HUNAN GREATWALL COMPUTER SYSTEM CO.,LTD.

TEST REPORT

SCOPE OF WORK
FCC TESTING–LM1097P, LM1097P-A, LM1097P-B, LM1097P-C

REPORT NUMBER
231204042SZN-003

ISSUE DATE **[REVISED DATE]**

22 July 2024 [----------]

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TEST REPORT

Intertek Report No.: 231204042SZN-003

HUNAN GREATWALL COMPUTER SYSTEM CO.,LTD.

Application
For
Certification

FCC ID: 2APUQ-LM1097P

Tablet

Model: LM1097P, LM1097P-A, LM1097P-B, LM1097P-C

Brand name: Greatwall

2.4GHz Wi-Fi Transceiver

Report No.: 231204042SZN-003

We hereby certify that the sample of the above item is considered to comply with the requirements of FCC Part 15, Subpart C for Intentional Radiator, mention 47 CFR [10-1-23]

Prepared and Checked by:

Draven Li
Project Engineer

Approved by:

Peter Kang
Sr. Technical Supervisor
Date: 22 July 2024

MEASUREMENT/TECHNICAL REPORT

This report concerns (check one) Original Grant ___X___ Class II Change _____

Equipment Type: DTS - Part 15 Digital Transmission Systems (Wi-Fi transmitter portion)

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? Yes _____ No ___X___

If yes, defer until: _____
date

Company Name agrees to notify the Commission by: _____
date

of the intended date of announcement of the product so that the grant can be issued on that date.

Transition Rules Request per 15.37? Yes _____ No ___X___

If no, assumed Part 15, Subpart C for intentional radiator - the new 47 CFR [10-01-23] Edition] provision.

Report prepared by:

Draven Li
Intertek Testing Services Shenzhen Ltd. Longhua Branch
101, 201, Building B, No. 308 Wuhe Avenue,
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Table of Contents

1.0 Summary of Test results

Applicant: HUNAN GREATWALL COMPUTER SYSTEM CO.,LTD.
Applicant Address: Hunan GreatWall Industrial Park, Xiangyun Middle Road, Tianyuan District, Zhuzhou, Hunan Province, China
Manufacturer: HUNAN GREATWALL COMPUTER SYSTEM CO.,LTD.
Manufacturer Address: Hunan GreatWall Industrial Park, Xiangyun Middle Road, Tianyuan District, Zhuzhou, Hunan Province, China

Model: LM1097P
FCC ID: 2APUQ-LM1097P

TEST ITEM	REFERENCE	RESULTS
Max. Output power	15.247(b)(3)	Pass
6 dB Bandwidth	15.247(a)(2)	Pass
Max. Power Density	15.247(e)	Pass
Out of Band Antenna Conducted Emission	15.247(d)	Pass
Radiated Emission in Restricted Bands	15.247(d), 15.209, FCC 15.205	Pass
AC Conducted Emission	15.207	Pass
Antenna Requirement	15.203	Pass (See Notes)

Notes: The EUT uses an Integral Antenna which in accordance to Section 15.203 is considered sufficient to comply with the provisions of this section.

2.0 General Description

2.1 Product Description

The Equipment Under Test (EUT) is a Tablet with Bluetooth 4.2 (dual-mode) function operating in 2402-2480MHz, 2.4G WIFI function operating in 2412-2462MHz and 5G WIFI function operating in 5150MHz~5250 MHz, 5250MHz~5350MHz, 5725MHz~5850MHz, GSM function operating in 850MHz&1900MHz, WCDMA function operating in FDD band II/IV/V, LTE function operating in Band 2/4/5/12/17/25/26/41/66/71. The EUT is powered by DC 3.8V rechargeable battery or DC 5V/2A by adapter. For more details information pls. refer to the user manual.

Type of Modulation: BPSK, QPSK, 16QAM, 64QAM for OFDM; CCK, DQPSK, DBPSK for DSSS.
Antenna Type: Integral antenna
Antenna Gain: 1.06dBi max (This information is provided by applicant, and the applicant is responsible for the authenticity of the provided information.)

For electronic filing, the brief circuit description is saved with filename: descri.pdf.

2.2 Related Submittal(s) Grants

This is an application for certification of a transceiver for the Tablet which has 2.4G WIFI function.
For the Bluetooth (EDR) function was reported in report: 231204042SZN-001.
For the Bluetooth (BLE) function was reported in report: 231204042SZN-002.
For the 5G WIFI function was reported in report: 231204042SZN-004.
For the GSM/WCDMA/LTE function was reported in report: 231204042SZN-005.
For other digital functions were reported in the SDOC report: 231204042SZN-007.

2.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.10 (2013) and KDB 558074 D01 v05r02. Radiated emission measurement was performed in semi-anechoic chamber and conducted emission measurement was performed in shield room. For radiated emission measurement, preliminary scans were performed in the semi-anechoic chamber only to determine the worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application.

2.4 Test Facility

The Semi-Anechoic chamber and shield room used to collect the radiated data and conducted data are **Intertek Testing Services Shenzhen Ltd. Longhua Branch** and located at 101, 201, Building B, No. 308 Wuhe Avenue, Zhangkengjing Community, GuanHu Subdistrict, LongHua District, ShenZhen, P.R. China. This test facility and site measurement data have been fully placed on file with the FCC (Registration Number: CN1188).

3.0 System Test Configuration

3.1 Justification

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, all cables were manipulated to produce worst case emissions. The EUT was powered by DC 3.8V full rechargeable battery or DC 5V/2A by adapter during the test.

On 802.11b/g/n-HT20 mode, only one antenna is used, and all data rate were tested and only the worst case data is shown in the report.

For maximizing emissions, the EUT was rotated through 360°, the EUT was placed on the styrene turntable with 0.8m up to 1GHz and 1.5 m above 1GHz. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000 MHz. The resolution is 1 MHz or greater for frequencies above 1000 MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

The EUT and transmitting antenna was centered on the turntable.

Radiated emission measurement were performed the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

3.2 EUT Exercising Software

The EUT exercise program (provided by client) used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The worst case configuration is used in all specified testing.

The parameters of test software setting:
During the test, Channel and power controlling software provided by the applicant 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 application and is going to be fixed on the firmware of the end product.

Test Software: Nonsignaling operation platform

3.3 Special Accessories

No special accessories used.

3.4 Equipment Modification

Any modifications installed previous to testing by HUNAN GREATWALL COMPUTER SYSTEM CO.,LTD. will be incorporated in each production model sold / leased in the United States.

No modifications were installed by Intertek Testing Services Shenzhen Ltd. Longhua Branch.

3.5 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

Measurement Uncertainty	Uncertainty
Channel Bandwidth	±3.46%
RF Output Power	±0.31dB
Power Density	±3.0dB
Conducted Unwanted Emission	±0.55dB
Spurious emission (Above 18GHz)	±5.3dB
Spurious emission (6GHz to 18GHz)	±5.1dB
Radiated emission (1GHz to 6GHz)	±4.8dB
Radiated emission (Up to 1GHz)	±4.8dB
AC Conducted emission	±3.6 dB
Temperature	±1°C
Humidity	±5%

3.6 Support Equipment List and Description

Description	Manufacturer	Remark
Router	NETGEAR (provided by Intertek)	Model: R7800
Mobile phone	SAMSUNG (provided by Intertek)	Model: S7
Adapter	Shenzhen Huajin Electronics Co., Ltd. (Provided by Client)	Model: HJ-0502000W2-US Input: 100-240V~ 50/60Hz 0.3A Output: 5.0V⎓2.0A 10.0W
Type-C cable	N/A (Provided by Client)	Unshielded, Length 105cm

Applicant: HUNAN GREATWALL COMPUTER SYSTEM CO.,LTD.
Date of Test: 07 December 2023 Model: LM1097P

4.0 Measurement Results

4.1 Maximum Conducted Output Power at Antenna Terminals, FCC Rules 15.247(b)(3):

The antenna power of the EUT was connected to the input of a broadband peak RF power meter. The power meter has a video bandwidth that is greater than DTS bandwidth and utilize a fast-responding diode detector. Power was read directly at the EUT antenna terminals with cable loss added.

Systems operating in the 2400–2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

Maximum allowed Transmitter output is 1 watt (+30 dBm).

IEEE 802.11b (Antenna Gain = 1.06dBi) (CCK, 1Mbps)		
Frequency (MHz)	Output in dBm (Peak Reading)	Output in mWatt
Low Channel: 2412	14.1	25.7
Middle Channel: 2437	14.1	25.7
High Channel: 2462	14.0	25.1

IEEE 802.11g (Antenna Gain = 1.06dBi) (16QAM, 6Mbps)		
Frequency (MHz)	Output in dBm (Peak Reading)	Output in mWatt
Low Channel: 2412	22.3	169.8
Middle Channel: 2437	22.0	158.5
High Channel: 2462	21.6	144.5

IEEE 802.11n-HT20 (Antenna Gain = 1.06dBi) (64QAM, 6Mbps)		
Frequency (MHz)	Output in dBm (Peak Reading)	Output in mWatt
Low Channel: 2412	22.4	173.8
Middle Channel: 2437	22.2	166.0
High Channel: 2462	22.0	158.5

Cable loss: 0.3 dB External Attenuation: 0 dB

Cable loss, external attenuation has been included in OFFSET function

EUT max. output level = 22.4dBm
EUT max. E.I.R.P = 22.4dBm +1.06dBi = 23.46dBm = 221.8mW

For RF Exposure, the information is saved with filename: RF exposure.pdf.

Applicant: HUNAN GREATWALL COMPUTER SYSTEM CO.,LTD.
Date of Test: 07 December 2023 Model: LM1097P

4.2 Minimum 6 dB RF Bandwidth, FCC Rule 15.247(a) (2):

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RES BW was set to 100 KHz according to FCC KDB 558074 D01 v05r02. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK output reading was taken, a DISPLAY line was drawn 6 dB lower than PEAK level. The 6dB bandwidth was determined from where the channel output spectrum intersected the display line.

Limit: The 6 dB Bandwidth is at least 500 kHz.

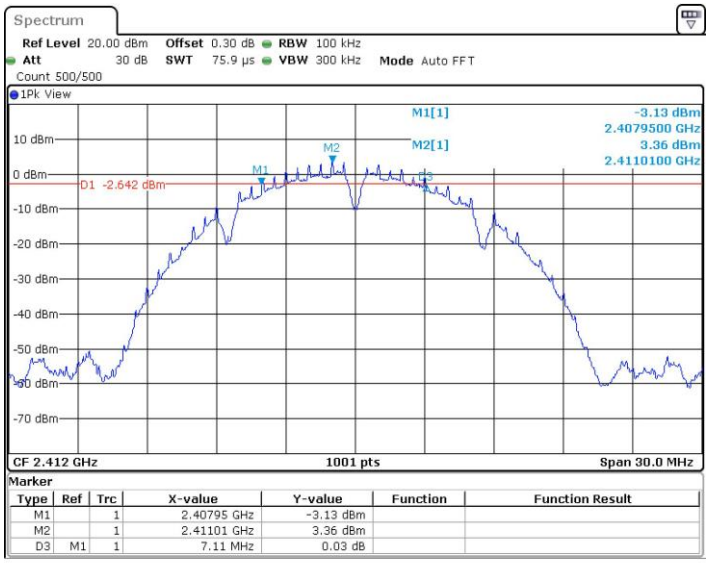
IEEE 802.11b (CCK, 1Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2412	7.110
2437	8.100
2462	7.620

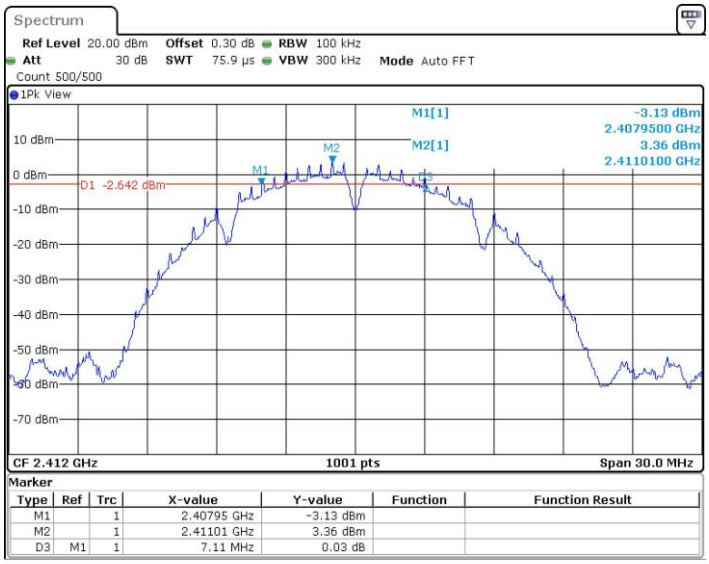
IEEE 802.11g (16QAM, 6Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2412	14.880
2437	15.690
2462	12.000

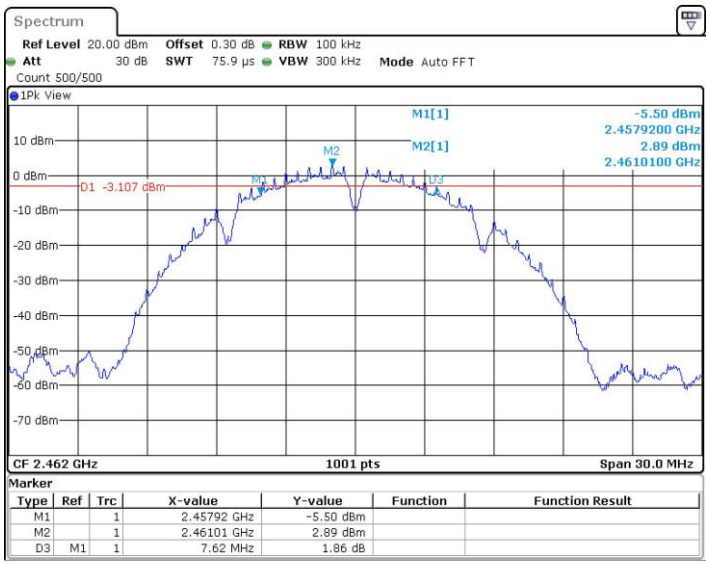
IEEE 802.11n-HT20 (64QAM, 6Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2412	12.660
2437	16.590
2462	11.430

The test plots are attached as below.

