

# FCC Test Report (Part 15 Subpart C)

**FCC ID: 2AM8R-D450I**

## Client Information:

\*Applicant: Netradyne Inc

\*Applicant add.: 9171 Towne Centre Drive, Suite 110, San Diego, CA 92122

Manufacturer: Netradyne Inc

\*Manufacturer add.: 9171 Towne Centre Drive, Suite 110, San Diego, CA 92122

## Product Information:

**Sampling Details.....:** The below Test Item provided by applicant

\*Product Name: Driveri

\*Model No.: D-450

\*Derivative model No.: D-450A,D-455

\*Brand Name:



## Applied Standard:

FCC PART 15 Subpart C:2013 section 15.247

## Laboratory Details:

AA Electro Magnetic Test Laboratory Private Limited

PlotNo174, Udyog Vihar-Phase4, Sector18, Gurgaon, Haryana, India

Date of Receipt: Aug 30, 2024

Date of Test: Aug 30 ~ Oct. 18, 2024

Date of Issue: Nov. 22, 2024

Test Result: **In Compliance/Pass**

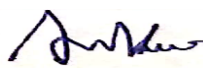
**Declaration of Conformity:** Declaration of conformity of the results is based as per the standard limits

**Disclaimer:** The \* Information are provided by Manufacturer and it is verified through the Request form and Marking

**Label,** AA Electro Magnetic Test Laboratory is not responsible for the above information accuracy. This device described above has been tested by AA Electro Magnetic Test Laboratory Private Limited, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

\*This test report must not be used by the client to claim product endorsement by any agency of the U.S. government.

Prepared By (+ signature) Ankur Kumar:



Reviewed & Approved by: (+ signature)

Dr. Lenin Raja (Authorized Representative)/( lenin83/)



# 1 Contents

	Page
<b>COVER PAGE</b>	
<b>1 CONTENTS.....</b>	<b>2</b>
<b>2 TEST SUMMARY .....</b>	<b>4</b>
2.1 COMPLIANCE WITH FCC PART 15 SUBPART C.....	4
2.2 TEST LOCATION .....	5
2.3 MEASUREMENT UNCERTAINTY .....	5
<b>3 TEST FACILITY .....</b>	<b>6</b>
3.1 DEVIATION FROM STANDARD.....	6
3.2 ABNORMALITIES FROM STANDARD CONDITIONS .....	6
<b>4 GENERAL INFORMATION .....</b>	<b>7</b>
4.1 GENERAL DESCRIPTION OF EUT .....	7
4.2 DESCRIPTION OF TEST CONDITIONS .....	9
4.3 TEST PERIPHERAL LIST .....	10
4.4 EUT PERIPHERAL LIST.....	10
<b>5 EQUIPMENTS LIST FOR ALL TEST ITEMS.....</b>	<b>11</b>
<b>6 TEST RESULT .....</b>	<b>13</b>
6.1 ANTENNA REQUIREMENT .....	13
6.1.1 Standard requirement .....	13
6.1.2 EUT Antenna .....	13
6.2 CONDUCTION EMISSIONS MEASUREMENT .....	14
6.2.1 Applied procedures / Limit .....	14
6.2.2 Test procedure .....	14
6.2.3 Test setup.....	14
6.2.4 Test results .....	15
6.3 RADIATED EMISSIONS MEASUREMENT .....	17
6.3.1 Applied procedures / Limit .....	17
6.3.2 Test setup.....	17
6.3.3 Test procedure .....	19
6.3.4 Test Result .....	20
6.3.5 TEST RESULTS (Restricted Bands Requirements) .....	34
6.4 BANDWIDTH TEST.....	35
6.4.1 Applied procedures / Limit .....	35
6.4.2 Test procedure .....	35
6.4.3 Deviation from standard .....	35
6.4.4 Test setup.....	35
6.4.5 Test results .....	36
6.5 CARRIER FREQUENCIES SEPARATED.....	42

6.5.1	Applied procedures / Limit .....	42
6.5.2	Test procedure .....	42
6.5.3	Deviation from standard .....	42
6.5.4	Test setup .....	42
6.5.5	Test results .....	43
6.6	HOPPING CHANNEL NUMBER .....	50
6.6.1	Applied procedures / Limit .....	50
6.6.2	Test procedure .....	50
6.6.3	Deviation from standard .....	50
6.6.4	Test setup .....	50
6.6.5	Test result .....	50
6.7	DWELL TIME .....	53
6.7.1	Applied procedures / Limit .....	53
6.7.2	Test procedure .....	53
6.7.3	Deviation from standard .....	53
6.7.4	Test setup .....	53
6.7.5	Test result .....	54
6.8	MAXIMUM PEAK OUTPUT POWER .....	60
6.8.1	Applied procedures / Limit .....	60
6.8.2	Test procedure .....	60
6.8.3	Deviation from standard .....	60
6.8.4	Test setup .....	60
6.8.5	Test results .....	61
6.9	BAND EDGE .....	68
6.9.1	Applied procedures / Limit .....	68
6.9.2	Test procedure .....	68
6.9.3	Deviation from standard .....	68
6.9.4	Test setup .....	68
6.9.5	Test results .....	69
6.10	CONDUCTED SPURIOUS EMISSIONS .....	72
6.10.1	Applied procedures / Limit .....	72
6.10.2	Test procedure .....	72
6.10.3	Deviation from standard .....	72
6.10.4	Test setup .....	72
6.10.5	Test results .....	73

## 2 Test Summary

### 2.1 Compliance with FCC Part 15 subpart C

Test	Test Requirement	Standard Paragraph	Result
Antenna Requirement	FCC Part 15 C	Section 15.247©	PASS
Conduction Emissions	FCC Part 15 C	Section 15.207(a)	PASS
Radiated Emissions	FCC Part 15 C	Section 15.247(d)	PASS
Bandwidth Test	FCC Part 15 C	Section 15.247(a)	PASS
Carrier Frequencies Separated	FCC Part 15 C	Section 15.247(a)(1)	PASS
Hopping Channel Number	FCC Part 15 C	Section 15.247(a)(1) (iii)	PASS
Dwell Time	FCC Part 15 C	Section 15.247(a)(1) (iii)	PASS
Maximum Peak Output Power	FCC Part 15 C	Section 15.247(b)	PASS
Band edge	FCC Part 15 C	Section 15.247(d)	PASS
Conducted Spurious Emissions	FCC Part 15 C	Section 15.247(d)	PASS
<b>Note:</b> N/A is an abbreviation for Not Applicable.			
<b>Model description:</b> N/A			
(1)	Reference to the FCC Public Notice DA 00-705		
(2)	Reference to ANSI C63.10		

## 2.2 Test Location

All tests were performed at:

AA Electro Magnetic Test Laboratory Private Limited

Plot No 174, Udyog Vihar - Phase 4, Sector 18, Gurgaon, Haryana, India

Tel.: +91-0124-4235350

## 2.3 Measurement Uncertainty

All measurements involve certain levels of uncertainties, The following measurements uncertainty Levels have estimated based on ANSI C63.4:2009, the maximum value of the uncertainty as below

No.	Item	Uncertainty
1	Conducted Emission Test	2.83dB
2	Radiated Emission Test	3.78dB

### 3 Test Facility

**ILAC / NABL Accreditation No.: TC-8597**

Three 3m Semi-Anechoic Chamber, 1 full-Anechoic chamber and 2 Shielding Rooms of AA Electro Magnetic Test Laboratory Private Limited have been registered by National Accreditation Board for Testing and Calibration Laboratories (NABL).

**ILAC –A2LA Accreditation No.: 5593.01**

Three 3m Semi-Anechoic Chamber, 1 full-Anechoic chamber and 2 Shielding Rooms of AA Electro Magnetic Test Laboratory Private Limited have been registered American Association of Laboratory Accreditation ( A2LA.)

**FCC- Recognition No.: 137777**

Three 3m Semi-Anechoic Chamber, 1 full-Anechoic chamber and 2 Shielding Rooms of AA Electro Magnetic Test Laboratory Private Limited have been registered by Federal Communications Commission (FCC).

**ISED Recognition No.: 26046**

Three 3m Semi-Anechoic Chamber, 1 full-Anechoic chamber and 2 Shielding Rooms of AA Electro Magnetic Test Laboratory Private Limited have been registered by Institute for Social and Economic Development.( ISED)

**VCCI- Registration No: 4053**

Three 3m Semi-Anechoic Chamber, 1 full-Anechoic chamber and 2 Shielding Rooms of AA Electro Magnetic Test Laboratory Private Limited have been registered by Voluntary Control Council for Interference.(VCCI)

**TEC Designation No.: IND063**

Three 3m Semi-Anechoic Chamber, 1 full-Anechoic chamber and 2 Shielding Rooms of AA Electro Magnetic Test Laboratory Private Limited have been registered by Telecommunication Engineering (TEC) Center.

**BIS Recognition No: 816586**

BIS recognized as per CRS scheme for IT electronics, LED control gears, Lamp, Inverter / UPS are recognized as per LRS 2020.

#### 3.1 Deviation from standard


None

#### 3.2 Abnormalities from standard conditions

None

## 4 General Information

### 4.1 General Description of EUT

Manufacturer:	Netradyne Inc
Manufacturer Address:	9171 Towne Centre Drive, Suite 110, San Diego, CA 92122
EUT Name:	Driveri
Model No:	D-450
Brand Name:	
Derivative model No.:	D-450A,D-455
Serial No:	103302400025
Operation frequency:	2402 MHz to 2480 MHz
Number Of Channel:	79
Modulation Technology:	GFSK, $\pi/4$ -DQPSK, 8DPSK (1/2/3Mbps)
Antenna Gain:	-2.6dBi
H/W No.:	103-00-00006
S/W No.:	13.0.19
Power Supply Range:	Input of AC Adapter: AC 100-240V, 0.5A, 50-60Hz Output of AC Adapter/Input of EUT : DC 12V, 5A
Condition of Sample on receipt:	Good
Note:	1 .For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual. 2. Antenna gain and antenna type provided by manufacturer.
Opinions and Interpretations:	<del>See the specific Note / Annexure if any in the whole /full report/NA</del>

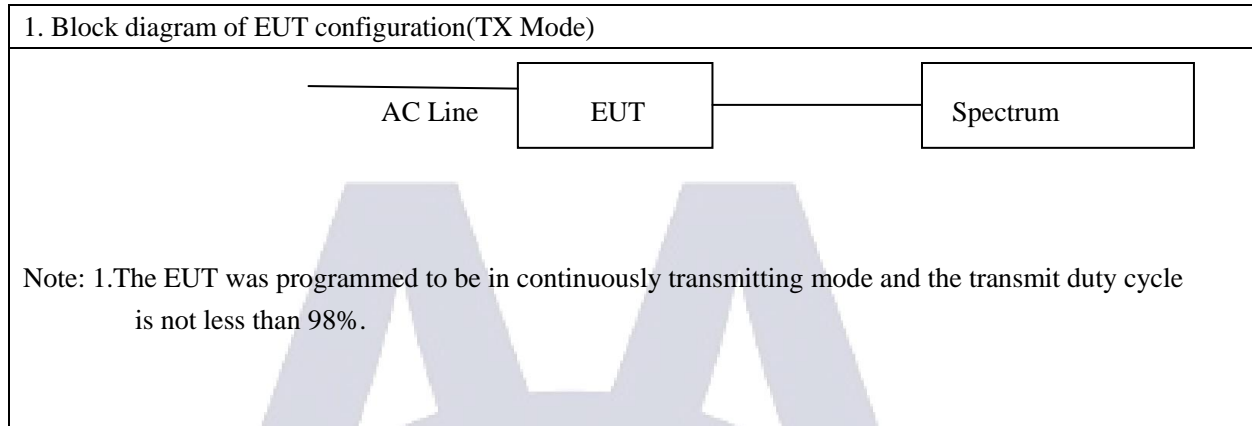


Description of Channel:					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	27	2429	54	2456
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458
03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462
07	2409	34	2436	61	2463
08	2410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



## 4.2 Description of Test conditions

- (1) EUT was tested in normal configuration (Please See following Block diagram)



- (2) E.U.T. test conditions:

15.31(e): For intentional radiators, measurements of the variation of the input power or the adiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

- (3) Test frequencies:

According to the 15.31(m) Measurements on intentional radiators or receivers, other than TV broadcast receivers, shall be performed and. If required reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table:

Frequency range over which device operates	Number of frequencies	Location in the range of operation
1 MHz or less	1	Middle
1 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

- (4) Frequency range of radiated measurements:

According to the 15.33, the test range will be up to the tenth harmonic of the highest fundamental frequency.

