



KSIGN (Guangdong) Testing Co., Ltd.

West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park,
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TEST REPORT

Report No...... : **KS2103S0482EC**

FCC ID.....: **2AZO4-DT100**

Applicant.....: **SHENZHEN XINKEYING DIGITAL CO.,LTD**

Address.....: 8th Floor, Block C, Han's Innovation Building,9018 Beihuan Avenue,
Nanshan District, ShenZhen City,China

Manufacturer.....: SHENZHEN XINKEYING DIGITAL CO.,LTD

Address.....: 8th Floor, Block C, Han's Innovation Building,9018 Beihuan Avenue,
Nanshan District, ShenZhen City,China

Product Name.....: **Smart watch**

Trade Mark.....: DT NO.I

Model/Type reference.....: DT100

Listed Model(s).....: DTS, DT81, DT82, DT83, DT85, DT87, DT33, DT32, DT01, DT76,
DT75, DT39, DT94, DT100Pro

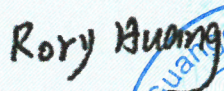
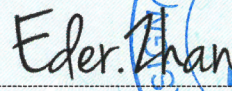
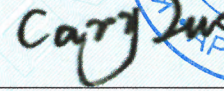
Standard..... : **FCC CFR Title 47 Part 15 Subpart C Section 15.247**

Date of Receipt.....: Mar. 25, 2021

Date of Test Date.....: Mar. 30, 2021~ May. 10, 2021

Date of issue.....: May. 10, 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	



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	May. 10, 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:	SHENZHEN XINKEYING DIGITAL CO.,LTD
Address:	8th Floor, Block C, Han's Innovation Building,9018 Beihuan Avenue, Nanshan District, ShenZhen City,China
Manufacturer:	SHENZHEN XINKEYING DIGITAL CO.,LTD
Address:	8th Floor, Block C, Han's Innovation Building,9018 Beihuan Avenue, Nanshan District, ShenZhen City,China

2.2. General Description of EUT

Test Sample Number 1:	1-1-1(Normal Sample),1-1-2(Engineering Sample)
Product Name:	Smart watch
Marketing Name:	DT NO.I
Model/Type reference:	DT100
Listed Model(s):	DTS, DT81, DT82, DT83, DT85, DT87, DT33, DT32, DT01, DT76, DT75, DT39, DT94, DT100Pro
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):	DC 3.7V 180mAh 0.67Wh
Hardware version:	V1.0
Software version:	V1.0.0
Bluetooth 5.0	
Modulation:	GFSK(DH5), π /4-DQPSK(2DH5), 8DPSK(3DH5)
Operation frequency:	2402MHz~2480MHz
Max Peak Output Power:	DH5: -0.57dBm 2DH5: -1.07dBm 3DH5: -0.78dBm
Channel number:	79
Channel separation:	1MHz
Antenna type:	Wire Antenna
Antenna gain:	1.1dBi

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 SecureCRTSecure_V7.0.0.326 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:

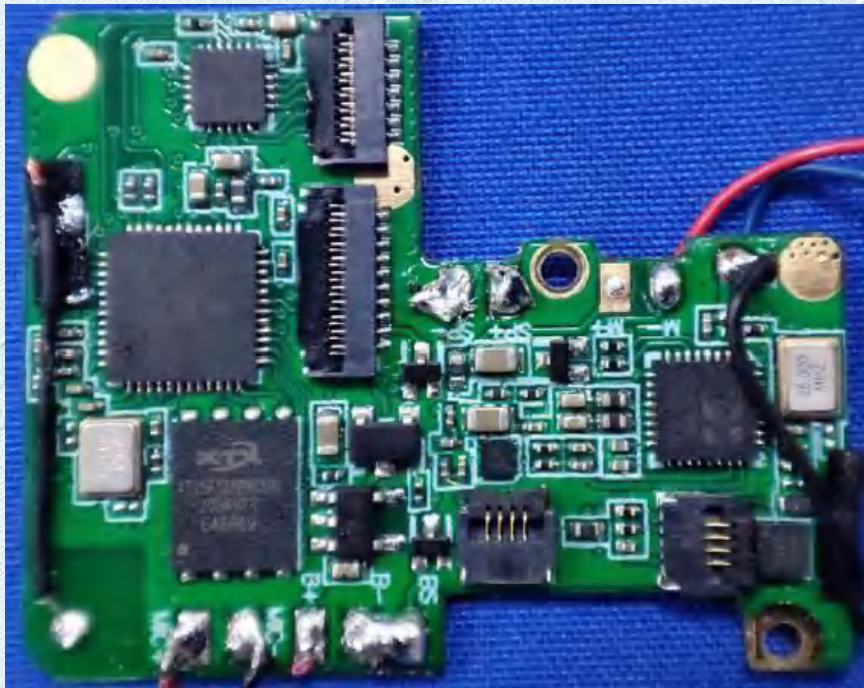
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit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

