TEST REPORT

Applicant:	Silk Road Hong Kong Ecommerce Limited
Address of Applicant:	RM 1552,15F, AMIATA INDUSTRIAL BUILDING, 58 LEI MUK ROAD, KWAI CHUNG, HONG KONG, China
Manufacturer/Factory:	Shen Zhen Wisezec Intelligent Technology Co., Ltd
Address of Manufacturer/Factory:	401-1, A6 Building, Fangxing Technology Park A, No. 13th Baonan Road, Longgang Community, Longgang Street, Shenzhen, China

Equipment Under Test (EUT)

Product Name:	Smart bird feeder
Model No.:	TTBF002CP, TTBF001CP01, TTBF001CP02
Trade Mark:	TITTO
FCC ID:	2BPV4-TTBF002CP
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.247
Date of sample receipt:	May 27, 2025
Date of Test:	May 28, 2025-June 19, 2025
Date of report issued:	June 19, 2025
Test Result :	PASS *

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

Authorized Signature:

深圳市环球尔一科技有限公司 Global United Technology Services Co., Ltd. 检验检测专用章 Inspection&Testing Services

Robinson Luo

Laboratory Manager

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

2 Version

Version No.	Date	Description
00	*June 19, 2025*	*Original*

Prepared By: ***Date:*** *June 19, 2025*

Project Engineer

Check By: ***Date:*** *June 19, 2025*

Reviewer

3 Contents

Page

1 COVER PAGE 1

2 VERSION 2

3 CONTENTS 3

4 TEST SUMMARY 5

5 GENERAL INFORMATION 6

5.1 GENERAL DESCRIPTION OF EUT 6
5.2 TEST MODE 8
5.3 DESCRIPTION OF SUPPORT UNITS 8
5.4 DEVIATION FROM STANDARDS 8
5.5 ABNORMALITIES FROM STANDARD CONDITIONS 8
5.6 TEST FACILITY 8
5.7 TEST LOCATION 8
5.8 ADDITIONAL INSTRUCTIONS 8

6 TEST INSTRUMENTS LIST 9

7 TEST RESULTS AND MEASUREMENT DATA 11

7.1 ANTENNA REQUIREMENT 11
7.2 CONDUCTED EMISSIONS 12
7.3 CONDUCTED OUTPUT POWER 17
7.4 CHANNEL BANDWIDTH 18
7.5 POWER SPECTRAL DENSITY 19
7.6 SPURIOUS EMISSION IN NON-RESTRICTED & RESTRICTED BANDS 20
7.6.1 Conducted Emission Method 20
7.6.2 Radiated Emission Method 21

8 TEST SETUP PHOTO 35

9 EUT CONSTRUCTIONAL DETAILS 35

10 APPENDIX FOR WIFI 2.4G 36

10.1 DTS BANDWIDTH 36
10.1.1 Test Result 36
10.1.2 Test Graphs 37
10.2 OCCUPIED CHANNEL BANDWIDTH 39
10.2.1 Test Result 39
10.2.2 Test Graphs 40
10.3 MAXIMUM CONDUCTED OUTPUT POWER 42
10.3.1 Test Result 42
10.4 MAXIMUM POWER SPECTRAL DENSITY 43
10.4.1 Test Result 43
10.4.2 Test Graphs 43
10.5 BAND EDGE MEASUREMENTS 45
10.5.1 Test Result 45
10.5.2 Test Graphs 46
10.6 CONDUCTED SPURIOUS EMISSION 47
10.6.1 Test Result 47
10.6.2 Test Graphs 48
10.7 DUTY CYCLE 53

10.7.1 Test Result.....53
10.7.2 Test Graphs.....53

4 Test Summary

Test Item	Section	Result
Antenna requirement	FCC part 15.203/15.247 (c)	Pass
AC Power Line Conducted Emission	FCC part 15.207	Pass
Conducted Peak Output Power	FCC part 15.247 (b)(3)	Pass
Channel Bandwidth & 99% OCB	FCC part 15.247 (a)(2)	Pass
Power Spectral Density	FCC part 15.247 (e)	Pass
Band Edge	FCC part 15.247(d)	Pass
Spurious Emission	FCC part 15.205/15.209	Pass

Remarks:

1. *Pass: The EUT complies with the essential requirements in the standard.*
2. *N/A: not applicable*
3. *Test according to ANSI C63.10:2013*

Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	$\pm 7.25\times10^{-8}$
2	Duty cycle	±0.37%
3	Occupied Bandwidth	±3%
4	RF conducted power	±0.75dB
5	RF power density	±3dB
6	Conducted Spurious emissions	±2.58dB
7	AC Power Line Conducted Emission	±3.44dB (0.15MHz ~ 30MHz)
8	Radiated Spurious emission test	±3.1dB (9kHz-30MHz)
		±3.8039dB (30MHz-200MHz)
		±3.9679dB (200MHz-1GHz)
		±4.29dB (1GHz-18GHz)
		±3.30dB (18GHz-40GHz)
9	Temperature test	±1°C
10	Humidity test	±3%
11	Time	±3%

5 General Information

5.1 General Description of EUT

Product Name:	Smart bird feeder
Model No.:	TTBF002CP, TTBF001CP01, TTBF001CP02
Test Model No.:	TTBF002CP, TTBF001CP02
Remark: All above models are identical in the same PCB layout, interior structure and electrical circuits. The differences are appearance design, appearance color and model name for commercial purpose.	
Test sample(s) ID:	GTS2025050411-1
Sample(s) Status	Engineer sample
S/N:	N/A
Operation Frequency:	802.11b/802.11g/802.11n(HT20): 2412MHz~2462MHz
Channel numbers:	802.11b/802.11g /802.11n(HT20): 11
Channel separation:	5MHz
Modulation technology:	802.11b: Direct Sequence Spread Spectrum (DSSS) 802.11g/802.11n(HT20): Orthogonal Frequency Division Multiplexing (OFDM)
Antenna Type:	Integral Antenna
Antenna gain:	5.42dBi(Declared by applicant)
Power supply:	DC 3.7V (Powered by Rechargeable Li-ion Battery) DC 5.0V (Powered by solar energy) The battery is charged via USB DC5V

Remark:
1. Antenna gain information provided by the customer
2. The relevant information of the sample is provided by the entrusting company, and the laboratory is not responsible for its authenticity.

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412MHz	4	2427MHz	7	2442MHz	10	2457MHz
2	2417MHz	5	2432MHz	8	2447MHz	11	2462MHz
3	2422MHz	6	2437MHz	9	2452MHz		

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Test channel	**Frequency (MHz)**
	802.11b/802.11g/802.11n(HT20)
Lowest channel	2412MHz
Middle channel	2437MHz
Highest channel	2462MHz

5.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:

Pre-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.

Mode	802.11b	802.11g	802.11n(HT20)
Data rate	1Mbps	6Mbps	6.5Mbps

5.3 Description of Support Units

None.

5.4 Deviation from Standards

None.

5.5 Abnormalities from Standard Conditions

None.

5.6 Test Facility

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

● **FCC —Registration No.: 381383**

Designation Number: CN5029

Global United Technology Services Co., Ltd., Shenzhen 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 files.

● **ISED—Registration No.: 9079A**

CAB identifier: CN0091

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of ISED for radio equipment testing.

● **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

5.7 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.
Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102
Tel: 0755-27798480
Fax: 0755-27798960

5.8 Additional Instructions

Test Software	Special test command provided by manufacturer
Power level setup	Default

6 Test Instruments list

Radiated Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	Apr. 11, 2025	Apr. 10, 2026
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	Apr. 12, 2025	Apr. 11, 2026
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9168	GTS640	Apr. 12, 2025	Apr. 11, 2026
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	Apr. 11, 2025	Apr. 10, 2026
6	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	Jul. 02, 2024	Jul. 01, 2025
7	Loop Antenna	ZHINAN	ZN30900A	GTS534	Nov.16, 2024	Nov.15, 2025
8	Broadband Preamplifier	SCHWARZBECK	BBV9718	GTS535	Apr. 11, 2025	Apr. 10, 2026
9	Amplifier(1GHz-26.5GHz)	HP	8449B	GTS601	Apr. 11, 2025	Apr. 10, 2026
10	Horn Antenna (18GH-40GHz)	Schwarzbeck	BBHA 9170	GTS691	Apr. 11, 2025	Apr. 10, 2026
11	FSV·Signal Analyzer (10Hz-40GHz)	Keysight	FSV-40-N	GTS666	Mar. 11, 2025	Mar. 10, 2026
12	Amplifier	/	LNA-1000-30S	GTS650	Apr. 11, 2025	Apr. 10, 2026
13	CDNE M2+M3-16A	HCT	30MHz-300MHz	GTS692	Nov. 13, 2024	Nov. 12, 2025
14	Wideband Amplifier	/	WDA-01004000-15P35	GTS602	Apr. 11, 2025	Apr. 10, 2026
15	Thermo meter	JINCHUANG	GSP-8A	GTS643	Apr. 15, 2025	Apr. 14, 2026
16	RE cable 1	GTS	N/A	GTS675	Jul. 02, 2024	Jul. 01, 2025
17	RE cable 2	GTS	N/A	GTS676	Jul. 02, 2024	Jul. 01, 2025
18	RE cable 3	GTS	N/A	GTS677	Jul. 02, 2024	Jul. 01, 2025
19	RE cable 4	GTS	N/A	GTS678	Jul. 02, 2024	Jul. 01, 2025
20	RE cable 5	GTS	N/A	GTS679	Jul. 02, 2024	Jul. 01, 2025
21	RE cable 6	GTS	N/A	GTS680	Jul. 02, 2024	Jul. 01, 2025
22	RE cable 7	GTS	N/A	GTS681	Jul. 05, 2024	Jul. 04, 2025
23	RE cable 8	GTS	N/A	GTS682	Jul. 05, 2024	Jul. 04, 2025
24	EMI Test Software	AUDIX	E3-6.100614a	GTS725	N/A	N/A

Conducted Emission						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	Jul. 12, 2022	Jul. 11, 2027
2	EMI Test Receiver	R&S	ESCI 7	GTS552	Apr. 12, 2025	Apr. 11, 2026
3	LISN	ROHDE & SCHWARZ	ENV216	GTS226	Apr. 11, 2025	Apr. 10, 2026
4	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
5	Thermo meter	JINCHUANG	GSP-8A	GTS642	Apr. 15, 2025	Apr. 14, 2026
6	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	Apr. 12, 2025	Apr. 11, 2026
7	ISN	SCHWARZBECK	NTFM 8158	GTS565	Apr. 11, 2025	Apr. 10, 2026
8	High voltage probe	SCHWARZBECK	TK9420	GTS537	Apr. 11, 2025	Apr. 10, 2026
9	Antenna end assembly	Weinschel	1870A	GTS560	Apr. 11, 2025	Apr. 10, 2026
10	EMI Test Software	AUDIX	E3-6.100622	GTS726	N/A	N/A
11	Current probe	CYBERTEK	EM5011	GTS698	Jan. 13, 2025	Jan. 12, 2026

RF Conducted Test:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	Apr. 11, 2025	Apr. 10, 2026
2	EMI Test Receiver	R&S	ESCI 7	GTS552	Apr. 12, 2025	Apr. 11, 2026
3	PSA Series Spectrum Analyzer	Agilent	E4440A	GTS536	Apr. 11, 2025	Apr. 10, 2026
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	Apr. 11, 2025	Apr. 10, 2026
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	Apr. 11, 2025	Apr. 10, 2026
6	Wideband Power Meter	Keysighte	N1924A	GTS673	Apr. 11, 2025	Apr. 10, 2026
7	USB RF Power Sensor	DARE	RPR3006W	GTS569	Apr. 11, 2025	Apr. 10, 2026
8	RF Switch Box	Shongyi	RFSW3003328	GTS571	Apr. 11, 2025	Apr. 10, 2026
9	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	Apr. 11, 2025	Apr. 10, 2026
10	Thermo meter	JINCHUANG	GSP-8A	GTS641	Apr. 15, 2025	Apr. 14, 2026
11	EXA Signal Analyzer	Keysight	N9010B	MY60241168	Nov. 02, 2024	Nov. 01, 2025

General used equipment:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Barometer	KUMAO	SF132	GTS647	Aug. 17, 2024	Aug. 16, 2025

7 Test results and Measurement Data

7.1 Antenna requirement

Standard requirement:	FCC Part15 C Section 15.203 /247(c)
15.203 requirement: 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. **15.247(c) (1)(i) requirement:** (i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi 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 6dBi.	
EUT Antenna:	
The antenna is integral antenna, reference to the appendix II for details	

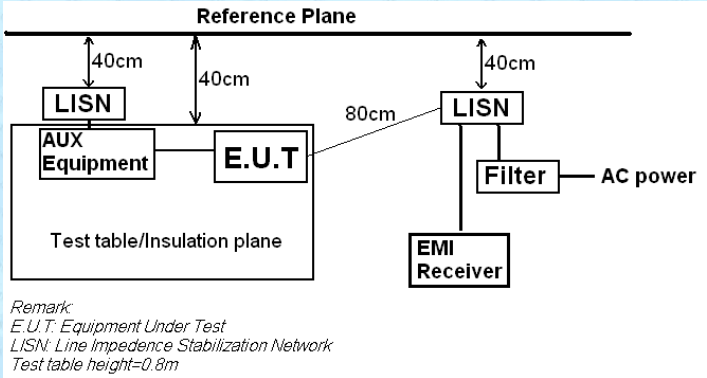
7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10:2013
Test Frequency Range:	150KHz to 30MHz
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto
Limit:	

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 setup:



Test procedure:

1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.
2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).
3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.

