

TEST REPORT

Application No.: GZEM2003010907CR
Applicant: J.I.C. ENTERPRISES (HONG KONG) LIMITED
Address of Applicant: RM.613, TOWER B, HUNG HOM COMMERCIAL CENTRE 37 MA TAU WAI RD., HUNG HOM, KOWLOON, HONG KONG
Manufacturer: I.A. Technology (Dong Guan) Company Limited
Address of Manufacturer: Building A, No. 478, YouYi Road, Qiao Tou Town, DongGuan City, China
Factory: I.A. Technology (Dong Guan) Company Limited
Address of Factory: Building A, No. 478, YouYi Road, Qiao Tou Town, DongGuan City, China
Equipment Under Test (EUT):
EUT Name: LCD BAR DISPLAY WIFI MODULE
Model No.: NO. SZ3391
Standard(s): MIC Item 19 of Article 2 Paragraph 1
Date of Receipt: 2020-03-16
Date of Test: 2020-03-23
Date of Issue: 2020-03-27

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.

Kobe Jian

Kobe Jian
EMC Laboratory Manager



Revision Record

Version	Chapter	Date	Modifier	Remark
01		2020-03-27		Original

Authorized for issue by:

Tested By

Jackson Yuan

Jackson_Yuan /Project Engineer

2020-03-23

Date

Checked By

Jerry Chan

Jerry_Chan /Reviewer

2020-03-27

Date



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2 Test Summary

Radio Spectrum Technical Requirement				
Item	Standard	Method	Requirement	Result
Antenna Requirement	MIC Item 19 of Article 2 Paragraph 1	N/A	MIC Item 19 of Article 2 Paragraph 1	Pass
Interference prevention capability	MIC Item 19 of Article 2 Paragraph 1	MIC Notice No.88 Appendix No.43	MIC Item 19 of Article 2 Paragraph 1	Pass
RF accessibility	MIC Item 19 of Article 2 Paragraph 1	N/A	MIC Item 19 of Article 2 Paragraph 1	Pass

Radio Spectrum Matter Part				
Item	Standard	Method	Requirement	Result
Frequency Error	MIC Item 19 of Article 2 Paragraph 1	MIC Notice No.88 Appendix No.43	MIC Item 19 of Article 2 Paragraph 1	Pass
Occupied Bandwidth(99%)	MIC Item 19 of Article 2 Paragraph 1	MIC Notice No.88 Appendix No.43	MIC Item 19 of Article 2 Paragraph 1	Pass
Spread spectrum Bandwidth(90%)	MIC Item 19 of Article 2 Paragraph 1	MIC Notice No.88 Appendix No.43	MIC Item 19 of Article 2 Paragraph 1	Pass
Antenna Power	MIC Item 19 of Article 2 Paragraph 1	MIC Notice No.88 Appendix No.43	MIC Item 19 of Article 2 Paragraph 1	Pass
Spurious emission Intensity	MIC Item 19 of Article 2 Paragraph 1	MIC Notice No.88 Appendix No.43	MIC Item 19 of Article 2 Paragraph 1	Pass
Limit of secondary radiated emissions	MIC Item 19 of Article 2 Paragraph 1	MIC Notice No.88 Appendix No.43	MIC Item 19 of Article 2 Paragraph 1	Pass
Carrier Sensing	MIC Item 19 of Article 2 Paragraph 1	MIC Notice No.88 Appendix No.43	MIC Item 19 of Article 2 Paragraph 1	Pass

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4 General Information

4.1 Details of E.U.T.

Power Supply:	DC 12 V
Test Voltage:	AC 100 V, 60 Hz powered by AC/DC adapter referred to section 4.2
Cable:	DC input ports; Phone ports; HDMI ports; USB 3.0 ports*2; TF ports; LAN ports.
Antenna Gain	0 dBi
Antenna Type	Integral Antenna
Channel Spacing	5MHz
Modulation Type	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Number of Channels	802.11b/g/n(HT20): 13 802.11n(HT40):9
Operation Frequency	802.11b/g/n(HT20): 2412MHz to 2472MHz 802.11n(HT40): 2422MHz to 2462MHz

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Mouse	Lenovo	M-U0025-O	REF. No.:SEA2400
Television	Samsung	UA32J4088AJXXZ?	0MF63TBG919802T
AC/DC adapter	Offered by client	GPE036W-A120300-3	None

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4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	$\pm 5.5 \times 10^{-8}$
2	Duty cycle	$\pm 0.57\%$
3	Occupied Bandwidth	$\pm 3\%$
4	RF Conducted power	$\pm 0.68\text{dB}$
5	RF Power Density	$\pm 1.50\text{dB}$
6	Conducted Spurious Emissions	$\pm 1.04\text{dB}$
7	RF Radiated Power	$\pm 4.5\text{dB}$ (below 1GHz)
		$\pm 4.8\text{dB}$ (above 1GHz)
8	Radiated Spurious Emission Test	$\pm 4.5\text{dB}$ (30MHz-1GHz)
		$\pm 4.8\text{dB}$ (1GHz-18GHz)
9	Temperature	$\pm 0.4^\circ\text{C}$
10	Humidity	$\pm 1.3\%$
11	Supply Voltages	$\pm 1.5\%$
12	Time	$\pm 3\%$

4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou Branch EMC Laboratory,
198 Kezhu Road, Sciencetech Park, Guangzhou Economic & Technology Development District,
Guangzhou, China 510663

Tel: +86 20 82155555

Fax: +86 20 82075059

No tests were sub-contracted.

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4.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

● **NVLAP (Lab Code: 200611-0)**

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

● **ACMA**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our NVLAP accreditation.

● **SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO**

Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.

● **CNAS (Lab Code: L0167)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAS-CL01:2018 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2017 General Requirements) for the Competence of Testing Laboratories.

● **FCC Recognized 2.948 Listed Test Firm(Registration No.: 282399)**

SGS-CSTC Standards Technical Services 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. Registration 282399, May 31, 2002.

● **FCC Recognized Accredited Test Firm(Registration No.: 486818)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been accredited and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Designation Number: CN5016, Test Firm Registration Number: 486818, Jul 13, 2017.

● **Industry Canada (Registration No.: 4620B, CAB identifier: CN0052)**

SGS-CSTC Standards Technical Services Co., Ltd., has been registered by Innovation Science and Economic Development Canada for Wireless Device Testing laboratories to test to Canadian radio equipment requirements. Registration No. 4620B, CAB identifier: CN0052.

● **VCCI (Registration No.: R-12460, C-12584, G-10449 and T-11179)**

The 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-12460, C-12584, G-10449 and T-11179 respectively.

● **CBTL (Lab Code: TL129)**

SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully comply with the requirements of ISO/IEC 17025:2005, the Basic Rules, IECEE 01 and Rules of procedure IECEE 02, and the relevant IECEE CB-Scheme Operational documents.



4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None

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5 Equipment List

Frequency Error					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
MXA Signal Analyzer	AgilentTechnologies	N9020A	SEM004-10	20120-03-02	2021-03-01
6dB Attenuator	HP	8491A	EMC2062	2018-04-04	2020-04-03
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	2019-11-02	2021-11-01
MI CABLE	SGS-EMC	0.8M	EMC2137	2019-11-02	2021-11-01

Occupied Bandwidth (99%)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
MXA Signal Analyzer	AgilentTechnologies	N9020A	SEM004-10	20120-03-02	2021-03-01
6dB Attenuator	HP	8491A	EMC2062	2018-04-04	2020-04-03
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	2019-11-02	2021-11-01
MI CABLE	SGS-EMC	0.8M	EMC2137	2019-11-02	2021-11-01

Spread spectrum Bandwidth (90%)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
MXA Signal Analyzer	AgilentTechnologies	N9020A	SEM004-10	20120-03-02	2021-03-01
6dB Attenuator	HP	8491A	EMC2062	2018-04-04	2020-04-03
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	2019-11-02	2021-11-01
MI CABLE	SGS-EMC	0.8M	EMC2137	2019-11-02	2021-11-01

Antenna Power					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
MXA Signal Analyzer	AgilentTechnologies	N9020A	SEM004-10	20120-03-02	2021-03-01
6dB Attenuator	HP	8491A	EMC2062	2018-04-04	2020-04-03
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	2019-11-02	2021-11-01
MI CABLE	SGS-EMC	0.8M	EMC2137	2019-11-02	2021-11-01

Spurious emission Intensity					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
MXA Signal Analyzer	AgilentTechnologies	N9020A	SEM004-10	20120-03-02	2021-03-01
6dB Attenuator	HP	8491A	EMC2062	2018-04-04	2020-04-03
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	2019-11-02	2021-11-01



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MI CABLE	SGS-EMC	0.8M	EMC2137	2019-11-02	2021-11-01
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Limit of secondary radiated emissions					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
MXA Signal Analyzer	AgilentTechnologies	N9020A	SEM004-10	20120-03-02	2021-03-01
6dB Attenuator	HP	8491A	EMC2062	2018-04-04	2020-04-03
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	2019-11-02	2021-11-01
MI CABLE	SGS-EMC	0.8M	EMC2137	2019-11-02	2021-11-01

Carrier Sensing					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
MXA Signal Analyzer	AgilentTechnologies	N9020A	SEM004-10	20120-03-02	2021-03-01
ESG Vector Signal Generator	Keysight	E4438C	SEM006-03	2019-04-05	2020-04-04
EXG Analog Signal Generator	AgilentTechnologies	N5171B	SEM006-04	2017-07-26	2020-07-25
6dB Attenuator	HP	8491A	EMC2062	2018-04-04	2020-04-03
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	2019-11-02	2021-11-01
MI CABLE	SGS-EMC	0.8M	EMC2137	2019-11-02	2021-11-01

General used equipment					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
DMM	Fluke	73	EMC0006	2019-07-16	2020-07-15
DMM	Fluke	73	EMC0007	2019-07-16	2020-07-15

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6 Radio Spectrum Technical Requirement

6.1 EUT Test Conditions

Power supply:

the RF unit supplied by DC 3.3V.

The EUT has the input voltage to the circuit of RF unit complies with output voltage limitation ($\pm 1\%$) against input voltage fluctuation (90V (-10%) - 240V).

So, all measurements were conducted at only rated voltage AC 100V 60Hz.

The measurement result of the voltage fluctuation at RF circuit when AC 100V-240V.

DC input (AC 100V)	Measured value (3.3V)
AC 100V	3.3V
AC 90V	3.28V
AC 240V	3.31V

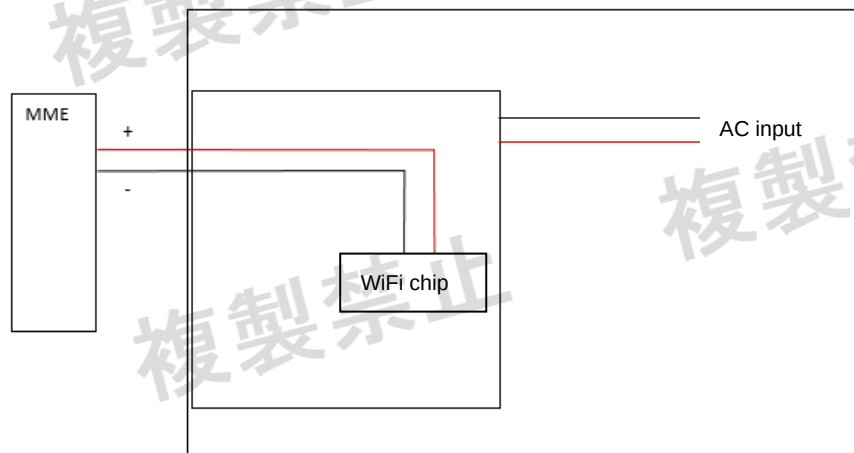
Temperature: 5.0 -35.0 °C

Humidity: 45-85 % RH

Atmospheric Pressure: 1000 -1010 mbar

Test frequencies: If the EUT can be set to 3 of more different (carrier) frequencies in 1 allocated band, testing shall be performed using the Lowest, M and the Highest frequency (L, M and H). If there are 2 or fewer frequencies, testing shall be performed with the available frequencies.

Test Setup Diagram



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6.2 Environment Parameter

Environment Parameter	Selected Values During Tests	
Relative Humidity	Ambient	
Value	Temperature (°C)	Voltage (V)
TNVN	25	100
Note:		
VN: Normal Voltage		
TN: Normal Temperature		

Operation Frequency each of channel (802.11b/g/n HT20)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412MHz	5	2432MHz	9	2452MHz	13	2472MHz
2	2417MHz	6	2437MHz	10	2457MHz		
3	2422MHz	7	2442MHz	11	2462MHz		
4	2427MHz	8	2447MHz	12	2467MHz		

Operation Frequency each of channel (802.11n HT40)					
Channel	Frequency	Channel	Frequency	Channel	Frequency
3	2422MHz	6	2437MHz	9	2452MHz
4	2427MHz	7	2442MHz	10	2457MHz
5	2432MHz	8	2447MHz	11	2462MHz

Using test software was control EUT work in continuous transmitter and receiver mode. And select test channel as below:

For 802.11b/g/n (HT20):

Channel	Frequency
The lowest channel (CH1)	2412MHz
The middle channel (CH7)	2442MHz
The highest channel (CH13)	2472MHz

For 802.11n (HT40):

Channel	Frequency
The lowest channel (CH3)	2422MHz
The middle channel (CH7)	2442MHz
The highest channel (CH11)	2462MHz



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6.3 Antenna Requirement

6.3.1 Test Requirement:

MIC Item 19 of Article 2 Paragraph 1

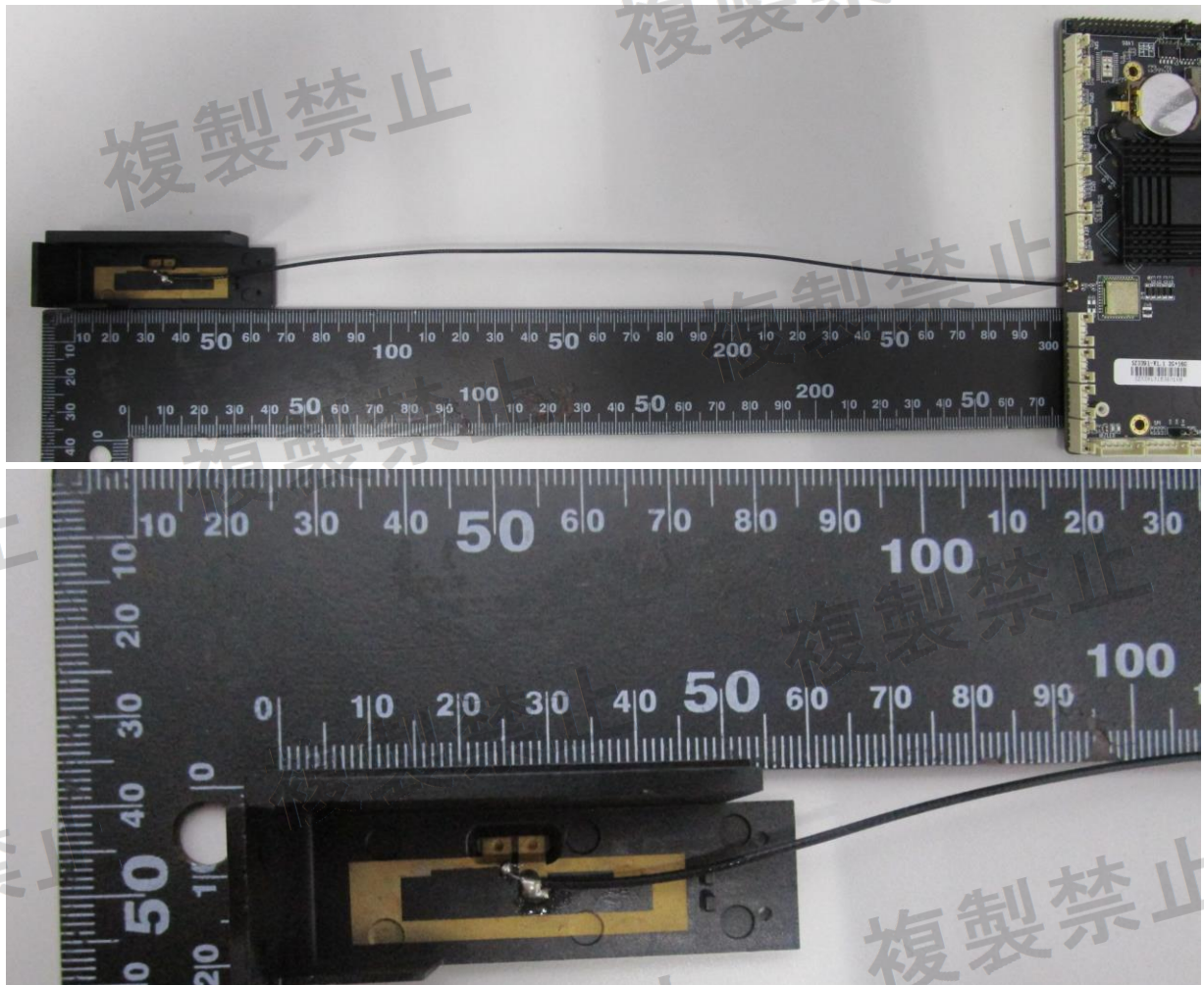
6.3.2 Conclusion

Standard requirement:

Applicable for equipment with an antenna terminal, including testing terminals. If an antenna connector is available, all relevant tests will be carried out conducted. If not, tests will be carried out in an anechoic room or with a suitable test-fixture.

EUT Details:

The antenna is Integral and no consideration of replacement. The best case gain of the antenna is 0 dBi.



Result:

An antenna connector is available, all relevant tests will be carried out conducted.



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6.4 Interference prevention capability

6.4.1 Test Requirement:

MIC Item 19 of Article 2 Paragraph 1

Limit:

Article 2, Item (19) Notice 88 Appendix 43, 44, 45

The EUT shall be constructed in such a way that sensitive RF parts, (like modulation and oscillator parts) cannot be reached easily by the user. These parts shall be covered by soldered metal caps or glue or by other mechanical covers. If the covers are fixed with screws, these shall be not the common type(s) like a Phillips, but special versions like Torx, so that the user cannot open the device with common tools.

6.4.2 Test Setup Diagram



6.4.3 Conclusion

Standard Requirement:

- 1) Measurement system diagram as shown above and test equipment keep transmitting identification code.
- 2) Condition of measuring instrument
 - (1) Demodulator must be able to demodulate the transmitting signal emitted by test equipment and to indicate the identification code.
- 3) Condition of test equipment The mode of normal use.
- 4) Measuring operation procedure
 - (1) When test equipment has the function to transmit identification code automatically:
 - A) Transmit the predetermined identification code from test equipment.
 - B) Confirm the transmitted identification code by demodulator.

B0:FC:59:05:DC:BD

EUT Details:

The unit does meet the requirements (Good).

