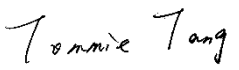
TEST REPORT

Application No.:	KSCR2411002391AT
FCC ID:	2BM9RRT01
Applicant:	Dongguan Geek Photoelectric Technology Co., Ltd
Address of Applicant:	Room 102, No.1, Qingxi baixin Road, Qingxi Town, Dongguan City, Guangdong Province, China
Manufacturer:	Dongguan Geek Photoelectric Technology Co., Ltd
Address of Manufacturer:	Room 102, No.1, Qingxi baixin Road, Qingxi Town, Dongguan City, Guangdong Province, China
Factory:	Dongguan Geek Photoelectric Technology Co., Ltd
Address of Factory:	Room 102, No.1, Qingxi baixin Road, Qingxi Town, Dongguan City, Guangdong Province, China
Equipment Under Test (EUT):	
EUT Name:	Radar sensing bicycle taillights
Model No.:	RT01
Standard(s) :	47 CFR Part 15, Subpart C 15.249
Date of Receipt:	2024-11-29
Date of Test:	2024-11-30 to 2024-12-30
Date of Issue:	2024-12-30
Test Result:	**Pass***

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

Revision Record			
Version	**Description**	***Date***	***Remark***
00	Original	2024-12-30	/

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

2 Test Summary

Radio Spectrum Technical Requirement			
Item	**FCC Requirement**	**Method**	**Result**
Antenna Requirement	47 CFR Part 15, Subpart C 15.249	N/A	Pass

Radio Spectrum Matter Part			
Item	**FCC Requirement**	**Method**	**Result**
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.249	47 CFR Part 15, Subpart C 15.207	Pass
20dB Emission bandwidth	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.9	Pass
Filed strength of fundamental	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.6	Pass
Radiation Spurious Emission	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.6	Pass
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.10	Pass

3 Contents

4 General Information

4.1 Details of E.U.T.

Power supply:	DC 3.7V by battery charged by USB
Operation Frequency Range:	24GHz-24.25GHz
Modulation:	FMCW
Antenna type:	Patch Antenna
Antenna Gain:	14dBi (Provided by the manufacturer)

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Adapter	Sichuan Jiuzhou Electronic technology Co., Ltd	DYS05200CQ-U	/

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).

3. Sample source: sent by customer.

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 (Kunshan) 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
Conducted Emission at Mains Terminals						
1	EMI Test Receive	R&S	ESCI	KS301101	01/15/2024	01/14/2025
2	LISN	R&S	ENV216	KS301197	01/15/2024	01/14/2025
3	LISN	Schwarzbeck	NNLK 8129	KS301091	01/15/2024	01/14/2025
4	Pulse Limiter	R&S	ESH3-Z2	KUS1902E001	01/15/2024	01/14/2025
5	CE test Cable	Thermax	/	CZ301102	01/15/2024	01/14/2025
6	Test Software	ESE	E3_V 6.111221a	/	N.C.R	N.C.R
RF Radiated Test						
1	Spectrum Analyzer	R&S	FSV40	KUS1806E003	08/06/2024	08/05/2025
2	PXA Spectrum Analyzer	KEYSIGHT	N9030B	KSEM021-1	01/15/2024	01/14/2025
3	Signal Generator	Agilent	E8257C	KS301066	08/06/2024	08/05/2025
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
9	Amplifier(18~40GHz)	PANSHAN TECHNOLOGY	LNA180400G40	KSEM038	08/12/2024	08/11/2025
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	Temperature & Humidity Recorder	Renke Control	RS-WS-N01-6J	KSEM024-4	03/21/2024	03/20/2025
39	Software	Faratronic	EZ_EMC-v 3A1	/	NCR	NCR
40	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:

47 CFR Part 15, Subpart C 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 Patch Antenna and no consideration of replacement.

Antenna location: Refer to EUT Photos.

7 Radio Spectrum Matter Test Results

7.1 Conducted Emissions at AC Power Line (150kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.207

Test Method: ANSI C63.10 (2013) Section 6.2

Limit:

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	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.		

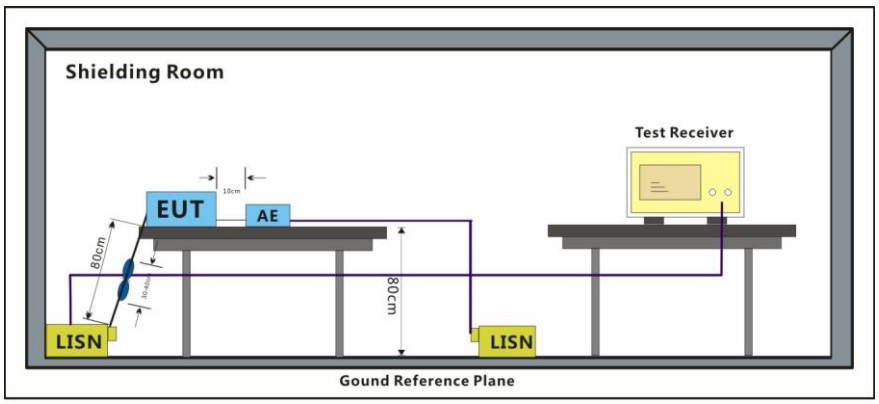
7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 22.4 °C Humidity: 50.2 % 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) The mains terminal disturbance voltage test was conducted in a shielded room.

2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50μH + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

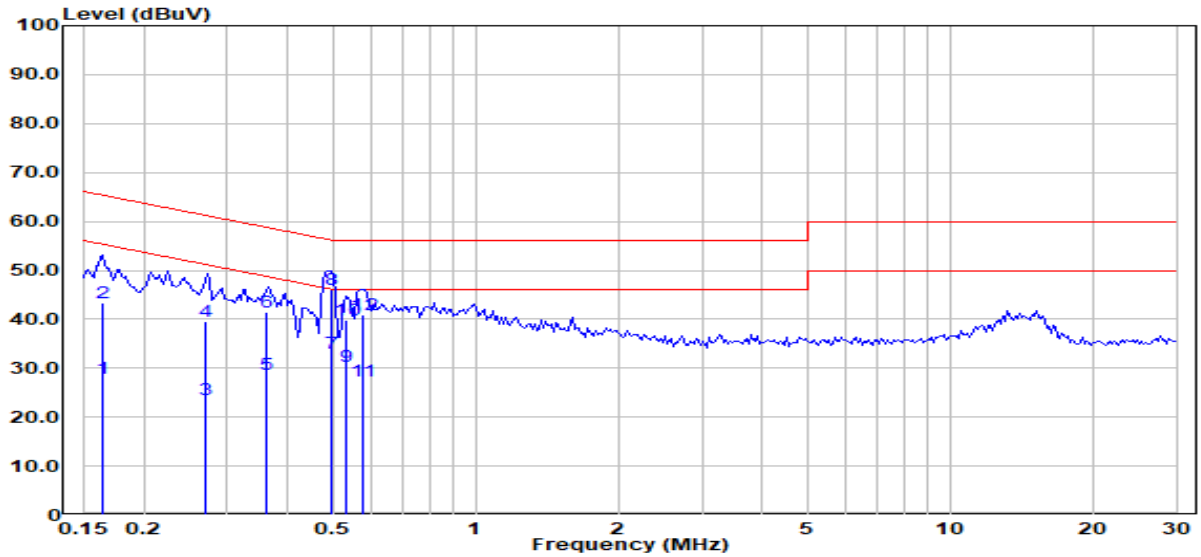
3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane

4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.

