

TEST REPORT

Report No.: SHE24060051-02AE

Date: 2024-07-05

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Applicant : Cibes Lift AB (Jiaxing) Co.,Ltd
Address of Applicant : Building F, Baodi(Jiaxing) International Industrial Park,
Wanguo Road, Jiaxing, China

Product Name : CONTROL BOX
Brand Name : Cibes
Model Name : LRC241
Sample Acquisition Method : Sent by Client
Sample No. : E24060051-02#01(Radiation Sample)
E24060051-02#02(Conducted Sample)

FCC ID : 2BHC5LRC241

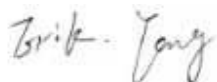
Standards : FCC CFR47 Part 15.247, Subpart C

Date of Receipt : 2024-06-17
Date of Test : 2024-06-18~ 2024-07-01
Date of Issue : 2024-07-05

Remark:

This report details the results of the testing carried out on one sample, the results contained in this report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

Prepared by:



(Erik Yang)

Reviewed by:



(Jennifer Zhou)

Approved by:



(Authorized signatory: Echo Mu)

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1 General Information

1.1 Testing Laboratory

Company Name	ICAS Testing Technology Service (Shanghai) Co., Ltd.
Address	No.1298, Pingan Road, Minhang District, Shanghai, China
Telephone	0086 21-51682999
Fax	0086 21-54711112
Homepage	www.icasiso.com

1.2 Details of Application

Applicant Company Name	Cibes Lift AB (Jiaxing) Co.,Ltd
Address	Building F, Baodi(Jiaxing) International Industrial Park, Wanguo Road, Jiaxing, China
Contact Person	Jacky Wang
Telephone	+86 135 2438 0472
Email	jacky.wang@cibes.cn
Manufacturer Company Name	Cibes Lift AB (Jiaxing) Co.,Ltd
Address	Building F, Baodi(Jiaxing) International Industrial Park, Wanguo Road, Jiaxing, China
Factory Company Name	Cibes Lift AB (Jiaxing) Co.,Ltd
Address	Building F, Baodi(Jiaxing) International Industrial Park, Wanguo Road, Jiaxing, China

1.3 Details of EUT

Product Name	CONTROL BOX
Brand Name	Cibes
Model Name	LRC241
FCC ID	2BHC5LRC241
Frequency Range	2404MHz ~ 2480MHz
Number of Channels	77 (at intervals of 1MHz)
Modulation Type	GFSK
Max RF Output Power-Conducted	3.96dBm
Antenna Type	Ceramic Antenna
Antenna Gain	2.66dBi
Extreme Temperature Range	-10°C~ +55°C
Test Voltage	DC 24V by DC Power Supply
Hardware Version	MR-HW-9.1A
Software Version	V2.1.0
RF power setting in TEST SW	Serial testing tool_Power level setting_Default(5dBm)

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- Note:
- 1. The above information was declared by the manufacture.
 - 2. For more details, please refer to the User's manual of the EUT.

Channel List

Channel	Frequency	Channel	Frequency	Channel	Frequency
01	2.404GHz	28	2.431GHz	55	2.458GHz
02	2.405GHz	29	2.432GHz	56	2.459GHz
03	2.406GHz	30	2.433GHz	57	2.460GHz
04	2.407GHz	31	2.434GHz	58	2.461GHz
05	2.408GHz	32	2.435GHz	59	2.462GHz
06	2.409GHz	33	2.436GHz	60	2.463GHz
07	2.410GHz	34	2.437GHz	61	2.464GHz
08	2.411GHz	35	2.438GHz	62	2.465GHz
09	2.412GHz	36	2.439GHz	63	2.466GHz
10	2.413GHz	37	2.440GHz	64	2.467GHz
11	2.414GHz	38	2.441GHz	65	2.468GHz
12	2.415GHz	39	2.442GHz	66	2.469GHz
13	2.416GHz	40	2.443GHz	67	2.470GHz
14	2.417GHz	41	2.444GHz	68	2.471GHz
15	2.418GHz	42	2.445GHz	69	2.472GHz
16	2.419GHz	43	2.446GHz	70	2.473GHz
17	2.420GHz	44	2.447GHz	71	2.474GHz
18	2.421GHz	45	2.448GHz	72	2.475GHz
19	2.422GHz	46	2.449GHz	73	2.476GHz
20	2.423GHz	47	2.450GHz	74	2.477GHz
21	2.424GHz	48	2.451GHz	75	2.478GHz
22	2.425GHz	49	2.452GHz	76	2.479GHz
23	2.426GHz	50	2.453GHz	77	2.480GHz
24	2.427GHz	51	2.454GHz		
25	2.428GHz	52	2.455GHz		
26	2.429GHz	53	2.456GHz		
27	2.430GHz	54	2.457GHz		

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1.4 Test Methodology

47 CFR Part 15, Subpart C	Telecommunication-Radio Frequency Devices-Intentional Radiators
KDB Publication 558074 D01 v05r02	15.247 Meas Guidance.
ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

Note(s):
All test items were verified and recorded according to the standards and without any addition/deviation/exclusion during the test.

1.5 Test Summary

Test Item	FCC Rules	Result
Antenna Requirement	FCC Part 15.247(b)(4), Part 15.203	PASS
Maximum peak conducted output power	FCC Part 15.247(b)(3)	PASS
6dB Bandwidth	FCC Part 15.247(a)(2)	PASS
Maximum conducted output power spectral density	FCC Part 15.247(e)	PASS
Conducted Spurious Emission & Authorized-band band-edge	FCC Part 15.247(d)	PASS
Radiated Emission	FCC Part 15.247(d), 15.205, 15.209	PASS
Band Edge (Restricted-band band-edge)	FCC Part 15.247(d), 15.205, 15.209	PASS
Conducted Emission on AC Mains	FCC Part 15.207(a)	N/A ^{note}

Note(s): The EUT is DC 24V by DC Power Supply.
Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Devices that include, or make provisions for, the use of battery chargers which permit operating while charging, AC adapters or battery eliminators or that connect to the AC power lines indirectly, obtaining their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

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2 Test Condition

2.1 Environmental conditions

Temperature (°C)	18-25
Humidity (%RH)	40-65
Barometric Pressure (mbar)	960-1060

2.2 Equipment List

Name of Equipment	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	Keysight	N9020B	MY59260184	2023-07-27	2024-07-26
Spectrum Analyzer	Rohde & Schwarz	FSV40N	101450	2024-06-04	2025-06-03
Signal Generator	Rohde & Schwarz	SMR27	100184	2023-07-27	2024-07-26
DC Power Supply	ITECH	IT6512A	N/A	2024-06-06	2025-06-05
EMI Test Receiver	Rohde & Schwarz	ESR 7	101911	2024-06-04	2025-06-03
Broadband Antenna	SCHWARZBECK	VULB9163	9163-1037	2023-03-22	2025-03-21
Horn Antenna-18G	SCHWARZBECK	BBHA9120D	9120D-1775	2023-06-13	2025-06-12
Loop Antenna	SCHWARZBECK	FMZB 1513	/	2023-06-09	2025-06-08
Horn Antenna-40G	YINGLIAN	LB-180400-KF	N/A	2023-06-18	2025-06-17
Broadband Preamplifier	SCHWARZBECK	BBV 9718	346	2024-06-04	2025-06-03
EMC chamber 9*6*6(L*W*H)	CHANGNING	966	N/A	2023-06-09	2025-06-08
Shielded Enclosure 8*5*4(L*W*H)	CHANGNING	854	N/A	2023-06-09	2025-06-08
Test Software	BL	BL410_E	Version:2.1.1.436	N/A	N/A
Test Software	BL	BL410_R	Version:2.1.1.409	N/A	N/A

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2.3 Measurement Uncertainty

The uncertainty is calculated using the methods suggested in the “Guide to the Expression of Uncertainty in measurement” (GUM) published by CISPR and ANSI. The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95.45%.

Parameter		Uncertainty
Antenna Port Conducted Emission	< 1GHz	± 1.5 dB
	> 1GHz	± 1.5 dB
Radiated Emission	9KHz – 30MHz	± 3.42 dB
	30 MHz – 1GHz	± 5.01 dB
	> 1GHz	± 5.21 dB
Occupied Channel Bandwidth		± 5 %
Maximum Conducted Output Power		± 0.64 dB
Maximum Conducted Output Power Spectral Density		± 1.18 dB

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3 Test Set-up and Operation Modes

3.1 Details of Test Mode

Using test software was control EUT work in continuous transmitting mode. Select test channel as below:

Channel	Frequency
The lowest channel(CH01)	2404MHz
The middle channel(CH39)	2442MHz
The highest channel(CH77)	2480MHz

The basic operation modes are:

- A. On
1. Fixed frequency mode

a. Transmitting

i. Low Channel

ii. Middle Channel

iii. High Channel

b. Receiving
2. Normal working with Bluetooth on
- B. Standby
- C. Off

3.2 Special Accessories and Auxiliary Equipment

Description	Manufacturer	Model Name	Serial No.
Laptop	Lenovo	TP00083A	PF-0PRDGN
USB Cable	N/A	N/A	1.00m Unshielded

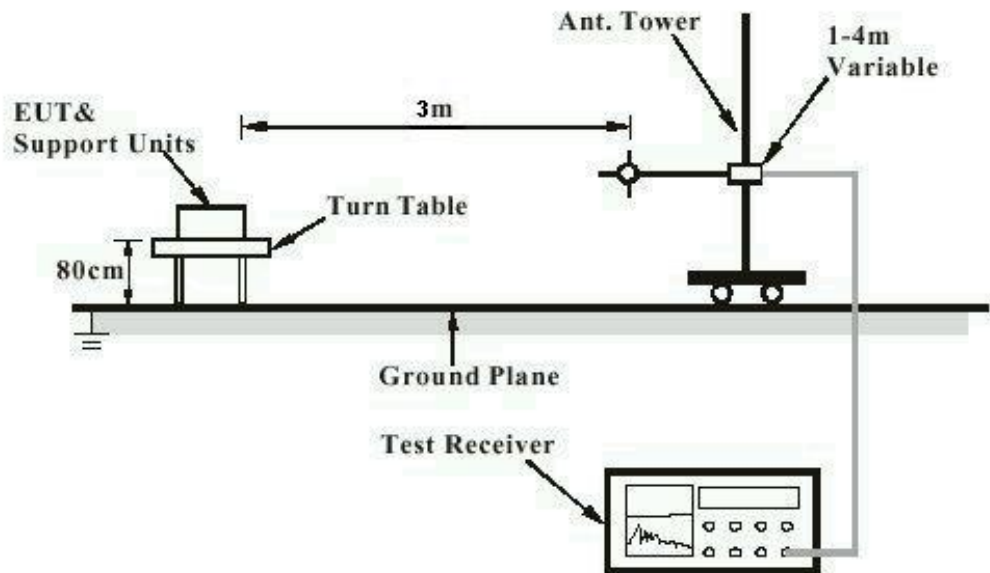
3.3 Support Software

Description	Manufacturer	Software Name
Software	N/A	Serial testing tool

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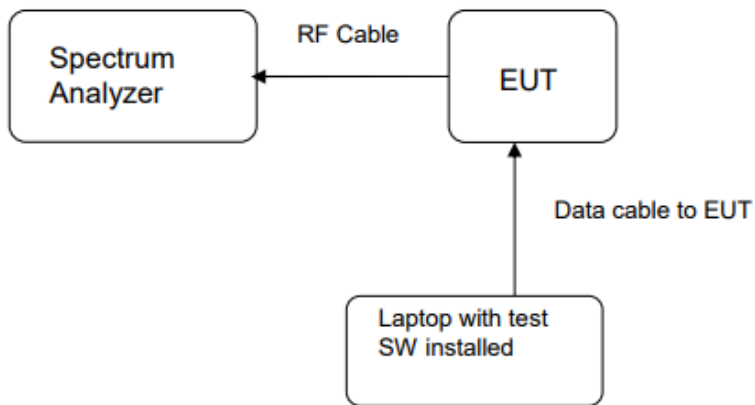
3.4 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test



Note: Measurements above 1GHz are done with a table height of 1.5m. In addition, there is RF absorbing material on the floor of the test site for above 1GHz measurement.