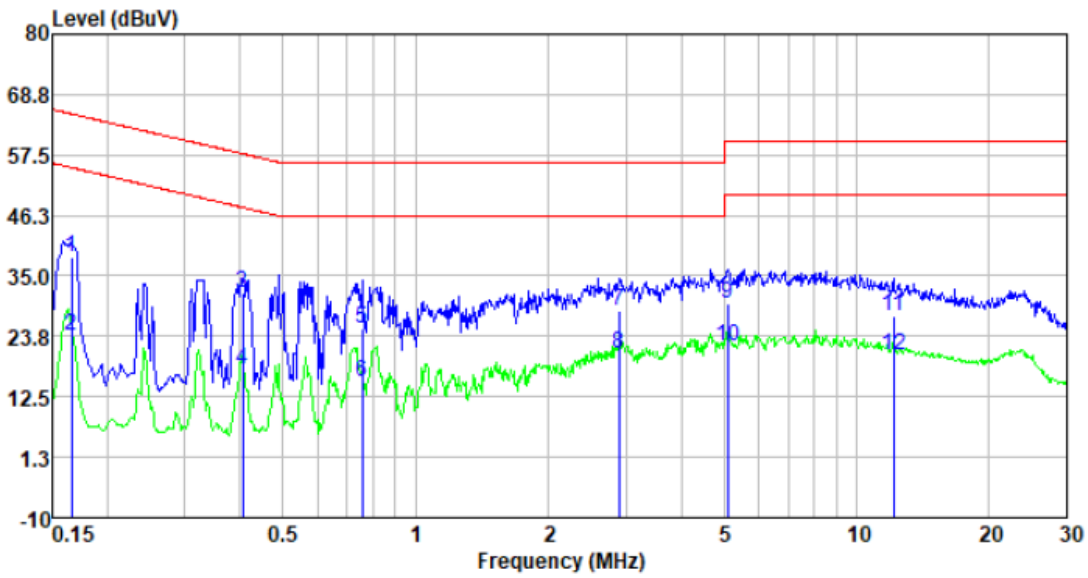
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar
Test voltage:	AC 120V, 60Hz					
Test results:	Pass					

Measurement data

Pre-scan all test modes, found worst case at 802.11g 2462MHz, and so only show the test result of it.

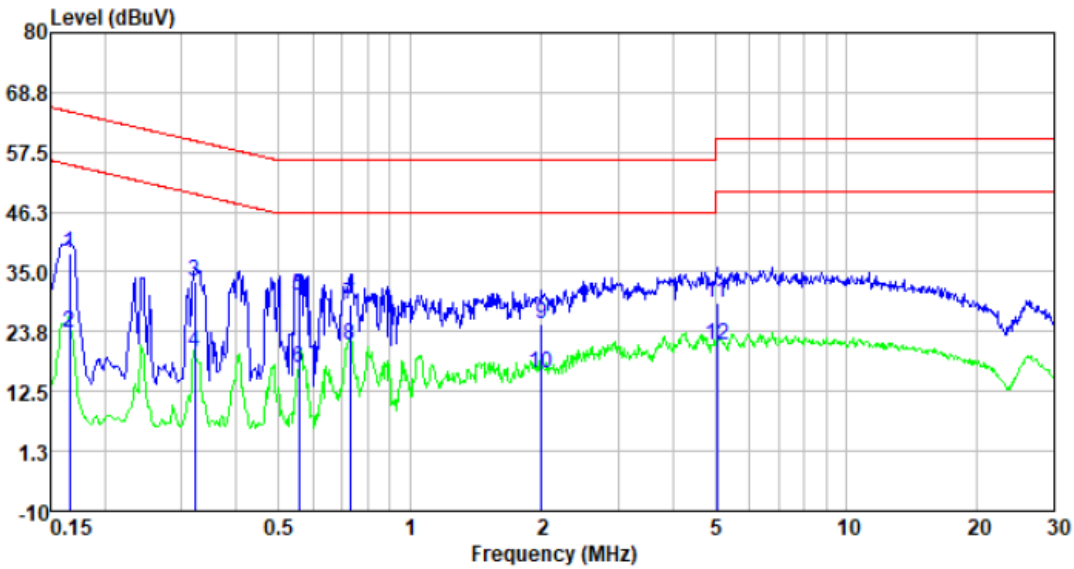
Model No.: TTBF002CP

Line:



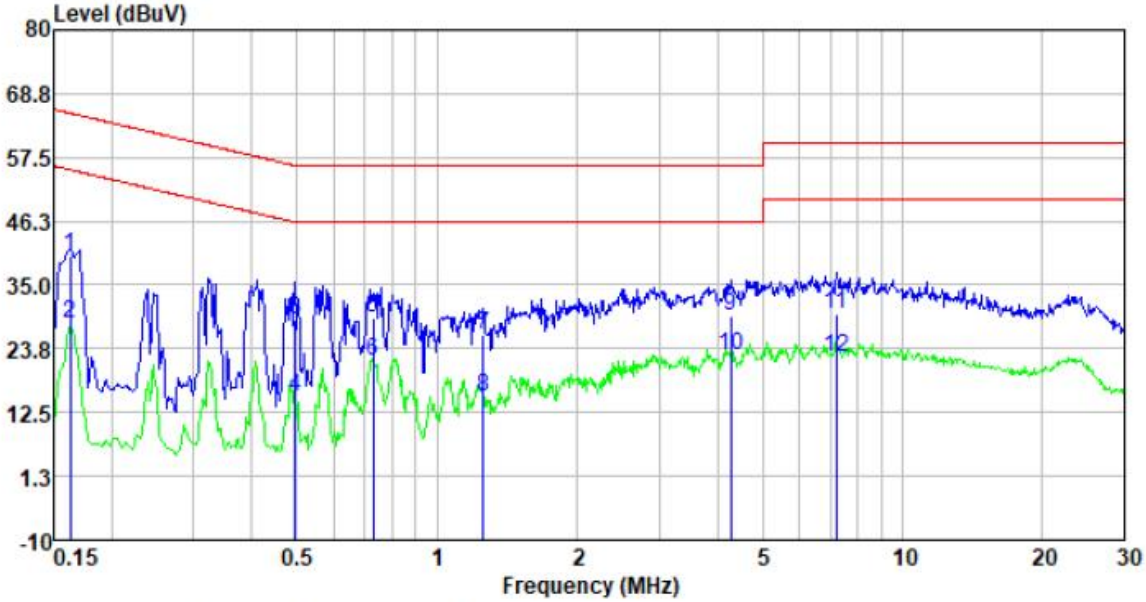
Freq MHz	Reading level dBuV	LISN/ISN factor dB	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.17	18.42	9.91	0.01	38.34	65.16	-26.82	QP
0.17	4.07	9.91	0.01	23.99	55.16	-31.17	Average
0.41	12.04	9.64	0.01	31.69	57.73	-26.04	QP
0.41	-1.96	9.64	0.01	17.69	47.73	-30.04	Average
0.75	5.58	9.76	0.02	25.36	56.00	-30.64	QP
0.75	-4.38	9.76	0.02	15.40	46.00	-30.60	Average
2.88	8.90	9.52	0.05	28.47	56.00	-27.53	QP
2.88	0.87	9.52	0.05	20.44	46.00	-25.56	Average
5.11	10.01	9.79	0.06	29.86	60.00	-30.14	QP
5.11	1.93	9.79	0.06	21.78	50.00	-28.22	Average
12.12	7.83	9.70	0.13	27.66	60.00	-32.34	QP
12.12	0.45	9.70	0.13	20.28	50.00	-29.72	Average

Neutral:



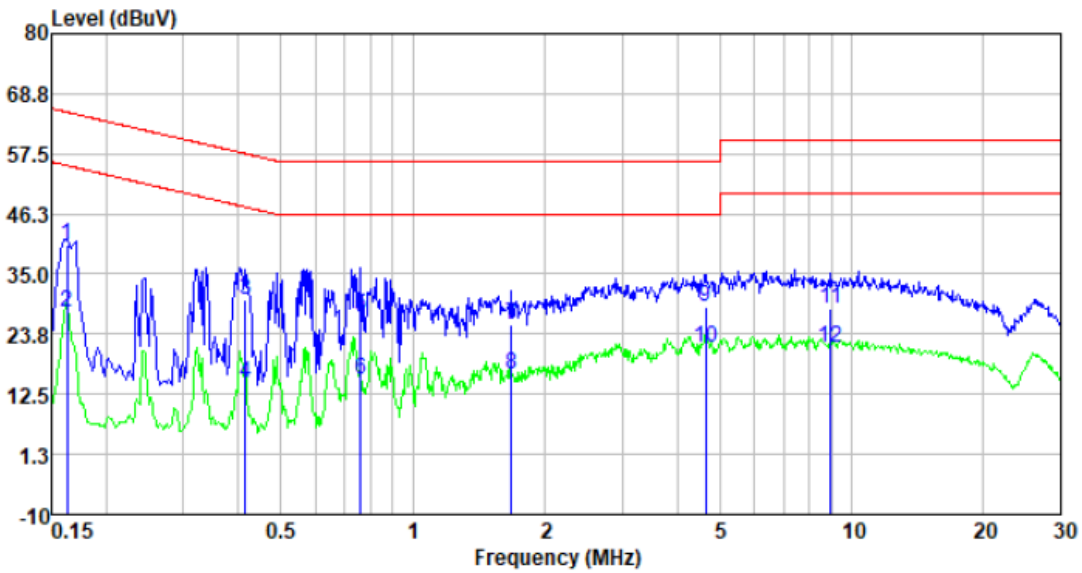
Freq	Reading level	LISN/ISN factor	Cable loss	Level	Limit level	Over limit	Remark
MHz	dBuV	dB	dB	dBuV	dBuV	dB	
0.17	18.40	9.95	0.01	38.36	65.16	-26.80	QP
0.17	3.58	9.95	0.01	23.54	55.16	-31.62	Average
0.32	13.21	9.80	0.01	33.02	59.66	-26.64	QP
0.32	-0.05	9.80	0.01	19.76	49.66	-29.90	Average
0.56	10.54	9.82	0.02	30.38	56.00	-25.62	QP
0.56	-2.96	9.82	0.02	16.88	46.00	-29.12	Average
0.73	8.81	9.88	0.02	28.71	56.00	-27.29	QP
0.73	1.15	9.88	0.02	21.05	46.00	-24.95	Average
2.00	5.47	9.83	0.04	25.34	56.00	-30.66	QP
2.00	-3.83	9.83	0.04	16.04	46.00	-29.96	Average
5.06	9.46	9.75	0.06	29.27	60.00	-30.73	QP
5.06	1.51	9.75	0.06	21.32	50.00	-28.68	Average

