TEST REPORT

Applicant	:	ShangHai Ehong Technology Co.,Ltd
Address of Applicant	:	Suite501,No.3 building,No.439 Jinglian road,Minhang district,Shanghai,China
Product Name	:	Ehong BLE Module
Brand Name	:	Ehong
Model Name	:	EH-MC25, EH-MC25B
Sample Acquisition Method	:	Sent by Client
Sample No.	:	E23020098-01#03(EH-MC25 Model) E23020098-01#04(EH-MC25 Model) E23020098-01#05(EH-MC25B Model)
FCC ID	:	2ACCRMC25
Standards	:	FCC CFR47 Part 15, Subpart C
Date of Receipt	:	2023-03-08
Date of Test	:	2023-03-21~ 2023-03-28
Date of Issue	:	2023-03-30

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: Guoyou Chi (Authorized signatory: Guoyou Chi)

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	ShangHai Ehong Technology Co.,Ltd.
Address	Suite501,No.3 building,No.439 Jinglian road,Minhang district,Shanghai,China
Contact Person	Rik Tang
Telephone	02164769993
Email	rik.tang@ehonglink.com
Manufacturer Company Name	ShangHai Ehong Technology Co.,Ltd.
Address	Suite501,No.3 building,No.439 Jinglian road,Minhang district,Shanghai,China
Factory Company Name	ShangHai Ehong Technology Co.,Ltd.
Address	Suite501,No.3 building,No.439 Jinglian road,Minhang district,Shanghai,China

1.3 Details of EUT

Product Name	Ehong BLE Module
Brand Name	Ehong
Test Model Name	EH-MC25, EH-MC25B
Difference Description	All the same except for the antenna EH-MC25 Model is the pcb antenna EH-MC25B Model is the external antenna
FCC ID	2ACCRMC25
Mode of Operation	Bluetooth BLE Version 5.2
Frequency Range	2402MHz ~ 2480MHz
Number of Channels	40 (at intervals of 2 MHz)
Modulation Type	GFSK
RF Output Power	EH-MC25(4.08dBm) EH-MC25B(3.46dBm)
Antenna Type	EH-MC25(PCB Antenna) EH-MC25B(External Antenna)
Antenna Gain	EH-MC25: 0.4dBi EH-MC25B: 3.0dBi
Extreme Temperature Range	-10℃~ +85℃
Test Voltage	DC 3.3V

Hardware Version	V2.0
Software Version	V1.0.0
Test SW Version	BL410_R;BL410_E
RF power setting in TEST SW	RTL8762x_RFTestTool_V1.0.2.3 Power setting_0xA0(3dBm)

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)	N/Anote

Note(s): N/A meas not applicable.The EUT is powered by DC Power Supply(DC 3.3V), Conducted Emission on AC Mains 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.

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	2022-06-10	2023-06-09
Signal Generator	Rohde & Schwarz	SMR27	100184	2022-08-02	2023-08-01
EMI Test Receiver	Rohde & Schwarz	ESR 7	101911	2022-06-10	2023-06-09
Broadband Antenna	SCHWARZBECK	VULB9163	9163-1037	2021-06-08	2023-06-07
Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1775	2021-06-08	2023-06-07
Loop Antenna	SCHWARZBECK	FMZB 1513	/	2022-06-10	2023-06-09
Broadband Preamplifier	SCHWARZBECK	BBV 9718	346	2022-06-10	2023-06-09
EMC chamber 9*6*6 （L*W*H)	CHANGNING	966	N/A	2022-06-10	2023-06-09
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

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
Occupied Channel Bandwidth		±5 %

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

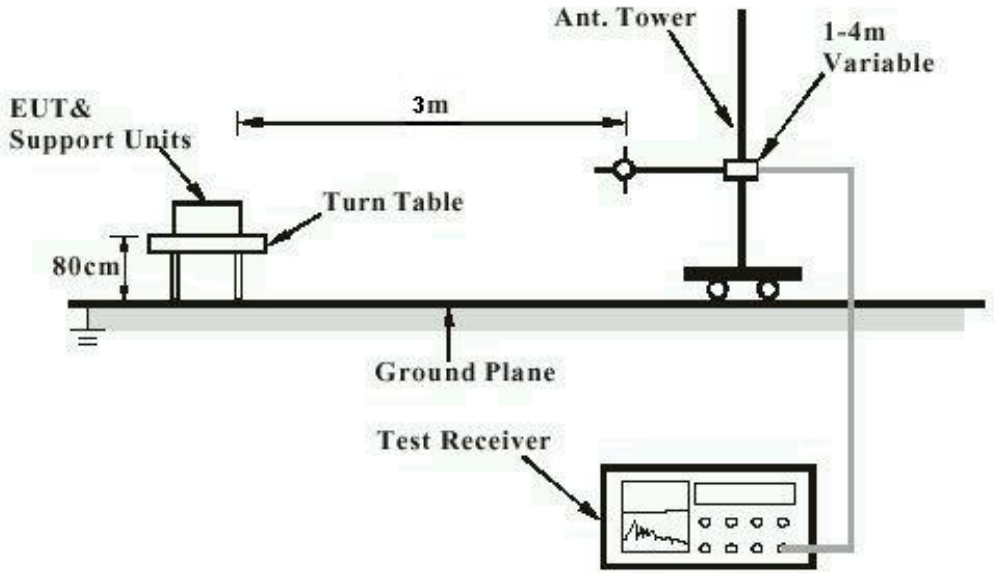
Description	Manufacturer	Model Name	Serial No.
Laptop 1	HP	HP ZHAN 66 Pro G1	N/A
Laptop 2	Lenovo	TP00083A	N/A
USB Cable	N/A	N/A	1.00m Unshielded