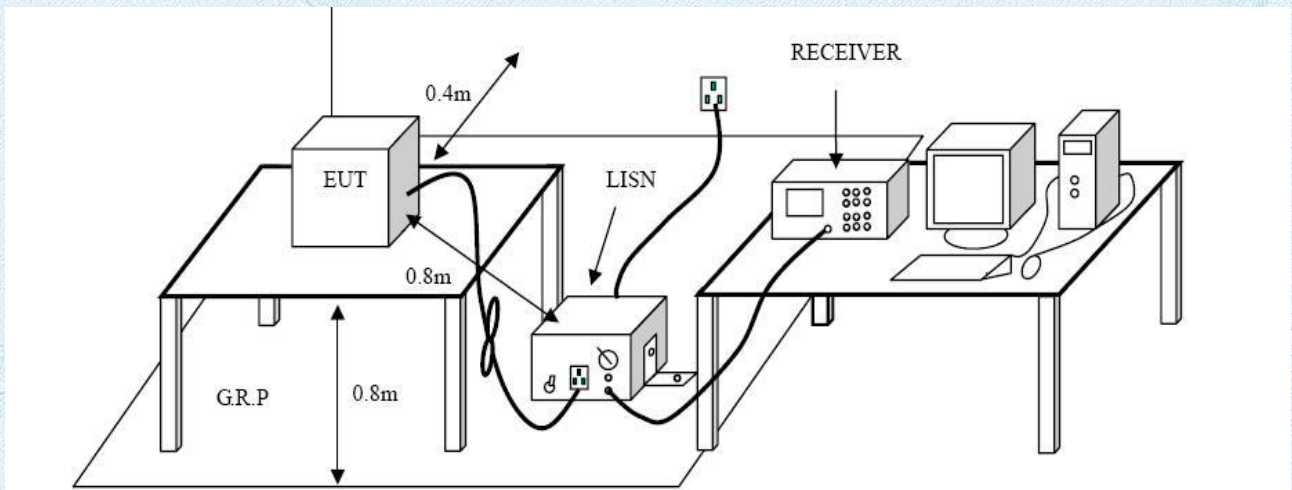
Conducted Emission Test Limit

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

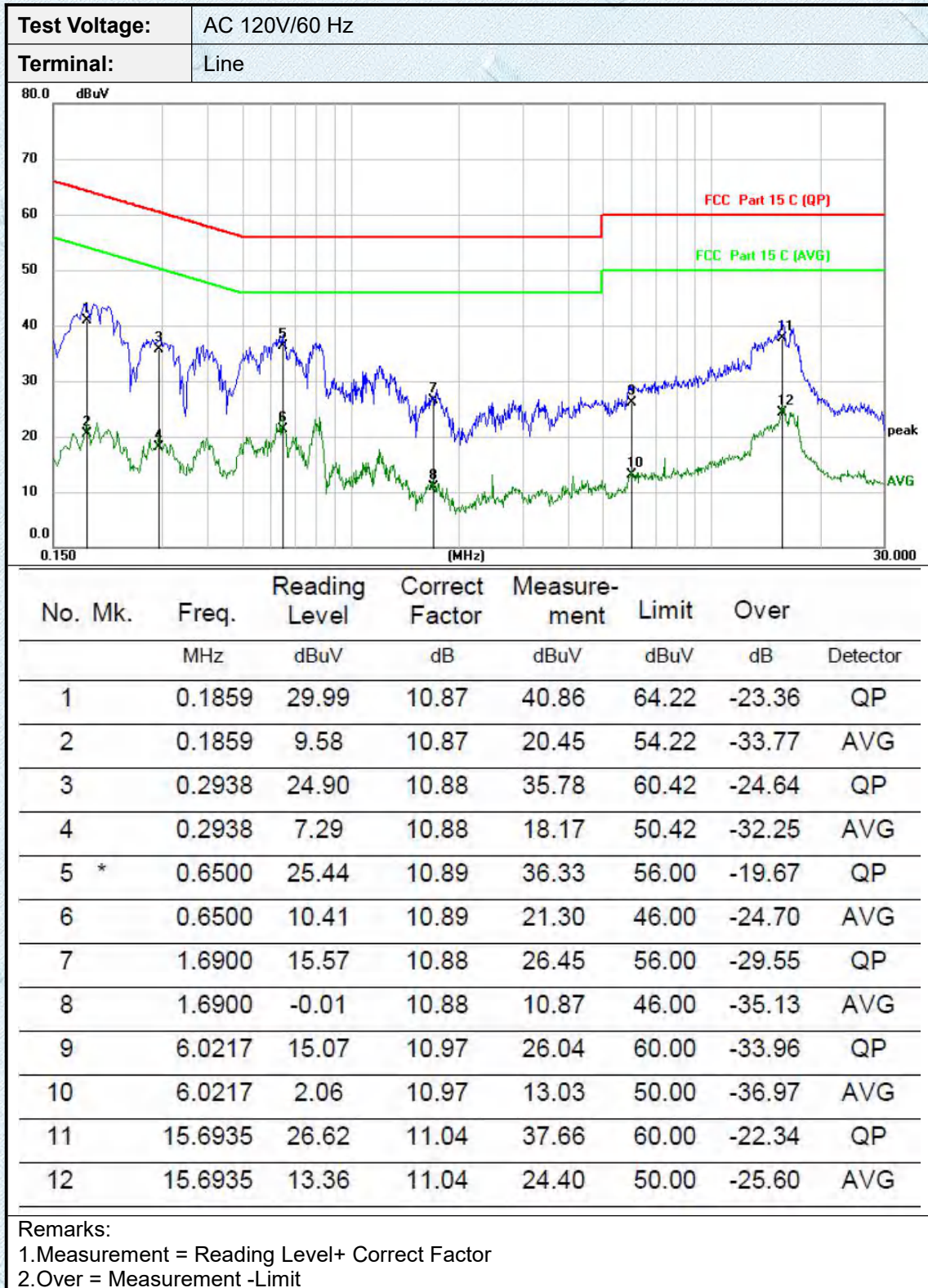
1. The EUT was setup according to ANSI C63.10:2013 requirements.
2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from 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.

