

TEST REPORT

Report No.: SHE25070059-06CE

Date: 2025-09-11

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Applicant : Keeson Technology Corporation Limited
Address of Applicant : No.158, Qiumao Road, Wangjiangjing, Xiuzhou district,
Jiaxing, Zhejiang, China

Product Name : CONTROL BOX
Brand Name : N/A
Model Name : MC332
Sample Acquisition Method : Sent by Client
Sample No. : E25070059-02#01
E25070059-02#02

FCC ID : 2AK23MC332

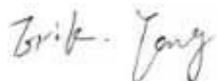
Standards : FCC CFR47 Part 15.247, Subpart C

Date of Receipt : 2025-07-21
Date of Test : 2025-07-25 ~ 2025-09-03
Date of Issue : 2025-09-11

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	Keeson Technology Corporation Limited
Applicant Company Address	No.158, Qiumao Road, Wangjiangjing, Xiuzhou district, Jiaxing, Zhejiang, China
Contact Person	Sam xu
Telephone	18279170755
Email	Sam.Xu@keeson.com
Manufacturer Company Name	Ergo Intelligent Technology (Jiaxing) Co., Ltd.
Manufacturer Company Address	No.1508, Xiushui Road, WangJiangjing Town, Xiuzhou District, Jiaxing City, Zhejiang Province,China.
Factory Company Name	Ergo Intelligent Technology (Jiaxing) Co., Ltd.
Factory Company Address	No.1508, Xiushui Road, WangJiangjing Town, Xiuzhou District, Jiaxing City, Zhejiang Province,China.

1.3 Details of EUT

Product Name	CONTROL BOX
Brand Name	N/A
Test Model Name	MC332
FCC ID	2AK23MC332
Mode of Operation	Bluetooth LE Version 5.0
Frequency Range	2402MHz ~ 2480MHz
Number of Channels	40 (at intervals of 2 MHz)
Modulation Type	BLE ☒ GFSK 1Mbps ☒ GFSK 2Mbps
RF Output Power	0.68dBm
Antenna Type	PCB Antenna
Antenna Gain	0dBi
Extreme Temperature Range	-10℃~ +40℃
Test Voltage	DC 29V supply by adapter
Hardware Version	V1.2
Software Version	V1.0

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RF power setting in TEST SW

Direct Test Mode Tool Version 0.9.1 _Power level setting_ 4dBm

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
0	2.402GHz	14	2.430GHz	28	2.458GHz
1	2.404GHz	15	2.432GHz	29	2.460GHz
2	2.406GHz	16	2.434GHz	30	2.462GHz
3	2.408GHz	17	2.436GHz	31	2.464GHz
4	2.410GHz	18	2.438GHz	32	2.466GHz
5	2.412GHz	19	2.440GHz	33	2.468GHz
6	2.414GHz	20	2.442GHz	34	2.470GHz
7	2.416GHz	21	2.444GHz	35	2.472GHz
8	2.418GHz	22	2.446GHz	36	2.474GHz
9	2.420GHz	23	2.448GHz	37	2.476GHz
10	2.422GHz	24	2.450GHz	38	2.478GHz
11	2.424GHz	25	2.452GHz	39	2.480GHz
12	2.426GHz	26	2.454GHz		
13	2.428GHz	27	2.456GHz		

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 C63.10-2020	American National Standard of Procedures for Compliance Testing of 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.

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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)	PASS

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2 Test Condition

2.1 Environmental conditions

Temperature (°C)	15-35
Humidity (%RH)	30-60
Barometric Pressure (mbar)	860-1060

Note: Actual values will be recorded during the test.

2.2 Equipment List

Name of Equipment	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	Keysight	N9020B	MY59260184	2025-06-30	2026-06-29
Spectrum Analyzer	Rohde & Schwarz	FSV40N	101450	2025-06-10	2026-06-09
Signal Generator	Rohde & Schwarz	SMR27	100184	2025-06-30	2026-06-29
EMI Test Receiver	Rohde & Schwarz	ESPI3	100173	2025-06-09	2026-06-08
EMI Test Receiver	Rohde & Schwarz	ESR 7	101911	2025-06-09	2026-06-08
V-network	SCHWARZBECK	NSLK 8127	8127-902	2025-06-09	2026-06-08
Attenuator	SCHWARZBECK	VTSD 9561-FN	/	2025-06-09	2026-06-08
Broadband Antenna	SCHWARZBECK	VULB9163	9163-1037	2025-03-24	2027-03-23
Horn Antenna-18G	SCHWARZBECK	BBHA9120D	9120D-1775	2025-06-22	2027-06-21
Loop Antenna	SCHWARZBECK	FMZB 1513	/	2025-06-23	2027-06-22
Horn Antenna-40G	YINGLIAN	LB-180400-KF	N/A	2025-06-22	2027-06-21
Broadband Preamplifier	SCHWARZBECK	BBV 9718	346	2025-06-09	2026-06-08
EMC chamber 9*6*6(L*W*H)	CHANGNING	966	N/A	2025-06-10	2028-06-09
Shielded Enclosure 8*5*4(L*W*H)	CHANGNING	854	N/A	2025-06-10	2028-06-09
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 expanded 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		$\pm 1.04\text{dB}$
Radiated Emission	< 1GHz	$\pm 5.00\text{dB}$
	> 1GHz	$\pm 5.46\text{dB}$
Conducted Emission on AC Mains	150KHz-30MHz	$\pm 3.36\text{dB}$
Occupied Channel Bandwidth		$\pm 39.26\text{KHz}$
Maximum Conducted Output Power		$\pm 1.06\text{dB}$
Maximum Conducted Output Power Spectral Density		$\pm 1.12\text{dB}$

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3 Test Set-up and Operation Modes

3.1 Details of Test Mode

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

Channel	Frequency
The lowest channel(CH00)	2402MHz
The middle channel(CH19)	2440MHz
The highest channel(CH39)	2480MHz

The basic operation modes are:

- A. On
1. BLE 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 1	Lenovo	TP00083A	PF-0PRDGN
Laptop 2	HP	HP ZHAN 66 Pro G1	5CD7438R1J
USB Cable	N/A	N/A	1.00m Unshielded
Adapter	GRP	GRP-A290020-A	680024554D0344817008

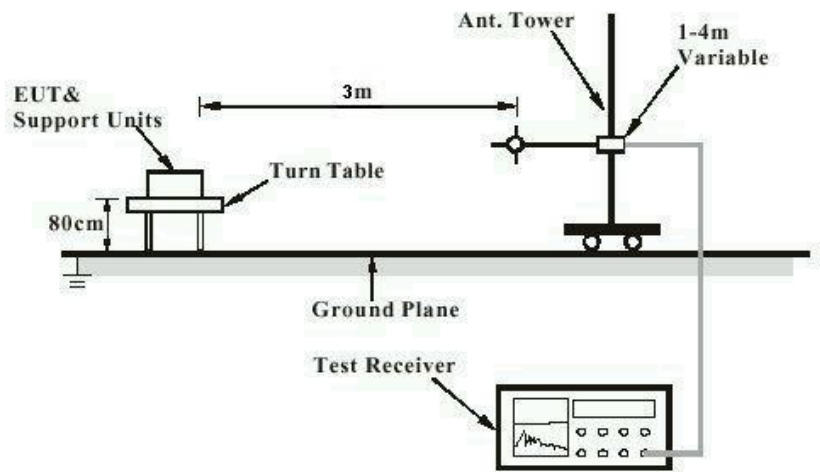
3.3 Support Software

Description	Manufacturer	Software Name
Software	N/A	Direct Test Mode 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 Conduction Measurement

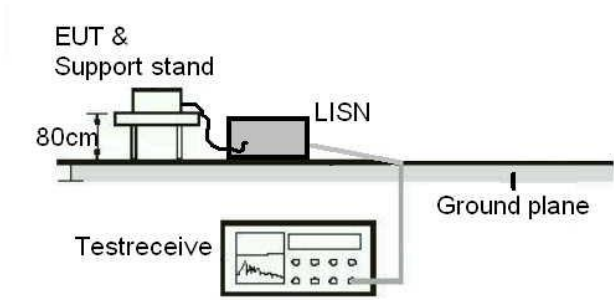
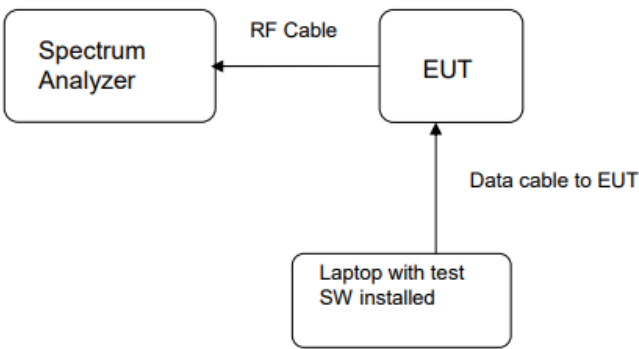


Diagram of Measurement Equipment Configuration for Transmitter Test



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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, the EUT has an antenna with a directional gain of 0dBi. The antenna is pcb antenna with no possibility of replacement with a non-approved antenna by the end-user.

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 C63.10-2020 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 : 24.5°C

Relative humidity : 42%

Table 1: Maximum peak conducted output power

Test Mode	Test Channel (MHz)	Maximum peak conducted output power		Limit (W)
		(dBm)	(mW)	
BLE-1Mbps	2402	0.66	1.16	< 1
	2440	-0.68	0.86	
	2480	-1.78	0.66	
BLE-2Mbps	2402	0.68	1.17	< 1
	2440	-0.65	0.86	
	2480	-1.75	0.67	

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Figure 1: Peak Output Power, 2402MHz, BLE-1Mbps

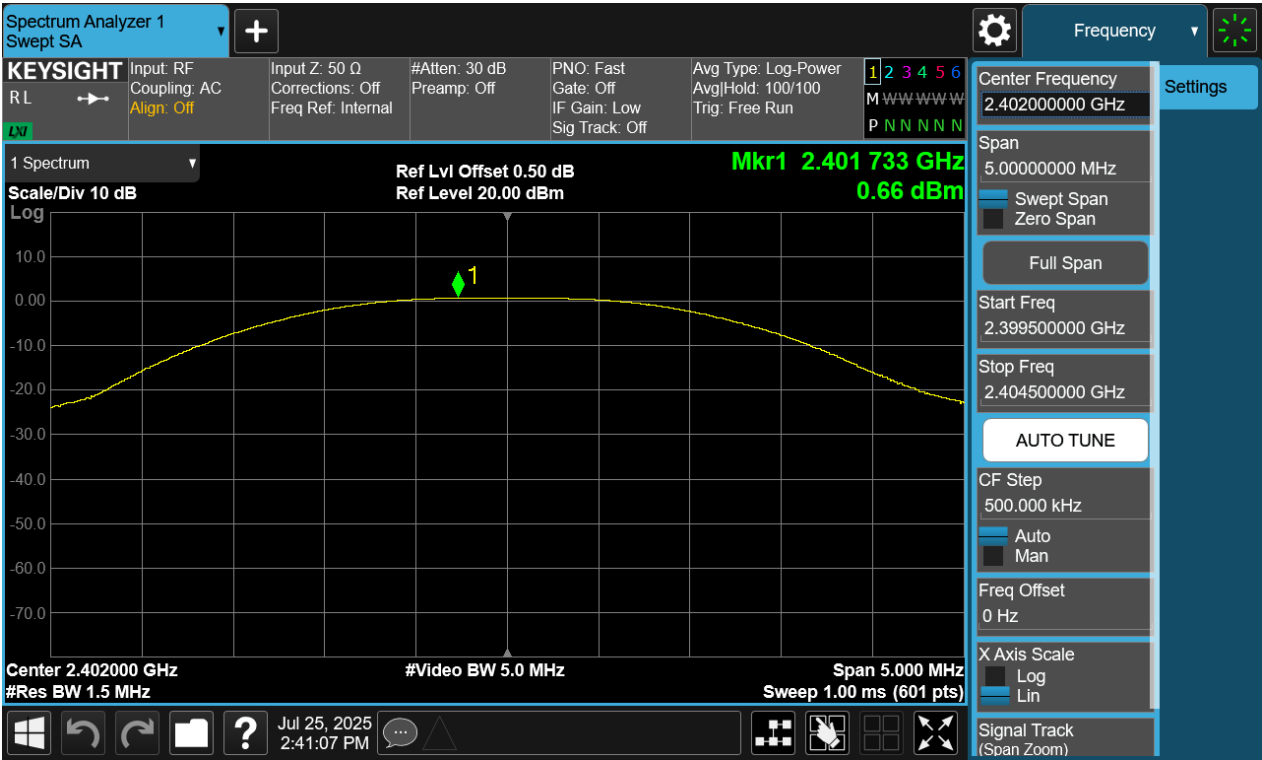
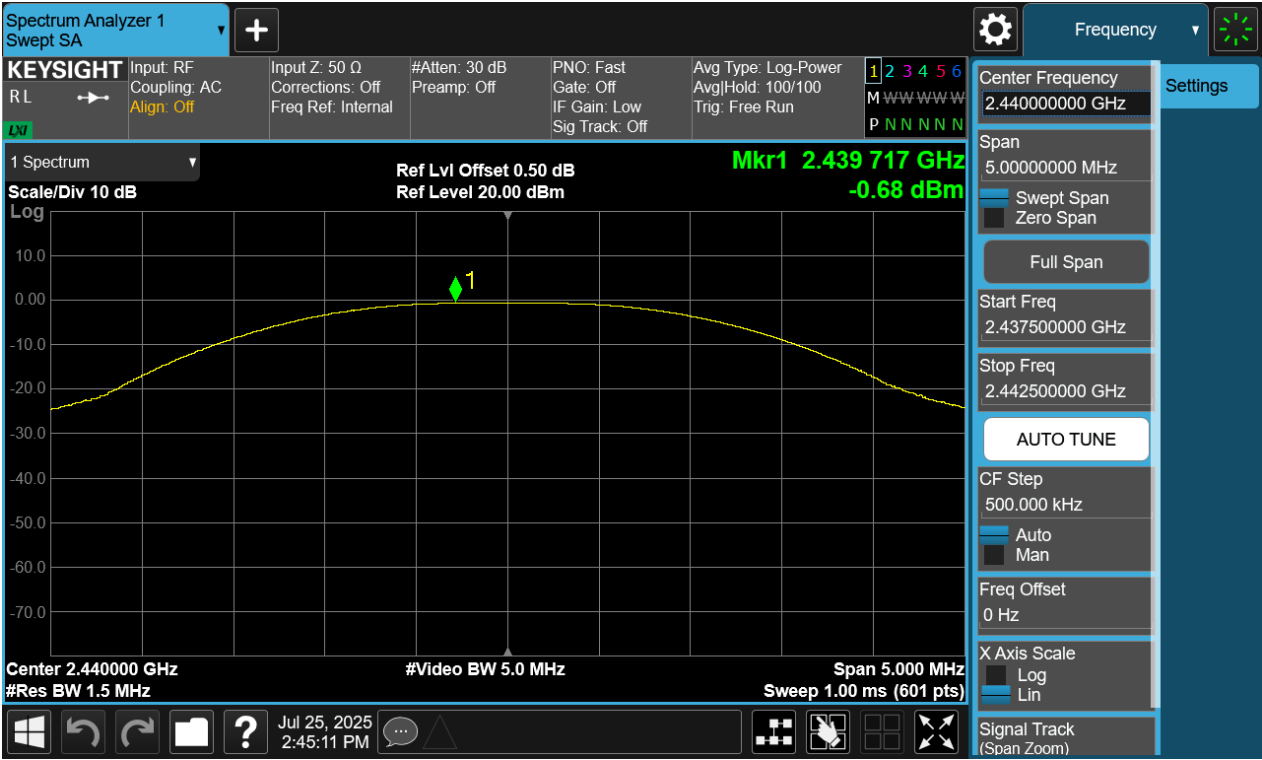


Figure 2: Peak Output Power, 2440MHz, BLE-1Mbps



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Figure 3: Peak Output Power, 2480MHz, BLE-1Mbps

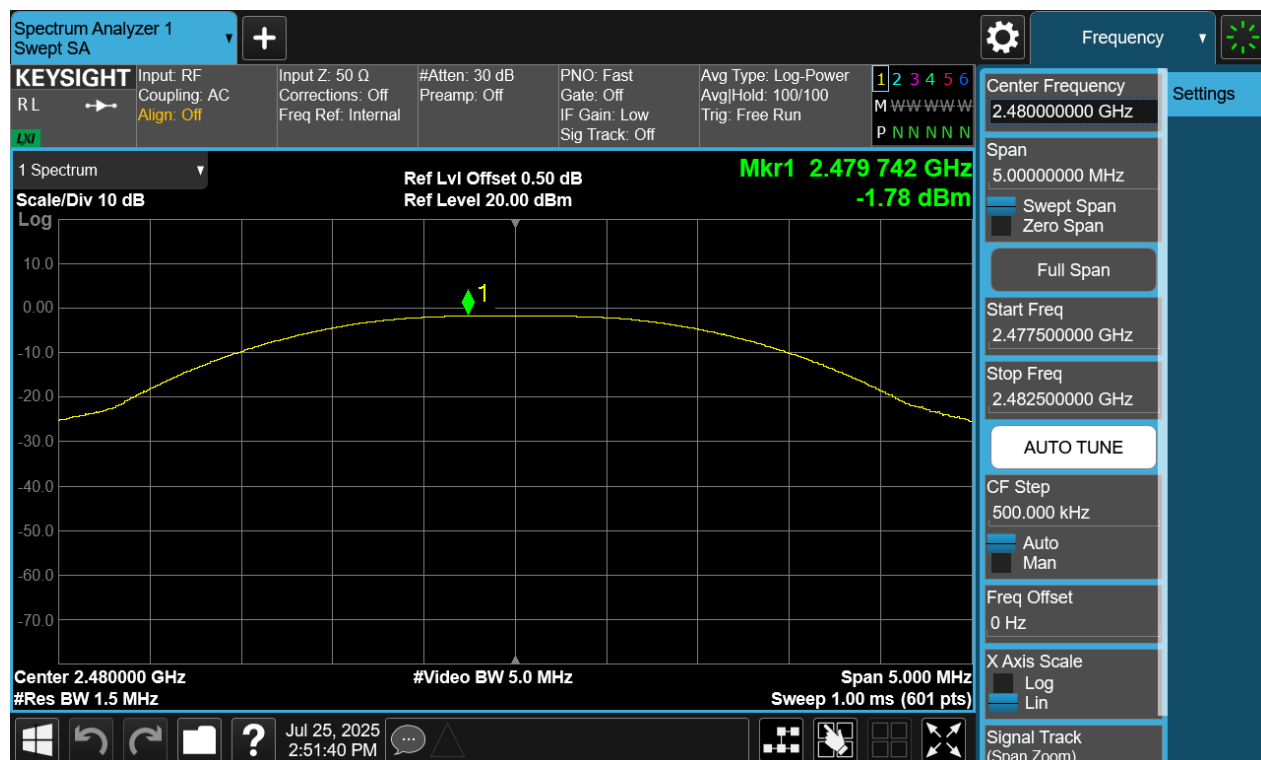


Figure 4: Peak Output Power, 2402MHz, BLE-2Mbps



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Figure 5: Peak Output Power, 2440MHz, BLE-2Mbps



