

TEST REPORT

Application No.: SHEM1905012869CR
Japan MIC No.:
Applicant: PAI TECHNOLOGY LIMITED
Address of Applicant: 11/F, Block 02, 101 King's Road, North Point, Hong Kong
Manufacturer: PAI TECHNOLOGY LIMITED
Address of Manufacturer: 11/F, Block 02, 101 King's Road, North Point, Hong Kong
Factory: Broadway Precision Industrial (Kunshan) Limited
Address of Factory: No.88, Changshun Road, Zhangpu Town, Kunshan City, Suzhou City, Jiangsu Province, China

Equipment Under Test (EUT):

EUT Name: BOTZEES

Model No.: 83101, 83102, 83103, 83104



Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.

Standard(s) : MIC Item 19 of Article 2 Paragraph 1

Date of Receipt: 2019-05-05

Date of Test: 2019-05-07 to 2019-05-12

Date of Issue: 2019-05-30

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

Parlan Zhan

Parlan Zhan
E&E Section Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.



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Revision Record			
Version	Description	Date	Remark
00	Original	2019-05-30	/

Authorized for issue by:			
		Bill Wu	
		Bill Wu / Project Engineer	
		Eddy Zong	
		Eddy Zong / Reviewer	

2 Test Summary

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

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

Declaration of EUT Family Grouping:

Note: There are series models mentioned in this report, and they are the similar in electrical and electronic characters. Only the model 83101 was tested since their differences were the model number, trade name and appearance.

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4 General Information

4.1 Details of E.U.T.

Power supply:	DC 3.7V 1500mAh rechargeable battery
Cable:	USB Cable 50cm
Antenna Gain	0dBi
Antenna Type	Monopole Antenna
Channel Spacing	2MHz
Modulation Type	GFSK
Number of Channels	40
Operation Frequency	2402MHz to 2480MHz

4.2 Description of Support Units

The EUT has been tested independently.

4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	$\pm 8.4 \times 10^{-8}$
2	Timeout	$\pm 2s$
3	Duty cycle	$\pm 0.37\%$
4	Occupied Bandwidth	$\pm 3\%$
5	RF conducted power	$\pm 0.6dB$
6	RF power density	$\pm 2.84dB$
7	Conducted Spurious emissions	$\pm 0.75dB$
8	RF Radiated power	$\pm 4.6dB$ (Below 1GHz) $\pm 4.1dB$ (Above 1GHz)
9	Radiated Spurious emission test	$\pm 4.2dB$ (Below 30MHz) $\pm 4.4dB$ (30MHz-1GHz) $\pm 4.8dB$ (1GHz-18GHz) $\pm 5.2dB$ (Above 18GHz)
10	Temperature test	$\pm 1^{\circ}C$
11	Humidity test	$\pm 3\%$
12	Supply voltages	$\pm 1.5\%$
13	Time	$\pm 3\%$

Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. E&E Lab

588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China

Tel: +86 21 6191 5666 Fax: +86 21 6191 5678

No tests were sub-contracted.

4.5 Test Facility

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

- **CNAS (No. CNAS L0599)**

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **NVLAP (Certificate No. 201034-0)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. is accredited by the National Voluntary Laboratory Accreditation Program(NVLAP). Certificate No. 201034-0.

- **FCC –Designation Number: CN5033**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been recognized as an accredited testing laboratory.

Designation Number: CN5033. Test Firm Registration Number: 479755.

- **Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

IC Registration No.: 8617A-1. CAB Identifier: CN0020.

- **VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-13868, C-14336, T-12221, G-10830 respectively.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None

5 Equipment List

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date	Certifier
Conducted Test						
Spectrum Analyzer	R&S	FSP-30	SHEM002-1	2018-12-20	2019-12-19	(C)
Spectrum Analyzer	Agilent	N9020A	SHEM181-1	2018-08-13	2019-08-12	(C)
Signal Generator	R&S	SMR20	SHEM006-1	2018-08-13	2019-08-12	(C)
Signal Generator	Agilent	N5182A	SHEM182-1	2018-08-13	2019-08-12	(C)
Communication Tester	R&S	CMW270	SHEM183-1	2018-08-13	2019-08-12	(C)
Switcher	Tonscend	JS0806	SHEM184-1	2018-08-13	2019-08-12	(C)
Power Sensor	Keysight	U2021XA * 4	SHEM184-1	2018-08-13	2019-08-12	(C)
Splitter	Anritsu	MA1612A	SHEM185-1	/	/	(C)
Coupler	e-meca	803-S-1	SHEM186-1	/	/	(C)
High-low Temp Cabinet	Suzhou Zhihe	TL-40	SHEM087-1	2017-09-25	2020-09-24	(C)
AC Power Stabilizer	WOCEN	6100	SHEM045-1	2018-12-26	2019-12-25	(C)
DC Power Supply	MCN	MCH-303A	SHEM210-1	2018-12-26	2019-12-25	(C)
Conducted test Cable	/	RF01~RF04	/	2018-12-26	2019-12-25	(C)

Remark:

- 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.
- Correction conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Act (Act No. 51 of 1992).
- 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).
- 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:

- (C) is applicable for equipment calibration above.
- Calibration duration for above equipments is 1 year.

6 Radio Spectrum Technical Requirement

6.1 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 2-1)

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
Tolerance of occupied bandwidth	FH: 83.5MHz or less FH + DS: 83.5MHz or less FH + OFDM: 83.5MHz or less OFDM: 38MHz or less Others: 26MHz or less
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 (4) OFDM OBW 26 - 38MHz: 5mW/MHz 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	DS, FH, FH+DS, FH+OFDM: 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

6.2 E.U.T. test conditions

Environment:	Temperature:	20.0 -25.0 °C
	Humidity:	35-75 % RH
	Atmospheric Pressure:	99.2 -102.0 kPa

Power supply: Test Voltage: rated voltage and $\pm 10\%$ of the rated voltage.

The product is supplied by DC 3.7V. The fluctuation of input voltage to the circuit of RF unit of test equipment is under $\pm 1\%$, when input voltage to the test equipment is fluctuated by $\pm 10\%$. So, all measurement has been conducted by only rated voltage DC 3.7V

Test Mode Classify	Power Supply	Measured Value
TM 1	DC 3.7V	DC 3.30V
TM 2	DC 4.0V	DC 3.31V
TM 3	DC 3.3V	DC 3.29V

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.

EUT channels and frequencies list:

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

6.3 Antenna Requirement

6.3.1 Test Requirement:

MIC Item 19 of Article 2 Paragraph 1

6.3.2 Conclusion

Standard requirement:

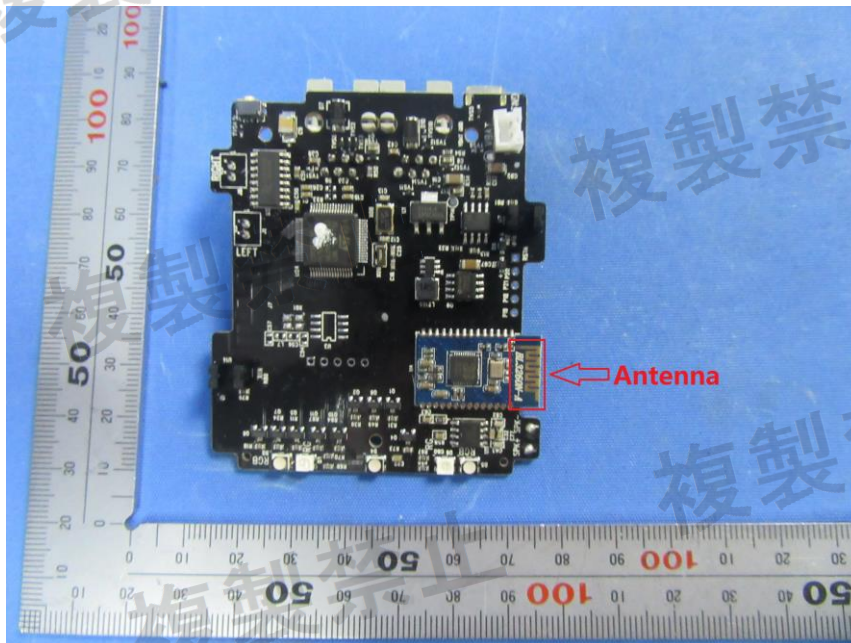
Applicable for equipment with an antenna terminal, including testing terminals. If an antenna connector is available, all relevant tests will be carried out conducted. If not, tests will be carried out in an anechoic room or with a suitable test-fixture.

EUT Details:

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

Result:

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



6.4 Interference prevention capability

6.4.1 Test Requirement:

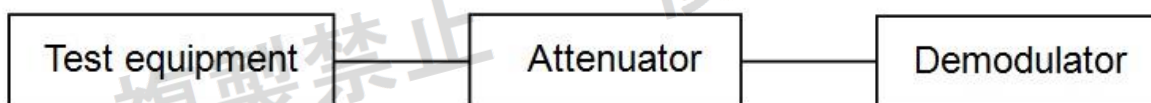
MIC Item 19 of Article 2 Paragraph 1

Limit:

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

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

6.4.2 Test Setup Diagram



6.4.3 Conclusion

Standard Requirement:

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

EUT Details:

The unit does meet the requirements (Good).

