



Project No.: TM-2112000081P
Report No.: TMWK2201000244KR

FCC ID: 2AAWQ-CAPRICA5UXL-2
IC: 11138A-CAPRICA5UXL

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Rev.: 05

RADIO TEST REPORT

FCC 47 CFR PART 15 SUBPART C

INDUSTRY CANADA RSS-247

Test Standard	FCC Part 15.247 IC RSS-247 issue 2 and IC RSS-GEN issue 5
Product name	Play-Fi Wireless Module
Brand Name	XPERI
Model No.	Caprica5UXL-2
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
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	September 14, 2023	Initial Issue	ALL	Doris Chu
01	October 6, 2023	See the following Note Rev. (01)	P.4, P.9, P.12, P.5, P.10	Doris Chu
02	October 20, 2023	See the following Note Rev. (02)	P.4	Doris Chu
03	November 20, 2023	See the following Note Rev. (03)	P.5	Doris Chu
04	November 28, 2023	See the following Note Rev. (04)	P.5	Doris Chu
05	December 7, 2023	See the following Note Rev. (05)	P.37, P.41, P.38-40, P.8, P.20, P.32, P.36	Doris Chu

Rev. (01)

1. Add serial number in section 1.1.
2. Add test methodology in section 1.8.
3. Modify remark 1 in section 3.2.
4. Modify Antenna connector to IPEX Connector and note 1 in section 1.3.
5. Add 15.205 in FCC Standard in section 2.

Rev. (02)

1. Modify serial number in section 1.1.

Rev. (03)

1. Modify Antenna connector in section 1.3.

Rev. (04)

1. Modify Antenna connector in section 1.3.

Rev. (05)

1. Modify limit in section 4.3.1 and 4.4.1.
2. Remove note in section 4.3.4.
3. Modify Conducted equipment list in section 1.6.
4. Modify HT40 OBW test data in section 4.2.4.



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1. GENERAL INFORMATION

1.1 EUT INFORMATION

Applicant	Phorus, Inc. 5220 Las Virgenes Road, Calabasas, California 91302, United States
Manufacturer	Phorus, Inc. 5220 Las Virgenes Road, Calabasas, California 91302, United States
Equipment	Play-Fi Wireless Module
Model Name	Caprica5UXL-2
Model Discrepancy	N/A
Brand Name	XPERI
Received Date	May 17, 2023
Date of Test	June 1 ~ December 8, 2023
Power Supply	Power from host device. (DC 3.3V)
HW Version	PVT-V03
SW Version	RTL8822CU_WiFi_linux_v5.14.0.3-2
Serial number	C14-0000-0001

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 HT20: 2412 MHz ~ 2462 MHz 802.11n HT40: 2422 MHz ~ 2452 MHz
Modulation Type	1. IEEE 802.11b mode: DSSS 2. IEEE 802.11g mode: OFDM 3. IEEE 802.11n HT20 mode: OFDM 4. IEEE 802.11n HT40 mode: OFDM
Number of channels	1. IEEE 802.11b mode: 11 Channels 2. IEEE 802.11g mode: 11 Channels 3. IEEE 802.11n HT20 mode: 11 Channels 4. IEEE 802.11n HT40 mode: 7 Channels

Remark:

Refer as ANSI C63.10: 2013 clause 5.6.1 Table 4 and RSS-GEN Table 1 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 Specification	Dipole Antenna / Gain: 5 dBi Power Directional Gain: 8.01 dBi PIFA Antenna / Gain: 4.80 dBi Power Directional Gain: 7.81 dBi
Antenna connector	Dipole Antenna: SMA Female PIFA Antenna: IPEX Compatible

Notes:

- Antenna must use a unique type of connector to attach to the EUT. So the EUT complies with the requirements of §15.203 and RSS-GEN 6.8.
- Power Directional Gain = $10 \cdot \log \{ [10^{(Ant1/20)} + 10^{(Ant2/20)} + \dots + 10^{(Ant N / 20)}]^2 / N \text{ ANT} \}$ dBi

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	± 3.761 dB
Radiated Emission_30MHz-200MHz	± 3.473 dB
Radiated Emission_200MHz-1GHz	± 3.946 dB
Radiated Emission_1GHz-6GHz	± 4.797 dB
Radiated Emission_6GHz-18GHz	± 4.803 dB
Radiated Emission_18GHz-26GHz	± 3.459 dB
Radiated Emission_26GHz-40GHz	± 3.297 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

☒ 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, Ray Li	-
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



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1.6 INSTRUMENT CALIBRATION

RF Conducted Test Site					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Power Sensor	Anritsu	MA2411B	1911386	2022-08-08	2023-08-07
				2023-07-25	2024-07-24
Power Sensor	Anritsu	MA2411B	1911387	2022-08-08	2023-08-07
				2023-07-25	2024-07-24
EXA Signal Analyzer	Keysight	N9010B	MY60242460	2023-02-20	2024-02-01
Power Meter	Anritsu	ML2496A	2136002	2022-11-24	2023-11-23
				2023-11-16	2024-11-15
Attenuator	Mini-Circuits	BW-S10W2+	2	2022-12-13	2023-12-12
Software	Radio Test Software Ver. 21				

3M 966 Chamber Test Site					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Horn Antenna	ETS LINDGREN	3116	00026370	2022-12-22	2023-12-21
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
PXA Signal Analyzer	Keysight Technologies	N9030B	MY62291089	2022-10-14	2023-10-13
Preamplifier	HP	8449B	3008A00965	2022-12-23	2023-12-22
Bi-Log Antenna	Sunol Sciences	JB3	A030105	2022-08-03	2023-08-02
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	2022-06-29	2023-06-28
				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
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				

AC Conducted Emissions Test Site					
Equipment	Manufacturer	Model	S/N	Cal Date	Cal 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	2023-06-26	2024-06-25
Software	EZ-EMC(CCS-3A1-CE-WUGU)				

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

EUT Accessories Equipment						
No.	Equipment	Brand	Model	Series No.	FCC ID	IC
	N/A					

Support Equipment						
No.	Equipment	Brand	Model	Series No.	FCC ID	IC
1	NB(E)	Lenovo	T460	N/A	N/A	N/A

1.8 TEST METHODOLOGY AND APPLIED STANDARDS

Test Mode

The EUT is connected to the laptop, and the test software (MP Tool) is used to set according to the test requirements (Modulation, Frequency, Power Setting...), so that the RF signal is continuously transmitted to perform the test.

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 2 and RSS-GEN Issue 5.



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2. TEST SUMMARY

IC Standard Section	FCC Standard Section	Report Section	Test Item	Result
-	15.203	1.3	Antenna Requirement	Pass
RSS-GEN 8.8	15.207(a)	4.1	AC Conducted Emission	Pass
RSS-247(5.2)(a)	15.247(a)(2)	4.2	6 dB Bandwidth	Pass
RSS-GEN 6.7	-	4.2	Occupied Bandwidth (99%)	Pass
RSS-247(5.4)(d)	15.247(b)	4.3	Output Power Measurement	Pass
RSS-247(5.2)(b)	15.247(e)	4.4	Power Spectral Density	Pass
RSS-247(5.5)	15.247(d)	4.5	Conducted Band Edge	Pass
RSS-247(5.5)	15.247(d)	4.5	Conducted Spurious Emission	Pass
RSS-GEN 8.9, 8.10	15.247(d) 15.205	4.6	Radiation Band Edge	Pass
RSS-GEN 8.9, 8.10	15.247(d) 15.205	4.6	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
Operation Transmitter	IEEE 802.11b mode: 2T2R IEEE 802.11g mode: 2T2R IEEE 802.11n HT20 mode: 2T2R IEEE 802.11n HT40 mode: 2T2R
Test Channel Frequencies	IEEE 802.11b mode: 1. Lowest Channel: 2412 MHz 2. Middle Channel: 2437MHz 3. Highest Channel: 2462 MHz IEEE 802.11g mode : 1. Lowest Channel: 2412 MHz 2. Middle Channel: 2437MHz 3. Highest Channel: 2462 MHz IEEE 802.11n HT20 mode : 1. Lowest Channel: 2412 MHz 2. Middle Channel: 2437MHz 3. Highest Channel: 2462 MHz IEEE 802.11n HT40 mode : 1. Lowest Channel: 2422 MHz 2. Middle Channel: 2437MHz 3. Highest Channel: 2452 MHz

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: EUT power by Adapter (Dipole) Mode 2: EUT power by Adapter (PIFA)
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 (Dipole) Mode 2: EUT power by Adapter (PIFA)
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 (Dipole) Mode 2: EUT power by Adapter (PIFA)
Worst Mode	☒ Mode 1 ☒ Mode 2 ☐ Mode 3 ☐ Mode 4

Remark:

1. There are three types of EUT memory (ESMT, NANYA, MICRON), the worst of which is ESMT memory, and is recorded in the test report.
2. EUT pre-scanned in three axis ,X,Y, Z and two polarity, for radiated measurement. The worst case(Z-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.

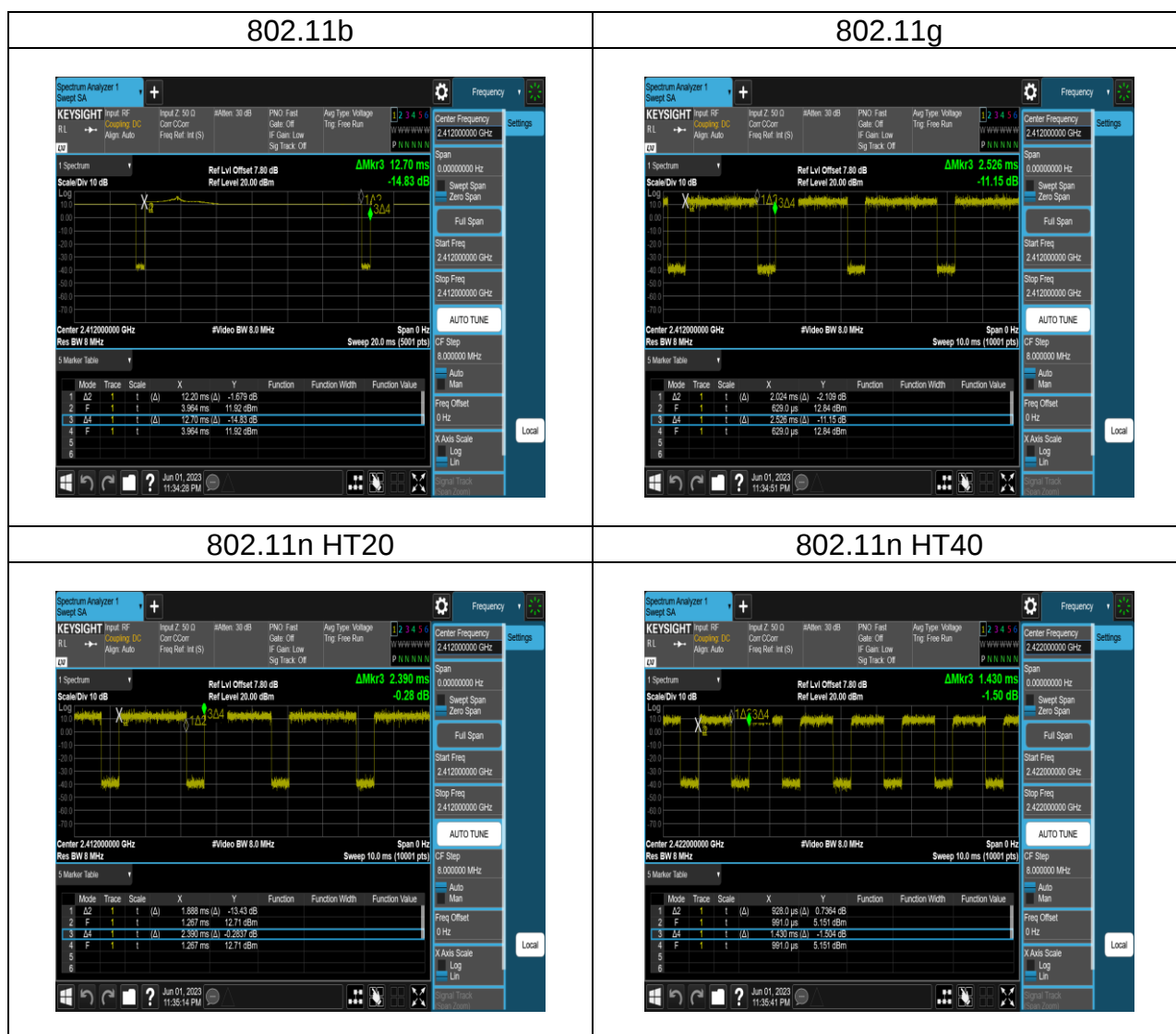
Report No.: TMWK2201000244KR

3.3 EUT DUTY CYCLE

Temperature: 24.3 ~ 24.6°C
Humidity: 59 ~ 61% RH

Test date: June 1 ~ 2, 2023
Tested by: Marco Chan

Duty Cycle				
Configuration	Duty Cycle (%)	Duty Factor (dB) =10*log (1/Duty Cycle)	1/T (kHz)	VBW setting (kHz)
802.11b	96.06	0.17	0.08	1.00
802.11g	80.13	0.96	0.49	1.00
802.11n_20	79.00	1.02	0.53	1.00
802.11n_40	64.90	1.88	1.08	2.00



