

TEST REPORT

Applicant: Wahoo Fitness L.L.C.

Address: 90 West Wieuca Road NE #110 Atlanta, GA 30342, United States

Product Name: TRACKR RADAR

FCC ID: PADWF153

IC: 10563A-WF153

HVIN: WF153

47 CFR Part 15, Subpart C(15.249)


RSS-210 Issue 11, June 25, 2024

Standard(s): RSS-Gen, Issue 5, February 2021 Amendment 2
ANSI C63.10-2020

Report Number: 2502Q19989E-RF-00

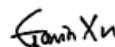
Report Date: 2025/3/28

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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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
1.0	2502Q19989E-RF-00	Original Report	2025/3/28

1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

EUT Name:	TRACKR RADAR
EUT Model:	WF153
Operation Frequency:	24.04-24.24GHz
Modulation Type:	FMCW
Rated Input Voltage:	DC 3.7V from battery or DC 5V from USB port
Serial Number:	2Z34-3
EUT Received Date:	2025/3/3
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
Wahoo Fitness L.L.C.	Array	50	24-24.25GHz	unknown
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 RSS-Gen Clause 6.8	Antenna Requirement	Compliant
§15.207(a) RSS-Gen Clause 8.8	Conduction Emissions	Not applicable
15.205, §15.209, §15.249 RSS-Gen Clause 8.10 RSS-210 Annex B B.10	Radiated Emissions	Compliant
§15.215 (c)	20 dB Bandwidth	Compliant
RSS-Gen Clause 6.7	99% Occupied Bandwidth	Compliant
Note 1: Not Applicable, the device was powered by battery when operating.		

3. DESCRIPTION OF TEST CONFIGURATION

3.1 EUT Operation Condition

The device employs FMCW modulation in the frequency range: 24.04GHz-24.24GHz. Test in sweep mode per C63.10-2020 clause 5.7.

3.2 Support Equipment List and Details

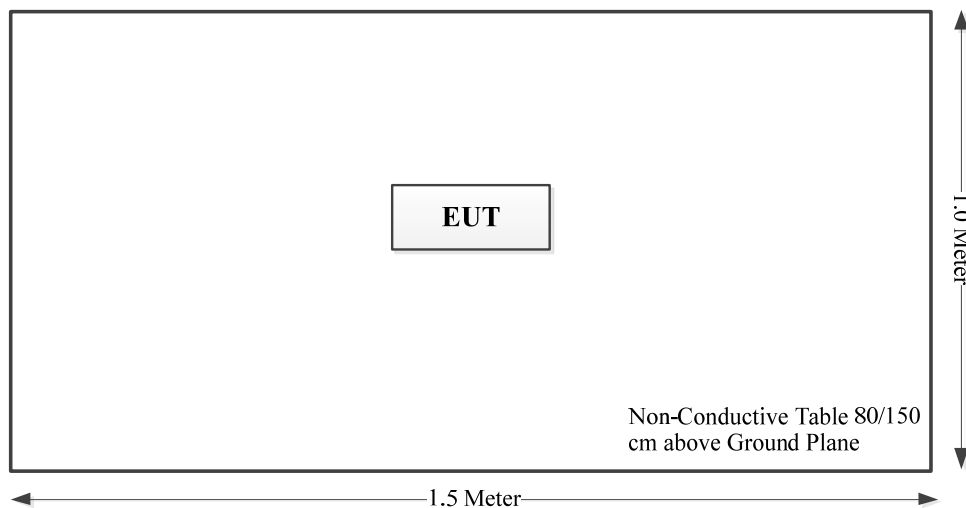
Manufacturer	Description	Model	Serial Number
/	/	/	/

3.3 Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
/	/	/	/	/	/

3.4 Block Diagram of Test Setup

Spurious Emissions:



3.5 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.

3.6 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℃
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

Not applicable, the device was powered by battery when operating.

4.2 Radiated Emissions

4.2.1 Applicable Standard

As per FCC§15.249 (a), except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

As per FCC§15.249 (c), Field strength limits are specified at a distance of 3 meters.

- (d) 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.

RSS-210, Annex B, B.10

Devices operating in the frequency bands listed in table B2 may be used for any application and shall comply with the following requirements:

- (a) The field strength of fundamental and harmonic emissions measured at 3 m shall not exceed the limits in table B2.

Table B2: Field strength limits for fundamental and harmonic emissions

Fundamental frequency (MHz)	Field strength (mV/m) of fundamental emissions	Field strength (mV/m) of harmonic emissions
902-928	50	0.5
2400-2483.5	50	0.5
5725-5875	50	0.5
24000-24250	250	2.5

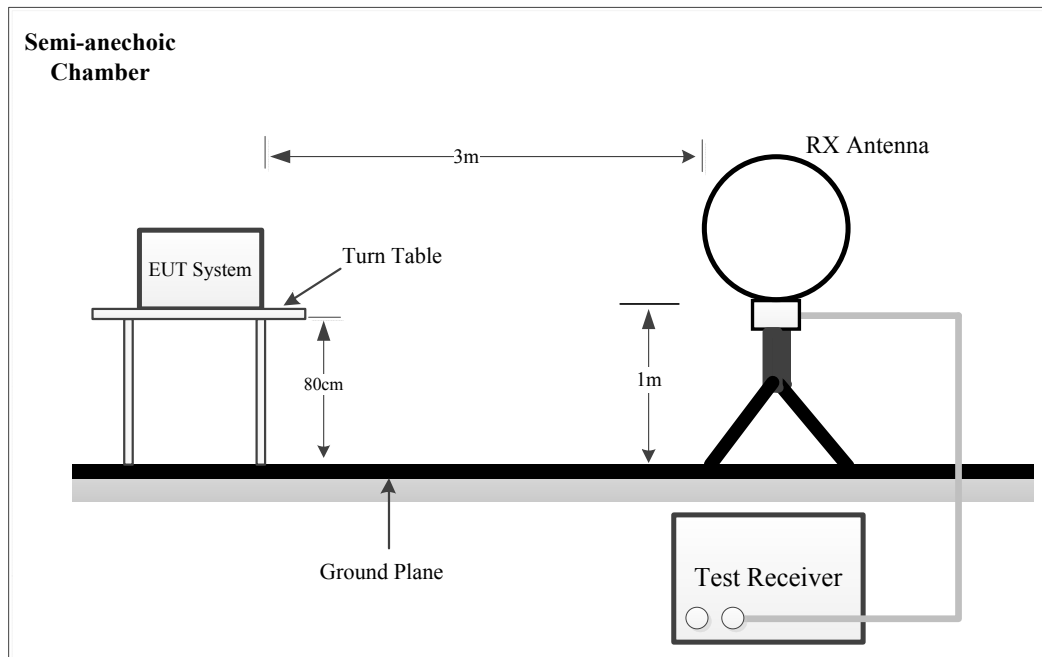
The field strength shall be measured using an average detector, except for the fundamental emission in the frequency band 902-928 MHz, which is based on measurements using a CISPR quasi-peak detector.

