Shenzhen CTL Testing Technology Co., Ltd.
Tel: +86-755-89486194 E-mail: ctl@ctl-lab.com

TEST REPORT

FCC PART 15.247

Report Reference No. ..... :	**CTL2411191033-WF03**	
Compiled by: (position+printed name+signature)	Happy Guo (File administrators)	
Tested by: (position+printed name+signature)	Wuqiang Wu (Test Engineer)	
Approved by: (position+printed name+signature)	Ivan Xie (Manager)	

Product Name ..... :	laptop
Model/Type reference ..... :	T1568
List Model(s)..... :	T140R, T140H, T156R, T156H, T160H, T160R, T173R, T173H, T1567
Trade Mark..... :	N/A
FCC ID..... :	**2BAGV-T1568**
Applicant's name ..... :	**Shenzhen Forwell Electronics Technology Co., Ltd.**
Address of applicant ..... :	2nd Floor, Building A, Shatang Beifangyongfa Science and Technology Park, Jincheng Rd., Shajing, Baoan, Shenzhen, Guangdong, China
Test Firm..... :	**Shenzhen CTL Testing Technology Co., Ltd.**
Address of Test Firm ..... :	Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, China 518055
Test specification..... :	
Standard ..... :	**FCC Part 15.247:** Operation within the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz.
TRF Originator ..... :	Shenzhen CTL Testing Technology Co., Ltd.
Master TRF..... :	Dated 2011-01
Date of receipt of test item ..... :	Nov. 22, 2024
Date of Test Date..... :	Nov. 22, 2024-Jan. 08, 2025
Date of Issue ..... :	Jan. 09, 2025
Result..... :	**Pass**

Shenzhen CTL Testing Technology Co., Ltd.
Tel: +86-755-89486194 E-mail: ctl@ctl-lab.com

TEST REPORT

Test Report No. :	CTL2411191033-WF03	Jan. 09, 2025 Date of issue

Equipment under Test	:	laptop
Sample No	:	CTL2411191033
Model /Type	:	T1568
Listed Models	:	T140R, T140H, T156R, T156H, T160H, T160R, T173R, T173H, T1567
Applicant	:	**Shenzhen Forwell Electronics Technology Co., Ltd.**
Address	:	2nd Floor, Building A, Shatang Beifangyongfa Science and Technology Park, Jincheng Rd., Shajing, Baoan, Shenzhen, Guangdong, China
Manufacturer	:	**Shenzhen Forwell Electronics Technology Co., Ltd.**
Address	:	2nd Floor, Building A, Shatang Beifangyongfa Science and Technology Park, Jincheng Rd., Shajing, Baoan, Shenzhen, Guangdong, China

Test result	**Pass ***

* In the configuration tested, the EUT complied with the standards specified page 5.

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the issuing testing laboratory.
The device (Product Name: laptop) Models Name: T1568, T140R, T140H, T156R, T156H, T160H, T160R, T173R, T173H, T1567 have same electrical, PCB and BOM, only the colour and model' s names are different for marketing requirements.
.

** Modified History **

Revisions	Description	Issued Data	Report No.	Remark
Version 1.0	Initial Test Report Release	2025-01-09	CTL2411191033-WF03	Tracy Qi

Table of Contents Page

1. SUMMARY

1.1. TEST STANDARDS

The tests were performed according to following standards:

FCC Rules Part 15.247: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

ANSI C63.10: 2013: American National Standard for Testing Unlicensed Wireless Devices

KDB 558074 D01 v05r02: KDB558074 D01 15.247 Meas Guidance v05r02

1.2. Test Description

FCC PART 15.247		
FCC Part 15.207	AC Power Conducted Emission	PASS
FCC Part 15.247(a)(2)	6dB Bandwidth	PASS
FCC Part 15.247(d)	Spurious RF Conducted Emission	PASS
FCC Part 15.247(b)	Maximum Conducted Output Power	PASS
FCC Part 15.247(e)	Power Spectral Density	PASS
FCC Part 15.109/ 15.205/ 15.209	Radiated Emissions	PASS
FCC Part 15.247(d)	Band Edge	PASS
FCC Part 15.203/15.247 (b)	Antenna Requirement	PASS

1.3. Test Facility

1.3.1 Address of the test laboratory

Shenzhen CTL Testing Technology Co.,Ltd.
Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, China 518055

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.10 and CISPR 22/EN 55022 requirements.

1.3.2 Laboratory accreditation

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

CNAS-Lab Code: L7497

Shenzhen CTL Testing Technology Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No. 4343.01

Shenzhen CTL Testing Technology Co., Ltd, EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

IC Registration No.: 9618B

CAB identifier: CN0041

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements with Registration No.: 9618B.

FCC-Registration No.: 399832

Designation No.: CN1216

Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 399832.

1.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen CTL Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for CTL laboratory is reported:

Test	Measurement Uncertainty	Notes
Transmitter power conducted	±0.57 dB	(1)
Transmitter power Radiated	±2.20 dB	(1)
Conducted spurious emission 9KHz-40 GHz	±2.20 dB	(1)
Occupied Bandwidth	±0.01ppm	(1)
Radiated Emission9KHz~30MHz	±3.66dB	(1)
Radiated Emission 30~1000MHz	±4.10dB	(1)
Radiated Emission Above 1GHz	±4.32dB	(1)
Conducted Disturbance0.15~30MHz	±3.20dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

2. GENERAL INFORMATION

2.1. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

2.2. General Description of EUT

Product Name:	laptop
Model/Type reference:	T1568
Power supply:	AC100V/60Hz&Powered by a 11.4V DC battery
Adapter information:	MODEL: JHD-AD065B-190342BA-A INPUT: 100-240V,50/60Hz 1.5A OUTPUT: 19V⎓3.42A 64.98W
2.4G WIFI	
Supported type:	802.11b/802.11g/802.11n(HT20)/802.11n(HT40)
Modulation:	802.11b: DSSS 802.11g/802.11n(HT20)/802.11n(HT40): OFDM
Operation frequency:	802.11b/802.11g/802.11n(HT20): 2412MHz~2462MHz 802.11n(HT40): 2422MHz~2452MHz
Channel number:	802.11b/802.11g/802.11n(HT20): 11 802.11n(HT40): 7
Channel separation:	802.11b/802.11g/802.11n(HT20)/802.11n(HT40)
Antenna type:	ANT1: FPC Antenna ANT2: FPC Antenna
Antenna gain:	ANT1: 1.35dBi ANT2: 1.37dBi

Note1: For more details, please refer to the user's manual of the EUT.
Note2: Antenna gain provided by the applicant.
Note3: The device has two WIFI antennas, but WIFI Ant1 and Ant2 cannot transmit simultaneously in MIMO mode.

2.3. Description of Test Modes and Test Frequency

The Applicant provides communication tools software to control the EUT for staying in continuous transmitting and receiving mode for testing.

There are 11 channels provided to the EUT and Channel 01/03/06/09/11 were selected for WIFI test.

Operation Frequency WIFI：

Channel	Frequency(MHz)	Channel	Frequency(MHz)
1	**2412**	8	2447
2	2417	**9**	**2452**
3	**2422**	10	2457
4	2427	**11**	**2462**
5	2432		
6	**2437**		
7	2442		

Note: The line display in grey were the channel selected for testing

Data Rate Used:

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode	Data Rate	Channel
Maximum Conducted Output Power Power Spectral Density 6dB Bandwidth Spurious RF conducted emission Radiated Emission 9kHz~1GHz& Radiated Emission 1GHz~10th Harmonic	11b/DSSS	1 Mbps	1/6/11
	11g/OFDM	6 Mbps	1/6/11
	11n(20MHz)/OFDM	6.5Mbps	1/6/11
	11n(40MHz)/OFDM	13.5 Mbps	3/6/9
Band Edge	11b/DSSS	1 Mbps	1/11
	11g/OFDM	6 Mbps	1/11
	11n(20MHz)/OFDM	6.5Mbps	1/11
	11n(40MHz)/OFDM	13.5 Mbps	3//9

There was 3 test Modes. TM1 to TM3 were shown below:

TM1 : Operate in 2.4G WIFI mode;
TM2 : Operate in Charging mode;
TM3 : Idle mode.

