

# Japan radio Test Report

Report No.: AGC03991190301TE01

**PRODUCT DESIGNATION** : Wireless Keypad  
**BRAND NAME** : N/A  
**TEST MODEL** : 3R-KCWNK01  
**CLIENT** : 3R SYSTEMS CORP. JAPAN  
**DATE OF ISSUE** : Apr. 12, 2019  
**STANDARD(S)** : Article 2 Paragraph 1 Item 19 of the Certification,  
MIC Notice No.88 Appendix No.43  
**REPORT VERSION** : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd.

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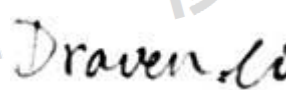
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## 1. TEST RESULT CERTIFICATION

<b>Applicant</b>	3R SYSTEMS CORP. JAPAN
<b>Address</b>	2F-2-8-30 Toko Hakata-ku,Fukuoka-city,Japan
<b>manufacturer</b>	Shenzhen Loyal Electronics CO., Ltd.
<b>Address</b>	No.5, First Industry Park, Shanmen Yanluo, Bao'an district, Shenzhen, China
<b>Product Designation</b>	Wireless Keypad
<b>Brand Name</b>	N/A
<b>Test Model</b>	3R-KCWNK01
<b>Test Standard</b>	Article 2 Paragraph 1 Item 19 of the Certification, MIC Notice No.88 Appendix No.43
<b>File Number</b>	AGC03991190301TE01
<b>Date of Test</b>	Apr. 09, 2019 to Apr. 11, 2019
<b>Test Result</b>	Pass

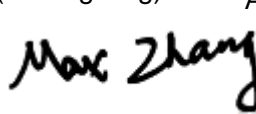
We (AGC), Attestation of Global Compliance (Shenzhen) Co., Ltd. for compliance with the requirements set forth in the Japan MIC Notice No.88 Annex43. The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Tested by

  
Draven Li (Li Mingliang)

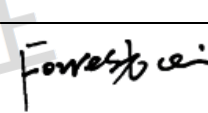
Apr. 11, 2019

Reviewed by

  
Max Zhang (Zhang Yi)

Apr. 12, 2019

Approved By

  
Forrest Lei (Lei Yonggang)

Authorized Officer

Apr. 12, 2019

## 2. GENERAL INFORMATION

Note: the following data is based on the information by the applicant.

### 2.1 EUT DESCRIPTION

Product Designation	Wireless Keypad
Model Name	3R-KCWNK01
Hardware Version	VD
Software Version	4.0
Modulation Type	GFSK
Operation Frequency	2406~2475MHz
Antenna Designation	PCB Antenna: Ant Gain: -0.61dBi
Channel No.	24 Channels
Rated Power Density	1mW
Power Supply	DC 3V
Test Power	(3.3V)High Voltage + 10% of Normal Voltage (2.7V)Low Voltage - 10% of Normal Voltage (3V) Normal Voltage
Test Channel	2406MHz, 2445MHz, 2475MHz

**Note:**

1. The EUT has only one antenna.
2. Only those frequencies within 2406-2475MHz were tested according the standard requirement.
3. The EUT has single chip with one antennas and the output of the antenna feeder is 50 Ohm.
4. The EUT is a 2.4GHz single-chip controller according to MIC Notice No.88 Annex43.
5. For more details, please refer to the User's manual of the EUT.

## 2.2 CHANNEL LIST

Channel Number	Frequency	Channel Number	Frequency
1	2406	13	2442
2	2409	14	2445
3	2412	15	2448
4	2415	16	2451
5	2418	17	2454
6	2421	18	2457
7	2424	19	2460
8	2427	20	2463
9	2430	21	2466
10	2433	22	2469
11	2436	23	2472
12	2439	24	2475

Note: Each product worked at one channel by pairing to avoid the interference.

### 2.3 DESCRIPTION OF TEST MODES

The transmitter module was tested while in a continuous transmitter/receiver mode. The EUT was tuned to a low, middle, and high channel for all tests. For all test case pre/scans were completed in all modes to determine worst case levels.

Power Supply Voltage Fluctuation Test

Voltage Fluctuation Test	Normal Voltage	High Voltage +10% of Normal Voltage	Low Voltage -10% of Normal Voltage
battery power	3V	3.3V	2.7V
Voltage Variation (%)	--	10%	10%

Note:

Voltage Variation (%)

= (Output high or Low Voltage - Output Normal Voltage)/ Output Normal Voltage\*100

During the input supply voltage to the EUT from the external power source is varied by +/- 10%, if output voltage had been confirmed that the fluctuation of power supply to the RF circuit of EUT (excluding power source) is equal to or less than +/-1%. Exempt extremely high and low supply voltage condition test, EUT only operated in normal voltage to test all regulations.



### 3. TEST ITEMS AND THE RESULTS

Part	Rule Section	Description of Test	Result
5.1	3	Frequency Error	Complies
5.2	4	Occupied Bandwidth (99%) and Spread-spectrum Bandwidth (90%)	Complies
5.3	5	Unwanted Emission Intensity	Complies
5.4	6	Antenna Power Error	Complies
5.5	7	Limitation of Collateral Emission of Receiver	Complies
5.6	8	Transmission Antenna Gain (EIRP Antenna Power)	N/A
5.7	9	Transmission Radiation Angle Width (3dB Beamwidth)	N/A
5.8	10	Radio Interference Prevention Capability	Complies
5.9	Note1	Carrier Sense Capability	N/A
5.10	Note 2	Construction Protection Confirmation	Complies

**Note 1:** MIC Notice No.88 Appendix No.43

**Note 2:** MIC Ordinance Regulating Radio Equipment Section 4.17 of Article 49.20

#### 4. DETAILS OF TEST

##### 4.1 IDENTIFICATION OF THE RESPONSIBLE TESTING LOCATION

<b>Company Name:</b>	Attestation of Global Compliance (Shenzhen) Co., Ltd.
<b>Address:</b>	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
<b>Website</b>	www.agc-cert.com

##### 4.2 LIST OF TEST EQUIPMENTS

Description	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due.
Regulated dc power supply	LONGWEI	50V30A	978256	Jul.13, 2018	Jul.12, 2019
Exa signal analyzer	AGILENT	N9020A	MY52090123	Sep.20, 2018	Sep.19, 2019
Power meter	R&S	NRVD	832378/027	Jul.13, 2018	Jul.12, 2019
Power sensor	ANRITSU	MA2491A	0341138	Jul.13, 2018	Jul.12, 2019
Pre-amplifier	ANRITSU	MH648A	M09961	Jul.13, 2018	Jul.12, 2019
RF Cable	SUIRONG	30MHZ-18GHZ	N/A	Jul.13, 2018	Jul.12, 2019
Attenuator	MINI-CIRCUITS	VAT-10+	15542	Jul.13, 2018	Jul.12, 2019
2.4G Band Fliter	MICRO RRANICS	BRM50702	087	Jul.13, 2018	Jul.12, 2019

Calibration Company Name: South China National Centre Metrology & Guangdong Institute of Metrology  
Calibration Person: Chen Sheng and Liu Wen Gang

##### 4.3 ENVIRONMENTAL CONDITIONS

During the measurement the environmental conditions were within the listed ranges:

- Temperature: 15-35°C
- Humidity: 45-85 %
- Atmospheric pressure: 86-106 kPa



## 5. TEST RESULTS

### 5.1 FREQUENCY ERROR MEASUREMENT

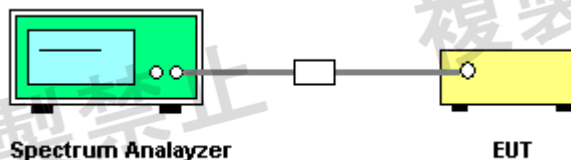
#### 5.1.1. LIMIT

Item	Limits
Frequency Tolerance (2406~2475MHz)	$\leq 50\text{ppm}$

#### 5.1.2. TEST PROCEDURES

1. Frequency accuracy of SA shall be less than 10% of limits tolerance (5ppm)
2. Setting of SA is following as: RB: 9kHz / VB:30kHz / SPAN: 1MHz / AT: 10dB / Ref: 0dBm
3. Center Frequency: The center frequency of testing for EUT
4. Sweep time: Auto
5. Sweep mode: Continuous sweep
6. Detect mode: Positive peak
7. Mark function: Frequency Counter (Resolution 100Hz)
8. EUT have transmitted absence of modulation signal and fixed channelize. "f" is using the mark cursor to mark the peak frequency value, "fc" is declaring of channel frequency.  
Then the frequency error formula is  $(f_c - f) / f_c \times 10^6$  ppm and the limit is less than  $\pm 50\text{ppm}$

#### 5.1.3. TEST SETUP LAYOUT



#### 5.1.4. TEST DEVIATION

There is no deviation with the original standard.

#### 5.1.5. EUT OPERATION DURING TEST

The EUT was placed on the test table and programmed in un-modulation function.

### 5.1.6. RESULTS OF FREQUENCY ERROR

EUT:	3R-KCWNK01	Test Date:	Apr. 09, 2019
Temperature:	25°C	Tested by:	Draven
Humidity:	55 % RH	Operation Mode:	Un-modulation

#### Test Voltage: 3V

	Test Frequency (MHz)	Measured Frequency (MHz)	Frequency Error(ppm)	Limit (ppm)	P/F
Un-modulation	2406	2406.111	46.25	±50	PASS
	2445	2445.106	43.33	±50	PASS
	2475	2475.109	44.10	±50	PASS

#### Test Voltage: 3.3V

	Test Frequency (MHz)	Measured Frequency (MHz)	Frequency Error(ppm)	Limit (ppm)	P/F
Un-modulation	2406	2406.111	45.99	±50	PASS
	2445	2445.119	48.56	±50	PASS
	2475	2475.096	38.84	±50	PASS

#### Test Voltage: 2.7V

	Test Frequency (MHz)	Measured Frequency (MHz)	Frequency Error(ppm)	Limit (ppm)	P/F
Un-modulation	2406	2406.111	45.96	±50	PASS
	2445	2445.113	46.04	±50	PASS
	2475	2475.108	43.51	±50	PASS

## 5.2. OCCUPIED BANDWIDTH AND SPREAD-SPECTRUM BANDWIDTH MEASUREMENT

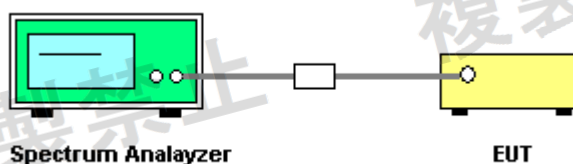
### 5.2.1. LIMIT

Item	Limits
Occupied Band Width:	FH 83.5MHz; OFDM,DS $\leq$ 26MHz;Others $\leq$ 26MHz
Spreading Bandwidth:	$\geq$ 500 kHz (FH, DS)

### 5.2.2. TEST PROCEDURES

1. Setting of SA is following as: RB: Auto / VB:Auto / AT: 30dB Ref: 20dBm / Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: Max hold
2. EUT have transmitted the maximum modulation signal and fixed channelize ( For DSSS or OFDM Device) or continuous maximum power of hopping mode(For FHSS Device). SA set to 99% of occupied bandwidth to measure occupied bandwidth. The limit is less than 26MHz(For DSSS or OFDM Device) or 83.5MHz(For FHSS Device).
3. SA set to 90% of occupied bandwidth to measure Spread Spectrum Bandwidth and must greater than 500kHz.
4. Spread Spectrum Factor = Spread Spectrum Bandwidth / modulation rate of EUT.
5. Spread Spectrum Factor limit is greater than 5

### 5.2.3. TEST SETUP LAYOUT



### 5.2.4. TEST DEVIATION

There is no deviation with the original standard.

