

FCC - TEST REPORT

Report Number : **64.790.25.80013.01** Date of Issue: **2025-12-25**

Model/HVIN : 3398-x (-x=blank, -1, -2, -3, -4, -5, -6, -7, -8, -9, -10, -11, -12, indicates different colour)

Product Type : Electric Breast Pump

Applicant : Shantou Huihengqi Electronic Technology Co., Ltd.

Address : 501, 5/F, Block C, 301, 3/F, Block A, 14A Industrial Zone, Longhu District, 515000 Shantou, Guangdong, PEOPLE'S REPUBLIC OF CHINA

Manufacturer : Shantou Huihengqi Electronic Technology Co., Ltd.

Address : 501, 5/F, Block C, 301, 3/F, Block A, 14A Industrial Zone, Longhu District, 515000 Shantou, Guangdong, PEOPLE'S REPUBLIC OF CHINA

Factory : Shantou Huihengqi Electronic Technology Co., Ltd.

Address : 501, 5/F, Block C, 301, 3/F, Block A, 14A Industrial Zone, Longhu District, 515000 Shantou, Guangdong, PEOPLE'S REPUBLIC OF CHINA

Test Result : ☒ **Positive** ☐ **Negative**

Total pages including Appendices : **51**

Any use for advertising purposes must be granted in writing. This technical report may only be quoted in full. This report is the result of a single examination of the object in question. It does not imply a general statement regarding the quality of products from regular production. For further details please see Testing, Certification, Validation and Verification Regulations, chapter A-3.3.

1 Table of Contents

1	Table of Contents.....	2
2	Details about the Test Laboratory.....	3
3	Description of the Equipment Under Test.....	4
4	Summary of Test Standards	5
5	Summary of Test Results.....	6
6	General Remarks	7
7	Test Setups	8
7.1	Radiated test setups	8
7.2	Conducted RF test setups	9
7.3	AC Power Line Conducted Emission test setups	9
8	Systems test configuration	10
9	Technical Requirement	11
9.1	Conducted Emission.....	11
9.2	Conducted Output Power	14
9.3	6 dB Bandwidth.....	17
9.4	Power spectral density.....	20
9.5	Spurious RF conducted emissions	23
9.6	Band edge testing.....	27
9.7	Spurious radiated emissions for transmitter	30
10	Test Equipment List.....	50
11	System Measurement Uncertainty	51

2 Details about the Test Laboratory

Details about the Test Laboratory

Test Site:

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F & 8F East, Communication Building, No.163 Pingyun Road,
Huangpu Ave. West
Guangzhou 510656
P.R. China

Telephone: 86 20 3815 3415

FCC Registration No.: 141693

FCC Designation Number: CN1408

3 Description of the Equipment Under Test

Product:	Electric breast pump
Model no.:	3398-x (-x=blank, -1, -2, -3, -4, -5, -6, -7, -8, -9, -10, -11, -12, indicates different colour)
FCC ID:	2BSODBP3398
Options and accessories:	NIL
Ratings:	Charging input: DC 5V, 2.0A Battery type: DC 3.7V, 1100mAh Li-ion battery
RF Transmission Frequency:	2402MHz-2480MHz (for BLE-1Mbps)
No. of Operated Channel:	40
Modulation:	GFSK
Antenna Type:	PCB antenna
Antenna Gain:	0.5dBi
Description of the EUT:	The EUT is an Electric breast pump, supports BLE-1Mbps function, operates at 2402 – 2480MHz.

Remark: The above EUT's information is declared by manufacturer. And we assume no responsibility for the relevant results arising therefrom.



4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C 10-1-2024 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators

All the test methods were according to KDB 558074 D01 15.247 Meas Guidance v05r02 Measurement Guidance and ANSI C63.10-2020.

5 Summary of Test Results

Technical Requirements						
FCC Part 15 Subpart C						
Test Condition		Test Site	Test Result			Test Environment
			Pass	Fail	N/A	
§15.207	Conducted emission AC power port	Site 1	☒	☐	☐	T: 22.4°C H: 51.6%
§15.247 (b) (3)	Conducted peak output power	Site 1	☒	☐	☐	T: 22.4°C H: 51.6%
§15.247(a)(2)	6dB bandwidth and 99% Occupied Bandwidth	Site 1	☒	☐	☐	T: 24.1°C H: 52.3%
§15.247(e)	Power spectral density	Site 1	☒	☐	☐	T: 22.4°C H: 51.6%
§15.247(d)	Spurious RF conducted emissions	Site 1	☒	☐	☐	T: 22.4°C H: 51.6%
§15.247(d)	Band edge	Site 1	☒	☐	☐	T: 22.4°C H: 51.6%
§15.247(d) & §15.209 & §15.205	Spurious radiated emissions for transmitter	Site 1	☒	☐	☐	T: 24.6°C H: 43.7%
§15.203	Antenna requirement	See note 2	☒	☐	☐	--

Note 1: N/A=Not Applicable.

Note 2: The EUT use a PCB antenna, which gain of antenna is 0.5dBi. In accordance to §15.203, it is considered sufficiently to comply with the provisions of this section.

Note 3: T=Temperature, H=Humidity

6 General Remarks

This submittal(s) (test report) is intended for FCC ID: 2BSODBP3398 complies with Section 15.207, 15.205, 15.209, 15.247 of the FCC Part 15, Subpart C rules.
All models are identical except the appearance of colour, so the model 3398 was selected to perform full test

SUMMARY:

All tests according to the regulations cited on page 5 were:

■ - Performed

□ - **Not** Performed

The Equipment under Test

■ - **Fulfills** the general approval requirements.

□ - **Does not** fulfill the general approval requirements.

Sample Received Date: 2025-05-27

Testing Start Date: 2025-05-30

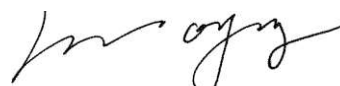
Testing End Date: 2025-06-19

– TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch –

Reviewed by:

Prepared by:

Tested by:



Mike Zhuo
Senior Project Manager

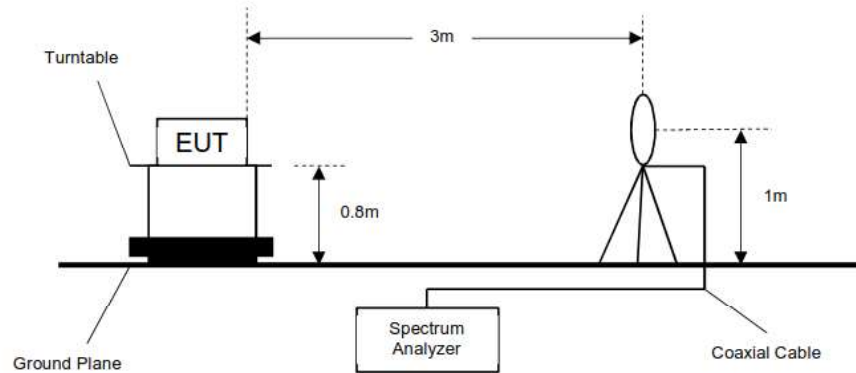
Kevin Ouyang
Project Manager

Joe Chi
Test Engineer

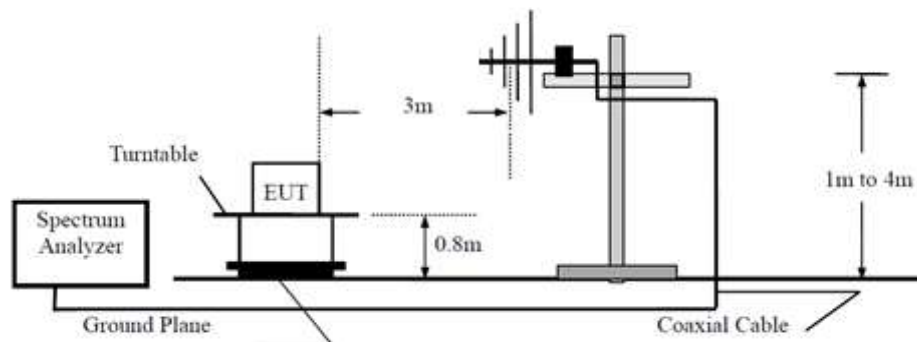
7 Test Setups

7.1 Radiated test setups

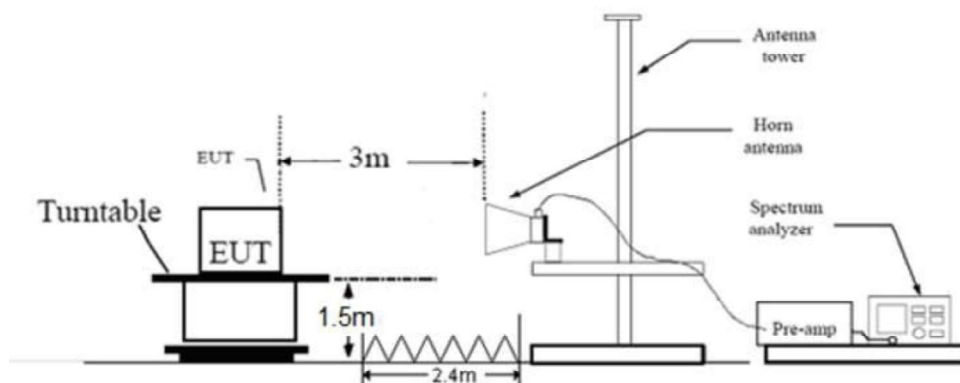
9kHz - 30MHz



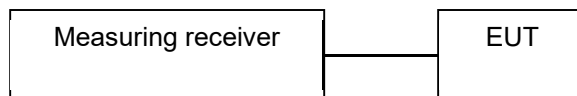
30MHz-1GHz



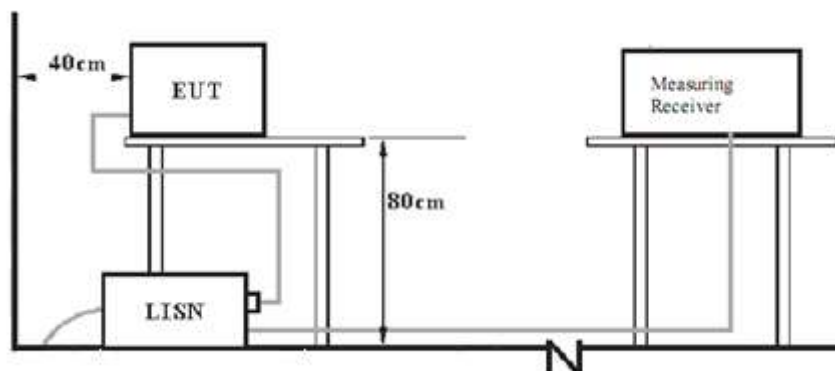
Above 1GHz



7.2 Conducted RF test setups



7.3 AC Power Line Conducted Emission test setups



8 Systems test configuration

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.	REMARK
Notebook	LENOVO	X220	---

Test software information:

Test Software Version	MacroGiga Test 2.9	
Modulation	Setting TX Power	Packet Type
GFSK	3	Pn9

The system was configured to non-hopping mode, testing channel 0, 19, 39.

9 Technical Requirement

9.1 Conducted Emission

Test Method

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. Both sides of AC line were checked for maximum conducted interference.
6. The frequency range from 150 kHz to 30 MHz was searched.
7. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

Limit

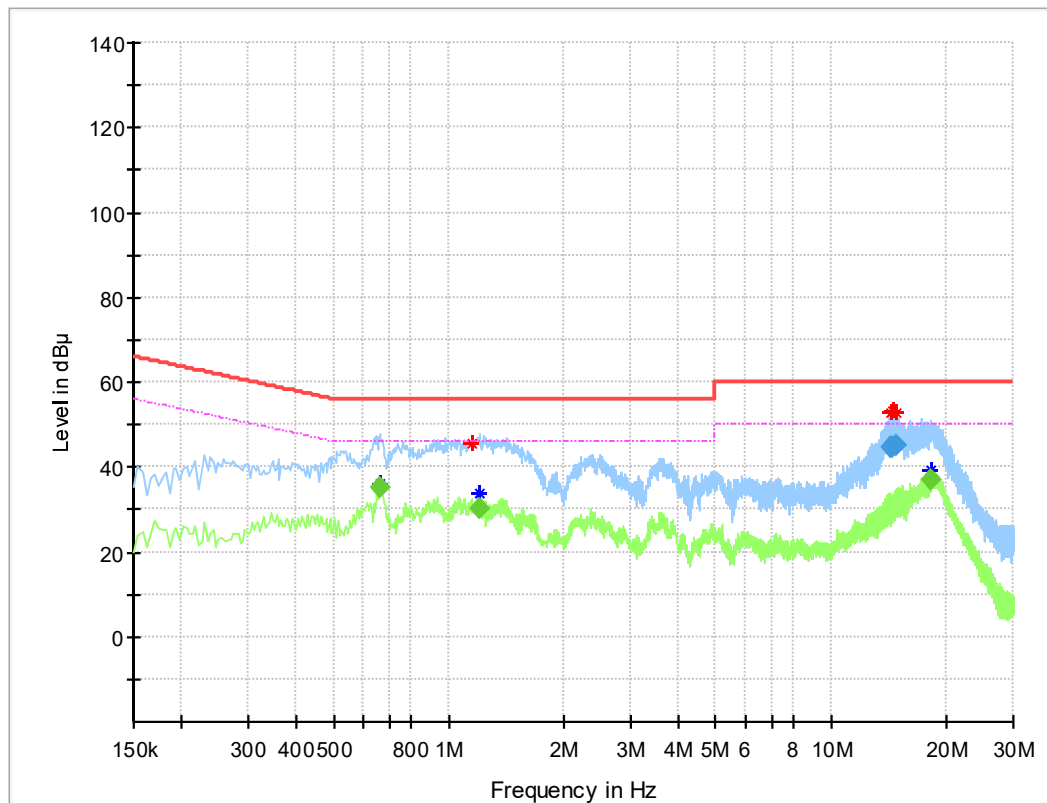
According to §15.207, conducted emissions limit as below:

Frequency MHz	QP Limit dB μ V	AV Limit dB μ V
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

Remark: “*” Decreasing linearly with logarithm of the frequency

Conducted Emission

Product Type : Electric breast pump
 M/N : 3398
 Operating Condition : Charging+ BLE communication mode
 Test Specification : L
 Comment : AC 120V/60Hz

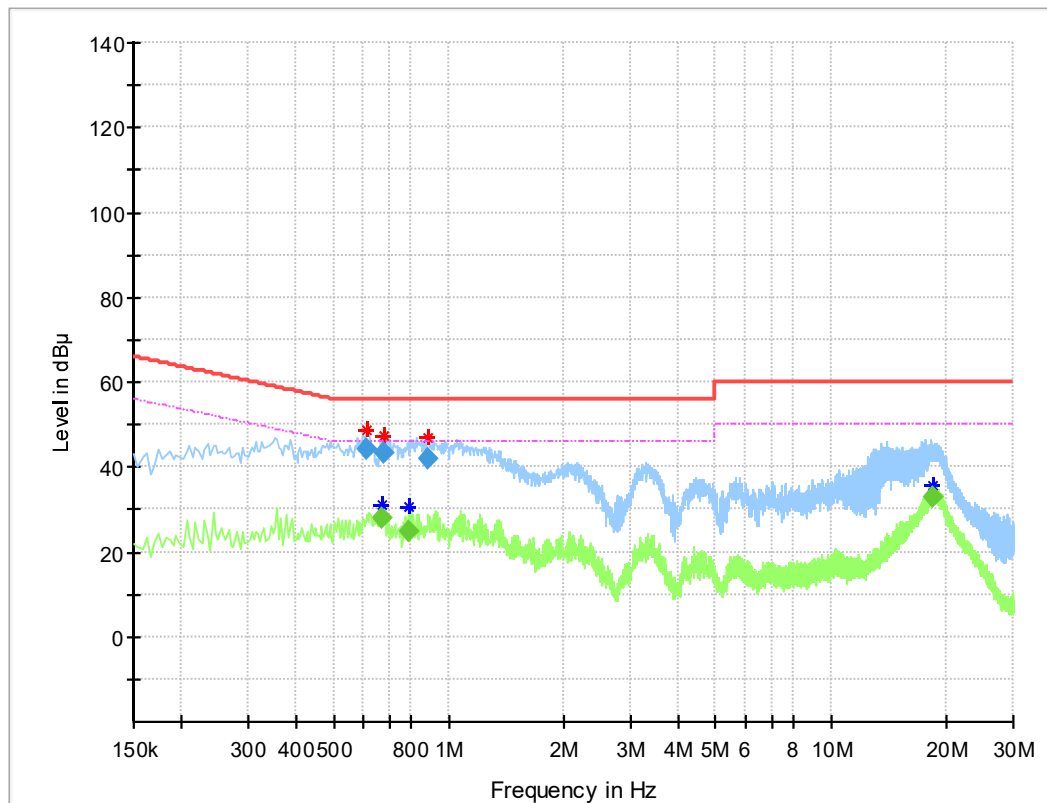


Final Result

Frequency (MHz)	QuasiPeak (dB μ V)	CAverage (dB μ V)	Limit (dB μ V)	Margin (dB)	Line
0.662000	---	35.08	46.00	10.92	L1
1.206000	---	29.99	46.00	16.01	L1
14.414000	44.75	---	60.00	15.25	L1
14.554000	44.67	---	60.00	15.33	L1
14.778000	44.96	---	60.00	15.04	L1
18.362000	---	36.77	50.00	13.23	L1

Conducted Emission

Product Type : Electric breast pump
 M/N : 3398
 Operating Condition : Charging+ BLE communication mode
 Test Specification : N
 Comment : AC 120V/60Hz



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Line
0.610000	43.98	---	56.00	12.02	N
0.674000	---	28.12	46.00	17.88	N
0.678000	43.29	---	56.00	12.71	N
0.786000	---	24.62	46.00	21.38	N
0.882000	41.78	---	56.00	14.22	N
18.598000	---	32.86	50.00	17.14	N

9.2 Conducted Output Power

Test Method

1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Use the following test receiver settings:
Span = approximately 5 times the 6dB bandwidth, centered on a channel need to test,
RBW > the 6dB bandwidth of the emission being measured, VBW $\geq$ 3RBW,
Sweep = auto, Detector function = peak, Trace = max hold
4. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power and record the results in the test report.
5. Repeat above procedures until all frequencies measured were complete.

Limit

According to §15.247 (b) (3), conducted output power limit as below:

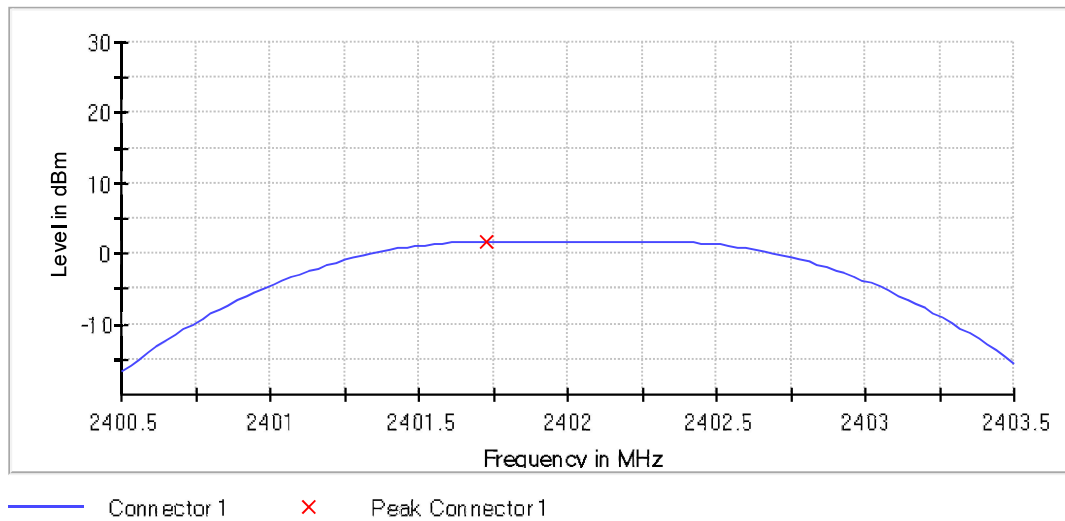
Frequency Range MHz	Limit W	Limit dBm
2400-2483.5	≤ 1	≤ 30