Model No.: TTBF001CP02
Line:



Freq	Reading level	LISN/ISN factor	Cable loss	Level	Limit level	Over limit	Remark
MHz	dBuV	dB	dB	dBuV	dBuV	dB	
0.16	20.26	9.94	0.01	40.21	65.34	-25.13	QP
0.16	8.30	9.94	0.01	28.25	55.34	-27.09	Average
0.49	8.93	9.86	0.01	28.80	56.10	-27.30	QP
0.49	-4.65	9.86	0.01	15.22	46.10	-30.88	Average
0.73	9.37	9.76	0.02	29.15	56.00	-26.85	QP
0.73	1.83	9.76	0.02	21.61	46.00	-24.39	Average
1.26	6.20	9.87	0.03	26.10	56.00	-29.90	QP
1.26	-4.80	9.87	0.03	15.10	46.00	-30.90	Average
4.27	10.04	9.51	0.06	29.61	56.00	-26.39	QP
4.27	2.82	9.51	0.06	22.39	46.00	-23.61	Average
7.21	10.15	9.71	0.09	29.95	60.00	-30.05	QP
7.21	2.26	9.71	0.09	22.06	50.00	-27.94	Average

Neutral:

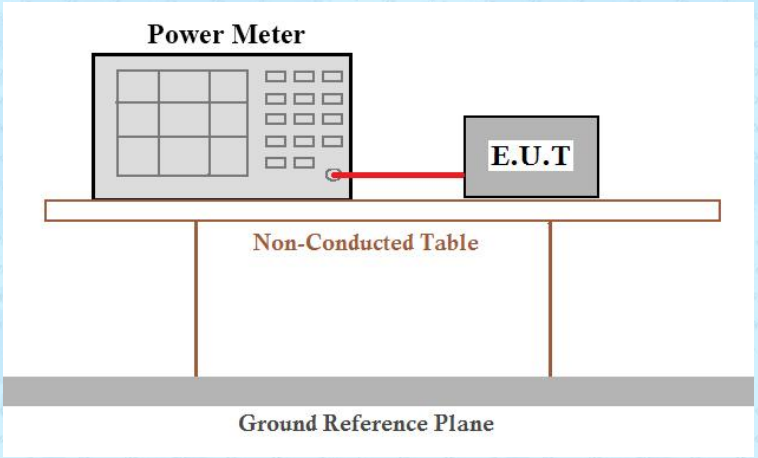


Freq	Reading level	LISN/ISN factor	Cable loss	Level	Limit level	Over limit	Remark
MHz	dBuV	dB	dB	dBuV	dBuV	dB	
0.16	20.38	9.93	0.01	40.32	65.34	-25.02	QP
0.16	7.84	9.93	0.01	27.78	55.34	-27.56	Average
0.41	10.66	9.66	0.01	30.33	57.55	-27.22	QP
0.41	-5.15	9.66	0.01	14.52	47.55	-33.03	Average
0.76	7.15	9.92	0.02	27.09	56.00	-28.91	QP
0.76	-4.85	9.92	0.02	15.09	46.00	-30.91	Average
1.68	5.76	9.86	0.04	25.66	56.00	-30.34	QP
1.68	-3.56	9.86	0.04	16.34	46.00	-29.66	Average
4.65	9.14	9.74	0.06	28.94	56.00	-27.06	QP
4.65	1.56	9.74	0.06	21.36	46.00	-24.64	Average
8.96	8.92	9.58	0.10	28.60	60.00	-31.40	QP
8.96	1.38	9.58	0.10	21.06	50.00	-28.94	Average

Notes:

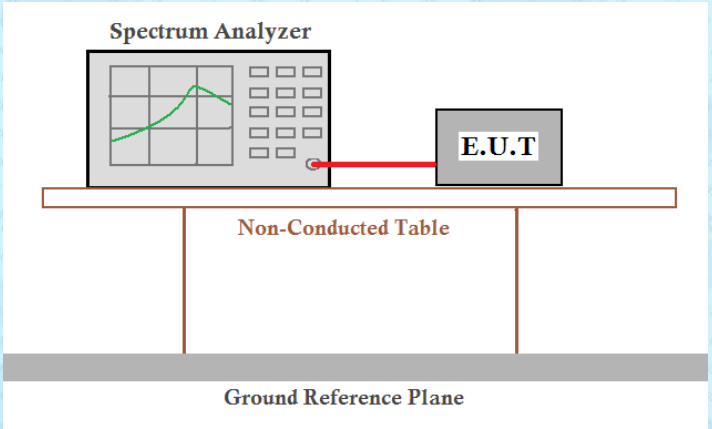
1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level =Receiver Read level + LISN Factor + Cable Loss
4. *If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.*

7.3 Conducted Output Power

Test Requirement :	FCC Part15 C Section 15.247 (b)(3)
Test Method :	KDB558074 D01 15.247 Meas Guidance v05r02
Limit:	30dBm 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 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi 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 6 dBi.
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

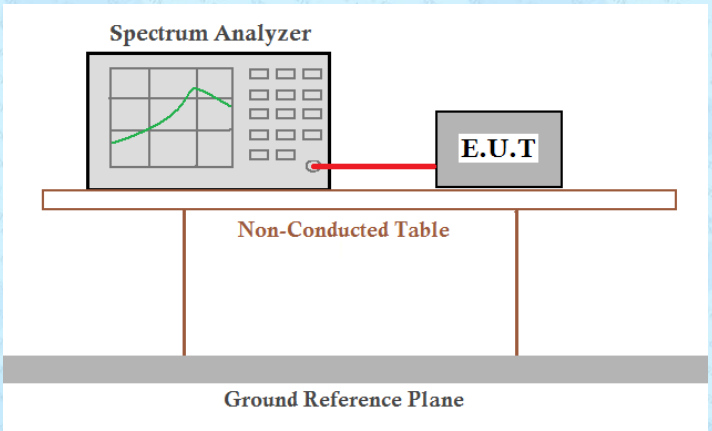
Measurement Data: The detailed test data see Appendix for WIFI 2.4G.

7.4 Channel Bandwidth

Test Requirement :	FCC Part15 C Section 15.247 (a)(2)
Test Method :	KDB558074 D01 15.247 Meas Guidance v05r02
Limit:	>500KHz
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data: The detailed test data see Appendix for WIFI 2.4G.

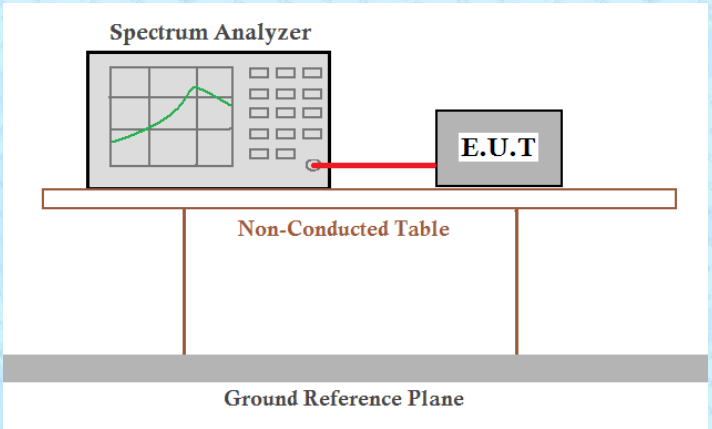
7.5 Power Spectral Density

Test Requirement:	FCC Part15 C Section 15.247 (e)
Test Method:	KDB558074 D01 15.247 Meas Guidance v05r02
Limit:	8dBm/3kHz
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data: The detailed test data see Appendix for WIFI 2.4G.

7.6 Spurious Emission in Non-restricted & restricted Bands

7.6.1 Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	KDB558074 D01 15.247 Meas Guidance v05r02
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 30 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.
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data: The detailed test data see Appendix for WIFI 2.4G.

7.6.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209
Test Method:	ANSI C63.10:2013
Test Frequency Range:	9kHz to 25GHz
Test site:	Measurement Distance: 3m

Receiver setup:

Frequency	Detector	RBW	VBW	Value
9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak
150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

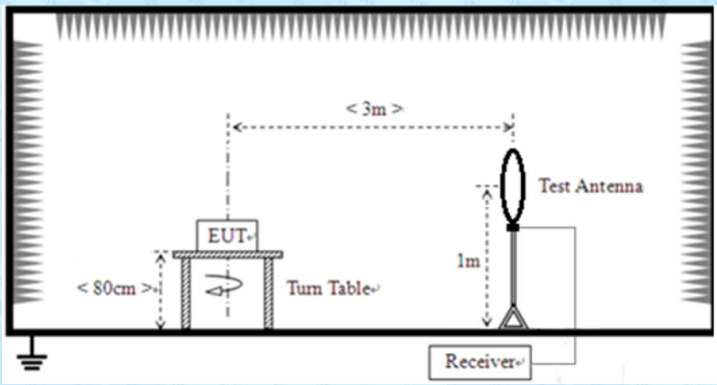
Note: For Duty cycle ≥ 98%, average detector set as above For Duty cycle < 98%, average detector set as below: VBW ≥ 1 / T

Limit:

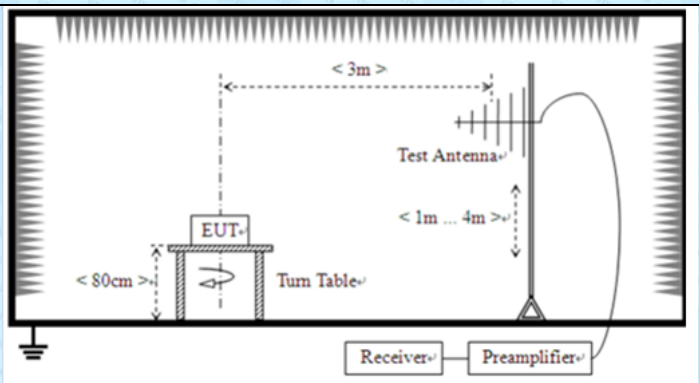
Frequency	Limit (uV/m)	Value	Measurement Distance
0.009MHz-0.490MHz	2400/F(KHz)	PK/QP/AV	300m
0.490MHz-1.705MHz	24000/F(KHz)	QP	30m
1.705MHz-30MHz	30	QP	30m
30MHz-88MHz	100	QP	3m
88MHz-216MHz	150	QP	
216MHz-960MHz	200	QP	
960MHz-1GHz	500	QP	
Above 1GHz	500	Average	
	5000	Peak	

Test setup:

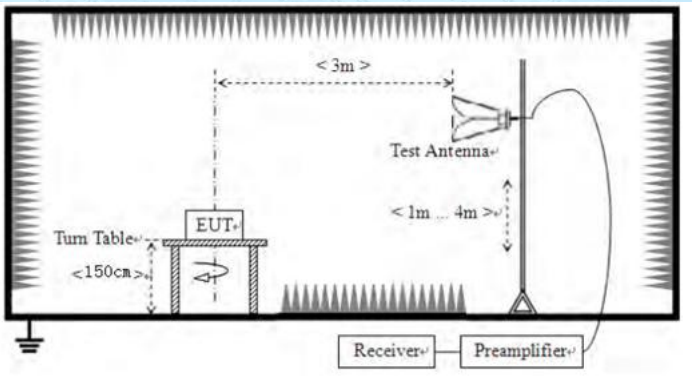
For radiated emissions from 9kHz to 30MHz



For radiated emissions from 30MHz to1GHz



For radiated emissions above 1GHz



Test Procedure:	1. The EUT was placed on the top of a rotating table (0.8m for below 1G and 1.5m for above 1G) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test environment:	Temp.: 25 °C Humid.: 52% Press.: 1012mbar
Test voltage:	AC 120V, 60Hz
Test results:	Pass

Remarks:

1. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.