### 5.2.5. EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

## 5.2.6. RESULTS OF OCCUPIED BANDWIDTH AND SPREAD-SPECTRUM BANDWIDTH

EUT:	3R-KCWNK01	Test Date:	Apr. 09, 2019
Temperature:	25°C	Tested by:	Draven
Humidity:	55 % RH	Operation Mode:	GFSK

### Test Voltage: 3.3V

Test frequency (MHz)	Occupied Bandwidth (MHz)	Limit (MHz)	Spread Bandwidth (MHz)	Limit (KHz)	P/F
2406	1.8031	<26	0.8655	>500	PASS
2445	1.4969	<26	0.7826	>500	PASS
2475	1.6074	<26	0.8113	>500	PASS

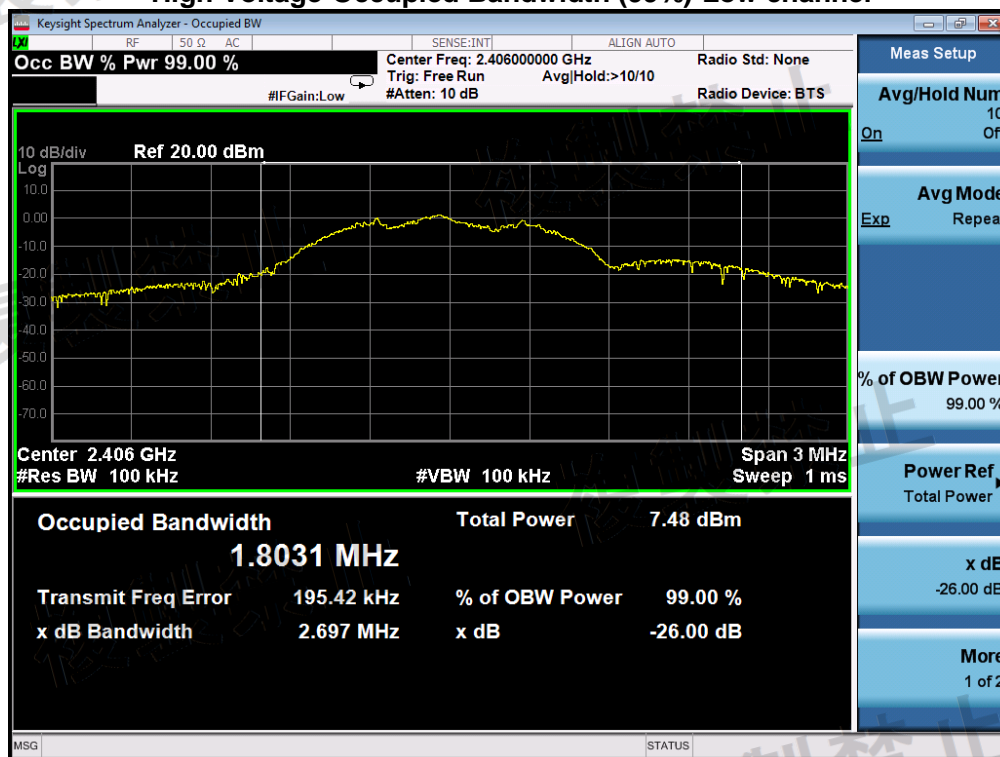
### Test Voltage: 3V

Test frequency (MHz)	Occupied Bandwidth (MHz)	Limit (MHz)	Spread Bandwidth (MHz)	Limit (KHz)	P/F
2406	1.8175	<26	0.8671	>500	PASS
2445	1.7059	<26	0.8497	>500	PASS
2475	1.5796	<26	0.8146	>500	PASS

### Test Voltage: 2.7V

Test frequency (MHz)	Occupied Bandwidth (MHz)	Limit (MHz)	Spread Bandwidth (MHz)	Limit (KHz)	P/F
2406	1.7923	<26	0.8584	>500	PASS
2445	1.6963	<26	0.8428	>500	PASS
2475	1.5786	<26	0.8185	>500	PASS

### High Voltage-Occupied Bandwidth (99%)-Low channel



### High Voltage -Spread Bandwidth (90%)-Low channel

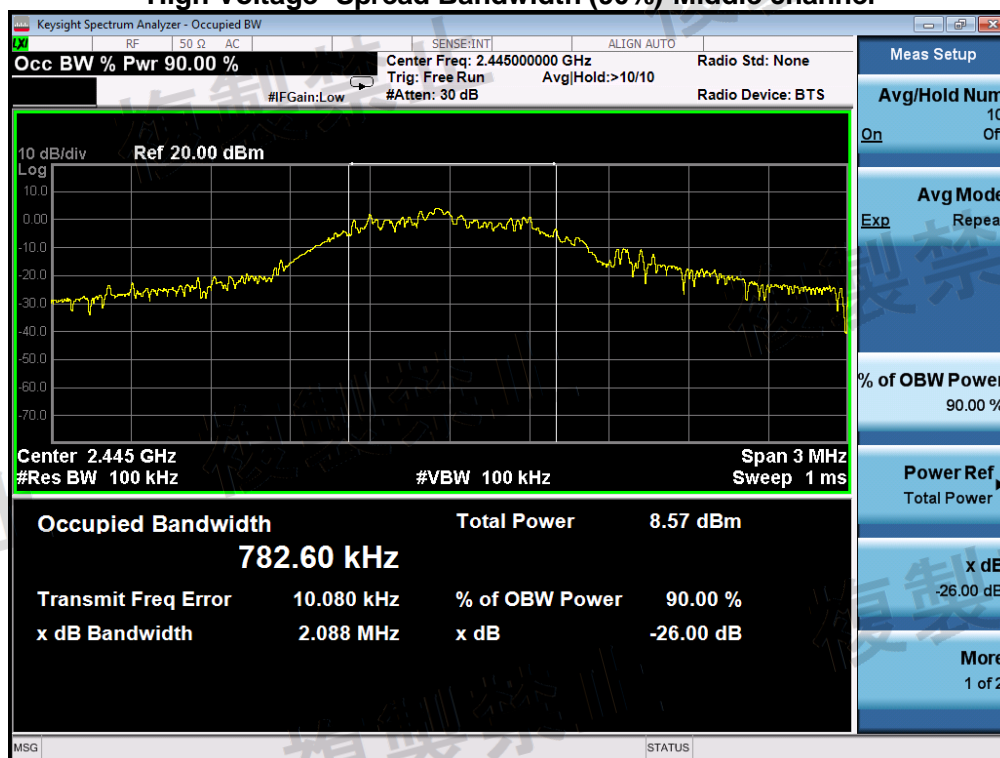




### High Voltage-Occupied Bandwidth (99%)-Middle channel

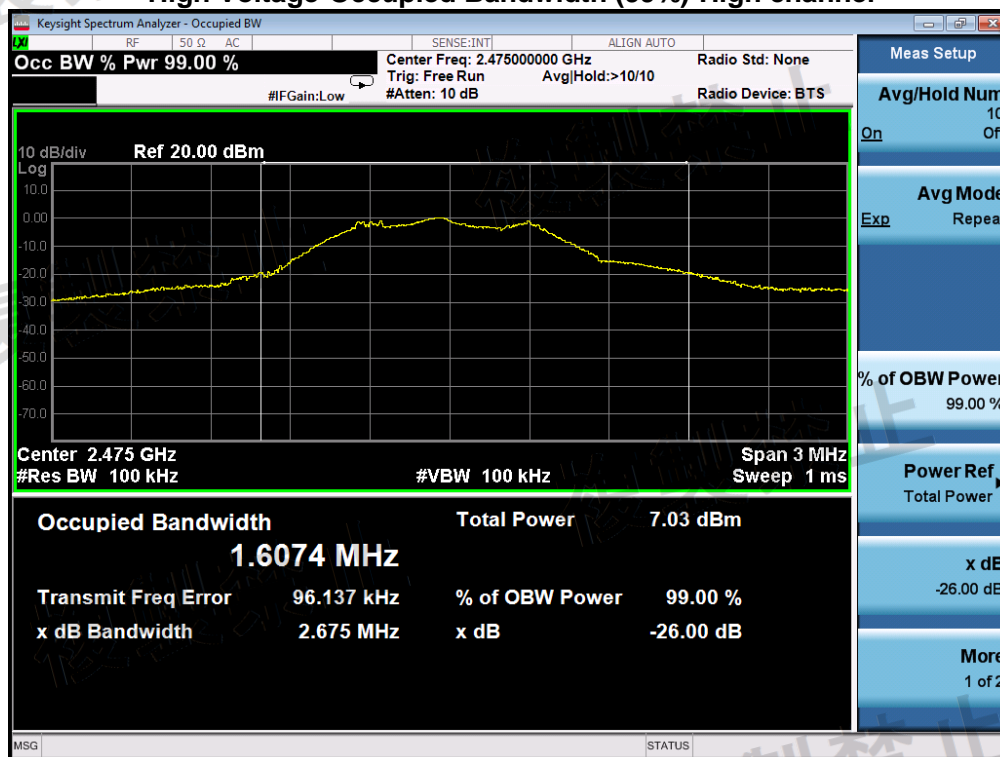


### High Voltage -Spread Bandwidth (90%)-Middle channel

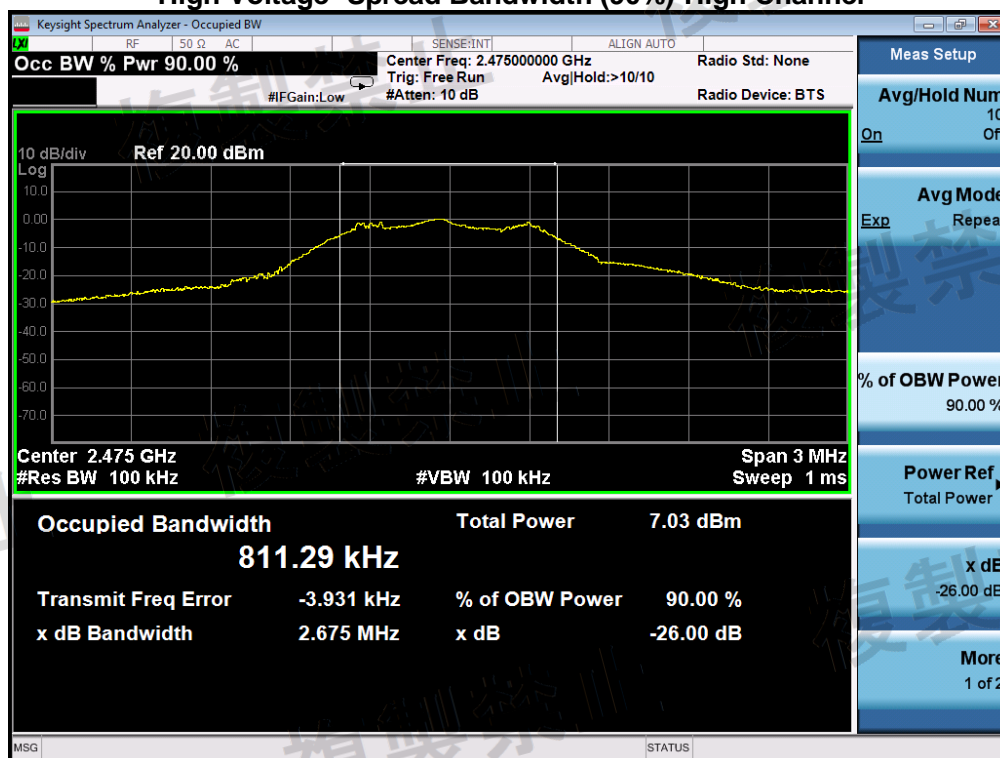




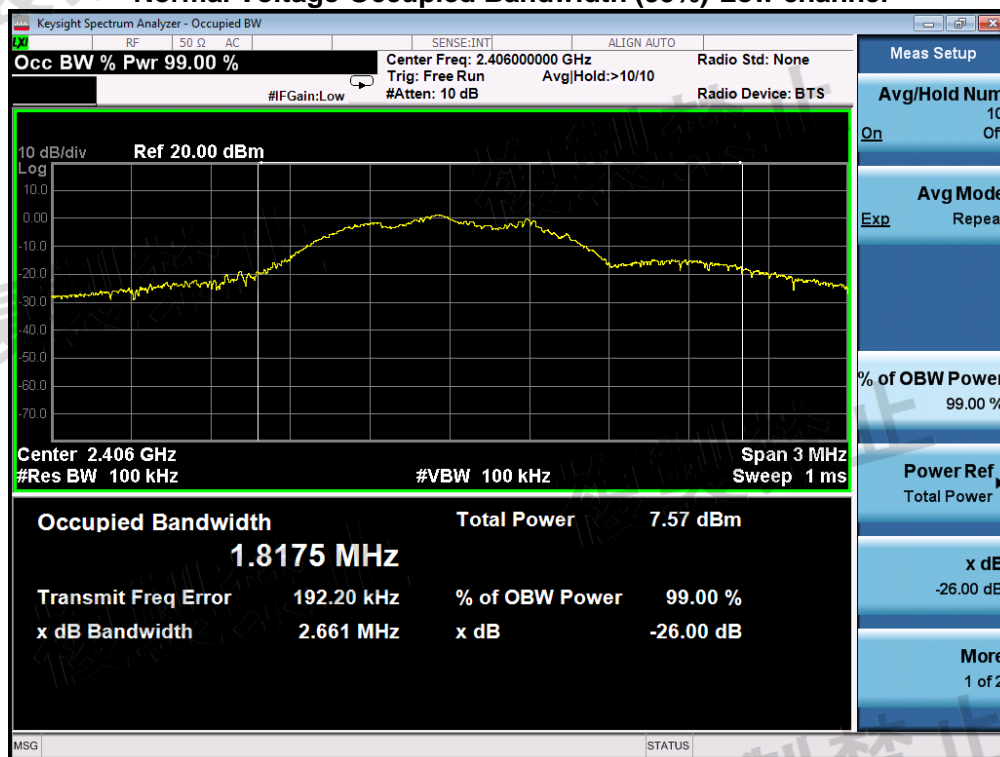
### High Voltage-Occupied Bandwidth (99%)-High channel