Diagram of Measurement Equipment Configuration for Transmitter Test



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4 Test Results

4.1 Transmitter Requirement & Test Suites

4.1.1 Antenna Requirement

RESULT:

PASS

Test standard	: FCC Part 15.247(b)(4), Part 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 shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. In addition, If transmitting antennas of directional gain greater than 6dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

According to the manufacturer declaration, LRC241 model has an antenna with a directional gain of 2.66dBi. The antenna is Cermatic Antenna with no possibility of replacement with a non-approved antenna by the end-user. 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. Therefore, the EUT is considered to comply with this provision.

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4.1.2 Maximum peak conducted output power

RESULT:

PASS

Test standard : FCC Part 15.247(b)(3)

Requirement : ANSI C63.10-2013 clause 11.9.1.1,
KDB 558074 D01 v05r02, Clause 8.3.1

Kind of test site : Shielded room

Test setup

Test Channel : Low/Middle/High

Operation Mode : A.1.a

Ambient temperature : 24.1°C

Relative humidity : 46%

Table 1: Maximum peak conducted output power

Test Channel (MHz)	Maximum peak conducted output power		Limit (W)
	(dBm)	(mW)	
2404	3.96	2.49	< 1
2442	3.95	2.48	
2480	3.87	2.44	

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Figure 1: Peak Output Power, 2404MHz

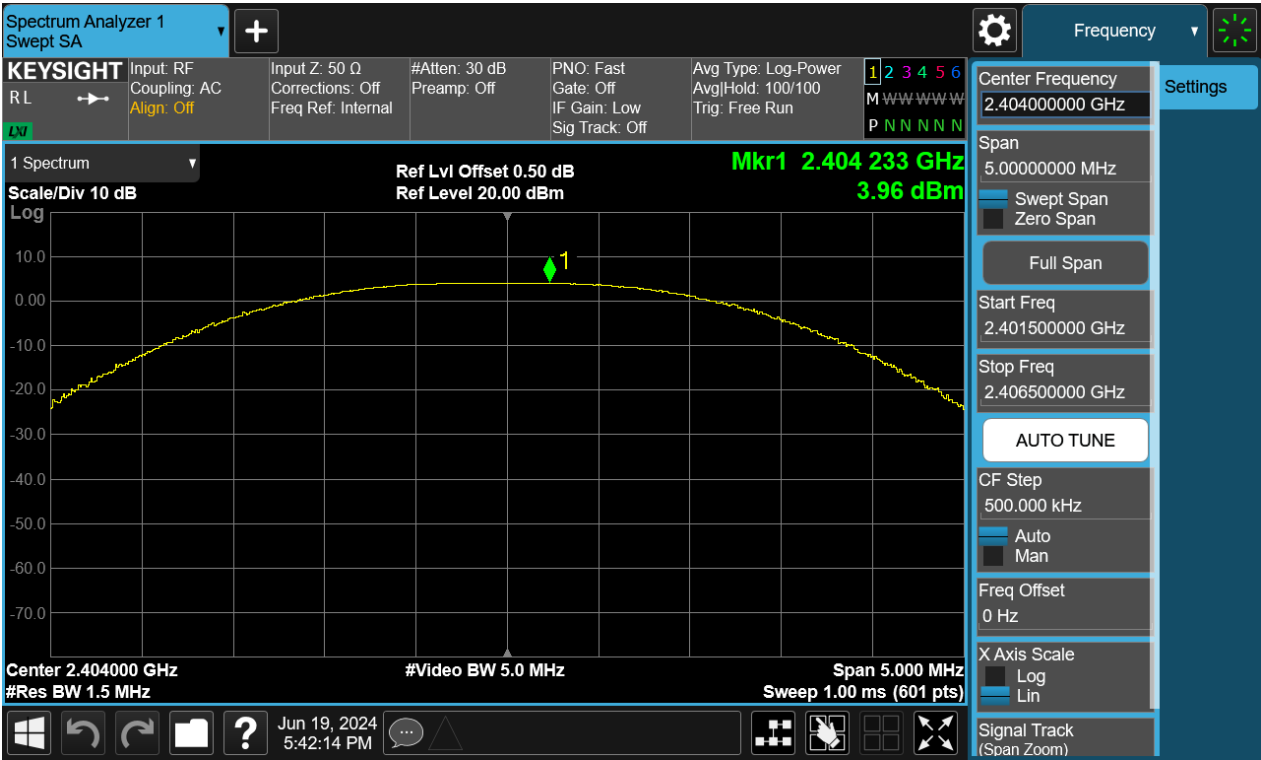


Figure 2: Peak Output Power, 2442MHz



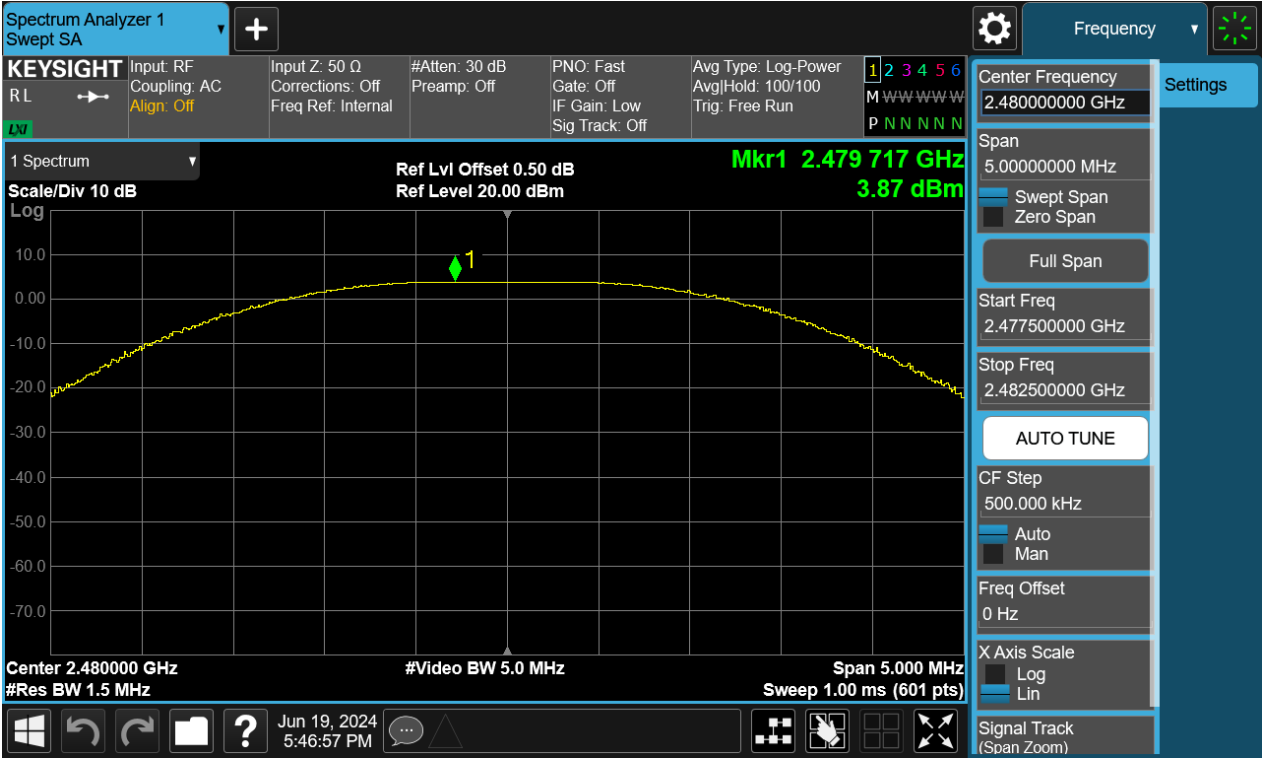
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Figure 3: Peak Output Power, 2480MHz



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4.1.3 6dB Bandwidth

RESULT:

PASS

Test standard : FCC Part 15.247(a)(2)

Requirement : ANSI C63.10-2013 clause 11.8.1,
KDB 558074 D01 v05r02, Clause 8.2

Kind of test site : Shielded room

Test setup

Test Channel : Low/Middle/High

Operation Mode : A.1.a

Ambient temperature : 24.1°C

Relative humidity : 46%

Table 2: 6dB Bandwidth

Test Channel (MHz)	6dB Bandwidth (MHz)	6dB Bandwidth Limit
2404	0.6999	>0.5 MHz
2442	0.7185	
2480	0.7758	

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Figure 4: 6dB Bandwidth, 2404MHz



Figure 5: 6dB Bandwidth, 2442MHz



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Figure 6: 6dB Bandwidth, 2480MHz



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4.1.4 Maximum conducted output power spectral density

RESULT:

PASS

Test standard : FCC Part 15.247(e)

Requirement : ANSI C63.10-2013 clause 11.10.2,
KDB 558074 D01 v05r02, Clause 8.4

Kind of test site : Shielded room

Test setup

Test Channel : Low/Middle/High

Operation Mode : A.1.a

Ambient temperature : 24.1°C

Relative humidity : 46%

Table 3: Maximum conducted output power spectral density

Test Channel (MHz)	Measured Result (dBm/3kHz)	Limit (dBm/3kHz)
2404	-12.70	8
2442	-12.74	
2480	-12.07	

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Figure 7: Power Spectral Density, 2404MHz