- (b) Emissions radiated outside of the specified frequency bands, except for harmonic emissions, shall be attenuated by at least 50 dB below the level of the fundamental emission or to the general field strength limits listed in RSS-Gen, whichever is less stringent.

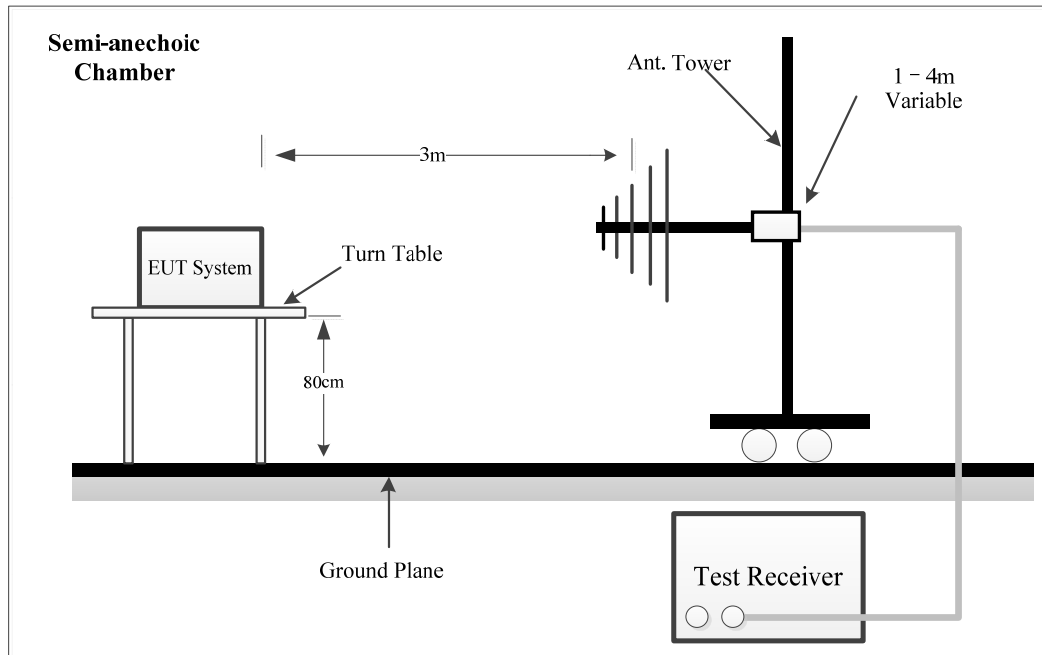
- (c) The provisions of RSS-Gen regarding pulsed operation do not apply to measurements performed in the 902-928 MHz frequency range.

4.2.2 EUT Setup

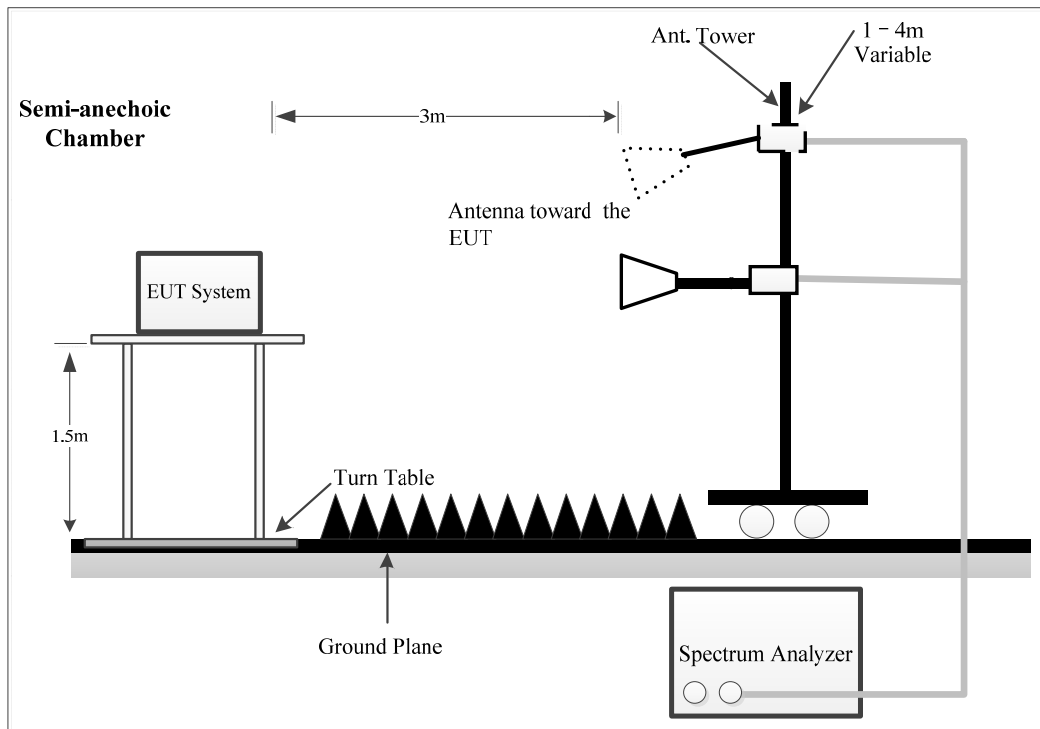
9kHz~30MHz:



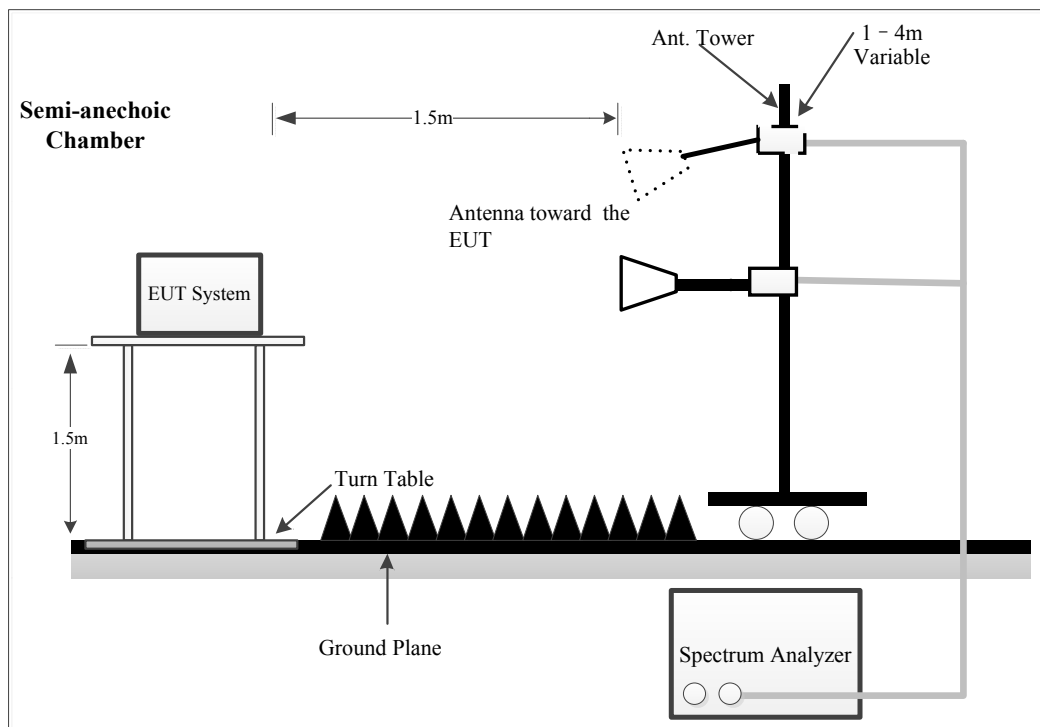
30MHz-1GHz:



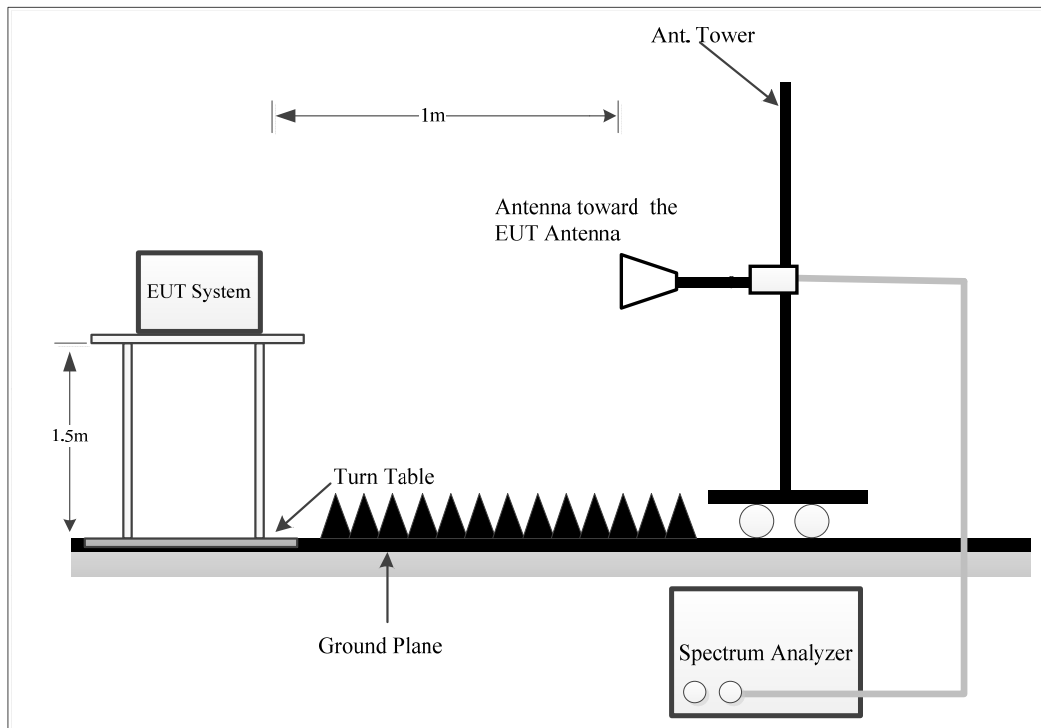
1GHz-26.5 GHz:



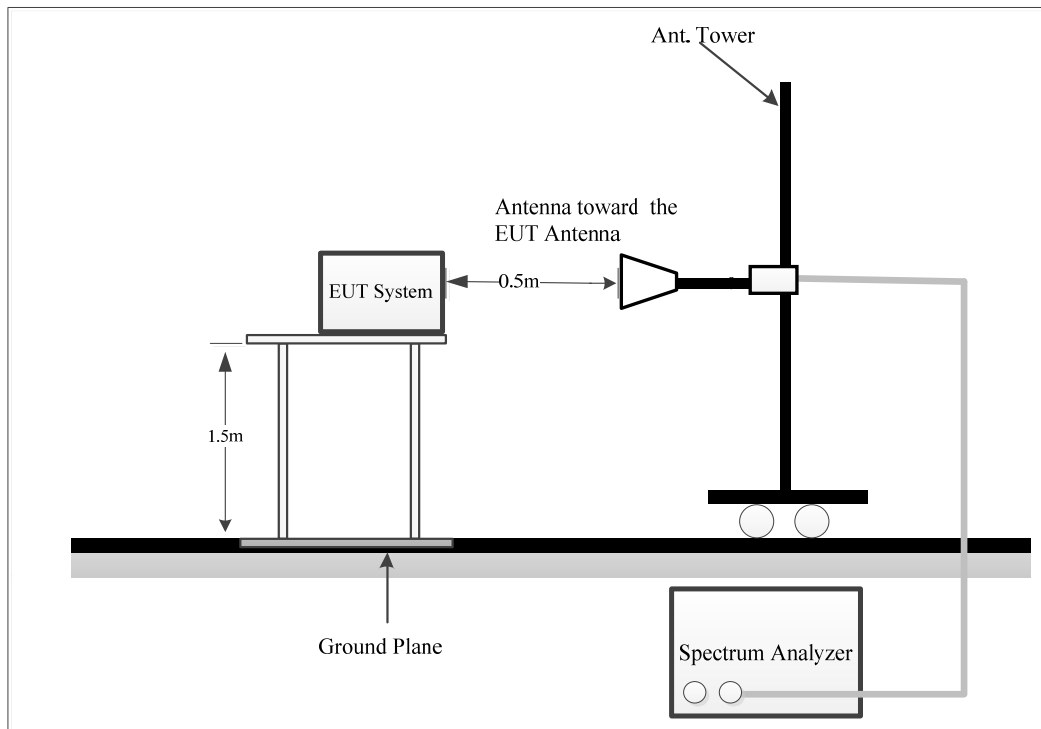
26.5-40GHz:



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 15.209/15.205/15.249 and RSS-210/RSS-Gen 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	0.54
M08RH	90-140	19.7	0.36

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

For the spurious emission below 30MHz, the limit was convert from dB μ A/m to dB μ V/m by adding 51.5 dB.

4.2.6 Test Result

Serial Number:	2Z34-1, 2Z34-3	Test Date:	Below 1GHz: 2025/3/14 Above 1GHz: 2025/3/21
Test Site:	Chamber10m, Chamber B	Test Mode:	Sweep TX mode
Tester:	Zoo Zou, Colin Yang	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	22.1~24.5	Relative Humidity: (%)	48~55	ATM Pressure: (kPa)	100.7~101.8
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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
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:

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.

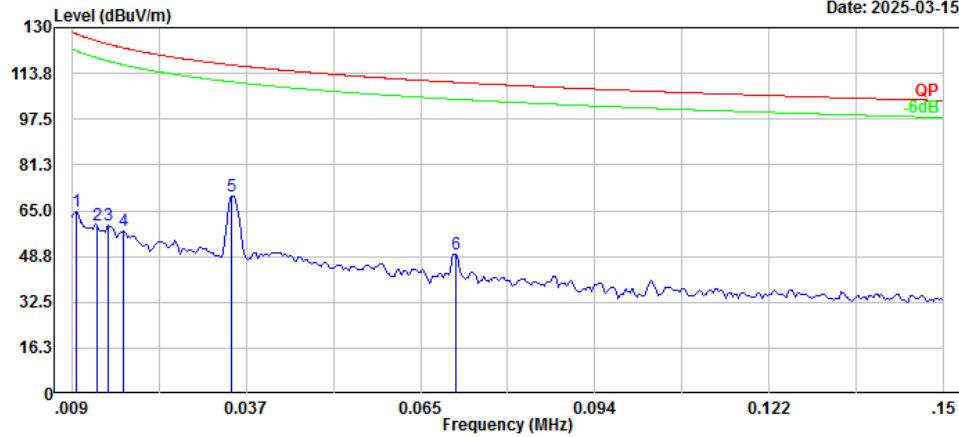
1) 9kHz-30MHz:

Three antenna orientations (parallel, perpendicular, and ground-parallel) was measured, the worst orientations was below:

Project No.: 2502Q19989E-RF
Polarization: Parallel
Test Mode: Transmitting
Note:
RBW:300Hz VBW:1kHz

Serial No.: 2234-1
Tester: Zoo Zou

Date: 2025-03-15



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Measurement
1	0.010	11.63	52.90	64.53	127.74	63.21	Peak
2	0.013	7.69	51.95	59.64	125.17	65.53	Peak
3	0.015	8.16	51.47	59.63	124.13	64.50	Peak
4	0.017	6.94	50.75	57.69	122.76	65.07	Peak
5	0.035	23.46	46.67	70.13	116.74	46.61	Peak
6	0.071	8.99	40.41	49.40	110.57	61.17	Peak

Project No.: 2502Q19989E-RF

Serial No.: 2234-1

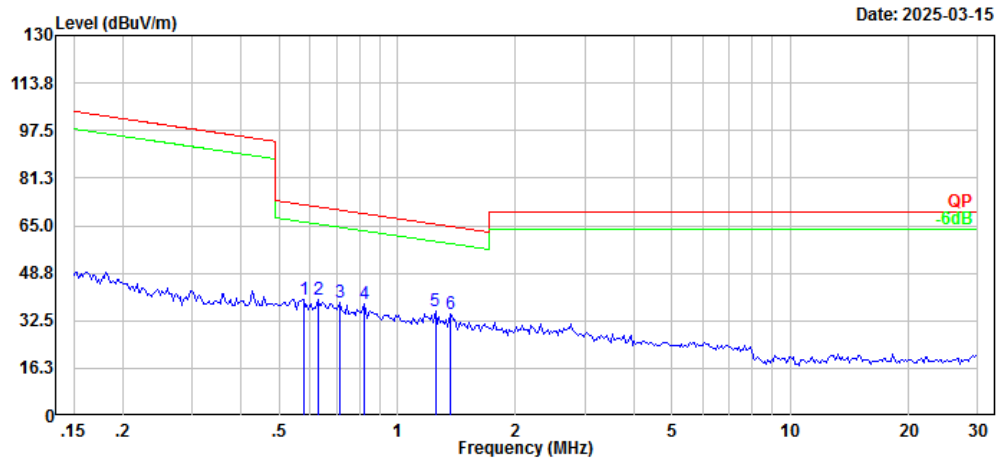
Polarization: Parallel

Tester: Zoo Zou

Test Mode: Transmitting

Note:

RBW:10kHz VBW:30kHz



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Measurement
1	0.576	17.15	22.71	39.86	72.36	32.50	Peak
2	0.627	17.50	22.20	39.70	71.61	31.91	Peak
3	0.712	17.59	21.36	38.95	70.48	31.53	Peak
4	0.826	18.18	20.04	38.22	69.17	30.95	Peak
5	1.249	20.45	15.45	35.90	65.50	29.60	Peak
6	1.359	19.67	14.96	34.63	64.75	30.12	Peak

2) 30MHz-1GHz:

Project No.: 2502Q19989E-RF

Serial No.: 2234-1

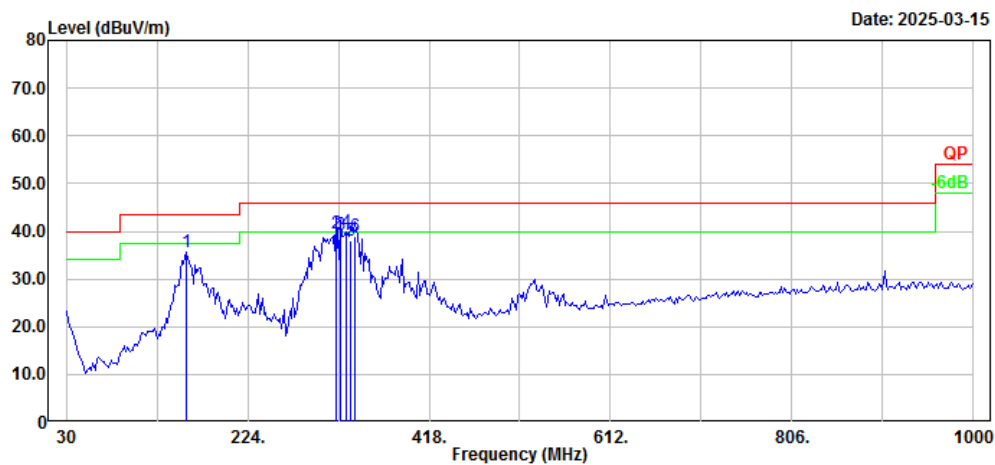
Polarization: Horizontal

Tester: Zoo Zou

Test Mode: Transmitting

Note:

RBW:100kHz VBW:300kHz



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Measurement
1	158.04	46.81	-11.13	35.68	43.50	7.82	Peak
2	319.06	48.71	-9.10	39.61	46.00	6.39	QP
3	322.94	48.20	-9.01	39.19	46.00	6.81	QP
4	328.76	48.66	-8.88	39.78	46.00	6.22	Peak
5	334.58	46.90	-8.80	38.10	46.00	7.90	QP
6	338.46	47.60	-8.75	38.85	46.00	7.15	QP

