NVLAP TESTING
NVLAP LAB CODE 600341-0

BACL Bay Area Compliance Labs Corp.

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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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:				
☒ Unit uses a permanently attached antenna.				
☐ Unit uses a unique coupling to the intentional radiator.				
☐ 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

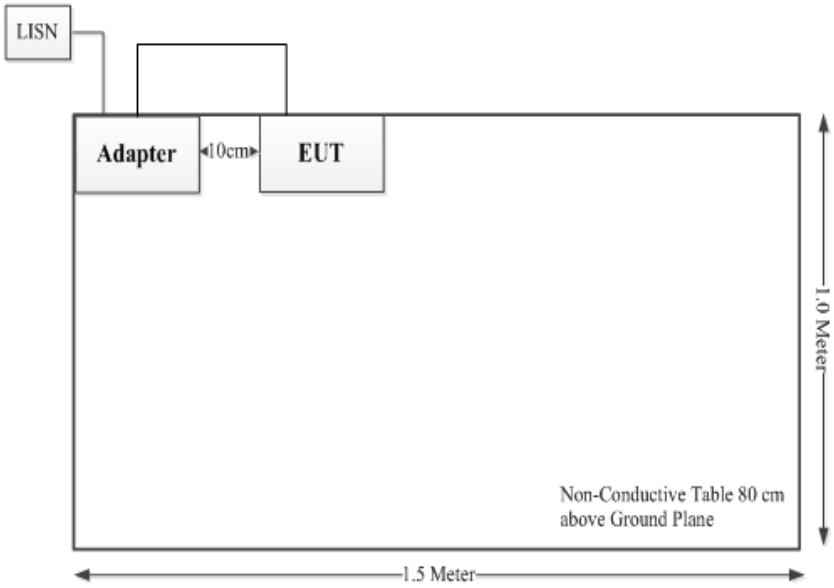
Manufacturer	Description	Model	Serial Number
HONOR	Adapter(USB)	ADS-12EA-0505010E	EA1320505

3.4 Support Cable List and Details

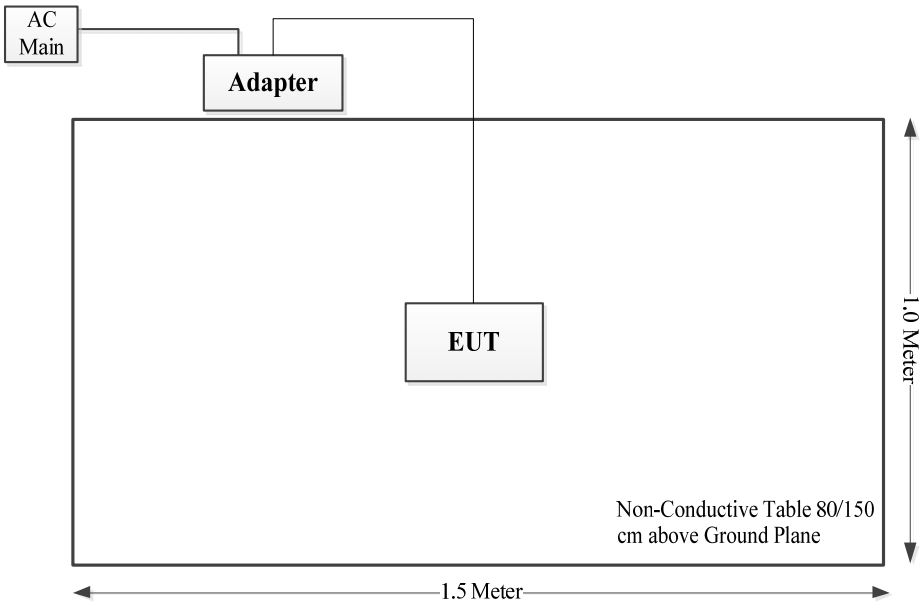
Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
USB Cable	No	No	1.3	Adapter	EUT

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℃
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 µH/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.

	Conducted limit (dBµV)	
Frequency of emission (MHz)	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:

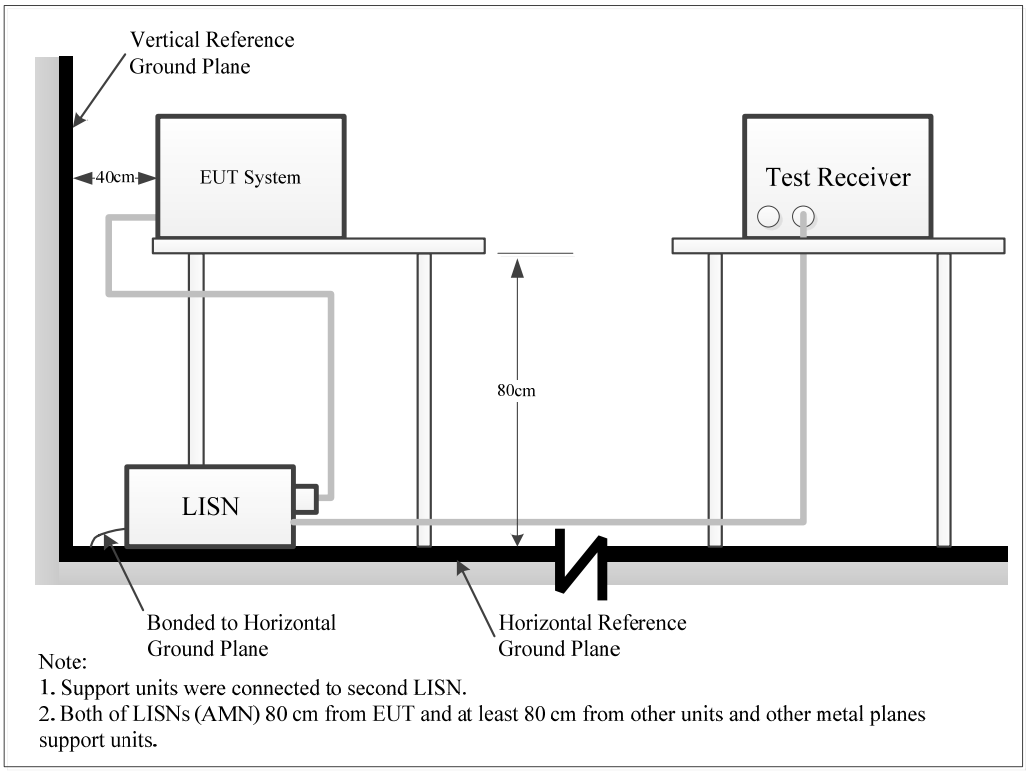
(1) For carrier current system containing their fundamental emission within the frequency band 535-1705 kHz and intended to be received using a standard AM broadcast receiver: no limit on conducted emissions.

(2) For all other carrier current systems: 1000 µV within the frequency band 535-1705 kHz, as measured using a 50 µH/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, obtainig 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: (℃)	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

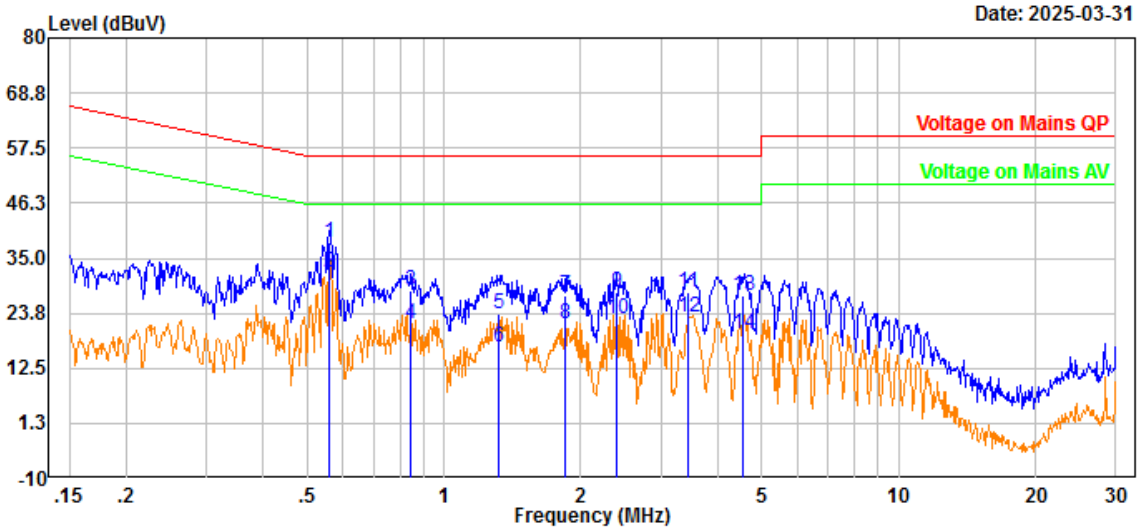
** Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

High channel was tested.