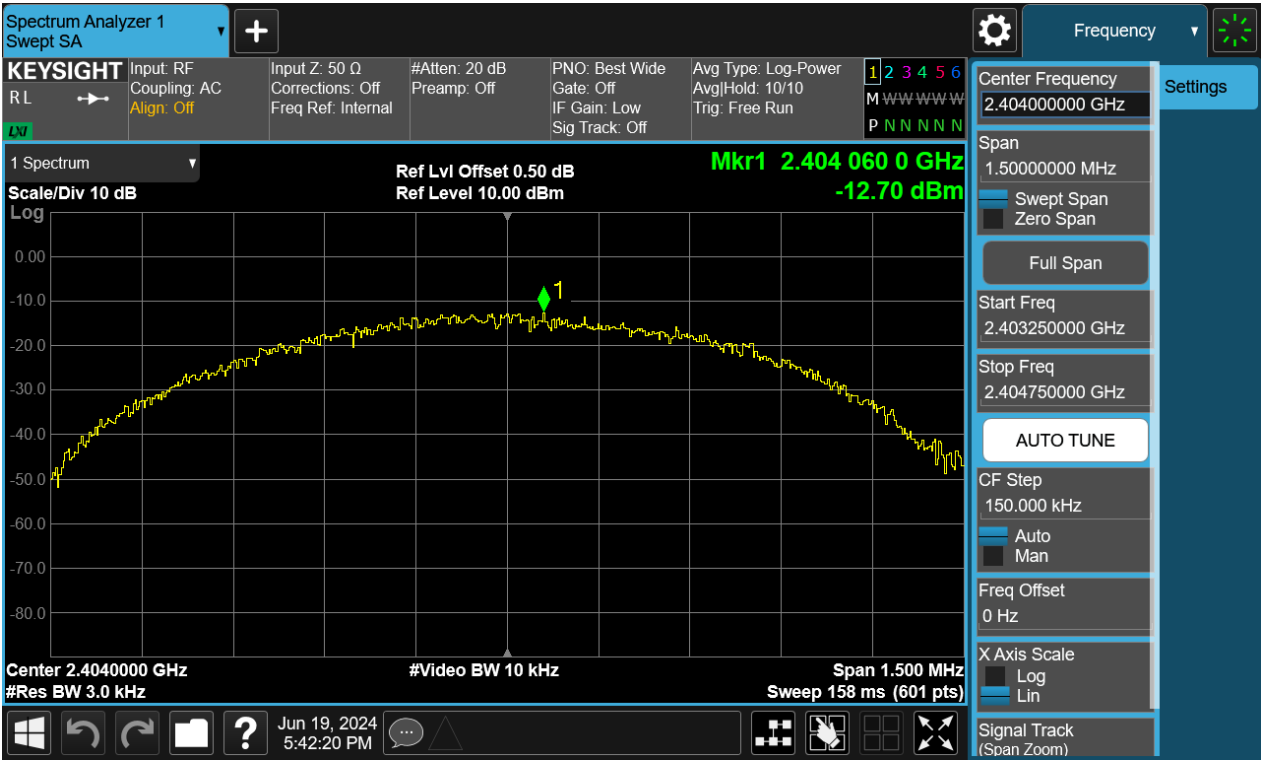
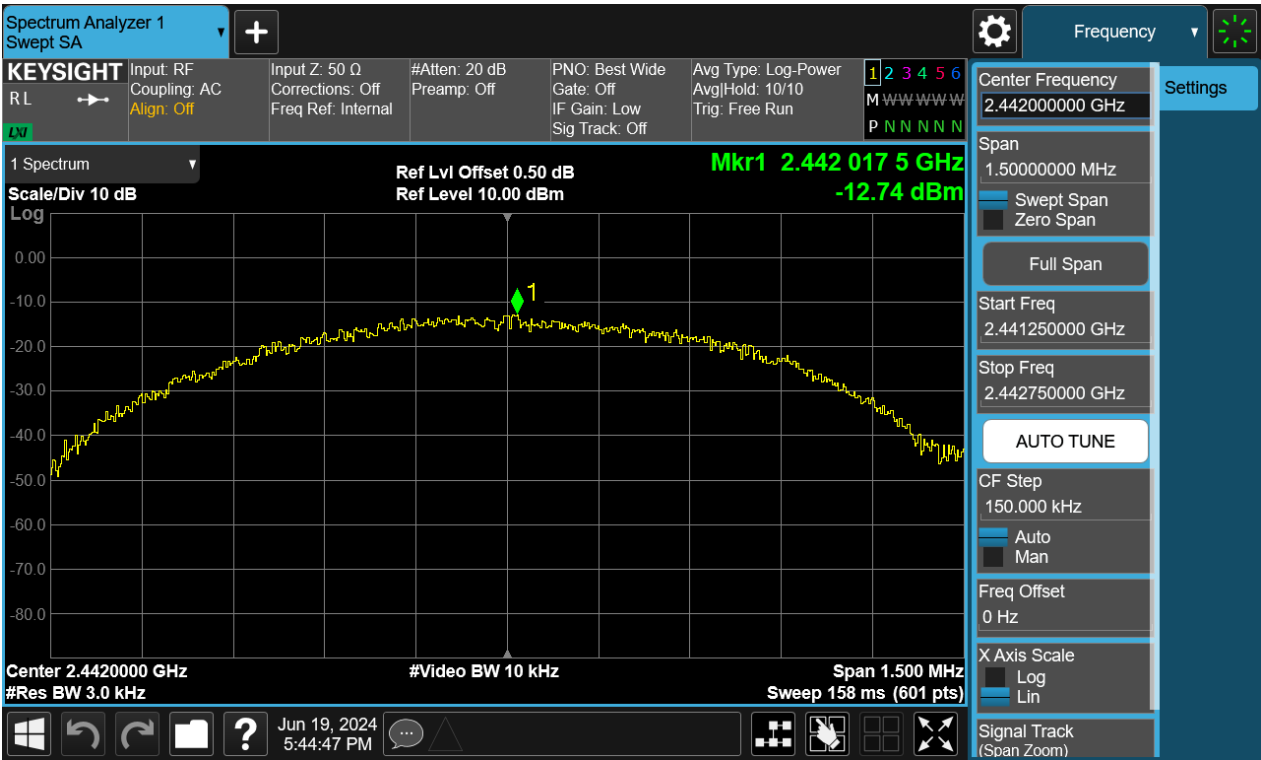


Figure 8: Power Spectral Density, 2442MHz



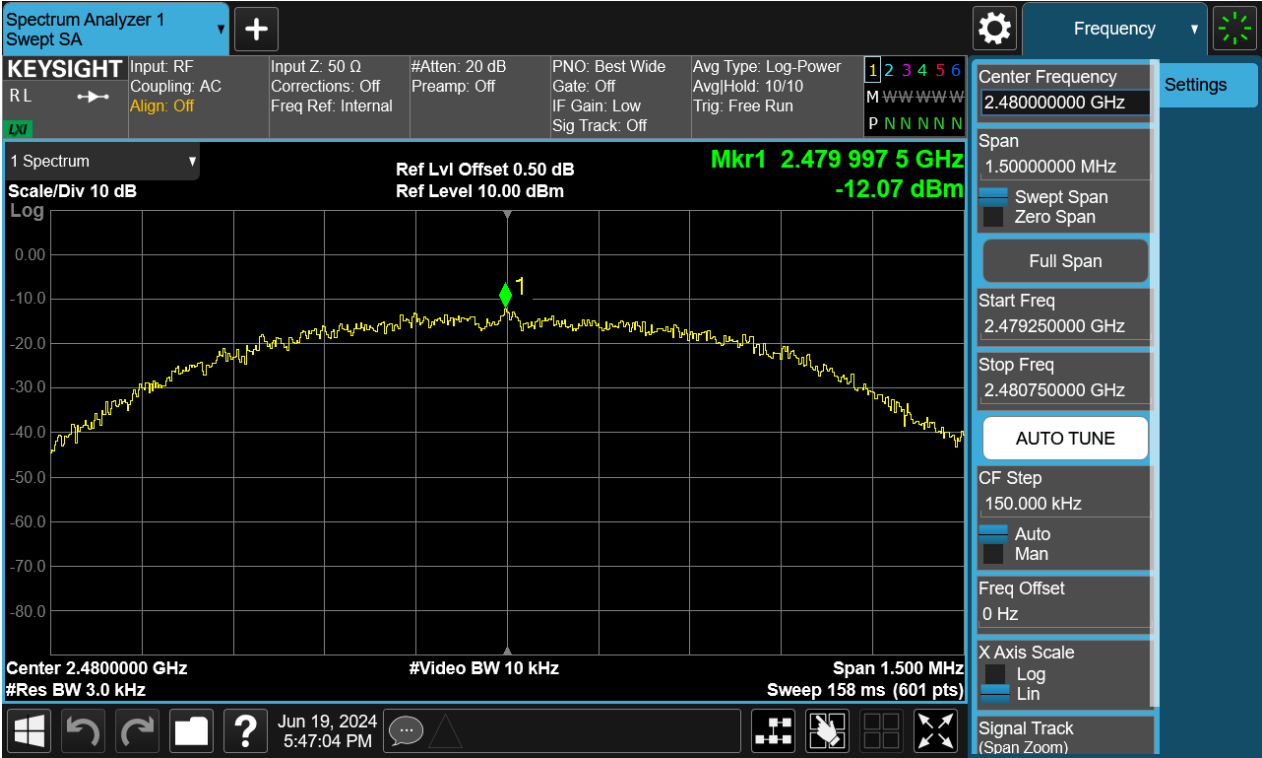
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Figure 9: Power Spectral Density, 2480MHz



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4.1.5 Conducted Spurious Emission & Authorized-band band-edge

RESULT:

PASS

Test standard	: FCC Part 15.247(d)
Requirement	: ANSI C63.10-2013, Clause 11.11.1(a) KDB 558074 D01 v05r02, Clause 8.5
Kind of test site	: Shielded room

Test setup

Test Channel	: Low/Middle/High for spurious, Low/High for Band Edge
Operation Mode	: A.1.a
Ambient temperature	: 24.1°C
Relative humidity	: 46%

For details refer to following test plot.