12: 23: 34: 54: B4: 56

6.5 RF accessibility

6.5.1 Test Requirement:

MIC Item 19 of Article 2 Paragraph 1

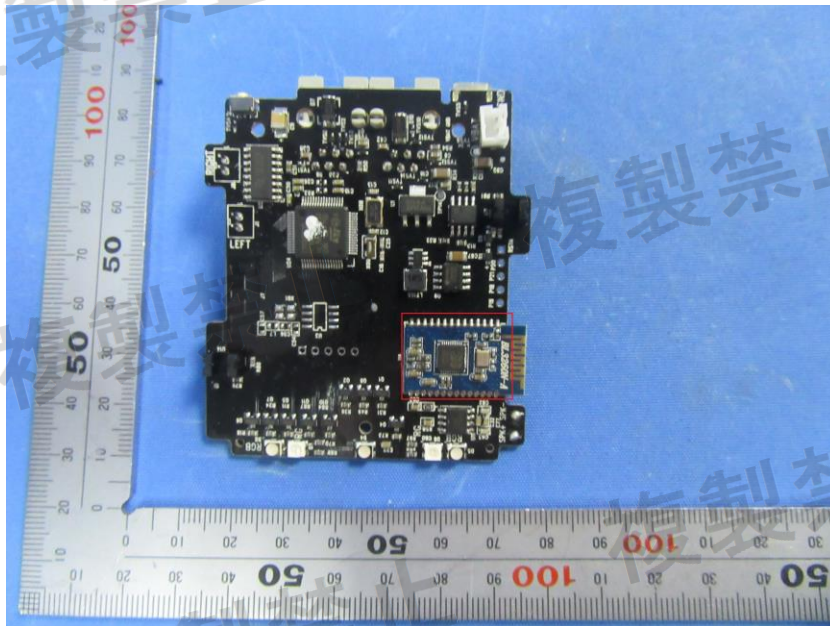
6.5.2 Conclusion

Standard Requirement:

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

EUT Details:

RF chip and modulation using SMT technology that end user cannot open with common tools.



7 Radio Spectrum Matter Test Results

7.1 Occupied Bandwidth(99%)

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

7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1001 mbar

Test mode a:TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation

7.1.2 Test Setup Diagram



7.1.3 Measurement Procedure and Data

1. Test Conditions:

Spectrum Analyzer is used for measurement.

2. EUT conditions:

Modulation/Spread/Hopping ON, Modulation Tx

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

3. Spectrum Analyzer conditions:

Frequency: Test Frequency

Span 3MHz (OFDM; DSSS); 2-3.5 times OBW (Others)

RBW 30kHz (OFDM; DSSS); 3% OBW (Others)

VBW 100kHz (OFDM; DSSS); 3 times RBW (Others)

Sweep Time Auto

detector mode Positive peak

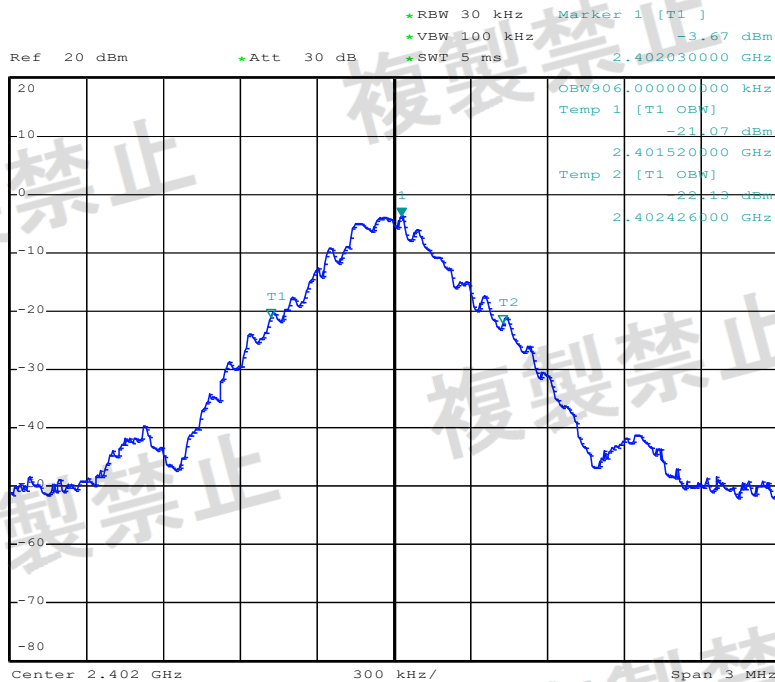
Indication mode Max hold

OBW 99%

Test Mode	Test Frequency (MHz)	Bandwidth (MHz)			Limit	Result
		TM 1	TM 2	TM 3		
GFSK	2402	0.906	/	/	26 MHz or less	Pass
	2442	0.906	/	/		Pass
	2480	0.918	/	/		Pass

Test mode: TM 1- GFSK

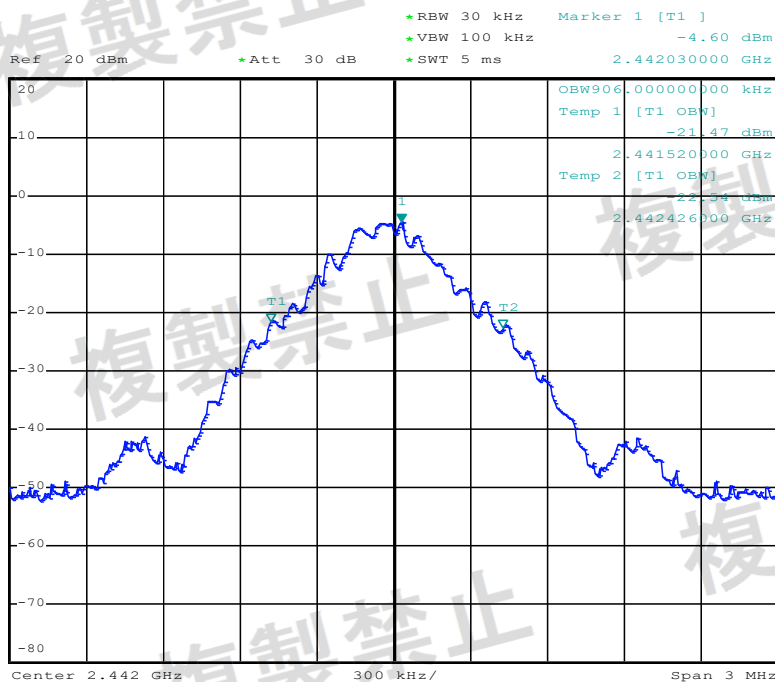
Channel: Lowest



Date: 10.MAY.2019 14:10:18

Test mode: TM 1- GFSK

Channel: Middle

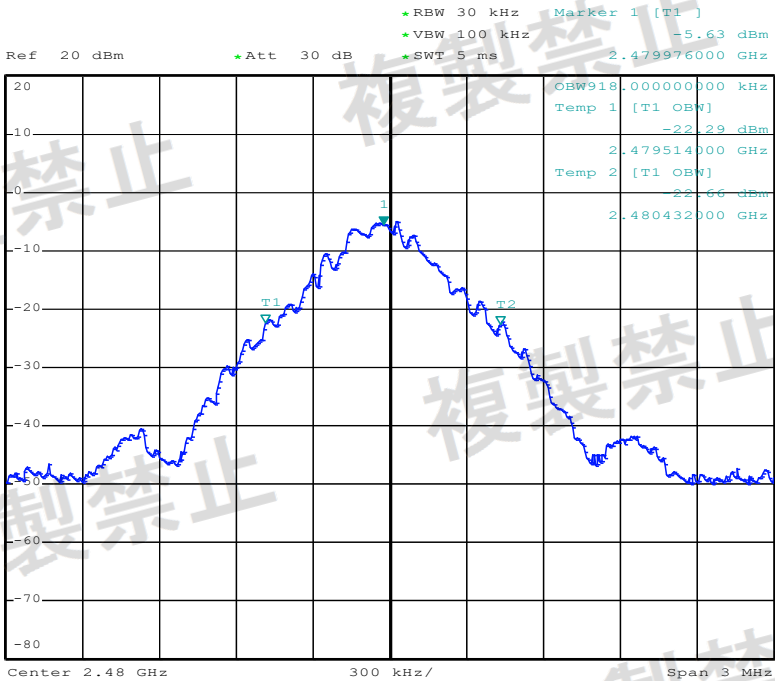


Date: 10.MAY.2019 14:11:00



Test mode: TM 1- GFSK

Channel: Highest



Date: 10.MAY.2019 14:12:22

7.2 Antenna Power

Test Requirement	MIC Item 19 of Article 2 Paragraph 1
Test Method:	MIC Notice No.88 Appendix No.43
Limit:	Designated value (1) FH, FH+DS, FH+OFDM: 3mW/MHz (used in the range of 2427 - 2470.75 MHz) (2) OFDM, DS other than (1) 10mW/MHz (3) Other than (1) & (2) 10mW (4) OFDM OBW 26 - 38MHz: 5mW/MHz Tolerance:+20%,-80%

7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1001 mbar

Test mode a:TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation

7.2.2 Test Setup Diagram



7.2.3 Measurement Procedure and Data

1. Test Conditions:

Spectrum Analyzer is used for measurement.

