RF Test Report

2.4 GHz Bluetooth

Report No.	:	FCCCBNW-WAY-P23110165-2R1
Customer	:	Pittasoft Co., Ltd.
Address	:	A 4th floor, ABN Tower, 331, Pangyo-ro, Bundang-gu Seongnam-si, Gyeonggi-do South Korea
Use of Report	:	Certification
Model Name	:	DR970X Plus
FCC ID	:	YCK-DR970XP
Date of Test	:	2023.11.15 to 2024.01.22
Test Method Used	:	FCC 47 CFR PART 15 Subpart C (Section §15.247) KDB558074 D01v05r02, ANSI C63.10-2013
Testing Environment	:	Refer to the Test Condition

Test Result : ☒ **Pass** ☐ **Fail**

ISSUED BY:	BV CPS ADT Korea Ltd., EMC/RF Laboratory
ADDRESS:	Innoplex No.2 106, Sinwon-ro 306, Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea 16675
TEST LOCATION:	HeungAn-daero 49, DongAn-gu, Anyang-si, Gyeonggi-do, Korea, 14119

Tested by

Name : Kwangmin JUNG (Signature)

Technical Manager

Name : Donghwa SHIN (Signature)

2024. 01. 31

BV CPS ADT Korea Ltd.

RELEASE CONTROL RECORD

REPORT NO.	REASON FOR CHANGE	DATE ISSUED
FCCCBNW-WAY-P23110165-2	Original release	2024.01.26
FCCCBNW-WAY-P23110165-2R1	Update the test report	2024.01.31

Table of Contents

1 Summary of Test Results

The EUT has been tested according to the following specifications

Applied Standard : FCC Part 15, Subpart C 15.247					
FCC Part Section(s)	**Test Description**	**Limit**	**Test Condition**	**Test Result**	**Reference**
15.247(a)	Carrier Frequency Separation	>= 25 kHz or >= Two thirds of the 20 dB BW, whichever is greater.	Conduted	PASS	Section 3.4
15.247(a)	Number of Hopping Frequencies	>= 15 hops		PASS	Section 3.5
15.247(a)	20 dB Bandwidth	N/A		PASS	Section 3.2
15.247(a)	Dwell Time	=< 0.4 seconds		PASS	Section 3.6
15.247(b)	Transmitter Output Power	=< 1 Watt , if CHs >= 75 Others =< 0.125 W		PASS	Section 3.3
15.247(d)	Conducted spurious emissions	≥ 20 dBc In any 100 kHz bandwidth		PASS	Section 3.7
15.205 15.209	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in Restricted bands must meet the radiated limits detailed in 15.209	Radiated	PASS	Section 3.7
15.207	AC Conducted Emissions (150 kHz – 30 MHz)	< FCC 15.207 limits	AC Line Conduted	NA[Note3)]	Section 3.8
15.203	Antenna Requirement	FCC 15.203	-	PASS	Section 3.1

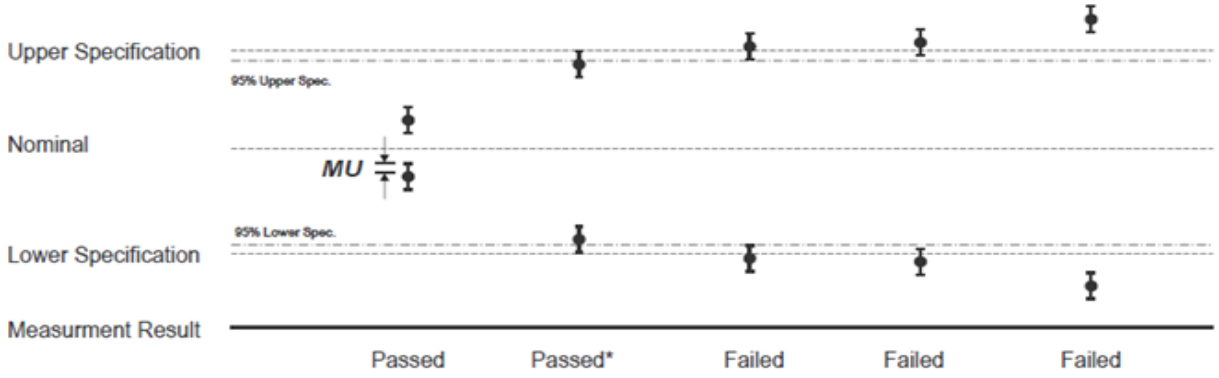
NOTES

1) The general test methods used to test on this devices are ANSI C63.10.

2) Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

3) This Devices which only employ battery power for operation.

1.1 Decision Rules for Statement of Conformity



QUA-52 Decision Rule(QA Document) was applied.

Step 1) : Reference Check, Daily Check, Peripheral device Check

Step 2) : Re-test Procedure (Repeat the test maximum 3 times, Different Test Engineer)

1) If the original test results are subject to retesting and the judgement is unclear, the retest is carried out.
2) If the result of the first retest is the same as the initial test, the judgement is made based on the value.
3) If the result of the first retest differ from the results of the initial test, the second re-test is carried out.
4) After completion of the second retest, the average of the three test results is determined as the final result. However, if the deviation of the three test values is more than 5 % of the reference value, the technical manager should review the reproducibility of the test from the beginning.

1.2 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2

Measurement Items	Frequency Range	Expanded Uncertainty U = *k*Uc (*k* = 2)
Radiated Spurious Emissions	9 kHz – 30 MHz	2.00
	30 MHz – 1 GHz	4.22
	1 GHz – 18 GHz	5.40
	18 GHz – 26.5 GHz	5.08
Measurement Items		**Expanded Uncertainty U = *k*Uc (*k* = 2)**
Conducted	Maximum Output Power	1.20
	Spurious Emissions	1.36

This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of k = 2.

2 General Information

2.1 General Description of EUT

Equipment Class	Sperad Spectrum Transmitter (DSS)
Product name	CAR DASHCAM
FCC ID	YCK-DR970XP
Model	DR970X Plus
Additional model name	DR970X-1CH Plus, DR970X-2CH Plus, DR970X-2CH IR Plus, DR970X-2CH Truck Plus, DR970X-2CH DMS Plus
Power Supply	DC 12 V , DC 24V
Modulation Type	GFSK, π/4DQPSK, 8DPSK
Transfer Rate	1Mbps, 2Mbps, 3Mbps
Operating Frequency	2 402 MHz to 2 480 MHz
Output Power	8.62 dBm
Antenna Type	Chip Antenna
Antenna Gain	-1.79 dBi
H/W Version	1.0
S/W Version	1.0

NOTE 1: For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

NOTE 2: For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

2.2 Tested sample and Tested companion device information

Type	Model	Note
Test sample (Conducted)	DR970X Plus	S/N: 97XPK3MAE00210
Test sample (Radiated)	DR970X Plus	S/N: 97XPK3MAE00213

2.3 Description of Test Mode

The EUT has been tested with all modes of operating conditions to determine the worst case emission characteristics.

Test Mode		Tested Frequency (MHz)		
TM 1	GFSK (1Mpbs)	2 402	2 440	2 480
TM 2	π/4DQPSK (2Mbps)	2 402	2 440	2 480
TM 3	8DPSK (3Mbps)	2 402	2 440	2 480

Note: A test was performed for each voltage.