4. TEST RESULT

4.1 AC POWER LINE CONDUCTED EMISSION

4.1.1 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

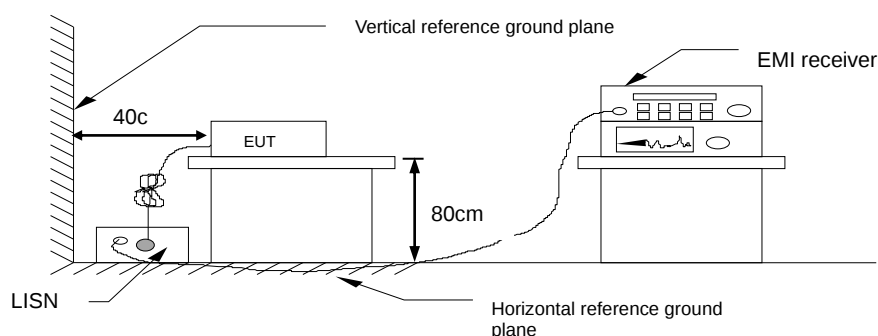
* Decreases with the logarithm of the frequency.

4.1.2 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.

4.1.3 Test Setup

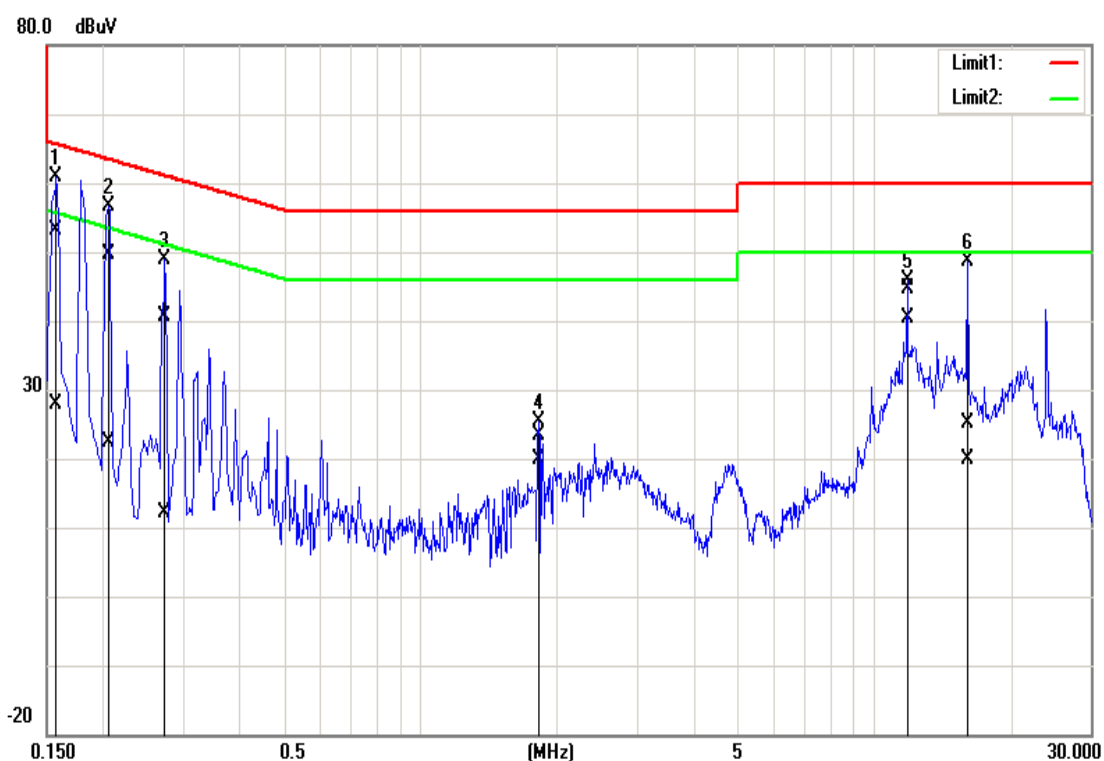


4.1.4 Test Result

Pass.

Test Data

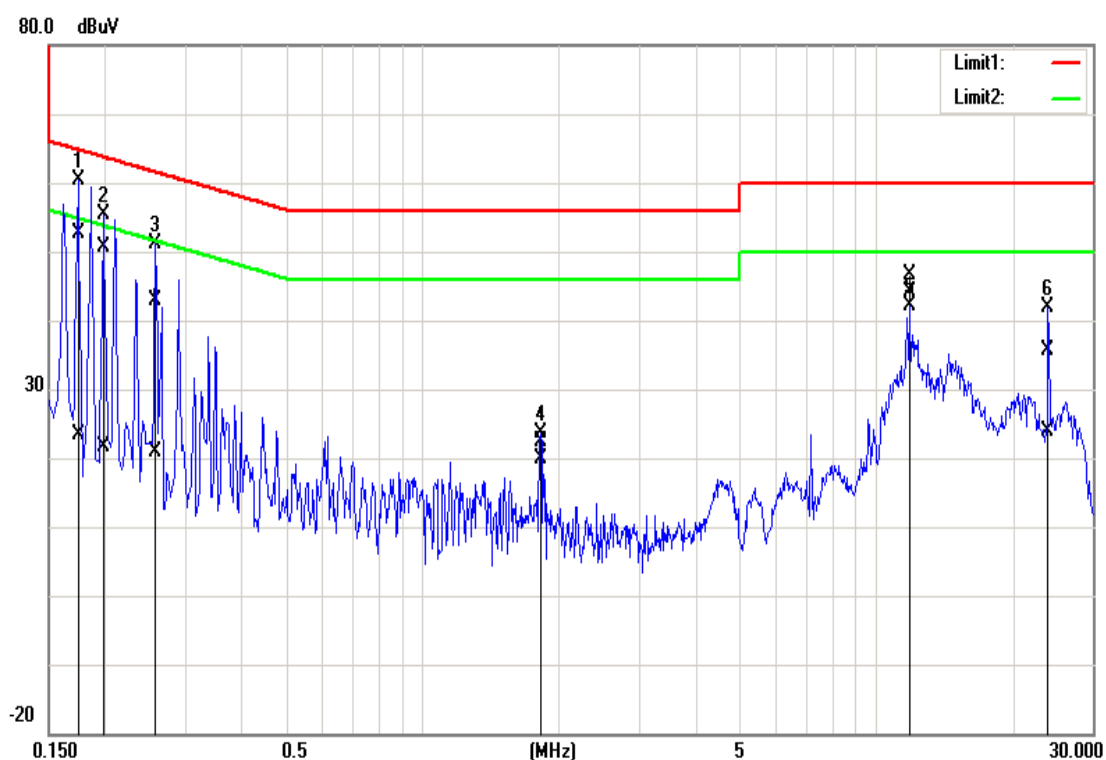
Test Mode:	Mode 1	Temp/Hum	24.3(°C)/ 50%RH
Phase:	Line	Test Date	July 5, 2023
Test Voltage:	120Vac, 60Hz	Test Engineer	Tony Chao



Frequency (MHz)	Quasi Peak reading (dBuV)	Average reading (d uV)	Correction factor (dB)	Quasi Peak result (dBuV)	Average result (dBuV)	Quasi Peak limit (dBuV)	Average limit (dBuV)	Quasi Peak margin (dB)	Average margin (dB)	Remark
0.1580	53.03	27.65	0.15	53.18	27.80	65.57	55.57	-12.39	-27.77	Pass
0.2060	49.39	22.25	0.15	49.54	22.40	63.37	53.37	-13.83	-30.97	Pass
0.2740	40.54	12.07	0.15	40.69	12.22	61.00	51.00	-20.31	-38.78	Pass
1.8220	23.17	19.70	0.21	23.38	19.91	56.00	46.00	-32.62	-26.09	Pass
11.8180	44.22	40.02	0.38	44.60	40.40	60.00	50.00	-15.40	-9.60	Pass
16.0900	24.58	19.36	0.45	25.03	19.81	60.00	50.00	-34.97	-30.19	Pass

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

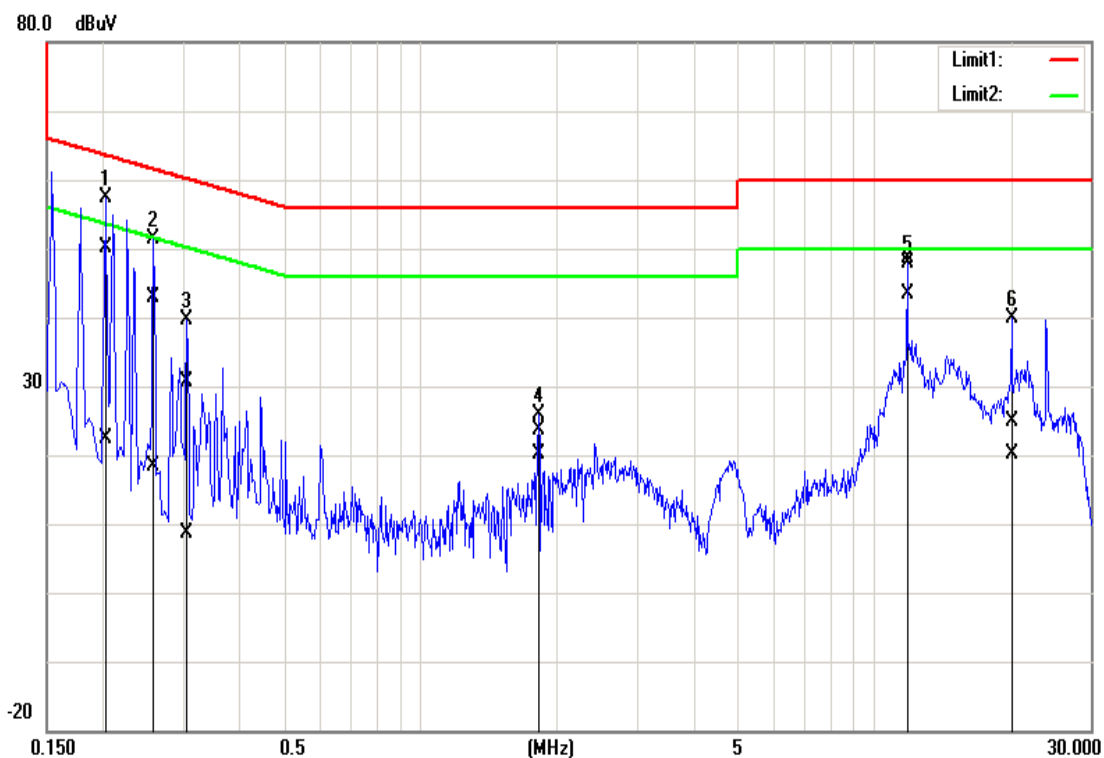
Test Mode:	Mode 1	Temp/Hum	24.3(°C)/ 50%RH
Phase:	Neutral	Test Date	July 5, 2023
Test Voltage:	120Vac, 60Hz	Test Engineer	Tony Chao



