TEST REPORT

Applicant	:	SIMCom Wireless Solutions Limited
Address of Applicant	:	SIMCom Headquarters Building, Building 3, No.289 Linhong Road, Changning District, Shanghai,China
Product Name	:	Wireless Data Module
Brand Name	:	SIMCom
Model Name	:	SIM8070
Sample Acquisition Method	:	Sent by Client
Sample No.	:	E23060104-01#02
FCC ID	:	2AJYU-8XK0002
Standards	:	FCC CFR47 Part 15, Subpart C
Date of Receipt	:	2023-07-07
Date of Test	:	2023-07-13~ 2023-08-03
Date of Issue	:	2023-08-07

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 (Erik Yang) Reviewed by: Jennifer zhou (Jennifer Zhou) Approved by: Echo Mu (Authorized signatory: Echo Mu)

Contents

1 General Information

1.1 Testing Laboratory

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

1.2 Details of Application

Applicant Company Name	SIMCom Wireless Solutions Limited
Address	SIMCom Headquarters Building, Building 3, No.289 Linhong Road, Changning District, Shanghai,China
Contact Person	Yongsheng Li
Telephone	+86 21 3252 3134
Email	yongsheng.li@simcom.com
Manufacturer Company Name	SIMCom Wireless Solutions Limited
Address	SIMCom Headquarters Building, Building 3, No.289 Linhong Road, Changning District, Shanghai,China
Factory Company Name	SIMCom Wireless Solutions Limited
Address	SIMCom Headquarters Building, Building 3, No.289 Linhong Road, Changning District, Shanghai,China

1.3 Details of EUT

Product Name	Wireless Data Module
Brand Name	SIMCom
Test Model Name	SIM8070
FCC ID	2AJYU-8XK0002
Mode of Operation	Bluetooth BLE Version 5.0
Frequency Range	2402MHz ~ 2480MHz
Number of Channels	40 (at intervals of 2 MHz)
Modulation Type	BLE ☒GFSK 1Mbps ☐GFSK 2Mbps
Max RF Output Power	5.95dBm
Antenna Type	External Antenna
Antenna Gain	4.01dBi
Extreme Temperature Range	-30℃~ +75℃
Test Voltage	DC 3.8V
Hardware Version	SIM8970CE_V1.02
Software Version	SIM8070B01V01_A10

RF power setting in TEST SW	QRCT_Power level setting_Default

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 C63.10-2013	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)	PASS

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	2022-08-02	2023-08-01
Spectrum Analyzer	Rohde & Schwarz	FSV40N	101450	2023-06-08	2024-06-07
Signal Generator	Rohde & Schwarz	SMR27	100184	2022-08-02	2023-08-01
EMI Test Receiver	Rohde & Schwarz	ESPI3	100173	2023-06-08	2024-06-07
EMI Test Receiver	Rohde & Schwarz	ESR 7	101911	2023-06-08	2024-06-07
V-network	SCHWARZBECK	NSLK 8127	8127-902	2023-06-07	2024-06-06
Attenuator	SCHWARZBECK	VTSD 9561-FN	/	2023-06-06	2024-06-05
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	2024-06-08
Horn Antenna-40G	YINGLIAN	LB-180400-KF	N/A	2023-06-18	2025-06-17
Broadband Preamplifier	SCHWARZBECK	BBV 9718	346	2023-06-08	2024-06-07
EMC chamber 9*6*6（L*W*H)	CHANGNING	966	N/A	2023-06-09	2024-06-08
Shielded Enclosure 8*5*4（L*W*H)	CHANGNING	854	N/A	2023-06-09	2025-06-08
Test Software	BL	BL410_E	Version:1.0.0.117	N/A	N/A
Test Software	BL	BL410_R	Version:2.1.1.409	N/A	N/A

Equipment Calibration Date Updated:

Name of Equipment	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	Keysight	N9020B	MY59260184	2023-07-27	2024-07-26
Signal Generator	Rohde & Schwarz	SMR27	100184	2023-07-27	2024-07-26

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 ±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	± 5.00 dB
	> 1GHz	± 4.88 dB
Conducted Emission on AC Mains	150kHz-30MHz	± 2.68 dB
Occupied Channel Bandwidth		±5 %
RF output power, PSD		± 0.6 dB

3 Test Set-up and Operation Modes

3.1 Details of Test Mode

Using test software was control EUT work in continuous transmitter and receiver 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

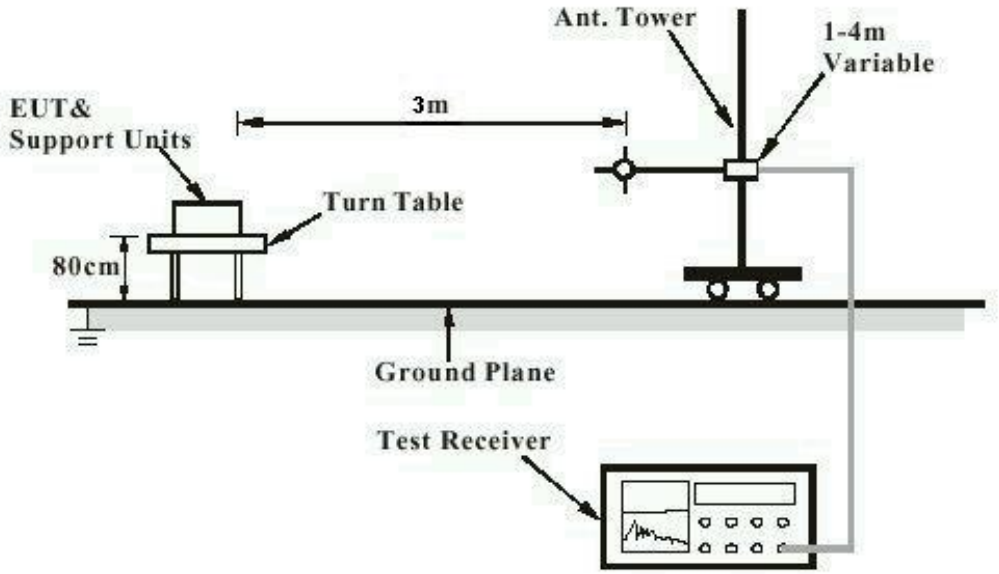
Description	Manufacturer	Model Name	Serial No.
Laptop	Lenovo	TP00083A	N/A
SWITCHING POWER SUPPLY	N/A	P-050B-050200EU	N/A
EVB Debug Board 1	N/A	8PYA00-SIMCOM-EVB_V1.02	N/A
EVB Debug Board 2	N/A	8XK000-SIM8970-EVB I	N/A
USB Cable	N/A	N/A	1.00m Unshielded

3.3 Support Software

Description	Manufacturer	Software Name
Software	Qualcomm	QRCT Version 4.0.00166.0

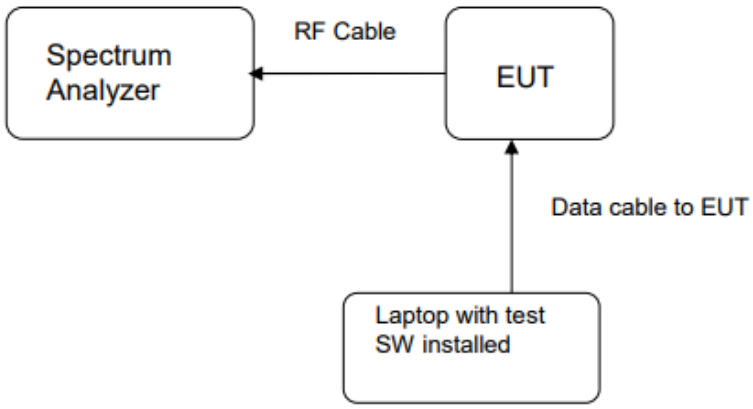
3.4 Test Setup Diagram

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



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	:	The use of approved antennas only with directional gains that do not exceed 6dBi

According to the manufacturer declaration, the EUT has an antenna with a directional gain of 4.01dBi. The antenna is an external 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.

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	:	24.9°C
Relative humidity	:	56%

Table 1: Maximum peak conducted output power

Test Mode	Test Channel (MHz)	Maximum peak conducted output power		Limit (W)
		(dBm)	(mW)	
BLE	2402	5.70	3.72	< 1
	2440	5.52	3.56	
	2480	5.95	3.94	

Figure 1: Peak Output Power, 2402MHz

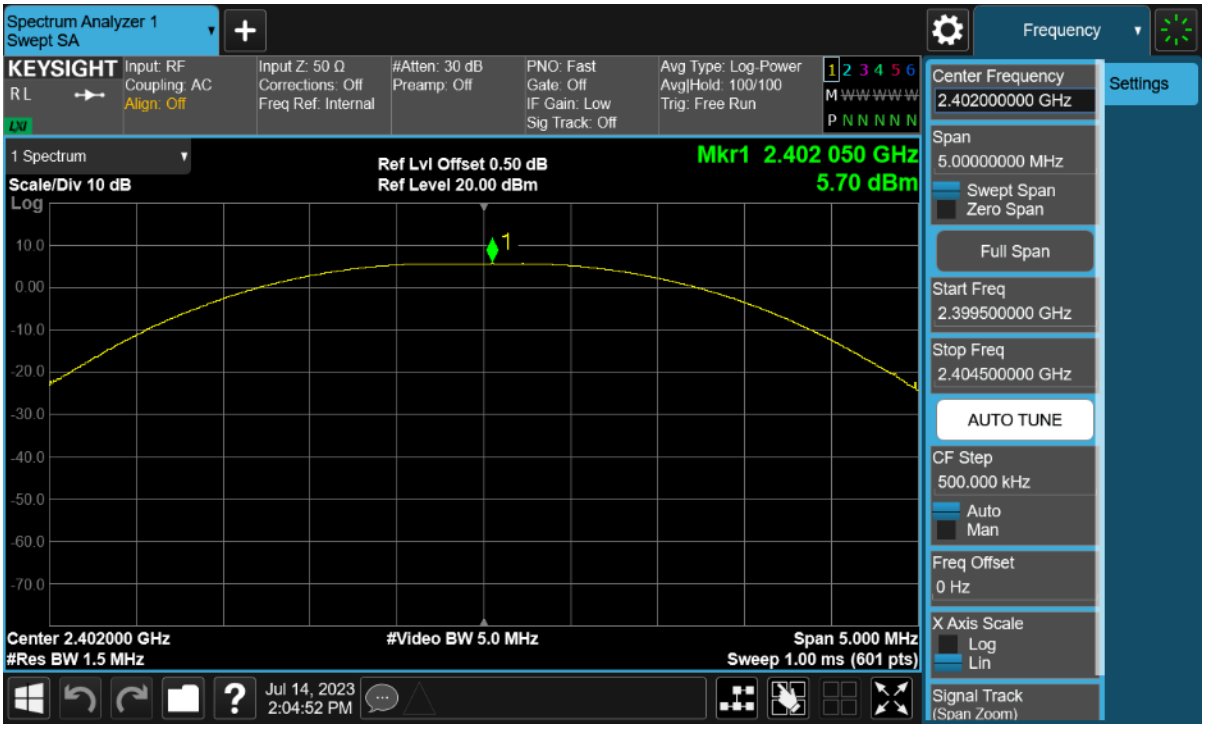


Figure 2: Peak Output Power, 2440MHz

Figure 3: Peak Output Power, 2480MHz

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 : 24.9°C
Relative humidity : 56%