- (5) Pre-test the EUT in all transmitting mode at the lowest (2402 MHz), middle (2441 MHz) and highest (2480 MHz) channel with different data packet and conducted to determine the worst-case mode, only the worst-case results(1Mbps/2Mbps/3Mbps) are recorded in this report.

### 4.3 Test Peripheral List

No.	Equipment	Manufacturer	EMC Compliance	Model No.	Serial No.	Power cord	signal cable
1	Laptop	DELL	N/A	Latitude 3490	5M2Z1W2	2m unshielded	N/A

### 4.4 EUT Peripheral List

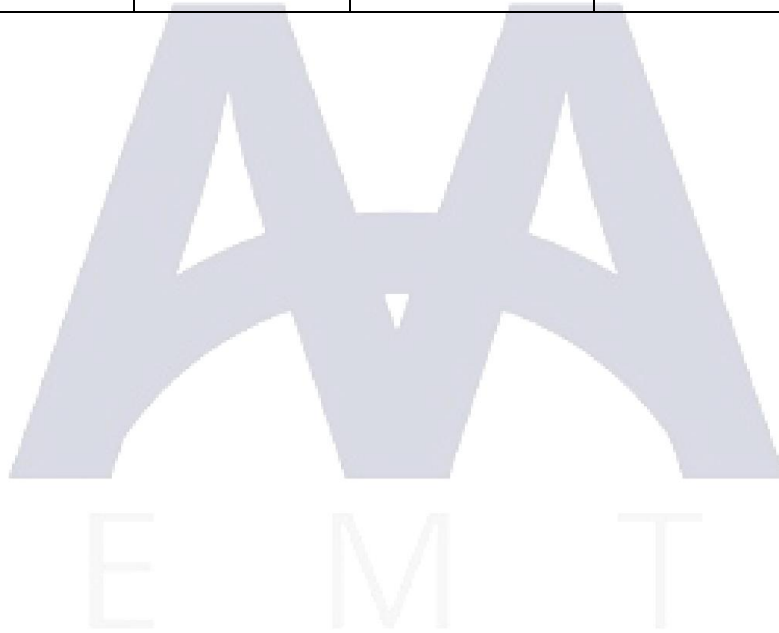
No.	Equipment	Manufacturer	FCC ID	Model No.	Serial No.	Power cord	signal cable
1	AC ADAPTER	DELTA ELECTRONIC S, INC.	--	LA-45WLAJI	N/A	1 meter	N/A

## 5 Equipments List for All Test Items

No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
1	Spectrum Analyzer	Rohde and Schwarz	FSP	101163	2023/02/13	2025/02/13
2	Loop antenna	DAZE Beijing	ZN30900C	18052	2023/09/15	2026/09/15
3	Hi power horn antenna	DAZE Beijing	ZN30700	18012	2023/09/11	2026/09/10
4	MXA Signal Analyzer	Keysight	N9020A	6272323218	2023/07/27	2025/07/27
5	Horn antenna	DAZE Beijing	ZN30703	18005	2023/09/11	2026/09/10
6	Pre amplifier	KELIANDA	LNA-0009295	-	2024/01/10	2025/01/10
7	Pre amplifier	KELIANDA	CF-00218	-	2024/01/10	2025/01/10
8	Biconical Antenna	DAZE Beijing	ZN30505C	17038	2023/09/11	2026/09/10
9	EMI-RECEIVER	Schwarzbeck	FCKL	1528194	2024/01/10	2025/01/10
10	LISN	Kyoritsu	KNW-407	8-1789-5	2024/01/10	2025/01/10
11	Network-LISN	SCHWARZBECK	NNBM8125	81251314	2024/01/10	2025/01/10
12	Network-LISN	SCHWARZBECK	NNBM8125	81251315	2024/01/10	2025/01/10
13	PULSELIMITER	Rohde and Schwarz	ESH3-Z2	100681	-	-
14	50Ω Coaxial Switch	DAIWA	1565157	-	-	-
15	50Ω Coaxial Switch	-	-	-	-	-
16	Wireless signal power meter	DARE!!	RPR3006W	RFSW190220	2024/01/13	2025/01/13
17	Signal Generator	KEYSIGHT	N5181A	512071	2024/01/10	2026/01/10
18	RF Vector Signal Generator	Keysight	N5182B	512094	2024/01/10	2026/01/10

Report No.: AAEMT/RF/240830-01-02

19	Spectrum analyzer	R&S	FSV-40N	101385	2023/04/28	2025/04/28
20	Radio Communication Tester	R&S	CMW 500	124589	2023/09/08	2025/09/08
21	Signal Generator	R&S	SMP02	837017/004 836593/005	2023/09/08	2025/09/08
22	DC Regulated Power	Metravi	RPS-3005	669076	2023/12/12	2024/12/11



## 6 Test Result

### 6.1 Antenna Requirement

#### 6.1.1 Standard requirement

15.203 requirements: For intentional device, according to 15.203: an intentional radiator shall Be designed to ensure that no antenna other than that furnished by the responsible party shall be Used with the device.

15.247(c) (1)(i) requirement: (i) Systems operating in the 2400-2483.5 MHz band that is used Exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional Gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

#### 6.1.2 EUT Antenna

The antenna is a Flexible PCB Antenna with Cable which is connected to the board using a N-type to U.FL cable which is connected to the board via U.FL connector. Antenna gain is maximum -2.6dBi from 2.4GHz to 2.5 GHz.

## 6.2 Conduction Emissions Measurement

### 6.2.1 Applied procedures / Limit

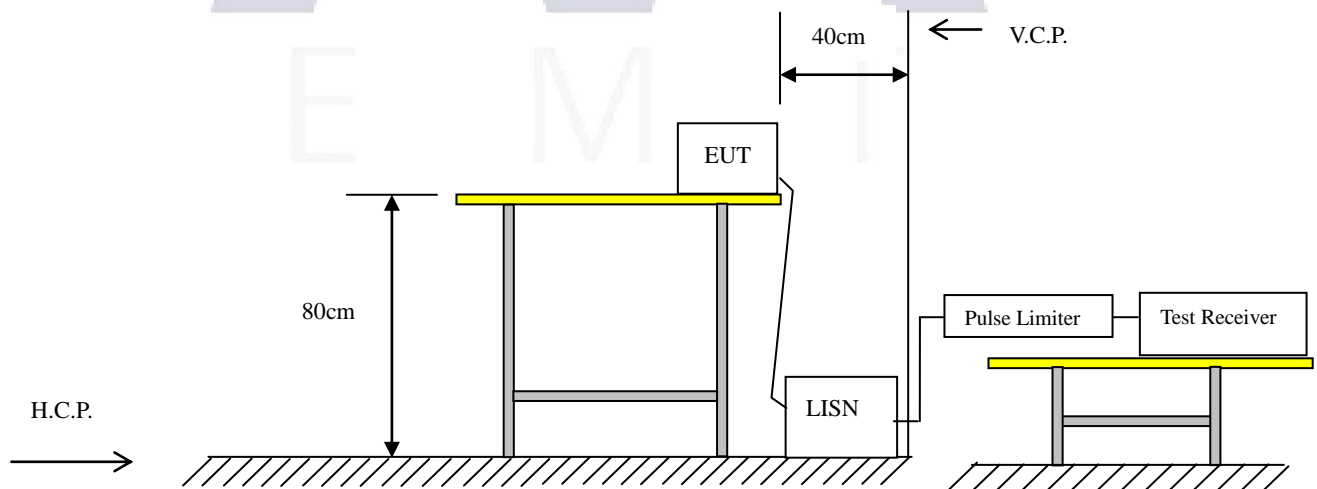
Frequency of Emission (MHz)	Conducted Limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

Note: Decreases with the logarithm of the frequency.

### 6.2.2 Test procedure

EUT was placed upon a wooden test table 0.8m above the horizontal metal reference plane and 0.4m from the Vertical ground plane, and it was connected to an AMN. The closest distance between the boundary of the EUT and the surface of the AMN is 0.8m. All peripherals were connected to another AMN, and placed at a distance of 10cm from each other. A spectrum and receiver was connected to the RF output port of the AMN. Both average and quasi-peak value were detected.

### 6.2.3 Test setup

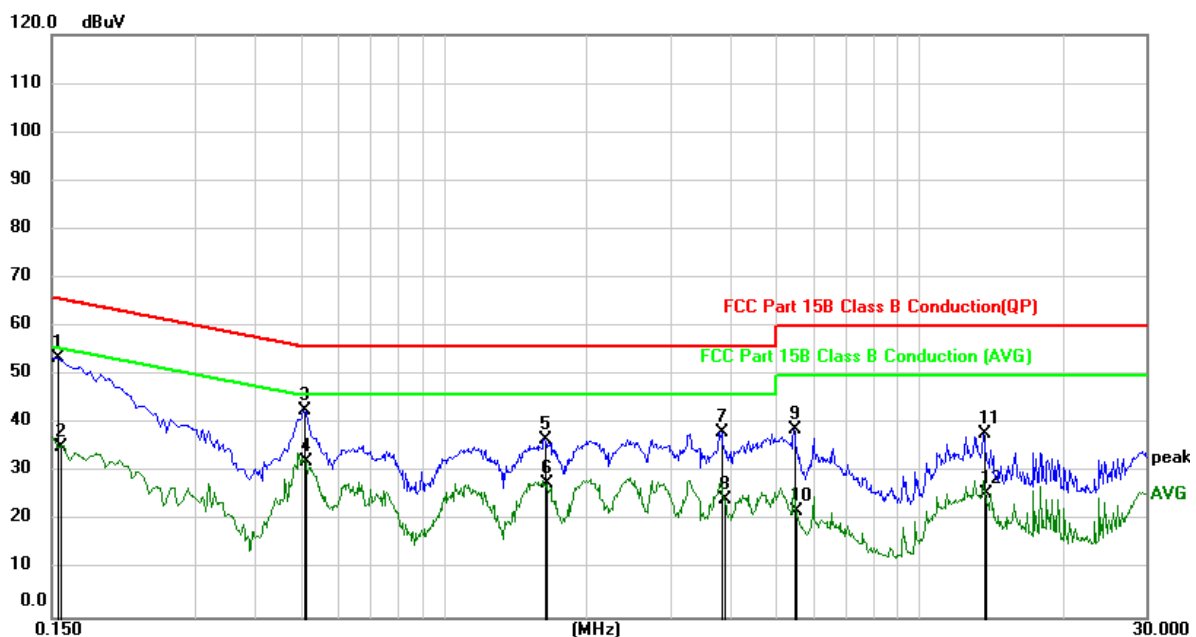


### 6.2.4 Test results

EUT:	Driveri	Model Name. :	D-450
Temperature:	25.8 °C	Relative Humidity:	52%
Pressure:	1010hPa	Test Date :	2024-09-02
Test Mode:	TX CH00 (1Mbps worst case)	Phase :	Line
Test Voltage :	110VAC,60Hz		

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	
		MHz	Level	Factor	ment			Detector
			dBuV	dB	dBuV	dBuV	dB	
1	*	0.1544	42.91	10.71	53.62	65.75	-12.13	QP
2		0.1564	24.56	10.80	35.36	55.65	-20.29	AVG
3		0.5100	31.82	10.90	42.72	56.00	-13.28	QP
4		0.5143	21.36	10.89	32.25	46.00	-13.75	AVG
5		1.6304	26.22	10.41	36.63	56.00	-19.37	QP
6		1.6484	17.21	10.41	27.62	46.00	-18.38	AVG
7		3.8490	27.76	10.59	38.35	56.00	-17.65	QP
8		3.8894	14.01	10.57	24.58	46.00	-21.42	AVG
9		5.4600	28.37	10.51	38.88	60.00	-21.12	QP
10		5.5274	11.46	10.51	21.97	50.00	-28.03	AVG
11		13.6320	26.98	10.84	37.82	60.00	-22.18	QP
12		13.7713	14.90	10.84	25.74	50.00	-24.26	AVG

Remark: Factor = LISN factor + Cable Loss + Pulse limiter factor.



