



KSIGN (Guangdong) Testing Co., Ltd.

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TEST REPORT

Report No.: **KS2102S00365E03**

FCC ID.....: **2AM8GCHAMELEONH**

Applicant.....: **GUANGZHOU LIE DUN ELECTRONICS TECHNOLOGY CO. LIMITED**

Address.....: No.4 plant of No.43 South International Trade Avenue,Hualong
Town,Panyu District,Guangzhou,Guangdong,China

Manufacturer.....: **GUANG ZHOU LIE DUN ELECTRONICS TECHNOLOGY CO, LIMITED**

Address.....: No.4 plant of No.43 South International Trade Avenue,Hualong
Town,Panyu District,Guangzhou,Guangdong,China

Product Name.....: **Chameleon-H**

Trade Mark.....: **CHAMELEON**

Model/Type reference.....: **E9XG-A05-M**

Listed Model(s): **/**

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

Date of receipt of test sample...: Mar. 02 2021

Date of testing.....: Mar. 02, 2021~Mar. 17, 2021

Date of issue.....: Mar. 17, 2021

Test Result.....:

Compiled by: **Pass**
(Printed name+signature) Rory Huang

Supervised by:
(Printed name+signature) Eder Zhan

Approved by:
(Printed name+signature) Cary Luo



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	Mar. 17, 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. General Description of EUT

Test Sample Number:	1-1-1(Normal Sample),1-1-2(Engineering Sample)
Product Name:	Chameleon-H
Marketing Name:	CHAMELEON
Model/Type reference:	E9XG-A05-M
Listed Model(s):	/
Model Difference:	/
Power supply(Adapter):	AC/DC ADAPTER MODEL:AD018A120150UV INPUT:100-240V~ 50/60Hz 0.5A Max OUTPUT:DC 12V1.5A
Power supply(Battery):	DC 3.7V 10000mAh 37Wh
Hardware version:	V1.0
Software version:	V1.0.0
Bluetooth V5.0	
Modulation:	GFSK(DH5), $\pi/4$ -DQPSK(2DH5), 8DPSK(3DH5)
Operation frequency:	2402MHz~2480MHz
Max Peak Output Power:	DH5: 6.35 dBm 2DH5: 5.72 dBm 3DH5: 5.56 dBm
Channel number:	79
Channel separation:	1MHz
Antenna type:	FPC 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. BT EDR, 79 channels are provided to the EUT. Channels 00/39/78 were selected for testing.

Operation Frequency List:

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

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

Test mode

For RF test items:
The engineering test program was provided and enabled to make EUT continuous transmit
For AC power line conducted emissions:
The EUT was set to connect with the Bluetooth instrument under large package sizes transmission.
For Radiated spurious emissions test item:
The engineering test program was provided and enabled to make EUT continuous transmit. The EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.

2.3. 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	04/07/2021
2	Vector Signal Generator	Agilent	N5182A	MY50142520	04/07/2021
3	Analog Signal Generator	HP	83752A	3344A00337	04/07/2021
4	Power Sensor	Agilent	E9304A	MY50390009	04/07/2021
5	Power Sensor	Agilent	E9300A	MY41498315	04/07/2021
6	Wideband Radio Communication Tester	R&S	CMW500	157282	04/07/2021
7	Climate Chamber	Angul	AGNH80L	1903042120	04/07/2021
8	Dual Output DC Power Supply	Agilent	E3646A	MY40009992	04/07/2021
9	RF Control Unit	Tonscend	JS0806-2	/	04/07/2021

Transmitter spurious emissions & Receiver spurious emissions					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
1	EMI Test Receiver	R&S	ESR	102525	04/07/2021
2	High Pass Filter	Chengdu E-Microwave	OHF-3-18-S	0E01901038	03/27/2021
3	High Pass Filter	Chengdu E-Microwave	OHF-6.5-18-S	0E01901039	03/27/2021
4	Spectrum Analyzer	HP	8593E	3831U02087	04/07/2021
5	Ultra-Broadband logarithmic period Antenna	Schwarzbeck	VULB 9163	01230	03/29/2023
6	Loop Antenna	Beijin ZHINAN	ZN30900C	18050	03/25/2021
7	Spectrum Analyzer	R&S	FSV40-N	101798	04/07/2021
8	Horn Antenna	Schwarzbeck	BBHA 9120 D	2023	03/29/2023
9	Pre-Amplifier	Schwarzbeck	BBV 9745	9745#129	04/07/2021
10	Pre-Amplifier	EMCI	EMC051835SE	980662	04/07/2021
11	Pre-Amplifier	Schwarzbeck	BBV-9721	57	04/07/2021
12	Horn Antenna	Schwarzbeck	BBHA 9170	00939	03/27/2021