Test Results

Mode	TX Type	Frequency (MHz)	Maximum Peak Conducted Output Power (dBm)		Verdict
			ANT1	Limit	
1M	SISO	2402	1.8	≤ 30	Pass
		2440	2.0	≤ 30	Pass
		2480	1.6	≤ 30	Pass

1M_LCH_2402MHz_Ant1_NTNV

Peak Power

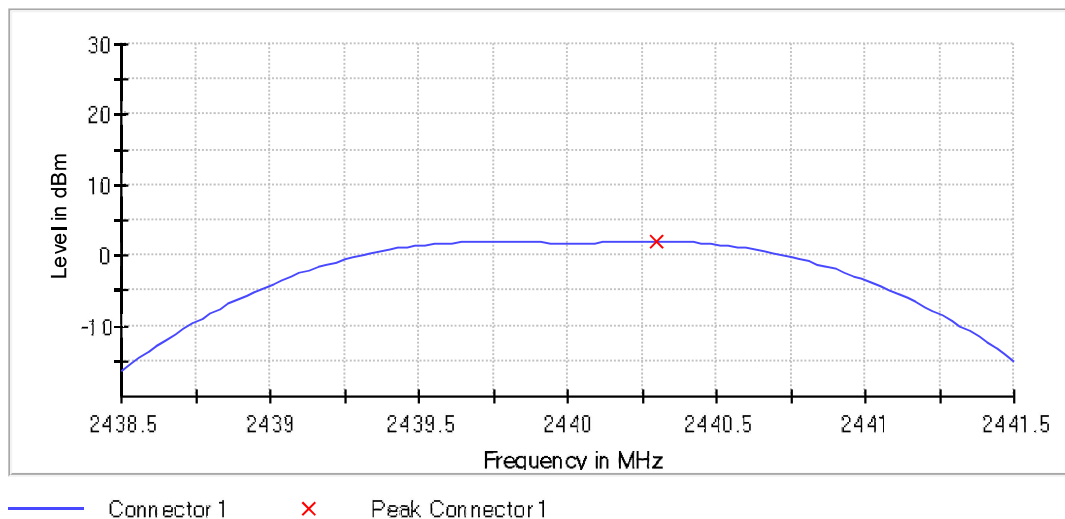


Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.40050 GHz	2.40050 GHz
Stop Frequency	2.40350 GHz	2.40350 GHz
Span	3.000 MHz	3.000 MHz
RBW	1.000 MHz	>= 880.001 kHz
VBW	3.000 MHz	>= 3.000 MHz
SweepPoints	101	~ 101
SweepTime	4.210 μ s	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak

1M_MCH_2440MHz_Ant1_NTNV

Peak Power

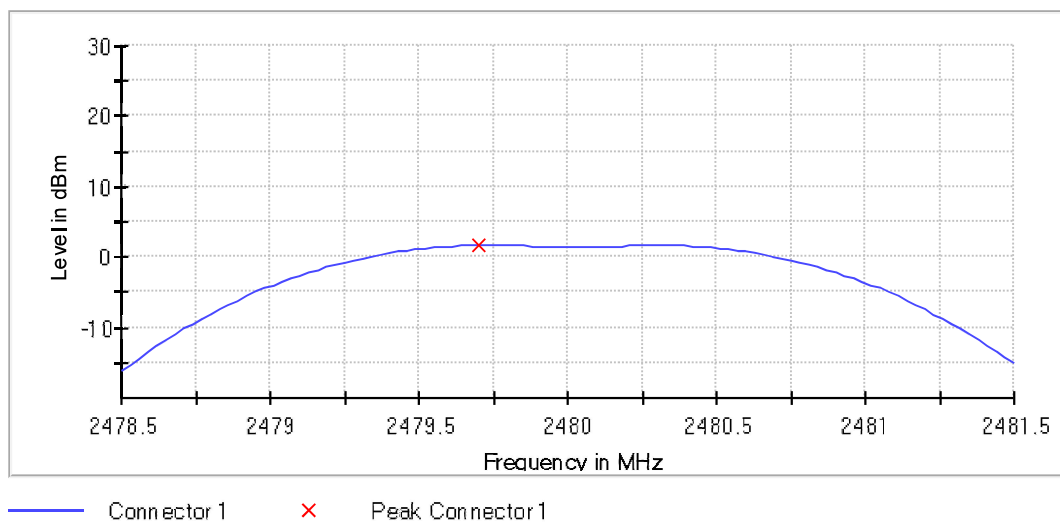


Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.43850 GHz	2.43850 GHz
Stop Frequency	2.44150 GHz	2.44150 GHz
Span	3.000 MHz	3.000 MHz
RBW	1.000 MHz	≥ 900.001 kHz
VBW	3.000 MHz	≥ 3.000 MHz
SweepPoints	101	~ 101
SweepTime	4.210 μ s	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak

1M_HCH_2480MHz_Ant1_NTNV

Peak Power



Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.47850 GHz	2.47850 GHz
Stop Frequency	2.48150 GHz	2.48150 GHz
Span	3.000 MHz	3.000 MHz
RBW	1.000 MHz	≥ 940.001 kHz
VBW	3.000 MHz	≥ 3.000 MHz
SweepPoints	101	~ 101
SweepTime	4.210 μ s	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak

9.3 6 dB Bandwidth

Test Method for 6 dB Bandwidth

1. The RF output of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting, the instrument center frequency is set to the nominal EUT channel center frequency enable the EUT transmit continuously.
3. Use the following spectrum analyzer settings:
RBW=1% to 5% of the occupied bandwidth but not less than 100kHz, VBW $\geq$ 3RBW, Sweep = auto, Detector function = peak, Trace = max hold
4. Use the automatic bandwidth measurement capability of an instrument, use the X dB bandwidth mode with X set to 6 dB.
5. Allow the trace to stabilize, record the 6 dB Bandwidth value.

