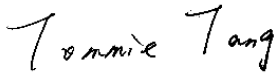
TEST REPORT

Application No.:	KSCR2404000691AT
FCC ID:	2AVK2AT60MF1T1RP32A
Applicant:	Airtouch (Shanghai) Intelligent Technology Co., Ltd
Address of Applicant:	11th Floor, Building 4, Lane 388, Shengrong Road, Pudong New Area, Shanghai, China
Manufacturer:	Airtouch (Shanghai) Intelligent Technology Co., Ltd
Address of Manufacturer:	11th Floor, Building 4, Lane 388, Shengrong Road, Pudong New Area, Shanghai, China
Factory:	Airtouch (Shanghai) Intelligent Technology Co., Ltd
Address of Factory:	11th Floor, Building 4, Lane 388, Shengrong Road, Pudong New Area, Shanghai, China
Equipment Under Test (EUT):	
EUT Name:	60Ghz millimeter wave radar sensor
Model No.:	AT60MF1T1RP32A, AT60MF1T2RS32A, AT60MF1T2RP32A ♣
♣	Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
Trade Mark:	Airtouch
Standard(s) :	47 CFR Part 15, Subpart C 15.255
Date of Receipt:	2024-04-23
Date of Test:	2024-04-24 to 2024-07-11
Date of Issue:	2024-07-12
Test Result:	**Pass***

* In the configuration tested, the EUT complied with the standards specified above.

Revision Record			
Version	**Description**	***Date***	***Remark***
00	Original	2024-07-12	/

Authorized for issue by:				
Tested By				
		Tommie_Tang/Project Engineer		
Approved By				
		Terry Hou /Reviewer		

2 Test Summary

Radio Spectrum Technical Requirement				
Item	**Standard**	**Method**	**Requirement**	**Result**
Antenna Requirement	47 CFR Part 15, Subpart C 15.255	N/A	47 CFR Part 15, Subpart C 15.203	Pass

N/A: Not applicable

Radio Spectrum Matter Part				
Item	**Standard**	**Method**	**Requirement**	**Result**
Transmitter power and Transmitter off-times	47 CFR Part 15, Subpart C 15.255	ANSI C63.10, Sections 9.4, 9.5	47 CFR Part 15, Subpart C 15.255(c)(2)(iii)(A)	PASS
Occupied bandwidth	47 CFR Part 15, Subpart C 15.255	ANSI C63.10 (2013) Section 9.3	47 CFR Part 15, Subpart C 15.215(c),15.255(c2)	PASS
Radiated spurious emissions below 40 GHz	47 CFR Part 15, Subpart C 15.255	ANSI C63.10 (2013) Section 9.13	47 CFR Part 15, Subpart C 15.255(d)(2)	PASS
Radiated emissions outside assigned band and above 40 GHz up to 200 GHz	47 CFR Part 15, Subpart C 15.255	ANSI C63.10 (2013) Section 9.9, 9.12	47 CFR Part 15, Subpart C 15. 255(d)(3)	PASS
Frequency stability	47 CFR Part 15, Subpart C 15.255	ANSI C63.10 (2013) Section 9.4	47 CFR Part 15, Subpart C 15. 255(f)	PASS

Declaration of EUT Family Grouping:

Note: There are series models mentioned in this report, and they are identical in electrical and electronic characters. Only the model AT60MF1T1RP32A was tested since their differences were the model number and software which adapts to different application scenarios without affecting RF parameters.

3 Contents

4 General Information

4.1 Details of E.U.T.

Power supply: DC 3.3V
Frequency: 59-64GHz
Modulation Type: FMCW
Antenna Type: Integrated Patch Antenna
Antenna Gain: 5dBi (Provided by the manufacturer)

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
DC Power Supply	Agilent	E3632A	/

4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	8.4×10^{-8}
2	Timeout	2s
3	Duty Cycle	0.37%
4	Occupied Bandwidth	3%
5	RF Radiated Power	5.2dB (Below 1GHz)
		5.9dB (Above 1GHz)
6	Radiated Spurious Emission Test	4.2dB (Below 30MHz)
		4.5dB (30MHz-1GHz)
		5.1dB (1GHz-18GHz)
		5.4dB (Above 18GHz)
7	Temperature Test	1°C
8	Humidity Test	3%
9	Supply Voltages	1.5%
10	Time	3%
Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.		

4.4 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc.

No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.

Tel: +86 512 5735 5888 Fax: +86 512 5737 0818

No tests were sub-contracted.

Note:

1.SGS is not responsible for wrong test results due to incorrect information (e.g., max. internal working frequency, antenna gain, cable loss, etc) is provided by the applicant. (If applicable).

2.SGS is not responsible for the authenticity, integrity and the validity of the conclusion based on results of the data provided by applicant. (If applicable).

4.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• A2LA

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

• FCC

Compliance Certification Services Inc. has been recognized as an accredited testing laboratory.

Designation Number: CN1172.

• ISED

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory. Company Number: 2324E

• VCCI

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services (Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-20134, R-11600, C-11707, T-11499, G-10216 respectively.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None

