

Project No.: TM-2310000293P
Report No.: TMWK2310003857KR

FCC ID: KA2G403A3

Page: 1 / 103
Rev.: 01

RADIO TEST REPORT

FCC 47 CFR PART 15 SUBPART C

Test Standard	FCC Part 15.247
Product name	N300 4G Smart Router
Brand Name	D-Link
Model No.	G403
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:



Shawn Wu
Supervisor

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。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com.tw/Terms-and-Conditions> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <http://www.sgs.com.tw/Terms-and-Conditions>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of client's instruction, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced, except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	December 8, 2023	Initial Issue	ALL	Peggy Tsai
01	December 15, 2023	See the following Note Rev. (01)	ALL	Peggy Tsai

Rev. (01):

1. Delete CH12 and CH13 data.
2. Modify Conducted test date.

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.....	14
5.1 AC POWER LINE CONDUCTED EMISSION	14
5.2 6DB BANDWIDTH AND OCCUPIED BANDWIDTH(99%).....	19
5.3 OUTPUT POWER MEASUREMENT.....	32
5.4 POWER SPECTRAL DENSITY	37
5.5 CONDUCTED BANDEDGE AND SPURIOUS EMISSION	43
5.6 RADIATION BANDEDGE AND SPURIOUS EMISSION.....	56
APPENDIX 1 - PHOTOGRAPHS OF EUT	A-1

1. GENERAL INFORMATION

1.1 EUT INFORMATION

Applicant	D-Link Corporation 14420 Myford Road Suite 100 Irvine California United States 92606
Manufacturer	D-Link Corporation 14420 Myford Road Suite 100 Irvine California United States 92606
Equipment	N300 4G Smart Router
Model Name	G403
Model Discrepancy	N/A
Trade Name	D-Link
Received Date	October 18, 2023
Date of Test	November 16 ~ 28, 2023
Power Supply	Power form Adapter AMIGO / AMS159A-1201000FU I / P:100-240 Vac, 50-60 Hz, 0.5A O / P:12Vdc, 1.0A

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.

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 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
Antenna Gain	Ant 1: INPAQ / RFDPA191707IMAB301 Gain: 4.75 dBi Ant 2: INPAQ / RFDPA191716IMAB301 Gain: 4.27 dBi Direction Gain(dBi): 7.52 dBi
Antenna Connector	N/A

Notes:

1. Power Directional Gain: $10\text{LOG}(((10^{(\text{Ant1}/10)} + 10^{(\text{Ant2}/10)})/2))$
2. 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.

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.

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	Czerny Lin	-
RF Conducted	Marco Chan	-

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

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	N9030B	MY62291089	2023-10-13	2024-10-12
Software	Radio Test Software Ver. 21				

Radiated Emission Test Site: 966 D					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Antenna	SHWARZBECK	VULB 9168	1277	2023-01-13	2024-01-12
Pre-Amplifier	EMCI	EMC118A45SE	980820	2022-12-23	2023-12-22
Pre-Amplifier	EMCI	EMC330N	980853	2022-12-23	2023-12-22
Coaxial Cable	EMC	EMC101G-KM-KM-9000	220407+211228+230205	2023-11-14	2024-11-13
EXA Signal Analyzer	Agilent	N9010A	MY52220817	2023-03-09	2024-03-08
Coaxial Cable	EMC	EMCCFD400	211212+211222+211020	2023-03-21	2024-03-20
High Pass Filter	TITAN	T04H30001800070S01	211215-7-1	2023-02-02	2024-02-01
Thermo-Hygro Meter	EDSDS	EDS-A49	966D1	2023-05-11	2024-05-10
Pre-Amplifier	EMCI	EMC184045SE	980872	2023-01-03	2024-01-02
Horn Antenna	RF SPIN	DRH18-E	210301A18ES	2023-02-03	2024-02-02
Horn Antenna	SHWARZBECK	BBHA 9170	1134	2022-12-30	2023-12-29
Loop Antenna	SCHWARZBECK	FMZB 1513-60	1513-60-028	2022-12-27	2023-12-26
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	e3 V6-110812				

Remark:

- Each piece of equipment is scheduled for calibration once a year.
- N.C.R. = No Calibration Required.

1.7 SUPPORT AND EUT ACCESSORIES EQUIPMENT

Radiated_Sup_Units					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
NB(E)	Lenovo	IBM7663	N/A	N/A	N/A
Adapter	AMIGO	AMS159A-1201000FU	N/A	N/A	N/A
RJ45 Cable	N/A	N/A	N/A	N/A	N/A

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

RF_Conduction(RF)					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Adapter	AMIGO	AMS159A-120100FU	NA	NA	NA
RJ45	NA	NA	NA	NA	NA

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.

2. TEST SUMMARY

FCC Standard Section	Report Section	Test Item	Result
15.203	1.3	Antenna Requirement	Pass
15.207(a)	5.1	AC Conducted Emission	Pass
15.247(a)(2)	5.2	6 dB Bandwidth	Pass
-	5.2	Occupied Bandwidth (99%)	Pass
15.247(b)(3)	5.3	Output Power Measurement	Pass
15.247(e)	5.4	Power Spectral Density	Pass
15.247(d)	5.5	Conducted Band Edge	Pass
15.247(d)	5.5	Conducted Emission	Pass
15.247(d)	5.6	Radiation Band Edge	Pass
15.247(d)	5.6	Radiation Spurious Emission	Pass

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 : 2T2R IEEE 802.11g mode : 2T2R IEEE 802.11n HT20 mode : 2T2R IEEE 802.11n HT40 mode : 2T2R

Remark:

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

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: 2.4G 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
Worst Mode	☒ Mode 1
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
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4

Remark:

1. The worst mode was record in this test report.
2. 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.
3. 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

4. EUT DUTY CYCLE

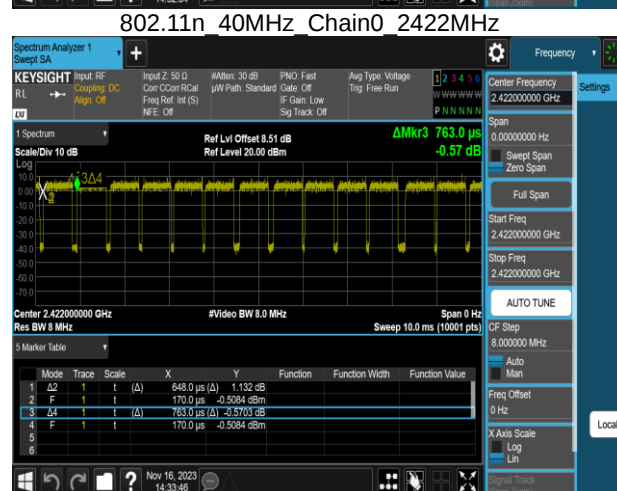
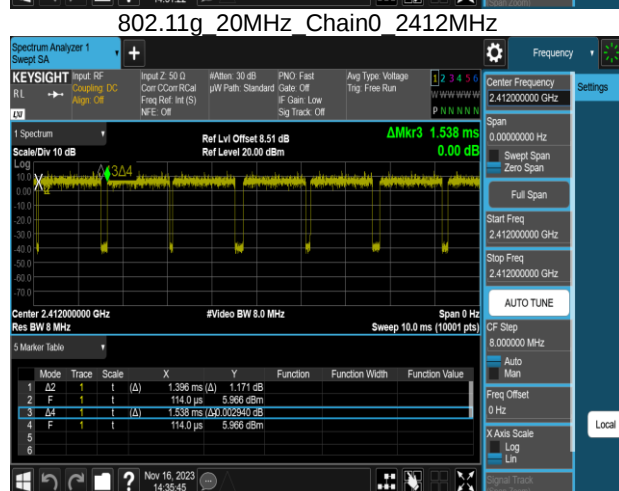
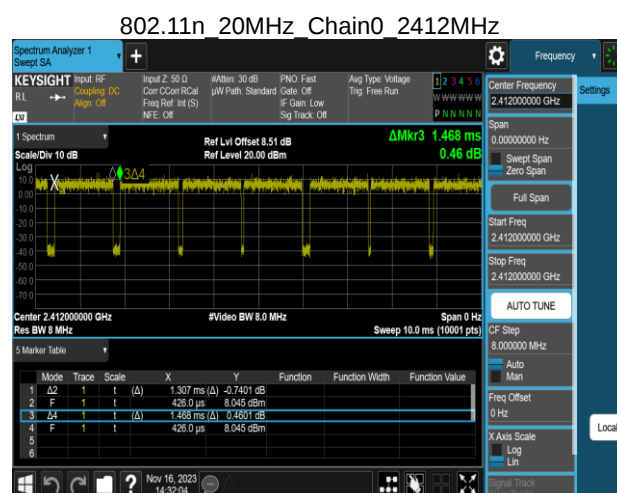
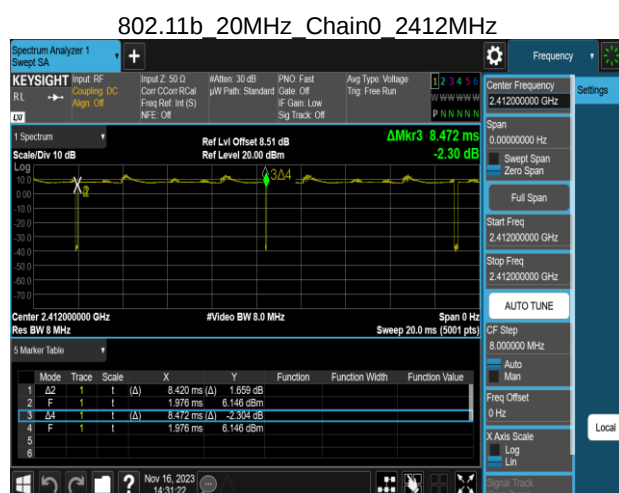
Temperature: 21.9 ~ 24.2°C