Frequency (MHz)	Quasi Peak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	Quasi Peak result (dBuV)	Average result (dBuV)	Quasi Peak limit (dBuV)	Average limit (dBuV)	Quasi Peak margin (dB)	Average margin (dB)	Remark
0.1740	52.32	23.15	0.19	52.51	23.34	64.77	54.77	-12.26	-31.43	Pass
0.1980	50.34	21.55	0.19	50.53	21.74	63.69	53.69	-13.16	-31.95	Pass
0.2580	42.59	20.72	0.19	42.78	20.91	61.50	51.50	-18.72	-30.59	Pass
1.8220	22.07	19.73	0.25	22.32	19.98	56.00	46.00	-33.68	-26.02	Pass
11.8140	46.25	43.62	0.41	46.66	44.03	60.00	50.00	-13.34	-5.97	Pass
23.9700	35.02	23.43	0.55	35.57	23.98	60.00	50.00	-24.43	-26.02	Pass

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

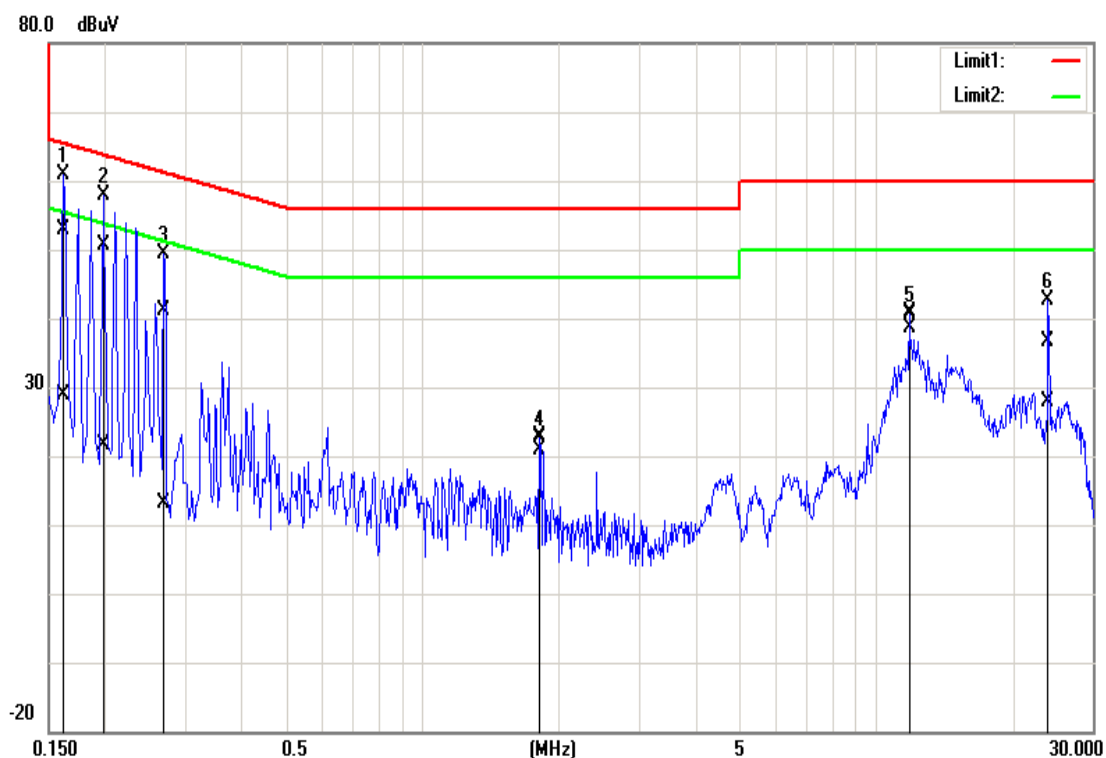
Test Mode:	Mode 2	Temp/Hum	24.3(°C)/ 50%RH
Phase:	Line	Test Date	July 5, 2023
Test Voltage:	120Vac, 60Hz	Test Engineer	Tony Chao



Frequency (MHz)	Quasi Peak reading (dBuV)	Average reading (d uV)	Correction factor (dB)	Quasi Peak result (dBuV)	Average result (dBuV)	Quasi Peak limit (dBuV)	Average limit (dBuV)	Quasi Peak margin (dB)	Average margin (dB)	Remark
0.2020	50.07	22.21	0.15	50.22	22.36	63.53	53.53	-13.31	-31.17	Pass
0.2580	42.79	18.35	0.15	42.94	18.50	61.50	51.50	-18.56	-33.00	Pass
0.3060	30.51	8.50	0.15	30.66	8.65	60.08	50.08	-29.42	-41.43	Pass
1.8220	23.45	19.92	0.21	23.66	20.13	56.00	46.00	-32.34	-25.87	Pass
11.8140	48.36	43.02	0.38	48.74	43.40	60.00	50.00	-11.26	-6.60	Pass
20.1260	24.42	19.56	0.51	24.93	20.07	60.00	50.00	-35.07	-29.93	Pass

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

Test Mode:	Mode 2	Temp/Hum	24.3(°C)/ 50%RH
Phase:	Neutral	Test Date	July 5, 2023
Test Voltage:	120Vac, 60Hz	Test Engineer	Tony Chao



Frequency (MHz)	Quasi Peak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	Quasi Peak result (dBuV)	Average result (dBuV)	Quasi Peak limit (dBuV)	Average limit (dBuV)	Quasi Peak margin (dB)	Average margin (dB)	Remark
0.1620	52.72	28.63	0.20	52.92	28.83	65.36	55.36	-12.44	-26.53	Pass
0.1980	50.34	21.32	0.19	50.53	21.51	63.69	53.69	-13.16	-32.18	Pass
0.2700	40.97	12.93	0.19	41.16	13.12	61.12	51.12	-19.96	-38.00	Pass
1.8180	22.73	20.60	0.25	22.98	20.85	56.00	46.00	-33.02	-25.15	Pass
11.8180	40.56	38.12	0.41	40.97	38.53	60.00	50.00	-19.03	-11.47	Pass
24.0140	36.08	27.26	0.55	36.63	27.81	60.00	50.00	-23.37	-22.19	Pass

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

4.2 6dB BANDWIDTH AND OCCUPIED BANDWIDTH (99%)

4.2.1 Test Limit

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

6 dB Bandwidth :

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

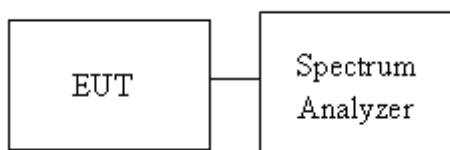
Occupied Bandwidth(99%) : For reporting purposes only.

4.2.2 Test Procedure

Test method Refer as ANSI C63.10: 2013,

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.

4.2.3 Test Setup



4.2.4 Test Result

Temperature: 21.1 ~ 26.8°C

Test date: June 1 ~ December 8, 2023

Humidity: 59 ~ 61% RH

Tested by: Marco Chan

Test mode: IEEE 802.11b mode / 2412-2462 MHz						
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 6dB BW (kHz)	Chain 1 6dB BW (kHz)	6dB limit (kHz)
1	2412	14.748	14.555	10130.00	10130.00	≥500
6	2437	14.755	14.583	10130.00	10130.00	
11	2462	14.768	14.588	10140.00	10130.00	

Test mode: IEEE 802.11g mode / 2412-2462 MHz						
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 6dB BW (kHz)	Chain 1 6dB BW (kHz)	6dB limit (kHz)
1	2412	16.510	16.442	15550.00	15960.00	≥500
6	2437	16.520	16.450	15720.00	16310.00	
11	2462	16.516	16.454	15680.00	15970.00	

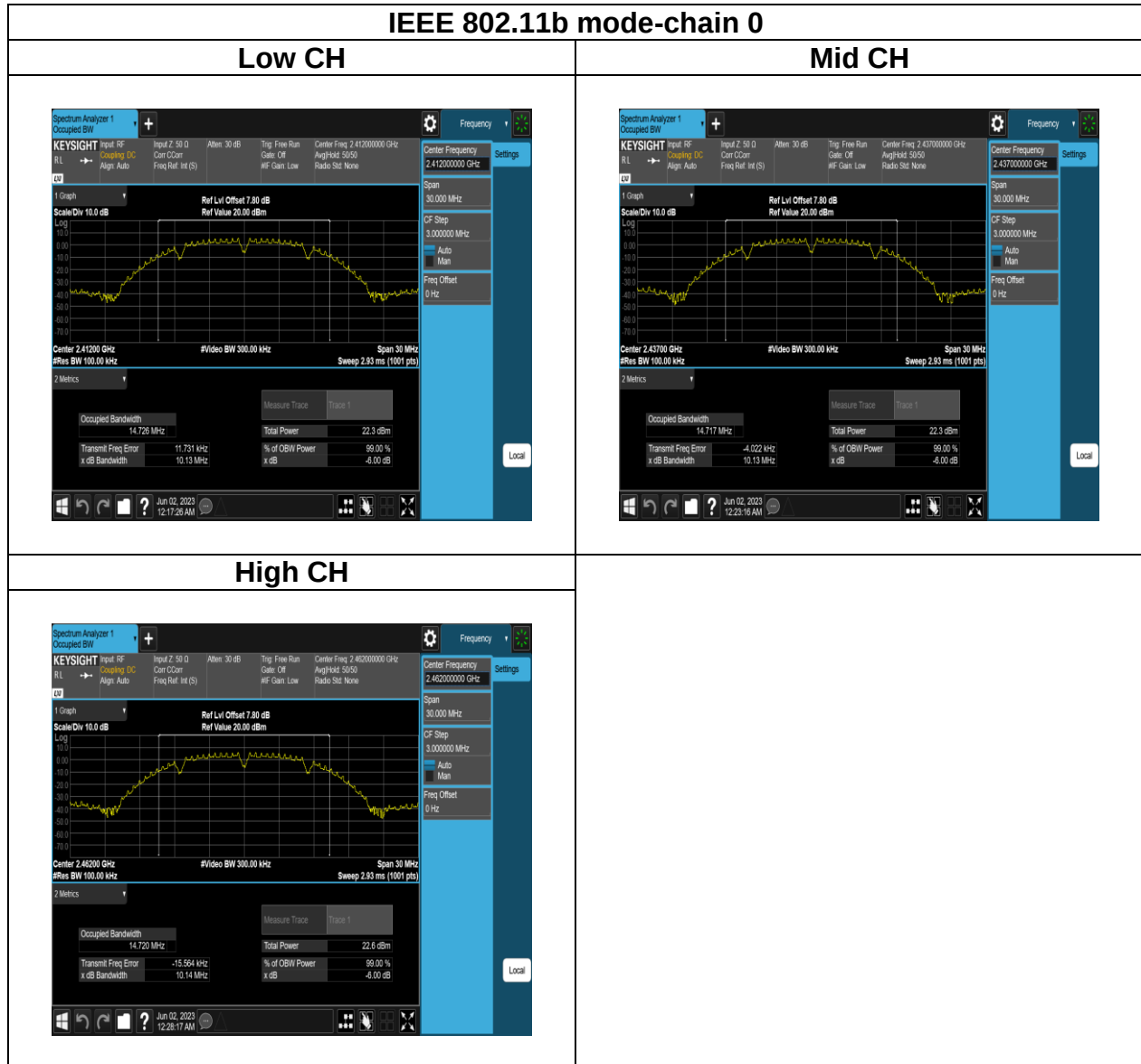
Test mode: IEEE 802.11n HT20 MHz mode / 2412-2462 MHz						
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 6dB BW (kHz)	Chain 1 6dB BW (kHz)	6dB limit (kHz)
1	2412	17.756	17.737	16050.00	16090.00	≥500
6	2437	17.743	17.740	16070.00	16300.00	
11	2462	17.749	17.748	16040.00	16320.00	

