

TEST REPORT

CERTIFICATE OF CONFORMITY

Standard: Certification Ordinance Article 2-1-19
Report No.: RJBDKG-WTW-P21040795C-1
Product: Wireless Keyboard
Brand: logicool G
Model No.: YR0076
Received Date: 2023/12/21
Test Date: 2023/12/25 ~ 2024/3/29
Issued Date: 2024/4/1
Applicant: Logitech Far East Ltd.
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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Hsin Chu Laboratory
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Test Location: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan

Approved by: _____, **Date:** 2024/4/1
May Chen / Manager

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Prepared by : Vito Lung / Specialist



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Release Control Record

Issue No.	Description	Date Issued
RJBDBG-WTW-P21040795C-1	Original release.	2024/4/1

1 Certificate

Product: Wireless Keyboard

Brand: logicool G

Test Model: YR0076

Sample Status: Engineering sample

Applicant: Logitech Far East Ltd.

Test Date: 2023/12/25 ~ 2024/3/29

Standard: Certification Ordinance Article 2-1-19

Measurement procedure: MIC notice 88 Appendix 43

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

2 Summary of Test Results

Certification Ordinance Article 2-1-19		
Clause	Test Item	Result
OR: Article 5 OR: Annex 1 table 7-8	Frequency Tolerance	Pass
OR: Article 6 Annex 2.30	Occupied Bandwidth	Pass
OR: Article 7. Annex 3.26	Spurious Emissions	Pass
OR: Article 49-20	Antenna Specifications	Pass
OR: Article 24.2	Spurious Emissions of Receiver	Pass
OR: Article 49-20	Housing Requirements	Pass (Refer to Note 1)
OR: Article 49-20	Antenna Power	Pass
OR: Article 49-20	Absolute Gain of Transmitting Antenna	Pass
OR: Article 49-20	Angular Width of Principal Radiation (AWPR)	N/A
OR: Article 49-20	Number of Carriers within 1 MHz Bandwidth in OFDM	N/A
OR: Article 49-20	Spreading Bandwidth	N/A
OR: Article 49-20	Dwell Time (FH employed)	N/A
OR: Article 9-4.5 RE: Article 6-2.3 RE: Article 6-2.5	Interference Prevention Function	Pass
OR: Article 49-20	Carrier Sense Capability	N/A

Notes:

1. The relative information refer section 3.1 of this report.
2. OR: Ordinance Regulating Radio Equipment
3. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in ETSI TR 100 028-1 and ETSI TR 100 028-2:

Parameter	Uncertainty (±)
Occupied Bandwidth	1050.00 Hz
Spurious Emissions	2.5 dB
Output Power Density	1.2 dB
Out of Band Radiated Power	2.5 dB
Frequency Tolerance	960 Hz

The other instruments specified are routine verified to remain within the calibrated levels, no measurement uncertainty is required to be calculated.

2.2 Supplementary Information

There is not any deviation from the test standards for the test method, and no modifications required for compliance.

3 General Information

3.1 General Description

Product	Wireless Keyboard
Brand	logicool G
Test Model	YR0076
Test Software Version	RF Sample with Receiver [Number Lock]
Status of EUT	Engineering sample
Power Supply Rating	3.7 Vdc from battery or 5 Vdc from USB interface
Modulation Type	GFSK
Modulation Technology	DTS
Transfer Rate	Up to 2 Mbps (*Note 1)
Operating Frequency	2.402 ~ 2.480 GHz (*Note 1)
Number of Channel	40 (*Note 1)
Assembly	The EUT is constructed as a Wireless Keyboard. The housing consists of two parts, and the plastic enclosure was assembled with glue and covered by rubbers, separating the two parts was only possible by means of brute force.
Accessory	1. USB-A to USB-C cable x 1 (shielded, 1.8 m with one core) (Color: black, white) 2. USB Extender x 1 (Color: black, white)

Note:

1. BT-LE technique supports 1Mbps and 2Mbps data rates, both have been evaluated in this test report. Refer to "section 3.3 Channel List" for more detail specification.
2. The EUT may have a lot of colors for marketing requirement.
3. The device of Bluetooth and GFSK modulation type can't transmit simultaneously.
4. The EUT could be supplied with rechargeable battery as the following table:

No.	Manufacturer	Model	Specification
1	Springpower Technology (Shenzhen) Co., Ltd.	325085 or 533-000204	Power Rating: 3.7Vdc, 1500mAh, 5.55Wh
2	SYNERGY SCIEN TECH CORP.	AHB355085PCT-03 or 533-000210	Power Rating: 3.7Vdc, 1500mAh, 5.6Wh
3	Kunshan Synergy Scien Tech Co., Ltd.	AHB355085PCT-02 or 533-000152	Power Rating: 3.7Vdc, 1500mAh, 5.6Wh

5. The EUT could be supplied configurations A and B as the following table:

Configuration	Remark
A	Configuration A and B are different suppliers of PCB/Power IC/Charger IC/Power Connector.
B	

6. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 Output Power Description of EUT

Operation Mode	Rated Output Power (mW)	Conducted RF Output Power (mW)	Radiated RF Output Power (mW)
BT-LE 1M	3	2.432	6.083
BT-LE 2M	3	2.455	5.849

3.3 Antenna Description of EUT

1. The antenna information is listed as below.

Frequency (MHz)	Antenna Gain (dBi)	Frequency Range (GHz)	Antenna Type	Connector Type
2403	4.99	2.4~2.4835	PIFA	None
2442	4.06			
2479	2.26			

* Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.

2. Antenna Pattern:

Please refer to the attached file (Antenna pattern).

3.4 Channel List

BT-LE channels:

RF Channel	RF Center Frequency	Channel Index	Channels Type for BT 5.x		Channels Type for BT 4.x
			Maximum Data Rate 2Mbps	Maximum Data Rate 1Mbps	Maximum Data Rate 1Mbps
0	2402 MHz	37		●	●
1	2404 MHz	0	●		●
2	2406 MHz	1	●		●
3	2408 MHz	2	●		●
4	2410 MHz	3	●		●
5	2412 MHz	4	●		●
6	2414 MHz	5	●		●
7	2416 MHz	6	●		●
8	2418 MHz	7	●		●
9	2420 MHz	8	●		●
10	2422 MHz	9	●		●
11	2424 MHz	10	●		●
12	2426 MHz	38		●	●
13	2428 MHz	11	●		●
14	2430 MHz	12	●		●
15	2432 MHz	13	●		●
16	2434 MHz	14	●		●
17	2436 MHz	15	●		●
18	2438 MHz	16	●		●
19	2440 MHz	17	●		●
20	2442 MHz	18	●		●
21	2444 MHz	19	●		●
22	2446 MHz	20	●		●
23	2448 MHz	21	●		●
24	2450 MHz	22	●		●
25	2452 MHz	23	●		●
26	2454 MHz	24	●		●
27	2456 MHz	25	●		●
28	2458 MHz	26	●		●
29	2460 MHz	27	●		●
30	2462 MHz	28	●		●
31	2464 MHz	29	●		●
32	2466 MHz	30	●		●
33	2468 MHz	31	●		●
34	2470 MHz	32	●		●
35	2472 MHz	33	●		●
36	2474 MHz	34	●		●
37	2476 MHz	35	●		●
38	2478 MHz	36	●		●
39	2480 MHz	39		●	●

3.5 Power Setting

Power Setting			
Channel	BT-LE 1M	Channel	BT-LE 2M
0	Default	1	Default
19	Default	19	Default
39	Default	38	Default

Test Item	Operation Description
Frequency Tolerance / Occupied Bandwidth / Antenna Power / Spurious Emissions	BLE1M TX Modulated 2402MHz BLE1M TX Modulated 2440MHz BLE1M TX Modulated 2480MHz BLE2M TX Modulated 2404MHz BLE2M TX Modulated 2440MHz BLE2M TX Modulated 2478MHz
Spurious Emissions for Receiver	BLE1M RX 2402MHz BLE1M RX 2440MHz BLE1M RX 2480MHz BLE2M RX 2404MHz BLE2M RX 2440MHz BLE2M RX 2478MHz
Interference Prevention Function	Normal Operation

3.6 Test Mode Applicability and Tested Channel Detail

Test Conditions	Voltage (Vdc)
V_{normal}	3.7
$V_{max. (+10\%)}$	4.07
$V_{min. (-10\%)}$	3.33

Pre-Scan:	1. The EUT has the following config of different suppliers: configuration A/ B. Pre-scan these configs of EUT and find the worst case as a representative test condition. 2. Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
Worst Case:	1. EUT Worst Configuration: A

Following channel(s) was (were) selected for the final test as listed below:

Test Item	Mode	Tested Channel	Modulation	Data Rate Parameter
Frequency Tolerance	BT-LE 1M	0, 19, 39	unmodulated	-
	BT-LE 2M	1, 19, 38	unmodulated	-
Occupied Bandwidth	BT-LE 1M	0, 19, 39	GFSK	1Mb/s
	BT-LE 2M	1, 19, 38	GFSK	2Mb/s
Antenna Power	BT-LE 1M	0, 19, 39	GFSK	1Mb/s
	BT-LE 2M	1, 19, 38	GFSK	2Mb/s
Spurious Emissions	BT-LE 1M	0, 19, 39	GFSK	1Mb/s
	BT-LE 2M	1, 19, 38	GFSK	2Mb/s
Spurious Emissions of Receiver	BT-LE 1M	0, 19, 39	-	-
	BT-LE 2M	1, 19, 38	-	-
Interference Prevention Function	Normal Operation			

4 Test Instruments

The calibration interval of the all test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.1 Frequency Tolerance

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until	Calibration Authority	Calibration Method
DC Power Supply Topward	6603D	795558	Note 2	Note 2	BV CPS E&E	(d)
MXA Signal Analyzer Keysight	N9020B	MY60112409	2024/2/20	2025/2/19	ETC	(c)
Software	ADT_RF Test Software V7.6.5.4	N/A	N/A	N/A	N/A	N/A
True RMS Clamp Meter FLUKE	325	31130711WS	2023/6/8	2024/6/7	ETC	(c)

Notes:

- Calibration method:
 - Calibration conducted by the National Institute of Information and Communications Technology (NICT) or a designated calibration agency under Article 102-18 paragraph (1).
 - Calibration conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Law (Law No. 51 of 1992) Japan Calibration Service System.
 - Calibration conducted in foreign countries, which shall be equivalent to the calibration conducted by the NICT or a designated calibration agency under Article 102-18 paragraph (1).
 - Calibration conducted by using other equipment that listed above from a) to c).
- The power supply no evaluation calibrated, which used the RMS clamp meter to verify before each testing.
- The test was performed in Oven room 2.
- Tested Date: 2024/3/26

4.2 Occupied Bandwidth

Refer to section 4.1 to get information of the instruments.

4.3 Spurious Emissions

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until	Calibration Authority	Calibration Method
DC Power Supply GOOD WILL INSTRUMENT CO. LTD	GPC-3030D	E847076	Note 2	Note 2	BV CPS E&E	(d)
MXA Signal Analyzer Keysight	N9020B	MY60112409	2023/2/18	2024/2/17	ETC	(c)
Software	ADT_RF Test Software V7.6.5.4	N/A	N/A	N/A	N/A	N/A
True RMS Clamp Meter FLUKE	325	31130711WS	2023/6/8	2024/6/7	ETC	(c)

Notes:

- Calibration method:
 - Calibration conducted by the National Institute of Information and Communications Technology (NICT) or a designated calibration agency under Article 102-18 paragraph (1).
 - Calibration conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Law (Law No. 51 of 1992) Japan Calibration Service System.
 - Calibration conducted in foreign countries, which shall be equivalent to the calibration conducted by the NICT or a designated calibration agency under Article 102-18 paragraph (1).
 - Calibration conducted by using other equipment that listed above from a) to c).
- The power supply no evaluation calibrated, which used the RMS clamp meter to verify before each testing.
- The test was performed in Oven room 2.
- Tested Date: 2023/12/25

4.4 Spurious Emissions of Receiver

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until	Calibration Authority	Calibration Method
MXA Signal Analyzer Keysight	N9020B	MY60112409	2023/2/18	2024/2/17	ETC	(c)
Software	ADT_RF Test Software V7.6.5.4	N/A	N/A	N/A	N/A	N/A

Notes:

- Calibration method:
 - Calibration conducted by the National Institute of Information and Communications Technology (NICT) or a designated calibration agency under Article 102-18 paragraph (1).
 - Calibration conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Law (Law No. 51 of 1992) Japan Calibration Service System.
 - Calibration conducted in foreign countries, which shall be equivalent to the calibration conducted by the NICT or a designated calibration agency under Article 102-18 paragraph (1).
 - Calibration conducted by using other equipment that listed above from a) to c).
- The test was performed in Oven room 2.
- Tested Date: 2023/12/25

4.5 Antenna Power

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until	Calibration Authority	Calibration Method
DC Power Supply Topward	6603D	795558	Note 2	Note 2	BV CPS E&E	(d)
Pulse Power Sensor Anritsu	MA2411B	1726434	2023/6/19	2024/6/18	ETC	(c)
RF Power Meter Anritsu	ML2495A	1529002	2023/6/17	2024/6/16	ETC	(c)
True RMS Clamp Meter FLUKE	325	31130711WS	2023/6/8	2024/6/7	ETC	(c)

Notes:

- Calibration method:
 - Calibration conducted by the National Institute of Information and Communications Technology (NICT) or a designated calibration agency under Article 102-18 paragraph (1).
 - Calibration conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Law (Law No. 51 of 1992) Japan Calibration Service System.
 - Calibration conducted in foreign countries, which shall be equivalent to the calibration conducted by the NICT or a designated calibration agency under Article 102-18 paragraph (1).
 - Calibration conducted by using other equipment that listed above from a) to c).
- The power supply no evaluation calibrated, which used the RMS clamp meter to verify before each testing.
- The test was performed in Oven room 2.
- Tested Date: 2024/3/29

4.6 Interference Prevention Function

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until	Calibration Authority	Calibration Method
Bluetooth Simulator Anritsu	MT8852B	1218002	2023/5/21	2024/5/20	ETC	(c)
DC Power Supply Topward	6603D	795558	Note 2	Note 2	BV CPS E&E	(d)
Fixed Attenuator Woken	MDCS18N-10	MDCS18N-10-01	2023/3/27	2024/3/26	BV CPS E&E	(d)
True RMS Clamp Meter FLUKE	325	31130711WS	2023/6/8	2024/6/7	ETC	(c)

Notes:

- Calibration method:
 - Calibration conducted by the National Institute of Information and Communications Technology (NICT) or a designated calibration agency under Article 102-18 paragraph (1).
 - Calibration conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Law (Law No. 51 of 1992) Japan Calibration Service System.
 - Calibration conducted in foreign countries, which shall be equivalent to the calibration conducted by the NICT or a designated calibration agency under Article 102-18 paragraph (1).
 - Calibration conducted by using other equipment that listed above from a) to c).
- The power supply no evaluation calibrated, which used the RMS clamp meter to verify before each testing.
- The test was performed in Oven room 2.
- Tested Date: 2023/12/25 ~ 2024/1/4

5 Limits of Test Items

5.1 Frequency Tolerance

Tolerance of frequency shall be +/- 50ppm.

5.2 Occupied Bandwidth

Modulation Method	Limit	Remark
DSSS	<26 MHz	
OFDM	<26 MHz	Antenna power limitation is 10 mW/MHz
	26 – 40 MHz	Antenna power limitation is 5 mW/MHz
FHSS	<83.5 MHz	
Other Digital	<26 MHz	

5.3 Spurious Emissions

Frequencies	Limit
Operating frequency 2400 to 2483.5 MHz	
30.0 MHz to 1000.0 MHz	$\leq 0.25 \text{ uW/100 kHz}$
1000.0 MHz to 2387 MHz	$\leq 2.5 \text{ uW/MHz}$
2387.0 MHz to 2400.0 MHz	$\leq 25 \text{ uW/MHz}$
2483.5 MHz to 2496.5 MHz	$\leq 25 \text{ uW/MHz}$
2496.5 MHz to 12500.0 MHz	$\leq 2.5 \text{ uW/MHz}$

5.4 Spurious Emissions of Receiver

Frequencies	Limit
Below 1 GHz	$\leq 4 \text{ nW}$
Above 1 GHz	$\leq 20 \text{ nW}$

5.5 Antenna Power

Modulation System	Frequency Band Used	Antenna Power (Max.)	E.I.R.P. Limit (Note 3)
DSSS	2400 – 2483.5 MHz	10 mW/MHz	12.14 dBm/MHz ~ 22.14 dBm/MHz (16.368 mW/MHz ~ 163.68 mW/MHz)
OFDM (Note 1)	2400 – 2483.5 MHz	10 mW/MHz	12.14 dBm/MHz ~ 22.14 dBm/MHz (16.368 mW/MHz ~ 163.68 mW/MHz)
OFDM (Note 2)	2400 – 2483.5 MHz	5 mW/MHz	9.13 dBm/MHz ~ 19.13 dBm/MHz (8.184 mW/MHz ~ 81.84 mW/MHz)
FHSS	2400 – 2483.5 MHz	3 mW/MHz	6.91 dBm/MHz ~ 16.91 dBm/MHz (4.91 mW/MHz ~ 49.10 mW/MHz)
Other Digital	2400 – 2483.5 MHz	10 mW	12.14 dBm ~ 22.14 dBm (16.368 mW ~ 163.68 mW)

Notes:

- Occupied bandwidth is less than 26 MHz.
- Occupied bandwidth is more than 26 MHz and less than 40 MHz.
- E.I.R.P. limit is variable by the HPBA, the HPBA (half-power beam width) of the antenna shall be $360 / A$ degrees or less, where $A = \text{E.I.R.P.} / (2.14 \text{ dBi} + \text{"Antenna Power (limit)"})$.
- Tolerance of antenna power shall be +20% (upper value).

5. When an E.I.R.P. is less than 2.14 dBi + antenna power limit. The shortage can be compensated for by the antenna power. (Application to transmitting devices using "Other method" is Limited to "GFSK")

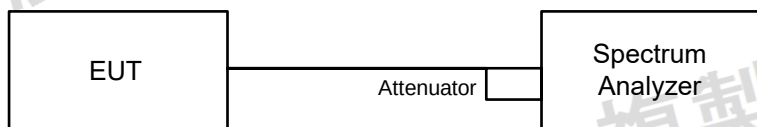
5.6 Interference Prevention Function

When conducting wireless communications that transmit data or other information: A function that automatically sends or receives an identification code.

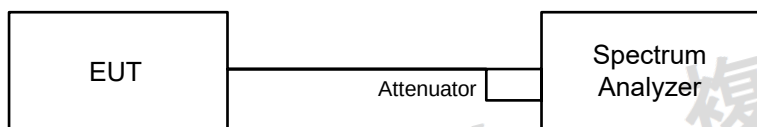
When performing radiolocation work: A function that allows you to distinguish between reflected waves of radio waves transmitted by your own station and radio waves transmitted by other radio stations by identifying the modulation method and other characteristics of received radio waves. (However, if it also has the function of transmitting signals for data transmission, both functions shall be included.)