Measurement data:

■ **9kHz~30MHz**

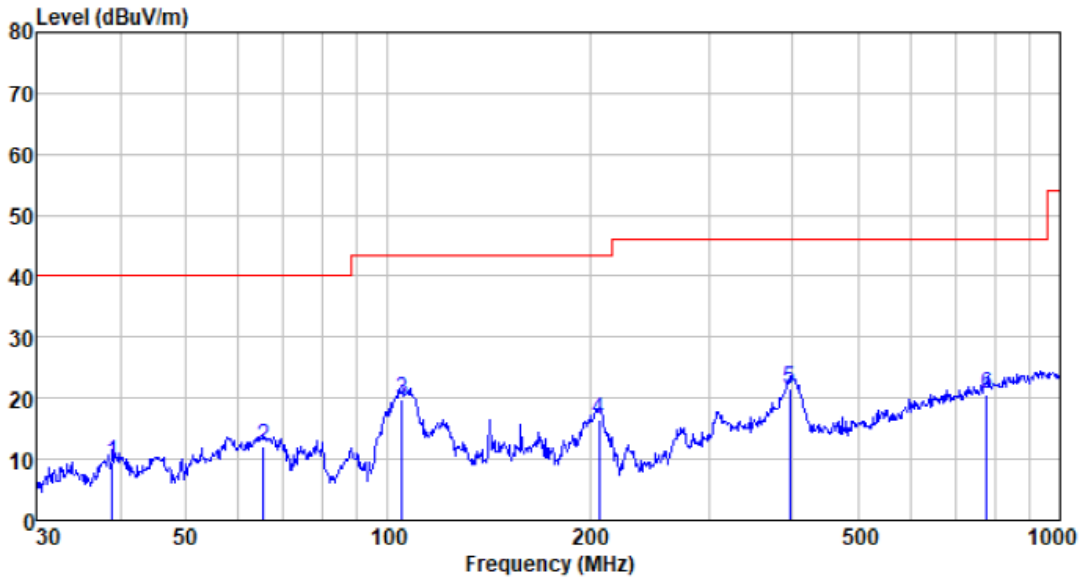
The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o), the test result no need to reported.

■ **Below 1GHz**

Pre-scan all test modes, found worst case at 802.11g 2462MHz, and so only show the test result of it.

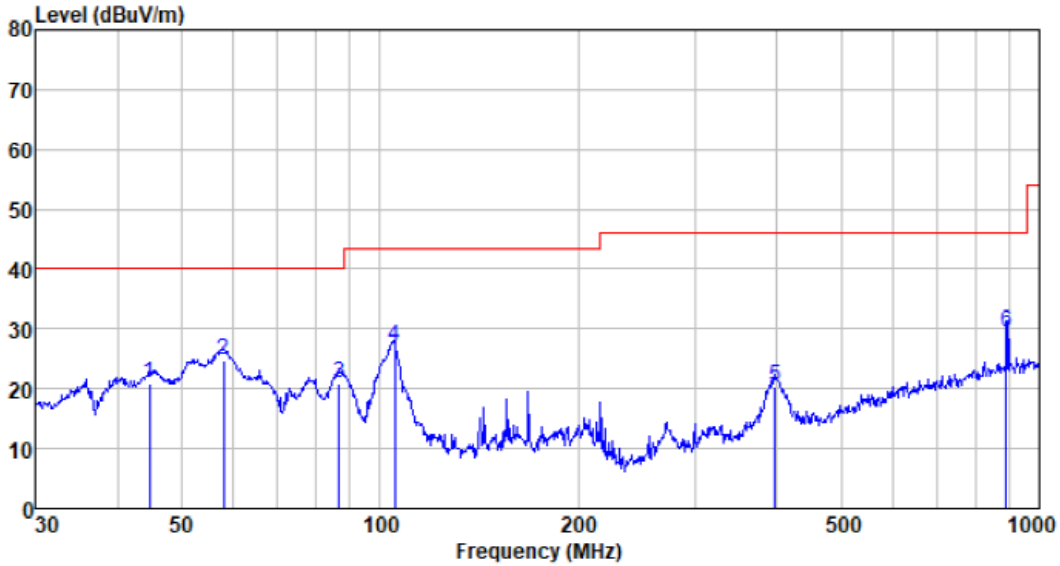
Model No.: TTBF002CP

Horizontal:



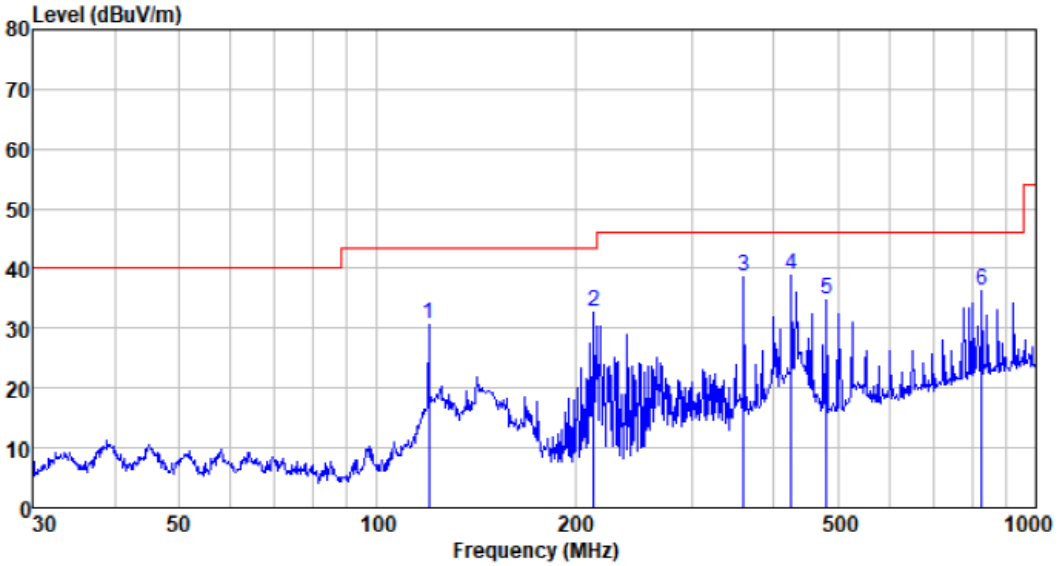
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
38.888	26.35	14.17	1.24	32.30	9.46	40.00	-30.54	QP
65.343	31.52	11.27	1.57	32.36	12.00	40.00	-28.00	QP
104.903	39.79	10.47	1.99	32.50	19.75	43.50	-23.75	QP
206.398	35.94	10.19	2.89	32.39	16.63	43.50	-26.87	QP
396.242	35.37	14.72	3.86	32.25	21.70	46.00	-24.30	QP
776.878	24.91	21.64	5.38	31.18	20.75	46.00	-25.25	QP

Vertical:



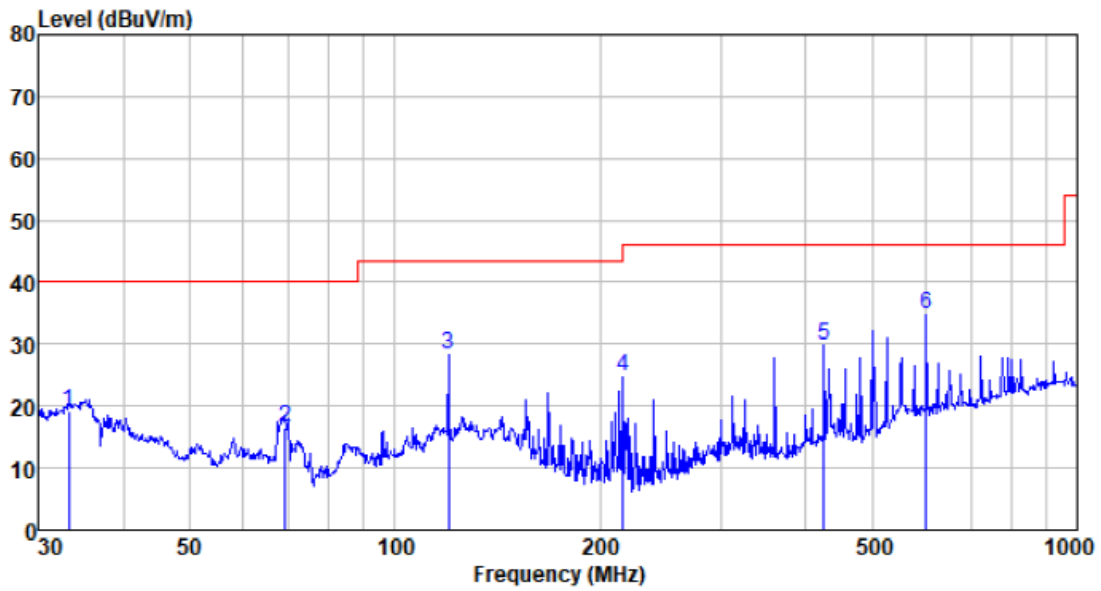
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
44.743	38.65	13.42	1.33	32.30	21.10	40.00	-18.90	QP
57.999	43.22	12.30	1.46	32.33	24.65	40.00	-15.35	QP
86.807	42.70	9.02	1.73	32.45	21.00	40.00	-19.00	QP
105.272	47.07	10.53	2.00	32.49	27.11	43.50	-16.39	QP
397.633	33.95	14.75	3.87	32.25	20.32	46.00	-25.68	QP
890.728	31.82	23.00	5.71	31.10	29.43	46.00	-16.57	QP

Model No.: TTBF001CP02
Horizontal:



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
119.856	48.50	12.59	2.17	32.48	30.78	43.50	-12.72	QP
213.015	52.49	9.84	2.94	32.39	32.88	43.50	-10.62	QP
360.448	53.34	13.81	3.71	32.27	38.59	46.00	-7.41	QP
425.028	51.92	15.40	3.96	32.24	39.04	46.00	-6.96	QP
480.528	46.28	16.50	4.13	32.21	34.70	46.00	-11.30	QP
827.493	39.38	22.35	5.54	31.10	36.17	46.00	-9.83	QP

Vertical:



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
33.211	37.81	12.64	1.16	32.30	19.31	40.00	-20.69	QP
69.114	36.34	10.89	1.64	32.38	16.49	40.00	-23.51	QP
119.856	46.05	12.59	2.17	32.48	28.33	43.50	-15.17	QP
216.024	44.46	9.76	2.96	32.38	24.80	46.00	-21.20	QP
425.028	42.75	15.40	3.96	32.24	29.87	46.00	-16.13	QP
601.427	42.92	19.03	4.64	31.83	34.76	46.00	-11.24	QP

- **Above 1GHz**
- **Unwanted Emissions in non-restricted Frequency Bands**

Test mode:	802.11b	Test channel:	Lowest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4824.00	47.55	32.05	6.02	38.54	47.08	74.00	-26.92	Vertical
7236.00	42.94	36.27	7.95	39.17	47.99	74.00	-26.01	Vertical
9648.00	41.77	38.20	13.95	40.23	53.69	74.00	-20.31	Vertical
4824.00	46.46	32.05	6.02	38.54	45.99	74.00	-28.01	Horizontal
7236.00	42.90	36.27	7.95	39.17	47.95	74.00	-26.05	Horizontal
9648.00	41.76	38.20	13.95	40.23	53.68	74.00	-20.32	Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4824.00	36.15	32.05	6.02	38.54	35.68	54.00	-18.32	Vertical
7236.00	31.59	36.27	7.95	39.17	36.64	54.00	-17.36	Vertical
9648.00	30.43	38.20	13.95	40.23	42.35	54.00	-11.65	Vertical
4824.00	35.08	32.05	6.02	38.54	34.61	54.00	-19.39	Horizontal
7236.00	31.56	36.27	7.95	39.17	36.61	54.00	-17.39	Horizontal
9648.00	30.43	38.20	13.95	40.23	42.35	54.00	-11.65	Horizontal

Test mode:	802.11b	Test channel:	Middle

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874.00	47.17	32.10	6.03	38.52	46.78	74.00	-27.22	Vertical
7311.00	42.87	36.30	8.04	39.23	47.98	74.00	-26.02	Vertical
9748.00	42.88	38.20	11.16	40.25	51.99	74.00	-22.01	Vertical
4874.00	48.01	32.10	6.03	38.52	47.62	74.00	-26.38	Horizontal
7311.00	42.79	36.30	8.04	39.23	47.90	74.00	-26.10	Horizontal
9748.00	43.58	38.20	11.16	40.25	52.69	74.00	-21.31	Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874.00	36.08	32.10	6.03	38.52	35.69	54.00	-18.31	Vertical
7311.00	31.83	36.30	8.04	39.23	36.94	54.00	-17.06	Vertical
9748.00	31.85	38.20	11.16	40.25	40.96	54.00	-13.04	Vertical
4874.00	36.95	32.10	6.03	38.52	36.56	54.00	-17.44	Horizontal
7311.00	31.76	36.30	8.04	39.23	36.87	54.00	-17.13	Horizontal
9748.00	32.55	38.20	11.16	40.25	41.66	54.00	-12.34	Horizontal