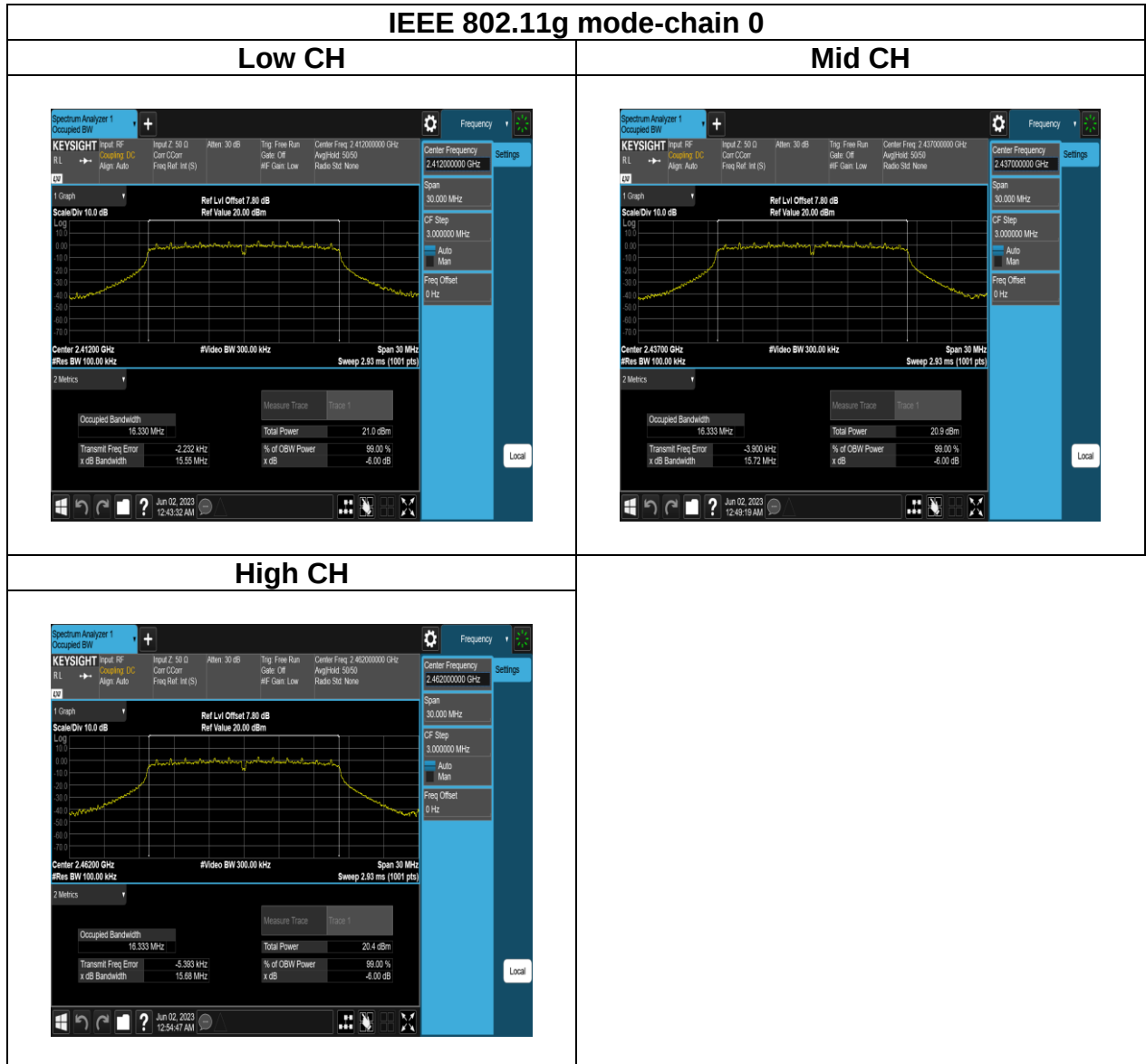
Test mode: IEEE 802.11n HT40 MHz mode / 2422-2452 MHz						
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 6dB BW (kHz)	Chain 1 6dB BW (kHz)	6dB limit (kHz)
3	2422	35.923	36.113	35170.00	35180.00	≥500
6	2437	35.981	35.938	35140.00	35180.00	
9	2452	36.038	36.074	35190.00	35170.00	

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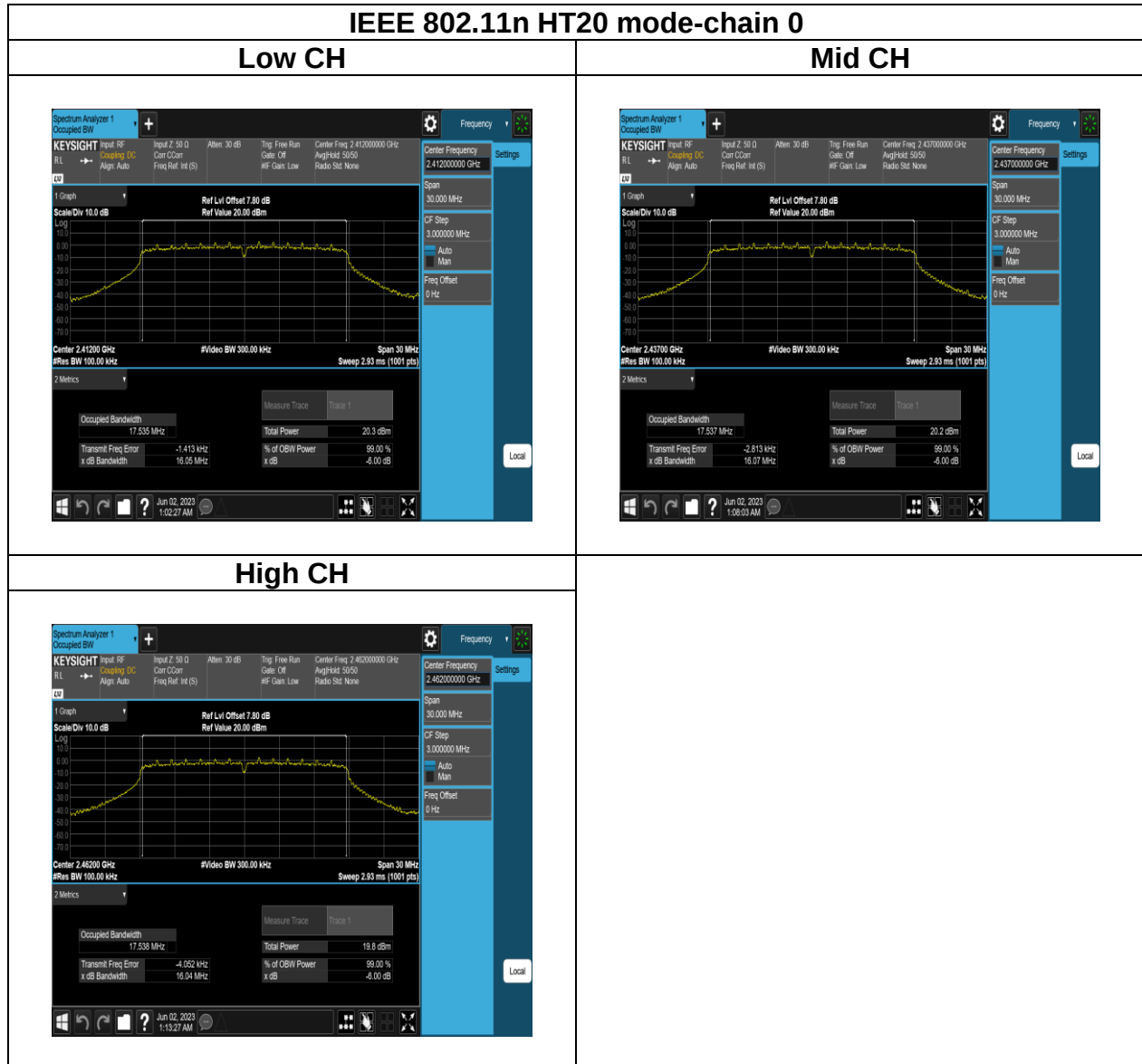
Test Data

6dB BANDWIDTH

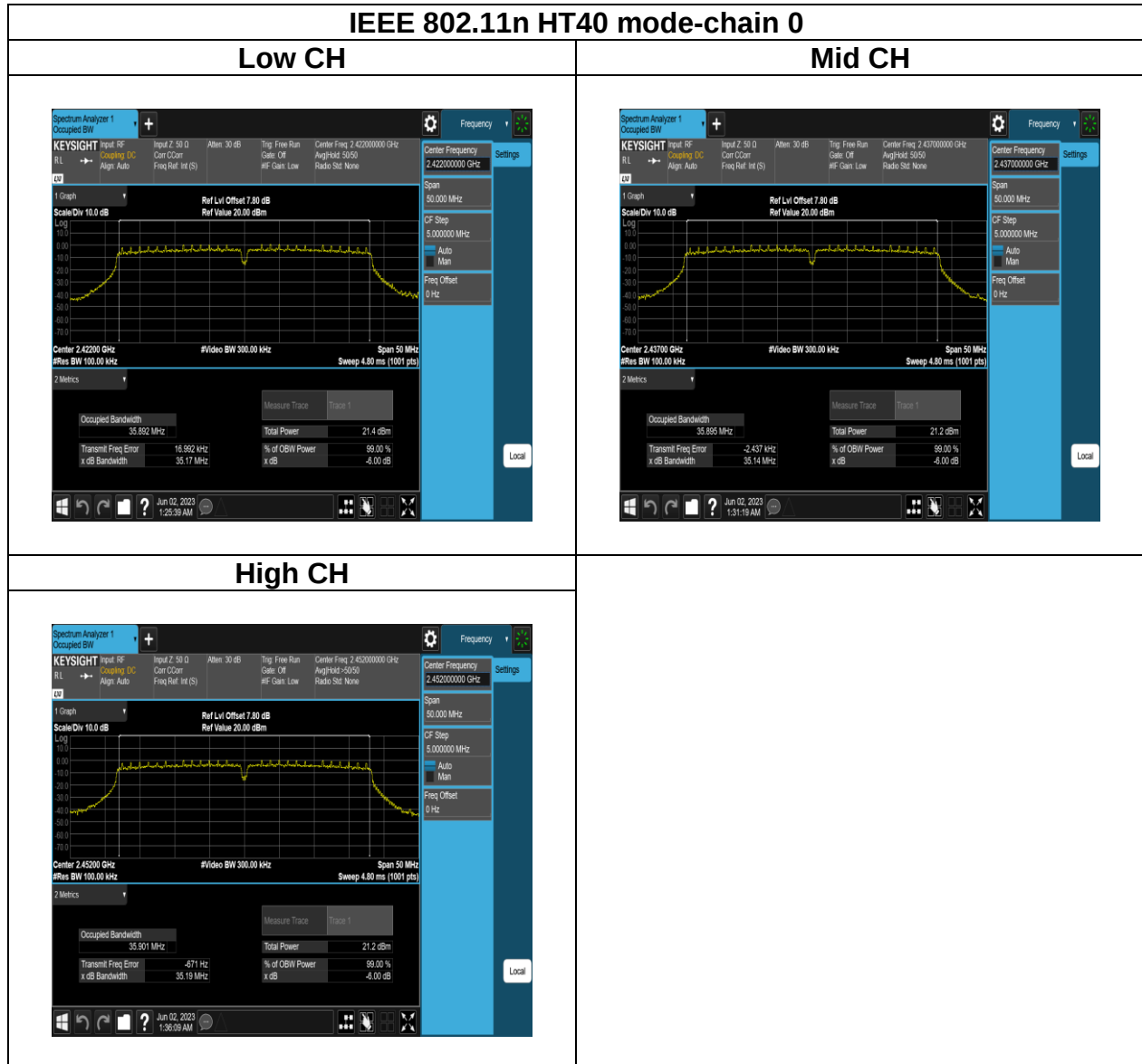




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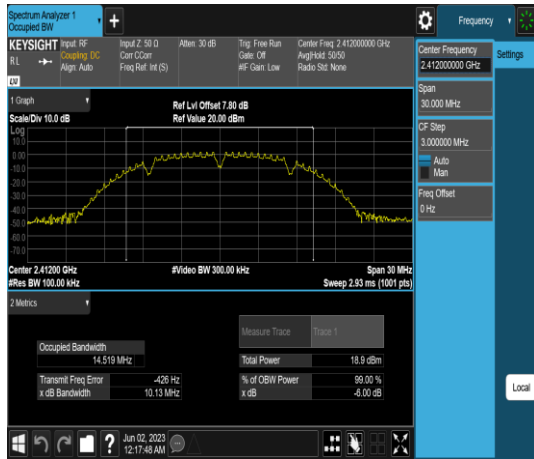
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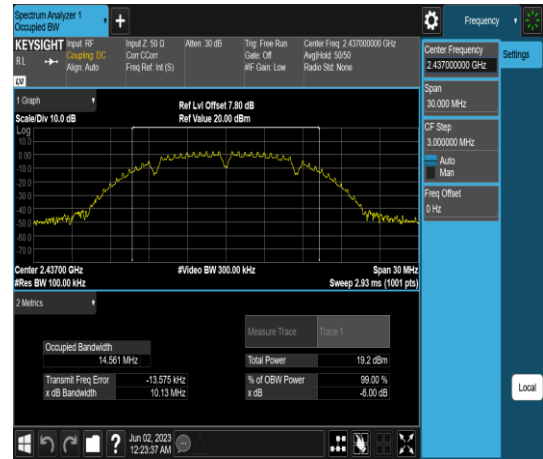
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IEEE 802.11b mode-chain 1