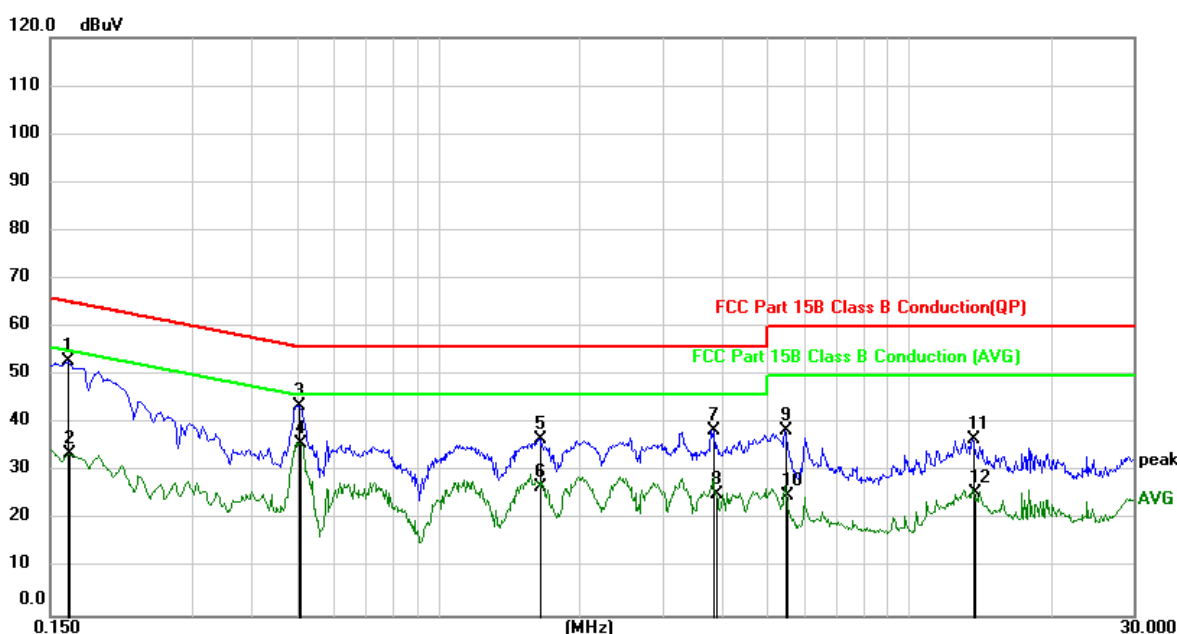


Report No.: AAEMT/RF/240830-01-02

EUT:	Driveri	Model Name. :	D-450
Temperature:	25.8 °C	Relative Humidity:	52%
Pressure:	1010hPa	Test Date :	2024-09-02
Test Mode:	TX CH00 (worst case)	Phase :	Neutral
Test Voltage :	110VAC,60Hz		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB	dBuV	dBuV	dB	
1		0.1635	41.93	10.89	52.82	65.28	-12.46	QP
2		0.1650	22.72	10.95	33.67	55.20	-21.53	AVG
3		0.5055	32.96	10.73	43.69	56.00	-12.31	QP
4 *		0.5100	25.07	10.73	35.80	46.00	-10.20	AVG
5		1.6394	26.52	10.31	36.83	56.00	-19.17	QP
6		1.6484	16.41	10.31	26.72	46.00	-19.28	AVG
7		3.8445	28.11	10.43	38.54	56.00	-17.46	QP
8		3.8894	14.94	10.41	25.35	46.00	-20.65	AVG
9		5.4555	28.39	10.29	38.68	60.00	-21.32	QP
10		5.4960	14.84	10.29	25.13	50.00	-24.87	AVG
11		13.6275	26.58	10.29	36.87	60.00	-23.13	QP
12		13.7759	15.33	10.29	25.62	50.00	-24.38	AVG

Remark: Factor = LISN factor + Cable Loss + Pulse limiter factor.



## 6.3 Radiated Emissions Measurement

### 6.3.1 Applied procedures / Limit

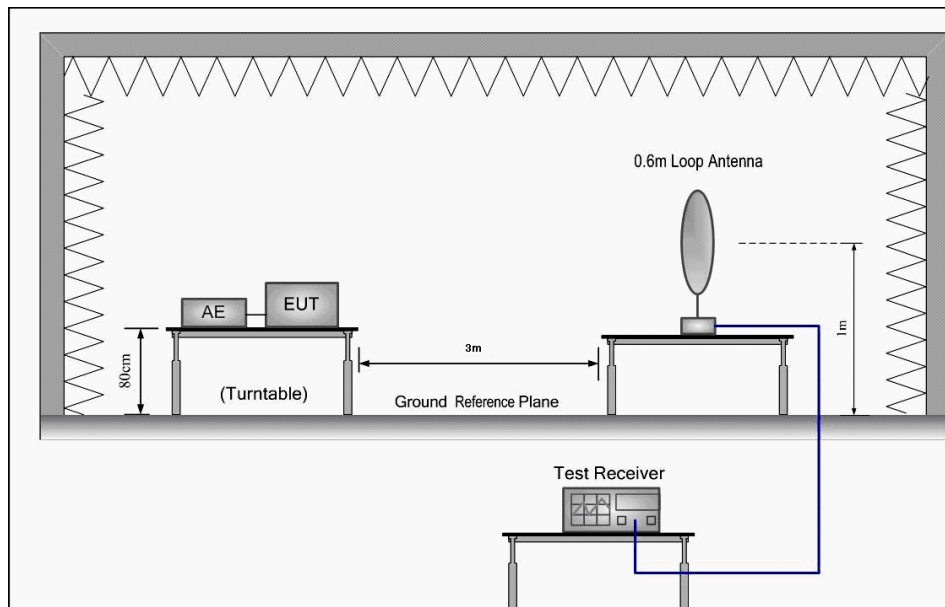
15.247(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Frequency of Emission (MHz)	Field Strength		Measurement Distance (meters)
	$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$	
0.009-0.49	2400/F(kHz)		300
0.49-1.705	24000/F(kHz)		30
1.705-30	30		30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

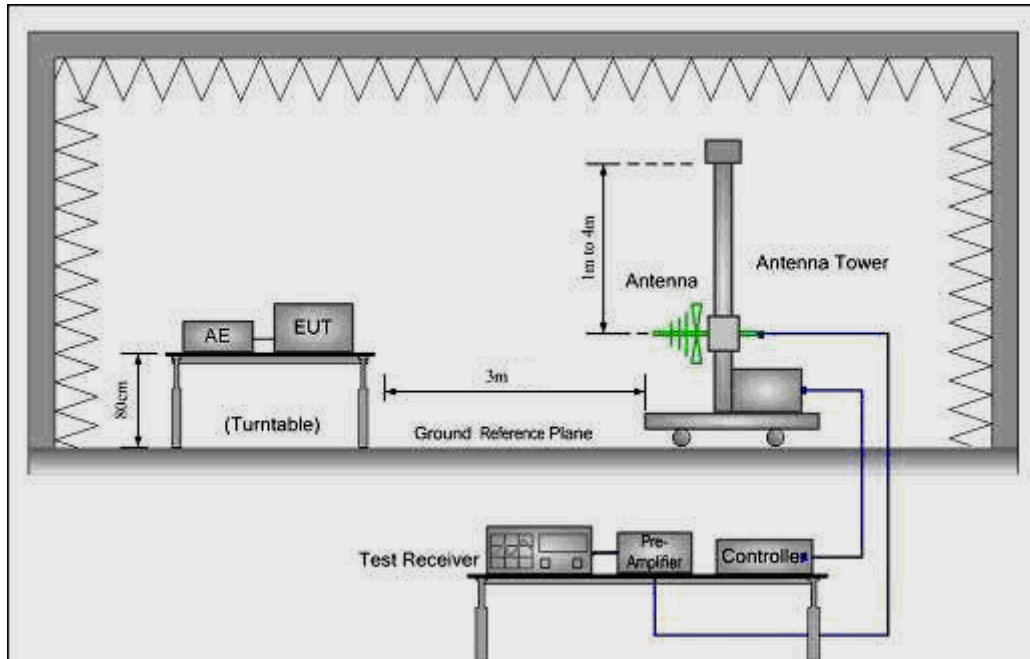
### 6.3.2 Test setup

#### Test Configuration:

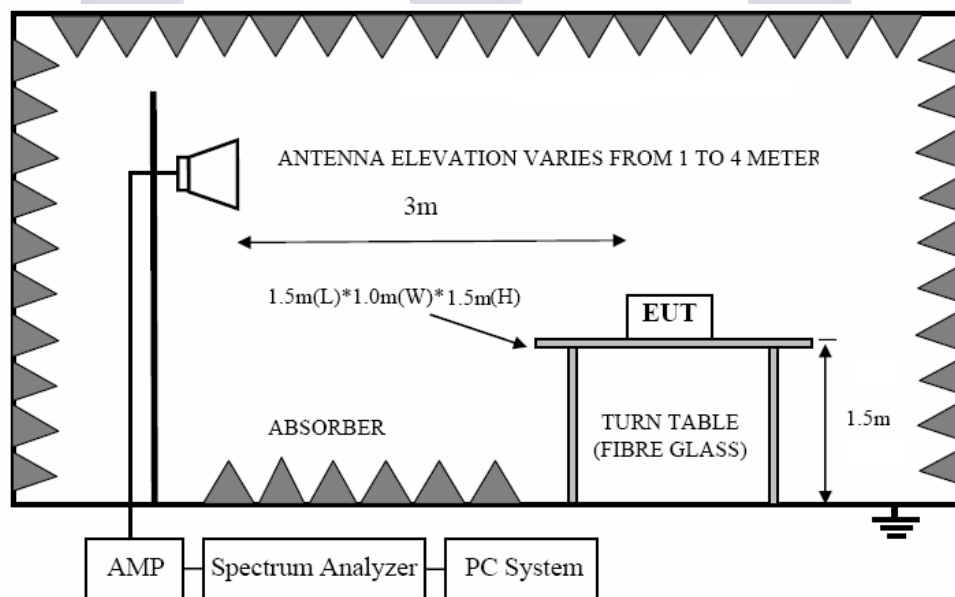
- 1) 9 kHz to 30 MHz emissions:



2) 30 MHz to 1 GHz emissions:



3) 1 GHz to 25 GHz emissions:



### 6.3.3 Test procedure

EUT was placed upon a wooden test table which was placed on the turn table 0.8m above the horizontal metal ground plane, and operating in the mode as mentioned above. A receiving antenna was placed 3m away from the EUT. During testing, turn around the turn table and move the antenna from 1m to 4m to find the maximum field-strength reading. All peripherals were placed at a distance of 10cm between each other. Both horizontal and Vertical antenna polarities were tested. The worst case emissions were reported.