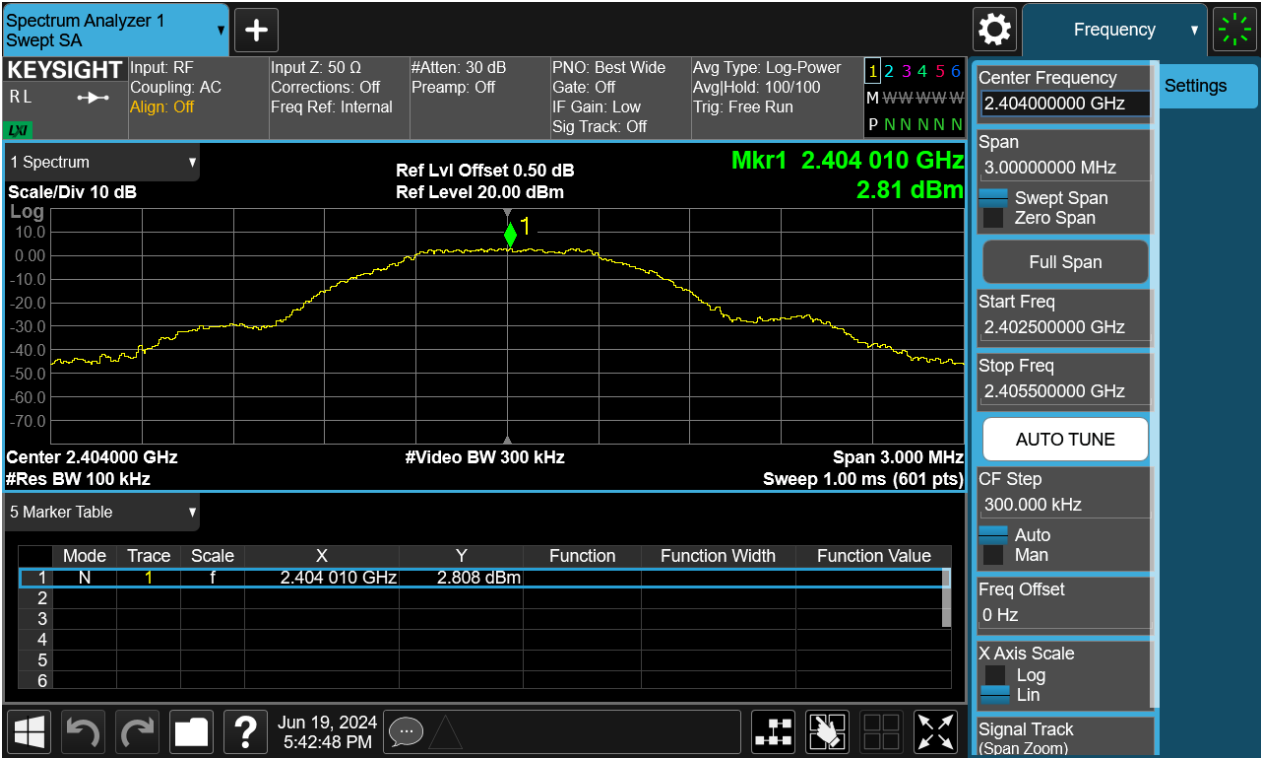
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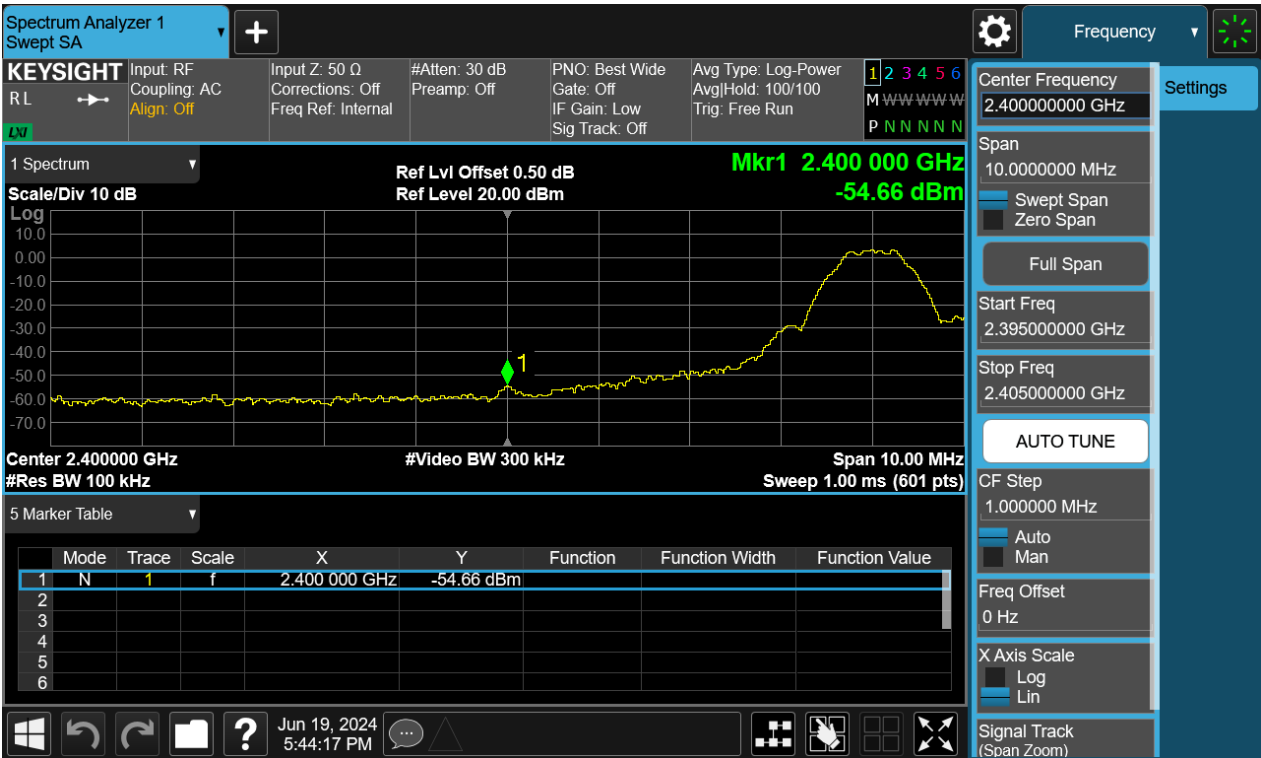
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Figure 10: Conducted Spurious Emission & Authorized-band band-edge, 2404MHz
Carrier Level



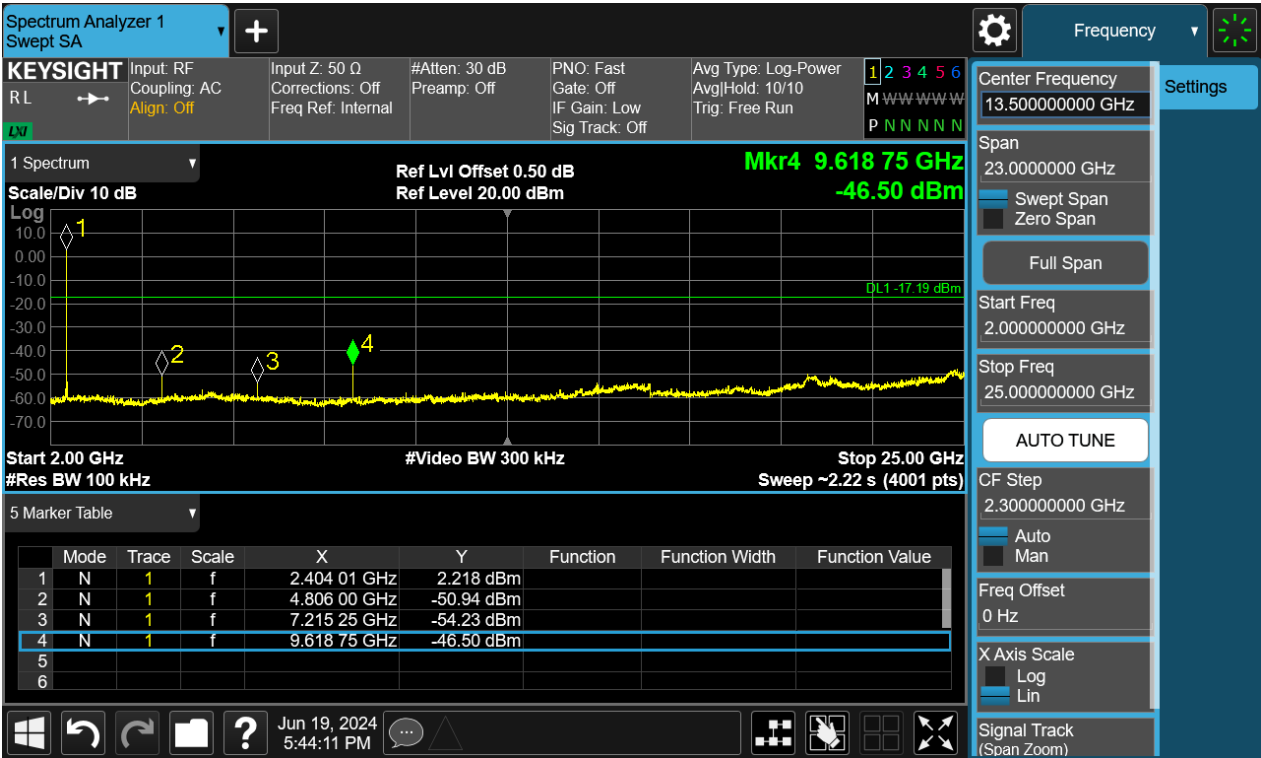
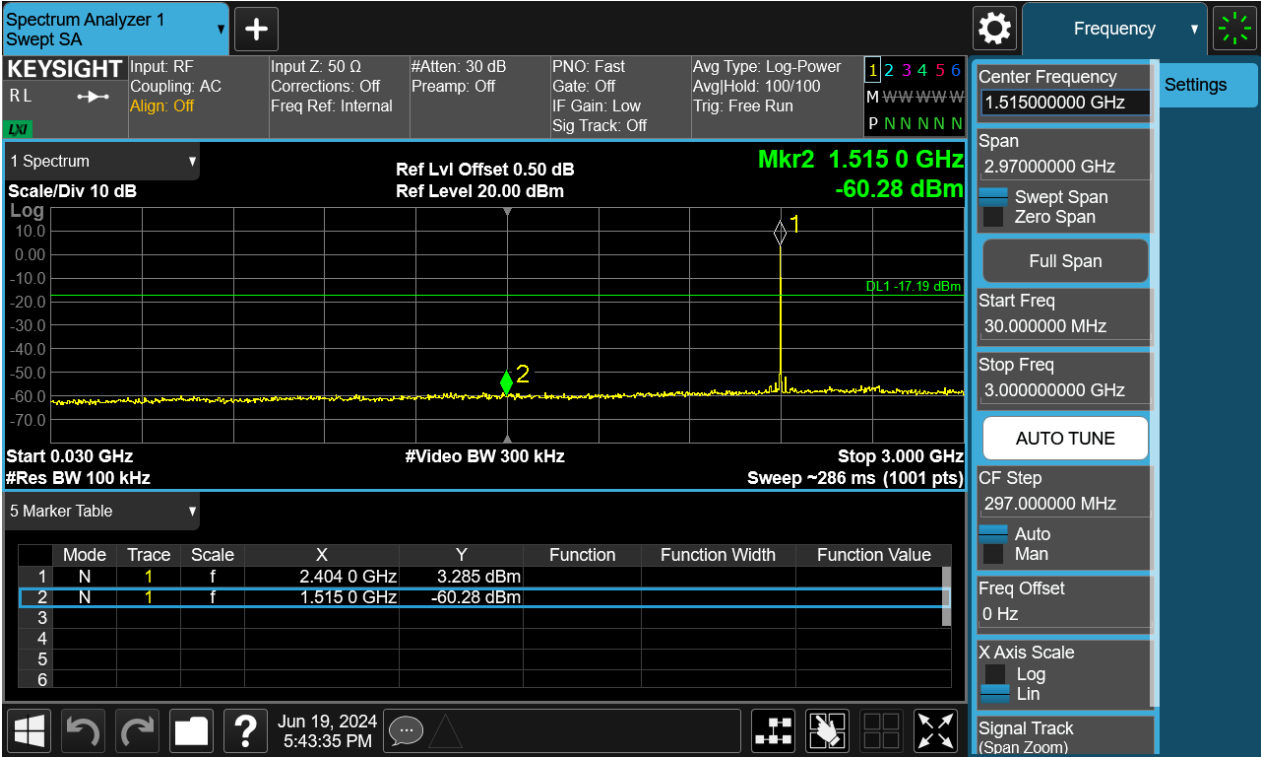
Band Edge