***Note:

1. All test modes were tested, but we only recorded the worst case in this report.

2.4. Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
LISN	R&S	ESH2-Z5	860014/010	2024/04/30	2025/04/29
Double cone logarithmic antenna	Schwarzbeck	VULB 9168	824	2023/02/13	2026/02/12
EMI Test Receiver	R&S	ESCI	1166.5950.03	2024/04/30	2025/04/29
Spectrum Analyzer	Agilent	N9020A	US46220290	2024/05/02	2025/05/01
Spectrum Analyzer	Keysight	N9020A	MY53420874	2024/05/02	2025/05/01
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2024/12/21	2025/12/20
Active Loop Antenna	Da Ze	ZN30900A	/	2024/04/30	2025/04/29
Amplifier	Agilent	8449B	3008A02306	2024/04/30	2025/04/29
Amplifier	Brief&Smart	LNA-4018	2104197	2024/05/03	2025/05/02
Temperature/Humidity Meter	Ji Yu	MC501	/	2024/05/04	2025/05/03
Power measurement module	TSTPASS	TSPS2023R	TSCB220016	2024/05/03	2025/05/02
Power Sensor	Agilent	U2021XA	MY53340004	2024/05/04	2025/05/03
Power Sensor	Agilent	U2021XA	MY54080012	2024/05/03	2025/05/02
Spectrum Analyzer	RS	FSP	1164.4391.38	2024/05/03	2025/05/02

Test Software	
Name of Software	Version
TST-PASS	V2.0
EZ_EMC(Below 1GHz)	V1.1.4.2
EZ_EMC((Above 1GHz)	V1.1.4.2

The calibration interval was one year

2.5. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

2.6. Modifications

No modifications were implemented to meet testing criteria.

3. TEST CONDITIONS AND RESULTS

3.1. Conducted Emissions Test

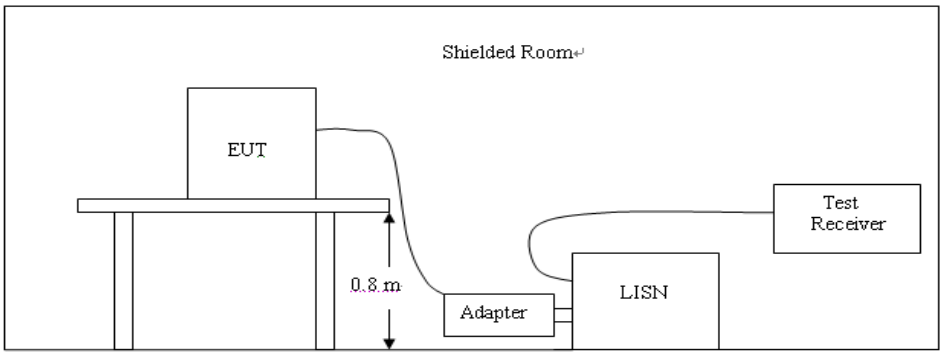
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.207

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST CONFIGURATION



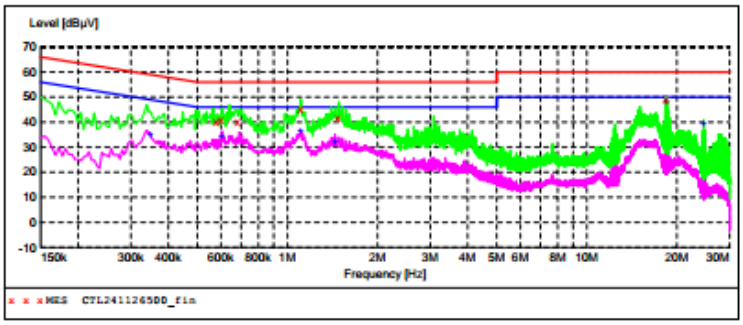
TEST PROCEDURE

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a Speaker; a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10:2013.
2. Support equipment, if needed, was placed as per ANSI C63.10:2013.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10:2013.
4. The adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5. All support equipments received AC power from a second LISN, if any.
6. The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.

TEST RESULTS

Line:	L
Test Modes	TM2

SCAN TABLE: "Voltage (9K-30M)FIN"
Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "CTL241126500_fin"

11/26/2024 9:45AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.577500	39.90	10.0	56	16.1	QP	L1	GND
0.600000	40.80	10.0	56	15.2	QP	L1	GND
0.681000	40.40	10.0	56	15.6	QP	L1	GND
1.108500	45.30	10.1	56	10.7	QP	L1	GND
1.477500	41.70	10.1	56	14.3	QP	L1	GND
18.433500	49.10	11.2	60	10.9	QP	L1	GND

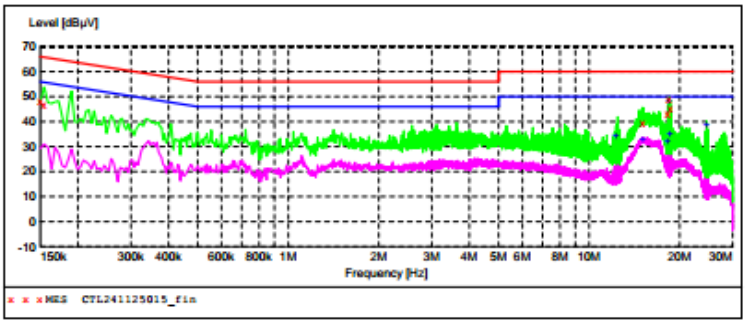
MEASUREMENT RESULT: "CTL241126500_fin2"

11/26/2024 9:45AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.348000	34.90	10.0	49	14.1	AV	L1	GND
0.604500	34.60	10.0	46	11.4	AV	L1	GND
1.108500	36.60	10.1	46	9.4	AV	L1	GND
1.441500	32.10	10.1	46	13.9	AV	L1	GND
18.433500	48.00	11.2	50	2.0	AV	L1	GND
24.576000	39.30	10.6	50	10.7	AV	L1	GND

Line:	N
Test Modes	TM2

SCAN TABLE: "Voltage (9K-30M)FIN"
Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "CTL241125015_fin"

11/26/2024 9:20AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	48.20	10.0	66	17.8	QP	N	GND
0.154500	46.40	10.0	66	19.4	QP	N	GND
15.072000	39.30	11.2	60	20.7	QP	N	GND
18.267000	42.70	11.2	60	17.3	QP	N	GND
18.433500	49.00	11.2	60	11.0	QP	N	GND
18.595500	44.90	11.2	60	15.1	QP	N	GND

MEASUREMENT RESULT: "CTL241125015_fin2"

11/26/2024 9:20AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
12.291000	34.50	10.9	50	15.5	AV	N	GND
15.018000	33.00	11.2	50	17.0	AV	N	GND
18.262500	31.90	11.2	50	18.1	AV	N	GND
18.433500	47.90	11.2	50	2.1	AV	N	GND
18.600000	34.70	11.2	50	15.3	AV	N	GND
24.576000	38.90	10.6	50	11.1	AV	N	GND

3.2. Radiated Emissions and Band Edge

Limit

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission out of authorized band shall not exceed the following table at a 3 meters measurement distance.