6 Test Arrangements

6.1 Frequency Tolerance



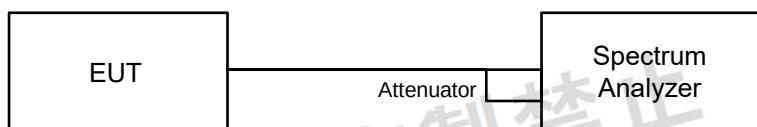
6.2 Occupied Bandwidth



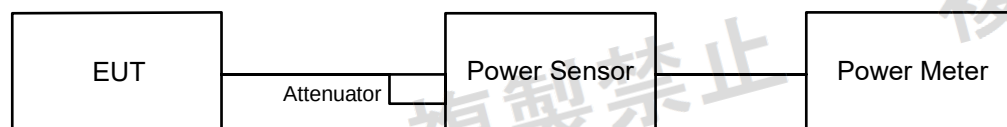
6.3 Spurious Emissions



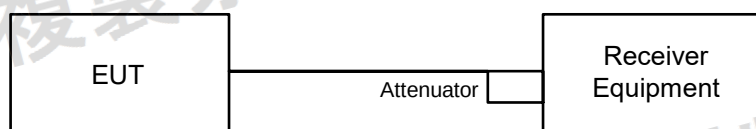
6.4 Spurious Emissions of Receiver



6.5 Antenna Power



6.6 Interference Prevention Function



7 Test Results of Test Item

7.1 Frequency Tolerance

Environmental Conditions:	23°C, 63% RH	Tested By:	Katina Lu
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BT-LE 1M

Channel	Frequency (MHz)	V_{normal}		$V_{max.}$		$V_{min.}$	
		Carrier frequency (MHz)	Frequency tolerance (ppm)	Carrier frequency (MHz)	Frequency tolerance (ppm)	Carrier frequency (MHz)	Frequency tolerance (ppm)
0	2402	2402.004060	1.690	2402.003980	1.656	2402.003940	1.640
19	2440	2440.004100	1.680	2440.004040	1.655	2440.004100	1.680
39	2480	2480.004200	1.693	2480.004120	1.661	2480.004140	1.669

BT-LE 2M

Channel	Frequency (MHz)	V_{normal}		$V_{max.}$		$V_{min.}$	
		Carrier frequency (MHz)	Frequency tolerance (ppm)	Carrier frequency (MHz)	Frequency tolerance (ppm)	Carrier frequency (MHz)	Frequency tolerance (ppm)
1	2404	2404.004040	1.680	2404.003960	1.647	2404.004020	1.672
19	2440	2440.004100	1.680	2440.004160	1.704	2440.004080	1.672
38	2478	2478.004140	1.670	2478.004120	1.662	2478.004220	1.702

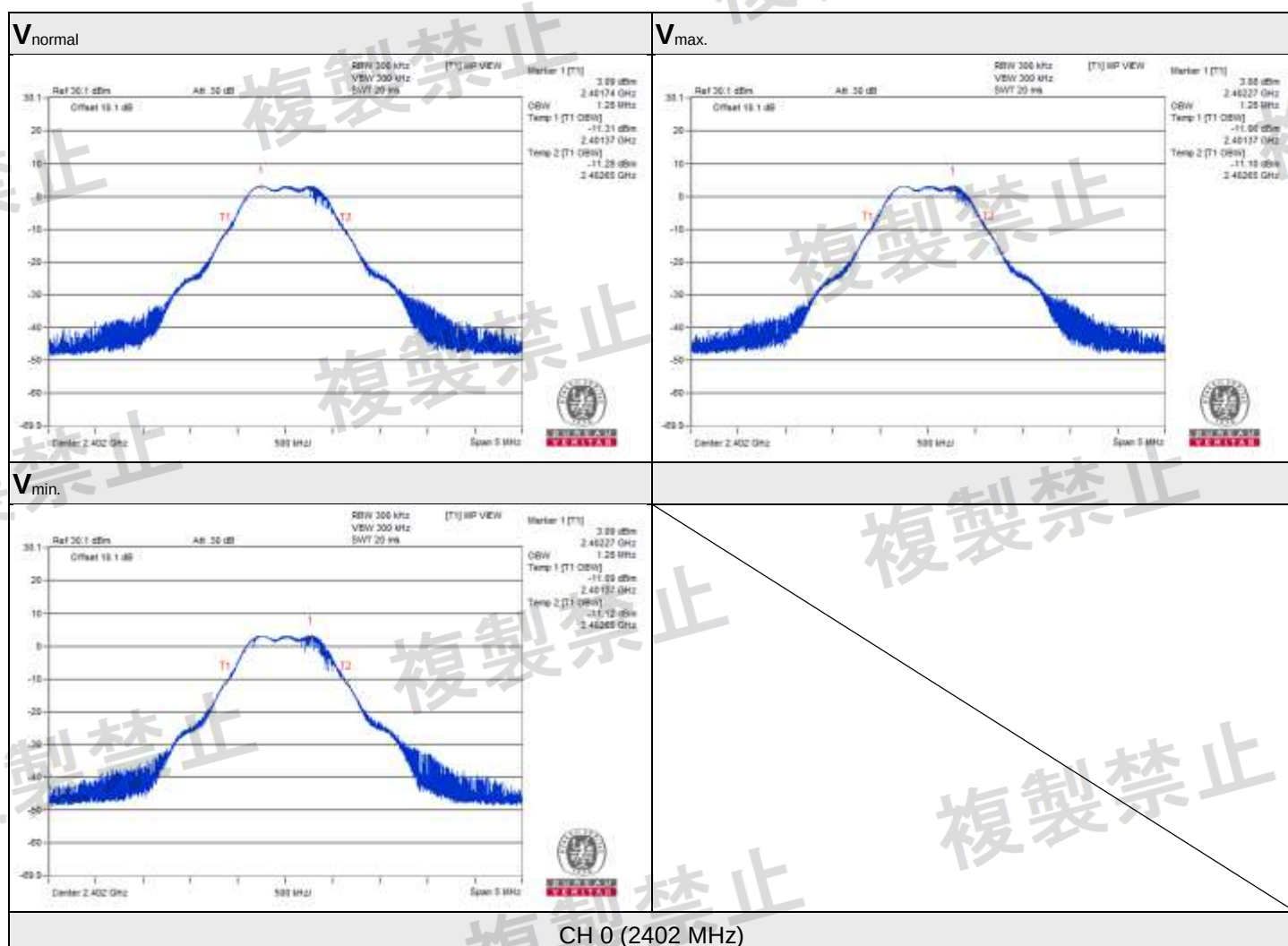
7.2 Occupied Bandwidth

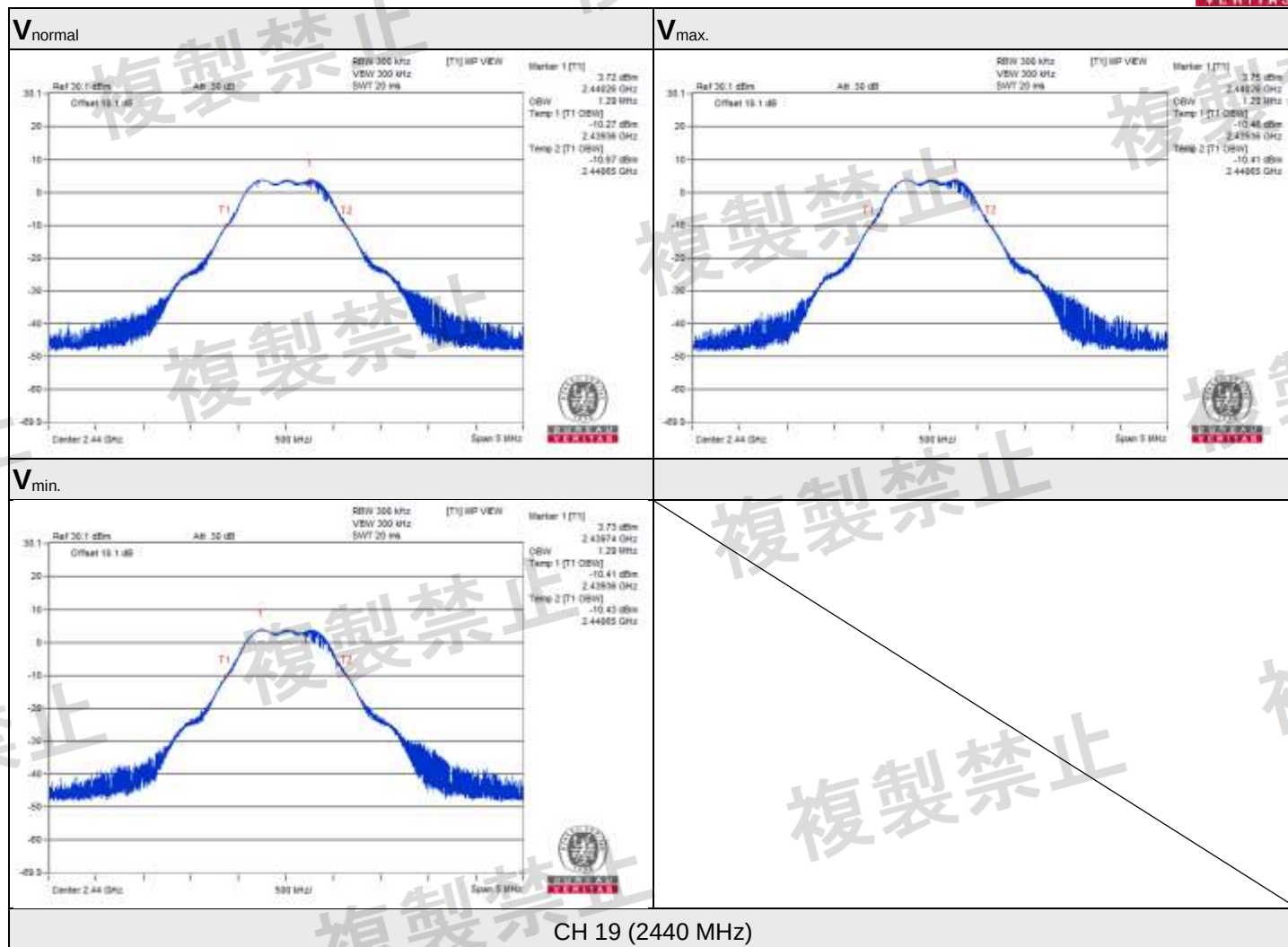
Environmental Conditions:	23°C, 63% RH	Tested By:	Katina Lu
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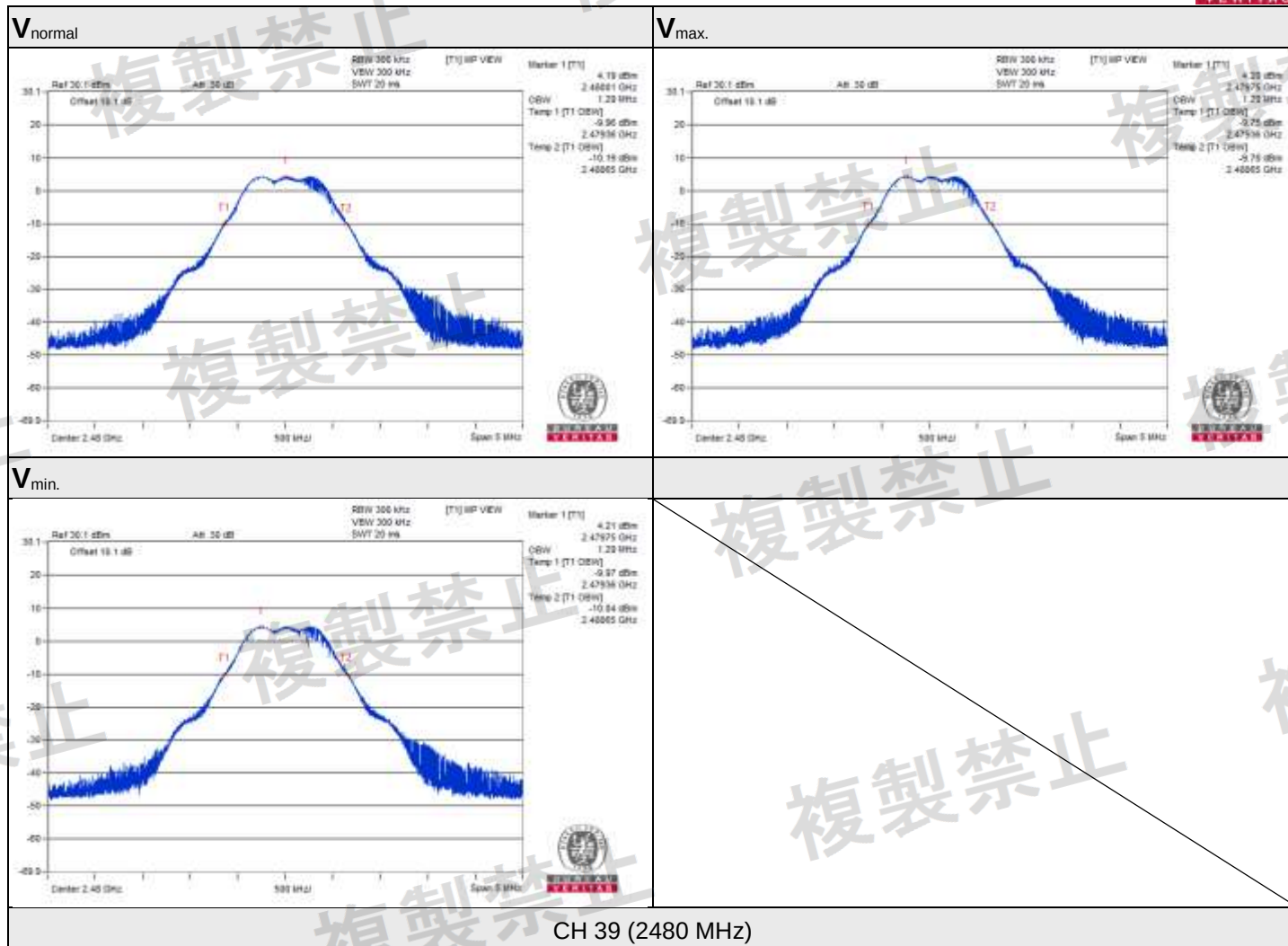
BT-LE 1M

Channel	Frequency (MHz)	V _{normal}	V _{max.}	V _{min.}
		Occupied Bandwidth (MHz)	Occupied Bandwidth (MHz)	Occupied Bandwidth (MHz)
0	2402	1.28	1.28	1.28
19	2440	1.29	1.29	1.29
39	2480	1.29	1.29	1.29

NOTE: For the test plots please refer to the below pages.



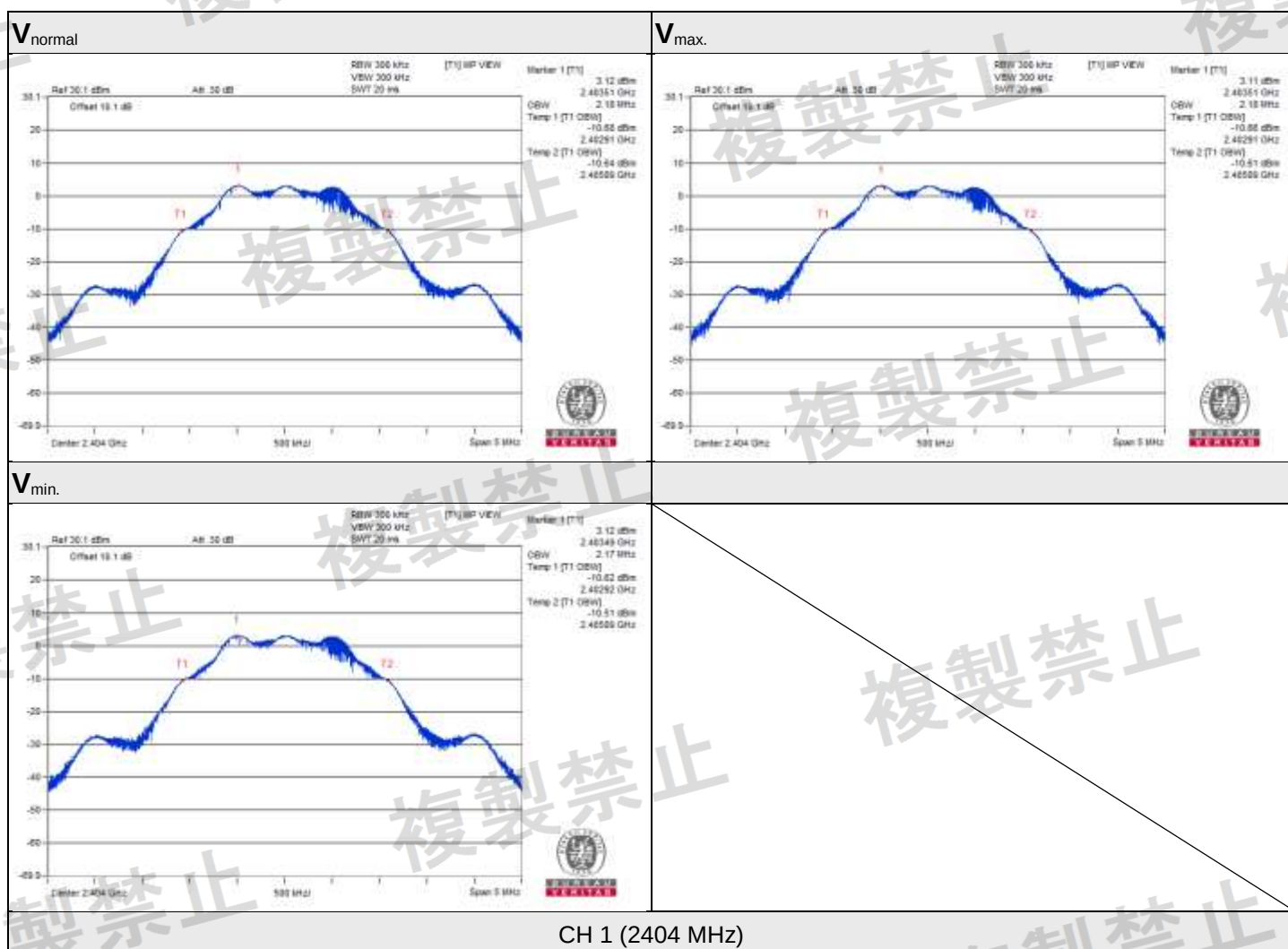




BT-LE 2M

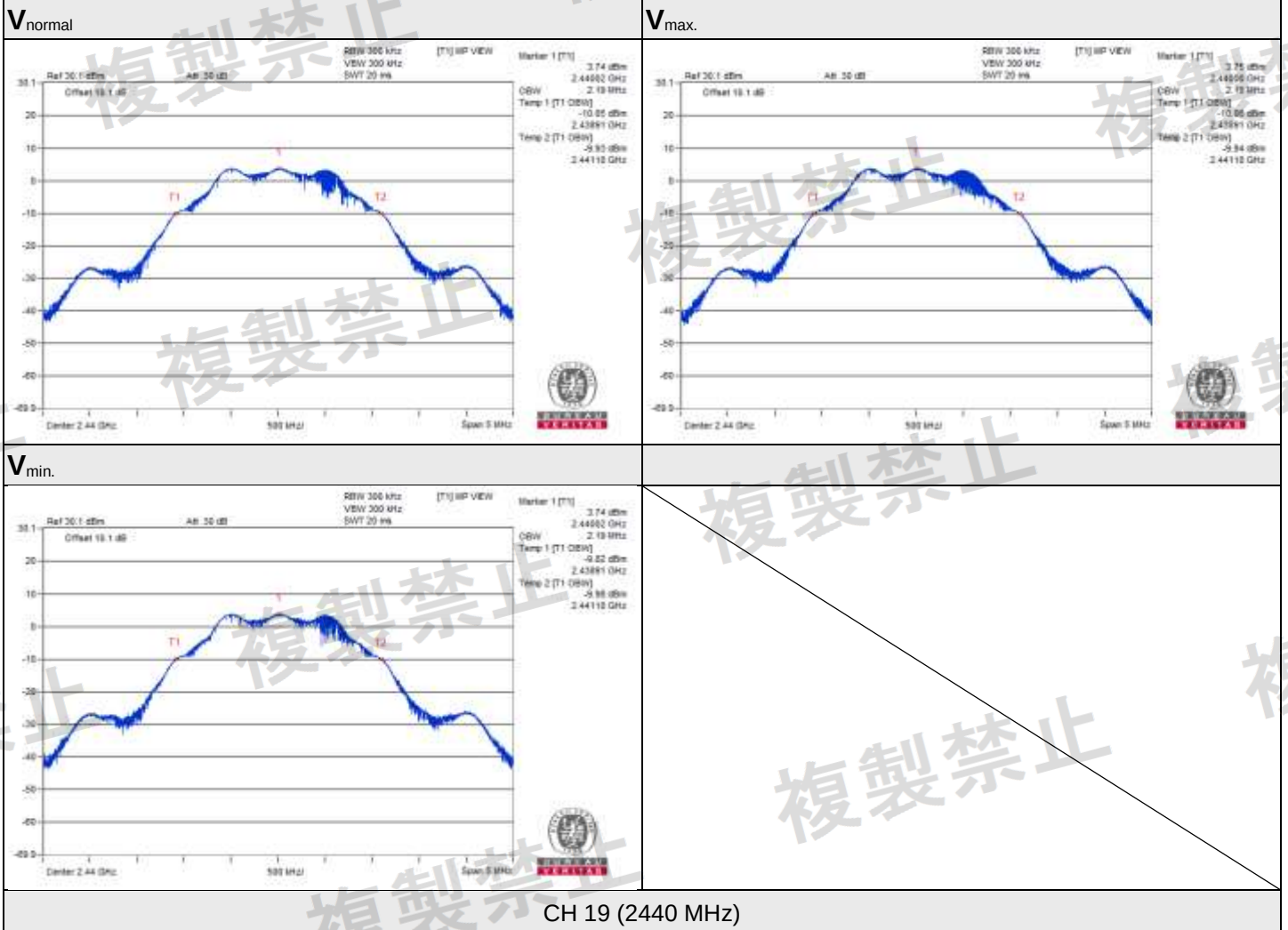
Channel	Frequency (MHz)	V _{normal}	V _{max.}	V _{min.}
		Occupied Bandwidth (MHz)	Occupied Bandwidth (MHz)	Occupied Bandwidth (MHz)
1	2404	2.18	2.18	2.17
19	2440	2.19	2.19	2.19
38	2478	2.19	2.19	2.19

NOTE: For the test plots please refer to the below pages.