Information about the FHSS characteristics

A) The hopping sequence is pseudorandom

Note 1 : Pseudorandom Frequency Hopping Sequence Table as below:

Channel: 08, 24, 40, 56, 42, 54, 72, 09, 01, 11, 33, 41, 34, 42, 65, 73, 53, 69, 06, 22, 04, 20, 36, 52, 38, 46, 70, 78, 68, 76, 21, 29, 10, 26, 41, 58, 44, 60, 76, 13, 03, 11, 35, 43, 37, 45, 69, 77, 52, 71, 08, 24, 06, 24, 48, 56, 45, 46, 70, 01, 72, 06, 25, 33, 12, 28, 49, 60, 45, 58, 74, 13, 05, 18, 37, 49 etc

The System receiver have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shift frequencies in synchronization with the transmitted signals.

B) All channels are used equally on average

C) The receiver input bandwidth equals the transmit bandwidth

D) The receiver hops in sequence with the transmit signal

2.4 INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipments, which is traceable to recognized national standards.

2.5 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

2.6 General Description of Applied Standards

Generally the tests were performed according to the specifications of the standard, it must comply with the requirements of the following standards.

FCC CFR 47 Part 15, Subpart C (§15.247)
KDB 558074 D01 15.247 Meas Guidance v05r02
ANSI C63.10-2013

All test items in this test report have been performed and recorded as per the above standards.

2.7 Test Equipment

Test Equipment is traceable to the National Institute of Standards and Technology (NIST). Measurement antenna used during testing were calibrated in accordance to the requirements of ANSI C63.5-2017.

Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
Spectrum Analyzer	R&S	FSW50	101403	2024-11-22
Signal Analyzer	R&S	FSV30	103017	2024-11-22
Signal Analyzer	Keysight Technologies	N9020B	MY62150135	2024-05-25
Signal Analyzer	Keysight Technologies	N9030B	MY57142476	2024-11-22
MXG Vector Signal Generator	Keysight Technologies	N5182B	MY53051310	2024-11-22
Signal Generator	R&S	SMB100A	MY41006053	2024-05-25
DC Power Supply	Keysight Technologies	E3632A	MY62216181	2024-05-25
Attenuator	Aeroflex	40AH2W-10	1	2024-11-22
True-RMS Digital Multimeter	Fluke	177	43240434	2024-05-25
High Pass Filter	Micro-Tronics	HPM17543	28	2024-05-25
High Pass Filter	Wt Microwave	WT-A1698-HS	WT190313-6-4	2024-11-22
Humidity Barometer TEMP Meter	LUTRON	MHB-382SD	AJ.38475	2024-11-21
Humidity Barometer TEMP Meter	LUTRON	MHB-382SD	AJ.38459	2023-11-29
EMI Test Receiver	R&S	ESW8	101170	2024-11-21
EMI Test Receiver	R&S	ESW44	101812	2024-11-22
Active Loop Antenna	R&S	HFH2-Z2E	100881	2025-02-03
Trilog Antenna (with 6 dB ATT.)	Schwarzbeck	VULB 9163	1100	2025-02-08
Horn Antenna	R&S	HF907	102773	2024-12-05
BBHA 9170 Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	00955	2024-11-27
Signal Conditioning Unit	R&S	SCU-18F	180112	2024-11-21
Signal Conditioning Unit	R&S	SCU08F2	08400015	2024-11-21
Amplifier	L3 Narda-MITEQ	JS44-18004000-33-8P	2142086	2024-11-22
Power Meter	R&S	NRX	103577	2024-11-22
Power Sensor	R&S	NRP-Z211	102377	2024-11-22
EMC 32	R&S	EMC32	1000	-
EMC 32	R&S	EMC32	1040	-

3 Test Results

3.1 Antenna Requirement

Except from §15.203 of the FCC Rules/Regulations:

An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of the section.

- The antenna(s) of the EUT are Permanently attached.
- There are no provisions for connection to an external antenna.

Result
The EUT complies with the requirement of §15.203

3.2 20 dB Bandwidth

3.2.1 Regulation

§15.247(a)(1) : Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

3.2.2 Test Procedure

The 20 dB bandwidth & Occupied bandwidth were measured with a spectrum analyzer connected to RF antenna Connector(conducted measurement) while EUT was operating in transmit mode. The analyzer center frequency was set to the EUT carrier frequency, using the analyzer.
The bandwidth of the fundamental frequency was measured with the spectrum analyzer using below setting:

RBW = 1% to 5% of the 20 dB BW & Occupied BW

VBW ≥ 3 × RBW

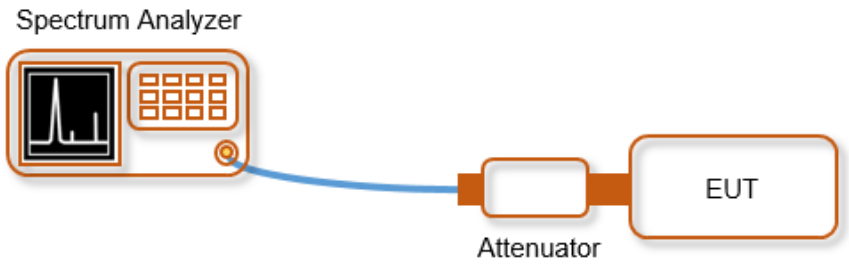
Span = between two times and five times the 20 dB bandwidth & Occupied BW

Sweep = auto

Detector function = peak

Trace = max hold

3.2.3 Test Setup

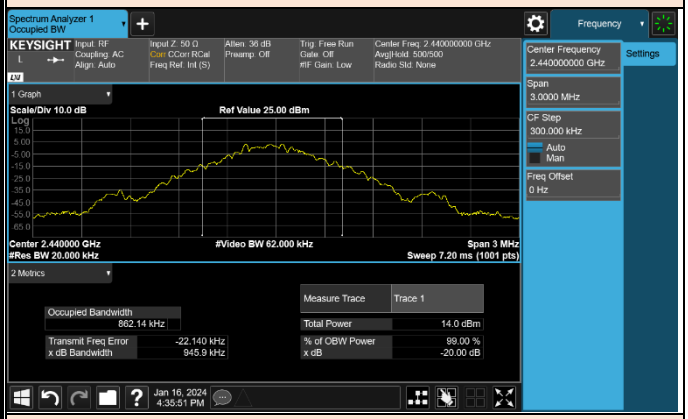


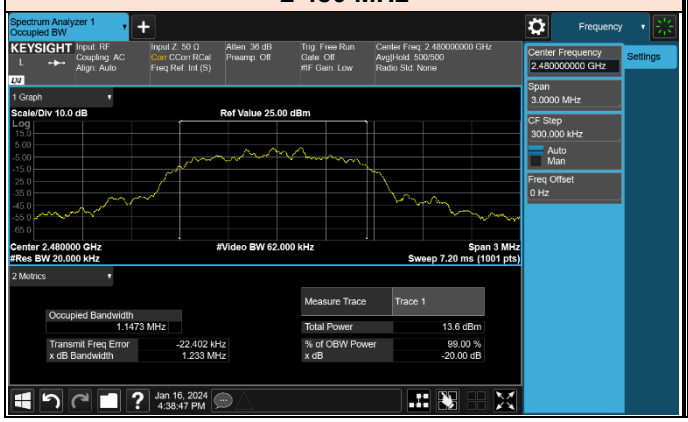
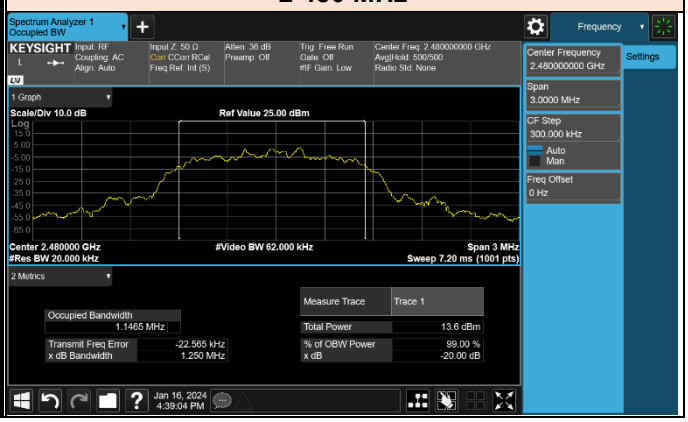
3.2.4 Test Result