Test mode:	802.11b	Test channel:	Highest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924.00	51.73	32.15	6.04	38.52	51.40	74.00	-22.60	Vertical
7386.00	43.24	36.30	8.11	39.27	48.38	74.00	-25.62	Vertical
9848.00	44.96	38.20	10.56	40.27	53.45	74.00	-20.55	Vertical
4924.00	51.43	32.15	6.04	38.52	51.10	74.00	-22.90	Horizontal
7386.00	41.74	36.30	8.11	39.27	46.88	74.00	-27.12	Horizontal
9848.00	42.90	38.20	10.56	40.27	51.39	74.00	-22.61	Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924.00	40.28	32.15	6.04	38.52	39.95	54.00	-14.05	Vertical
7386.00	31.87	36.30	8.11	39.27	37.01	54.00	-16.99	Vertical
9848.00	33.59	38.20	10.56	40.27	42.08	54.00	-11.92	Vertical
4924.00	40.02	32.15	6.04	38.52	39.69	54.00	-14.31	Horizontal
7386.00	30.38	36.30	8.11	39.27	35.52	54.00	-18.48	Horizontal
9848.00	31.54	38.20	10.56	40.27	40.03	54.00	-13.97	Horizontal

Test mode:	802.11g	Test channel:	lowest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4824.00	47.65	32.05	6.02	38.54	47.18	74.00	-26.82	Vertical
7236.00	43.00	36.27	7.95	39.17	48.05	74.00	-25.95	Vertical
9648.00	41.81	38.20	13.95	40.23	53.73	74.00	-20.27	Vertical
4824.00	46.54	32.05	6.02	38.54	46.07	74.00	-27.93	Horizontal
7236.00	42.95	36.27	7.95	39.17	48.00	74.00	-26.00	Horizontal
9648.00	41.80	38.20	13.95	40.23	53.72	74.00	-20.28	Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4824.00	36.24	32.05	6.02	38.54	35.77	54.00	-18.23	Vertical
7236.00	31.66	36.27	7.95	39.17	36.71	54.00	-17.29	Vertical
9648.00	30.47	38.20	13.95	40.23	42.39	54.00	-11.61	Vertical
4824.00	35.16	32.05	6.02	38.54	34.69	54.00	-19.31	Horizontal
7236.00	31.61	36.27	7.95	39.17	36.66	54.00	-17.34	Horizontal
9648.00	30.47	38.20	13.95	40.23	42.39	54.00	-11.61	Horizontal

Test mode:	802.11g	Test channel:	Middle

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874.00	47.25	32.10	6.03	38.52	46.86	74.00	-27.14	Vertical
7311.00	42.92	36.30	8.04	39.23	48.03	74.00	-25.97	Vertical
9748.00	42.92	38.20	11.16	40.25	52.03	74.00	-21.97	Vertical
4874.00	48.08	32.10	6.03	38.52	47.69	74.00	-26.31	Horizontal
7311.00	42.84	36.30	8.04	39.23	47.95	74.00	-26.05	Horizontal
9748.00	43.62	38.20	11.16	40.25	52.73	74.00	-21.27	Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874.00	36.16	32.10	6.03	38.52	35.77	54.00	-18.23	Vertical
7311.00	31.88	36.30	8.04	39.23	36.99	54.00	-17.01	Vertical
9748.00	31.88	38.20	11.16	40.25	40.99	54.00	-13.01	Vertical
4874.00	37.01	32.10	6.03	38.52	36.62	54.00	-17.38	Horizontal
7311.00	31.80	36.30	8.04	39.23	36.91	54.00	-17.09	Horizontal
9748.00	32.58	38.20	11.16	40.25	41.69	54.00	-12.31	Horizontal

Test mode:	802.11g	Test channel:	Highest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924.00	51.87	32.15	6.04	38.52	51.54	74.00	-22.46	Vertical
7386.00	43.33	36.30	8.11	39.27	48.47	74.00	-25.53	Vertical
9848.00	45.02	38.20	10.56	40.27	53.51	74.00	-20.49	Vertical
4924.00	51.55	32.15	6.04	38.52	51.22	74.00	-22.78	Horizontal
7386.00	41.82	36.30	8.11	39.27	46.96	74.00	-27.04	Horizontal
9848.00	42.96	38.20	10.56	40.27	51.45	74.00	-22.55	Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924.00	40.41	32.15	6.04	38.52	40.08	54.00	-13.92	Vertical
7386.00	31.96	36.30	8.11	39.27	37.10	54.00	-16.90	Vertical
9848.00	33.65	38.20	10.56	40.27	42.14	54.00	-11.86	Vertical
4924.00	40.13	32.15	6.04	38.52	39.80	54.00	-14.20	Horizontal
7386.00	30.45	36.30	8.11	39.27	35.59	54.00	-18.41	Horizontal
9848.00	31.59	38.20	10.56	40.27	40.08	54.00	-13.92	Horizontal

Test mode:	802.11n(HT20)	Test channel:	Lowest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4824.00	47.80	32.05	6.02	38.54	47.33	74.00	-26.67	Vertical
7236.00	43.09	36.27	7.95	39.17	48.14	74.00	-25.86	Vertical
9648.00	41.88	38.20	13.95	40.23	53.80	74.00	-20.20	Vertical
4824.00	46.67	32.05	6.02	38.54	46.20	74.00	-27.80	Horizontal
7236.00	43.03	36.27	7.95	39.17	48.08	74.00	-25.92	Horizontal
9648.00	41.87	38.20	13.95	40.23	53.79	74.00	-20.21	Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4824.00	36.38	32.05	6.02	38.54	35.91	54.00	-18.09	Vertical
7236.00	31.75	36.27	7.95	39.17	36.80	54.00	-17.20	Vertical
9648.00	30.54	38.20	13.95	40.23	42.46	54.00	-11.54	Vertical
4824.00	35.28	32.05	6.02	38.54	34.81	54.00	-19.19	Horizontal
7236.00	31.69	36.27	7.95	39.17	36.74	54.00	-17.26	Horizontal
9648.00	30.53	38.20	13.95	40.23	42.45	54.00	-11.55	Horizontal

Test mode:	802.11n(HT20)	Test channel:	Middle

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874.00	47.37	32.10	6.03	38.52	46.98	74.00	-27.02	Vertical
7311.00	43.00	36.30	8.04	39.23	48.11	74.00	-25.89	Vertical
9748.00	42.97	38.20	11.16	40.25	52.08	74.00	-21.92	Vertical
4874.00	48.18	32.10	6.03	38.52	47.79	74.00	-26.21	Horizontal
7311.00	42.91	36.30	8.04	39.23	48.02	74.00	-25.98	Horizontal
9748.00	43.67	38.20	11.16	40.25	52.78	74.00	-21.22	Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874.00	36.27	32.10	6.03	38.52	35.88	54.00	-18.12	Vertical
7311.00	31.96	36.30	8.04	39.23	37.07	54.00	-16.93	Vertical
9748.00	31.93	38.20	11.16	40.25	41.04	54.00	-12.96	Vertical
4874.00	37.11	32.10	6.03	38.52	36.72	54.00	-17.28	Horizontal
7311.00	31.87	36.30	8.04	39.23	36.98	54.00	-17.02	Horizontal
9748.00	32.63	38.20	11.16	40.25	41.74	54.00	-12.26	Horizontal

Test mode:	802.11n(HT20)	Test channel:	Highest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924.00	52.09	32.15	6.04	38.52	51.76	74.00	-22.24	Vertical
7386.00	43.47	36.30	8.11	39.27	48.61	74.00	-25.39	Vertical
9848.00	45.12	38.20	10.56	40.27	53.61	74.00	-20.39	Vertical
4924.00	51.73	32.15	6.04	38.52	51.40	74.00	-22.60	Horizontal
7386.00	41.94	36.30	8.11	39.27	47.08	74.00	-26.92	Horizontal
9848.00	43.05	38.20	10.56	40.27	51.54	74.00	-22.46	Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924.00	40.61	32.15	6.04	38.52	40.28	54.00	-13.72	Vertical
7386.00	32.09	36.30	8.11	39.27	37.23	54.00	-16.77	Vertical
9848.00	33.75	38.20	10.56	40.27	42.24	54.00	-11.76	Vertical
4924.00	40.30	32.15	6.04	38.52	39.97	54.00	-14.03	Horizontal
7386.00	30.57	36.30	8.11	39.27	35.71	54.00	-18.29	Horizontal
9848.00	31.68	38.20	10.56	40.27	40.17	54.00	-13.83	Horizontal

Notes:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

■ **Unwanted Emissions in restricted Frequency Bands**

Test mode:	802.11b	Test channel:	Lowest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	59.75	27.00	4.13	39.14	51.74	74.00	-22.26	Horizontal
2390.00	58.13	27.08	4.17	39.34	50.04	74.00	-23.96	Horizontal
2310.00	58.63	27.00	4.13	39.14	50.62	74.00	-23.38	Vertical
2390.00	59.42	27.08	4.17	39.34	51.33	74.00	-22.67	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	48.17	27.00	4.13	39.14	40.16	54.00	-13.84	Horizontal
2390.00	46.34	27.08	4.17	39.34	38.25	54.00	-15.75	Horizontal
2310.00	47.05	27.00	4.13	39.14	39.04	54.00	-14.96	Vertical
2390.00	47.45	27.08	4.17	39.34	39.36	54.00	-14.64	Vertical

Test mode:	802.11b	Test channel:	Highest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	58.60	27.27	4.08	39.56	50.39	74.00	-23.61	Horizontal
2500.00	51.33	27.30	4.06	39.60	43.09	74.00	-30.91	Horizontal
2483.50	58.01	27.27	4.08	39.56	49.80	74.00	-24.20	Vertical
2500.00	53.56	27.30	4.06	39.60	45.32	74.00	-28.68	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	47.76	27.27	4.08	39.56	39.55	54.00	-14.45	Horizontal
2500.00	40.62	27.30	4.06	39.60	32.38	54.00	-21.62	Horizontal
2483.50	47.07	27.27	4.08	39.56	38.86	54.00	-15.14	Vertical
2500.00	42.70	27.30	4.06	39.60	34.46	54.00	-19.54	Vertical

Test mode:	802.11g	Test channel:	Lowest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	59.65	27.00	4.13	39.14	51.64	74.00	-22.36	Horizontal
2390.00	57.99	27.08	4.17	39.34	49.90	74.00	-24.10	Horizontal
2310.00	58.51	27.00	4.13	39.14	50.50	74.00	-23.50	Vertical
2390.00	59.25	27.08	4.17	39.34	51.16	74.00	-22.84	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	48.09	27.00	4.13	39.14	40.08	54.00	-13.92	Horizontal
2390.00	46.25	27.08	4.17	39.34	38.16	54.00	-15.84	Horizontal
2310.00	46.97	27.00	4.13	39.14	38.96	54.00	-15.04	Vertical
2390.00	47.35	27.08	4.17	39.34	39.26	54.00	-14.74	Vertical

Test mode:	802.11g	Test channel:	Highest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	58.44	27.27	4.08	39.56	50.23	74.00	-23.77	Horizontal
2500.00	51.22	27.30	4.06	39.60	42.98	74.00	-31.02	Horizontal
2483.50	57.84	27.27	4.08	39.56	49.63	74.00	-24.37	Vertical
2500.00	53.42	27.30	4.06	39.60	45.18	74.00	-28.82	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	47.67	27.27	4.08	39.56	39.46	54.00	-14.54	Horizontal
2500.00	40.54	27.30	4.06	39.60	32.30	54.00	-21.70	Horizontal
2483.50	46.97	27.27	4.08	39.56	38.76	54.00	-15.24	Vertical
2500.00	42.62	27.30	4.06	39.60	34.38	54.00	-19.62	Vertical