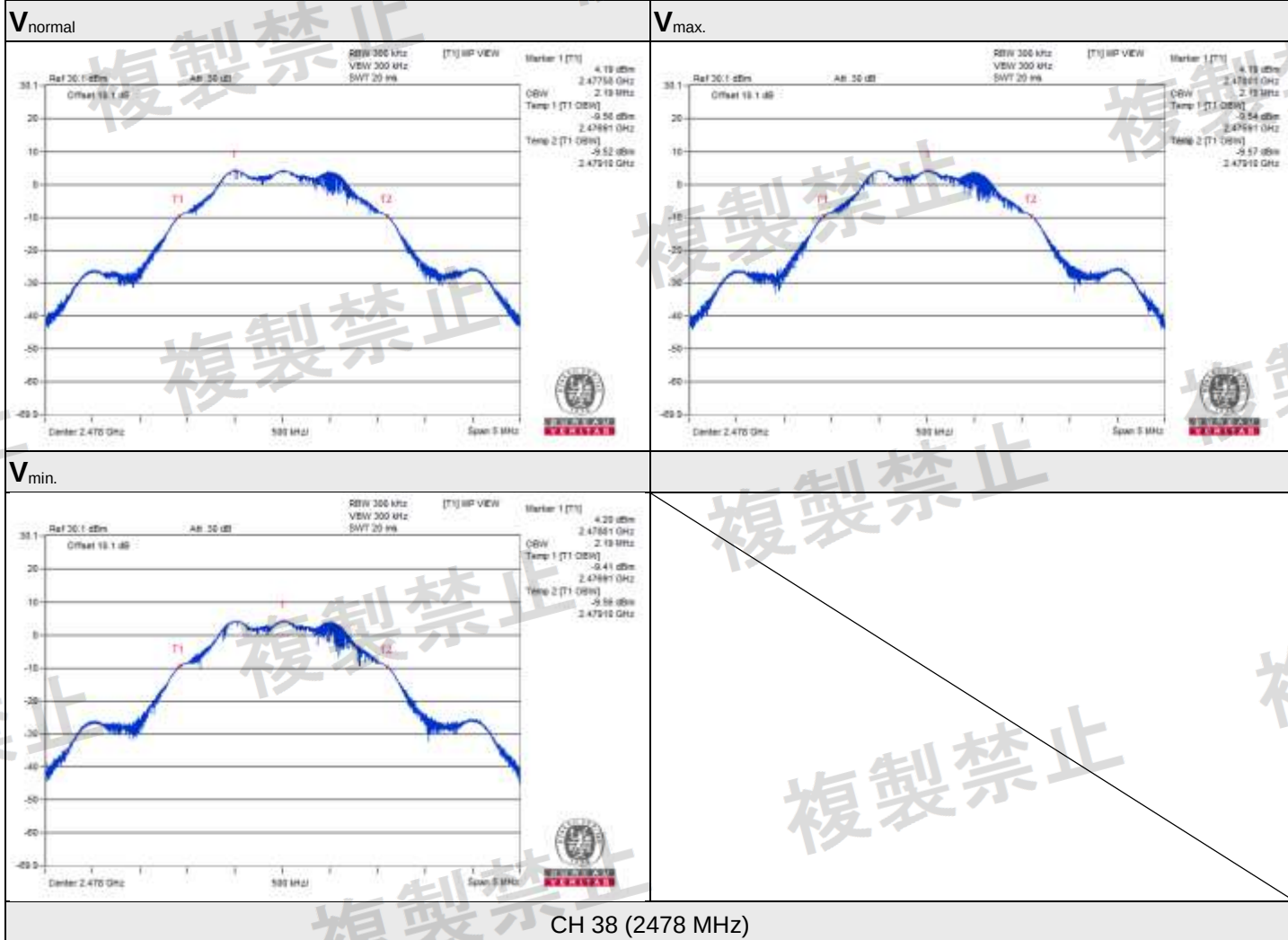


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VERITAS



7.3 Spurious Emissions

Environmental Conditions:	22°C, 55% RH	Tested By:	Kevin Ko
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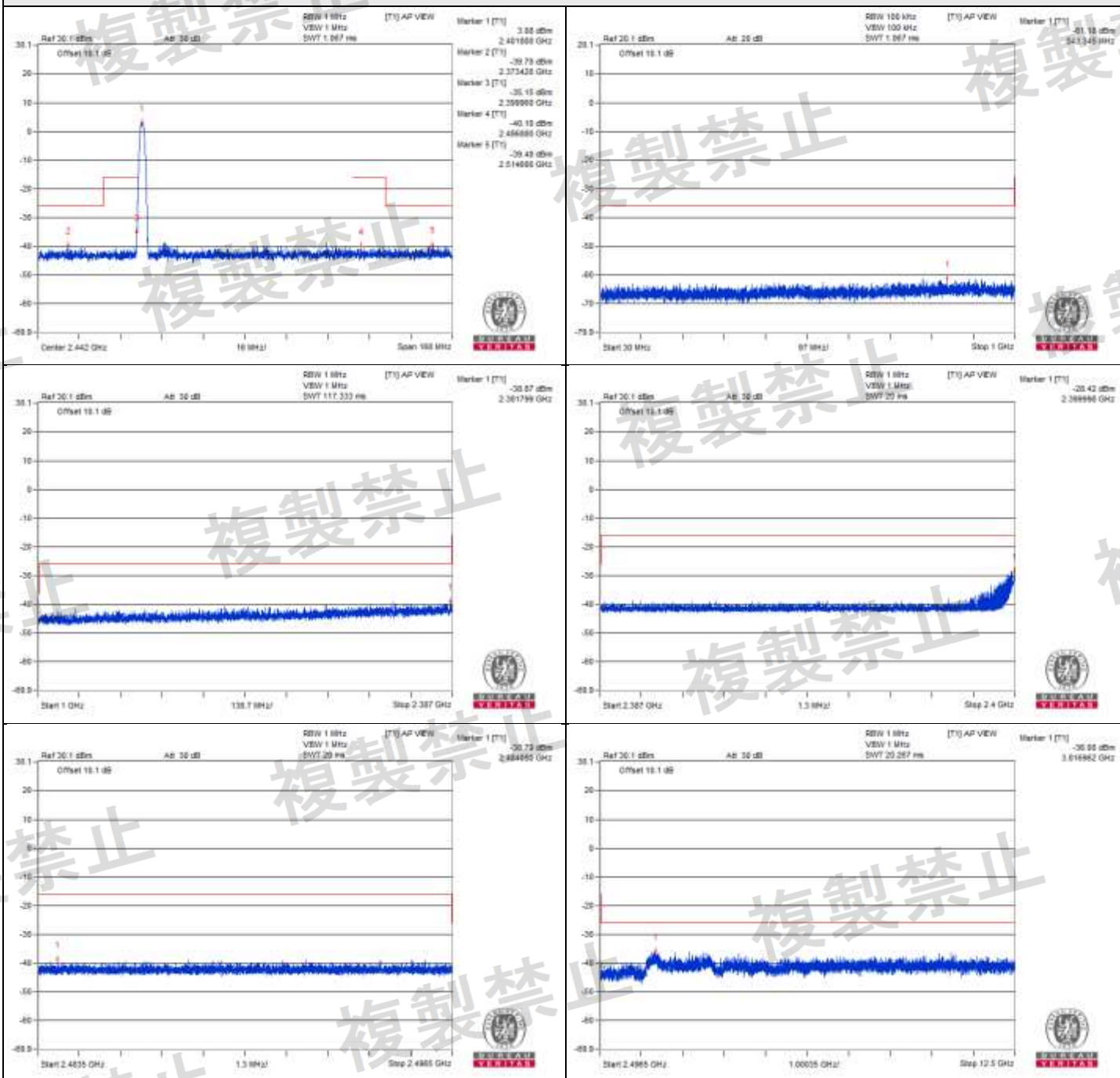
BT-LE 1M

TEST CHANNEL		CH 0 (2402 MHz)			
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASUREMENT VALUE	LIMIT	RESULT
V_{normal}	30.0 to 1000.0	843.345	0.000762 uW/100kHz	0.25 uW/100kHz	PASS
	1000.0 to 2387.0	2381.799	0.129718 uW/MHz	2.5 uW/MHz	PASS
	2387.0 to 2400.0	2399.998	1.438799 uW/MHz	25 uW/MHz	PASS
	2483.5 to 2496.5	2484.080	0.13213 uW/MHz	25 uW/MHz	PASS
	2496.5 to 12500.0	3816.962	0.251189 uW/MHz	2.5 uW/MHz	PASS
V_{max.}	30.0 to 1000.0	889.178	0.000721 uW/100kHz	0.25 uW/100kHz	PASS
	1000.0 to 2387.0	2338.282	0.123595 uW/MHz	2.5 uW/MHz	PASS
	2387.0 to 2400.0	2399.995	1.648162 uW/MHz	25 uW/MHz	PASS
	2483.5 to 2496.5	2486.093	0.124165 uW/MHz	25 uW/MHz	PASS
	2496.5 to 12500.0	3738.184	0.289734 uW/MHz	2.5 uW/MHz	PASS
V_{min.}	30.0 to 1000.0	765.139	0.000785 uW/100kHz	0.25 uW/100kHz	PASS
	1000.0 to 2387.0	2381.799	0.130617 uW/MHz	2.5 uW/MHz	PASS
	2387.0 to 2400.0	2399.977	1.527566 uW/MHz	25 uW/MHz	PASS
	2483.5 to 2496.5	2486.313	0.130918 uW/MHz	25 uW/MHz	PASS
	2496.5 to 12500.0	10636.848	0.25527 uW/MHz	2.5 uW/MHz	PASS
TEST CHANNEL		CH 19 (2440 MHz)			
V_{normal}	30.0 to 1000.0	823.581	0.000697 uW/100kHz	0.25 uW/100kHz	PASS
	1000.0 to 2387.0	2215.706	0.129718 uW/MHz	2.5 uW/MHz	PASS
	2387.0 to 2400.0	2390.125	0.123027 uW/MHz	25 uW/MHz	PASS
	2483.5 to 2496.5	2488.284	0.138357 uW/MHz	25 uW/MHz	PASS
	2496.5 to 12500.0	3720.678	0.34435 uW/MHz	2.5 uW/MHz	PASS
V_{max.}	30.0 to 1000.0	774.839	0.000853 uW/100kHz	0.25 uW/100kHz	PASS
	1000.0 to 2387.0	2219.000	0.15417 uW/MHz	2.5 uW/MHz	PASS
	2387.0 to 2400.0	2390.812	0.111686 uW/MHz	25 uW/MHz	PASS
	2483.5 to 2496.5	2489.670	0.120781 uW/MHz	25 uW/MHz	PASS
	2496.5 to 12500.0	3730.682	0.27227 uW/MHz	2.5 uW/MHz	PASS
V_{min.}	30.0 to 1000.0	877.659	0.001002 uW/100kHz	0.25 uW/100kHz	PASS
	1000.0 to 2387.0	2386.133	0.131826 uW/MHz	2.5 uW/MHz	PASS
	2387.0 to 2400.0	2394.213	0.128825 uW/MHz	25 uW/MHz	PASS
	2483.5 to 2496.5	2484.402	0.134276 uW/MHz	25 uW/MHz	PASS
	2496.5 to 12500.0	3859.477	0.236048 uW/MHz	2.5 uW/MHz	PASS

TEST CHANNEL		CH 39 (2480 MHz)			
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASUREMENT VALUE	LIMIT	RESULT
V_{normal}	30.0 to 1000.0	951.621	0.000771 uW/100kHz	0.25 uW/100kHz	PASS
	1000.0 to 2387.0	2376.597	0.116681 uW/MHz	2.5 uW/MHz	PASS
	2387.0 to 2400.0	2394.317	0.138357 uW/MHz	25 uW/MHz	PASS
	2483.5 to 2496.5	2483.706	0.170216 uW/MHz	25 uW/MHz	PASS
	2496.5 to 12500.0	3811.960	0.255859 uW/MHz	2.5 uW/MHz	PASS
V_{max.}	30.0 to 1000.0	889.784	0.000752 uW/100kHz	0.25 uW/100kHz	PASS
	1000.0 to 2387.0	2124.337	0.12331 uW/MHz	2.5 uW/MHz	PASS
	2387.0 to 2400.0	2390.926	0.122744 uW/MHz	25 uW/MHz	PASS
	2483.5 to 2496.5	2490.856	0.136458 uW/MHz	25 uW/MHz	PASS
	2496.5 to 12500.0	9769.044	0.267301 uW/MHz	2.5 uW/MHz	PASS
V_{min.}	30.0 to 1000.0	458.983	0.00074 uW/100kHz	0.25 uW/100kHz	PASS
	1000.0 to 2387.0	2370.529	0.106905 uW/MHz	2.5 uW/MHz	PASS
	2387.0 to 2400.0	2387.032	0.122744 uW/MHz	25 uW/MHz	PASS
	2483.5 to 2496.5	2483.519	0.148252 uW/MHz	25 uW/MHz	PASS
	2496.5 to 12500.0	3880.734	0.316957 uW/MHz	2.5 uW/MHz	PASS

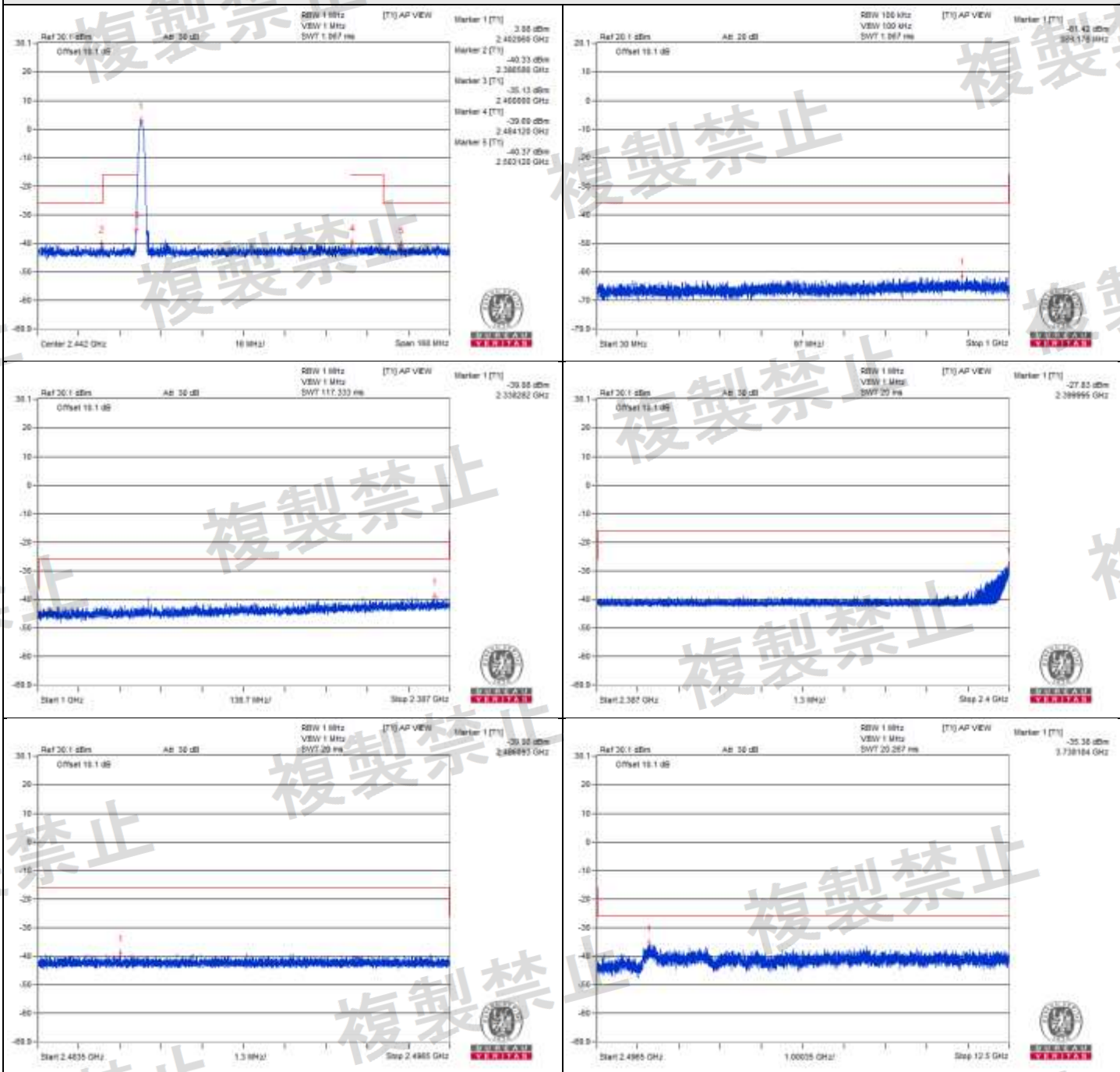
NOTE: 1. The spectrum plots are attached on the following pages.

Vnormal



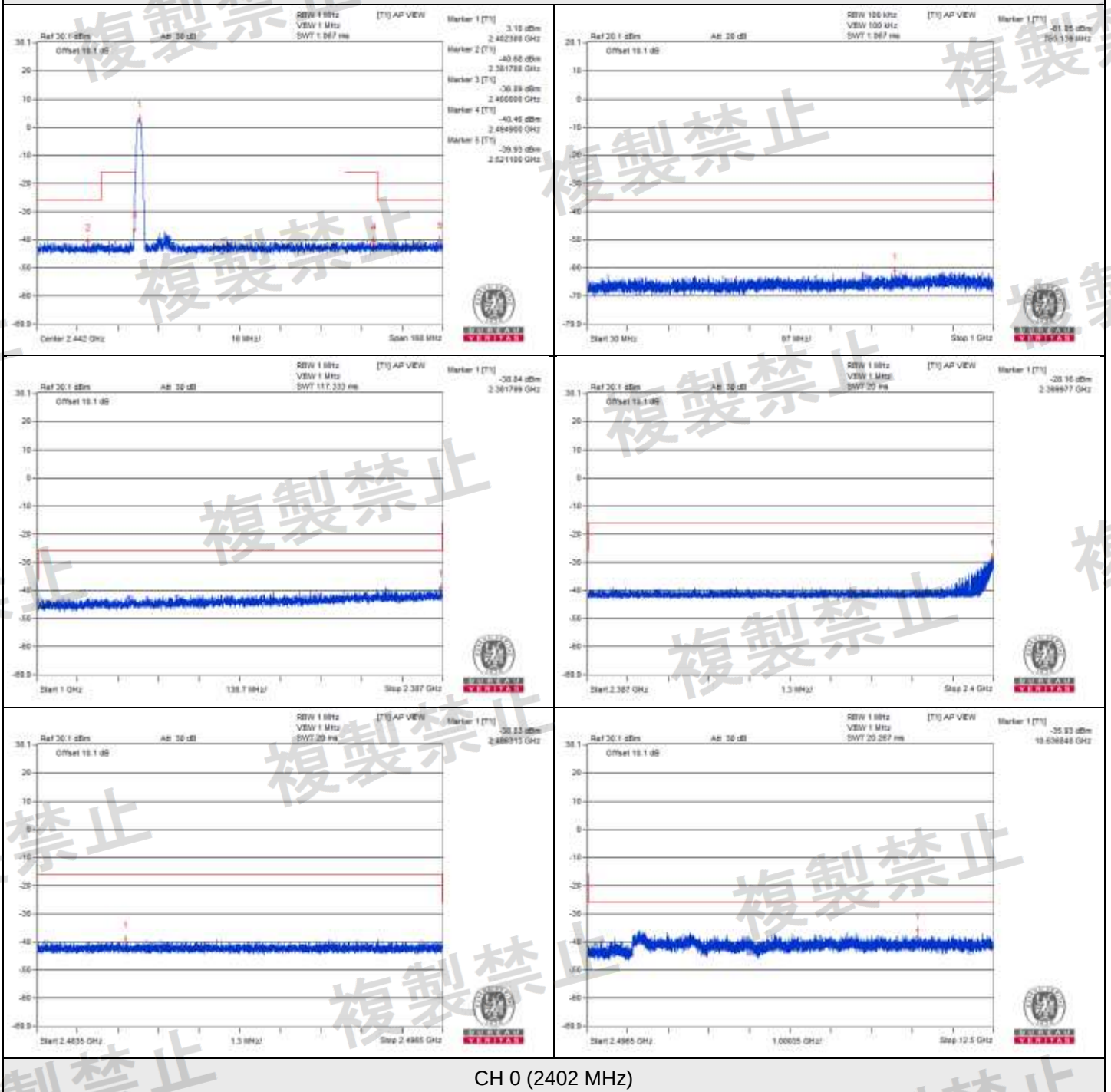
CH 0 (2402 MHz)

V_{max}.

