TEST REPORT

CTK Co., Ltd.
(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-100, Korea
Tel: +82-31-339-9970
Fax: +82-31-624-9501

1. Applicant

◦ Name : SOLUM CO.,LTD.

◦ Address : 4,5,6th F, 357, Guseong-ro, Giheung-gu, Yongin-si, Gyeonggi-do, Republic of Korea (Zip 16914)

◦ Date of Receipt : 2024-11-21

2. Manufacturer

◦ Name : DONGGUAN SOLUM ELECTRONICS CO., LTD

◦ Address : Building 2/4/6, No.35, Tongzhen Road, Tongsha, Dongcheng District, Dongguan City, Guangdong Province, 523127 People's Republic of China

3. Use of Report : For FCC Certification & ISED Certification

4. Test Sample / Model: Monitor (Digital Signage) / WB25QACNDU0/SM

5. Date of Test : 2024-11-28 to 2024-12-21

6. Test Standard(method) used : FCC 47 CFR part 15 subpart C 15.247, ANSI C63.10-2013, RSS-247, RSS-Gen

7. Testing Environment: refer to 10 page

8. Test Results : Compliance

9. Location of Test : ☒ Permanent Testing Lab ☐ On Site Testing

(Address : (Unhak-Dong) 5, Dongbu-ro 221beon-gil, Cheoin-gu, Yong-in-si, Gyeonggi-do, Korea)

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This report cannot be reproduced or copied without the written consent of CTK.

Approval	Tested by Seoung-uk Park: (Signature)	Technical Manager Young-taek Lee: (Signature)

2025-01-06

CTK Co., Ltd.

REPORT REVISION HISTORY

Date	Revision	Page No
2025-01-06	Issued (CTK-2025-00046)	all
2025-01-06	Issued (CTK-2025-00046-1) 1. Change the applicant's address	1 & 4 Page

This report shall not be reproduced except in full, without the written approval of CTK Co., Ltd. This document may be altered or revised by CTK Co., Ltd. personnel only, and shall be noted in the revision section of the document. Any alteration of this document not carried out by CTK Co., Ltd. will constitute fraud and shall nullify the document.

CONTENTS

1. General Product Description 4
1.1 Applicant Information 4
1.2 Product Information 4
1.3 Peripheral Devices 5
1.4 Model Differences 5
2. Accreditations 6
2.1 Laboratory Accreditations and Listings 6
2.2 Calibration Details of Equipment Used for Measurement 6
3. Test Specifications 7
3.1 Standards 7
3.2 Mode of operation during the test 8
3.3 Device Modifications 8
3.4 Measurement Uncertainty 8
3.5 Test Software 9
3.6 Testing Environment 9
4. Technical Characteristic Test 10
4.1 6dB Bandwidth & 99% Bandwidth 10
4.2 Maximum peak conducted output power 16
4.3 Transmitter Power Spectral Density 20
4.4 Conducted Spurious emission 24
4.5 Radiated Emission 29
4.6 AC Conducted Emissions 47
APPENDIX A – Test Equipment Used For Tests 49

1. General Product Description

1.1 Applicant Information

Company	SOLUM CO.,LTD.
Contact Point	4,5,6th F, 357, Guseong-ro, Giheung-gu, Yongin-si, Gyeonggi-do, Republic of Korea (Zip 16914)
Contact Person	Name : Ki Dong Lee E-mail : kdlee007@solu-m.com Tel : +82-31-8006-7677

1.2 Product Information

FCC ID	2AFWN-WB25QACNDU0SM
IC	22800-WB25QACNDU0
Product Description	Monitor (Digital Signage)
Model name	WB25QACNDU0/SM
Variant Model name	WB25QACNDU1/SM (Variant model has no technical differences with each model except for the model name and color for marketing purposes.)
Operating Frequency	2 412 MHz – 2 462 MHz (20 MHz_BW) 2 422 MHz – 2 452 MHz (40 MHz_BW)
RF Output Power	802.11b : 15.82 dBm (38.19 mW) 802.11g : 11.15 dBm (13.03 mW) 802.11n_HT20 : 11.07 dBm (12.79 mW) 802.11n_HT40 : 10.89 dBm (12.27 mW)
Antenna Specification	Antenna type : Diplo Antenna Peak Gain : 3.35 dBi
Antenna Configurations	802.11b : SISO 802.11g : SISO 802.11n_HT20 : SISO 802.11n_HT40 : SISO
Number of channels	11 (802.11b/g/n_HT20) 9 (802.11n_HT40)
Type of Modulation	802.11b : DSSS 802.11g/n : OFDM
Data Rate	802.11b : 11 / 5.5 / 2 / 1 Mbps 802.11g : 54 / 48 / 36 / 24 / 18 / 12 / 9 / 6 Mbps 802.11n: up to 300 Mbps
Power Source	DC 19 V
FVIN	V3.0.5

RF Power setting in Test SW

Mode	Frequency	Power Setting Value
802.11b	2 412 MHz	44
	2 437 MHz	44
	2 462 MHz	44
802.11g	2 412 MHz	44
	2 437 MHz	44
	2 462 MHz	44
802.11n_HT20	2 412 MHz	44
	2 437 MHz	44
	2 462 MHz	44
802.11n_HT40	2 422 MHz	44
	2 437 MHz	44
	2 452 MHz	44

1.3 Peripheral Devices

Device	Manufacturer	Model No.	Serial No.
Note Computer	HP	15-bs563TU	CND7253R5S
AC/DC Adapter	HP	HSTNN-LA40	-

1.4 Model Differences

Not applicable

2. Accreditations

2.1 Laboratory Accreditations and Listings

Country	Agency	Registration Number
USA	FCC	805871
CANADA	ISED	CN : 8737A CAB ID : KR0025
KOREA	NRRA	KR0025

2.2 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less. All test equipment calibrations are traceable to the Korea Research Institute of Standards and Science (KRISS), therefore, all test data recorded in this report is traceable to KRISS.