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

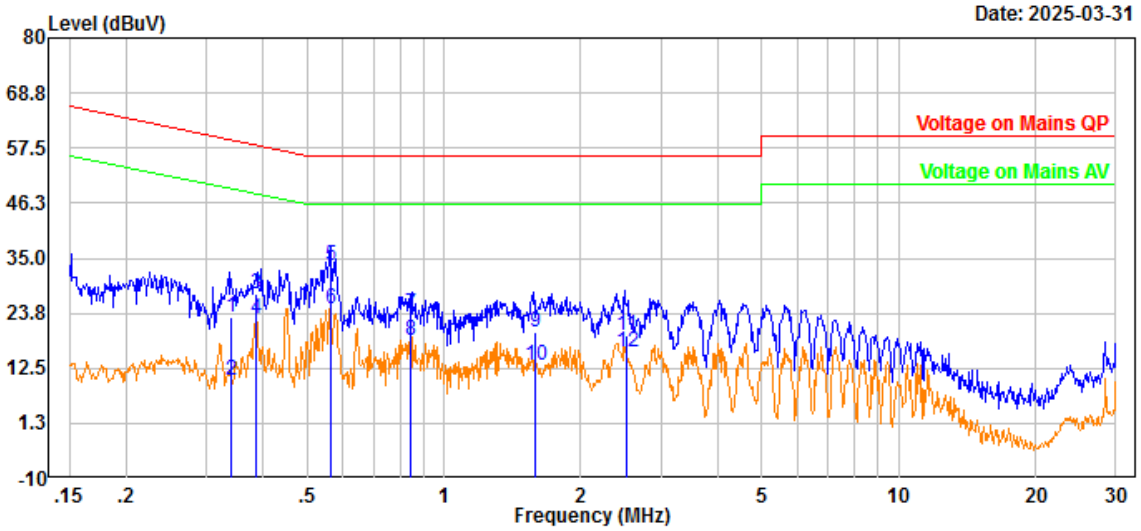
Serial No.: 2YAI-4
Tester: Yolo Fan



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



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Measurement
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.).

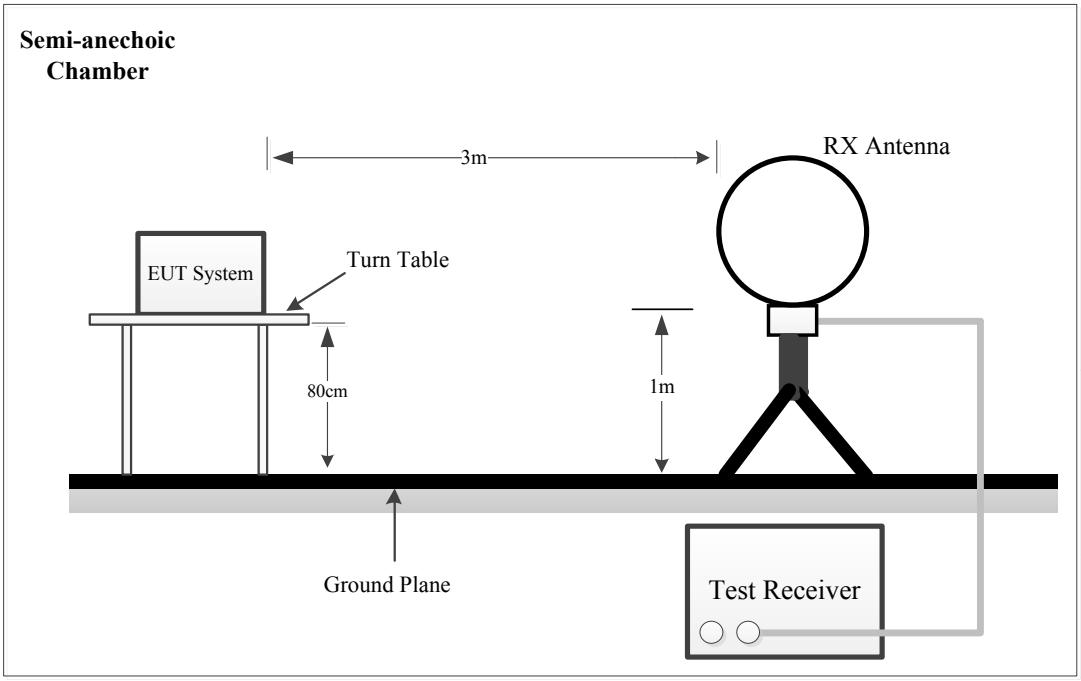
(2) Field strength limits are specified at a distance of 3 meters.

(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.

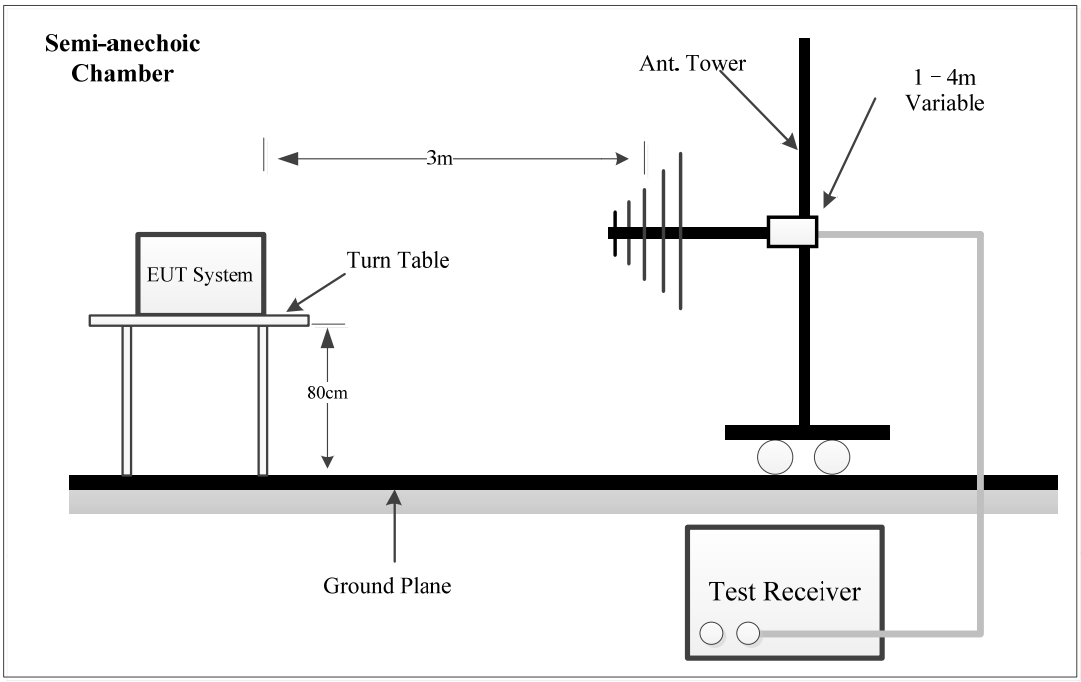
(4) The emission limits shown above are based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply.

