FCC 47 CFR PART 15 SUBPART C
ISED RSS-247 ISSUE 2

CERTIFICATION TEST REPORT

For

AXIS W110 BODY WORN CAMERA

FCC MODEL NUMBER: AXIS W110 BODY WORN CAMERA BLACK

FCC ADDITIONAL MODEL NUMBER: AXIS W110 BODY WORN CAMERA GRAY, AXIS W110 BODY WORN CAMERA, W110

IC MODEL NUMBER: W110

PROJECT NUMBER: 4790752664

REPORT NUMBER: 4790752664-5

FCC ID: PNB-AXISW110

IC: 3919A-W110

HVIN: W110

ISSUE DATE: Jun. 06, 2023

Prepared for

AXIS COMMUNICATIONS AB

Prepared by

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Revision History

Rev.	Issue Date	Revisions	Revised By
V0	06/06/2023	Initial Issue	

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name:	AXIS COMMUNICATIONS AB
Address:	GRANDEN 1 SE-223 69 LUND SWEDEN

Manufacturer Information

Company Name:	AXIS COMMUNICATIONS AB
Address:	GRANDEN 1 SE-223 69 LUND SWEDEN

Factory Information

Company Name:	Jabil Poland Sp.z o.o
Address:	Ul. Milosna 32 82-500 Kwidzyn Poland

EUT Description

Product Name:	AXIS W110 BODY WORN CAMERA
FCC Model Name:	AXIS W110 BODY WORN CAMERA BLACK
FCC Additional No.:	AXIS W110 BODY WORN CAMERA GRAY, W110, AXIS W110 BODY WORN CAMERA
IC Model Name:	W110
FCC Model Difference:	The four models are identical except for color of the appearance.
Sample Number:	5819987
Data of Receipt Sample:	Feb. 23, 2023
Test Date:	Feb. 23, 2023~ Jun. 02, 2023

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	PASS
ISED RSS-247 Issue 2	PASS
ISED RSS-GEN Issue 5	PASS

Summary of Test Results			
Clause	**Test Items**	**FCC/ISED Rules**	**Test Results**
1	20dB Bandwidth and 99% Occupied Bandwidth	FCC 15.247 (a) (1) RSS-247 Clause 5.1 (a) RSS-Gen Clause 6.7	Pass
2	Conducted Output Power	FCC 15.247 (b) (1) RSS-247 Clause 5.1 (b)	Pass
3	Carrier Hopping Channel Separation	FCC 15.247 (a) (1) RSS-247 Clause 5.1 (b)	Pass
4	Number of Hopping Frequency	15.247 (a) (1) III RSS-247 Clause 5.1 (d)	Pass
5	Time of Occupancy (Dwell Time)	15.247 (a) (1) III RSS-247 Clause 5.1 (d)	Pass
6	Conducted Bandedge	FCC 15.247 (d) RSS-247 Clause 5.5	Pass
7	Radiated Bandedge and Spurious	FCC 15.247 (d) FCC 15.209 FCC 15.205 RSS-247 Clause 5.5 RSS-GEN Clause 8.9 RSS-GEN Clause 8.10	Pass
8	Conducted Emission Test for AC Power Port	FCC 15.207 RSS-GEN Clause 8.8	Pass
9	Antenna Requirement	FCC 15.203 RSS-GEN Clause 6.8	Pass
Note: The measurement result for the sample received is <Pass> according to < ANSI C63.10-2013, FCC CFR 47 Part 2, FCC CFR 47 Part 15C, ISED RSS-GEN, ISED RSS-247> when <Accuracy Method> decision rule is applied.			

Prepared By:

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Reviewed By:

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Leon Wu

Authorized By:

Chris Zhong

Chris Zhong
EMC&RF Lab Operations Manager

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with KDB 558074 D01 15.247 Meas Guidance v05r02, 414788 D01 Radiated Test Site v01r01, CFR 47 FCC Part 2, CFR 47 FCC Part 15, ANSI C63.10-2013, ISED RSS-247 Issue 2 and ISED RSS-GEN Issue 5.

3. FACILITIES AND ACCREDITATION

Accreditation Certificate	**A2LA (Certificate No.: 4829.01)** **UL-CCIC COMPANY LIMITED has been assessed and proved to be in compliance with A2LA.** **FCC (FCC Designation No.: CN1247)** **UL-CCIC COMPANY LIMITED has been recognized to perform compliance testing on equipment subject to the Commission's Declaration of Conformity (DoC) and Certification rules.** **IC (IC Designation No.: 25056; CAB No.: CN0073)** **UL-CCIC COMPANY LIMITED has been recognized to perform compliance testing on equipment subject to the Commission's Declaration of Conformity (DoC) and Certification rules.**

Note 1: All tests measurement facilities use to collect the measurement data are located at No. 2, Chengwan Road, Suzhou Industrial Park, Suzhou 215122, China.

Note 2: For below 30MHz, lab had performed measurements at test anechoic chamber and comparing to measurements obtained on an open field site. These measurements below 30MHz had been correlated to measurements performed on an OFS.

Note 3: The test anechoic chamber in UL-CCIC COMPANY LIMITED had been calibrated and compared to the open field sites and the test anechoic chamber is shown to be equivalent to or worst case from the open field site.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations and is traceable to recognized national standards.

4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test Item	Uncertainty
Conduction emission	3.1dB
Maximum Conduct Output Power	± 1.3dB
20dB Bandwidth and 99% Occupied Bandwidth	±1.9 %
Carrier Hopping Channel Separation	±1.9 %
Number of Hopping Frequency	±1.9 %
Time of Occupancy (Dwell Time)	±1.9 %
Conducted Bandedge	± 1.9%
Radiation Emission test (include Fundamental emission) (9kHz-30MHz)	3.4dB
Radiation Emission test (include Fundamental emission) (30MHz-1GHz)	3.4dB
Radiation Emission test (1GHz to 26GHz) (include Fundamental emission)	3.5dB (1GHz-18GHz)
	3.9dB (18GHz-26.5GHz)
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

Product Name:	AXIS W110 BODY WORN CAMERA		
FCC Model Name:	AXIS W110 BODY WORN CAMERA BLACK		
FCC Additional No.:	AXIS W110 BODY WORN CAMERA GRAY		
IC Model Name:	W110		
Technology	Bluetooth – BR & EDR		
Transmit Frequency Range	2402 MHz ~ 2480 MHz		
Mode	Basic Rate	Enhanced Data Rate	
Modulation	GFSK	∏/4-DQPSK	8DPSK
Packet Type (Maximum Payload):	DH5	2DH5	3DH5
Data Rate	1 Mbps	2 Mbps	3 Mbps
Test software of EUT:	Prodstub (manufacturer declare)		
Antenna Type:	FPC Antenna		
Antenna Gain:	1.4 dBi		
	Note: This data is provided by customer and our lab isn't responsible for this data.		

5.2. MAXIMUM OUTPUT POWER

Test Mode	Frequency (MHz)	Channel Number	Maximum Output Power (dBm)
GFSK	2402 ~ 2480	0-78[79]	2.94
8DPSK	2402 ~ 2480	0-78[79]	2.63

5.3. PACKET TYPE CONFIGURATION

Test Mode	Packet Type	Setting (Packet Length)
GFSK	DH1	27
	DH3	183
	DH5	339
∏/4-DQPSK	2-DH1	54
	2-DH3	367
	2-DH5	679
8DPSK	3-DH1	83
	3-DH3	552
	3-DH5	1021

5.4. CHANNEL LIST

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	20	2422	40	2442	60	2462
01	2403	21	2423	41	2443	61	2463
02	2404	22	2424	42	2444	62	2464
03	2405	23	2425	43	2445	63	2465
04	2406	24	2426	44	2446	64	2466
05	2407	25	2427	45	2447	65	2467
06	2408	26	2428	46	2448	66	2468
07	2409	27	2429	47	2449	67	2469
08	2410	28	2430	48	2450	68	2470
09	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461	/	/

5.5. TEST CHANNEL CONFIGURATION

Test Mode	Test Channel	Frequency
GFSK	CH 0(Low Channel), CH 39(MID Channel), CH 78(High Channel)	2402 MHz, 2441 MHz, 2480 MHz
∏/4-DQPSK	CH 0(Low Channel), CH 39(MID Channel), CH 78(High Channel)	2402 MHz, 2441 MHz, 2480 MHz
8DPSK	CH 0(Low Channel), CH 39(MID Channel), CH 78(High Channel)	2402 MHz, 2441 MHz, 2480 MHz
GFSK	Hopping	2402 MHz ~ 2480 MHz
∏/4-DQPSK	Hopping	2402 MHz ~ 2480 MHz
8DPSK	Hopping	2402 MHz ~ 2480 MHz

5.6. WORST-CASE CONFIGURATIONS

Test Mode	Modulation Technology	Modulation Type	Data Rate	Packet Type
BR	FHSS	GFSK	1Mbit/s	DH5
EDR	FHSS	∏/4-DQPSK	2Mbit/s	2DH5
EDR	FHSS	8DPSK	3Mbit/s	3-DH5

5.7. THE WORSE CASE POWER SETTING PARAMETER

The Worse Case Power Setting Parameter under 2400 ~ 2483.5 MHz Band				
Test Software		Prodstub		
Test Mode	Transmit Antenna Number	Test Software Setting Value		
		CH 00	CH 39	CH 78
GFSK	1	Default	Default	Default
∏/4-DQPSK	1	Default	Default	Default
8DPSK	1	Default	Default	Default

5.8. DESCRIPTION OF AVAILABLE ANTENNAS

Ant.	Frequency (MHz)	Antenna Type	Antenna Gain (dBi)
1	2400-2483.5	FPC Antenna	1.4 dBi

Note: This data is provided by customer and our lab isn't responsible for this data.