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	LISN	R&S	ENV432	1326.6105.02	03/28/2021
2	EMI Test Receiver	R&S	ESR	102524	04/06/2021
3	Manual RF Switch	JS TOYO	/	MSW-01/002	04/06/2021

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

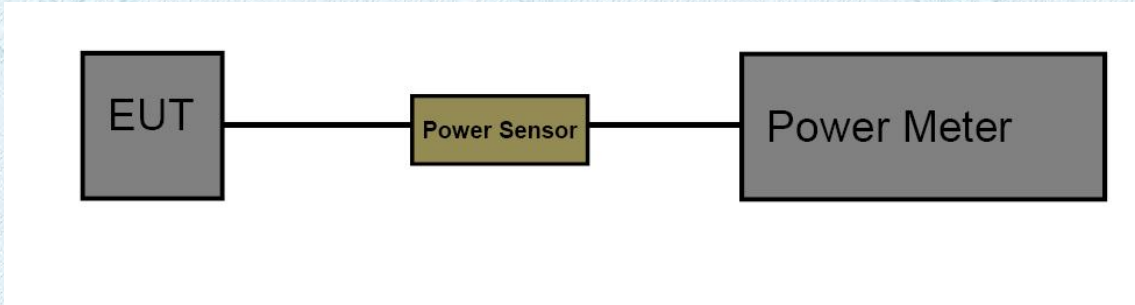
The directional gain of the antenna less than 6dBi, please refer to the EUT internal photographs antenna photo.

3.2. 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.

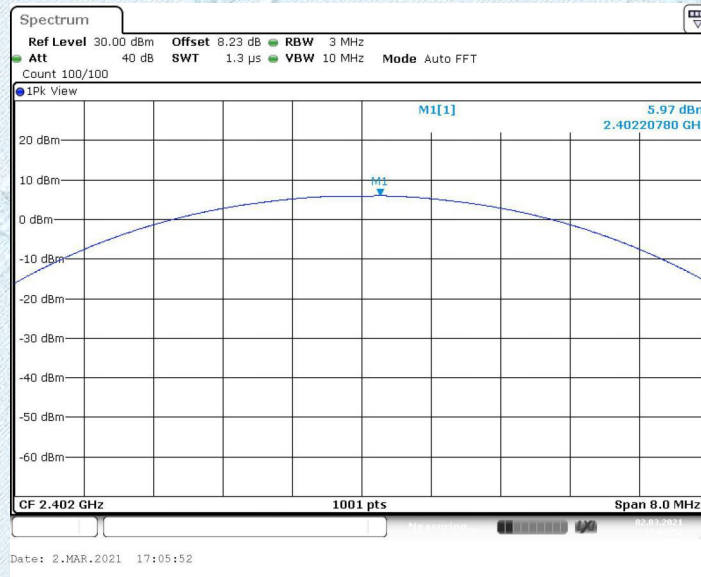
Test Mode

Please refer to the clause 2.2

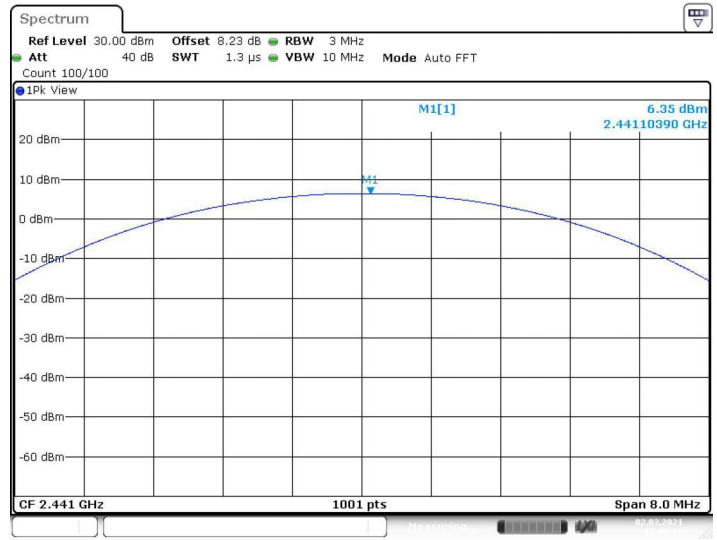
Test Result

Test Mode:	DH5		
Channel frequency (MHz)	Test Result (dBm)	Limit (dBm)	
2402	5.97	30	
2441	6.35		
2480	4.54		