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6.5 RF accessibility

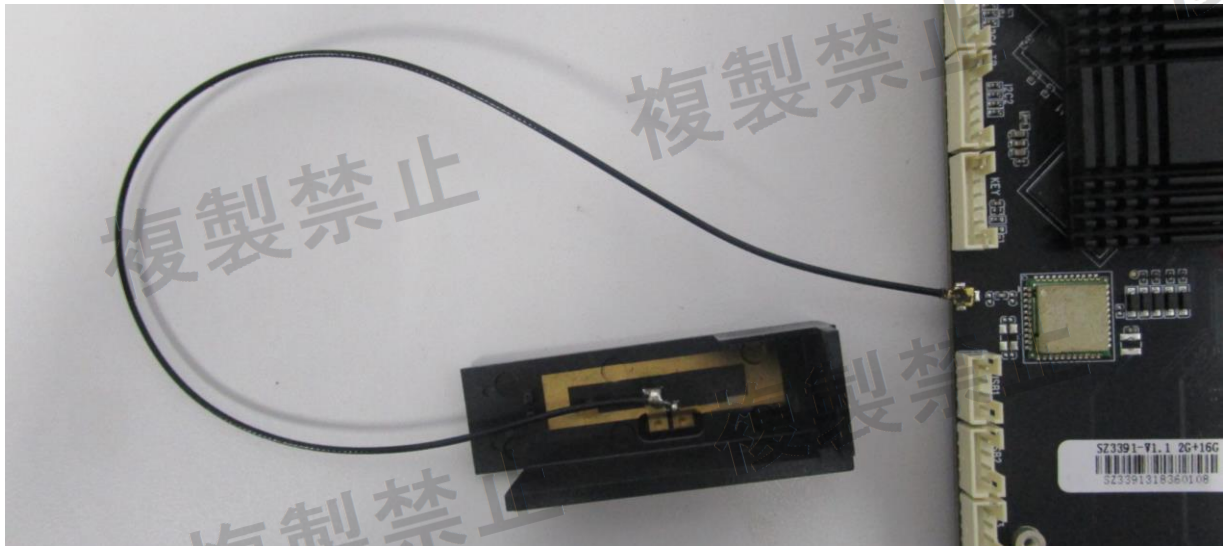
6.5.1 Test Requirement:

MIC Item 19 of Article 2 Paragraph 1

6.5.2 Conclusion

Standard Requirement:

The EUT shall be constructed in such a way that sensitive RF parts, (like modulation and oscillator parts) cannot be reached easily by the user. These parts shall be covered by soldered metal caps or glue or by other mechanical covers. If the covers are fixed with screws, these shall be not the common type(s) like a Phillips, but special versions like Torx, so that the user cannot open the device with common tools.



EUT Details:

RF and Modulation parts are mounted on PCB with surface mount technology, and there is no any adjustable parts on PCB or adjustable parts are not exposed.

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7 Radio Spectrum Matter Test Results

7.1 Frequency Error

Test Requirement	MIC Item 19 of Article 2 Paragraph 1
Test Method:	MIC Notice No.88 Appendix No.43
Limit:	Tolerance of frequency: $\pm 50\text{E-6}$

7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 25.7 °C Humidity: 59.7 % RH Atmospheric Pressure: 1020 mbar
Test mode a:TX mode_Keep the EUT in continuously transmitting in CW mode.

7.1.2 Test Setup Diagram



7.1.3 Measurement Procedure and Data

1. Test Conditions:

Spectrum Analyzer is used for measurement.

2. EUT conditions:

Modulation/Spread/Hopping OFF, CW Tx

3. Spectrum Analyzer conditions:

Frequency: Test Frequency

Span 1MHz

RBW 10 kHz (Modulation OFF),

VBW 10 kHz (Modulation OFF),

Sweep Time Auto

Detector mode Positive peak

Indication mode Max hold

Alternative method:

Frequency: Test Frequency

Span 2 times channel bandwidth

RBW 100 kHz (Modulation ON),

VBW 100 kHz (Modulation ON),

Sweep Time Auto

Detector mode Positive peak

Indication mode Max hold

The detailed test data see: Appendix MIC19-2



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7.2 Occupied Bandwidth(99%)

Test Requirement MIC Item 19 of Article 2 Paragraph 1
Test Method: MIC Notice No.88 Appendix No.43
Limit:
FH: 83.5MHz or less
FH + DS: 83.5MHz or less
FH + OFDM: 83.5MHz or less
OFDM: 38MHz or less
Others: 26MHz or less

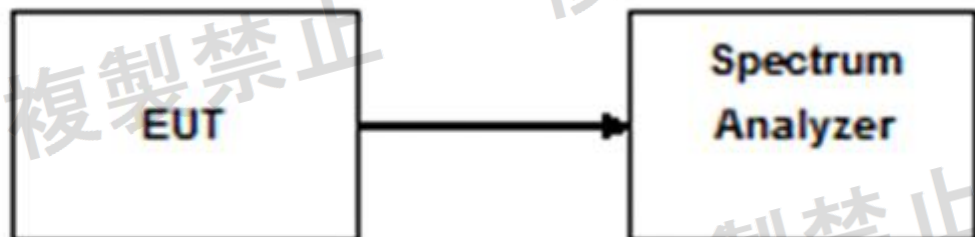
7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 25.7 °C Humidity: 59.8 % RH Atmospheric Pressure: 1020 mbar

Test mode a: TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.

7.2.2 Test Setup Diagram



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7.2.3 Measurement Procedure and Data

1. Test Conditions:

Spectrum Analyzer is used for measurement.

2. EUT conditions:

Modulation/Spread/Hopping ON, Modulation Tx

For equipment using diffusion code, set to the test diffusion code and modulate with standard coding test signal.

3. Spectrum Analyzer conditions:

Frequency: Test Frequency

Span 83.5 MHz (FHSS); 40/60 MHz (OFDM; DSSS); 2-5 times OBW (Others)

RBW 1 MHz (FHSS); 300kHz (OFDM; DSSS); 3% OBW (Others)

VBW 1 MHz (FHSS); 300kHz (OFDM; DSSS); 3 times RBW (Others)

Sweep Time Auto

detector mode Positive peak

Indication mode Max hold

OBW 99%

The detailed test data see: Appendix MIC19-2

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7.3 Spread spectrum Bandwidth(90%)

Test Requirement MIC Item 19 of Article 2 Paragraph 1
Test Method: MIC Notice No.88 Appendix No.43
Limit: DS,FH,FH+DS,FH+OFDM: 500kHz or more

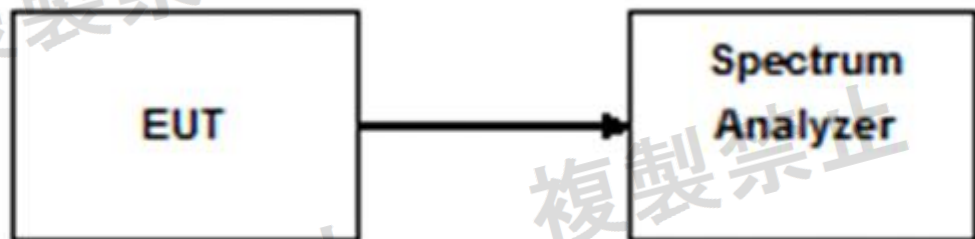
7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 25.7 °C Humidity: 59.8 % RH Atmospheric Pressure: 1020 mbar

Test mode a:TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.

7.3.2 Test Setup Diagram



7.3.3 Measurement Procedure and Data

1. Test Conditions:

Spectrum Analyzer is used for measurement.

2. EUT conditions:

Modulation/Spread/Hopping ON, Modulation Tx

For equipment using diffusion code, set to the test diffusion code and modulate with standard coding test signal.

3. Spectrum Analyzer conditions:

Frequency: Test Frequency

Span 83.5 MHz (FHSS); 40/60 MHz (OFDM; DSSS)

RBW 1 MHz (FHSS); 300kHz (OFDM; DSSS)

VBW 1 MHz (FHSS); 300kHz (OFDM; DSSS)

Sweep Time Auto

detector mode Positive peak

Indication mode Max hold

OBW 90%

The detailed test data see: Appendix MIC19-2



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7.4 Antenna Power

Test Requirement

Test Method:

Limit:

MIC Item 19 of Article 2 Paragraph 1

MIC Notice No.88 Appendix No.43

Designated value

- (1) FH, FH+DS, FH+OFDM: 3mW/MHz
(used in the range of 2427 - 2470.75 MHz)
 - (2) OFDM, DS other than (1) 10mW/MHz
 - (3) Other than (1) & (2) 10mW
 - (4) OFDM OBW 26 - 38MHz: 5mW/MHz
- Tolerance: +20%, -80%

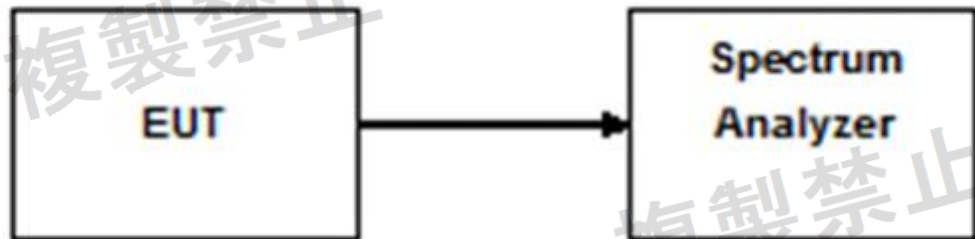
7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 25.7 °C Humidity: 59.7 % RH Atmospheric Pressure: 1020 mbar

Test mode a: TX mode_ Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.

7.4.2 Test Setup Diagram



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7.4.3 Measurement Procedure and Data

1. Test Conditions:

Spectrum Analyzer is used for measurement.

2. EUT conditions:

Modulation/Spread/Hopping ON, Modulation Tx

For equipment using diffusion code, set to the test diffusion code and modulate with standard coding test signal.

3. Spectrum Analyzer conditions:

Frequency: Test Frequency

Span 25 MHz(FHSS); 40/60 MHz (OFDM; DSSS); Enough to capture the emission (Others)

RBW 1 MHz (FHSS; OFDM; DSSS); More than OBW (Others)

VBW 1 MHz (FHSS; OFDM; DSSS); More than RBW (Others)

Sweep Time Auto

detector mode RMS

Indication mode Max hold

The detailed test data see: Appendix MIC19-2



7.5 Spurious emission Intensity

Test Requirement	MIC Item 19 of Article 2 Paragraph 1
Test Method:	MIC Notice No.88 Appendix No.43
Limit:	(1) Below 2387 MHz: 2.5 μ W/MHz (2) 2387 to 2400 MHz: 25 μ W/MHz (3) 2483.5 through 2496.5 MHz: 25 μ W/MHz (4) Over 2496.5 MHz: 2.5 μ W/MHz

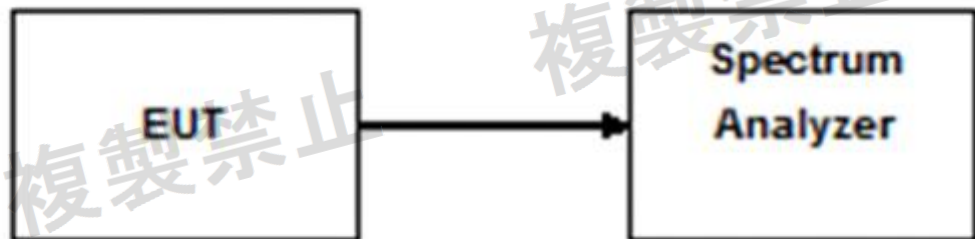
7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 25.7 °C Humidity: 59.7 % RH Atmospheric Pressure: 1020 mbar

Test mode a:TX mode_ Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.

7.5.2 Test Setup Diagram



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7.5.3 Measurement Procedure and Data**1. Test Conditions:**

Spectrum Analyzer is used for measurement.

2. EUT conditions:

Modulation/Spread/Hopping ON, , Modulation Tx

For equipment using diffusion code, set to the test diffusion code and modulate with standard coding test signal.

3. Spectrum Analyzer conditions:**Step 1**

All spurious are measured from 30 MHz to 13 GHz by peak mode.

Step 2

IF the value measured by Step1 is 2 dB or less, measure in average mode.

Test setup for Step 1:

Frequency: 30 MHz – 2400 MHz , 2483.5 MHz –13 GHz

RBW 1 MHz

VBW 1 MHz

Sweep Time Auto

detector mode Positive peak

Indication mode Max hold

Test setup for Step 2:

Frequency: Spurious Frequency

RBW 1 MHz

VBW 1 MHz

Sweep Time Auto

detector mode Sample

Indication mode Max hold

The detailed test data see: Appendix MIC19-2

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7.6 Limit of secondary radiated emissions

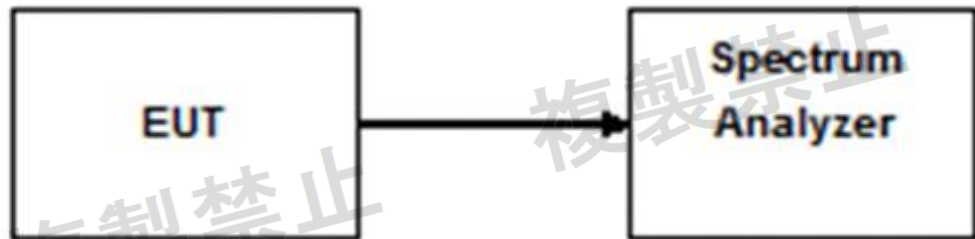
Test Requirement	MIC Item 19 of Article 2 Paragraph 1
Test Method:	MIC Notice No.88 Appendix No.43
Limit:	(1) Below 1 GHz : 4 nW or less (2) 1 GHz and over : 20 nW or less

7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 25.7 °C Humidity: 59.8 % RH Atmospheric Pressure: 1020 mbar
Test mode b:RX mode_Keep the EUT in continuously Receiving mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.

7.6.2 Test Setup Diagram



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7.6.3 Measurement Procedure and Data**1. Test Conditions:**

Spectrum Analyzer is used for measurement.

2. EUT conditions:

Modulation/Spread/Hopping ON

For equipment using diffusion code, set to the test diffusion code and modulate with standard coding test signal.

3. Spectrum Analyzer conditions:**Step 1**

All spurious are measured from 30 MHz to 13 GHz by peak mode.

Step 2

IF the value measured by Step1 is 2 dB or less, measure in average mode.

Test setup for Step 1:

Frequency: 30 MHz – 2400 MHz , 2483.5 MHz –13 GHz

RBW 100 kHz (30 – 1GHz) , 1 MHz (over 1GHz)

VBW 100 kHz (30 – 1GHz) , 1 MHz (over 1GHz)

Sweep Time Auto

detector mode Positive peak

Indication mode Max hold

Test setup for Step 2:

Frequency: Spurious Frequency

Span 0 Hz

RBW 100 kHz (30 – 1GHz) , 1 MHz (over 1GHz)

VBW 100 kHz (30 – 1GHz) , 1 MHz (over 1GHz)

Sweep Time Auto

detector mode Sample

Indication mode Max hold

The detailed test data see: Appendix MIC19-2

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7.7 Carrier Sensing

Test Requirement MIC Item 19 of Article 2 Paragraph 1

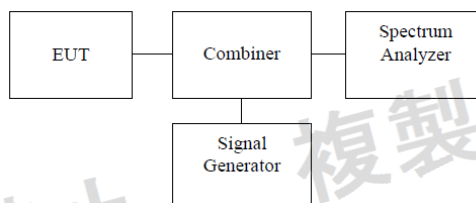
Test Method: MIC Notice No.88 Appendix No.43

7.7.1 E.U.T. Operation

Operating Environment:

Temperature: 23 °C Humidity: 56 % RH Atmospheric Pressure: 1015 mbar

Test mode c:Normal Working_Keep the EUT normal operation.

7.7.2 Test Setup Diagram**7.7.3 Measurement Procedure and Data**

1. Test Conditions:

Spectrum Analyzer and Signal Generator are used for measurement.

2. EUT conditions:

Normal Operation

3. Signal Generator conditions:

Setting 1 – Output frequency: Center of test frequency

Modulation: Un-modulation

Output level: The required level at the EUT antenna input, as defined by the applicant.

4. Spectrum Analyzer conditions:

Setting 2 – Frequency: Center of the frequency

Span: 50MHz

RBW: 1MHz

VBW: 1MHz

Trigger: Free running

Detector: Positive peak

5. Test procedure:

①Set the spectrum analyser to [Setting 2]

②With the signal generator OFF, set the EUT to transmit mode and confirm that the transmission meets the following characteristics:

a: Modulation: OFDM

b: Occupied bandwidth: over 26 MHz

③Set the EUT to receive mode

④First, set the signal generator output ON, then set the EUT to transmit mode and confirm that the EUT does NOT transmit a signal with the following characteristics:

a: Modulation: OFDM

b: Occupied bandwidth: over 26 MHz

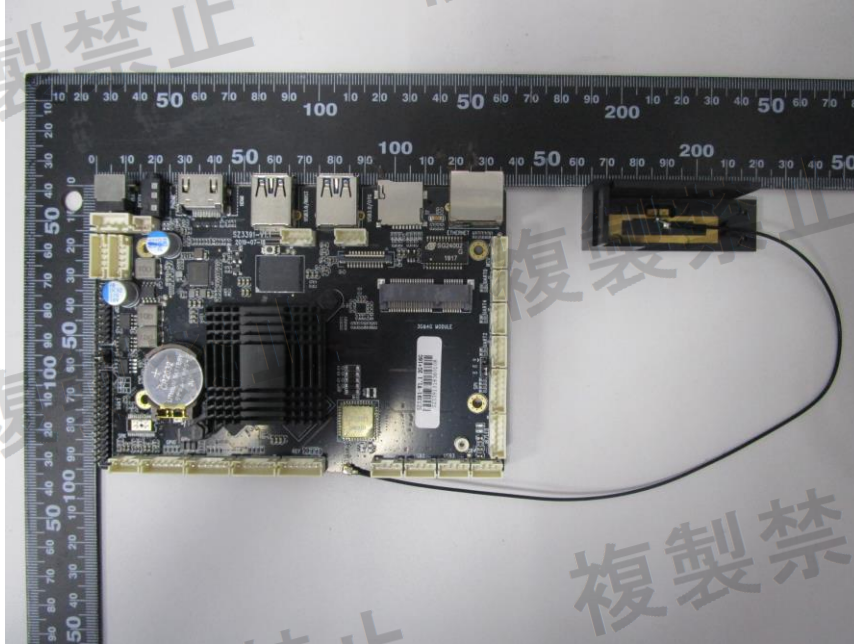
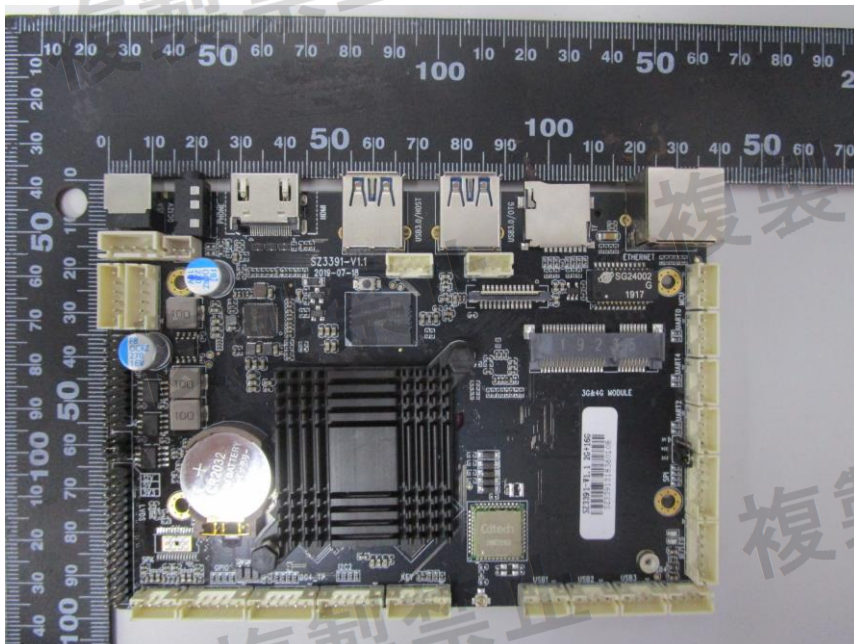
The detailed test data see: Appendix MIC19-2