5) In order to find the maximum emission, the relative positions of equipment and all the interface cables must be changed according to ANSI C63.10 on conducted measurement.

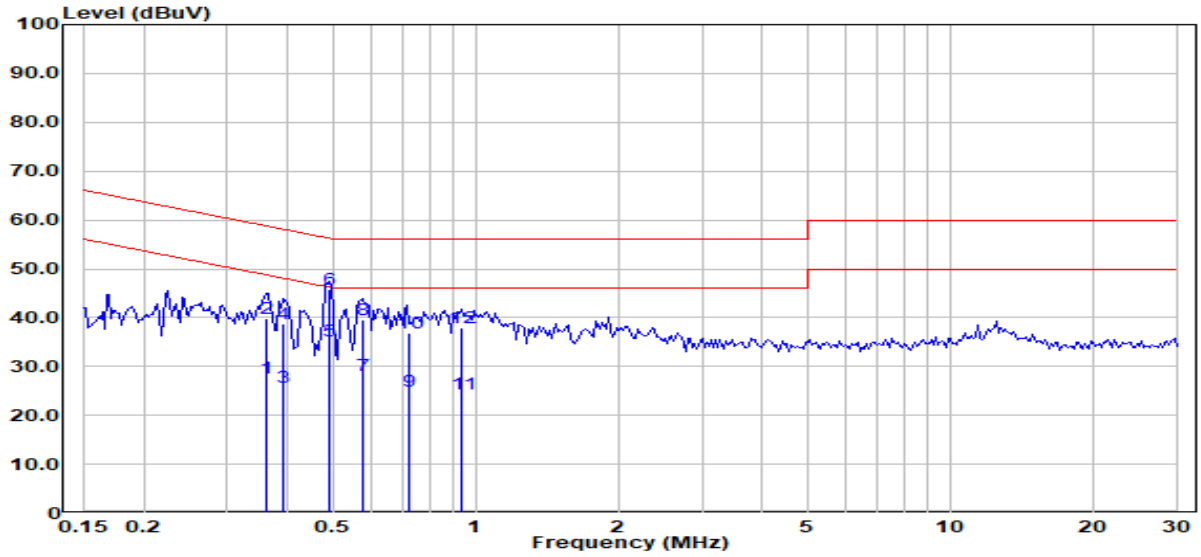
Remark 1: LISN = Read Level + Cable Loss + LISN Factor

Mode: a; Line: Live Line



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1632	7.76	20.20	27.96	55.30	-27.34	Average
2	0.1632	23.06	20.20	43.26	65.30	-22.04	QP
3	0.2704	3.39	20.07	23.46	51.11	-27.65	Average
4	0.2704	19.47	20.07	39.54	61.11	-21.57	QP
5	0.3625	8.61	20.07	28.68	48.67	-19.99	Average
6	0.3625	21.43	20.07	41.50	58.67	-17.17	QP
7	0.4963	12.94	20.03	32.97	46.06	-13.09	Average
8	0.4963	25.99	20.03	46.02	56.06	-10.04	QP
9	0.5342	10.38	19.98	30.36	46.00	-15.64	Average
10	0.5342	19.95	19.98	39.93	56.00	-16.07	QP
11	0.5780	7.42	19.91	27.33	46.00	-18.67	Average
12	0.5780	21.01	19.91	40.92	56.00	-15.08	QP

Mode: a; Line: Neutral Line



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.3608	7.51	20.10	27.61	48.71	-21.10	Average
2	0.3608	19.86	20.10	39.96	58.71	-18.75	QP
3	0.3951	5.54	20.11	25.65	47.96	-22.31	Average
4	0.3951	18.59	20.11	38.70	57.96	-19.26	QP
5	0.4922	15.36	19.94	35.30	46.13	-10.83	Average
6	0.4922	25.75	19.94	45.69	56.13	-10.44	QP
7	0.5764	8.20	19.89	28.09	46.00	-17.91	Average
8	0.5764	19.76	19.89	39.65	56.00	-16.35	QP
9	0.7232	4.98	19.84	24.82	46.00	-21.18	Average
10	0.7232	16.99	19.84	36.83	56.00	-19.17	QP
11	0.9382	4.44	19.90	24.34	46.00	-21.66	Average
12	0.9382	18.12	19.90	38.02	56.00	-17.98	QP

7.2 20dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.215

Test Method: ANSI C63.10 (2013) Section 6.9

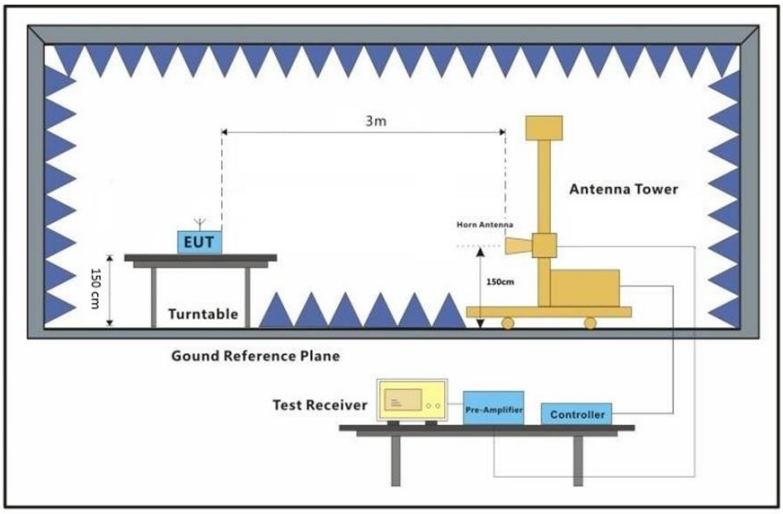
7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 22.4 °C Humidity: 50.2 % 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=1%~5% OBW, VBW=3RBW and Detector=Peak
3) Measure and record the result of 20dB bandwidth

Please Refer to Appendix for Details

7.3 Filed Strength of Fundamental and Radiation Spurious Emission

Test Requirement 47 CFR Part 15, Subpart C 15.249(a)

Test Method: ANSI C63.10 (2013) Section 6.6

Limit:

(1) 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 (microvolts/meter)
2400-2483.5	50	500
5725-5875	50	500
24000-24250	250	2500

* Field strength limits are specified at a distance of 3 meters.