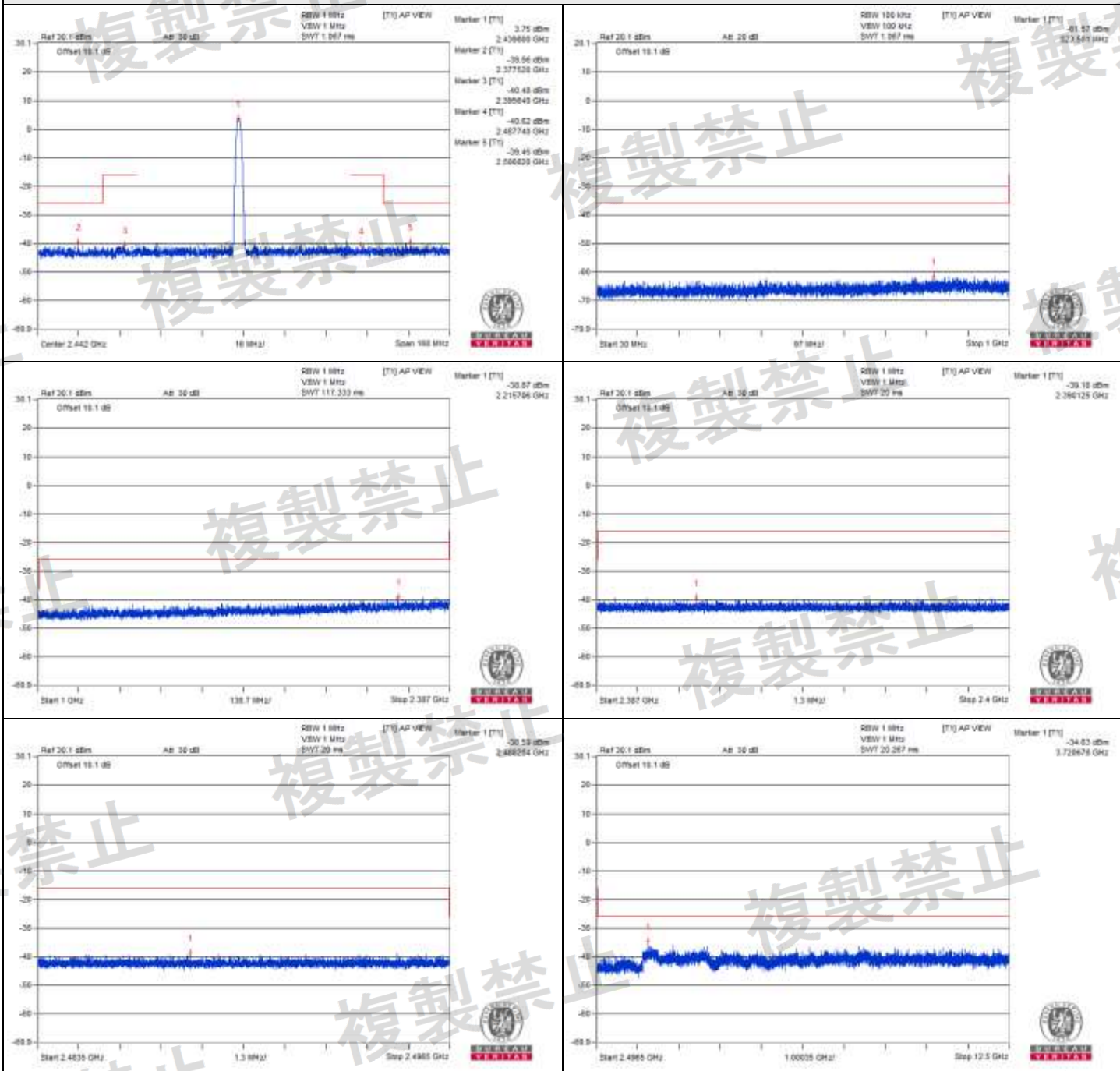


CH 0 (2402 MHz)

V_{min}.

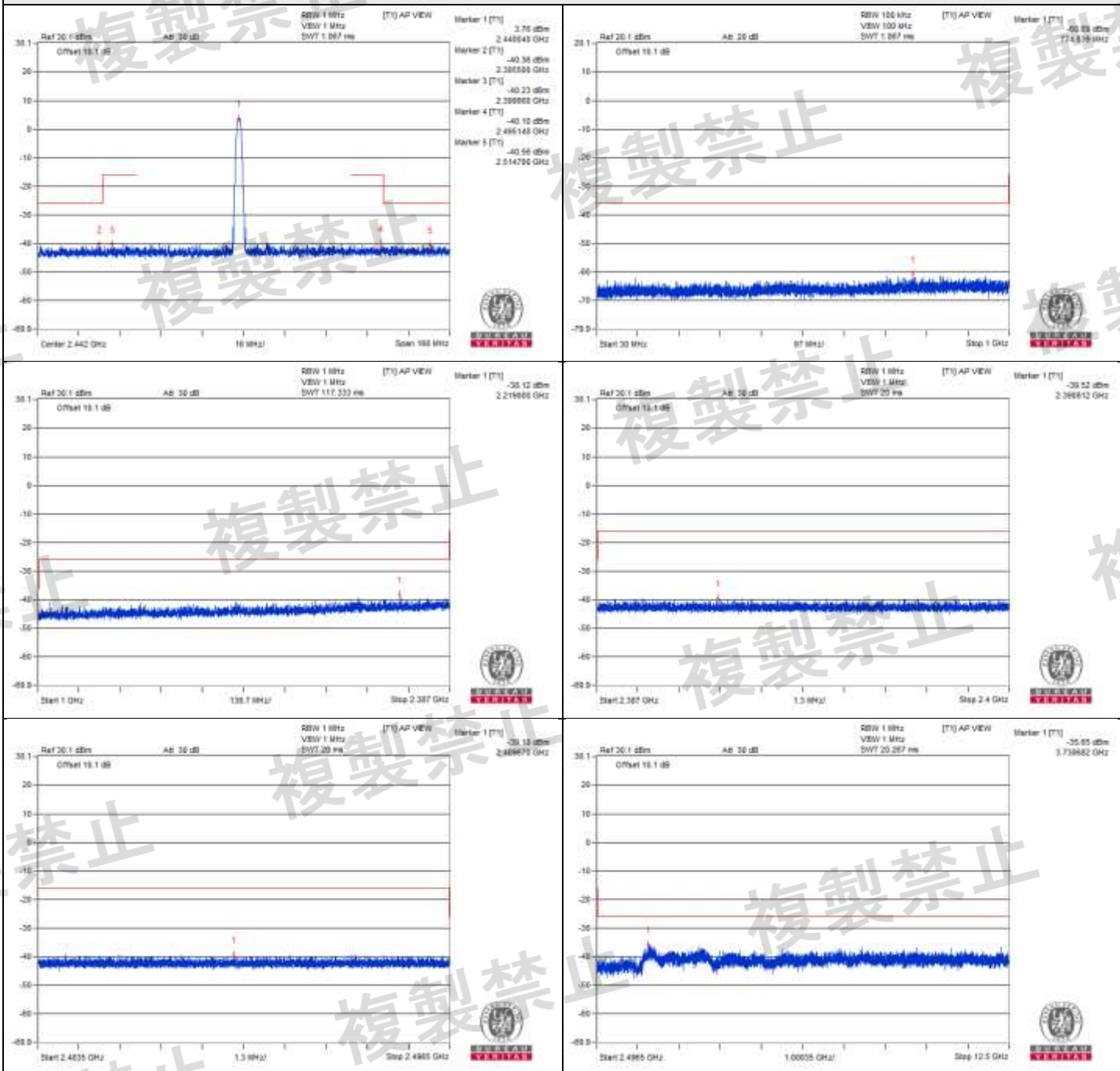


Vnormal



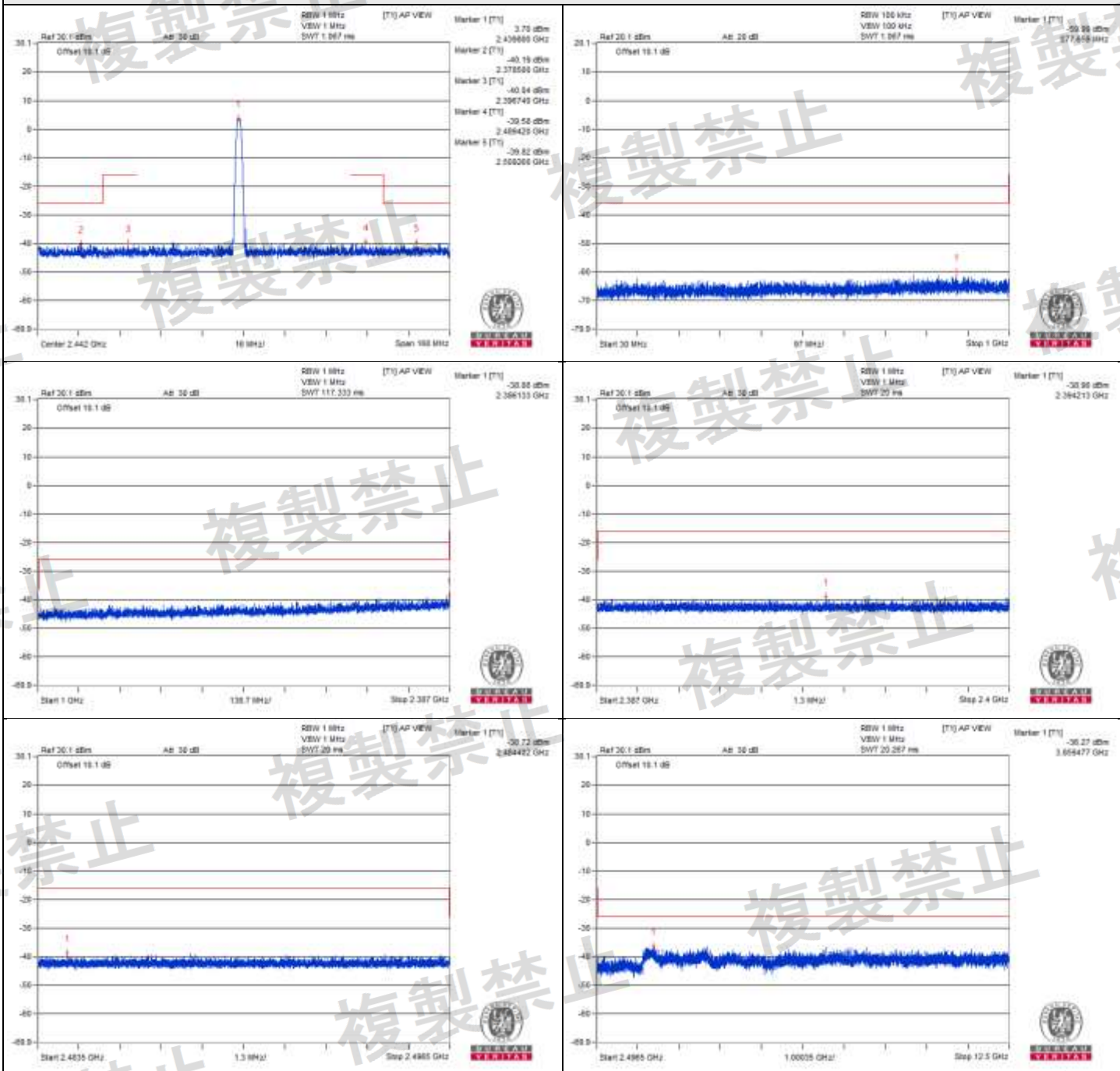
CH 19 (2440 MHz)

V_{max}.



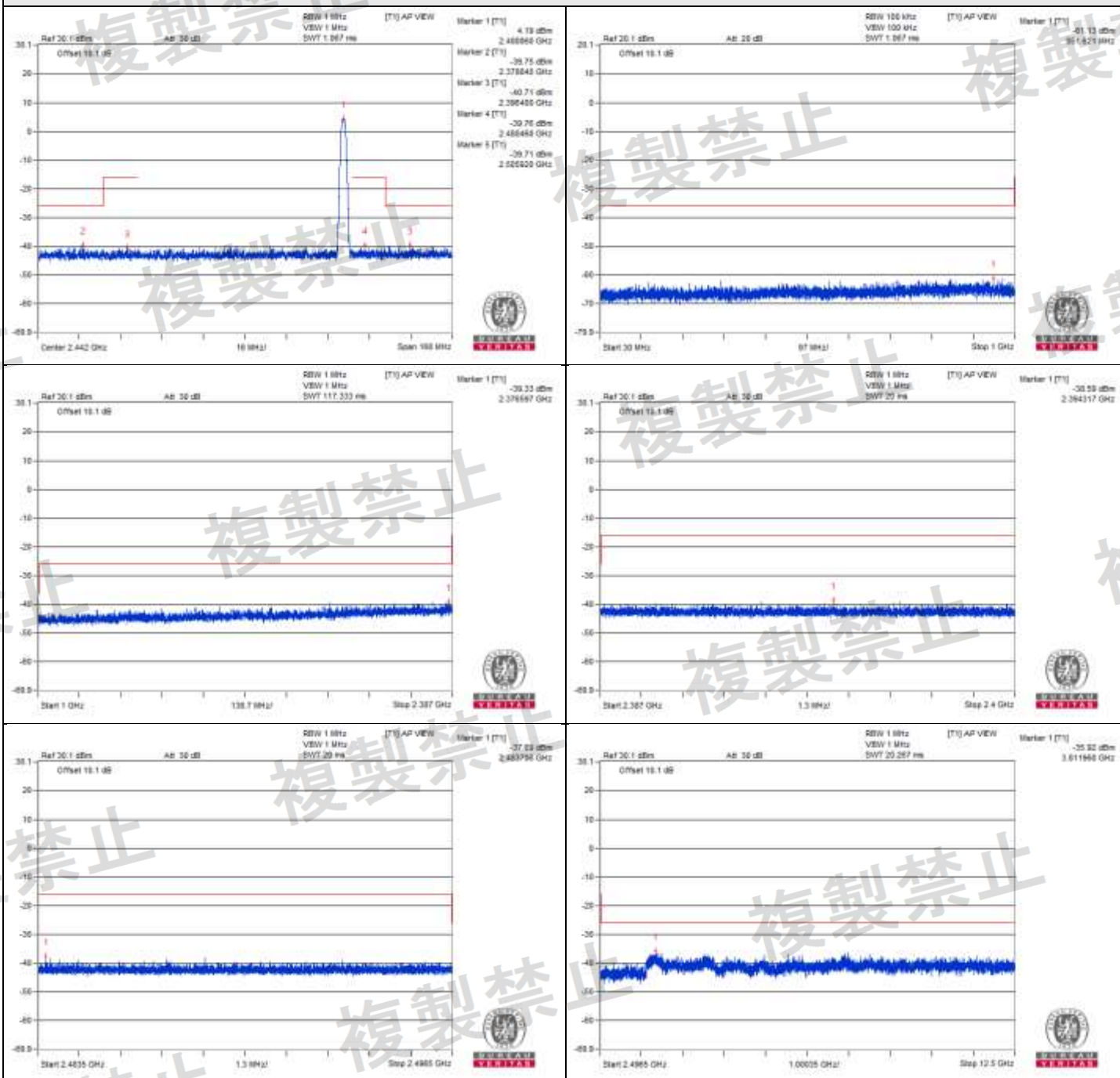
CH 19 (2440 MHz)

V_{min}.



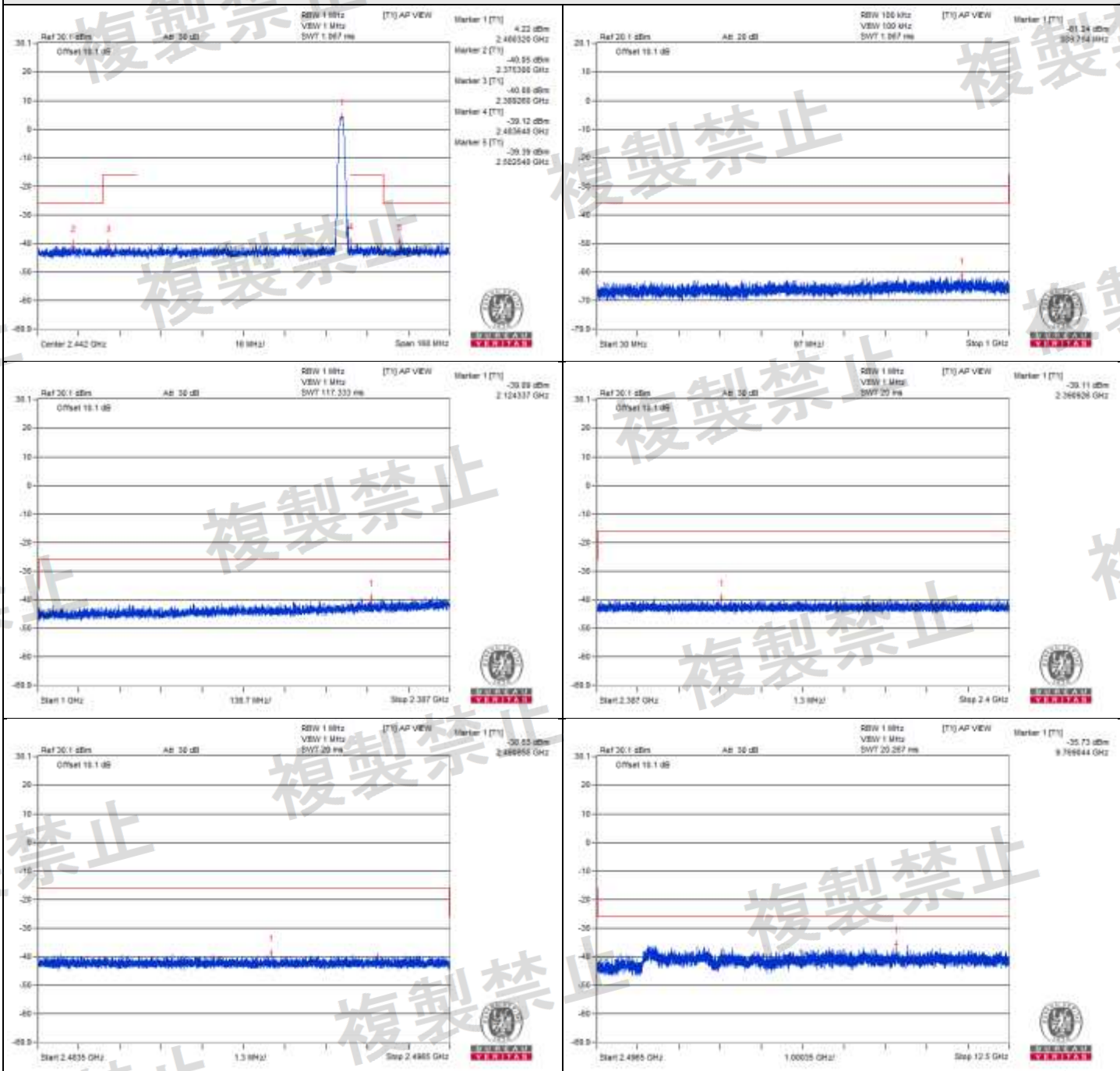
CH 19 (2440 MHz)

Vnormal



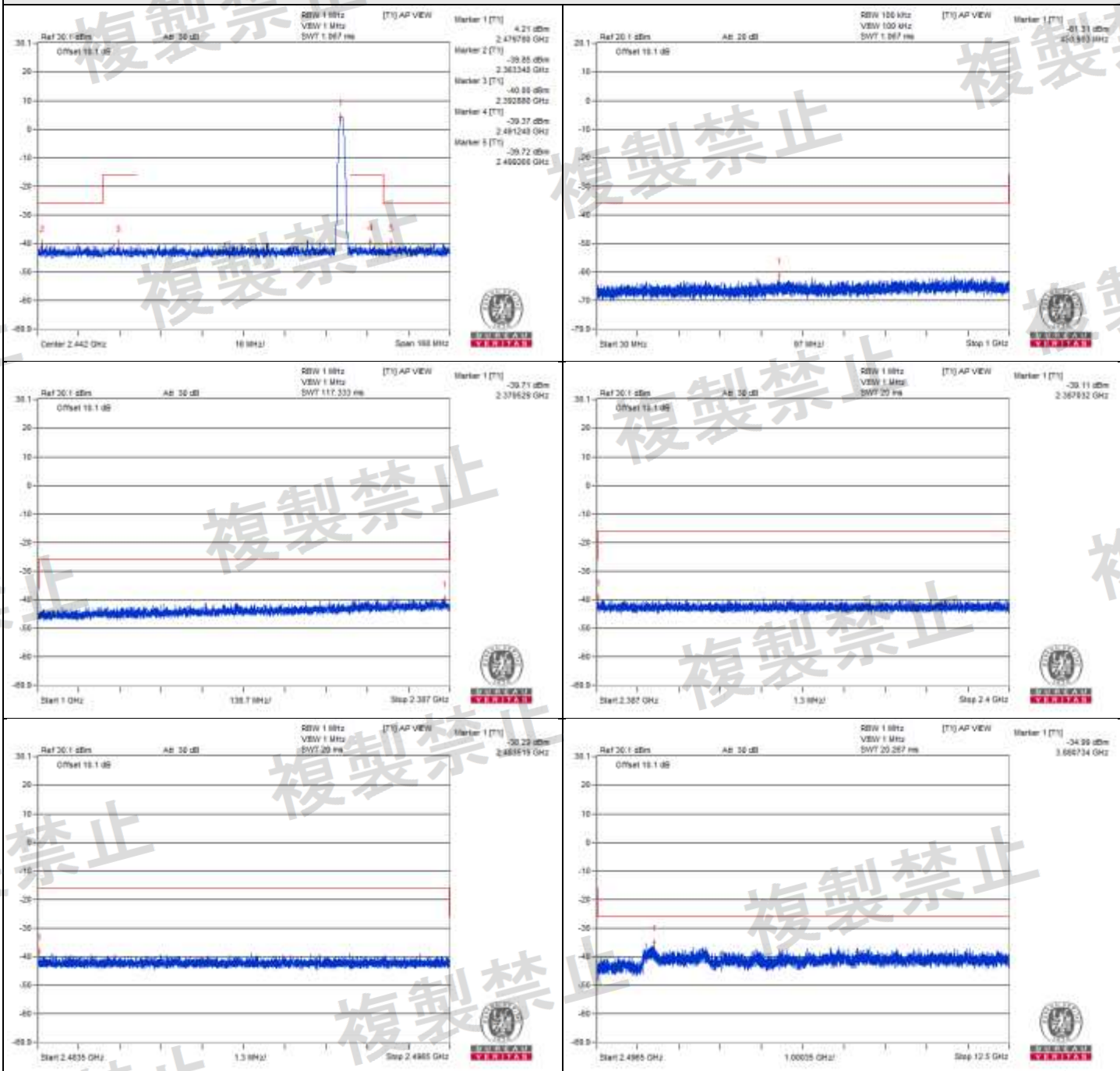
CH 39 (2480 MHz)

V_{max}.