Figure 6: Peak Output Power, 2480MHz, BLE-2Mbps



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4.1.3 6dB Bandwidth

RESULT:

PASS

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

Requirement : ANSI C63.10-2020 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 : 24.5°C

Relative humidity : 42%

Table 3: 6dB Bandwidth

Test Mode	Test Channel (MHz)	6dB Bandwidth (MHz)	Limit
BLE-1Mbps	2402	0.6758	>0.5 MHz
	2440	0.7352	
	2480	0.6786	
BLE-2Mbps	2402	1.1770	
	2440	1.1090	
	2480	1.1170	

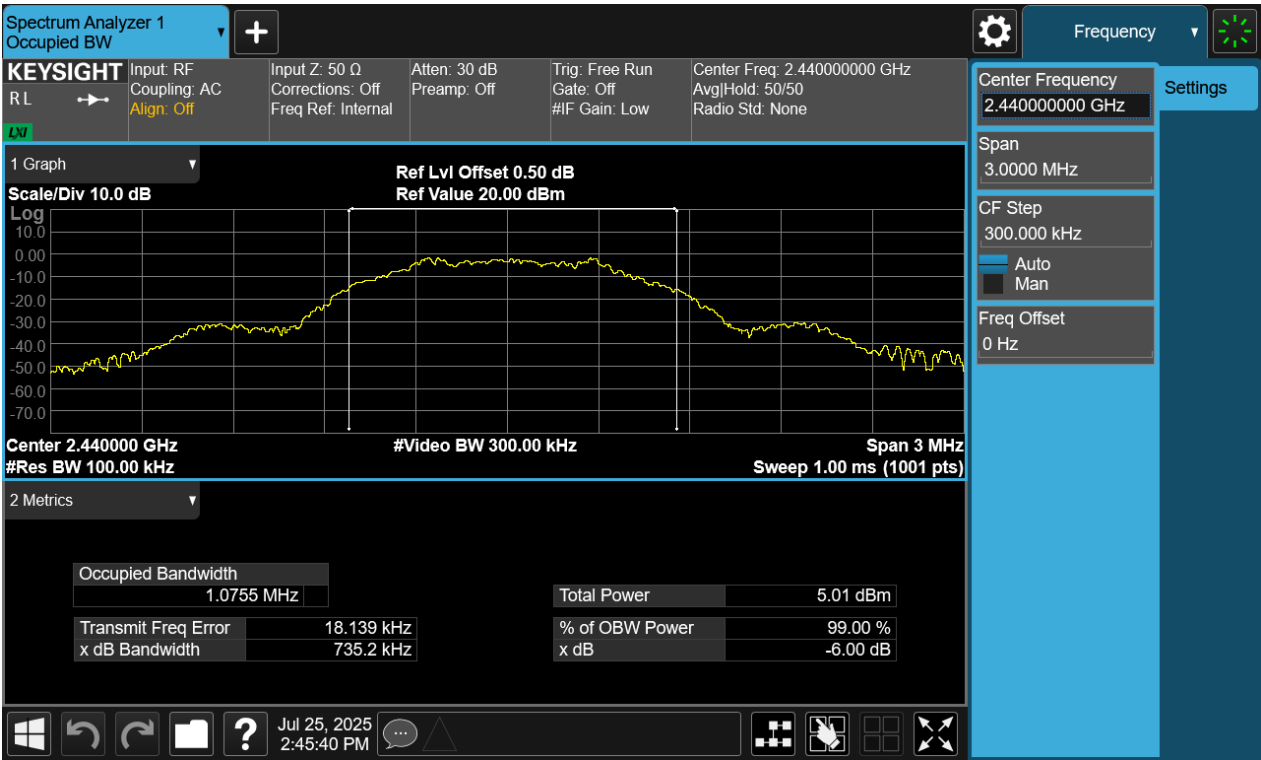
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Figure 7: 6dB Bandwidth, 2402MHz, BLE-1Mbps



Figure 8: 6dB Bandwidth, 2440MHz, BLE-1Mbps



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Figure 9: 6dB Bandwidth, 2480MHz, BLE-1Mbps

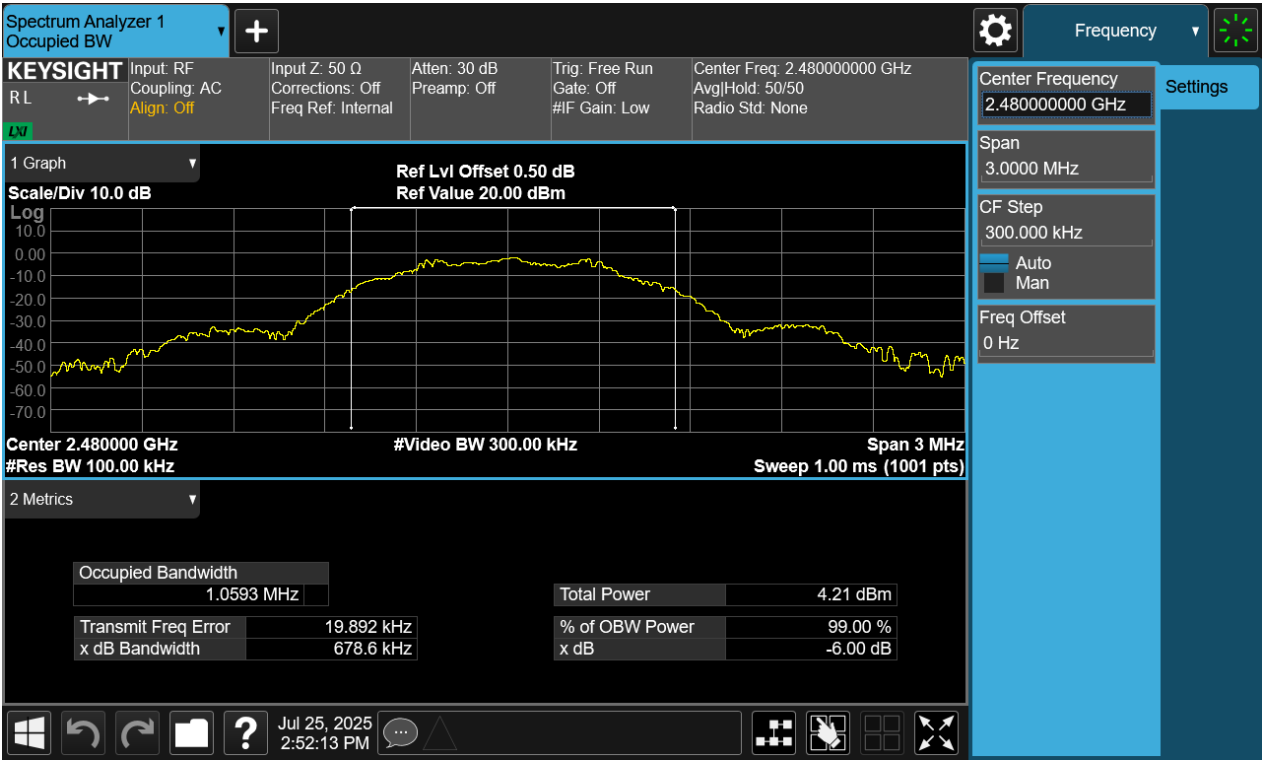
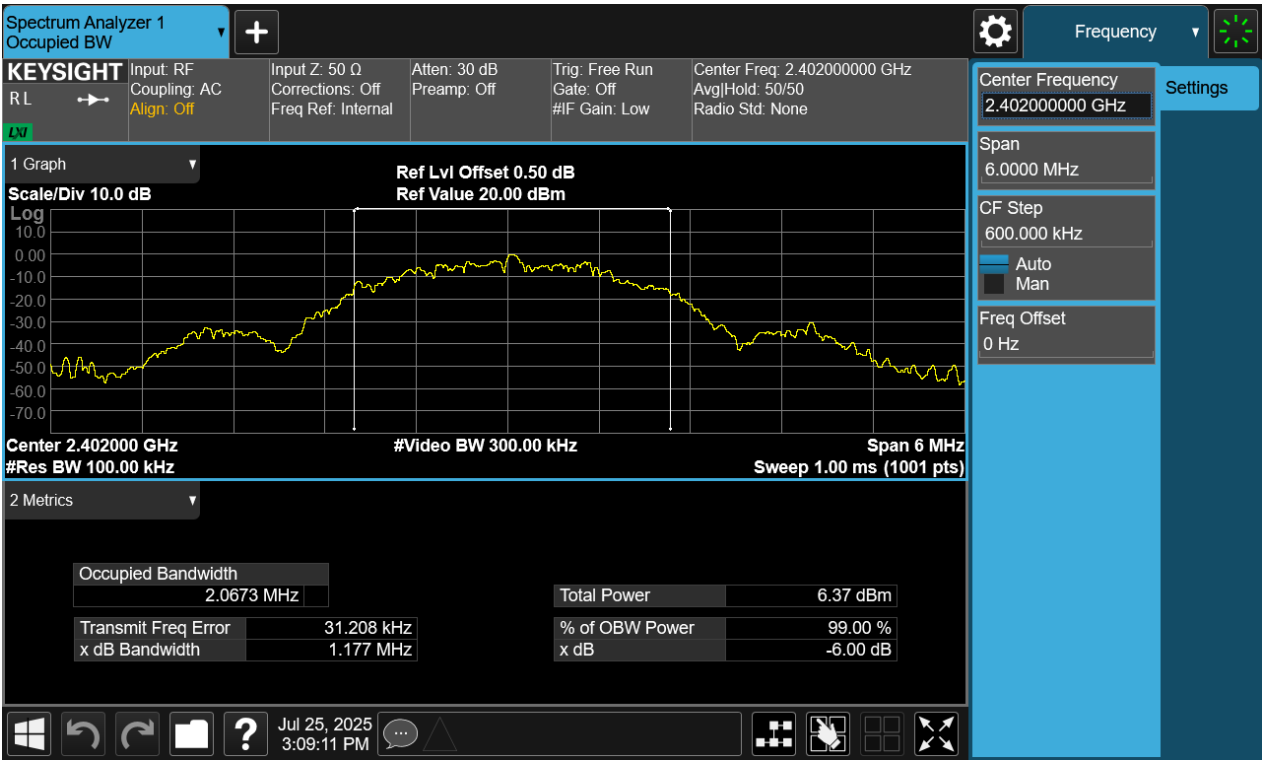


Figure 10: 6dB Bandwidth, 2402MHz, BLE-2Mbps



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Figure 11: 6dB Bandwidth, 2440MHz, BLE-2Mbps

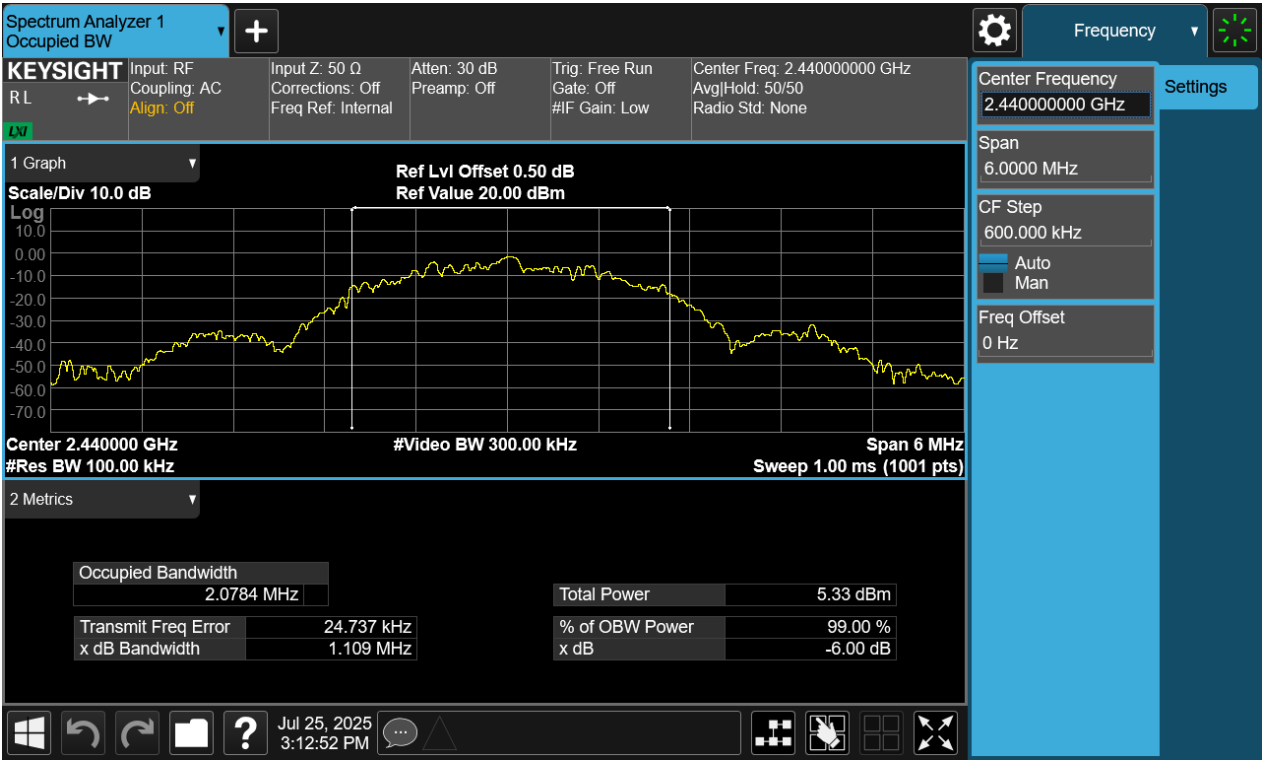
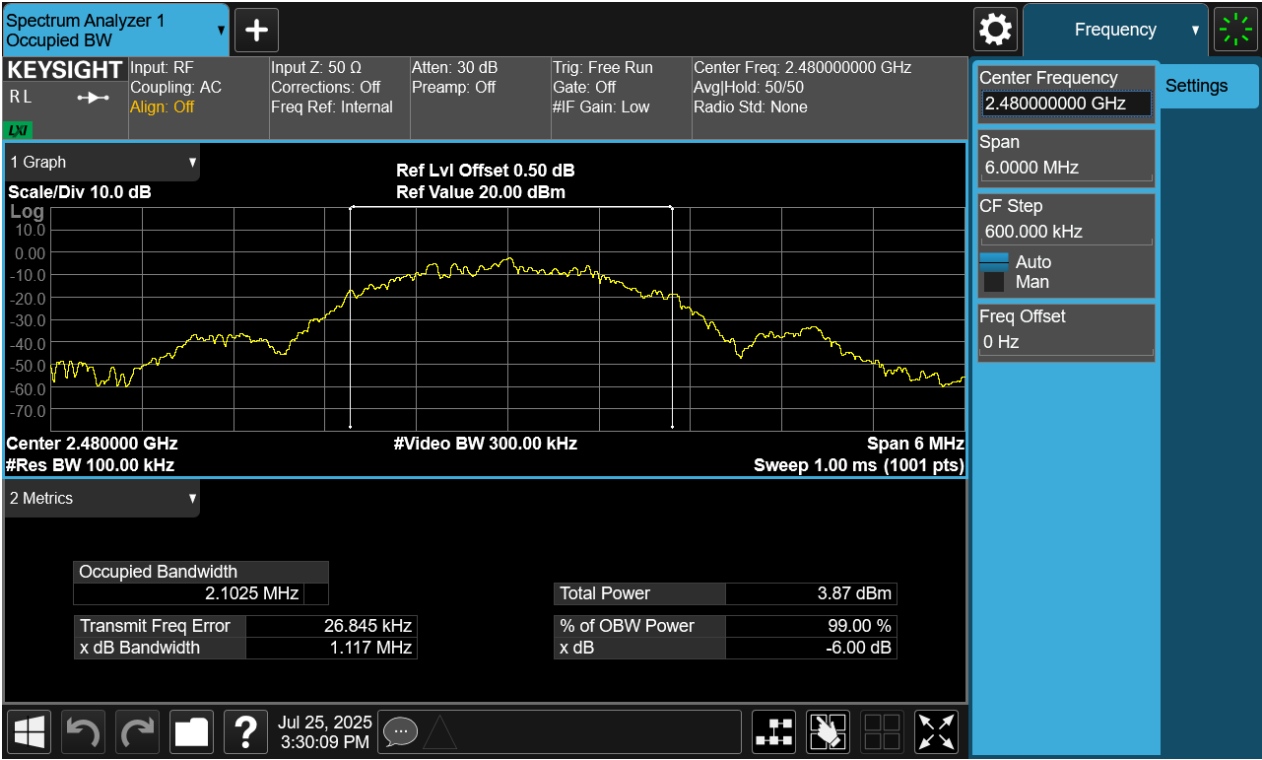