For measurement at frequency above 1GHz

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

### 6.3.4 Test Result

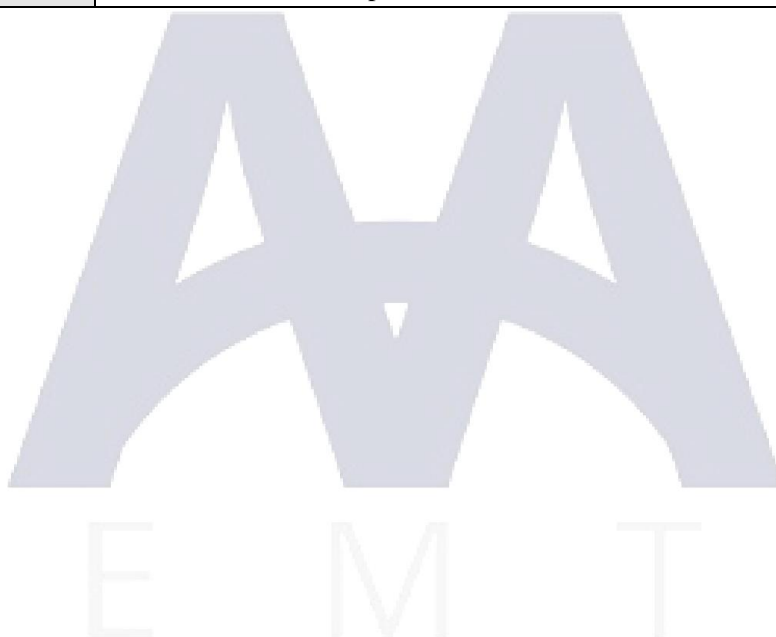
#### Radiated Emissions Test Data Below 30MHz

EUT:	Driveri	Model Name. :	D-450
Temperature:	25.4 °C	Relative Humidity:	53%
Pressure:	1010hPa	Test Date :	2024-09-24
Test Mode :	TX	Test Voltage :	110V AC, 60Hz
Measurement Distance	3 m	Frequency Range	9KHz to 30MHz
RBW/VBW	9KHz~150KHz/RB 200Hz for QP, 150KHz~30MHz/RB 9KHz for QP		

No emission found between lowest internal used/generated frequencies to 30MHz.

### Radiated Emissions Test Data Below 1GHz

EUT:	Driveri	Model Name. :	D-450
Temperature:	25.4 °C	Relative Humidity:	53%
Pressure:	1010hPa	Test Date :	2024-09-24
Test Mode :	TX (1Mbps) CH00 (2402MHz)	Test Voltage :	110V AC, 60Hz
Measurement Distance	3 m	Frequency Range	30MHz to 1GHz
RBW/VBW	100KHz / 300KHz for spectrum, RBW=120KHz for receiver.		



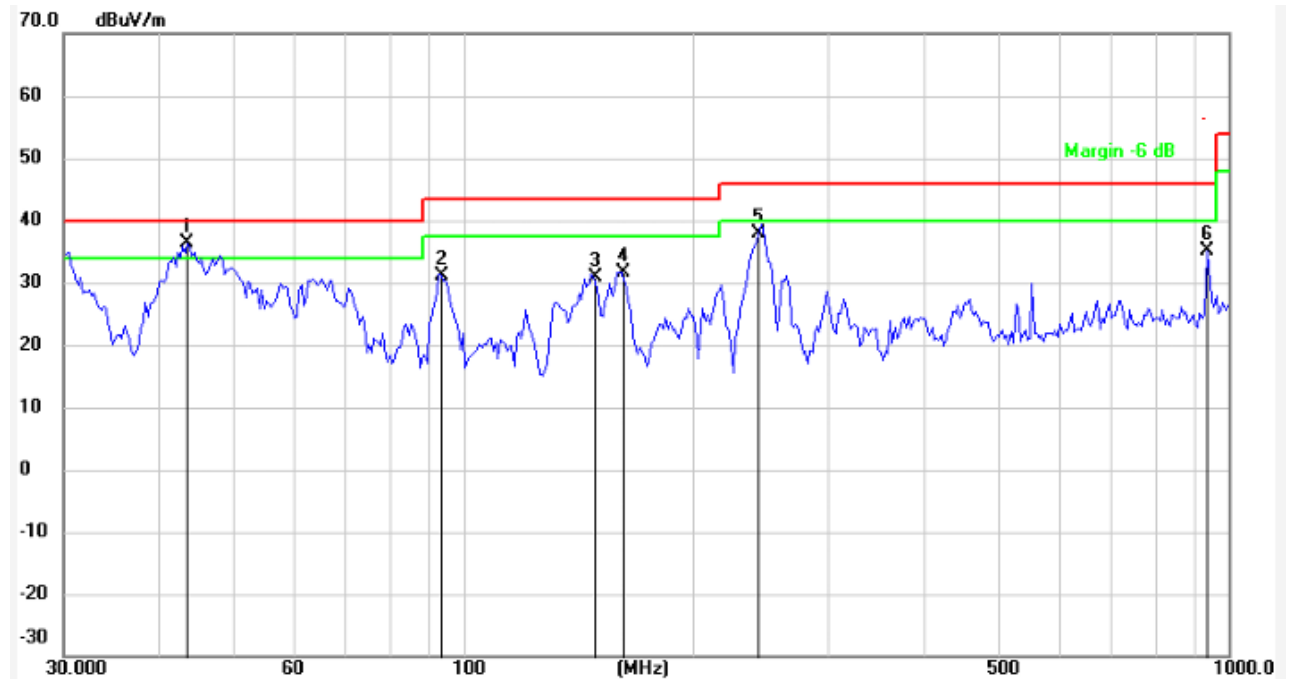
Test at Channel 00 (2.402 GHz) in transmitting status

30 MHz~1 GHz Spurious Emissions. Quasi-Peak Measurement

**Vertical:**

Peak scan

Level (dBμV/m)



Quasi-peak measurement

No.	Frequency (MHz)	Factor (dBμV/m)	Reading (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	43.5380	-11.75	48.08	36.33	40.00	-3.67	QP
2	93.6532	-12.35	43.52	31.17	43.50	-12.33	QP
3	147.8747	-15.45	46.41	30.96	43.50	-12.54	QP
4	160.8852	-14.74	46.25	31.51	43.50	-11.99	QP
5	243.5431	-10.38	48.23	37.85	46.00	-8.15	QP
6	938.7139	0.35	34.75	35.10	46.00	-10.90	QP

Measurement Level = Reading Level + Factor

Factor= Ant Factor + Cable Loss - Pre-amplifier



Report No.: AAEMT/RF/240830-01-02

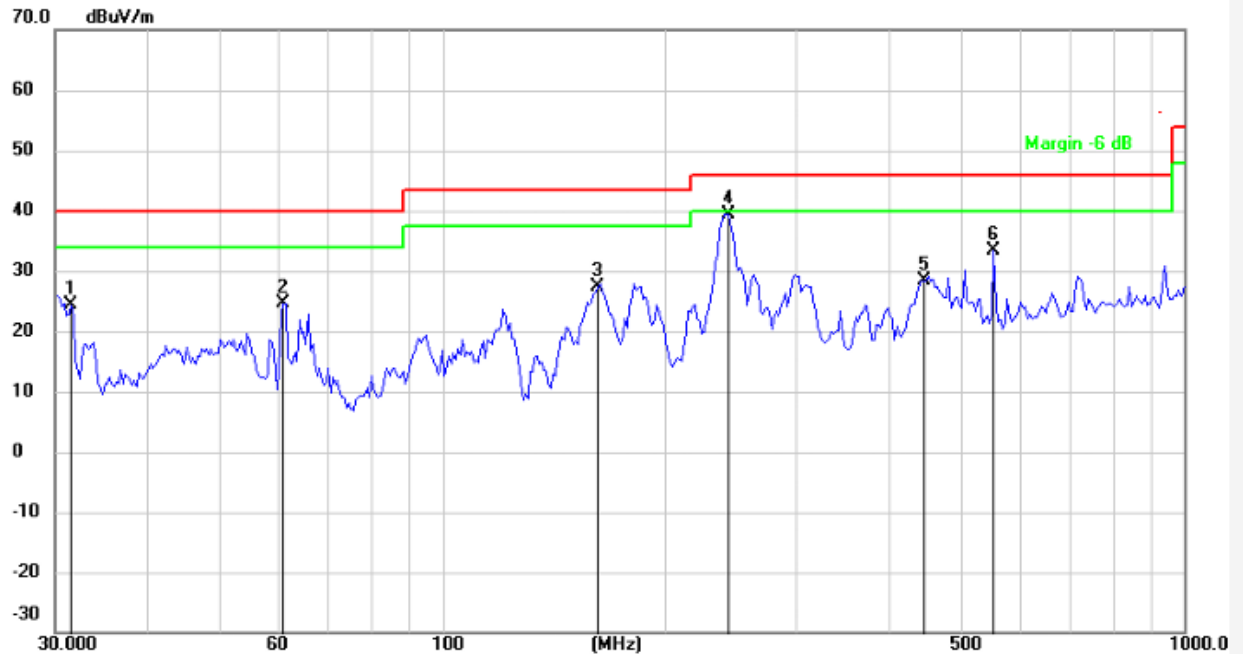
Test at Channel 00 (2.402 GHz) in transmitting status

30 MHz~1 GHz Spurious Emissions. Quasi-Peak Measurement

**Horizontal:**

Peak scan

Level (dBμV/m)



Quasi-peak measurement

No.	Frequency (MHz)	Factor (dBμV/m)	Reading (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	31.5126	-10.95	35.37	24.42	40.00	-15.58	QP
2	61.0041	-10.45	35.13	24.68	40.00	-15.32	QP
3	162.0197	-12.67	39.98	27.31	43.50	-16.19	QP
4	243.5431	-8.38	47.79	39.41	46.00	-6.59	QP
5	442.5722	-3.07	31.43	28.36	46.00	-17.64	QP
6	554.1708	-0.95	34.39	33.44	46.00	-12.56	QP

Measurement Level = Reading Level + Factor

Factor= Ant Factor + Cable Loss - Pre-amplifier

Report No.: AAEMT/RF/240830-01-02

**Radiated Emissions Test Data Above 1GHz**

EUT:	Driveri	Model Name. :	D-450
Temperature:	25.4 °C	Relative Humidity:	53%
Pressure:	1010hPa	Test Date :	2024-09-24
Test Mode :	TX (1Mbps) CH00 (2402MHz)	Test Voltage :	110V AC, 60Hz
Measurement Distance	3 m	Frequency Range	1GHz to 25GHz
RBW/VBW	Spurious emission: 1MHz/1MHz for Peak, 1MHz/10Hz for Average. Non-restricted band: 100KHz/300KHz for Peak.		