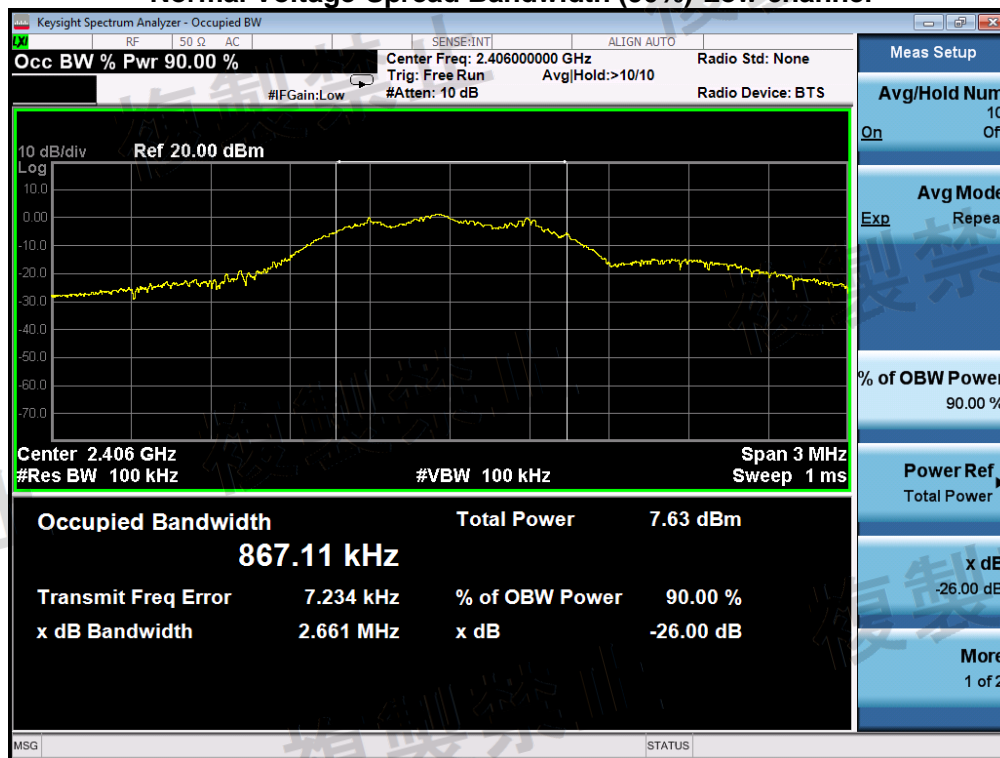
### High Voltage -Spread Bandwidth (90%)-High Channel



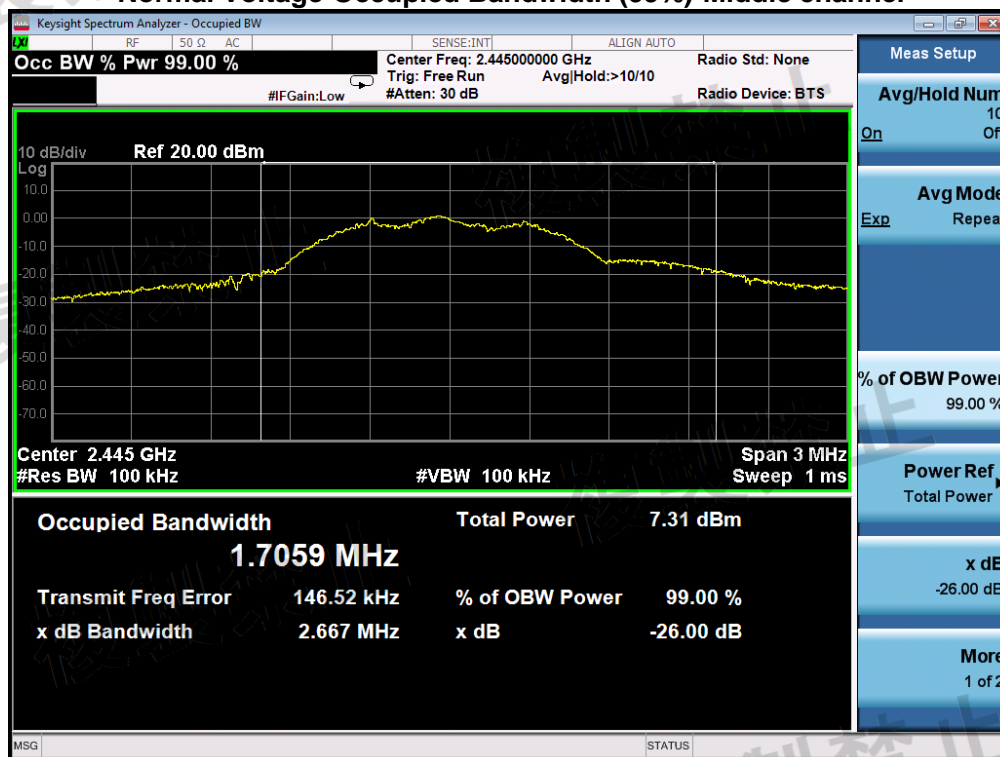
### Normal Voltage-Occupied Bandwidth (99%)-Low channel



### Normal Voltage-Spread Bandwidth (90%)-Low channel



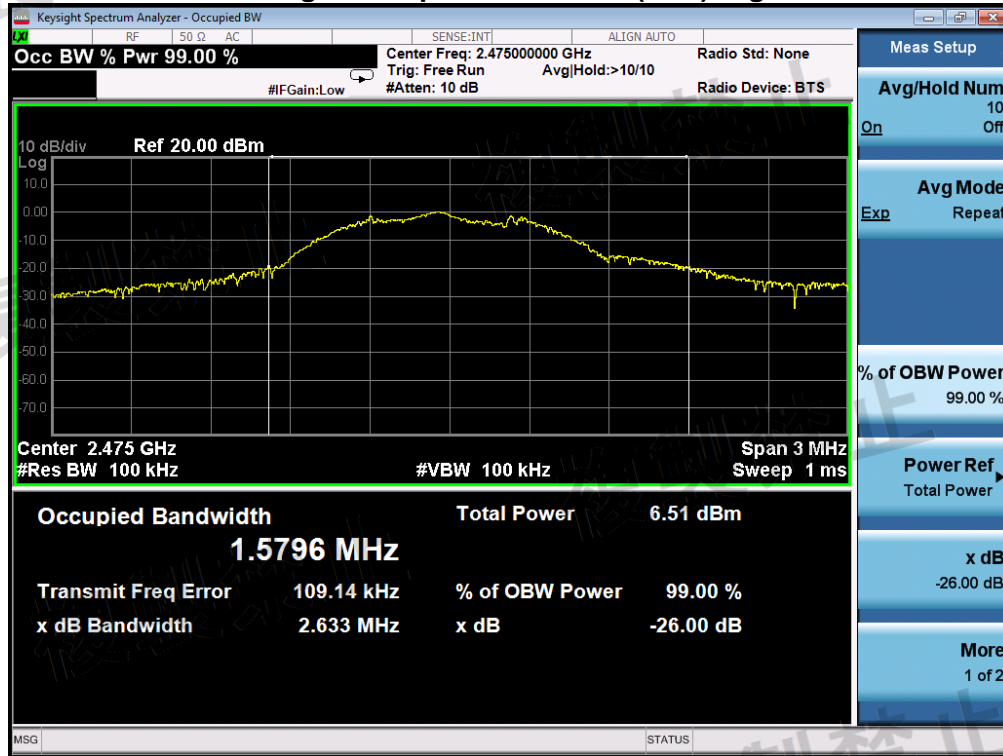
### Normal Voltage-Occupied Bandwidth (99%)-Middle channel



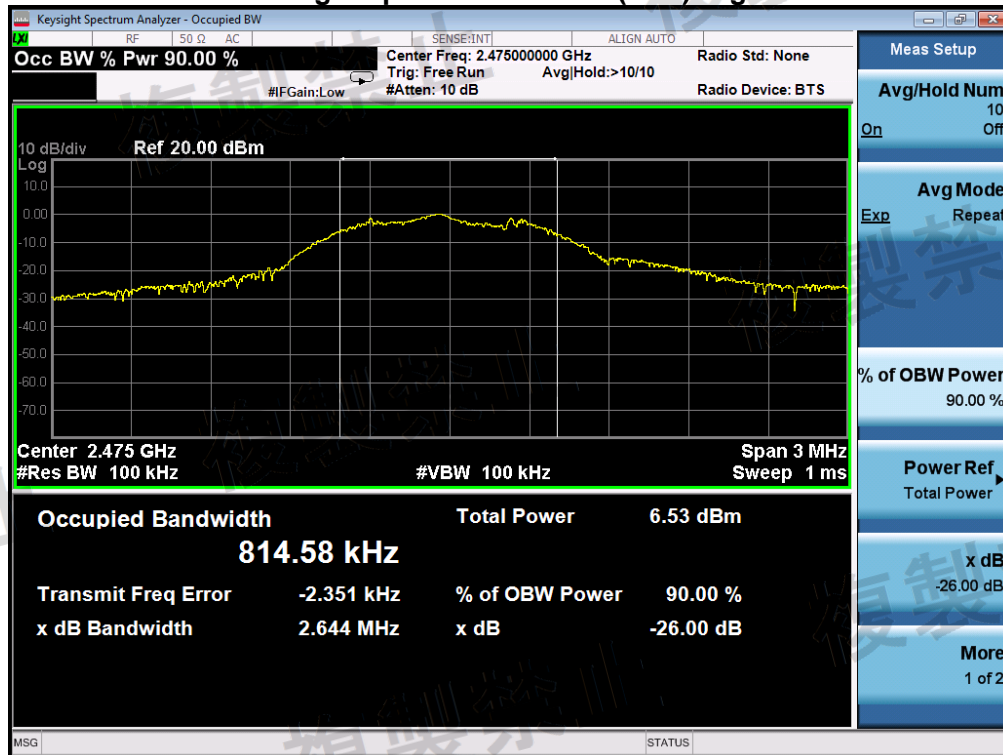
### Normal Voltage -Spread Bandwidth (90%)-Middle channel