3.3 Support Software

Description	Manufacturer	Software Name
Software	N/A	RTL8762x_RFTestTool_V1.0.2.3

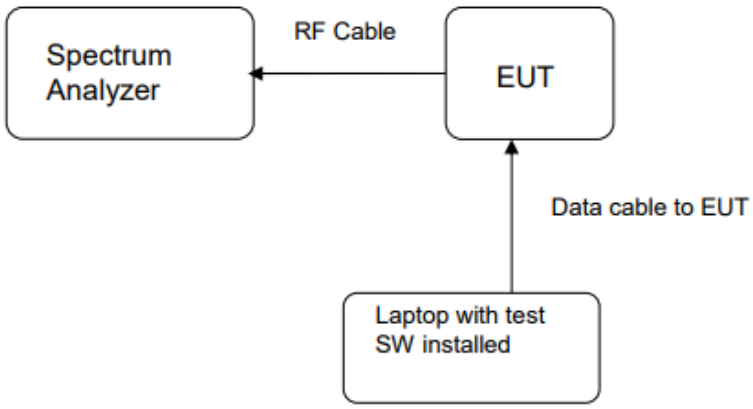
3.4 Test Setup Diagram

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, an antenna with a directional gain of 3.0dBi(max). The antenna is a External 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.

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 clause 8.3.1.1
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_ Model: EH-MC25

Test Mode	Test Channel (MHz)	Maximum peak conducted output power		Limit (W)
		(dBm)	(mW)	
BLE-1M	2402	4.08	2.56	< 1
	2440	3.89	2.45	
	2480	3.73	2.36	
BLE-2M	2402	4.03	2.53	
	2440	3.88	2.44	
	2480	3.70	2.34	

Table 2: Maximum peak conducted output power_ Model: EH-MC25B

Test Mode	Test Channel (MHz)	Maximum peak conducted output power		Limit (W)
		(dBm)	(mW)	
BLE-1M	2402	3.46	2.22	< 1
	2440	3.39	2.18	
	2480	3.37	2.17	
BLE-2M	2402	3.45	2.21	
	2440	3.37	2.17	
	2480	3.31	2.14	

Model: EH-MC25

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

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

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

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

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

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

Model: EH-MC25B

Figure 7: Peak Output Power, 2402MHz BLE-1M

Figure 8: Peak Output Power, 2440MHz BLE-1M

Figure 9: Peak Output Power, 2480MHz BLE-1M

Figure 10: Peak Output Power, 2402MHz BLE-2M

Figure 11: Peak Output Power, 2440MHz BLE-2M

Figure 12: Peak Output Power, 2480MHz BLE-2M

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 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 3: 6dB Bandwidth_ Model: EH-MC25

Test Mode	Test Channel (MHz)	6dB Bandwidth (MHz)	Limit
BLE-1M	2402	0.6841	>0.5 MHz
	2440	0.7288	
	2480	0.7517	
BLE-2M	2402	1.2180	
	2440	1.3620	
	2480	1.3610	

Table 4: 6dB Bandwidth_Model: EH-MC25B

Test Mode	Test Channel (MHz)	6dB Bandwidth (MHz)	Limit
BLE-1M	2402	0.6760	>0.5 MHz
	2440	0.7087	
	2480	0.7167	
BLE-2M	2402	1.3260	
	2440	1.4130	
	2480	1.3840	