Harmonic Limit Conversion			
Average (uV/m) at 3M	Average (dBuV/m) at 3M	Average (dBuV/m) at 1M	Peak (dBuV/m) at 1M
2500	67.9588	77.50	97.50

*(Limit = 67.96 + 20LOG(3/1)=77.5 dBuV/m)

(2) 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 (follow the table), whichever is the lesser attenuation.

Below 30MHz

Frequency	Field Strength (μA/m)	Magnetic field strength (H-Field) (μA/m)	Measurement Distance (metres)
9-490 kHz	2,400/F (F in kHz)	2,400/F (F in kHz)	300
490-1,705 kHz	24,000/F (F in kHz)	24,000/F (F in kHz)	30
1.705-30 MHz	30	N/A	30

Above 30MHz

Frequency (MHz)	Field Strength microvolts/m at 3 metres (watts, e.i.r.p.)	
	Transmitters	Receivers
30-88	100 (3 nW)	100 (3 nW)
88-216	150 (6.8 nW)	150 (6.8 nW)
216-960	200 (12 nW)	200 (12 nW)
Above 960	500 (75 nW)	500 (75 nW)

Frequency	Field Strength microvolts/m at specific distance	
	Peak	AVG
Above 40GHz	83.52dBuV/m @1m	63.52dBuV/m @1m

*(Limit = 53.98 + 20LOG(3/1)=63.52 dBuV/m)

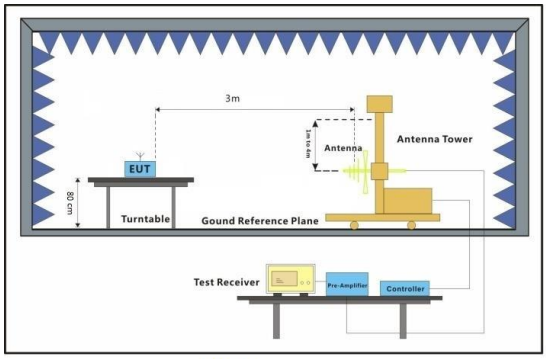
7.3.1 E.U.T. Operation

Operating Environment:

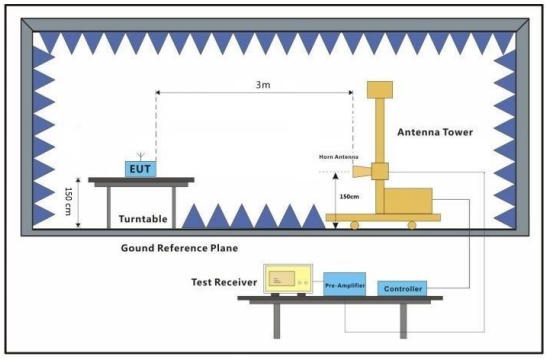
Temperature: 22.4 °C Humidity: 50.2% RH Atmospheric Pressure: 1010 mbar

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

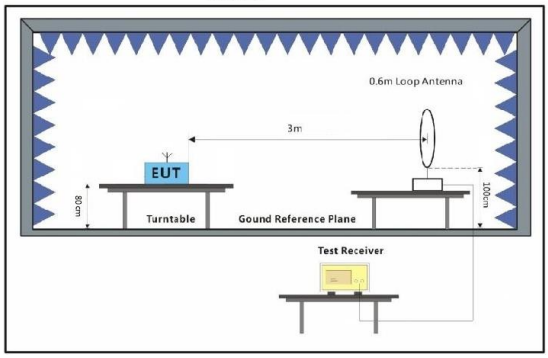
7.3.2 Test Setup Diagram



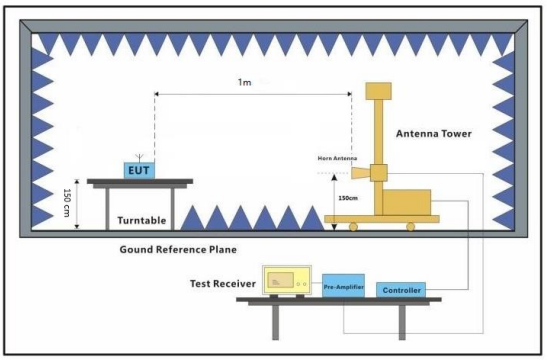
30MHz-1GHz



1GHz-40GHz



Below 30MHz



Above 40GHz

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 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. For 1-18GHz, 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. For 18-40GHz, 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.

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

e. 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.

f. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (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.

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

h. 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.

i. 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.

j. 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

7.4 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2013) Section 6.10.5

Limit:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3
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.		

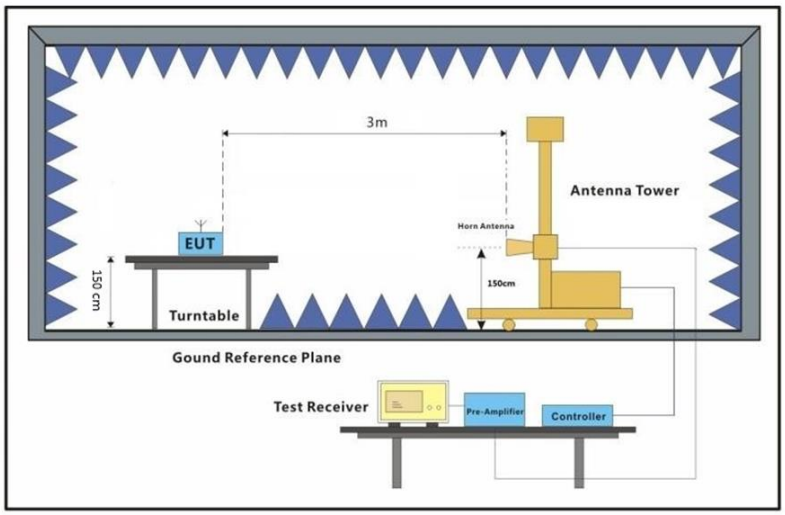
7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 22.4 °C Humidity: 50.2% RH Atmospheric Pressure: 1010 mbar

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

7.4.2 Test Setup Diagram



7.4.3 Measurement Procedure and Data

1) 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.
2) 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.
3) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (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.
4) The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
5) 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.
6) 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.
7) 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

