RADIO TEST REPORT

FCC 47 CFR PART 15 SUBPART C
INDUSTRY CANADA RSS-247

Test Standard	**FCC Part 15.247** **IC RSS-247 issue 3 and IC RSS-GEN issue 5**
Product name	**Chrion Pro**
Brand Name	**Mio, MiTAC, Magellan, Teletrac Navman**
Model No.	**N635**
Test Result	**Pass**
Statements of Conformity	**Determination of compliance is based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.**

The test Result was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were given in ANSI C63.10: 2013 and compliance standards.
The test results of this report relate only to the tested sample (EUT) identified in this report.

The test Report of full or partial shall not copy. Without written approval of Compliance Certification Services Inc.(Wugu Laboratory)

Approved by:

Dally Hong

Dally Hong
Sr. Engineer

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.
除非另有說明，此報告結果僅對測試之樣品負責，同時此樣品僅保留90天。本報告未經本公司書面許可，不可部份複製。
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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	January 4, 2024	Initial Issue	ALL	Allison Chen

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Table of contents

1. GENERAL INFORMATION 4
1.1 EUT INFORMATION 4
1.2 EUT CHANNEL INFORMATION 5
1.3 ANTENNA INFORMATION 5
1.4 MEASUREMENT UNCERTAINTY 6
1.5 FACILITIES AND TEST LOCATION 7
1.6 INSTRUMENT CALIBRATION 8
1.7 SUPPORT AND EUT ACCESSORIES EQUIPMENT 9
1.8 TEST METHODOLOGY AND APPLIED STANDARDS 9
2. TEST SUMMARY 10
3. DESCRIPTION OF TEST MODES 11
3.1 THE WORST MODE OF OPERATING CONDITION 11
3.2 THE WORST MODE OF MEASUREMENT 12
4. EUT DUTY CYCLE 13
5. TEST RESULT 15
5.1 AC POWER LINE CONDUCTED EMISSION 15
5.2 6DB BANDWIDTH AND OCCUPIED BANDWIDTH(99%) 22
5.3 OUTPUT POWER MEASUREMENT 29
5.4 POWER SPECTRAL DENSITY 33
5.5 CONDUCTED BANDEDGE AND SPURIOUS EMISSION 37
5.6 RADIATION BANDEDGE AND SPURIOUS EMISSION 45
APPENDIX 1 - PHOTOGRAPHS OF EUT

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1. GENERAL INFORMATION

1.1 EUT INFORMATION

FCC Applicant	Mitac Digital Technology Corporation 4F., No. 1, R&D Road 2, Hsinchu Science Park, Hsinchu 30076 Taiwan
IC Applicant	MiTAC Digital Technology Corporation 4F., No. 1, R&D Road 2, Hsinchu Science Park, Hsinchu 30076 Taiwan
Manufacturer	MITAC COMPUTER (KUNSHAN) CO., LTD. No. 269, 2nd Avenue, District A, Comprehensive Free Trade Zone, Kunshan, Jiangsu, P.R. China
Equipment	Chrion Pro
Trade Name	Mio, MiTAC, Magellan, Teletrac Navman
Model No.	N635
Model Discrepancy	Difference of the those trade names (list on this report) are just for marketing purpose only.
Received Date	May 25, 2023
Date of Test	October 11 ~ 30, 2023
Power Supply	1. Powered from AC Adapter. I/P: 100-240Vac, 50-60Hz, 0.3A; O/P: Vdc,5V 2.0A 2. Powered from car charge. I/P: 12-24Vdc; O/P: 5Vdc, 2A (Max) 3. Powered from Rechargeable Li-ion Polymer Battery. Rating: 3.7VDC, 4000mAh, 14.8Wh
HW Version	R02
SW Version	R15
Serial number	HGM37E0001

Remark:
1. For more details, please refer to the User's manual of the EUT.
2. Disclaimer: Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.
3. Disclaimer: The variant model numbers / trademarks are assessed as identical in hardware and software to each other, hence all variants are fully covered by the test results in this test report without further verification test.

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1.2 EUT CHANNEL INFORMATION

Frequency Range	802.11b/g/n HT 20: 2412MHz ~ 2462MHz 802.11n HT 40: 2422MHz ~ 2452MHz
Modulation Type	1. IEEE 802.11b mode: CCK 2. IEEE 802.11g mode: OFDM 3. IEEE 802.11n HT 20 MHz mode : OFDM 4. IEEE 802.11n HT 40 MHz mode : OFDM
Number of channel	1. IEEE 802.11b mode: 11 Channels 2. IEEE 802.11g mode: 11 Channels 3. IEEE 802.11n HT 20 MHz mode : 11 Channels 4. IEEE 802.11n HT 40 MHz mode : 7 Channels

Remark:
Refer as ANSI C63.10: 2013 clause 5.6.1 Table 4 and RSS-GEN Table A1 for test channels

Number of frequencies to be tested		
Frequency range in which device operates	**Number of frequencies**	**Location in frequency range of operation**
☐ 1 MHz or less	1	Middle
☐ 1 MHz to 10 MHz	2	1 near top and 1 near bottom
☒ More than 10 MHz	3	1 near top, 1 near middle, and 1 near bottom

1.3 ANTENNA INFORMATION

Antenna Type	☐ PIFA ☐ PCB ☐ Dipole ☐ Coils ☒ Chip
Antenna Gain	Antenna Gain: 1.31 dBi
Brand / Model	INPAQ / ACM3-5036-A1-CC-S
Antenna connector	i-pex

Notes:
1. The antenna(s) of the EUT are permanently attached and there are no provisions for connection to an external antenna. So the EUT complies with the requirements of §15.203 and RSS-Gen §6.8.

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1.4 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
AC Powerline Conducted Emission	± 2.213 dB
Channel Bandwidth	± 2.7 %
RF output power (Power Meter + Power sensor)	± 0.243 dB
Power Spectral density	± 2.739 dB
Conducted Bandedge	± 2.739 dB
Conducted Spurious Emission	± 2.742 dB
Radiated Emission_9kHz-30MHz	± 3.115 dB
Radiated Emission_30MHz-200MHz	± 4.071 dB
Radiated Emission_200MHz-1GHz	± 4.419 dB
Radiated Emission_1GHz-6GHz	± 5.023 dB
Radiated Emission_6GHz-18GHz	± 5.068 dB
Radiated Emission_18GHz-26GHz	± 3.349 dB
Radiated Emission_26GHz-40GHz	± 3.229 dB

Remark:
1.This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2
2. ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report.

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1.5 FACILITIES AND TEST LOCATION

All measurement facilities used to collect the measurement data are located at

AC Powerline Conducted Emission and Conducted:

☒ No.11, Wugong 6th Rd., Wugu Dist., New Taipei City, Taiwan.

Radiated emission 9kHz to 40GHz:

☒ No.11, Wugong 6th Rd., Wugu Dist., New Taipei City, Taiwan.

☐ No. 12, Ln. 116, Wugong 3rd Rd., Wugu Dist., New Taipei City, Taiwan 24803

CAB identifier: TW1309

Test site	Test Engineer	Remark
AC Conduction Room	Tony Chao	-
Radiation	Tony Chao	-
RF Conducted	David Li	-

Remark: The lab has been recognized as the FCC accredited lab. under the KDB 974614 D01 and is listed in the FCC pubic Access Link (PAL) database, FCC Registration No. :444940, the FCC Designation No.:TW1309

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1.6 INSTRUMENT CALIBRATION

Conducted_FCC/IC/NCC (All)					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Power Sensor	Anritsu	MA2411B	1911386	2023-07-25	2024-07-24
Power Sensor	Anritsu	MA2411B	1911387	2023-07-25	2024-07-24
Power Meter	Anritsu	ML2496A	2136002	2022-11-24	2023-11-23
EXA Signal Analyzer	Keysight	N9010B	MY60242460	2023-02-02	2024-02-01
Software	Radio Test Software Ver. 21				

966A_Radiated Wi-Fi 2.4GHz					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Loop Antenna	COM-POWER	AL-130	121051	2023-05-23	2024-05-22
Preamplifier	EMEC	EM330	060609	2023-02-22	2024-02-21
Thermo-Hygro Meter	WISEWIND	1206	D07	2022-12-19	2023-12-18
Signal Analyzer	KEYSIGHT	N9010A	MY54200716	2023-10-13	2024-10-12
Preamplifier	HP	8449B	3008A00965	2022-12-23	2023-12-22
Bi-Log Antenna	Sunol Sciences	JB3	A030105	2023-08-08	2024-08-07
Cable	Huber+Suhner	104PEA	20995+21000+182330	2023-02-22	2024-02-21
Horn Antenna	ETC	MCTD 1209	DRH13M02003	2023-01-12	2024-01-11
High Pass Filters	Titan Microwave	T04H30001800070S01	22011402-4	2023-06-17	2024-06-16
Horn Antenna	SCHWARZBECK	BBHA9170	1047	2022-12-30	2023-12-29
Pre-Amplifier	EMCI	EMC184045SE	980860	2022-12-27	2023-12-26
Cable	EMCI	EMC101G	211010+211011+211012	2022-12-12	2023-12-11
Cable	EMCI	EMC101G	221213+221011+221012	2023-10-17	2024-10-16
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Software	e3 V9-210616c				

RF_Conduction(RF)					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EMI Test Receiver	R&S	ESCI	100064	2023-06-07	2024-06-06
LISN	TESEQ	LN2-16N	22012	2023-03-08	2024-03-07
Cable	EMCI	CFD300-NL	CERF	2023-06-27	2024-06-26
Software	EZ-EMC(CCS-3A1-CE-WUKU)				

Remark:
1. Each piece of equipment is scheduled for calibration once a year.
2. N.C.R. = No Calibration Required.

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1.7 SUPPORT AND EUT ACCESSORIES EQUIPMENT

Conducted_Sup_Units					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
NB(E)	Lenovo	T460	N/A	N/A	N/A
Cable	SP	Type C Cable	N/A	N/A	N/A

Support Unit List					
N0	Kind	Brand	Model	Core	Length
1	NB(D)	Lenovo	ThinkPad X260	N/A	N/A
A	TypeA to TypeC	N/A	N/A	N/A	N/A

RF_Conduction(RF)					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
NB	Lenovo	IBM 7663	N/A	N.C.R	N.C.R

1.8 TEST METHODOLOGY AND APPLIED STANDARDS

The test methodology, setups and results comply with all requirements in accordance with ANSI C63.10:2013, FCC Part 2, FCC Part 15.247, KDB 662911, KDB 558074, RSS-247 Issue 3 and RSS-GEN Issue 5.

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2. TEST SUMMARY

FCC Standard Section	IC Standard Section	Report Section	Test Item	Result
15.203	RSS-GEN 6.8	1.3	Antenna Requirement	Pass
15.207(a)	RSS-GEN 8.8	5.1	AC Conducted Emission	Pass
15.247(a)(2)	RSS-247(5.2)(a)	5.2	6 dB Bandwidth	Pass
-	RSS-GEN 6.7	5.2	Occupied Bandwidth (99%)	Pass
15.247(b)(3)	RSS-247(5.4)(d)	5.3	Output Power Measurement	Pass
15.247(e)	RSS-247(5.2)(b)	54	Power Spectral Density	Pass
15.247(d)	RSS-247(5.5)	5.5	Conducted Band Edge	Pass
15.247(d)	RSS-247(5.5)	5.5	Conducted Emission	Pass
15.247(d) 15.205	RSS-GEN 8.9, 8.10	5.6	Radiation Band Edge	Pass
15.247(d) 15.205	RSS-GEN 8.9, 8.10	5.6	Radiation Spurious Emission	Pass

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3. DESCRIPTION OF TEST MODES

3.1 THE WORST MODE OF OPERATING CONDITION

Operation mode	IEEE 802.11b mode :1Mbps IEEE 802.11g mode :6Mbps IEEE 802.11n HT20 mode :MCS0 IEEE 802.11n HT40 mode :MCS0
Test Channel Frequencies	**IEEE 802.11b mode :** 1. Lowest Channel : 2412MHz 2. Middle Channel : 2437MHz 3. Highest Channel : 2462MHz **IEEE 802.11g mode :** 1. Lowest Channel : 2412MHz 2. Middle Channel : 2437MHz 3. Highest Channel : 2462MHz **IEEE 802.11n HT20 mode :** 1. Lowest Channel : 2412MHz 2. Middle Channel : 2437MHz 3. Highest Channel : 2462MHz **IEEE 802.11n HT40 mode :** 1. Lowest Channel : 2422MHz 2. Middle Channel : 2437MHz 3. Highest Channel : 2452MHz
Operation Transmitter	IEEE 802.11b mode :1T1R IEEE 802.11g mode :1T1R IEEE 802.11n HT20 mode : 1T1R IEEE 802.11n HT40 mode : 1T1R

Remark:
1. EUT pre-scanned data rate of output power for each mode, the worst data rate were recorded in this report.

