

TEST REPORT

Application No.: SZCR2510004391AT
Applicant: LOCKIN (U.S.) INC.
Address of Applicant: 8605 SANTA MONICA BLVD #79525 WEST HOLLYWOOD, CA 90069-4109 CALIFORNIA California 90069-4109 United States
Manufacturer: LOCKIN (U.S.) INC.
Address of Manufacturer: 8605 SANTA MONICA BLVD #79525 WEST HOLLYWOOD, CA 90069-4109 CALIFORNIA California 90069-4109 United States
Factory: Chongqing Luxiangjia Technology Co., Ltd.
Address of Factory: No.50 Industrial Avenue, Pulu Street, Tongliang District, Chongqing, P.R.China
Equipment Under Test (EUT):
EUT Name: Venio Go Palm Vein Recognition Smart Lock
Model No.: LKMSD551A
Trade Mark:  LOCKIN
FCC ID: 2BMOG-LKMSD551A
Standard(s) : 47 CFR Part 15, Subpart C 15.249
Date of Receipt: 2025-10-11
Date of Test: 2025-10-14 to 2025-11-03
Date of Issue: 2025-11-07

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.

Kenx. Xu

Kenx Xu
EMC Laboratory Manager



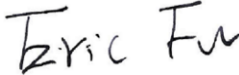
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SZEMC-TRF-01 Rev. A/1

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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2025-11-07		Original

Authorized for issue by:				
				
		Bill Chen/Project Engineer		
				
		Eric Fu/Reviewer		



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2 Test Summary

Radio Spectrum Technical Requirement				
Item	Standard	Method	Requirement	Result
Antenna Requirement	47 CFR Part 15, Subpart C 15.249	N/A	47 CFR Part 15, Subpart C 15.203	Pass

Radio Spectrum Matter Part				
Item	Standard	Method	Requirement	Result
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2020) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass
Field Strength of the Fundamental Signal (15.249(a))		ANSI C63.10 (2020) Section 6.5&6.6	47 CFR Part 15, Subpart C 15.249(a)	Pass
Restricted Band Around Fundamental Frequency		ANSI C63.10 (2020) Section 6.10.5	47 CFR Part 15, Subpart C 15.205 & 15.249(d) & 15.209	Pass
Radiated Emissions Below 1GHz		ANSI C63.10 (2020) Section 6.4&6.5	47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)	Pass
Radiated Emissions Above 1GHz		ANSI C63.10 (2020) Section 6.6	47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)	Pass
20dB Bandwidth		ANSI C63.10 (2020) Section 6.9	47 CFR Part 15, Subpart C 15.215	Pass



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4 General Information

4.1 Details of E.U.T.

Power supply:	Rechargeable Li-ion Battery Pack Model:ZNS-09G Nominal Voltage:DC 7.4V Rated Capacity:5000mAh Nominal Energy:37Wh
Operation Frequency:	24.05-24.25GHz
Modulation:	FM
Antenna Type:	PCB
Antenna Gain:	3.9dBi

Remark:The information in this section is provided by the applicant or manufacturer, SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Adapter	HUAWEI	HW-050200E01	REF. No.SEA05E03F
Type-C Cable	SGS	N/A	REF. No.SEA07B00

4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty
Conducted Emissions at AC Power Line (150kHz-30MHz)	$\pm 3.1\text{dB}$
Field Strength of the Fundamental Signal (15.249(a))	$\pm 4.5\text{dB}$ (Below 1GHz); $\pm 4.8\text{dB}$ (Above 1GHz)
Restricted Band Around Fundamental Frequency	$\pm 6.0\text{dB}$ (Below 1GHz); $\pm 4.6\text{dB}$ (Above 1GHz)
Radiated Emissions Below 1GHz	$\pm 6.0\text{dB}$ for 3m; $\pm 5.0\text{dB}$ for 10m
Radiated Emissions Above 1GHz	$\pm 4.6\text{dB}$ (1GHz-18GHz); $\pm 4.8\text{dB}$ (18MHz-40GHz)
20dB Bandwidth	$\pm 3\%$

Remark:

The U_{lab} (lab Uncertainty) is less than $U_{\text{CISPR/ETSI}}$ (CISPR/ETSI Uncertainty), so the test results
 – compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
 – non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

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4.4 Test Location

All tests were performed at:

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Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.5 Test Facility

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

• A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• VCCI (Member No. 1937)

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen EMC laboratory have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• FCC –Designation Number: CN1336

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1336. Test Firm Registration Number: 787754.

• Innovation, Science and Economic Development Canada

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None



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5 Equipment List

Conducted Emissions at AC Power Line (150kHz-30MHz)					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Shielding Room	ZhongYu Electron	GB-88	SEM001-06	2025-05-07	2028-05-06
EMI Test Receiver	Rohde&Schwarz	ESR	SZ-WRG-M-047	2025-01-08	2026-01-07
Measurement Software	AUDIX	e3 V8.2014-6-27a	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM024-01	2025-07-05	2026-07-04
LISN	Rohde&Schwarz	ENV216	SEM007-01	2025-07-25	2026-07-24
LISN	ETS-LINDGREN	3816/2	SEM007-02	2025-03-03	2026-03-02

Radiated Emissions Below 1GHz					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Loop Antenna	ETS-Lindgren	6502	SEM003-08	2023-11-20	2025-11-19
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2023-06-19	2026-06-18
MXE EMI Receiver	Agilent Technologies	N9038A	SEM004-15	2025-07-25	2026-07-24
BiConiLog Antenna	ETS-LINDGREN	3142C	SEM003-01	2025-08-29	2027-08-28
Pre-Amplifier	Agilent Technologies	8447D	SEM005-01	2025-03-04	2026-03-03
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2025-07-05	2026-07-04

Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
3m Fully-Anechoic Chamber	AUDIX	N/A	SEM001-02	2025-05-07	2028-05-06
Signal Analyzer	Rohde & Schwarz	FSV40	SEM008-04	2025-03-04	2026-03-03
Horn Antenna	Rohde&Schwarz	HF907	SEM003-07	2025-07-22	2026-07-21
Microwave system amplifier	Agilent	83017A	SEM005-25	2025-09-10	2026-09-09
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2025-07-05	2026-07-04
Microwave system amplifier (0.5GHz-26.5GHz)	Agilent	83017A	SEM005-25	2025-09-13	2026-09-12
Broad-Band Horn Antenna(15GHz-40GHz)	SCHWARZBECK	BBHA 9170	SEM003-15	2025-08-09	2026-08-08
Programmable Temperature Humidity	Votsch Industrietechnik	VT 4002	SEM002-15	2025-03-18	2026-03-17



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Chamber	GmbH				
Pre-amplifier (26GHz-40GHz)	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2025-03-14	2026-03-13
Waveguide(40-60GHz)	REBES	SWG-19025- FB	06303-01	2025-02-18	2028-02-17
Waveguide(50-75GHz)	REBES	SWG-15025- FB	01525-09	2025-02-18	2028-02-17
Waveguide(75-110GHz)	REBES	SWG-10025- FB	01509-01	2025-02-18	2028-02-17
Waveguide Harmonic Mixer(40-60GHz)	REBES	STH-19SF-S1	06937-01	2025-02-18	2028-02-17
Waveguide Harmonic Mixer(50-75GHz)	KEYSIGHT	M1970V	MY51390966	2025-02-18	2028-02-17
Waveguide Harmonic Mixer(75-110GHz)	KEYSIGHT	M1970W	MY51430883	2025-02-18	2028-02-17
Signal Analyzer	Rohde & Schwarz	FSV40	SEM008-04	2025-03-13	2026-03-12
Coaxial Cable	SGS	N/A	SEM026-01	2025-07-05	2026-07-04

General used equipment

Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Humidity/ Temperature Indicator	deli	8838	SEM002-32	2025-07-23	2026-07-22
Humidity/ Temperature Indicator	deli	8838	SEM002-33	2025-07-23	2026-07-22
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2025-03-03	2026-03-02



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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

15.203 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 a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, 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.

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 3.9dBi.

Antenna location: Refer to internal 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 (2020) 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.		
Detector: Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz		

7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 25.3 °C

Humidity: 40.5 % RH

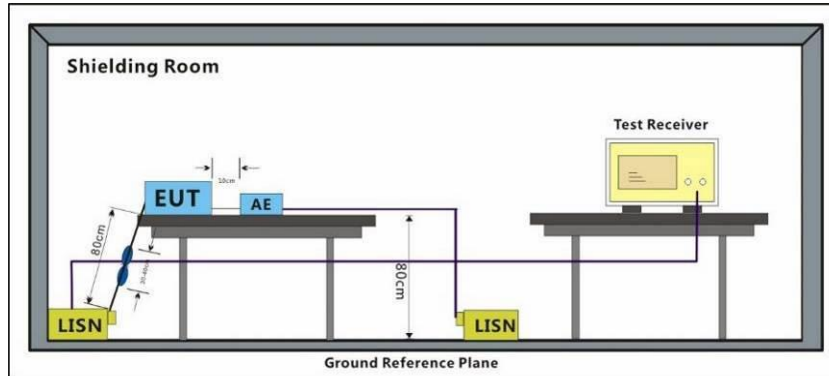
Atmospheric Pressure: 1020 mbar

7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	07	Charge + TX mode_Keep the EUT in charging and transmitting with modulation mode.



7.1.3 Test Setup Diagram



7.1.4 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 of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

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



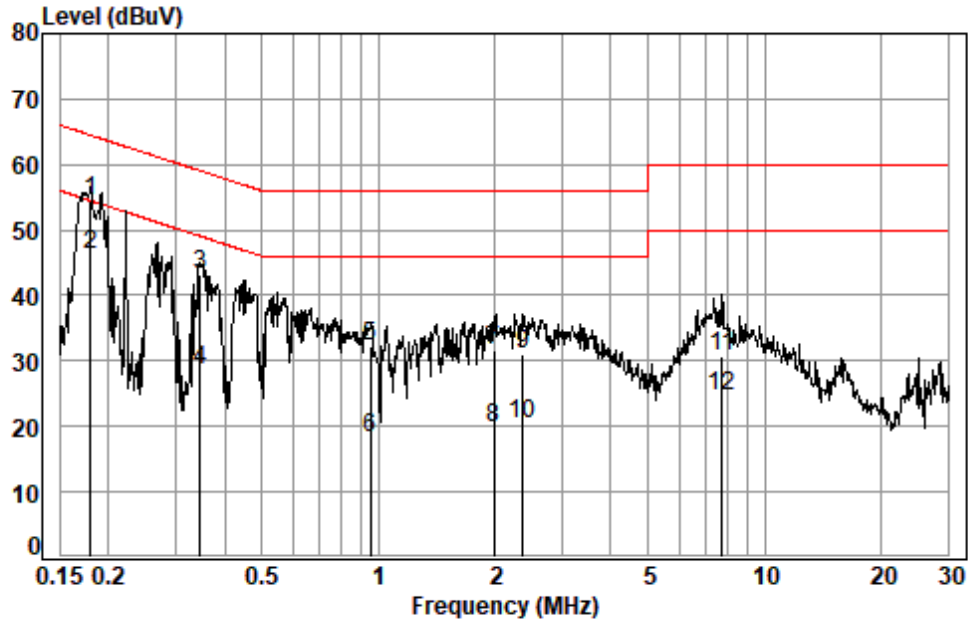
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Test Mode: 07; Line: Live line