Test Mode	Transmit and Receive Mode	Description
GFSK	☒1TX, 1RX	Antenna 1 can be used as transmitting/receiving antenna.
8DPSK	☒1TX, 1RX	Antenna 1 can be used as transmitting/receiving antenna.

5.9. TEST ENVIRONMENT

Environment Parameter	Selected Values During Tests	
Relative Humidity	55 ~ 65%	
Atmospheric Pressure:	101kPa	
Temperature	TN	23 ~ 28°C
Voltage:	VL	N/A
	VN	AC 120V
	VH	N/A

Note: VL= Lower Extreme Test Voltage
VN= Nominal Voltage
VH= Upper Extreme Test Voltage
TN= Normal Temperature

5.10. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	Description
1	Laptop	ThinkPad	E590	Supplied by UL Lab

I/O PORT

Cable No	Port	Connector Type	Cable Type	Cable Length(m)	Remarks
1	LAN	LAN	LAN	100cm Length	/

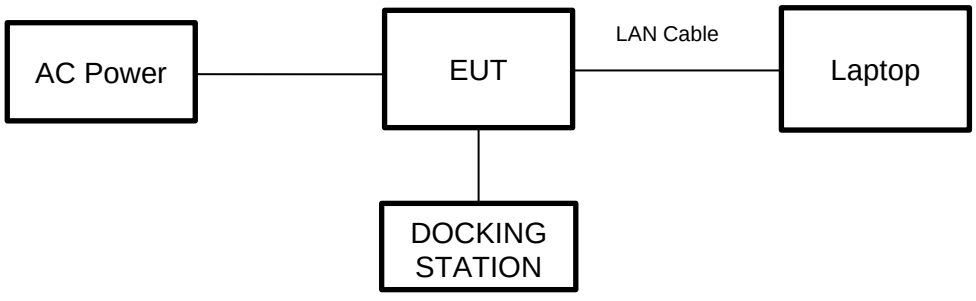
ACCESSORY

Item	Accessory	Brand Name	Model Name	Description
1	DOCKING STATION	AXIS	W702	Supplied by UL Customer
2	Switching Power Adapter	AXIS	FSP015-DPAN3	INPUT: 100-240~, 0.5A, 50-60Hz OUTPUT: 5.0V⎓3.0A 15.0W

TEST SETUP

The EUT can work in an engineer mode with a software through a table PC.

SETUP DIAGRAM FOR TESTS



5.11. MEASURING INSTRUMENT AND SOFTWARE USED

Conducted Emissions (Instrument**)**							
Used	Equipment	Manufacturer	Model No.	Serial No.	Upper Last Cal.	Last Cal.	Next Cal.
☑	EMI Test Receiver	R&S	ESR3	126700	2021-12-20	2022-12-19	2023-12-18
☑	Two-Line V-Network	R&S	ENV216	126701	2021-12-04	2022-12-03	2023-12-02
☑	Artificial Mains Networks	R&S	ENY81	126712	2021-10-12	2022-10-09	2023-10-08
Software							
Used	Description		Manufacturer		Name	Version	
☑	Test Software for Conducted disturbance		R&S		EMC32	Ver. 9.25	
Radiated Emissions (Instrument**)**							
Used	Equipment	Manufacturer	Model No.	Serial No.	Upper Last Cal.	Last Cal.	Next Cal.
☑	EMI test receiver	R&S	ESR7	222993	2022-04-09	2023-04-08	2024-04-07
☑	EMI test receiver	R&S	ESR26	126703	2021-12-04	2022-12-03	2023-12-02
☑	Spectrum Analyzer	R&S	FSV3044	222992	2022-04-09	2023-04-08	2024-04-07
☑	Receiver Antenna (9kHz-30MHz)	Schwarzbeck	FMZB 1513	155456	2018-06-15	2021-06-03	2024-06-02
☑	Receiver Antenna (30MHz-1GHz)	Schwarzbeck	VULB 9163	126704	2019-01-19	2022-01-18	2025-01-17
☑	Receiver Antenna (1GHz-18GHz)	R&S	HF907	126705	2019-02-29	2022-02-28	2025-02-27
☑	Receiver Antenna (18GHz-26.5GHz)	Schwarzbeck	BBHA9170	126706	2019-02-29	2022-02-28	2025-02-27
☑	Pre-amplification (To 18GHz)	Tonscned	TAP01018050	224539	/	2022-10-20	2023-10-19
☑	Pre-amplification (To 18GHz)	R&S	SCU-18D	134667	2021-12-04	2022-12-03	2023-12-02
☑	Pre-amplification (To 26.5GHz)	R&S	SCU-26D	135391	2021-12-04	2022-12-03	2023-12-02
☑	Band Reject Filter	Wainwright	WRCGV12-2375-2400-2485-2510-40SS	1	2022-05-08	2023-05-07	2024-05-06
☑	High Pass Filter	COM-MW	ZBF13-3-18G-01	2	2022-05-08	2023-05-07	2024-05-06
Software							
Used	Description		Manufacturer	Name		Version	
☑	Test Software for Radiated disturbance		Tonscend	TS+		Ver. 2.5	
☑	Test Software for Radiated disturbance		Chinese-EMC	RE_RSE		Ver. 3.03	
Other instruments							
Used	Equipment	Manufacturer	Model No.	Serial No.	Upper Last Cal.	Last Cal.	Next Cal.
☑	Spectrum Analyzer	Keysight	N9010B	155368	2022-04-09	2023-04-08	2024-04-07
☑	Power Meter	MWT	MW100-RFCB	221694	2022-05-23	2023-04-08	2024-04-07
☑	Attenuator	PASTERNACK	PE7087-6	1624	2022-05-23	2023-05-22	2024-05-21

6. ANTENNA PORT TEST RESULTS

6.1. ON TIME AND DUTY CYCLE

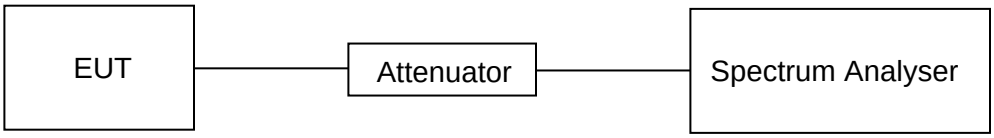
LIMITS

None; for reporting purposes only

PROCEDURE

Refer to ANSI C63.10-2013 Zero – Span Spectrum Analyzer method.

TEST SETUP



TEST ENVIRONMENT

Temperature	22°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V

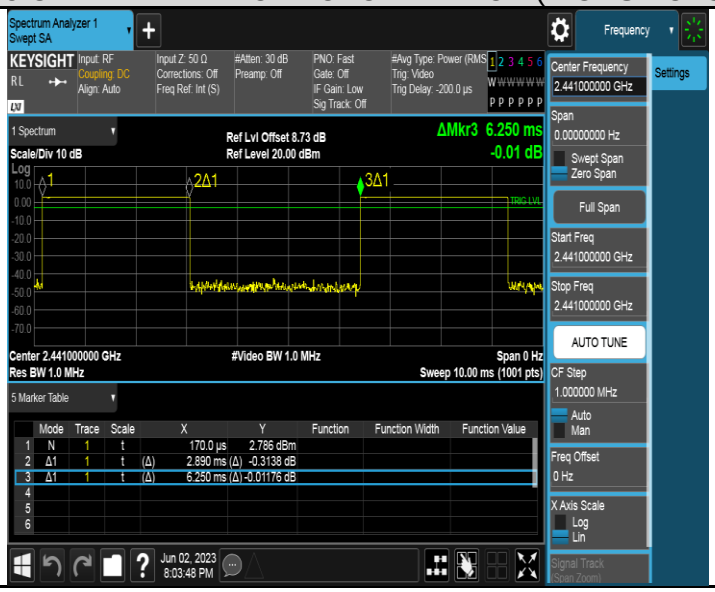
TEST RESULTS TABLE

Mode	On Time (msec)	Period (msec)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (db)	1/T Minimum VBW (kHz)	Final VBW (kHz)
DH5	2.89	6.25	0.4624	46.24	3.35	0.35	1
2DH5	2.89	6.25	0.4624	46.24	3.35	0.35	1
3DH5	2.89	6.25	0.4624	46.24	3.35	0.35	1

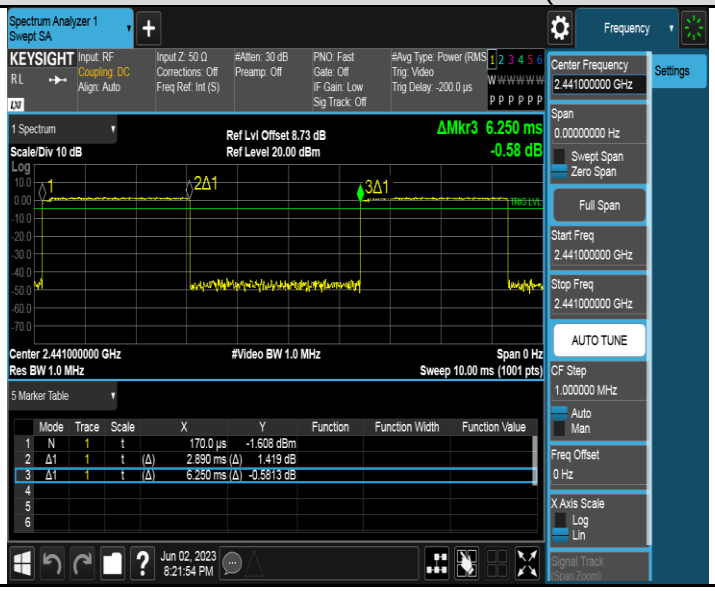
Note: 1) Duty Cycle Correction Factor=10log(1/x).
2) Where: x is Duty Cycle (Linear)
3) Where: T is On Time (transmit duration)

