



TEST REPORT

Report No.: SHE21120035-02BE

Date: 2022-03-08

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Applicant : Shanghai HUVITZ Co., Ltd.
Address of Applicant : Building 1, No. 150, Renjie Road, Fengxian, Shanghai

Product Name : Automatic Visual Acuity Tester
Model No. : CDC-1,SB-404
Brand Name : CHAROPS, Specsavers
Sample No. : E21120035-02#01
E21120035-03#01
FCC ID : 2AT8E-CDC1

Standards : FCC CFR47 Part 15, Subpart C

Date of Receipt : 2021-12-10
Date of Test : 2021-12-10 ~ 2022-03-08
Date of Issue : 2022-03-08

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.

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5.5 SET-UP FOR SPURIOUS EMISSIONS ABOVE 1GHZ.....70

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 HUVITZ Co., Ltd.
Address	Building 1, No. 150, Renjie Road, Fengxian, Shanghai
Contact Person	Jiaqiang.zhuo
Telephone	18621890304
Email	jiaqiang.zhuo@aliyun.com
Manufacturer Company Name	Shanghai HUVITZ Co., Ltd.
Address	Building 1, No. 150, Renjie Road, Fengxian, Shanghai
Factory Company Name	Shanghai HUVITZ Co., Ltd.
Address	Building 1, No. 150, Renjie Road, Fengxian, Shanghai

1.3 Details of EUT

Product Name	Automatic Visual Acuity Tester
Test Model No.Brand Name	CHAROPS
Series Model No. Brand Name	Specsavers
Test Model No.	CDC-1
Series Model No.	SB-404
Difference Description	The difference between models is for different market sale, the other (hardware and software) was the same as before.
FCC ID	2AT8E-CDC1
Mode of Operation	Bluetooth BR/EDR
Frequency Range	2400MHz ~ 2483.5MHz
Number of Channels	79 (at intervals of 1 MHz)
Modulation Type	GFSK, $\pi/4$ -DQPSK, 8-DPSK
Antenna Type	Internal Antenna



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Antenna Gain	2.00 dBi
Test Voltage	DC 12V 5A by adapter (which received AC 100-240V 50/60Hz power)
Hardware version	V100A
Software version	V1.0.0
Test SW Version	BL410_R; BL410_E
RF power setting in TEST SW	Linux operation Command

1.4 Test Methodology

47 CFR Part 15, Subpart C	Miscellaneous Wireless Communications Services
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	Requirement	Result
Antenna Requirement	FCC Part 15.247(b)(4), 15.203	FCC Part 15.247(b)(4), 15.203	PASS
Maximum Conducted Output Power	FCC Part 15.247(b)(1)	ANSI C63.10-2013, Clause 7.8.5 KDB 558074 D01 v05r02, Clause 2.2	PASS
20dB Bandwidth	FCC Part 15.247(a)(1)	ANSI C63.10-2013, Clause 7.8.7 KDB 558074 D01 v05r02, Clause 2.2	PASS
Conducted Spurious Emission & Authorized-band band-edge	FCC Part 15.247(d)	ANSI C63.10-2013, Clause 7.8.8	PASS
Radiated Spurious Emission	FCC Part 15.247(d), 15.205, 15.209	ANSI C63.10-2013, Clause 7.8.8	PASS
Band Edge (Restricted-band band-edge)	FCC Part 15.247(d), 15.205, 15.209	ANSI C63.10-2013, Clause 7.8.6	PASS
Hopping Frequency Separation	FCC Part 15.247(a)(1)	ANSI C63.10-2013, Clause 7.8.2 KDB 558074 D01 v05r02, Clause 2.2	PASS
Number of Hopping Frequency	FCC Part 15.247(a)(1)(iii)	ANSI C63.10-2013, Clause 7.8.3 KDB 558074 D01 v05r02, Clause 2.2	PASS