Report No.: AAEMT/RF/240830-01-02

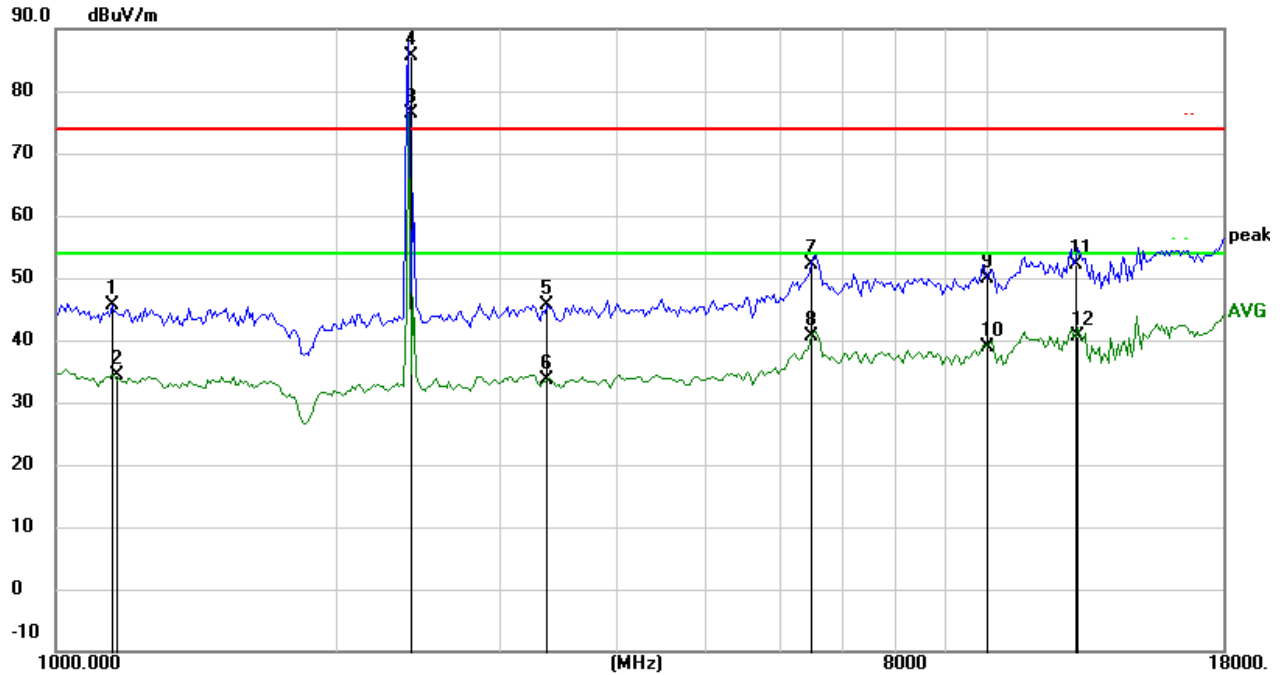
Test at Channel 00 (2.402 GHz) in transmitting status (Worst Case)

1000 MHz~18000 MHz Spurious Emissions .

**Vertical:**

Peak scan

Level (dBuV/m)



No.	Frequency (MHz)	Factor (dBuV/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	1149.142	-4.38	50.10	45.72	74.00	-28.28	peak
2	1155.818	-4.36	38.62	34.26	54.00	-19.74	AVG
3	2398.016	-2.77	79.25	76.48	54.00	22.48	AVG
4	2402.000	-2.76	88.44	85.68	74.00	11.68	peak
5	3374.978	-1.33	46.96	45.63	74.00	-28.37	peak
6	3374.978	-1.33	35.02	33.69	54.00	-20.31	AVG
7	6494.281	8.59	43.57	52.16	74.00	-21.84	peak
8	6494.281	8.59	32.01	40.60	54.00	-13.40	AVG
9	10027.653	5.22	44.65	49.87	74.00	-24.13	peak
10	10027.653	5.22	33.70	38.92	54.00	-15.08	AVG
11	12424.406	8.43	43.78	52.21	74.00	-21.79	peak
12	12496.581	8.45	32.16	40.61	54.00	-13.39	AVG

Measurement Level = Reading Level + Factor

Factor= Ant Factor + Cable Loss - Pre-amplifier

Note: Marker 3 & 4 is the intentional frequency from EUT, Hence considered as pass.

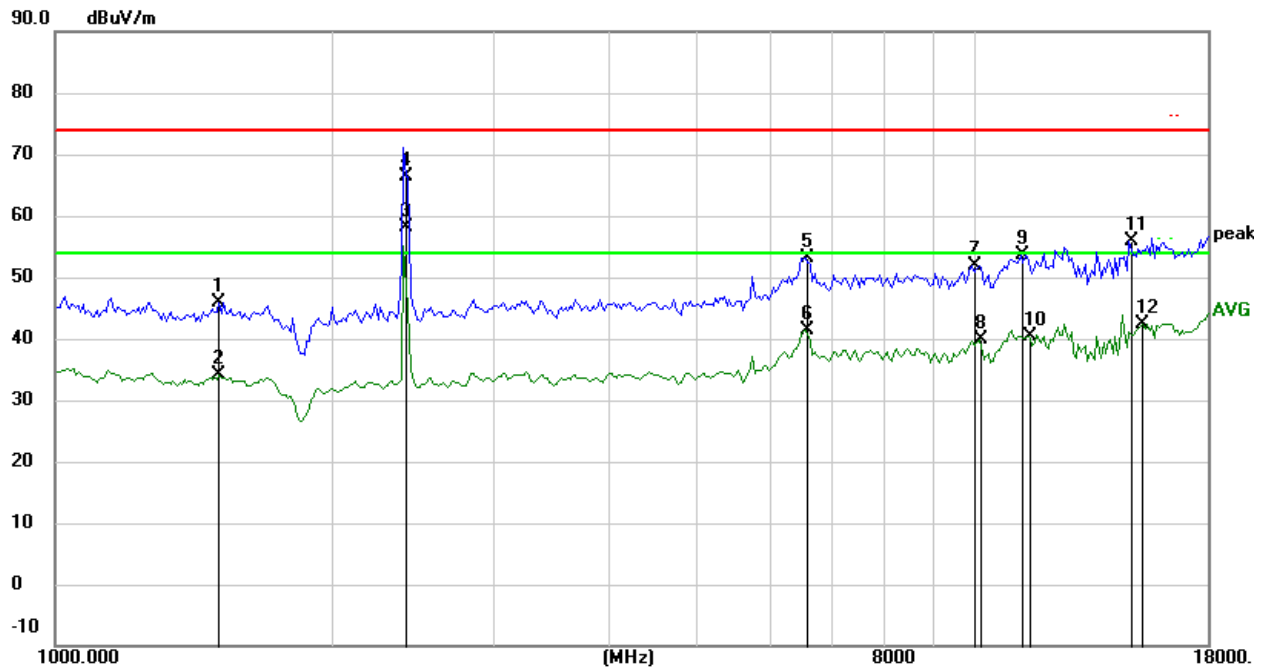
Test at Channel 00 (2.402 GHz) in transmitting status

1000 MHz~18000 MHz Spurious Emissions .

**Horizontal:**

Peak scan

Level (dBμV/m)



No.	Frequency (MHz)	Factor (dBμV/m)	Reading (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	1508.710	22.12	23.65	45.77	74.00	-28.23	peak
2	1508.710	22.12	11.89	34.01	54.00	-19.99	AVG
3	2398.016	24.68	33.53	58.21	54.00	4.21	AVG
4	2402.000	24.71	41.76	66.47	74.00	-7.53	peak
5	6569.953	31.25	21.86	53.11	74.00	-20.89	peak
6	6569.953	31.25	10.17	41.42	54.00	-12.58	AVG
7	9969.738	43.26	8.58	51.84	74.00	-22.16	peak
8	10144.496	43.52	-3.53	39.99	54.00	-14.01	AVG
9	11259.286	47.30	6.33	53.63	74.00	-20.37	peak
10	11456.648	47.38	-6.90	40.48	54.00	-13.52	AVG
11	14782.331	49.45	6.48	55.93	74.00	-18.07	peak
12	15305.107	48.93	-6.49	42.44	54.00	-11.56	AVG

Measurement Level = Reading Level + Factor

Factor= Ant Factor + Cable Loss - Pre-amplifier

Note: Marker 3 & 4 is the intentional frequency from EUT, Hence considered as pass.

**Radiated Emissions Test Data Below 1GHz**

EUT:	Driveri	Model Name. :	D-450
Temperature:	25.4 °C	Relative Humidity:	53%
Pressure:	1010hPa	Test Date :	2024-09-24
Test Mode :	TX (1Mbps) CH78 (2480MHz)	Test Voltage :	110V AC, 60Hz
Measurement Distance	3 m	Frequency Range	30MHz to 1GHz
RBW/VBW	100KHz / 300KHz for spectrum, RBW=120KHz for receiver.		



Report No.: AAEMT/RF/240830-01-02

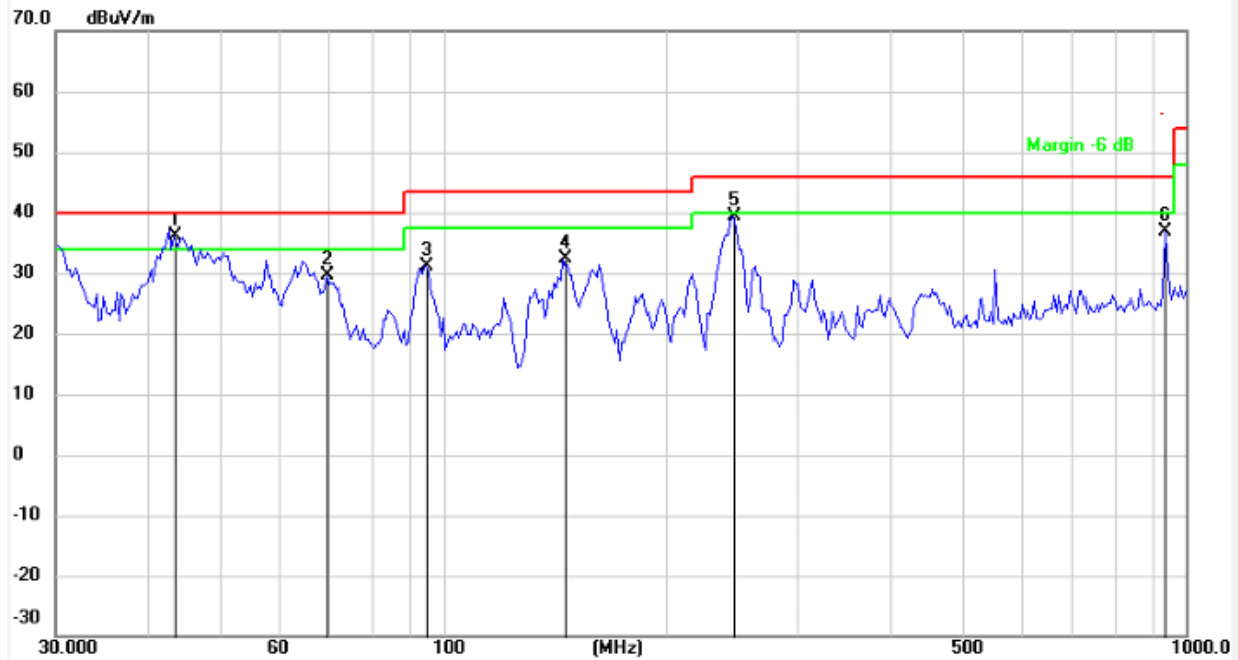
Test at Channel 78 (2.480 GHz) in transmitting status

30 MHz~1 GHz Spurious Emissions. Quasi-Peak Measurement

**Vertical:**

Peak scan

Level (dBμV/m)



Quasi-peak measurement

No.	Frequency (MHz)	Factor (dBμV/m)	Reading (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	43.2333	-11.74	47.97	36.23	40.00	-3.77	QP
2	69.7179	-15.91	45.54	29.63	40.00	-10.37	QP
3	94.3137	-12.24	43.42	31.18	43.50	-12.32	QP
4	144.7899	-15.53	47.94	32.41	43.50	-11.09	QP
5	245.2606	-10.30	49.57	39.27	46.00	-6.73	QP
6	938.7139	0.35	36.56	36.91	46.00	-9.09	QP