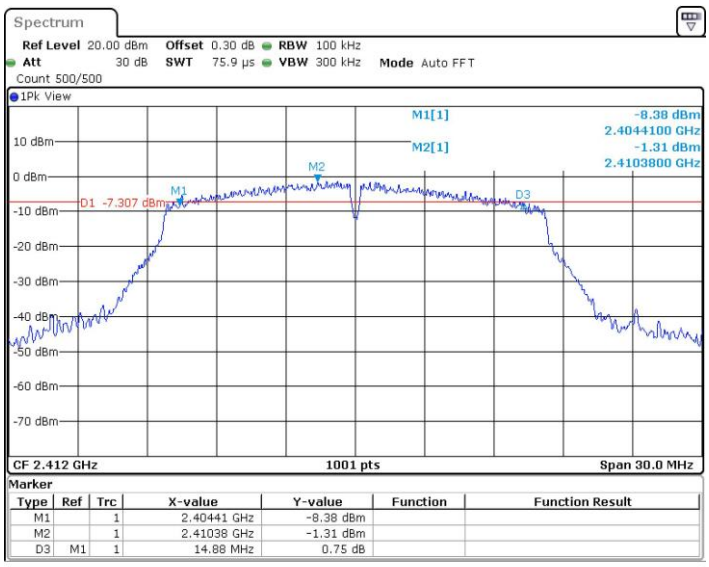
802.11b

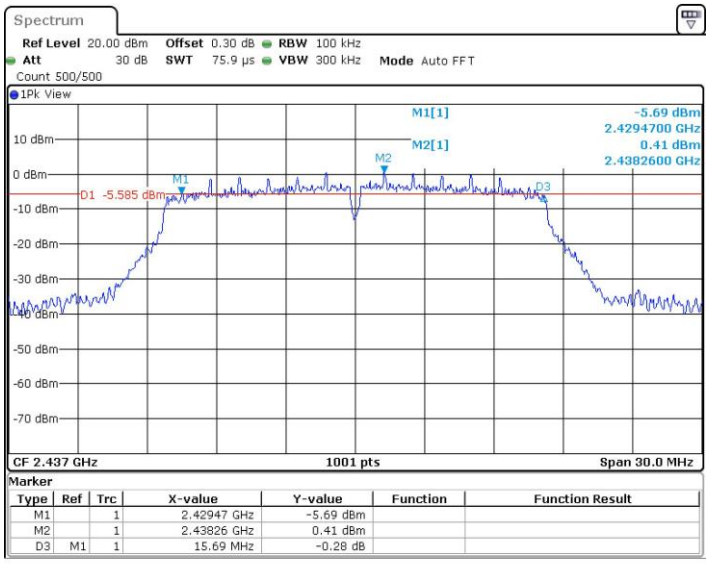

Spectrum
Ref Level 20.00 dBm Offset 0.30 dB RBW 100 kHz
Att 30 dB SWT 75.9 µs VBW 300 kHz Mode Auto FFT
Count 500/500
1Pk View
M1[1] -3.13 dBm
2.4079500 GHz
M2[1] 3.36 dBm
2.4110100 GHz
D1 -2.642 dBm
CF 2.412 GHz
1001 pts
Span 30.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.40795 GHz -3.13 dBm
M2 1 2.41101 GHz 3.36 dBm
D3 M1 1 7.11 MHz 0.03 dB

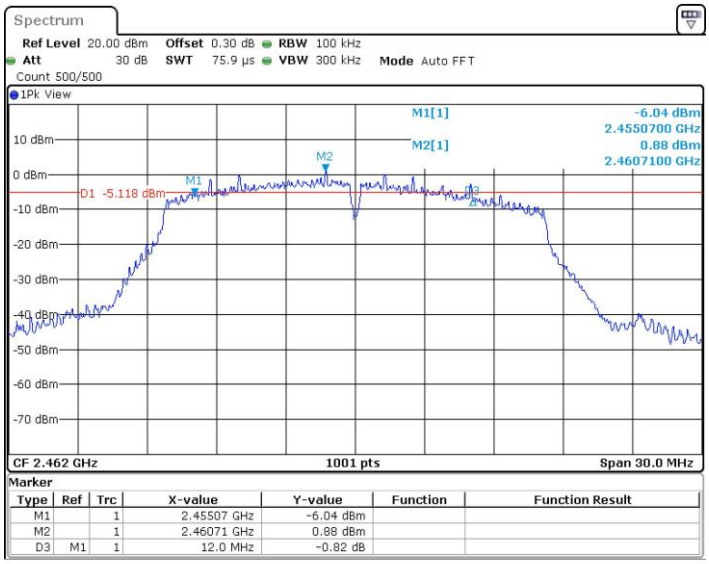

Spectrum
Ref Level 20.00 dBm Offset 0.30 dB RBW 100 kHz
Att 30 dB SWT 75.9 µs VBW 300 kHz Mode Auto FFT
Count 500/500
1Pk View
M1[1] -3.13 dBm
2.4079500 GHz
M2[1] 3.36 dBm
2.4110100 GHz
D1 -2.642 dBm
CF 2.412 GHz
1001 pts
Span 30.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.40795 GHz -3.13 dBm
M2 1 2.41101 GHz 3.36 dBm
D3 M1 1 7.11 MHz 0.03 dB


Spectrum
Ref Level 20.00 dBm Offset 0.30 dB RBW 100 kHz
Att 30 dB SWT 75.9 µs VBW 300 kHz Mode Auto FFT
Count 500/500
1Pk View
M1[1] -5.50 dBm
2.4579200 GHz
M2[1] 2.89 dBm
2.4610100 GHz
D1 -3.107 dBm
CF 2.462 GHz
1001 pts
Span 30.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.45792 GHz -5.50 dBm
M2 1 2.46101 GHz 2.89 dBm
D3 M1 1 7.62 MHz 1.86 dB

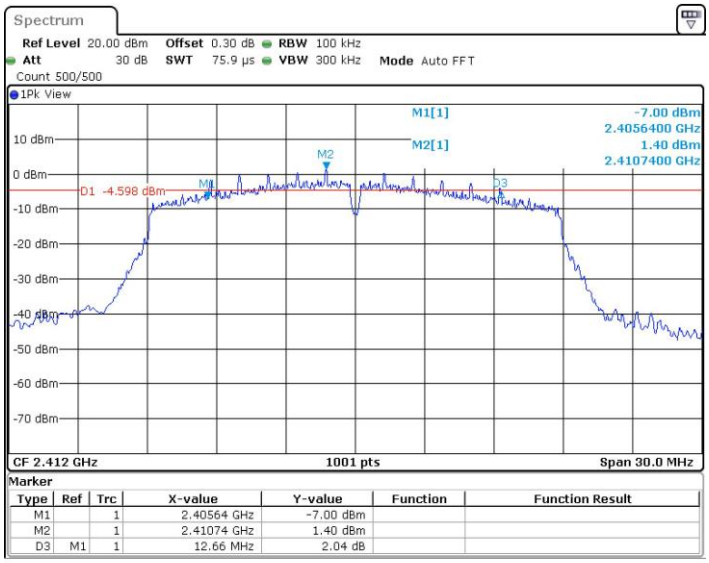
802.11g

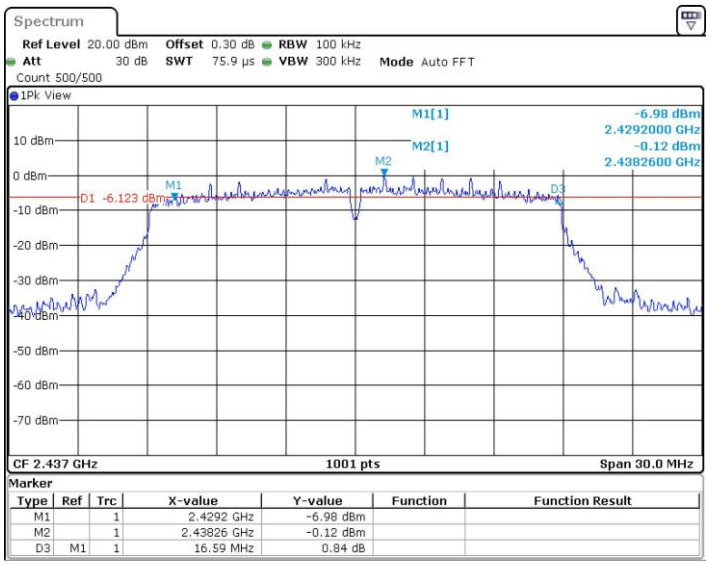

Spectrum
Ref Level 20.00 dBm Offset 0.30 dB RBW 100 kHz
Att 30 dB SWT 75.9 µs VBW 300 kHz Mode Auto FFT
Count 500/500
1Pk View
M1[1] -8.38 dBm
2.4044100 GHz
M2[1] -1.31 dBm
2.4103800 GHz
D1 -7.307 dBm
CF 2.412 GHz
1001 pts
Span 30.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.40441 GHz -8.38 dBm
M2 1 2.41038 GHz -1.31 dBm
D3 M1 1 14.88 MHz 0.75 dB

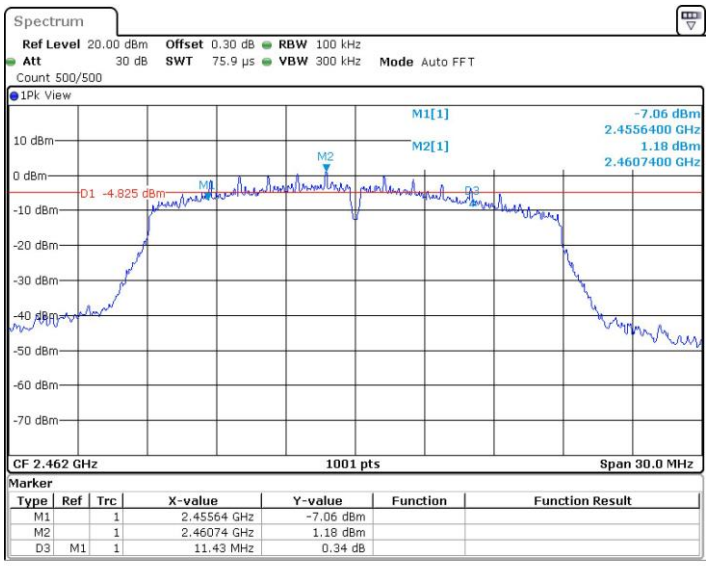

Spectrum
Ref Level 20.00 dBm Offset 0.30 dB RBW 100 kHz
Att 30 dB SWT 75.9 µs VBW 300 kHz Mode Auto FFT
Count 500/500
1Pk View
M1[1] -5.69 dBm
2.4294700 GHz
M2[1] 0.41 dBm
2.4382600 GHz
D1 -5.585 dBm
CF 2.437 GHz
1001 pts
Span 30.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.42947 GHz -5.69 dBm
M2 1 2.43826 GHz 0.41 dBm
D3 M1 1 15.69 MHz -0.28 dB


Spectrum
Ref Level 20.00 dBm Offset 0.30 dB RBW 100 kHz
Att 30 dB SWT 75.9 µs VBW 300 kHz Mode Auto FFT
Count 500/500
1Pk View
M1[1] -6.04 dBm
2.4550700 GHz
M2[1] 0.88 dBm
2.4607100 GHz
D1 -5.118 dBm
CF 2.462 GHz
1001 pts
Span 30.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.45507 GHz -6.04 dBm
M2 1 2.46071 GHz 0.88 dBm
D3 M1 1 12.0 MHz -0.82 dB

802.11n-HT20


Spectrum
Ref Level 20.00 dBm Offset 0.30 dB RBW 100 kHz
Att 30 dB SWT 75.9 µs VBW 300 kHz Mode Auto FFT
Count 500/500
1Pk View
M1[1] -7.00 dBm
2.4056400 GHz
M2[1] 1.40 dBm
2.4107400 GHz
D1 -4.598 dBm
CF 2.412 GHz
1001 pts
Span 30.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.40564 GHz -7.00 dBm
M2 1 2.41074 GHz 1.40 dBm
D3 M1 1 12.66 MHz 2.04 dB


Spectrum
Ref Level 20.00 dBm Offset 0.30 dB RBW 100 kHz
Att 30 dB SWT 75.9 µs VBW 300 kHz Mode Auto FFT
Count 500/500
1Pk View
M1[1] -6.98 dBm
2.4292000 GHz
M2[1] -0.12 dBm
2.4382600 GHz
D1 -6.123 dBm
CF 2.437 GHz
1001 pts
Span 30.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.4292 GHz -6.98 dBm
M2 1 2.43826 GHz -0.12 dBm
D3 M1 1 16.59 MHz 0.84 dB


Spectrum
Ref Level 20.00 dBm Offset 0.30 dB RBW 100 kHz
Att 30 dB SWT 75.9 µs VBW 300 kHz Mode Auto FFT
Count 500/500
1Pk View
M1[1] -7.06 dBm
2.4556400 GHz
M2[1] 1.18 dBm
2.4607400 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
D1 -4.825 dBm
M1
M2
D3
CF 2.462 GHz
1001 pts
Span 30.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.45564 GHz -7.06 dBm
M2 1 2.46074 GHz 1.18 dBm
D3 M1 1 11.43 MHz 0.34 dB

Applicant: HUNAN GREATWALL COMPUTER SYSTEM CO.,LTD.
Date of Test: 07 December 2023 Model: LM1097P

4.3 Maximum Power Density Reading, FCC Rule 15.247(e):

The Measurement Procedure PKPSD was set according to the FCC KDB 558074 D01 v05r02.

Antenna output of the EUT was coupled directly to spectrum analyzer; if an external attenuator and/or cable was used, these losses are compensated for with the analyzer OFFSET function.

Limit: The Power Density does not exceed 8dBm/3 kHz.