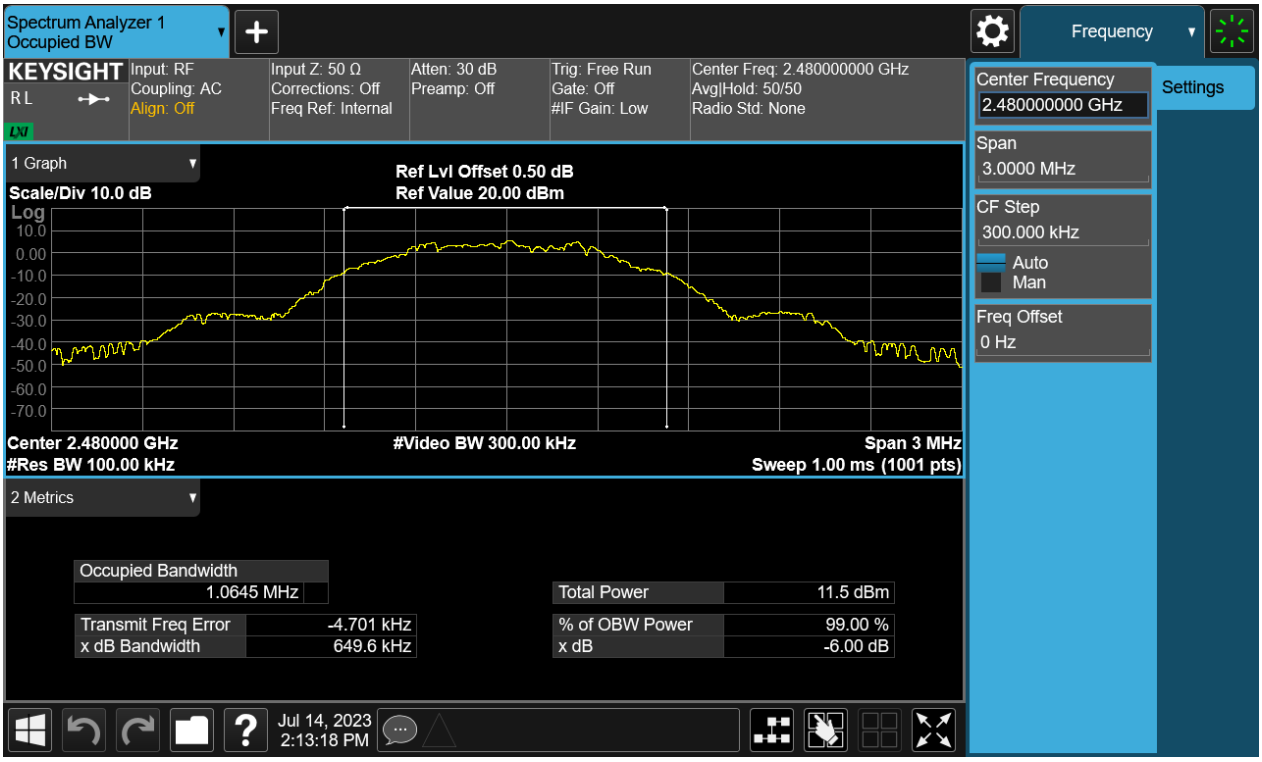
Table 2: 6dB Bandwidth

Test Mode	Test Channel (MHz)	6dB Bandwidth (MHz)	Limit
BLE	2402	0.6412	⩾0.5 MHz
	2440	0.6403	
	2480	0.6496	

Figure 4: 6dB Bandwidth, 2402MHz

Figure 5: 6dB Bandwidth, 2440MHz

Figure 6: 6dB Bandwidth, 2480MHz



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	:	24.9°C
Relative humidity	:	56%

Table 3: Maximum conducted output power spectral density

Test Mode	Test Channel (MHz)	Measured Result (dBm/3kHz)	Limit (dBm/3kHz)
BLE	2402	-11.07	8
	2440	-10.28	
	2480	-9.93	

Figure 7: Power Spectral Density, 2402MHz

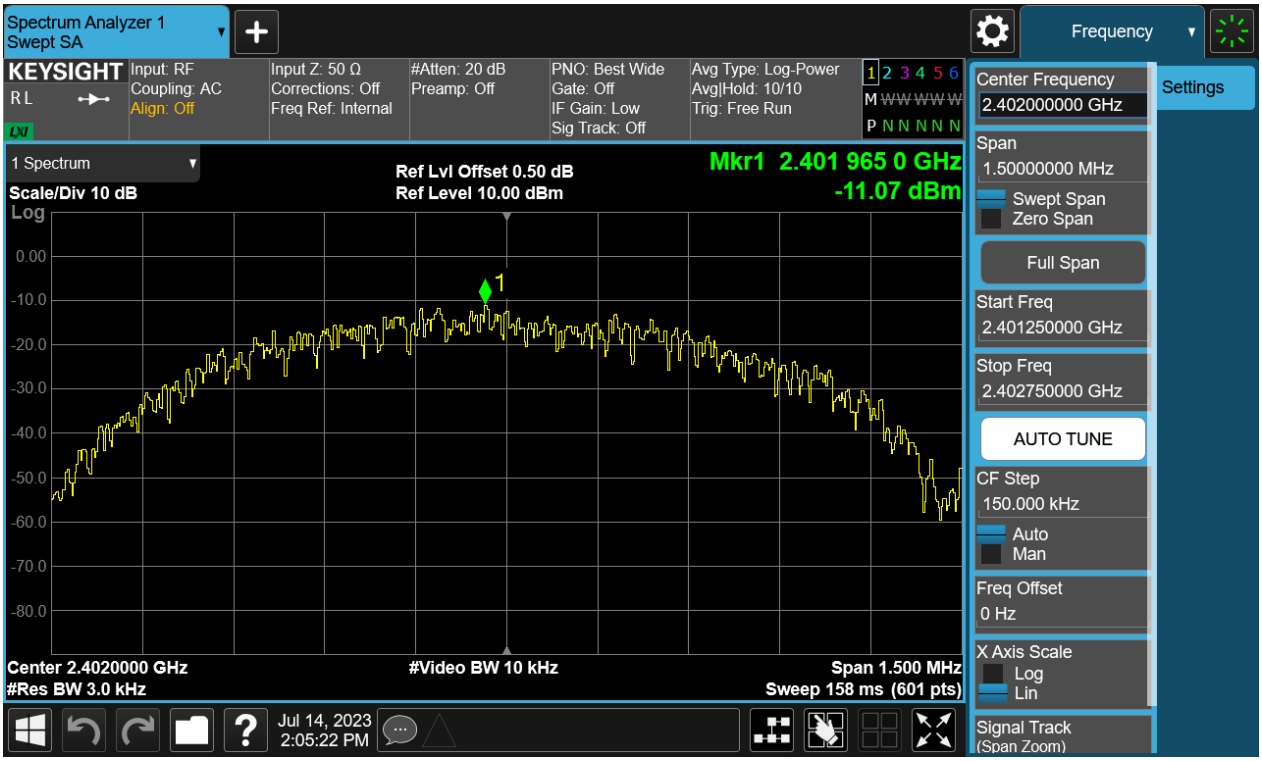


Figure 8: Power Spectral Density, 2440MHz

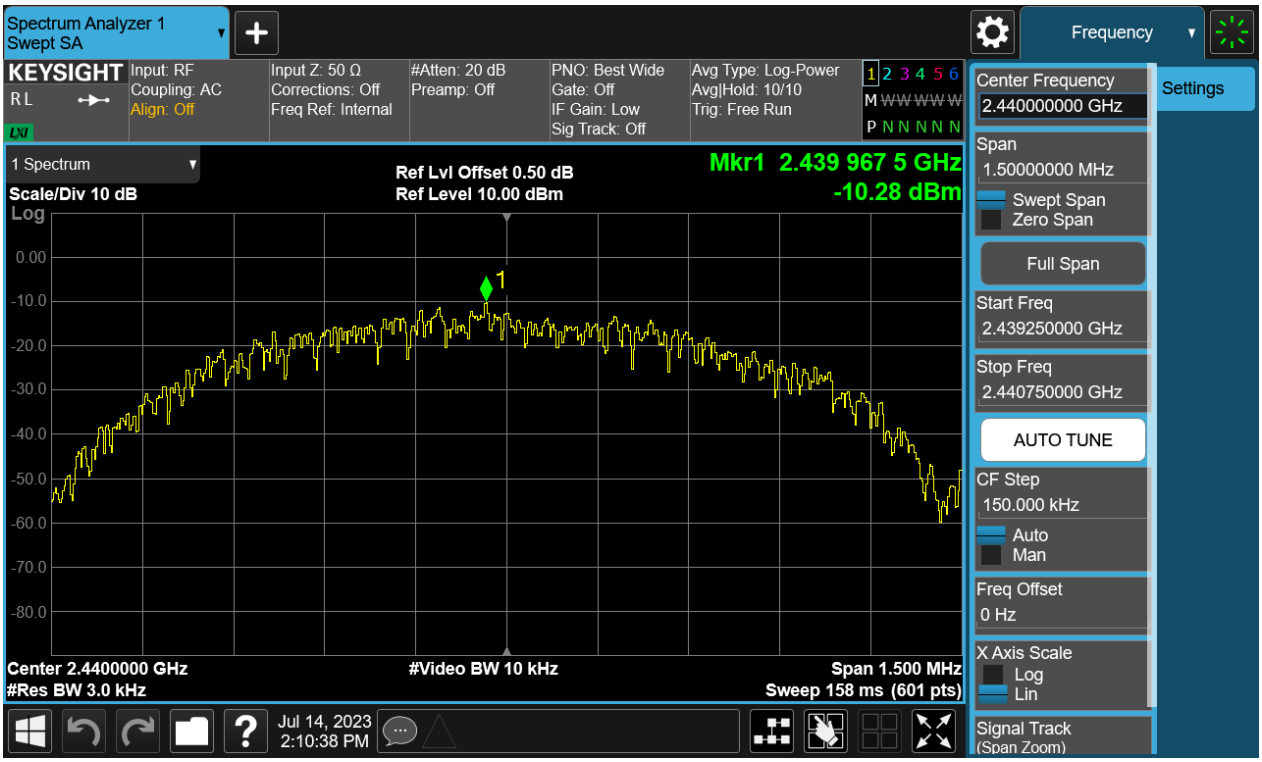
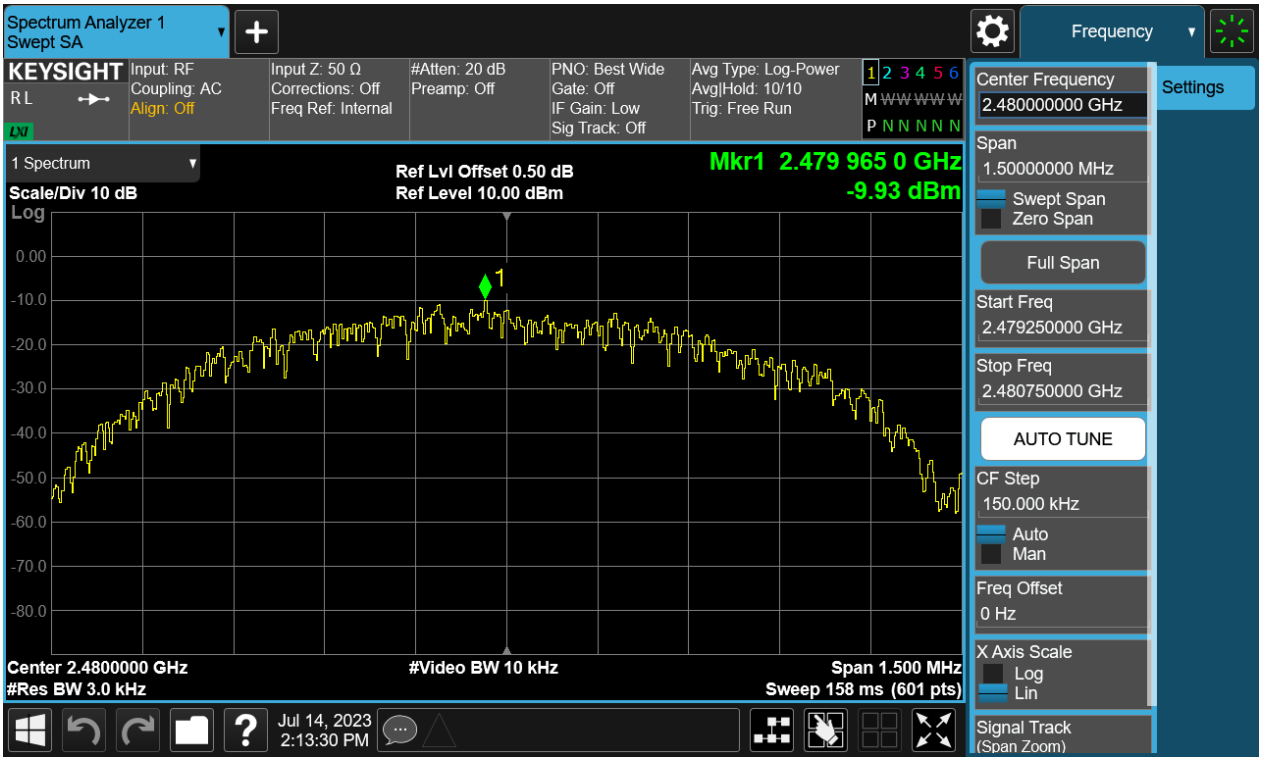