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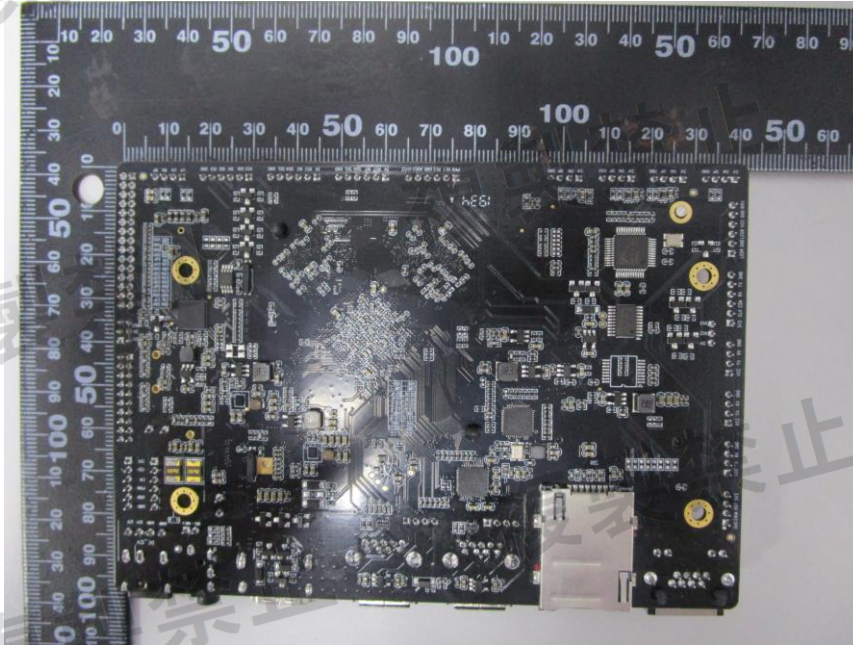
8 Photographs

8.1 EUT Constructional Details



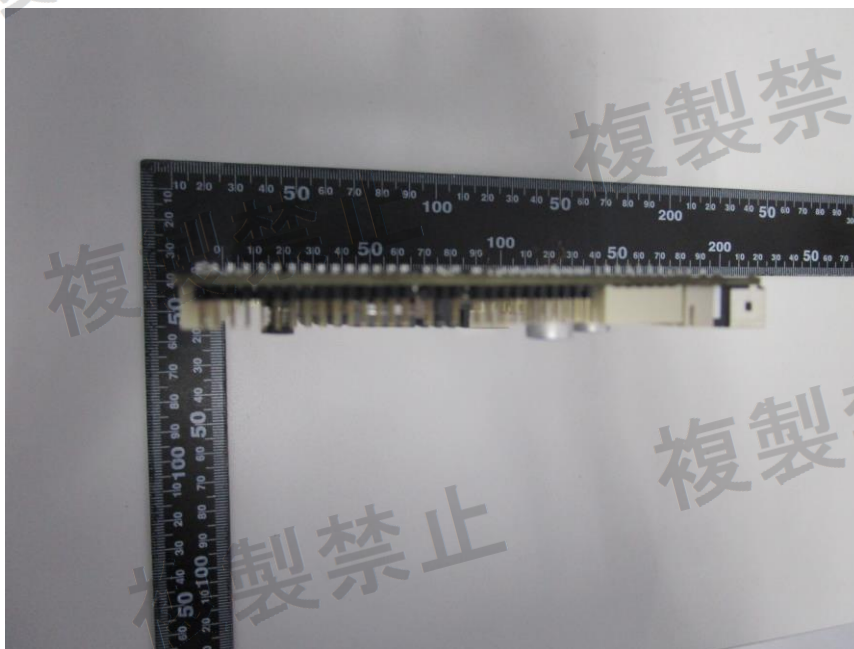
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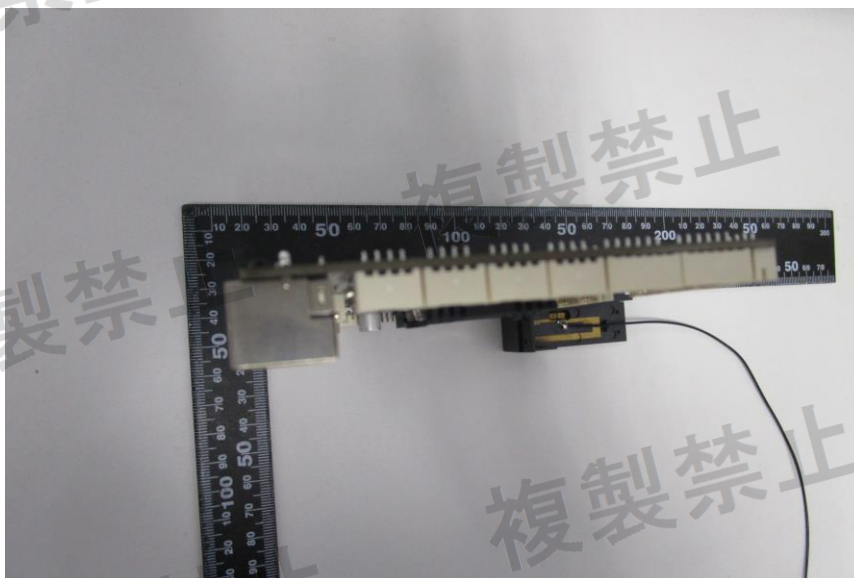
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9 Appendix

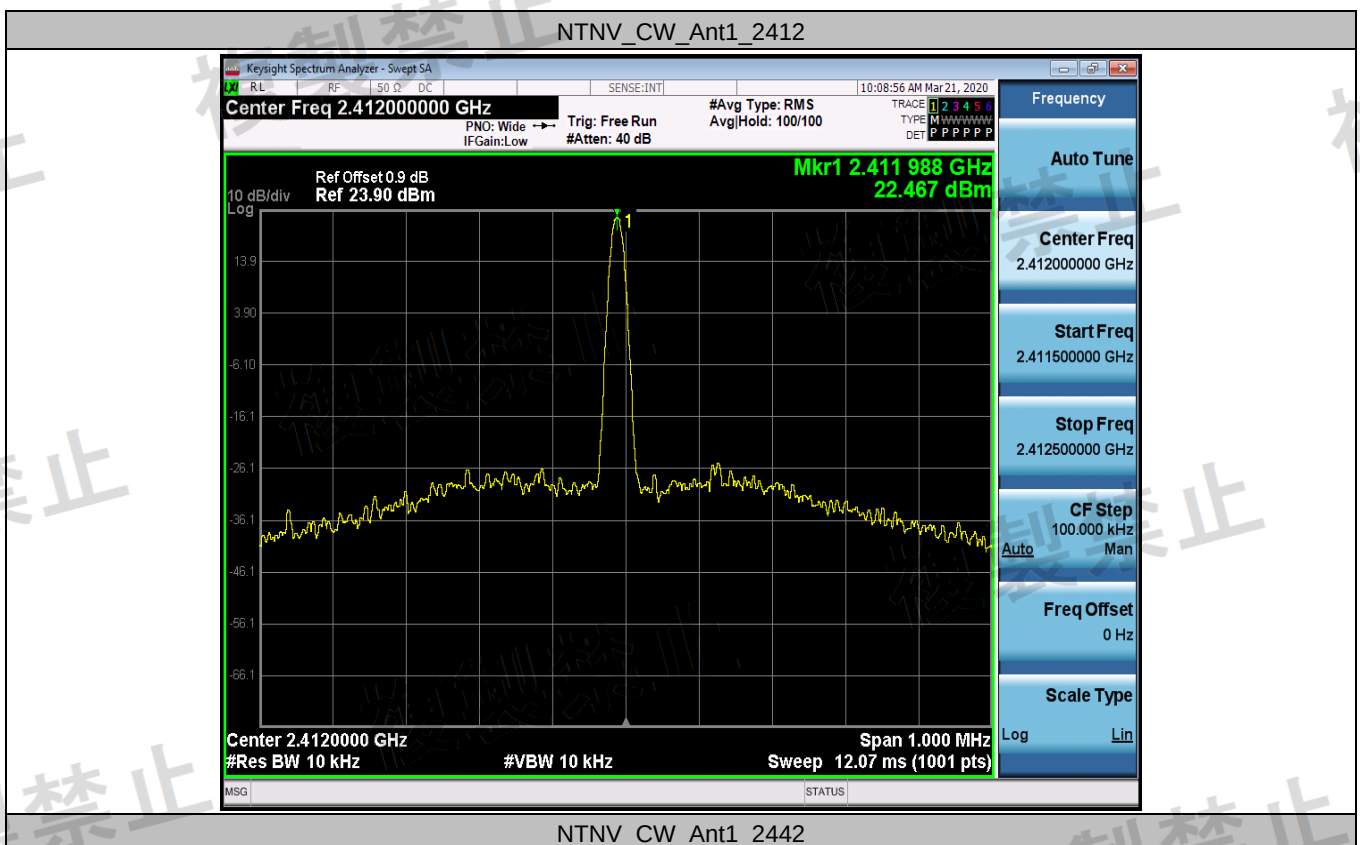
9.1 Appendix MIC19-2

9.2 Appendix A: Frequency Error

9.2.1 Test Result

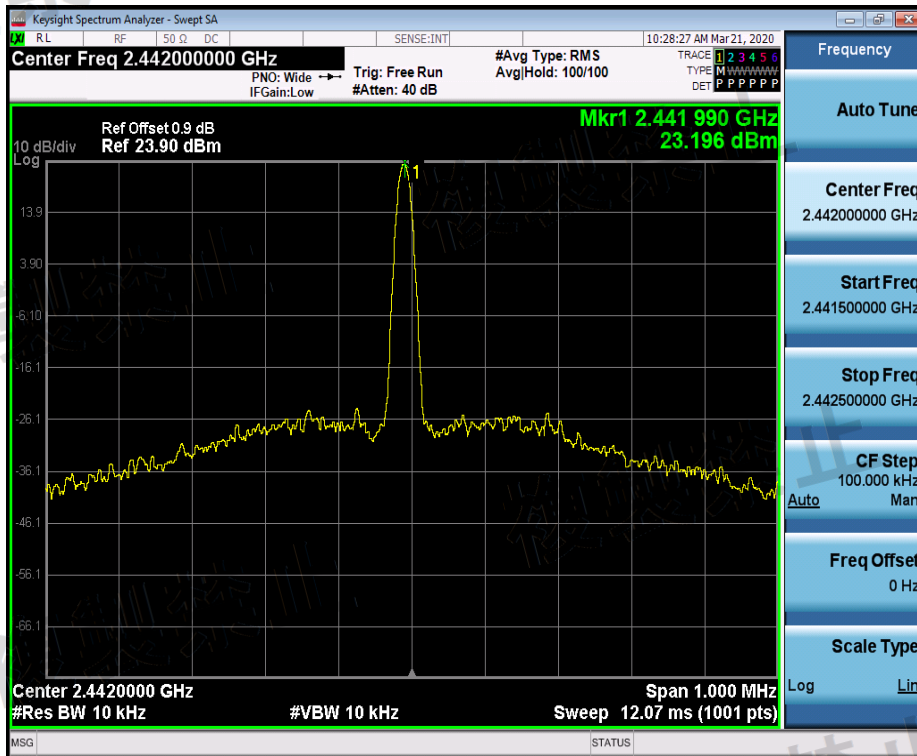
TestCondition	TestMode	Antenna	Channel	Result[ppm]	Limit[ppm]	Verdict
NTNV	CW	Ant1	2412	-4.97512	±50	PASS
	CW	Ant1	2442	-4.09500	±50	PASS
	CW	Ant1	2472	-4.44984	±50	PASS

9.2.2 Test Graphs

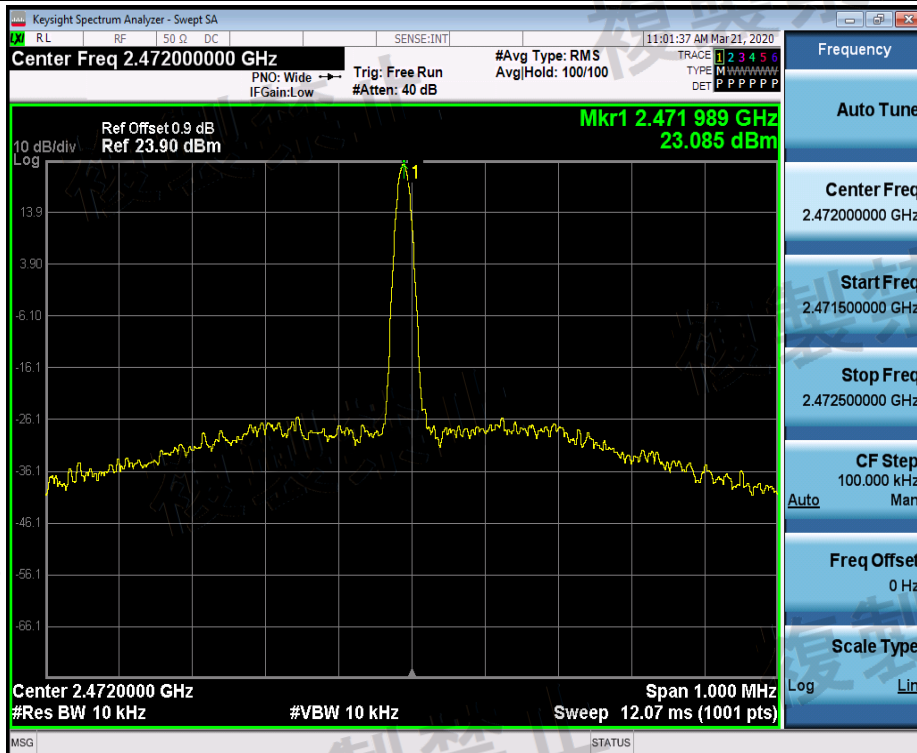


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9.3 Appendix B: Antenna Power

9.3.1 Test Result

Test Mode	Channel	Ant	Ave. Burst Power [mW/MHz]	Limit [mW/MHz]	Tolerance [%]	Limit [%]	Verdict
11B	2412	Ant1	2.450	10	-18.33	-80 to +20	PASS
	2442	Ant1	2.768	10	-7.73	-80 to +20	PASS
	2472	Ant1	2.619	10	-12.70	-80 to +20	PASS
11G	2412	Ant1	1.531	10	-23.45	-80 to +20	PASS
	2442	Ant1	2.036	10	1.80	-80 to +20	PASS
	2472	Ant1	1.866	10	-6.70	-80 to +20	PASS
11N20SISO	2412	Ant1	1.653	10	-17.35	-80 to +20	PASS
	2442	Ant1	1.863	10	-6.85	-80 to +20	PASS
	2472	Ant1	1.708	10	-14.60	-80 to +20	PASS
11N40SISO	2422	Ant1	0.705	10	-29.5	-80 to +20	PASS
	2442	Ant1	0.851	10	-14.9	-80 to +20	PASS
	2462	Ant1	0.803	10	-19.7	-80 to +20	PASS

Remark:

Test Condition: TNVN

Refer to section 9.1-2 for Peak Frequency of each channel

Rated antenna power: 3.0mW/MHz @11B

2.0mW/MHz @11G

2.0mW/MHz @11N20SISO

1.0mW/MHz @11N40SISO

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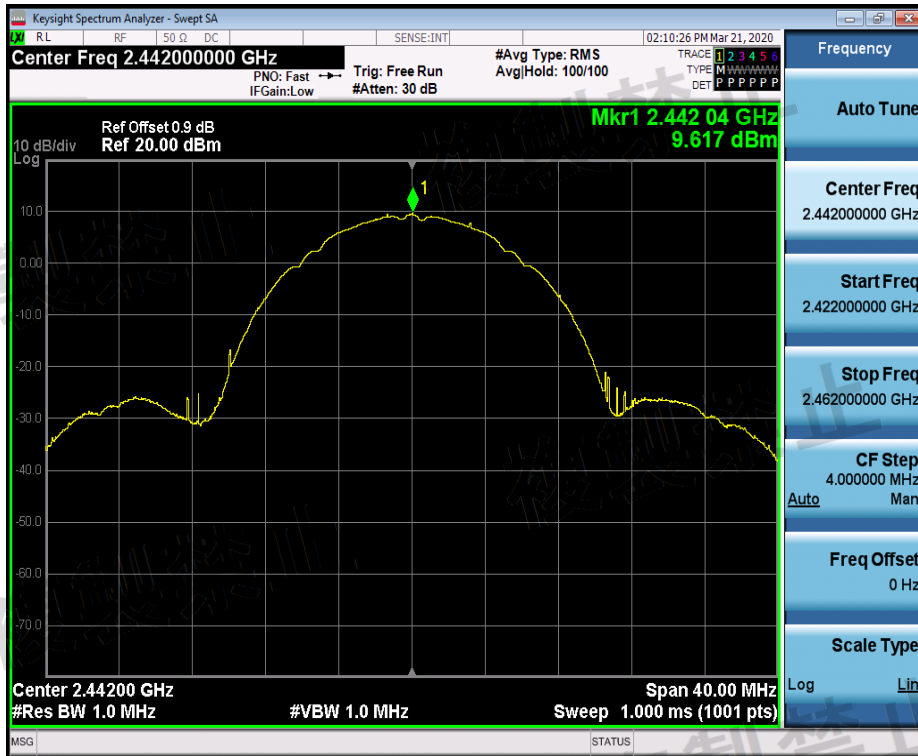
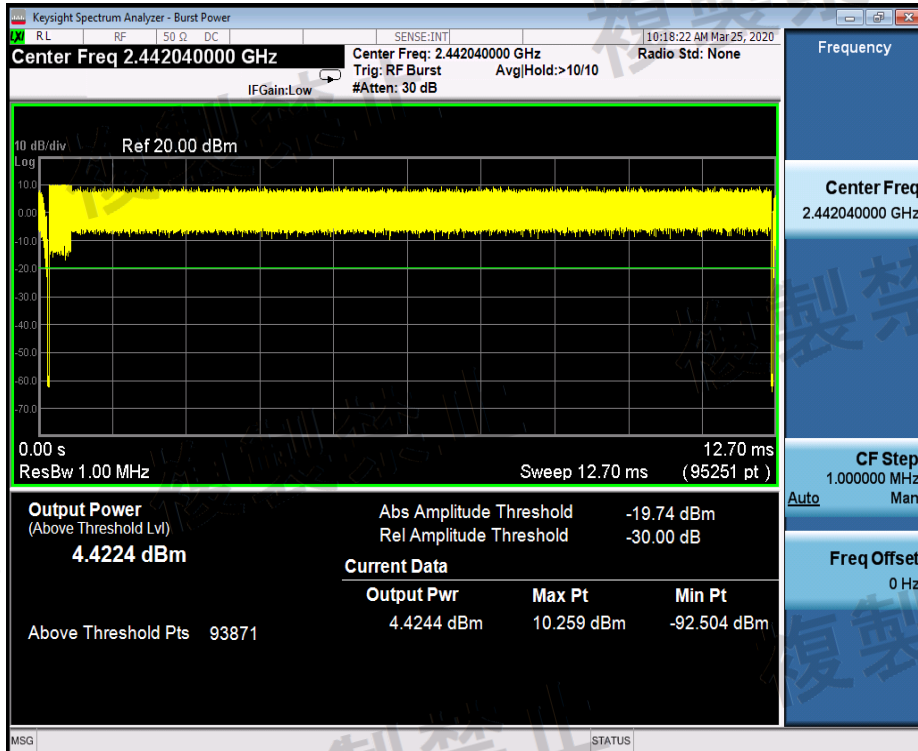
9.3.2 Test Graphs