3. Test Specifications

3.1 Standards

Section in FCC	Section in RSS	Requirement(s)	Status (Note 1)	Test Condition
15.247(a)	RSS-247 5.2(a)	6 dB Bandwidth	C	Conducted
15.247(e)	RSS-247 5.2(b)	Transmitter power spectral density	C	
15.247(b)	RSS-247 5.4(d)	Maximum peak conducted output power	C	
15.247(d)	RSS-247 5.5	Unwanted emission	C	
15.209	RSS-Gen 6.13	Transmitter emission	C	Radiated
15.207(a)	RSS-Gen 8.8	AC Conducted Emission	C	Line Conducted
Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable				
Note 2: The data in this test report are traceable to the national or international standards.				
Note 3: The sample was tested according to the following specification: FCC Part 15.247, ANSI C63.10-2013, RSS-247 Issue 3, RSS-Gen Issue 5.				
Note 4: The tests were performed according to the method of measurements prescribed in KDB No.558074.				
Note 5: This equipment has been tested in a 100% duty cycle transmission situation using applicant supplied software.				

3.2 Mode of operation during the test

The EUT is operated in a manner representative of the typical of the equipments.
During at testing, system components were manipulated within the confines of typical usage to maximize each emission. All modulation modes were tests.
The results are only attached worst cases.

Test Frequency & Bandwidth

802.11b/g/n

Bandwidth	Lowest channel	Middle channel	Highest channel
20 MHz	2 412 MHz	2 437 MHz	2 462 MHz

802.11n

Bandwidth	Lowest channel	Middle channel	Highest channel
40 MHz	2 422 MHz	2 437 MHz	2 452 MHz

Test mode & Worst case

Test mode	Modulation	Data rate (Worst case)	Duty Cycle	Duty Cycle Factor
802.11b	DSSS	11 Mbps	100 %	0 dB
802.11g	OFDM	6 Mbps	100 %	0 dB
802.11n_HT20	OFDM	MCS 0	100 %	0 dB
802.11n_HT40	OFDM	MCS 0	100 %	0 dB

3.3 Device Modifications

The following modifications were necessary for compliance:

Not applicable

3.4 Measurement Uncertainty

The value of the measurement uncertainty for the measurement of each parameter.
Coverage factor k = 2, Confidence levels of 95 %

Description	Uncertainty
Conducted RF Output Power	1.5 dB (C.L.: Approx. 95 %, k = 2)
Power Spectral Density	1.5 dB (C.L.: Approx. 95 %, k = 2)
Occupied Bandwidth	0.1 MHz (C.L.: Approx. 95 %, k = 2)
Unwanted Emission(conducted)	3.0 dB (C.L.: Approx. 95 %, k = 2)
Radiated Emissions (f ≤ 1 GHz)	3.82 dB (C.L.: Approx. 95 %, k = 2)
Radiated Emissions (f > 1 GHz)	4.50 dB (C.L.: Approx. 95 %, k = 2)
Line Conducted Emission	2.00 dB (C.L.: Approx. 95 %, k = 2)

3.5 Test Software

automation program

Conducted Test	Ics Pro Ver. 6.0.3
Radiated Test	EP5RE Ver. 6.0.10, ES10 Ver. 10.001
Line Conducted Test	EMC32 Ver. 10.50.00

3.6 Testing Environment

Test Item	Test Date	Temperature (℃)	Relative Humidity (%)
6 dB Bandwidth	2024-11-28	22	37
Maximum Output Power	2024-11-28	22	37
Conducted Spurious emission	2024-11-28	22	37
Unwanted Emission(Conducted)	2024-11-28	22	37
Transmitter Power Spectral Density	2024-11-28	22	37
Radiated Emissions (f > 1GHz)	2024-12-21	20	28
Radiated Emissions (f < 1GHz)	2024-12-04, 2024-12-11	22, 21	40, 37
AC Conducted Emissions	2024-12-04	24	25

4. Technical Characteristic Test

4.1 6dB Bandwidth & 99% Bandwidth

Test Procedures

KDB 558074 - Section 8.2
ANSI C63.10-2013 - Section 11.8.2

Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Test Procedures

ANSI C63.10-2013 - Section 6.9
RSS-Gen – Section 6.7

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission.
Use the 99% power bandwidth function of the instrument and report the measured bandwidth.