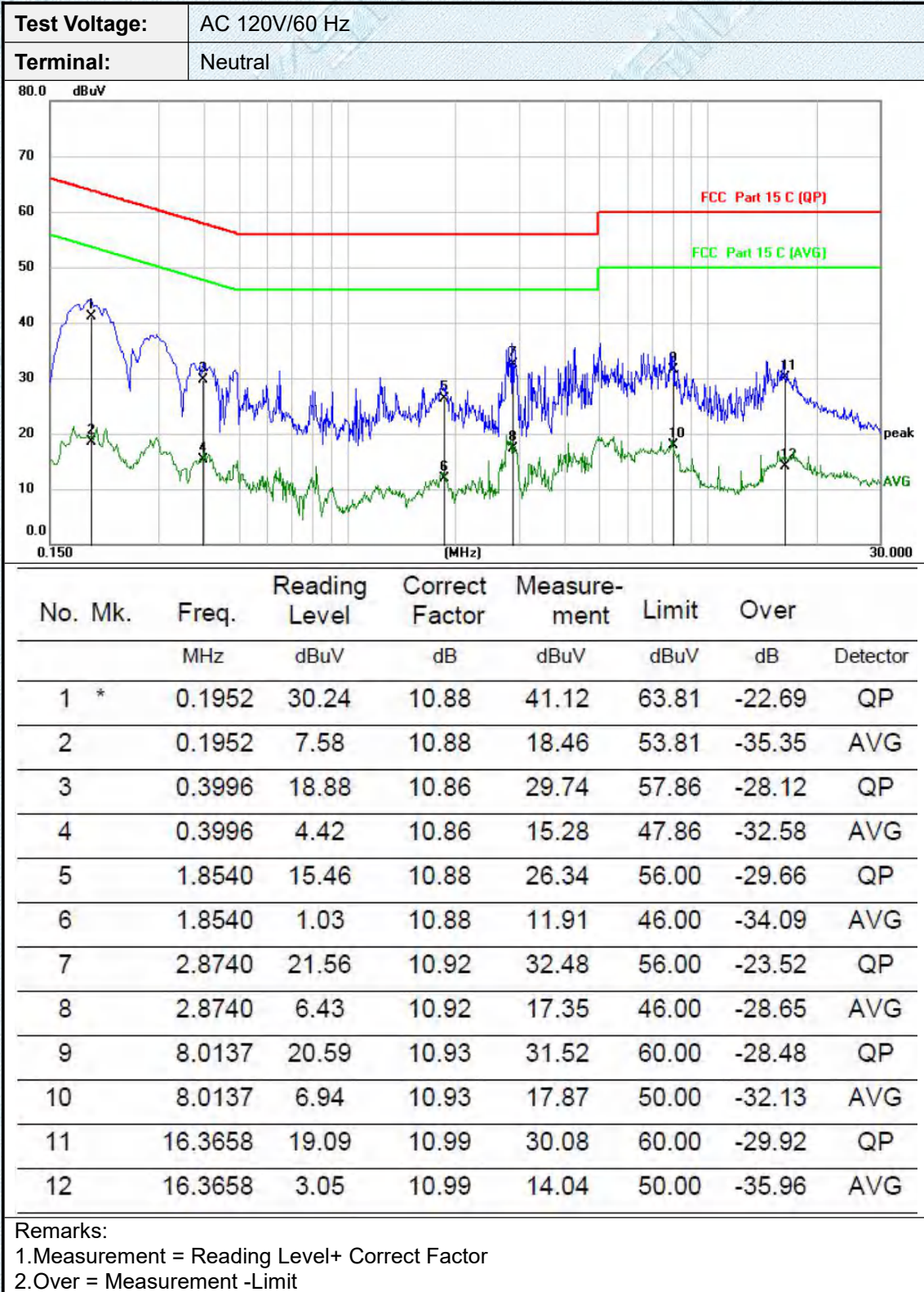
Test Mode:

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.



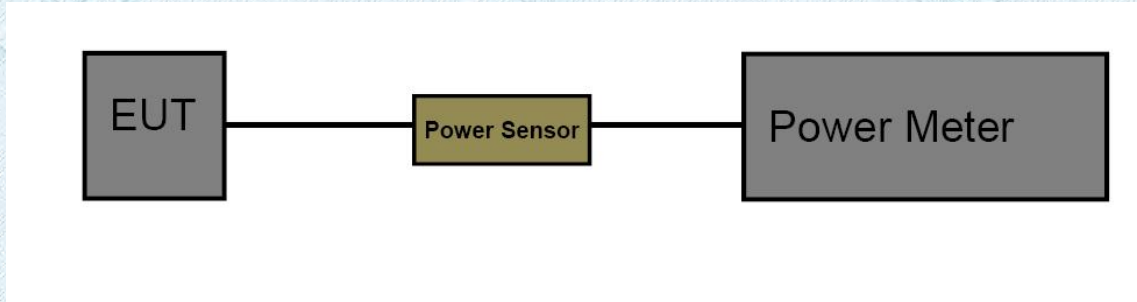


3.3. Peak Output Power

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.