TEST GRAPHS

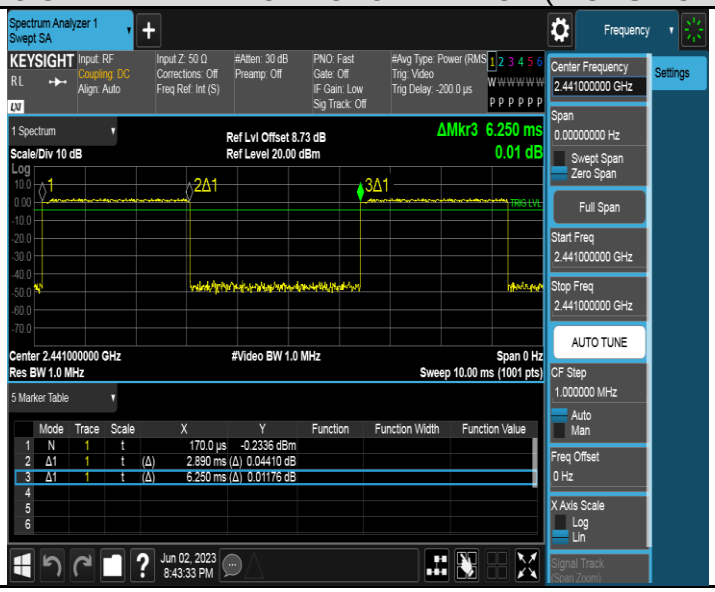
DH5 ON TIME AND DUTY CYCLE MID CH (WORSE CASE)



2DH5 ON TIME AND DUTY CYCLE MID CH (WORSE CASE)



3DH5 ON TIME AND DUTY CYCLE MID CH (WORSE CASE)



6.2. 20 dB BANDWIDTH AND 99 % OCCUPIED BANDWIDTH

LIMITS

FCC Part15 (15.247) Subpart C, ISED RSS-Gen			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC 15.247 (a) (1) RSS-247 Clause 5.1 (a)	20 dB Bandwidth	None; for reporting purposes only.	2400-2483.5
ISED RSS-Gen Clause 6.7	99 % Occupied Bandwidth	None; for reporting purposes only.	2400-2483.5

TEST PROCEDURE

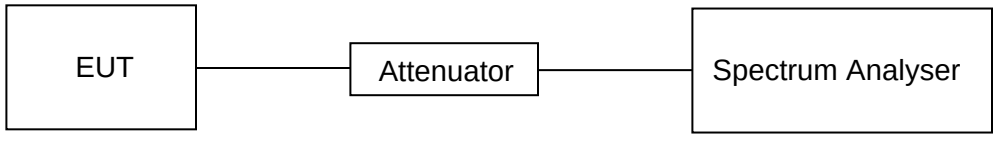
Refer to ANSI C63.10-2013 clause 6.9.2.

Connect the EUT to the spectrum analyser and use the following settings:

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	For 20 dB Bandwidth: 1 % to 5 % of the 20 dB bandwidth For 99 % Occupied Bandwidth: 1 % to 5 % of the occupied bandwidth
VBW	For 20 dB Bandwidth: approximately 3×RBW For 99 % Occupied Bandwidth: ≥ 3×RBW
Span	Approximately 2 to 5 times the OBW
Trace	Max hold
Sweep	Auto couple

Use the occupied bandwidth function of the instrument, allow the trace to stabilize and report the measured 99 % occupied bandwidth and 20 dB Bandwidth.

TEST SETUP



TEST ENVIRONMENT

Temperature	22°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V

TEST RESULTS TABLE

Test Mode	Test Channel (MHz)	20dB bandwidth (MHz)	99% bandwidth (MHz)	Result
DH5	2402	0.9381	0.85172	Pass
	2441	0.9388	0.85594	Pass
	2480	0.9382	0.85374	Pass
2DH5	2402	1.2804	1.1642	Pass
	2441	1.2783	1.1651	Pass
	2480	1.2792	1.1653	Pass
3DH5	2402	1.2770	1.1723	Pass
	2441	1.2765	1.1621	Pass
	2480	1.2763	1.1629	Pass

TEST GRAPHS

For 6dB Bandwidth:

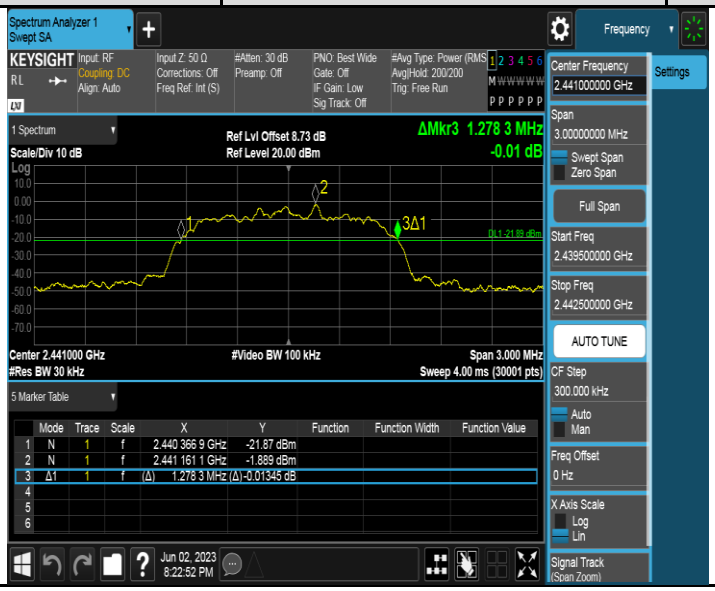
Test Mode	Test Channel	Verdict
DH5	LCH	PASS

Test Mode	Test Channel	Verdict
DH5	MCH	PASS

Test Mode	Test Channel	Verdict
DH5	HCH	PASS

Test Mode	Test Channel	Verdict
2DH5	LCH	PASS

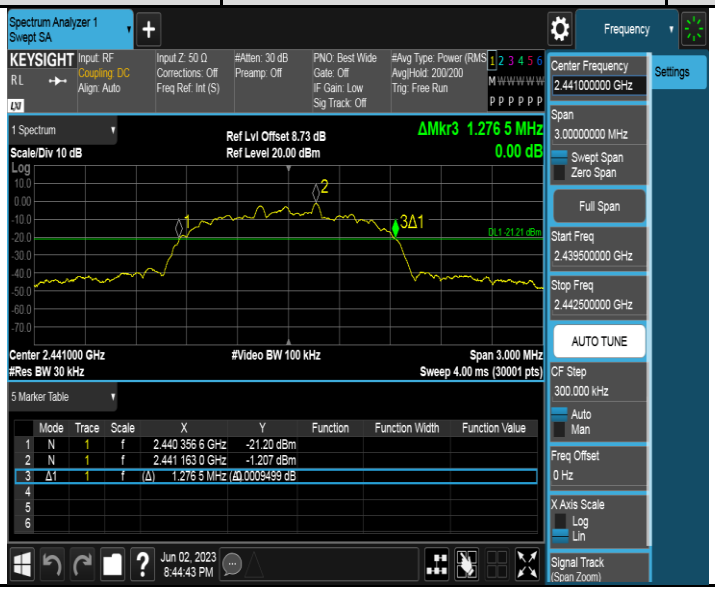
Test Mode	Test Channel	Verdict
2DH5	MCH	PASS



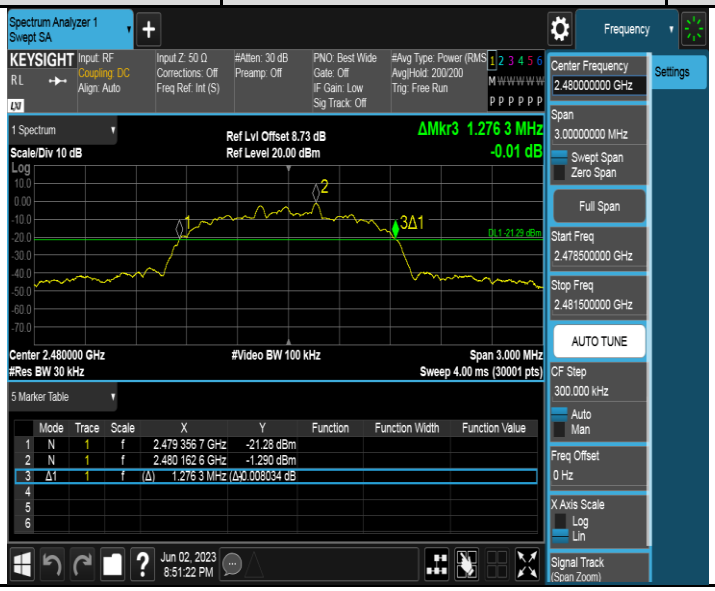
Test Mode	Test Channel	Verdict
2DH5	HCH	PASS

