

2.4GHz Wideband Low Power Data Communication System Test Report

Product Name	Wireless speaker
Model No.	Codi

Applicant	Dynaudio A/S
Address	Sverigesvej 15, 8660 Skanderborg, Denmark

Date of Receipt	Nov. 20, 2020
Issued Date	May 03, 2021
Report No.	20B0726R-E3032140405
Report Version	V1.0



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.

This report must not be used to claim product endorsement by TAF or any agency of the government.

The test report shall not be reproduced without the written approval of DEKRA Testing and Certification Co., Ltd.

Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Test Report

Issued Date: May 03, 2021

Report No.: 20B0726R-E3032140405



Product Name	Wireless speaker
Applicant	Dynaudio A/S
Address	Sverigesvej 15, 8660 Skanderborg, Denmark
Manufacturer	Dynaudio A/S
Model No.	Codi
EUT Rated Voltage	AC 100-240V, 50-60Hz
EUT Test Voltage	AC 100V / 60Hz
Trade Name	DYNAUDIO
Test Method	Public notice of MIC No.88 test method of specified radio equipment (January 26, 2004) Annex43. Article 2 paragraph 1 item 19
Test Result	Complied

Documented By :

Ida Tung

(Project Specialist / Ida Tung)

Tested By :

Bill Lin

(Senior Engineer / Bill Lin)

Approved By :

Jack Hsu

(Senior Engineer / Jack Hsu)

TABLE OF CONTENTS

Description	Page
1. GENERAL INFORMATION	6
1.1. EUT Description	6
1.2. EUT Exercise Software	8
1.3. Parament of test software setting	8
1.4. Test Conditions	8
1.5. RF and IF section must be tamper requirement	9
1.6. Test Facility	10
1.7. List of Test Equipment	11
1.8. Uncertainty	12
2. Output Power Density 、Output Power Density Tolerance and E.I.R.P	13
2.1. Test Setup	13
2.2. Limits	13
2.3. Test Procedure	13
2.4. Test Result of Output Power Density 、Output Power Density Tolerance and E.I.R.P	14
3. Spread Bandwidth and Spread Factor	20
3.1. Test Setup	20
3.2. Test Procedure	20
3.3. Limits	20
3.4. Test Result of Spread Bandwidth and Spread Factor	21
4. Occupied Bandwidth	20
4.1. Test Setup	33
4.2. Test Procedure	33
4.3. Limits	33
4.4. Test Result of Occupied Bandwidth	34
5. Frequency Tolerance	40
5.1. Test Setup	40
5.2. Test Procedure	40
5.3. Limits	40
5.4. Test Result of Frequency Tolerance	41
6. Dwell Time	53
6.1. Test Setup	53
6.2. Test Procedure	54

6.3. Limits	54
6.4. Test Result of Dwell Time and Burst Ratio	55
7. Transmitter Suprious Emissions	61
7.1. Test Setup.....	61
7.2. Test Procedure.....	61
7.3. Limits	61
7.4. Test Result of Transmitter Spurious Emissions	62
8. Receiver Suprious Emissions.....	86
8.1. Test Setup.....	86
8.2. Test Procedure.....	86
8.3. Limits	86
8.4. Test Result of Receiver Spurious Emissions.....	87
9. EMI Reduction Method During Compliance Testing	105
Appendix 1: EUT Test Photographs	
Appendix 2: EUT Detailed Photographs	

Revision History

Report No.	Version	Description	Issued Date
20B0726R-E3032140405	V1.0	Initial issue of report.	May 03, 2021

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Wireless speaker
Trade Name	DYNAUDIO
Model No.	Codi
SERIAL NUMBER	50:1E:2D:3E:2F:7C
Frequency Range	2402-2480MHz
Type of Modulation	V3.0+HS,V2.1+EDR:GFSK(1Mbps)/ π /4DQPSK(2Mbps)/8DPSK(3Mbps)
Antenna Type	PIFA Antenna
Number of Channels	79
Antenna Gain	Refer to the table "Antenna List"
Channel Control	Auto
Declared Output Power	Normal operation (39 channel): 0.05 mW/MHz AFH operation (09 channel): 0.15 mW/MHz
Contain Module	Stream / Stream1832 (M/N: Codi Primary) Summit / SWM908SD (M/N: Codi Primary) Summit / SWS997SD (M/N: Codi Client)

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	WoodStone	WIA2416ILMS200317	PIFA Antenna	3.1dBi for 2.4 GHz

Center Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 00:	2402 MHz	Channel 20:	2422 MHz	Channel 40:	2442 MHz	Channel 60:	2462 MHz
Channel 01:	2403 MHz	Channel 21:	2423 MHz	Channel 41:	2443 MHz	Channel 61:	2463 MHz
Channel 02:	2404 MHz	Channel 22:	2424 MHz	Channel 42:	2444 MHz	Channel 62:	2464 MHz
Channel 03:	2405 MHz	Channel 23:	2425 MHz	Channel 43:	2445 MHz	Channel 63:	2465 MHz
Channel 04:	2406 MHz	Channel 24:	2426 MHz	Channel 44:	2446 MHz	Channel 64:	2466 MHz
Channel 05:	2407 MHz	Channel 25:	2427 MHz	Channel 45:	2447 MHz	Channel 65:	2467 MHz
Channel 06:	2408 MHz	Channel 26:	2428 MHz	Channel 46:	2448 MHz	Channel 66:	2468 MHz
Channel 07:	2409 MHz	Channel 27:	2429 MHz	Channel 47:	2449 MHz	Channel 67:	2469 MHz
Channel 08:	2410 MHz	Channel 28:	2430 MHz	Channel 48:	2450 MHz	Channel 68:	2470 MHz
Channel 09:	2411 MHz	Channel 29:	2431 MHz	Channel 49:	2451 MHz	Channel 69:	2471 MHz
Channel 10:	2412 MHz	Channel 30:	2432 MHz	Channel 50:	2452 MHz	Channel 70:	2472 MHz
Channel 11:	2413 MHz	Channel 31:	2433 MHz	Channel 51:	2453 MHz	Channel 71:	2473 MHz
Channel 12:	2414 MHz	Channel 32:	2434 MHz	Channel 52:	2454 MHz	Channel 72:	2474 MHz
Channel 13:	2415 MHz	Channel 33:	2435 MHz	Channel 53:	2455 MHz	Channel 73:	2475 MHz
Channel 14:	2416 MHz	Channel 34:	2436 MHz	Channel 54:	2456 MHz	Channel 74:	2476 MHz
Channel 15:	2417 MHz	Channel 35:	2437 MHz	Channel 55:	2457 MHz	Channel 75:	2477 MHz
Channel 16:	2418 MHz	Channel 36:	2438 MHz	Channel 56:	2458 MHz	Channel 76:	2478 MHz
Channel 17:	2419 MHz	Channel 37:	2439 MHz	Channel 57:	2459 MHz	Channel 77:	2479 MHz
Channel 18:	2420 MHz	Channel 38:	2440 MHz	Channel 58:	2460 MHz	Channel 78:	2480 MHz
Channel 19:	2421 MHz	Channel 39:	2441 MHz	Channel 59:	2461 MHz		

Note:

1. The EUT is a Wireless speaker with a built-in 2.4 GHz and 5 GHz WLAN and Bluetooth V5.0, V3.0, V2.1+EDR and WISA transceiver, this report for Bluetooth V3.0, V2.1+EDR.
2. The test data in this report is Stream / Stream1832 (M/N: Codi Primary).
3. DEKRA has evaluated each test mode. Only the worst case is shown in the report.
4. DEKRA verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Test Mode	Mode 1: Transmitter-Normal-1Mbps
	Mode 2: Transmitter-Normal-2Mbps
	Mode 3 :Transmitter-Normal-3Mbps
	Mode 4: Transmitter-AFH-1Mbps
	Mode 5: Transmitter-AFH-2Mbps
	Mode 6: Transmitter-AFH-3Mbps
	Mode 7: Receiver-Normal-1Mbps
	Mode 8: Receiver-Normal-2Mbps
	Mode 9: Receiver-Normal-3Mbps
	Mode 10: Receiver-AFH-1Mbps
	Mode 11: Receiver-AFH-2Mbps
	Mode 12: Receiver-AFH-3Mbps

1.2. EUT Exercise Software

- (1) Execute software “Dut labtool V1.0.0.146” on the EUT.
- (2) Configure the test mode, the test channel, and the data rate.
- (3) Press “OK” to start the continuous Transmit.
- (4) Verify that the EUT works properly.

1.3. Parament of test software setting

The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Normal Operation

Test Software	Dut labtool V1.0.0.146		
Frequency	2402MHz	2441MHz	2480MHz
GFSK	4	4	4
$\pi/4$ DQPSK	4	4	4
8DPSK	4	4	4

AFH Operation

Test Software	Dut labtool V1.0.0.146		
Frequency	2402MHz	2411MHz	2421MHz
GFSK	4	4	4
$\pi/4$ DQPSK	4	4	4
8DPSK	4	4	4

1.4. Test Conditions

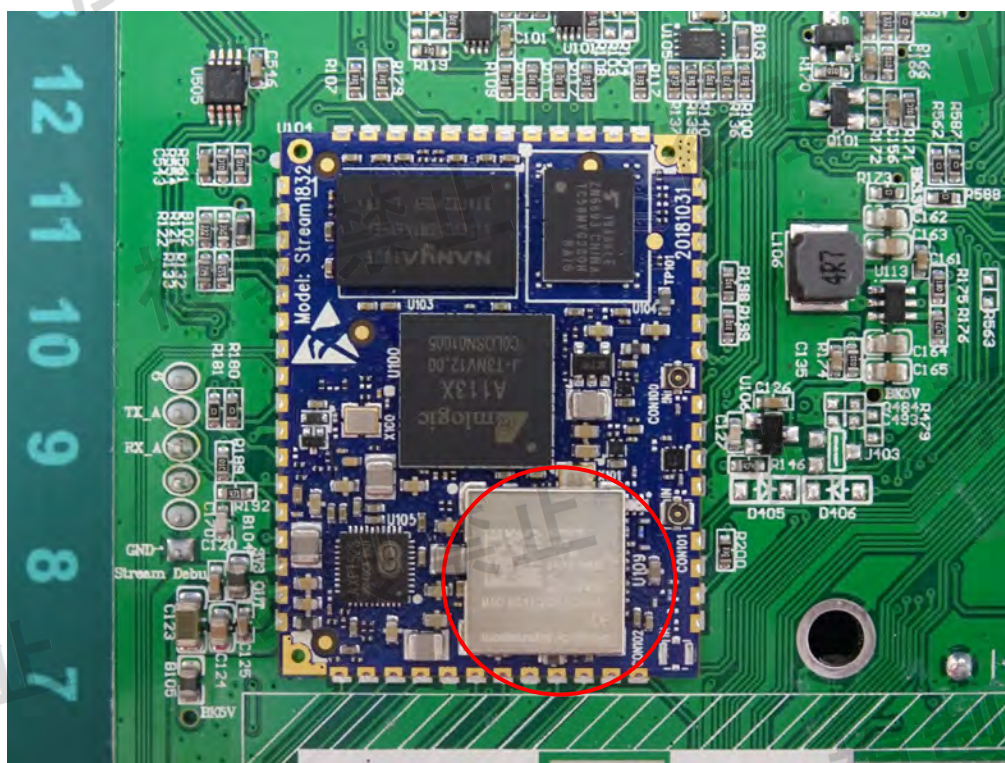
Voltage Test Item	Test Voltage	Voltage meter reading value (RF Chip pin17)
Nominal Voltage	AC 110V	5.04V DC
Highest Voltage	AC 121V	5.03V DC
Lowest Voltage	AC 99V	5.01V DC

Note: 1. The Voltage supply for RF Chip pin17 is 5.03 VDC.

2. The internal supply gives a fluctuation value less than 1 % (**Around 0.60% from max. to min.**)

1.5. RF and IF section must be tamper requirement

Requirement	Comments	Result
RF, IF and Modulation section must be tamper	☐ Use Special Screw ☐ Metal Shielding is Soldered (Please see Attachment: EUT Detailed Photographs) ☐ Use Ball Grid Array (BGA)	--
	☐ RF module/Chip pin >10 ☒ RF module/Chip pins distance <1.5mm (Please see mechanism photograph)	Complete



1.6. Test Facility

Ambient conditions in the laboratory:

Performed Item	Items	Required	Actual
Conductive	Temperature (°C)	15~35 °C	21.3 °C
	Humidity (%RH)	20~75 %	55.1 %

Site Description : Accredited by TAF
Accredited Number: 3023

Test Laboratory : DEKRA Testing and Certification Co., Ltd
Address : No. 26, Huaya 1st Rd., Guishan Dist.,
Taoyuan City 333411, Taiwan, R.O.C.

Phone number : +886-3-275-7255
Fax number : +866-3-327-5505
Email address : info.tw@dekra.com
Website : <http://www.dekra.com.tw>

1.7. List of Test Equipment

For Conducted measurements /SH2

	Equipment	Manufacturer	Model No.	Serial No.	Calibrated	Cal. Method	Cal. Date	Due. Date
X	Spectrum Analyzer	R&S	FSV40	101149	ETC	*(c)	2021.02.04	2022.02.03
X	Peak Power Analyzer	Keysight	8990B	MY51000539	ETC	*(c)	2021.06.07	2022.06.06
X	Wideband Power Sensor	Keysight	N1923A	MY59240002	ETC	*(c)	2021.05.17	2022.05.16
X	Wideband Power Sensor	Keysight	N1923A	MY59240003	ETC	*(c)	2021.05.17	2022.05.16
X	Signal Generator	R&S	SMB100A	110724	ETC	*(c)	2021.04.07	2022.04.06
X	Signal Generator	R&S	SMBV100A	261757	ETC	*(c)	2020.12.23	2021.12.22
X	4-WAY Power Divider	Woken	0120A04056002D	DSU893W3S3	ETC	*(c)	2020.11.23	2021.11.22

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : DEKRA Conduction Test System V9.0.5
4.
 - a) Calibration conducted by the National Institute of Information and Communications Technology(NICT) (hereinafter referred to as "NICT") or a designated calibration agency under Article 102-18 paragraph (1)
 - b) Correction conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Law (Law No. 51 of 1992)
 - c) Calibration conducted in foreign countries, which shall be equivalent to the calibration conducted by the NICT or a designated agency under Article 102-18 paragraph (1).
 - d) Calibration conducted by using measuring instruments and other equipment listed in the right column of Table No. 3 attached hereto, which shall have been given any of calibration, etc. listed above from a) to c).

1.8. Uncertainty

Uncertainties have been calculated according to the DEKRA internal document, and is described in each test chapter of this report.

The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Test item	Uncertainty	
	Power Meter	Spectrum Analyzer
Output Power Density 、 Output Power Density Tolerance and E.I.R.P	± 0.91 dB	± 2.53 dB
Spread Bandwidth and Spread Factor	± 682.83 Hz	
Occupied Bandwidth	± 682.83 Hz	
Frequency Tolerance	± 682.83 Hz	
Dwell Time	± 2.31 ms	
Transmitter Spurious Emissions	± 2.53 dB	
Receiver Spurious Emissions	± 2.53 dB	

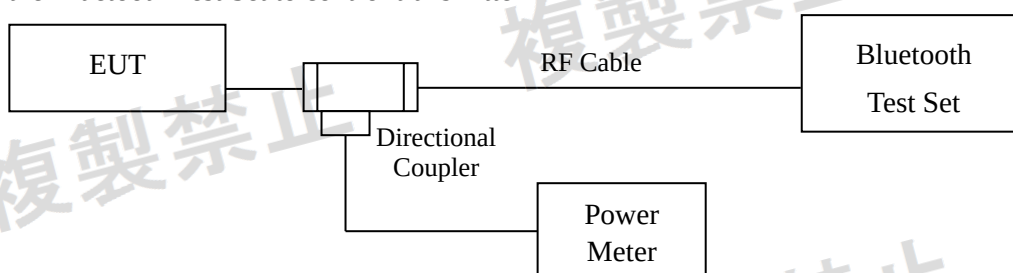
2. Output Power Density 、 Output Power Density Tolerance and E.I.R.P

2.1. Test Setup

- ☒ Use the program to control transmitter



- ☐ Use the Bluetooth Test Set to control transmitter



2.2. Limits

Output Power must be 3mW/MHz or less.

Output Power Tolerance: +20% to -80%

E.I.R.P. must be 6.9112dBm/MHz or less or 16.9112dBm/MHz.

2.3. Test Procedure

- Measure the total power by Power Meter in a state of hopping mode (with Average Sensor).
- If it's the burst wave, please measure the burst ratio. Then calculate the real total power by burst ratio.
- Calculate the mean power per 1MHz by dividing the total power by spread bandwidth.

2.4. Test Result of Output Power Density、Output Power Density Tolerance and E.I.R.P

Product : Wireless speaker
 Test Item : Output Power Density、Output Power Density Tolerance and E.I.R.P
 Test Date : 2021/03/31
 Test Mode : Mode 1: Transmitter-Normal-1Mbps

Output Power Density

Test Conditions		Frequency (MHz)	Reading Value (dBm)	Real Value (mW/MHz)	Limit (mW/MHz)
--	--	--	--	--	--
Tnom (21.3 °C)	Vnom (100VAC)	2441	1.97	0.0286	3
--	--	--	--	--	--

Note: Reading Value= power meter reading value
 Real Value= $10^{(\text{Reading value (dBm)}/10)}$ / Burst Ratio/ Spread bandwidth (MHz)

Output Power Density Tolerance

Frequency (MHz)	Declared Output Power (mW/MHz)	Output Power (mW/MHz)	Tolerance (%)	Limit (mW/MHz)
--	--	--	--	--
2441	0.05	0.0286	-42.81	+20% to -80%
--	--	--	--	--

Note: Deviation = (Output Power - Declared Output Power) / Declared Output Power * 100%

E.I.R.P

Maximum Antenna Gain= 3.1 dBi					
Test Conditions		Frequency (MHz)	Output Power (dBm/MHz)	Real Value (dBm/MHz)	Limit (dBm/MHz)
--	--	--	--	--	--
Tnom (21.3 °C)	Vnom (100VAC)	2441	-15.437	-12.337	6.911
--	--	--	--	--	--

Note: Real Value= Output Power + Maximum Antenna Gain (dBi)

Product : Wireless speaker
 Test Item : Output Power Density 、 Output Power Density Tolerance and E.I.R.P
 Test Date : 2021/03/31
 Test Mode : Mode 2: Transmitter-Normal-2Mbps

Output Power Density

Test Conditions		Frequency (MHz)	Reading Value (dBm)	Real Value (mW/MHz)	Limit (mW/MHz)
--	--	--	--	--	--
Tnom (21.3 °C)	Vnom (100VAC)	2441	1.99	0.0287	3
--	--	--	--	--	--

Note: Reading Value= power meter reading value
 Real Value= $10^{(\text{Reading value (dBm)}/10)}$ / Burst Ratio/ Spread bandwidth (MHz)

Output Power Density Tolerance

Frequency (MHz)	Declared Output Power (mW/MHz)	Output Power (mW/MHz)	Tolerance (%)	Limit (mW/MHz)
--	--	--	--	--
2441	0.05	0.0287	-42.55	+20% to -80%
--	--	--	--	--

Note: Deviation = (Output Power - Declared Output Power) / Declared Output Power * 100%

E.I.R.P

Maximum Antenna Gain= 3.1 dBi					
Test Conditions		Frequency (MHz)	Output Power (dBm/MHz)	Real Value (dBm/MHz)	Limit (dBm/MHz)
--	--	--	--	--	--
Tnom (21.3 °C)	Vnom (100VAC)	2441	-15.417	-12.3174	6.911
--	--	--	--	--	--

Note: Real Value= Output Power + Maximum Antenna Gain (dBi)

Product : Wireless speaker
 Test Item : Output Power Density 、Output Power Density Tolerance and E.I.R.P
 Test Date : 2021/03/31
 Test Mode : Mode 3 :Transmitter-Normal-3Mbps

Output Power Density

Test Conditions		Frequency (MHz)	Reading Value (dBm)	Real Value (mW/MHz)	Limit (mW/MHz)
--	--	--	--	--	--
Tnom (21.3 °C)	Vnom (100VAC)	2441	1.93	0.0284	3
--	--	--	--	--	--

Note: Reading Value= power meter reading value
 Real Value= $10^{(\text{Reading value (dBm)}/10)}$ / Burst Ratio/ Spread bandwidth (MHz)

Output Power Density Tolerance

Frequency (MHz)	Declared Output Power (mW/MHz)	Output Power (mW/MHz)	Tolerance (%)	Limit (mW/MHz)
--	--	--	--	--
2441	0.05	0.0284	-43.26	+20% to -80%
--	--	--	--	--

Note: Deviation = (Output Power - Declared Output Power) / Declared Output Power * 100%

E.I.R.P

Maximum Antenna Gain= 3.1 dBi					
Test Conditions		Frequency (MHz)	Output Power (dBm/MHz)	Real Value (dBm/MHz)	Limit (dBm/MHz)
--	--	--	--	--	--
Tnom (21.3 °C)	Vnom (100VAC)	2441	-15.471	-12.3713	6.911
--	--	--	--	--	--

Note: Real Value= Output Power + Maximum Antenna Gain (dBi)

Product : Wireless speaker
 Test Item : Output Power Density 、Output Power Density Tolerance and E.I.R.P
 Test Date : 2021/03/31
 Test Mode : Mode 4: Transmitter-AFH-1Mbps

Output Power Density

Test Conditions		Frequency (MHz)	Reading Value (dBm)	Real Value (mW/MHz)	Limit (mW/MHz)
--	--	--	--	--	--
Tnom (21.3 °C)	Vnom (100VAC)	2411	2.19	0.1179	3
--	--	--	--	--	--

Note: Reading Value= power meter reading value
 Real Value= $10^{(\text{Reading value (dBm)}/10)}$ / Burst Ratio/ Spread bandwidth (MHz)

Output Power Density Tolerance

Frequency (MHz)	Declared Output Power (mW/MHz)	Output Power (mW/MHz)	Tolerance (%)	Limit (mW/MHz)
--	--	--	--	--
2411	0.15	0.1179	-21.43	+20% to -80%
--	--	--	--	--

Note: Deviation = (Output Power - Declared Output Power) / Declared Output Power * 100%

E.I.R.P

Maximum Antenna Gain= 3.1 dBi					
Test Conditions		Frequency (MHz)	Reading Value (dBm/MHz)	Real Value (dBm/MHz)	Limit (dBm/MHz)
--	--	--	--	--	--
Tnom (21.3 °C)	Vnom (100VAC)	2411	-9.287	-6.1865	6.911
--	--	--	--	--	--

Note: Real Value= Output Power+ Maximum Antenna Gain (dBi)

Product : Wireless speaker
 Test Item : Output Power Density 、Output Power Density Tolerance and E.I.R.P
 Test Date : 2021/03/31
 Test Mode : Mode 5: Transmitter-AFH-2Mbps

Output Power Density

Test Conditions		Frequency (MHz)	Reading Value (dBm)	Real Value (mW/MHz)	Limit (mW/MHz)
--	--	--	--	--	--
Tnom (21.3 °C)	Vnom (100VAC)	2411	1.54	0.1017	3
--	--	--	--	--	--

Note: Reading Value= power meter reading value
 Real Value= $10^{(\text{Reading value (dBm)}/10)}$ / Burst Ratio/ Spread bandwidth (MHz)

Output Power Density Tolerance

Frequency (MHz)	Declared Output Power (mW/MHz)	Output Power (mW/MHz)	Tolerance (%)	Limit (mW/MHz)
--	--	--	--	--
2411	0.15	0.1017	-32.17	+20% to -80%
--	--	--	--	--

Note: Deviation = (Output Power - Declared Output Power) / Declared Output Power * 100%

E.I.R.P

Maximum Antenna Gain= 3.1 dBi					
Test Conditions		Frequency (MHz)	Reading Value (dBm/MHz)	Real Value (dBm/MHz)	Limit (dBm/MHz)
--	--	--	--	--	--
Tnom (21.3 °C)	Vnom (100VAC)	2411	-9.925	-6.8251	6.911
--	--	--	--	--	--

Note: Real Value= Output Power+ Maximum Antenna Gain (dBi)

Product : Wireless speaker
 Test Item : Output Power Density 、 Output Power Density Tolerance and E.I.R.P
 Test Date : 2021/03/31
 Test Mode : Mode 6: Transmitter-AFH-3Mbps

Output Power Density

Test Conditions		Frequency (MHz)	Reading Value (dBm)	Real Value (mW/MHz)	Limit (mW/MHz)
--	--	--	--	--	--
Tnom (21.3 °C)	Vnom (100VAC)	2411	1.68	0.1051	3
--	--	--	--	--	--

Note: Reading Value= power meter reading value
 Real Value= $10^{(\text{Reading value (dBm)}/10)}$ / Burst Ratio/ Spread bandwidth (MHz)

Output Power Density Tolerance

Frequency (MHz)	Declared Output Power (mW/MHz)	Output Power (mW/MHz)	Tolerance (%)	Limit (mW/MHz)
--	--	--	--	--
2411	0.15	0.1051	-29.95	+20% to -80%
--	--	--	--	--

Note: Deviation = (Output Power - Declared Output Power) / Declared Output Power * 100%

E.I.R.P

Maximum Antenna Gain= 3.1 dBi					
Test Conditions		Frequency (MHz)	Reading Value (dBm/MHz)	Real Value (dBm/MHz)	Limit (dBm/MHz)
--	--	--	--	--	--
Tnom (21.3 °C)	Vnom (100VAC)	2411	-9.785	-6.6851	6.911
--	--	--	--	--	--

Note: Real Value= Output Power+ Maximum Antenna Gain (dBi)

Test Result	PASS
--------------------	------

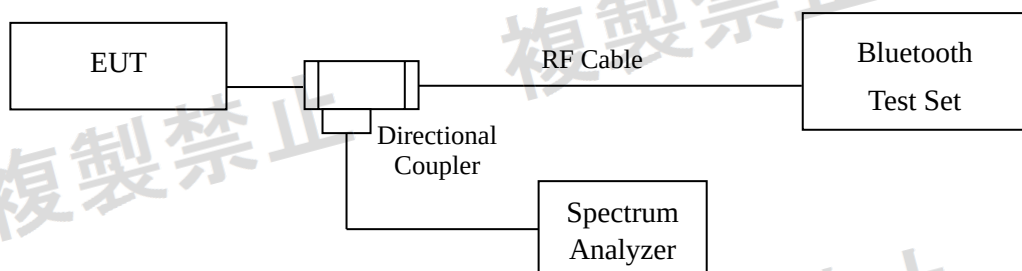
3. Spread Bandwidth and Spread Factor

3.1. Test Setup

☒ Use the program to control transmitter



☐ Use the Bluetooth Test Set to control transmitter



3.2. Test Procedure

A spectrum analyzer or similar device shall be used to observe a sample of the modulated transmitter's radio frequency power output.

- A positive peak detector function must be used.
- A measurement instrument with an integrated 90% power bandwidth function may be used to automate the test process.
- The measurement instrument bandwidth and span must be set sufficiently with, and, the scan time set sufficiently slow, to ensure all major modulation products are captured. Note that the measurement bandwidth should also be set sufficiently narrow to avoid adding significant error to the test result.
- 'Maximum Hold' mode may be used to accumulate the measurement result over several scans provided the emission is repetitive in nature.

3.3. Limits

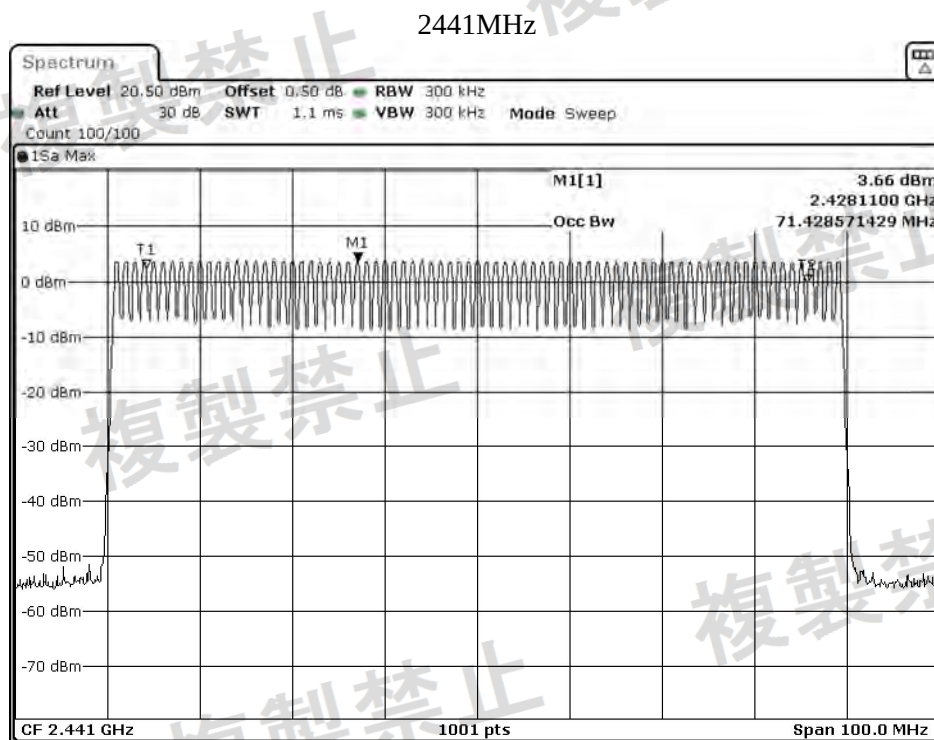
Spread Bandwidth ≥ 500 kHz

Spread Factor ≥ 5 for 2400 – 2483.5 MHz, ≥ 10 for 2471 – 2497 MHz

3.4. Test Result of Spread Bandwidth and Spread Factor

Product : Wireless speaker
 Test Item : Spread Bandwidth
 Test Mode : Mode 1: Transmitter-Normal-1Mbps

Test Conditions		Frequency (MHz)	Reading Value (MHz)	Limit (kHz)
--	--	--	--	>= 500
Tnom (21.3 °C)	Vnom (100VAC)	2441	71.429	>= 500
--	--	--	--	>= 500



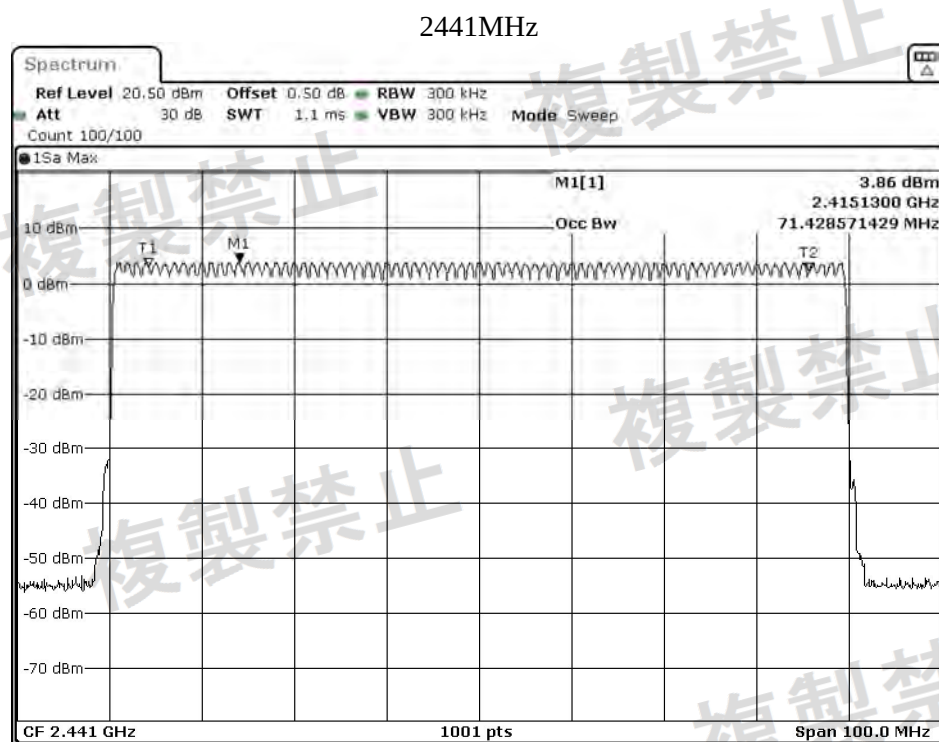
Date: 31.MAR.2021 06:00:23

Product : Wireless speaker
Test Item : Spread Factor
Test Mode : Mode 1: Transmitter-Normal-1Mbps

Test Conditions		Frequency (MHz)	Spread Bandwidth / 1	Limit
--	--	--	--	>= 5
Tnom (21.3 °C)	Vnom (100VAC)	2441	71.429	>= 5
--	--	--	--	>= 5

Product : Wireless speaker
 Test Item : Spread Bandwidth
 Test Mode : Mode 2: Transmitter-Normal-2Mbps

Test Conditions		Frequency (MHz)	Reading Value (MHz)	Limit (kHz)
--	--	--	--	>= 500
Tnom (21.3 °C)	Vnom (100VAC)	2441	71.429	>= 500
--	--	--	--	>= 500



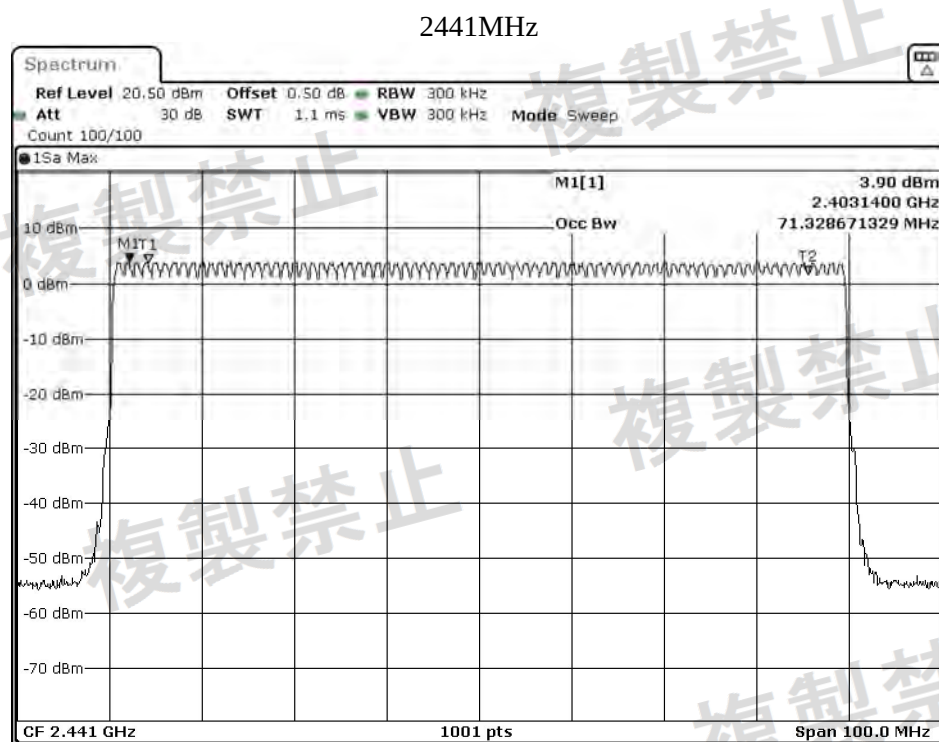
Date: 31.MAR.2021 06:18:20

Product : Wireless speaker
Test Item : Spread Factor
Test Mode : Mode 2: Transmitter-Normal-2Mbps

