| 73.50              | 44.5            | 23.0          | 77.00              | 45.0            | 22.9          | 80.50              | 45.2            | 23.1          |
| 73.60              | 44.6            | 23.0          | 77.10              | 45.0            | 22.9          | 80.60              | 45.2            | 23.1          |
| 73.70              | 44.6            | 23.0          | 77.20              | 45.0            | 22.9          | 80.70              | 45.2            | 23.1          |
| 73.80              | 44.6            | 22.9          | 77.30              | 45.0            | 23.0          | 80.80              | 45.2            | 23.2          |
| 73.90              | 44.7            | 22.9          | 77.40              | 45.0            | 23.0          | 80.90              | 45.2            | 23.2          |
| 74.00              | 44.7            | 22.9          | 77.50              | 45.0            | 23.0          | 81.00              | 45.2            | 23.2          |
| 74.10              | 44.7            | 22.9          | 77.60              | 45.0            | 23.0          | 81.10              | 45.2            | 23.2          |
| 74.20              | 44.8            | 22.9          | 77.70              | 45.0            | 23.1          | 81.20              | 45.2            | 23.2          |
| 74.30              | 44.8            | 22.9          | 77.80              | 45.0            | 23.1          | 81.30              | 45.2            | 23.2          |
| 74.40              | 44.8            | 22.9          | 77.90              | 45.0            | 23.1          | 81.40              | 45.2            | 23.2          |
| 74.50              | 44.8            | 22.9          | 78.00              | 45.0            | 23.1          | 81.50              | 45.2            | 23.2          |

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## 1. Antenna Factor & Gain (cont.)

| Frequency<br>(GHz) | AF<br>[dB(1/m)] | Gain<br>(dBi) | Frequency<br>(GHz) | AF<br>[dB(1/m)] | Gain<br>(dBi) | Frequency<br>(GHz) | AF<br>[dB(1/m)] | Gain<br>(dBi) |
|--------------------|-----------------|---------------|--------------------|-----------------|---------------|--------------------|-----------------|---------------|
| 81.60              | 45.3            | 23.2          | 84.50              | 45.6            | 23.1          | 87.40              | 45.9            | 23.1          |
| 81.70              | 45.3            | 23.2          | 84.60              | 45.7            | 23.1          | 87.50              | 46.0            | 23.1          |
| 81.80              | 45.3            | 23.2          | 84.70              | 45.7            | 23.1          | 87.60              | 46.0            | 23.1          |
| 81.90              | 45.3            | 23.1          | 84.80              | 45.8            | 23.0          | 87.70              | 46.0            | 23.0          |
| 82.00              | 45.4            | 23.1          | 84.90              | 45.8            | 23.0          | 87.80              | 46.1            | 23.0          |
| 82.10              | 45.4            | 23.1          | 85.00              | 45.8            | 23.0          | 87.90              | 46.1            | 23.0          |
| 82.20              | 45.5            | 23.0          | 85.10              | 45.9            | 23.0          | 88.00              | 46.1            | 23.0          |
| 82.30              | 45.5            | 23.0          | 85.20              | 45.9            | 23.0          | 88.10              | 46.1            | 23.0          |
| 82.40              | 45.6            | 23.0          | 85.30              | 45.9            | 23.0          | 88.20              | 46.1            | 23.0          |
| 82.50              | 45.6            | 23.0          | 85.40              | 45.9            | 23.0          | 88.30              | 46.1            | 23.0          |
| 82.60              | 45.6            | 23.0          | 85.50              | 45.9            | 23.0          | 88.40              | 46.1            | 23.0          |
| 82.70              | 45.6            | 23.0          | 85.60              | 45.9            | 23.0          | 88.50              | 46.1            | 23.1          |
| 82.80              | 45.6            | 23.0          | 85.70              | 45.9            | 23.0          | 88.60              | 46.1            | 23.1          |
| 82.90              | 45.6            | 23.0          | 85.80              | 45.9            | 23.0          | 88.70              | 46.1            | 23.1          |
| 83.00              | 45.6            | 23.0          | 85.90              | 45.8            | 23.1          | 88.80              | 46.1            | 23.1          |
| 83.10              | 45.6            | 23.0          | 86.00              | 45.8            | 23.1          | 88.90              | 46.0            | 23.2          |
| 83.20              | 45.6            | 23.0          | 86.10              | 45.8            | 23.1          | 89.00              | 46.0            | 23.2          |
| 83.30              | 45.6            | 23.0          | 86.20              | 45.8            | 23.1          | 89.10              | 46.0            | 23.2          |
| 83.40              | 45.6            | 23.1          | 86.30              | 45.8            | 23.1          | 89.20              | 46.0            | 23.2          |
| 83.50              | 45.5            | 23.1          | 86.40              | 45.8            | 23.1          | 89.30              | 46.0            | 23.2          |
| 83.60              | 45.5            | 23.1          | 86.50              | 45.8            | 23.2          | 89.40              | 46.1            | 23.2          |
| 83.70              | 45.5            | 23.2          | 86.60              | 45.8            | 23.2          | 89.50              | 46.1            | 23.2          |
| 83.80              | 45.5            | 23.2          | 86.70              | 45.8            | 23.2          | 89.60              | 46.1            | 23.2          |
| 83.90              | 45.5            | 23.2          | 86.80              | 45.8            | 23.2          | 89.70              | 46.1            | 23.2          |
| 84.00              | 45.5            | 23.2          | 86.90              | 45.8            | 23.2          | 89.80              | 46.1            | 23.1          |
| 84.10              | 45.5            | 23.2          | 87.00              | 45.8            | 23.2          | 89.90              | 46.2            | 23.1          |
| 84.20              | 45.5            | 23.2          | 87.10              | 45.8            | 23.2          | 90.00              | 46.2            | 23.1          |
| 84.30              | 45.5            | 23.2          | 87.20              | 45.9            | 23.2          | -                  | -               | -             |
| 84.40              | 45.6            | 23.2          | 87.30              | 45.9            | 23.1          | -                  | -               | -             |

※ The measurement uncertainty of this result is 1.2 dB (Confidence level about 95 %,  $k = 2$ )