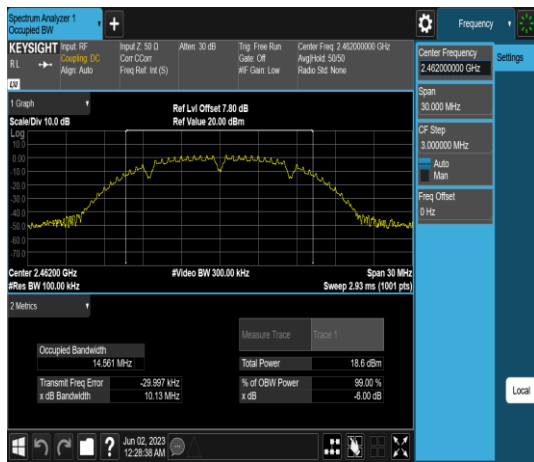
Low CH

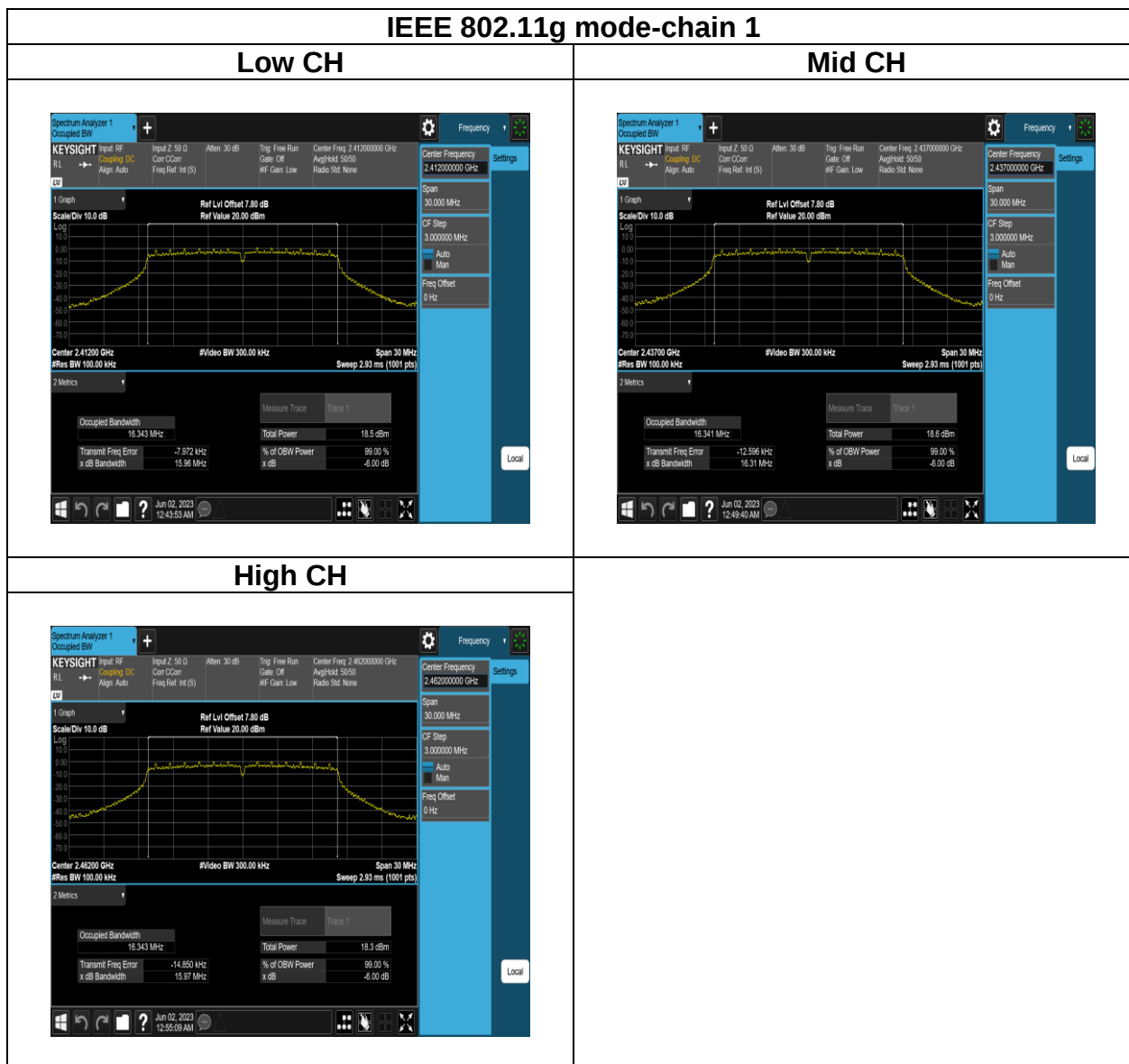


Mid CH

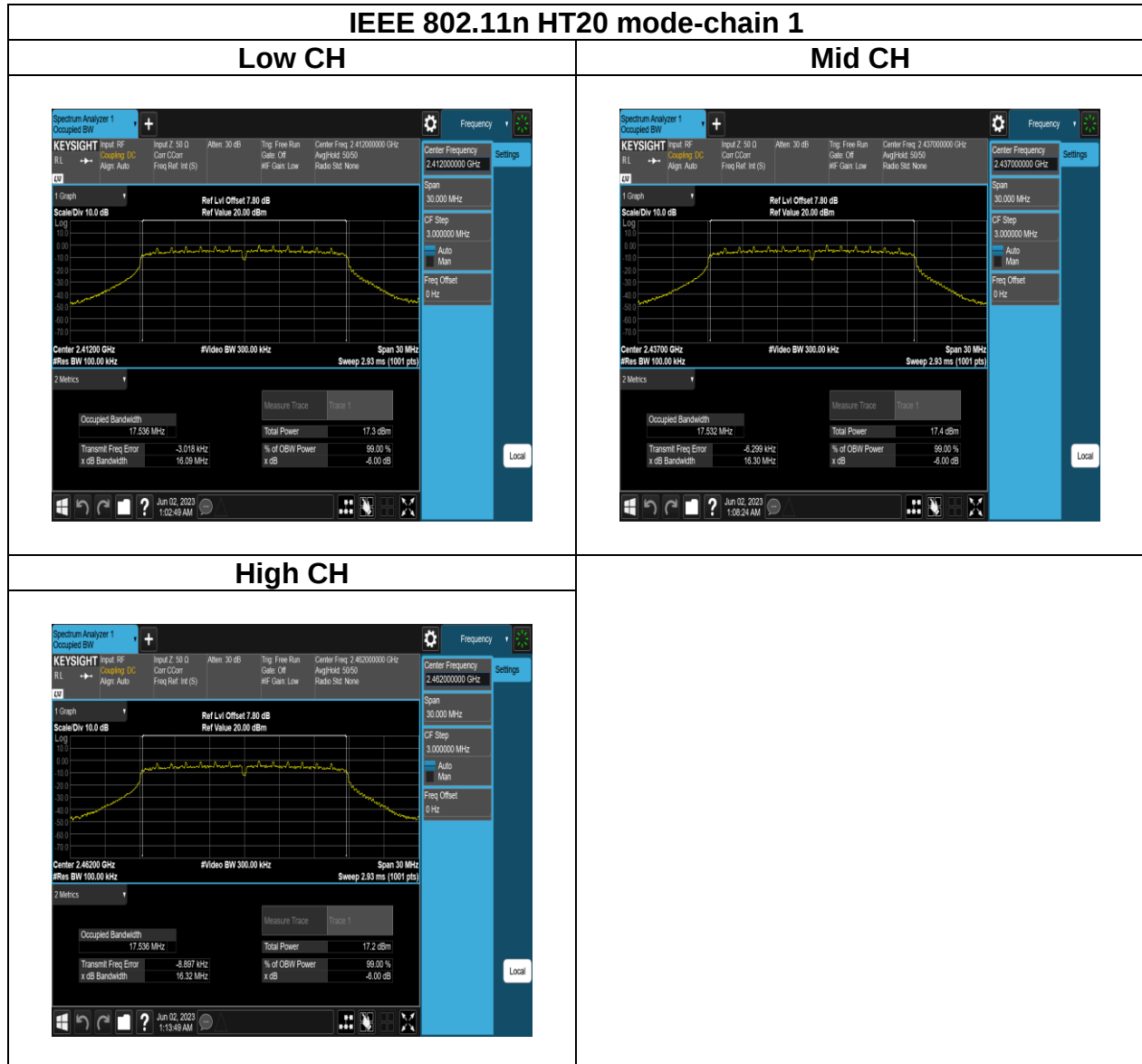


High CH

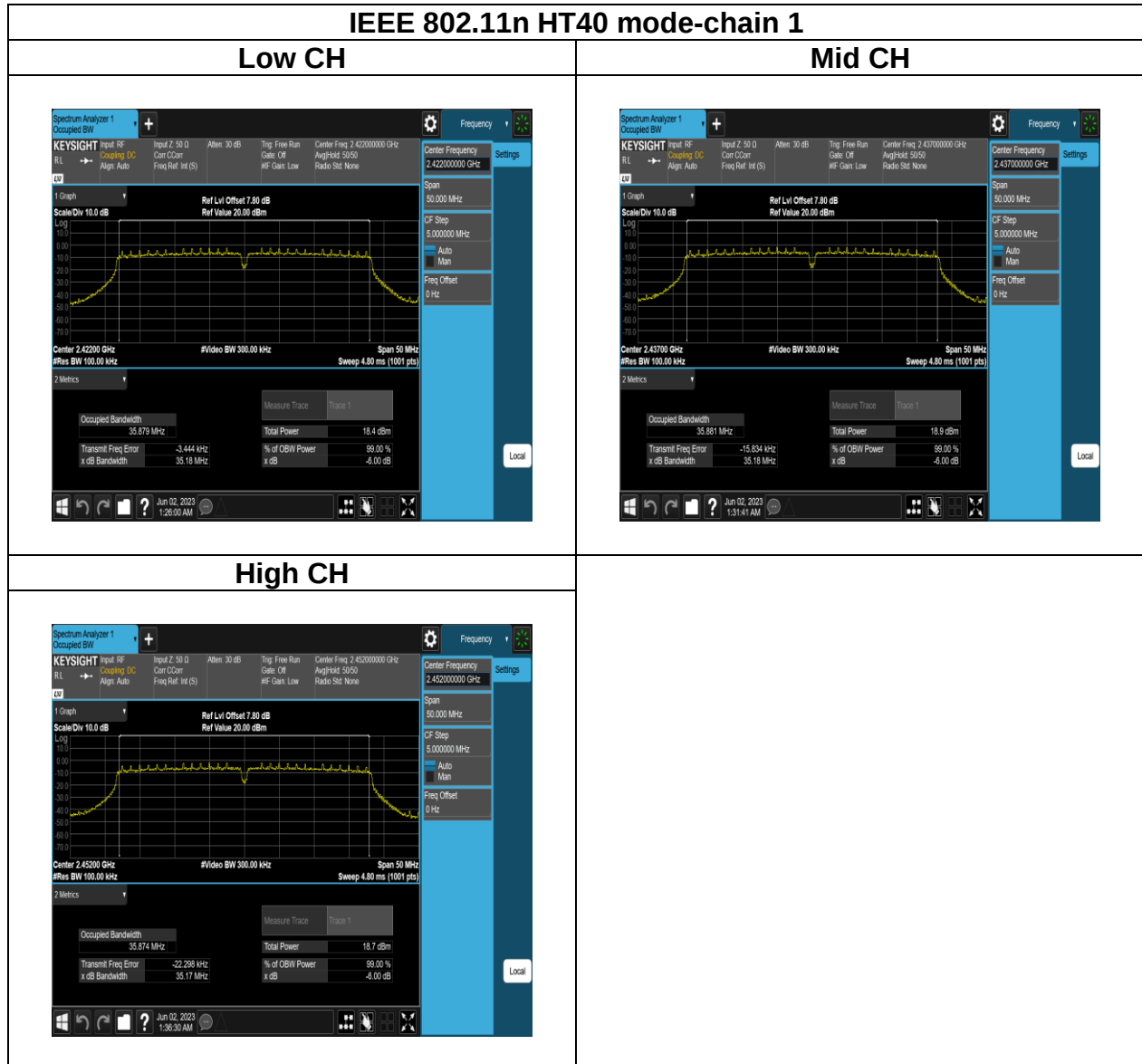