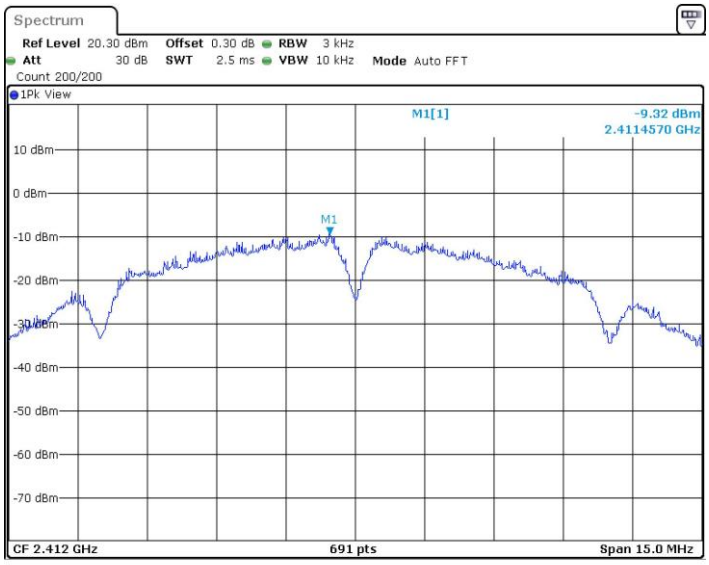
IEEE 802.11b (CCK, 1Mbps)	
Frequency (MHz)	Power Density with RBW 100KHz
2412	-9.32
2437	-10.17
2462	-10.11

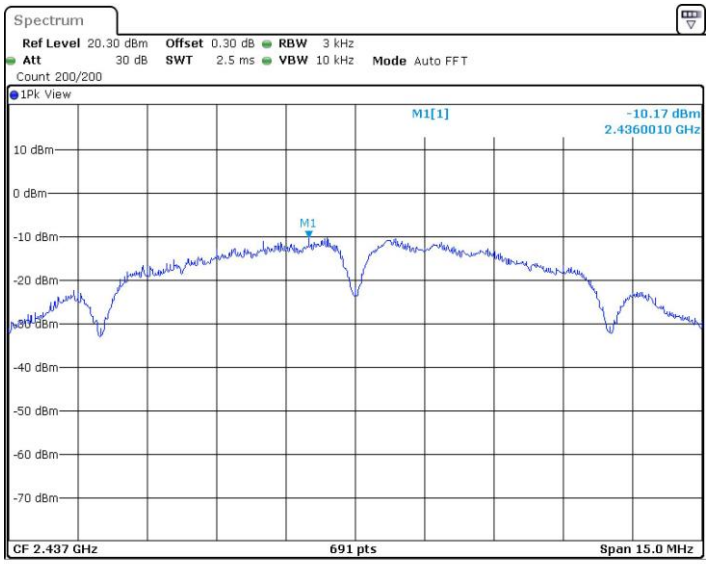
IEEE 802.11g (16QAM, 6Mbps)	
Frequency (MHz)	Power Density with RBW 100KHz
2412	-10.3
2437	-12.79
2462	-11.9

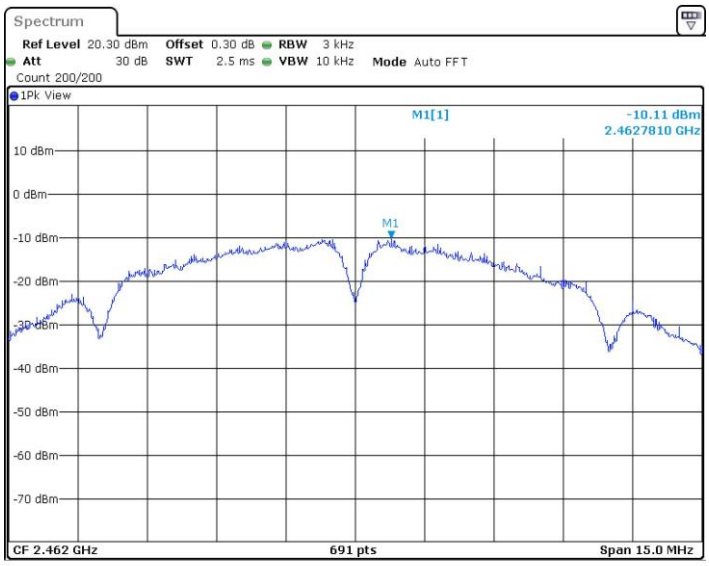
IEEE 802.11n-HT20 (64QAM, 6Mbps)	
Frequency (MHz)	Power Density with RBW 100KHz
2412	-12.14
2437	-12.33
2462	-12.42

The test plots are attached as below.

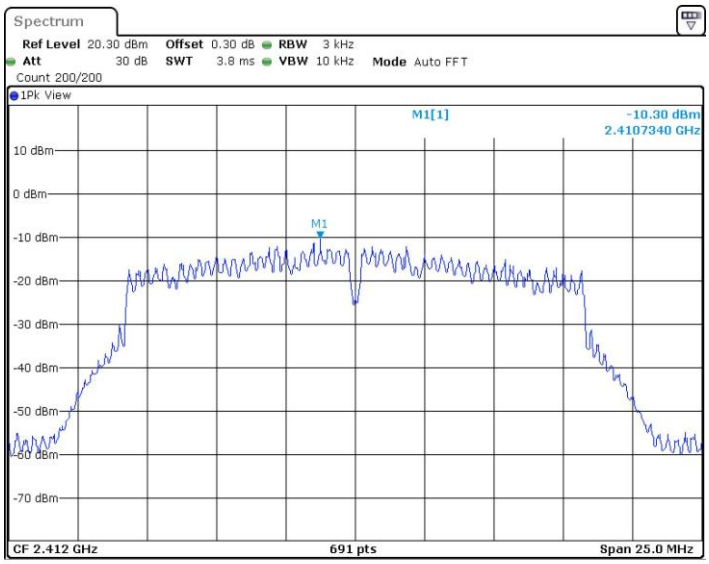
802.11b

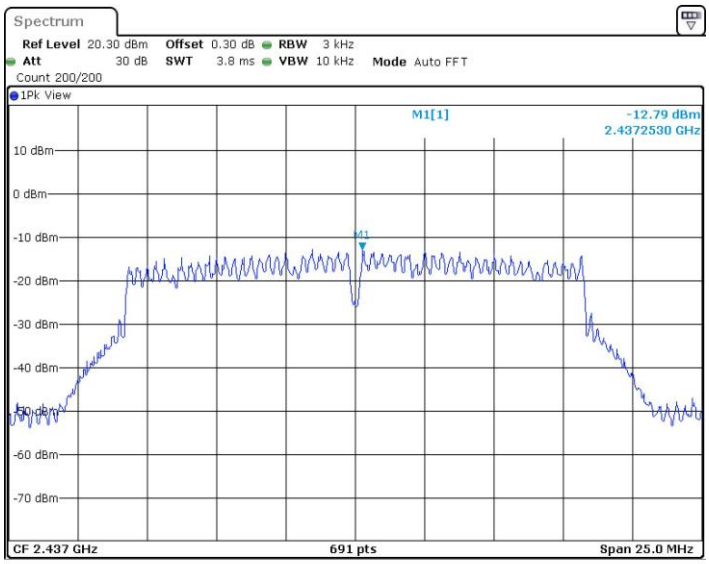

Spectrum
Ref Level 20.30 dBm Offset 0.30 dB RBW 3 kHz
Att 30 dB SWT 2.5 ms VBW 10 kHz Mode Auto FFT
Count 200/200
1Pk View
M1[1] -9.32 dBm
2.4114570 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
CF 2.412 GHz
691 pts
Span 15.0 MHz

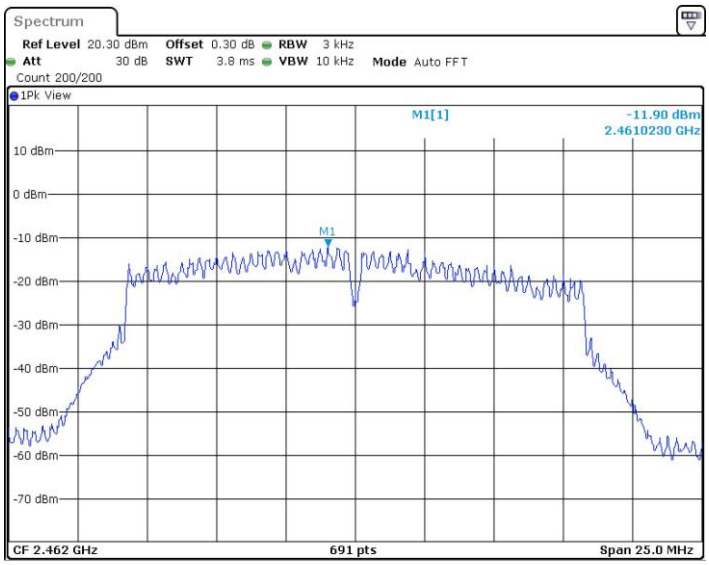

Spectrum
Ref Level 20.30 dBm Offset 0.30 dB RBW 3 kHz
Att 30 dB SWT 2.5 ms VBW 10 kHz Mode Auto FFT
Count 200/200
1Pk View
M1[1] -10.17 dBm
2.4360010 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
CF 2.437 GHz
691 pts
Span 15.0 MHz


Spectrum
Ref Level 20.30 dBm Offset 0.30 dB RBW 3 kHz
Att 30 dB SWT 2.5 ms VBW 10 kHz Mode Auto FFT
Count 200/200
1Pk View
M1[1] -10.11 dBm
2.4627810 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
CF 2.462 GHz
691 pts
Span 15.0 MHz

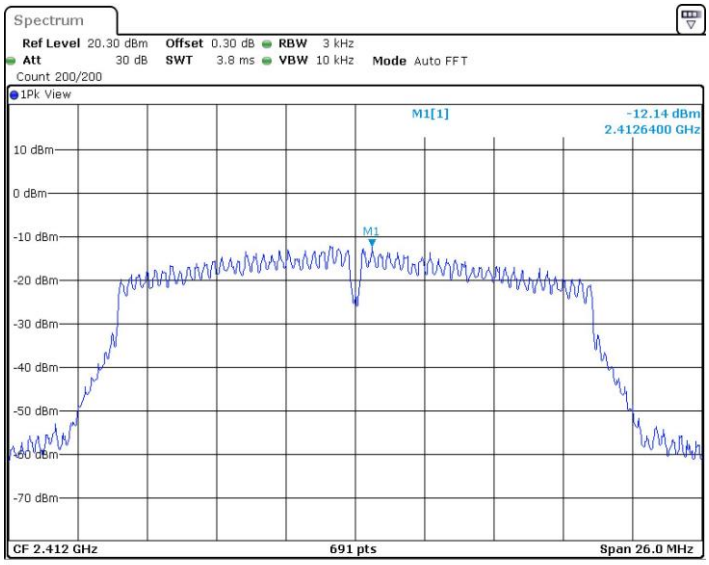
802.11g

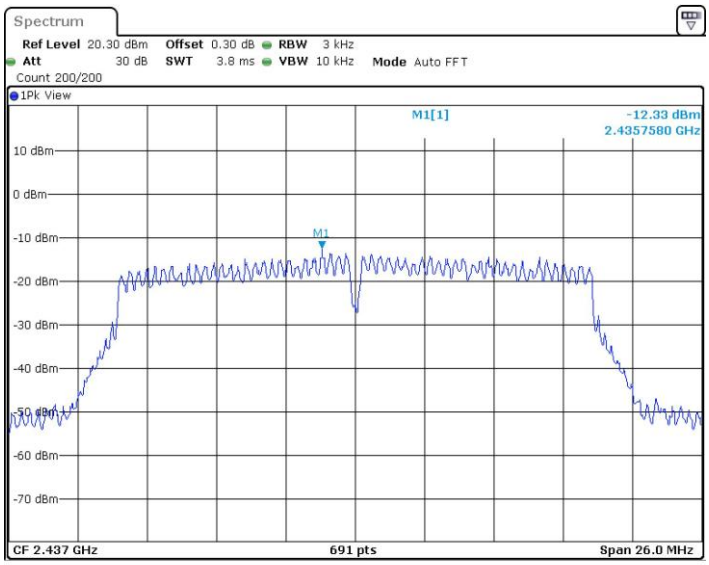

Spectrum
Ref Level 20.30 dBm Offset 0.30 dB RBW 3 kHz
Att 30 dB SWT 3.8 ms VBW 10 kHz Mode Auto FFT
Count 200/200
1Pk View
M1[1] -10.30 dBm
2.4107340 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
CF 2.412 GHz
691 pts
Span 25.0 MHz

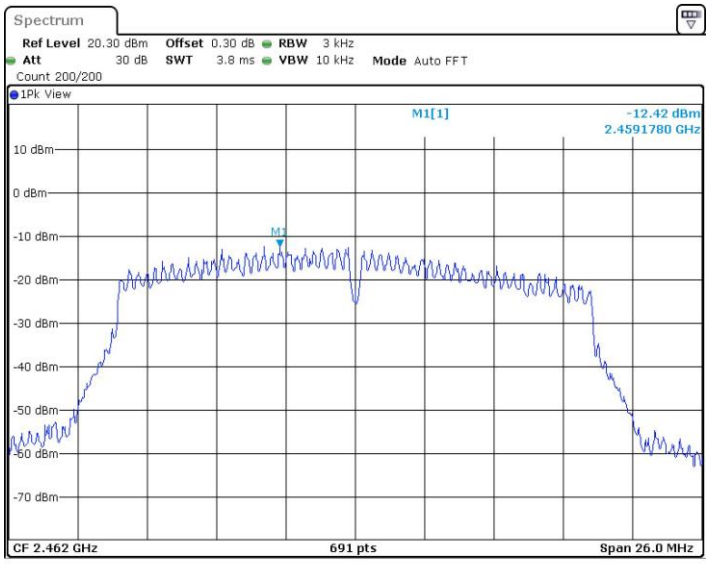

Spectrum
Ref Level 20.30 dBm Offset 0.30 dB RBW 3 kHz
Att 30 dB SWT 3.8 ms VBW 10 kHz Mode Auto FFT
Count 200/200
1Pk View
M1[1] -12.79 dBm
2.4372530 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
CF 2.437 GHz
691 pts
Span 25.0 MHz


Spectrum
Ref Level 20.30 dBm Offset 0.30 dB RBW 3 kHz
Att 30 dB SWT 3.8 ms VBW 10 kHz Mode Auto FFT
Count 200/200
1Pk View
M1[1] -11.90 dBm
2.4610230 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
CF 2.462 GHz
691 pts
Span 25.0 MHz

802.11n-HT20


Spectrum
Ref Level 20.30 dBm Offset 0.30 dB RBW 3 kHz
Att 30 dB SWT 3.8 ms VBW 10 kHz Mode Auto FFT
Count 200/200
1Pk View
M1[1] -12.14 dBm
2.4126400 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
CF 2.412 GHz
691 pts
Span 26.0 MHz


Spectrum
Ref Level 20.30 dBm Offset 0.30 dB RBW 3 kHz
Att 30 dB SWT 3.8 ms VBW 10 kHz Mode Auto FFT
Count 200/200
1Pk View
M1[1] -12.33 dBm
2.4357580 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
CF 2.437 GHz
691 pts
Span 26.0 MHz


Spectrum
Ref Level 20.30 dBm Offset 0.30 dB RBW 3 kHz
Att 30 dB SWT 3.8 ms VBW 10 kHz Mode Auto FFT
Count 200/200
1Pk View
M1[1] -12.42 dBm
2.4591780 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
CF 2.462 GHz
691 pts
Span 26.0 MHz

Applicant: HUNAN GREATWALL COMPUTER SYSTEM CO.,LTD.
Date of Test: 07 December 2023 Model: LM1097P

4.4 Out of Band Conducted Emissions, FCC Rule 15.247(d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. The Measurement Procedure was set according to the FCC KDB 558074 D01 v05r02.