4.2.2 EUT Setup

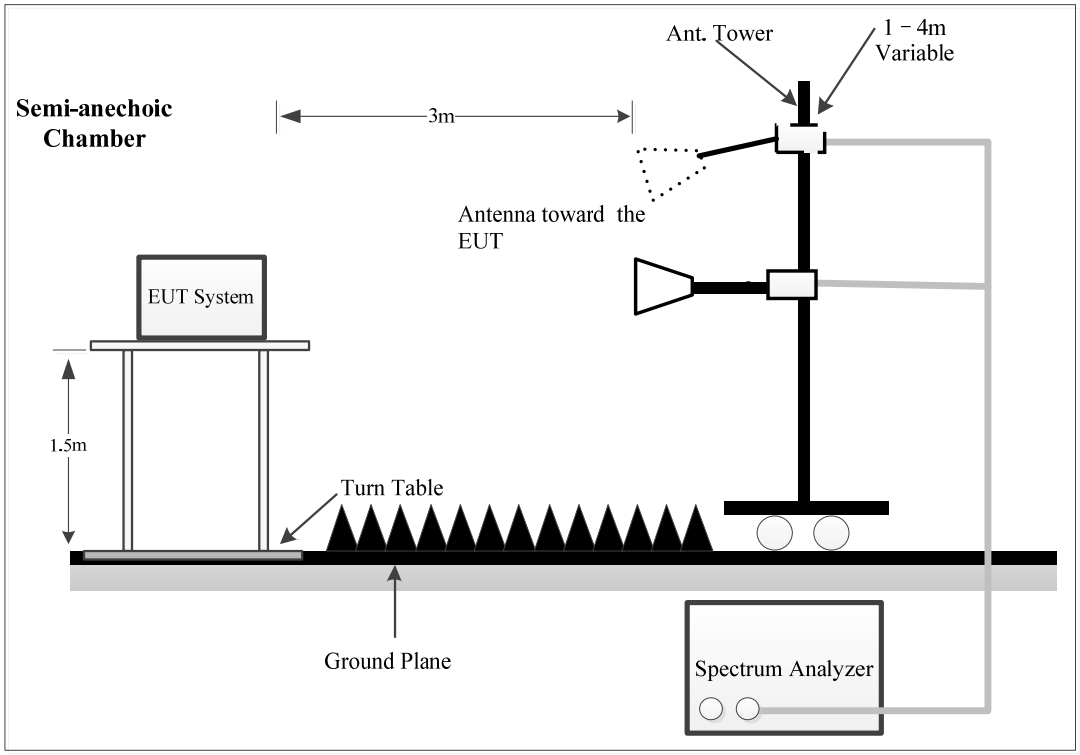
9kHz~30MHz:



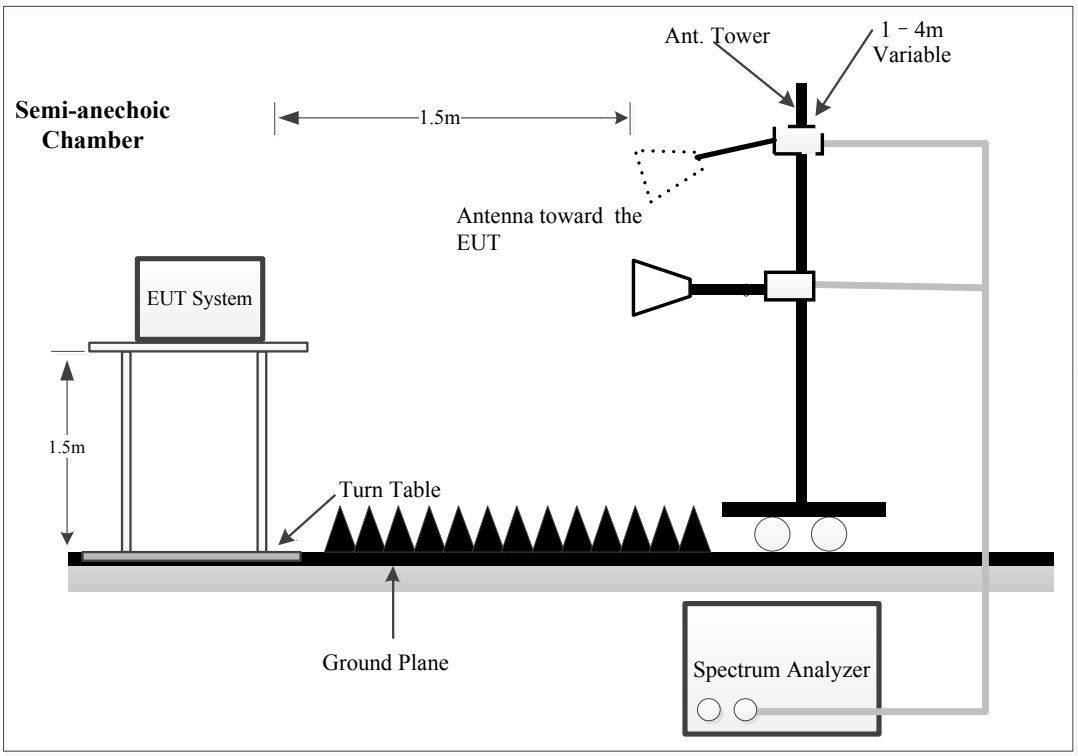
30MHz-1GHz:



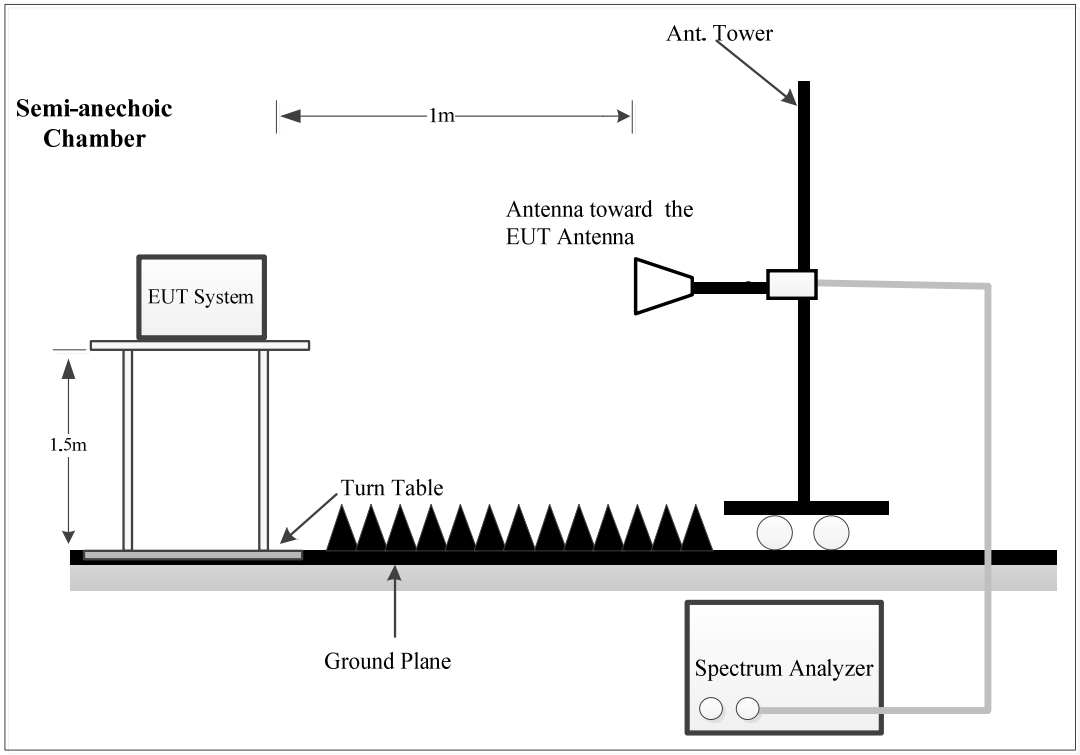
1GHz-26.5 GHz:



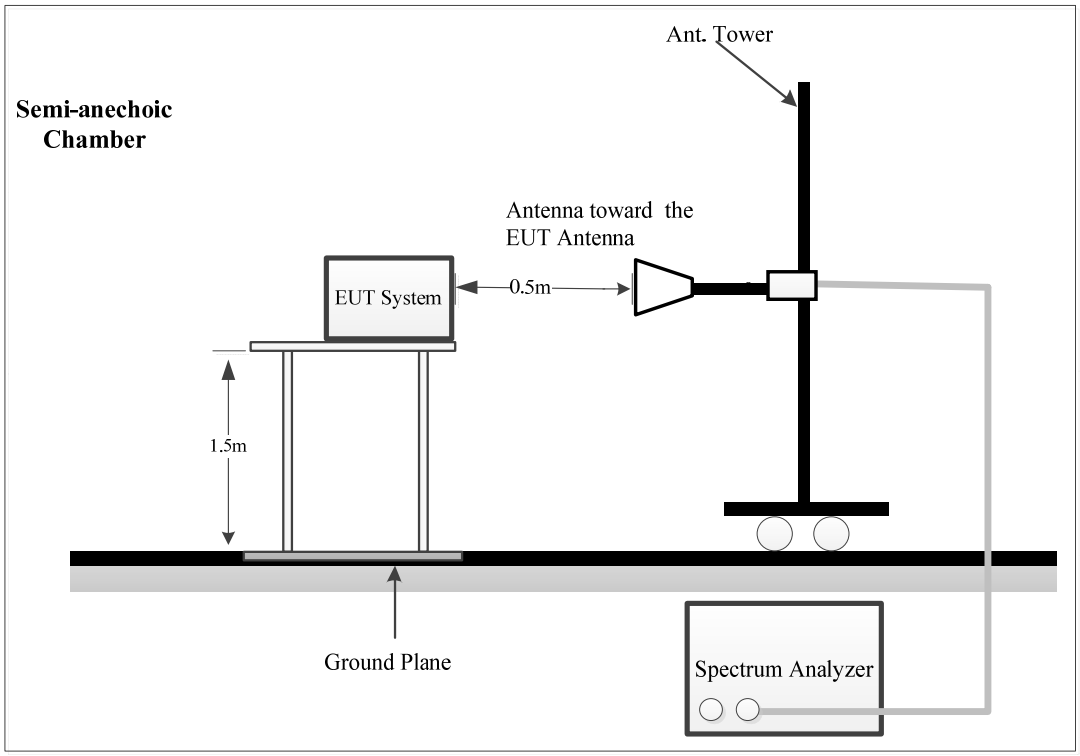
26.5-40GHz:



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 (specific distance [3m]/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 (specific distance [3m]/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 (specific distance [3m]/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: (℃)	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

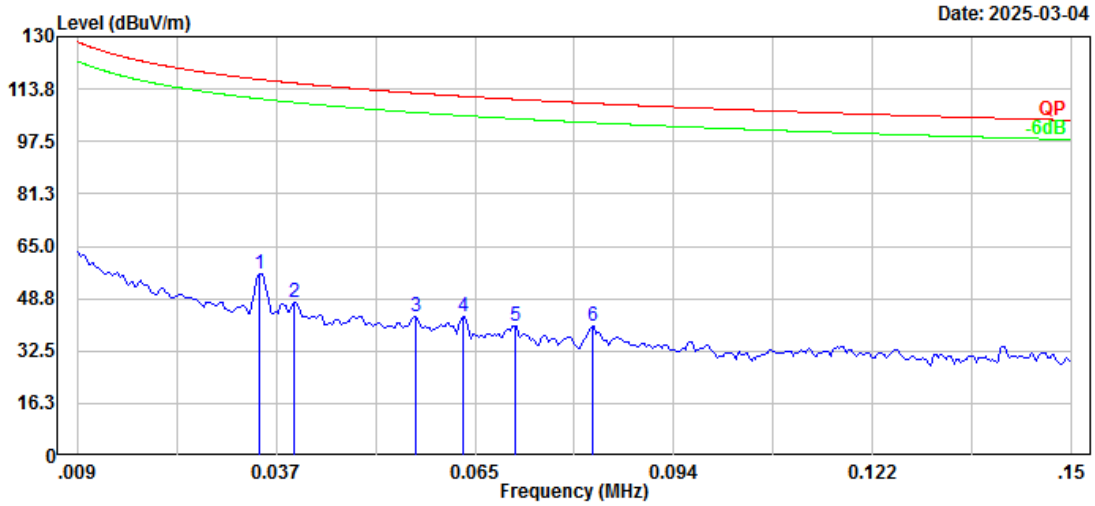
** Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

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:

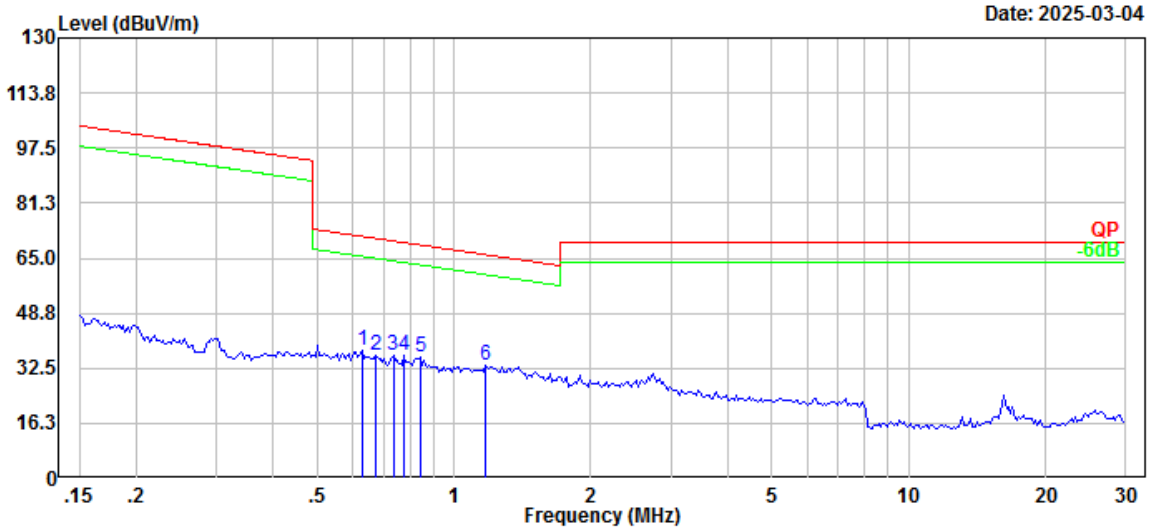
```
 Project No.: 2502Q09631E-RF                    Serial No.: 2YAI-4
Polarization: Parallel                              Tester: Zoo Zou
   Test Mode: Transmitting
        Note:
              RBW:300Hz VBW:1kHz
```



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
Polarization: Parallel
Test Mode: Transmitting
Note:
RBW:10kHz VBW:30kHz

