

TEST REPORT

Product : OF2006-CONTROL CENTER
Trade mark : OUTFORM
Model/Type reference : UM101734
Serial Number : N/A
Report Number : EED32K002182
Date of Issue : Aug. 30, 2018
Product Class : Item 19 of Article 2 Paragraph 1
Test result : PASS

Prepared for:

Outform Science and Technology Ltd.
No.A103 Medical Appliance and Industry Garden, #1019, Nanhai road,
Nanshan district, ShenZhen 518035

Prepared by:

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Date:

Aug. 30, 2018

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Lab supervisor

Check No.:3096361651



2 Version

Version No.	Date	Description
00	Aug. 30, 2018	Original

3 Test Summary

Test	Test Requirement	Limit/Severity	Result
Antenna Requirement	Item 19 of Article 2 Paragraph 1	Notice 88 Appendix 43,B-1 (1)&(2)	PASS
Test frequency	Item 19 of Article 2 Paragraph 1	Notice 88 Appendix 43, A-3	PASS
Frequency Error	Item 19 of Article 2 Paragraph 1	±50 PPM or less	PASS
Occupied Bandwidth	Item 19 of Article 2 Paragraph 1	OFDM, DSSS : 26MHz or less Others : 26MHz or less	PASS
Spread-spectrum Bandwidth	Item 19 of Article 2 Paragraph 1	500 kHz or more	PASS
Antenna Power	Item 19 of Article 2 Paragraph 1	Designated value:10mW Tolerance: +20%,-80%	PASS
Spurious Emission of Tx	Item 19 of Article 2 Paragraph 1	(1) Below 2387 MHz : -26dBm (2) 2387 to 2400 MHz : -16dBm (3) 2483.5 through 2496.5 MHz : -16dBm (4) Over 2496.5 MHz : -26dBm	PASS
Interference prevention capability	Item 19 of Article 2 Paragraph 1	Notice 88 Appendix 43, 44, 45	PASS
RF accessibility	Item 19 of Article 2 Paragraph 1	Notice 88 Appendix 43, 44, 45	PASS
Spurious Emission of Rx	Item 19 of Article 2 Paragraph 1	(1) Below 1 GHz: -54dBm (2) 1GHz or higher: -47dBm	PASS

Remark:

The tested sample(s) and the sample information are provided by the client.

EUT: In this whole report EUT means Equipment Under Test.

Tx: In this whole report Tx (or tx) means the product in transmitting status.

Rx: In this whole report Rx (or rx) means the product in receiving status.

RF: In this whole report RF means Radiated Frequency.

DS: Direct spreading FH: Frequency hopping

OFDM: Orthogonal frequency division multiplexing

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5 General Information

5.1 Client Information

Applicant:	Outform Science and Technology Ltd.
Address of Applicant:	No.A103 Medical Appliance and Industry Garden, #1019, Nanhai road, Nanshan district, ShenZhen 518035
Manufacturer:	Outform Science and Technology Ltd.
Address of Manufacturer:	No.A103 Medical Appliance and Industry Garden, #1019, Nanhai road, Nanshan district, ShenZhen 518035
Factory:	Outform Science and Technology Ltd.
Address of Factory:	No.A103 Medical Appliance and Industry Garden, #1019, Nanhai road, Nanshan district, ShenZhen 518035

5.2 General Description of EUT

Product Name:	OF2006-CONTROL CENTER
Model No.:	UM101734
Trade Mark:	OUTFORM
EUT Supports Radios application:	2.4GHz Wi-Fi:802.11b/g/n(HT20): 2412MHz ~2472 MHz
Operating Frequency:	2412 MHz to 2472 MHz
Conducted rate power	802.11b: 0.80 mW/MHz 802.11g: 1.50 mW/MHz 802.11n (HT20): 1.50 mW/MHz
Number of Channels:	802.11b: 13 Channels 802.11g/n (HT20): 13 Channels
Type of Modulation:	802.11b: DSSS(CCK/QPSK/BPSK) 802.11g: OFDM(BPSK/QPSK/16QAM/64QAM) IEEE for 802.11n (HT20): OFDM (64QAM, 16QAM, QPSK, BPSK)
Transmit Data Rate:	802.11b: 1M/2M/5.5M/11M bps 802.11g: 6M/9M/12M/18M/24M/36M/48M/54M bps 802.11n: 6.5M/13M/19.5M/26M/39M/52M/58.5M/64M bps
Channel Separation:	5 MHz
Antenna Type:	Dipole
Antenna gain:	2.96 dBi
Test Power Grade:	B:40, G:37, N20:38 (manufacturer declare)
Test Software of EUT:	Ampak RFTestTool, VER:5.6(manufacturer declare)
Sample Received Date:	Aug. 14, 2018
Sample tested Date:	Aug. 14, 2018 to Aug. 30, 2018

5.3 EUT test environment range

Temperature:	24 °C
Humidity:	52 % RH
Atmospheric Pressure:	1010 mbar

5.4 Description of Support Units

The EUT has been tested stand-alone.

5.5 Test Location

Centre Testing International Group Co., Ltd.

Building C, Hongwei Industrial Park Block 70, Bao'an District, Shenzhen, Guangdong, China 518101

Telephone: +86 (0) 755 33683668 Fax: +86 (0) 755 33683385

No tests were sub-contracted.

6 Equipment List

Equipment	Manufacturer	Model	Serial No.	Cal. Date	Due date	Calibration body	Classification
Spectrum Analyzer	R&S	FSP40	100416	05/11/2018	05/10/2019	SMQ	(c)
Temperature & Humidity Chamber	TAYLOR	1451	N/A	05/09/2018	05/08/2019	CTIMT	(c)
Signal Generator	Keysight	N5182B	MY53051549	03/13/2018	03/12/2019	CTIMT	(c)

Remark:

- (a) Calibration conducted by the National Institute of Information and Communications Technology (NICT) in Japan (hereinafter referred to as "NICT") or a designated calibration agency under Article 102-18 paragraph (1) in JRL.
- (b) Correction conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Act (Act No. 51 of 1992) .
- (c) Calibration conducted in countries except Japan, which shall be equivalent to the calibration conducted by the NICT or a designated calibration agency under Article 102-18 paragraph (1).
- (d) Calibration, etc. conducted by using measuring instruments and other equipment listed in the right column of appended table No. 3, which shall have been given any type of calibration, etc. listed above from (a) to(c).

From JRL Article 24-2, paragraph 4, Item 2

Notice: Calibration duration for above equipment is 1 year.

7 Radio Technical Requirements Specification

Table 1: Radio Technical Requirements Specification for 2.4 GHz band wide-band low-power data communication system (Item 19 of Article 2 Paragraph 1)

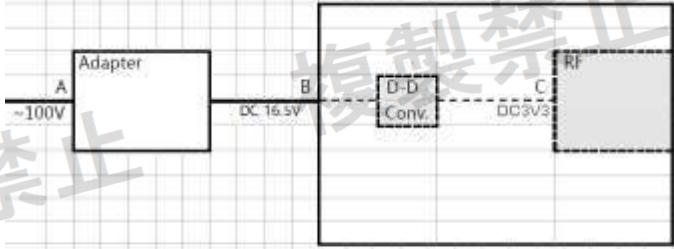
Items	Technical standard
Assigned frequency or designated frequency	2400-2483.5MHz
Communication method	One-way communication, simplex, semi-duplex, or duplex operation of digital signal transmission including spread spectrum
Tolerance of frequency ($\times 10^{-6}$)	± 50 PPM
Tolerance of occupied bandwidth	FH: 83.5MHz or less FH + OFDM: 83.5MHz or less Others: 26MHz or less FH + DS: 83.5MHz or less OFDM: 38MHz or less
Antenna power	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 Tolerance: +20%, -80%
Antenna gain	1) 12.14 dBi or less in principle 2) In case of directional antenna (1) FH, FH+DS or FH+OFDM using 2427-2470.75 MHz EIRP $\leq$ 16.91 dBm/MHz (2) OFDM or DS other than (1) EIRP $\leq$ 22.14 dBm/MHz (3) Other than (1) and (2): 22.14 dBm or less (4) OFDM OBW 26 - 38MHz: 19.14dBm/MHz (5) Half-power angle of directional antenna (e) in case of the item 2): $e \leq 360/A$ (The A is 10 in maximum.)
Tolerance of spurious emission intensity	(1) Below 2387 MHz: 2.5 μ W (2) 2387 to 2400 MHz: 25 μ W (3) 2483.5 through 2496.5 MHz: 25 μ W (4) Over 2496.5 MHz: 2.5 μ W
Spreading bandwidth	500kHz or more
Spreading rate of spectrum	For DS system; (Spreading bandwidth) / (Frequency corresponding to transmission rate) ≥ 5
Limit of secondary radiated emissions	(1) Below 1 GHz: 4nW (2) 1 GHz or higher: 20nW
Interference prevention function	Shall have the function of automatic transmission and reception of identification sign.
Structure	Shall be of the structure that the RF and modulator sections excluding antenna cannot easily be opened.
Note	DS: Direct spread FH: Frequency hopping OFDM: Orthogonal frequency division multiplexing

Note: The Technical Standards described here do not cover all of the regulated items.

7.1 Transmitter Requirements

7.1.1 EUT test voltage and Frequency

7.1.1.1 EUT test voltage

Power Supply:	AC 100V, 60Hz			
Test voltage require:	The RF unit is supplied DC with AC/DC adapter. The fluctuation of input voltage to the circuit of RF unit of test equipment is under $\pm 1\%$, when input voltage from DC16.5V or AC/DC adapter (AC 100V) to the test equipment is fluctuated by $\pm 10\%$, so the AC100V was chosen in the test report.			
Power Supply view:	 Test below: 1: The fluctuation of C point is under $\pm 1\%$, when input voltage from B point to the test equipment is fluctuated by $\pm 10\%$. 2: The fluctuation of C point is under $\pm 1\%$, when input voltage from A point to the test equipment is fluctuated by $\pm 10\%$.			
Power Supply result:	The measurement result of the voltage fluctuation at RF circuit when AC100V $\pm 10\%$ or DC16.5V $\pm 10\%$.			
	AC INPUT	DC3V3	DC Input	DC3V3
	110V	3.31V	18.15V	3.32V
	100V	3.30V	16.5V	3.30V
	90V	3.30V	14.85V	3.28V

7.1.1.2 Test frequency

Test frequencies:	If the EUT can be set to 3 or more different (carrier) frequencies in 1 allocated band, testing shall be performed using the Lowest, Middle and the Highest frequency (L,M and H). If there are 2 or fewer frequencies, testing shall be performed with the available frequencies.		
	Frequency range over which device operates	Number of frequencies	Location in the range of operation
	1 MHz or less	1	Middle
	1 to 10 MHz	2	1 near top and 1 near bottom
	More than 10 MHz	3	1 near top, 1 near middle and 1 near bottom

EUT channels and frequencies list:

802.11b

Channel	Frequency (MHz)
1	2412
2	2417
3	2422
4	2427
5	2432
6	2437
7	2442
8	2447
9	2452
10	2457
11	2462
12	2467
13	2472

Test frequencies are the lowest channel: 1 channel(2412MHz), middle channel: 7 channel(2442 MHz) and the highest channel: 13 channel(2472 MHz)

802.11g&n (HT20)

Channel	Frequency (MHz)
1	2412
2	2417
3	2422
4	2427
5	2432
6	2437
7	2442
8	2447
9	2452
10	2457
11	2462
12	2467
13	2472

Test frequencies are the lowest channel: 1 channel(2412MHz), middle channel: 7 channel(2442 MHz) and the highest channel: 13 channel(2472 MHz)

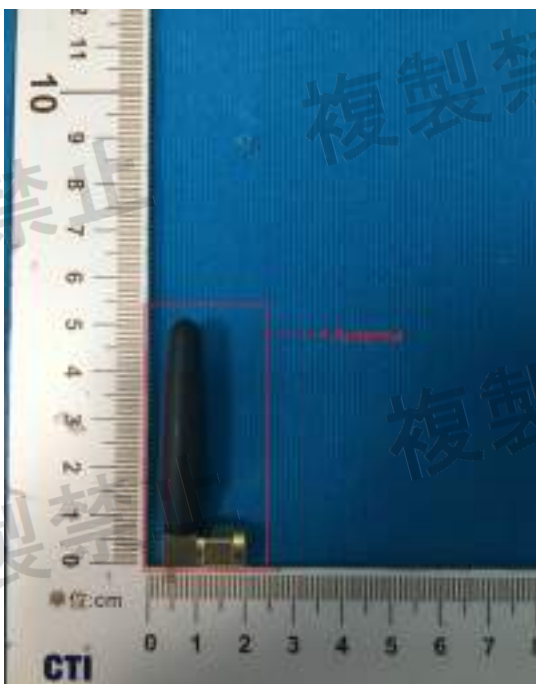
7.1.2 Antenna Requirement

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 Antenna

The antenna is Dipole and no consideration of replacement. The best case gain of the antenna is 2.96 dBi.



Result: An antenna connector is available; all relevant tests will be carried out conducted.

7.1.3 Frequency Error

Test Requirement:	Item 19 of Article 2 Paragraph 1		
Test Method:	MIC Notice No.88 Appendix No.43		
EUT Operation:			
Ambient:	Temp.: 24.0°C	Humid.: 52%	Press.: 1010 mbar
Test Status:	Enter the unmodulation mode for the product. Test in Channel lowest (2412MHz), middle (2442MHz) and highest(2472MHz), keep in continuously transmitting status.		
Test Configuration:			
EUT → Spectrum Analyzer			
Test Conditions:	Frequency Counter or Spectrum Analyzer is used for measurement.		
EUT conditions:	Modulation/Spread/Hopping off, CW Tx If EUT does not accept “Modulation OFF” mode in the measurement, you may use “Modulation ON” mode. In that case you can use the Max power Frequency as the measuring results.		
Spectrum Analyzer conditions:	Frequency: Test Frequency Span 1MHz RBW 10KHz (Modulation ON), VBW 10KHz (Modulation ON), Sweep Time Auto Detector mode Positive peak Indication mode Max hold		
Technical standard:	Tolerance of frequency: $\pm 50 \times 10^{-6}$		
Test result:	PASS		

Measurement Record:

Uncertainty: $\pm 10\text{Hz}$

Test result:

802.11b

Test channel	Test Frequency (MHz)	Test Result			Unit	Limit
		Normal Voltage	High Voltage	Low Voltage		
Lowest	2412.0	100V AC	N/A	N/A	MHz	± 50 PPM or less
		2411.894	N/A	N/A	PPM	
Middle	2442.0	-43.95	N/A	N/A	MHz	
		2441.892	N/A	N/A	PPM	
Highest	2472.0	-44.23	N/A	N/A	MHz	
		2471.890	N/A	N/A	PPM	
		-44.50	N/A	N/A		

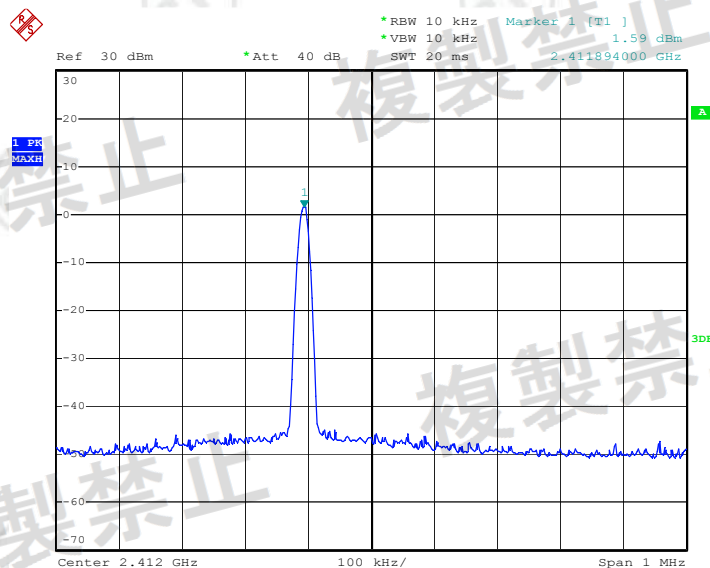
Note: The nominal frequency shall be confirmed by the applicant and test lab.

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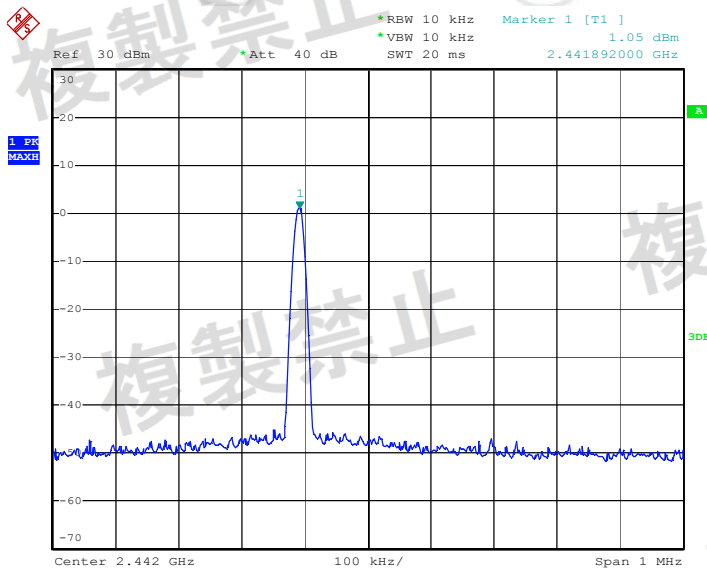
Result plot as follows:

Channel 1: 2.412GHz:



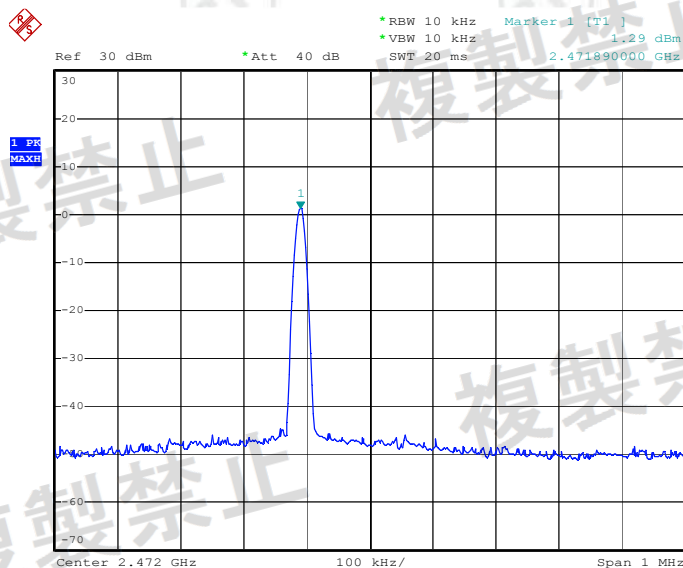
Date: 16.AUG.2018 15:51:00

Channel 7: 2.442GHz:



Date: 16.AUG.2018 15:53:29

Channel 13:2.472GHz



Date: 16.AUG.2018 15:54:45

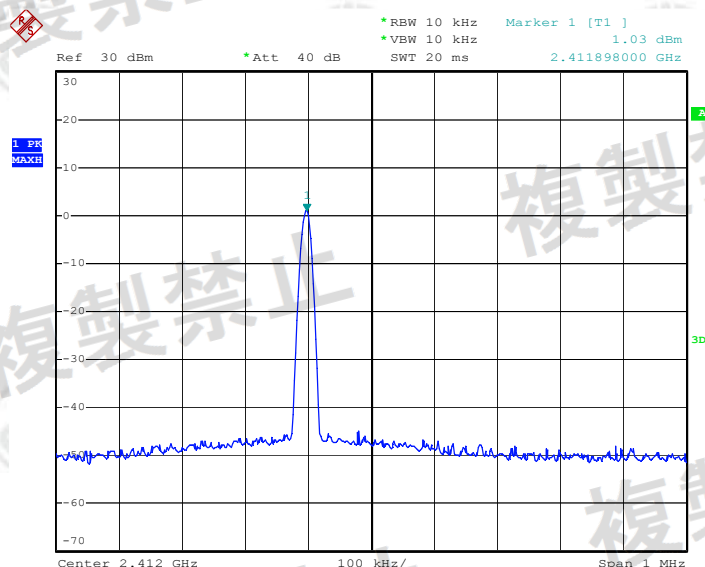
802.11g

Test channel	Test Frequency (MHz)	Test Result			Unit	Limit
		Normal Voltage	High Voltage	Low Voltage		
Lowest	2412.0	2411.898	N/A	N/A	MHz	±50 PPM or less
		-42.29	N/A	N/A	PPM	
Middle	2442.0	2441.896	N/A	N/A	MHz	
		-42.59	N/A	N/A	PPM	
Highest	2472.0	2471.894	N/A	N/A	MHz	
		-42.88	N/A	N/A	PPM	

Note: The nominal frequency shall be confirmed by the applicant and test lab.

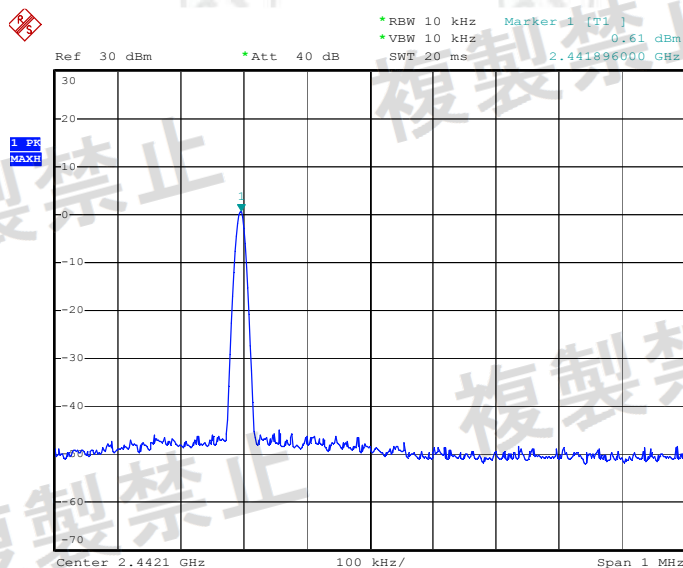
Result plot as follows:

Channel 1:2.412GHz:



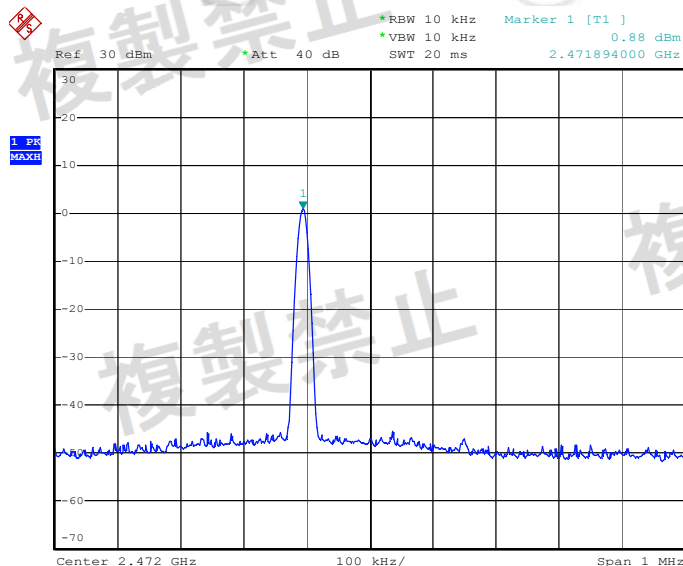
Date: 16.AUG.2018 16:10:13

Channel 7:2.442GHz:



Date: 16.AUG.2018 16:11:39

Channel 13:2.472GHz



Date: 16.AUG.2018 16:13:26

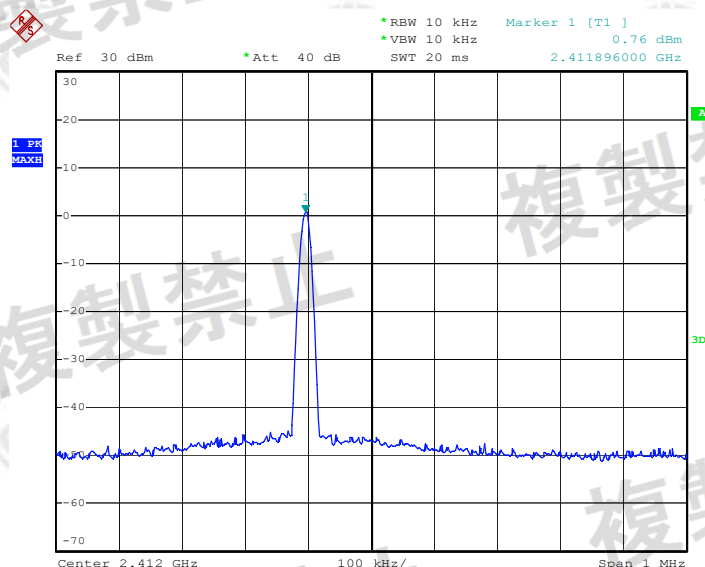
802.11n

Test channel	Test Frequency (MHz)	Test Result			Unit	Limit
		Normal Voltage	High Voltage	Low Voltage		
		100V AC	N/A	N/A		
Lowest	2412.0	2411.896	N/A	N/A	MHz	±50 PPM or less
		-43.12	N/A	N/A	PPM	
Middle	2442.0	2441.894	N/A	N/A	MHz	
		-43.41	N/A	N/A	PPM	
Highest	2472.0	2471.892	N/A	N/A	MHz	
		-43.69	N/A	N/A	PPM	

Note: The nominal frequency shall be confirmed by the applicant and test lab.

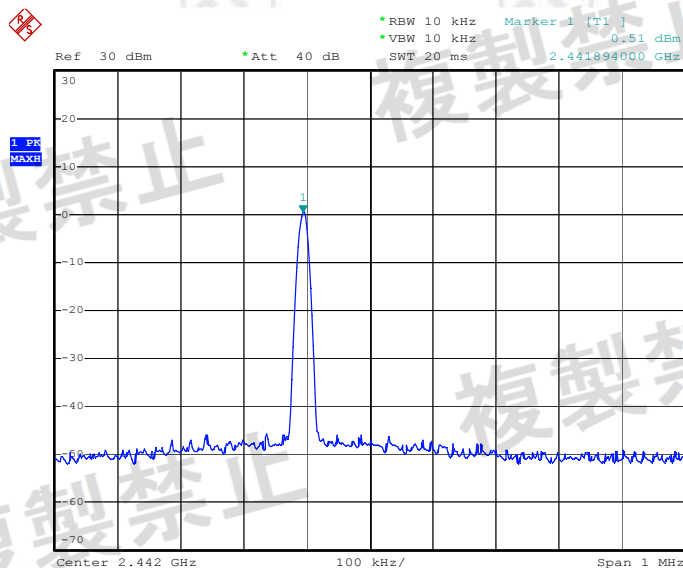
Result plot as follows:

Channel 1:2.412GHz:



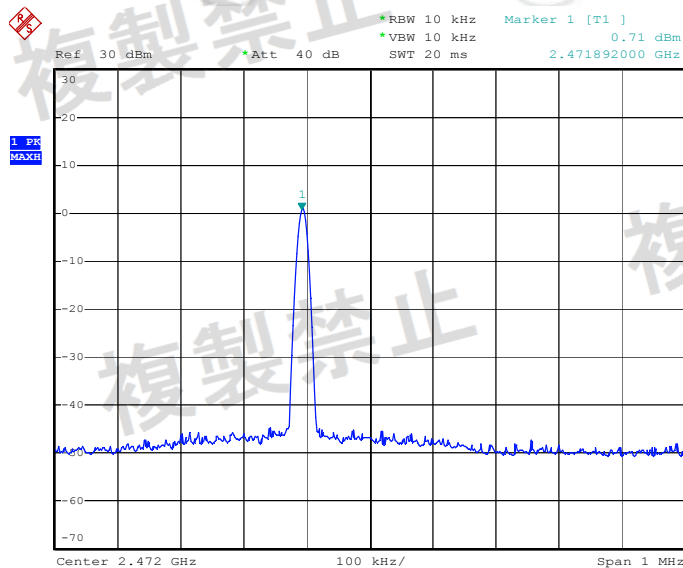
Date: 16.AUG.2018 16:17:22

Channel 7:2.442GHz:



Date: 16.AUG.2018 16:18:55

Channel 13:2.472GHz



Date: 16.AUG.2018 16:20:53

Test result: The unit does meet the requirements.

7.1.4 Occupied Bandwidth (99%)

Test Requirement:	Item 19 of Article 2 Paragraph 1		
Test Method:	MIC Notice No.88 Appendix No.43		
EUT Operation:			
Ambient:	Temp.: 24°C	Humid.: 52%	Press.: 1010 mbar
Test Status:	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). Following channel(s) was (were) selected for the final test as listed below.		
Test Configuration:	EUT → Spectrum Analyzer		
EUT conditions:	Modulation/Spread/Hopping on, PN9 Modulation Tx For equipment using diffusion code, set to the test diffusion code and modulate with standard coding test signal.		
Spectrum Analyzer conditions:	Frequency: Test Frequency Span 40MHz (DSSS,OFDM) RBW 300 kHz VBW 300 kHz Sweep Time Auto detector mode Positive peak Indication mode Max hold OBW 99%		
Technical standard:	OFDM : 38MHz or less Others : 26MHz or less		
Test result:	PASS		

Measurement Record:

Uncertainty: $\pm 10\text{KHz}$

Test result:

DSSS mode:

802.11b

Test channel	Test Frequency (MHz)	Test Result			Unit	Limit
		Normal Voltage	High Voltage	Low Voltage		
		100V AC	N/A	N/A		
Lowest	2412.0	14.080	N/A	N/A	MHz	26 MHz or less
Middle	2442.0	14.160	N/A	N/A	MHz	
Highest	2472.0	14.080	N/A	N/A	MHz	

OFDM mode:

802.11g

Test ch	Test Frequency (MHz)	Test Result			Unit	Limit
		Normal Voltage	High Voltage	Low Voltage		
		100V AC	N/A	N/A		
Lowest	2412.0	16.960	N/A	N/A	MHz	38 MHz or less
Middle	2442.0	16.880	N/A	N/A	MHz	
Highest	2472.0	16.880	N/A	N/A	MHz	

802.11n (HT20)

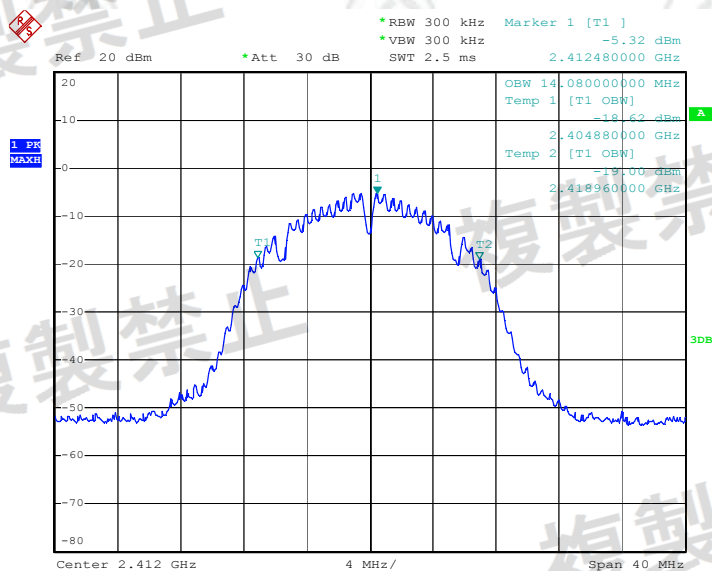
Test ch	Test Frequency (MHz)	Test Result			Unit	Limit
		Normal Voltage	High Voltage	Low Voltage		
		100V AC	N/A	N/A		
Lowest	2412.0	18.080	N/A	N/A	MHz	38 MHz or less
Middle	2442.0	18.080	N/A	N/A	MHz	
Highest	2472.0	18.080	N/A	N/A	MHz	

Result plot as follows:

802.11b

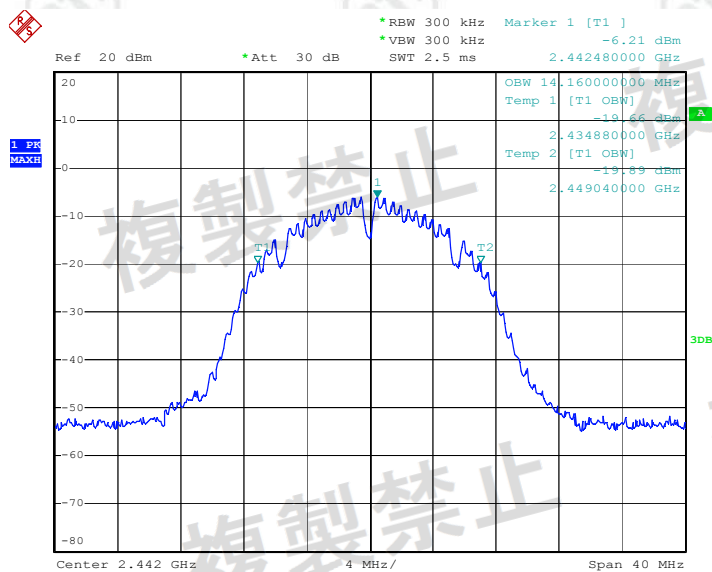
DSSS mode with 11Mbps data rate

Channel 1:2.412 GHz:



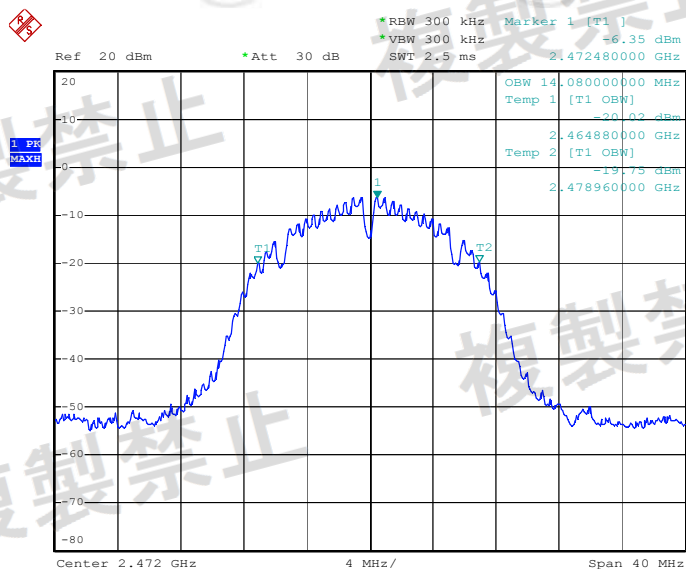
Date: 29.AUG.2018 15:41:07

Channel 7:2.442 GHz:



Date: 29.AUG.2018 15:42:09

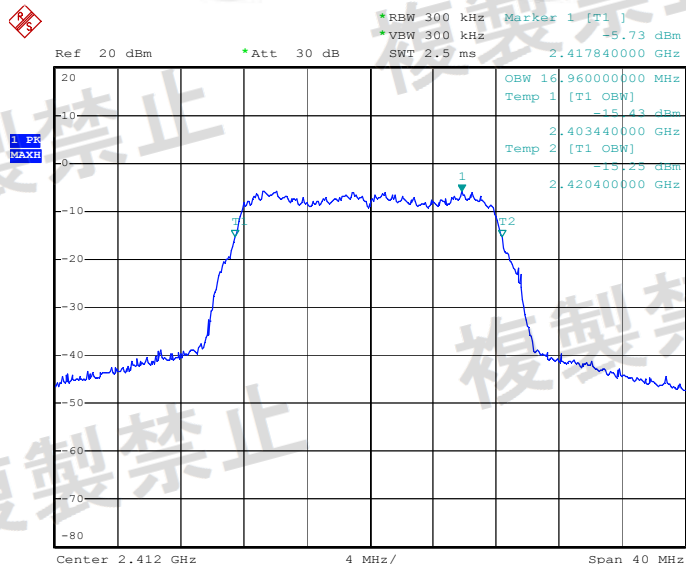
Channel 13:2.472GHz:



Date: 29.AUG.2018 15:43:06

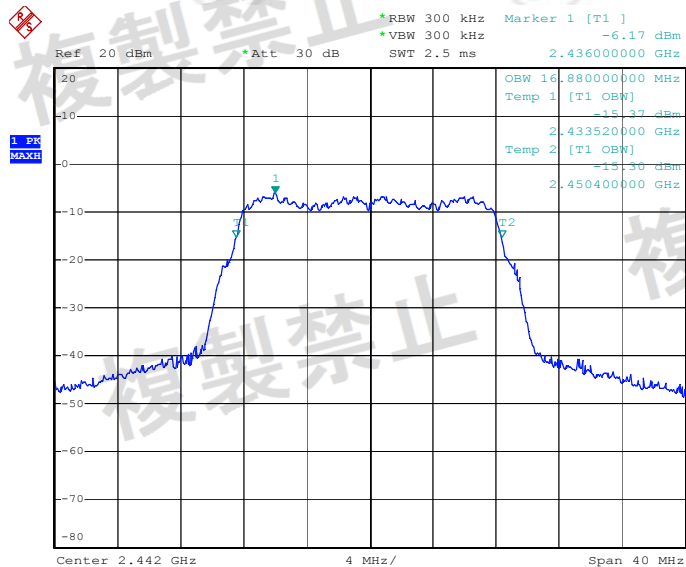
OFDM mode with 6Mbps data rate
802.11g

Channel 1:2.412 GHz:



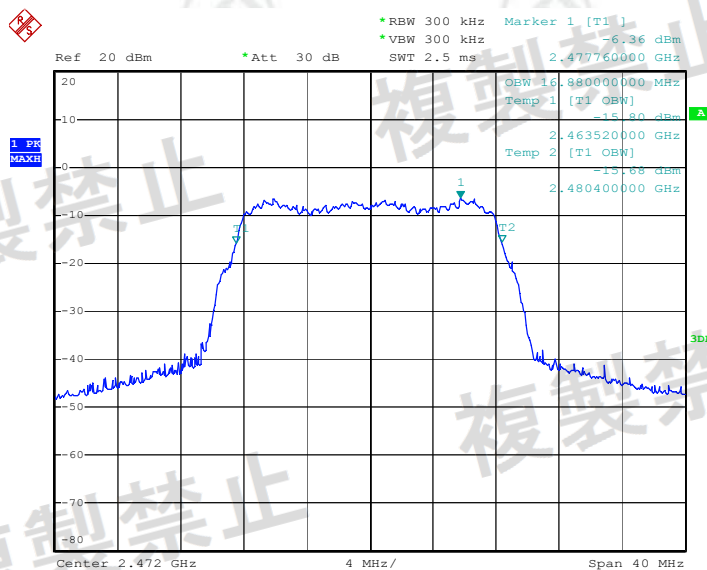
Date: 29.AUG.2018 15:47:13

Channel 7:2.442 GHz:



Date: 29.AUG.2018 15:51:06

Channel 13:2.472GHz:

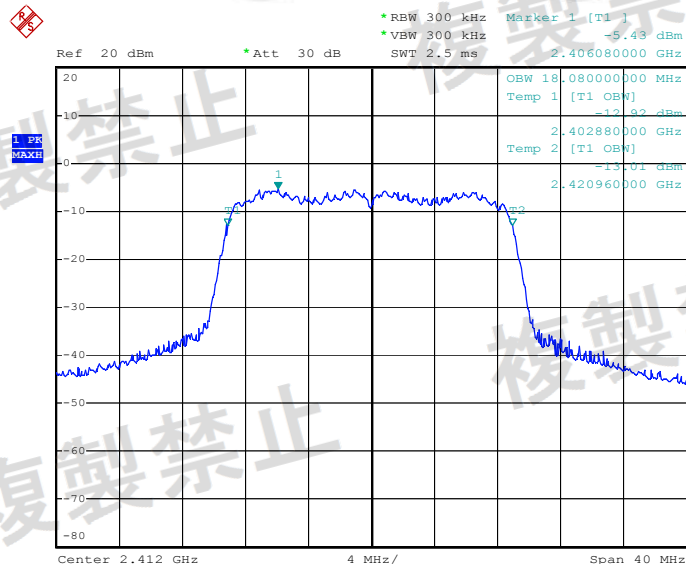


Date: 29.AUG.2018 15:54:51

OFDM mode with 6.5Mbps data rate

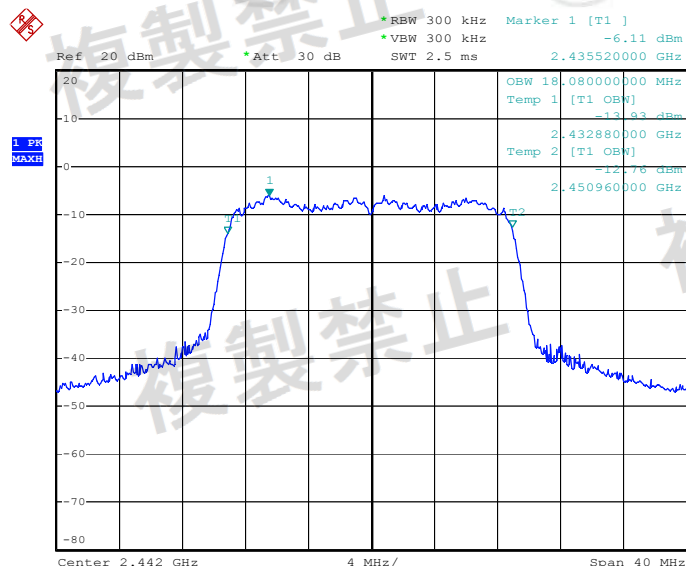
802.11n (HT20)

Channel 1:2.412 GHz:



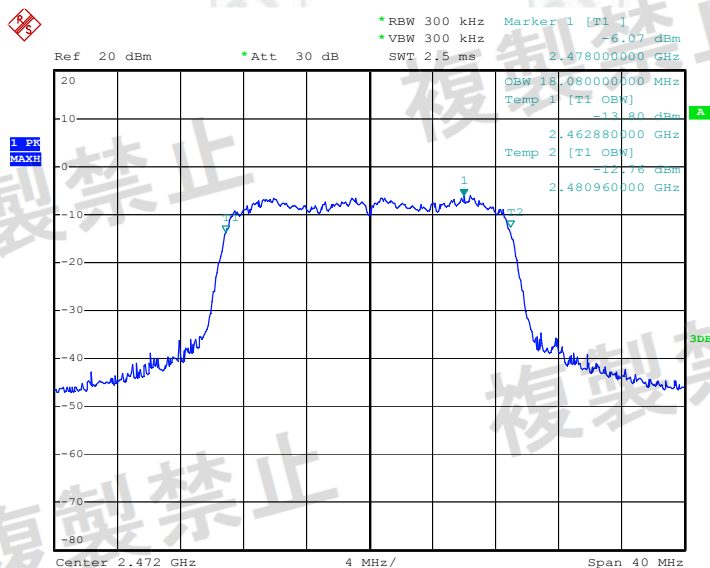
Date: 29.AUG.2018 15:59:34

Channel 7:2.442 GHz:



Date: 29.AUG.2018 16:02:06

Channel 13:2.472GHz:



Date: 29.AUG.2018 16:05:35

Test result: The unit does meet the requirements.

7.1.5 Spread spectrum Bandwidth (90%)

Test Requirement:	Item 19 of Article 2 Paragraph 1		
Test Method:	MIC Notice No.88 Appendix No.43		
EUT Operation:			
Ambient:	Temp.: 24°C	Humid.: 52%	Press.: 1010 mbar
Test Status:	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).Following channel(s) was (were) selected for the final test as listed below.		
Test Configuration:	EUT → Spectrum Analyzer		
EUT conditions:	Modulation/Spread/Hopping on, PN9 Modulation Tx For equipment using diffusion code, set to the test diffusion code and modulate with standard coding test signal.		
Spectrum Analyzer conditions:	Frequency: Test Frequency Span 40MHz (DSSS,OFDM) RBW 300kHz VBW 300kHz Sweep Time Auto detector mode Positive peak Indication mode Max hold OBW 90%		
Technical standard:	500kHz or more		
Test result:	PASS		

Measurement Record:

Uncertainty: $\pm 10\text{KHz}$

Test result:

DSSS mode:

802.11b

Test channel	Test Frequency (MHz)	Test Result			Unit	Limit
		Normal Voltage	High Voltage	Low Voltage		
		100V AC	N/A	N/A		
Lowest	2412.0	9.280	N/A	N/A	MHz	500 kHz or more
Middle	2442.0	9.280	N/A	N/A	MHz	
Highest	2472.0	9.280	N/A	N/A	MHz	

Note:

For DS system: (Spreading bandwidth) / (Frequency corresponding to transmission rate) ≥ 5
(Frequency corresponding to transmission rate) = max rate/8

Lowest: $9.280/1.375=6.75>5$

Middle: $9.280/1.375=6.75>5$

Highest: $9.280/1.375=6.75>5$

OFDM mode:

802.11g

Test ch	Test Frequency (MHz)	Test Result			Unit	Limit
		Normal Voltage	High Voltage	Low Voltage		
		100V AC	N/A	N/A		
Lowest	2412.0	14.560	N/A	N/A	MHz	500 kHz or more
Middle	2442.0	14.560	N/A	N/A	MHz	
Highest	2472.0	14.480	N/A	N/A	MHz	

802.11n (HT20)

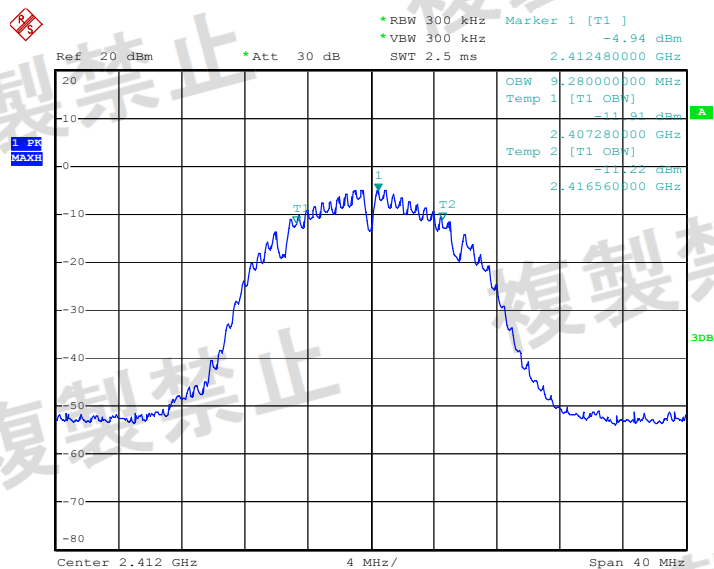
Test ch	Test Frequency (MHz)	Test Result			Unit	Limit
		Normal Voltage	High Voltage	Low Voltage		
		100V AC	N/A	N/A		
Lowest	2412.0	15.600	N/A	N/A	MHz	500 kHz or more
Middle	2442.0	15.600	N/A	N/A	MHz	
Highest	2472.0	15.600	N/A	N/A	MHz	

Result plot as follows:

DSSS mode with 11Mbps data rate

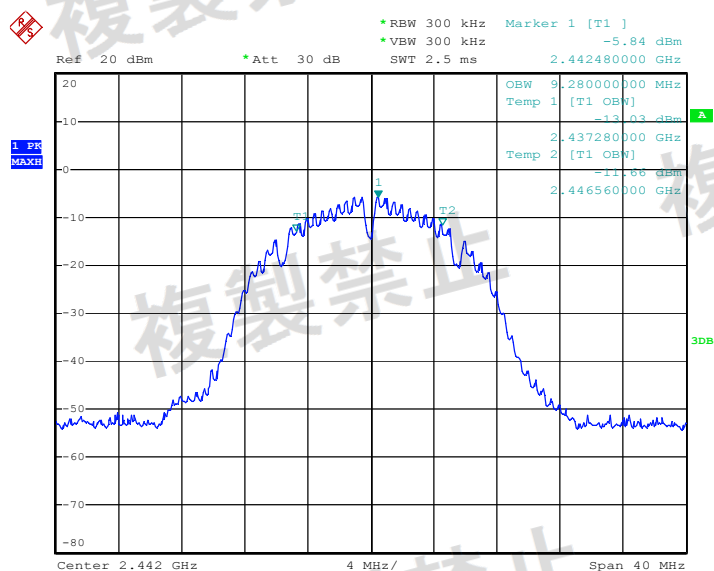
802.11b

Channel 1:2.412 GHz:



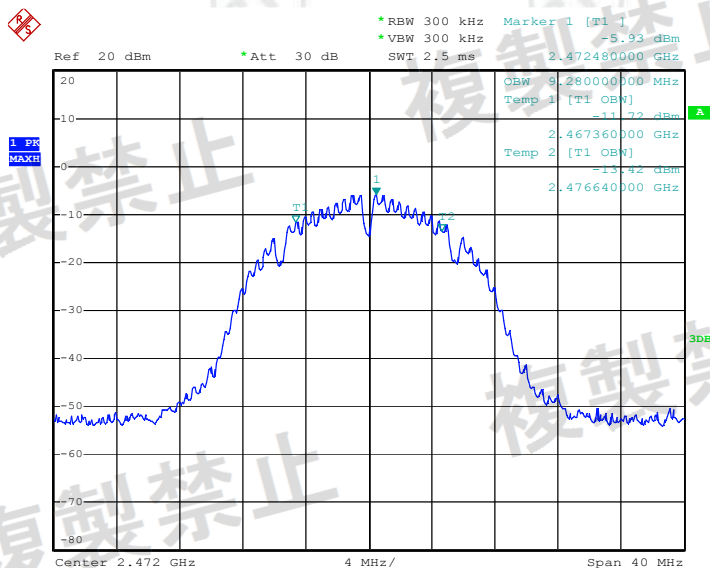
Date: 29.AUG.2018 16:42:36

Channel 7:2.442 GHz:



Date: 29.AUG.2018 16:43:23

Channel 13:2.472GHz:

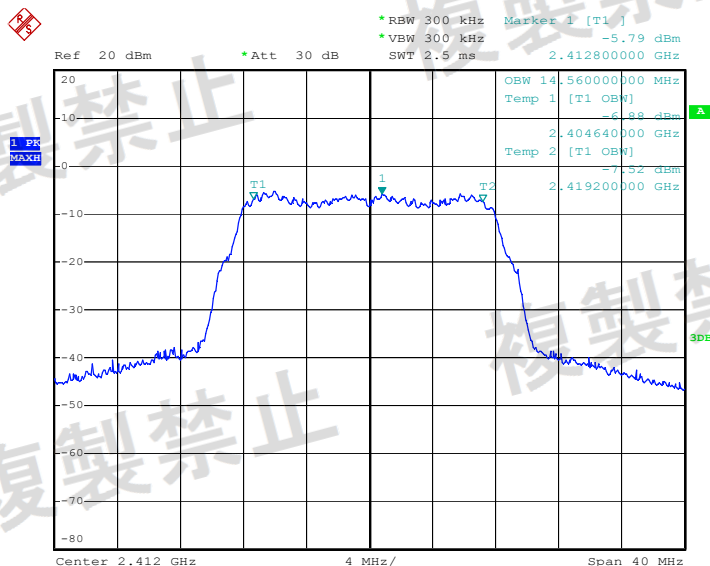


Date: 29.AUG.2018 16:44:34

OFDM mode with 6Mbps data rate

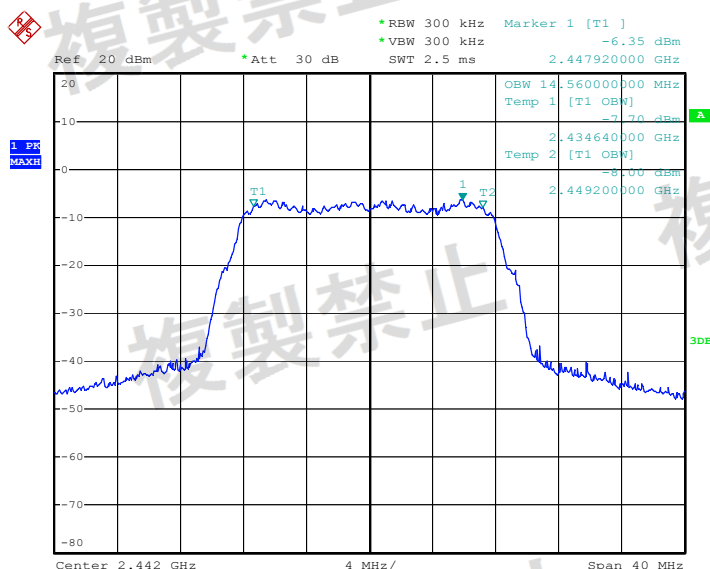
802.11g

Channel 1:2.412 GHz:



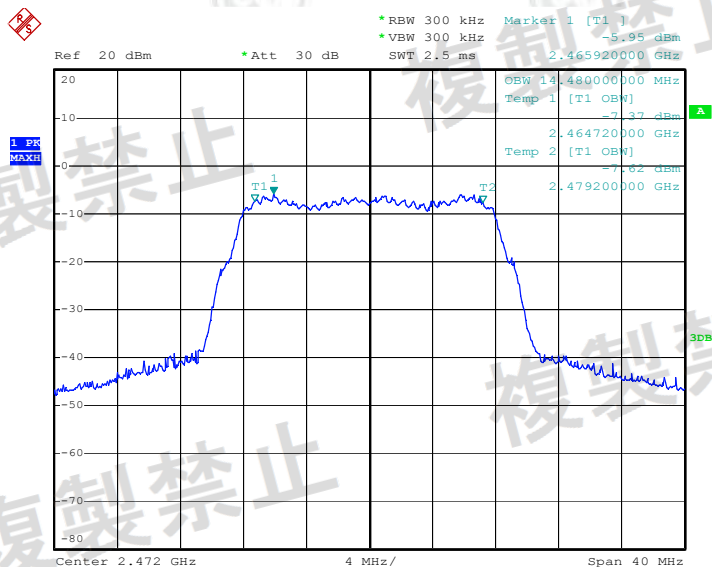
Date: 29.AUG.2018 16:26:46

Channel 7:2.442 GHz:



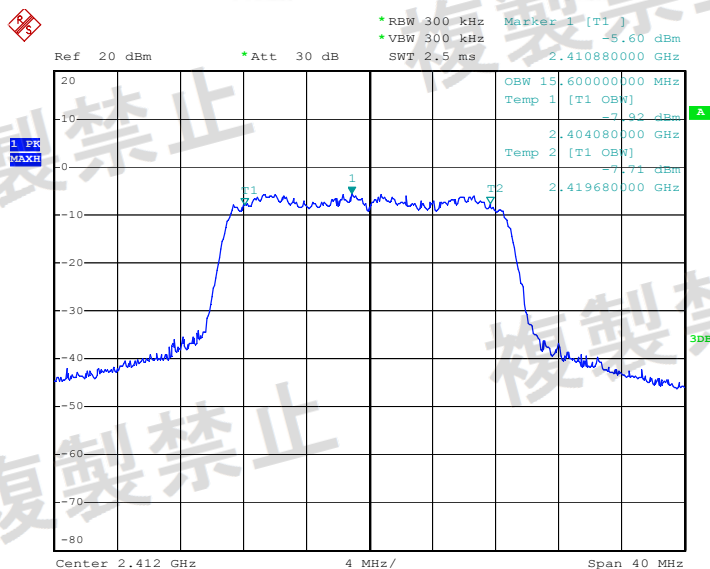
Date: 29.AUG.2018 16:31:11

Channel 13:2.472GHz:



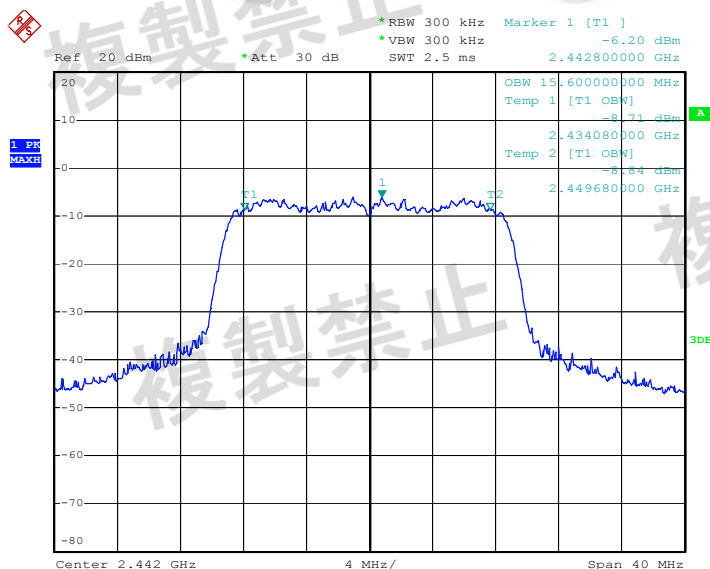
Date: 29.AUG.2018 16:41:19

OFDM mode with 6.5Mbps data rate
802.11n(HT20)
Channel 1:2.412 GHz:



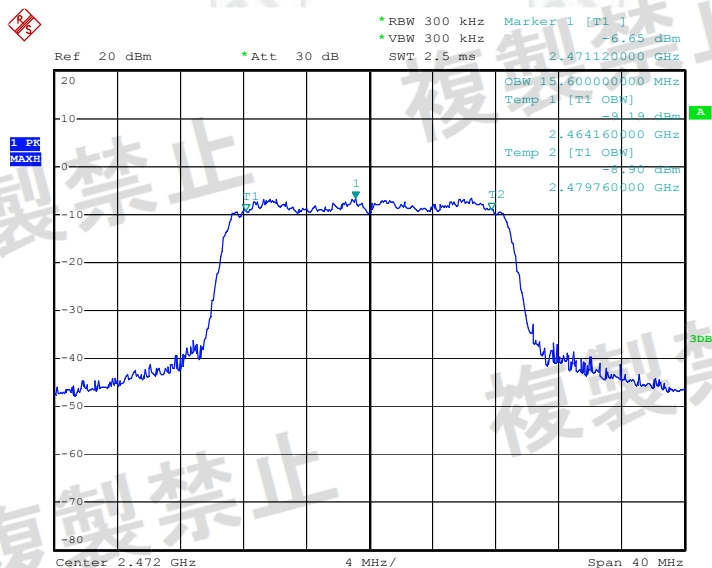
Date: 29.AUG.2018 16:16:22

Channel 7:2.442 GHz:



Date: 29.AUG.2018 16:12:13

Channel 13:2.472GHz:



Date: 29.AUG.2018 16:08:19

Test result: The unit does meet the requirements.

7.1.6 Antenna Power

Test Requirement:	Item 19 of Article 2 Paragraph 1		
Test Method:	MIC Notice No.88 Appendix No.43		
EUT Operation:			
Ambient:	Temp.: 24°C	Humid.: 52%	Press.: 1010 mbar
Test Status:	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). Following channel(s) was (were) selected for the final test as listed below.		
Test Configuration:	EUT → Spectrum Analyzer		
EUT conditions:	Modulation/Spread/Hopping on, PN9 Modulation Tx For equipment using diffusion code, set to the test diffusion code and modulate with standard coding test signal.		
Spectrum Analyzer conditions(FHSS):	Frequency: Test Frequency Span 40 MHz (DSSS,OFDM) RBW 1 MHz VBW 1 MHz Sweep Time Auto detector mode Positive peak Indication mode Max hold		
Technical standard:	Antenna Power (1) FH, FH+DS , FH+OFDM 3mW/MHz or less (used in the range of 2427 - 2470.75 MHz) (2) OFDM , DS other than (1) 10mW/MHz or less (3) Other than (1) & (2) 10mW or less Tolerance: +20% -80%		
Test result:	PASS		

Measurement Record:

Uncertainty: ± 10 kHz / ± 1 dB

Test result:

Pre-scan under all rate at lowest channel 1

Mode	802.11b							
Data Rate	1Mbps	2Mbps	5.5Mbps	11Mbps				
EIRP(dBm)	-3.25	-3.01	-2.91	-2.73				
Mode	802.11g							
Data Rate	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
EIRP(dBm)	0.51	0.45	0.31	0.25	0.18	0.11	0.07	0.01
Mode	802.11n (HT20)							
Data Rate	6.5Mbps	13Mbps	19.5Mbps	26Mbps	39Mbps	52Mbps	58.5Mbps	65Mbps
EIRP(dBm)	0.51	0.43	0.38	0.33	0.25	0.20	0.12	0.03

Through Pre-scan, 11Mbps of rate the power is the worst case of 802.11b; 6Mbps of rate the power is the worst case of 802.11g; 6.5Mbps of rate the power is the worst case of 802.11n (HT20);

DSSS mode:

802.11b

Test channel	Test Frequency (MHz)	Test Result			Unit	Limit
		Normal Voltage	High Voltage	Low Voltage		
		100V AC	110V AC	90V AC		
Lowest	2412.0	0.533	N/A	N/A	mW/MHz	10mW/MHz or less Error + 20%~-80%
		-33.33	N/A	N/A	%	
Middle	2442.0	0.441	N/A	N/A	mW/MHz	
		-44.93	N/A	N/A	%	
Highest	2472.0	0.448	N/A	N/A	mW/MHz	
		-44.04	N/A	N/A	%	

The rate conducted power is 802.11b: 0.80 mW/MHz,
Tolerance (%) :[(test value- rate power)/rater power]*100

**OFDM mode:
802.11g**

Test channel	Test Frequency (MHz)	Test Result			Unit	Limit
		Normal Voltage	High Voltage	Low Voltage		
		100V AC	110V AC	90V AC		
Lowest	2412.0	1.125	N/A	N/A	mW/MHz	10mW /MHz or less Error + 20% ~ -80%
		-25.03	N/A	N/A	%	
Middle	2442.0	1.081	N/A	N/A	mW/MHz	
		-27.90	N/A	N/A	%	
Highest	2472.0	1.021	N/A	N/A	mW/MHz	
		-31.94	N/A	N/A	%	

The rate conducted power is 802.11g: 1.50 mW/MHz,

Tolerance (%) :[(test value- rate power)/rater power]*100

802.11n

Test channel	Test Frequency (MHz)	Test Result			Unit	Limit
		Normal Voltage	High Voltage	Low Voltage		
		100V AC	110V AC	90V AC		
Lowest	2412.0	1.125	N/A	N/A	mW/MHz	10mW /MHz or less Error + 20%~ -80%
		-25.03	N/A	N/A	%	
Middle	2442.0	0.906	N/A	N/A	mW/MHz	
		-39.62	N/A	N/A	%	
Highest	2472.0	0.959	N/A	N/A	mW/MHz	
		-36.04	N/A	N/A	%	

Note:

The rate conducted power is 802.11n (HT20): 1.50 mW/MHz

Tolerance (%) :[(test value- rate power)/rater power]*100

Test result: The unit does meet the requirements.

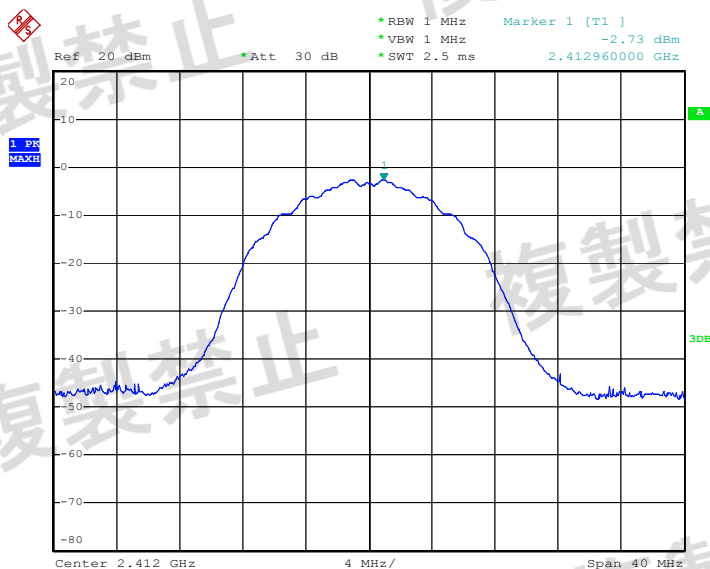
Result plot as follows:

Normal Voltage:100V

DSSS mode with 11Mbps data rate

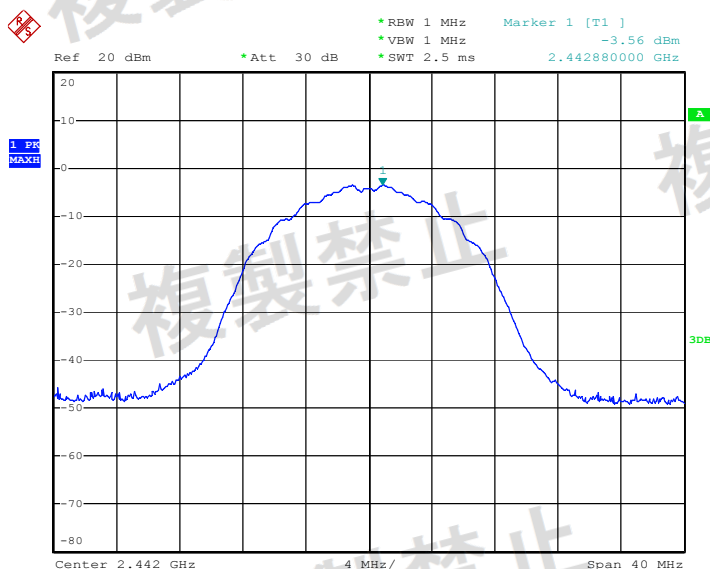
802.11b

Channel 1:2.412 GHz:



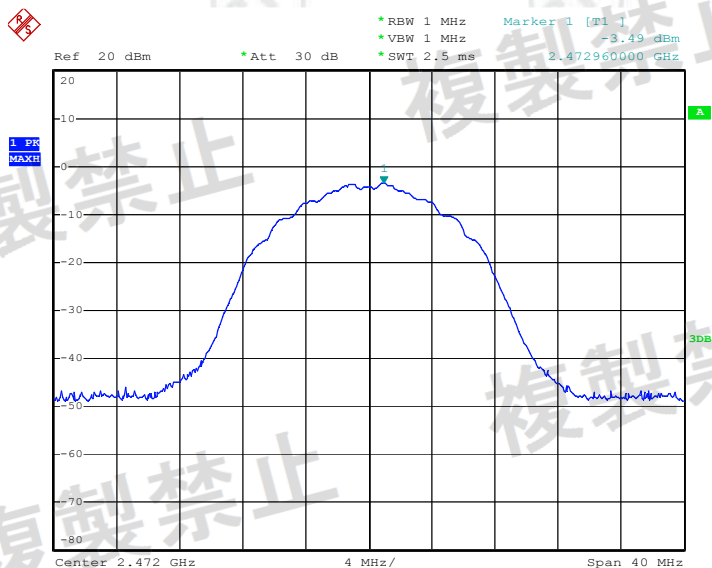
Date: 29.AUG.2018 14:40:40

Channel 7:2.442 GHz:



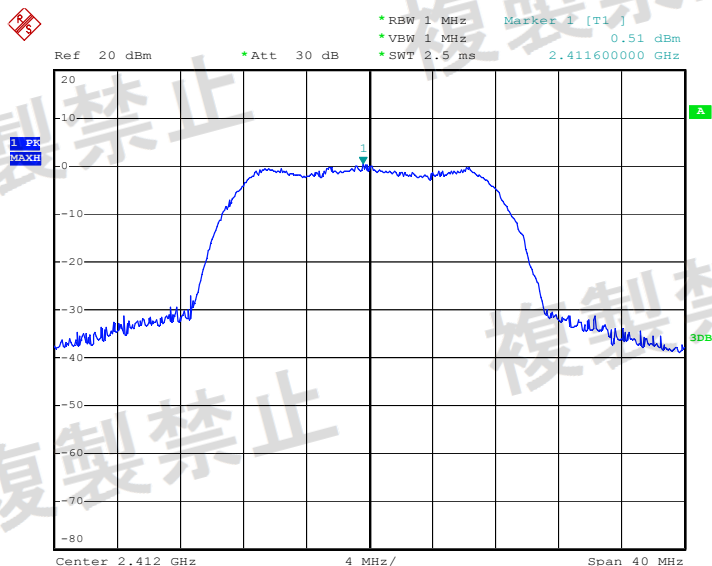
Date: 29.AUG.2018 14:41:21

Channel 13:2.472GHz:



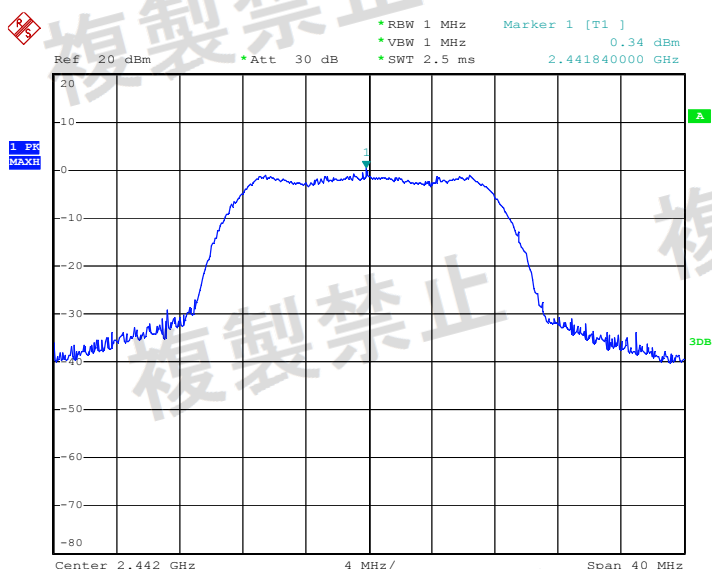
Date: 29.AUG.2018 14:42:01

OFDM mode with 6Mbps data rate
802.11g
Channel 1:2.412 GHz:



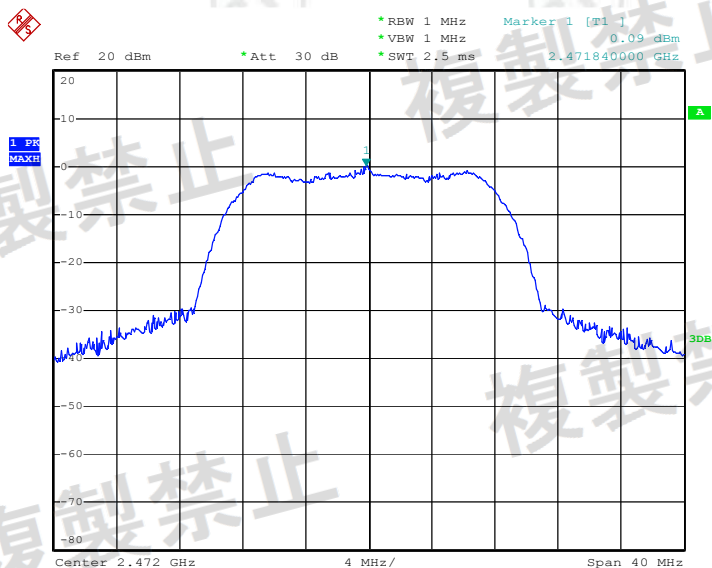
Date: 29.AUG.2018 14:48:52

Channel 7:2.442 GHz:



Date: 29.AUG.2018 14:53:20

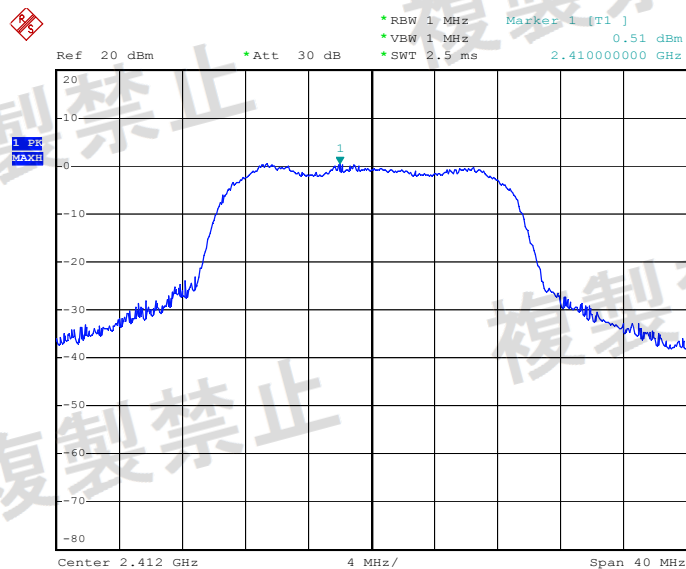
Channel 13:2.472GHz:



Date: 29.AUG.2018 15:01:54

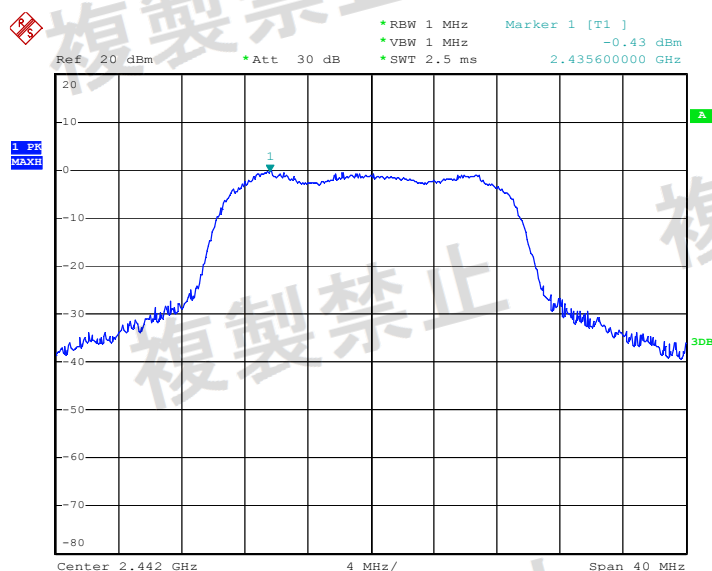
OFDM mode with 6.5Mbps data rate
802.11n (HT20)

Channel 1:2.412 GHz:



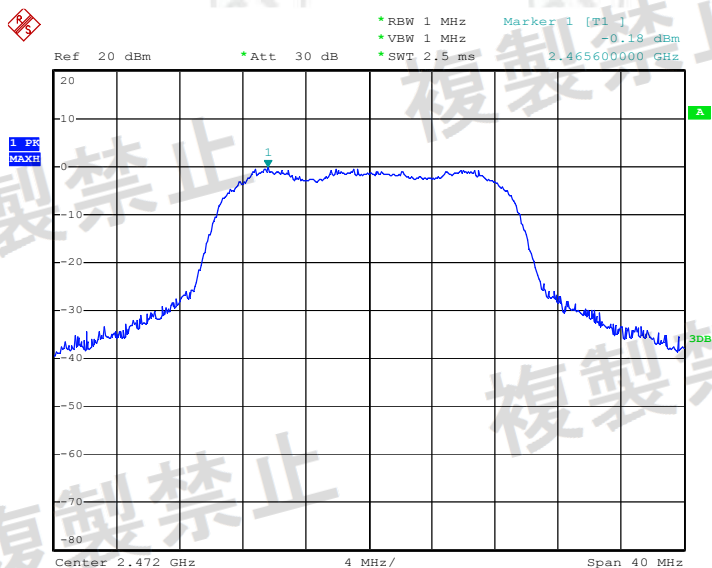
Date: 29.AUG.2018 15:11:00

Channel 7:2.442 GHz:



Date: 29.AUG.2018 15:19:04

Channel 13:2.472GHz:



Date: 29.AUG.2018 15:28:47

7.1.7 Spurious Emissions of Tx

Test Requirement:	Item 19 of Article 2 Paragraph 1		
Test Method:	MIC Notice No.88 Appendix No.43		
EUT Operation:			
Ambient:	Temp.: 24°C	Humid.: 52%	Press.: 1010 mbar
Test Status:	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). Following channel(s) was (were) selected for the final test as listed below.		
Test Configuration:	EUT → Spectrum Analyzer		
EUT conditions:	Modulation/Spread/Hopping on, PN9 Modulation Tx For equipment using diffusion code, set to the test diffusion code and modulate with standard coding test signal.		
Measurement Procedure:	Step1 All spurious are measured from 30MHz to 13GHz by peak mode. Step2 IF the value measured by Step1 is 2dB or less, measure in average mode.		
Spectrum Analyzer conditions(Step 1):	Frequency: 30MHz – 2400MHz, 2483.5MHz –13GHz RBW 1000kHz (30 – 1GHz), 1000KHz (over 1GHz) VBW 1000kHz (30 – 1GHz), 1000KHz (over 1GHz) Sweep Time Auto detector mode Positive peak Indication mode Max hold		
Spectrum Analyzer conditions(Step 2):	Frequency: Spurious Frequency Span 0Hz RBW 1MHz VBW 1MHz Sweep Time Auto Detector mode Sample Indication mode Max hold		
Technical standard:	(1) Below 2387 MHz : 2.5μW/MHz (2) 2387 to 2400 MHz : 25μW/MHz (3) 2483.5 through 2496.5 MHz : 25μW/MHz (4) Over 2496.5 MHz : 2.5μW/MHz		
Test result:	PASS		

Measurement Record:

Uncertainty: $\pm 1\text{dB}$

Test result:

DSSS mode:

802.11b

Test channel	Test Frequency (MHz)	Test Result			Unit	Limit
		Normal Voltage	High Voltage	Low Voltage		
		100V AC	N/A	N/A		
Lowest	675.818	-44.85	N/A	N/A	dBm	(1) Below 2387 MHz: -26dBm/MHz (2) 2387 to 2400 MHz :-16dBm/MHz (3) 2483.5 through 2496.5 MHz : -16dBm/MHz (4) Over 2496.5 MHz: -26dBm/MHz
	2399.948	-42.71	N/A	N/A		
	2485.918	-47.10	N/A	N/A		
	7874.292	-42.85	N/A	N/A		
Middle	704.102	-43.82	N/A	N/A		
	2390.640	-46.05	N/A	N/A		
	2495.590	-46.07	N/A	N/A		
	3168.724	-42.66	N/A	N/A		
Highest	732.386	-44.06	N/A	N/A		
	2395.866	-46.03	N/A	N/A		
	2483.604	-42.64	N/A	N/A		
	3609.871	-42.60	N/A	N/A		

OFDM mode:

802.11g

Test channel	Test Frequency (MHz)	Test Result			Unit	Limit
		Normal Voltage	High Voltage	Low Voltage		
		100V AC	N/A	N/A		
Lowest	2387.000	-43.10	N/A	N/A	dBm	(1) Below 2387 MHz: -26dBm/MHz (2) 2387 to 2400 MHz :-16dBm/MHz (3) 2483.5 through 2496.5 MHz : -16dBm/MHz (4) Over 2496.5 MHz: -26dBm/MHz
	2399.714	-28.88	N/A	N/A		
	2496.214	-46.06	N/A	N/A		
	3252.752	-42.19	N/A	N/A		
Middle	1948.598	-45.14	N/A	N/A		
	2399.428	-43.04	N/A	N/A		
	2484.410	-44.57	N/A	N/A		
	3651.885	-42.62	N/A	N/A		
Highest	732.386	-43.61	N/A	N/A		
	2398.076	-46.14	N/A	N/A		
	2484.098	-28.28	N/A	N/A		
	6298.767	-42.71	N/A	N/A		

802.11n (HT20)

Test channel	Test Frequency (MHz)	Test Result			Unit	Limit
		Normal Voltage	High Voltage	Low Voltage		
		100V AC	N/A	N/A		
Lowest	2382.286	-42.68	N/A	N/A	dBm	(1) Below 2387 MHz: -26dBm/MHz (2) 2387 to 2400 MHz :-16dBm/MHz (3) 2483.5 through 2496.5 MHz : -16dBm/MHz (4)Over 2496.5 MHz: -26dBm/MHz
	2399.688	-24.51	N/A	N/A		
	2491.924	-47.10	N/A	N/A		
	3189.731	-42.65	N/A	N/A		
Middle	708.816	-44.91	N/A	N/A		
	2397.374	-42.71	N/A	N/A		
	2486.984	-45.15	N/A	N/A		
	3651.885	-42.71	N/A	N/A		
Highest	737.100	-43.90	N/A	N/A		
	2395.346	-46.13	N/A	N/A		
	2483.604	-25.11	N/A	N/A		
	3147.717	-42.38	N/A	N/A		

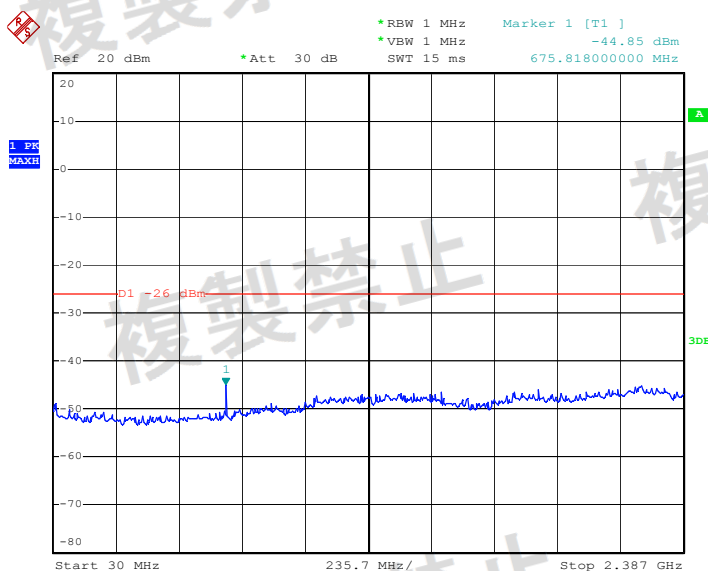
Result plot as follows:

DSSS mode with 11 Mbps data rate

802.11b

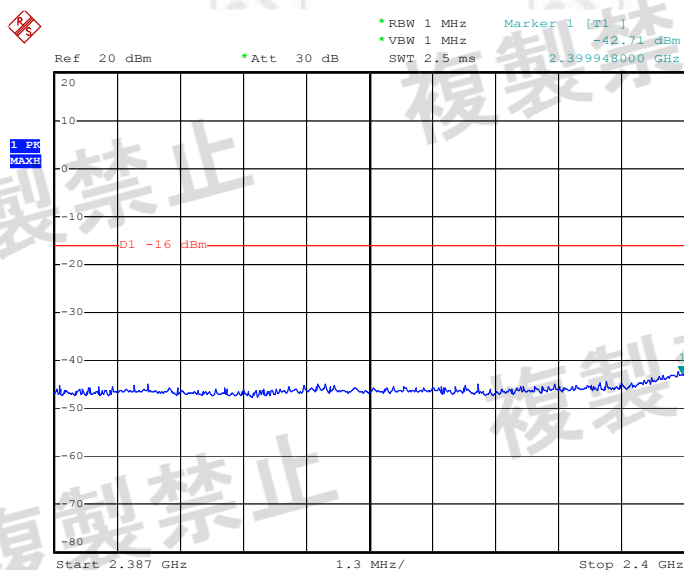
Channel 1: 2.412 GHz

30MHz to 2387MHz:



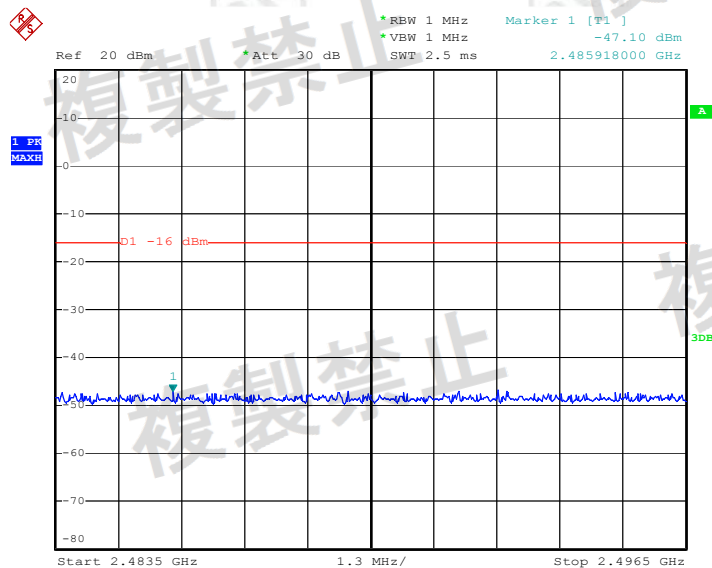
Date: 29.AUG.2018 17:25:59

2387MHz to 2400MHz:



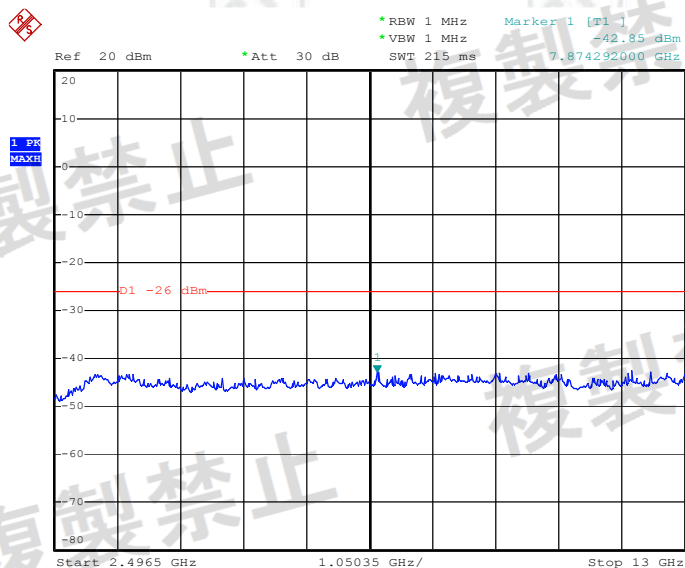
Date: 29.AUG.2018 17:46:28

2483.5MHz to 2496.5MHz:



Date: 29.AUG.2018 18:20:50

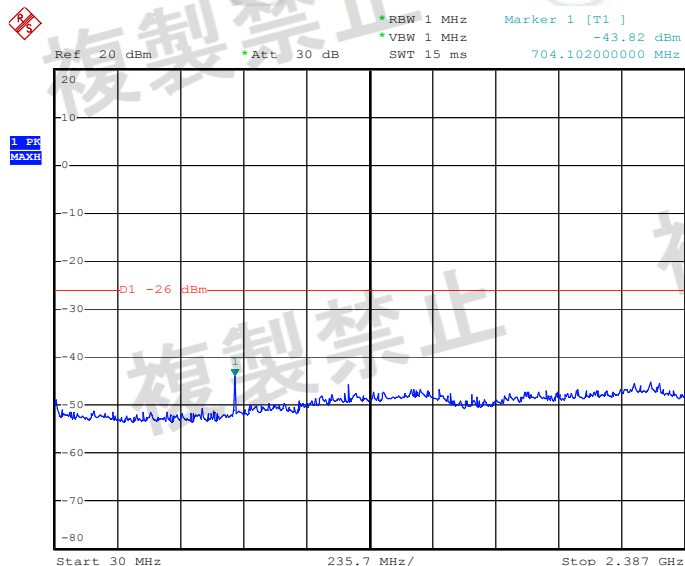
2496.5MHz to 13 GHz:



Date: 29.AUG.2018 18:24:50

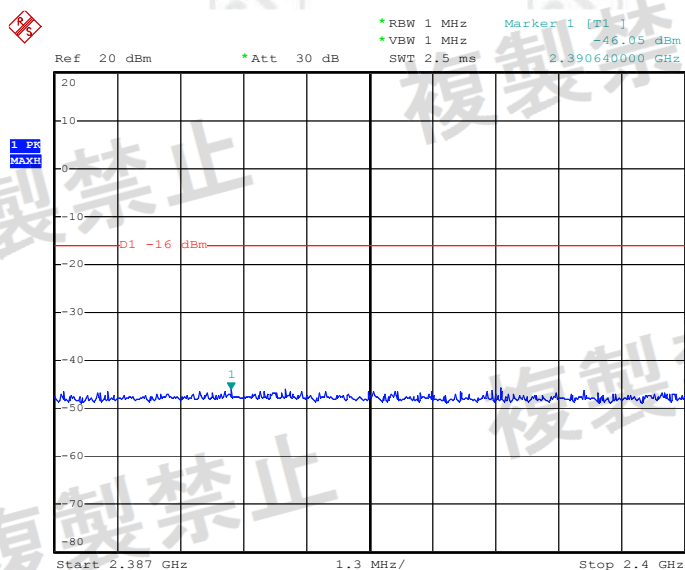
Channel 7: 2.442 GHz

30MHz to 2387MHz:



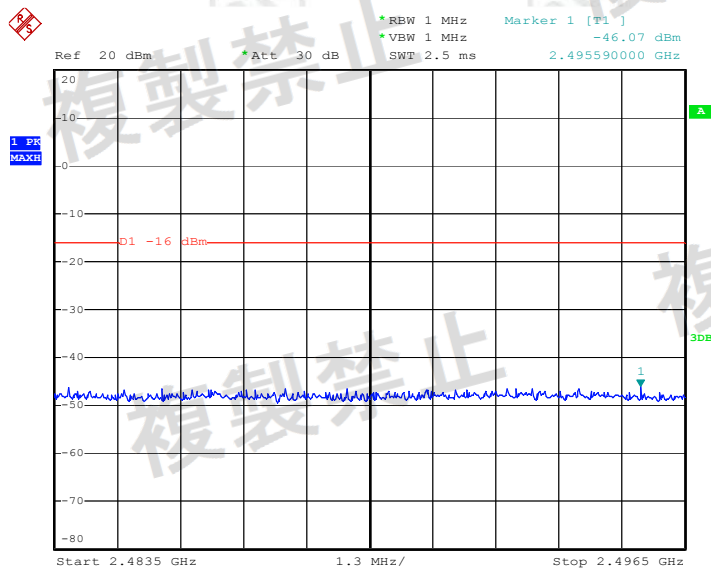
Date: 29.AUG.2018 17:26:35

2387MHz to 2400MHz:



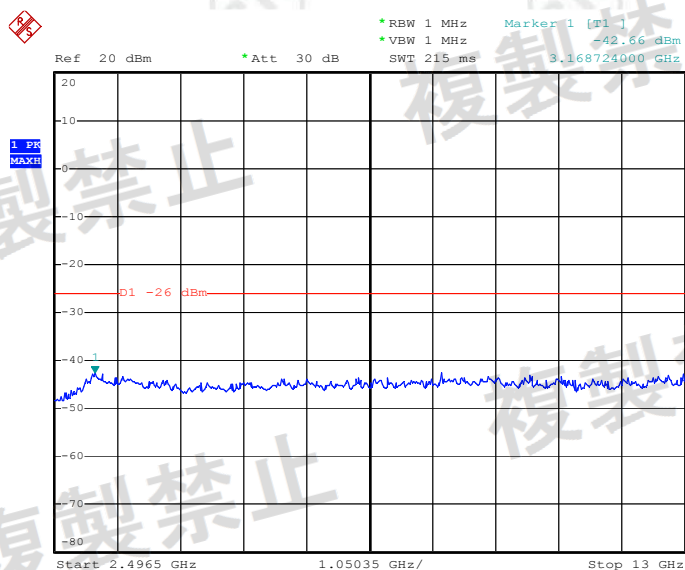
Date: 29.AUG.2018 17:53:26

2483.5MHz to 2496.5MHz:



Date: 29.AUG.2018 18:21:20

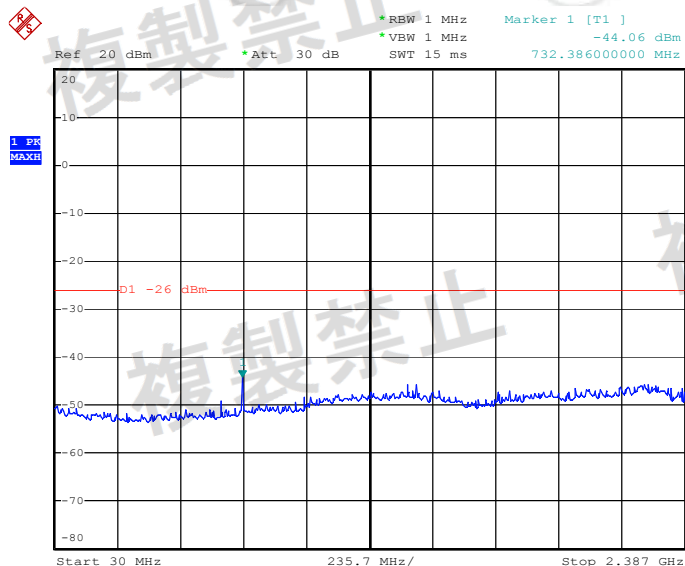
2496.5MHz to 13 GHz:



Date: 29.AUG.2018 18:24:24

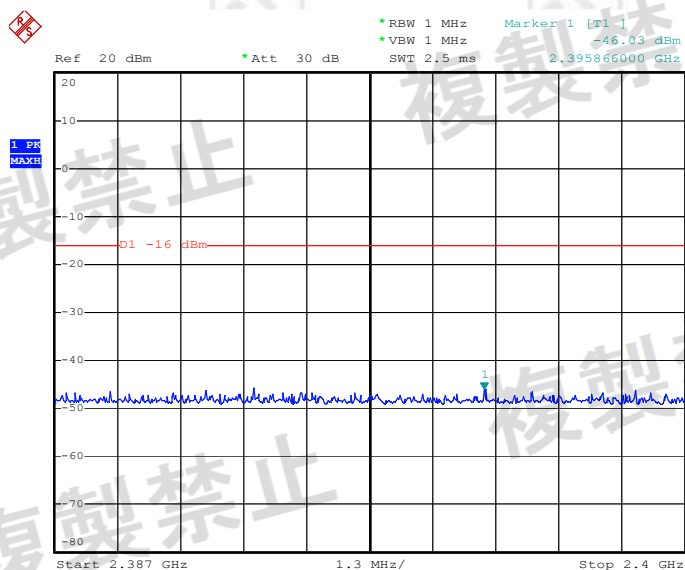
Channel 13: 2.472 GHz

30MHz to 2387MHz:



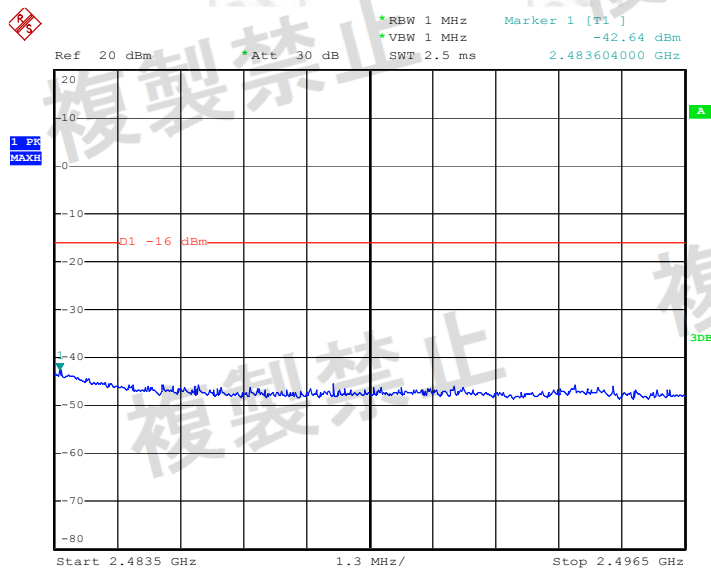
Date: 29.AUG.2018 17:27:03

2387MHz to 2400MHz:



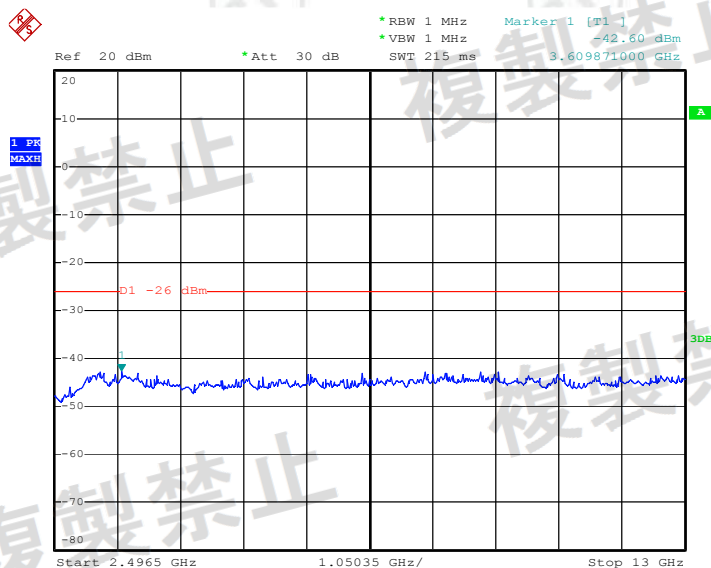
Date: 29.AUG.2018 17:53:51

2483.5MHz to 2496.5MHz:



Date: 29.AUG.2018 18:22:03

2496.5MHz to 13 GHz:



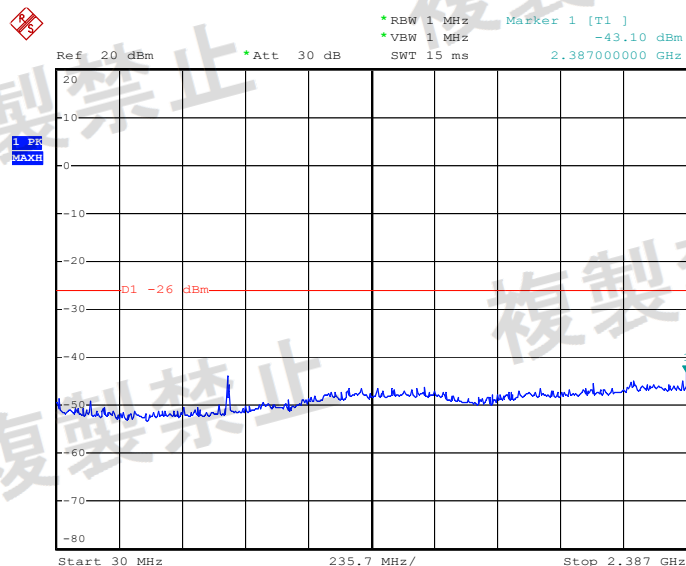
Date: 29.AUG.2018 18:23:52

OFDM mode with 6Mbps data rate

802.11g

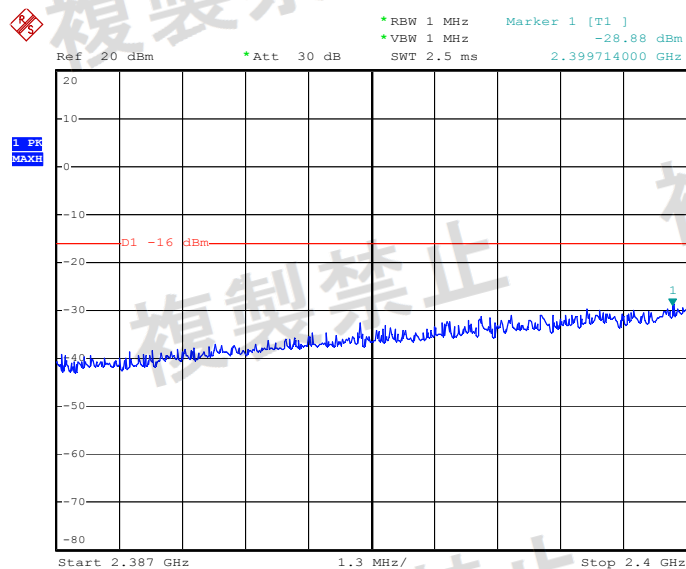
Channel 1: 2.412 GHz

30MHz to 2387MHz:



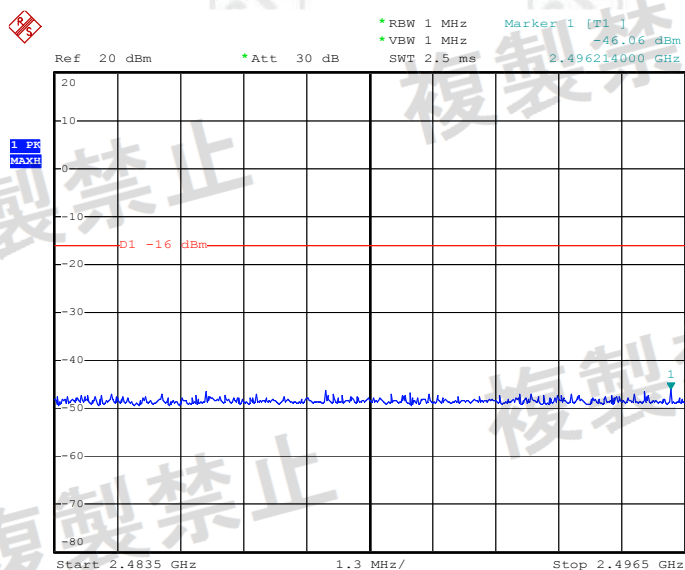
Date: 29.AUG.2018 17:22:29

2387MHz to 2400MHz:



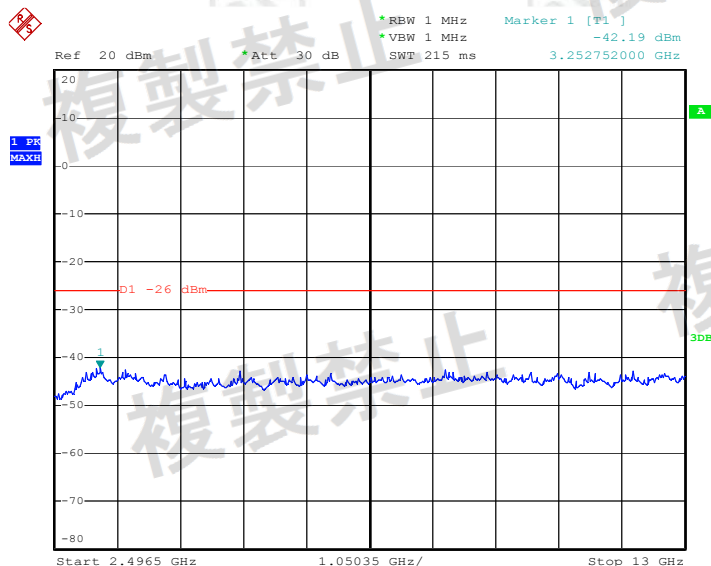
Date: 29.AUG.2018 17:51:48

2483.5MHz to 2496.5MHz:



Date: 29.AUG.2018 18:07:41

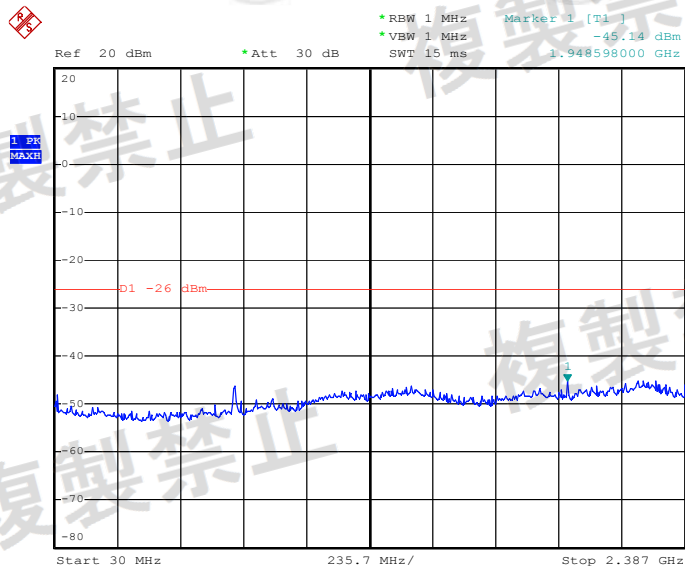
2496.5MHz to 13 GHz:



Date: 29.AUG.2018 18:25:35

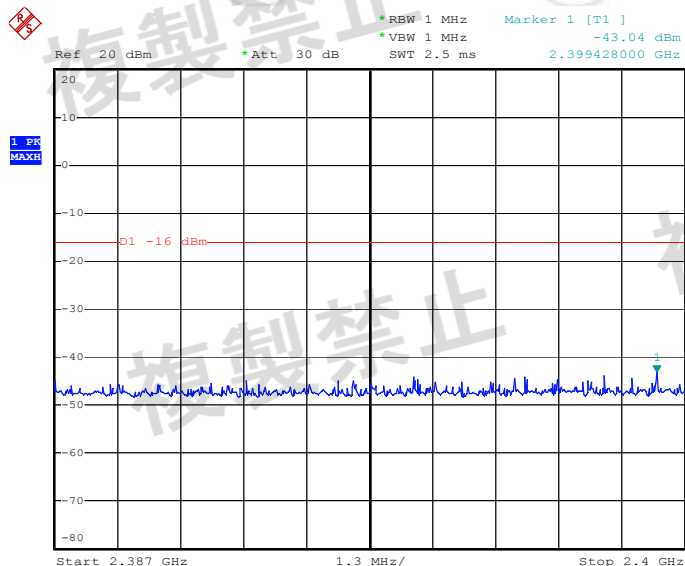
Channel 7: 2.442 GHz

30MHz to 2387MHz:



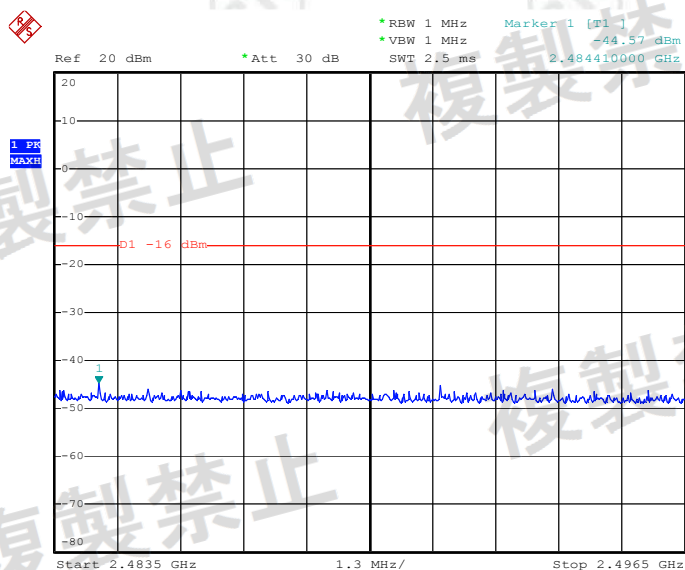
Date: 29.AUG.2018 17:24:27

2387MHz to 2400MHz:



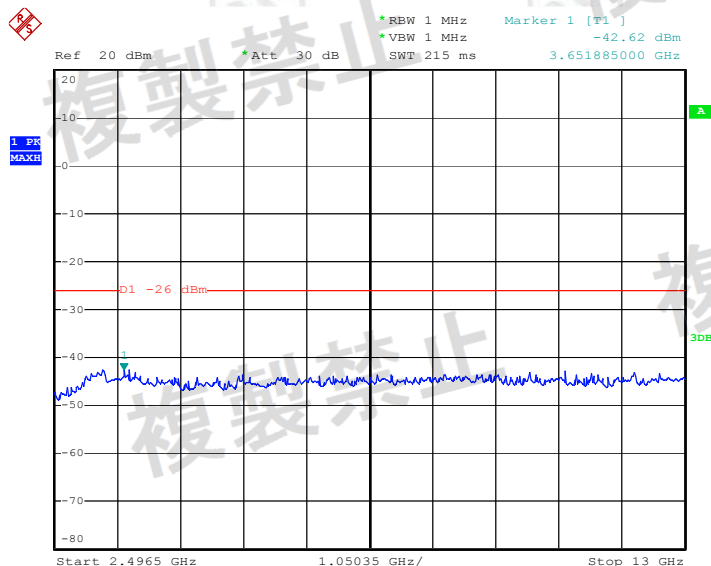
Date: 29.AUG.2018 17:52:25

2483.5MHz to 2496.5MHz:



Date: 29.AUG.2018 18:08:08

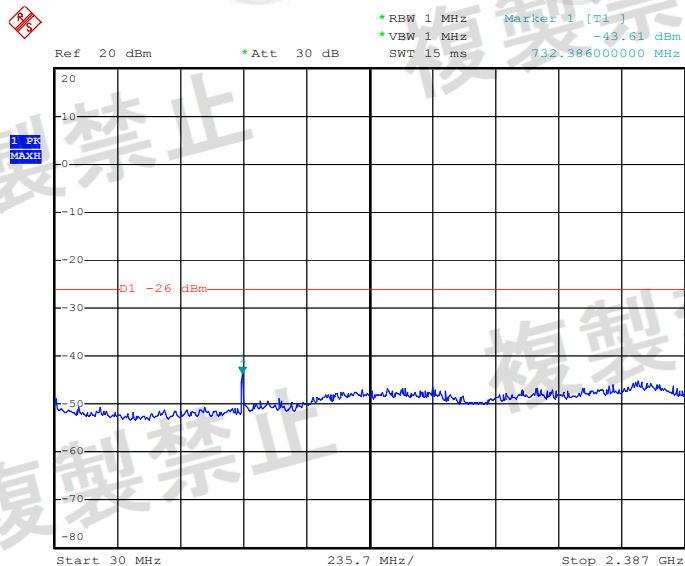
2496.5MHz to 13 GHz:



Date: 29.AUG.2018 18:26:06

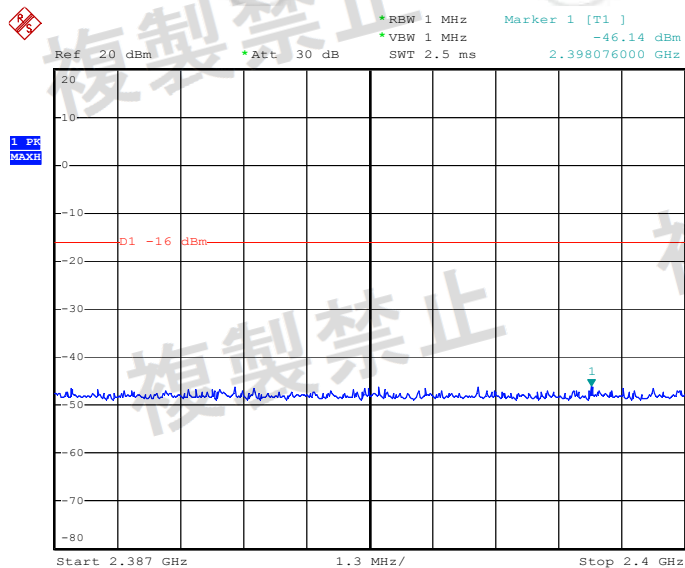
Channel 13: 2.472 GHz

30MHz to 2387MHz:



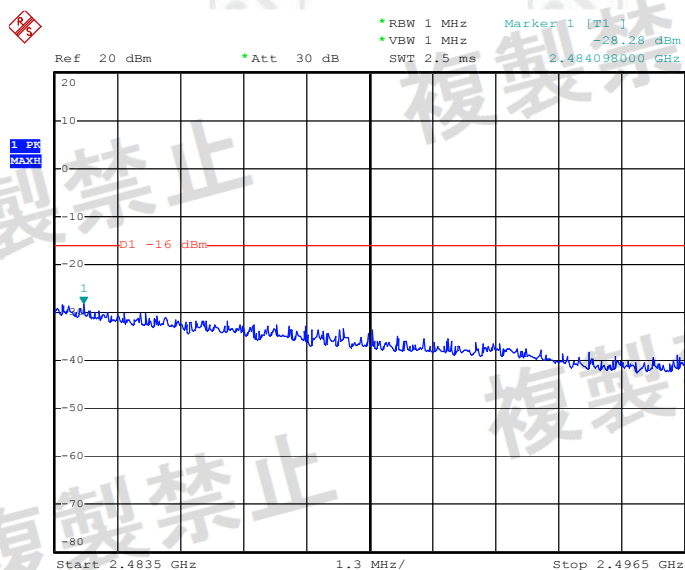
Date: 29.AUG.2018 17:25:05

2387MHz to 2400MHz:



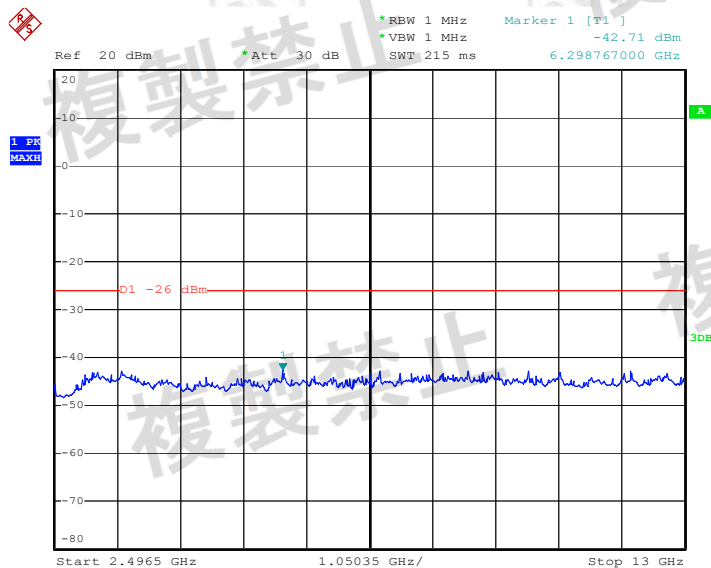
Date: 29.AUG.2018 17:52:51

2483.5MHz to 2496.5MHz:



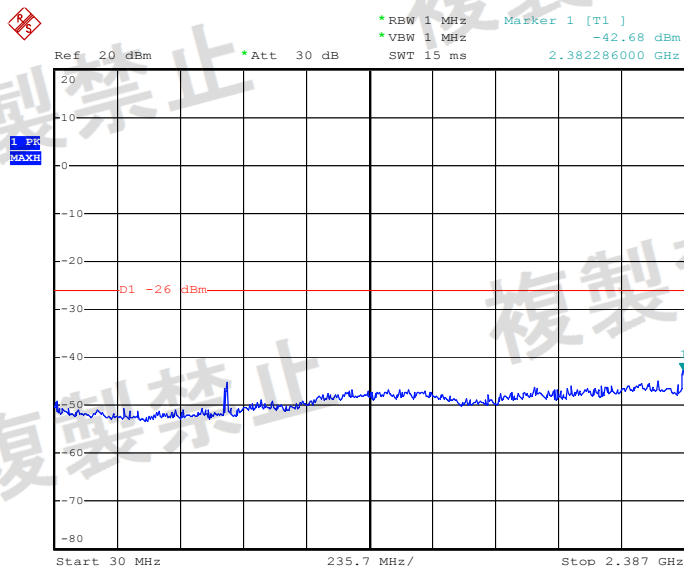
Date: 29.AUG.2018 18:20:05

2496.5MHz to 13 GHz:



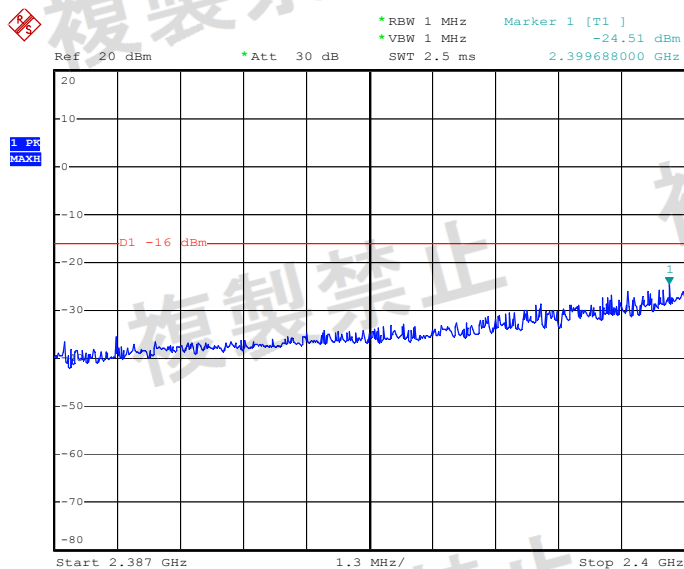
Date: 29.AUG.2018 18:26:33

OFDM mode with 6.5Mbps data rate
802.11n (HT20)
Channel 1: 2.412 GHz
30MHz to 2387MHz:



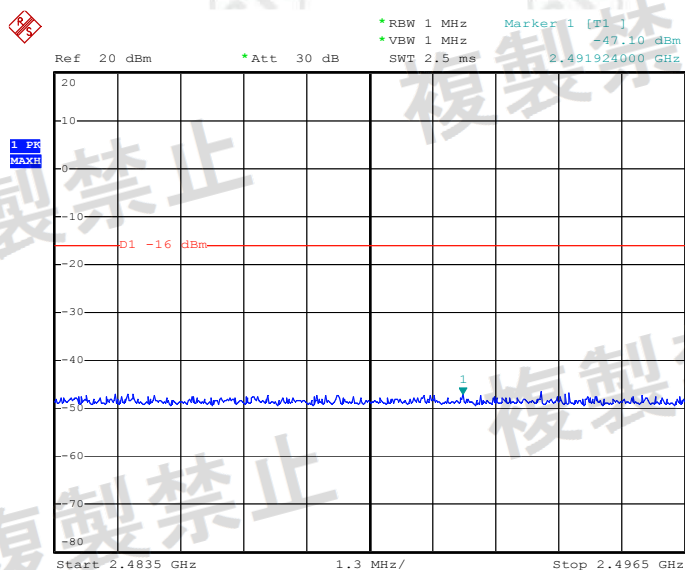
Date: 29.AUG.2018 17:27:54

2387MHz to 2400MHz:



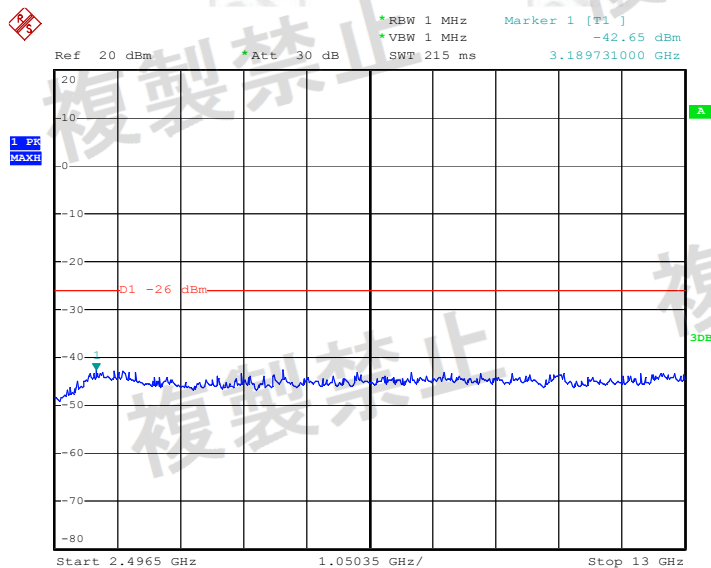
Date: 29.AUG.2018 17:56:36

2483.5MHz to 2496.5MHz:



Date: 29.AUG.2018 18:07:01

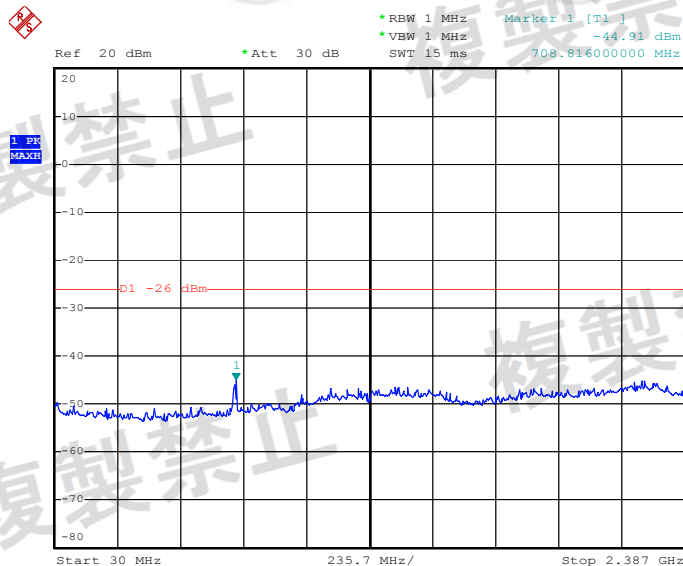
2496.5MHz to 13 GHz:



Date: 29.AUG.2018 18:27:09

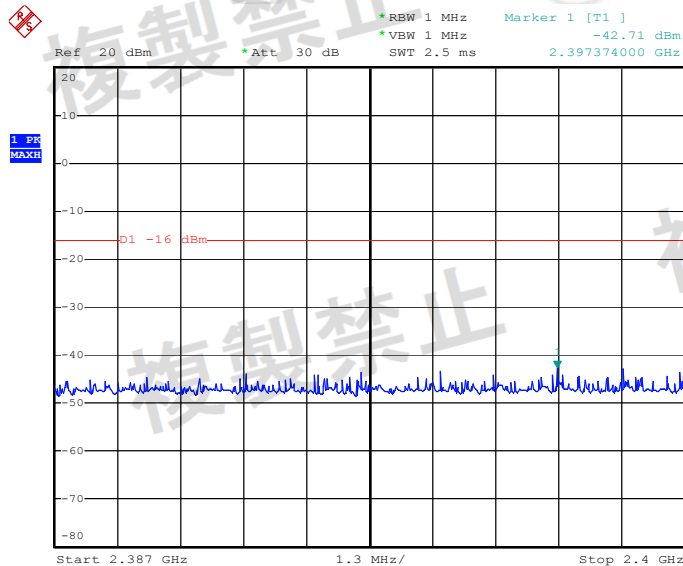
Channel 7: 2.442 GHz

30MHz to 2387MHz:



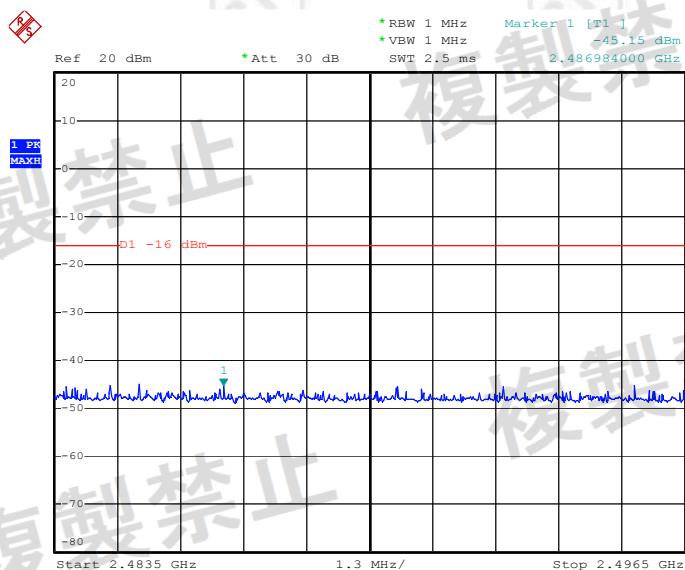
Date: 29.AUG.2018 17:28:31

2387MHz to 2400MHz:



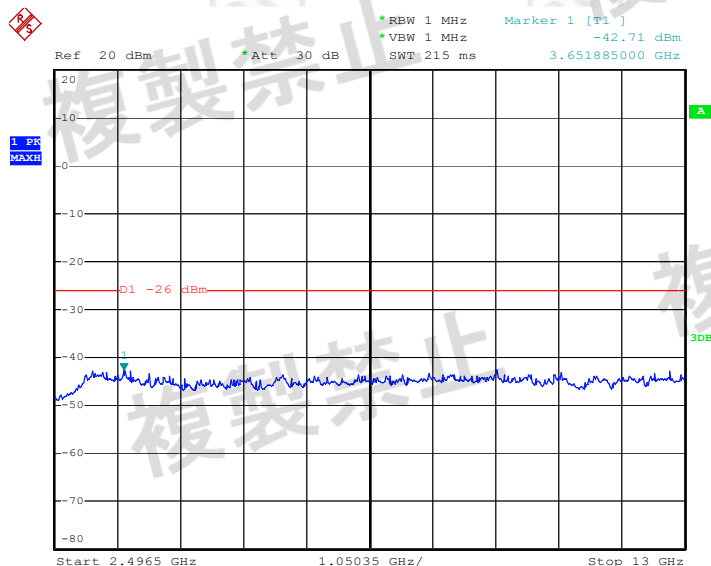
Date: 29.AUG.2018 17:57:06

2483.5MHz to 2496.5MHz:



Date: 29.AUG.2018 18:06:13

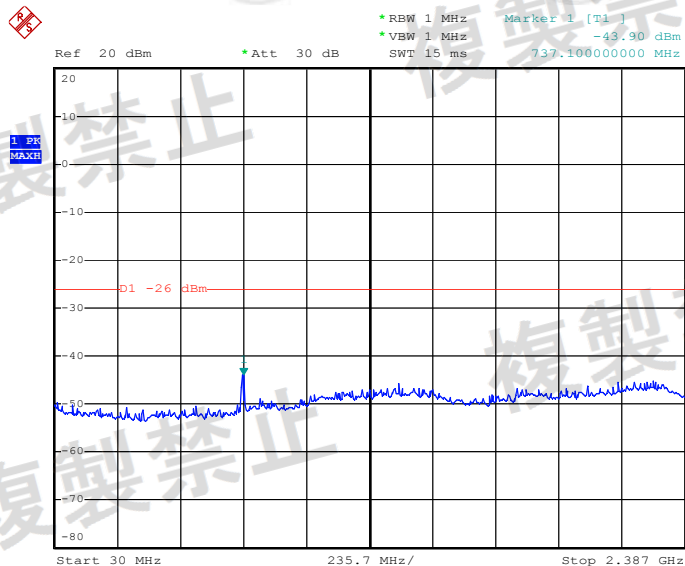
2496.5MHz to 13 GHz:



Date: 29.AUG.2018 18:27:41

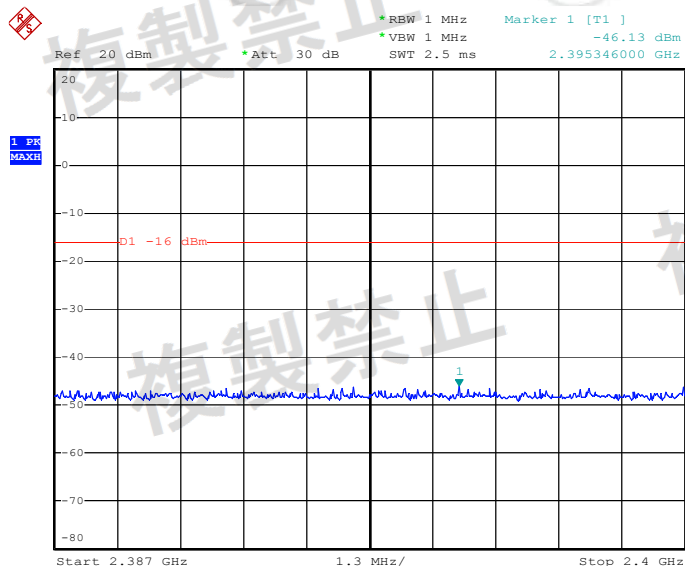
Channel 13: 2.472 GHz

30MHz to 2387MHz:



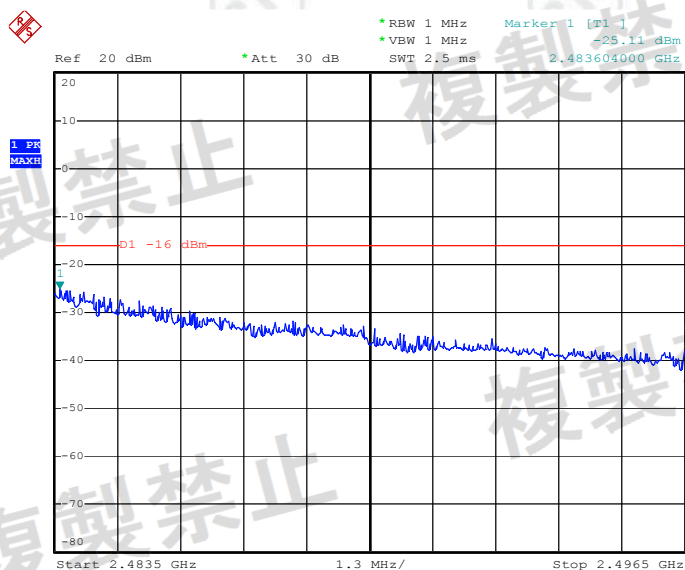
Date: 29.AUG.2018 17:29:06

2387MHz to 2400MHz:



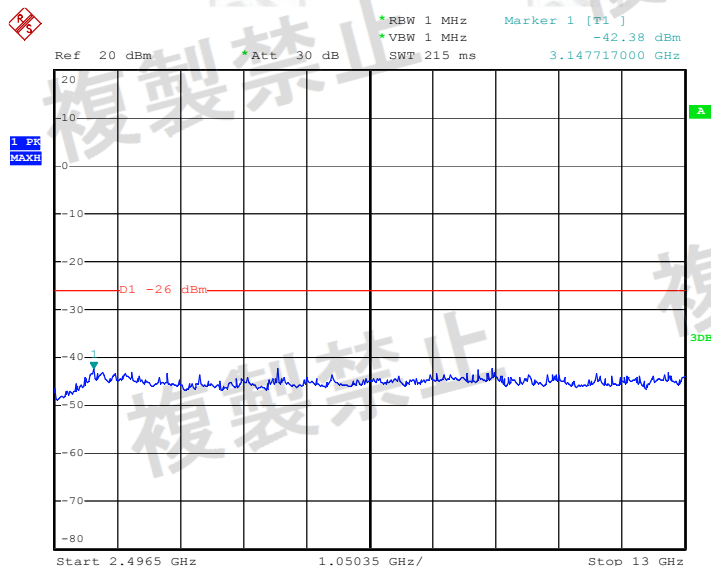
Date: 29.AUG.2018 17:57:37

2483.5MHz to 2496.5MHz:



Date: 29.AUG.2018 18:05:39

2496.5MHz to 13 GHz:



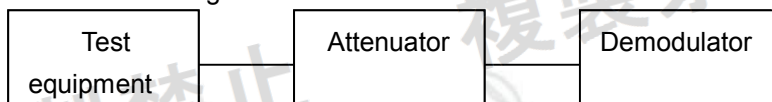
Date: 29.AUG.2018 18:28:09

Test result: The unit does meet the requirements.

7.1.8 Interference prevention function

1) Measurement system diagram

(1) When 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.



5) Test result: The unit does meet the requirements (Good).

Test result: PASS

7.1.9 RF accessibility

Standard requirement

Article 49-20, paragraph 1 (a)

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.

☐	Sealed with special screws.
☐	Plastic chassis is being welded using ultrasonic waves.
☐	Chassis is glued using a special adhesive.
☐	Metal covers are spot-fused.
☐	Cover is specially interlocked.
☒	RF and Modulation components are covered with shielding case and this shielding case is soldered.
☐	Shield case is welded at RF and modulation parts, and ID-ROM is welded using the BGA Method.
☐	Shield case is welded at RF and modulation parts, and ID-ROM is glued at its lead with a special adhesive.
☐	Shield case is welded at RF and modulation parts, and ID-ROM is glued with anon-transparent laminating agent.
☐	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.



7.2 Receiver Requirements

7.2.1 Spurious Emissions of Rx

Test Requirement:	Item 19 of Article 2 Paragraph 1		
Test Method:	MIC Notice No.88 Appendix No.43		
EUT Operation:			
Ambient:	Temp.: 24°C	Humid.: 52%	Press.: 1010 mbar
Test Status:	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). Following channel(s) was (were) selected for the final test as listed below.		
Test Configuration:	 <pre> graph LR EUT[EUT] --> SA[Spectrum Analyzer] </pre>		
EUT conditions:	Rx		
Measurement Procedure:	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.		
Spectrum Analyzer conditions(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		
Spectrum Analyzer Conditions(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		
Technical standard:	(1) Below 1 GHz : 4 nW or less (2) 1 GHz and over : 20 nW or less		
Test result:	PASS		

Test Result:
802.11b

Test channel	Test Frequency (MHz)	Test Result			Unit	Limit
		Normal Voltage	High Voltage	Low Voltage		
		100V AC	N/A	N/A		
Lowest	179.380	-67.79	N/A	N/A	dBm	(1) Below 1 GHz : -54dBm (2) 1 GHz to 13 GHz : -47dBm
	9400.000	-63.24	N/A	N/A		
Middle	842.860	-63.13	N/A	N/A		
	8608.000	-62.90	N/A	N/A		
Highest	842.860	-64.85	N/A	N/A		
	3256.000	-62.83	N/A	N/A		

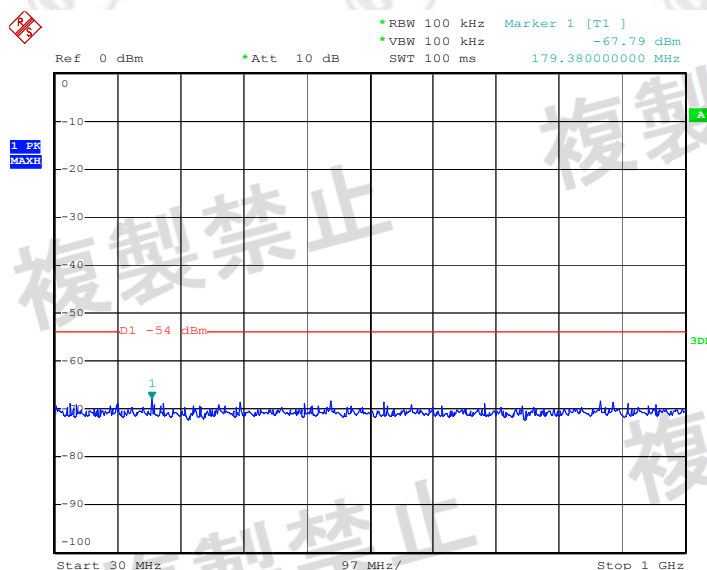
Result plot as follows

(Normal Voltage 100V):

802.11b

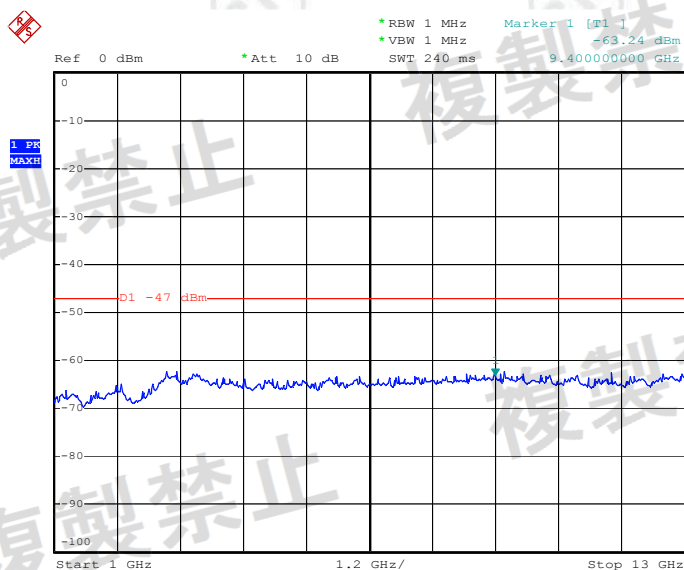
Channel 1: 2.412 GHz

30MHz to 1 GHz:



Date: 20.AUG.2018 11:30:51

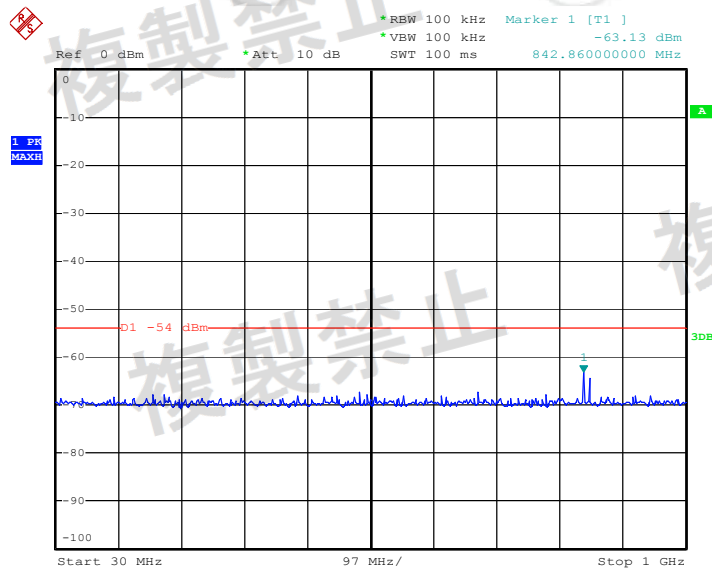
1 GHz to 13 GHz:



Date: 20.AUG.2018 13:10:58

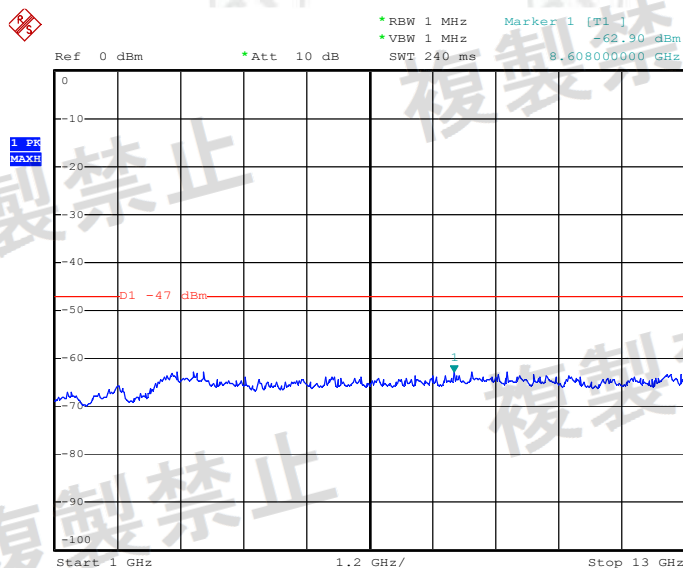
Channel 7: 2.442 GHz

30MHz to 1 GHz:



Date: 20.AUG.2018 11:33:17

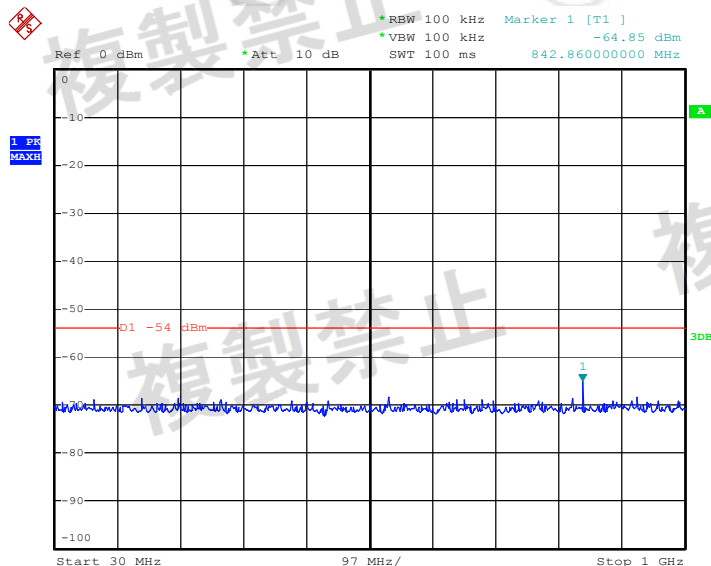
1 GHz to 13 GHz:



Date: 20.AUG.2018 13:11:28

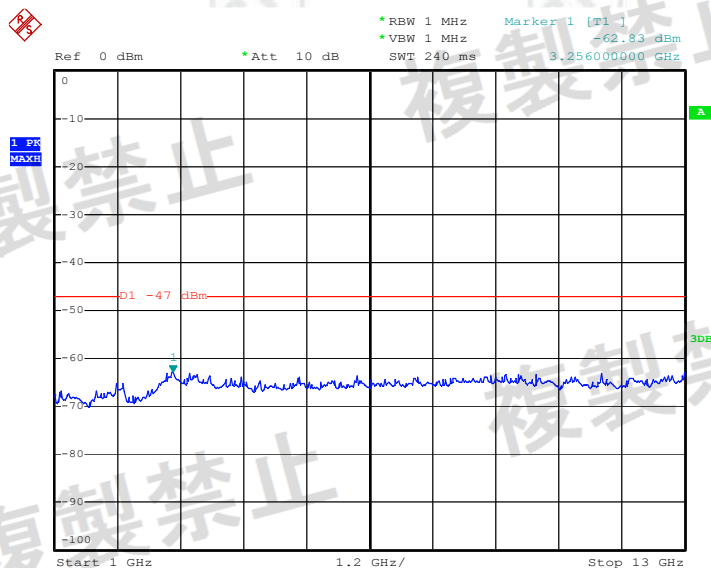
Channel 13: 2.472 GHz

30 MHz to 1 GHz:



Date: 20.AUG.2018 11:33:43

1 GHz to 13 GHz:



Date: 20.AUG.2018 13:11:54

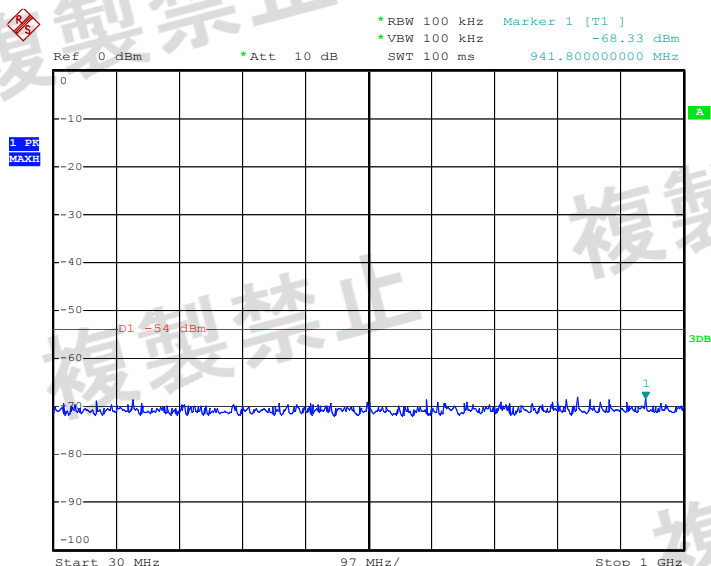
802.11g

Test Channel	Test Frequency (MHz)	Test Result			Unit	Limit
		Normal Voltage	High Voltage	Low Voltage		
		AC100V	N/A	N/A		
Lowest	941.800	-68.33	N/A	N/A	dBm	(1) Below 1 GHz : -54dBm (2) 1 GHz to 13 GHz : -47dBm
	3232.000	-61.89	N/A	N/A		
Middle	460.680	-69.06	N/A	N/A		
	8056.000	-62.30	N/A	N/A		
Highest	474.260	-67.81	N/A	N/A		
	9808.000	-62.66	N/A	N/A		

802.11g

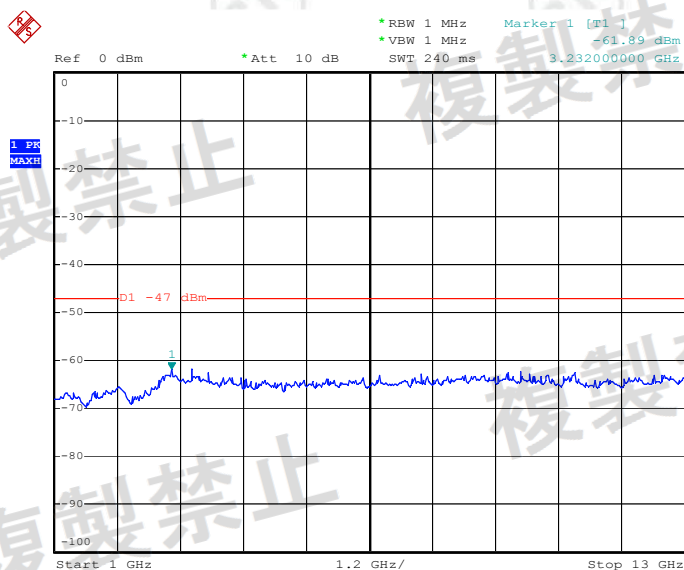
Channel 1: 2.412 GHz

30MHz to 1 GHz:



Date: 20.AUG.2018 11:47:07

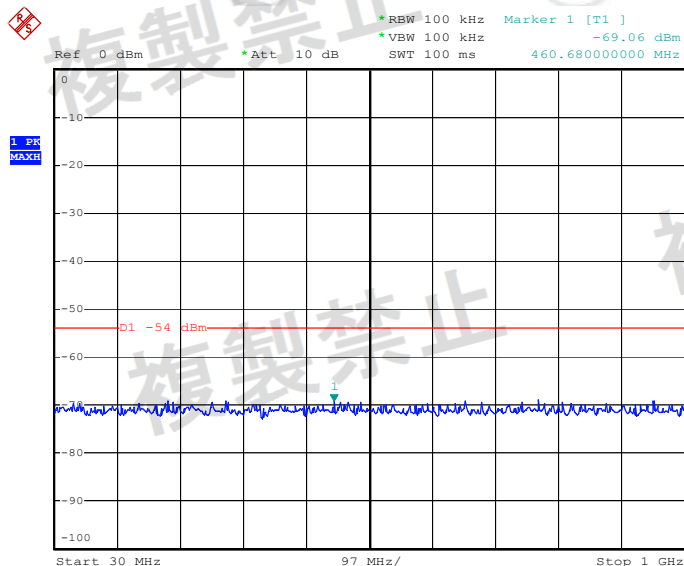
1 GHz to 13 GHz:



Date: 20.AUG.2018 13:13:11

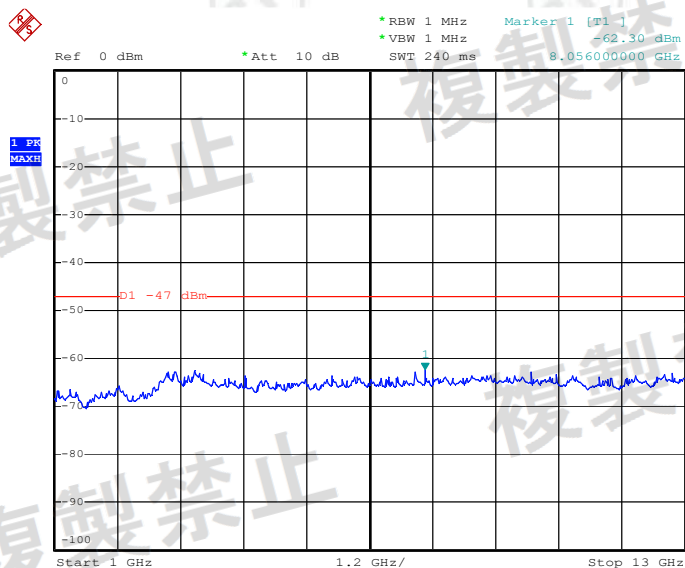
Channel 7: 2.442 GHz

30MHz to 1 GHz:



Date: 20.AUG.2018 11:47:23

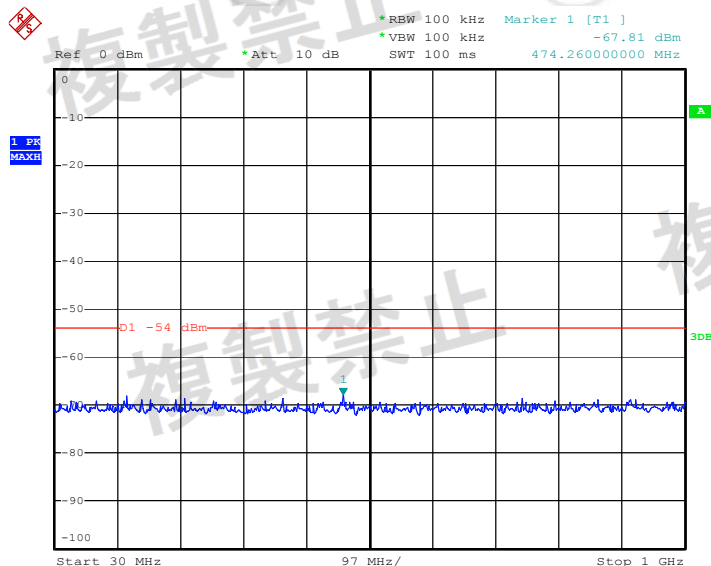
1 GHz to 13 GHz:



Date: 20.AUG.2018 13:13:41

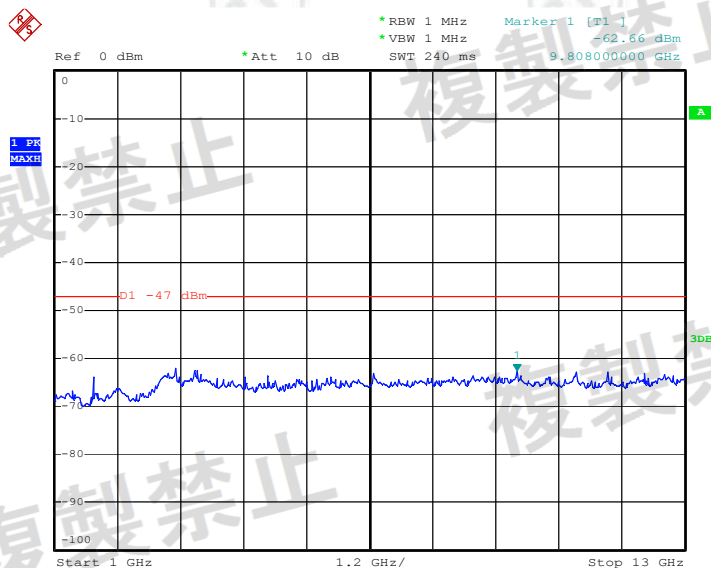
Channel 13: 2.472 GHz

30 MHz to 1 GHz:



Date: 20.AUG.2018 11:47:43

1 GHz to 13 GHz:



Date: 20.AUG.2018 13:14:12

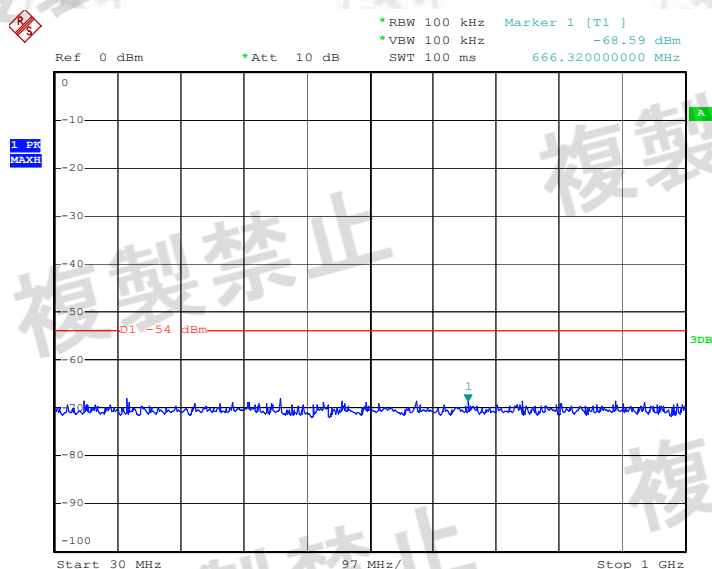
802.11n(HT20)

Test Channel	Test Frequency (MHz)	Test Result			Unit	Limit
		Normal Voltage	High Voltage	Low Voltage		
		AC100V	N/A	N/A		
Lowest	666.320	-68.59	N/A	N/A	dBm	(1) Below 1 GHz : -54dBm (2) 1 GHz to 13 GHz : -47dBm
	3616.000	-61.62	N/A	N/A		
Middle	889.420	-67.97	N/A	N/A		
	8392.000	-63.01	N/A	N/A		
Highest	218.180	-69.09	N/A	N/A		
	6304.000	-62.43	N/A	N/A		

802.11n

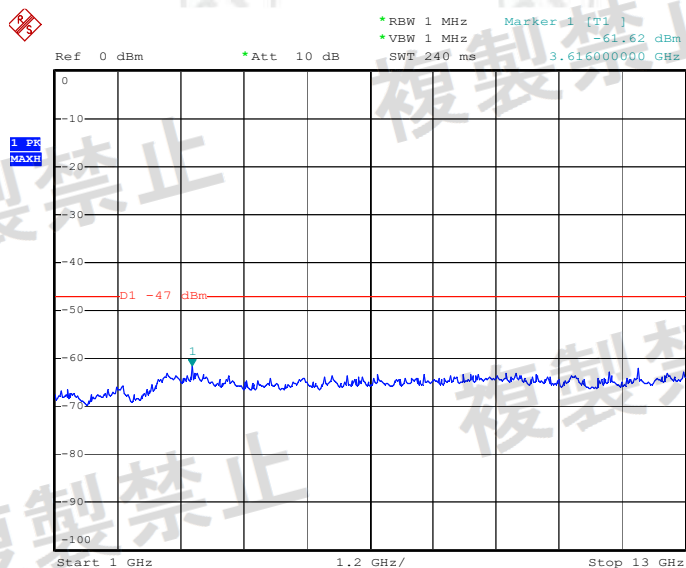
Channel 1: 2.412 GHz

30MHz to 1 GHz:



Date: 20.AUG.2018 11:48:13

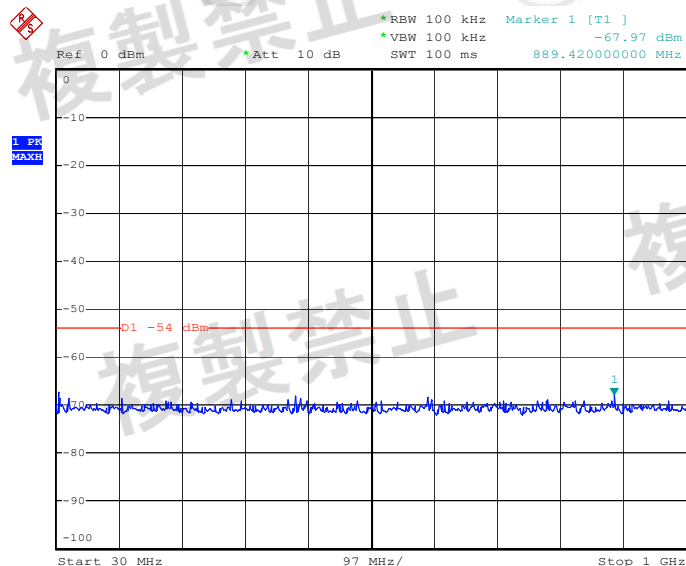
1 GHz to 13 GHz:



Date: 20.AUG.2018 13:15:19

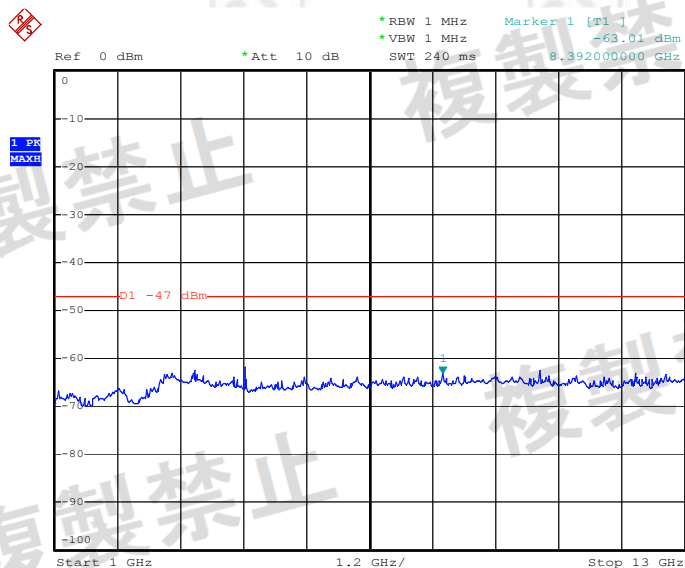
Channel 7: 2.442 GHz

30MHz to 1 GHz:



Date: 20.AUG.2018 11:48:37

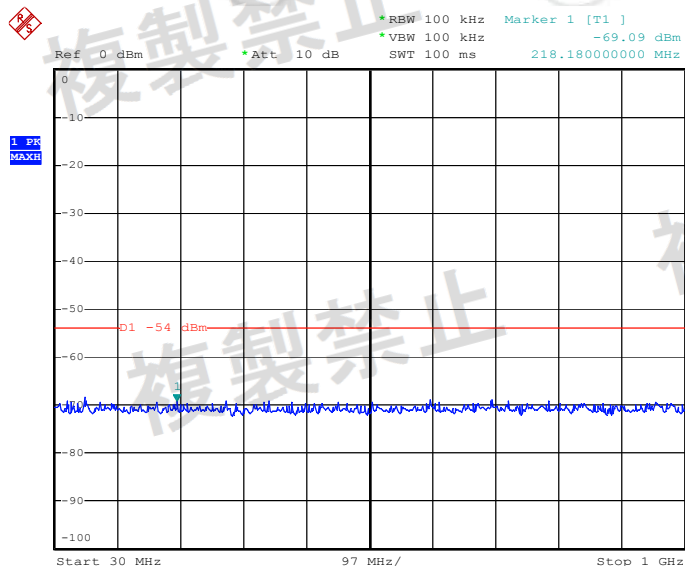
1 GHz to 13 GHz:



Date: 20.AUG.2018 13:15:54

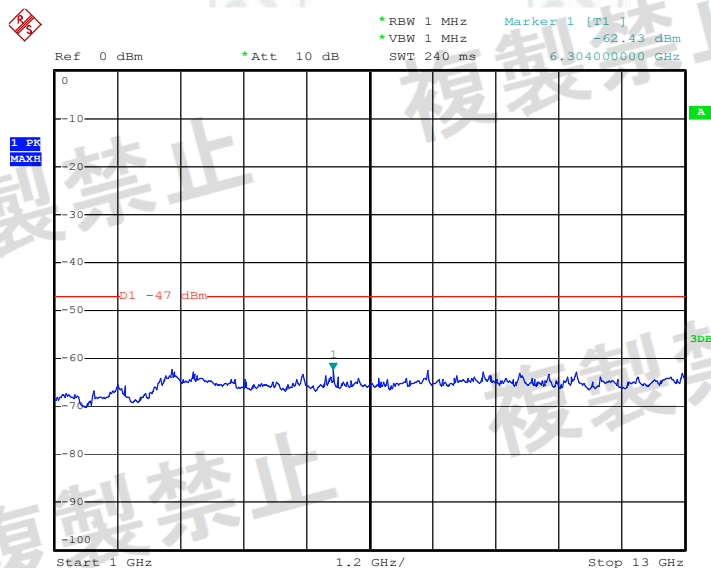
Channel 13: 2.472 GHz

30 MHz to 1 GHz:



Date: 20.AUG.2018 11:49:00

1 GHz to 13 GHz:



Date: 20.AUG.2018 13:16:20

8 Photographs

8.1 EUT Test Setup (test model No.: UM101734)



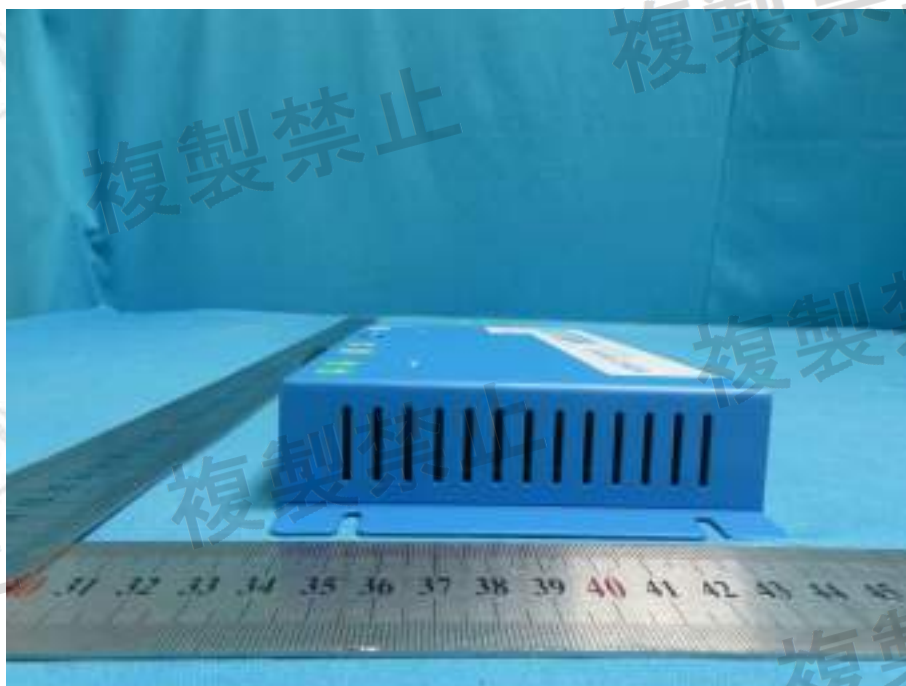
8.2 EUT Constructional Details



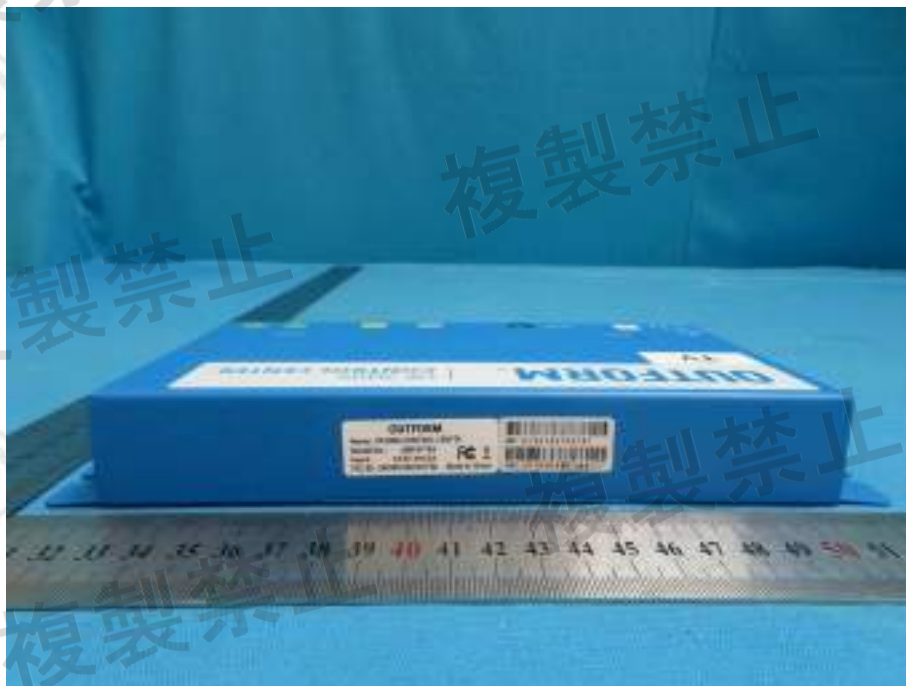
View of Product-1



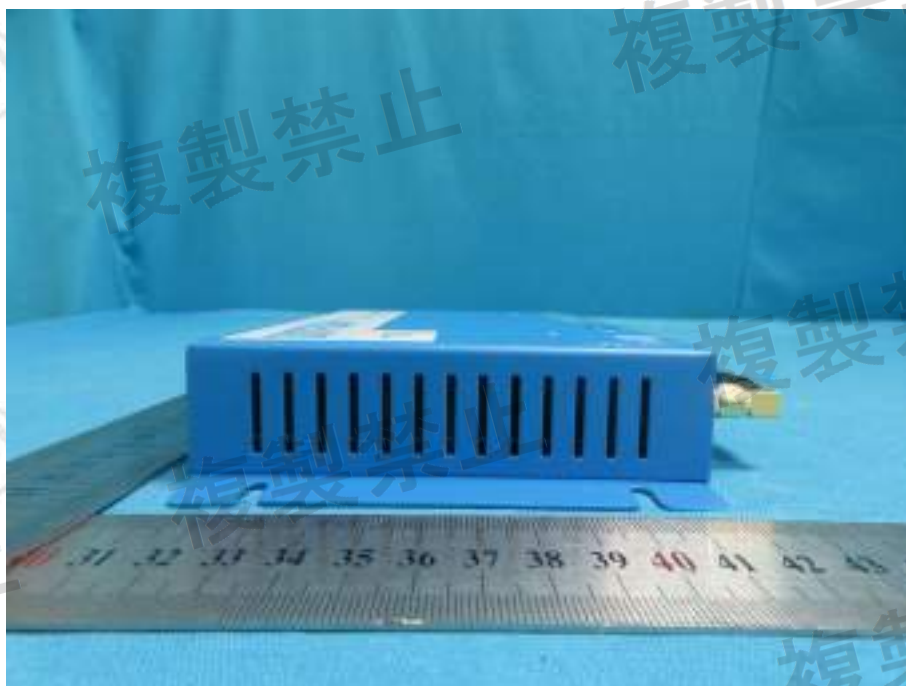
View of Product-2



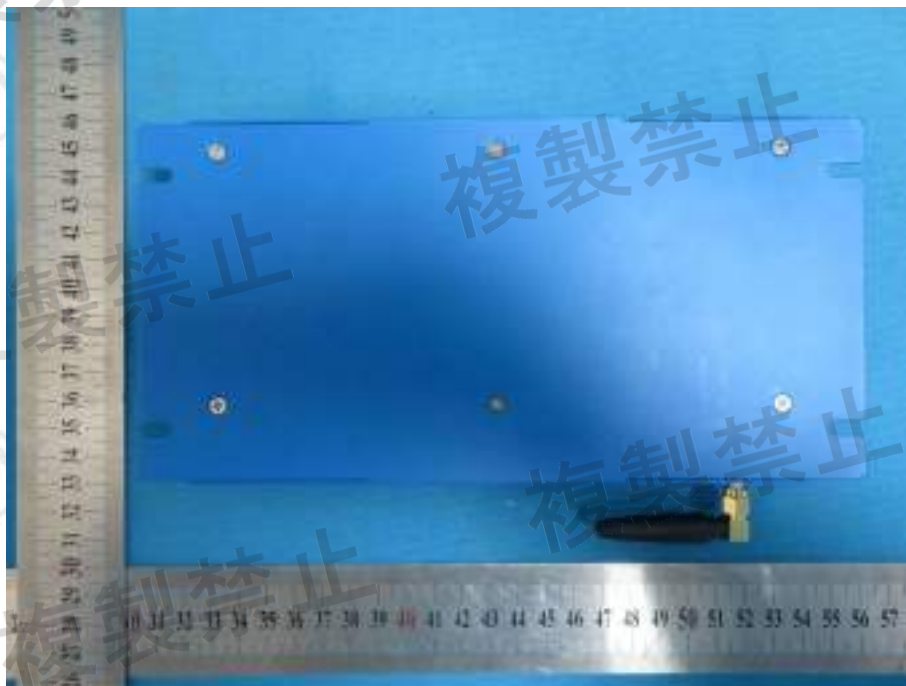
View of Product-3



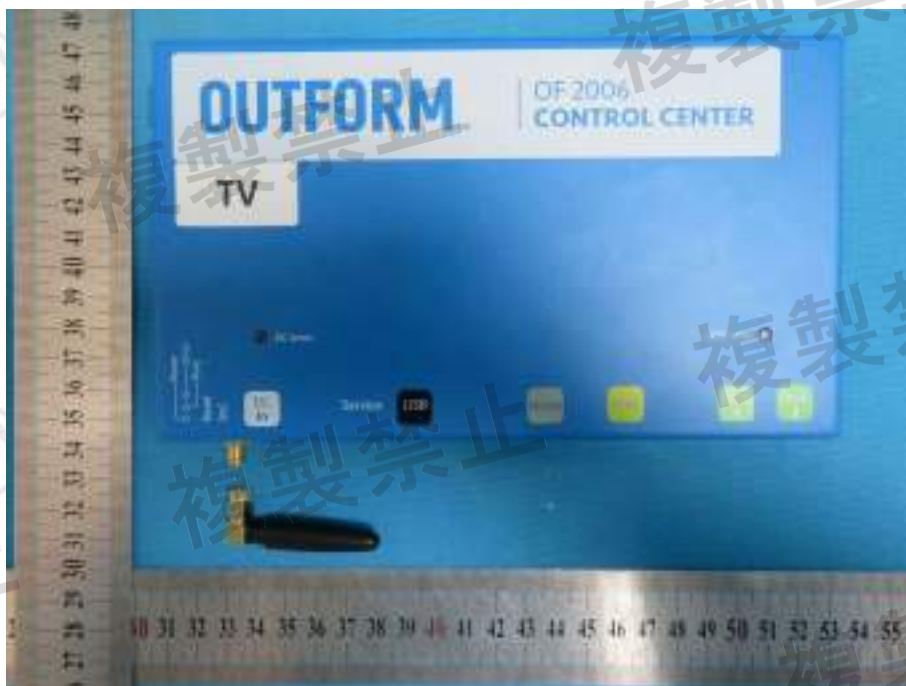
View of Product-4



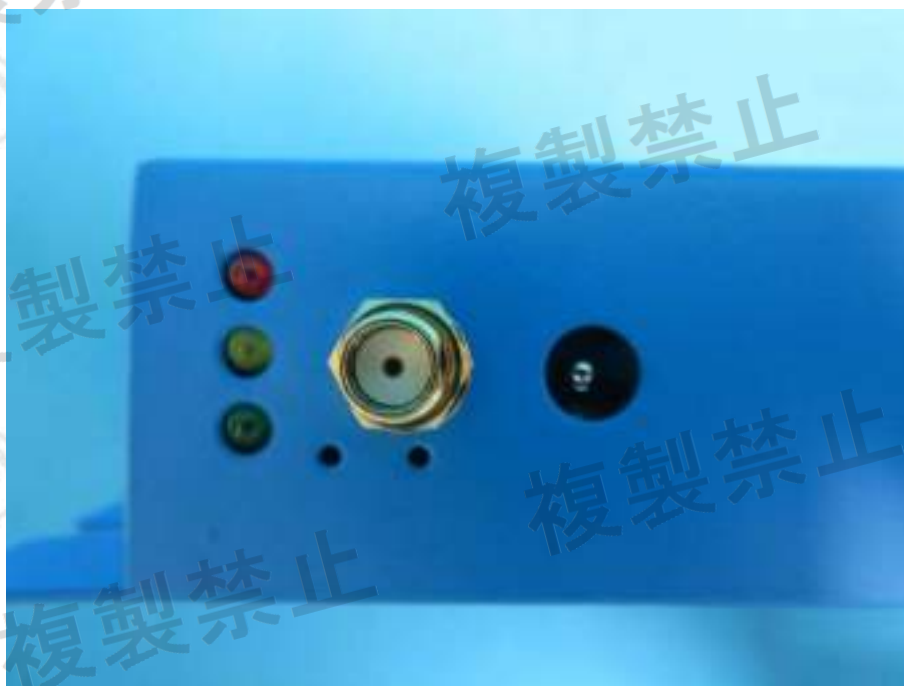
View of Product-5



View of Product-6



View of Product-7



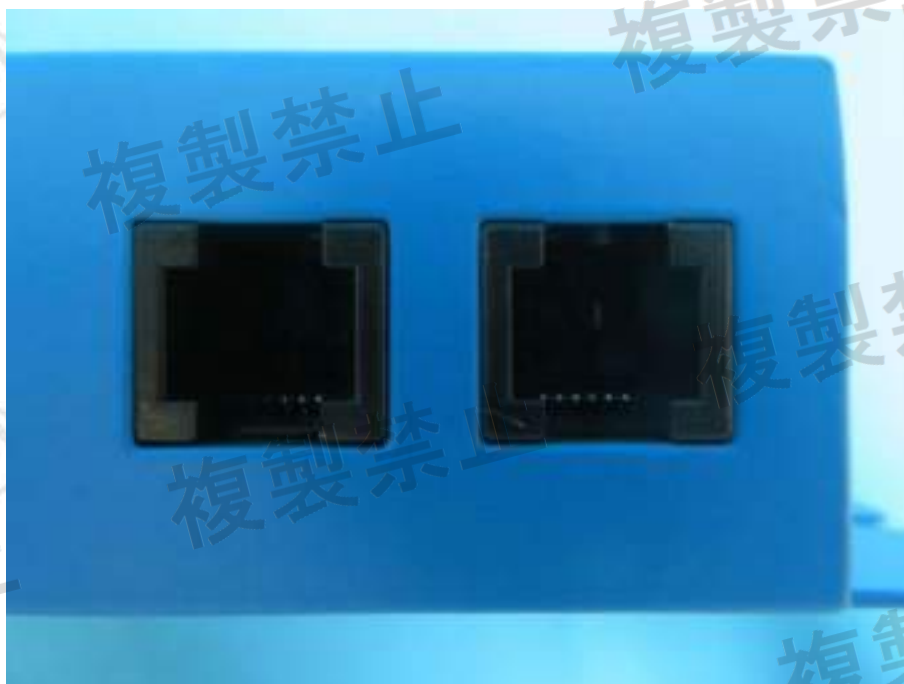
View of Product-8



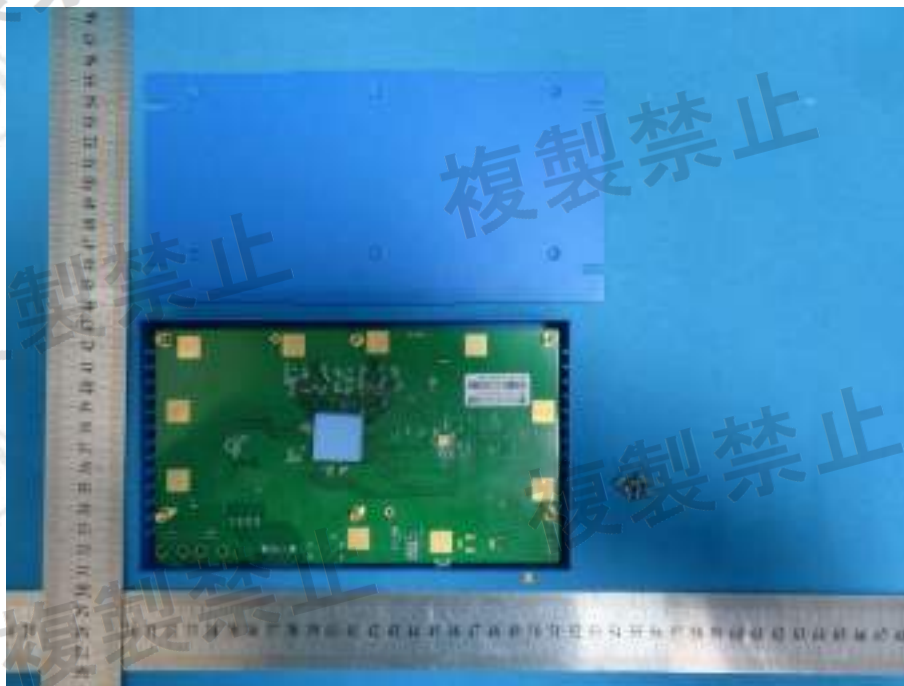
View of Product-9



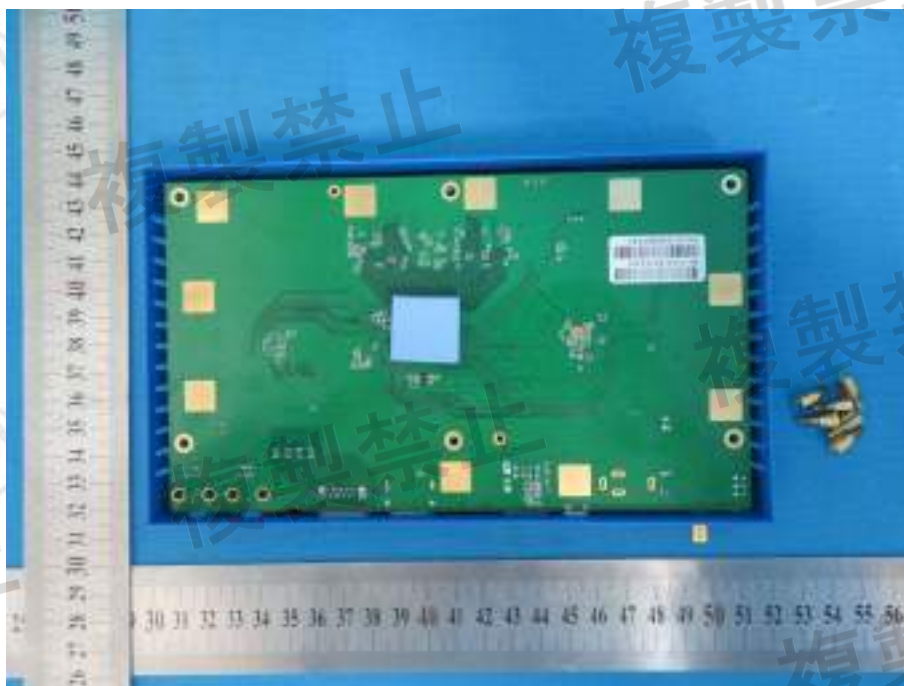
View of Product-10



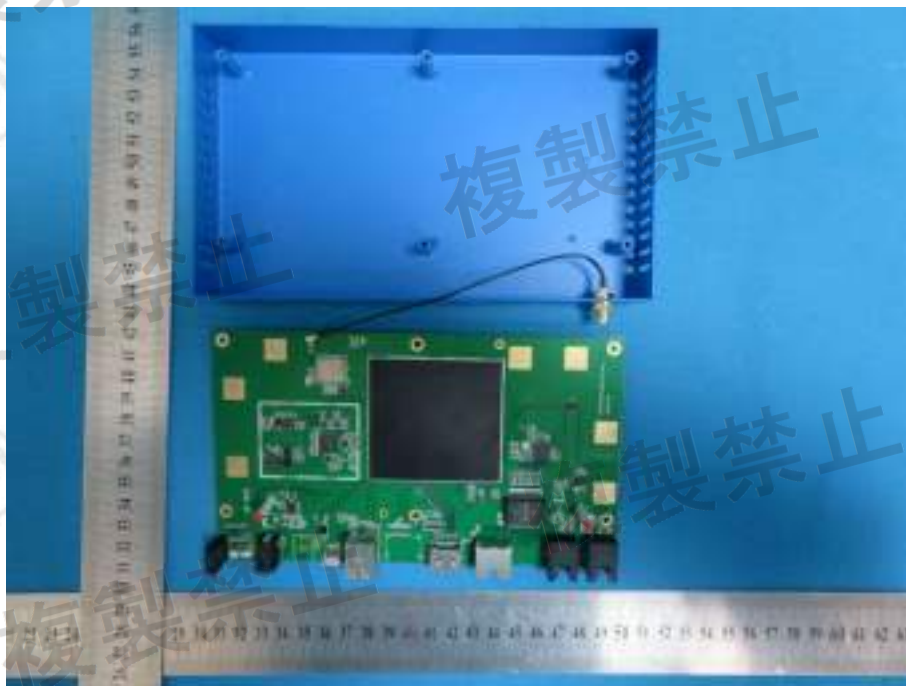
View of Product-11



View of Product-12



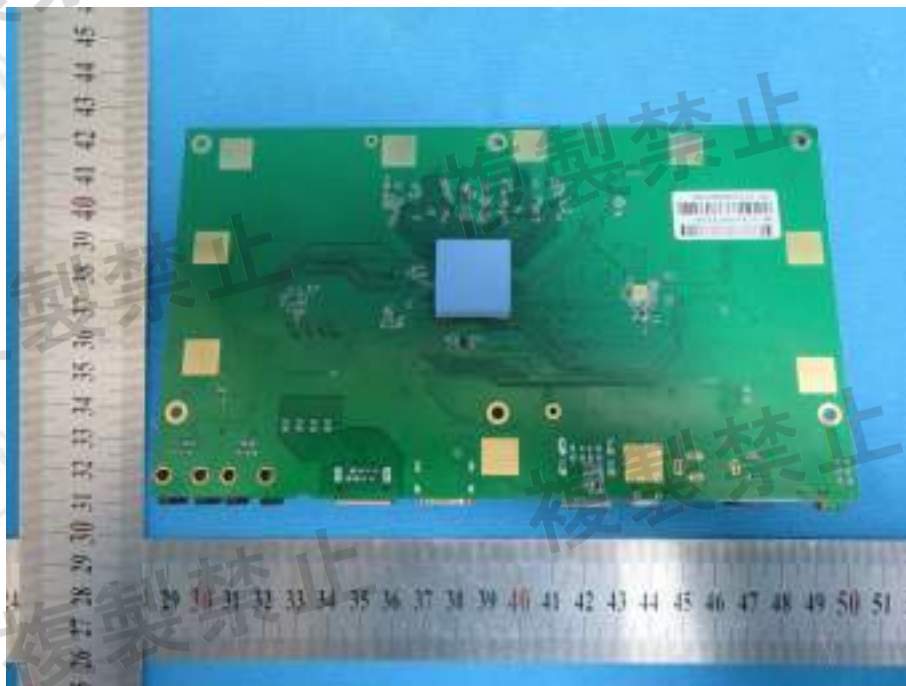
View of Product-13



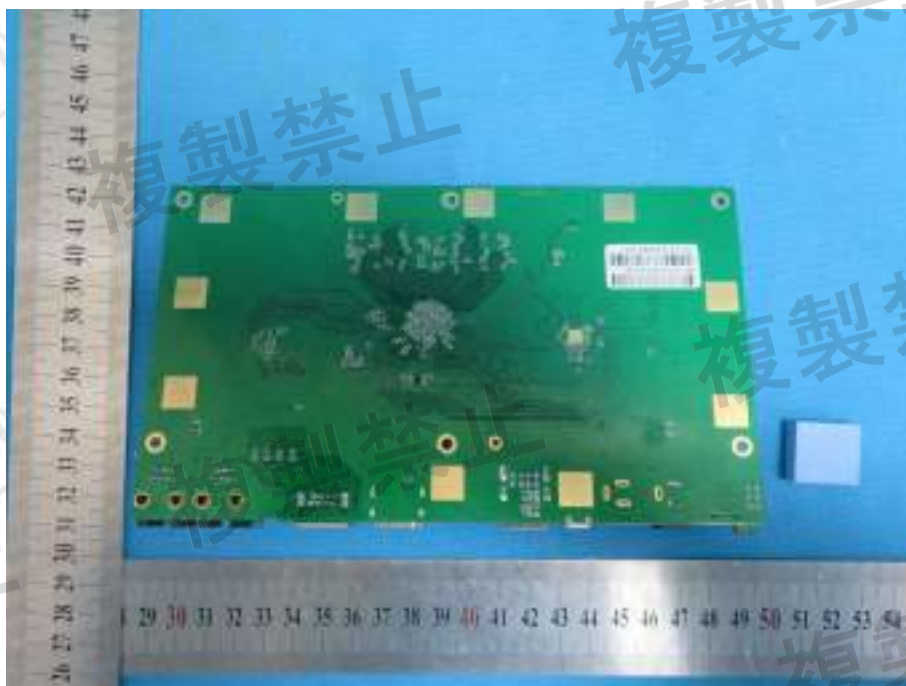
View of Product-14



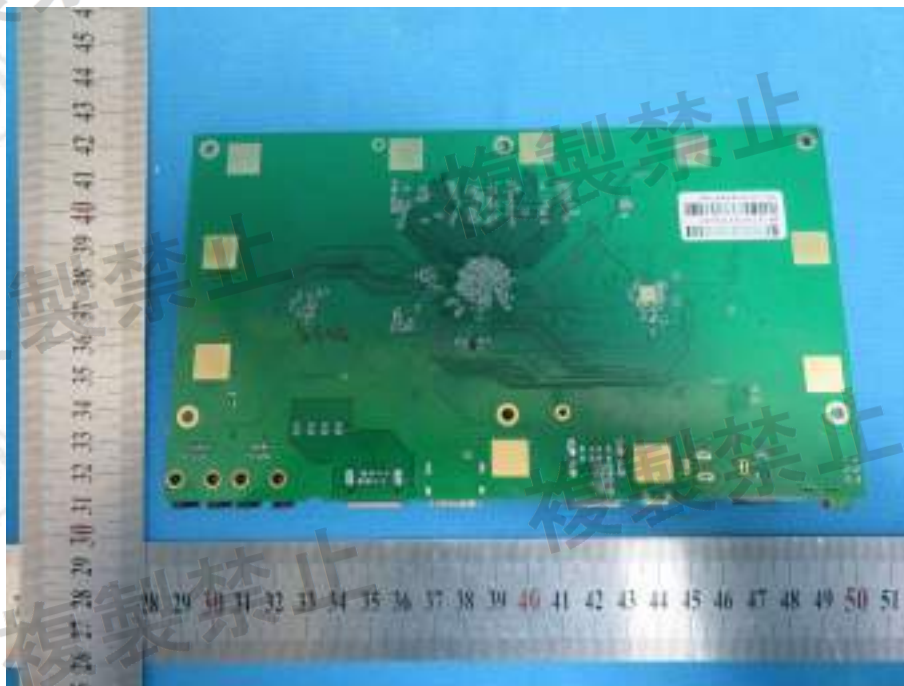
View of Product-15



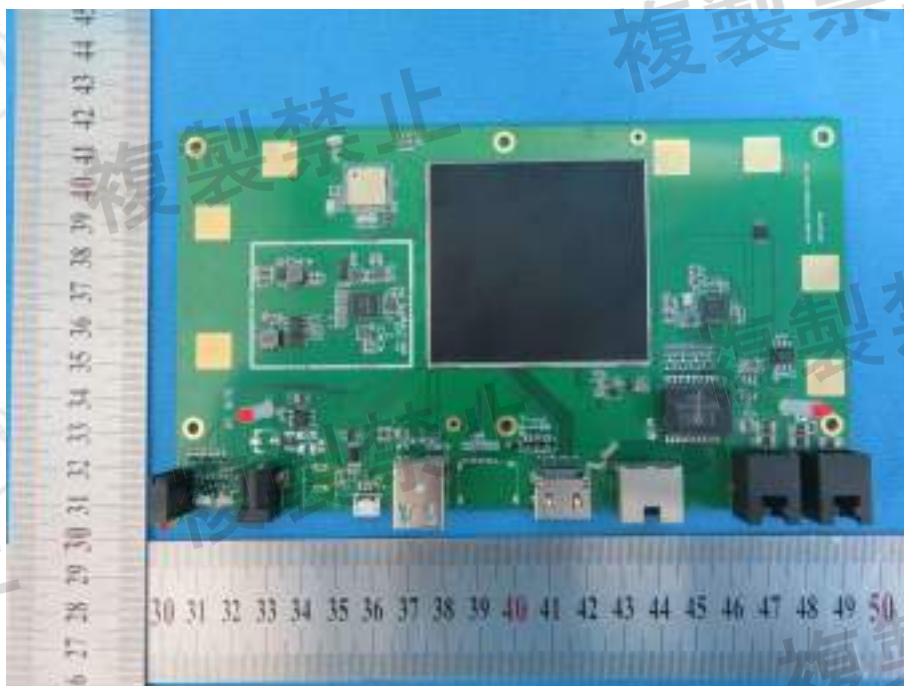
View of Product-16



View of Product-17



View of Product-18



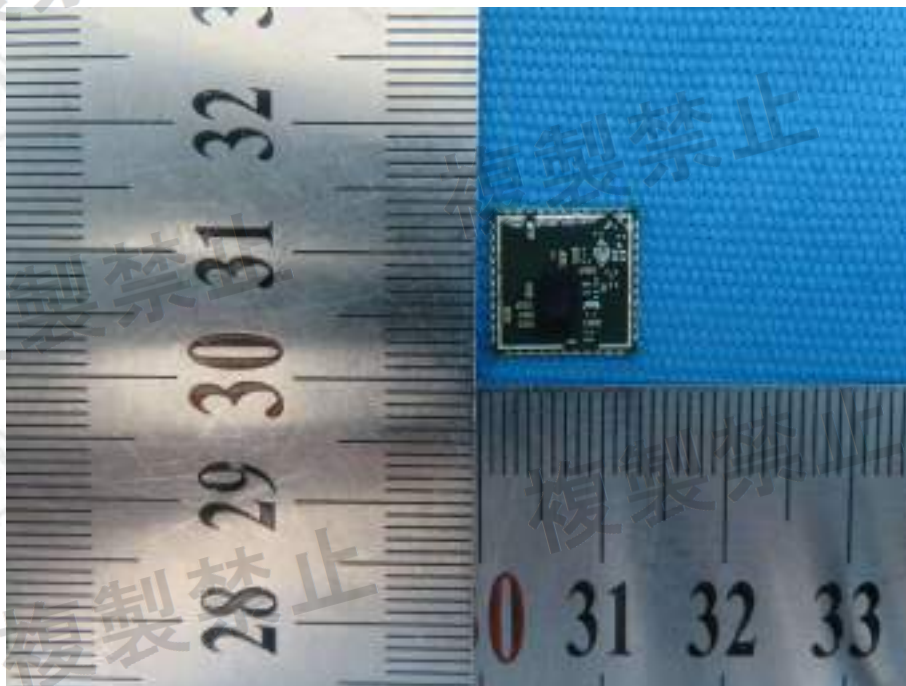
View of Product-19



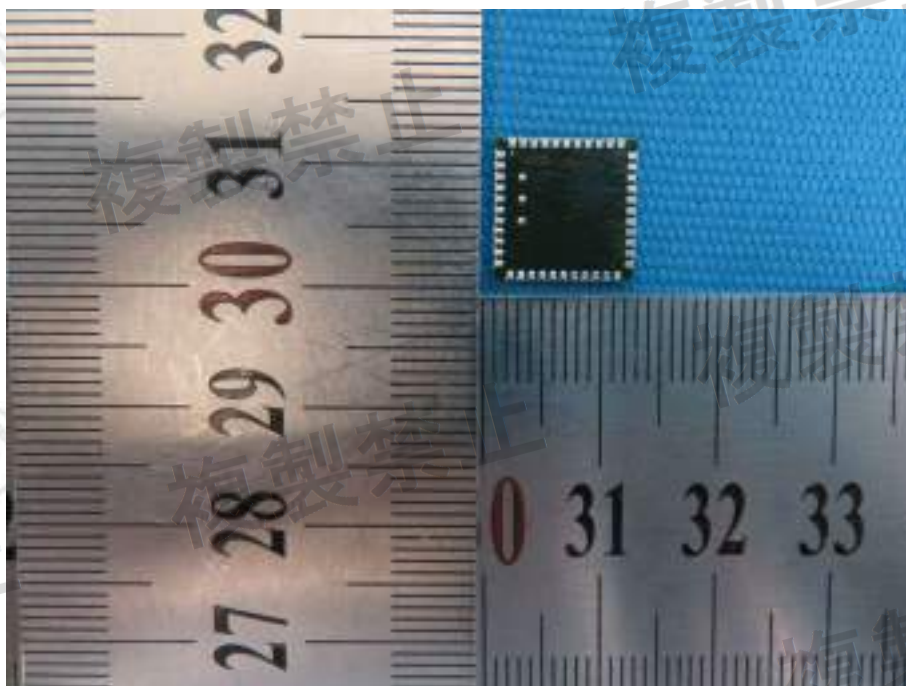
View of Product-20



View of Product-21



View of Product-22



View of Product-23

*** End of Report ***

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