Model: EH-MC25

Figure 13: 6dB Bandwidth, 2402MHz BLE-1M

Figure 14: 6dB Bandwidth, 2440MHz BLE-1M

Figure 15: 6dB Bandwidth, 2480MHz BLE-1M

Figure 16: 6dB Bandwidth, 2402MHz BLE-2M

Figure 17: 6dB Bandwidth, 2440MHz BLE-2M

Figure 18: 6dB Bandwidth, 2480MHz BLE-2M

Model: EH-MC25B

Figure 19: Peak Output Power, 2402MHz BLE-1M

Figure 20: Peak Output Power, 2440MHz BLE-1M

Figure 21: Peak Output Power, 2480MHz BLE-1M

Figure 22: Peak Output Power, 2402MHz BLE-2M

Figure 23: Peak Output Power, 2440MHz BLE-2M

Figure 24: Peak Output Power, 2480MHz BLE-2M EH-MC25B

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 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 5: Maximum conducted output power spectral density_ Model: EH-MC25

Test Mode	Test Channel (MHz)	Measured Result (dBm/3kHz)	Limit (dBm/3kHz)
BLE-1M	2402	-10.19	8
	2440	-10.03	
	2480	-11.33	
BLE-2M	2402	-10.83	
	2440	-12.72	
	2480	-12.20	

Table 6: Maximum conducted output power spectral density_Model: EH-MC25B

Test Mode	Test Channel (MHz)	Measured Result (dBm/3kHz)	Limit (dBm/3kHz)
BLE-1M	2402	-9.26	8
	2440	-10.90	
	2480	-11.46	
BLE-2M	2402	-12.68	
	2440	-12.75	
	2480	-12.85	