Site : Shielding Room
Condition: Line
Job No. : 04391AT/04392AT
Test mode: 07

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1 *	0.1796	0.07	10.15	44.15	54.37	64.50	-10.13	QP
2 *	0.1796	0.07	10.15	36.01	46.23	54.50	-8.27	Average
3	0.3465	0.08	9.76	33.39	43.23	59.05	-15.82	QP
4	0.3465	0.08	9.76	18.65	28.49	49.05	-20.56	Average
5	0.9531	0.11	9.59	22.45	32.15	56.00	-23.85	QP
6	0.9531	0.11	9.59	8.44	18.14	46.00	-27.86	Average
7	1.9906	0.12	9.58	21.83	31.53	56.00	-24.47	QP
8	1.9906	0.12	9.58	10.10	19.80	46.00	-26.20	Average
9	2.3710	0.13	9.61	21.36	31.10	56.00	-24.90	QP
10	2.3710	0.13	9.61	10.73	20.47	46.00	-25.53	Average
11	7.7689	0.15	9.68	20.94	30.77	60.00	-29.23	QP
12	7.7689	0.15	9.68	14.72	24.55	50.00	-25.45	Average



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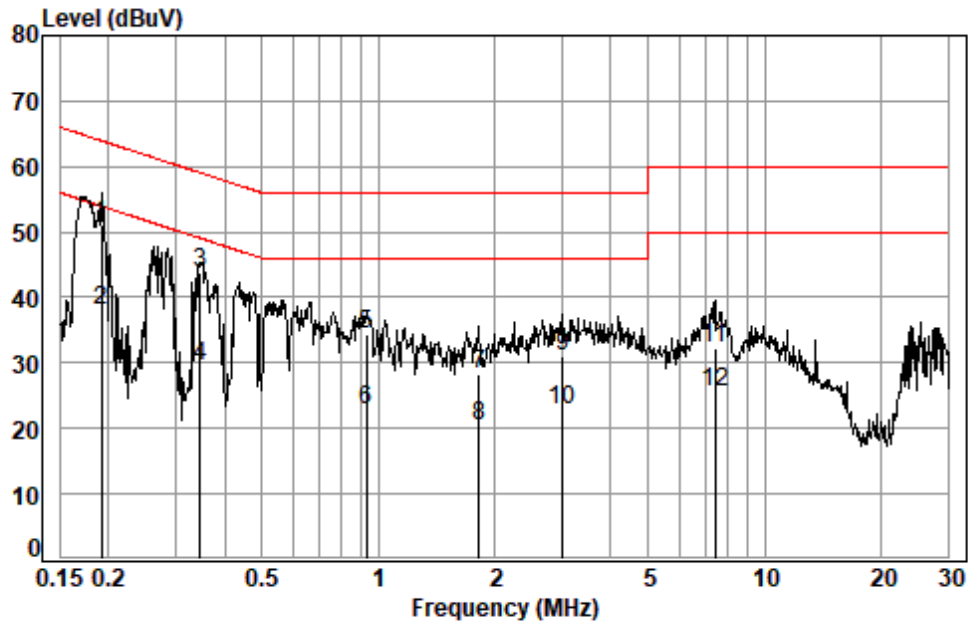
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SZEMC-TRF-01 Rev. A/1

Report No.: SZCR251000439104

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Test Mode: 07; Line: Neutral Line



Site : Shielding Room
Condition: Neutral
Job No. : 04391AT/04392AT
Test mode: 07

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1 *	0.1924	0.07	10.09	40.97	51.13	63.93	-12.80	QP
2 *	0.1924	0.07	10.09	27.85	38.01	53.93	-15.92	Average
3	0.3465	0.08	9.75	33.94	43.77	59.05	-15.28	QP
4	0.3465	0.08	9.75	19.66	29.49	49.05	-19.56	Average
5	0.9331	0.11	9.56	24.66	34.33	56.00	-21.67	QP
6	0.9331	0.11	9.56	13.04	22.71	46.00	-23.29	Average
7	1.8192	0.12	9.55	18.70	28.37	56.00	-27.63	QP
8	1.8192	0.12	9.55	10.62	20.29	46.00	-25.71	Average
9	3.0094	0.13	9.54	21.42	31.09	56.00	-24.91	QP
10	3.0094	0.13	9.54	13.04	22.71	46.00	-23.29	Average
11	7.4465	0.15	9.64	22.51	32.30	60.00	-27.70	QP
12	7.4465	0.15	9.64	15.74	25.53	50.00	-24.47	Average



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7.2 Restricted Band Around Fundamental Frequency

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.249(d) & 15.209

Test Method: ANSI C63.10 (2020) Section 6.10.5

Limit:

Frequency	Limit (dBuV/m @3m)	Remark
30MHz-88MHz	40.0	Quasi-peak Value
88MHz-216MHz	43.5	Quasi-peak Value
216MHz-960MHz	46.0	Quasi-peak Value
960MHz-1GHz	54.0	Quasi-peak Value
Above 1GHz	54.0	Average Value
Above 1GHz	74.0	Peak Value

Emission 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 Section 15.209, whichever is the lesser attenuation.

Remark: For measurement distance 1m, the filed strength doesn't exceed 63.52 dBuV/m

7.2.1 E.U.T. Operation

Operating Environment:

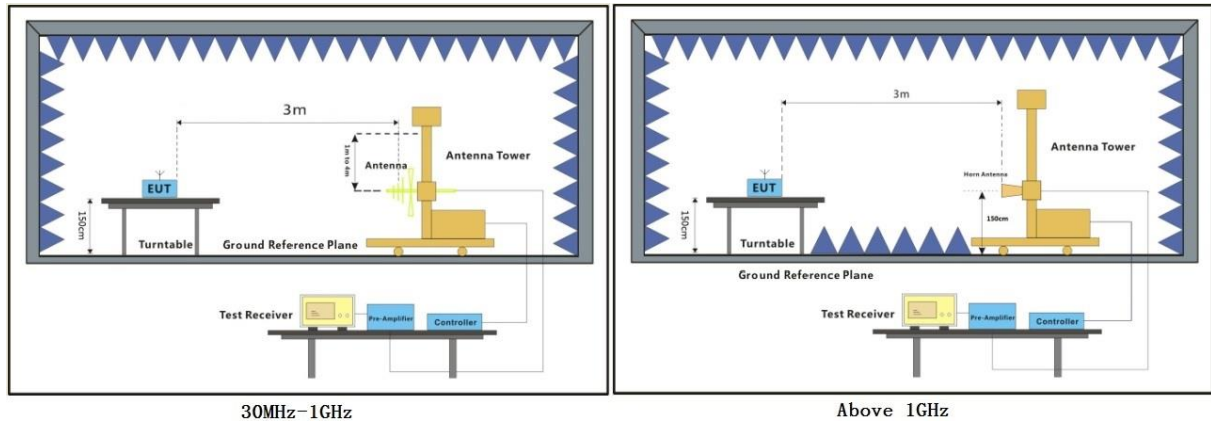
Temperature: 25.3 °C Humidity: 40.5 % RH Atmospheric Pressure: 1020 mbar

7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	06	TX mode_Keep the EUT in transmitting with modulation mode.
Pre-scan	07	Charge + TX mode_Keep the EUT in charging and transmitting with modulation mode.



7.2.3 Test Setup Diagram



7.2.4 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 above 1GHz, 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 EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
 - d. 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.
 - e. 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.
 - f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
 - g. 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.
 - h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
 - 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: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor



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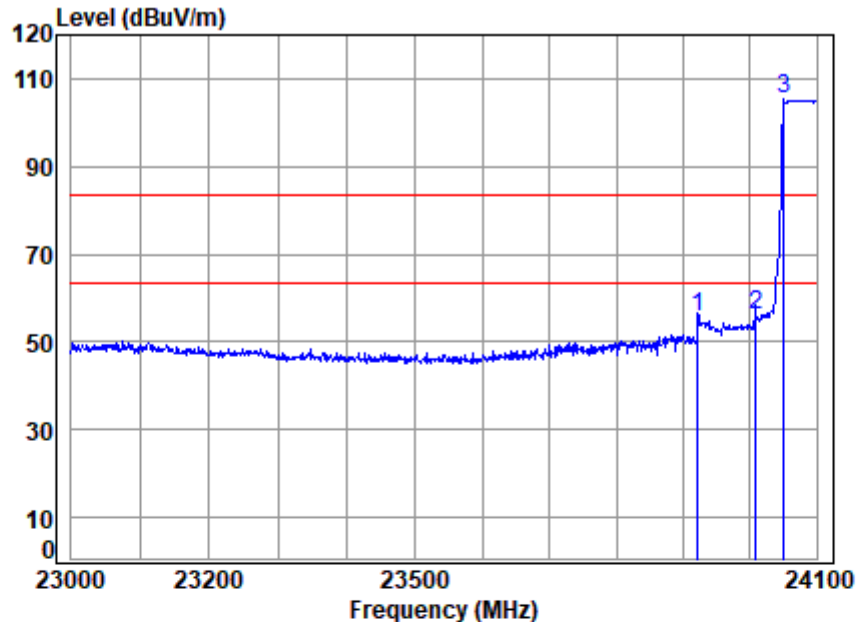
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Test Data:

Test Mode: 06; Polarity: Horizontal



Site : chamber
Condition: 1m VERTICAL
Job No : 04391AT\04392AT
Mode : RSE TX
Note :

	Cable	Ant	Preamp	Read		Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 23921.650	6.64	37.84	54.98	66.20	55.70	83.54	-27.84	Peak
2 24007.850	6.64	37.91	55.18	66.90	56.27	83.54	-27.27	Peak
3 p24050.510	6.65	37.94	55.07	115.83	105.35	83.54	21.81	Peak



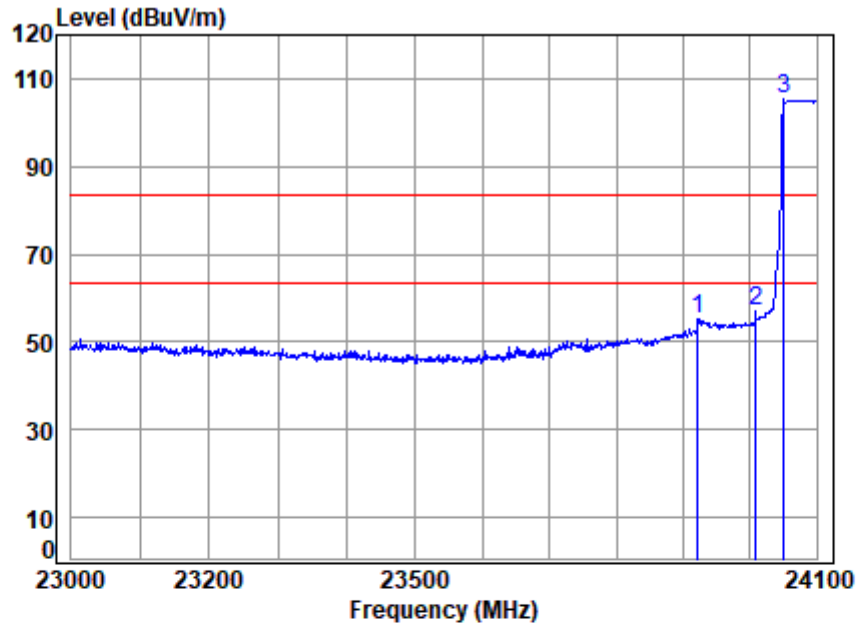
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Test Mode: 06; Polarity: Vertical