[Test Data of 20 dB Bandwidth]

Test Mode	Tested Frequency	20 dB Bandwidth [MHz]	
		12 V	24 V
TM 1	2 402	0.947	0.945
	2 440	0.947	0.946
	2 480	0.946	0.944
TM 2	2 402	1.245	1.231
	2 440	1.247	1.233
	2 480	1.233	1.250
TM 3	2 402	1.247	1.246
	2 440	1.251	1.249
	2 480	1.249	1.248

[Test Plot of 20 dB Bandwidth]

TM 1	
12 V	24 V
2 402 MHz	2 402 MHz
	
2 440 MHz	2 440 MHz
	
2 480 MHz	2 480 MHz
	

TM 2	
12 V	24 V
2 402 MHz	2 402 MHz
	
2 440 MHz	2 440 MHz
	
2 480 MHz	2 480 MHz
	

TM 3	
12 V	24 V
2 402 MHz	2 402 MHz
	
2 440 MHz	2 440 MHz
	
2 480 MHz	2 480 MHz
	

3.3 Maximum Peak Output Power

3.3.1 Regulation

§15.247(a)(1) : Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

§15.247(b)(1) : For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

§15.247(b)(4) : The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.3.2 Test Procedure

The method of measurement used to test this FHSS device is ANSI C63.10-2013

This is an RF conducted test to evaluate maximum peak output power. Use a direct connection between the antenna port of the unlicensed wireless device and the spectrum analyzer, through suitable attenuation.

a) Use the following spectrum analyzer settings:

Peak Power Measurement

1) Span : Approximately five times the 20 dB bandwidth, centered on hopping channel.
2) RBW > 20 dB bandwidth of emission being measured.
3) VBW ≥ RBW.
4) Sweep : Auto.
5) Detector function : Peak.
6) Trace : Max hold.

b) Allow trace to stabilize

c) Use the marker-to-peak function to set the marker to the peak of the emissions

d) The indicated level is the peak output power, after any corrections for external attenuators and cables.

e) A plot of the test results and setup description shall be included in the test report.

Average Power Measurement
Measurement using a power meter.

a) Averge Power measurement using an RF average power meter, as follows:

1) The EUT is configured to transmit continuously, or to transmit with a constant duty cycle.

2) At all times when the EUT is transmitting, it shall be transmitting at its maximum power control level.

3) The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.

b) If the transmitter does not transmit continuously, measure the duty cycle, D, of the transmitter output signal.

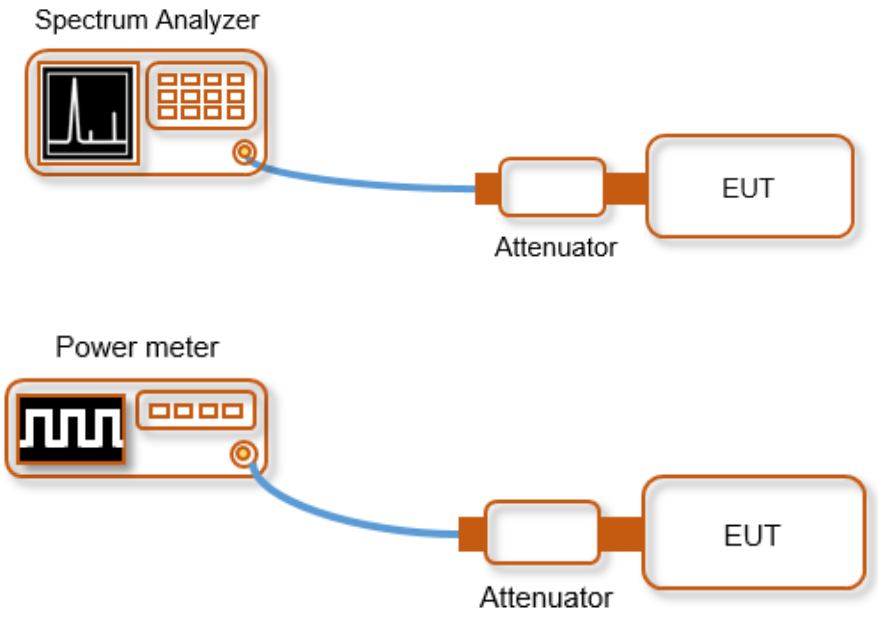
c) Measure the average power of the transmitter.

d) This measurement is an average over both the ON and OFF periods of the transmitter.

e) Correct the measurement in dBm by adding [10 log (1 / D)], where D is the duty cycle.

f) Please refer D value at page 11 2.4 Duty cycle of test signal.

3.3.3 Test Setup



3.3.4 Test Result

[Test Result of Peak Power & Average Power]