## Normal Voltage -Occupied Bandwidth (99%)-High channel

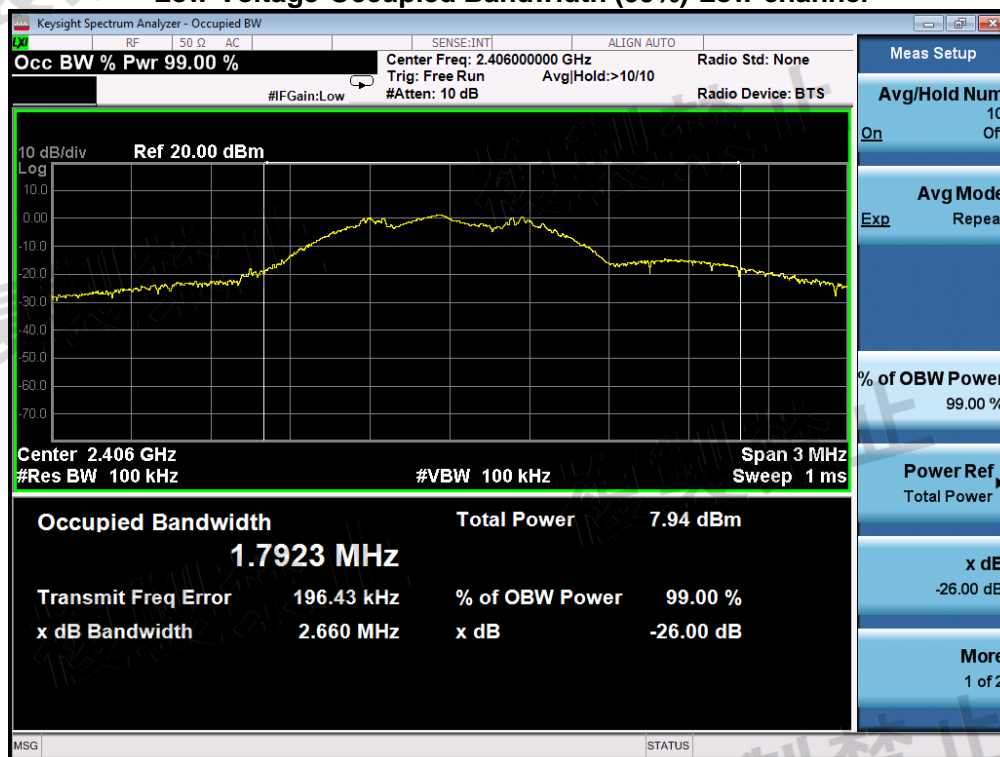


## Normal Voltage -Spread Bandwidth (90%)-High Channel

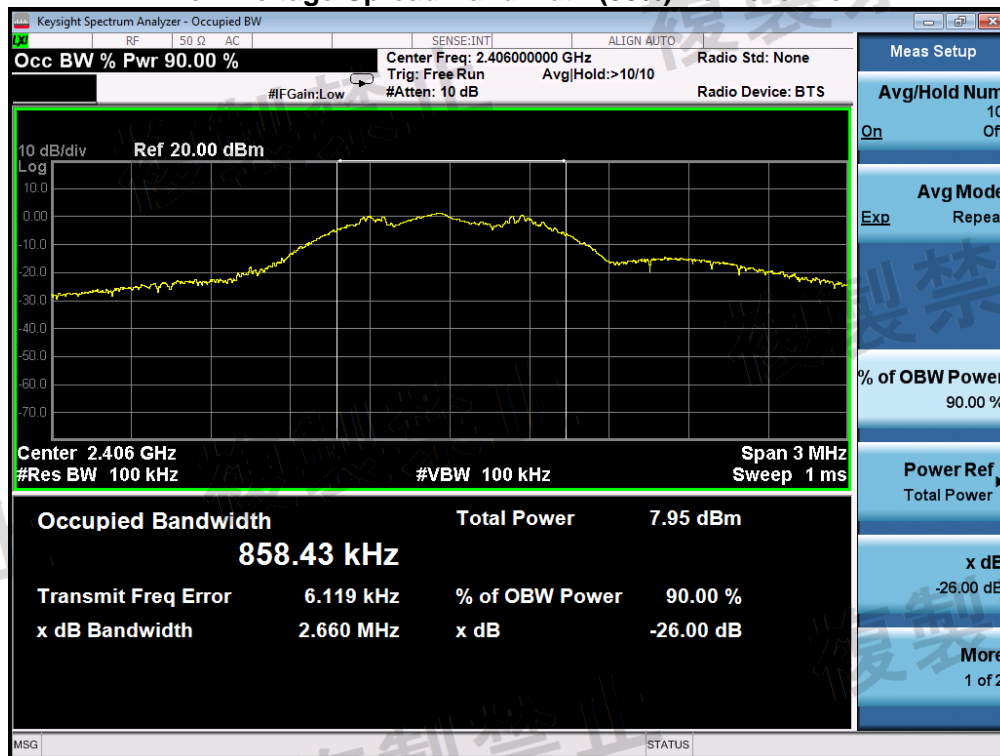




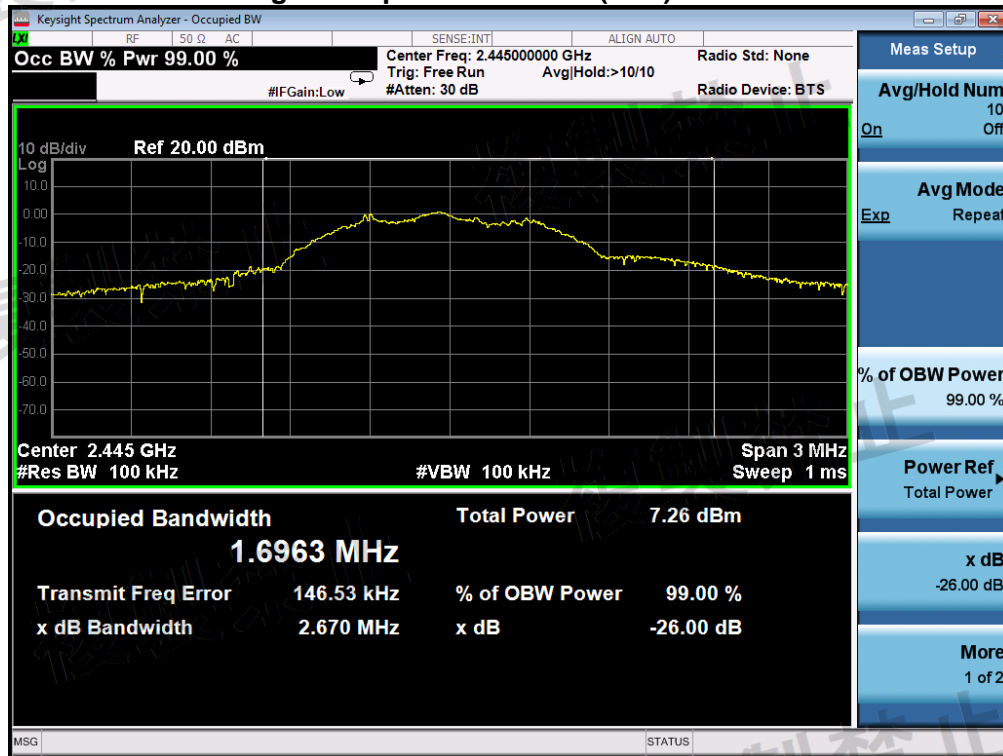
### Low Voltage-Occupied Bandwidth (99%)-Low channel



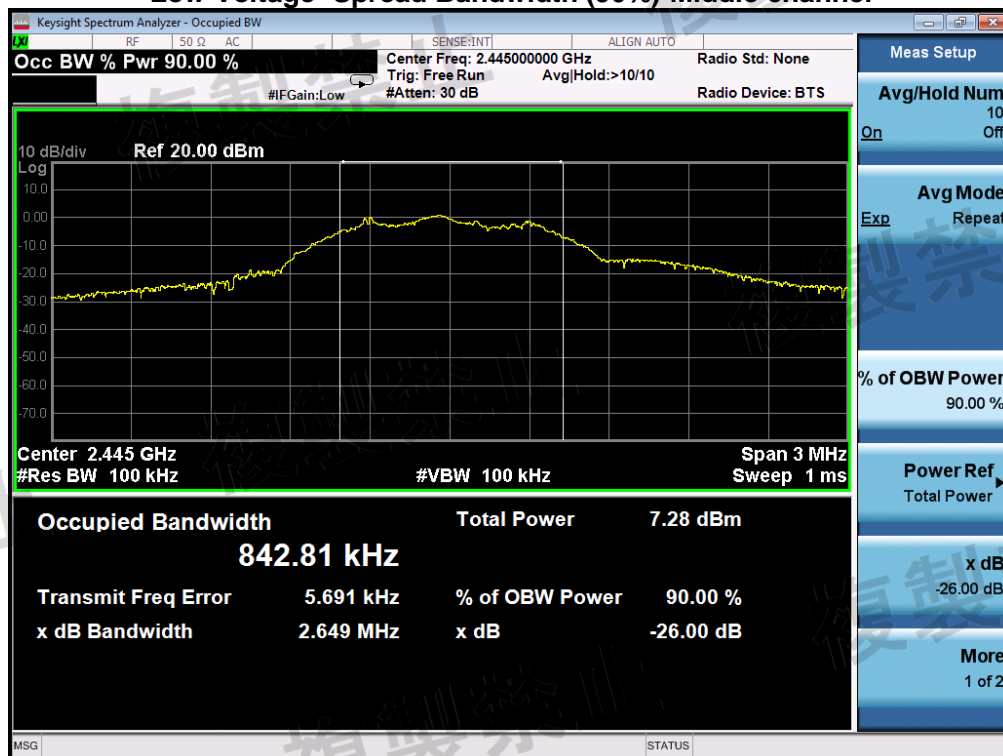
### Low Voltage-Spread Bandwidth (90%)-Low channel



## Low Voltage-Occupied Bandwidth (99%)-Middle channel

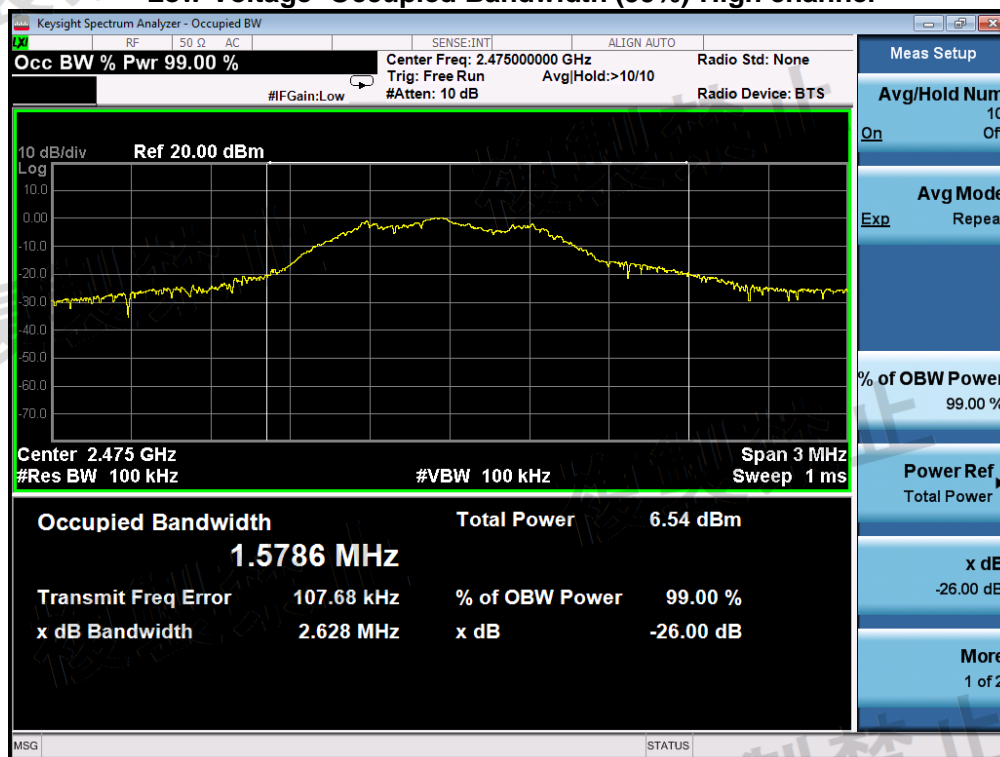


## Low Voltage -Spread Bandwidth (90%)-Middle channel

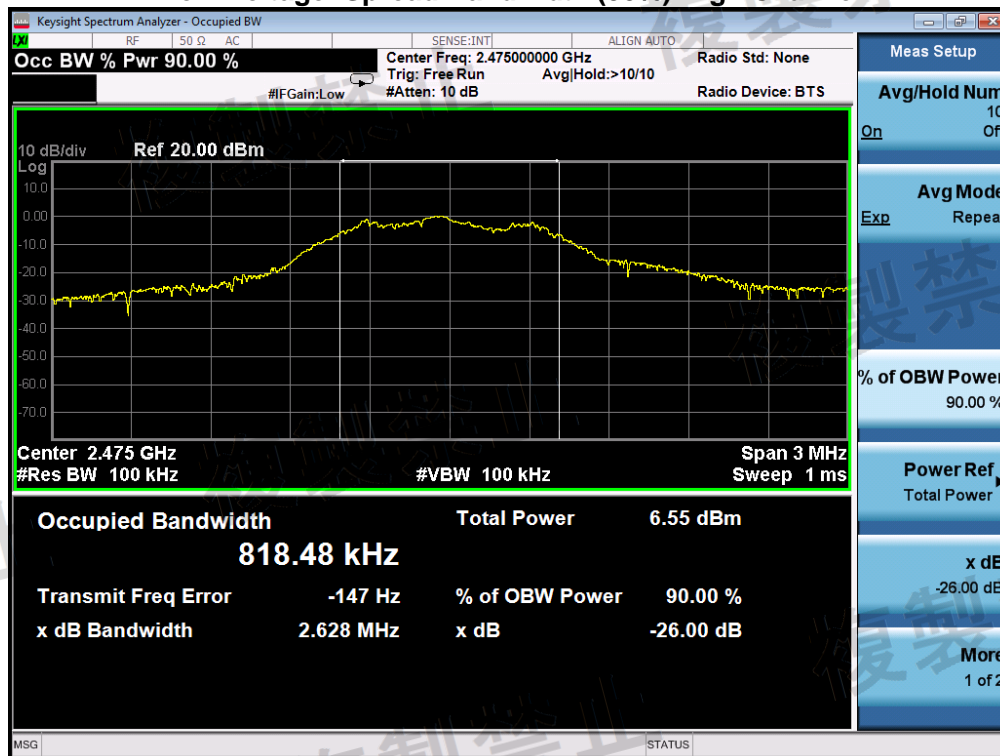




### Low Voltage -Occupied Bandwidth (99%)-High channel



### Low Voltage -Spread Bandwidth (90%)-High Channel



### 5.3. UNWANTED EMISSION INTENSITY MEASUREMENT

#### 5.3.1 LIMIT

Item	Limits
TX Spurious Emission(2406~2475MHz)	$\leq 0.25 \mu\text{W}$ ( $f \leq 1000\text{MHz}$ )
	$\leq 2.5 \mu\text{W}$ ( $1000\text{MHz} < f \leq 2387\text{MHz}$ )
	$\leq 25 \mu\text{W}$ ( $2387\text{MHz} < f \leq 2400\text{MHz}$ )
	$\leq 25 \mu\text{W}$ ( $2483.5\text{MHz} \leq f < 2496.5\text{MHz}$ )
	$\leq 2.5 \mu\text{W}$ ( $2496.5\text{MHz} \leq f < 12500\text{MHz}$ )