5 Equipment List

Item	Equipment	Manufacturer	Model	Inventory No	Cal Date	Cal. Due Date
1	Spectrum Analyzer	R&S	FSV40	KUS1806E003	08/24/2023	08/23/2024
2	PXA Spectrum Analyzer	KEYSIGHT	N9030B	KSEM021-1	01/15/2024	01/14/2025
3	Signal Generator	Agilent	E8257C	KS301066	08/24/2023	08/23/2024
4	Loop Antenna	COM-POWER	AL-130R	KUS1806E001	03/18/2023	03/17/2025
5	Bilog Antenna	TESEQ	CBL 6112D	KUS1806E005	06/29/2023	06/28/2025
6	Amplifier(30MHz~18GHz)	PANSHAN TECHNOLOGY	LNA:1~18G	KSEM010-1	01/15/2024	01/14/2025
7	Horn-antenna(1-18GHz)	ETS-LINDGREN	3117	KS301186	04/07/2023	04/06/2025
8	Horn-antenna(1-18GHz)	Schwarzbeck	BBHA9120D	KS301079	08/24/2023	08/23/2024
9	Amplifier(18~40GHz)	PANSHAN TECHNOLOGY	LNA180400G40	KSEM038	08/24/2023	08/23/2024
10	Horn Antenna(18-40GHz)	Schwarzbeck	BBHA9170	CZ301058	01/07/2024	01/06/2026
11	Horn-antenna(40-60GHz)	ERAVANT	SAZ-2410-19-S1	KSEM003-1	02/02/2021*	02/01/2031**
12	Horn-antenna(50-75GHz)	ERAVANT	SAZ-2410-15-S1	KSEM003-2	02/02/2021*	02/01/2031**
13	Horn-antenna(50-75GHz)	ERAVANT	SAZ-2410-15-S1	KSEM003-7	12/14/2022*	12/13/2032**
14	Horn-antenna(60-90GHz)	ERAVANT	SAZ-2410-12-S1	KSEM003-8	12/14/2022*	12/13/2032**
15	Horn-antenna(75-110GHz)	ERAVANT	SAZ-2410-10-S1	KSEM003-3	02/02/2021*	02/01/2031**
16	Horn-antenna(90-140GHz)	ERAVANT	SAZ-2410-08-S1	KSEM003-9	12/14/2022*	12/13/2032**
17	Horn-antenna(110-170GHz)	ERAVANT	SAZ-2410-06-S1	KSEM003-4	02/02/2021*	02/01/2031**
18	Horn-antenna(140-220GHz)	ERAVANT	SAZ-2410-05-S1	KSEM003-5	02/02/2021*	02/01/2031**
19	Horn-antenna(140-220GHz)	ERAVANT	SAZ-2410-05-S1	KSEM003-10	12/14/2022*	12/13/2032**
20	Horn-antenna(220-325GHz)	ERAVANT	SAR-2309-03-S2	KSEM003-6	02/02/2021*	02/01/2031**
21	Extended waveguide(40-60GHz)	ERAVANT	SWG-19025-FB	KSEM004-1	02/02/2021*	02/01/2031**
22	Extended waveguide(50-75GHz)	ERAVANT	SWG-15025-FB	KSEM004-2	02/02/2021*	02/01/2031**
23	Extended waveguide(50-75GHz)	ERAVANT	SWG-15025-FB	KSEM004-7	12/14/2022*	12/13/2032**
24	Extended waveguide(60-90GHz)	ERAVANT	SWG-12025-FB	KSEM004-8	12/14/2022*	12/13/2032**
25	Extended waveguide(75-110GHz)	ERAVANT	SWG-10025-FB	KSEM004-3	02/02/2021*	02/01/2031**
26	Extended waveguide(90-140GHz)	ERAVANT	SWG-08025-FB	KSEM004-9	12/14/2022*	12/13/2032**
27	Extended waveguide(110-170GHz)	ERAVANT	SWG-06025-FB	KSEM004-4	02/02/2021*	02/01/2031**
28	Extended waveguide(140-220GHz)	ERAVANT	SWG-05025-FB	KSEM004-5	02/02/2021*	02/01/2031**
29	Extended waveguide(140-220GHz)	ERAVANT	SWG-05025-FB	KSEM004-10	12/14/2022*	12/13/2032**
30	Extended waveguide(220-325GHz)	ERAVANT	SWG-03025-FB	KSEM004-6	02/02/2021*	02/01/2031**
31	Harmonic mixer(40-60GHz)	ERAVANT	STH-19SF-S1	KSEM005-2	10/01/2020*	09/30/2030**

32	Harmonic Mixer(50-75GHz)	VDI	SAX WR15	KSEM007-1	08/23/2023*	08/23/2033**
33	Harmonic Mixer(60-90GHz)	VDI	SAX WR12	KSEM007-2	08/23/2023*	08/23/2033**
34	Harmonic mixer(90-140GHz)	VDI	SAX WR8.0	KSEM007-3	08/23/2023*	08/23/2033**
35	Harmonic mixer(140-220GHz)	VDI	SAX WR5.1	KSEM007-4	08/23/2023*	08/23/2033**
36	Harmonic mixer(220-325GHz)	ERAVANT	HM 220-325	KSEM005-4	04/20/2021*	04/19/2031**
37	Upconverter	Talent	TMAM-060090-0612-12-AC	KSEM043	01/18/2022*	01/17/2032**
38	RE Test Cable	ERAVANT MICROWAVE	/	CZ301097	11/10/2023	11/09/2024
39	Temperature & Humidity Recorder	Renke Control	RS-WS-N01-6J	KSEM024-4	03/19/2024	03/18/2025
40	Software	Faratronic	EZ_EMC-v 3A1	/	NCR	NCR
41	Software	ESE	E3_V 6.111221a	/	NCR	NCR

*Calibration date provided by the equipment manufacturer.

**Calibration every ten years. During this period, there will be daily check files for the equipment and the requirements for operators will be clearly defined through SOP.

6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

FCC 47 CFR Part 15C Section 15.203

6.1.2 Conclusion

Standard Requirement:

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 an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit permanently attached antenna or of an so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

EUT Antenna:

The antenna is Integrated Patch Antenna and no consideration of replacement.

Antenna location: Refer to EUT Photos.

7 Radio Spectrum Matter Test Results

7.1 Occupied bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.215(c),15.255(c2)

Test Method: ANSI C63.10, Section 9.3

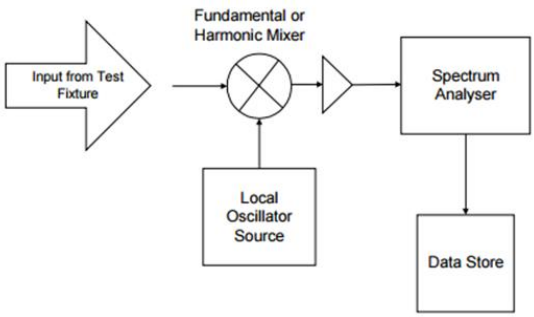
7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 24.5 °C Humidity: 50.1 % RH Atmospheric Pressure: 1010 mbar

Test Mode: a: TX mode _ Keep the EUT in continuously transmitting mode.