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3.2 THE WORST MODE OF MEASUREMENT

AC Power Line Conducted Emission	
Test Condition	**AC Power line conducted emission for line and neutral**
Power supply Mode	**Mode 1: EUT power by NB** **Mode 2: EUT power by Adapter**
Worst Mode	☒ **Mode 1** ☒ **Mode 2** ☐ **Mode 3** ☐ **Mode 4**

Radiated Emission Measurement Above 1G	
Test Condition	**Radiated Emission Above 1G**
Power supply Mode	**Mode 1: EUT power by Adapter without Cradle**
Worst Mode	☒ **Mode 1** ☐ **Mode 2** ☐ **Mode 3** ☐ **Mode 4**
Worst Position	☐ **Placed in fixed position.** ☒ **Placed in fixed position at X-Plane (E2-Plane)** ☐ **Placed in fixed position at Y-Plane (E1-Plane)** ☐ **Placed in fixed position at Z-Plane (H-Plane)**

Radiated Emission Measurement Below 1G	
Test Condition	**Radiated Emission Below 1G**
Power supply Mode	**Mode 1: EUT power by Adapter without Cradle** **Mode 2: EUT power by N635_V+CarCharger** **Mode 3: EUT power by N564_TN+CarCharger** **Mode 4: EUT power by N635_V+Adapter** **Mode 5: EUT power by N564_TN+Adapter**
Worst Mode	☒ **Mode 1** ☐ **Mode 2** ☐ **Mode 3** ☐ **Mode 4**

Remark:
1. The worst mode was record in this test report.
2. EUT pre-scanned in three axis ,X,Y, Z and two polarity, for radiated measurement. The worst case(X-Plane) were recorded in this report
3. AC power line conducted emission and for below 1G radiation emission were performed the EUT transmit at the highest output power channel as worse case.

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4. EUT DUTY CYCLE

Temperature: 22.7~25.6℃ **Test date:** October 11~30, 2023
Humidity: 51~61% RH **Tested by:** David Li

	Duty Cycle (%) = Ton / (Ton+Toff)	Duty Factor (dB) =10*log (1/Duty Cycle)	1/T (kHz)	VBW setting (kHz)
802.11b	97.67	0.10	0.12	1.00
802.11g	87.32	0.59	0.73	1.00
802.11n_20	86.57	0.63	0.78	1.00
802.11n_40	76.17	1.18	1.57	2.00

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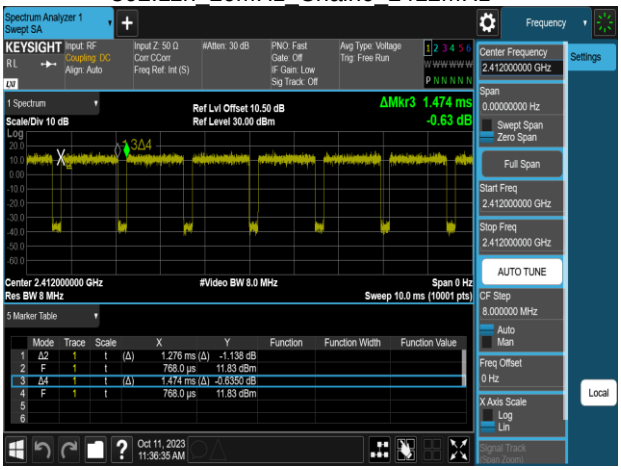
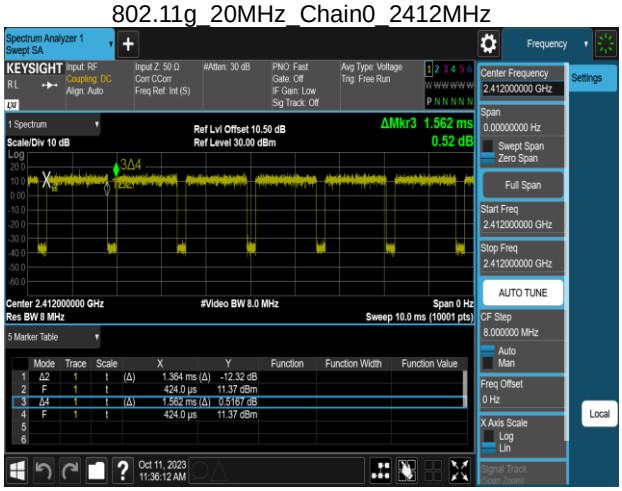
802.11b_20MHz_Chain0_2412MHz

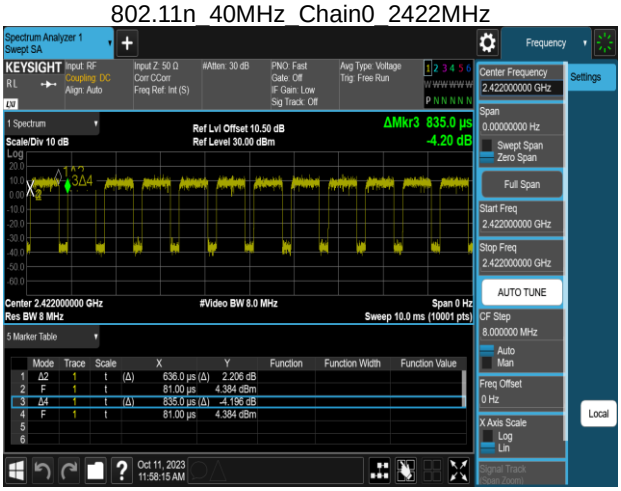
802.11n_20MHz_Chain0_2412MHz



802.11g_20MHz_Chain0_2412MHz



802.11n_40MHz_Chain0_2422MHz



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5. TEST RESULT

5.1 AC POWER LINE CONDUCTED EMISSION

5.1.1 Test Limit

According to §15.207(a)(2) and RSS-GEN section 8.8,

Frequency Range (MHz)	Limits(dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

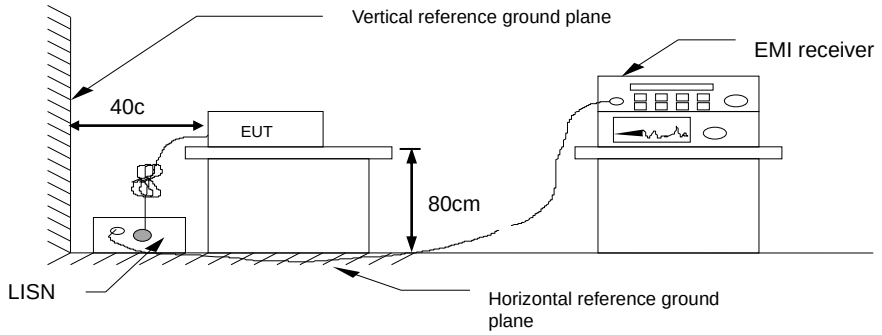
* Decreases with the logarithm of the frequency.

5.1.2 Test Procedure

Test method Refer as ANSI C63.10: 2013 clause 6.2,

1. The EUT was placed on a non-conducted table, which is 0.8m above horizontal ground plane and 0.4m above vertical ground plane.
2. EUT connected to the line impedance stabilization network (LISN)
3. Receiver set RBW of 9kHz and Detector Peak, and note as quasi-peak and average.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. Recorded Line for Neutral and Line.

5.1.3 Test Setup



5.1.4 Test Result

Pass.

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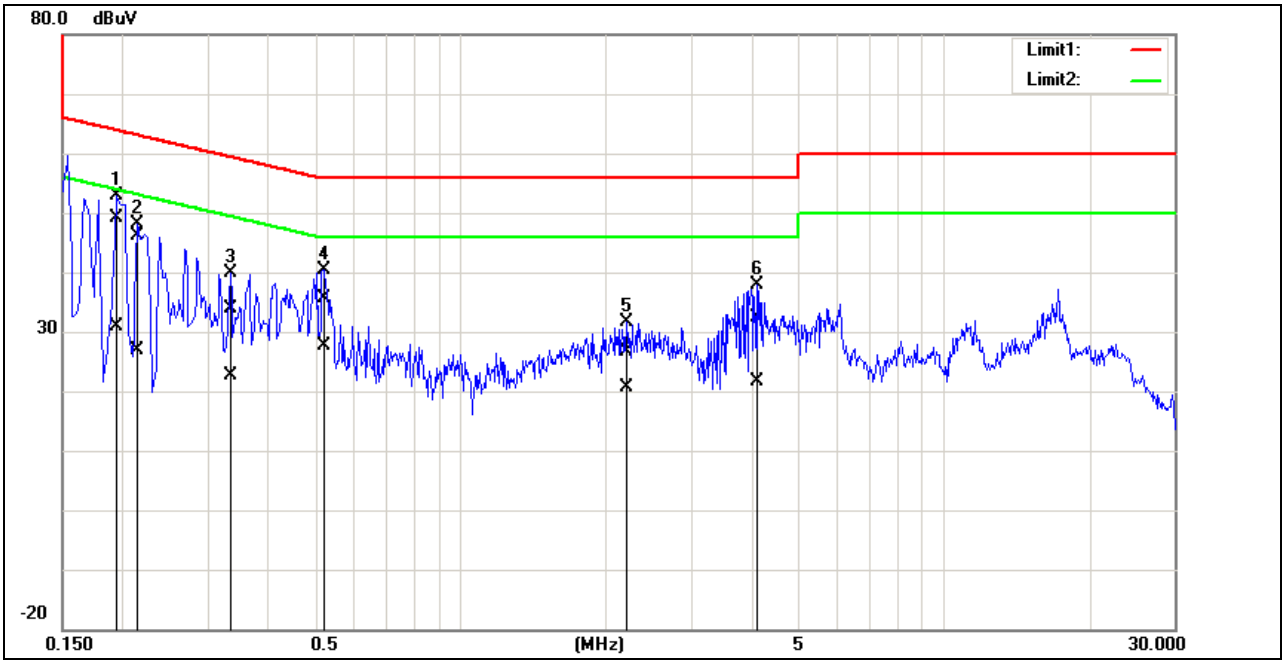
Test Data

Note: 1. Correction factor = LISN loss + Cable loss.