Test Mode	Test Channel	Verdict
3DH5	LCH	PASS

Test Mode	Test Channel	Verdict
3DH5	MCH	PASS



Test Mode	Test Channel	Verdict
3DH5	HCH	PASS



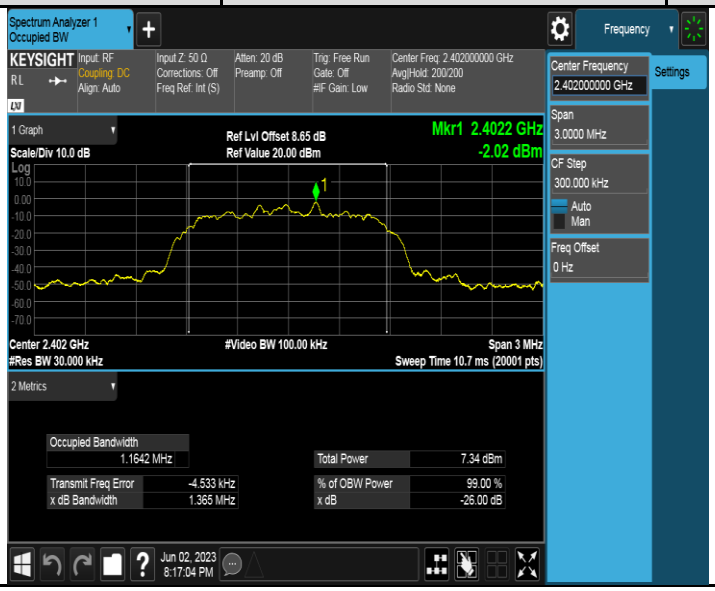
For 99% Bandwidth:

Test Mode	Test Channel	Verdict
DH5	LCH	PASS

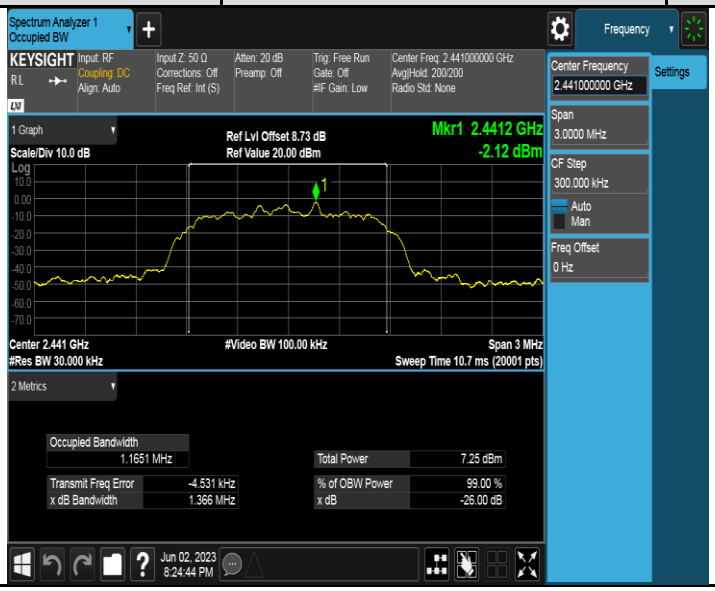
Test Mode	Test Channel	Verdict
DH5	MCH	PASS

Test Mode	Test Channel	Verdict
DH5	HCH	PASS

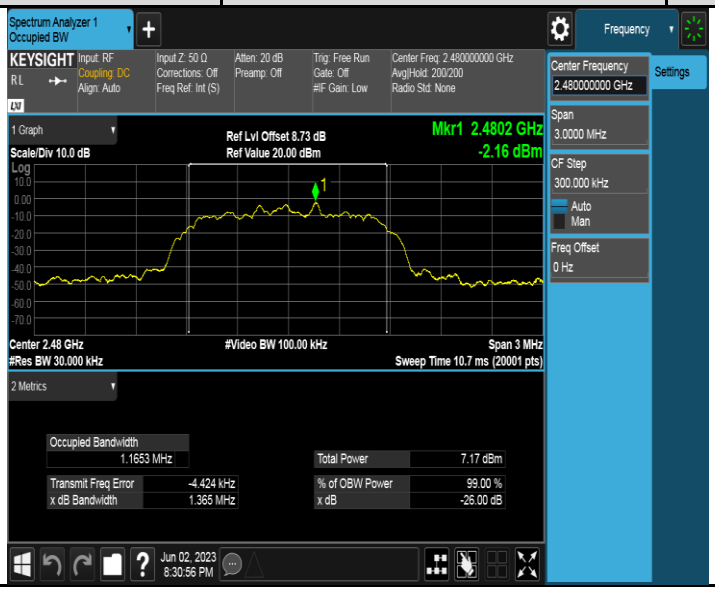
Test Mode	Test Channel	Verdict
2DH5	LCH	PASS



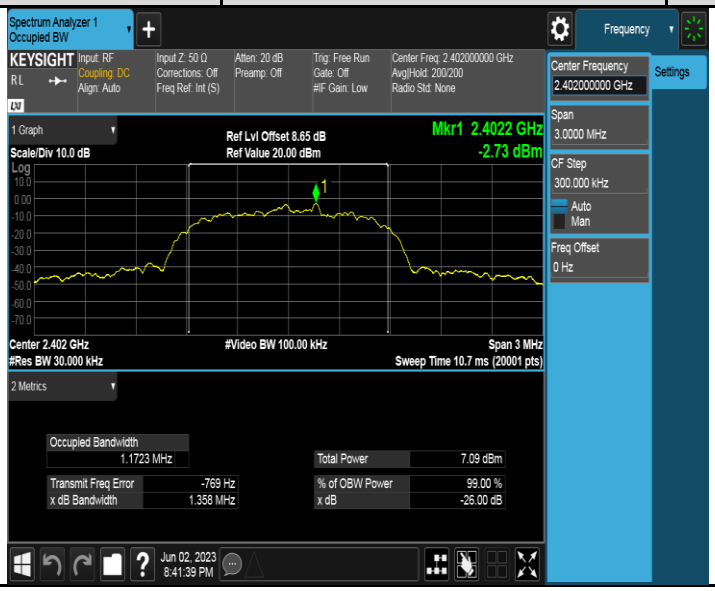
Test Mode	Test Channel	Verdict
2DH5	MCH	PASS



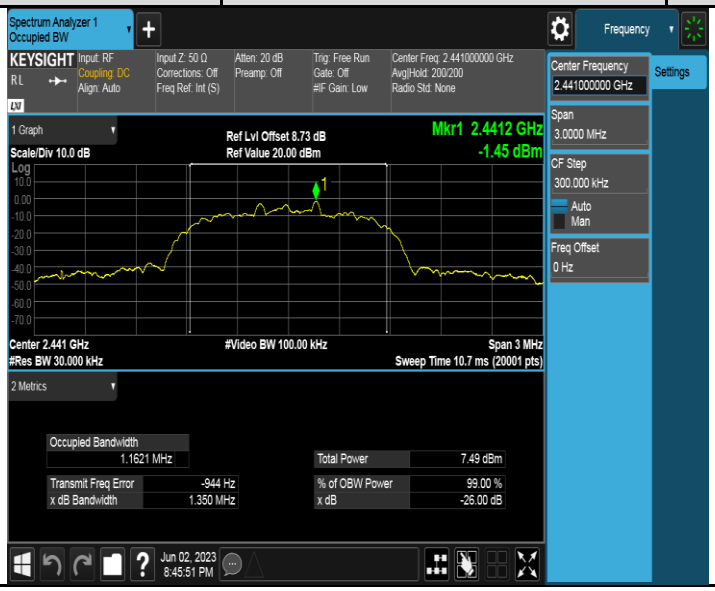
Test Mode	Test Channel	Verdict
2DH5	HCH	PASS



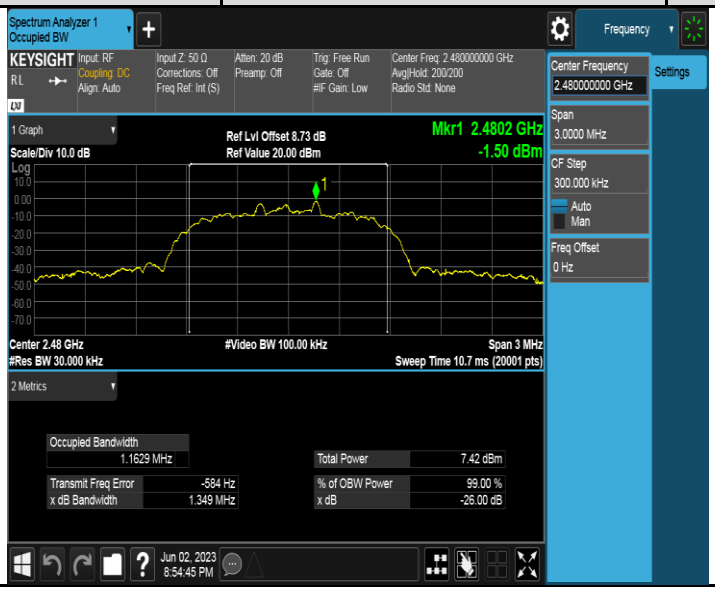
Test Mode	Test Channel	Verdict
3DH5	LCH	PASS



Test Mode	Test Channel	Verdict
3DH5	MCH	PASS



Test Mode	Test Channel	Verdict
3DH5	HCH	PASS



6.3. CONDUCTED OUTPUT POWER

LIMITS

FCC Part15 (15.247) Subpart C, ISED RSS-Gen			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC 15.247 (b) (1) ISED RSS-247 Clause 5.4 (b)	Output Power	Hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel: 1 watt or 30 dBm; Hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20dB bandwidth of the hopping channel: 125 mW or 21 dBm	2400-2483.5

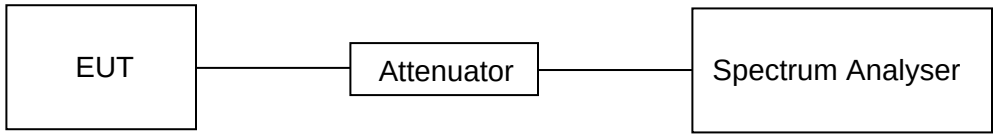
TEST PROCEDURE

Place the EUT on the table and set it in the transmitting mode.
Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Power sensor.
Measure the power of each channel.
PK Detector used for PK result.
Average Detector used for Average result.