CH 39 (2480 MHz)

V_{min}.



CH 39 (2480 MHz)

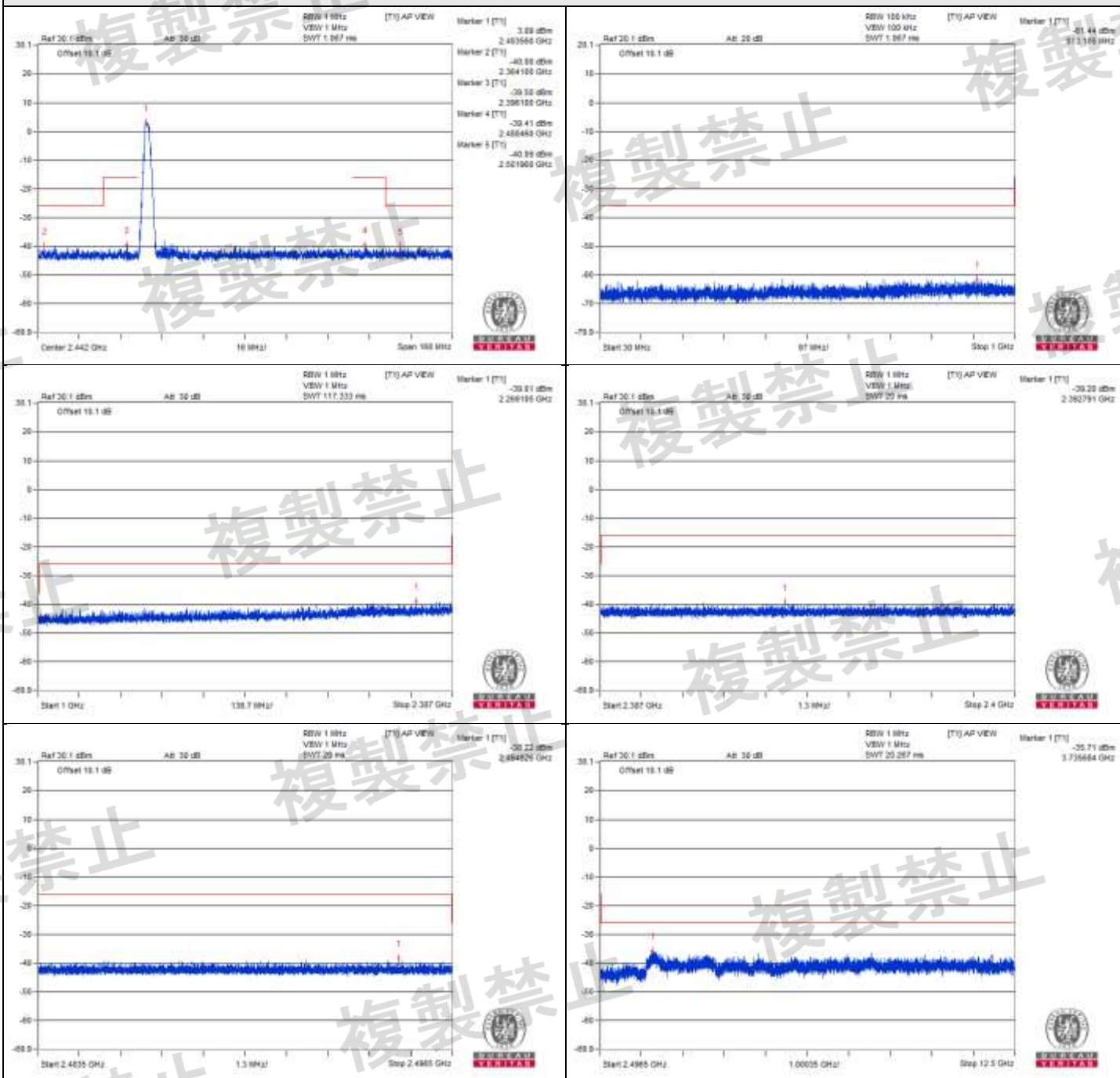
BT-LE 2M

TEST CHANNEL		CH 1 (2404 MHz)			
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASUREMENT VALUE	LIMIT	RESULT
V_{normal}	30.0 to 1000.0	913.185	0.000718 uW/100kHz	0.25 uW/100kHz	PASS
	1000.0 to 2387.0	2269.105	0.125603 uW/MHz	2.5 uW/MHz	PASS
	2387.0 to 2400.0	2392.791	0.120226 uW/MHz	25 uW/MHz	PASS
	2483.5 to 2496.5	2494.826	0.150661 uW/MHz	25 uW/MHz	PASS
	2496.5 to 12500.0	3735.684	0.268534 uW/MHz	2.5 uW/MHz	PASS
V_{max.}	30.0 to 1000.0	956.835	0.000933 uW/100kHz	0.25 uW/100kHz	PASS
	1000.0 to 2387.0	2351.978	0.118577 uW/MHz	2.5 uW/MHz	PASS
	2387.0 to 2400.0	2396.129	0.140605 uW/MHz	25 uW/MHz	PASS
	2483.5 to 2496.5	2491.105	0.125603 uW/MHz	25 uW/MHz	PASS
	2496.5 to 12500.0	3890.738	0.254683 uW/MHz	2.5 uW/MHz	PASS
V_{min.}	30.0 to 1000.0	886.268	0.000693 uW/100kHz	0.25 uW/100kHz	PASS
	1000.0 to 2387.0	2385.960	0.147571 uW/MHz	2.5 uW/MHz	PASS
	2387.0 to 2400.0	2394.332	0.130017 uW/MHz	25 uW/MHz	PASS
	2483.5 to 2496.5	2490.466	0.131826 uW/MHz	25 uW/MHz	PASS
	2496.5 to 12500.0	3819.463	0.280543 uW/MHz	2.5 uW/MHz	PASS
TEST CHANNEL		CH 19 (2440 MHz)			
V_{normal}	30.0 to 1000.0	460.316	0.000759 uW/100kHz	0.25 uW/100kHz	PASS
	1000.0 to 2387.0	2385.440	0.12388 uW/MHz	2.5 uW/MHz	PASS
	2387.0 to 2400.0	2387.153	0.12388 uW/MHz	25 uW/MHz	PASS
	2483.5 to 2496.5	2484.439	0.144544 uW/MHz	25 uW/MHz	PASS
	2496.5 to 12500.0	11455.885	0.259418 uW/MHz	2.5 uW/MHz	PASS
V_{max.}	30.0 to 1000.0	991.755	0.000789 uW/100kHz	0.25 uW/100kHz	PASS
	1000.0 to 2387.0	2356.659	0.138038 uW/MHz	2.5 uW/MHz	PASS
	2387.0 to 2400.0	2397.431	0.134896 uW/MHz	25 uW/MHz	PASS
	2483.5 to 2496.5	2494.514	0.153462 uW/MHz	25 uW/MHz	PASS
	2496.5 to 12500.0	3685.666	0.249459 uW/MHz	2.5 uW/MHz	PASS
V_{min.}	30.0 to 1000.0	950.166	0.000782 uW/100kHz	0.25 uW/100kHz	PASS
	1000.0 to 2387.0	2169.934	0.118304 uW/MHz	2.5 uW/MHz	PASS
	2387.0 to 2400.0	2393.581	0.147571 uW/MHz	25 uW/MHz	PASS
	2483.5 to 2496.5	2494.415	0.12942 uW/MHz	25 uW/MHz	PASS
	2496.5 to 12500.0	3629.396	0.267917 uW/MHz	2.5 uW/MHz	PASS

TEST CHANNEL		CH 38 (2478 MHz)			
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASUREMENT VALUE	LIMIT	RESULT
V_{normal}	30.0 to 1000.0	803.454	0.00091 uW/100kHz	0.25 uW/100kHz	PASS
	1000.0 to 2387.0	2361.861	0.125893 uW/MHz	2.5 uW/MHz	PASS
	2387.0 to 2400.0	2389.678	0.120226 uW/MHz	25 uW/MHz	PASS
	2483.5 to 2496.5	2488.469	0.130918 uW/MHz	25 uW/MHz	PASS
	2496.5 to 12500.0	3755.691	0.24322 uW/MHz	2.5 uW/MHz	PASS
V_{max.}	30.0 to 1000.0	987.996	0.000839 uW/100kHz	0.25 uW/100kHz	PASS
	1000.0 to 2387.0	2255.408	0.150661 uW/MHz	2.5 uW/MHz	PASS
	2387.0 to 2400.0	2394.670	0.129718 uW/MHz	25 uW/MHz	PASS
	2483.5 to 2496.5	2491.386	0.135831 uW/MHz	25 uW/MHz	PASS
	2496.5 to 12500.0	3786.952	0.275423 uW/MHz	2.5 uW/MHz	PASS
V_{min.}	30.0 to 1000.0	838.616	0.000817 uW/100kHz	0.25 uW/100kHz	PASS
	1000.0 to 2387.0	2372.436	0.136458 uW/MHz	2.5 uW/MHz	PASS
	2387.0 to 2400.0	2398.515	0.115878 uW/MHz	25 uW/MHz	PASS
	2483.5 to 2496.5	2489.480	0.134276 uW/MHz	25 uW/MHz	PASS
	2496.5 to 12500.0	5052.394	0.240436 uW/MHz	2.5 uW/MHz	PASS

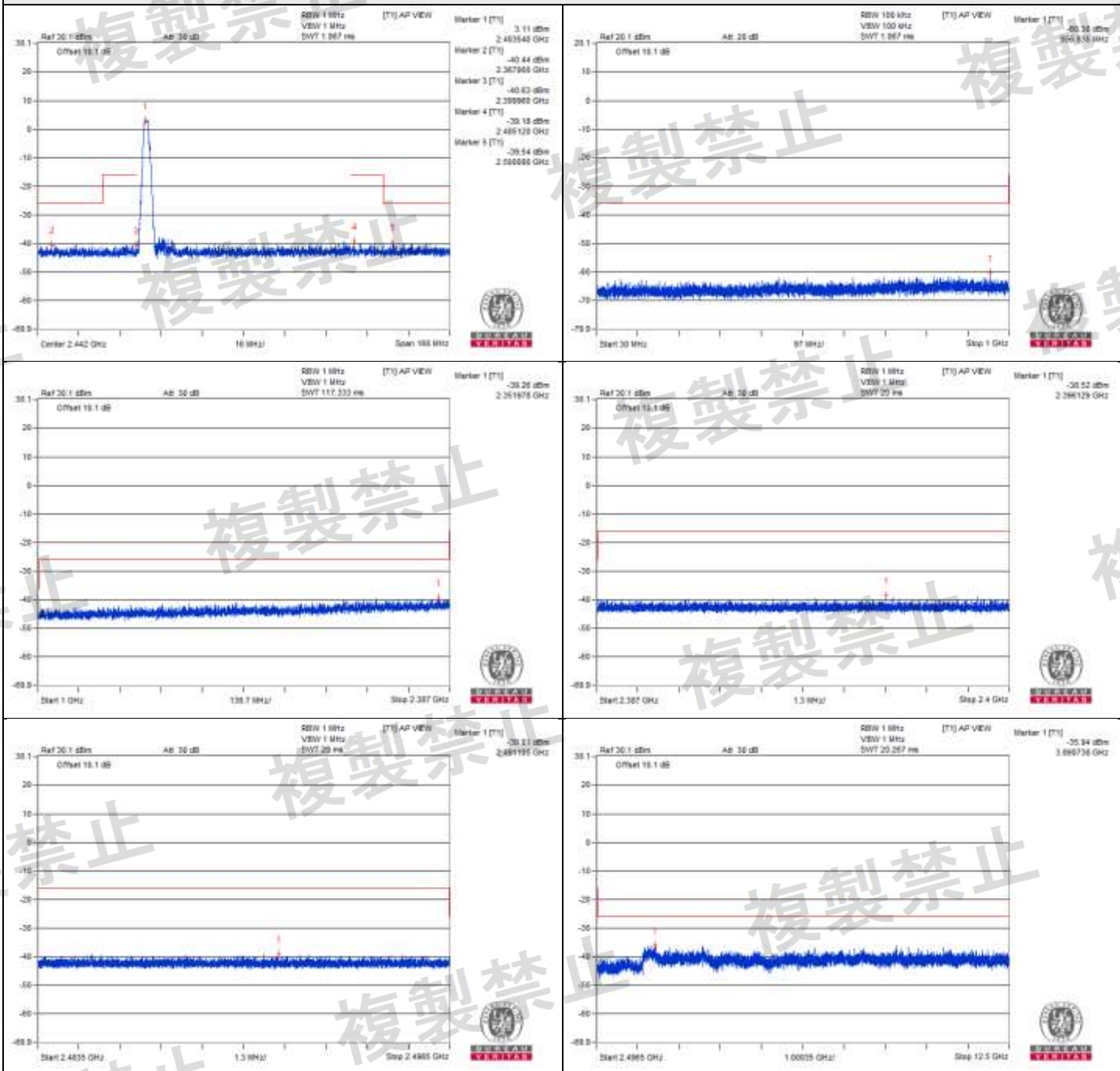
NOTE: 1. The spectrum plots are attached on the following pages.

Vnormal



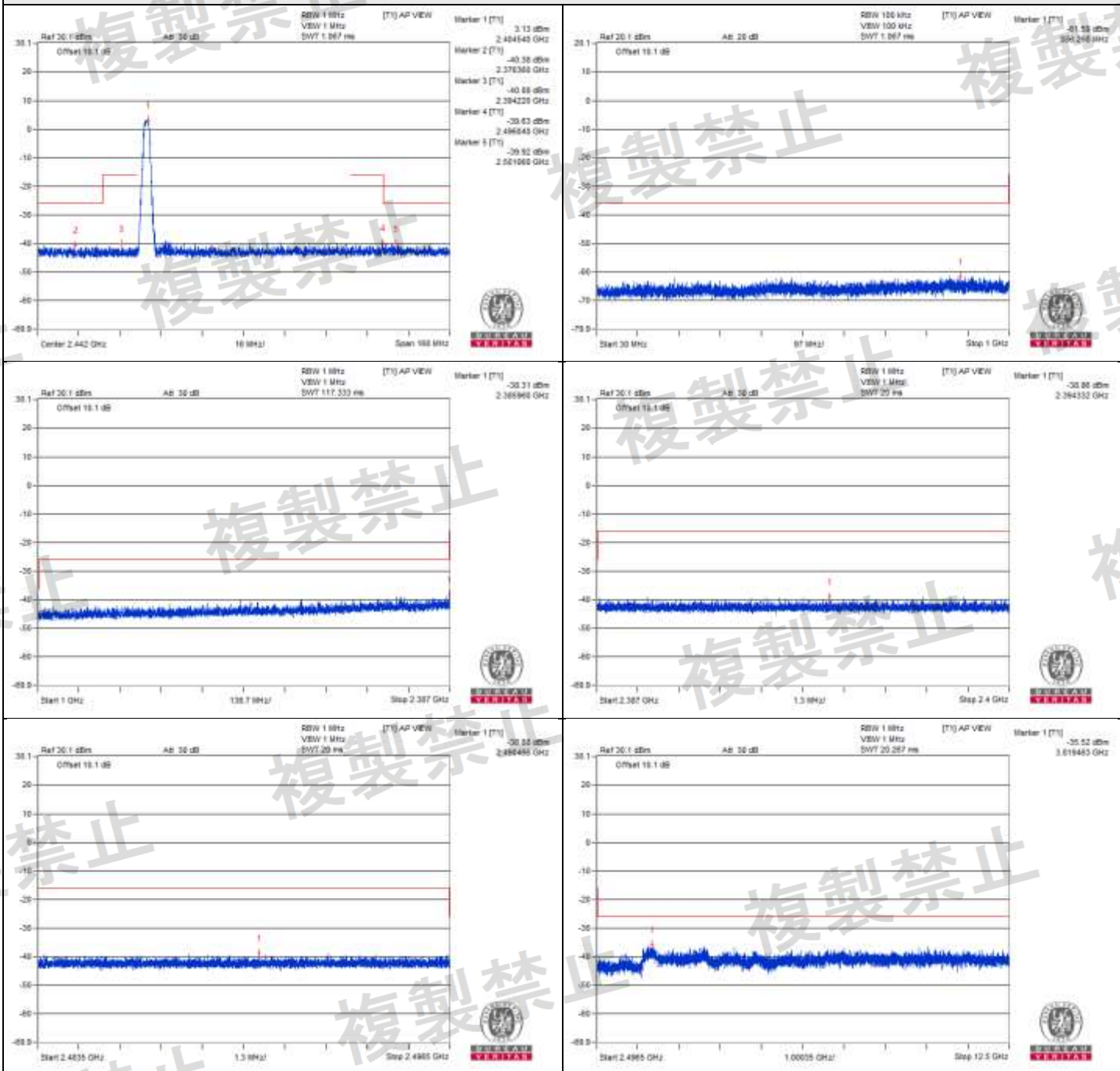
CH 1 (2404 MHz)

V_{max}.



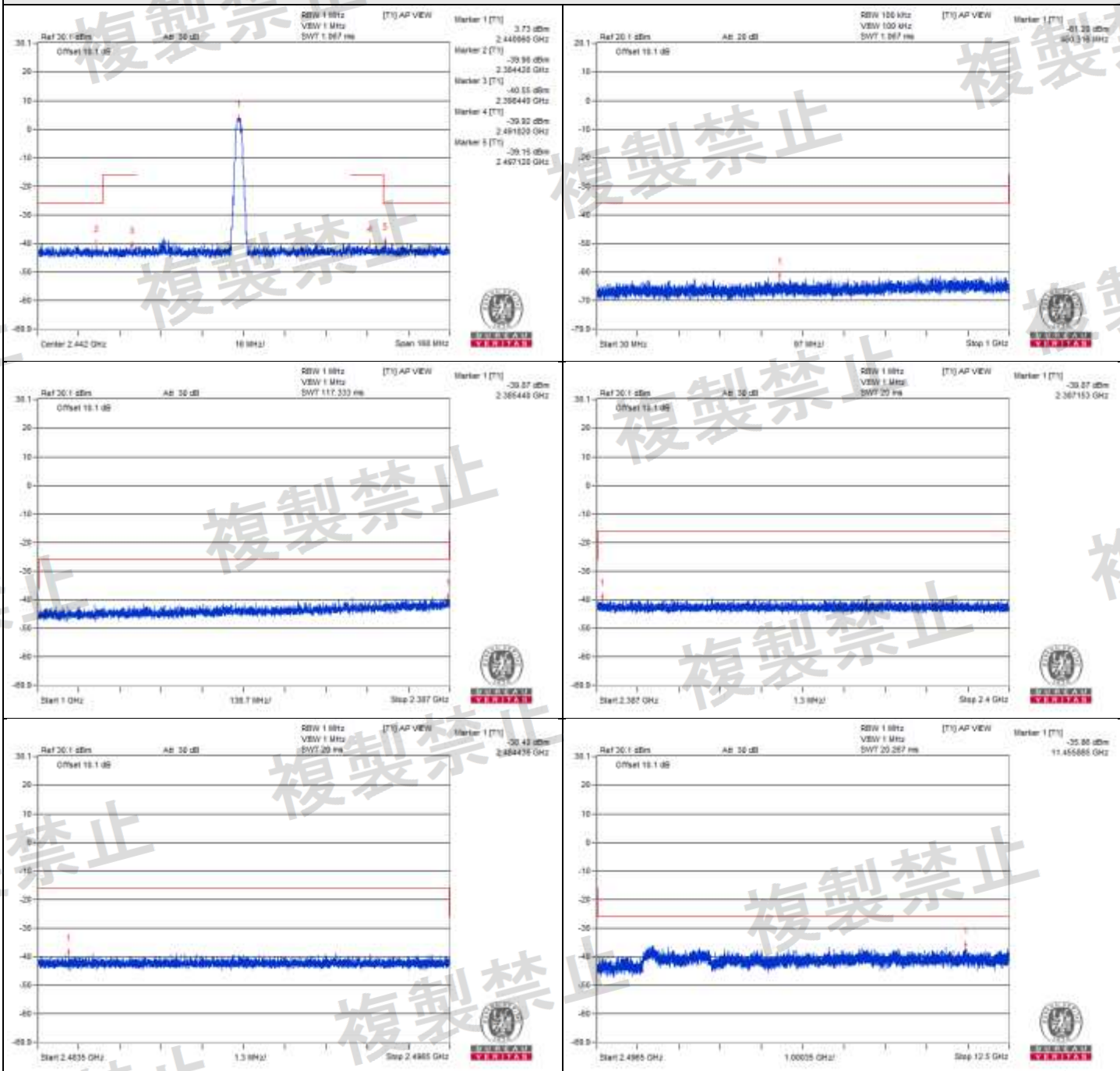
CH 1 (2404 MHz)

V_{min}.