Project No.:	**TM-2305000074P**	**Date:**	**2023/10/26**
Standard:	**NCC/FCC/IC QP**	**Temp.(℃)/Hum.(%):**	**24.3(℃)/52%**
Test item:	**Conduction test**	**Test By:**	**Tony.Chao**
Line:	**L1**	**Test Voltage:**	**AC 120V/60Hz**
Model:	**Mode 1**		
Description:			



No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1*	0.1940	48.90	30.79	0.15	49.05	30.94	63.86	53.86	-14.81	-22.92	Pass
2	0.2140	45.93	26.82	0.15	46.08	26.97	63.05	53.05	-16.97	-26.08	Pass
3	0.3340	33.62	22.59	0.15	33.77	22.74	59.35	49.35	-25.58	-26.61	Pass
4	0.5220	35.50	27.53	0.15	35.65	27.68	56.00	46.00	-20.35	-18.32	Pass
5	2.2020	26.49	20.42	0.22	26.71	20.64	56.00	46.00	-29.29	-25.36	Pass
6	4.1020	32.20	21.48	0.26	32.46	21.74	56.00	46.00	-23.54	-24.26	Pass

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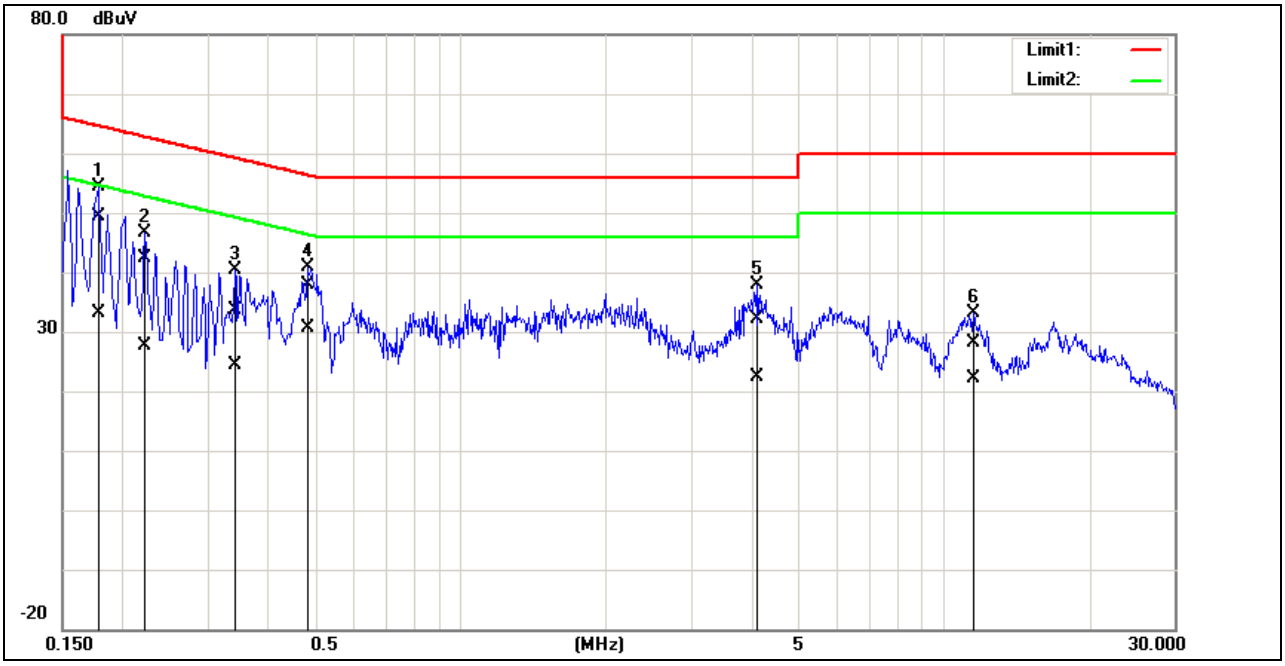
Project No.:	**TM-2305000074P**	**Date:**	**2023/10/26**
Standard:	**NCC/FCC/IC QP**	**Temp.(℃)/Hum.(%):**	**24.3(℃)/52%**
Test item:	**Conduction test**	**Test By:**	**Tony.Chao**
Line:	**N**	**Test Voltage:**	**AC 120V/60Hz**
Model:	**Mode 1**		
Description:			



No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1*	0.1780	49.22	32.92	0.20	49.42	33.12	64.58	54.58	-15.16	-21.46	Pass
2	0.2220	42.12	27.40	0.19	42.31	27.59	62.74	52.74	-20.43	-25.15	Pass
3	0.3420	33.53	24.08	0.19	33.72	24.27	59.15	49.15	-25.43	-24.88	Pass
4	0.4820	37.65	30.50	0.19	37.84	30.69	56.30	46.30	-18.46	-15.61	Pass
5	4.0940	31.88	22.09	0.31	32.19	22.40	56.00	46.00	-23.81	-23.60	Pass
6	11.5060	27.60	21.79	0.41	28.01	22.20	60.00	50.00	-31.99	-27.80	Pass

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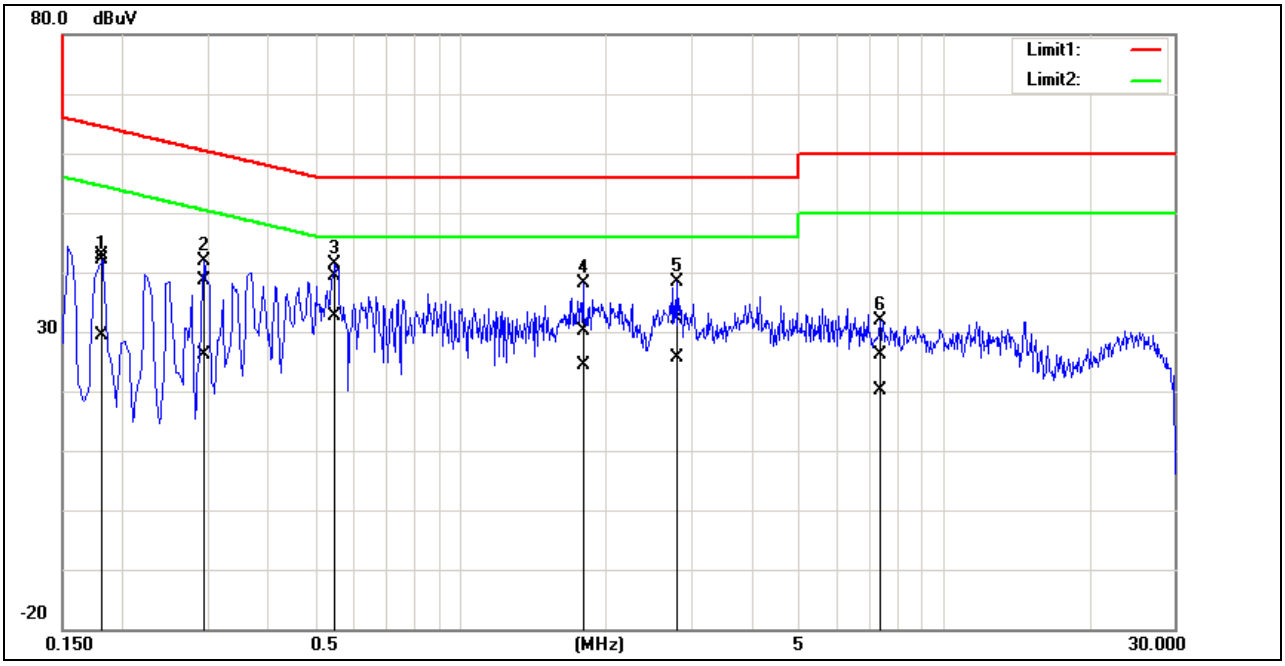
Project No.:	**TM-2305000074P**	**Date:**	**2023/11/3**
Standard:	**NCC/FCC/IC QP**	**Temp.(℃)/Hum.(%):**	**24.3(℃)/52%**
Test item:	**Conduction test**	**Test By:**	**Tony.Chao**
Line:	**L1**	**Test Voltage:**	**AC 120V/60Hz**
Model:	**Mode 2**		
Description:			



No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1	0.1820	42.67	29.20	0.15	42.82	29.35	64.39	54.39	-21.57	-25.04	Pass
2	0.2940	38.36	26.08	0.15	38.51	26.23	60.41	50.41	-21.90	-24.18	Pass
3*	0.5500	39.16	32.43	0.15	39.31	32.58	56.00	46.00	-16.69	-13.42	Pass
4	1.7980	29.99	24.11	0.21	30.20	24.32	56.00	46.00	-25.80	-21.68	Pass
5	2.8020	31.90	25.29	0.24	32.14	25.53	56.00	46.00	-23.86	-20.47	Pass
6	7.3700	25.82	19.72	0.32	26.14	20.04	60.00	50.00	-33.86	-29.96	Pass

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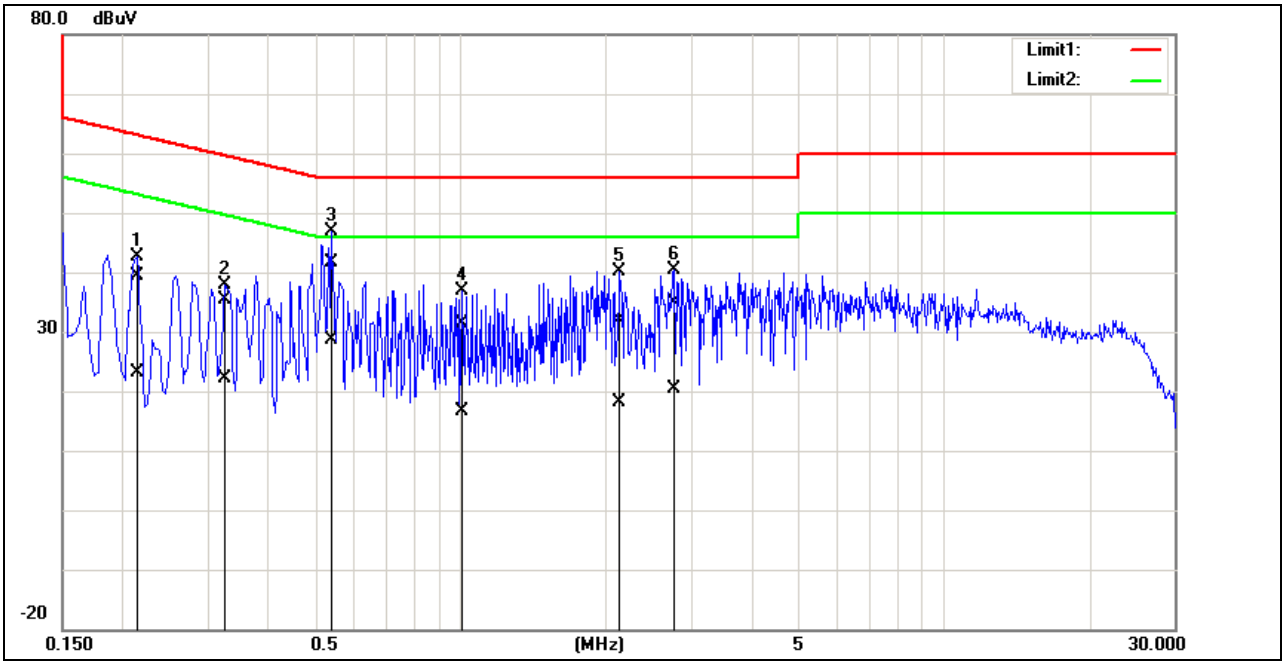
Project No.:	**TM-2305000074P**	**Date:**	**2023/11/3**
Standard:	**NCC/FCC/IC QP**	**Temp.(℃)/Hum.(%):**	**24.3(℃)/52%**
Test item:	**Conduction test**	**Test By:**	**Tony.Chao**
Line:	**N**	**Test Voltage:**	**AC 120V/60Hz**
Model:	**Mode 2**		
Description:			



No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1	0.2140	39.26	22.95	0.19	39.45	23.14	63.05	53.05	-23.60	-29.91	Pass
2	0.3260	35.25	21.94	0.19	35.44	22.13	59.55	49.55	-24.11	-27.42	Pass
3*	0.5420	41.36	28.54	0.19	41.55	28.73	56.00	46.00	-14.45	-17.27	Pass
4	1.0100	31.24	16.51	0.21	31.45	16.72	56.00	46.00	-24.55	-29.28	Pass
5	2.1420	31.69	17.99	0.26	31.95	18.25	56.00	46.00	-24.05	-27.75	Pass
6	2.7740	34.57	20.16	0.28	34.85	20.44	56.00	46.00	-21.15	-25.56	Pass