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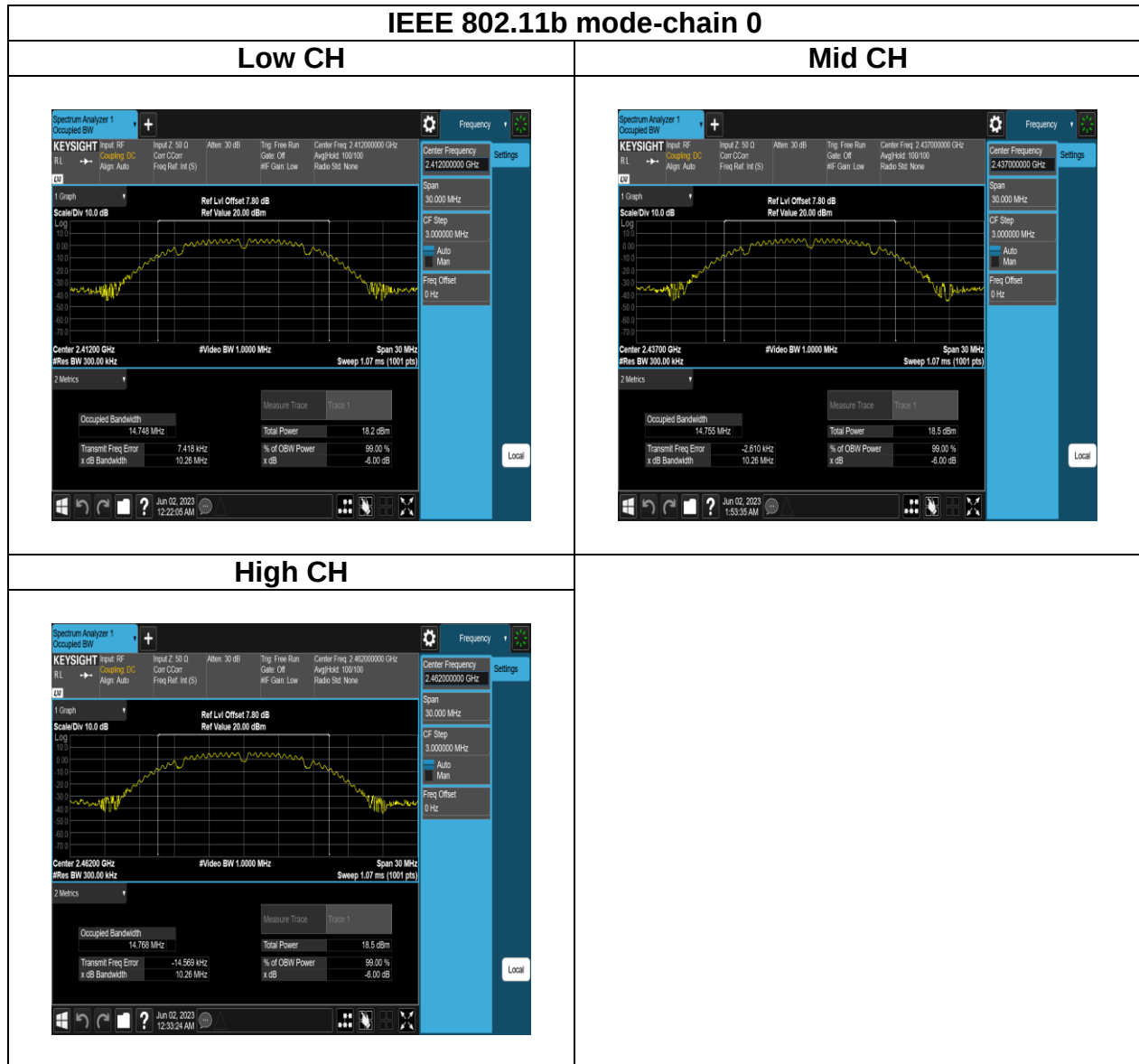


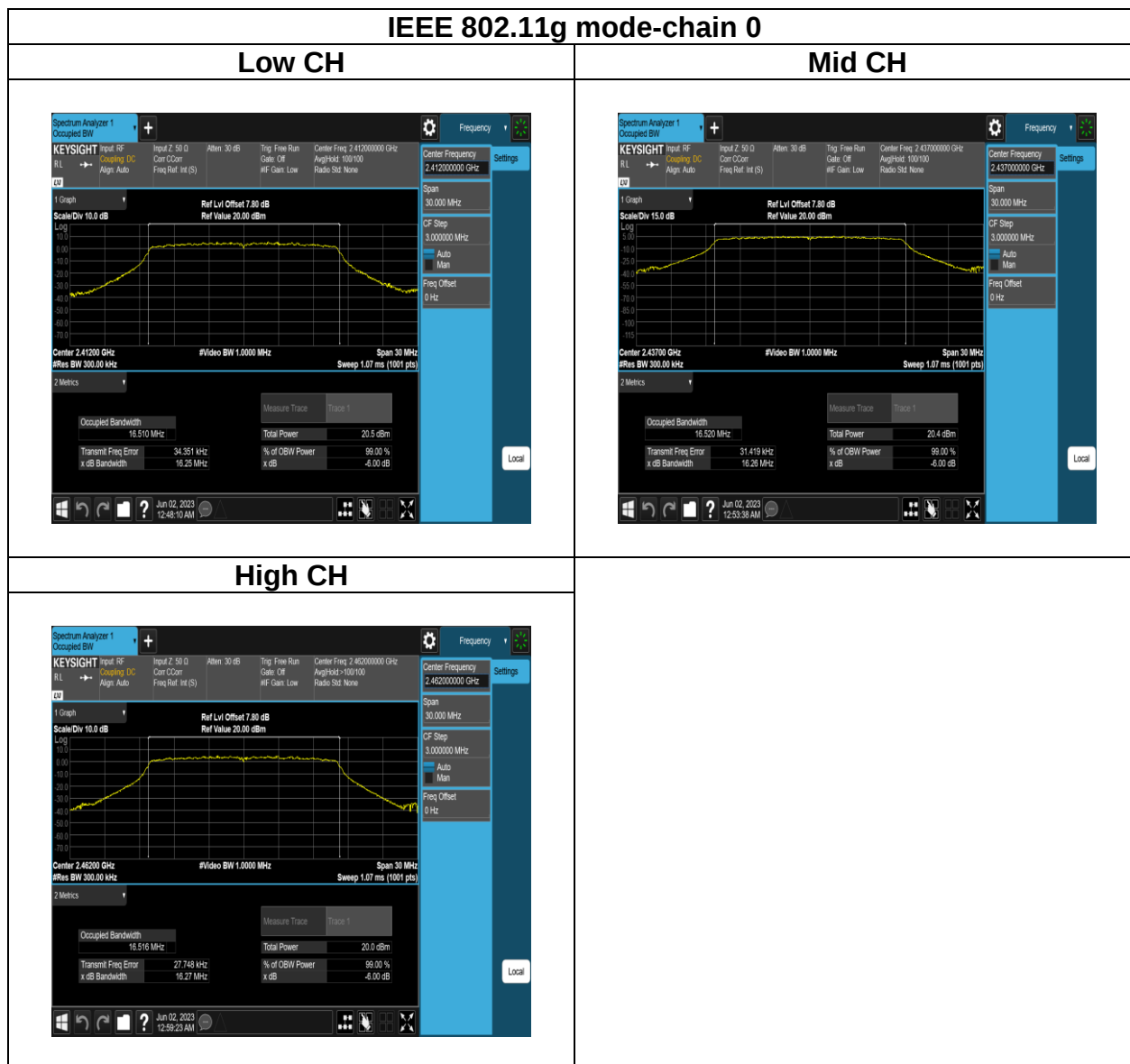
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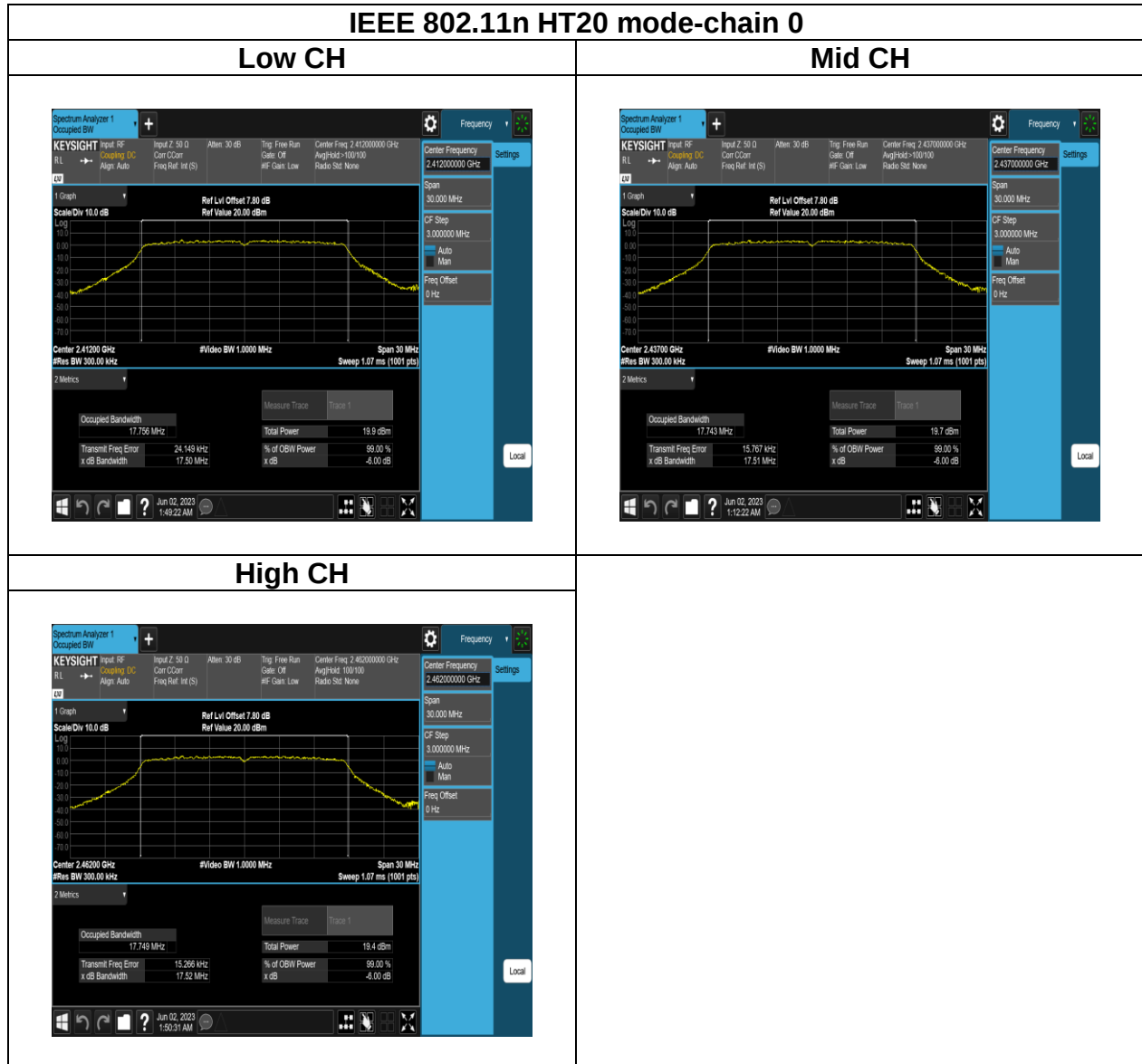
Test Data