Figure 9: Power Spectral Density, 2480MHz



4.1.5 Conducted Spurious Emission & Authorized-band band-edge

RESULT: **PASS**

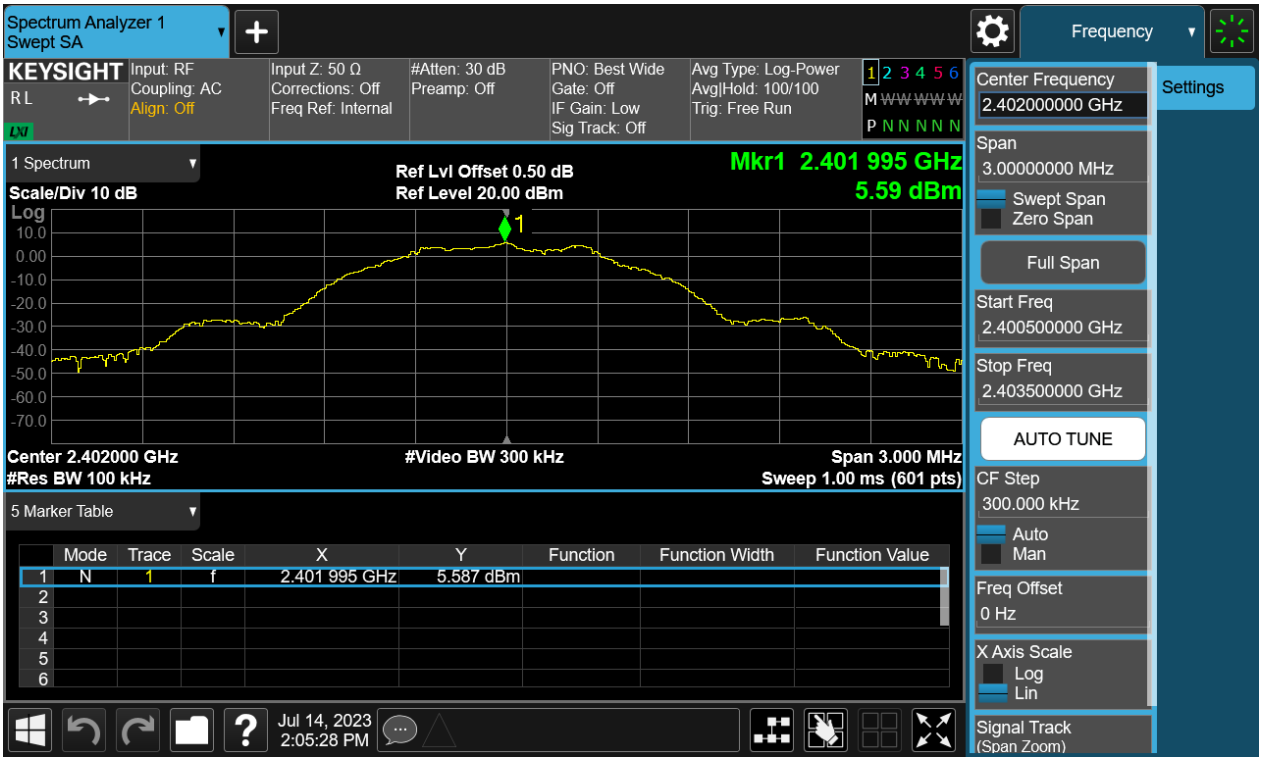
Test standard	:	FCC Part 15.247(d)
Requirement	:	ANSI C63.10-2013, Clause 11.11.1(a) KDB 558074 D01 v05r02, Clause 8.5
Kind of test site	:	Shielded room

Test setup

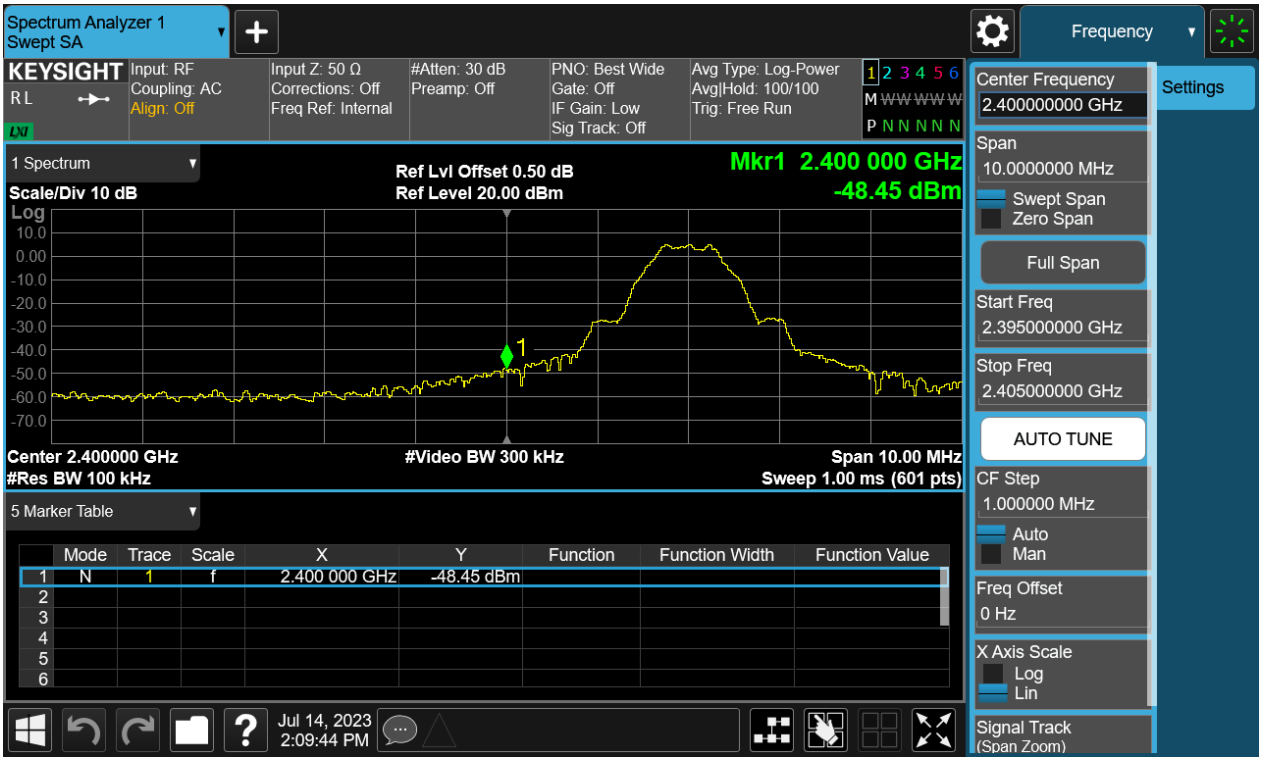
Test Channel	:	Low/Middle/High for spurious, Low/High for Band Edge
Operation Mode	:	A.1.a
Ambient temperature	:	24.9°C
Relative humidity	:	56%

For details refer to following test plot.

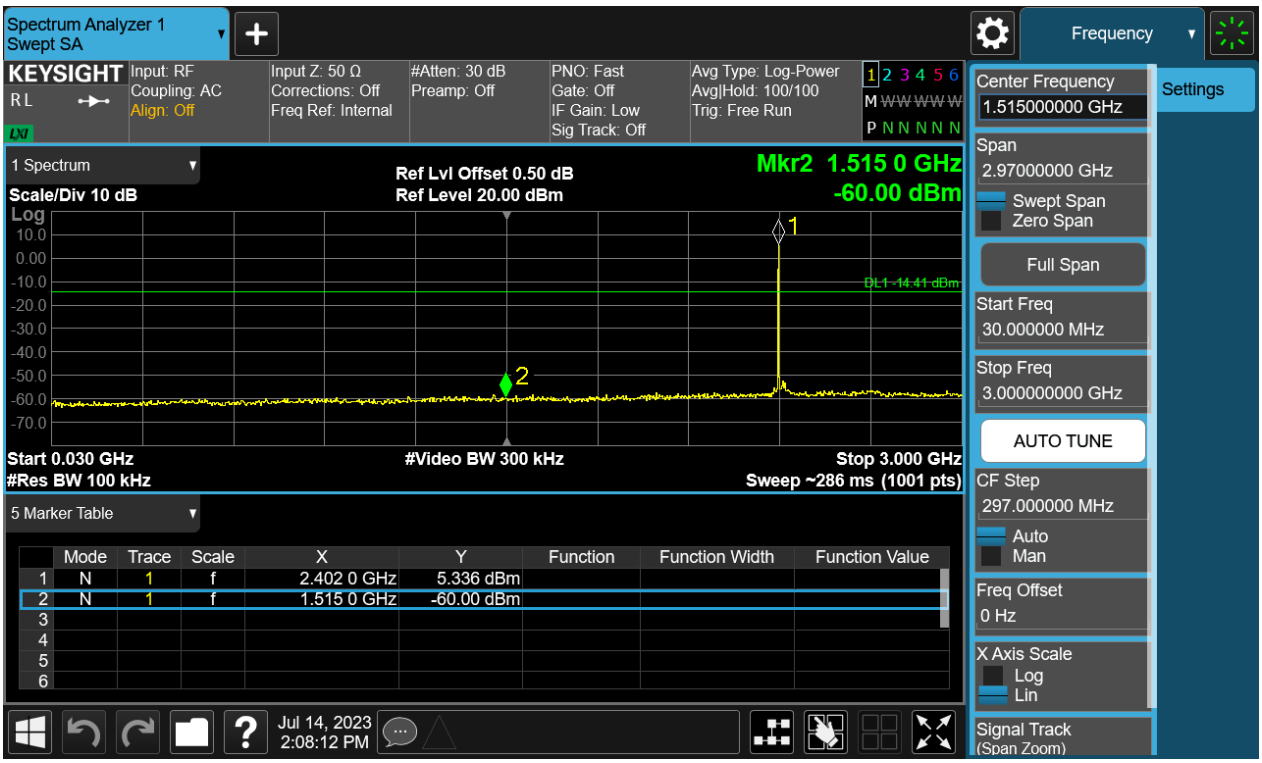
Figure 10: Conducted Spurious Emission & Authorized-band band-edge, 2402MHz, BLE Carrier Level