8 Test Setup Photo

Refer to Appendix - Test Setup Photo for KSCR2411002391LM

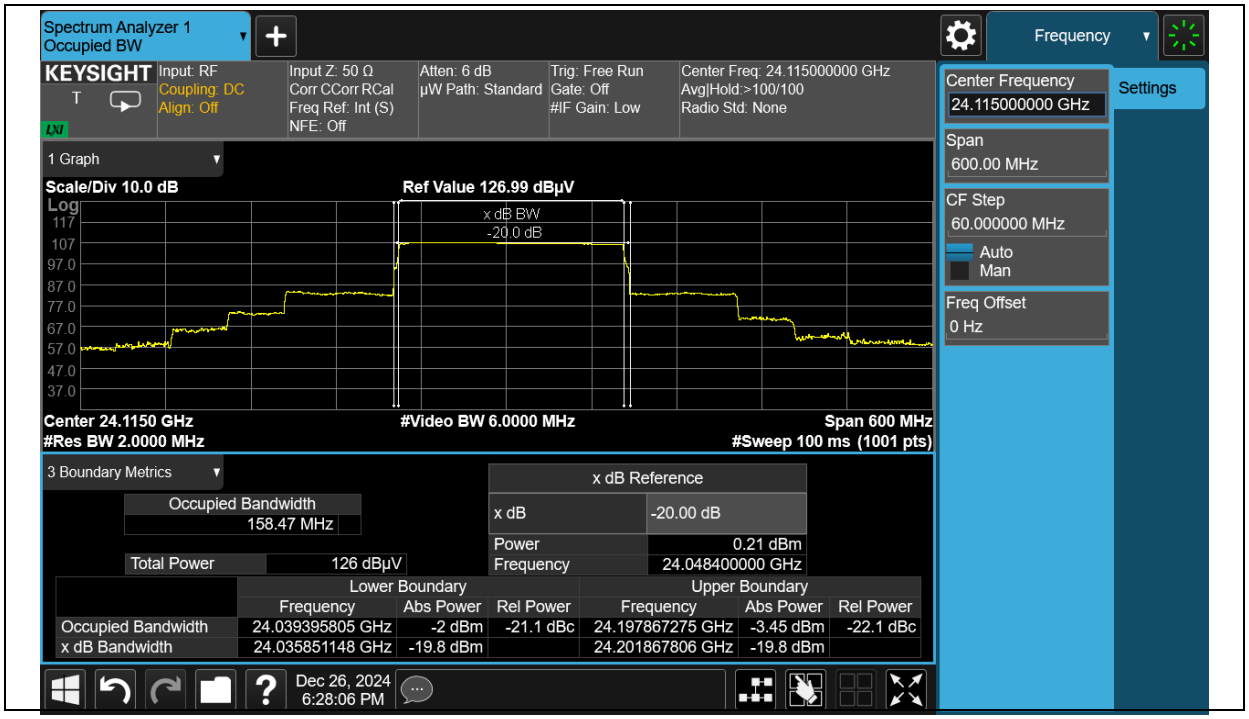
9 EUT Constructional Details (EUT Photos)

Refer to Appendix - Photographs of EUT Constructional Details for KSCR2411002391LM

10 Appendix

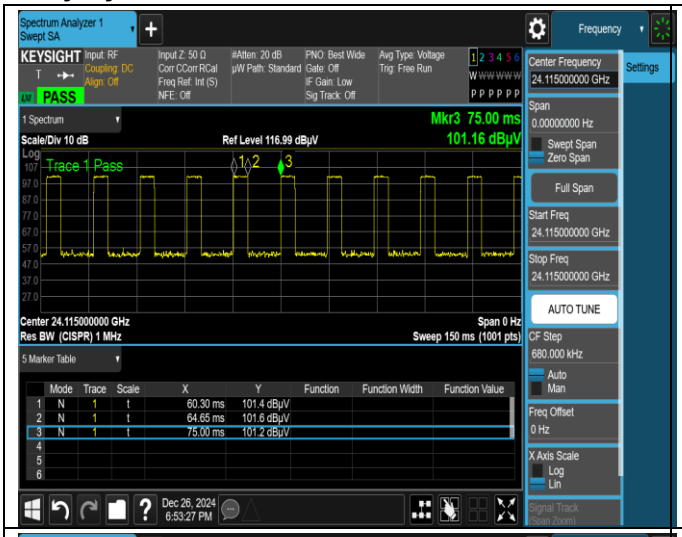
10.1 20dB Bandwidth

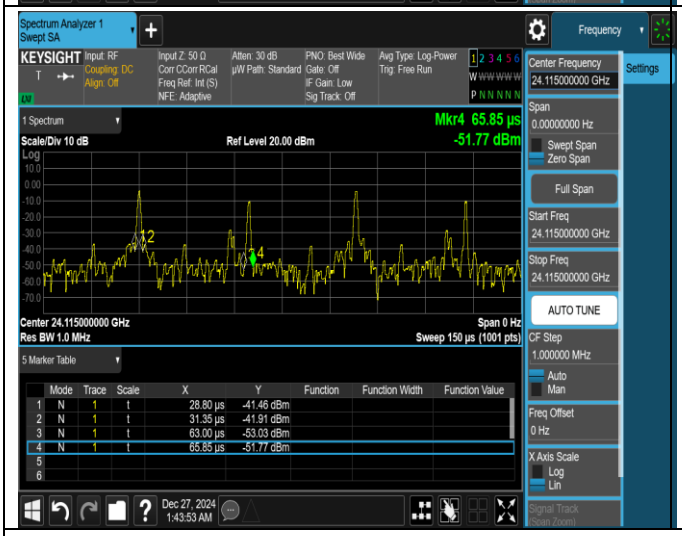
Low Frequency (GHz)	Limit (GHz)	High Frequency (GHz)	Limit (GHz)	20db Bandwidth (MHz)	Result
24.0393	24.00	24.1978	24.25	158.47	Pass



10.2 Filed Strength of Fundamental

Duty Cycle Factor





Duty Cycle Factor = 20lg(Duty Cycle) = -32.5

Note 1: Duty Cycle =Transmission Time / Burst Period

2: Transmission Time = Chirp Width * Chirp number = 64*2.55uS + 65*2.85uS = 348.45uS

3: Burst Period = 14.7mS

Filed Strength of Fundamental

Frequency (GHz)	Distance (m)	Desensitization factor (dB)	Peak Power @3m dBuV/m	Peak Power Limit @3m dBuV/m	Average Power @3m dBuV/m	Average Power Limit @3m dBuV/m	Result	Polarity
24.115	3	1.67	104.44	127.96	71.94	107.96	Pass	Horizontal
24.115	3	1.67	85.85	127.96	53.35	107.96	Pass	Vertical

