

TEST REPORT

CERTIFICATE OF CONFORMITY

Standard: Certification Ordinance Article 2-1-19
Report No.: RJBEMI-WTW-P22010621B-3
Product: Electronic Display Device
Brand: Rakuten kobo
Model No.: N506
Received Date: 2022/9/6
Test Date: 2022/10/7
Issued Date: 2022/11/3
Applicant: NETRONIX, INC.
Address: No 945, Boai St, Jubei City, Hsinchu, 30265 Taiwan
Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Hsin Chu Laboratory
Lab Address: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
Test Location: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan

Approved by: _____

May Chen / Manager

, Date: _____

2022/11/3

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Prepared by : Luna Yu / Specialist



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Release Control Record

Issue No.	Description	Date Issued
RJBEMI-WTW-P22010621B-3	Original release.	2022/11/3

1 Certificate

Product: Electronic Display Device

Brand: Rakuten kobo

Test Model: N506

Sample Status: Engineering sample

Applicant: NETRONIX, INC.

Test Date: 2022/10/7

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 7. Annex 3.26 Notice 88 -Appendix 43 - 5	Spurious Emissions	Pass
OR: Article 49-20	Antenna Specifications	Pass
OR: Article 24.2 Notice 88 -Appendix 43 - 7	Spurious Emissions of Receiver	Pass
OR: Article 49-20	Housing Requirements	Pass
OR: Article 49-20	Communication Method	Pass
OR: Article 49-20	Modulation Mehtod	Pass
OR: Article 49-20 Notice 88 -Appendix 43 - 11	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 Notice 88 -Appendix 43 - 13	Dwell Time (FH employed)	N/A
OR: Article 49-20 Notice 88 -Appendix 43 - 8	Carrier Sense Capability	N/A

Notes:

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

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:

Parameter	Uncertainty (±)
Occupied Bandwidth	960 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	Electronic Display Device
Brand	Rakuten kobo
Test Model	N506
Test Software Version	Run Tera Term Ver 4.77.0.0
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
Operating Frequency	2.402 ~ 2.480 GHz
Number of Channel	40
Assembly	The EUT is constructed as an Electronic Display Device. 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 Device	NA
Cable Supplied	USB cable x1 (Shielded, 1m)

Note:

1. This is a supplementary report of Report No.: RJBEMI-WTW-P22010621A-3. The differences between them are as below information:

◆ Change DRAM LP-DDR2

Original	
Brand	Model No.
MK FOUNDER	MKM04SL04TD2-TN
Newly	
Brand	Model No.
NANYA	NT6TL128M32BQ-G0

2. According to above conditions, only spurious emissions (below 1GHz) to be performed. And all data are verified to meet the requirements.
3. For input voltage of EUT, the worse case was found at the voltage 5 Vdc condition. Therefore only the test data of the mode was recorded in this report individually.
4. There are WLAN and Bluetooth technology used for the EUT.
5. Simultaneously transmission condition.

Condition	Technology	
1	WLAN 2.4GHz	Bluetooth
2	WLAN 5GHz	Bluetooth

6. The EUT must be supplied battery as following table:

No.	Brand	Model No.	Spec.
1	EVE Energy CO., LTD	PR-284983N	DC Output: 3.7V, 1500mAH, 5.25Wh

7. The EUT could be supplied with MicroSD card and following different models could be chosen:

No.	Model	Remark
1	SDSDQAB-016G	1st source MicroSD
2	SDSDQAB-032G-1	2 nd source MicroSD

Note: In the original report, from the above models, the worst case were found in **Model: SDSDQAB-016G**. Therefore only the test data of the mode was recorded in this report.

8. The EUT could be supplied with USB cable as following table:

Brand	Material	Model	Signal Line
Yih Fone	PVC	SH-0422	Shielded : Y , 1.0M , Core: N/A
Yih Fone	TPE	SH-0418	

9. 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	2.748	3.155
BT-LE 2M	3	2.742	3.148

3.3 Antenna Description of EUT

1. The antenna information is listed as below.

Brand	Model	Antenna Gain (dBi)	Frequency Range (GHz)	Antenna Type	Connector Type	Cable Length (mm)
INPAQ	ACM3-3216-P1-CC-S	0.6	2.4~2.4835	Chip Ant.	NA	NA
		2	5.15~5.85			

* 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

40 channels are provided for BT-LE:

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

3.5 Power Setting

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

3.6 Test Mode Applicability and Tested Channel Detail

Test Conditions	Voltage (Vdc)
V_{normal}	5
$V_{max. (+10\%)}$	5.5
$V_{min. (-10\%)}$	4.5

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

Test Item	Mode	Tested Channel	Modulation	Data Rate Parameter
Spurious Emissions	BT-LE 1M	0, 19, 39	GFSK	1Mb/s
	BT-LE 2M	0, 19, 39	GFSK	2Mb/s
Spurious Emissions of Receiver	BT-LE 1M	0, 19, 39	-	-
	BT-LE 2M	0, 19, 39	-	-

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 Spurious Emissions

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until	Calibration Authority	Calibration Method
Attenuator WOKEN	MDCS18N-10	MDCS18N-10-01	2022/4/5	2023/4/4	BV CPS E&E	(d)
DC POWER SUPPLY Topward	6603D	795558	Note 2	Note 2	BV CPS E&E	(d)
Software	ADT_RF Test Software V6.6.5.4	N/A	N/A	N/A	N/A	N/A
Spectrum Analyzer R&S	FSV40	101516	2022/3/7	2023/3/6	ETC	(c)
True RMS Clamp Meter Fluke	325	31130711WS	2022/6/9	2023/6/8	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 digital multimeter to verify before each testing.
- The test was performed in Oven room 2.
- Tested Date: 2022/10/7

4.2 Spurious Emissions of Receiver

Refer to section 4.1 to get information of the instruments.