Limit

6dB bandwidth Limit [kHz]

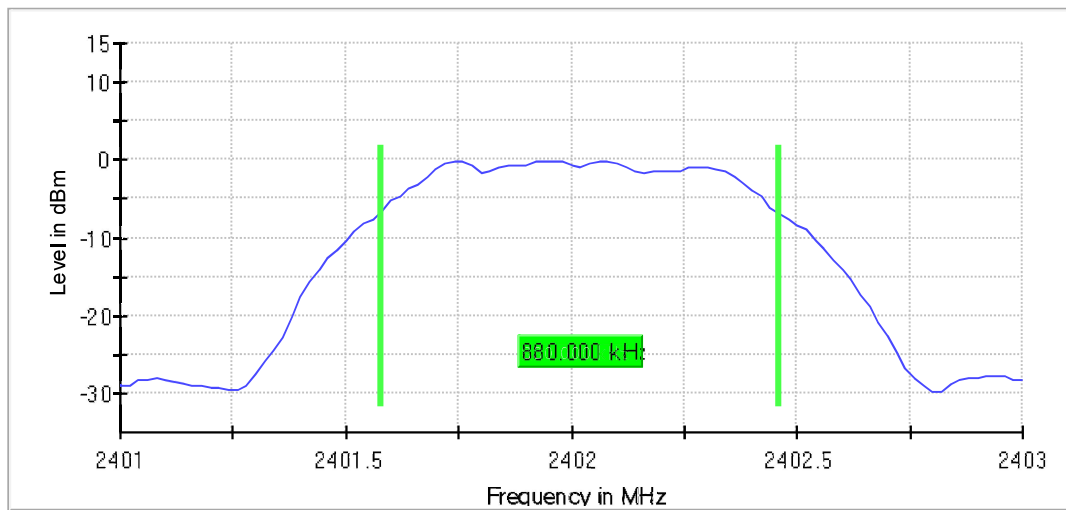
≥ 500

Test result for 6 dB Bandwidth

Mode	TX Type	Frequency (MHz)	ANT	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
1M	SISO	2402	1	0.880	≥ 0.5	Pass
		2440	1	0.900	≥ 0.5	Pass
		2480	1	0.940	≥ 0.5	Pass

1M_LCH_2402MHz_Ant1_NTNV

6 dB Bandwidth

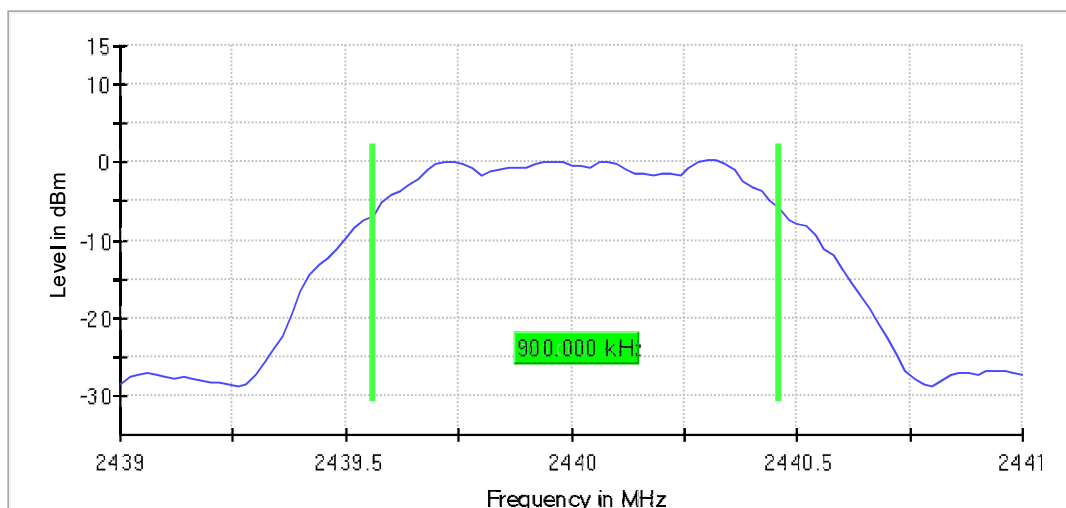


Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.40100 GHz	2.40100 GHz
Stop Frequency	2.40300 GHz	2.40300 GHz
Span	2.000 MHz	2.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	~ 300.000 kHz
SweepPoints	101	~ 40
SweepTime	41.830 μ s	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak

1M_MCH_2440MHz_Ant1_NTNV

6 dB Bandwidth

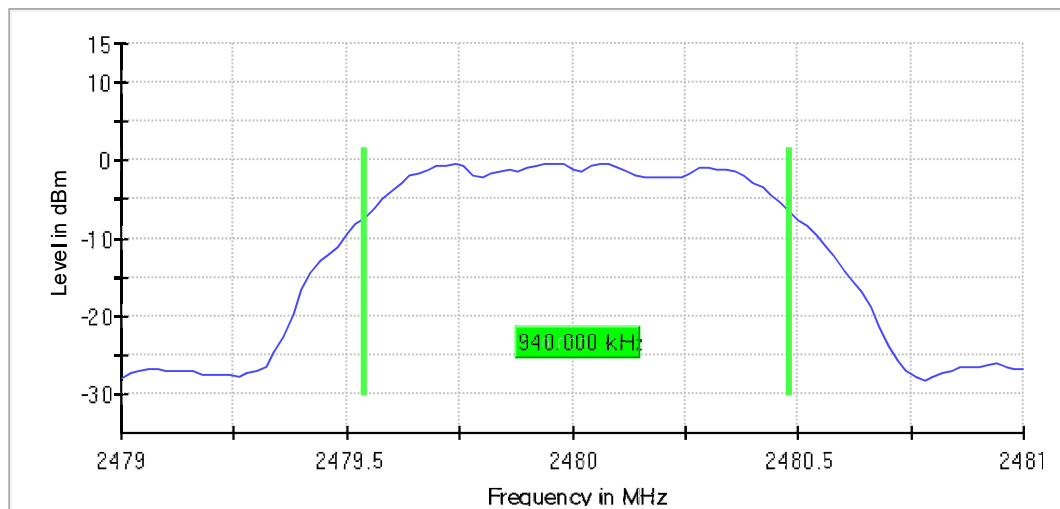


Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.43900 GHz	2.43900 GHz
Stop Frequency	2.44100 GHz	2.44100 GHz
Span	2.000 MHz	2.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	~ 300.000 kHz
SweepPoints	101	~ 40
SweepTime	41.830 μ s	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak

1M_HCH_2480MHz_Ant1_NTNV

6 dB Bandwidth



Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.47900 GHz	2.47900 GHz
Stop Frequency	2.48100 GHz	2.48100 GHz
Span	2.000 MHz	2.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	~ 300.000 kHz
SweepPoints	101	~ 40
SweepTime	41.830 μ s	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak

9.4 Power spectral density

Test Method

This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance:

1. The RF output of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting, the instrument center frequency is set to the nominal EUT channel center frequency enable the EUT transmit continuously.
3. Use the following spectrum analyzer settings:
4. Set analyzer center frequency to DTS channel center frequency. RBW=3kHz, VBW $\geq$ 3RBW, Span=1.5 times DTS bandwidth, Detector=Peak, Sweep=auto, Trace= max hold.
5. Allow trace to fully stabilize, use the peak marker function to determine the maximum amplitude level within the RBW.
6. Repeat above procedures until other frequencies measured were completed.

Limit

Limit [dBm/3kHz]

≤ 8

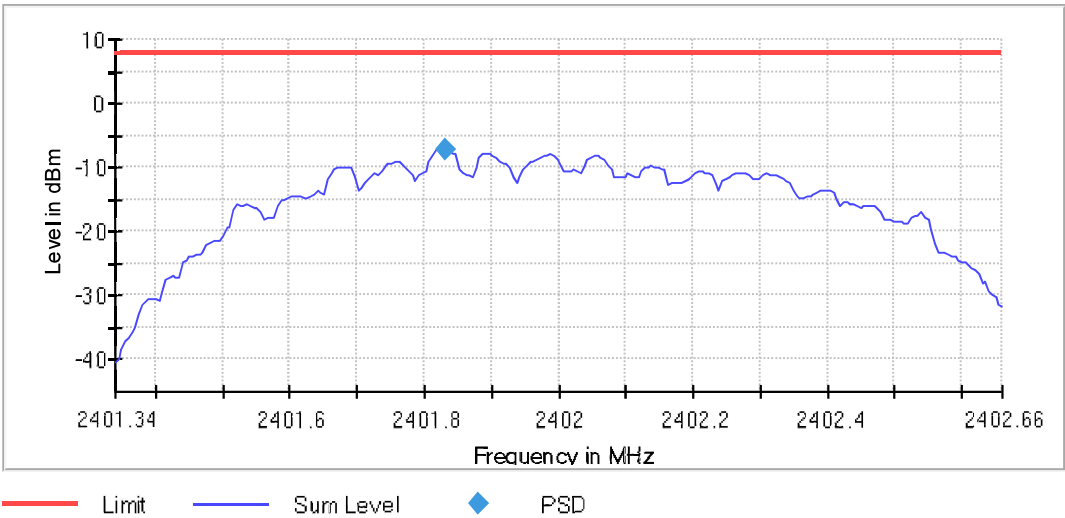
Test Results

Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm/10kHz)	Correction factor (dB)	Maximum PSD (dBm/3kHz)		Verdict
			ANT1		ANT1	Limit	
1M	SISO	2402	-7.246	5.23	-12.476	≤ 8	Pass
		2440	-7.153	5.23	-12.383	≤ 8	Pass
		2480	-7.978	5.23	-13.208	≤ 8	Pass

Note: Maximum PSD(dBm/3kHz)= Maximum PSD(dBm/10kHz)-10log (10/3)= Maximum PSD (dBm/10kHz)- 5.23

1M_LCH_2402MHz_Ant1_NTNV

Peak Power Spectral Density

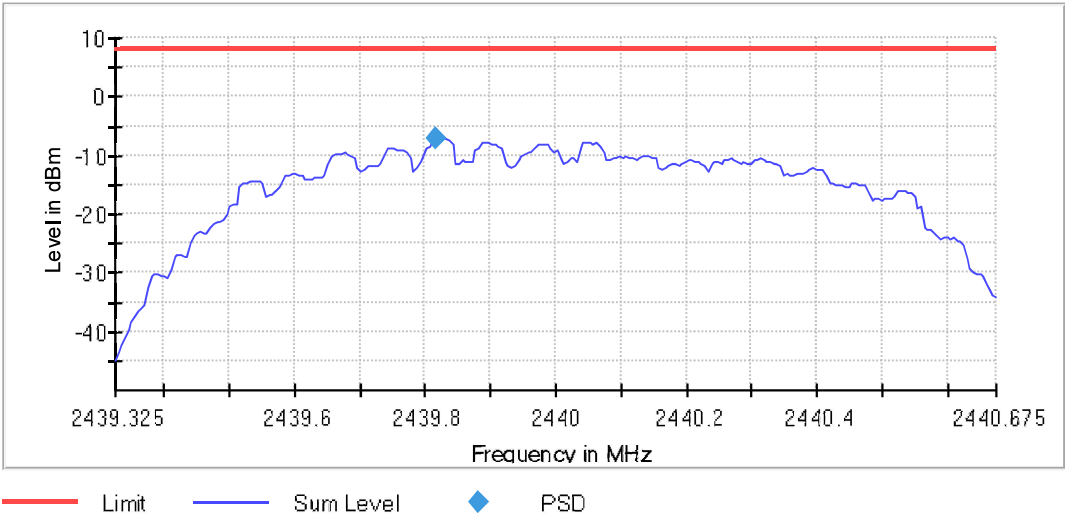


Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.40134 GHz	2.40134 GHz
Stop Frequency	2.40266 GHz	2.40266 GHz
Span	1.320 MHz	1.320 MHz
RBW	10.000 kHz	<= 10.000 kHz
VBW	30.000 kHz	>= 30.000 kHz
SweepPoints	264	~ 264
SweepTime	1.320 ms	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak

1M_MCH_2440MHz_Ant1_NTNV

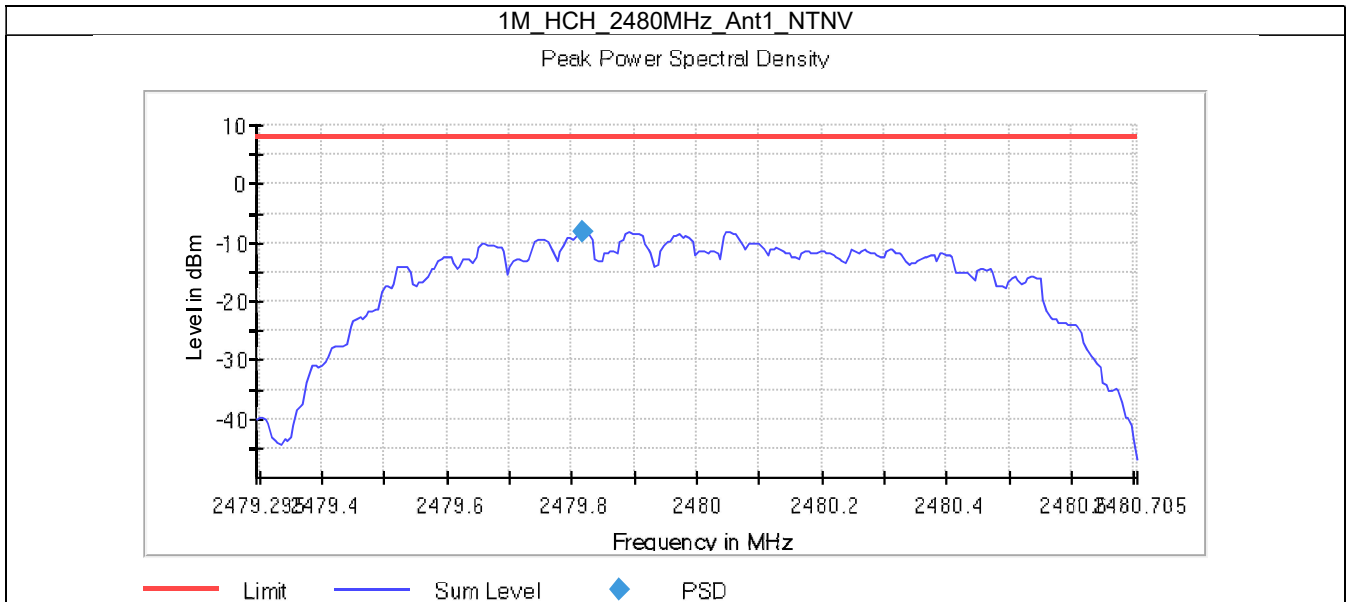
Peak Power Spectral Density



Measurement

Setting	Instrument Value	Target Value
---------	------------------	--------------

Start Frequency	2.43933 GHz	2.43933 GHz
Stop Frequency	2.44068 GHz	2.44068 GHz
Span	1.350 MHz	1.350 MHz
RBW	10.000 kHz	<= 10.000 kHz
VBW	30.000 kHz	>= 30.000 kHz
SweepPoints	270	~ 270
SweepTime	1.350 ms	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak



Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.47930 GHz	2.47930 GHz
Stop Frequency	2.48071 GHz	2.48071 GHz
Span	1.410 MHz	1.410 MHz
RBW	10.000 kHz	<= 10.000 kHz
VBW	30.000 kHz	>= 30.000 kHz
SweepPoints	282	~ 282
SweepTime	1.410 ms	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak

9.5 Spurious RF conducted emissions

Test Method

1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting, the instrument center frequency is set to the nominal EUT channel center frequency enable the EUT transmit continuously.
3. Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.
RBW = 100 kHz, VBW $\geq$ 3RBW, Sweep = auto, Detector function = peak, Trace = max hold
4. Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded.
5. The level displayed must comply with the limit specified in this Section. Submit these plots.
6. Repeat above procedures until all frequencies measured were complete.

Limit

Frequency Range MHz	Limit (dBc)
30-25000	-20

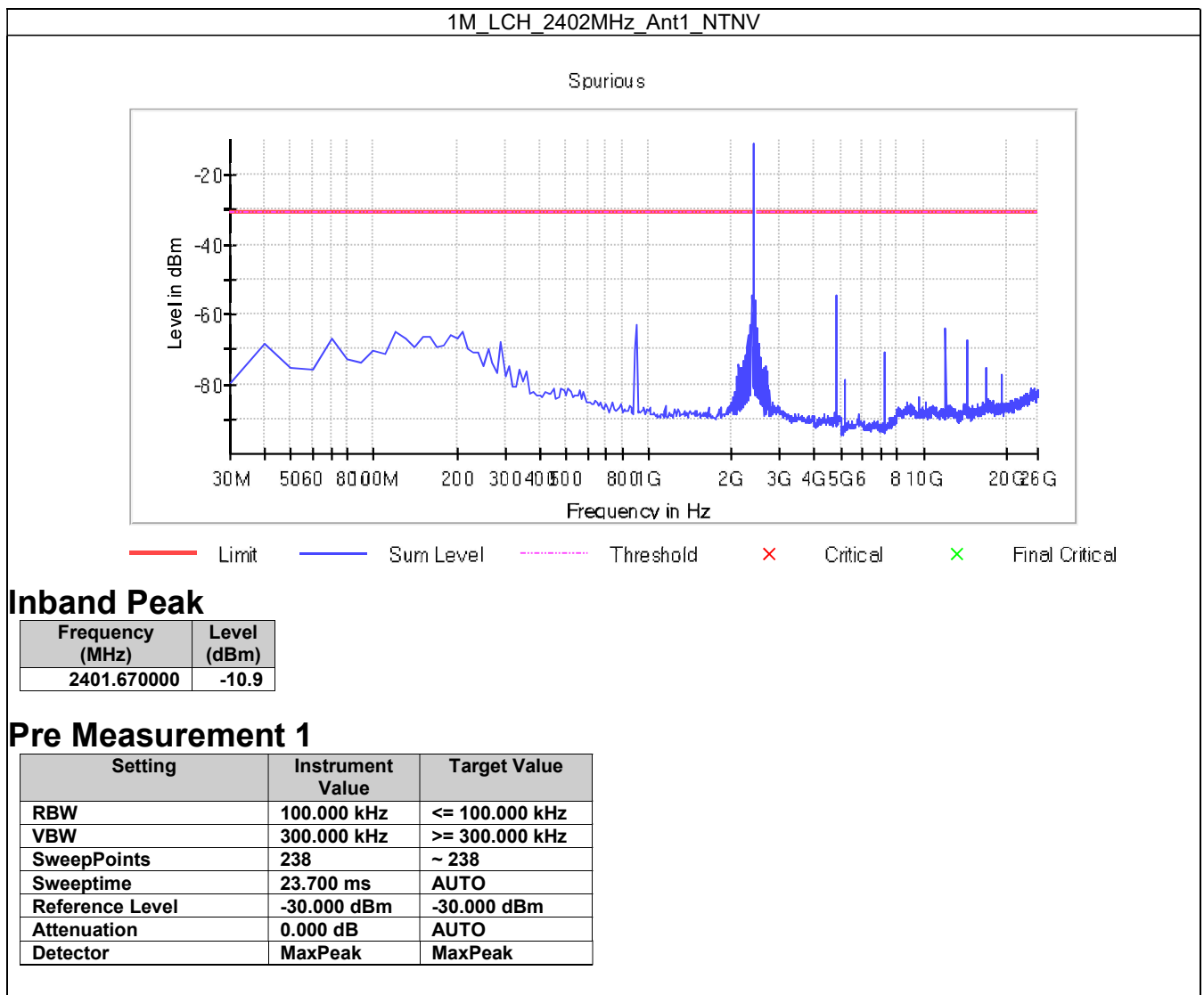
Test Result

Reference level:

Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)
1M	SISO	2402	1	-10.9
		2440	1	-9.3
		2480	1	-9.6
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.				

