

TEST REPORT

Applicant: TAG Sports and Outdoor LLC

Address: 1421 Research Park Drive Suite 2A, Lawrence, KS, United States

Product Name: TAG One Sports Radar

FCC ID: 2BNPA-TAGONEG1

Standard(s): 47 CFR Part 15, Subpart C(15.245)
ANSI C63.10-2020

Report Number: 2502Q09631E-RF-00B

Report Date: 2025/4/3

The above device has been tested and found compliant with the requirement of the relative standards by Bay Area Compliance Laboratories Corp. (Dongguan).

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CONTENTS

| | |
|--|-----------|
| DOCUMENT REVISION HISTORY | 4 |
| 1. GENERAL INFORMATION | 5 |
| 1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) | 5 |
| 1.2 ACCESSORY INFORMATION | 5 |
| 1.3 ANTENNA INFORMATION DETAIL ▲: | 5 |
| 1.4 EQUIPMENT MODIFICATIONS | 5 |
| 2. SUMMARY OF TEST RESULTS | 6 |
| 3. DESCRIPTION OF TEST CONFIGURATION | 7 |
| 3.1 EUT OPERATION CONDITION | 7 |
| 3.2 EUT EXERCISE SOFTWARE | 7 |
| 3.3 SUPPORT EQUIPMENT LIST AND DETAILS | 7 |
| 3.4 SUPPORT CABLE LIST AND DETAILS | 7 |
| 3.5 BLOCK DIAGRAM OF TEST SETUP | 8 |
| 3.6 TEST FACILITY | 9 |
| 3.7 MEASUREMENT UNCERTAINTY | 9 |
| 4. REQUIREMENTS AND TEST RESULTS | 10 |
| 4.1 AC LINE CONDUCTED EMISSIONS | 10 |
| 4.1.1 Applicable Standard | 10 |
| 4.1.2 EUT Setup | 11 |
| 4.1.3 EMI Test Receiver Setup | 11 |
| 4.1.4 Test Procedure | 12 |
| 4.1.5 Corrected Amplitude & Margin Calculation | 12 |
| 4.1.6 Test Result | 13 |
| 4.2 RADIATED EMISSIONS | 16 |
| 4.2.1 Applicable Standard | 16 |
| 4.2.2 EUT Setup | 17 |
| 4.2.3 EMI Test Receiver & Spectrum Analyzer Setup | 20 |
| 4.2.4 Test Procedure | 20 |
| 4.2.5 Corrected Amplitude & Margin Calculation | 21 |
| 4.2.6 Test Result | 22 |
| 4.3 20 dB EMISSION BANDWIDTH | 36 |
| 4.3.1 Applicable Standard | 36 |
| 4.3.2 EUT Setup | 36 |
| 4.3.3 Test Procedure | 36 |
| 4.3.4 Test Result | 37 |
| 4.4 ANTENNA REQUIREMENT | 39 |
| 4.4.1 Applicable Standard | 39 |
| 4.4.2 Judgment | 39 |
| EXHIBIT A - EUT PHOTOGRAPHS | 40 |
| EXHIBIT B - TEST SETUP PHOTOGRAPHS | 41 |
| EXHIBIT C - RF EXPOSURE EVALUATION | 42 |

APPLICABLE STANDARD 42

CALCULATION FORMULA: 42

CALCULATED DATA:..... 42

DOCUMENT REVISION HISTORY

| Revision Number | Report Number | Description of Revision | Date of Revision |
|-----------------|--------------------|-------------------------|------------------|
| 1.0 | 2502Q09631E-RF-00B | Original Report | 2025/4/3 |

1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

| | |
|-----------------------------|---|
| EUT Name: | TAG One Sports Radar |
| EUT Model: | TAG One |
| Operation Frequency: | 24080.02-24170.02 MHz |
| Modulation Type: | CW |
| Rated Input Voltage: | DC 3.8V from battery or DC 5V from USB |
| Serial Number: | 2YAI-2 (For Radiated Spurious Emission Above 1G test) 2YAI-4 (For AC Line Conducted Emissions and Radiated Spurious Emission Below 1G tests) |
| EUT Received Date: | 2025/2/13 |
| EUT Received Status: | Good |

1.2 Accessory Information

| Accessory Description | Manufacturer | Model | Parameters |
|-----------------------|--------------|-------|------------|
| / | / | / | / |

1.3 Antenna Information Detail ▲:

| Antenna Manufacturer | Antenna Type | input impedance (Ohm) | Frequency Range | Antenna Gain |
|--|------------------|-----------------------|-----------------|--------------|
| Shenzhen Qiangda Circuit Co.,Ltd | microstrip patch | 50 | 24-24.25GHz | 14dBi |
| The design of compliance with §15.203: | | | | |
| <input checked="" type="checkbox"/> Unit uses a permanently attached antenna. | | | | |
| <input type="checkbox"/> Unit uses a unique coupling to the intentional radiator. | | | | |
| <input type="checkbox"/> Unit was professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit. | | | | |

1.4 Equipment Modifications

No modifications are made to the EUT during all test items.

2. SUMMARY OF TEST RESULTS

| Standard(s)/Rule(s) | Description of Test | Result |
|--|----------------------------|-----------|
| §15.203 | Antenna Requirement | Compliant |
| §15.207(a) | AC Line Conducted Emission | Compliant |
| 15.205, §15.209, §15.245 | Radiated Emissions | Compliant |
| §15.215 (c) | 20 dB Bandwidth | Compliant |
| §1.1310 & §2.1091 | RF Exposure | Compliant |
| Note 1: For AC line conducted emissions, the maximum output power mode and channel was tested. Note 2: For Radiated Spurious Emissions 9kHz~1GHz, the maximum output power mode and channel was tested. | | |

3. DESCRIPTION OF TEST CONFIGURATION

3.1 EUT Operation Condition

The device built in a Radar module, which operates in the frequency range: 24080.02-24170.02MHz:

| The below frequencies were test: | |
|----------------------------------|-------------|
| Low Channel | 24080.02MHz |
| Middle Channel | 24125.02MHz |
| High Channel | 24170.02MHz |

3.2 EUT Exercise Software

The system was configured for testing in Engineering Mode, which was provided by the manufacturer.

3.3 Support Equipment List and Details

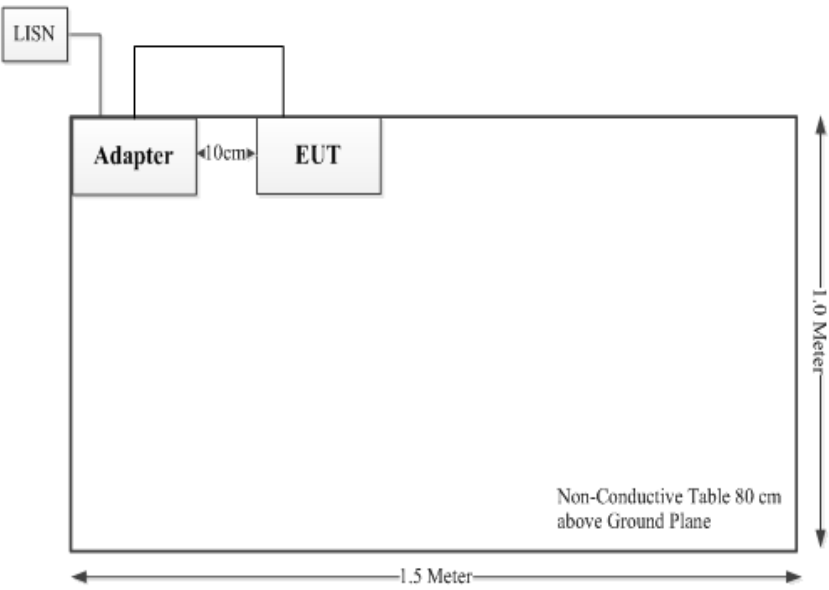
| Manufacturer | Description | Model | Serial Number |
|--------------|--------------|-------------------|---------------|
| HONOR | Adapter(USB) | ADS-12EA-0505010E | EA1320505 |

3.4 Support Cable List and Details

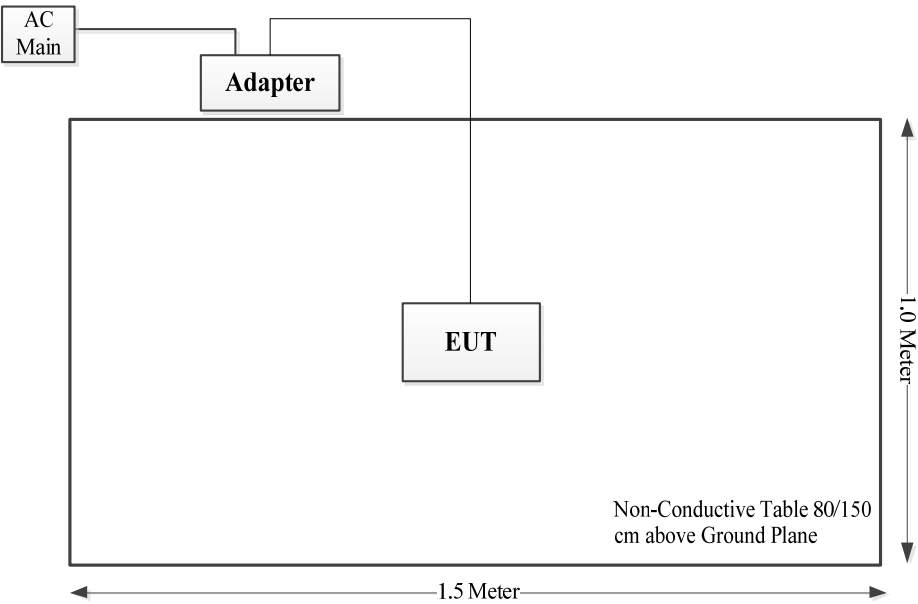
| Cable Description | Shielding Type | Ferrite Core | Length (m) | From Port | To |
|-------------------|----------------|--------------|------------|-----------|-----|
| USB Cable | No | No | 1.3 | Adapter | EUT |

3.5 Block Diagram of Test Setup

AC line conducted emissions:



Spurious Emissions:



3.6 Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.12, Pulong East 1st Road, Tangxia Town, Dongguan, Guangdong, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 829273, the FCC Designation No. : CN5044.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0022.

3.7 Measurement Uncertainty

Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

| Parameter | Measurement Uncertainty |
|-----------------------------------|--|
| Occupied Channel Bandwidth | ±5 % |
| Unwanted Emissions, radiated | 9kHz~30MHz: 3.3dB, 30MHz~200MHz: 4.55 dB, 200MHz~1GHz: 5.92 dB, 1GHz~6GHz: 4.98 dB, 6GHz~18GHz: 5.89 dB, 18GHz~26.5GHz: 5.47 dB, 26.5GHz~40GHz: 5.63 dB, 40~60G: 4.83dB, 60G~90G: 4.94dB, 90G-140G: 5.46dB, 140G-220G: 6.00dB, 220G-325G: 7.35dB |
| Temperature | ±1 °C |
| Humidity | ±5% |
| DC and low frequency voltages | ±0.4% |
| AC Power Lines Conducted Emission | 3.11 dB (150 kHz to 30 MHz) |

4. REQUIREMENTS AND TEST RESULTS

4.1 AC Line Conducted Emissions

4.1.1 Applicable Standard

FCC§15.207(a).

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN).

Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

| Frequency of emission (MHz) | Conducted limit (dB μ V) | |
|-----------------------------|------------------------------|-----------|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56* | 56 to 46* |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

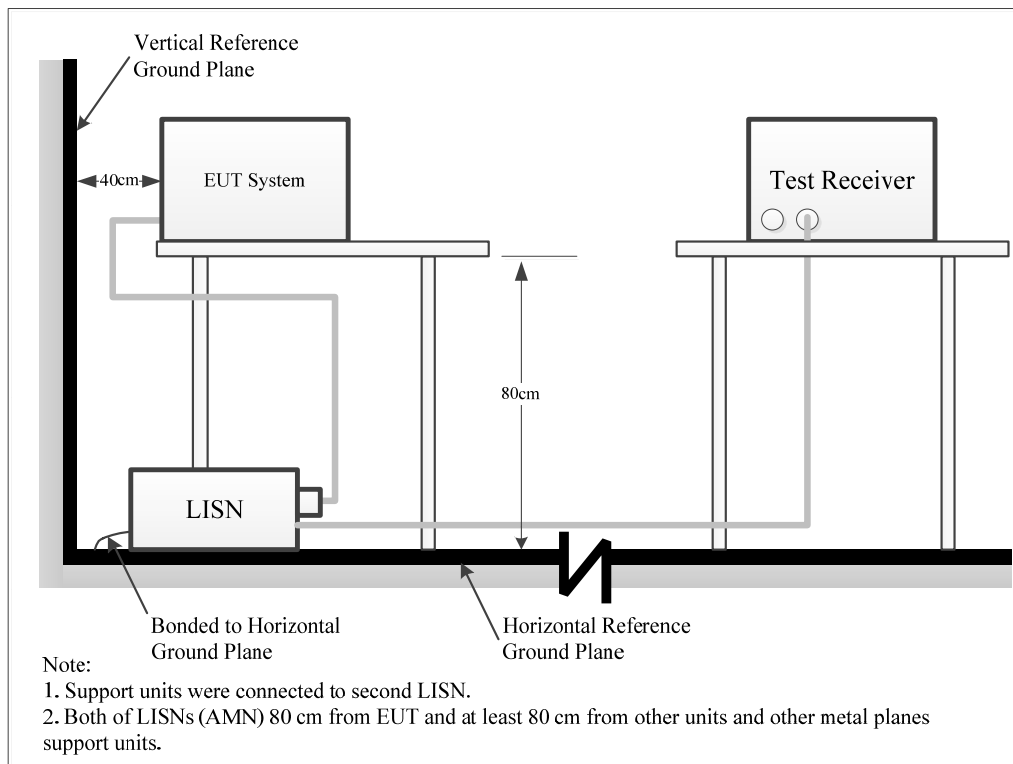
*Decreases with the logarithm of the frequency.