2. EUT conditions:

Modulation/Spread/Hopping ON, Modulation Tx

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

3. Spectrum Analyzer conditions:

Frequency: Test Frequency

Span 25 MHz (OFDM; DSSS); Enough to capture the emission (Others)

RBW 3 MHz (FHSS; OFDM; DSSS); More than OBW (Others)

VBW 3 MHz (FHSS; OFDM; DSSS); More than RBW (Others)

Sweep Time Auto

detector mode RMS

Indication mode Max hold

Test Mode	Test Frequency (MHz)	Test Result			Unit	Limit	Result
		TM 1	TM 2	TM 3			
GFSK	2402	0.82	/	/	mW	10 mW or less Error +20% -80%	Pass
		-18.34	/	/	%		Pass
	2442	0.69	/	/	mW		Pass
		-31.45	/	/	%		Pass
	2480	0.59	/	/	mW		Pass
		-41.39	/	/	%		Pass

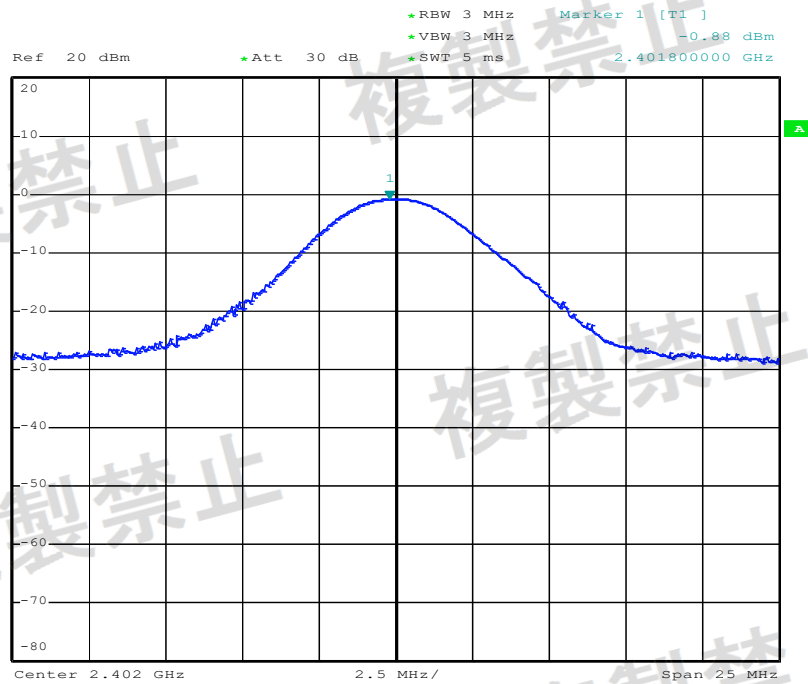
Remark:

Normal antenna power is 1mW



Test mode: TM 1- GFSK

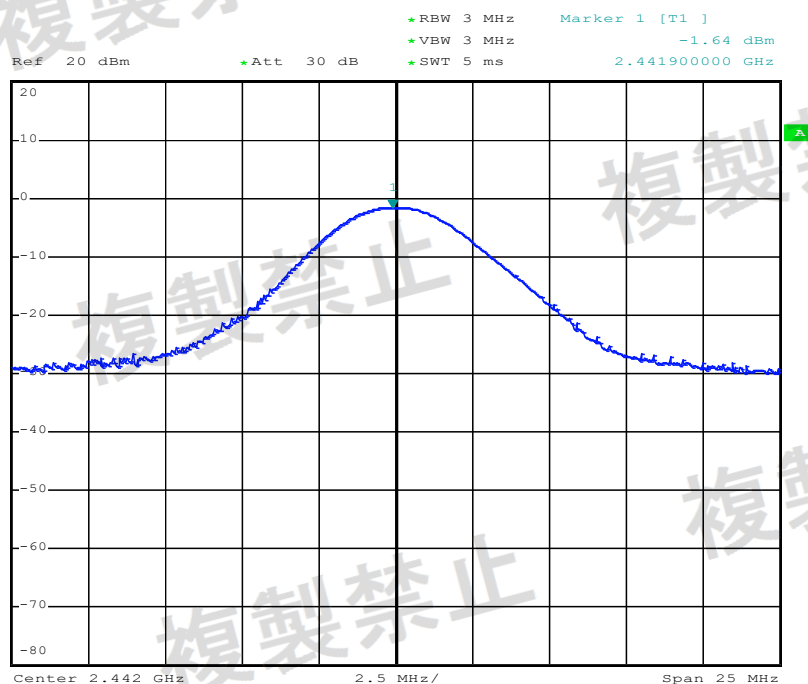
Channel: Lowest



Date: 10.MAY.2019 13:57:56

Test mode: TM 1- GFSK

Channel: Middle



Date: 10.MAY.2019 13:58:46

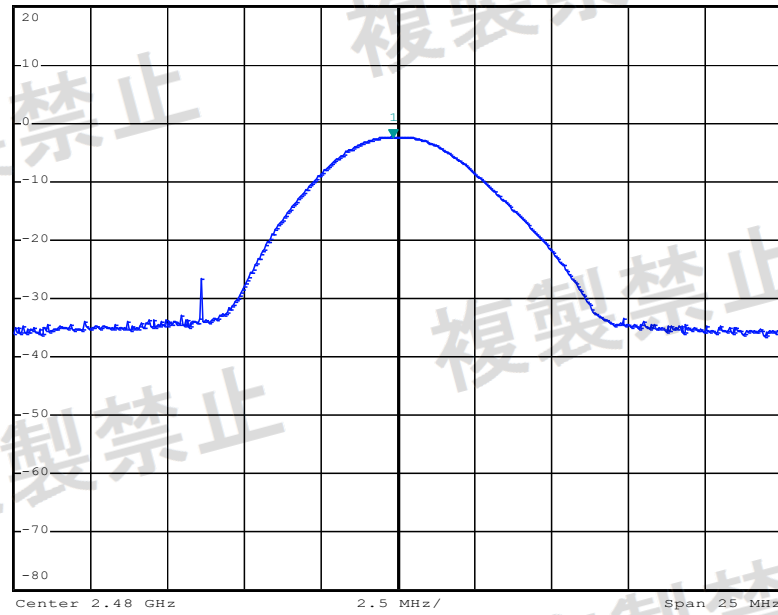


Test mode: TM 1- GFSK

Channel: Highest



Ref 20 dBm Att 30 dB RBW 3 MHz VBW 3 MHz SWT 5 ms Marker 1 [T1] -2.32 dBm 2.479850000 GHz



Date: 10.MAY.2019 14:03:07

7.3 Frequency Error

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

7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1001 mbar

Test mode a:TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation

7.3.2 Test Setup Diagram



7.3.3 Measurement Procedure and Data

1. Test Conditions:

Spectrum Analyzer is used for measurement.

2. EUT conditions:

Modulation/Spread/Hopping OFF, CW Tx

3. Spectrum Analyzer conditions:

Frequency: Test Frequency

Span 1MHz

RBW 10 kHz (Modulation OFF),

VBW 10 kHz (Modulation OFF),

Sweep Time Auto

Detector mode Positive peak

Indication mode Max hold

Alternative method:

Frequency: Test Frequency

Span 2 times channel bandwidth

RBW 100 kHz (Modulation ON),

VBW 100 kHz (Modulation ON),

Sweep Time Auto

Detector mode Positive peak

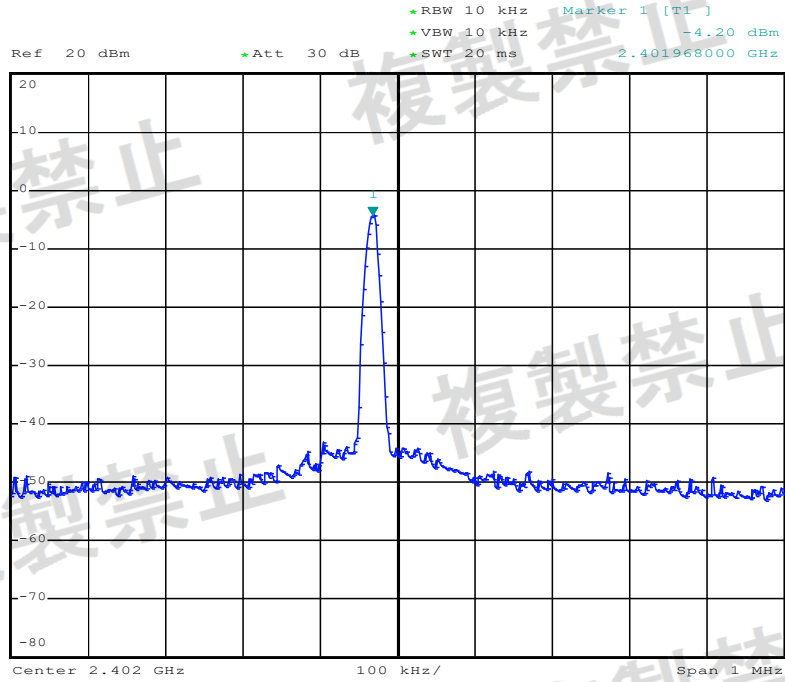
Indication mode Max hold

Test Frequency (MHz)	Test Frequency/Error			Unit	Limit	Result
	TM 1	TM 2	TM 3			
2402	2401.968	/	/	MHz	±50 PPM or less	Pass
	-13.32	/	/	PPM		Pass
2442	2441.966	/	/	MHz		Pass
	-13.92	/	/	PPM		Pass
2480	2479.968	/	/	MHz		Pass
	-12.90	/	/	PPM		Pass

