JAPAN MIC

TEST REPORT

For

JSP Co Ltd.

Yokohama Higashiguchi Wesports Bldg 11F, 2-6-32 Takashima, Nishi-ku, Yokohama, 220-0011, Japan.

Tested Model: 003-SP1002-J
Multiple Models: 003-SP1002-0, 003-SP1002-W

This Report Concerns:	Equipment Type:
☒ Original Report	Sheeva64-WhitePlug, Sheeva64

Report Number:	RDG190301003-07B
Report Date:	2019-03-25
Reviewed By:	Robin Zheng RF Engineer
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

Equipment Name		Sheeva64-WhitePlug, Sheeva64
Tested Model Number		003-SP1002-J (Product name: Sheeva64-WhitePlug)
Multiple Models		003-SP1002-0, 003-SP1002-W (Product name: Sheeva64)
Bluetooth Technical Parameters	Support Technical	BDR+EDR
	Modulation Type	GFSK, π/4-DQPSK, 8DPSK
	Emission Type	F1D
	Frequency Range	2402-2480MHz
	Output Power	0.1mW/MHz
	Antenna Gain	-2dBi
Nominal Power Supply:		AC 100V
External Dimension		129.5mm(L)*80.2mm(W)*22.5mm(H)
Serial Number		190301003 (Assigned by BACL, Dongguan)
Received Date		2019.02.27

Note: The series product, model 003-SP1002-J, 003-SP1002-0, 003-SP1002-W are electrically identical, the difference between them please refer to the attached declaration letter, we selected003-SP1002-J for fully testing.

Objective

The objective of the manufacturer is to demonstrate compliance with Radio Law of Japan item 19 of Article 2 Paragraph 1

Test Methodology

All measurements contained in this report were conducted with technical regulations of the Radio Law of Japan.

EUT TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in engineering mode which provide by manufacturer. For Bluetooth BDR and EDR mode, EUT was tested with Channel 2402MHz, 2441MHz, 2480MHz.

The input power will through a regulator IC (UP8809), then supply a constant voltage to the RF circuit of EUT, so exempt extremely high and low supply voltage condition tests, EUT only operated in normal voltage to test all regulations.

EUT Exercise Software

The software 'DutApiMimoBt.exe' was used for testing, which was provided by manufacturer and the maximum power was configured as following table:

Test Mode	Test Software Version	DutApiMimoBt.exe		
	Test Frequency	2402MHz	2441MHz	2480MHz
GFSK	Power Level Setting	10	11	11
π/4 DQPSK	Power Level Setting	10	13	13
8DPSK	Power Level Setting	10	13	13

Equipment Modifications

No modification was made to the EUT tested.

Configuration of Test Setup

Blocking Control

Spectrum Analyzer　　　　　　　EUT
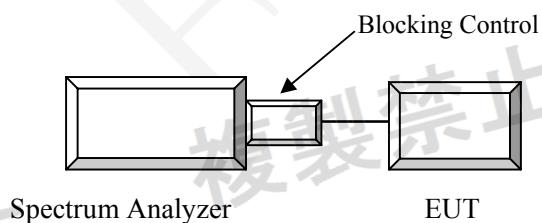
Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2018-12-10	2019-12-10
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A
E-Microwave	Blocking Control	EMDCB-00036	0E01201047	2018-05-06	2019-05-06
E-Microwave	Coaxial Attenuators	EMCA10-5RN-6	OE01203239	2018-09-06	2019-09-06
Agilent	USB Wideband Power Sensor	U2022XA	MY5417006	2018-12-10	2019-12-10

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

SUMMARY OF TEST RESULTS

MIC Notice No.88 Appendix No.43 Article 2, Paragraph 1, Item 19 Rules Section	Description of Test	Result
3	Frequency Error	Compliance
4	Occupied Bandwidth and Spreading Bandwidth	Compliance
5	Transmitter Spurious Emission and Unwanted Emission Intensity	Compliance
6	Antenna Output Power and Output Power Tolerance	Compliance
7	Receiver Spurious Emission and Unwanted Emission Intensity	Compliance
8	Transmission Antenna Gain	Not Applicable
9	Transmission Radiation Angle Width	Not Applicable
10	Frequency Hopping Dwell Time	Compliance
11	Interference Prevention Function	Compliance
Note 1	Construction Protection Confirmation	Compliance

Not Applicable: Please refer to 'Note 2' of Antenna Output Power and Output Power Tolerance section.

FREQUENCY ERROR

Limit

50ppm or below

Test Procedure

Set the EUT to the measurement frequency without modulation.
Setting of SA is following as: RB: 30 kHz / VB: 100 kHz / Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: Max hold.
Record the peak spot frequency.

If the EUT can`t set at un-modulation mode, measure the 10dBc center frequency.

Test Data

Environmental Conditions

Temperature:	24.1 °C
Relative Humidity:	50 %
ATM Pressure:	101 kPa

The testing was performed by Carrie He on 2019-03-11.

Test Result: Compliant

Test Mode: Transmitting

Test Mode	Test Frequency	Voltage	Measure Frequency (MHz)		Result	Tolerance	Limit
	MHz		F1	F2	MHz	ppm	
GFSK	2402	NV	2401.706	2402.252	2401.979	-8.74	
	2441	NV	2440.712	2441.258	2440.985	-6.15	
	2480	NV	2479.712	2480.258	2479.985	-6.05	
π/4-DQPSK	2402	NV	2401.46	2402.534	2401.997	-1.25	≤50ppm
	2441	NV	2440.466	2441.528	2440.997	-1.23	
	2480	NV	2479.466	2480.528	2479.997	-1.21	
8DPSK	2402	NV	2401.472	2402.516	2401.994	-2.50	
	2441	NV	2440.472	2441.516	2440.994	-2.46	
	2480	NV	2479.472	2480.516	2479.994	-2.42	

Note:

Result = (F1+F2)/2
Tolerance = (Result–Test Frequency)/Test Frequency$*10^6$

Please refer to the plots for normal voltage test
GFSK
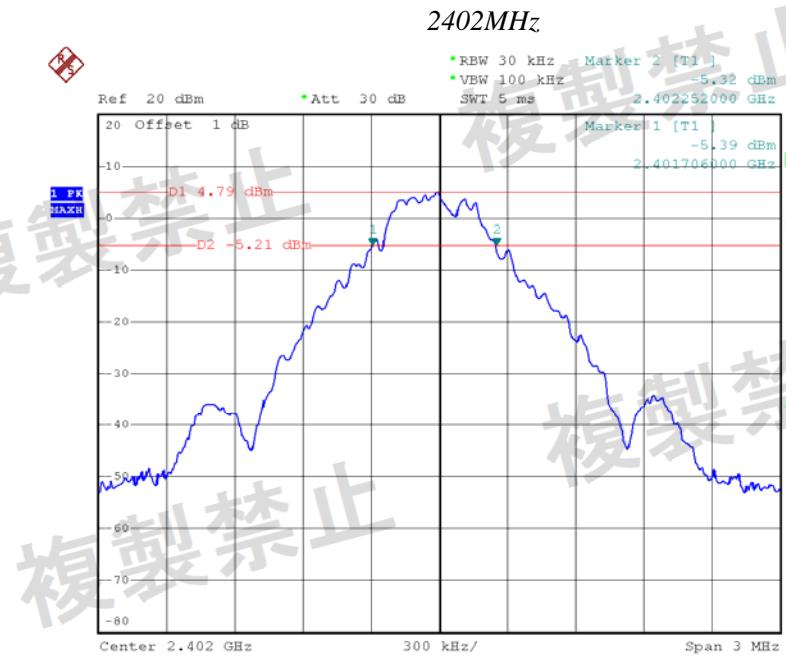
*2402MHz*

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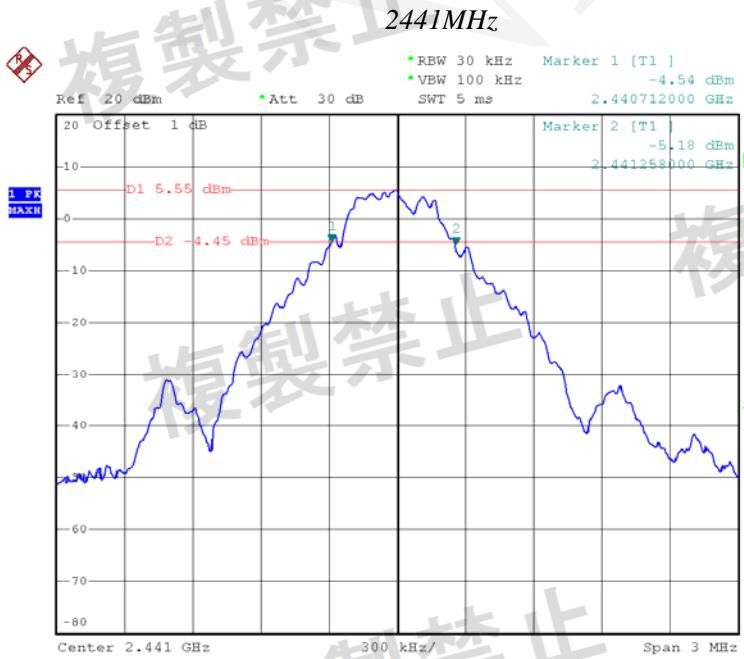
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2480MHz
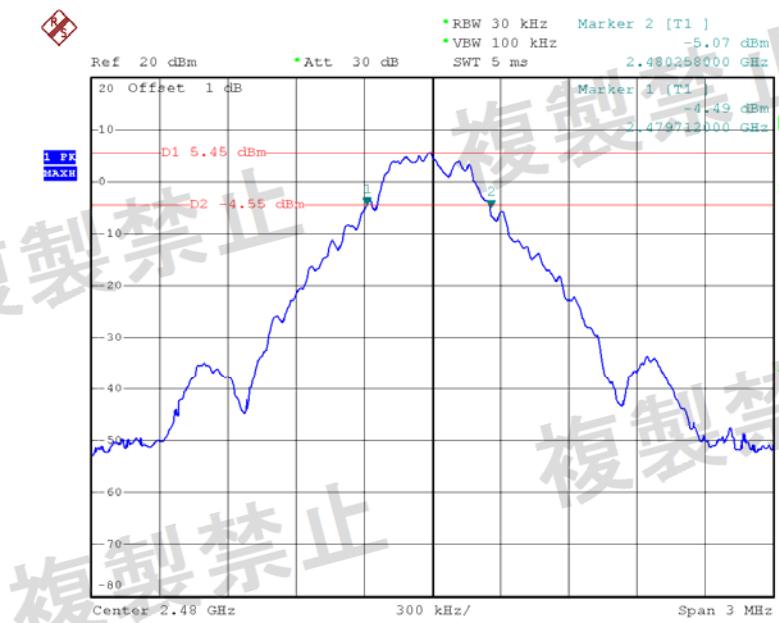
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π/4-DQPSK
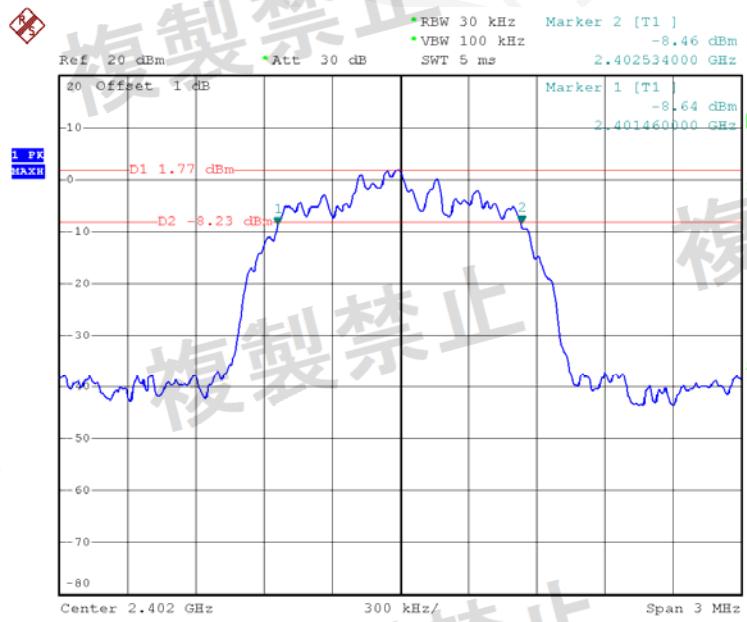
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*2441MHz*
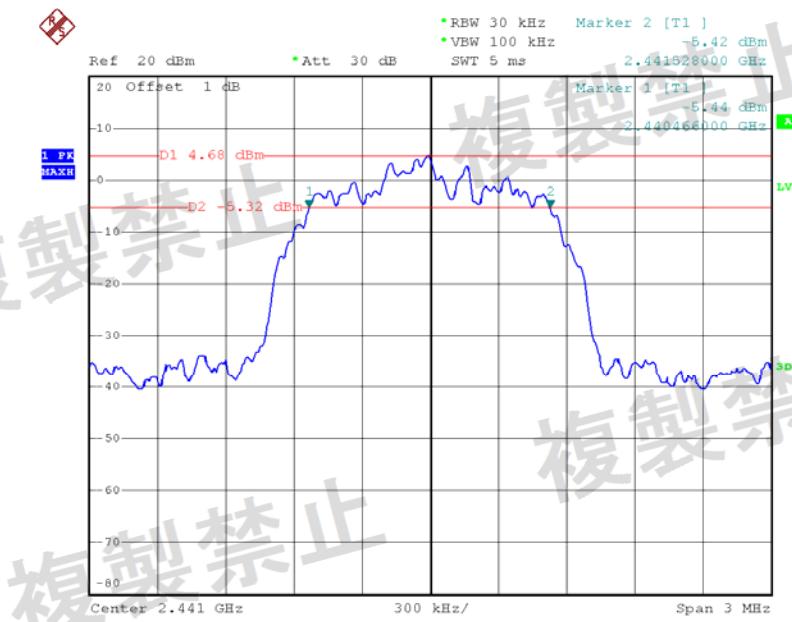
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2480MHz
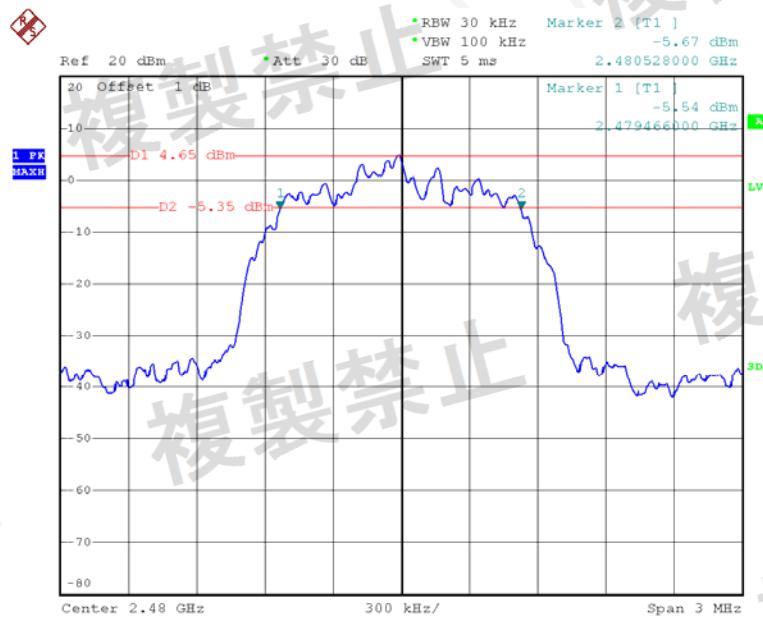
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8DPSK

2402MHz
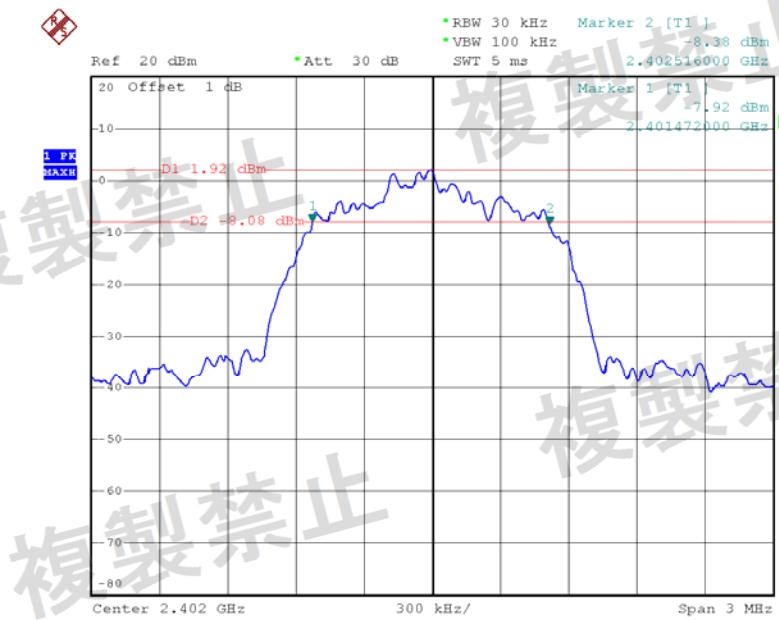
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2441MHz
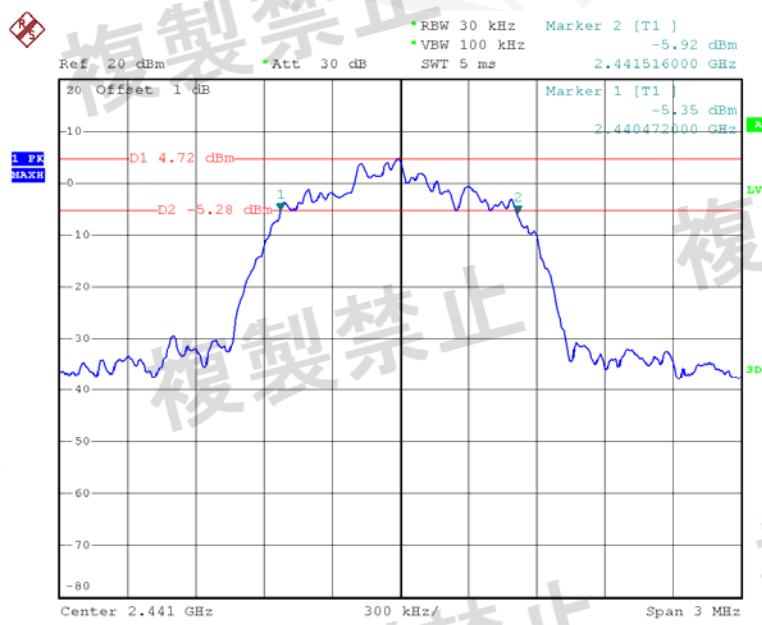
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2480MHz
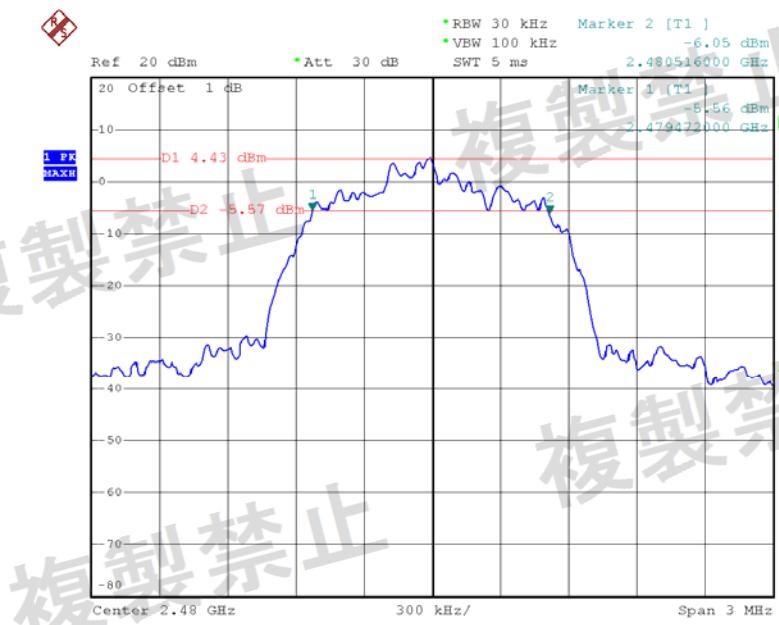
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OCCUPIED BANDWIDTH AND SPREADING BANDWIDTH

Limit

- Occupied bandwidth: FH≤83.5 MHz; DS≤26 MHz; OFDM≤38 MHz, Others≤26 MHz
- Spread Bandwidth:≥ 500 kHz(FH,DS),Spread factor≥5.

Test Procedure

❖ Conditions of Application Equipment（EUT）

  - The modulation state shall be "continuous frequency-hopping mode" by spread spectrum.

❖ Spectrum Analyzer Conditions

  - Span: 200 MHz
  - RBW: 300 kHz
  - VBW: 300 kHz
  - Sweep time: Auto, Marker: Marker Off
  - Log scale : 10dB/Div, Data points : 501points (400 points or more)
  - Detection: Positive Peak, Sweep mode: Continuous

Test Data

  Environmental Conditions

Temperature:	24.1 °C
Relative Humidity:	50 %
ATM Pressure:	101 kPa

The testing was performed by Carrie He on 2019-03-11.

Test Result: Compliance

Test Mode: Transmitting

Mode	Voltage	NV	Limit
BDR Mode (GFSK)	**Occupied Bandwidth (MHz)**	78.800	≤83.5MHz
	Spread Bandwidth (MHz)	72.000	≥500kHz
	Spread Factor	72.000	≥5
EDR Mode (π/4-DQPSK)	**Occupied Bandwidth (MHz)**	78.800	≤83.5MHz
	Spread Bandwidth (MHz)	70.800	≥500kHz
	Spread Factor	70.800	≥5
EDR Mode (8DPSK)	**Occupied Bandwidth (MHz)**	78.400	≤83.5MHz
	Spread Bandwidth (MHz)	71.600	≥500kHz
	Spread Factor	71.600	≥5

Please refer to the below plots for normal voltage test.