Test Settings :

Center frequency = the highest, middle and the lowest channels

a) RBW = 100 kHz (6dB Bandwidth)
1% to 5% of the OBW kHz
(99% Bandwidth)

b) VBW ≥ 3 x RBW

c) Detector = peak

d) Trace mode = Max hold

e) Sweep = auto couple

f) Allow trace to fully stabilize

g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Minimum Standard :

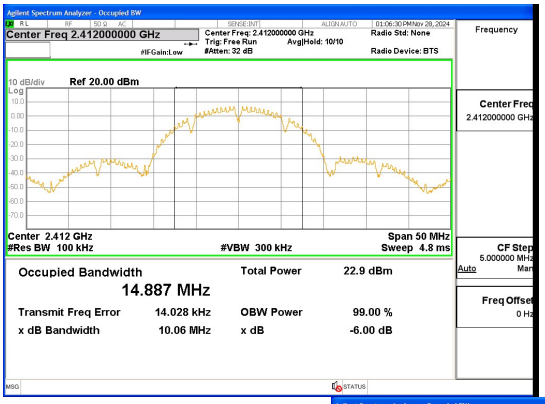
6 dB Bandwidth	>	500kHz

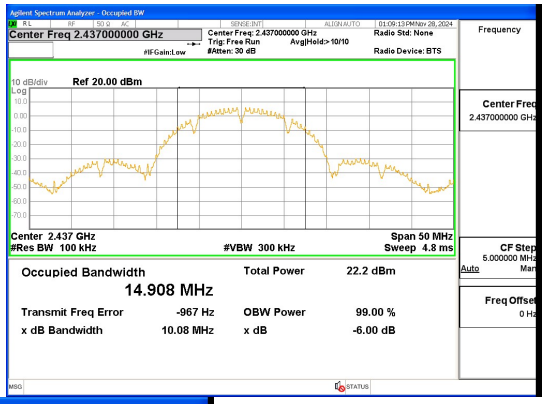
Test Data :

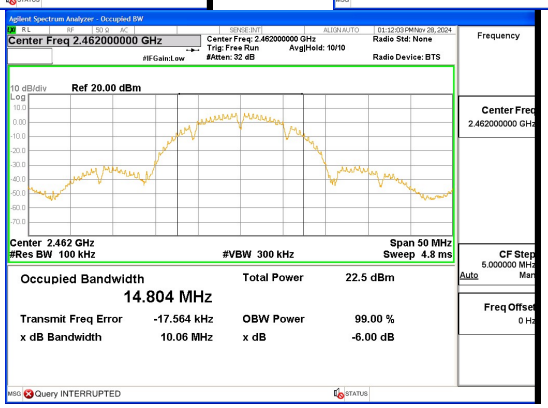
Mode	6 dB Bandwidth and 99 % Bandwidth (MHz)					
	802.11b		802.11g		802.11n_HT20	
Frequency	6 dB	99 %	6 dB	99 %	6 dB	99 %
2 412 MHz	10.06	14.917	16.38	17.192	17.56	18.331
2 437 MHz	10.08	14.976	16.40	17.338	17.57	18.227
2 462 MHz	10.06	14.866	16.39	17.107	17.57	18.111

Mode	6 dB Bandwidth and 99 % Bandwidth (MHz)	
	802.11n_HT40	
Frequency	6 dB	99 %
2 422 MHz	35.41	35.866
2 437 MHz	35.42	35.991
2 452 MHz	35.21	35.983

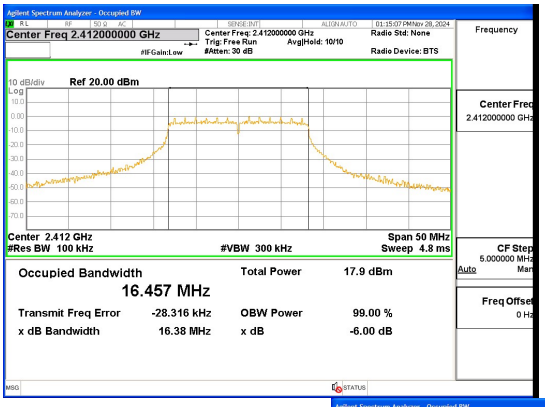
See next pages for actual measured spectrum plots.