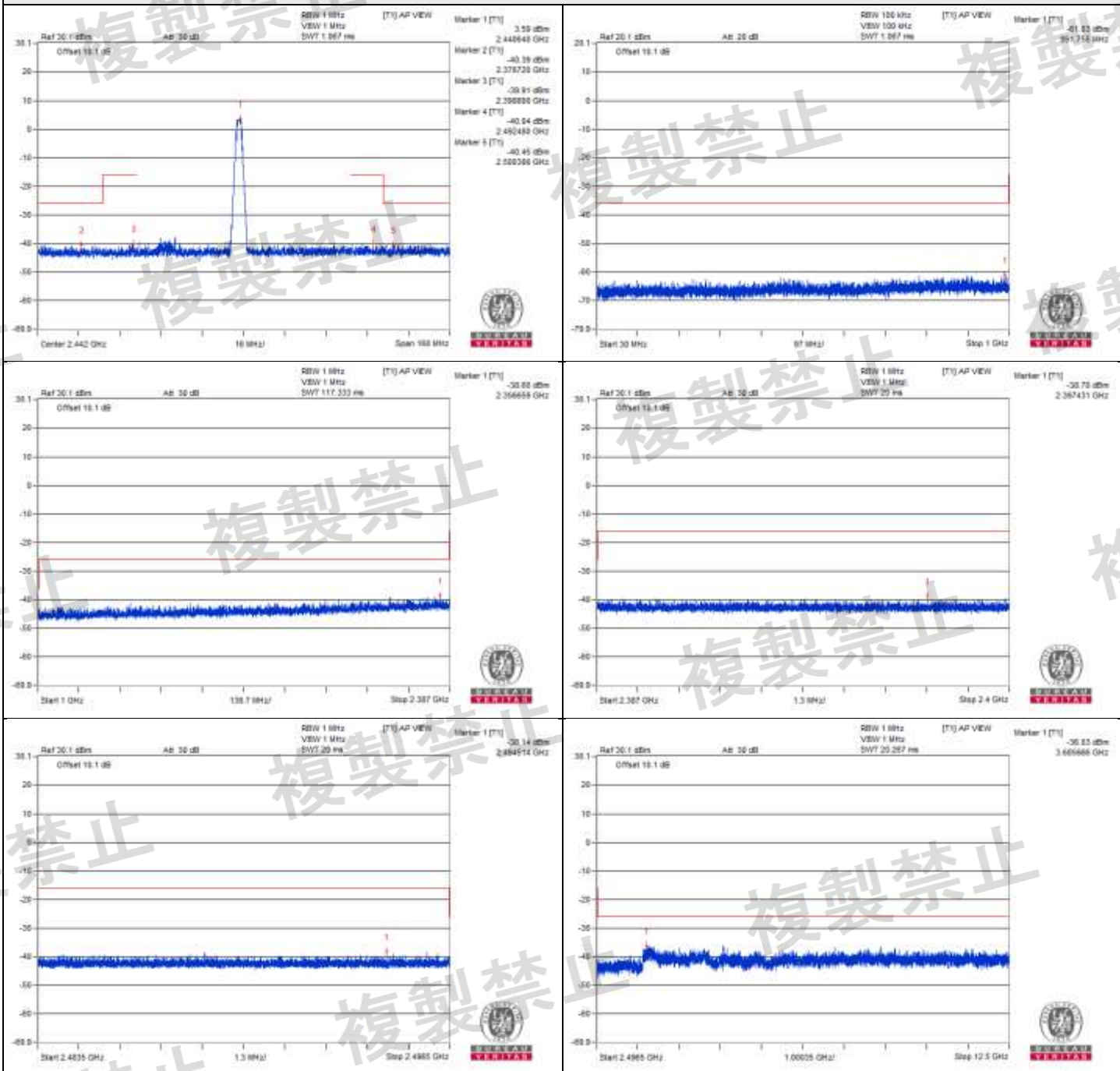
CH 1 (2404 MHz)

Vnormal



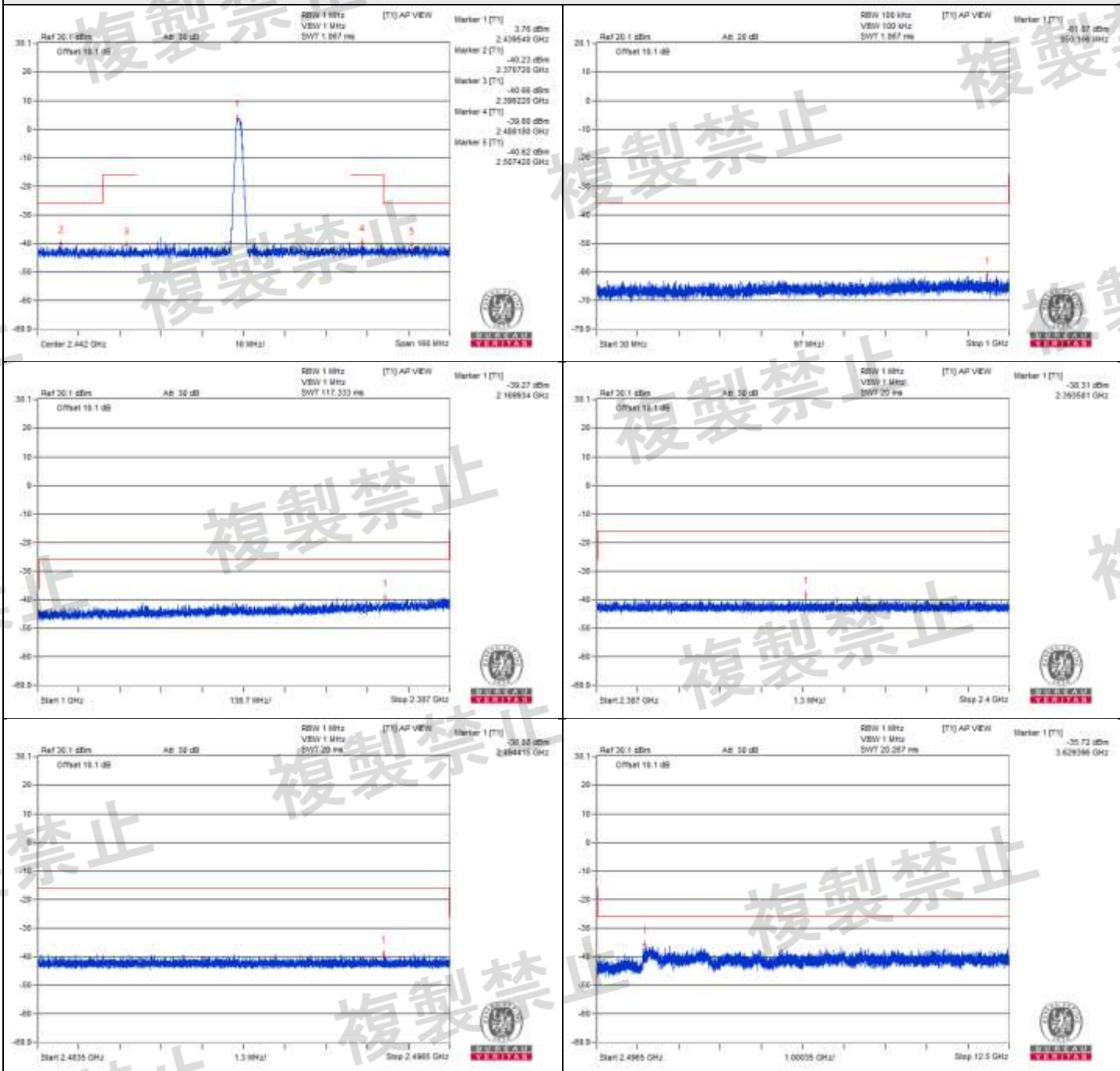
CH 19 (2440 MHz)

V_{max}.



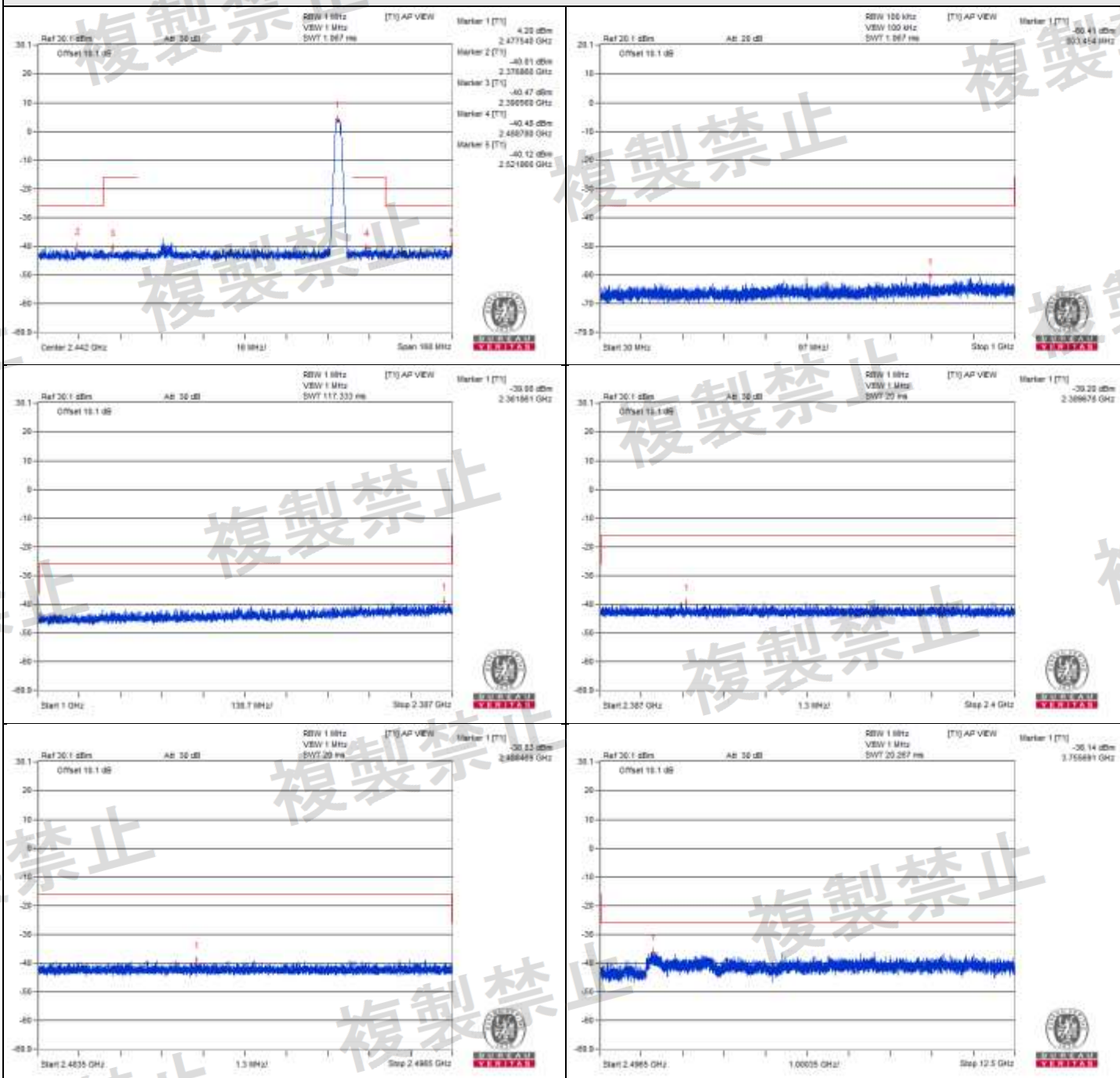
CH 19 (2440 MHz)

V_{min}.



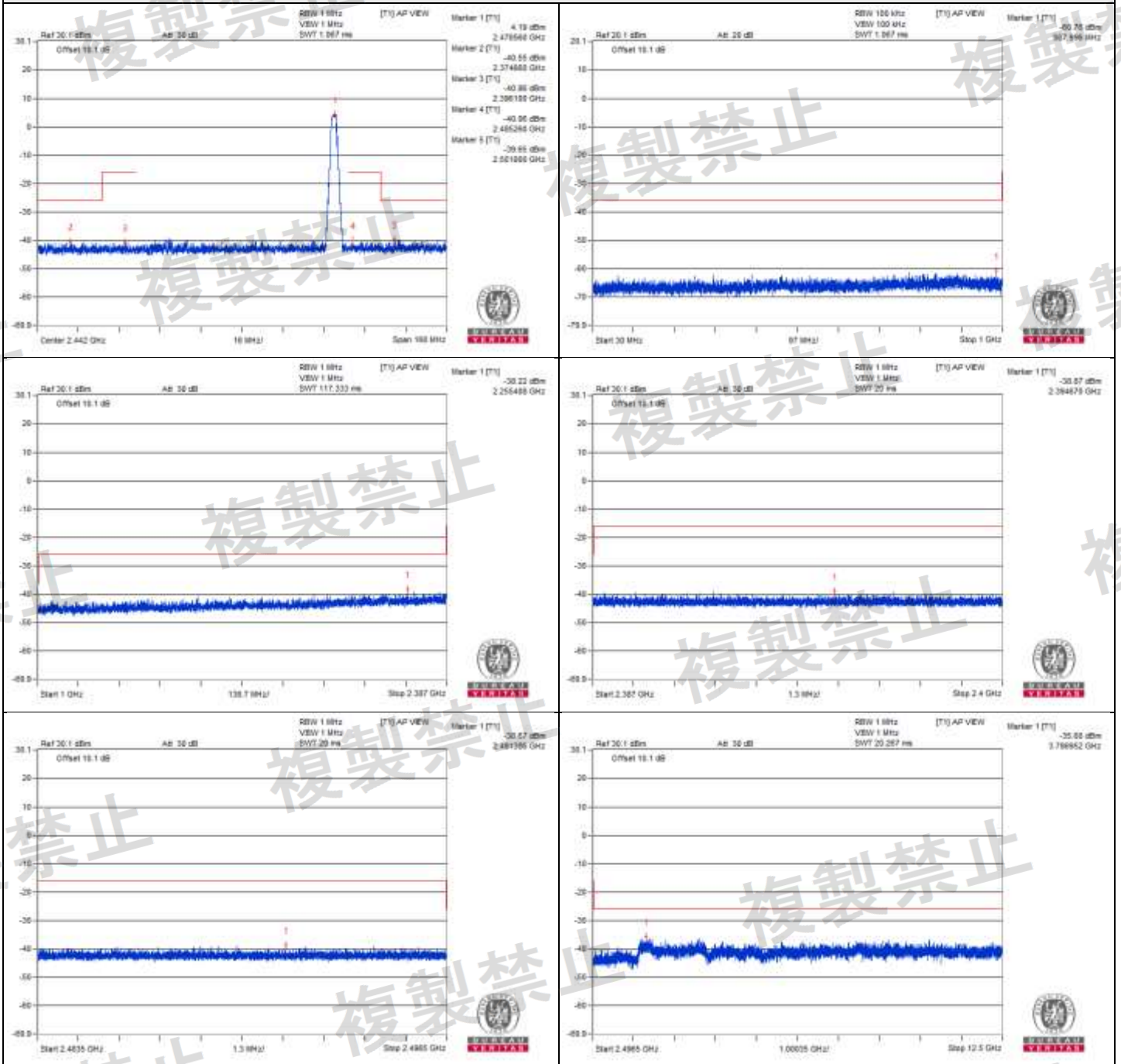
CH 19 (2440 MHz)

Vnormal



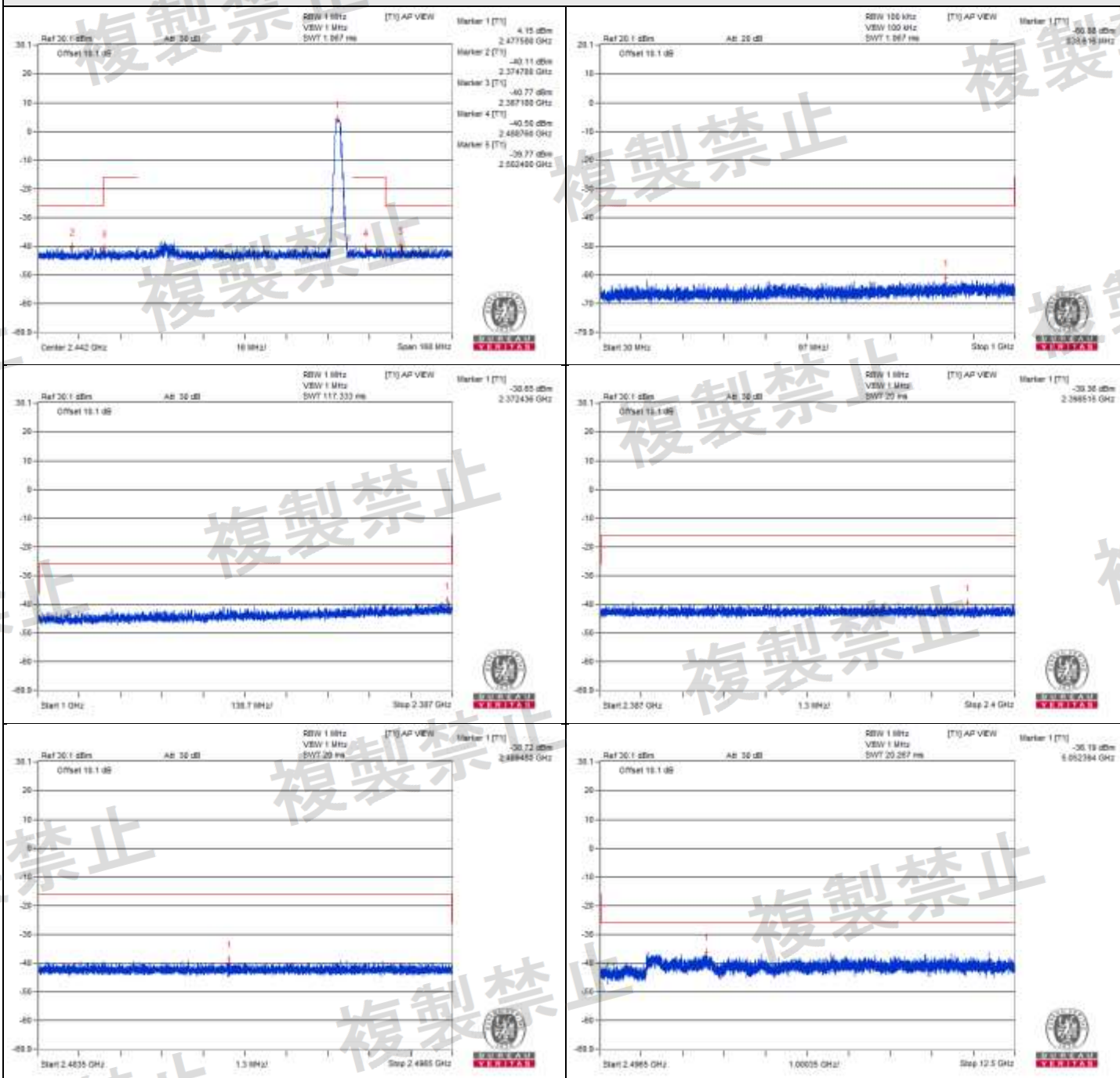
CH 38 (2478 MHz)

V_{max}.



CH 38 (2478 MHz)

V_{min}.