TEST ENVIRONMENT

Temperature	22°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V

TEST SETUP



TEST RESULTS TABLE

Test Mode	Test Channel	Maximum Conducted Output Power (PK)	LIMIT
		dBm	dBm
DH5	LCH	2.94	30
	MCH	2.91	30
	HCH	2.84	30
2DH5	LCH	2.31	30
	MCH	2.27	30
	HCH	2.19	30
3DH5	LCH	2.63	30
	MCH	2.60	30
	HCH	2.53	30

Test Mode	Test Channel	Measurement Output Power (AV)	10log(1/x) Factor	Maximum Conducted Output Power (AV)	LIMIT
		dBm	dBm	dBm	dBm
DH5	LCH	-0.58	3.35	2.77	30
	MCH	-0.56	3.35	2.79	30
	HCH	-0.68	3.35	2.67	30
2DH5	LCH	-3.37	3.35	-0.02	30
	MCH	-3.23	3.35	0.12	30
	HCH	-3.82	3.35	-0.47	30
3DH5	LCH	-3.55	3.35	-0.20	30
	MCH	-3.66	3.35	-0.31	30
	HCH	-3.84	3.35	-0.49	30

6.4. CARRIER FREQUENCY SEPARATION

LIMITS

CFR 47 FCC Part15 (15.247), Subpart C ISED RSS-247 ISSUE 2			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC 15.247 (a) (1) ISED RSS-247 Clause 5.1 (b)	Carrier Frequency Separation	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.	2400-2483.5

TEST PROCEDURE

Refer to ANSI C63.10-2013 clause 7.8.2.

Connect the EUT to the spectrum analyzer and use the following settings:

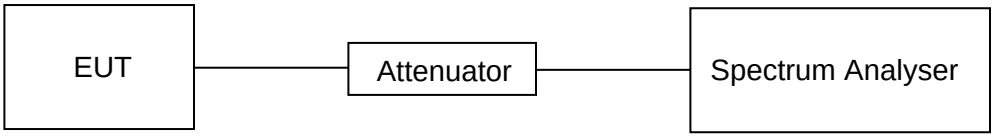
Center Frequency	The center frequency of the channel under test
Span	wide enough to capture the peaks of two adjacent channels
Detector	Peak
RBW	Start with the RBW set to approximately 30 % of the channel spacing; adjust as necessary to best identify the center of each individual channel.
VBW	≥RBW
Trace	Max hold
Sweep time	Auto couple

Allow the trace to stabilize and 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.

TEST ENVIRONMENT

Temperature	22°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V

TEST SETUP

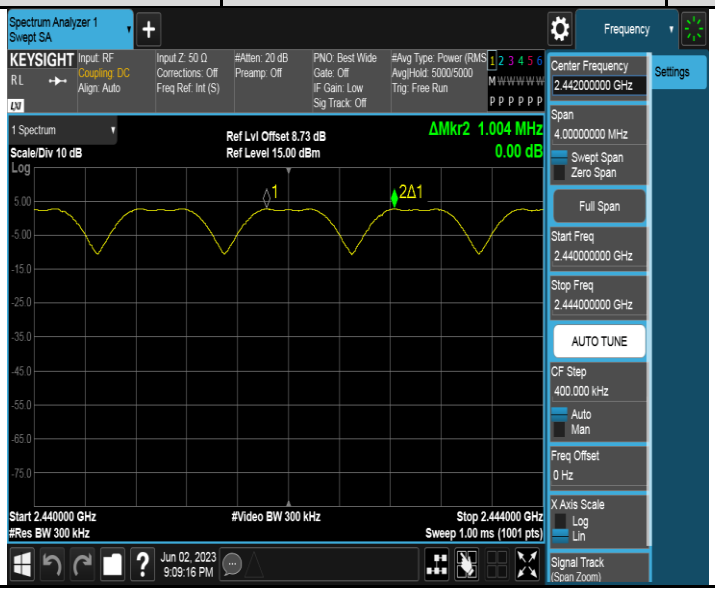


TEST RESULTS TABLE

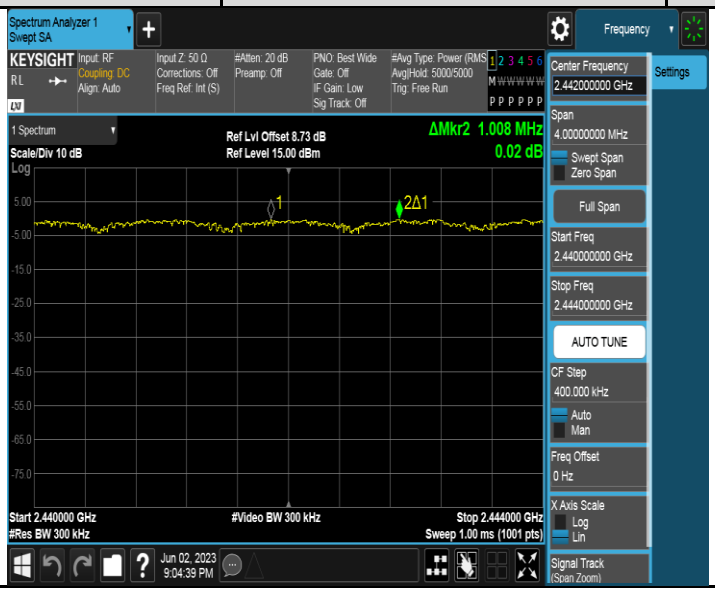
Test Mode	Test Channel	Result (MHz)	Result
DH5	Hop	1.004	Pass
2DH5	Hop	1.008	Pass
3DH5	Hop	1.148	Pass

TEST GRAPHS

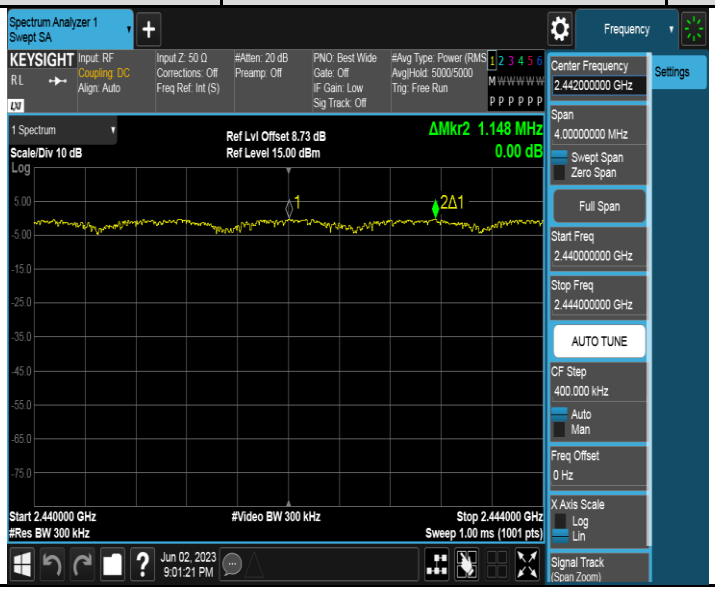
Test Mode	Test Channel	Verdict
DH5	Hop	PASS



Test Mode	Test Channel	Verdict
2DH5	Hop	PASS



Test Mode	Test Channel	Verdict
3DH5	Hop	PASS



6.5. NUMBER OF HOPPING FREQUENCIES

LIMITS

CFR 47 FCC Part15 (15.247), Subpart C ISED RSS-247 ISSUE 2		
Section	Test Item	Limit
CFR 47 15.247 (a) (1) III ISED RSS-247 Clause 5.1 (d)	Number of Hopping Frequency	at least 15 hopping channels

TEST PROCEDURE

Refer to ANSI C63.10-2013 clause 7.8.3.

Connect the EUT to the spectrum Analyzer and use the following settings:

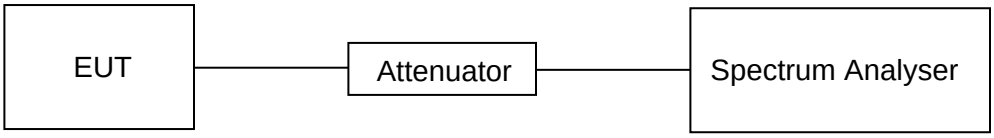
Detector	Peak
RBW	To identify clearly the individual channels, set the RBW to less than 30 % of the channel spacing or the 20 dB bandwidth, whichever is smaller.
VBW	≥RBW
Span	The frequency band of operation. Depending on the number of channels the device supports, it may be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen.
Trace	Max hold
Sweep time	Auto couple

Set EUT to transmit maximum output power and switch on frequency hopping function. then set enough count time (larger than 5000 times) to get all the hopping frequency channel displayed on the screen of spectrum analyzer, count the quantity of peaks to get the number of hopping channels.