Test mode:	802.11n(HT20)	Test channel:	Lowest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	59.81	27.00	4.13	39.14	51.80	74.00	-22.20	Horizontal
2390.00	58.21	27.08	4.17	39.34	50.12	74.00	-23.88	Horizontal
2310.00	58.69	27.00	4.13	39.14	50.68	74.00	-23.32	Vertical
2390.00	59.51	27.08	4.17	39.34	51.42	74.00	-22.58	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	48.21	27.00	4.13	39.14	40.20	54.00	-13.80	Horizontal
2390.00	46.39	27.08	4.17	39.34	38.30	54.00	-15.70	Horizontal
2310.00	47.10	27.00	4.13	39.14	39.09	54.00	-14.91	Vertical
2390.00	47.50	27.08	4.17	39.34	39.41	54.00	-14.59	Vertical

Test mode:	802.11n(HT20)	Test channel:	Highest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	58.67	27.27	4.08	39.56	50.46	74.00	-23.54	Horizontal
2500.00	51.39	27.30	4.06	39.60	43.15	74.00	-30.85	Horizontal
2483.50	58.10	27.27	4.08	39.56	49.89	74.00	-24.11	Vertical
2500.00	53.63	27.30	4.06	39.60	45.39	74.00	-28.61	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	47.81	27.27	4.08	39.56	39.60	54.00	-14.40	Horizontal
2500.00	40.65	27.30	4.06	39.60	32.41	54.00	-21.59	Horizontal
2483.50	47.12	27.27	4.08	39.56	38.91	54.00	-15.09	Vertical
2500.00	42.74	27.30	4.06	39.60	34.50	54.00	-19.50	Vertical

Remarks:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

8 Test Setup Photo

Reference to the **appendix I** for details.

9 EUT Constructional Details

Reference to the **appendix II** for details.

10 Appendix for WIFI 2.4G

10.1 DTS Bandwidth

10.1.1 Test Result

Test Mode	Antenna	Frequency[MHz]	Rate	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	1Mbps	10.080	2406.960	2417.040	0.5	PASS
11B	Ant1	2437	1Mbps	10.080	2431.960	2442.040	0.5	PASS
11B	Ant1	2462	1Mbps	10.120	2456.920	2467.040	0.5	PASS
11G	Ant1	2412	6Mbps	16.360	2403.800	2420.160	0.5	PASS
11G	Ant1	2437	6Mbps	16.360	2428.800	2445.160	0.5	PASS
11G	Ant1	2462	6Mbps	16.360	2453.800	2470.160	0.5	PASS
11N20SISO	Ant1	2412	MCS0	17.600	2403.200	2420.800	0.5	PASS
11N20SISO	Ant1	2437	MCS0	17.560	2428.200	2445.760	0.5	PASS
11N20SISO	Ant1	2462	MCS0	17.560	2453.200	2470.760	0.5	PASS

10.1.2 Test Graphs

11B-Ant1-2412-PASS

11B-Ant1-2437-PASS

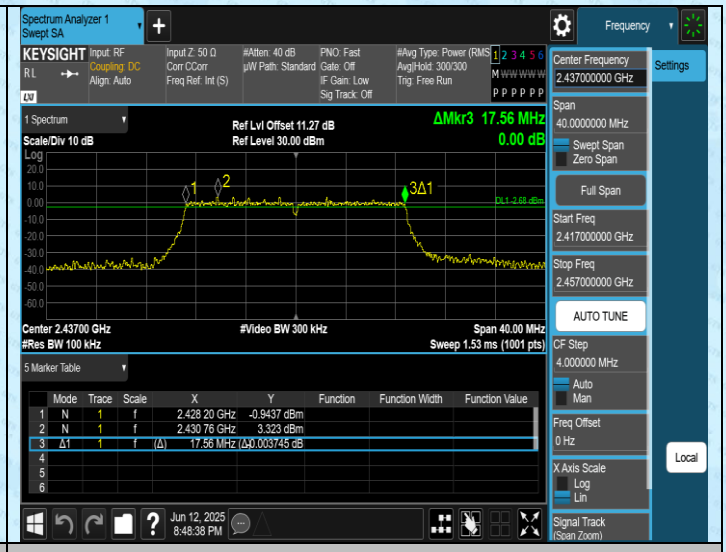
11B-Ant1-2462-PASS

11G-Ant1-2412-PASS

11G-Ant1-2437-PASS

11G-Ant1-2462-PASS

11N20SISO-Ant1-2412-PASS



11N20SISO-Ant1-2437-PASS

11N20SISO-Ant1-2462-PASS

/

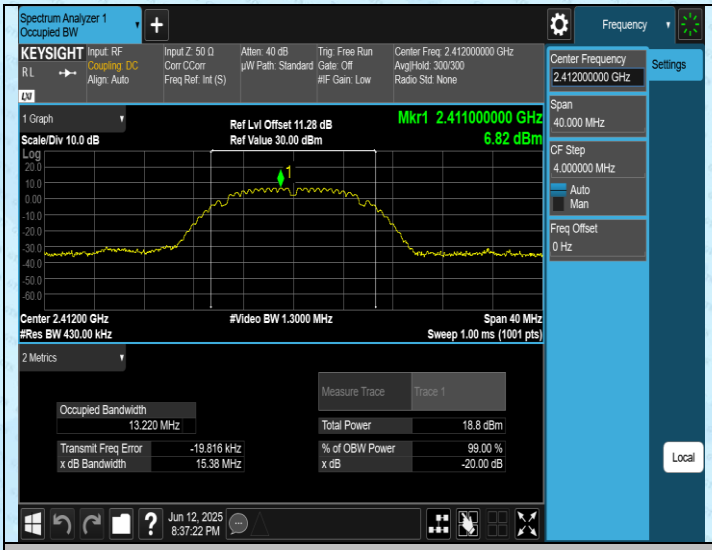
/

10.2 Occupied Channel Bandwidth

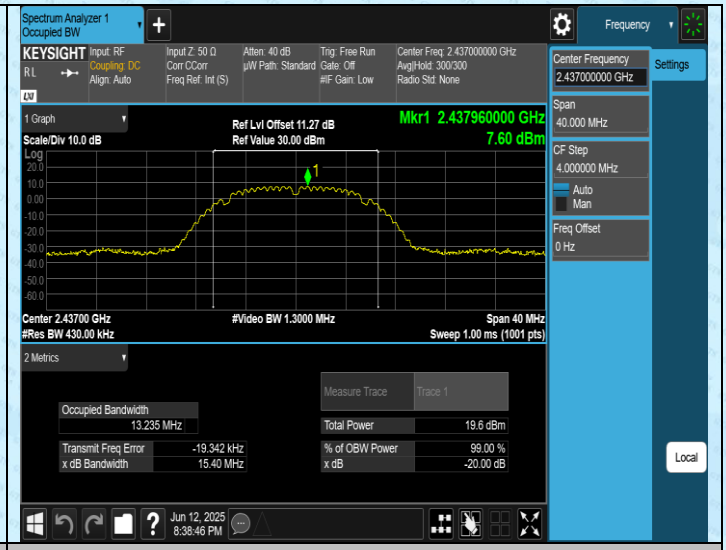
10.2.1 Test Result

Test Mode	Antenna	Channel Frequency[MHz]	Rate	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	1Mbps	13.220	2405.3702	2418.5902	---	---
11B	Ant1	2437	1Mbps	13.235	2430.3632	2443.5982	---	---
11B	Ant1	2462	1Mbps	13.273	2455.3217	2468.5947	---	---
11G	Ant1	2412	6Mbps	16.870	2403.5507	2420.4207	---	---
11G	Ant1	2437	6Mbps	16.880	2428.5290	2445.4090	---	---
11G	Ant1	2462	6Mbps	16.880	2453.5424	2470.4224	---	---
11N20SISO	Ant1	2412	MCS0	17.828	2403.0713	2420.8993	---	---
11N20SISO	Ant1	2437	MCS0	17.832	2428.0644	2445.8964	---	---
11N20SISO	Ant1	2462	MCS0	17.855	2453.0239	2470.8789	---	---