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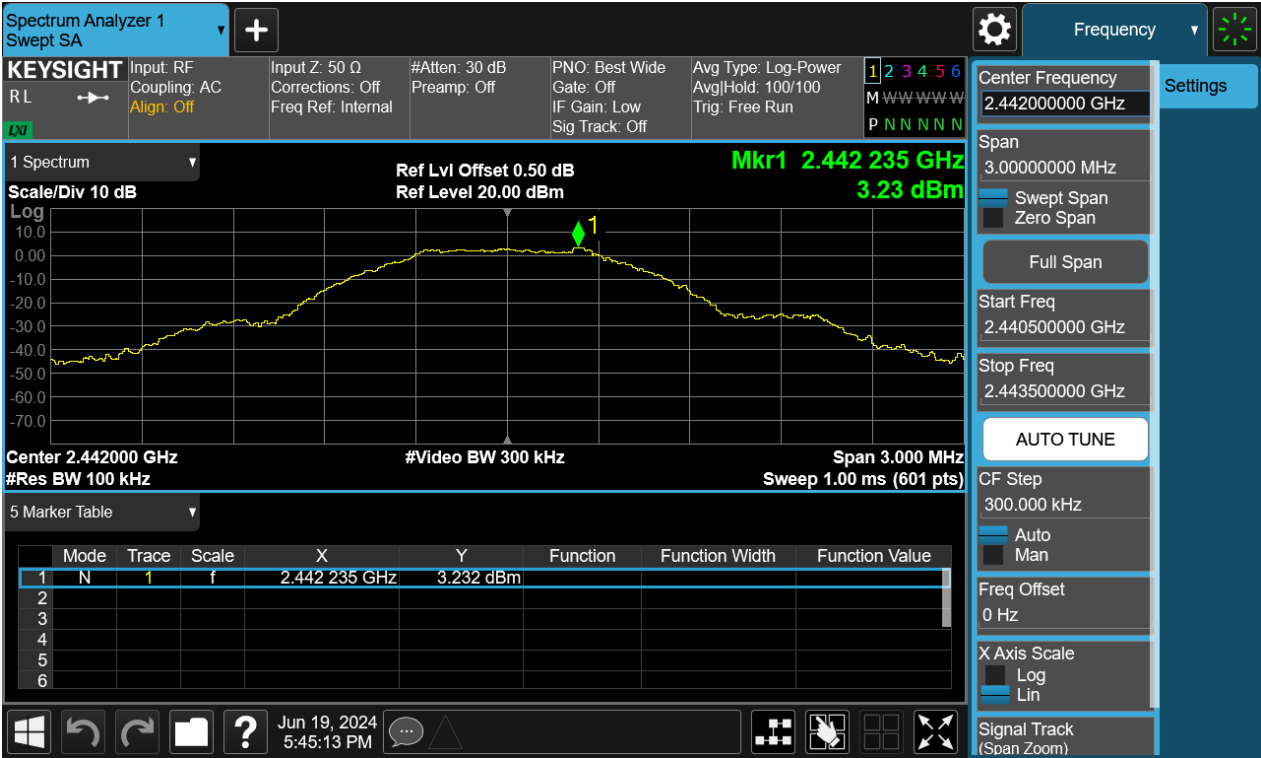
Conducted spurious emissions 30MHz-25GHz



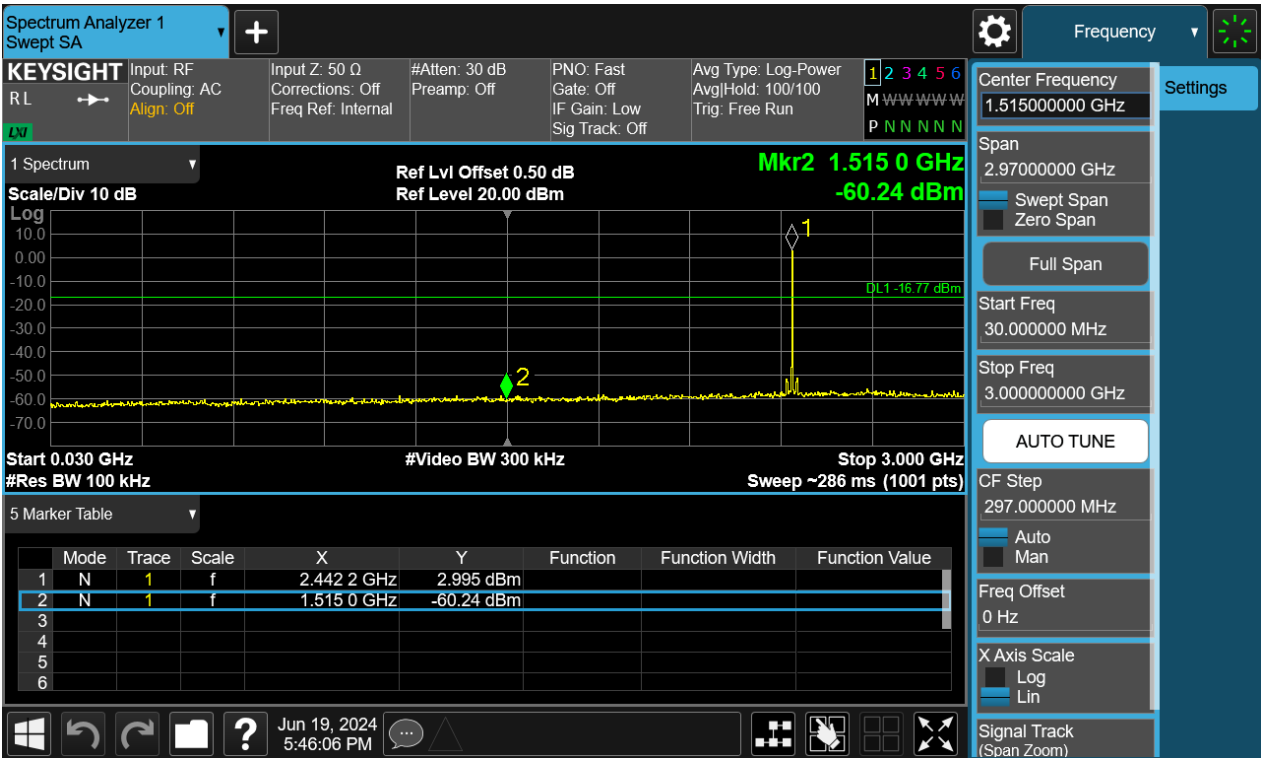
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Figure 11: Conducted Spurious Emission & Authorized-band band-edge, 2442MHz
Carrier Level



Conducted spurious emissions 30MHz-25GHz



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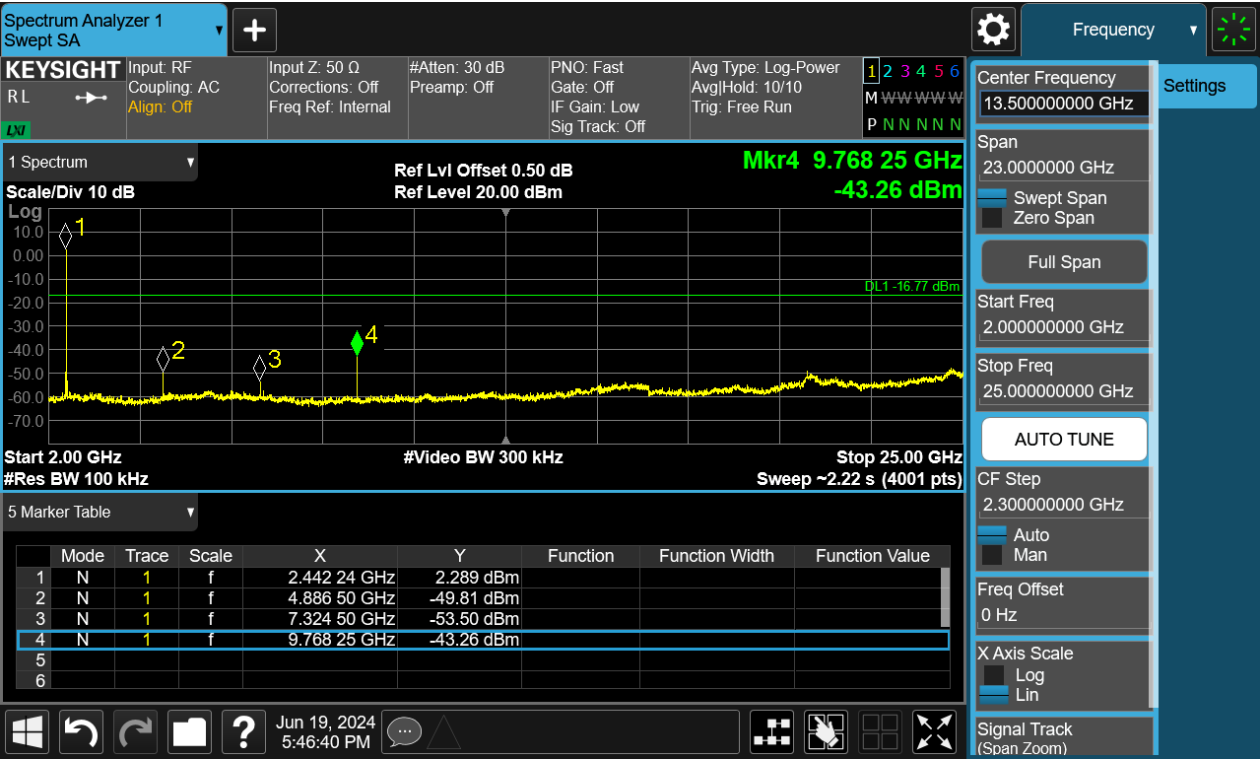
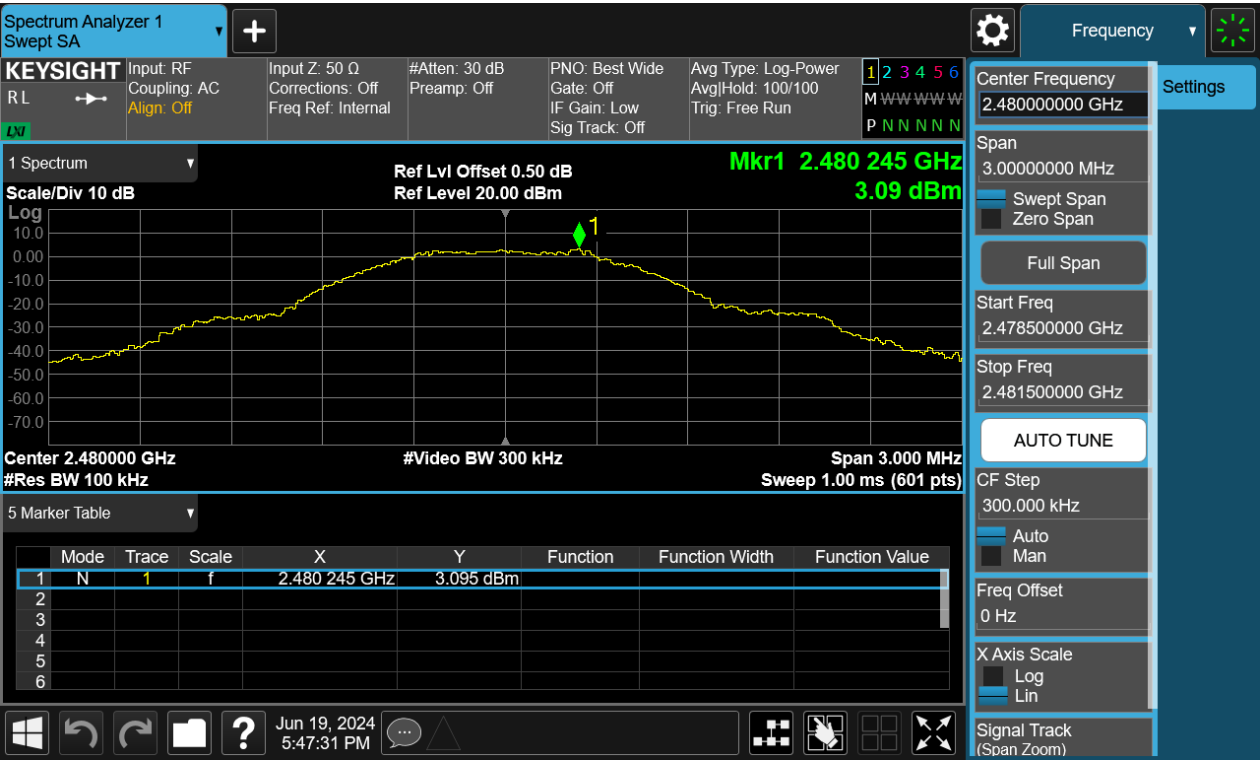