2402 MHz

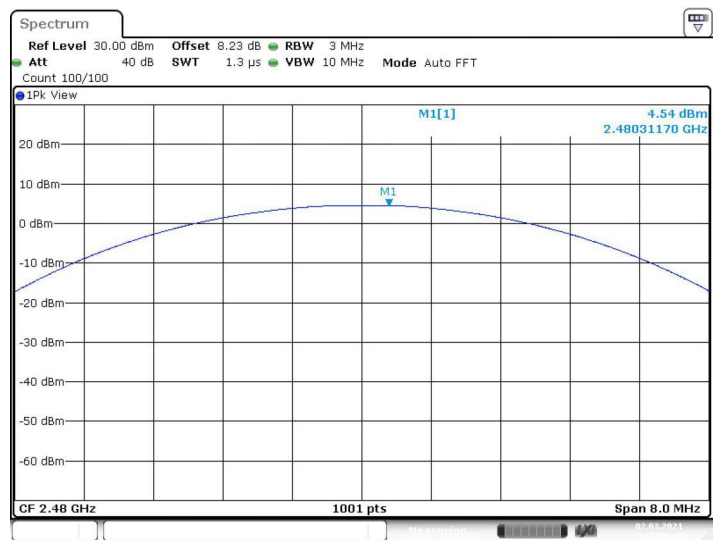


2441 MHz



Date: 2.MAR.2021 17:06:06

2480 MHz



Date: 2.MAR.2021 17:08:48

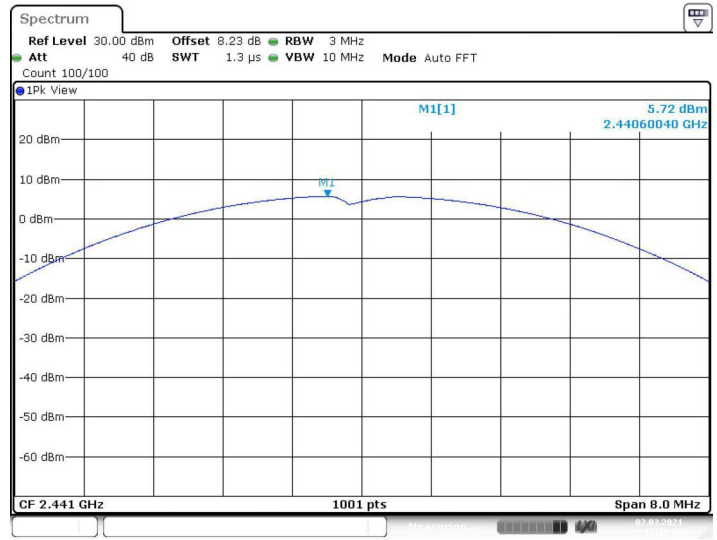
Test Mode:	2DH5	
Channel frequency (MHz)	Test Result (dBm)	Limit (dBm)
2402	5.11	30
2441	5.72	
2480	4.1	