Site : chamber
Condition: 1m HORIZONTAL
Job No : 04391AT\04392AT
Mode : RSE TX
Note :

	Cable	Ant	Preamp	Read		Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 23921.650	6.64	37.84	54.98	65.90	55.40	83.54	-28.14	Peak
2 24007.850	6.64	37.91	55.18	67.44	56.81	83.54	-26.73	Peak
3 p24049.390	6.65	37.94	55.07	116.04	105.56	83.54	22.02	Peak



7.3 Radiated Emissions Below 1GHz

Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)

Test Method: ANSI C63.10 (2020) Section 6.4&6.5

Measurement Distance: 3m

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
960-1000	500	3

7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 23.5 °C

Humidity: 46.8 % RH

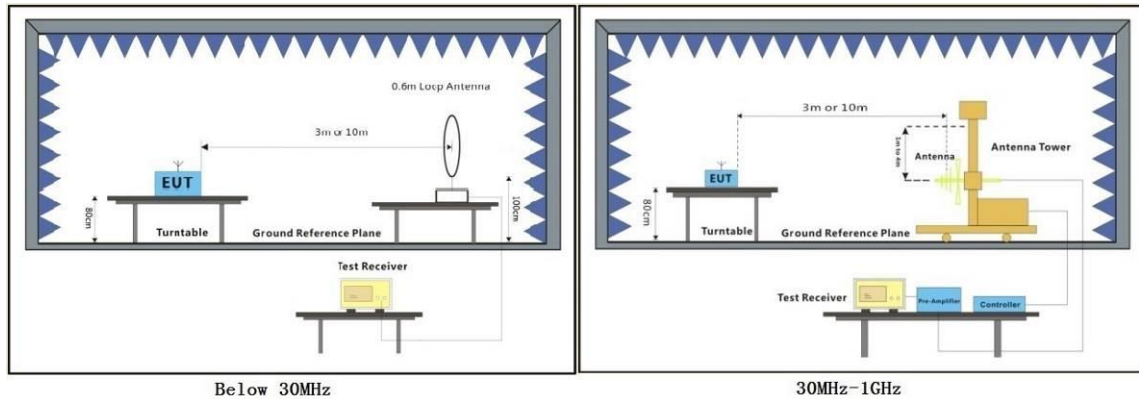
Atmospheric Pressure: 1020 mbar

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Pre-scan	06	TX mode_Keep the EUT in transmitting with modulation mode.
Final test	07	Charge + TX mode_Keep the EUT in charging and transmitting with modulation mode.



7.3.3 Test Setup Diagram



7.3.4 Measurement Procedure and Data

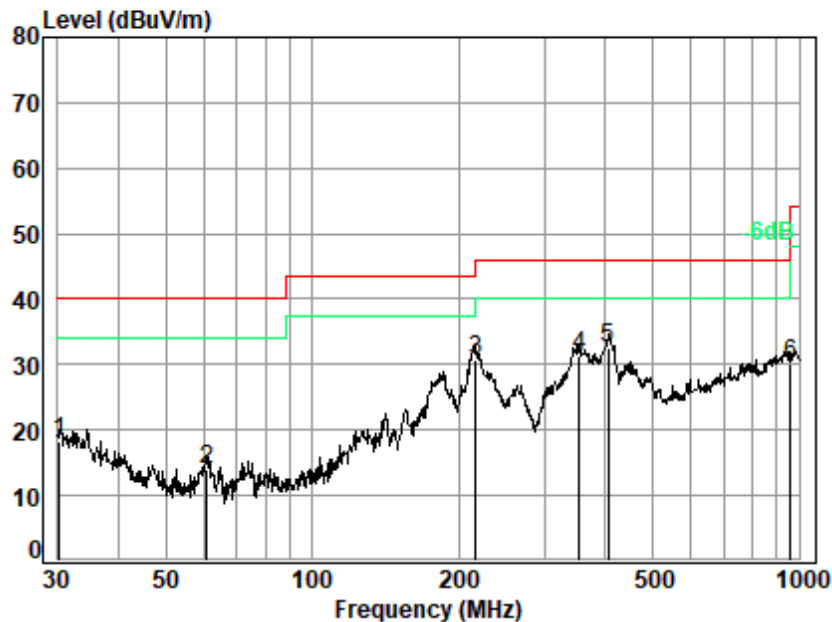
- For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 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.
- 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.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- 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 quasi-peak method as specified and then reported in a data sheet.
- Test the EUT in the lowest channel, the middle channel, the Highest channel.
- 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.
- Repeat above procedures until all frequencies measured was complete.

Remark:

- Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
- Scan from 9kHz to 30MHz, the disturbance below 30MHz 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.



Test Mode: 07; Polarity: Horizontal



Site : chamber

Condition: 3m HORIZONTAL

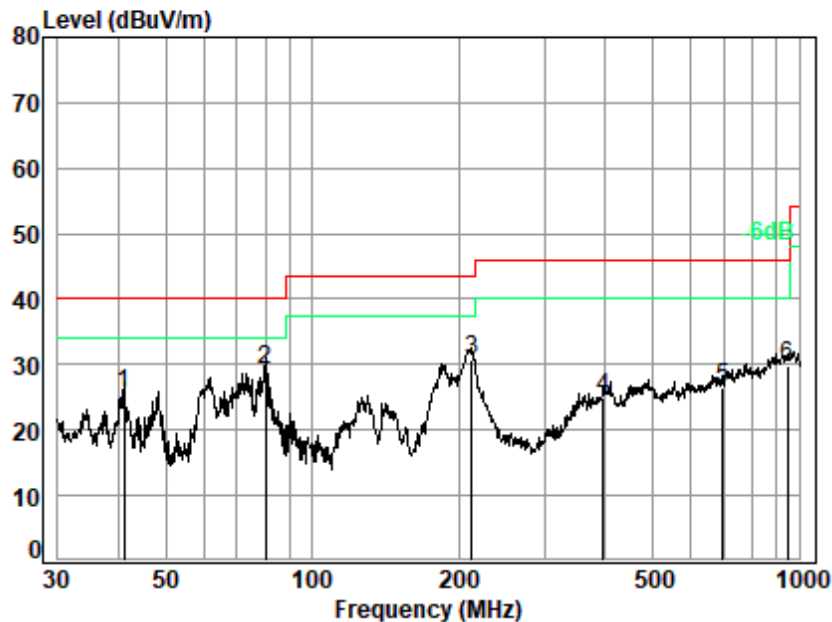
Job No. : 04391AT/04392AT

Test Mode: 07

	Ant	Cable	Preamp	Read		Limit	Over	
	Freq	Factor	Loss	Factor	Level	Level	Line	Limit Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB
1	30.211	21.10	0.74	27.65	23.98	18.17	40.00	-21.83 QP
2	60.704	11.40	0.92	27.62	29.36	14.06	40.00	-25.94 QP
3	216.783	14.93	1.78	27.74	41.80	30.77	46.00	-15.23 QP
4	354.183	20.05	2.33	27.64	36.53	31.27	46.00	-14.73 QP
5 q	406.088	20.53	2.51	27.76	37.29	32.57	46.00	-13.43 QP
6	958.794	28.10	4.09	26.63	24.43	29.99	46.00	-16.01 QP



Test Mode: 07; Polarity: Vertical



Site : chamber

Condition: 3m VERTICAL

Job No. : 04391AT/04392AT

Test Mode: 07

		Ant	Cable	Preamp	Read		Limit	Over	
	Freq	Factor	Loss	Factor	Level	Level	Line	Limit	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB	
1	40.988	15.91	0.83	27.64	36.36	25.46	40.00	-14.54	QP
2	80.081	10.46	1.10	27.61	45.14	29.09	40.00	-10.91	QP
3	212.270	14.79	1.76	27.76	41.84	30.63	43.50	-12.87	QP
4	396.242	20.68	2.48	27.74	29.40	24.82	46.00	-21.18	QP
5	696.857	25.88	3.40	27.84	24.94	26.38	46.00	-19.62	QP
6	945.440	28.26	4.07	26.70	24.06	29.69	46.00	-16.31	QP



7.4 Filed Strength of Fundamental and Radiation Spurious Emission

Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)

Test Method: ANSI C63.10 (2020) Section 6.6

Measurement Distance: 3m

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.

Fundamental Limit Conversion			
Average (mV/m) at 3M	Average (dBuV/m) at 3M	Average (dBuV/m) at 0.5M	Peak (dBuV/m) at 0.5M
250	107.9588	123.52	143.52

* (Limit = 107.9588 + 20LOG(3/0.5) = 123.52 dBuV/m)

Harmonic Limit Conversion			
Average (uV/m) at 3M	Average (dBuV/m) at 3M	Average (dBuV/m) at 0.5M	Peak (dBuV/m) at 0.5M
2500	67.9588	83.52	103.52

*(Limit=67.9588+20LOG(3/0.5)=83.52 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.



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Frequency	Field Strength microvolts/m at specific distance	
	Peak	AVG
1-40GHz	83.54dBuV/m@1m	63.54dBuV/m@1m
Above 40GHz	103.52dBuV/m@0.5m	83.52dBuV/m@0.5m

7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 23.5 °C

Humidity: 56.3 % RH

Atmospheric Pressure: 1020 mbar

7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	06	TX mode_Keep the EUT in transmitting with modulation mode.
Pre-scan	07	Charge + TX mode_Keep the EUT in charging and transmitting with modulation mode.



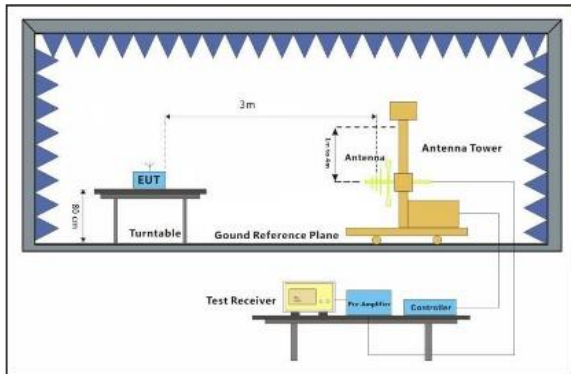
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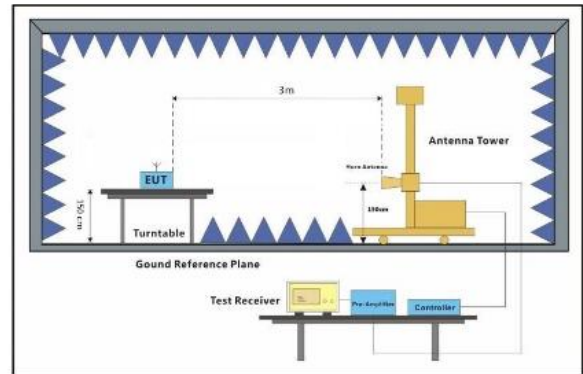
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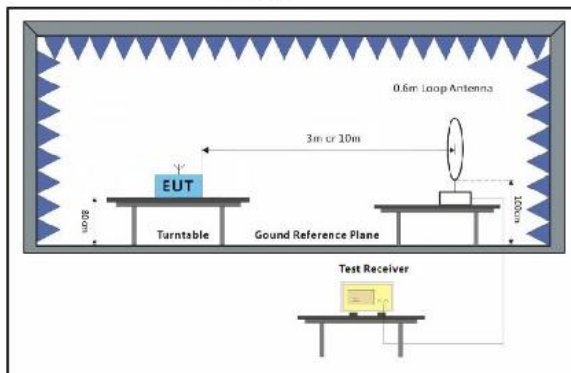
7.4.3 Test Setup Diagram



