



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
Tel.: + (86)755-29852678 Fax: + (86)755-29852397 E-mail: info@gdksign.cn Website: www.gdksign.com

TEST REPORT

Report No...... : **KS2104S1120E**

FCC ID..... : 2AS2T-XT16

Applicant..... : Shenzhen Xintu Century Technology Co.,Ltd

Address..... : 5th Floor,Building A1,Anle Industrial Park,No.172,Hangcheng Avenue, Xixiang Street, Baoan District,ShenzhenCity,China

Manufacturer..... : Shenzhen Xintu Century Technology Co.,Ltd

Address..... : 5th Floor,Building A1,Anle Industrial Park,No.172,Hangcheng Avenue, Xixiang Street, Baoan District,ShenzhenCity,China

Product Name..... : **Bluetooth headset**

Trade Mark..... : N/A

Model/Type reference..... : XT16.ANC

Listed Model(s)..... : N/A

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

Date of Receipt..... : Apr. 29, 2021

Date of Test Date..... : Apr. 29, 2021~ May. 12, 2021

Date of issue..... : May. 12, 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

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

This test report may be duplicated completely for legal use with the approval of the applicant. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product endorsement by KSIGN. The test results in the report only apply to the tested sample. The test report shall be invalid without all the signatures of testing engineers, reviewer and approver. Any objections must be raised to KSIGN within 15 days since the date when the report is received. It will not be taken into consideration beyond this limit. The test report merely correspond to the test sample.

TABLE OF CONTENTS**Page**

1. TEST SUMMARY.....	3
1.1. TEST STANDARDS.....	3
1.2. REPORT VERSION.....	3
1.3. TEST DESCRIPTION.....	4
1.4. TEST FACILITY.....	5
1.5. MEASUREMENT UNCERTAINTY.....	6
1.6. ENVIRONMENTAL CONDITIONS.....	6
2. GENERAL INFORMATION.....	7
2.1. CLIENT INFORMATION.....	7
2.2. GENERAL DESCRIPTION OF EUT.....	7
2.3. OPERATION STATE.....	8
2.4. MEASUREMENT INSTRUMENTS LIST.....	9
2.5. TEST SOFTWARE.....	10
3. TEST ITEM AND RESULTS.....	11
3.1. ANTENNA REQUIREMENT.....	11
3.2. CONDUCTED EMISSION.....	12
3.3. PEAK OUTPUT POWER.....	15
3.4. 99% OCCUPIED BANDWIDTH & 20dB BANDWIDTH.....	22
3.5. CARRIER FREQUENCIES SEPARATION.....	35
3.6. NUMBER OF HOPPING CHANNEL.....	38
3.7. DWELL TIME.....	40
3.8. BAND EDGE AND SPURIOUS EMISSION (CONDUCTED).....	43
3.9. BAND EDGE EMISSIONS(RADIATED).....	49
3.10. RADIATED SPURIOUS EMISSIONS.....	58
3.11. PSEUDORANDOM FREQUENCY HOPPING SEQUENCE.....	69
4. EUT TEST PHOTOS.....	70
5. PHOTOGRAPHS OF EUT CONSTRUCTIONAL.....	73

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. 12, 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:

- 1.The measurement uncertainty is not included in the test result.
- 2.Only the worst test data for the Left ear was recorded in the report.

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:	Shenzhen Xintu Century Technology Co.,Ltd
Address:	5th Floor,Building A1,Anle Industrial Park,No.172,Hangcheng Avenue, Xixiang Street, Baoan District,ShenzhenCity,China
Manufacturer:	Shenzhen Xintu Century Technology Co.,Ltd
Address:	5th Floor,Building A1,Anle Industrial Park,No.172,Hangcheng Avenue, Xixiang Street, Baoan District,ShenzhenCity,China

2.2. General Description of EUT

Test Sample Number 1:	1-1-1(Normal Sample),1-1-2(Engineering Sample)
Product Name:	Bluetooth headset
Marketing Name:	N/A
Model/Type reference:	XT16.ANC
Listed Model(s):	N/A
Model Difference:	N/A
Power supply:	DC 5V
Power supply(Battery):	DC 3.7V 300mAh 1.11Wh for Box DC 3.7V for Headset
Hardware version:	V1.0
Software version:	V003
Bluetooth 5.0	
Modulation:	GFSK(DH5), $\pi/4$ -DQPSK(2DH5), 8DPSK(3DH5)
Operation frequency:	2402MHz~2480MHz
Max Peak Output Power:	DH5 : 1.38 dBm 2DH5 : 0.61 dBm 3DH5 : 0.56 dBm
Channel number:	79
Channel separation:	1MHz
Antenna type:	Ceramic Antenna
Antenna gain:	2.73 dBi

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)
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

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:

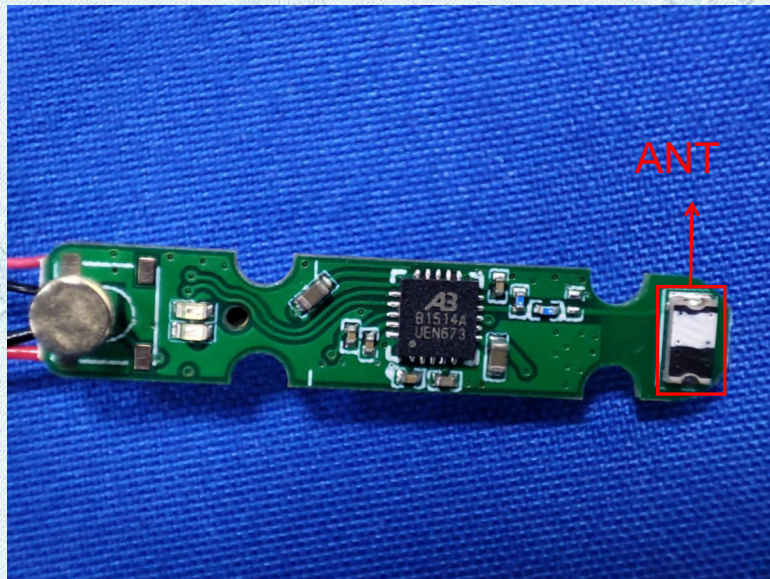
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit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

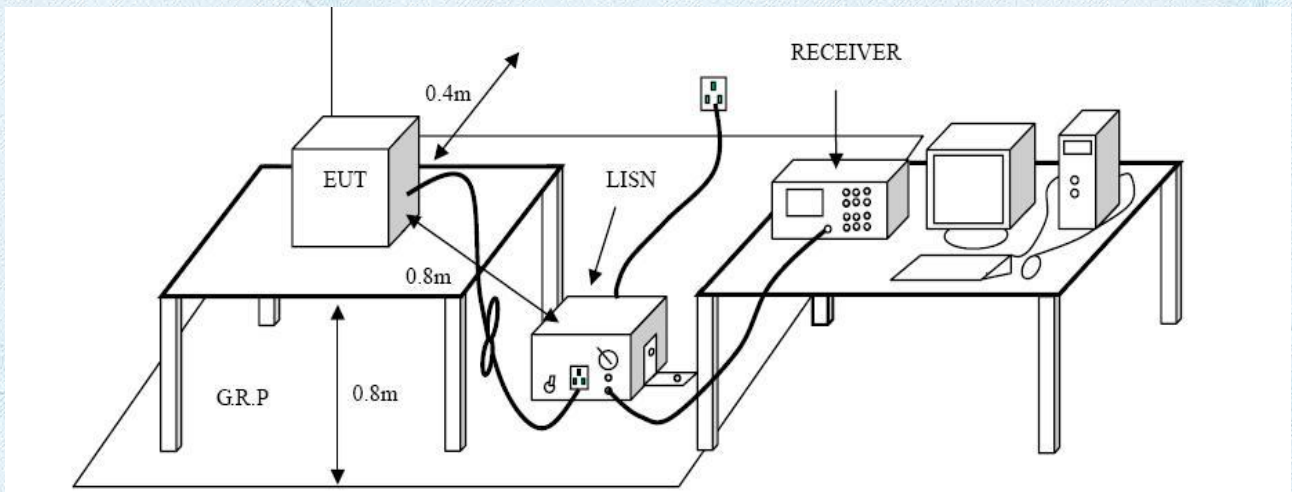
Conducted Emission Test Limit

Frequency	Maximum RF Line Voltage (dB μ 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



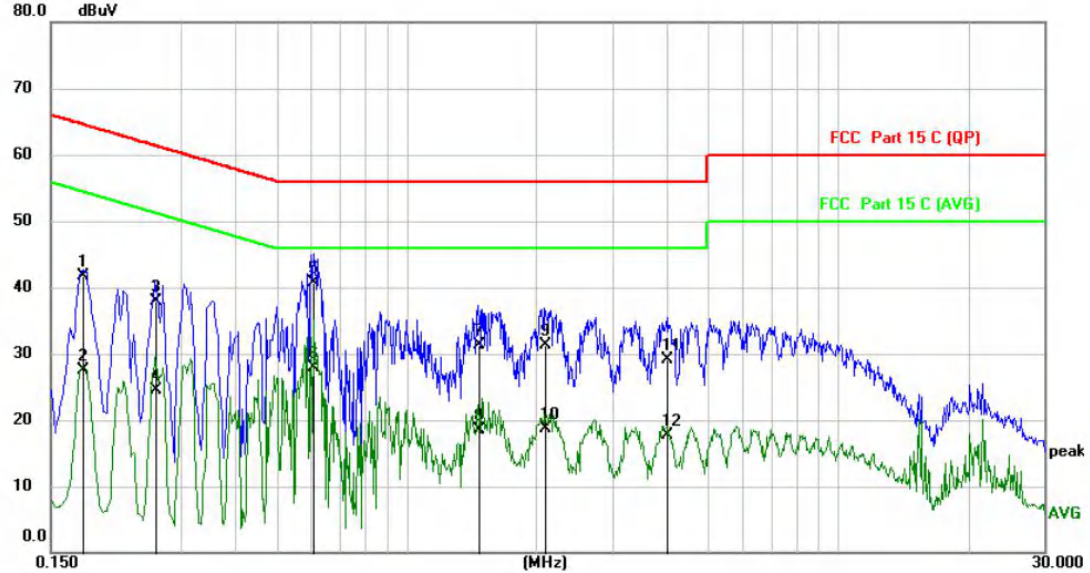
Test Procedure

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.

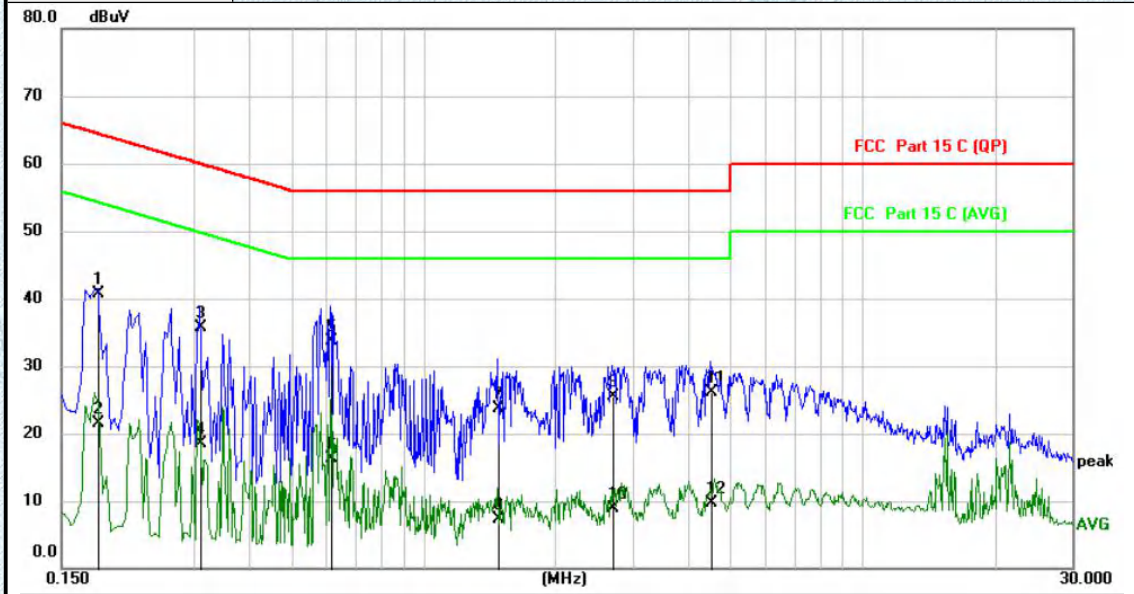
Test Mode:

Note: Bluetooth will not work properly while charging.

Test Results

Test Voltage:	AC 120V/60 Hz						
Terminal:	Line						
Test Mode	Charging						
							
No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	0.1780	30.84	10.86	41.70	64.58	-22.88	QP
2	0.1780	16.61	10.86	27.47	54.58	-27.11	AVG
3	0.2620	26.93	10.88	37.81	61.37	-23.56	QP
4	0.2620	13.63	10.88	24.51	51.37	-26.86	AVG
5 *	0.6100	29.76	10.89	40.65	56.00	-15.35	QP
6	0.6100	17.00	10.89	27.89	46.00	-18.11	AVG
7	1.4700	20.49	10.88	31.37	56.00	-24.63	QP
8	1.4700	7.58	10.88	18.46	46.00	-27.54	AVG
9	2.0980	20.32	10.89	31.21	56.00	-24.79	QP
10	2.0980	7.76	10.89	18.65	46.00	-27.35	AVG
11	4.0220	18.20	10.96	29.16	56.00	-26.84	QP
12	4.0220	6.72	10.96	17.68	46.00	-28.32	AVG
Remarks: 1.Measurement = Reading Level+ Correct Factor 2.Over = Measurement -Limit							

Test Voltage:	AC 120V/60 Hz
Terminal:	Neutral



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1		0.1819	29.93	10.87	40.80	64.40	-23.60	QP
2		0.1819	10.67	10.87	21.54	54.40	-32.86	AVG
3		0.3100	24.89	10.85	35.74	59.97	-24.23	QP
4		0.3100	7.74	10.85	18.59	49.97	-31.38	AVG
5	*	0.6140	22.93	10.87	33.80	56.00	-22.20	QP
6		0.6140	5.48	10.87	16.35	46.00	-29.65	AVG
7		1.4740	12.73	10.88	23.61	56.00	-32.39	QP
8		1.4740	-3.51	10.88	7.37	46.00	-38.63	AVG
9		2.7020	14.54	10.91	25.45	56.00	-30.55	QP
10		2.7020	-1.96	10.91	8.95	46.00	-37.05	AVG
11		4.5020	15.15	10.96	26.11	56.00	-29.89	QP
12		4.5020	-1.21	10.96	9.75	46.00	-36.25	AVG

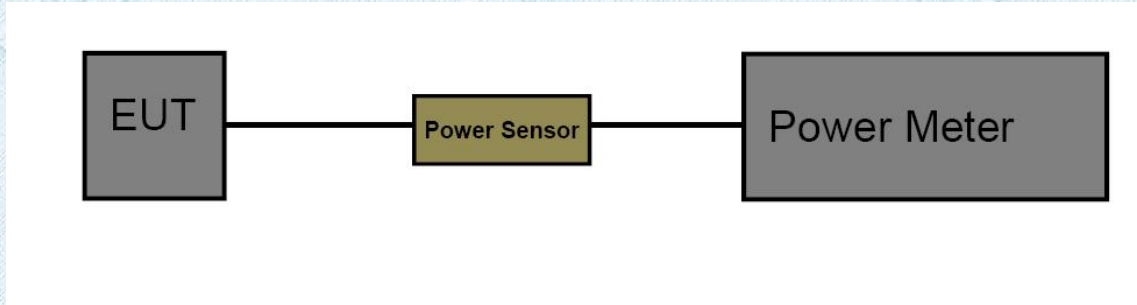
Remarks:
 1.Measurement = Reading Level+ Correct Factor
 2.Over = Measurement -Limit

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.

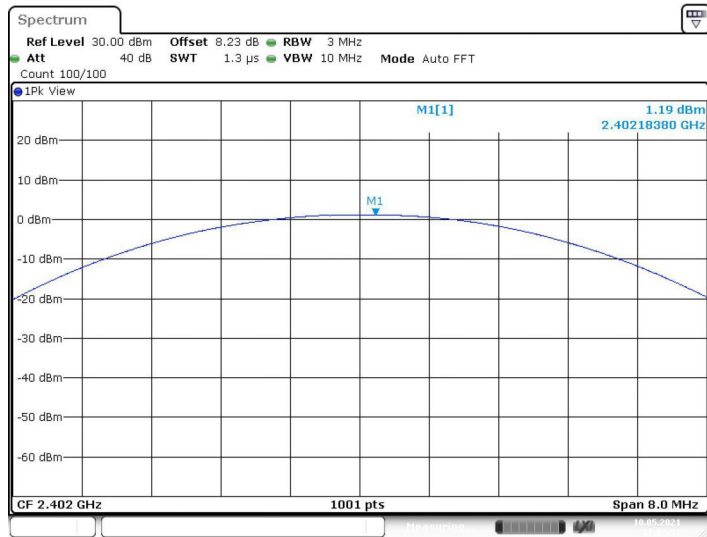
Test Mode

Please refer to the clause 2.3

Test Result

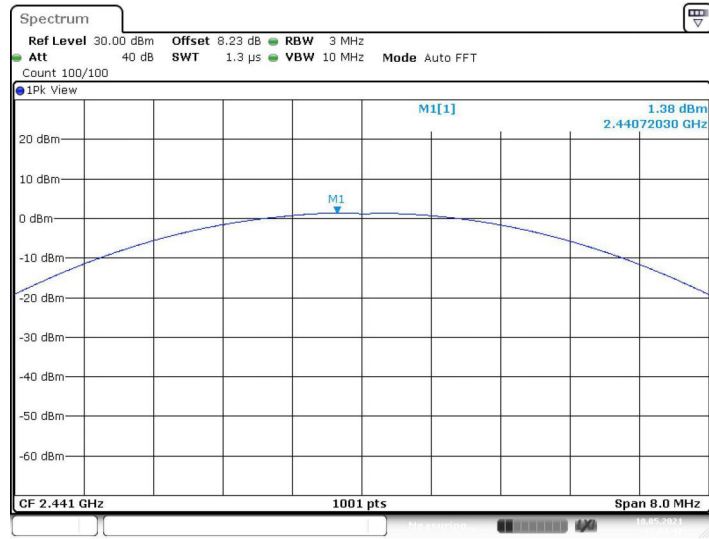
Test Mode:	DH5		
Channel frequency (MHz)	Test Result (dBm)	Limit (dBm)	
2402	1.19	30	
2441	1.38		
2480	0.27		

2402 MHz

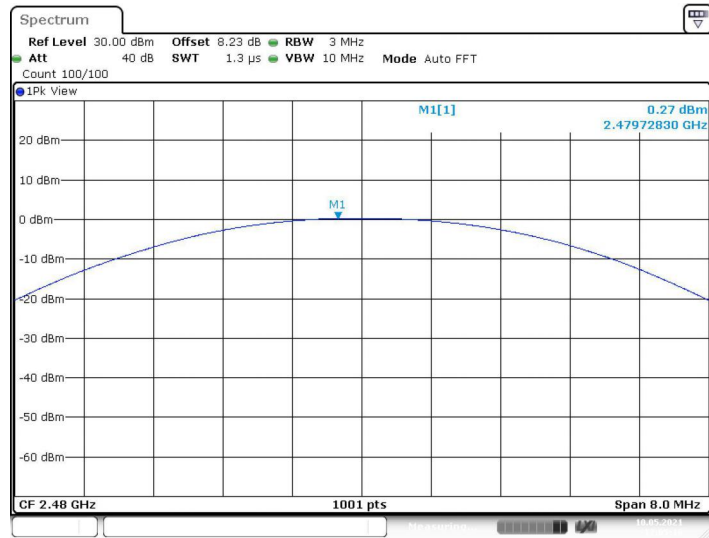


Date: 10.MAY.2021 12:03:52

2441 MHz

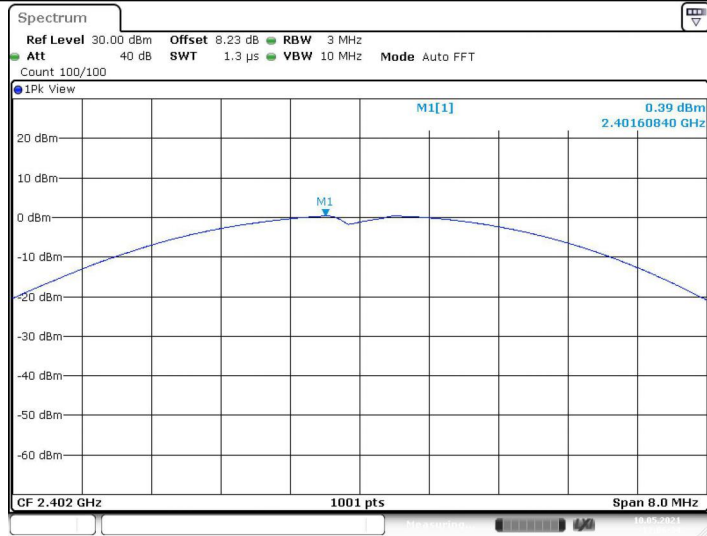


2480 MHz

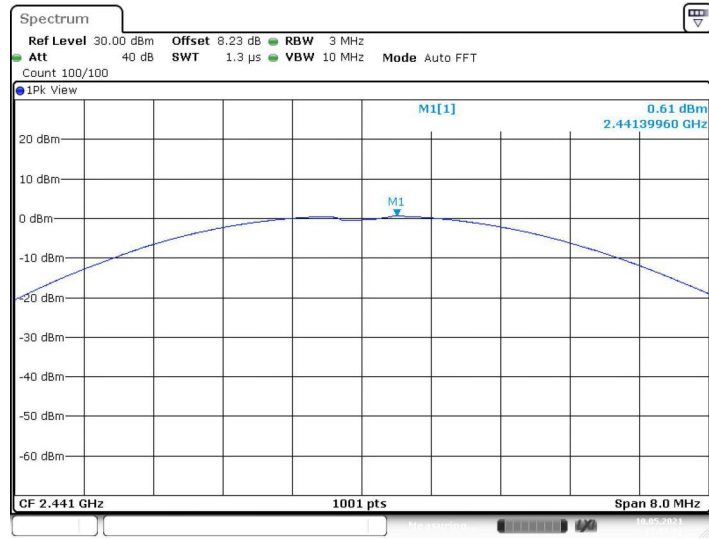


Test Mode:	2DH5	
Channel frequency (MHz)	Test Result (dBm)	Limit (dBm)
2402	0.39	30
2441	0.61	
2480	-0.09	

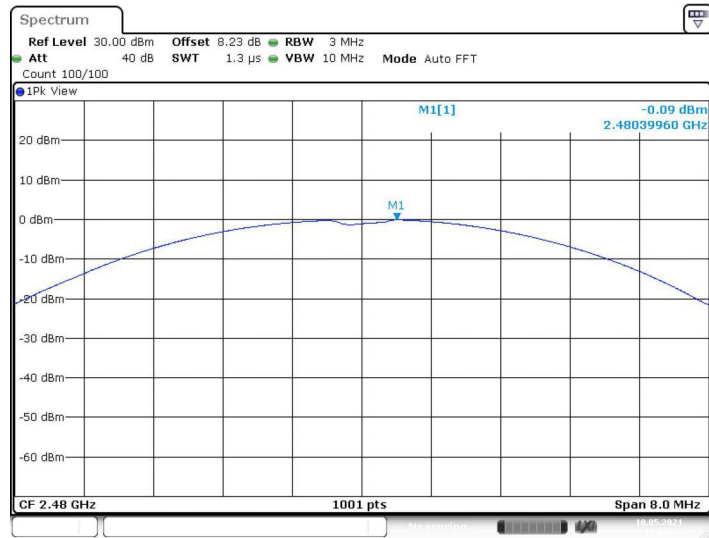
2402 MHz



2441 MHz

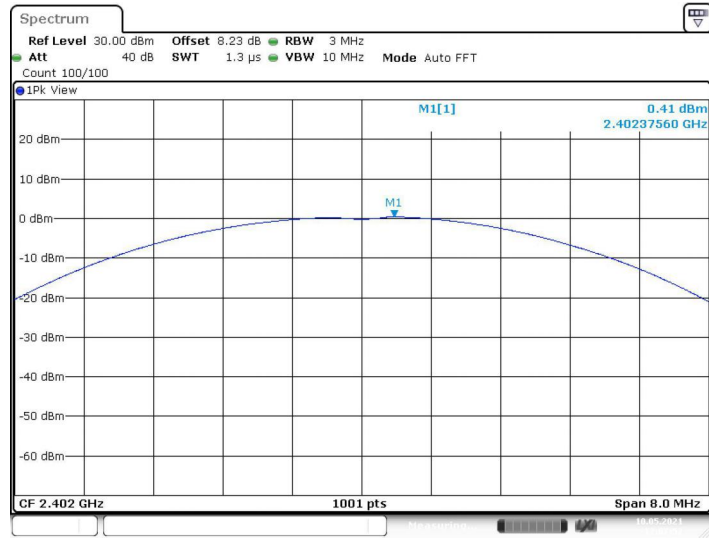


2480 MHz

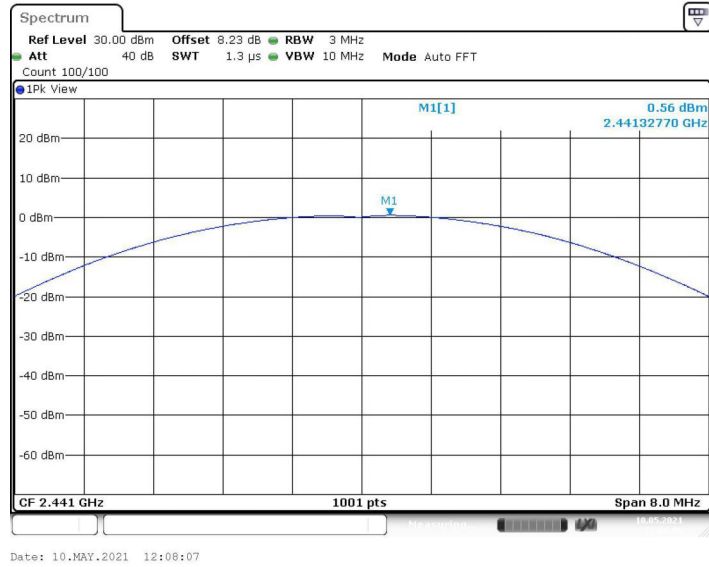


Test Mode:	3DH5	
Channel frequency (MHz)	Test Result (dBm)	Limit (dBm)
2402	0.41	30
2441	0.56	
2480	-0.11	

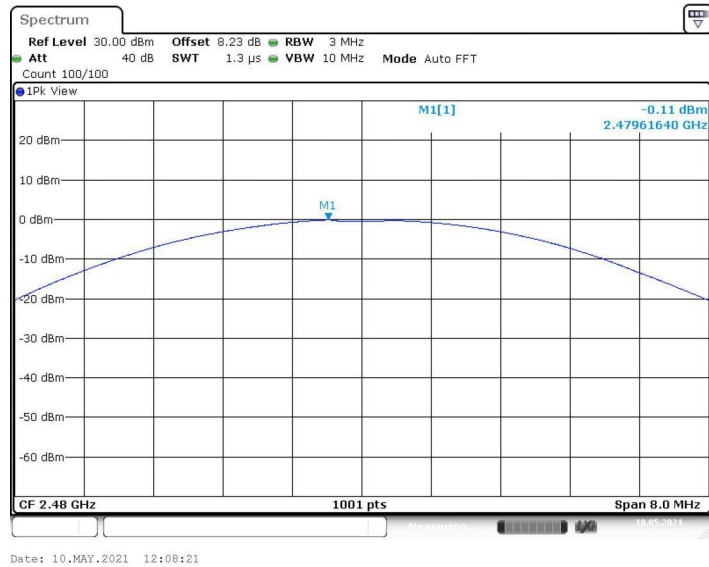
2402 MHz



2441 MHz



2480 MHz

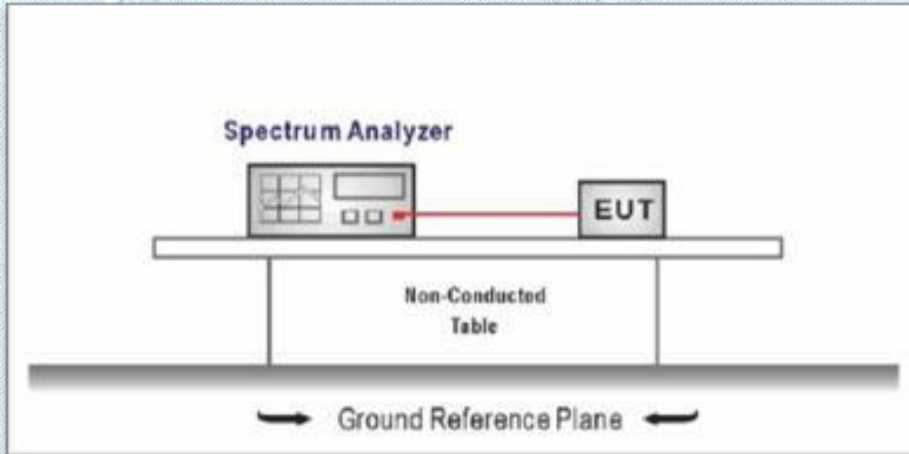


3.4. 99% Occupied Bandwidth & 20dB Bandwidth

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) $\geq 3 \times$ 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.

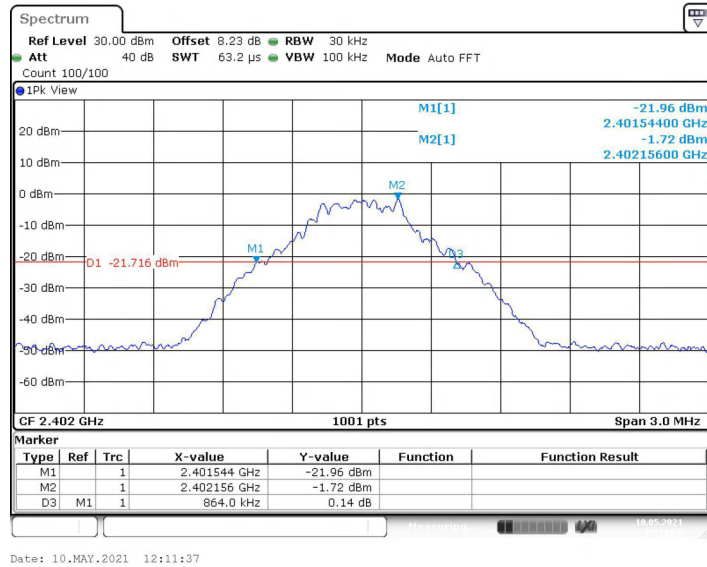
Test Mode

Please refer to the clause 2.3.

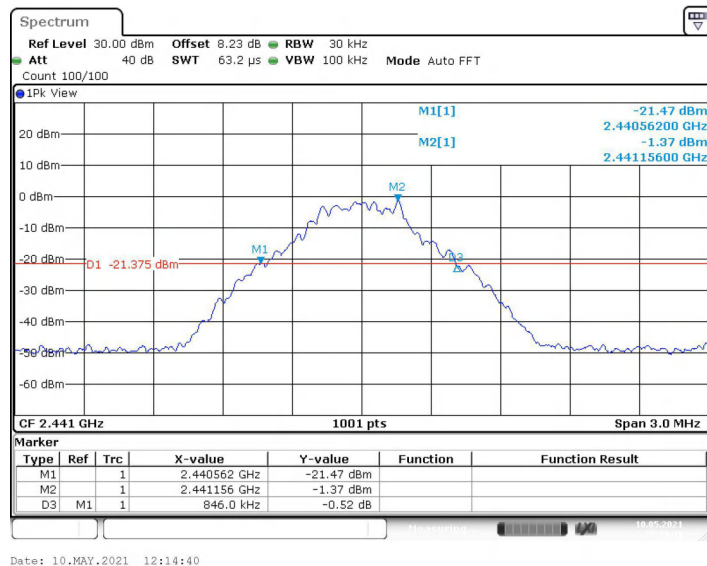
Test Results

Test Mode:	DH5			
Channel frequency (MHz)	20dB Bandwidth [MHz]	FL[MHz]	FH[MHz]	Verdict
2402	0.864	2401.544	2402.408	PASS
2441	0.846	2440.562	2441.408	PASS
2480	0.921	2479.544	2480.465	PASS

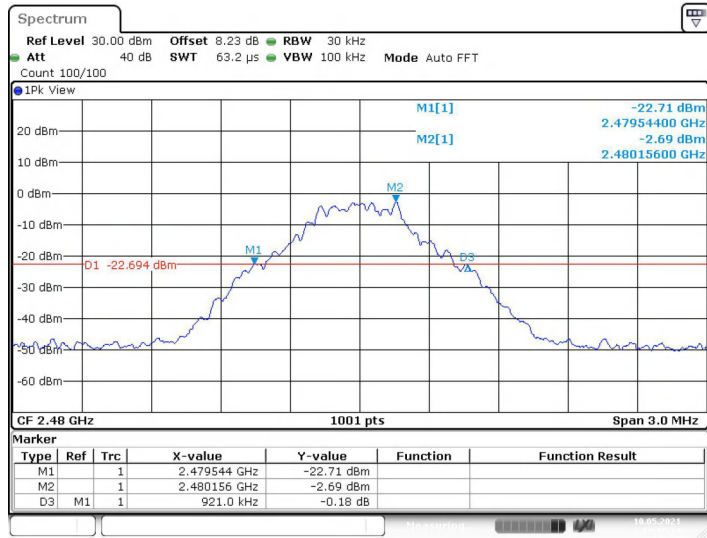
2402 MHz



2441 MHz



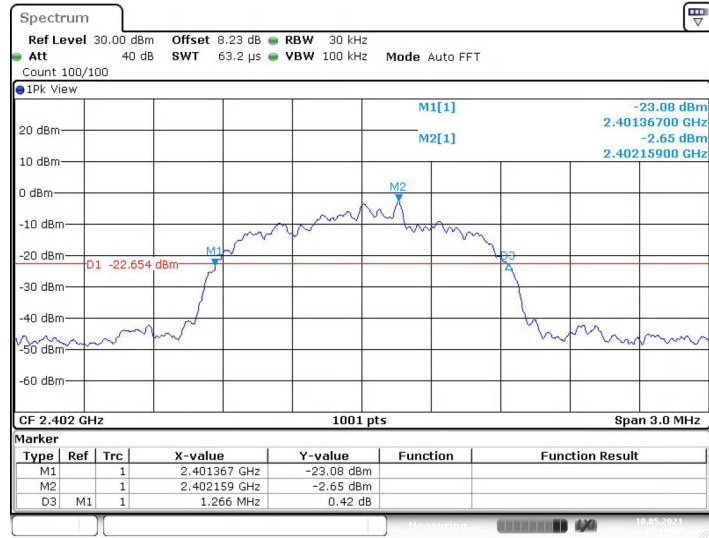
2480 MHz



Date: 10.MAY.2021 12:17:24

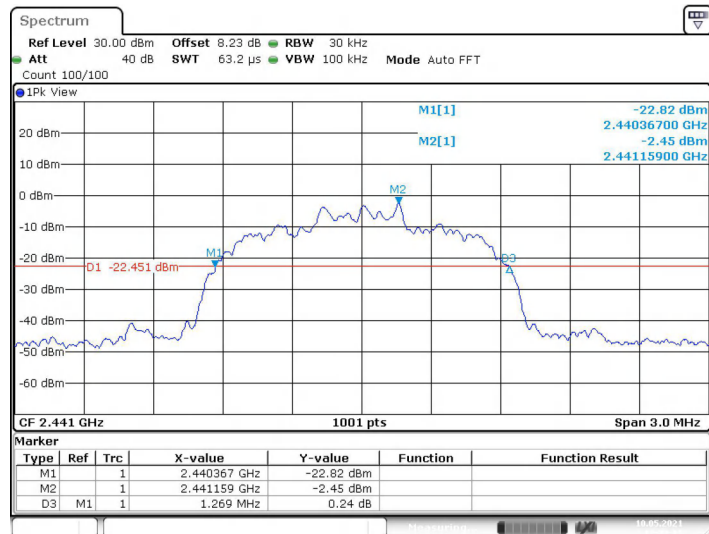
Test Mode:	2DH5			
Channel frequency (MHz)	20dB Bandwidth [MHz]	FL[MHz]	FH[MHz]	Verdict
2402	1.266	2401.367	2402.633	PASS
2441	1.269	2440.367	2441.636	PASS
2480	1.278	2479.364	2480.642	PASS

2402 MHz



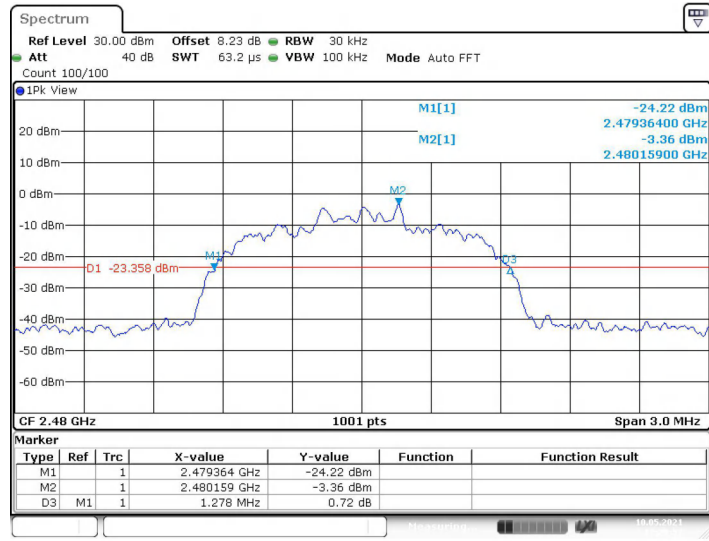
Date: 10.MAY.2021 12:19:48

2441 MHz



Date: 10.MAY.2021 12:22:20

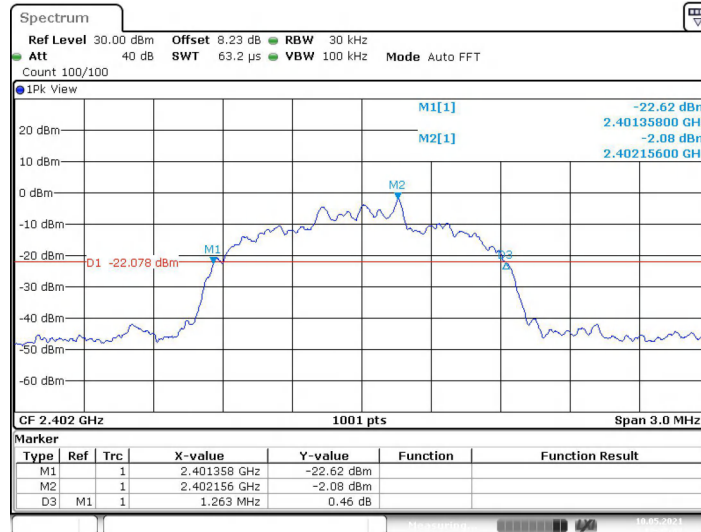
2480 MHz



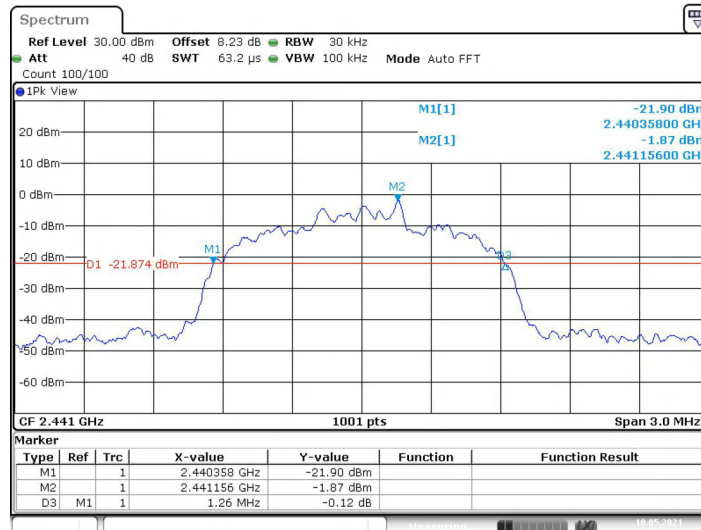
Date: 10.MAY.2021 12:23:51

Test Mode:	3DH5			
Channel frequency (MHz)	20dB Bandwidth [MHz]	FL[MHz]	FH[MHz]	Verdict
2402	1.263	2401.358	2402.621	PASS
2441	1.260	2440.358	2441.618	PASS
2480	1.278	2479.352	2480.630	PASS

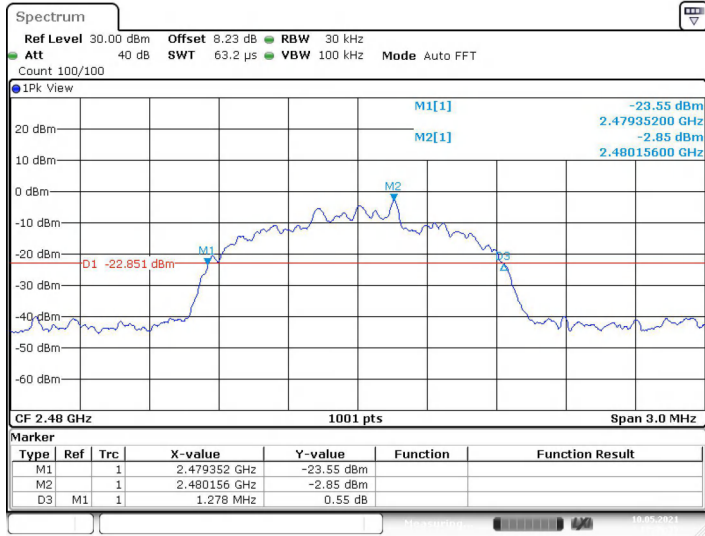
2402 MHz



2441 MHz



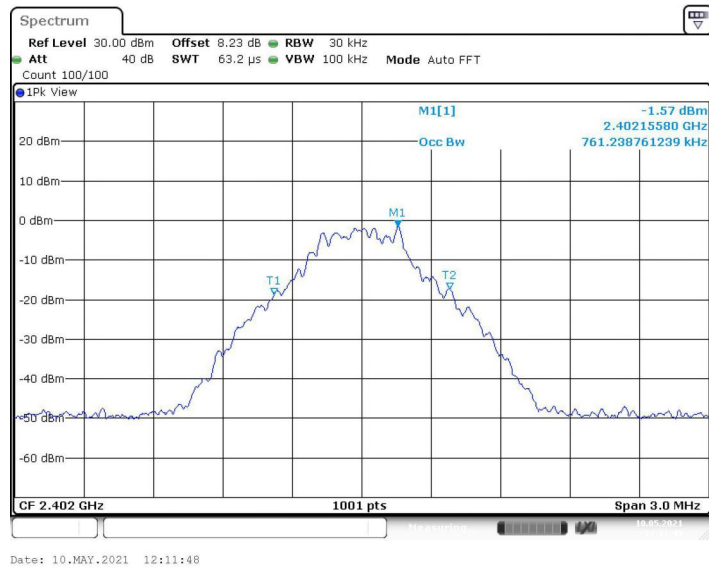
2480 MHz



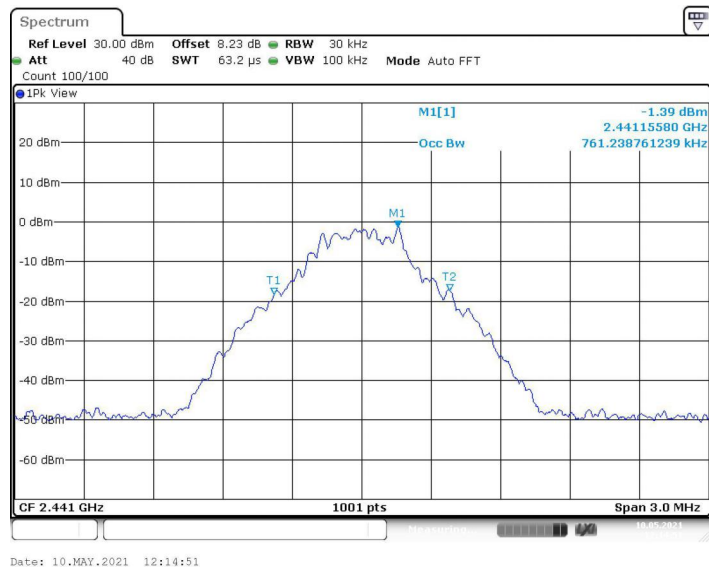
Date: 10.MAY.2021 12:36:35

Test Mode:	DH5			
Channel frequency (MHz)	99% OCB [MHz]	FL[MHz]	FH[MHz]	Verdict
2402	0.761	2401.619	2402.381	PASS
2441	0.761	2440.619	2441.381	PASS
2480	0.773	2479.613	2480.387	PASS

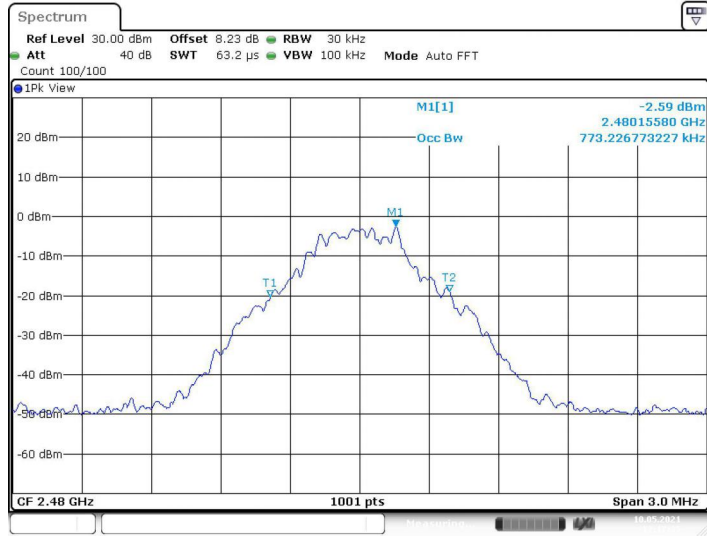
2402 MHz



2441 MHz



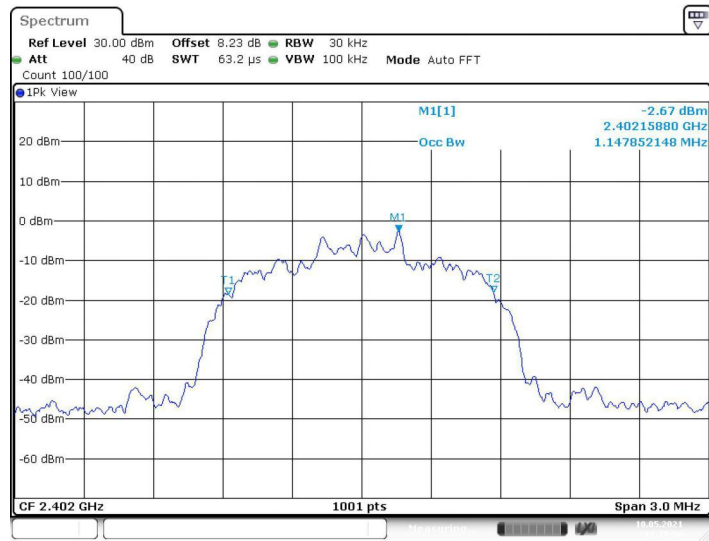
2480 MHz



Date: 10.MAY.2021 12:17:35

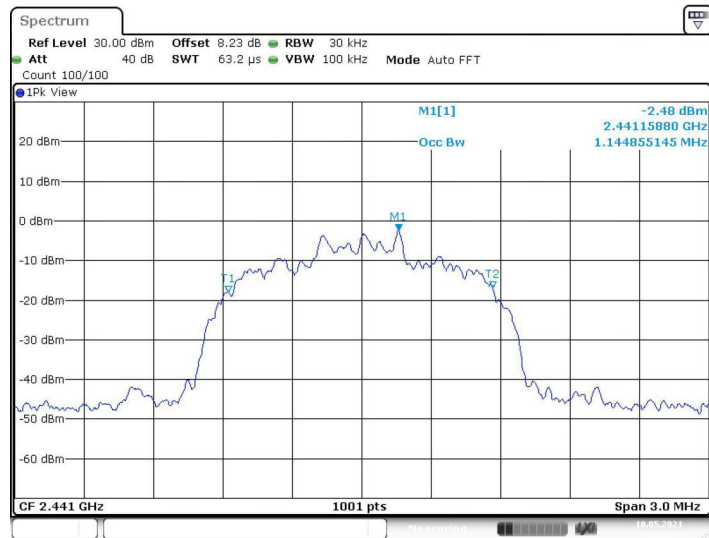
Test Mode:	2DH5			
Channel frequency (MHz)	99% OCB [MHz]	FL[MHz]	FH[MHz]	Verdict
2402	1.148	2401.422	2402.569	PASS
2441	1.145	2440.422	2441.566	PASS
2480	1.16	2479.413	2480.572	PASS

2402 MHz



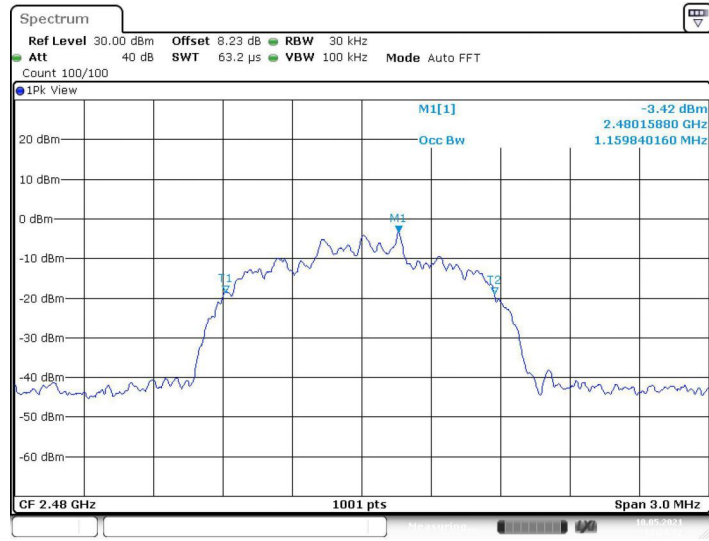
Date: 10.MAY.2021 12:19:59

2441 MHz



Date: 10.MAY.2021 12:22:31

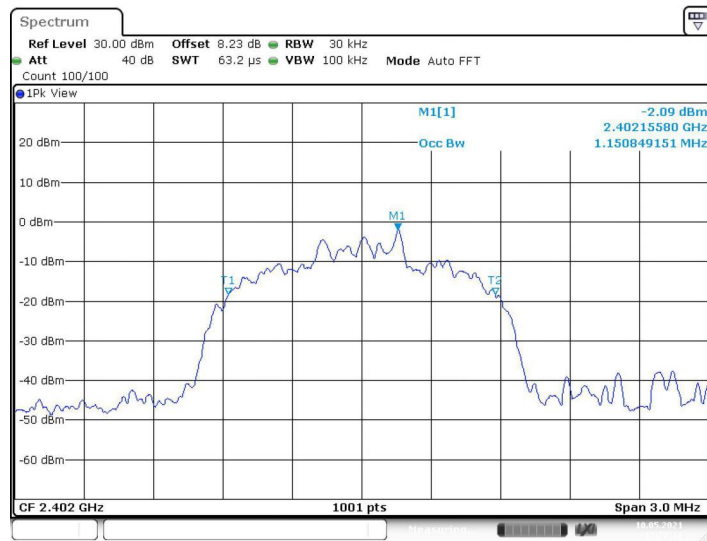
2480 MHz



Date: 10.MAY.2021 12:24:02

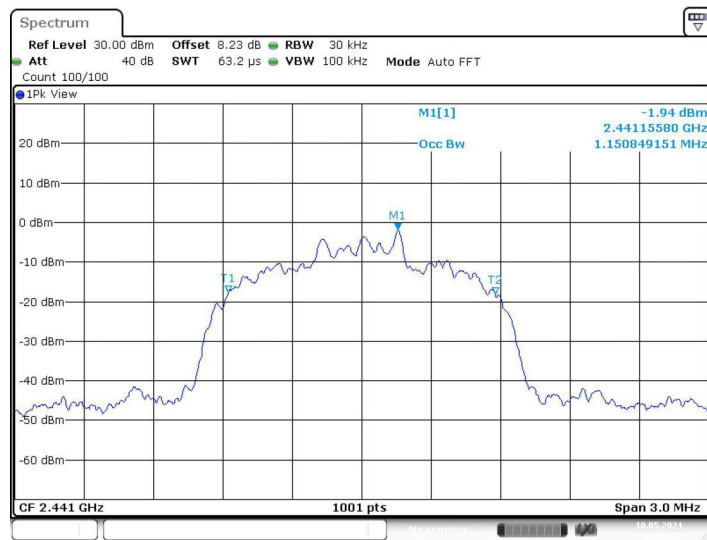
Test Mode:	3DH5			
Channel frequency (MHz)	99% OCB [MHz]	FL[MHz]	FH[MHz]	Verdict
2402	1.151	2401.425	2402.575	PASS
2441	1.151	2440.425	2441.575	PASS
2480	1.169	2479.416	2480.584	PASS

2402 MHz



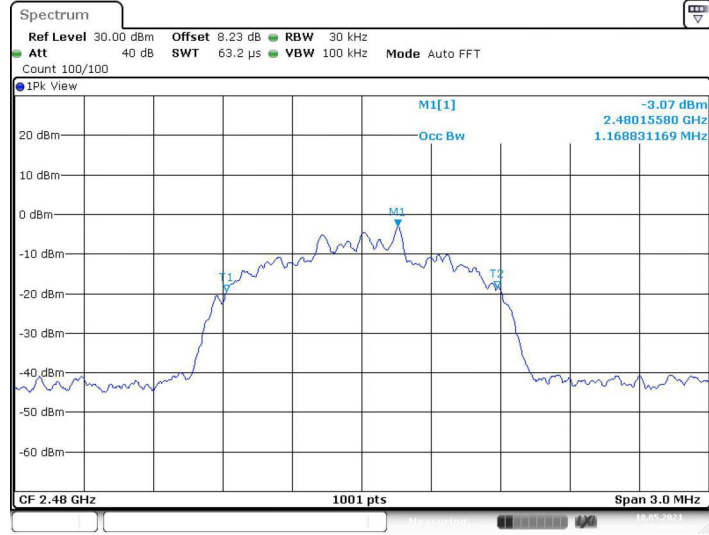
Date: 10.MAY.2021 12:27:12

2441 MHz



Date: 10.MAY.2021 12:34:05

2480 MHz



3.5. Carrier Frequencies Separation

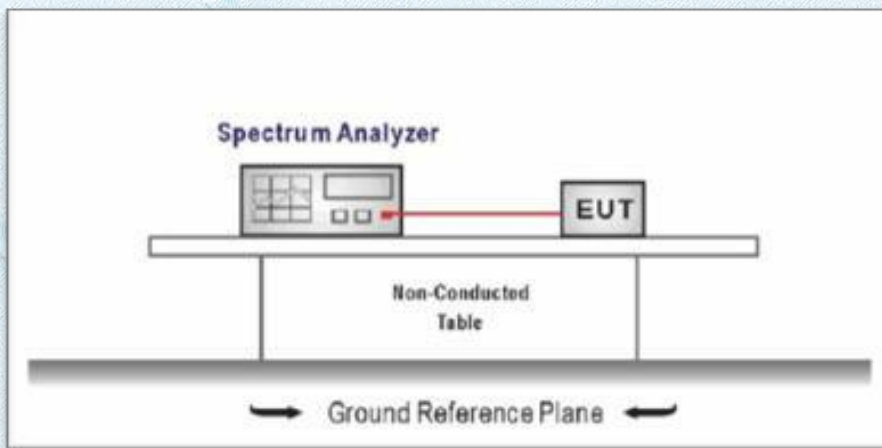
LIMIT

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 $\frac{2}{3} \times 20\text{dB}$ bandwidth of the hopping channel, whichever is greater.

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

Test Configuration



Test Procedure

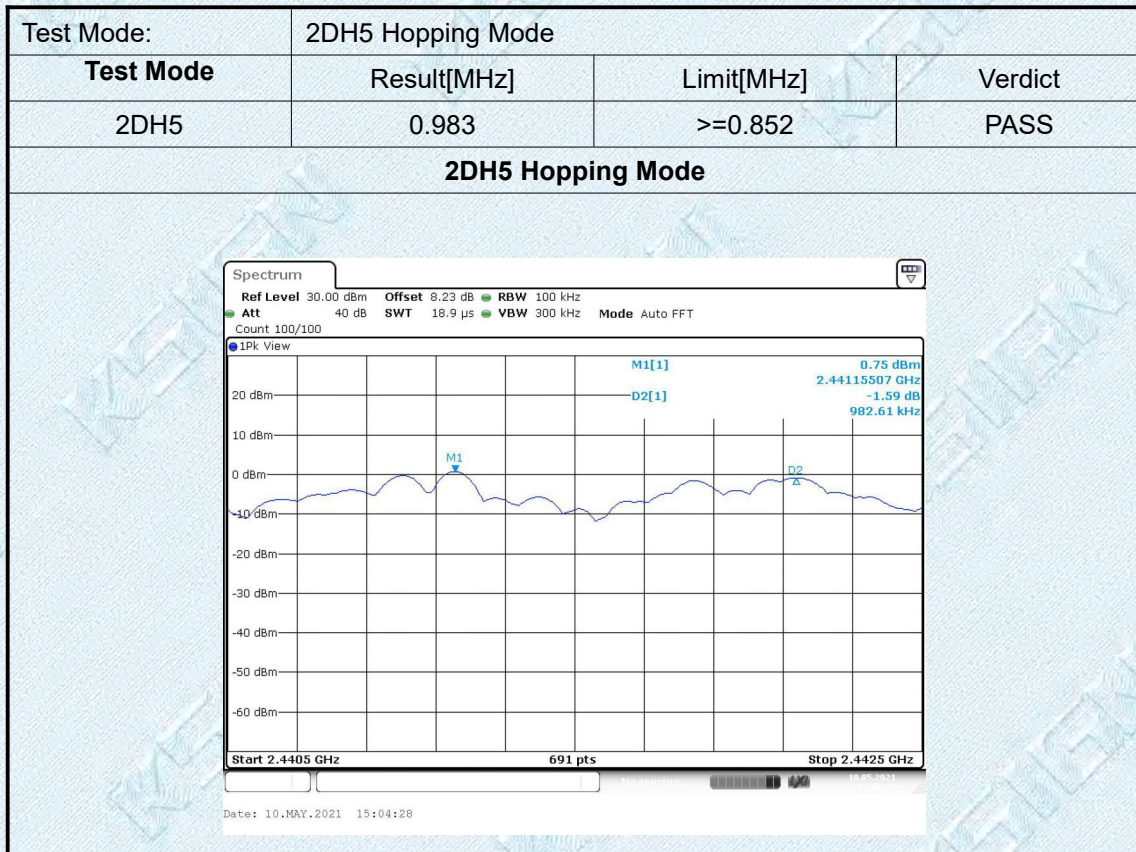
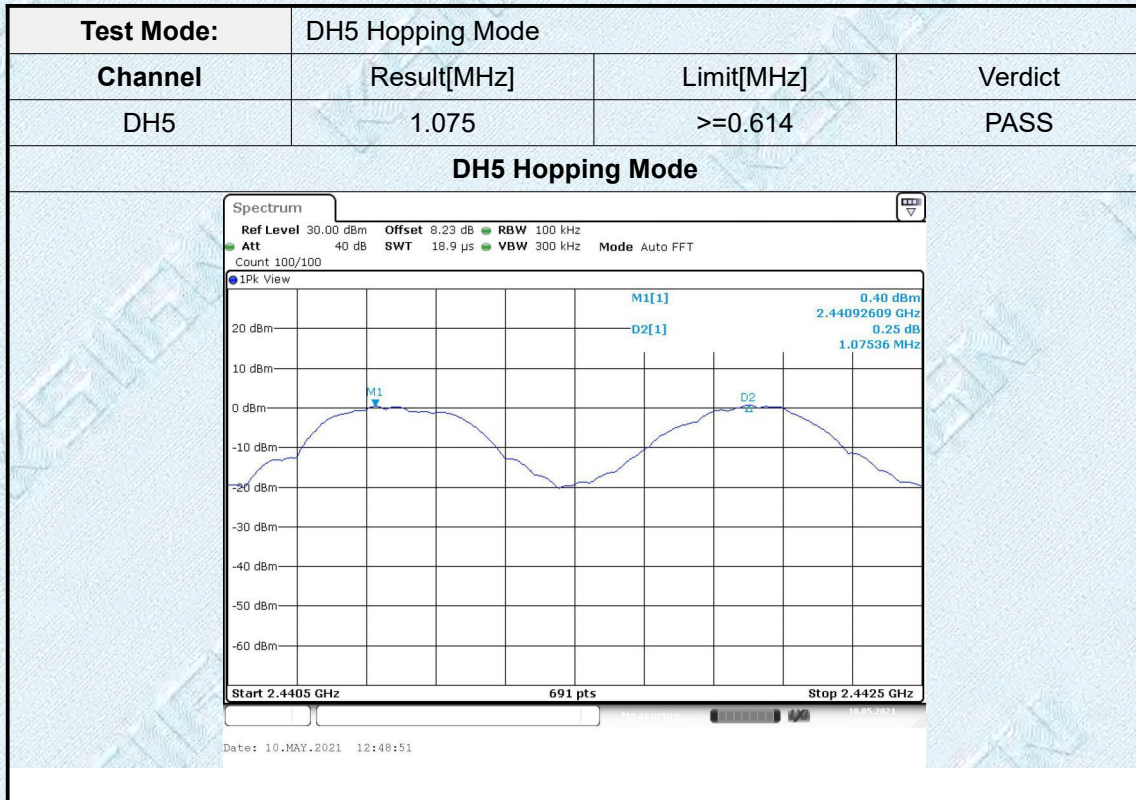
1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator.
2. Spectrum Setting:
 - (1) Set RBW = 100 kHz.
 - (2) Set the video bandwidth (VBW) ≥ 3 RBW.
 - (3) Detector = Peak.
 - (4) Trace mode = Max hold.
 - (5) Sweep = Auto couple.

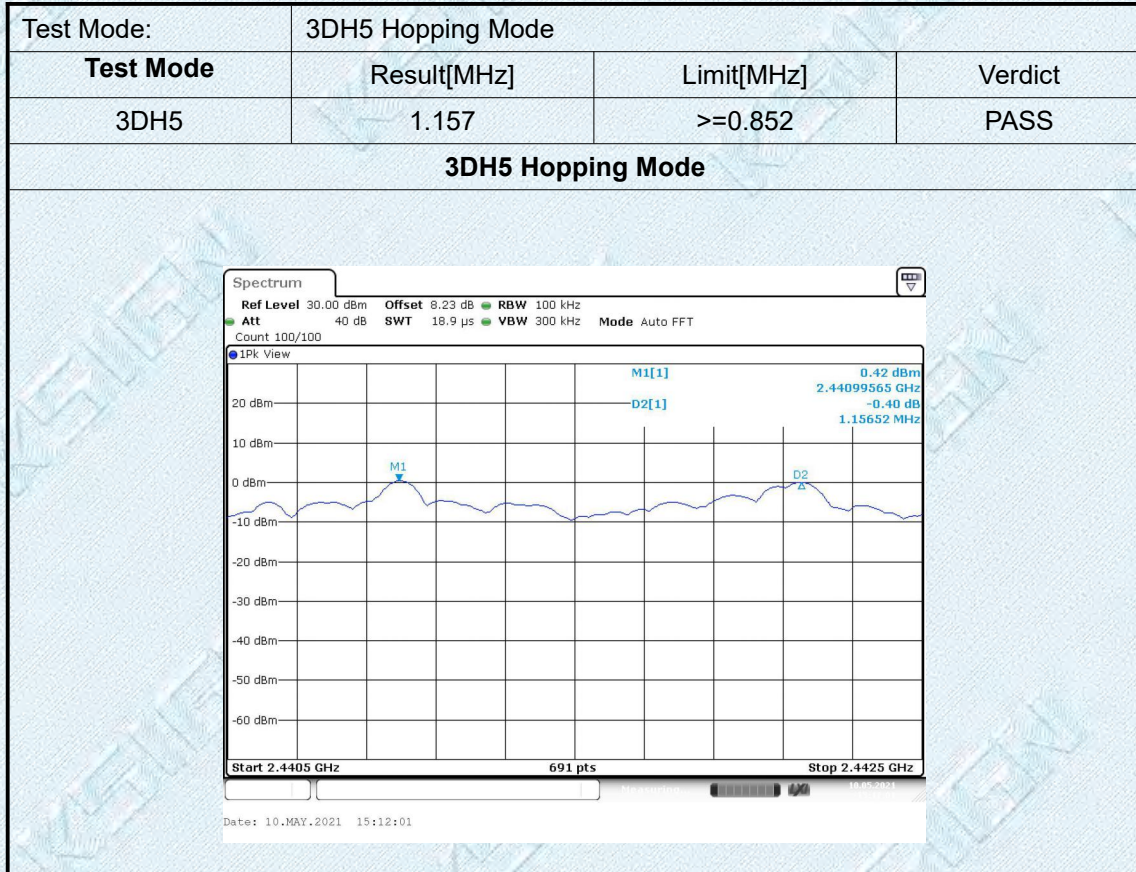
NOTE: The EUT was set to continuously transmitting in each mode and low, Middle and high channel for the test.

Test Mode

Please refer to the clause 2.3.

Test Results



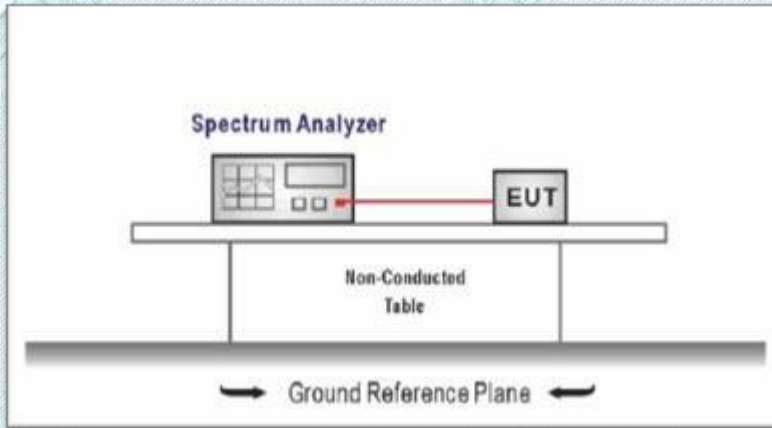


3.6. Number of Hopping Channel

Limit

Section	Test Item	Limit
15.247	Number of Hopping Channel	>15

Test Configuration



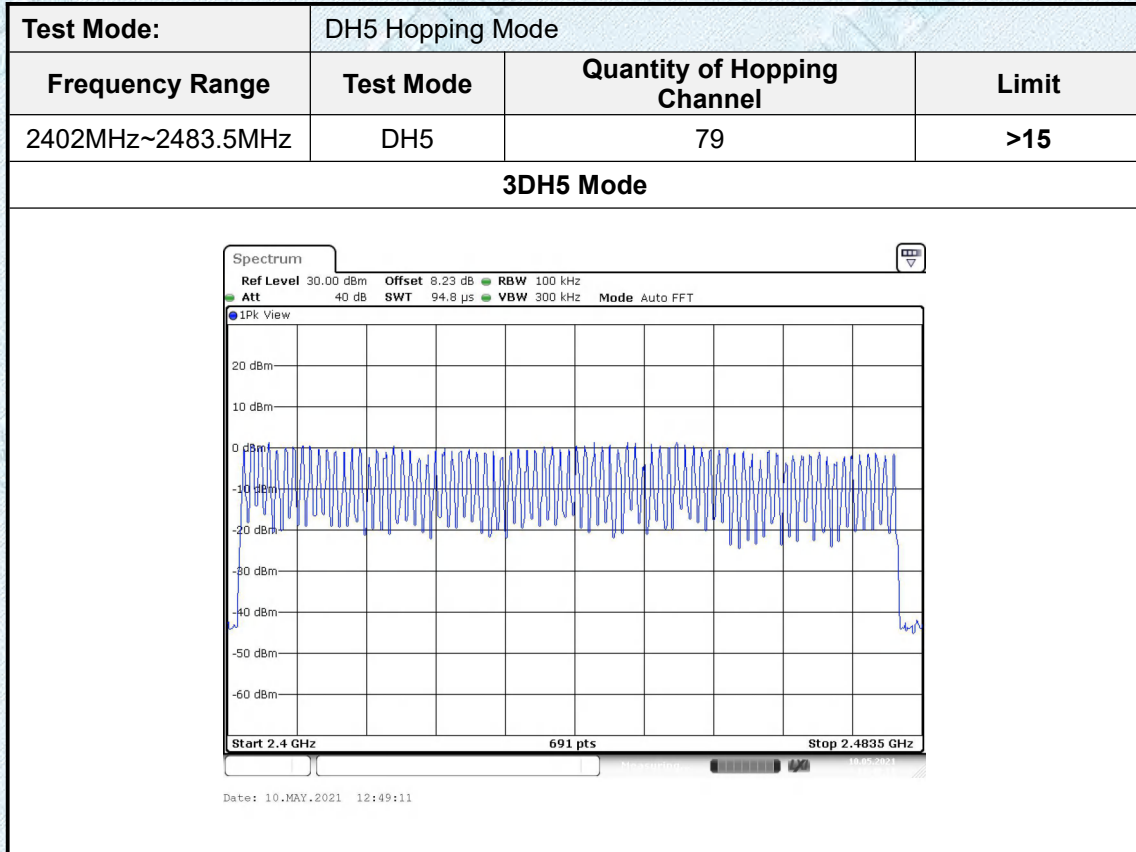
Test Procedure

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator.
2. Spectrum Setting:
 - (1) Peak Detector: RBW=100 kHz, VBW ≥ RBW, Sweep time= Auto.

Test Mode

Please refer to the clause 2.3.

Test Result



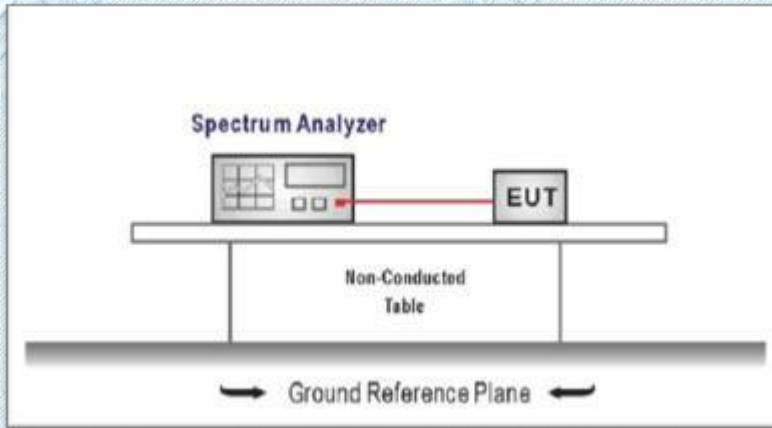
Note: The GFSK modulation is the worst case and recorded in the report.

3.7. Dwell Time

Limit

Section	Test Item	Limit
15.247(a)(1)	Average Time of Occupancy	0.4 sec

Test Configuration



Test Procedure

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator.
2. Spectrum Setting:
 - (1) Spectrum Setting: RBW=1MHz, VBW ≥ RBW.
 - (2) Use video trigger with the trigger level set to enable triggering only on full pulses.
 - (3) Sweep Time is more than once pulse time.
 - (4) Set the center frequency on any frequency would be measure and set the frequency span to zero.
 - (5) Measure the maximum time duration of one single pulse.
 - (6) Set the EUT for packet transmitting.

Test Mode

Please refer to the clause 2.3

Test Result

Note:

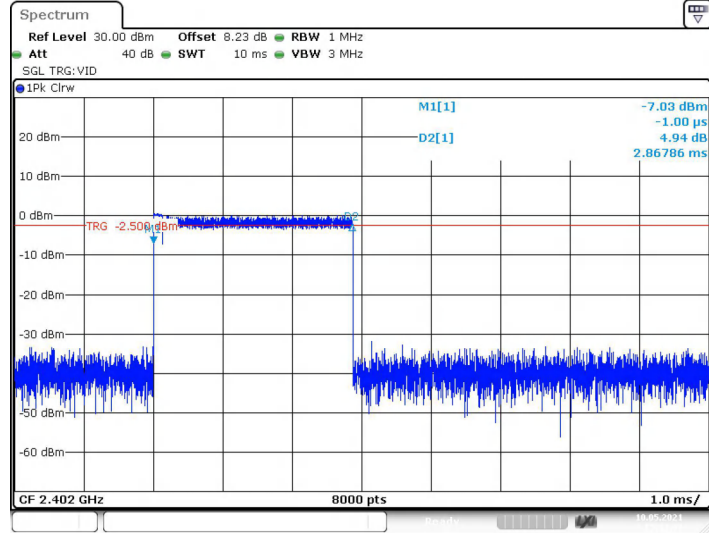
1. Dwell time = Pulse time (ms) × (1600 ÷ 2 ÷ 79) × 31.6 Second for DH1, 2DH1, 3DH1

Dwell time = Pulse time (ms) × (1600 ÷ 4 ÷ 79) × 31.6 Second for DH3, 2DH3, 3DH3

Dwell time = Pulse time (ms) × (1600 ÷ 6 ÷ 79) × 31.6 Second for DH5, 2DH5, 3DH5

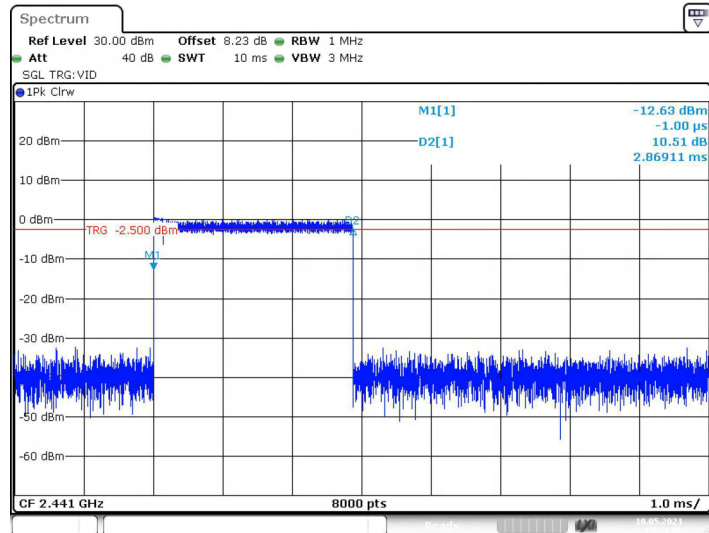
2. The 3DH5 modulation is the worst case and recorded in the report .

Test Mode	Channel (MHz)	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
3DH5	2402	2.87	306.13	31.6	400	PASS



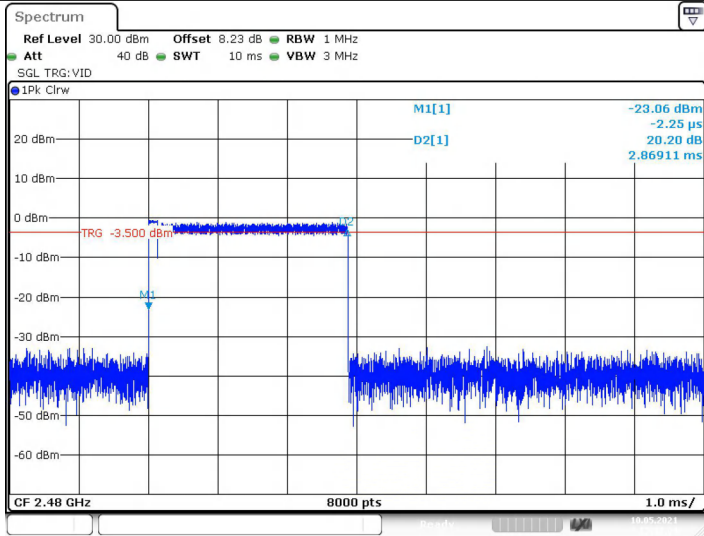
Date: 10.MAY.2021 15:12:33

Test Mode	Channel (MHz)	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
3DH5	2441	2.87	306.13	31.6	400	PASS



Date: 10.MAY.2021 15:14:30

Test Mode	Channel (MHz)	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
3DH5	2480	2.87	306.13	31.6	400	PASS



Date: 10.MAY.2021 15:18:04

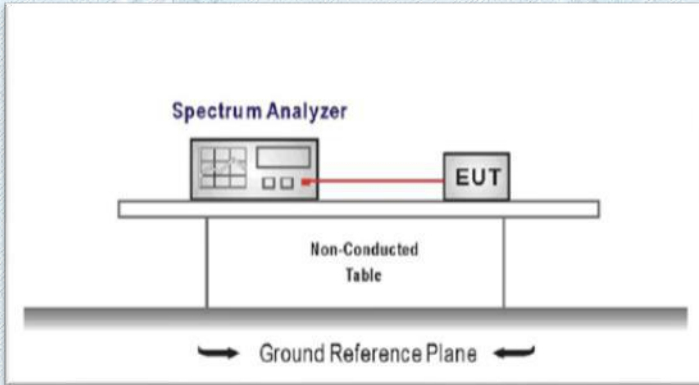
3.8. Band Edge and Spurious Emission (Conducted)

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=3*RBW.

Detector function: Peak.

Trace: Max hold.

Sweep = Auto couple.

Allow the trace to stabilize.

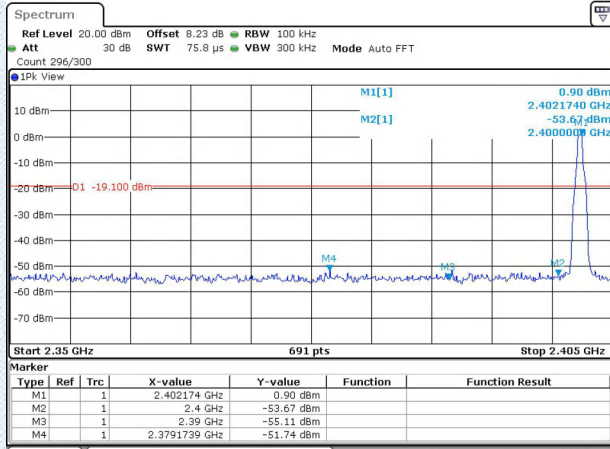
TEST MODE:

Please refer to the clause 2.3.

TEST RESULTS

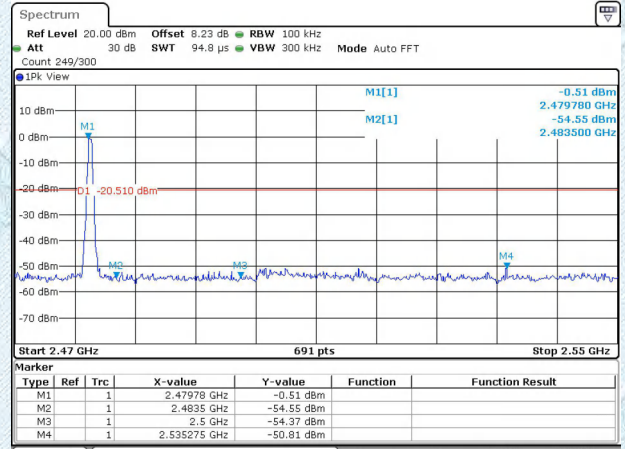
DH5

CH00-Bandedge



Date: 10.MAY.2021 12:11:58

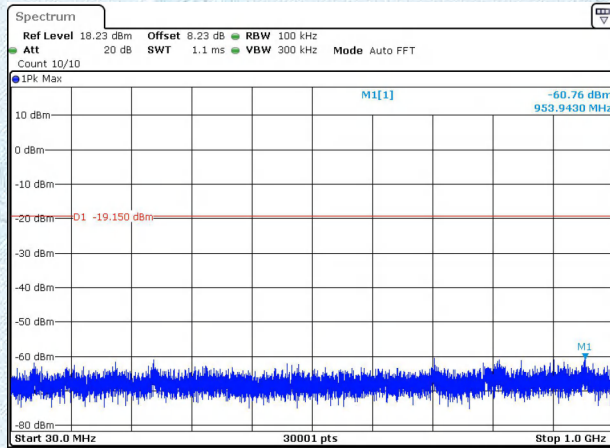
CH78-Bandedge



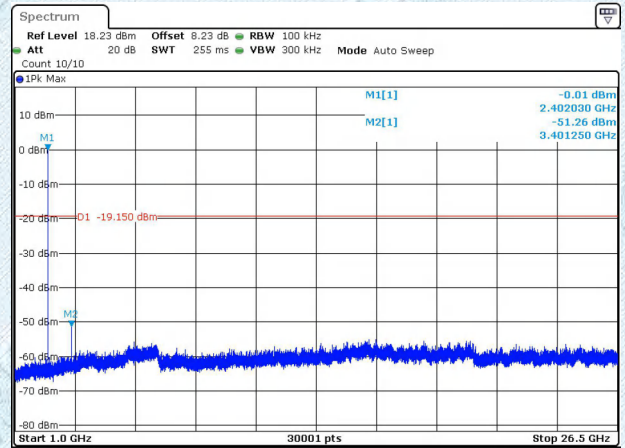
Date: 10.MAY.2021 12:17:44

DH5

CH00-SE

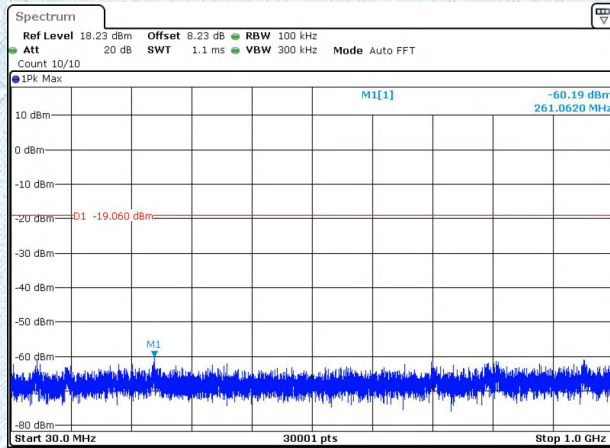


Date: 10.MAY.2021 12:12:26

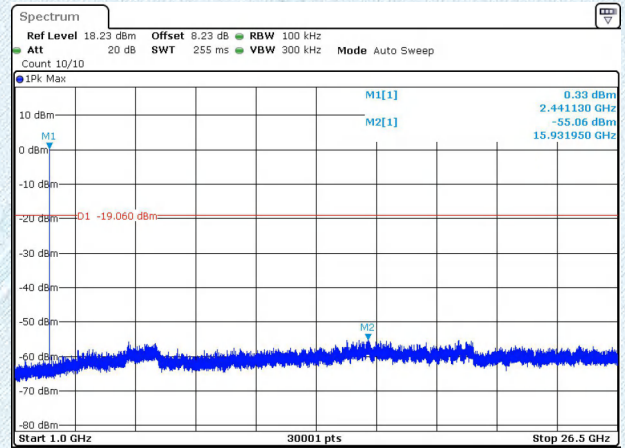


Date: 10.MAY.2021 12:12:49

CH39-SE



Date: 10.MAY.2021 12:15:02



Date: 10.MAY.2021 12:15:25

CH78-SE