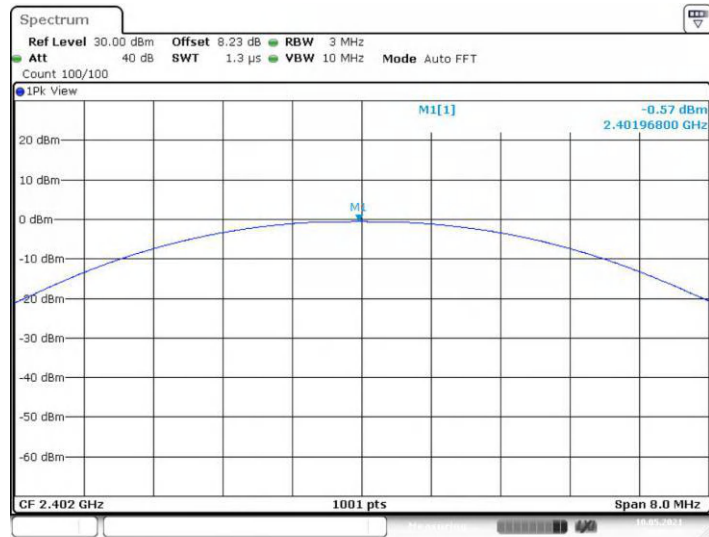
Test Mode

Please refer to the clause 2.3

Test Result

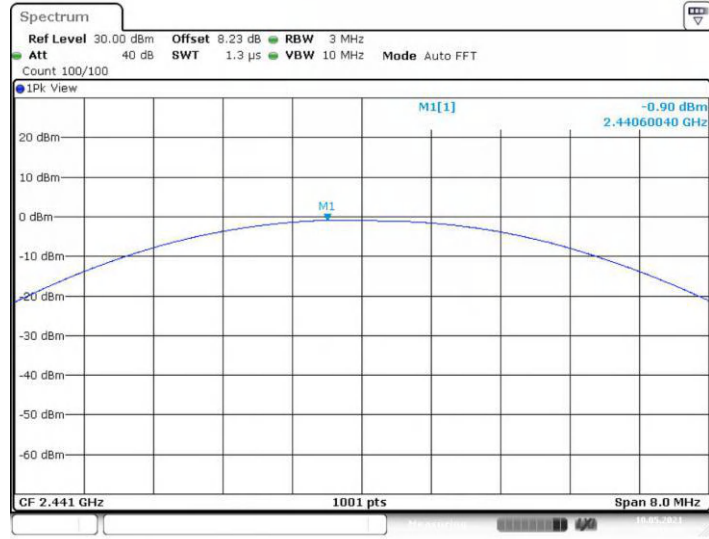
Test Mode:	DH5		
Channel frequency (MHz)	Test Result (dBm)	Limit (dBm)	
2402	-0.57	30	
2441	-0.9		
2480	-2.87		

2402 MHz



Date: 10.MAY.2021 20:08:48

2441 MHz

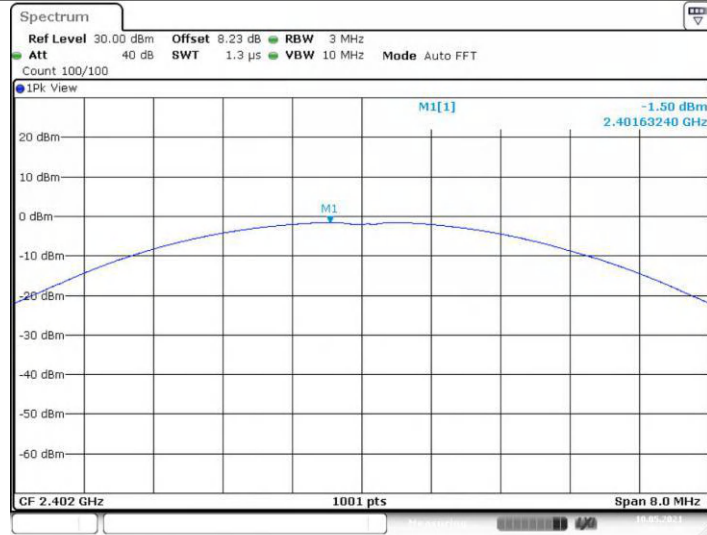


2480 MHz



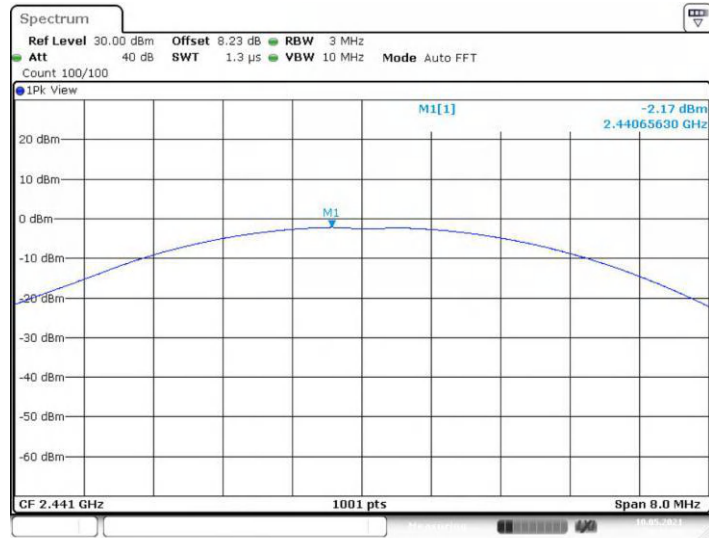
Test Mode:	2DH5	
Channel frequency (MHz)	Test Result (dBm)	Limit (dBm)
2402	-1.50	30
2441	-2.17	
2480	-1.07	