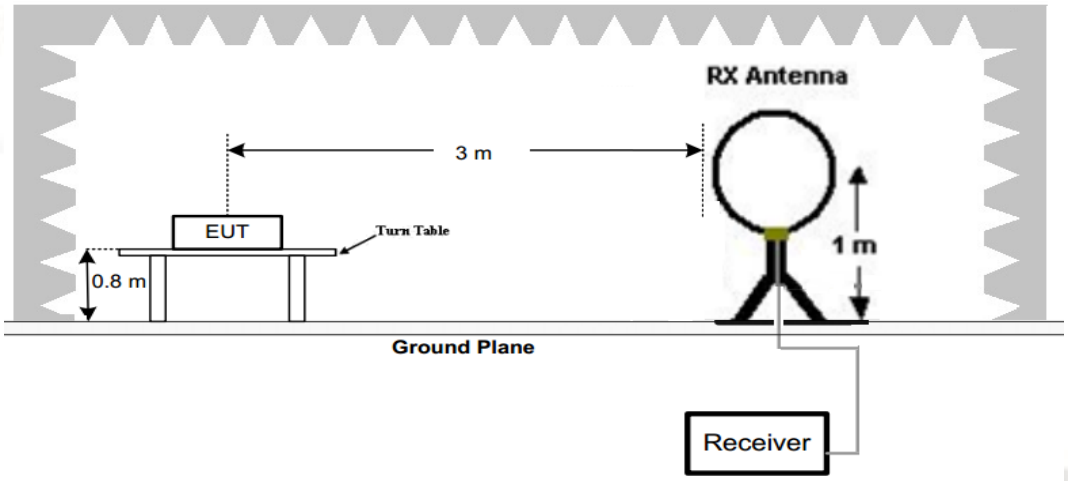
In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

Radiated emission limits

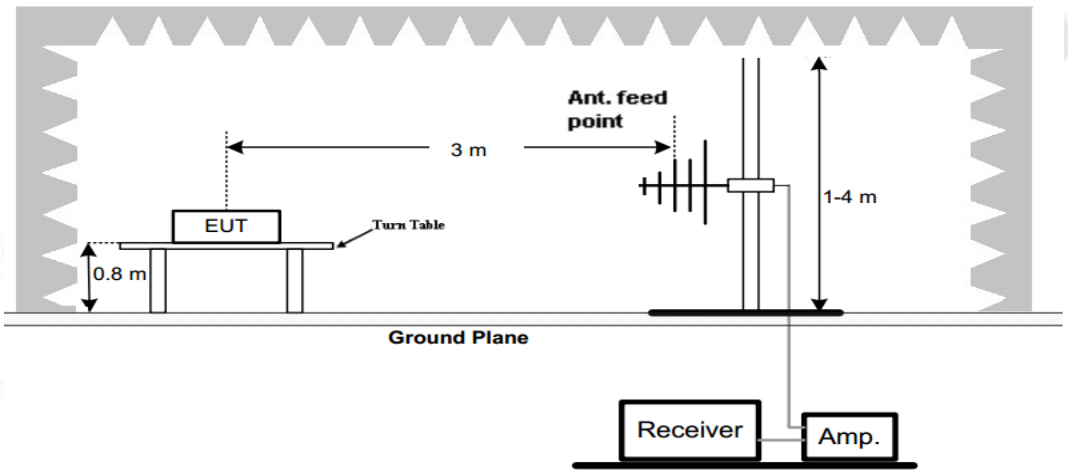
Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)
1.705-30	3	20log(30)+ 40log(30/3)	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST CONFIGURATION

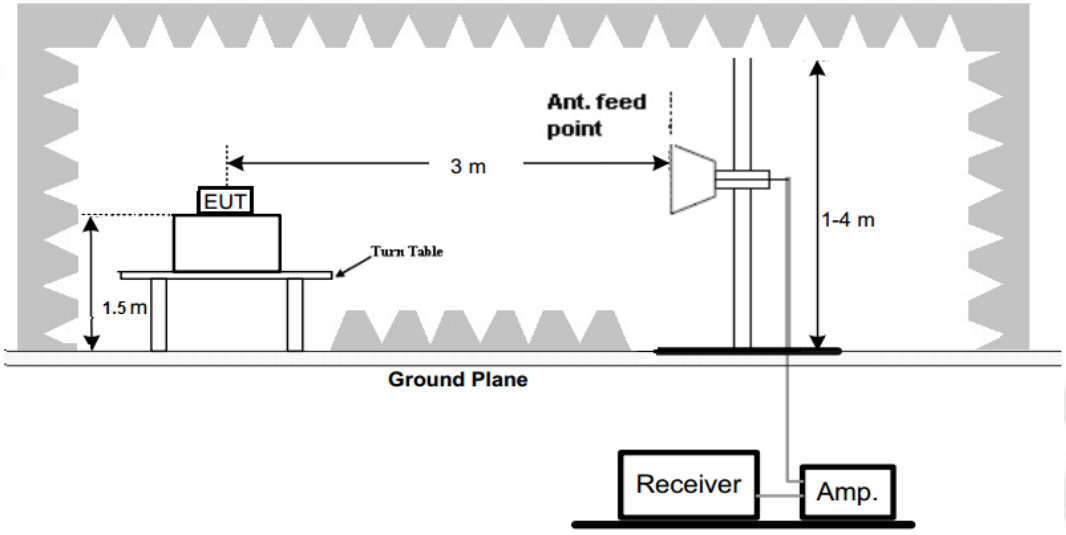
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



Test Procedure

1. Below 1GHz measurement the EUT is placed on a turntable which is 0.8m above ground plane, and above 1GHz measurement EUT was placed on a low permittivity and low loss tangent turn table which is 1.5m above ground plane.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0℃ to 360℃ to acquire the highest emissions from EUT
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement –X, Y, and Z-plane. The X-plane results were found as the worst case and were shown in this report.

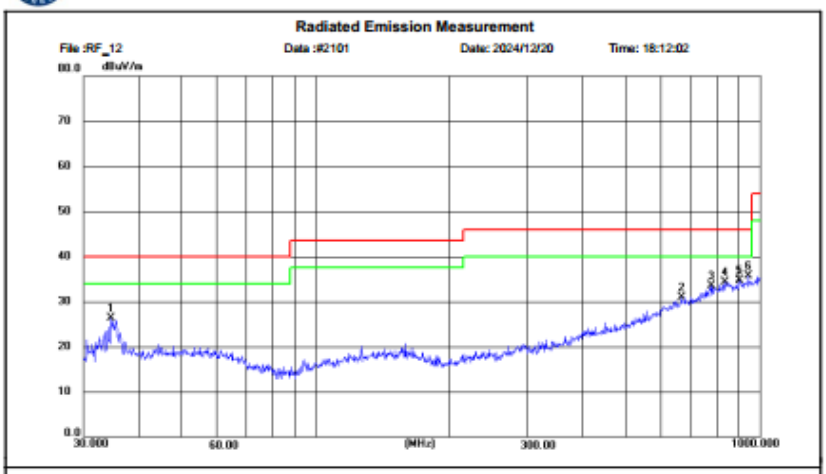
TEST RESULTS

Remark:
1. All three channels (lowest/middle/highest) of each mode were measured below 1GHz and recorded worst case at 802.11b low channel (Antenna 1).
2. All three channels (lowest/middle/highest) of each mode were measured above1GHz and recorded worst case at 802.11b mode (Antenna 1).
3. Radiated emission test from 9 KHz to 10th harmonic of fundamental was verified, Found the emission level are attenuated 20dB below the limits from 9 kHz to 30MHz, so it does not recorded in report.

For 30MHz-1GHz

Test mode:	TM1	Polarization:	Horizontal

Shenzhen CTL Testing Technology Co., Ltd
Tel: +86-755-89486194



Site LAB Chamber 2
Limit: FCC Part15 RE-Class C_30-1000MHz
EUT:
M/N: T1568
Mode: Wi-Fi2.4G 2412MHz
Note: Shenzhen Forwell Electronics Technology Co., Ltd.