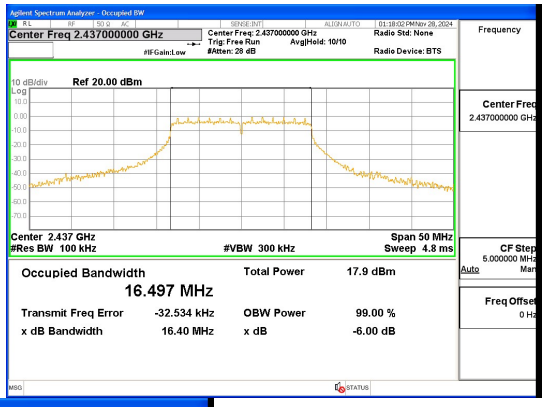


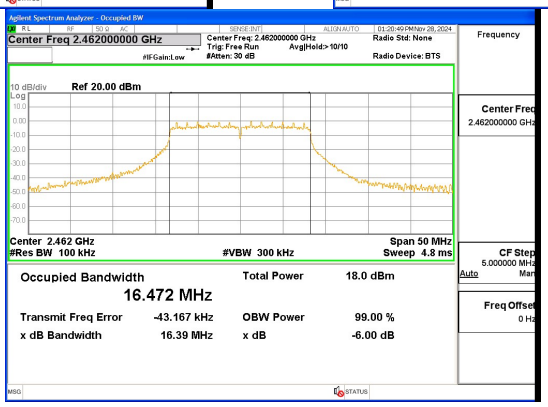




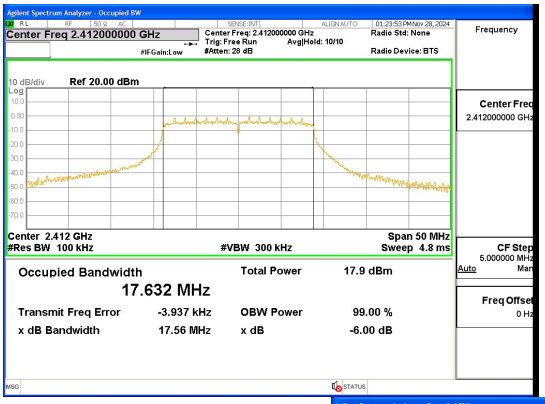
802.11b, 6dB Bandwidth

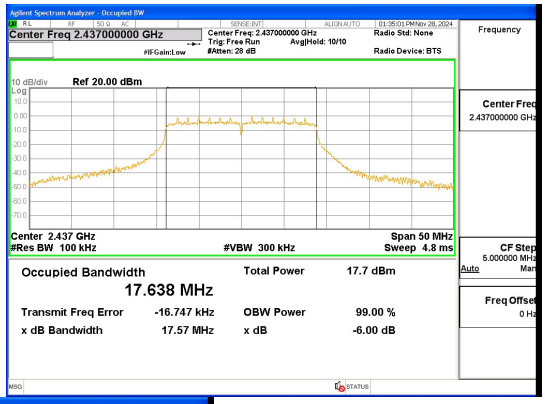


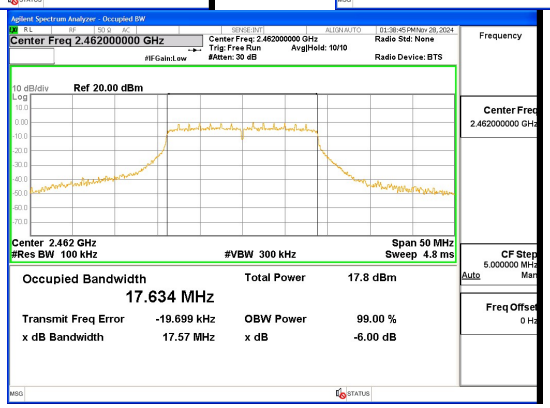




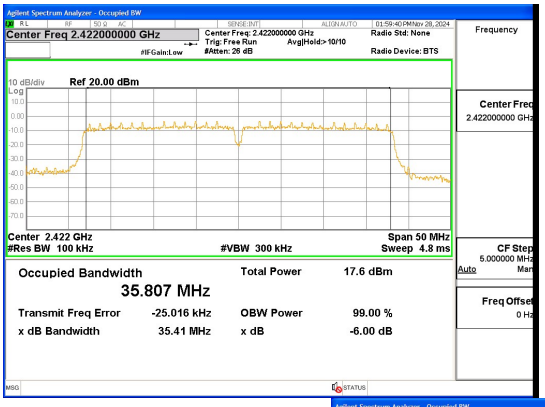
802.11g, 6dB Bandwidth

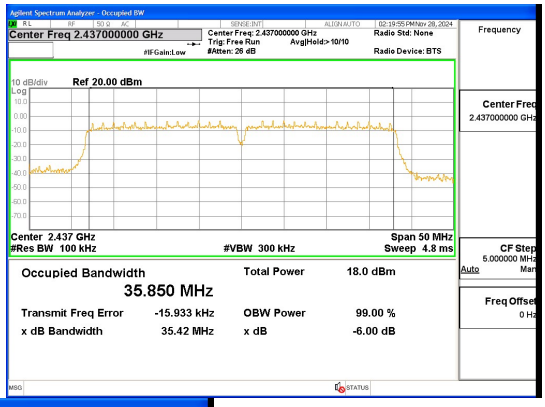


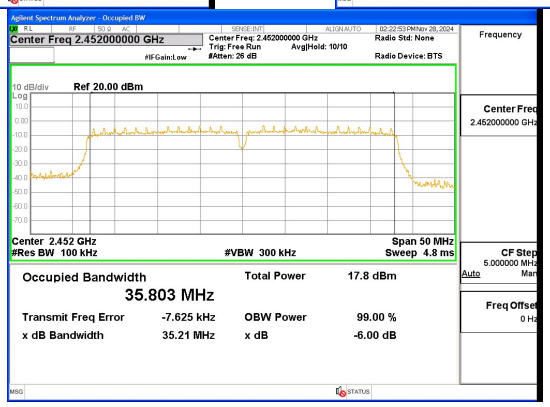




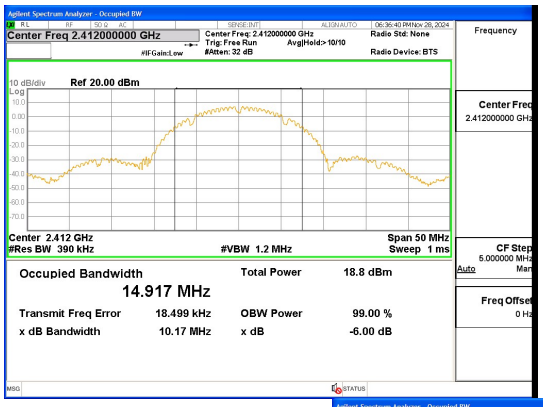
802.11n_HT20, 6dB Bandwidth

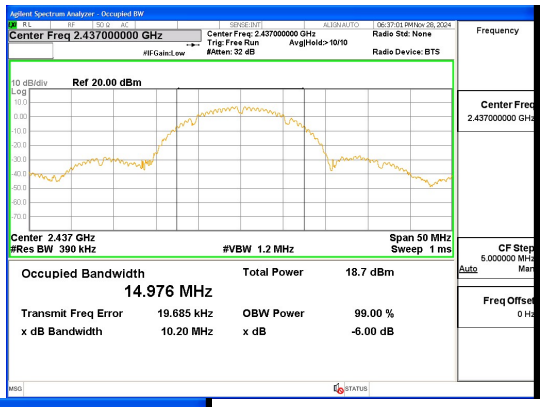