Model: EH-MC25

Figure 25: Power Spectral Density, 2402MHz BLE-1M

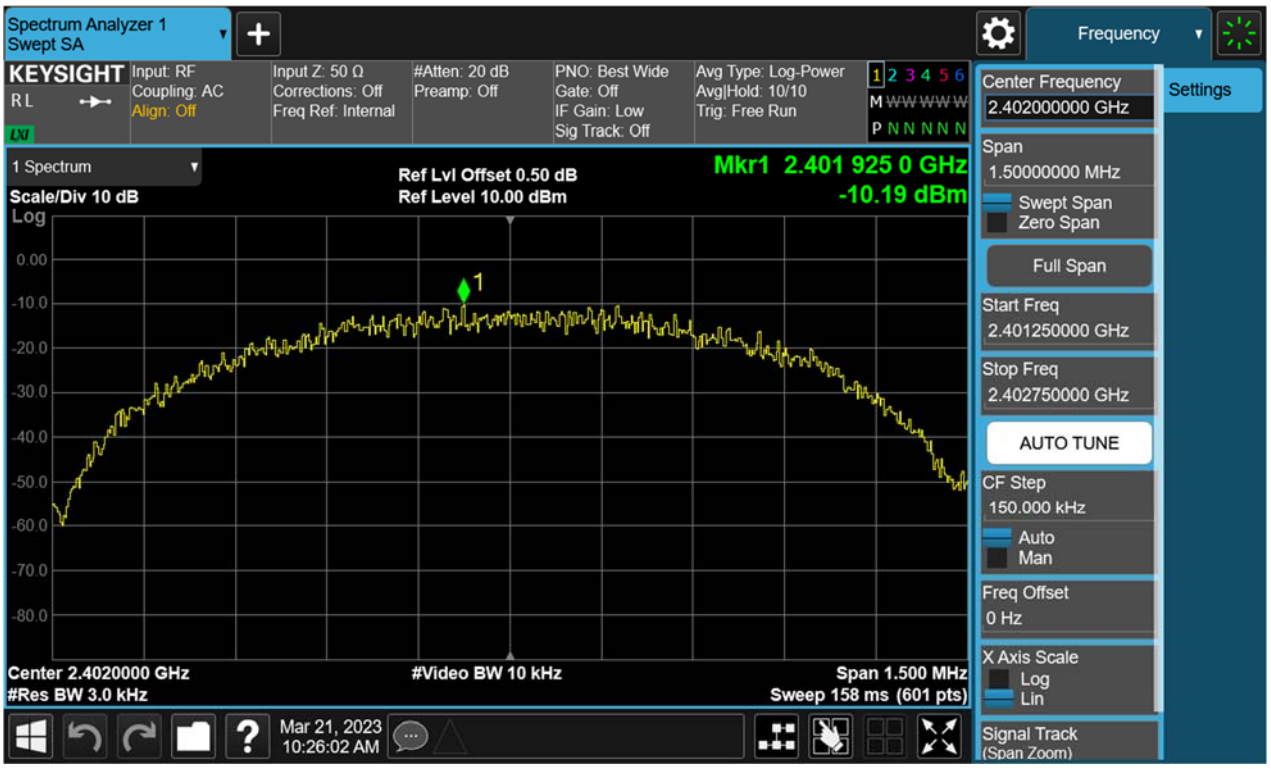


Figure 26: Power Spectral Density, 2440MHz BLE-1M