Measurement Level = Reading Level + Factor

Factor= Ant Factor + Cable Loss - Pre-amplifier

Report No.: AAEMT/RF/240830-01-02

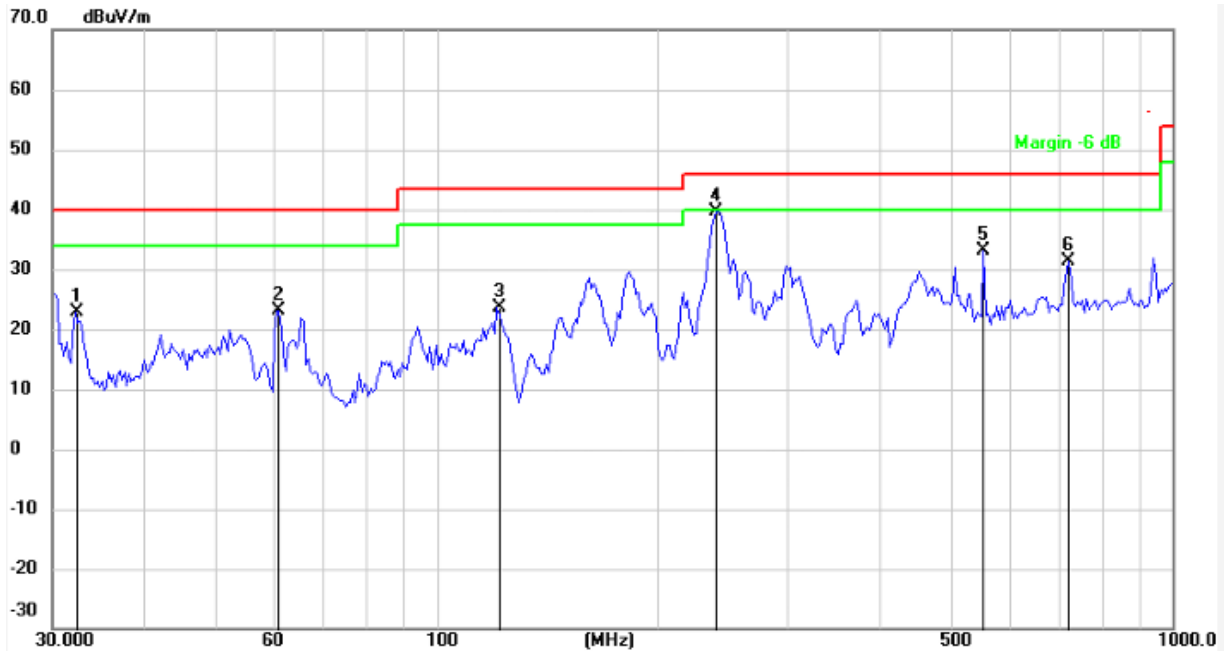
Test at Channel 78 (2.480 GHz) in transmitting status

30 MHz~1 GHz Spurious Emissions. Quasi-Peak Measurement

**Horizontal:**

Peak scan

Level (dBμV/m)



Quasi-peak measurement

No.	Frequency (MHz)	Factor (dBμV/m)	Reading (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	32.1840	-10.94	33.93	22.99	40.00	-17.01	QP
2	61.0041	-10.45	33.67	23.22	40.00	-16.78	QP
3	120.6118	-11.99	35.50	23.51	43.50	-19.99	QP
4	240.1442	-8.53	48.11	39.58	46.00	-6.42	QP
5	554.1708	-0.95	34.05	33.10	46.00	-12.90	QP
6	723.7930	0.81	30.52	31.33	46.00	-14.67	QP

Measurement Level = Reading Level + Factor

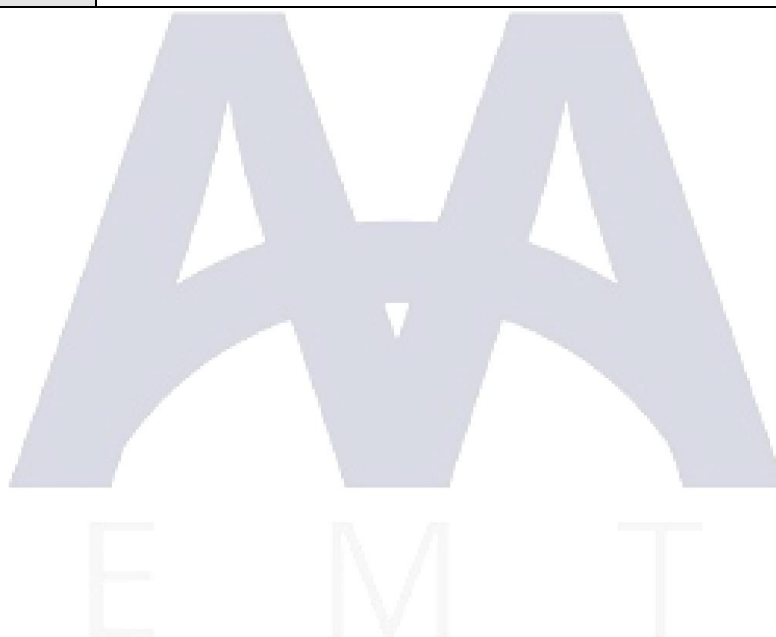
Factor= Ant Factor + Cable Loss - Pre-amplifier



Report No.: AAEMT/RF/240830-01-02

**Radiated Emissions Test Data Above 1GHz**

EUT:	Driveri	Model Name. :	D-450
Temperature:	25.4 °C	Relative Humidity:	53%
Pressure:	1010hPa	Test Date :	2024-09-24
Test Mode :	TX (1Mbps) CH78 (2480MHz)	Test Voltage :	110V AC, 60Hz
Measurement Distance	3 m	Frequency Range	1GHz to 25GHz
RBW/VBW	Spurious emission: 1MHz/1MHz for Peak, 1MHz/10Hz for Average. Non-restricted band: 100KHz/300KHz for Peak.		



Report No.: AAEMT/RF/240830-01-02

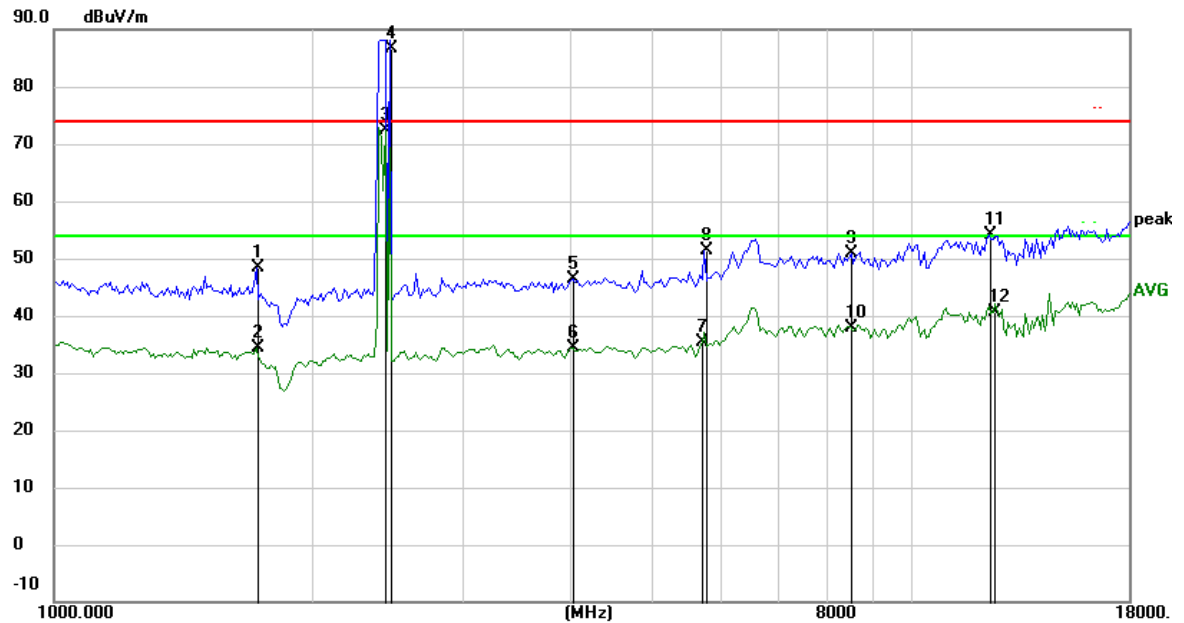
Test at Channel 78 (2.480 GHz) in transmitting status

1000 MHz~18000 MHz Spurious Emissions .

**Vertical:**

Peak scan

Level (dBμV/m)



No.	Frequency (MHz)	Factor (dBμV/m)	Reading (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	1723.710	-3.74	52.10	48.36	74.00	-25.64	peak
2	1723.710	-3.74	38.19	34.45	54.00	-19.55	AVG
3	2440.050	-2.73	75.02	72.29	54.00	18.29	AVG
4	2480.000	-2.69	89.34	86.65	74.00	12.65	peak
5	4038.814	-0.36	46.70	46.34	74.00	-27.66	peak
6	4038.814	-0.36	34.78	34.42	54.00	-19.58	AVG
7	5717.266	1.69	33.71	35.40	54.00	-18.60	AVG
8	5750.479	1.75	49.53	51.28	74.00	-22.72	peak
9	8526.350	3.82	47.18	51.00	74.00	-23.00	peak
10	8526.350	3.82	34.09	37.91	54.00	-16.09	AVG
11	12352.648	8.42	45.78	54.20	74.00	-19.80	peak
12	12496.581	8.45	32.16	40.61	54.00	-13.39	AVG

Measurement Level = Reading Level + Factor

Factor= Ant Factor + Cable Loss - Pre-amplifier

Note: Marker 3 & 4 is the intentional frequency from EUT, Hence considered as pass.

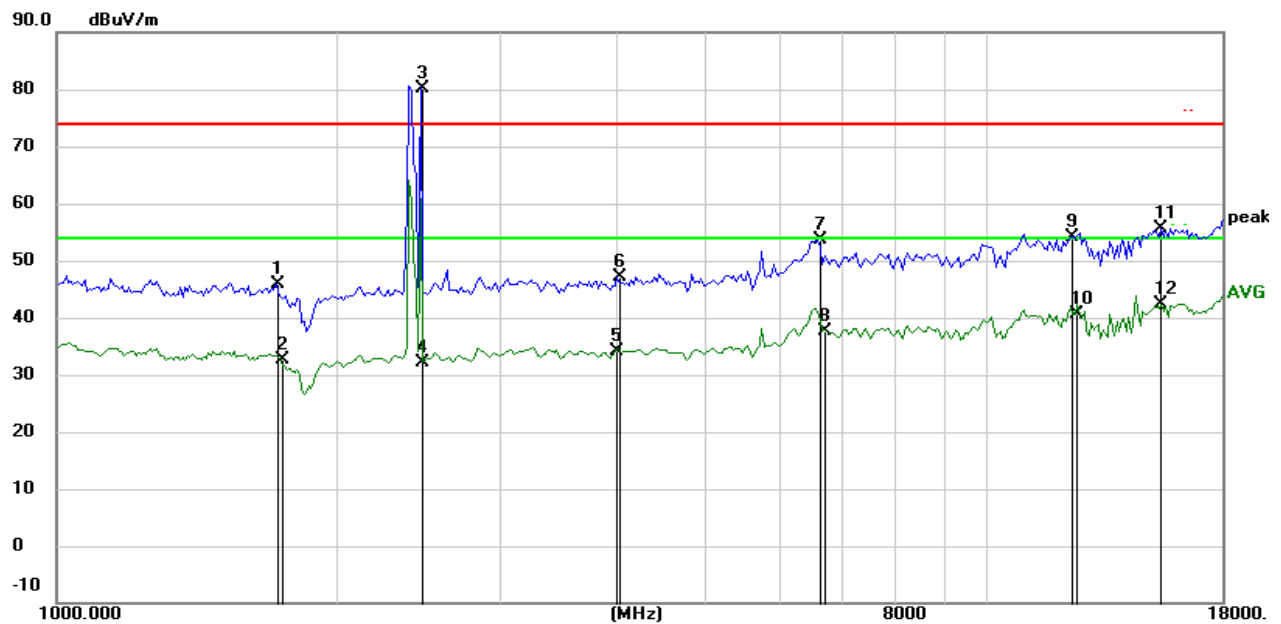
Test at Channel 78 (2.480 GHz) in transmitting status