Note 1: Average Power = Peak Power + Ducy Cycle Factor

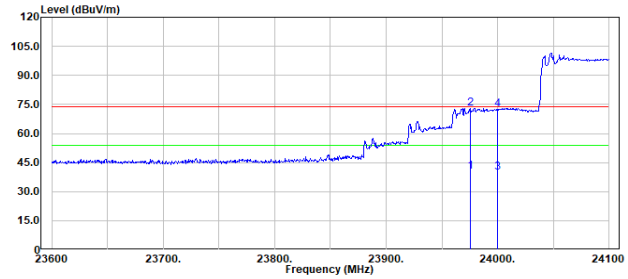
Note 2: The FMCW modulation desensitization correct factor 1.67 was calculated with equation below, where the BW_{Chirp}=158.47MHz, T_{chirp}=65uS, B=1MHz.

$$\alpha = \frac{1}{\sqrt{1+\left(\frac{2\ln(2)}{\pi}\right)^2\left(\frac{BW_{Chirp}}{T_{Chirp}B^2}\right)^2}}$$

where

α	is the reduction in amplitude
BW_{Chirp}	is the FMCW Chirp Bandwidth
T_{Chirp}	is the FMCW Chirp Time
B	is the 3 dB IF Bandwidth = RBW

Bandedge

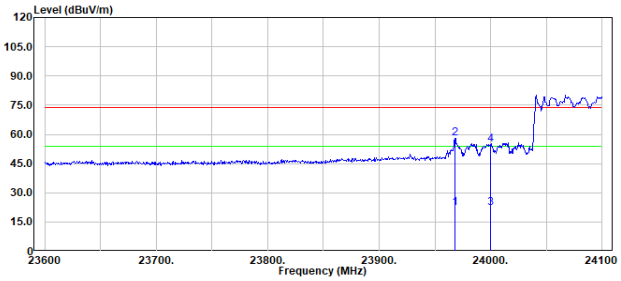


Antenna Polarity :Horizontal

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	
1	23975.50	45.57	39.22	10.53	54.80	40.52	54.00	-13.48	Average
2	23975.50	78.07	39.22	10.53	54.80	73.02	74.00	-0.98	Peak
3	24000.00	44.68	39.23	10.58	54.71	39.78	54.00	-14.22	Average
4	24000.00	77.18	39.23	10.58	54.71	72.28	74.00	-1.72	Peak

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

23600MHz-24100MHz-Horizontal

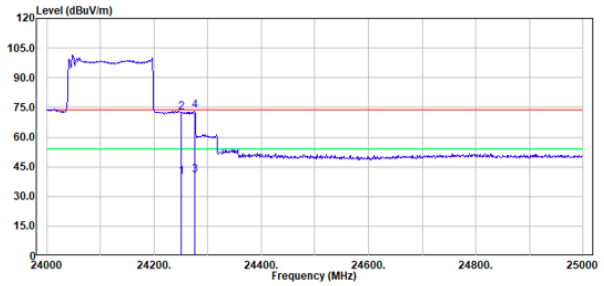


Antenna Polarity :Vertical

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	
1	23968.00	27.42	39.22	10.52	54.83	22.33	54.00	-31.67	Average
2	23968.00	63.23	39.22	10.52	54.83	58.14	74.00	-15.86	Peak
3	24000.00	27.09	39.23	10.58	54.71	22.19	54.00	-31.81	Average
4	24000.00	59.59	39.23	10.58	54.71	54.69	74.00	-19.31	Peak

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

23600MHz-24100MHz-Vertical

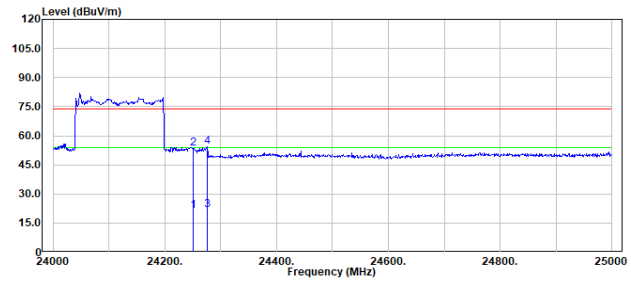


Antenna Polarity :Horizontal

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	
1	24250.00	44.77	39.33	10.46	54.79	39.77	54.00	-14.23	Average
2	24250.00	77.27	39.33	10.46	54.79	72.27	74.00	-1.73	Peak
3	24276.00	45.50	39.34	10.48	54.67	40.65	54.00	-13.35	Average
4	24276.00	77.00	39.34	10.48	54.67	72.15	74.00	-1.85	Peak

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

24000MHz-25000MHz-Horizontal



Antenna Polarity :Vertical

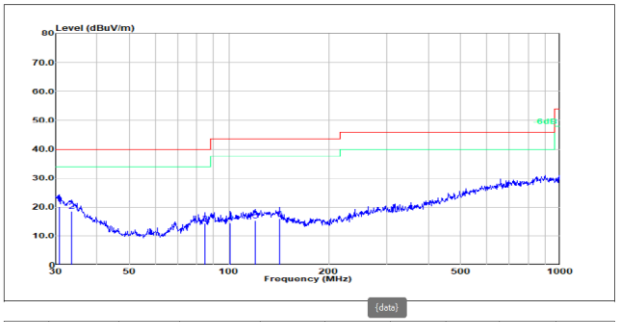
No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
1	24250.00	26.06	39.33	10.46	54.79	21.06	54.00	-32.94	Average
2	24250.00	58.56	39.33	10.46	54.79	53.56	74.00	-20.44	Peak
3	24276.00	26.72	39.34	10.48	54.67	21.87	54.00	-32.13	Average
4	24276.00	59.22	39.34	10.48	54.67	54.37	74.00	-19.63	Peak

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

24000MHz-25000MHz-Vertical

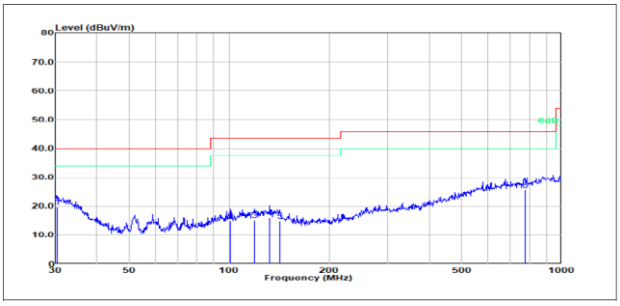
10.3 Radiation Spurious Emissions below 40 GHz

30MHz-1GHz



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	30.8530	1.49	18.74	20.23	40.00	-19.77	200	217	QP
2	33.5620	1.62	17.06	18.68	40.00	-21.32	100	69	QP
3	84.4050	4.24	10.06	14.30	40.00	-25.70	200	110	QP
4	100.9340	1.86	12.77	14.63	43.50	-28.87	100	354	QP
5	120.2770	0.84	14.48	15.32	43.50	-28.18	100	0	QP
6	141.8260	2.17	13.87	16.04	43.50	-27.46	200	360	QP