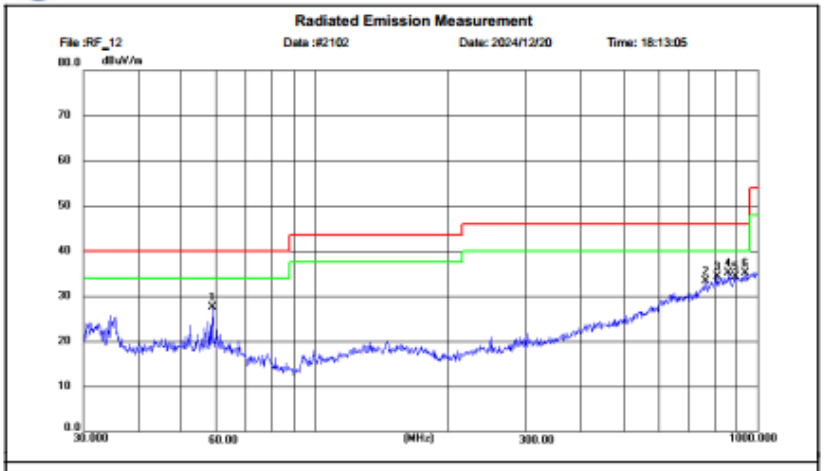
Polarization: *Horizontal*
Power:
Distance: 3m

Temperature: 25(C)
Humidity: 50 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	34.6537	12.37	13.90	26.27	40.00	13.73	peak	100	9	P	
2	666.6795	7.49	23.32	30.81	46.00	15.19	peak	100	9	P	
3	781.6597	7.27	26.19	33.46	46.00	12.54	peak	100	293	P	
4	839.1818	7.09	27.22	34.31	46.00	11.69	peak	100	303	P	
5	900.1474	6.76	27.87	34.63	46.00	11.37	peak	100	9	P	
6	944.1975	7.33	28.34	35.67	46.00	10.33	peak	100	271	P	

Test mode:	TM1	Polarization:	Vertical

Shenzhen CTL Testing Technology Co., Ltd
Tel: +86-755-89486194



Site LAB Chamber 2
Limit: FCC Part15 RE-Class C_30-1000MHz
EUT:
M/N: T1568
Mode: Wi-Fi2.4G 2412MHz
Note: Shenzhen Forwell Electronics Technology Co., Ltd.

Polarization: *Vertical*
Power:
Distance: 3m

Temperature: 25(C)
Humidity: 50 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	58.7670	13.13	14.30	27.43	40.00	12.57	peak	100	237	P	
2	765.7214	7.53	25.79	33.32	46.00	12.68	peak	100	100	P	
3	813.4681	7.36	26.96	34.32	46.00	11.68	peak	100	194	P	
4	860.7894	7.64	27.49	35.13	46.00	10.87	peak	100	47	P	
5	893.4650	6.60	27.61	34.21	46.00	11.79	peak	100	340	P	
6	940.4801	6.72	28.33	35.05	46.00	10.95	peak	100	257	P	

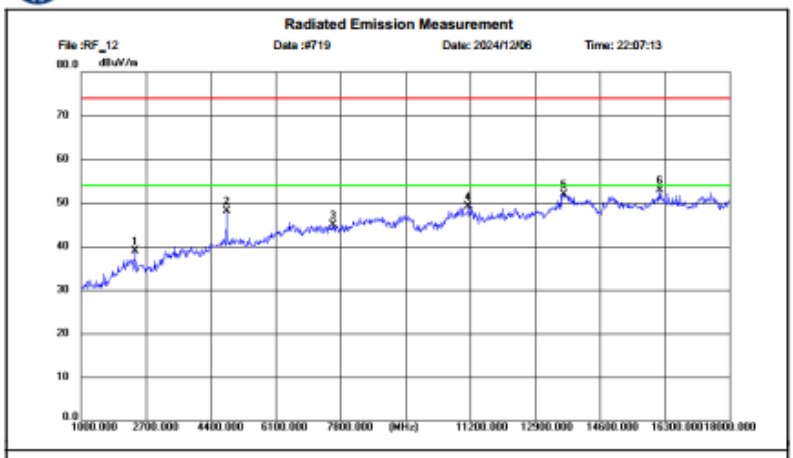
For 1GHz to 25GHz

802.11b Mode (above 1GHz)

Note: 802.11b/802.11g/802.11n (HT20)/802.11n (HT40) all have been tested, only worse case 802.11b is reported (Antenna 1).

Horizontal	Channel 1

Shenzhen CTL Testing Technology Co., Ltd
Tel: +86-755-89486194



Site LAB Chamber 2
Limit: FCC Part15 RE-Class C_Above 1GHz_PK
EUT:
M/N: T1568
Mode: Wi-Fi2.4G 2412MHz
Note: Shenzhen Forwell Electronics Technology Co., Ltd.

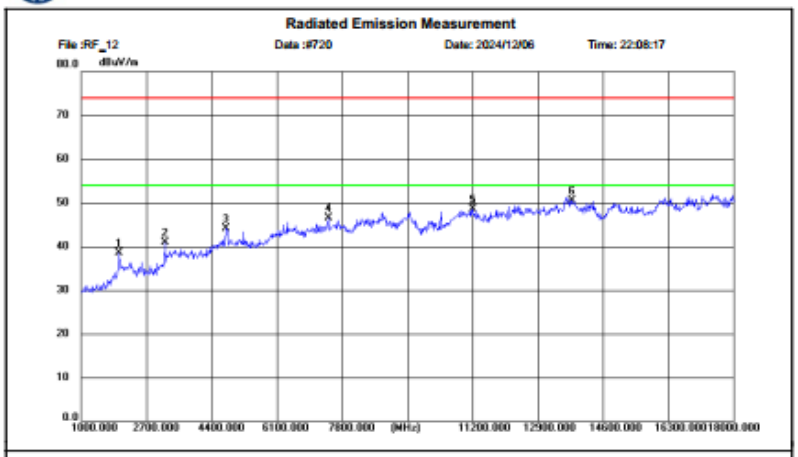
Polarization: *Horizontal*
Power:
Distance: 3m

Temperature: 25(C)
Humidity: 50 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2415.250	55.70	-16.89	38.81	74.00	35.19	peak	150	355	P	
2	4822.875	56.22	-8.05	48.17	74.00	25.83	peak	150	53	P	
3	7604.500	47.65	-2.83	44.82	74.00	29.18	peak	150	12	P	
4	11157.500	48.31	0.82	49.13	74.00	24.87	peak	150	355	P	
5	13677.750	47.96	3.91	51.87	74.00	22.13	peak	150	241	P	
6	16166.125	47.75	5.14	52.89	74.00	21.11	peak	150	293	P	

Vertical	Channel 1

Shenzhen CTL Testing Technology Co., Ltd
Tel: +86-755-89486194



Site LAB Chamber 2
Limit: FCC Part15 RE-Class C_Above 1GHz_PK
EUT:
M/N: T1568
Mode: Wi-Fi2.4G 2412MHz
Note: Shenzhen Forwell Electronics Technology Co., Ltd.