Test Conditions		Frequency (MHz)	Spread Bandwidth / 1	Limit
--	--	--	--	≥ 5
Tnom (21.3 °C)	Vnom (100VAC)	2441	71.429	≥ 5
--	--	--	--	≥ 5

Product : Wireless speaker
 Test Item : Spread Bandwidth
 Test Mode : Mode 3 :Transmitter-Normal-3Mbps

Test Conditions		Frequency (MHz)	Reading Value (MHz)	Limit (kHz)
--	--	--	--	>= 500
Tnom (21.3 °C)	Vnom (100VAC)	2441	71.329	>= 500
--	--	--	--	>= 500



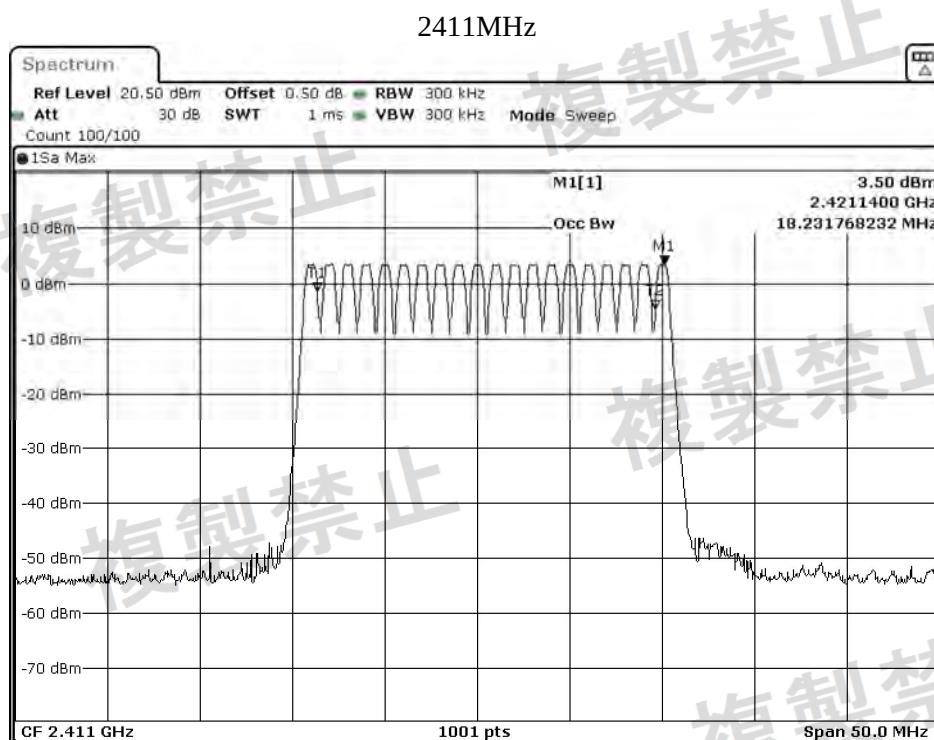
Date: 31.MAR.2021 06:31:25

Product : Wireless speaker
Test Item : Spread Factor
Test Mode : Mode 3 :Transmitter-Normal-3Mbps

Test Conditions		Frequency (MHz)	Spread Bandwidth / 1	Limit
--	--	--	--	≥ 5
Tnom (21.3 °C)	Vnom (100VAC)	2441	71.329	≥ 5
--	--	--	--	≥ 5

Product : Wireless speaker
 Test Item : Spread Bandwidth
 Test Mode : Mode 4: Transmitter-AFH-1Mbps

Test Conditions		Frequency (MHz)	Reading Value (MHz)	Limit (kHz)
--	--	--	--	>= 500
Tnom (21.3 °C)	Vnom (100VAC)	2411	18.23	>= 500
--	--	--	--	>= 500



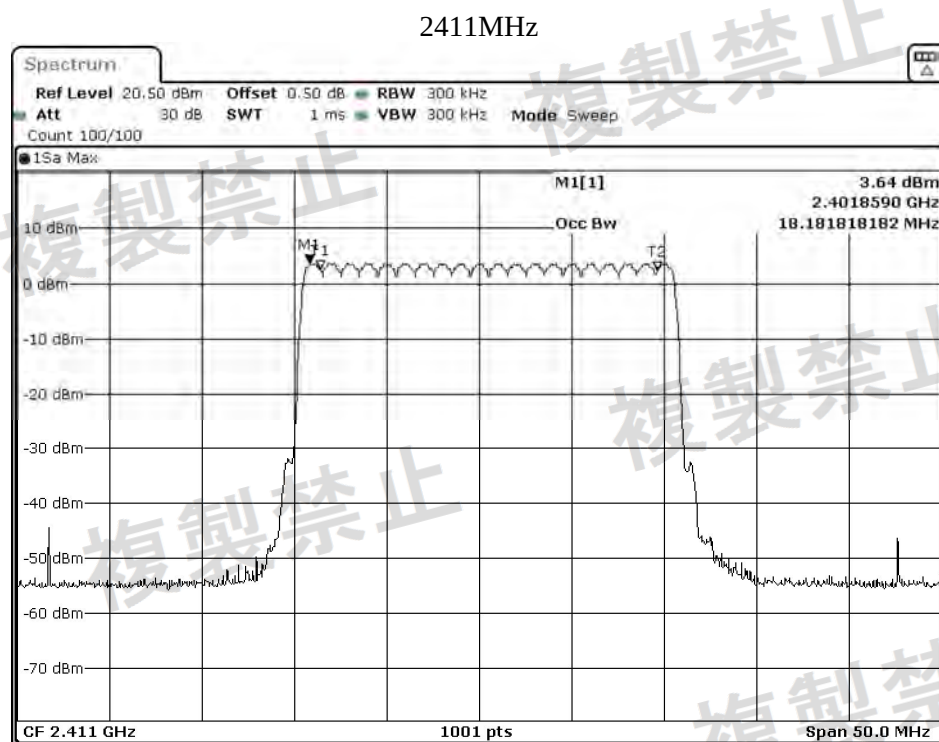
Date: 31.MAR.2021 07:31:55

Product : Wireless speaker
Test Item : Spread Factor
Test Mode : Mode 4: Transmitter-AFH-1Mbps

Test Conditions		Frequency (MHz)	Spread Bandwidth / 1	Limit
--	--	--	--	≥ 5
Tnom (21.3 °C)	Vnom (100VAC)	2411	18.23	≥ 5
--	--	--	--	≥ 5

Product : Wireless speaker
 Test Item : Spread Bandwidth
 Test Mode : Mode 5: Transmitter-AFH-2Mbps

Test Conditions		Frequency (MHz)	Reading Value (MHz)	Limit (kHz)
--	--	--	--	>= 500
Tnom (21.3 °C)	Vnom (100VAC)	2411	18.182	>= 500
--	--	--	--	>= 500



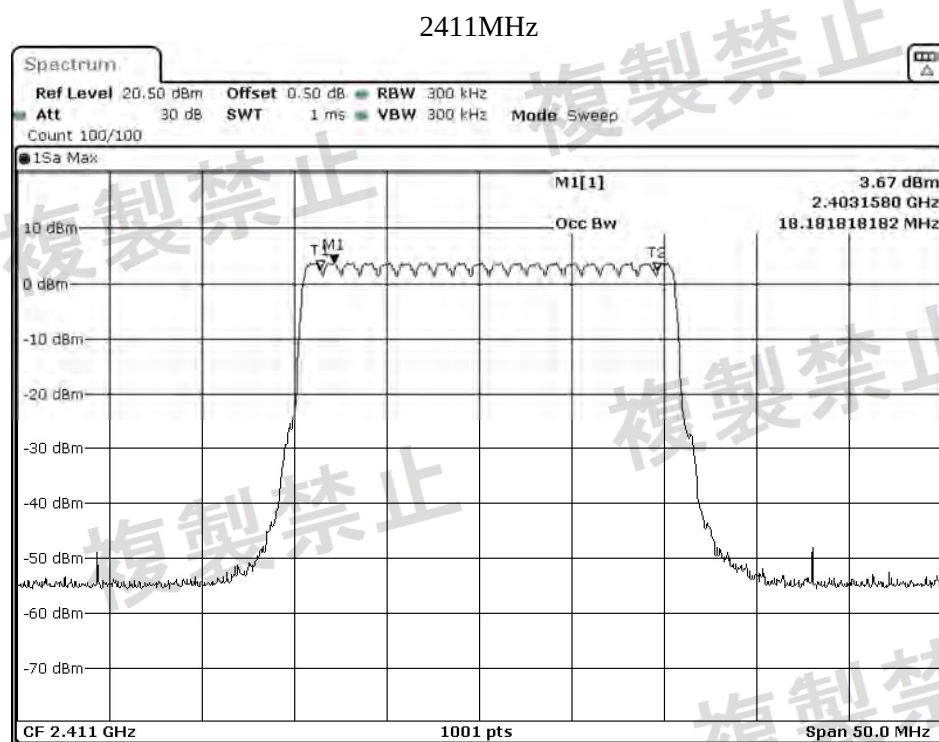
Date: 31.MAR.2021 07:39:05

Product : Wireless speaker
Test Item : Spread Factor
Test Mode : Mode 5: Transmitter-AFH-2Mbps

Test Conditions		Frequency (MHz)	Spread Bandwidth / 1	Limit
--	--	--	--	≥ 5
Tnom (21.3 °C)	Vnom (100VAC)	2411	18.182	≥ 5
--	--	--	--	≥ 5

Product : Wireless speaker
 Test Item : Spread Bandwidth
 Test Mode : Mode 6: Transmitter-AFH-3Mbps

Test Conditions		Frequency (MHz)	Reading Value (MHz)	Limit (kHz)
--	--	--	--	>= 500
Tnom (21.3 °C)	Vnom (100VAC)	2411	18.182	>= 500
--	--	--	--	>= 500



Date: 31.MAR.2021 07:45:08

Product : Wireless speaker
Test Item : Spread Factor
Test Mode : Mode 6: Transmitter-AFH-3Mbps

Test Conditions		Frequency (MHz)	Spread Bandwidth / 1	Limit
--	--	--	--	≥ 5
Tnom (21.3 °C)	Vnom (100VAC)	2411	18.182	≥ 5
--	--	--	--	≥ 5

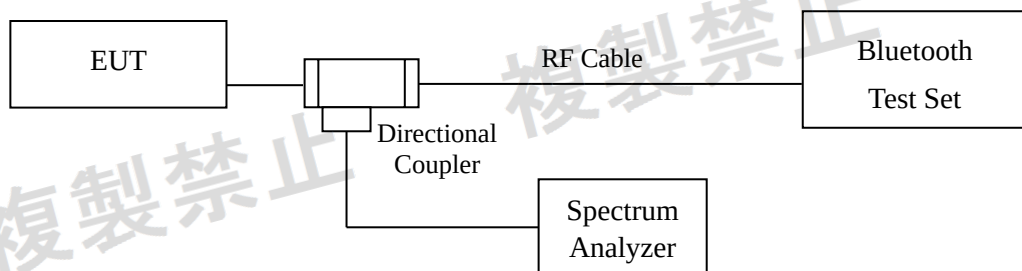
4. Occupied Bandwidth

4.1. Test Setup

- ☒ Use the program to control transmitter



- ☐ Use the Bluetooth Test Set to control transmitter



4.2. Test Procedure

A spectrum analyzer or similar device shall be used to observe a sample of the modulated transmitter's radio frequency power output.

- A positive peak detector function must be used.
- A measurement instrument with an integrated 99% power bandwidth function may be used to automate the test process.
- The measurement instrument bandwidth and span must be set sufficiently with, and, the scan time set sufficiently slow, to ensure all major modulation products are captured. Note that the measurement bandwidth should also be set sufficiently narrow to avoid adding significant error to the test result.
- 'Maximum Hold' mode may be used to accumulate the measurement result over several scans provided the emission is repetitive in nature.

4.3. Limits

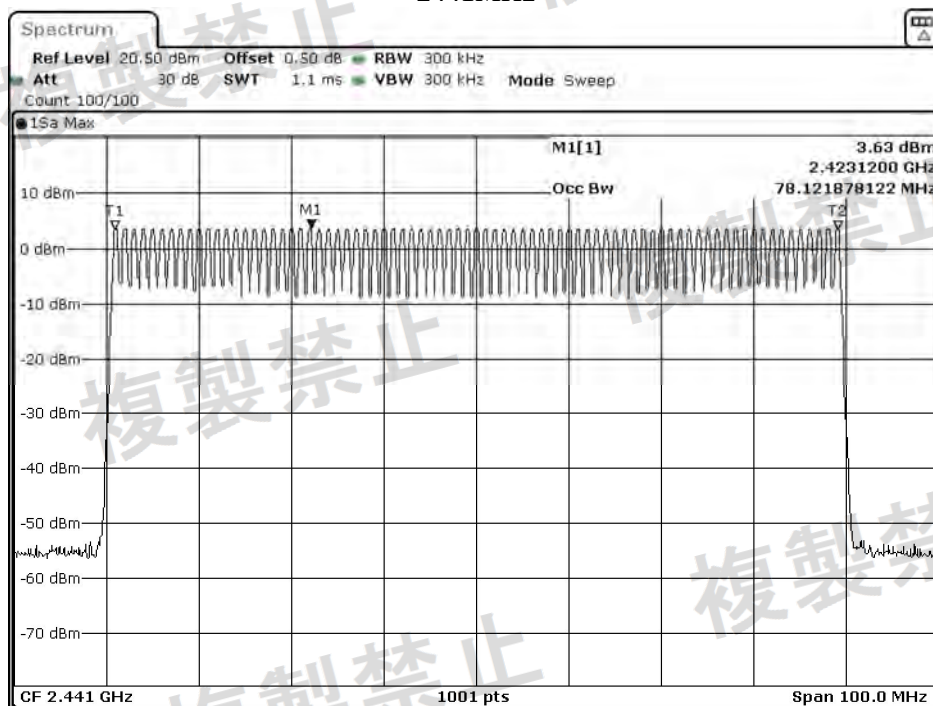
≤ 26 MHz for DSSS, ≤ 83.5 MHz for FHSS

4.4. Test Result of Occupied Bandwidth

Product : Wireless speaker
 Test Item : Occupied Bandwidth
 Test Mode : Mode 1: Transmitter-Normal-1Mbps

Test Conditions		Frequency (MHz)	Reading Value (MHz)	Limit (MHz)
--	--	--	--	<= 83.5
Tnom (21.3 °C)	Vnom (100VAC)	2441	78.122	<= 83.5
--	--	--	--	<= 83.5

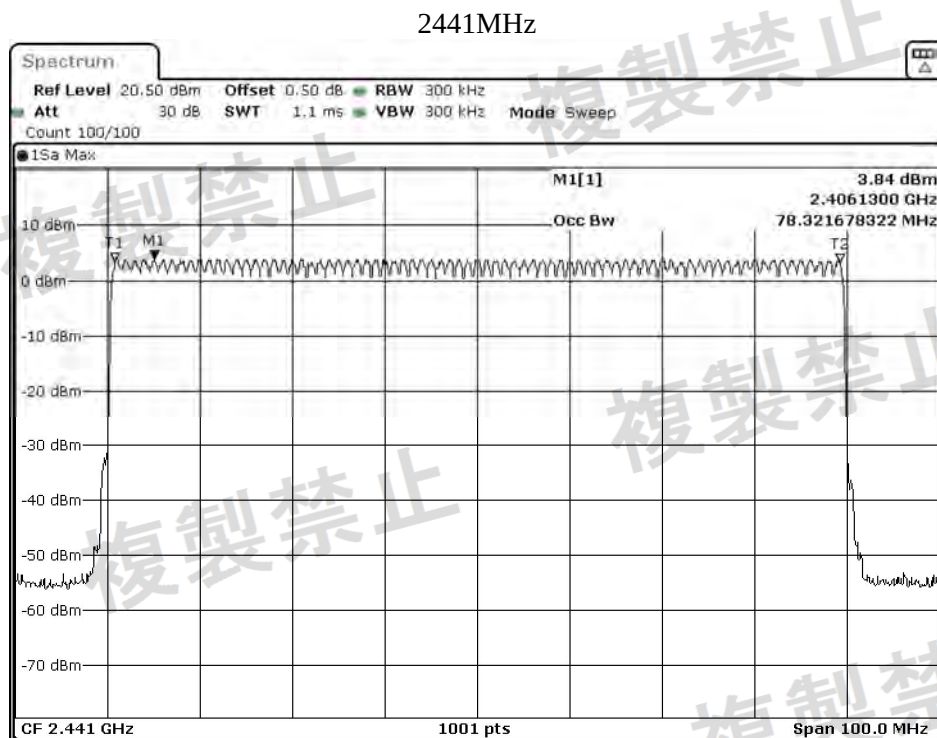
2441MHz



Date: 31.MAR.2021 05:58:56

Product : Wireless speaker
 Test Item : Occupied Bandwidth
 Test Mode : Mode 2: Transmitter-Normal-2Mbps

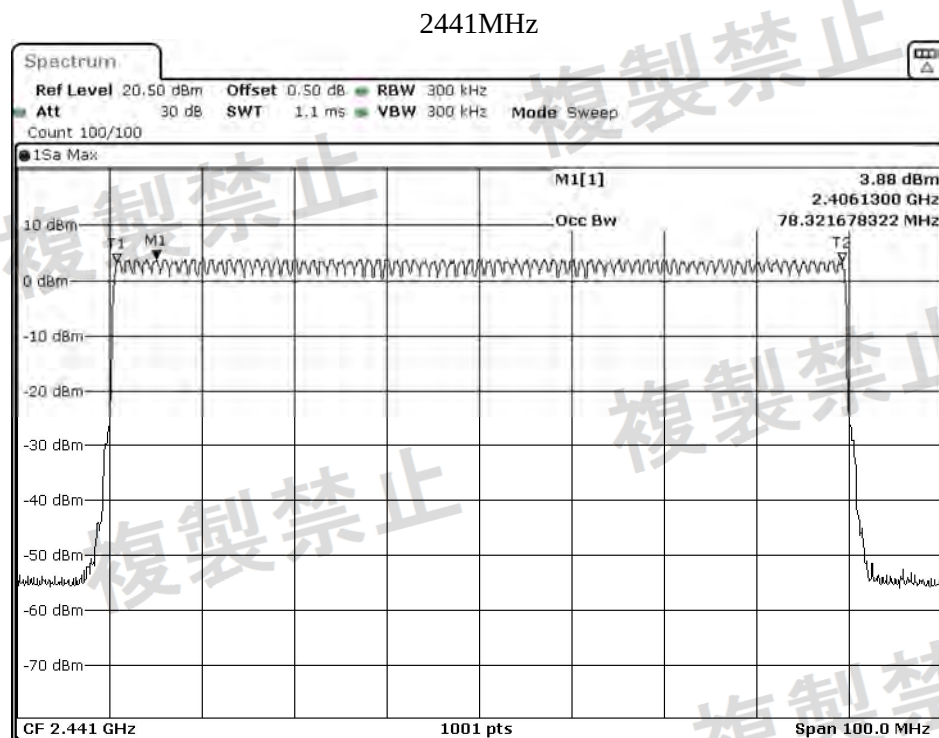
Test Conditions		Frequency (MHz)	Reading Value (MHz)	Limit (MHz)
--	--	--	--	<= 83.5
Tnom (21.3 °C)	Vnom (100VAC)	2441	78.322	<= 83.5
--	--	--	--	<= 83.5



Date: 31.MAR.2021 06:17:03

Product : Wireless speaker
 Test Item : Occupied Bandwidth
 Test Mode : Mode 3 :Transmitter-Normal-3Mbps

Test Conditions		Frequency (MHz)	Reading Value (MHz)	Limit (MHz)
--	--	--	--	<= 83.5
Tnom (21.3 °C)	Vnom (100VAC)	2441	78.322	<= 83.5
--	--	--	--	<= 83.5

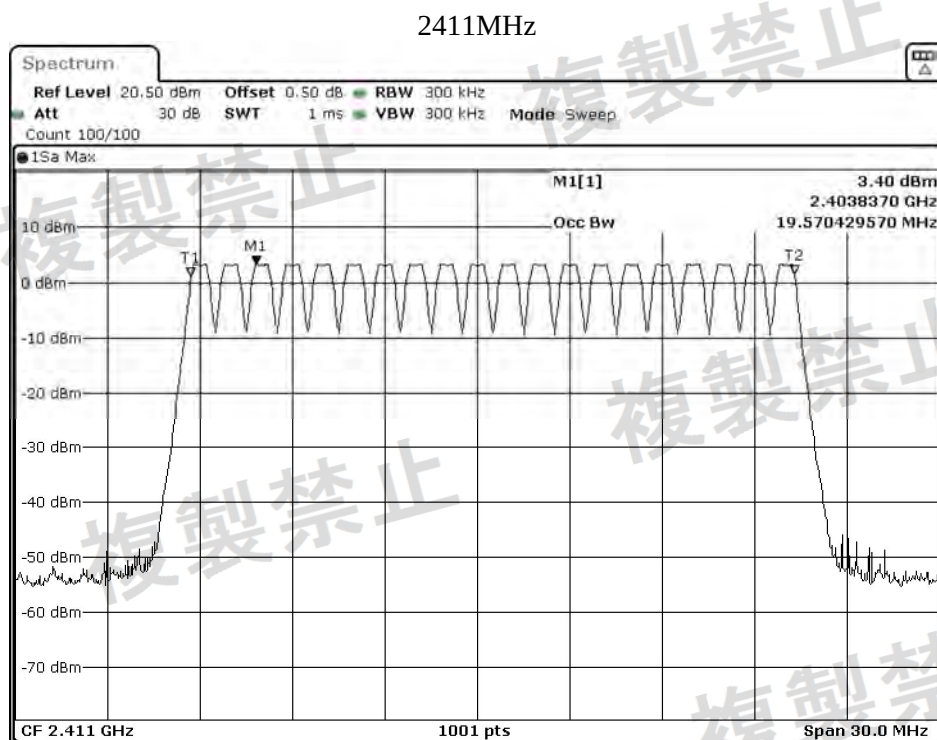


Date: 31.MAR.2021 06:29:36

Test Result	PASS
--------------------	------

Product : Wireless speaker
 Test Item : Occupied Bandwidth
 Test Mode : Mode 4: Transmitter-AFH-1Mbps

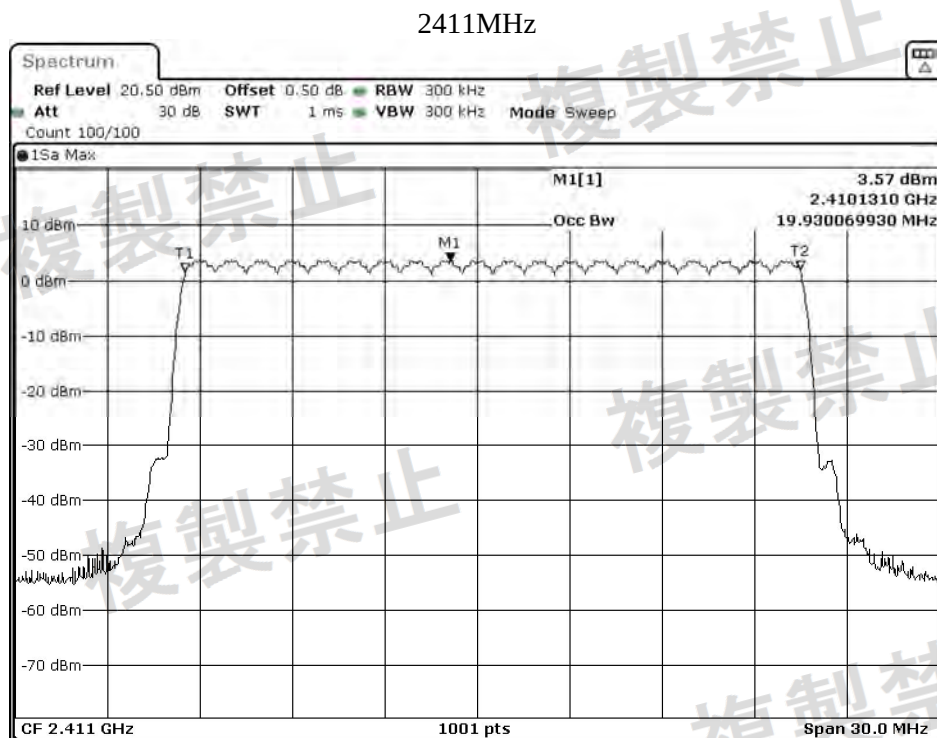
Test Conditions		Frequency (MHz)	Reading Value (MHz)	Limit (MHz)
--	--	--	--	<= 83.5
Tnom (21.3 °C)	Vnom (100VAC)	2411	19.57	<= 83.5
--	--	--	--	<= 83.5



Date: 31.MAR.2021 07:53:22

Product : Wireless speaker
 Test Item : Occupied Bandwidth
 Test Mode : Mode 5: Transmitter-AFH-2Mbps

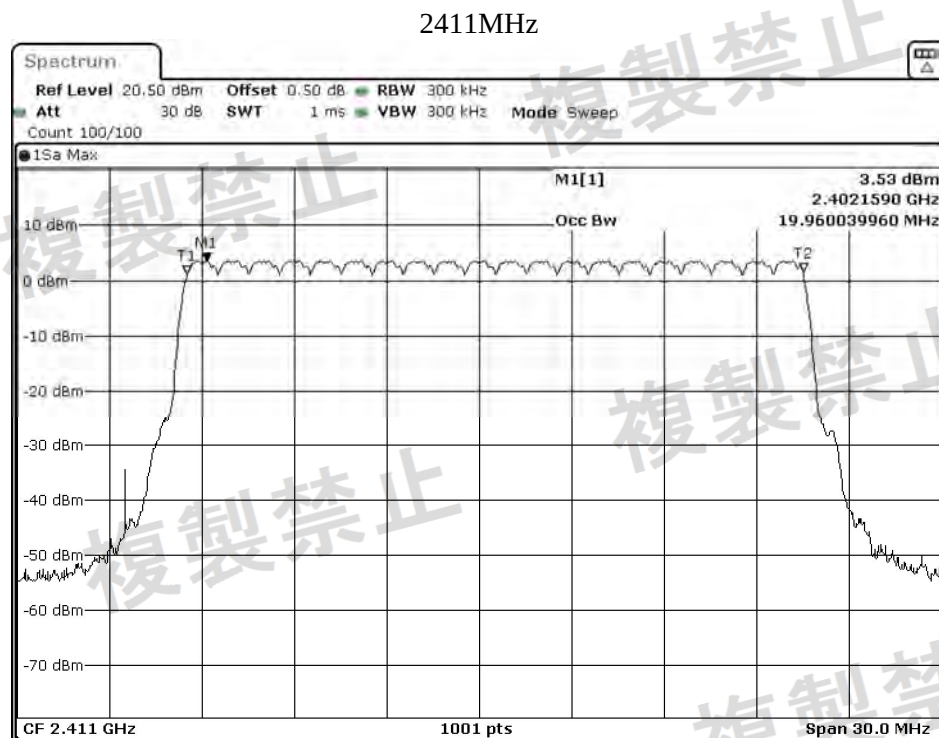
Test Conditions		Frequency (MHz)	Reading Value (MHz)	Limit (MHz)
--	--	--	--	<= 83.5
Tnom (21.3 °C)	Vnom (100VAC)	2411	19.93	<= 83.5
--	--	--	--	<= 83.5



Date: 31.MAR.2021 07:35:57

Product : Wireless speaker
 Test Item : Occupied Bandwidth
 Test Mode : Mode 6: Transmitter-AFH-3Mbps

Test Conditions		Frequency (MHz)	Reading Value (MHz)	Limit (MHz)
--	--	--	--	<= 83.5
Tnom (21.3 °C)	Vnom (100VAC)	2411	19.96	<= 83.5
--	--	--	--	<= 83.5



Date: 31.MAR.2021 07:42:32

Test Result	PASS
-------------	------

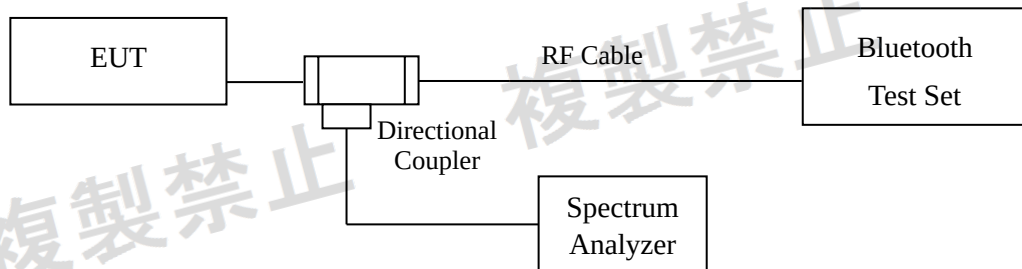
5. Frequency Tolerance

5.1. Test Setup

- ☒ Use the program to control transmitter



- ☐ Use the Bluetooth Test Set to control transmitter



5.2. Test Procedure

A spectrum analyzer or similar device shall be used to observe a sample of the modulated transmitter's radio frequency power output.

- A positive peak detector function must be used.
- The measurement instrument bandwidth and span must be set sufficiently with, and, the scan time set sufficiently slow, to ensure all major modulation products are captured. Note that the measurement bandwidth should also be set sufficiently narrow to avoid adding significant error to the test result.
- 'Maximum Hold' mode may be used to accumulate the measurement result over several scans provided the emission is repetitive in nature.

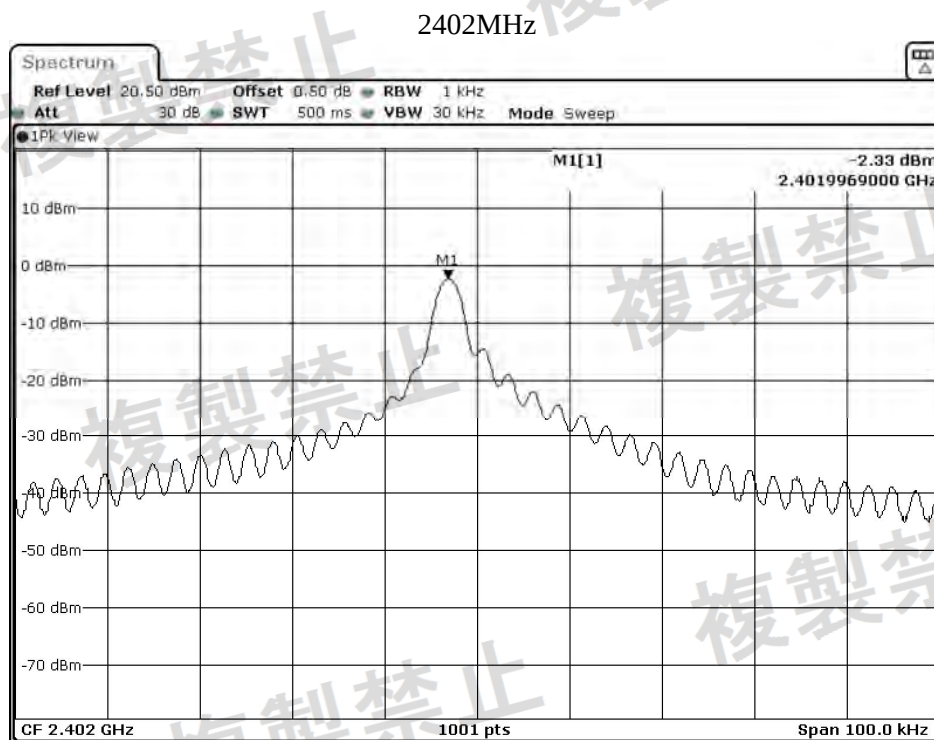
5.3. Limits

≤ 50 ppm

5.4. Test Result of Frequency Tolerance

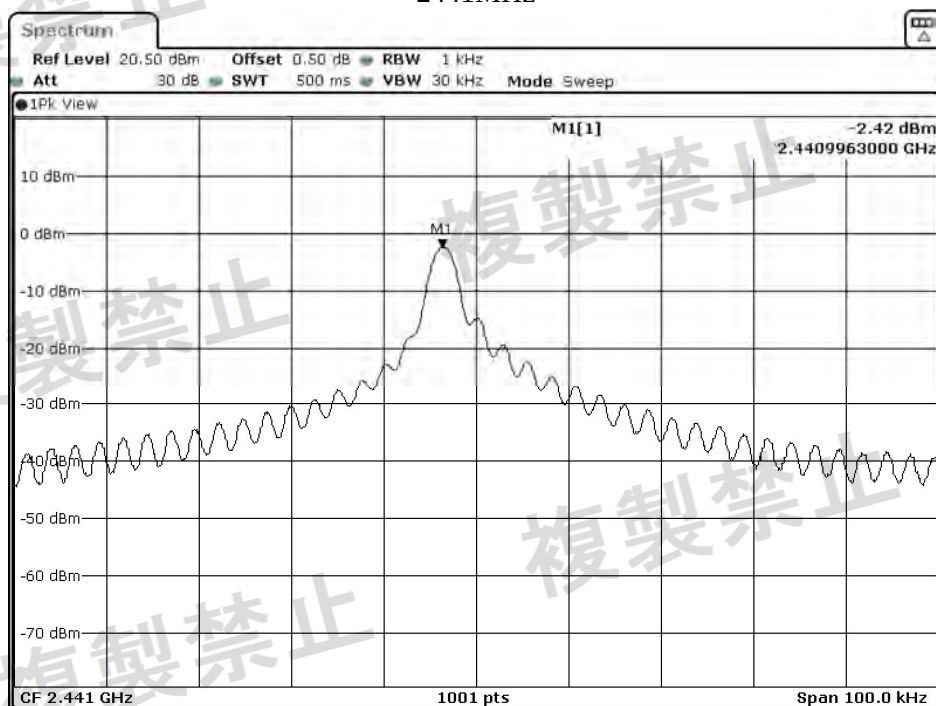
Product : Wireless speaker
 Test Item : Frequency Tolerance
 Test Mode : Mode 1: Transmitter-Normal-1Mbps

Test Conditions		Frequency (MHz)	Reading Value (MHz)	Tolerance (ppm)	Limit (ppm)
Tnom (21.3 °C)	Vnom (100VAC)	2402	2401.9969	-1.2906	<= 50
Tnom (21.3 °C)	Vnom (100VAC)	2441	2440.9963	-1.5158	<= 50
Tnom (21.3 °C)	Vnom (100VAC)	2480	2479.9965	-1.4113	<= 50



