

Radio Test Report

ARIB STD T-66 Ver.3.6

Applicant: Wonders Technology Co., Ltd.

Product Name: Wireless Bluetooth Speaker

Brand Name: N/A

Model No.: DOSS SoundBox XL, DOSS PowerBox, DOSS E-go II, DOSS E-go, DOSS BE3, WB-116, BT-20, BT-30, WB-201, WB-196, WB-10

Report No: MTE/LUL/E18071387

Date of Receipt: Jul.16, 2018

Date of Test: Jul.17-24, 2018

Date of Report: Jul.25, 2018

Test Result: Pass

Prepared by: Shenzhen Most Technology Service Co., Ltd.

Shenzhen Most Technology Service Co., Ltd.
No.5, 2nd Langshan Road, North District, Hi-tech Industry Park,
Nanshan, Shenzhen, Guangdong, China
Phone: 86-755-86026850
Fax: 86-755-26013350
[http:// www.szmost.com](http://www.szmost.com)

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TEST REPORT DECLARATION

Report Number	MTE/LUL/E18071387	
Applicant	Wonders Technology Co., Ltd.	
	4/F, Tower A, 3rd Building, Tian'an Cloud Park, Bantian Avenue, Longgang District, Shenzhen 518129, China	
Manufacturer	Wonders Technology Co., Ltd.	
	4/F, Tower A, 3rd Building, Tian'an Cloud Park, Bantian Avenue, Longgang District, Shenzhen 518129, China	
Product	Product Name	Wireless Bluetooth Speaker
	Model No.	DOSS SoundBox XL
	Power Supply	DC 5V by USB Port DC 7.4V by Battery
Test Result	The EUT was found compliant with the requirement(s) of the standards.	
Standard	ARIB STD T-66 Ver.3.6	
*Note The above device has been tested by Shenzhen Most Technology Service Co., Ltd. To determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The test record, data evaluation & Equipment Under Test (EUT) configurations represented are contained in this test report and Shenzhen Most Technology Service Co., Ltd. Is assumed full responsibility for the accuracy and completeness of test. Also, this report shows that the EUT is technically compliant with the requirement of the above standards. This report applies to above tested sample only. This report shall not be reproduced except in full, without written approval of Shenzhen Most Technology Service Co., Ltd., this document may be altered or revised by Shenzhen Most Technology Service Co., Ltd., personal only, and shall be noted in the revision of the document.		
Prepared by	Lili Lu	
	Lili Lu(Engineer)	
Reviewed by	Sunny	
	Sunny Deng(Engineer)	
Approved by	Yvette Zhou	
	Yvette Zhou (Manager)	

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

ARIB STD T-66 Ver.3.6

Standard Section	Test Item	Judgment	Remark
General provisions			
5	Frequency Error	PASS	
6	Occupied Bandwidth	PASS	
7	Spurious Emissions Intensity	PASS	
Transmitting equipment			
14	Antenna Power	PASS	
14.2	SAR		
Transmitting antenna			
20	Type, Configuration, etc., of Transmitting Antenna	PASS	
22	Direction Pattern of Transmitting Antenna (Provided at Individual Antenna Report)	PASS	
Receiving antenna			
24	Limitation of Collateral Emission of Receiver	PASS	
26	Refer to All Articles for Transmitting Antenna	PASS	
Operating frequency 2400-2483MHz			
49.20(1);a	RF Shielding Method	PASS	
49.20(1);a	Communication Method	PASS	
49.20(1);b	Spread-spectrum Method	PASS	
49.20(1);c	Antenna Power	PASS	
49.20(1);d	Absolute Antenna Gain(Provided at Individual Antenna Report)	PASS	
49.20(1);e	Spread-spectrum Bandwidth	PASS	
49.20(1);f	Spreading Factor	N/A	
49.20(1);g	Hopping Frequency Dwell Time(FH employed)	PASS	

NOTE: (1) "N/A" denotes test is not applicable in this Test Report

1.1 TEST FACILITY

Shenzhen Most Technology Service Co., Ltd.

Add: No.5, Lang shan 2nd Rd., North Hi-Tech Industrial park, Nan shan, Shenzhen,
Guangdong, China

FCC Registration No.: 490827

1.2 MENSUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No	Item	Uncertainty
1	Conducted Emission Test	$\pm 3.2\text{dB}$
2	Radiated Emission Test	$\pm 4.7\text{dB}$
3	RF power, conducted	$\pm 0.16\text{dB}$
4	Spurious emissions, conducted	$\pm 0.21\text{dB}$
5	All emissions, radiated(<1G)	$\pm 4.68\text{dB}$
6	All emissions, radiated(>1G)	$\pm 5.0\text{dB}$

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Wireless Bluetooth Speaker	
Model Name	DOSS SoundBox XL	
Serial Model	DOSS PowerBox, DOSS E-go II, DOSS E-go, DOSS BE3, WB-116, BT-20, BT-30, WB-201, WB-196, WB-10	
Model Difference	Only difference in model names	
Product Description	Product Name	Wireless Bluetooth Speaker
	Operation frequency:	2402~2480 MHz
	Modulation Type:	GFSK, $\pi/4$ -DPSK, 8DPSK
	Number Of Channel:	79 CH
	Antenna Designation:	Internal PCB Antenna
	Antenna Gain(Peak):	0 dBi
	Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.	
Adapter	N/A	
Power Supply	DC 5V by USB Port DC 7.4V by Battery	
Battery	Rated Voltage: 7.4V	

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.2

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

2.3 Table for Filed Antenna

Ant	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	N/A	N/A	Internal PCB Antenna	N/A	0	BT Antenna

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	GFSK(CH00 CH39 CH78)
Mode 2	$\pi/4$ -DPSK (CH00 CH39 CH78)
Mode 3	8DPSK (CH00 CH39 CH78)

For Radiated Emission	
Final Test Mode	Description
Mode 1	GFSK(CH00 CH39 CH78)
Mode 2	$\pi/4$ -DPSK (CH00 CH39 CH78)
Mode 3	8DPSK (CH00 CH39 CH78)

2.3 TEST CONDITIONS

DC input (VAC)	DC output in RF circuit (VDC)	DC output in modulation circuit (VDC)
5	3.35	3.35
5+10%	3.35	3.35
5-10%	3.35	3.35

Apply the input DC voltage to the EUT and vary the DC input voltage with +10% and -10%, then check how much the "output voltage" varies at two measuring points within the radio section:

- 1) Measure the output voltage in the RF circuit
- 2) Measure the output voltage at the modulation circuit
 - a) If the voltage variation at both parts appears to be more than 1%, then it is mandatory to perform further testing at 3 voltage levels (V-10%, V nominal, V+10%).
 - b) If the voltage variation at both parts appears to be less than 1%, then you only have to conduct further testing at V nominal.

During the input supply voltage to the EUT from the external power source, EUT only operated in normal voltage to test all regulations.

2.4 TABLE OF PARAMETERS OF TEST SOFTWARE SETTING

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. 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 power parameters of FHSS

Test software Version	Test program: CSR		
Frequency	2402 MHz	2441 MHz	2480 MHz
Parameters(1Mbps/2Mbps/3Mb)	DEF	DEF	DEF

2.5 BLOCK DIGRAM SHOWING THE CONFUGURATION OF SYSTEM TESTED

Mode 1:



2.6 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Spectrum Analyzer	Agilent	E4408B	16040005	2018.07.06	Jul. 05. 2019	1 year
2	Test Receiver	R&S	ESPI	101318	2018.07.06	Jul. 05. 2019	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2018.07.06	Jul. 05. 2019	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	620064416	2018.07.06	Jul. 05. 2019	1 year
5	Spectrum Analyzer	ADVANTEST	R3132	15090201	2018.07.06	Jul. 05. 2019	1 year
6	Horn Antenna	EM	EM-AH-1080	2011071402	2018.07.06	Jul. 05. 2019	1 year
7	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2018.07.06	Jul. 05. 2019	1 year
8	Amplifier	EM	EM-30180	060538	2018.07.06	Jul. 05. 2019	1 year
9	Loop Antenna	ARA	PLA-1030/B	1029	2018.07.06	Jul. 05. 2019	1 year
10	Power Meter	R&S	NRVS	100696	2018.07.06	Jul. 05. 2019	1 year
11	Test Receiver	R&S	ESCI	101160	2018.07.06	Jul. 05. 2019	1 year
12	LISN	R&S	ENV216	101313	2018.07.06	Jul. 05. 2019	1 year
13	LISN	EMCO	3816/2	00042990	2018.07.06	Jul. 05. 2019	1 year
14	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2018.07.06	Jul. 05. 2019	1 year

3. RF SHIELDING METHOD

We apply the product for Japan RF certification. The RF module is installed on the PCB board. Outside with plastic shell, plastic shell with 6 angle screws has to be covered by a pad so that they are not easily accessible.



4. TEST RESULT FOR BLUETOOTH

4.1 FREQUENCY ERROR

4.2 LIMIT

Item	Limit
Frequency error	50ppm

4.3 MEASURING INSTRUMENTS AND SETTING

The following table is the setting of Spectrum Analyzer.

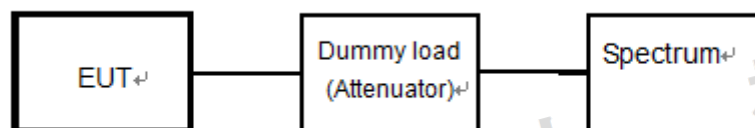
Spectrum Parameter	Setting
Attenuation	Auto
RB / VB	10KHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.4 TEST PROCEDURES

- (1) In the case of unmodulated signal (continuous or continuous burst), measure the frequency directly by a frequency meter.
- (2) In the case of burst waves, the measurement shall be done for enough time in order to obtain the enough measuring accuracy, and the average of the measured values becomes the final value.
- (3) In the case of a test mode with a specific frequency spectrum, measure the frequency of the specific spectrum by a spectrum analyzer.
- (4) In the cases above, if the frequency equivalent to the test frequency is not directly measured in principle, it shall be obtained by necessary calculation.

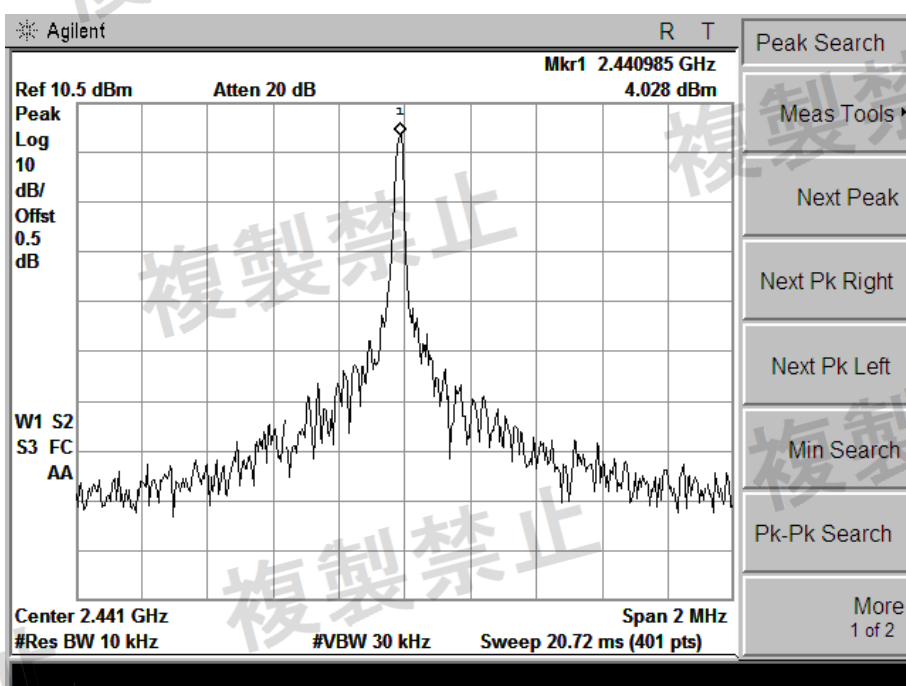
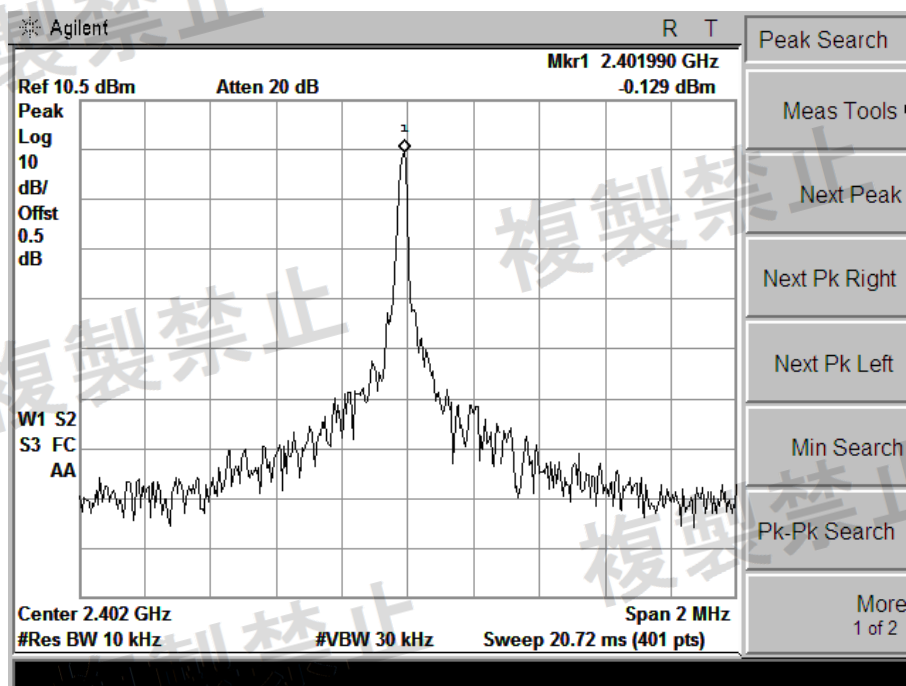
In the case of modulated signal, if there is no specific spectrum measurable by a spectrum analyzer but a specific dip is observed, it is allowed to measure the frequency with the signal generator (synthesized). That is, observe a signal of the signal generator concurrently (or alternately) with the tested signal using the spectrum analyzer while setting the frequency of the signal generator to the position of the dip on the screen of the spectrum analyzer, and determine the frequency of the signal generator at the time as a measured value.

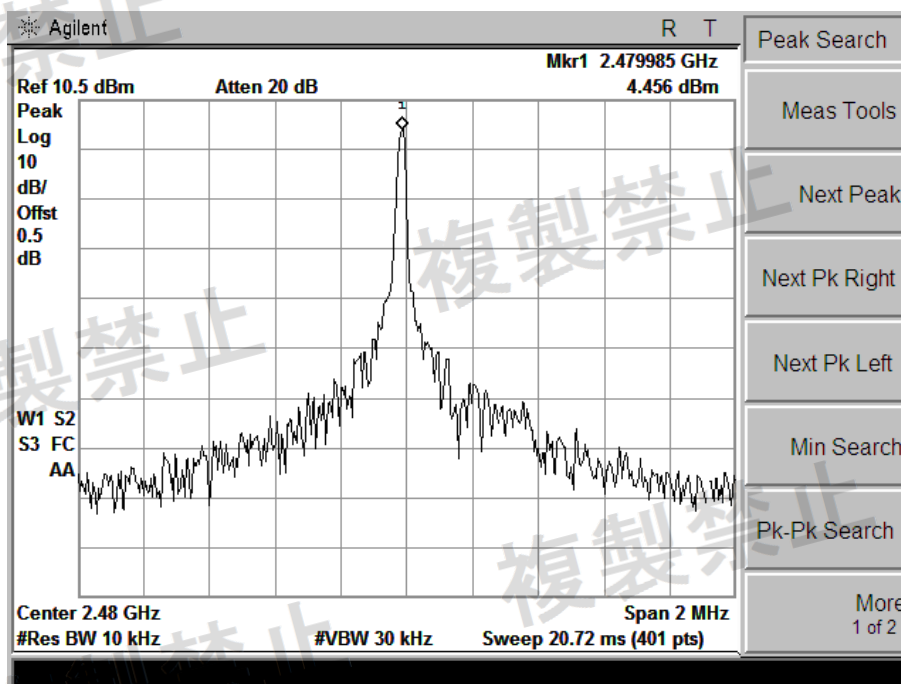
4.5 TEST SETUP LAYOUT



4.5.1 TEST RESULT

Frequency	Reading	Tolerance	Limit	Remark
MHz	MHz	ppm	ppm	
2402	2401.990	-4.163	±50	Normal Voltage: DC 5V by USB Port
2441	2440.985	-6.145	±50	
2480	2479.985	-6.048	±50	





5. ANTENNA POWER

5.1 LIMIT

Item	Limits
Antenna Power Density	$\leq 3\text{mW/MHz}$ (FH form 2427 - 2470.75 MHz) $\leq 10\text{mW/MHz}$ (OFDM,DS from 2400~2483.5MHz) $\leq 10\text{mW}$ (Other from 2400~2483.5MHz)
Antenna Power Error	+20%, -80% (Base on manufacturer declare antenna power density)

5.2 MEASURING INSTRUMENTS AND SETTING

Please refer to section 5 in this report. The following table is the setting of Spectrum Analyzer.

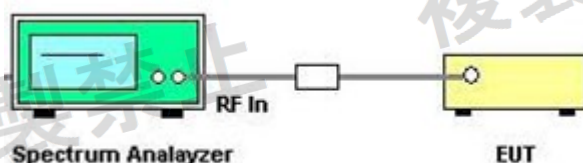
Spectrum Parameter	Setting
Attenuation	Auto
RB / VB	1 MHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

5.3 TEST PROCEDURES

1. A power meter is connected on the IF output port of the spectrum analyzer.
2. Adjust the spectrum analyzer to have the center frequency the same with the measured carrier. RBW=VBW=1MHz, detector mode is positive peak. Turn off the averaging function and use zero span.
3. The calibrating signal power shall be reduced to 0 dBm and it shall be verified that the power meter reading also reduces by 10 dB.
4. Connect the equipment to be measured. Using the following settings of the spectrum analyzer in combination with "max hold" function, find the frequency of highest power output in the power envelope: center frequency equal to operating frequency; RBW & VBW: 1 MHz; detector mode: positive peak; averaging: off; span: 3 times the spectrum width; amplitude: adjust for middle of the instrument' range. The frequency found shall be recorded.
5. Set the center frequency of the spectrum analyzer to the found frequency and switch to zero span. The power meter indicates the measured power density "E".
6. Calculate antenna power density by the formula below

$$PT(\text{mW/MHz}) = \text{Total Output Power (mW)} / \text{Burst Ratio} / \text{Spread Bandwidth (MHz)} \text{ Burst Ratio} = \text{ON Time} / \text{OFF Time}$$
7. Antenna Power Error is definition that actual measure antenna power tolerance between + 20% to - 80% power range that base on manufacturer declare the conducted power density.

5.4 TEST SETUP LAYOUT



5.5 TEST DEVIATION

There is no deviation with the original standard.

5.6 TEST RESULT

EUT:	Bluetooth Microphone with speaker	Test Date:	Jul.24, 2018
Temperature:	25°C	Tested by:	Joe
Humidity:	55 % RH	Test Voltage	DC 5V by USB Port
Operation Mode:	GFSK/ π /4-DPSK/8DPSK TX CH 00/CH 39/CH 78		

GFSK

TEST CONDITION	Conducted RF output power density(mW/MHz)	Rated power density (mW/MHz)	Antenna Power Error (%)
CH00	0.315	0.341	-7.6%
CH39	0.356	0.341	4.4%
CH78	0.367	0.341	7.6%
Limit : +20%, -80% (Base on manufacturer declare antenna power density)			

π /4-DPSK

TEST CONDITION	Conducted RF output power density (mW/MHz)	Rated power density (mW/MHz)	Antenna Power Error (%)
CH00	0.326	0.341	-4.4%
CH39	0.338	0.341	-0.9%
CH78	0.387	0.341	-13%
Limit : +20%, -80% (Base on manufacturer declare antenna power density)			

8DPSK

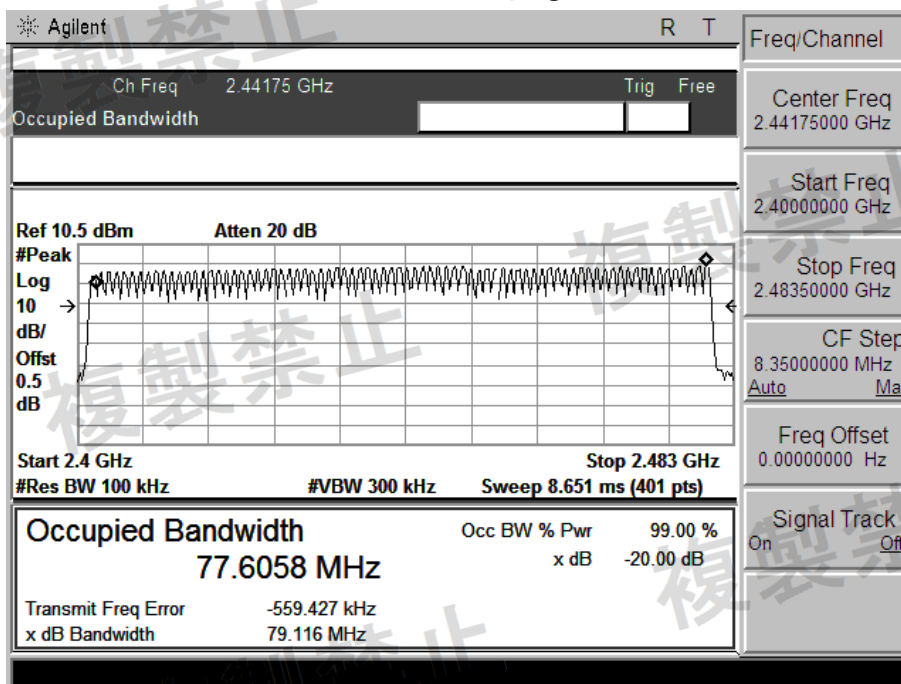
TEST CONDITION	Conducted RF output power density (mW/MHz)	Rated power density (mW/MHz)	Antenna Power Error (%)
CH00	0.335	0.341	-1.8%
CH39	0.346	0.341	1.5%
CH78	0.368	0.341	7.9%
Limit : +20%, -80% (Base on manufacturer declare antenna power density)			

6. OCCUPIED BANDWIDTH (99%)

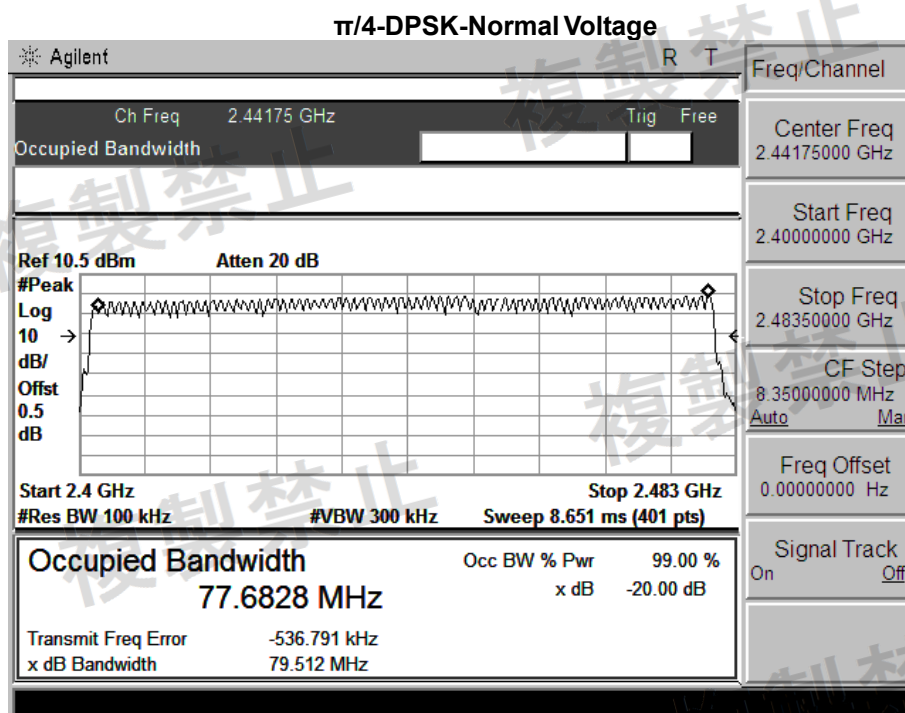
6.1 TEST RESULT

Voltage	TX Mode(Occupied bandwidth) MHz
Normal Voltage	77.6058

GFSK-Normal Voltage

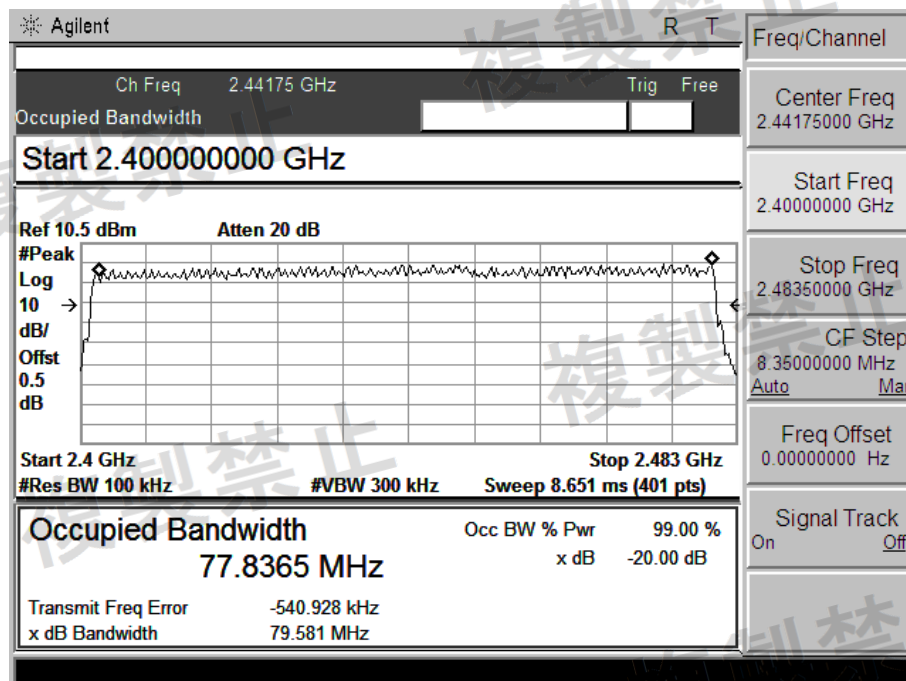


Voltage	TX Mode(Occupied bandwidth) MHz
Normal Voltage	77.6828



Voltage	TX Mode(Occupied bandwidth) MHz
Normal Voltage	77.8365

8 DPSK-Normal Voltage



7. UNWANTED EMISSION INTENSITY MEASUREMENT

7.1 LIMIT

Item	Limits
TX Spurious Emission	$\leq 2.5 \mu\text{W}$ ($30\text{MHz} \leq f \leq 1000\text{MHz}$)
	$\leq 2.5 \mu\text{W}$ ($1000\text{MHz} < f \leq 2387\text{MHz}$)
	$\leq 25 \mu\text{W}$ ($2387\text{MHz} < f \leq 2400\text{MHz}$)
	$\leq 25 \mu\text{W}$ ($2483.5\text{MHz} \leq f < 2496.5\text{MHz}$)
	$\leq 2.5 \mu\text{W}$ ($2496.5\text{MHz} \leq f < 12500\text{MHz}$)

7.2 MEASURING INSTRUMENTS AND SETTING

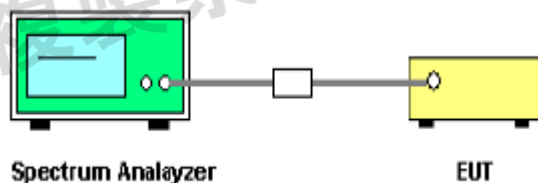
Please refer to section 5 in this report. The following table is the setting of Spectrum Analyzer

Spectrum Parameter	Setting
Attenuation	Auto
RB / VB	1 MHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

7.3 TEST PROCEDRES

- EUT have transmitted the maximum modulation signal and fixed channelize.
- Setting of SA is following as: Below 1GHz RB:100KHz / VB:100KHz
Above 1GHz RB:1MHz / VB:1MHz / AT: 10dB Ref: 0dBm / Sweep time: Auto Sweep Mode: Continuous sweep / Detect mode: Positive peak Trace mode: Max hold
- Setting of SA is following as 30MHz and stop frequency 1000MHz Then to mark peak reading value + cable loss shall be less than 0.25μW.
- Setting of SA is following as 1000MHz and stop frequency 2387MHz Then to mark reading value + cable loss shall be less than 2.5μW.
- SA adjusted to start frequency 2387MHz and stop frequency 2400MHz. Then to mark peak reading value + cable loss shall be less than 25μW.
- SA adjusted to start frequency 2483.5MHz and stop frequency 2496.5MHz Then to mark peak reading value + cable loss shall be less than 25μW
- SA adjusted to start frequency 2496.5MHz and stop frequency 12500MHz Then to mark peak reading value + cable loss shall be less than 2.5μW
- Measure side band spurious as follows: For 2.4GHz band: 2374MHz~2400MHz and 2483.5MHz~2509.5MHz RBW = VBW = 30kHz, Result_Value = Measured_Value + 15.2 [dBm]
- If the Result_Value is over the requirement, take total sum of 1MHz band centered at the spur frequency like ACLP measurement as Result_Value.

7.4 TEST SETUP LAY OUT



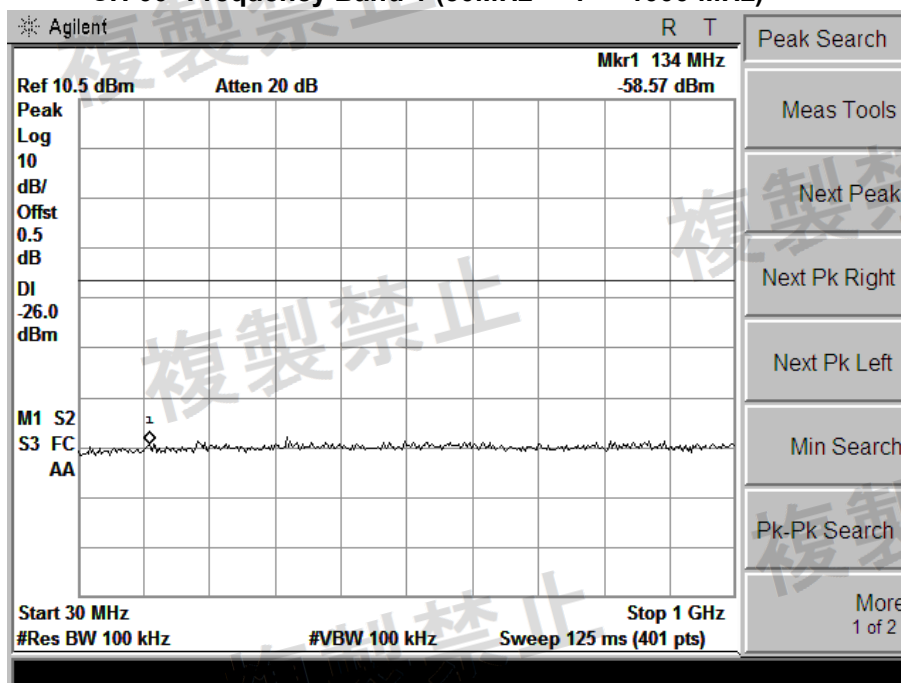
7.5 TEST DEVIATION

There is no deviation with the original standard.

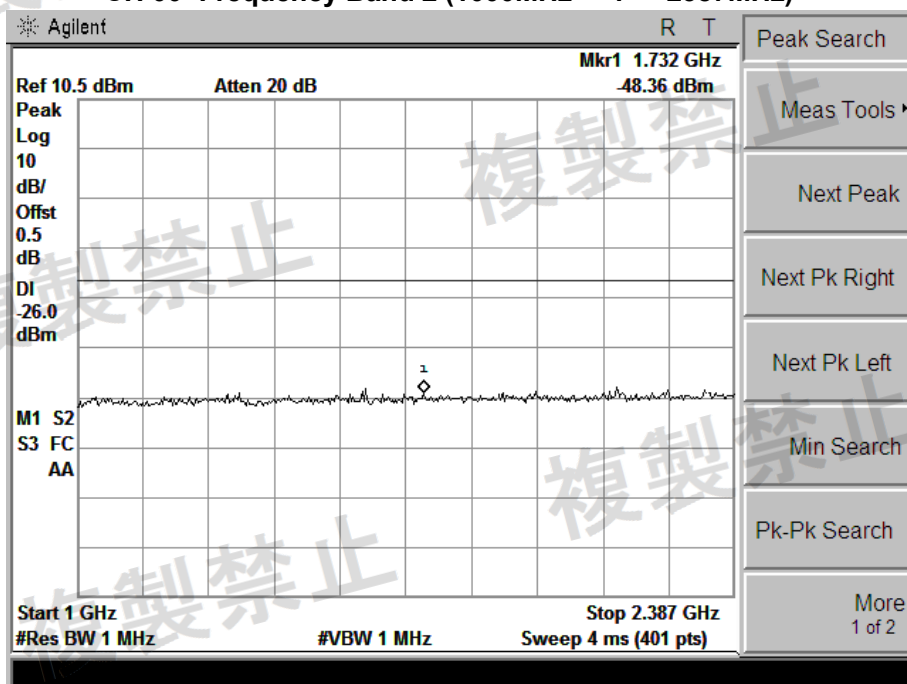
7.6 TEST RESULT

EUT:	Wireless Bluetooth Speaker	Test Date:	Jul.24, 2018
Temperature:	25°C	Tested by:	Joe
Humidity:	55 % RH	Test Voltage	DC 5V by USB Port
Operation Mode:	GFSK TX CH 00/CH 39/CH 78 ; Normal Voltage (DC 5V by USB Port)		

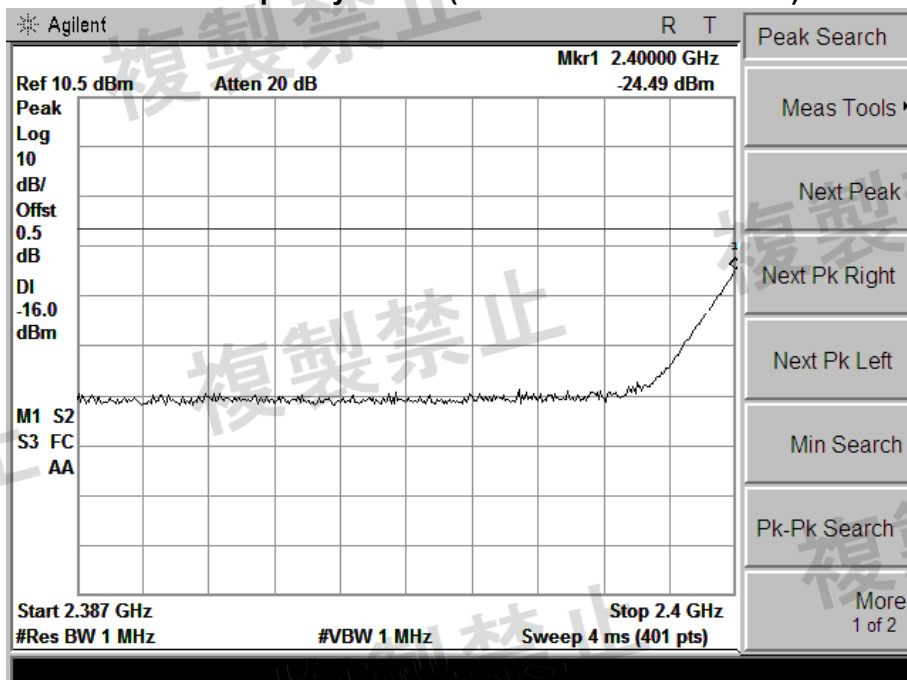
CH 00- Frequency Band 1 (30MHz $\leq$ f $\leq$ 1000 MHz)