2402 MHz



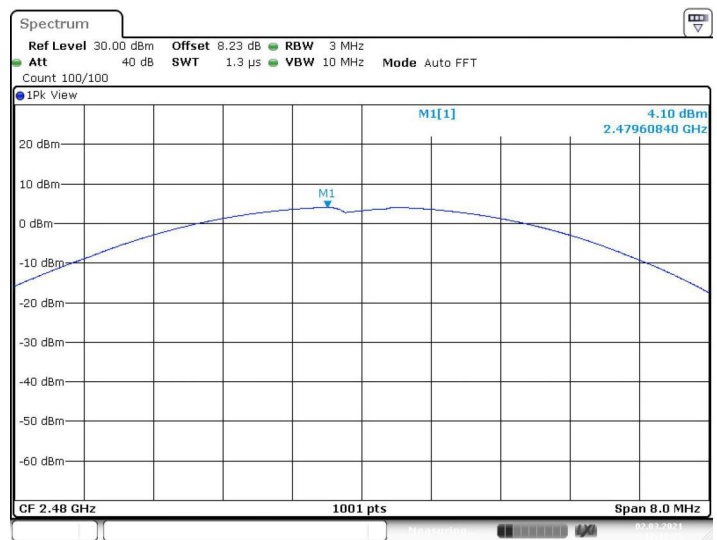
Date: 2.MAR.2021 17:10:52

2441 MHz



Date: 2.MAR.2021 17:12:08

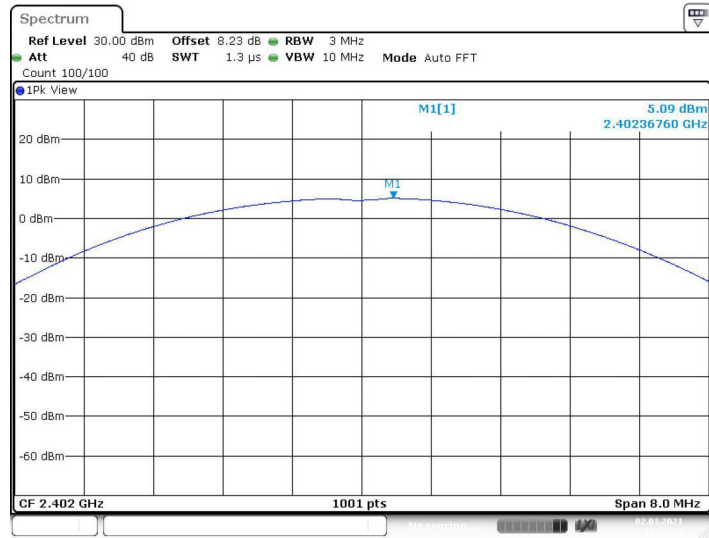
2480 MHz



Date: 2.MAR.2021 17:12:26

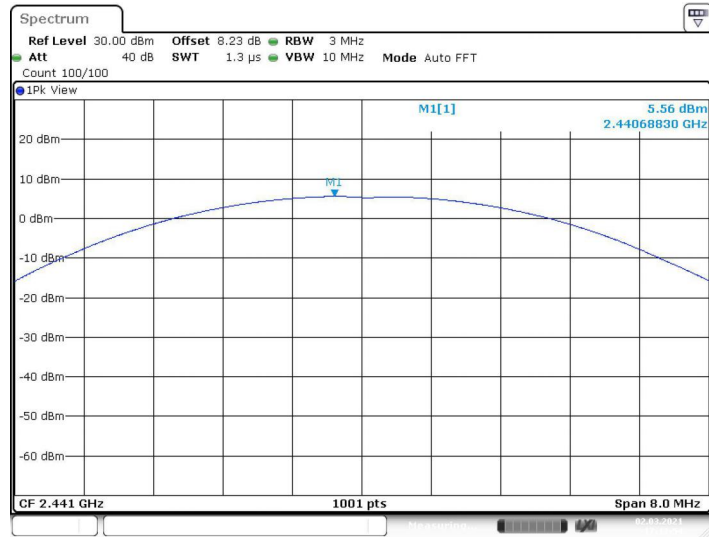
Test Mode:	3DH5	
Channel frequency (MHz)	Test Result (dBm)	Limit (dBm)
2402	5.09	30
2441	5.56	
2480	4.01	

2402 MHz



Date: 2.MAR.2021 17:13:20

2441 MHz



2480 MHz

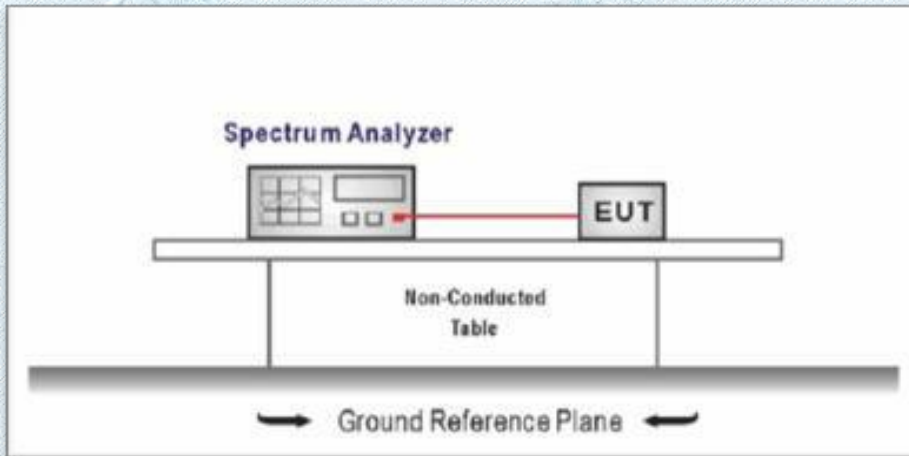


3.3. 20dB Bandwidth

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) $\geq 3 \times$ 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.