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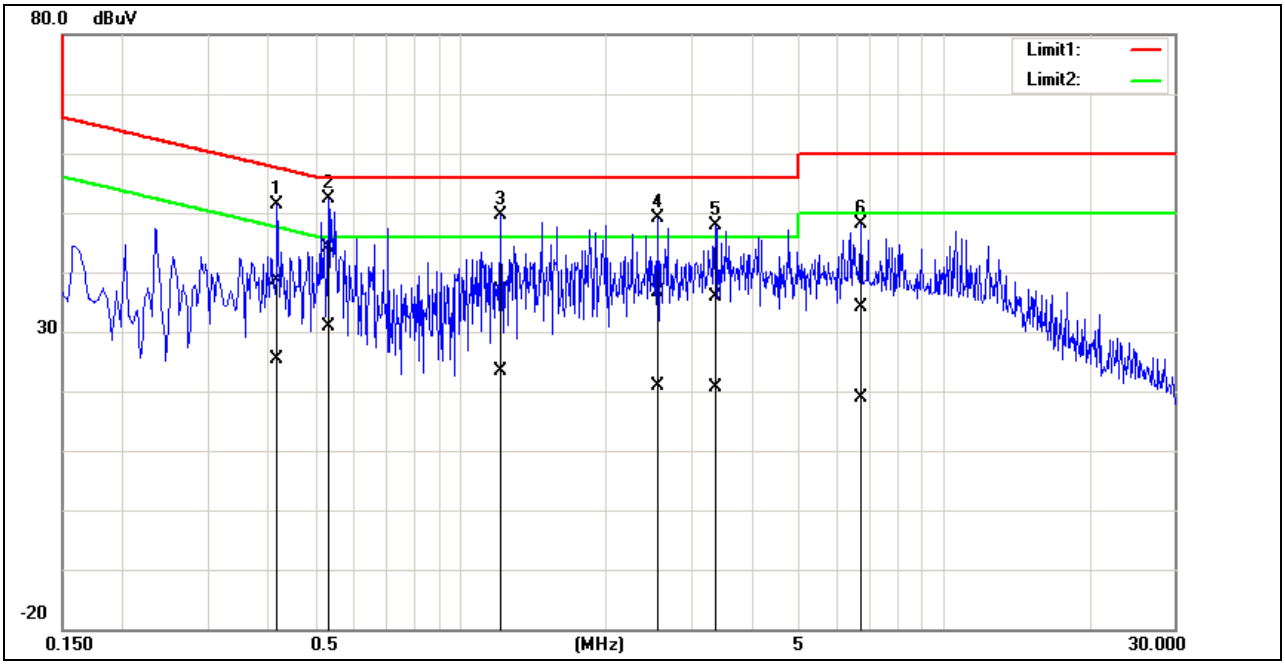
Project No.:	**TM-2305000074P**	**Date:**	**2023/11/6**
Standard:	**NCC/FCC/IC QP**	**Temp.(℃)/Hum.(%):**	**24.3(℃)/52%**
Test item:	**Conduction test**	**Test By:**	**Tony.Chao**
Line:	**L1**	**Test Voltage:**	**AC 230V/50Hz**
Model:	**Mode 2**		
Description:			



No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1	0.4180	28.47	15.09	10.19	38.66	25.28	57.49	47.49	-18.83	-22.21	Pass
2*	0.5340	33.98	20.62	10.19	44.17	30.81	56.00	46.00	-11.83	-15.19	Pass
3	1.2100	26.77	13.11	10.22	36.99	23.33	56.00	46.00	-19.01	-22.67	Pass
4	2.5580	26.33	10.65	10.29	36.62	20.94	56.00	46.00	-19.38	-25.06	Pass
5	3.3700	25.70	10.42	10.29	35.99	20.71	56.00	46.00	-20.01	-25.29	Pass
6	6.7660	23.83	8.56	10.33	34.16	18.89	60.00	50.00	-25.84	-31.11	Pass

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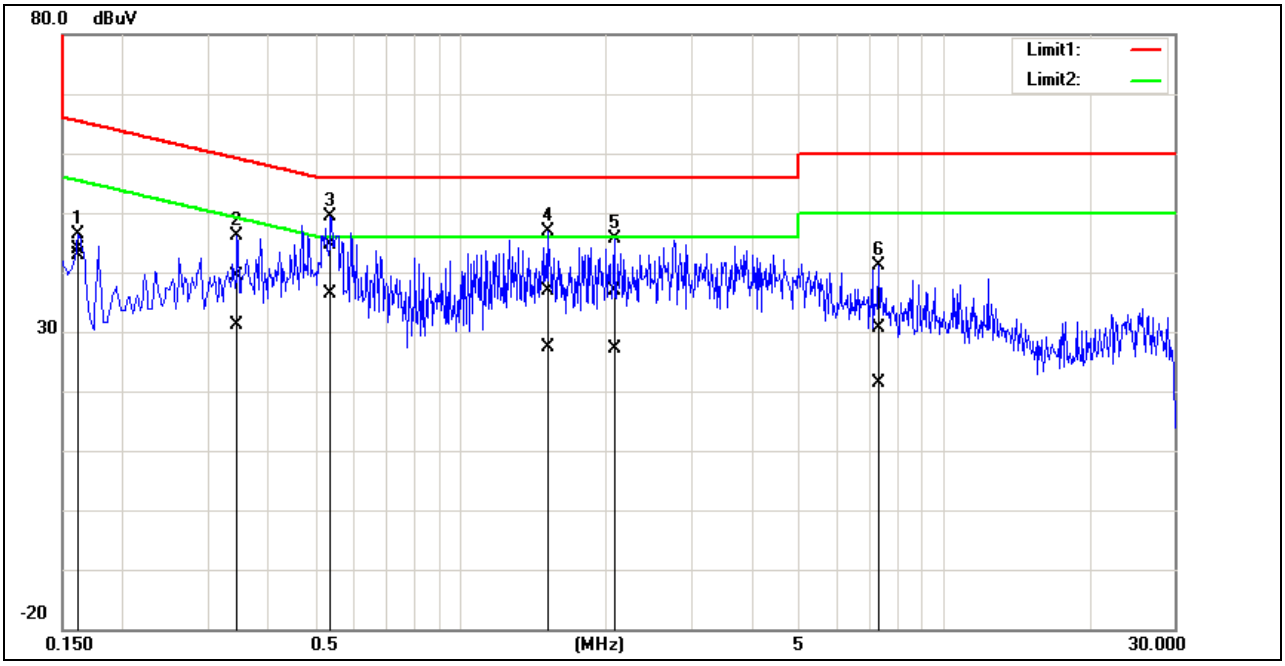
Project No.:	**TM-2305000074P**	**Date:**	**2023/11/6**
Standard:	**NCC/FCC/IC QP**	**Temp.(℃)/Hum.(%):**	**24.3(℃)/52%**
Test item:	**Conduction test**	**Test By:**	**Tony.Chao**
Line:	**N**	**Test Voltage:**	**AC 230V/50Hz**
Model:	**Mode 2**		
Description:			



No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1	0.1620	33.78	32.72	10.17	43.95	42.89	65.36	55.36	-21.41	-12.47	Pass
2	0.3460	29.20	20.91	10.18	39.38	31.09	59.06	49.06	-19.68	-17.97	Pass
3*	0.5380	34.41	26.15	10.18	44.59	36.33	56.00	46.00	-11.41	-9.67	Pass
4	1.5140	26.53	17.03	10.23	36.76	27.26	56.00	46.00	-19.24	-18.74	Pass
5	2.0780	26.61	16.91	10.25	36.86	27.16	56.00	46.00	-19.14	-18.84	Pass
6	7.3620	20.18	11.02	10.33	30.51	21.35	60.00	50.00	-29.49	-28.65	Pass

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5.2 6dB BANDWIDTH AND OCCUPIED BANDWIDTH(99%)

5.2.1 Test Limit

According to §15.247(a)(2) and RSS-247 section 5.2(a),

6 dB Bandwidth ：

Limit	Shall be at least 500kHz

Occupied Bandwidth(99%) ： For reporting purposes only.

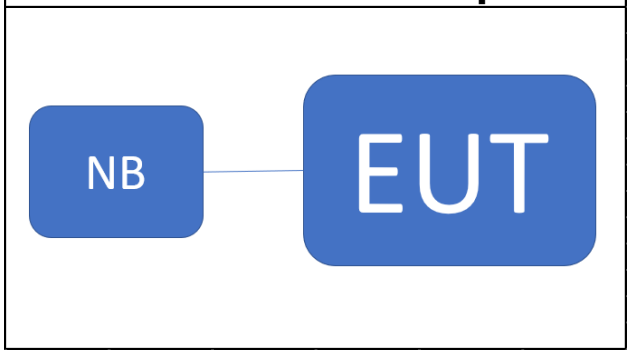
5.2.2 Test Procedure

Test method Refer as KDB 558074 D01 and ANSI C63.10: 2013 clause 6.9.2,

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT
3. SA set RBW = 100kHz, VBW = 300kHz and Detector = Peak, to measurement 6 dB Bandwidth.
4. SA set RBW = 1% ~ 5% OBW, VBW = three times the RBW and Detector = Peak, to measurement 99% Bandwidth
5. Measure and record the result of 6 dB Bandwidth and 99% Bandwidth. in the test report.

5.2.3 Test Setup

Conducted Setup



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5.2.4 Test Result

Temperature:	22.7~25.6℃	**Test date:**	October 11~30, 2023
Humidity:	51~61% RH	**Tested by:**	David Li

6dB BANDWIDTH

802.11b Ch0

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	**8054.00**	≧ 500	PASS
2437	7598.00	≧ 500	PASS
2462	7577.00	≧ 500	PASS

802.11g Ch0

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	16360.00	≧ 500	PASS
2437	**16400.00**	≧ 500	PASS
2462	16390.00	≧ 500	PASS

802.11n_HT_20M Ch0

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	17560.00	≧ 500	PASS
2437	**17600.00**	≧ 500	PASS
2462	**17600.00**	≧ 500	PASS

802.11n_HT_40M Ch0

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2422	35220.00	≧ 500	PASS
2437	**35530.00**	≧ 500	PASS
2452	35210.00	≧ 500	PASS

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BANDWIDTH 99%

802.11b Ch0

Freq. (MHz)	99% BW (MHz)	6dB BW (MHz)
2412	**12.845**	7.673
2437	12.798	7.675
2462	12.679	**7.68**

802.11g Ch0

Freq. (MHz)	99% BW (MHz)	6dB BW (MHz)
2412	17.215	16.42
2437	**17.45**	**16.58**
2462	17.279	16.5

802.11n_HT20M Ch0

Freq. (MHz)	99% BW (MHz)	6dB BW (MHz)
2412	18.013	17.61
2437	**18.299**	**17.66**
2462	18.069	17.6

802.11n_HT40M Ch0

Freq. (MHz)	99% BW (MHz)	6dB BW (MHz)
2422	36.101	**35.97**
2437	**36.543**	35.69
2452	36.195	35.65