BANDWIDTH 99%

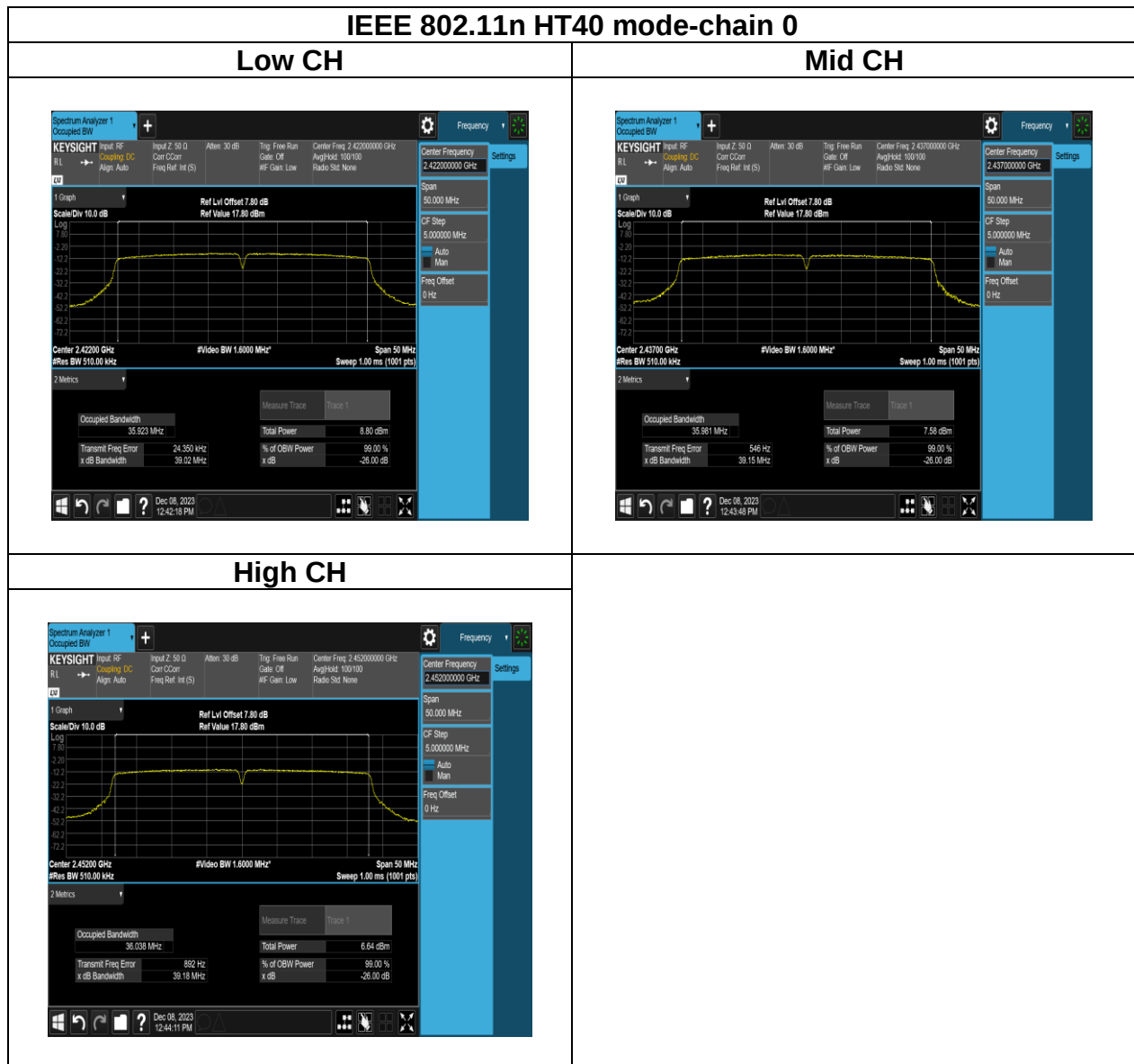




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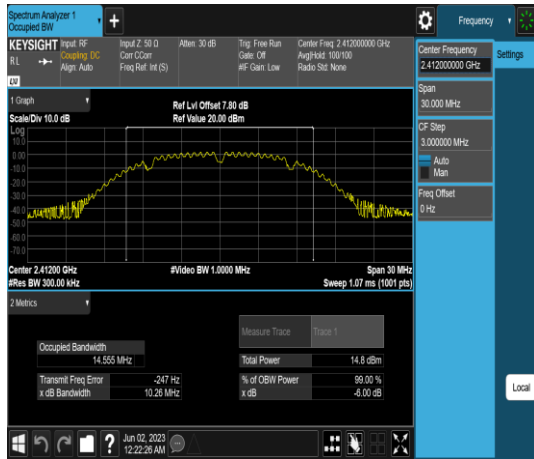
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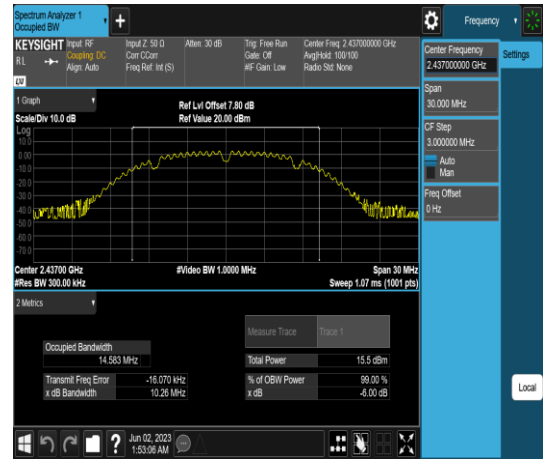
Report No.: TMWK2201000244KR