#### 5.3.2. MEASURING INSTRUMENTS AND SETTING

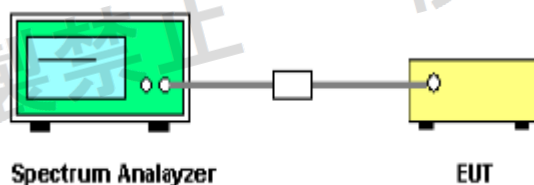
Please refer to section 5 in this report. The following table is the setting of Spectrum Analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
RBW/ VBW	1 MHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

### 5.3.3. TEST PROCEDURES

1. EUT have transmitted the maximum modulation signal and fixed channelize.
2. Setting of SA is following as: Below 1GHz RB:100KHz / VB:100KHz  
Above 1GHz RB:1MHz / VB:1MHz / AT: 10dB Ref: 0dBm / Sweep time: Auto  
Sweep Mode: Continuous sweep / Detect mode: Positive peak  
Trace mode: Max hold
3. Setting of SA is following as 30MHz and stop frequency 1000MHz Then to mark peak reading value + cable loss shall be less than 0.25 $\mu$ W.
4. Setting of SA is following as 1000MHz and stop frequency 2387MHz Then to mark peak reading value + cable loss shall be less than 2.5 $\mu$ W.
5. SA adjusted to start frequency 2387MHz and stop frequency 2400MHz. Then to mark peak reading value + cable loss shall be less than 25 $\mu$ W.
6. SA adjusted to start frequency 2483.5MHz and stop frequency 2496.5MHz Then to mark peak reading value + cable loss shall be less than 25 $\mu$ W
7. SA adjusted to start frequency 2496.5MHz and stop frequency 12500MHz Then to mark peak reading value + cable loss shall be less than 2.5 $\mu$ W
8. Measure side band spurious as follows: For 2.4GHz band: 2374MHz~2400MHz and 2483.5MHz~2509.5MHz RBW = VBW = 30kHz, Result\_Value = Measured\_Value + 15.2 [dBm]
9. If the Result\_Value is over the requirement, take total sum of 1MHz band centered at the spur frequency like ACLP measurement as Result\_Value.

### 5.3.4. TEST SETUP LAYOUT



### 5.3.5. TEST DEVIATION

There is no deviation with the original standard.

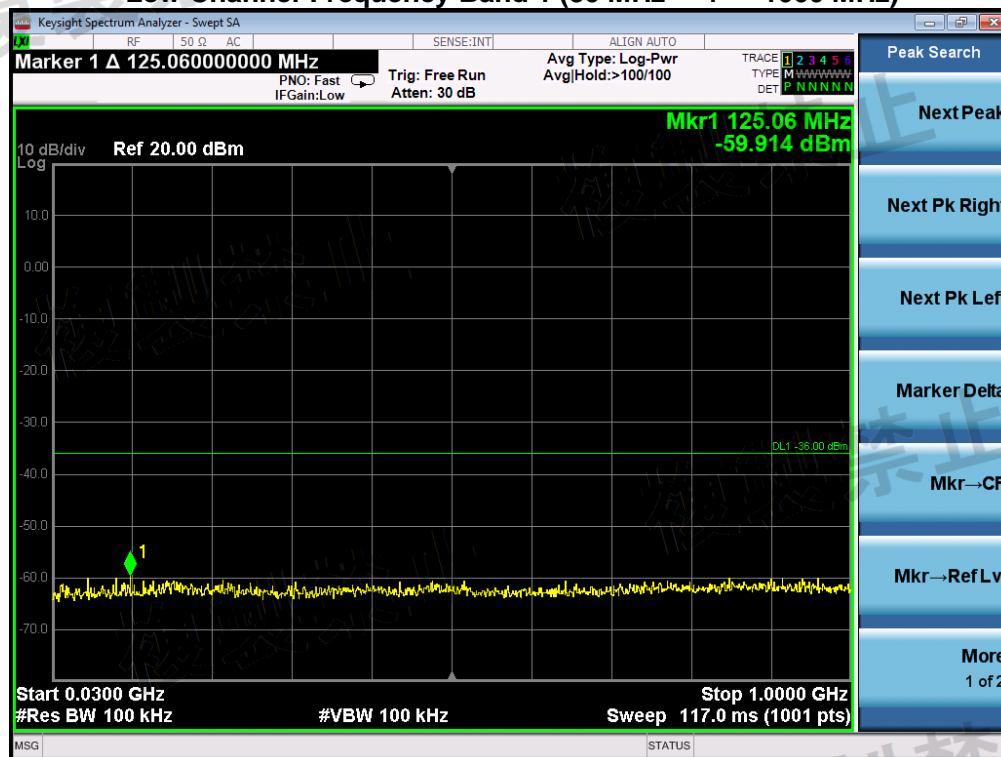
### 5.3.6. EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

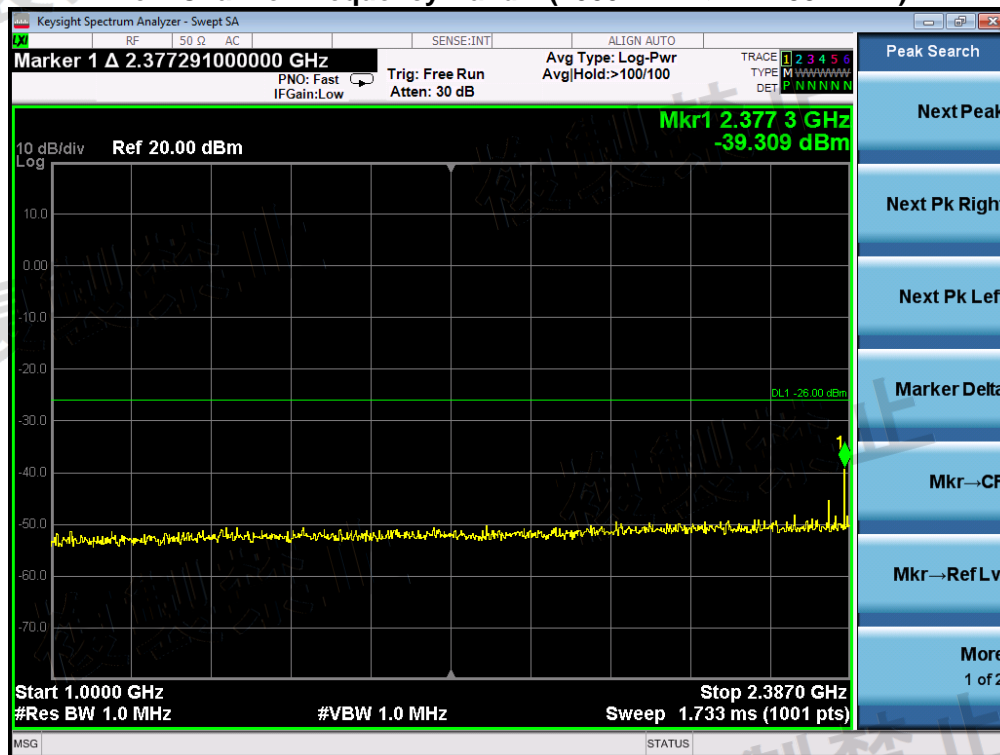
### 5.3.7. TEST RESULT OF UNWANTED EMISSION INTENSITY

EUT:	3R-KCWNK01	Test Date:	Apr. 09, 2019
Temperature:	25°C	Tested by:	Draven
Humidity:	55 % RH	Operation Mode:	GFSK
Test Voltage	High Voltage		

#### Low Channel-Frequency Band 1 (30 MHz $\leq$ f $\leq$ 1000 MHz)



### Low Channel-Frequency Band 2 ( $1000 \text{ MHz} < f \leq 2387 \text{ MHz}$ )

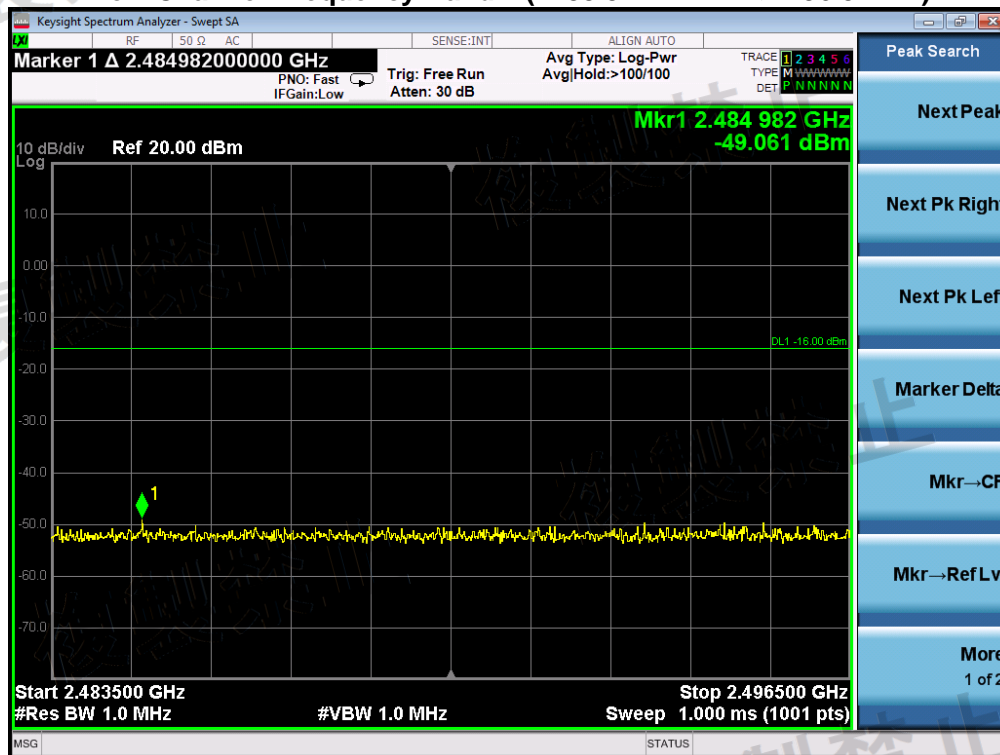


### Low Channel-Frequency Band 3 ( $2387 \text{ MHz} < f \leq 2400 \text{ MHz}$ )

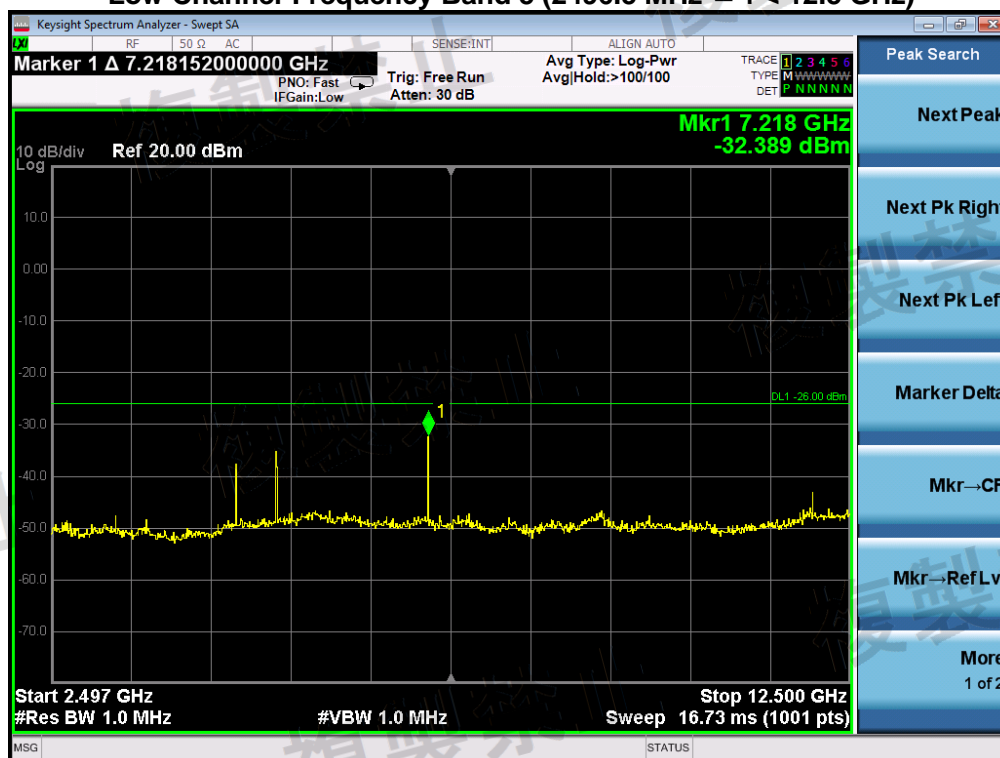




Low Channel-Frequency Band 4 ( $2483.5 \text{ MHz} \leq f < 2496.5 \text{ MHz}$ )