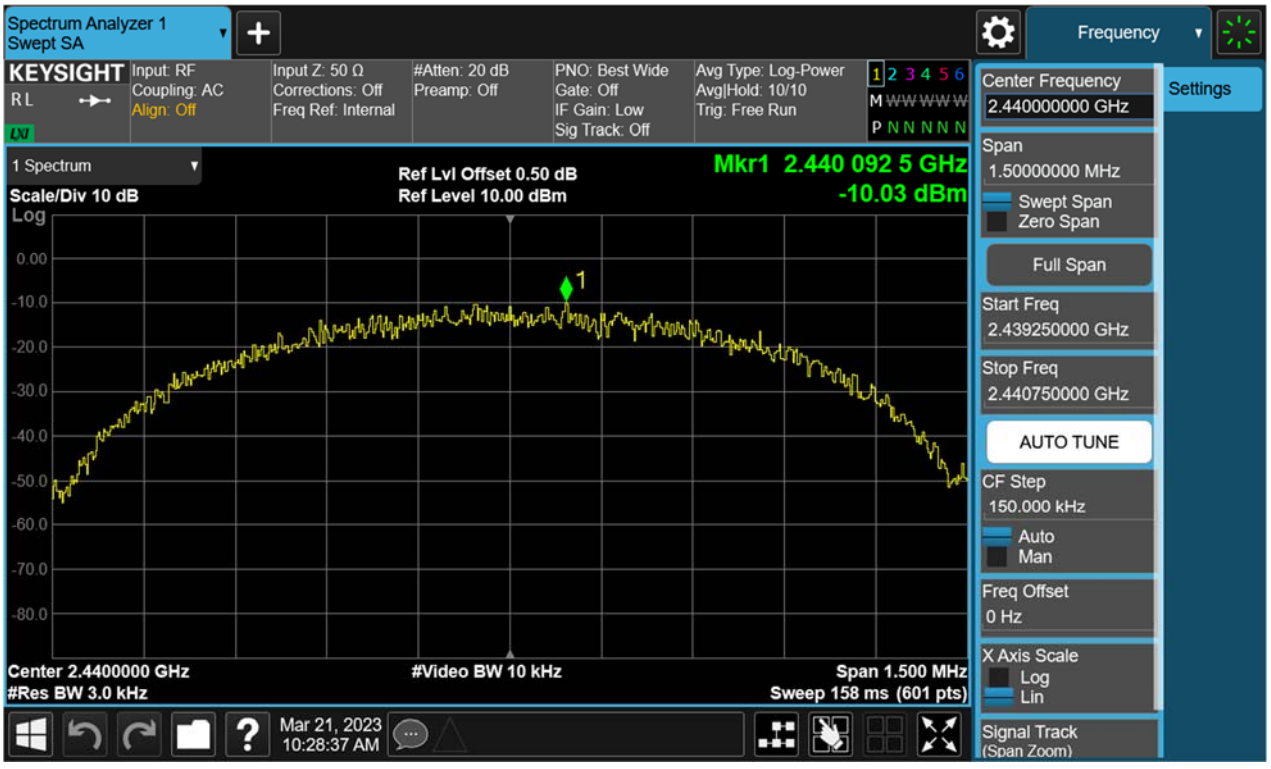


Figure 27: Power Spectral Density, 2480MHz BLE-1M

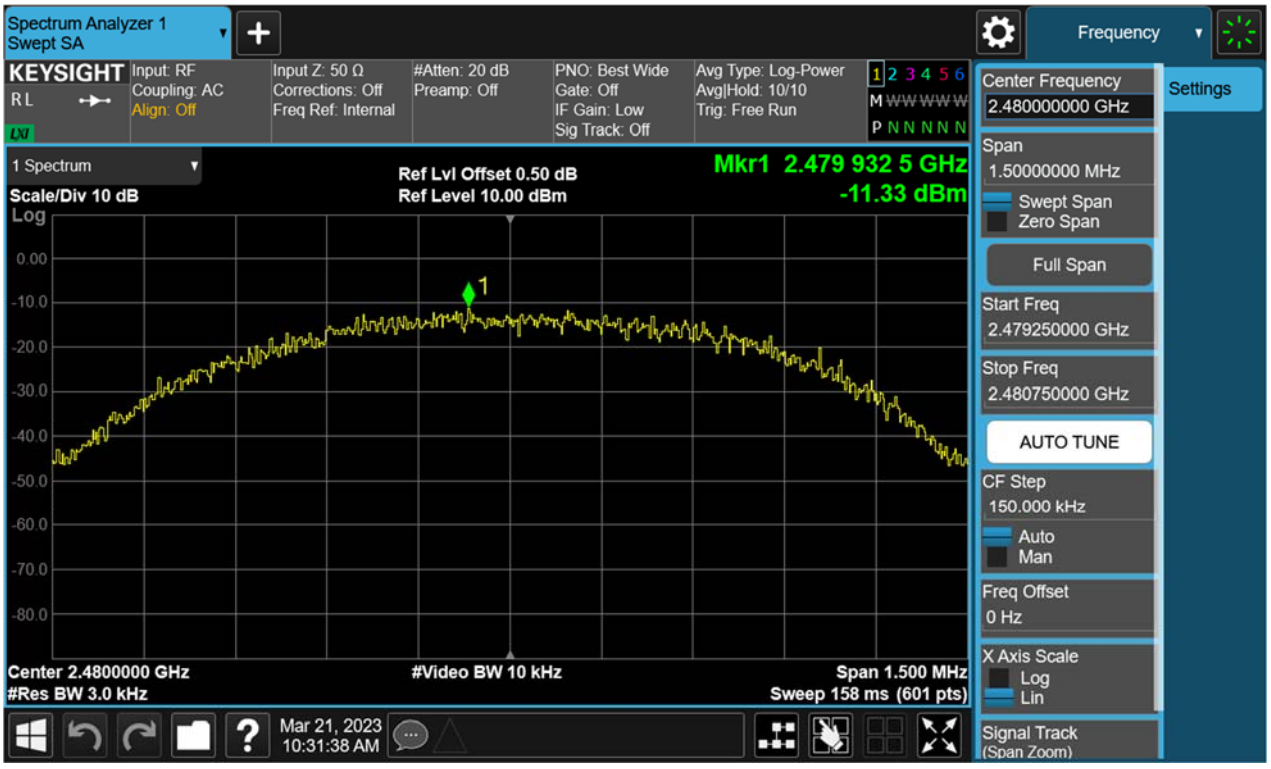


Figure 28: Power Spectral