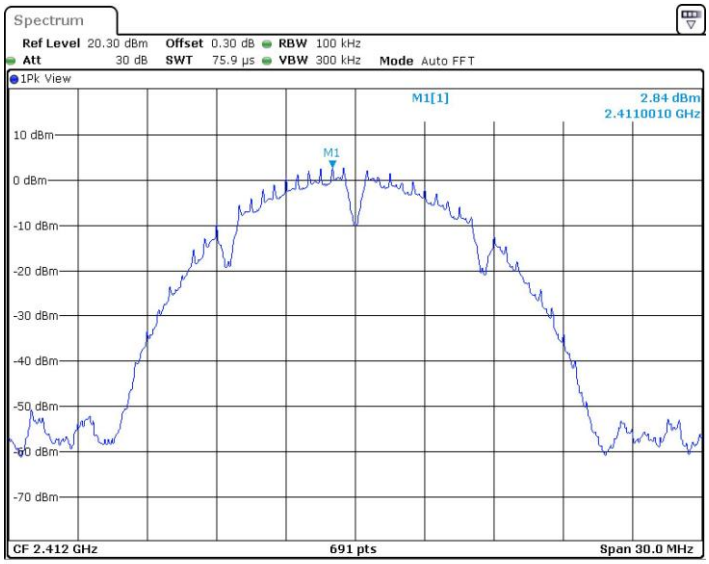
All other types of emissions from the EUT shall meet the general limits for radiated frequencies outside the passband.

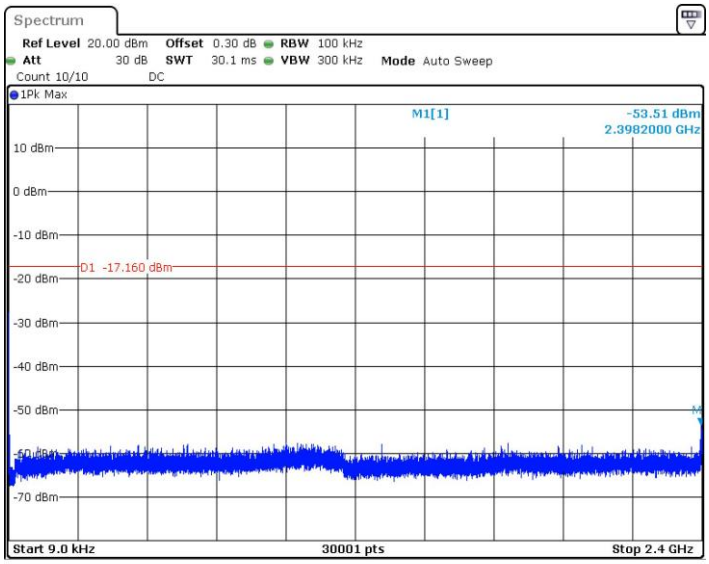
Refer to the attached test plots for out of band conducted emissions data with rate of 1Mbps for 802.11b and 6Mbps for 802.11g and 6Mbps for 802.11n-HT20 and 13.5Mbps for 802.11n-HT40.

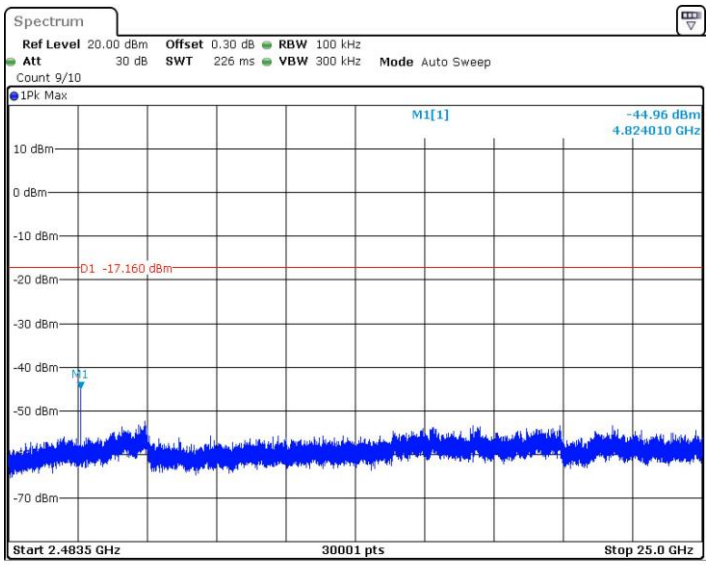
The test plots showed all spurious emission up to the tenth harmonic were measured and they were found to be at least 20 dB below the highest level of the desired power in the passband.

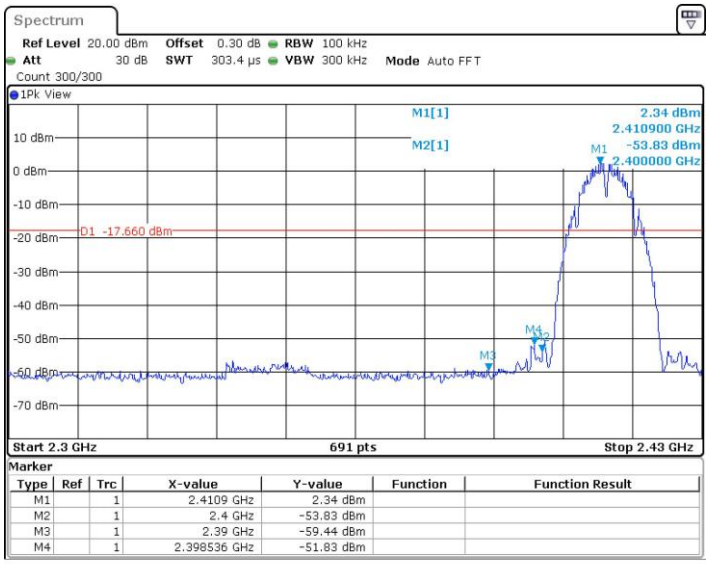
The test plots are attached as below.

802.11b
Channel 01 (2412MHz) Reference Level: 2.84dBm





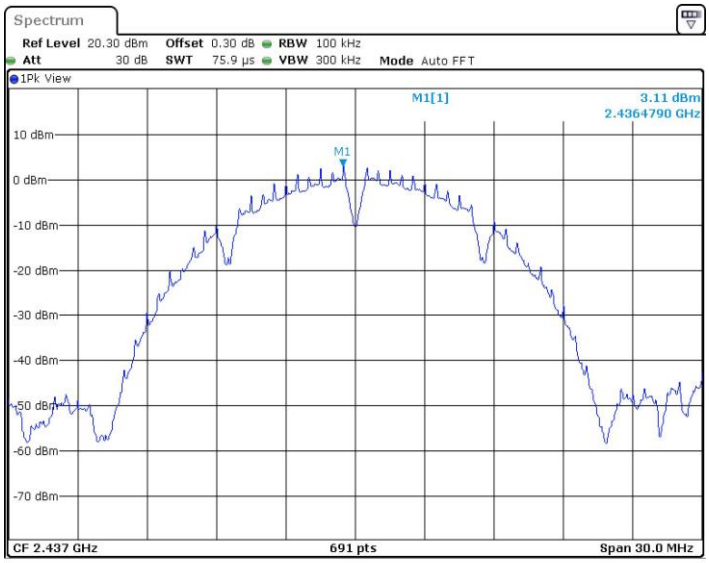


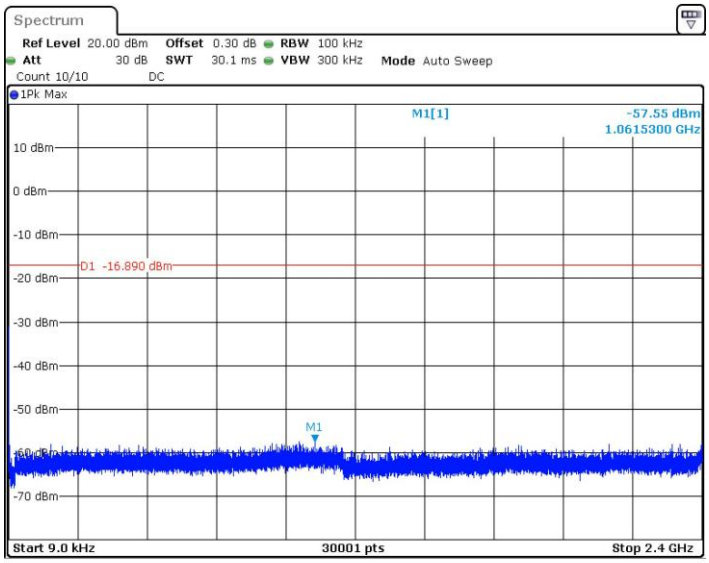


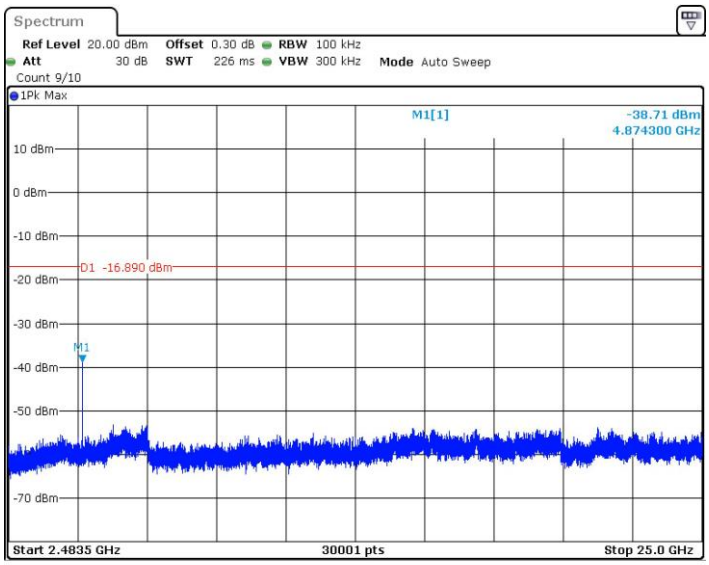
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.4109 GHz	2.34 dBm		
M2		1	2.4 GHz	-53.83 dBm		
M3		1	2.39 GHz	-59.44 dBm		
M4		1	2.398536 GHz	-51.83 dBm		

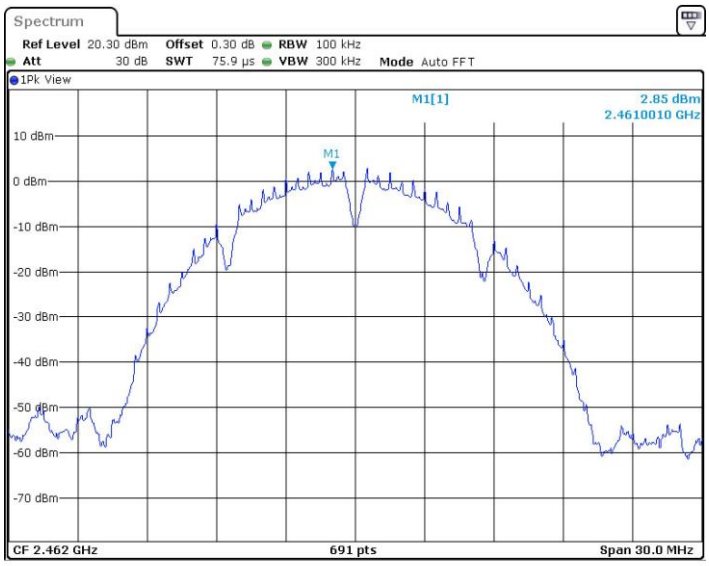
Channel 06 (2437MHz) Reference Level: 3.11dBm

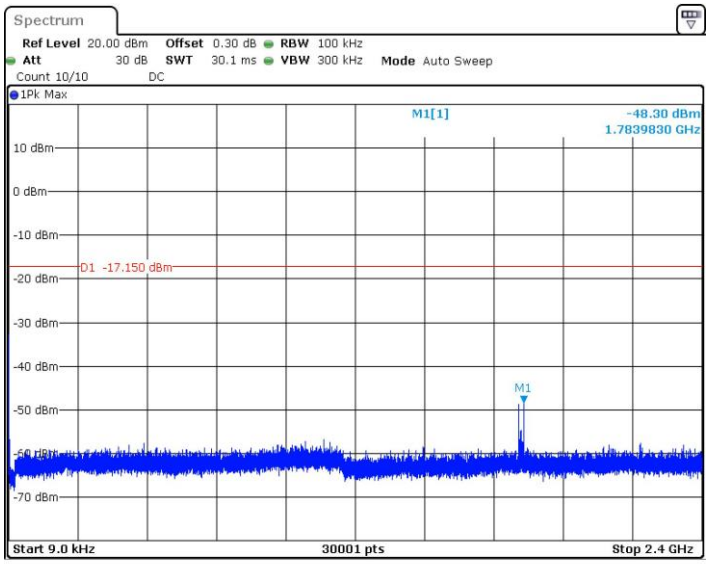


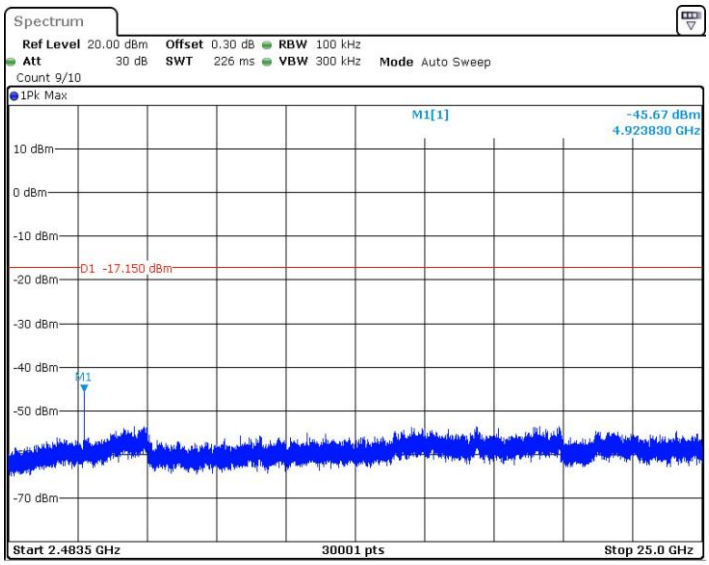


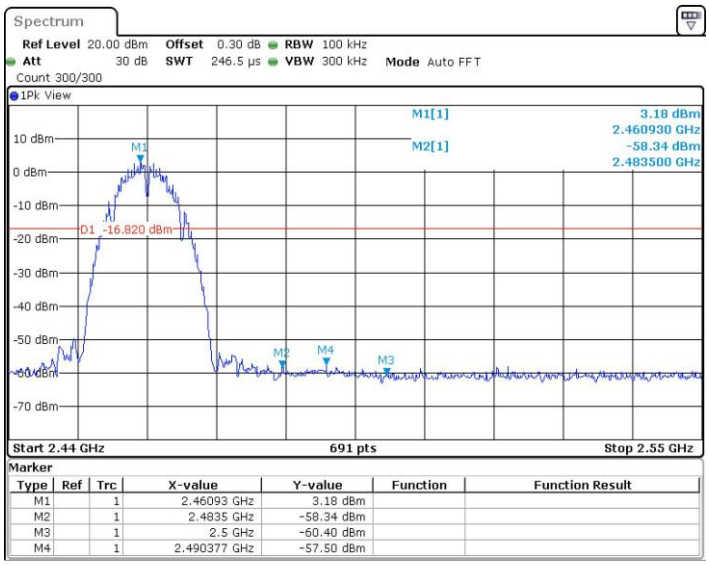

Spectrum
Ref Level 20.00 dBm Offset 0.30 dB RBW 100 kHz
Att 30 dB SWT 226 ms VBW 300 kHz Mode Auto Sweep
Count 9/10
1Pk Max
M1[1]
-38.71 dBm
4.874300 GHz
10 dBm
0 dBm
-10 dBm
D1 -16.890 dBm
-20 dBm
-30 dBm
M1
-40 dBm
-50 dBm
-70 dBm
Start 2.4835 GHz
30001 pts
Stop 25.0 GHz