Test Date: November 16 ~ 22, 2023

Humidity: 50 ~ 61% RH

Tested by: Marco Chan

	Duty Cycle (%) = Ton / (Ton+Toff)	Duty Factor (dB) = 10*log (1/Duty Cycle)	1/T (kHz)	VBW setting (kHz)
802.11b	99.39	0.03	0.12	0.01
802.11g	90.77	0.42	0.72	1.00
802.11n_20	89.03	0.50	0.77	1.00
802.11n_40	84.93	0.71	1.54	2.00



5. TEST RESULT

5.1 AC POWER LINE CONDUCTED EMISSION

5.1.1 Test Limit

According to §15.207(a)(2),

Frequency Range (MHz)	Limits(dB μ V)	
	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

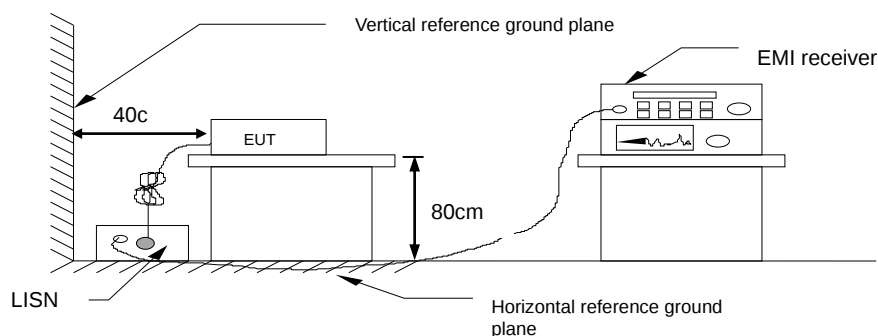
* Decreases with the logarithm of the frequency.

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



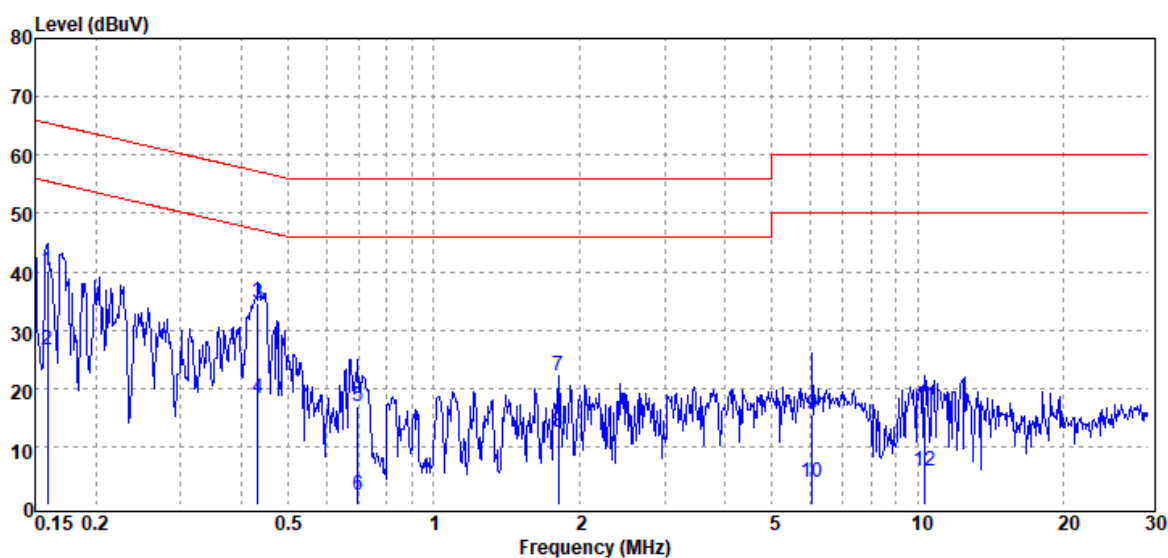
5.1.4 Test Result

Pass.

Test Data

Project No : TM-2310000293P
 Operation Mode : TX
 Test Chamber : Conduction
 Probe : LINE
 Note : 2.4G

Test Date : 2023-11-28
 Temp./Humi. : 24.4°C / 56%
 Engineer : Tony Chao
 Test Voltage : AC 120V/60Hz



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dBμV	Factor dB	Actual FS dBμV	Limit dBμV	Margin dB
0.159	QP	39.92	0.15	40.07	65.52	-25.45
0.159	Average	26.37	0.15	26.52	55.52	-29.00
0.433	QP	34.44	0.15	34.59	57.20	-22.61
0.433	Average	18.18	0.15	18.33	47.20	-28.87
0.697	QP	16.82	0.16	16.98	56.00	-39.02
0.697	Average	1.50	0.16	1.66	46.00	-44.34
1.810	QP	21.95	0.21	22.16	56.00	-33.84
1.810	Average	12.34	0.21	12.55	46.00	-33.45
6.056	QP	15.25	0.30	15.55	60.00	-44.45
6.056	Average	3.46	0.30	3.76	50.00	-46.24
10.342	QP	16.64	0.36	17.00	60.00	-43.00
10.342	Average	5.52	0.36	5.88	50.00	-44.12

Note: 1. Actual FS= Spectrum Read Level + Factor

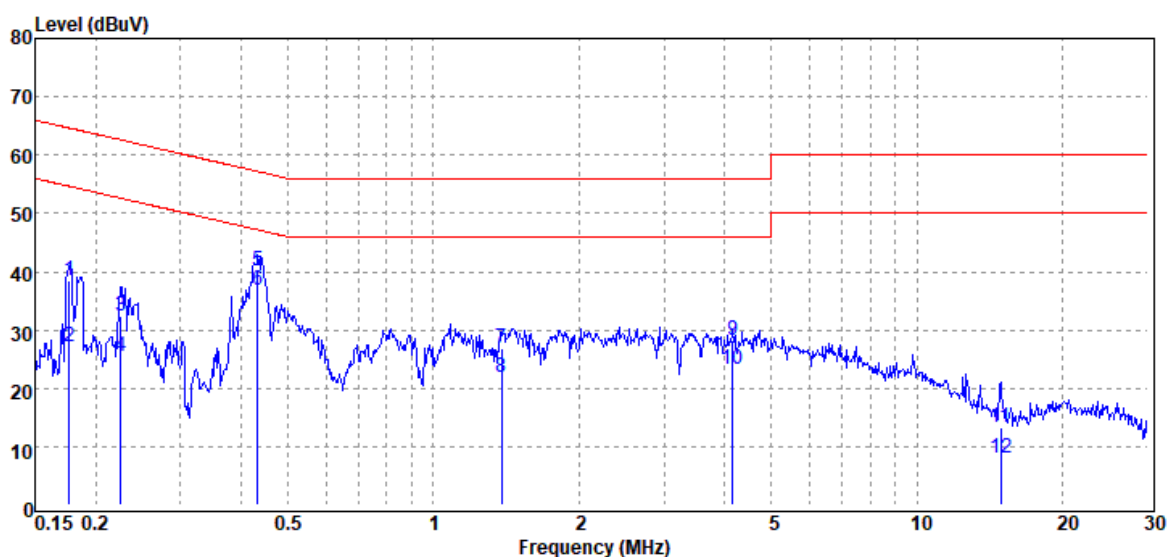
Note: 2. Margin= Actual FS - Limit

Report No.: TMWK2310003857KR

Rev.: 01

Project No : TM-2310000293P
Operation Mode : TX
Test Chamber : Conduction
Probe : NEUTRAL
Note : 2.4G

Test Date : 2023-11-28
Temp./Humi. : 24.4°C / 56%
Engineer : Tony Chao
Test Voltage : AC 120V/60Hz



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dBμV	Factor dB	Actual FS dBμV	Limit dBμV	Margin dB
0.177	QP	38.27	0.20	38.47	64.64	-26.17
0.177	Average	26.99	0.20	27.19	54.64	-27.45
0.226	QP	32.23	0.19	32.42	62.61	-30.19
0.226	Average	25.31	0.19	25.50	52.61	-27.11
0.433	QP	40.06	0.19	40.25	57.20	-16.95
0.433	Average	36.63	0.19	36.82	47.20	-10.38
1.381	QP	26.59	0.23	26.82	56.00	-29.18
1.381	Average	21.77	0.23	22.00	46.00	-24.00
4.158	QP	27.83	0.31	28.14	56.00	-27.86
4.158	Average	22.88	0.31	23.19	46.00	-22.81
14.907	QP	12.81	0.47	13.28	60.00	-46.72
14.907	Average	7.63	0.47	8.10	50.00	-41.90