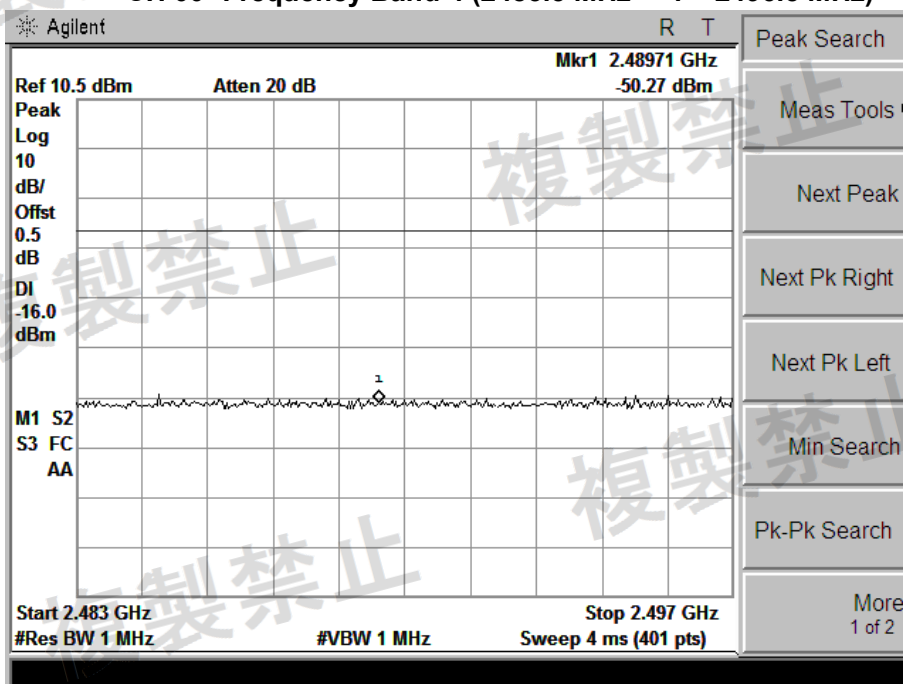
CH 00- Frequency Band 2 (1000MHz $\leq$ f $\leq$ 2387MHz)



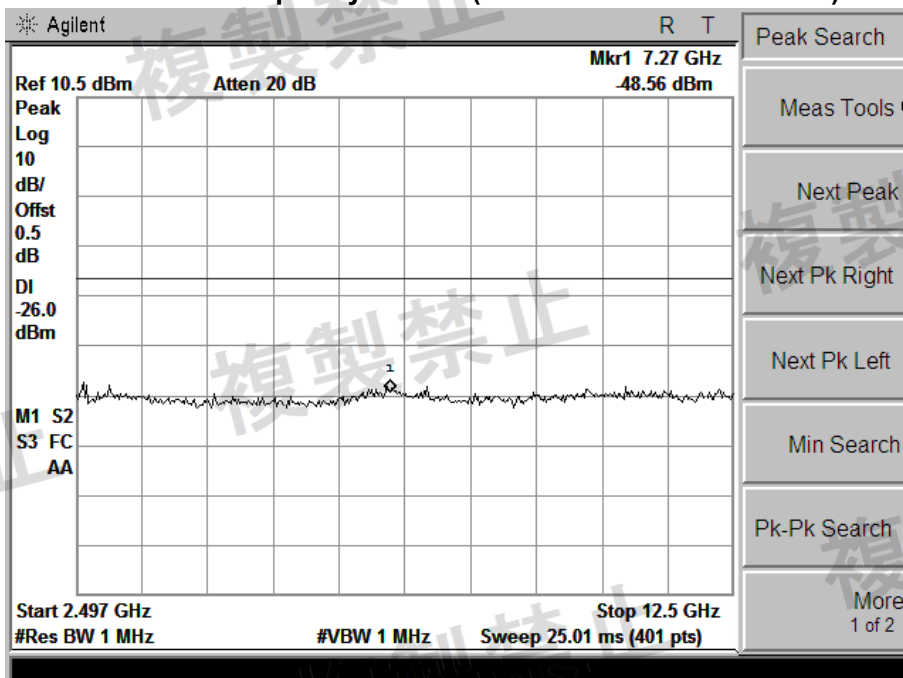
CH 00- Frequency Band 3(2387MHz $\leq$ f $\leq$ 2400 MHz)



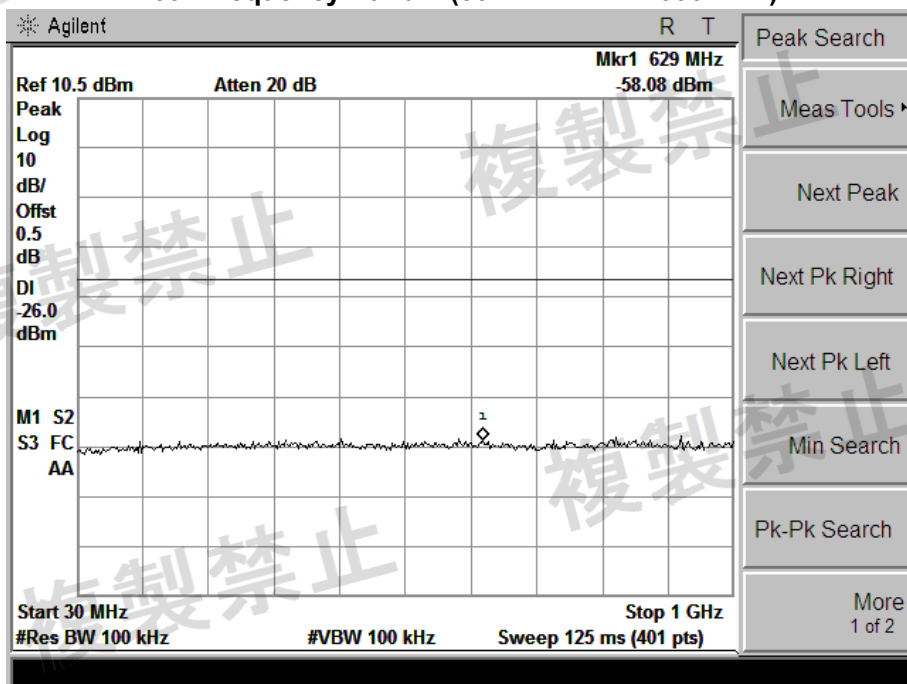
CH 00- Frequency Band 4 (2483.5 MHz $\leq$ f < 2496.5 MHz)



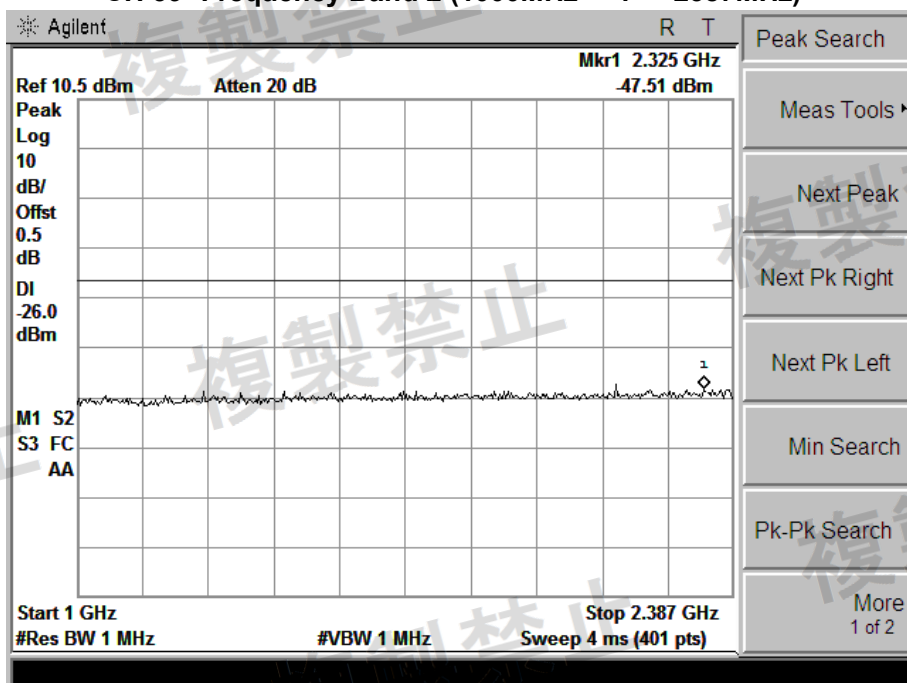
CH 00- Frequency Band 5 (2496.5 MHz $\leq$ f < 12.5 GHz)



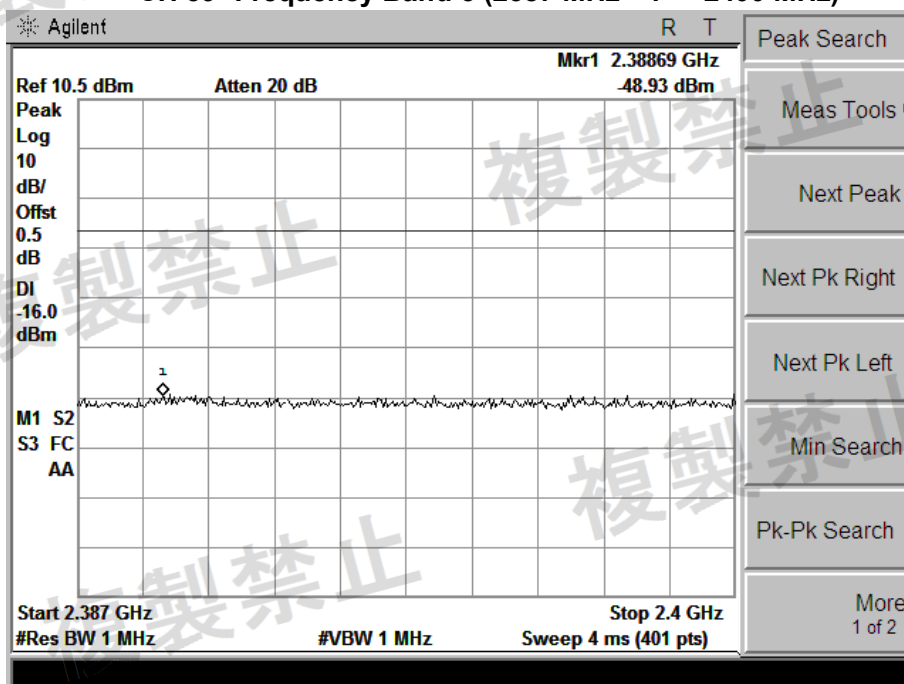
CH 39- Frequency Band 1 (30MHz $\leq$ f $\leq$ 1000 MHz)



CH 39- Frequency Band 2 (1000MHz $\leq$ f $\leq$ 2387MHz)



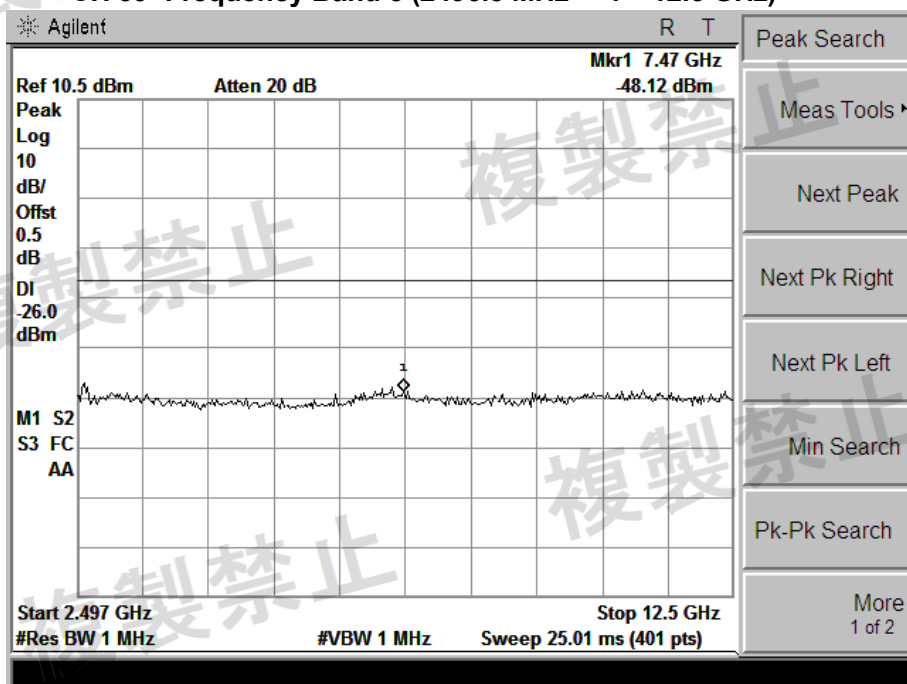
CH 39- Frequency Band 3 (2387 MHz < f ≤ 2400 MHz)



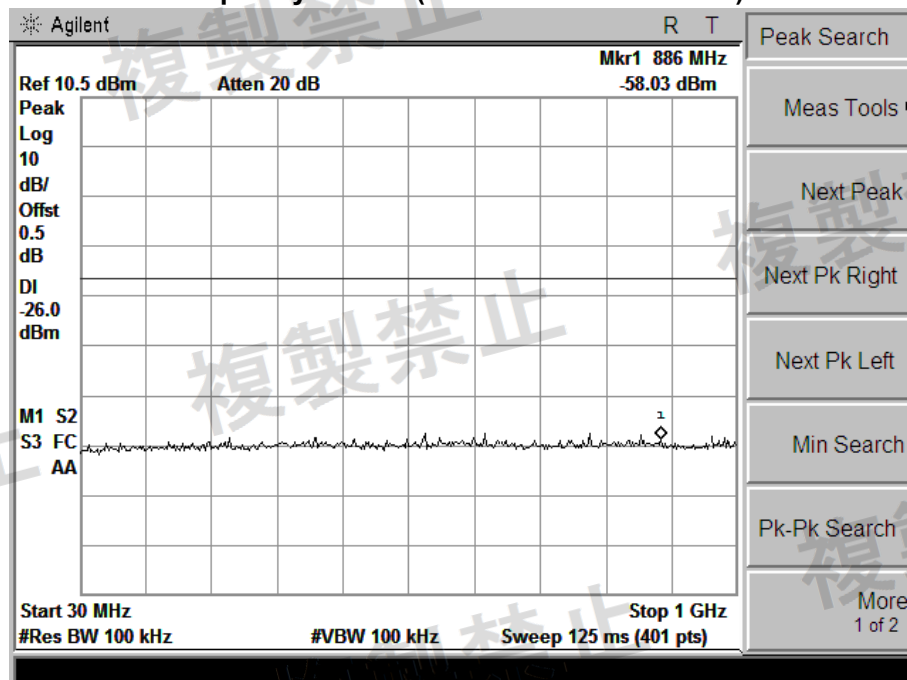
CH 39- Frequency Band 4 (2483.5 MHz < f ≤ 2495.5 MHz)



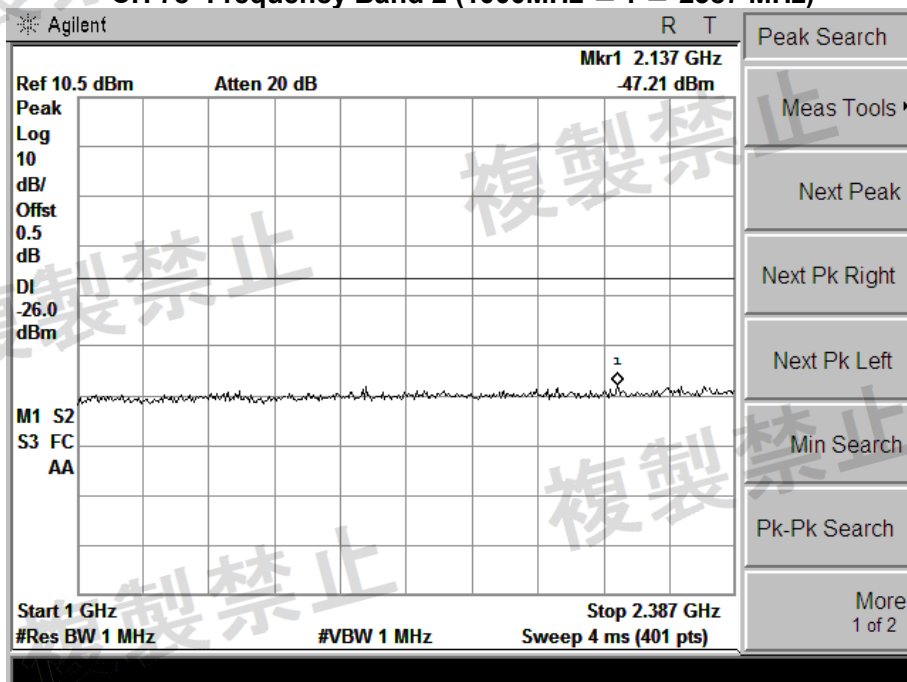
CH 39- Frequency Band 5 ($2496.5 \text{ MHz} \leq f < 12.5 \text{ GHz}$)



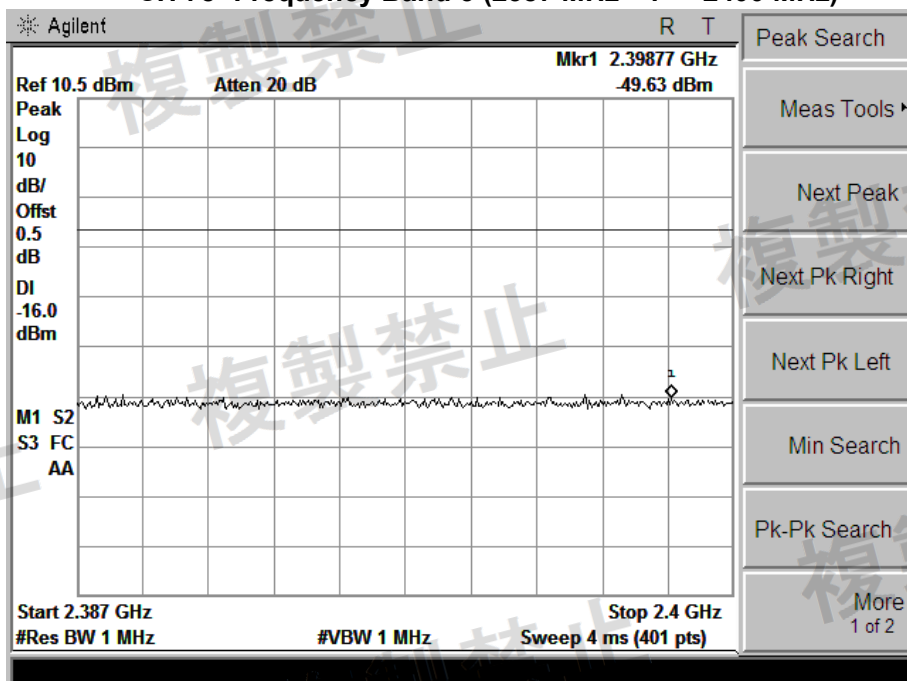
CH 78- Frequency Band 1 ($30 \text{ MHz} \leq f \leq 1000 \text{ MHz}$)