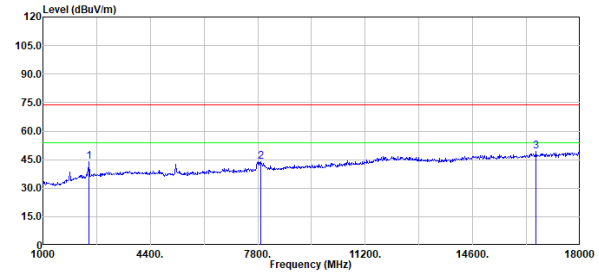
Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	30.3170	0.57	19.17	19.74	40.00	-20.26	200	16	QP
2	100.9340	2.26	12.77	15.03	43.50	-28.47	100	141	QP
3	119.0180	0.63	14.47	15.10	43.50	-28.40	200	327	QP
4	132.6850	1.77	14.31	16.08	43.50	-27.42	200	360	QP
5	141.8260	1.03	13.87	14.90	43.50	-28.60	100	159	QP
6	776.8780	1.16	24.50	25.66	46.00	-20.34	200	34	QP

Vertical

1GHz-18GHz

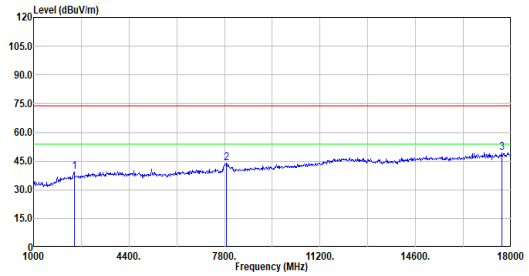


Antenna Polarity :Horizontal

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	
1	2462.00	64.04	32.16	3.79	56.08	43.91	74.00	-30.09	Peak
2	7902.00	53.41	35.43	9.88	54.58	44.14	74.00	-29.86	Peak
3	16606.00	50.30	41.15	10.28	52.42	49.31	74.00	-24.69	Peak

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

Horizontal

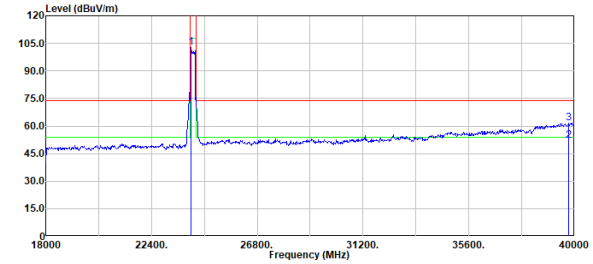


Antenna Polarity :Vertical

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	
1	2445.00	59.57	32.16	3.77	56.09	39.41	74.00	-34.59	Peak
2	7868.00	52.68	35.45	10.28	54.57	43.84	74.00	-30.16	Peak
3	17660.00	49.69	40.86	10.62	51.97	49.20	74.00	-24.80	Peak

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

Vertical

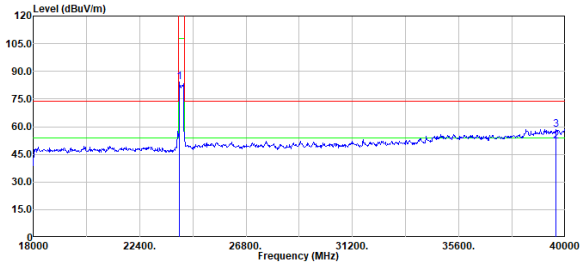


Antenna Polarity :Horizontal

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	
1	24050.00	107.75	39.25	10.56	54.79	102.77	128.00	-25.23	Peak
2	39758.00	45.65	43.72	15.23	52.61	51.99	54.00	-2.01	Average
3	39758.00	55.32	43.72	15.23	52.61	61.66	74.00	-12.34	Peak

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

Horizontal



Antenna Polarity :Vertical

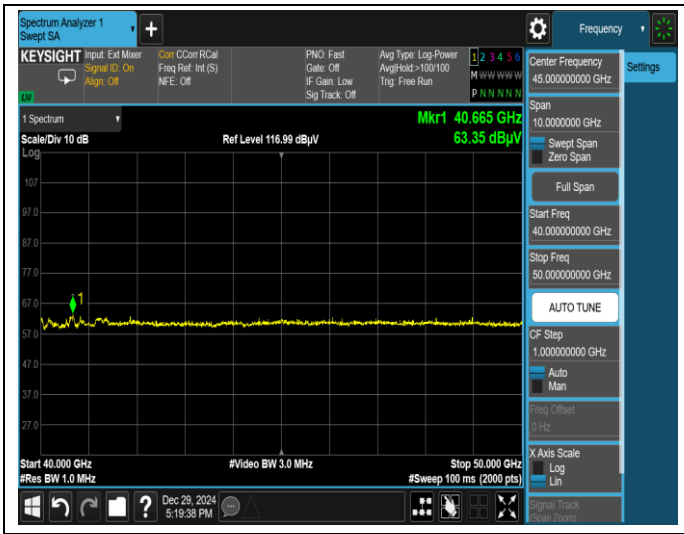
No.	Freq	Read level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
1	24050.00	89.16	39.25	10.56	54.79	84.18	128.00	-43.82	Peak
2	39626.00	46.23	43.67	14.84	52.48	52.26	54.00	-1.74	Average
3	39626.00	52.56	43.67	14.84	52.48	58.59	74.00	-15.41	Peak

