

# TEST REPORT

Report No..... : KS2006S00237E

FCC ID..... : 2AZLT-BCST40

Applicant..... : ShenZhen Inateck Tecknology Co.,Ltd

Address..... : Rm. 2507,Bldg.11, TianAn Cloud Park, No. 2018 XueGang Road,  
Bantian Town,Shenzhen City, China

Manufacturer..... : ShenZhen Inateck Tecknology Co.,Ltd

Address..... : Rm. 2507,Bldg.11, TianAn Cloud Park, No. 2018 XueGang Road,  
Bantian Town,Shenzhen City, China

Factory ..... : Shenzhen Lixin Technology Co., Ltd.

Address..... : Tongyi Industrial Park, No. 351, Jihua Road, Longgang District,  
Shenzhen, China

Product Name..... : Barcode Scanner

Trade Mark..... : inateck

Model/Type reference..... : BCST-40

Listed Model(s)..... : BCST-41,BCST-42

Standard..... : FCC CFR Title 47 Part 15 Subpart C Section 15.247

Date of Receipt..... : July. 16, 2020

Date of Test Date..... : May. 24, 2021~ May.26, 2021

Date of issue..... : May. 26, 2021

Test result..... : Pass

Compiled by:  
(Printed name+signature) Rory Huang

Supervised by:  
( Printed name+signature) Eder Zhan

Approved by:  
( Printed name+signature) Neil Wan

Rory Huang

Eder.Zhan

Neil Wan



Testing Laboratory Name..... : K SIGN(Guangdong) Testing Co., Ltd.

Address..... : West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, People's Republic of China

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TRF No. Part 15 Subpart C Section 15.247\_R1

Add : West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China

Tel : +(86) 0755-2985 2678 Fax: +(86) 0755-2985 2397 E-mail : info@gdksign.cn Web: www.gdksign.com



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## 1. TEST SUMMARY

### 1.1. Test Standards

The tests were performed according to following standards:

**FCC Rules Part 15.247:** Operation within the bands of 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz.

**KDB 558074 D01** : The measurement guidance provided herein is applicable only to Digital Transmission System (DTS) devices operating in the 902-928 MHz. 2400-2483.5 MHz and/or 5725-5850 MHz bands under § 15.247 of the FCC rules (Title 47 of the Code of Federal Regulations)

**ANSI C63.10-2013:** American National Standard for Testing Unlicensed Wireless Devices.

### 1.2. Report version

Revised No.	Date of issue	Description
01	May. 26, 2021	Original



## 2. GENERAL INFORMATION

### 2.1. General Description of EUT

Test Sample Number 1:	1-1-1(Normal Sample),1-1-2(Engineering Sample )
Product Name:	Barcode Scanner
Trade Mark:	inateck
Model/Type reference:	BCST-40
Listed Model(s):	BCST-41,BCST-42
Model Difference:	The difference between product models only depends on the appearance color and the model naming is different. Other power supply methods, safety structure and key components are the same, which do not affect the safety and electromagnetic compatibility performance.
Power supply:	DC 5V
Power supply (Battery):	DC3.7V $\approx$ 1200mAh 4.44Wh
Hardware version:	V1.0
Software version:	V1.0.0
<b>Bluetooth V5.0</b>	
Modulation:	GFSK
Operation frequency:	2402MHz-2480MHz
Channel number:	40
Channel separation:	2MHz
Antenna type:	Spring Antenna
Antenna gain:	1.0dBi



## 2.2. Operation State

Operation Frequency List: The EUT has been tested under typical operating condition. The Applicant provides communication tools software to control the EUT for staying in continuous transmitting and receiving mode for testing. BLE, 40 channels are provided to the EUT. Channels 00/19/39 were selected for testing.

Operation Frequency List:

Channel	Frequency (MHz)
00	2402
01	2404
⋮	⋮
<b>19</b>	<b>2440</b>
20	2442
21	2444
⋮	⋮
38	2478
<b>39</b>	<b>2480</b>

Note: The display in grey were the channel selected for testing.

Test mode

NO.	TEST MODE DESCRIPTION
1	Low channel TX (2402MHz)
2	Middle channel TX (2440MHz)
3	High channel TX (2480MHz)

Note:

1. Only the result of the worst case was recorded in the report, if no other cases..
2. The test software is the SecureCRTSecure\_V7.0.0.326 which can set the EUT into the individual test modes.

## 2.3. Test Software

Software name	Model	Version
Conducted emission Measurement Software	EZ-EMC	EMC-Con 3A1.1
Radiated emission Measurement Software	EZ-EMC	FA-03A.2.RE
Bluetooth and WIFI Test System	JS1120-3	2.5.77.0418



## 2.4. Measurement Instruments List

Tonscend JS0806-2 Test system					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
1	Spectrum Analyzer	R&S	FSV40-N	101798	03/22/2022
2	Vector Signal Generator	Agilent	N5182A	MY50142520	03/18/2022
3	Analog Signal Generator	HP	83752A	3344A00337	03/18/2022
4	Power Sensor	Agilent	E9304A	MY50390009	03/18/2022
5	Power Sensor	Agilent	E9300A	MY41498315	03/18/2022
6	Wideband Radio Communication Tester	R&S	CMW500	157282	03/18/2022
7	Climate Chamber	Angul	AGNH80L	1903042120	03/18/2022
8	Dual Output DC Power Supply	Agilent	E3646A	MY40009992	03/18/2022
9	RF Control Unit	Tonscend	JS0806-2	/	03/18/2022

Transmitter spurious emissions & Receiver spurious emissions					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
1	EMI Test Receiver	R&S	ESR	102525	03/18/2022
2	High Pass Filter	Chengdu E-Microwave	OHF-3-18-S	0E01901038	03/22/2022
3	High Pass Filter	Chengdu E-Microwave	OHF-6.5-18-S	0E01901039	03/22/2022
4	Spectrum Analyzer	HP	8593E	3831U02087	03/22/2022
5	Ultra-Broadband logarithmic period Antenna	Schwarzbeck	VULB 9163	01230	03/29/2023
6	Loop Antenna	Beijin ZHINAN	ZN30900C	18050	03/27/2022
7	Spectrum Analyzer	R&S	FSV40-N	101798	03/22/2022
8	Horn Antenna	Schwarzbeck	BBHA 9120 D	2023	03/29/2023
9	Pre-Amplifier	Schwarzbeck	BBV 9745	9745#129	03/22/2022
10	Pre-Amplifier	EMCI	EMC051835SE	980662	03/22/2022

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
1	LISN	R&S	ENV432	1326.6105.02	03/18/2022
2	EMI Test Receiver	R&S	ESR	102524	03/18/2022
3	Manual RF Switch	JS TOYO	/	MSW-01/002	03/18/2022

Note:

1)The Cal. Interval was one year.

2)The cable loss has calculated in test result which connection between each test instruments.



## 2.5. Test Description

FCC Part 15 Subpart C(15.247)			
Test Item	Standard Section	Result	Test Engineer
	FCC		
Antenna Requirement	15.203	Pass	Rory Huang
Conducted Emission	15.207	Pass	Rory Huang
Restricted Bands	15.205	Pass	Rory Huang
Peak Output Power	15.247(b)	Pass	Rory Huang
Band Edge Emissions	15.247(d)	Pass	Rory Huang
Power Spectral Density	15.247(e)	Pass	Rory Huang
Radiated Emission	15.205&15.209	Pass	Rory Huang
6dB Bandwidth	15.247(a)(2)	Pass	Rory Huang
Spurious RF Conducted Emission	15.247(d)	Pass	Rory Huang

Note:

The measurement uncertainty is not included in the test result.



## 2.6. Test Facility

### Address of the report laboratory

#### **KSIGN(Guangdong) Testing Co., Ltd.**

West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, People's Republic of China

### Laboratory accreditation

The test facility is recognized, certified, or accredited by the following organizations:

#### **CNAS-Lab Code: L13261**

KSIGN(Guangdong) Testing Co., Ltd. has been assessed and proved to be in Compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2017 General Requirements) for the Competence of Testing and Calibration Laboratories.

#### **A2LA-Lab Cert. No.: 5457.01**

KSIGN(Guangdong) Testing Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

#### **IC Registration No.: CN0096**

The 3m alternate test site of KSIGN(Guangdong) Testing Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: CN0096

#### **FCC-Registration No.: CN1272**

KSIGN(Guangdong) Testing Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.



## 2.7. Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01" Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 2 " and is documented in the KSIGN(Guangdong) Testing Co., Ltd. system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device. Below is the best measurement capability for KSIGN(Guangdong) Testing Co., Ltd.