Band Edge



Conducted spurious emissions 30MHz-25GHz



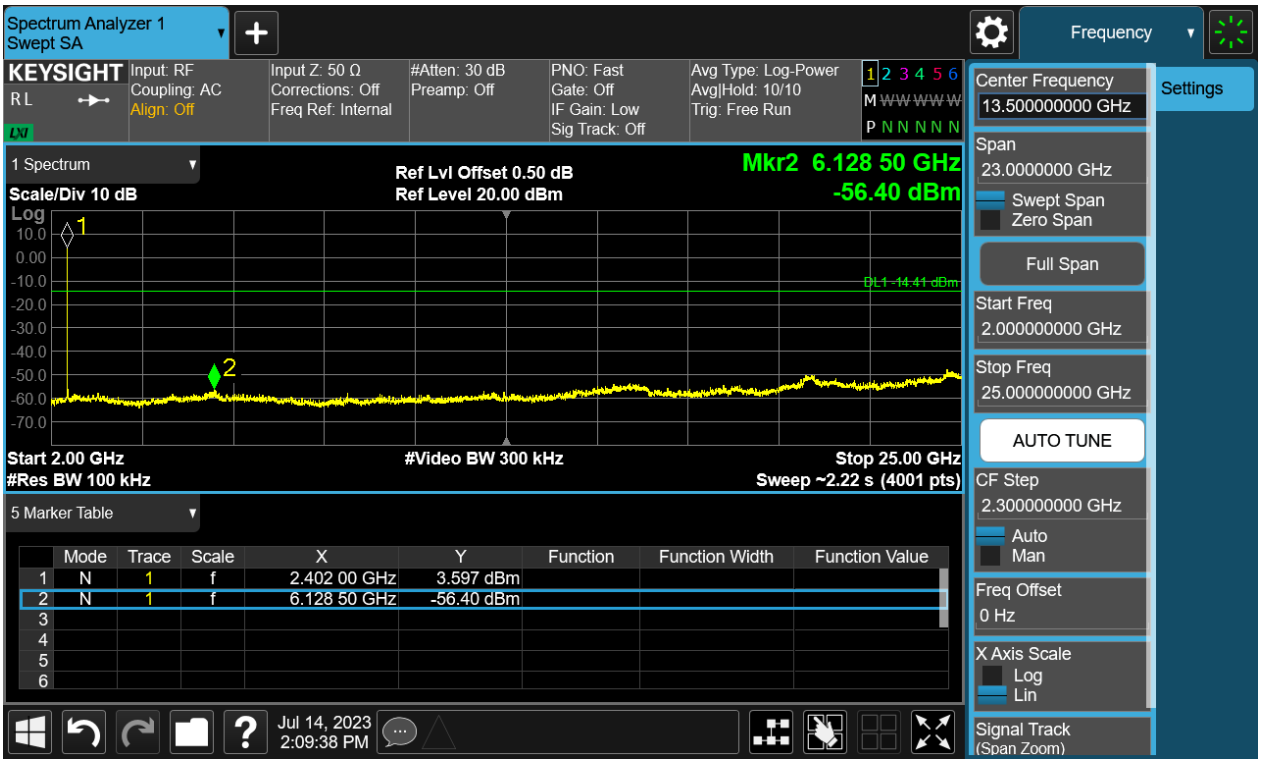
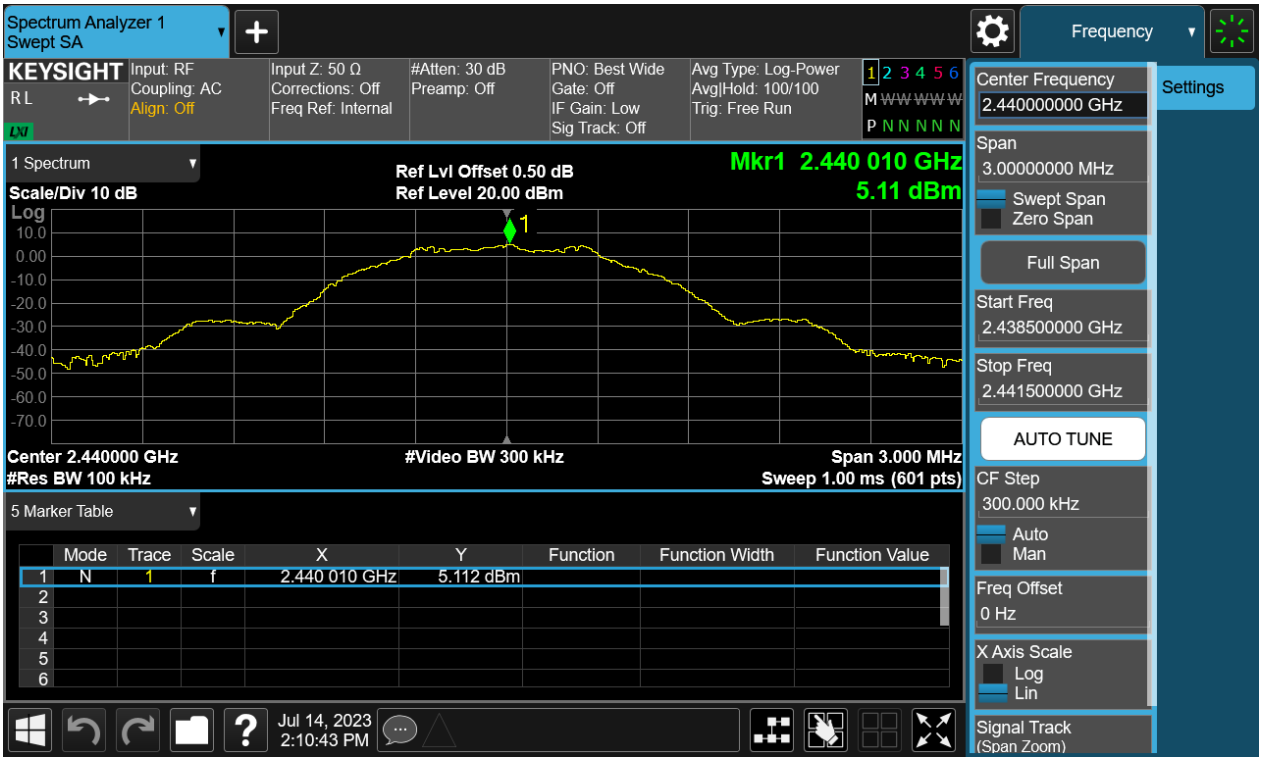
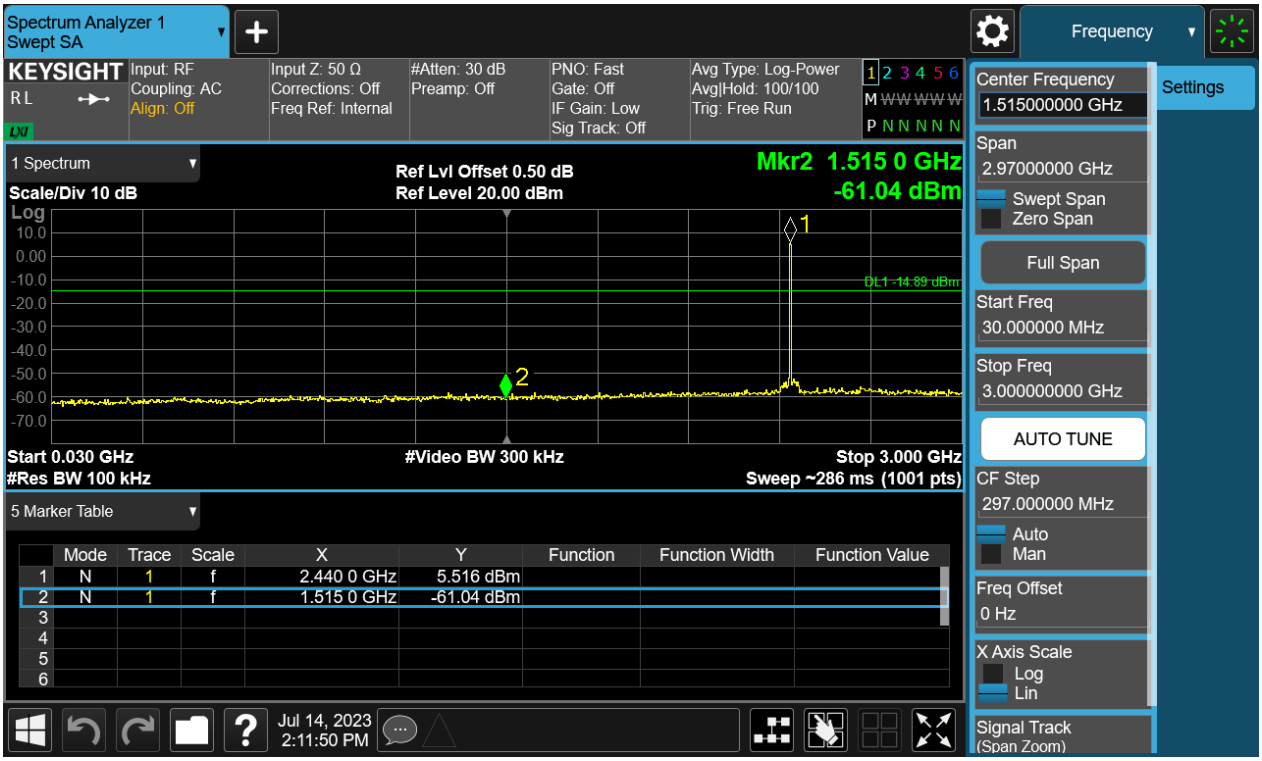


Figure 11: Conducted Spurious Emission & Authorized-band band-edge, 2440MHz, BLE Carrier Level



Conducted spurious emissions 30MHz-25GHz



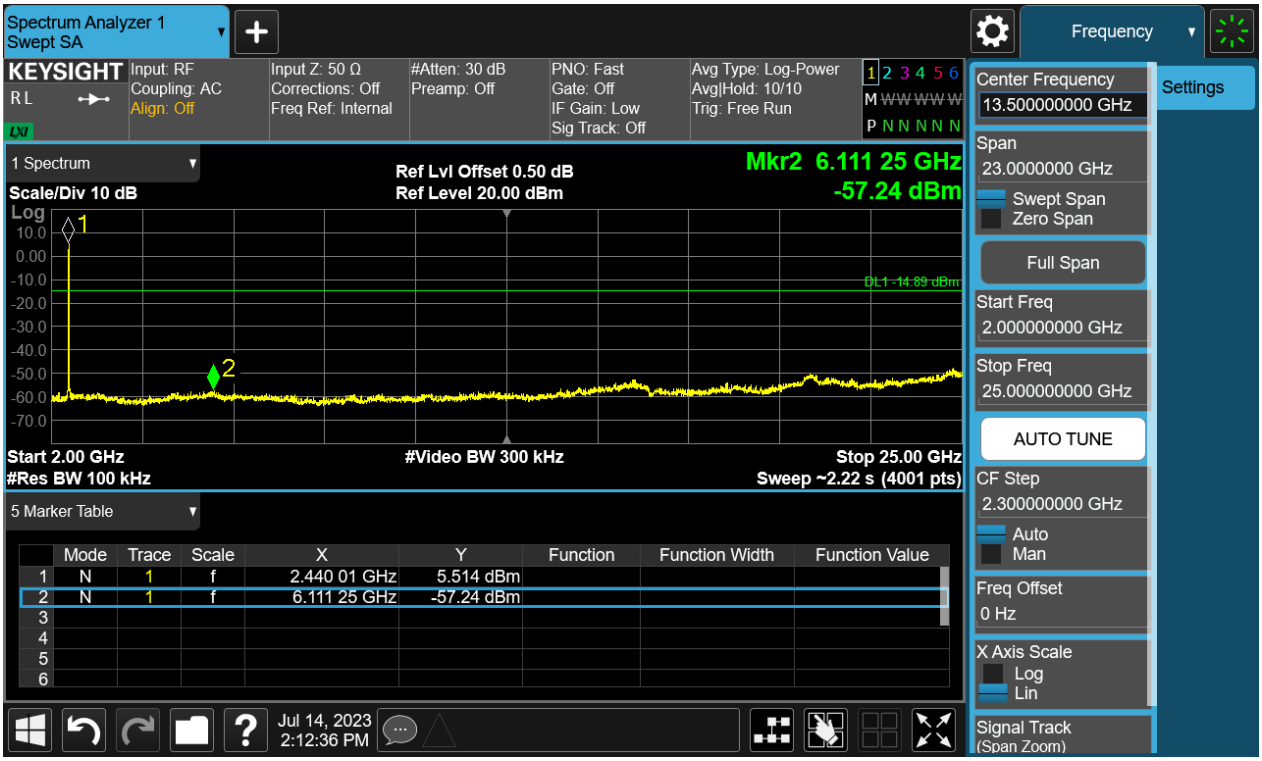
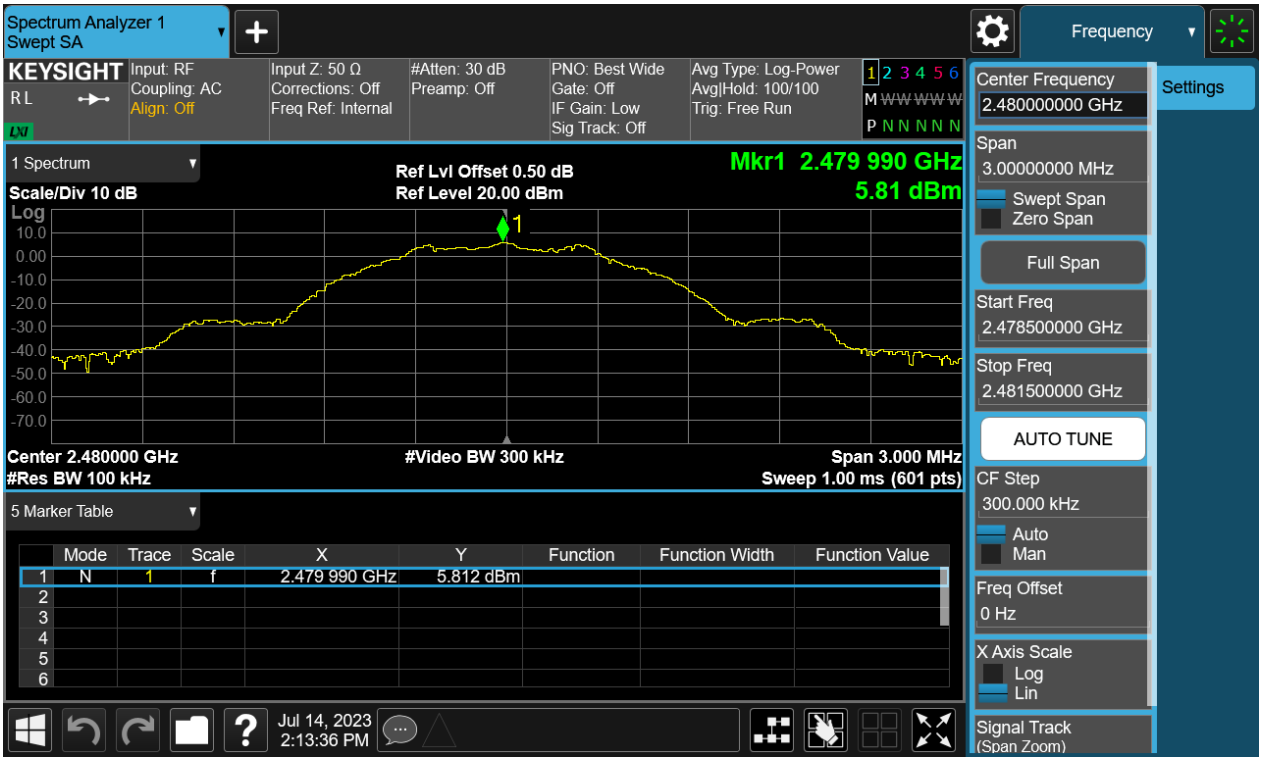
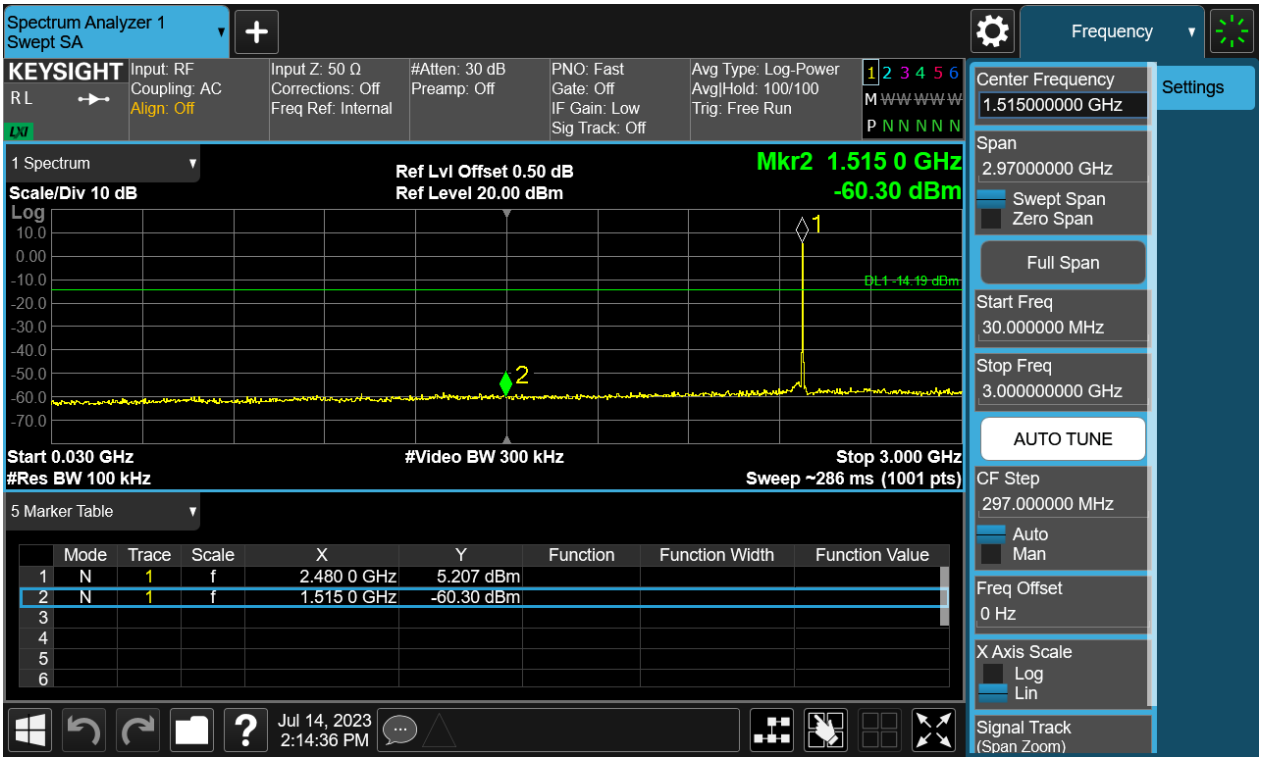