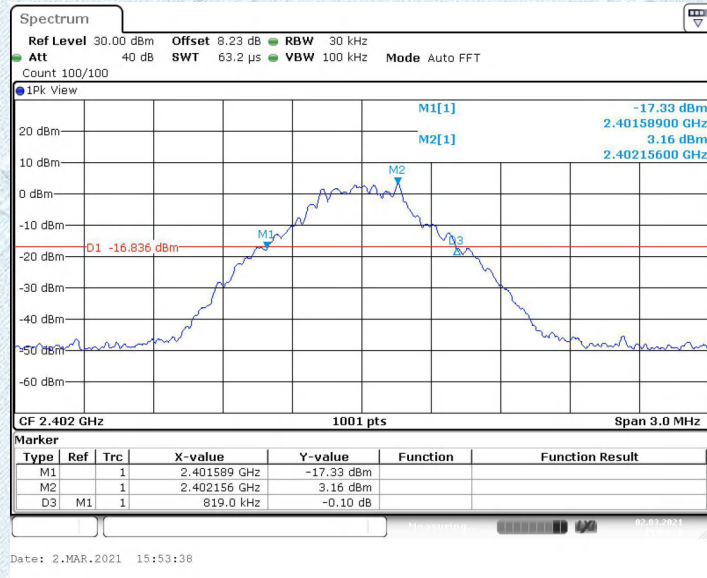
Test Mode

Please refer to the clause 2.2.

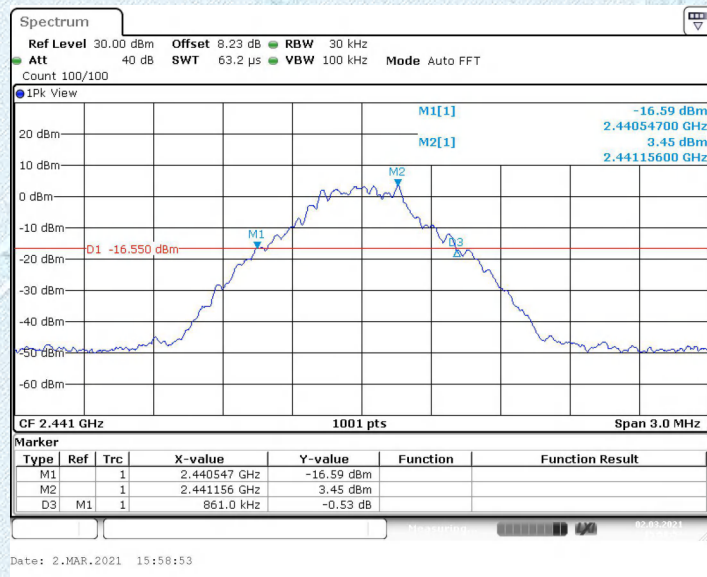
Test Results

Test Mode:	DH5			
Channel frequency (MHz)	20dB Bandwidth [MHz]	FL[MHz]	FH[MHz]	Verdict
2402	0.819	2401.589	2402.408	PASS
2441	0.861	2440.547	2441.408	PASS
2480	0.864	2479.544	2480.408	PASS