(b) The limit shown in paragraph (a) of this section shall not apply to carrier current systems operating as intentional radiators on frequencies below 30 MHz. In lieu thereof, these carrier current systems shall be subject to the following standards:

- (1) For carrier current system containing their fundamental emission within the frequency band 535-1705 kHz and intended to be received using a standard AM broadcast receiver: no limit on conducted emissions.
- (2) For all other carrier current systems: 1000 μ V within the frequency band 535-1705 kHz, as measured using a 50 μ H/50 ohms LISN.
- (3) Carrier current systems operating below 30 MHz are also subject to the radiated emission limits in §15.205, §15.209, §15.221, §15.223, or §15.227, as appropriate.

(c) Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Devices that include, or make provisions for, the use of battery chargers which permit operating while charging, AC adapters or battery eliminators or that connect to the AC power lines indirectly, obtaining their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

4.1.2 EUT Setup



The setup of EUT is according with per ANSI C63.10-2020 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10cm.

The adapter or EUT was connected to the main LISN with a 120 V/60 Hz AC power source.

4.1.3 EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

| Frequency Range | IF B/W |
|------------------|--------|
| 150 kHz – 30 MHz | 9 kHz |

4.1.4 Test Procedure

The frequency and amplitude of the six highest ac power-line conducted emissions relative to the limit, measured over all the current-carrying conductors of the EUT power cords, and the operating frequency or frequency to which the EUT is tuned (if appropriate), should be reported, unless such emissions are more than 20 dB below the limit. AC power-line conducted emissions measurements are to be separately carried out only on each of the phase ("hot") line(s) and (if used) on the neutral line(s), but not on the ground[protective earth] line(s). If less than six emission frequencies are within 20 dB of the limit, then the noise level of the measuring instrument at representative frequencies should be reported. The specific conductor of the power-line cord for each of the reported emissions should be identified. Measure the six highest emissions with respect to the limit on each current-carrying conductor of each power cord associated with the EUT (but not the power cords of associated or peripheral equipment that are part of the test configuration). Then, report the six highest emissions with respect to the limit from among all the measurements identifying the frequency and specific current-carrying conductor identified with the emission. The six highest emissions should be reported for each of the current-carrying conductors, or the six highest emissions may be reported over all the current-carrying conductors.

4.1.5 Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Result = Reading + Factor

Factor=attenuation caused by cable loss + voltage division factor of AMN

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. The equation for margin calculation is as follows:

Margin = Limit – Result

4.1.6 Test Result

| | | | |
|----------------|----------|--------------|--------------|
| Serial Number: | 2YAI-4 | Test Date: | 2025/03/31 |
| Test Site: | CE | Test Mode: | Transmitting |
| Tester: | Yolo Fan | Test Result: | Pass |

Environmental Conditions:

| | | | | | |
|----------------------|------|---------------------------|----|------------------------|-------|
| Temperature: (°C) | 20.4 | Relative Humidity: (%) | 48 | ATM Pressure: (kPa) | 101.5 |
|----------------------|------|---------------------------|----|------------------------|-------|

Test Equipment List and Details:

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|--------------|-------------------|-----------|---------------|------------------|----------------------|
| R&S | LISN | ENV216 | 101614 | 2024/9/5 | 2025/9/4 |
| MICRO-COAX | Coaxial Cable | C-NJNJ-50 | C-0200-01 | 2024/9/5 | 2025/9/4 |
| R&S | EMI Test Receiver | ESCI | 101121 | 2024/9/5 | 2025/9/4 |
| Audix | Test Software | E3 | 191218 V9 | N/A | N/A |

** Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

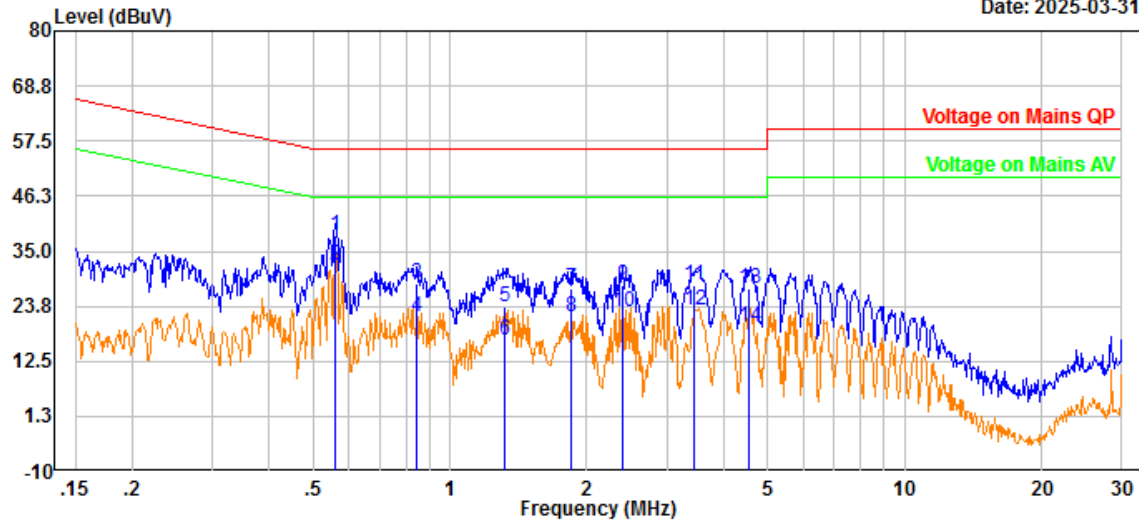
Test Data:

High channel was tested.

Project No.: 2502Q09631E-RF
Port: Line
Test Mode: Transmitting
IF B/W 9KHz PK/AV

Serial No.: 2YAI-4
Tester: Yolo Fan

Date: 2025-03-31

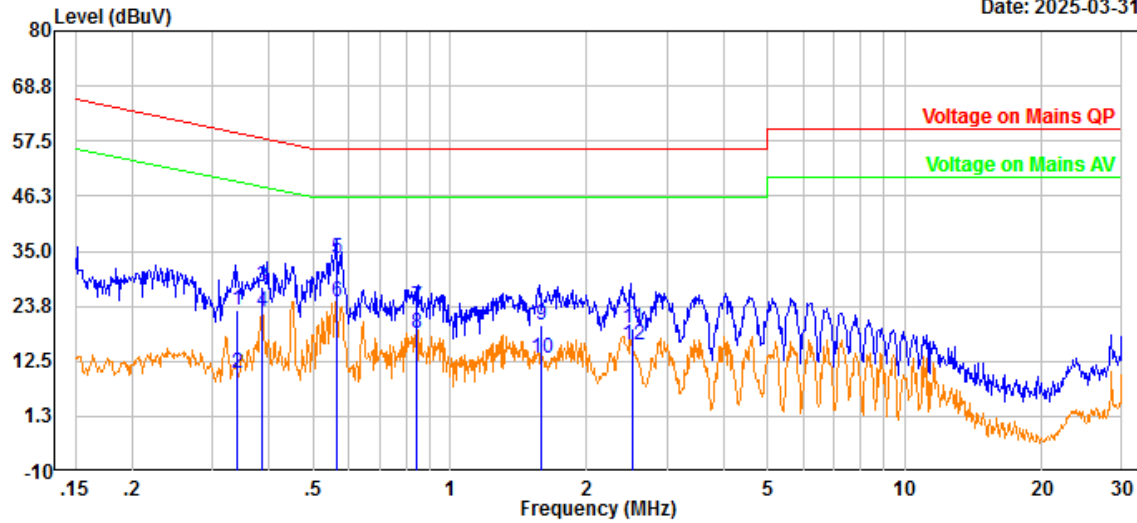


| No. | Frequency (MHz) | Reading (dBμV) | Factor (dB) | Result (dBμV) | Limit (dBμV) | Margin (dB) | Measurement |
|-----|--------------------|-------------------|----------------|------------------|-----------------|----------------|-------------|
| 1 | 0.56 | 27.27 | 10.83 | 38.10 | 56.00 | 17.90 | QP |
| 2 | 0.56 | 21.40 | 10.83 | 32.23 | 46.00 | 13.77 | Average |
| 3 | 0.85 | 17.58 | 10.85 | 28.43 | 56.00 | 27.57 | QP |
| 4 | 0.85 | 10.84 | 10.85 | 21.69 | 46.00 | 24.31 | Average |
| 5 | 1.31 | 12.76 | 10.84 | 23.60 | 56.00 | 32.40 | QP |
| 6 | 1.31 | 5.82 | 10.84 | 16.66 | 46.00 | 29.34 | Average |
| 7 | 1.84 | 16.64 | 10.82 | 27.46 | 56.00 | 28.54 | QP |
| 8 | 1.84 | 10.68 | 10.82 | 21.50 | 46.00 | 24.50 | Average |
| 9 | 2.41 | 17.25 | 10.81 | 28.06 | 56.00 | 27.94 | QP |
| 10 | 2.41 | 11.85 | 10.81 | 22.66 | 46.00 | 23.34 | Average |
| 11 | 3.44 | 17.42 | 10.78 | 28.20 | 56.00 | 27.80 | QP |
| 12 | 3.44 | 12.28 | 10.78 | 23.06 | 46.00 | 22.94 | Average |
| 13 | 4.56 | 16.53 | 10.79 | 27.32 | 56.00 | 28.68 | QP |
| 14 | 4.56 | 8.71 | 10.79 | 19.50 | 46.00 | 26.50 | Average |

Project No.: 2502Q09631E-RF
 Port: neutral
 Test Mode: Transmitting
 IF B/W 9KHz PK/AV

Serial No.: 2YAI-4
 Tester: Yolo Fan

Date: 2025-03-31



| No. | Frequency (MHz) | Reading (dBμV) | Factor (dB) | Result (dBμV) | Limit (dBμV) | Margin (dB) | Measurement |
|-------|--------------------|-------------------|----------------|------------------|-----------------|----------------|-------------|
| <hr/> | | | | | | | |
| 1 | 0.34 | 12.19 | 10.78 | 22.97 | 59.19 | 36.22 | QP |
| 2 | 0.34 | -0.65 | 10.78 | 10.13 | 49.19 | 39.06 | Average |
| 3 | 0.39 | 16.94 | 10.78 | 27.72 | 58.12 | 30.40 | QP |
| 4 | 0.39 | 11.68 | 10.78 | 22.46 | 48.12 | 25.66 | Average |
| 5 | 0.56 | 22.60 | 10.73 | 33.33 | 56.00 | 22.67 | QP |
| 6 | 0.56 | 13.87 | 10.73 | 24.60 | 46.00 | 21.40 | Average |
| 7 | 0.85 | 12.87 | 10.80 | 23.67 | 56.00 | 32.33 | QP |
| 8 | 0.85 | 7.25 | 10.80 | 18.05 | 46.00 | 27.95 | Average |
| 9 | 1.58 | 8.86 | 10.89 | 19.75 | 56.00 | 36.25 | QP |
| 10 | 1.58 | 2.20 | 10.89 | 13.09 | 46.00 | 32.91 | Average |
| 11 | 2.52 | 8.24 | 10.90 | 19.14 | 56.00 | 36.86 | QP |
| 12 | 2.52 | 4.83 | 10.90 | 15.73 | 46.00 | 30.27 | Average |

4.2 Radiated Emissions

4.2.1 Applicable Standard

FCC§15.245 (b);

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

| Fundamental frequency (MHz) | Field strength of fundamental (millivolts/meter) | Field strength of harmonics (millivolts/meter) |
|-----------------------------|--|--|
| 902-928 | 500 | 1.6 |
| 2435-2465 | 500 | 1.6 |
| 5785-5815 | 500 | 1.6 |
| 10500-10550 | 2500 | 25.0 |
| 24075-24175 | 2500 | 25.0 |

(1) Regardless of the limits shown in the above table, harmonic emissions in the restricted bands below 17.7 GHz, as specified in §15.205, shall not exceed the field strength limits shown in §15.209. Harmonic emissions in the restricted bands at and above 17.7 GHz shall not exceed the following field strength limits:

(i) For the second and third harmonics of field disturbance sensors operating in the 24075-24175 MHz band and for other field disturbance sensors designed for use only within a building or to open building doors, 25.0 mV/m.