Figure 12: 6dB Bandwidth, 2480MHz, BLE-2Mbps



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4.1.4 Maximum conducted output power spectral density

RESULT:

PASS

Test standard : FCC Part 15.247(e)

Requirement : ANSI C63.10-2020 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 : 24.5°C

Relative humidity : 42%

Table 4: Maximum conducted output power spectral density

Test Mode	Test Channel (MHz)	Measured Result (dBm/3kHz)	Limit (dBm/3kHz)
BLE-1Mbps	2402	-14.51	8
	2440	-15.99	
	2480	-17.29	
BLE-2Mbps	2402	-17.11	
	2440	-18.37	
	2480	-19.69	

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Figure 13: Power Spectral Density, 2402MHz, BLE-1Mbps

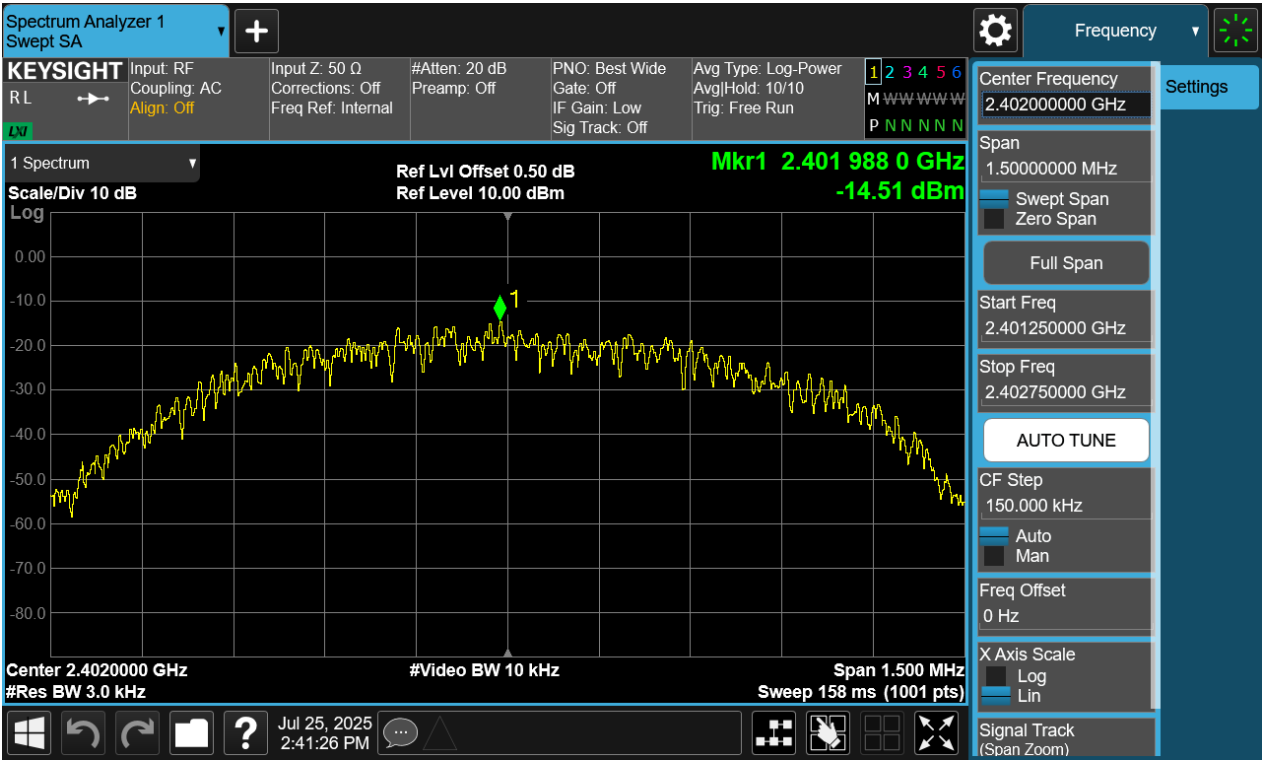
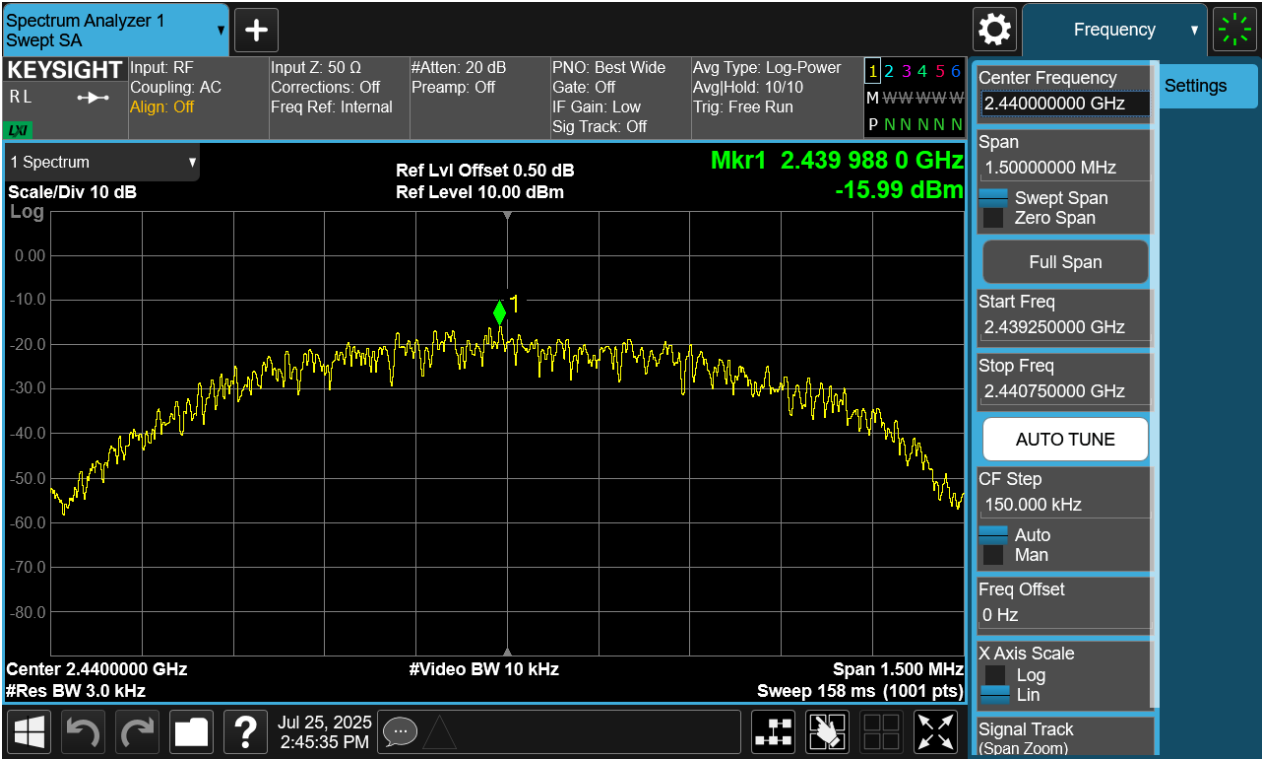


Figure 14: Power Spectral Density, 2440MHz, BLE-1Mbps



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Figure 15: Power Spectral Density, 2480MHz, BLE-1Mbps

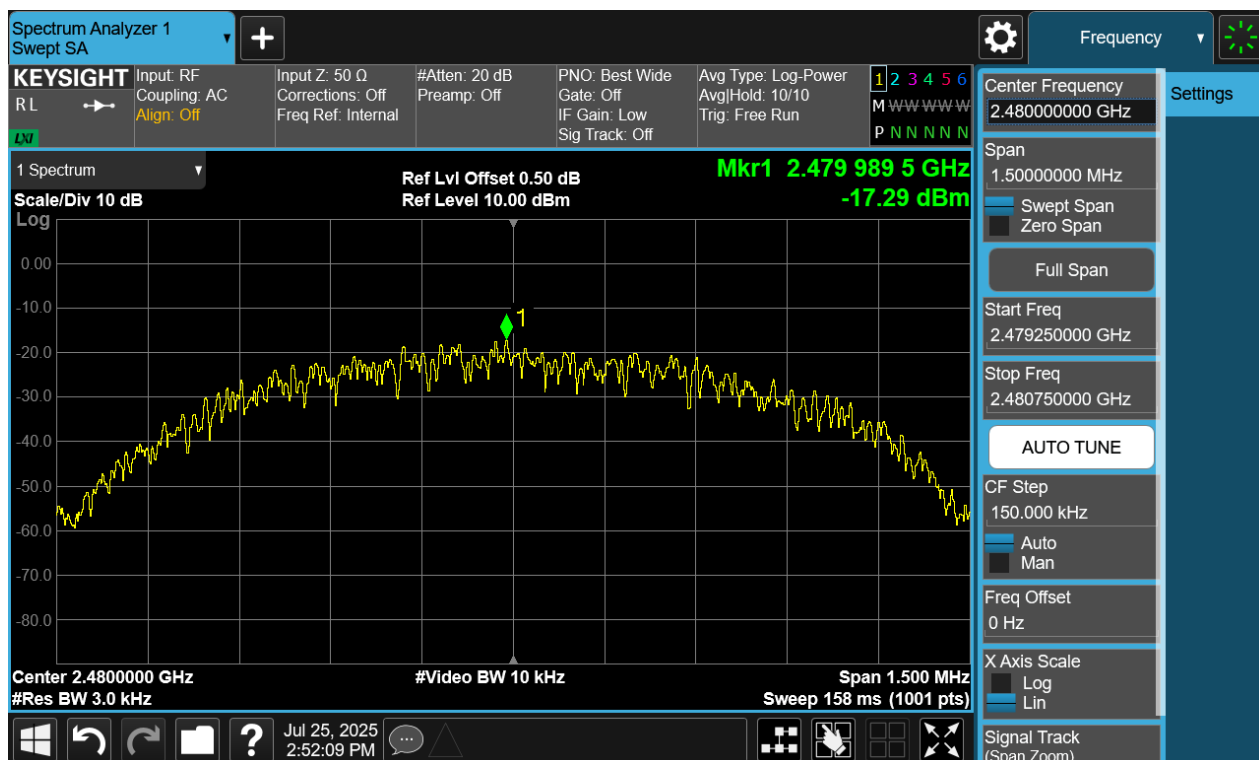
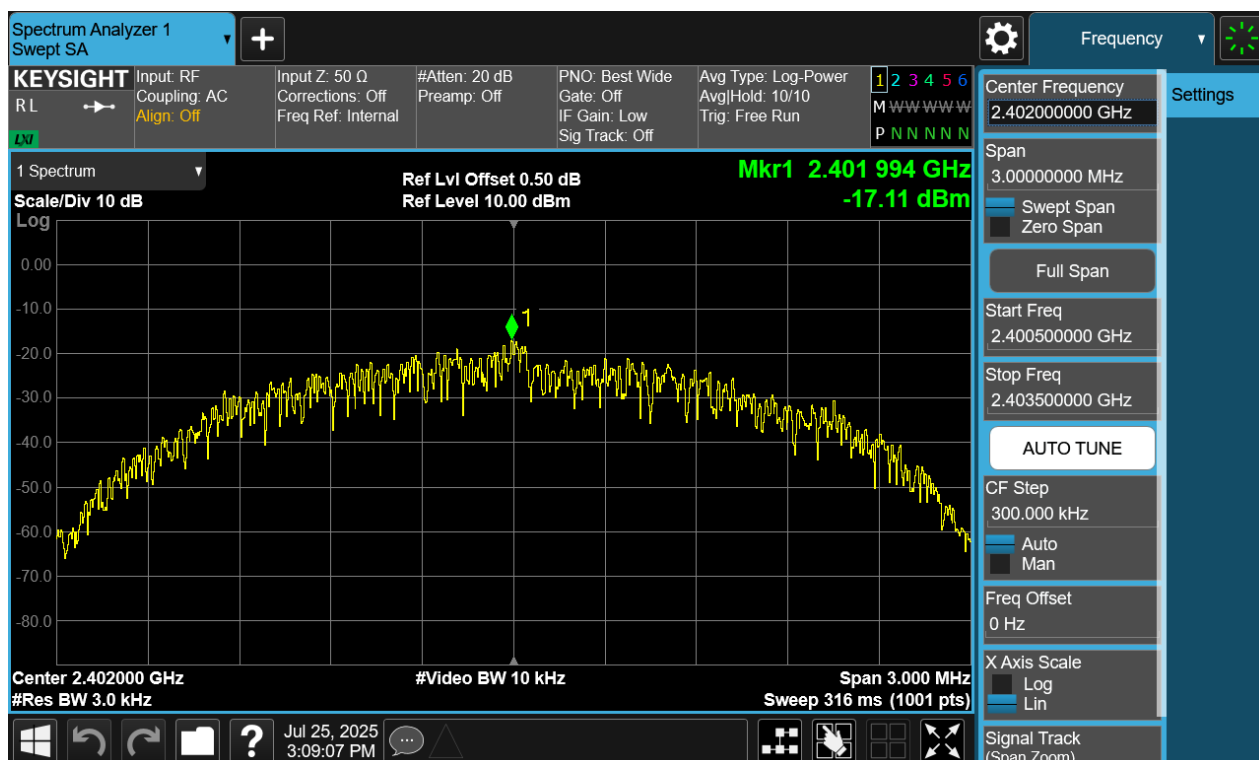


Figure 16: Power Spectral Density, 2402MHz, BLE-2Mbps



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Figure 17: Power Spectral Density, 2440MHz, BLE-2Mbps

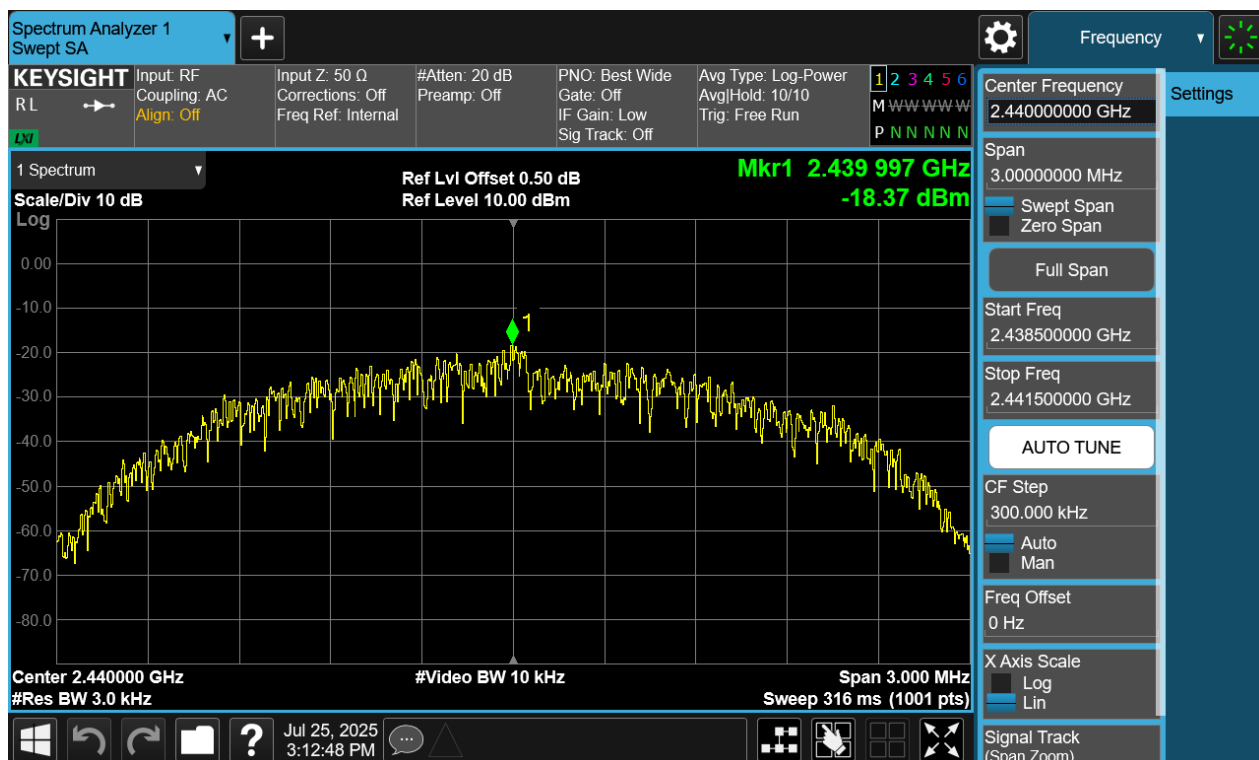
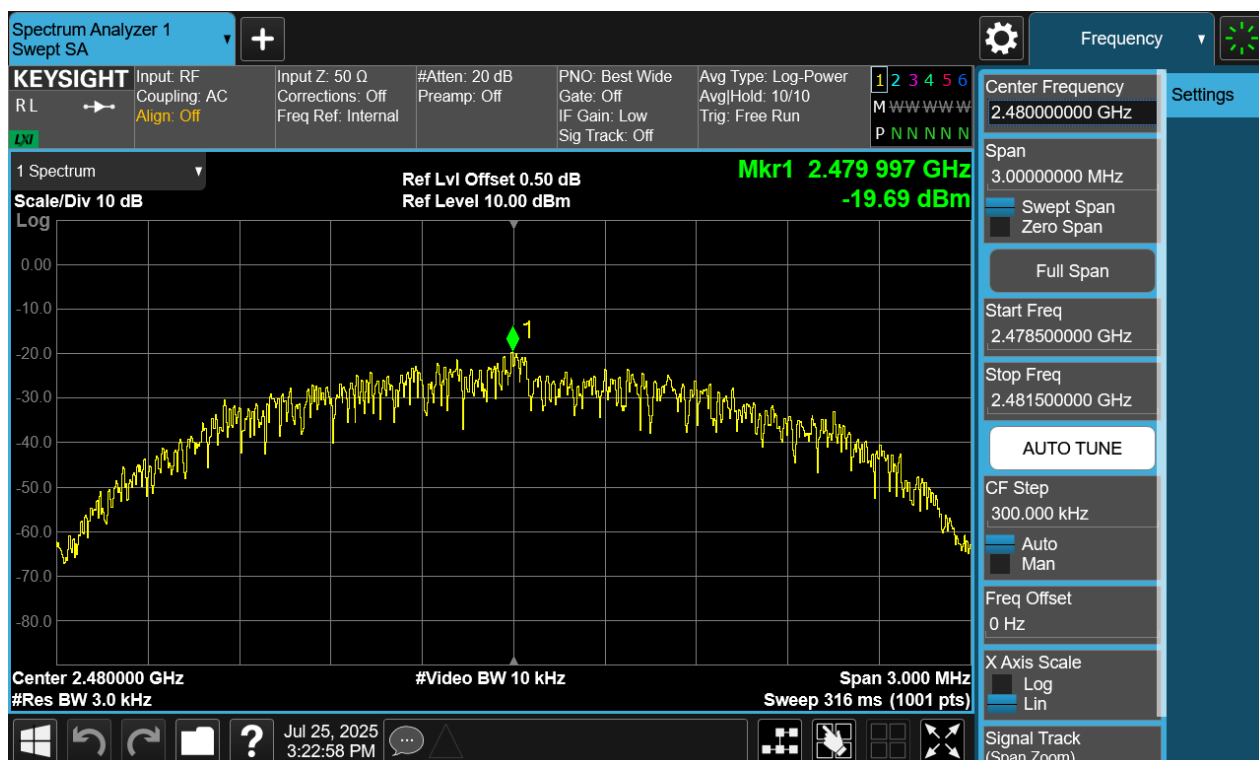