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

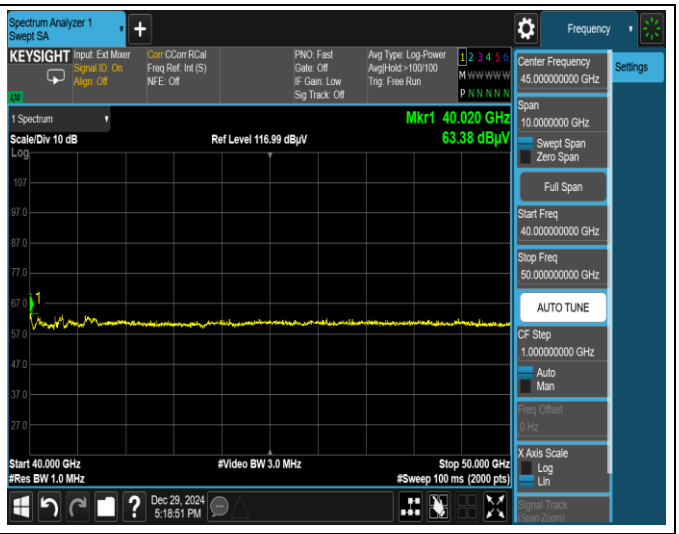
Vertical

10.4 Radiated emissions above 40 GHz

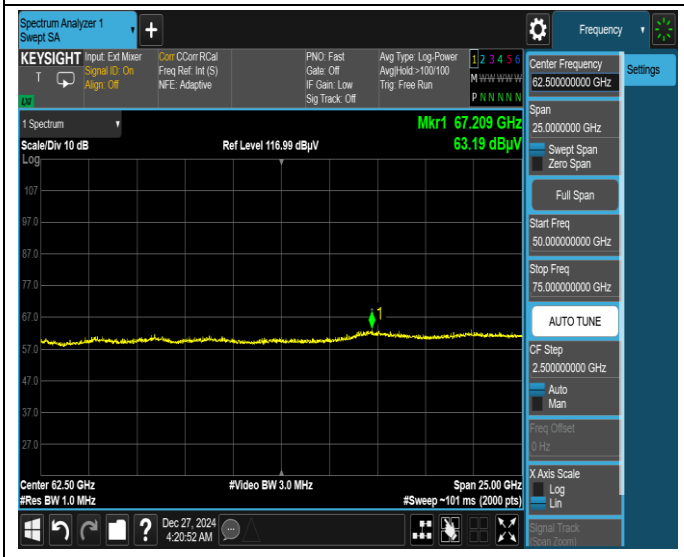
Frequency (GHz)	Distance (M)	Peak Value (dBuv/m)	PK Limit (dBuV/m)	AV Limit (dBuV/m)	Polarization	Result
40.665	1	63.35	83.52	63.52	Horizontal	Pass
40.020	1	63.38	83.52	63.52	Vertical	Pass
67.209	1	63.19	83.52	63.52	Horizontal	Pass
67.221	1	62.61	83.52	63.52	Vertical	Pass



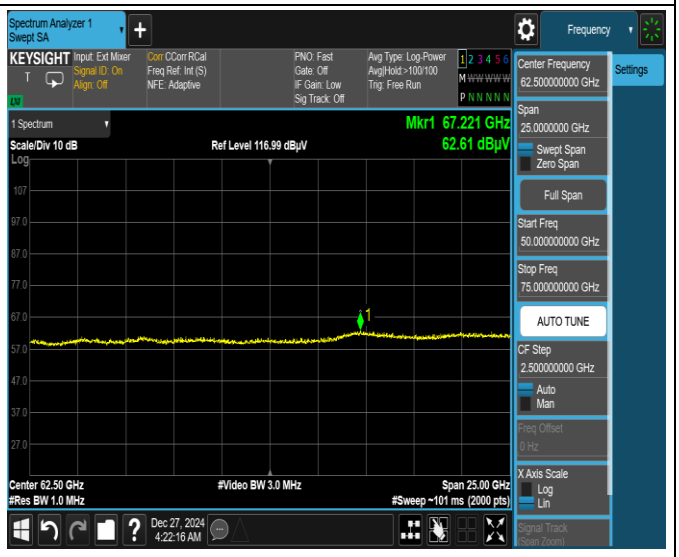
40GHz-50GHz-Horizontal



40GHz-50GHz-Vertical

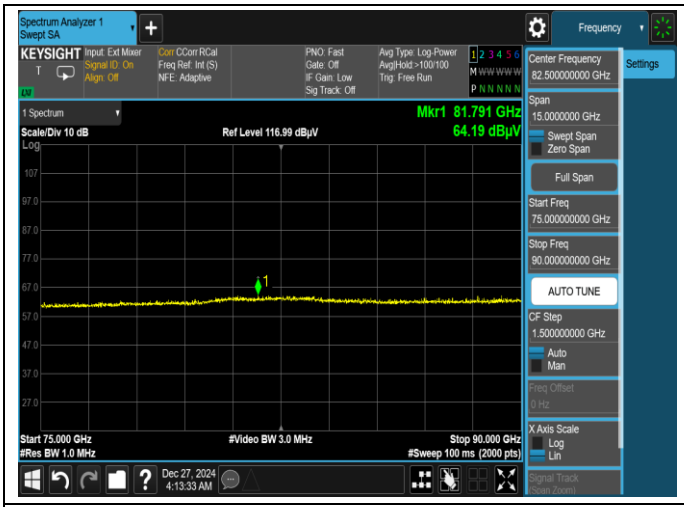


50GHz-75GHz-Horizontal

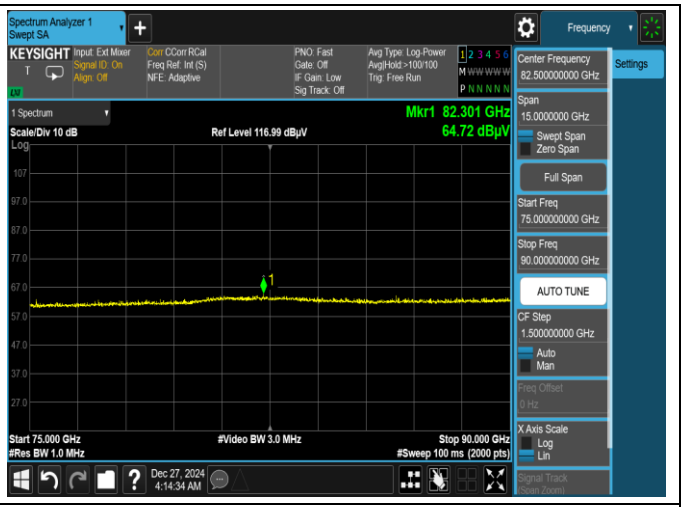


50GHz-75GHz-Vertical

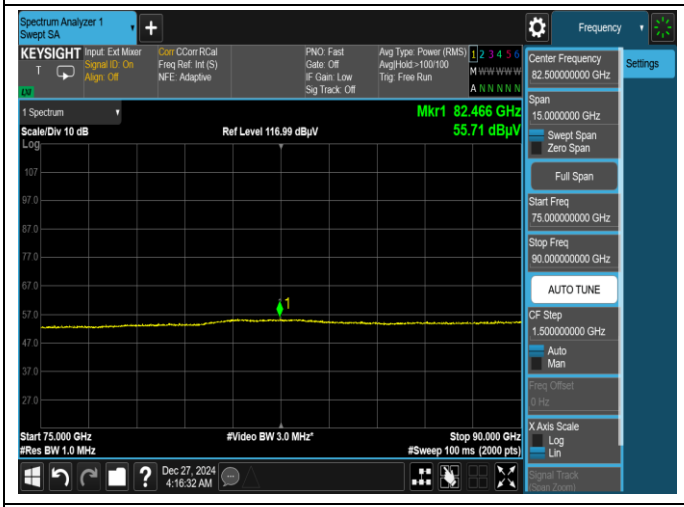
Frequency (GHz)	Distance (M)	Peak Value (dBuv/m)	Average Value (dBuv/m)	PK Limit (dBuV/m)	AV Limit (dBuV/m)	Polarization	Result
81.791	1	64.19	/	83.52	/	Horizontal	Pass
82.301	1	64.72	/	83.52	/	Vertical	Pass
82.466	1	/	55.71	/	63.52	Horizontal	Pass
82.294	1	/	55.50	/	63.52	Vertical	Pass