1000 MHz~18000 MHz Spurious Emissions .

**Horizontal:**

Peak scan

Level (dBμV/m)



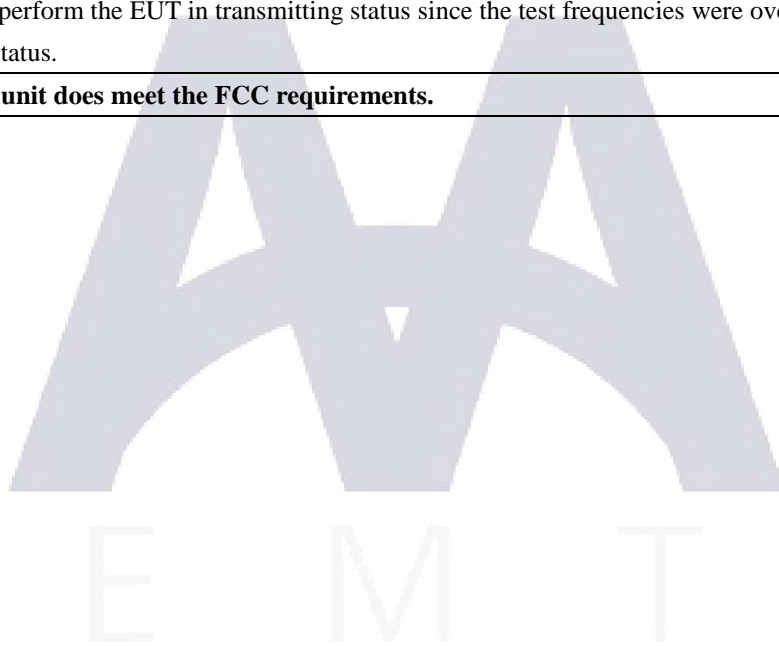
No.	Frequency (MHz)	Factor (dBμV/m)	Reading (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	1723.710	22.39	23.47	45.86	74.00	-28.14	peak
2	1743.795	22.42	10.23	32.65	54.00	-21.35	AVG
3	2480.000	25.00	55.11	80.11	74.00	6.11	peak
4	2482.821	25.01	7.24	32.25	54.00	-21.75	AVG
5	3992.296	30.33	3.75	34.08	54.00	-19.92	AVG
6	4015.488	30.37	16.82	47.19	74.00	-26.81	peak
7	6608.119	32.51	21.14	53.65	74.00	-20.35	peak
8	6685.117	35.06	2.51	37.57	54.00	-16.43	AVG
9	12352.648	47.54	6.64	54.18	74.00	-19.82	peak
10	12496.581	47.70	-7.09	40.61	54.00	-13.39	AVG
11	15483.442	48.67	7.00	55.67	74.00	-18.33	peak
12	15483.442	48.67	-6.29	42.38	54.00	-11.62	AVG

Measurement Level = Reading Level + Factor

Factor= Ant Factor + Cable Loss - Pre-amplifier

Note: Marker 3 is the intentional frequency from EUT, Hence considered as pass.

Remark:
1) .For this intentional radiator operates below 25 GHz. The spectrum shall be investigated to the tenth Harmonics of the highest fundamental frequency. And above the third harmonic of this intentional radiator, the disturbance is very low. So the test result only displays to 3 <sup>rd</sup> harmonic.
2). As shown in Section, for frequencies above 1000 MHz. the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.
3). The test only perform the EUT in transmitting status since the test frequencies were over 1GHz only required transmitting status.
<b>Test result: The unit does meet the FCC requirements.</b>



### 6.3.5 TEST RESULTS (Restricted Bands Requirements)

EUT:	Driveri	Model Name. :	D-450
Temperature:	25.4 °C	Relative Humidity:	53%
Pressure:	1010hPa	Test Date :	2023-09-24
Test Mode :	TX (1Mbps,2Mbps)	Test Voltage :	110V AC, 60Hz
Note:	1. The transmitter was setup to transmit at the lowest channel. Then the field strength was measured at 2310-2390 MHz. 2. The transmitter was setup to transmit at the highest channel. Then the field strength was measured at 2483.5-2500 MHz. 3. The data of 2390MHz and 2483.5MHz was the worst.		

Test Mode	Ant.Pol. H/V	Freq. (MHz)	Reading		Ant/CF CF(dB)	Act		Limit	
			Peak (dBuv)	AV (dBuv)		Peak (dBuv/m)	AV (dBuv/m)	Peak (dBuv/m)	AV (dBuv/m)
Data rate 1Mbps	V	2390	43.24	32.43	-5.79	37.45	26.64	74	54
	H	2390	42.90	34.97	-5.79	37.11	29.18	74	54
	V	2483.5	44.56	33.51	-4.98	39.58	28.53	74	54
	H	2483.5	43.98	34.27	-4.98	39.00	29.29	74	54
Data rate 2Mbps	V	2390	46.70	32.89	-5.79	40.91	27.10	74	54
	H	2390	44.82	34.83	-5.79	39.03	29.04	74	54
	V	2483.5	46.14	33.57	-4.98	41.16	28.59	74	54
	H	2483.5	44.85	33.01	-4.98	39.87	28.03	74	54

#### Remark:

- (1) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode.
- (2) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna
- (3) Corr.Factor = Antenna Factor + Cable Loss – Pre-amplifier.

## 6.4 BANDWIDTH TEST

### 6.4.1 Applied procedures / Limit

For frequency hopping system operating in the 2400-2483.5MHz, If the 20dB bandwidth of hopping channel is greater than 25kHz, two-thirds 20dB bandwidth of hopping channel shall be a minimum limit for the hopping channel separation.

### 6.4.2 Test procedure

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel  
RBW  $\geq$  1% of the 20 dB bandwidth, VBW  $\geq$  RBW, Sweep = auto, Detector function = peak  
Trace = max hold

### 6.4.3 Deviation from standard

No deviation.

### 6.4.4 Test setup



### 6.4.5 Test results

EUT:	Driveri	Model Name. :	D-450
Temperature:	25.3 °C	Relative Humidity:	56%
Pressure:	1010 hPa	Test Power :	110V AC, 60Hz
Test Mode :	TX 1Mbps/ 2Mbps		

Channel		Channel frequency (MHz)	20dB bandwidth (KHz)	Limit (MHz)	Conclusion
1Mbps	Low	2402	886	N/A	Pass
	Middle	2441	886	N/A	Pass
	High	2480	886	N/A	Pass
2Mbps	Low	2402	1232	N/A	Pass
	Middle	2441	1234	N/A	Pass
	High	2480	1230	N/A	Pass
3Mbps	Low	2402	1220	N/A	Pass
	Middle	2441	1220	N/A	Pass
	High	2480	1220	N/A	Pass