Figure 18: Power Spectral Density, 2480MHz, BLE-2Mbps



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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 C63.20-2020, Clause 11.11.1 KDB 558074 D01 v05r02, Clause 8.5
Kind of test site	: Shielded room

Test setup

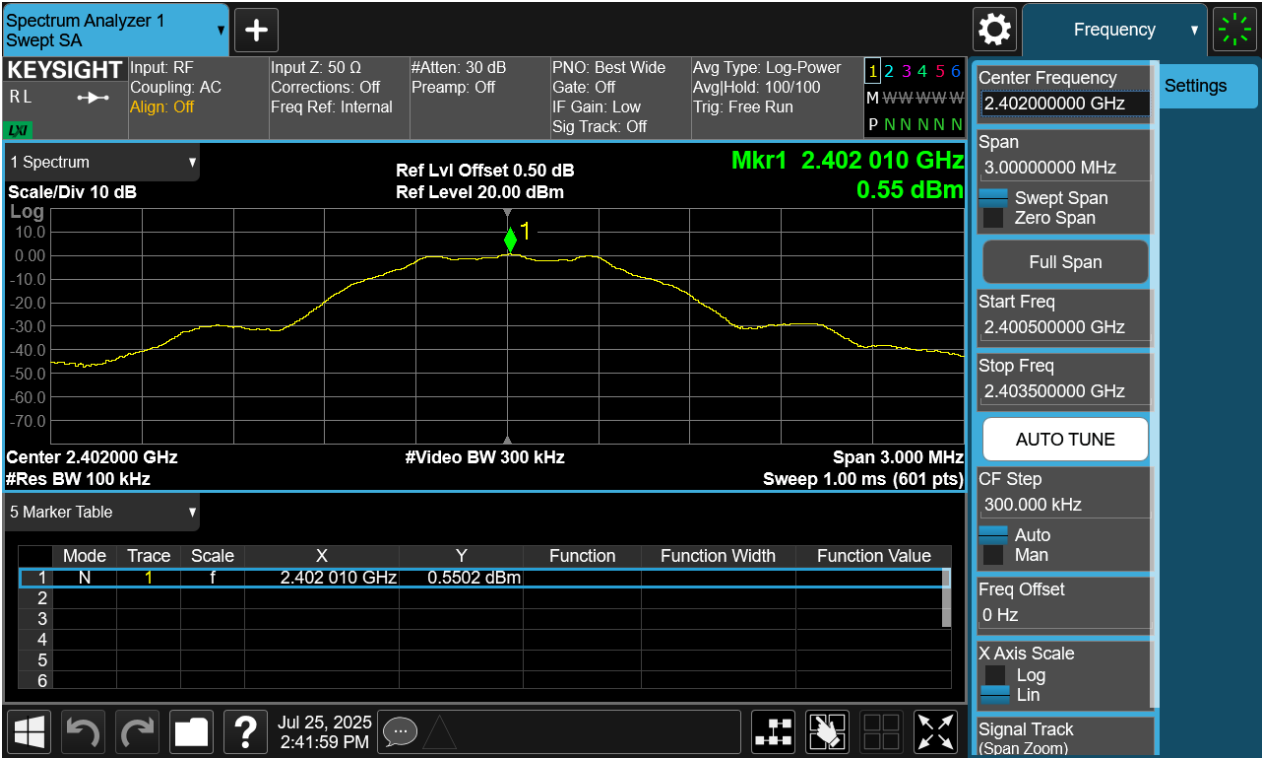
Test Channel	: Low/Middle/High for spurious, Low/High for Band Edge
Operation Mode	: A.1.a
Ambient temperature	: 24.5°C
Relative humidity	: 42%

For details refer to following test plot.

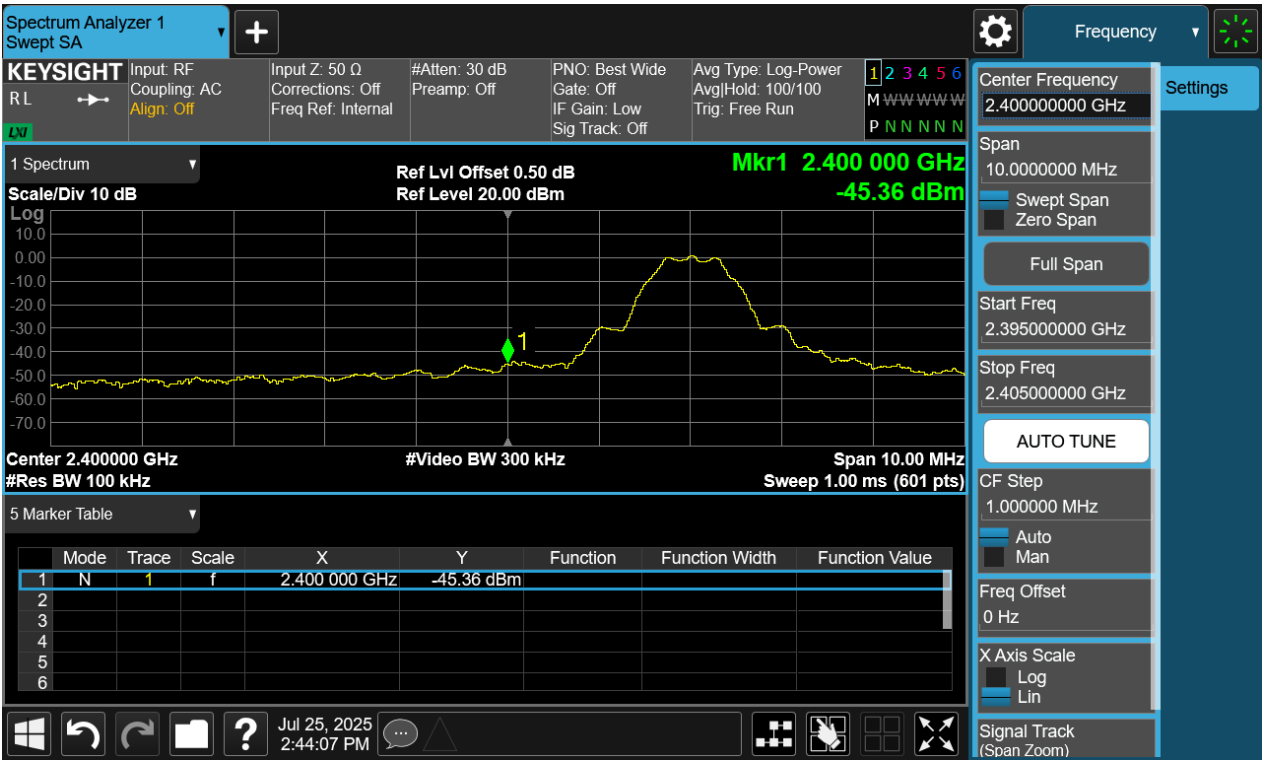
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Figure 19: Conducted Spurious Emission & Authorized-band band-edge, 2402MHz, BLE-1Mbps Carrier Level



Band Edge



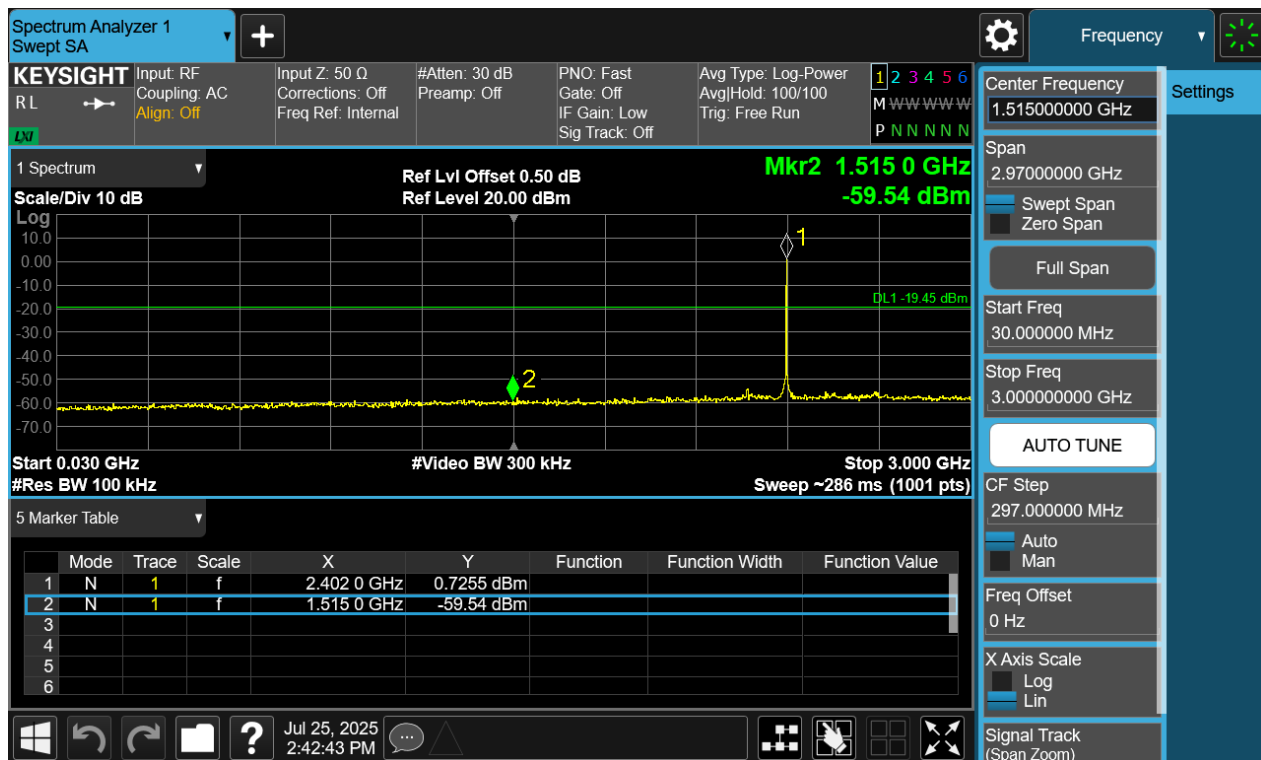
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Conducted spurious emissions 30MHz-25GHz



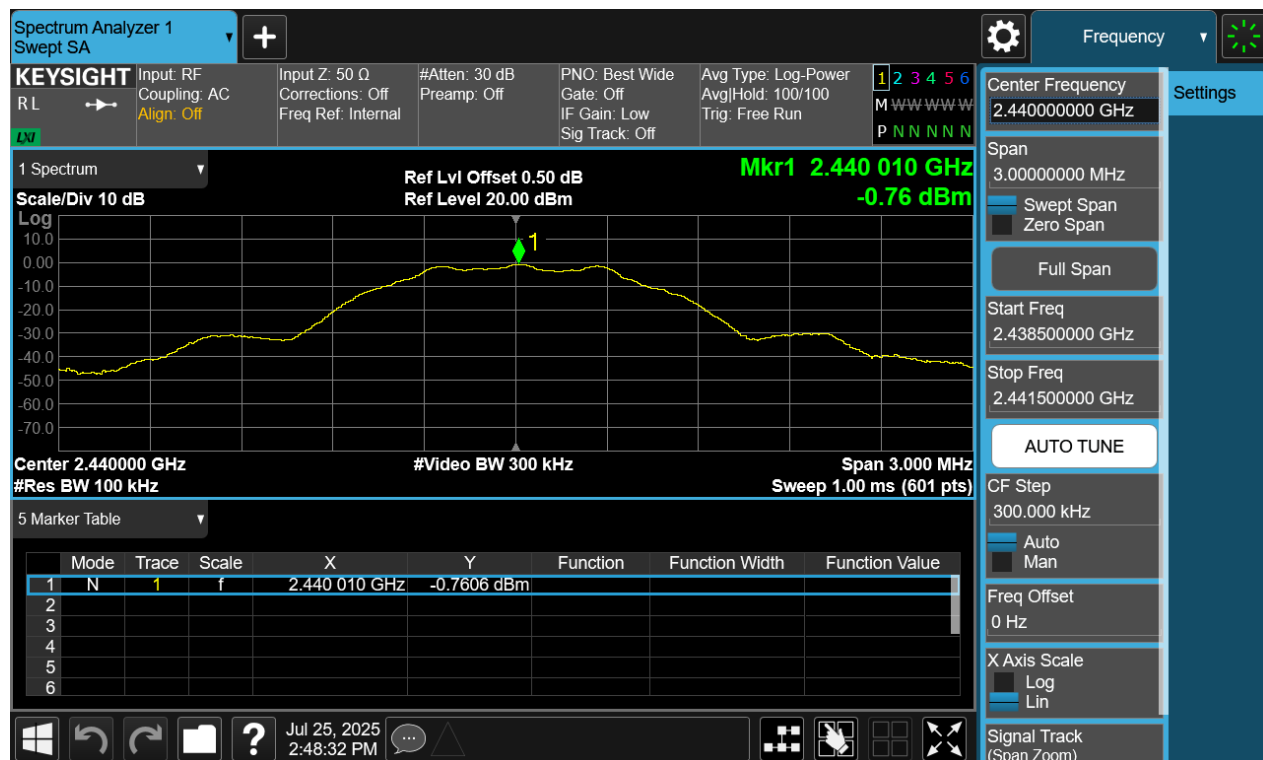
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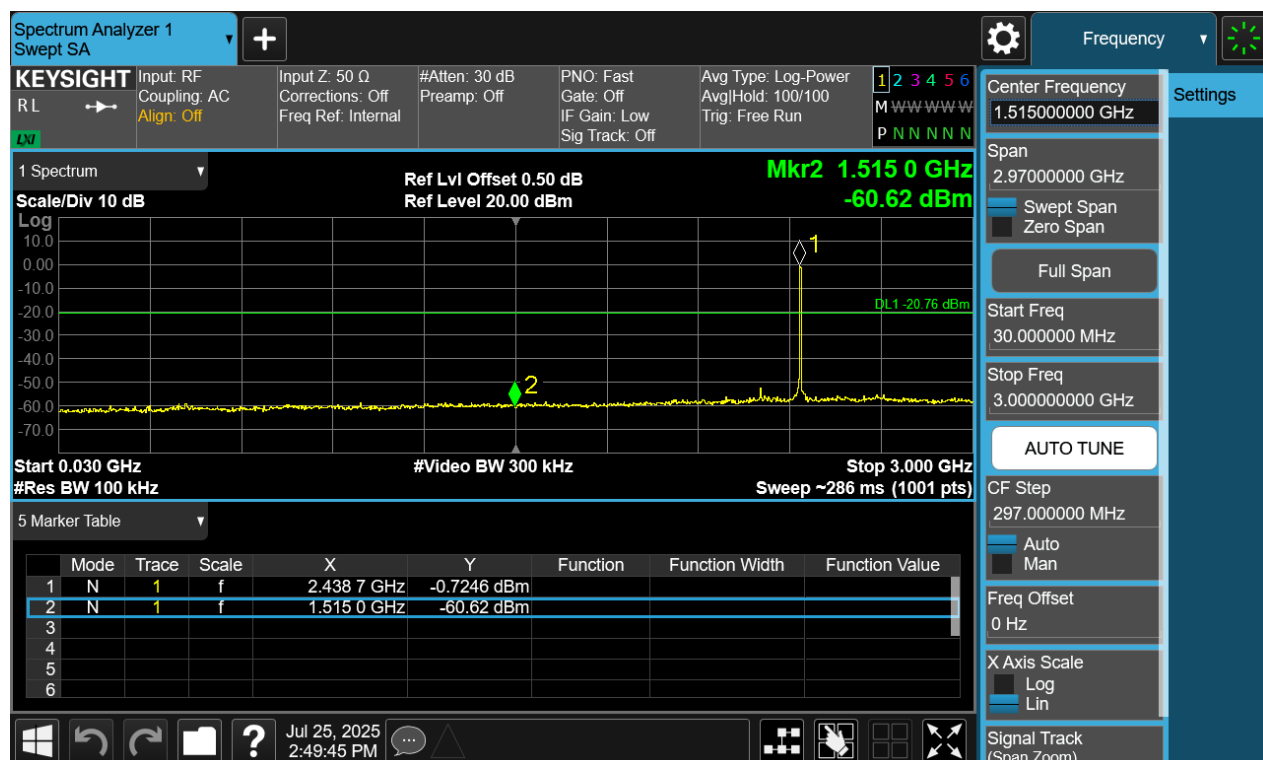
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Figure 20: Conducted Spurious Emission & Authorized-band band-edge, 2440MHz, BLE-1Mbps Carrier Level