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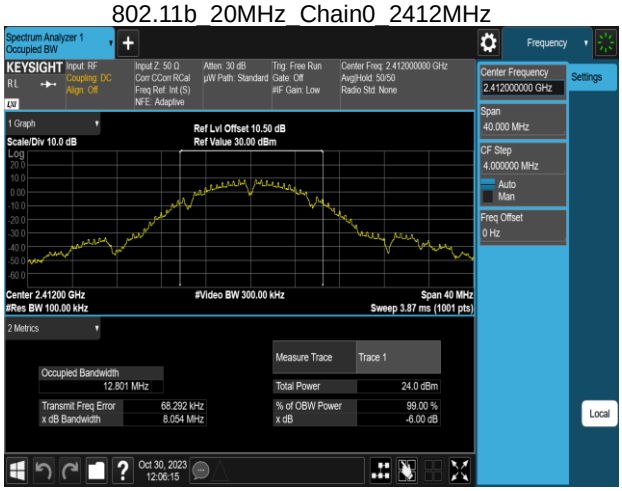
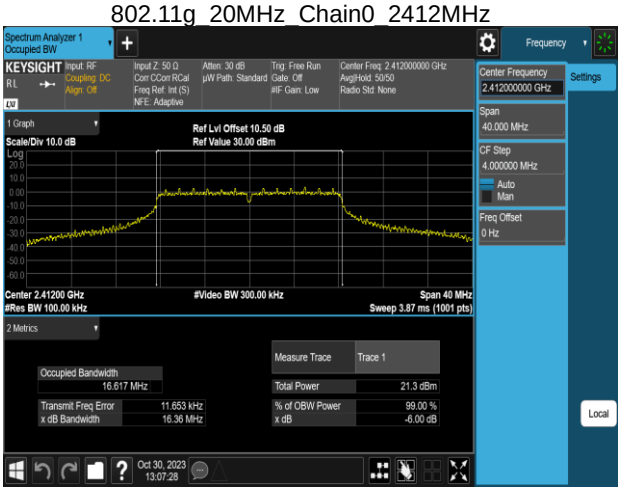
Test Data (6dB BANDWIDTH)

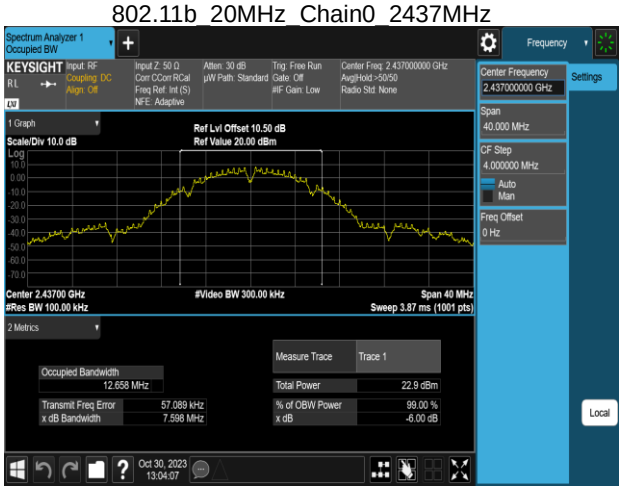
802.11b_20MHz_Chain0_2412MHz



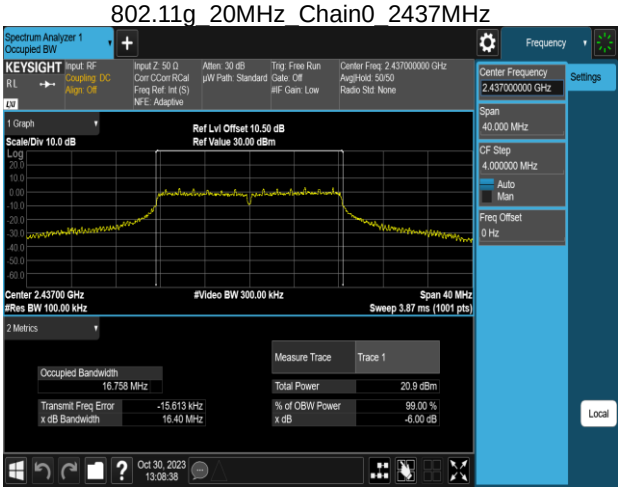
802.11g_20MHz_Chain0_2412MHz



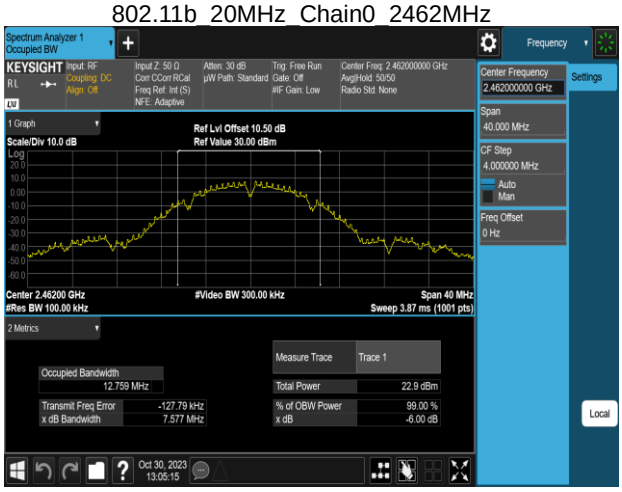
802.11b_20MHz_Chain0_2437MHz



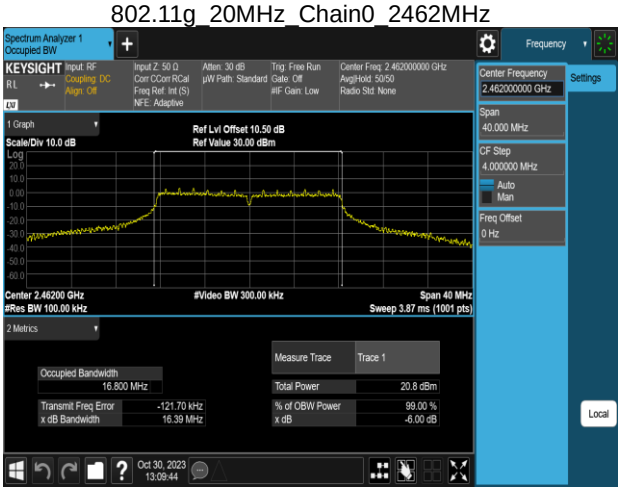
802.11g_20MHz_Chain0_2437MHz



802.11b_20MHz_Chain0_2462MHz



802.11g_20MHz_Chain0_2462MHz



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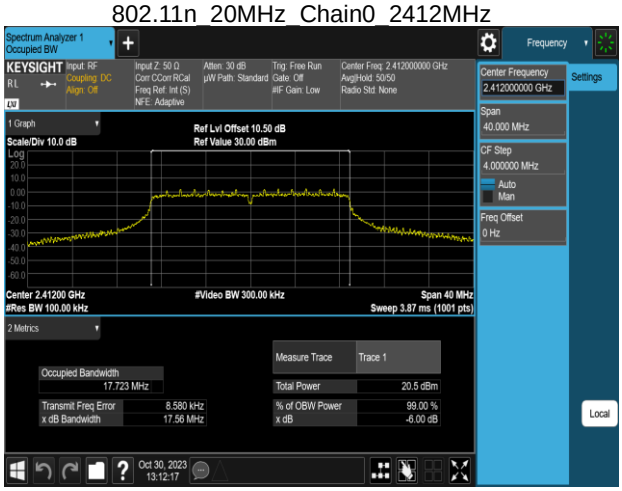
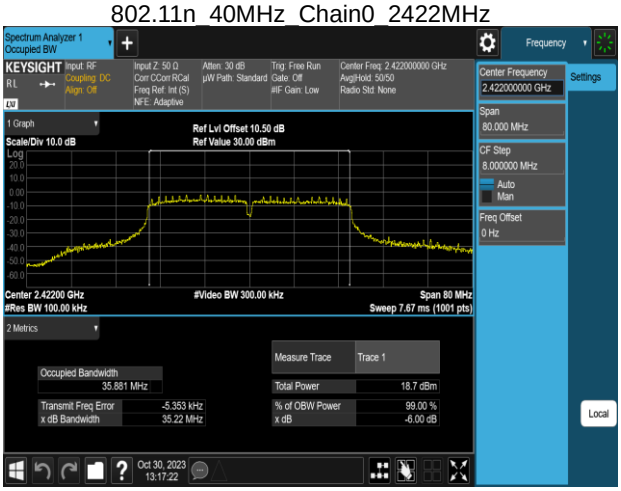
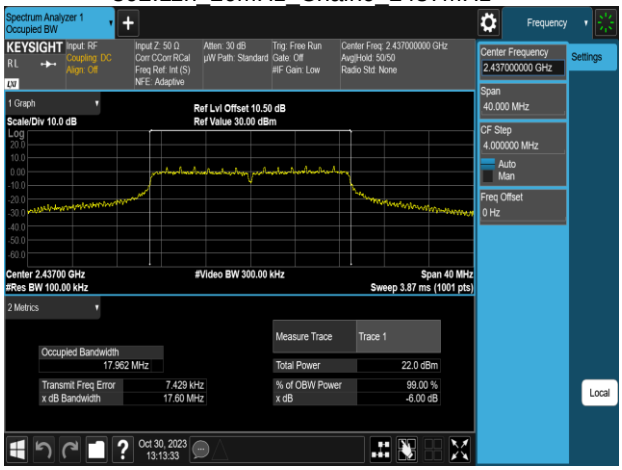
802.11n_20MHz_Chain0_2412MHz



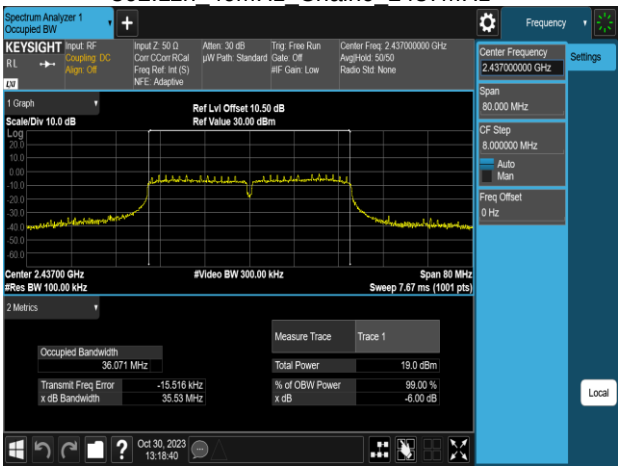
802.11n_40MHz_Chain0_2422MHz



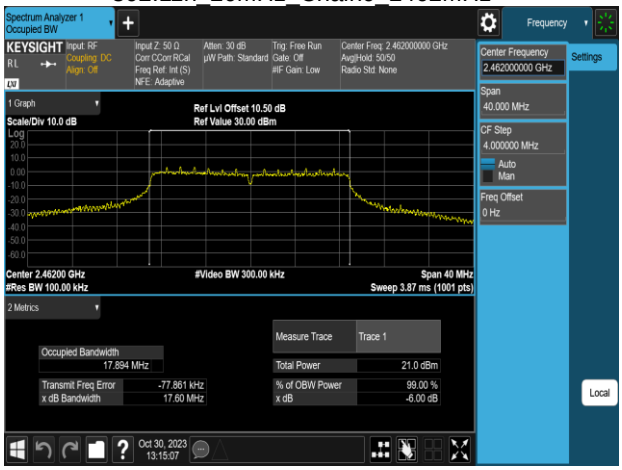
802.11n_20MHz_Chain0_2437MHz



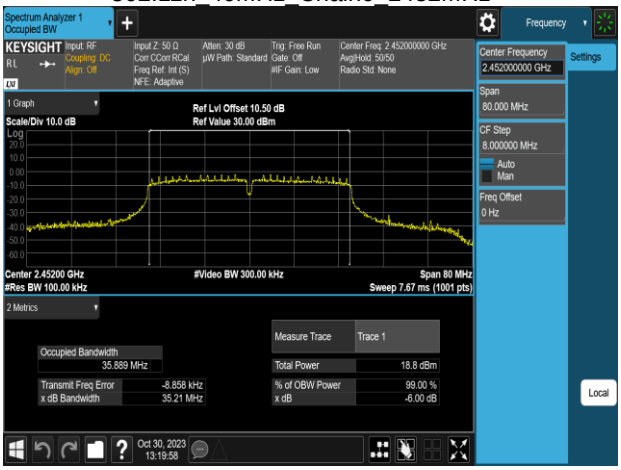
802.11n_40MHz_Chain0_2437MHz



802.11n_20MHz_Chain0_2462MHz



802.11n_40MHz_Chain0_2452MHz



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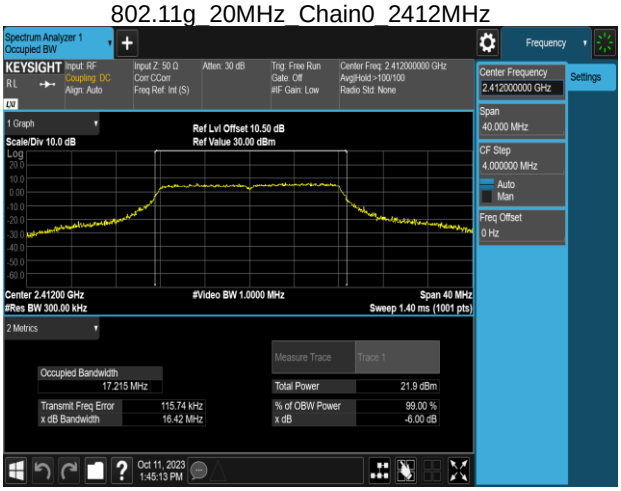
Test Data (BANDWIDTH 99%)