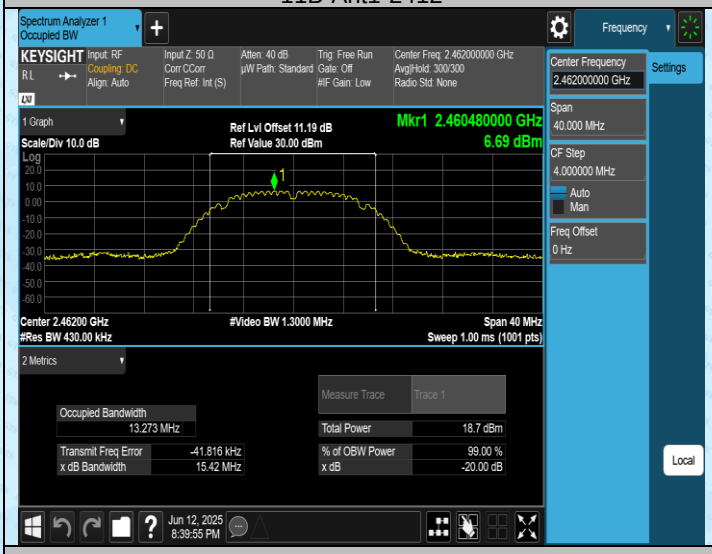
10.2.2 Test Graphs



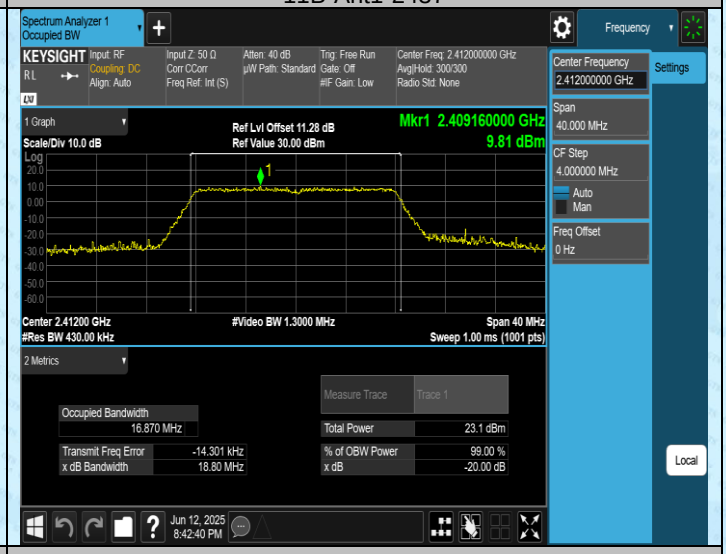
11B-Ant1-2412



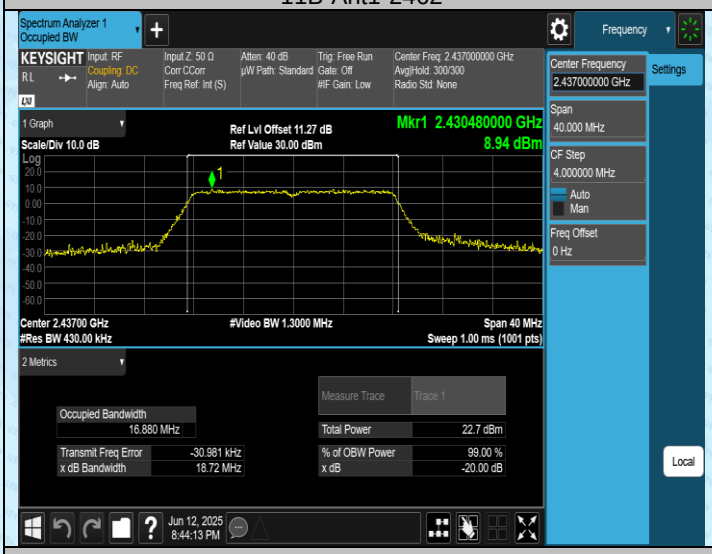
11B-Ant1-2437



11B-Ant1-2462

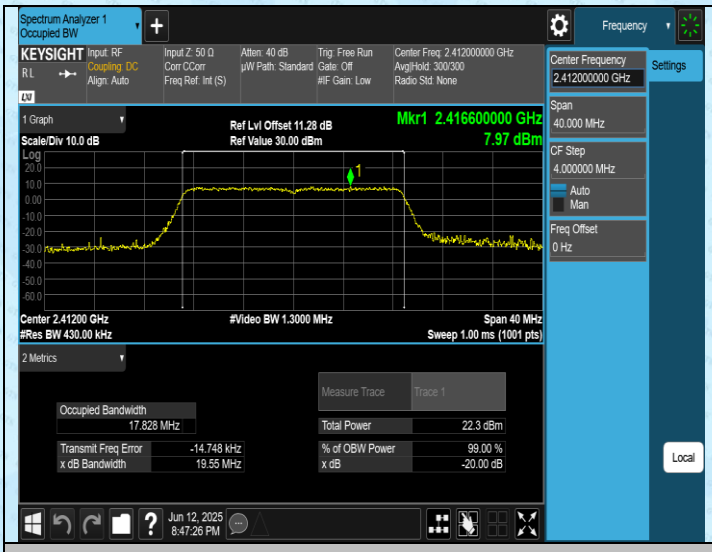


11G-Ant1-2412

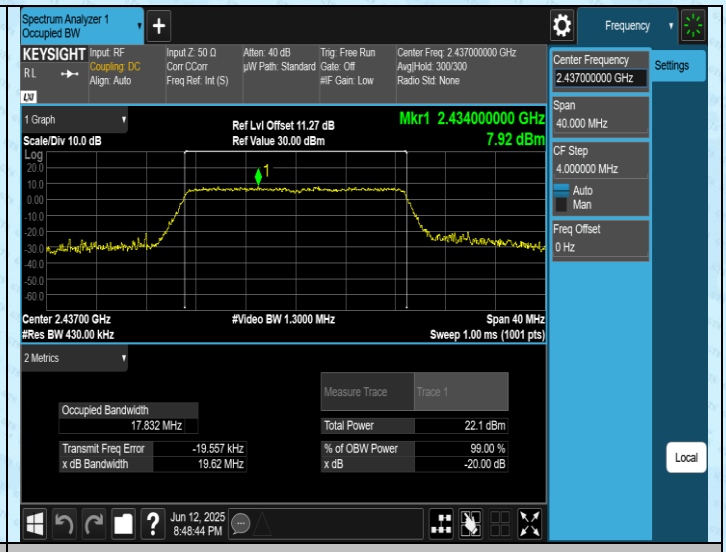


11G-Ant1-2437

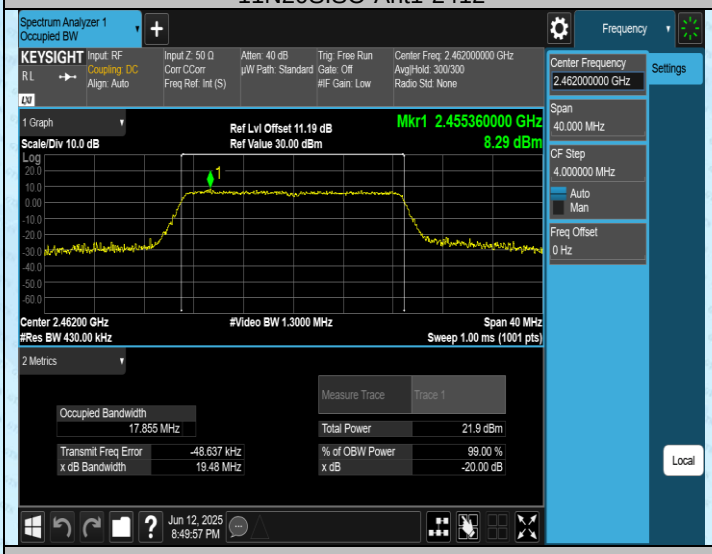
11G-Ant1-2462



11N20SISO-Ant1-2412



11N20SISO-Ant1-2437



11N20SISO-Ant1-2462

/

/

10.3 Maximum conducted output power

10.3.1 Test Result

Test Mode	Antenna	Frequency [MHz]	Rate	Peak Power[dBm]	Conducted Limit[dBm]	Verdict
11B	Ant1	2412	1Mbps	18.60	≤30.00	PASS
11B	Ant1	2437	1Mbps	19.37	≤30.00	PASS
11B	Ant1	2462	1Mbps	18.49	≤30.00	PASS
11G	Ant1	2412	6Mbps	24.12	≤30.00	PASS
11G	Ant1	2437	6Mbps	23.70	≤30.00	PASS
11G	Ant1	2462	6Mbps	23.19	≤30.00	PASS
11N20SISO	Ant1	2412	MCS0	23.55	≤30.00	PASS
11N20SISO	Ant1	2437	MCS0	23.09	≤30.00	PASS
11N20SISO	Ant1	2462	MCS0	22.81	≤30.00	PASS

10.4 Maximum power spectral density

10.4.1 Test Result

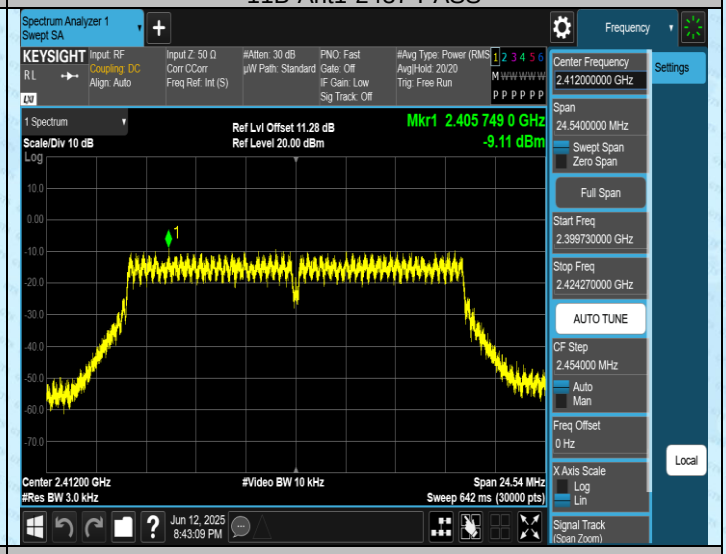
Test Mode	Antenna	Frequency [MHz]	Rate	Result [dBm/3kHz]	Limit [dBm/3kHz]	Verdict
11B	Ant1	2412	1Mbps	-5.64	≤8.00	PASS
11B	Ant1	2437	1Mbps	-7.22	≤8.00	PASS
11B	Ant1	2462	1Mbps	-6.62	≤8.00	PASS
11G	Ant1	2412	6Mbps	-9.11	≤8.00	PASS
11G	Ant1	2437	6Mbps	-9.26	≤8.00	PASS
11G	Ant1	2462	6Mbps	-10.14	≤8.00	PASS
11N20SISO	Ant1	2412	MCS0	-9.58	≤8.00	PASS
11N20SISO	Ant1	2437	MCS0	-10.29	≤8.00	PASS
11N20SISO	Ant1	2462	MCS0	-10.08	≤8.00	PASS