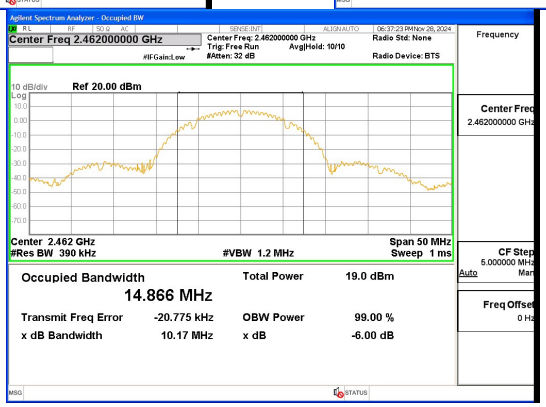




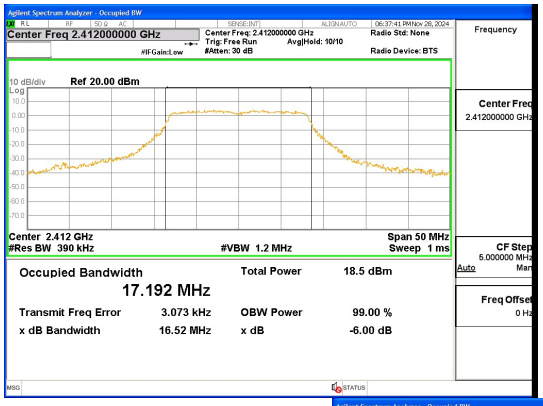
802.11n_HT40, 6dB Bandwidth

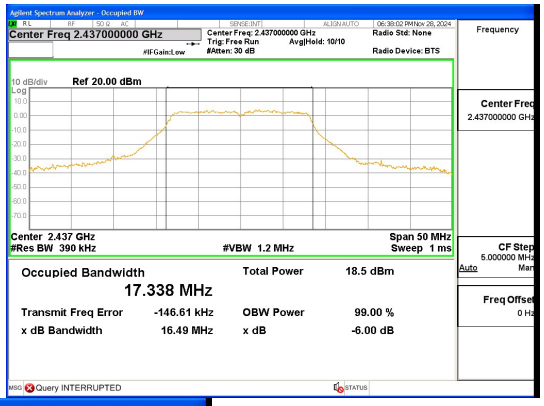


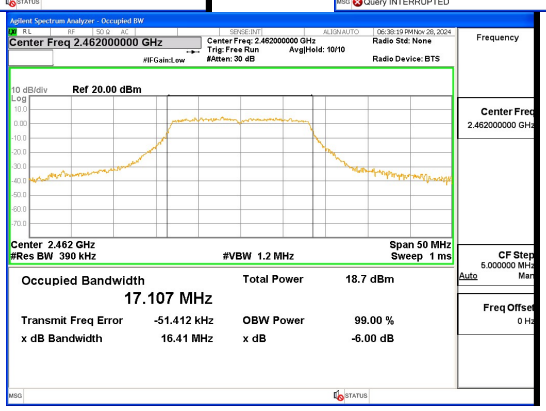




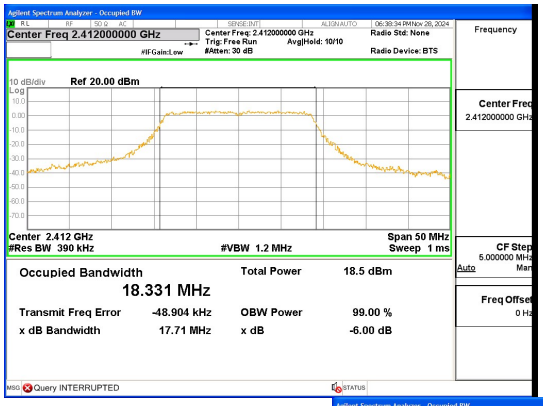
802.11b, 99% Bandwidth

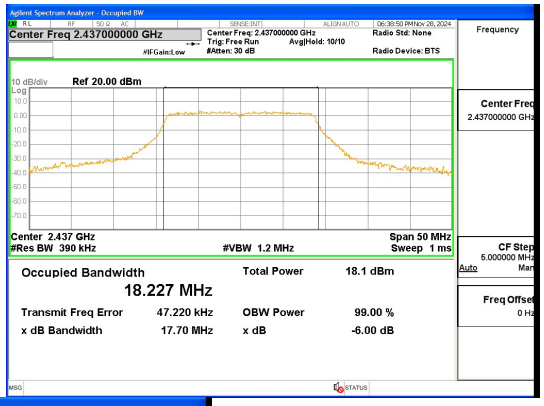


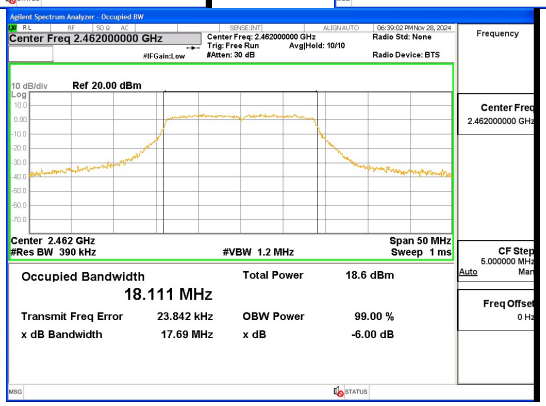




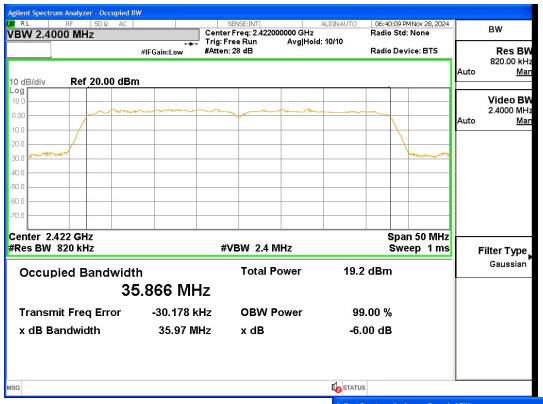
802.11g, 99% Bandwidth

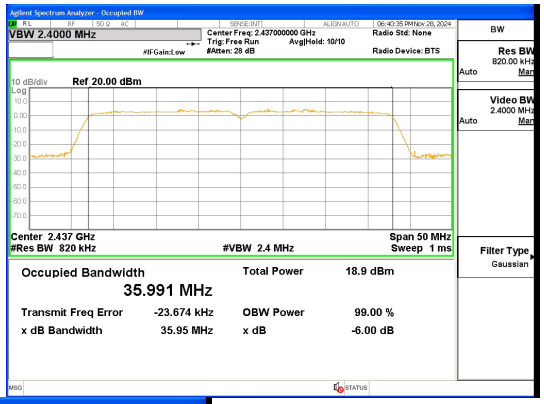


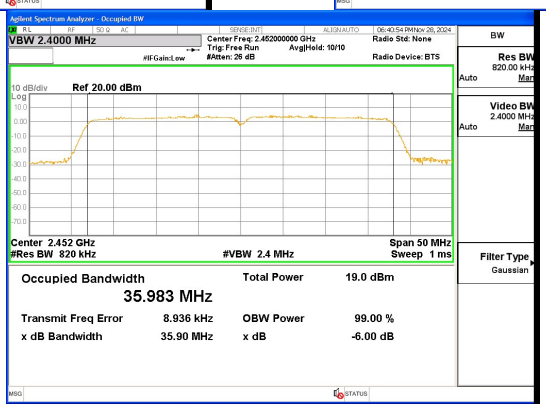




802.11n_HT20, 99% Bandwidth







802.11n_HT40, 99% Bandwidth

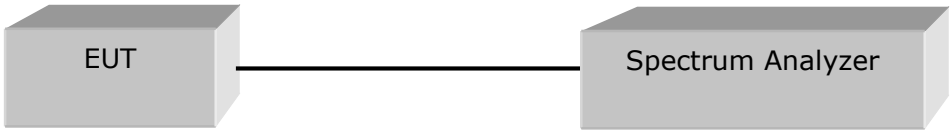
4.2 Maximum peak conducted output power

Test Procedures

<802.11b/g/n mode>

KDB 558074 - Section 8.3.2.2 (Average Power)
ANSI C63.10-2013 - Section 11.9.2.2

The transmitter output is connected to a spectrum analyzer and the analyzer's internal channel power integration function is used to integrate the power over a bandwidth greater than or equal to the 99% bandwidth.