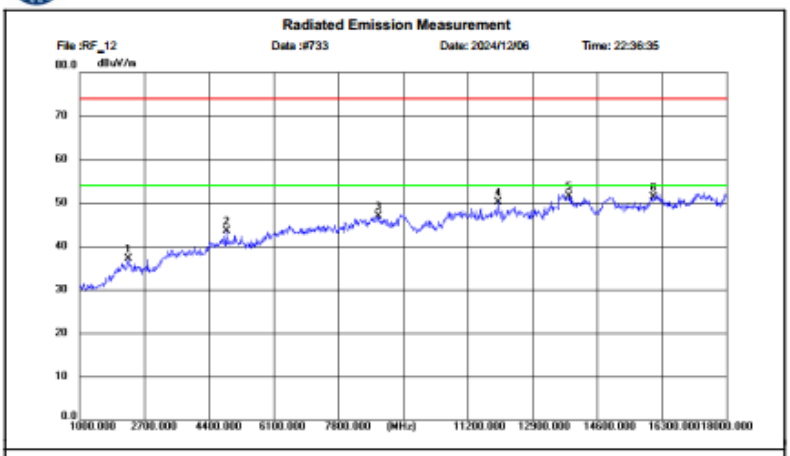
Polarization: *Vertical*
Power:
Distance: 3m

Temperature: 25(C)
Humidity: 50 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	1996.625	57.37	-18.82	38.55	74.00	35.45	peak	150	88	P	
2	3190.875	54.10	-13.17	40.93	74.00	33.07	peak	150	233	P	
3	4784.625	52.22	-8.12	44.10	74.00	29.90	peak	150	306	P	
4	7457.875	49.25	-2.80	46.45	74.00	27.55	peak	150	306	P	
5	11212.750	47.66	0.83	48.49	74.00	25.51	peak	150	15	P	
6	13788.250	46.76	3.75	50.51	74.00	23.49	peak	150	338	P	

Horizontal	Channel 6

Shenzhen CTL Testing Technology Co., Ltd
Tel: +86-755-89486194



Site LAB Chamber 2
Limit: FCC Part15 RE-Class C_Above 1GHz_PK
EUT:
M/N: T1568
Mode: Wi-Fi2.4G 2437MHz TX
Note: Shenzhen Forwell Electronics Technology Co., Ltd.

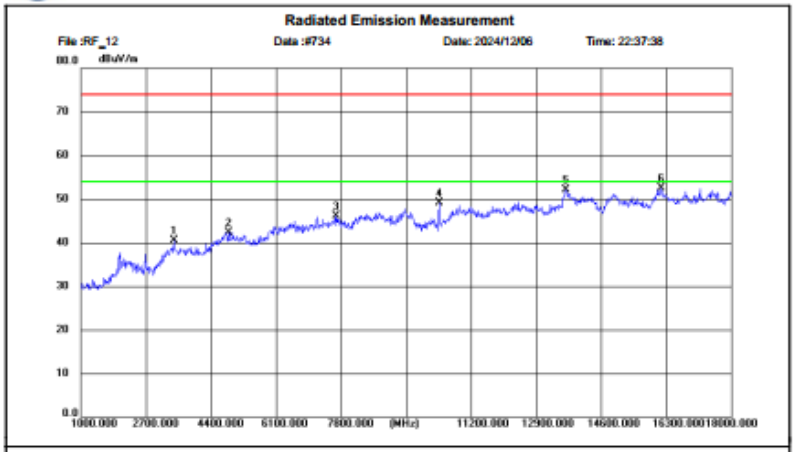
Polarization: *Horizontal*
Power:
Distance: 3m

Temperature: 25(C)
Humidity: 50 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2279.250	54.47	-17.31	37.16	74.00	36.84	peak	150	2	P	
2	4873.875	51.45	-7.97	43.48	74.00	30.52	peak	150	22	P	
3	8862.500	47.56	-0.63	46.93	74.00	27.07	peak	150	210	P	
4	12011.750	47.99	2.21	50.20	74.00	23.80	peak	150	158	P	
5	13877.500	47.76	3.76	51.52	74.00	22.48	peak	150	252	P	
6	16079.000	46.36	4.91	51.27	74.00	22.73	peak	150	241	P	

Vertical	Channel 6

Shenzhen CTL Testing Technology Co., Ltd
Tel: +86-755-89486194



Site LAB Chamber 2
Limit: FCC Part15 RE-Class C_Above 1GHz_PK
EUT:
M/N: T1568
Mode: Wi-Fi2.4G 2437MHz TX
Note: Shenzhen Forwell Electronics Technology Co., Ltd.

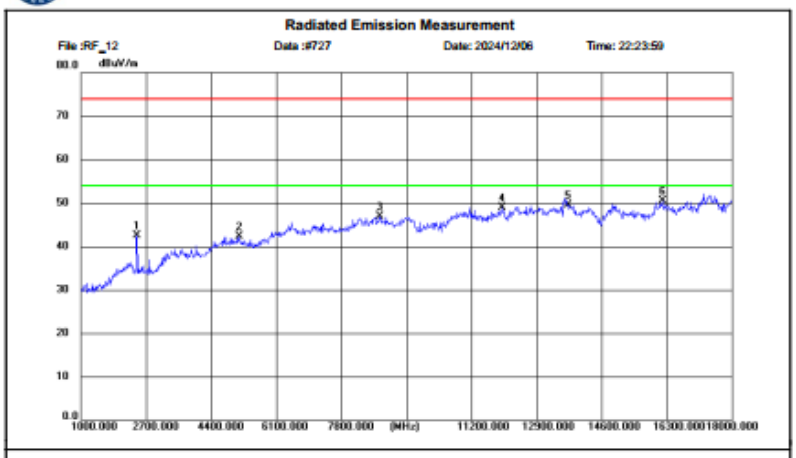
Polarization: *Vertical*
Power:
Distance: 3m

Temperature: 25(C)
Humidity: 50 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	3443.750	52.80	-12.28	40.52	74.00	33.48	peak	150	67	P	
2	4873.875	50.37	-7.97	42.40	74.00	31.60	peak	150	296	P	
3	7691.625	48.95	-2.91	46.04	74.00	27.96	peak	150	296	P	
4	10371.250	49.14	0.02	49.16	74.00	24.84	peak	150	358	P	
5	13692.625	48.12	3.90	52.02	74.00	21.98	peak	150	140	P	
6	16176.750	47.34	5.17	52.51	74.00	21.49	peak	150	67	P	

Horizontal	Channel 11

Shenzhen CTL Testing Technology Co., Ltd
Tel: +86-755-89486194



Site LAB Chamber 2
Limit: FCC Part15 RE-Class C_Above 1GHz_PK
EUT:
M/N: T1568
Mode: Wi-Fi2.4G 2462MHz TX
Note: Shenzhen Forwell Electronics Technology Co., Ltd.

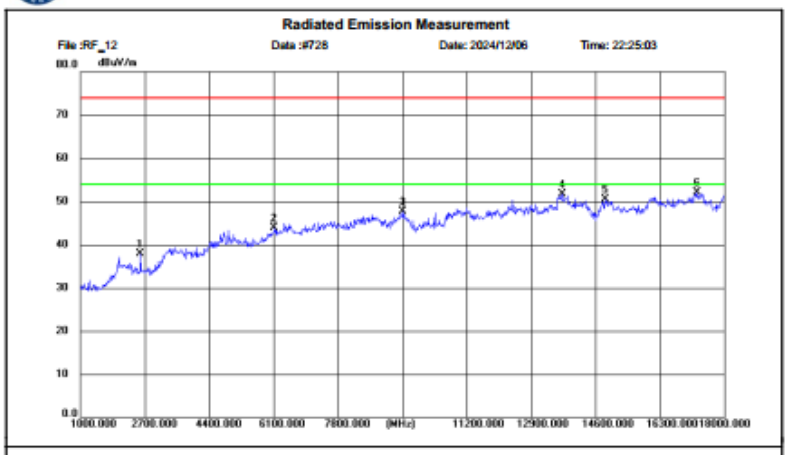
Polarization: *Horizontal*
Power:
Distance: 3m

Temperature: 25(C)
Humidity: 50 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2462.000	59.21	-16.75	42.46	74.00	31.54	peak	150	357	P	
2	5143.750	50.16	-7.78	42.38	74.00	31.62	peak	150	148	P	
3	8805.125	47.72	-0.86	46.86	74.00	27.14	peak	150	346	P	
4	12005.375	46.65	2.21	48.86	74.00	25.14	peak	150	305	P	
5	13737.250	45.71	3.84	49.55	74.00	24.45	peak	150	284	P	
6	16200.125	45.34	5.24	50.58	74.00	23.42	peak	150	200	P	

Vertical	Channel 11

Shenzhen CTL Testing Technology Co., Ltd
Tel: +86-755-89486194



Site LAB Chamber 2
Limit: FCC Part15 RE-Class C_Above 1GHz_PK
EUT:
M/N: T1568
Mode: Wi-Fi2.4G 2462MHz TX
Note: Shenzhen Forwell Electronics Technology Co., Ltd.