BDR Mode (GFSK)：

Spreading bandwidth
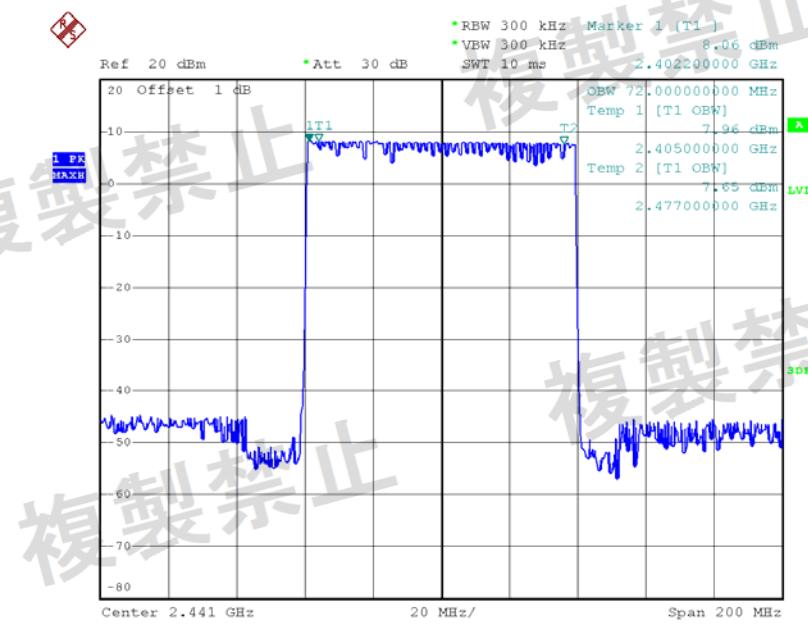
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Occupied bandwidth
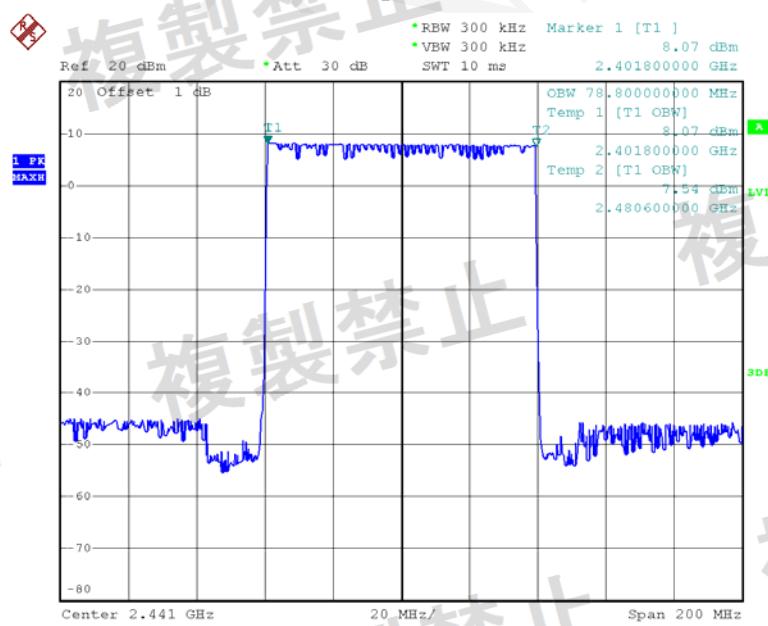
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EDR Mode (π/4-DQPSK):

Spreading bandwidth
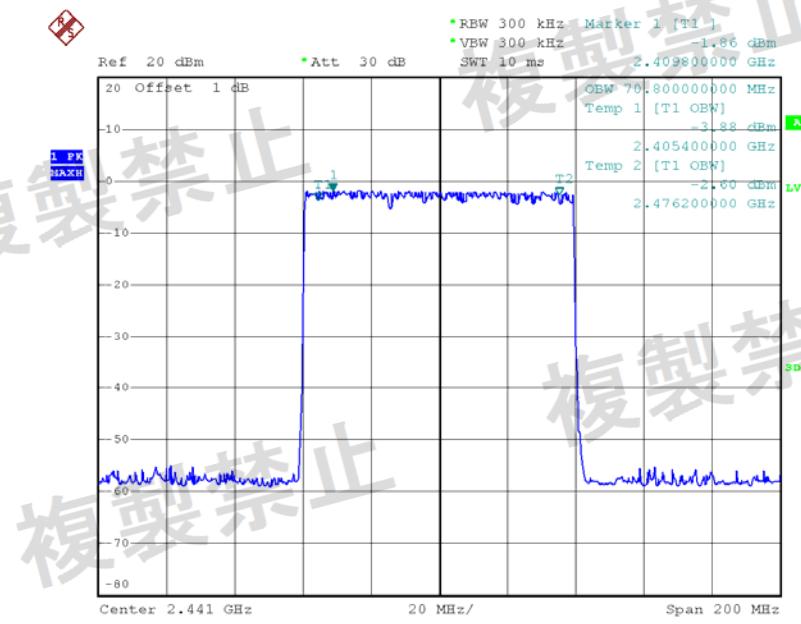
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Occupied bandwidth
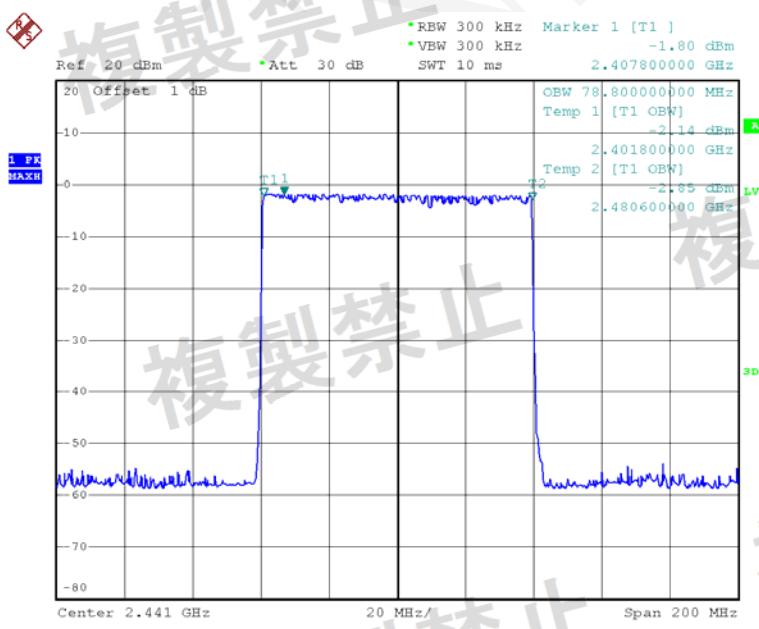
Date: 11.MAR.2019 14:44:51

EDR Mode (8DPSK):

Spreading bandwidth
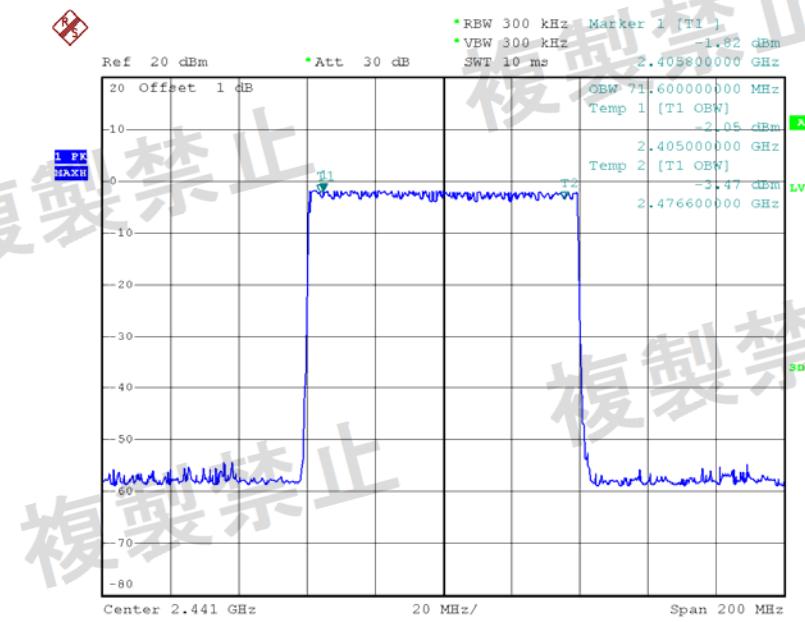
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Occupied bandwidth
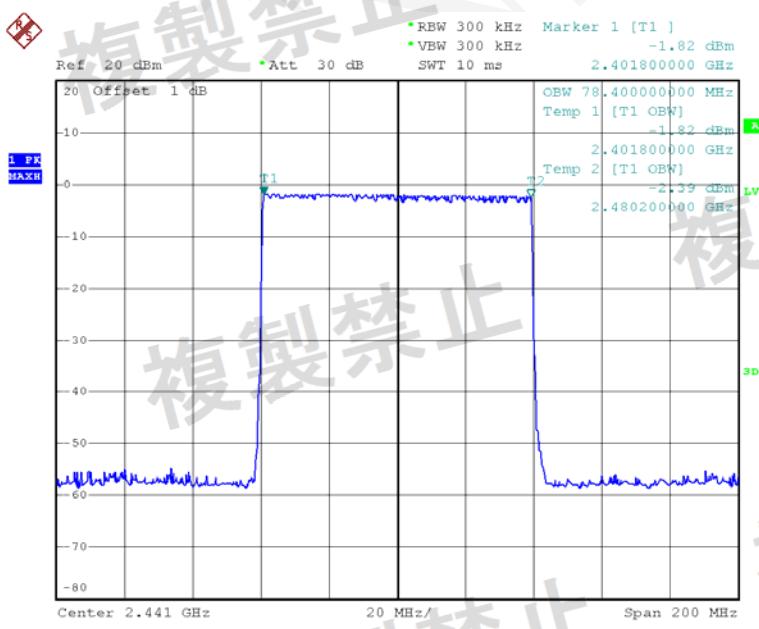
Date: 11.MAR.2019　14:48:17

TRANSMITTER SPURIOUS EMISSION STRENGTH AND UNWANTED EMISSION INTENSITY

Limit

- f＜1000 MHz: ≤0.25μW/100kHz
- f＜2387 MHz, f＞2496.5 MHz: ≤2.5μW/MHz
- 2387 MHz≤f≤2400 MHz; 2483.5 MHz＜f≤2496.5 MHz: ≤25μW/MHz

Test Procedure

❖ Conditions of Application Equipment (EUT)

- The modulation state shall be in continuously transmitting mode.

❖ Spectrum Analyzer Conditions

Step1:

- Setting of SA start 30MHz and stop frequency 1000MHz, RB:100kHz/VB:100kHz,Sweep time: Auto. Sweep mode: continuous sweep .Detect mode: Positive peak/Trace mode: max hold. Then to mark peak. reading value + cable loss shall be less than 0.25μW/100kHz.
- Setting of SA start 1000MHz and stop frequency 2387MHz, RBW: 1MHz/VBW: 1MHz, Sweep time: Auto. Sweep mode: continuous sweep .Detect mode: Positive peak/Trace mode: max hold. Then to mark peak. Reading value + cable loss shall be less than 2.5μW/MHz.
- Setting of SA start 2387MHz and stop frequency 2400MHz, RBW: 1MHz/VBW: 1MHz, Sweep time: Auto. Sweep mode: continuous sweep .Detect mode: Positive peak/Trace mode: max hold. Then to mark peak. Reading value + cable loss shall be less than 25μW/MHz.
- Setting of SA start 2483.5MHz and stop frequency 2496.5MHz, RBW: 1MHz/VBW: 1MHz, Sweep time: Auto. Sweep mode: continuous sweep .Detect mode: Positive peak/Trace mode: max hold. Then to mark peak. Reading value + cable loss shall be less than 25μW/MHz.
- Setting of SA start 2496.5MHz and stop frequency 12500MHz, RBW: 1MHz/VBW: 1MHz, Sweep time: Auto. Sweep mode: continuous sweep .Detect mode: Positive peak/Trace mode: max hold. Then to mark peak. Reading value + cable loss shall be less than 2.5μW/MHz.

Step 2:

Center frequency: Searched Frequency
Span: 0Hz
RBW:1MHz(Above 1GHz), 100 kHz(30MHz-1GHz). VBW: Same as RBW.
Sweep time: Auto(Minimum time to ensure measurement accuracy. *In case of burst wave, one burst shall be included per data point) Data points: 400 points or more. Sweep mode: Single Sweep.
Detection Mode: Sample

Test Data

Environmental Conditions

Temperature:	24.1°C
Relative Humidity:	50 %
ATM Pressure:	101 kPa

The testing was performed by Carrie He on 2019-03-11.

Test Result: Compliance

Test Mode: Transmitting

BDR Mode (GFSK):

Frequency		2402MHz	2441MHz	2480MHz	Limit
Voltage		NV	NV	NV	
Raw Data	Band I (dBm/100kHz)	-41.36	-39.09	-39.81	-36dBm/100kHz (0.25 µW/100kHz)
	Band II (dBm/MHz)	-46.76	-45.92	-45.90	-26dBm/MHz (2.5 µW/MHz)
	Band III (dBm/MHz)	-32.41	-56.26	-56.10	-16dBm/MHz (25 µW/MHz)
	Band IV (dBm/MHz)	-46.75	-55.17	-33.39	-16dBm/MHz (25 µW/MHz)
	Band V (dBm/MHz)	-47.81	-47.08	-48.36	-26dBm/MHz (2.5 µW/MHz)

EDR Mode (π/4-DQPSK):

Frequency		2402MHz	2441MHz	2480MHz	Limit
Voltage		NV	NV	NV	
Raw Data	Band I (dBm/100kHz)	-41.16	-42.91	-45.89	-36dBm/100kHz (0.25 µW/100kHz)
	Band II (dBm/MHz)	-47.26	-48.36	-47.37	-26dBm/MHz (2.5 µW/MHz)
	Band III (dBm/MHz)	-16.48	-51.46	-49.39	-16dBm/MHz (25 µW/MHz)
	Band IV (dBm/MHz)	-50.38	-52.11	-31.78	-16dBm/MHz (25 µW/MHz)
	Band V (dBm/MHz)	-48.81	-49.80	-49.25	-26dBm/MHz (2.5 µW/MHz)

EDR Mode (8DPSK):

Frequency		2402MHz	2441MHz	2480MHz	Limit
Voltage		NV	NV	NV	
Raw Data	Band I (dBm/100kHz)	-49.35	-45.55	-42.17	-36dBm/100kHz (0.25 μW/100kHz)
	Band II (dBm/MHz)	-51.32	-48.19	-48.37	-26dBm/MHz (2.5 μW/MHz)
	Band III (dBm/MHz)	-16.28	-52.47	-48.60	-16dBm/MHz (25 μW/MHz)
	Band IV (dBm/MHz)	-50.32	-53.73	-31.98	-16dBm/MHz (25 μW/MHz)
	Band V (dBm/MHz)	-51.91	-48.74	-50.61	-26dBm/MHz (2.5 μW/MHz)

Note： *Band I*：*30MHz～1000MHz*
Band II：*1000MHz～2387MHz*
Band III：*2387MHz～2400MHz*
Band IV：*2483.5MHz～2496.5MHz*
Band V：*2496.5MHz~12500MHz*

Please refer to the below plots for normal voltage test.

BDR Mode (GFSK)
 2402MHz:

30MHz~1GHz
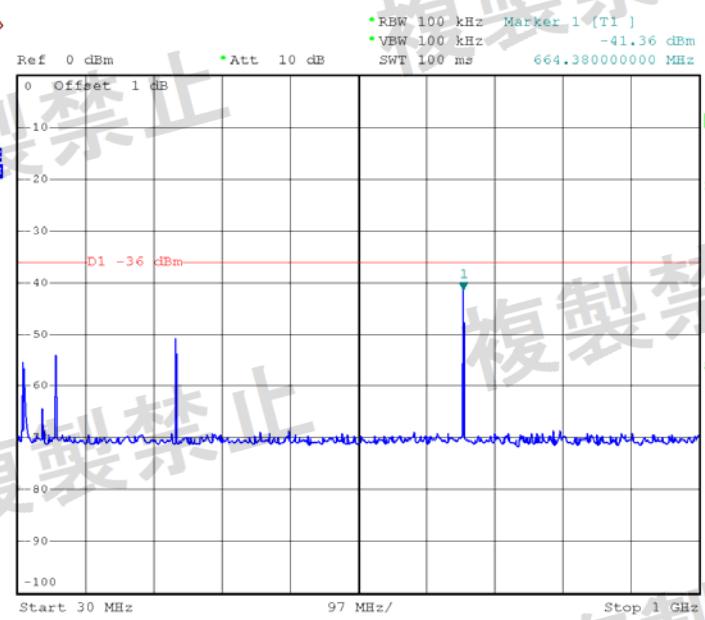
Date: 11.MAR.2019 13:05:51

1GHz~2.387GHz
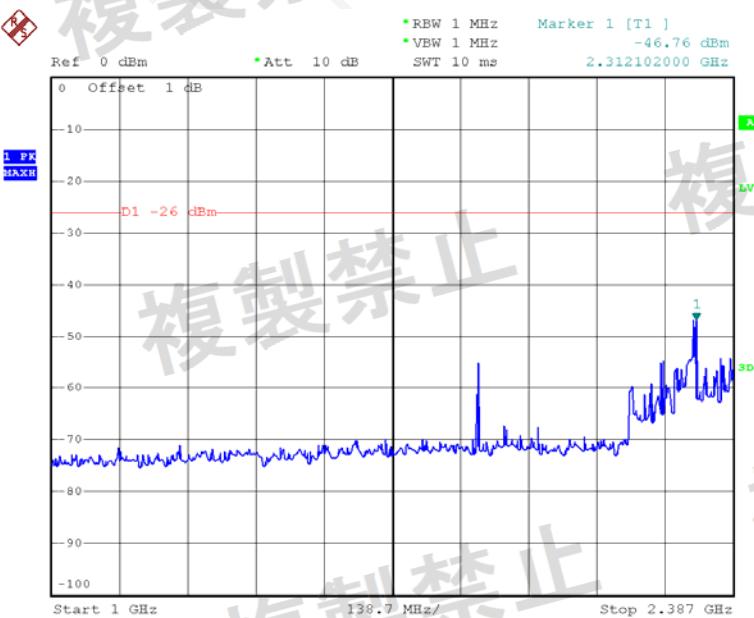
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2.387GHz~2.4GHz
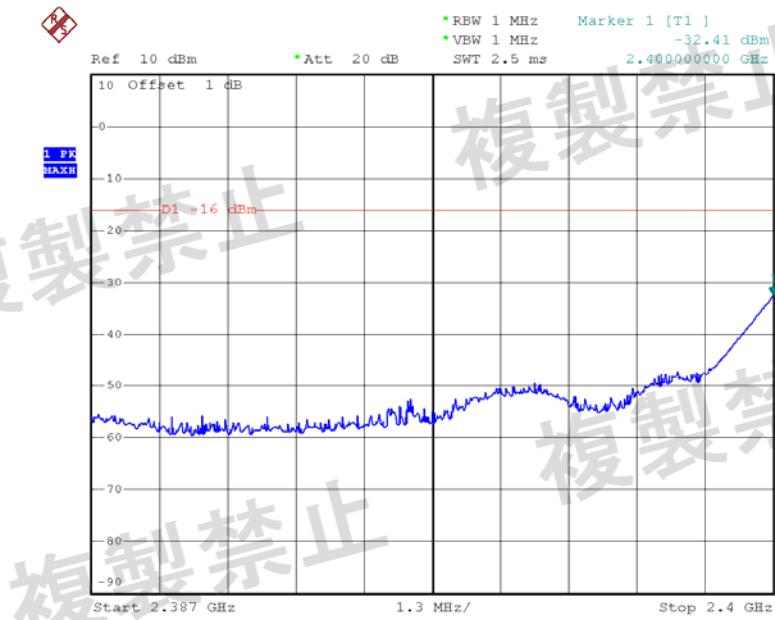
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2.4835GHz~2.4965GHz
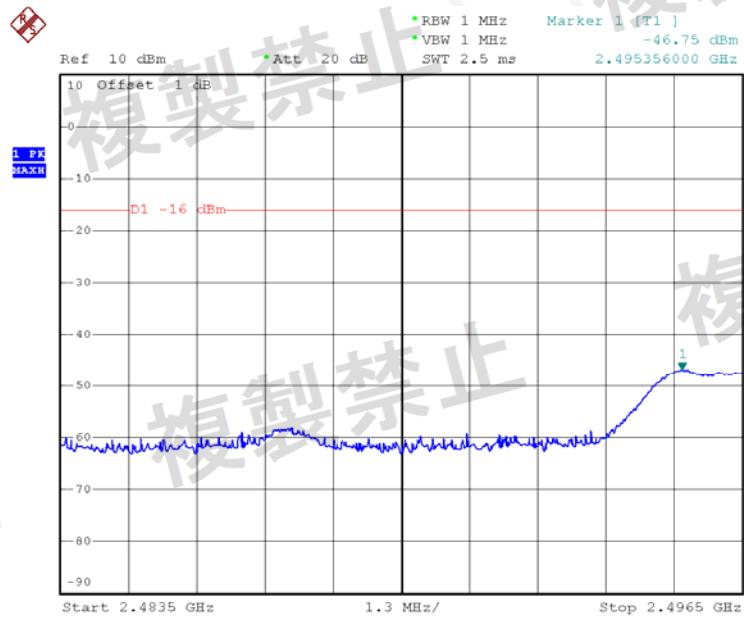
Date: 11.MAR.2019 13:07:10

2.4965GHz~12.5GHz
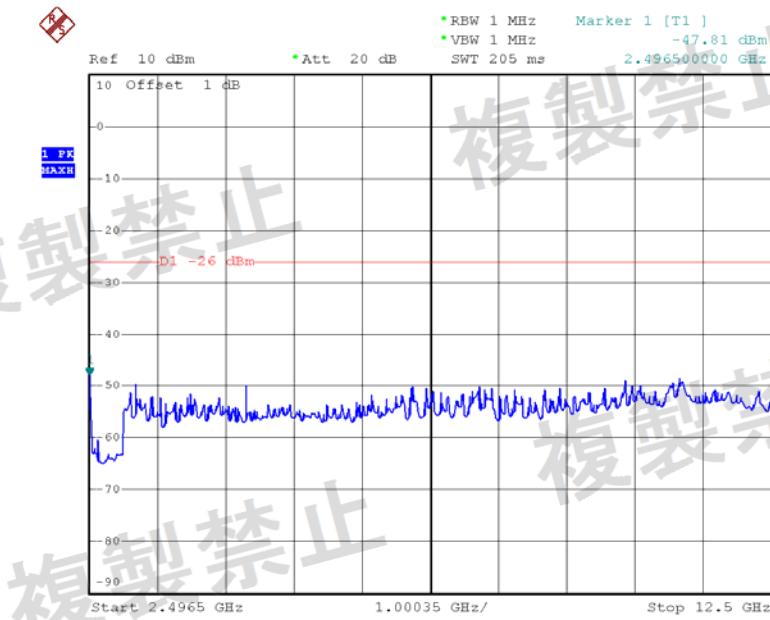
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**2441MHz:**

30MHz~1GHz
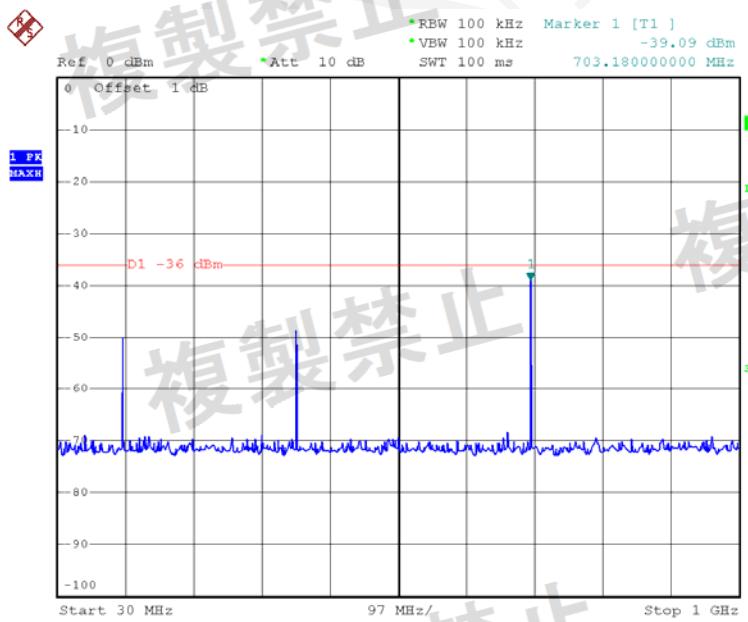
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1GHz~2.387GHz
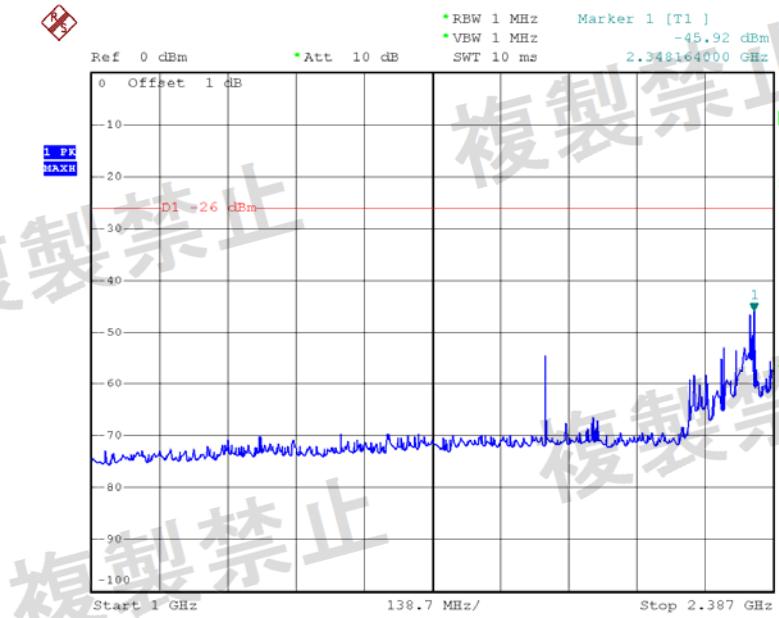
Date: 11.MAR.2019   13:09:38