Test Settings:

Center frequency = the highest, middle and the lowest channels

a) span ≥ 1.5 x OBW
b) RBW = 1 MHz
c) VBW ≥ 3 x RBW
d) Sweep time = auto
e) Detector = RMS
f) average at least 100
g) Duty cycle factor = 10log(1/x)

Test mode	Duty Cycle Factor
802.11b	0.00 dB
802.11g	0.00 dB
802.11n_HT20	0.00 dB
802.11n_HT40	0.00 dB

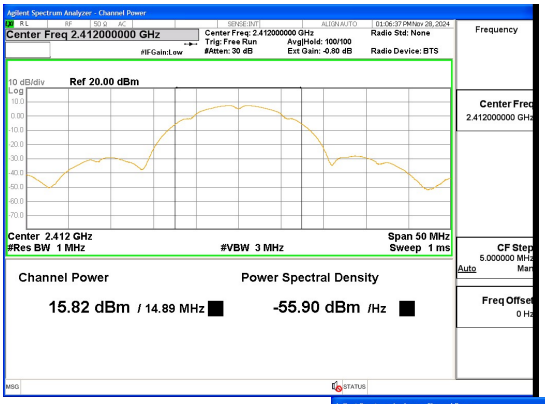
Limit

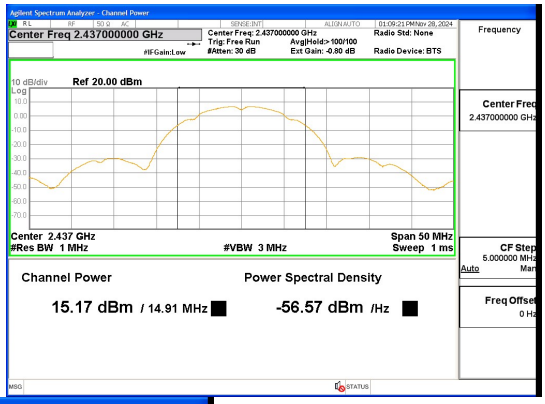
Operating Mode	Mode	ANT Gain (dBi)	Limit (dBm)
SISO	802.11b/g/n	3.35	30.00

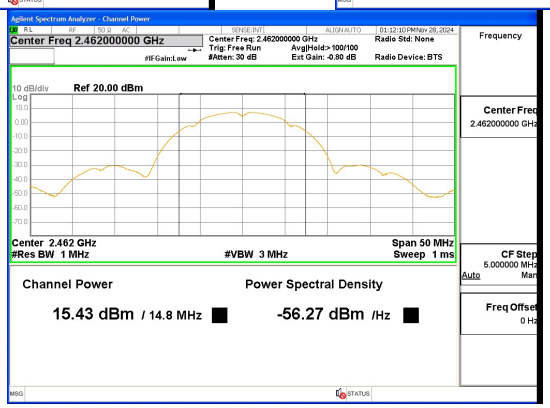
Test Data :

Test Mode	Frequency (MHz)	Measured Output Power (dBm)	Duty cycle Factor (dB)	Result Output Power (dBm)	Limit (dBm)	Margin (dB)
802.11b	2 412	15.82	0.00	15.82	30.00	14.18
	2 437	15.17	0.00	15.17	30.00	14.83
	2 462	15.43	0.00	15.43	30.00	14.57
802.11g	2 412	10.97	0.00	10.97	30.00	19.03
	2 437	10.87	0.00	10.87	30.00	19.13
	2 462	11.15	0.00	11.15	30.00	18.85
802.11n _HT20	2 412	10.89	0.00	10.89	30.00	19.11
	2 437	10.67	0.00	10.67	30.00	19.33
	2 462	11.07	0.00	11.07	30.00	18.93
802.11n _HT40	2 422	10.51	0.00	10.51	30.00	19.49
	2 437	10.89	0.00	10.89	30.00	19.11
	2 452	10.75	0.00	10.75	30.00	19.25

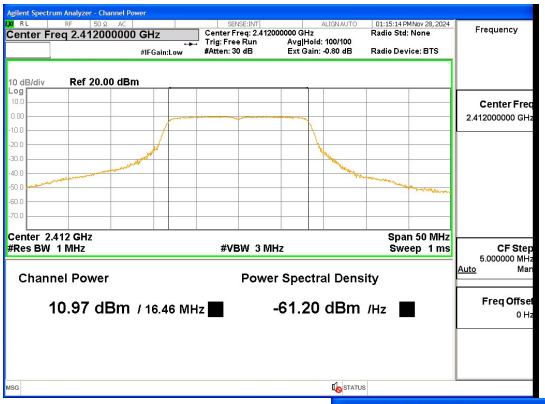
See next pages for actual measured spectrum plots.