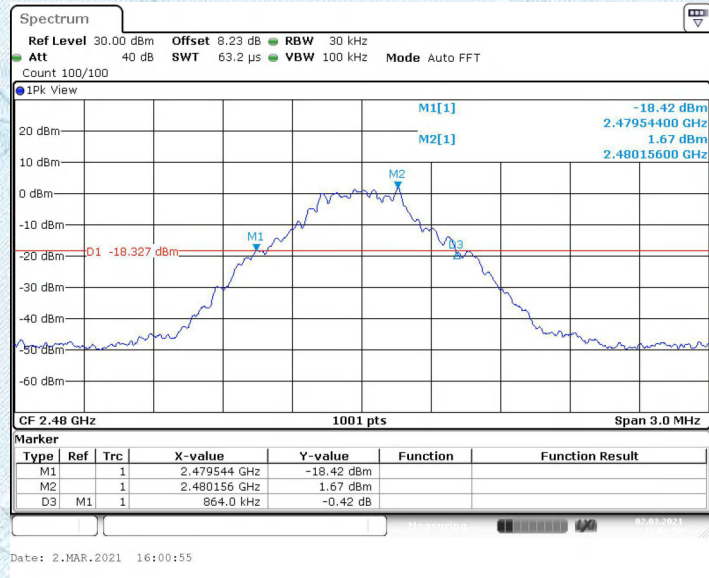
2402 MHz



2441 MHz

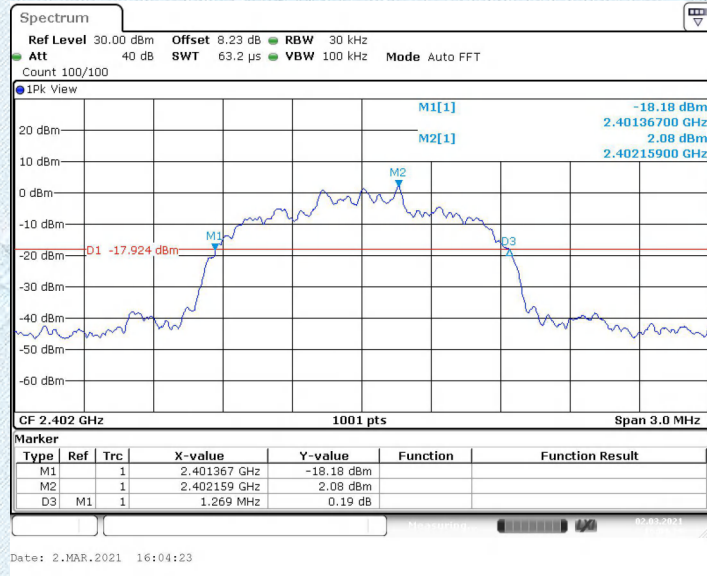


2480 MHz

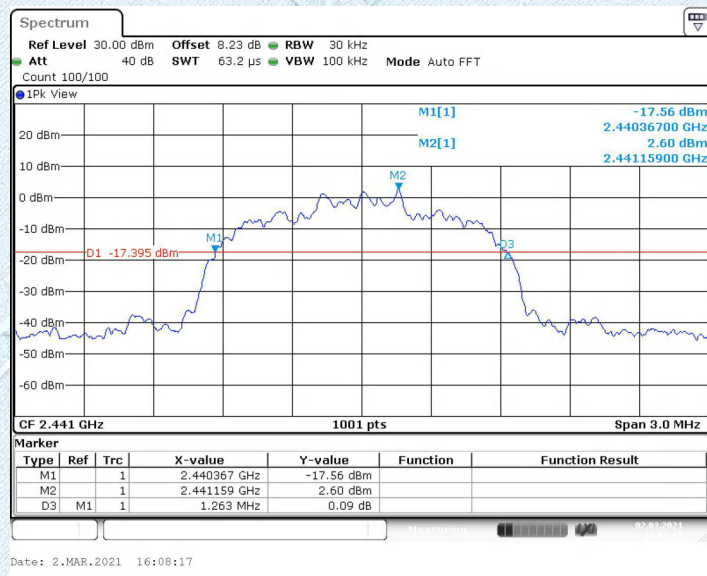


Test Mode:	2DH5			
Channel frequency (MHz)	20dB Bandwidth [MHz]	FL[MHz]	FH[MHz]	Verdict
2402	1.269	2401.367	2402.636	PASS
2441	1.263	2440.367	2441.630	PASS
2480	1.275	2479.364	2480.639	PASS

2402 MHz



2441 MHz



2480 MHz



Test Mode:	3DH5			
Channel frequency (MHz)	20dB Bandwidth [MHz]	FL[MHz]	FH[MHz]	Verdict
2402	1.269	2401.355	2402.624	PASS
2441	1.257	2440.358	2441.615	PASS
2480	1.278	2479.352	2480.630	PASS