Density, 2402MHz BLE-2M

Figure 29: Power Spectral Density, 2440MHz BLE-2M

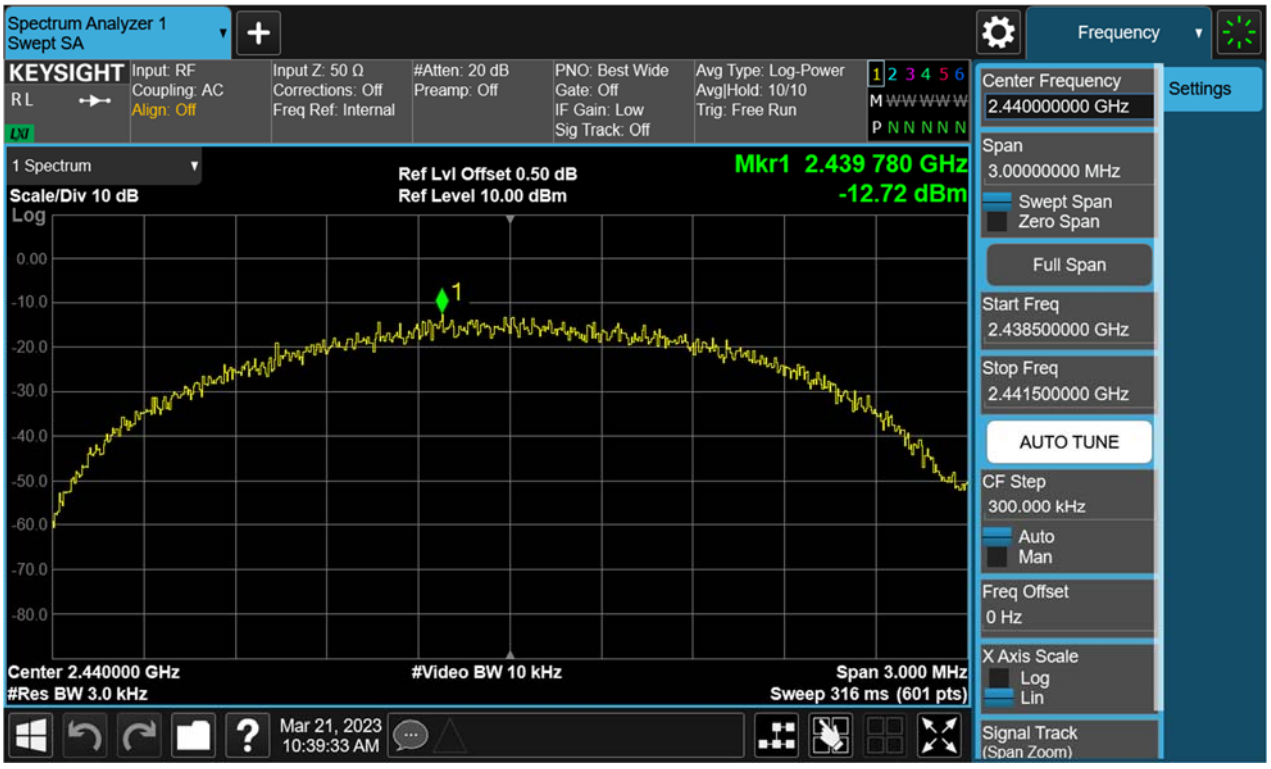
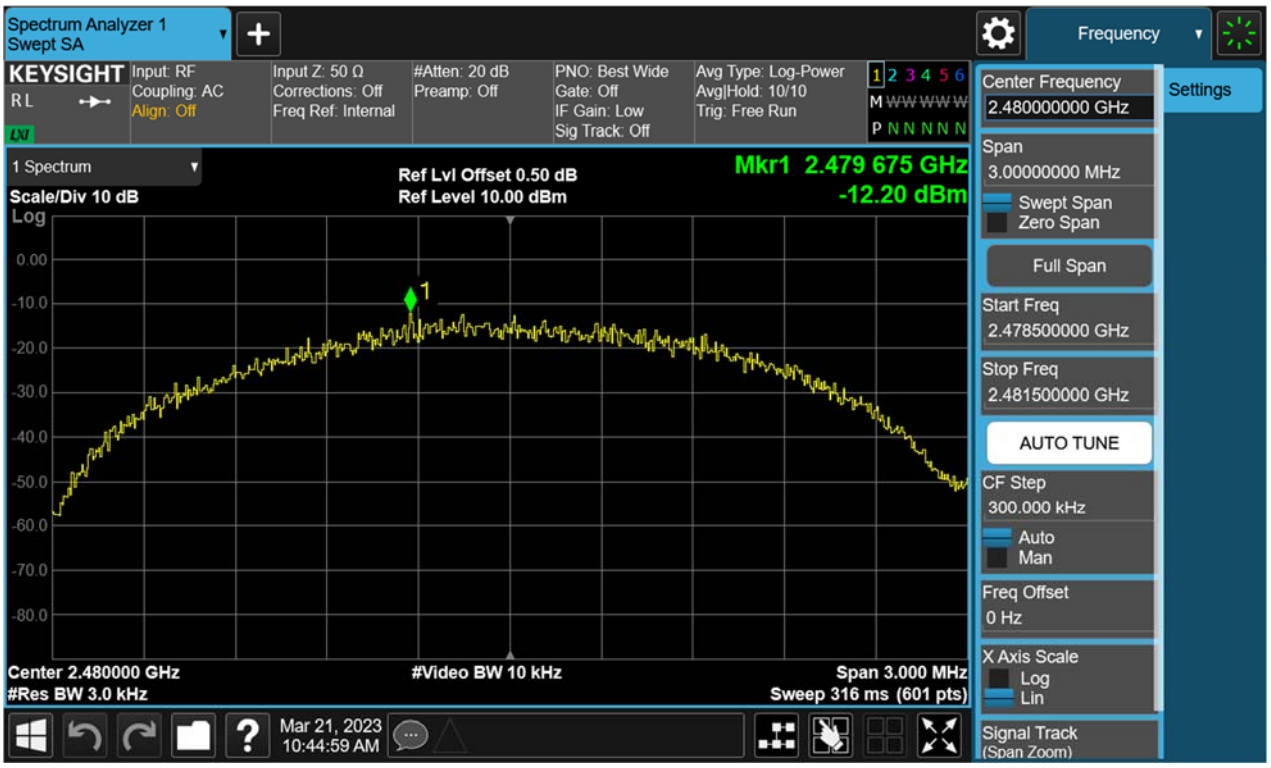