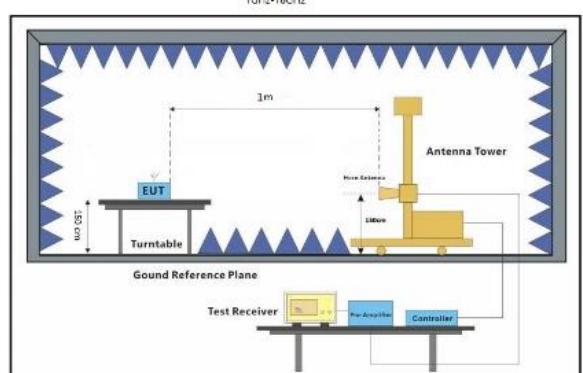
30MHz-1GHz



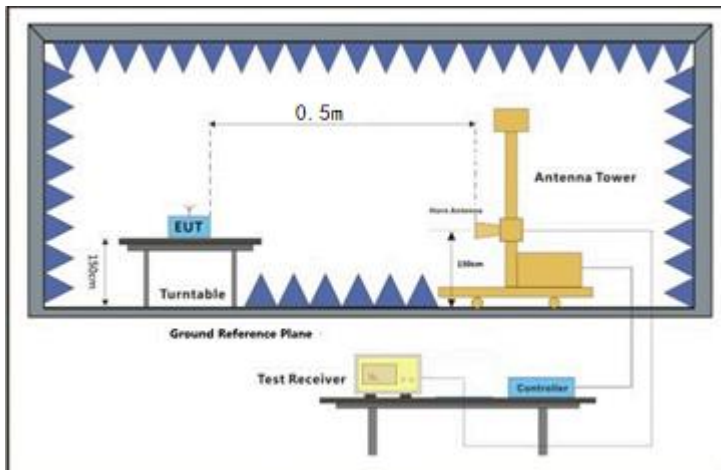
1GHz-18GHz



Below 30MHz



18GHz-40GHz



7.4.4 Measurement Procedure and Data

- a. 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.
- b. For 18-40GHz, 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.
- c. For above 40GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 0.5 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation
- d. 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.
- e. 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.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. 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.



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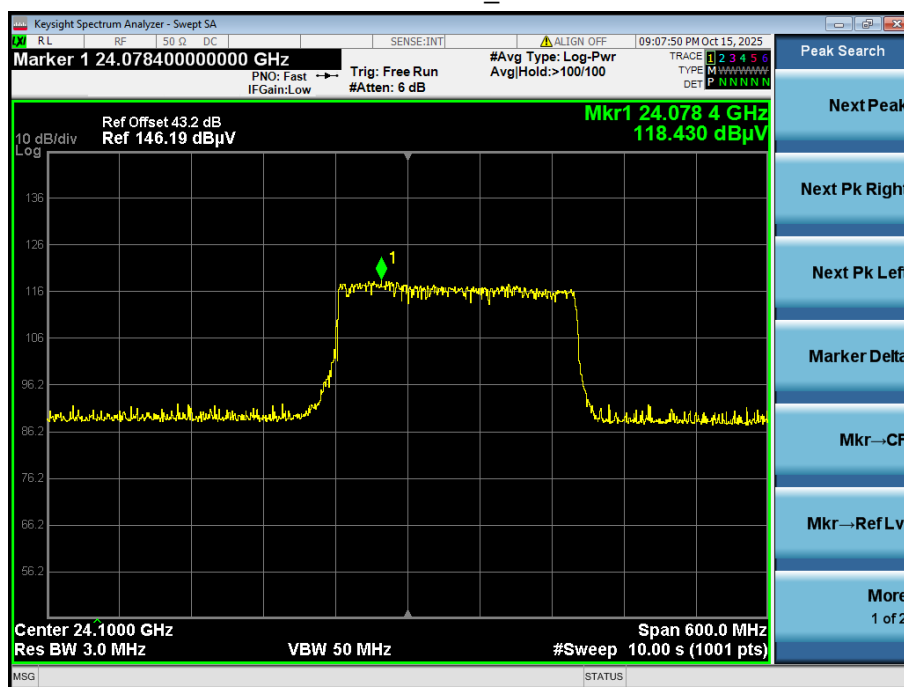
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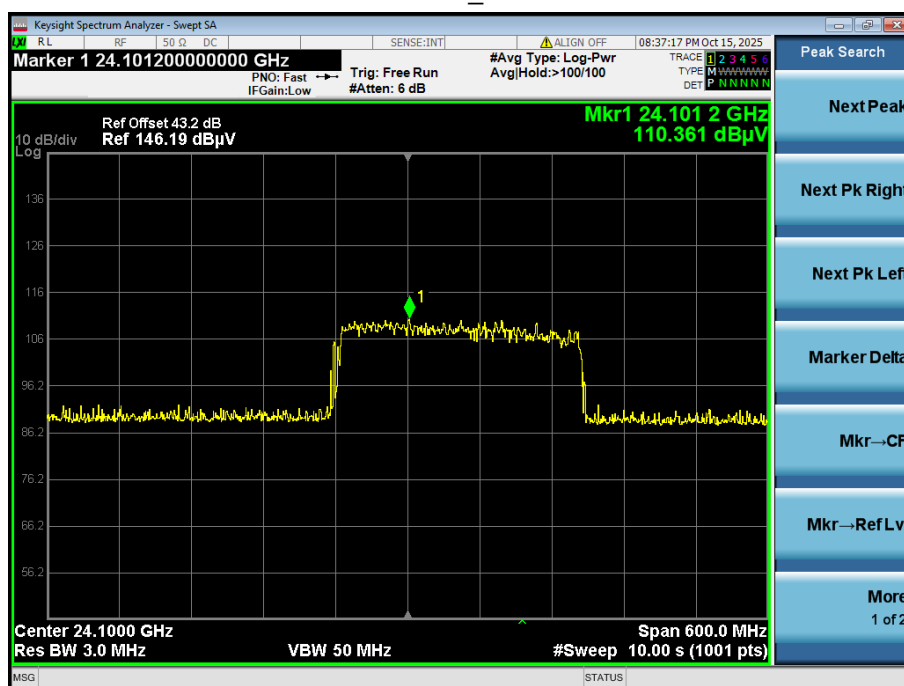
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Test Data for Filed Strength of Fundamental

Horizontal_Peak



Vertical_Peak



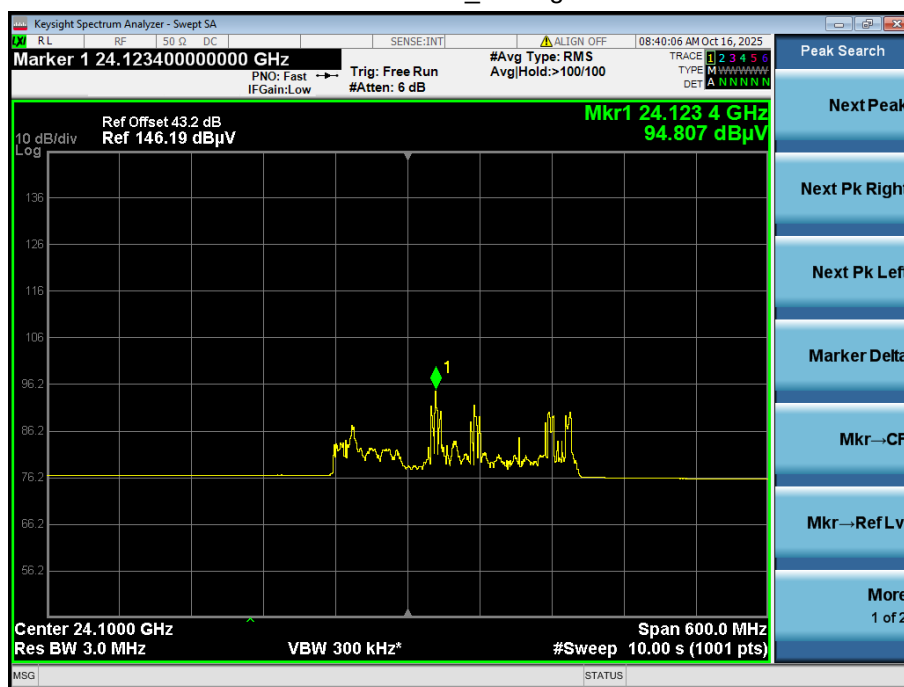
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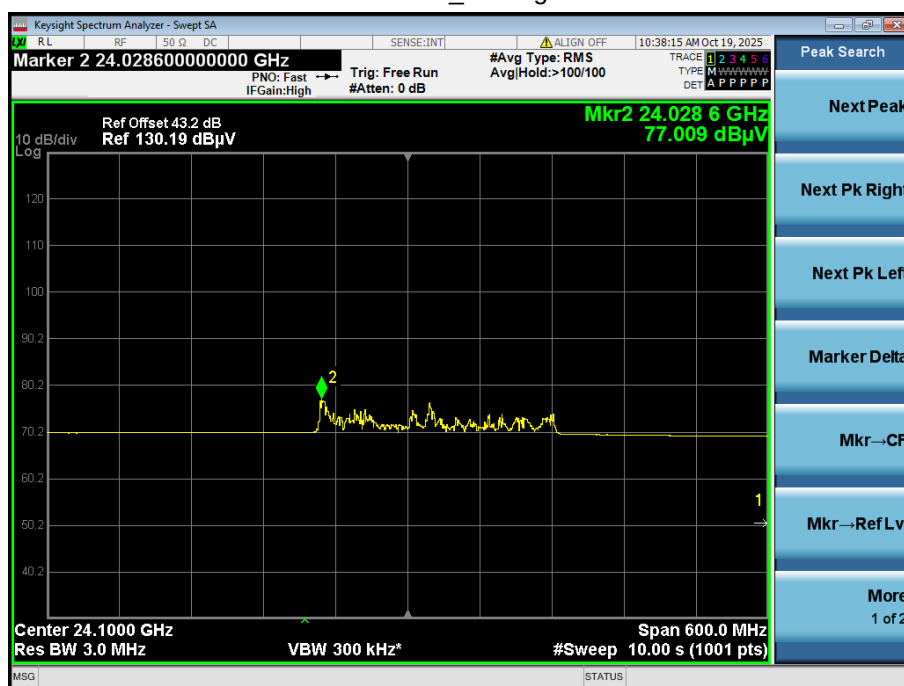
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Horizontal_Average



Vertical_Average



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Frequency (GHz)	Measured Filed strength dBuV/m@0.5m	Desensitization Factor(dB)	Polarity	Final Filed strength dBuV/m@0.5m	Measured Filed strength dBuV/m@3m	Limit@0.5m	Result	Remark
24.0784	118.43	1.48	Horizontal	119.91	104.35	143.52	Pass	Peak
24.1234	94.807	1.48	Horizontal	96.287	80.72	123.52	Pass	AVG
24.1012	110.361	1.48	Vertical	111.841	96.28	143.52	Pass	Peak
24.0286	77.709	1.48	Vertical	79.189	63.63	123.52	Pass	AVG