Limit: 0.125 Watt

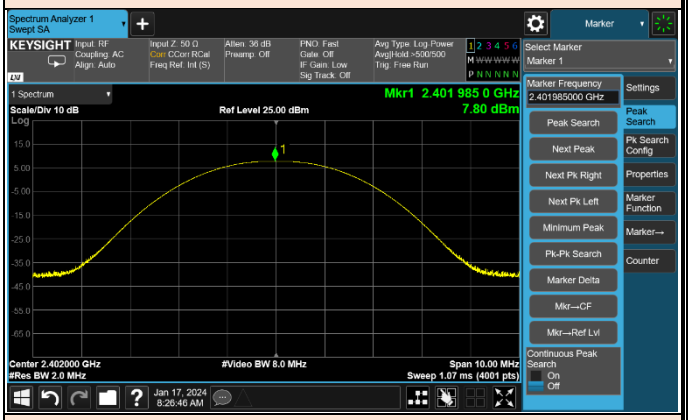
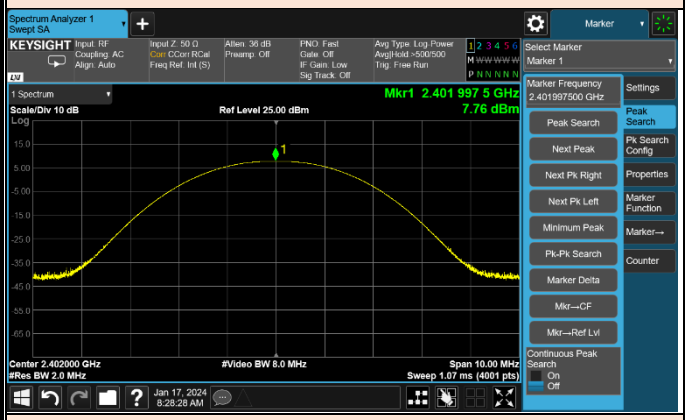
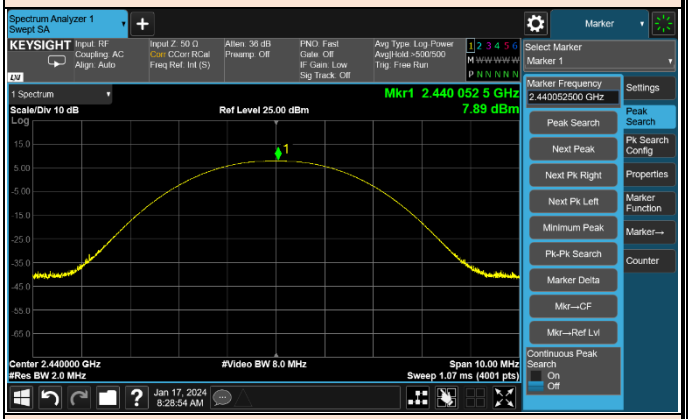
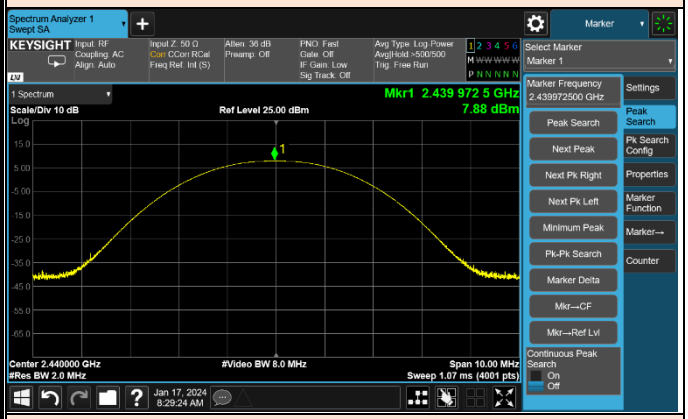
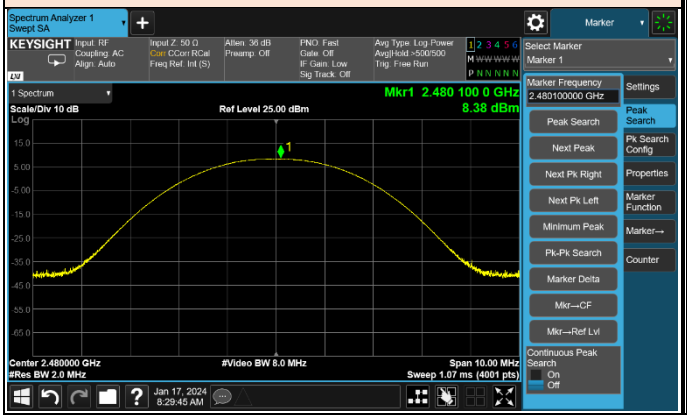
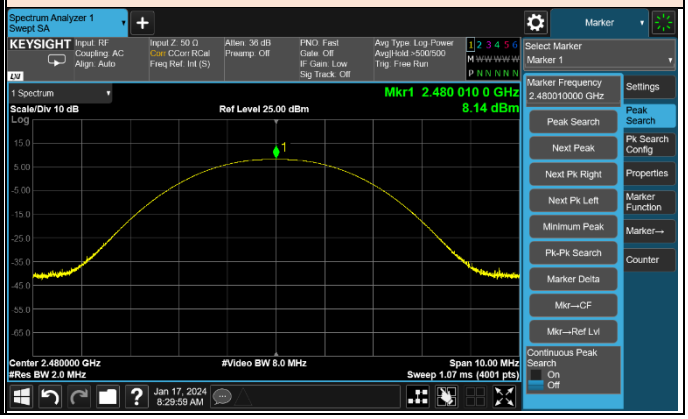
Test Mode	Tested Frequency	12 V			
		Measured Power [dBm]		Measured Power [mW]	
		PK	Average	PK	Average
TM 1	2 402	7.80	7.11	6.03	5.14
	2 440	7.89	7.33	6.15	5.41
	2 480	8.38	7.31	6.89	5.39
TM 2	2 402	7.78	4.74	6.00	2.98
	2 440	7.90	5.00	6.17	3.16
	2 480	8.16	5.06	6.55	3.21
TM 3	2 402	8.25	4.75	6.68	2.99
	2 440	8.35	4.97	6.84	3.14
	2 480	8.61	4.99	7.26	3.16

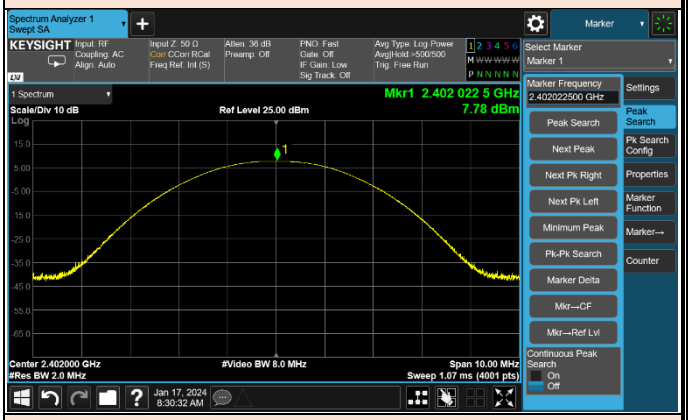
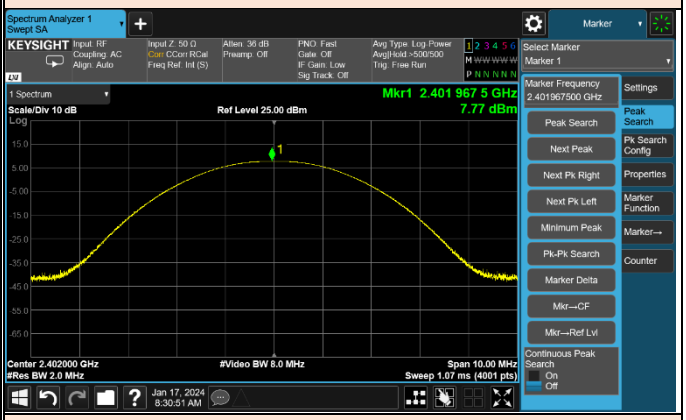
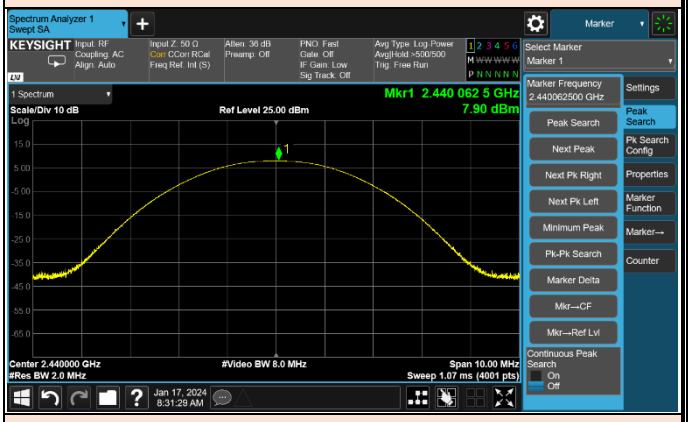
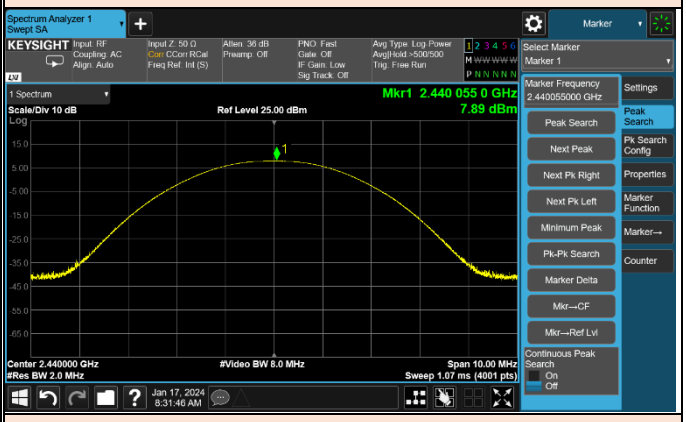
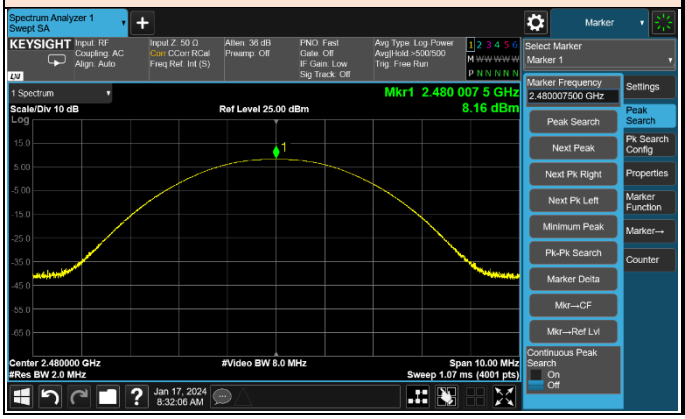
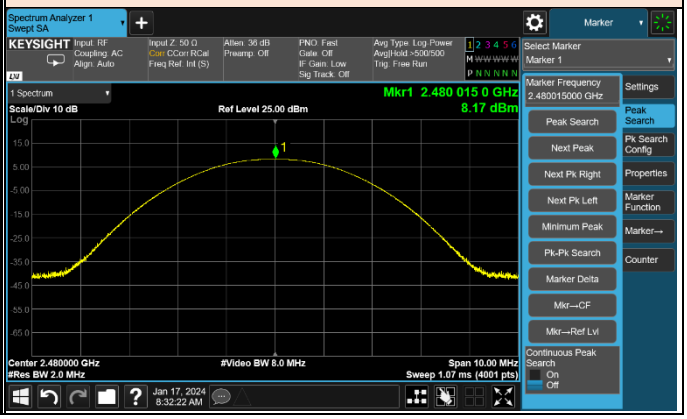
Note: Average Power = Measurement Average Power + Duty cycle factor.