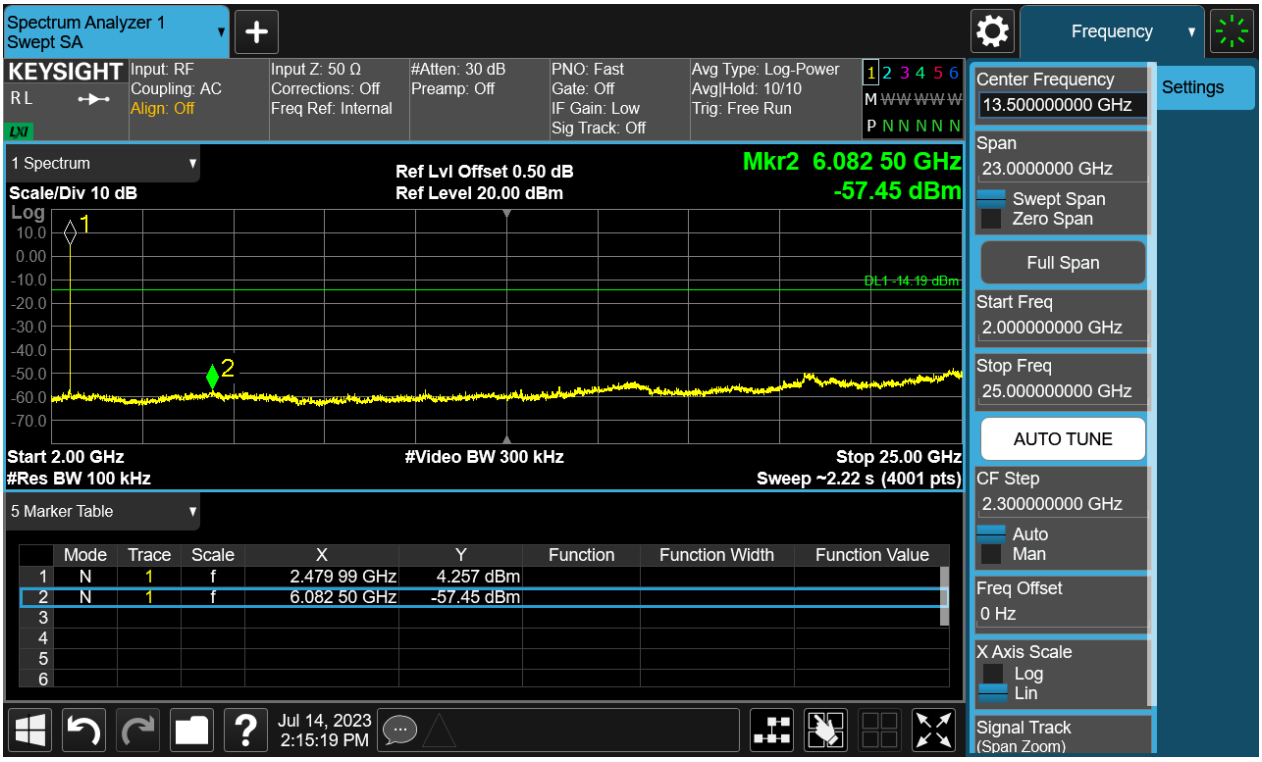
Figure 12: Conducted Spurious Emission & Authorized-band band-edge, 2480MHz, BLE Carrier Level



Band Edge

Conducted spurious emissions 30MHz-25GHz




Spectrum Analyzer 1
Swept SA
Frequency
KEYSIGHT
RL
Input: RF
Coupling: AC
Align: Off
Input Z: 50 Ω
Corrections: Off
Freq Ref: Internal
#Atten: 30 dB
Preamp: Off
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
Avg Type: Log-Power
Avg|Hold: 10/10
Trig: Free Run
1 Spectrum
Scale/Div 10 dB
Ref Lvl Offset 0.50 dB
Ref Level 20.00 dBm
Mkr2 6.082 50 GHz
-57.45 dBm
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
DL1 -14.19 dBm
Start 2.00 GHz
#Res BW 100 kHz
#Video BW 300 kHz
Stop 25.00 GHz
Sweep ~2.22 s (4001 pts)
5 Marker Table
Mode Trace Scale X Y Function Function Width Function Value
1 N 1 f 2.479 99 GHz 4.257 dBm
2 N 1 f 6.082 50 GHz -57.45 dBm
Jul 14, 2023
2:15:19 PM
Center Frequency
13.500000000 GHz
Span
23.0000000 GHz
Swept Span
Zero Span
Full Span
Start Freq
2.000000000 GHz
Stop Freq
25.000000000 GHz
AUTO TUNE
CF Step
2.300000000 GHz
Auto
Man
Freq Offset
0 Hz
X Axis Scale
Log
Lin
Signal Track
(Span Zoom)
Settings

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	:	24.5°C
Relative humidity	:	53%

Notes

Test plots please refer to the annex document "SHE23060104-02AE 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.

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	:	24.5°C
Relative humidity	:	53%

Notes

Test plots please refer to the annex document "SHE23060104-02AE DATA BLE-TX EXHIBIT A".

4.2 Mains Emissions

4.2.1 Conducted Emission on AC Mains

RESULT: **PASS**

Test standard	:	FCC Part 15.207(a)
Requirement	:	ANSI C63.10-2013, Clause 6.2
Kind of test site	:	Shielded room

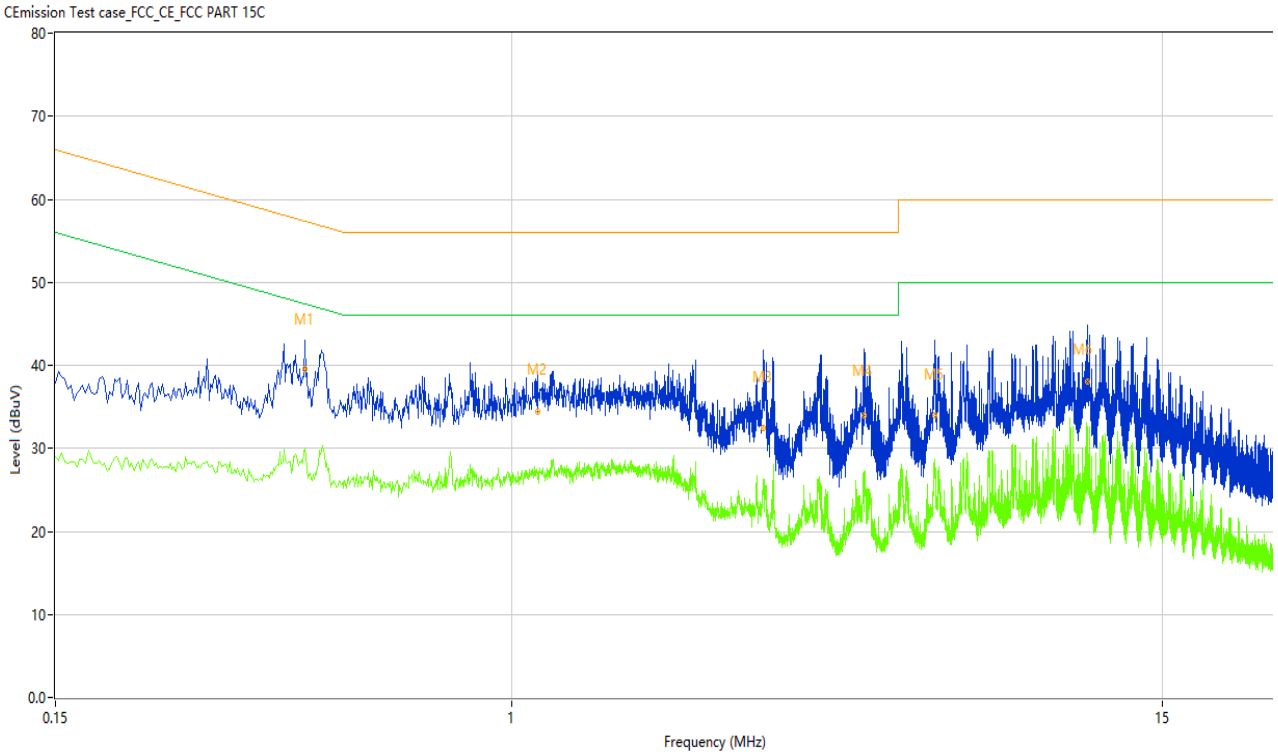
Test setup

Input Voltage	:	which received AC 120V, 60Hz Power
Operation Mode	:	A.1.a
Earthing	:	Disconnected to GND
Ambient temperature	:	21°C
Relative humidity	:	50%

For details refer to following test plot.