Note: 1. Actual FS= Spectrum Read Level + Factor

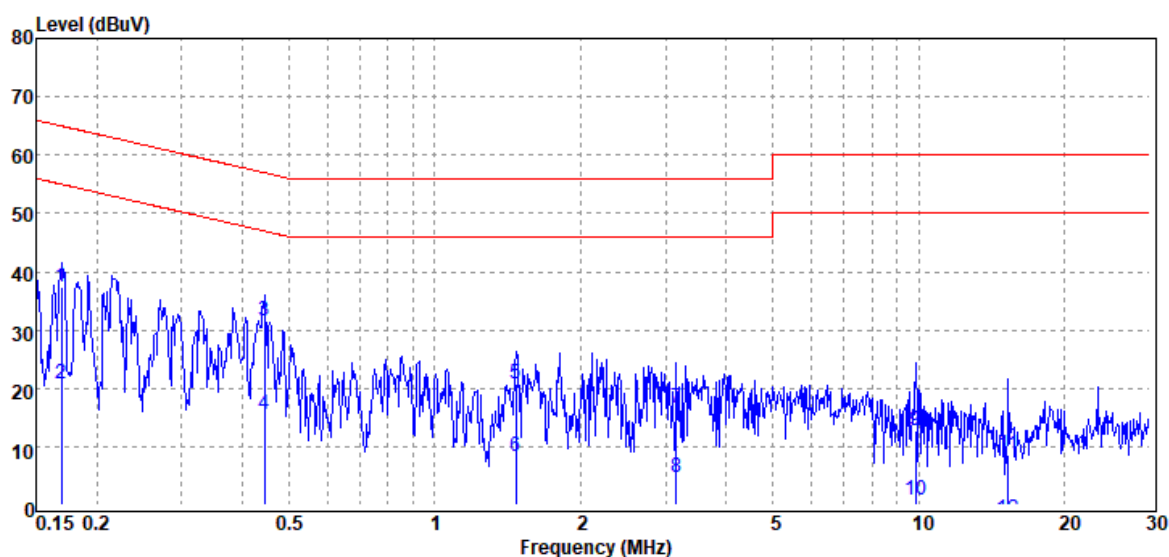
Note: 2. Margin= Actual FS - Limit

Report No.: TMWK2310003857KR

Rev.: 01

Project No : TM-2310000293P
Operation Mode : TX
Test Chamber : Conduction
Probe : LINE
Note : 2.4G

Test Date : 2023-11-28
Temp./Humi. : 24.4°C / 56%
Engineer : Tony Chao
Test Voltage : AC 240V/50Hz



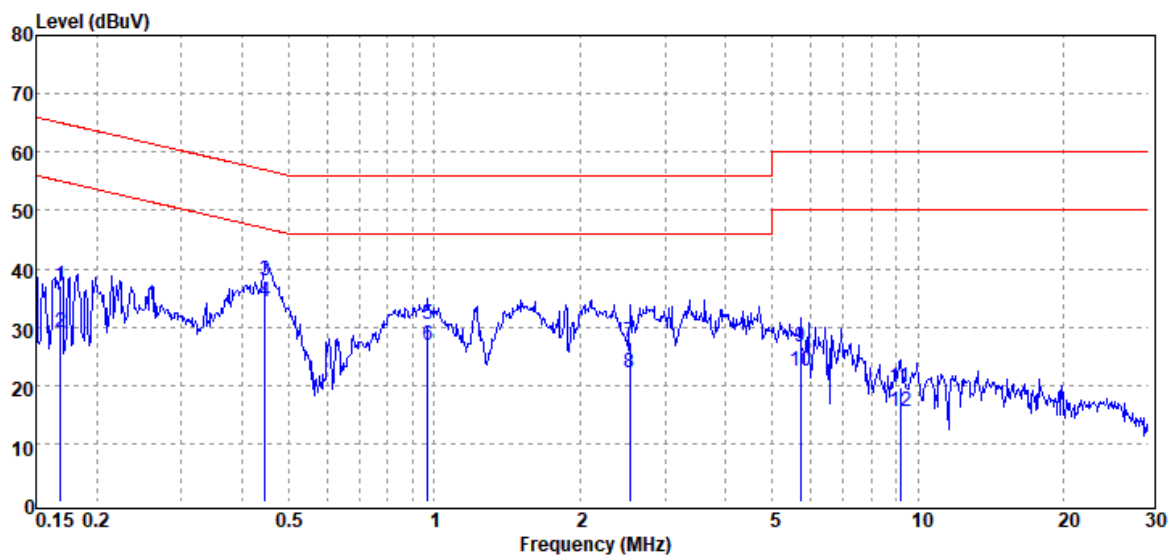
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dBμV	Factor dB	Actual FS dBμV	Limit dBμV	Margin dB
0.169	QP	37.17	0.15	37.32	64.99	-27.67
0.169	Average	20.65	0.15	20.80	54.99	-34.19
0.444	QP	31.48	0.15	31.63	56.98	-25.35
0.444	Average	15.43	0.15	15.58	46.98	-31.40
1.472	QP	20.59	0.19	20.78	56.00	-35.22
1.472	Average	8.21	0.19	8.40	46.00	-37.60
3.156	QP	16.47	0.24	16.71	56.00	-39.29
3.156	Average	4.44	0.24	4.68	46.00	-41.32
9.861	QP	12.46	0.36	12.82	60.00	-47.18
9.861	Average	0.49	0.36	0.85	50.00	-49.15
15.307	QP	8.07	0.45	8.52	60.00	-51.48
15.307	Average	-3.08	0.45	-2.63	50.00	-52.63

Note: 1. Actual FS= Spectrum Read Level + Factor

Note: 2. Margin= Actual FS - Limit

Project No : TM-2310000293P
 Operation Mode : TX
 Test Chamber : Conduction
 Probe : NEUTRAL
 Note : 2.4G

Test Date : 2023-11-28
 Temp./Humi. : 24.4°C / 56%
 Engineer : Tony Chao
 Test Voltage : AC 240V/50Hz



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dBμV	Factor dB	Actual FS dBμV	Limit dBμV	Margin dB
0.169	QP	36.80	0.19	36.99	65.03	-28.04
0.169	Average	28.91	0.19	29.10	55.03	-25.93
0.447	QP	37.84	0.19	38.03	56.93	-18.90
0.447	Average	34.18	0.19	34.37	46.93	-12.56
0.968	QP	30.29	0.21	30.50	56.00	-25.50
0.968	Average	26.52	0.21	26.73	46.00	-19.27
2.540	QP	27.14	0.28	27.42	56.00	-28.58
2.540	Average	21.78	0.28	22.06	46.00	-23.94
5.713	QP	26.37	0.34	26.71	60.00	-33.29
5.713	Average	22.08	0.34	22.42	50.00	-27.58
9.204	QP	19.39	0.39	19.78	60.00	-40.22
9.204	Average	15.18	0.39	15.57	50.00	-34.43

Note: 1. Actual FS= Spectrum Read Level + Factor

Note: 2. Margin= Actual FS - Limit

5.2 6dB BANDWIDTH AND OCCUPIED BANDWIDTH(99%)

5.2.1 Test Limit

According to §15.247(a)(2),

6 dB Bandwidth :

Limit	Shall be at least 500kHz
-------	--------------------------

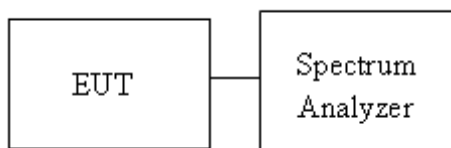
Occupied Bandwidth(99%) : For reporting purposes only.

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



5.2.4 Test Result

Temperature: 21.9 ~ 24.2°C

Test Date: November 16 ~ 22, 2023

Humidity: 50 ~ 61% RH

Tested by: Marco Chan

802.11b Ch0

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	10110.00	≥ 500	PASS
2437	10110.00	≥ 500	PASS
2462	10100.00	≥ 500	PASS

802.11b Ch1

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	10060.00	≥ 500	PASS
2437	10080.00	≥ 500	PASS
2462	10100.00	≥ 500	PASS

802.11g Ch0

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	15020.00	≥ 500	PASS
2437	15060.00	≥ 500	PASS
2462	13850.00	≥ 500	PASS

802.11g Ch1

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	15070.00	≥ 500	PASS
2437	13890.00	≥ 500	PASS
2462	15100.00	≥ 500	PASS

802.11n_HT_20M Ch0

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	15080.00	≥ 500	PASS
2437	15090.00	≥ 500	PASS
2462	13820.00	≥ 500	PASS

802.11n_HT_20M Ch1

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	15070.00	≥ 500	PASS
2437	15070.00	≥ 500	PASS
2462	15090.00	≥ 500	PASS

802.11n_HT_40M Ch0

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2422	26360.00	≥ 500	PASS
2437	20080.00	≥ 500	PASS
2452	23880.00	≥ 500	PASS

802.11n_HT_40M Ch1

Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2422	23800.00	≥ 500	PASS
2437	22630.00	≥ 500	PASS
2452	23840.00	≥ 500	PASS