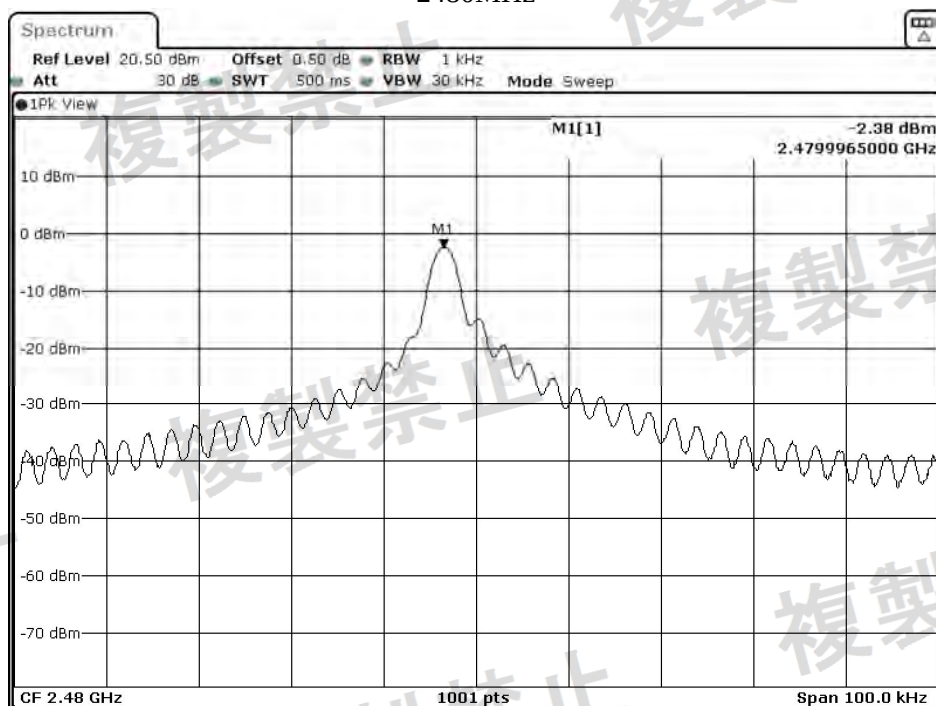
Date: 31.MAR.2021 05:25:12

2441MHz



Date: 31.MAR.2021 05:55:44

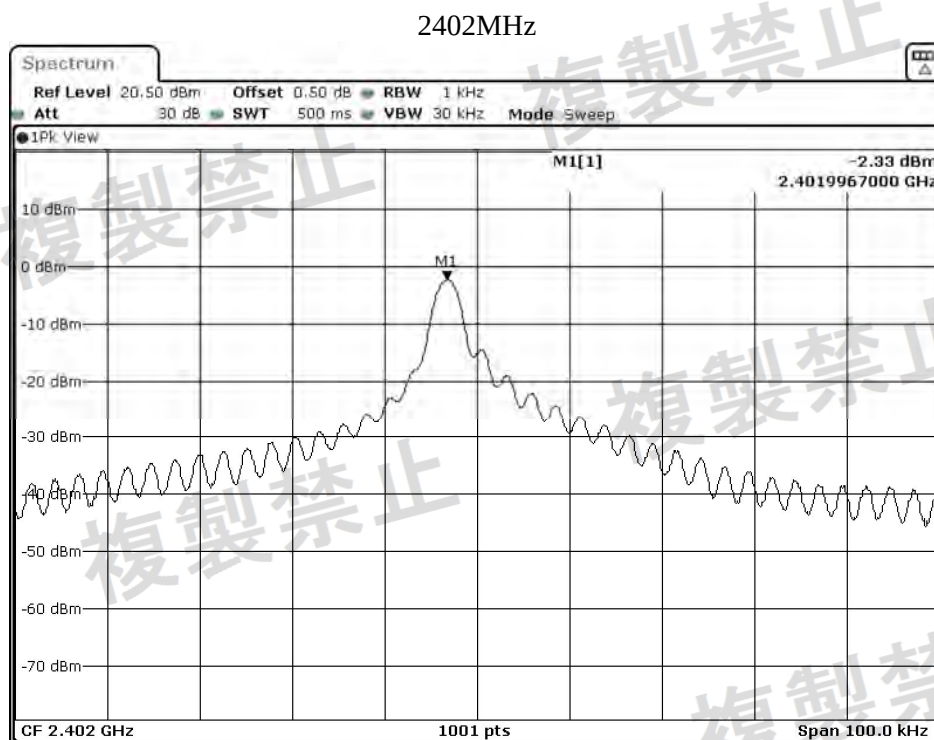
2480MHz



Date: 31.MAR.2021 06:07:26

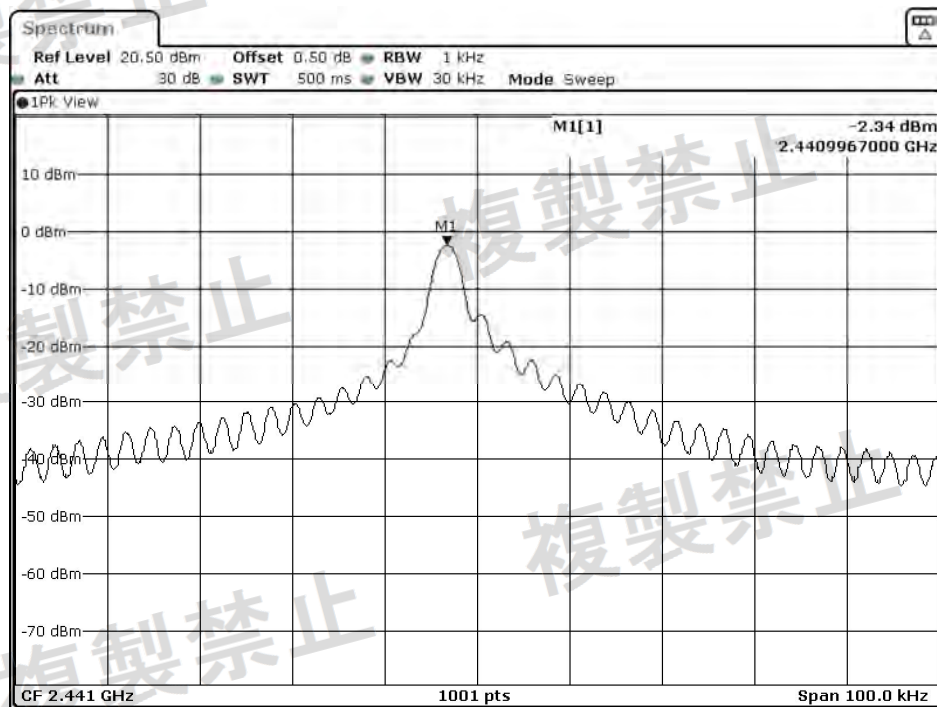
Product : Wireless speaker
 Test Item : Frequency Tolerance
 Test Mode : Mode 2: Transmitter-Normal-2Mbps

Test Conditions		Frequency (MHz)	Reading Value (MHz)	Tolerance (ppm)	Limit (ppm)
Tnom (21.3 °C)	Vnom (100VAC)	2402	2401.9967	-1.3739	<= 50
Tnom (21.3 °C)	Vnom (100VAC)	2441	2440.9967	-1.3519	<= 50
Tnom (21.3 °C)	Vnom (100VAC)	2480	2479.9968	-1.2903	<= 50



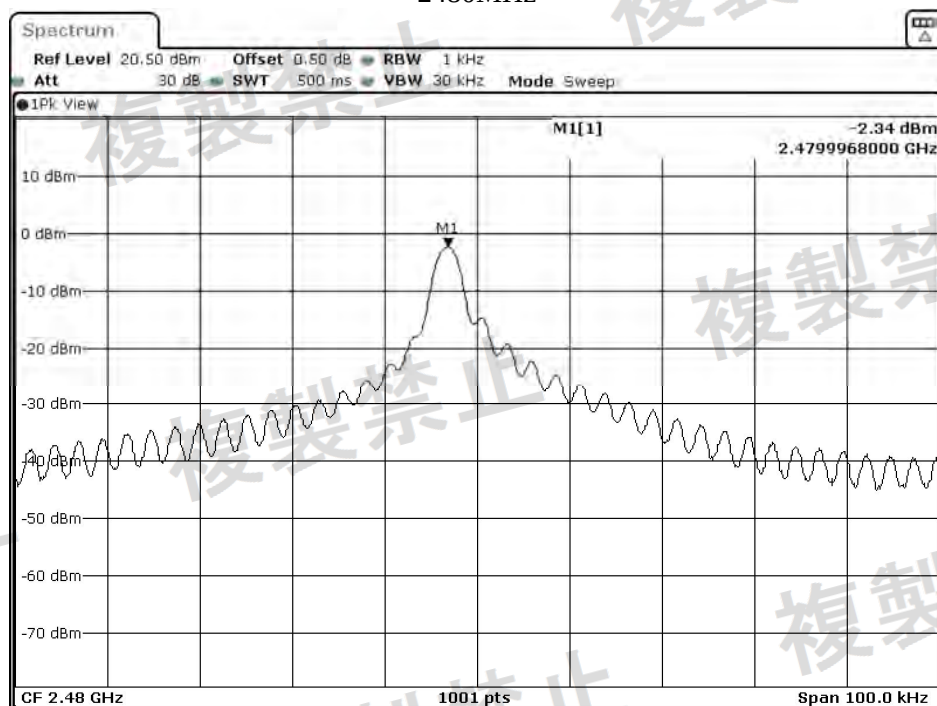
Date: 31.MAR.2021 06:08:18

2441MHz



Date: 31.MAR.2021 06:12:49

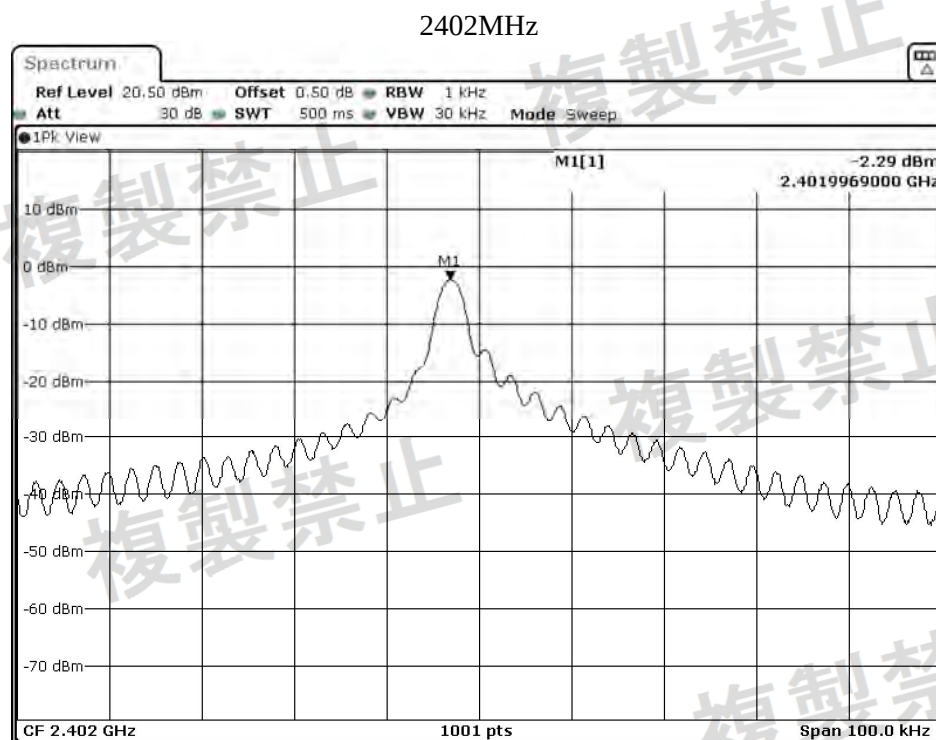
2480MHz



Date: 31.MAR.2021 06:24:42

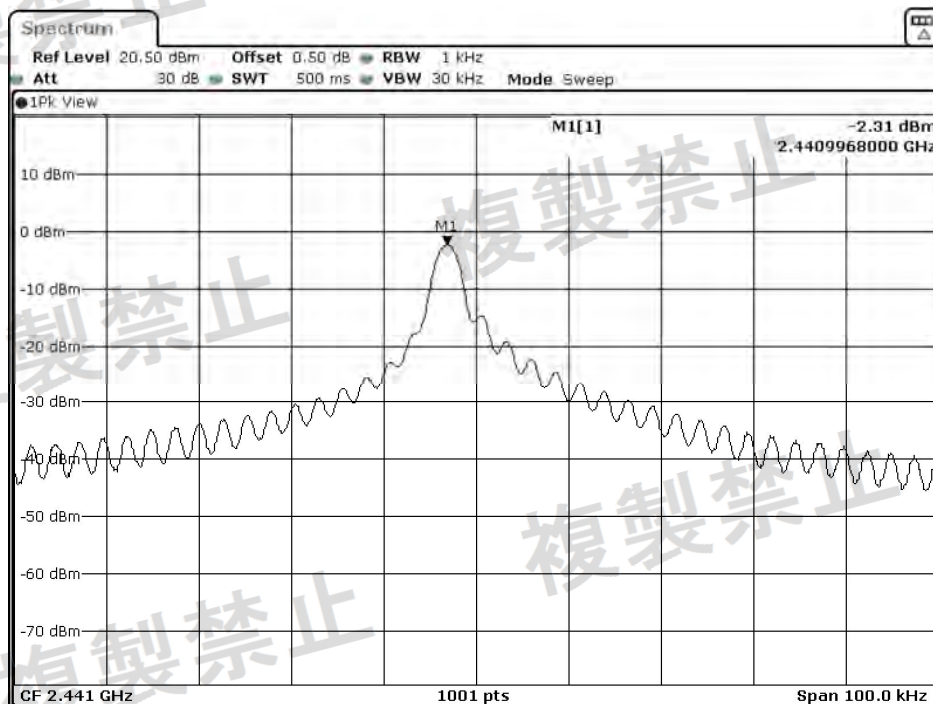
Product : Wireless speaker
 Test Item : Frequency Tolerance
 Test Mode : Mode 3 :Transmitter-Normal-3Mbps

Test Conditions		Frequency (MHz)	Reading Value (MHz)	Tolerance (ppm)	Limit (ppm)
Tnom (21.3 °C)	Vnom (100VAC)	2402	2401.9969	-1.2906	<= 50
Tnom (21.3 °C)	Vnom (100VAC)	2441	2440.9968	-1.3109	<= 50
Tnom (21.3 °C)	Vnom (100VAC)	2480	2479.9966	-1.3710	<= 50



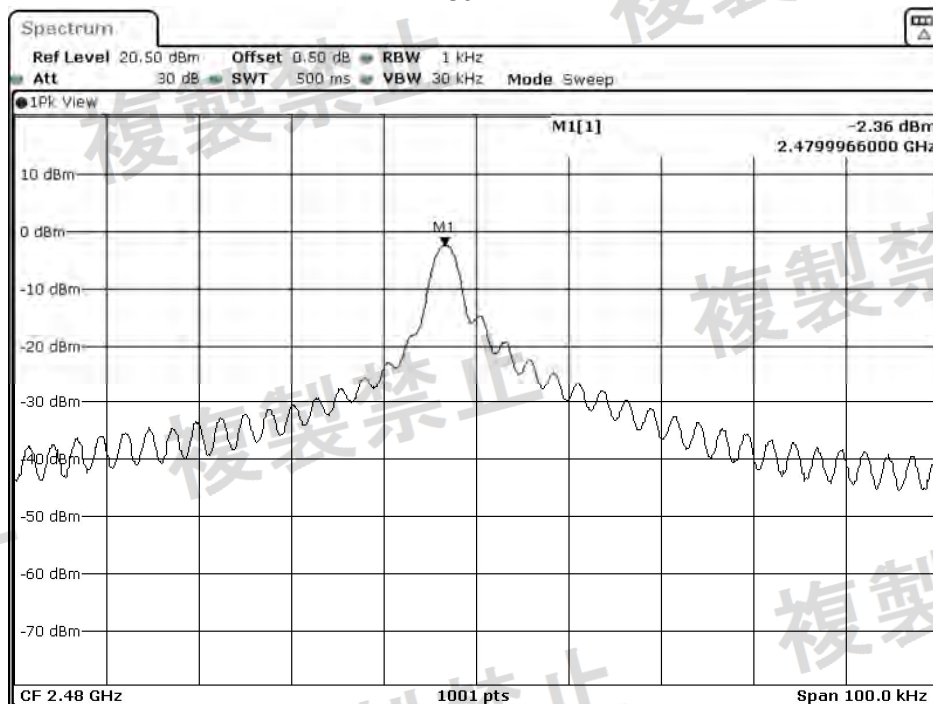
Date: 31. MAR. 2021 06:25:47

2441MHz



Date: 31.MAR.2021 06:28:05

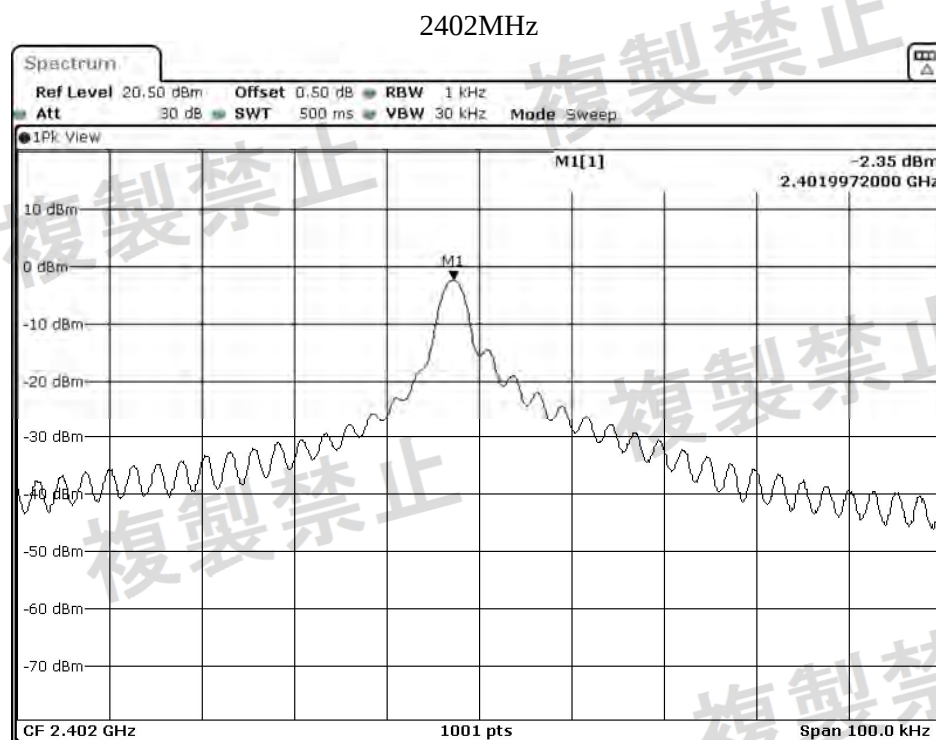
2480MHz



Date: 31.MAR.2021 06:38:10

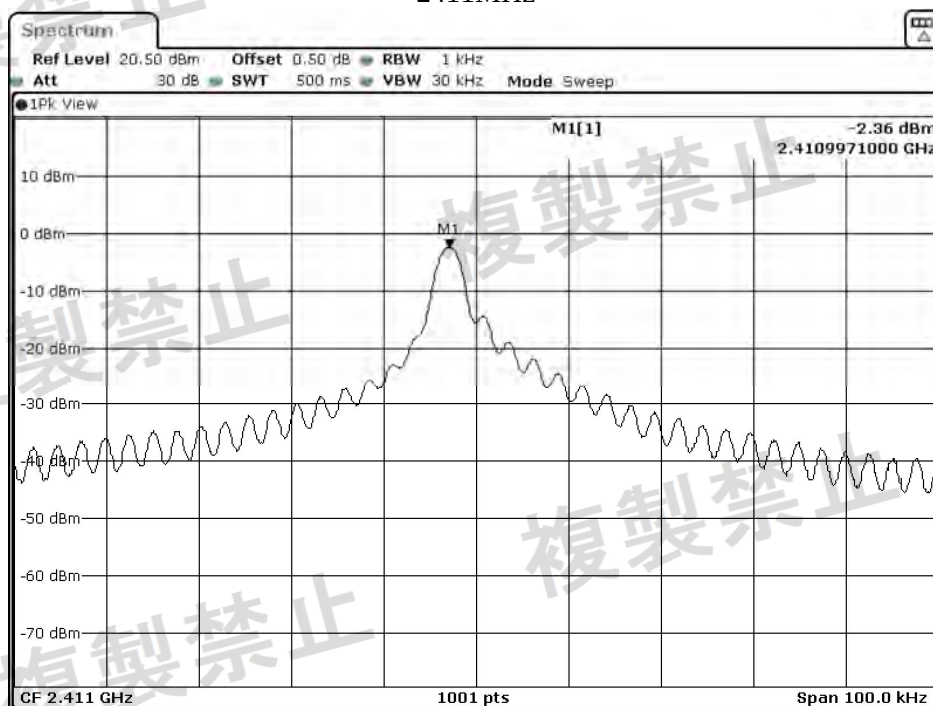
Product : Wireless speaker
 Test Item : Frequency Tolerance
 Test Mode : Mode 4: Transmitter-AFH-1Mbps

Test Conditions		Frequency (MHz)	Reading Value (MHz)	Tolerance (ppm)	Limit (ppm)
Tnom (21.3 °C)	Vnom (100VAC)	2402	2401.9972	-1.1657	<= 50
Tnom (21.3 °C)	Vnom (100VAC)	2411	2410.9971	-1.2028	<= 50
Tnom (21.3 °C)	Vnom (100VAC)	2421	2420.9970	-1.2392	<= 50



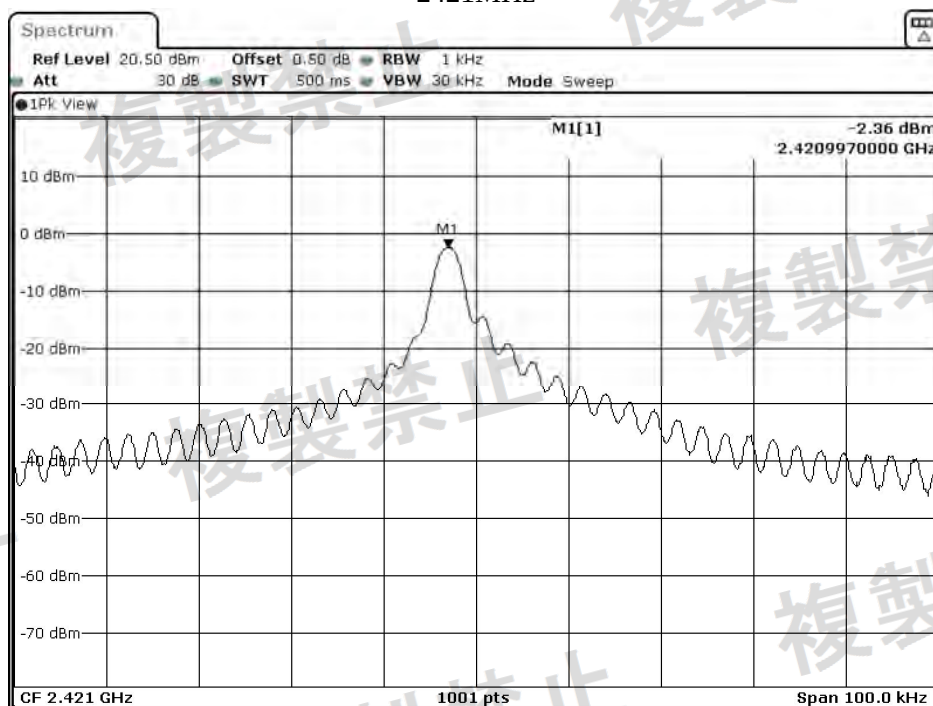
Date: 31. MAR. 2021 03:21:53

2411MHz



Date: 31.MAR.2021 03:24:33

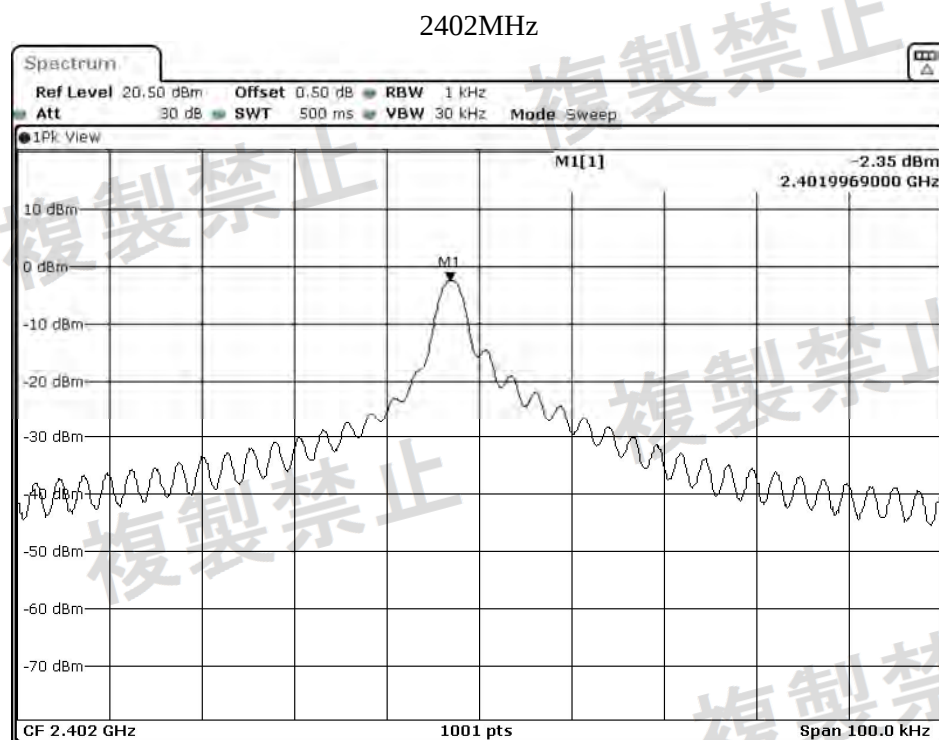
2421MHz



Date: 31.MAR.2021 03:38:39

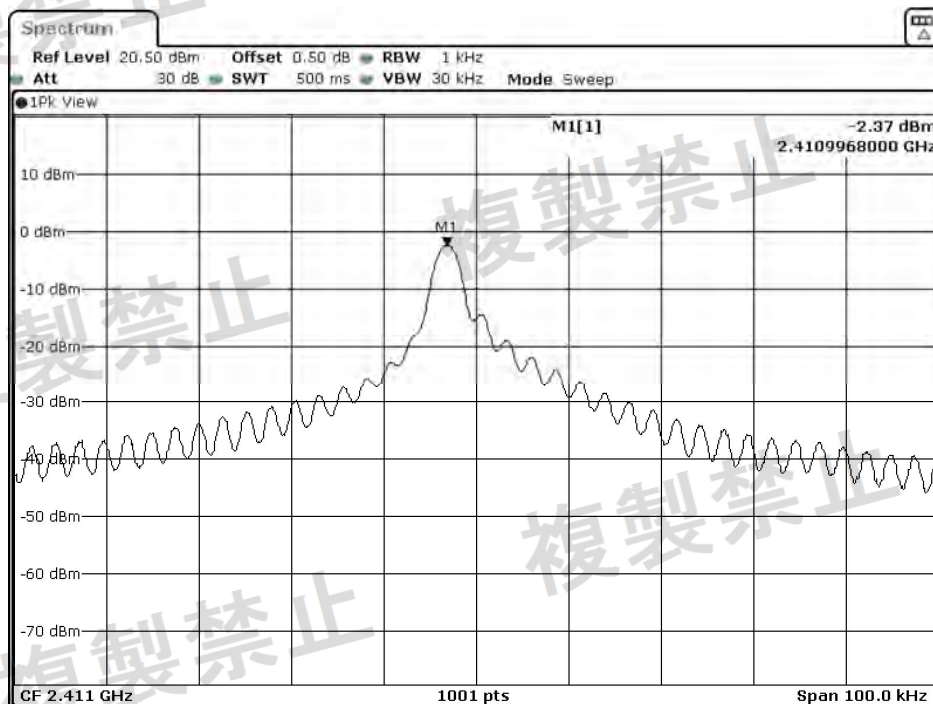
Product : Wireless speaker
 Test Item : Frequency Tolerance
 Test Mode : Mode 5: Transmitter-AFH-2Mbps

Test Conditions		Frequency (MHz)	Reading Value (MHz)	Tolerance (ppm)	Limit (ppm)
Tnom (21.3 °C)	Vnom (100VAC)	2402	2401.9969	-1.2906	<= 50
Tnom (21.3 °C)	Vnom (100VAC)	2411	2410.9968	-1.3273	<= 50
Tnom (21.3 °C)	Vnom (100VAC)	2421	2420.9970	-1.2392	<= 50



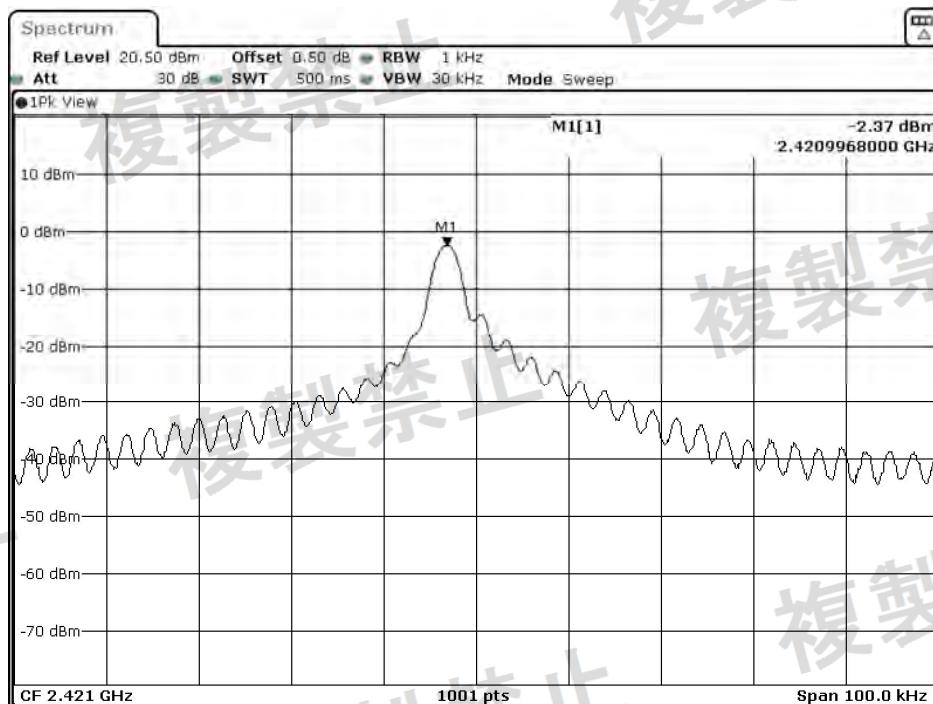
Date: 31.MAR.2021 03:48:16

2411MHz



Date: 31.MAR.2021 03:50:32

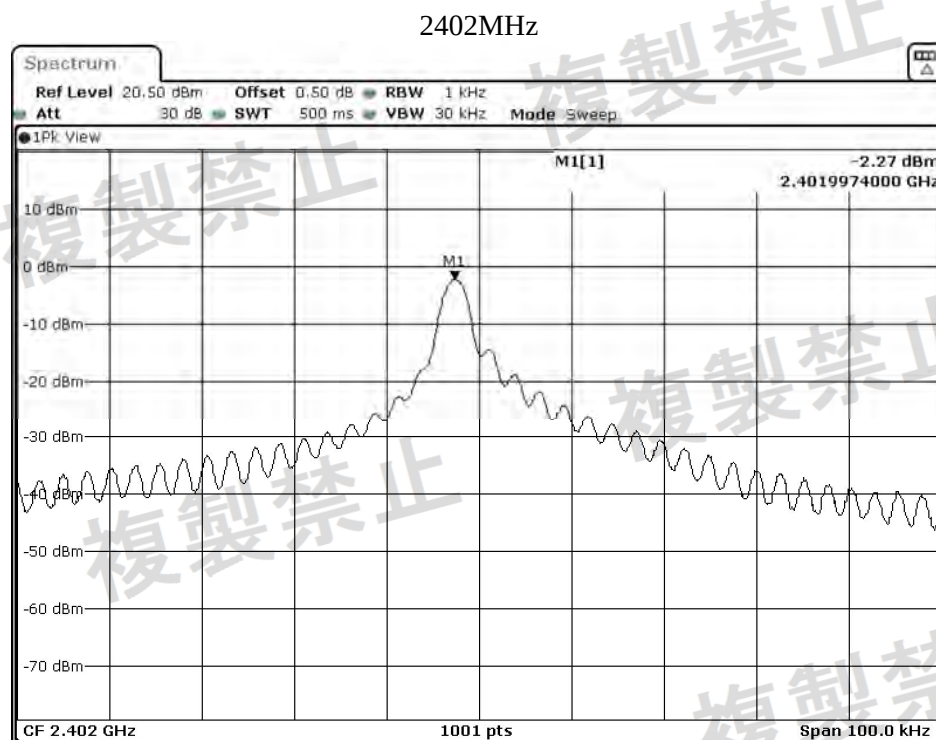
2421MHz



Date: 31.MAR.2021 03:58:27

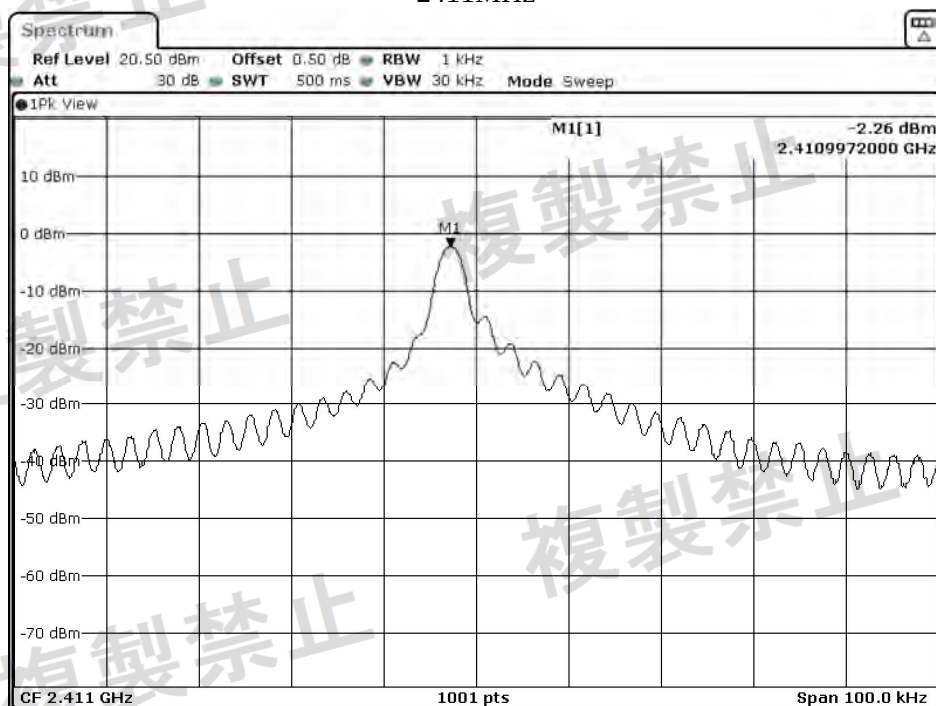
Product : Wireless speaker
 Test Item : Frequency Tolerance
 Test Mode : Mode 6: Transmitter-AFH-3Mbps

Test Conditions		Frequency (MHz)	Reading Value (MHz)	Tolerance (ppm)	Limit (ppm)
Tnom (21.3 °C)	Vnom (100VAC)	2402	2401.9974	-1.0824	<= 50
Tnom (21.3 °C)	Vnom (100VAC)	2411	2410.9972	-1.1613	<= 50
Tnom (21.3 °C)	Vnom (100VAC)	2421	2420.9969	-1.2805	<= 50



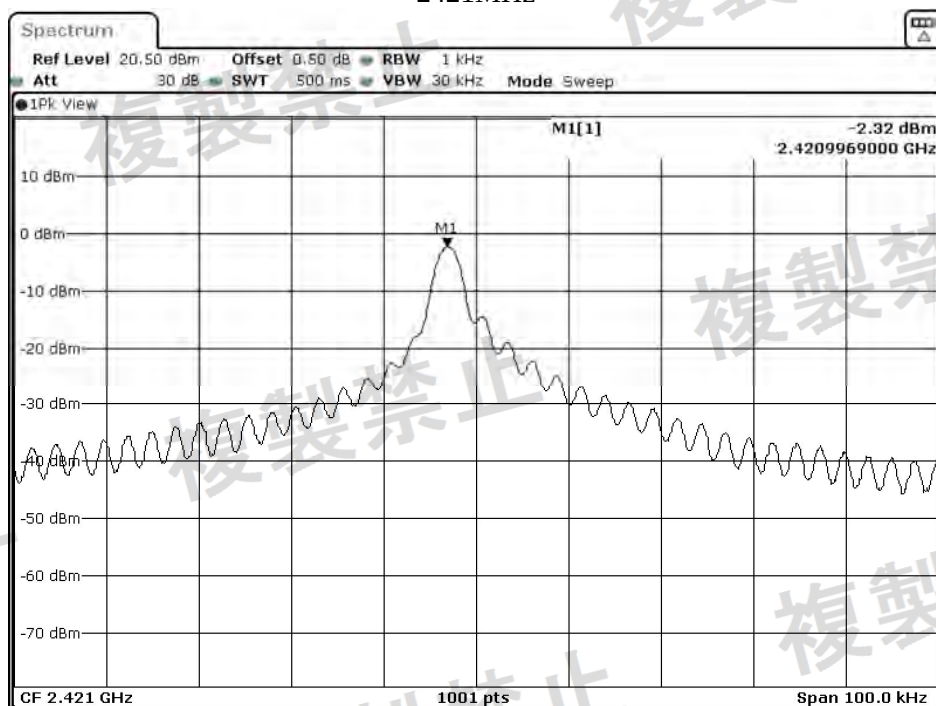
Date: 31.MAR.2021 05:08:01

2411MHz



Date: 31.MAR.2021 05:10:50

2421MHz



Date: 31.MAR.2021 05:21:32

Test Result**PASS**

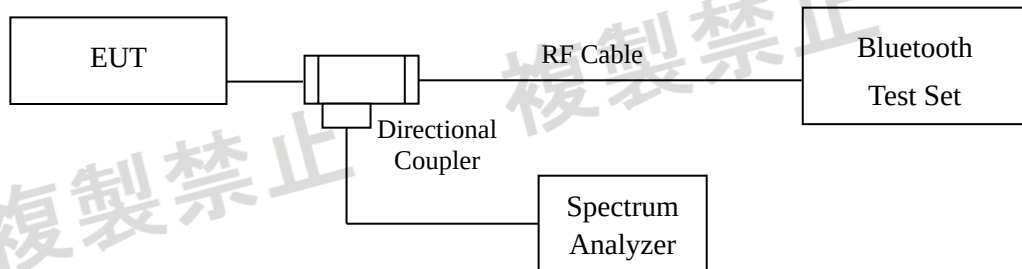
6. Dwell Time

6.1. Test Setup

- ☒ Use the program to control transmitter



- ☐ Use the Bluetooth Test Set to control transmitter



6.2. Test Procedure

A spectrum analyzer or similar device shall be used to observe a sample of the modulated transmitter's radio frequency power output.