Test Items	Measurement Uncertainty	Notes
Transmitter power conducted	0.42 dB	(1)
Transmitter power Radiated	2.14 dB	(1)
Conducted spurious emissions 9kHz~40GHz	1.60 dB	(1)
Radiated spurious emissions 9kHz~40GHz	2.20 dB	(1)
Conducted Emissions 9kHz~30MHz	3.20 dB	(1)
Radiated Emissions 30~1000MHz	4.70 dB	(1)
Radiated Emissions 1~18GHz	5.00 dB	(1)
Radiated Emissions 18~40GHz	5.54 dB	(1)
Occupied Bandwidth	2.80 dB	(1)

**Note (1):** This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

## 2.8. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15~35°C
Relative Humidity:	30~60 %
Air Pressure:	950~1050mba



### 3. TEST ITEM AND RESULTS

#### 3.1. Antenna requirement

##### Requirement

##### **FCC CFR Title 47 Part 15 Subpart C Section 15.203:**

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, 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.

##### **FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1)(i):**

(i) Systems operating in the 2400~2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

##### Test Result

The directional gain of the antenna less than 6dBi, please refer to the EUT internal photographs antenna photo.

Note: The antenna is permanently fixed to the EUT



### 3.2. Peak Output Power

#### Limit

Test Item	Limit	Frequency Range(MHz)
Peak Output Power	1 Watt or 30 dBm	2400~2483.5

#### Test Configuration



#### Test Procedure

1. Connect EUT RF Output port to the Spectrum Analyzer through an RF attenuator..
2. Spectrum Setting:  
 Peak Detector:  $RBW \geq DTS \text{ Bandwidth}$ ,  $VBW \geq 3 * RBW$ .  
 Sweep time=Auto.  
 Detector= Peak.  
 Trace mode= Maxhold.  
 Allow trace to fully stabilize. Then use the peak marker function to determine the maximum amplitude level.

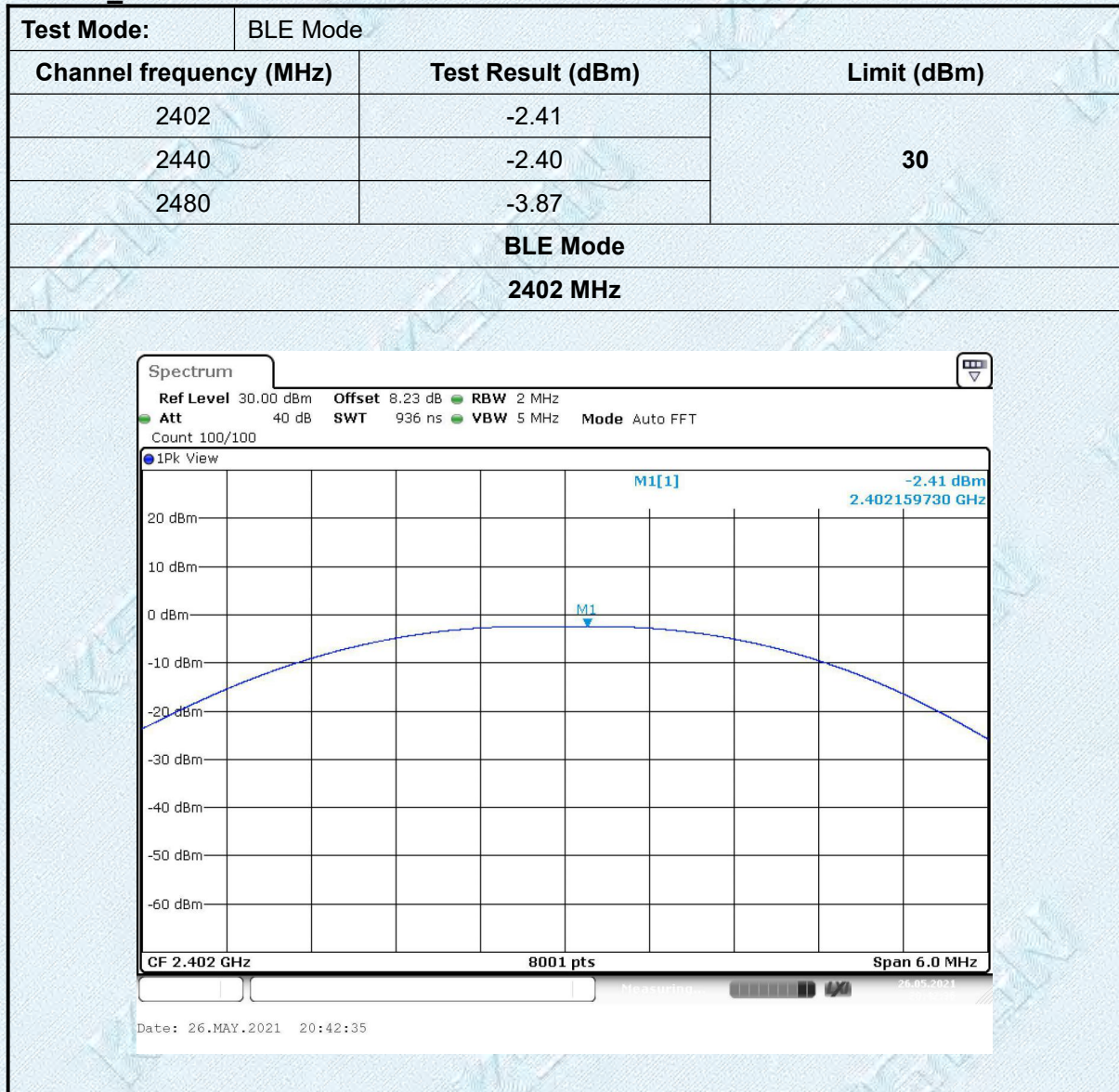
#### Test Mode

Please refer to the clause 2.2.

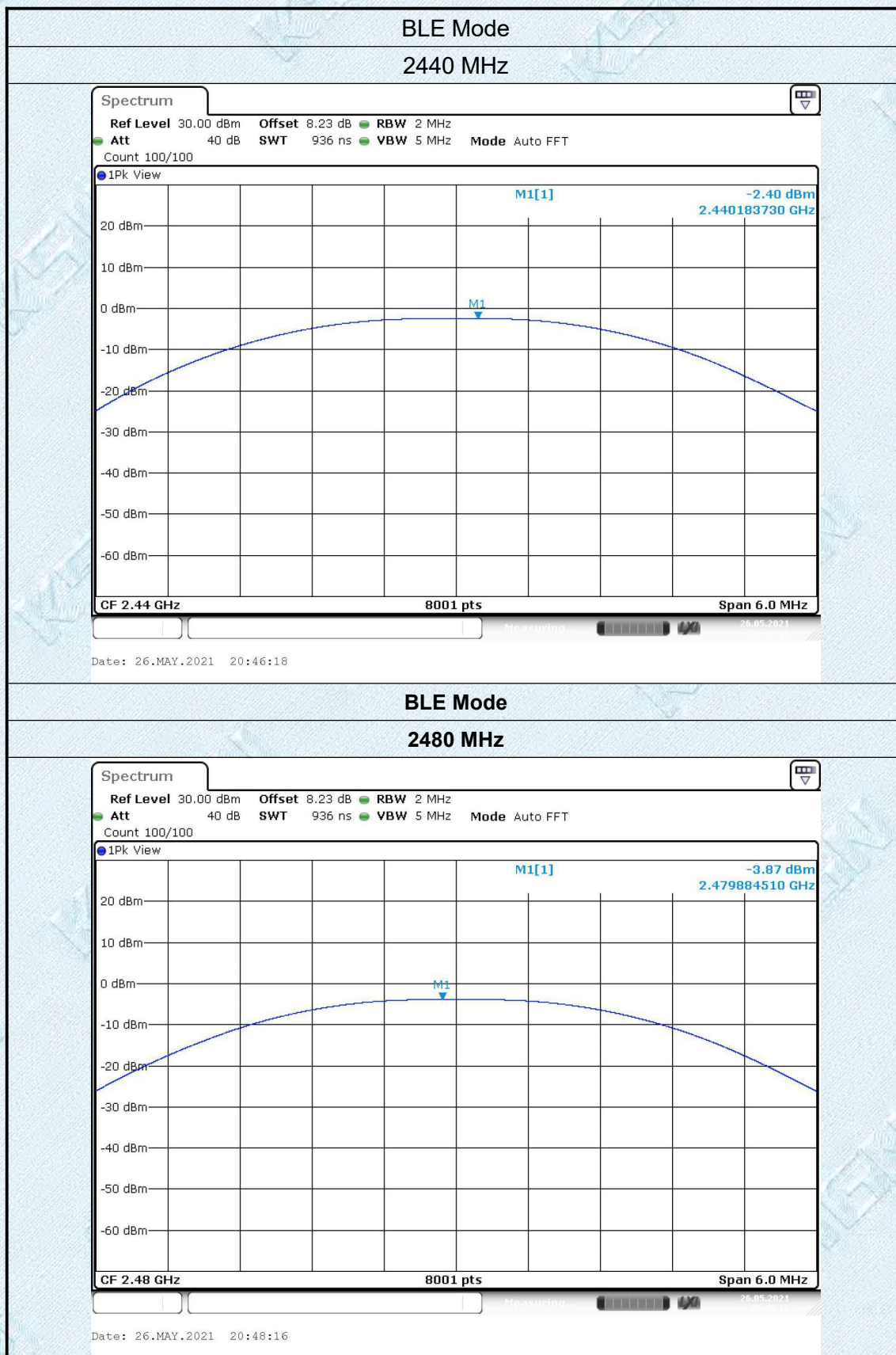
#### Test Result



### GFSK\_1M

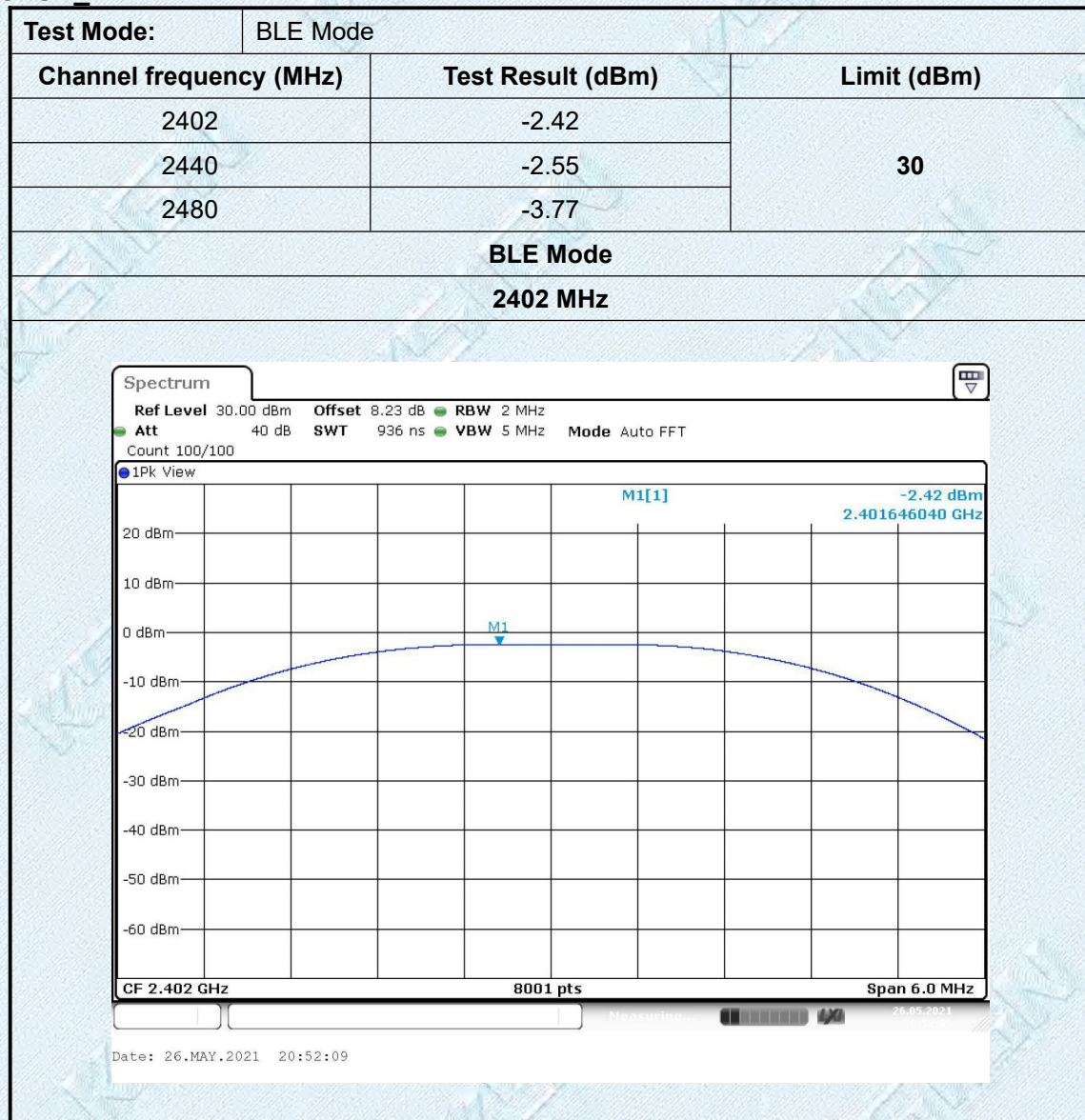






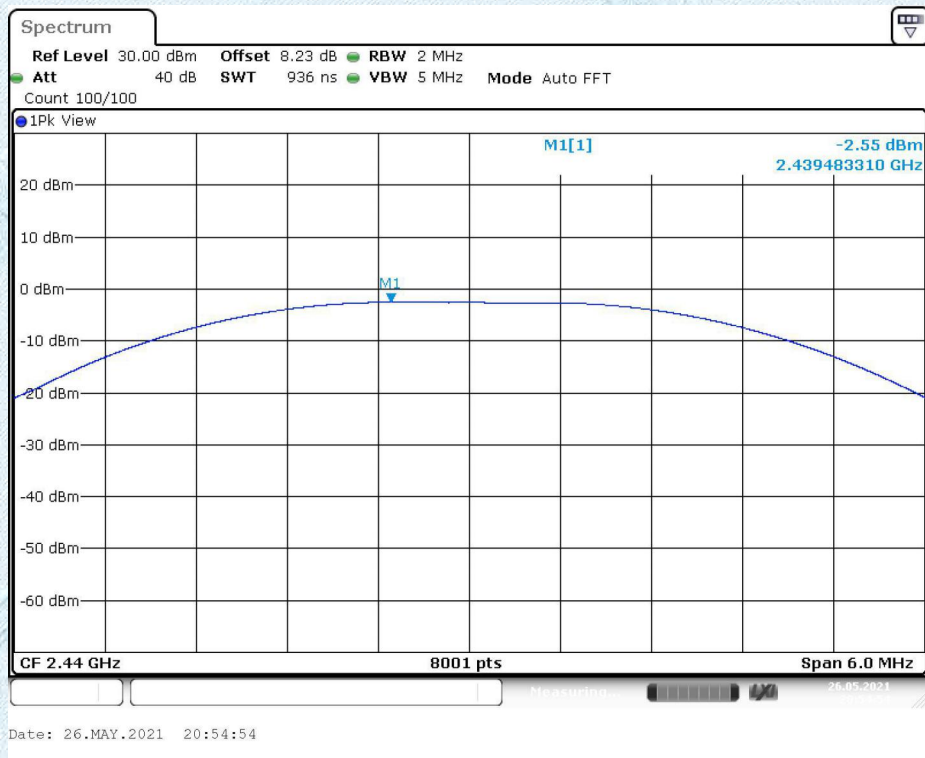


### GFSK\_2M

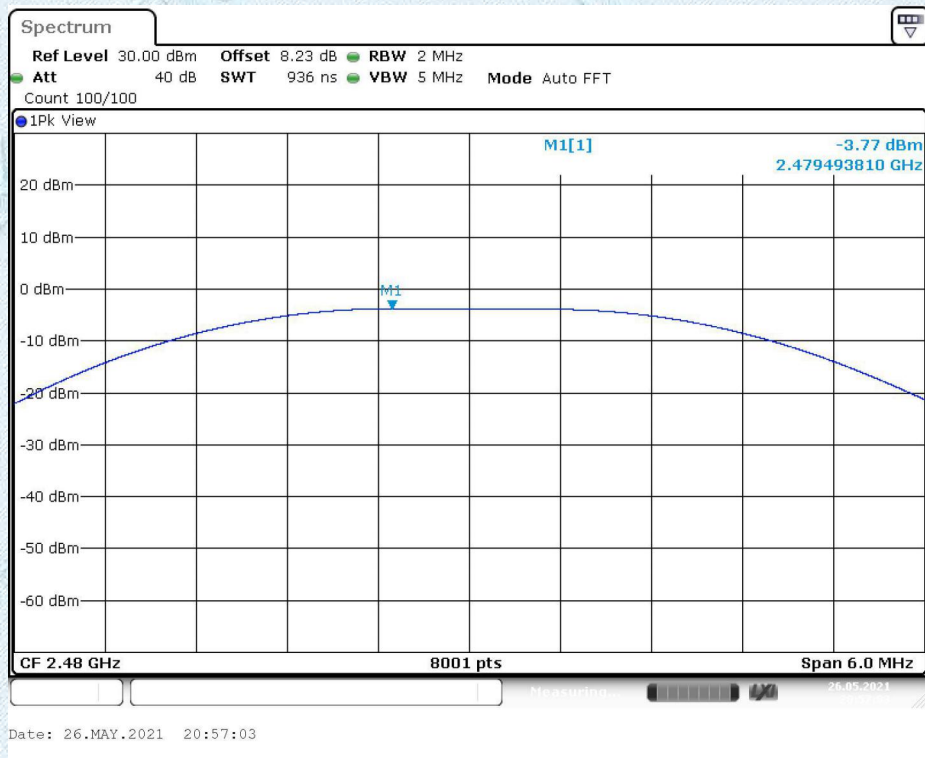




### 2440 MHz



### 2480MHz





### 3.3. Power Spectral Density

#### Limit

FCC Part 15 Subpart C(15.247)		
Test Item	Limit	Frequency Range(MHz)
Power Spectral Density	8dBm(in any 3 kHz)	2400~2483.5

#### Test Configuration



#### Test Procedure

1. Connect EUT RF Output port to the Spectrum Analyzer through an RF attenuator.
2. The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram above. The measurement according to section 10.b-6.ii of KDB 558074 D01 DTS Meas Guidance v05r02.
3. Spectrum Setting:
  - Set analyser center frequency to DTS channel center frequency.
  - Set the span to 1.5 times the DTS bandwidth.
  - Set the RBW to: 10 kHz
  - Set the VBW to: 30 kHz
  - Detector: peak
  - Sweep time: auto
  - Allow trace to fully stabilize. Then use the peak marker function to determine the maximum amplitude level.

#### Test Mode

Please refer to the clause 2.2.

#### Test Result

Note:

$$\text{Power Density(dBm/3kHz)} = \text{Power Density(dBm/10kHz)} - 10 \cdot \log(10/3)$$



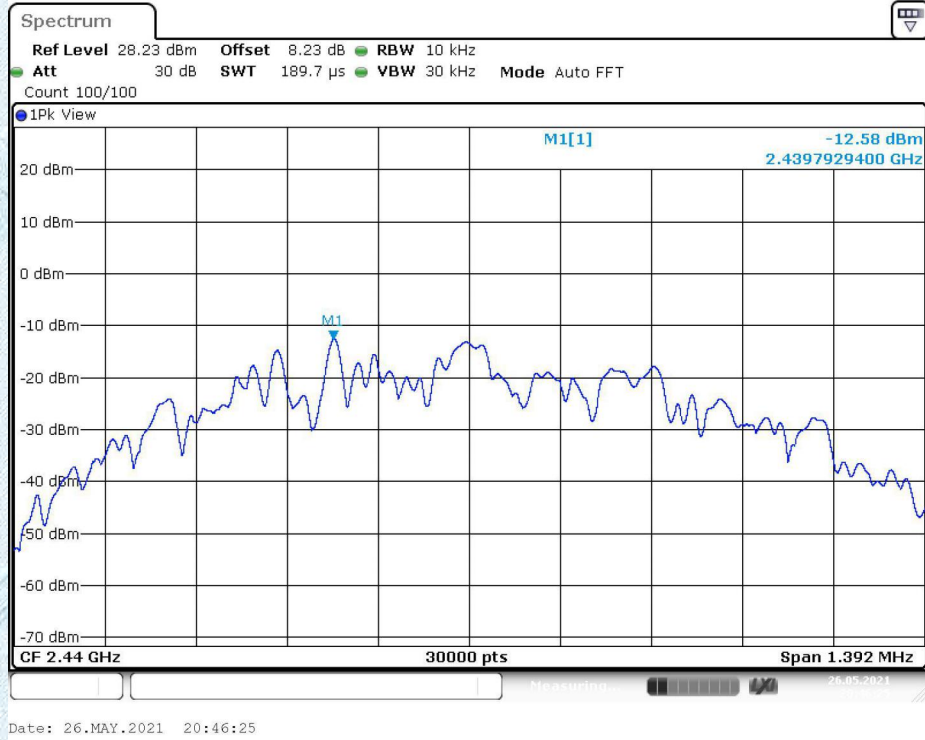
## GFSK\_1M





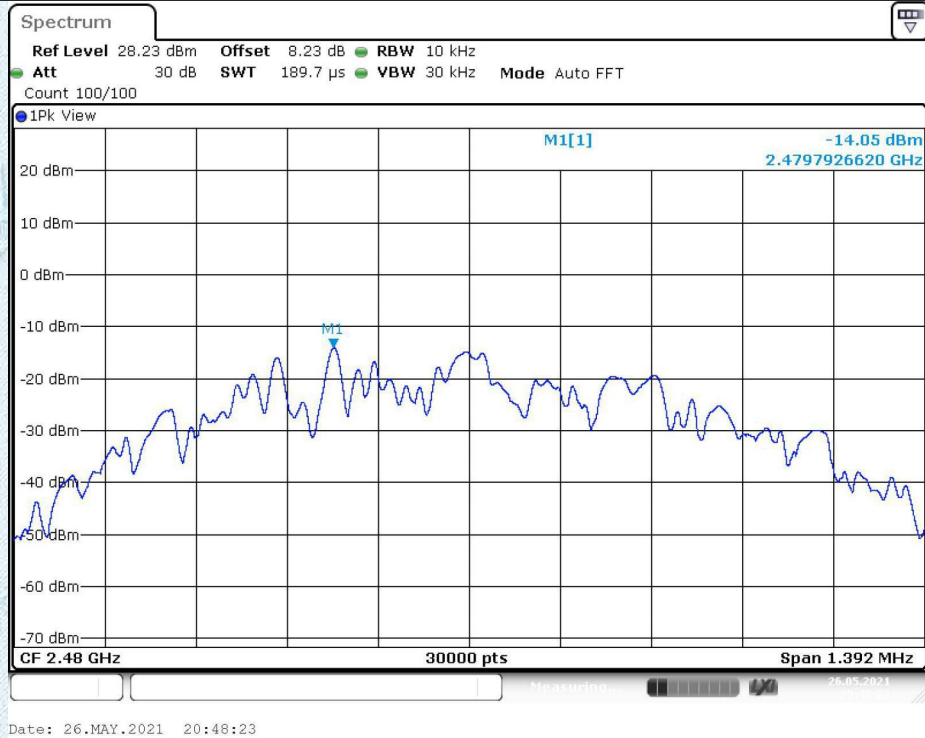
### BLE Mode

2440 MHz



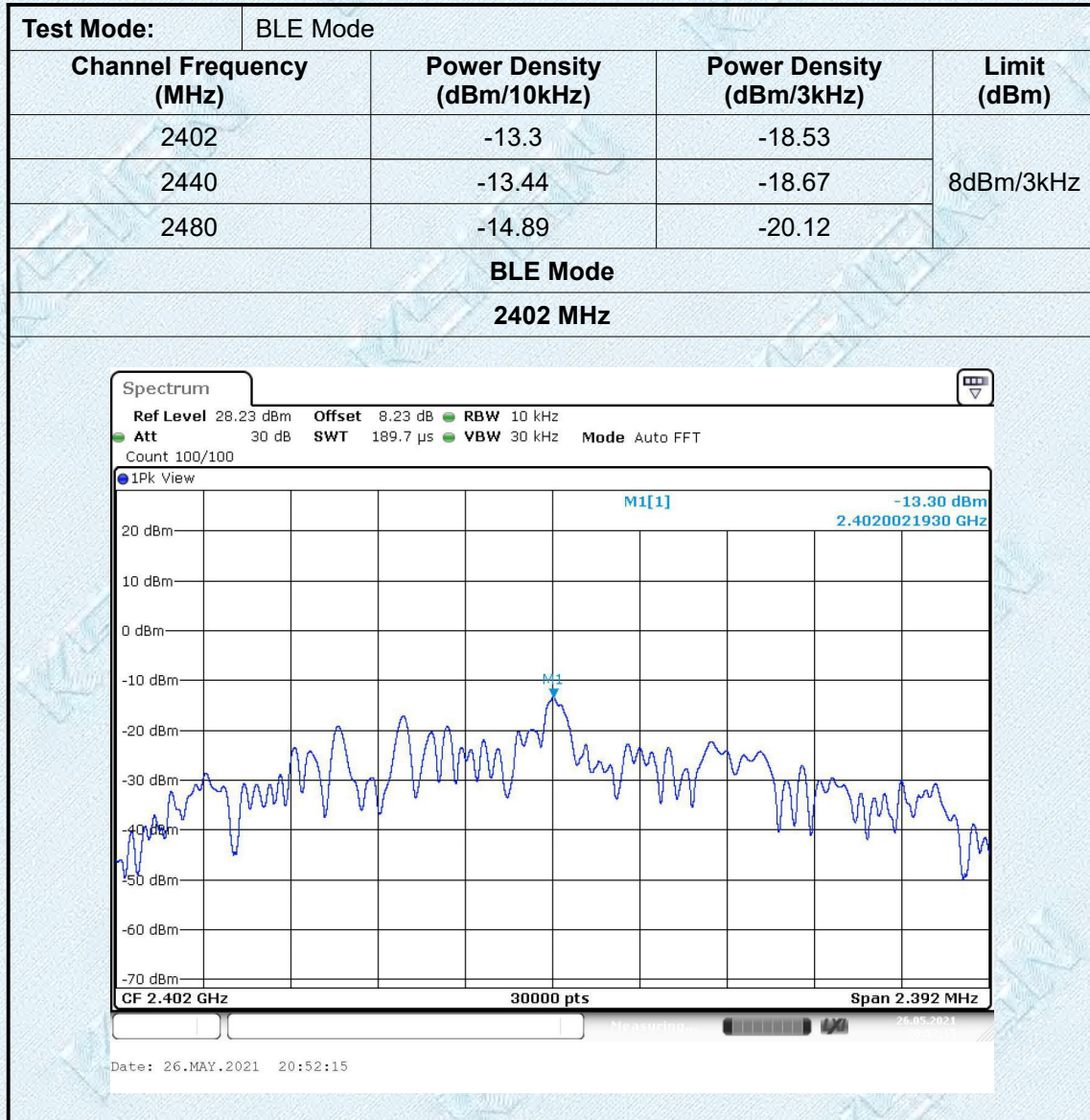
### BLE Mode

2480 MHz



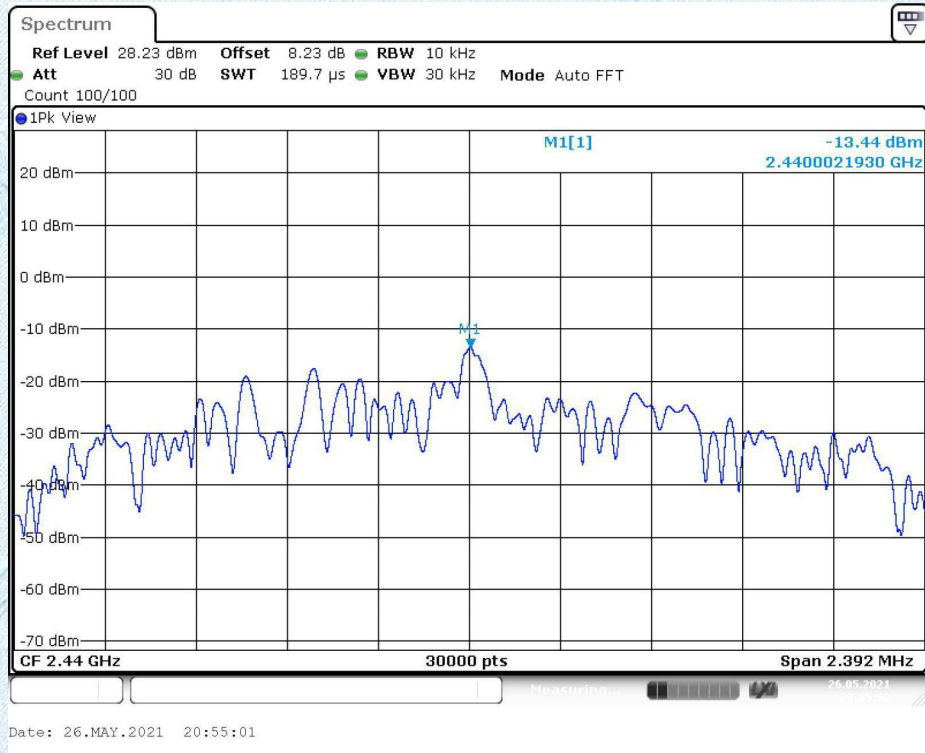


## GFSK\_2M

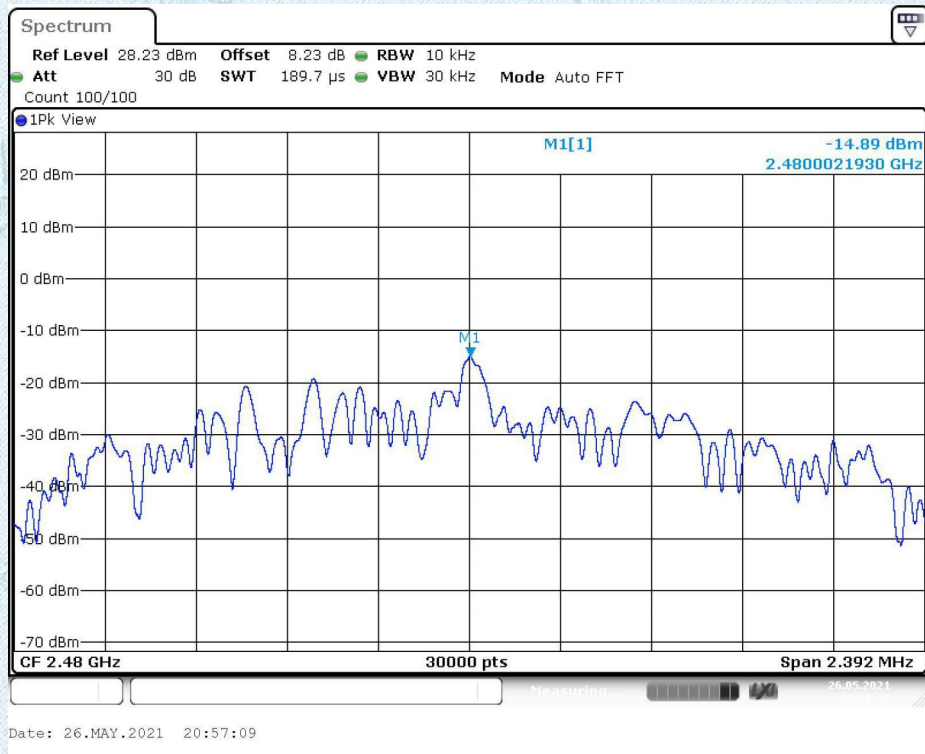




### 2440 MHz



### 2480 MHz



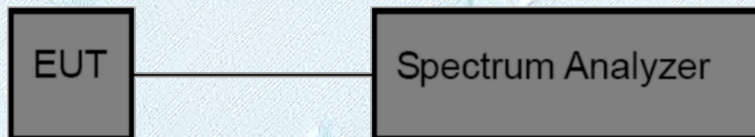


### 3.4. 6dB Bandwidth

#### Limit

Test Item	Limit	Frequency Range(MHz)
Bandwidth	$\geq 500$ KHz (6dB bandwidth)	2400~2483.5

#### Test Configuration



#### Test Procedure

1. Connect EUT RF Output port to the Spectrum Analyzer through an RF attenuator.
2. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.
3. The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission.
4. Spectrum Setting:  
6dB bandwidth:
  - (1) Set RBW = 100 kHz.
  - (2) Set the video bandwidth (VBW)  $\geq 3$  RBW.
  - (3) Detector = Peak.
  - (4) Trace mode = Max hold.
  - (5) Sweep = Auto couple.
  - (6) Allow the trace to stabilize.
- (7) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

NOTE: The EUT was set to continuously transmitting in each mode and low, Middle and high channel for the test.

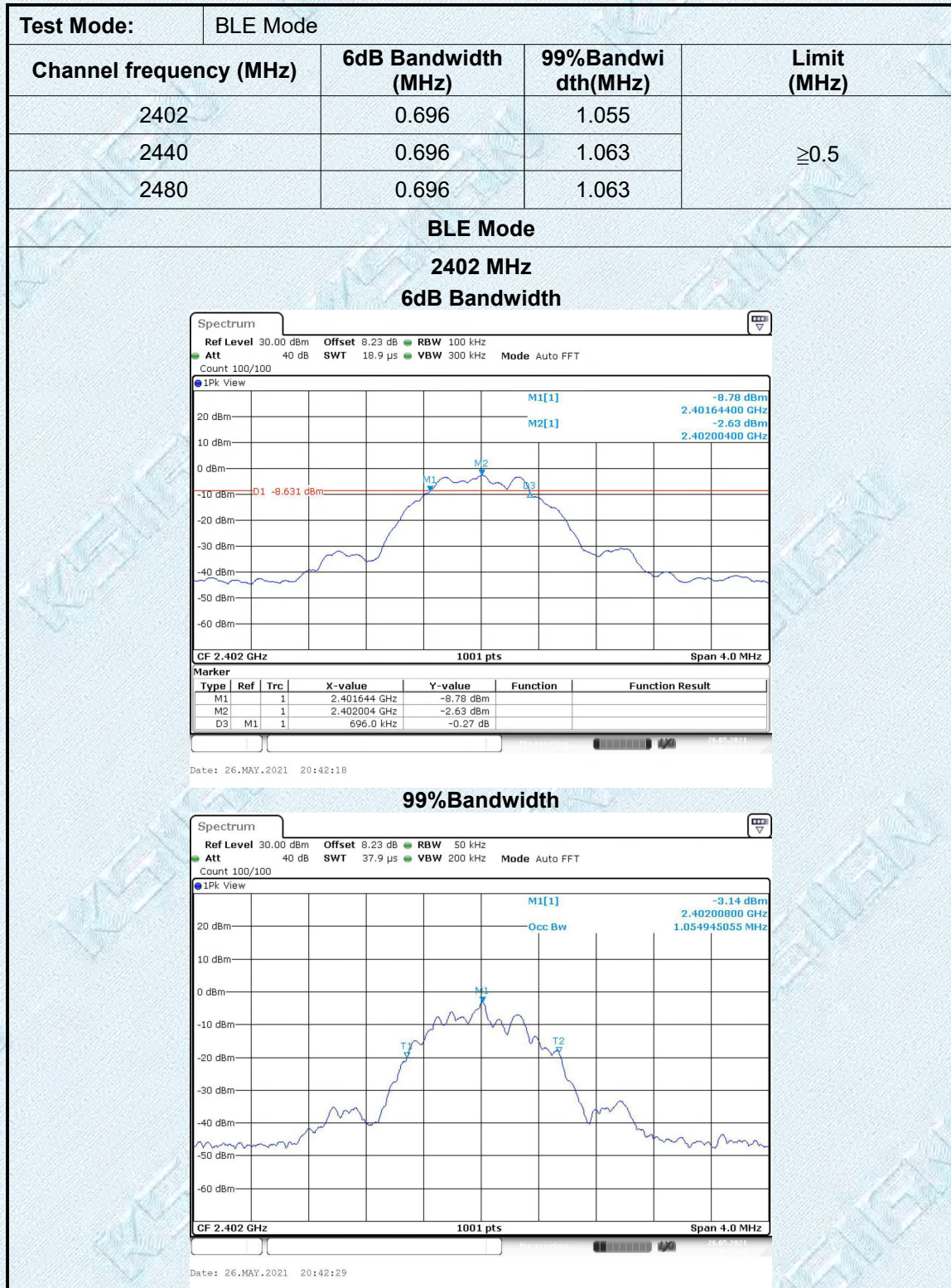
#### Test Mode

Please refer to the clause 2.2.



## Test Results

### GFSK\_1M

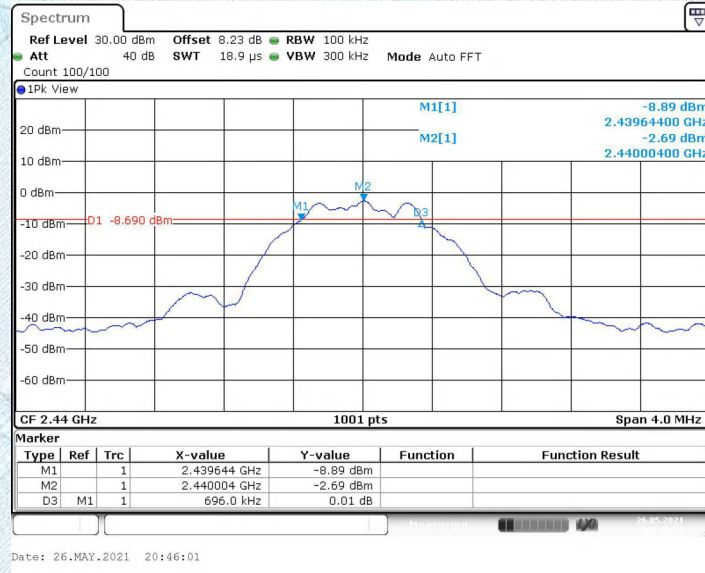




BLE Mode

2440 MHz

6dB Bandwidth



2440MHz

99%Bandwidth

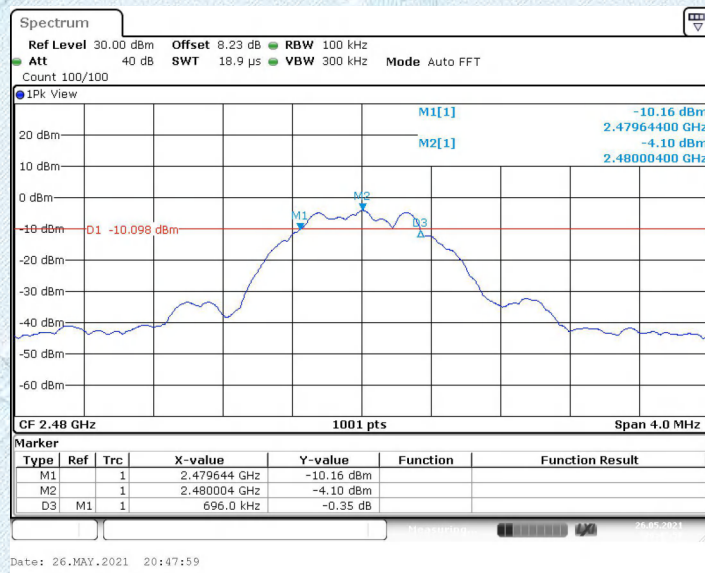




## BLE Mode

2480 MHz

6dB Bandwidth



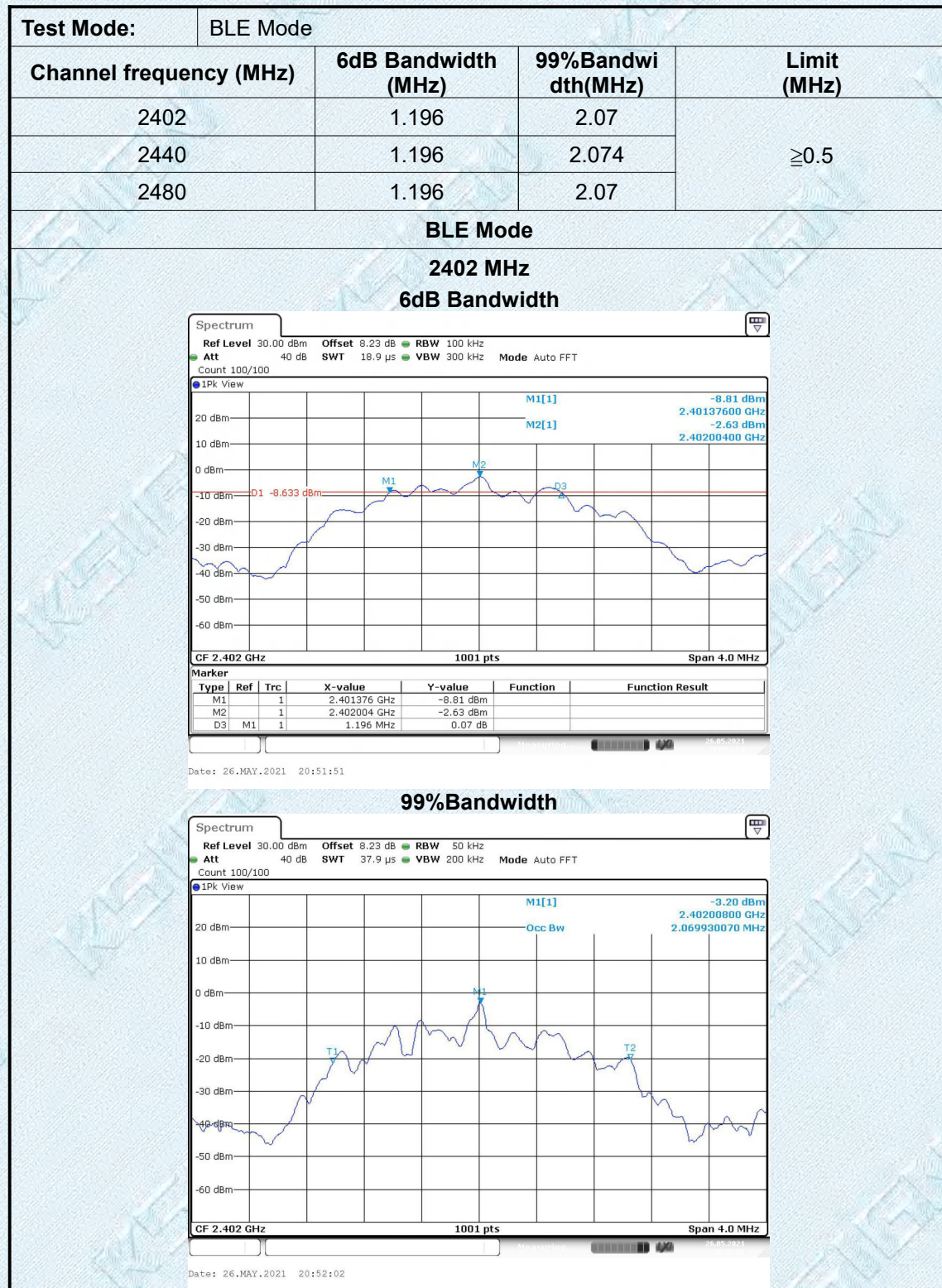
2480MHz

99%Bandwidth





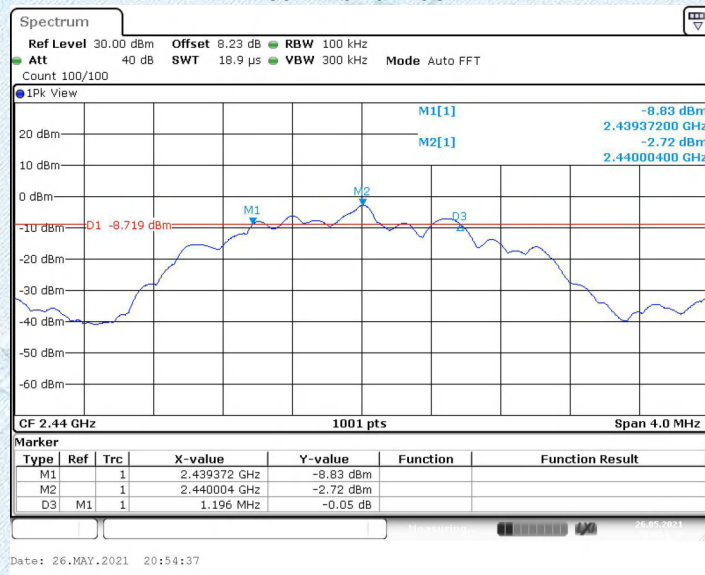
## GFSK\_2M





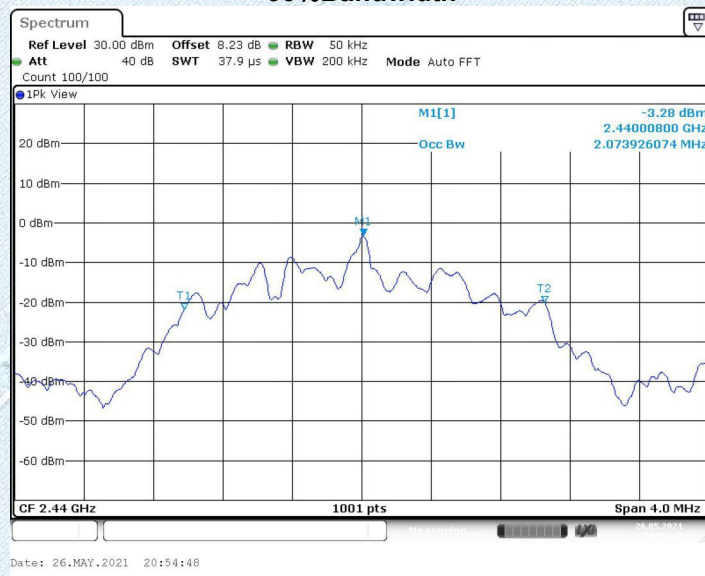
2440 MHz

6dB Bandwidth



2440 MHz

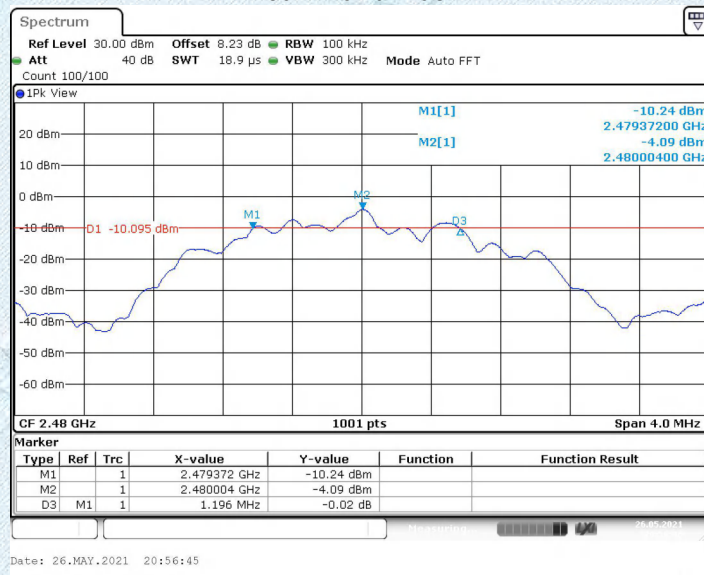
99%Bandwidth





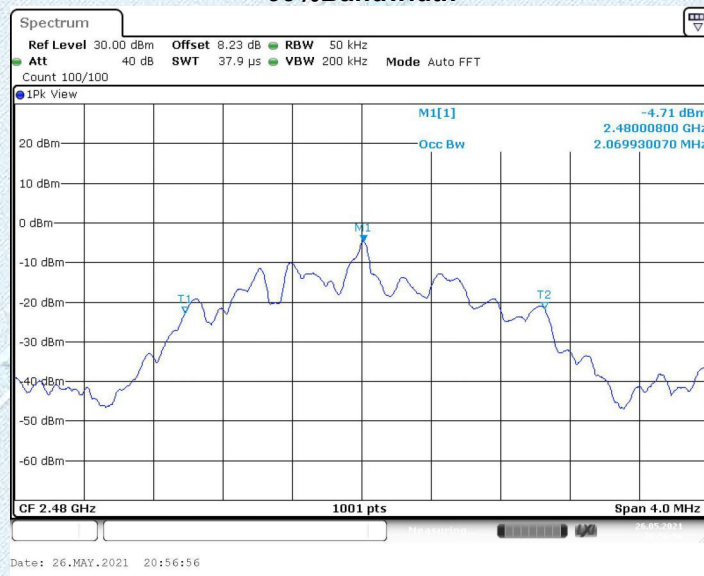
2480 MHz

6dB Bandwidth



2480 MHz

99%Bandwidth





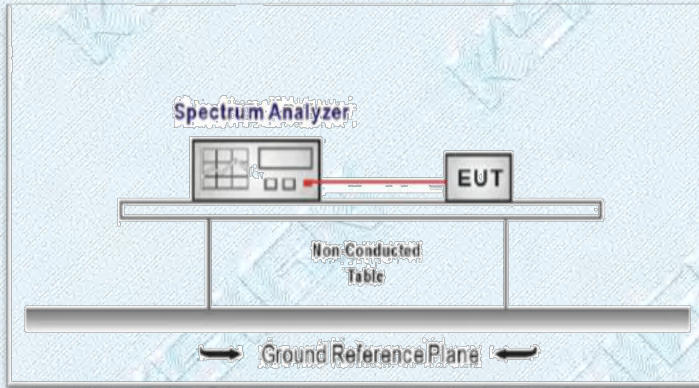
### 3.5. Band edge and Spurious Emission (Conducted)

#### Limit

#### **FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d):**

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

#### **Test Configuration**



#### **Test Procedure**

1. Connect EUT RF Output port to the Spectrum Analyzer through an RF attenuator.
2. Spectrum Setting:  
 RBW=100KHz  
 VBW=300KHz.  
 Detector function: Peak.  
 Trace: Max hold.  
 Sweep = Auto couple.

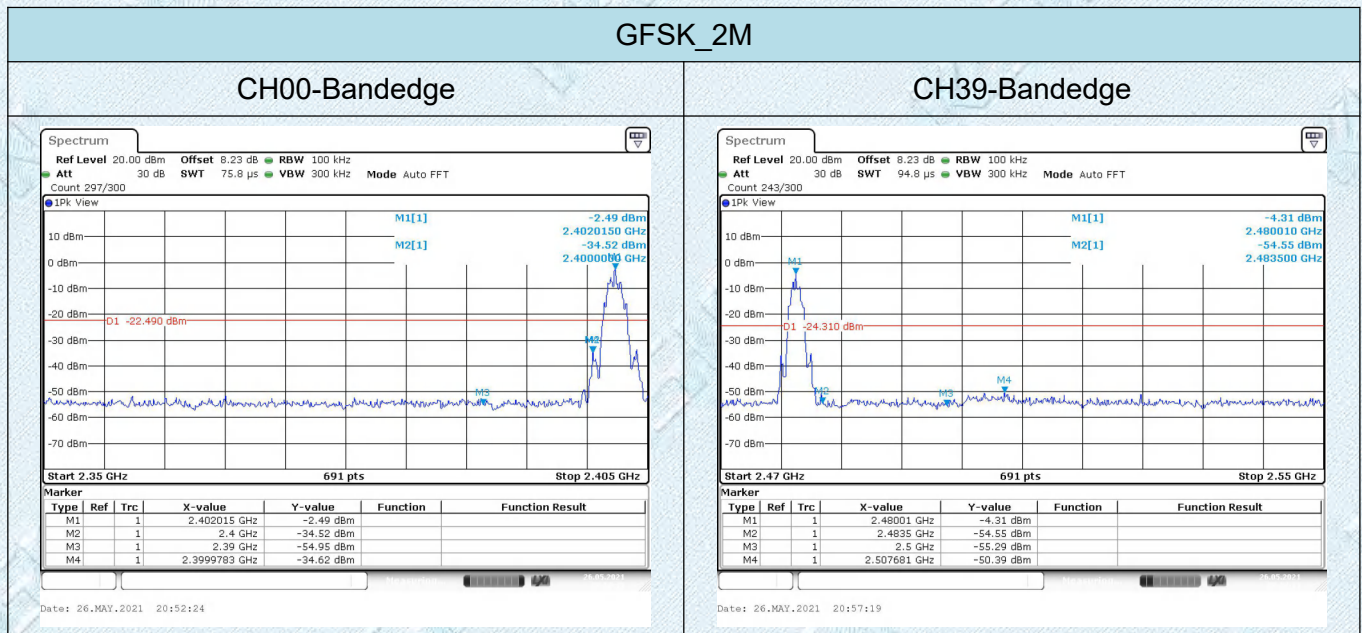
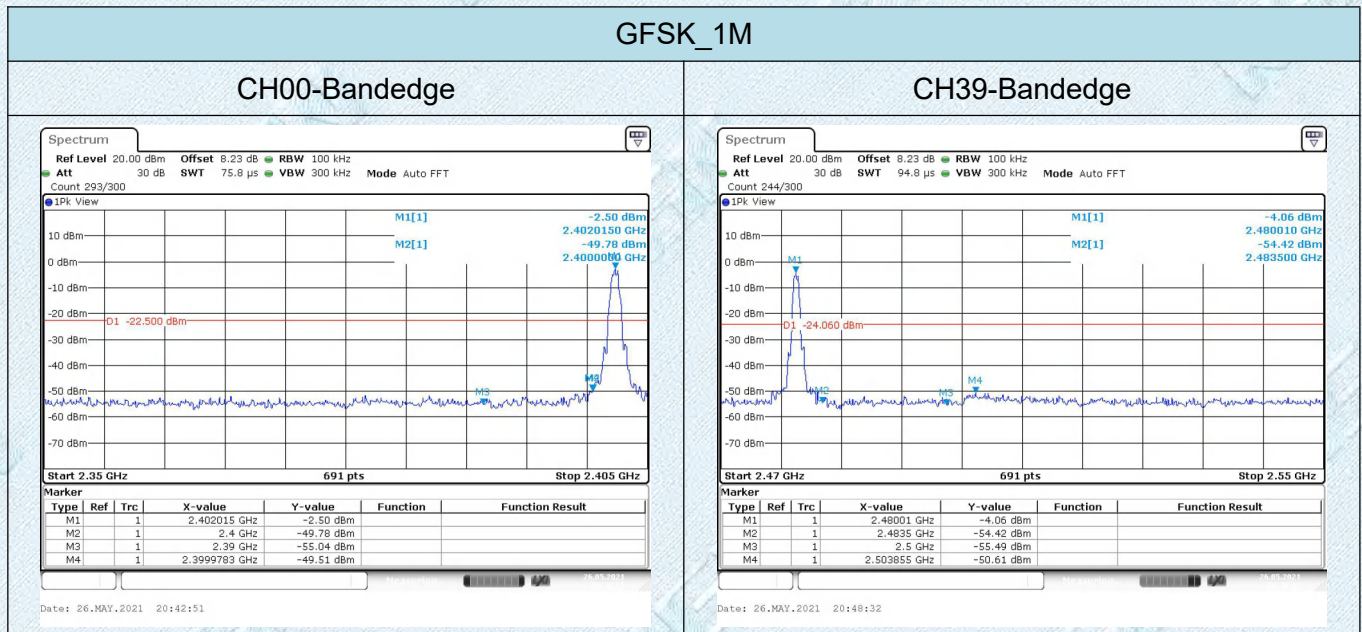
Allow the trace to stabilize.

#### **Test Mode**

Please refer to the clause 2.2.



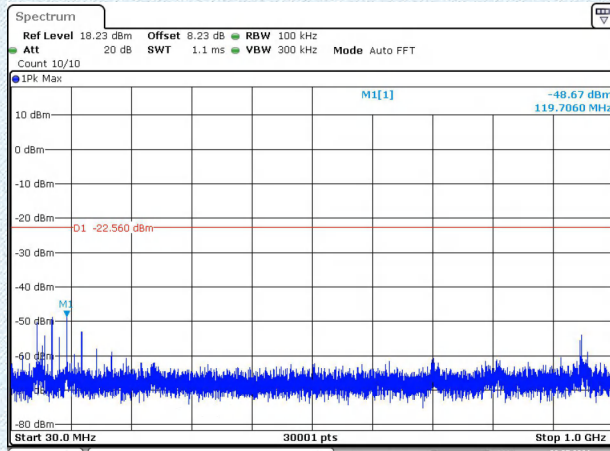
## Test Results



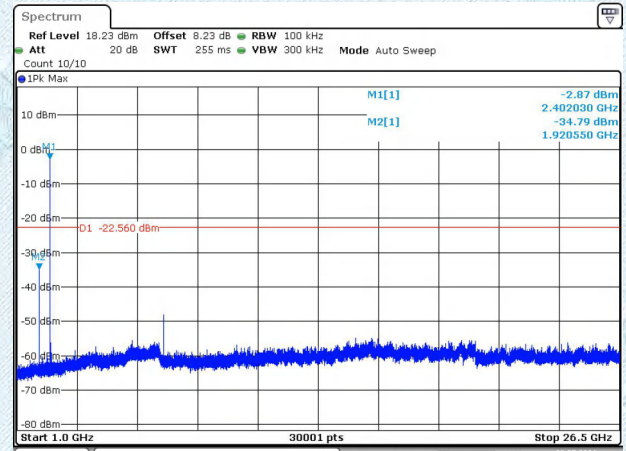


## GFSK\_1M

### CH00-SE

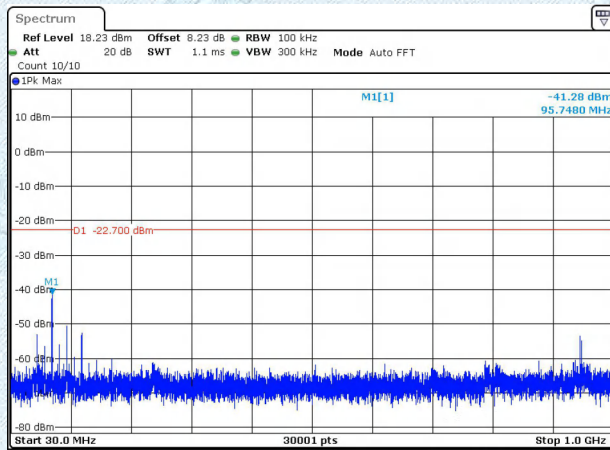


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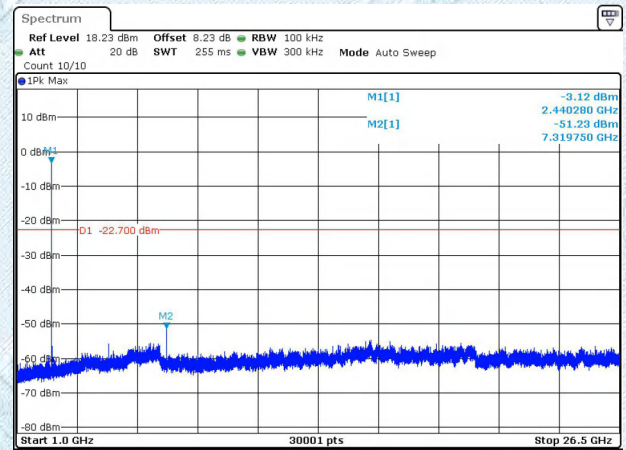


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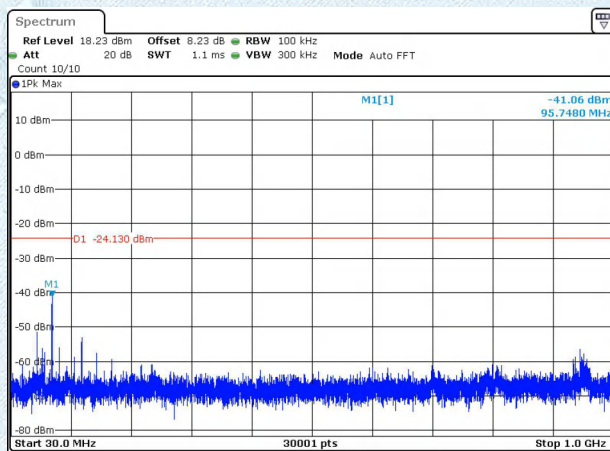


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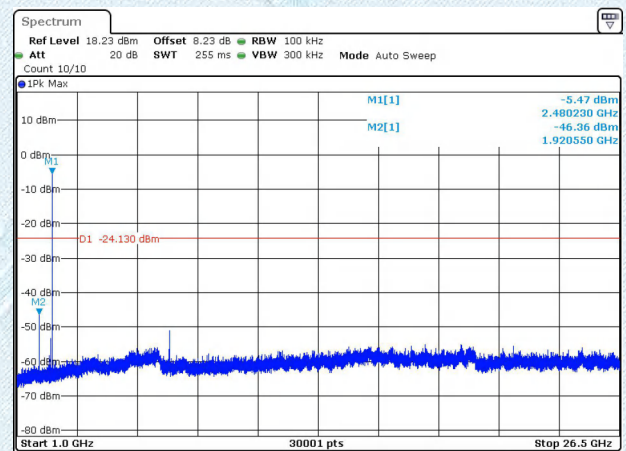


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