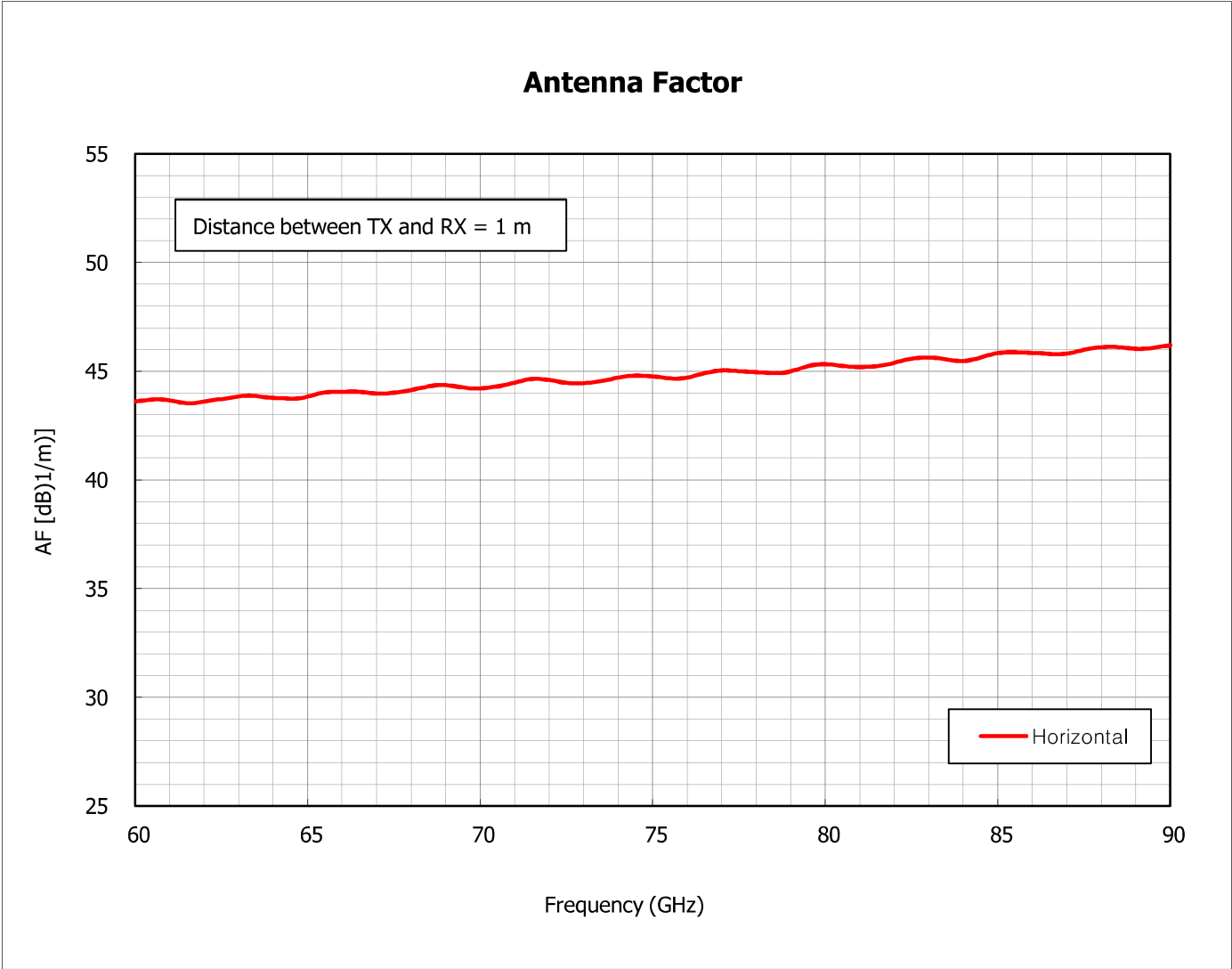
# Calibration Results



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## 2. Antenna Factor Curve



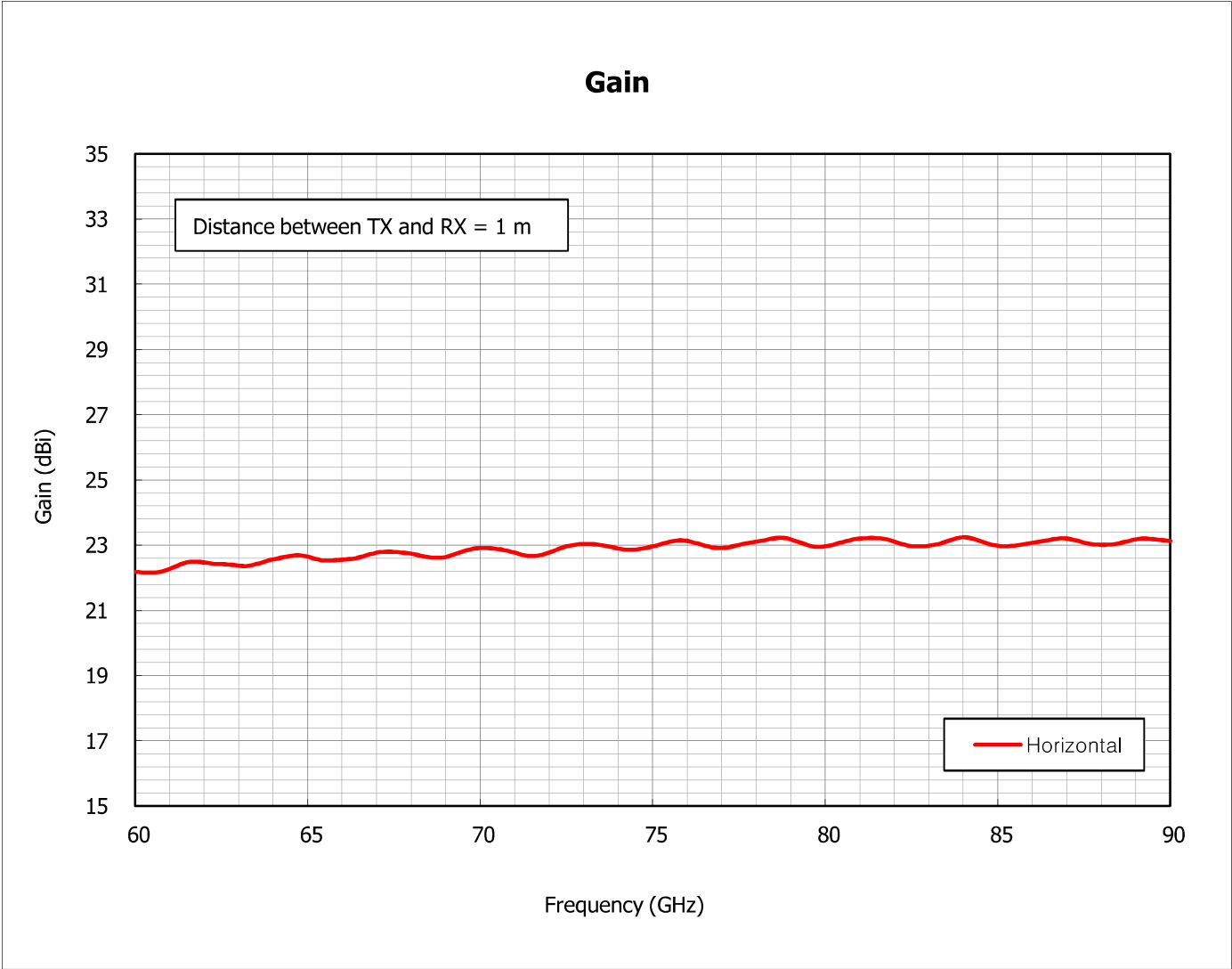
# Calibration Results



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### 3. Gain Curve



END.

- Certificate No : IC-2024-057643  
- Calibration No : C-2024-067812

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**1. Client**

- Name : SPORTON INTERNATIONAL INC.  
- Address : No.58, Aly. 75, Ln. 564, Wenhua 3rd Rd., Guishan Dist., Taoyuan City 333, Taiwan, R.O.C.

**2. Calibration Subject**

◇Registration No : 527323

- Description : ANTENNA  
- Manufacturer and Model Name : QUINSTAR / QWH-FPRR00  
- Serial Number : 1011500008

**3. Date of Calibration**

: 2024.06.27

**4. Environment**

- Temperature : ( 23.1  $\pm$  0.3 ) °C - Humidity : ( 49  $\pm$  2 ) % R.H.  
- Location : Permanent Calibration Lab  
(Address: 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea)

**5. Traceability****Calibration method and/or brief description**

This certifies that the equipment has been calibrated using applicable HCT procedure(HCT-CS-264-40707), (HCT-CS-264-40707), in compliance with ISO/IEC 17025. Measurement are traceable to the International System of Unit (SI) via national metrology institutes.

**List of used standards/specifications**

| Description                        | Manufacturer / Model Name     | Serial Number | The due date of next Calibration | Calibration laboratory |
|------------------------------------|-------------------------------|---------------|----------------------------------|------------------------|
| PNA SERIES NETWORK ANALYZER        | AGILENT/E8363B                | MY43030182    | 2025/06/18                       | HCT CO., LTD.          |
| TRANSMISSION/REFLECTION MODULE SET | OML/V10VNA2-T/R               | 200722-1      | 2024/10/18                       | HCT CO., LTD.          |
| CALIBRATION KIT                    | Keysight Technologies/W11644A | MY46042118    | 2024/10/08                       | Keysight Technologies  |
|                                    |                               |               |                                  |                        |
|                                    |                               |               |                                  |                        |
|                                    |                               |               |                                  |                        |
|                                    |                               |               |                                  |                        |
|                                    |                               |               |                                  |                        |
|                                    |                               |               |                                  |                        |
|                                    |                               |               |                                  |                        |

**6. Calibration result**

: Refer to attachment

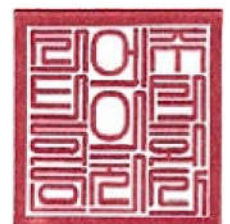
**7. Measurement uncertainty**

: Refer to attachment

(Confidence level about 95 %,  $k = 2$  )

|             |                              |             |                                                             |             |
|-------------|------------------------------|-------------|-------------------------------------------------------------|-------------|
| affirmation | Measurements performed by    | (signature) | Approved by                                                 | (signature) |
|             | Name : <b>Minhyeong Shin</b> |             | Title      Technical Cal. Manager<br>Name <b>Jaesang So</b> |             |

The above calibration certificate is the accredited calibration items by Korea Laboratory Accreditation Scheme, which signed the ILAC-MRA.

**2024. 06. 27**Accredited by KOLAS, Republic of KOREA **HCT Co., Ltd.**

(NOTE) If any significant instability or other adverse factor(overload, temperature, humidity etc.) manifests itself before, during or after calibration, and is likely to affect the validity of the calibration.

# Calibration Results



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Calibration No : C-2024-067812

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## 1. Antenna Factor & Gain

| Frequency<br>(GHz) | AF<br>[dB(1/m)] | Gain<br>(dBi) | Frequency<br>(GHz) | AF<br>[dB(1/m)] | Gain<br>(dBi) | Frequency<br>(GHz) | AF<br>[dB(1/m)] | Gain<br>(dBi) |
|--------------------|-----------------|---------------|--------------------|-----------------|---------------|--------------------|-----------------|---------------|
| 90.00              | 47.1            | 22.2          | 93.70              | 47.2            | 22.5          | 97.40              | 47.4            | 22.6          |
| 90.10              | 47.1            | 22.2          | 93.80              | 47.2            | 22.5          | 97.50              | 47.4            | 22.6          |
| 90.20              | 47.1            | 22.2          | 93.90              | 47.2            | 22.5          | 97.60              | 47.4            | 22.6          |
| 90.30              | 47.1            | 22.2          | 94.00              | 47.2            | 22.5          | 97.70              | 47.5            | 22.6          |
| 90.40              | 47.1            | 22.2          | 94.10              | 47.2            | 22.5          | 97.80              | 47.5            | 22.6          |
| 90.50              | 47.1            | 22.3          | 94.20              | 47.2            | 22.5          | 97.90              | 47.5            | 22.6          |
| 90.60              | 47.1            | 22.3          | 94.30              | 47.2            | 22.5          | 98.00              | 47.5            | 22.6          |
| 90.70              | 47.1            | 22.3          | 94.40              | 47.2            | 22.5          | 98.10              | 47.5            | 22.6          |
| 90.80              | 47.1            | 22.3          | 94.50              | 47.2            | 22.5          | 98.20              | 47.5            | 22.6          |
| 90.90              | 47.1            | 22.3          | 94.60              | 47.2            | 22.5          | 98.30              | 47.5            | 22.6          |
| 91.00              | 47.1            | 22.3          | 94.70              | 47.3            | 22.5          | 98.40              | 47.5            | 22.6          |
| 91.10              | 47.0            | 22.4          | 94.80              | 47.3            | 22.5          | 98.50              | 47.5            | 22.6          |
| 91.20              | 47.0            | 22.4          | 94.90              | 47.3            | 22.5          | 98.60              | 47.5            | 22.6          |
| 91.30              | 47.0            | 22.4          | 95.00              | 47.3            | 22.5          | 98.70              | 47.5            | 22.6          |
| 91.40              | 47.1            | 22.4          | 95.10              | 47.3            | 22.5          | 98.80              | 47.5            | 22.6          |
| 91.50              | 47.1            | 22.4          | 95.20              | 47.3            | 22.5          | 98.90              | 47.6            | 22.6          |
| 91.60              | 47.1            | 22.4          | 95.30              | 47.3            | 22.5          | 99.00              | 47.6            | 22.5          |
| 91.70              | 47.1            | 22.3          | 95.40              | 47.3            | 22.5          | 99.10              | 47.6            | 22.5          |
| 91.80              | 47.2            | 22.3          | 95.50              | 47.3            | 22.5          | 99.20              | 47.6            | 22.5          |
| 91.90              | 47.2            | 22.3          | 95.60              | 47.3            | 22.5          | 99.30              | 47.6            | 22.5          |
| 92.00              | 47.2            | 22.3          | 95.70              | 47.4            | 22.5          | 99.40              | 47.6            | 22.6          |
| 92.10              | 47.2            | 22.3          | 95.80              | 47.4            | 22.5          | 99.50              | 47.6            | 22.6          |
| 92.20              | 47.2            | 22.4          | 95.90              | 47.4            | 22.5          | 99.60              | 47.6            | 22.6          |
| 92.30              | 47.2            | 22.4          | 96.00              | 47.4            | 22.5          | 99.70              | 47.6            | 22.6          |
| 92.40              | 47.1            | 22.4          | 96.10              | 47.4            | 22.5          | 99.80              | 47.6            | 22.6          |
| 92.50              | 47.1            | 22.4          | 96.20              | 47.4            | 22.5          | 99.90              | 47.6            | 22.6          |
| 92.60              | 47.2            | 22.4          | 96.30              | 47.4            | 22.5          | 100.00             | 47.6            | 22.6          |
| 92.70              | 47.2            | 22.4          | 96.40              | 47.4            | 22.5          | 100.10             | 47.6            | 22.6          |
| 92.80              | 47.2            | 22.4          | 96.50              | 47.4            | 22.5          | 100.20             | 47.6            | 22.6          |
| 92.90              | 47.2            | 22.4          | 96.60              | 47.4            | 22.5          | 100.30             | 47.6            | 22.6          |
| 93.00              | 47.2            | 22.4          | 96.70              | 47.4            | 22.5          | 100.40             | 47.6            | 22.6          |
| 93.10              | 47.2            | 22.4          | 96.80              | 47.4            | 22.5          | 100.50             | 47.6            | 22.7          |
| 93.20              | 47.2            | 22.4          | 96.90              | 47.4            | 22.5          | 100.60             | 47.6            | 22.7          |
| 93.30              | 47.2            | 22.4          | 97.00              | 47.4            | 22.6          | 100.70             | 47.6            | 22.7          |
| 93.40              | 47.2            | 22.4          | 97.10              | 47.4            | 22.6          | 100.80             | 47.6            | 22.7          |
| 93.50              | 47.2            | 22.4          | 97.20              | 47.4            | 22.6          | 100.90             | 47.6            | 22.7          |
| 93.60              | 47.2            | 22.5          | 97.30              | 47.4            | 22.6          | 101.00             | 47.6            | 22.7          |