Figure 30: Power Spectral Density, 2480MHz BLE-2M



Model: EH-MC25B

Figure 31: Peak Output Power, 2402MHz BLE-1M

Figure 32: Peak Output Power, 2440MHz BLE-1M

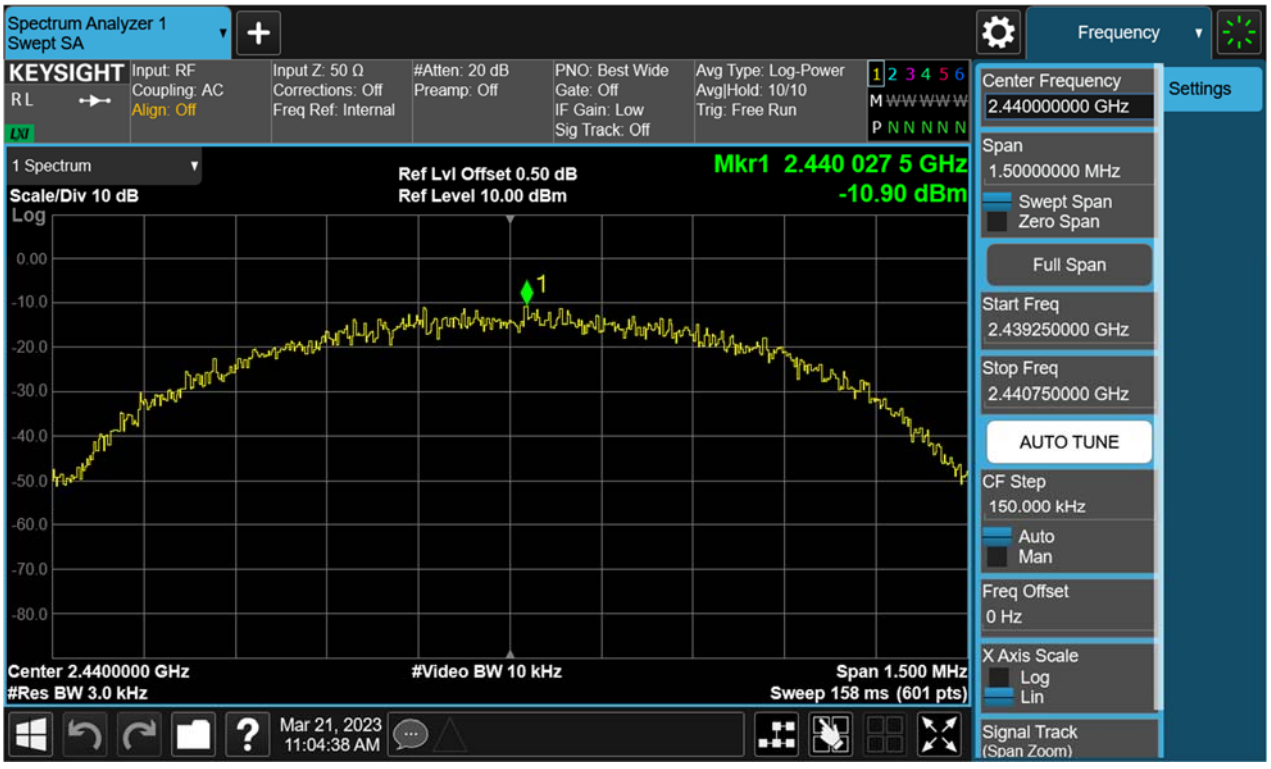


Figure 33: Peak Output Power, 2480MHz BLE-1M