(ii) For all other field disturbance sensors, 7.5 mV/m.

(iii) Field disturbance sensors designed to be used in motor vehicles or aircraft must include features to prevent continuous operation unless their emissions in the restricted bands, other than the second and third harmonics from devices operating in the 24075-24175 MHz band, fully comply with the limits given in §15.209. Continuous operation of field disturbance sensors designed to be used in farm equipment, vehicles such as fork lifts that are intended primarily for use indoors or for very specialized operations, or railroad locomotives, railroad cars and other equipment which travels on fixed tracks is permitted. A field disturbance sensor will be considered not to be operating in a continuous mode if its operation is limited to specific activities of limited duration (e.g., putting a vehicle into reverse gear, activating a turn signal, etc.).

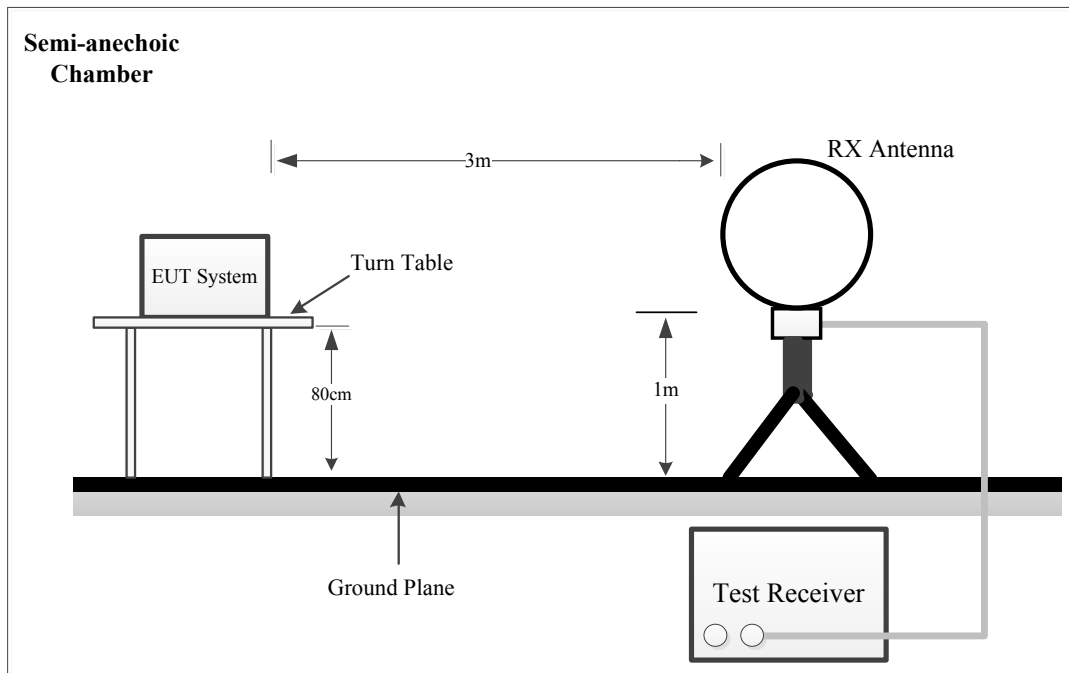
(2) Field strength limits are specified at a distance of 3 meters.

(3) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

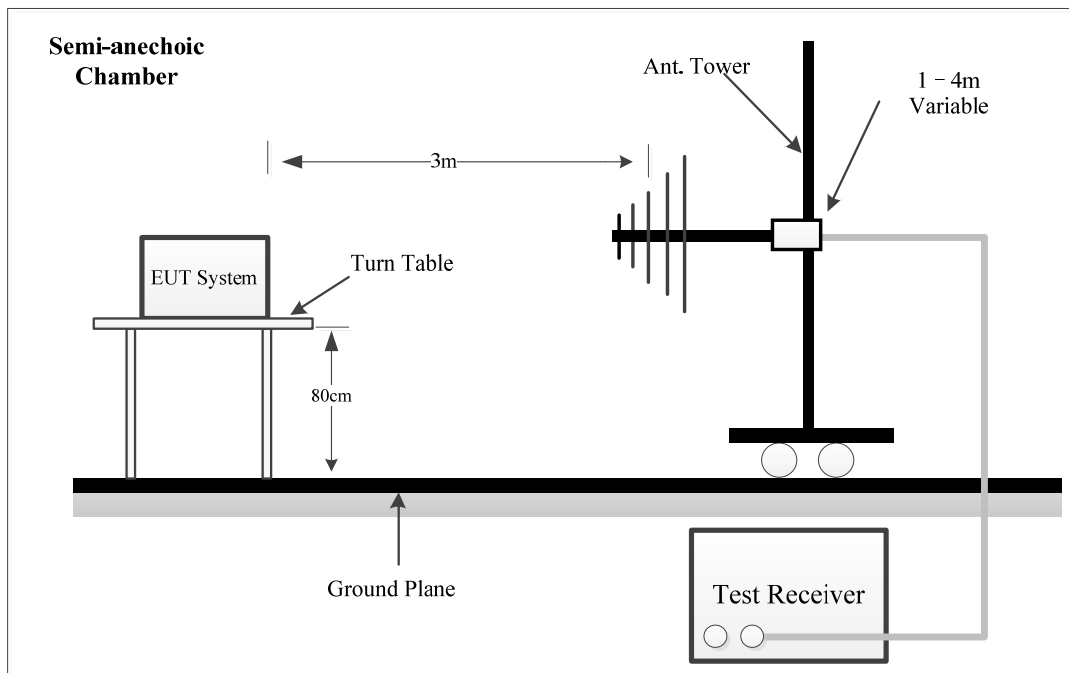
(4) The emission limits shown above are based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply.

4.2.2 EUT Setup

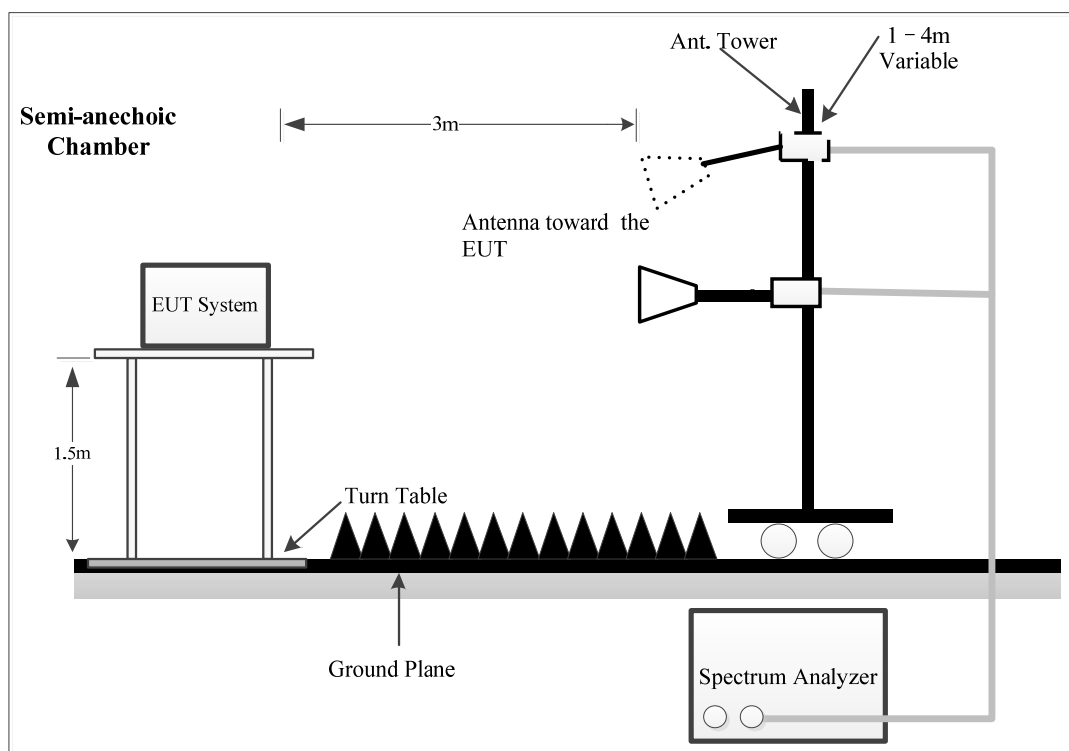
9kHz~30MHz:



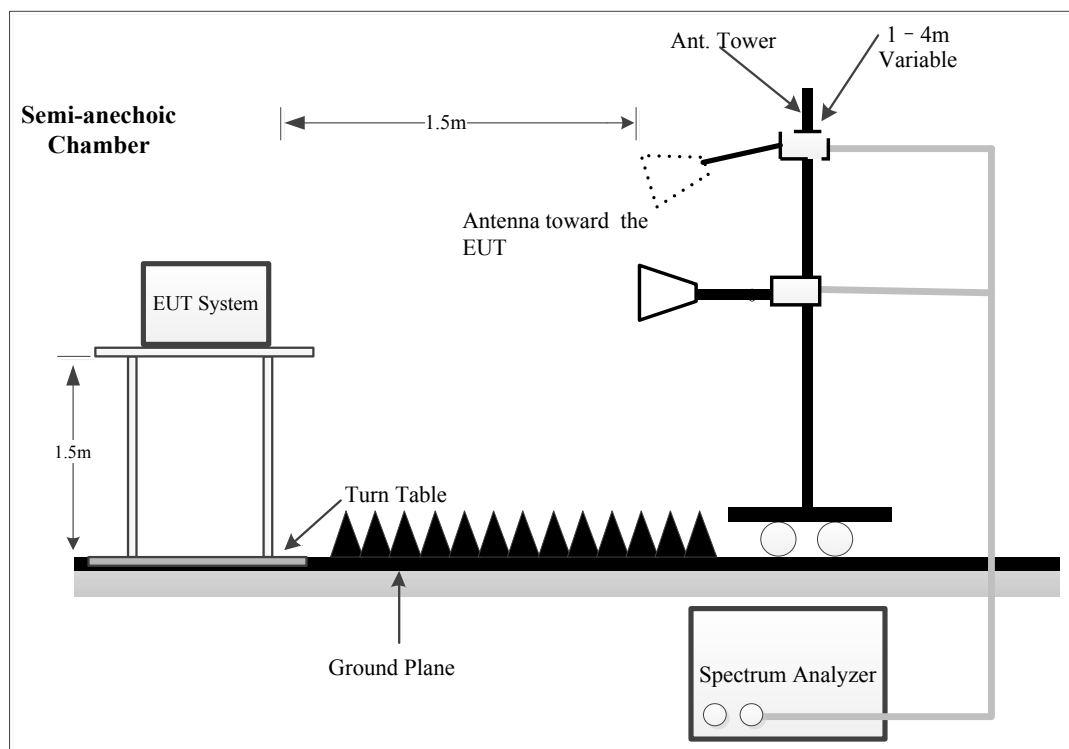
30MHz-1GHz:



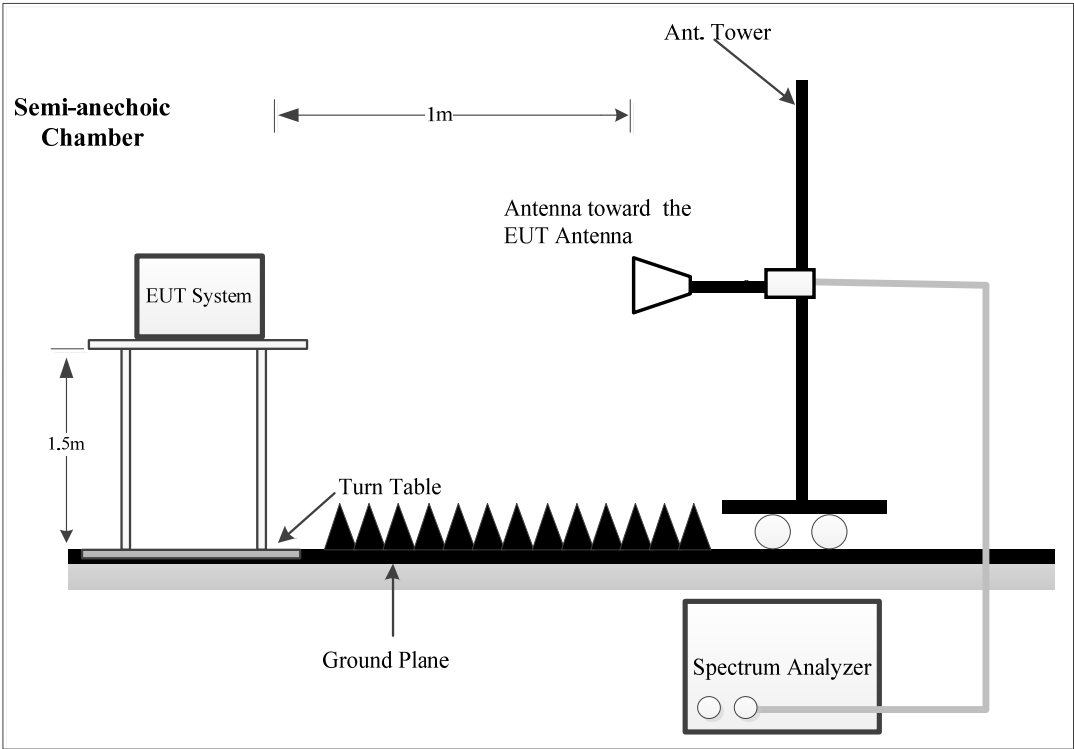
1GHz-26.5 GHz:



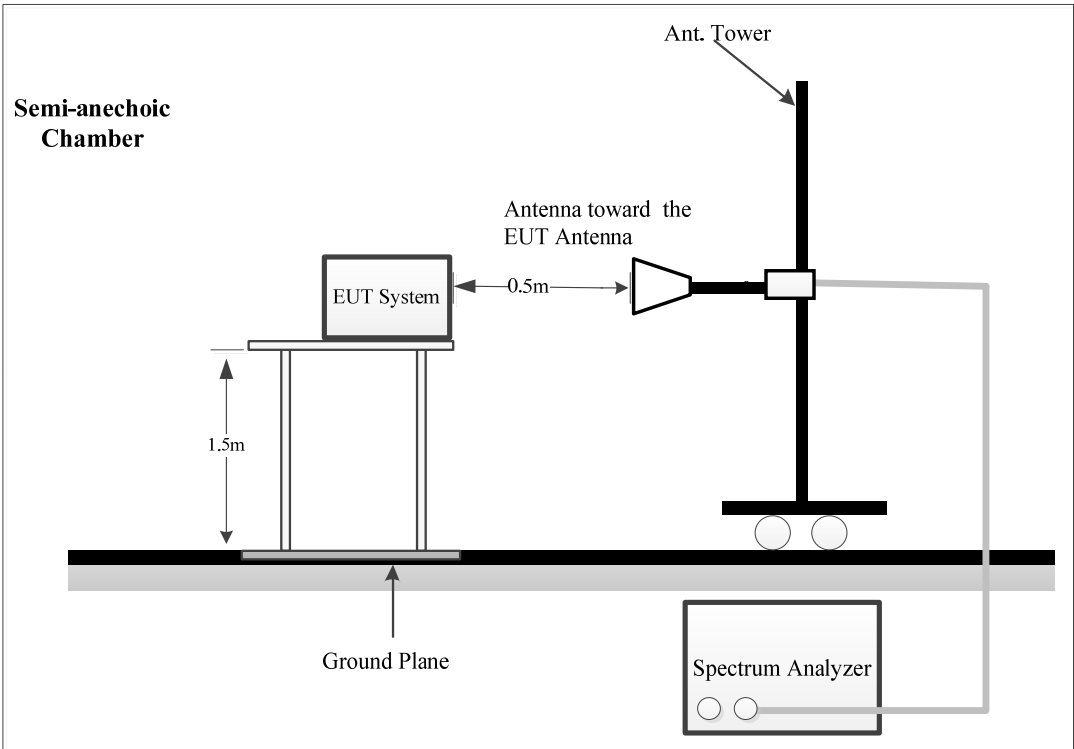
26.5-40GHz:



40~90 GHz:



90~100 GHz:



For 9kHz-30MHz test, the lowest height of the magnetic antenna shall be 1 m above the ground and three antenna orientations (parallel, perpendicular, and ground-parallel) shall be measured.

For above 40GHz: The antenna is scanned around the entire perimeter surface of the EUT, in both horizontal and vertical polarizations, at the distance of 1.0 m from 40 GHz to 90 GHz, and 0.5 m from 90 GHz to 100 GHz.

The radiated emission test was performed in the 3 meters chamber, using the setup accordance with the ANSI C63.10-2020. The specification used was the FCC 15.209/15.205,FCC 15.245 limits.

4.2.3 EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 9 kHz to 100 GHz.

9kHz-1000MHz:

| Frequency Range | Measurement | RBW | Video B/W | IF B/W | Detector |
|-----------------|-------------|---------|-----------|---------|----------|
| 9 kHz-150 kHz | QP/AV | 300 Hz | 1 kHz | 200 Hz | QP/AV |
| 150 kHz-30 MHz | QP/AV | 10 kHz | 30 kHz | 9 kHz | QP/AV |
| 30 MHz-1000 MHz | Peak | 100 kHz | 300 kHz | / | PK |
| | QP | / | / | 120 kHz | QP |

Above 1GHz:

Pre-scan:

| Frequency Range | Measurement | RBW | Video B/W | Detector |
|-----------------|-------------|------|-----------|----------|
| Above 1 GHz | Peak | 1MHz | 3 MHz | PK |
| | AV | 1MHz | 5kHz | PK |

Final measurement for emission identified during the pre-scan:

| Frequency Range | Measurement | RBW | Video B/W | Detector |
|-----------------|-------------|------|-----------|----------|
| Above 1 GHz | Peak | 1MHz | 3 MHz | PK |
| | AV | 1MHz | 10 Hz | PK |

4.2.4 Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was required in Quasi-peak measurement for frequency range of 9 kHz-1 GHz except 9-90 kHz, 110-490 kHz, employing an average measurement, peak and Average measurement for frequencies above 1 GHz.

If the maximized peak measured value complies with under the QP/Average limit more than 6dB, then it is unnecessary to perform an QP/Average measurement.

For Radiated 26.5-40GHz test:

Which was performed at 1.5 m distance, according to C63.10, the test result shall be extrapolated to the specified distance using an extrapolation Factor of 20dB/decade from 3m to 1.5m

Distance extrapolation Factor = $20 \log (\text{specific distance [3m]}/\text{test distance [1.5m]})$ dB= 6.0 dB

For 40-90GHz:

Test result shall be extrapolated to the specified distance using an extrapolation factor of 20dB/decade from 3m to 1m.

Distance extrapolation factor = $20 \log (\text{specific distance [3m]}/\text{test distance [1m]})$ dB= 9.54 dB.

For 90-100GHz:

Test result shall be extrapolated to the specified distance using an extrapolation factor of 20dB/decade from 3m to 0.5m.

Distance extrapolation factor = $20 \log (\text{specific distance [3m]}/\text{test distance [0.5m]})$ dB = 15.56 dB.

External harmonic mixers are utilized. The antenna is scanned around the entire perimeter surface of the EUT, in both horizontal and vertical polarizations. The Mixers and it's RF cables is compose a system for calibration, the conversion factor was added into the test Spectrum Analyzer in testing.

The far-field boundary is given in ANSI C63.10-2020:

$$R_m = 2D^2 / \lambda$$

Where:

D is the largest dimension of the antenna aperture in m and

λ is the free-space wavelength in m at the frequency of measurement.

The minimum test distance for the frequency range 40GHz-100GHz determine as below:

| Model | Frequency Range (GHz) | Largest Dimension of the Horn Antenna (mm) | Minimum Test Distance R_m (m) |
|-------|-----------------------|--|---------------------------------|
| M19RH | 40-60 | 46.3 | 0.86 |
| M12RH | 60-90 | 30.02 | 0.55 |
| M08RH | 90-140 | 19.7 | 0.39 |

Note: the test distances used were 1.0 m from 40 GHz to 90 GHz, and 0.5 m from 90 GHz to 100GHz, it can be seen that the EUT was always in the Far-field of the Receive Antenna during all Radiated Emissions Tests.

4.2.5 Corrected Amplitude & Margin Calculation

The basic equation except 26.5-100GHz test is as follows:

Factor = Antenna Factor + Cable Loss- Amplifier Gain

For Radiated 26.5-100GHz test:

Factor = Antenna Factor + Cable Loss- Distance extrapolation Factor

Result = Reading + Factor

The “**Margin**” column of the following data tables indicates the degree of compliance within the applicable limit. The equation for margin calculation is as follows:

Margin = Limit – Result

4.2.6 Test Result

| | | | |
|----------------|-----------------------|--------------|---|
| Serial Number: | 2YAI-2 | Test Date: | Below 1GHz: 2025/3/4 Above 1GHz: 2025/3/17-2025/3/18 |
| Test Site: | Chamber B, Chamber10m | Test Mode: | Transmitting |
| Tester: | Colin Yang, Zoo Zou | Test Result: | Pass |

Environmental Conditions:

| | | | | | |
|----------------------|-----------|---------------------------|-------|------------------------|-------------|
| Temperature: (°C) | 21.4~22.5 | Relative Humidity: (%) | 41~48 | ATM Pressure: (kPa) | 101.7~101.8 |
|----------------------|-----------|---------------------------|-------|------------------------|-------------|

Test Equipment List and Details:

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|-----------------------|--|---------------------------|-------------------|------------------|----------------------|
| 9kHz~1000MHz | | | | | |
| EMCO | Passive Loop Antenna | 6512 | 9706-1206 | 2023/10/25 | 2026/10/24 |
| Sunol Sciences | Hybrid Antenna | JB3 | A060611-1 | 2023/9/6 | 2026/9/5 |
| Narda | Coaxial Attenuator | 779-6dB | 04269 | 2023/9/6 | 2026/9/5 |
| Unknown | Coaxial Cable | C-NJNJ-50 | C-1000-01 | 2024/7/1 | 2025/6/30 |
| Unknown | Coaxial Cable | C-NJNJ-50 | C-0400-04 | 2024/7/1 | 2025/6/30 |
| Unknown | Coaxial Cable | C-NJNJ-50 | C-0530-01 | 2024/7/1 | 2025/6/30 |
| Sonoma | Amplifier | 310N | 185914 | 2024/8/26 | 2025/8/25 |
| R&S | EMI Test Receiver | ESCI | 100224 | 2024/8/26 | 2025/8/25 |
| Audix | Test Software | E3 | 191218 V9 | N/A | N/A |
| Above 1GHz | | | | | |
| ETS-Lindgren | Horn Antenna | 3115 | 000 527 35 | 2023/9/7 | 2026/9/6 |
| Xinhang Macrowave | Coaxial Cable | XH750A-N/J-SMA/J-10M | 20231117004 #0001 | 2024/11/17 | 2025/11/16 |
| AH | Preamplifier | PAM-0118P | 469 | 2024/4/15 | 2025/4/14 |
| Audix | Test Software | E3 | 191218 V9 | N/A | N/A |
| R&S | Spectrum Analyzer | FSV40 | 101944 | 2024/9/6 | 2025/9/5 |
| Ducommun Technologies | Horn Antenna | ARH-4223-02 | 1007726-02 1304 | 2023/2/22 | 2026/2/21 |
| Ducommun Technologies | Horn Antenna | ARH-2823-02 | 1007726-01 1302 | 2023/2/22 | 2026/2/21 |
| Xinhang Macrowave | Coaxial Cable | XH360A-2.92/J-2.92/J-6M-A | 20231208001 #0001 | 2024/12/9 | 2025/12/8 |
| AH | Preamplifier | PAM-1840VH | 191 | 2024/9/5 | 2025/9/4 |
| Decentest | Multiplex Switch Test Control Set & Filter Switch Unit | DT7220SCU & DT7220FCU | DC79902 & DC79905 | 2024/8/27 | 2025/8/26 |
| OML | Waveguide Mixer | WR19/M19HWD | U60313-1 | 2023/2/16 | 2026/2/15 |
| OML | Horn Antenna | M19RH | 11648-01 | 2023/2/27 | 2026/2/26 |
| OML | Waveguide Mixer | WR12/M12HWD | E60120-1 | 2023/2/16 | 2026/2/15 |
| OML | Horn Antenna | M12RH | E60120-2 | 2023/2/27 | 2026/2/26 |
| OML | Waveguide Mixer | WR08/M08HWD | F60313-1 | 2023/2/16 | 2026/2/15 |
| OML | Horn Antenna | M08RH | F60313-2 | 2023/2/27 | 2026/2/26 |

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data:

Please refer to the below table and plots.