802.11b Ch0

Freq. (MHz)	99% BW (MHz)
2412	13.796
2437	13.709
2462	13.784

802.11b Ch1

Freq. (MHz)	99% BW (MHz)
2412	13.684
2437	13.644
2462	13.661

802.11g Ch0

Freq. (MHz)	99% BW (MHz)
2412	16.366
2437	16.375
2462	16.369

802.11g Ch1

Freq. (MHz)	99% BW (MHz)
2412	16.397
2437	16.423
2462	16.363

802.11n_HT20M Ch0

Freq. (MHz)	99% BW (MHz)
2412	17.377
2437	17.413
2462	17.313

802.11n_HT20M Ch1

Freq. (MHz)	99% BW (MHz)
2412	17.413
2437	17.455
2462	17.387

802.11n_HT40M Ch0

Freq. (MHz)	99% BW (MHz)
2422	34.464
2437	34.148
2452	34.006

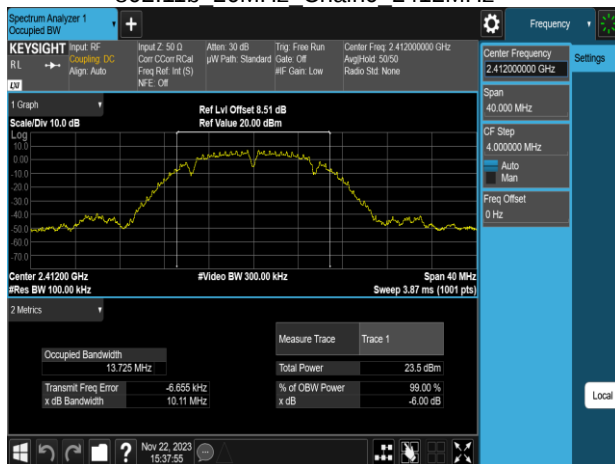
802.11n_HT40M Ch1

Freq. (MHz)	99% BW (MHz)
2422	34.371
2437	34.152
2452	33.931

Test Data

6dB BANDWIDTH

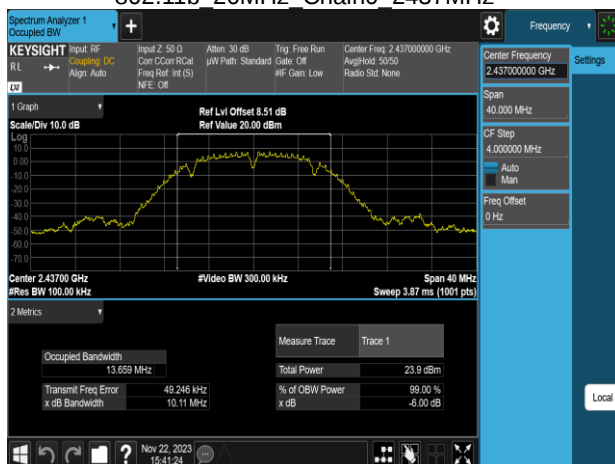
802.11b 20MHz Chain0 2412MHz



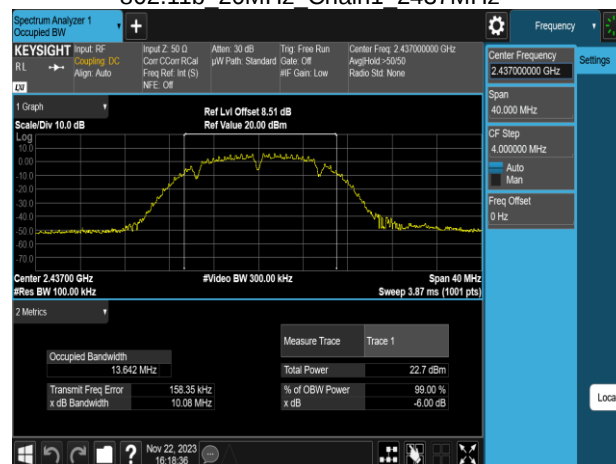
802.11b 20MHz Chain1 2412MHz



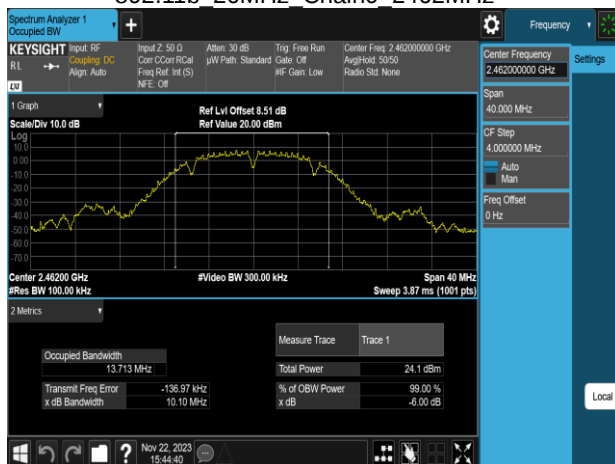
802.11b 20MHz Chain0 2437MHz



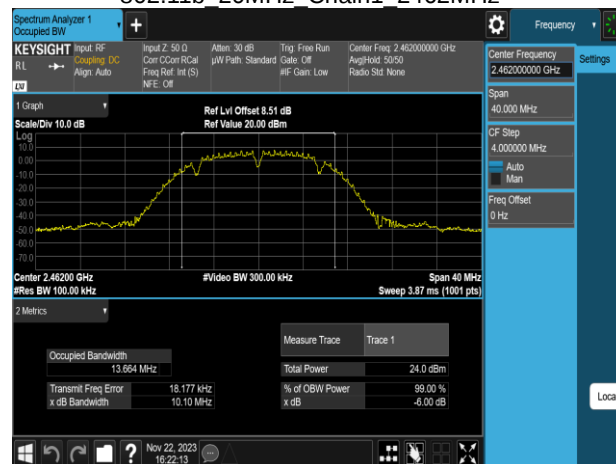
802.11b 20MHz Chain1 2437MHz