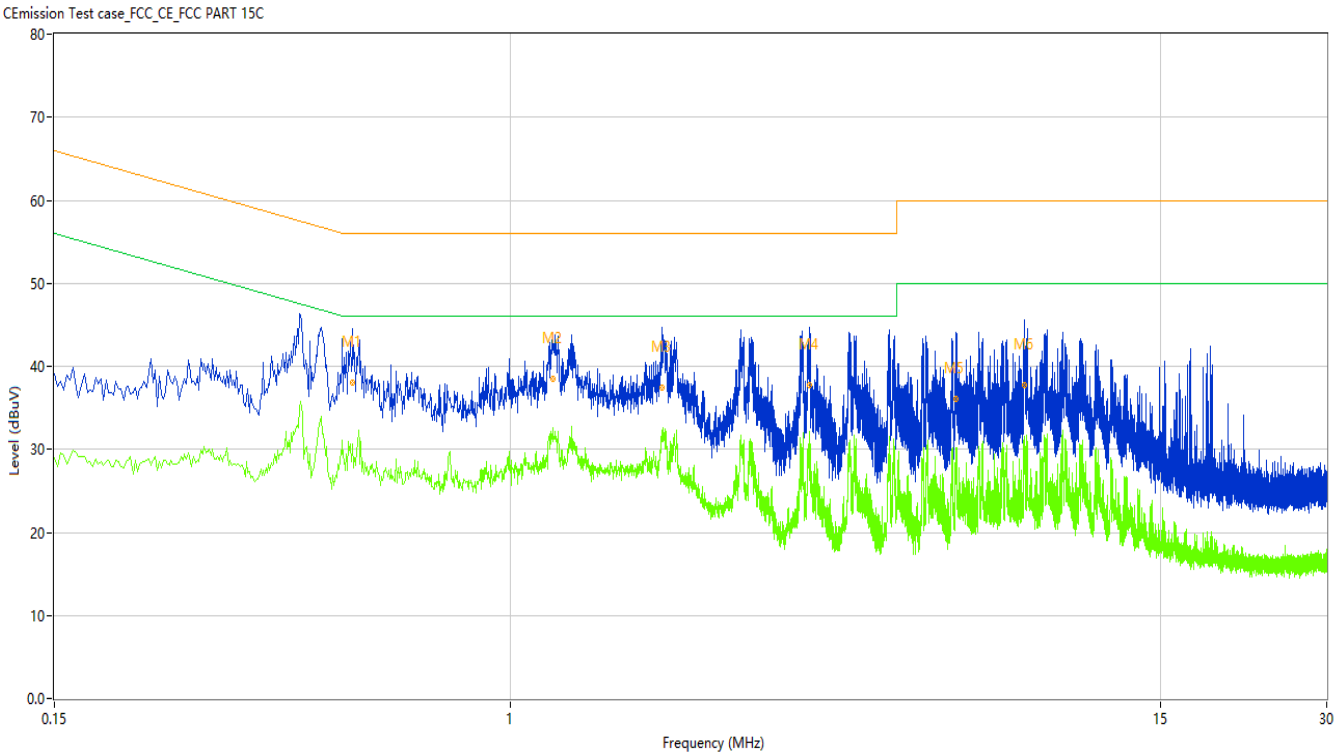
Note：The all configurations were tested respectively, but only the worst data (at middle channel) shown here.

Figure 13: Conducted Emission on AC Mains, L Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.424	47.20	9.97	57.37	10.17	Peak	L	Pass
1*	0.424	39.48	9.97	57.37	17.89	QP	L	Pass
1**	0.424	30.09	9.97	47.37	17.28	AV	L	Pass
2	1.114	41.75	9.83	56.00	14.25	Peak	L	Pass
2*	1.114	34.36	9.83	56.00	21.64	QP	L	Pass
2**	1.114	27.23	9.83	46.00	18.77	AV	L	Pass
3	2.858	41.50	9.83	56.00	14.50	Peak	L	Pass
3*	2.858	32.39	9.83	56.00	23.61	QP	L	Pass
3**	2.858	25.93	9.83	46.00	20.07	AV	L	Pass
4	4.340	42.17	9.82	56.00	13.83	Peak	L	Pass
4*	4.340	34.00	9.82	56.00	22.00	QP	L	Pass
4**	4.340	26.24	9.82	46.00	19.76	AV	L	Pass
5	5.818	42.87	9.81	60.00	17.13	Peak	L	Pass
5*	5.818	33.95	9.81	60.00	26.05	QP	L	Pass
5**	5.818	27.81	9.81	50.00	22.19	AV	L	Pass
6	10.980	45.11	9.66	60.00	14.89	Peak	L	Pass
6*	10.980	37.96	9.66	60.00	22.04	QP	L	Pass
6**	10.980	32.67	9.66	50.00	17.33	AV	L	Pass

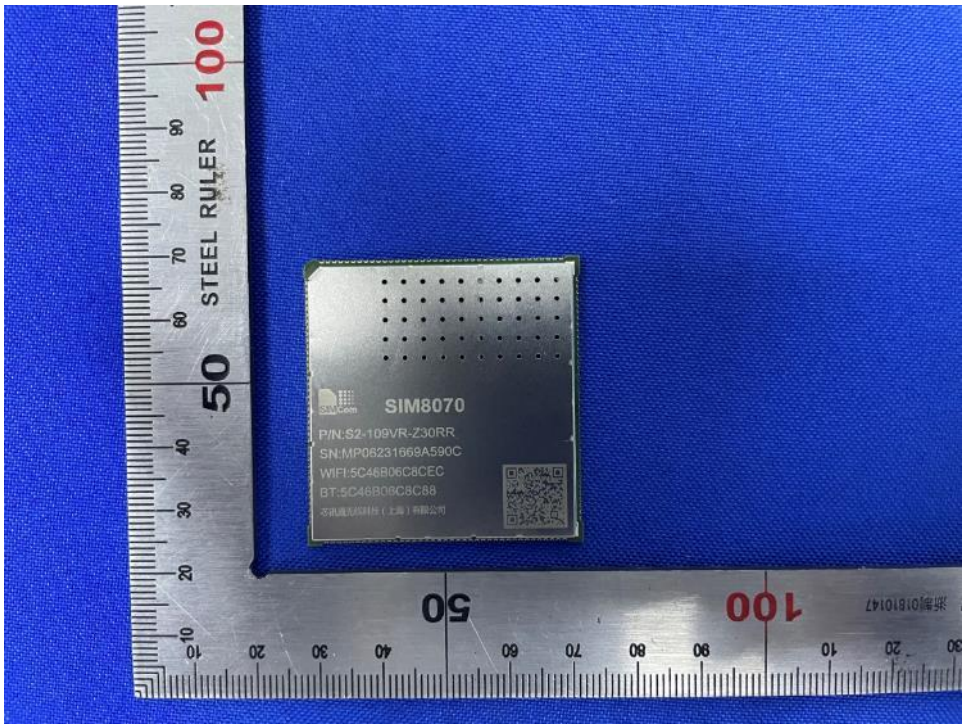
Figure 14: Conducted Emission on AC Mains, N Phase



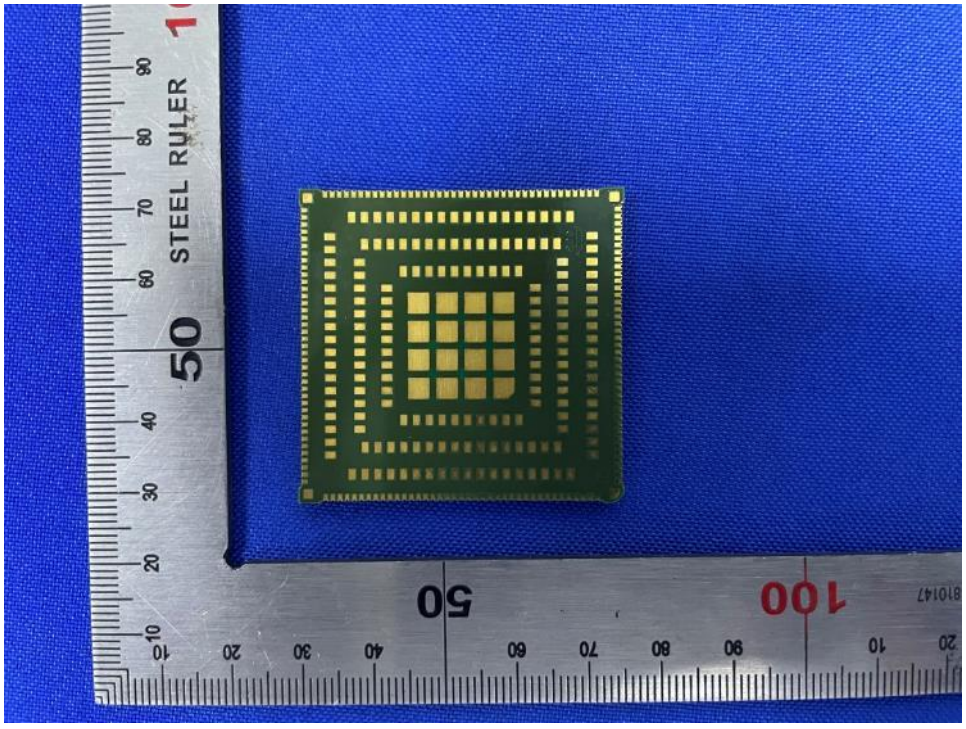
No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.520	44.75	10.07	56.00	11.25	Peak	N	Pass
1*	0.520	38.11	10.07	56.00	17.89	QP	N	Pass
1**	0.520	30.66	10.07	46.00	15.34	AV	N	Pass
2	1.194	44.23	9.95	56.00	11.77	Peak	N	Pass
2*	1.194	38.45	9.95	56.00	17.55	QP	N	Pass
2**	1.194	32.54	9.95	46.00	13.46	AV	N	Pass
3	1.880	44.01	9.94	56.00	11.99	Peak	N	Pass
3*	1.880	37.40	9.94	56.00	18.60	QP	N	Pass
3**	1.880	32.29	9.94	46.00	13.71	AV	N	Pass
4	3.476	44.21	9.90	56.00	11.79	Peak	N	Pass
4*	3.476	37.79	9.90	56.00	18.21	QP	N	Pass
4**	3.476	32.20	9.90	46.00	13.80	AV	N	Pass
5	6.404	44.63	9.81	60.00	15.37	Peak	N	Pass
5*	6.404	36.12	9.81	60.00	23.88	QP	N	Pass
5**	6.404	30.18	9.81	50.00	19.82	AV	N	Pass
6	8.514	45.38	9.80	60.00	14.62	Peak	N	Pass
6*	8.514	37.78	9.80	60.00	22.22	QP	N	Pass
6**	8.514	31.61	9.80	50.00	18.39	AV	N	Pass