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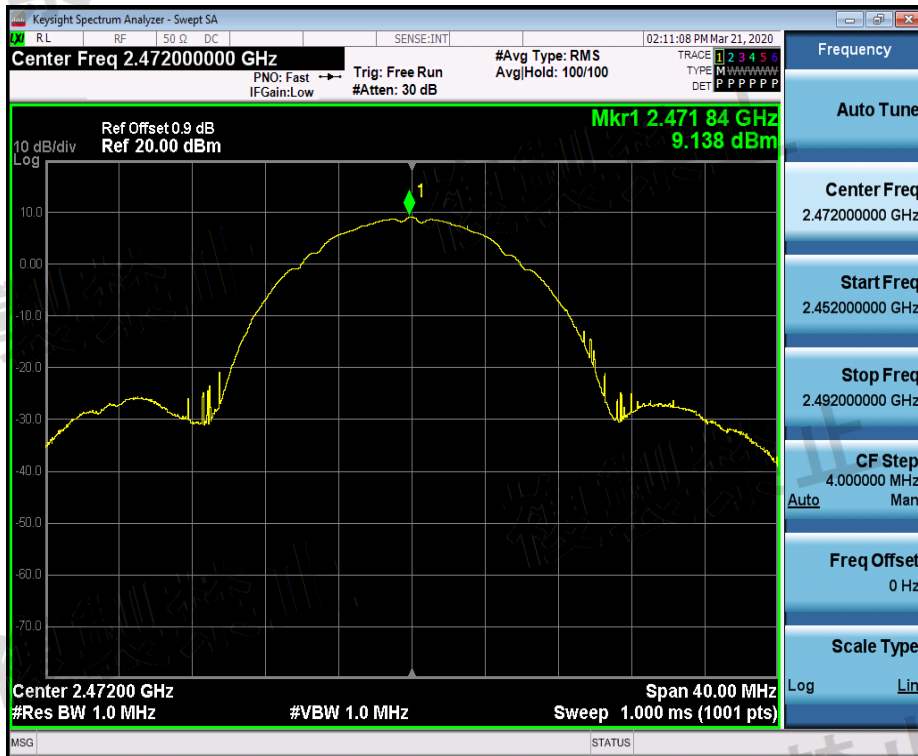
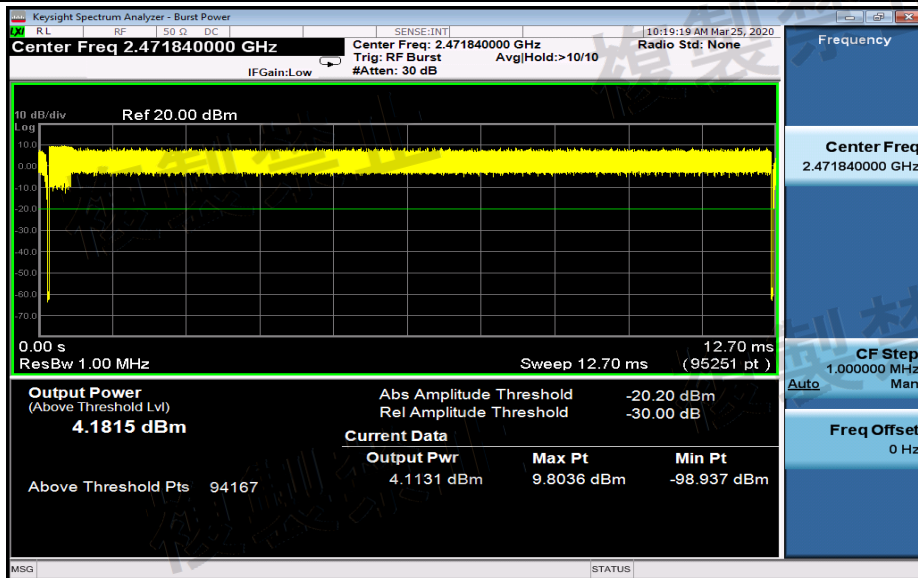


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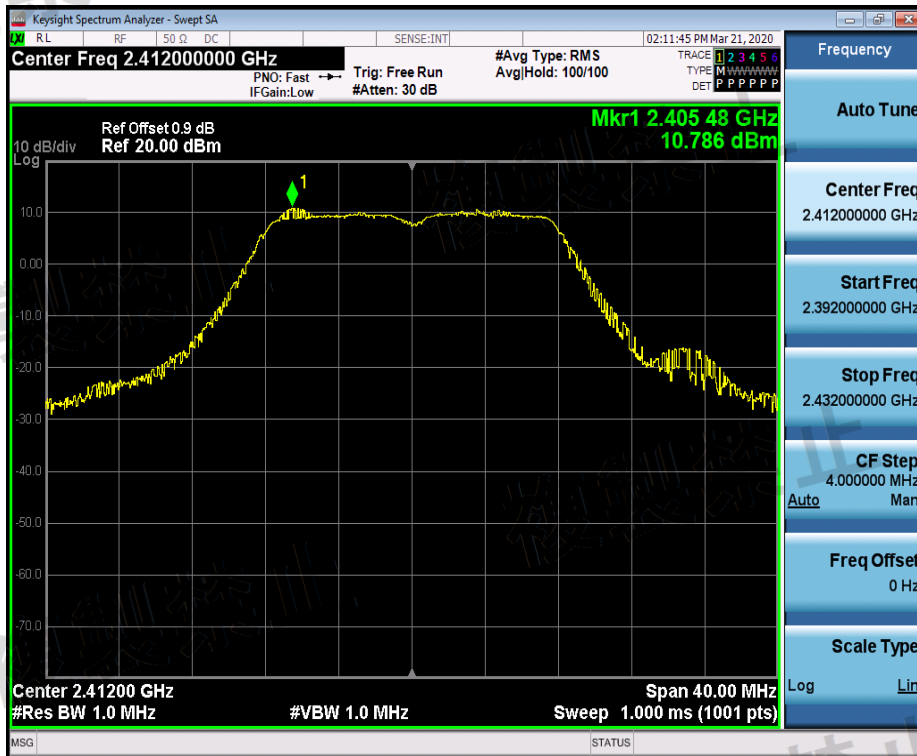
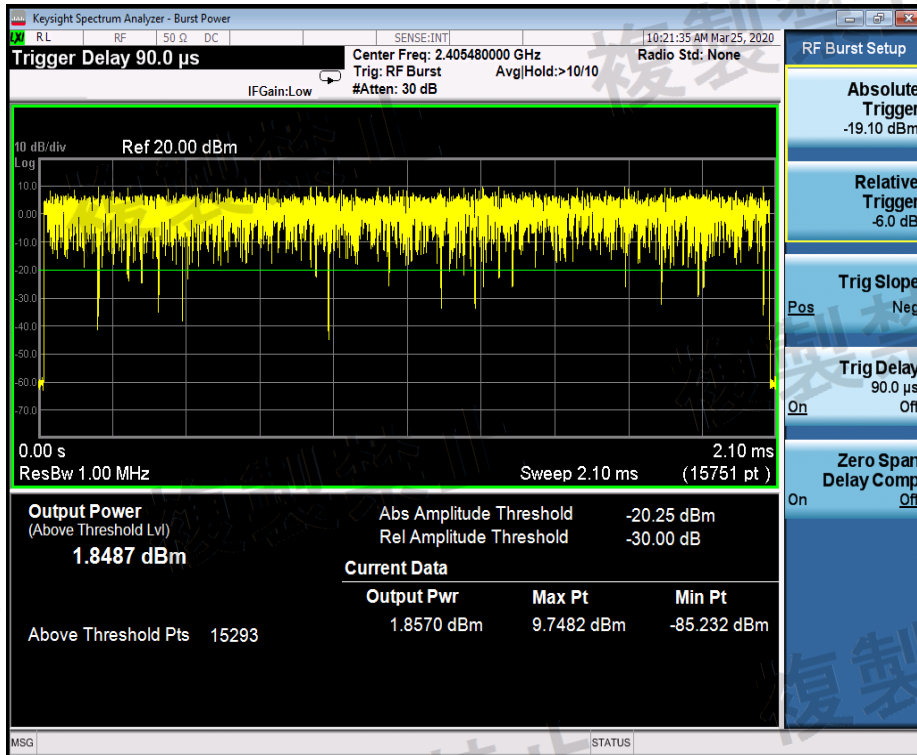
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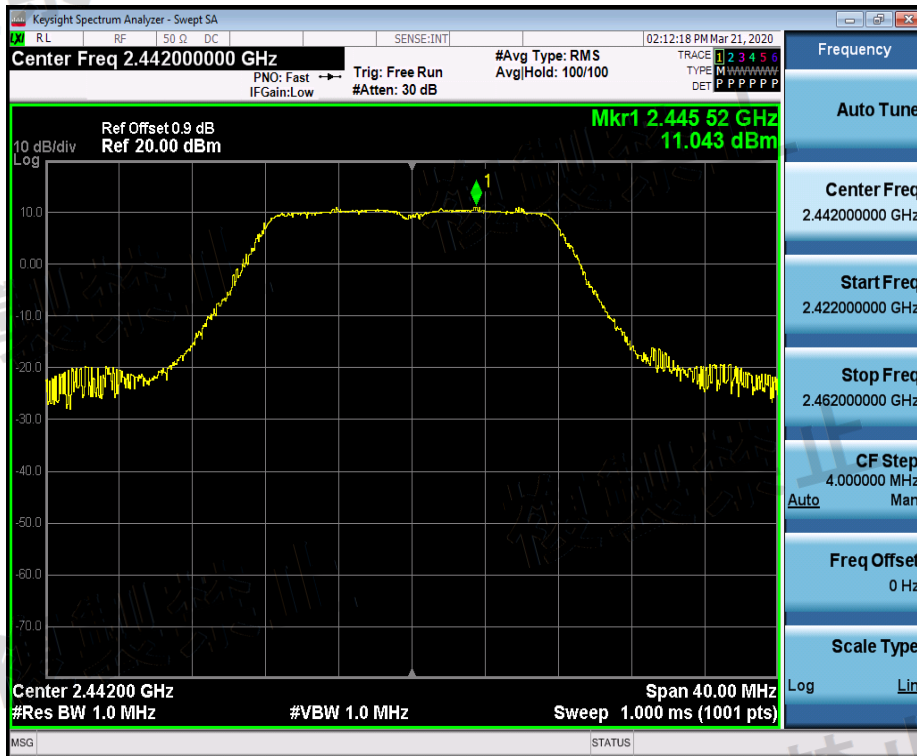
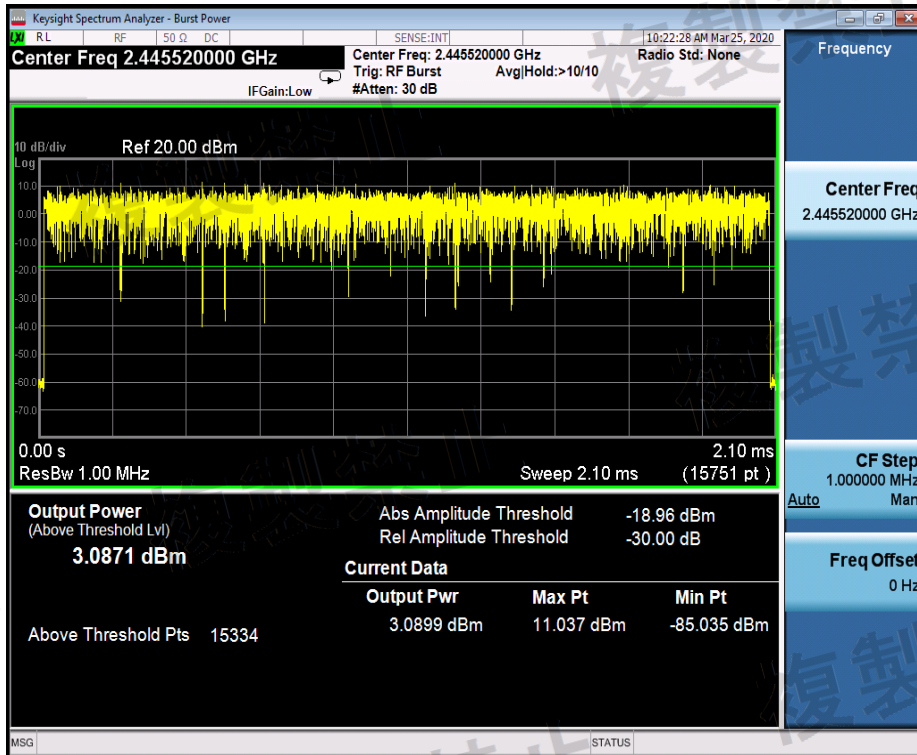


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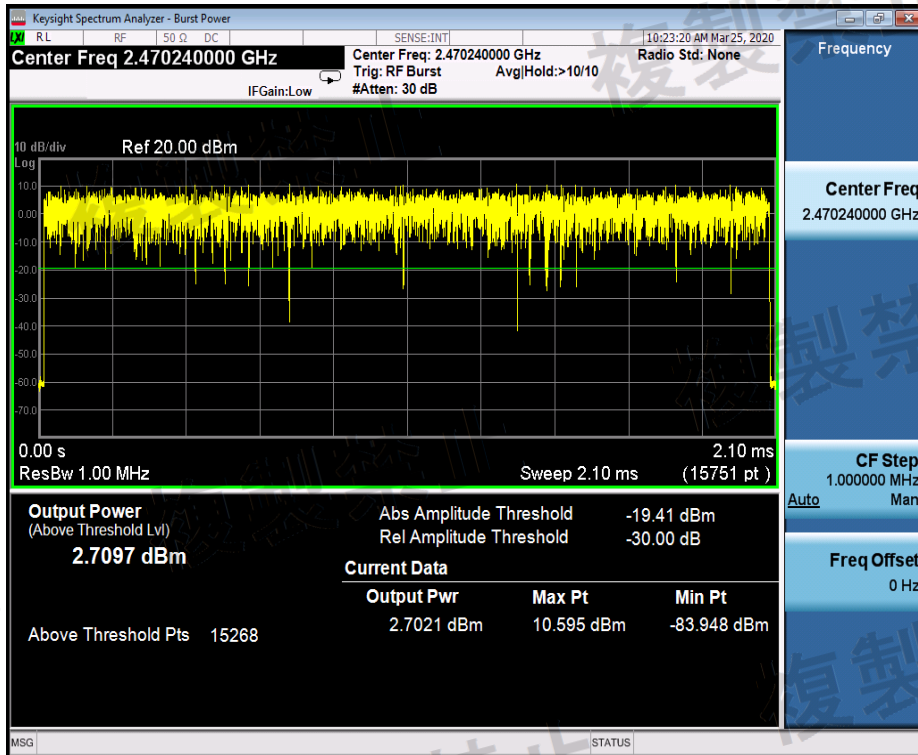


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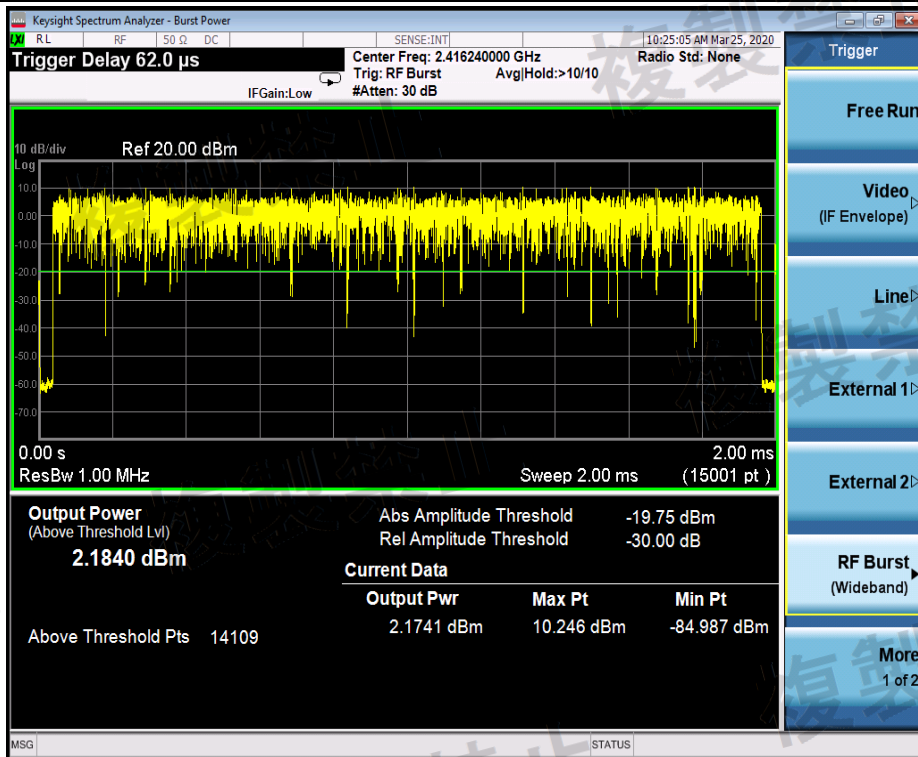