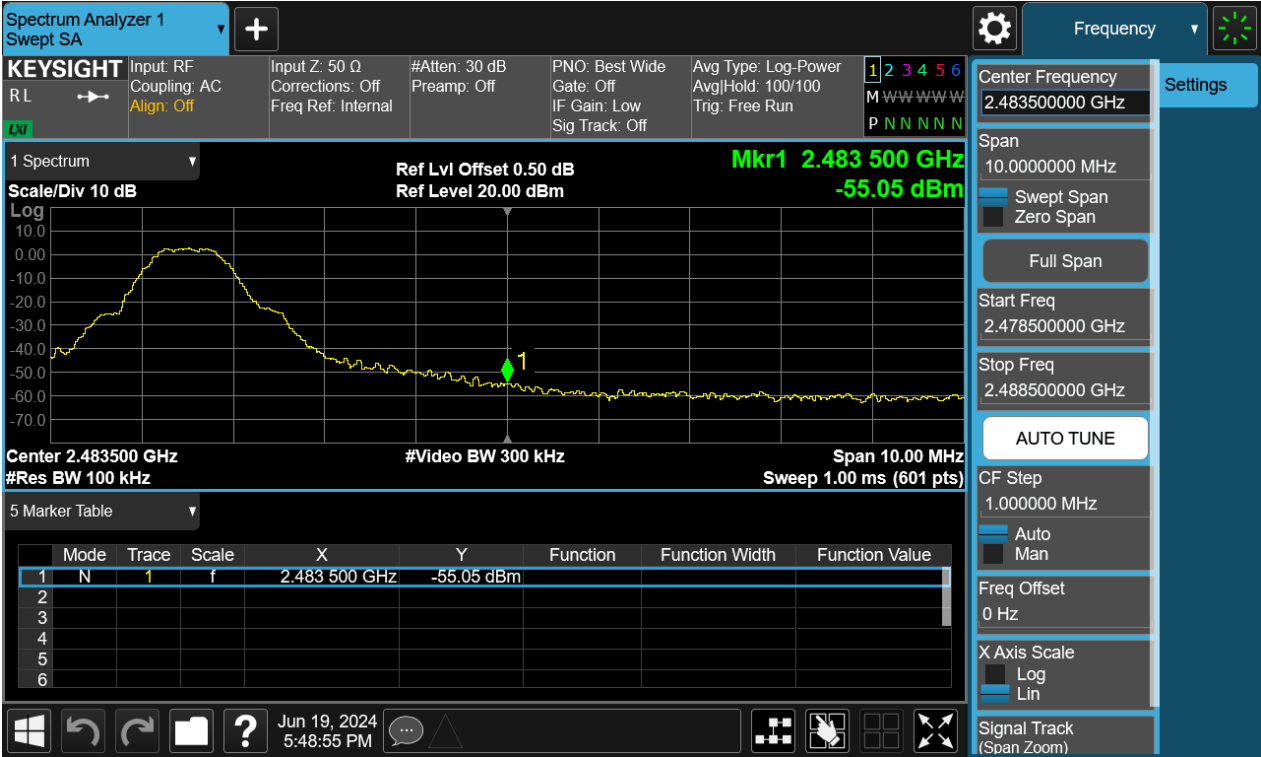
Figure 12: Conducted Spurious Emission & Authorized-band band-edge, 2480MHz Carrier Level



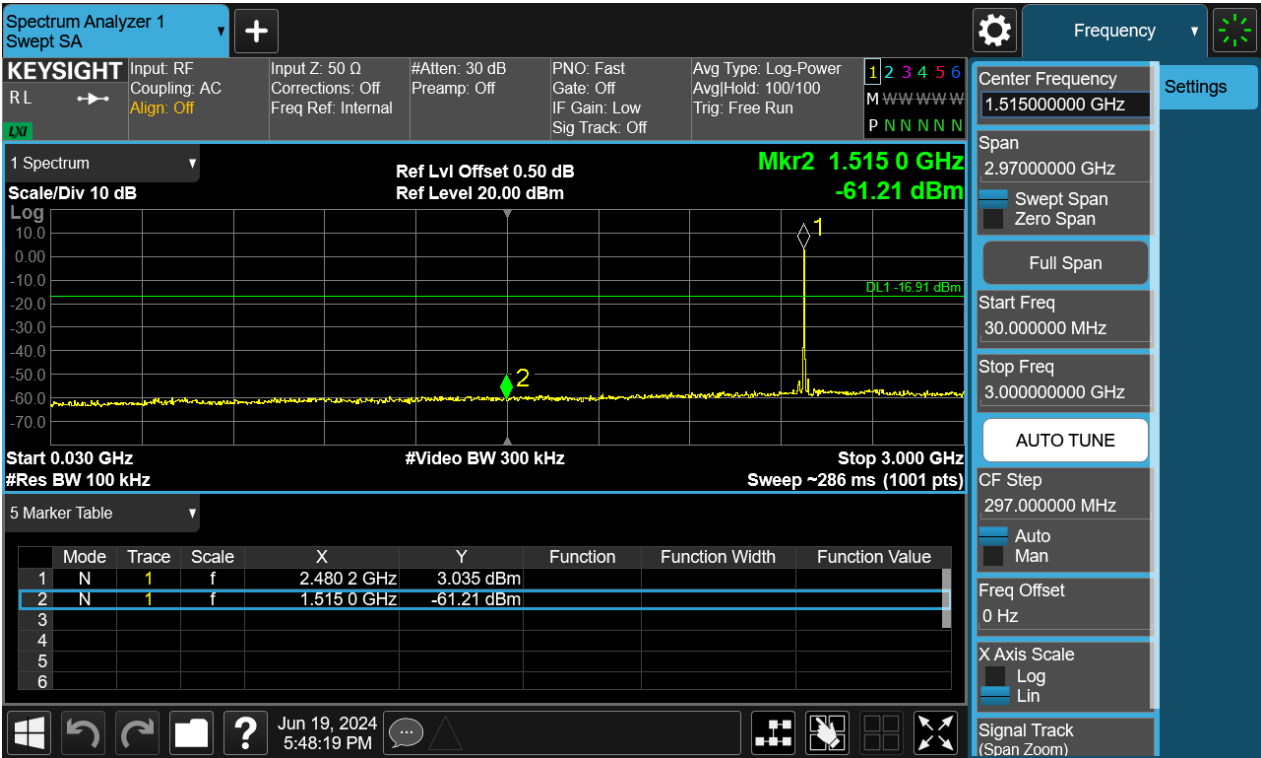
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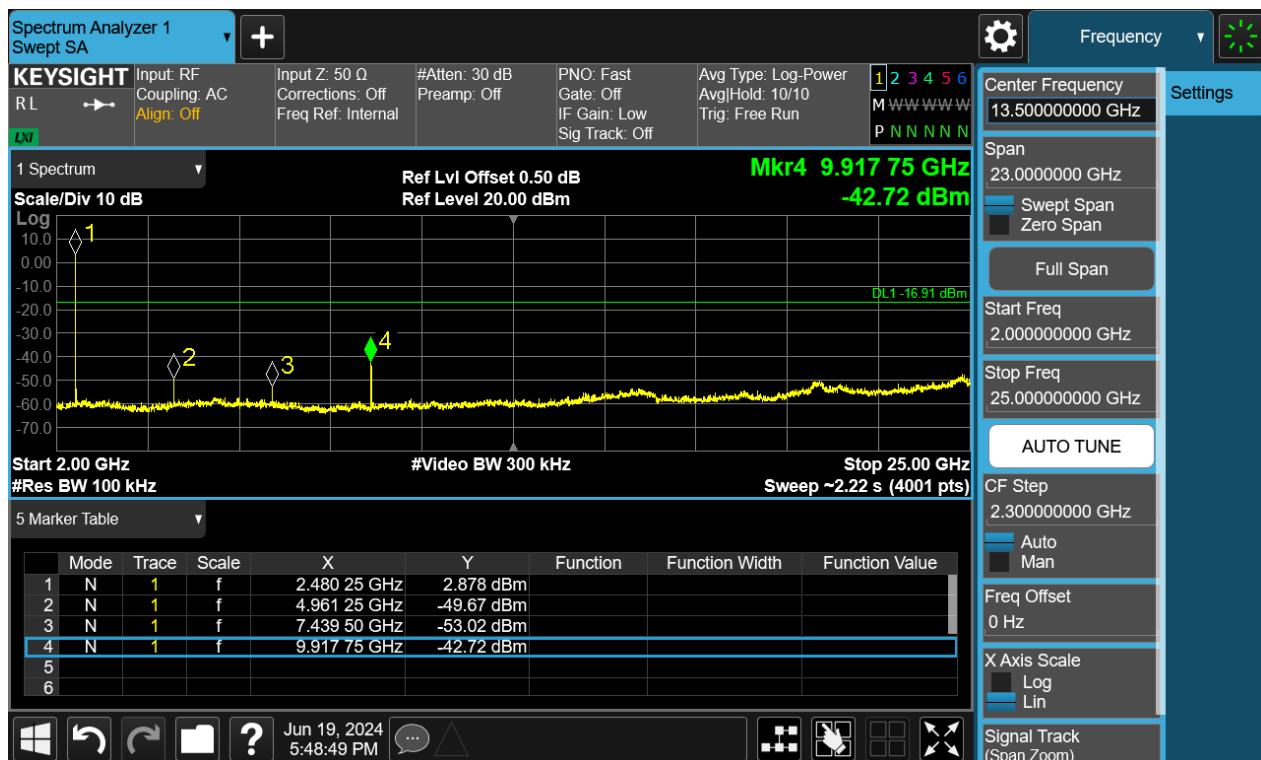
Band Edge



Conducted spurious emissions 30MHz-25GHz



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4.1.6 Radiated Emission

RESULT: PASS

Test standard : FCC Part 15.247(d), 15.205, 15.209
Requirement : ANSI C63.10-2013 clause 11.12,
KDB 558074 D01 v05r02, Clause 8.6
Kind of test site : 3m Semi-Anechoic Chamber

Test setup

Test Channel : Low/Middle/High
Operation Mode : A
Ambient temperature : 23.5°C
Relative humidity : 51%

Notes

Test plots please refer to the annex document “SHE24060051-02AE DATA TX EXHIBIT A”.

- 1. For 9 kHz ~ 30 MHz, the amplitude of spurious emissions that are attenuated by more than 20dB below the permissible. The value has no need to be reported. In addition, During 30MHz to 1GHz test frequency range, only the worst mode data was reported in this report.
- 2. The spurious above 18GHz is noise only and 20dB below the limit. The value has no need to be reported.
- 3. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement –X, Y, and Z-plane. The X-plane results were found as the worst case and were shown in this report.

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4.1.7 Band Edge (Restricted-band band-edge)

RESULT:

PASS

Test standard

: FCC Part 15.247(d), 15.205, 15.209

Requirement

: ANSI C63.10-2013 clause 11.13,
KDB 558074 D01 v05r02, Clause 8.7

Kind of test site

: 3m Semi-Anechoic Chamber

Test setup

Test Channel

: Low/Middle/High

Operation Mode

: A.1

Ambient temperature

: 23.5°C

Relative humidity

: 51%

Notes

Test plots please refer to the annex document “SHE24060051-02AE DATA TX EXHIBIT A ”.