IEEE 802.11b mode-chain 1

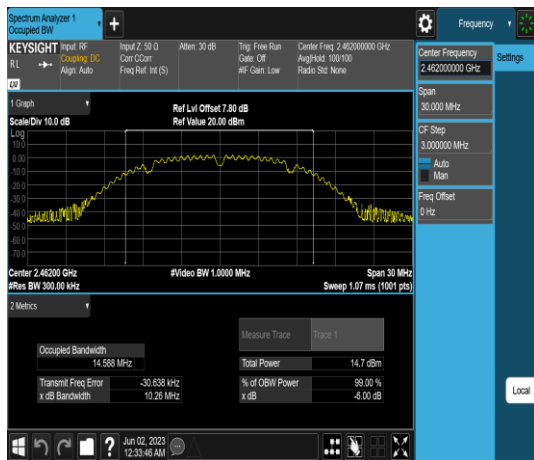
Low CH



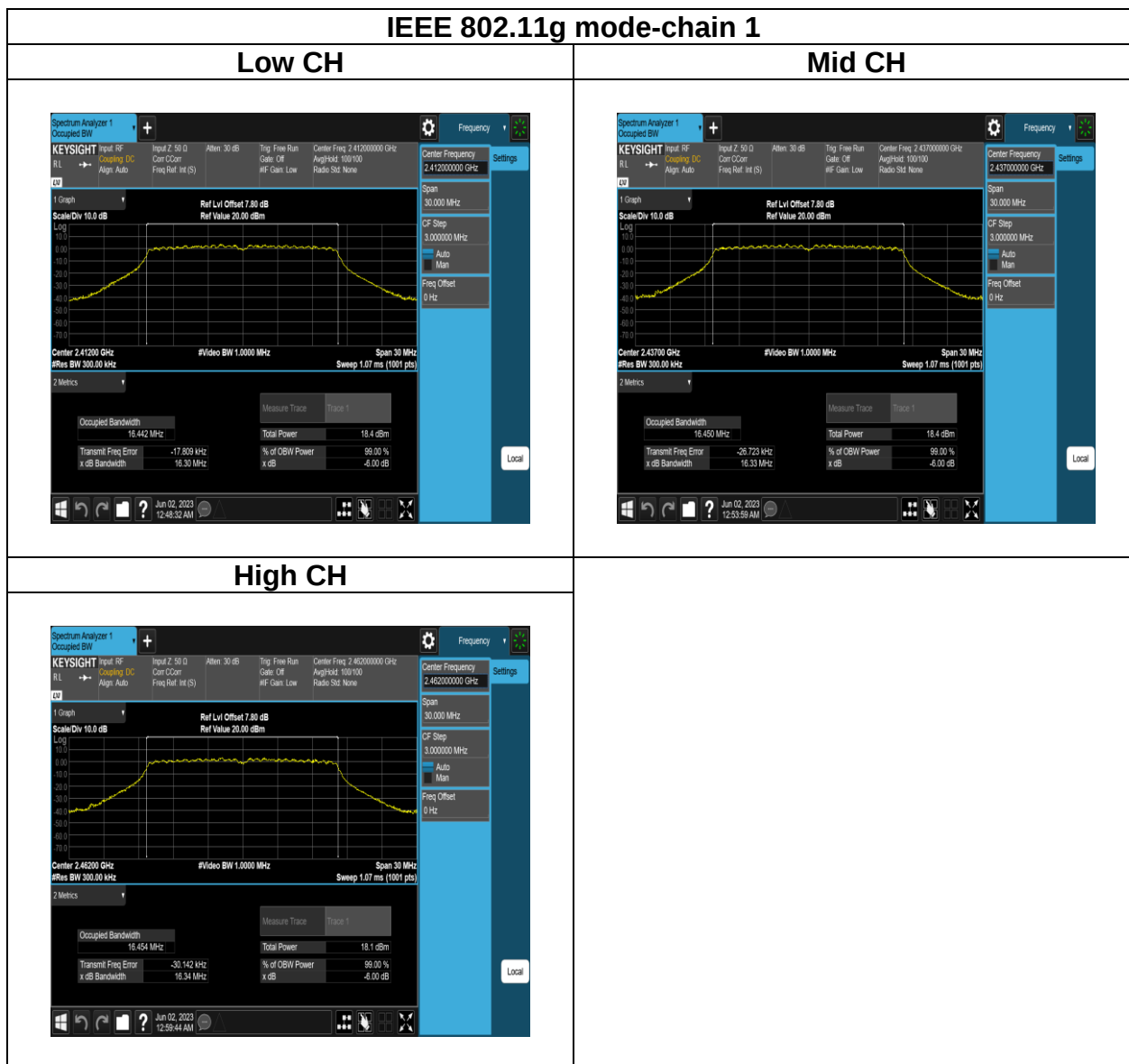
Mid CH



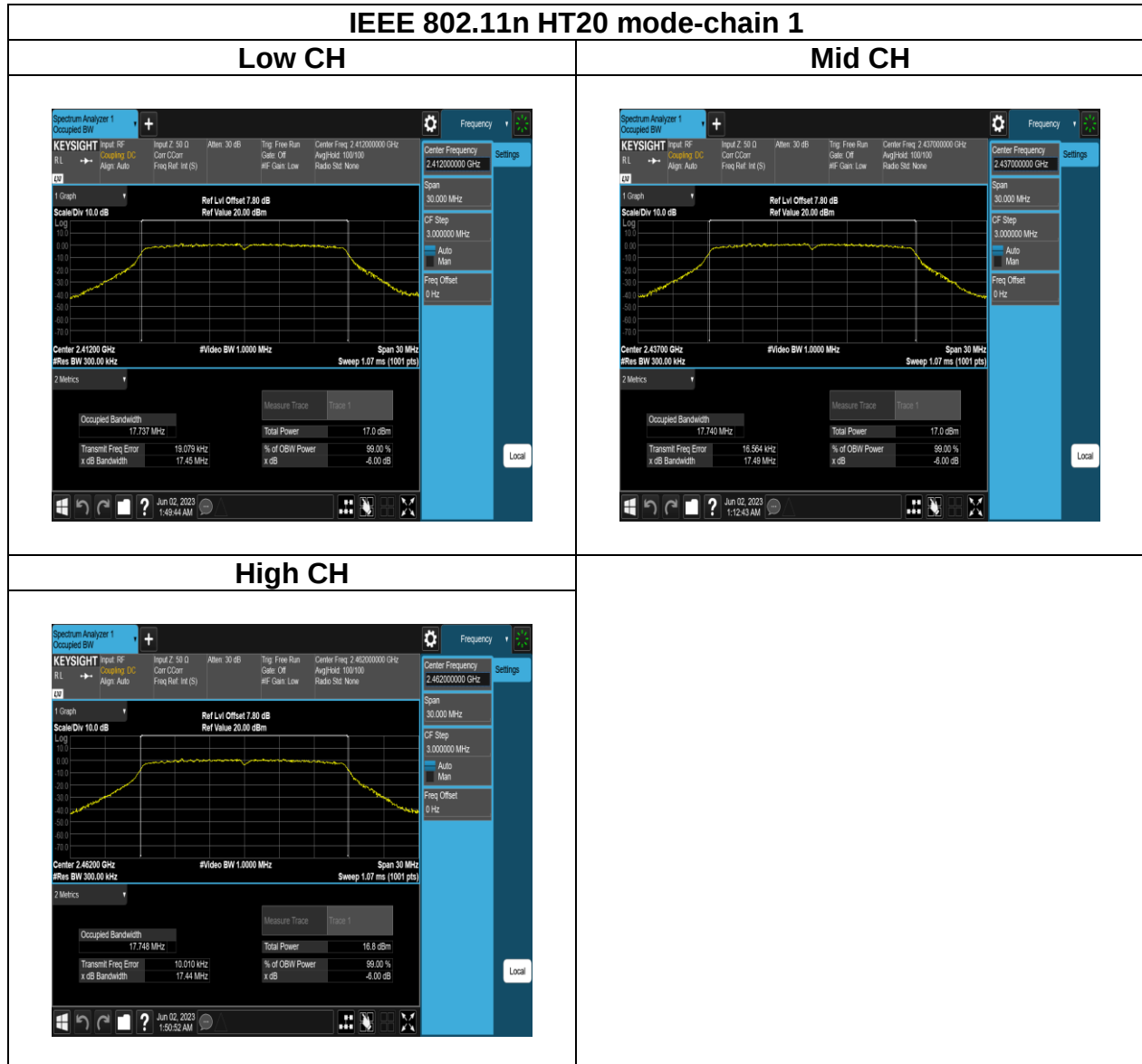
High CH



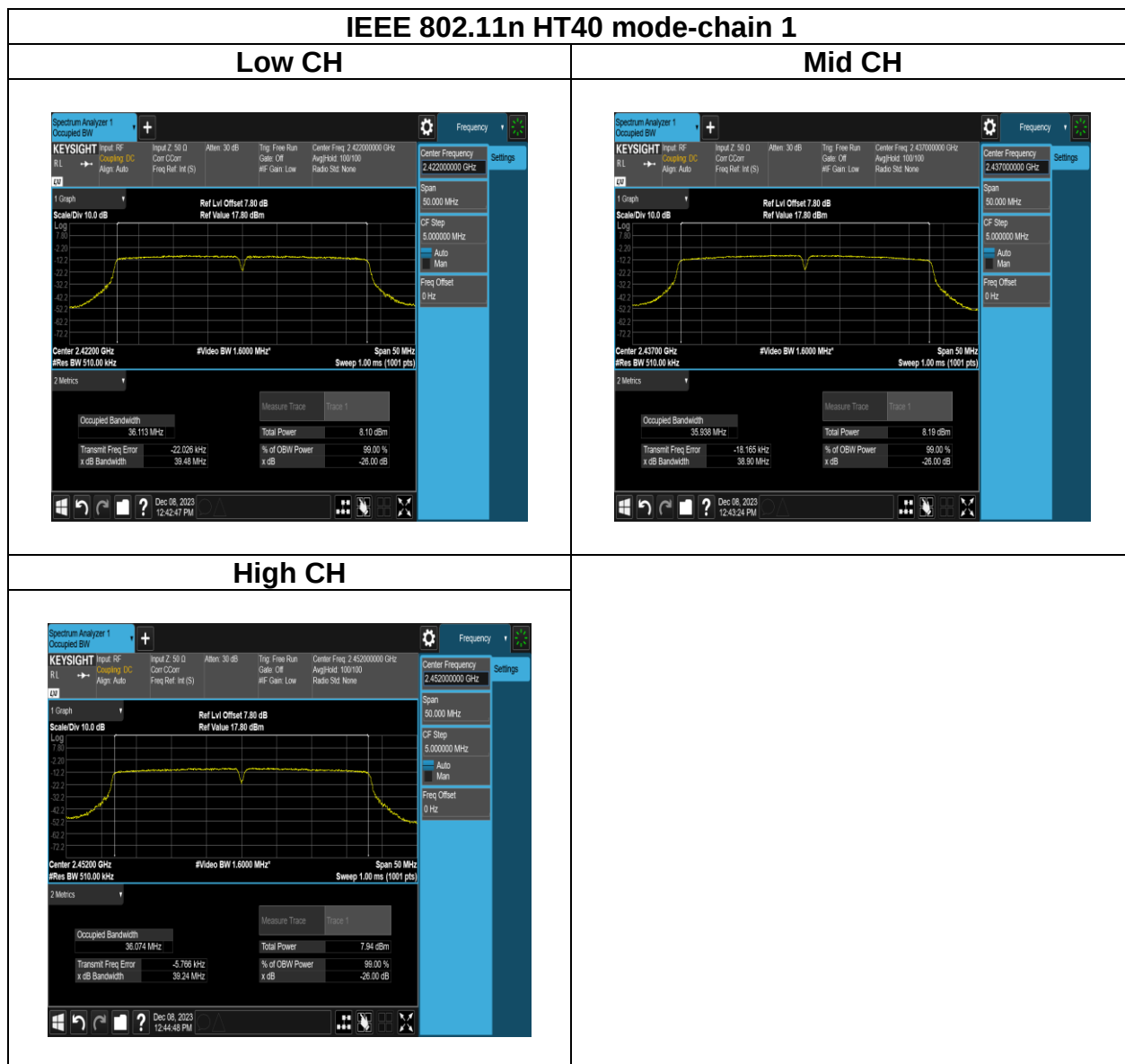
Report No.: TMWK2201000244KR



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4.3 OUTPUT POWER MEASUREMENT

4.3.1 Test Limit

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

Peak output power :

For FCC:

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.

For IC:

For DTSSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1 W. The e.i.r.p. shall not exceed 4 W, except as provided in section 5.4(e).

Limit	☐ Antenna not exceed 6 dBi : 30dBm ☒ Antenna with DG greater than 6 dBi : [Limit = 30 – (DG – 6)] ☐ Point-to-point operation :
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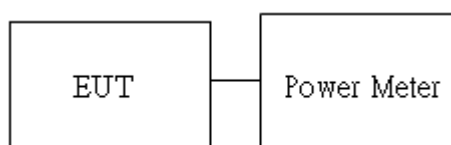
Average output power : For reporting purposes only.

4.3.2 Test Procedure

Test method Refer as ANSI C63.10:2013.

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.

4.3.3 Test Setup



4.3.4 Test Result

Temperature: 24.3 ~ 24.6°C

Test date: June 1 ~ 2, 2023

Humidity: 59 ~ 61% RH

Tested by: Marco Chan

Peak Output Power

802.11b_2TX								
CH	Freq. (MHz)	Data Rate	Power set	Peak Output Power (dBm)		Total Peak Output Power (dBm)	Limit (dBm)	RESULT
				Ch0	Ch1			
1	2412	1	73	16.77	13.75	18.53	27.99	PASS
6	2437	1	75	16.85	13.91	18.63	27.99	PASS
11	2462	1	74	17.13	13.51	18.70	27.99	PASS

802.11g_2TX								
CH	Freq. (MHz)	Data Rate	Power set	Peak Output Power (dBm)		Total Peak Output Power (dBm)	Limit (dBm)	RESULT
				Ch0	Ch1			
1	2412	6	55	23.37	21.45	25.53	27.99	PASS
6	2437	6	57	23.52	21.98	25.83	27.99	PASS
11	2462	6	57	23.67	21.89	25.88	27.99	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			
1	2412	MCS0	52	22.89	21.13	25.11	27.99	PASS
6	2437	MCS0	54	22.68	20.96	24.91	27.99	PASS
11	2462	MCS0	54	22.86	20.71	24.93	27.99	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			
3	2422	MCS0	55	22.91	20.21	24.78	27.99	PASS
6	2437	MCS0	57	23.05	20.96	25.14	27.99	PASS
9	2452	MCS0	57	23.10	20.72	25.08	27.99	PASS



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Average Output Power

802.11b_2TX								
CH	Freq. (MHz)	Data Rate	Power set	Avg. Output Power (dBm)		Total Avg. Output Power (dBm)	Limit (dBm)	RESULT
				Ch0	Ch1			
1	2412	1	73	15.06	11.95	16.79	27.99	PASS
6	2437	1	75	15.03	12.18	16.85	27.99	PASS
11	2462	1	74	15.31	11.79	16.91	27.99	PASS

802.11g_2TX								
CH	Freq. (MHz)	Data Rate	Power set	Avg. Output Power (dBm)		Total Avg. Output Power (dBm)	Limit (dBm)	RESULT
				Ch0	Ch1			
1	2412	6	55	13.94	11.49	15.90	27.99	PASS
6	2437	6	57	13.80	11.84	15.94	27.99	PASS
11	2462	6	57	13.92	11.57	15.91	27.99	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			
1	2412	MCS0	52	12.87	10.39	14.82	27.99	PASS
6	2437	MCS0	54	12.96	10.49	14.91	27.99	PASS
11	2462	MCS0	54	12.93	10.32	14.83	27.99	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			
3	2422	MCS0	55	13.09	10.09	14.85	27.99	PASS
6	2437	MCS0	57	12.88	10.78	14.96	27.99	PASS
9	2452	MCS0	57	13.13	10.13	14.89	27.99	PASS



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EIRP Power:

802.11b_2TX									
CH	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)		Total Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	RESULT
			Ch0	Ch1					
1	2412	1	15.06	11.95	16.79	8.01	24.80	36	PASS
6	2437	1	15.03	12.18	16.85	8.01	24.86	36	PASS
11	2462	1	15.31	11.79	16.91	8.01	24.92	36	PASS

802.11g_2TX									
CH	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)		Total Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	RESULT
			Ch0	Ch1					
1	2412	6	13.94	11.49	15.90	8.01	23.91	36	PASS
6	2437	6	13.80	11.84	15.94	8.01	23.95	36	PASS
11	2462	6	13.92	11.57	15.91	8.01	23.92	36	PASS

802.11n_HT20M_2TX									
CH	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)		Total Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	RESULT
			Ch0	Ch1					
1	2412	MCS0	12.87	10.39	14.82	8.01	22.83	36	PASS
6	2437	MCS0	12.96	10.49	14.91	8.01	22.92	36	PASS
11	2462	MCS0	12.93	10.32	14.83	8.01	22.84	36	PASS

802.11n_HT40M_2TX									
CH	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)		Total Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	RESULT
			Ch0	Ch1					
3	2422	MCS0	13.09	10.09	14.85	8.01	22.86	36	PASS
6	2437	MCS0	12.88	10.78	14.96	8.01	22.97	36	PASS
9	2452	MCS0	13.13	10.13	14.89	8.01	22.90	36	PASS

4.4 POWER SPECTRAL DENSITY

4.4.1 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 :
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4.4.2 Test Procedure

Test method Refer as ANSI C63.10:2013,

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 = 10kHz, 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.

4.4.3 Test Setup



Report No.: TMWK2201000244KR

4.4.4 Test Result

Temperature: 24.3 ~ 24.6°C

Test date: June 1 ~ 2, 2023

Humidity: 59 ~ 61% RH

Tested by: Marco Chan

POWER DENSITY 802.11b					
Freq. (MHz)	Ch0 PSD	Ch1 PSD	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
2412	-8.37	-11.85	-6.76	5.99	PASS
2437	-9.66	-11.29	-7.39	5.99	PASS
2462	-9.12	-13.04	-7.64	5.99	PASS

POWER DENSITY 802.11g					
Freq. (MHz)	Ch0 PSD	Ch1 PSD	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
2412	-11.57	-13.78	-9.53	5.99	PASS
2437	-11.82	-13.61	-9.61	5.99	PASS
2462	-12.37	-13.97	-10.09	5.99	PASS

POWER DENSITY 802.11n HT20					
Freq. (MHz)	Ch0 PSD	Ch1 PSD	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
2412	-12.74	-15.06	-10.74	5.99	PASS
2437	-12.35	-14.91	-10.43	5.99	PASS
2462	-12.04	-15.07	-10.29	5.99	PASS

POWER DENSITY 802.11n HT40					
Freq. (MHz)	Ch0 PSD	Ch1 PSD	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
2422	-14.29	-17.64	-12.64	5.99	PASS
2437	-13.51	-17.23	-11.97	5.99	PASS
2452	-15.19	-18.12	-13.40	5.99	PASS

Test Data:

