



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

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## TEST REPORT

Report No..... : **KS2103S0615E**  
FCC ID..... : **2AYIY-A10U**  
Applicant..... : Shenzhen Yinghongyuan Technology Co., Ltd.  
Address..... : 440A, 4th Floor, No. 4-1, Shajing Road, Dawangshan Community,  
Shajing Street, Baoan District, Shenzhen, China  
Manufacturer..... : Shenzhen Yinghongyuan Technology Co., Ltd.  
Address..... : 440A, 4th Floor, No. 4-1, Shajing Road, Dawangshan Community,  
Shajing Street, Baoan District, Shenzhen, China  
Product Name..... : **Bluetooth speaker**  
Trade Mark..... : /  
Model/Type reference..... : **A10U**  
Listed Model(s)..... : /  
Standard..... : **FCC CFR Title 47 Part 15 Subpart C Section 15.247**  
Date of Receipt..... : Mar. 25, 2021  
Date of Test Date..... : Mar. 25, 2021~ Apr. 06, 2021  
Date of issue..... : Apr. 06, 2021  
Test result..... : **Pass**

Compiled by:  
(Printed name+signature) **Rory Huang**  
Supervised by:  
(Printed name+signature) **Eder Zhan**  
Approved by:  
(Printed name+signature) **Cary Luo**

*Rory Huang*  
*Eder Zhan*  
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KSIGN (Guangdong) Testing Co., Ltd.  
APPROVED

Testing Laboratory Name..... : **KSIGN(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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## 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	Apr. 06, 2021	Original

### 1.3. 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
Hopping Channel Separation	15.247(a)(1)	Pass	Rory Huang
Dwell Time	15.247(a)(1)	Pass	Rory Huang
Peak Output Power	15.247(b)(1)	Pass	Rory Huang
Number of Hopping Frequency	15.247 (a)(1)	Pass	Rory Huang
Band Edge Emissions	15.247(d)	Pass	Rory Huang
Radiated Spurious Emission	15.247(c)&15.209	Pass	Rory Huang
99% Occupied Bandwidth & 20dB Bandwidth	15.247(a)(1)	Pass	Rory Huang
Pseudorandom Frequency Hopping Sequence	15.247 (a)(1)	Pass	Rory Huang

Note: The measurement uncertainty is not included in the test result.

## 1.4. 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.

## 1.5. 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  $k=1.96$ .

## 1.6. 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

## 2. GENERAL INFORMATION

### 2.1. Client Information

Applicant:	<b>Shenzhen Yinghongyuan Technology Co., Ltd.</b>
Address:	440A, 4th Floor, No. 4-1, Shajing Road, Dawangshan Community, Shajing Street, Baoan District, Shenzhen, China
Manufacturer:	Shenzhen Yinghongyuan Technology Co., Ltd.
Address:	440A, 4th Floor, No. 4-1, Shajing Road, Dawangshan Community, Shajing Street, Baoan District, Shenzhen, China

### 2.2. General Description of EUT

Product Name:	Bluetooth speaker
Marketing Name:	/
Model/Type reference:	A10U
Listed Model(s):	/
Model Difference:	/
Power supply:	DC 5V= 1A by Micro USB
Power supply(Battery):	DC 3.7V 350mAh
Hardware version:	BFF-120
Software version:	V1.2
<b>Bluetooth 5.0</b>	
Modulation:	GFSK(DH5), π /4-DQPSK(2DH5), 8DPSK(3DH5)
Operation frequency:	2402MHz~2480MHz
Max Peak Output Power:	DH5 : 6.35dBm 2DH5 : 5.67dBm 3DH5 : 5.53dBm
Channel number:	79
Channel separation:	1MHz
Antenna type:	PCB Antenna
Antenna gain:	1.0dBi

## 2.3. 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. BT EDR, 79 channels are provided to the EUT. Channels 00/39/78 were selected for testing.

Operation Frequency List:

Channel	Frequency (MHz)
<b>00</b>	<b>2402</b>
01	2403
:	:
38	2440
<b>39</b>	<b>2441</b>
40	2442
:	:
77	2479
<b>78</b>	<b>2480</b>

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

Test mode

NO.	TEST MODE DESCRIPTION
1	Low channel GFSK
2	Middle channel GFSK
3	High channel GFSK
4	Low channel $\pi/4$ -DQPSK
5	Middle channel $\pi/4$ -DQPSK
6	High channel $\pi/4$ -DQPSK
7	Low channel 8DPSK
8	Middle channel 8DPSK
9	High channel 8DPSK
10	Hopping mode GFSK
11	Hopping mode $\pi/4$ -DQPSK
12	Hopping mode 8DPSK

Note:

1. Only the result of the worst case was recorded in the report, if no other cases.
2. The test software is the Blue Test3 which can set the EUT into the individual test modes.

## 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
11	Pre-Amplifier	Schwarzbeck	BBV-9721	57	04/06/2022
12	Horn Antenna	Schwarzbeck	BBHA 9170	00939	03/28/2022

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated 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 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

### 3. TEST ITEM AND RESULTS

#### 3.1. Antenna requirement

##### Requirement

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

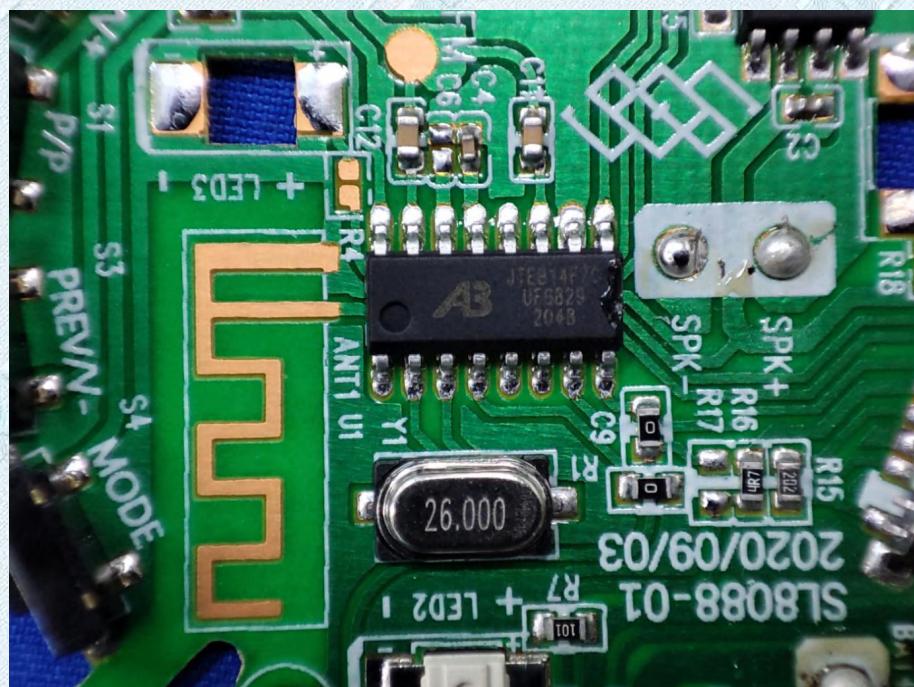
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit 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.



### 3.2. Conducted Emission

### Limit

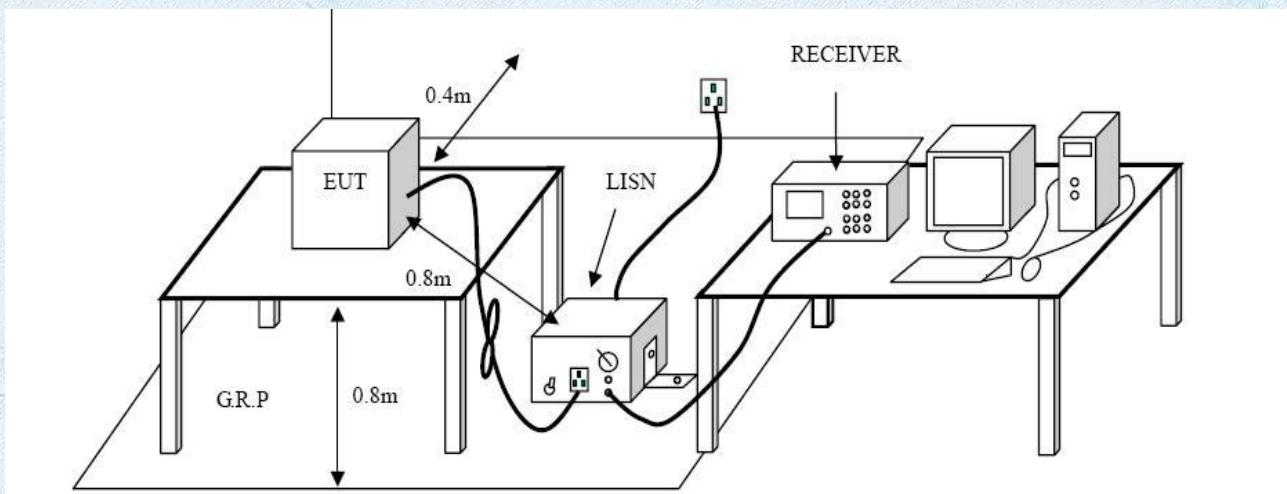
### Conducted Emission Test Limit

Frequency	Maximum RF Line Voltage (dB $\mu$ V)	
	Quasi-peak Level	Average Level
150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
500kHz~5MHz	56	46
5MHz~30MHz	60	50

## Notes:

- (1) \*Decreasing linearly with logarithm of the frequency.
- (2) The lower limit shall apply at the transition frequencies.
- (3) The limit decrease in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

## Test Configuration



## **Test Procedure**

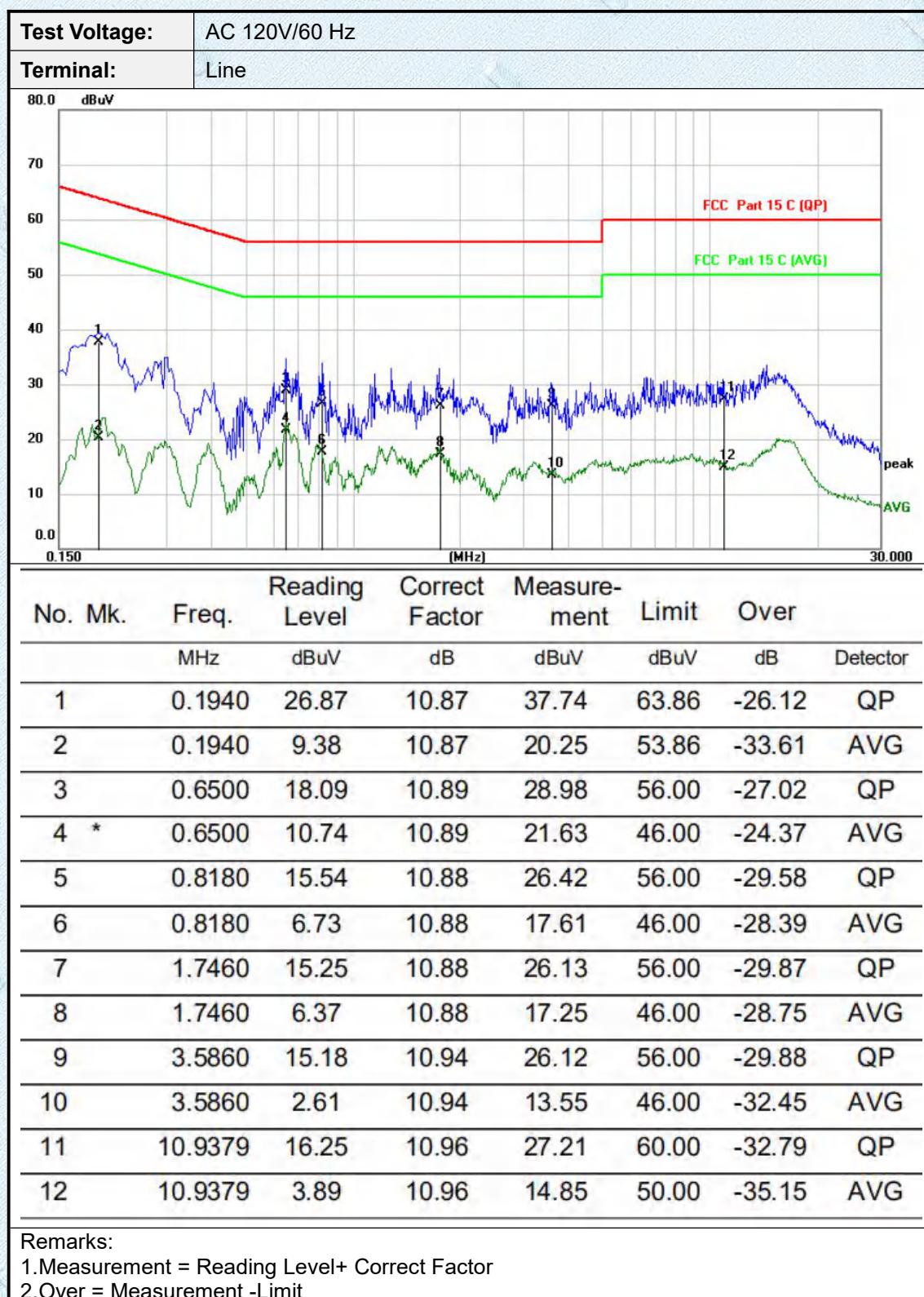
1. The EUT was setup according to ANSI C63.10:2013 requirements.
2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface.
3. The EUT and simulators are connected to the main power through a line impedances stabilization network (LISN). The LISN provides a 50ohm /50uH coupling impedance for the measuring equipment.  
The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)
4. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
5. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
6. Conducted Emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
7. During the above scans, the emissions were maximized by cable manipulation.

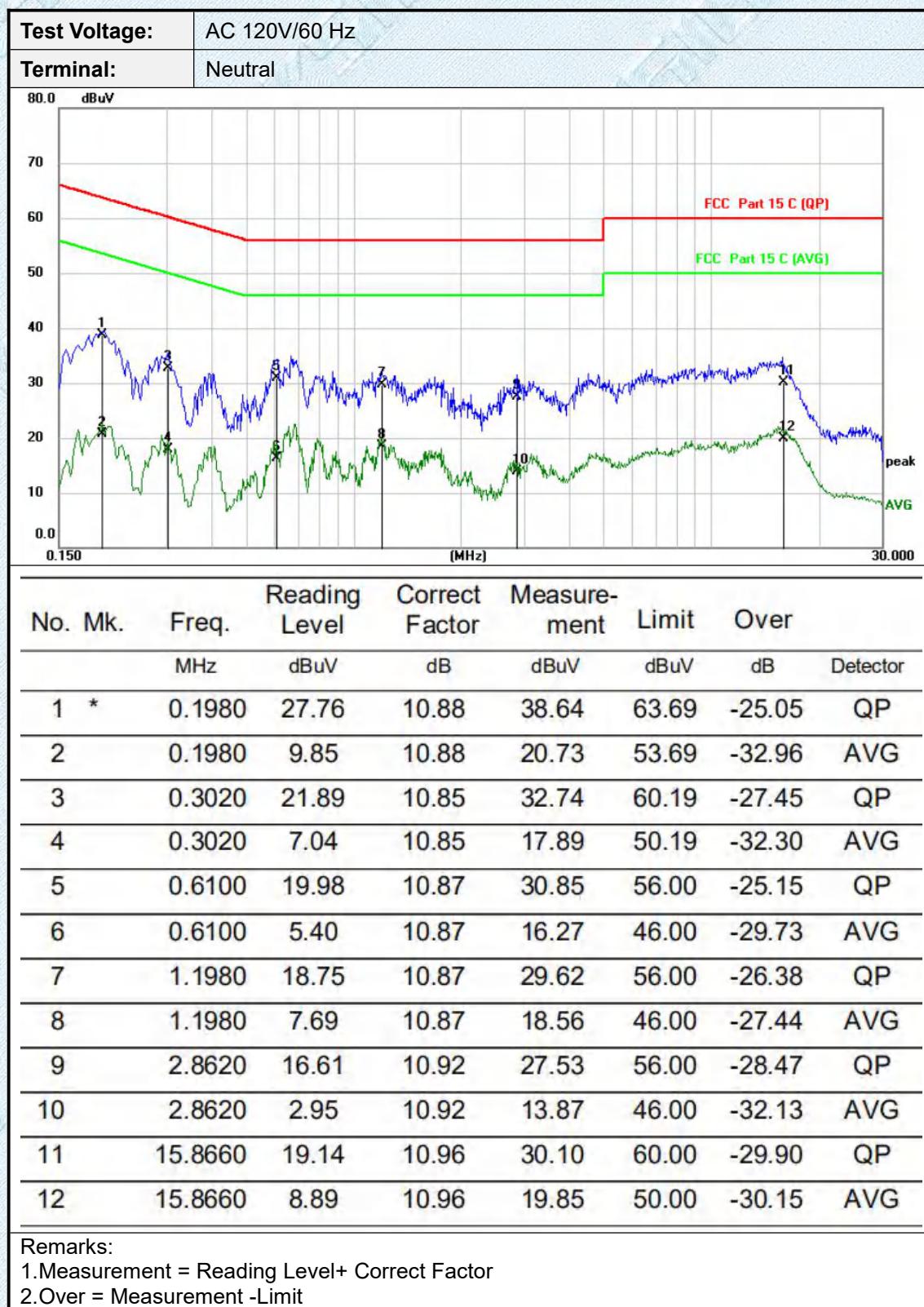
## Test Mode:

Please refer to the clause 2.3.

**Test Results**

Pre-scan DH5, 2DH5,3DH5 modulation, and found the DH5 modulation 2402MHz which it is worse case, so only show the test data for worse case.



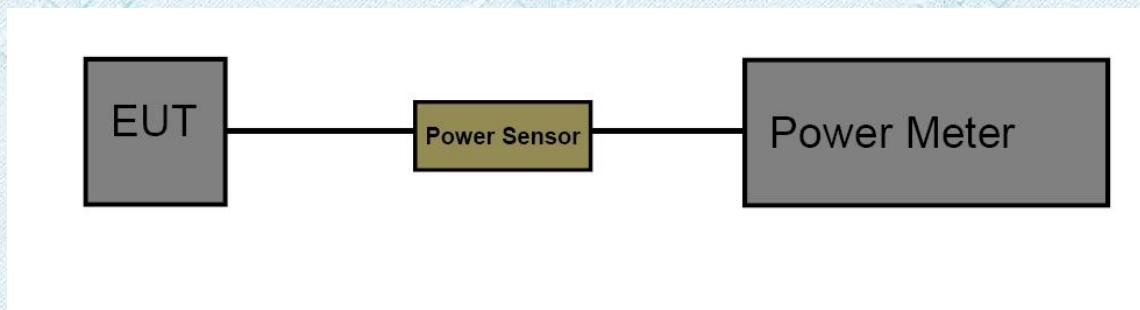


### 3.3. Peak Output Power

#### Limit

Test Item	Limit	Frequency Range(MHz)
Peak Output Power	Hopping Channels>75 Power<1W(30dBm) Other <125mW(21dBm)	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=1 MHz, VBW=3 MHz for bandwidth less than 1MHz.  
RBW=3 MHz, VBW=10 MHz for bandwidth more than 1MHz.

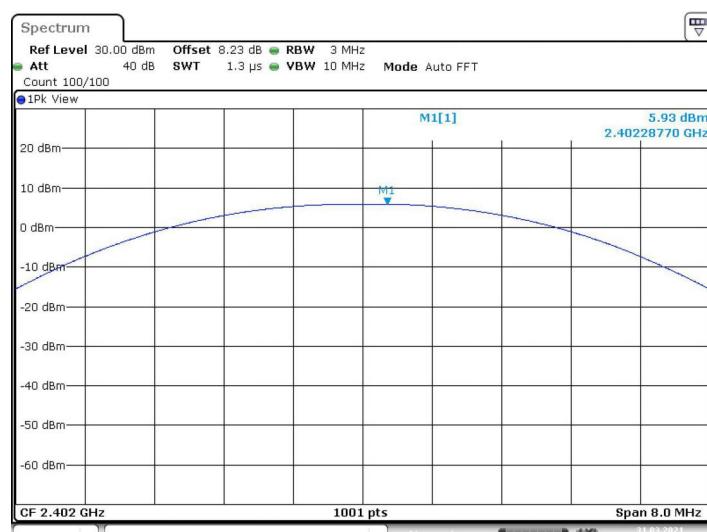
#### Test Mode

Please refer to the clause 2.3

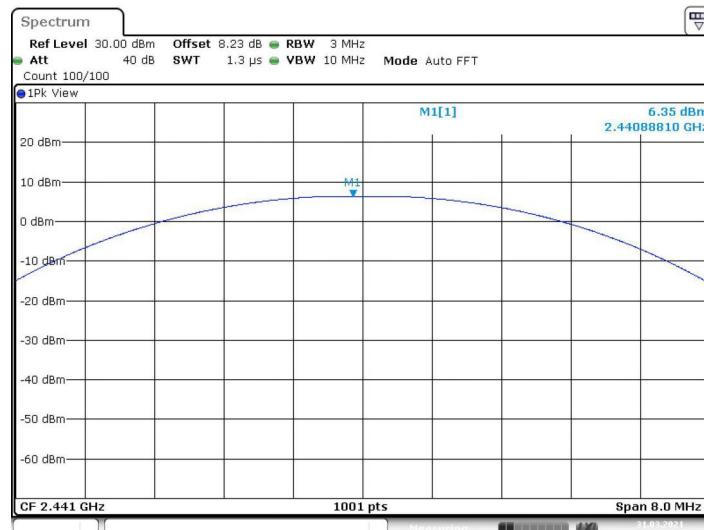
#### Test Result

Test Mode:	DH5	
Channel frequency (MHz)	Test Result (dBm)	Limit (dBm)
2402	5.93	
2441	6.35	30
2480	4.55	

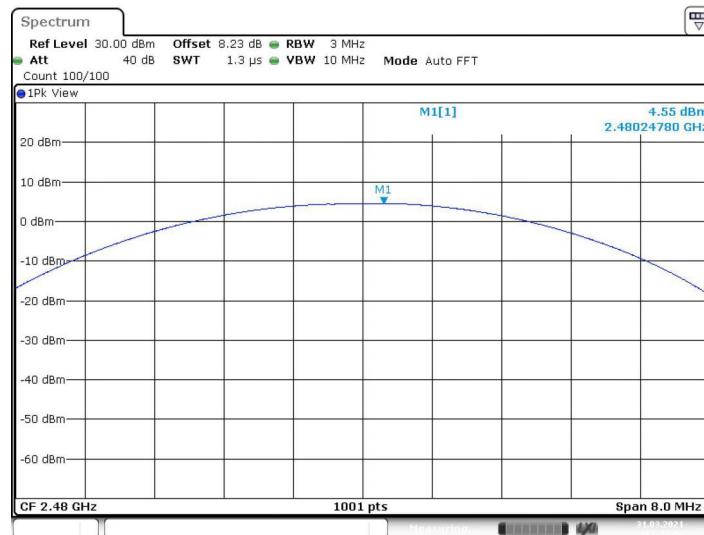
**2402 MHz**



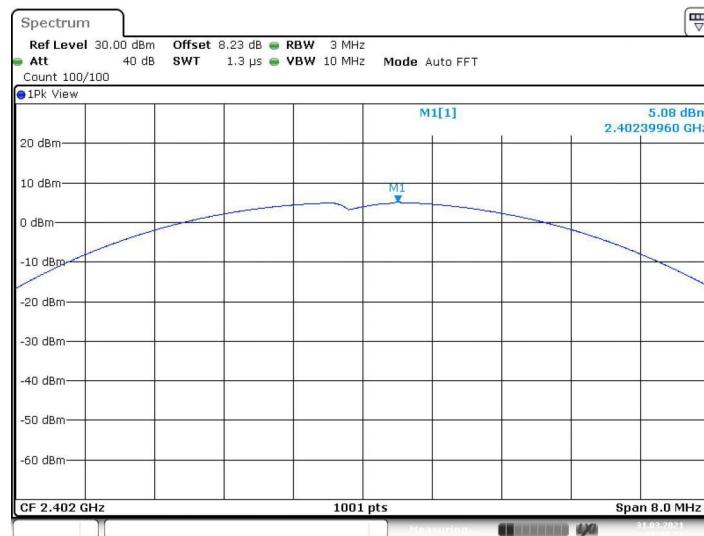
## 2441 MHz



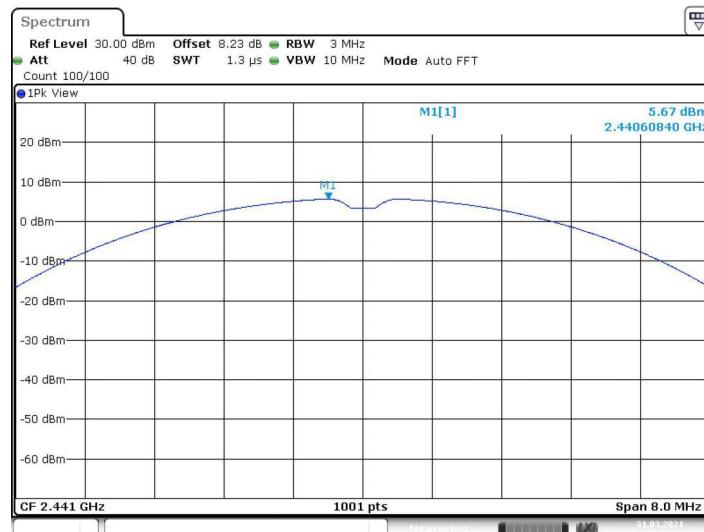
## 2480 MHz



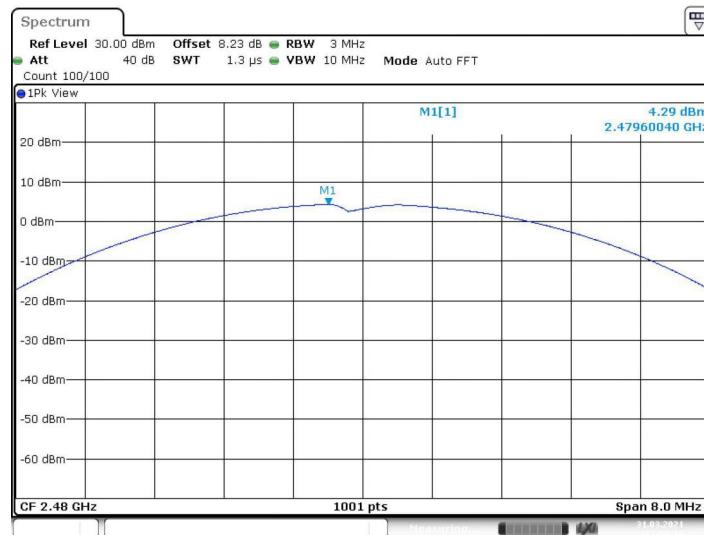
Test Mode:	2DH5	
Channel frequency (MHz)	Test Result (dBm)	Limit (dBm)
2402	5.08	
2441	5.67	
2480	4.29	
<b>2402 MHz</b>		



## 2441 MHz



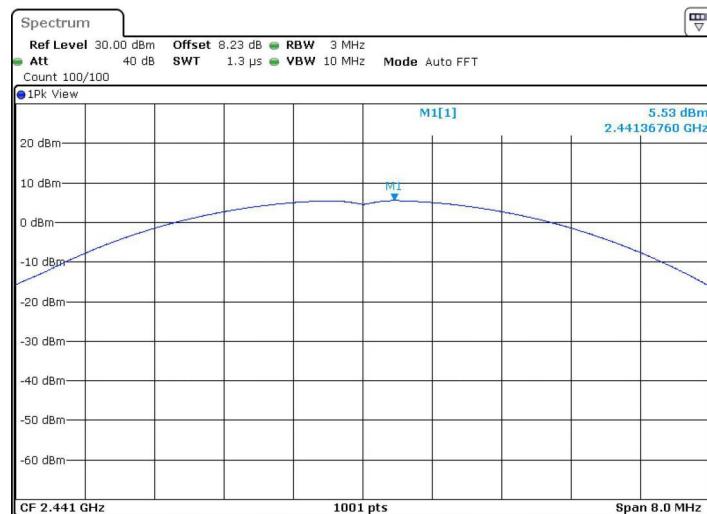
## 2480 MHz



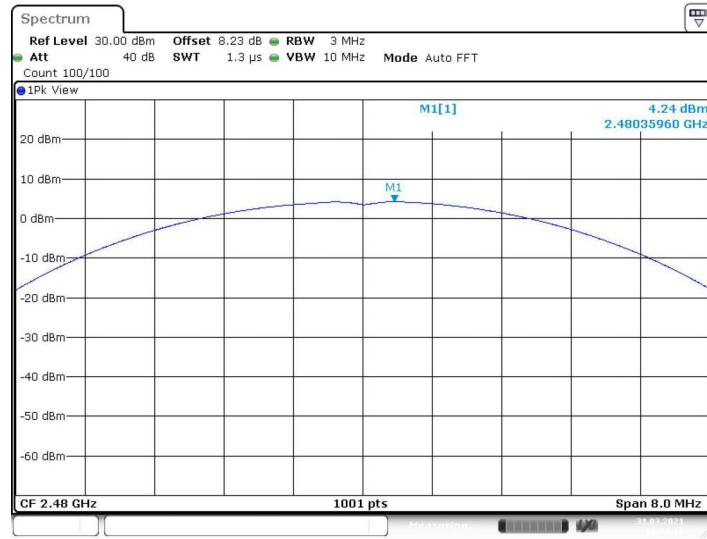
Test Mode:	3DH5	
Channel frequency (MHz)	Test Result (dBm)	Limit (dBm)
2402	5.08	30
2441	5.53	
2480	4.24	
<b>2402 MHz</b>		



## 2441 MHz



## 2480 MHz

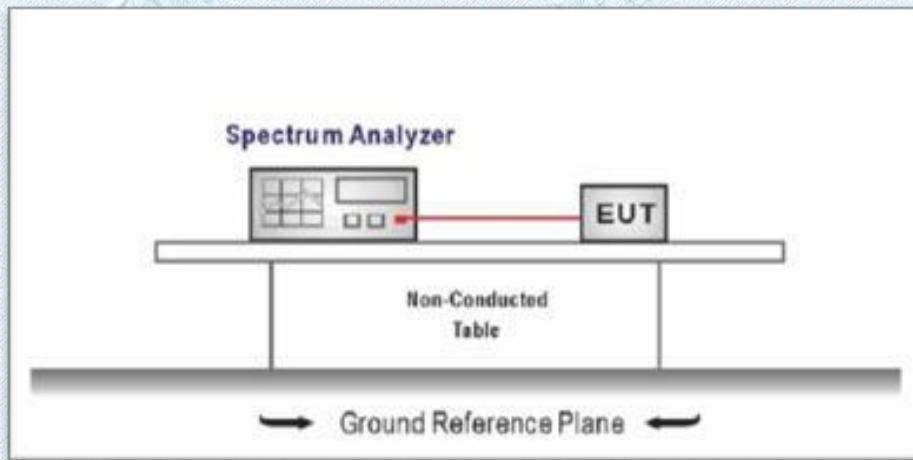


### 3.4. 99% Occupied Bandwidth & 20dB Bandwidth

#### Limit

Test Item	Limit	Frequency Range(MHz)
Bandwidth	N/A	2400~2483.5

#### Test Configuration



#### Test Procedure

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator.
2. Spectrum Setting:
  - (1) Set RBW = 30 kHz.
  - (2) Set the video bandwidth (VBW)  $\geq 3 \times \text{RBW}$ .
  - (3) Detector = Peak.
  - (4) Trace mode = Max hold.
  - (5) Sweep = Auto couple.

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

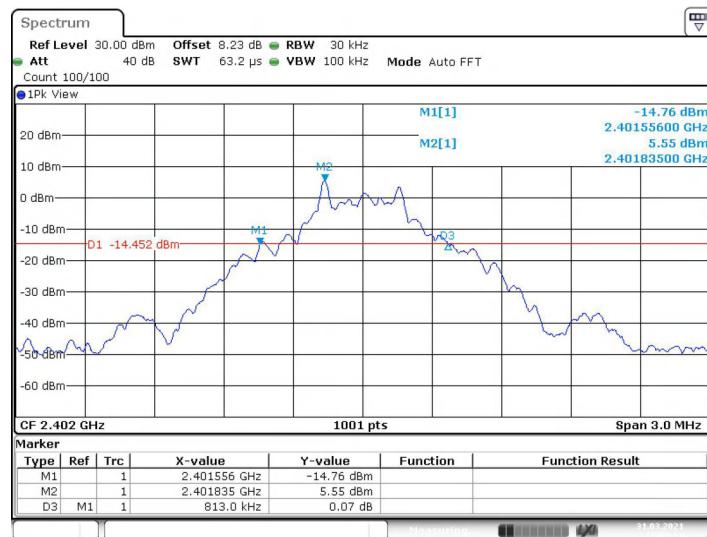
#### Test Mode

Please refer to the clause 2.3.

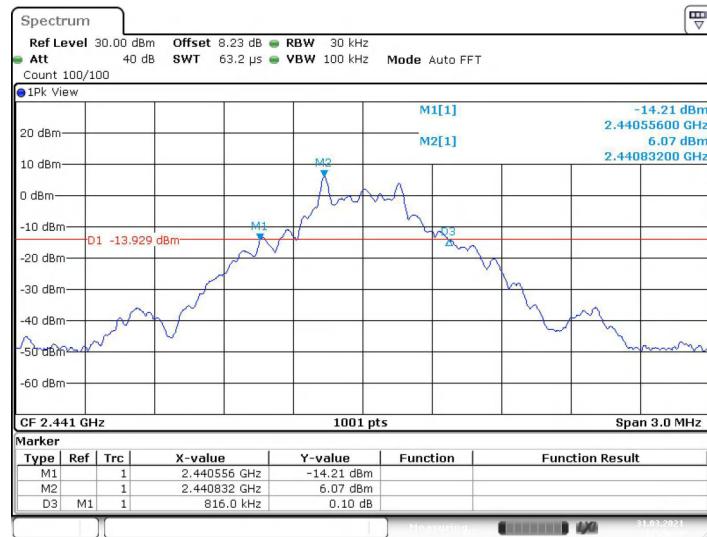
#### Test Results

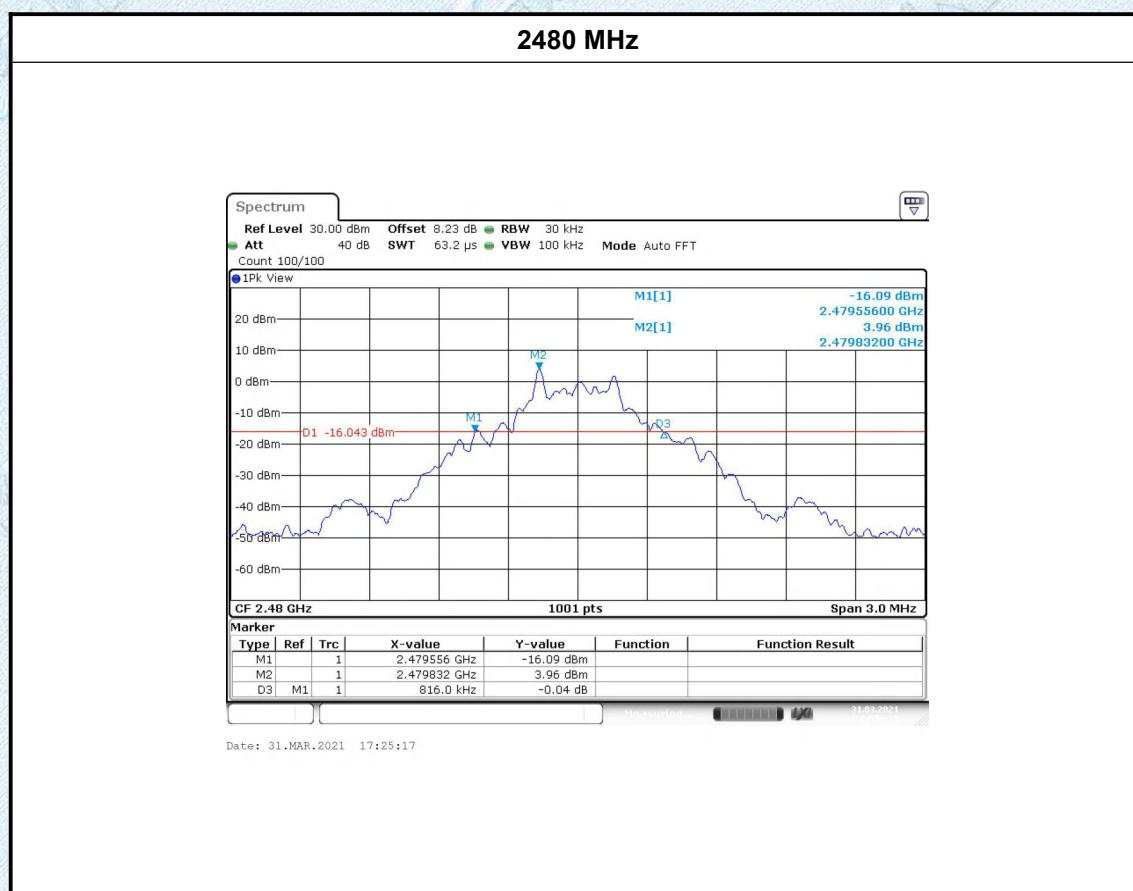
Test Mode:	DH5			
Channel frequency (MHz)	20dB Bandwidth [MHz]	FL[MHz]	FH[MHz]	Verdict
2402	0.813	2401.556	2402.369	PASS
2441	0.816	2440.556	2441.372	PASS
2480	0.816	2479.556	2480.372	PASS

## 2402 MHz



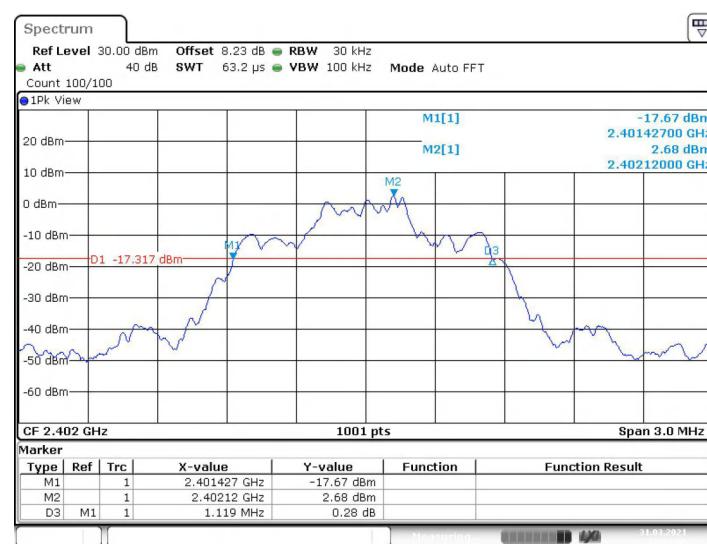
## 2441 MHz





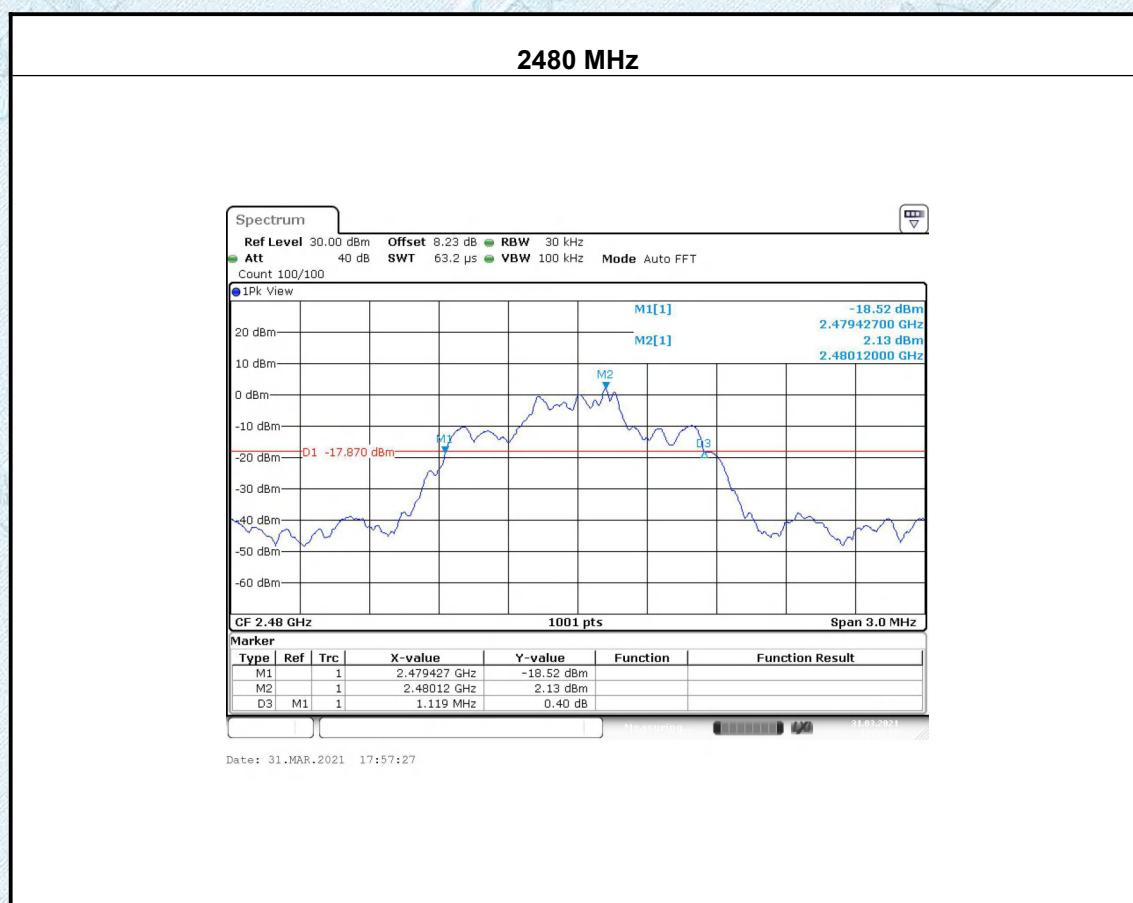
<b>Test Mode:</b>	2DH5			
<b>Channel frequency (MHz)</b>	20dB Bandwidth [MHz]	FL[MHz]	FH[MHz]	Verdict
2402	1.119	2401.427	2402.546	PASS
2441	1.119	2440.427	2441.546	PASS
2480	1.119	2479.427	2480.546	PASS

2402 MHz

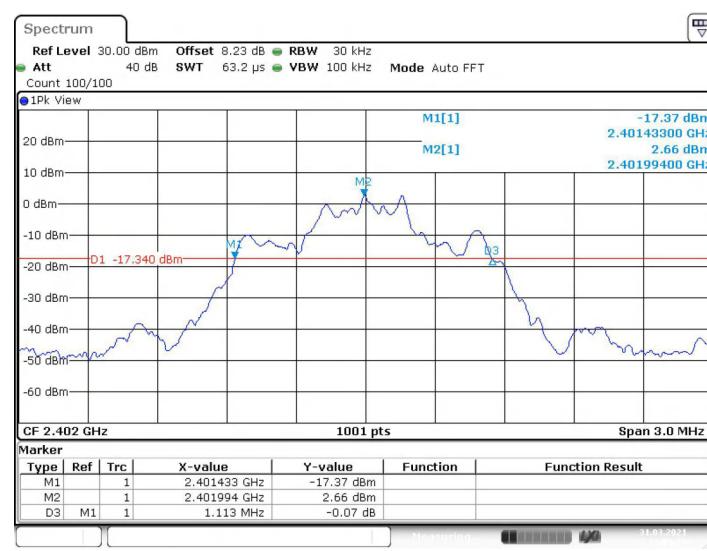
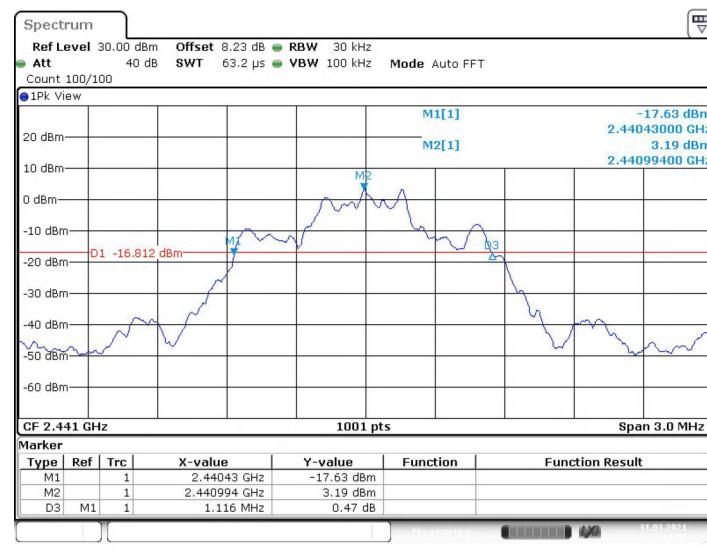


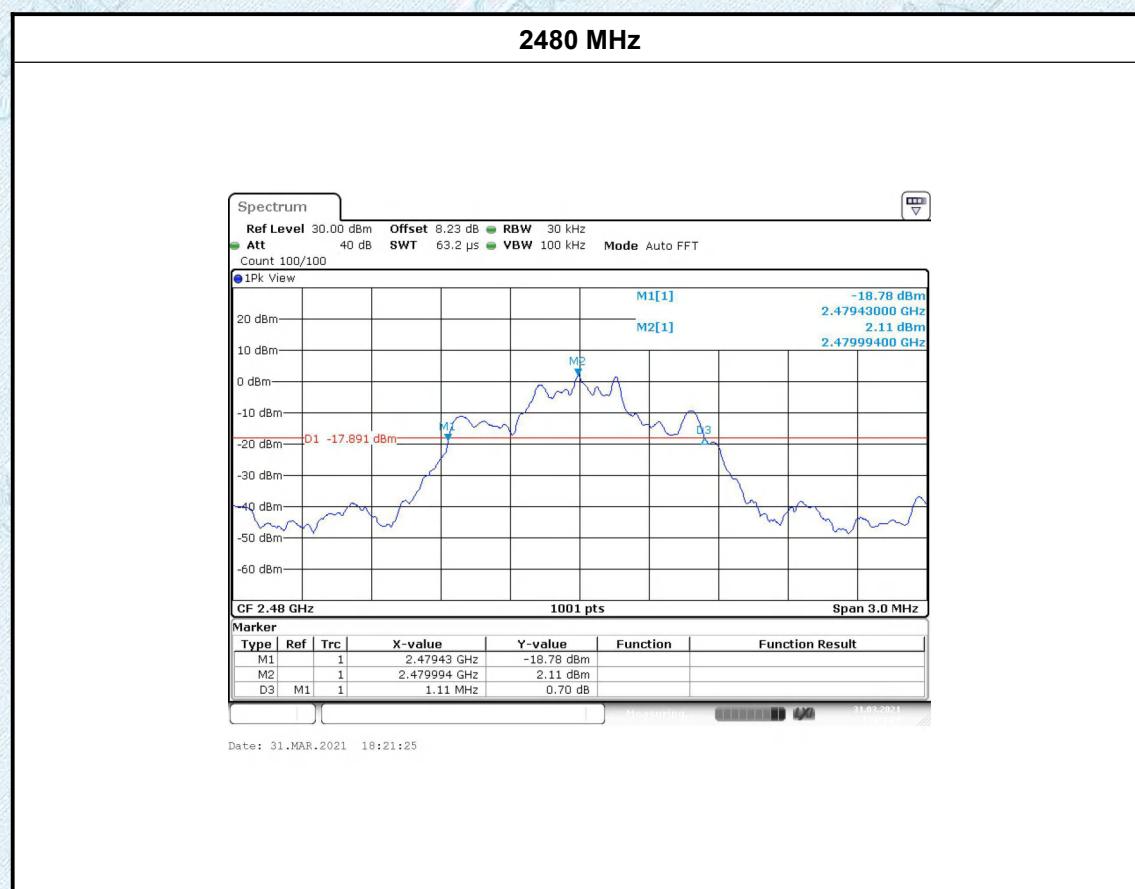
2441 MHz





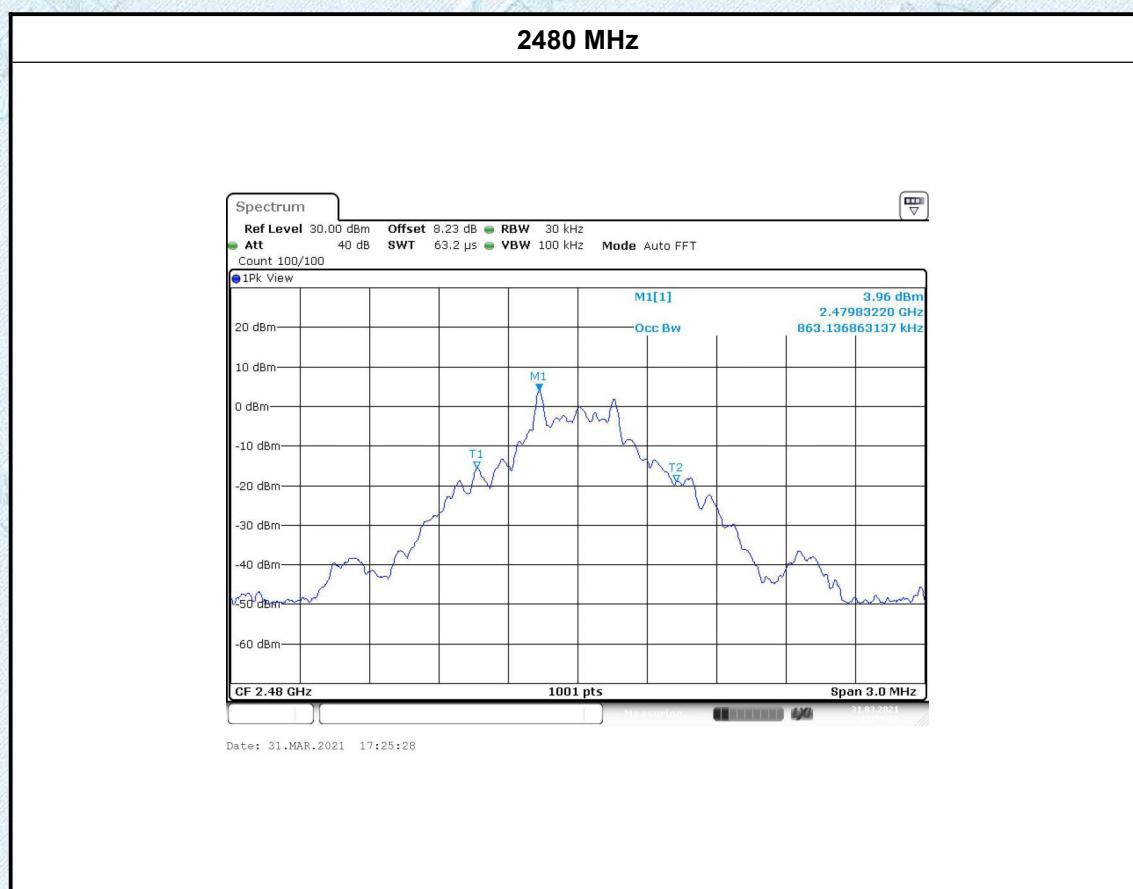
Test Mode:	3DH5			
Channel frequency (MHz)	20dB Bandwidth [MHz]	FL[MHz]	FH[MHz]	Verdict
2402	1.113	2401.433	2402.546	PASS
2441	1.116	2440.430	2441.546	PASS
2480	1.110	2479.430	2480.540	PASS

**2402 MHz****2441 MHz**

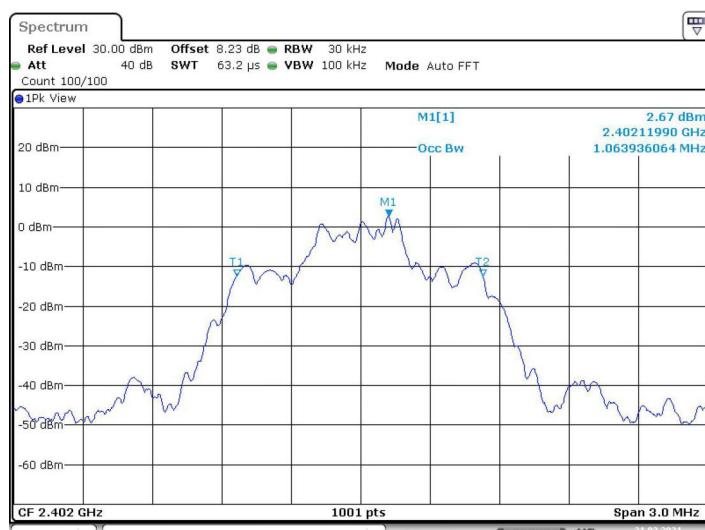
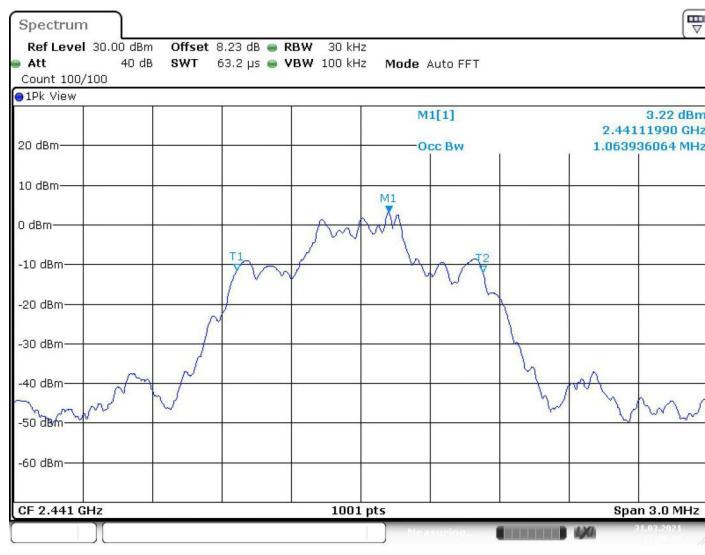


Test Mode:	DH5			
Channel frequency (MHz)	99% OCB [MHz]	FL[MHz]	FH[MHz]	Verdict
2402	0.863	2401.565	2402.429	PASS
2441	0.857	2440.565	2441.423	PASS
2480	0.863	2479.562	2480.426	PASS

**2402 MHz****2441 MHz**



Test Mode:	2DH5			
Channel frequency (MHz)	99% OCB [MHz]	FL[MHz]	FH[MHz]	Verdict
2402	1.064	2401.464	2402.527	PASS
2441	1.064	2440.464	2441.527	PASS
2480	1.07	2479.461	2480.530	PASS

**2402 MHz****2441 MHz**



Test Mode:	3DH5			
Channel frequency (MHz)	99% OCB [MHz]	FL[MHz]	FH[MHz]	Verdict
2402	1.055	2401.464	2402.518	PASS
2441	1.052	2440.464	2441.515	PASS
2480	1.058	2479.461	2480.518	PASS

**2402 MHz****2441 MHz**

## 2480 MHz



### 3.5. Carrier Frequencies Separation

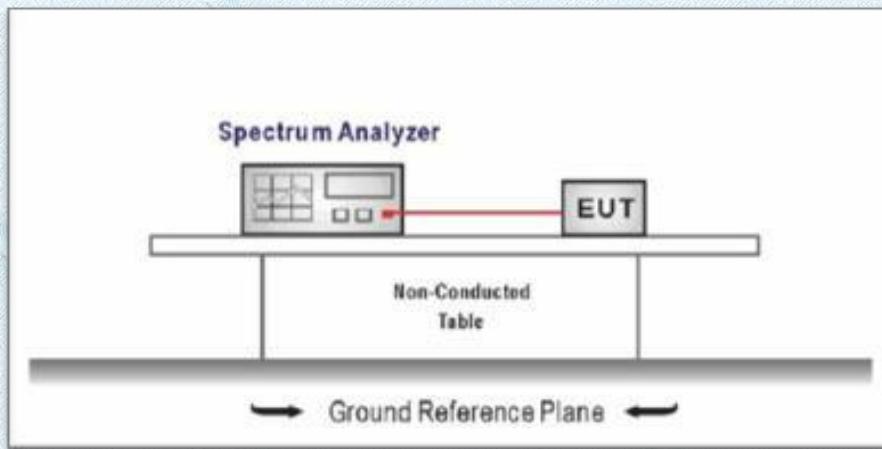
#### LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(1):

frequency hopping systems shall have hopping channel carrier frequencies separated by minimum of 25kHz or the  $2/3 \times 20$ dB bandwidth of the hopping channel, whichever is greater.

Test Item	Limit	Frequency Range(MHz)
Channel Separation	$\geq 25\text{kHz}$ or $\geq \text{two-thirds of the } 20\text{ dB bandwidth}$ Which is greater	2400~2483.5

#### Test Configuration



#### Test Procedure

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator.

2. Spectrum Setting:

- (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.

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 2.3.

#### Test Results