TEST ENVIRONMENT

Temperature	22°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V

TEST SETUP

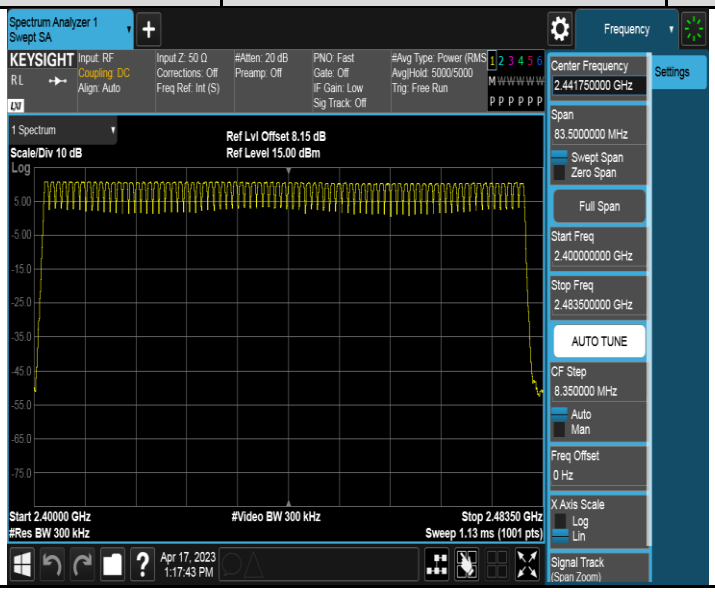


TEST RESULTS TABLE

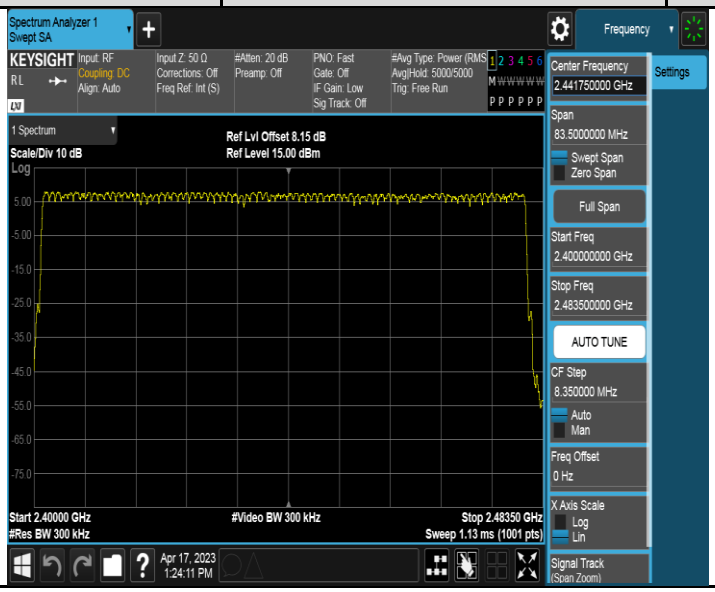
Test Mode	Test Channel	Result (Num)	Result
DH5	Hop	79	Pass
2DH5	Hop	79	Pass
3DH5	Hop	79	Pass

TEST GRAPHS

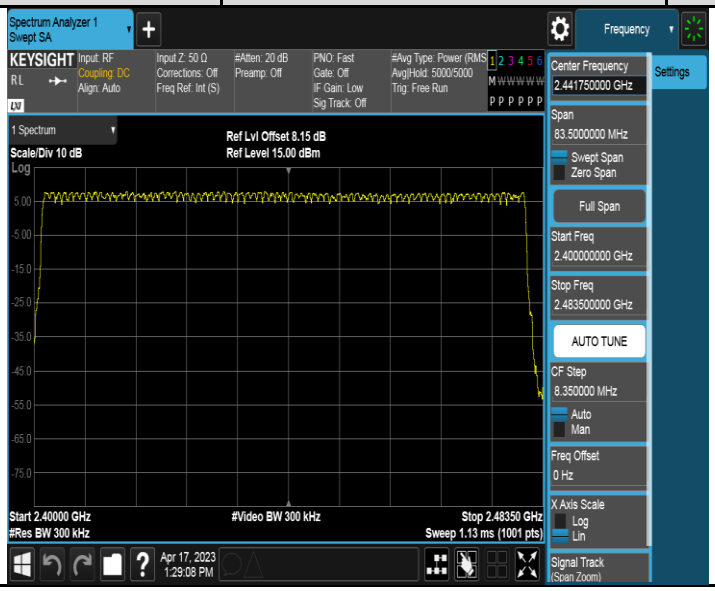
Test Mode	Test Channel	Verdict
DH5	Hop	PASS



Test Mode	Test Channel	Verdict
2DH5	Hop	PASS



Test Mode	Test Channel	Verdict
3DH5	Hop	PASS



6.6. TIME OF OCCUPANCY (DWELL TIME)

LIMITS

CFR 47 FCC Part15 (15.247), Subpart C ISED RSS-247 ISSUE 2		
Section	Test Item	Limit
CFR 47 15.247 (a) (1) III ISED RSS-247 Clause 5.1 (d)	Time of Occupancy (Dwell Time)	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.

TEST PROCEDURE

Refer to ANSI C63.10-2013 clause 7.8.4.

Connect the EUT to the spectrum Analyzer and use the following settings:

Center Frequency	The center frequency of the channel under test
Detector	Peak
RBW	1 MHz
VBW	≥RBW
Span	Zero span, centered on a hopping channel
Trace	Max hold
Sweep time	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

Use the marker-delta function to determine the transmit time per hop (Burst Width). 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.

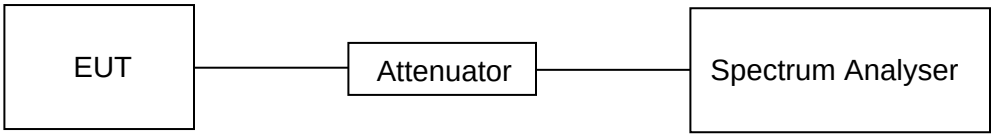
For FHSS Mode (79 Channel):
DH1/3DH1 Dwell Time: Burst Width * (1600/2) * 31.6 / (channel number)
DH3/3DH3 Dwell Time: Burst Width * (1600/4) * 31.6 / (channel number)
DH5/3DH5 Dwell Time: Burst Width * (1600/6) * 31.6 / (channel number)

For AFHSS Mode (20 Channel):
DH1/3DH1 Dwell Time: Burst Width * (800/2) * 8 / (channel number)
DH3/3DH3 Dwell Time: Burst Width * (800/4) * 8 / (channel number)
DH5/3DH5 Dwell Time: Burst Width * (800/6) * 8 / (channel number)

TEST ENVIRONMENT

Temperature	22°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V

TEST SETUP



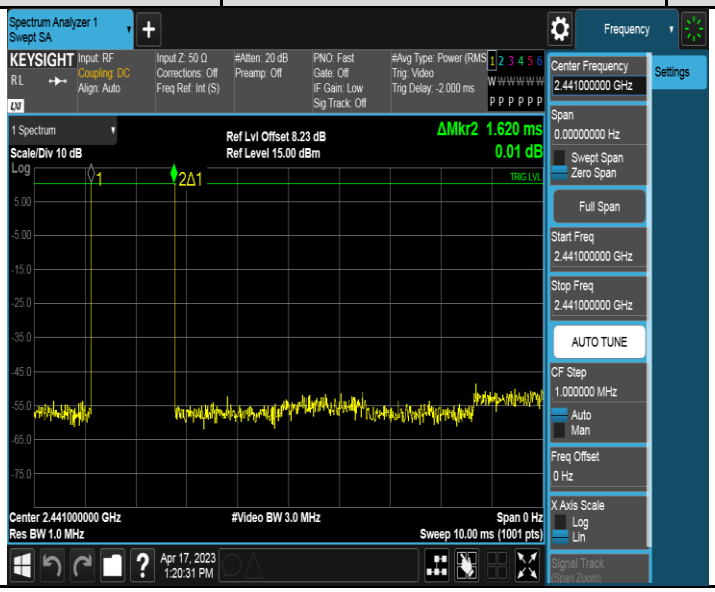
TEST RESULTS TABLE

FHSS Mode				
Packet	**Channel**	**Burst Width [ms/hop/ch]**	**Dwell Time [ms]**	**Results**
DH1	Hop	0.370	0.1184	PASS
DH3	Hop	1.620	0.2592	PASS
DH5	Hop	2.870	0.3061	PASS
3DH1	Hop	0.370	0.1184	PASS
3DH3	Hop	1.620	0.2592	PASS
3DH5	Hop	2.870	0.3061	PASS
AFHSS Mode				
DH1	Hop	0.370	0.0592	PASS
DH3	Hop	1.620	0.1296	PASS
DH5	Hop	2.870	0.1531	PASS
3DH1	Hop	0.370	0.0592	PASS
3DH3	Hop	1.620	0.1296	PASS
3DH5	Hop	2.870	0.1531	PASS