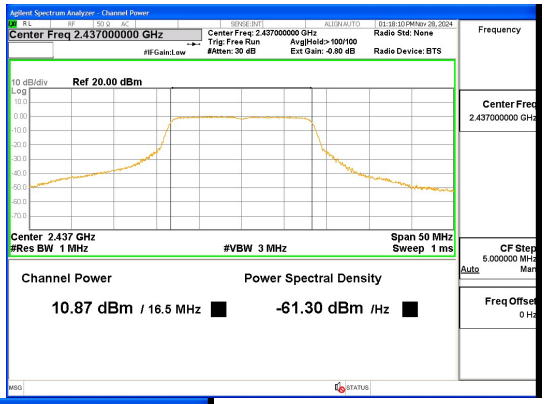


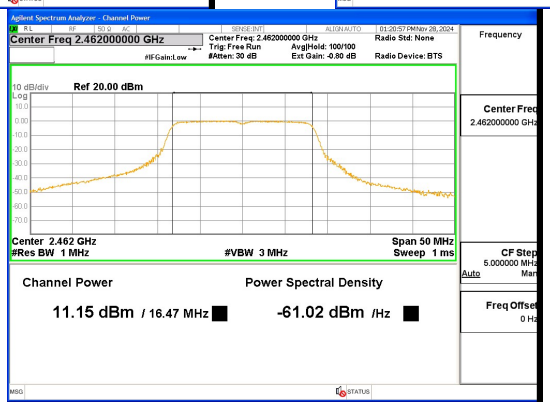




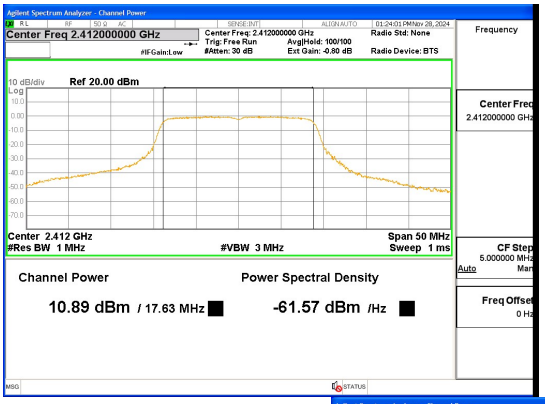
802.11b

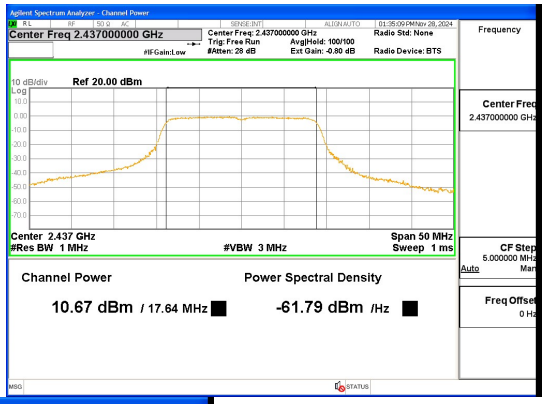


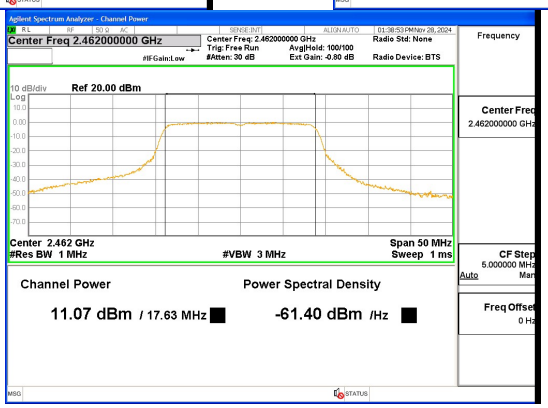




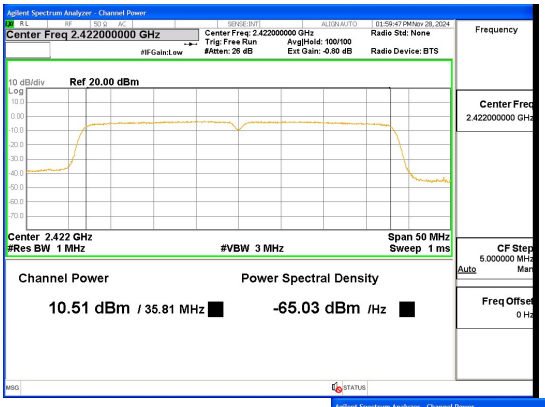
802.11g

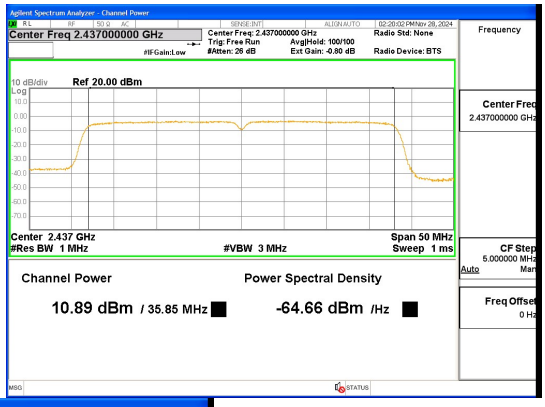


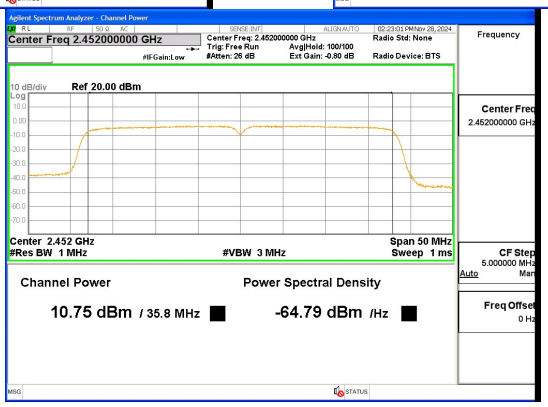




802.11n_HT20







802.11n_HT40