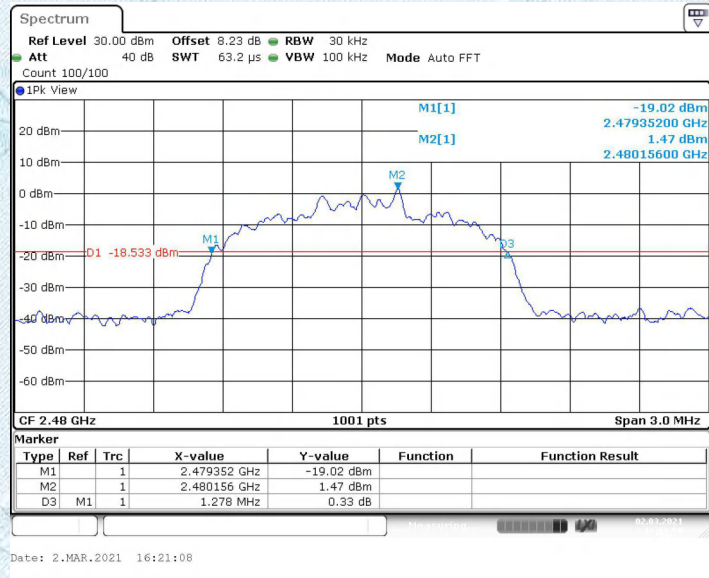
2402 MHz



2441 MHz

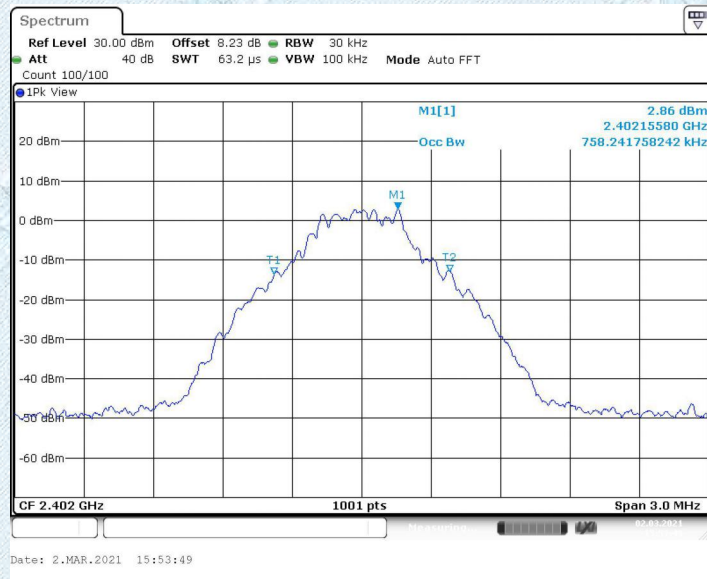


2480 MHz

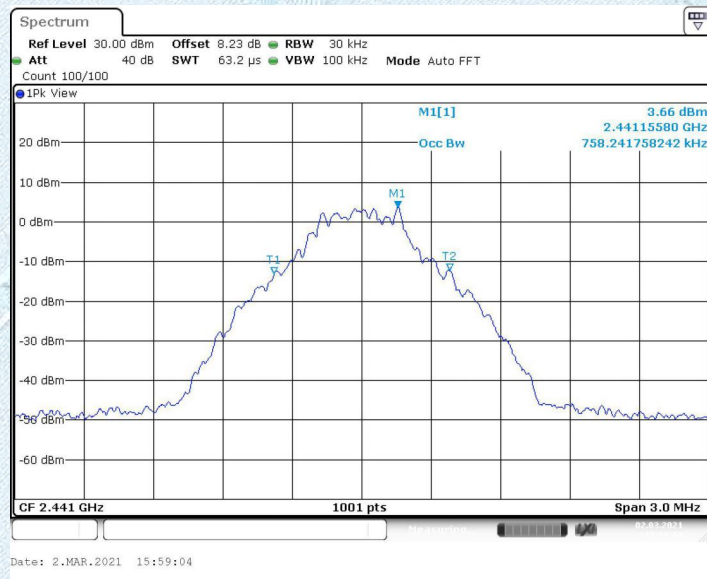


Test Mode:	DH5			
Channel frequency (MHz)	99% OCB [MHz]	FL[MHz]	FH[MHz]	Verdict
2402	0.758	2401.622	2402.381	PASS
2441	0.758	2440.619	2441.378	PASS
2480	0.77	2479.613	2480.384	PASS