# Calibration Results



Certificate No : IC-2024-057643

Calibration No : C-2024-067812

page : 3 of 5

## 1. Antenna Factor & Gain (cont.)

| Frequency<br>(GHz) | AF<br>[dB(1/m)] | Gain<br>(dBi) | Frequency<br>(GHz) | AF<br>[dB(1/m)] | Gain<br>(dBi) | Frequency<br>(GHz) | AF<br>[dB(1/m)] | Gain<br>(dBi) |
|--------------------|-----------------|---------------|--------------------|-----------------|---------------|--------------------|-----------------|---------------|
| 101.10             | 47.6            | 22.7          | 104.10             | 47.9            | 22.7          | 107.10             | 47.9            | 22.9          |
| 101.20             | 47.6            | 22.7          | 104.20             | 47.9            | 22.7          | 107.20             | 47.9            | 22.9          |
| 101.30             | 47.6            | 22.7          | 104.30             | 47.9            | 22.7          | 107.30             | 48.0            | 22.9          |
| 101.40             | 47.6            | 22.8          | 104.40             | 47.9            | 22.7          | 107.40             | 48.0            | 22.9          |
| 101.50             | 47.6            | 22.8          | 104.50             | 47.9            | 22.7          | 107.50             | 48.0            | 22.9          |
| 101.60             | 47.6            | 22.8          | 104.60             | 47.9            | 22.7          | 107.60             | 48.0            | 22.8          |
| 101.70             | 47.6            | 22.8          | 104.70             | 47.9            | 22.7          | 107.70             | 48.0            | 22.8          |
| 101.80             | 47.6            | 22.8          | 104.80             | 47.9            | 22.7          | 107.80             | 48.1            | 22.8          |
| 101.90             | 47.6            | 22.8          | 104.90             | 47.9            | 22.7          | 107.90             | 48.1            | 22.8          |
| 102.00             | 47.6            | 22.8          | 105.00             | 47.9            | 22.7          | 108.00             | 48.1            | 22.8          |
| 102.10             | 47.6            | 22.8          | 105.10             | 47.9            | 22.8          | 108.10             | 48.1            | 22.8          |
| 102.20             | 47.7            | 22.8          | 105.20             | 47.9            | 22.8          | 108.20             | 48.1            | 22.8          |
| 102.30             | 47.7            | 22.8          | 105.30             | 47.9            | 22.8          | 108.30             | 48.2            | 22.8          |
| 102.40             | 47.7            | 22.8          | 105.40             | 47.9            | 22.8          | 108.40             | 48.2            | 22.8          |
| 102.50             | 47.7            | 22.8          | 105.50             | 47.9            | 22.8          | 108.50             | 48.2            | 22.8          |
| 102.60             | 47.7            | 22.8          | 105.60             | 47.8            | 22.9          | 108.60             | 48.1            | 22.8          |
| 102.70             | 47.7            | 22.8          | 105.70             | 47.8            | 22.9          | 108.70             | 48.1            | 22.8          |
| 102.80             | 47.7            | 22.8          | 105.80             | 47.8            | 22.9          | 108.80             | 48.1            | 22.8          |
| 102.90             | 47.7            | 22.8          | 105.90             | 47.8            | 22.9          | 108.90             | 48.1            | 22.9          |
| 103.00             | 47.7            | 22.8          | 106.00             | 47.8            | 22.9          | 109.00             | 48.1            | 22.9          |
| 103.10             | 47.7            | 22.8          | 106.10             | 47.8            | 22.9          | 109.10             | 48.1            | 22.9          |
| 103.20             | 47.7            | 22.7          | 106.20             | 47.8            | 22.9          | 109.20             | 48.1            | 22.9          |
| 103.30             | 47.8            | 22.7          | 106.30             | 47.8            | 22.9          | 109.30             | 48.1            | 22.9          |
| 103.40             | 47.8            | 22.7          | 106.40             | 47.8            | 22.9          | 109.40             | 48.1            | 22.9          |
| 103.50             | 47.8            | 22.7          | 106.50             | 47.8            | 22.9          | 109.50             | 48.1            | 22.9          |
| 103.60             | 47.8            | 22.7          | 106.60             | 47.9            | 22.9          | 109.60             | 48.1            | 22.9          |
| 103.70             | 47.9            | 22.7          | 106.70             | 47.9            | 22.9          | 109.70             | 48.1            | 22.9          |
| 103.80             | 47.9            | 22.7          | 106.80             | 47.9            | 22.9          | 109.80             | 48.1            | 22.9          |
| 103.90             | 47.9            | 22.7          | 106.90             | 47.9            | 22.9          | 109.90             | 48.1            | 22.9          |
| 104.00             | 47.9            | 22.7          | 107.00             | 47.9            | 22.9          | 110.00             | 48.1            | 22.9          |

※ The measurement uncertainty of this result is 1.2 dB (Confidence level about 95 %,  $k = 2$ )