Conducted spurious emissions 30MHz-25GHz



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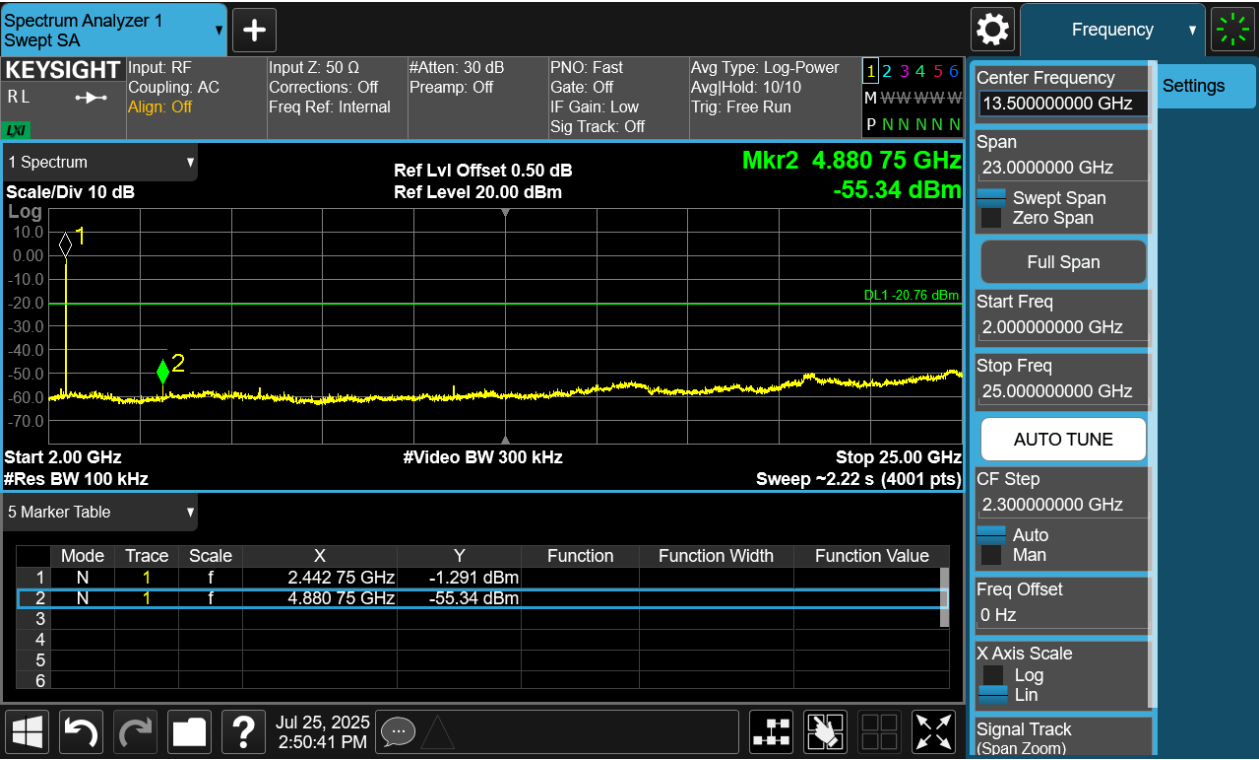
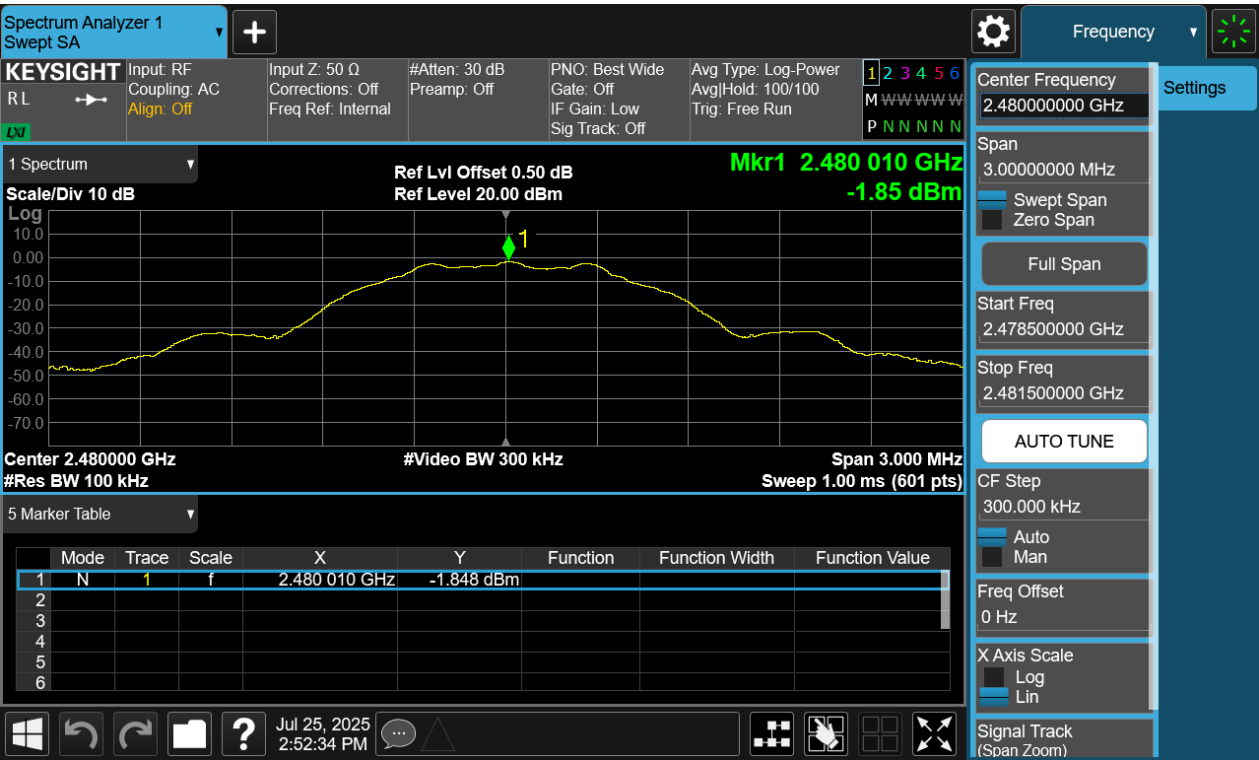


Figure 21: Conducted Spurious Emission & Authorized-band band-edge, 2480MHz, BLE-1Mbps Carrier Level



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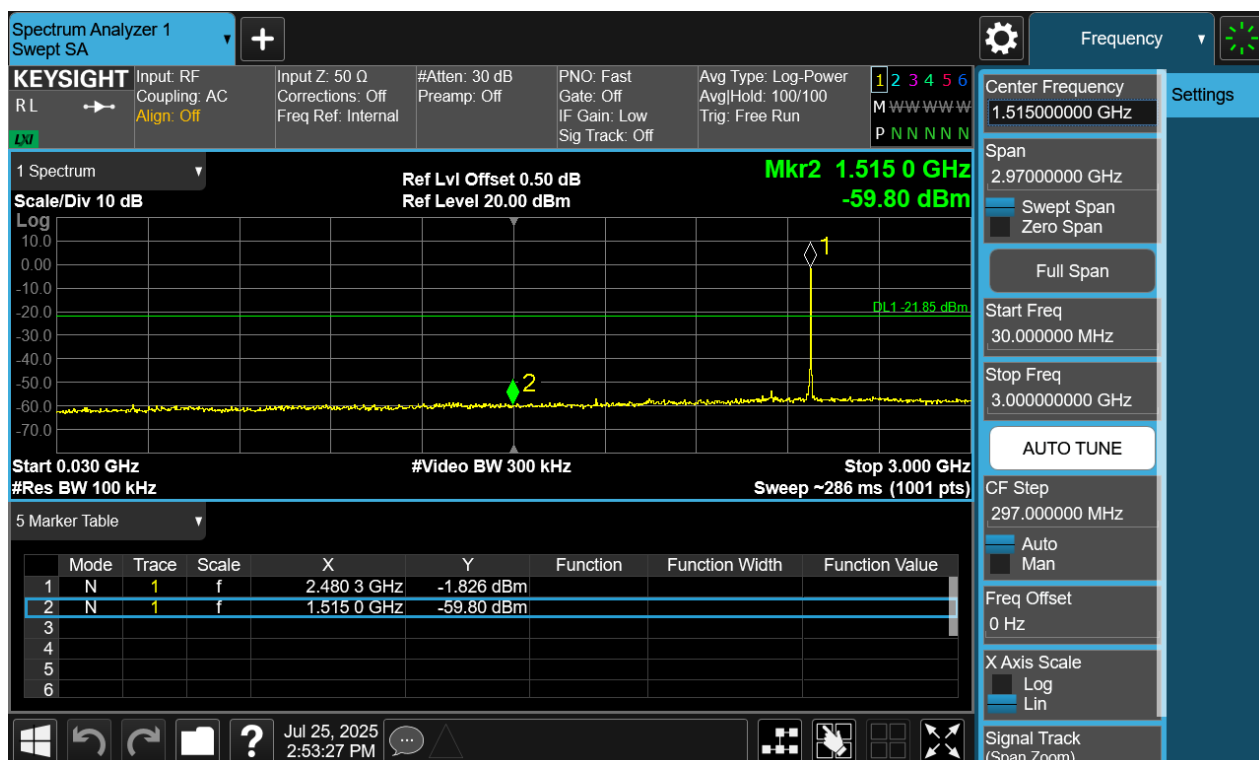
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Band Edge



Conducted spurious emissions 30MHz-25GHz



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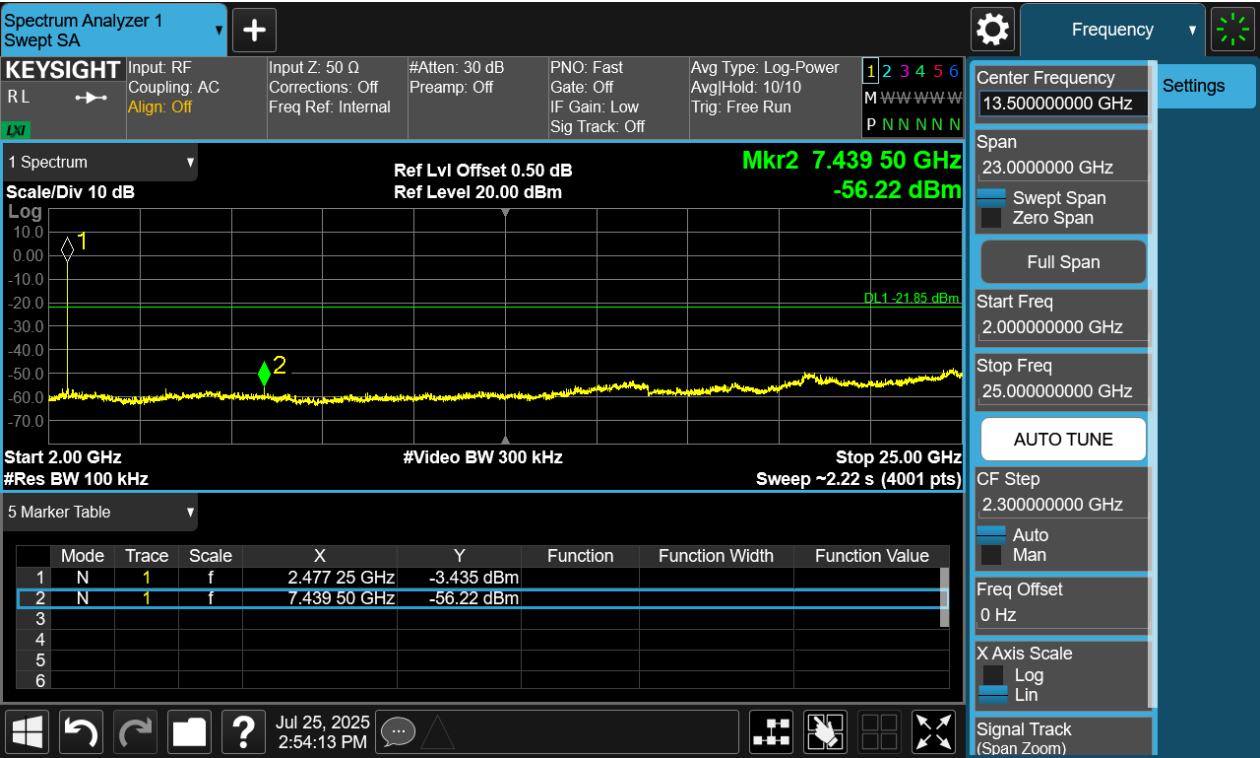
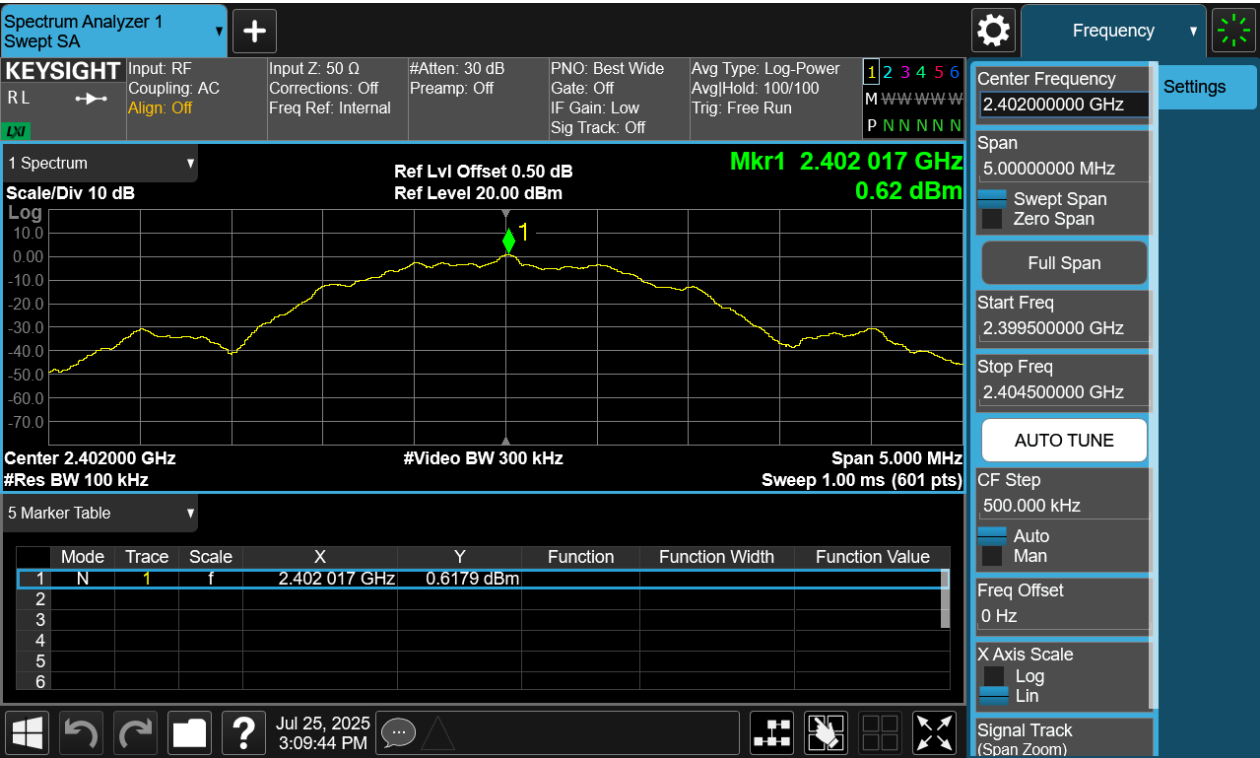


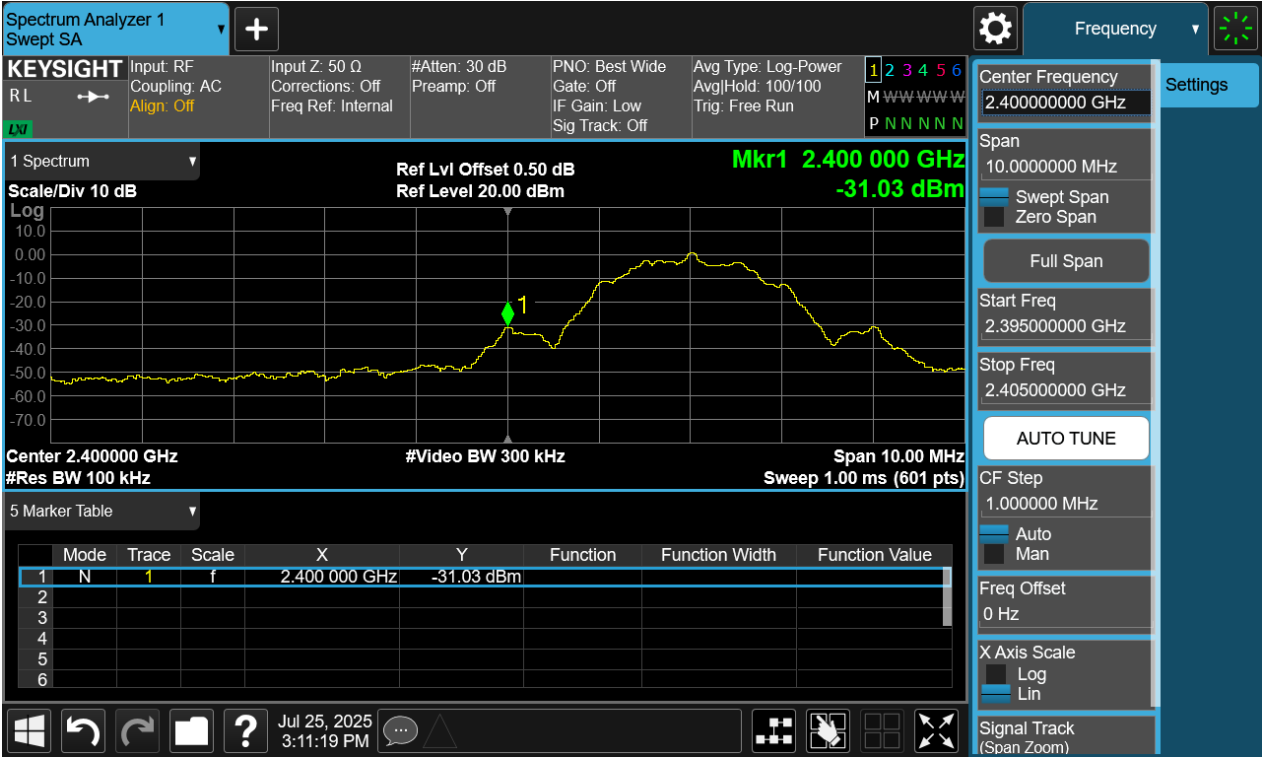
Figure 22: Conducted Spurious Emission & Authorized-band band-edge, 2402MHz, BLE-2Mbps Carrier Level