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

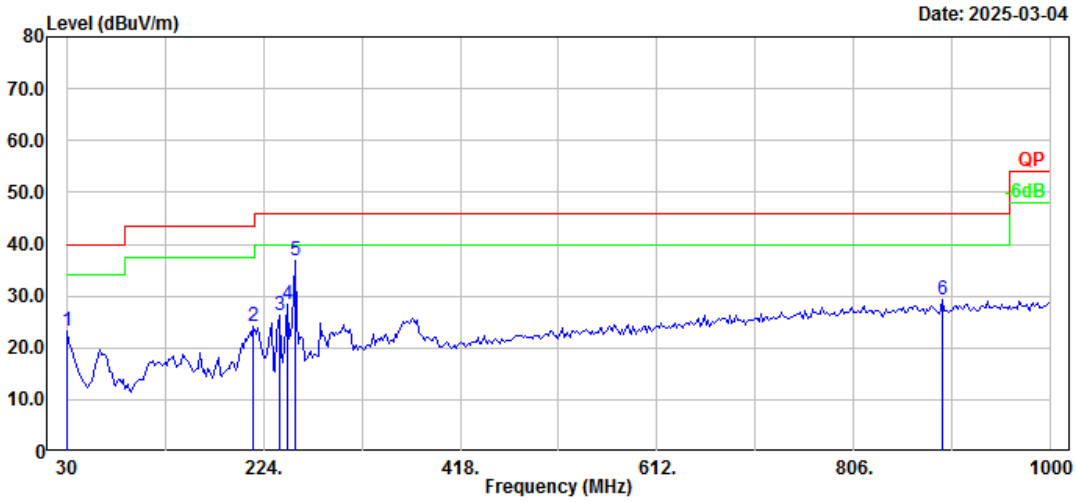


No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	0.627	15.50	22.20	37.70	71.61	33.91	Peak
2	0.675	14.63	21.71	36.34	70.95	34.61	Peak
3	0.735	15.34	21.15	36.49	70.20	33.71	Peak
4	0.775	15.49	20.78	36.27	69.73	33.46	Peak
5	0.844	16.20	19.68	35.88	68.98	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
Polarization: Horizontal
Test Mode: Transmitting
Note:
RBW:100kHz VBW:300kHz

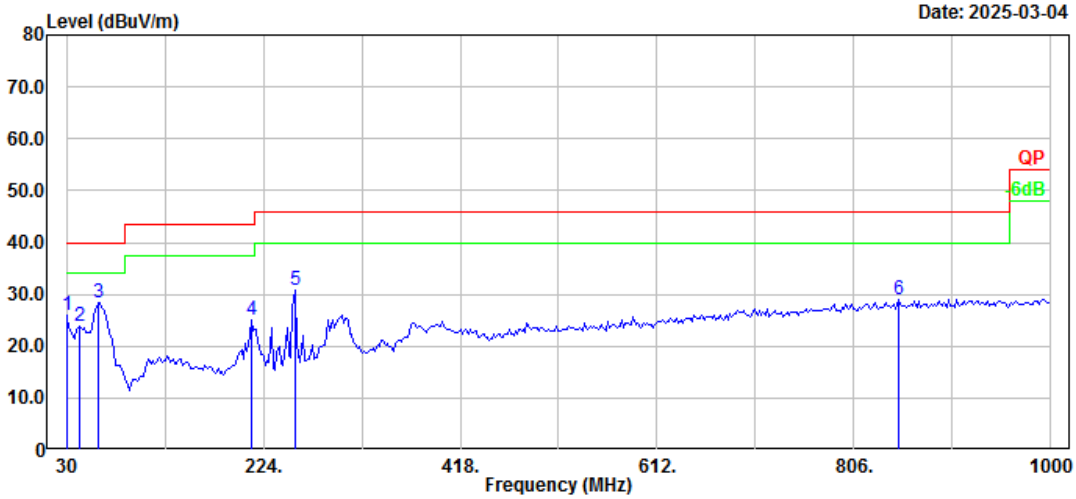
Serial No.: 2YAI-4
Tester: Zoo Zou



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	30.00	26.98	-3.80	23.18	40.00	16.82	Peak
2	214.30	36.78	-12.54	24.24	43.50	19.26	Peak
3	239.52	37.96	-11.77	26.19	46.00	19.81	Peak
4	247.28	39.94	-11.52	28.42	46.00	17.58	Peak
5	255.04	47.98	-11.27	36.71	46.00	9.29	Peak
6	893.30	27.98	1.34	29.32	46.00	16.68	Peak

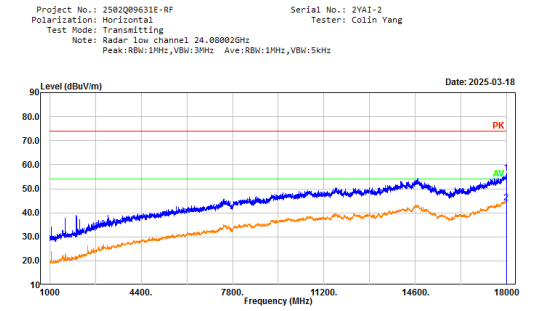
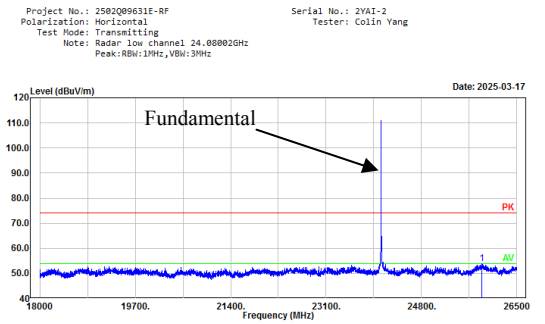
Project No.: 2502Q09631E-RF
Polarization: Vertical
Test Mode: Transmitting
Note:
RBW:100kHz VBW:300kHz

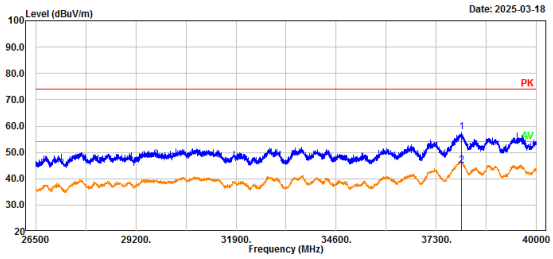
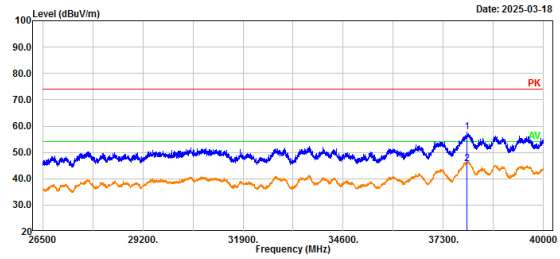
Serial No.: 2YAI-4
Tester: Zoo Zou



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	30.00	29.68	-3.80	25.88	40.00	14.12	Peak
2	43.58	36.67	-12.88	23.79	40.00	16.21	Peak
3	61.04	45.07	-16.62	28.45	40.00	11.55	Peak
4	212.36	37.65	-12.55	25.10	43.50	18.40	Peak
5	255.04	42.02	-11.27	30.75	46.00	15.25	Peak
6	850.62	28.15	0.89	29.04	46.00	16.96	Peak

3) 1-40GHz:

Low channel, Horizontal	Low channel, Vertical
 No. Frequency (MHz) Reading (dBμV) Factor (dB/m) Result (dBμV/m) Limit (dBμV/m) Margin (dB) Measurement 1 17976.20 48.56 7.96 56.52 74.00 17.48 Peak 2 17976.20 36.07 7.96 44.03 54.00 9.97 Average	 No. Frequency (MHz) Reading (dBμV) Factor (dB/m) Result (dBμV/m) Limit (dBμV/m) Margin (dB) Measurement 1 17993.20 48.59 8.09 56.68 74.00 17.32 Peak 2 17993.20 36.21 8.09 44.30 54.00 9.70 Average
 No. Frequency (MHz) Reading (dBμV) Factor (dB/m) Result (dBμV/m) Limit (dBμV/m) Margin (dB) Measurement 1 25869.30 43.25 10.61 53.86 74.00 20.14 Peak	 No. Frequency (MHz) Reading (dBμV) Factor (dB/m) Result (dBμV/m) Limit (dBμV/m) Margin (dB) Measurement 1 26120.90 42.80 10.91 53.71 74.00 20.29 Peak

Low channel, Horizontal	Low channel, Vertical
	

Project No.: 2502Q09631E-RF Serial No.: 2YAI-2
Polarization: Horizontal Tester: Colin Yang
Test Mode: Transmitting
Note: Radar low channel 24.08002GHz
Peak:RBW:1MHz,VBW:3MHz Ave:RBW:1MHz,VBW:5kHz

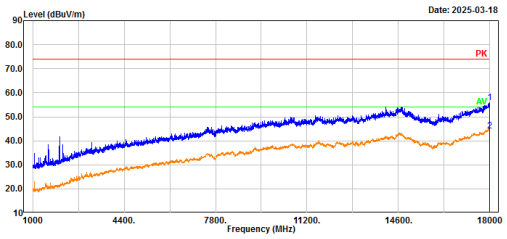
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Measurement
1	37975.00	45.97	11.81	57.78	74.00	16.22	Peak
2	37975.00	33.19	11.81	45.00	54.00	9.00	Average

Project No.: 2502Q09631E-RF Serial No.: 2YAI-2
Polarization: Vertical Tester: Colin Yang
Test Mode: Transmitting
Note: Radar low channel 24.08002GHz
Peak:RBW:1MHz,VBW:3MHz Ave:RBW:1MHz,VBW:5kHz

No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Measurement
1	37929.10	46.20	11.59	57.79	74.00	16.21	Peak
2	37929.10	34.11	11.59	45.70	54.00	8.30	Average

Middle channel, Horizontal

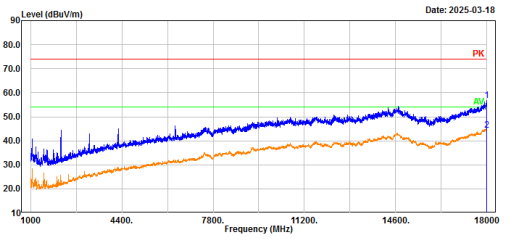
Project No.: 2502Q09631E-RF Serial No.: 2YAI-2
Polarization: Horizontal Tester: Colin Yang
Test Mode: Transmitting
Note: Radar middle channel 24.12502GHz
Peak:RBW:1MHz,VBW:3MHz Ave:RBW:1MHz,VBW:5kHz



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Measurement
1	17979.60	47.99	7.99	55.98	74.00	18.02	Peak
2	17979.60	36.13	7.99	44.12	54.00	9.88	Average

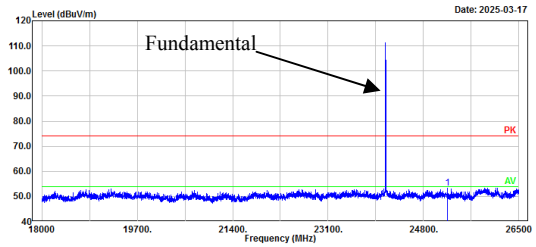
Middle channel, Vertical

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



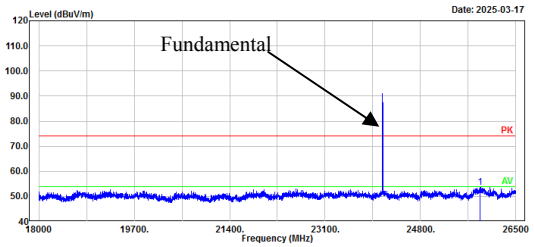
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Measurement
1	17986.40	48.72	8.04	56.76	74.00	17.24	Peak
2	17986.40	36.45	8.04	44.49	54.00	9.51	Average

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



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Measurement
1	25231.80	43.65	9.75	53.40	74.00	20.60	Peak

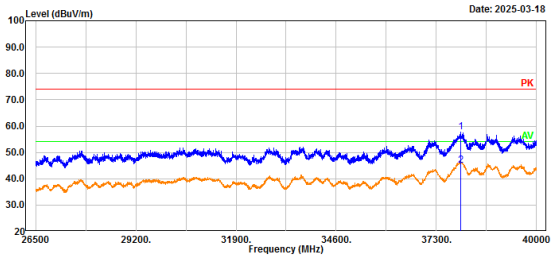
Project No.: 2502Q09631E-RF Serial No.: 2YAI-2
Polarization: Vertical Tester: Colin Yang
Test Mode: Transmitting
Note: Radar middle channel 24.12502GHz
Peak:RBW:1MHz,VBW:3MHz



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Measurement
1	25865.90	43.10	10.61	53.71	74.00	20.29	Peak

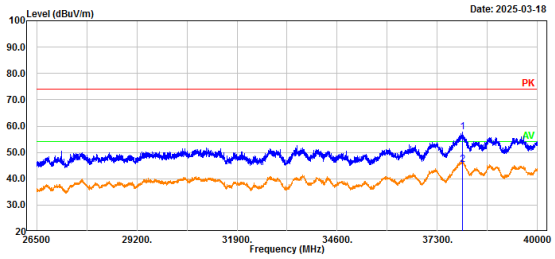
Middle channel, Horizontal	Middle channel, Vertical

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 (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/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

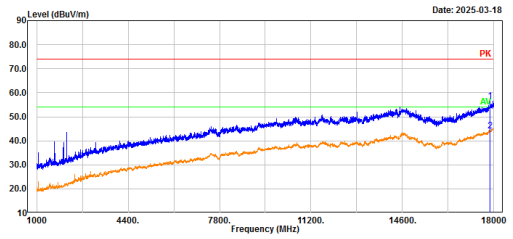
Project No.: 2502Q09631E-RF Serial No.: 2YAI-2
Polarization: Vertical Tester: Colin Yang
Test Mode: Transmitting
Note: Radar middle channel 24.12502GHz
Peak:RBW:1MHz,VBW:3MHz Ave:RBW:1MHz,VBW:5kHz



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/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

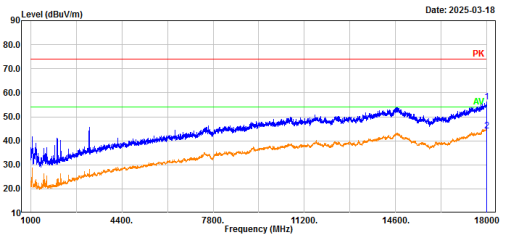
Project No.: 2502Q09631E-RF Serial No.: 2YAI-2
Polarization: Horizontal Tester: Colin Yang
Test Mode: Transmitting
Note: Radar high channel 24.17002GHz
Peak:RBW:1MHz,VBW:3MHz Ave:RBW:1MHz,VBW:5kHz



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/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

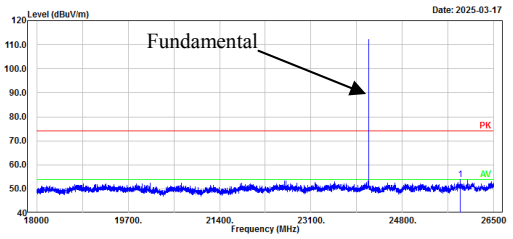
High channel, Vertical

Project No.: 2502Q09631E-RF Serial No.: 2YAI-2
Polarization: Vertical Tester: Colin Yang
Test Mode: Transmitting
Note: Radar high channel 24.17002GHz
Peak:RBW:1MHz,VBW:3MHz Ave:RBW:1MHz,VBW:5kHz



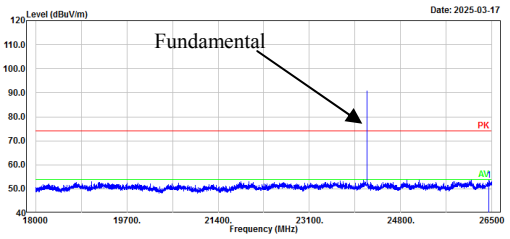
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Measurement
1	17986.40	48.13	8.04	56.17	74.00	17.83	Peak
2	17986.40	36.22	8.04	44.26	54.00	9.74	Average

Project No.: 2502Q09631E-RF Serial No.: 2YAI-2
Polarization: Horizontal Tester: Colin Yang
Test Mode: Transmitting
Note: Radar high channel 24.17002GHz
Peak:RBW:1MHz,VBW:3MHz

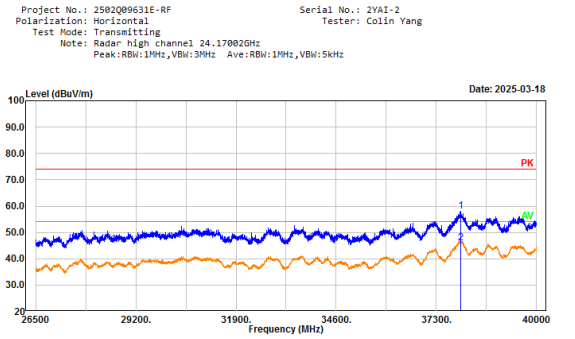
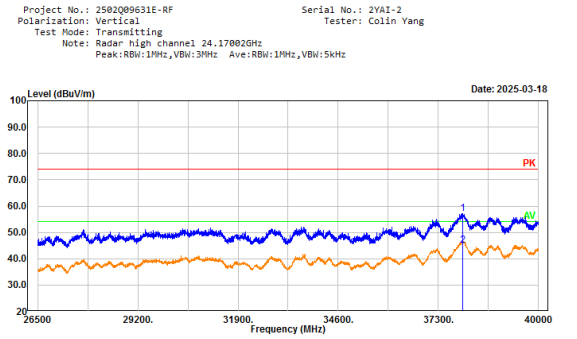


No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Measurement
1	25872.70	43.15	10.61	53.76	74.00	20.24	Peak

Project No.: 2502Q09631E-RF Serial No.: 2YAI-2
Polarization: Vertical Tester: Colin Yang
Test Mode: Transmitting
Note: Radar high channel 24.17002GHz
Peak:RBW:1MHz,VBW:3MHz



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

High channel, Horizontal	High channel, Vertical
	

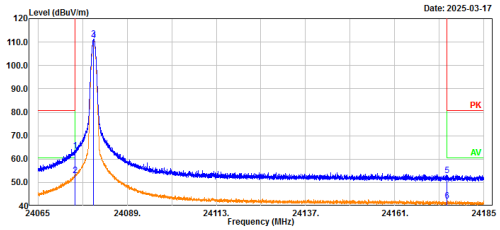
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Measurement
1	37945.30	46.38	11.67	58.05	74.00	15.95	Peak
2	37945.30	34.39	11.67	46.06	54.00	7.94	Average

No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Measurement
1	37948.00	45.53	11.68	57.21	74.00	16.79	Peak
2	37948.00	33.50	11.68	45.18	54.00	8.82	Average

Fundamental strength and Bandedge:

Low Channel, Horizontal

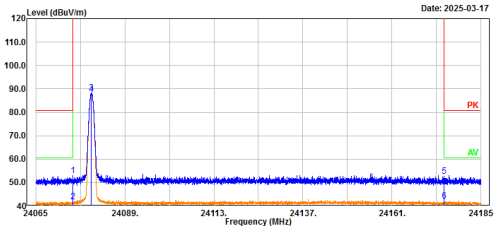
Project No.: 2502Q09631E-RF Serial No.: 2YAI-2
Polarization: Horizontal Tester: Colin Yang
Test Mode: Transmitting
Note: Radar low channel 24.08002GHz
Peak:RBW:1MHz,VBW:3MHz Ave:RBW:1MHz,VBW:5kHz



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	24075.00	54.87	8.80	63.67	74.00	10.33	Peak
2	24075.00	44.22	8.80	53.02	54.00	0.98	Average
3	24080.00	102.32	8.81	111.13	147.96	36.83	Peak
4	24080.00	101.84	8.81	110.65	127.96	17.31	Average
5	24175.00	44.11	8.86	52.97	74.00	21.03	Peak
6	24175.00	33.22	8.86	42.08	54.00	11.92	Average

Low Channel, Vertical

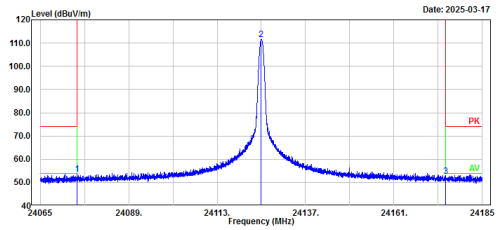
Project No.: 2502Q09631E-RF Serial No.: 2YAI-2
Polarization: Vertical Tester: Colin Yang
Test Mode: Transmitting
Note: Radar low channel 24.08002GHz
Peak:RBW:1MHz,VBW:3MHz Ave:RBW:1MHz,VBW:5kHz



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	24075.00	44.07	8.80	52.87	74.00	21.13	Peak
2	24075.00	33.10	8.80	41.90	54.00	12.10	Average
3	24080.00	79.40	8.81	88.21	147.96	59.75	Peak
4	24080.00	78.96	8.81	87.77	127.96	40.19	Average
5	24175.00	43.95	8.86	52.81	74.00	21.19	Peak
6	24175.00	33.33	8.86	42.19	54.00	11.81	Average

Middle Channel, Horizontal

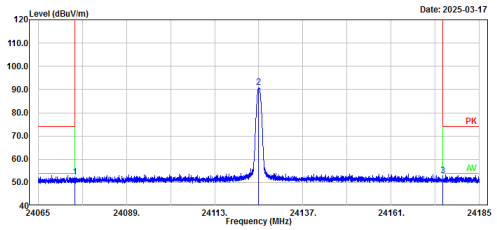
Project No.: 2502Q09631E-RF Serial No.: 2YAI-2
Polarization: Horizontal Tester: Colin Yang
Test Mode: Transmitting
Note: Radar middle channel 24.12502GHz
Peak:RBW:1MHz,VBW:3MHz



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Measurement
1	24075.00	44.74	8.80	53.54	74.00	20.46	Peak
2	24125.00	102.64	8.84	111.48	147.96	36.48	Peak
3	24175.00	43.77	8.86	52.63	74.00	21.37	Peak

Middle Channel, Vertical

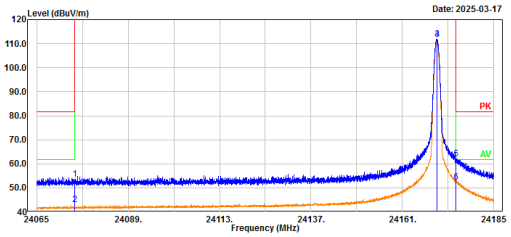
Project No.: 2502Q09631E-RF Serial No.: 2YAI-2
Polarization: Vertical Tester: Colin Yang
Test Mode: Transmitting
Note: Radar middle channel 24.12502GHz
Peak:RBW:1MHz,VBW:3MHz



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Measurement
1	24075.00	43.70	8.80	52.50	74.00	21.50	Peak
2	24125.00	82.03	8.84	90.87	147.96	57.09	Peak
3	24175.00	44.16	8.86	53.02	74.00	20.98	Peak