Polarization: *Vertical*
Power:
Distance: 3m

Temperature: 25(C)
Humidity: 50 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2593.750	54.06	-16.20	37.86	74.00	36.14	peak	150	296	P	
2	6119.125	49.12	-5.26	43.86	74.00	30.14	peak	150	358	P	
3	9523.375	47.29	0.32	47.61	74.00	26.39	peak	150	223	P	
4	13730.875	47.77	3.85	51.62	74.00	22.38	peak	150	86	P	
5	14855.000	47.45	3.06	50.51	74.00	23.49	peak	150	358	P	
6	17290.250	43.96	8.11	52.06	74.00	21.94	peak	150	45	P	

REMARKS:

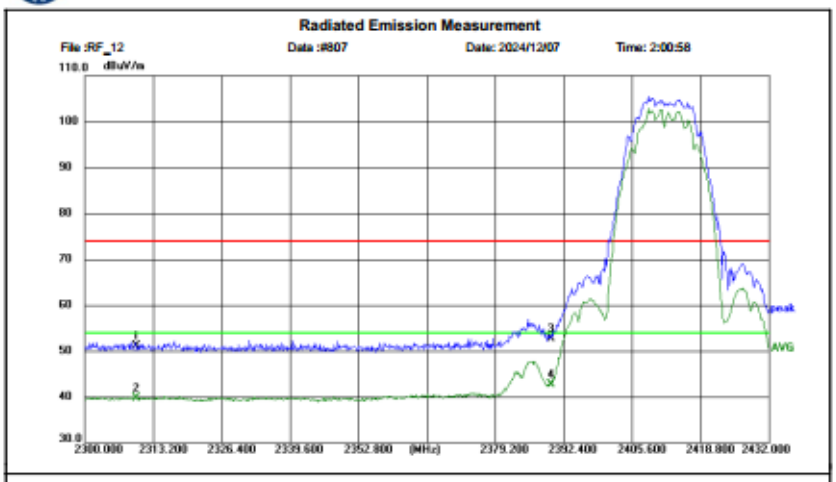
1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
3. Margin value = Limit value- Emission level.
4. -- Mean the PK detector measured value is below average limit.
5. RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.
6. Other emissions are attenuated 20dB below the limits from 9 kHz to 30MHz, so it does not recorded in report.
7. 18GHz-26GHz not recorded for no spurious point have a margin of less than 6 dB with respect to the limits.

Results of Band Edges Test (Radiated)

Note: 802.11b/802.11g/802.11n (HT20)/802.11n (HT40) all have been tested, only worse case 802.11b is reported (Antenna 1).

Horizontal	Channel 1

Shenzhen CTL Testing Technology Co., Ltd
Tel: +86-755-89486194



Site LAB Chamber 2
Limit: FCC Part 15 C
EUT:
M/N: T1568
Mode: Wi-Fi2.4G 2412MHz
Note: Shenzhen Forwell Electronics Technology Co., Ltd.

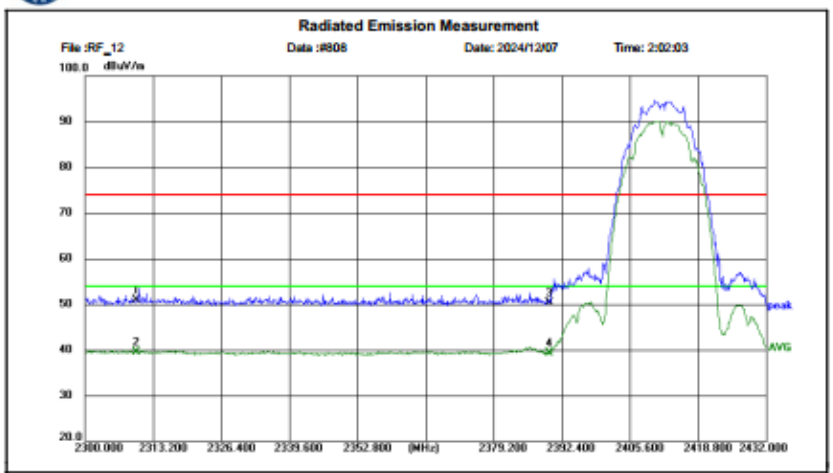
Polarization: *Horizontal*
Power:
Distance: 3m

Temperature: 25(C)
Humidity: 50 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2310.000	41.32	9.69	51.01	74.00	22.99	peak	150	2	P	
2	2310.000	30.04	9.69	39.73	54.00	14.27	AVG	150	2	P	
3	2390.000	43.02	9.77	52.79	74.00	21.21	peak	150	360	P	
4	2390.000	32.88	9.77	42.65	54.00	11.35	AVG	150	360	P	

Vertical	Channel 1

Shenzhen CTL Testing Technology Co., Ltd
Tel: +86-755-89486194



Site LAB Chamber 2
Limit: FCC Part 15 C
EUT:
M/N: T1568
Mode: Wi-Fi2.4G 2412MHz
Note: Shenzhen Forwell Electronics Technology Co., Ltd.

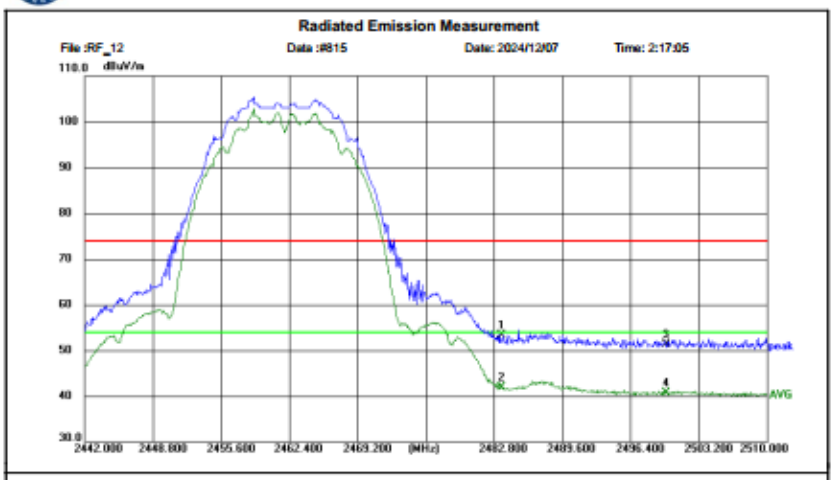
Polarization: *Vertical*
Power:
Distance: 3m

Temperature: 25(C)
Humidity: 50 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2310.000	41.25	9.69	50.94	74.00	23.06	peak	150	203	P	
2	2310.000	29.72	9.69	39.41	54.00	14.59	AVG	150	203	P	
3	2390.000	40.52	9.77	50.29	74.00	23.71	peak	150	141	P	
4	2390.000	29.47	9.77	39.24	54.00	14.76	AVG	150	141	P	

Horizontal	Channel 11

Shenzhen CTL Testing Technology Co., Ltd
Tel: +86-755-89486194



Site LAB Chamber 2
Limit: FCC Part 15 C
EUT:
M/N: T1568
Mode: Wi-Fi2.4G 2462MHz
Note: Shenzhen Forwell Electronics Technology Co., Ltd.