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Time of Occupancy	FCC Part 15.247(a)(1)(iii)	ANSI C63.10-2013, Clause 7.8.4 KDB 558074 D01 v05r02, Clause 2.2	PASS
Conducted Emission on AC Mains	FCC Part 15.207(a)	ANSI C63.10-2013, Clause 6.2	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 Date
Spectrum Analyzer	Keysight	N9020B	MY59260184	2021-08-17	2022-08-16
Spectrum Analyzer	Rohde & Schwarz	FSV40N	101450	2021-06-10	2022-06-09
EMI Test Receiver	Rohde & Schwarz	ESPI3	100173	2021-06-10	2022-06-09
EMI Test Receiver	Rohde & Schwarz	ESR 7	101911	2021-06-10	2022-06-09
V-network	SCHWARZBECK	NSLK 8127	8127-902	2021-06-10	2022-06-09
Wideband Radio Communication Tester	Rohde & Schwarz	CMW 500	100687	2021-08-13	2022-08-12
Broadband Antenna	SCHWARZBECK	VULB9163	9163-1037	2021-06-08	2022-06-07
Horn Antenna-18G	SCHWARZBECK	BBHA9120D	9120D-1775	2021-06-08	2022-06-07
Loop Antenna	SCHWARZBECK	FMZB 1513	N/A	2020-11-23	2022-11-22
Horn Antenna-40G	YINGLIAN	LB-180400-KF	N/A	2021-06-12	2022-06-11
EMC chamber 9*6*6 (L*W*H)	CHANGNING	966	N/A	2020-06-09	2023-06-08
Shielded Enclosure 8*5*4 (L*W*H)	CHANGNING	854	N/A	2020-06-09	2023-06-08
Test Software	BL	BL410_E	N/A	N/A	N/A
Test Software	BL	BL410_R	N/A	N/A	N/A



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2.3 Measurement Uncertainty

Parameter	Frequency	Uncertainty
Antenna Port Conducted Emission	< 1GHz	± 1.5 dB
	> 1GHz	± 1.5 dB
Radiated Emission	30 MHz – 1 GHz	± 3.42 dB
	> 1GHz	± 4.20 dB
Conducted Emission on AC Mains	9 kHz to 30 MHz	± 1.71 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 transmitter and receiver mode. Select test channel as below:

Channel	Frequency
The lowest channel(CH0)	2402MHz
The middle channel(CH39)	2441MHz
The highest channel(CH78)	2480MHz

The basic operation modes are:

- A. On
 - 1. BR/EDR mode
 - a. Transmitting
 - i. Low Channel
 - ii. Middle Channel
 - iii. High Channel
 - iv. Hopping mode
 - b. Receiving
 - 2. Normal working with Bluetooth on
- B. Standby
- C. Off

3.2 Special Accessories and Auxiliary Equipment

Description	Manufacturer	Model No.	Serial No.
Power Adapter	DELTA ELECTRONICS, INC.	MEA-065A12C	N/A
Keyboard	DELL	KB216P	N/A

3.3 Support Software

Description	Manufacturer	Software Name
Command	N/A	N/A



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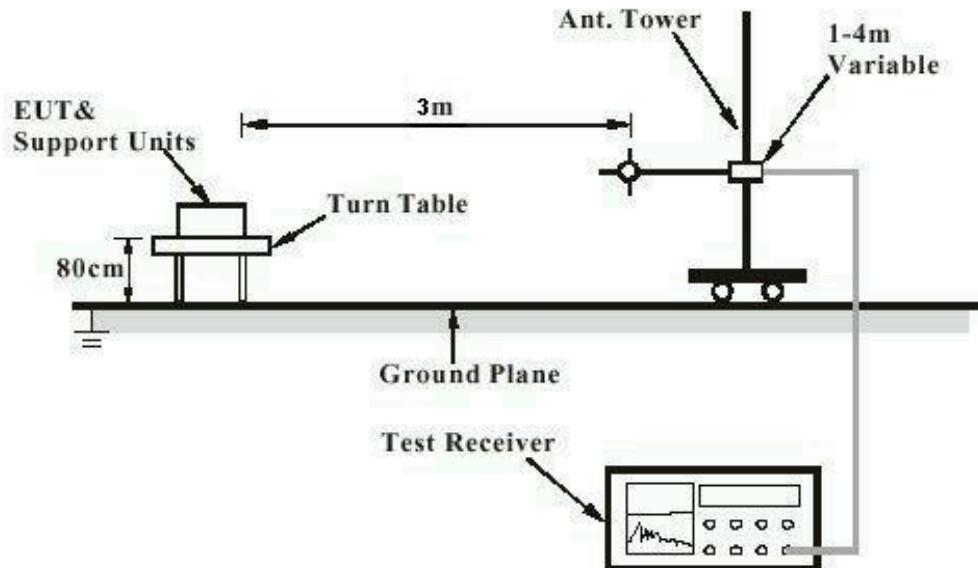
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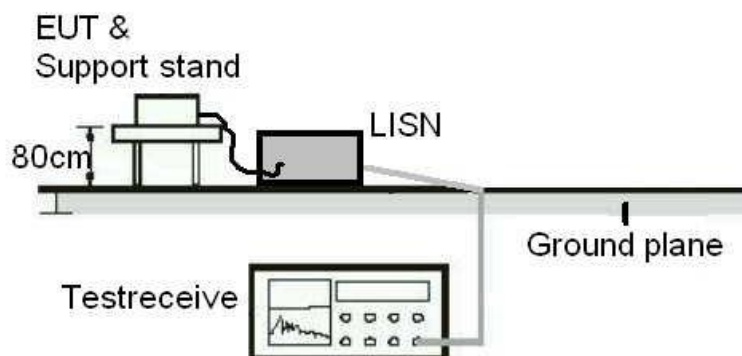
3.4 Test Setup Diagram