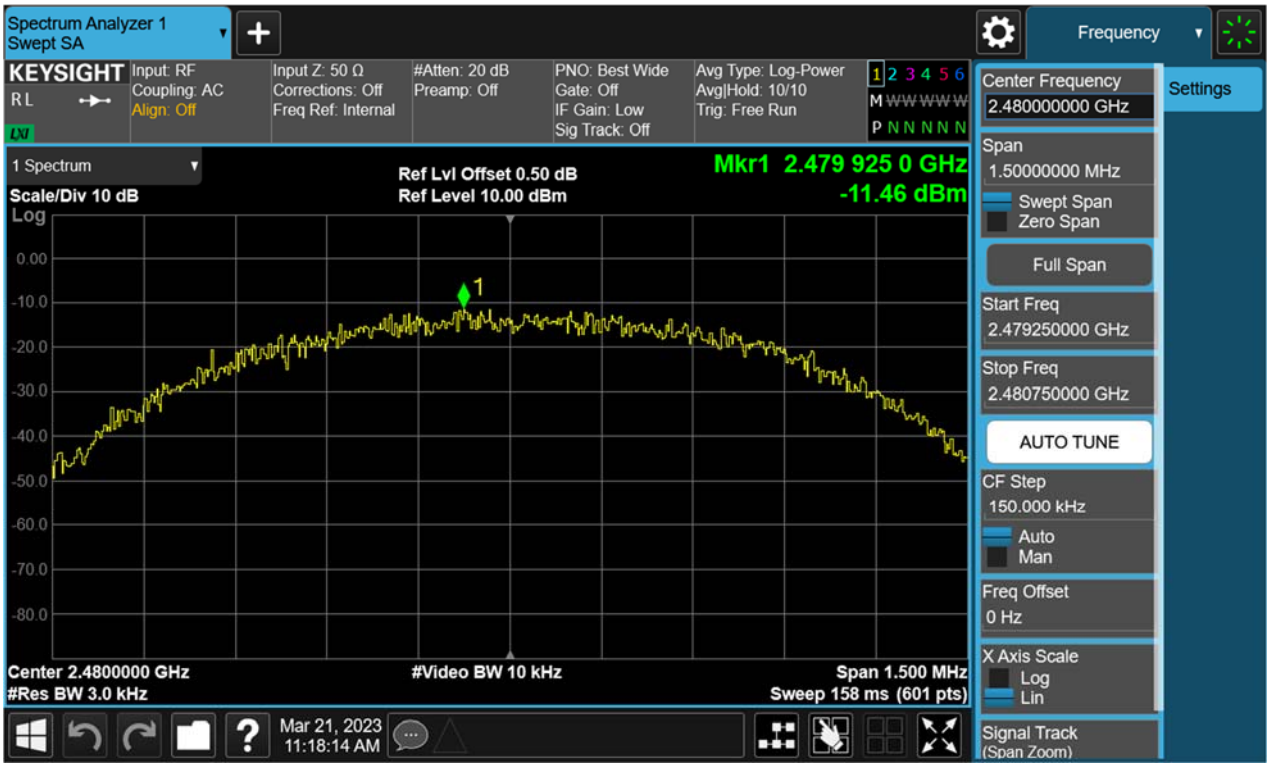


Figure 34: Peak Output Power, 2402MHz BLE-2M

Figure 35: Peak Output Power, 2440MHz BLE-2M

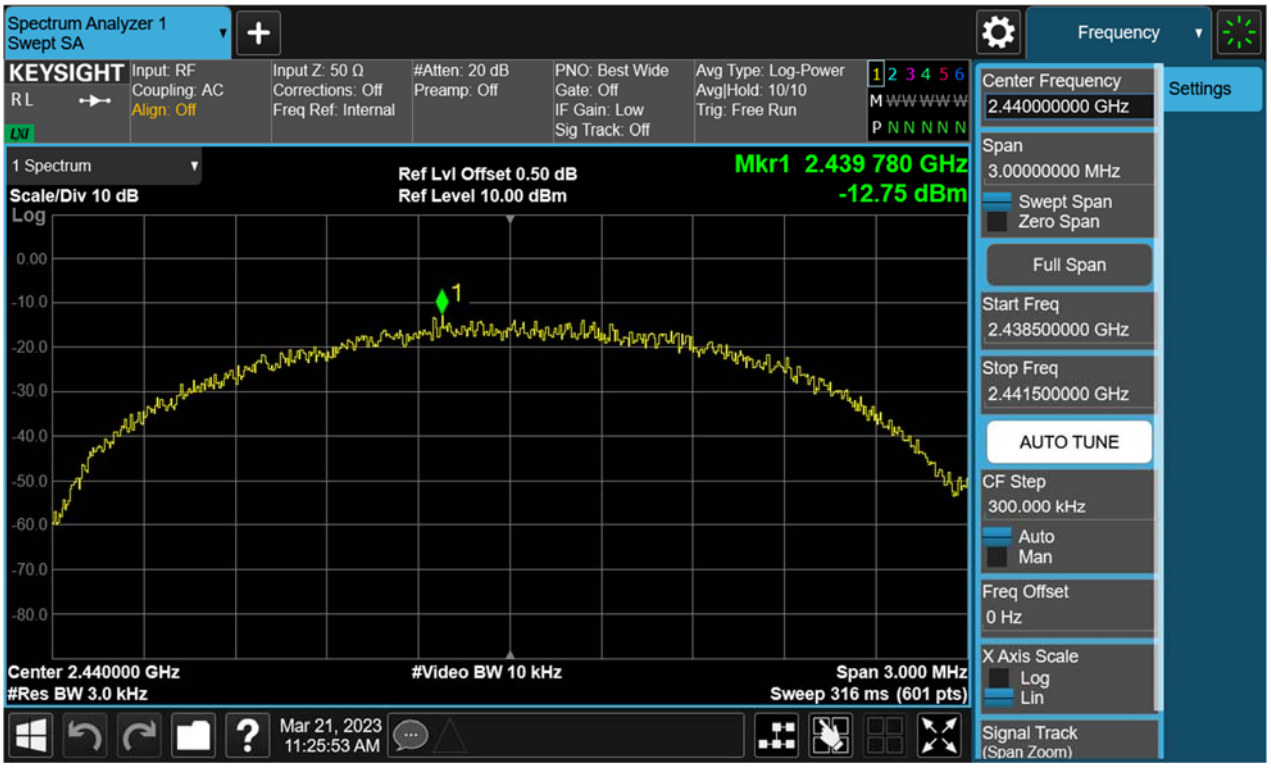


Figure 36: Peak Output Power, 2480MHz BLE-2M