CH 38 (2478 MHz)

7.4 Spurious Emissions of Receiver

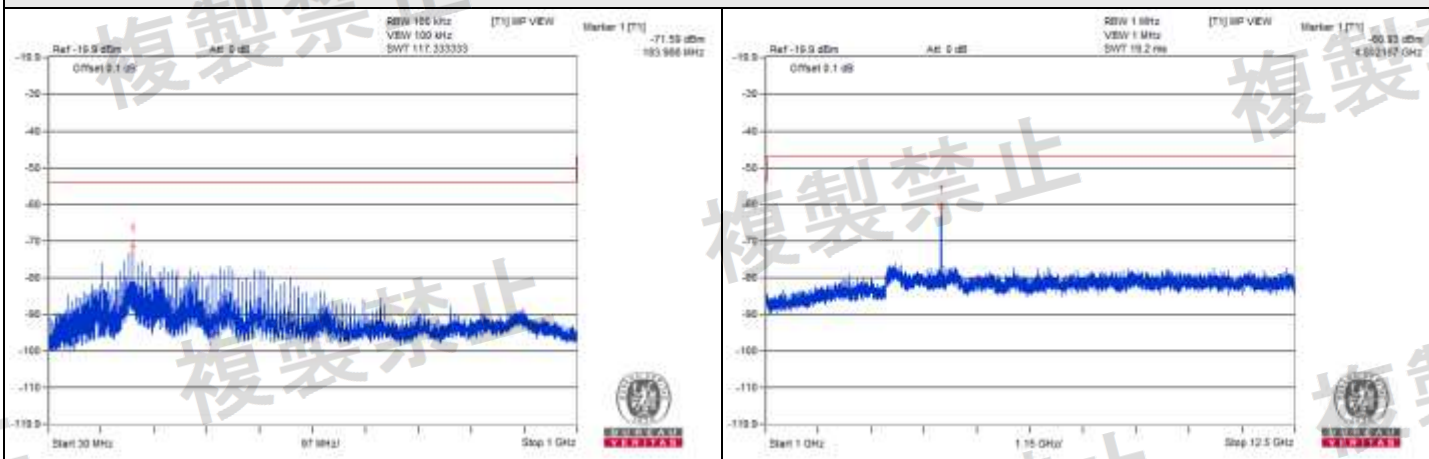
Environmental Conditions:	22°C, 55% RH	Tested By:	Kevin Ko
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BT-LE 1M

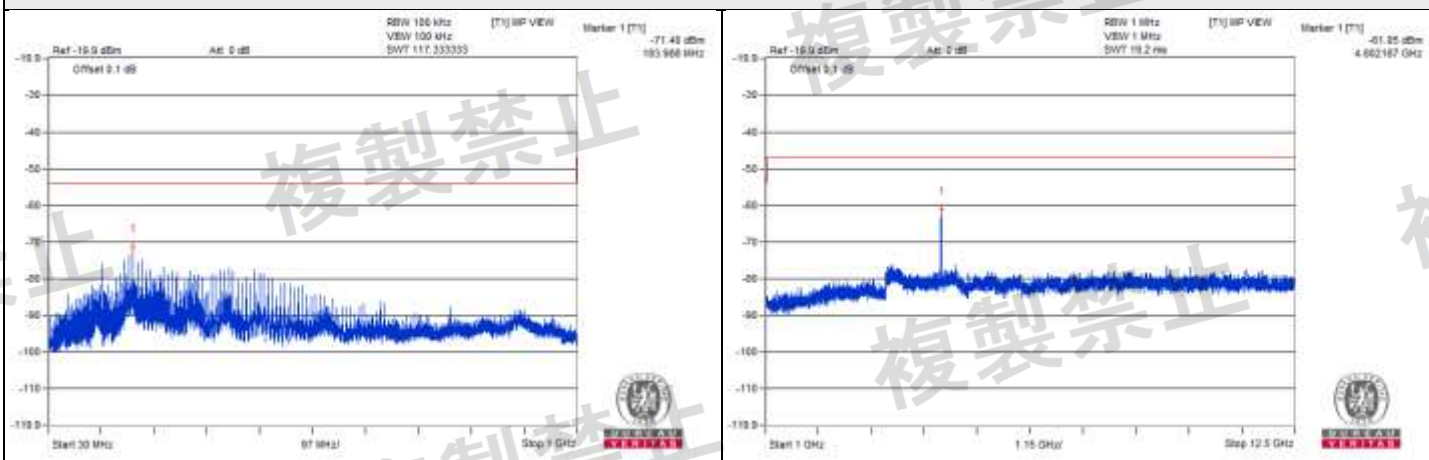
TEST CHANNEL		CH 0 (2402 MHz)			
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASUREMENT VALUE(nW)	LIMIT (nW)	RESULT
V_{normal}	30.0 to 1000.0	183.988	0.069343	4	PASS
	1000.0 to 12500.0	4802.187	0.807235	20	PASS
$V_{max.}$	30.0 to 1000.0	183.988	0.072444	4	PASS
	1000.0 to 12500.0	4802.187	0.785236	20	PASS
$V_{min.}$	30.0 to 1000.0	183.988	0.062806	4	PASS
	1000.0 to 12500.0	4802.187	0.801678	20	PASS
TEST CHANNEL		CH 19 (2440 MHz)			
V_{normal}	30.0 to 1000.0	183.988	0.065615	4	PASS
	1000.0 to 12500.0	4878.375	0.466659	20	PASS
$V_{max.}$	30.0 to 1000.0	183.988	0.062806	4	PASS
	1000.0 to 12500.0	4878.375	0.414	20	PASS
$V_{min.}$	30.0 to 1000.0	183.988	0.068391	4	PASS
	1000.0 to 12500.0	4878.375	0.419759	20	PASS
TEST CHANNEL		CH 39 (2480 MHz)			
V_{normal}	30.0 to 1000.0	183.988	0.068391	4	PASS
	1000.0 to 12500.0	4957.437	0.383707	20	PASS
$V_{max.}$	30.0 to 1000.0	183.988	0.069024	4	PASS
	1000.0 to 12500.0	4958.875	0.396278	20	PASS
$V_{min.}$	30.0 to 1000.0	183.988	0.066681	4	PASS
	1000.0 to 12500.0	4957.437	0.389942	20	PASS

NOTE: 1. The spectrum plots are attached on the following pages.

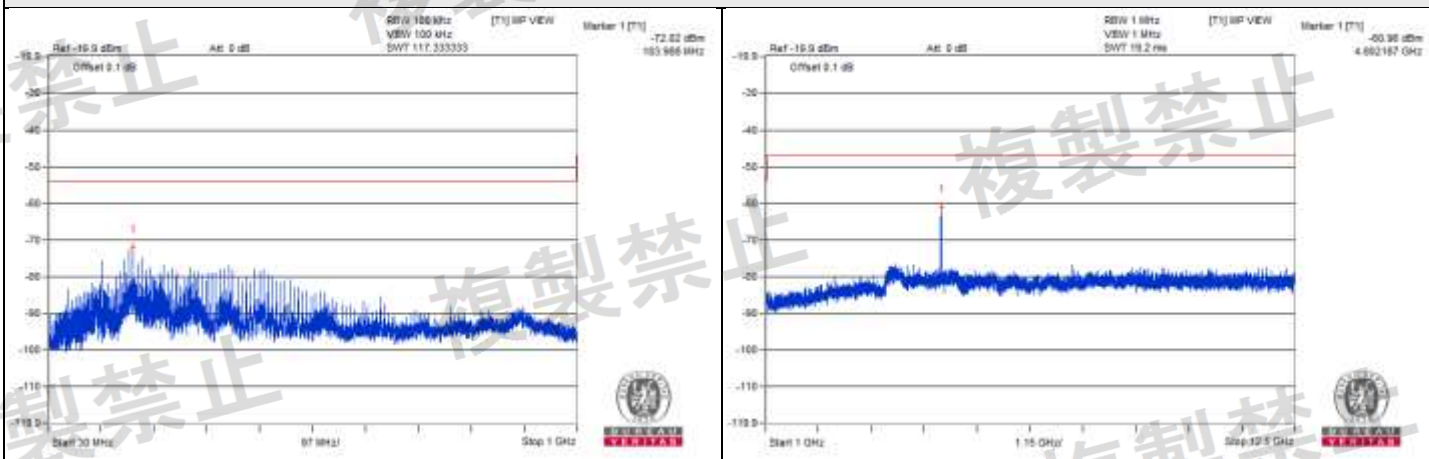
V_{normal}



V_{max}

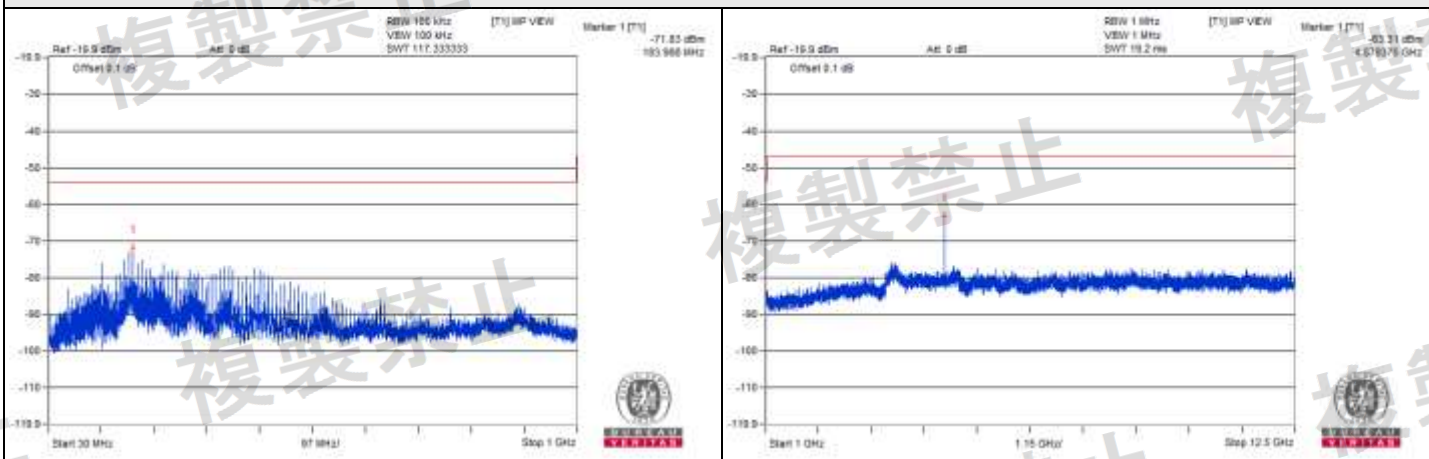


V_{min}

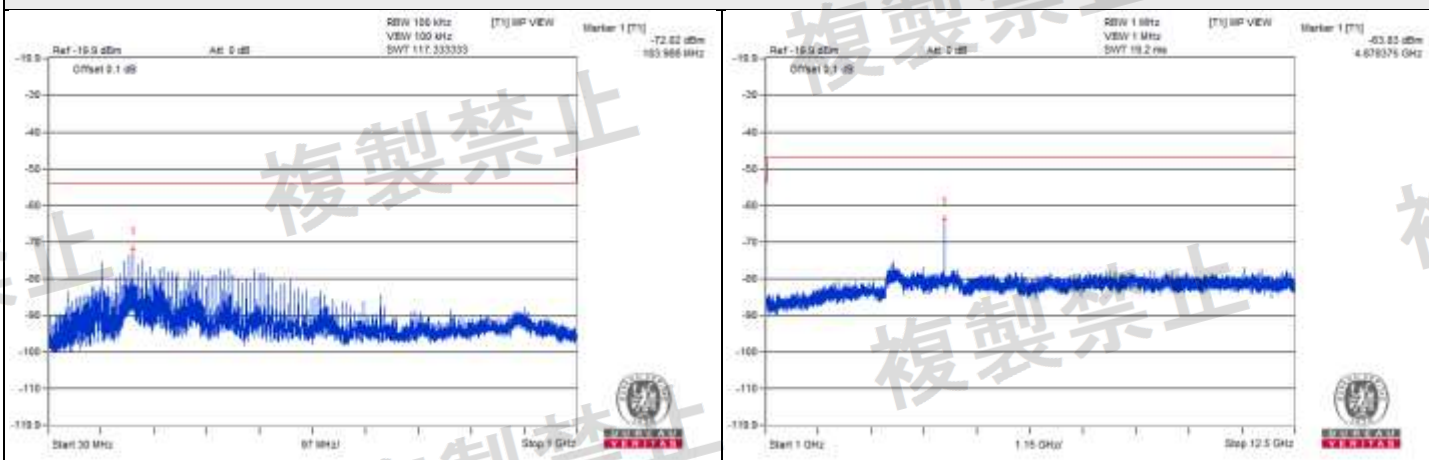


CH 0 (2402 MHz)

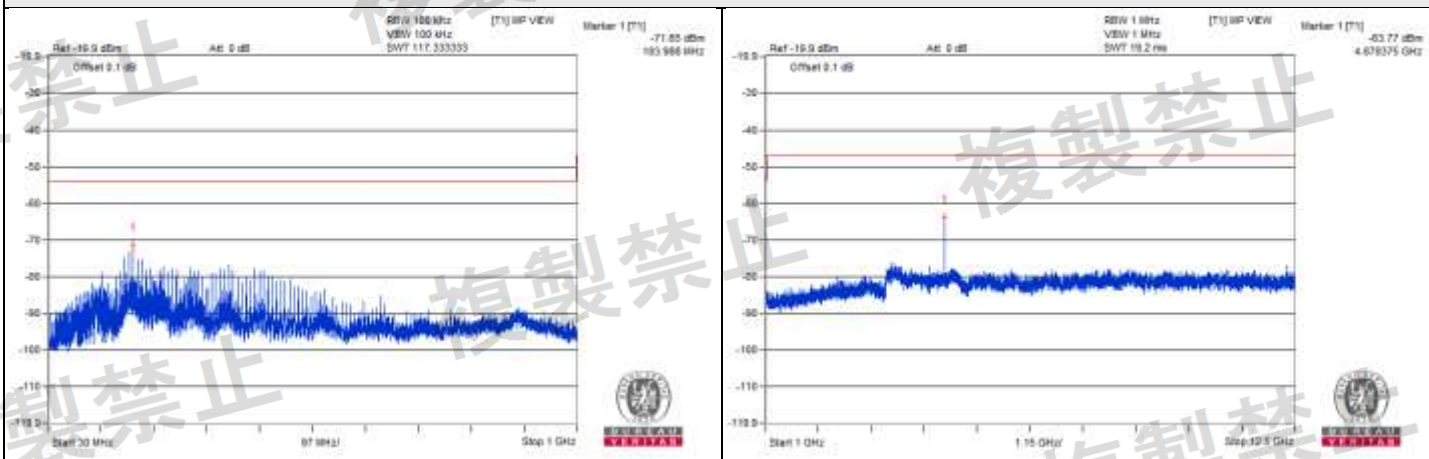
V_{normal}



V_{max}

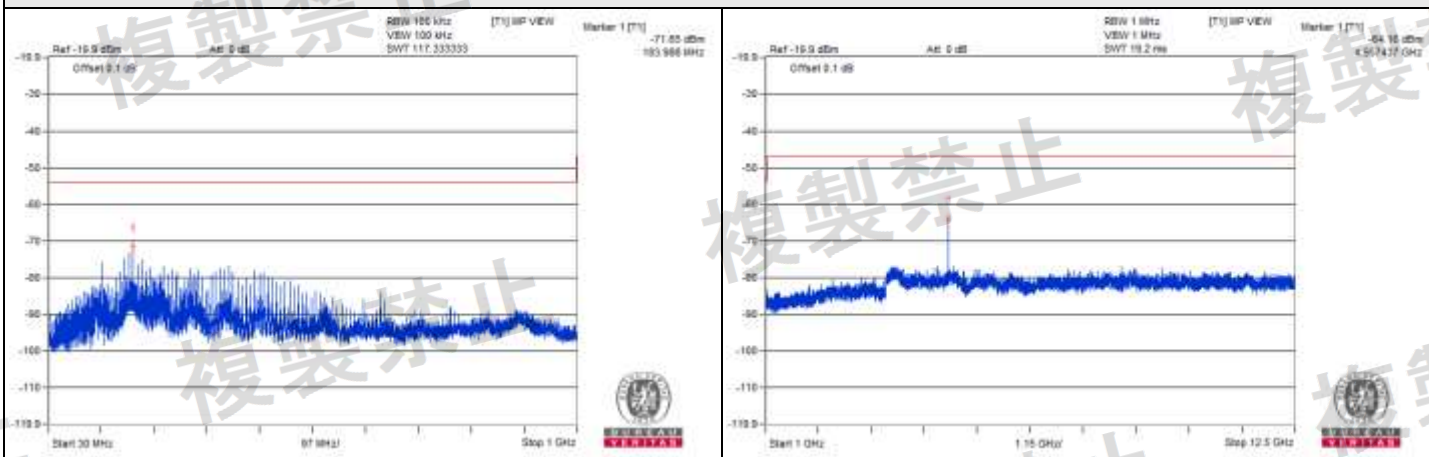


V_{min}

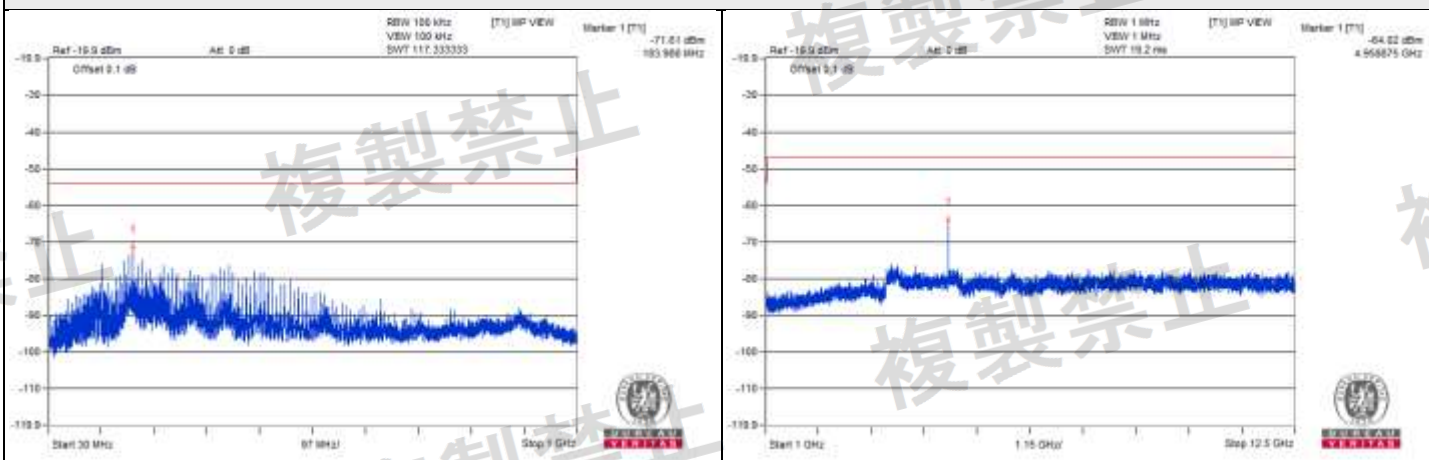


CH 19 (2440 MHz)

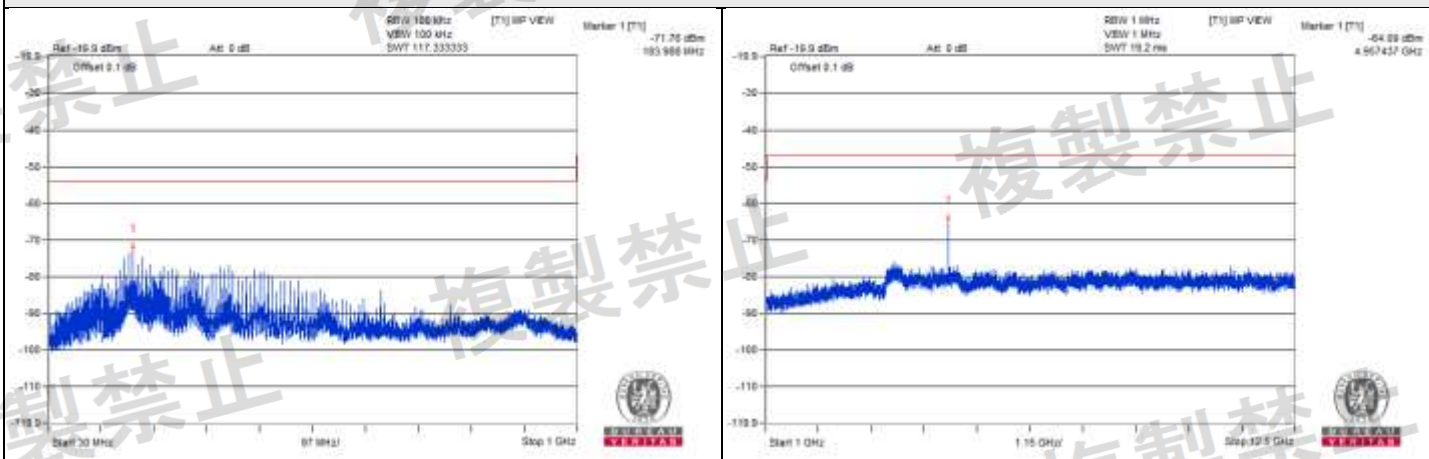
V_{normal}



V_{max}



V_{min}



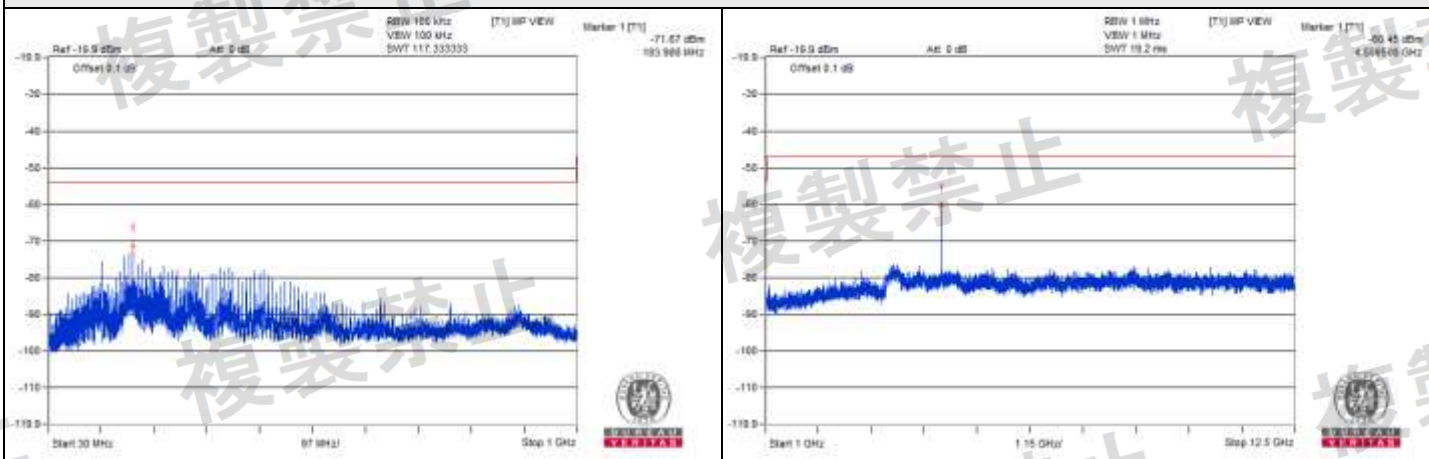
CH 39 (2480 MHz)