Note: Final Field strength [dBuV/m]=Measured Field strength [dBuV/m]+ Desensitization Factor[dB]

The FMCW Desensitization factor

FMCW Width(MHz)	T _{chirp} (us)	RBW(MHz)	Desensitization Factor(lin)	Desensitization Factor(dB)
192.35	86	1	0.727	1.48

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

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



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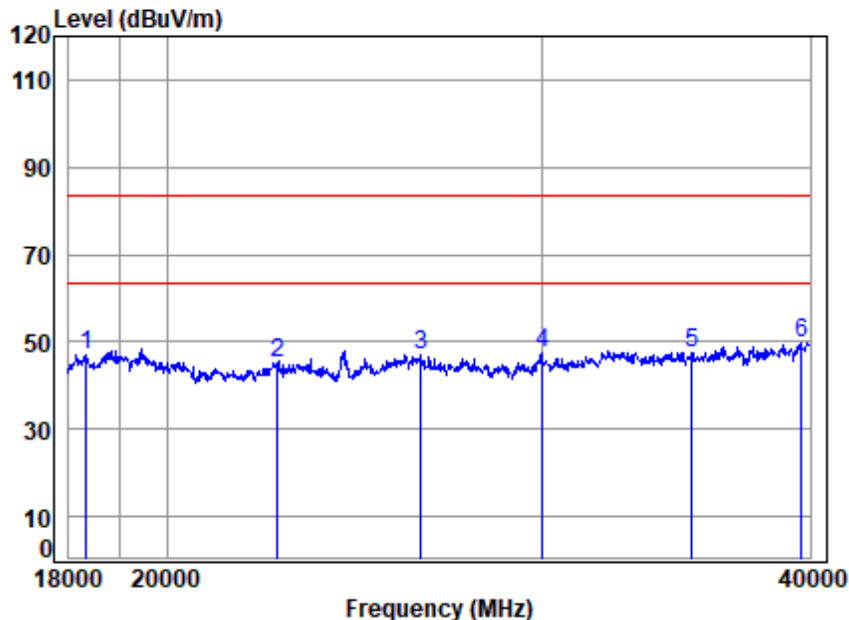
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Radiation Spurious Emission

Test Mode: 40G; Polarity: Horizontal

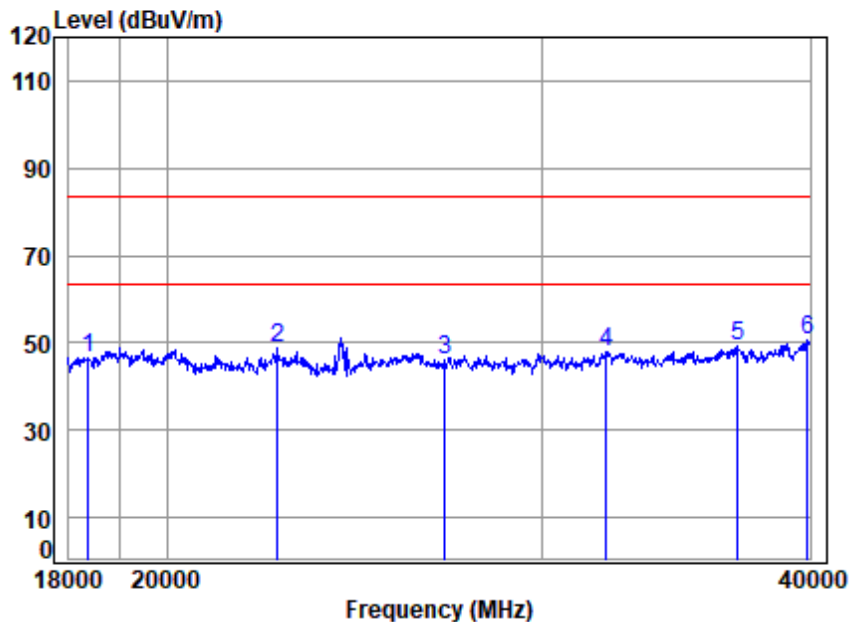


Site : chamber
Condition: 1m HORIZONTAL
Job No : 04391AT\04392AT
Mode : RSE TX
Note :

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	18348.280	5.18	36.02	54.54	60.48	47.14	83.54	-36.40	Peak
2	22527.850	6.32	36.69	52.96	55.10	45.15	83.54	-38.39	Peak
3	26281.480	7.46	38.75	52.16	52.89	46.94	83.54	-36.60	Peak
4	29958.700	7.36	39.85	53.02	53.05	47.24	83.54	-36.30	Peak
5	35230.660	7.81	40.51	51.35	50.71	47.68	83.54	-35.86	Peak
6	39618.550	7.57	42.79	52.06	51.50	49.80	83.54	-33.74	Peak



Test Mode: 40G; Polarity: Vertical

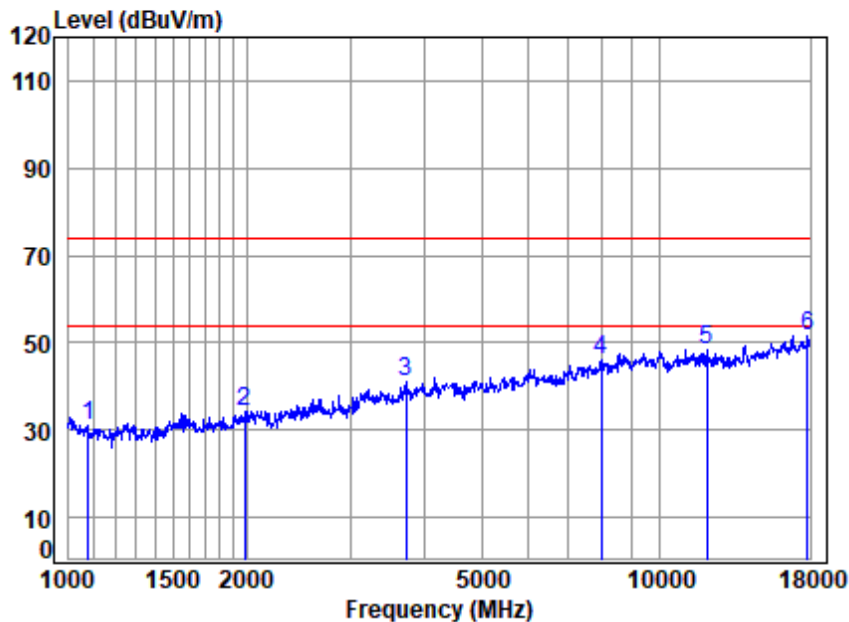


Site : chamber
Condition: 1m VERTICAL
Job No : 04391AT\04392AT
Mode : RSE TX
Note :

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	18377.610	5.22	36.11	54.55	59.63	46.41	83.54	-37.13	Peak
2	22527.850	6.32	36.69	52.96	58.81	48.86	83.54	-34.68	Peak
3	26961.680	7.41	38.26	52.29	52.88	46.26	83.54	-37.28	Peak
4	32088.290	8.01	40.07	52.13	51.89	47.84	83.54	-35.70	Peak
5	36959.660	7.43	42.39	50.39	49.89	49.32	83.54	-34.22	Peak
6	39840.620	7.67	43.01	51.91	51.89	50.66	83.54	-32.88	Peak



Test Mode: 18G; Polarity: Horizontal

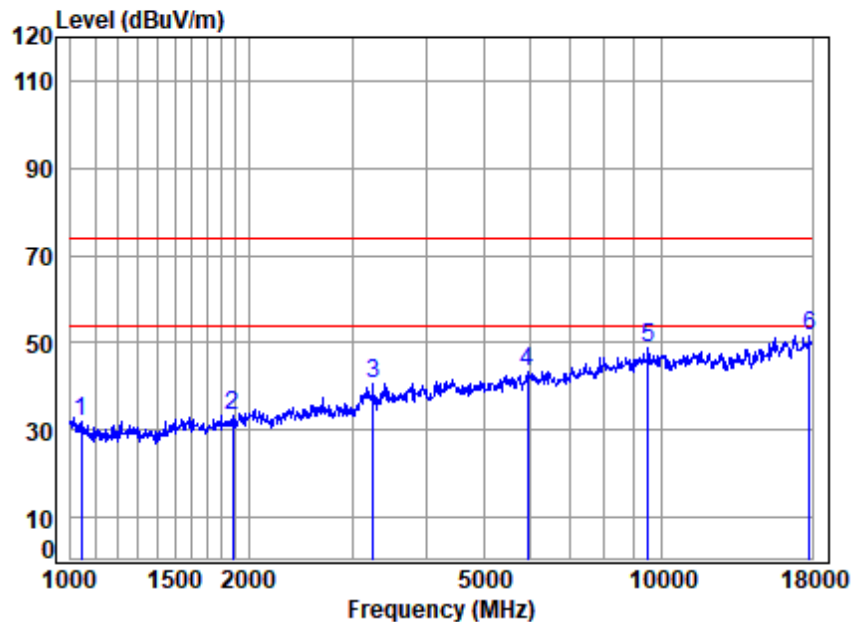


Site : chamber
Condition: 3m HORIZONTAL
Job No : 04391AT/04392AT
Mode : RSE TX

		Cable	Ant	Preamp	Read		Limit	Over	
Freq		Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz		dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1078.046	5.74	24.14	54.63	55.72	30.97	74.00	-43.03	Peak
2	1983.808	5.01	28.51	54.90	55.51	34.13	74.00	-39.87	Peak
3	3725.195	6.52	32.95	54.47	56.20	41.20	74.00	-32.80	Peak
4	7966.832	9.04	36.40	53.10	53.54	45.88	74.00	-28.12	Peak
5	12044.520	11.63	37.76	53.20	52.13	48.32	74.00	-25.68	Peak
6	17844.590	11.41	43.90	52.48	48.54	51.37	74.00	-22.63	Peak