Channel 11 (2462MHz) Reference Level: 2.85dBm





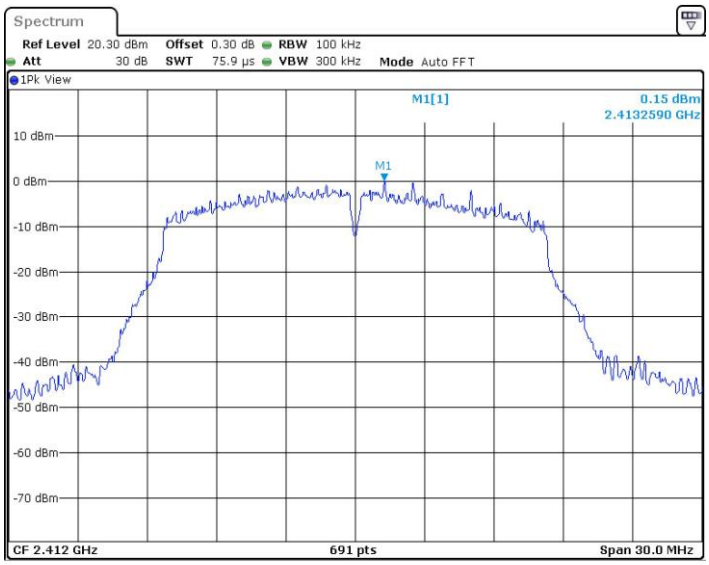


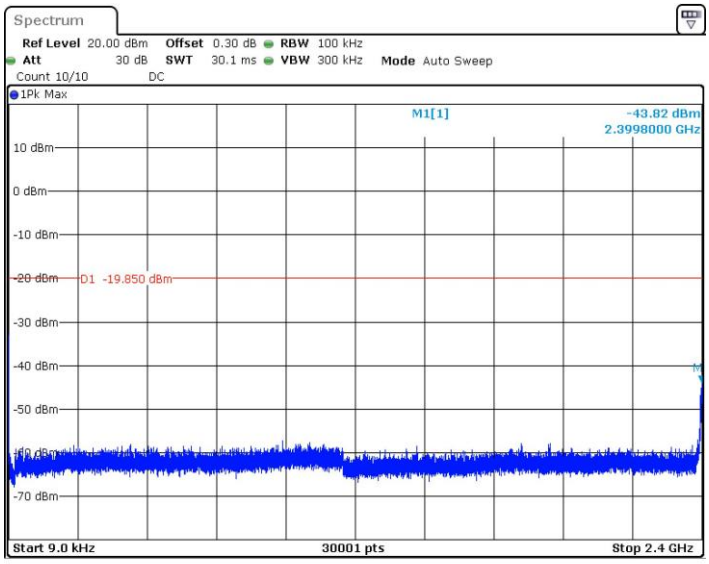


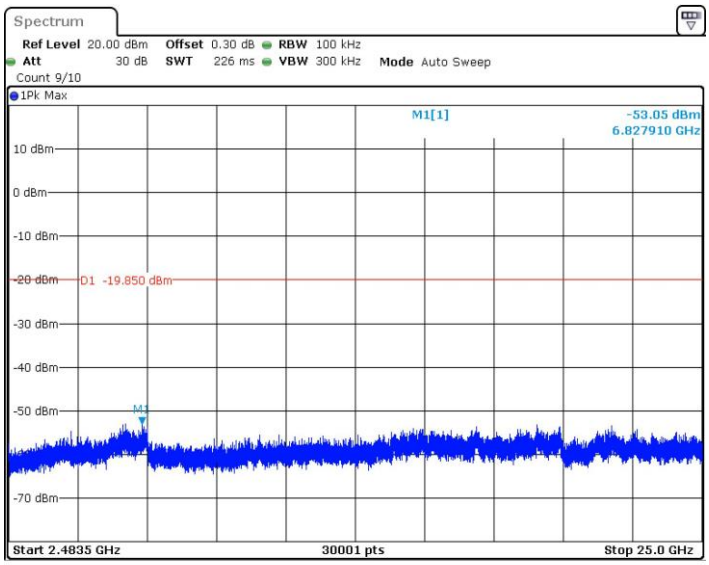
Marker

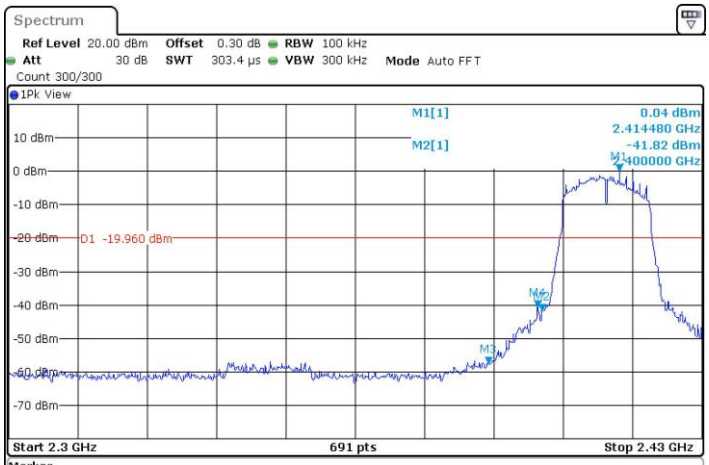
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.46093 GHz	3.18 dBm		
M2		1	2.4835 GHz	-58.34 dBm		
M3		1	2.5 GHz	-60.40 dBm		
M4		1	2.490377 GHz	-57.50 dBm		

802.11g
Channel 01 (2412MHz) Reference Level: 0.15dBm





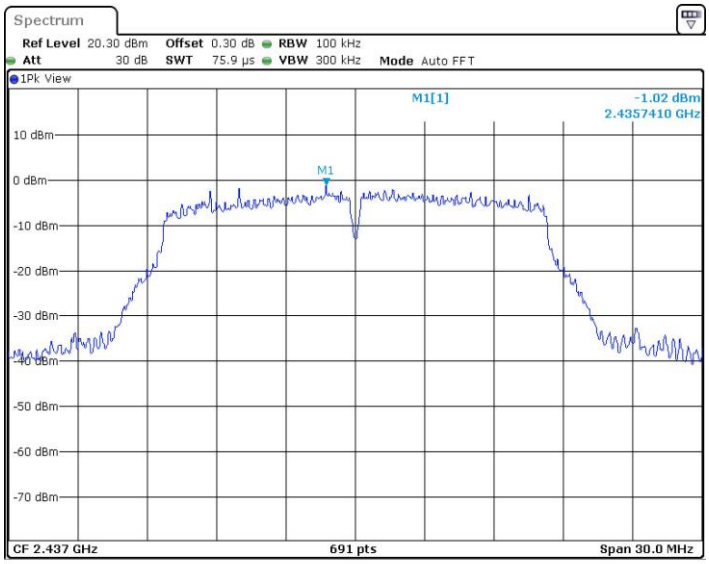


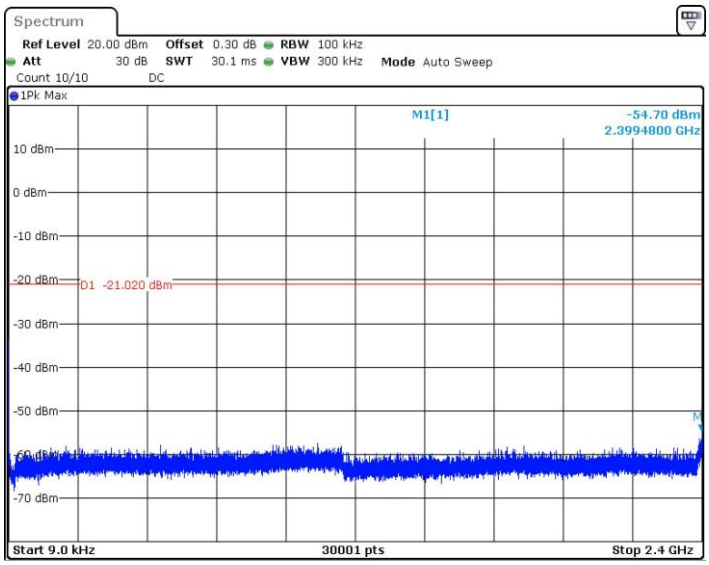


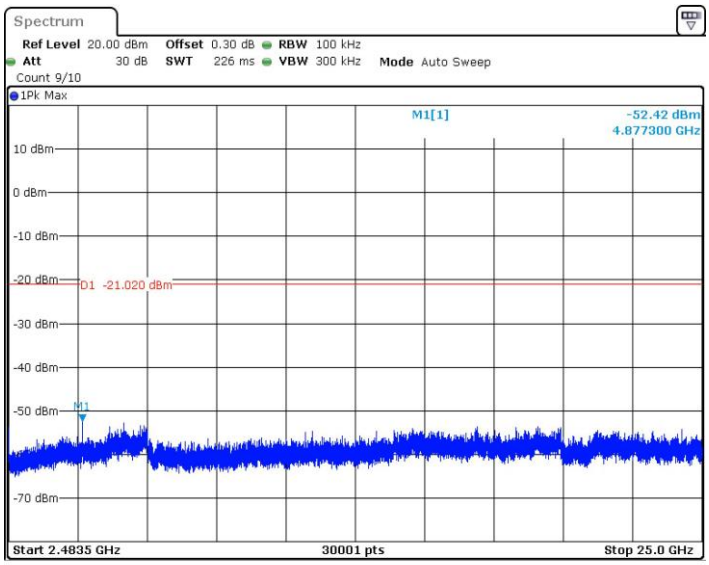
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.41448 GHz	0.04 dBm		
M2		1	2.4 GHz	-41.82 dBm		
M3		1	2.39 GHz	-57.47 dBm		
M4		1	2.399101 GHz	-40.55 dBm		

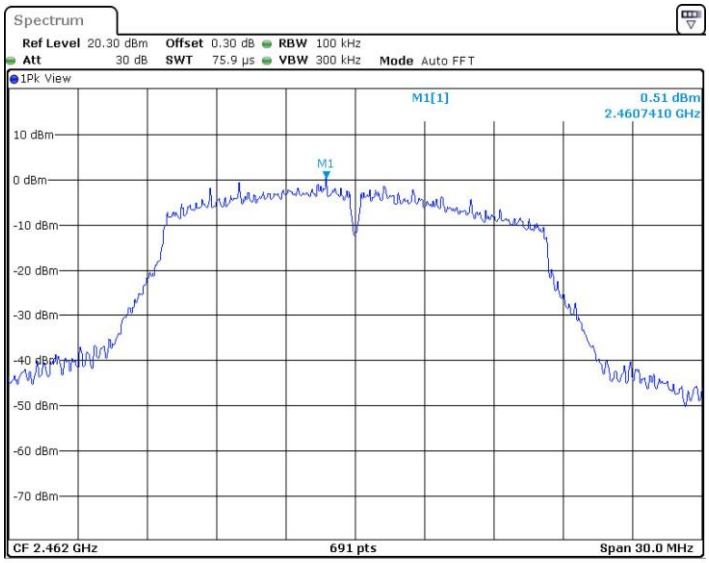
Channel 06 (2437MHz) Reference Level: -1.02dBm

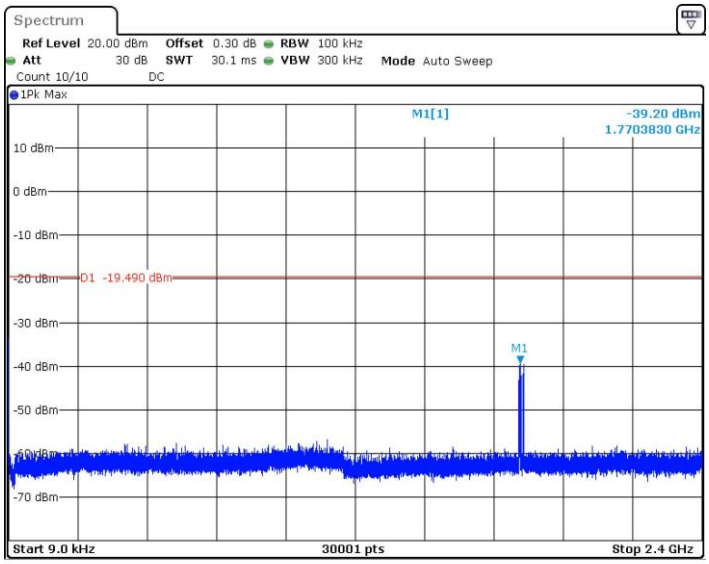


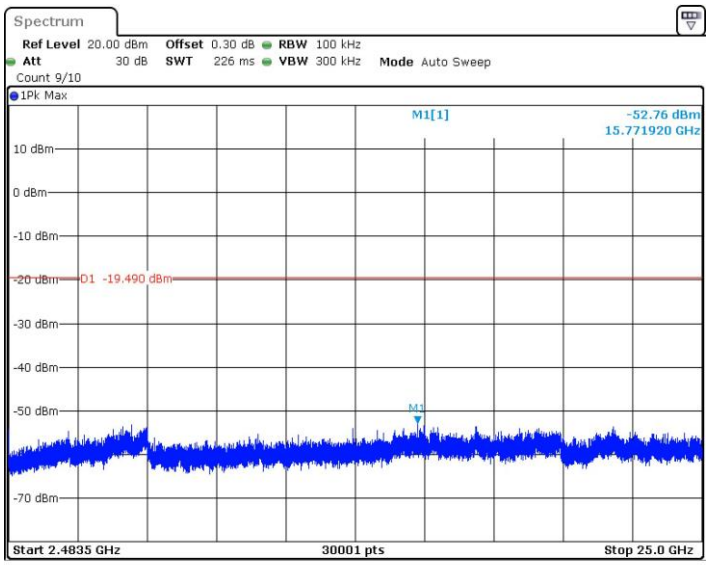


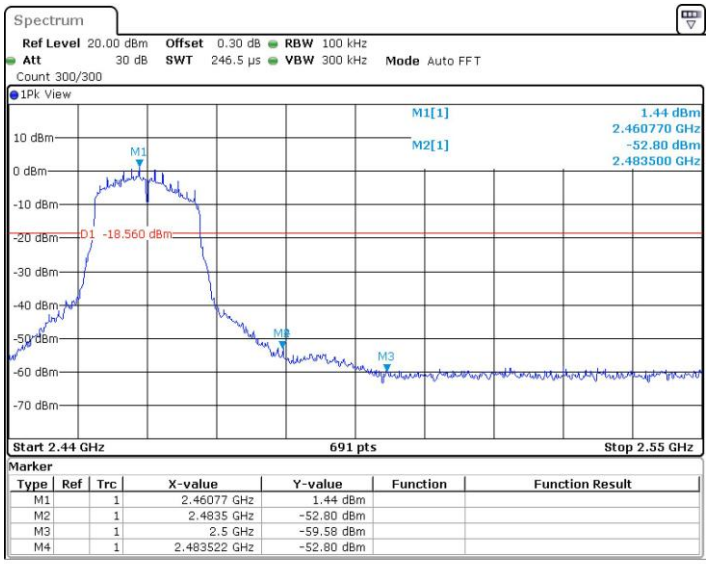

Spectrum
Ref Level 20.00 dBm Offset 0.30 dB RBW 100 kHz
Att 30 dB SWT 226 ms VBW 300 kHz Mode Auto Sweep
Count 9/10
1Pk Max
M1[1] -52.42 dBm
4.877300 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
D1 -21.020 dBm
-30 dBm
-40 dBm
-50 dBm
M1
-70 dBm
Start 2.4835 GHz
30001 pts
Stop 25.0 GHz