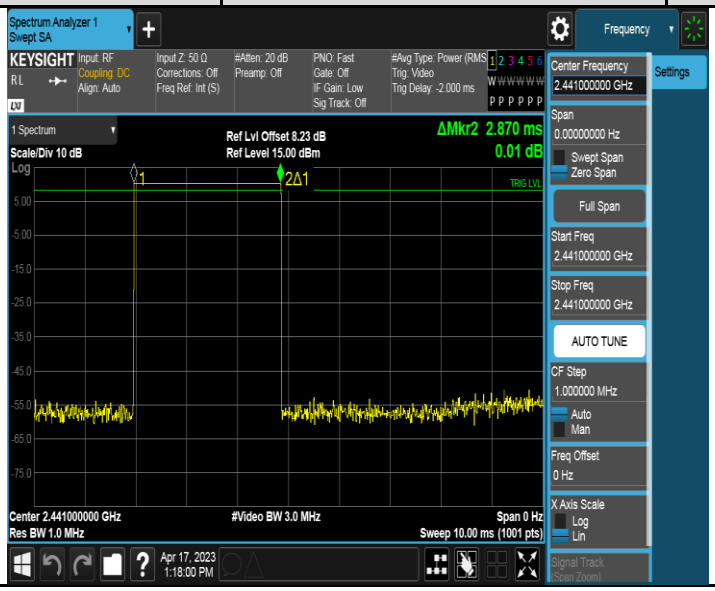
TEST GRAPHS

Test Mode	Test Channel	Verdict
DH1	Hop	PASS

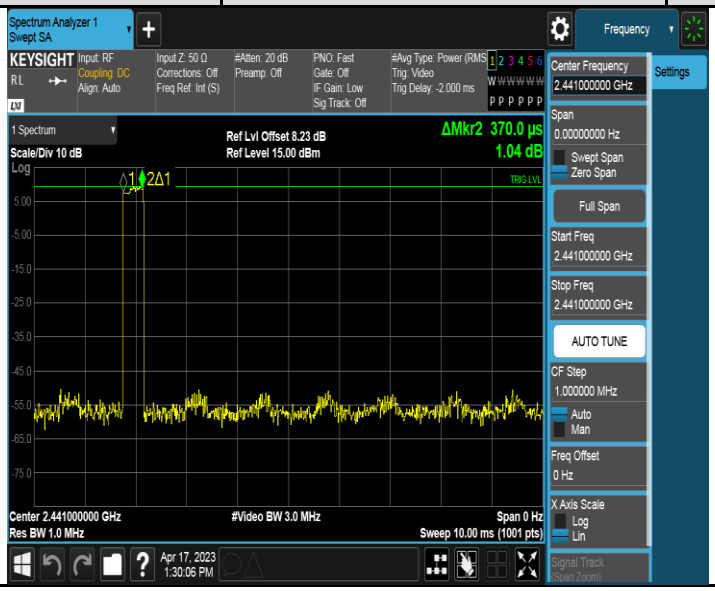
Test Mode	Test Channel	Verdict
DH3	Hop	PASS



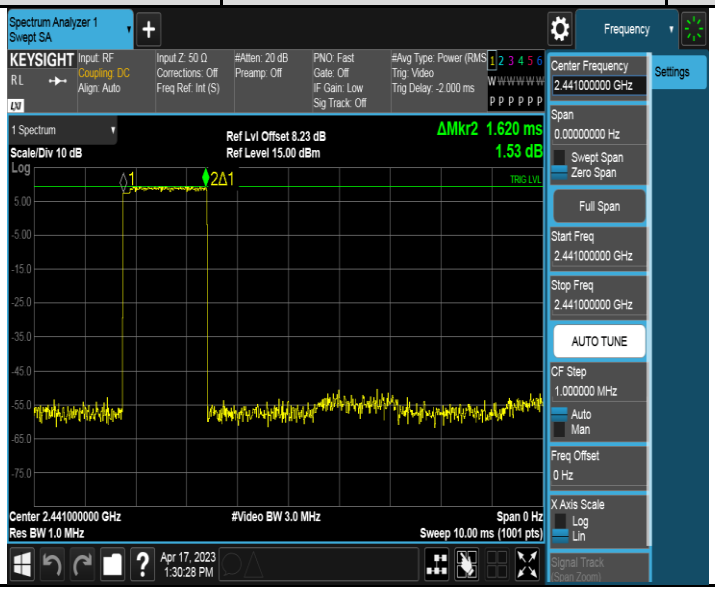
Test Mode	Test Channel	Verdict
DH5	Hop	PASS



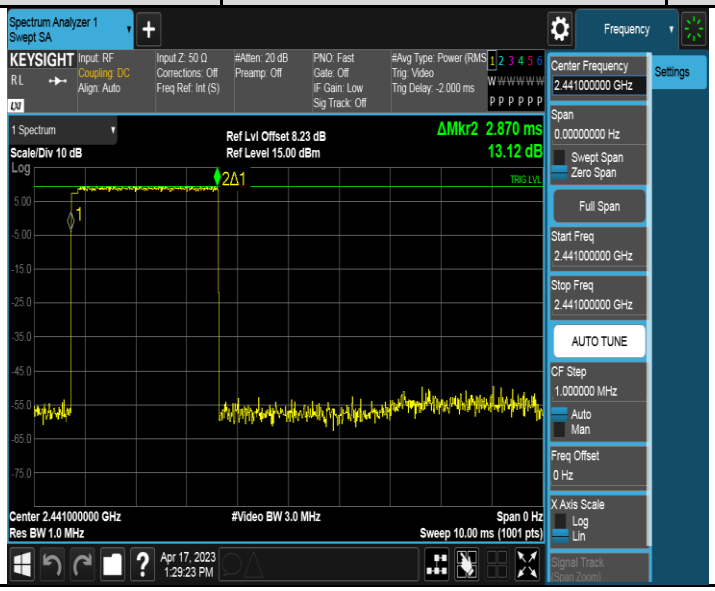
Test Mode	Test Channel	Verdict
3DH1	Hop	PASS



Test Mode	Test Channel	Verdict
3DH3	Hop	PASS



Test Mode	Test Channel	Verdict
3DH5	Hop	PASS



6.7. CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS

LIMITS

FCC Part15 (15.247) Subpart C, ISED RSS-247 ISSUE 2		
Section	Test Item	Limit
CFR 47 FCC §15.247 (d) ISED RSS-247 5.5	Conducted Bandedge and Spurious Emissions	20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power

TEST PROCEDURE

Refer to FCC KDB 558074, connect the UUT to the spectrum analyser and use the following settings:

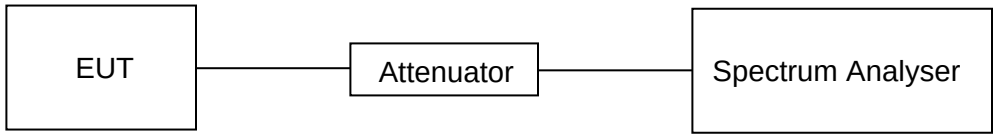
Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	100 kHz
VBW	≥3 × RBW
Span	1.5 x DTS bandwidth
Trace	Max hold
Sweep time	Auto couple.

Use the peak marker function to determine the maximum PSD level.

Span	Set the center frequency and span to encompass frequency range to be measured
Detector	Peak
RBW	100 kHz
VBW	≥3 × RBW
measurement points	≥span/RBW
Trace	Max hold
Sweep time	Auto couple.

Use the peak marker function to determine the maximum amplitude level**.**

TEST SETUP



TEST ENVIRONMENT

Temperature	22°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V

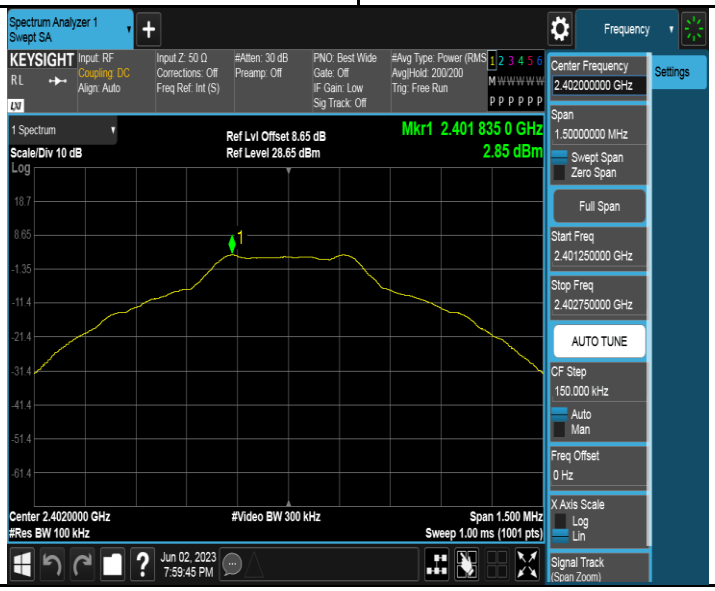
PART 1: REFERENCE LEVEL MEASUREMENT

TEST RESULTS TABLE

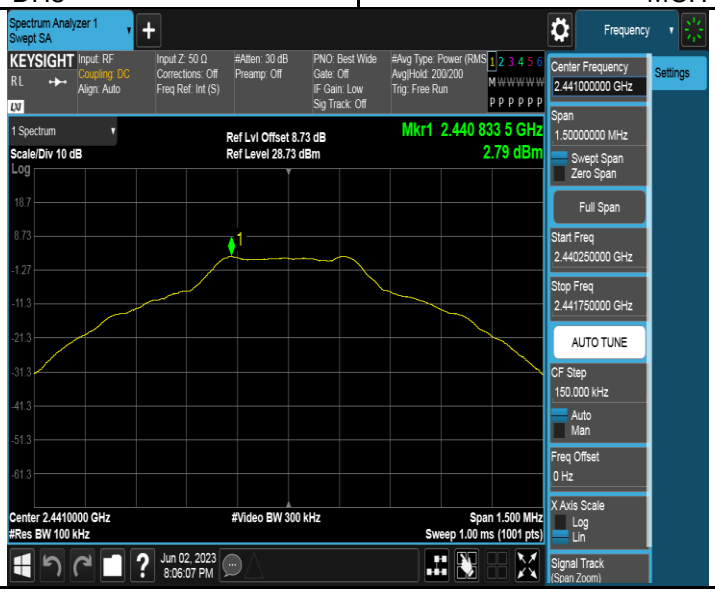
Test Mode	Test Channel	Result[dBm]
DH5	LCH	2.85
	MCH	2.79
	HCH	2.75
2DH5	LCH	-0.17
	MCH	-0.23
	HCH	-0.34
3DH5	LCH	-0.15
	MCH	-0.20
	HCH	-0.30