BT-LE 2M

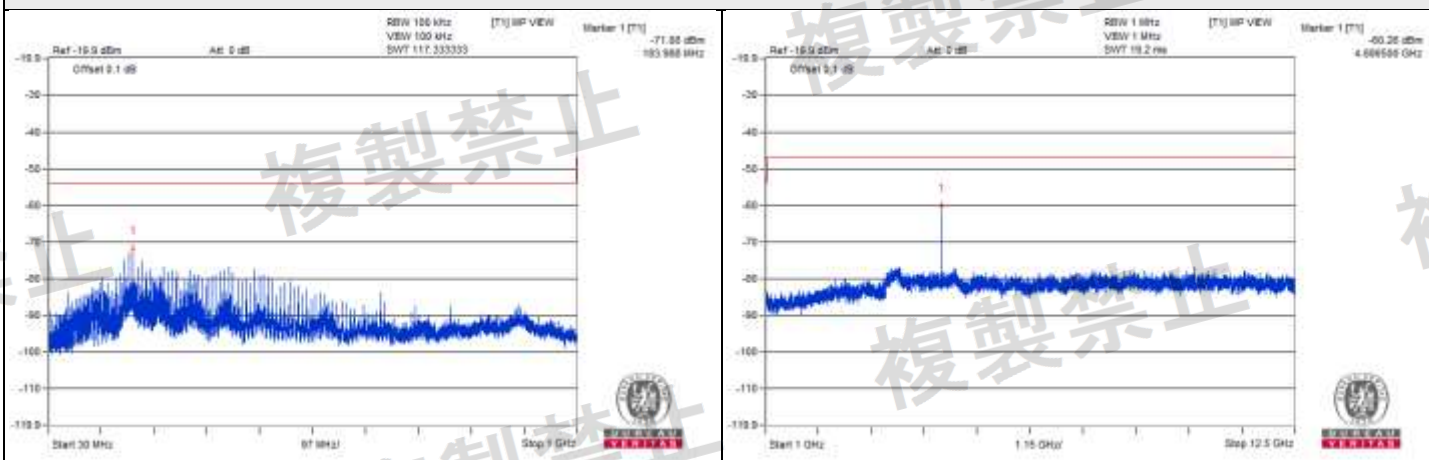
TEST CHANNEL		CH 1 (2404 MHz)			
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASUREMENT VALUE(nW)	LIMIT (nW)	RESULT
V_{normal}	30.0 to 1000.0	183.988	0.068077	4	PASS
	1000.0 to 12500.0	4806.500	0.901571	20	PASS
V_{max.}	30.0 to 1000.0	183.988	0.066069	4	PASS
	1000.0 to 12500.0	4806.500	0.94189	20	PASS
V_{min.}	30.0 to 1000.0	183.988	0.066527	4	PASS
	1000.0 to 12500.0	4806.500	0.901571	20	PASS
TEST CHANNEL		CH 19 (2440 MHz)			
V_{normal}	30.0 to 1000.0	183.988	0.065313	4	PASS
	1000.0 to 12500.0	4878.375	0.454988	20	PASS
V_{max.}	30.0 to 1000.0	183.988	0.065464	4	PASS
	1000.0 to 12500.0	4878.375	0.433511	20	PASS
V_{min.}	30.0 to 1000.0	183.988	0.066834	4	PASS
	1000.0 to 12500.0	4878.375	0.418794	20	PASS
TEST CHANNEL		CH 38 (2478 MHz)			
V_{normal}	30.0 to 1000.0	183.988	0.065766	4	PASS
	1000.0 to 12500.0	4954.562	0.396278	20	PASS
V_{max.}	30.0 to 1000.0	183.988	0.066374	4	PASS
	1000.0 to 12500.0	4954.562	0.362243	20	PASS
V_{min.}	30.0 to 1000.0	183.988	0.067143	4	PASS
	1000.0 to 12500.0	4954.562	0.353183	20	PASS

NOTE: 1. The spectrum plots are attached on the following pages.

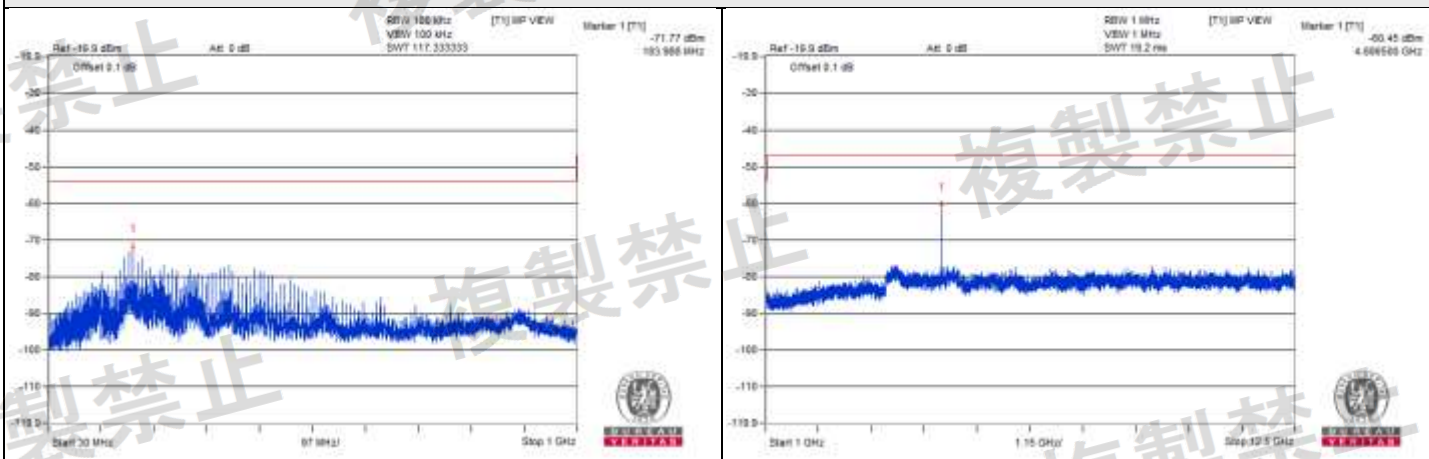
V_{normal}



V_{max}

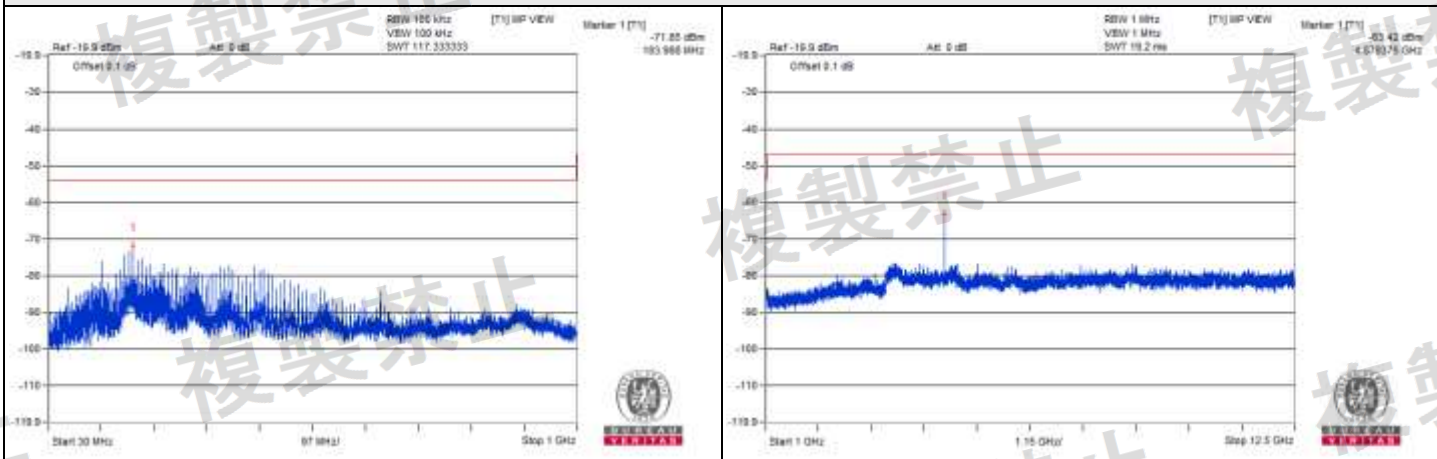


V_{min}

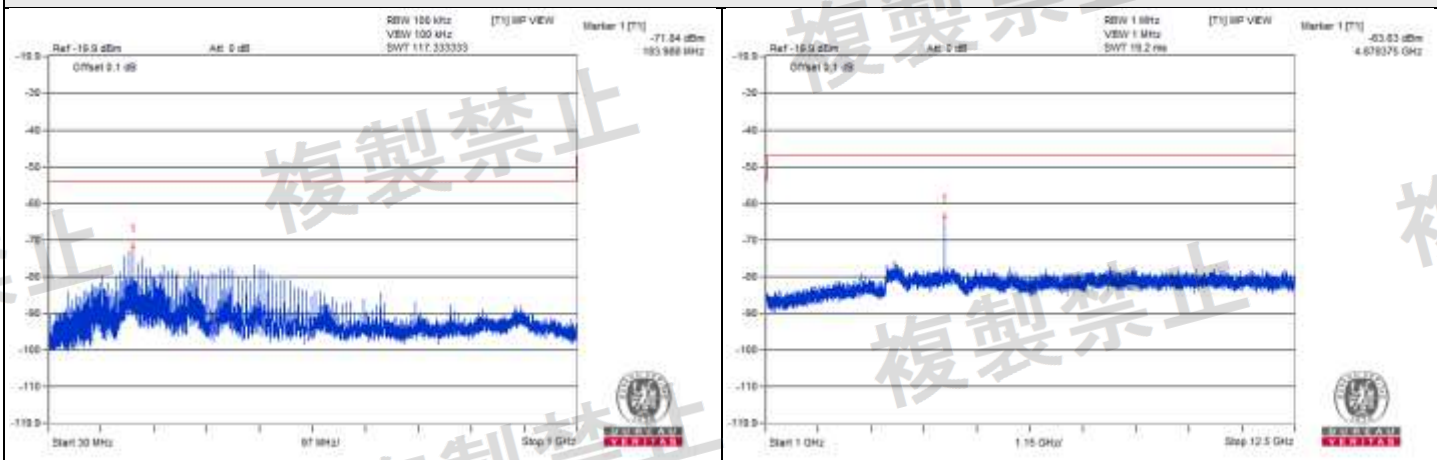


CH 1 (2404 MHz)

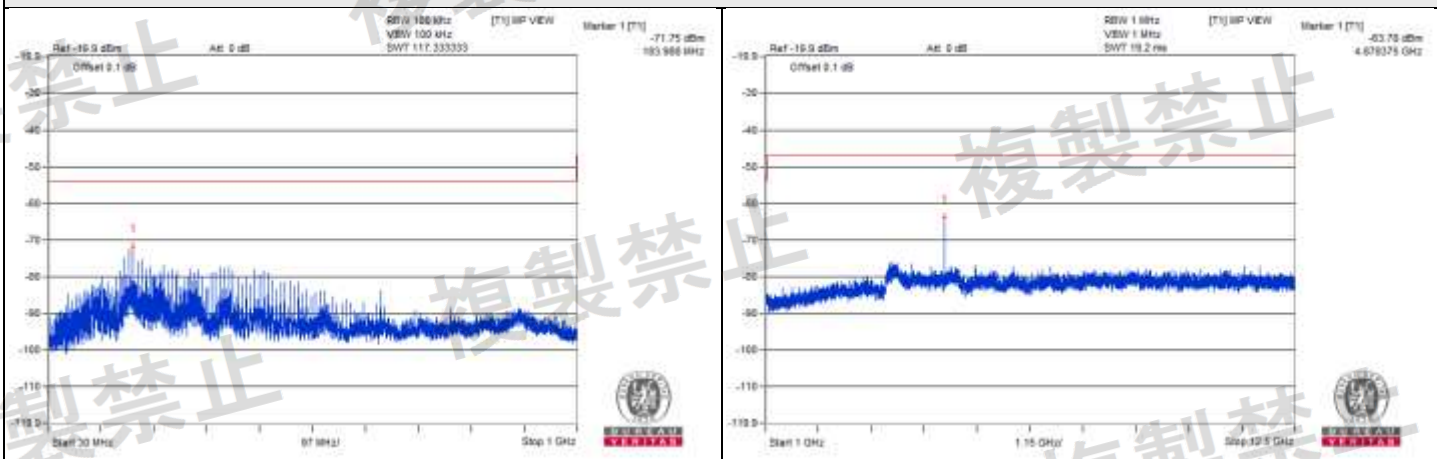
V_{normal}



V_{max}

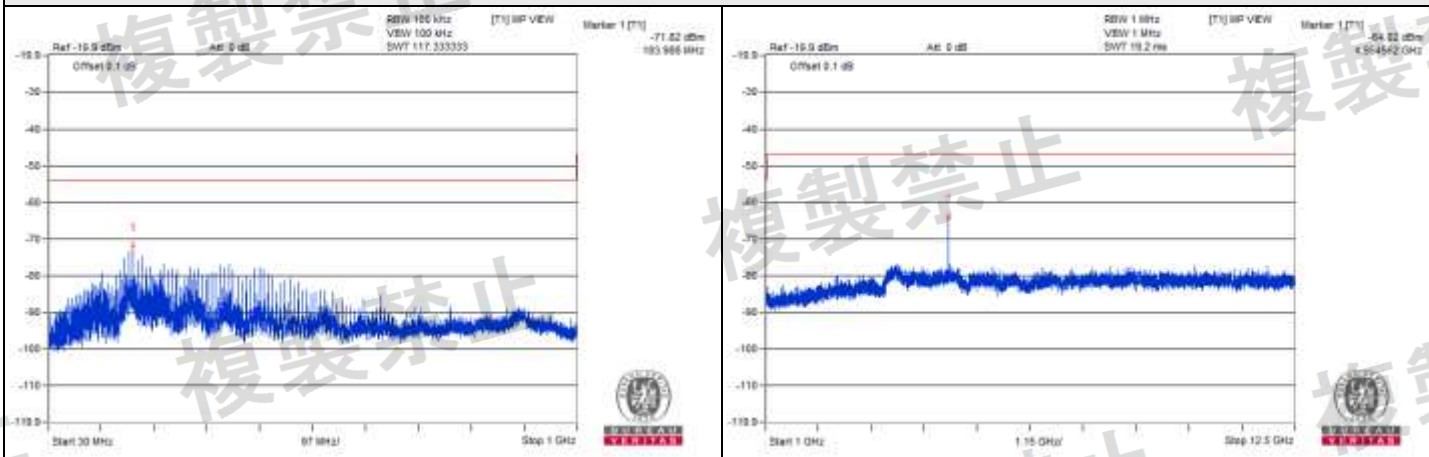


V_{min}

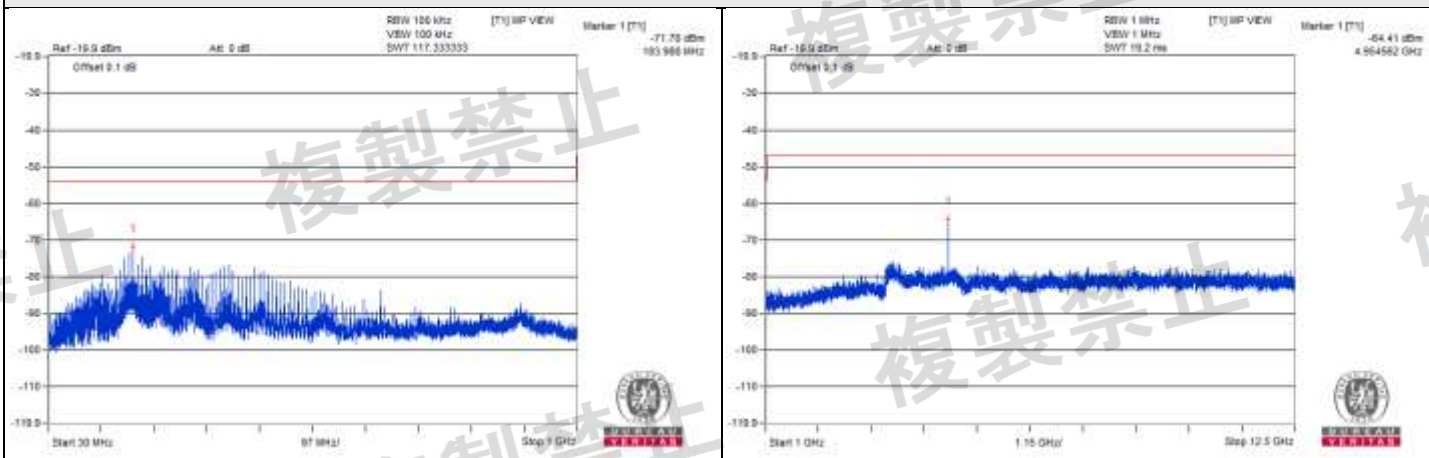


CH 19 (2440 MHz)

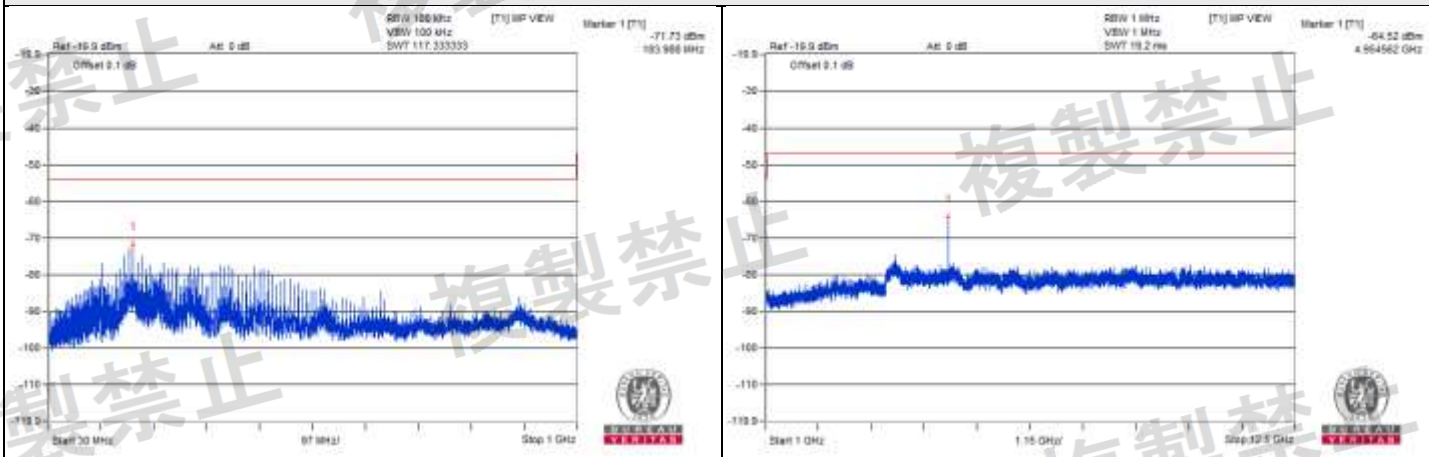
V_{normal}



V_{max}



V_{min}



CH 38 (2478 MHz)

7.5 Antenna Power

Environmental Conditions:	25°C, 60% RH	Tested By:	Kevin Ko
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For BT-LE 1M

Voltage (Vdc)	Channel Number	Frequency (MHz)	Conducted RF Output Power (mW)	Radiated RF Output Power (mW)
3.7	0	2402	1.845	5.821
	19	2440	2.094	5.333
	39	2480	2.371	3.99
4.07	0	2402	1.77	5.584
	19	2440	2.178	5.547
	39	2480	2.432	4.092
3.33	0	2402	1.928	6.083
	19	2440	2.046	5.211
	39	2480	2.275	3.828
Maximum Limit (mW):			10	-
Rated Power (mW):			3	-
Tolerance of Antenna Power (mW):			3.6	-
Maximum EIRP Limit (mW):			-	16.368

Notes:

1. Antenna gain of 2402 MHz is 4.99 dBi.
2. Antenna gain of 2440 MHz is 4.06 dBi.
3. Antenna gain of 2480 MHz is 2.26 dBi.
4. The radiated RF output power is a "calculated" value derived from the conducted value.
5. Formula: Radiated RF output power = Conducted RF output power + Antenna gain

For BT-LE 2M

Voltage (Vdc)	Channel Number	Frequency (MHz)	Conducted RF Output Power (mW)	Radiated RF Output Power (mW)
3.7	1	2404	1.854	5.849
	19	2440	2.094	5.333
	38	2478	2.36	3.971
4.07	1	2404	1.828	5.767
	19	2440	2.089	5.32
	38	2478	2.382	4.008
3.33	1	2404	1.824	5.755
	19	2440	2.023	5.152
	38	2478	2.455	4.131
Maximum Limit (mW):			10	-
Rated Power (mW):			3	-
Tolerance of Antenna Power (mW):			3.6	-
Maximum EIRP Limit (mW):			-	16.368

Notes:

1. Antenna gain of 2404 MHz is 4.99 dBi.
2. Antenna gain of 2440 MHz is 4.06 dBi.
3. Antenna gain of 2478 MHz is 2.26 dBi.
4. The radiated RF output power is a "calculated" value derived from the conducted value.
5. Formula: Radiated RF output power = Conducted RF output power + Antenna gain

7.6 Interference Prevention Function

Environmental Conditions:	25°C, 60% RH	Tested By:	Kevin Ko
Link Mode		Test Result	
BT-LE		Pass	

8 Pictures of Test Arrangements



9 Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

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The address and road map of all our labs can be found in our web site also.

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