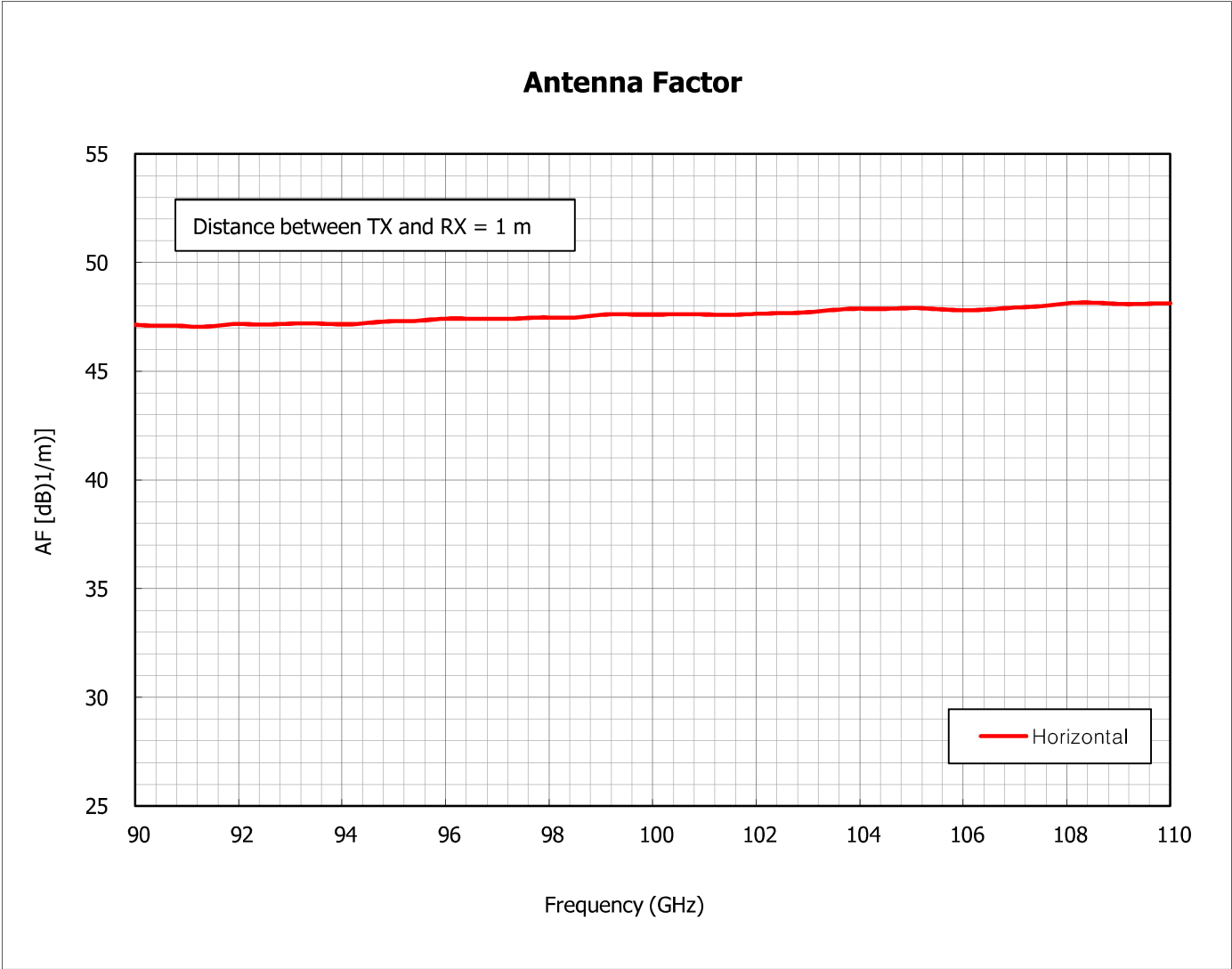
# Calibration Results



Certificate No : IC-2024-057643  
Calibration No : C-2024-067812

page : 4 of 5

## 2. Antenna Factor Curve

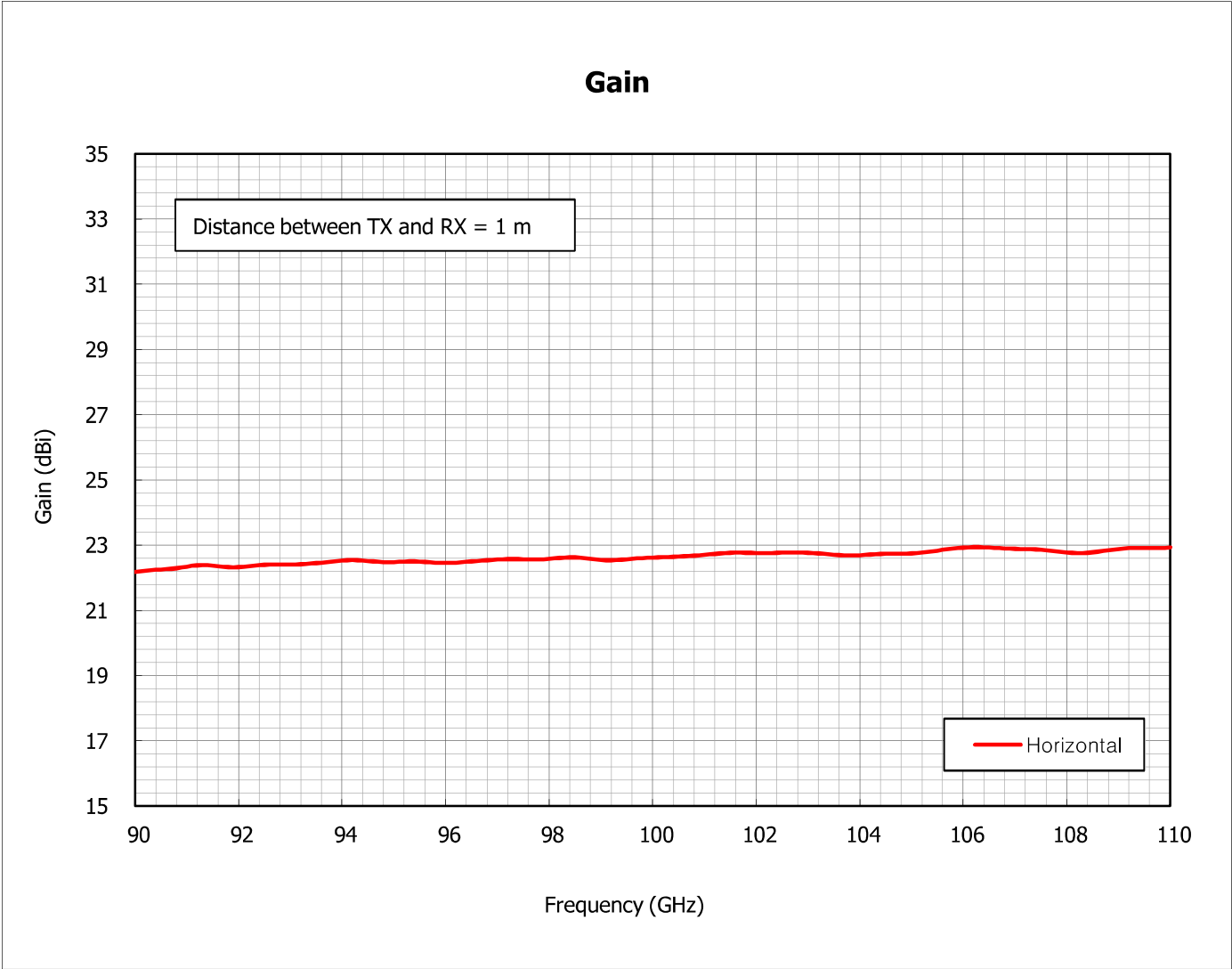


# Calibration Results



Certificate No : IC-2024-057643  
Calibration No : C-2024-067812

### 3. Gain Curve



END.

## Measurement Report

74, Seoicheon-ro 578beon-gil, Majang-myeon,  
Icheon-si, Gyeonggi-do, Korea 17383  
Tel :82-31-645-6900, www.hct.co.kr보고서번호(Report No) : IC-2024-057785  
측정번호(Measurement No) : C-2024-067936

페이지(page) : 1 of 5

## 1. 의뢰자 (Client)

- 기관명 (Name) : SPORTON INTERNATIONAL INC.  
- 주소 (Address) : No.58, Aly. 75, Ln. 564, Wenhua 3rd Rd., Guishan Dist., Taoyuan City 333, Taiwan, R.O.C.

## 2. 대상품목 (Measurement Item)

◇ HCT 등록번호 : 527377

- 기기명 (Description) : ANTENNA  
- 제작회사 및 형식(Manufacturer and Model Name) : QUINSTAR / QWH-FPRR00  
- 기기번호 (Serial Number) : 1011500008

## 3. 측정일자 (Measurement date) : 2024.06.27

## 4. 측정환경 (Environment)

- 온도(Temperature) : ( 23.1 ± 0.3 ) °C - 습도(Humidity) : ( 49 ± 2 ) % R.H.

## 5. 측정방법 (Measurement method used)

This certifies that the above equipment was measured using the standard equipment below according to the customer requirements. This equipment was simulated by the size of the antenna.

측정에 사용한 표준장비 명세 (List of used standards/specifications)

| 기기명<br>(Description)   | 제작회사 / 형식<br>(Manufacturer and Model Name) | 기기번호<br>(Serial Number) | 차기교정예정일자<br>(The due date of<br>next Calibration) | 교정기관<br>(Calibration laboratory) |
|------------------------|--------------------------------------------|-------------------------|---------------------------------------------------|----------------------------------|
| VIDEO MEASURING SYSTEM | RATIONAL/VMS-2010G                         | VBG00090                | 2025/02/17                                        | HCT CO., LTD.                    |
|                        |                                            |                         |                                                   |                                  |
|                        |                                            |                         |                                                   |                                  |
|                        |                                            |                         |                                                   |                                  |
|                        |                                            |                         |                                                   |                                  |
|                        |                                            |                         |                                                   |                                  |
|                        |                                            |                         |                                                   |                                  |
|                        |                                            |                         |                                                   |                                  |
|                        |                                            |                         |                                                   |                                  |

## 6. 측정결과 (Measurement result)

: 측정결과 참조 (Refer to attachment)

(주) 이 측정결과는 의뢰자가 제시한 시료 및 시료명에만 한정됩니다.

The measurement results shown in this report refer only to the sample(s) measured unless otherwise stated.

|                      |                            |                                                             |
|----------------------|----------------------------|-------------------------------------------------------------|
| 확 인<br>(Affirmation) | 작성자 (Tested by)            | 승인자 (Approved by)                                           |
|                      | 성명 (Name) : Minhyeong Shin | 직위 (Title) 기술책임자(Technical Manager)<br>성명 (Name) Jaesang So |

이 성적서는 ILAC MRA 서명 기관인 KOLAS(Korea Laboratory Accreditation Scheme)와 A2LA (American Laboratory for Laboratory Accreditation)의 인정  
과 무관합니다. This calibration certificate is Not an accredited report by KOLAS(Korea Laboratory Accreditation Scheme) and A2LA(American Association  
for Laboratory Accreditation), a ILAC MRA signatory.

2024. 06. 27

HCT

(주)에이치시티 대표이사  
President, HCT Co., Ltd.

(※) 측정결과는 측정기의 정밀정확도에 영향을 미치는 요소(과부하, 온도, 습도 등)의 급격한 변화가 발생한 경우에는 무효가 됩니다. If any significant instability  
or other adverse factor(overload, temperature, humidity etc.) manifests itself before, during or after calibration, and is likely to affect the validity of the calibration.

# Measurement Results

Certificate No : IC-2024-057785  
Measurement No : C-2024-067936

페이지(page) : 2 of 5

## 1. Antenna Factor & Gain

| Frequency<br>(GHz) | AF<br>[dB(1/m)] | Gain<br>(dBi) | Frequency<br>(GHz) | AF<br>[dB(1/m)] | Gain<br>(dBi) | Frequency<br>(GHz) | AF<br>[dB(1/m)] | Gain<br>(dBi) |
|--------------------|-----------------|---------------|--------------------|-----------------|---------------|--------------------|-----------------|---------------|
| 110.00             | 48.55           | 22.50         | 119.25             | 49.15           | 22.60         | 128.50             | 49.80           | 22.60         |
| 110.25             | 48.56           | 22.50         | 119.50             | 49.17           | 22.60         | 128.75             | 49.82           | 22.60         |
| 110.50             | 48.58           | 22.51         | 119.75             | 49.19           | 22.60         | 129.00             | 49.83           | 22.60         |
| 110.75             | 48.60           | 22.51         | 120.00             | 49.20           | 22.60         | 129.25             | 49.85           | 22.60         |
| 111.00             | 48.61           | 22.51         | 120.25             | 49.22           | 22.60         | 129.50             | 49.87           | 22.60         |
| 111.25             | 48.63           | 22.52         | 120.50             | 49.24           | 22.60         | 129.75             | 49.89           | 22.59         |
| 111.50             | 48.64           | 22.52         | 120.75             | 49.26           | 22.60         | 130.00             | 49.91           | 22.59         |
| 111.75             | 48.66           | 22.53         | 121.00             | 49.27           | 22.60         | 130.25             | 49.92           | 22.59         |
| 112.00             | 48.68           | 22.53         | 121.25             | 49.29           | 22.60         | 130.50             | 49.94           | 22.59         |
| 112.25             | 48.69           | 22.53         | 121.50             | 49.31           | 22.60         | 130.75             | 49.96           | 22.59         |
| 112.50             | 48.71           | 22.54         | 121.75             | 49.32           | 22.61         | 131.00             | 49.98           | 22.59         |
| 112.75             | 48.72           | 22.54         | 122.00             | 49.34           | 22.61         | 131.25             | 50.00           | 22.59         |
| 113.00             | 48.74           | 22.54         | 122.25             | 49.36           | 22.61         | 131.50             | 50.01           | 22.58         |
| 113.25             | 48.76           | 22.54         | 122.50             | 49.38           | 22.61         | 131.75             | 50.03           | 22.58         |
| 113.50             | 48.77           | 22.55         | 122.75             | 49.39           | 22.61         | 132.00             | 50.05           | 22.58         |
| 113.75             | 48.79           | 22.55         | 123.00             | 49.41           | 22.61         | 132.25             | 50.07           | 22.58         |
| 114.00             | 48.80           | 22.55         | 123.25             | 49.43           | 22.61         | 132.50             | 50.09           | 22.58         |
| 114.25             | 48.82           | 22.56         | 123.50             | 49.44           | 22.61         | 132.75             | 50.11           | 22.58         |
| 114.50             | 48.84           | 22.56         | 123.75             | 49.46           | 22.61         | 133.00             | 50.12           | 22.57         |
| 114.75             | 48.85           | 22.56         | 124.00             | 49.48           | 22.61         | 133.25             | 50.14           | 22.57         |
| 115.00             | 48.87           | 22.56         | 124.25             | 49.50           | 22.61         | 133.50             | 50.16           | 22.57         |
| 115.25             | 48.89           | 22.57         | 124.50             | 49.51           | 22.61         | 133.75             | 50.18           | 22.57         |
| 115.50             | 48.90           | 22.57         | 124.75             | 49.53           | 22.61         | 134.00             | 50.20           | 22.56         |
| 115.75             | 48.92           | 22.57         | 125.00             | 49.55           | 22.61         | 134.25             | 50.22           | 22.56         |
| 116.00             | 48.94           | 22.57         | 125.25             | 49.57           | 22.61         | 134.50             | 50.23           | 22.56         |
| 116.25             | 48.95           | 22.57         | 125.50             | 49.58           | 22.61         | 134.75             | 50.25           | 22.56         |
| 116.50             | 48.97           | 22.58         | 125.75             | 49.60           | 22.61         | 135.00             | 50.27           | 22.56         |
| 116.75             | 48.99           | 22.58         | 126.00             | 49.62           | 22.61         | 135.25             | 50.29           | 22.55         |
| 117.00             | 49.00           | 22.58         | 126.25             | 49.64           | 22.61         | 135.50             | 50.31           | 22.55         |
| 117.25             | 49.02           | 22.58         | 126.50             | 49.66           | 22.61         | 135.75             | 50.33           | 22.55         |
| 117.50             | 49.04           | 22.58         | 126.75             | 49.67           | 22.61         | 136.00             | 50.35           | 22.55         |
| 117.75             | 49.05           | 22.59         | 127.00             | 49.69           | 22.61         | 136.25             | 50.36           | 22.54         |
| 118.00             | 49.07           | 22.59         | 127.25             | 49.71           | 22.60         | 136.50             | 50.38           | 22.54         |
| 118.25             | 49.09           | 22.59         | 127.50             | 49.73           | 22.60         | 136.75             | 50.40           | 22.54         |
| 118.50             | 49.10           | 22.59         | 127.75             | 49.74           | 22.60         | 137.00             | 50.42           | 22.53         |
| 118.75             | 49.12           | 22.59         | 128.00             | 49.76           | 22.60         | 137.25             | 50.44           | 22.53         |
| 119.00             | 49.14           | 22.59         | 128.25             | 49.78           | 22.60         | 137.50             | 50.46           | 22.53         |

# Measurement Results

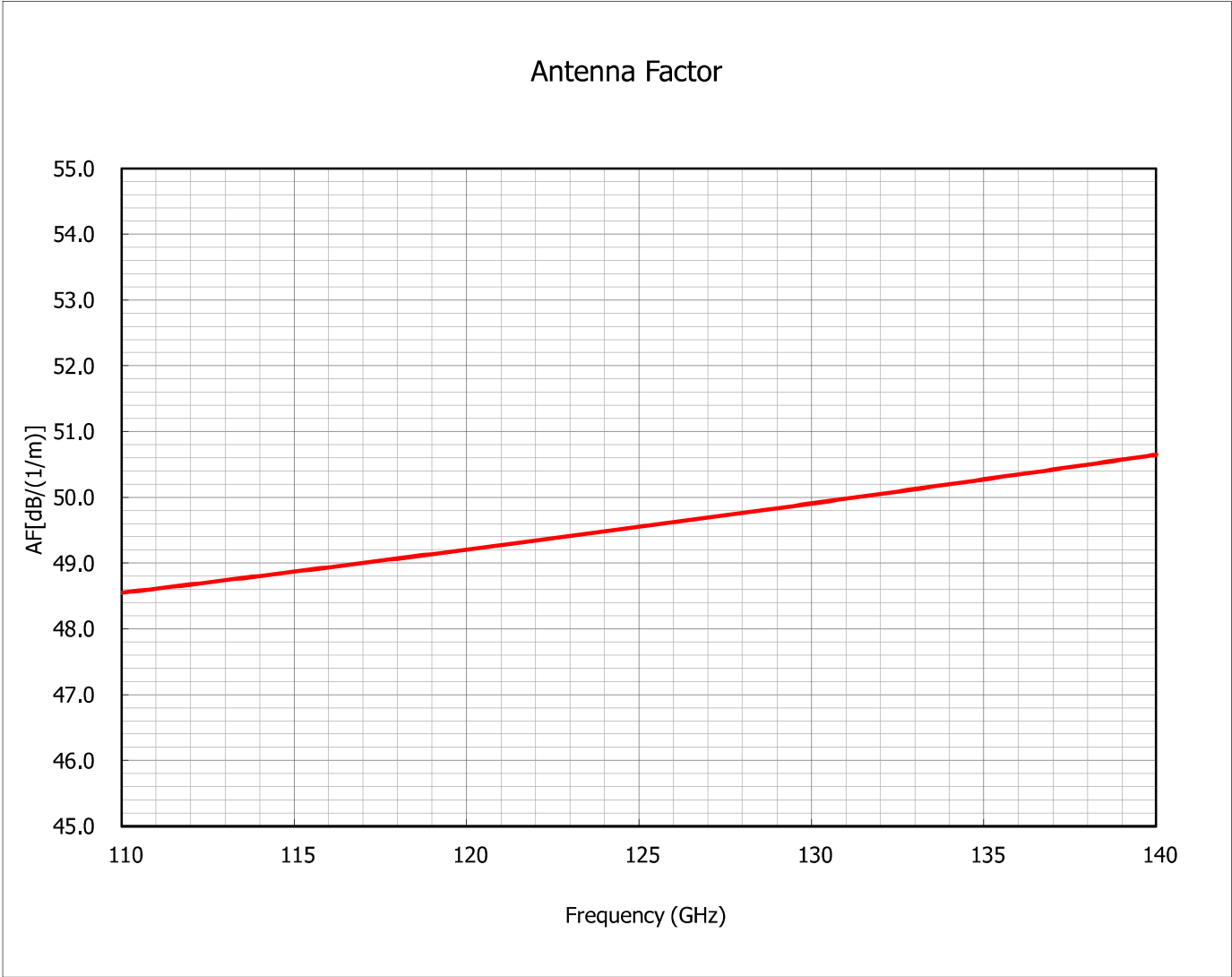
1. Antenna Factor & Gain (cont.)

| Frequency<br>(GHz) | AF<br>[dB(1/m)] | Gain<br>(dBi) | Frequency<br>(GHz) | AF<br>[dB(1/m)] | Gain<br>(dBi) | Frequency<br>(GHz) | AF<br>[dB(1/m)] | Gain<br>(dBi) |
|--------------------|-----------------|---------------|--------------------|-----------------|---------------|--------------------|-----------------|---------------|
| 137.75             | 50.48           | 22.53         | 138.75             | 50.55           | 22.51         | 139.75             | 50.63           | 22.50         |
| 138.00             | 50.50           | 22.52         | 139.00             | 50.57           | 22.51         | 140.00             | 50.65           | 22.50         |
| 138.25             | 50.51           | 22.52         | 139.25             | 50.59           | 22.51         | -                  | -               | -             |
| 138.50             | 50.53           | 22.52         | 139.50             | 50.61           | 22.50         | -                  | -               | -             |

※ The measurement uncertainty of this result is 1.3 dB (Confidence level about 95 %,  $k = 2$ )

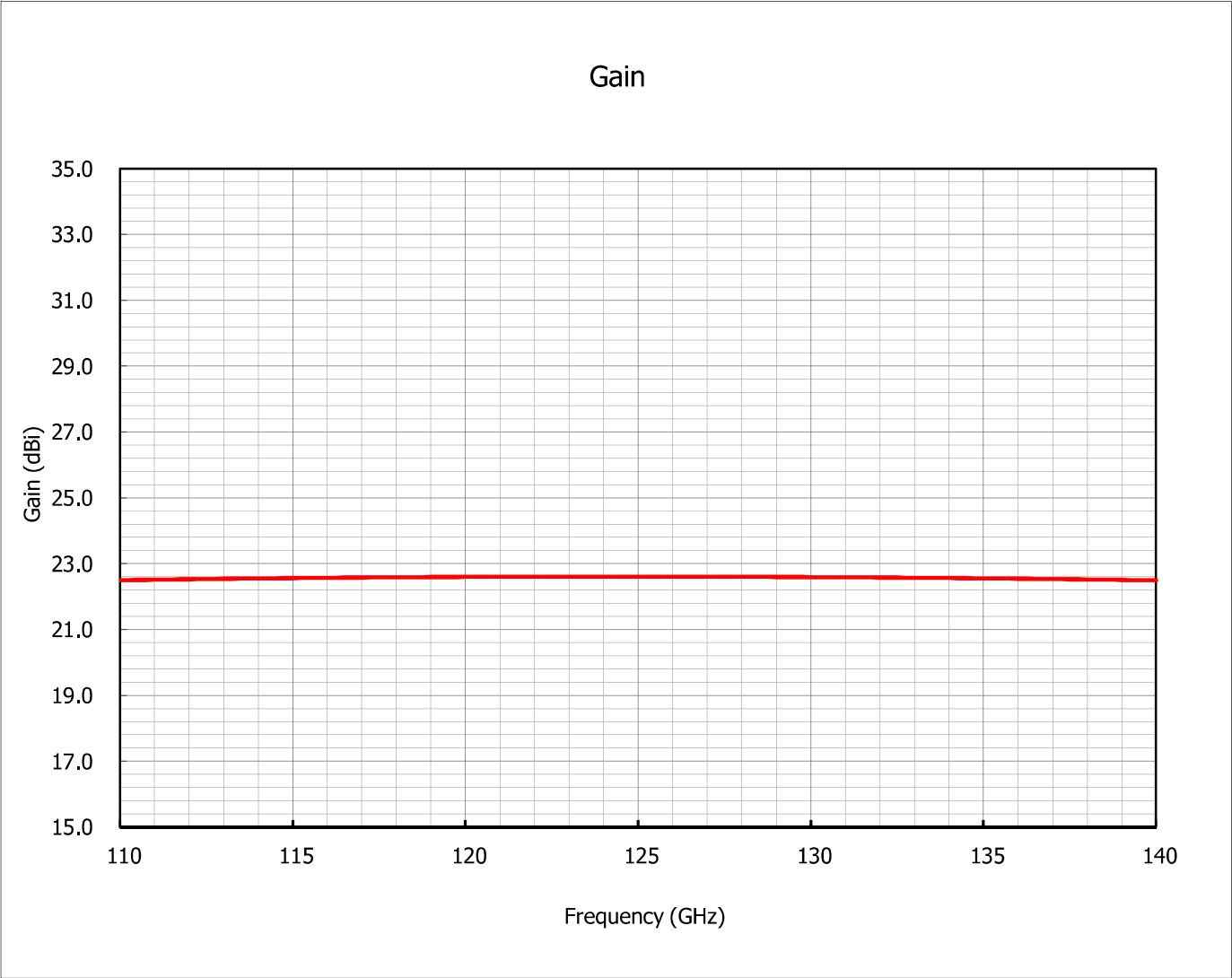
# Measurement Results

## 2. Antenna Factor Curve



# Measurement Results

### 3. Gain Curve



\* The above results are simulation results based on the measurement results in the report below.  
Report No : C-2024-067870

END.

## Measurement Report

74, Seoicheon-ro 578beon-gil, Majang-myeon,  
Icheon-si, Gyeonggi-do, Korea 17383  
Tel :82-31-645-6900, www.hct.co.kr보고서번호(Report No) : IC-2024-057638  
측정번호(Measurement No) : C-2024-067807

페이지(page) : 1 of 6

## 1. 의뢰자 (Client)

- 기관명 (Name) : SPORTON INTERNATIONAL INC.  
- 주소 (Address) : No.58, Aly. 75, Ln. 564, Wenhua 3rd Rd., Guishan Dist., Taoyuan City 333, Taiwan, R.O.C.

## 2. 대상품목 (Measurement Item)

◇ HCT 등록번호 : 527312

- 기기명 (Description) : ANTENNA  
- 제작회사 및 형식(Manufacturer and Model Name) : QUINSTAR / QWH-GPRR00  
- 기기번호 (Serial Number) : QWH-GPRR00-01

## 3. 측정일자 (Measurement date) : 2024.06.27

## 4. 측정환경 (Environment)

- 온도(Temperature) : ( 22.7 ± 0.1 ) °C - 습도(Humidity) : ( 48 ± 2 ) % R.H.

## 5. 측정방법 (Measurement method used)

This certifies that the above equipment was measured using the standard equipment below according to the customer requirements. This equipment was simulated by the size of the antenna.

측정에 사용한 표준장비 명세 (List of used standards/specifications)

| 기기명<br>(Description)   | 제작회사 / 형식<br>(Manufacturer and Model Name) | 기기번호<br>(Serial Number) | 차기교정예정일자<br>(The due date of<br>next Calibration) | 교정기관<br>(Calibration laboratory) |
|------------------------|--------------------------------------------|-------------------------|---------------------------------------------------|----------------------------------|
| VIDEO MEASURING SYSTEM | RATIONAL/VMS-2010G                         | VBG00090                | 2025/02/17                                        | HCT CO., LTD.                    |
|                        |                                            |                         |                                                   |                                  |
|                        |                                            |                         |                                                   |                                  |
|                        |                                            |                         |                                                   |                                  |
|                        |                                            |                         |                                                   |                                  |
|                        |                                            |                         |                                                   |                                  |
|                        |                                            |                         |                                                   |                                  |
|                        |                                            |                         |                                                   |                                  |
|                        |                                            |                         |                                                   |                                  |

## 6. 측정결과 (Measurement result)

: 측정결과 참조 (Refer to attachment)

(주) 이 측정결과는 의뢰자가 제시한 시료 및 시료명에만 한정됩니다.

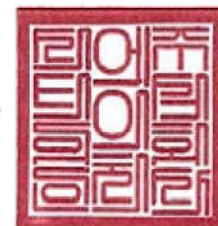
The measurement results shown in this report refer only to the sample(s) measured unless otherwise stated.

|                      |                            |                                                             |
|----------------------|----------------------------|-------------------------------------------------------------|
| 확 인<br>(Affirmation) | 작성자 (Tested by)            | 승인자 (Approved by)                                           |
|                      | 성명 (Name) : Minhyeong Shin | 직위 (Title) 기술책임자(Technical Manager)<br>성명 (Name) Jaesang So |

이 성적서는 ILAC MRA 서명 기관인 KOLAS(Korea Laboratory Accreditation Scheme)와 A2LA (American Laboratory for Laboratory Accreditation)의 인정  
과 무관합니다. This calibration certificate is Not an accredited report by KOLAS(Korea Laboratory Accreditation Scheme) and A2LA(American Association  
for Laboratory Accreditation), a ILAC MRA signatory.

2024. 06. 27

HCT

(주)에이치시티 대표이사  
President, HCT Co., Ltd.

(※) 측정결과는 측정기의 정밀정확도에 영향을 미치는 요소(과부하, 온도, 습도 등)의 급격한 변화가 발생한 경우에는 무효가 됩니다. If any significant instability  
or other adverse factor(overload, temperature, humidity etc.) manifests itself before, during or after calibration, and is likely to affect the validity of the calibration.

# Measurement Results

Certificate No : IC-2024-057638  
Measurement No : C-2024-067807

페이지(page) : 2 of 6

## 1. Antenna Factor & Gain

| Frequency<br>(GHz) | AF<br>[dB(1/m)] | Gain<br>(dBi) | Frequency<br>(GHz) | AF<br>[dB(1/m)] | Gain<br>(dBi) | Frequency<br>(GHz) | AF<br>[dB(1/m)] | Gain<br>(dBi) |
|--------------------|-----------------|---------------|--------------------|-----------------|---------------|--------------------|-----------------|---------------|
| 140.00             | 53.12           | 20.02         | 149.25             | 53.30           | 20.40         | 158.50             | 53.49           | 20.73         |
| 140.25             | 53.12           | 20.03         | 149.50             | 53.31           | 20.41         | 158.75             | 53.50           | 20.74         |
| 140.50             | 53.13           | 20.04         | 149.75             | 53.31           | 20.42         | 159.00             | 53.50           | 20.75         |
| 140.75             | 53.13           | 20.06         | 150.00             | 53.32           | 20.43         | 159.25             | 53.51           | 20.75         |
| 141.00             | 53.14           | 20.07         | 150.25             | 53.32           | 20.44         | 159.50             | 53.51           | 20.76         |
| 141.25             | 53.14           | 20.08         | 150.50             | 53.33           | 20.44         | 159.75             | 53.52           | 20.77         |
| 141.50             | 53.15           | 20.09         | 150.75             | 53.33           | 20.45         | 160.00             | 53.52           | 20.78         |
| 141.75             | 53.15           | 20.10         | 151.00             | 53.34           | 20.46         | 160.25             | 53.53           | 20.79         |
| 142.00             | 53.16           | 20.11         | 151.25             | 53.34           | 20.47         | 160.50             | 53.53           | 20.80         |
| 142.25             | 53.16           | 20.12         | 151.50             | 53.35           | 20.48         | 160.75             | 53.54           | 20.80         |
| 142.50             | 53.17           | 20.13         | 151.75             | 53.35           | 20.49         | 161.00             | 53.54           | 20.81         |
| 142.75             | 53.17           | 20.14         | 152.00             | 53.36           | 20.50         | 161.25             | 53.55           | 20.82         |
| 143.00             | 53.18           | 20.15         | 152.25             | 53.36           | 20.51         | 161.50             | 53.55           | 20.83         |
| 143.25             | 53.18           | 20.16         | 152.50             | 53.37           | 20.52         | 161.75             | 53.56           | 20.84         |
| 143.50             | 53.19           | 20.17         | 152.75             | 53.37           | 20.53         | 162.00             | 53.57           | 20.84         |
| 143.75             | 53.19           | 20.18         | 153.00             | 53.38           | 20.54         | 162.25             | 53.57           | 20.85         |
| 144.00             | 53.20           | 20.19         | 153.25             | 53.38           | 20.55         | 162.50             | 53.58           | 20.86         |
| 144.25             | 53.20           | 20.20         | 153.50             | 53.39           | 20.56         | 162.75             | 53.58           | 20.87         |
| 144.50             | 53.21           | 20.21         | 153.75             | 53.39           | 20.56         | 163.00             | 53.59           | 20.88         |
| 144.75             | 53.21           | 20.22         | 154.00             | 53.40           | 20.57         | 163.25             | 53.59           | 20.88         |
| 145.00             | 53.22           | 20.23         | 154.25             | 53.40           | 20.58         | 163.50             | 53.60           | 20.89         |
| 145.25             | 53.22           | 20.24         | 154.50             | 53.41           | 20.59         | 163.75             | 53.60           | 20.90         |
| 145.50             | 53.23           | 20.25         | 154.75             | 53.41           | 20.60         | 164.00             | 53.61           | 20.91         |
| 145.75             | 53.23           | 20.26         | 155.00             | 53.42           | 20.61         | 164.25             | 53.61           | 20.92         |
| 146.00             | 53.24           | 20.27         | 155.25             | 53.42           | 20.62         | 164.50             | 53.62           | 20.92         |
| 146.25             | 53.24           | 20.28         | 155.50             | 53.43           | 20.63         | 164.75             | 53.62           | 20.93         |
| 146.50             | 53.25           | 20.29         | 155.75             | 53.43           | 20.64         | 165.00             | 53.63           | 20.94         |
| 146.75             | 53.25           | 20.30         | 156.00             | 53.44           | 20.64         | 165.25             | 53.64           | 20.95         |
| 147.00             | 53.26           | 20.31         | 156.25             | 53.44           | 20.65         | 165.50             | 53.64           | 20.96         |
| 147.25             | 53.26           | 20.32         | 156.50             | 53.45           | 20.66         | 165.75             | 53.65           | 20.96         |
| 147.50             | 53.27           | 20.33         | 156.75             | 53.45           | 20.67         | 166.00             | 53.65           | 20.97         |
| 147.75             | 53.27           | 20.34         | 157.00             | 53.46           | 20.68         | 166.25             | 53.66           | 20.98         |
| 148.00             | 53.28           | 20.35         | 157.25             | 53.46           | 20.69         | 166.50             | 53.66           | 20.99         |
| 148.25             | 53.28           | 20.36         | 157.50             | 53.47           | 20.70         | 166.75             | 53.67           | 20.99         |
| 148.50             | 53.29           | 20.37         | 157.75             | 53.48           | 20.70         | 167.00             | 53.67           | 21.00         |
| 148.75             | 53.29           | 20.38         | 158.00             | 53.48           | 20.71         | 167.25             | 53.68           | 21.01         |
| 149.00             | 53.30           | 20.39         | 158.25             | 53.49           | 20.72         | 167.50             | 53.68           | 21.02         |

# Measurement Results

Certificate No : IC-2024-057638  
Measurement No : C-2024-067807

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## 1. Antenna Factor & Gain (cont.)

| Frequency<br>(GHz) | AF<br>[dB(1/m)] | Gain<br>(dBi) | Frequency<br>(GHz) | AF<br>[dB(1/m)] | Gain<br>(dBi) | Frequency<br>(GHz) | AF<br>[dB(1/m)] | Gain<br>(dBi) |
|--------------------|-----------------|---------------|--------------------|-----------------|---------------|--------------------|-----------------|---------------|
| 167.75             | 53.69           | 21.02         | 177.00             | 53.90           | 21.28         | 186.25             | 54.11           | 21.51         |
| 168.00             | 53.70           | 21.03         | 177.25             | 53.90           | 21.29         | 186.50             | 54.12           | 21.52         |
| 168.25             | 53.70           | 21.04         | 177.50             | 53.91           | 21.30         | 186.75             | 54.12           | 21.52         |
| 168.50             | 53.71           | 21.05         | 177.75             | 53.91           | 21.30         | 187.00             | 54.13           | 21.53         |
| 168.75             | 53.71           | 21.05         | 178.00             | 53.92           | 21.31         | 187.25             | 54.13           | 21.53         |
| 169.00             | 53.72           | 21.06         | 178.25             | 53.92           | 21.32         | 187.50             | 54.14           | 21.54         |
| 169.25             | 53.72           | 21.07         | 178.50             | 53.93           | 21.32         | 187.75             | 54.15           | 21.55         |
| 169.50             | 53.73           | 21.07         | 178.75             | 53.94           | 21.33         | 188.00             | 54.15           | 21.55         |
| 169.75             | 53.73           | 21.08         | 179.00             | 53.94           | 21.33         | 188.25             | 54.16           | 21.56         |
| 170.00             | 53.74           | 21.09         | 179.25             | 53.95           | 21.34         | 188.50             | 54.16           | 21.56         |
| 170.25             | 53.74           | 21.10         | 179.50             | 53.95           | 21.35         | 188.75             | 54.17           | 21.57         |
| 170.50             | 53.75           | 21.10         | 179.75             | 53.96           | 21.35         | 189.00             | 54.17           | 21.57         |
| 170.75             | 53.76           | 21.11         | 180.00             | 53.96           | 21.36         | 189.25             | 54.18           | 21.58         |
| 171.00             | 53.76           | 21.12         | 180.25             | 53.97           | 21.37         | 189.50             | 54.19           | 21.59         |
| 171.25             | 53.77           | 21.13         | 180.50             | 53.98           | 21.37         | 189.75             | 54.19           | 21.59         |
| 171.50             | 53.77           | 21.13         | 180.75             | 53.98           | 21.38         | 190.00             | 54.20           | 21.60         |
| 171.75             | 53.78           | 21.14         | 181.00             | 53.99           | 21.39         | 190.25             | 54.20           | 21.60         |
| 172.00             | 53.78           | 21.15         | 181.25             | 53.99           | 21.39         | 190.50             | 54.21           | 21.61         |
| 172.25             | 53.79           | 21.15         | 181.50             | 54.00           | 21.40         | 190.75             | 54.22           | 21.61         |
| 172.50             | 53.79           | 21.16         | 181.75             | 54.01           | 21.40         | 191.00             | 54.22           | 21.62         |
| 172.75             | 53.80           | 21.17         | 182.00             | 54.01           | 21.41         | 191.25             | 54.23           | 21.62         |
| 173.00             | 53.81           | 21.17         | 182.25             | 54.02           | 21.42         | 191.50             | 54.23           | 21.63         |
| 173.25             | 53.81           | 21.18         | 182.50             | 54.02           | 21.42         | 191.75             | 54.24           | 21.63         |
| 173.50             | 53.82           | 21.19         | 182.75             | 54.03           | 21.43         | 192.00             | 54.25           | 21.64         |
| 173.75             | 53.82           | 21.20         | 183.00             | 54.03           | 21.43         | 192.25             | 54.25           | 21.65         |
| 174.00             | 53.83           | 21.20         | 183.25             | 54.04           | 21.44         | 192.50             | 54.26           | 21.65         |
| 174.25             | 53.83           | 21.21         | 183.50             | 54.05           | 21.45         | 192.75             | 54.26           | 21.66         |
| 174.50             | 53.84           | 21.22         | 183.75             | 54.05           | 21.45         | 193.00             | 54.27           | 21.66         |
| 174.75             | 53.85           | 21.22         | 184.00             | 54.06           | 21.46         | 193.25             | 54.28           | 21.67         |
| 175.00             | 53.85           | 21.23         | 184.25             | 54.06           | 21.46         | 193.50             | 54.28           | 21.67         |
| 175.25             | 53.86           | 21.24         | 184.50             | 54.07           | 21.47         | 193.75             | 54.29           | 21.68         |
| 175.50             | 53.86           | 21.24         | 184.75             | 54.07           | 21.48         | 194.00             | 54.29           | 21.68         |
| 175.75             | 53.87           | 21.25         | 185.00             | 54.08           | 21.48         | 194.25             | 54.30           | 21.69         |
| 176.00             | 53.87           | 21.26         | 185.25             | 54.09           | 21.49         | 194.50             | 54.31           | 21.69         |
| 176.25             | 53.88           | 21.26         | 185.50             | 54.09           | 21.49         | 194.75             | 54.31           | 21.70         |
| 176.50             | 53.89           | 21.27         | 185.75             | 54.10           | 21.50         | 195.00             | 54.32           | 21.70         |
| 176.75             | 53.89           | 21.28         | 186.00             | 54.10           | 21.51         | 195.25             | 54.32           | 21.71         |

# Measurement Results

Certificate No : IC-2024-057638  
Measurement No : C-2024-067807

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## 1. Antenna Factor & Gain (cont.)

| Frequency<br>(GHz) | AF<br>[dB(1/m)] | Gain<br>(dBi) | Frequency<br>(GHz) | AF<br>[dB(1/m)] | Gain<br>(dBi) | Frequency<br>(GHz) | AF<br>[dB(1/m)] | Gain<br>(dBi) |
|--------------------|-----------------|---------------|--------------------|-----------------|---------------|--------------------|-----------------|---------------|
| 195.50             | 54.33           | 21.71         | 203.75             | 54.53           | 21.87         | 212.00             | 54.73           | 22.01         |
| 195.75             | 54.34           | 21.72         | 204.00             | 54.54           | 21.88         | 212.25             | 54.74           | 22.02         |
| 196.00             | 54.34           | 21.72         | 204.25             | 54.54           | 21.88         | 212.50             | 54.75           | 22.02         |
| 196.25             | 54.35           | 21.73         | 204.50             | 54.55           | 21.89         | 212.75             | 54.75           | 22.03         |
| 196.50             | 54.35           | 21.73         | 204.75             | 54.55           | 21.89         | 213.00             | 54.76           | 22.03         |
| 196.75             | 54.36           | 21.74         | 205.00             | 54.56           | 21.89         | 213.25             | 54.76           | 22.03         |
| 197.00             | 54.37           | 21.74         | 205.25             | 54.57           | 21.90         | 213.50             | 54.77           | 22.04         |
| 197.25             | 54.37           | 21.75         | 205.50             | 54.57           | 21.90         | 213.75             | 54.78           | 22.04         |
| 197.50             | 54.38           | 21.75         | 205.75             | 54.58           | 21.91         | 214.00             | 54.78           | 22.05         |
| 197.75             | 54.38           | 21.76         | 206.00             | 54.58           | 21.91         | 214.25             | 54.79           | 22.05         |
| 198.00             | 54.39           | 21.76         | 206.25             | 54.59           | 21.92         | 214.50             | 54.80           | 22.05         |
| 198.25             | 54.40           | 21.77         | 206.50             | 54.60           | 21.92         | 214.75             | 54.80           | 22.06         |
| 198.50             | 54.40           | 21.77         | 206.75             | 54.60           | 21.93         | 215.00             | 54.81           | 22.06         |
| 198.75             | 54.41           | 21.78         | 207.00             | 54.61           | 21.93         | 215.25             | 54.81           | 22.06         |
| 199.00             | 54.41           | 21.78         | 207.25             | 54.62           | 21.93         | 215.50             | 54.82           | 22.07         |
| 199.25             | 54.42           | 21.79         | 207.50             | 54.62           | 21.94         | 215.75             | 54.83           | 22.07         |
| 199.50             | 54.43           | 21.79         | 207.75             | 54.63           | 21.94         | 216.00             | 54.83           | 22.08         |
| 199.75             | 54.43           | 21.80         | 208.00             | 54.63           | 21.95         | 216.25             | 54.84           | 22.08         |
| 200.00             | 54.44           | 21.80         | 208.25             | 54.64           | 21.95         | 216.50             | 54.84           | 22.08         |
| 200.25             | 54.44           | 21.81         | 208.50             | 54.65           | 21.96         | 216.75             | 54.85           | 22.09         |
| 200.50             | 54.45           | 21.81         | 208.75             | 54.65           | 21.96         | 217.00             | 54.86           | 22.09         |
| 200.75             | 54.46           | 21.82         | 209.00             | 54.66           | 21.96         | 217.25             | 54.86           | 22.10         |
| 201.00             | 54.46           | 21.82         | 209.25             | 54.66           | 21.97         | 217.50             | 54.87           | 22.10         |
| 201.25             | 54.47           | 21.83         | 209.50             | 54.67           | 21.97         | 217.75             | 54.88           | 22.10         |
| 201.50             | 54.47           | 21.83         | 209.75             | 54.68           | 21.98         | 218.00             | 54.88           | 22.11         |
| 201.75             | 54.48           | 21.84         | 210.00             | 54.68           | 21.98         | 218.25             | 54.89           | 22.11         |
| 202.00             | 54.49           | 21.84         | 210.25             | 54.69           | 21.99         | 218.50             | 54.89           | 22.11         |
| 202.25             | 54.49           | 21.84         | 210.50             | 54.70           | 21.99         | 218.75             | 54.90           | 22.12         |
| 202.50             | 54.50           | 21.85         | 210.75             | 54.70           | 21.99         | 219.00             | 54.91           | 22.12         |
| 202.75             | 54.51           | 21.85         | 211.00             | 54.71           | 22.00         | 219.25             | 54.91           | 22.12         |
| 203.00             | 54.51           | 21.86         | 211.25             | 54.71           | 22.00         | 219.50             | 54.92           | 22.13         |
| 203.25             | 54.52           | 21.86         | 211.50             | 54.72           | 22.01         | 219.75             | 54.93           | 22.13         |
| 203.50             | 54.52           | 21.87         | 211.75             | 54.73           | 22.01         | 220.00             | 54.93           | 22.14         |

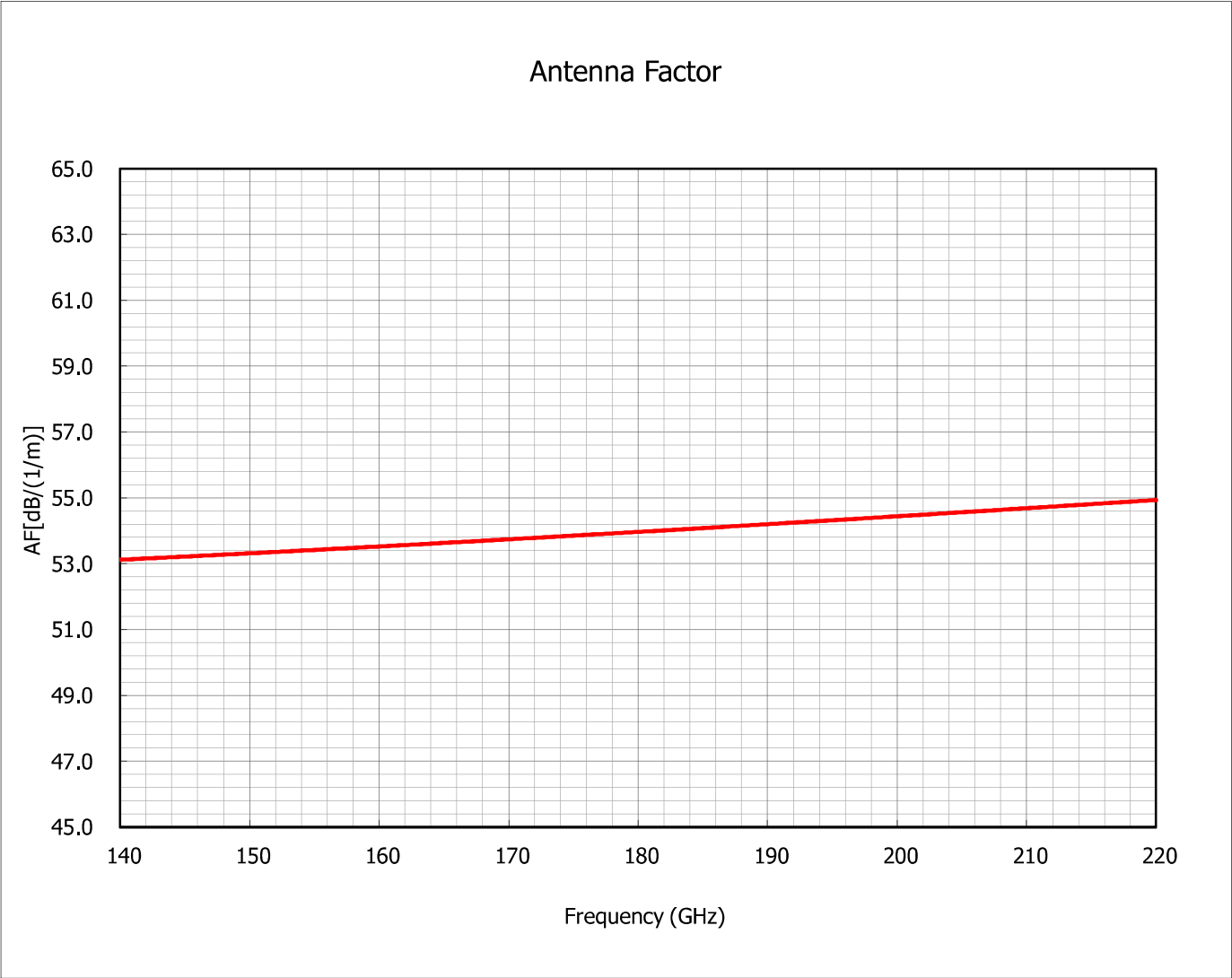
※ The measurement uncertainty of this result is 1.3 dB (Confidence level about 95 %,  $k = 2$ )

# Measurement Results

Certificate No : IC-2024-057638  
Measurement No : C-2024-067807

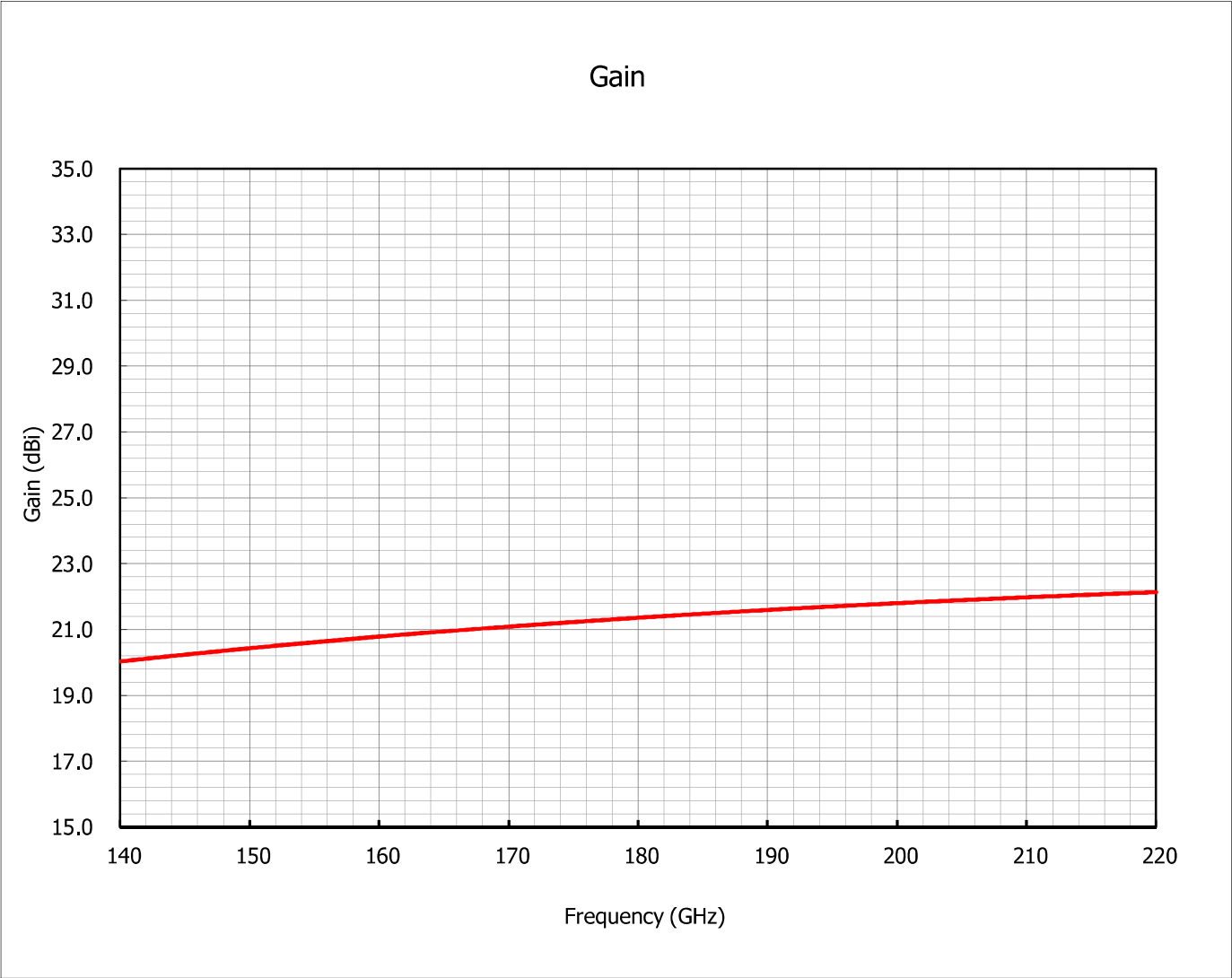
페이지(page) : 5 of 6

## 2. Antenna Factor Curve



# Measurement Results

### 3. Gain Curve



\* The above results are simulation results based on the measurement results in the report below.  
Report No : C-2024-067871

END.



## **Appendix C. Test Lab Accreditation Scope**

# **FEDERAL COMMUNICATIONS COMMISSION**

**Laboratory Division  
7435 Oakland Mills Road  
Columbia, MD 21046**

January 25, 2022

National Communications Commission  
No. 143, Yan-Ping S. Rd,  
Taipei, 100  
Taiwan

Attention: Jhih-Chang Shieh

Re: Accreditation of Sporton International Inc. Wensan Laboratory  
Designation Number: TW3786  
Test Firm Registration #: 654629

Dear Sir or Madam:

We have been notified by National Communications Commission that Sporton International Inc. Wensan Laboratory has been accredited as a testing laboratory.

At this time Sporton International Inc. Wensan Laboratory is hereby recognized to perform compliance testing on equipment subject to Declaration Of Conformity (DOC) and Certification of the Commission's Rules.

This recognition will expire upon expiration of the accreditation or notification of withdrawal of recognition.

Any questions about this recognition should be submitted as an inquiry to the FCC Knowledge Database at [www.fcc.gov/kdb](http://www.fcc.gov/kdb).

Sincerely,

Jihad Hermes  
Electronics Engineer

**Office of Engineering and Technology**

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**OET Accredited Test firm scope List**

**Test Firm: Sporton International Inc. Wensan Laboratory**

| Scope                                         | FCC Rule Parts                                                                                                        | Maximum Assessed Frequency in Mhz | Status   | Expiration Date | Recognition Date |
|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|-----------------------------------|----------|-----------------|------------------|
| Intentional Radiators                         | FCC Part 15 Subpart C                                                                                                 | 280000.00                         | Approved | 11-18-2023      | 01-25-2022       |
| U-NII without DFS                             | FCC Part 15, Subpart E                                                                                                | 40000.00                          | Approved | 11-18-2023      | 01-25-2022       |
| Intentional Radiators                         | FCC Part 15, Subpart E                                                                                                | 40000.00                          | Approved | 11-18-2023      | 01-25-2022       |
| U-NII with DFS                                | FCC Part 15, Subpart E                                                                                                | 40000.00                          | Approved | 11-18-2023      | 01-25-2022       |
| Intentional Radiators                         | FCC Part 15, Subpart F                                                                                                | 280000.00                         | Approved | 11-18-2023      | 01-25-2022       |
| UWB Intentional Radiators                     | FCC Part 15, Subpart F                                                                                                | 280000.00                         | Approved | 11-18-2023      | 01-25-2022       |
| Commercial Mobile Services                    | Part 22 (cellular), Part 24, Part 25 (below 3 GHz), Part 27                                                           | 40000.00                          | Approved | 11-18-2023      | 01-25-2022       |
| General Mobile Radio Services                 | Part 22 (non-cellular), Part 90 (below 3 GHz), Part 95 (below 3 GHz), Part 97 (below 3 GHz), Part 101 (below 3 GHz)   | 40000.00                          | Approved | 11-18-2023      | 01-25-2022       |
| Citizens Broadband Radio Services             | Part 96                                                                                                               | 40000.00                          | Approved | 11-18-2023      | 01-25-2022       |
| Microwave and Millimeter Bands Radio Services | Part 25 (above 3 GHz), Part 30, Part 74, Part 90 (above 3 GHz), Part 95 (above 3 GHz), Part 97 (above 3 GHz) Part 101 | 280000.00                         | Approved | 11-18-2023      | 01-25-2022       |
| RF Exposure                                   | Part 95 (above 3 GHz), Part 97 (above 3 GHz) Part 101                                                                 | 6000.00                           | Approved | 11-18-2023      | 01-25-2022       |
| Hearing Aid Compatibility                     | Part 20                                                                                                               | 40000.00                          | Approved | 11-18-2023      | 01-25-2022       |

Please use the Submit Inquiry link at [www.fcc.gov/labhelp](http://www.fcc.gov/labhelp) to send any comments or suggestions for this site

Federal Communications Commission  
 45 L Street NE  
 Washington, DC 20554  
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