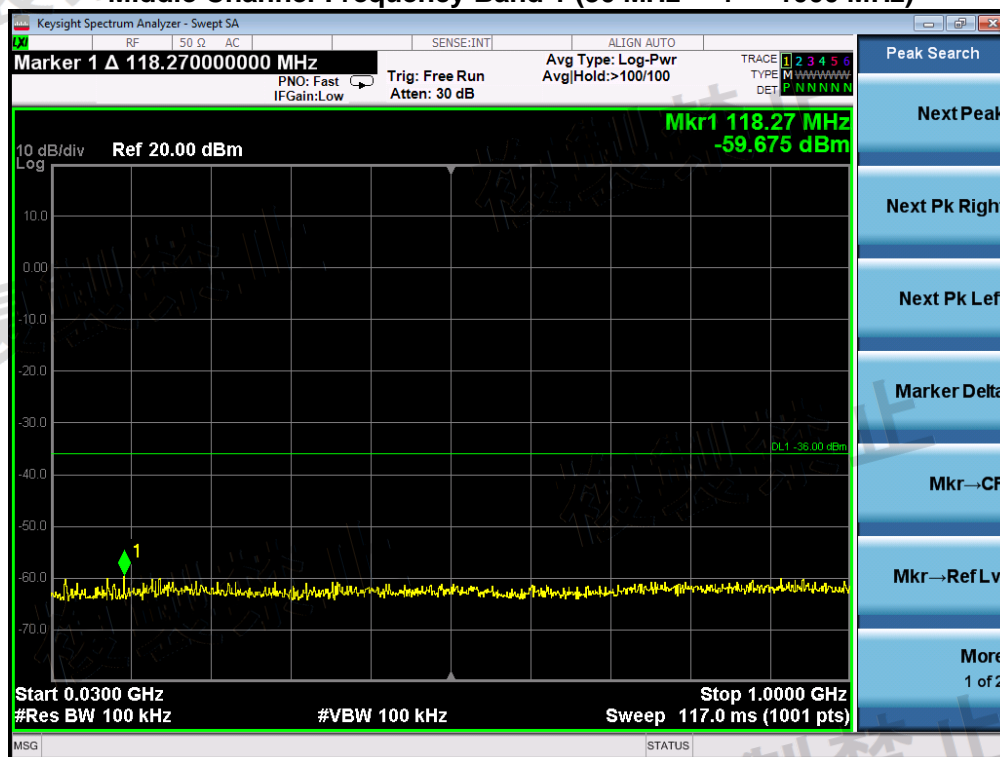


Low Channel-Frequency Band 5 ( $2496.5 \text{ MHz} \leq f < 12.5 \text{ GHz}$ )

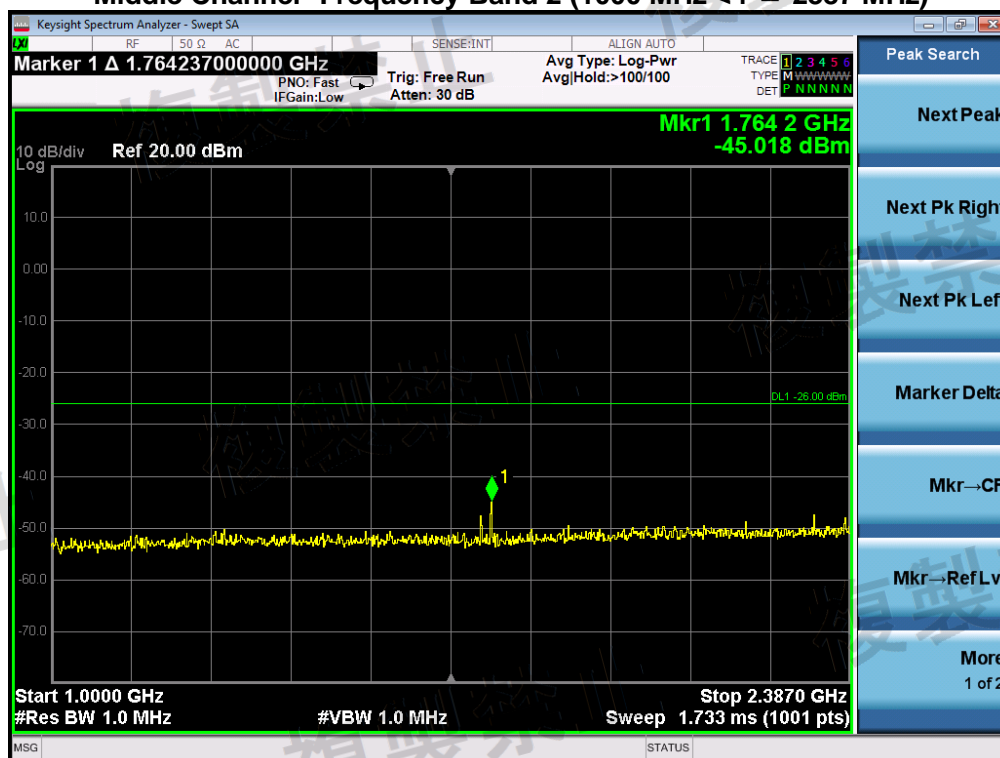




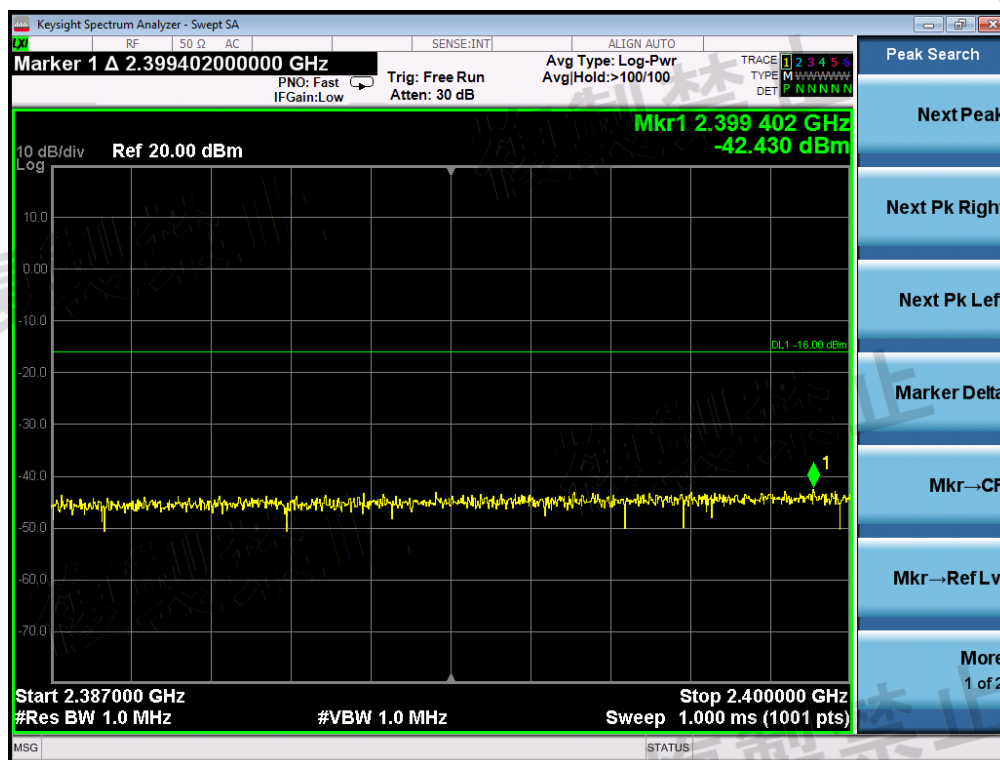
Middle Channel-Frequency Band 1 ( $30 \text{ MHz} \leq f \leq 1000 \text{ MHz}$ )



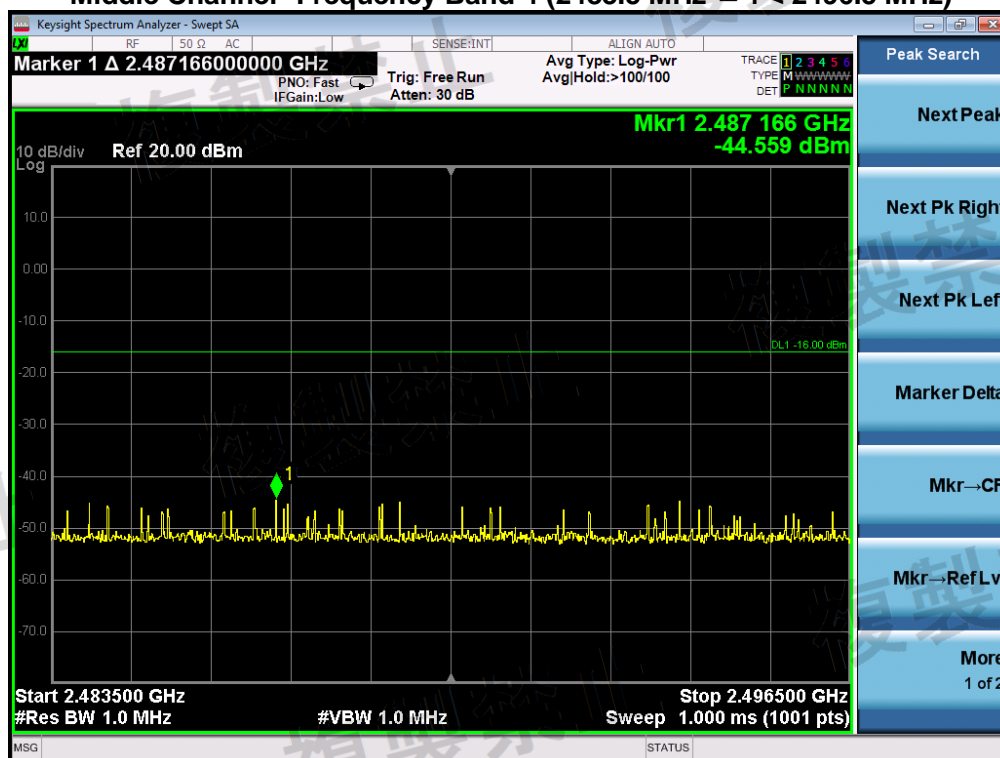
Middle Channel--Frequency Band 2 ( $1000 \text{ MHz} < f \leq 2387 \text{ MHz}$ )



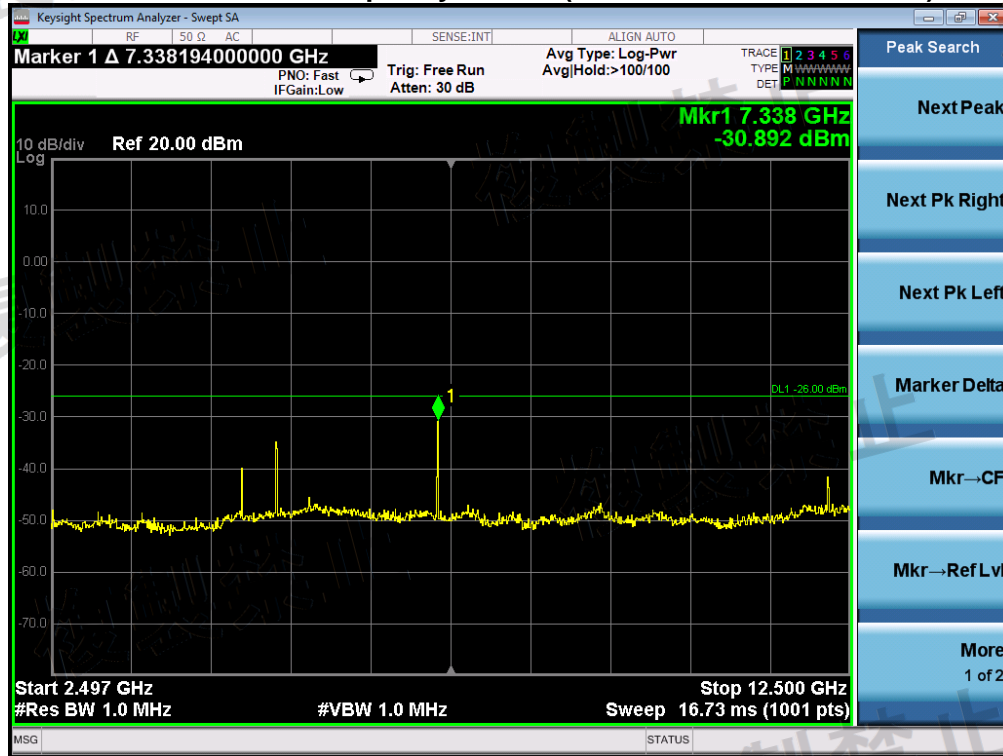
Middle Channel--Frequency Band 3 (2387 MHz < f ≤ 2400 MHz)