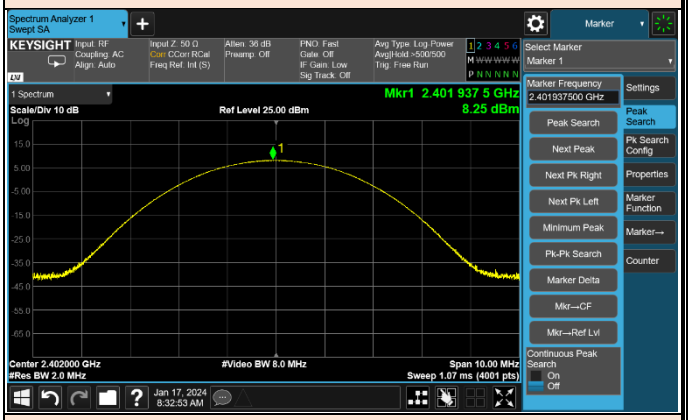
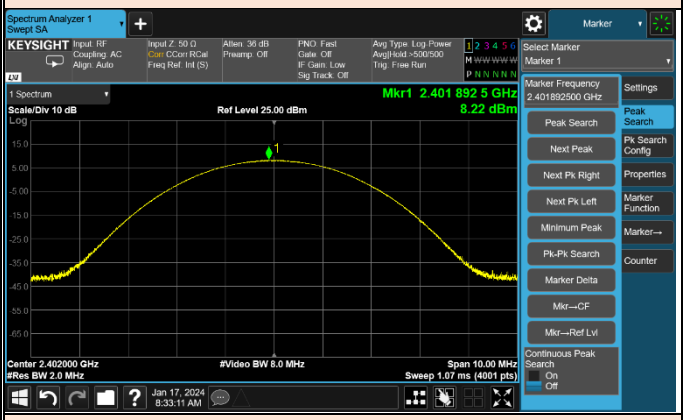
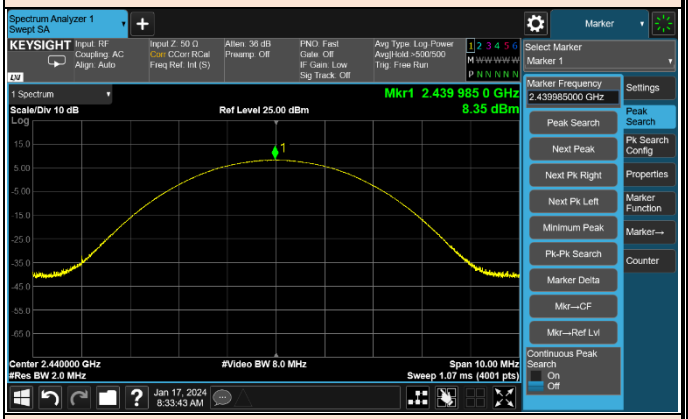
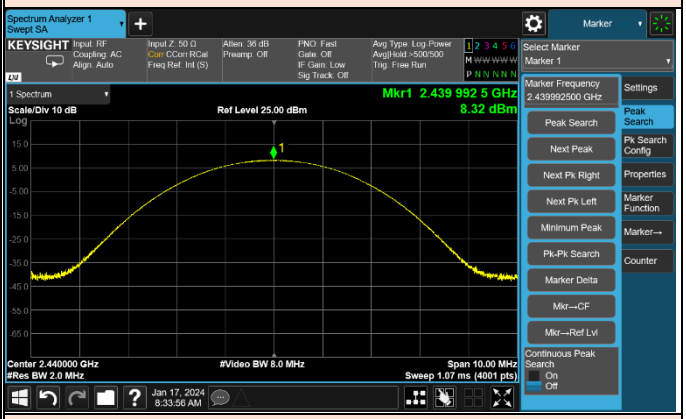
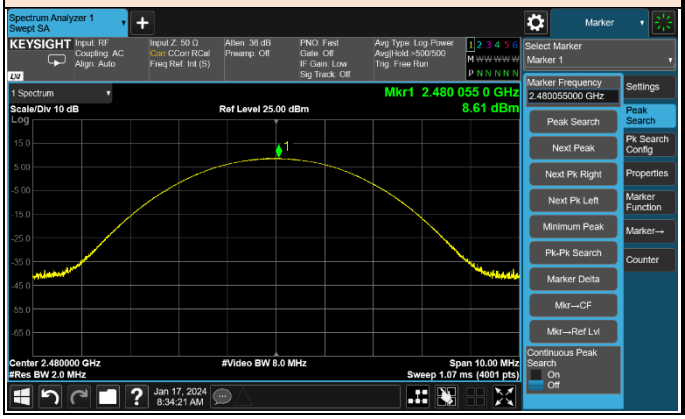
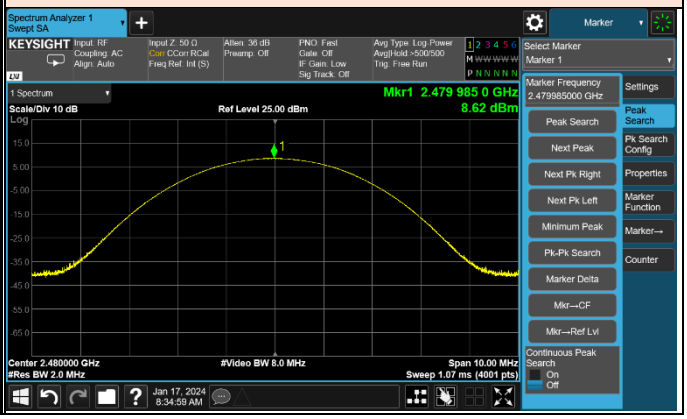
Test Mode	Tested Frequency	24 V			
		Measured Power [dBm]		Measured Power [mW]	
		PK	Average	PK	Average
TM 1	2 402	7.76	7.07	5.97	5.10
	2 440	7.88	7.28	6.14	5.35
	2 480	8.14	7.27	6.52	5.34
TM 2	2 402	7.77	4.73	5.98	2.97
	2 440	7.89	4.98	6.15	3.15
	2 480	8.17	5.00	6.56	3.16
TM 3	2 402	8.22	4.75	6.64	2.99
	2 440	8.32	4.97	6.79	3.14
	2 480	**8.62**	4.98	7.28	3.15