TEST GRAPHS

Test Mode	Channel
DH5	LCH

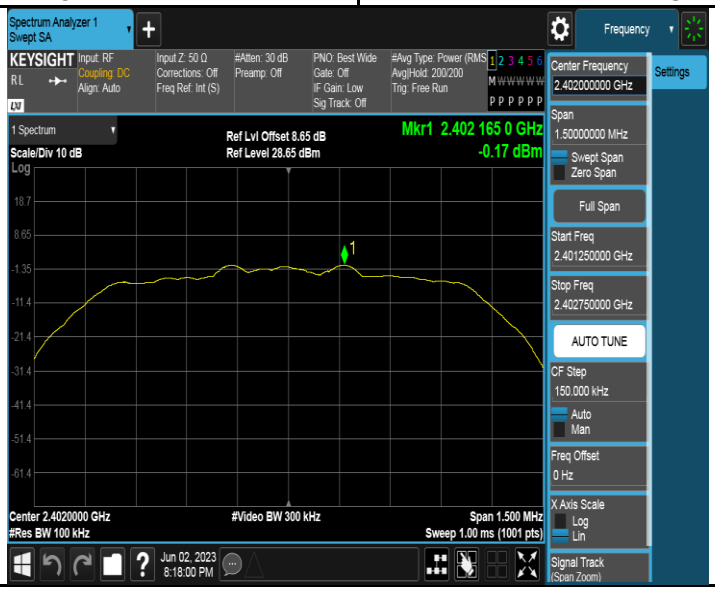


Test Mode	Channel
DH5	MCH

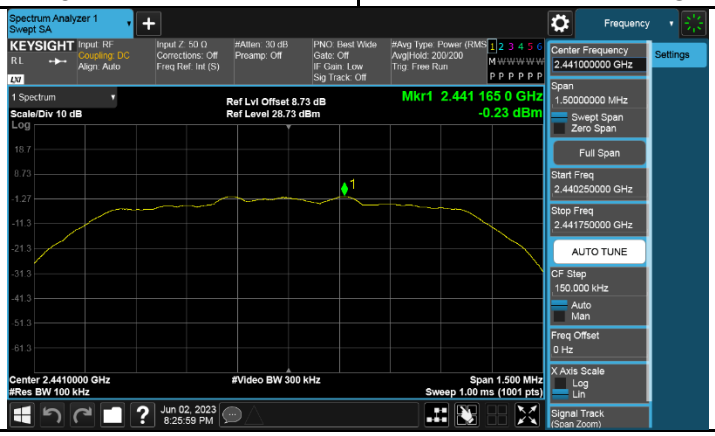


Test Mode	Channel
DH5	HCH

Test Mode	Channel
2DH5	LCH

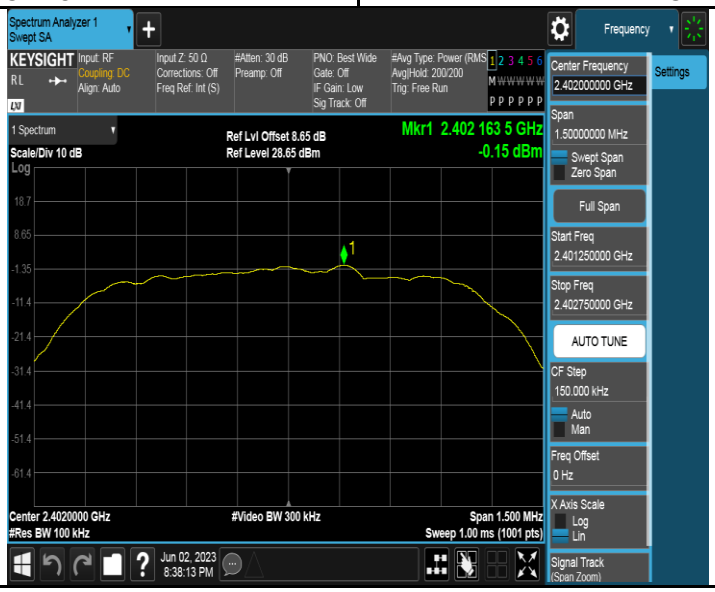


Test Mode	Channel
2DH5	MCH

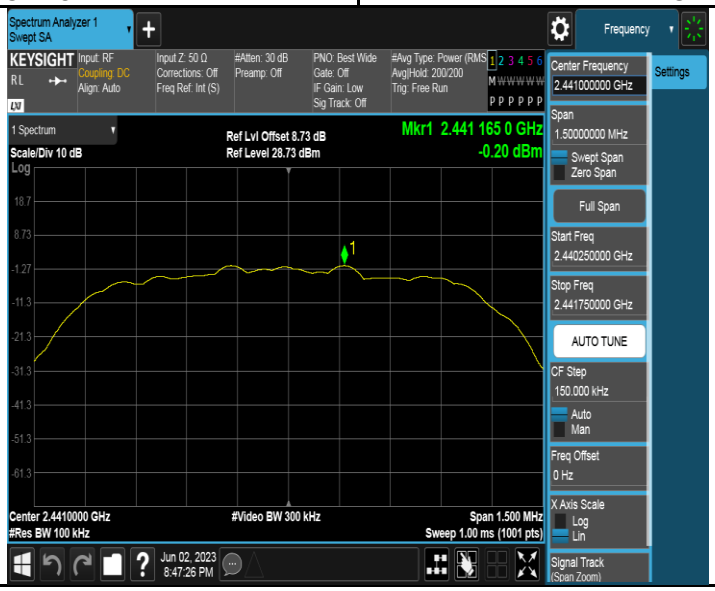


Test Mode	Channel
2DH5	HCH

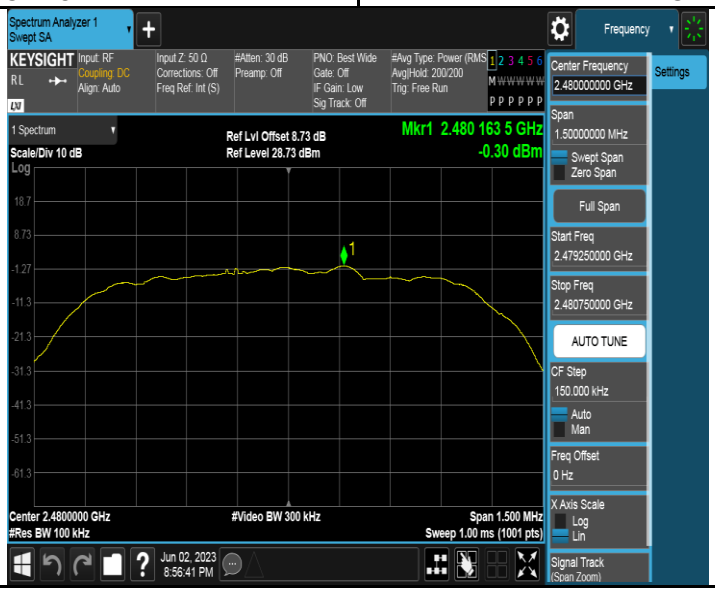
Test Mode	Channel
3DH5	LCH



Test Mode	Channel
3DH5	MCH



Test Mode	Channel
3DH5	HCH



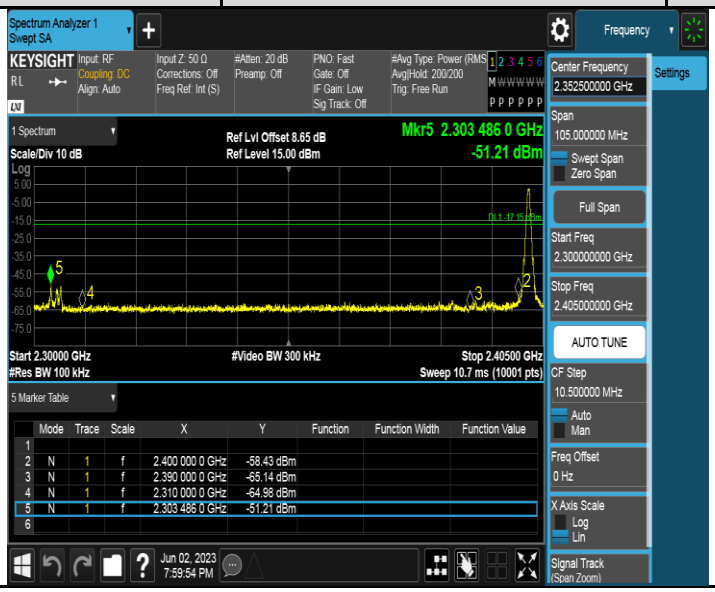
PART 2: CONDUCTED BANDEDGE

TEST RESULTS TABLE

Test Mode	Test Channel	Result	Verdict
DH5	LCH	Refer to the Test Graph	PASS
	HCH	Refer to the Test Graph	PASS
2DH5	LCH	Refer to the Test Graph	PASS
	HCH	Refer to the Test Graph	PASS
3DH5	LCH	Refer to the Test Graph	PASS
	HCH	Refer to the Test Graph	PASS

TEST GRAPHS

Test Mode	Test Channel	Verdict
DH5	LCH	PASS



Test Mode	Test Channel	Verdict
DH5	HCH	PASS