802.11b_20MHz_Chain0_2412MHz

802.11g_20MHz_Chain0_2412MHz

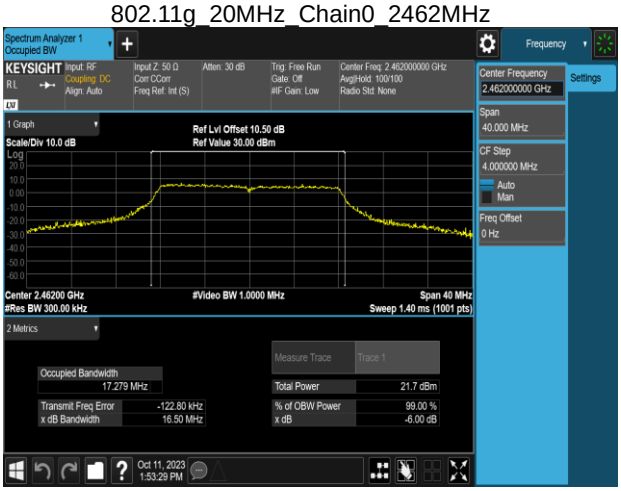


802.11b_20MHz_Chain0_2437MHz

802.11g_20MHz_Chain0_2437MHz

802.11b_20MHz_Chain0_2462MHz

802.11g_20MHz_Chain0_2462MHz



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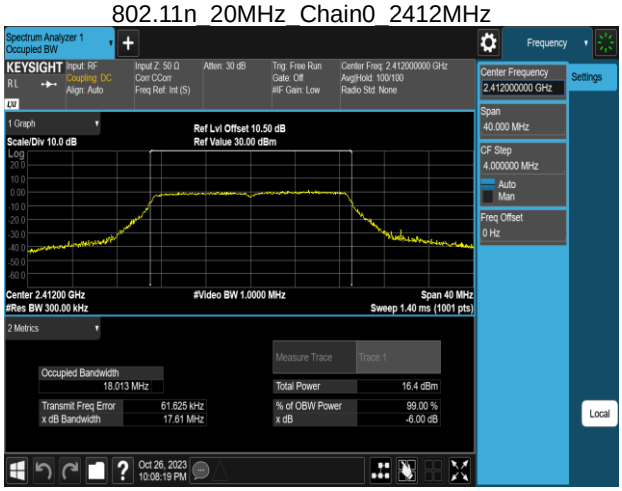
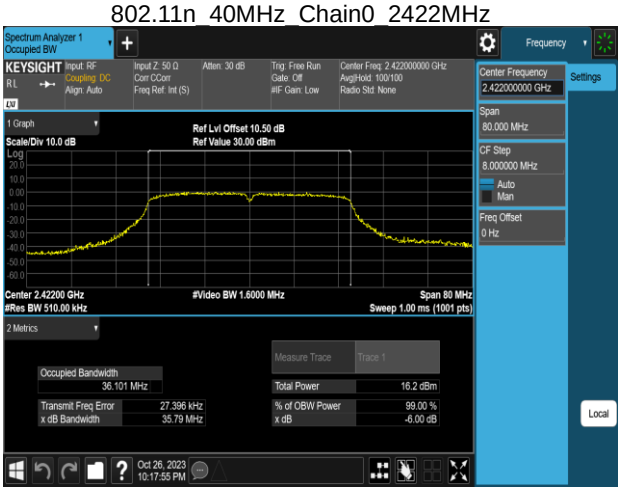
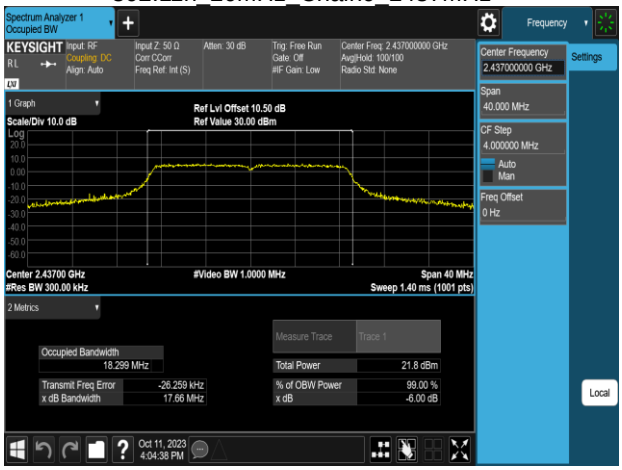
802.11n_20MHz_Chain0_2412MHz



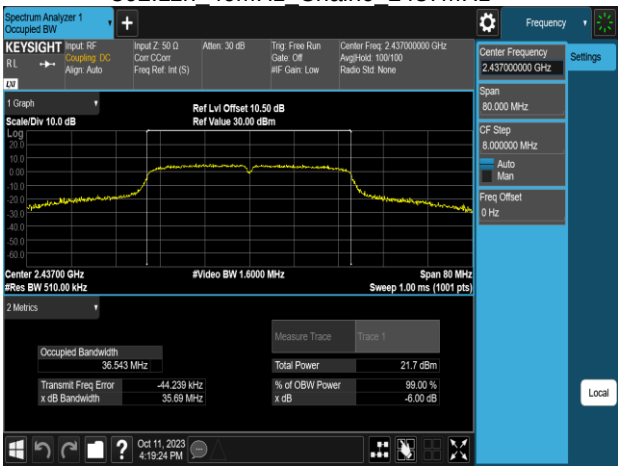
802.11n_40MHz_Chain0_2422MHz



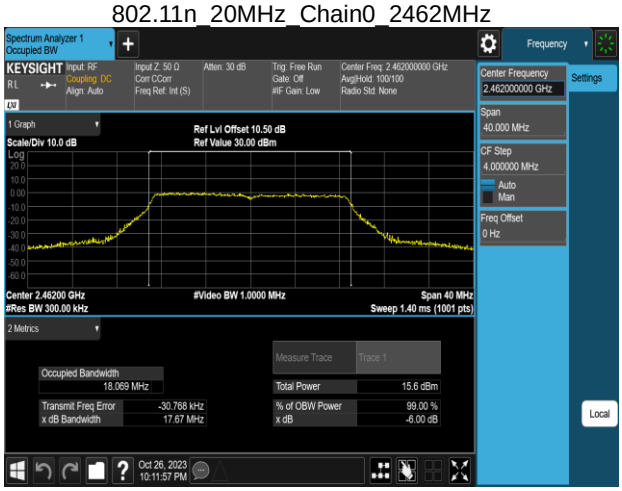
802.11n_20MHz_Chain0_2437MHz



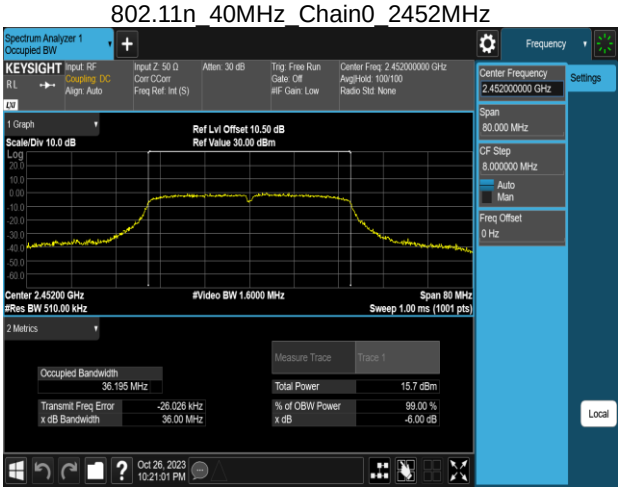
802.11n_40MHz_Chain0_2437MHz



802.11n_20MHz_Chain0_2462MHz



802.11n_40MHz_Chain0_2452MHz



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5.3 OUTPUT POWER MEASUREMENT

5.3.1 Test Limit

According to §15.247(b) and RSS-247 section 5.4(d),

Peak output power：

For systems using digital modulation in the 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt(30 dBm) and the e.i.r.p. shall not exceed 4Watt(36 dBm), base on the use of antennas with directional gain not exceed 6 dBi If transmitting antennas of directional gain greater than 6dBi are used the peak output power the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

Limit	☒ Antenna not exceed 6 dBi：30dBm ☐ Antenna with DG greater than 6 dBi： [Limit = 30 – (DG – 6)] ☐ Point-to-point operation：

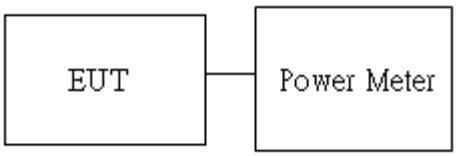
Average output power：For reporting purposes only.

5.3.2 Test Procedure

Test method Refer as KDB 558074 D01.

1. The EUT RF output connected to the power meter by RF cable.
2. Setting maximum power transmit of EUT.
3. The path loss was compensated to the results for each measurement.
4. Measure and record the result of Peak output power and Average output power. in the test report.

5.3.3 Test Setup



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5.3.4 Test Result

Temperature: 22.7~25.6℃ **Test date:** October 11~30, 2023

Humidity: 51~61% RH **Tested by:** David Li

Peak & Average output power：

802.11b Ch0						
CH	**Freq. (MHz)**	**Data Rate**	**Power set**	**Peak Output Power (dBm)**	**Limit (dBm)**	**RESULT**
1	2412	1	14	**17.28**	30.00	PASS
6	2437	1	14.5	17.15	30.00	PASS
11	2462	1	14.5	16.95	30.00	PASS
802.11b Ch0						
CH	**Freq. (MHz)**	**Data Rate**	**Power set**	**Avg. Output Power (dBm)**	**Limit (dBm)**	**RESULT**
1	2412	1	14	**14.43**	30.00	PASS
6	2437	1	14.5	14.30	30.00	PASS
11	2462	1	14.5	14.16	30.00	PASS

802.11g Ch0						
CH	**Freq. (MHz)**	**Data Rate**	**Power set**	**Peak Output Power (dBm)**	**Limit (dBm)**	**RESULT**
1	2412	6	15.5	**21.69**	30.00	PASS
6	2437	6	15.5	21.58	30.00	PASS
11	2462	6	15.5	21.55	30.00	PASS
802.11g Ch0						
CH	**Freq. (MHz)**	**Data Rate**	**Power set**	**Avg. Output Power (dBm)**	**Limit (dBm)**	**RESULT**
1	2412	6	15.5	**14.49**	30.00	PASS
6	2437	6	15.5	14.40	30.00	PASS
11	2462	6	15.5	14.12	30.00	PASS