2.387GHz~2.4GHz
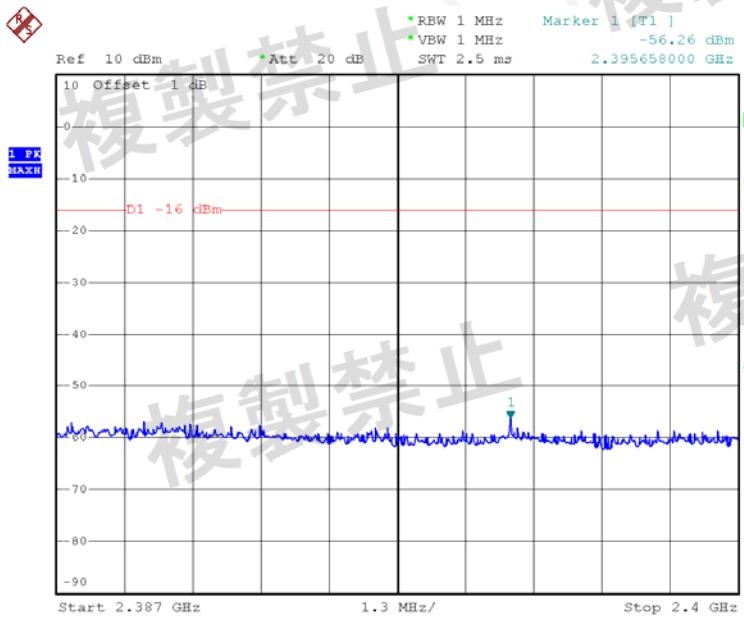

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2.4835GHz~2.4965GHz
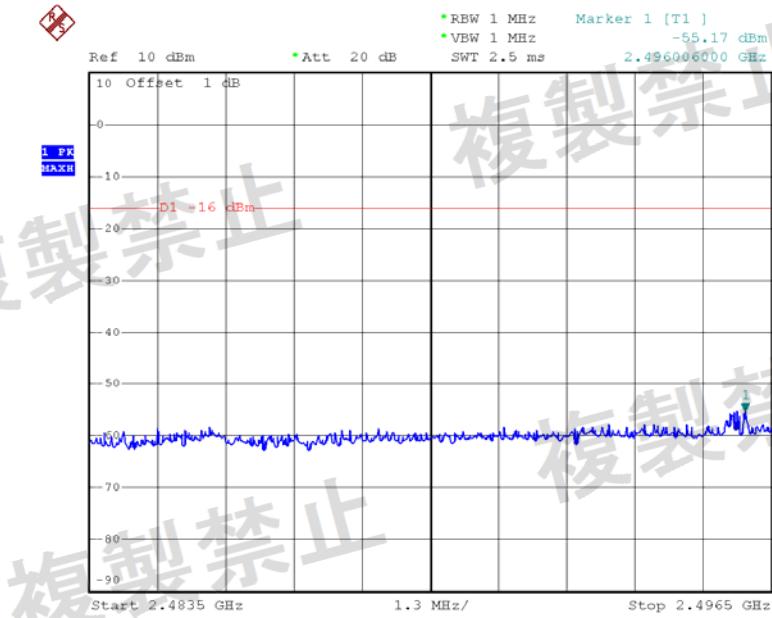
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2.4965GHz~12.5GHz
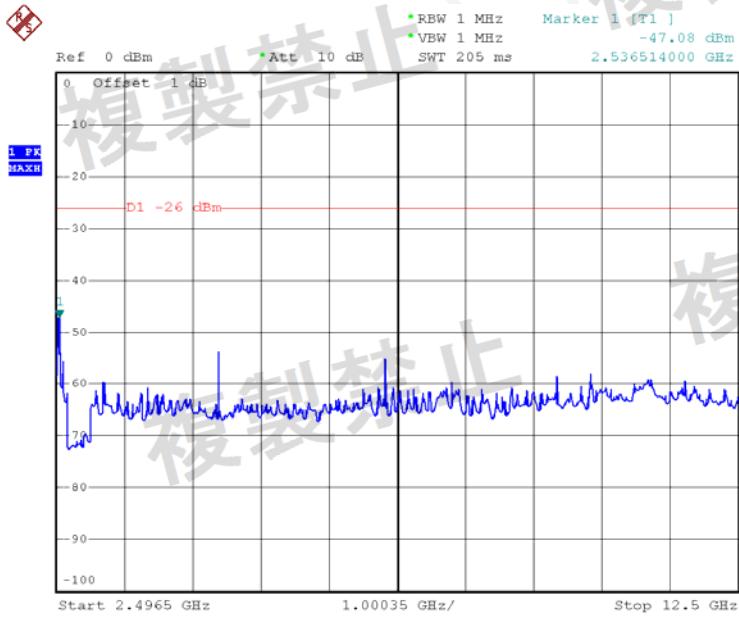
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2480MHz:

30MHz~1GHz
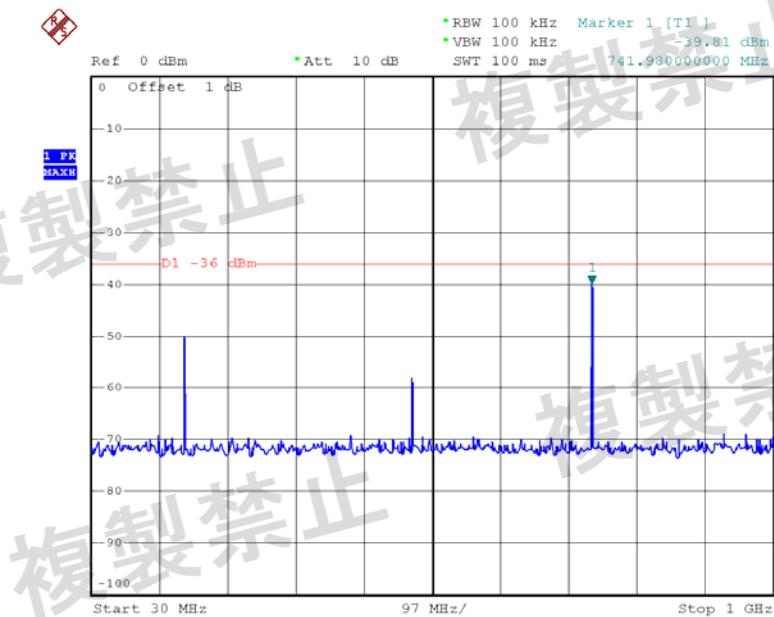
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1GHz~2.387GHz
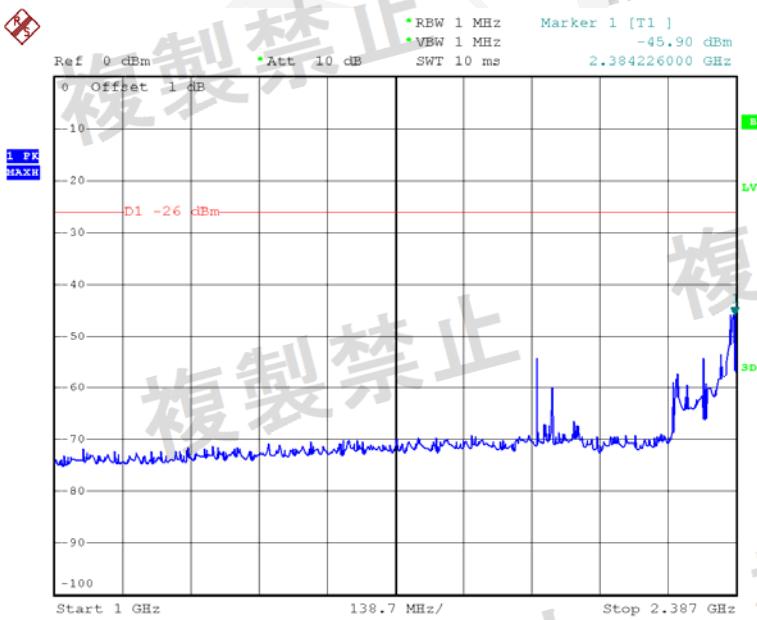
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2.387GHz~2.4GHz
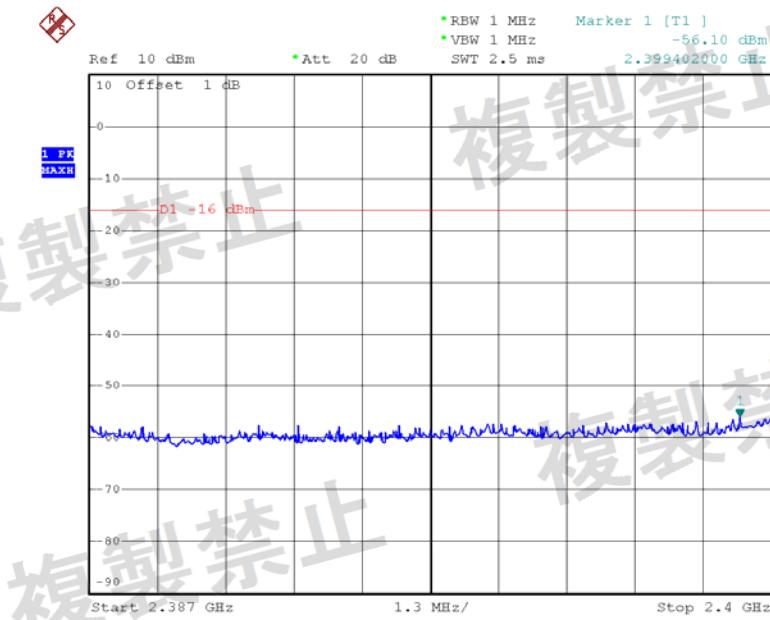
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2.4835GHz~2.4965GHz
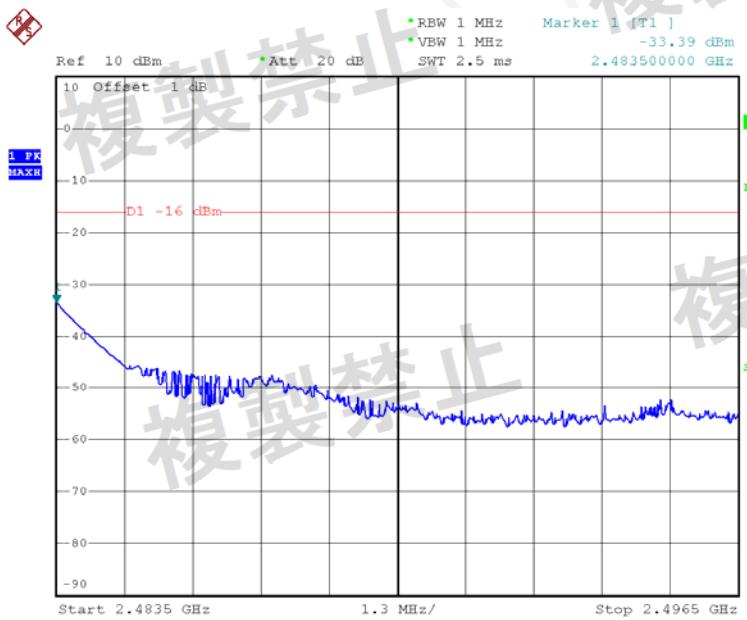
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2.4965GHz~12.5GHz
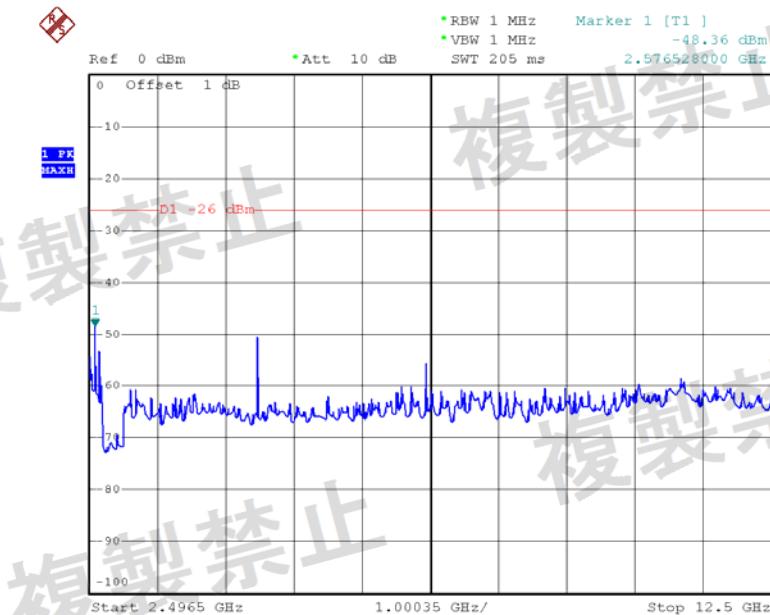
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EDR Mode (π/4-DQPSK):
2402MHz:
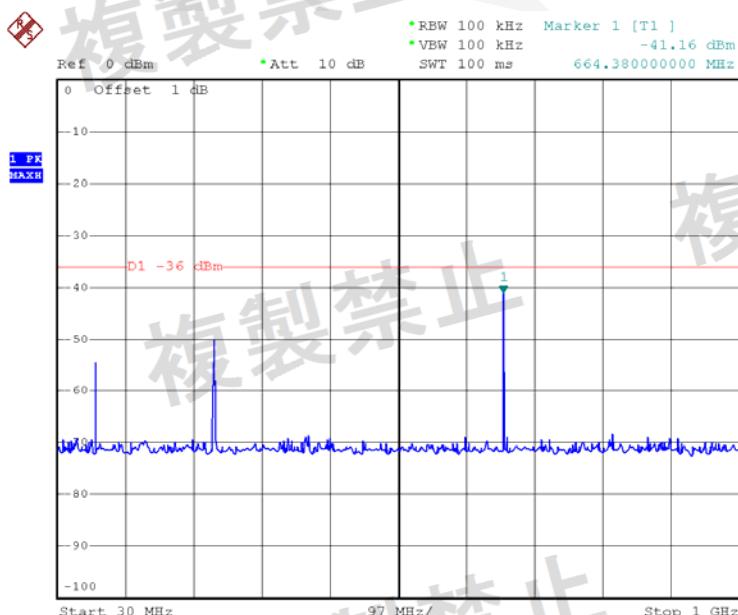
30MHz~1GHz

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1GHz~2.387GHz
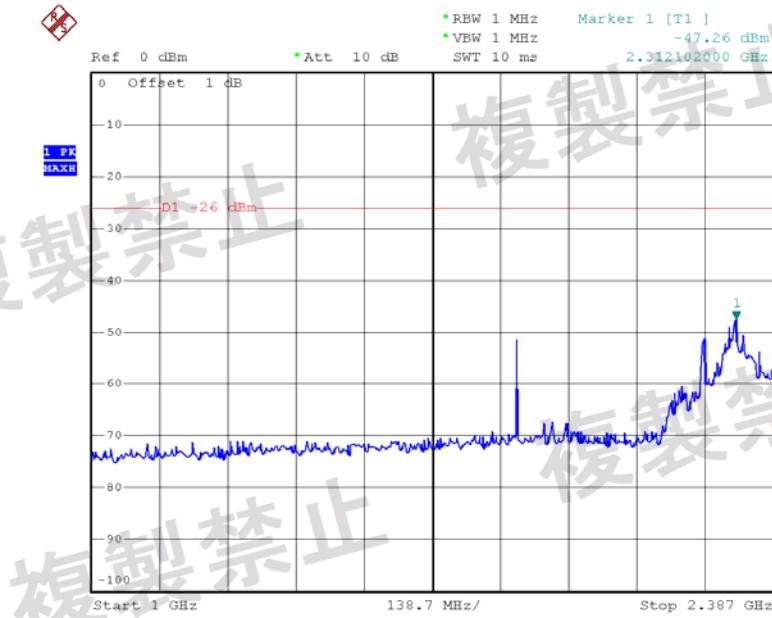
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2.387GHz~2.4GHz
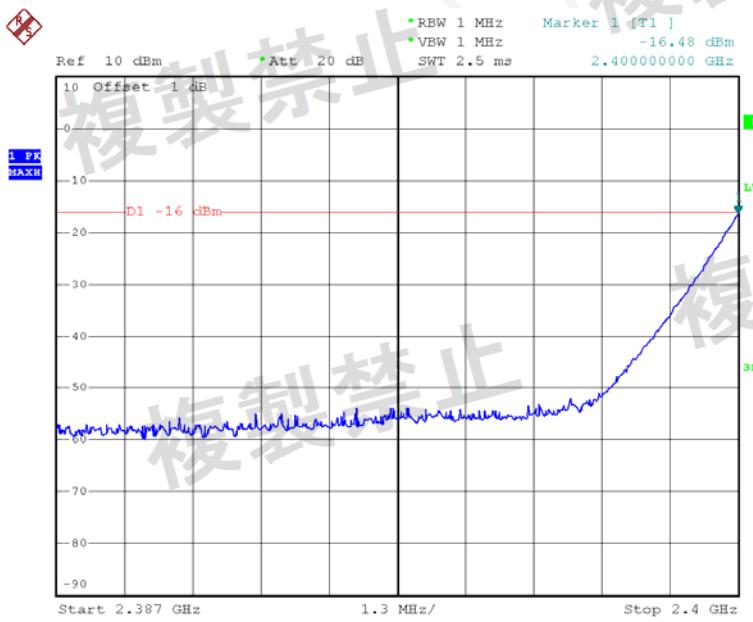
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2.4835GHz~2.4965GHz
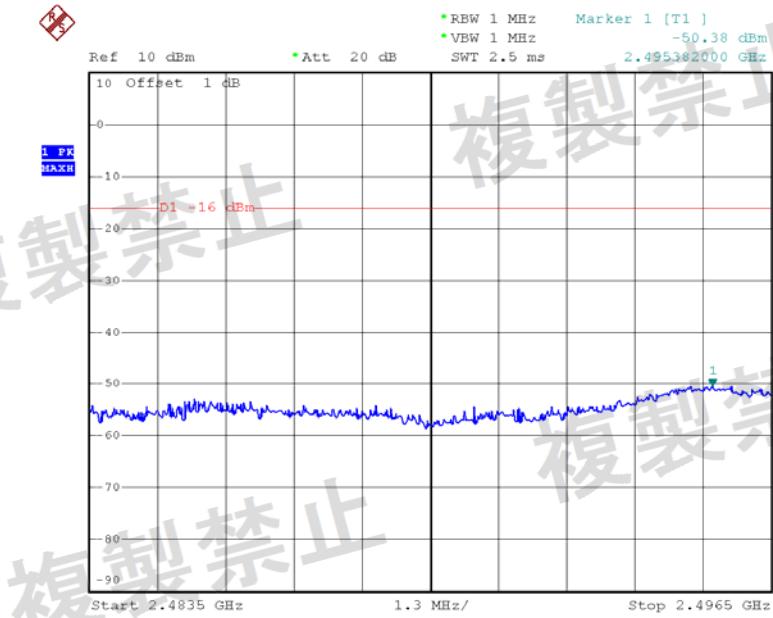
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2.4965GHz~12.5GHz
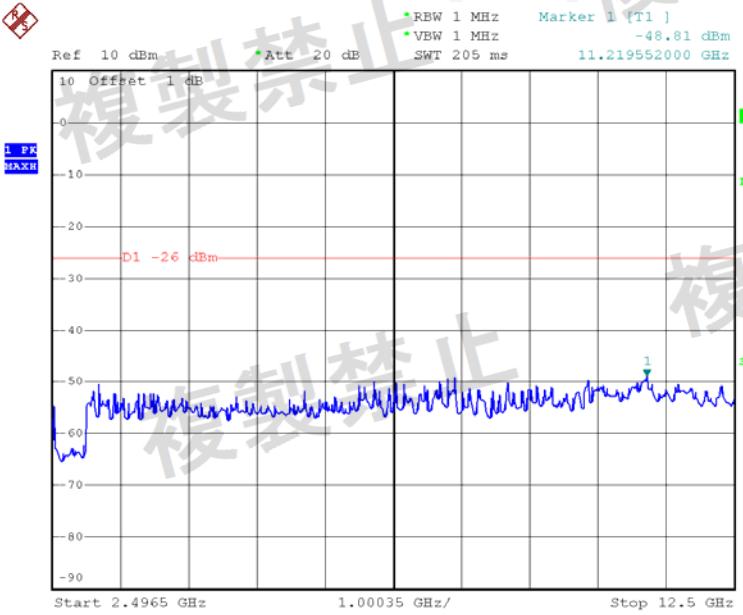
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2441MHz:

30MHz~1GHz
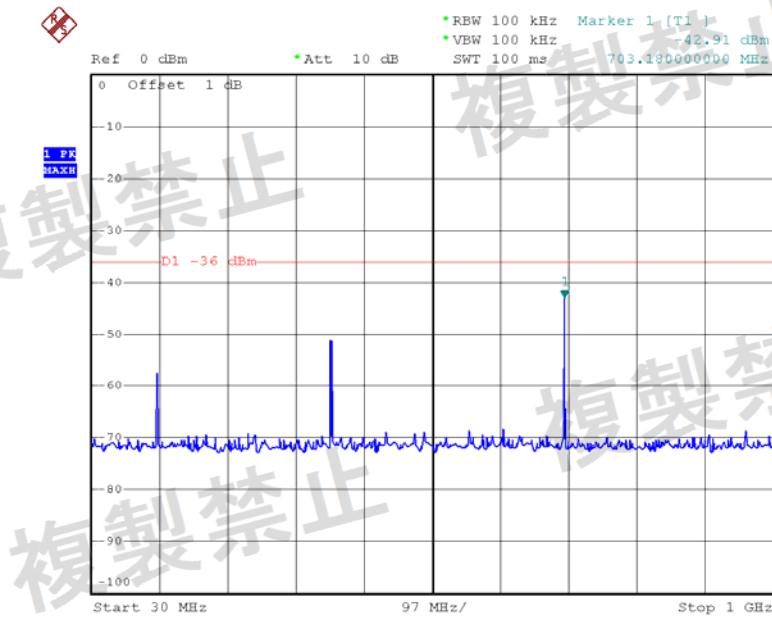
Date: 11.MAR.2019　13:35:21

1GHz~2.387GHz
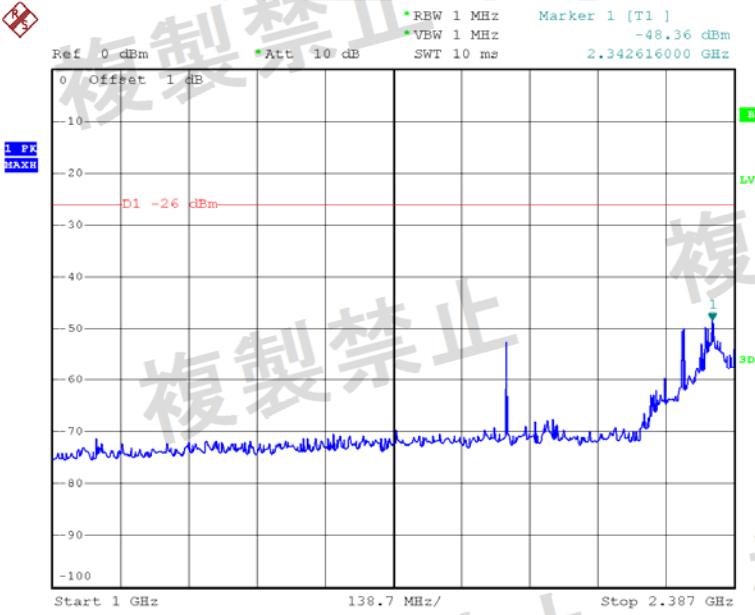

Date: 11.MAR.2019　13:35:41

2.387GHz~2.4GHz
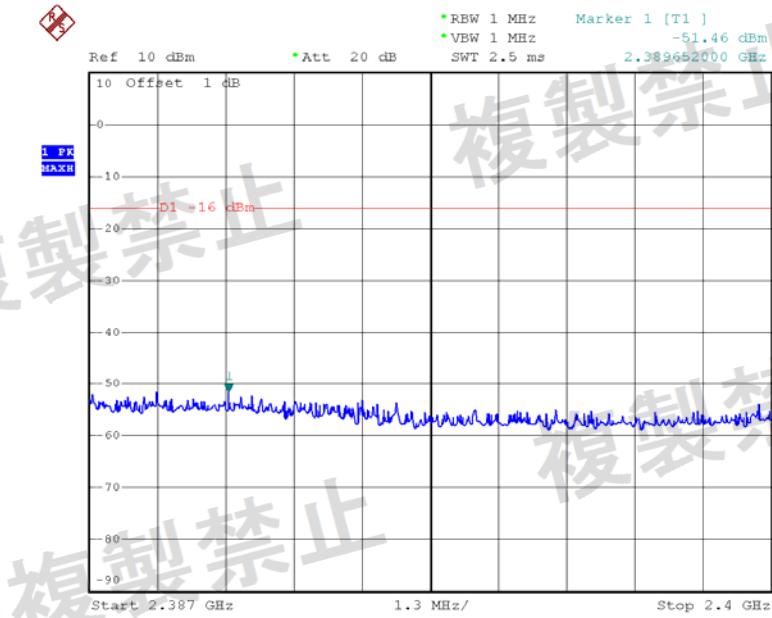
Date: 11.MAR.2019 13:36:34