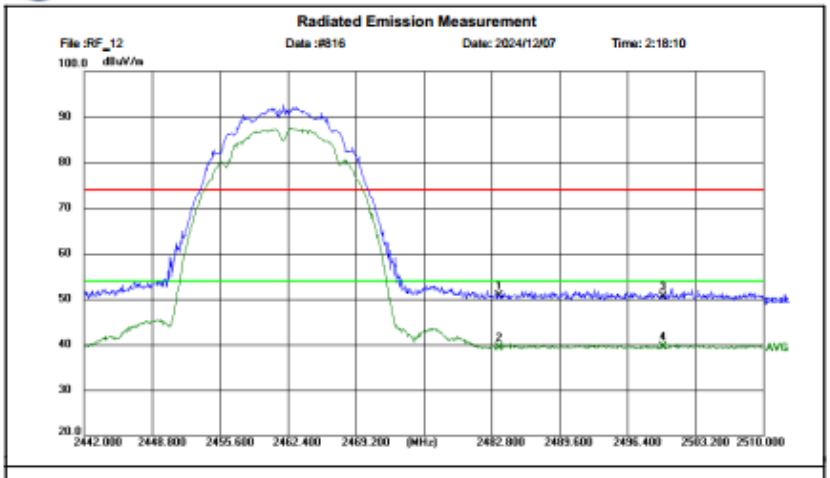
Polarization: *Horizontal*
Power:
Distance: 3m

Temperature: 25(C)
Humidity: 50 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2483.500	43.35	9.93	53.28	74.00	20.72	peak	150	346	P	
2	2483.500	32.00	9.93	41.93	54.00	12.07	AVG	150	346	P	
3	2500.000	41.22	10.00	51.22	74.00	22.78	peak	150	346	P	
4	2500.000	30.72	10.00	40.72	54.00	13.28	AVG	150	346	P	

Vertical	Channel 11

Shenzhen CTL Testing Technology Co., Ltd
Tel: +86-755-89486194



Site LAB Chamber 2
Limit: FCC Part 15 C
EUT:
M/N: T1568
Mode: Wi-Fi2.4G 2462MHz
Note: Shenzhen Forwell Electronics Technology Co., Ltd.

Polarization: *Vertical*
Power:
Distance: 3m

Temperature: 25(C)
Humidity: 50 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2483.500	40.80	9.93	50.73	74.00	23.27	peak	150	15	P	
2	2483.500	29.45	9.93	39.38	54.00	14.62	AVG	150	15	P	
3	2500.000	40.44	10.00	50.44	74.00	23.56	peak	150	203	P	
4	2500.000	29.41	10.00	39.41	54.00	14.59	AVG	150	203	P	

REMARKS:

1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
3. Margin value = Limit value- Emission level.
4. -- Mean the PK detector measured value is below average limit.
5. RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.
6. For fundamental frequency, RBW 3MHz VBW 3MHz Peak detector is for PK Value; RMS detector is for AV value.
7. Other emissions are attenuated 20dB below the limits from 9kHz to 30MHz, so it does not recorded in report.

3.3. Maximum Conducted Output Power

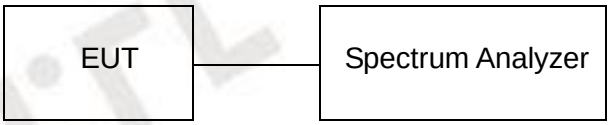
Limit

The Maximum Peak Output Power Measurement is 30dBm.

Test Procedure

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum.

Test Configuration



Test Results

Raw data reference to Section 2 from CTL2411191033-WF03_2.4G_WIFI_Appendix. .

3.4. Power Spectral Density

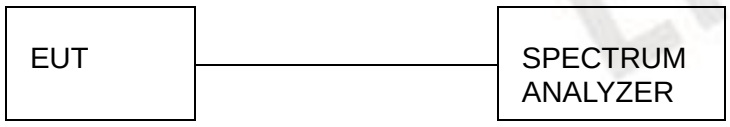
Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Test Procedure

1. Use this procedure when the maximum conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW ≥ 3 kHz.
3. Set the VBW ≥ 3× RBW.
4. Set the span to 1.5 times the DTS channel bandwidth.
5. Detector = Average.
6. Sweep points = 40001
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum power level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.
11. The resulting PSD level must be 8dBm.

Test Configuration



Test Results

Raw data reference to Section 3 from CTL2411191033-WF03_2.4G_WIFI_Appendix. .

3.5. 6dB Bandwidth

Limit

For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz

Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 KHz RBW and 300 KHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

Test Configuration

Test Results

Raw data reference to Section 1 from CTL2411191033-WF03_2.4G_WIFI_Appendix. .

3.6. Out-of-band Emissions

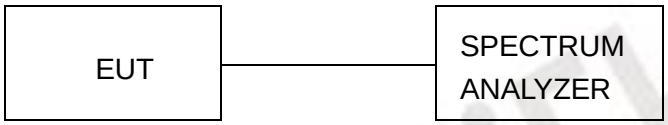
Limit

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 con-ducted or a radiated measurement, pro-vided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter com-plies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

Test Procedure

Connect the transmitter output to spectrum analyzer using a low loss RF cable, and set the spectrum analyzer to RBW=100 kHz, VBW= 300 kHz, peak detector , and max hold. Measurements utilizing these setting are made of the in-band reference level, bandedge and out-of-band emissions.

Test Configuration



Test Results

Raw data reference to Section 4 from CTL2411191033-WF03_2.4G_WIFI_Appendix. .

3.7. Antenna Requirement

Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203:

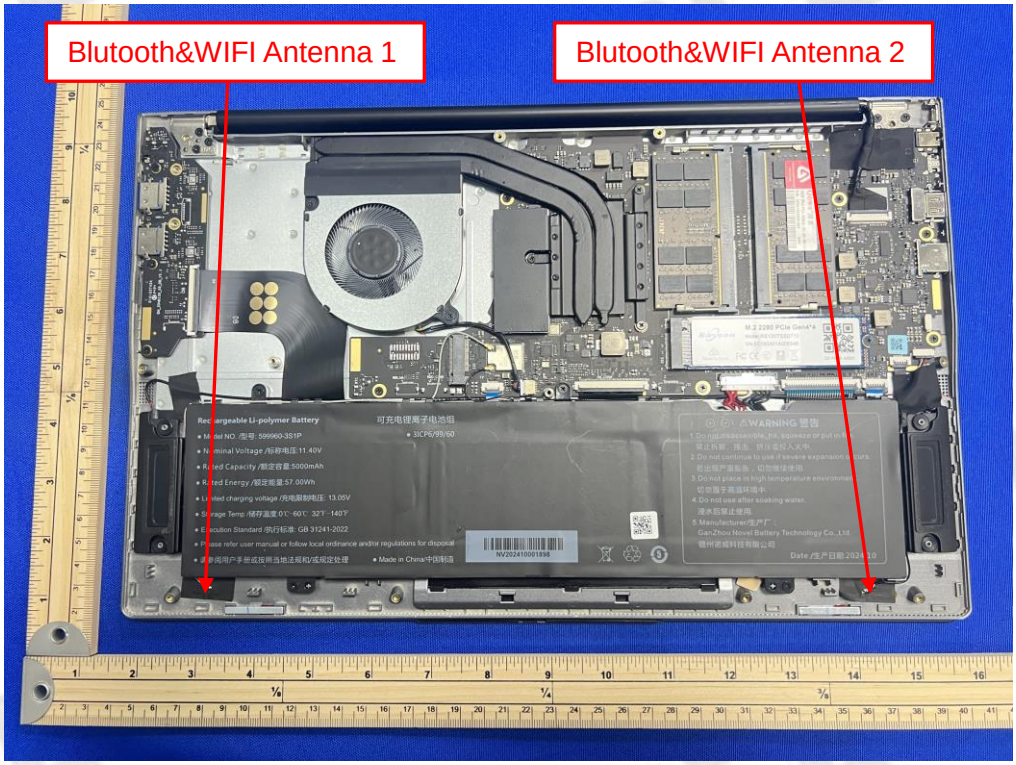
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited

FCC CFR Title 47 Part 15 Subpart C Section 15.247(b) (4):