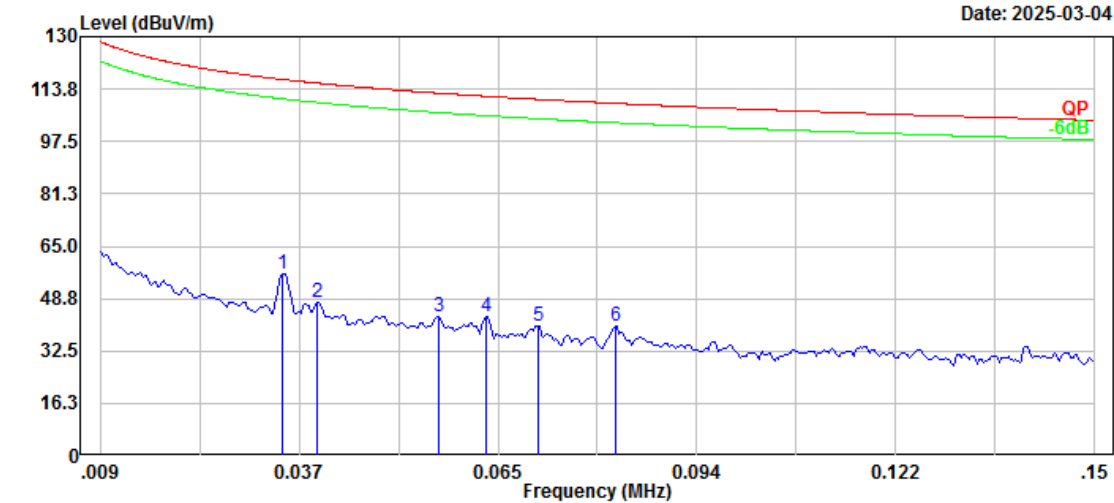
After pre-scan in the X, Y and Z axes of orientation, the worst case is refer to table and plots.

1) 9kHz~30MHz(High channel was tested)
Three antenna orientations (parallel, perpendicular, and ground-parallel) was measured,
the worst orientations was below:

Project No.: 2502Q09631E-RF
Polarization: Parallel
Test Mode: Transmitting
Note:
RBW:300Hz VBW:1kHz

Serial No.: 2YAI-4
Tester: Zoo Zou

Date: 2025-03-04



| No. | Frequency (MHz) | Reading (dBμV) | Factor (dB/m) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Detector |
|-----|--------------------|-------------------|------------------|--------------------|-------------------|----------------|----------|
| 1 | 0.035 | 9.81 | 46.67 | 56.48 | 116.74 | 60.26 | Peak |
| 2 | 0.040 | 1.93 | 45.81 | 47.74 | 115.62 | 67.88 | Peak |
| 3 | 0.057 | 0.15 | 42.86 | 43.01 | 112.50 | 69.49 | Peak |
| 4 | 0.064 | 1.49 | 41.69 | 43.18 | 111.52 | 68.34 | Peak |
| 5 | 0.071 | -0.05 | 40.41 | 40.36 | 110.57 | 70.21 | Peak |
| 6 | 0.082 | 1.85 | 38.56 | 40.41 | 109.32 | 68.91 | Peak |

Project No.: 2502Q09631E-RF

Serial No.: 2YAI-4

Polarization: Parallel

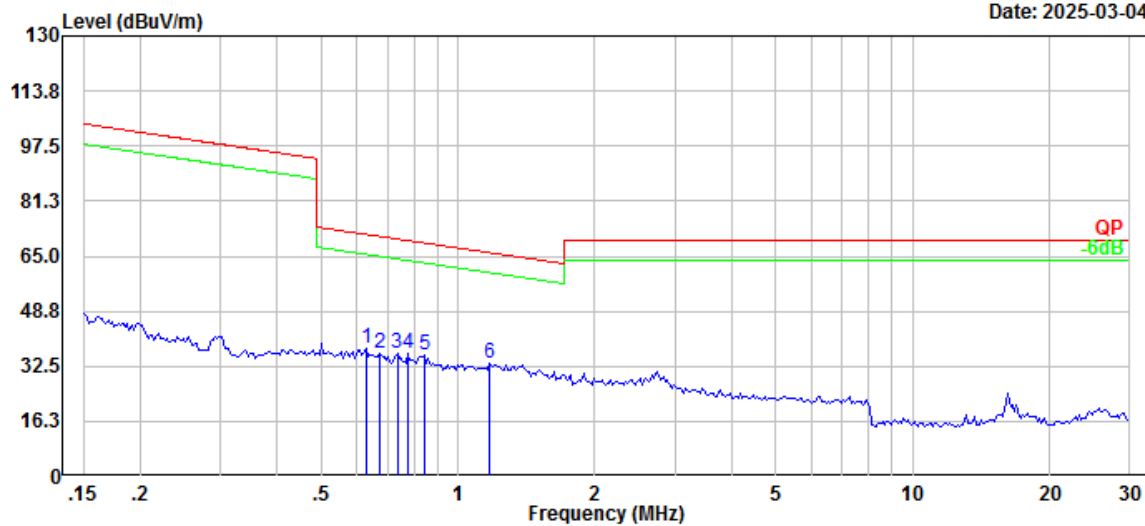
Tester: Zoo Zou

Test Mode: Transmitting

Note:

RBW:10kHz VBW:30kHz

Date: 2025-03-04



| No. | Frequency (MHz) | Reading (dBμV) | Factor (dB/m) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Detector |
|-----|--------------------|-------------------|------------------|--------------------|-------------------|----------------|----------|
| 1 | 0.627 | 15.50 | 22.20 | 37.70 | 71.61 | 33.91 | Peak |
| 2 | 0.675 | 14.63 | 21.71 | 36.34 | 70.95 | 34.61 | Peak |
| 3 | 0.735 | 15.34 | 21.15 | 36.49 | 70.20 | 33.71 | Peak |
| 4 | 0.775 | 15.49 | 20.78 | 36.27 | 69.73 | 33.46 | Peak |
| 5 | 0.844 | 16.20 | 19.68 | 35.88 | 68.98 | 33.10 | Peak |
| 6 | 1.172 | 17.77 | 15.80 | 33.57 | 66.06 | 32.49 | Peak |

2) 30MHz-1GHz(High channel was tested)

Project No.: 2502Q09631E-RF

Serial No.: 2YAI-4

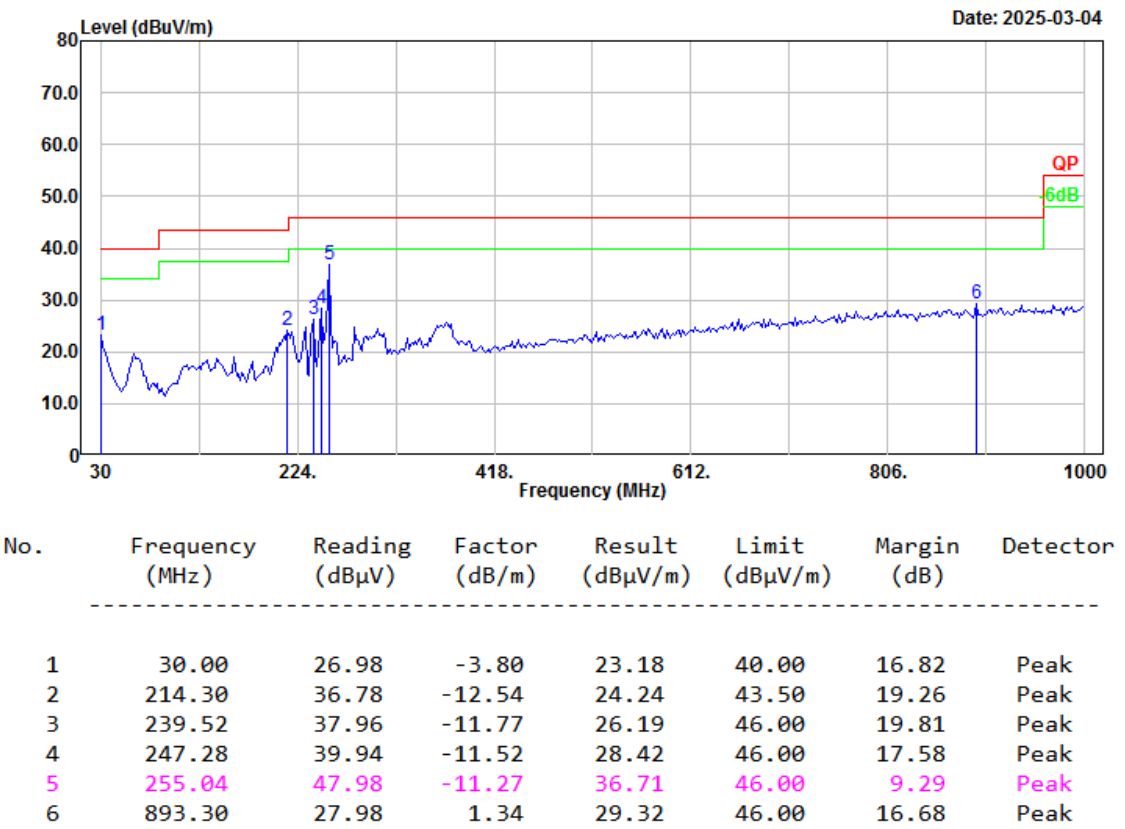
Polarization: Horizontal

Tester: Zoo Zou

Test Mode: Transmitting

Note:

RBW:100kHz VBW:300kHz



Project No.: 2502Q09631E-RF

Serial No.: 2YAI-4

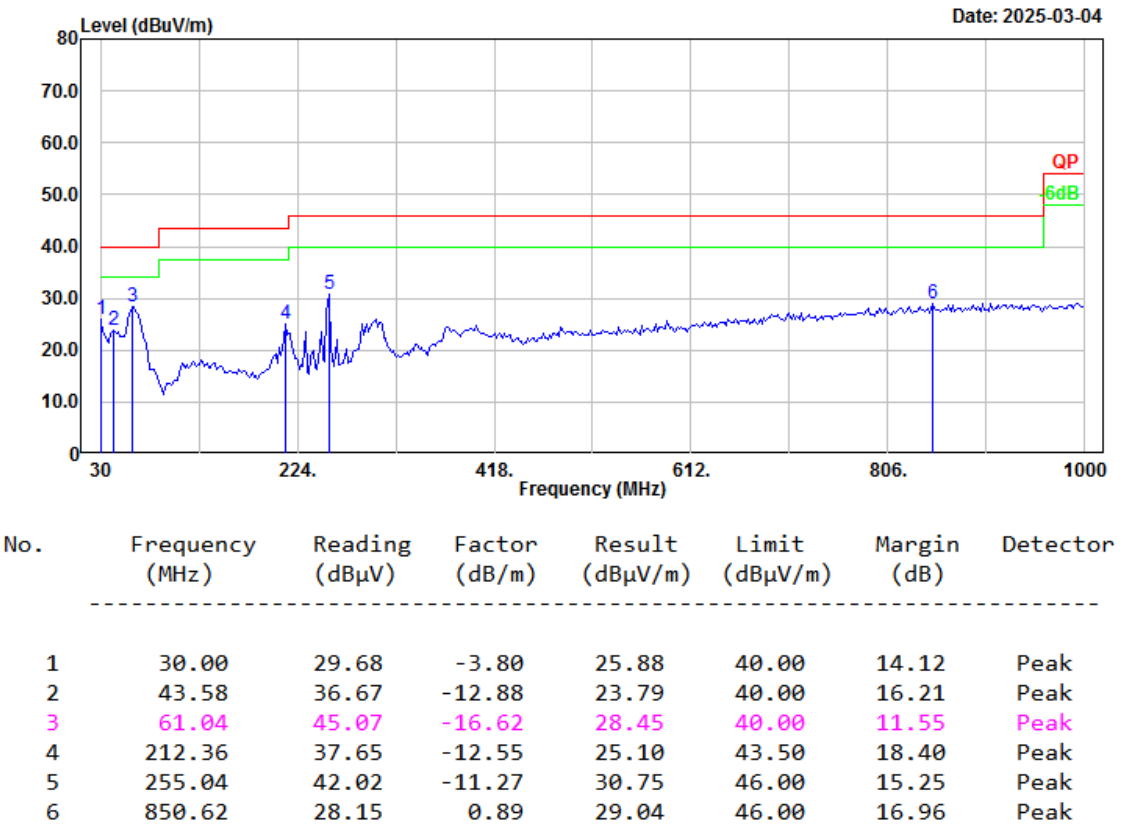
Polarization: Vertical

Tester: Zoo Zou

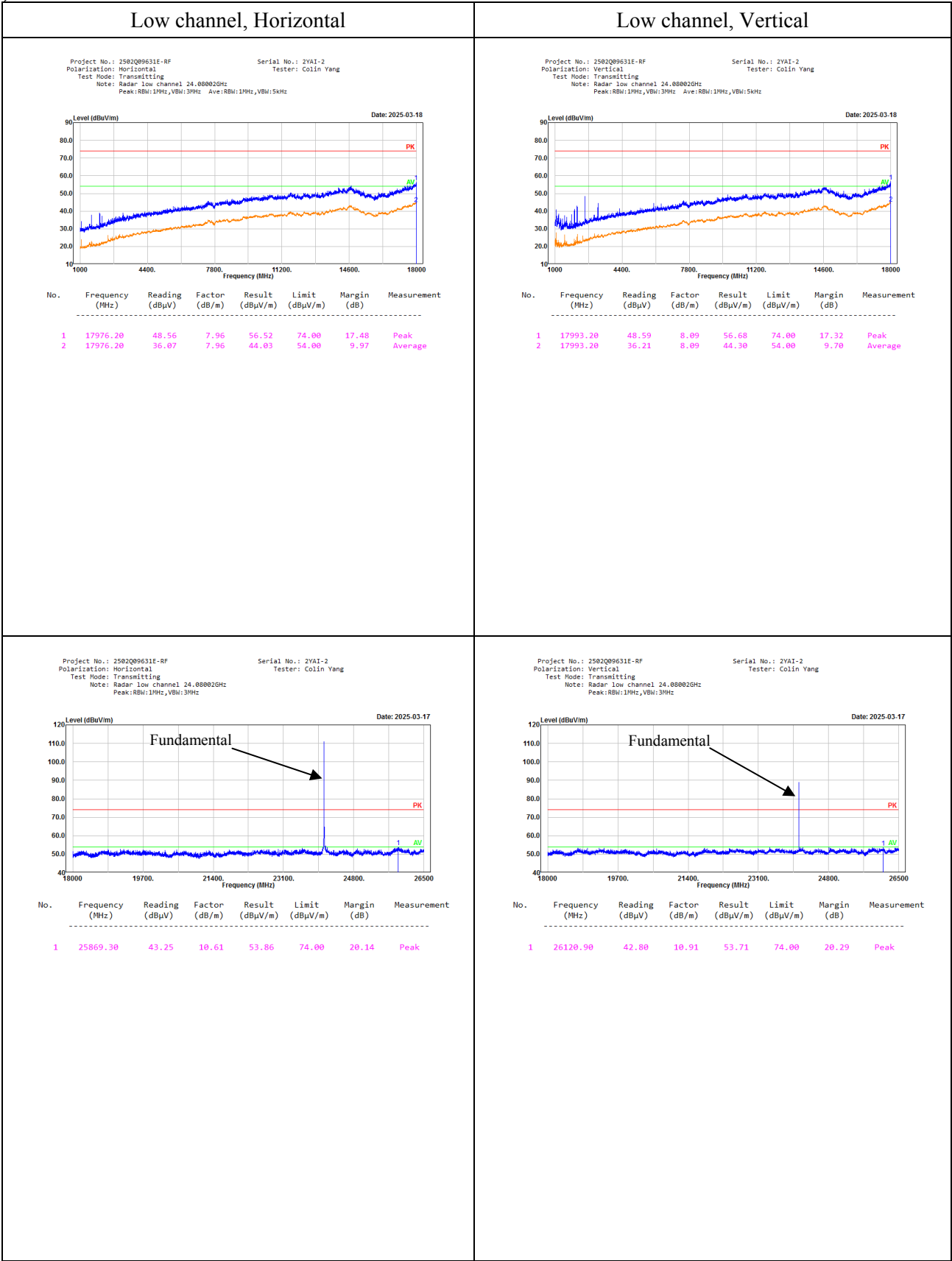
Test Mode: Transmitting

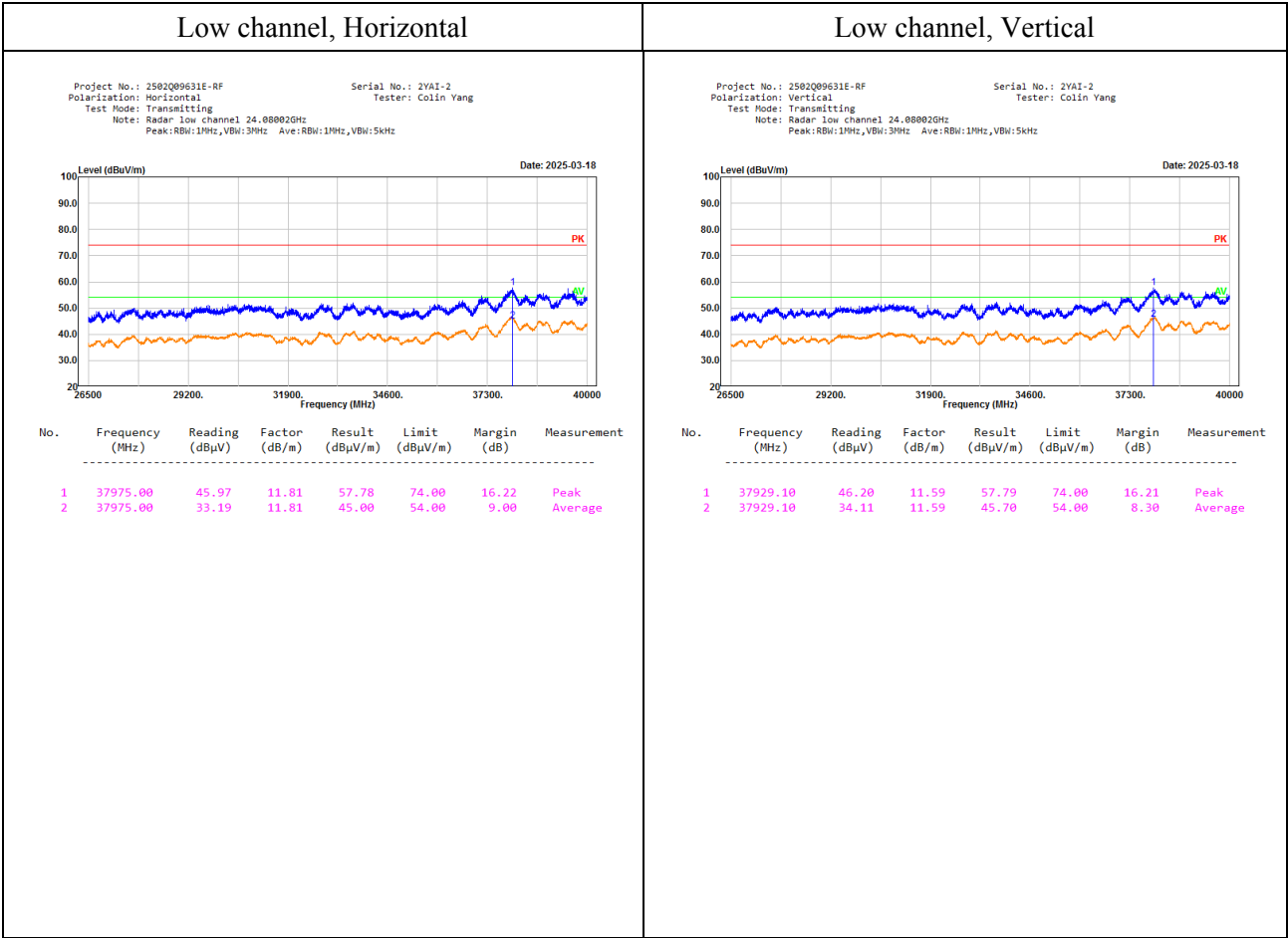
Note:

RBW:100kHz VBW:300kHz

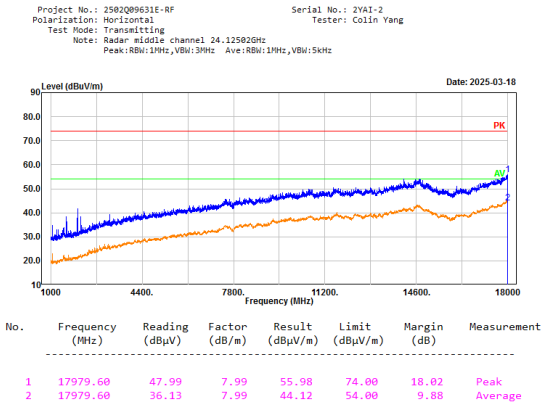


3) 1-40GHz:

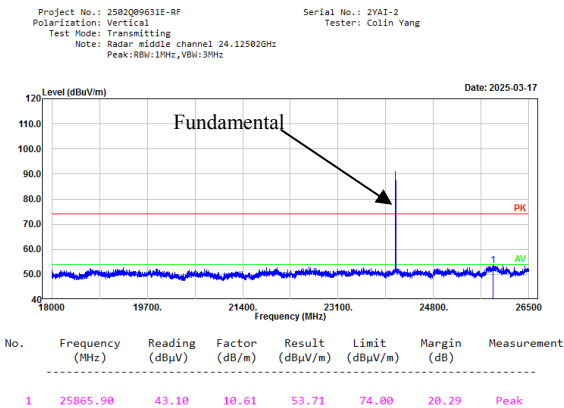
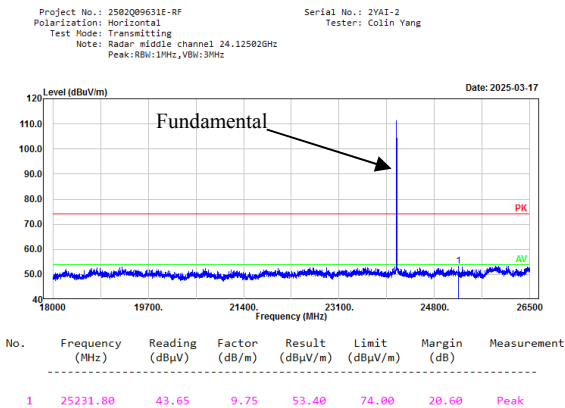
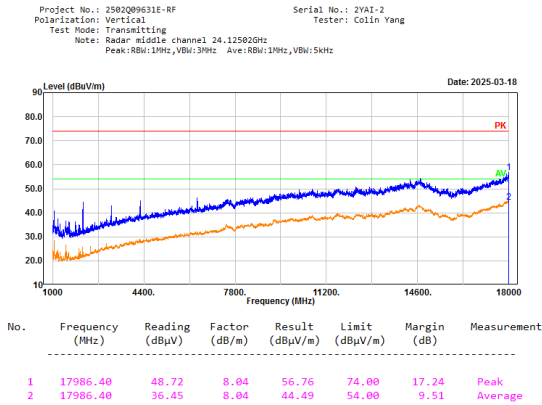




Middle channel, Horizontal

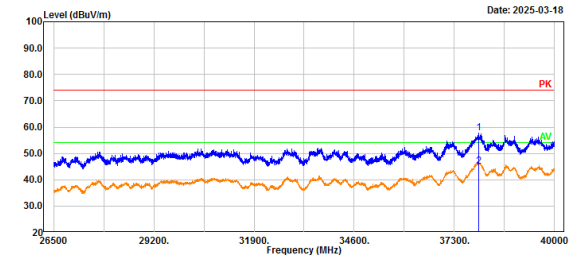


Middle channel, Vertical



Middle channel, Horizontal

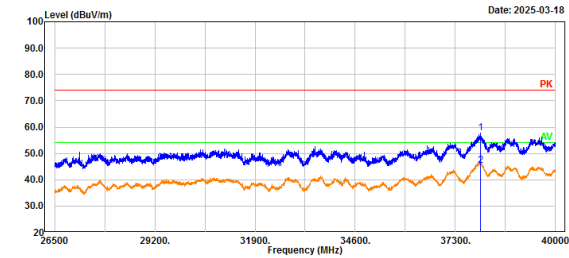
Project No.: 2502Q09631E-RF Serial No.: 2YAI-2
Polarization: Horizontal Tester: Colin Yang
Test Mode: Transmitting
Note: Radar middle channel 24.12502GHz
Peak: RBW:1MHz, VBW:3MHz Ave: RBW:1MHz, VBW:5kHz



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Measurement |
|-----|-----------------|----------------|---------------|-----------------|----------------|-------------|-------------|
| 1 | 37958.80 | 46.00 | 11.73 | 57.73 | 74.00 | 16.27 | Peak |
| 2 | 37958.80 | 33.27 | 11.73 | 45.00 | 54.00 | 9.00 | Average |

Middle channel, Vertical

Project No.: 2502Q09631E-RF Serial No.: 2YAI-2
Polarization: Vertical Tester: Colin Yang
Test Mode: Transmitting
Note: Radar middle channel 24.12502GHz
Peak: RBW:1MHz, VBW:3MHz Ave: RBW:1MHz, VBW:5kHz

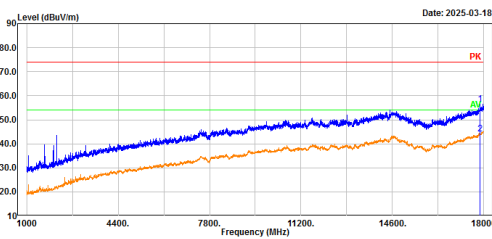


| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Measurement |
|-----|-----------------|----------------|---------------|-----------------|----------------|-------------|-------------|
| 1 | 37983.10 | 45.97 | 11.85 | 57.82 | 74.00 | 16.18 | Peak |
| 2 | 37983.10 | 33.39 | 11.85 | 45.24 | 54.00 | 8.76 | Average |

High channel, Horizontal

Project No.: 2502Q09631E-RF
Polarization: Horizontal
Test Mode: Transmitting
Note: Radar high channel 24.17002GHz
Peak: RBW:1MHz, VBW:30Hz Ave: RBW:1MHz, VBW:5kHz