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

Test mode: TM 1

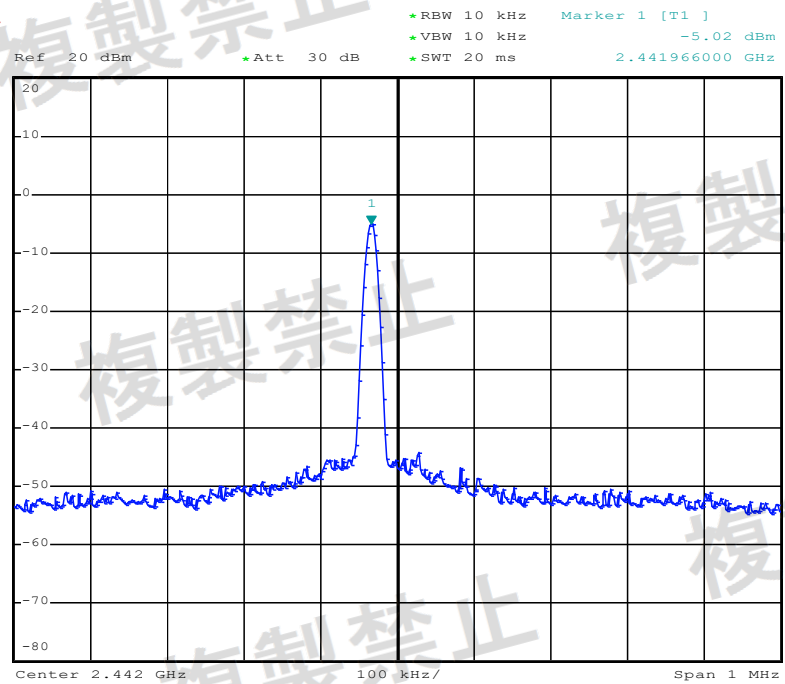
Test channel: 2402



Date: 10.MAY.2019 14:04:40

Test mode: TM 1

Test channel: 2442



Date: 10.MAY.2019 14:05:14

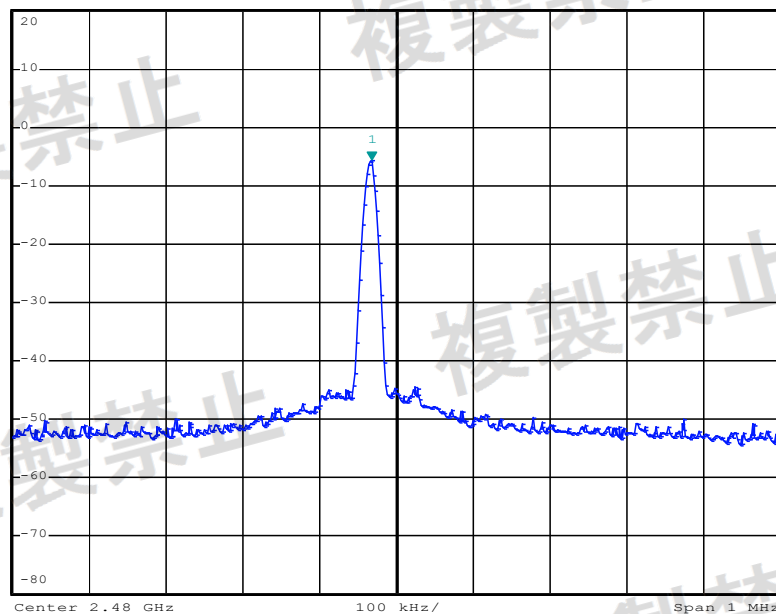


Test mode: TM 1

Test channel: 2480



Ref 20 dBm
Att 30 dB
RBW 10 kHz
VBW 10 kHz
SWT 20 ms
Marker 1 [T1]
-5.69 dBm
2.479968000 GHz



Date: 10.MAY.2019 14:06:10

7.4 Spurious emission Intensity

Test Requirement	MIC Item 19 of Article 2 Paragraph 1
Test Method:	MIC Notice No.88 Appendix No.43
Limit:	(1) Below 2387 MHz: 2.5μW/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

7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1001 mbar

Test mode a:TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation

7.4.2 Test Setup Diagram



7.4.3 Measurement Procedure and Data

1. Test Conditions:

Spectrum Analyzer is used for measurement.

2. EUT conditions:

Modulation/Spread/Hopping ON

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

3. Spectrum Analyzer conditions:

Step 1

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

Step 2

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

Test setup for Step 1:

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

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

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

Sweep Time Auto

detector mode Positive peak

Indication mode Max hold

Test setup for Step 2:

Frequency: Spurious Frequency

Span 0 Hz

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

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

Sweep Time Auto

detector mode Sample

Indication mode Max hold

Test mode: GFSK

Test Freq (MHz)	Spurious Emissions of TX						Limit	Result
	TM 1		TM 2		TM 3			
	Freq (MHz)	Level (dBm)	Freq (MHz)	Level (dBm)	Freq (MHz)	Level (dBm)		
2402	833.16	-58.01	/	/	/	/	(1) Below 2387 MHz: -26dBm/MHz (2) 2387 to 2400MHz: -16dBm/MHz (3) 2483.5 to 2496.5 MHz: -16dBm/MHz (4) Over 2496.5 MHz: -26dBm/MHz	Pass
	2381.45	-41.30	/	/	/	/		Pass
	2398.26	-27.93	/	/	/	/		Pass
	2495.20	-61.78	/	/	/	/		Pass
	11193.40	-50.55	/	/	/	/		Pass
2442	311.30	-57.60	/	/	/	/		Pass
	2339.84	-52.56	/	/	/	/		Pass
	2397.43	-47.39	/	/	/	/		Pass
	2483.76	-47.55	/	/	/	/		Pass
	11172.39	-51.19	/	/	/	/		Pass
2480	425.76	-58.67	/	/	/	/		Pass
	2273.27	-55.62	/	/	/	/		Pass
	2387.94	-61.98	/	/	/	/		Pass
	2483.55	-31.56	/	/	/	/		Pass
	2496.50	-45.32	/	/	/	/		Pass

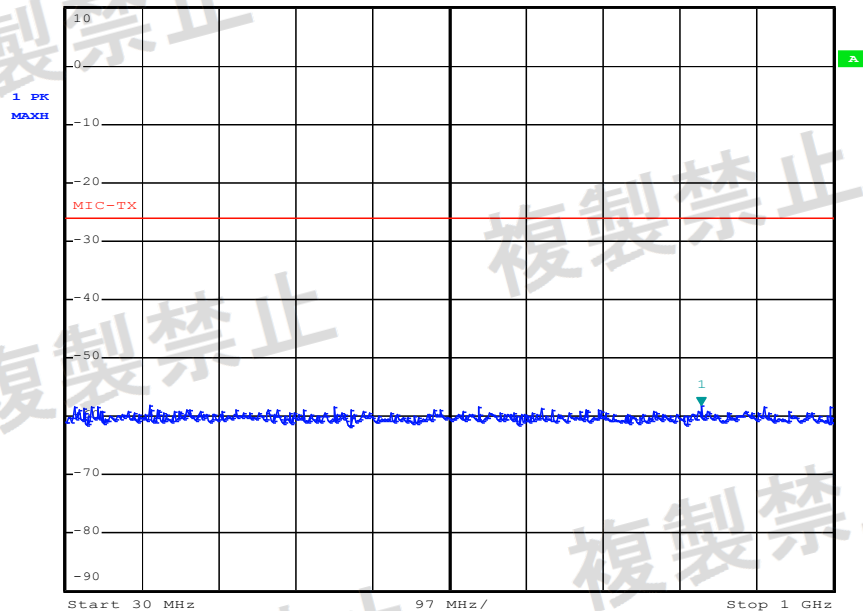
Test mode: TM 1-GFSK

Test channel:Lowest

30MHz to 1GHz



Ref 10 dBm Att 20 dB RBW 100 kHz Marker 1 [T1] -58.01 dBm
VBW 100 kHz
SWT 100 ms 833.16000000 MHz



Date: 10.MAY.2019 14:45:26

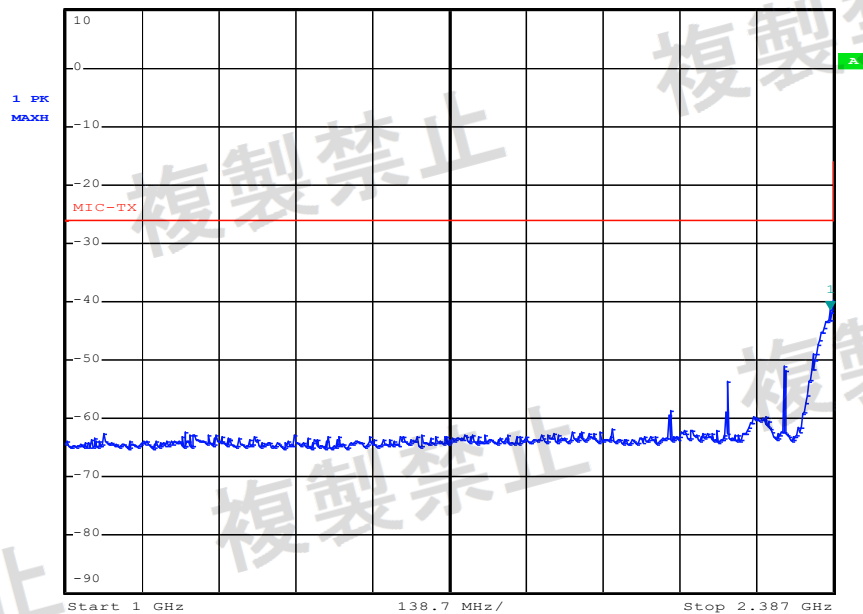
Test mode: TM 1-GFSK

Test channel:Lowest

1GHz to 2.387GHz



Ref 10 dBm Att 20 dB RBW 1 MHz Marker 1 [T1] -41.30 dBm
VBW 1 MHz
SWT 15 ms 2.381452000 GHz