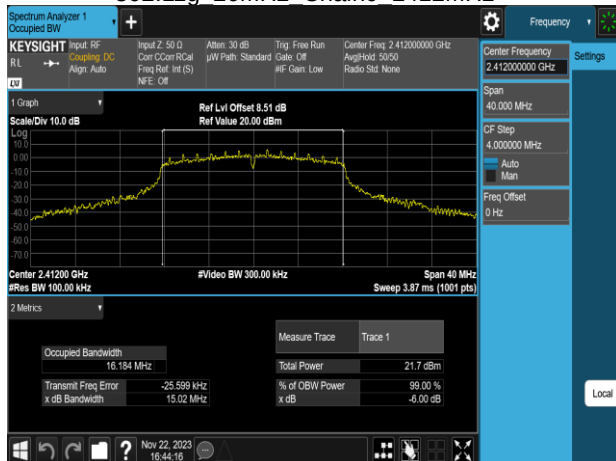
802.11b 20MHz Chain0 2462MHz



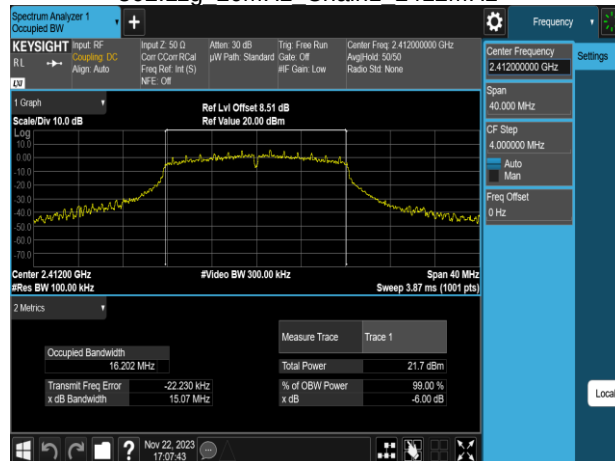
802.11b 20MHz Chain1 2462MHz



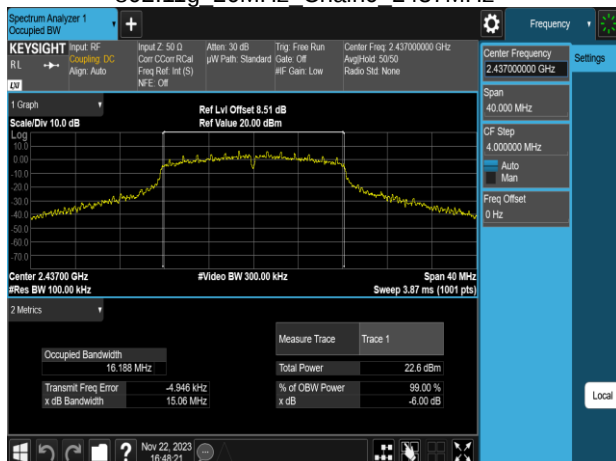
802.11g 20MHz Chain0 2412MHz



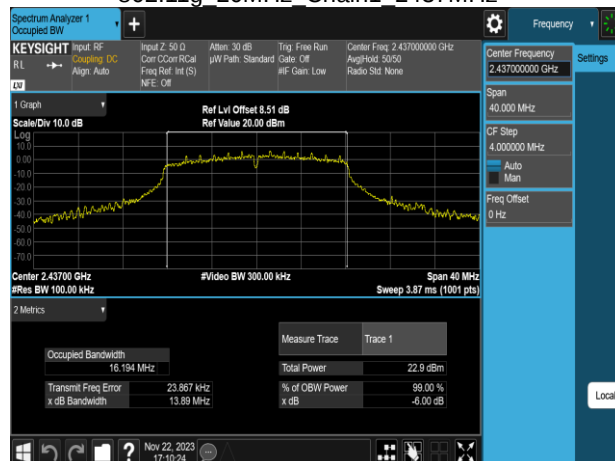
802.11g 20MHz Chain1 2412MHz



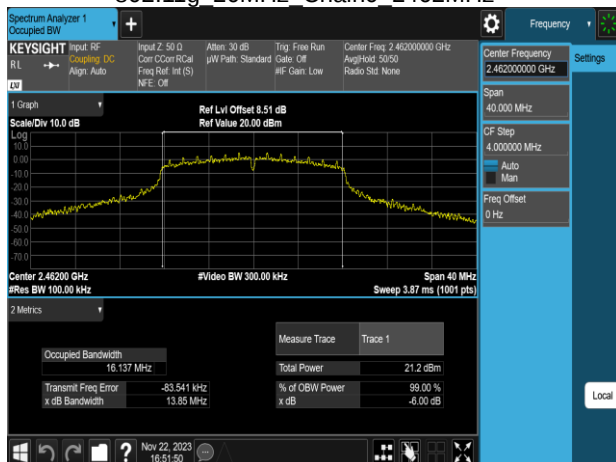
802.11g 20MHz Chain0 2437MHz



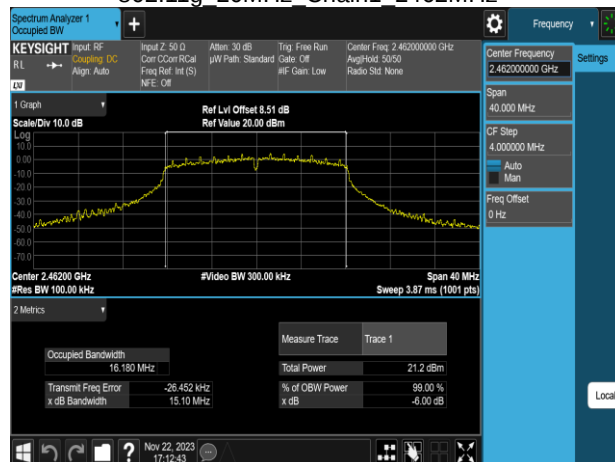
802.11g 20MHz Chain1 2437MHz



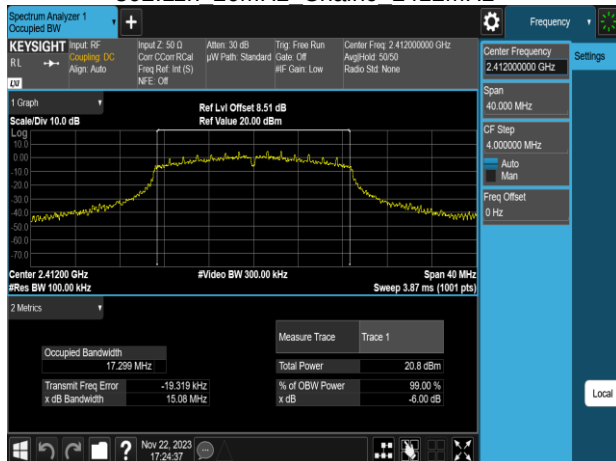
802.11g 20MHz Chain0 2462MHz



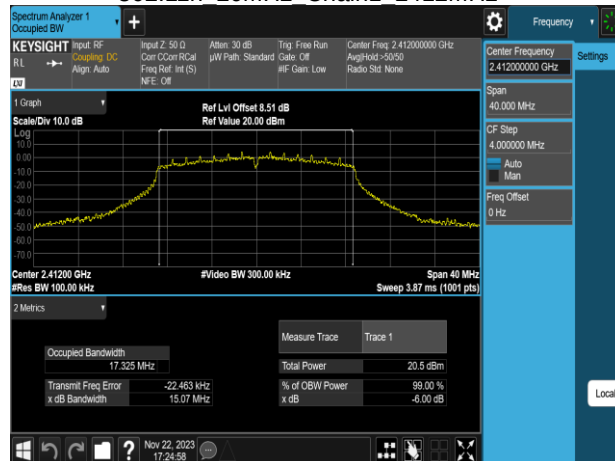
802.11g 20MHz Chain1 2462MHz



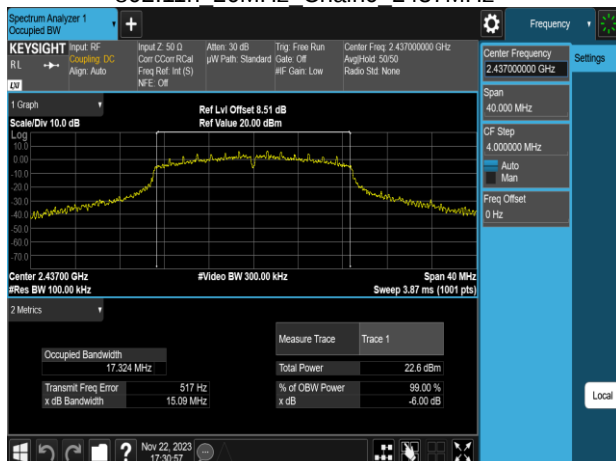
802.11n 20MHz Chain0 2412MHz



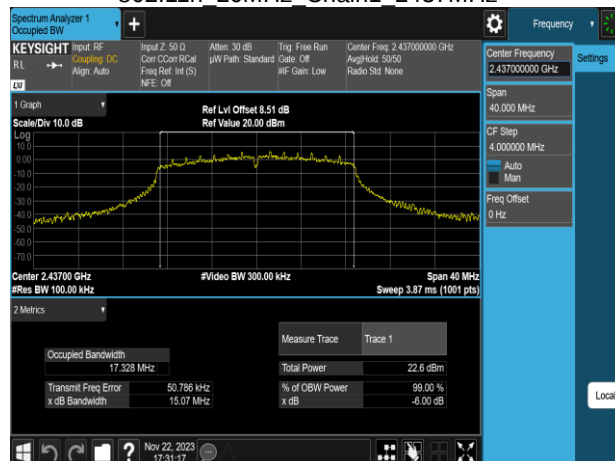
802.11n 20MHz Chain1 2412MHz



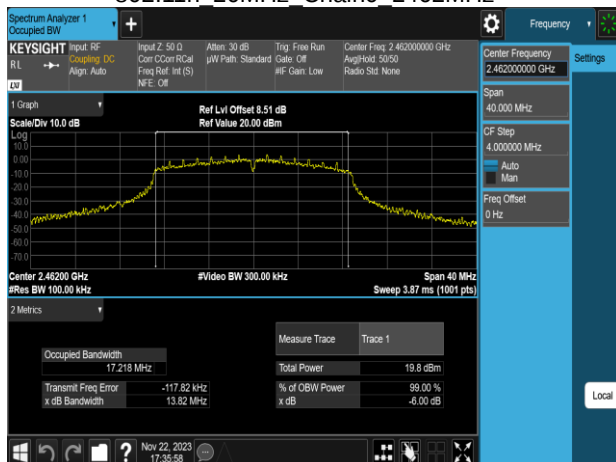
802.11n 20MHz Chain0 2437MHz



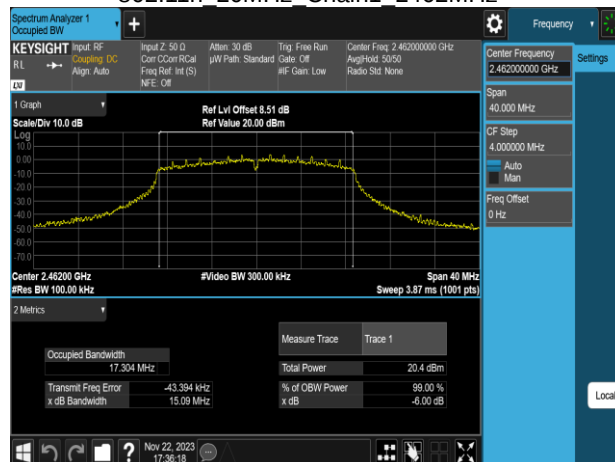
802.11n 20MHz Chain1 2437MHz



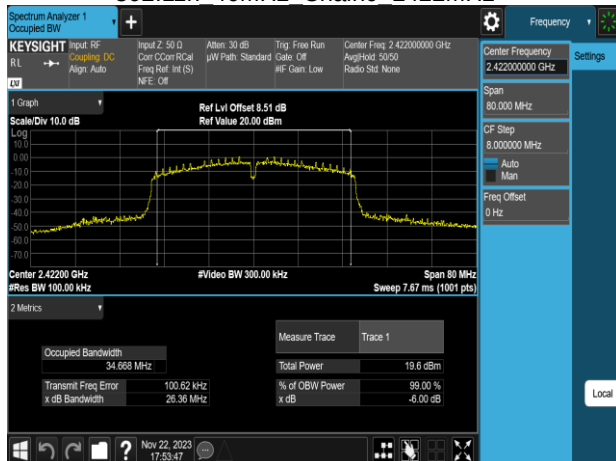
802.11n 20MHz Chain0 2462MHz



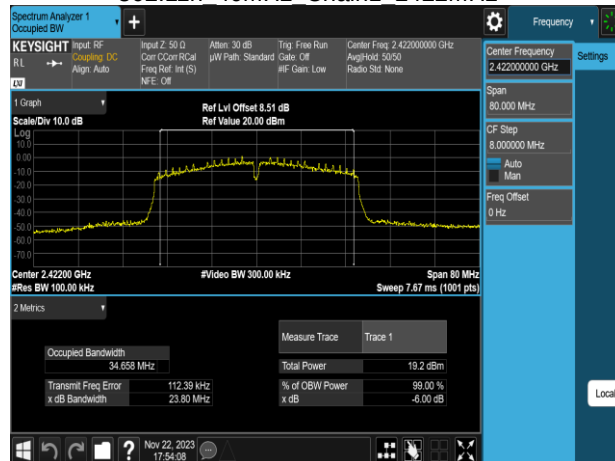