- (a) A positive peak detector function must be used.
- (b) The center frequency is set to the test frequency and the span is switched to zero.
- (c) The measurement instrument bandwidth must be set sufficiently with, and, the scan time set sufficiently slow, to ensure all major modulation products are captured. Note that the measurement bandwidth should also be set sufficiently narrow to avoid adding significant error to the test result.
- (d) "Single sweep" mode may be used to capture a packet over a single scan.

6.3. Limits

≤ 400 ms

6.4. Test Result of Dwell Time and Burst Ratio

Product : Wireless speaker
 Test Item : Dwell Time and Burst Ratio
 Test Mode : Mode 1: Transmitter-Normal-1Mbps (2441MHz)

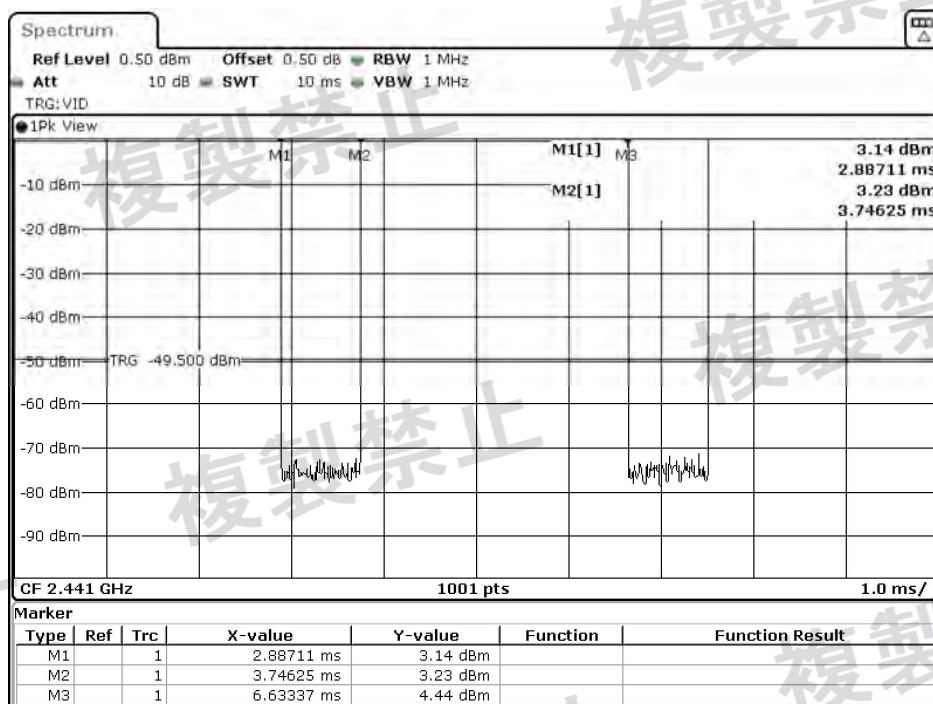
Frequency (MHz)	Duty cycle	Dwell Time (Sec)	Limit (Sec)	Result
2441	0.7707	0.2787	0.4	Pass

Note: Dwell time = (spreading rate * 0.4) * (Duty cycle /79)

Test Conditions	Frequency (MHz)	ON Time (ms)	OFF Time (ms)	Burst Ratio
Tnom (21.3 °C) Vnom (100VAC)	2441	2.88712	0.85914	0.7707

Note: Burst Ratio=(ON Time/ ON Time + OFF Time)

CH 39 Transmission Time



Date: 31.MAR.2021 05:51:45

Product : Wireless speaker
 Test Item : Dwell Time and Burst Ratio
 Test Mode : Mode 2: Transmitter-Normal-2Mbps (2441MHz)

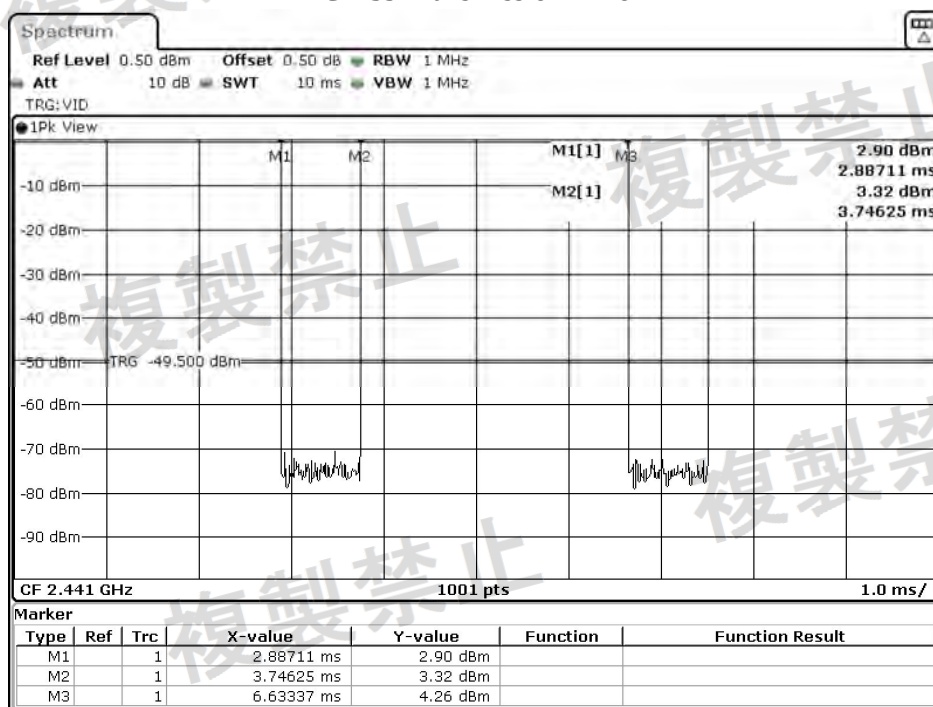
Frequency (MHz)	Duty cycle	Dwell Time (Sec)	Limit (Sec)	Result
2441	0.7707	0.2787	0.4	Pass

Note: Dwell time = (spreading rate * 0.4) * (Duty cycle / 79)

Test Conditions	Frequency (MHz)	ON Time (ms)	OFF Time (ms)	Burst Ratio
Tnom (21.3 °C) Vnom (100VAC)	2441	2.88712	0.85914	0.7707

Note: Burst Ratio=(ON Time/ ON Time + OFF Time)

CH 39 Transmission Time



Date: 31.MAR.2021 06:11:35

Product : Wireless speaker
 Test Item : Dwell Time and Burst Ratio
 Test Mode : Mode 3 :Transmitter-Normal-3Mbps (2441MHz)

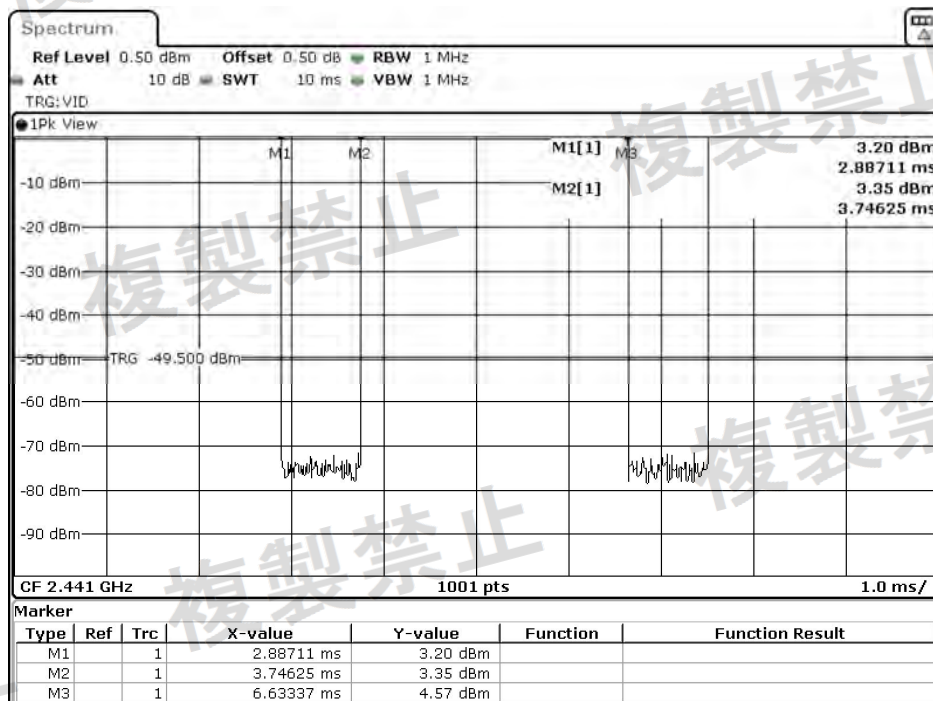
Frequency (MHz)	Duty cycle	Dwell Time (Sec)	Limit (Sec)	Result
2441	0.7707	0.2783	0.4	Pass

Note: Dwell time = (spreading rate * 0.4) * (Duty cycle /79)

Test Conditions		Frequency (MHz)	ON Time (ms)	OFF Time (ms)	Burst Ratio
Tnom (21.3 °C)	Vnom (100VAC)	2441	2.88712	0.85914	0.7707

Note: Burst Ratio=(ON Time/ ON Time + OFF Time)

CH 39 Transmission Time



Date: 31.MAR.2021 06:27:07

Product : Wireless speaker
 Test Item : Dwell Time and Burst Ratio
 Test Mode : Mode 4: Transmitter-AFH-1Mbps (2411MHz)

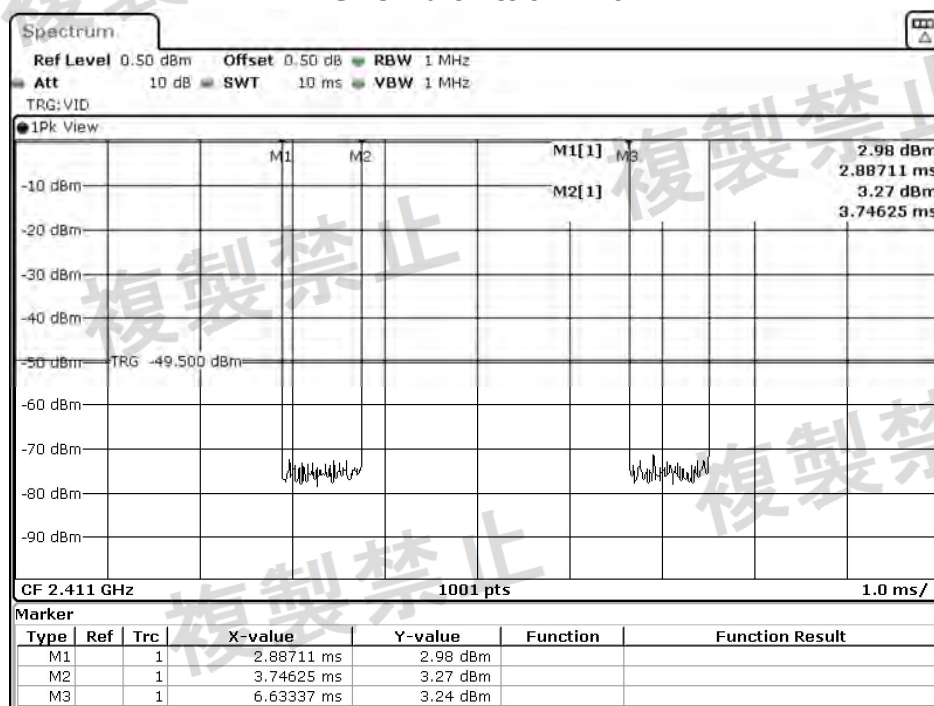
Frequency (MHz)	Duty cycle	Dwell Time (Sec)	Limit (Sec)	Result
2411	0.7707	0.2810	0.4	Pass

Note: Dwell time = (spreading rate * 0.4) * (Duty cycle /20)

Test Conditions	Frequency (MHz)	ON Time (ms)	OFF Time (ms)	Burst Ratio
Tnom (21.3 °C) Vnom (100VAC)	2411	2.88712	0.85914	0.7707

Note: Burst Ratio=(ON Time/ ON Time + OFF Time)

CH 9 Transmission Time



Date: 31.MAR.2021 03:22:57

Product : Wireless speaker
 Test Item : Dwell Time and Burst Ratio
 Test Mode : Mode 5: Transmitter-AFH-2Mbps (2411MHz)

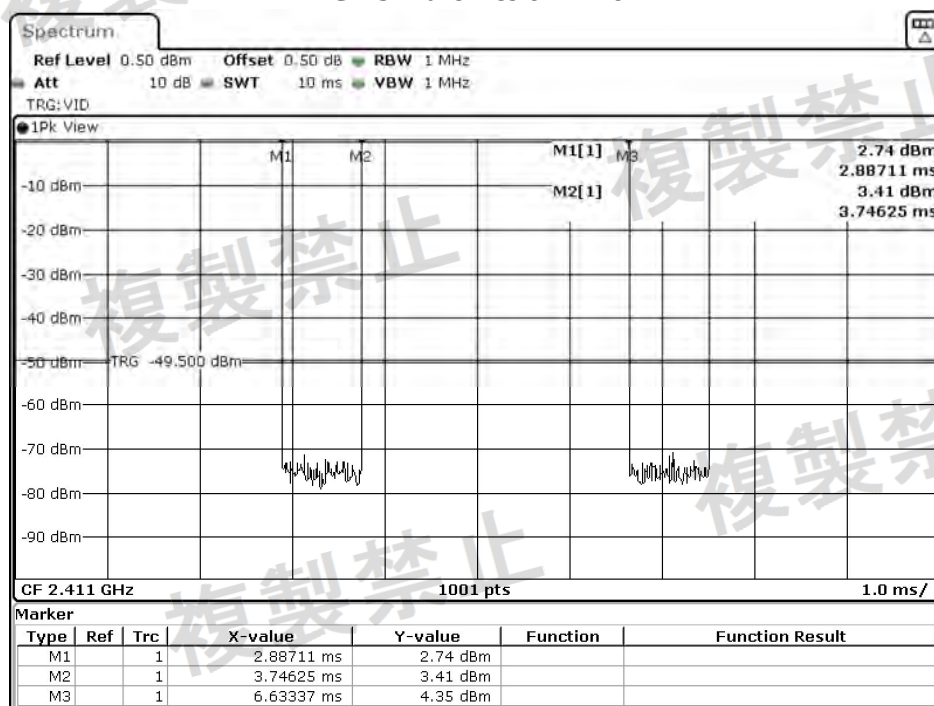
Frequency (MHz)	Duty cycle	Dwell Time (Sec)	Limit (Sec)	Result
2411	0.7707	0.2802	0.4	Pass

Note: Dwell time = (spreading rate * 0.4) * (Duty cycle /20)

Test Conditions	Frequency (MHz)	ON Time (ms)	OFF Time (ms)	Burst Ratio
Tnom (21.3 °C) Vnom (100VAC)	2411	2.88712	0.85914	0.7707

Note: Burst Ratio=(ON Time/ ON Time + OFF Time)

CH 9 Transmission Time



Date: 31.MAR.2021 03:49:12

Product : Wireless speaker
 Test Item : Dwell Time and Burst Ratio
 Test Mode : Mode 6: Transmitter-AFH-3Mbps (2411MHz)

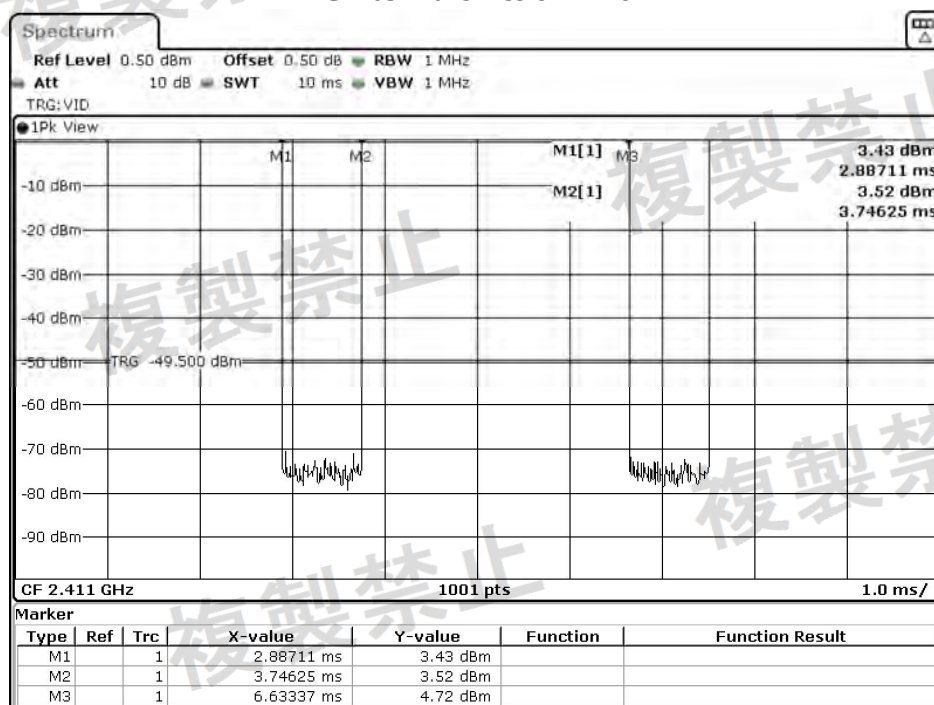
Frequency (MHz)	Duty cycle	Dwell Time (Sec)	Limit (Sec)	Result
2411	0.7707	0.2802	0.4	Pass

Note: Dwell time = (spreading rate * 0.4) * (Duty cycle / 20)

Test Conditions		Frequency (MHz)	ON Time (ms)	OFF Time (ms)	Burst Ratio
Tnom (21.3 °C)	Vnom (100VAC)	2411	2.88712	0.85914	0.7707

Note: Burst Ratio=(ON Time/ ON Time + OFF Time)

CH 09 Transmission Time

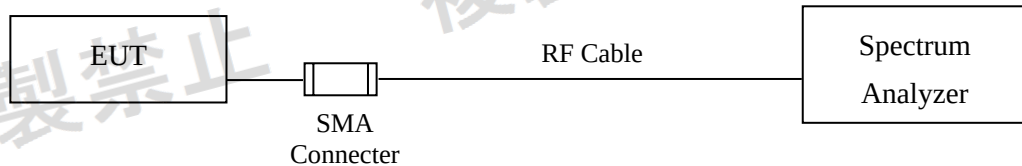


Date: 31.MAR.2021 05:09:18

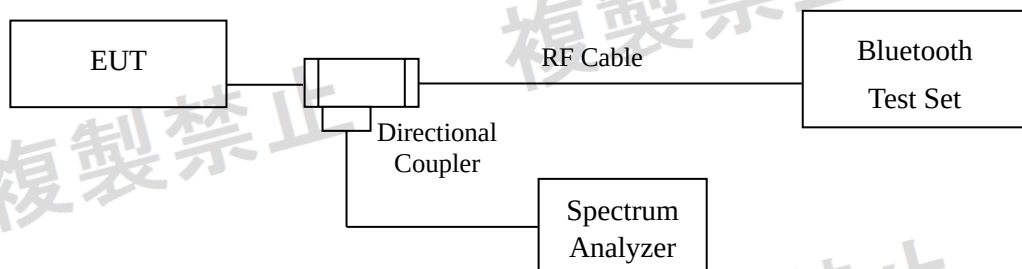
7. Transmitter Suprious Emissions

7.1. Test Setup

☒ Use the program to control transmitter



☐ Use the Bluetooth Test Set to control transmitter



7.2. Test Procedure

A spectrum analyzer or similar device shall be used to observe a sample of the modulated transmitter's radio frequency power output.

- A positive peak detector function must be used.
- The measurement instrument bandwidth and span must be set sufficiently with, and, the scan time set sufficiently slow, to ensure all major modulation products are captured. Note that the measurement bandwidth should also be set sufficiently narrow to avoid adding significant error to the test result.
- 'Maximum Hold' mode may be used to accumulate the measurement result over several scans provided the emission is repetitive in nature.

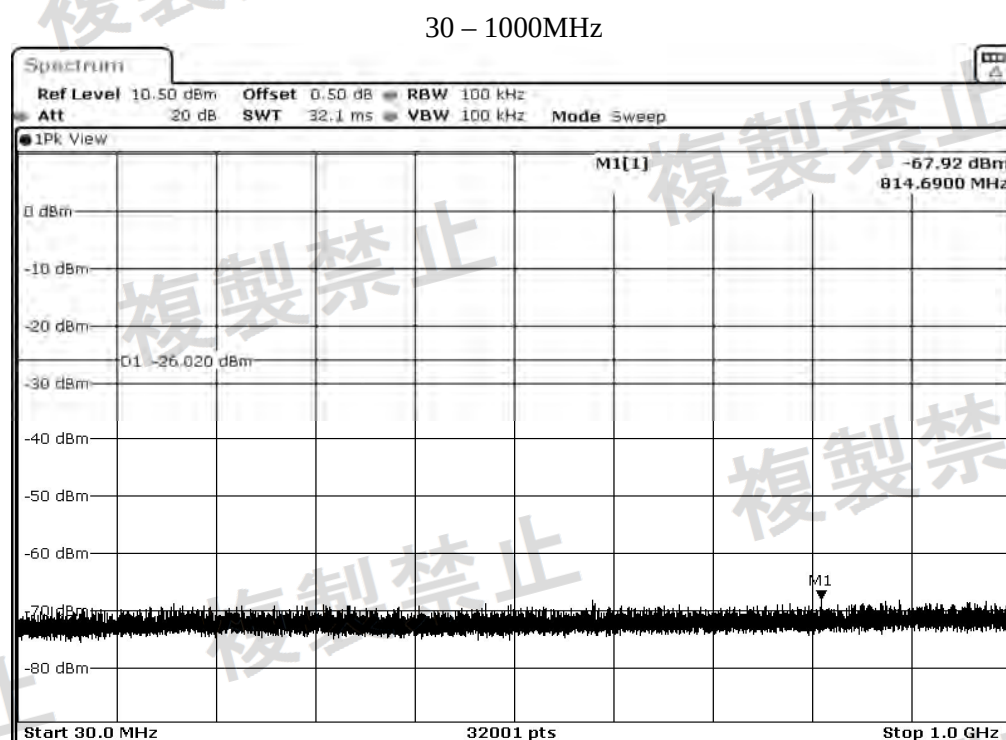
7.3. Limits

- $\leq 2.5\mu\text{W}$ for 30 – 2387 MHz
- $\leq 25\mu\text{W}$ for 2387 – 2400 MHz
- $\leq 25\mu\text{W}$ for 2483.5 – 2496.5 MHz
- $\leq 2.5\mu\text{W}$ for 2496.5 – 12500 MHz

7.4. Test Result of Transmitter Spurious Emissions

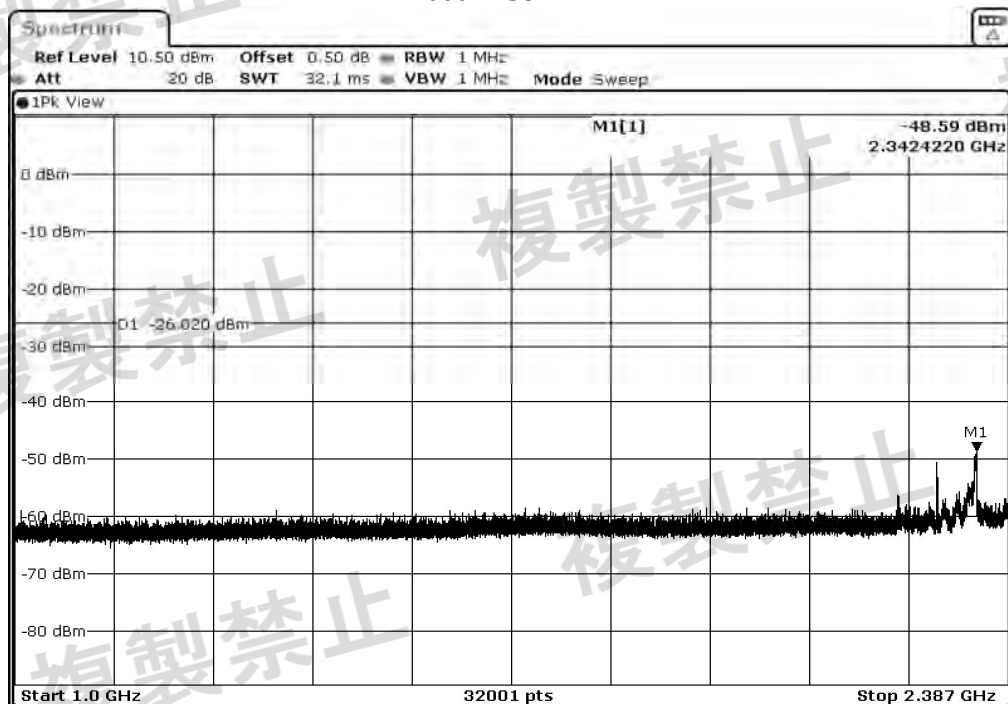
Product : Wireless speaker
 Test Item : Transmitter Spurious Emissions
 Test Mode : Mode 1: Transmitter-Normal-1Mbps(2441MHz)

Test Conditions		Frequency Range (MHz)	Reading Value (dBm)	Limit (dBm)
Tnom (21.3 °C)	Vnom (100VAC)	30 – 1000	-67.92	-26 (2.5uW)
		1000 – 2387	-48.59	-26 (2.5uW)
		2387 – 2400	-56.59	-16 (25uW)
		2483.5 – 2496.5	-55.93	-16 (25uW)
		2496.5 – 8000	-37.95	-26 (2.5uW)
		8000 – 12750	-55.60	-26 (2.5uW)



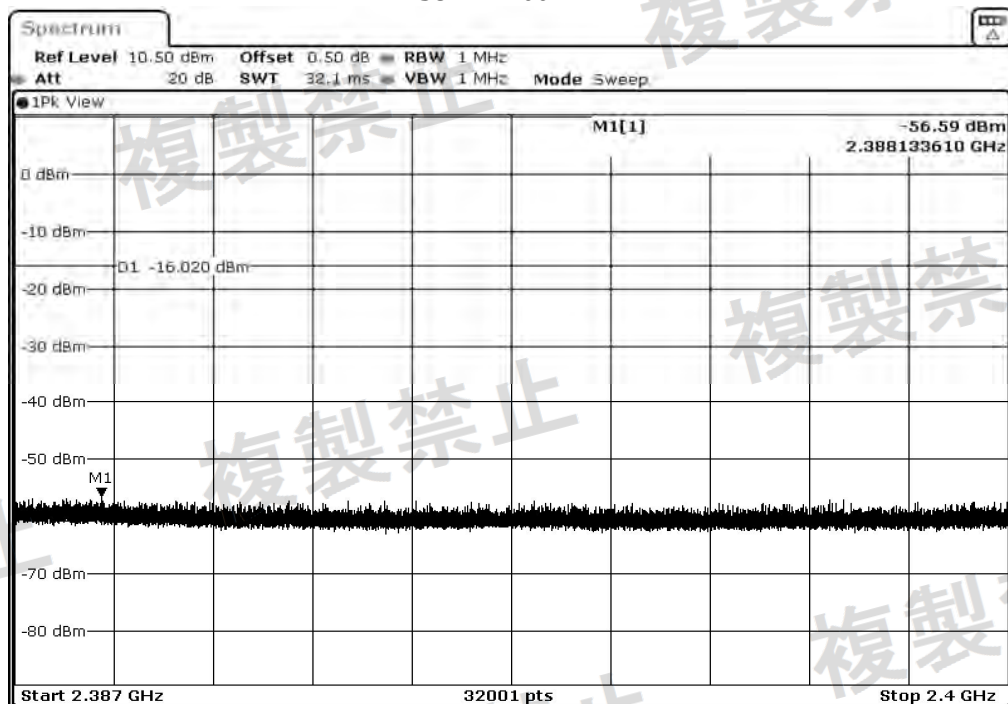
Date: 31.MAR.2021 06:04:26

1000– 2387MHz



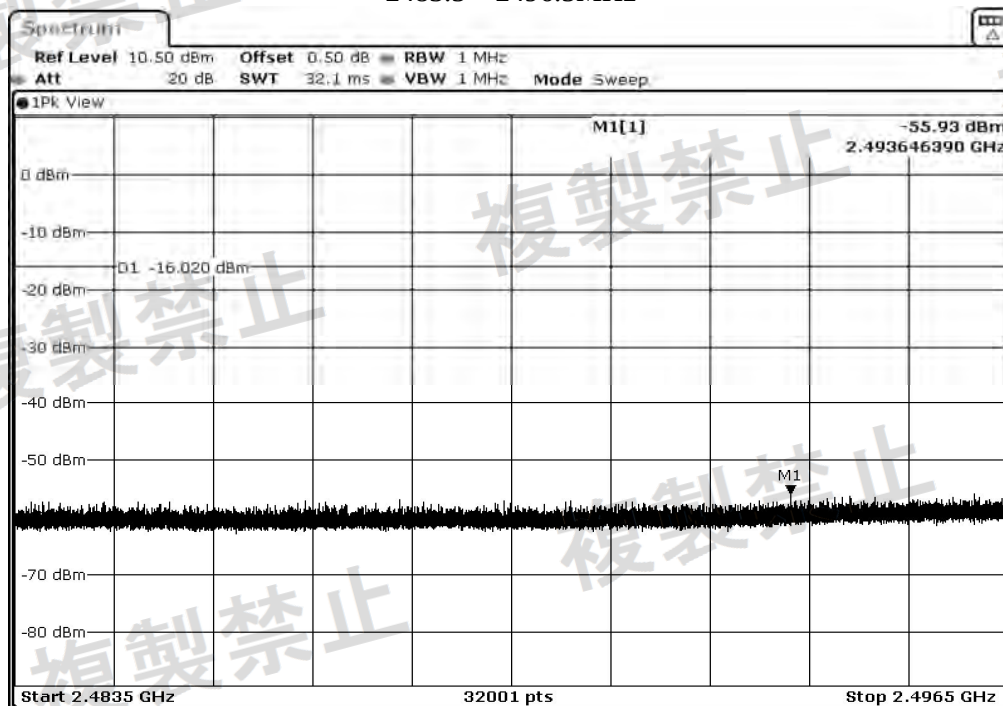
Date: 31.MAR.2021 06:04:49

2387 – 2400 MHz



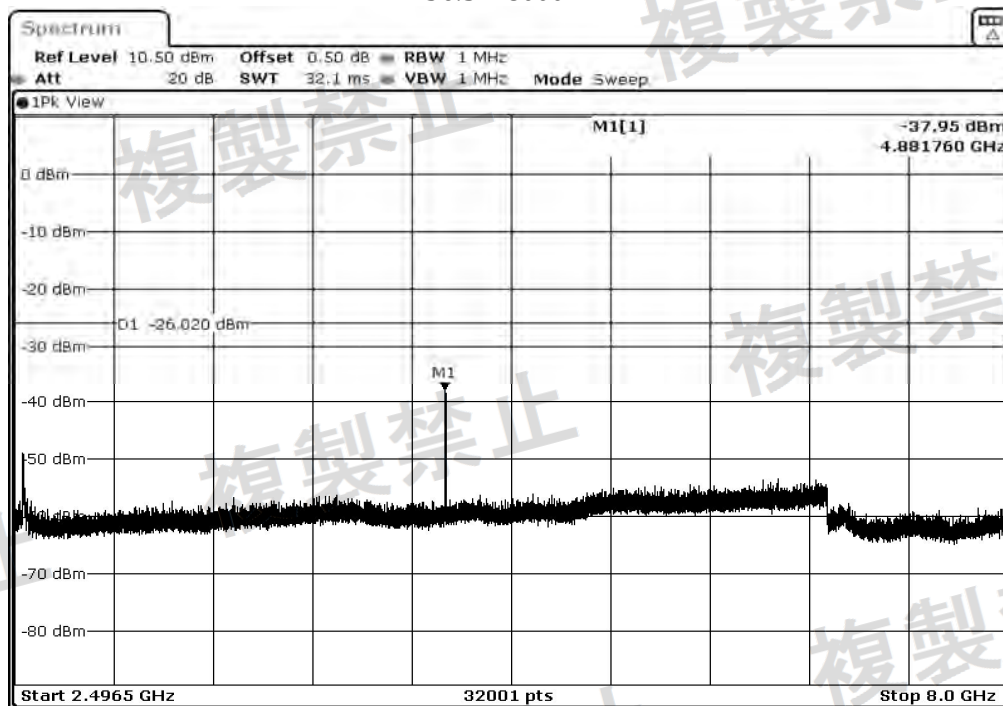
Date: 31.MAR.2021 06:05:11

2483.5 – 2496.5MHz



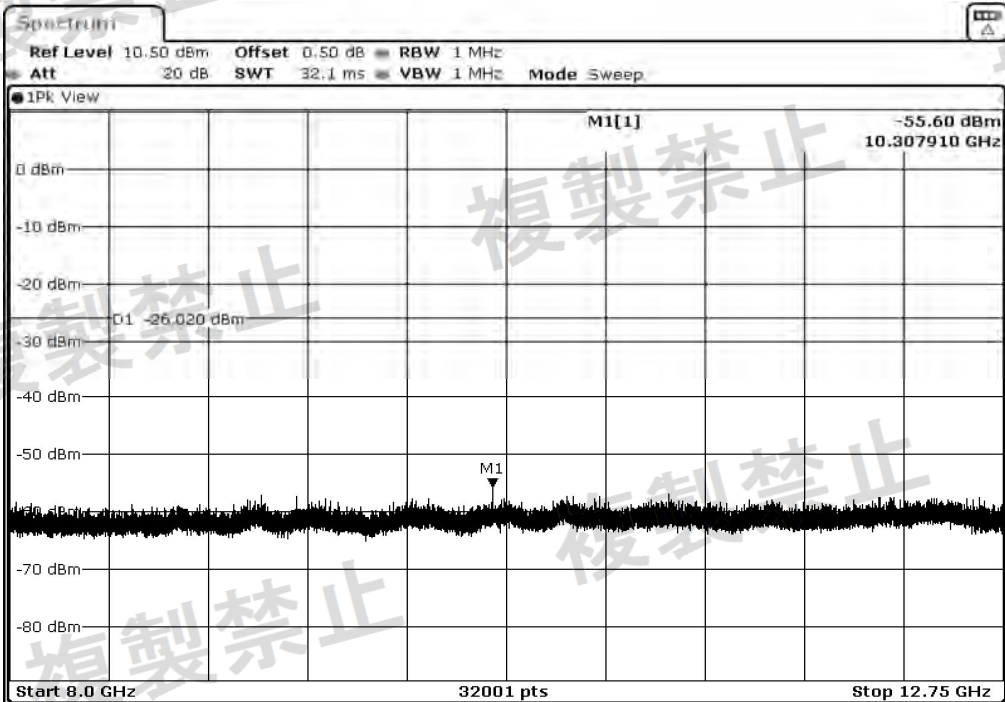
Date: 31.MAR.2021 06:05:33

2496.5 – 8000MHz



Date: 31.MAR.2021 06:05:56

8000 – 12750MHz

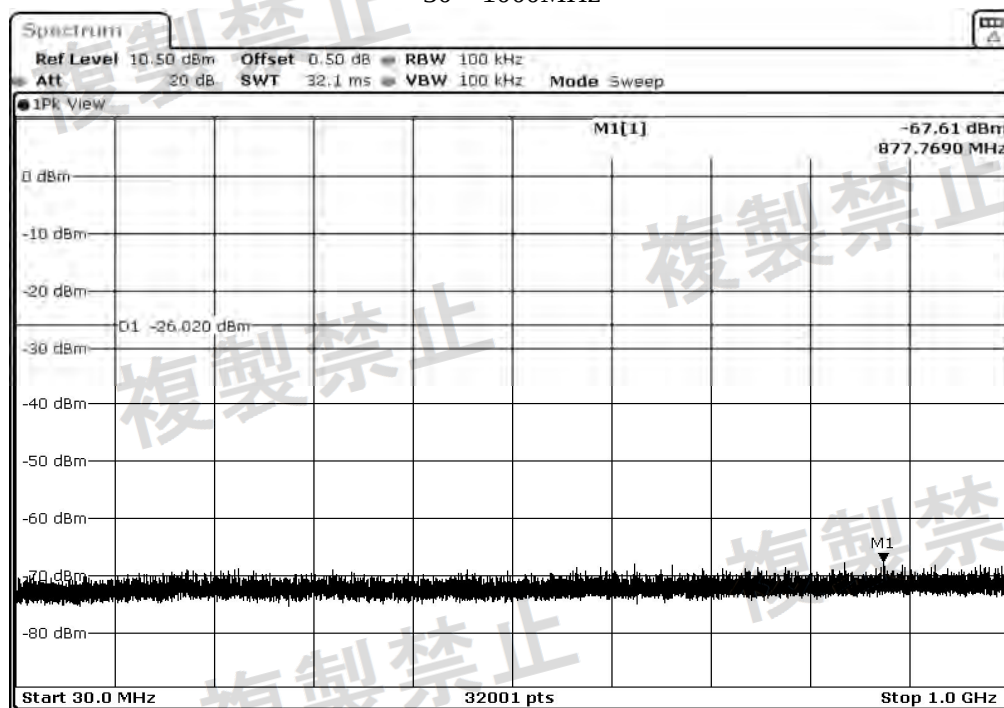


Date: 31.MAR.2021 06:06:18

Product : Wireless speaker
 Test Item : Transmitter Spurious Emissions
 Test Mode : Mode 2: Transmitter-Normal-2Mbps(2441MHz)

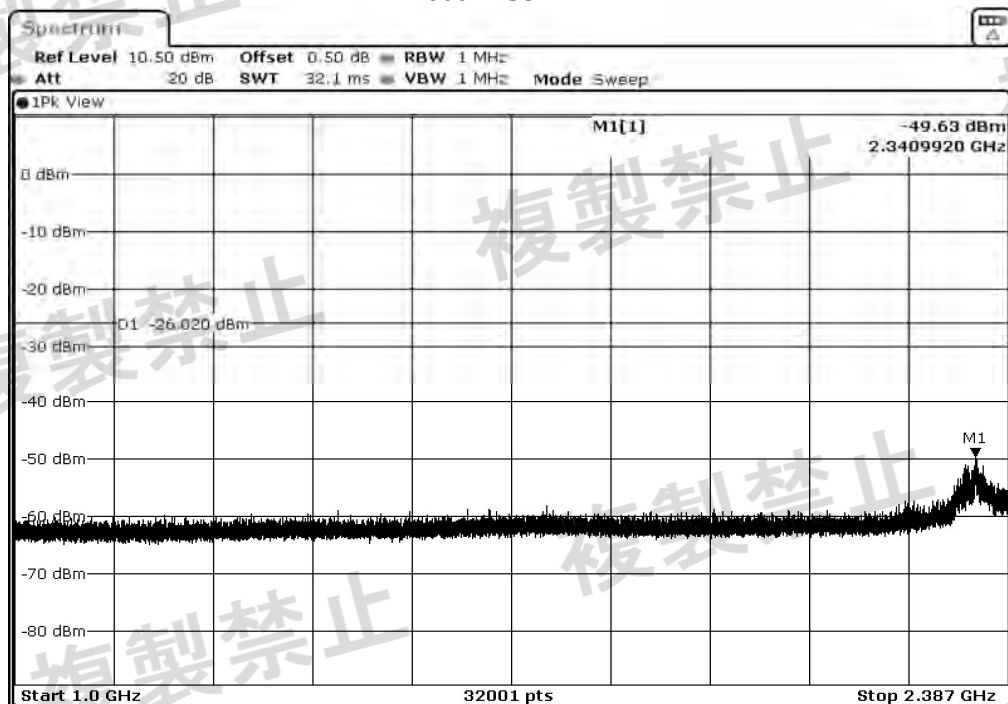
Test Conditions		Frequency Range (MHz)	Reading Value (dBm)	Limit (dBm)
Tnom (21.3 °C)	Vnom (100VAC)	30 – 1000	-67.61	-26 (2.5uW)
		1000 – 2387	-49.63	-26 (2.5uW)
		2387 – 2400	-53.44	-16 (25uW)
		2483.5 – 2496.5	-52.70	-16 (25uW)
		2496.5 – 8000	-35.63	-26 (2.5uW)
		8000 – 12750	-56.94	-26 (2.5uW)

30 – 1000MHz



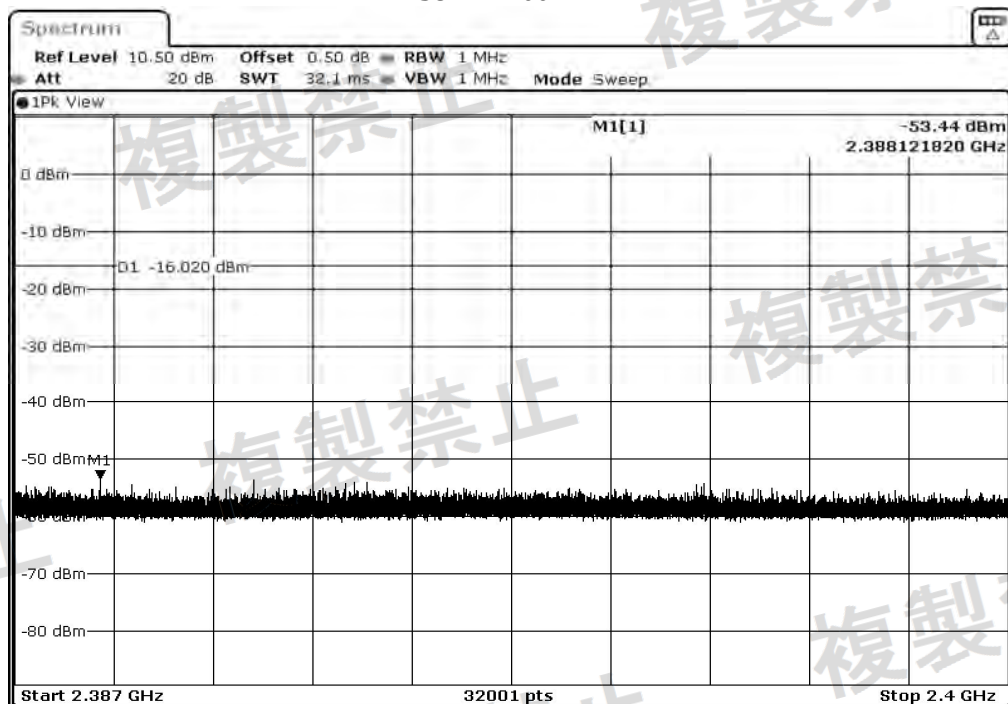
Date: 31.MAR.2021 06:21:37

1000– 2387MHz



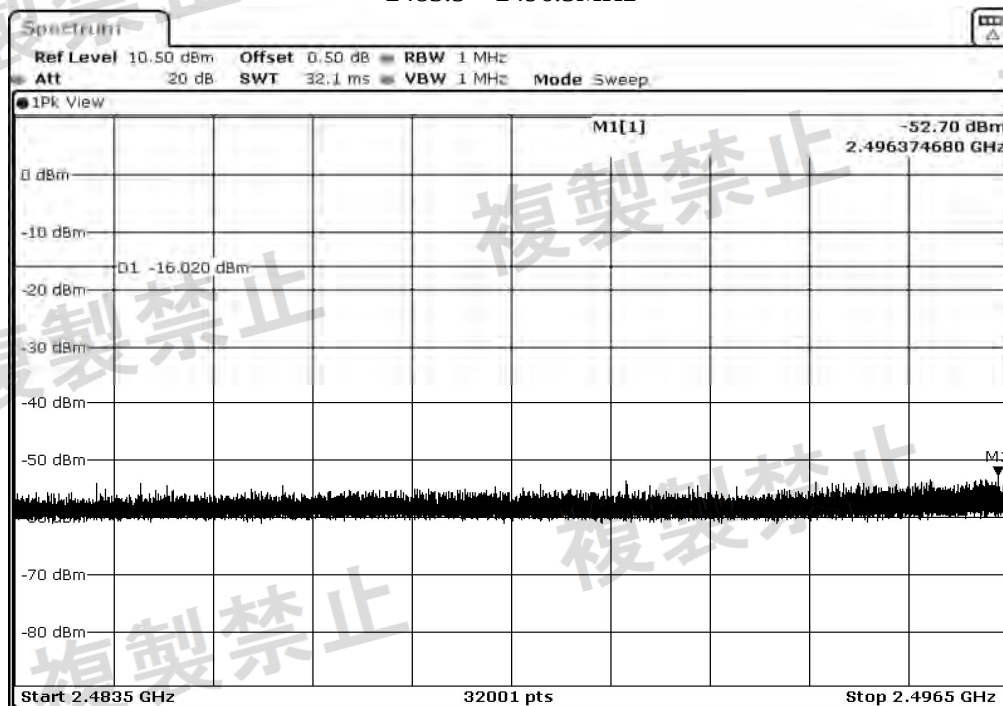
Date: 31.MAR.2021 06:22:00

2387 – 2400 MHz



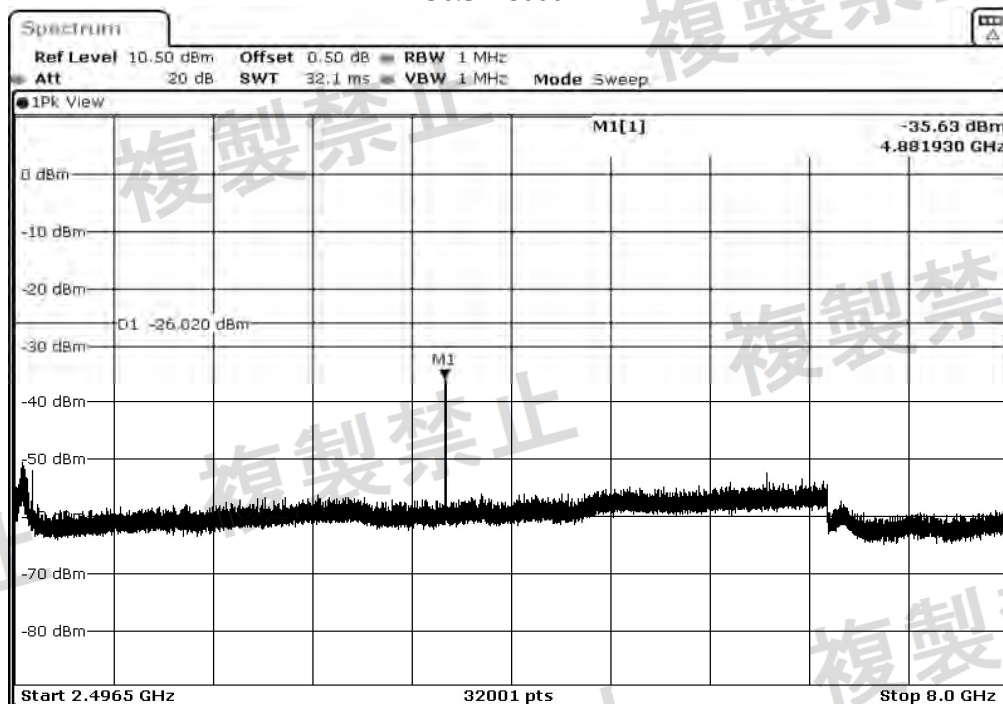
Date: 31.MAR.2021 06:22:21

2483.5 – 2496.5MHz



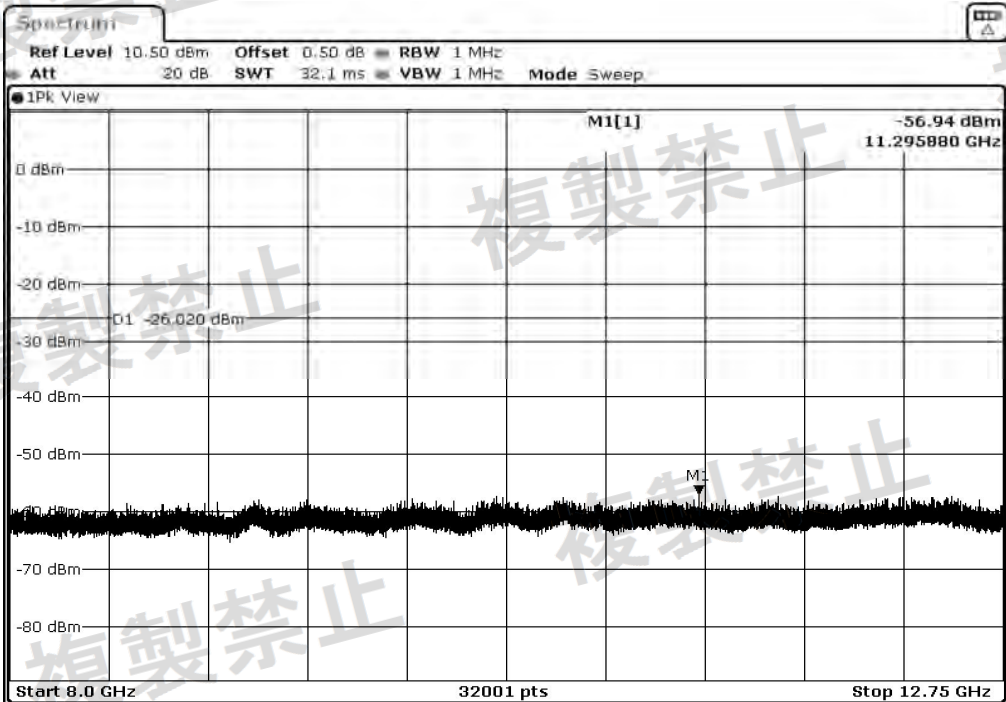
Date: 31.MAR.2021 06:22:44

2496.5 – 8000MHz



Date: 31.MAR.2021 06:23:07

8000 – 12750MHz

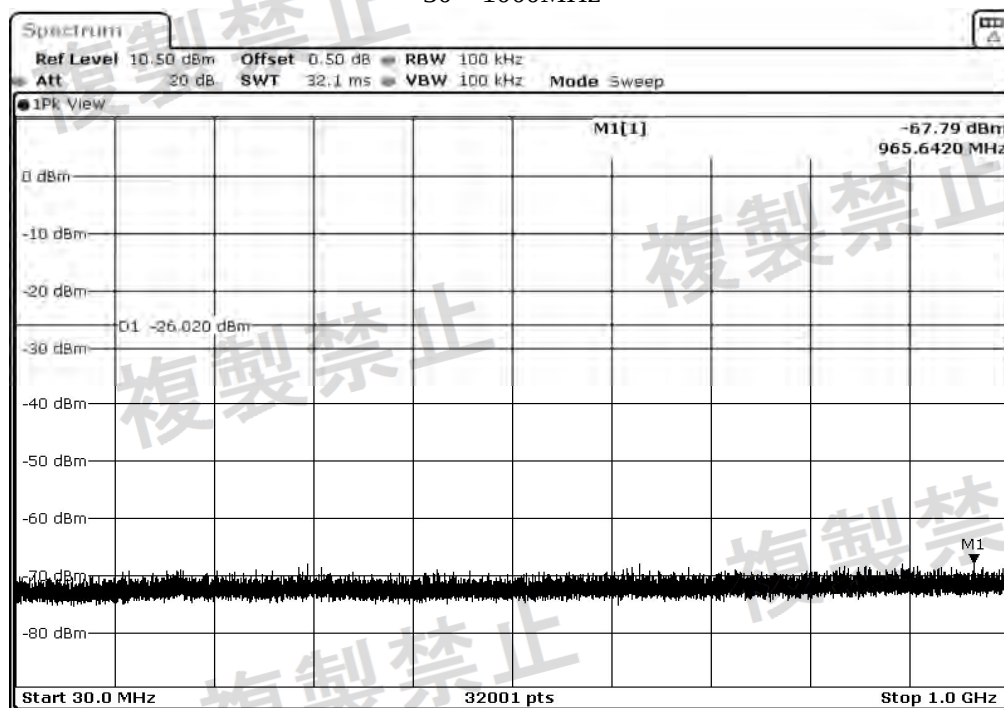


Date: 31.MAR.2021 06:23:29

Product : Wireless speaker
 Test Item : Transmitter Spurious Emissions
 Test Mode : Mode 3 :Transmitter-Normal-3Mbps (2441MHz)

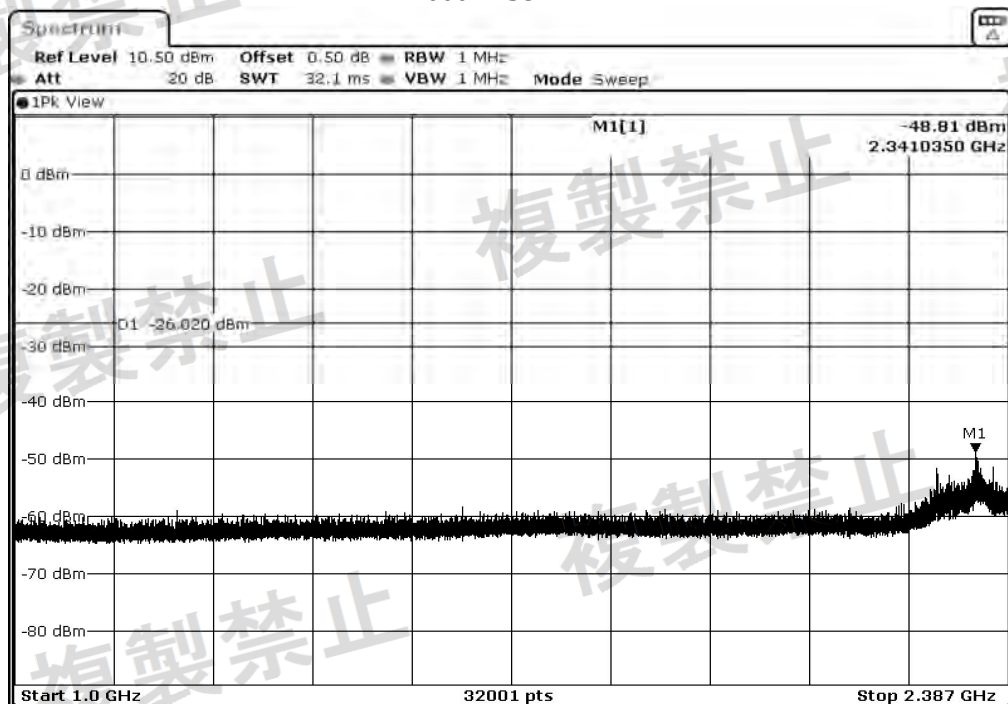
Test Conditions		Frequency Range (MHz)	Reading Value (dBm)	Limit (dBm)
Tnom (21.3 °C)	Vnom (100VAC)	30 – 1000	-67.79	-26 (2.5uW)
		1000 – 2387	-48.81	-26 (2.5uW)
		2387 – 2400	-52.75	-16 (25uW)
		2483.5 –2496.5	-52.07	-16 (25uW)
		2496.5– 8000	-35.54	-26 (2.5uW)
		8000 – 12750	-56.67	-26 (2.5uW)

30 – 1000MHz



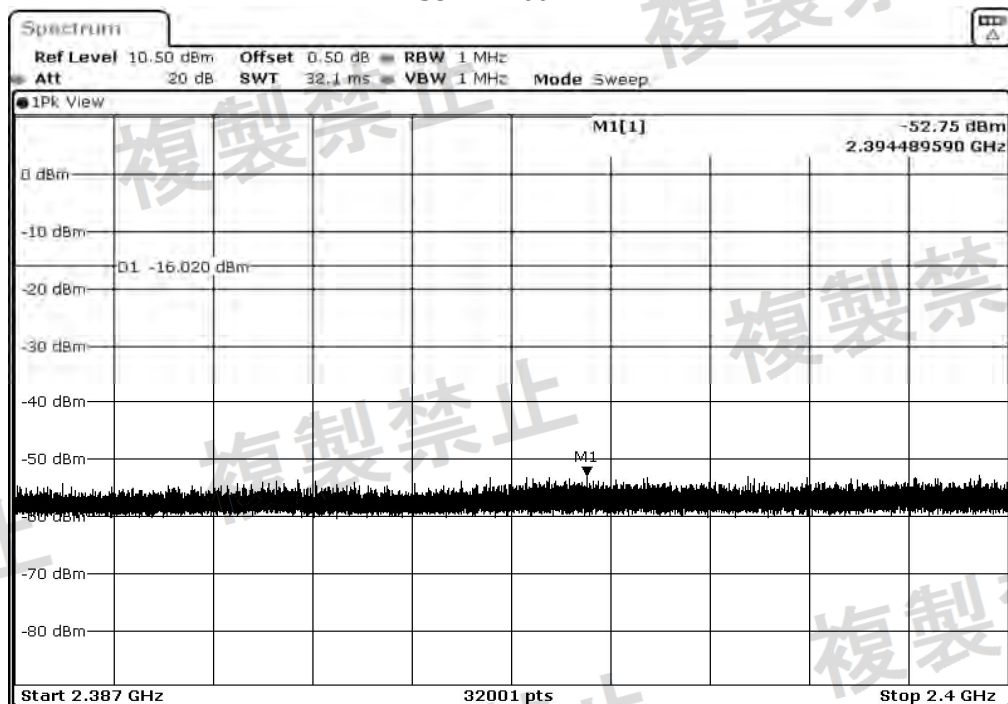
Date: 31.MAR.2021 06:34:41

1000– 2387MHz



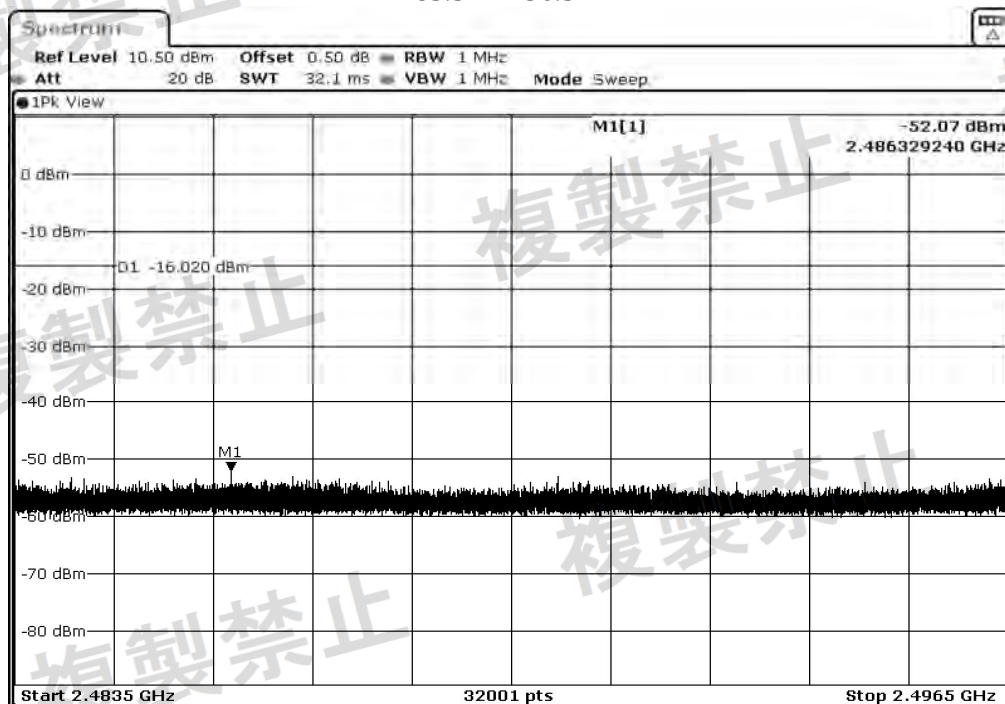
Date: 31.MAR.2021 06:35:04

2387 – 2400 MHz



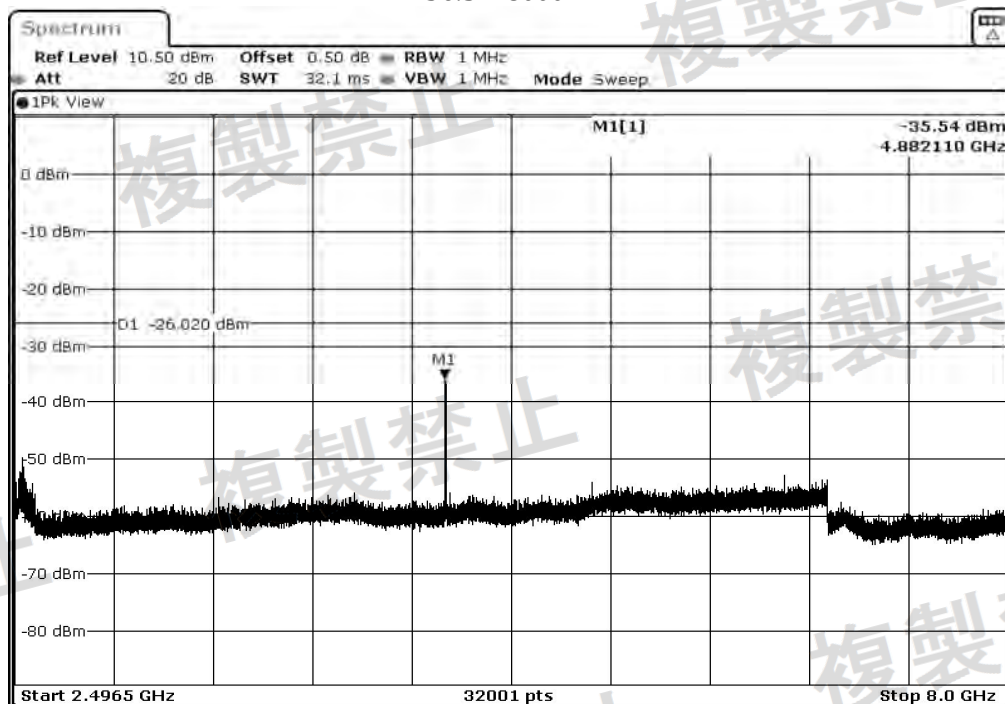
Date: 31.MAR.2021 06:35:26

2483.5 – 2496.5MHz



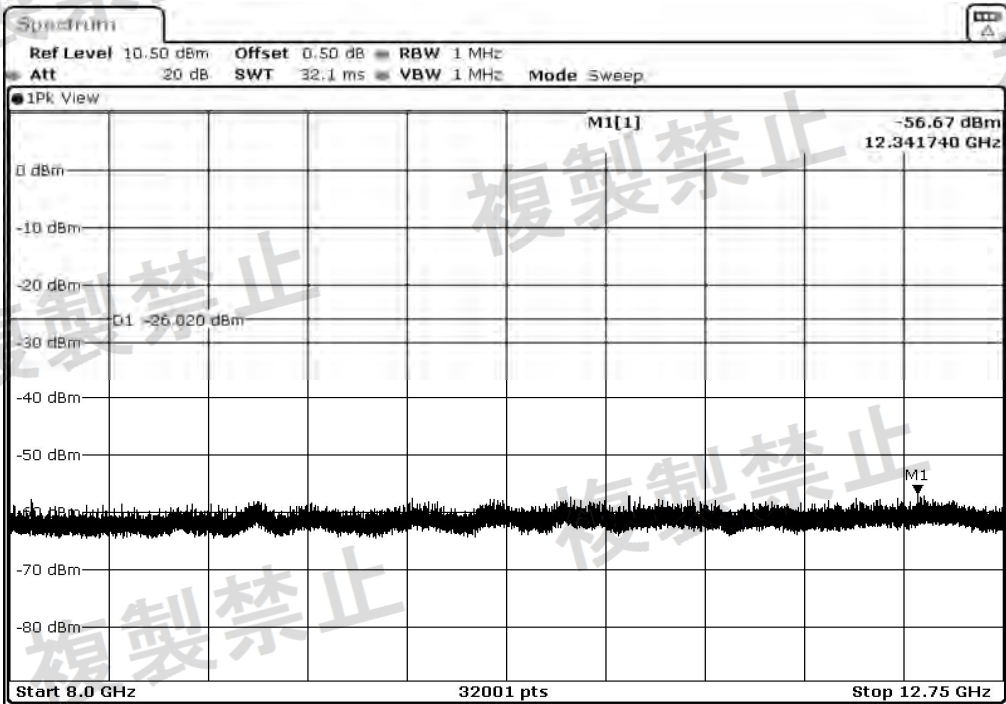
Date: 31.MAR.2021 06:35:48

2496.5 – 8000MHz



Date: 31.MAR.2021 06:36:11

8000 – 12750MHz

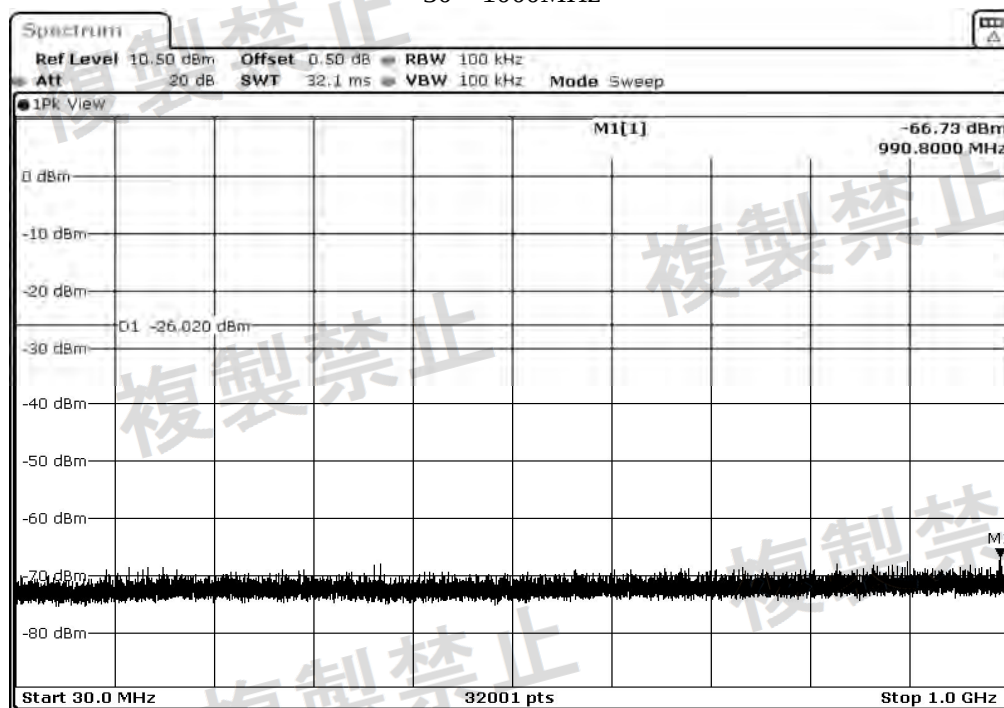


Date: 31.MAR.2021 06:36:34

Product : Wireless speaker
 Test Item : Transmitter Spurious Emissions
 Test Mode : Mode 4: Transmitter-AFH-1Mbps (2411MHz)

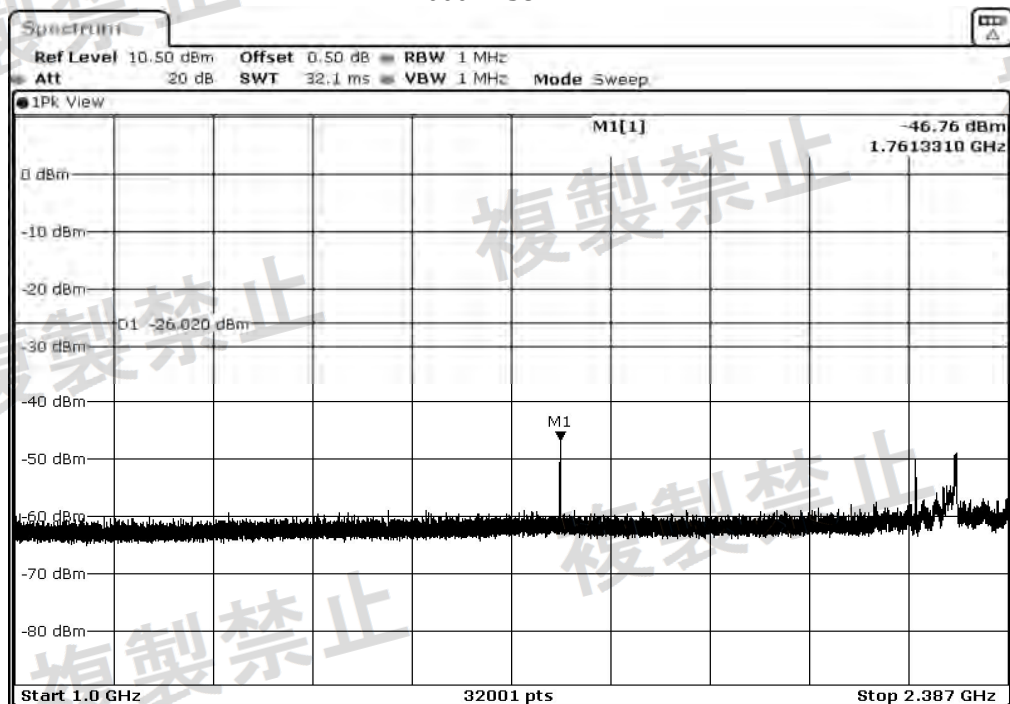
Test Conditions		Frequency Range (MHz)	Reading Value (dBm)	Limit (dBm)
Tnom (21.3 °C)	Vnom (100VAC)	30 – 1000	-66.73	-26 (2.5uW)
		1000 – 2387	-46.76	-26 (2.5uW)
		2387 – 2400	-52.93	-16 (25uW)
		2483.5 – 2496.5	-55.54	-16 (25uW)
		2496.5 – 8000	-37.77	-26 (2.5uW)
		8000 – 12750	-57.17	-26 (2.5uW)

30 – 1000MHz



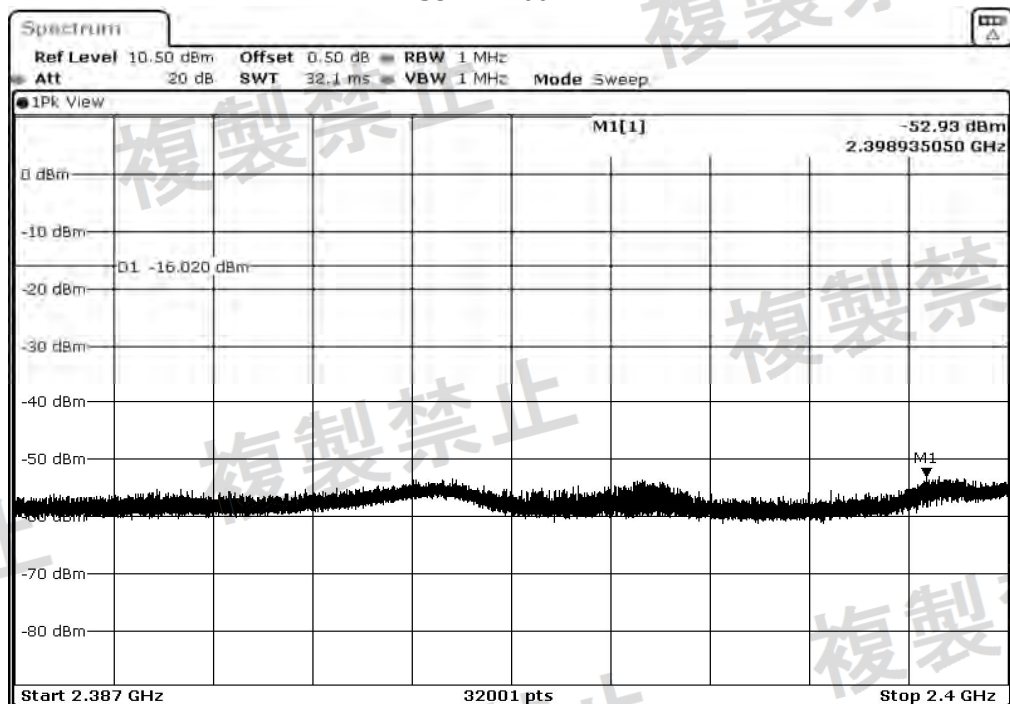
Date: 31.MAR.2021 03:34:47

1000– 2387MHz



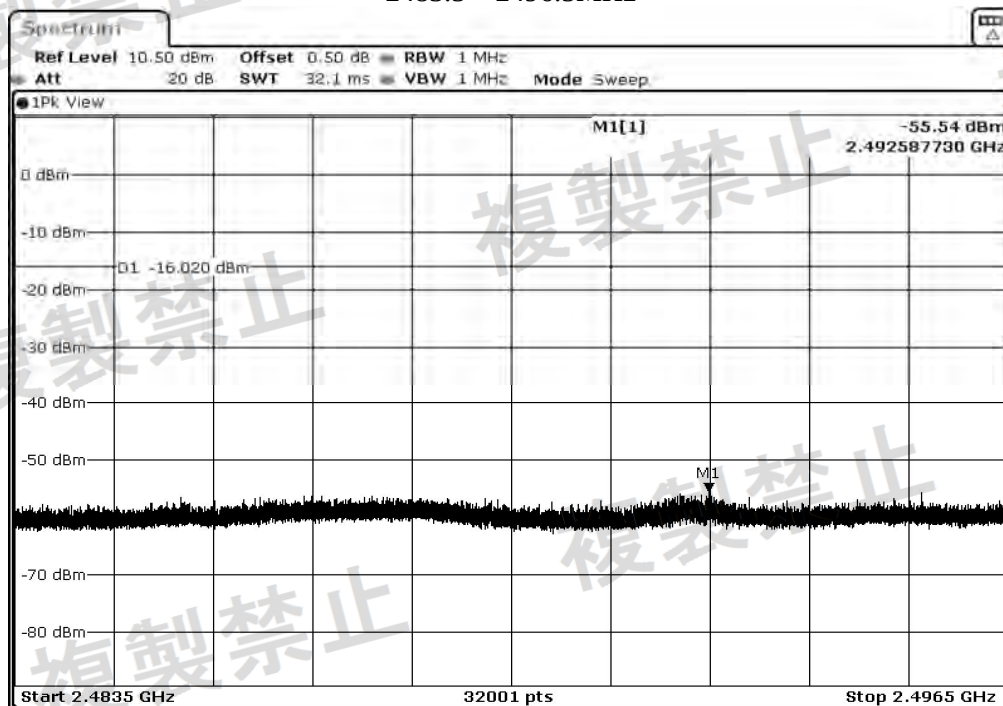
Date: 31.MAR.2021 03:35:09

2387 – 2400 MHz



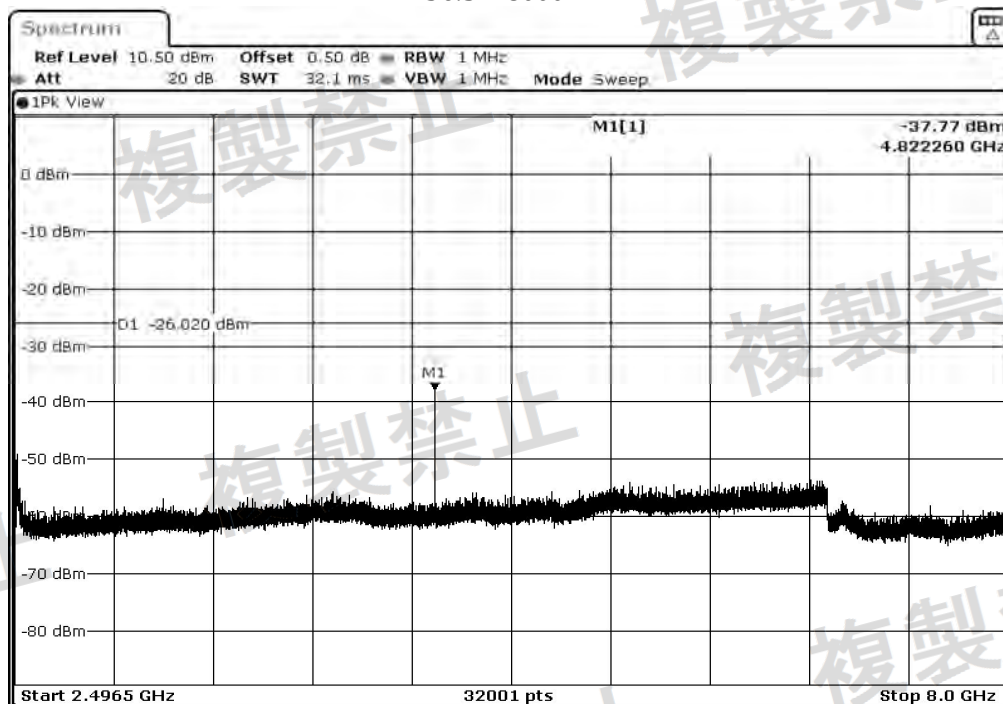
Date: 31.MAR.2021 03:35:31

2483.5 – 2496.5MHz



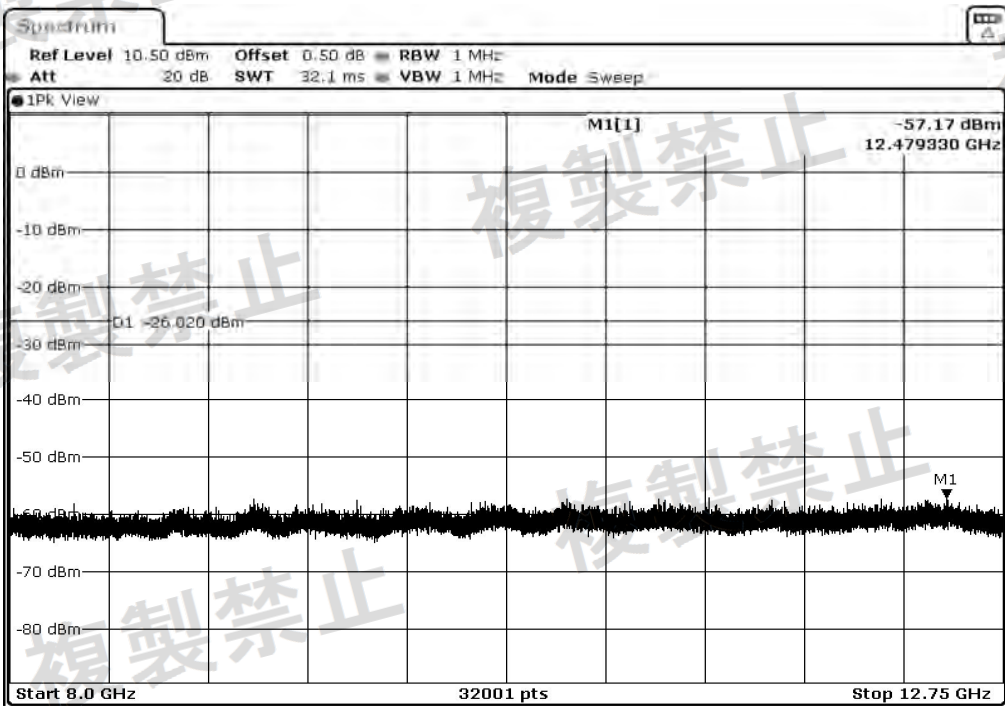
Date: 31.MAR.2021 03:35:53

2496.5 – 8000MHz



Date: 31.MAR.2021 03:36:16

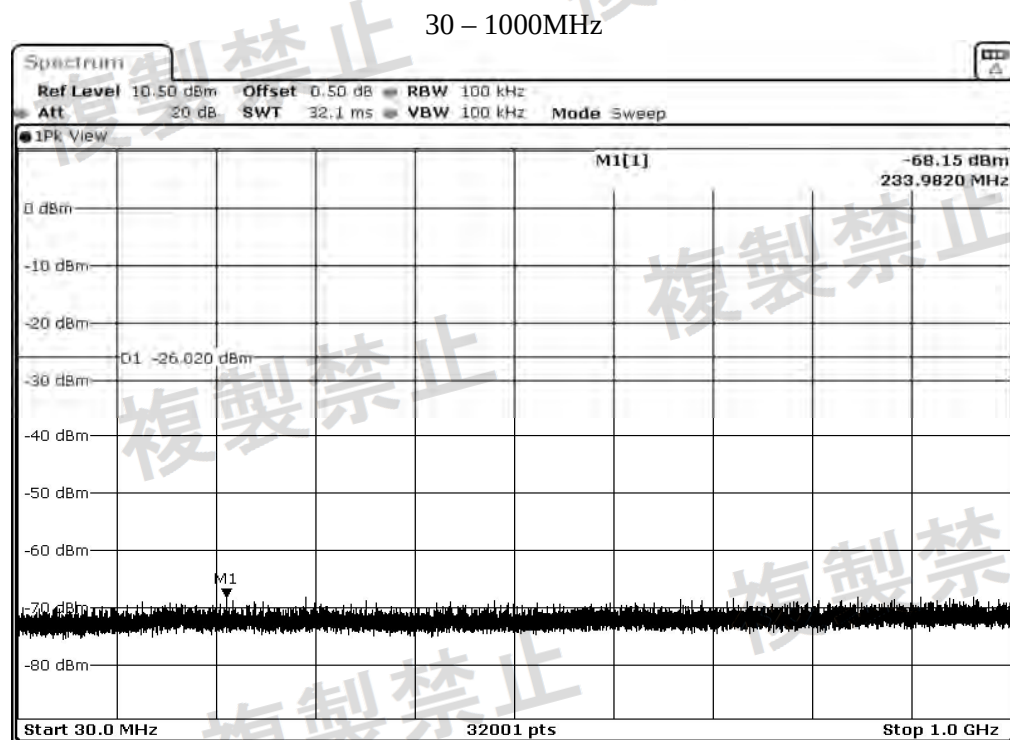
8000 – 12750MHz



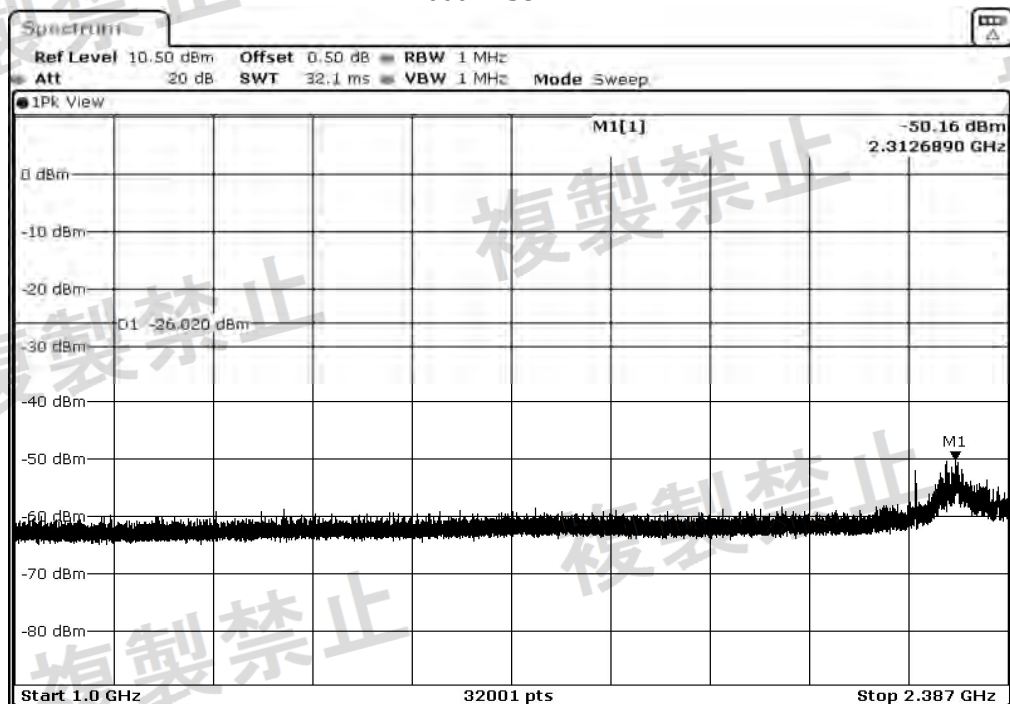
Date: 31.MAR.2021 03:36:39

Product : Wireless speaker
 Test Item : Transmitter Spurious Emissions
 Test Mode : Mode 5: Transmitter-AFH-2Mbps (2411MHz)

Test Conditions		Frequency Range (MHz)	Reading Value (dBm)	Limit (dBm)
Tnom (21.3 °C)	Vnom (100VAC)	30 – 1000	-68.15	-26 (2.5uW)
		1000 – 2387	-50.16	-26 (2.5uW)
		2387 – 2400	-53.70	-16 (25uW)
		2483.5 – 2496.5	-51.35	-16 (25uW)
		2496.5 – 8000	-35.47	-26 (2.5uW)
		8000 – 12750	-56.40	-26 (2.5uW)

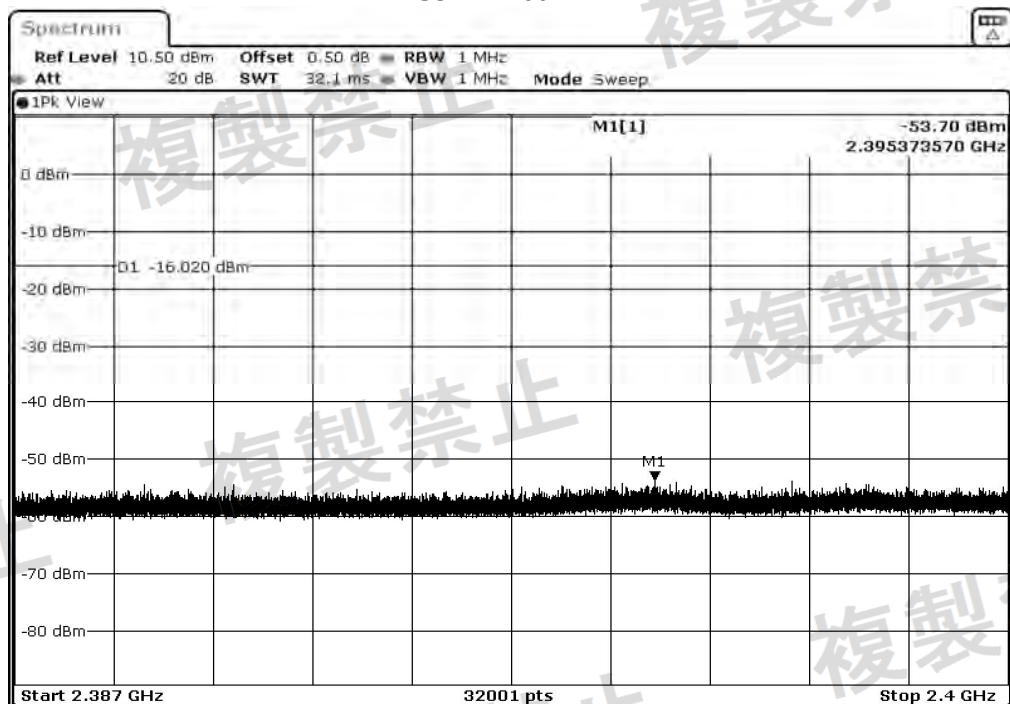


1000– 2387MHz



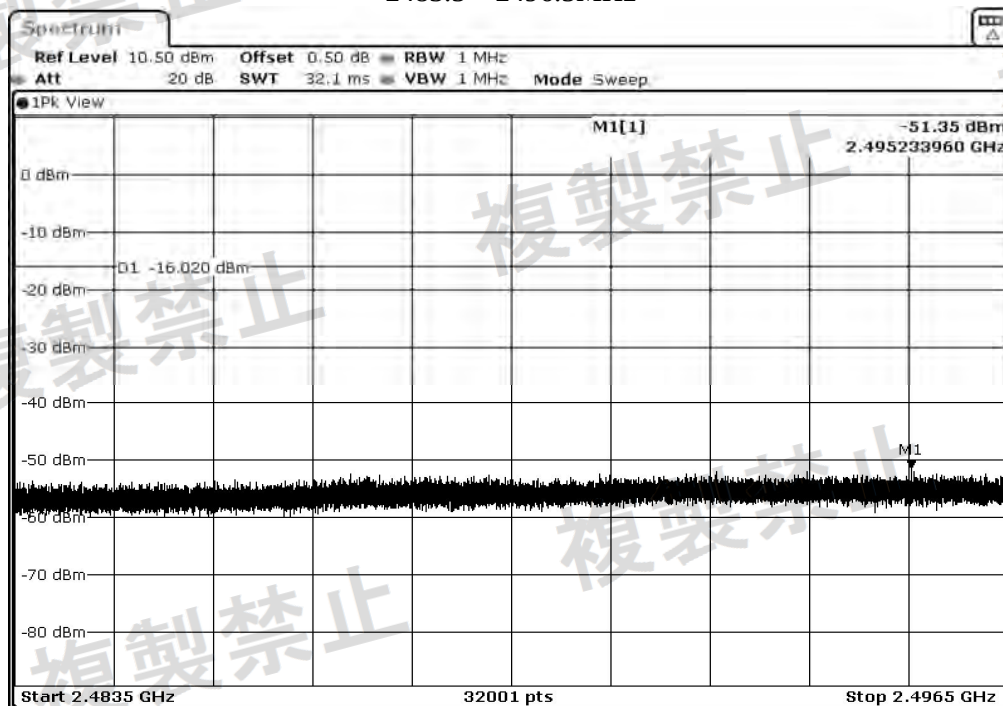
Date: 31.MAR.2021 03:55:48

2387 – 2400 MHz



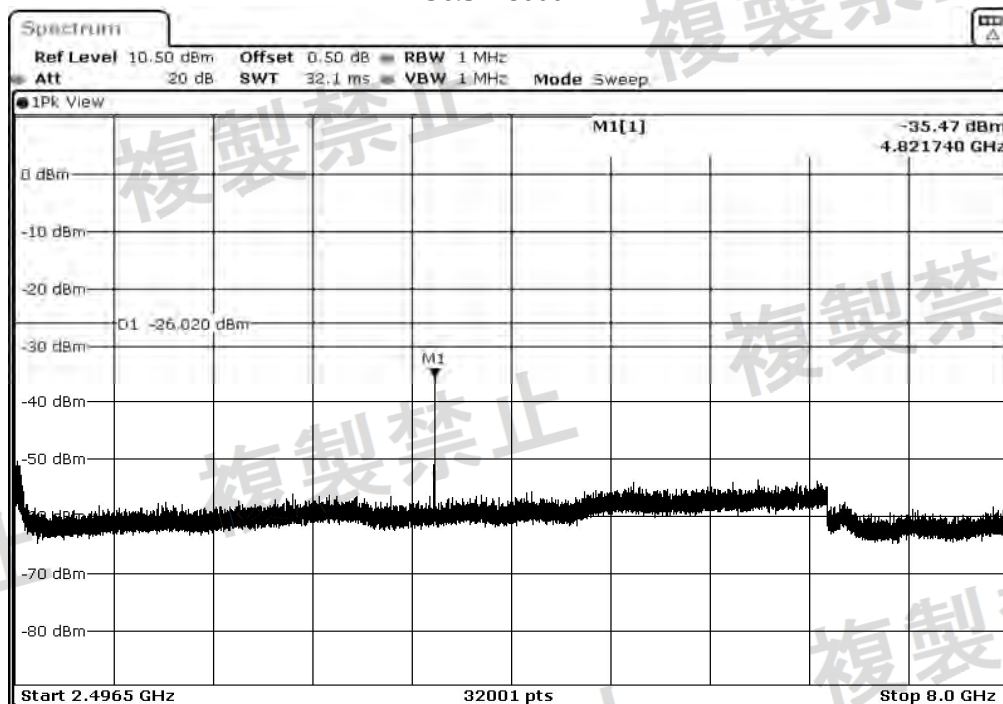
Date: 31.MAR.2021 03:56:11

2483.5 – 2496.5MHz



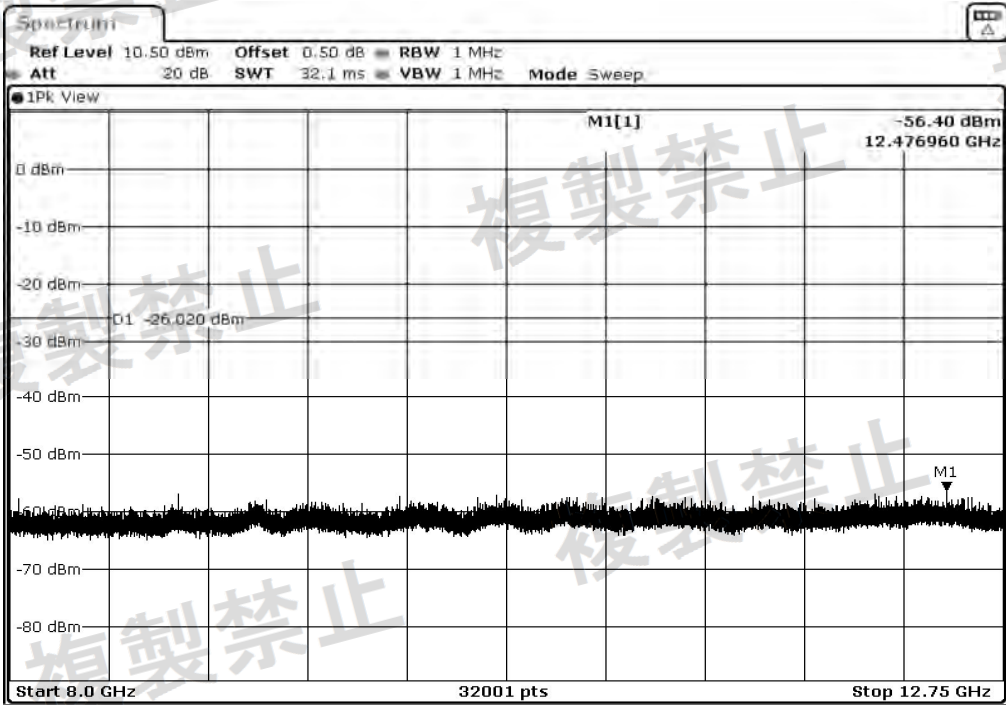
Date: 31.MAR.2021 03:56:33

2496.5 – 8000MHz



Date: 31.MAR.2021 03:56:56

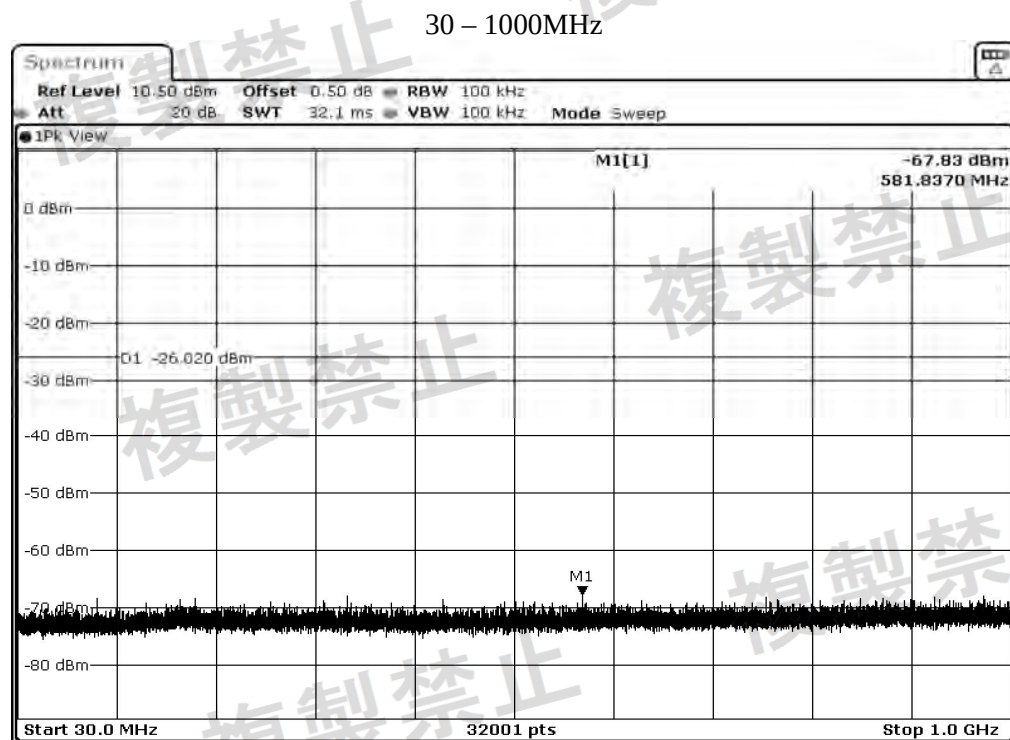
8000 – 12750MHz



Date: 31.MAR.2021 03:57:18

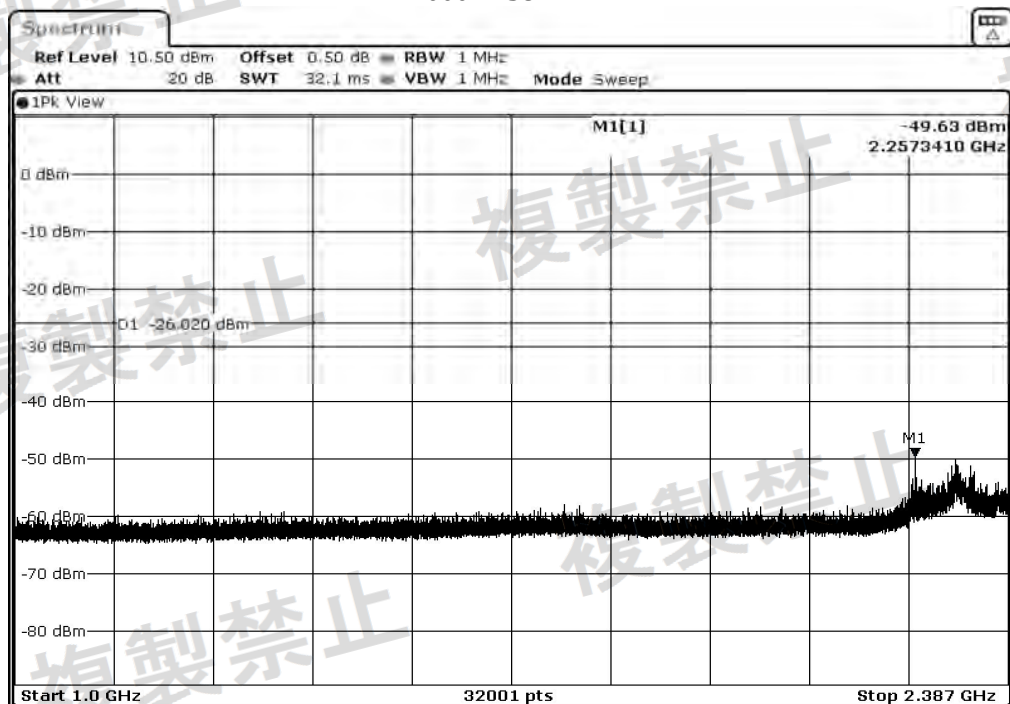
Product : Wireless speaker
 Test Item : Transmitter Spurious Emissions
 Test Mode : Mode 6: Transmitter-AFH-3Mbps (2411MHz)

Test Conditions		Frequency Range (MHz)	Reading Value (dBm)	Limit (dBm)
Tnom (21.3 °C)	Vnom (100VAC)	30 – 1000	-67.83	-26 (2.5uW)
		1000 – 2387	-49.63	-26 (2.5uW)
		2387 – 2400	-52.31	-16 (25uW)
		2483.5 – 2496.5	-50.80	-16 (25uW)
		2497 – 8000	-35.08	-26 (2.5uW)
		8000 – 12750	-56.02	-26 (2.5uW)



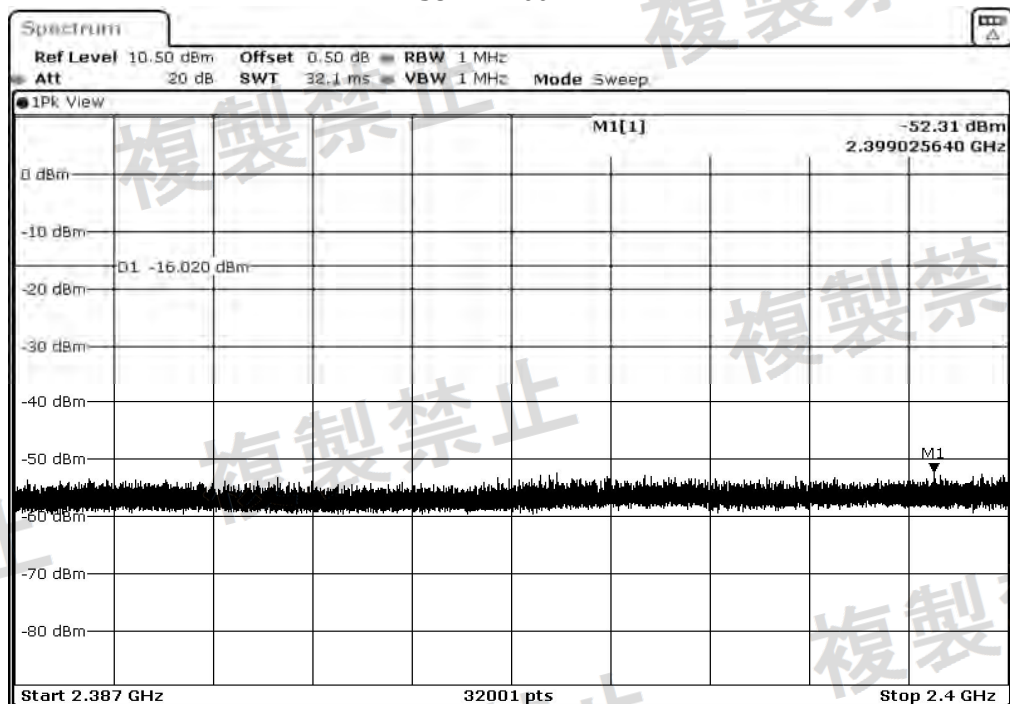
Date: 31.MAR.2021 05:18:37

1000– 2387MHz



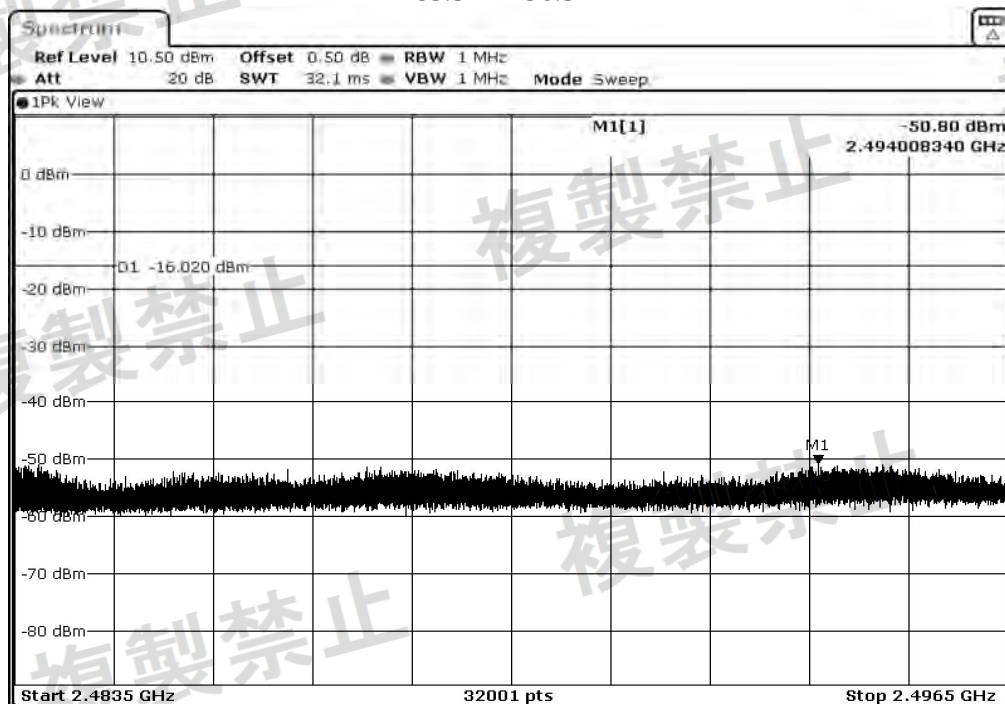
Date: 31.MAR.2021 05:18:58

2387 – 2400 MHz



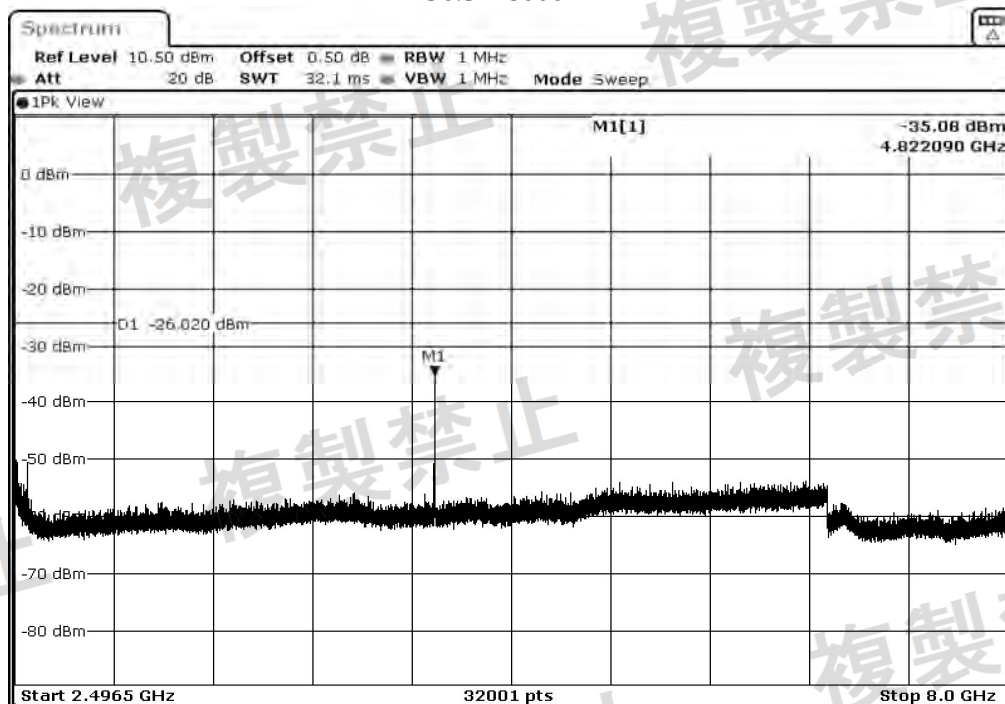
Date: 31.MAR.2021 05:19:21

2483.5 – 2496.5MHz



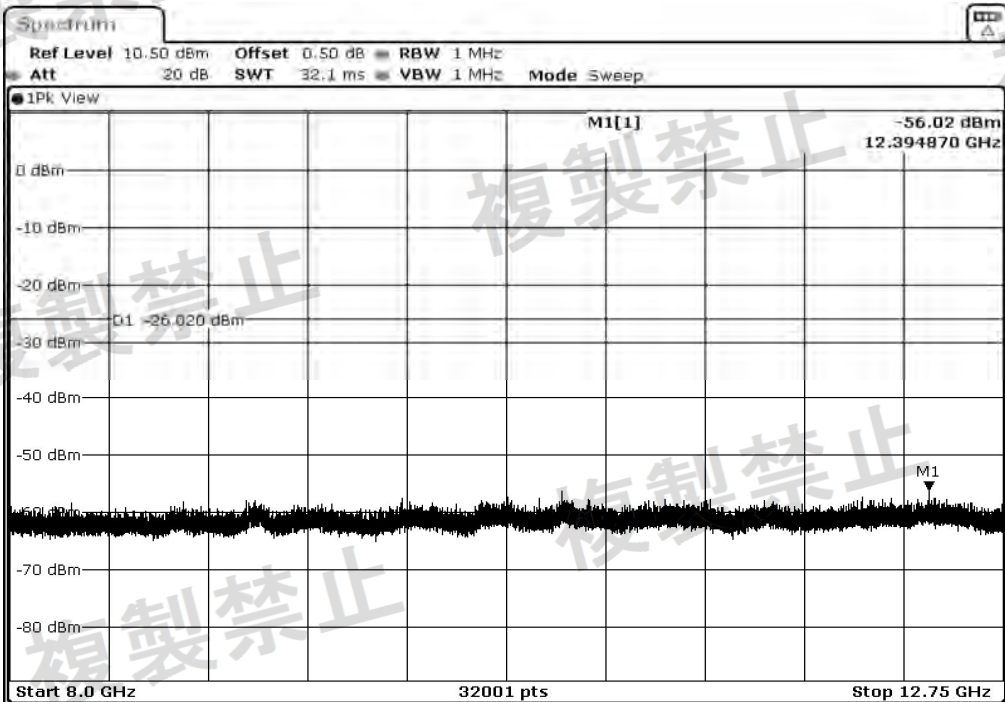
Date: 31.MAR.2021 05:19:44

2496.5 – 8000MHz



Date: 31.MAR.2021 05:20:07

8000 – 12750MHz



Date: 31.MAR.2021 05:20:28

Test Result

PASS

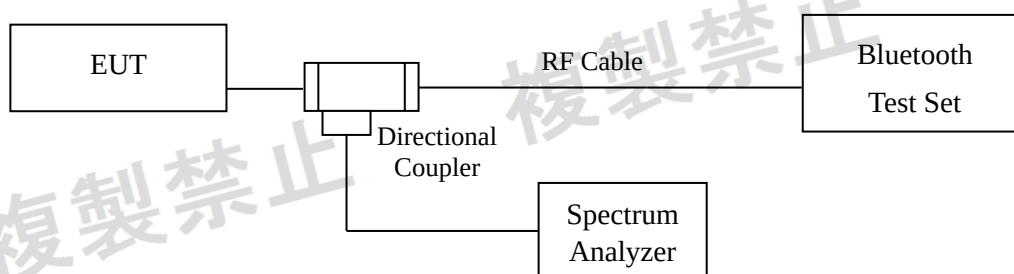
8. Receiver Suprious Emissions

8.1. Test Setup

- ☒ Use the program to control transmitter



- ☐ Use the Bluetooth Test Set to control transmitter



8.2. Test Procedure

A spectrum analyzer or similar device shall be used to observe a sample of the modulated transmitter's radio frequency power output.

- A positive peak detector function must be used.
- The measurement instrument bandwidth and span must be set sufficiently with, and, the scan time set sufficiently slow, to ensure all major modulation products are captured. Note that the measurement bandwidth should also be set sufficiently narrow to avoid adding significant error to the test result.
- 'Maximum Hold' mode may be used to accumulate the measurement result over several scans provided the emission is repetitive in nature.

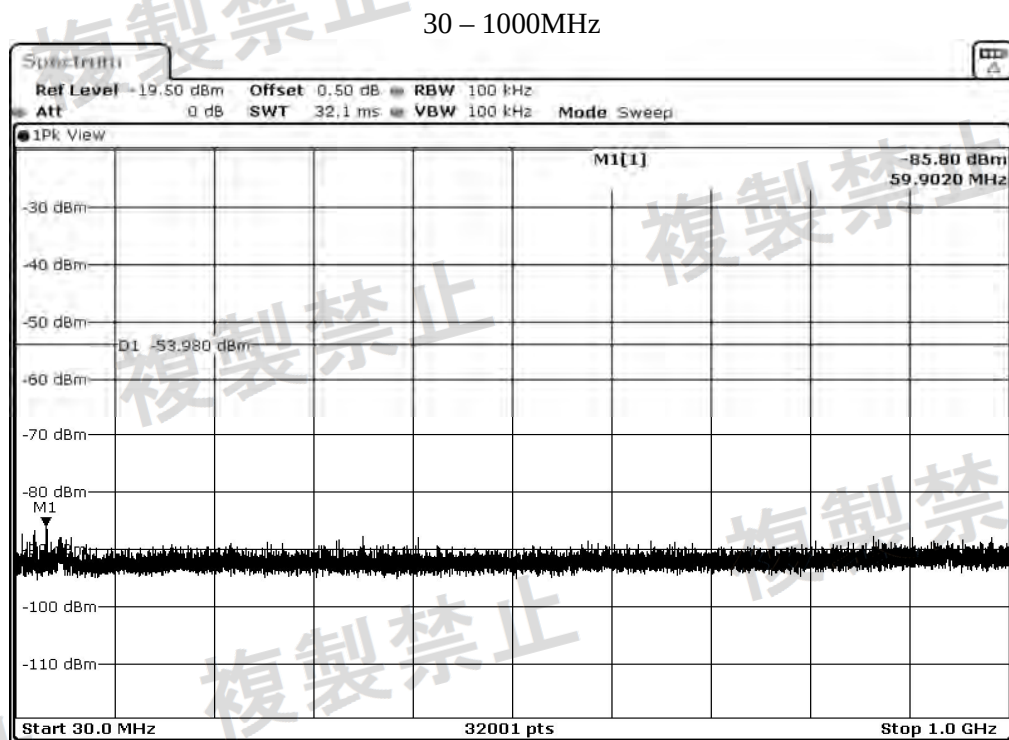
8.3. Limits

- $\leq 4\text{nW}$ for 30 – 1000 MHz
- $\leq 20\text{nW}$ for 1000 – 3000 MHz
- $\leq 20\text{nW}$ for 3000 – 8000 MHz
- $\leq 20\text{nW}$ for 8000 – 12500 MHz

8.4. Test Result of Receiver Spurious Emissions

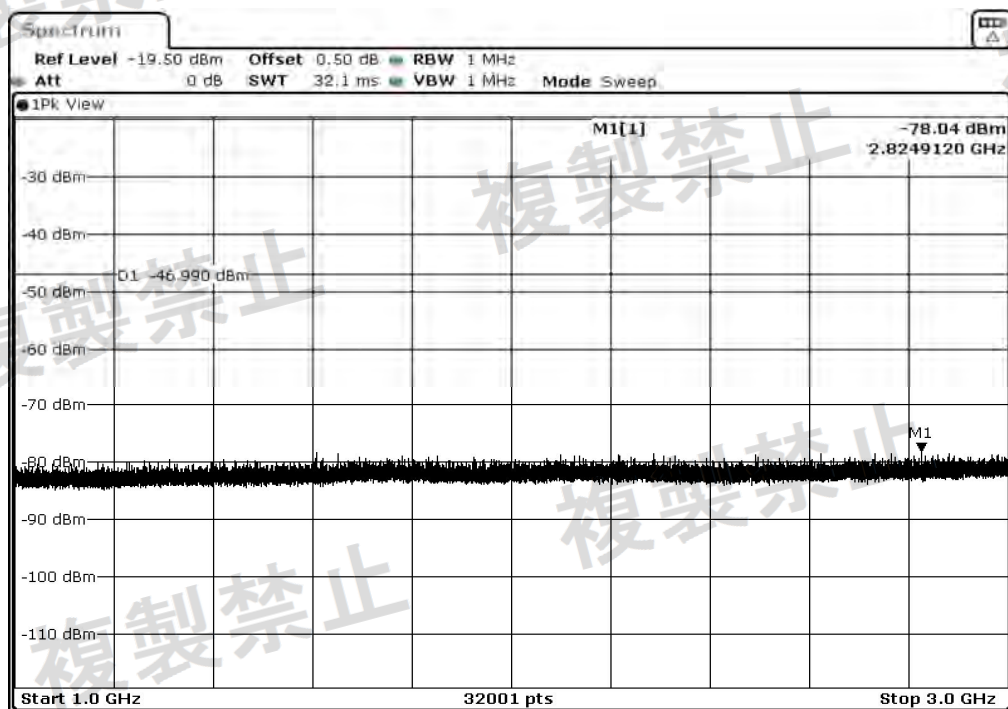
Product : Wireless speaker
 Test Item : Receiver Spurious Emissions
 Test Mode : Mode 7: Receiver-Normal-1Mbps (2441MHz)

Test Conditions		Frequency Range (MHz)	Reading Value (dBm)	Limit (dBm)
Tnom (21.3 °C)	Vnom (100VAC)	30 – 1000	-85.80	-54 (4nW)
		1000 – 3000	-78.04	-47 (20nW)
		3000 – 8000	-73.42	-47 (20nW)
		8000 – 12750	-76.45	-47 (20nW)



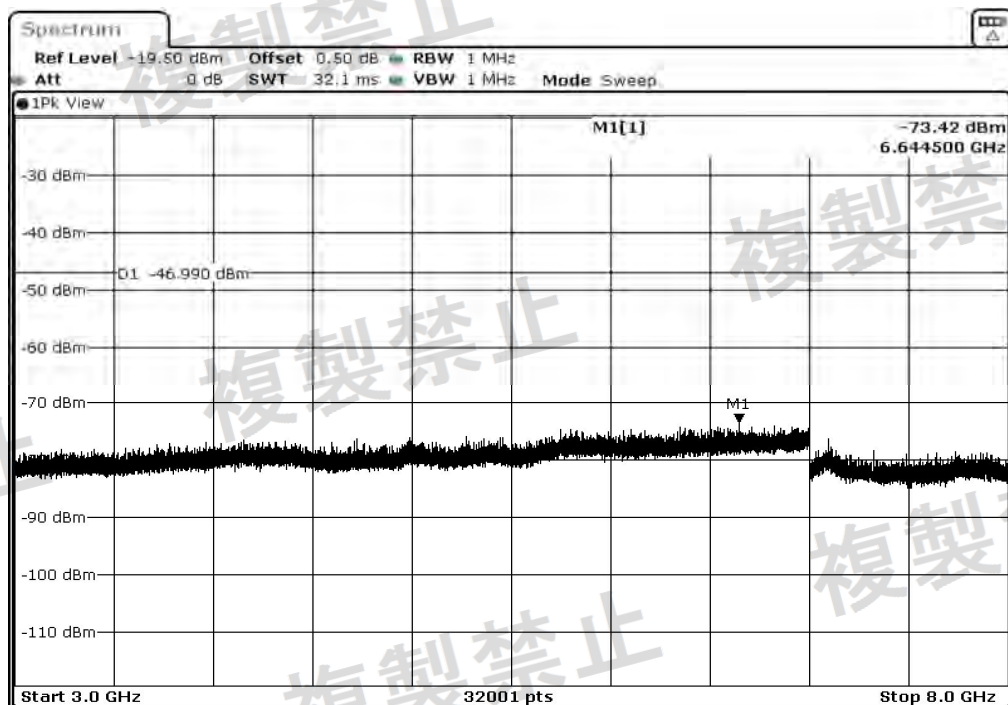
Date: 31.MAR.2021 06:02:39

1000 – 3000MHz



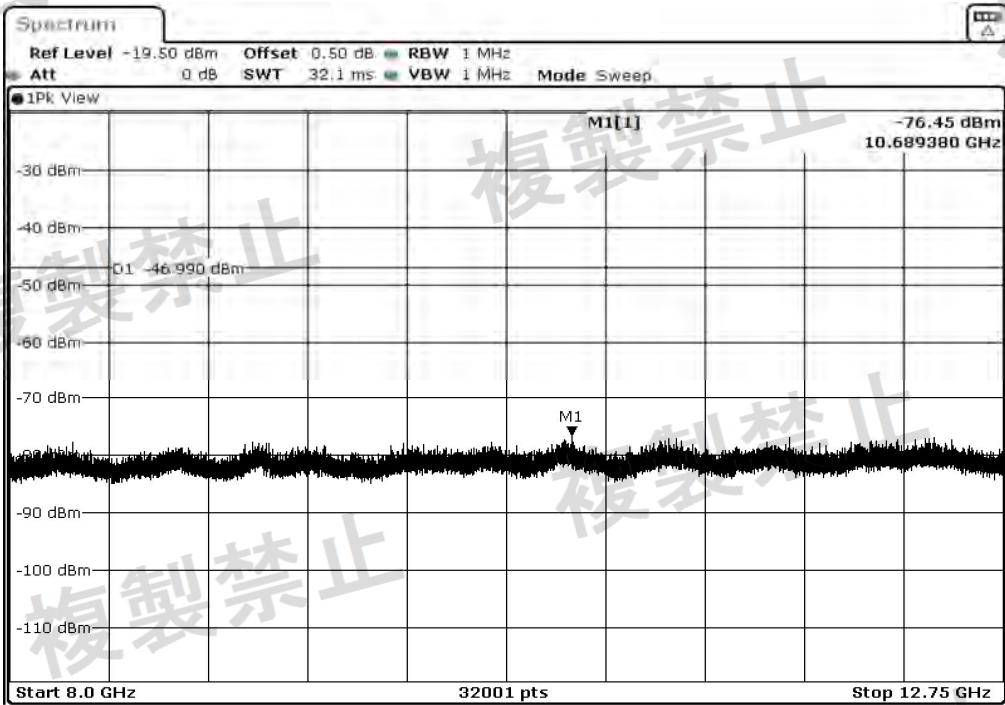
Date: 31.MAR.2021 06:03:00

3000 – 8000MHz



Date: 31.MAR.2021 06:03:23

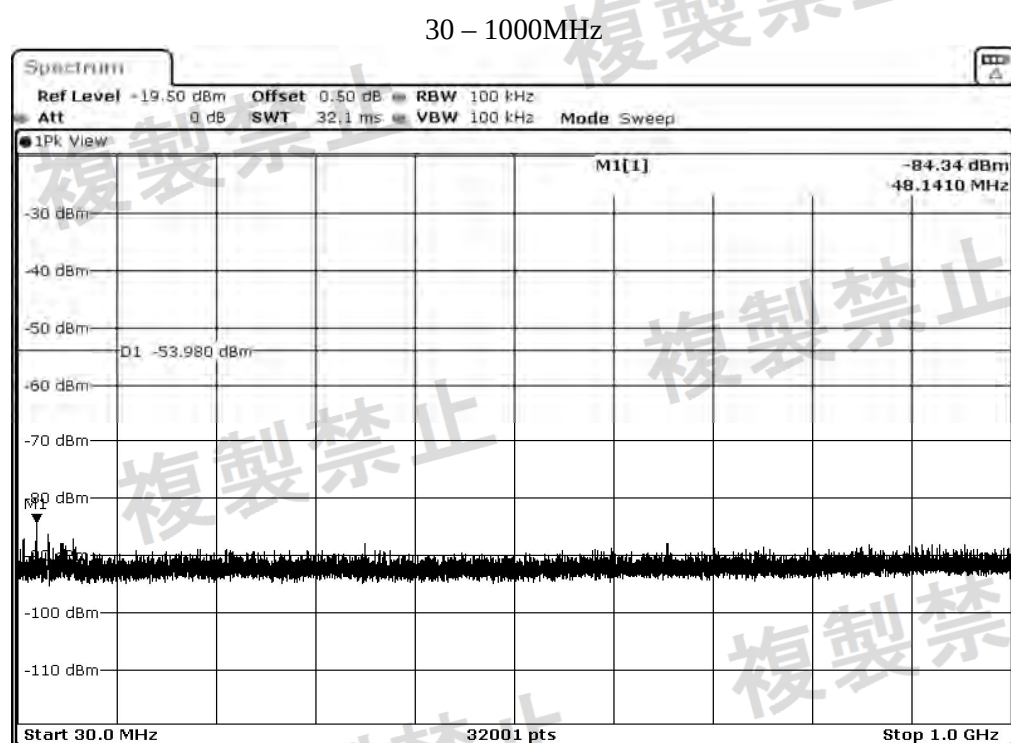
8000 – 12750MHz



Date: 31.MAR.2021 06:03:46

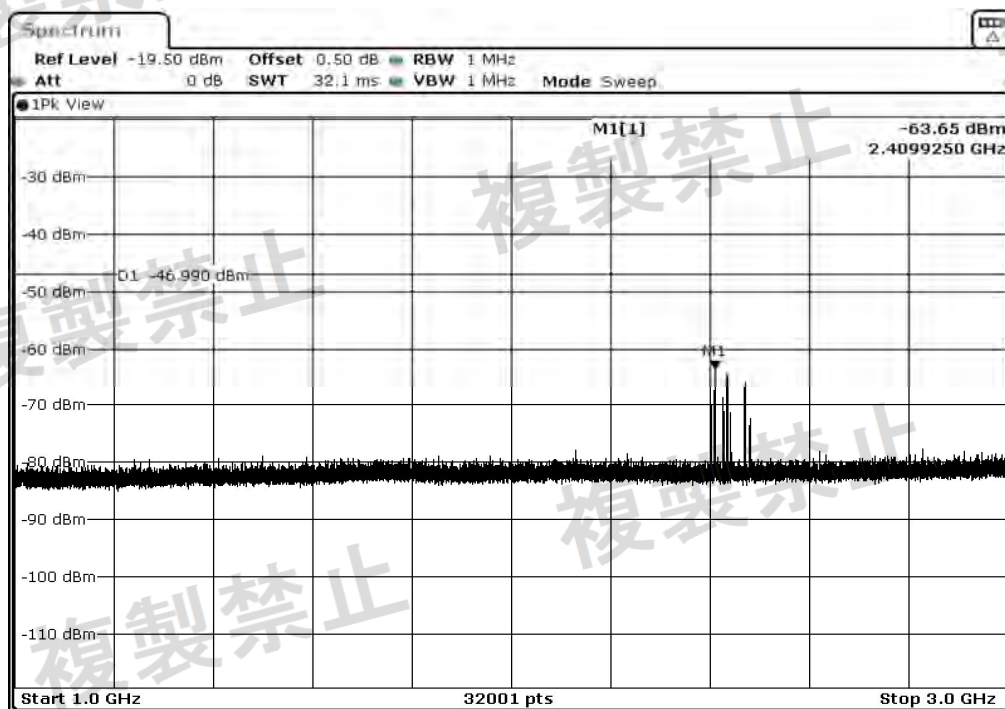
Product : Wireless speaker
 Test Item : Receiver Spurious Emissions
 Test Mode : Mode 8: Receiver-Normal-2Mbps (2441MHz)

Test Conditions		Frequency Range (MHz)	Reading Value (dBm)	Limit (dBm)
Tnom (21.3 °C)	Vnom (100VAC)	30 – 1000	-84.34	-54 (4nW)
		1000 – 3000	-63.65	-47 (20nW)
		3000 – 8000	-73.55	-47 (20nW)
		8000 – 12750	-76.59	-47 (20nW)



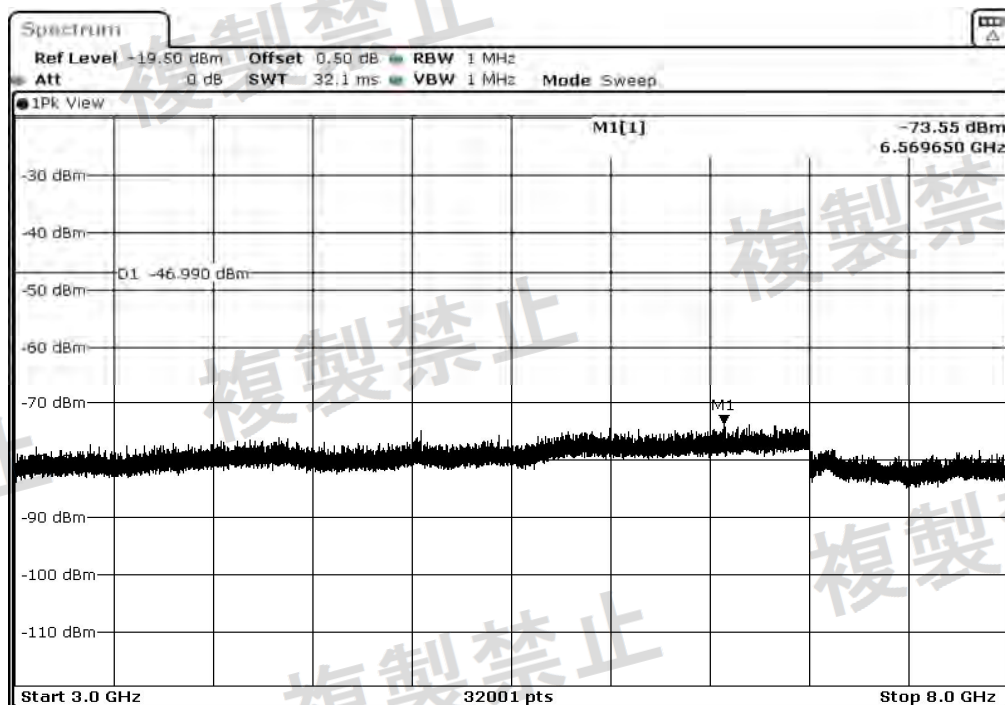
Date: 31.MAR.2021 06:19:56

1000 – 3000MHz



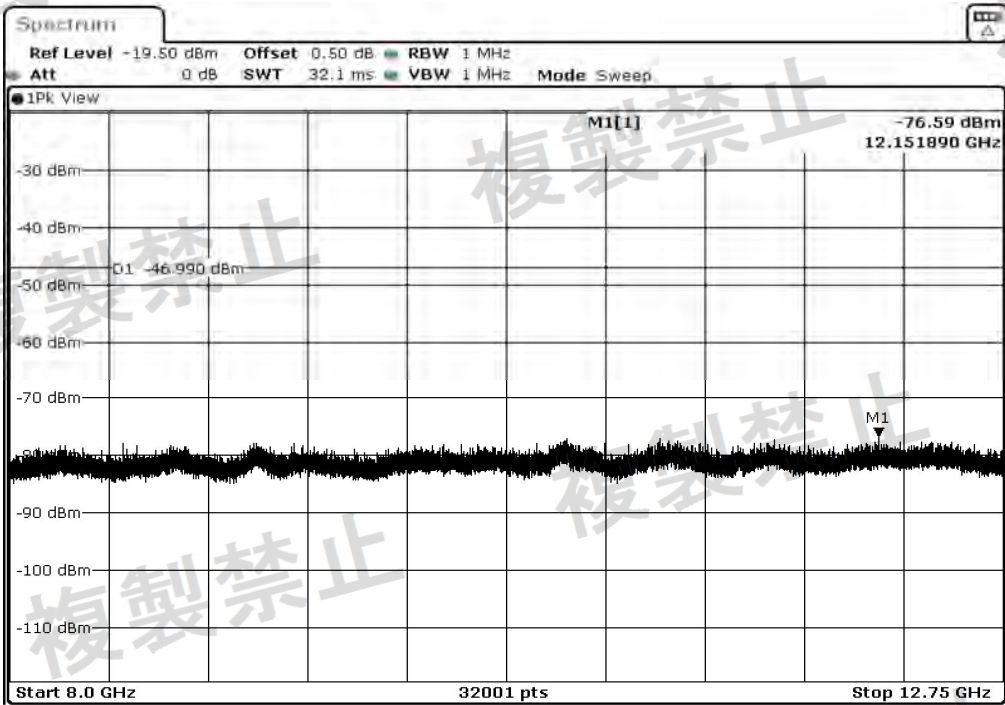
Date: 31.MAR.2021 06:20:18

3000 – 8000MHz



Date: 31.MAR.2021 06:20:39

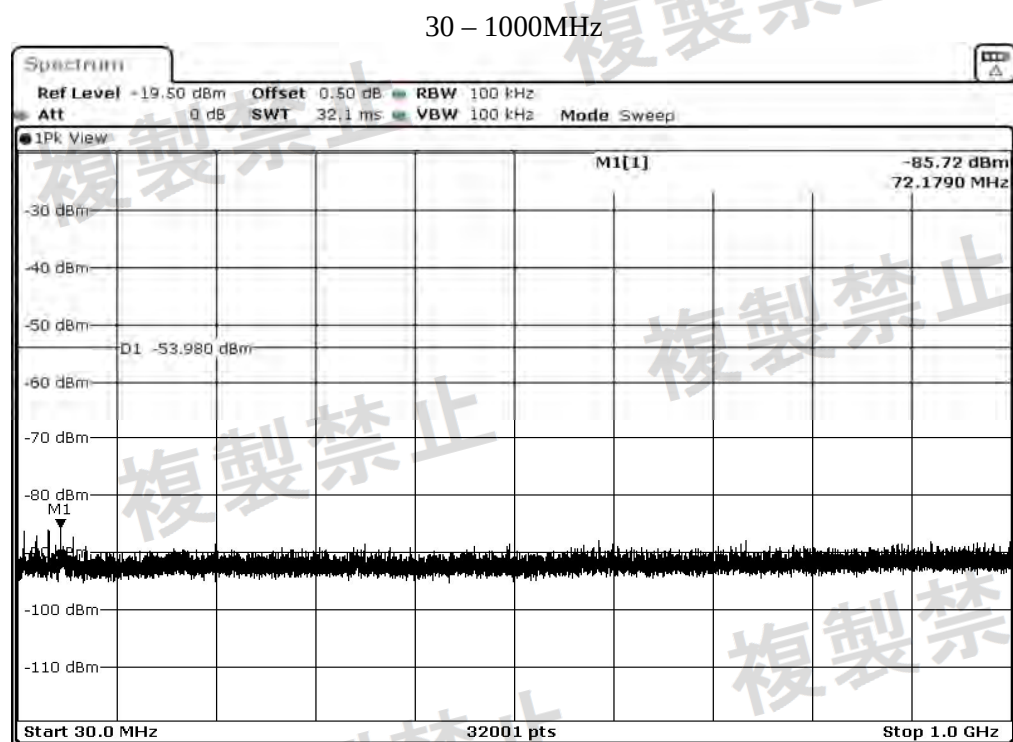
8000 – 12750MHz



Date: 31.MAR.2021 06:21:02

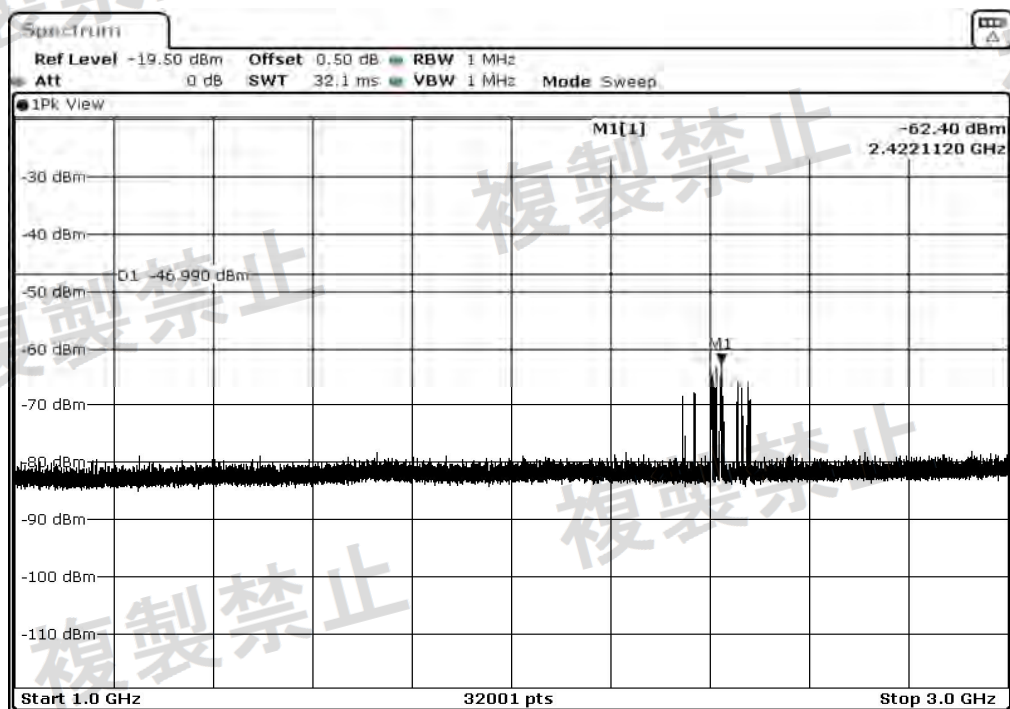
Product : Wireless speaker
 Test Item : Receiver Spurious Emissions
 Test Mode : Mode 9: Receiver-Normal-3Mbps(2441MHz)

Test Conditions		Frequency Range (MHz)	Reading Value (dBm)	Limit (dBm)
Tnom (21.3 °C)	Vnom (100VAC)	30 – 1000	-85.72	-54 (4nW)
		1000 – 3000	-62.40	-47 (20nW)
		3000 – 8000	-73.41	-47 (20nW)
		8000 – 12750	-76.86	-47 (20nW)



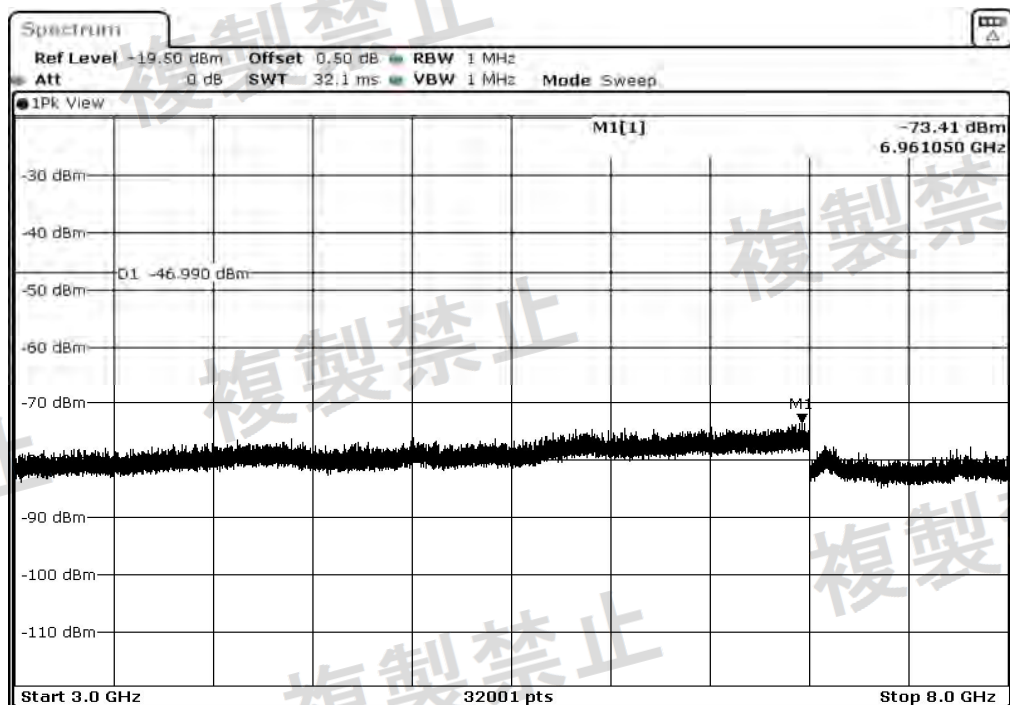
Date: 31.MAR.2021 06:32:56

1000 – 3000MHz



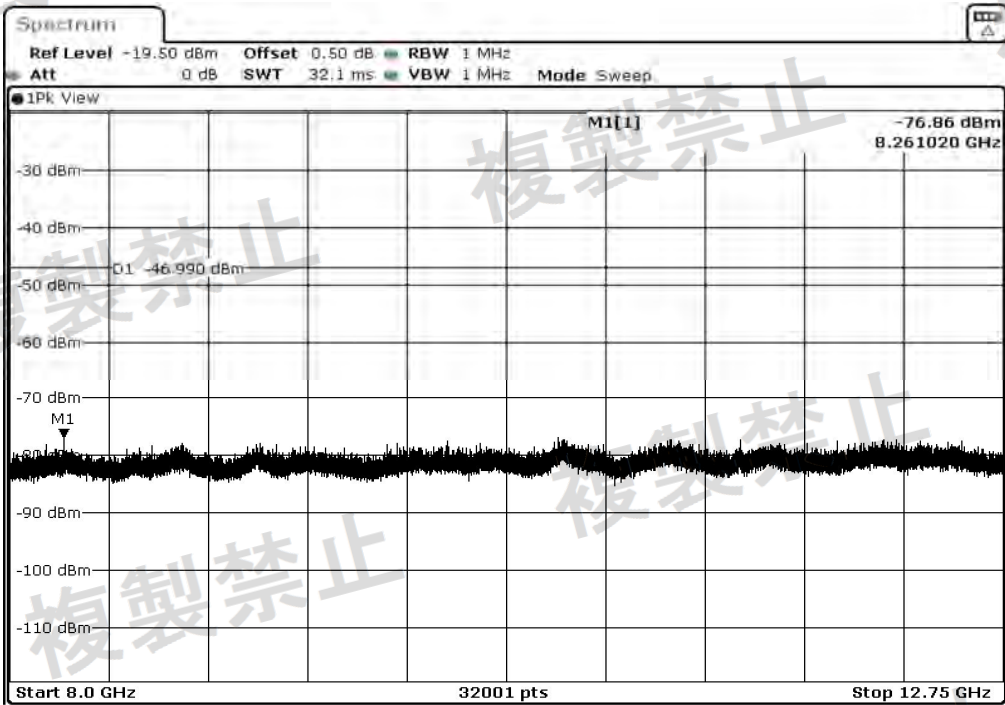
Date: 31.MAR.2021 06:33:19

3000 – 8000MHz



Date: 31.MAR.2021 06:33:41

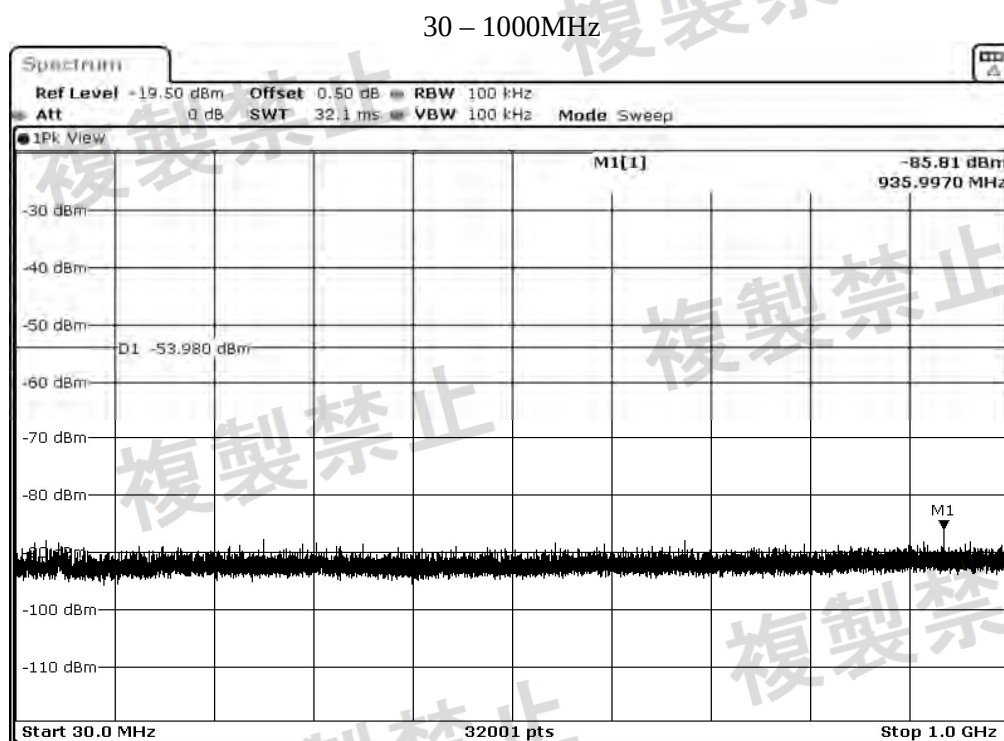
8000 – 12750MHz



Date: 31.MAR.2021 06:34:03

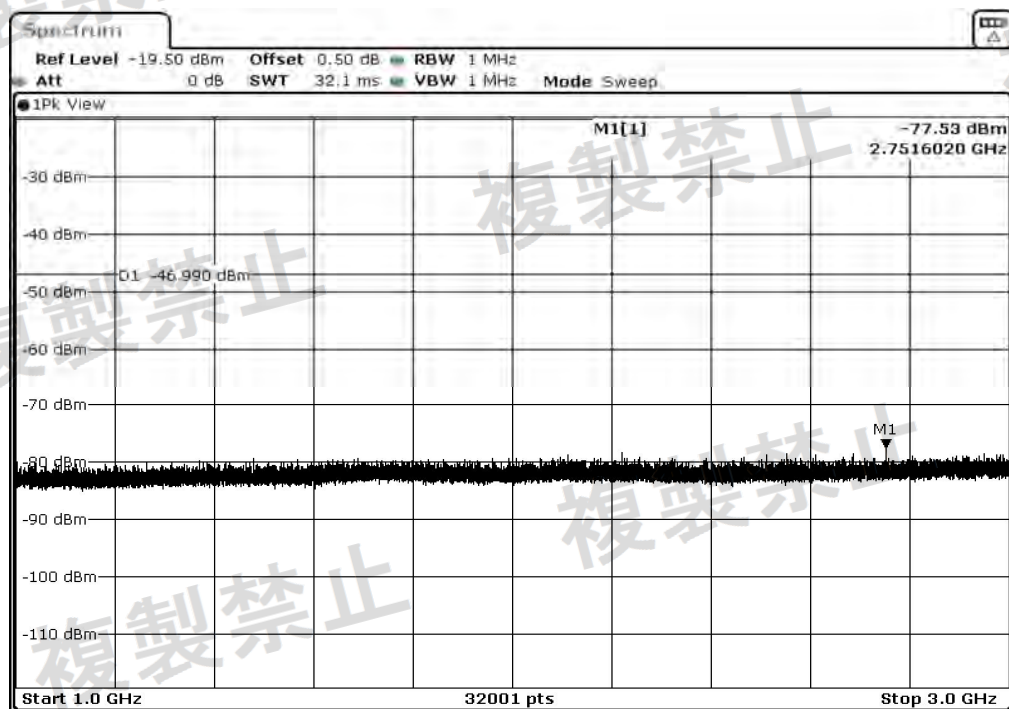
Product : Wireless speaker
 Test Item : Receiver Spurious Emissions
 Test Mode : Mode 10: Receiver-AFH-1Mbps(2411MHz)

Test Conditions		Frequency Range (MHz)	Reading Value (dBm)	Limit (dBm)
Tnom (21.3 °C)	Vnom (100VAC)	30 – 1000	-85.81	-54 (4nW)
		1000 – 3000	-77.53	-47 (20nW)
		3000 – 8000	-73.66	-47 (20nW)
		8000 – 12750	-76.50	-47 (20nW)



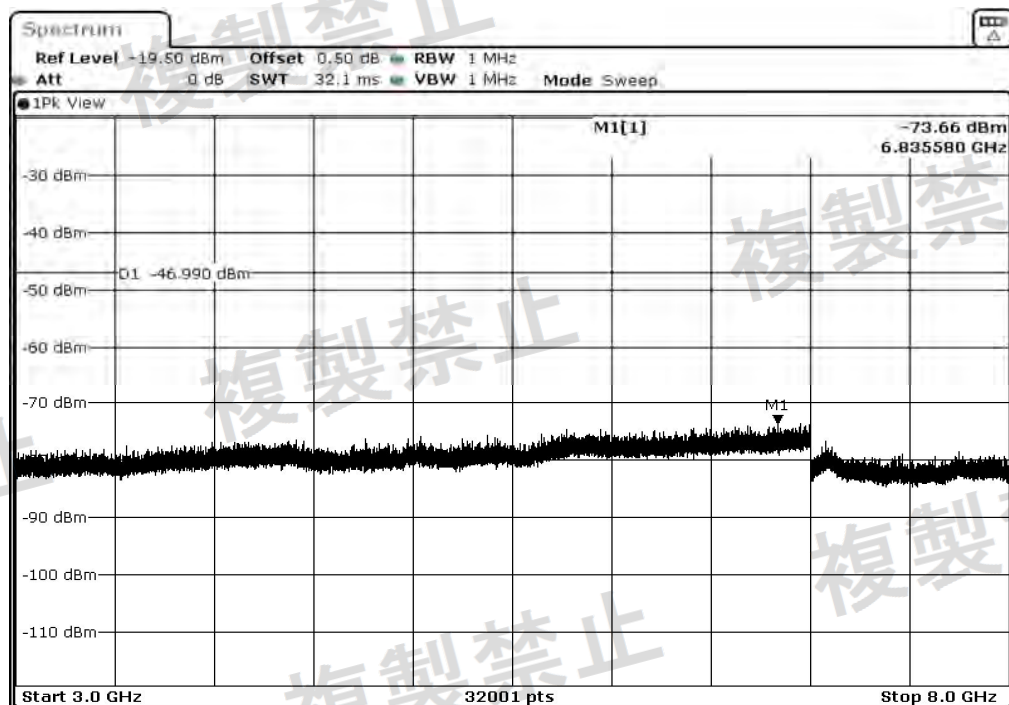
Date: 31.MAR.2021 03:44:48

1000 – 3000MHz



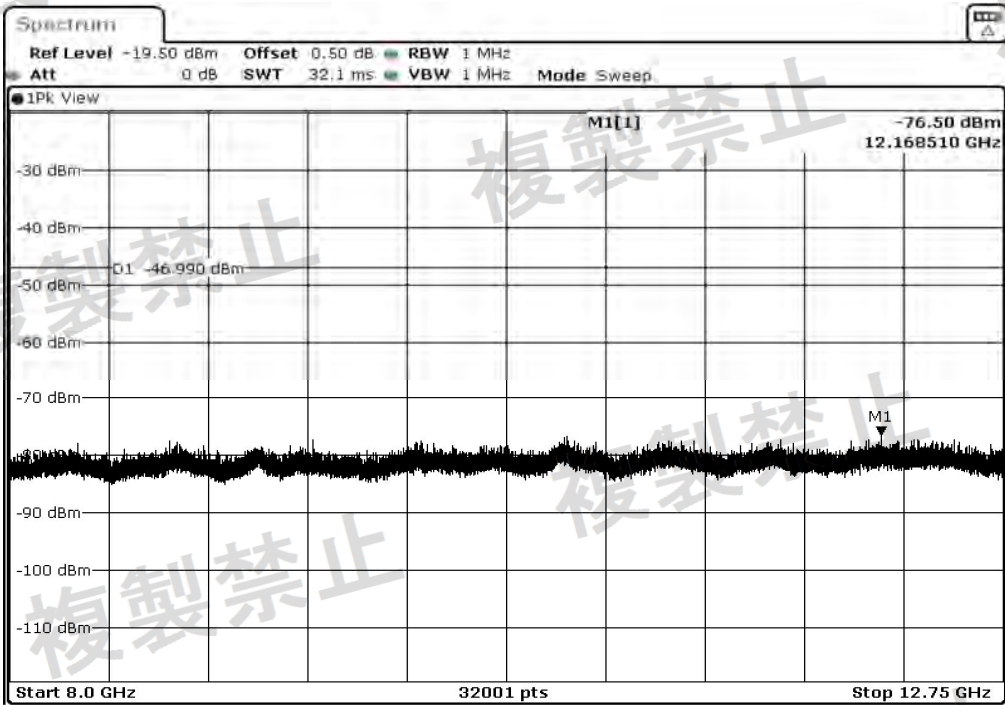
Date: 31.MAR.2021 03:45:10

3000 – 8000MHz



Date: 31.MAR.2021 03:45:32

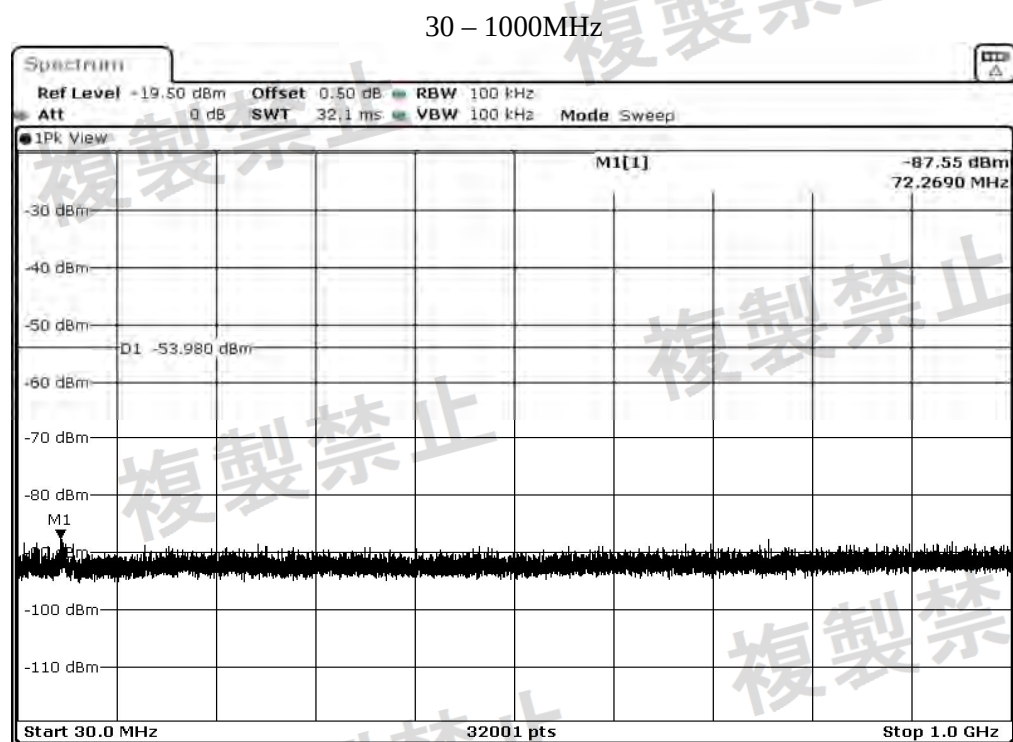
8000 – 12750MHz



Date: 31.MAR.2021 03:45:54

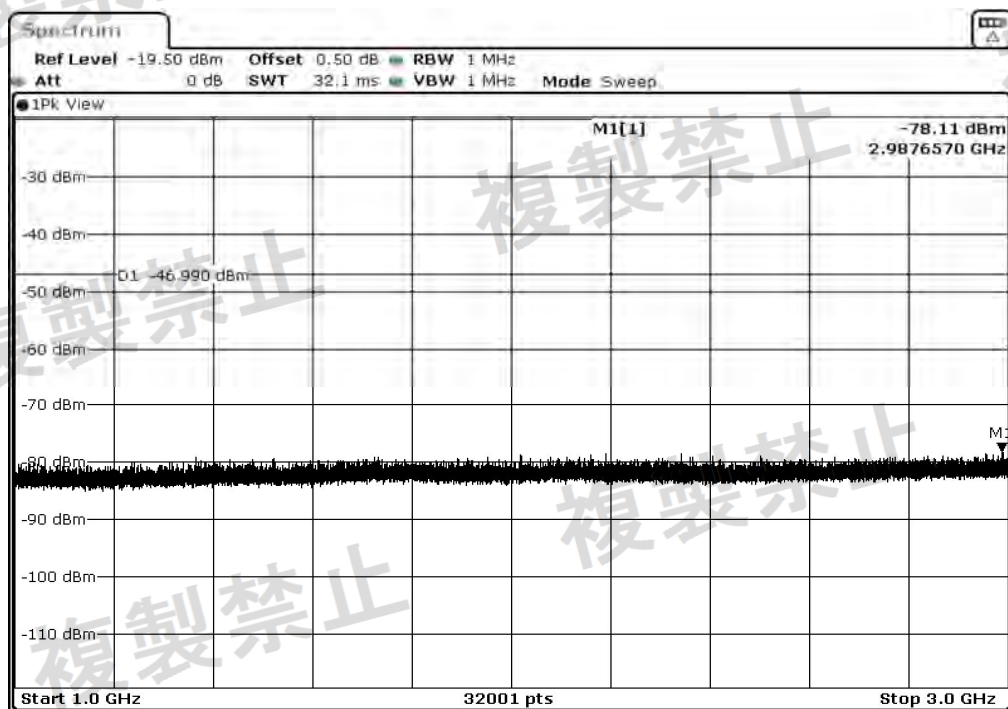
Product : Wireless speaker
 Test Item : Receiver Spurious Emissions
 Test Mode : Mode 11: Receiver-AFH-2Mbps(2411MHz)

Test Conditions		Frequency Range (MHz)	Reading Value (dBm)	Limit (dBm)
Tnom (21.3 °C)	Vnom (100VAC)	30 – 1000	-87.55	-54 (4nW)
		1000 – 3000	-78.11	-47 (20nW)
		3000 – 8000	-74.03	-47 (20nW)
		8000 – 12750	-76.54	-47 (20nW)



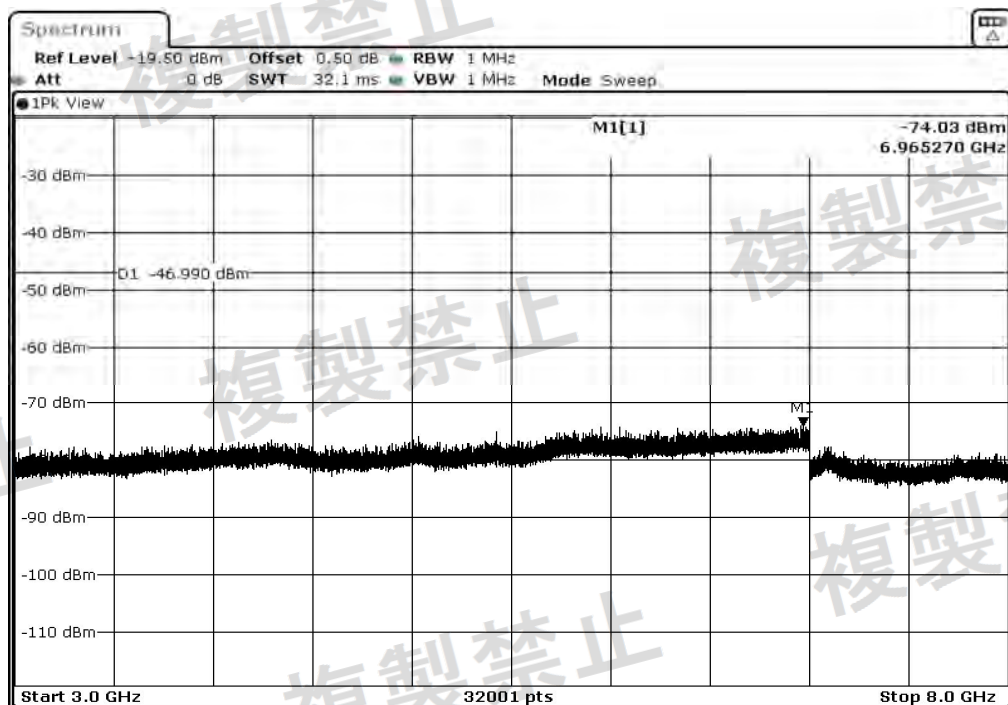
Date: 31.MAR.2021 03:53:40

1000 – 3000MHz



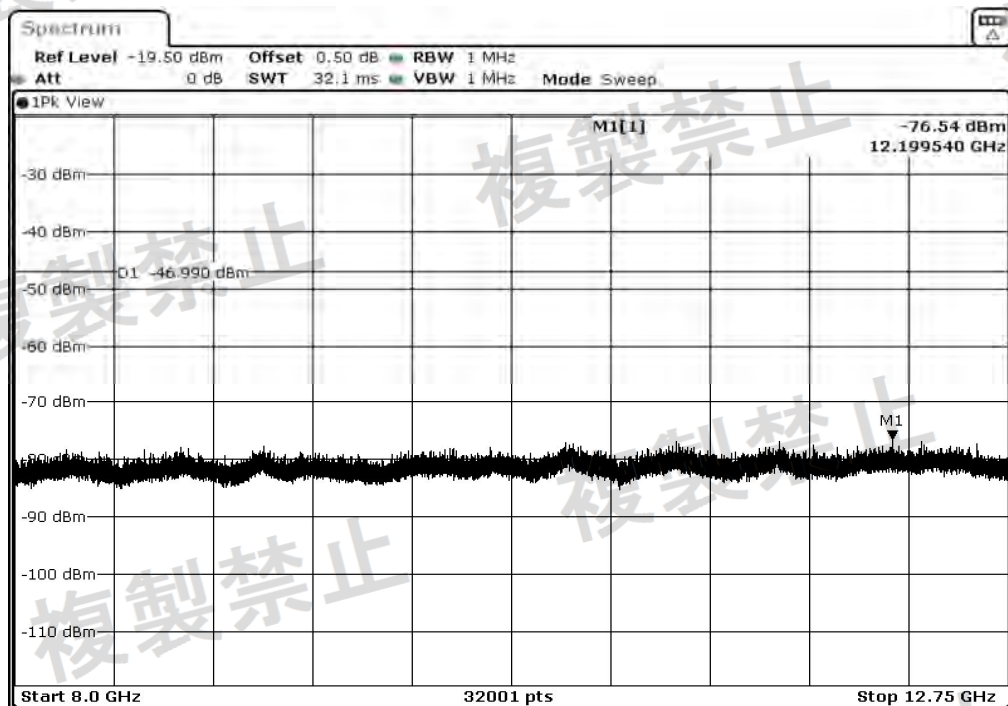
Date: 31.MAR.2021 03:54:01

3000 – 8000MHz



Date: 31.MAR.2021 03:54:24

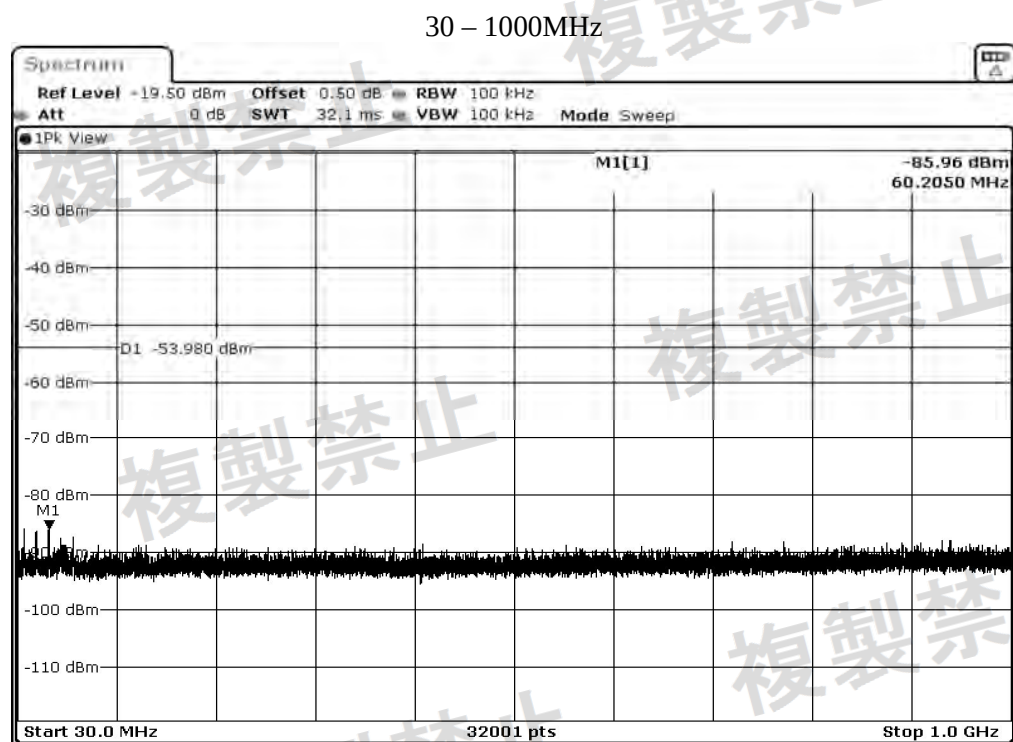
8000 – 12750MHz



Date: 31.MAR.2021 03:54:47

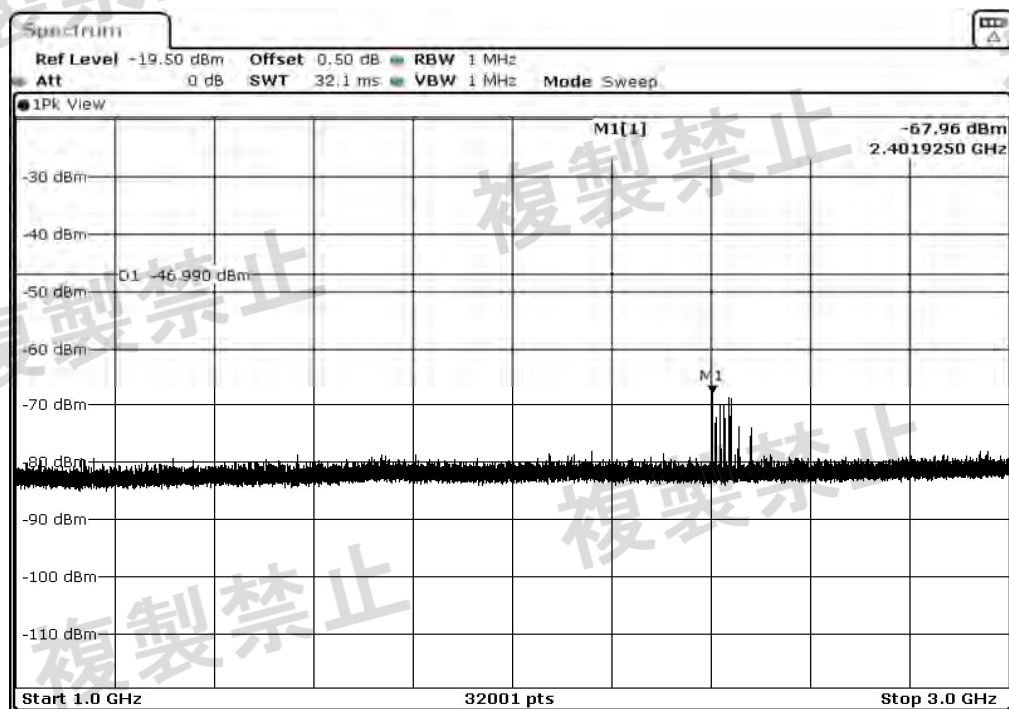
Product : Wireless speaker
 Test Item : Receiver Spurious Emissions
 Test Mode : Mode 12: Receiver-AFH-3Mbps (2411MHz)

Test Conditions		Frequency Range (MHz)	Reading Value (dBm)	Limit (dBm)
Tnom (21.3 °C)	Vnom (100VAC)	30 – 1000	-85.96	-54 (4nW)
		1000 – 3000	-67.96	-47 (20nW)
		3000 – 8000	-73.93	-47 (20nW)
		8000 – 12750	-76.51	-47 (20nW)



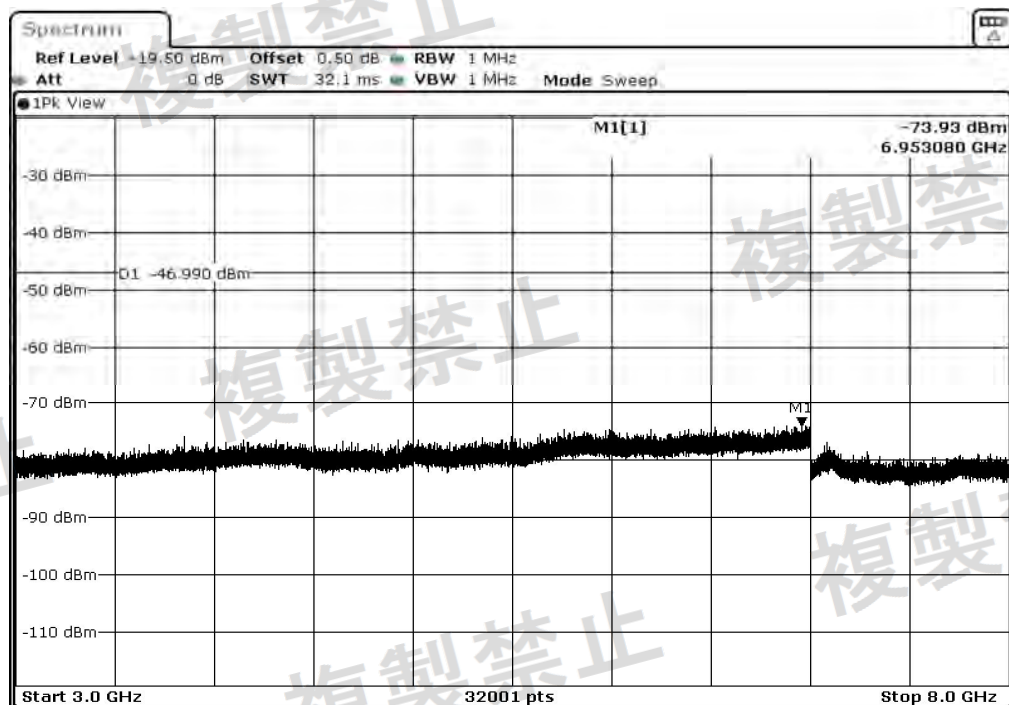
Date: 31.MAR.2021 05:16:40

1000 – 3000MHz



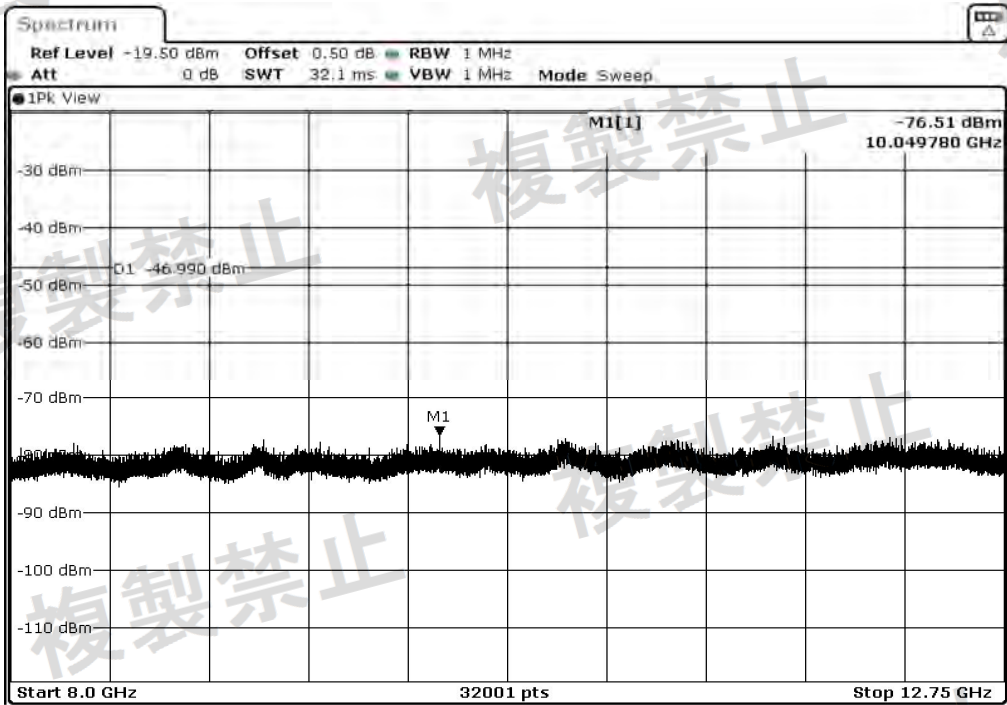
Date: 31.MAR.2021 05:17:02

3000 – 8000MHz



Date: 31.MAR.2021 05:17:24

8000 – 12750MHz



Date: 31.MAR.2021 05:17:46

Test Result	PASS
-------------	------

9. EMI Reduction Method During Compliance Testing

No modification was made during testing.