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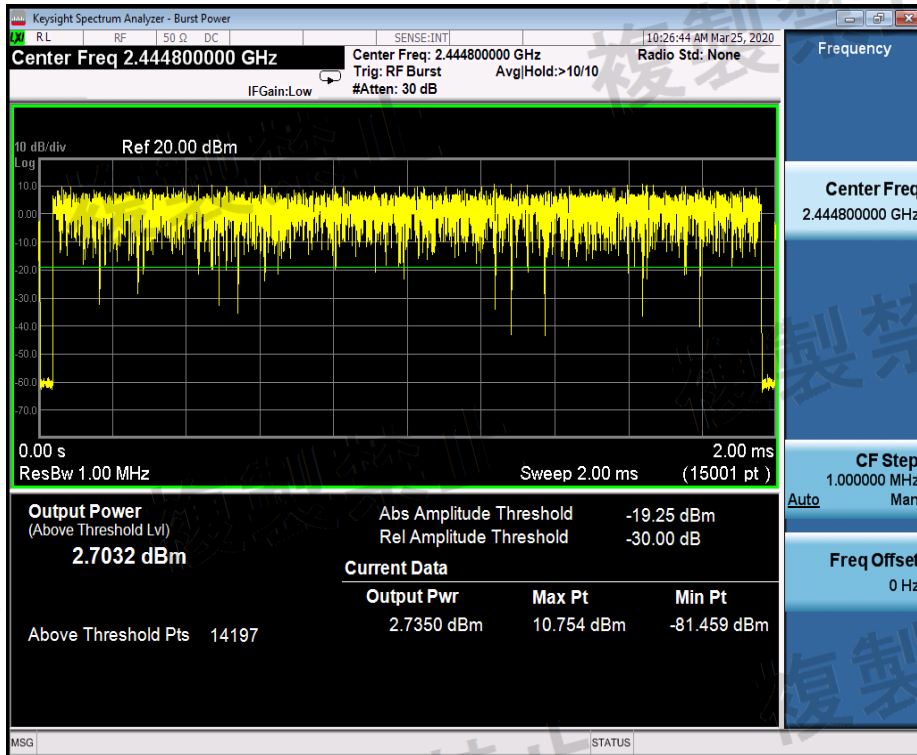
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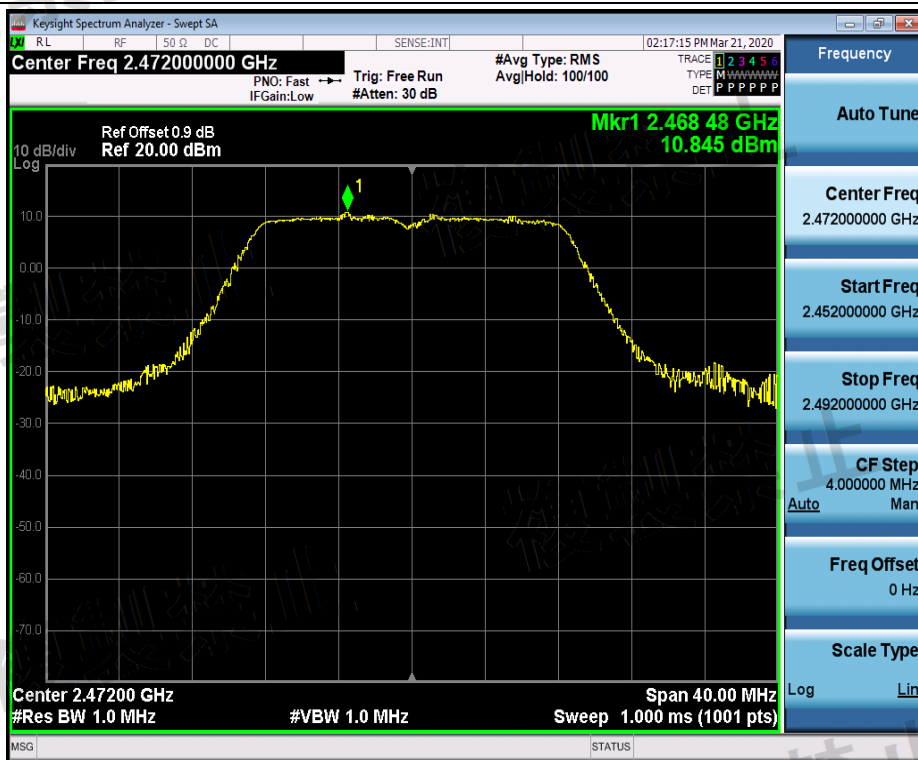
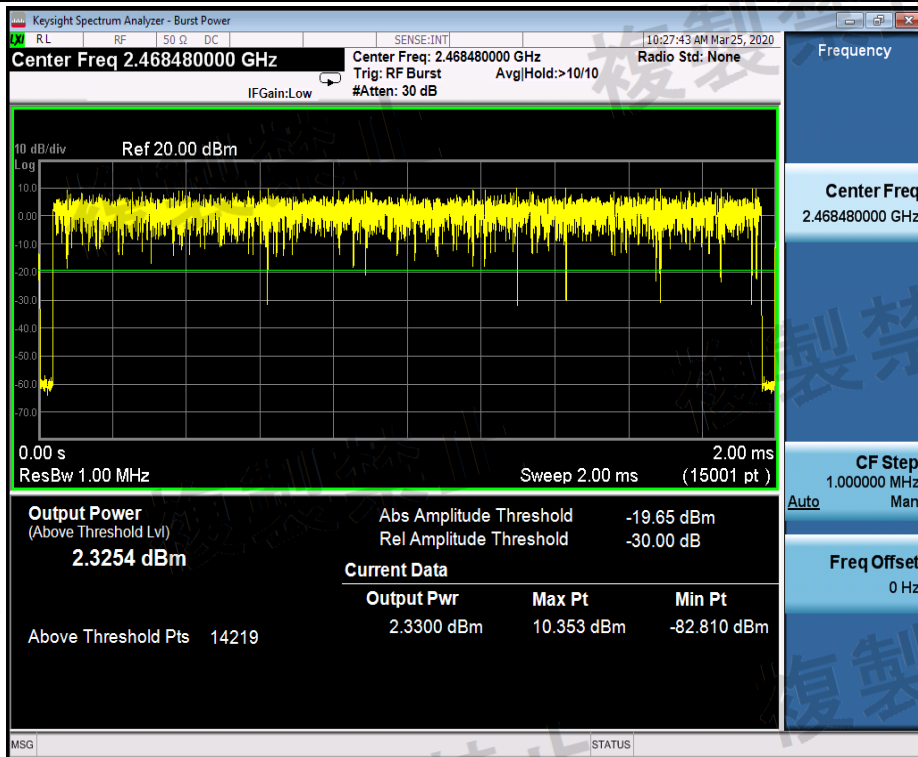


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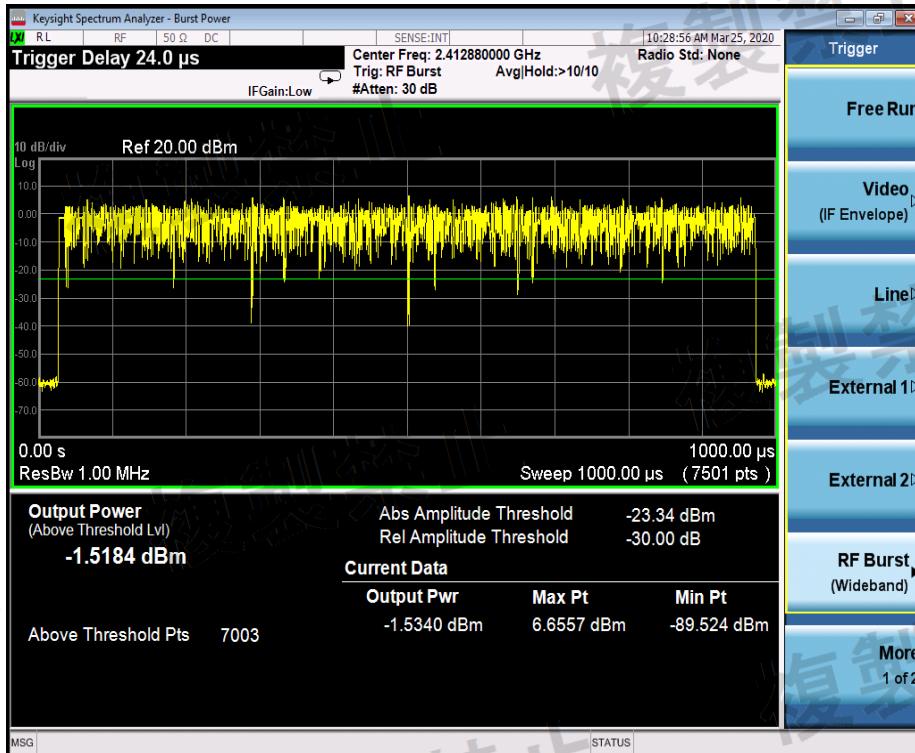


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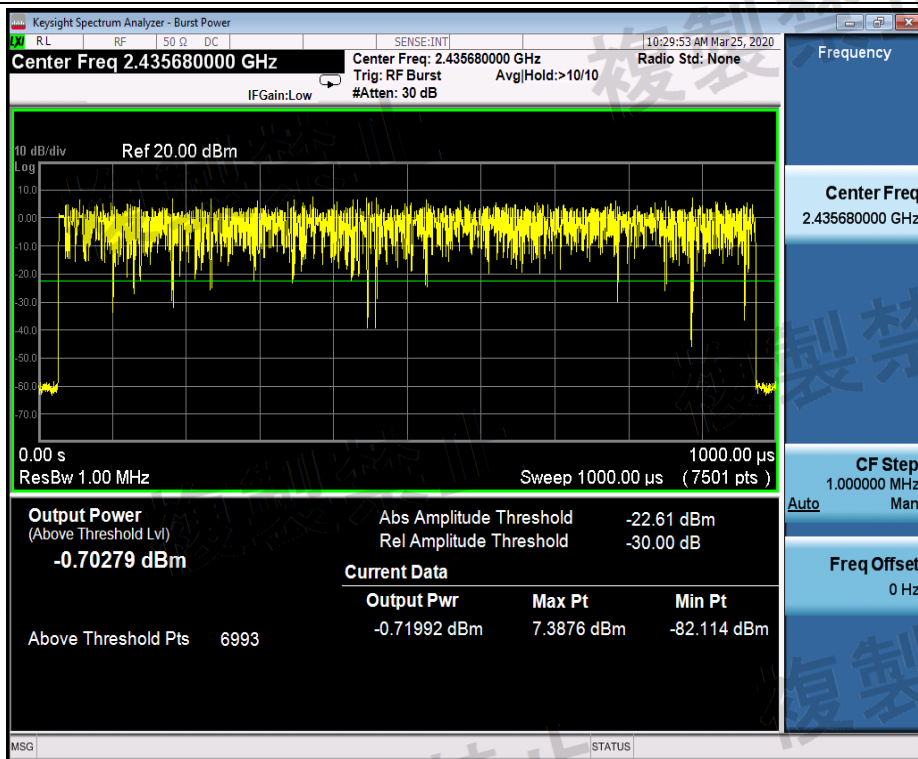


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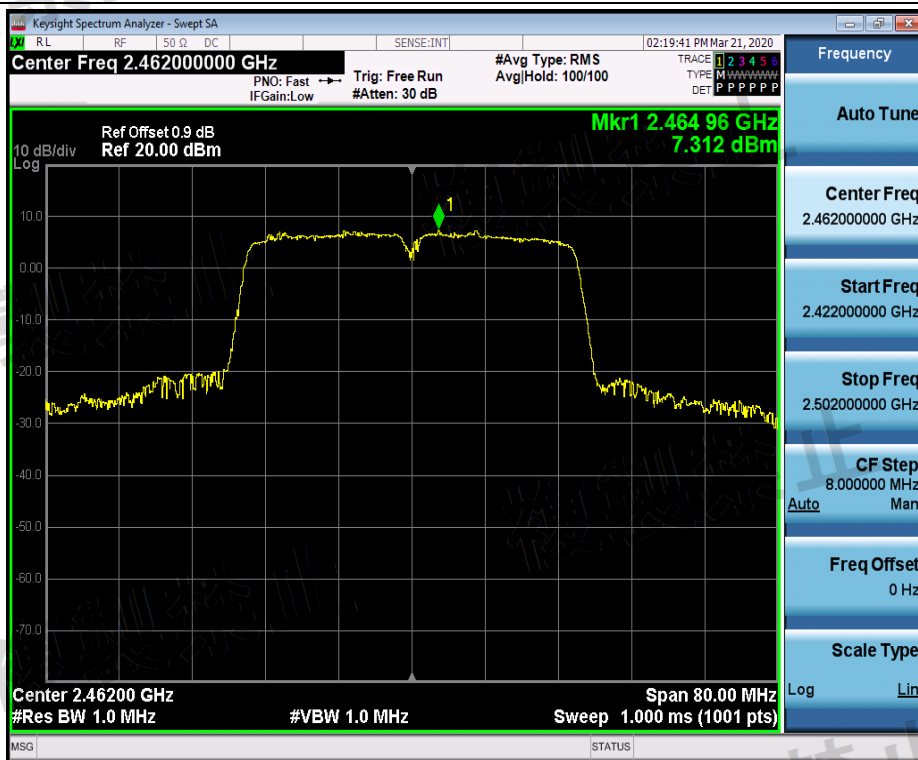
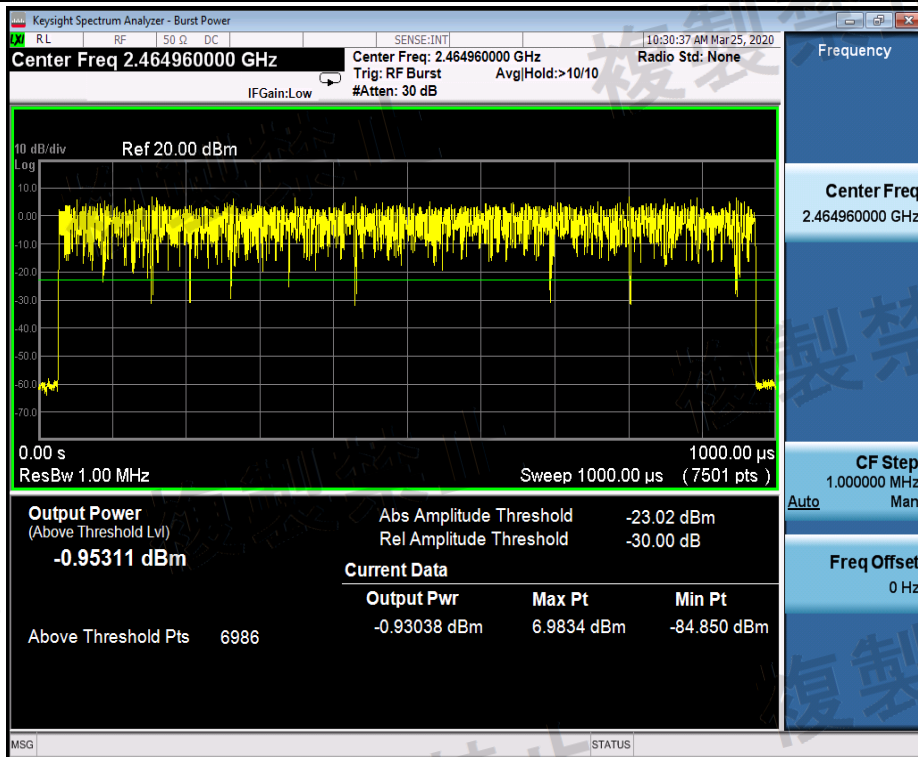


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9.4 Appendix C: Occupied Bandwidth

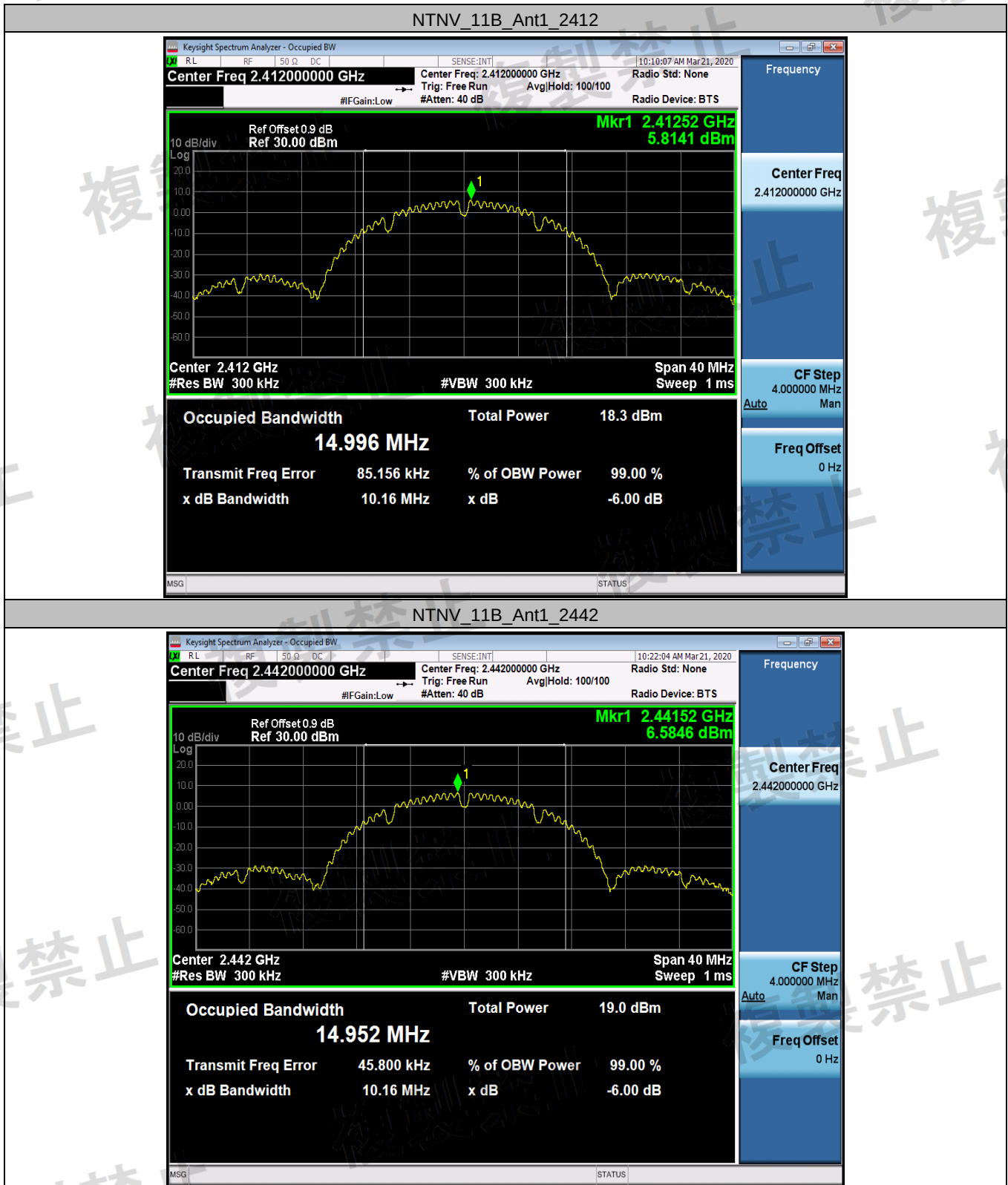
9.4.1 Test Result

TestCondition	TestMode	Antenna	Channel	Result [MHz]	Limit [MHz]	Verdict
NTNV	11B	Ant1	2412	14.996	<=26	PASS
			2442	14.952	<=26	PASS
			2472	14.943	<=26	PASS
	11G	Ant1	2412	16.784	<=38	PASS
			2442	16.732	<=38	PASS
			2472	16.815	<=38	PASS
	11N20SISO	Ant1	2412	17.910	<=38	PASS
			2442	17.899	<=38	PASS
			2472	17.899	<=38	PASS
	11N40SISO	Ant1	2422	35.926	<=38	PASS
			2442	35.877	<=38	PASS
			2462	35.956	<=38	PASS