Test Mode: 18G; Polarity: Vertical

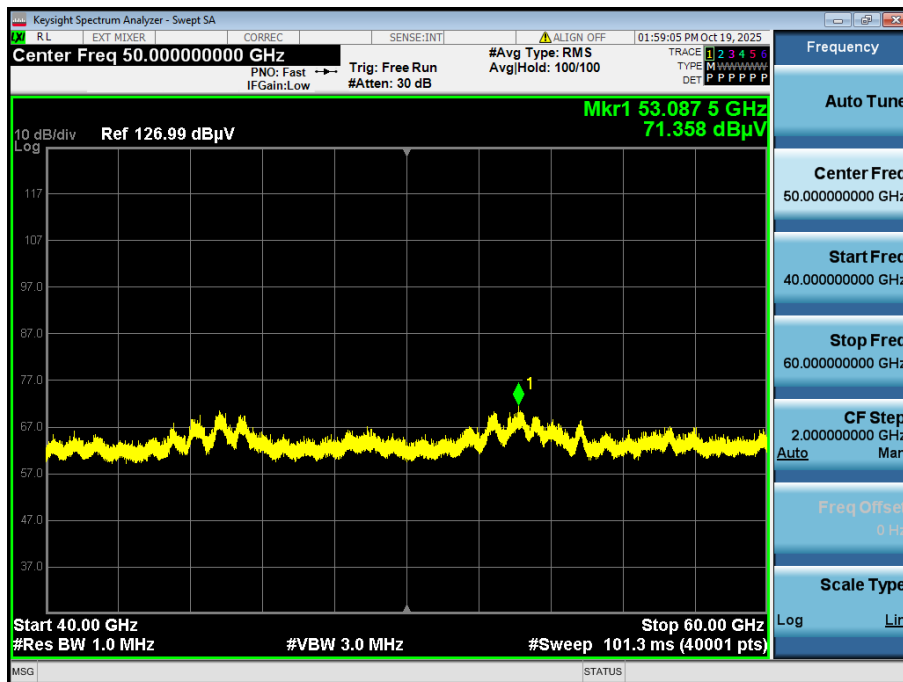


Site : chamber
Condition: 3m VERTICAL
Job No : 04391AT/04392AT
Mode : RSE TX

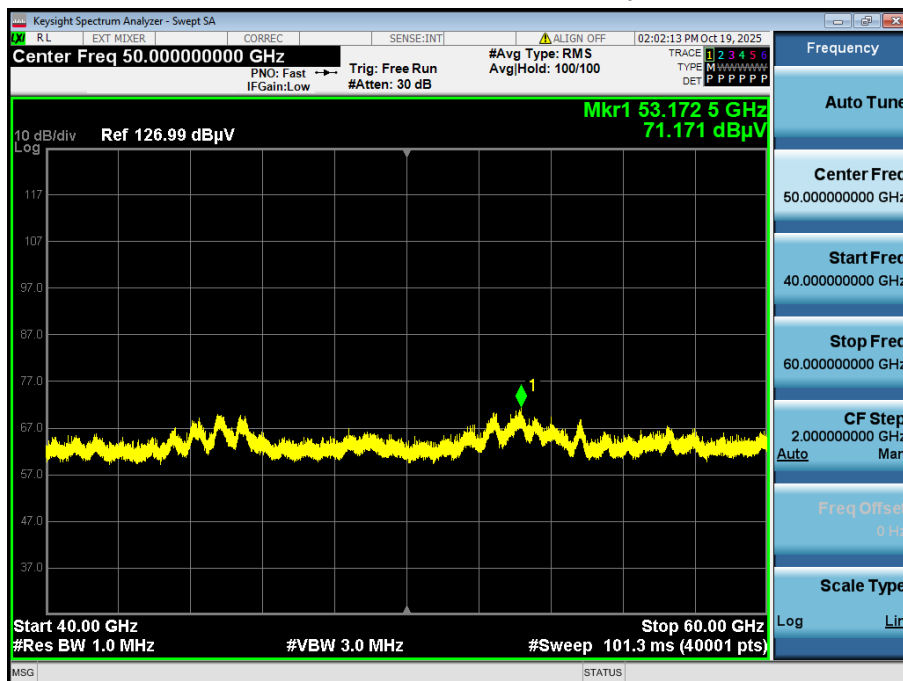
		Cable	Ant	Preamp	Read		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1041.295	5.82	24.98	54.62	55.74	31.92	74.00	-42.08	Peak
2	1883.236	5.01	27.27	54.87	55.82	33.23	74.00	-40.77	Peak
3	3252.005	6.05	32.06	54.80	57.30	40.61	74.00	-33.39	Peak
4	5932.638	8.83	34.67	53.17	52.95	43.28	74.00	-30.72	Peak
5	9502.925	10.77	37.50	53.39	53.94	48.82	74.00	-25.18	Peak
6	p17793.090	11.38	43.89	52.50	48.74	51.51	74.00	-22.49	Peak



40GHz-60GHz; Test Mode: 06; Polarity: Horizontal



40GHz-60GHz; Test Mode: 06; Polarity: Vertical



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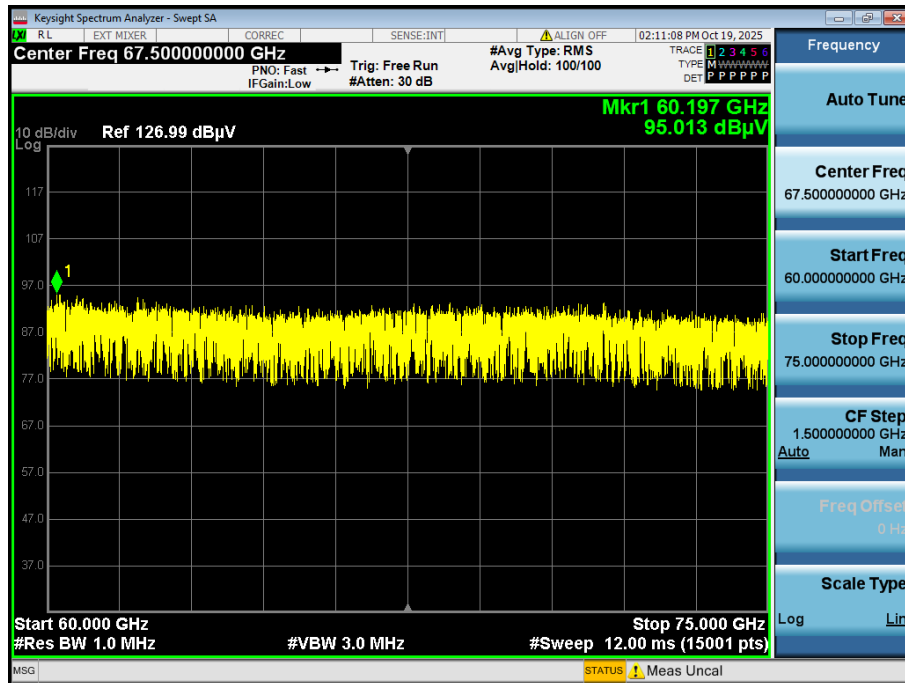
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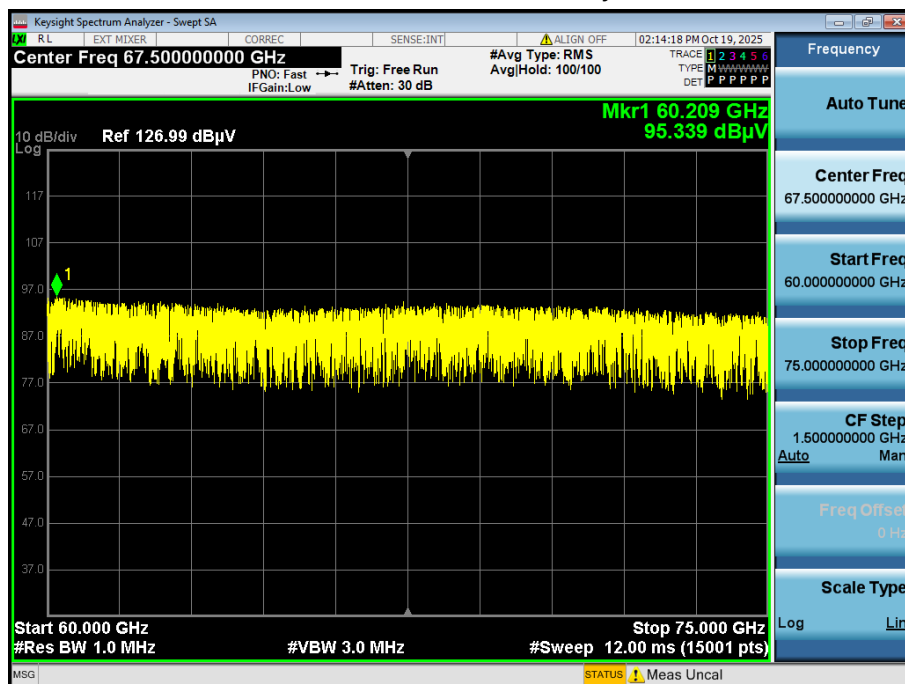
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Frequency (GHz)	Distance (M)	Peak Value (dBuV/m)	AV Limit (dBuV/m)	Polarization	Result
53.0875	0.5	71.358	83.52	H	PASS
53.1725	0.5	71.171	83.52	V	PASS

60-75GHz Test Mode: 06; Polarity: Horizontal



60-75 GHz Test Mode: 06; Polarity: Vertical



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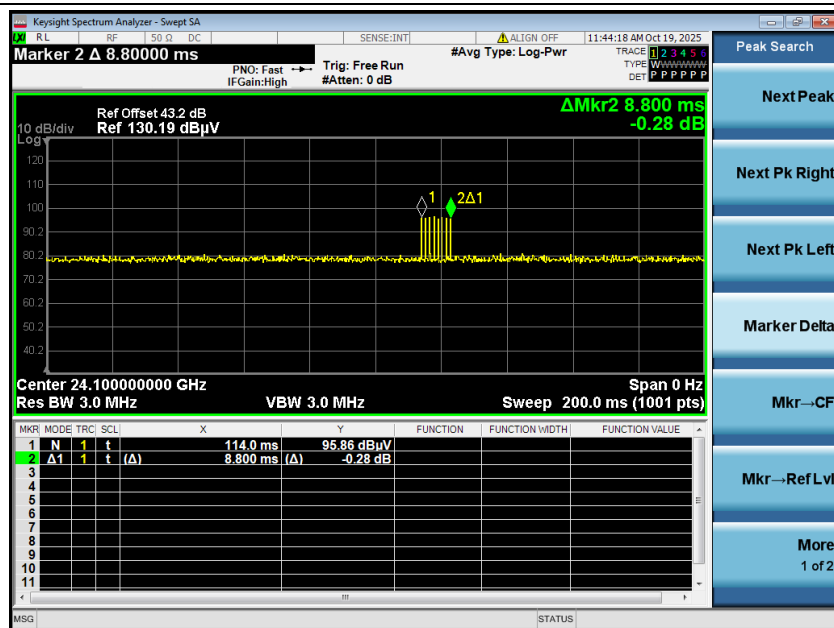
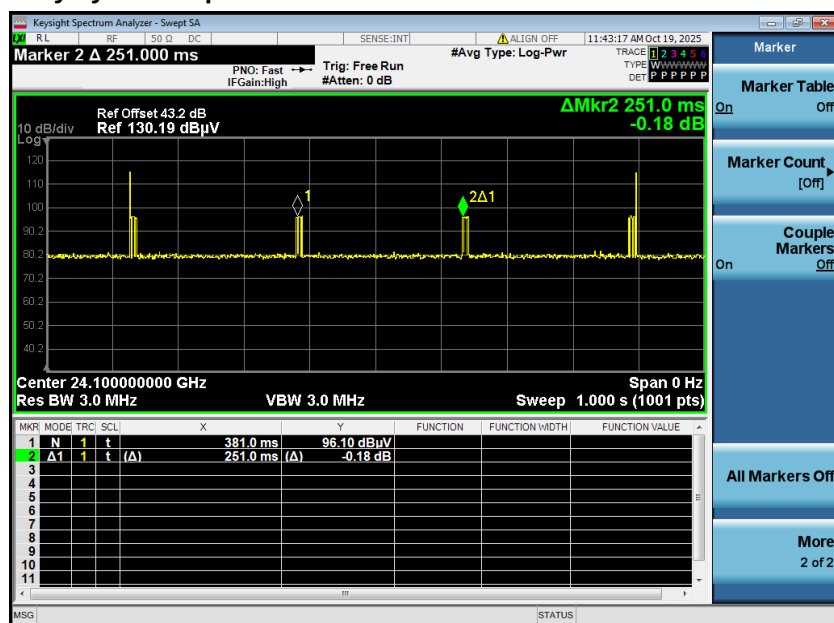
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Average value:

Calculate Formula:	Average value=Peak value + PDCF
	PDCF=20 log(Duty cycle)
	Duty cycle= T on time / T period
Test data:	Ton time =3.52ms
	T period =100ms
	PDCF value= -29.07dB

Duty cycle test plots:



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Frequency (GHz)	Distance (M)	Peak Value (dBuv/m)	Peak Limit (dBuv/m)	Polarization	Result
60.197	0.5	95.013	103.52	H	PASS
60.209	0.5	95.339	83.52	V	PASS

Frequency (GHz)	Distance (M)	AV Value (dBuv/m)	AV Limit (dBuv/m)	Polarization	Result
60.197	0.5	65.943	83.52	H	PASS
60.209	0.5	66.269	83.52	V	PASS



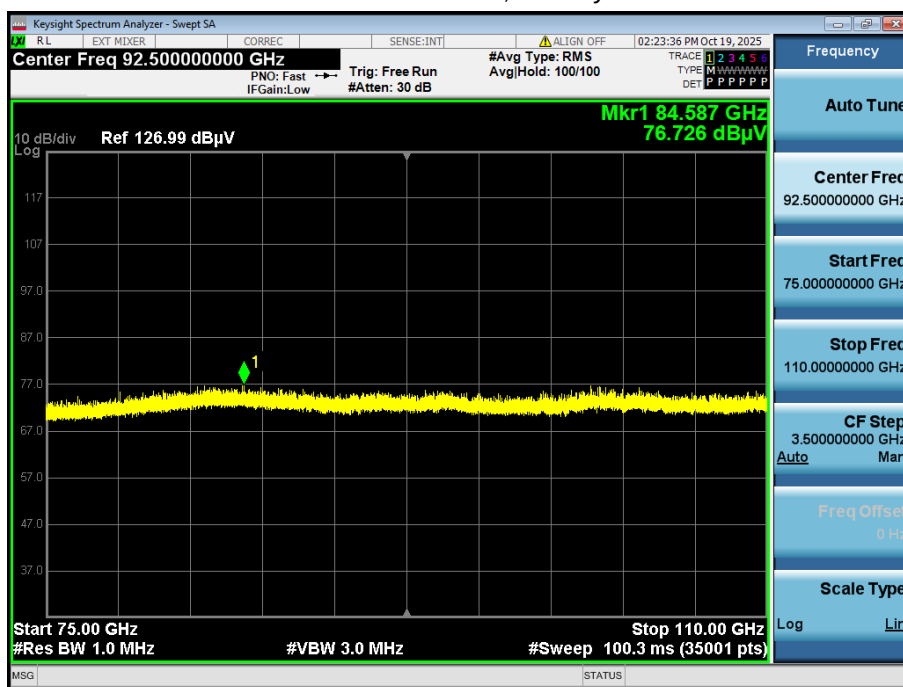
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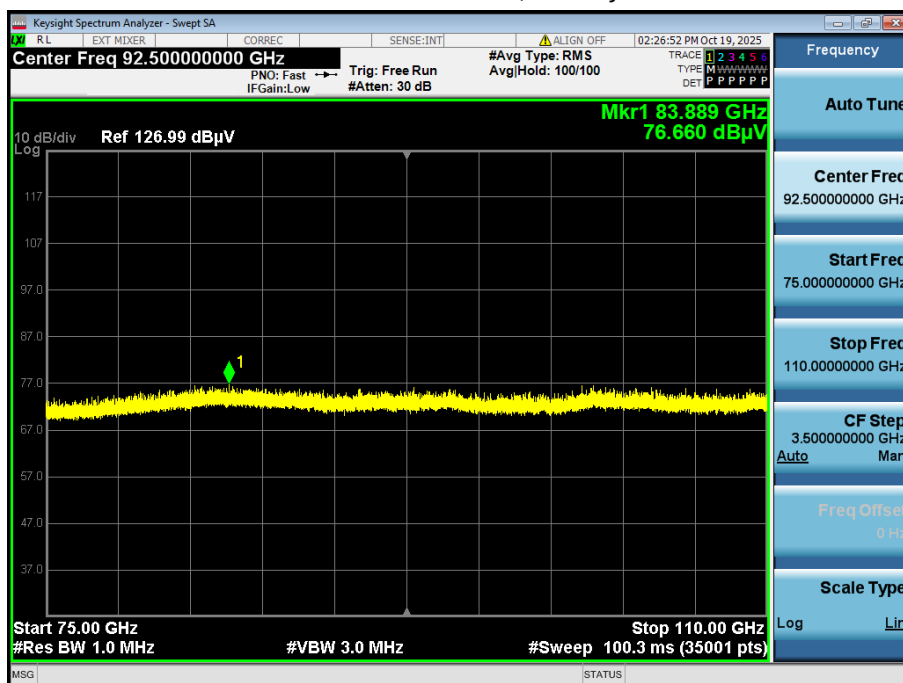
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75-110 GHz Test Mode: 06; Polarity: Horizontal



75-110 GHz Test Mode: 06; Polarity: Vertical



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Frequency (GHz)	Distance (M)	Peak Value (dBuv/m)	AV Limit (dBuv/m)	Polarization	Result
84.587	0.5	76.726	83.52	H	PASS
83.889	0.5	76.66	83.52	V	PASS

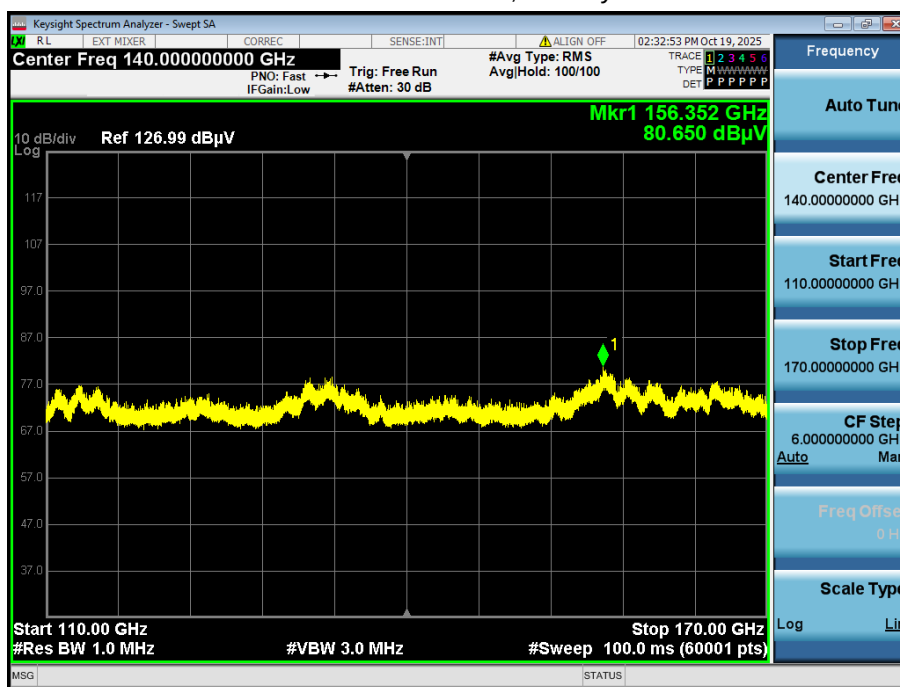


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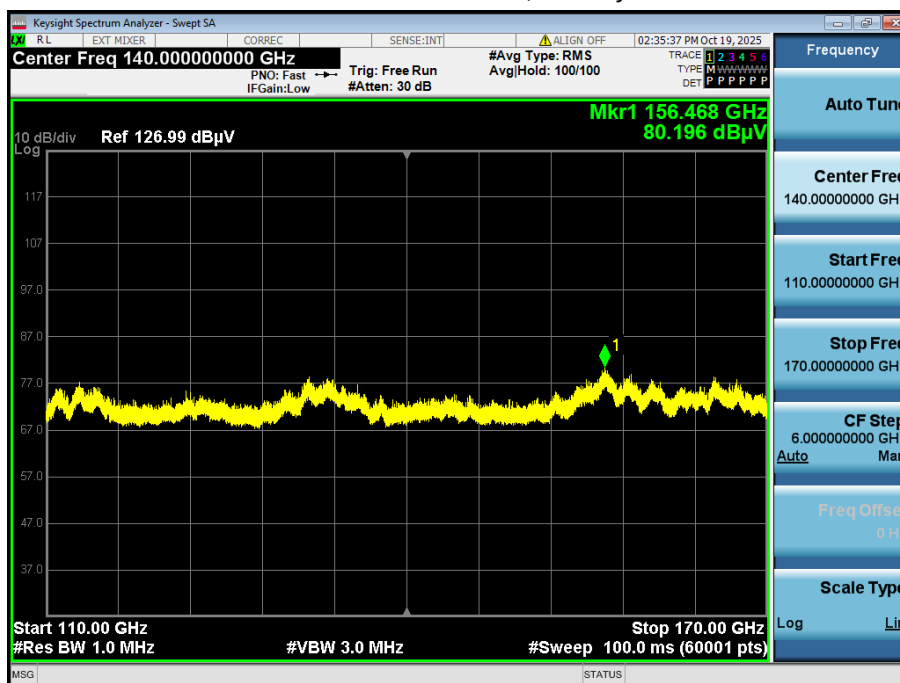
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110-170 GHz Test Mode: 06; Polarity: Horizontal



110-170 GHz Test Mode: 06; Polarity: Vertical



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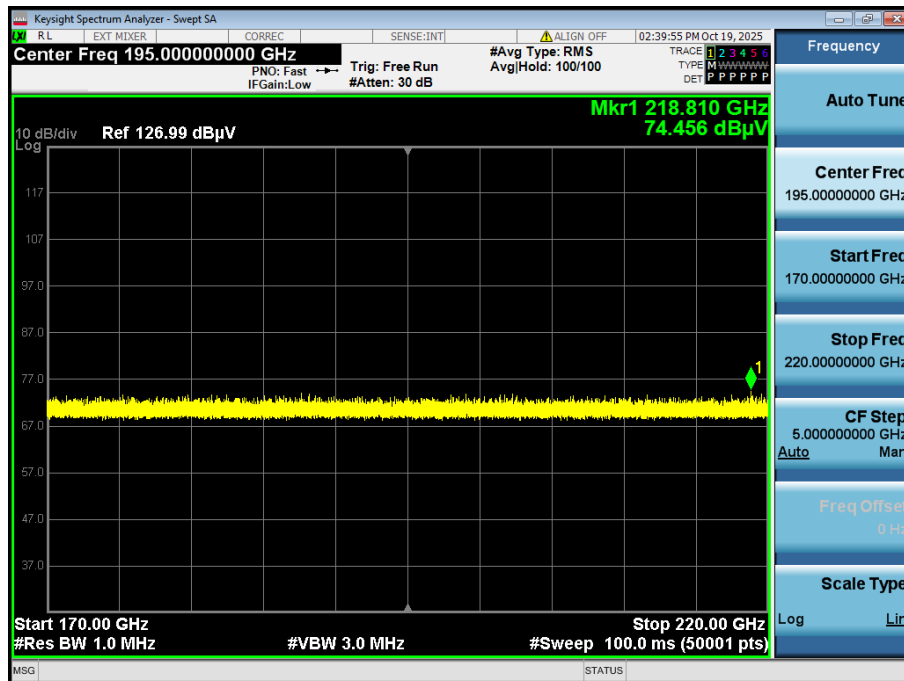
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Frequency (GHz)	Distance (M)	Peak Value (dBuv/m)	AV Limit (dBuv/m)	Polarization	Result
156.352	0.5	80.65	83.52	H	PASS
156.468	0.5	80.196	83.52	V	PASS