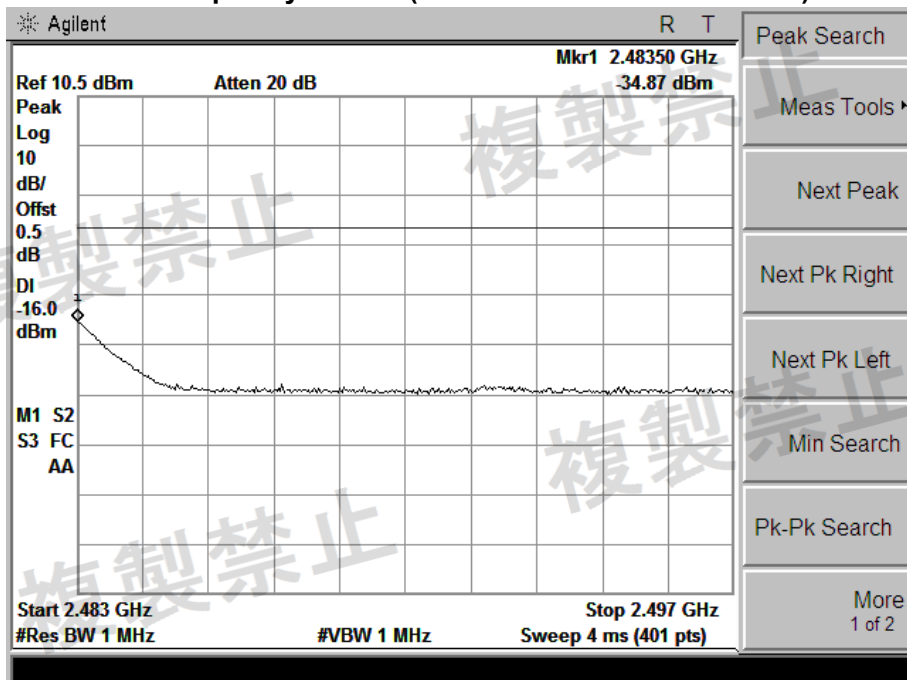
CH 78- Frequency Band 2 ($1000\text{MHz} \leq f \leq 2387\text{MHz}$)



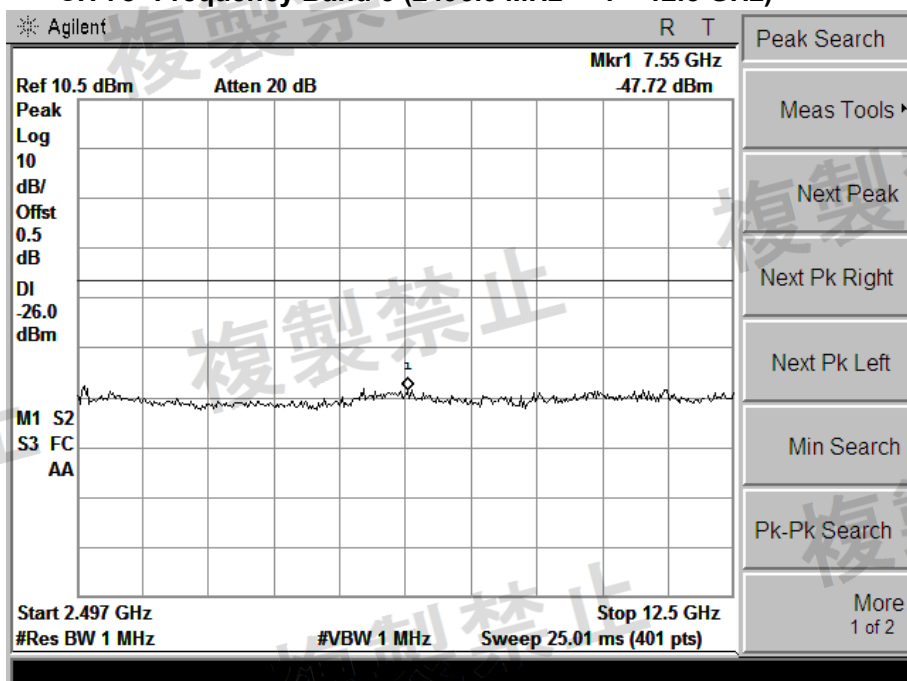
CH 78- Frequency Band 3 ($2387\text{MHz} < f \leq 2400\text{MHz}$)



CH78- Frequency Band 4 (2483.5 MHz $\leq$ f < 2496.5 MHz)

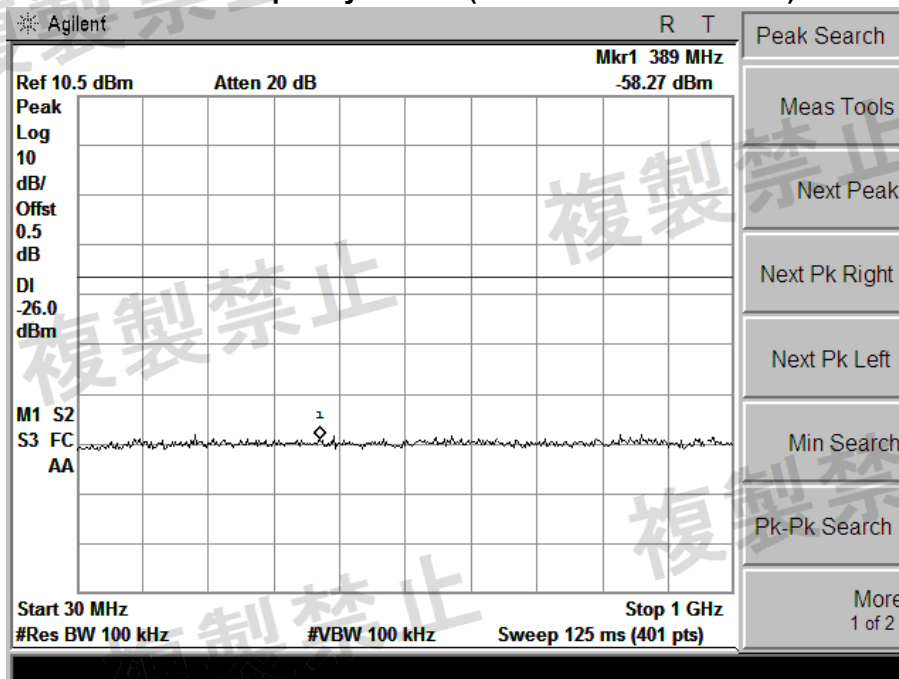


CH 78- Frequency Band 5 (2496.5 MHz $\leq$ f < 12.5 GHz)

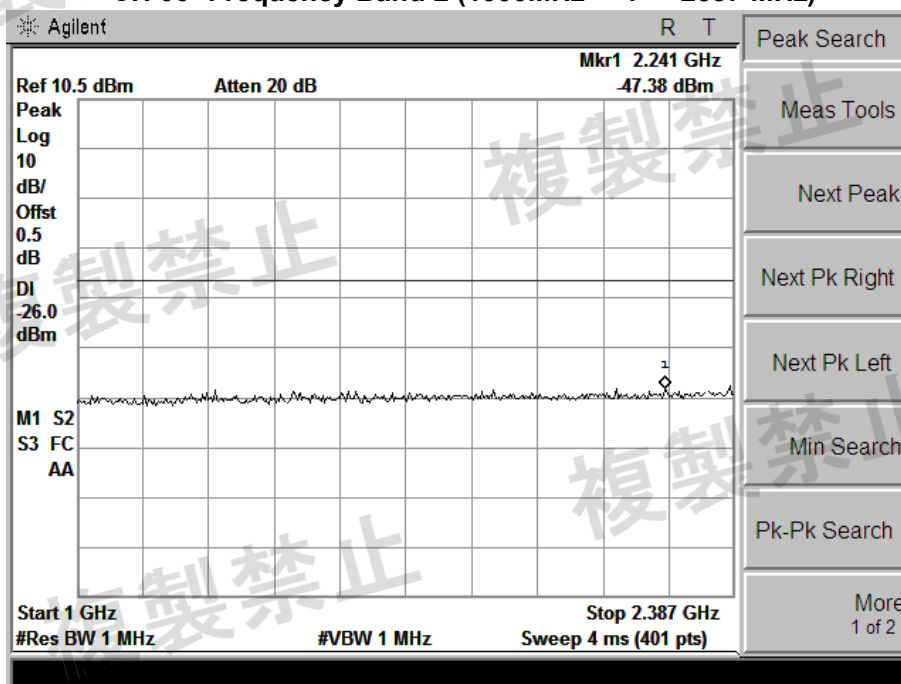


EUT:	Wireless Bluetooth Speaker	Test Date:	Jul.24, 2018
Temperature:	25°C	Tested by:	Joe
Humidity:	55 % RH	Test Voltage	DC 5V by USB Port
Operation Mode:	π /4-DPSK TX CH 00/CH 39/CH 78 ; Normal Voltage (DC 5V by USB Port)		

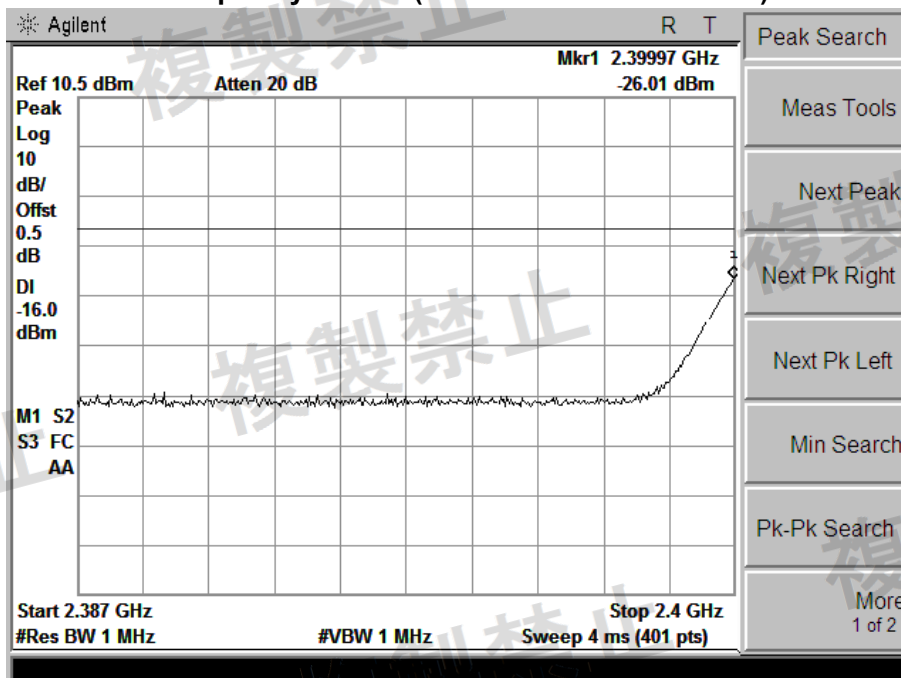
CH 00- Frequency Band 1 (30MHz $\leq$ f $\leq$ 1000 MHz)



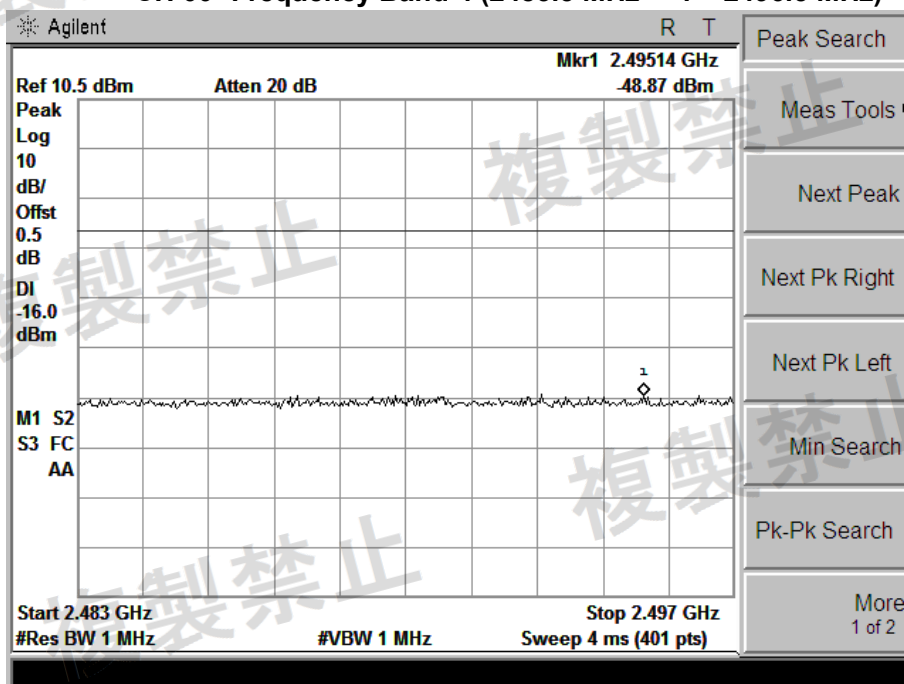
CH 00- Frequency Band 2 (1000MHz $\leq$ f $\leq$ 2387 MHz)



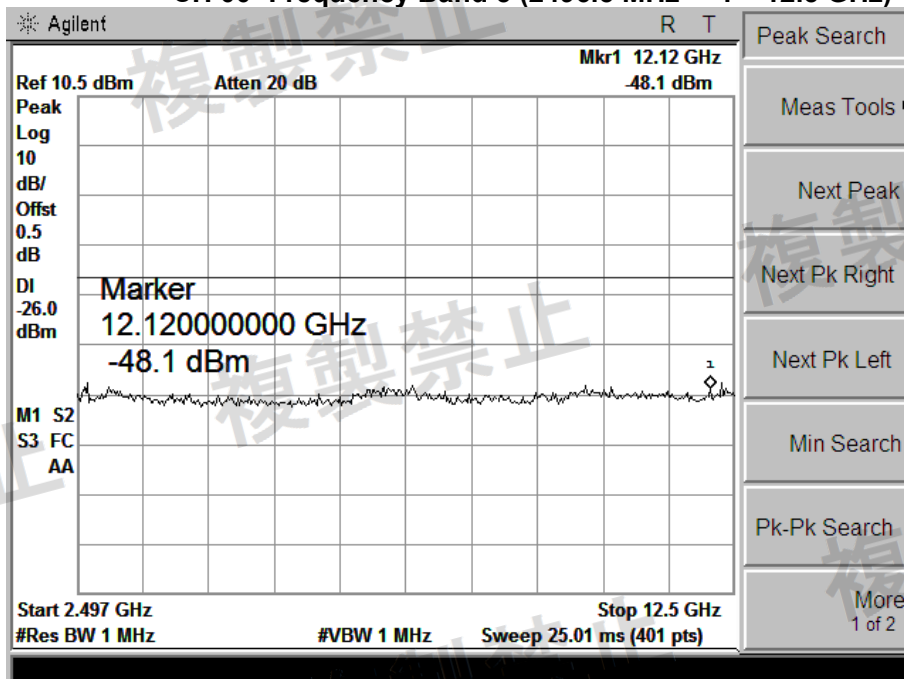
CH 00- Frequency Band 3 (2387 MHz < f $\leq$ 2400 MHz)



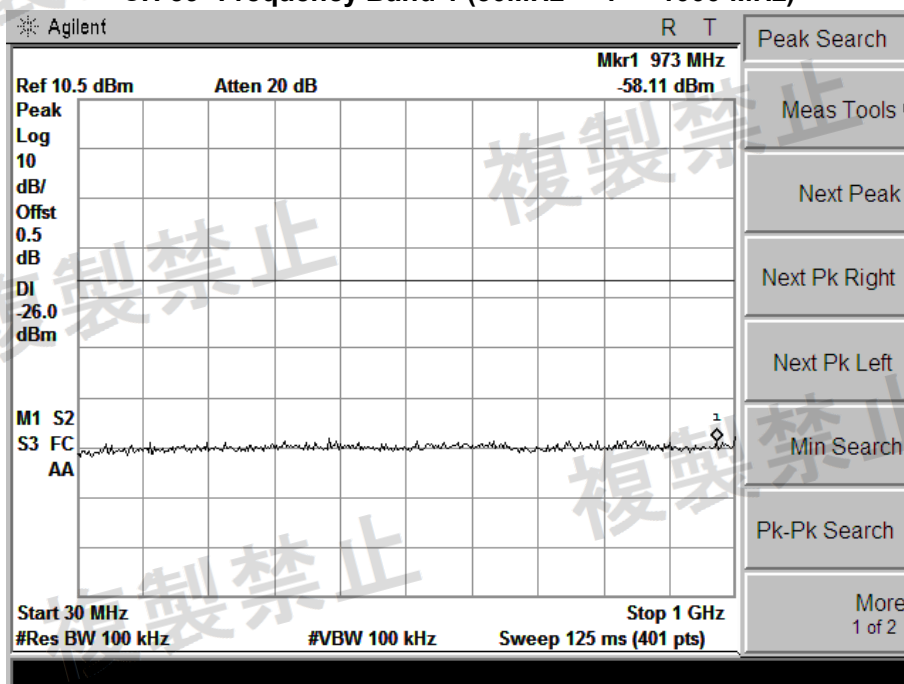
CH 00- Frequency Band 4 (2483.5 MHz $\leq$ f < 2496.5 MHz)



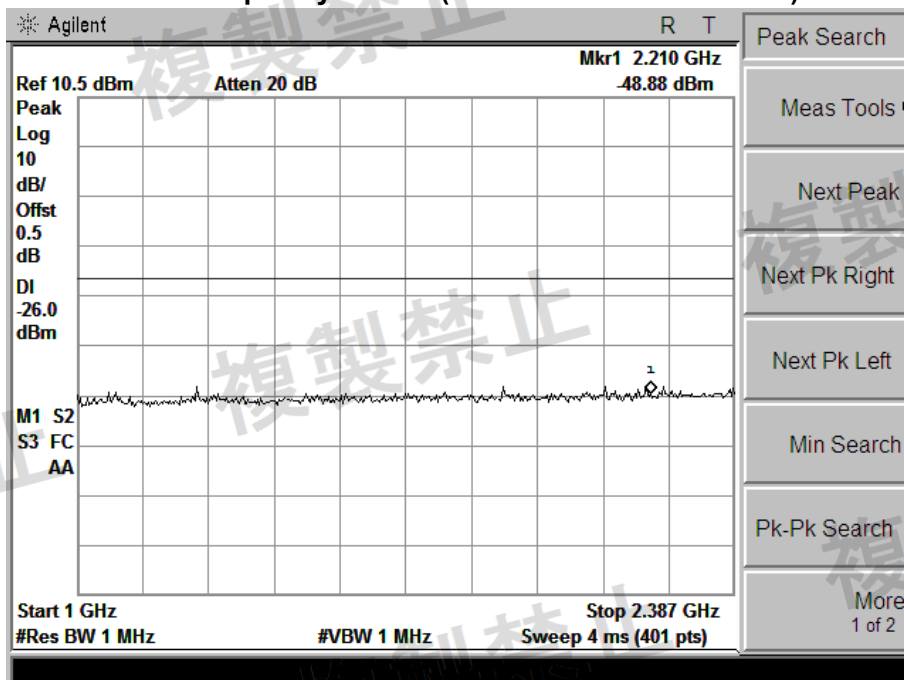
CH 00- Frequency Band 5 (2496.5 MHz $\leq$ f < 12.5 GHz)



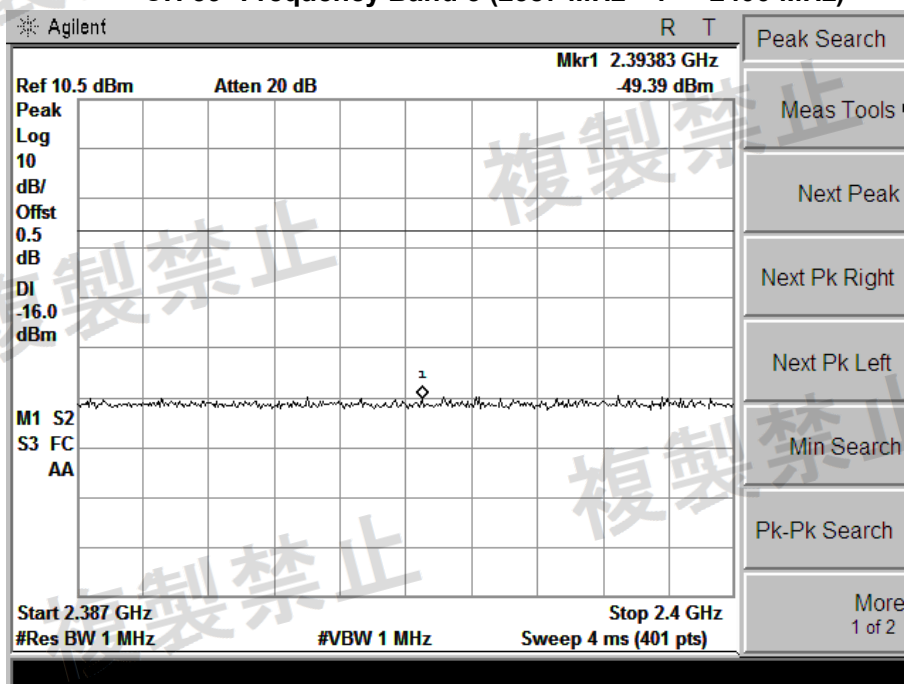
CH 39- Frequency Band 1 (30MHz $\leq$ f $\leq$ 1000 MHz)



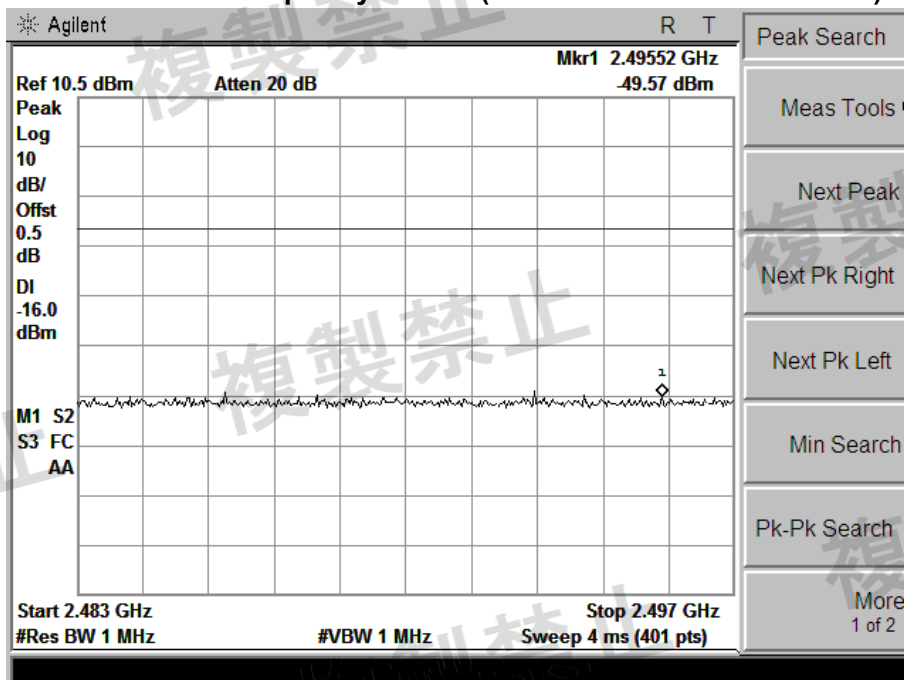
CH 39- Frequency Band 2 (1000MHz $\leq$ f $\leq$ 2387 MHz)



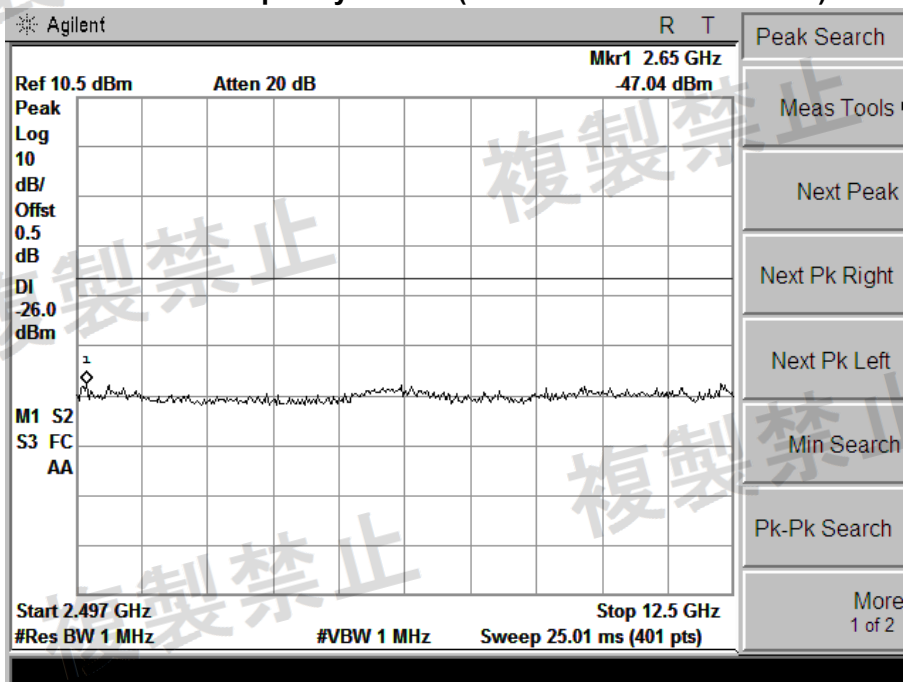
CH 39- Frequency Band 3 (2387 MHz < f ≤ 2400 MHz)



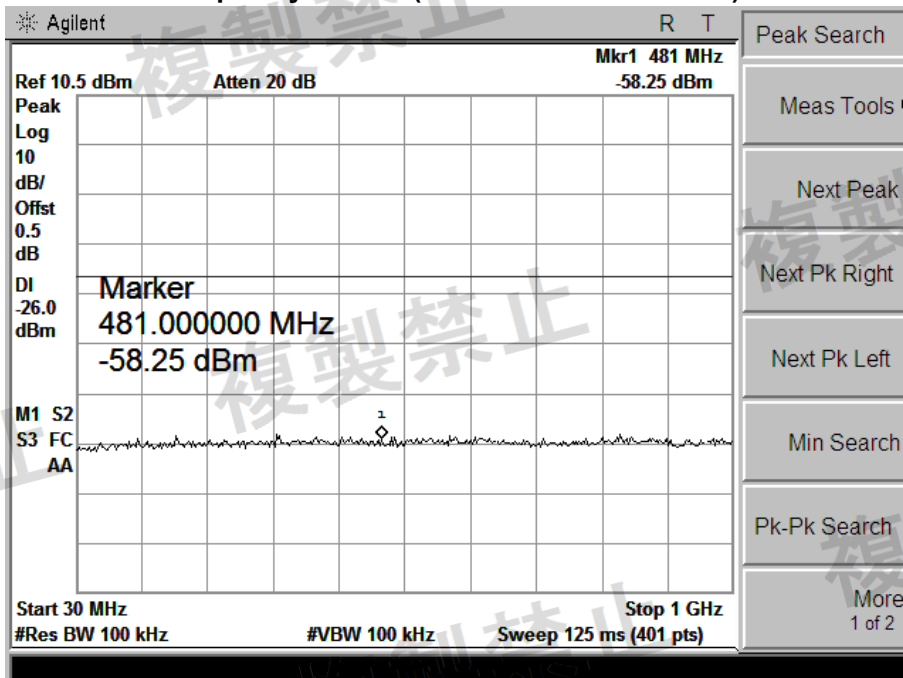
CH 39- Frequency Band 4 (2483.5 MHz ≤ f < 2496.5 MHz)



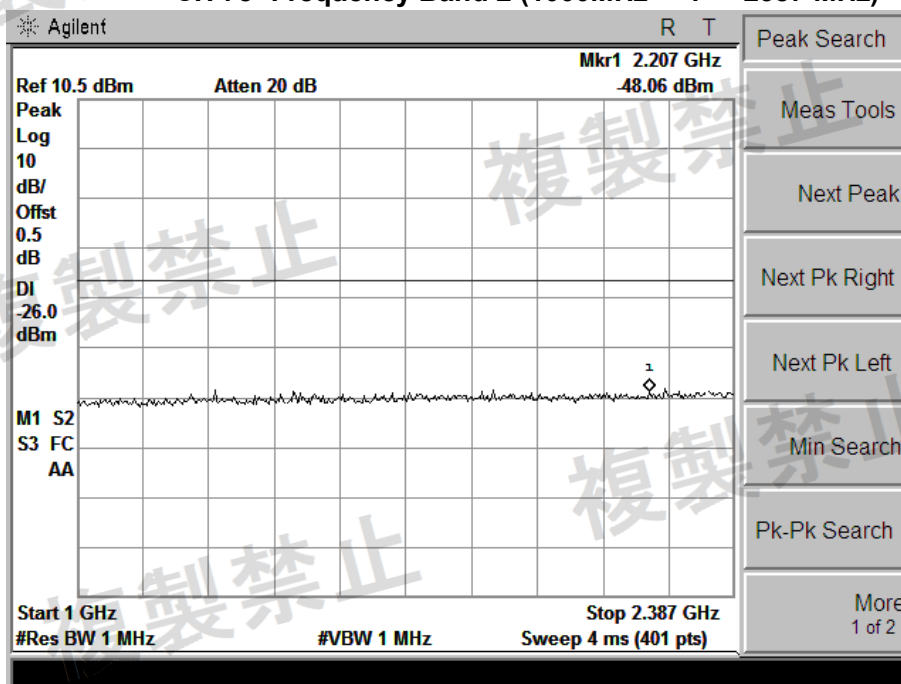
CH 39- Frequency Band 5 (2496.5 MHz $\leq$ f < 12.5 GHz)



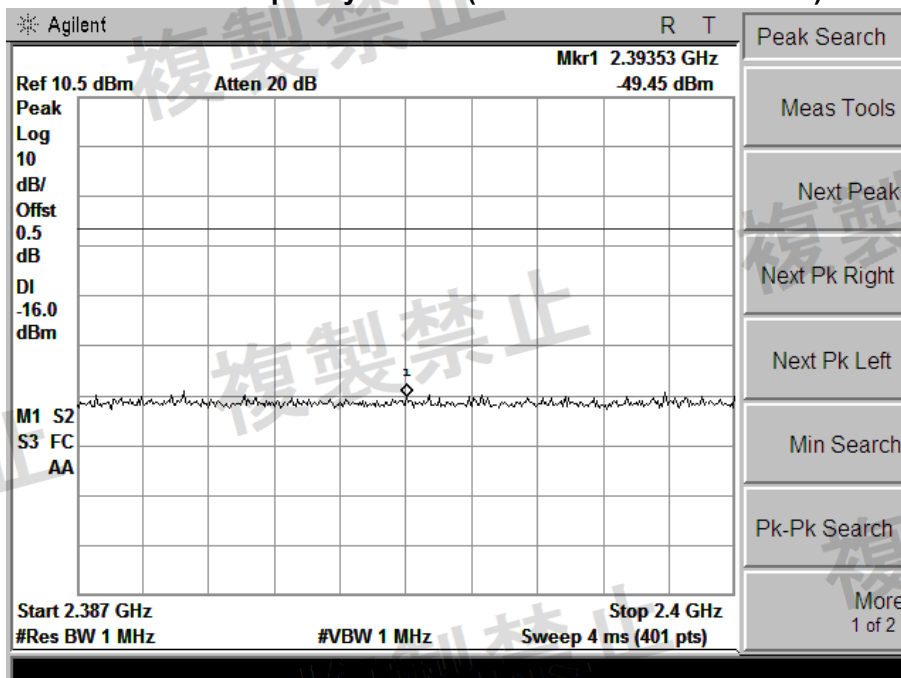
CH 78- Frequency Band 1 (30MHz $\leq$ f $\leq$ 1000 MHz)



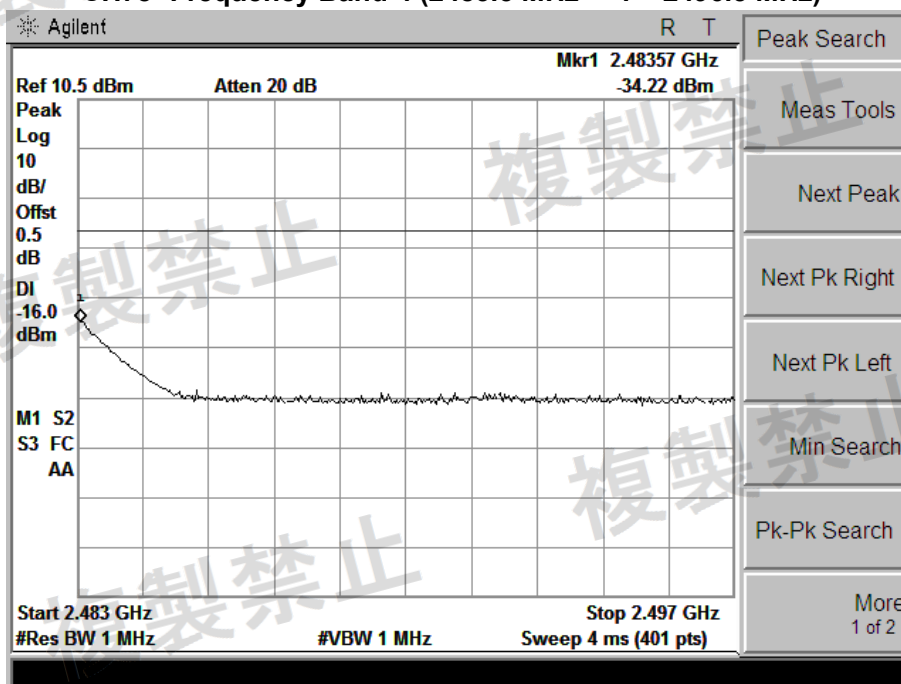
CH 78- Frequency Band 2 ($1000\text{MHz} \leq f \leq 2387\text{ MHz}$)



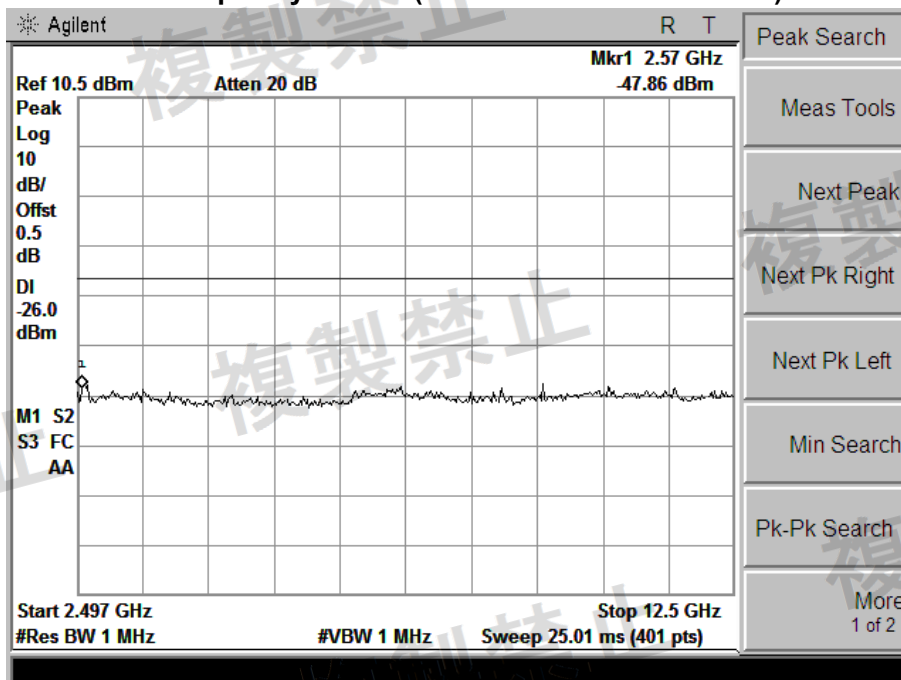
CH 78- Frequency Band 3 ($2387\text{ MHz} < f \leq 2400\text{ MHz}$)



CH78- Frequency Band 4 ($2483.5 \text{ MHz} \leq f < 2496.5 \text{ MHz}$)

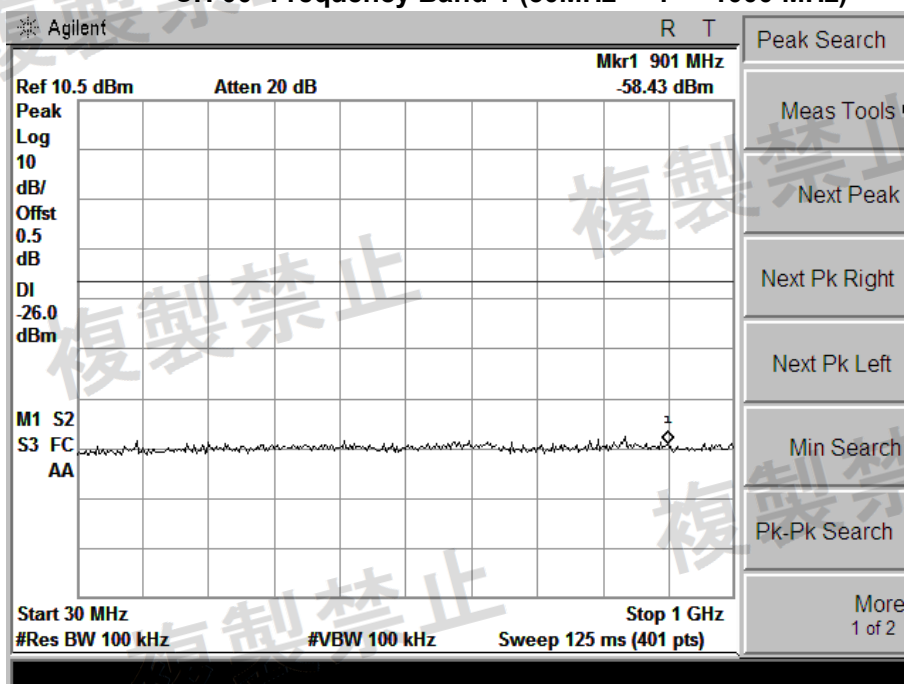


CH 78- Frequency Band 5 ($2496.5 \text{ MHz} \leq f < 12.5 \text{ GHz}$)

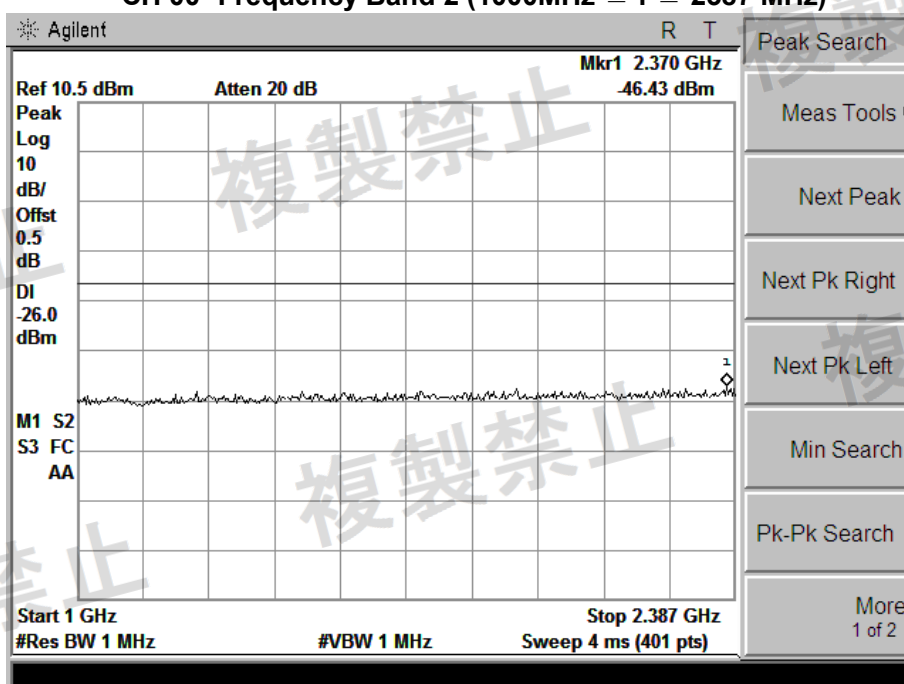


EUT:	Wireless Bluetooth Speaker	Test Date:	Jul.24, 2018
Temperature:	25°C	Tested by:	Joe
Humidity:	55 % RH	Test Voltage	DC 5V by USB Port
Operation Mode:	8DPSK TX TX CH 00/CH 39/CH 78 ; Normal Voltage (DC 5V by USB Port)		

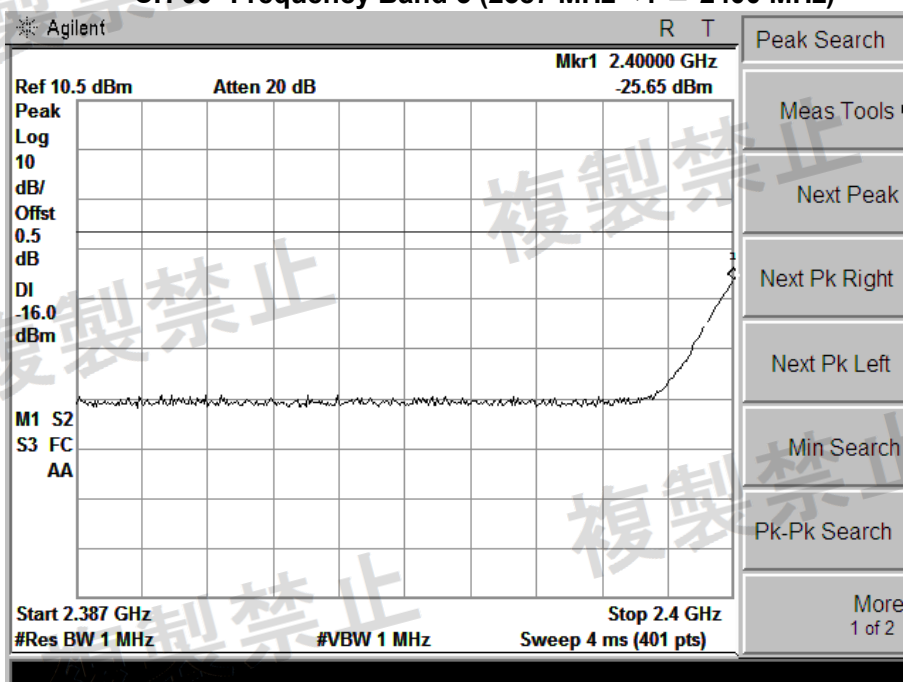
CH 00- Frequency Band 1 (30MHz $\leq$ f $\leq$ 1000 MHz)



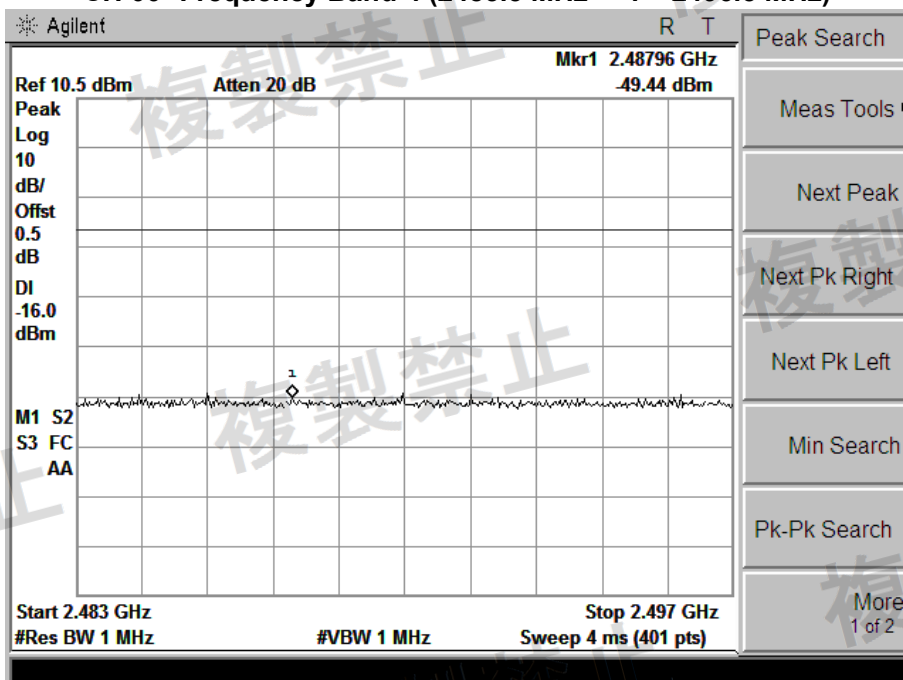
CH 00- Frequency Band 2 (1000MHz $\leq$ f $\leq$ 2387 MHz)



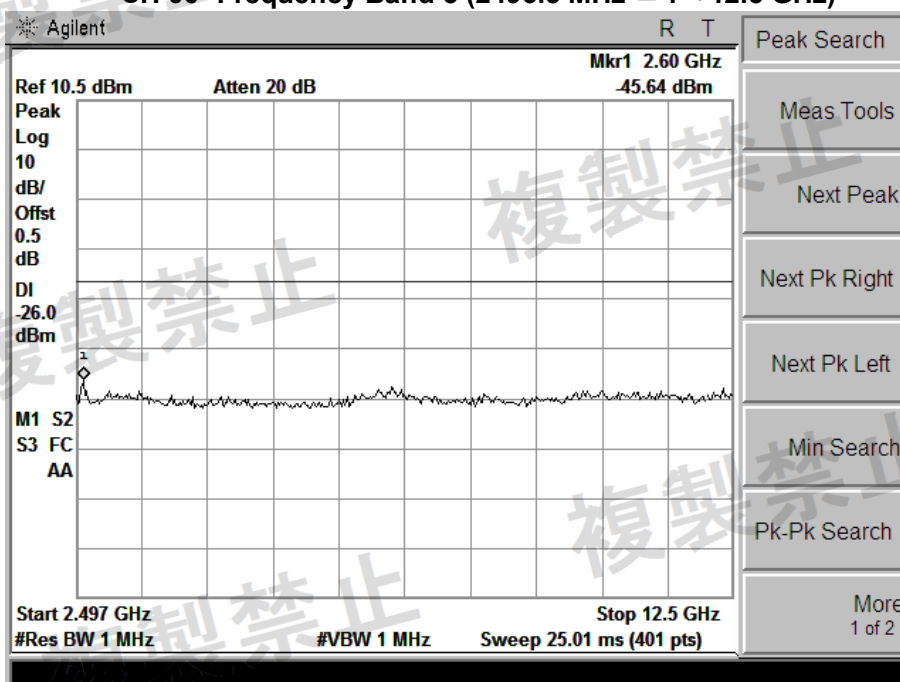
CH 00- Frequency Band 3 (2387 MHz < f ≤ 2400 MHz)



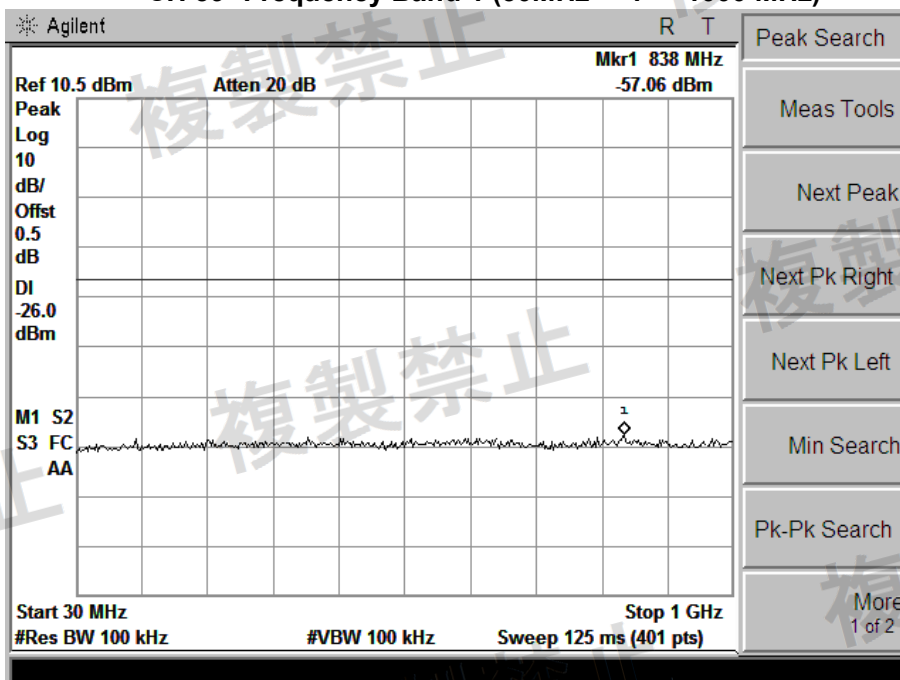
CH 00- Frequency Band 4 (2483.5 MHz ≤ f < 2496.5 MHz)



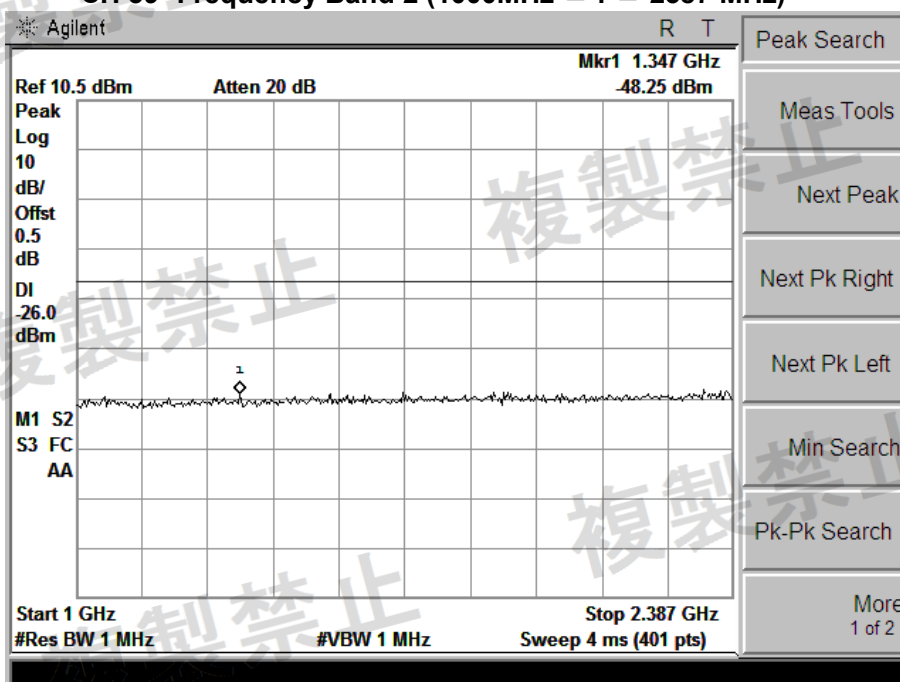
CH 00- Frequency Band 5 (2496.5 MHz $\leq$ f < 12.5 GHz)



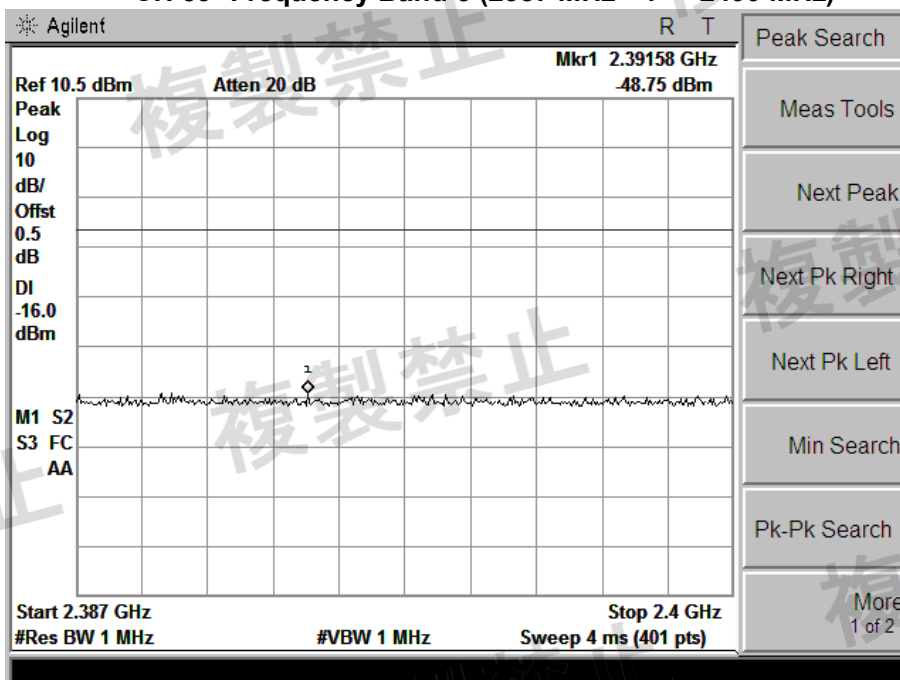
CH 39- Frequency Band 1 (30MHz $\leq$ f $\leq$ 1000 MHz)



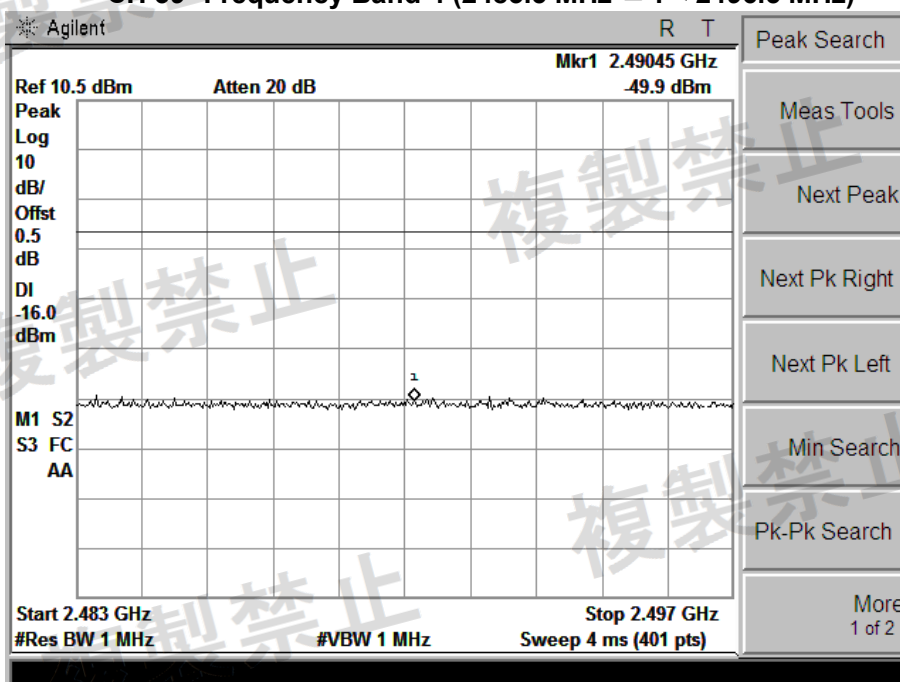
CH 39- Frequency Band 2 ($1000\text{MHz} \leq f \leq 2387\text{ MHz}$)



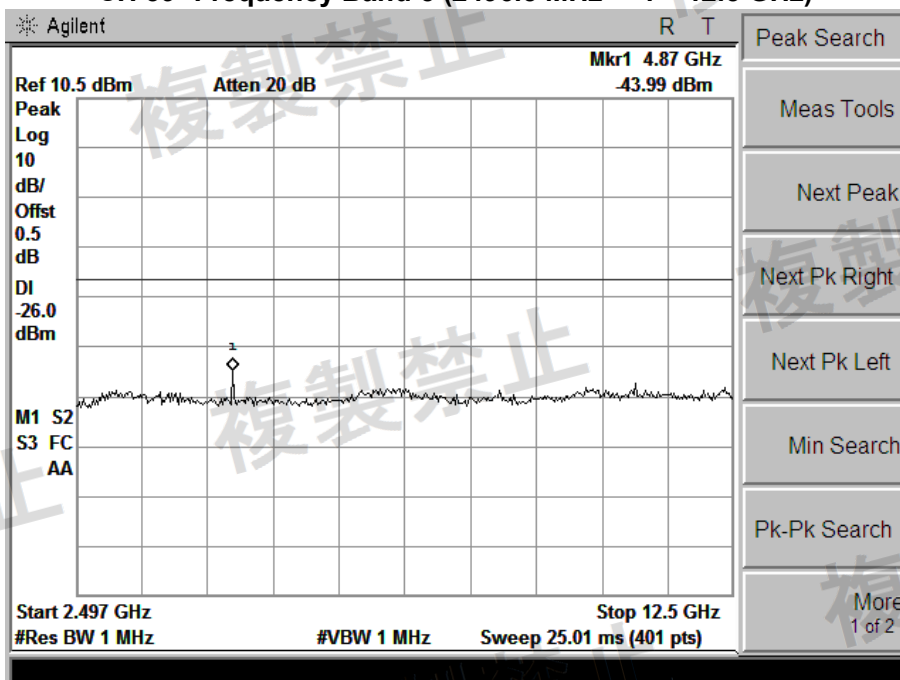
CH 39- Frequency Band 3 ($2387\text{ MHz} < f \leq 2400\text{ MHz}$)



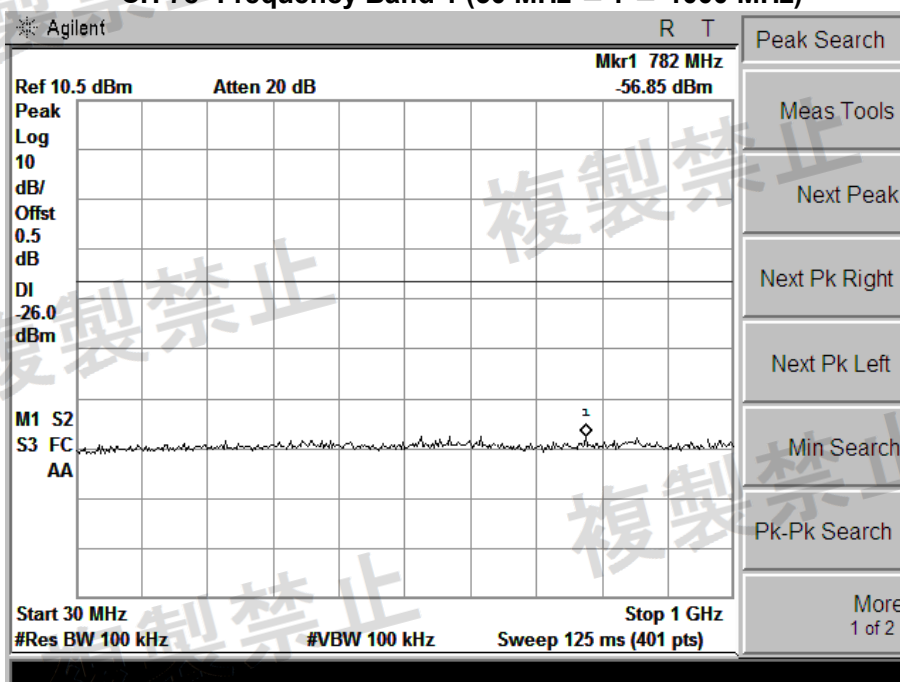
CH 39- Frequency Band 4 (2483.5 MHz $\leq$ f < 2496.5 MHz)



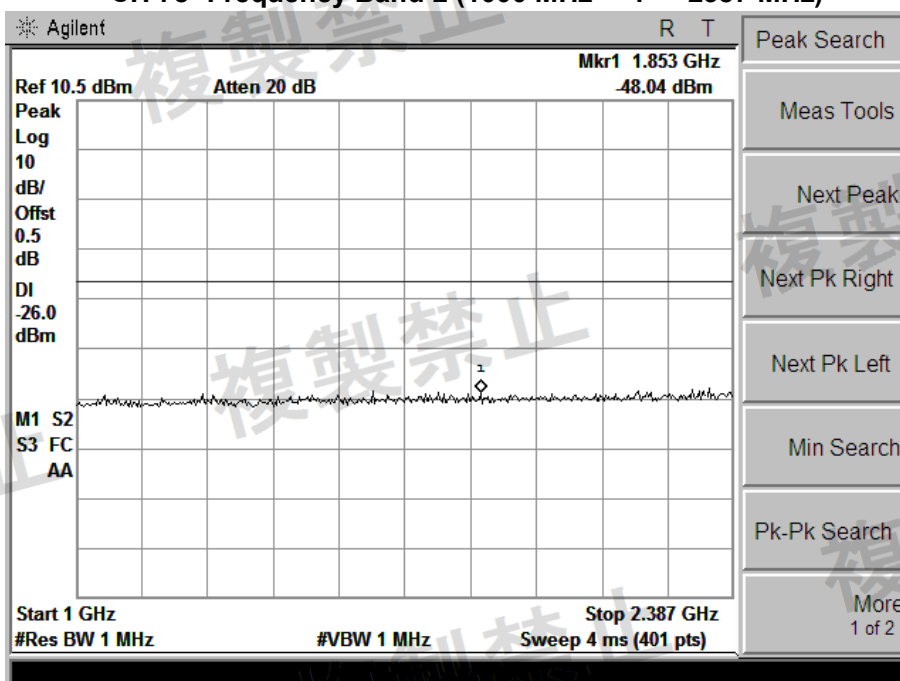
CH 39- Frequency Band 5 (2496.5 MHz $\leq$ f < 12.5 GHz)



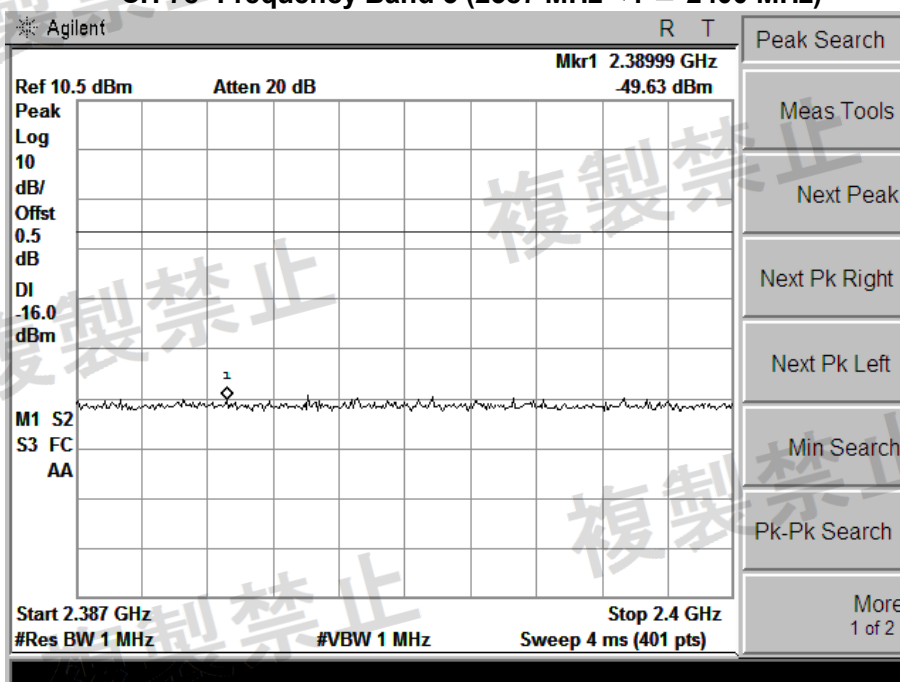
CH 78- Frequency Band 1 (30 MHz $\leq$ f $\leq$ 1000 MHz)



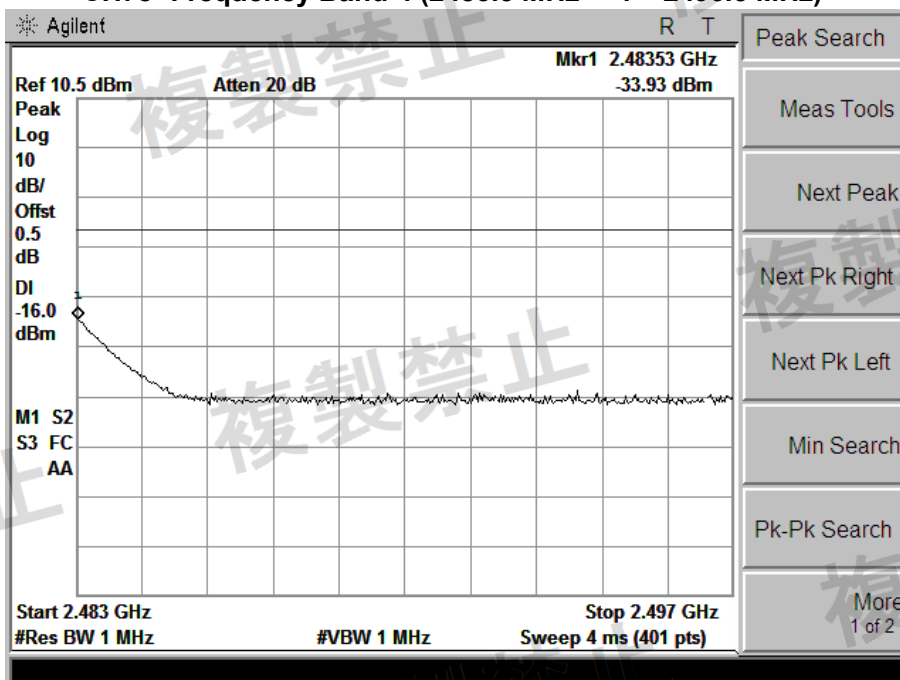
CH 78- Frequency Band 2 (1000 MHz $\leq$ f $\leq$ 2387 MHz)



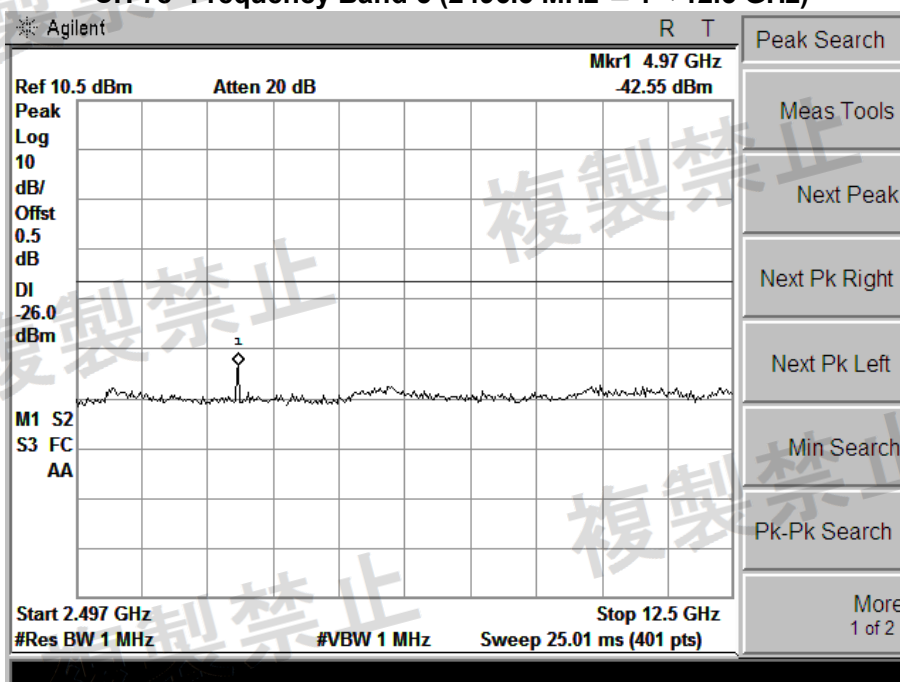
CH 78- Frequency Band 3 (2387 MHz < f ≤ 2400 MHz)



CH78- Frequency Band 4 (2483.5 MHz ≤ f < 2496.5 MHz)



CH 78- Frequency Band 5 (2496.5 MHz $\leq$ f < 12.5 GHz)



8. DWELL TIME

8.1 LIMIT

Item	Limits
Hopping Freq. Dwell Time	$\leq 0.4 \text{ sec (In } 0.4 \text{ sec} \times \text{spreading rate)}$

8.2 MEASURING INSTRUMENTS AND SETTING

Please refer to section 5 in this report. The following table is the setting of the analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	0 MHz
RB	1 MHz
VB	1 kHz
Detector	Peak
Trace	Max Hold
Sweep	Continuous

8.3 TEST PROCEDURES

a.	The transmitter output (antenna port) was connected to the spectrum analyzer
b.	Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz.
c.	Use a video trigger with the trigger level set to enable triggering only on full pulses.
d.	Sweep Time is more than once pulse time.
e.	Set the center frequency on any frequency would be measure and set the frequency span to zero span.
f.	Measure the maximum time duration of one single pulse.
g.	Set the EUT for DH5, DH3 and DH1 packet transmitting.
h.	Measure the maximum time duration of one single pulse.
i.	Dwell time = $[\text{spreading rate}/79] \times \text{duty-cycle} \times 0.4 \text{ seconds}$. (to be determined for each mode, DH1, DH3, DH5)

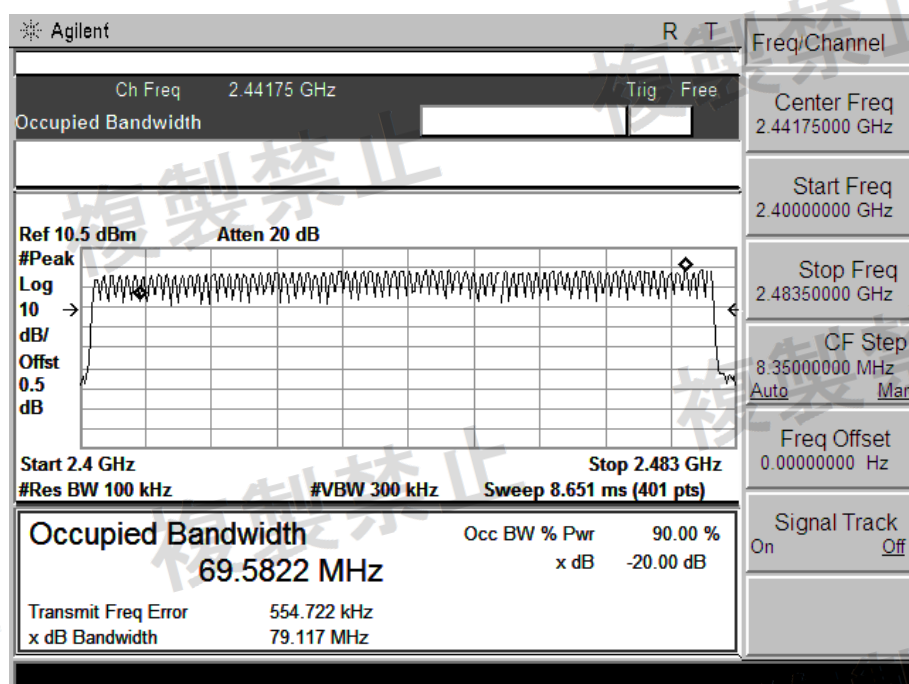
8.4 TEST SETUP LAYOUT



8.5 TEST RESULT

EUT:	Wireless Bluetooth Speaker	Test Date:	Jul.24, 2018
Temperature:	25°C	Tested by:	Joe
Humidity:	55 % RH	Test Voltage	DC 5V by USB Port
Test Mode:	GFSK		

Data Packet	90% Spread BW (MHz)	On time (ms)	Off time (ms)	Duty cycle (%)	Dwell Time (s)	Limits (s)
DH5	69.5822	2.88	3.74	43.50	0.006	0.400



Duty-cycle = [on time/total time] x 100%

Dwell time = [spreading rate/79] x duty-cycle x 0.4 second

Spreading rate = (Spreading bandwidth) / (Frequency corresponding to transmission rate)

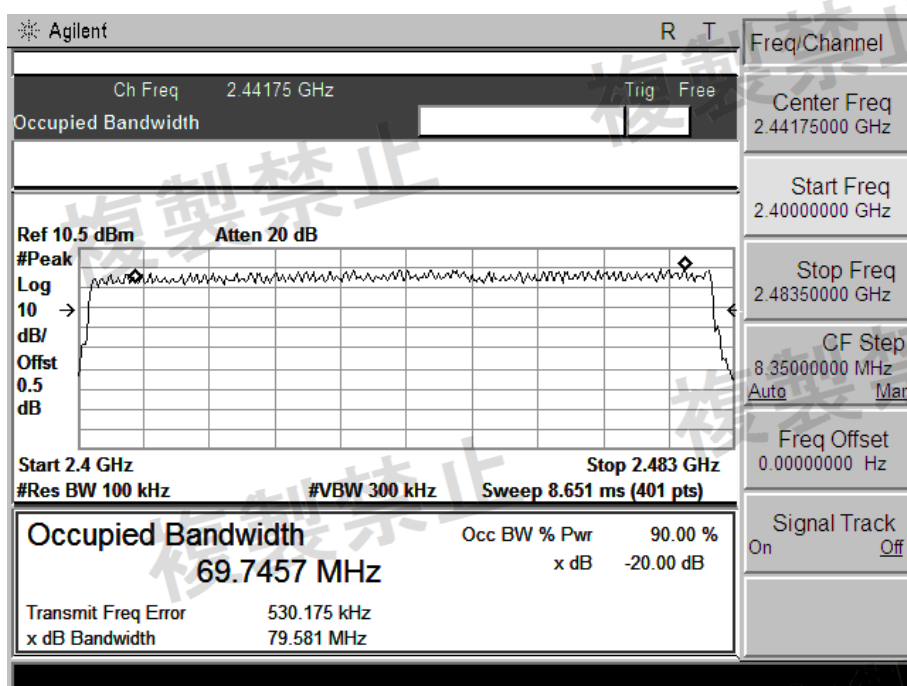
GFSK: Frequency corresponding to transmission rate=1MHz

$\pi/4$ -DPSK: Frequency corresponding to transmission rate=2MHz

8DPSK: Frequency corresponding to transmission rate=3MHz

EUT:	Wireless Bluetooth Speaker	Test Date:	Jul.24, 2018
Temperature:	25°C	Tested by:	Joe
Humidity:	55 % RH	Test Voltage	DC 5V by USB Port
Test Mode:	8DPSK		

Data Packet	90% Spread BW (MHz)	On time (ms)	Off time (ms)	Duty cycle (%)	Dwell Time (s)	Limits (s)
DH5	69.7457	2.90	3.76	43.54	0.006	0.400



Duty-cycle = [on time/total time] x 100%

Dwell time = [spreading rate/79] x duty-cycle x 0.4 second

Spreading rate =(Spreading bandwidth) / (Frequency corresponding to transmission rate)

GFSK: Frequency corresponding to transmission rate=1MHz

$\pi/4$ -DPSK: Frequency corresponding to transmission rate=2MHz

8DPSK: Frequency corresponding to transmission rate=3MHz

9. CARRIER SENSE

Not applicable, Since the EUT belong to Bluetooth

10. RADIO INTERFERENCE PREVENTION FUNCTION

Radio interface prevention function

	Normal voltage	Low voltage	High voltage
Result	OK	OK	OK

11. IMITATION OF COLLATERAL EMISSION OD RECEIVER MEASUREMENT

11.1 LIMIT

Item	Limits
RX Spurious Emission:	$\leq 4\text{nW}$ ($f < 1\text{GHz}$)
	$\leq 20\text{nW}$ ($1\text{GHz} \leq f$)

11.2 MEASURING IN STRUMENTS AND SETTING

Please refer to section 5 in this report. The following table is the setting of Spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
RB	100 kHz (below 1GHz emissions) 1 MHz (above 1GHz emissions)
VB	100 kHz (below 1GHz emissions) 1 MHz (above 1GHz emissions)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

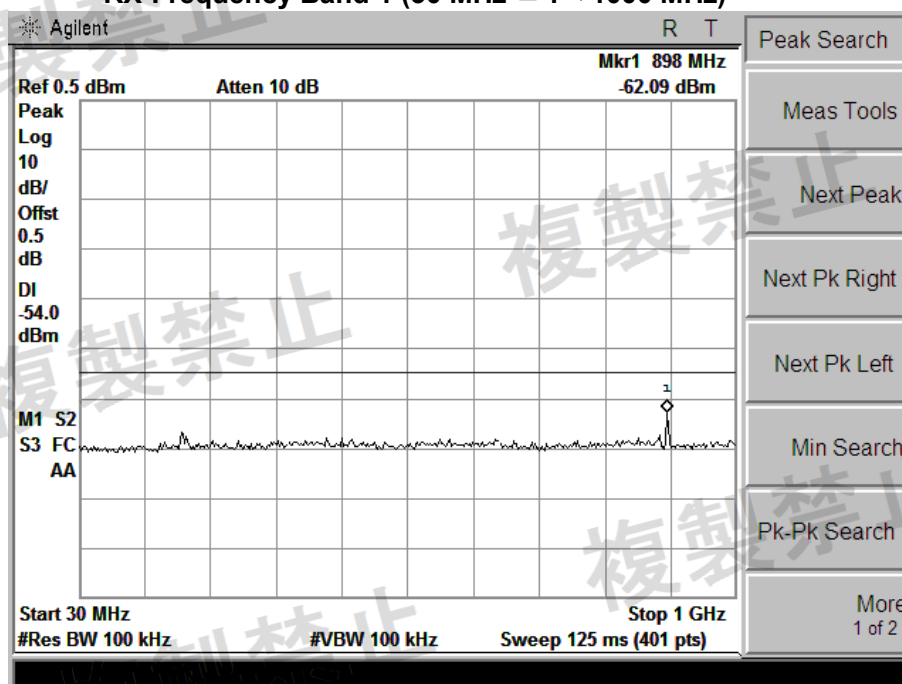
11.3 TEST PROCEDURES

- EUT have the continuous reception mode and fixed only one channelize .
- Setting of SA is following as RB / VB: 100 kHz (below 1GHz emissions) / 1 MHz (above 1GHz emissions) /
AT: 10dB / Ref: 0dBm / Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: Max hold .
- SA set RB: 100kHz and VB: 100kHz. Then adjust to start frequency 30MHz and stop frequency 1000MHz. Search to mark peak reading value + cable loss shall be less than 4nW
- SA set RB: 1MHz and VB: 1MHz. Then adjust to start frequency 1000MHz and stop frequency 12500MHz. Search to mark peak reading value + cable loss shall be less than 20nW
- If power level of lower emissions are more than 1/10 of limit (.0.4nW for $f < 1\text{GHz}$, 2nW for $f \geq 1\text{GHz}$), all those are to be indicated in the 2nd and 3rd lines. If others are 1/10 or less more of the limit, no necessary to be indicated.

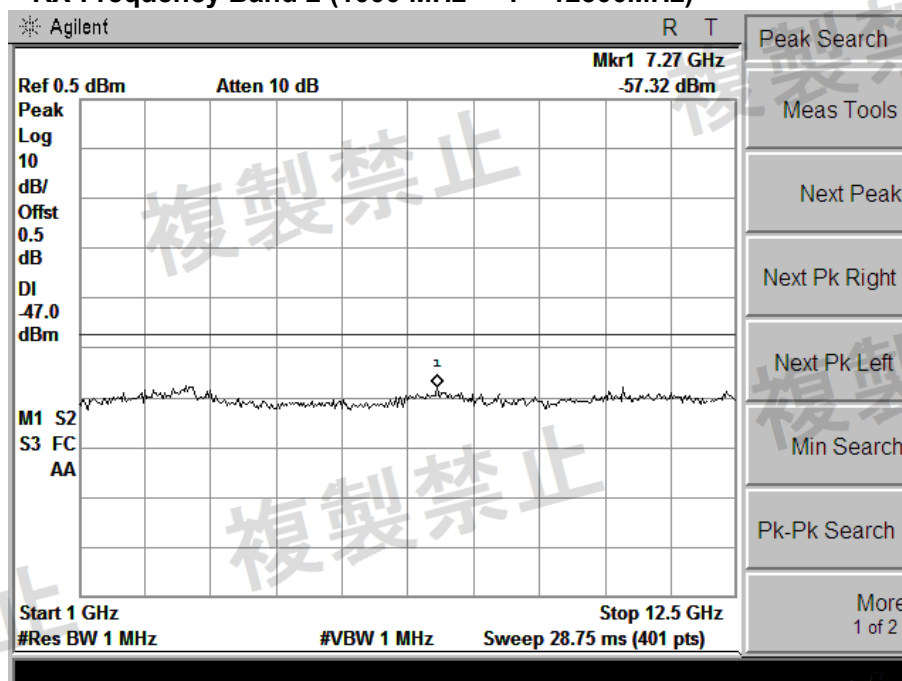
11.4 Test Results

EUT:	Wireless Bluetooth Speaker	Test Date:	Jul.24, 2018
Temperature:	25°C	Tested by:	Joe
Humidity:	55 % RH	Test Voltage	DC 5V by USB Port
Operation Mode:	GFSK		

RX-Frequency Band 1 ($30\text{ MHz} \leq f < 1000\text{ MHz}$)

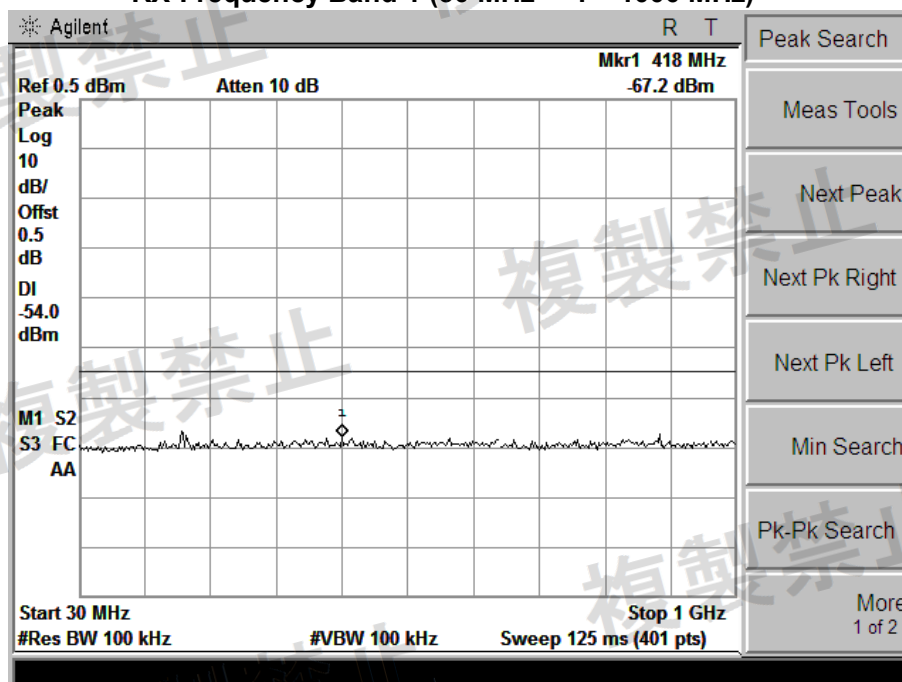


RX-Frequency Band 2 ($1000\text{ MHz} \leq f < 12500\text{ MHz}$)

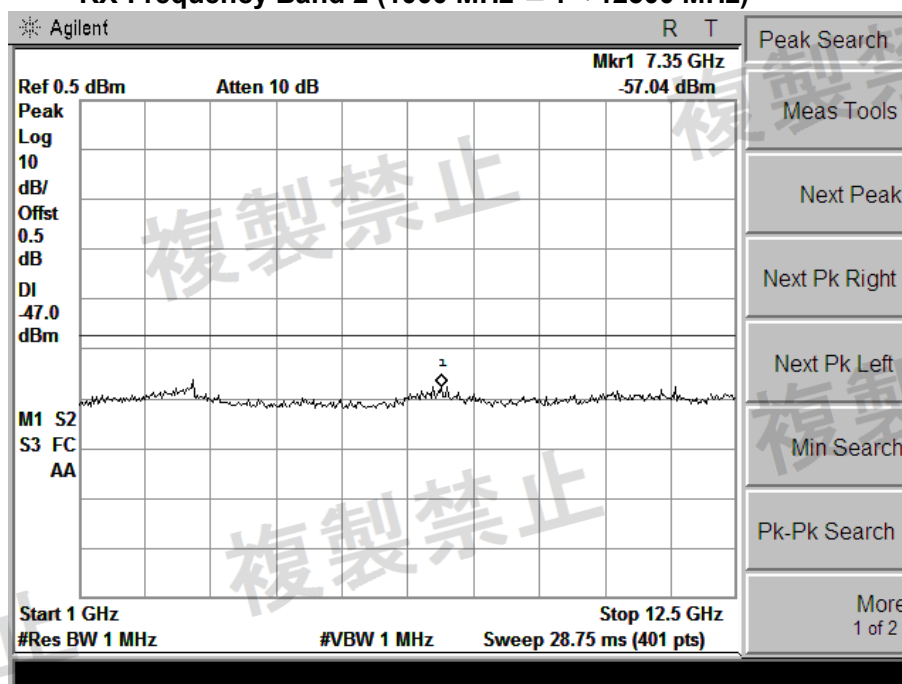


EUT:	Wireless Bluetooth Speaker	Test Date:	Jul.24, 2018
Temperature:	25°C	Tested by:	Joe
Humidity:	55 % RH	Test Voltage	DC 5V by USB Port
Operation Mode:	$\pi/4$ DQPSK		

RX-Frequency Band 1 ($30 \text{ MHz} \leq f < 1000 \text{ MHz}$)

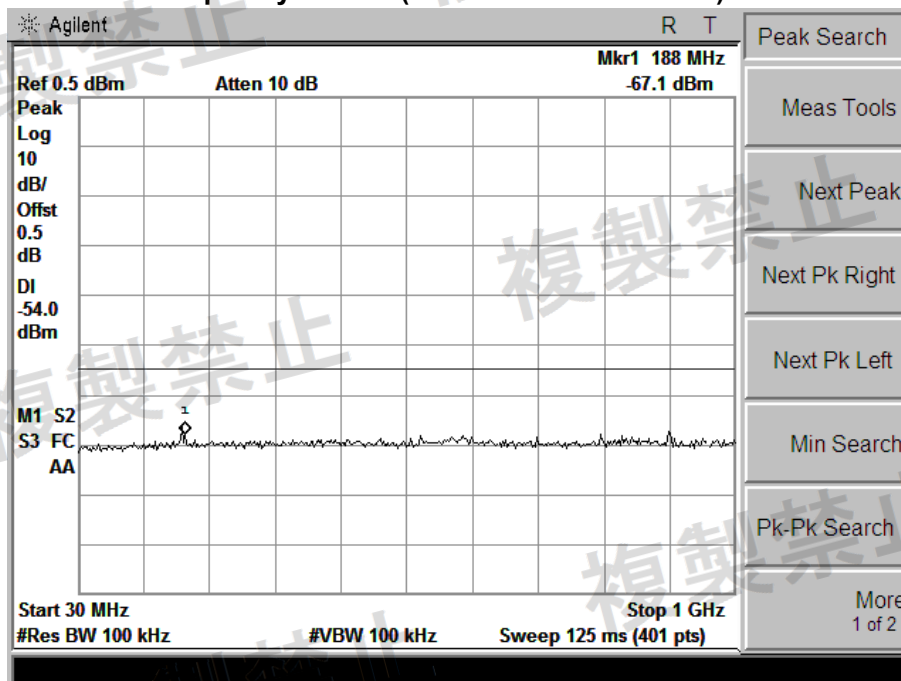


RX-Frequency Band 2 ($1000 \text{ MHz} \leq f < 12500 \text{ MHz}$)

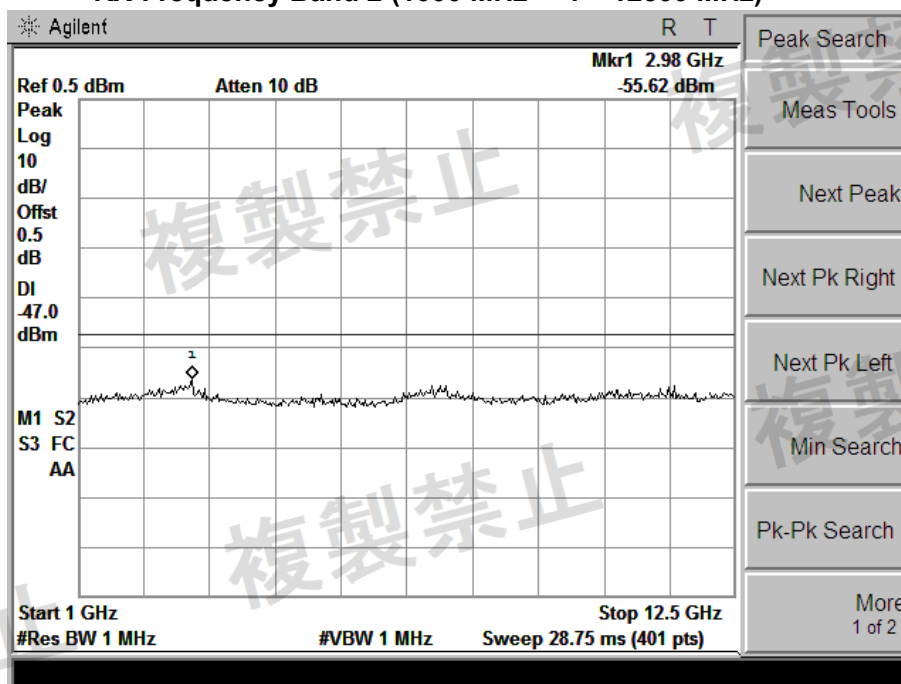


EUT:	Wireless Bluetooth Speaker	Test Date:	Jul.24, 2018
Temperature:	25°C	Tested by:	Joe
Humidity:	55 % RH	Test Voltage	DC 5V by USB Port
Operation Mode:	8DPSK		

RX-Frequency Band 1 (30 MHz $\leq$ f < 1000 MHz)



RX-Frequency Band 2 (1000 MHz $\leq$ f < 12500 MHz)



END OF THE REPORT