5 Limits of Test Items

5.1 Spurious Emissions

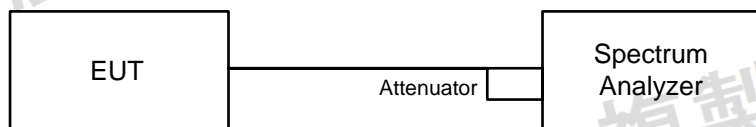
Frequencies (MHz)	Limit
Operating frequency 2400 to 2483.5 MHz	
30.0 MHz to 1000.0 MHz	$\leq 0.25 \mu\text{W}/100 \text{ kHz}$
1000.0 MHz to 2387 MHz	$\leq 2.5 \mu\text{W}/\text{MHz}$
2387.0 MHz to 2400.0 MHz	$\leq 25 \mu\text{W}/\text{MHz}$
2483.5 MHz to 2496.5 MHz	$\leq 25 \mu\text{W}/\text{MHz}$
2496.5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

5.2 Spurious Emissions of Receiver

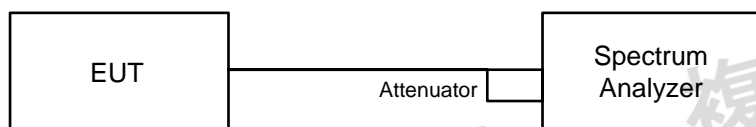
Frequencies (GHz)	Limit
Below 1 GHz	$\leq 4 \text{ nW}/100 \text{ kHz} (-54 \text{ dBm})$
Above 1 GHz	$\leq 20 \text{ nW}/\text{MHz} (-47 \text{ dBm})$

6 Test Arrangements

6.1 Spurious Emissions



6.2 Spurious Emissions of Receiver



7 Test Results of Test Item

7.1 Spurious Emissions

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

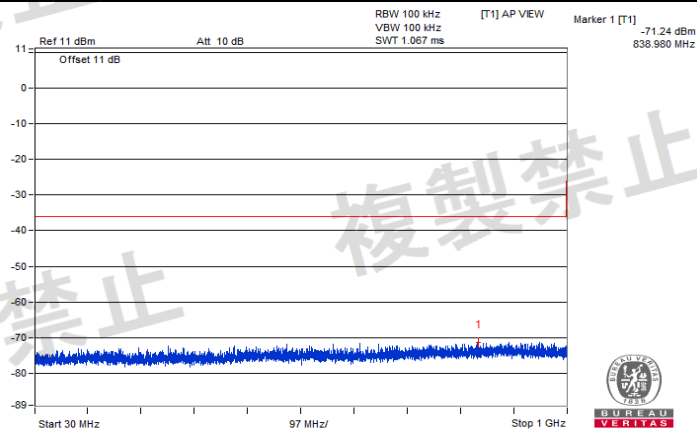
TEST CHANNEL		CH 0 (2402MHz)			
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASURE. VALUE(uW)	LIMIT (uW)	RESULT
V _{normal}	30MHz to 1000MHz	838.980	0.000075	0.25	PASS
V _{max.}	30MHz to 1000MHz	998.181	0.000079	0.25	PASS
V _{min.}	30MHz to 1000MHz	903.485	0.000082	0.25	PASS
TEST CHANNEL		CH 19 (2440MHz)			
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASURE. VALUE(uW)	LIMIT (uW)	RESULT
V _{normal}	30MHz to 1000MHz	757.863	0.000104	0.25	PASS
V _{max.}	30MHz to 1000MHz	978.053	0.000084	0.25	PASS
V _{min.}	30MHz to 1000MHz	907.486	0.000077	0.25	PASS
TEST CHANNEL		CH 39 (2480MHz)			
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASURE. VALUE(uW)	LIMIT (uW)	RESULT
V _{normal}	30MHz to 1000MHz	899.968	0.000083	0.25	PASS
V _{max.}	30MHz to 1000MHz	780.658	0.000087	0.25	PASS
V _{min.}	30MHz to 1000MHz	853.287	0.000087	0.25	PASS

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



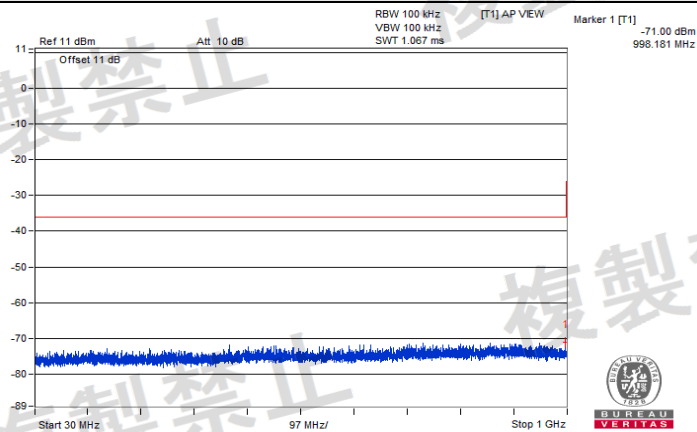
BUREAU
VERITAS

V_{normal}



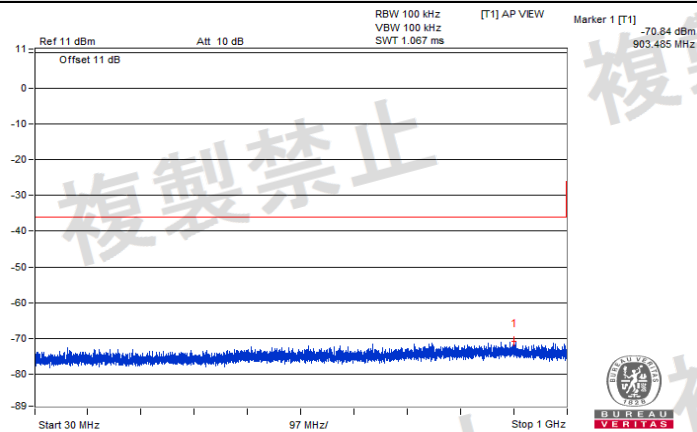
CH 0 (2402MHz)

V_{max}



CH 0 (2402MHz)

V_{min}

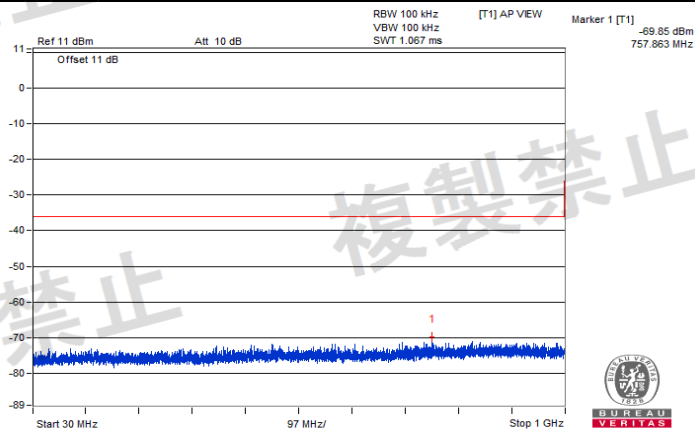


CH 0 (2402MHz)



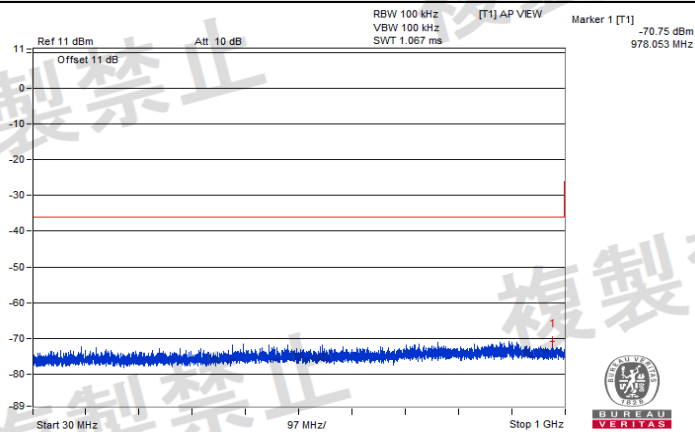
BUREAU
VERITAS

V_{normal}



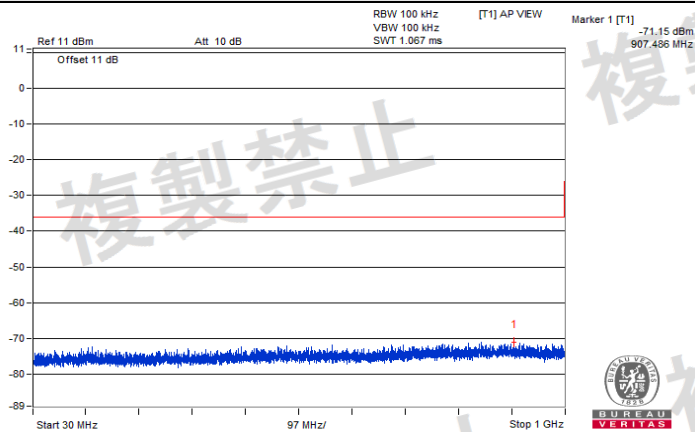
CH 19 (2440MHz)

V_{max}

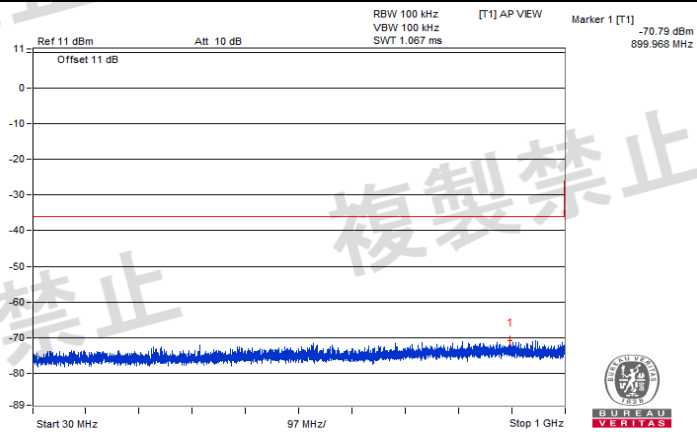


CH 19 (2440MHz)

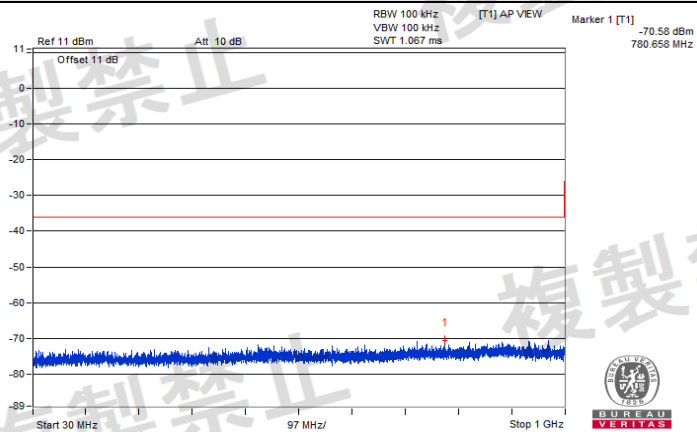
V_{min}



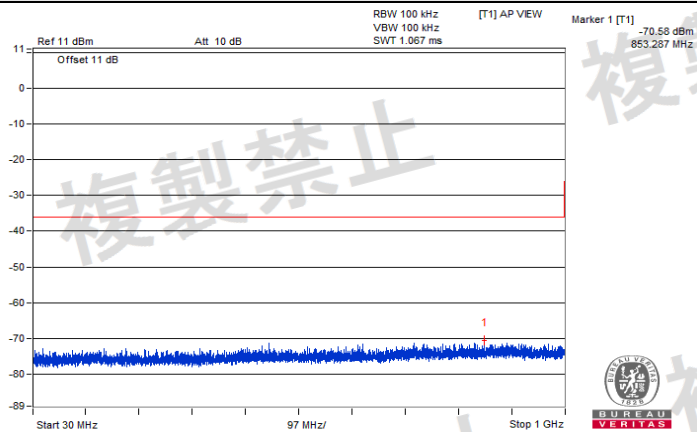
CH 19 (2440MHz)

V_{normal}

CH 39 (2480MHz)

V_{max}

CH 39 (2480MHz)

V_{min}

CH 39 (2480MHz)

BT-LE 2M

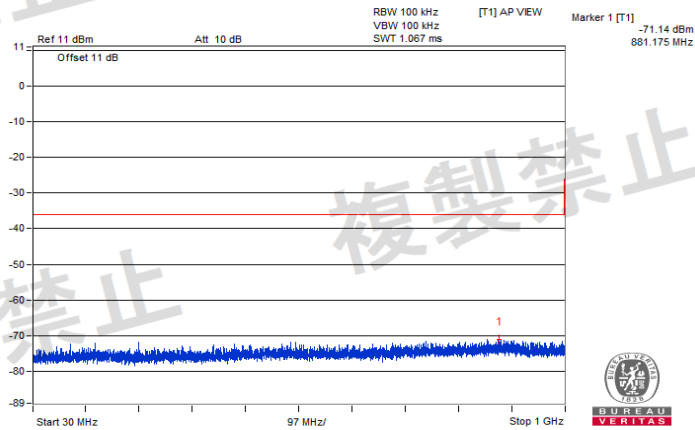
TEST CHANNEL		CH 0 (2402MHz)			
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASURE. VALUE(uW)	LIMIT (uW)	RESULT
V _{normal}	30MHz to 1000MHz	881.175	0.000077	0.25	PASS
V _{max.}	30MHz to 1000MHz	896.452	0.000094	0.25	PASS
V _{min.}	30MHz to 1000MHz	812.911	0.000095	0.25	PASS
TEST CHANNEL		CH 19 (2440MHz)			
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASURE. VALUE(uW)	LIMIT (uW)	RESULT
V _{normal}	30MHz to 1000MHz	867.352	0.000085	0.25	PASS
V _{max.}	30MHz to 1000MHz	808.546	0.000085	0.25	PASS
V _{min.}	30MHz to 1000MHz	891.845	0.000095	0.25	PASS
TEST CHANNEL		CH 39 (2480MHz)			
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASURE. VALUE(uW)	LIMIT (uW)	RESULT
V _{normal}	30MHz to 1000MHz	842.132	0.000105	0.25	PASS
V _{max.}	30MHz to 1000MHz	881.538	0.000084	0.25	PASS
V _{min.}	30MHz to 1000MHz	884.448	0.000097	0.25	PASS

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



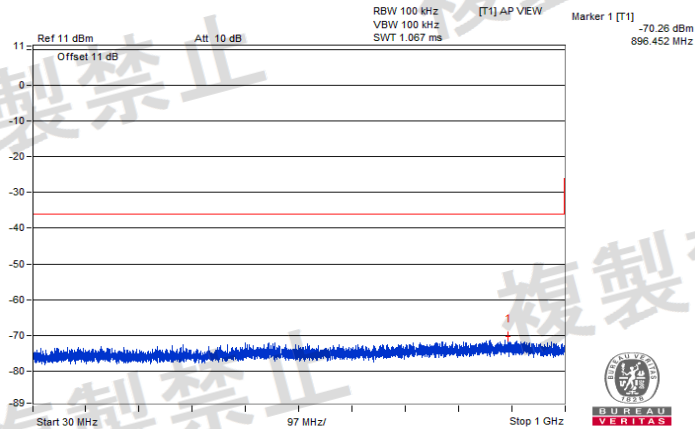
BUREAU
VERITAS

V_{normal}



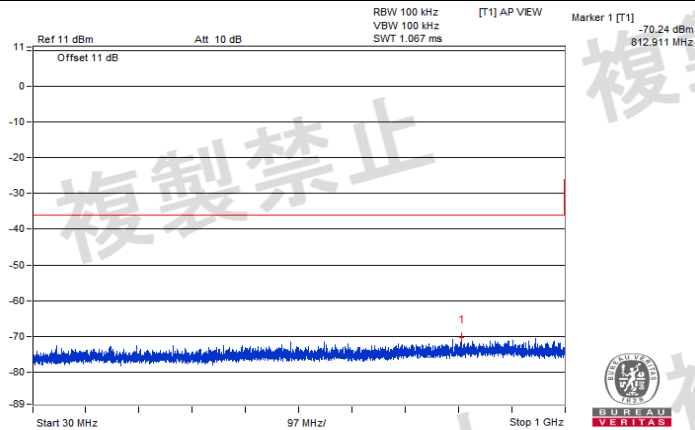
CH 0 (2402MHz)

V_{max}



CH 0 (2402MHz)

V_{min}

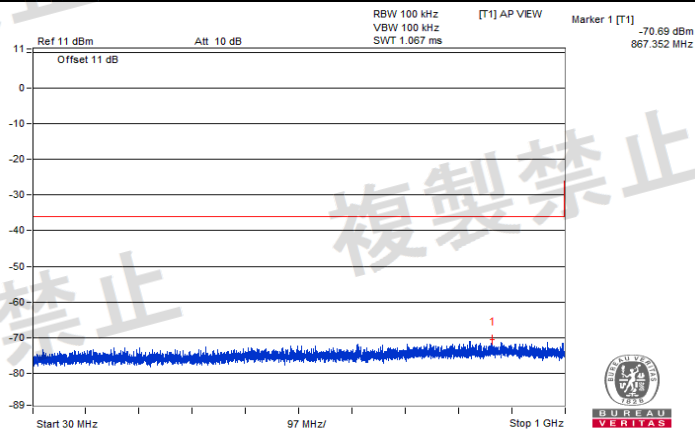


CH 0 (2402MHz)



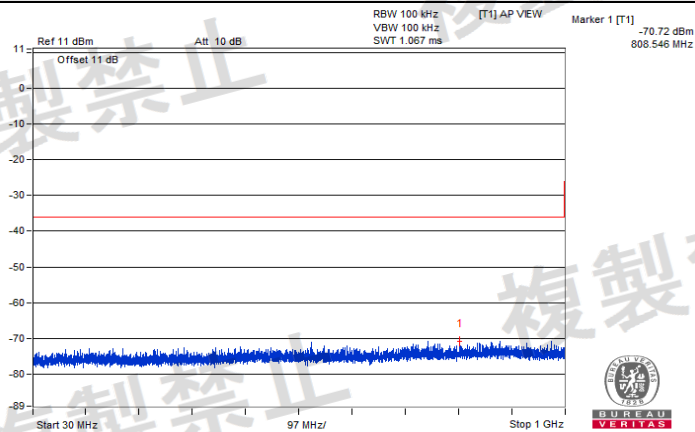
BUREAU
VERITAS

V_{normal}



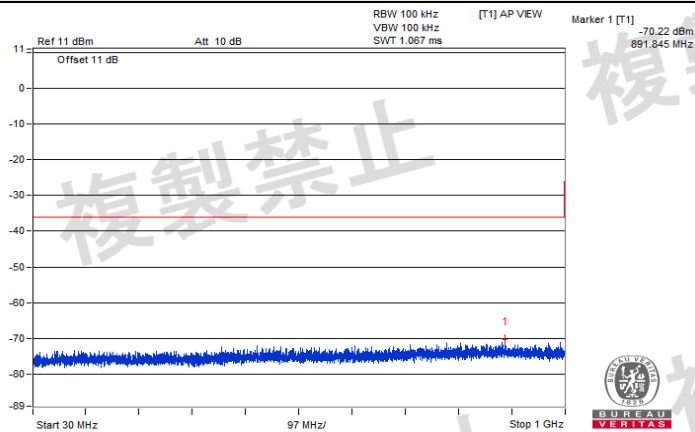
CH 19 (2440MHz)

V_{max}



CH 19 (2440MHz)

V_{min}

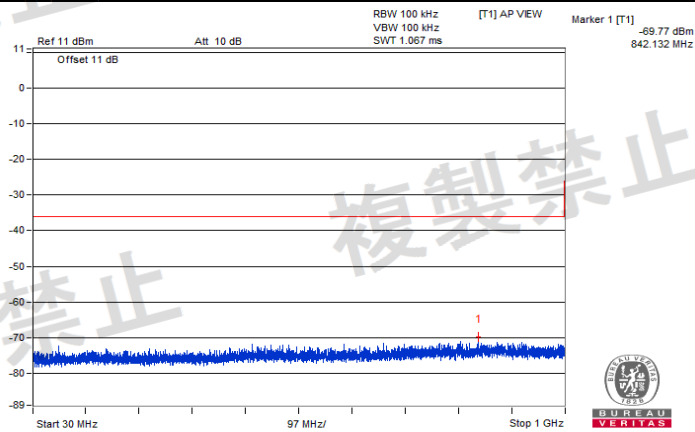


CH 19 (2440MHz)



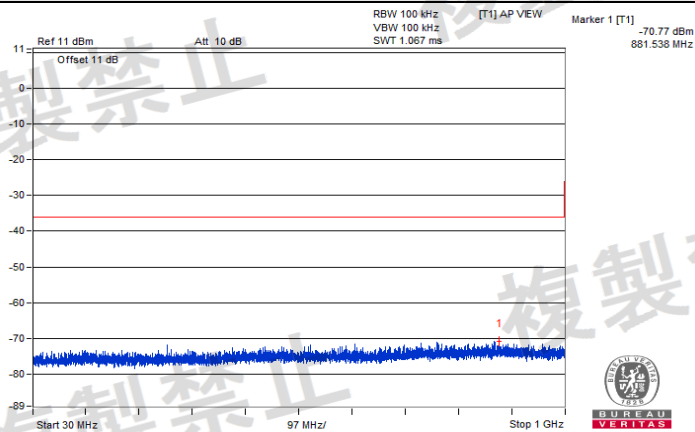
BUREAU
VERITAS

V_{normal}



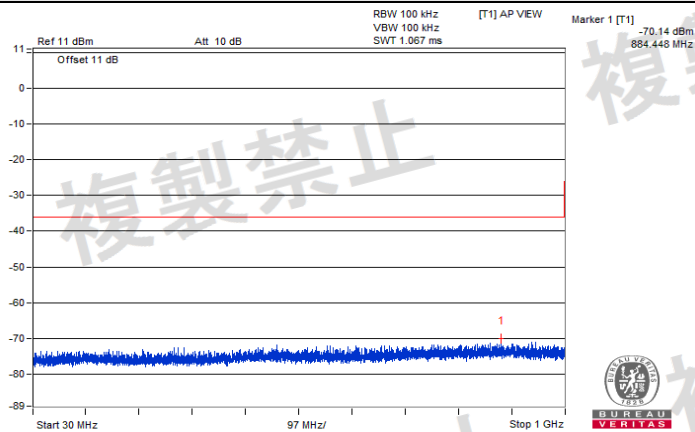
CH 39 (2480MHz)

V_{max}



CH 39 (2480MHz)

V_{min}



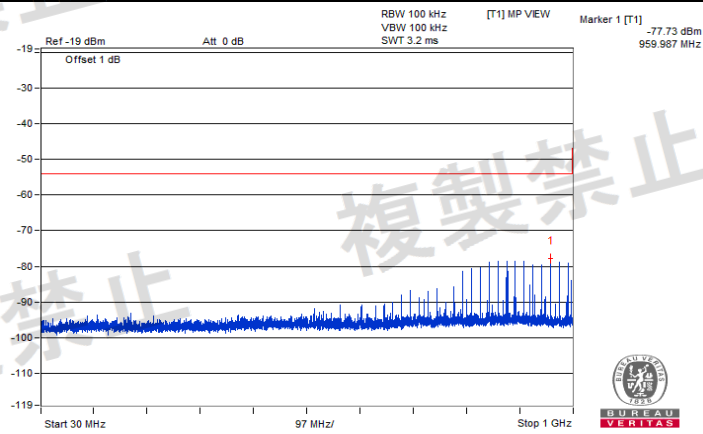
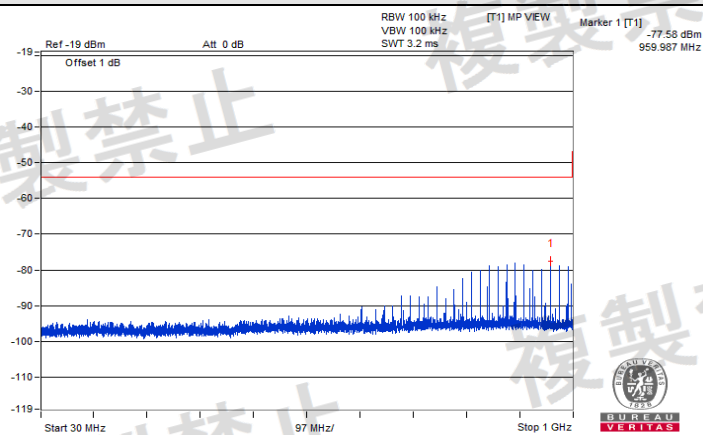
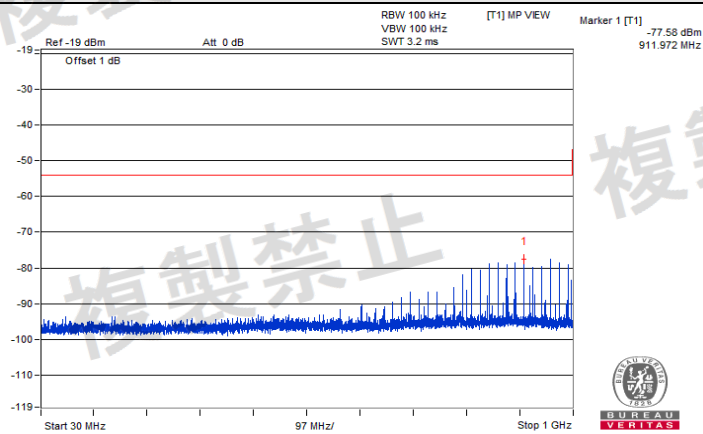
CH 39 (2480MHz)

7.2 Spurious Emissions of Receiver

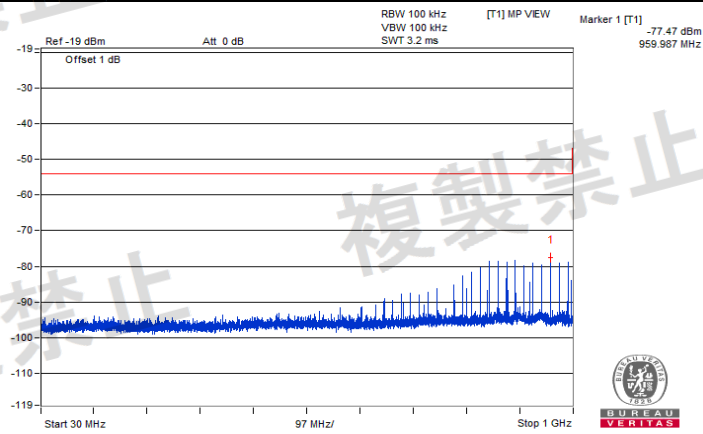
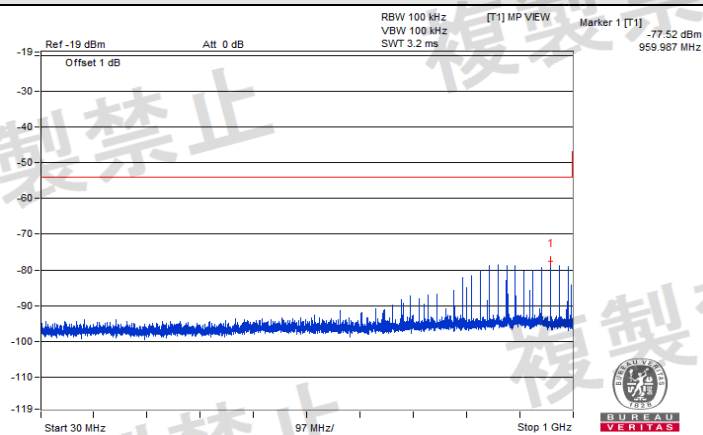
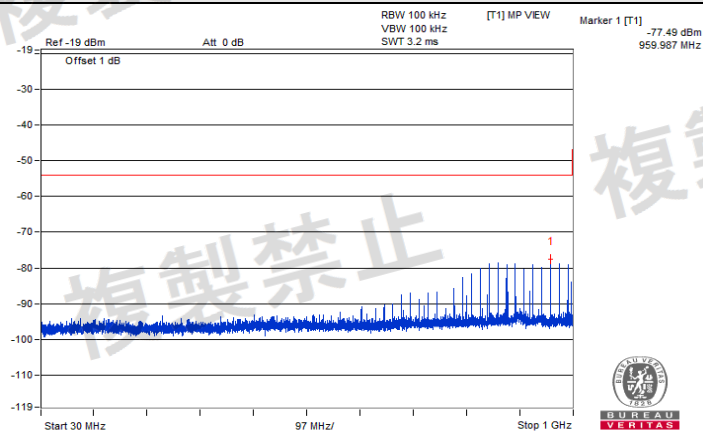
Environmental Conditions:	22°C, 55% RH	Tested By:	Kevin Ko
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BT-LE 1M

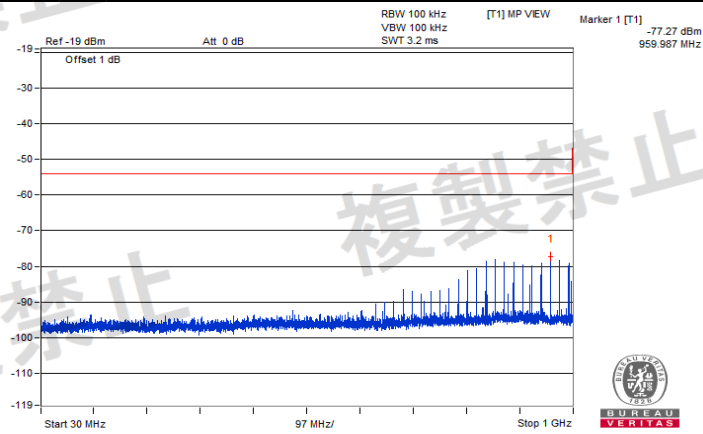
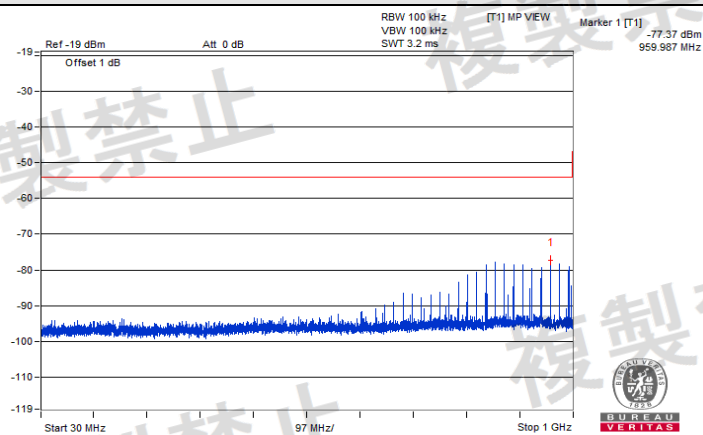
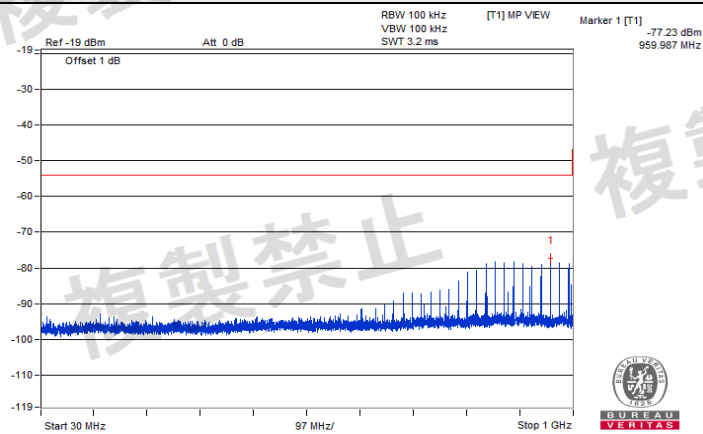
TEST CHANNEL		CH 0 (2402MHz)			
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASURE. VALUE(nW)	LIMIT (nW)	RESULT
V _{normal}	30MHz to 1000MHz	959.987	0.016866	4.0	PASS
V _{max.}	30MHz to 1000MHz	959.987	0.017458	4.0	PASS
V _{min.}	30MHz to 1000MHz	911.972	0.017458	4.0	PASS
TEST CHANNEL		CH 19 (2440MHz)			
V _{normal}	30MHz to 1000MHz	959.987	0.017906	4.0	PASS
V _{max.}	30MHz to 1000MHz	959.987	0.017701	4.0	PASS
V _{min.}	30MHz to 1000MHz	959.987	0.017824	4.0	PASS
TEST CHANNEL		CH 39 (2480MHz)			
V _{normal}	30MHz to 1000MHz	959.987	0.018750	4.0	PASS
V _{max.}	30MHz to 1000MHz	959.987	0.018323	4.0	PASS
V _{min.}	30MHz to 1000MHz	959.987	0.018923	4.0	PASS

V_{normal}**V_{max}****V_{min}**

CH 0 (2402MHz)

V_{normal}**V_{max}****V_{min}**

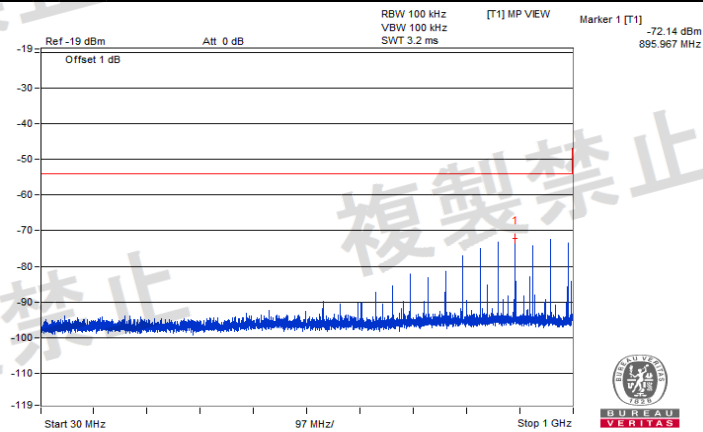
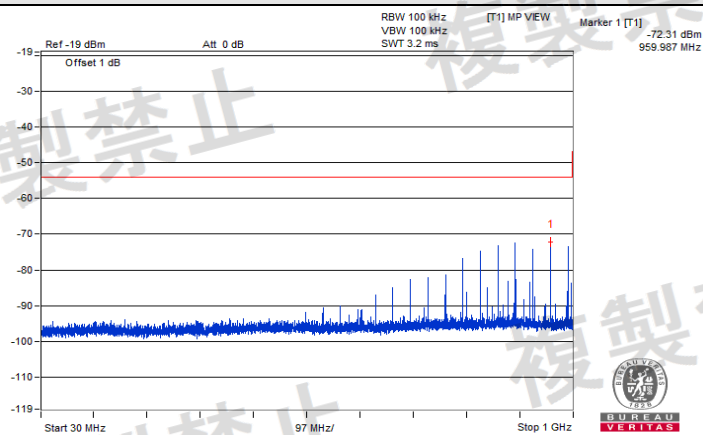
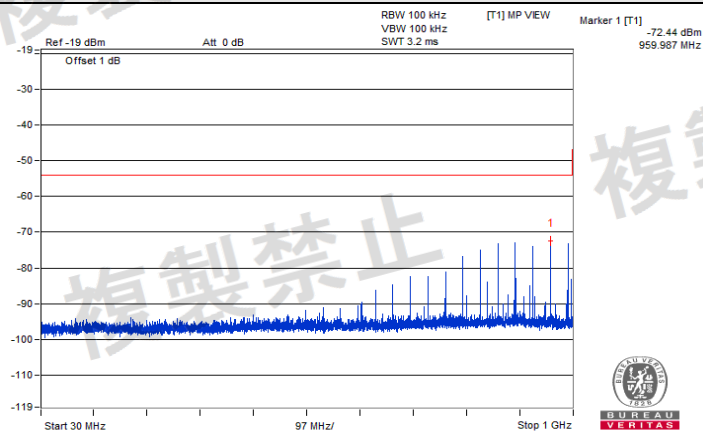
CH 19 (2440MHz)

V_{normal}**V_{max}****V_{min}**

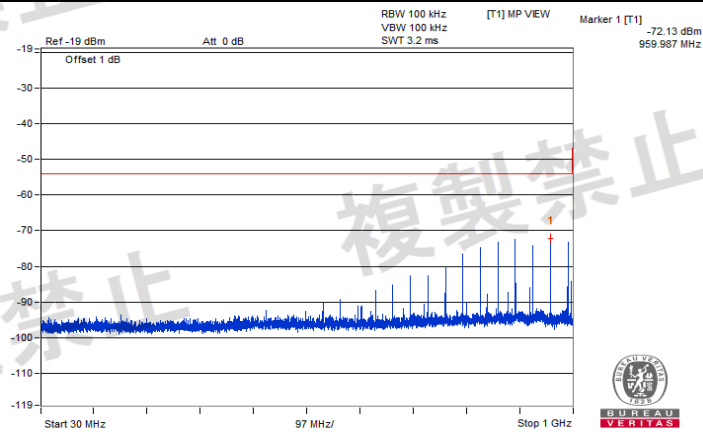
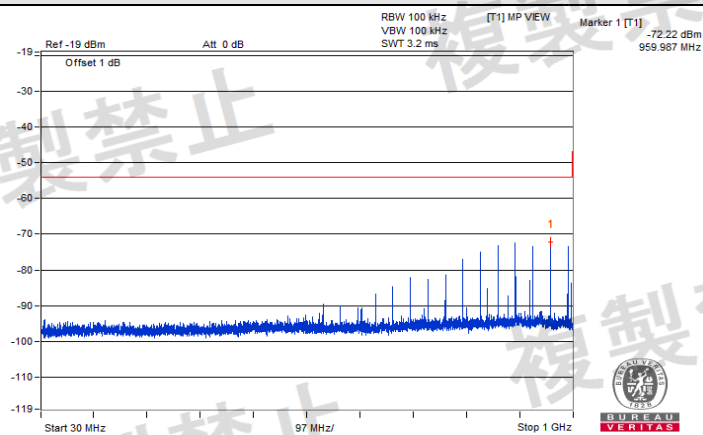
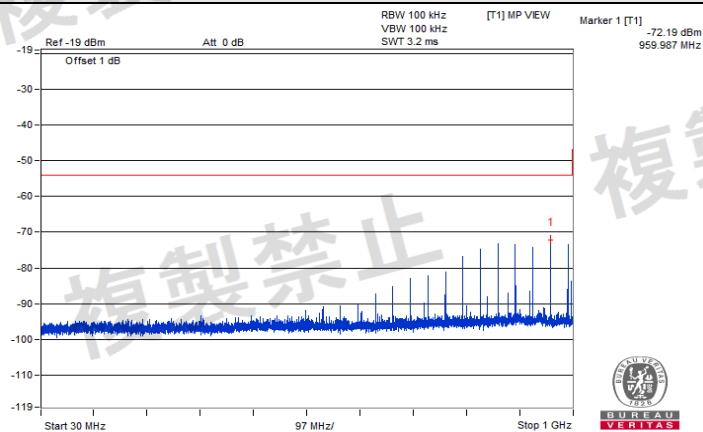
CH 39 (2480MHz)

BT-LE 2M

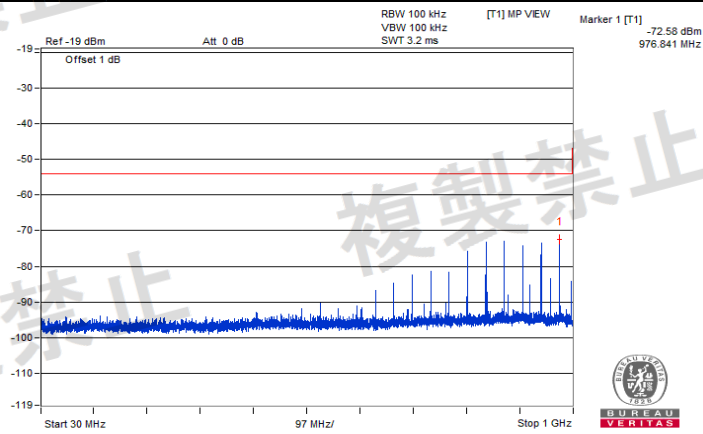
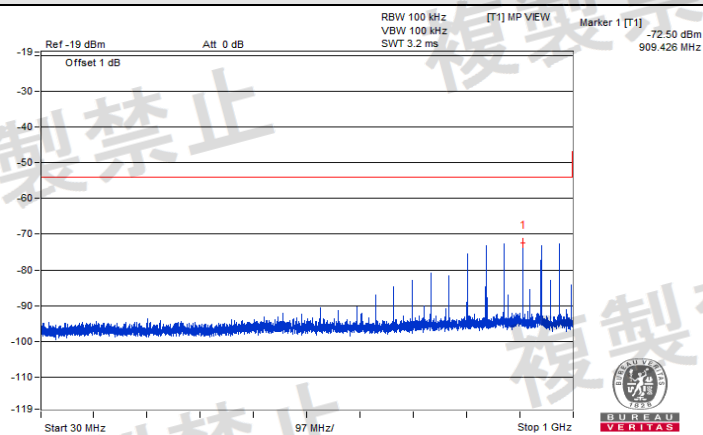
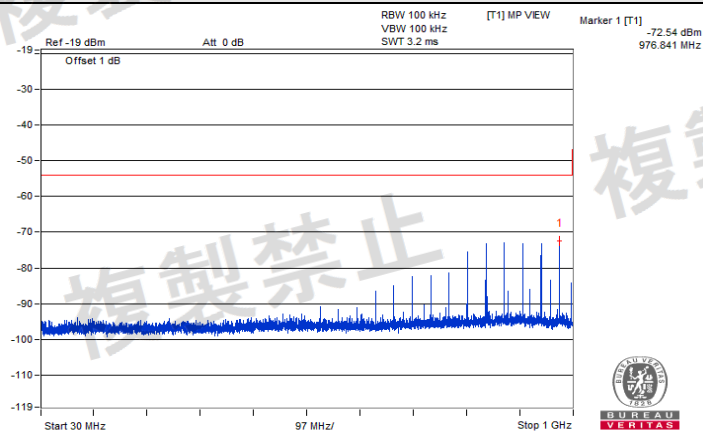
TEST CHANNEL		CH 0 (2402MHz)			
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASURE. VALUE(nW)	LIMIT (nW)	RESULT
V _{normal}	30MHz to 1000MHz	895.967	0.061094	4.0	PASS
V _{max.}	30MHz to 1000MHz	959.987	0.058749	4.0	PASS
V _{min.}	30MHz to 1000MHz	959.987	0.057016	4.0	PASS
TEST CHANNEL		CH 19 (2440MHz)			
V _{normal}	30MHz to 1000MHz	959.987	0.061235	4.0	PASS
V _{max.}	30MHz to 1000MHz	959.987	0.059979	4.0	PASS
V _{min.}	30MHz to 1000MHz	959.987	0.060395	4.0	PASS
TEST CHANNEL		CH 39 (2480MHz)			
V _{normal}	30MHz to 1000MHz	976.841	0.055208	4.0	PASS
V _{max.}	30MHz to 1000MHz	909.426	0.056234	4.0	PASS
V _{min.}	30MHz to 1000MHz	976.841	0.055719	4.0	PASS

V_{normal}**V_{max}****V_{min}**

CH 0 (2402MHz)

V_{normal}**V_{max}****V_{min}**

CH 19 (2440MHz)

V_{normal}**V_{max}****V_{min}**

CH 39 (2480MHz)

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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