7.1.2 Test Setup Diagram



7.1.3 Measurement Procedure and Data

1) Place the EUT on the table and set it in the transmitting mode
2) SA set RBW=1%~5% OBW, VBW=3*RBW and Detector=Peak, or a minimum of 1 MHz if this is not possible due to a large OBW.
3) Measure and record the result of 20dB and 99% bandwidth

Please Refer to Appendix for Details

7.2 Transmitter power and Transmitter off-times

Test Requirement	47 CFR Part 15, Subpart C 15.255(c)(2)(iii)(A)
Test Method:	ANSI C63.10, Sections 9.4, 9.5
Limit:	The peak EIRP shall not exceed 14 dBm, and the sum of continuous transmitter off-times of at least two milliseconds shall equal at least 25.5 milliseconds within any contiguous interval of 33 milliseconds.

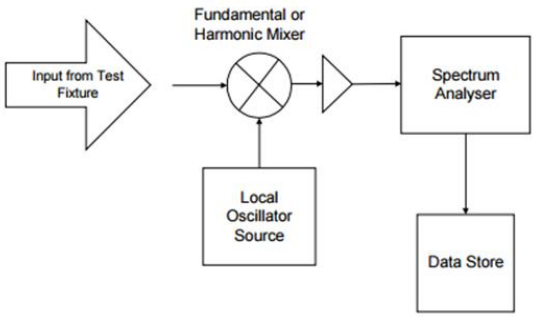
7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 24.5 °C Humidity: 50.1 % RH Atmospheric Pressure: 1010 mbar

Test Mode: a: TX mode _ Keep the EUT in continuously transmitting mode.

7.2.2 Test Setup Diagram



7.2.3 Measurement Procedure and Data

1) Place the EUT on the table and set it in the transmitting mode
2) SA set RBW=1MHz , VBW=3*RBW , Detector=Peak/Average, Trace: Mask Hold, Peak Search
3) The EUT was turned from 0 degrees to 360 degrees to find the maximum reading.

Please Refer to Appendix for Details

7.3 Out of band radiated emissions below 40 GHz

Test Requirement 47 CFR Part 15, Subpart C 15.255(d)(2)
Test Method: ANSI C63.10, Section 9.13
Limit:

Below 30MHz

Frequency	Field Strength (μV/m)	Measurement Distance (metres)
9 - 490 kHz	2,400/F (kHz)	300
490 - 1,705 kHz	24,000/F (kHz)	30
1.705-30 MHz	30	30
Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.		

Above 30MHz

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (metres)
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.

Frequency (MHz)	Field strength at 3 m, dB(uV/m)* Within restricted bands		
	Peak	Quasi Peak	Average
0.009 - 0.090	148.5 - 128.5	NA	128.5 - 108.5**
0.090 - 0.110	NA	108.5 - 106.8**	NA
0.110 - 0.490	126.8 - 113.8	NA	106.8 - 93.8**
0.490 - 1.705	NA	73.8 - 63.0**	NA
1.705 - 30.0*		69.5	
30 - 88		40.0	
88 - 216		43.5	
216 - 960		46.0	
960-40000		54.0	

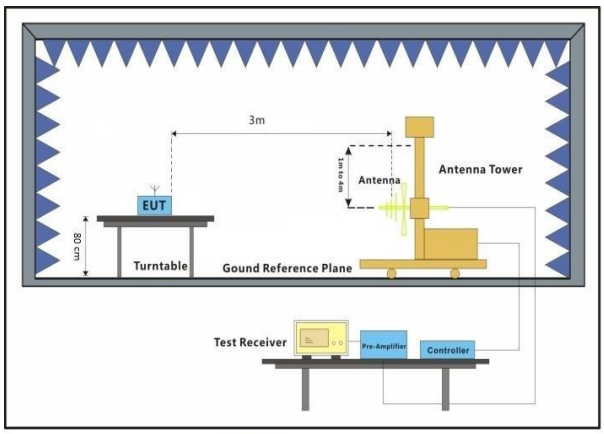
7.3.1 E.U.T. Operation

Operating Environment:

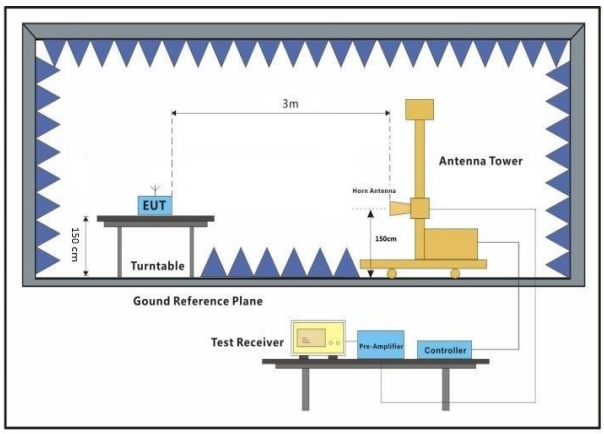
Temperature: 24.5 °C Humidity: 50.1 % RH Atmospheric Pressure: 1010 mbar

Test Mode: a: TX mode _ Keep the EUT in continuously transmitting mode.

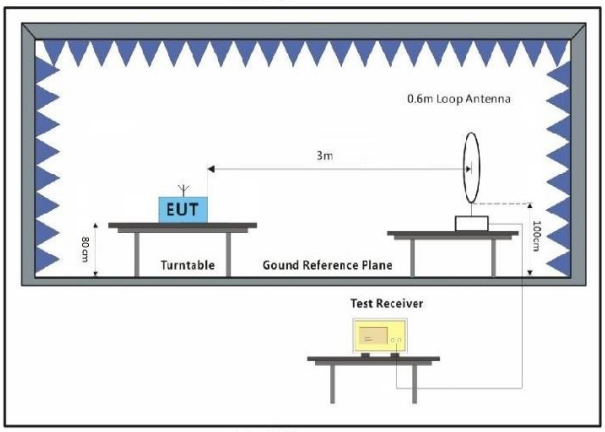
7.3.2 Test Setup Diagram



30MHz-1GHz



1GHz-40GHz



Below 30MHz

7.3.3 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. For 1-40GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was t tuned to the same hight (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

g. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

h. Repeat above procedures until all frequencies measured was complete.

Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

Remark 3: Scan from 9kHz to 30MHz, the disturbance was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

Please Refer to Appendix for Details

7.4 Out of band radiated emissions above 40 GHz

Test Requirement 47 CFR Part 15, Subpart C 15.255(d)(3)
Test Method: ANSI C63.10, Section 9.9, 9.12
Limit:

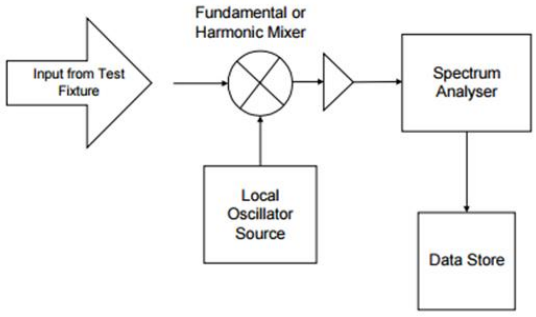
Above 40GHz

Frequency (GHz)	Power density at 3 m distance (pW/cm^2)	Distance (m)	Field strength (dBuV/m)*, peak	Field strength (dBuV/m)*, average
40 - 200	90	3.0	105.31	85.31
* - Field strength was calculated per equation (26) of ANSI C63.10-2013 section 9 as follows: E=sqrt(PD×377), where PD is the power density at the distance specified by the limit in W/m^2, E- field strength in V/m.				

7.4.1 E.U.T. Operation

Operating Environment:
Temperature: 24.5 °C Humidity: 50.1% RH Atmospheric Pressure: 1010 mbar
Test mode: a: TX mode _ Keep the EUT in continuously transmitting mode.

7.4.2 Test Setup Diagram



Above 40GHz

7.4.3 Measurement Procedure and Data

a. For above 40GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation

b. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

c. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to the same hight (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

d. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

e. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

f. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

g. Repeat above procedures until all frequencies measured was complete.

Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

Please Refer to Appendix for Details

7.5 Frequency stability

Test Requirement 47 CFR Part 15, Subpart C 15. 255(f)

Test Method: ANSI C63.10, Section 9.14

Limit:

Frequency (GHz)	Limit
57 - 64	The signal must be contained within assigned frequency band

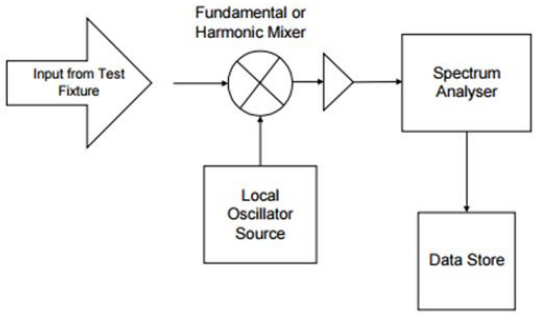
7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 24.5 °C Humidity: 50.1% RH Atmospheric Pressure: 1010 mbar

Test mode: a: TX mode _ Keep the EUT in continuously transmitting mode.

7.5.2 Test Setup Diagram



7.5.3 Measurement Procedure and Data

1. Temperature conditions:
   a) The RF output port of the EUT was connected to Frequency Meter;
   b) Set the working Frequency in the middle channel;
   c) record the 20°C and norminal voltage frequency value as reference point;
   d) vary the temperature from -20°C to 50°C with step 10°C
   e) when reach a temperature point, keep the temperature banlance at least 1 hour to make the product working in this status;
   f) read the frequency at the relative temperature.
2. Voltage conditions:
   a) record the 20°C and norminal voltage frequency value as reference point;
   b) vary the voltage from -15% norminal voltage to +15% voltage;
   read the frequency at the relative voltage.

Please Refer to Appendix for Details

8 Test Setup Photo

Refer to Appendix - Test Setup Photo for KSCR2404000691AT

9 EUT Constructional Details (EUT Photos)

Refer to Appendix - Photographs of EUT Constructional Details for KSCR2404000691AT

10 Appendix

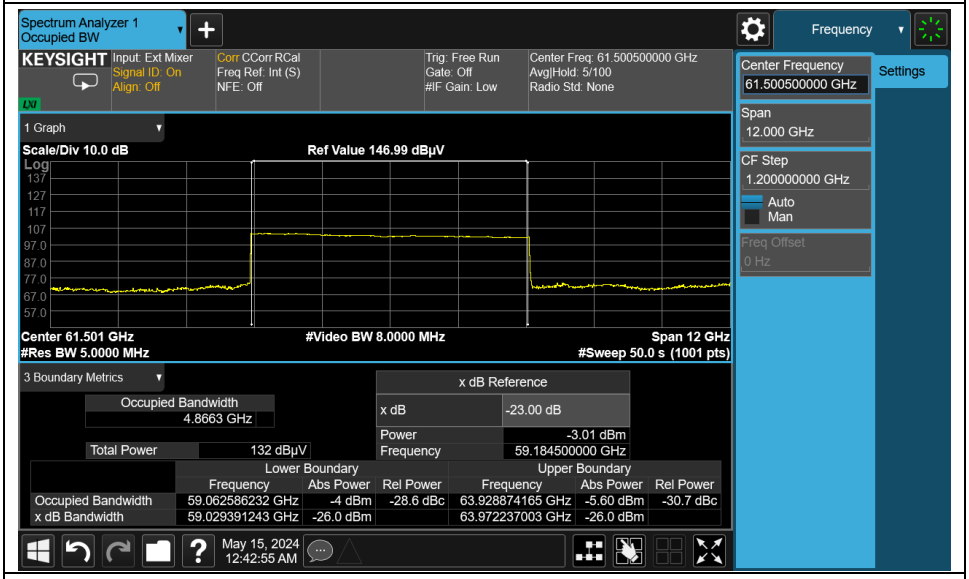
10.1 Occupied bandwidth

Centre Frequency (GHz)	99% OCW (MHz)	-20dB OCW (MHz)	F_L (GHz)	F_H (GHz)	Limit (GHz)	Result
61.501	4866.3	4872.3	59.062	63.928	57-64	Pass

Remark:

F_L: Frequency Low Band Edge, F_H: Frequency High Band Edge

99% Occupied Channel Bandwidth



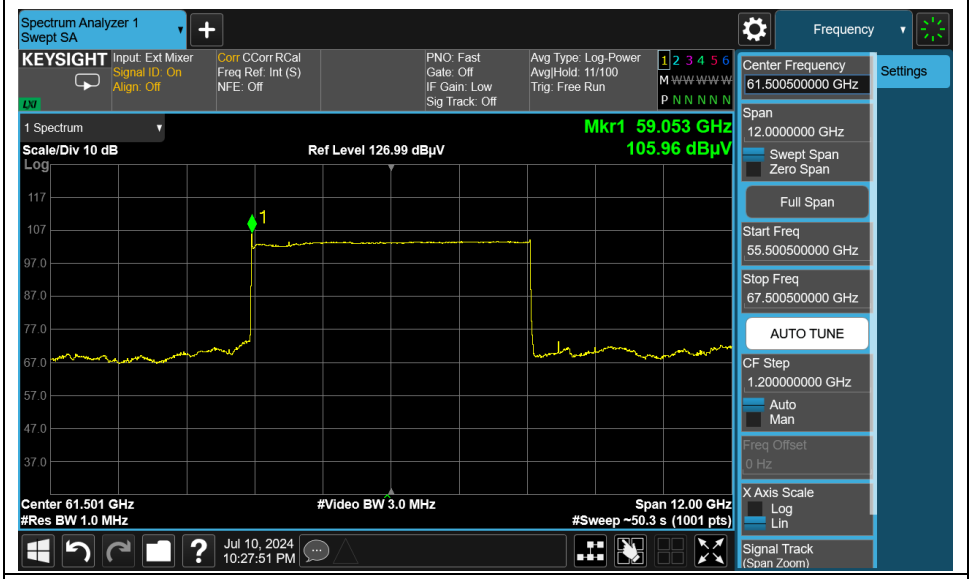
-20dB Occupied Channel Bandwidth

10.2 Transmitter power and Transmitter off-times

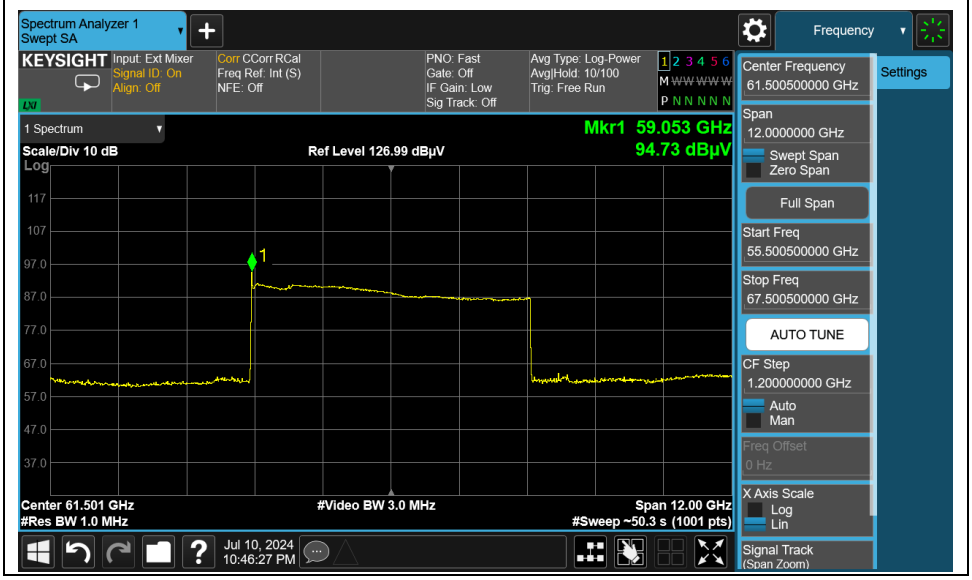
Frequency (GHz)	Distance (m)	Polarity	dBuV/m @ 3m	E.I.R.P. Power (dBm)	E.I.R.P Limit (dBm)	Remark	Result
61.501	3	Horizontal	105.96	10.73	14	peak	Pass
		Vertical	94.73	-0.50	14	peak	Pass

Remark: EIRP[dBm] = E[dBμV/m] + 20 log(d[meters]) - 104.77, where E = field strength and d = distance at which field strength limit is specified in the rules