Note: Average Power = Measurement Average Power + Duty cycle factor.

[Test Plot of Peak Power]

TM 1	
12 V	24 V
2 402 MHz	2 402 MHz
	
2 440 MHz	2 440 MHz
	
2 480 MHz	2 480 MHz
	

TM 2	
12 V	24 V
2 402 MHz	2 402 MHz
	
2 440 MHz	2 440 MHz
	
2 480 MHz	2 480 MHz
	

TM 3	
12 V	24 V
2 402 MHz	2 402 MHz
	
2 440 MHz	2 440 MHz
	
2 480 MHz	2 480 MHz
	

3.4 Carrier Frequency Separation

3.4.1 Regulation

§15.247(a)(1) : Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

3.4.2 Test Procedure

The method of measurement used to test this FHSS device is ANSI C63.10-2013.

a) The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

b) Span: Wide enough to capture the peaks of two adjacent channels.

c) RBW: Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel.

d) Video (or average) bandwidth (VBW) ≥ RBW.

e) Sweep: Auto.

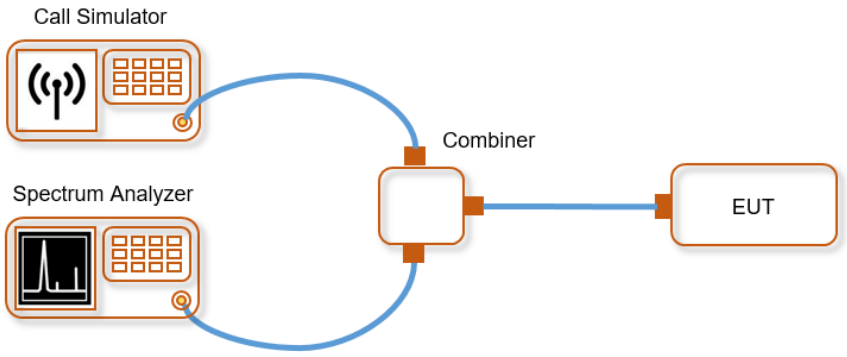
f) Detector function: Peak.

g) Trace: Max hold.

h) Allow the trace to stabilize.

i) Use the marker-delta function to determine the separation between the peaks of the adjacent channels. Compliance of an EUT with the appropriate regulatory limit shall be determined. A plot of the data shall be included in the test report.

3.4.3 Test Setup



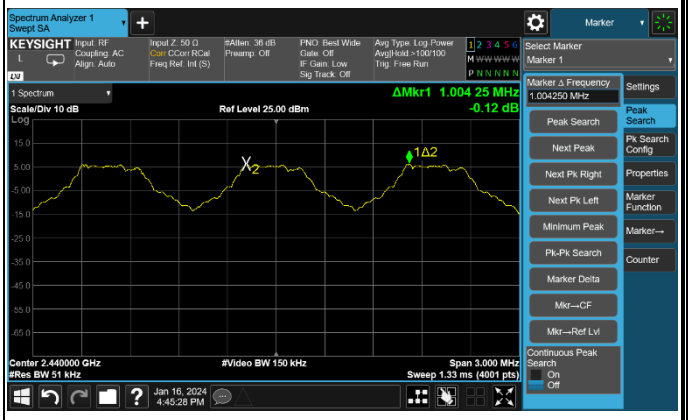
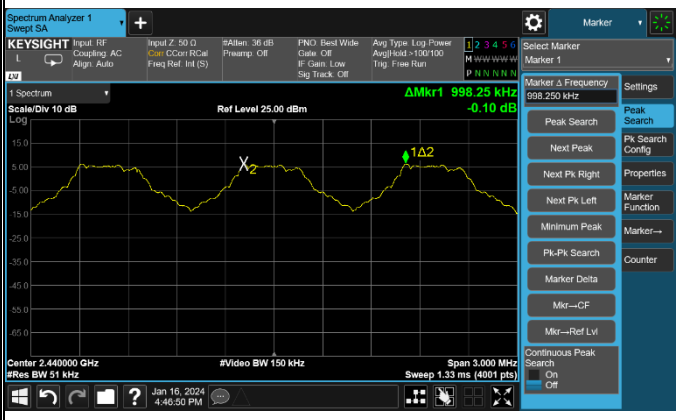
3.4.4 Test Result

[Test Result of Carrier Frequency Separation]

Limit : ≥ 25 kHz or ≥ Two-Thirds of the 20 dB BW whichever is greater

Test Mode	Tested Frequency	Measured Power [MHz]	
		12 V	24 V
TM 1	Hopping	1.004	0.998
TM 2	Hopping	0.999	1.001
TM 3	Hopping	0.997	1.000

[Test Plot of Carrier Frequency Separation]

12V	24V
TM 1	TM 1
	
TM 2	TM 2
	
TM 3	TM 3
	

3.5 Number of Hopping Channels

3.5.1 Regulation

§15.247(a)(1)(iii) : Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

§15.247(b)(1) : For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

3.5.2 Test Procedure

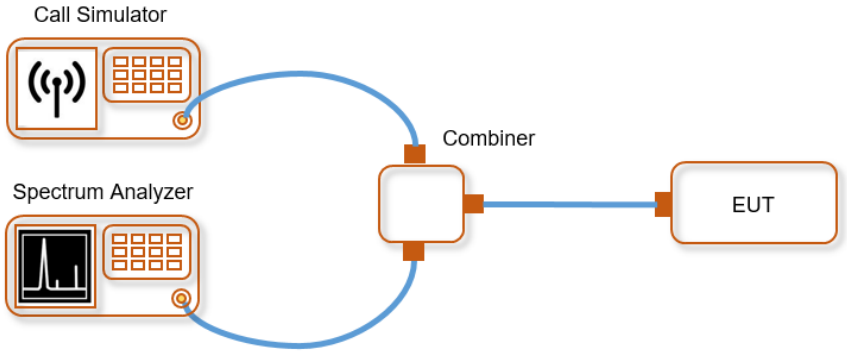
The method of measurement used to test this FHSS device is ANSI C63.10-2013.