170-220 GHz Test Mode: 06; Polarity: Horizontal



170-220 GHz Test Mode: 06; Polarity: Vertical



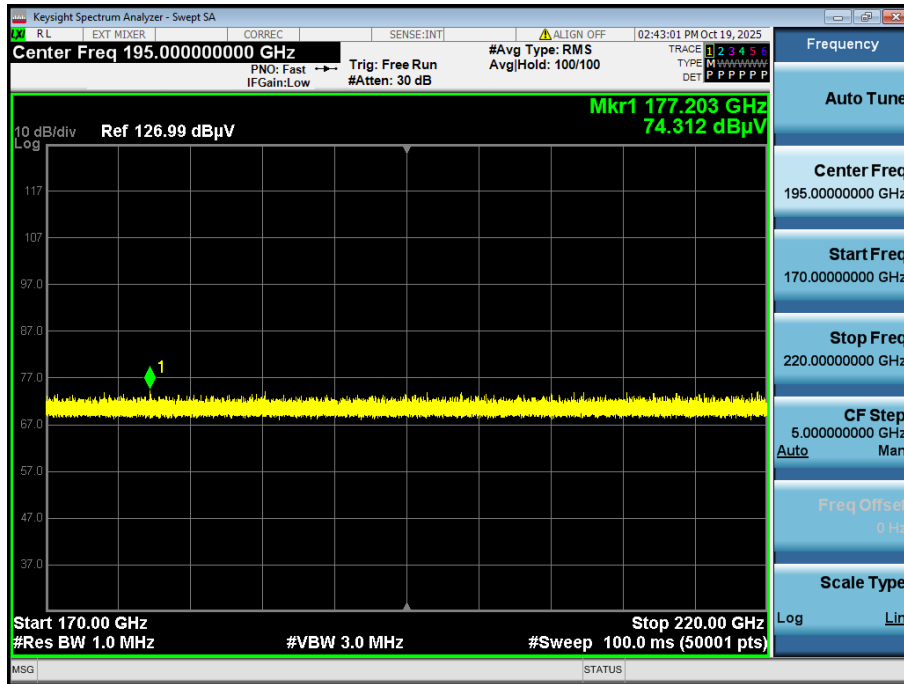
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Frequency (GHz)	Distance (M)	Peak Value (dBuv/m)	AV Limit (dBuv/m)	Polarization	Result
218.81	0.5	74.456	83.52	H	PASS
177.203	0.5	74.312	83.52	V	PASS

7.5 20dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.215

Test Method: ANSI C63.10 (2020) Section 6.9

7.5.1 E.U.T. Operation

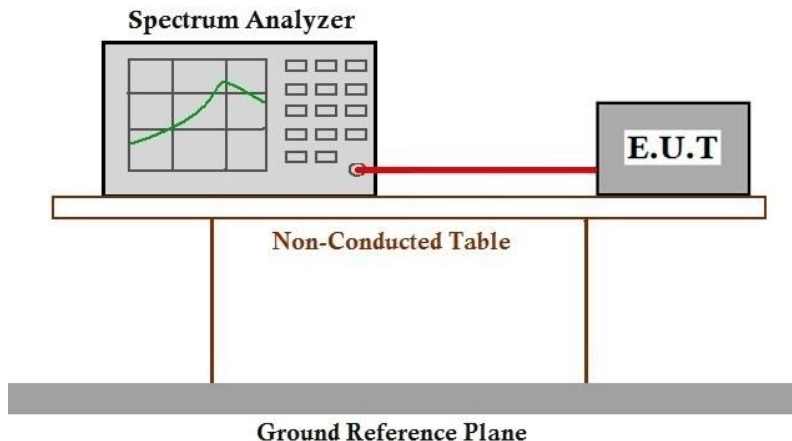
Operating Environment:

Temperature: 24.3 °C Humidity: 55.8 % RH Atmospheric Pressure: 1020 mbar

7.5.2 Test Mode Description

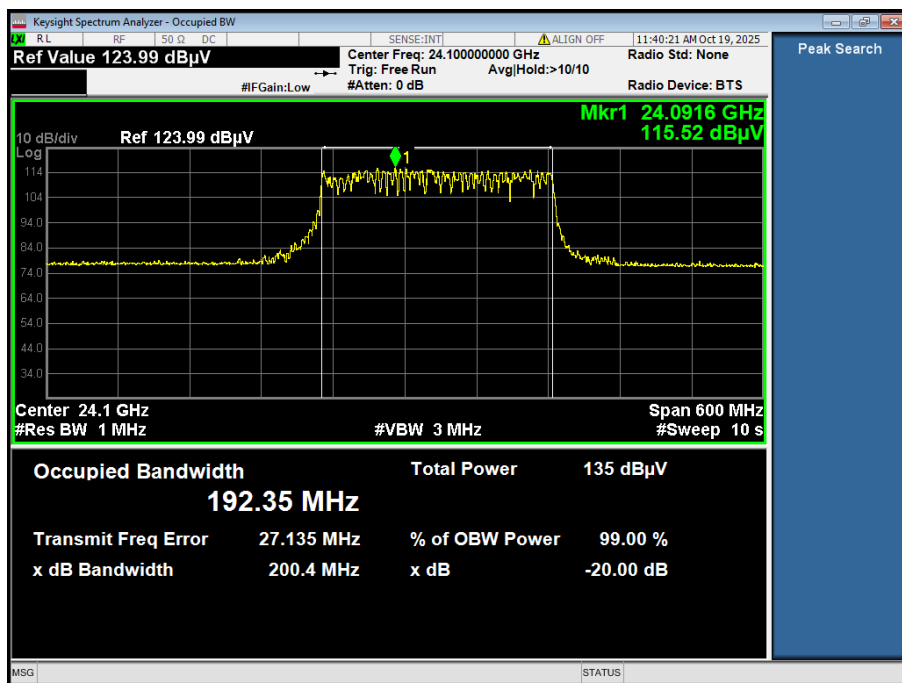
Pre-scan / Final test	Mode Code	Description
Final test	06	TX mode_Keep the EUT in transmitting with modulation mode.

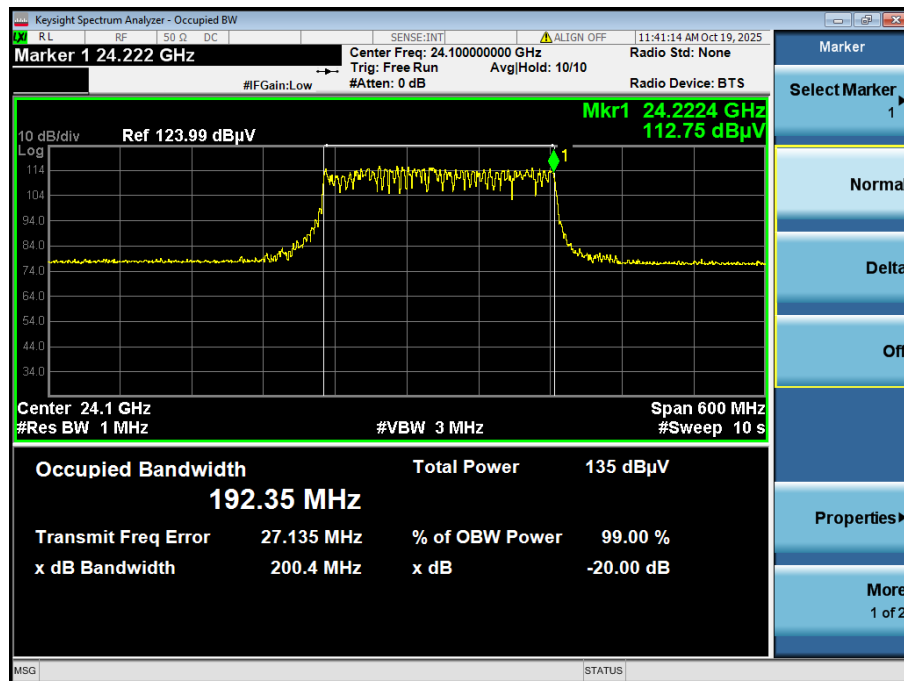
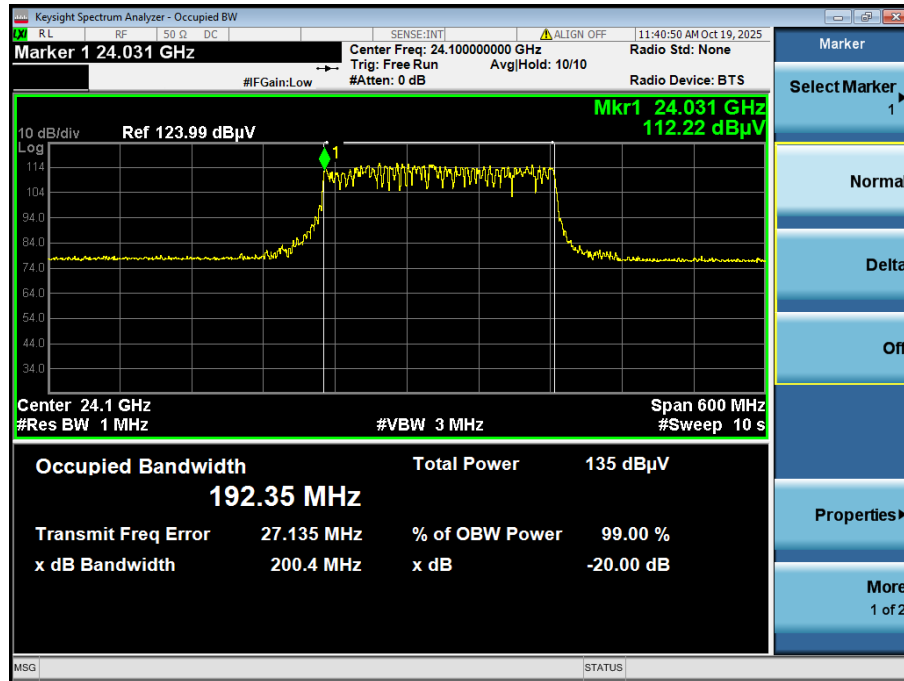
7.5.3 Test Setup Diagram



7.5.4 Measurement Procedure and Data

Test Data:





Low Frequency (GHz)	Limit (GHz)	High Frequency (GHz)	Limit (GHz)	20dB Bandwidth (MHz)	Result
24.0916	≥ 24.00	24.2224	≤ 24.25	192.35	Pass



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8 Test Setup Photo

Refer to Appendix - Test Setup Photo for SZCR2510004391AT

9 EUT Constructional Details (EUT Photos)

Refer to External and Internal Photos for SZCR2510004391AT

- End of the Report -