2402 MHz

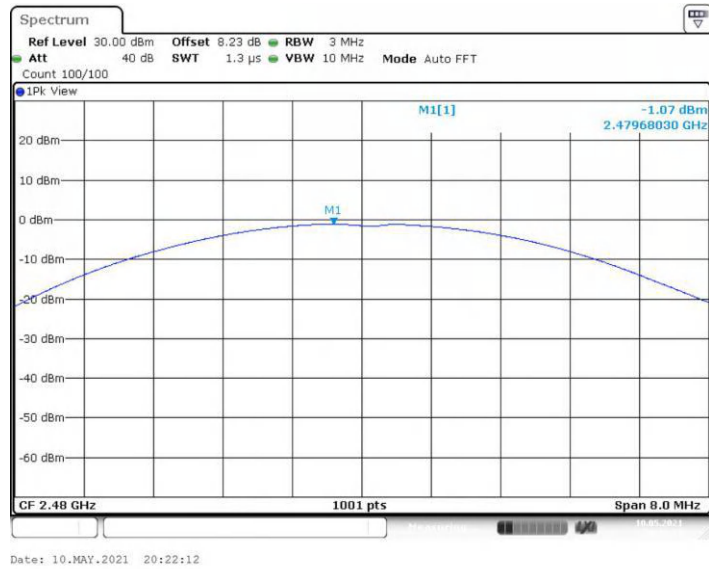


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2441 MHz

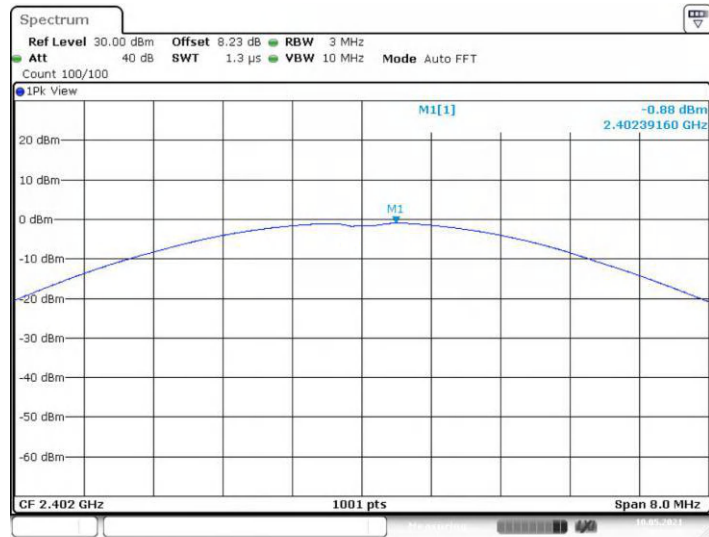


2480 MHz



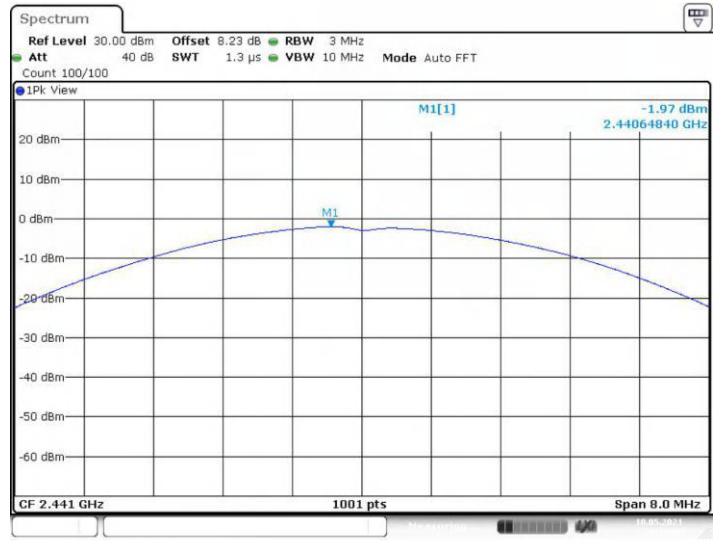
Test Mode:	3DH5	
Channel frequency (MHz)	Test Result (dBm)	Limit (dBm)
2402	-0.88	30
2441	-1.97	
2480	-0.78	

2402 MHz



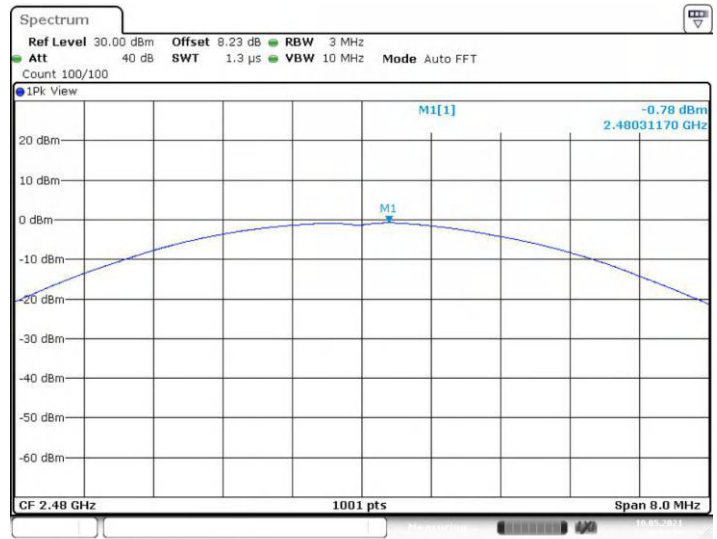
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2441 MHz



Date: 10.MAY.2021 20:23:03

2480 MHz



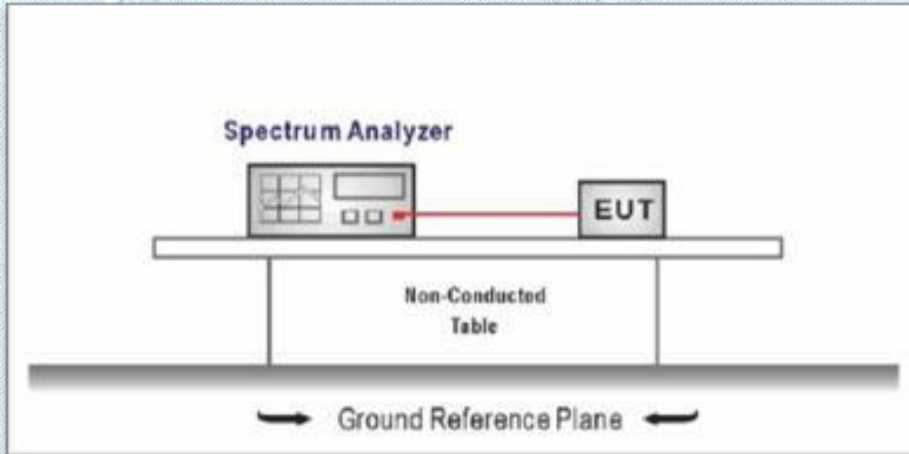
Date: 10.MAY.2021 20:23:19

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.