802.11n 20MHz Chain1 2462MHz



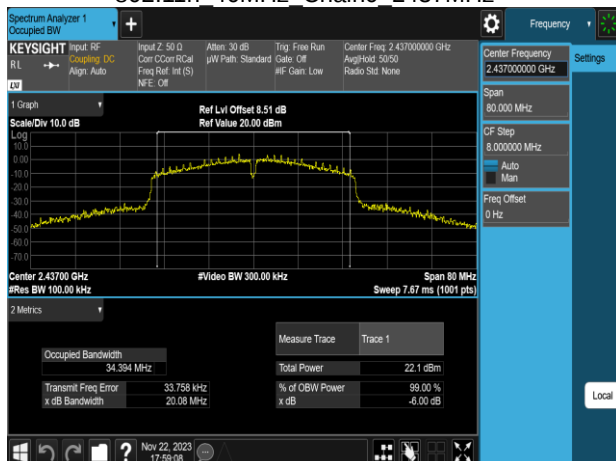
802.11n 40MHz Chain0 2422MHz



802.11n 40MHz Chain1 2422MHz



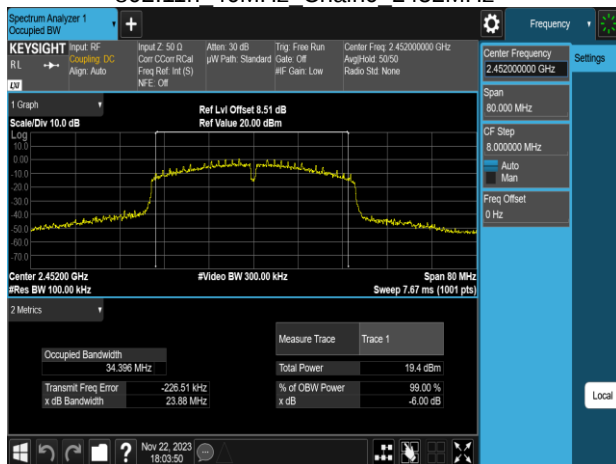
802.11n 40MHz Chain0 2437MHz



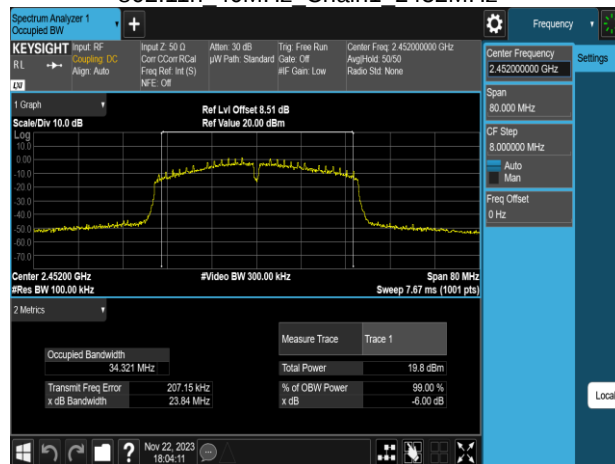
802.11n 40MHz Chain1 2437MHz



802.11n 40MHz Chain0 2452MHz



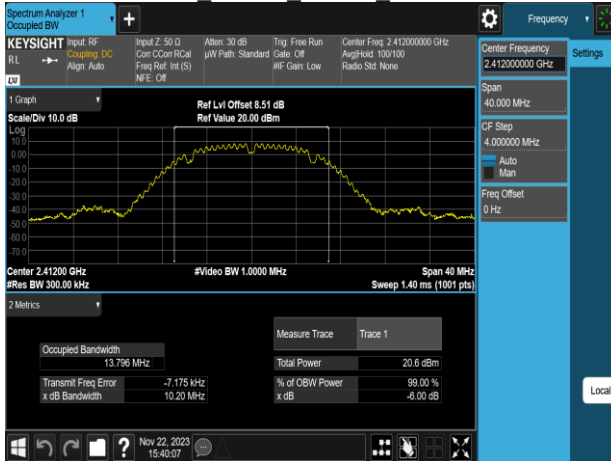
802.11n 40MHz Chain1 2452MHz



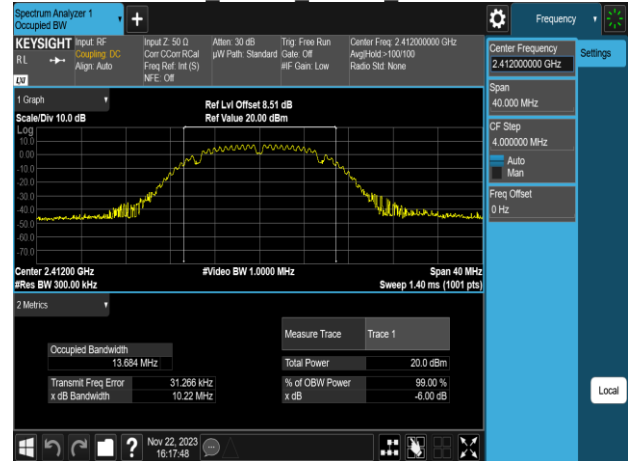
Test Data

BANDWIDTH 99%

802.11b 20MHz Chain0 2412MHz



802.11b 20MHz Chain1 2412MHz



802.11b 20MHz Chain0 2437MHz



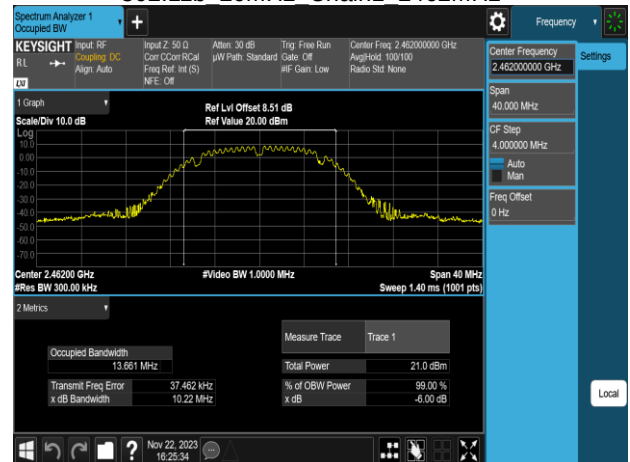
802.11b 20MHz Chain1 2437MHz



802.11b 20MHz Chain0 2462MHz



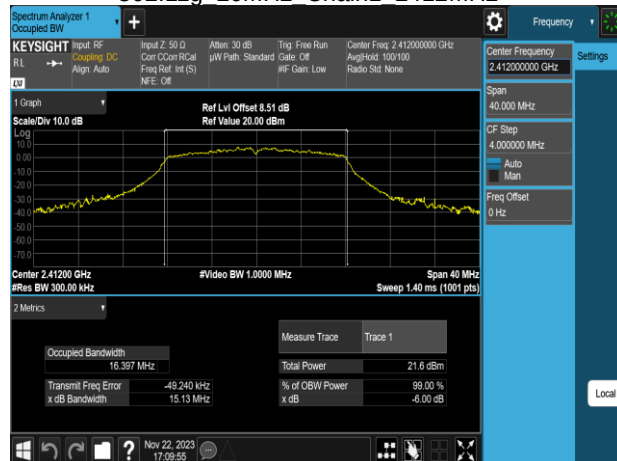
802.11b 20MHz Chain1 2462MHz



802.11g 20MHz Chain0 2412MHz



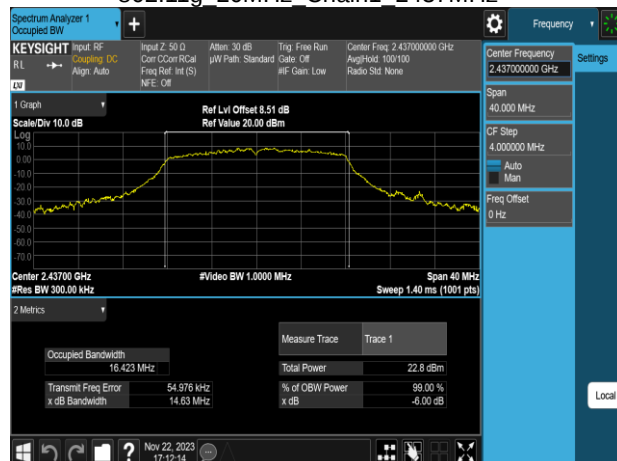
802.11g 20MHz Chain1 2412MHz



802.11g 20MHz Chain0 2437MHz



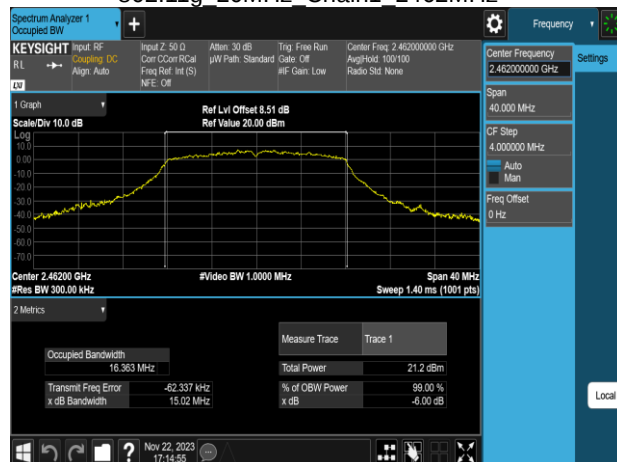
802.11g 20MHz Chain1 2437MHz



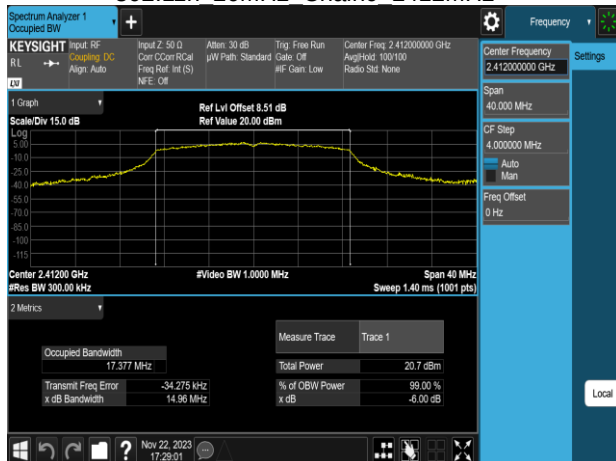
802.11g 20MHz Chain0 2462MHz