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802.11n_HT_20M Ch0						
CH	Freq. (MHz)	Data Rate	Power set	Peak Output Power (dBm)	Limit (dBm)	RESULT
1	2412	MCS0	15	**21.61**	30.00	PASS
6	2437	MCS0	15.5	21.54	30.00	PASS
11	2462	MCS0	15.5	21.37	30.00	PASS
802.11n_HT_20M Ch0						
CH	Freq. (MHz)	Data Rate	Power set	Avg. Output Power (dBm)	Limit (dBm)	RESULT
1	2412	MCS0	15	**14.27**	30.00	PASS
6	2437	MCS0	15.5	14.24	30.00	PASS
11	2462	MCS0	15.5	14.18	30.00	PASS

802.11n_HT_40M Ch0						
CH	Freq. (MHz)	Data Rate	Power set	Peak Output Power (dBm)	Limit (dBm)	RESULT
3	2422	MCS0	12	20.83	30.00	PASS
6	2437	MCS0	13	**21.32**	30.00	PASS
9	2452	MCS0	13	21.25	30.00	PASS
802.11n_HT_40M Ch0						
CH	Freq. (MHz)	Data Rate	Power set	Avg. Output Power (dBm)	Limit (dBm)	RESULT
3	2422	MCS0	12	12.29	30.00	PASS
6	2437	MCS0	13	**12.66**	30.00	PASS
9	2452	MCS0	13	12.45	30.00	PASS

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EIRP：

802.11b Ch0							
CH	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	RESULT
1	2412	1	14.43	1.31	**15.74**	36	PASS
6	2437	1	14.30	1.31	15.61	36	PASS
11	2462	1	14.16	1.31	15.47	36	PASS

802.11g Ch0							
CH	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	RESULT
1	2412	6	14.49	1.31	**15.80**	36	PASS
6	2437	6	14.40	1.31	15.71	36	PASS
11	2462	6	14.12	1.31	15.43	36	PASS

802.11n_HT_20M Ch0							
CH	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	RESULT
1	2412	MCS0	14.27	1.31	**15.58**	36	PASS
6	2437	MCS0	14.24	1.31	15.55	36	PASS
11	2462	MCS0	14.18	1.31	15.49	36	PASS

802.11n_HT_40M Ch0							
CH	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	RESULT
3	2422	MCS0	12.29	1.31	13.60	36	PASS
6	2437	MCS0	12.66	1.31	**13.97**	36	PASS
9	2452	MCS0	12.45	1.31	13.76	36	PASS

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5.4 POWER SPECTRAL DENSITY

5.4.1 Test Limit

According to §15.247(e) and RSS-247 section 5.2(b),

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.

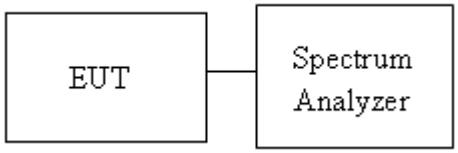
Limit	☒ Antenna not exceed 6 dBi：8dBm ☐ Antenna with DG greater than 6 dBi： [Limit = 8 – (DG – 6)] ☐ Point-to-point operation：

5.4.2 Test Procedure

Test method Refer as KDB 558074 D01

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT
3. SA set RBW = 3kHz, VBW = 30kHz, Span = 1.5 times DTS Bandwidth (6 dB BW), Detector = Peak, Sweep Time = Auto and Trace = Max hold.
4. The path loss and Duty Factor were compensated to the results for each measurement by SA.
5. Mark the maximum level.
6. Measure and record the result of power spectral density. in the test report.

5.4.3 Test Setup



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5.4.4 Test Result

Temperature: 22.7~25.6℃ **Test date:** October 11~30, 2023

Humidity: 51~61% RH **Tested by:** David Li

POWER DENSITY 802.11b				
Freq. (MHz)	Ch0 PSD	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
2412	-4.73	-4.73	8.00	PASS
2437	-6.13	-6.13	8.00	PASS
2462	-6.58	-6.58	8.00	PASS
POWER DENSITY 802.11g				
Freq. (MHz)	Ch0 PSD	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
2412	-11.36	-11.36	8.00	PASS
2437	-11.52	-11.52	8.00	PASS
2462	-11.51	-11.51	8.00	PASS
POWER DENSITY 802.11n HT20				
Freq. (MHz)	Ch0 PSD	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
2412	-12.37	-12.37	8.00	PASS
2437	-10.43	-10.43	8.00	PASS
2462	-10.8	-10.80	8.00	PASS
POWER DENSITY 802.11n HT40				
Freq. (MHz)	Ch0 PSD	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
2422	-16.88	-16.88	8.00	PASS
2437	-16.93	-16.93	8.00	PASS
2452	-16.04	-16.04	8.00	PASS

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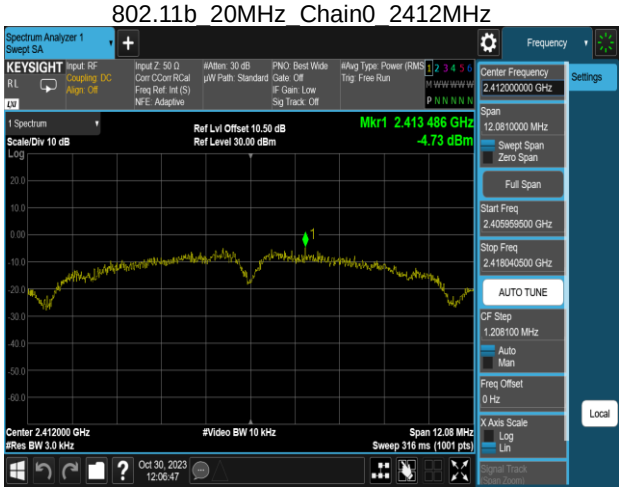
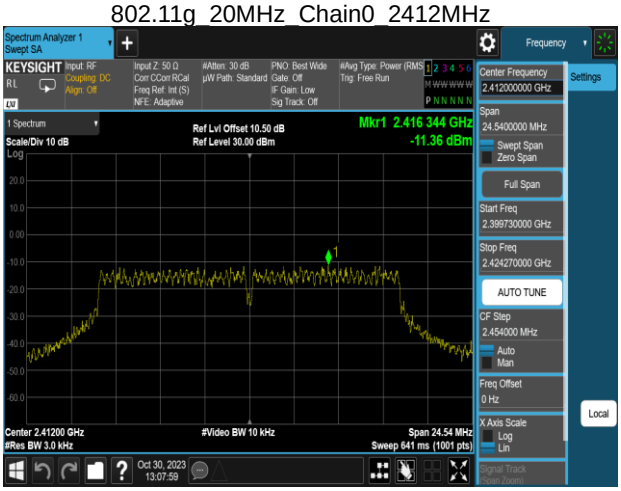
Test Data

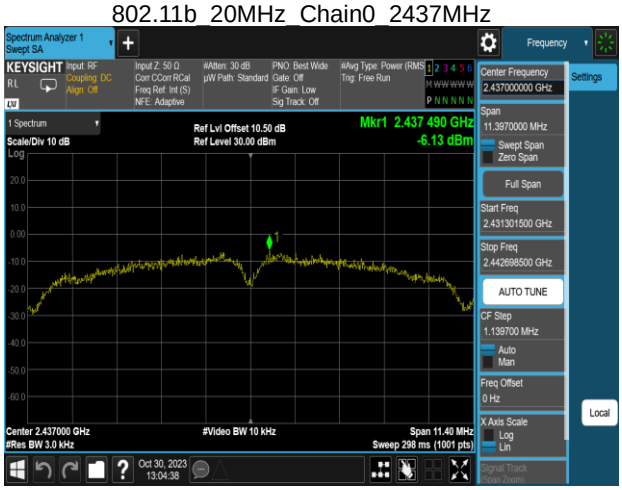
802.11b_20MHz_Chain0_2412MHz



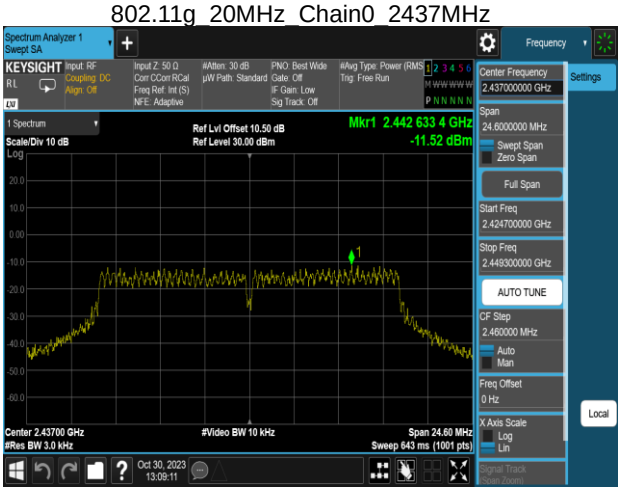
802.11g_20MHz_Chain0_2412MHz



802.11b_20MHz_Chain0_2437MHz

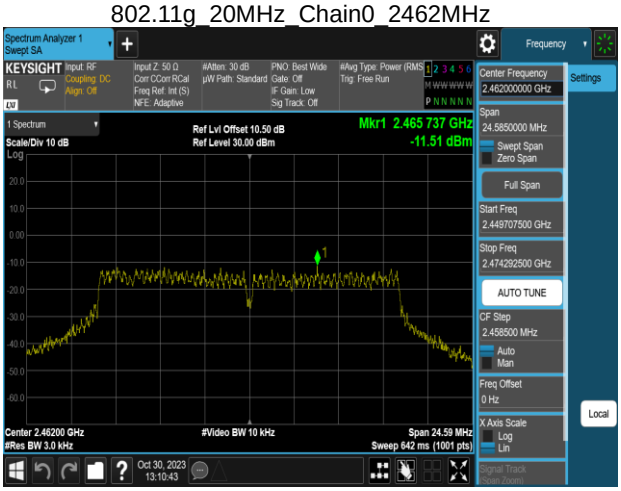


802.11g_20MHz_Chain0_2437MHz



802.11b_20MHz_Chain0_2462MHz

802.11g_20MHz_Chain0_2462MHz



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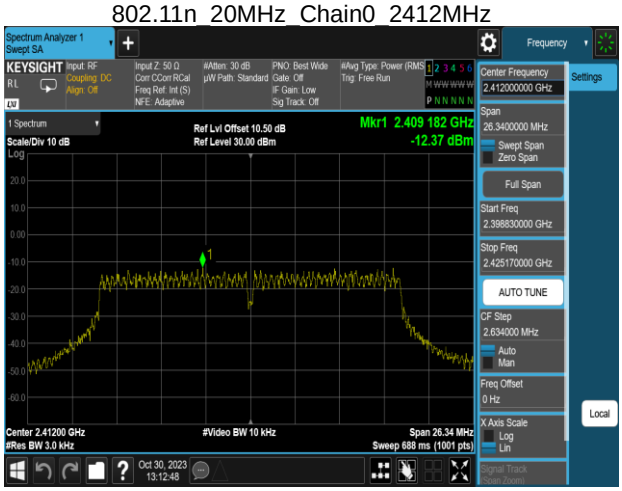
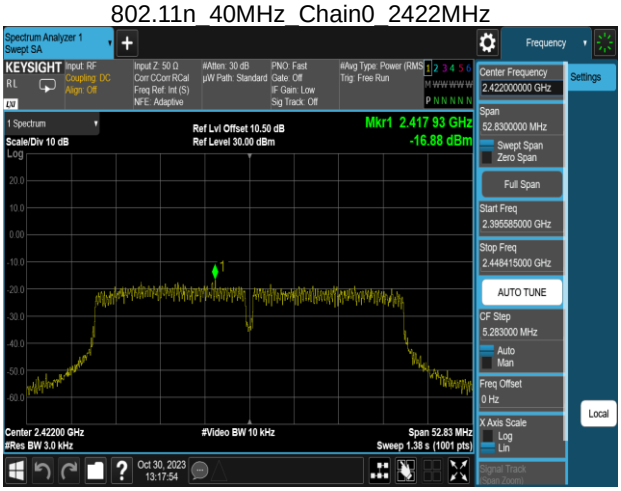
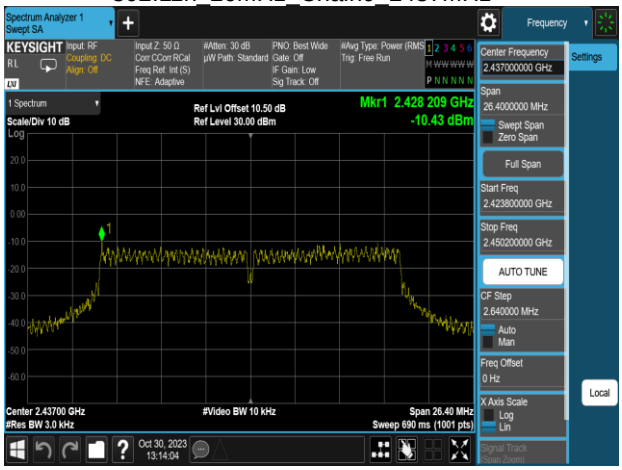
802.11n_20MHz_Chain0_2412MHz