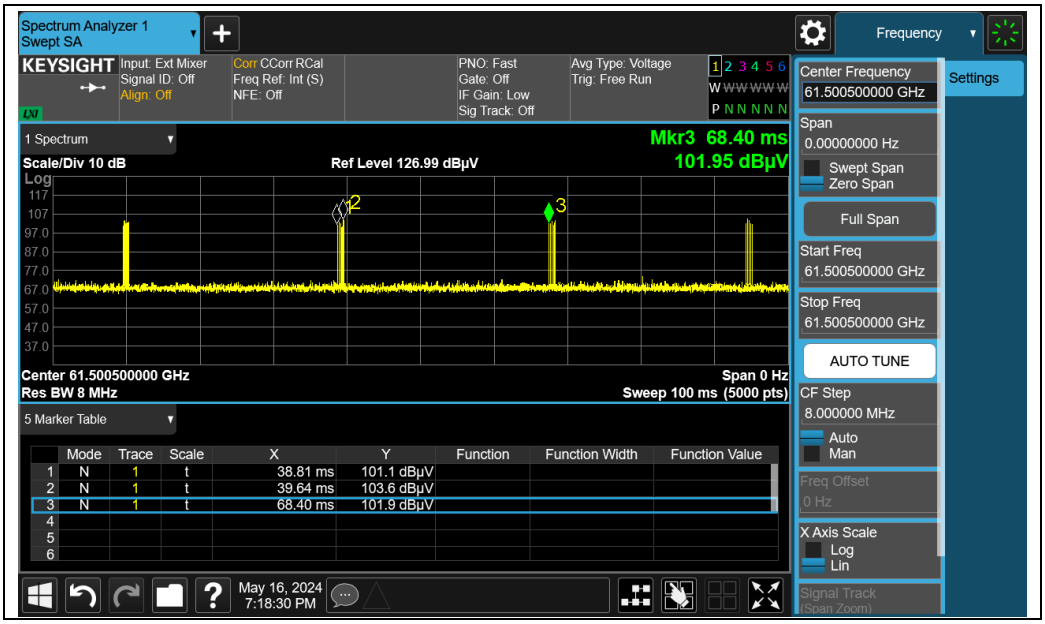
Peak E.I.R.P. Horizontal



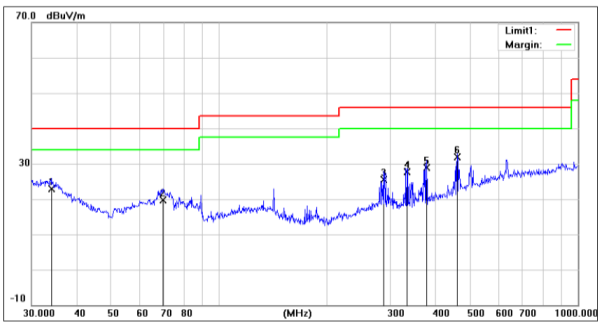
Peak E.I.R.P. Vertical



Frequency (GHz)	Transmitter off-times (ms)	Limit (ms)	Result
61.501	28.76	⩾25.5	Pass

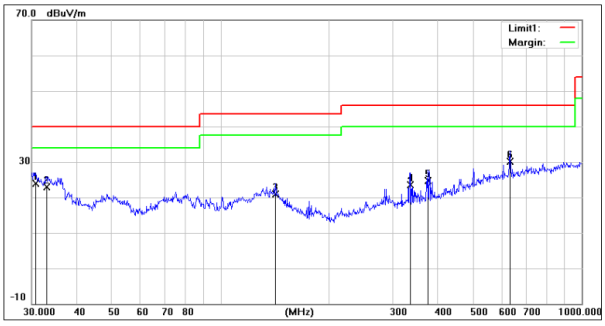


10.3 Out of band radiated emissions below 40 GHz



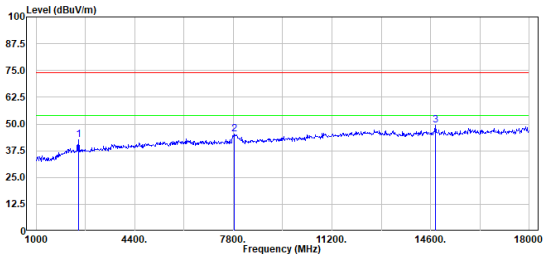
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	34.0365	6.18	16.72	22.90	40.00	-17.10	100	118	QP
2	69.6005	11.91	7.74	19.65	40.00	-20.35	100	226	QP
3	286.9823	9.96	15.64	25.60	46.00	-20.40	100	302	QP
4	333.6867	11.31	16.42	27.73	46.00	-18.27	100	281	QP
5	378.5843	11.81	17.04	28.85	46.00	-17.15	100	357	QP
6	460.7271	12.19	19.74	31.93	46.00	-14.07	100	7	QP

30MHz-1GHz-Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	30.7455	5.16	18.83	23.99	40.00	-16.01	100	180	QP
2	32.9791	5.41	17.44	22.85	40.00	-17.15	100	74	QP
3	141.8262	7.08	13.87	20.95	43.50	-22.55	200	48	QP
4	336.0352	7.26	16.22	23.48	46.00	-22.52	300	113	QP
5	375.9385	7.76	16.99	24.75	46.00	-21.25	200	197	QP
6	633.9073	6.76	23.35	30.11	46.00	-15.89	100	358	QP

30MHz-1GHz-Vertical

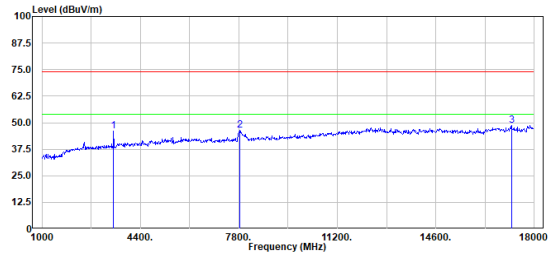


Antenna Polarity :Horizontal

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	2462.00	59.84	32.16	3.79	53.10	42.69	74.00	-31.31	Peak
	7834.00	52.43	35.48	10.68	53.24	45.35	74.00	-28.65	Peak
	14770.00	53.41	39.81	9.73	53.50	49.45	74.00	-24.55	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

1GHz-18GHz-Horizontal

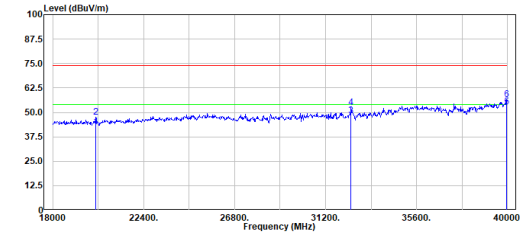


Antenna Polarity :Vertical

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	3465.00	62.23	32.59	4.59	53.21	46.20	74.00	-27.80	Peak
	7834.00	53.50	35.48	10.68	53.24	46.42	74.00	-27.58	Peak
	17218.00	50.91	40.82	10.46	53.49	48.70	74.00	-25.30	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

1GHz-18GHz-Vertical

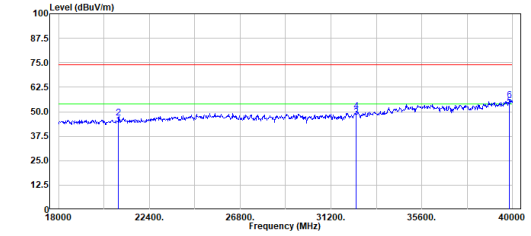


Antenna Polarity :Horizontal

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	20090.00	56.98	37.90	4.45	56.65	42.68	54.00	-11.32	Average
	20090.00	61.68	37.90	4.45	56.65	47.38	74.00	-26.62	Peak
	32432.00	54.85	40.65	7.29	54.63	48.16	54.00	-5.84	Average
	32432.00	59.12	40.65	7.29	54.63	52.43	74.00	-21.57	Peak
	39956.00	50.66	43.80	10.71	52.19	52.98	54.00	-1.02	Average
	39956.00	54.30	43.80	10.71	52.19	56.62	74.00	-17.38	Peak