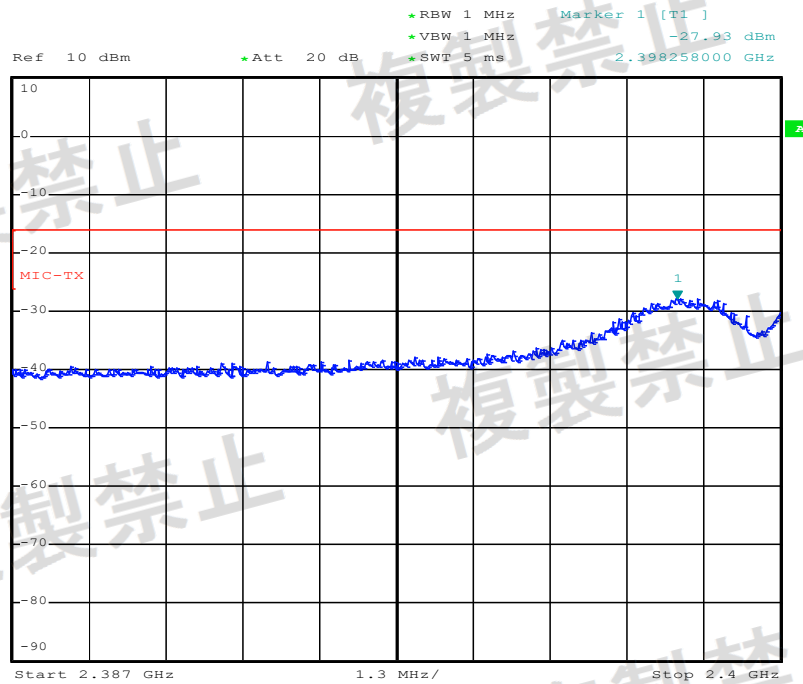


Date: 10.MAY.2019 14:50:52

Test mode: TM 1-GFSK

Test channel:Lowest

2.387GHz to 2.4GHz

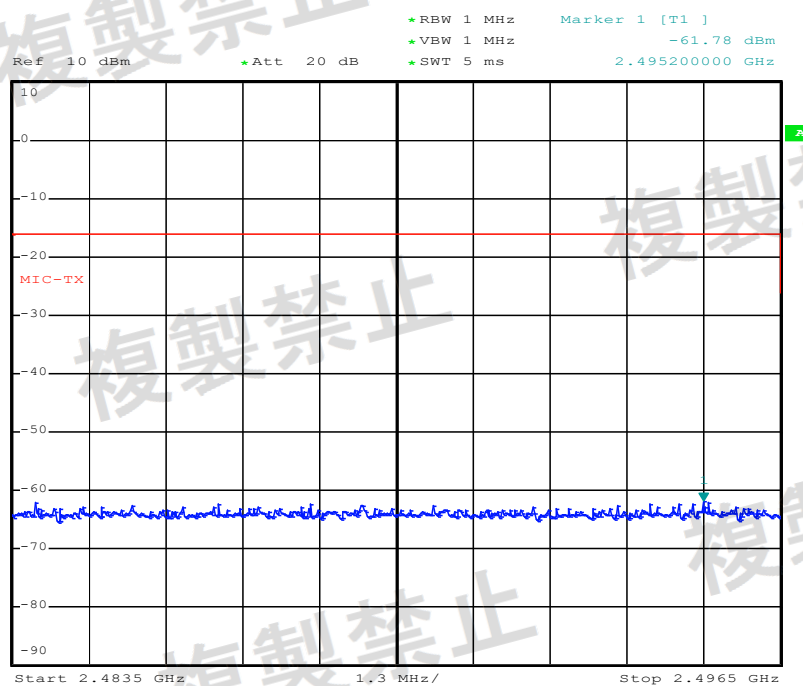


Date: 10.MAY.2019 14:36:29

Test mode: TM 1-GFSK

Test channel:Lowest

2483.5MHz to 2496.5MHz:



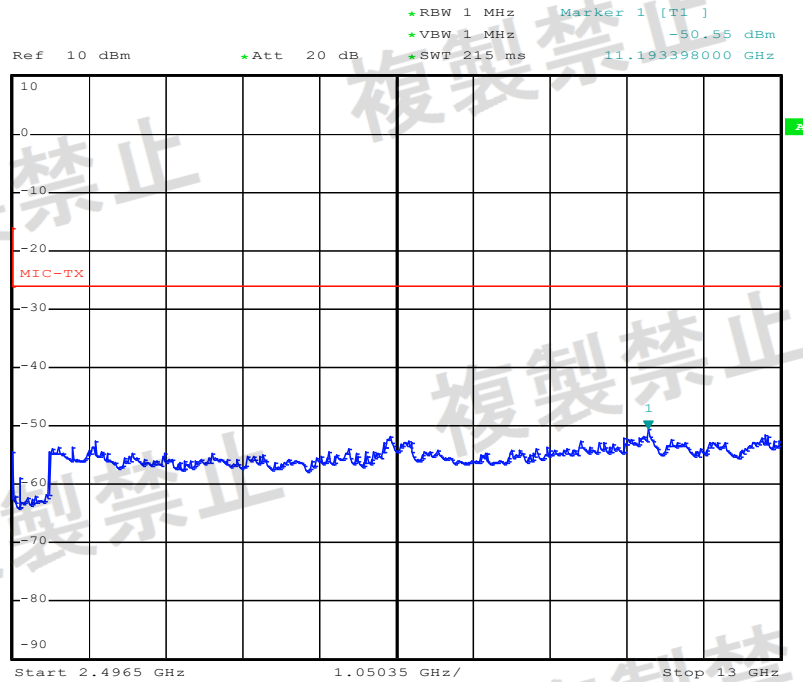
Date: 10.MAY.2019 14:38:42



Test mode: TM 1-GFSK

Test channel:Lowest

2496.5MHz to 13 GHz

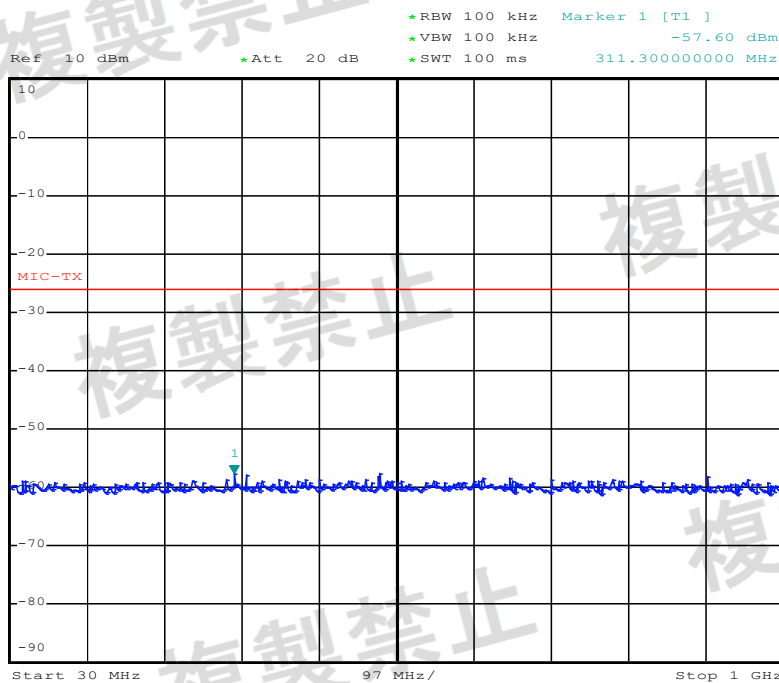


Date: 10.MAY.2019 14:42:48

Test mode: TM 1-GFSK

Test channel:Middle

30MHz to 1GHz



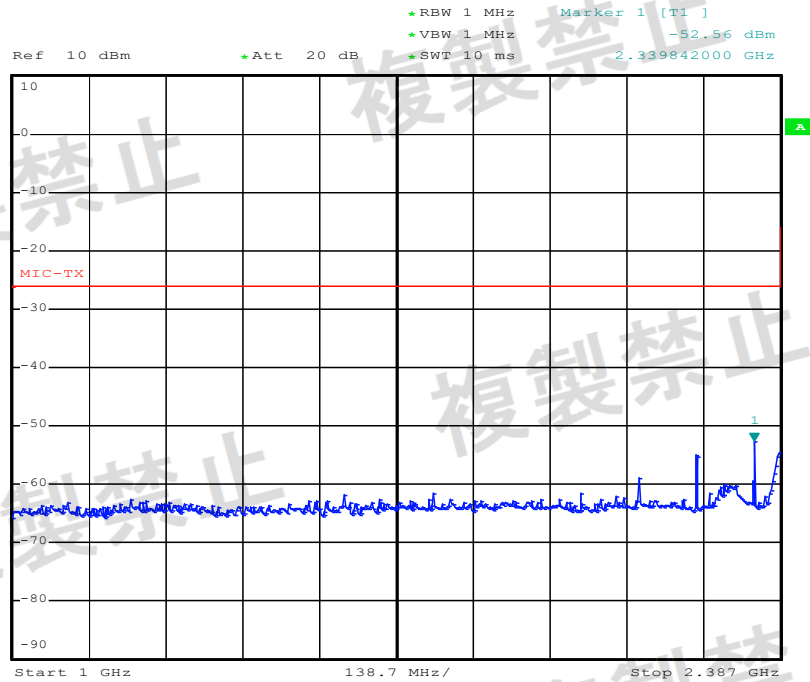
Date: 10.MAY.2019 14:46:57



Test mode: TM 1-GFSK

Test channel: Middle

1GHz to 2.387GHz

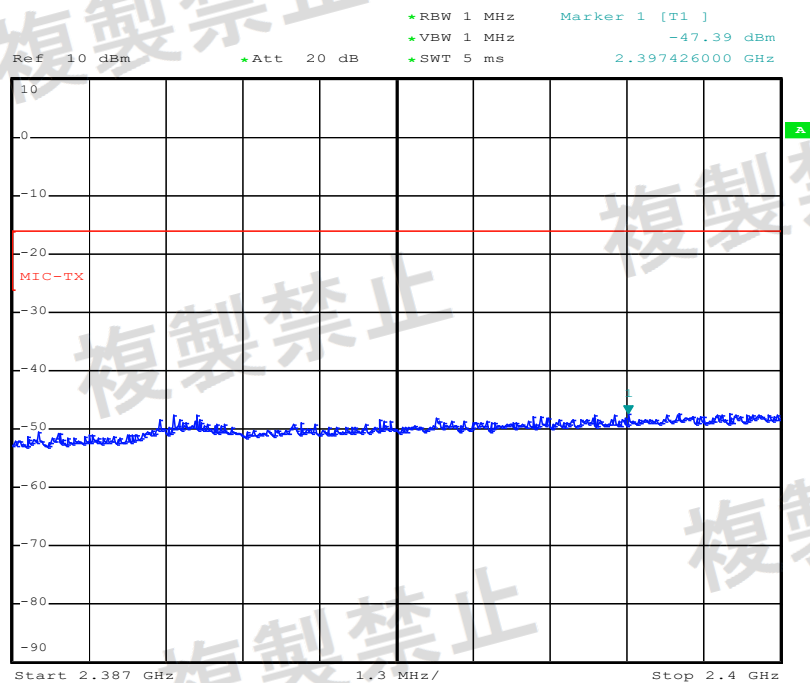


Date: 10.MAY.2019 14:34:42

Test mode: TM 1-GFSK

Test channel: Middle

2.387GHz to 2.4GHz



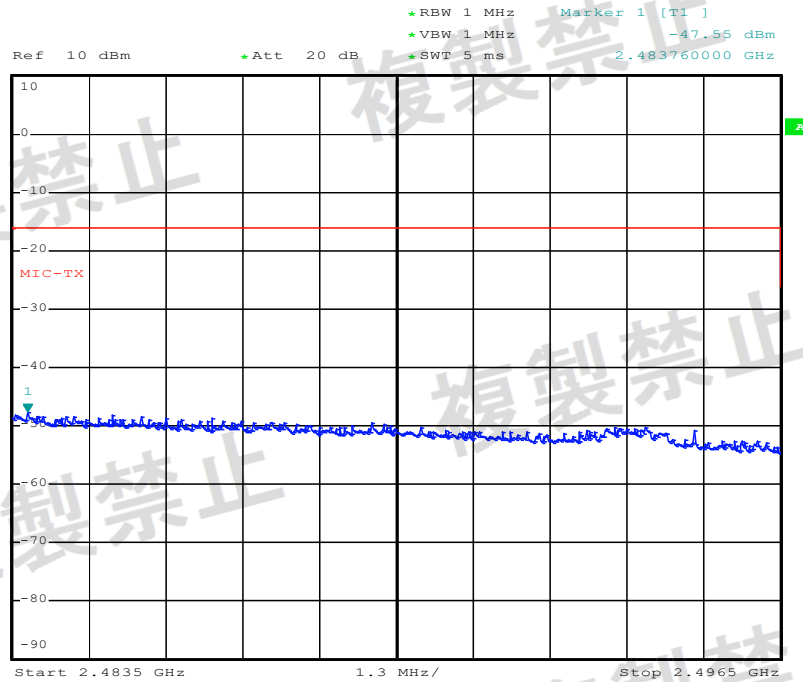
Date: 10.MAY.2019 14:37:15



Test mode: TM 1-GFSK

Test channel: Middle

2483.5MHz to 2496.5MHz:

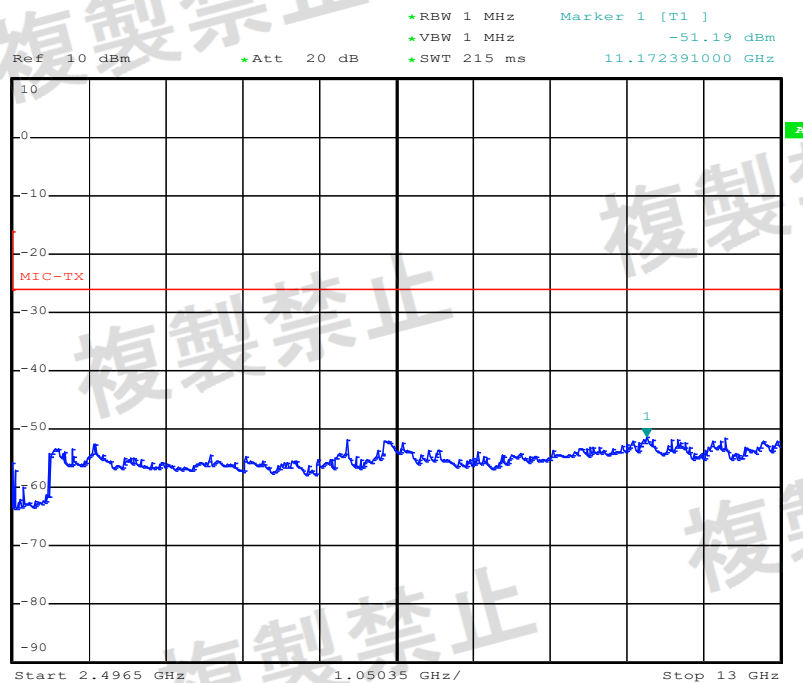


Date: 10.MAY.2019 14:40:54

Test mode: TM 1-GFSK

Test channel: Middle

2496.5MHz to 13 GHz



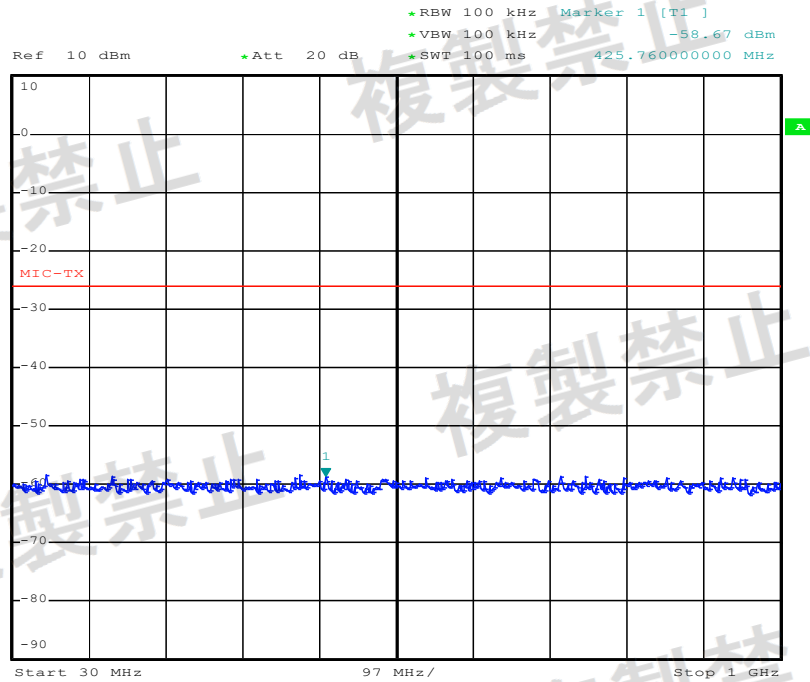
Date: 10.MAY.2019 14:43:40



Test mode: TM 1-GFSK

Test channel: Highest

30MHz to 1GHz

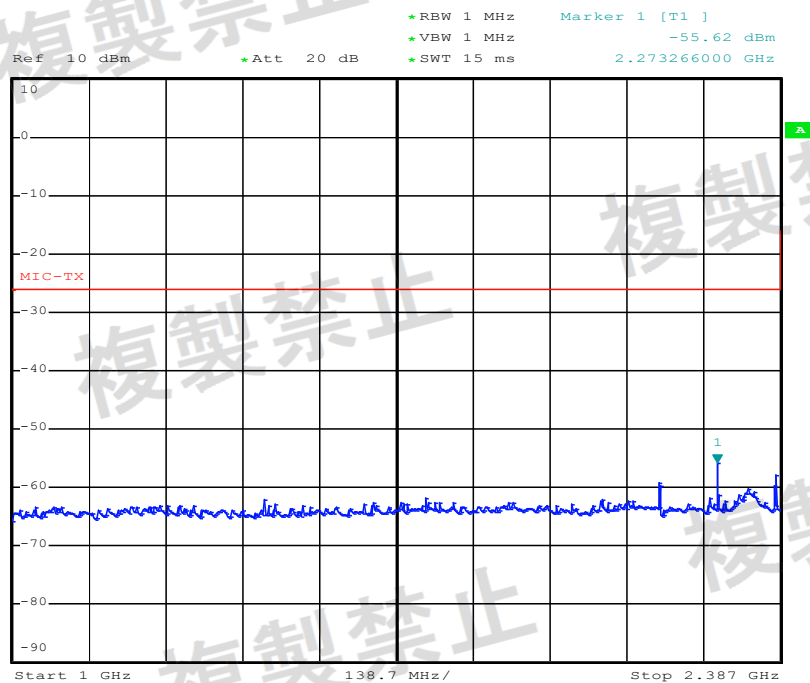


Date: 10.MAY.2019 14:47:36

Test mode: TM 1-GFSK

Test channel: Highest

1GHz to 2.387GHz



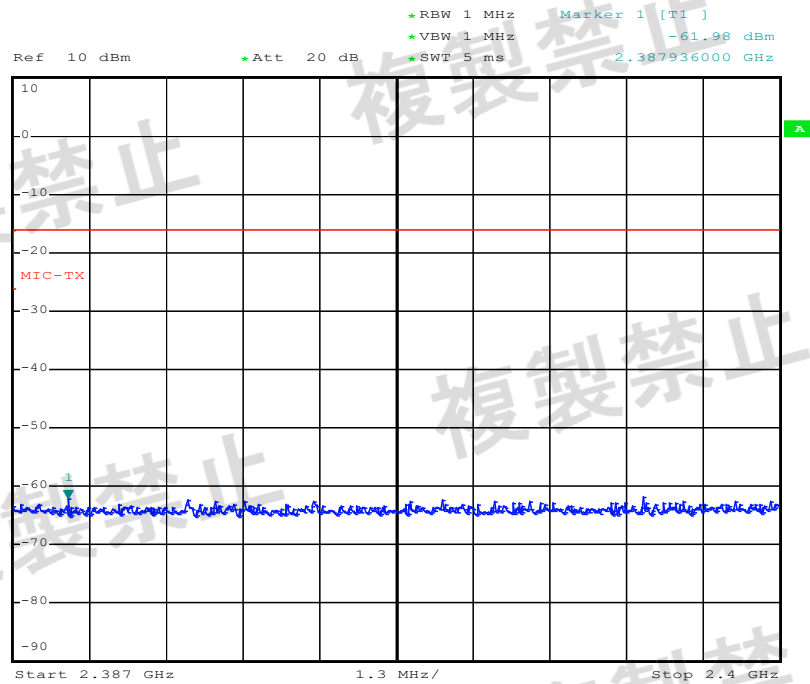
Date: 10.MAY.2019 14:50:05



Test mode: TM 1-GFSK

Test channel: Highest

2.387GHz to 2.4GHz

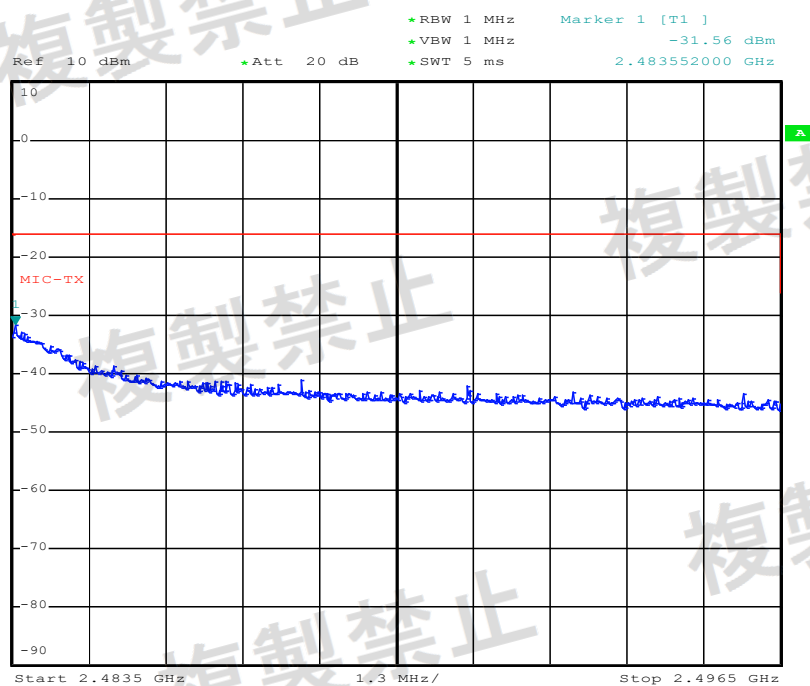


Date: 10.MAY.2019 14:37:45

Test mode: TM 1-GFSK

Test channel: Highest

2483.5MHz to 2496.5MHz:



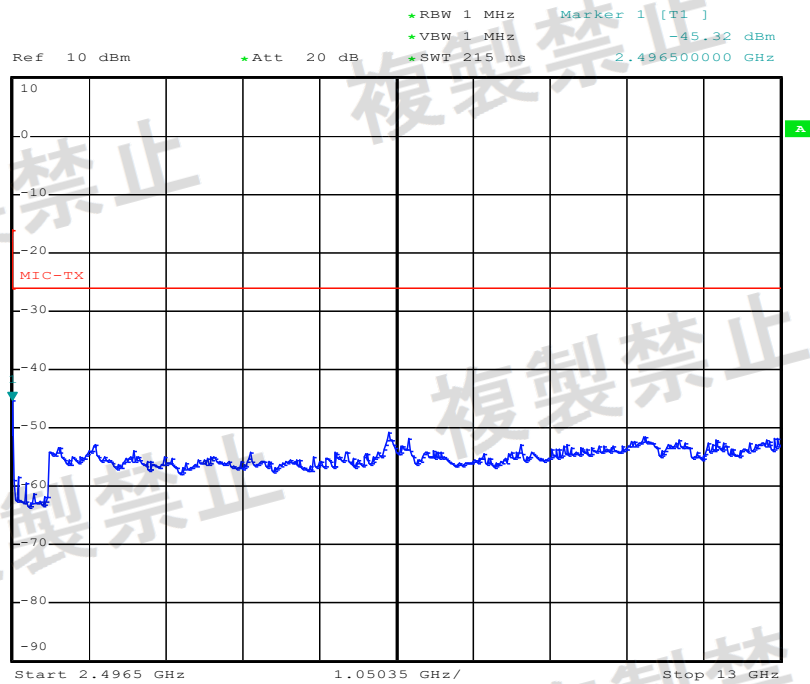
Date: 10.MAY.2019 14:41:34



Test mode: TM 1-GFSK

Test channel: Highest

2496.5MHz to 13 GHz



Date: 10.MAY.2019 14:44:16

7.5 Limit of secondary radiated emissions

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

7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1001 mbar
Test mode b:RX mode_Keep the EUT in continuously receiving mode with GFSK modulation

7.5.2 Test Setup Diagram



7.5.3 Measurement Procedure and Data

1. Test Conditions:

Spectrum Analyzer is used for measurement.

2. EUT conditions:

Modulation/Spread/Hopping ON

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

3. Spectrum Analyzer conditions:

Step 1

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

Step 2

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

Test setup for Step 1:

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

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

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

Sweep Time: Auto

detector mode: Positive peak

Indication mode: Max hold

Test setup for Step 2:

Frequency: Spurious Frequency

Span 0 Hz

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

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

Sweep Time: Auto

detector mode: Sample

Indication mode: Max hold

Test mode: GFSK

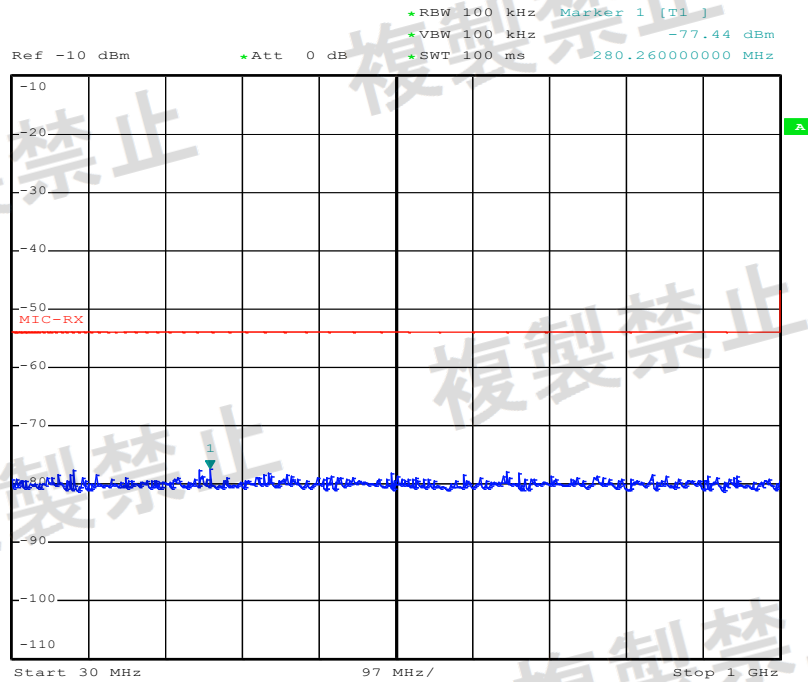
Test Freq (MHz)	Spurious Emissions of RX						Limit	Result
	TM 1		TM 2		TM 3			
	Freq (MHz)	Level (dBm)	Freq (MHz)	Level (dBm)	Freq (MHz)	Level (dBm)		
2402	280.26	-77.44	/	/	/	/	(1) Below 1 GHz: -54dBm	Pass
	11152.00	-71.33	/	/	/	/		Pass
2440	88.20	-78.28	/	/	/	/	(2) Over 1 GHz: -47dBm	Pass
	11248.00	-71.58	/	/	/	/		Pass
2480	501.42	-77.37	/	/	/	/		Pass
	11248.00	-71.25	/	/	/	/		Pass