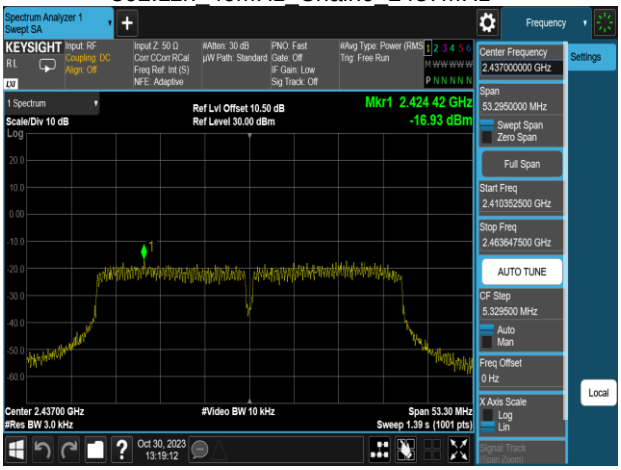
802.11n_40MHz_Chain0_2422MHz



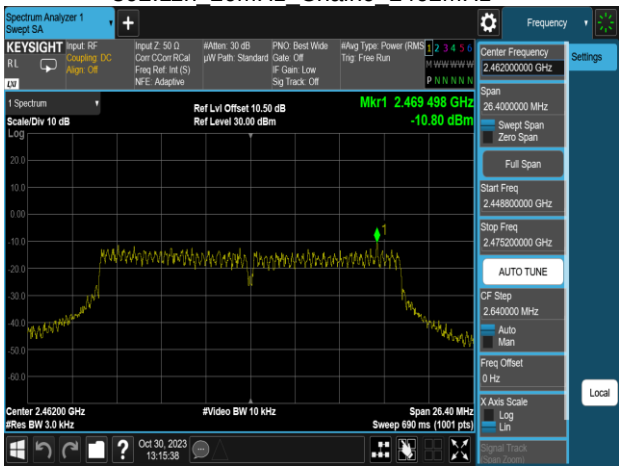
802.11n_20MHz_Chain0_2437MHz



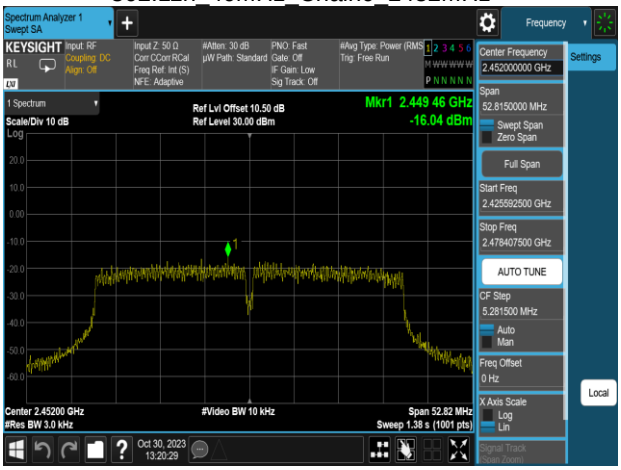
802.11n_40MHz_Chain0_2437MHz



802.11n_20MHz_Chain0_2462MHz



802.11n_40MHz_Chain0_2452MHz



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5.5 CONDUCTED BANDEDGE AND SPURIOUS EMISSION

5.5.1 Test Limit

According to §15.247(d) and RSS-247 section 5.5,

In any 100 kHz bandwidth outside the authorized frequency band,

Non-restricted bands shall be attenuated at least 20 dB/30 dB relative to the maximum PSD level in 100 kHz by RF conducted or a radiated measurement 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).

5.5.2 Test Procedure

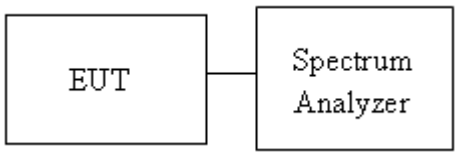
Test method Refer as KDB 662911 D01, KDB 558074 D01.

1. EUT RF output port connected to the SA by RF cable, and the path loss was compensated to result.

2. SA setting, RBW=100kHz, VBW=300kHz, Detector=Peak, Trace mode = max hold, SWT = Auto.

3. In any 100 kHz bandwidth outside the authorized frequency band, shall be attenuated at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when conducted power procedure is used. f the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

5.5.3 Test Setup



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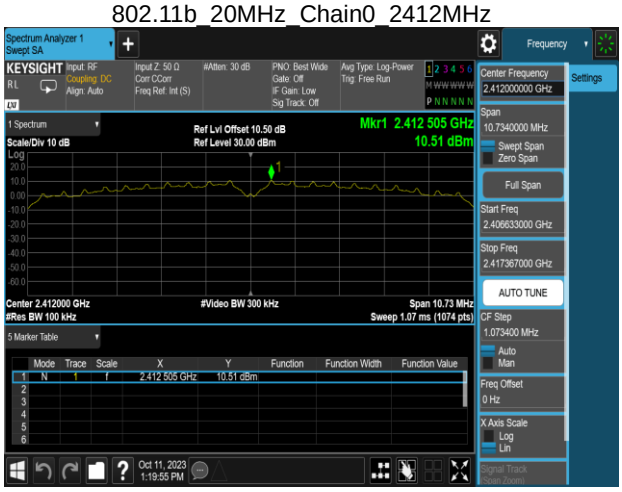
5.5.4 Test Result

Test Data

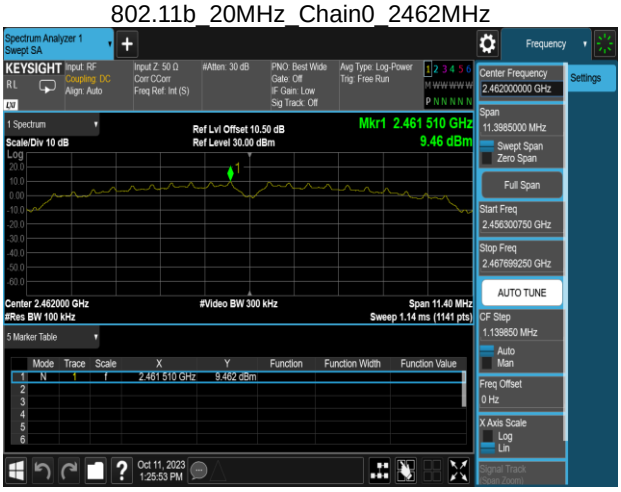
Temperature:	22.7~25.6℃	**Test date:**	October 11~30, 2023
Humidity:	51~61% RH	**Tested by:**	David Li

Conducted Reference

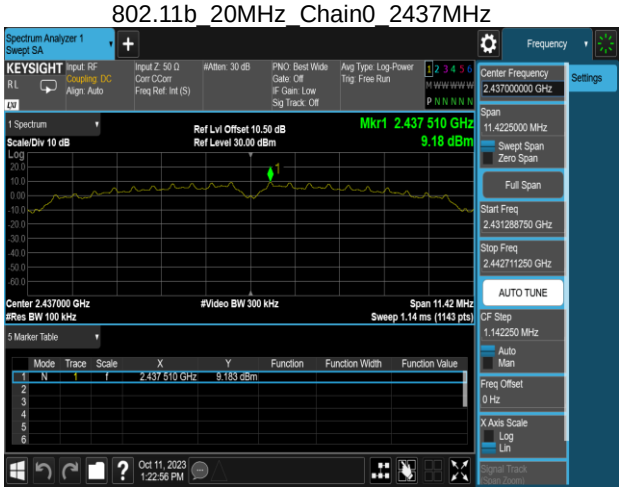
802.11b_20MHz_Chain0_2412MHz



802.11b_20MHz_Chain0_2462MHz



802.11b_20MHz_Chain0_2437MHz



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802.11g_20MHz_Chain0_2412MHz

802.11n_20MHz_Chain0_2412MHz

802.11g_20MHz_Chain0_2437MHz

802.11n_20MHz_Chain0_2437MHz

802.11g_20MHz_Chain0_2462MHz

802.11n_20MHz_Chain0_2462MHz

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802.11n_40MHz_Chain0_2422MHz

802.11n_40MHz_Chain0_2437MHz

802.11n_40MHz_Chain0_2452MHz

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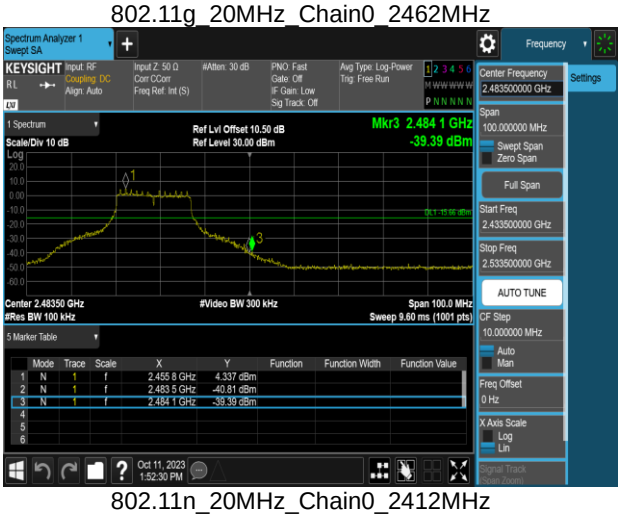
Conducted Band Edge

802.11b_20MHz_Chain0_2412MHz

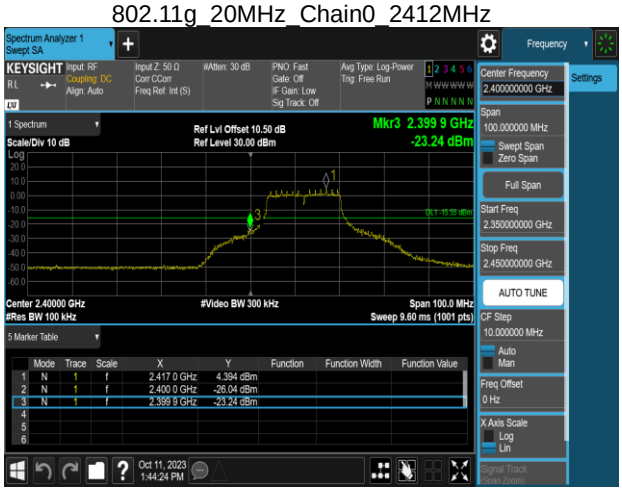
802.11g_20MHz_Chain0_2462MHz



802.11b_20MHz_Chain0_2462MHz

802.11n_20MHz_Chain0_2412MHz

802.11g_20MHz_Chain0_2412MHz



802.11n_20MHz_Chain0_2462MHz

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802.11n_40MHz_Chain0_2422MHz

802.11n_40MHz_Chain0_2452MHz

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