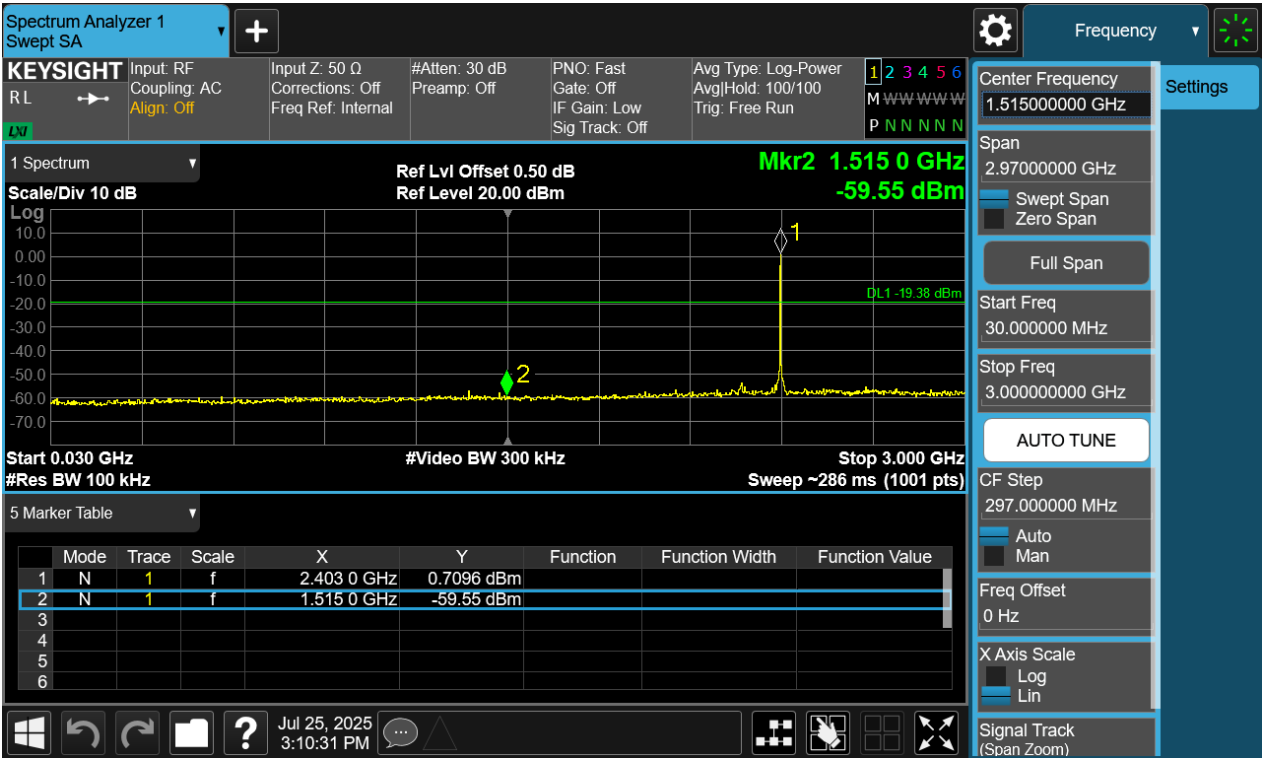
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Band Edge



Conducted spurious emissions 30MHz-25GHz



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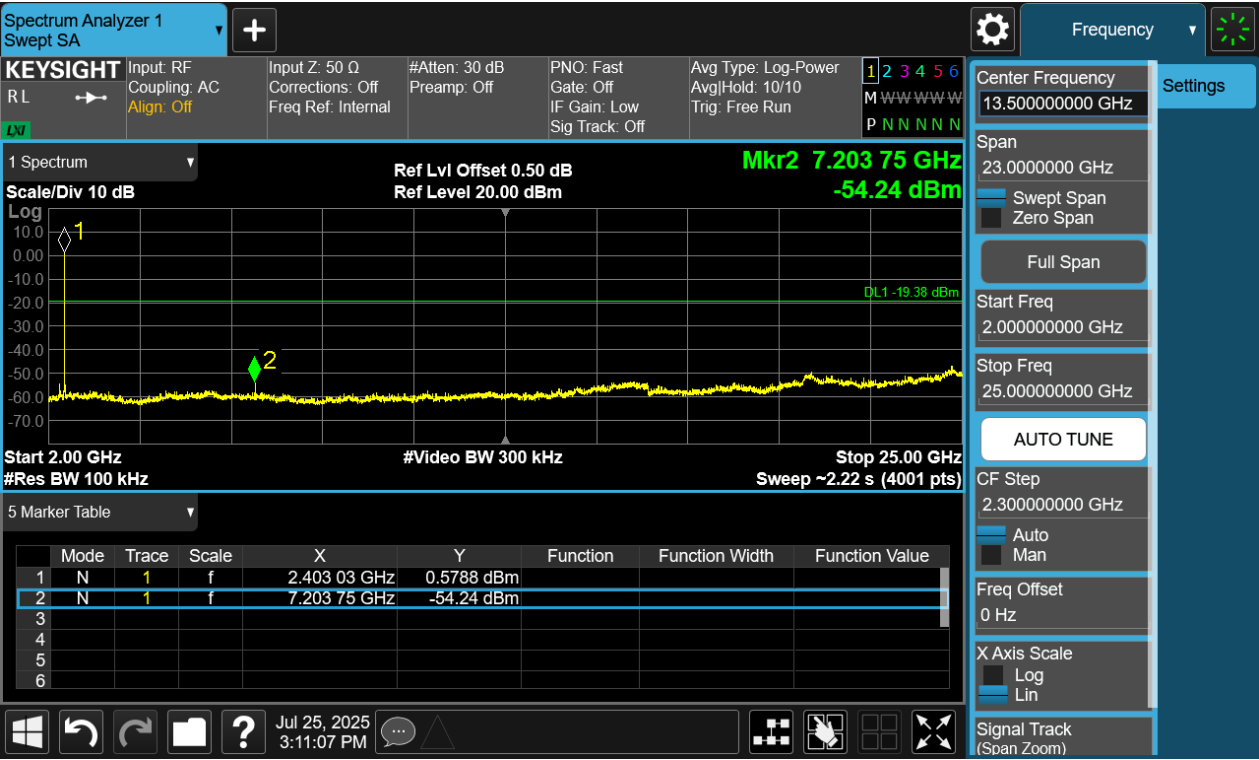
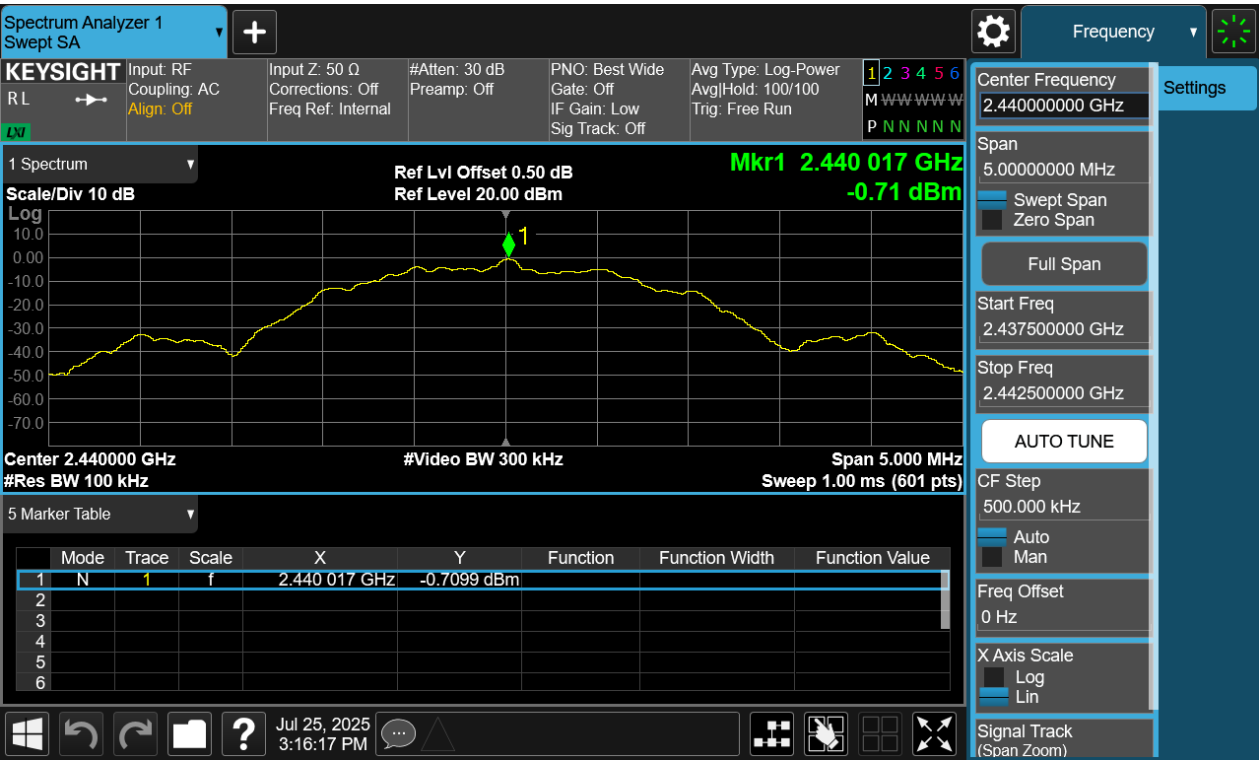


Figure 23: Conducted Spurious Emission & Authorized-band band-edge, 2440MHz, BLE-2Mbps Carrier Level



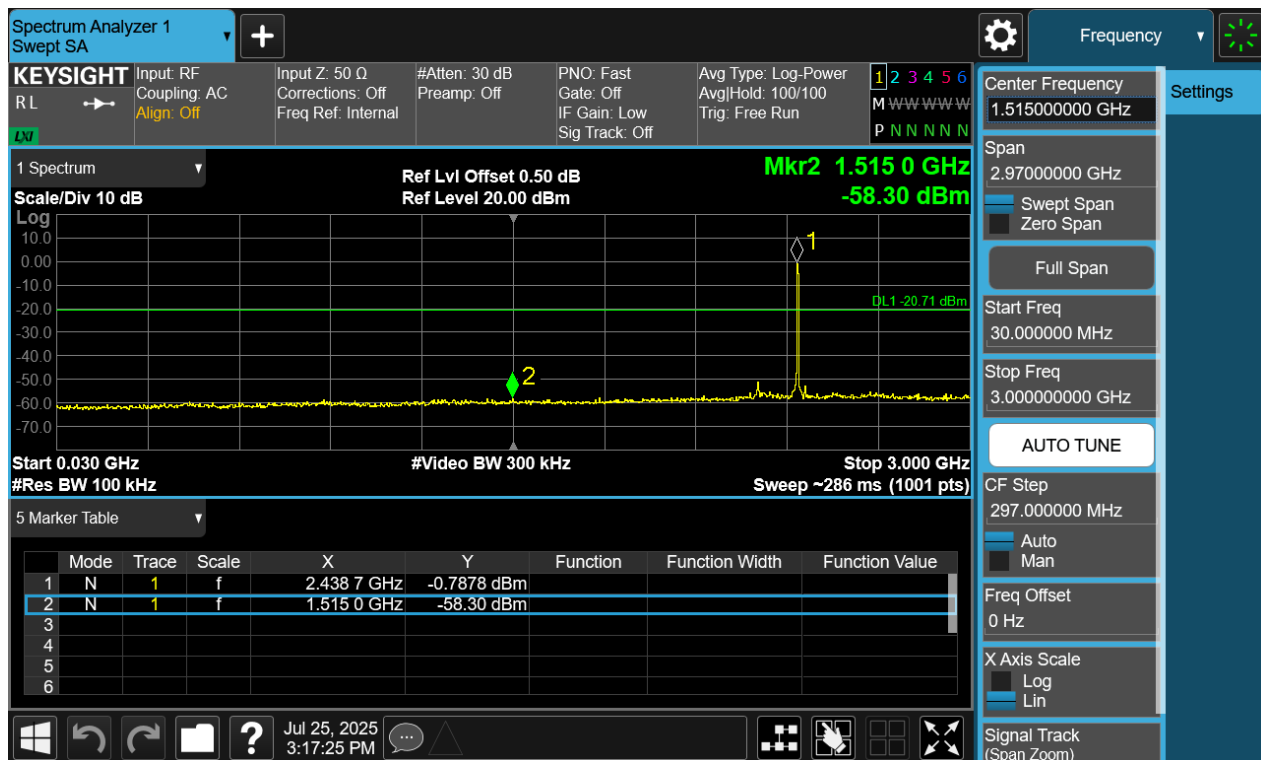
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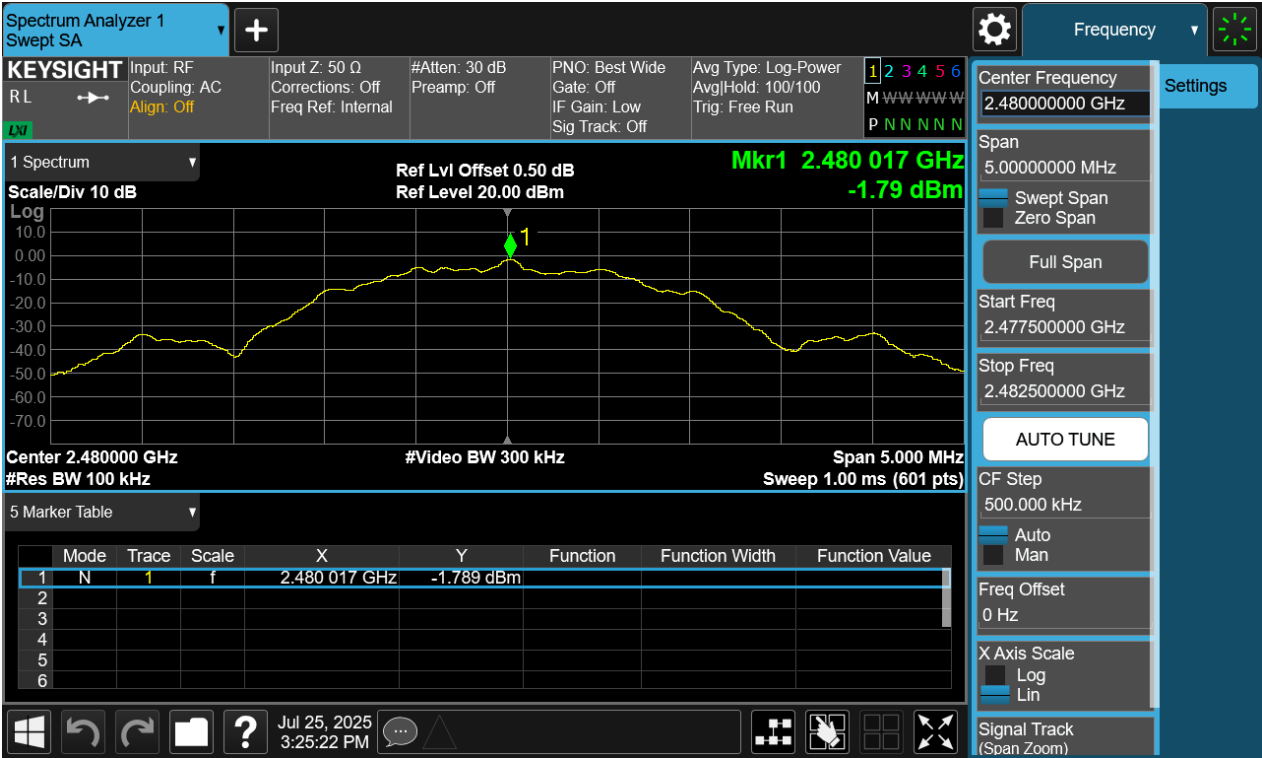
Conducted spurious emissions 30MHz-25GHz



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Figure 24: Conducted Spurious Emission & Authorized-band band-edge, 2480MHz, BLE-2Mbps Carrier Level