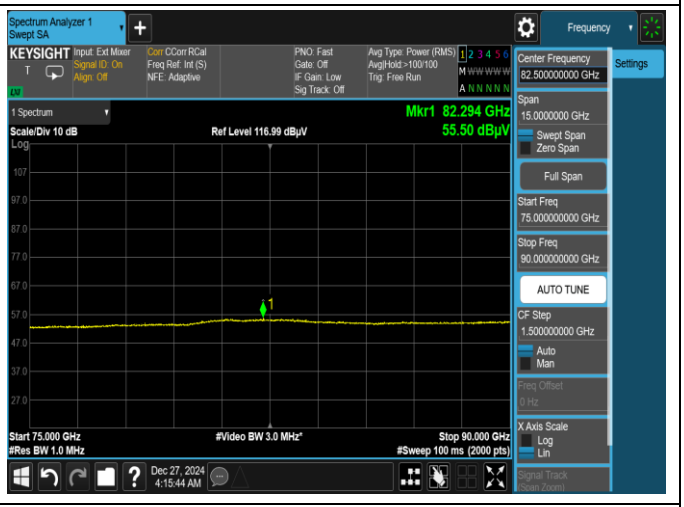
75GHz-90GHz-PK- Horizontal



75GHz-90GHz-PK-Vertical

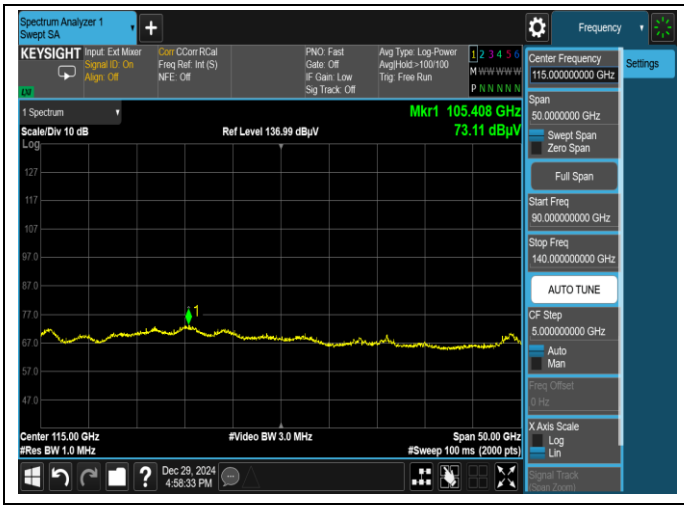


75GHz-90GHz-AV- Horizontal

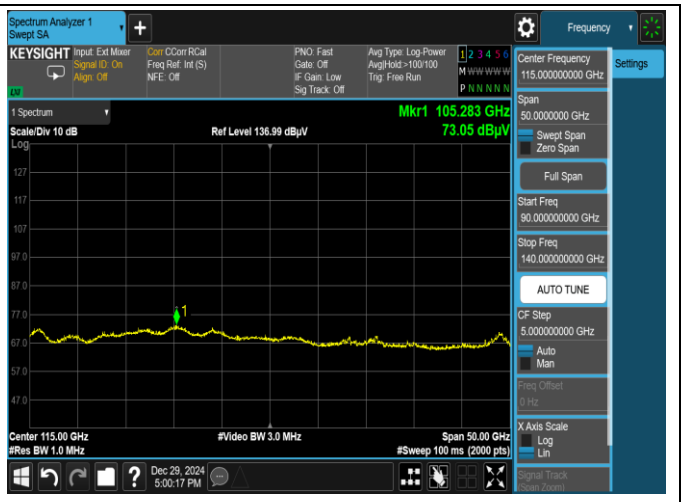


75GHz-90GHz-AV-Vertical

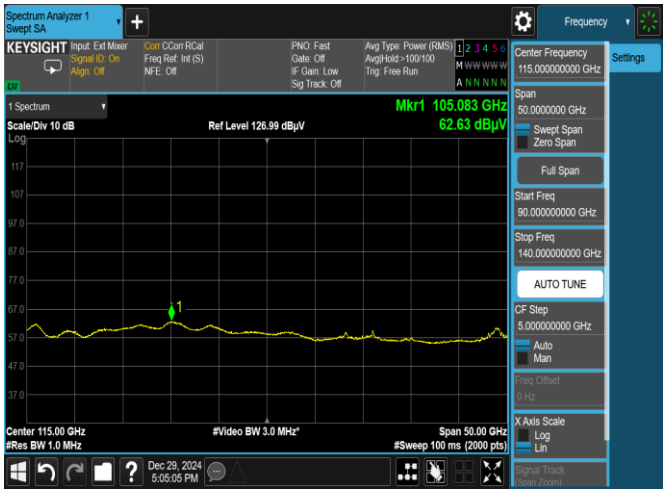
Frequency (GHz)	Distance (M)	Peak Value (dBuv/m)	Average Value (dBuv/m)	PK Limit (dBuV/m)	AV Limit (dBuV/m)	Polarization	Result
105.408	1	73.11	/	83.52	/	Horizontal	Pass
105.283	1	73.05	/	83.52	/	Vertical	Pass
105.083	1	/	62.63	/	63.52	Horizontal	Pass
104.932	1	/	62.64	/	63.52	Vertical	Pass



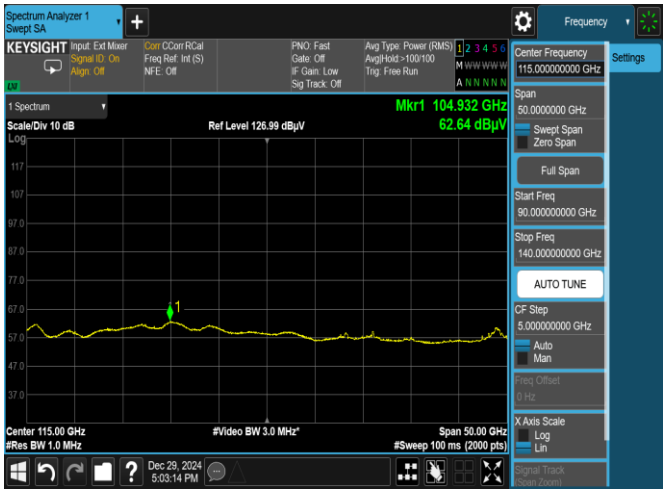
90GHz-110GHz-PK- Horizontal



90GHz-110GHz-PK-Vertical



90GHz-110GHz-AV- Horizontal



90GHz-110GHz-AV-Vertical

- End of the Report -