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

18GHz-40GHz-Horizontal



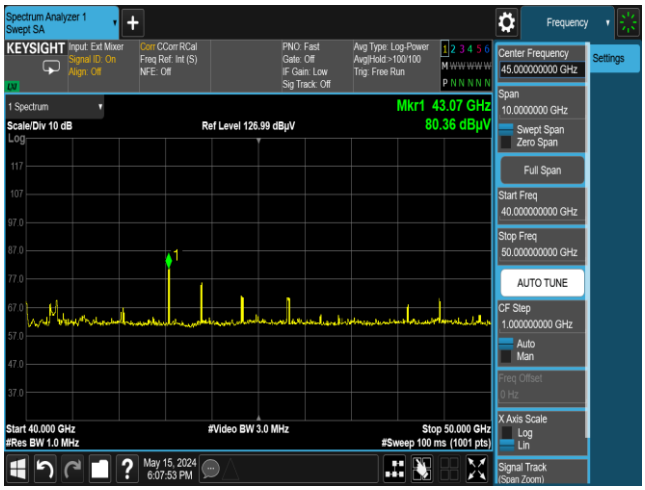
Antenna Polarity :Vertical

No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
	20904.00	56.77	38.07	4.69	56.56	42.97	54.00	-11.03	Average
	20904.00	60.55	38.07	4.69	56.56	46.75	74.00	-27.25	Peak
	32432.00	53.87	40.65	7.29	54.63	47.18	54.00	-6.82	Average
	32432.00	57.04	40.65	7.29	54.63	50.35	74.00	-23.65	Peak
	39846.00	50.52	43.76	10.89	52.51	52.66	54.00	-1.34	Average
	39846.00	53.85	43.76	10.89	52.51	55.99	74.00	-18.01	Peak

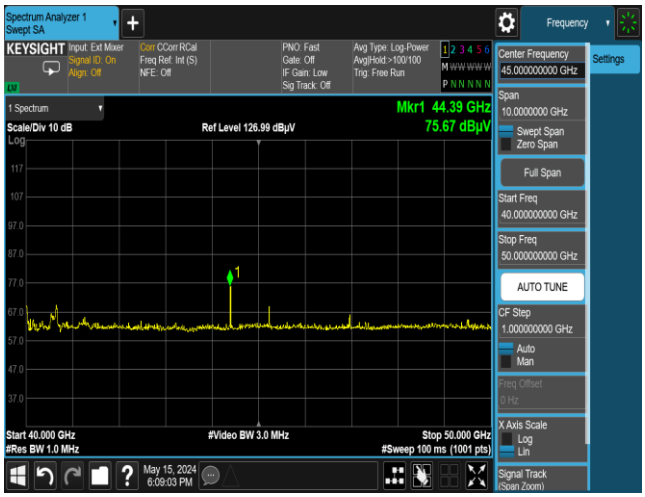
Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

18GHz-40GHz-Vertical

10.4 Out of band radiated emissions above 40 GHz

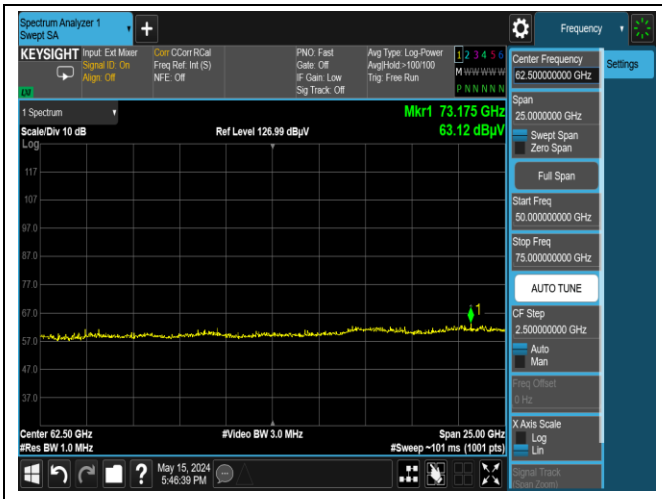


40GHz-50GHz-Horizontal

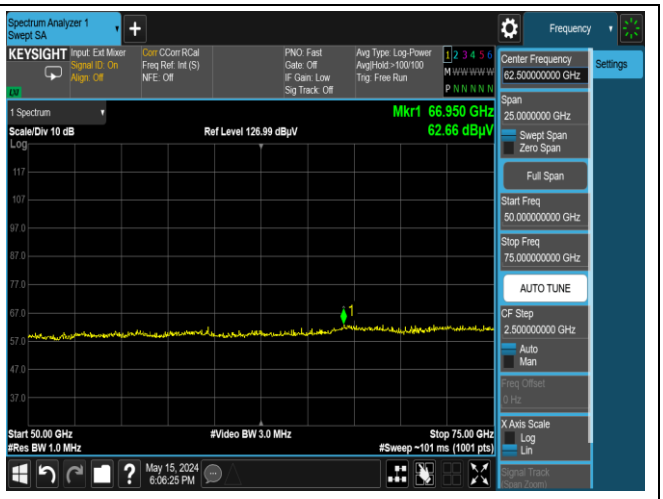


40GHz-50GHz-Vertical

Frequency (GHz)	Distance (M)	PK Value (dBuV/m)	PK Limit (dBuV/m)	AV Limit (dBuV/m)	Polarization	Result
44.08	3	69.97	105.31	85.31	Horizontal	PASS
43.96	3	69.64	105.31	85.31	Vertical	PASS