5 Appendixes

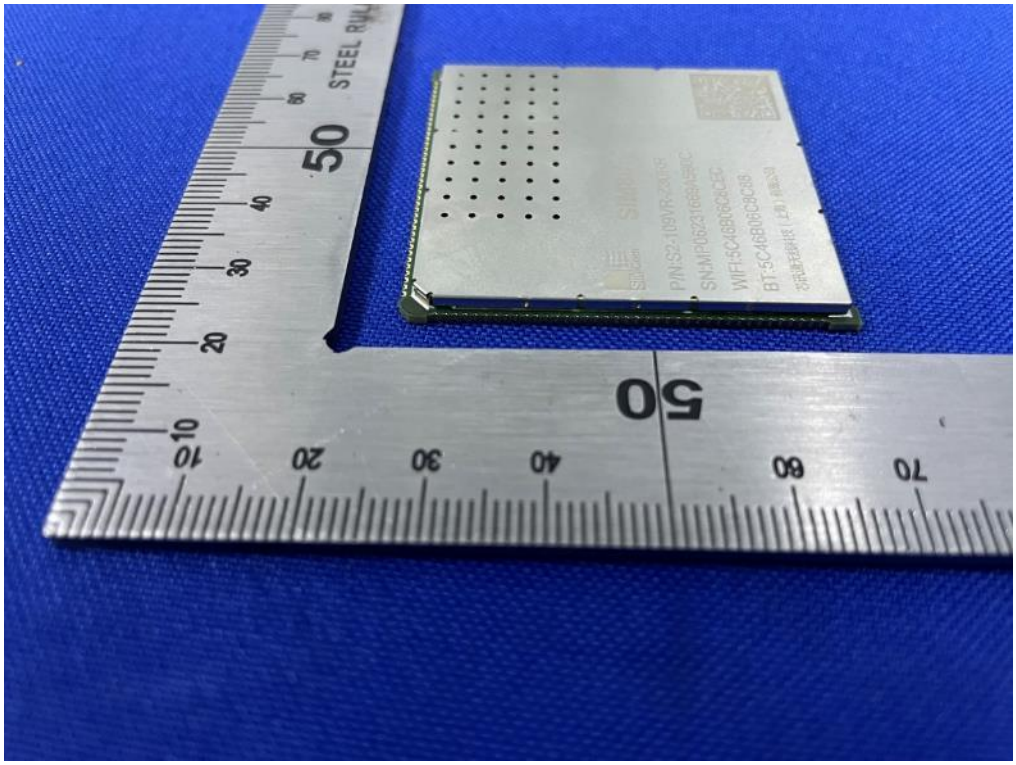
5.1 Photographs of the Sample



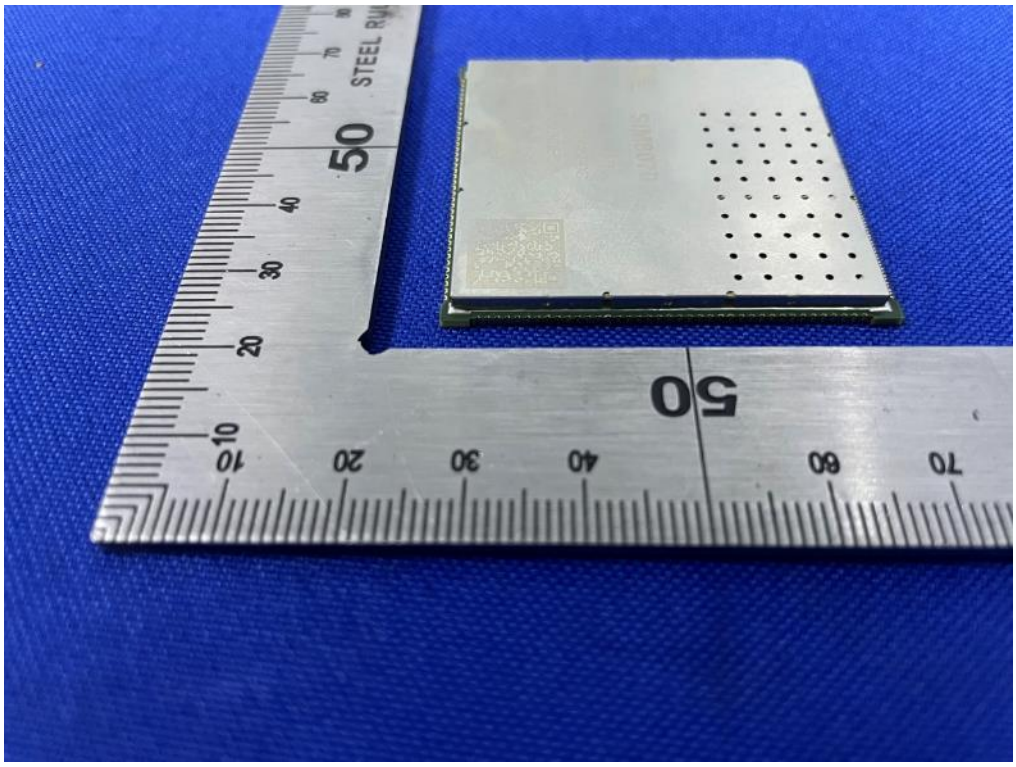
Front of the sample



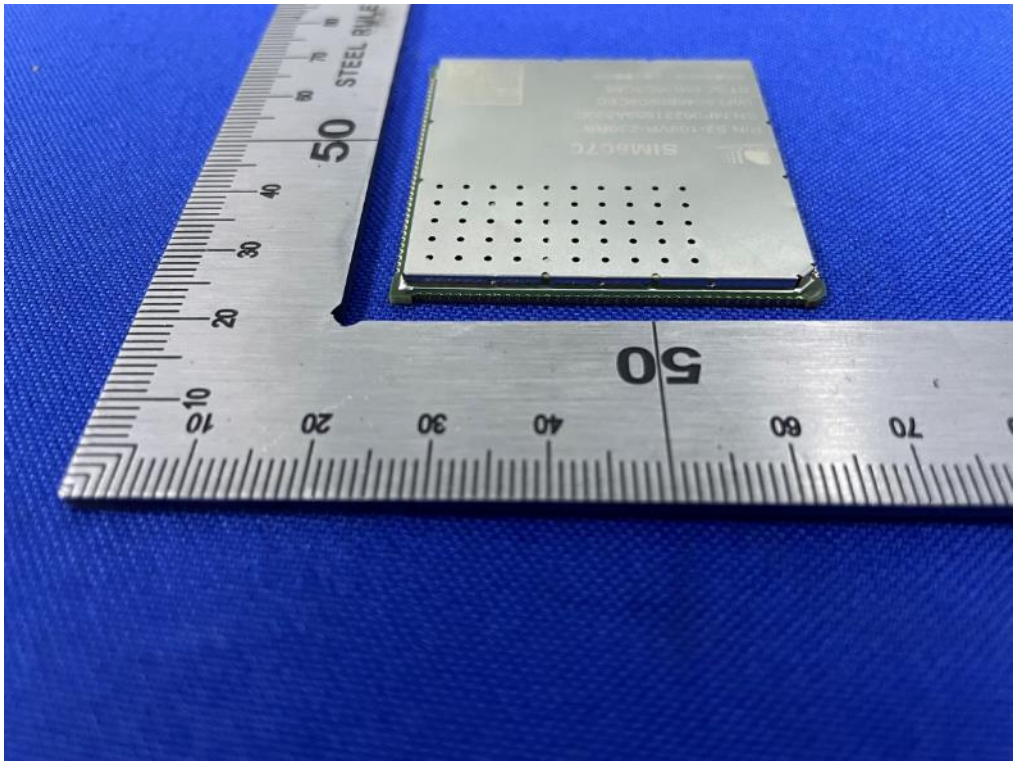
Rear of the sample



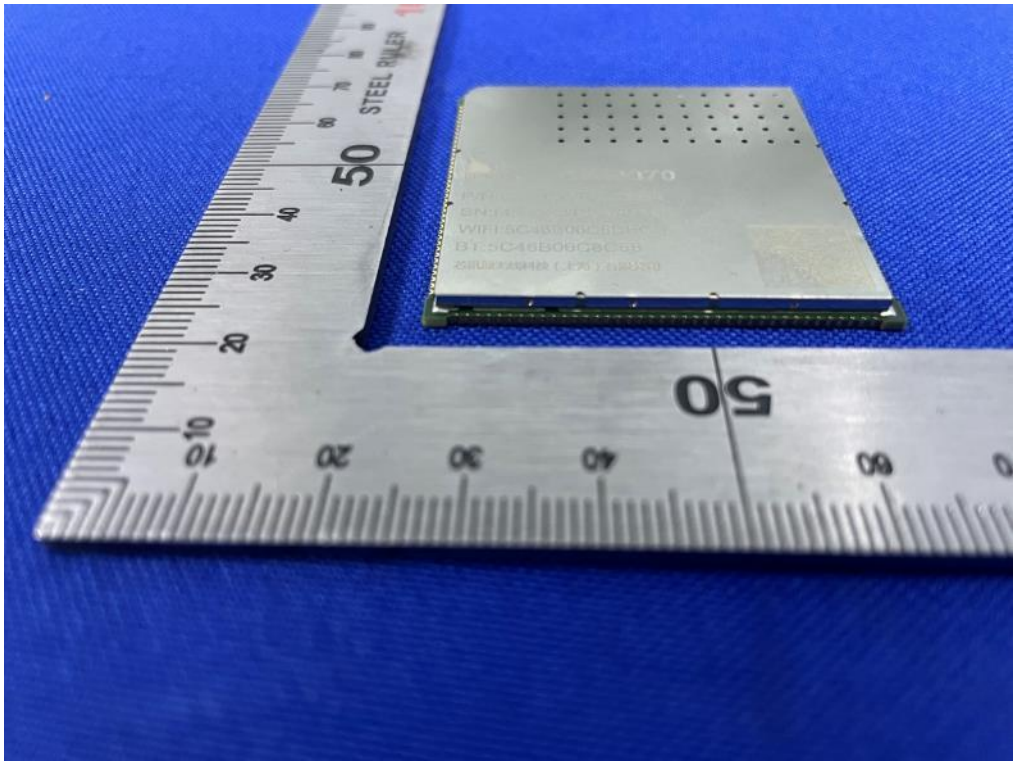
Left of the sample



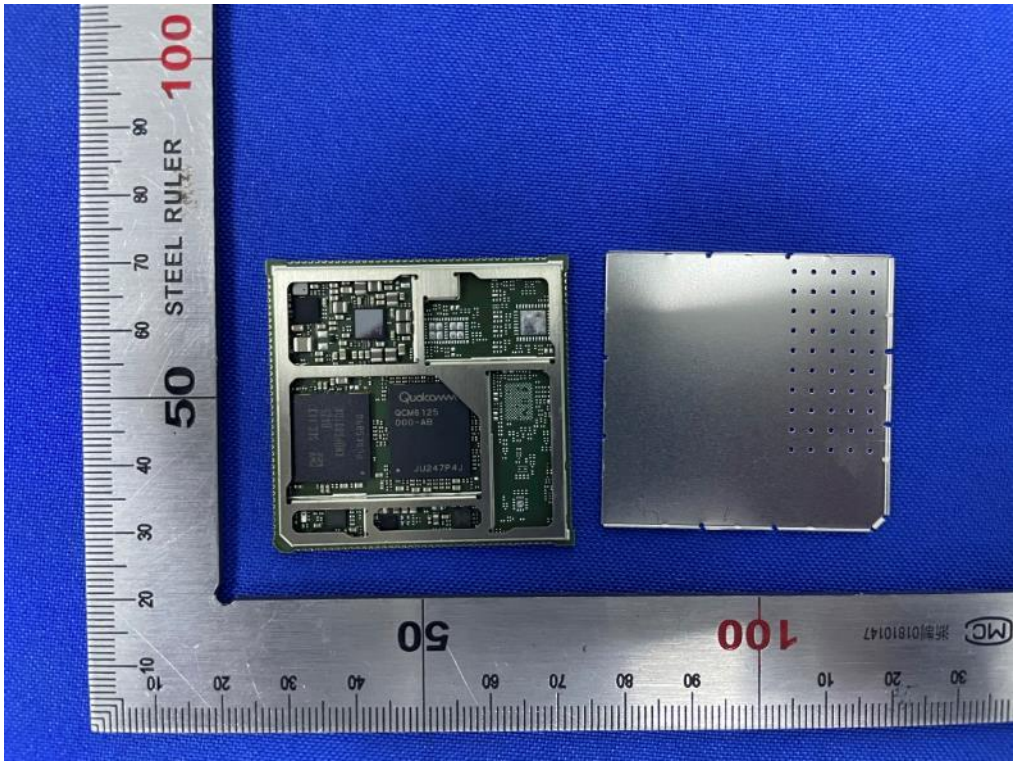
Right of the sample



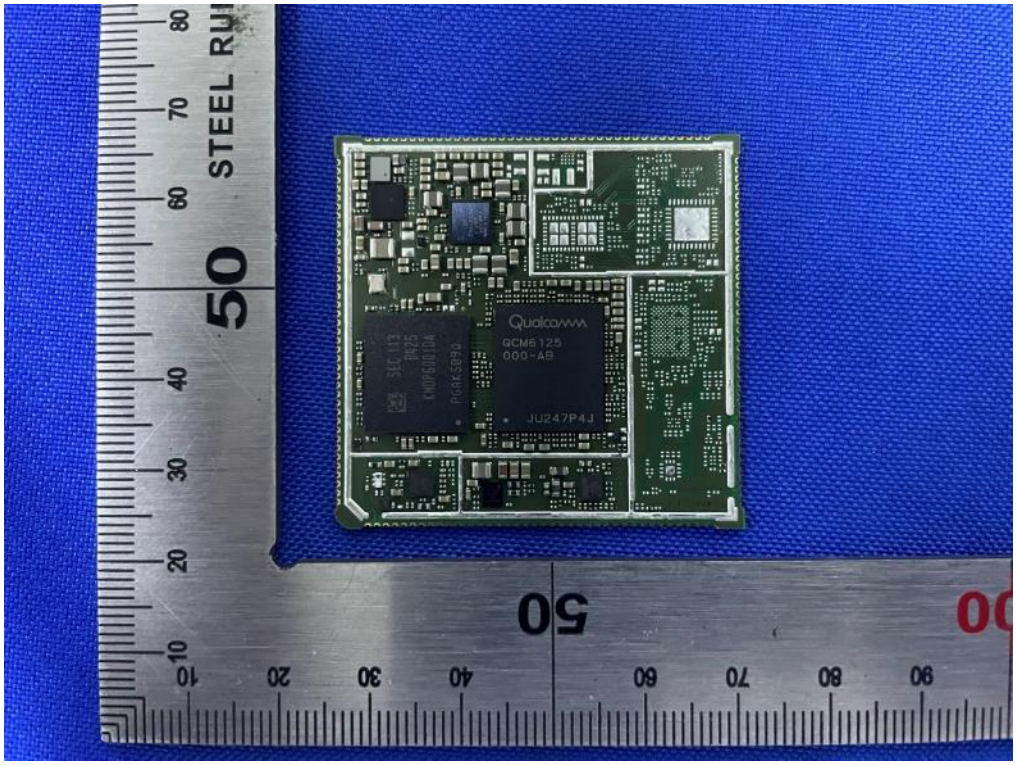
Top of the sample



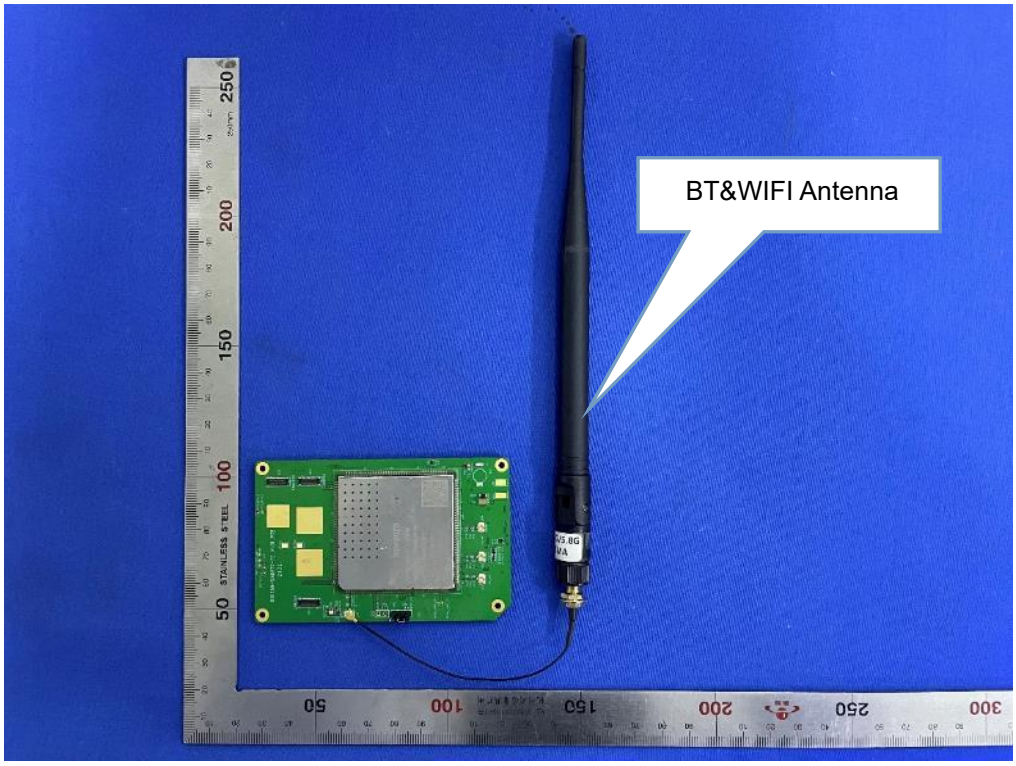