Channel 11 (2462MHz) Reference Level: 0.51dBm





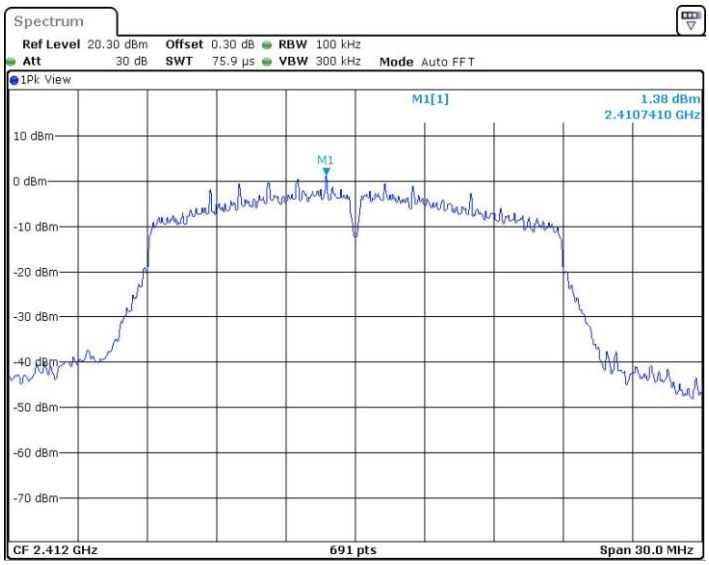


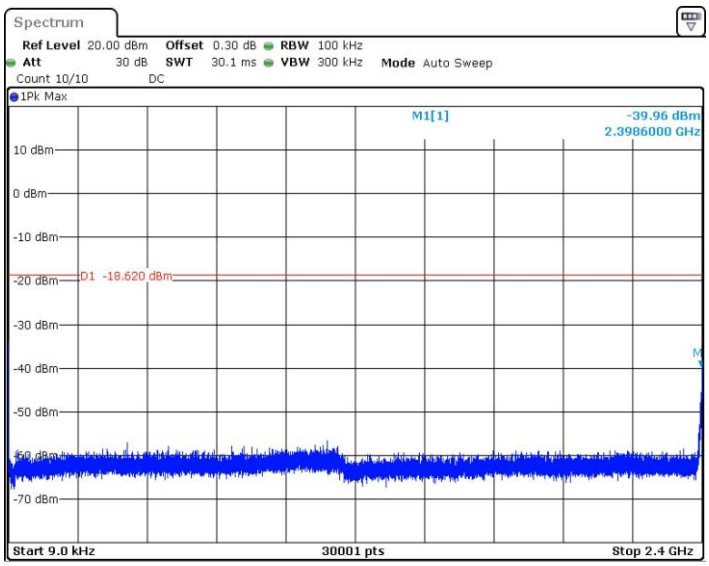


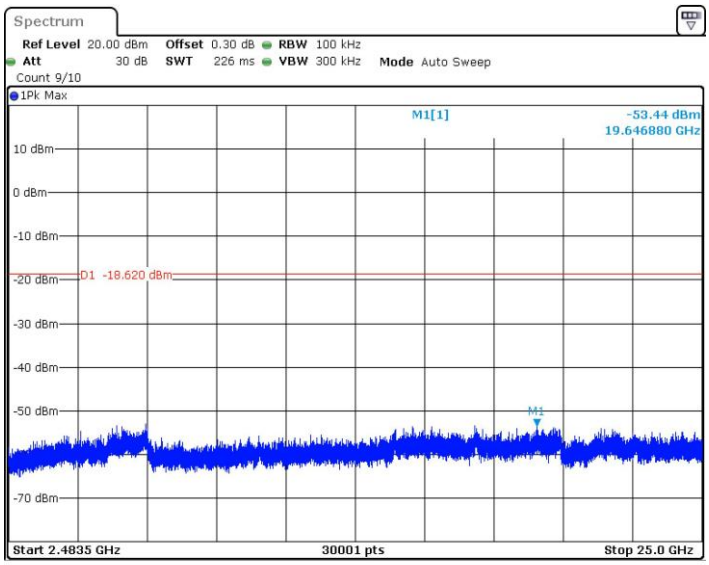
Marker

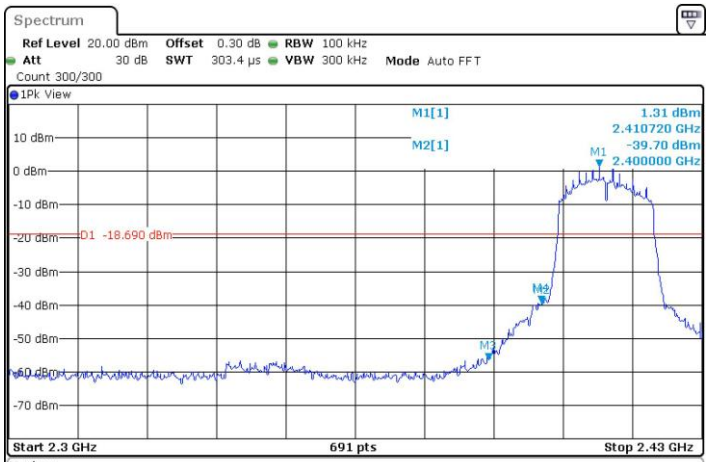
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.46077 GHz	1.44 dBm		
M2		1	2.4835 GHz	-52.80 dBm		
M3		1	2.5 GHz	-59.58 dBm		
M4		1	2.483522 GHz	-52.80 dBm		

802.11n-HT20
Channel 01 (2412MHz) Reference Level: 1.38dBm





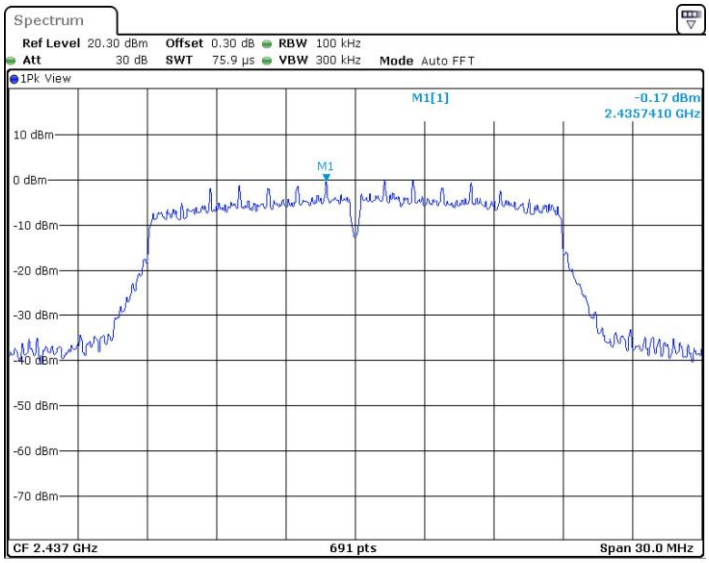


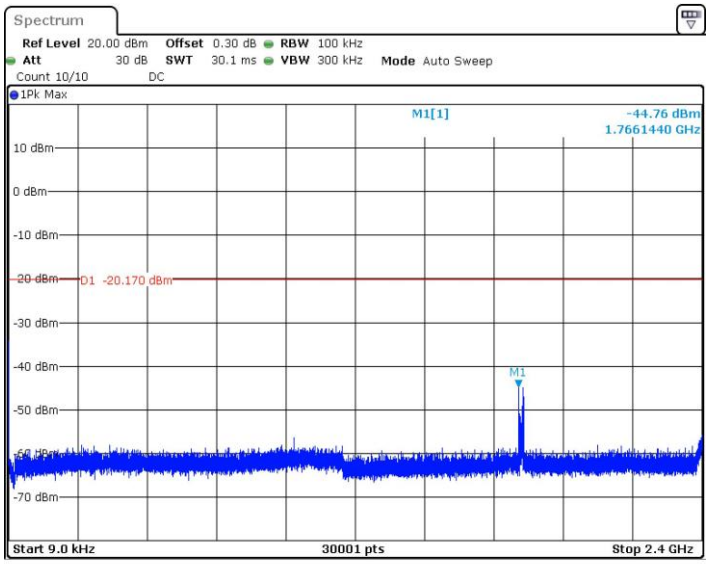


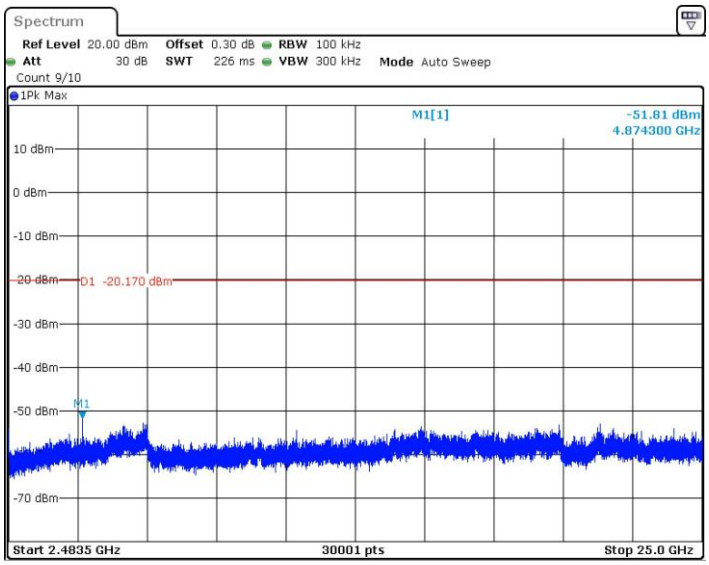
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.41072 GHz	1.31 dBm		
M2		1	2.4 GHz	-39.70 dBm		
M3		1	2.39 GHz	-56.36 dBm		
M4		1	2.399855 GHz	-39.31 dBm		

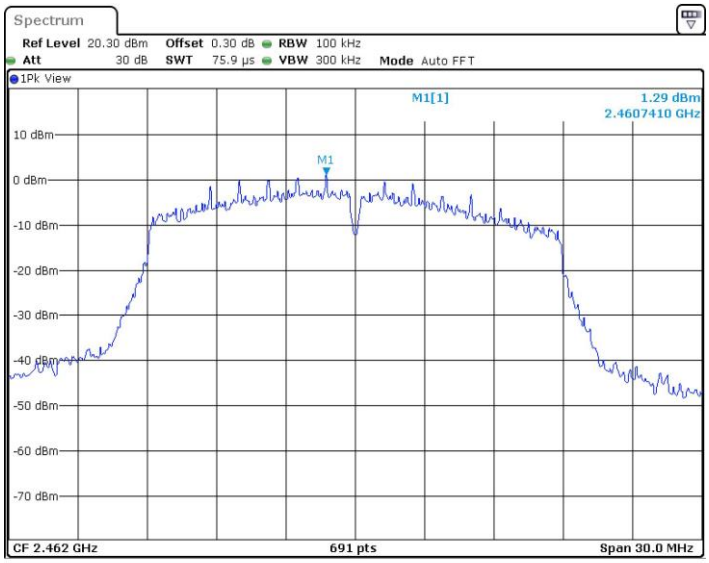
Channel 06 (2437MHz) Reference Level: -0.17dBm