## 2.4835GHz~2.4965GHz
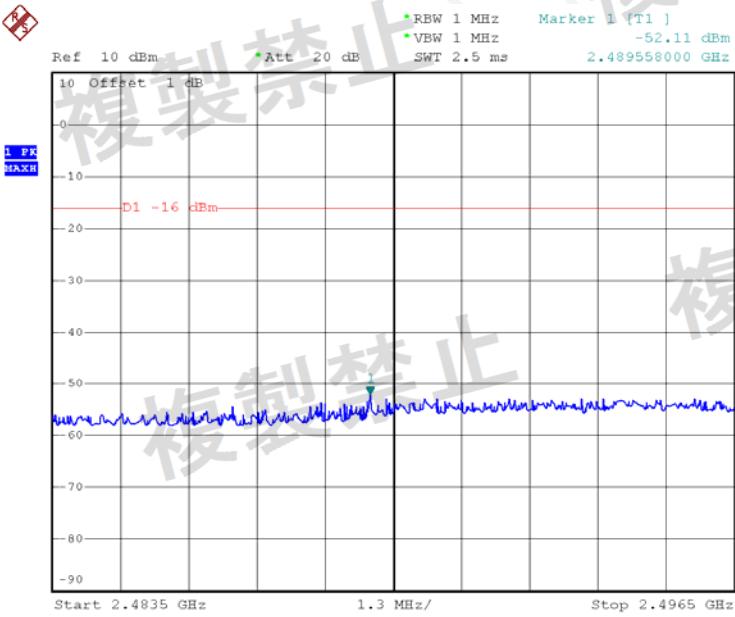
Date: 11.MAR.2019 13:37:08

## 2.4965GHz~12.5GHz
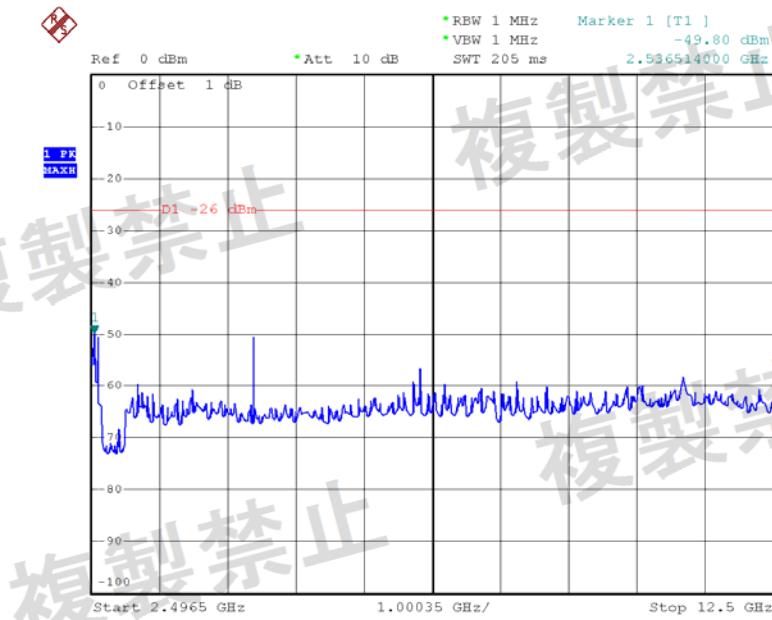
Date: 11.MAR.2019　13:37:58

2480MHz:

30MHz~1GHz
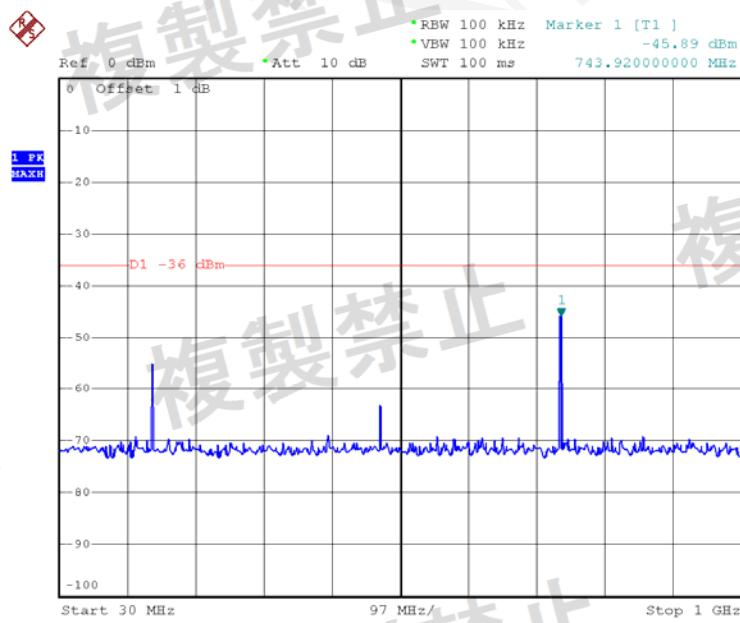
Date: 11.MAR.2019　13:41:00

## 1GHz~2.387GHz
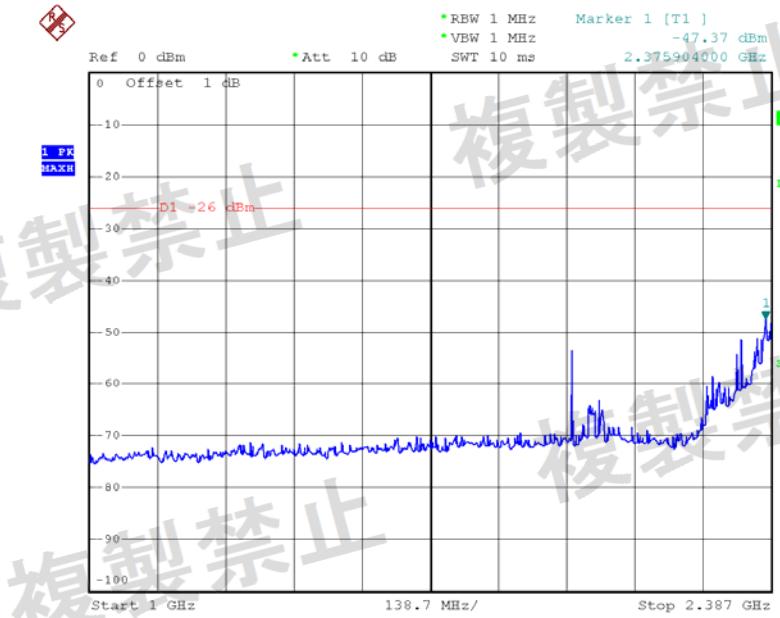
Date: 11.MAR.2019 13:41:20

2.387GHz~2.4GHz
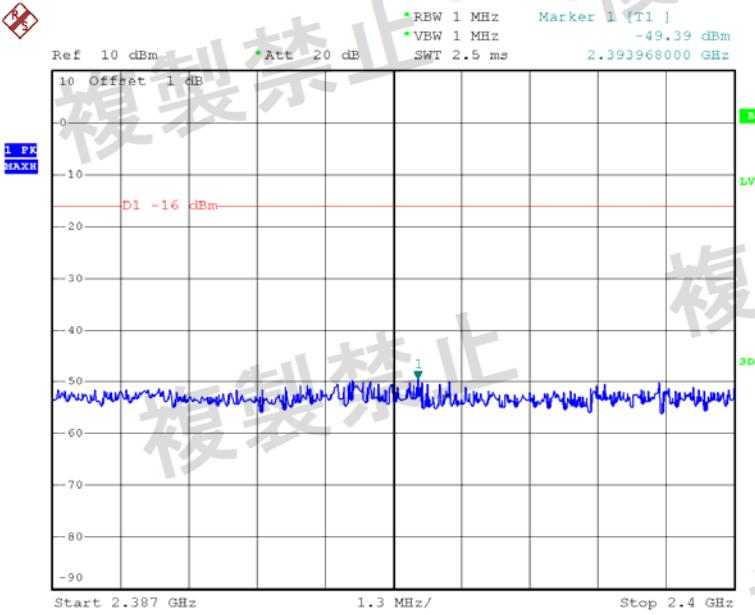
Date: 11.MAR.2019 13:41:46

2.4835GHz~2.4965GHz
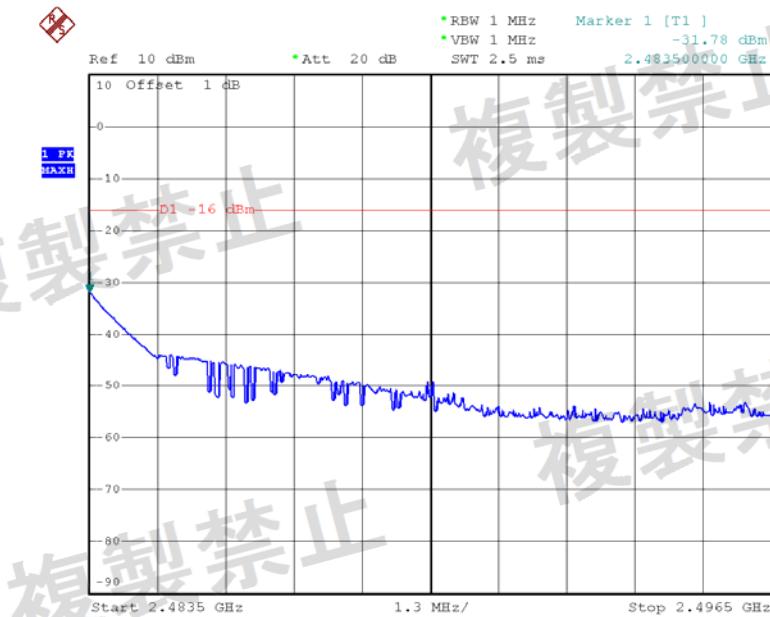
Date: 11.MAR.2019　13:42:10

## 2.4965GHz~12.5GHz
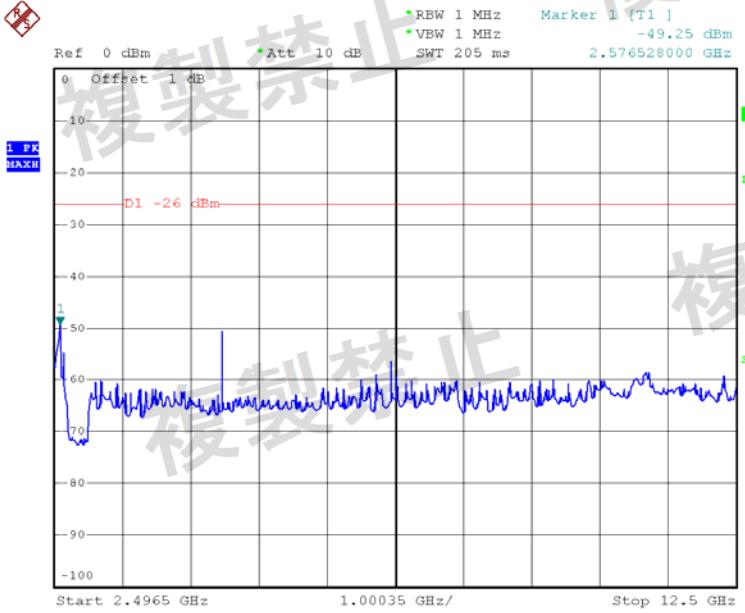
Date: 11.MAR.2019　13:42:42

EDR Mode (8DPSK):
 2402MHz:

30MHz~1GHz
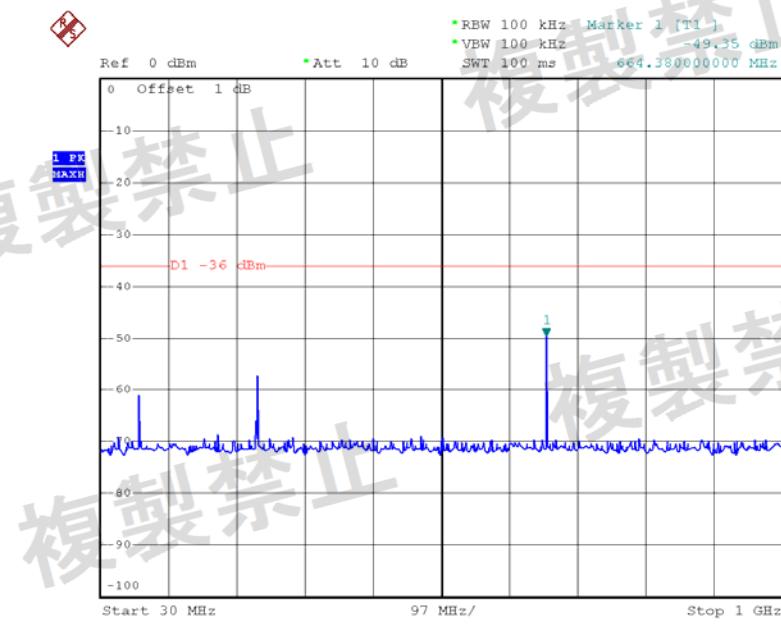
Date: 11.MAR.2019 13:55:30

1GHz~2.387GHz
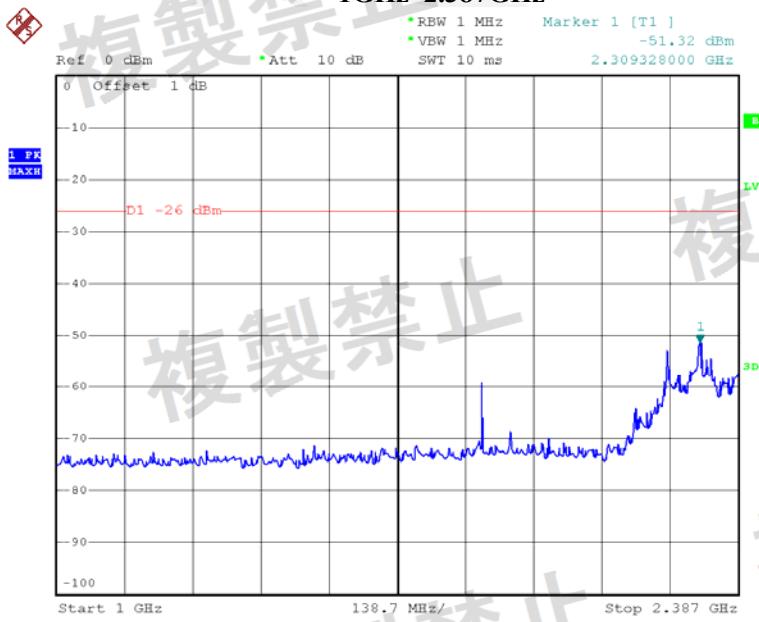
Date: 11.MAR.2019 13:55:52

2.387GHz~2.4GHz
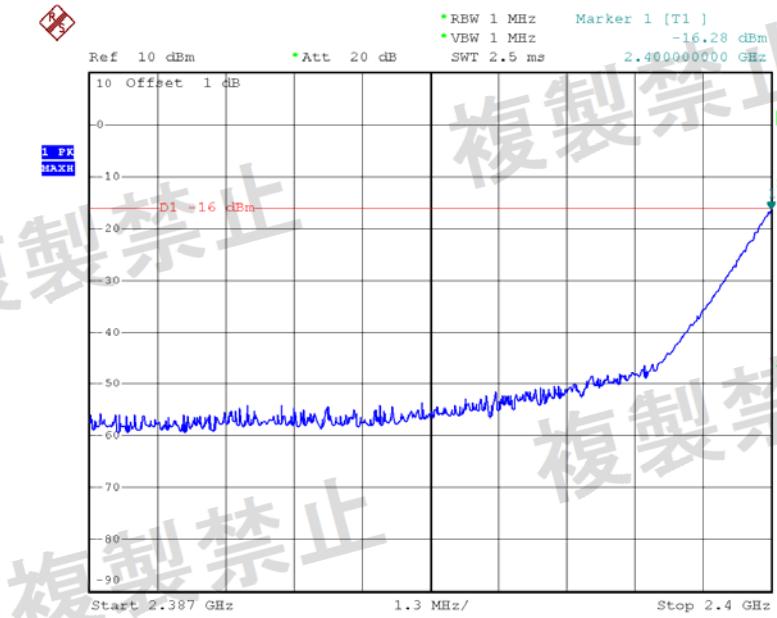
Date: 11.MAR.2019 13:59:18

2.4835GHz~2.4965GHz
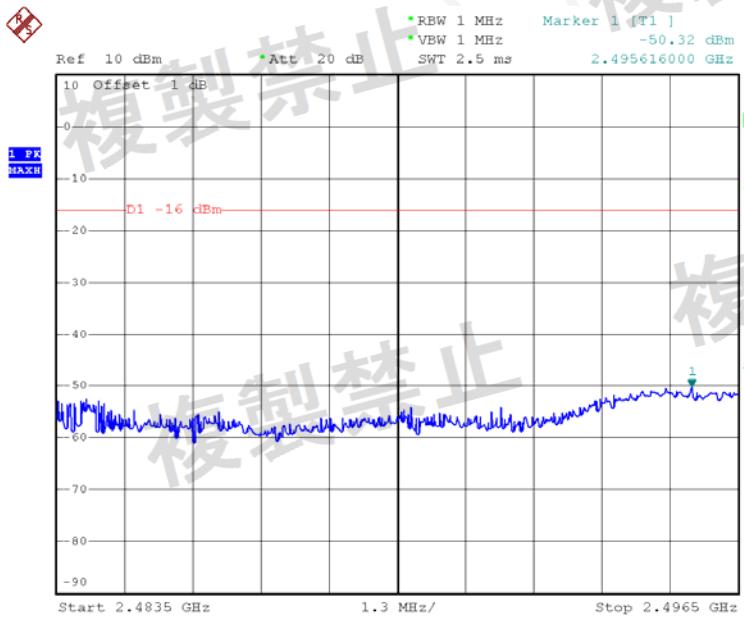
Date: 11.MAR.2019 13:59:41

2.4965GHz~12.5GHz

Date: 11.MAR.2019 14:01:38

2441MHz:
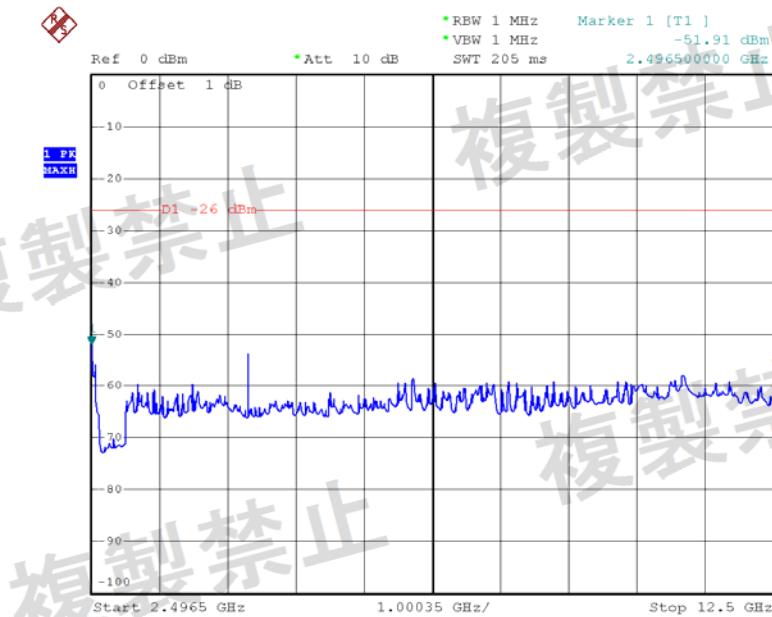
30MHz~1GHz

Date: 11.MAR.2019 14:07:28
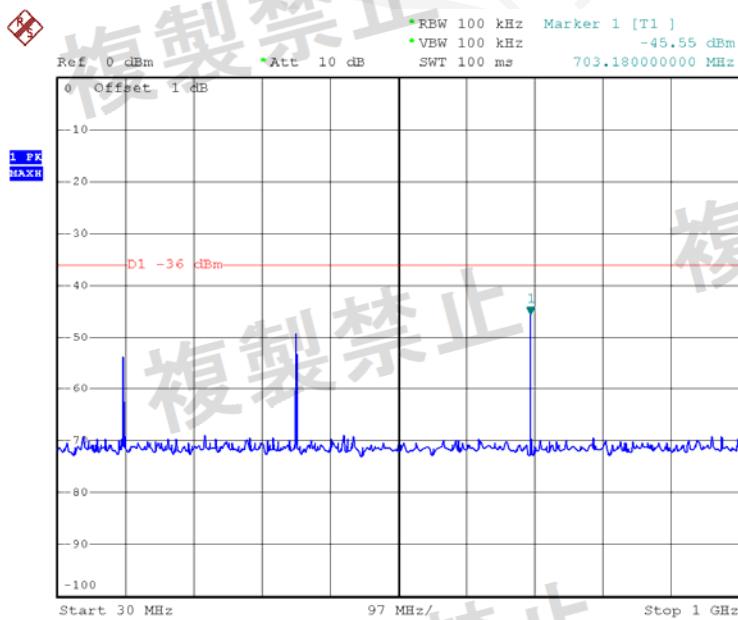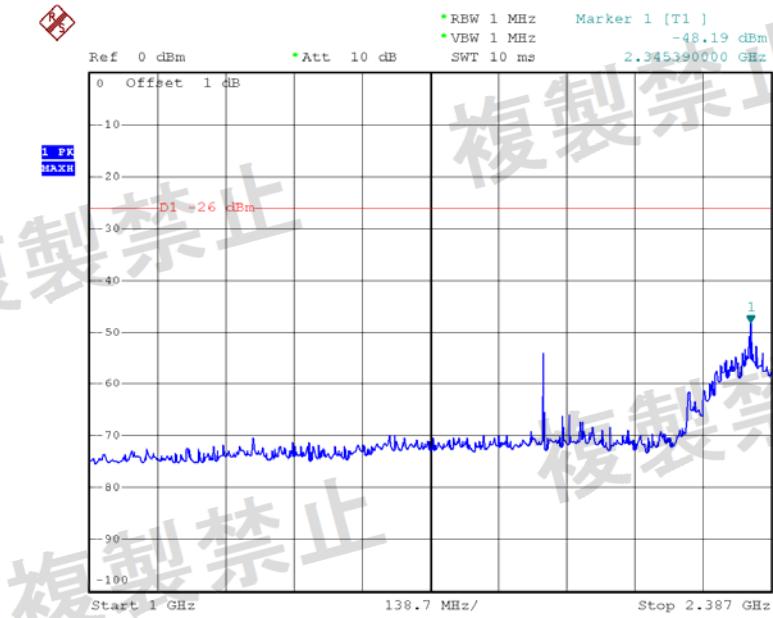
1GHz~2.387GHz

Date: 11.MAR.2019 14:07:48

2.387GHz~2.4GHz
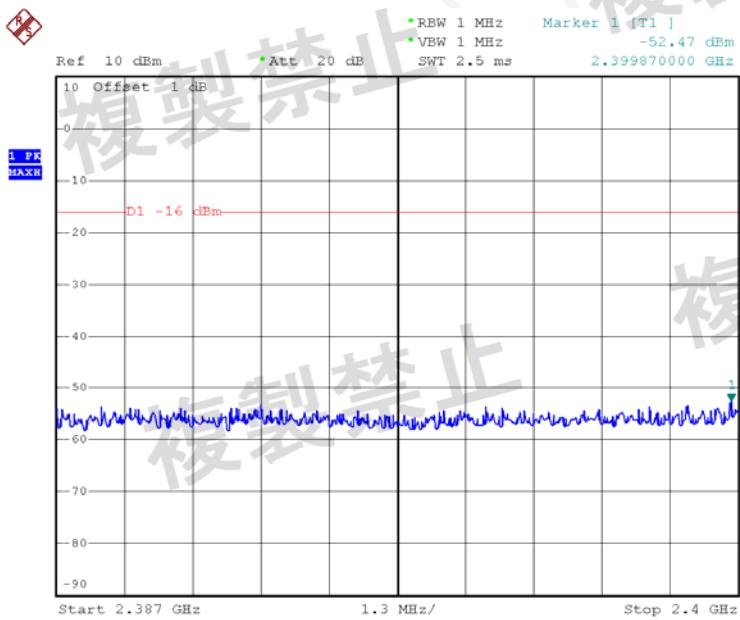
Date: 11.MAR.2019 14:08:12