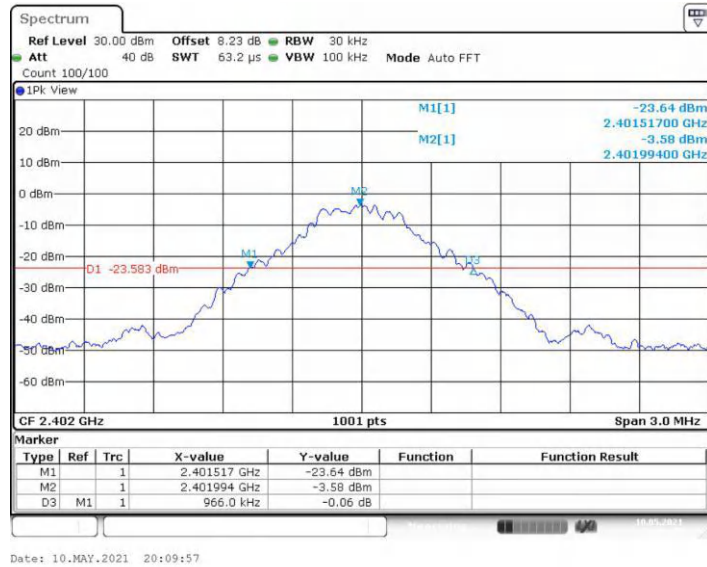
Test Mode

Please refer to the clause 2.3.

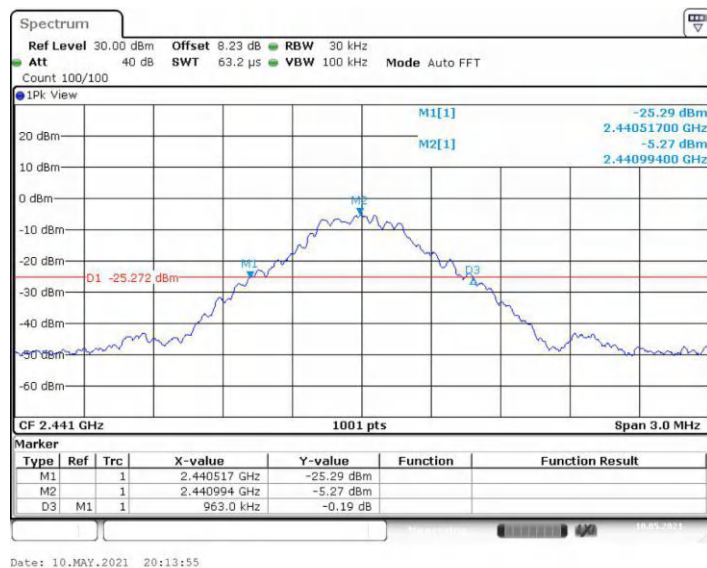
Test Results

Test Mode:	DH5			
Channel frequency (MHz)	20dB Bandwidth [MHz]	FL[MHz]	FH[MHz]	Verdict
2402	0.966	2401.517	2402.483	PASS
2441	0.963	2440.517	2441.480	PASS
2480	0.969	2479.514	2480.483	PASS

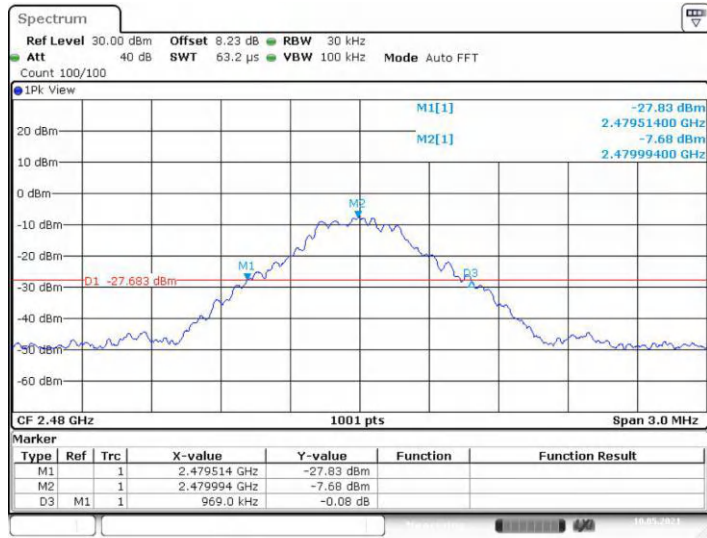
2402 MHz



2441 MHz



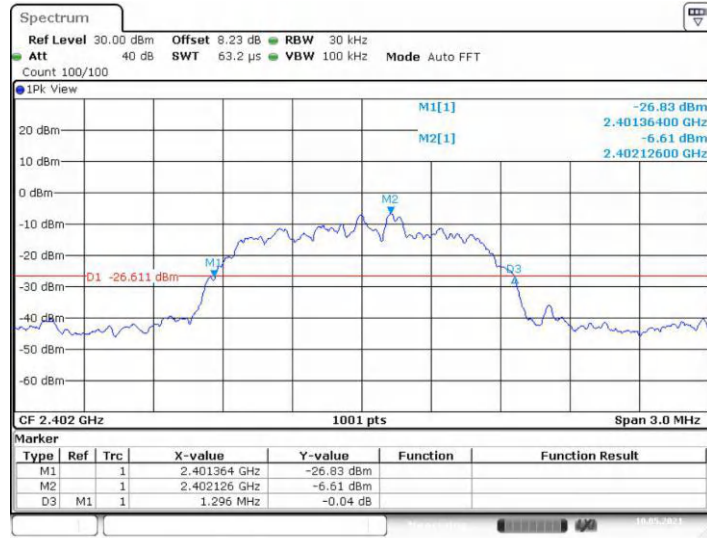
2480 MHz



Date: 10.MAY.2021 20:15:51

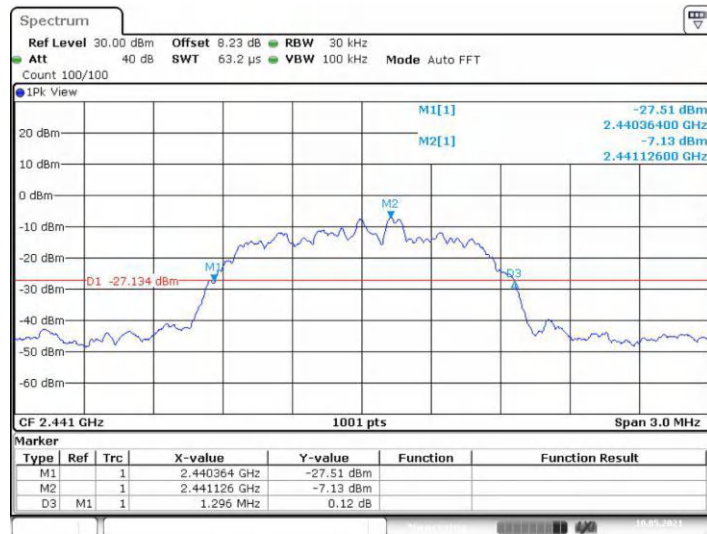
Test Mode:	2DH5			
Channel frequency (MHz)	20dB Bandwidth [MHz]	FL[MHz]	FH[MHz]	Verdict
2402	1.296	2401.364	2402.660	PASS
2441	1.296	2440.364	2441.660	PASS
2480	1.314	2479.343	2480.657	PASS

2402 MHz



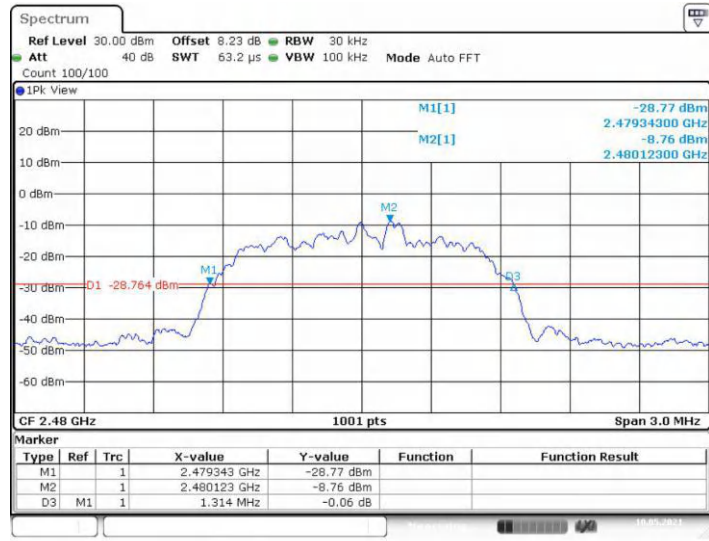
Date: 10.MAY.2021 20:24:33

2441 MHz



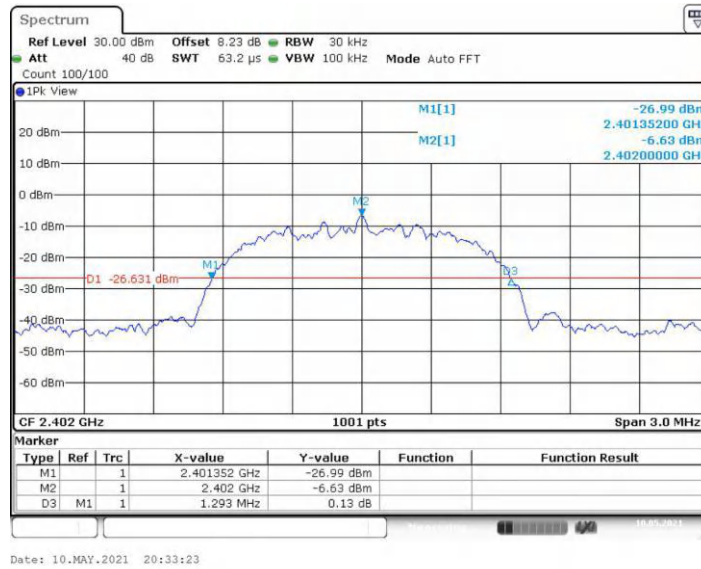
Date: 10.MAY.2021 20:27:43

2480 MHz

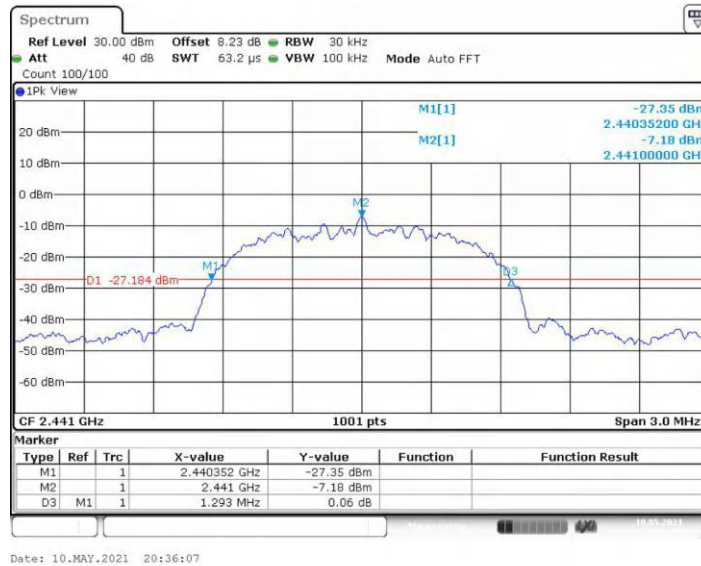


Test Mode:	3DH5			
Channel frequency (MHz)	20dB Bandwidth [MHz]	FL[MHz]	FH[MHz]	Verdict
2402	1.293	2401.352	2402.645	PASS
2441	1.293	2440.352	2441.645	PASS
2480	1.299	2479.349	2480.648	PASS