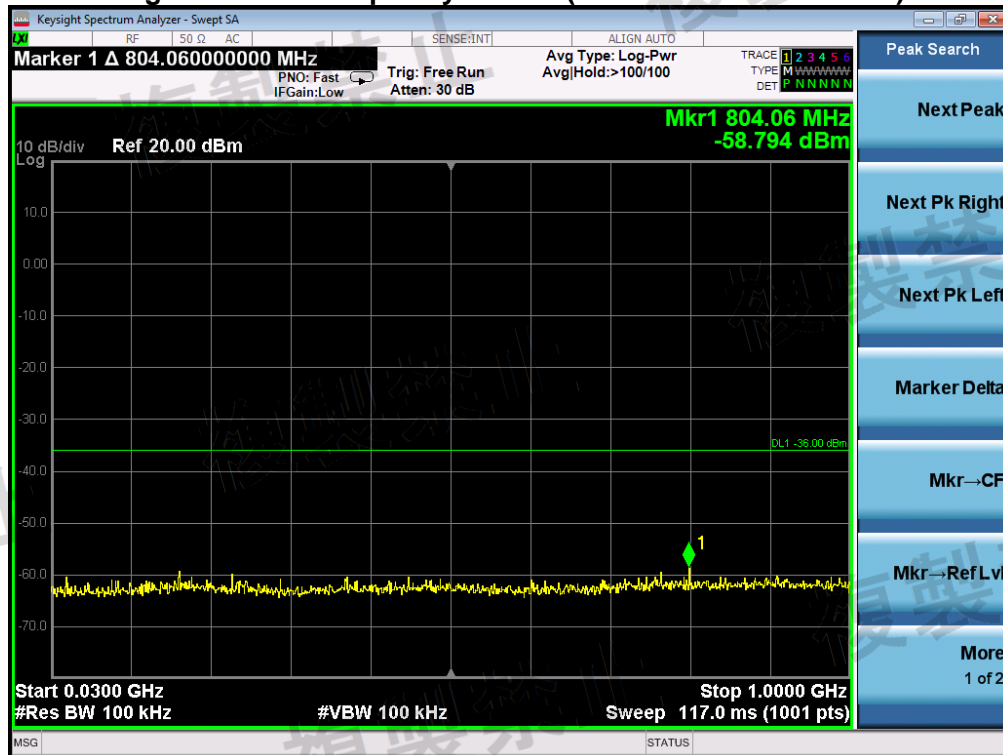
Middle Channel--Frequency Band 4 (2483.5 MHz ≤ f < 2496.5 MHz)



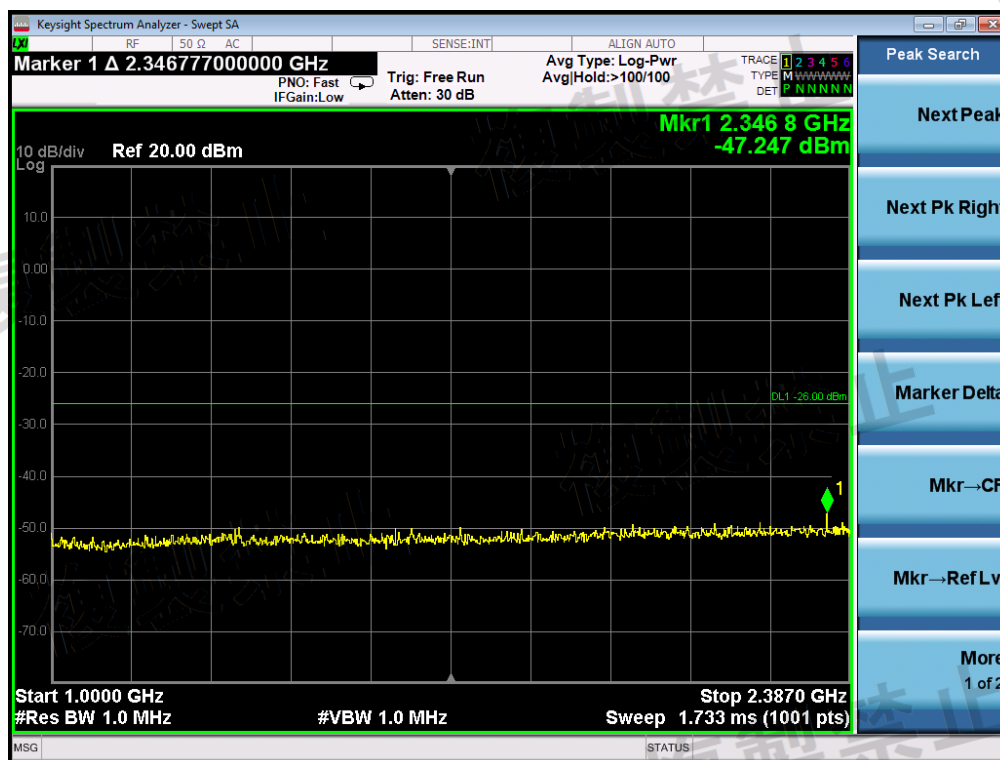
Middle Channel--Frequency Band 5 ( $2496.5 \text{ MHz} \leq f < 12.5 \text{ GHz}$ )



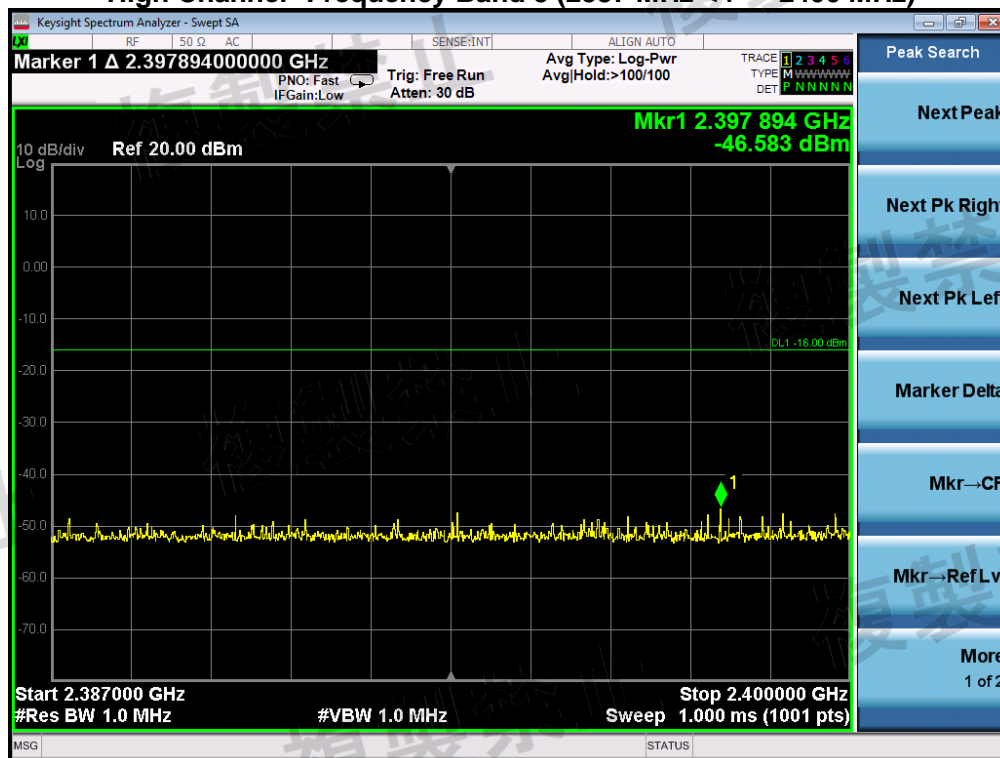
High Channel--Frequency Band 1 ( $30 \text{ MHz} \leq f \leq 1000 \text{ MHz}$ )



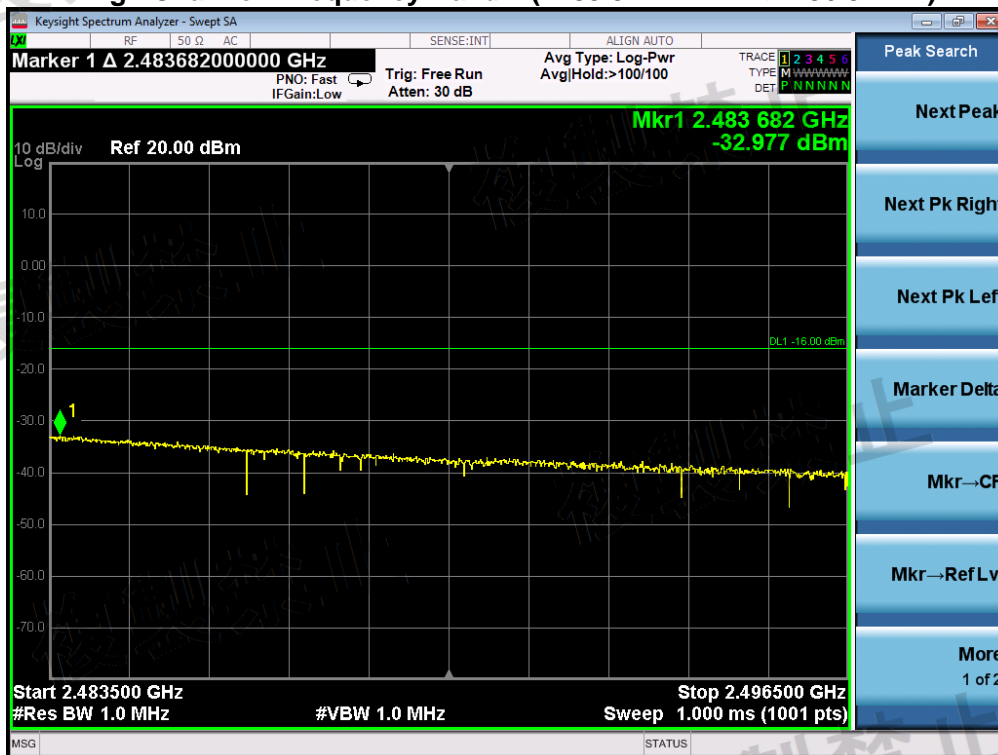
High Channel--Frequency Band 2 ( $1000\text{ MHz} < f \leq 2387\text{ MHz}$ )



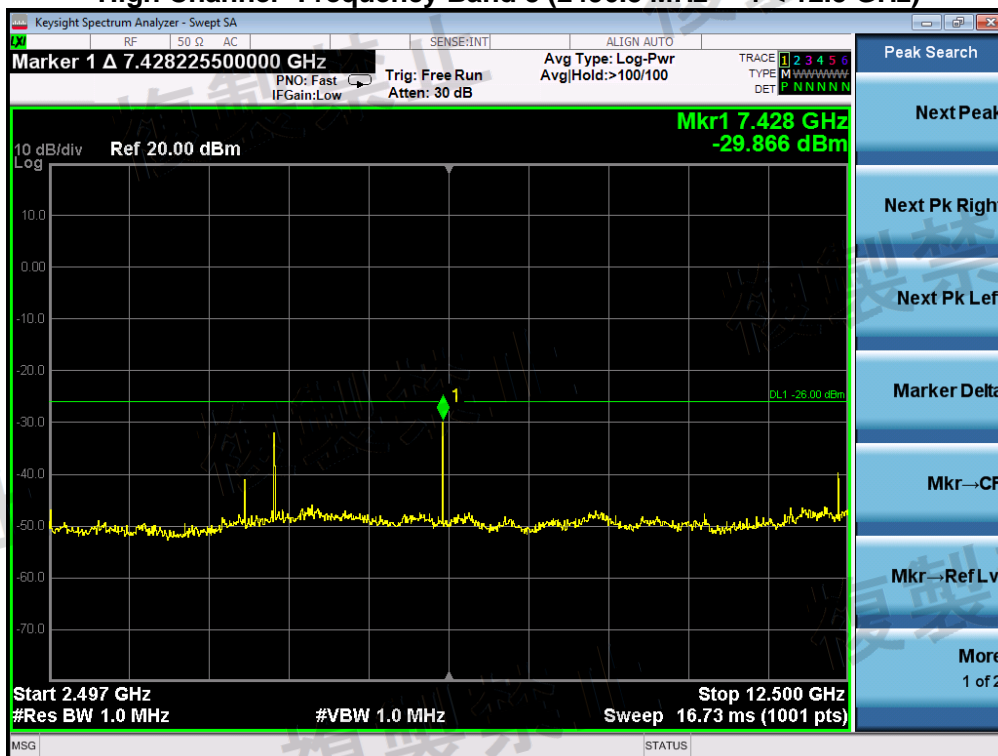
High Channel--Frequency Band 3 ( $2387\text{ MHz} < f \leq 2400\text{ MHz}$ )