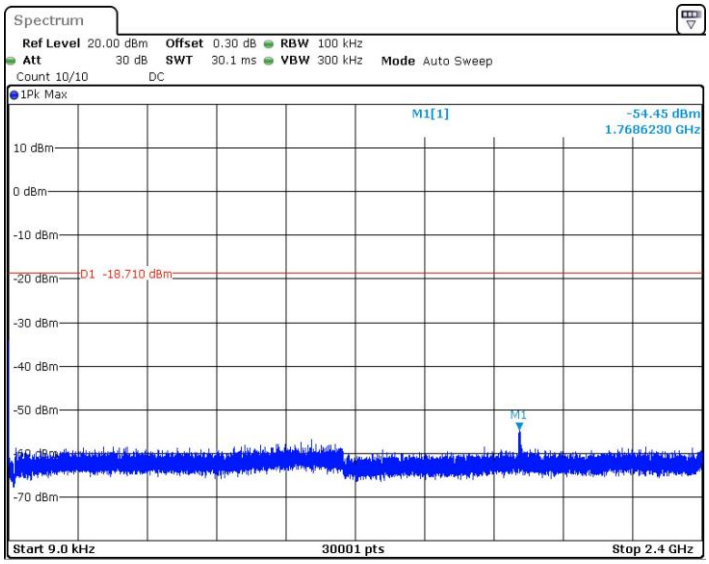


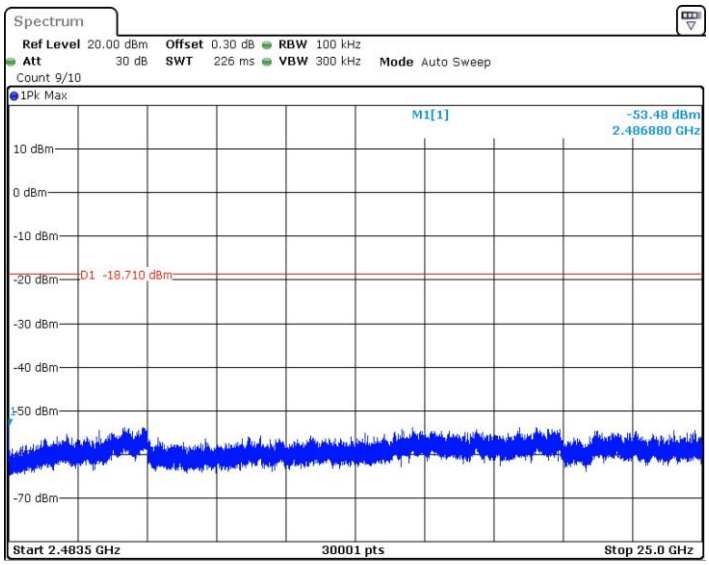


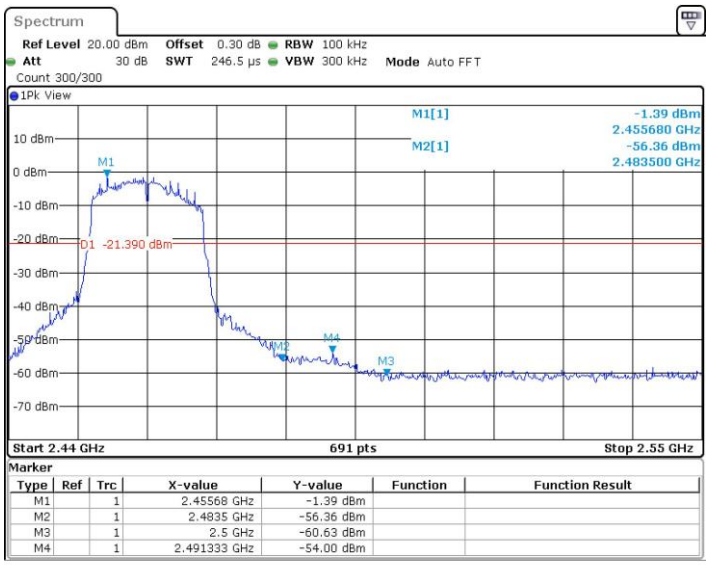

Spectrum
Ref Level 20.00 dBm Offset 0.30 dB RBW 100 kHz
Att 30 dB SWT 226 ms VBW 300 kHz Mode Auto Sweep
Count 9/10
1Pk Max
M1[1] -51.81 dBm
4.874300 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
D1 -20.170 dBm
-30 dBm
-40 dBm
-50 dBm
M1
-70 dBm
Start 2.4835 GHz
30001 pts
Stop 25.0 GHz

Channel 11 (2462MHz) Reference Level: 1.29dBm









Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.45568 GHz	-1.39 dBm		
M2		1	2.4835 GHz	-56.36 dBm		
M3		1	2.5 GHz	-60.63 dBm		
M4		1	2.491333 GHz	-54.00 dBm		

Applicant: HUNAN GREATWALL COMPUTER SYSTEM CO.,LTD.
Date of Test: 07 December 2023 Model: LM1097P

4.5 Out of Band Radiated Emissions (for emissions in 4.4 above that are less than 20dB below carrier), FCC Rule 15.247(d):

For out of band emissions that are close to or that exceed the 20dB attenuation requirement described in the specification, radiated measurements were performed at a 3m separation distance to determine whether these emissions complied with the general radiated emission requirement.

[×] Not required, since all emissions are more than 20dB below fundamental
[ ] See attached data sheet

Applicant: HUNAN GREATWALL COMPUTER SYSTEM CO.,LTD.
Date of Test: 07 December 2023 Model: LM1097P

4.6 Transmitter Radiated Emissions in Restricted Bands, FCC Rule 15.35(b) (c):

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included. All measurements were performed with peak detection unless otherwise specified.

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Applicant: HUNAN GREATWALL COMPUTER SYSTEM CO.,LTD.
Date of Test: 07 December 2023 Model: LM1097P

4.7 Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

FS = RA + AF + CF - AG + PD

Where FS = Field Strength in dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB/m
AG = Amplifier Gain in dB
PD = Pulse Desensitization in dB

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

FS = RA + AF + CF - AG + PD

Example

Assume a receiver reading of 62.0 dBμV is obtained. The antenna factor of 7.4 dB/m and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted. The pulse desensitization factor of the spectrum analyzer was 0 dB. The net field strength for comparison to the appropriate emission limit is 42 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 62.0 dBμV
AF = 7.4 dB/m
CF = 1.6 dB
AG = 29.0 dB
PD = 0 dB
FS = 62 + 7.4 + 1.6 - 29 + 0 = 42 dBμV/m

Level in mV/m = Common Antilogarithm [(42 dBμV/m)/20] = 125.9 μV/m

Applicant: HUNAN GREATWALL COMPUTER SYSTEM CO.,LTD.
Date of Test: 07 December 2023 Model: LM1097P

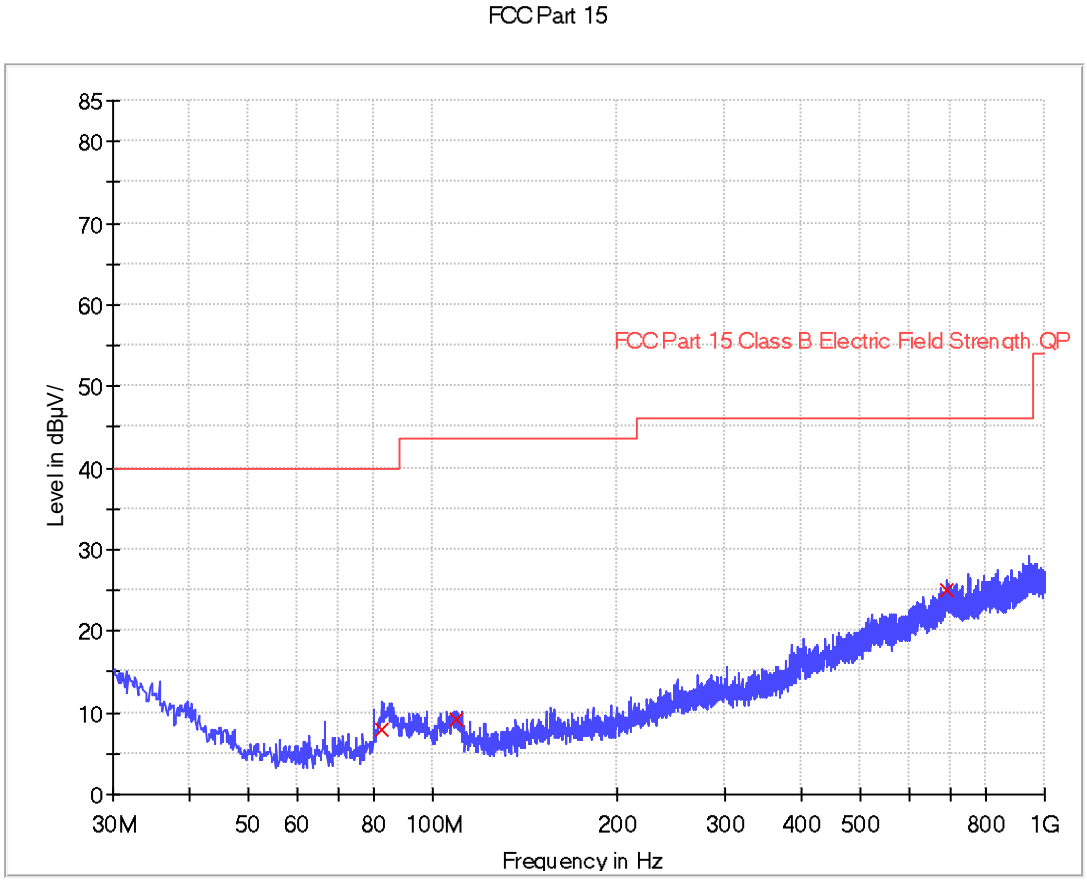
4.8 Radiated Spurious Emission

Worst Case Radiated Spurious Emission
at 2390.000MHz
is passed by 3.3dB margin.

For the electronic filing, the worst case radiated emission configuration photographs are saved with filename: radiated photos.pdf. Simultaneous transmission has been tested, and only the worst-case testing data were recorded in the report.

Applicant: HUNAN GREATWALL COMPUTER SYSTEM CO.,LTD.
Date of Test: 07 December 2023 Model: LM1097P
Worst Case Operating Mode: Simultaneous Transmission

ANT Polarity: Horizontal



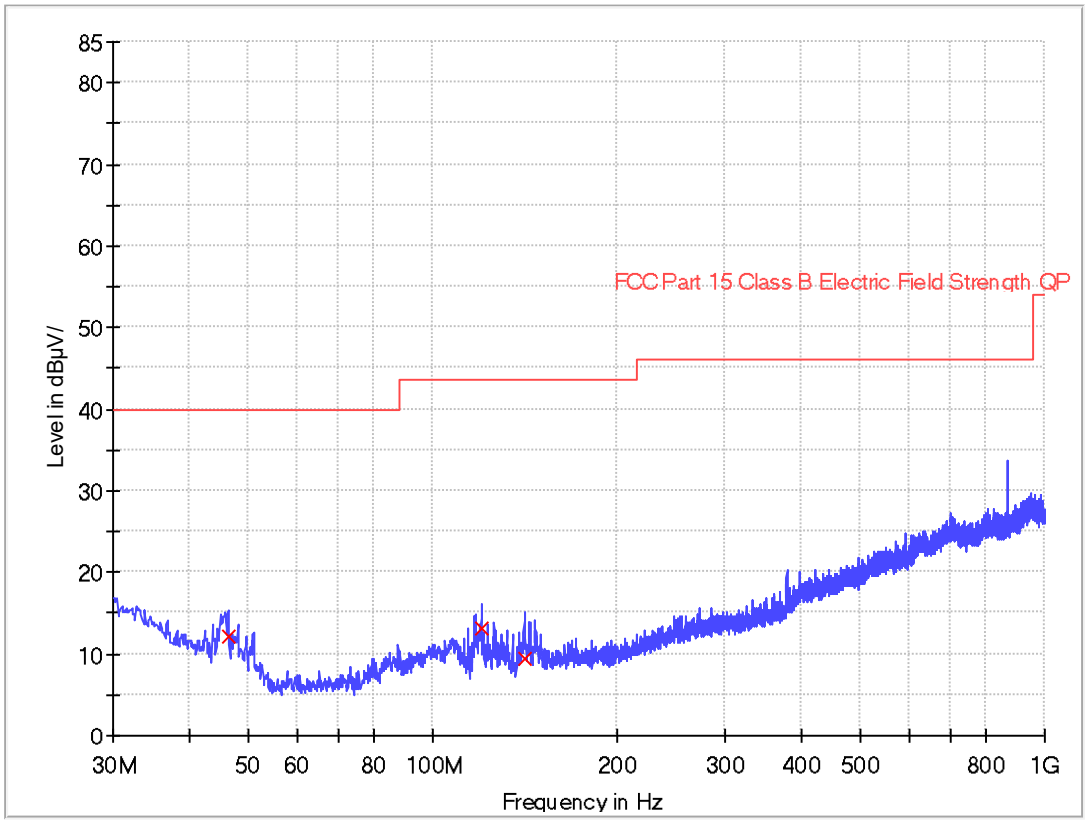
Frequency (MHz)	Quasi Peak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Corr. (dB/m)	Margin - QPK (dB)	Limit – QPK (dBµV/m)
82.743750	7.9	1000.0	120.000	100.0	H	9.0	32.1	40.0
109.297500	9.2	1000.0	120.000	100.0	H	9.9	34.3	43.5
693.237500	25.1	1000.0	120.000	100.0	H	25.3	20.9	46.0

Remark:
1. Corr. (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB)
2. Quasi Peak (dBµV/m) = Corr. (dB/m) + Read Level (dBµV)
3. Margin (dB) = Limit Line (dBµV/m) – Level (dBµV/m)

Applicant: HUNAN GREATWALL COMPUTER SYSTEM CO.,LTD.
Date of Test: 07 December 2023 Model: LM1097P
Worst Case Operating Mode: Simultaneous Transmission

ANT Polarity: Vertical

FCC Part 15



Frequency (MHz)	Quasi Peak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Corr. (dB/m)	Margin - QPK (dB)	Limit – QPK (dBµV/m)
46.247500	12.1	1000.0	120.000	100.0	V	10.0	27.9	40.0
120.088750	13.2	1000.0	120.000	100.0	V	9.4	30.3	43.5
141.065000	9.5	1000.0	120.000	100.0	V	9.9	34.0	43.5

Remark:
1. Corr. (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB)
2. Quasi Peak (dBµV/m) = Corr. (dB/m) + Read Level (dBµV)
3. Margin (dB) = Limit Line (dBµV/m) – Level (dBµV/m)

Applicant: HUNAN GREATWALL COMPUTER SYSTEM CO.,LTD.
Date of Test: 07 December 2023 Model: LM1097P
Worst Case Operating Mode: Transmitting (802.11b-Channel 01)

Radiated Emissions (above 1GHz)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4824.000	45.3	36.8	33.5	42.0	74.0	-32.0
Horizontal	*2390.000	67.5	36.4	29.1	60.2	74.0	-13.8

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4824.000	32.7	36.8	33.5	29.4	54.0	-24.6
Horizontal	*2390.000	55.1	36.4	29.1	47.8	54.0	-6.2

NOTES:
1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz/VBW=10Hz for average value.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna used for the emission over 1000MHz.

* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: HUNAN GREATWALL COMPUTER SYSTEM CO.,LTD.
Date of Test: 07 December 2023 Model: LM1097P
Worst Case Operating Mode: Transmitting (802.11b-Channel 06)

Radiated Emissions (above 1GHz)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4874.000	45.8	36.7	33.4	42.5	74.0	-31.5
Horizontal	*7311.000	48.0	36.6	35.8	47.2	74.0	-26.8

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4874.000	40.3	36.7	33.4	37.0	54.0	-17.0
Horizontal	*7311.000	43.4	36.6	35.8	42.6	54.0	-11.4

NOTES:
1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.

2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. Horn antenna used for the emission over 1000MHz.

* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: HUNAN GREATWALL COMPUTER SYSTEM CO.,LTD.
Date of Test: 07 December 2023 Model: LM1097P
Worst Case Operating Mode: Transmitting (802.11b-Channel 11)

Radiated Emissions (above 1GHz)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4924.000	46.1	36.8	33.3	42.6	74.0	-31.4
Horizontal	*7386.000	54.4	36.5	29.3	47.2	74.0	-26.8

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4924.000	38.6	36.8	33.3	35.1	54.0	-18.9
Horizontal	*7386.000	48.8	36.5	29.3	41.6	54.0	-12.4

NOTES:
1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.

2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. Horn antenna used for the emission over 1000MHz.

* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: HUNAN GREATWALL COMPUTER SYSTEM CO.,LTD.
Date of Test: 07 December 2023 Model: LM1097P
Worst Case Operating Mode: Transmitting (802.11g-Channel 01)

Radiated Emissions (above 1GHz)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4824.000	45.3	36.8	33.5	42.0	74.0	-32.0
Horizontal	*2390.000	67.6	36.4	29.1	60.3	74.0	-13.7

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4824.000	32.7	36.8	33.5	29.4	54.0	-24.6
Horizontal	*2390.000	57.7	36.4	29.1	50.4	54.0	-3.6

NOTES:
1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz/VBW=10Hz for average value.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna used for the emission over 1000MHz.

* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: HUNAN GREATWALL COMPUTER SYSTEM CO.,LTD.
Date of Test: 07 December 2023 Model: LM1097P
Worst Case Operating Mode: Transmitting (802.11g-Channel 06)

Radiated Emissions (above 1GHz)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4874.000	46.5	36.7	33.4	43.2	74.0	-30.8
Horizontal	*7311.000	48.0	36.6	35.8	47.2	74.0	-26.8

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4874.000	36.8	36.7	33.4	33.5	54.0	-20.5
Horizontal	*7311.000	43.1	36.6	35.8	42.3	54.0	-11.7

NOTES:
1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.

2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. Horn antenna used for the emission over 1000MHz.

* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: HUNAN GREATWALL COMPUTER SYSTEM CO.,LTD.
Date of Test: 07 December 2023 Model: LM1097P
Worst Case Operating Mode: Transmitting (802.11g-Channel 11)

Radiated Emissions (above 1GHz)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4924.000	48.1	36.8	33.3	44.6	74.0	-29.4
Horizontal	*7386.000	53.3	36.5	29.3	46.1	74.0	-27.9

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4924.000	39.1	36.8	33.3	35.6	54.0	-18.4
Horizontal	*7386.000	51.5	36.5	29.3	44.3	54.0	-9.7

NOTES:
1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.

2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. Horn antenna used for the emission over 1000MHz.

* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: HUNAN GREATWALL COMPUTER SYSTEM CO.,LTD.
Date of Test: 07 December 2023 Model: LM1097P
Worst Case Operating Mode: Transmitting (802.11n20-Channel 01)

Radiated Emissions (above 1GHz)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4824.000	45.3	36.8	33.5	42.0	74.0	-32.0
Horizontal	*2390.000	68.7	36.4	29.1	61.4	74.0	-12.6

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4824.000	32.7	36.8	33.5	29.4	54.0	-24.6
Horizontal	*2390.000	58.0	36.4	29.1	50.7	54.0	-3.3

NOTES:
1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz/VBW=10Hz for average value.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna used for the emission over 1000MHz.

* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: HUNAN GREATWALL COMPUTER SYSTEM CO.,LTD.
Date of Test: 07 December 2023 Model: LM1097P
Worst Case Operating Mode: Transmitting (802.11n20-Channel 06)

Radiated Emissions (above 1GHz)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4874.000	47.6	36.7	33.4	44.3	74.0	-29.7
Horizontal	*7311.000	46.8	36.6	35.8	46.0	74.0	-28.0

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4874.000	38.4	36.7	33.4	35.1	54.0	-18.9
Horizontal	*7311.000	43.8	36.6	35.8	43.0	54.0	-11.0

NOTES:
1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.

2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. Horn antenna used for the emission over 1000MHz.

* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: HUNAN GREATWALL COMPUTER SYSTEM CO.,LTD.
Date of Test: 07 December 2023 Model: LM1097P
Worst Case Operating Mode: Transmitting (802.11n20-Channel 11)

Radiated Emissions (above 1GHz)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4924.000	49.1	36.8	33.3	45.6	74.0	-28.4
Horizontal	*7386.000	54.3	36.5	29.3	47.1	74.0	-26.9

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB/m)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	*4924.000	39.9	36.8	33.3	36.4	54.0	-17.6
Horizontal	*7386.000	50.4	36.5	29.3	43.2	54.0	-10.8

NOTES:
1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.

2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. Horn antenna used for the emission over 1000MHz.

* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Applicant: HUNAN GREATWALL COMPUTER SYSTEM CO.,LTD.
Date of Test: 07 December 2023
Model: LM1097P

4.9 Conducted Emission

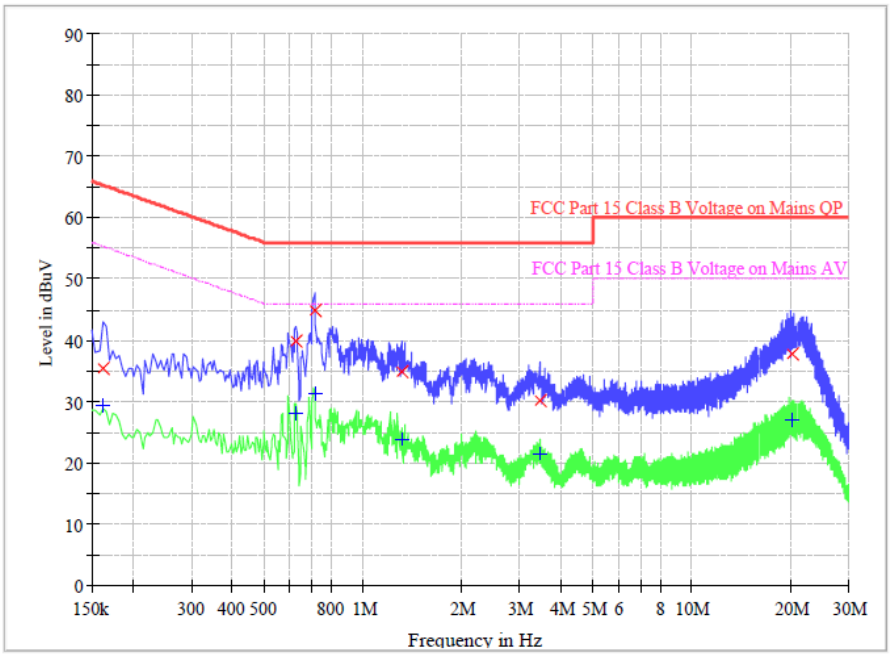
Worst Case Conducted Emission (802.11b-Channel 01)
at 0.562000MHz
is passed by 15.1dB margin.

For the electronic filing, the worst case radiated emission configuration photographs are saved with filename: conducted photos.pdf.

Applicant: HUNAN GREATWALL COMPUTER SYSTEM CO.,LTD.
Date of Test: 07 December 2023
Model: LM1097P
Worst Case Operating Mode: Simultaneous Transmission
Test Voltage: AC 120V/60Hz
Phase: Live

Graphic / Data Table

Conducted Emissions
Pursuant to FCC 15.207: Emissions Requirement



Limit and Margin QP

Frequency (MHz)	Quasi Peak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.162000	35.6	9.000	L1	9.6	29.8	65.4
0.626000	39.8	9.000	L1	9.7	16.2	56.0
0.714000	45.0	9.000	L1	9.7	11.0	56.0
1.310000	35.0	9.000	L1	9.7	21.0	56.0
3.442000	30.1	9.000	L1	9.7	25.9	56.0
20.306000	37.8	9.000	L1	10.5	22.2	60.0

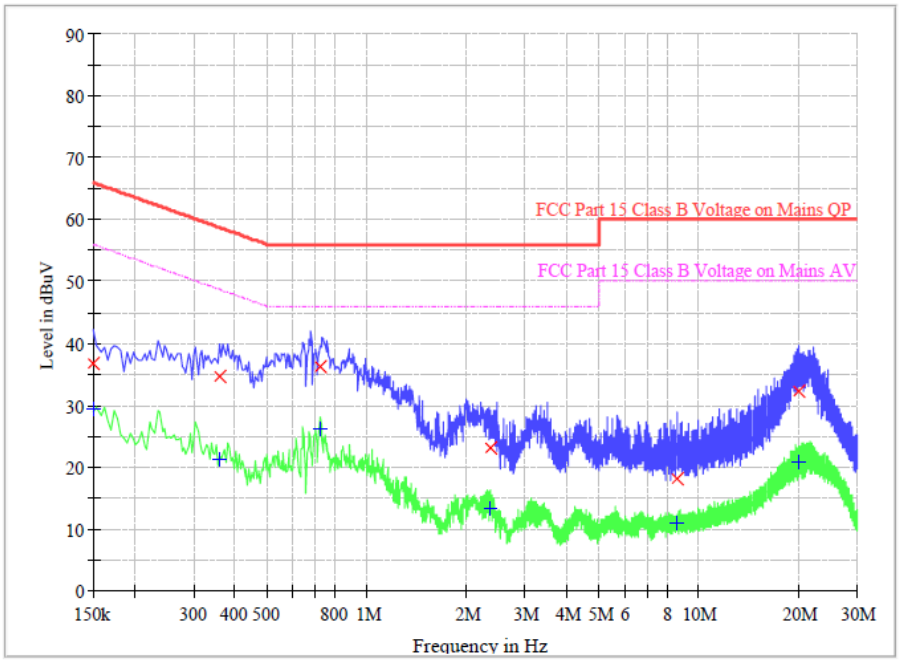
Limit and Margin AV

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.162000	29.3	9.000	L1	9.6	26.1	55.4
0.626000	28.0	9.000	L1	9.7	18.0	46.0
0.714000	31.2	9.000	L1	9.7	14.8	46.0
1.310000	23.9	9.000	L1	9.7	22.1	46.0
3.442000	21.5	9.000	L1	9.7	24.5	46.0
20.306000	26.9	9.000	L1	10.5	23.1	50.0

Applicant: HUNAN GREATWALL COMPUTER SYSTEM CO.,LTD.
Date of Test: 07 December 2023
Model: LM1097P
Worst Case Operating Mode: Simultaneous Transmission
Test Voltage: AC 120V/60Hz
Phase: Neutral

Graphic / Data Table

Conducted Emissions
Pursuant to FCC 15.207: Emissions Requirement



Limit and Margin QP

Frequency (MHz)	Quasi Peak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	36.6	9.000	N	9.6	29.4	66.0
0.362000	34.6	9.000	N	9.6	24.1	58.7
0.722000	36.3	9.000	N	9.6	19.7	56.0
2.354000	23.2	9.000	N	9.7	32.8	56.0
8.614000	18.1	9.000	N	9.9	41.9	60.0
20.074000	32.3	9.000	N	10.6	27.7	60.0

Limit and Margin AV

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	29.4	9.000	N	9.6	26.6	56.0
0.362000	21.4	9.000	N	9.6	27.3	48.7
0.722000	26.3	9.000	N	9.6	19.7	46.0
2.354000	13.5	9.000	N	9.7	32.5	46.0
8.614000	10.9	9.000	N	9.9	39.1	50.0
20.074000	20.7	9.000	N	10.6	29.3	50.0

Applicant: HUNAN GREATWALL COMPUTER SYSTEM CO.,LTD.
Date of Test: 07 December 2023
Model: LM1097P

4.10 Radiated Emissions from Digital Section of Transceiver, FCC Ref: 15.109

[ ] Not required - No digital part

[ ] Test results are attached

[x] Included in the separated report.

Applicant: HUNAN GREATWALL COMPUTER SYSTEM CO.,LTD.
Date of Test: 07 December 2023
Model: LM1097P

4.11 Transmitter Duty Cycle Calculation and Measurements, FCC Rule 15.35(b), (c)

The EUT antenna output port was connected to the input of the spectrum analyzer. The analyzer center frequency was set to EUT RF channel carrier. The SWEP function on the analyzer was set to ZERO SPAN. The Transmitter ON time was determined from the resultant time-amplitude display:

	See attached spectrum analyzer chart (s) for Transmitter timing
	See Transmitter timing diagram provided by manufacturer
x	Not applicable, duty cycle was not used.

5.0 Equipment Photographs

For electronic filing, the photographs are saved with filename: external photos.pdf & internal photos.pdf.

6.0 Product Labeling

For electronic filing, the FCC ID label artwork and location is saved with filename: label.pdf.

7.0 Technical Specifications

For electronic filing, the block diagram and circuit diagram are saved with filename: block.pdf and circuit.pdf respectively.

8.0 Instruction Manual

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual.pdf.

This manual will be provided to the end-user with each unit sold/leased in the United States.

9.0 Confidentiality Request

For electronic filing, the confidentiality request of the tested EUT is saved with filename: request.pdf.

10.0 Discussion of Pulse Desensitization

The determination of pulse desensitivity was made in accordance with Hewlett Packard Application Note 150-2, *Spectrum Analysis ... Pulsed RF.*

Pulse desensitivity is not applicable for this device since the transmitter transmits the RF signal continuously.

11.0 Test Equipment List

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
SZ061-12	BiConiLog Antenna	ETS	3142E	00166158	04-Aug-2021	04-Aug-2024
SZ185-03	EMI Receiver	R&S	ESR7	101975	27-Apr-2023	27-Apr-2024
SZ061-08	Horn Antenna	ETS	3115	00092346	05-Sep-2021	05-Sep-2024
SZ061-06	Active Loop Antenna	Electro-Metrics	EM-6876	217	18-May-2021	18-May-2024
SZ056-03	Spectrum Analyzer	R&S	FSP 30	101148	27-Apr-2023	27-Apr-2024
SZ056-06	Signal Analyzer	R&S	FSV 40	101101	19-Dec-2022 13-Dec-2023	19-Dec-2023 13-Dec-2024
SZ181-04	Preamplifier	Agilent	8449B	3008A02474	27-Apr-2023	27-Apr-2024
SZ188-01	Anechoic Chamber	ETS	RFD-F/A-100	4102	12-Dec-2021	12-Dec-2024
SZ062-23	RF Cable	RADIALL	SF104PE	--	26-Sep-2023	26-Sep-2024
SZ062-35	RF Cable	RADIALL	A50-3.5M3.5M-8M	--	26-Sep-2023	26-Sep-2024
SZ062-30	RF Cable	RADIALL	A50-3.5M3.5M-4.5M	--	26-Sep-2023	26-Sep-2024
SZ067-04	Notch Filter	Micro-Tronics	BRM50702-02	--	27-Apr-2023	27-Apr-2024
SZ185-02	EMI Test Receiver	R&S	ESCI	100692	11-Jul-2023	11-Jul-2024
SZ187-01	Two-Line V-Network	R&S	ENV216	100072	18-Oct-2023	19-Oct-2024
SZ187-02	Two-Line V-Network	R&S	ENV216	100072	27-Apr-2023	27-Apr-2024
SZ062-16	RF Cable	HUBER+SUHNER	CBL2-BN-1m	110127-2231000	11-Jul-2023	11-Jul-2024
SZ188-03	Shielding Room	ETS	RFD-100	4100	20-Dec-2022	20-Dec-2025

********** End of Report**********