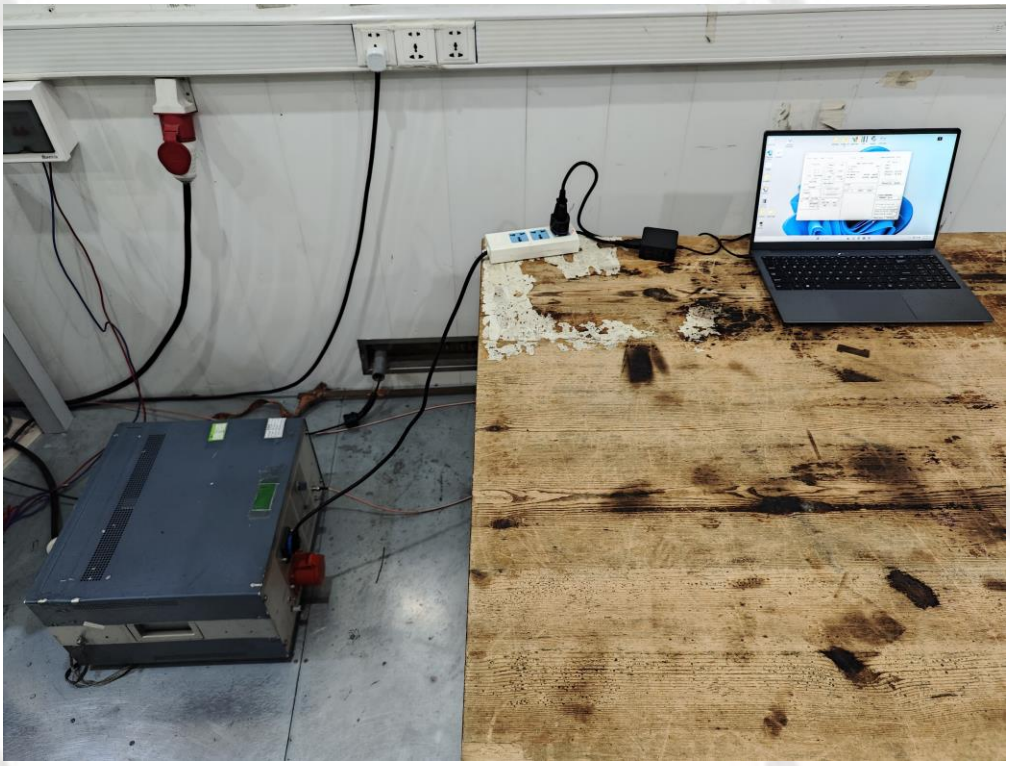
(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6dBi.

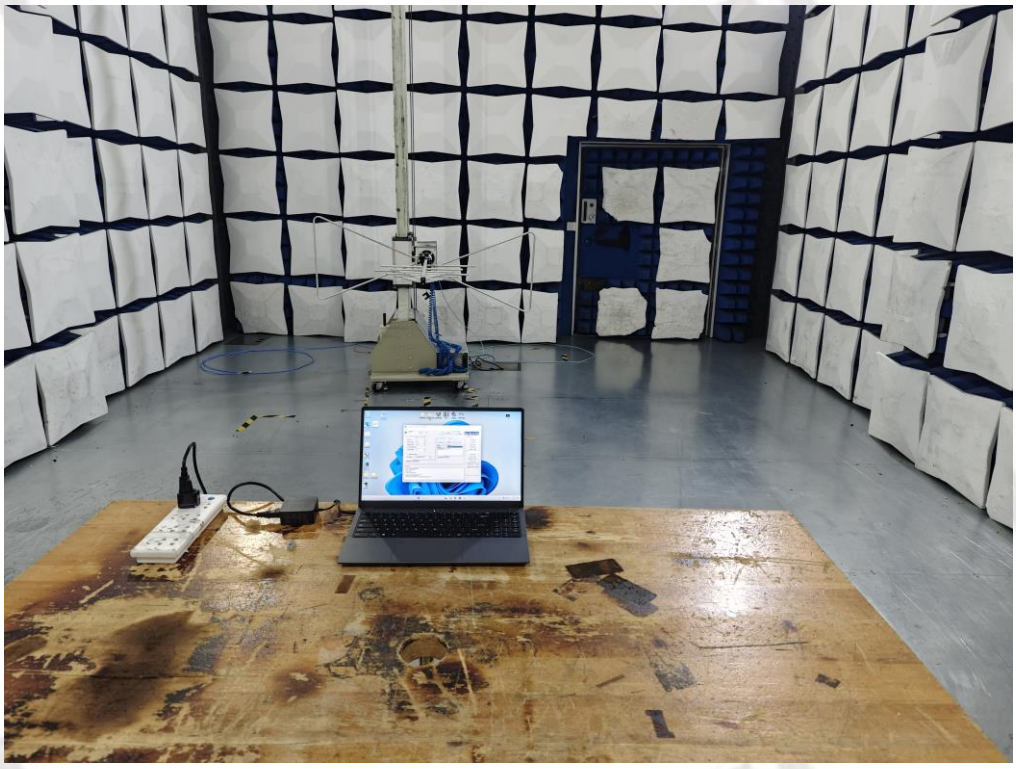
Test Result:

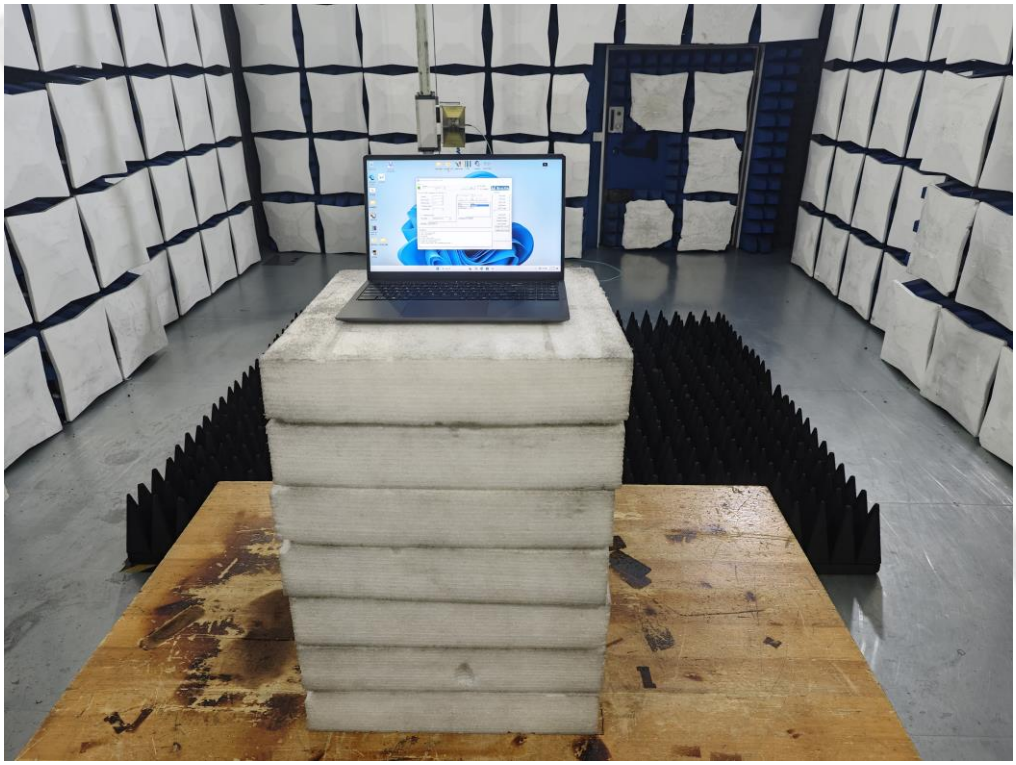
The maximum gain of 2.4G_WIFI Antenna 1 was 1.35dBi and 2.4G_WIFI Antenna 2 was 1.37dBi.



4. Test Setup Photos of the EUT







5. External and Internal Photos of the EUT

Reference to the test report No.CTL2411191033-WF01

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