10.4.2 Test Graphs

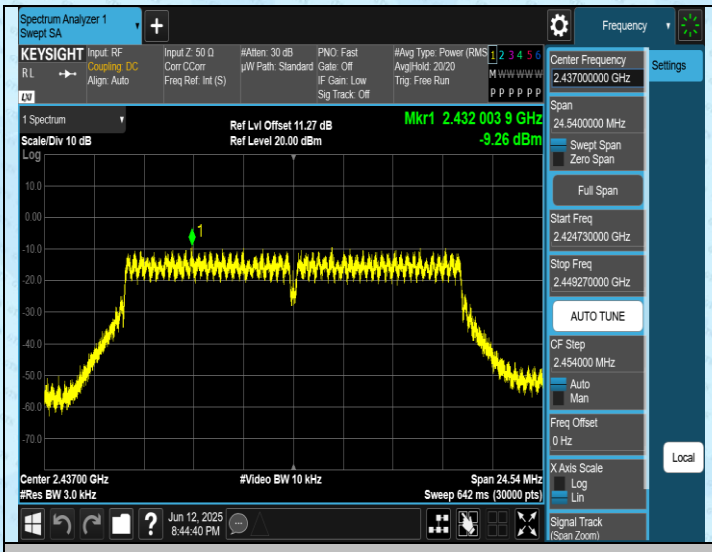
11B-Ant1-2412-PASS

11B-Ant1-2437-PASS

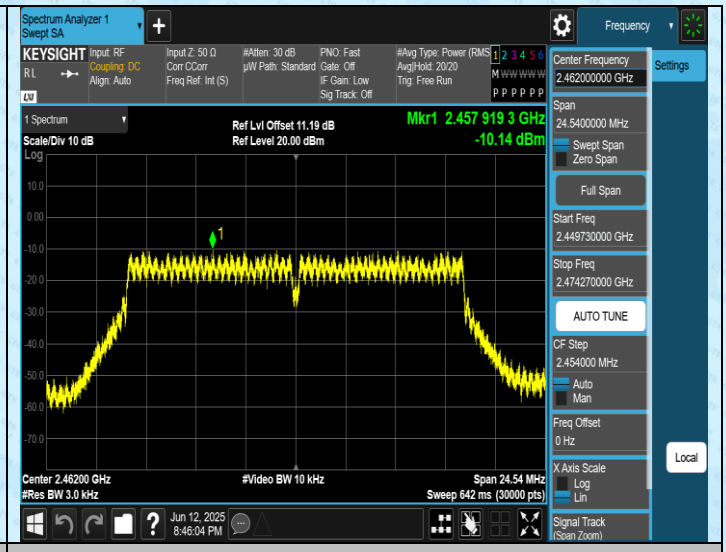
11B-Ant1-2462-PASS



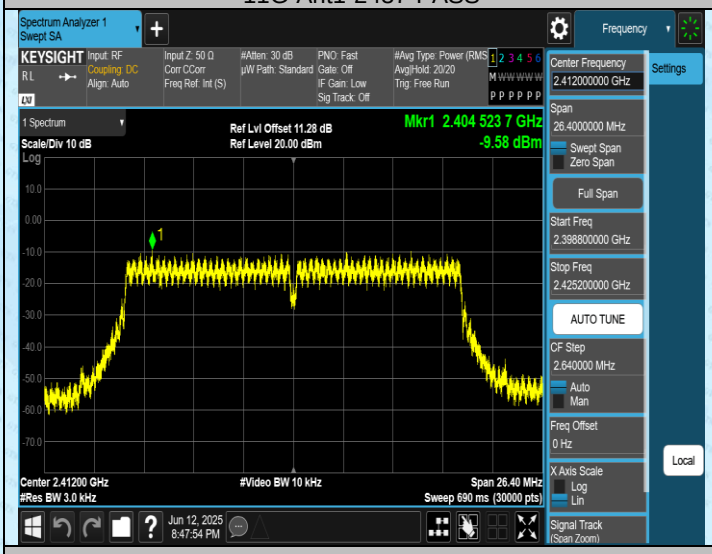
11G-Ant1-2412-PASS



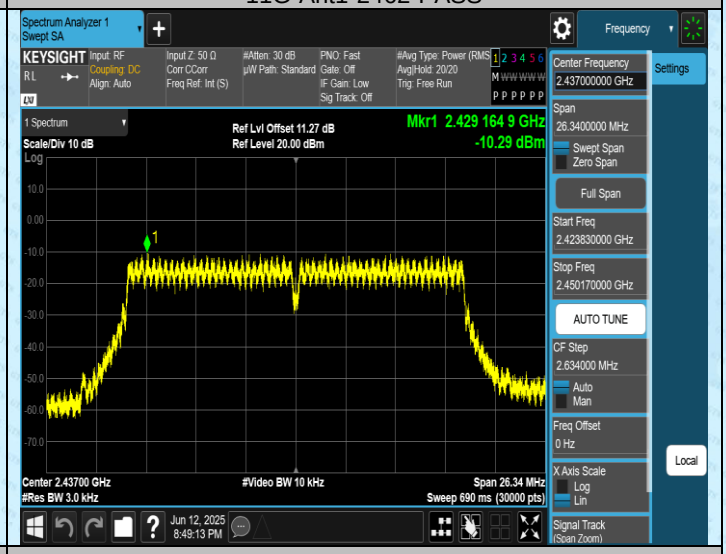
11G-Ant1-2437-PASS



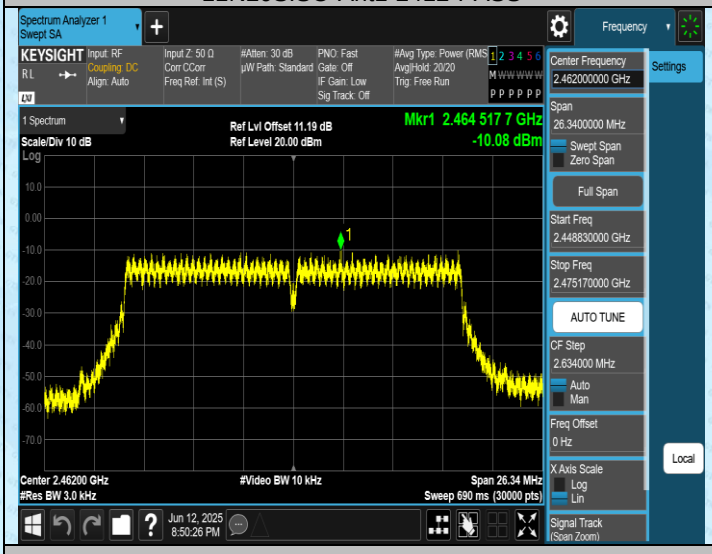
11G-Ant1-2462-PASS



11N20SISO-Ant1-2412-PASS



11N20SISO-Ant1-2437-PASS



11N20SISO-Ant1-2462-PASS

/

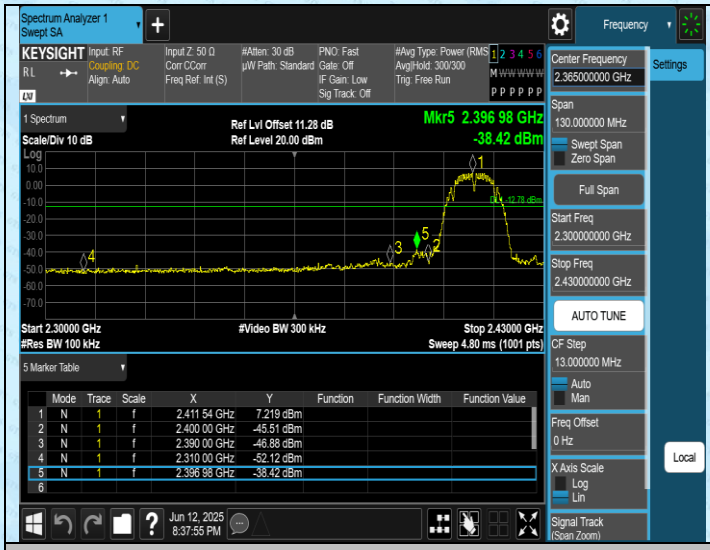
/

10.5 Band edge measurements

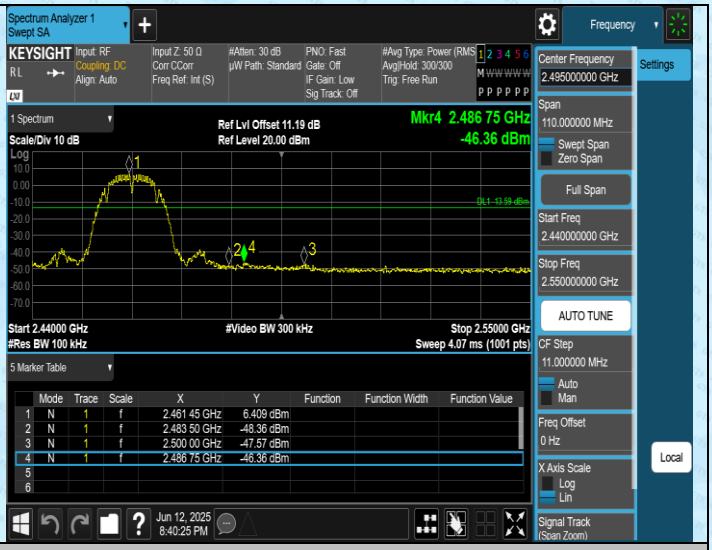
10.5.1 Test Result

Test Mode	Antenna	Channel	Frequency[MHz]	Rate	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	Low	2412	1Mbps	7.22	-38.42	≤-12.78	PASS
11B	Ant1	High	2462	1Mbps	6.41	-46.36	≤-13.59	PASS
11G	Ant1	Low	2412	6Mbps	4.76	-33.85	≤-15.24	PASS
11G	Ant1	High	2462	6Mbps	3.47	-40.36	≤-16.53	PASS
11N20SISO	Ant1	Low	2412	MCS0	4.11	-34.86	≤-15.89	PASS
11N20SISO	Ant1	High	2462	MCS0	3.61	-41.08	≤-16.39	PASS

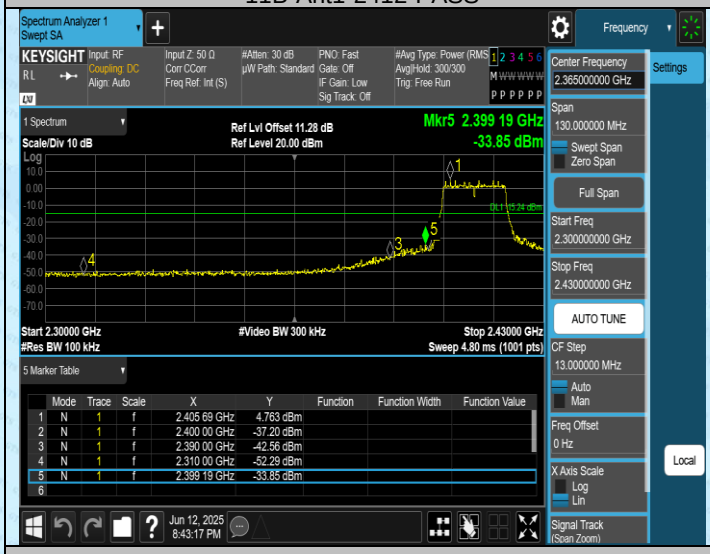
10.5.2 Test Graphs



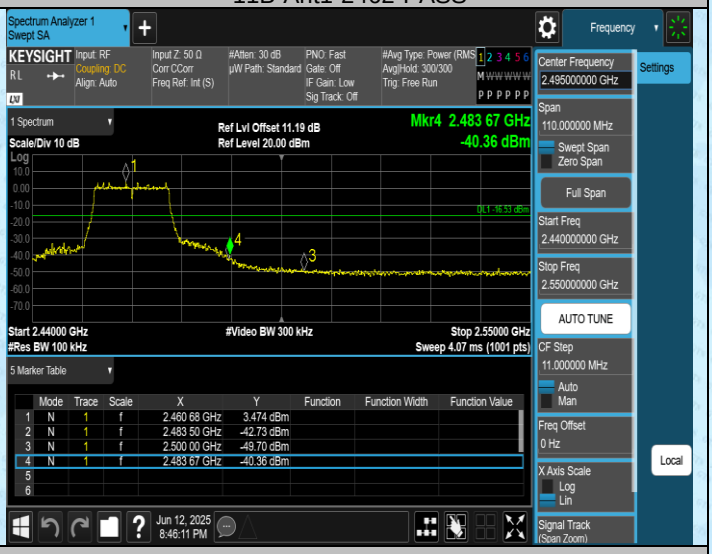
11B-Ant1-2412-PASS



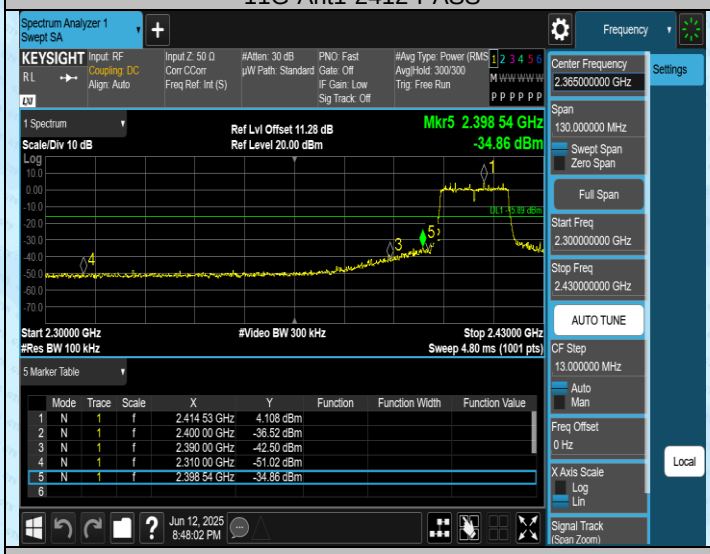
11B-Ant1-2462-PASS



11G-Ant1-2412-PASS



11G-Ant1-2462-PASS



11N20SISO-Ant1-2412-PASS

11N20SISO-Ant1-2462-PASS

10.6 Conducted Spurious Emission

10.6.1 Test Result

Test Mode	Antenna	Frequency[MHz]	Rate	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	1Mbps	0~Reference	6.94	6.94	---	PASS
11B	Ant1	2412	1Mbps	30~1000	6.94	-62.76	≤-13.06	PASS
11B	Ant1	2412	1Mbps	1000~26500	6.94	-43.26	≤-13.06	PASS
11B	Ant1	2437	1Mbps	0~Reference	6.68	6.68	---	PASS
11B	Ant1	2437	1Mbps	30~1000	6.68	-62.52	≤-13.32	PASS
11B	Ant1	2437	1Mbps	1000~26500	6.68	-43.57	≤-13.32	PASS
11B	Ant1	2462	1Mbps	0~Reference	6.12	6.12	---	PASS
11B	Ant1	2462	1Mbps	30~1000	6.12	-62.17	≤-13.88	PASS
11B	Ant1	2462	1Mbps	1000~26500	6.12	-43.5	≤-13.88	PASS
11G	Ant1	2412	6Mbps	0~Reference	3.72	3.72	---	PASS
11G	Ant1	2412	6Mbps	30~1000	3.72	-62.89	≤-16.28	PASS
11G	Ant1	2412	6Mbps	1000~26500	3.72	-43.26	≤-16.28	PASS
11G	Ant1	2437	6Mbps	0~Reference	4.73	4.73	---	PASS
11G	Ant1	2437	6Mbps	30~1000	4.73	-62.64	≤-15.27	PASS
11G	Ant1	2437	6Mbps	1000~26500	4.73	-43.18	≤-15.27	PASS
11G	Ant1	2462	6Mbps	0~Reference	3.59	3.59	---	PASS
11G	Ant1	2462	6Mbps	30~1000	3.59	-63.06	≤-16.41	PASS
11G	Ant1	2462	6Mbps	1000~26500	3.59	-43.19	≤-16.41	PASS
11N20SISO	Ant1	2412	MCS0	0~Reference	4.16	4.16	---	PASS
11N20SISO	Ant1	2412	MCS0	30~1000	4.16	-62.47	≤-15.84	PASS
11N20SISO	Ant1	2412	MCS0	1000~26500	4.16	-42.89	≤-15.84	PASS
11N20SISO	Ant1	2437	MCS0	0~Reference	4.47	4.47	---	PASS
11N20SISO	Ant1	2437	MCS0	30~1000	4.47	-62.68	≤-15.53	PASS
11N20SISO	Ant1	2437	MCS0	1000~26500	4.47	-41.71	≤-15.53	PASS
11N20SISO	Ant1	2462	MCS0	0~Reference	3.17	3.17	---	PASS
11N20SISO	Ant1	2462	MCS0	30~1000	3.17	-63	≤-16.83	PASS
11N20SISO	Ant1	2462	MCS0	1000~26500	3.17	-42.68	≤-16.83	PASS