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9.4.2 Test Graphs



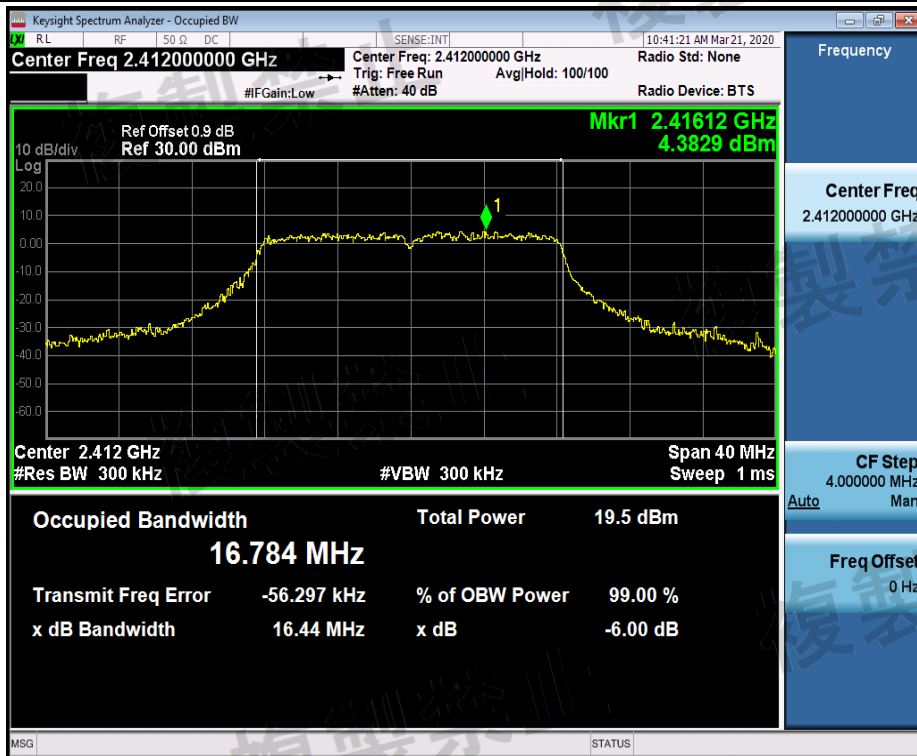
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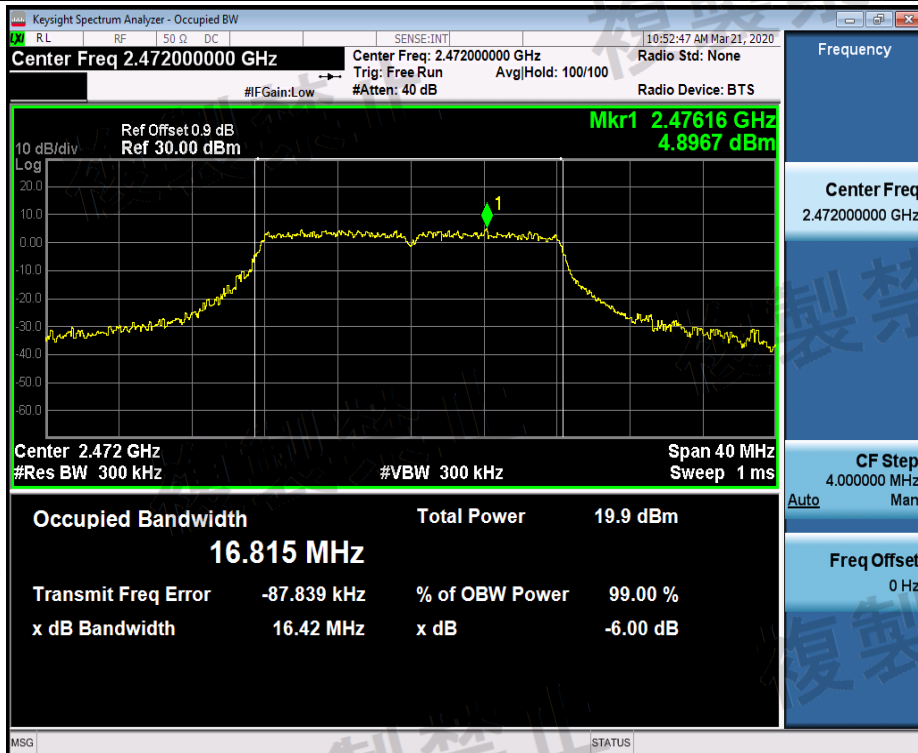
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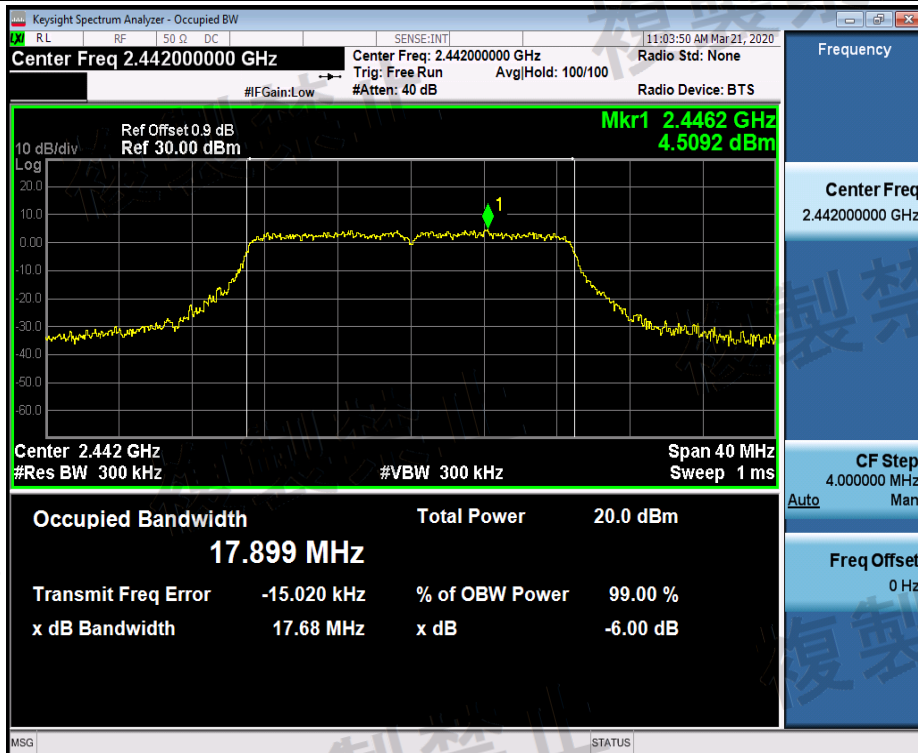
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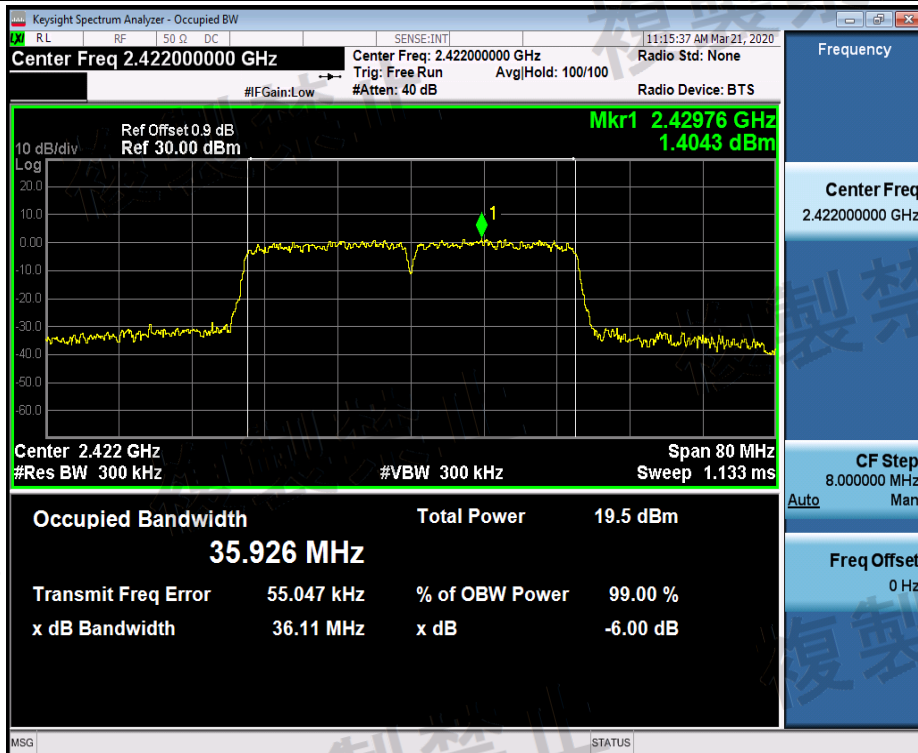
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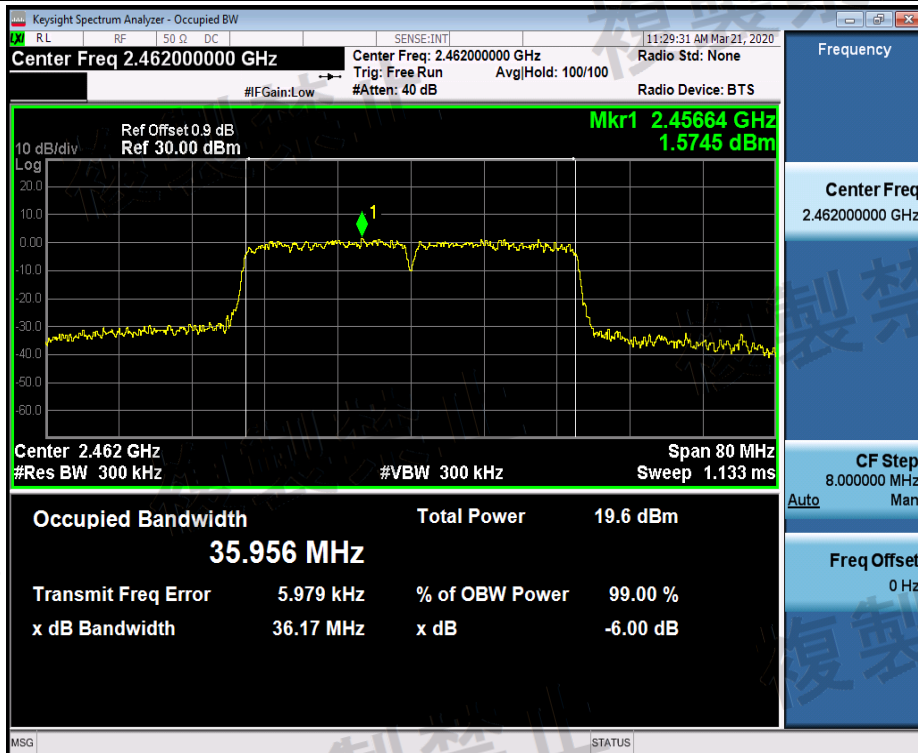
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NTNV_11N40SISO_Ant1_2462



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9.5 Appendix D: Spread Bandwidth

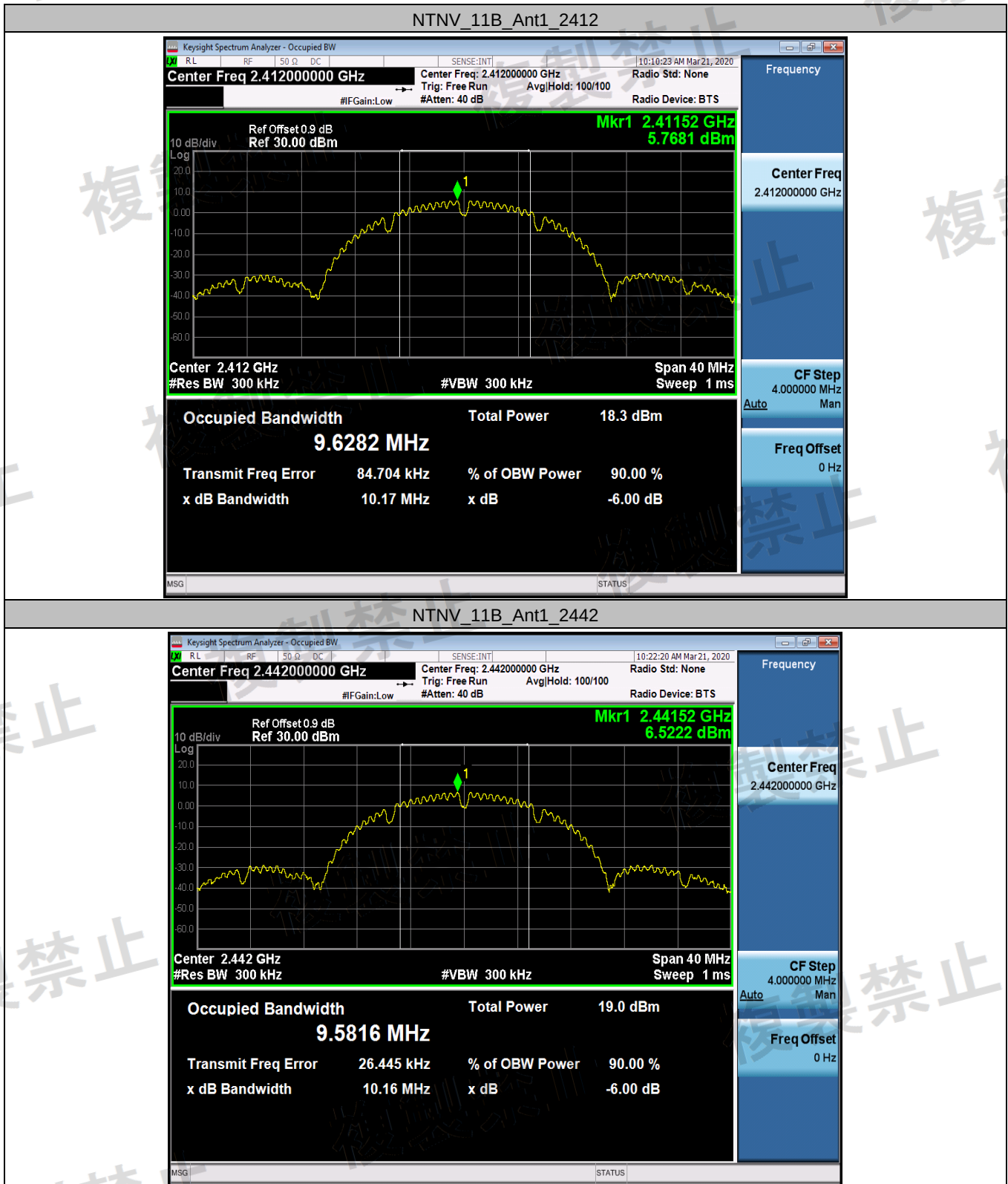
9.5.1 Test Result

TestCondition	TestMode	Antenna	Channel	Result [MHz]	Limit [MHz]	Verdict
NTNV	11B	Ant1	2412	9.6282	≥ 0.5	PASS
			2442	9.5816	≥ 0.5	PASS
			2472	9.5713	≥ 0.5	PASS
	11G	Ant1	2412	14.713	---	PASS
			2442	14.737	---	PASS
			2472	14.807	---	PASS
	11N20SISO	Ant1	2412	15.577	---	PASS
			2442	15.683	---	PASS
			2472	15.731	---	PASS
	11N40SISO	Ant1	2422	31.569	---	PASS
			2442	31.602	---	PASS
			2462	31.759	---	PASS

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9.5.2 Test Graphs



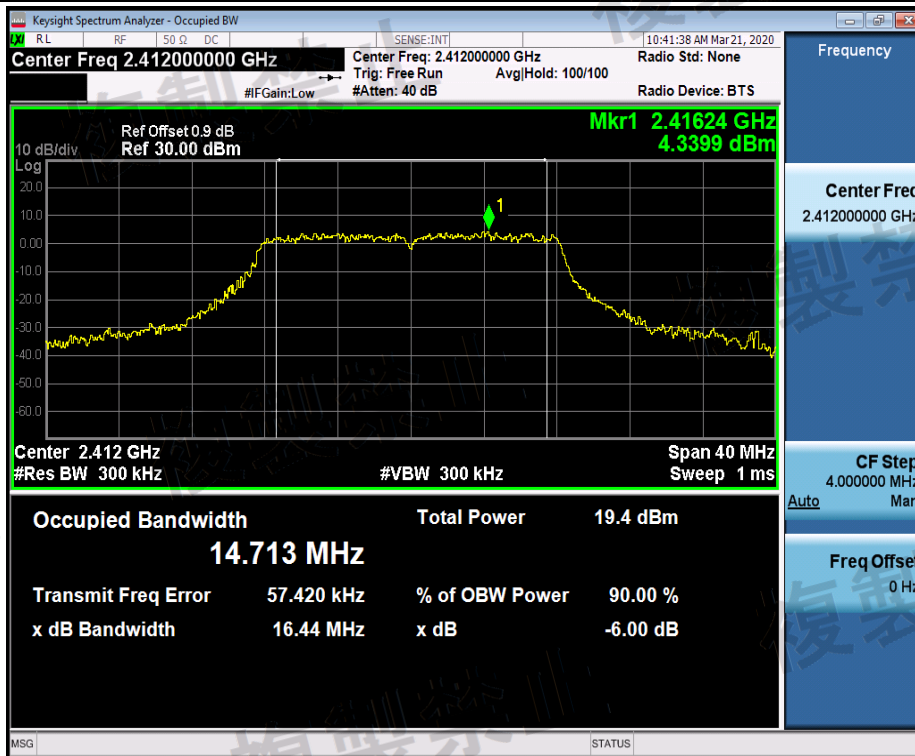
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NTNV_11B_Ant1_2472



NTNV_11G_Ant1_2412



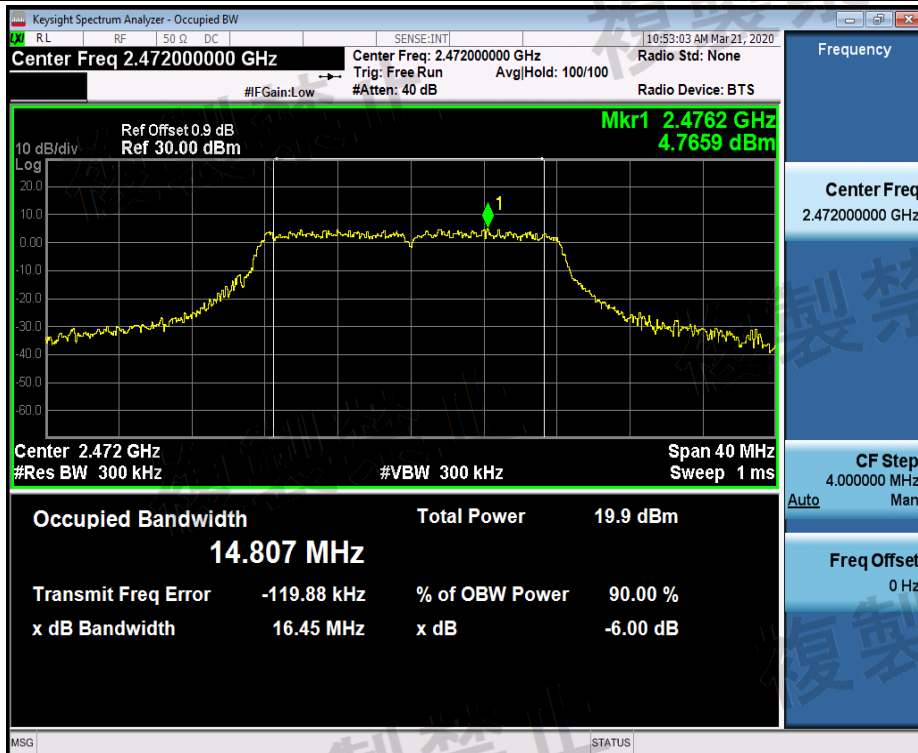
NTNV_11G_Ant1_2442

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NTNV_11G_Ant1_2472



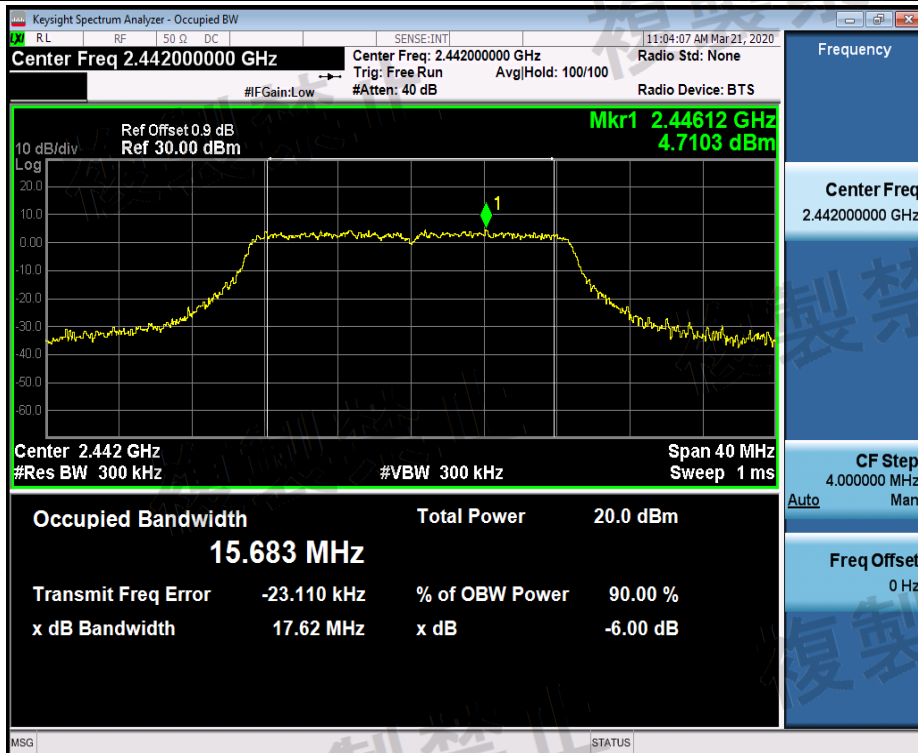
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NTNV_11N20SISO_Ant1_2442