Band Edge



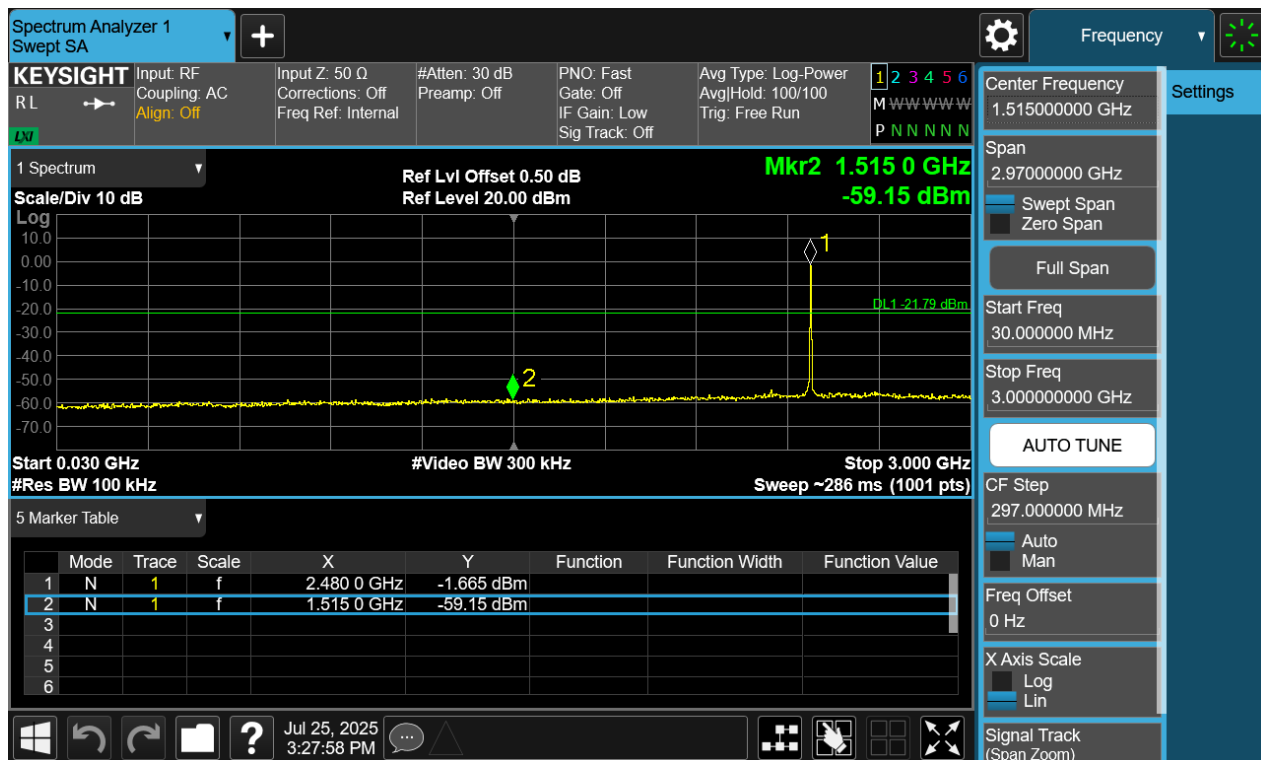
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Conducted spurious emissions 30MHz-25GHz



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4.1.6 Radiated Emission

RESULT:

PASS

Test standard	: FCC Part 15.247(d), 15.205, 15.209
Requirement	: ANSI C63.10-2020 clause 11.12.1 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	: 24.3°C
Relative humidity	: 42%

Notes

Test plots please refer to the annex document "SHE25070059-06CE DATA BLE-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 C63.10-2020 clause 11.12.3 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	: 24.3°C
Relative humidity	: 42%

Notes

Test plots please refer to the annex document "SHE25070059-06CE DATA BLE-TX EXHIBIT A".

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4.2 Mains Emissions

4.2.1 Conducted Emission on AC Mains

RESULT: **PASS**

Test standard	: FCC Part 15.207(a)
Requirement	: ANSI C63.10-2020, Clause 6.2
Kind of test site	: Shielded room

Test setup

Input Voltage	: which received AC 120V, 60Hz Power
Operation Mode	: A.1.a
Earthing	: Disconnected to GND
Ambient temperature	: 24.0°C
Relative humidity	: 52%

For details refer to following test plot.

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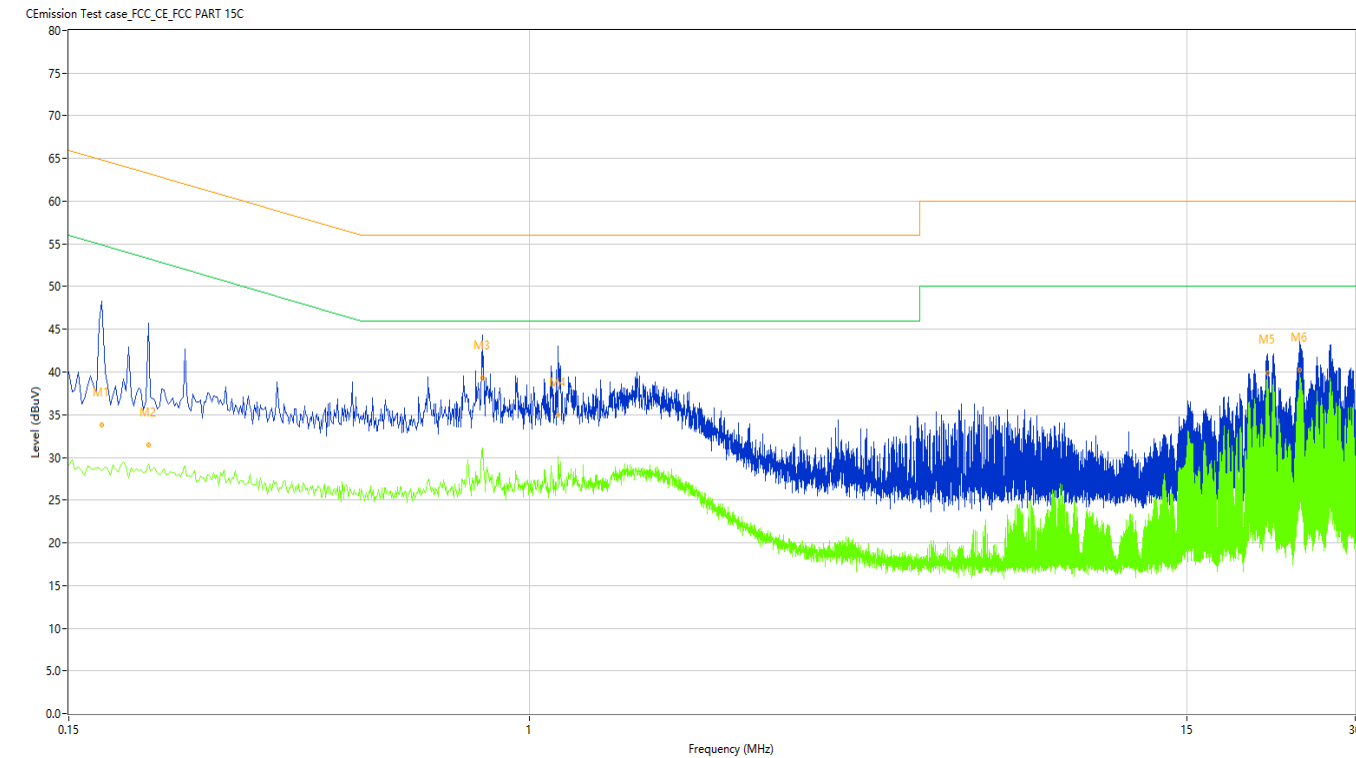
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Note: The all configurations were tested respectively, but only the worst data (at low channel,BLE-2Mbps) shown here.

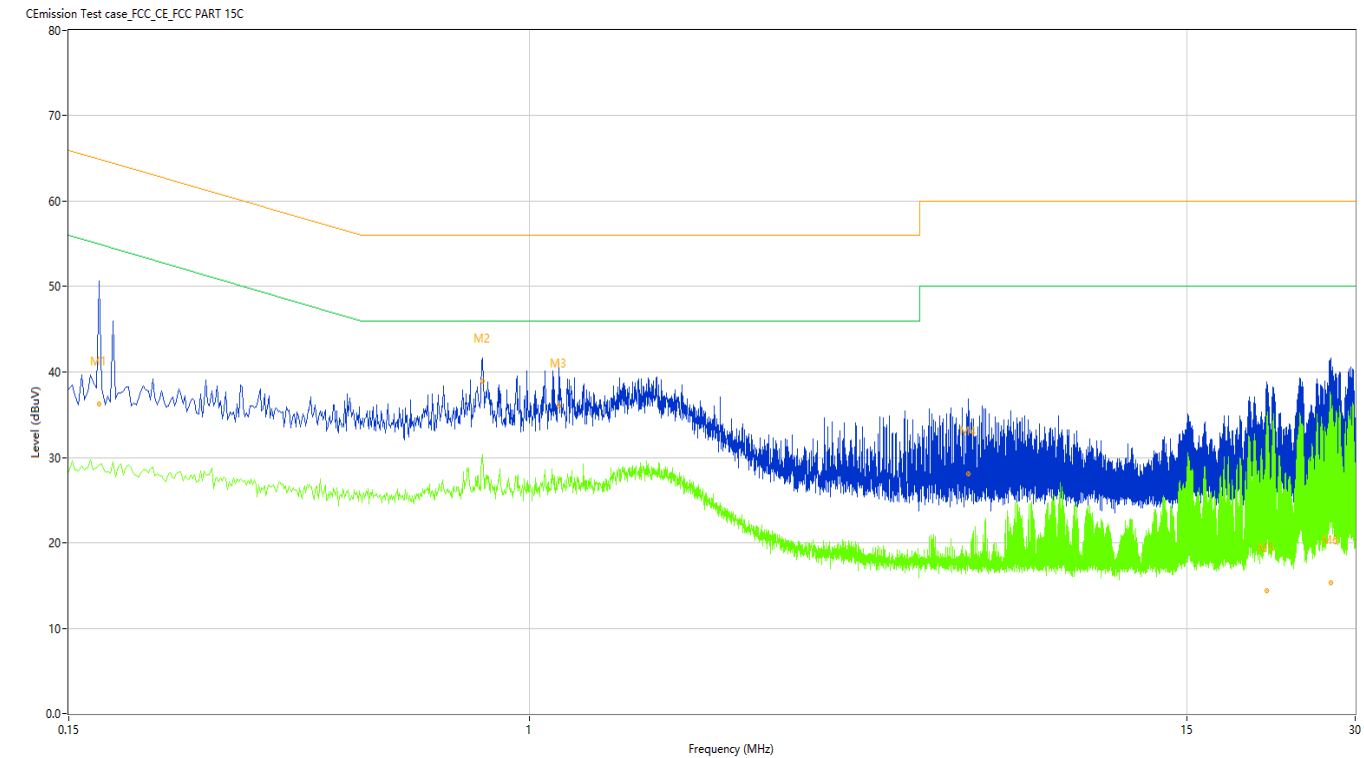
Figure 25: Conducted Emission on AC Mains, L Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.172	51.64	10.27	64.86	13.22	Peak	L	Pass
1*	0.172	33.79	10.27	64.86	31.07	QP	L	Pass
1**	0.172	28.41	10.27	54.86	26.45	AV	L	Pass
2	0.208	48.11	10.28	63.28	15.17	Peak	L	Pass
2*	0.208	31.43	10.28	63.28	31.85	QP	L	Pass
2**	0.208	29.20	10.28	53.28	24.08	AV	L	Pass
3	0.824	44.85	10.17	56.00	11.15	Peak	L	Pass
3*	0.824	39.28	10.17	56.00	16.72	QP	L	Pass
3**	0.824	31.05	10.17	46.00	14.95	AV	L	Pass
4	1.126	42.38	9.98	56.00	13.62	Peak	L	Pass
4*	1.126	35.02	9.98	56.00	20.98	QP	L	Pass
4**	1.126	30.07	9.98	46.00	15.93	AV	L	Pass
5	20.878	41.94	10.85	60.00	18.06	Peak	L	Pass
5*	20.878	39.85	10.85	60.00	20.15	QP	L	Pass
5**	20.878	38.58	10.85	50.00	11.42	AV	L	Pass
6	23.878	42.61	11.05	60.00	17.39	Peak	L	Pass
6*	23.878	40.22	11.05	60.00	19.78	QP	L	Pass
6**	23.878	39.56	11.05	50.00	10.44	AV	L	Pass

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Figure 26: Conducted Emission on AC Mains, N Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.170	53.31	10.15	64.96	11.65	Peak	N	Pass
1*	0.170	36.26	10.15	64.96	28.70	QP	N	Pass
1**	0.170	29.14	10.15	54.96	25.82	AV	N	Pass
2	0.824	43.72	10.13	56.00	12.28	Peak	N	Pass
2*	0.824	38.95	10.13	56.00	17.05	QP	N	Pass
2**	0.824	30.33	10.13	46.00	15.67	AV	N	Pass
3	1.130	41.84	9.84	56.00	14.16	Peak	N	Pass
3*	1.130	35.98	9.84	56.00	20.02	QP	N	Pass
3**	1.130	27.52	9.84	46.00	18.48	AV	N	Pass
4	6.092	37.80	10.21	60.00	22.20	Peak	N	Pass
4*	6.092	28.09	10.21	60.00	31.91	QP	N	Pass
4**	6.092	18.08	10.21	50.00	31.92	AV	N	Pass
5	20.836	21.86	10.86	60.00	38.14	Peak	N	Pass
5*	20.836	14.33	10.86	60.00	45.67	QP	N	Pass
5**	20.836	34.62	10.86	50.00	15.38	AV	N	Pass
6	27.118	22.63	11.23	60.00	37.37	Peak	N	Pass
6*	27.118	15.37	11.23	60.00	44.63	QP	N	Pass
6**	27.118	36.79	11.23	50.00	13.21	AV	N	Pass

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5 Appendixes

5.1 Photographs of the Sample



Front of the sample



Rear of the sample

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Left of the sample



Right of the sample

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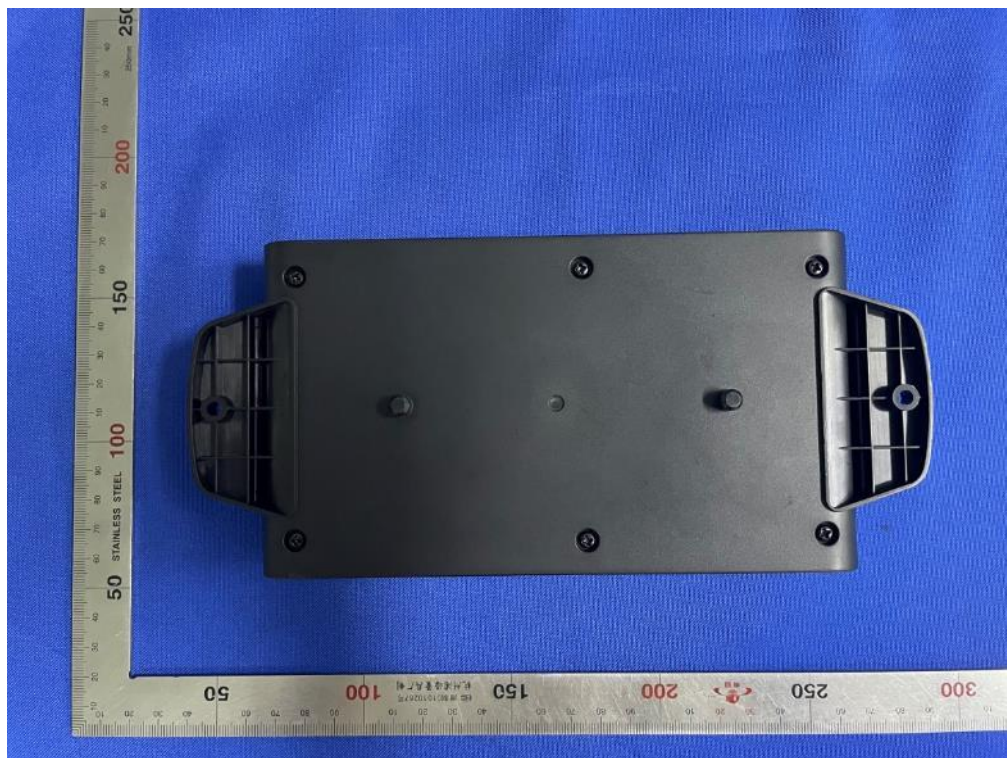
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Top of the sample