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

a) Span: The frequency band of operation. Depending on the number of channels the device supports, it may be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen.
b) RBW: To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.
c) VBW ≥ RBW.
d) Sweep: Auto.
e) Detector function: Peak.
f) Trace: Max hold.
g) Allow the trace to stabilize.

It might prove necessary to break the span up into subranges to show clearly all of the hopping frequencies. Compliance of an EUT with the appropriate regulatory limit shall be determined for the number of hopping channels. A plot of the data shall be included in the test report.

3.5.3 Test Setup



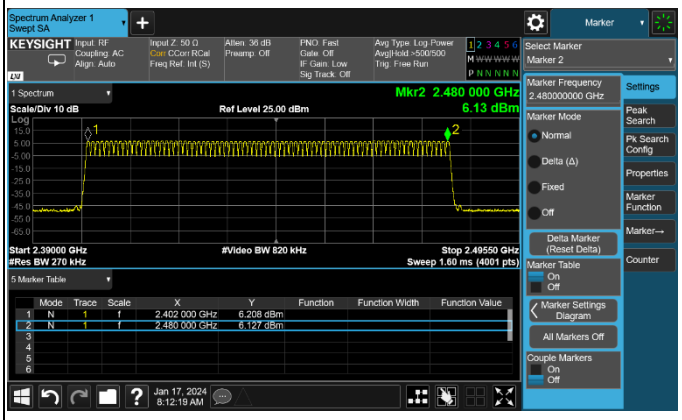
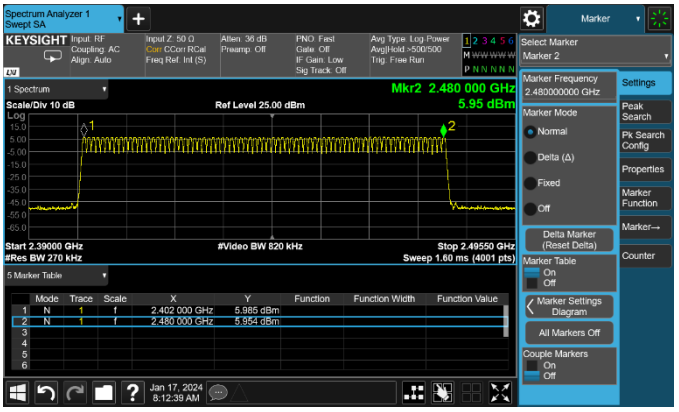
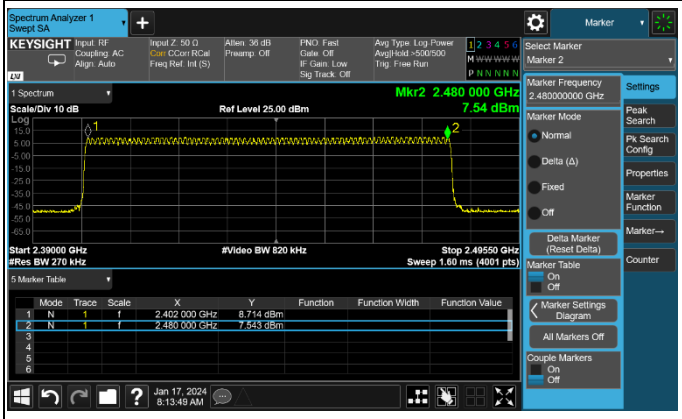
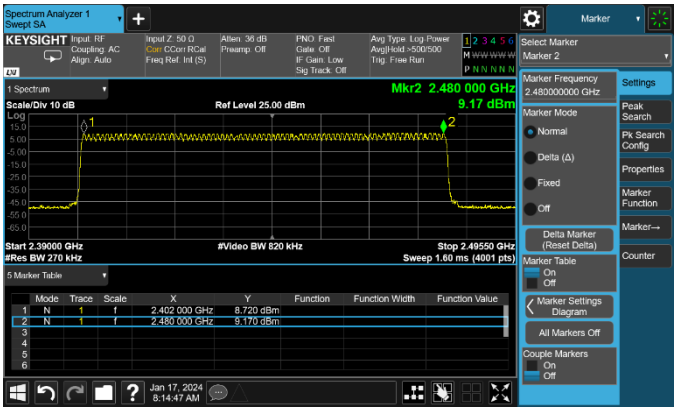
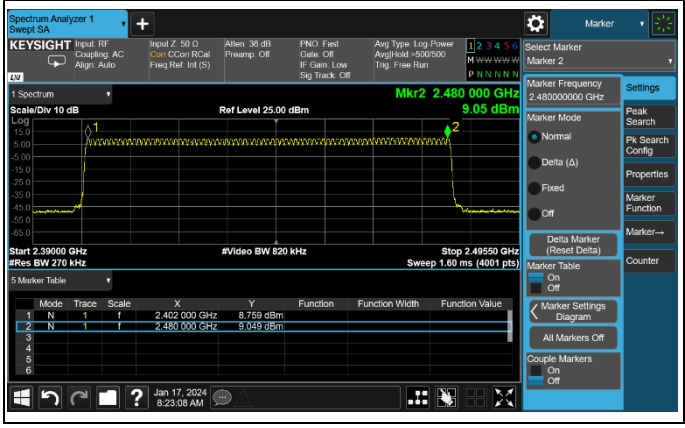
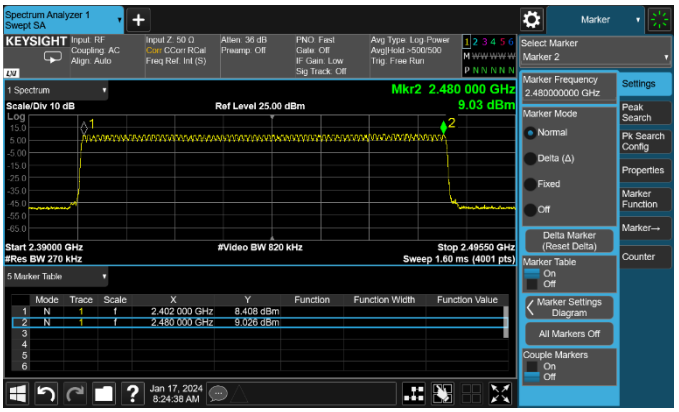
3.5.4 Test Result

[Test Result of Number of Hopping Channels]

Limit : >= 15 hops

Test Mode	Tested Frequency	Test Result (Total hops)	
		12 V	24 V
TM 1	Hopping	79	79
TM 2	Hopping	79	79
TM 3	Hopping	79	79

[Test Plot of Number of Hopping Channels]

12V	24V
TM 1	TM 1
	
TM 2	TM 2
	
TM 3	TM 3
	

3.6 Time of Occupancy (Dwell Time)

3.6.1 Regulation

§15.247(a)(1)(iii) : Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

3.6.2 Test Procedure

The method of measurement used to test this FHSS device is ANSI C63.10-2013.

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

a) Span: Zero span, centered on a hopping channel.
b) RBW shall be ≤ channel spacing and where possible RBW should be set >> 1 / T, where T is the expected dwell time per channel.
c) Sweep: As necessary to capture the entire dwell time per hopping channel; where possible use a video trigger and trigger delay so that the transmitted signal starts a little to the right of the start of the plot. The trigger level might need slight adjustment to prevent triggering when the system hops on an adjacent channel; a second plot might be needed with a longer sweep time to show two successive hops on a channel.
d) Detector function: Peak.
e) Trace: Max hold.