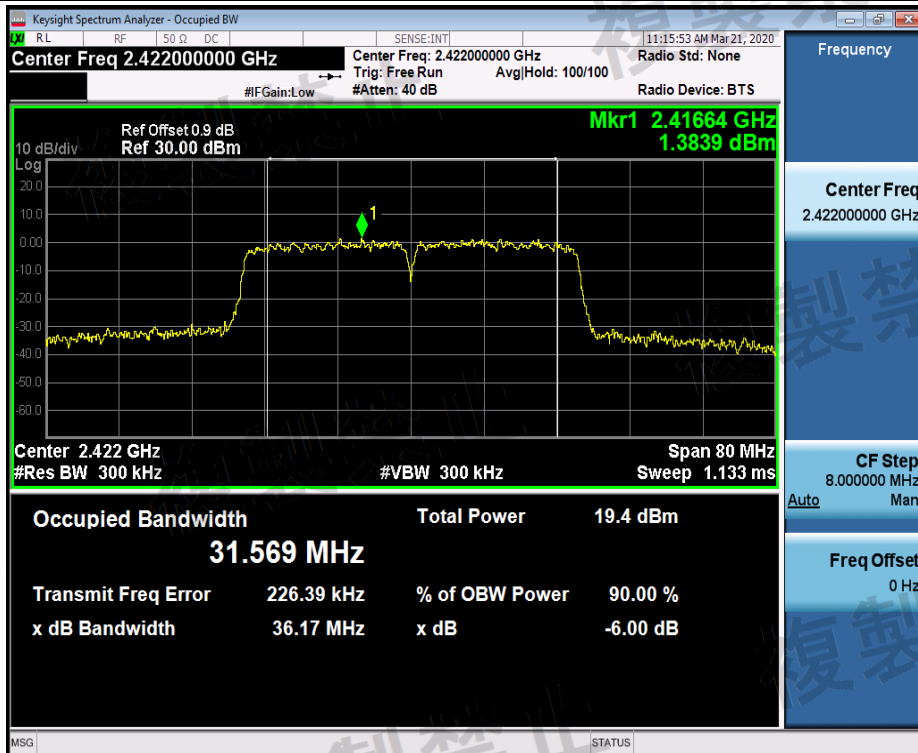
NTNV_11N20SISO_Ant1_2472

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NTNV_11N40SISO_Ant1_2422



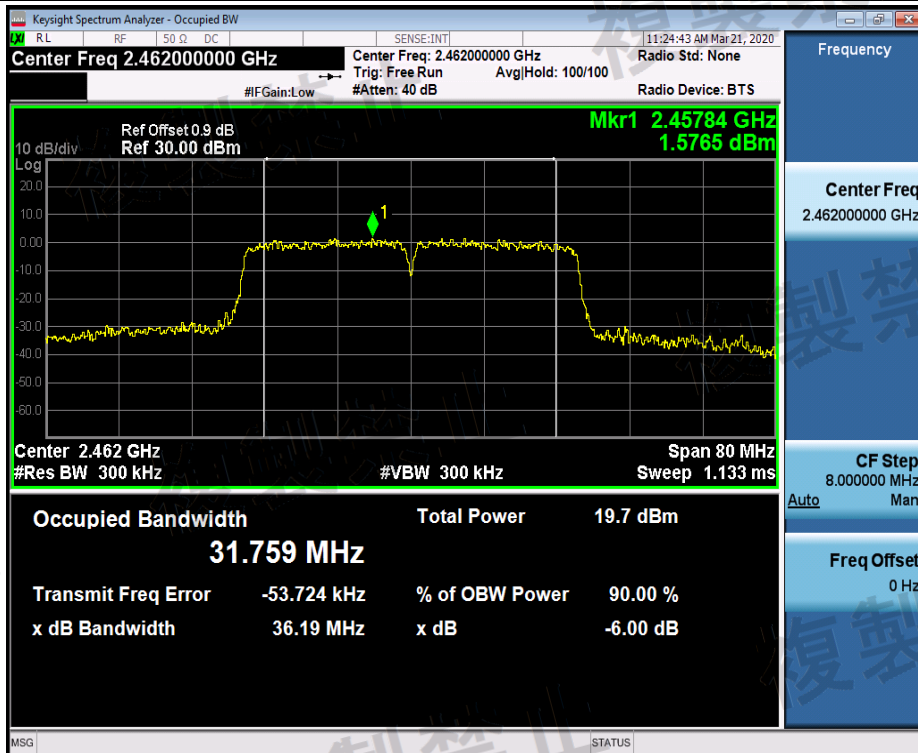
NTNV_11N40SISO_Ant1_2442

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9.6 Appendix E: Spurious Emission of TX

9.6.1 Test Result

TestCondition	TestMode	Antenna	Channel	Freq.Range [MHz]	Result [dBm]	Limit [dBm]	Verdict
NTNV	11B	Ant1	2412	30~2374	-50.985	<=-26	PASS
				2374~2387	-38.321	<=-26	PASS
				2387~2400	-22.673	<=-16	PASS
				2483.5~2496.5	-49.955	<=-16	PASS
				2496.5~2509.5	-52.21	<=-26	PASS
				2509.5~12500	-55.202	<=-26	PASS
			2442	30~2374	-51.83	<=-26	PASS
				2374~2387	-49.993	<=-26	PASS
				2387~2400	-50.359	<=-16	PASS
				2483.5~2496.5	-49.513	<=-16	PASS
				2496.5~2509.5	-51.19	<=-26	PASS
				2509.5~12500	-54.414	<=-26	PASS
			2472	30~2374	-52.432	<=-26	PASS
				2374~2387	-51.575	<=-26	PASS
				2387~2400	-51.223	<=-16	PASS
				2483.5~2496.5	-22.793	<=-16	PASS
				2496.5~2509.5	-41.445	<=-26	PASS
				2509.5~12500	-51.847	<=-26	PASS
	11G	Ant1	2412	30~2374	-43.898	<=-26	PASS
				2374~2387	-33.225	<=-26	PASS
				2387~2400	-21.586	<=-16	PASS
				2483.5~2496.5	-49.81	<=-16	PASS
				2496.5~2509.5	-51.474	<=-26	PASS
				2509.5~12500	-53.386	<=-26	PASS
			2442	30~2374	-51.407	<=-26	PASS
				2374~2387	-50.053	<=-26	PASS
				2387~2400	-47.57	<=-16	PASS
				2483.5~2496.5	-46.343	<=-16	PASS
				2496.5~2509.5	-49.585	<=-26	PASS
				2509.5~12500	-52.444	<=-26	PASS
			2472	30~2374	-52.051	<=-26	PASS
				2374~2387	-51.107	<=-26	PASS
				2387~2400	-50.742	<=-16	PASS
				2483.5~2496.5	-20.031	<=-16	PASS
				2496.5~2509.5	-34.378	<=-26	PASS
				2509.5~12500	-44.86	<=-26	PASS

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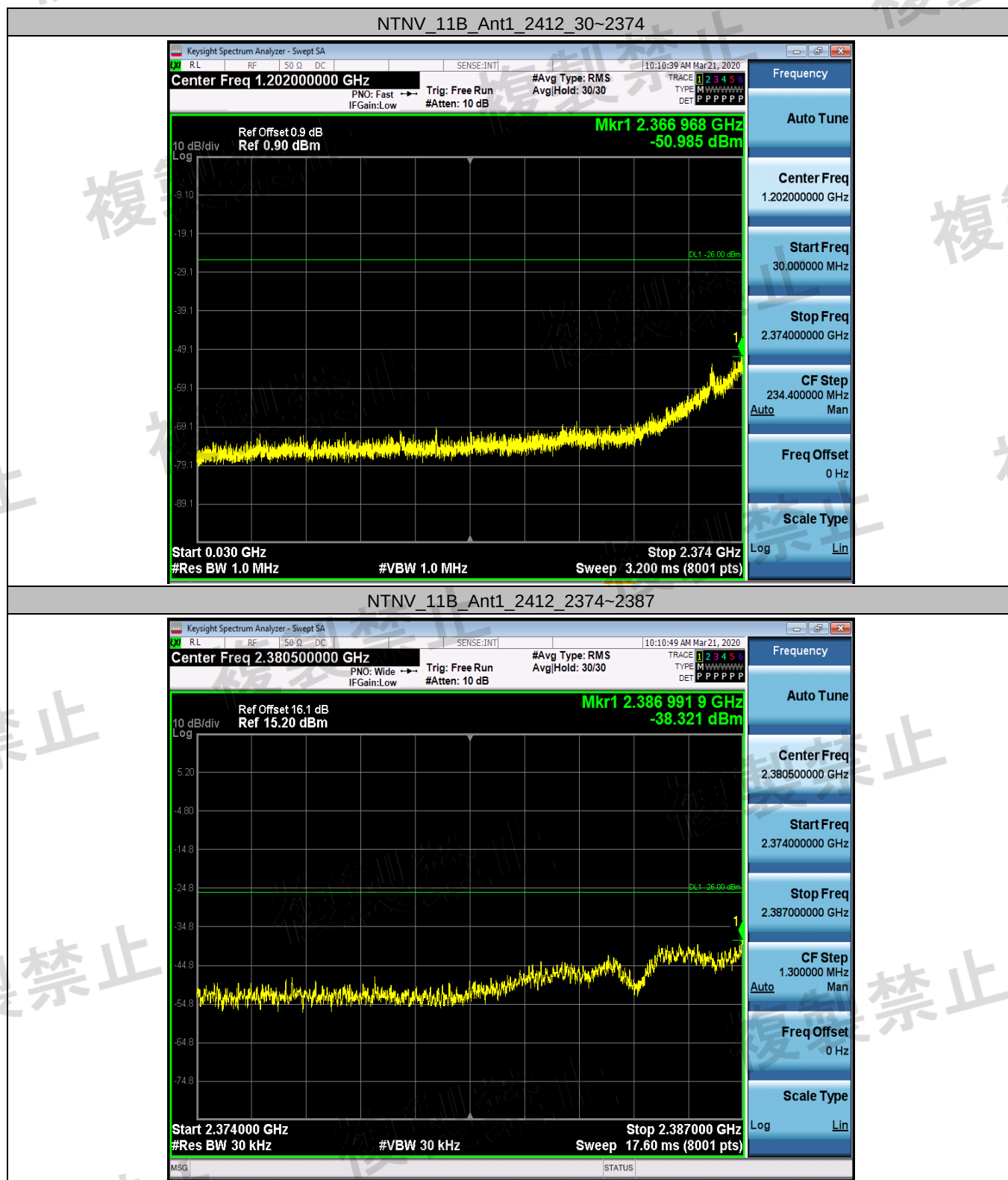
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	11N20SISO	Ant1	2412	30~2374	-45.561	<=-26	PASS
				2374~2387	-30.907	<=-26	PASS
				2387~2400	-21.665	<=-16	PASS
				2483.5~2496.5	-50.357	<=-16	PASS
				2496.5~2509.5	-50.616	<=-26	PASS
				2509.5~12500	-53.479	<=-26	PASS
			2442	30~2374	-51.425	<=-26	PASS
				2374~2387	-49.506	<=-26	PASS
				2387~2400	-47.915	<=-16	PASS
				2483.5~2496.5	-45.734	<=-16	PASS
				2496.5~2509.5	-49.949	<=-26	PASS
				2509.5~12500	-52.348	<=-26	PASS
			2472	30~2374	-51.754	<=-26	PASS
				2374~2387	-50.64	<=-26	PASS
				2387~2400	-50.135	<=-16	PASS
				2483.5~2496.5	-20.587	<=-16	PASS
				2496.5~2509.5	-33.89	<=-26	PASS
				2509.5~12500	-43.54	<=-26	PASS
	11N40SISO	Ant1	2422	30~2374	-35.208	<=-26	PASS
				2374~2387	-27.348	<=-26	PASS
				2387~2400	-23.013	<=-16	PASS
				2483.5~2496.5	-44.721	<=-16	PASS
				2496.5~2509.5	-49.117	<=-26	PASS
				2509.5~12500	-53.262	<=-26	PASS
			2442	30~2374	-43.186	<=-26	PASS
				2374~2387	-37.071	<=-26	PASS
				2387~2400	-30.383	<=-16	PASS
				2483.5~2496.5	-32.506	<=-16	PASS
				2496.5~2509.5	-43.396	<=-26	PASS
				2509.5~12500	-46.291	<=-26	PASS
			2462	30~2374	-50.567	<=-26	PASS
				2374~2387	-46.733	<=-26	PASS
				2387~2400	-38.714	<=-16	PASS
				2483.5~2496.5	-26.641	<=-16	PASS
				2496.5~2509.5	-31.461	<=-26	PASS
				2509.5~12500	-39.578	<=-26	PASS

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9.6.2 Test Graphs



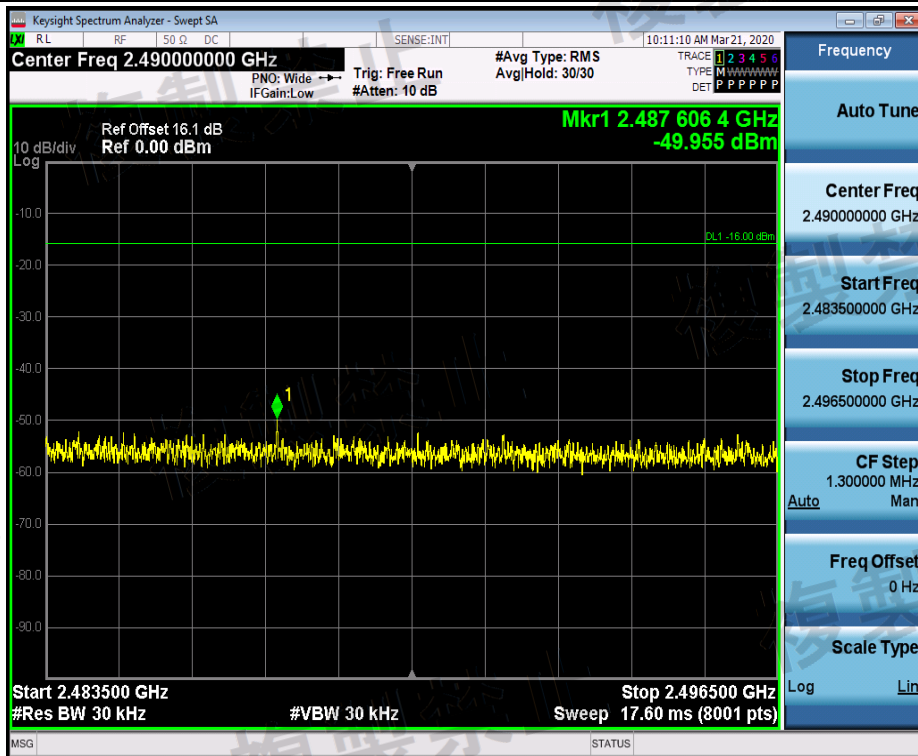
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NTNV_11B_Ant1_2412_2387~2400



NTNV_11B_Ant1_2412_2483.5~2496.5

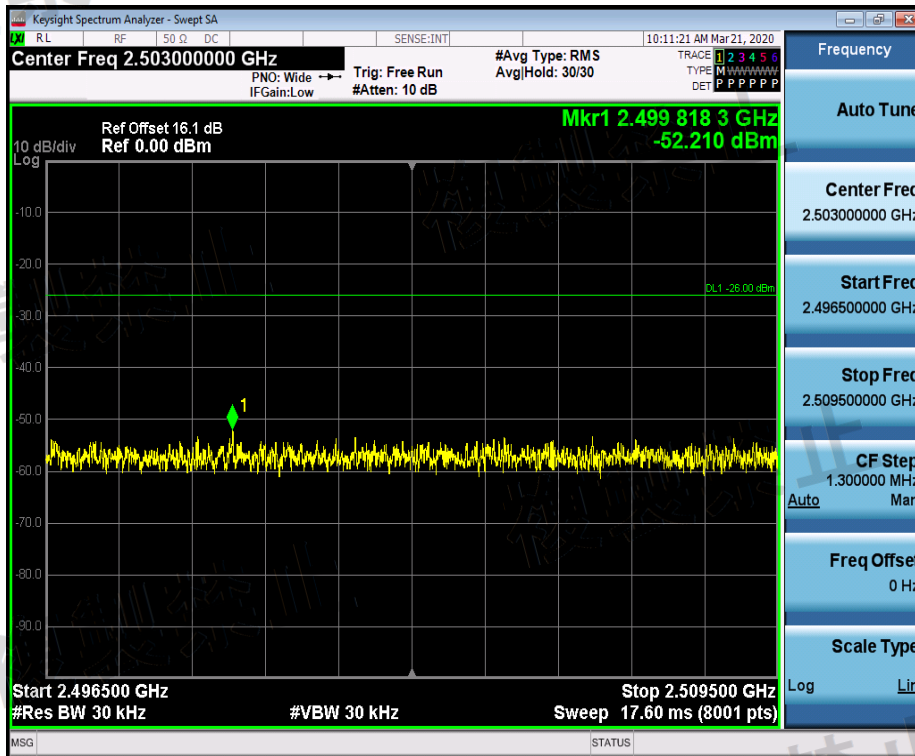


NTNV_11B_Ant1_2412_2496.5~2509.5

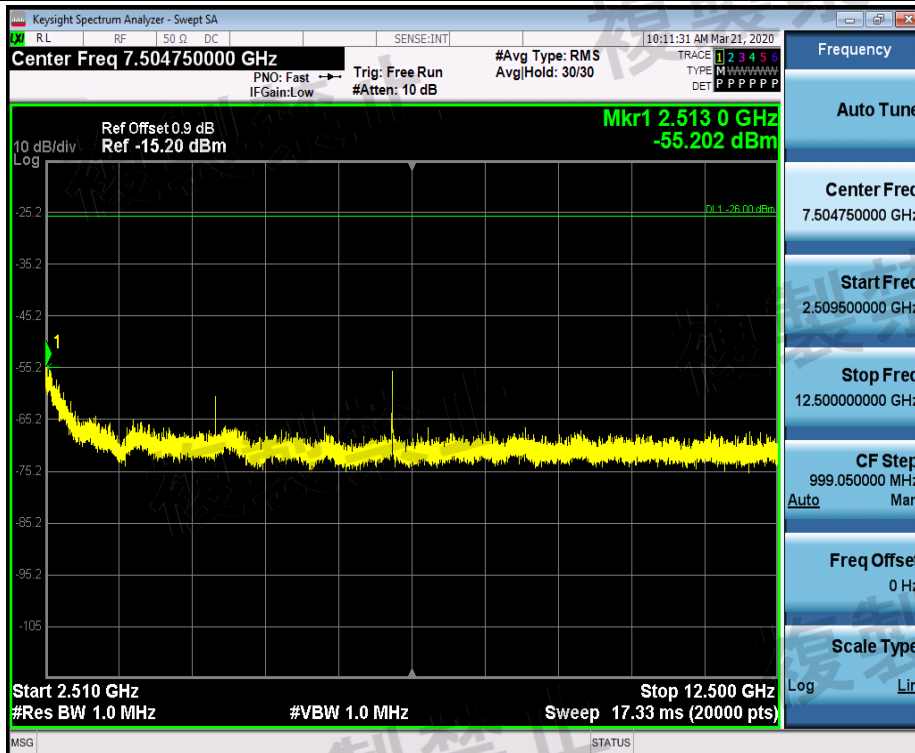


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NTNV_11B_Ant1_2412_2509.5~12500