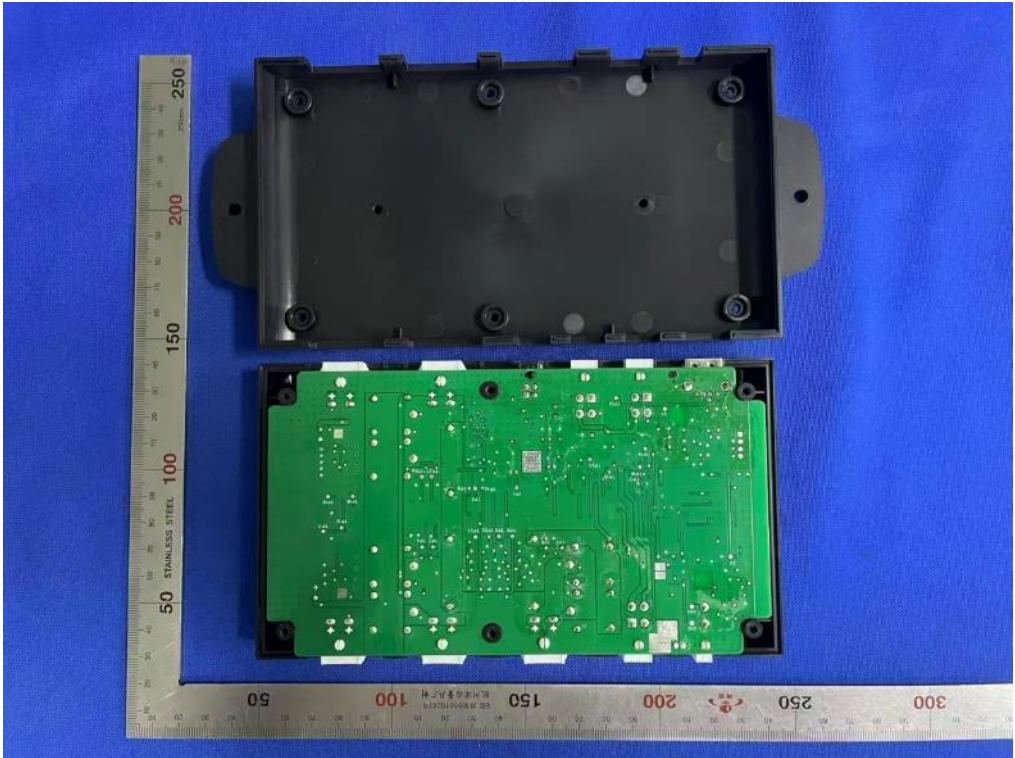
Bottom of the sample

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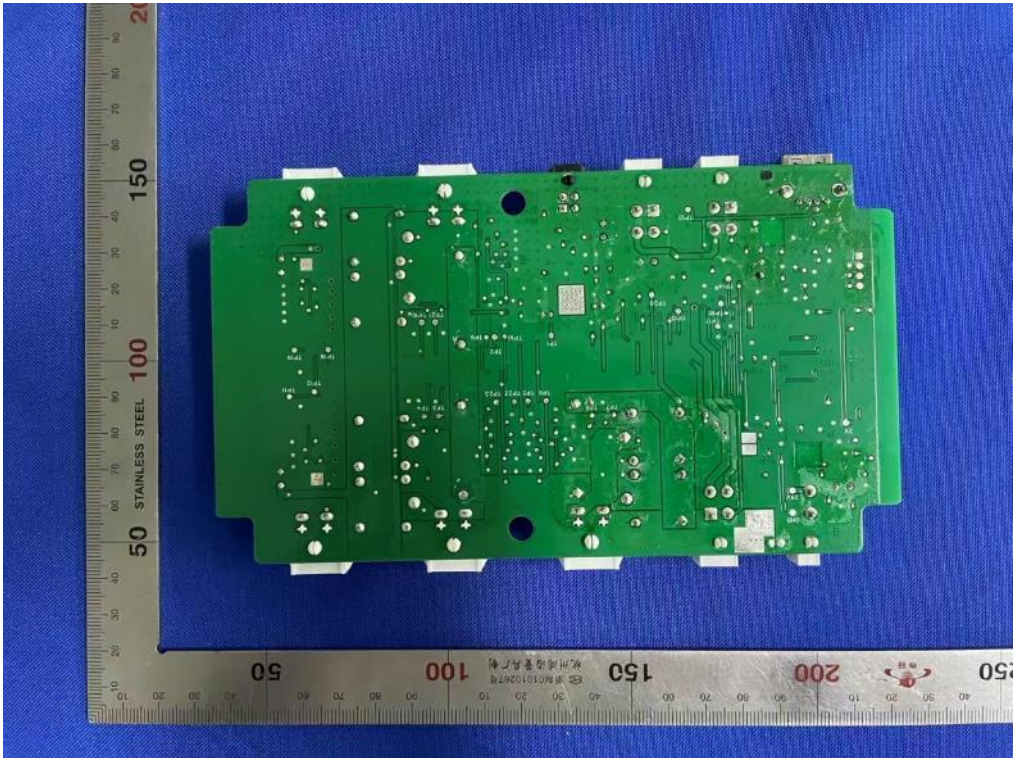
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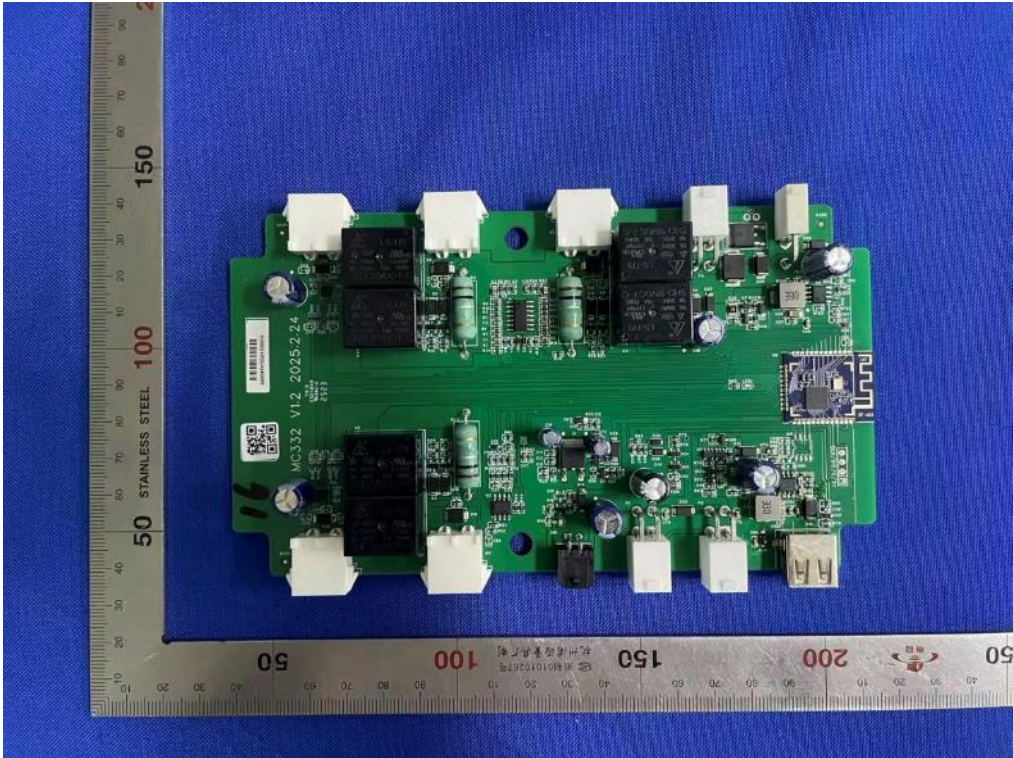


Open of the sample

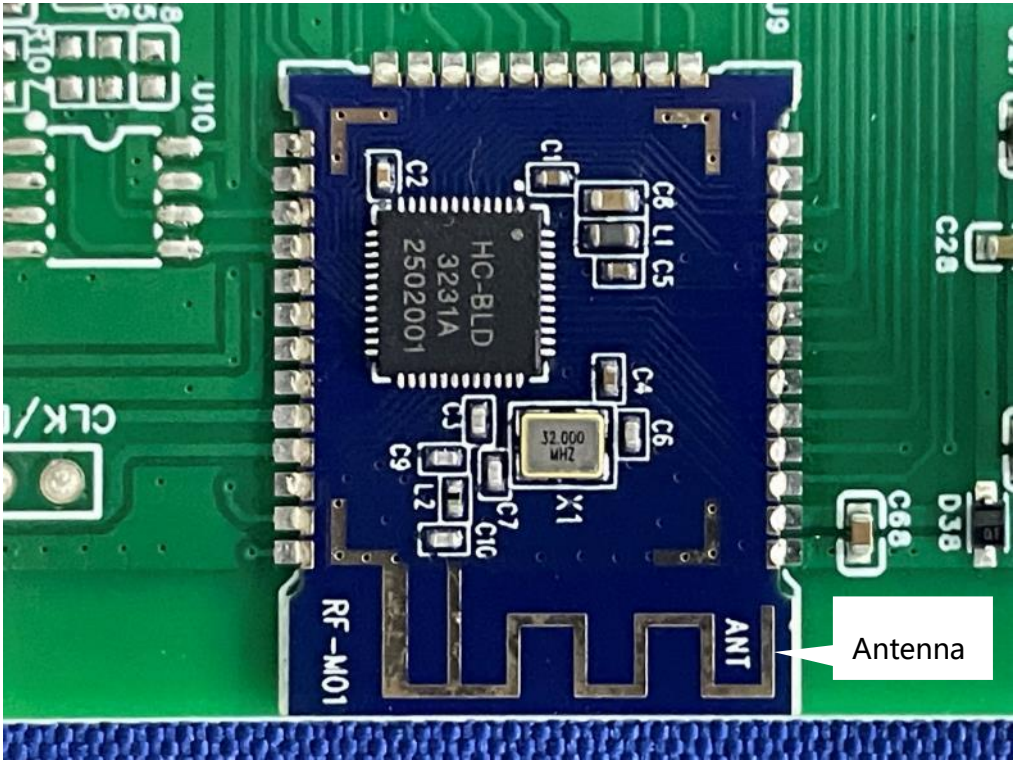


Internal photo-1 of the sample

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Internal photo-2 of the sample



Antenna position of the sample

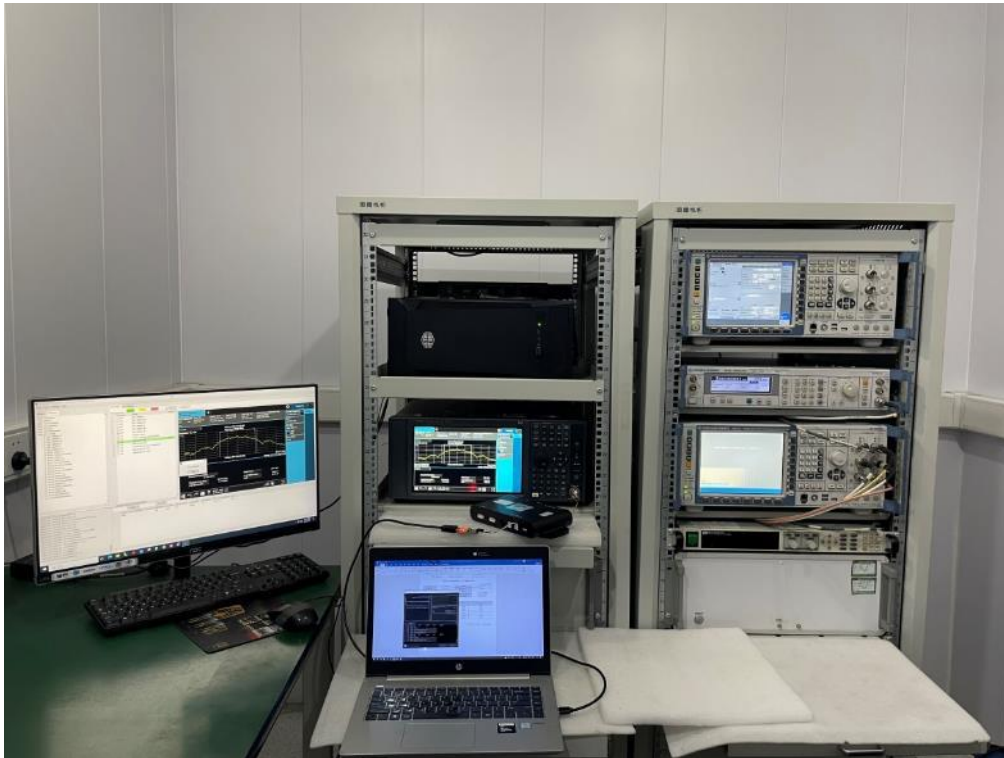
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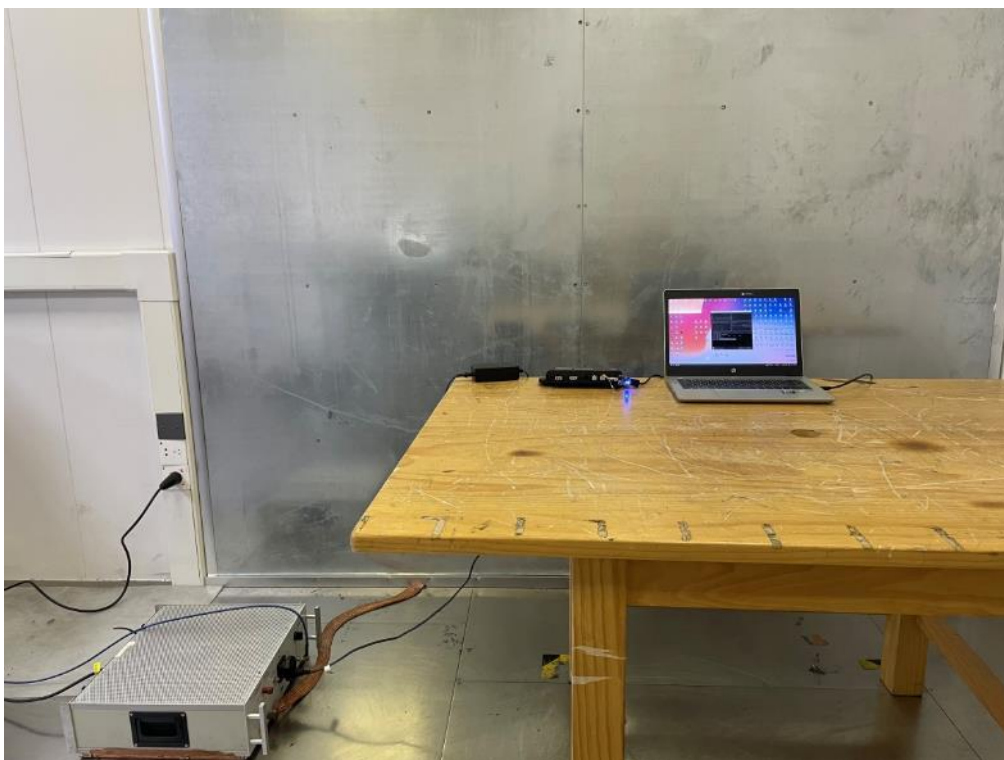
Date: 2025-09-11

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5.2 Set-up for Conducted RF test at Antenna Port



5.3 Set-up for Conducted Emissions on AC Mains



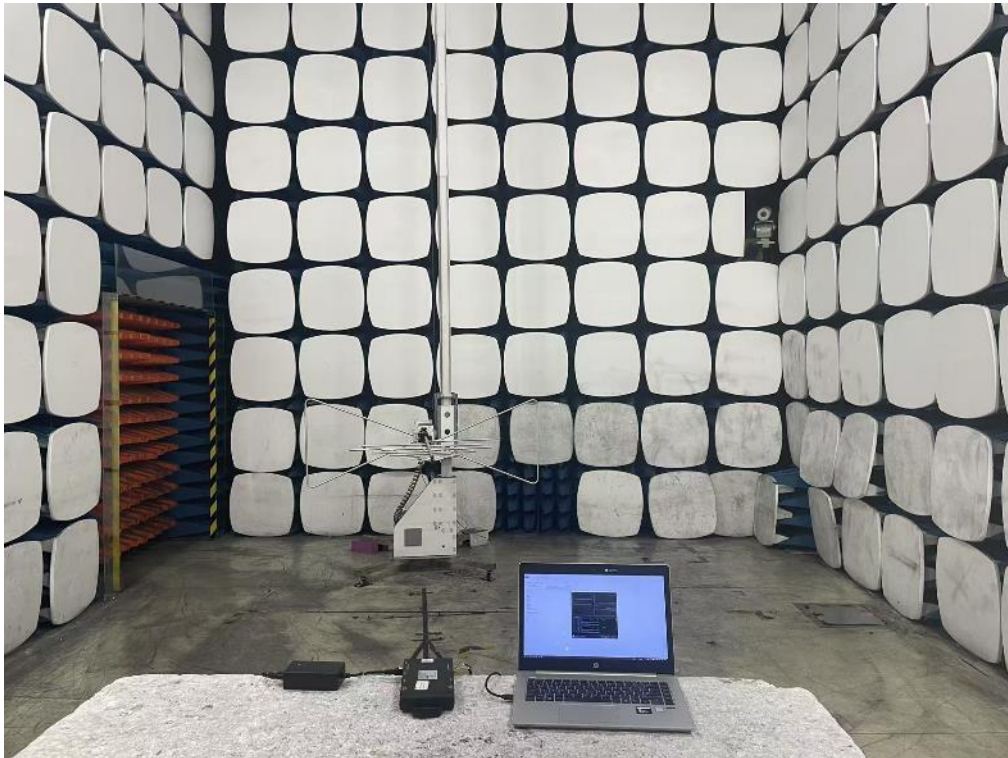
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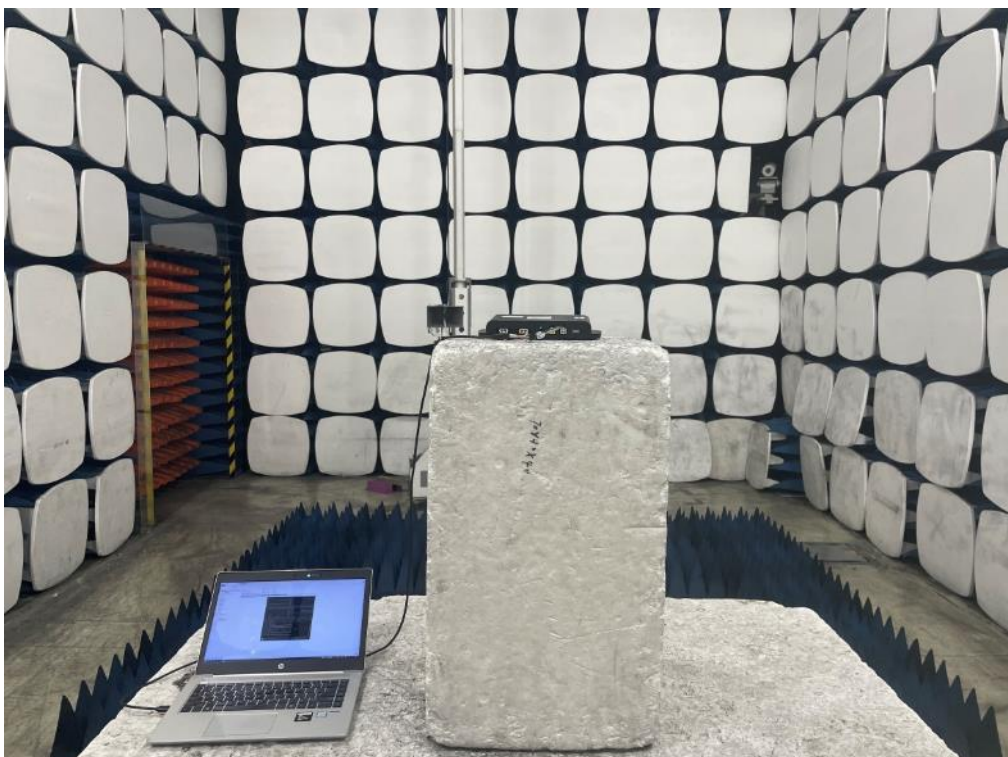
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5.4 Set-up for Spurious Emissions below 1GHz



5.5 Set-up for Spurious Emissions above 1GHz



End of the report