### High Channel--Frequency Band 4 (2483.5 MHz $\leq$ f < 2496.5 MHz)

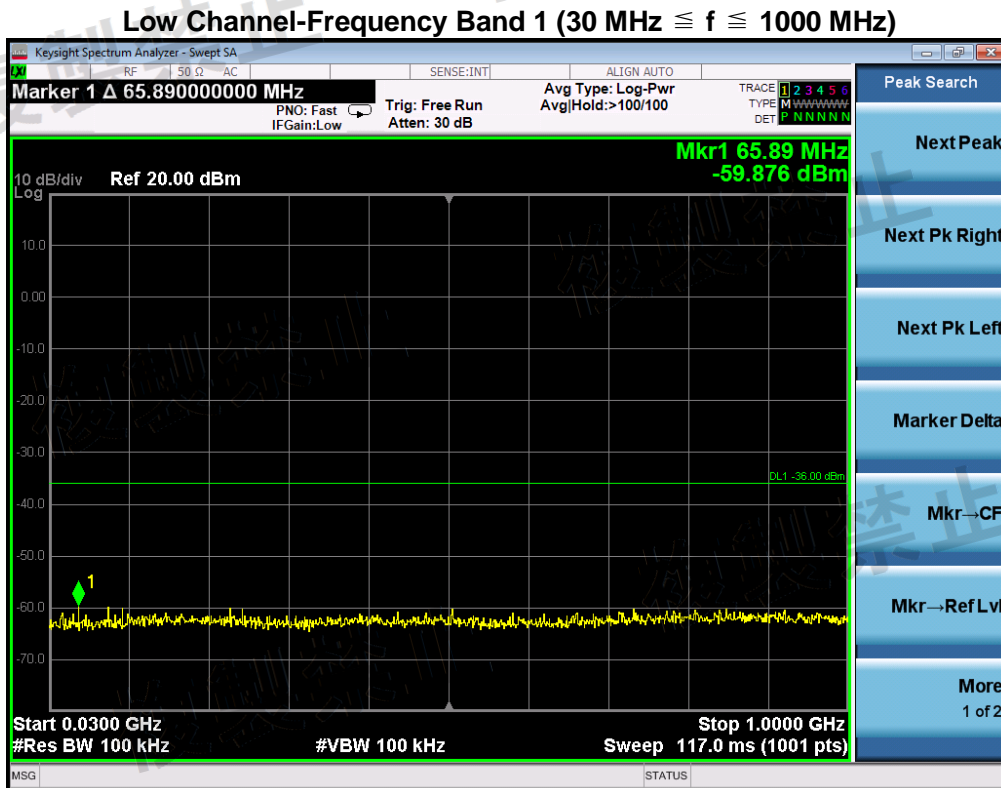


### High Channel--Frequency Band 5 (2496.5 MHz $\leq$ f < 12.5 GHz)



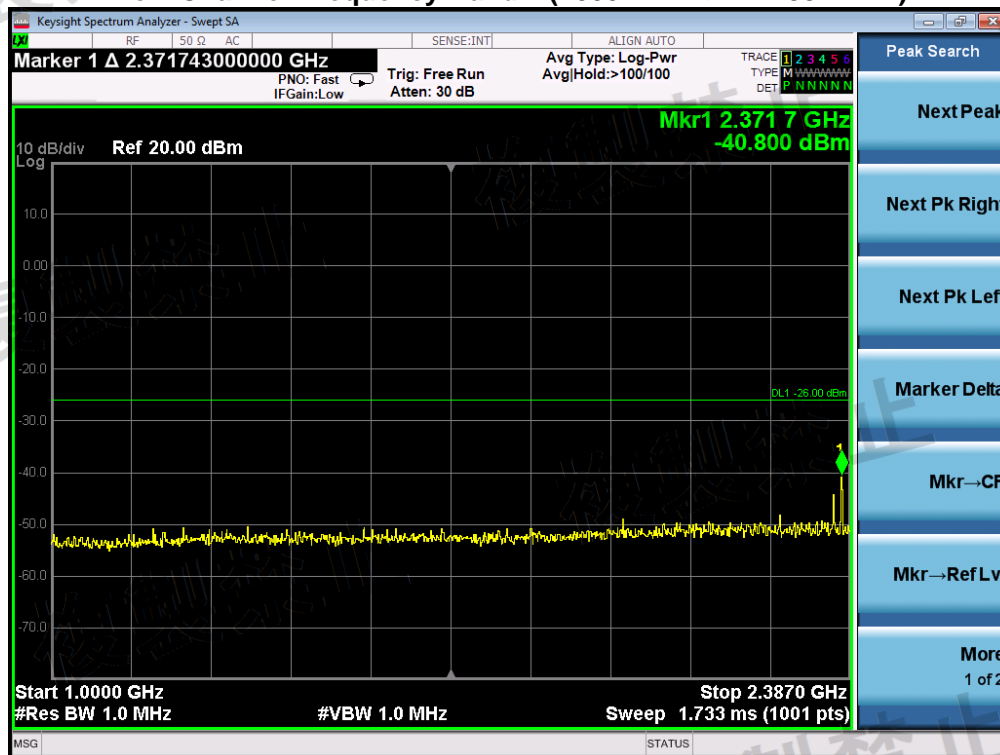


EUT:	3R-KCWNK01	Test Date:	Apr. 09, 2019
Temperature:	25°C	Tested by:	Draven
Humidity:	55 % RH	Operation Mode:	GFSK
Test Voltage	Normal Voltage		





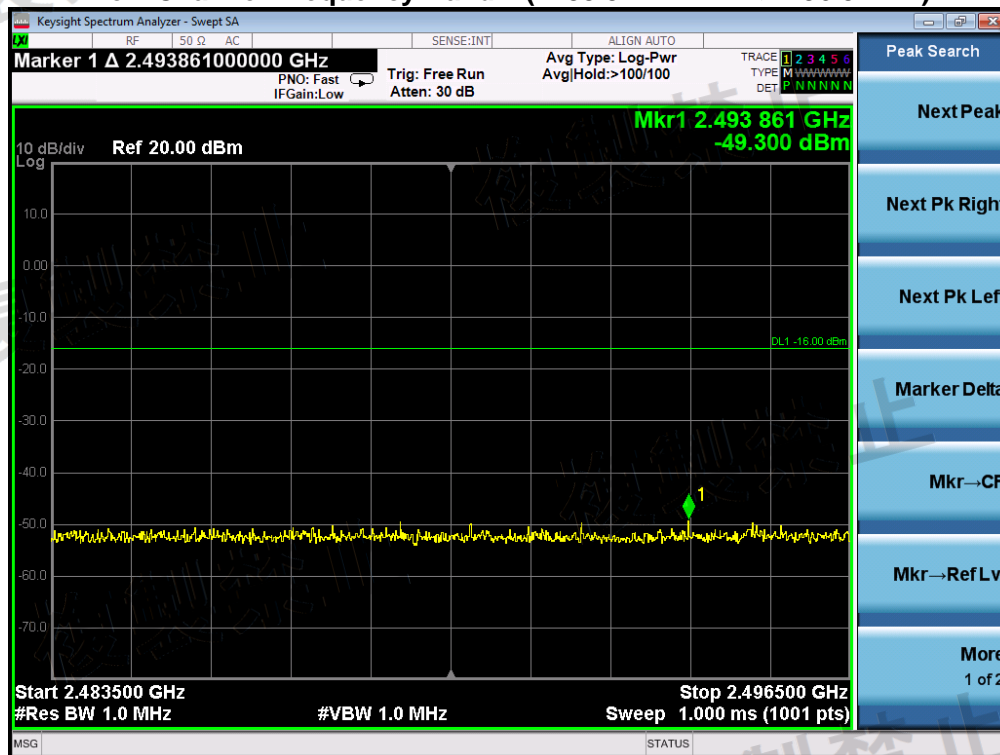
### Low Channel-Frequency Band 2 ( $1000 \text{ MHz} < f \leq 2387 \text{ MHz}$ )



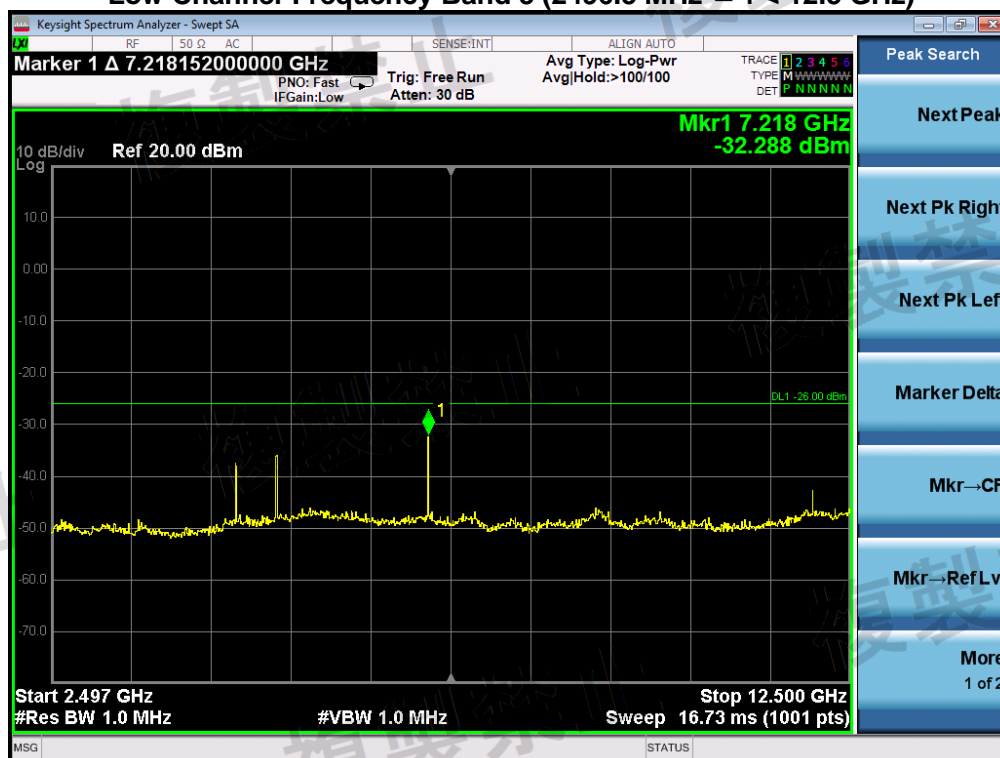
### Low Channel-Frequency Band 3 ( $2387 \text{ MHz} < f \leq 2400 \text{ MHz}$ )



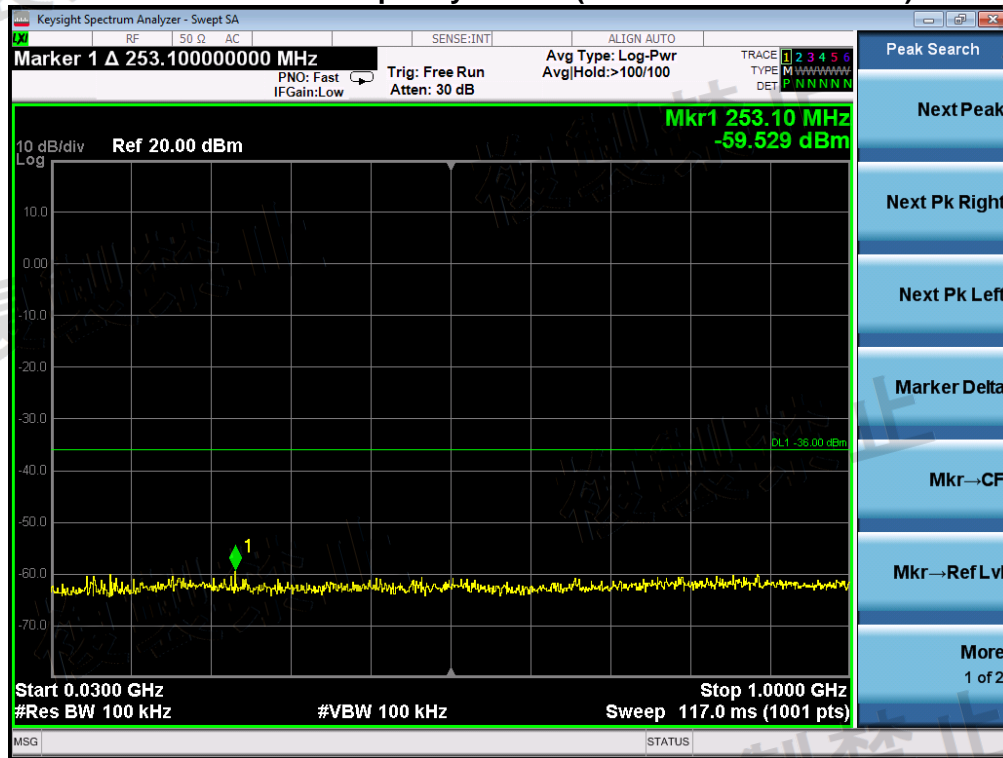
### Low Channel-Frequency Band 4 ( $2483.5 \text{ MHz} \leq f < 2496.5 \text{ MHz}$ )



### Low Channel-Frequency Band 5 ( $2496.5 \text{ MHz} \leq f < 12.5 \text{ GHz}$ )



Middle Channel-Frequency Band 1 ( $30 \text{ MHz} \leq f \leq 1000 \text{ MHz}$ )



Middle Channel--Frequency Band 2 ( $1000 \text{ MHz} < f \leq 2387 \text{ MHz}$ )