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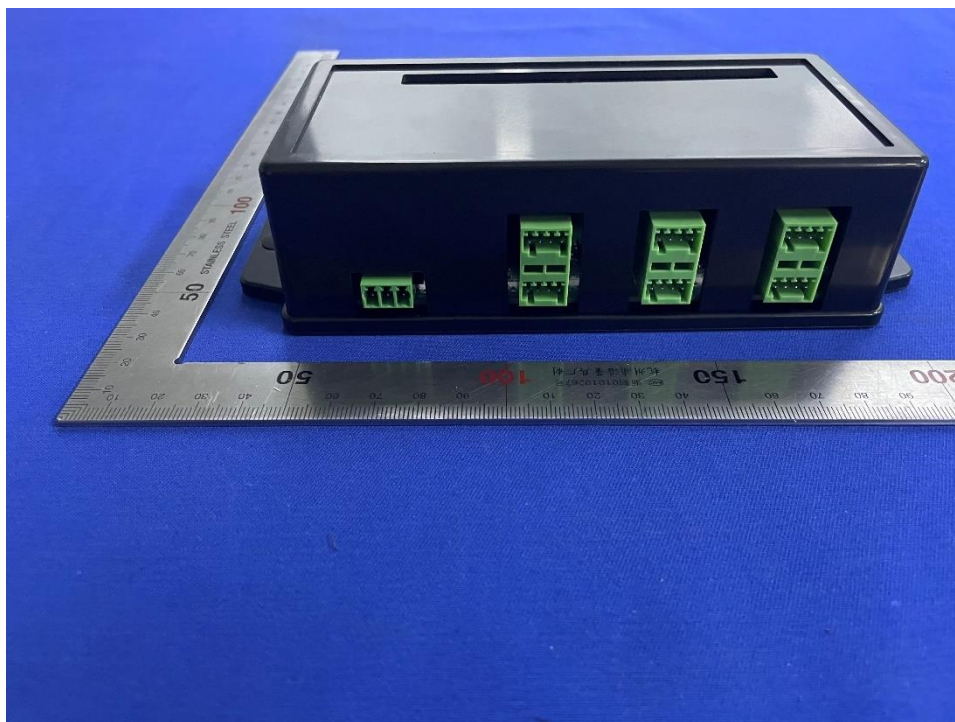
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5 Appendixes

5.1 Photographs of the Sample



Front of the sample



Rear of the sample

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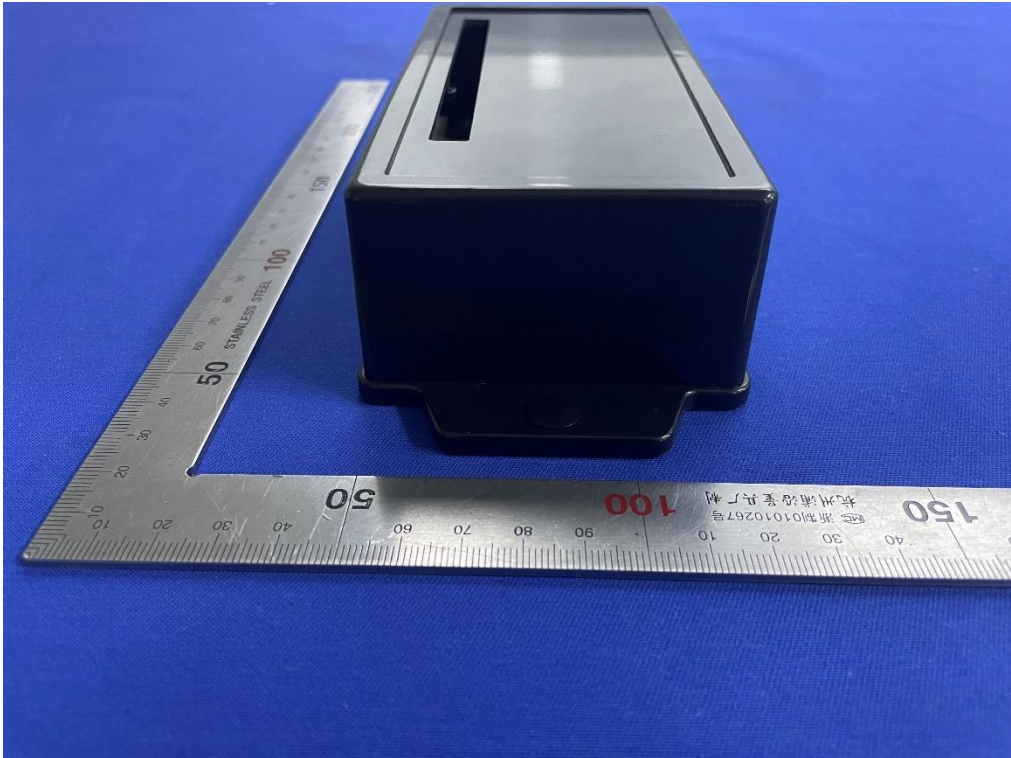
Report No.:

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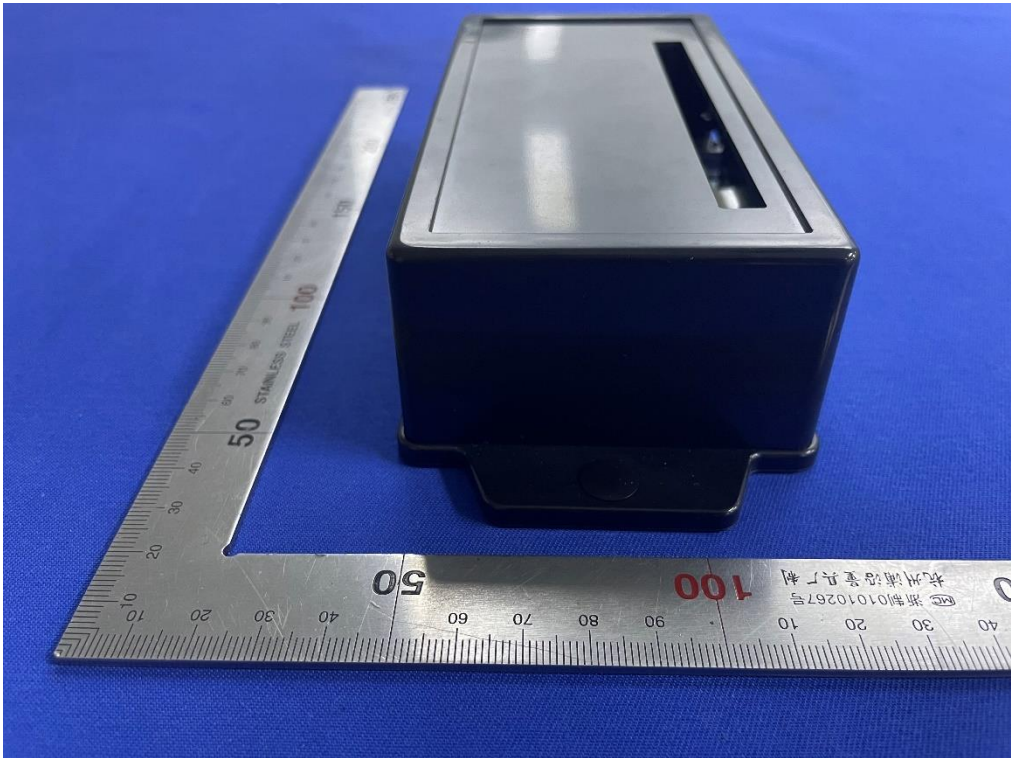
Date:

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Left of the sample



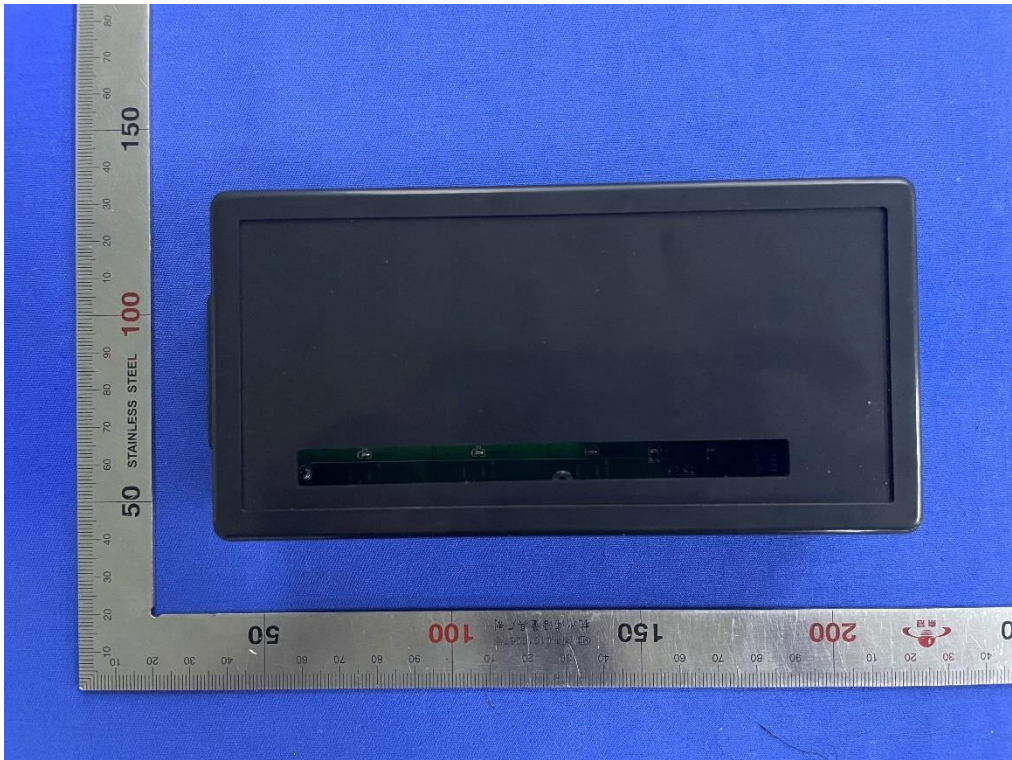
Right of the sample

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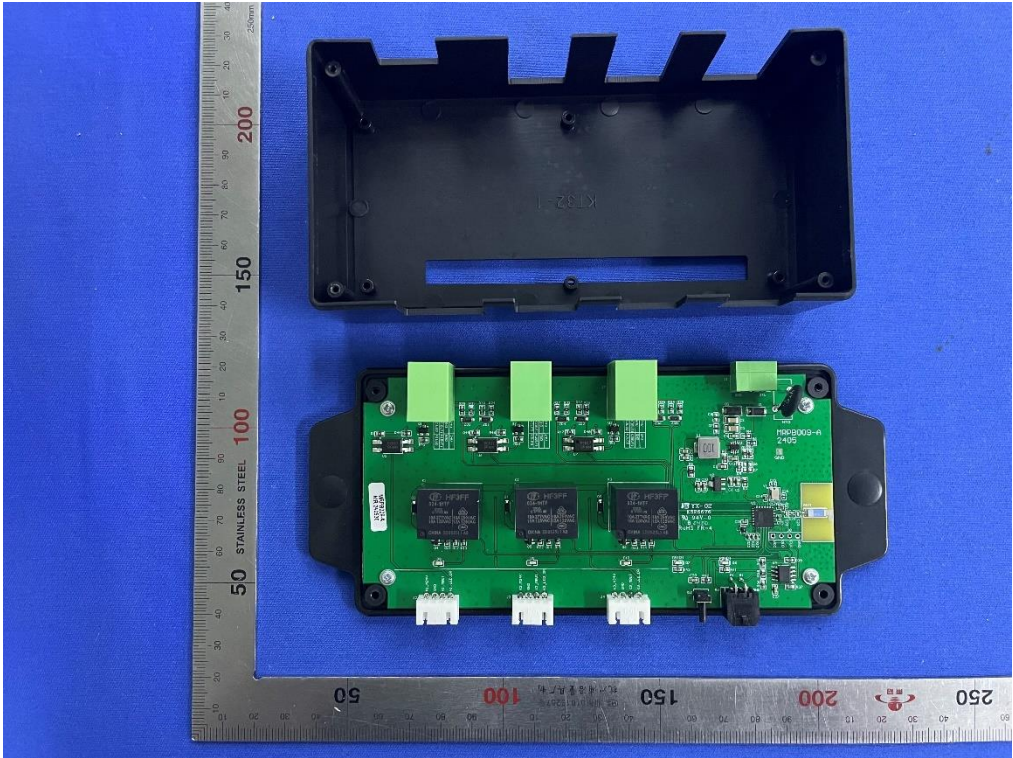