Use the marker-delta function to determine the transmit time per hop. If this value varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation in transmit time.

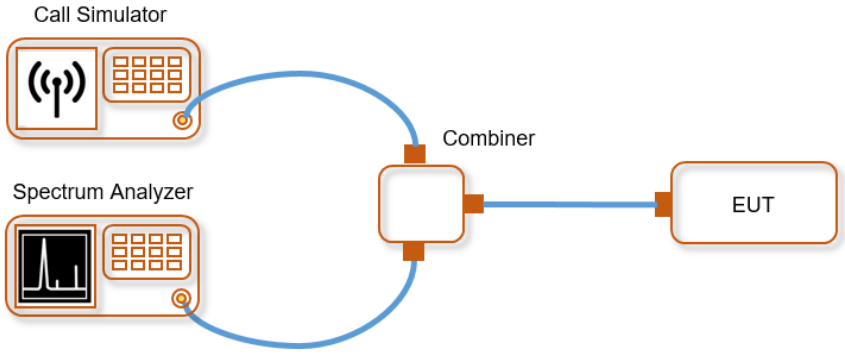
Repeat the measurement using a longer sweep time to determine the number of hops over the period specified in the requirements. The sweep time shall be equal to, or less than, the period specified in the requirements. Determine the number of hops over the sweep time and calculate the total number of hops in the period specified in the requirements, using the following equation:

(Number of hops in the period specified in the requirements) =
(number of hops on spectrum analyzer) × (period specified in the requirements / analyzer sweep time)

The average time of occupancy is calculated from the transmit time per hop multiplied by the number of hops in the period specified in the requirements. If the number of hops in a specific time varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation.

The measured transmit time and time between hops shall be consistent with the values described in the operational description for the EUT.

3.6.3 Test Setup



3.6.4 Test Result

[Test Result of Dwell Time]

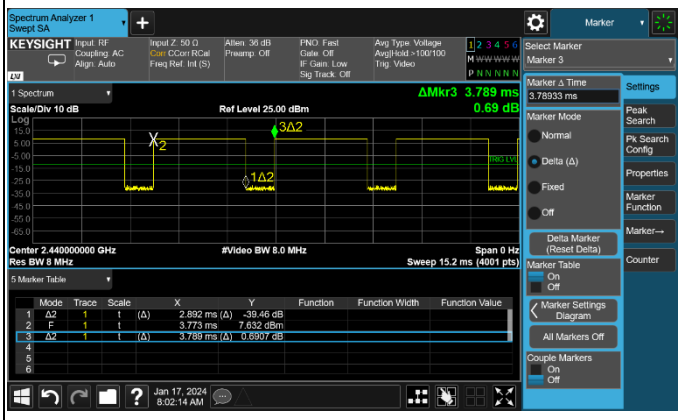
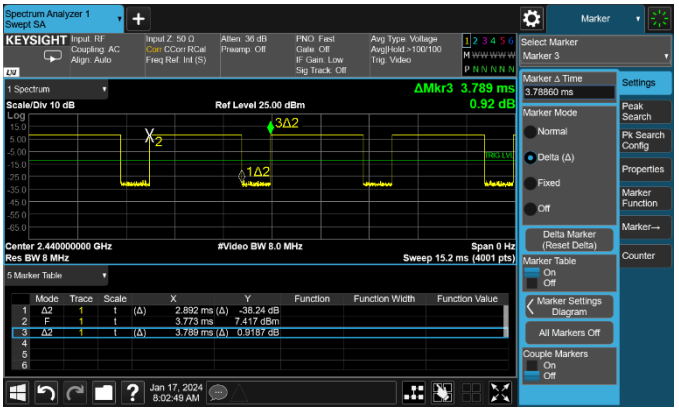
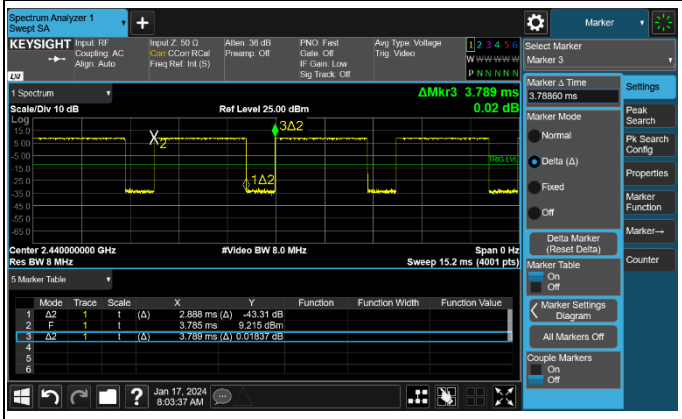
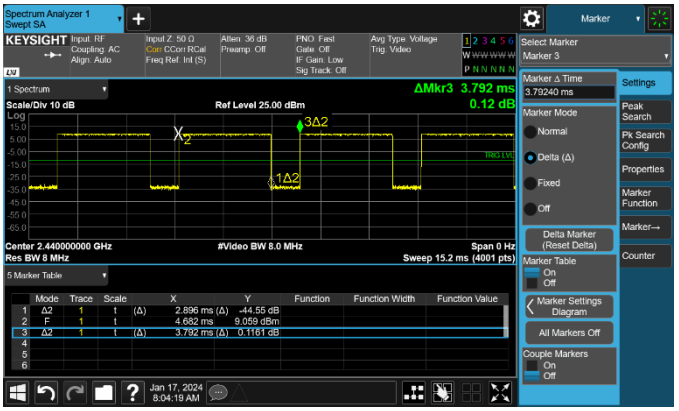
Test Mode	12 V							
	On Time [ms]	Period [ms]	Duty Cycle[X]	Duty Cycle[D]	D.C.C.F Note1 [dB]	D.C.C.F Note2 [dB]	Channels	Dwell Time (s)
TM 1	2.892	3.789	0.763	76.33	1.17	-24.76	79.00	0.308
TM 2	2.888	3.789	0.76	76.22	1.18	-24.77	79.00	0.308
TM 3	2.896	3.792	0.76	76.37	1.17	-24.74	79.00	0.309

Test Mode	24 V							
	On Time [ms]	Period [ms]	Duty Cycle[X]	Duty Cycle[D]	D.C.C.F Note1 [dB]	D.C.C.F Note2 [dB]	Channels	Dwell Time (s)
TM 1	2.892	3.789	0.763	76.33	1.17	-24.76	79	0.308
TM 2	2.896	3.792	0.76	76.37	1.17	-24.74	79	0.309
TM 3	2.892	3.777	0.77	76.57	1.16	-24.76	79	0.308

Note1
D.C.C.F Calculation. (D.C.C.F = Duty Cycle Correction Factor)
*Time to cycle through all channels = Δt = T [ms] X 20 minimum hopping channels , where T = pulse width = On Time
*100 ms / Δt [ms] = H -> Round up to next highest integer, to account for worst case, H'= 2
*The Worst Case Dwell Time = T [ms] x H'
*D.C.F = 20 Log(The Worst Case Dwell Time / 100 ms) dB

Note2
Dwell Time = 0.4 * Hopping Channels * On time * ((Hopping rate / Time slots) / Hopping channels)
* Tim slots for DH5 = 6 slots (TX = 5 slots , RX = 1 slot)
* Hopping rate = 1 600 for FH Mode

[Test Plot of Dwell Time]

12V	24V
TM 1	TM 1
	
TM 2	TM 2
	
TM 3	TM 3