2.4835GHz~2.4965GHz
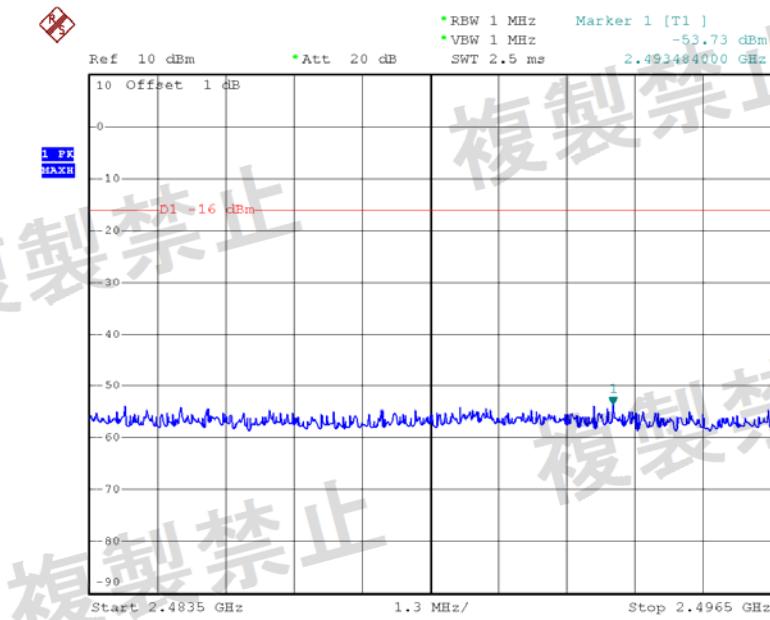
Date: 11.MAR.2019 14:08:43

2.4965GHz~12.5GHz
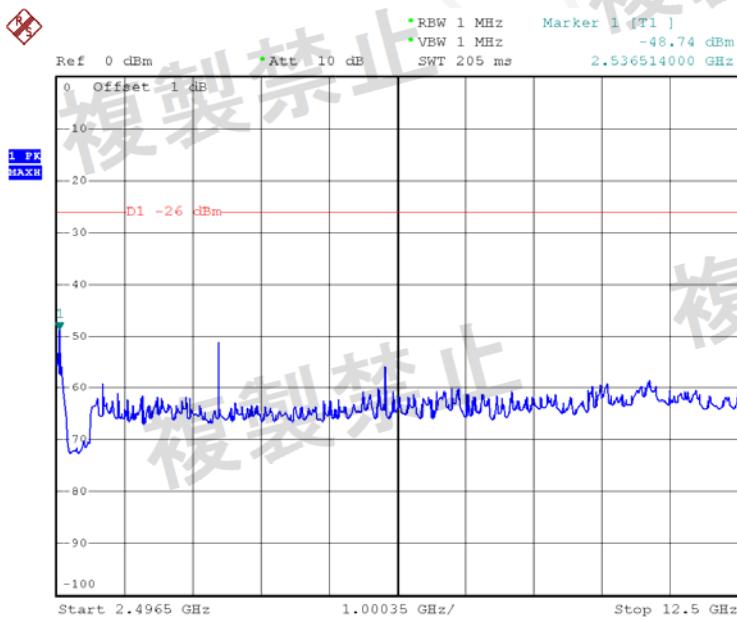
Date: 11.MAR.2019 14:09:12

2480MHz:

30MHz~1GHz
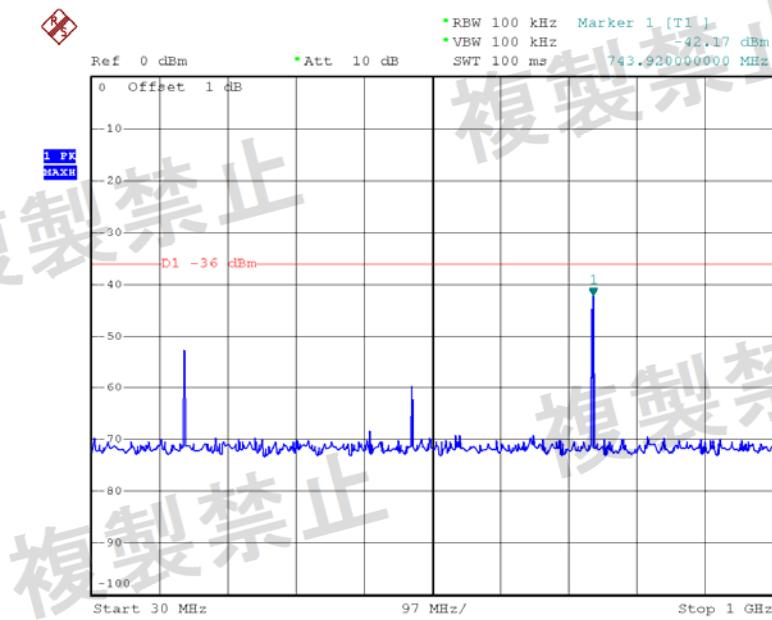
Date: 11.MAR.2019　14:11:41

1GHz~2.387GHz
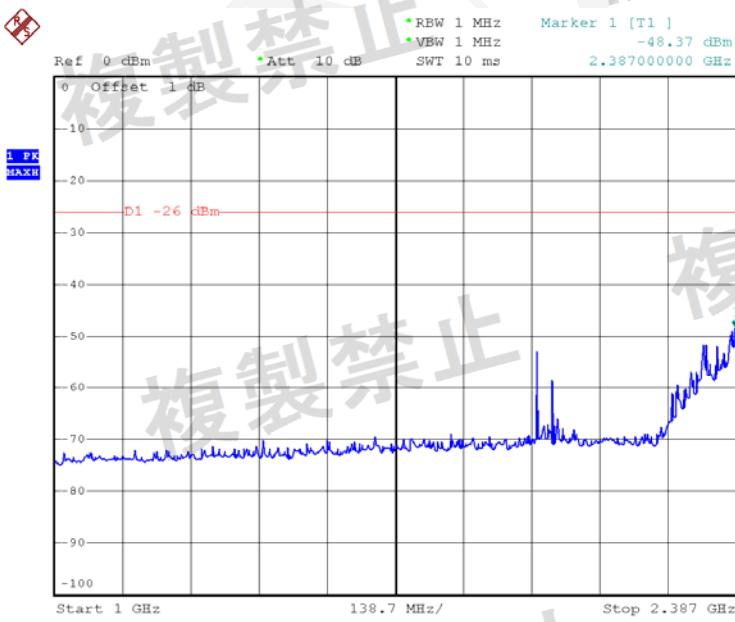
Date: 11.MAR.2019　14:12:18

2.387GHz~2.4GHz
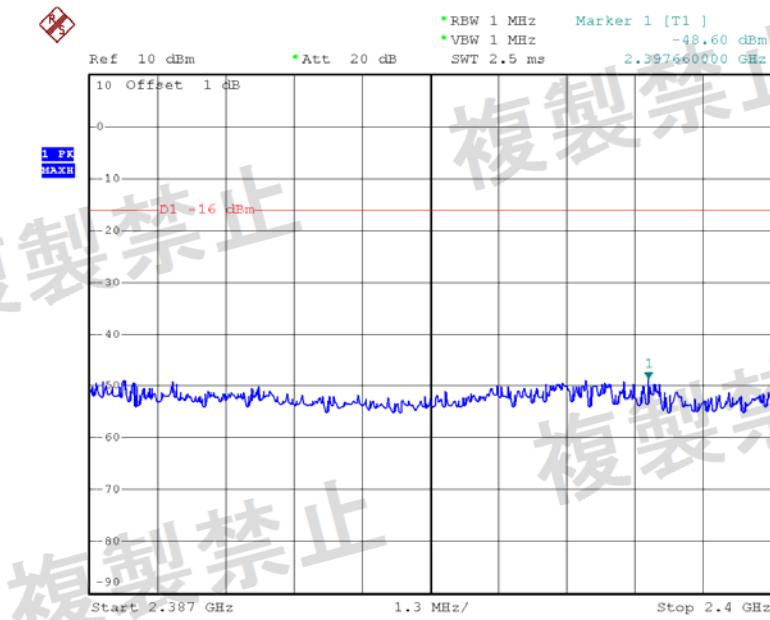
Date: 11.MAR.2019　14:20:30

## 2.4835GHz~2.4965GHz
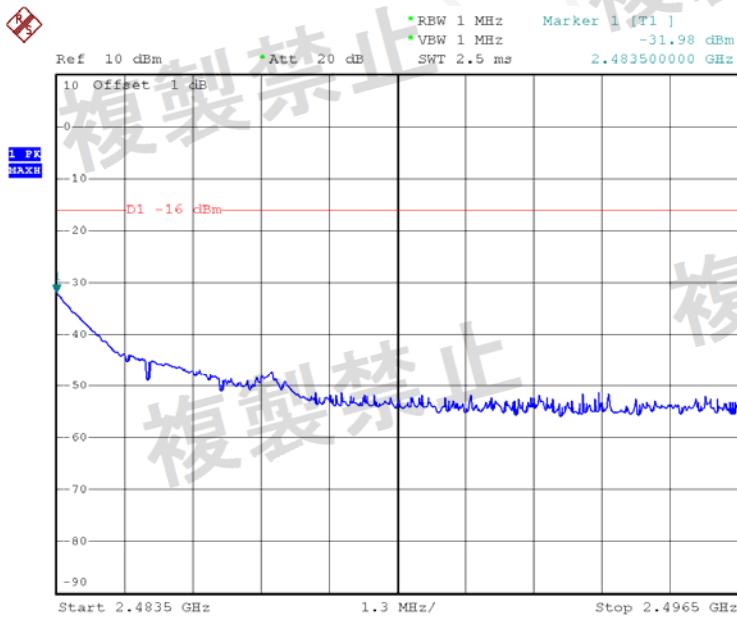

Date: 11.MAR.2019　14:14:07

2.4965GHz~12.5GHz
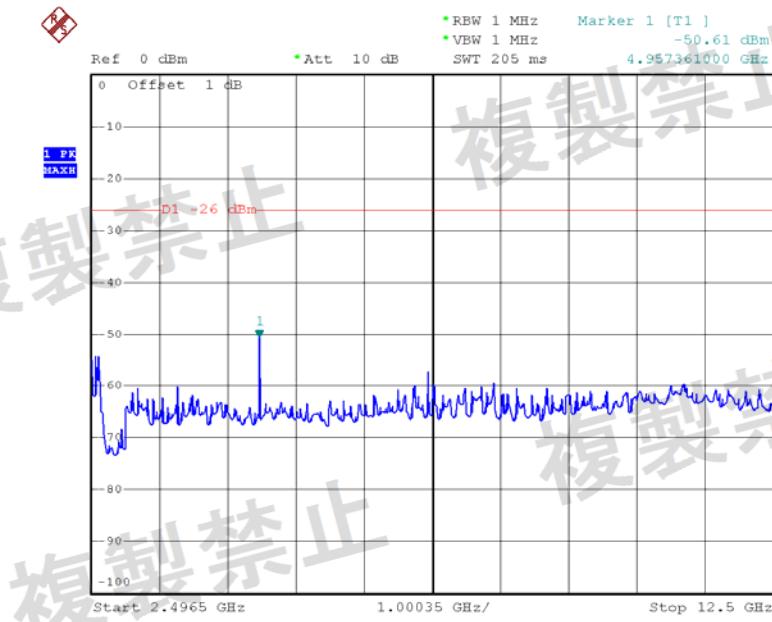
Date: 11.MAR.2019　14:15:29

ANTENNA OUTPUT POWER AND ANTENNA POWER TOLERANCE

Limit

- $\leqslant$ 3 mW /MHz(FHSS from 2402-2480 MHz which contains 2427-2470.75MHz)
- $\leqslant$ 10 mW/MHz (OFDM, DSSS from 2400-2483.5 MHz)
- $\leqslant$ 10 mW (other from 2400-2483.5 MHz)

The Output Power Tolerance must be within +20%, -80%.

- EIRP$\leqslant$ 6.91dBm/MHz(FHSS from 2402-2480 MHz)

Test Procedure

For FHSS UUT:
　Connect the UUT to the power meter in a state of hopping mode.

For OFDM, DSSS UUT:
Step 1:
Connect the UUT to the spectrum analyser and use the following settings:
  • Centre Frequency: The centre frequency of the channel under test.
  • RBW: 1 MHz.
  • VBW: 1 MHz.
  • Span: Wide enough to cover the complete power envelope of the signal of the UUT.
  • Detector: Peak.
  • Trace Mode: Max Hold.

Step 2:
When the trace is complete, find the peak value of the power envelope and record the frequency.

Step 3:
Make the following changes to the settings of the spectrum analyser:
  • Centre Frequency: Equal to the frequency recorded in step 2.
  • Span: 3 MHz.
  • RBW: 1 MHz.
  • VBW: 1 MHz.
  • Detector: Average (see note).

  • Trace Mode: Max Hold.

For other UUT:
Make the following changes to the settings of the spectrum analyser:
  • Centre Frequency: The centre frequency of the channel under test.
  • Span: 5MHz.
  • RBW: 3 MHz.
  • VBW: 10 MHz.
  • Detector: Peak
  • Trace Mode: Max Hold.

NOTE: The detector mode "Average" is often referred to as "RMS Average" or "Sample" but do not use Video Average.

When the trace is complete, capture the trace, for example using the "View" option on the spectrum analyser. For Find the peak value of the trace and place the analyser marker on this peak. This level is recorded as D.

D shall be recorded in the test report.

The maximum PD, which is e.i.r.p. PSD (spectral density power) or power, is calculated from the above measured value D, and the applicable antenna assembly gain "G" in dBi, according to the formula below. If more than one antenna assembly is intended for this power setting, the gain of the antenna assembly with the highest gain shall be used.

$PD = D + G$

Test Setup Block diagram
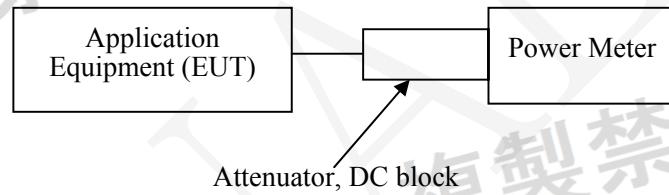
Attenuator, DC block

Test Data

Environmental Conditions

Temperature:	24.1 °C
Relative Humidity:	50 %
ATM Pressure:	101kPa

The testing was performed by Carrie He on 2019-03-11.

Test Result: Compliance

Test Mode: Transmitting

Mode	BDR (GFSK)	EDR (π/4-DQPSK)	EDR (8DPSK)	Limit
Voltage	**NV**	**NV**	**NV**	
Reading (dBm)	3.71	2.64	2.44	
Reading (mW)	2.35	1.84	1.75	
Spread Bandwidth (MHz)	72.00	70.80	71.60	
Duty Cycle (%)	30.00	30.00	30.00	
Antenna Output Power (mW/MHz)	0.1088	0.0866	0.0815	3mW/MHz
Antenna Output Power Tolerance (%)	8.80	-13.40	-18.50	+20% ~ -80%
EIRP (dBm/MHz)	-11.63	-12.62	-12.89	6.91dBm /MHz

Note:
1) Antenna Output power (mW/MHz) = Reading(mW)/Duty cycle (%)/Spread Bandwidth (MHz)
2) Antenna Output Power Tolerance = (Antenna Output power -Declared Power)/ Declared Power*100%
3) Declared Power: 0.1mW/MHz, the antenna gain is -2dBi.
Note 2: Transmission Antenna Gain and Transmission Radiation Angle Width are not required since EIRP less than
　　6.91dBm/MHz.

RECEIVER SPURIOUS EMISSION AND UNWANTED EMISSION INTENSITY

Limit

- ≤ 4 nW (30 MHz≤f≤1000 MHz)
- ≤ 20 nW (1 GHz≤f≤12.5 GHz)

Test Procedure

❖ Conditions of Application Equipment (EUT)

- The modulation state shall be "continuous receiving mode".

❖ Spectrum Analyzer Conditions

- Start Frequency: Start Frequency of frequency range to measure (30MHz or 1GHz)
- Stop Frequency: Stop Frequency of frequency range to measure (1GHz or 12.5GHz)
- Span: AUTO (Measurement Range)
- RBW: 100 kHz, VBW: 100 kHz for Frequency < 1 GHz
- RBW: 1MHz, VBW: 1MHz for Frequency > 1 GHz
- Sweep time: AUTO or more
- Sweep mode: Auto Sweep
- Detection: Positive Peak
- Reference Level: Enough level for maximum dynamic range

Measurement Result

Environmental Conditions

Temperature:	24.1 °C
Relative Humidity:	50 %
ATM Pressure:	101 kPa

The testing was performed by Carrie He on 2019-03-11.

Test Result: Compliance, please see the below tables and plots

Test Mode: Receiving

BDR (GFSK):

	Frequency band	2402MHz	2441MHz	2480MHz	Limit
		NV	NV	NV	
Raw data	Band VI (dBm)	-77.60	-78.93	-78.18	-54dBm(4nW)
	Band VII (dBm)	-68.07	-68.10	-68.19	-47dBm(20nW)

EDR (π/4-DQPSK):

	Frequency band	2402MHz	2441MHz	2480MHz	Limit
		NV	NV	NV	
Raw data	Band VI (dBm)	-78.99	-79.18	-78.32	-54dBm(4nW)
	Band VII (dBm)	-68.17	-68.43	-68.90	-47dBm(20nW)

EDR (8DPSK):

|	Frequency band	2402MHz	2441MHz	2480MHz	Limit
		NV	NV	NV	
Raw data	Band VI (dBm)	-78.99	-78.93	-79.34	-54dBm(4nW)
	Band VII (dBm)	-67.73	-68.74	-68.98	-47dBm(20nW)

Note:
Band VI：30MHz～1000MHz
Band VII：1000MHz～12500MHz

Please refer to the below plots for normal voltage test.

BDR (GFSK):
**2402MHz:**

30MHz~1GHz
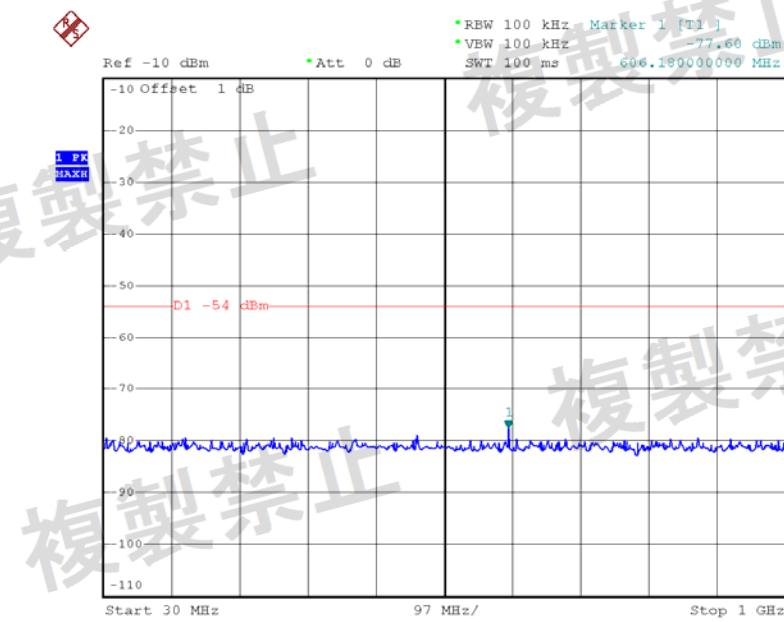
Date: 11.MAR.2019 15:42:48

1GHz~12.5GHz
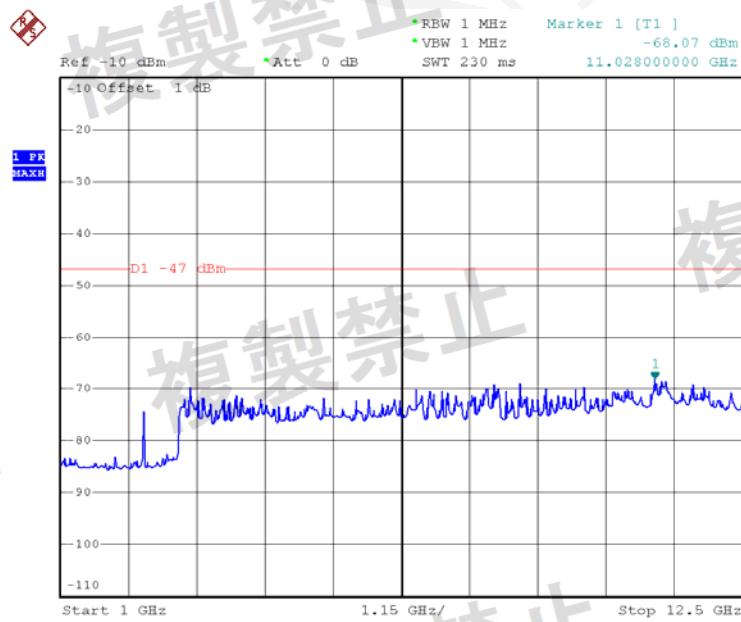
Date: 11.MAR.2019 15:43:10

2441MHz:

### 30MHz~1GHz
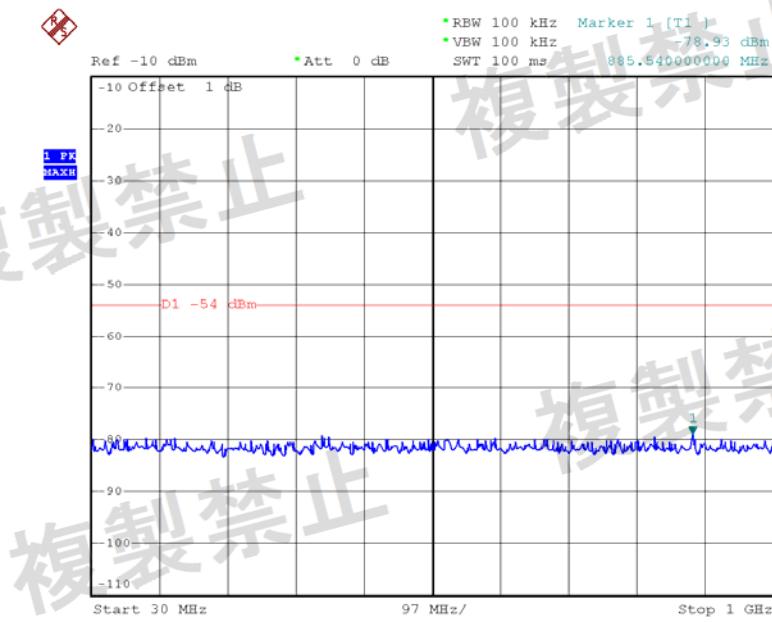
Date: 11.MAR.2019 15:44:45

1GHz~12.5GHz
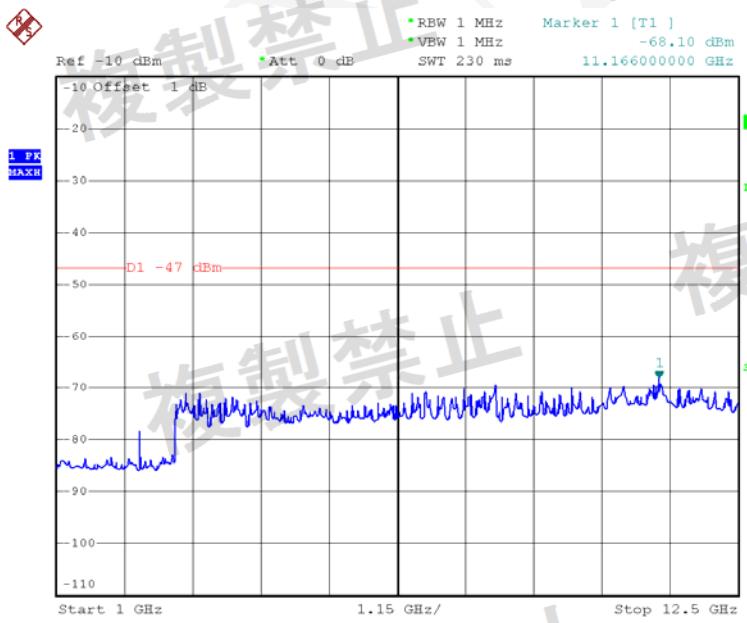
Date: 11.MAR.2019 15:45:02

2480MHz:

30MHz~1GHz
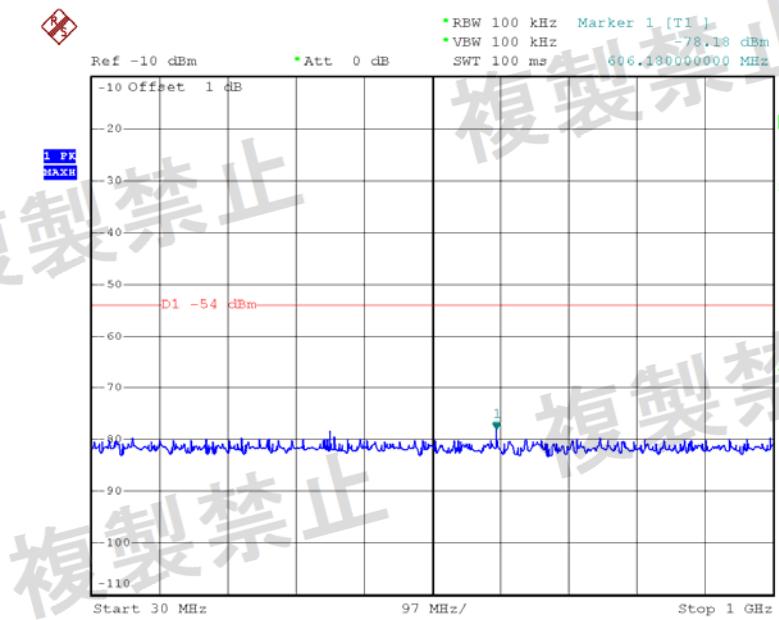
Date: 11.MAR.2019 15:46:28

1GHz~12.5GHz

Date: 11.MAR.2019 15:46:14

EDR (π/4-DQPSK):
2402MHz:

30MHz~1GHz


```
                              *RBW  100 kHz   Marker 1 [T1 ]
                              *VBW  100 kHz            -78.99 dBm
     Ref -10 dBm    *Att  0 dB  SWT  100 ms    666.320000000 MHz
     -10 Offset  1 dB
                                                                    A
      -20
  1 PK
  MAXH  -30
                                                                   LVL
      -40

      -50
      D1 -54 dBm
      -60
                                                                   3DB
      -70

      -80

      -90

     -100

     -110
     Start 30 MHz          97 MHz/              Stop 1 GHz
```
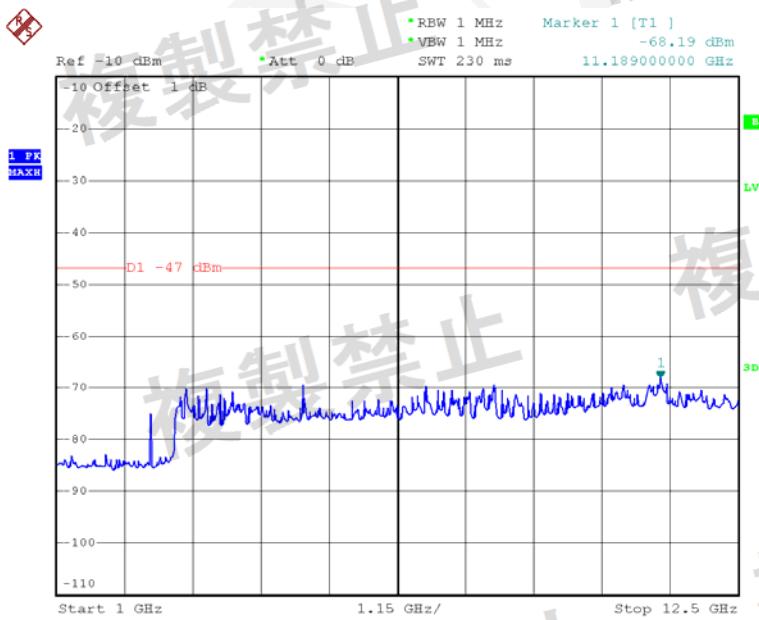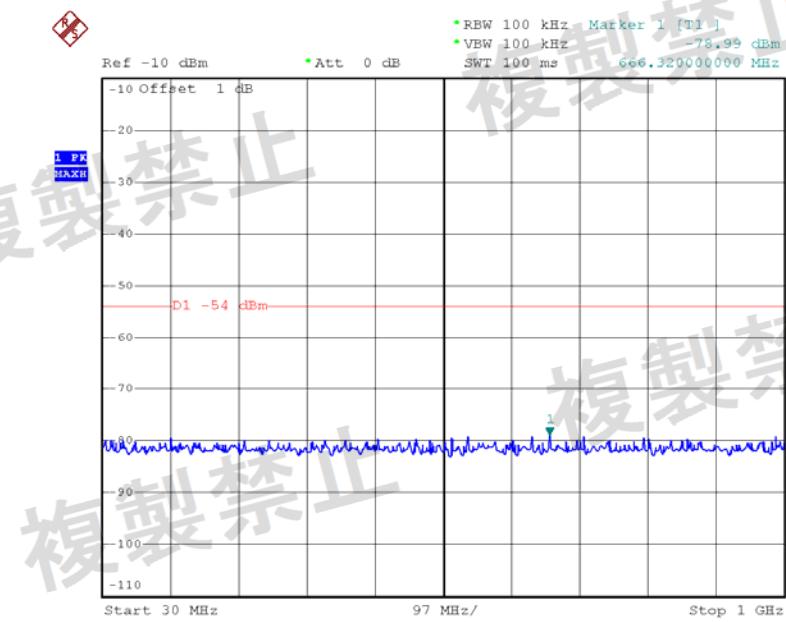
Date: 11.MAR.2019 15:47:28

1GHz~12.5GHz


```
                              *RBW  1 MHz    Marker 1 [T1 ]
                              *VBW  1 MHz             -68.17 dBm
     Ref -10 dBm    *Att  0 dB  SWT  230 ms    11.189000000 GHz
     -10 Offset  1 dB
                                                                    B
      -20
  1 PK
  MAXH  -30
                                                                   LVL
      -40

      -50
      D1 -47 dBm
      -60
                                                                   3DB
      -70

      -80

      -90

     -100

     -110
     Start 1 GHz          1.15 GHz/              Stop 12.5 GHz
```
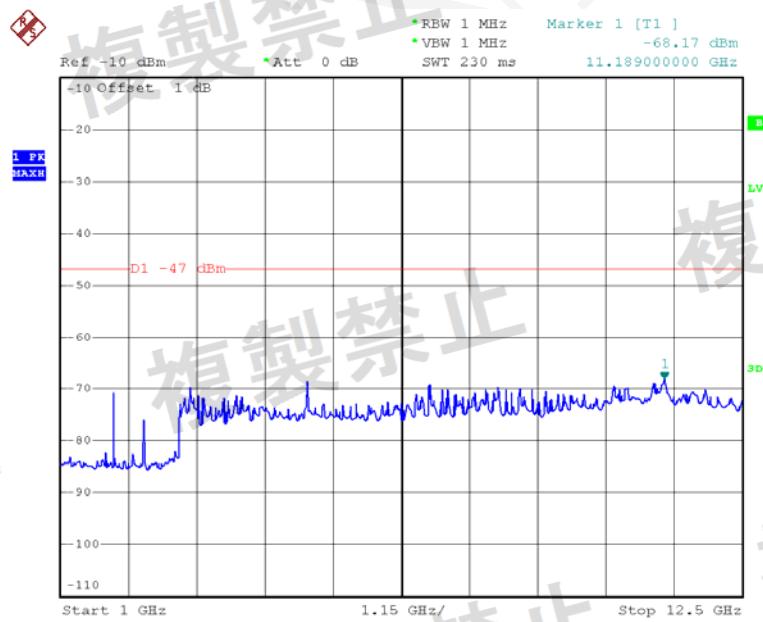
Date: 11.MAR.2019 15:47:49

2441MHz:

30MHz~1GHz
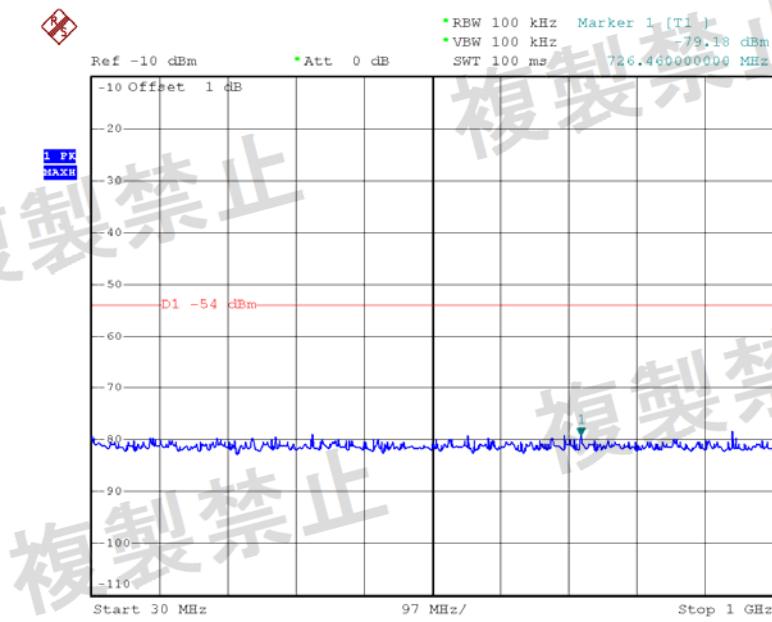

Date: 11.MAR.2019　15:48:33

1GHz~12.5GHz
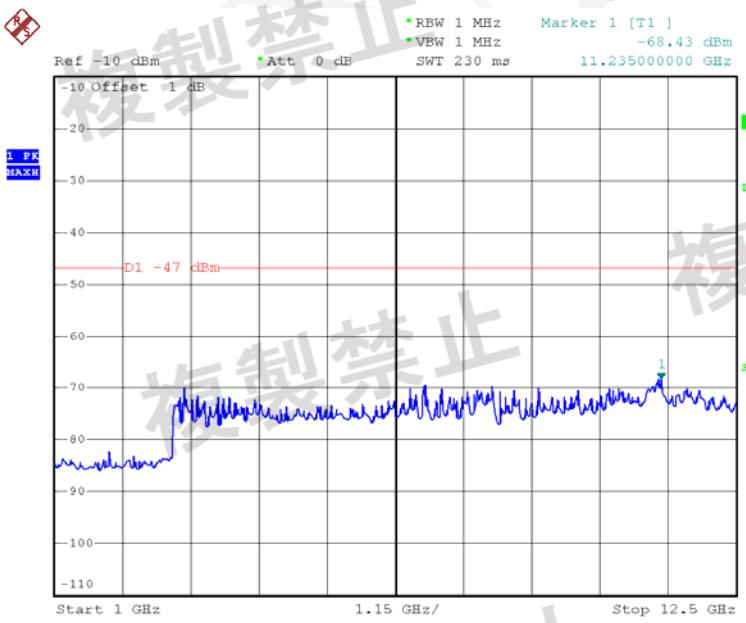
Date: 11.MAR.2019　15:48:18

2480MHz:

30MHz~1GHz
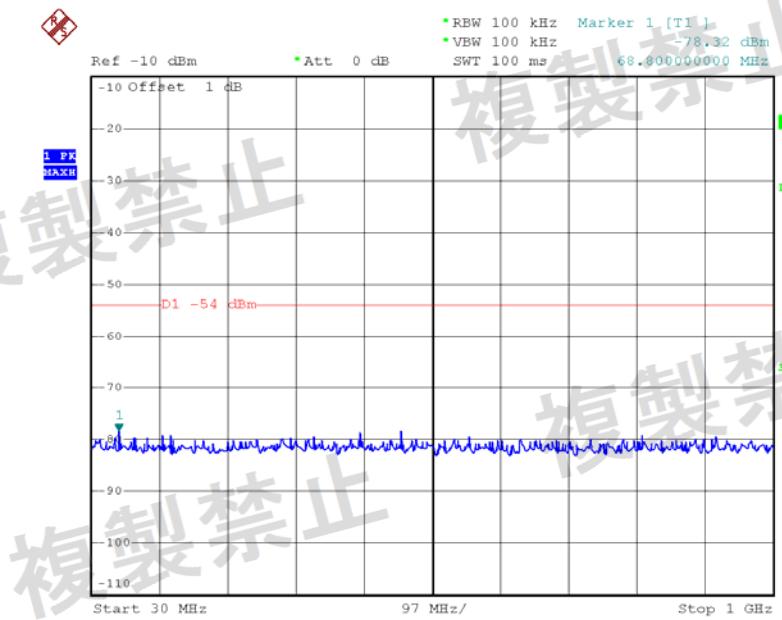
Date: 11.MAR.2019 15:49:00

1GHz~12.5GHz
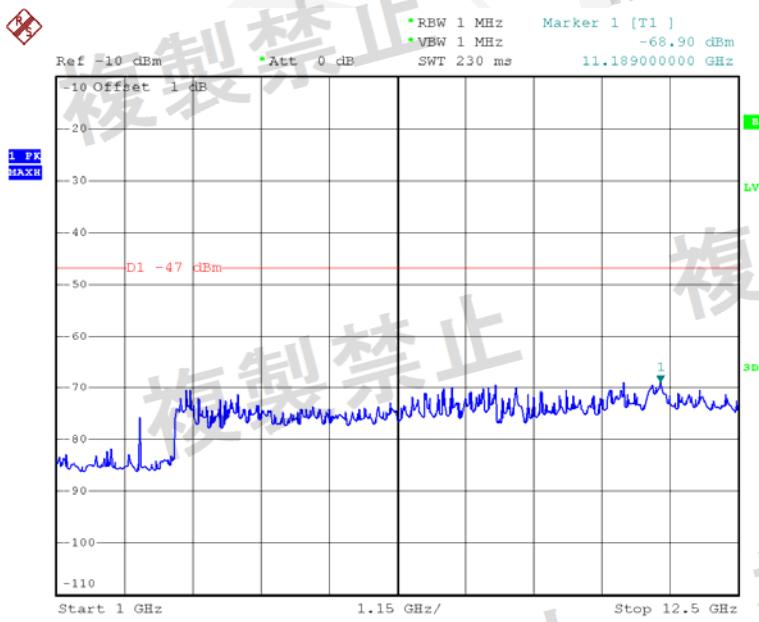
Date: 11.MAR.2019 15:49:15

EDR (8DPSK):
**2402MHz:**

30MHz~1GHz
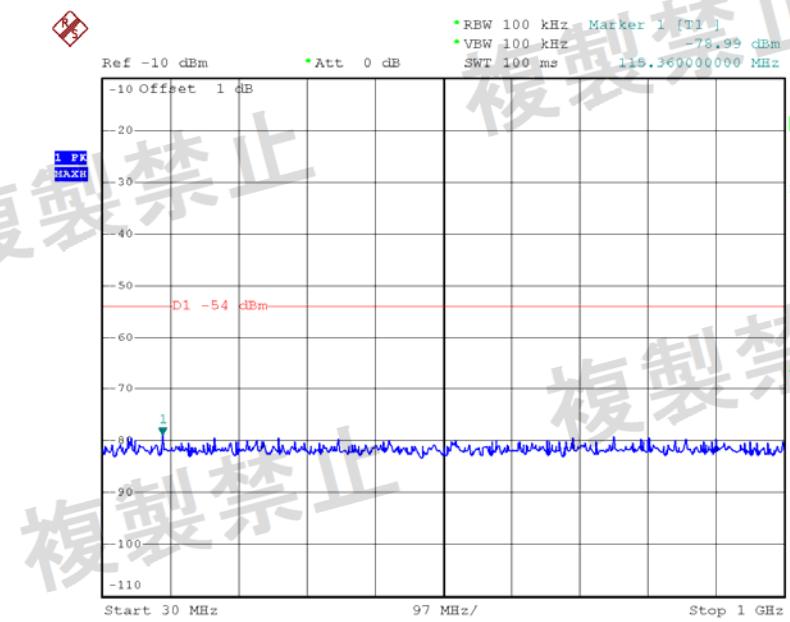
Date: 11.MAR.2019　15:50:11

### 1GHz~12.5GHz
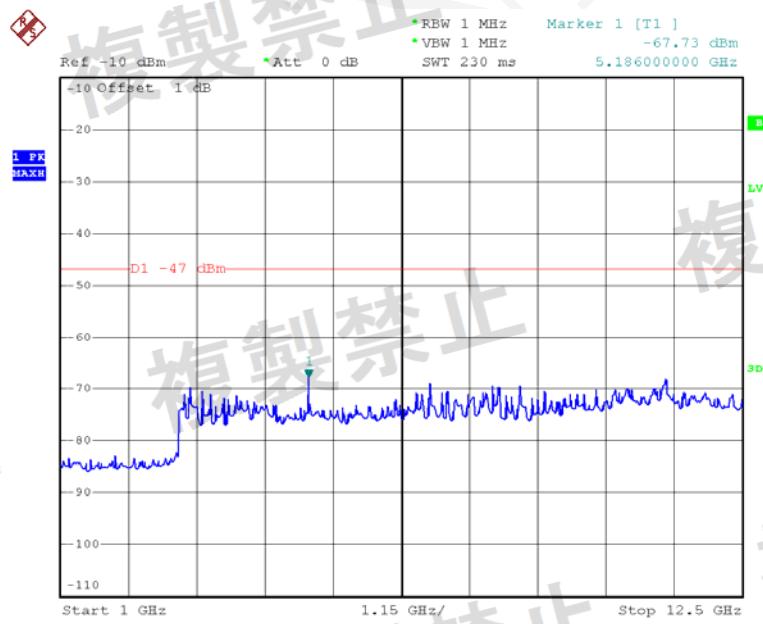
Date: 11.MAR.2019　15:49:56

2441MHz:

30MHz~1GHz
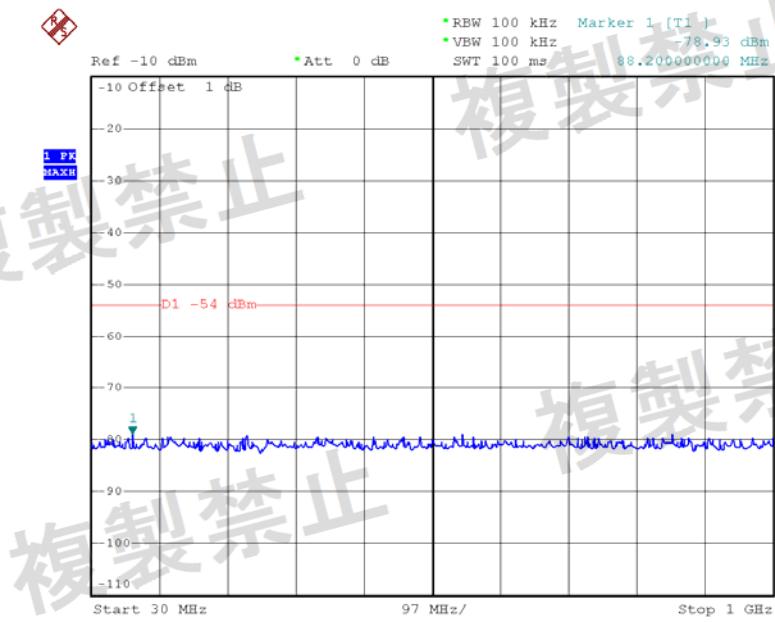


Date: 11.MAR.2019 15:50:40

1GHz~12.5GHz
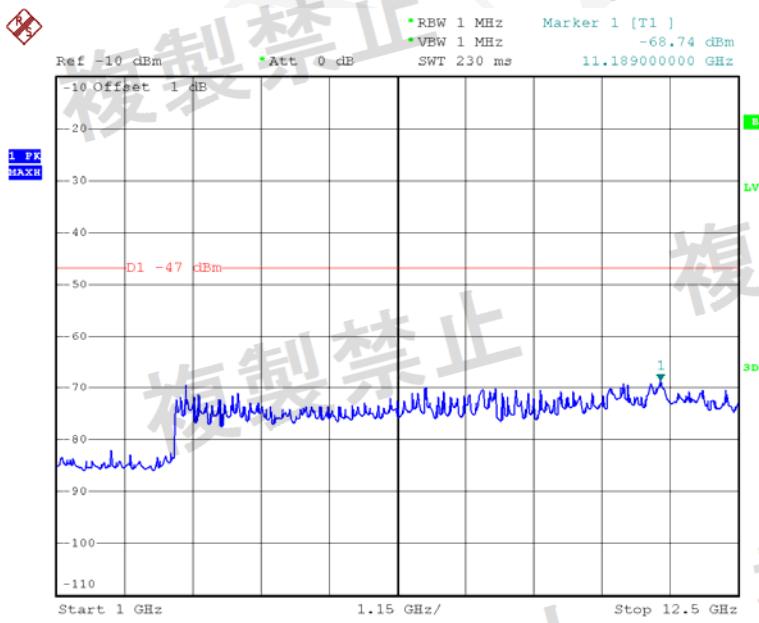
Date: 11.MAR.2019 15:50:54

2480MHz:

30MHz~1GHz
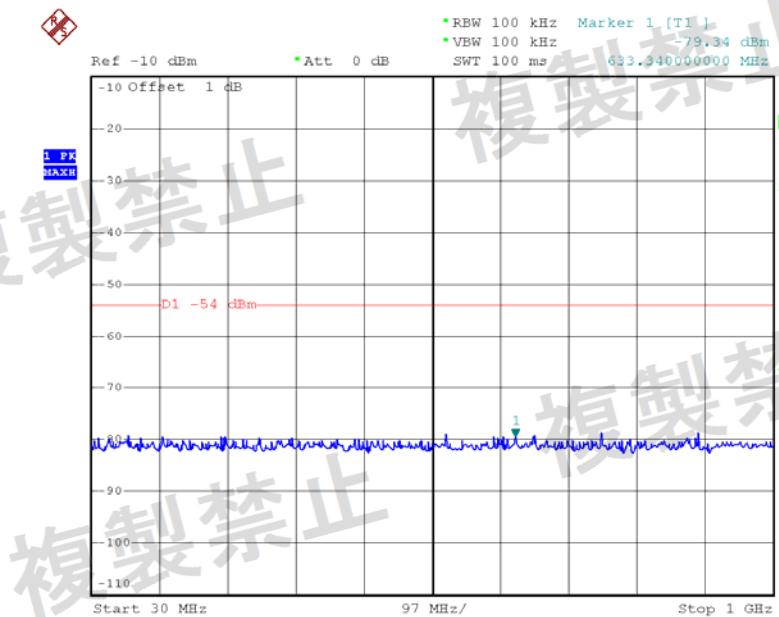
Date: 11.MAR.2019 15:51:23

1GHz~12.5GHz
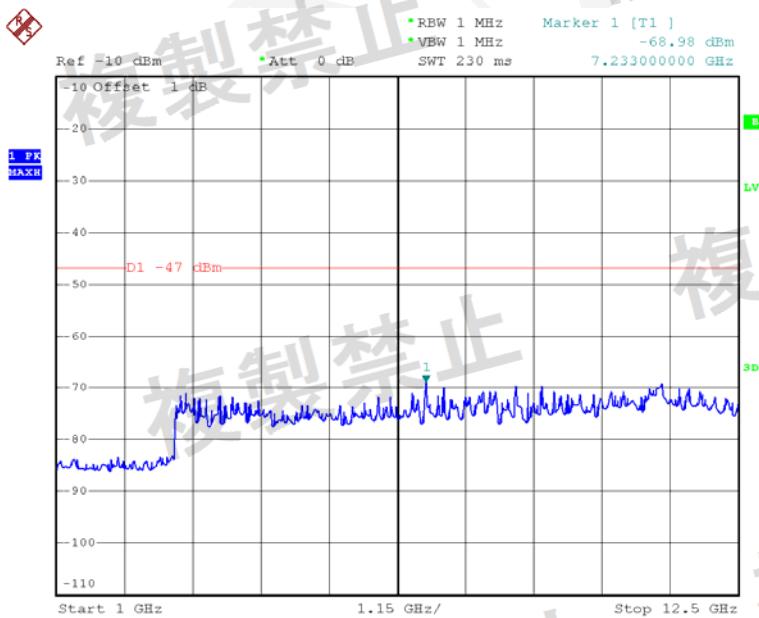
Date: 11.MAR.2019 15:51:35

FREQUENCY HOPPING DWELL TIME

Applicable Standard

According to Radio Law Radio Equipment Regulations Article 49-20, frequency dwell time is 0.4 seconds or below.

Test Procedure

❖ Conditions of Application Equipment（EUT）

- Set the application equipment (EUT) to the measurement frequency.
- The modulation state shall be "continuous (burst) transmission mode". If impossible, it shall be "continuous frequency-hopping mode".