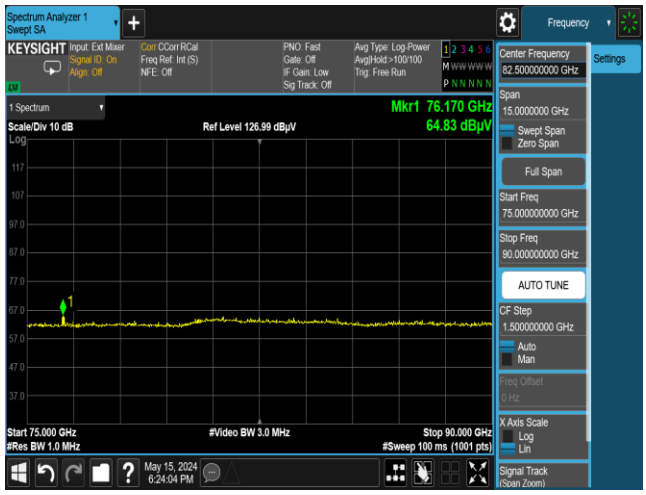


50GHz-75GHz-Horizontal

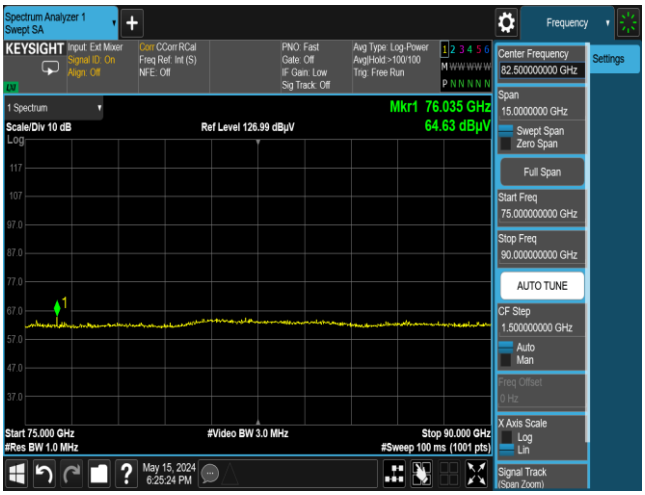


50GHz-75GHz-Vertical

Frequency (GHz)	Distance (M)	PK Value (dBuV/m)	PK Limit (dBuV/m)	AV Limit (dBuV/m)	Polarization	Result
73.175	3	63.12	105.31	85.31	Horizontal	PASS
66.950	3	62.66	105.31	85.31	Vertical	PASS



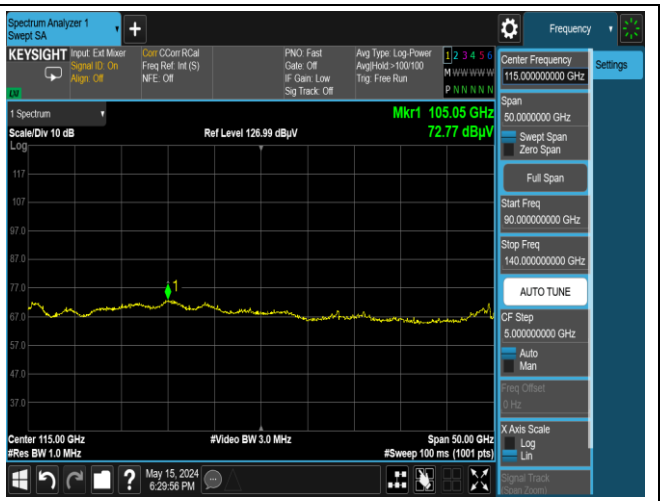
75GHz-90GHz-Horizontal



75GHz-90GHz-Vertical

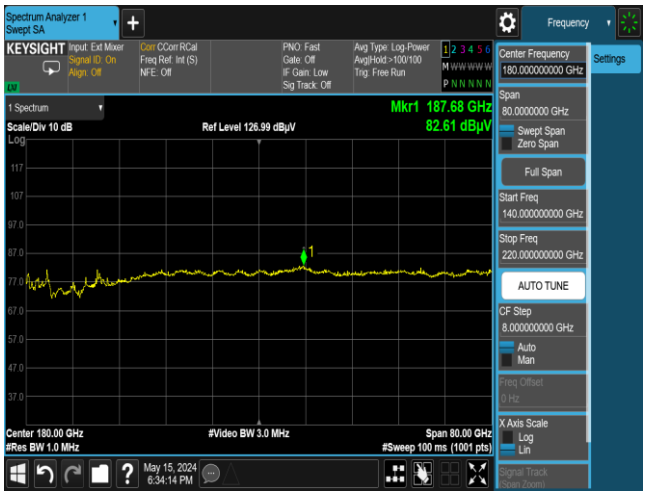
Frequency (GHz)	Distance (M)	PK Value (dBuV/m)	PK Limit (dBuV/m)	AV Limit (dBuV/m)	Polarization	Result
76.170	3	64.83	105.31	85.31	Horizontal	PASS
76.035	3	64.63	105.31	85.31	Vertical	PASS

90GHz-140GHz-Horizontal



90GHz-140GHz-Vertical

Frequency (GHz)	Distance (M)	PK Value (dBuV/m)	PK Limit (dBuV/m)	AV Limit (dBuV/m)	Polarization	Result
105.15	3	72.85	105.31	85.31	Horizontal	Pass
105.05	3	72.77	105.31	85.31	Vertical	Pass

	
140GHz-220GHz-Horizontal	140GHz-220GHz-Vertical

Frequency (GHz)	Distance (M)	PK Value (dBuV/m)	PK Limit (dBuV/m)	AV Limit (dBuV/m)	Polarization	Result
188.96	3	82.63	105.31	85.31	Horizontal	Pass
187.68	3	82.61	105.31	85.31	Vertical	Pass

10.5 Frequency stability

Frequency Stability vs temperature:

Test for 57GHz to 64GHz (Channel=61.501GHz)

Frequency (GHz)	Temperature (°C)	Voltage (V DC)	F_L (GHz)	Limit (GHz)	F_H (GHz)	Limit (GHz)	Result
57-64	50	3.300	59.0626	57	63.9284	64	Pass
	40	3.300	59.0625	57	63.9285	64	Pass
	30	3.300	59.0626	57	63.9285	64	Pass
	20	3.300	59.0624	57	63.9283	64	Pass
	10	3.300	59.0627	57	63.9286	64	Pass
	0	3.300	59.0624	57	63.9285	64	Pass
	-10	3.300	59.0626	57	63.9286	64	Pass
	-20	3.300	59.0623	57	63.9287	64	Pass
	20	3.795	59.0625	57	63.9283	64	Pass
	20	3.000	59.0626	57	63.9287	64	Pass

Remark 1: F_L: Frequency Low Band Edge, F_H: Frequency High Band Edge

Remark 2: We use DC 3.0V as lowest voltage in extreme environment test since the absolute working voltage of EUT is DC 3.0V~5.5V.