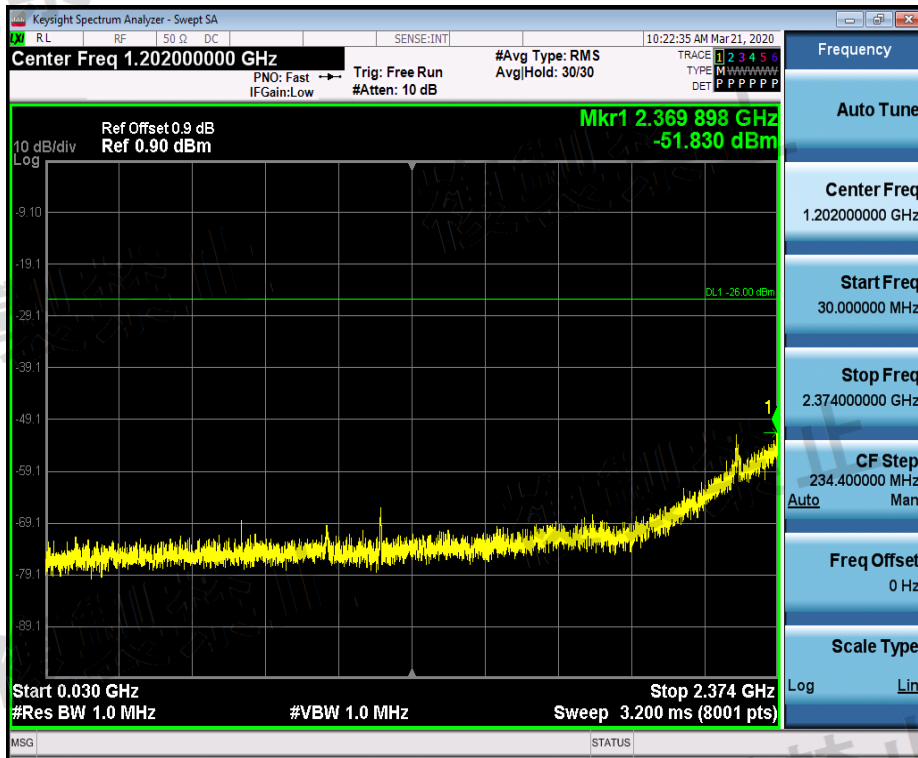


NTNV_11B_Ant1_2442_30~2374

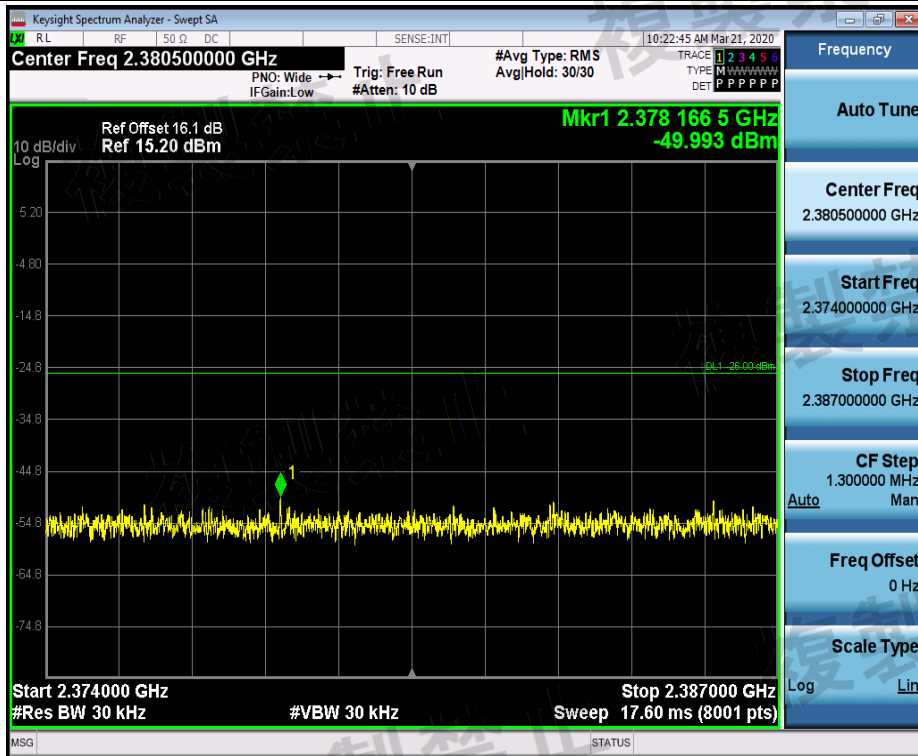


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NTNV_11B_Ant1_2442_2374~2387

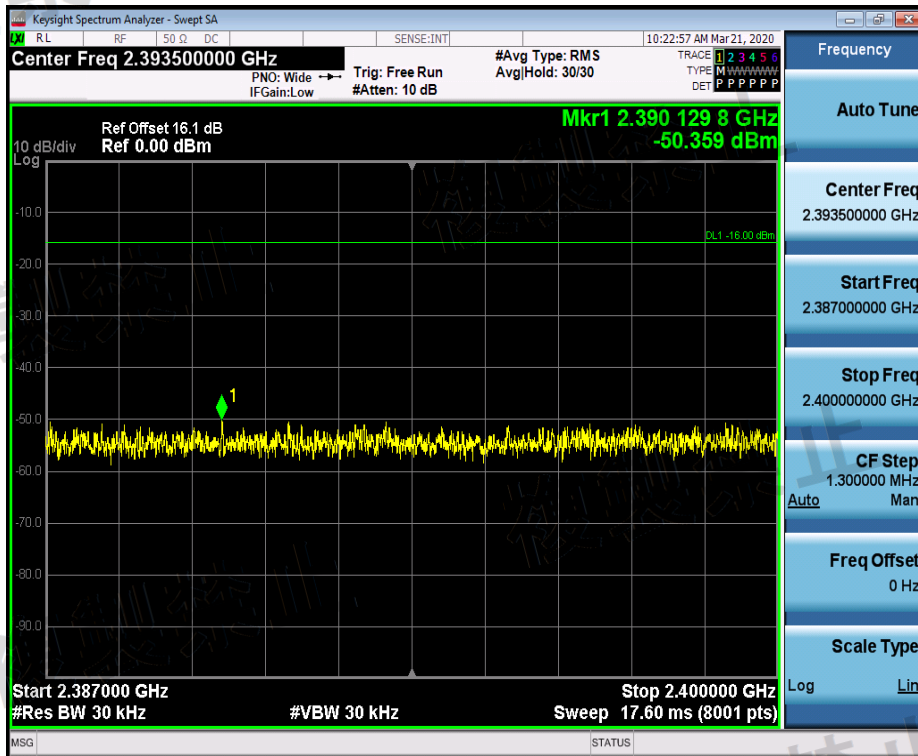


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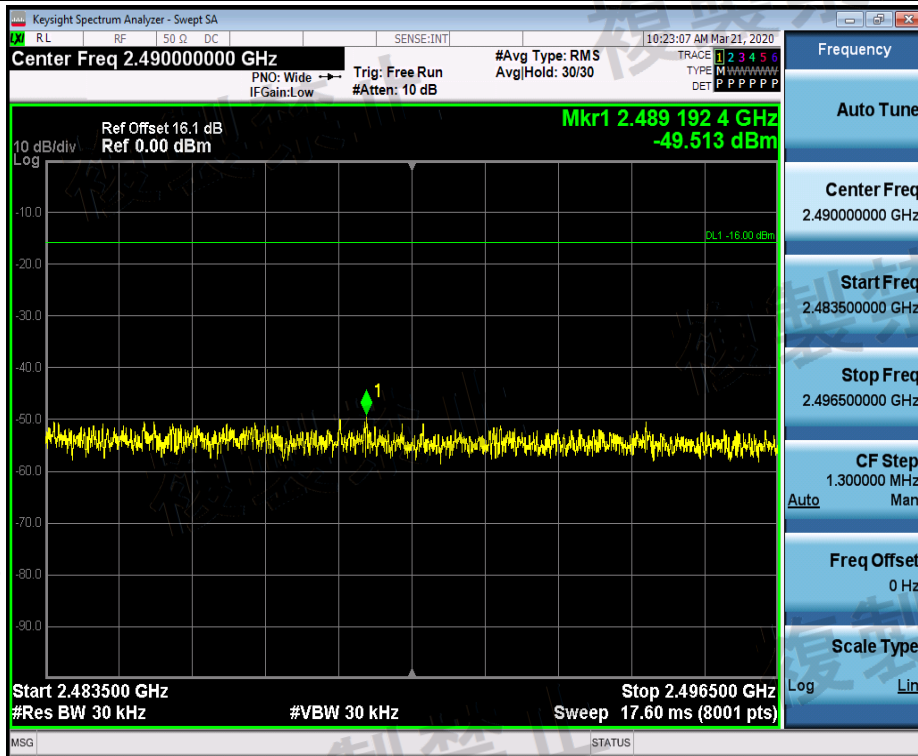


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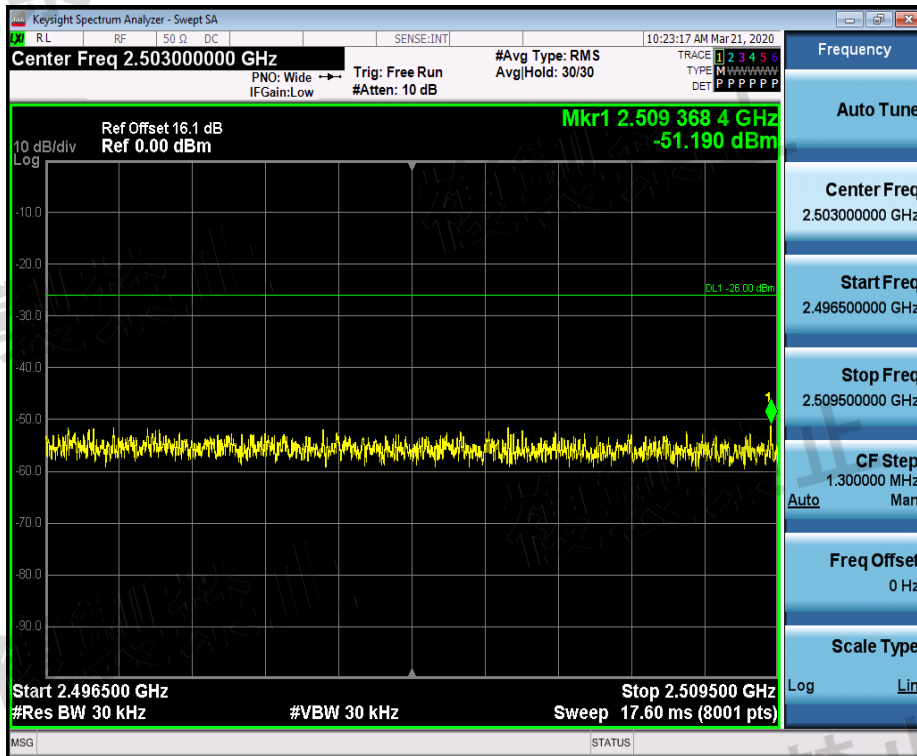


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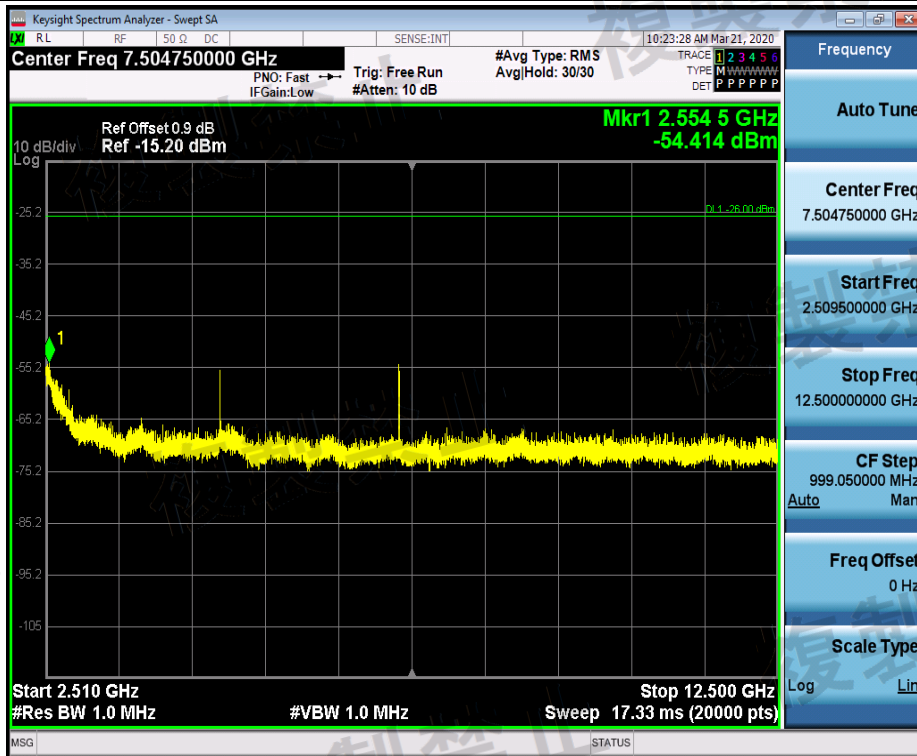


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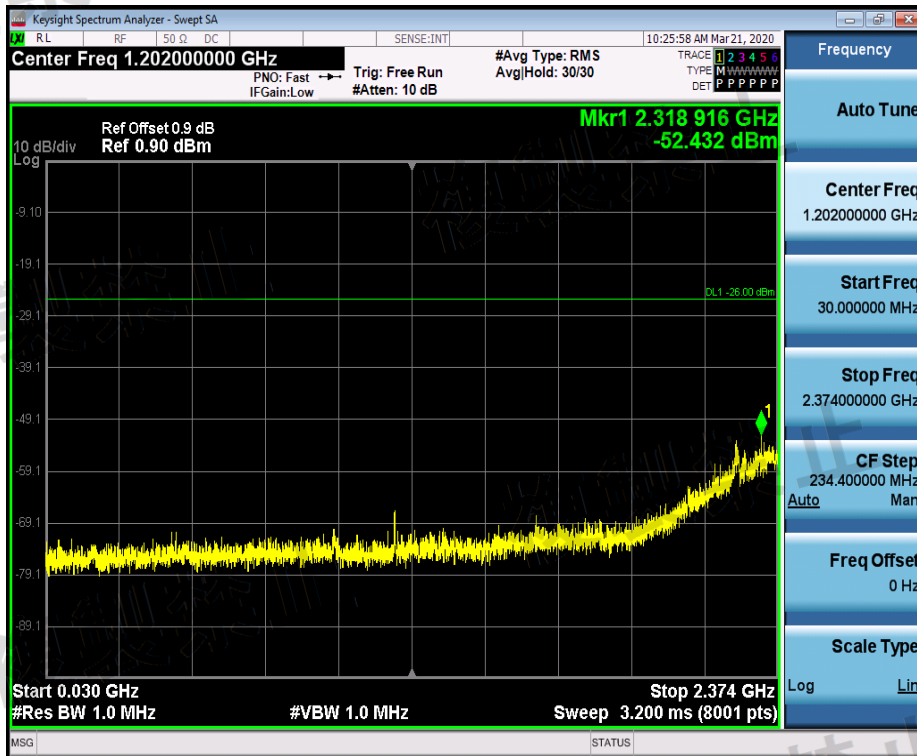
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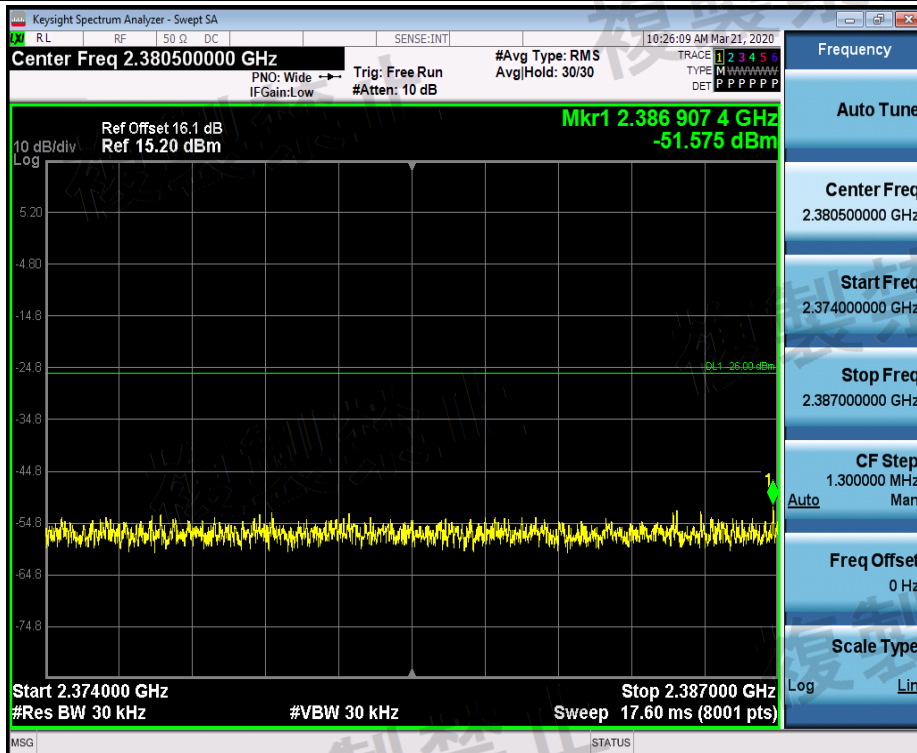
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