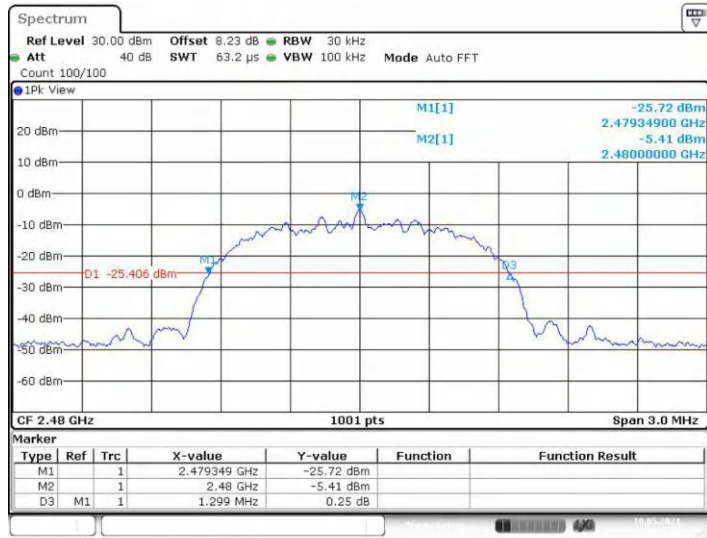
2402 MHz



2441 MHz



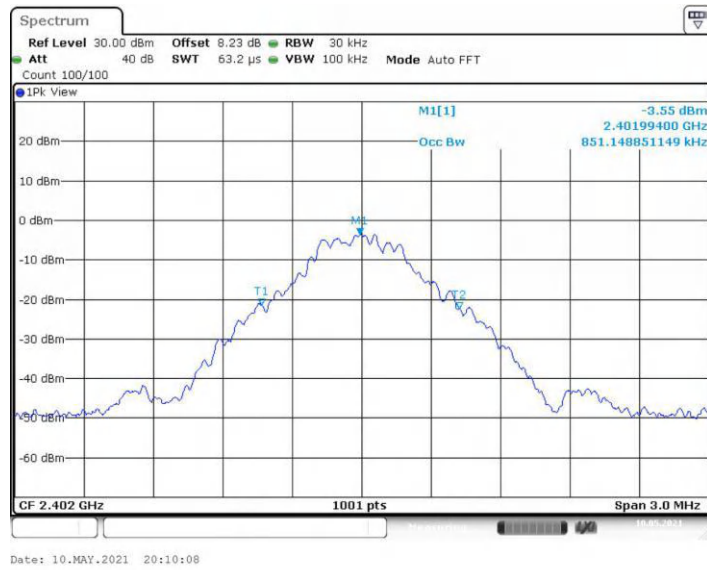
2480 MHz



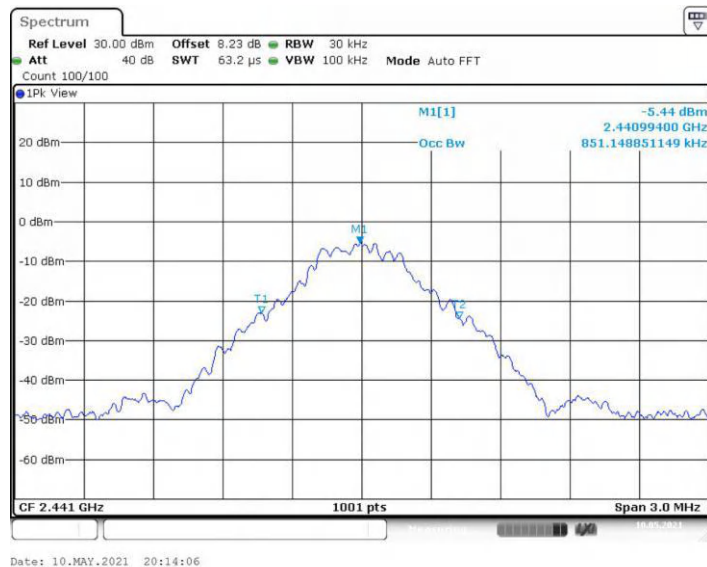
Date: 10.MAY.2021 20:37:52

Test Mode:	DH5			
Channel frequency (MHz)	99% OCB [MHz]	FL[MHz]	FH[MHz]	Verdict
2402	0.851	2401.568	2402.420	PASS
2441	0.851	2440.568	2441.420	PASS
2480	0.86	2479.565	2480.426	PASS

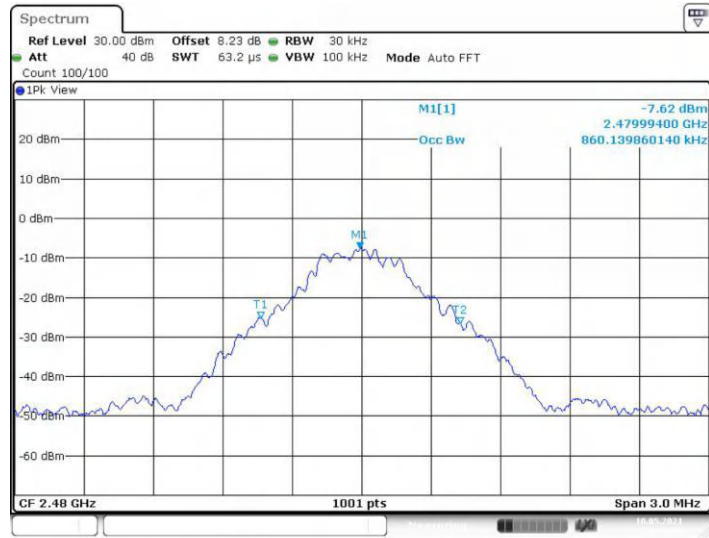
2402 MHz



2441 MHz



2480 MHz



Date: 10.MAY.2021 20:16:02