Conducted spurious emissions:

Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
1M	SISO	2402	1	-10.9	-30.9	Pass
		2440	1	-9.3	-29.3	Pass
		2480	1	-9.6	-29.6	Pass
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.						

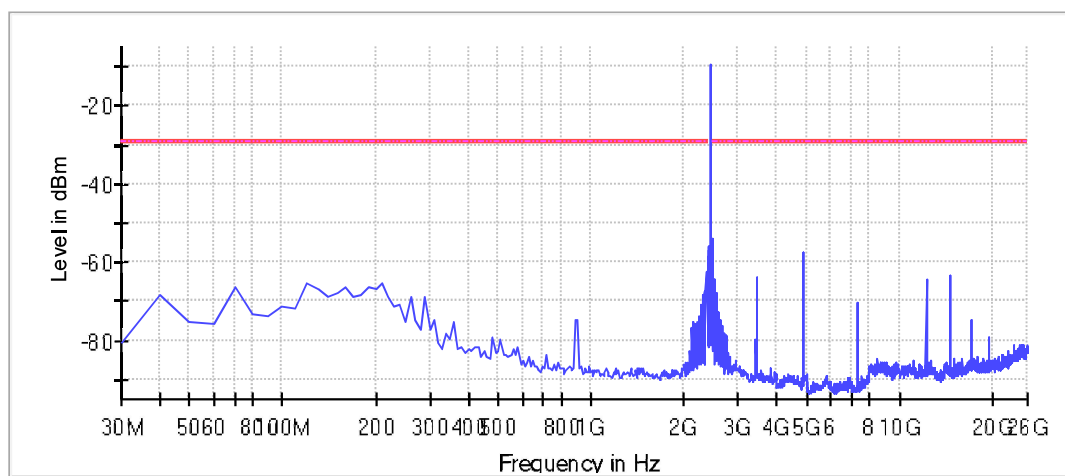


Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
2370.000000	-54.4	23.5	-30.9
4803.154762	-54.5	23.6	-30.9
2390.000000	-55.5	24.6	-30.9
2380.000000	-55.6	24.6	-30.9
2360.000000	-56.5	25.6	-30.9
2330.000000	-62.9	32.0	-30.9
900.000000	-63.1	32.2	-30.9
12012.081845	-63.7	32.8	-30.9
210.000000	-65.0	34.1	-30.9
120.000000	-65.0	34.1	-30.9
2290.000000	-66.0	35.1	-30.9
190.000000	-66.1	35.2	-30.9
150.000000	-66.3	35.4	-30.9
160.000000	-66.5	35.6	-30.9
70.000000	-66.7	35.7	-30.9

1M_MCH_2440MHz_Ant1_NTNV

Spurious



— Limit — Sum Level — Threshold × Critical × Final Critical

Inband Peak

Frequency (MHz)	Level (dBm)
2440.080000	-9.3

Pre Measurement 1

Setting	Instrument Value	Target Value
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	238	~ 238
SweepTime	23.700 ms	AUTO
Reference Level	-30.000 dBm	-30.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak

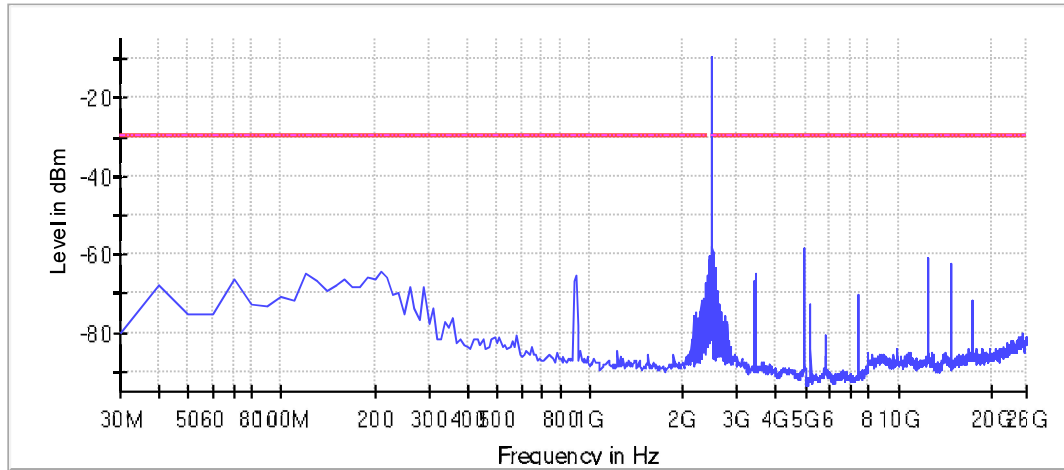
Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
4873.144345	-57.4	28.1	-29.3
2360.000000	-62.3	33.0	-29.3
14641.690476	-63.1	33.8	-29.3
3443.357143	-63.9	34.6	-29.3
2513.495536	-64.2	34.9	-29.3
12202.053571	-64.2	34.9	-29.3
2370.000000	-64.6	35.3	-29.3
210.000000	-65.1	35.8	-29.3
120.000000	-65.3	36.0	-29.3
190.000000	-66.3	37.0	-29.3

70.000000	-66.5	37.2	-29.3
160.000000	-66.5	37.2	-29.3
200.000000	-66.8	37.5	-29.3
130.000000	-66.9	37.6	-29.3
2330.000000	-67.5	38.2	-29.3

1M_HCH_2480MHz_Ant1_NTNV

Spurious



— Limit — Sum Level - - - Threshold × Critical × Final Critical

Inband Peak

Frequency (MHz)	Level (dBm)
2440.080000	-9.3

Pre Measurement 1

Setting	Instrument Value	Target Value
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	238	~ 238
SweepTime	23.700 ms	AUTO
Reference Level	-30.000 dBm	-30.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak

Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
2493.498512	-57.8	28.2	-29.6
4953.132440	-58.6	29.0	-29.6
2503.497024	-59.2	29.6	-29.6
2523.494048	-59.5	29.9	-29.6
12402.023810	-60.9	31.3	-29.6
14881.654762	-62.2	32.6	-29.6
2553.489583	-63.5	33.9	-29.6
210.000000	-64.3	34.6	-29.6
3433.358631	-64.8	35.2	-29.6
120.000000	-64.9	35.3	-29.6
900.000000	-65.2	35.5	-29.6
220.000000	-65.8	36.1	-29.6
190.000000	-65.9	36.3	-29.6
160.000000	-66.1	36.5	-29.6
70.000000	-66.2	36.6	-29.6