Project No.: 2502Q19989E-RF

Serial No.: 2234-1

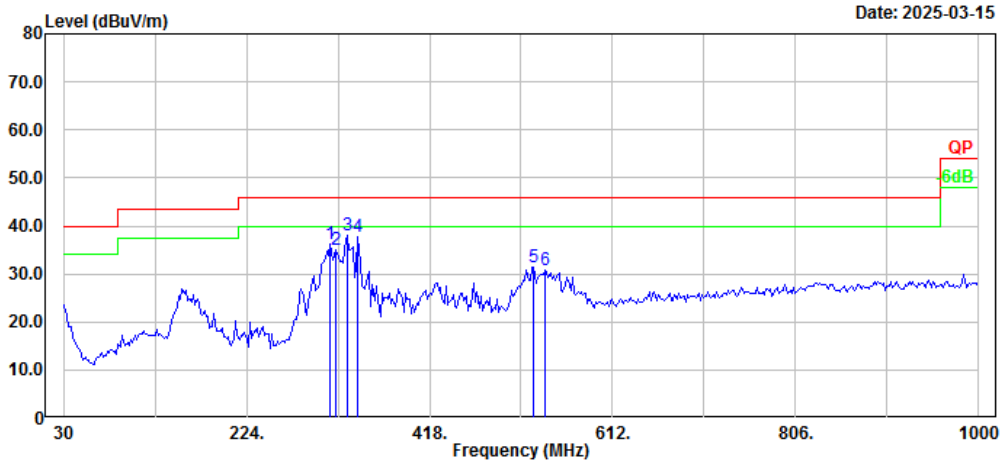
Polarization: Vertical

Tester: Zoo Zou

Test Mode: Transmitting

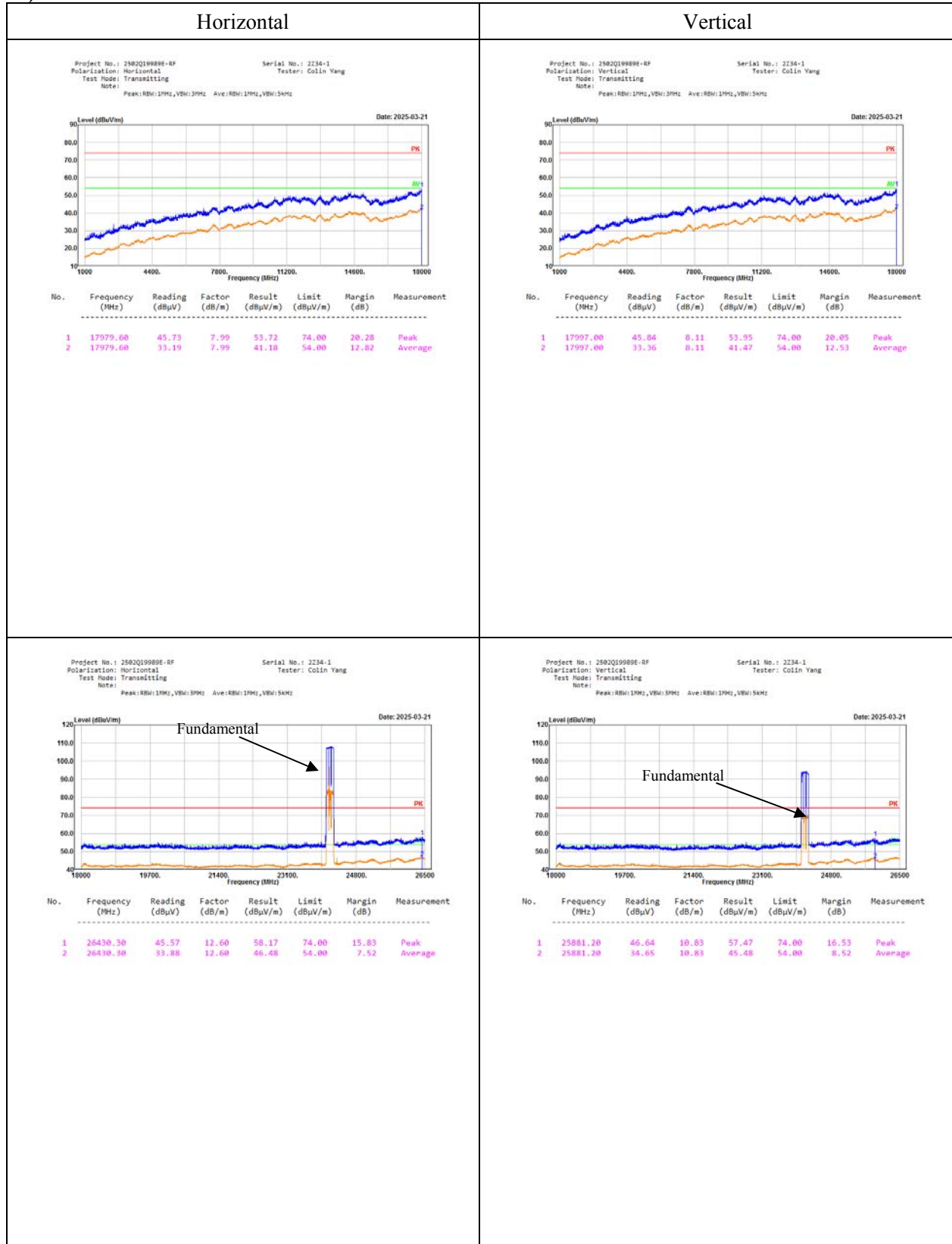
Note:

RBW:100kHz VBW:300kHz

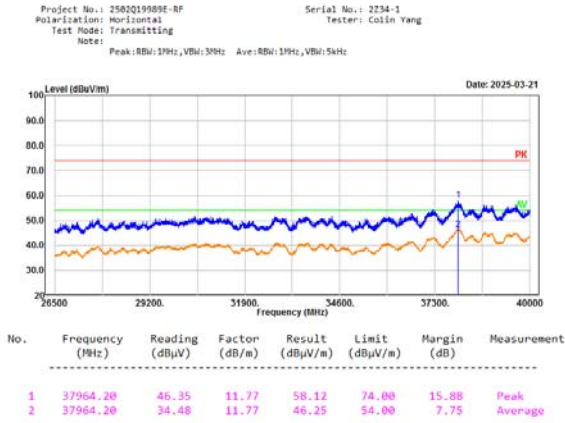


No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Measurement
1	313.24	45.38	-9.23	36.15	46.00	9.85	Peak
2	319.06	43.98	-9.10	34.88	46.00	11.12	Peak
3	330.70	46.81	-8.84	37.97	46.00	8.03	Peak
4	342.34	46.41	-8.70	37.71	46.00	8.29	Peak
5	528.58	35.31	-3.79	31.52	46.00	14.48	Peak
6	540.22	34.47	-3.59	30.88	46.00	15.12	Peak

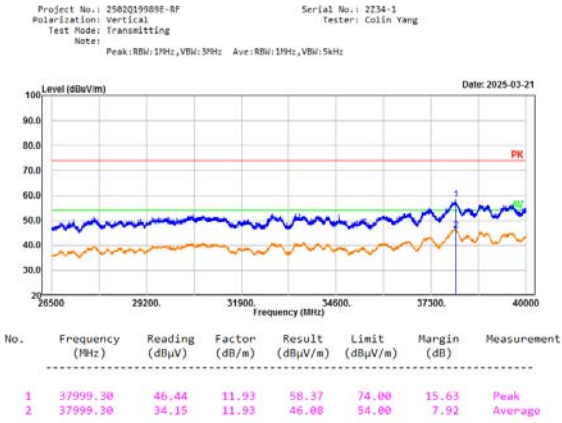
3) 1-40GHz:



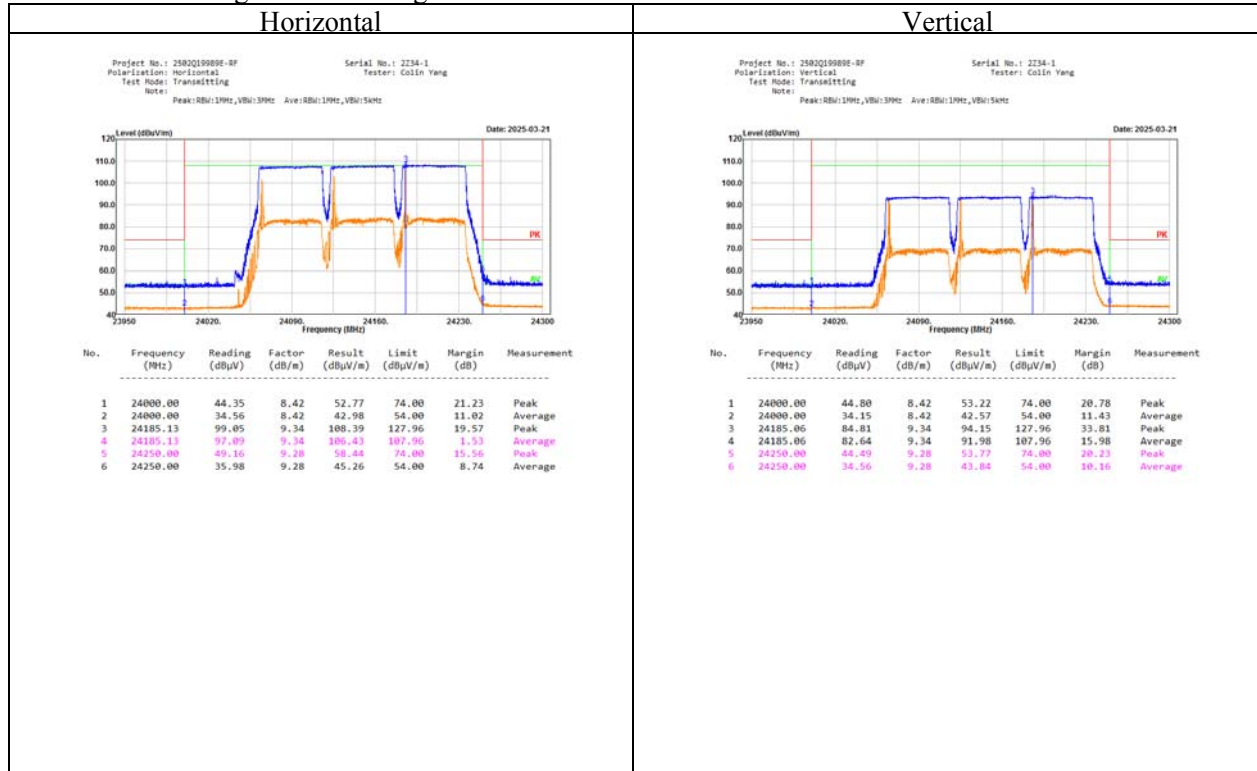
Horizontal



Vertical



Fundamental strength and Bandedge:



40-100GHz:

Frequency (GHz)	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
48.420	45.19	PK	H	40.10	75.75	87.96	12.21
48.420	33.34	AV	H	40.10	63.90	67.96	4.06
48.420	45.19	PK	V	40.10	75.75	87.96	12.21
48.420	33.29	AV	V	40.10	63.85	67.96	4.11
72.630	42.36	PK	H	43.88	76.70	87.96	11.26
72.630	30.44	AV	H	43.88	64.78	67.96	3.18
72.630	42.74	PK	V	43.88	77.08	87.96	10.88
72.630	30.23	AV	V	43.88	64.57	67.96	3.39

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 and 99% Occupied 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.

RSS-Gen Clause 6.7

The occupied bandwidth or the “99% emission bandwidth” is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

In some cases, the “x dB bandwidth” is required, which is defined as the frequency range between two points, one at the lowest frequency below and one at the highest frequency above the carrier frequency, at which the maximum power level of the transmitted emission is attenuated x dB below the maximum in-band power level of the modulated signal, where the two points are on the outskirts of the in-band emission.

The following conditions shall be observed for measuring the occupied bandwidth and x dB bandwidth: The transmitter shall be operated at its maximum carrier power measured under normal test conditions.

The span of the spectrum analyzer shall be set large enough to capture all products of the modulation process, including the emission skirts, around the carrier frequency, but small enough to avoid having other emissions (e.g. on adjacent channels) within the span.

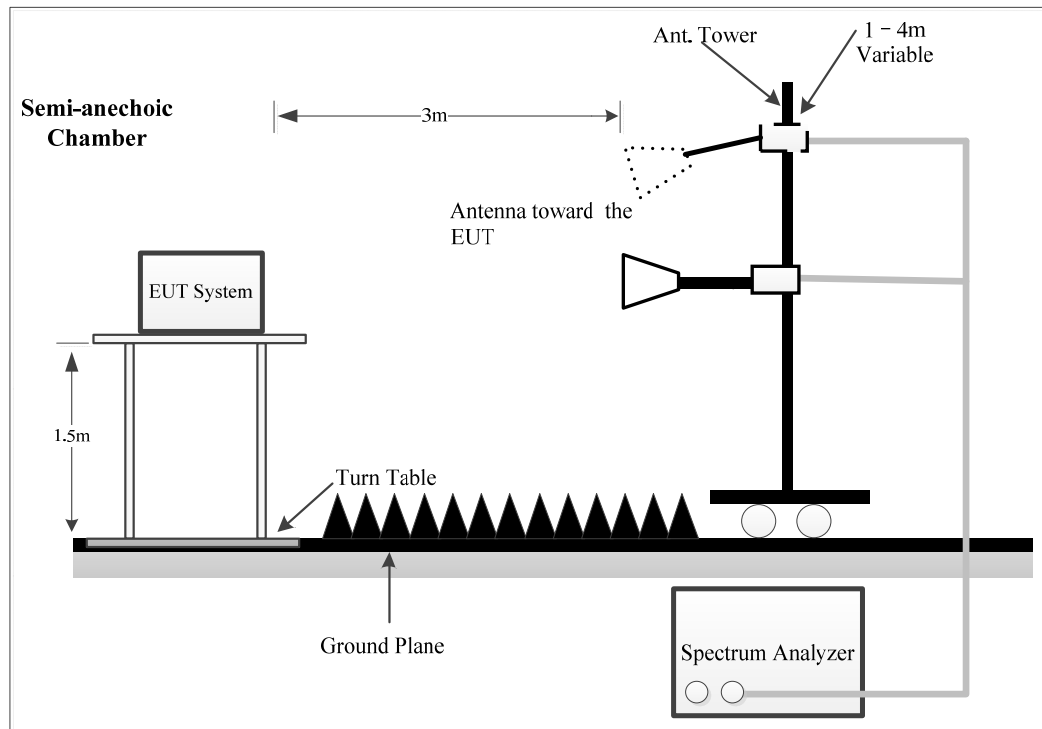
The detector of the spectrum analyzer shall be set to “Sample”. However, a peak, or peak hold, may be used in place of the sampling detector since this usually produces a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold (or “Max Hold”) may be necessary to determine the occupied / x dB bandwidth if the device is not transmitting continuously.

The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the actual occupied / x dB bandwidth and the video bandwidth (VBW) shall not be smaller than three times the RBW value. Video averaging is not permitted.

Note: It may be necessary to repeat the measurement a few times until the RBW and VBW are in compliance with the above requirement.

For the 99% emission bandwidth, the trace data points are recovered and directly summed in linear power level terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached, and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded. The difference between the two recorded frequencies is the occupied bandwidth (or the 99% emission bandwidth).

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.