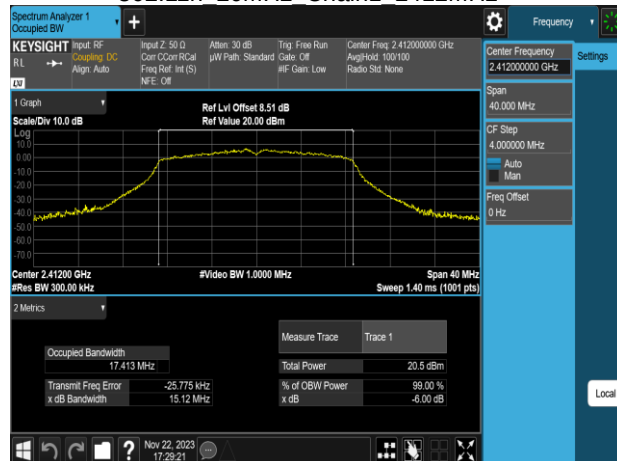
802.11g 20MHz Chain1 2462MHz



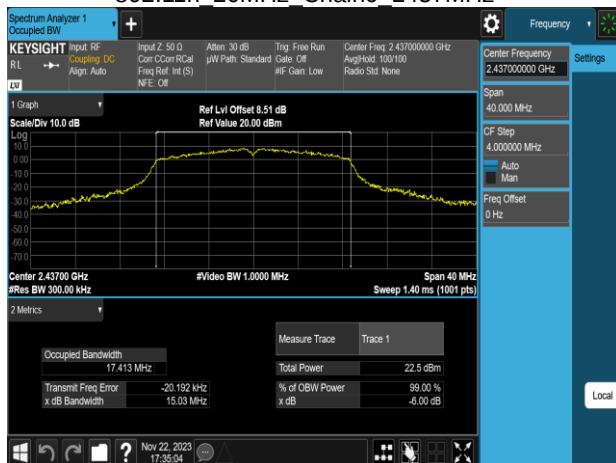
802.11n 20MHz Chain0 2412MHz



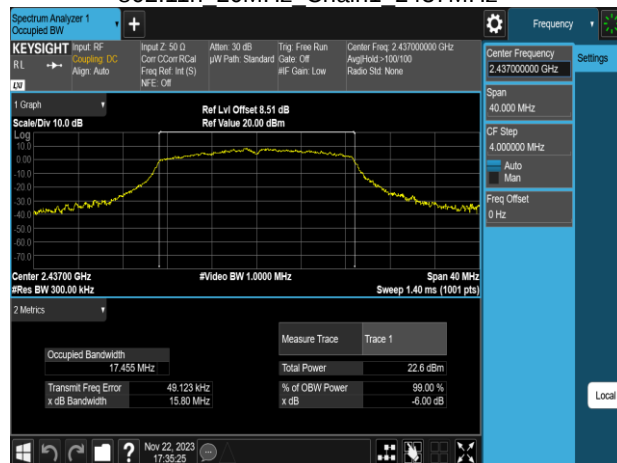
802.11n 20MHz Chain1 2412MHz



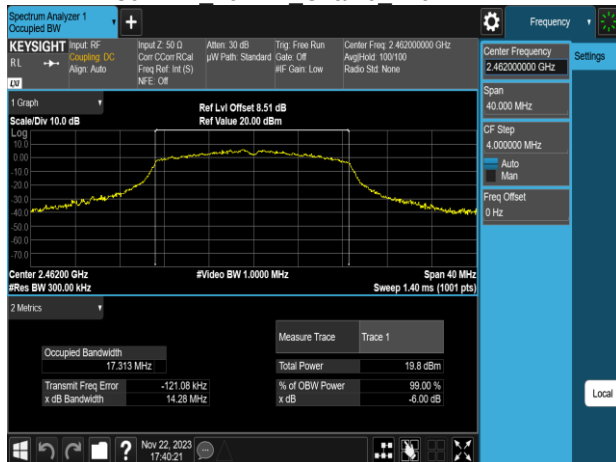
802.11n 20MHz Chain0 2437MHz



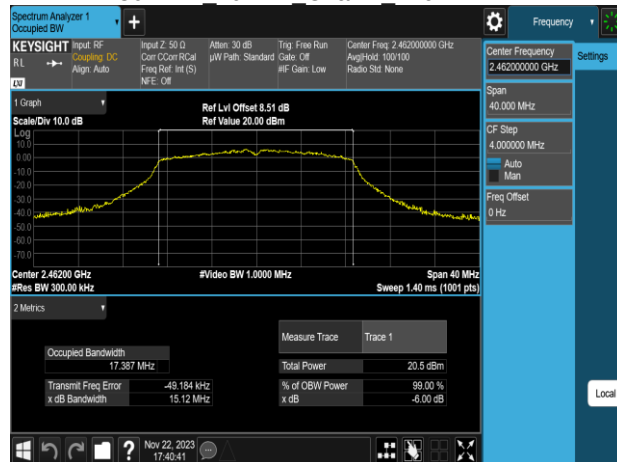
802.11n 20MHz Chain1 2437MHz



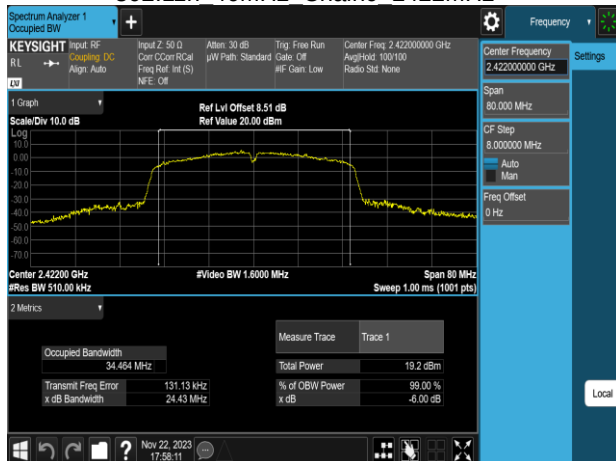
802.11n 20MHz Chain0 2462MHz



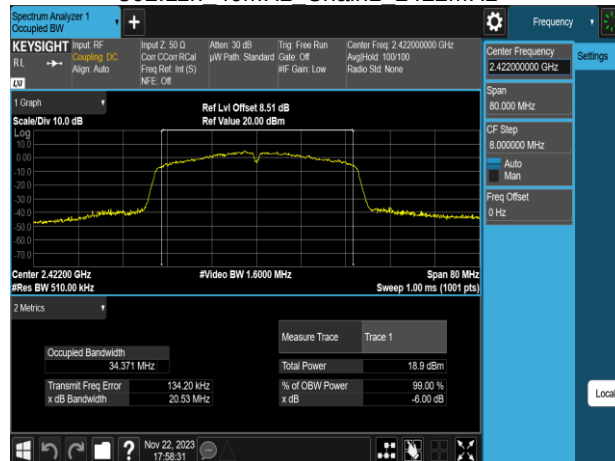
802.11n 20MHz Chain1 2462MHz



802.11n 40MHz Chain0 2422MHz



802.11n 40MHz Chain1 2422MHz



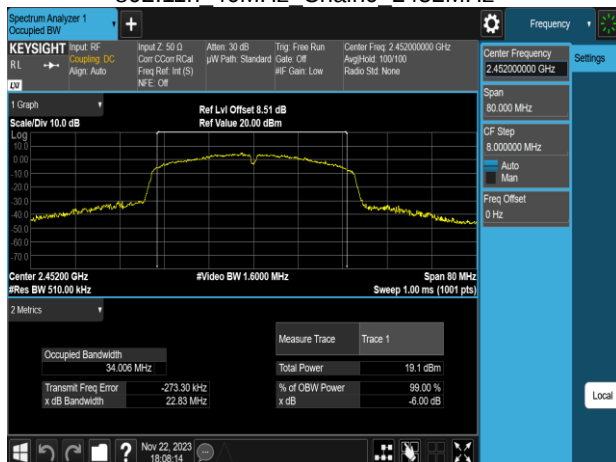
802.11n 40MHz Chain0 2437MHz



802.11n 40MHz Chain1 2437MHz



802.11n 40MHz Chain0 2452MHz



802.11n 40MHz Chain1 2452MHz



5.3 OUTPUT POWER MEASUREMENT

5.3.1 Test Limit

According to §15.247(b),

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 :
-------	---

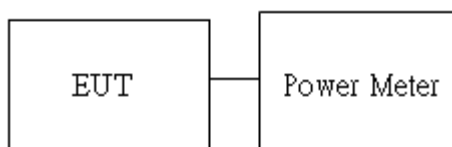
Average output power : For reporting purposes only.