Top of the sample

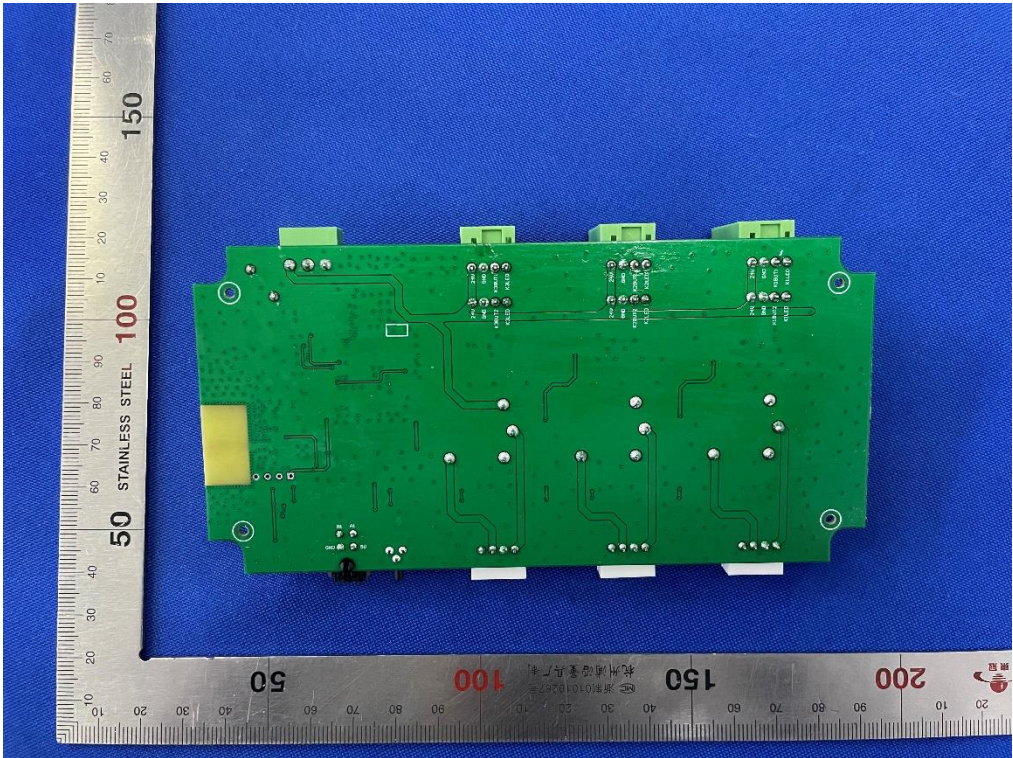


Bottom of the sample

TEST REPORT

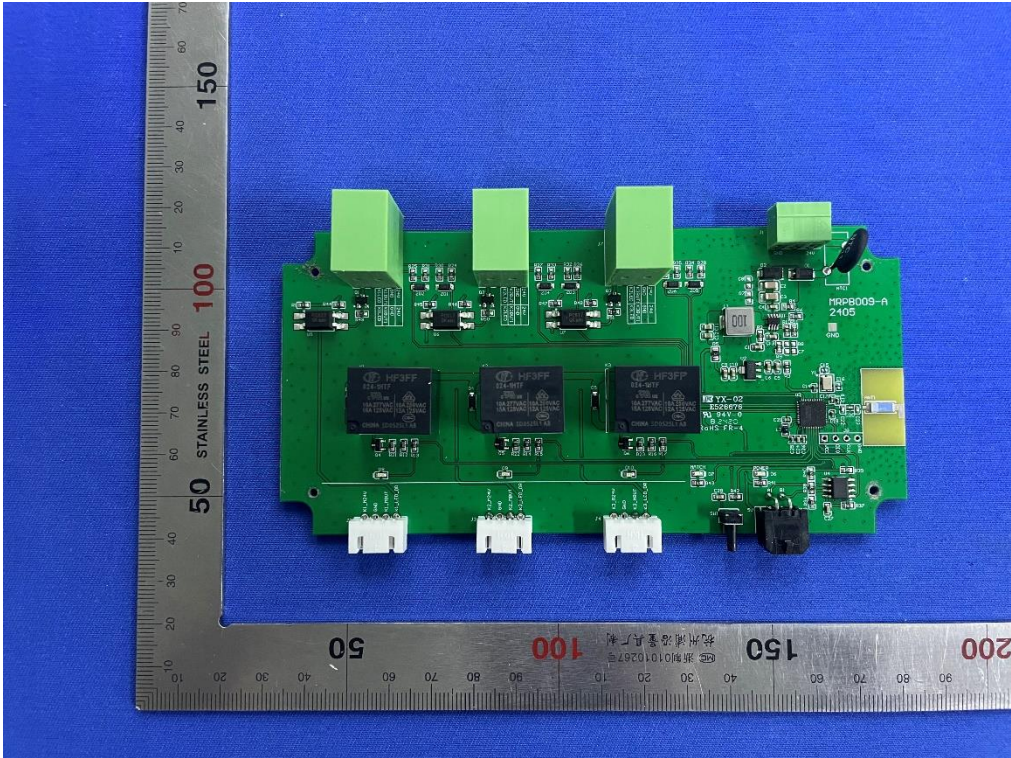


Open of the sample

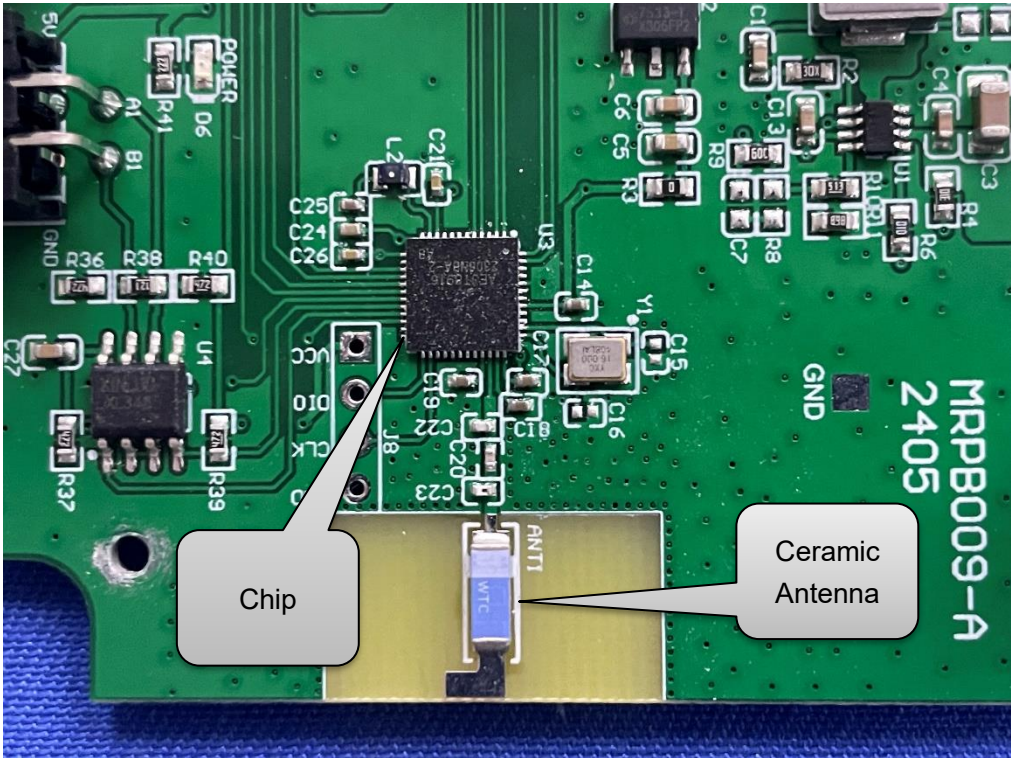


Internal-1 of the sample

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Internal-2 of the sample



Antenna Position

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5.2 Set-up for Conducted RF test at Antenna Port



5.3 Set-up for Spurious Emissions below 1GHz



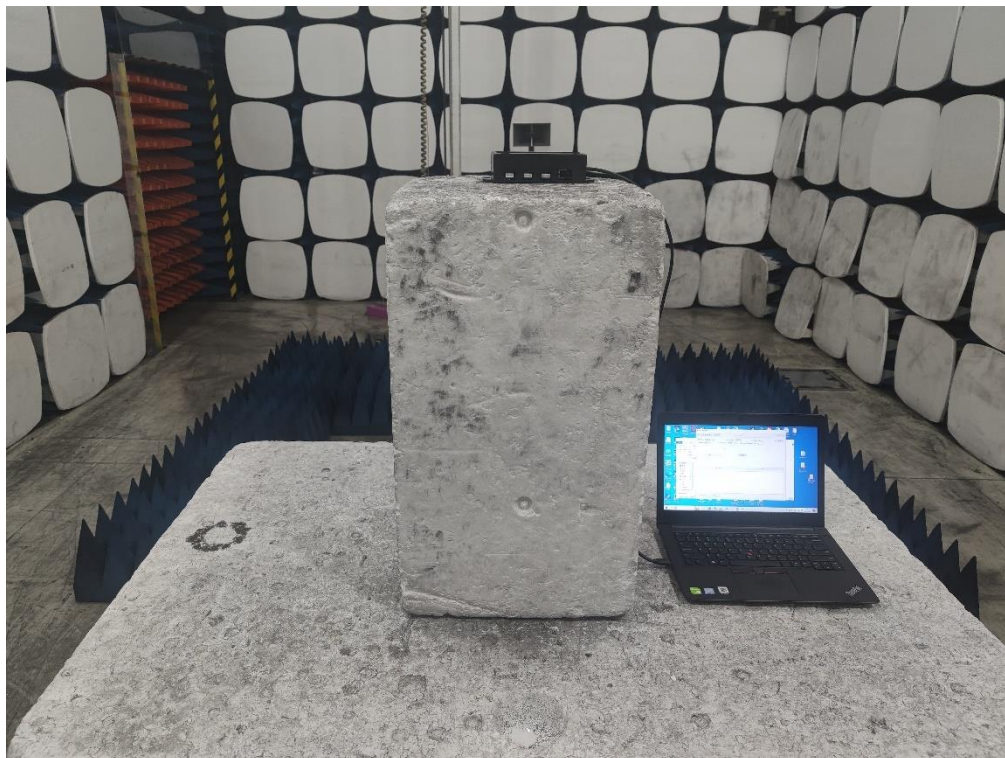
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5.4 Set-up for Spurious Emissions above 1GHz



End of the report