❖ Spectrum Analyzer Conditions

For spreading bandwidth：
- Span: 200MHz
- RBW: 300kHz, VBW: 300kHz
- Log scale: 10dB/Div, Data points: 501points (400 points or more)
- Detection: Positive Peak, Sweep mode: Continuous

For duty cycle：
- Center Frequency: 2441.0 MHz
- RBW/VBW: 3MHz
- Log scale: 10dB/Div, Data points: 501points (400 points or more)
- Detection: Positive Peak, Sweep mode: Single

For hopping number：
- Center Frequency: 2441.0 MHz
- RBW/VBW: 1MHz
- Log scale: 10dB/Div, Data points: 501points (400 points or more)
- Detection: Positive Peak, Sweep mode: Single

Test Data

Environmental Conditions

Temperature:	24.1 °C
Relative Humidity:	50 %
ATM Pressure:	101kPa

The testing was performed by Carrie He on 2019-03-11.

Test Result: Compliance

BDR Mode (GFSK):

Mode	Spreading bandwidth (MHz)	duty cycle			Observed Period (s)	Hops in Observed Period	Dwell Time (s)	Limit (s)	Result
		T_{on} (ms)	$T_{on}+T_{off}$ (ms)	$T_{on}/(T_{on}+T_{off})$ (%)					
DH 1	72.000	0.380	1.260	30.00	28.80	154.00	0.06	0.4	Pass
DH 3	72.000	1.650	2.510	66.00	28.80	111.00	0.18	0.4	Pass
DH 5	72.000	2.880	3.750	77.00	28.80	63.00	0.18	0.4	Pass

EDR Mode (π/4-DQPSK):

Mode	Spreading bandwidth (MHz)	duty cycle			Observed Period (s)	Hops in Observed Period	Dwell Time (s)	Limit (s)	Result
		T_{on} (ms)	$T_{on}+T_{off}$ (ms)	$T_{on}/(T_{on}+T_{off})$ (%)					
2DH 1	70.800	0.380	1.250	30.00	28.32	152.00	0.06	0.4	Pass
2DH 3	71.600	1.650	2.510	66.00	28.64	113.00	0.19	0.4	Pass
2DH 5	72.000	2.870	3.740	77.00	28.80	62.00	0.18	0.4	Pass

EDR Mode (8DPSK):

Mode	Spreading bandwidth (MHz)	duty cycle			Observed Period (s)	Hops in Observed Period	Dwell Time (s)	Limit (s)	Result
		T_{on} (ms)	$T_{on}+T_{off}$ (ms)	$T_{on}/(T_{on}+T_{off})$ (%)					
3DH 1	71.600	0.380	1.250	30.00	28.64	151.00	0.06	0.4	Pass
3DH 3	71.600	1.650	2.530	65.00	28.64	110.00	0.18	0.4	Pass
3DH 5	71.600	2.890	3.760	77.00	28.64	63.00	0.18	0.4	Pass

Note: Dwell time = Time per one hopping (On time) * hopping number (within the time obtained by multiplying the spread rate by 0.4s)

For Bluetooth device, spread rate equal to spread bandwidth.

BDR Mode (GFSK):

DH 1 Spread bandwidth
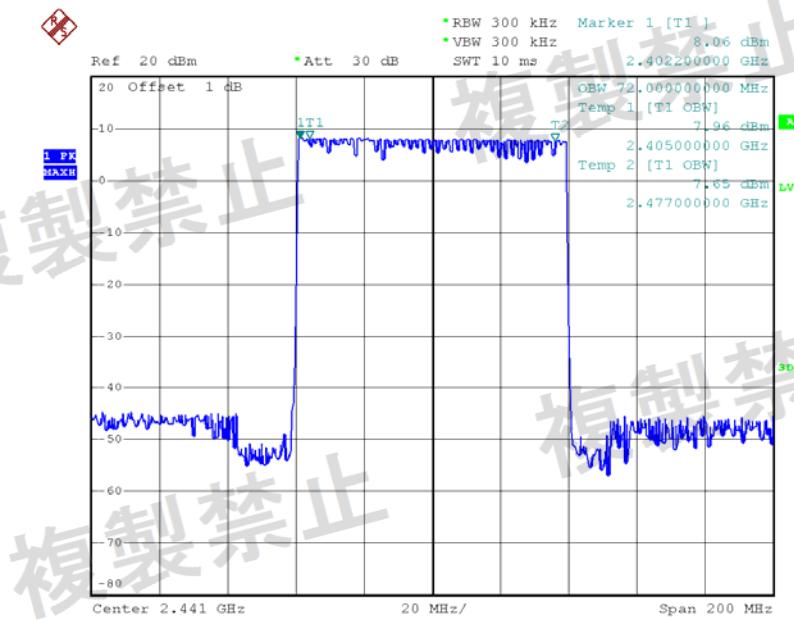

Date: 11.MAR.2019 14:39:57

DH 1 Duty cycle
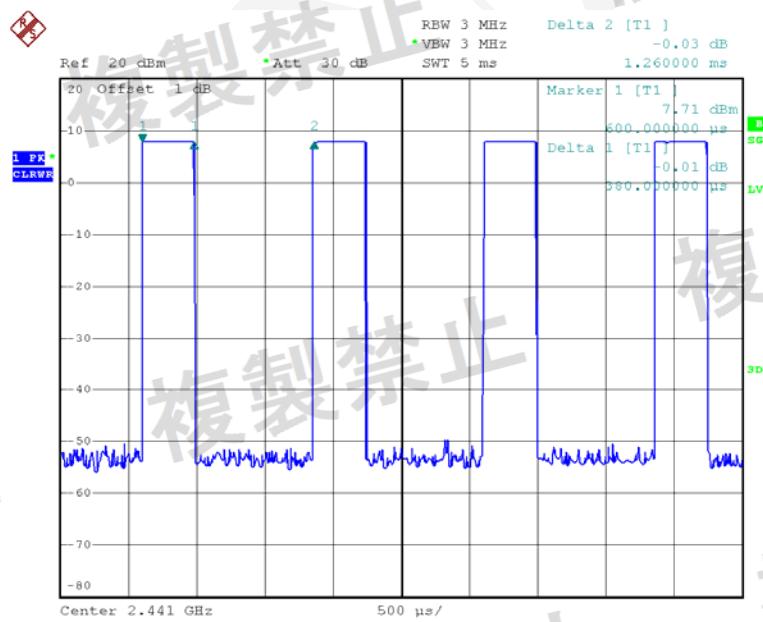
Date: 11.MAR.2019 13:16:50

DH 1 Hopping number

Date: 11.MAR.2019 15:13:59
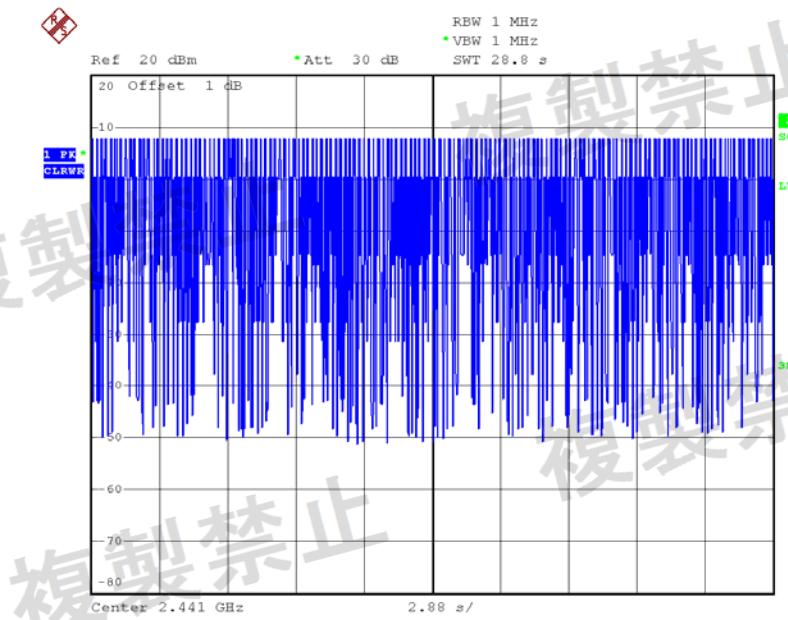
## DH 3 Spread bandwidth
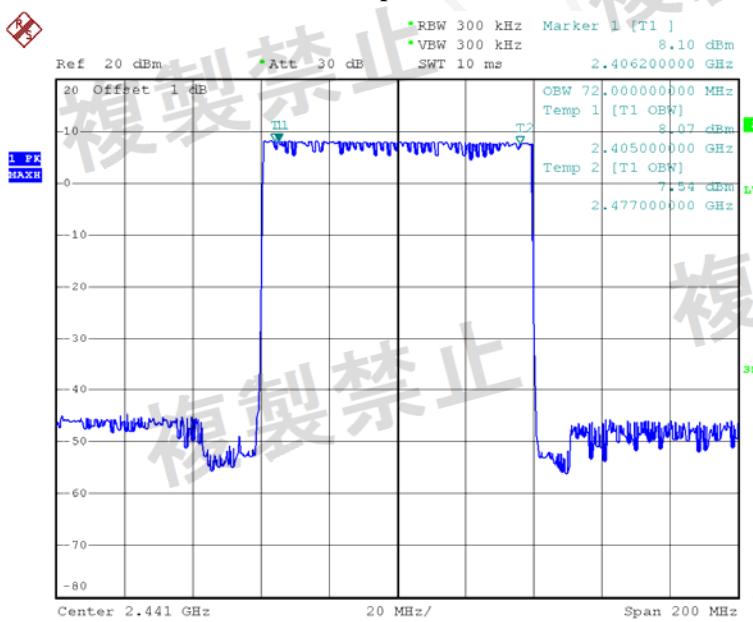
Date: 11.MAR.2019 15:05:23

DH 3 Duty cycle
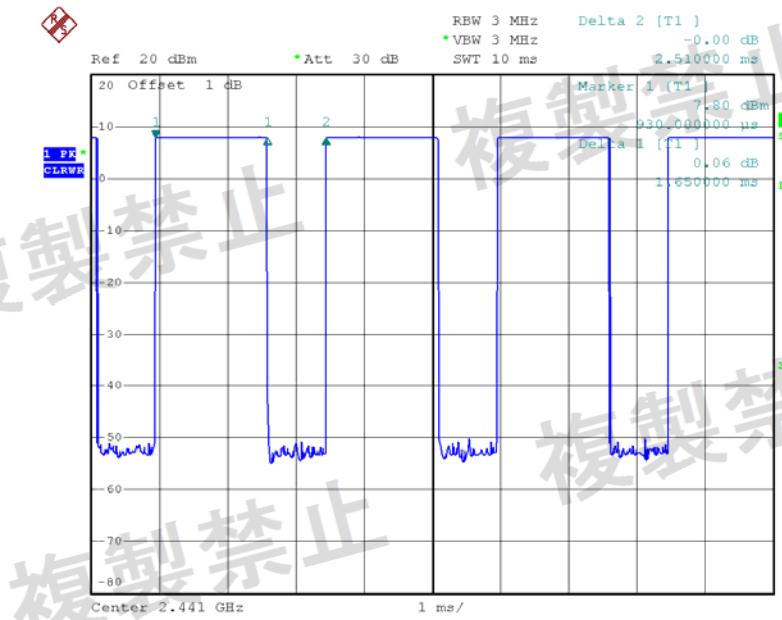
Date: 11.MAR.2019　14:26:44

## DH 3 Hopping number
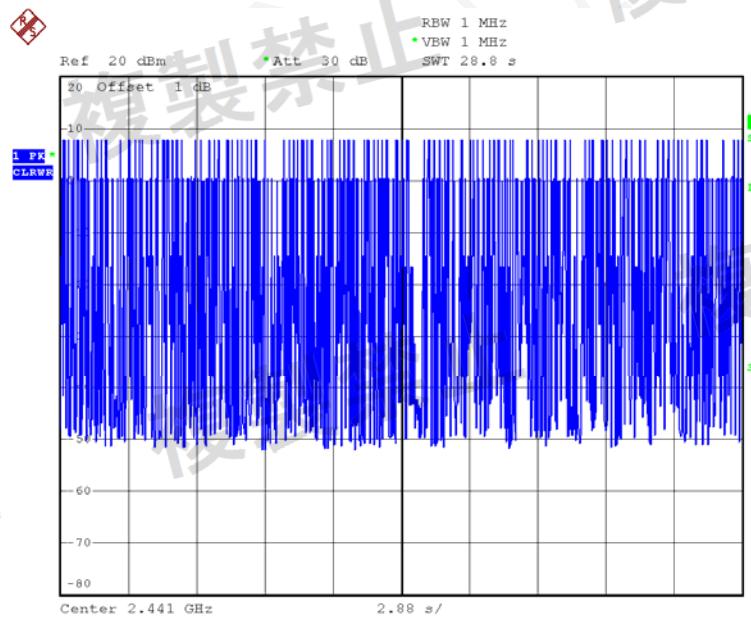

Date: 11.MAR.2019　15:16:14

DH 5 Spread bandwidth
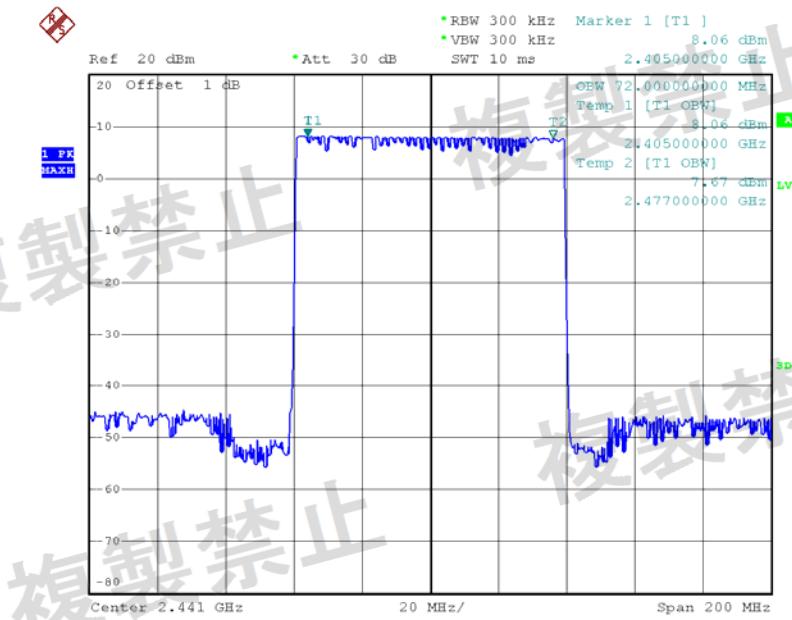

Date: 11.MAR.2019　15:07:37

DH 5 Duty cycle
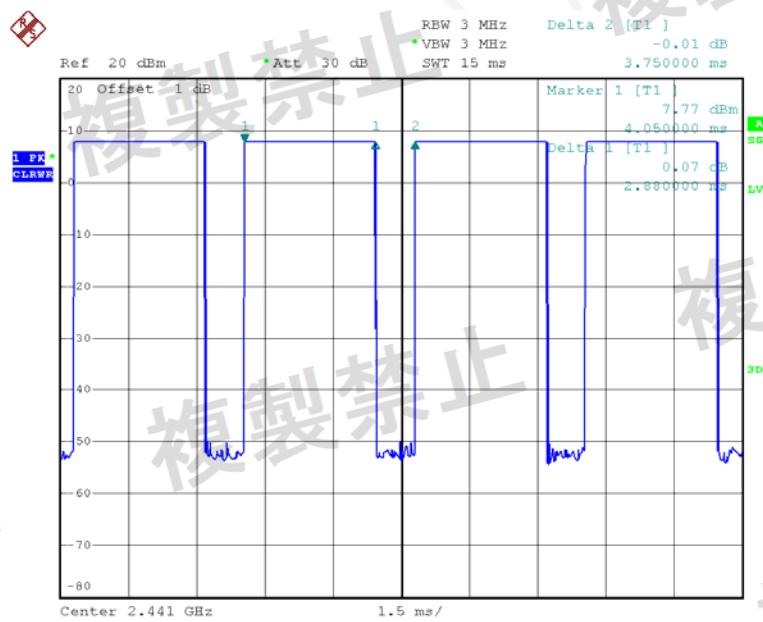
Date: 11.MAR.2019　14:27:40

DH 5 Hopping number
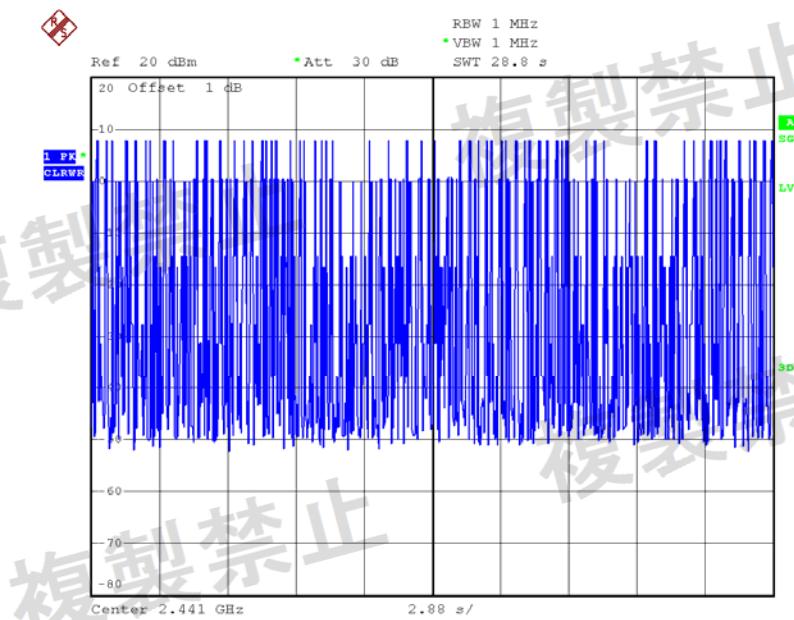
Date: 11.MAR.2019 15:17:50

EDR Mode (π/4-DQPSK):

2DH 1 Spread bandwidth
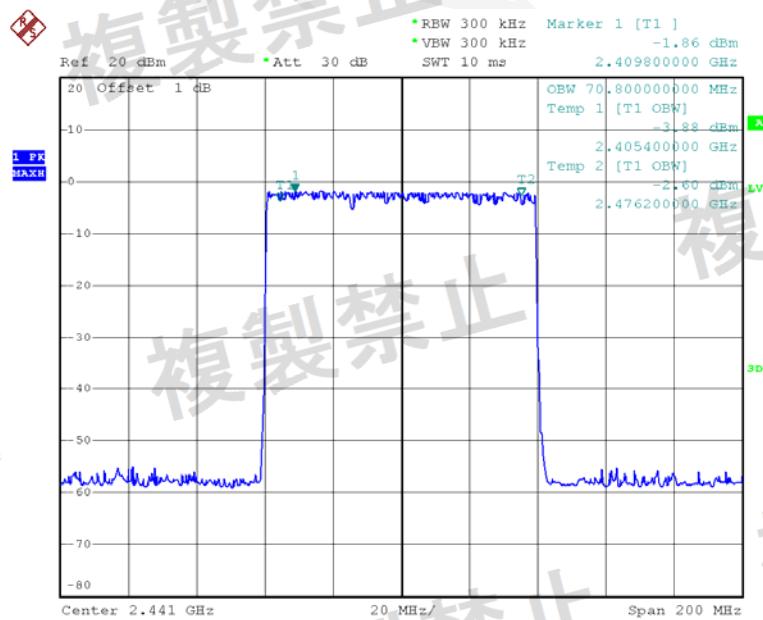
Date: 11.MAR.2019 14:42:39

2DH 1 Duty cycle
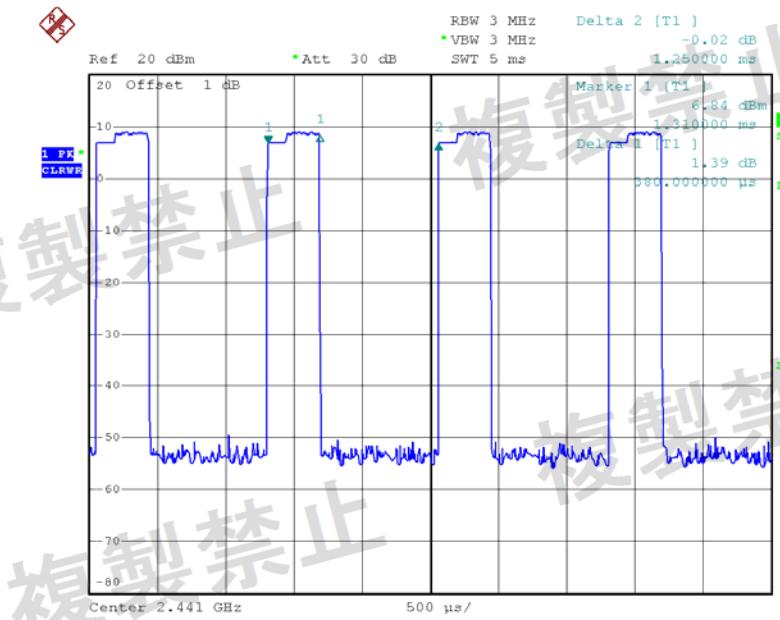

Date: 11.MAR.2019 13:34:32

2DH 1 Hopping number
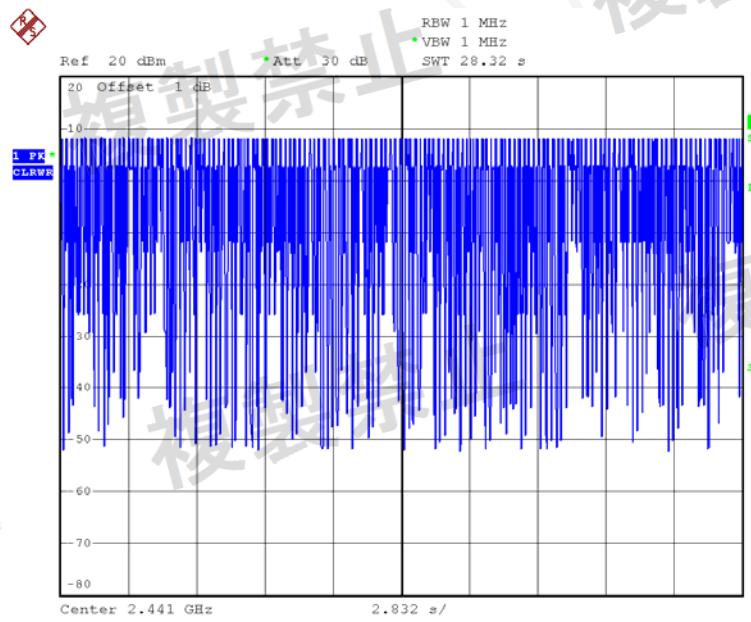
Date: 11.MAR.2019 15:19:47

2DH 3 Spread bandwidth
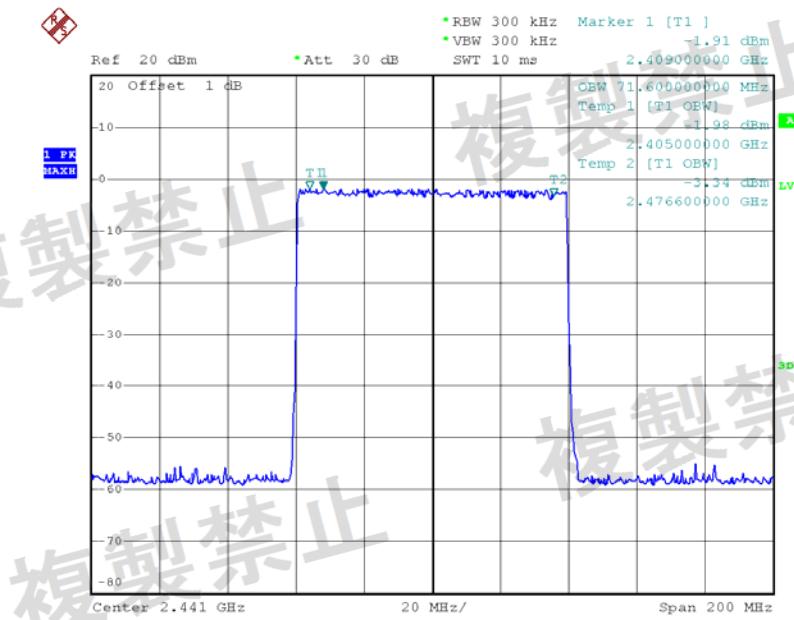
Date: 11.MAR.2019 14:55:19