Serial No.: 2YAI-2
Tester: Colin Yang

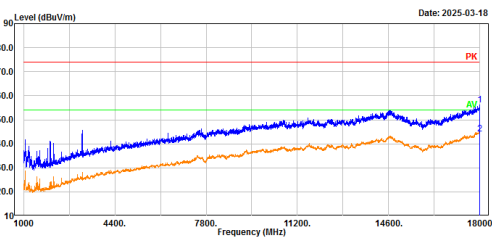


| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Measurement |
|-----|-----------------|----------------|---------------|-----------------|----------------|-------------|-------------|
| 1 | 17853.80 | 49.51 | 7.09 | 56.60 | 74.00 | 17.40 | Peak |
| 2 | 17853.80 | 37.04 | 7.09 | 44.13 | 54.00 | 9.87 | Average |

High channel, Vertical

Project No.: 2502Q09631E-RF
Polarization: Vertical
Test Mode: Transmitting
Note: Radar high channel 24.17002GHz
Peak: RBW:1MHz, VBW:30Hz Ave: RBW:1MHz, VBW:5kHz

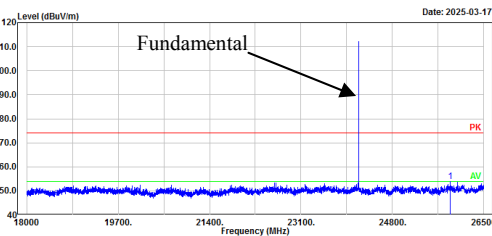
Serial No.: 2YAI-2
Tester: Colin Yang



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Measurement |
|-----|-----------------|----------------|---------------|-----------------|----------------|-------------|-------------|
| 1 | 17986.40 | 48.13 | 8.04 | 56.17 | 74.00 | 17.83 | Peak |
| 2 | 17986.40 | 36.22 | 8.04 | 44.26 | 54.00 | 9.74 | Average |

Project No.: 2502Q09631E-RF
Polarization: Horizontal
Test Mode: Transmitting
Note: Radar high channel 24.17002GHz
Peak: RBW:1MHz, VBW:30Hz

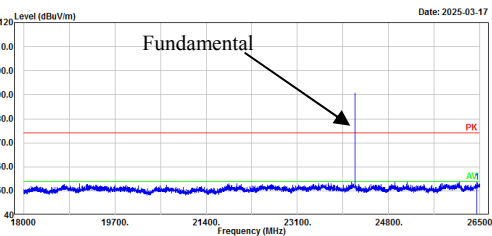
Serial No.: 2YAI-2
Tester: Colin Yang



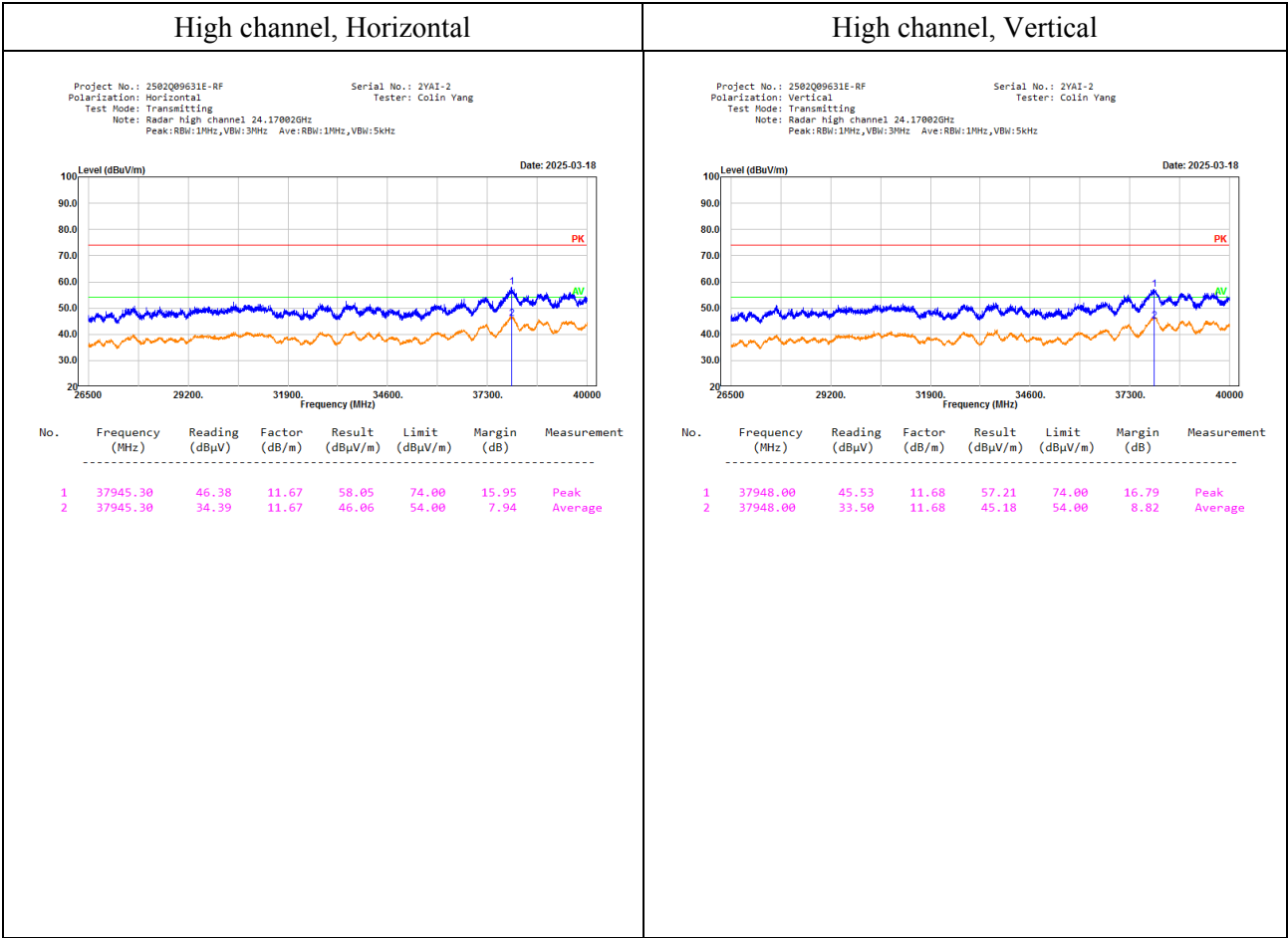
| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Measurement |
|-----|-----------------|----------------|---------------|-----------------|----------------|-------------|-------------|
| 1 | 25872.70 | 43.15 | 10.61 | 53.76 | 74.00 | 20.24 | Peak |

Project No.: 2502Q09631E-RF
Polarization: Vertical
Test Mode: Transmitting
Note: Radar high channel 24.17002GHz
Peak: RBW:1MHz, VBW:30Hz

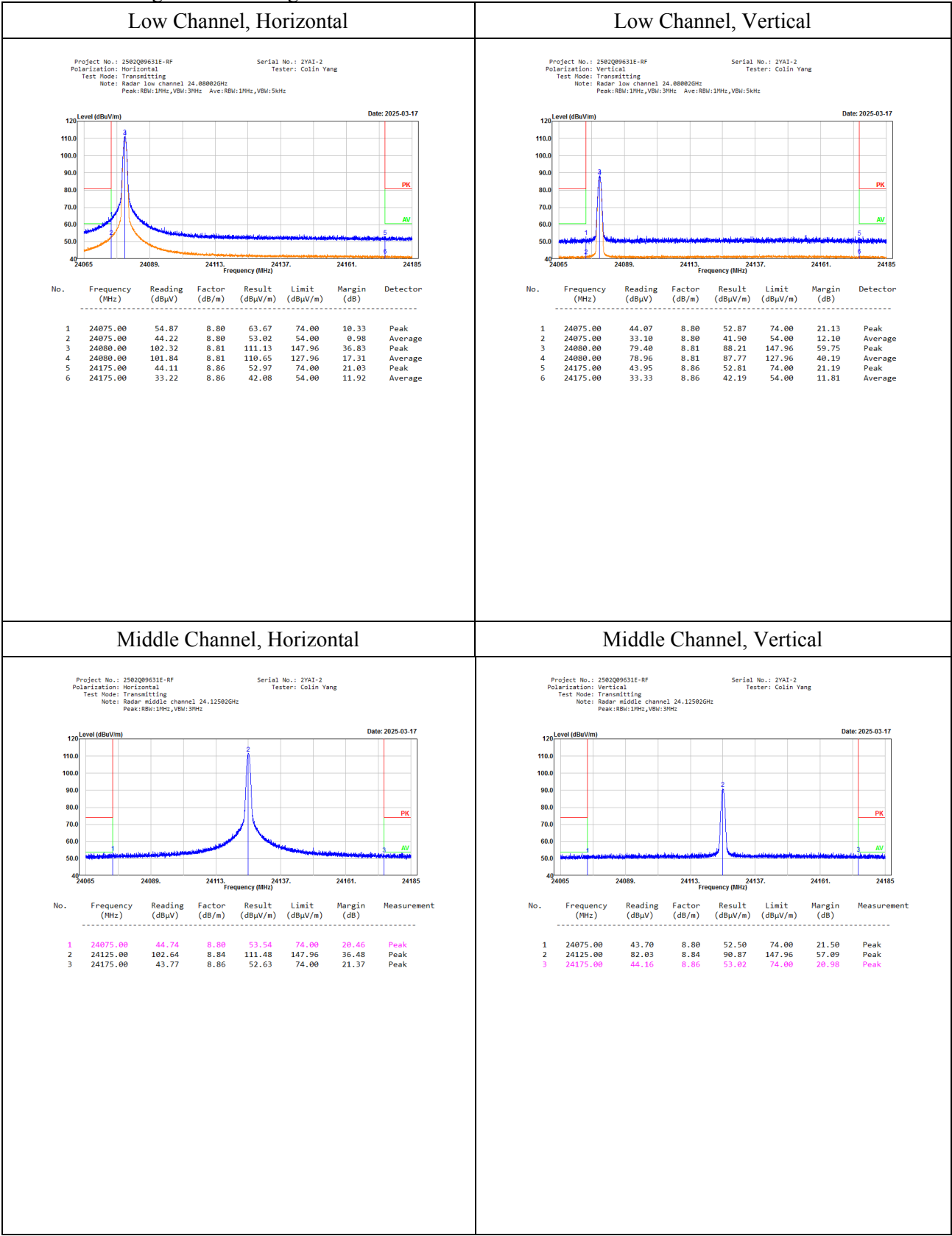
Serial No.: 2YAI-2
Tester: Colin Yang



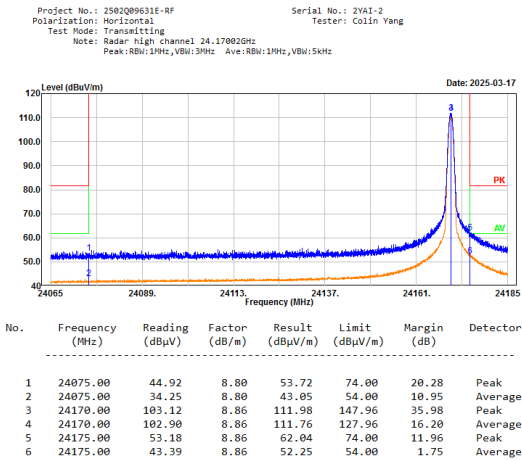
| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Measurement |
|-----|-----------------|----------------|---------------|-----------------|----------------|-------------|-------------|
| 1 | 26445.60 | 42.53 | 11.06 | 53.59 | 74.00 | 20.41 | Peak |



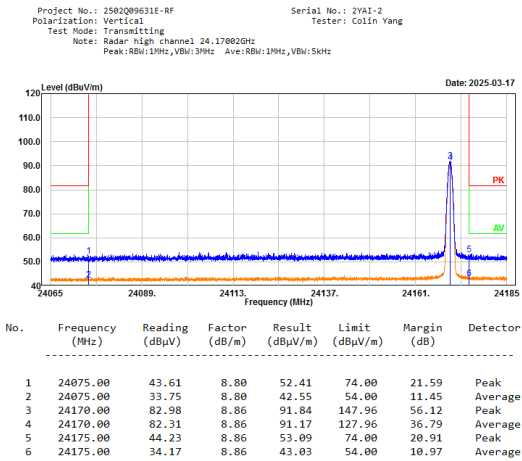
Fundamental strength and Bandedge:



High Channel, Horizontal



High Channel, Vertical



4)40-100GHz:

| Frequency (GHz) | Receiver | | Polar (H/V) | Factor (dB/m) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|-----------------------------|-------------------|----------|----------------|------------------|--------------------|-------------------|----------------|
| | Reading (dBμV) | Detector | | | | | |
| Low Channel 24.08002 GHz | | | | | | | |
| 48.160 | 45.36 | PK | H | 40.06 | 75.88 | 107.96 | 32.08 |
| 48.160 | 33.16 | AV | H | 40.06 | 63.68 | 87.96 | 24.28 |
| 48.160 | 45.16 | PK | V | 40.06 | 75.68 | 107.96 | 32.28 |
| 48.160 | 33.19 | AV | V | 40.06 | 63.71 | 87.96 | 24.25 |
| 72.240 | 42.36 | PK | H | 43.82 | 76.64 | 107.96 | 31.32 |
| 72.240 | 30.17 | AV | H | 43.82 | 64.45 | 87.96 | 23.51 |
| 72.240 | 42.48 | PK | V | 43.82 | 76.76 | 107.96 | 31.20 |
| 72.240 | 30.19 | AV | V | 43.82 | 64.47 | 87.96 | 23.49 |
| Middle Channel 24.12502 GHz | | | | | | | |
| 48.250 | 45.71 | PK | H | 40.08 | 76.25 | 107.96 | 31.71 |
| 48.250 | 33.32 | AV | H | 40.08 | 63.86 | 87.96 | 24.10 |
| 48.250 | 45.19 | PK | V | 40.08 | 75.73 | 107.96 | 32.23 |
| 48.250 | 33.16 | AV | V | 40.08 | 63.70 | 87.96 | 24.26 |
| 72.375 | 42.17 | PK | H | 43.84 | 76.47 | 107.96 | 31.49 |
| 72.375 | 30.44 | AV | H | 43.84 | 64.74 | 87.96 | 23.22 |
| 72.375 | 42.68 | PK | V | 43.84 | 76.98 | 107.96 | 30.98 |
| 72.375 | 30.32 | AV | V | 43.84 | 64.62 | 87.96 | 23.34 |
| High Channel 24.17002 GHz | | | | | | | |
| 48.340 | 45.16 | PK | H | 40.09 | 75.71 | 107.96 | 32.25 |
| 48.340 | 33.39 | AV | H | 40.09 | 63.94 | 87.96 | 24.02 |
| 48.340 | 45.24 | PK | V | 40.09 | 75.79 | 107.96 | 32.17 |
| 48.340 | 33.38 | AV | V | 40.09 | 63.93 | 87.96 | 24.03 |
| 72.510 | 42.18 | PK | H | 43.86 | 76.50 | 107.96 | 31.46 |
| 72.510 | 30.40 | AV | H | 43.86 | 64.72 | 87.96 | 23.24 |
| 72.510 | 42.46 | PK | V | 43.86 | 76.78 | 107.96 | 31.18 |
| 72.510 | 30.38 | AV | V | 43.86 | 64.70 | 87.96 | 23.26 |

Result = Reading + Factor- Distance extrapolation Factor

For 40-90GHz:

Distance extrapolation Factor = $20 \log (\text{specific distance [3m]}/\text{test distance [1m]})$ dB= 9.54 dB

For 90-100GHz:

Distance extrapolation Factor = $20 \log (\text{specific distance [3m]}/\text{test distance [0.5m]})$ dB= 15.56 dB

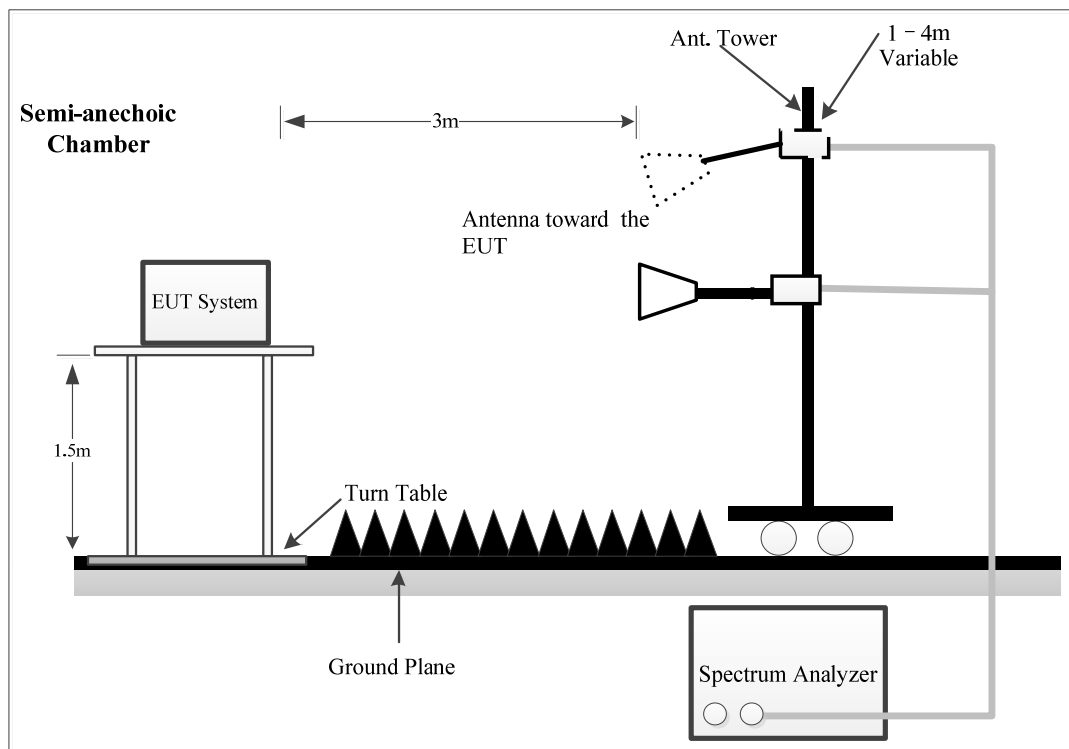
4.3 20 dB Emission Bandwidth

4.3.1 Applicable Standard

FCC §15.215

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

4.3.2 EUT Setup



4.3.3 Test Procedure

According to ANSI C63.10-2020 Section 6.9.2

- The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, unless otherwise specified by the applicable requirement.
- Set the video bandwidth (VBW) $\geq 3 \times \text{RBW}$.
- Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Allow the trace to stabilize.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.

4.3.4 Test Result

| | | | |
|-------------|------------|--------------|--------------|
| Serial No.: | 2YAI-2 | Test Date: | 2025/3/21 |
| Test Site: | Chamber B | Test Mode: | Transmitting |
| Tester: | Colin Yang | Test Result: | N/A |

Environmental Conditions:

| | | | | | |
|----------------------|------|---------------------------|----|------------------------|-------|
| Temperature: (°C) | 22.1 | Relative Humidity: (%) | 48 | ATM Pressure: (kPa) | 101.8 |
|----------------------|------|---------------------------|----|------------------------|-------|

Test Equipment List and Details:

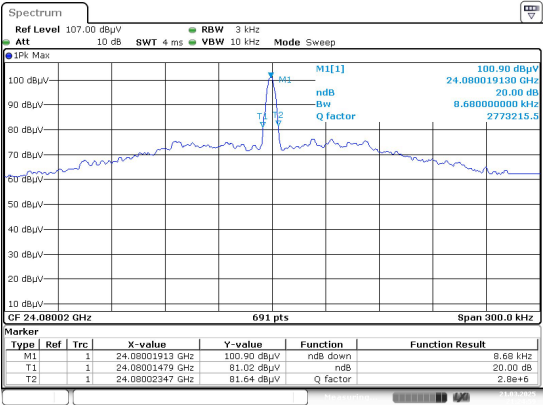
| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|-----------------------|-------------------|---------------------------|-------------------|------------------|----------------------|
| Ducommun Technologies | Horn Antenna | ARH-4223-02 | 1007726-02 1304 | 2023/2/22 | 2026/2/21 |
| AH | Preamplifier | PAM-1840VH | 191 | 2024/9/5 | 2025/9/4 |
| Xinhang Macrowave | Coaxial Cable | XH360A-2.92/J-2.92/J-6M-A | 20231208001 #0001 | 2024/12/9 | 2025/12/8 |
| R&S | Spectrum Analyzer | FSV40 | 101944 | 2024/9/6 | 2025/9/5 |

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data:

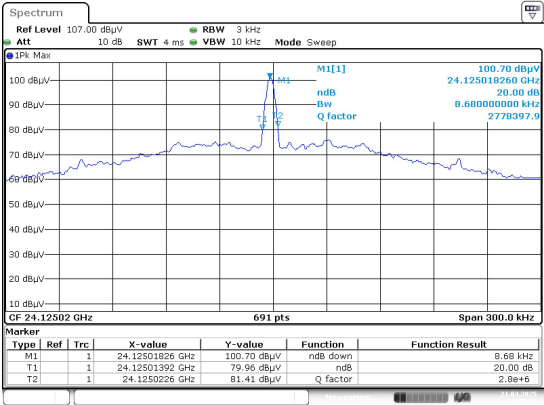
| Test Mode | 20 dB Bandwidth (kHz) |
|--|-----------------------|
| Low Channel | 8.680 |
| Middle Channel | 8.680 |
| High Channel | 8.680 |
| Note: the 20 dB bandwidth of the emission is contained within the operation frequency band. Please refer to the below plots. | |

20 dB Bandwidth_Low Channel



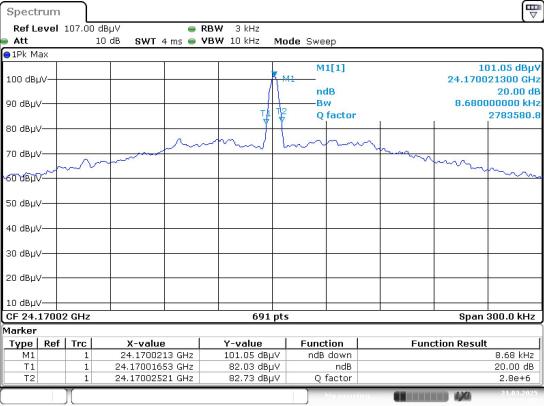
ProjectNo.: 2502Q09631E-RF Tester: Colin Yang
Date: 21.MAR.2025 21:24:59

20 dB Bandwidth_Middle Channel



ProjectNo.: 2502Q09631E-RF Tester: Colin Yang
Date: 21.MAR.2025 21:26:44

20 dB Bandwidth_High Channel



ProjectNo.: 2502Q09631E-RF Tester: Colin Yang
Date: 21.MAR.2025 21:21:42

4.4 Antenna Requirement

4.4.1 Applicable Standard

FCC §15.203

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§15.211, 15.213, 15.217, 15.219, 15.221, or §15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

4.4.2 Judgment

Compliant. Please refer to the Antenna Information detail in Section 1.3.

EXHIBIT A - EUT PHOTOGRAPHS

Please refer to the attachment 2502Q09631E-RF-EXP EUT EXTERNAL PHOTOGRAPHS and
2502Q09631E-RF-INP EUT INTERNAL PHOTOGRAPHS

EXHIBIT B - TEST SETUP PHOTOGRAPHS

Please refer to the attachment 2502Q09631E-RF-00B-TSP TEST SETUP PHOTOGRAPHS.

EXHIBIT C - RF EXPOSURE EVALUATION

Applicable Standard

According to subpart §1.1310 systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

| (B) Limits for General Population/Uncontrolled Exposure | | | | |
|---|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| Frequency Range (MHz) | Electric Field Strength (V/m) | Magnetic Field Strength (A/m) | Power Density (mW/cm ²) | Averaging Time (minutes) |
| 0.3–1.34 | 614 | 1.63 | *(100) | 30 |
| 1.34–30 | 824/f | 2.19/f | *(180/f ²) | 30 |
| 30–300 | 27.5 | 0.073 | 0.2 | 30 |
| 300–1500 | / | / | f/1500 | 30 |
| 1500–100,000 | / | / | 1.0 | 30 |

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculation formula:

Prediction of power density at the distance of the applicable MPE limit

$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm²);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

Calculated Data:

| Operation Mode | Frequency (MHz) | Antenna Gain | | Conducted output power including Tune-up Tolerance [▲] | | Evaluation Distance (cm) | Power Density (mW/cm ²) | MPE Limit (mW/cm ²) |
|----------------|-------------------|--------------|-----------|---|------|--------------------------|-------------------------------------|---------------------------------|
| | | (dBi) | (numeric) | (dBm) | (mW) | | | |
| BLE | 2402-2480 | 2.3 | 1.70 | 2.5 | 1.78 | 20.00 | 0.001 | 1.0 |
| 24G Radar | 24080.02-24170.02 | 14 | 25.12 | 3.0 | 2.0 | 20.00 | 0.010 | 1.0 |

For 24G Radar, Fundamental field strength is 111.98BμV/m @ 3m =16.78 dBm(47.64mW) EIRP.
 EIRP(dBm)=Field Strength of Fundamental(dBuV/m)-95.2 (dB).
 Conducted power=16.78-14dBm=2.78dBm.
 Conducted power(dBm)= EIRP(dBm)-Antenna Gain(dBi).

Note:

The Conducted output power including Tune-up Tolerance provided by manufacturer[▲].

Simultaneous transmission:

BLE and 24G Radar can transmit simultaneously:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

$$S_{BLE}/S_{limit-BLE} + S_{24G Radar}/S_{limit-24G Radar}$$

$$= 0.001/1.0 + 0.01/1.0$$

$$= 0.011$$

$$< 1.0$$

Result: Compliant. The devices meet FCC MPE at 20 cm distance.

******* END OF REPORT *******