According to ANSI C63.10-2020 Section 6.9.3

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. The following procedure shall be used for measuring 99% power bandwidth:

- The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW.
- The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, and VBW shall be approximately three times the RBW, unless otherwise specified by the applicable requirement.
- Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than $[10 \log (\text{OBW}/\text{RBW})]$ below the reference level. Specific guidance is given in 4.1.5.2.

- d) Step a) through step c) might require iteration to adjust within the specified range.
- e) Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
- f) Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth.
- g) If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies.
- h) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

4.3.4 Test Result

Serial Number:	2Z34-3	Test Date:	2025/3/28
Test Site:	Chamber B	Test Mode:	Sweep Mode
Tester:	Colin Yang	Test Result:	Pass

Environmental Conditions:			
Temperature: (°C)	24.1	Relative Humidity: (%)	41
		ATM Pressure: (kPa)	100.3

Test Equipment List and Details:

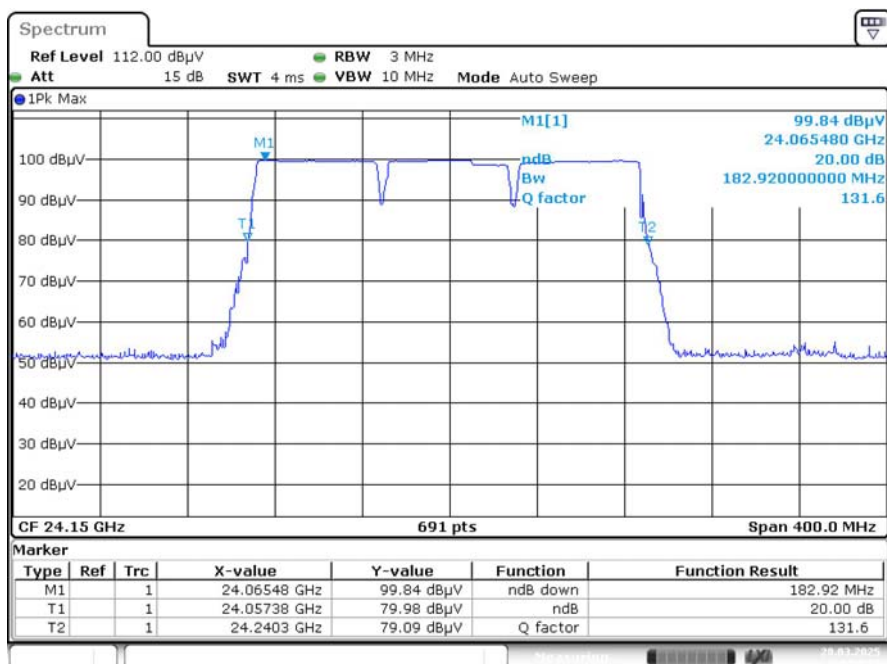
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-02 1304	2023/2/22	2026/2/21
AH	Preamplifier	PAM-1840VH	191	2024/9/5	2025/9/4
Xinhang Macrowave	Coaxial Cable	XH360A-2.92/J-2.92/J-6M-A	20231208001 #0001	2024/12/9	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 (MHz)	99% Occupied Bandwidth (MHz)	Result
Sweep Mode	182.920	175.398	Pass
Note: the 20 dB bandwidth of the emission and 99% Occupied Bandwidth is contained within the operation frequency band. Please refer to the below plots.			

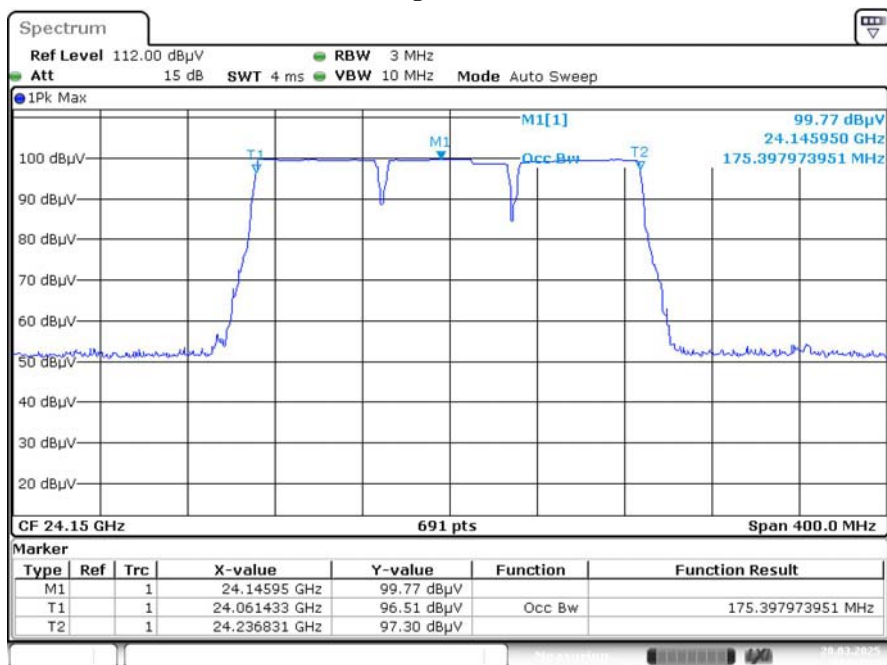
20 dB Bandwidth



ProjectNo.:2502Q19989E-RF Tester:Colin Yang

Date: 28.MAR.2025 20:57:37

99% Occupied Bandwidth



ProjectNo.:2502Q19989E-RF Tester:Colin Yang

Date: 28.MAR.2025 21:02:24

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.

RSS-Gen Clause 6.8

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below).

When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer.

The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.

For licence-exempt equipment with detachable antennas, the user manual shall also contain the following notice in a conspicuous location:

This radio transmitter [enter the device's ISCED certification number] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Immediately following the above notice, the manufacturer shall provide a list of all antenna types which can be used with the transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna type.

4.4.2 Judgment

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

EXHIBIT A - TEST SETUP PHOTOGRAPHS

Please refer to the attachment 2502Q19989E-RF-00-TSP TEST SETUP PHOTOGRAPHS.

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