2DH 3 Duty cycle
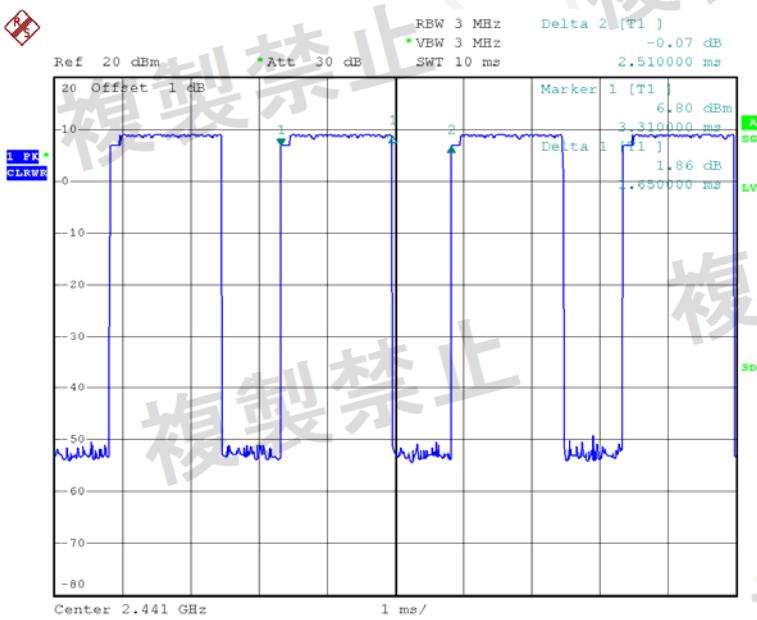
Date: 11.MAR.2019 14:32:03

2DH 3 Hopping number
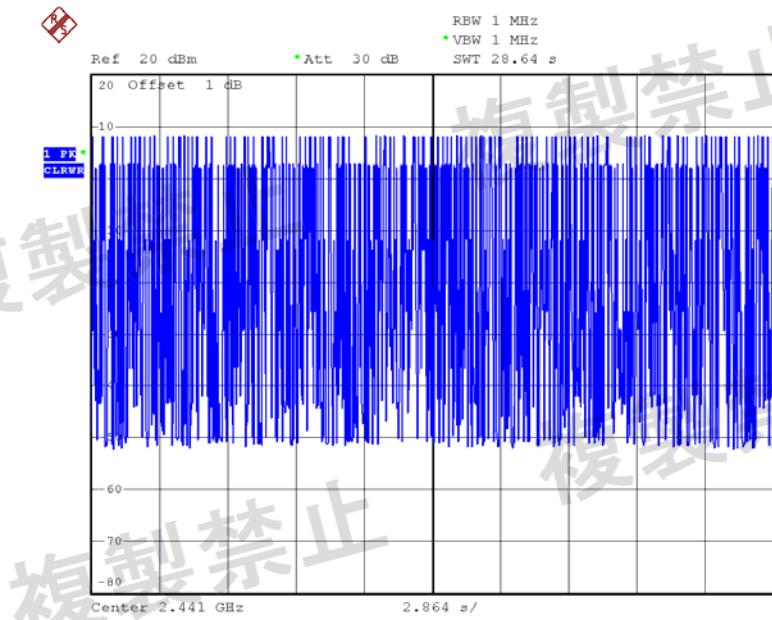
Date: 11.MAR.2019　15:21:45

2DH 5 Spread bandwidth
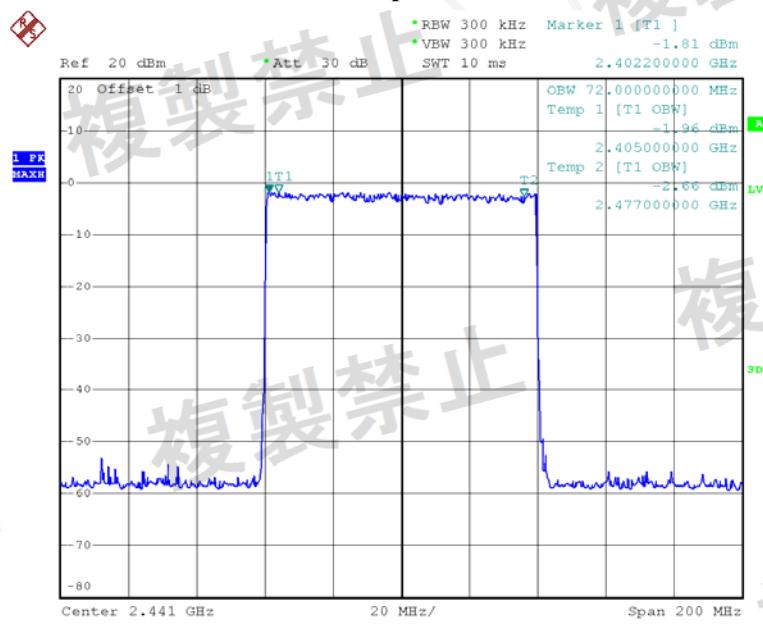
Date: 11.MAR.2019　14:56:37

2DH 5 Duty cycle
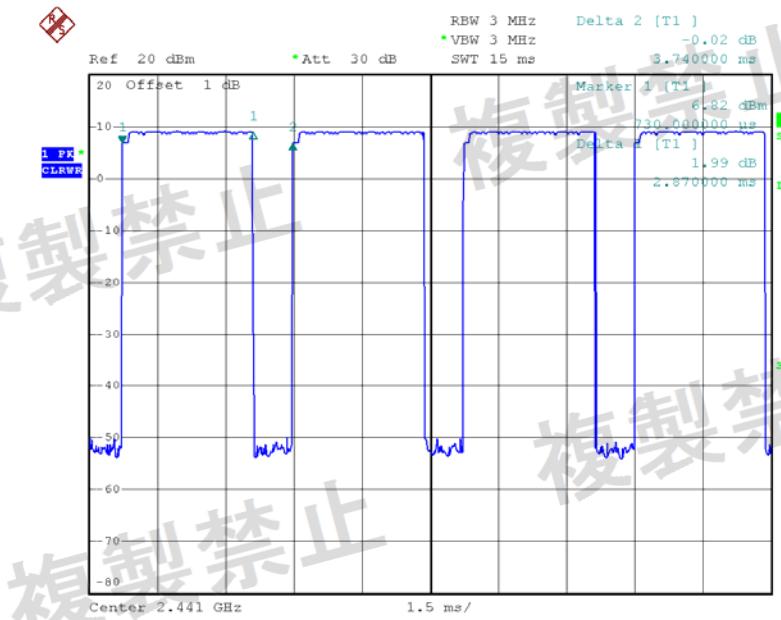
Date: 11.MAR.2019　14:32:57

2DH 5 Hopping number
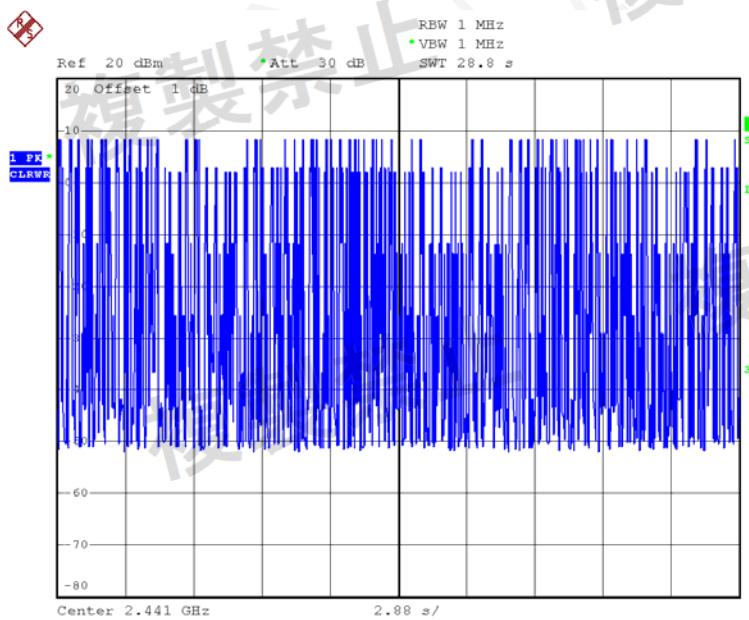
Date: 11.MAR.2019　15:25:02

EDR Mode (8DPSK):

3DH 1 Spread bandwidth
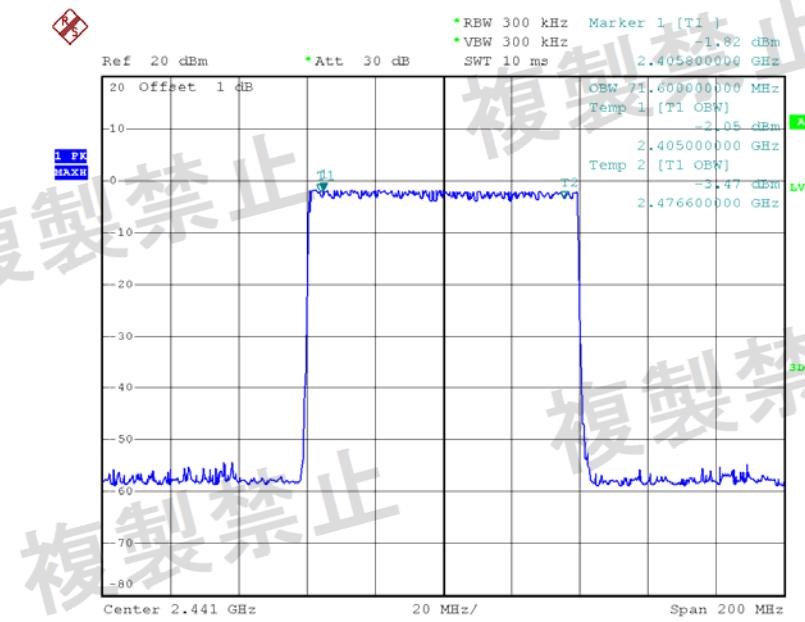
Date: 11.MAR.2019 14:50:10

3DH 1 Duty cycle
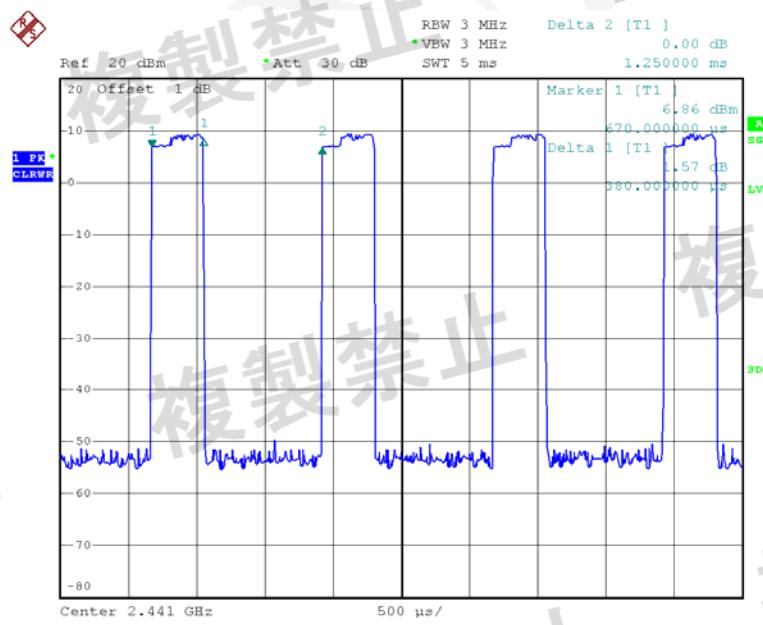
Date: 11.MAR.2019 14:06:29

## 3DH 1 Hopping number
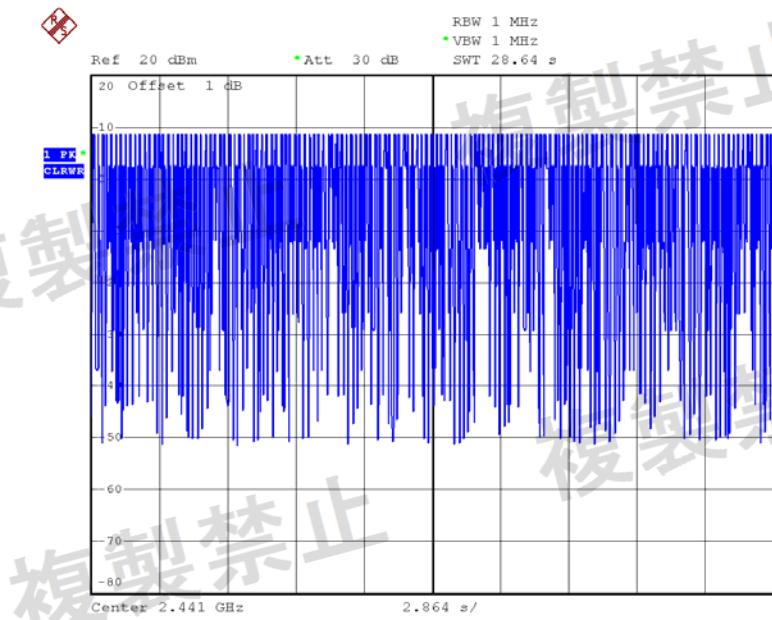
Date: 11.MAR.2019   15:26:57

3DH 3 Spread bandwidth
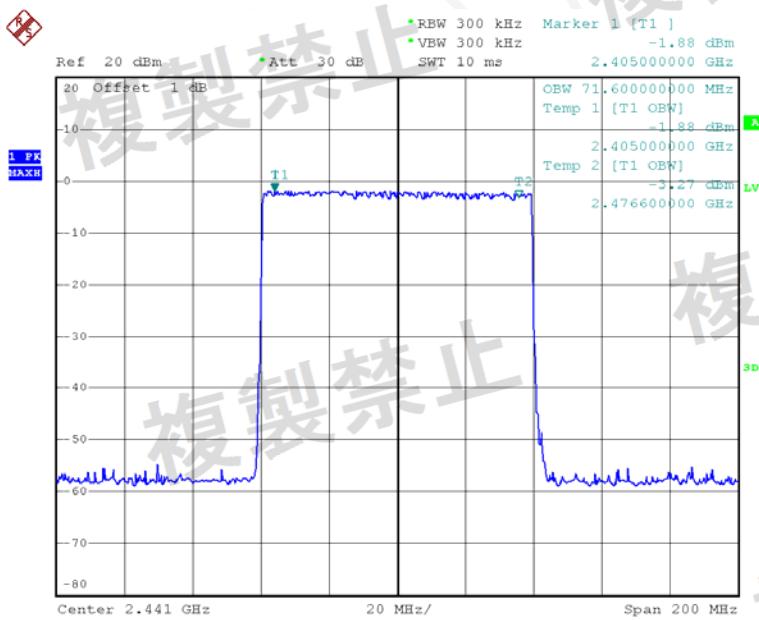
Date: 11.MAR.2019   14:58:40

3DH 3 Duty cycle
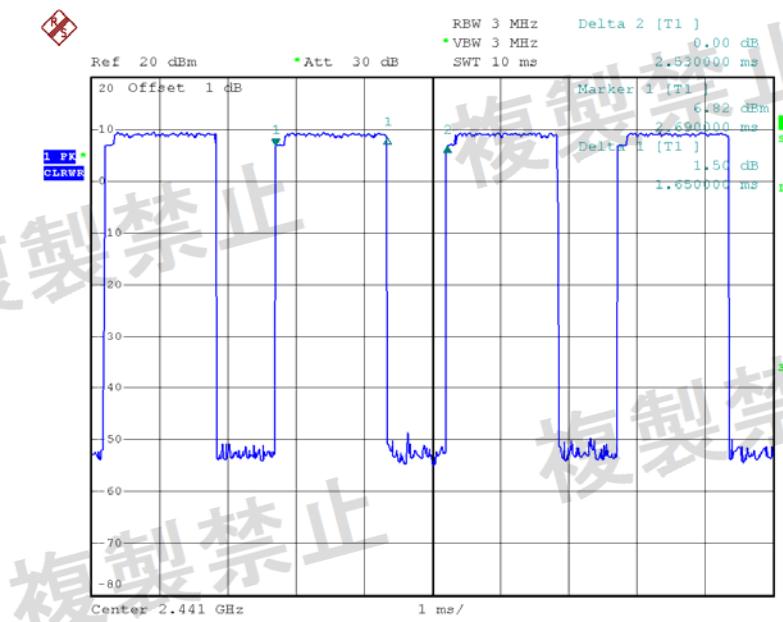
Date: 11.MAR.2019　14:28:48

3DH 3 Hopping number
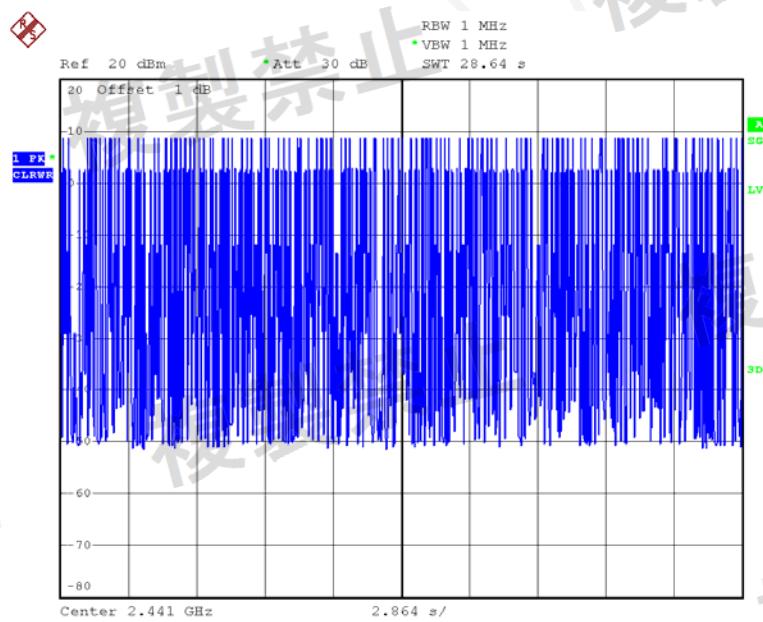
Date: 11.MAR.2019　15:29:03

3DH 5 Spread bandwidth
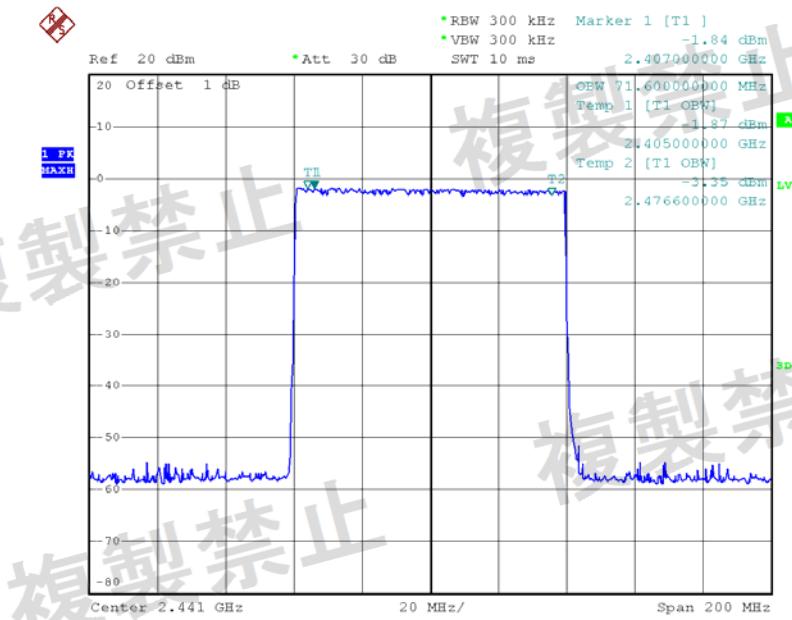
Date: 11.MAR.2019　15:00:48

3DH 5 Duty cycle
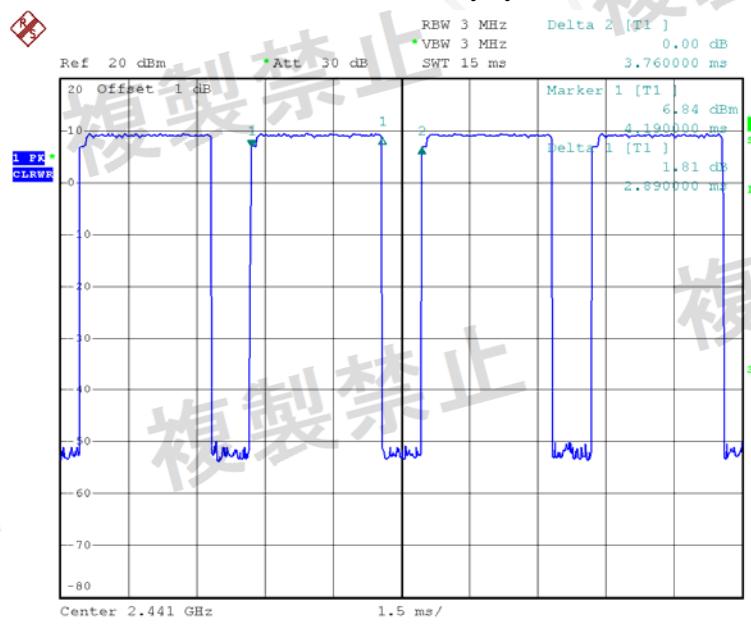
Date: 11.MAR.2019　14:30:55

3DH 5 Hopping number


```
                                    RBW 1 MHz
                                   *VBW 1 MHz
Ref  20 dBm          *Att  30 dB    SWT 28.64 s
20  Offset  1 dB
```
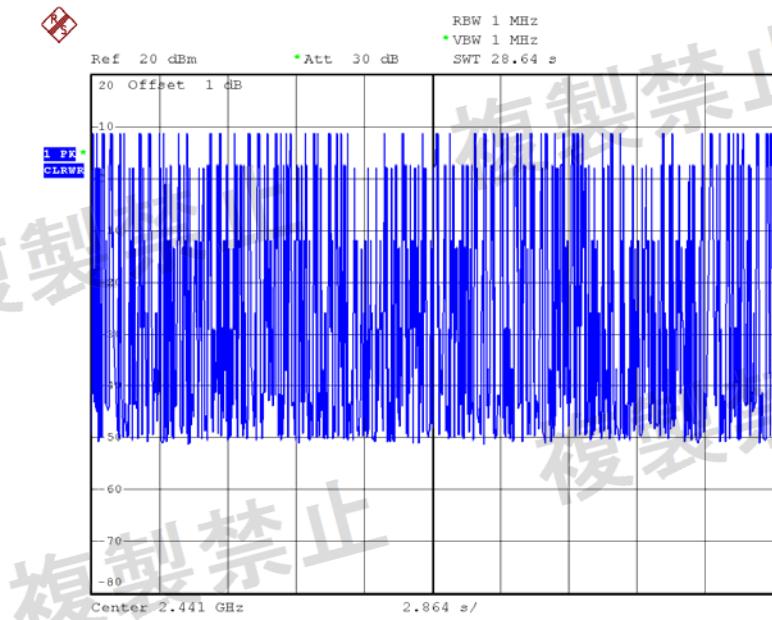
Date: 11.MAR.2019 15:30:36

INTERFERENCE PREVENTION FUNCTION

Requirement

The EUT shall have the interference prevention capability to transmit or to receive the identification automatically, so that sender and receiver shall exclude other equipment.

Test Procedure

In the case that the EUT has the function of automatically transmitting the identification code:
1. Transmit the predetermined identification codes from EUT
2. Check the transmitted identification codes with the demodulator.

In the case of receiving the identification codes:
1. Transmit the predetermined identification codes from the counterpart.
2. Check if communication is normal
3. Transmit the signal other than predetermined ID codes from the counterpart.
4. Check if the EUT stops the transmission, or if it displays that identification codes are different from the predetermined ones.

Measurement Result

Environmental Conditions

Temperature:	24.1 °C
Relative Humidity:	50 %
ATM Pressure:	101 kPa

The testing was performed by Carrie He on 2019-03-11.

Test Result: Good

CONSTRUCTION PROTECTION CONFIRMATION

Limit

The high-frequency section and modulation section of the radio equipment except for the antenna system shall not be capable of being opened easily.

Confirmation Method

The EUT has shielding cover the high-frequency section except for the antenna system, the shielding can`t be opened easily. Please refer the EUT photo.

****END OF REPORT****