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





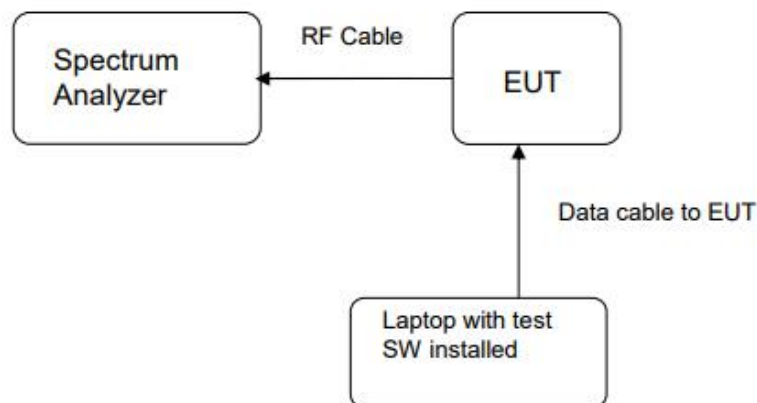
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Diagram of Measurement Equipment Configuration for Transmitter Measurement





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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 : 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 2.00dBi. The antenna is an internal 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 Conducted Output Power

RESULT:

PASS

Test standard : FCC Part 15.247(b)(1)

Requirement : ANSI C63.10-2013, Clause 7.8.5
KDB 558074 D01 v05r02, Clause 2.2

Kind of test site : Shielded room

Test setup

Test Channel : Low/Middle/High

Operation Mode : A.1.a

Ambient temperature : 19°C

Relative humidity : 53%

Table 1: Maximum Conducted Output Power

Test Mode	Test Channel (MHz)	Measured Peak Power		Limit (W)
		(dBm)	(mW)	
GFSK	2402	0.67	1.17	< 1
	2441	1.74	1.49	
	2480	2.37	1.73	
$\pi/4$ -DQPSK	2402	-2.27	0.59	< 0.125
	2441	-1.03	0.79	
	2480	-0.30	0.93	
8-DPSK	2402	-1.63	0.69	< 0.125
	2441	-0.49	0.89	
	2480	0.23	1.05	



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Figure 1: Maximum Conducted Output Power, 2402MHz, GFSK



Figure 2: Maximum Conducted Output Power, 2441MHz, GFSK





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Figure 3: Maximum Conducted Output Power, 2480MHz, GFSK



Figure 4: Maximum Conducted Output Power, 2402MHz, $\pi/4$ -DQPSK





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Figure 5: Maximum Conducted Output Power, 2441MHz, $\pi/4$ -DQPSK



Figure 6: Maximum Conducted Output Power, 2480MHz, $\pi/4$ -DQPSK





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Figure 7: Maximum Conducted Output Power, 2402MHz, 8-DPSK



Figure 8: Maximum Conducted Output Power, 2441MHz, 8-DPSK





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Figure 9: Maximum Conducted Output Power, 2480MHz, 8-DPSK





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4.1.3 20dB Bandwidth

RESULT:

PASS

Test standard : FCC Part 15.247(a)(1)

Requirement : ANSI C63.10-2013, Clause 7.8.7
KDB 558074 D01 v05r02, Clause 2.2

Kind of test site : Shielded room

Test setup

Test Channel : Low/Middle/High

Operation Mode : A.1.a

Ambient temperature : 23°C

Relative humidity : 52%

Table 2: 20dB Bandwidth

Test Mode	Test Channel (MHz)	20dB Bandwidth (MHz)
GFSK	2402	0.8445
	2441	0.8684
	2480	0.8390
$\pi/4$ -DQPSK	2402	1.2700
	2441	1.2720
	2480	1.2700
8-DPSK	2402	1.2800
	2441	1.2850
	2480	1.2830



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Figure 10: 20dB Bandwidth, 2402MHz, GFSK



Figure 11: 20dB Bandwidth, 2441MHz, GFSK





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Figure 12: 20dB Bandwidth, 2480MHz, GFSK



Figure 13: 20dB Bandwidth, 2402MHz, $\pi/4$ -DQPSK





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Figure 14: 20dB Bandwidth, 2441MHz, $\pi/4$ -DQPSK



Figure 15: 20dB Bandwidth, 2480MHz, $\pi/4$ -DQPSK





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Figure 16: 20dB Bandwidth, 2402MHz, 8-DPSK



Figure 17: 20dB Bandwidth, 2441MHz, 8-DPSK





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Figure 18: 20dB Bandwidth, 2480MHz, 8-DPSK





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4.1.4 Conducted Spurious Emission & Authorized-band band-edge

RESULT:

PASS

Test standard : FCC Part 15.247(d)

Requirement : ANSI C63.10-2013, Clause 7.8.8

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 : 23°C

Relative humidity : 52%

For details refer to following test plot.



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



Band Edge





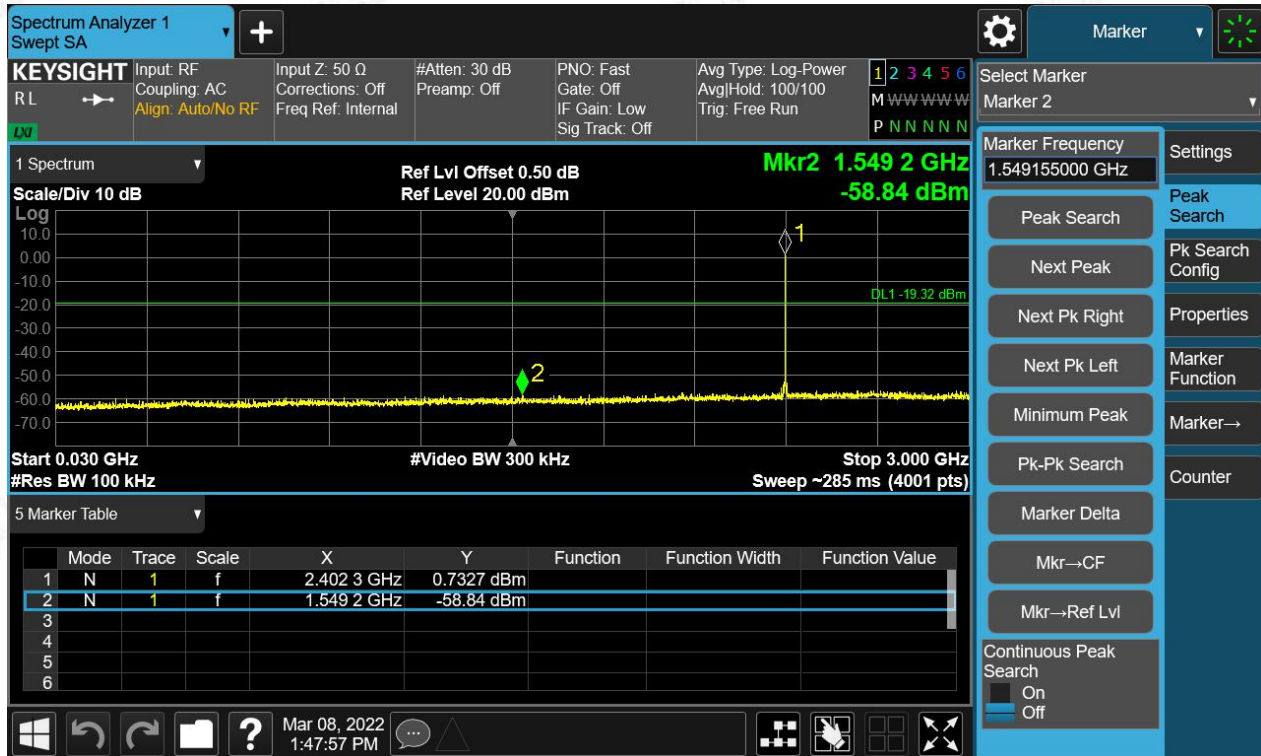
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Conducted spurious emissions 30MHz-25GHz





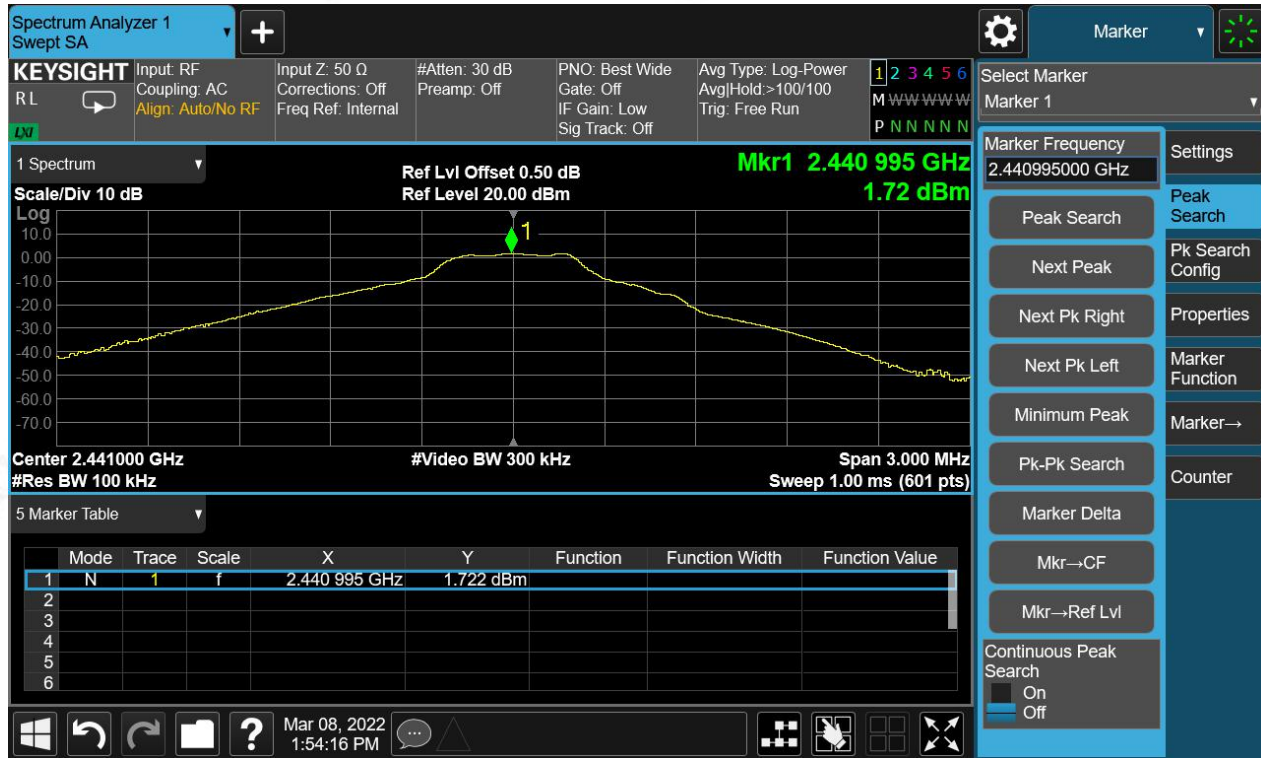
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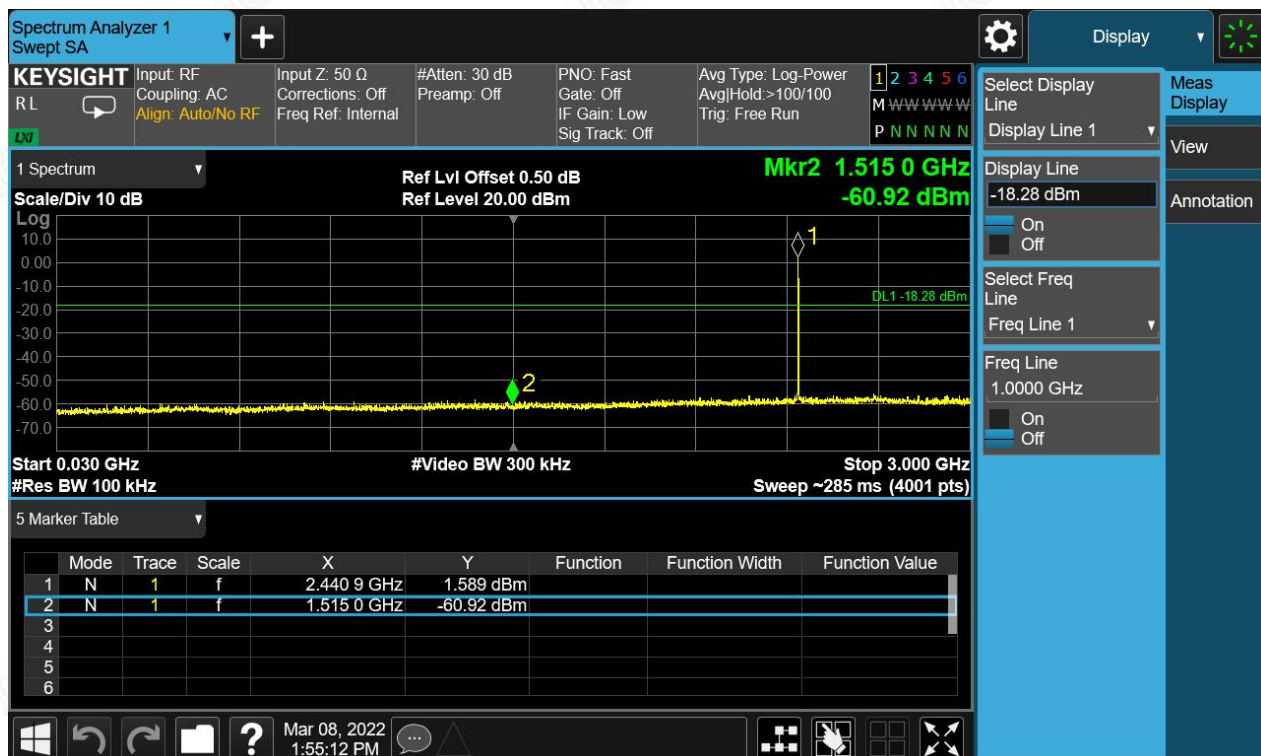
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Figure 20: Conducted Spurious Emission & Authorized-band band-edge, 2441MHz, GFSK Carrier Level



Conducted spurious emissions 30MHz-25GHz





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





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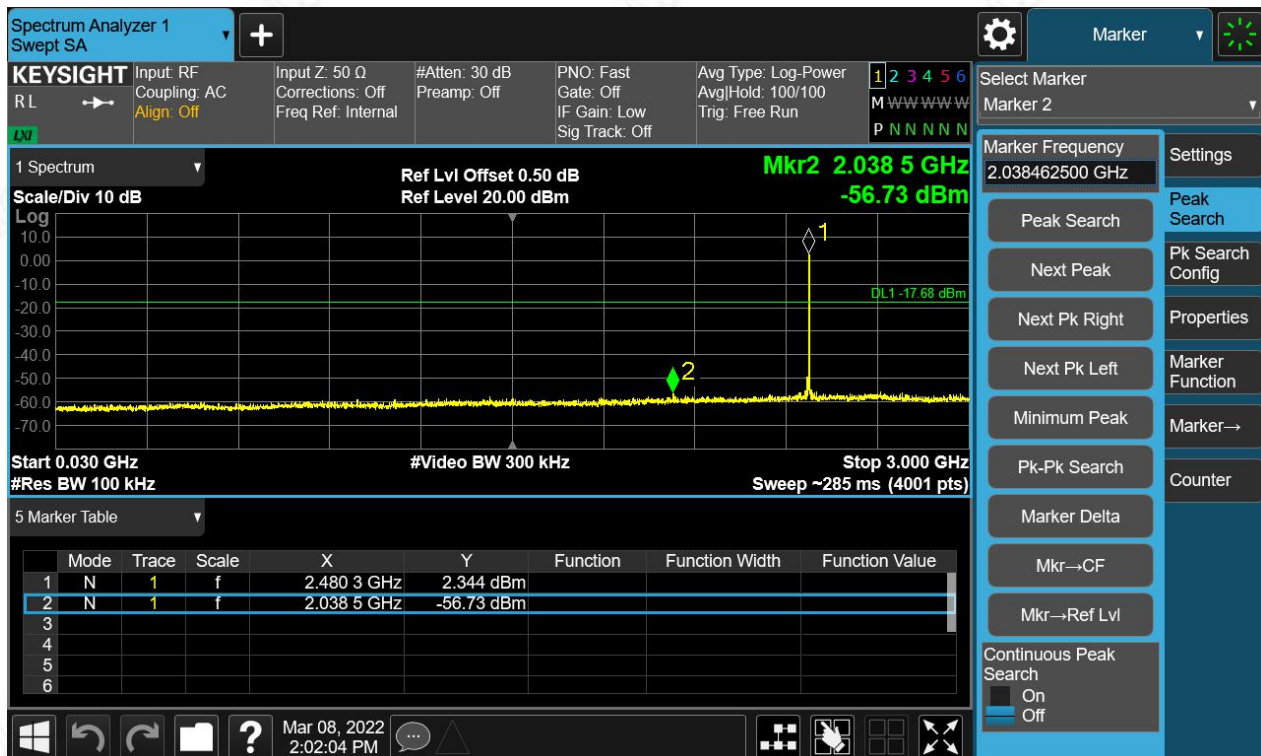
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Band Edge



Conducted spurious emissions 30MHz-25GHz





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Figure 22: Conducted Spurious Emission & Authorized-band band-edge, 2402MHz, $\pi/4$ -DQPSK Carrier Level





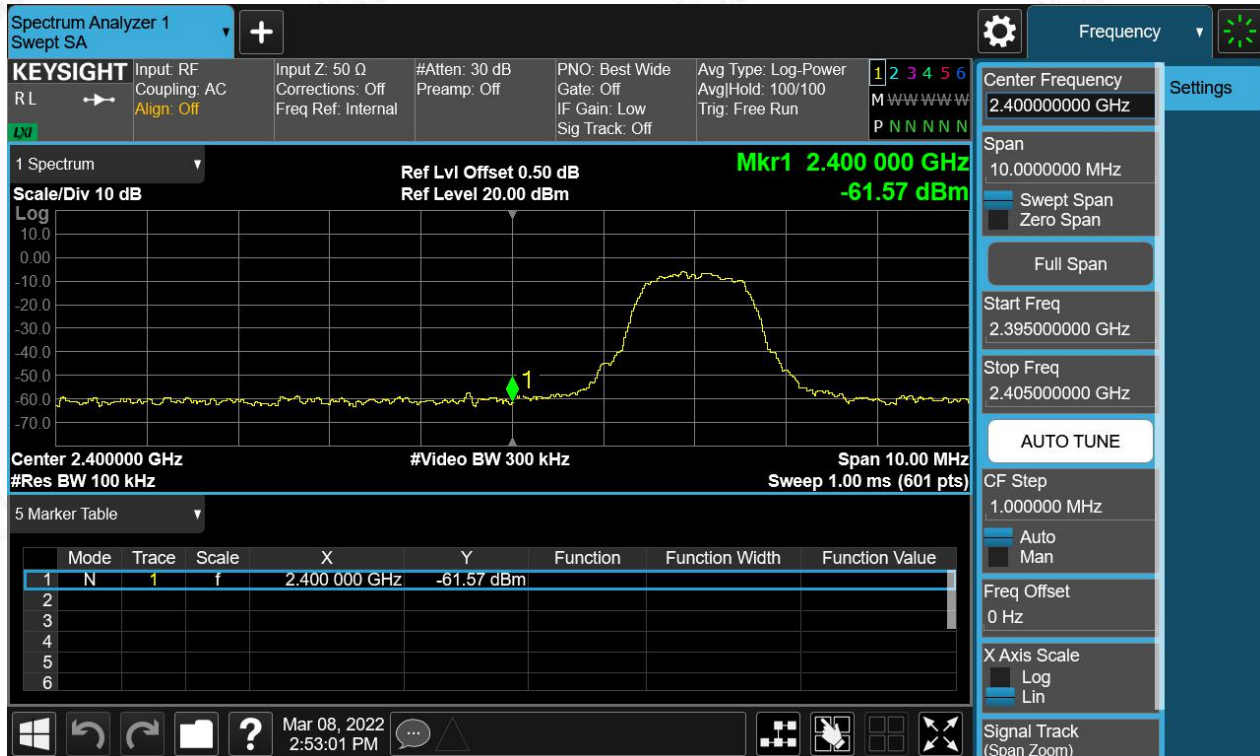
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Band Edge



Conducted spurious emissions 30MHz-25GHz