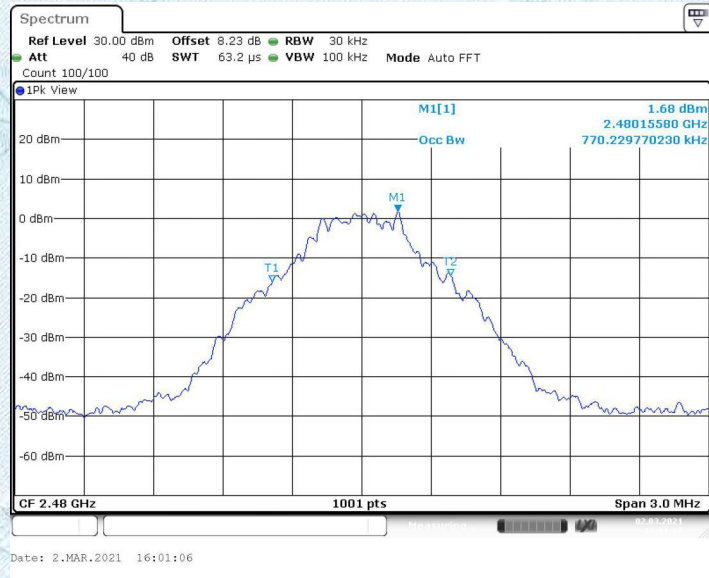
2402 MHz



2441 MHz

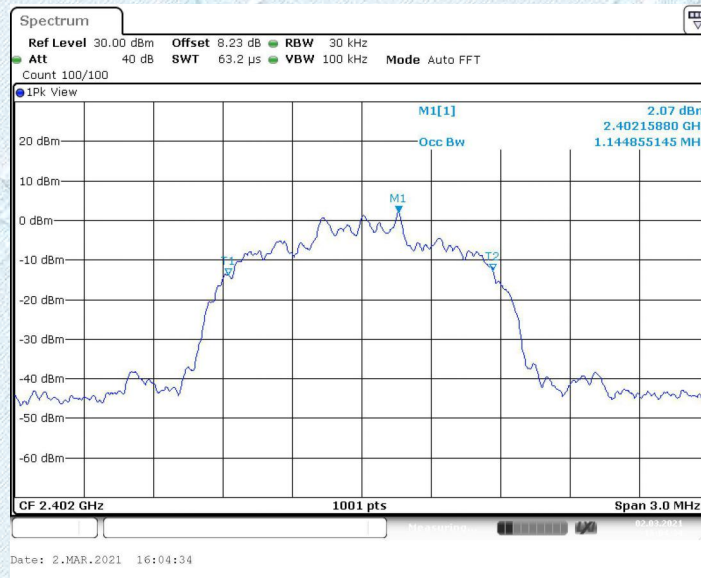


2480 MHz



Test Mode:	2DH5			
Channel frequency (MHz)	99% OCB [MHz]	FL[MHz]	FH[MHz]	Verdict
2402	1.145	2401.422	2402.566	PASS
2441	1.142	2440.422	2441.563	PASS
2480	1.157	2479.416	2480.572	PASS

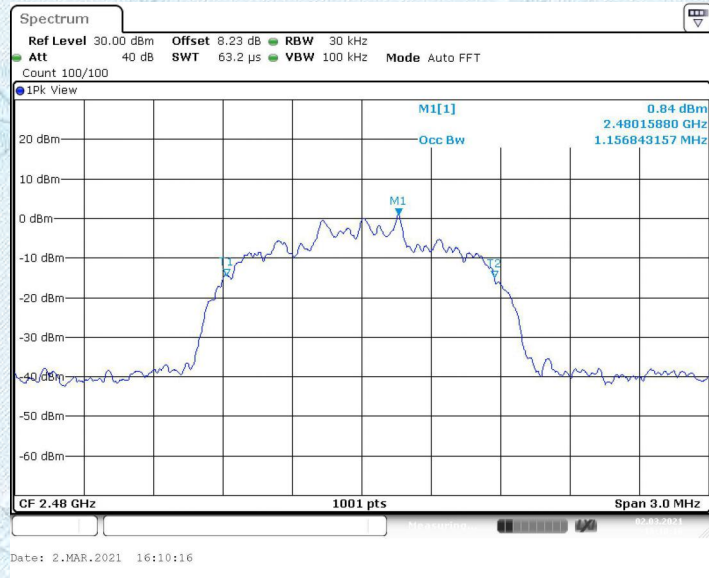
2402 MHz



2441 MHz

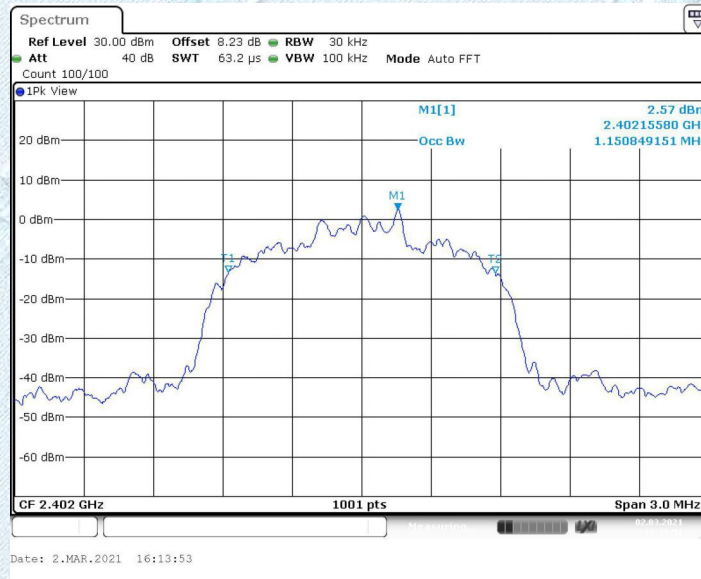


2480 MHz



Test Mode:	3DH5			
Channel frequency (MHz)	99% OCB [MHz]	FL[MHz]	FH[MHz]	Verdict
2402	1.151	2401.425	2402.575	PASS
2441	1.148	2440.425	2441.572	PASS
2480	1.166	2479.416	2480.581	PASS

2402 MHz



2441 MHz