High Channel, Horizontal

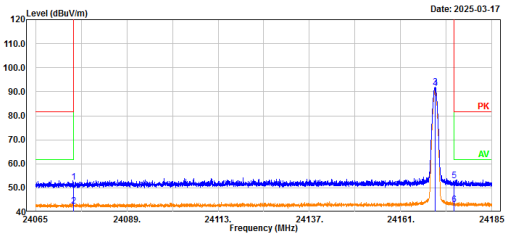
Project No.: 2502Q09631E-RF Serial No.: 2YAI-2
Polarization: Horizontal Tester: Colin Yang
Test Mode: Transmitting
Note: Radar high channel 24.17002GHz
Peak:RBW:1MHz,VBW:3MHz Ave:RBW:1MHz,VBW:5kHz



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	24075.00	44.92	8.80	53.72	74.00	20.28	Peak
2	24075.00	34.25	8.80	43.05	54.00	10.95	Average
3	24170.00	103.12	8.86	111.98	147.96	35.98	Peak
4	24170.00	102.90	8.86	111.76	127.96	16.20	Average
5	24175.00	53.18	8.86	62.04	74.00	11.96	Peak
6	24175.00	43.39	8.86	52.25	54.00	1.75	Average

High Channel, Vertical

Project No.: 2502Q09631E-RF Serial No.: 2YAI-2
Polarization: Vertical Tester: Colin Yang
Test Mode: Transmitting
Note: Radar high channel 24.17002GHz
Peak:RBW:1MHz,VBW:3MHz Ave:RBW:1MHz,VBW:5kHz



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	24075.00	43.61	8.80	52.41	74.00	21.59	Peak
2	24075.00	33.75	8.80	42.55	54.00	11.45	Average
3	24170.00	82.98	8.86	91.84	147.96	56.12	Peak
4	24170.00	82.31	8.86	91.17	127.96	36.79	Average
5	24175.00	44.23	8.86	53.09	74.00	20.91	Peak
6	24175.00	34.17	8.86	43.03	54.00	10.97	Average

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 (specific distance [3m]/test distance [1m]) dB= 9.54 dB
For 90-100GHz:
Distance extrapolation Factor =20 log (specific distance [3m]/test distance [0.5m]) dB= 15.56 dB

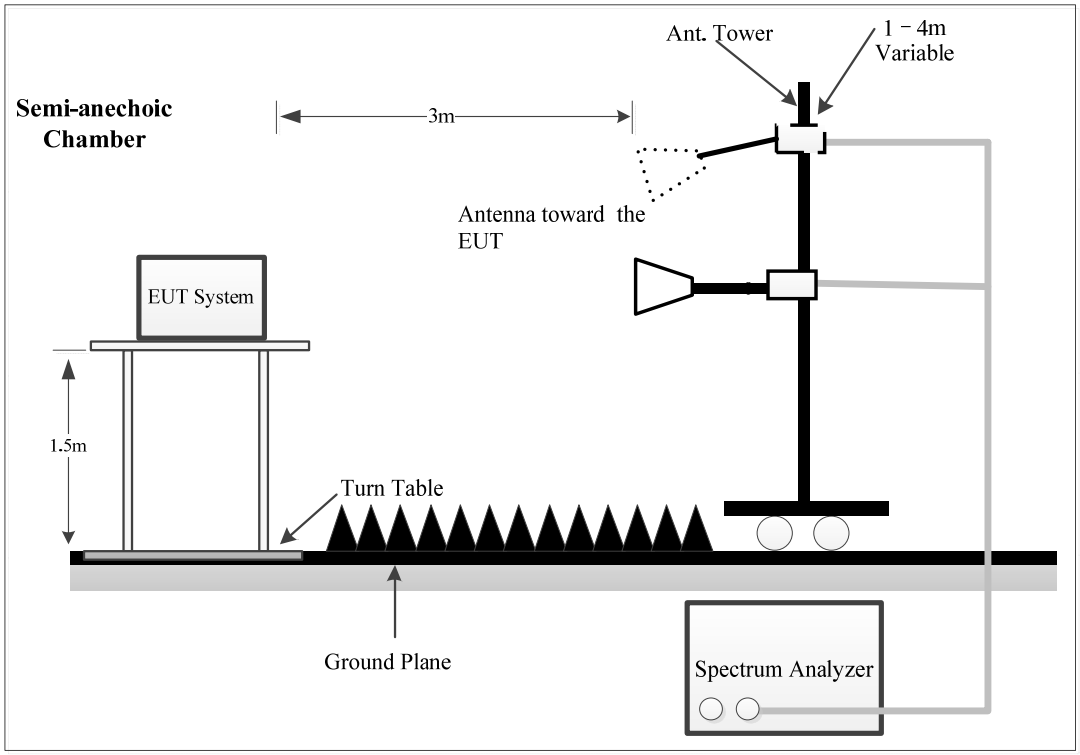
4.3 20 dB Emission Bandwidth

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

a) 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.
b) Set the video bandwidth (VBW) ≥ 3×RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) 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: (℃)	22.1	**Relative Humidity: (%)**	48	**ATM Pressure: (kPa)**	101.8

Test Equipment List and Details:

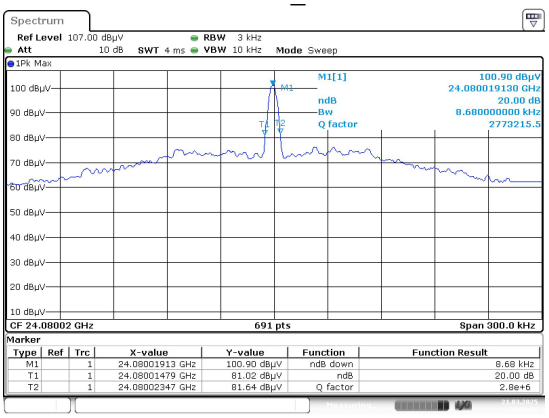
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-02 1304	2023/2/22	2026/2/21
AH	Preamplifier	PAM-1840VH	191	2024/9/5	2025/9/4
Xinhang Macrowave	Coaxial Cable	XH360A-2.92/J-2.92/J-6M-A	20231208001 #0001	2024/12/9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

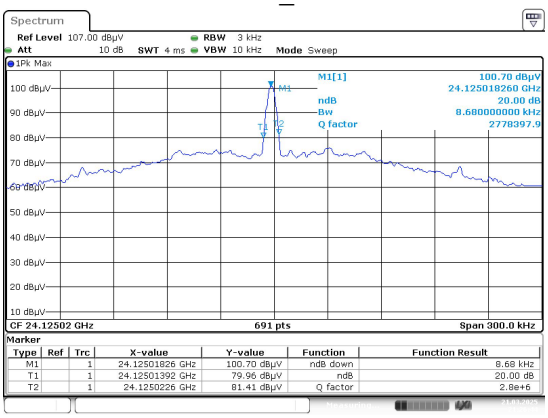
Test Mode	20 dB Bandwidth (kHz)
Low Channel	8.680
Middle Channel	8.680
High Channel	8.680
Note: the 20 dB bandwidth of the emission is contained within the operation frequency band. Please refer to the below plots.	

20 dB Bandwidth_Low Channel



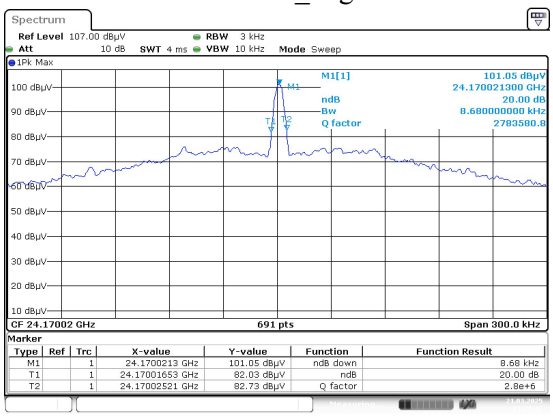
ProjectNo.:2502Q09631E-RF Tester:Colin Yang
Date: 21.MAR.2025 21:24:59

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/f²)	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/cm^2);
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 *******