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



5.3.4 Test Result

Temperature: 21.9 ~ 24.2°C

Test Date: November 16 ~ 22, 2023

Humidity: 50 ~ 61% RH

Tested by: Marco Chan

Peak & Average output power :

802.11b Ch0						
CH	Freq. (MHz)	Data Rate	Power set	Peak Output Power (dBm)	Limit (dBm)	RESULT
1	2412	1	84	19.75	30.00	PASS
6	2437	1	81	20.25	30.00	PASS
11	2462	1	85	20.32	30.00	PASS
802.11b Ch0						
CH	Freq. (MHz)	Data Rate	Power set	Avg. Output Power (dBm)	Limit (dBm)	RESULT
1	2412	1	84	16.86	30.00	PASS
6	2437	1	81	17.22	30.00	PASS
11	2462	1	85	17.73	30.00	PASS

802.11b Ch1						
CH	Freq. (MHz)	Data Rate	Power set	Peak Output Power (dBm)	Limit (dBm)	RESULT
1	2412	1	84	19.71	30.00	PASS
6	2437	1	78	19.24	30.00	PASS
11	2462	1	79	20.46	30.00	PASS
802.11b Ch1						
CH	Freq. (MHz)	Data Rate	Power set	Avg. Output Power (dBm)	Limit (dBm)	RESULT
1	2412	1	84	16.40	30.00	PASS
6	2437	1	78	16.11	30.00	PASS
11	2462	1	79	17.38	30.00	PASS

802.11g Ch0						
CH	Freq. (MHz)	Data Rate	Power set	Peak Output Power (dBm)	Limit (dBm)	RESULT
1	2412	6	85	22.93	30.00	PASS
6	2437	6	85	23.63	30.00	PASS
11	2462	6	83	22.68	30.00	PASS
802.11g Ch0						
CH	Freq. (MHz)	Data Rate	Power set	Avg. Output Power (dBm)	Limit (dBm)	RESULT
1	2412	6	85	15.59	30.00	PASS
6	2437	6	85	16.52	30.00	PASS
11	2462	6	83	15.17	30.00	PASS
802.11g Ch1						
CH	Freq. (MHz)	Data Rate	Power set	Peak Output Power (dBm)	Limit (dBm)	RESULT
1	2412	6	87	24.15	30.00	PASS
6	2437	6	87	25.03	30.00	PASS
11	2462	6	77	24.08	30.00	PASS
802.11g Ch1						
CH	Freq. (MHz)	Data Rate	Power set	Avg. Output Power (dBm)	Limit (dBm)	RESULT
1	2412	6	87	15.54	30.00	PASS
6	2437	6	87	16.51	30.00	PASS
11	2462	6	77	15.10	30.00	PASS

802.11n_HT20M_2TX								
CH	Freq. (MHz)	Data Rate	Power set	Peak Output Power (dBm)		Total Peak Output Power (dBm)	Limit (dBm)	RESULT
				Ch0	Ch1			
	2412	MCS0	83/83	22.14	22.81	25.50	28.48	PASS
	2437	MCS0	87/87	23.07	24.28	26.73	28.48	PASS
	2462	MCS0	79/75	21.33	22.60	25.02	28.48	PASS

802.11n_HT20M_2TX								
CH	Freq. (MHz)	Data Rate	Power set	Avg. Output Power (dBm)		Total Avg. Output Power (dBm)	Limit (dBm)	RESULT
				Ch0	Ch1			
	2412	MCS0	83/83	14.78	14.31	17.57	28.48	PASS
	2437	MCS0	87/87	16.52	16.41	19.48	28.48	PASS
	2462	MCS0	79/75	13.93	14.34	17.15	28.48	PASS

802.11n_HT40M_2TX								
CH	Freq. (MHz)	Data Rate	Power set	Peak Output Power (dBm)		Total Peak Output Power (dBm)	Limit (dBm)	RESULT
				Ch0	Ch1			
	2422	MCS0	78/78	22.47	22.79	25.64	28.48	PASS
	2437	MCS0	87/87	22.81	24.48	26.74	28.48	PASS
	2452	MCS0	76/73	22.03	22.98	25.54	28.48	PASS

802.11n_HT40M_2TX								
CH	Freq. (MHz)	Data Rate	Power set	Avg. Output Power (dBm)		Total Avg. Output Power (dBm)	Limit (dBm)	RESULT
				Ch0	Ch1			
	2422	MCS0	78/78	13.07	12.67	15.88	28.48	PASS
	2437	MCS0	87/87	15.41	15.53	18.48	28.48	PASS
	2452	MCS0	76/73	13.05	13.25	16.16	28.48	PASS

5.4 POWER SPECTRAL DENSITY

5.4.1 Test Limit

According to §15.247(e),

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.

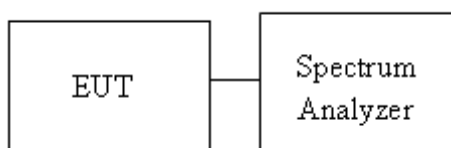
Limit	☒ Antenna not exceed 6 dBi : 8dBm ☐ Antenna with DG greater than 6 dBi : [Limit = 8 – (DG – 6)] ☐ Point-to-point operation :
-------	---

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



5.4.4 Test Result

Temperature: 21.9 ~ 24.2°C

Test Date: November 16 ~ 22, 2023

Humidity: 50 ~ 61% RH

Tested by: Marco Chan

POWER DENSITY 802.11b					
Freq. (MHz)	Ch0 PSD	Ch1 PSD	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
2412	-0.14	-0.31	-0.14	8.00	PASS
2437	0.70	-1.11	0.70	8.00	PASS
2462	0.67	1.39	0.67	8.00	PASS

POWER DENSITY 802.11g					
Freq. (MHz)	Ch0 PSD	Ch1 PSD	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
2412	-11.6	-11.2	-11.55	8.00	PASS
2437	-10.5	-10.40	-10.46	8.00	PASS
2462	-11.8	-12.5	-11.76	8.00	PASS

POWER DENSITY 802.11n HT20					
Freq. (MHz)	Ch0 PSD	Ch1 PSD	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
2412	-11.5	-12.1	-8.79	6.48	PASS
2437	-9.61	-9.96	-6.77	6.48	PASS
2462	-11.9	-12.1	-8.98	6.48	PASS

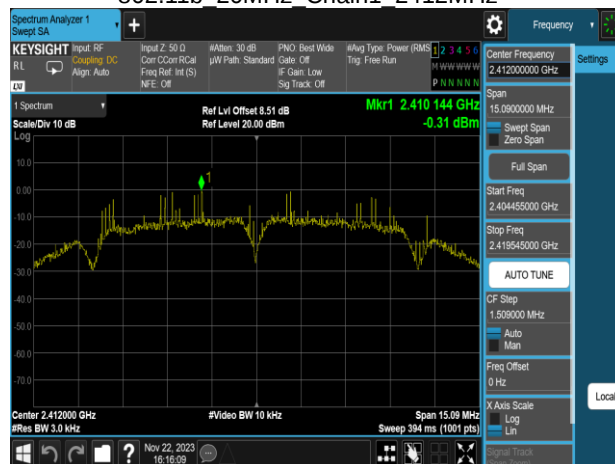
POWER DENSITY 802.11n HT40					
Freq. (MHz)	Ch0 PSD	Ch1 PSD	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
2422	-15.4	-14.90	-12.11	6.48	PASS
2437	-11.9	-12.9	-9.35	6.48	PASS
2452	-15.5	-13.6	-11.41	6.48	PASS

Test Data

802.11b 20MHz Chain0 2412MHz



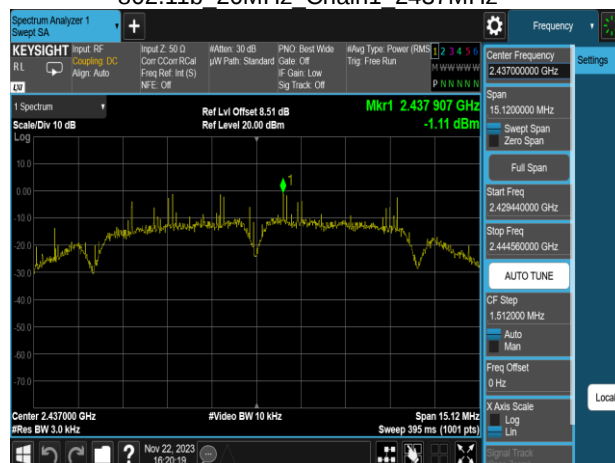
802.11b 20MHz Chain1 2412MHz



802.11b 20MHz Chain0 2437MHz



802.11b 20MHz Chain1 2437MHz



802.11b 20MHz Chain0 2462MHz



802.11b 20MHz Chain1 2462MHz