Bottom of the sample



Open of the sample

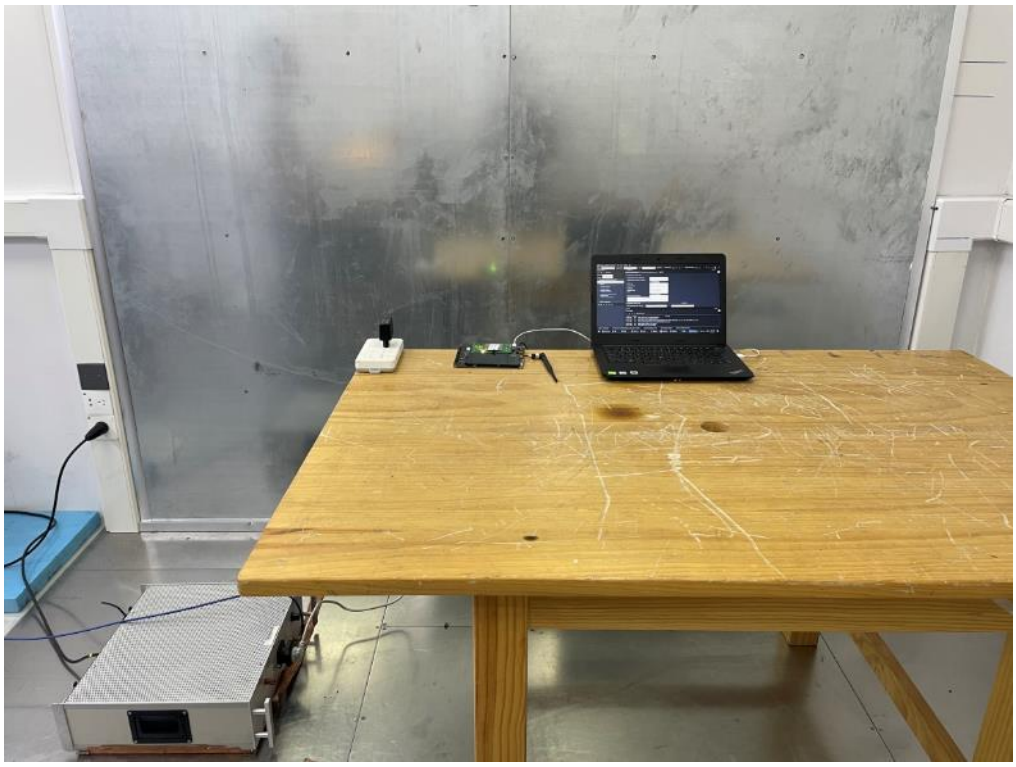


Internal-1 of the sample



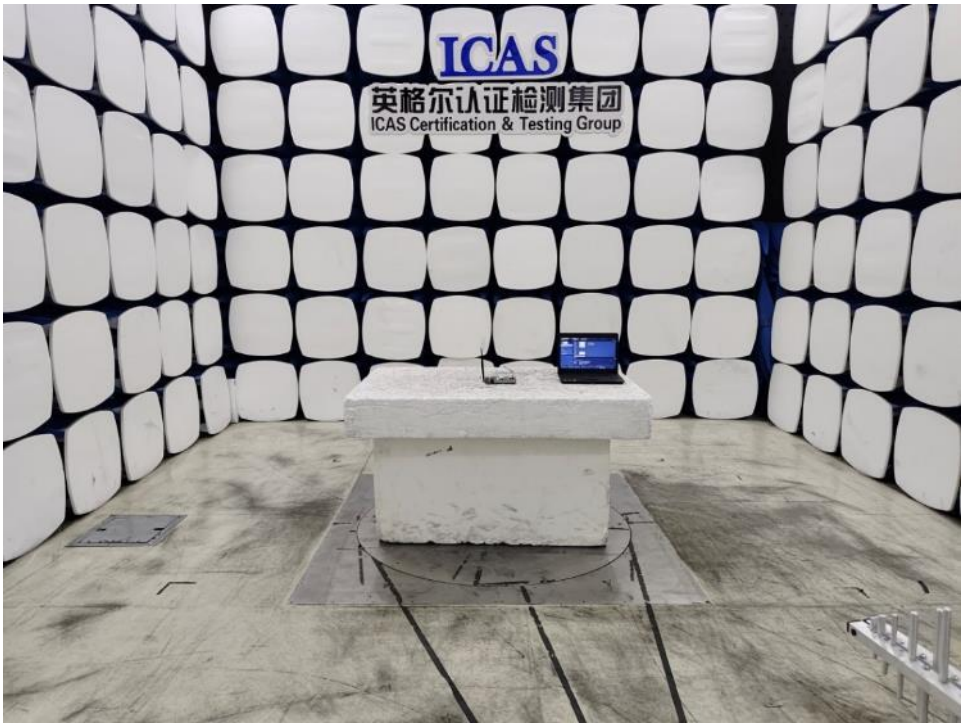
Antenna Position

5.2 Set-up for Conducted Emissions

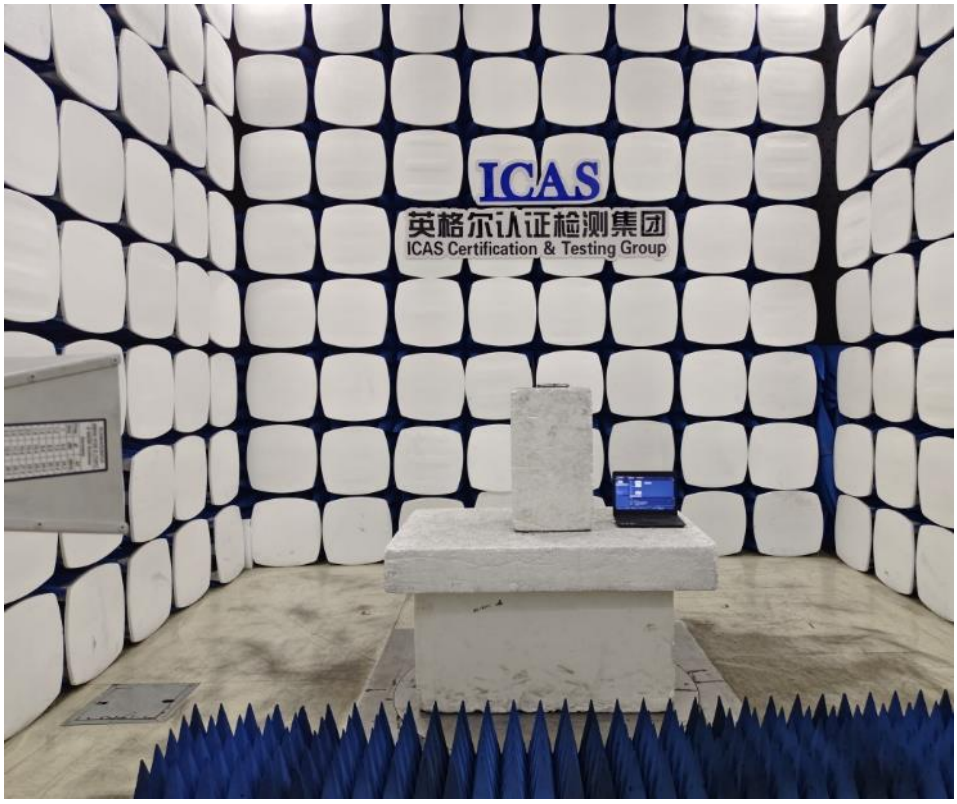


5.3 Set-up for Conducted RF test at Antenna Port

5.4 Set-up for Spurious Emissions below 1GHz



5.5 Set-up for Spurious Emissions above 1GHz



End of the report