Test mode: TM 1-GFSK

Test channel:Lowest

30MHz to 1GHz

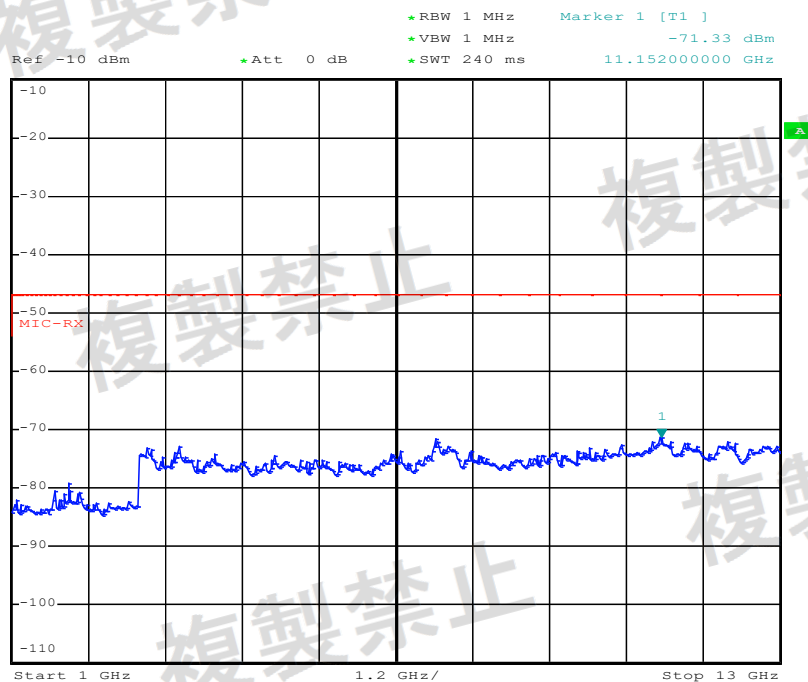


Date: 10.MAY.2019 14:20:58

Test mode: TM 1-GFSK

Test channel:Lowest

1GHz to 13GHz



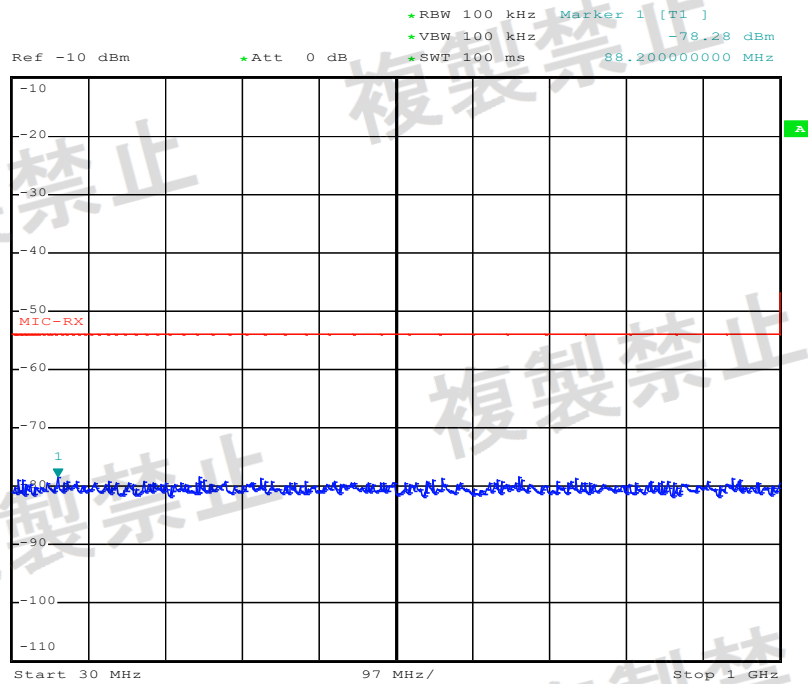
Date: 10.MAY.2019 14:24:05



Test mode: TM 1-GFSK

Test channel: Middle

30MHz to 1GHz

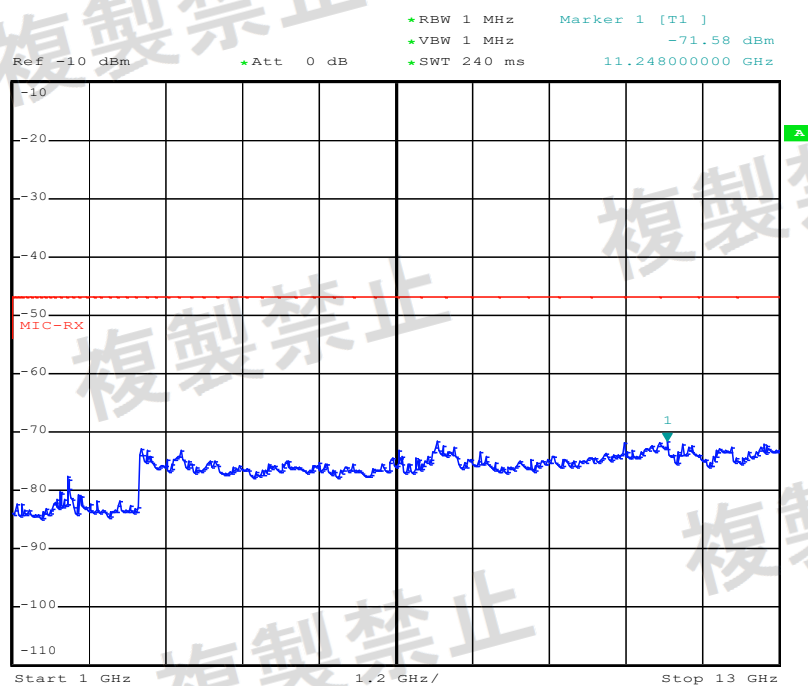


Date: 10.MAY.2019 14:21:24

Test mode: TM 1-GFSK

Test channel: Middle

1GHz to 13GHz



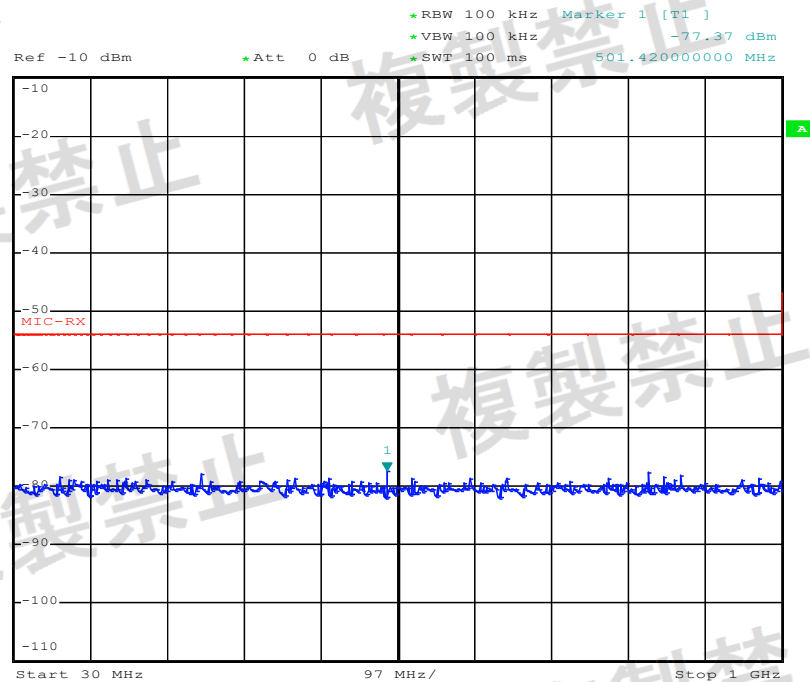
Date: 10.MAY.2019 14:25:12



Test mode: TM 1-GFSK

Test channel: Highest

30MHz to 1GHz

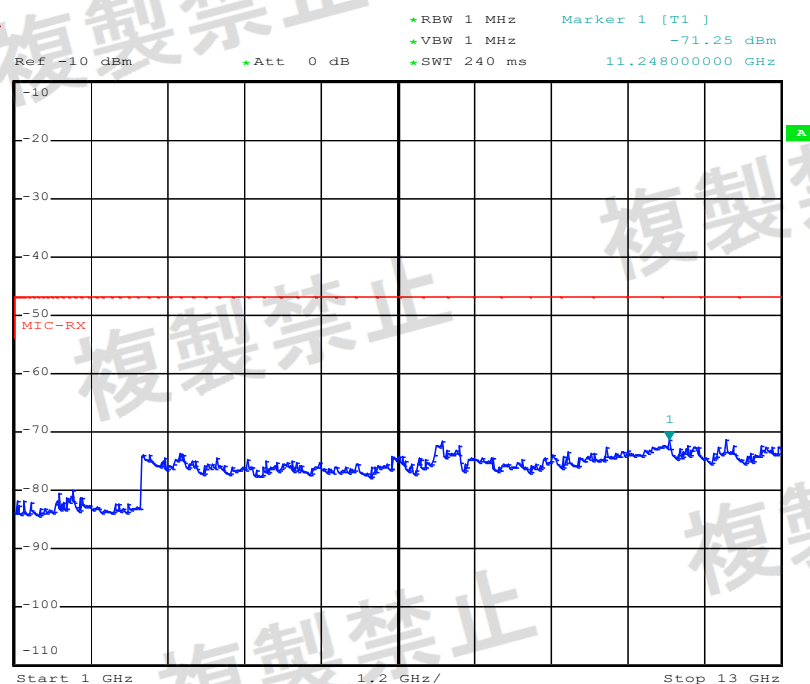


Date: 10.MAY.2019 14:22:30

Test mode: TM 1-GFSK

Test channel: Highest

1GHz to 13GHz



Date: 10.MAY.2019 14:26:12

8 Photographs

Refer to the < Photographs >

- End of the Report -