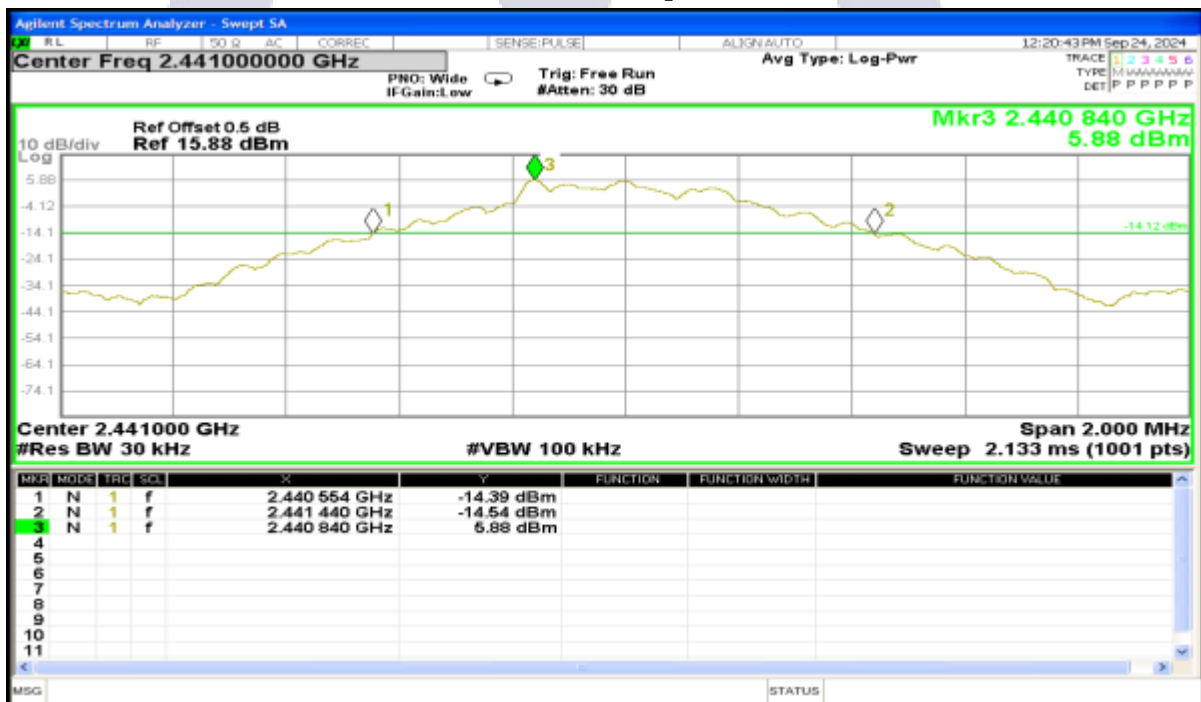


Report No.: AAEMT/RF/240830-01-02

### CH00-1Mbps

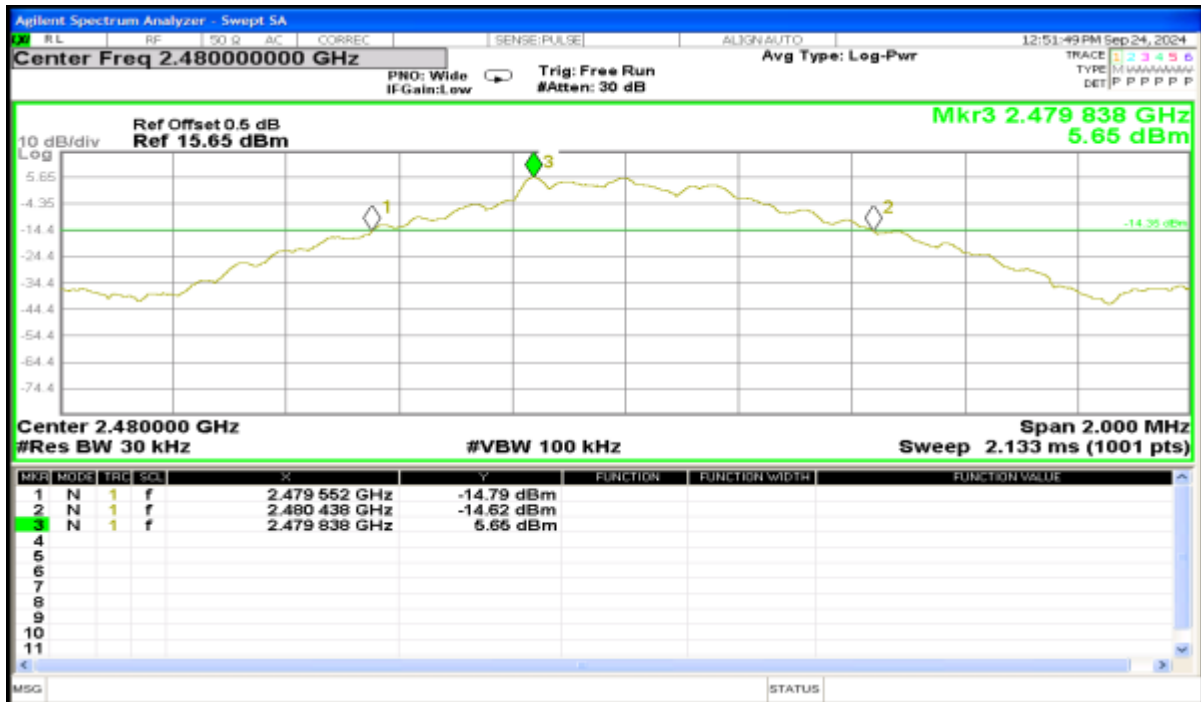


### CH 39-1Mbps

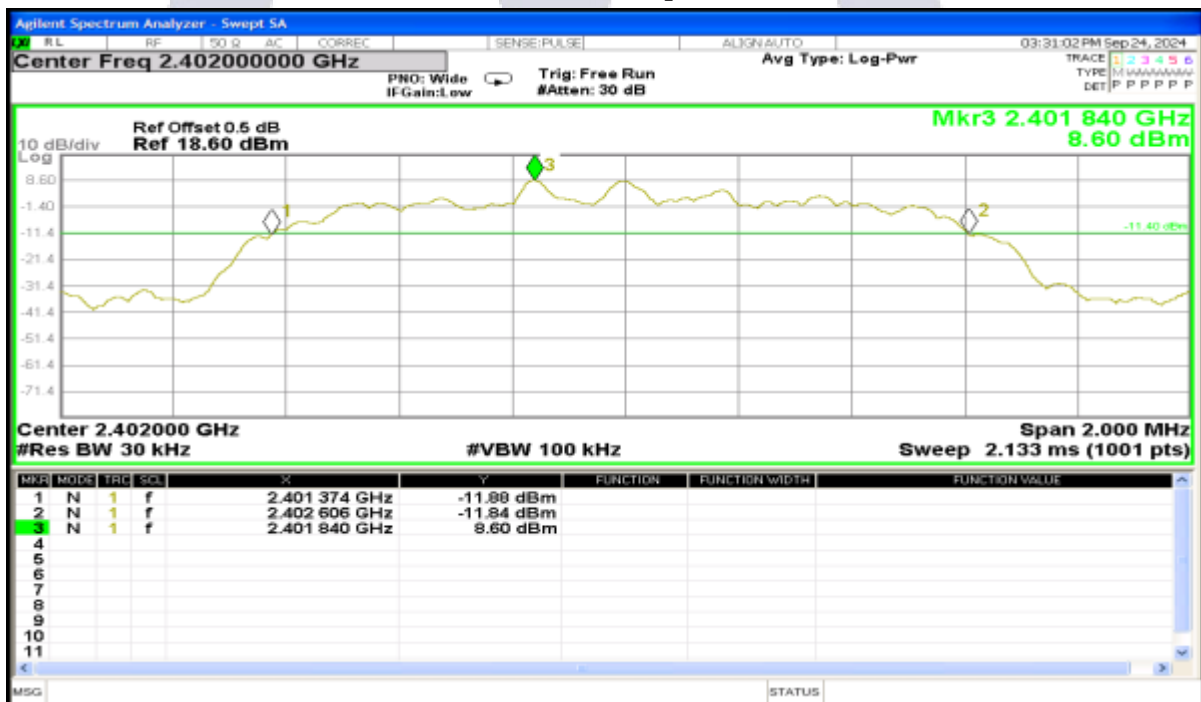


Report No.: AAEMT/RF/240830-01-02

### CH 78-1Mbps

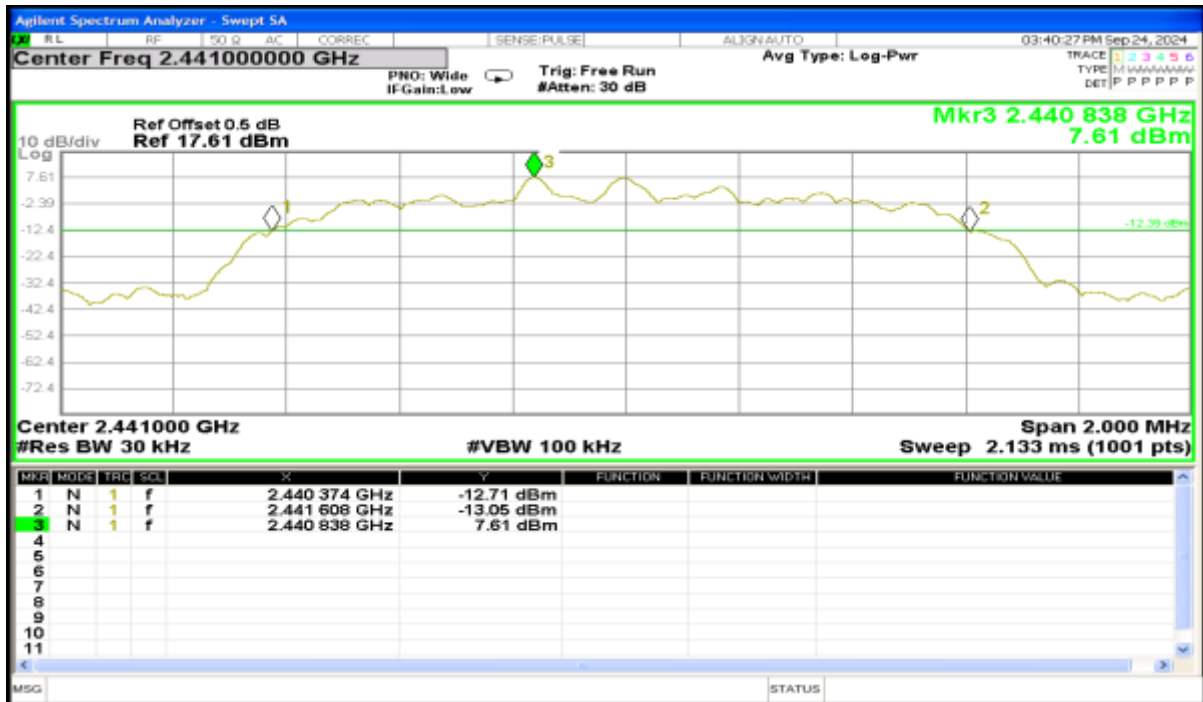


### CH 00-2Mbps

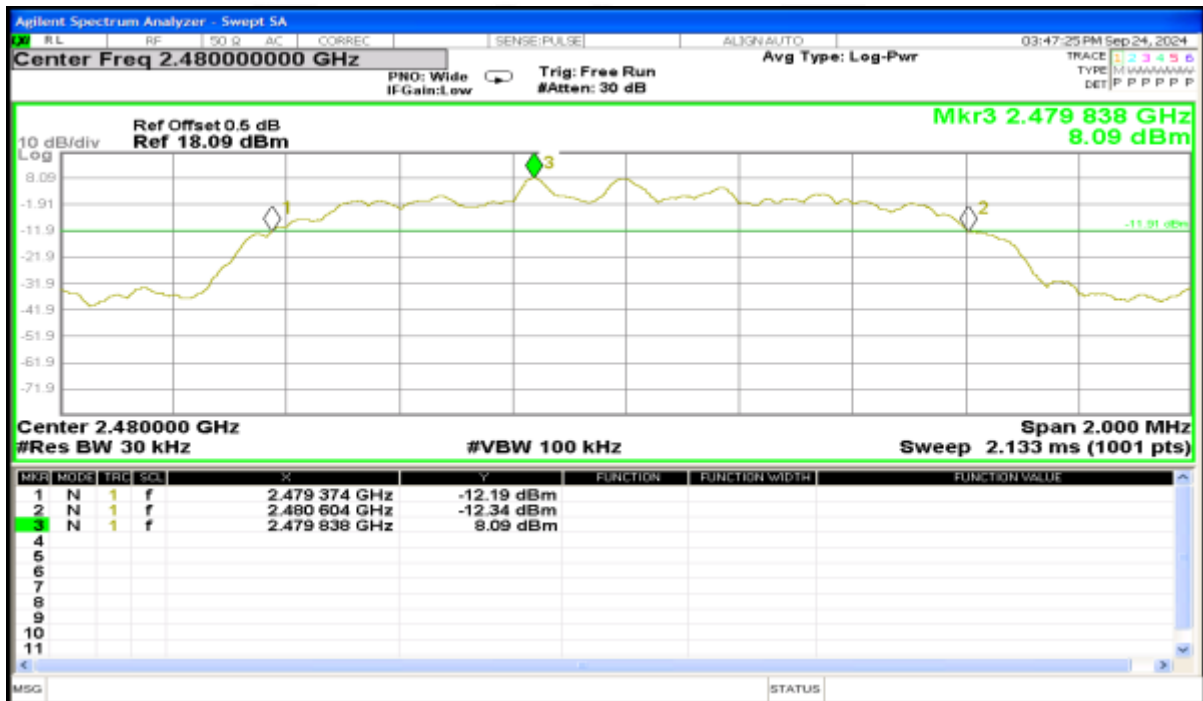


Report No.: AAEMT/RF/240830-01-02

### CH 39-2Mbps

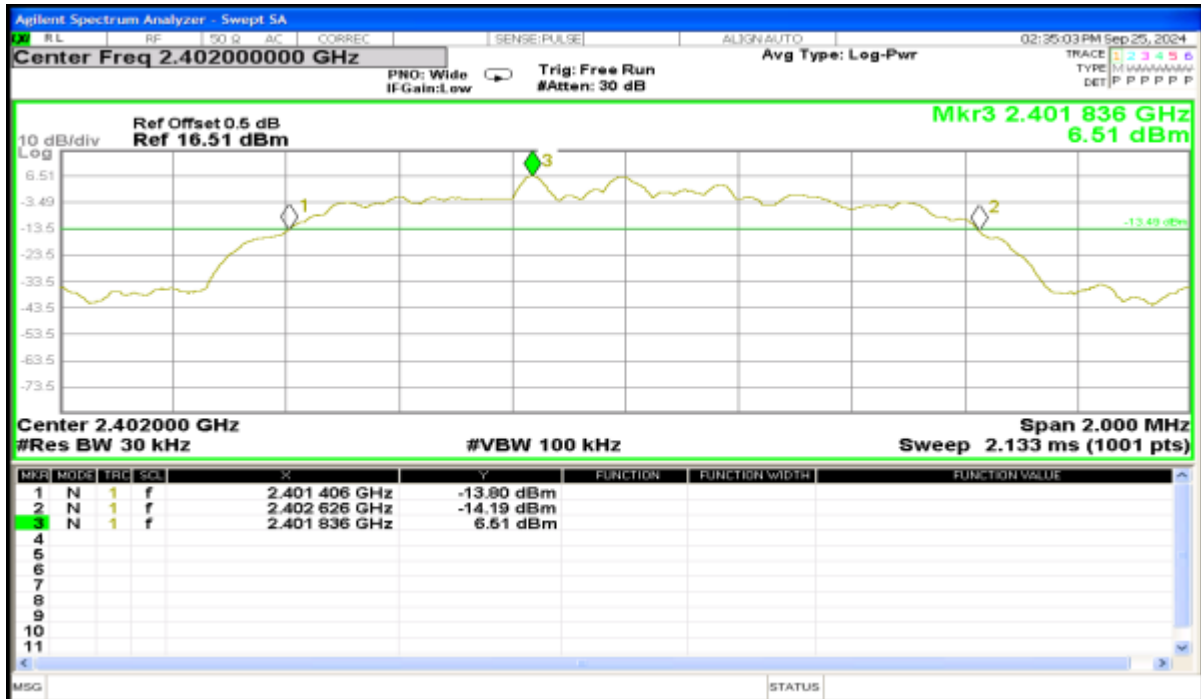


### CH 78-2Mbps

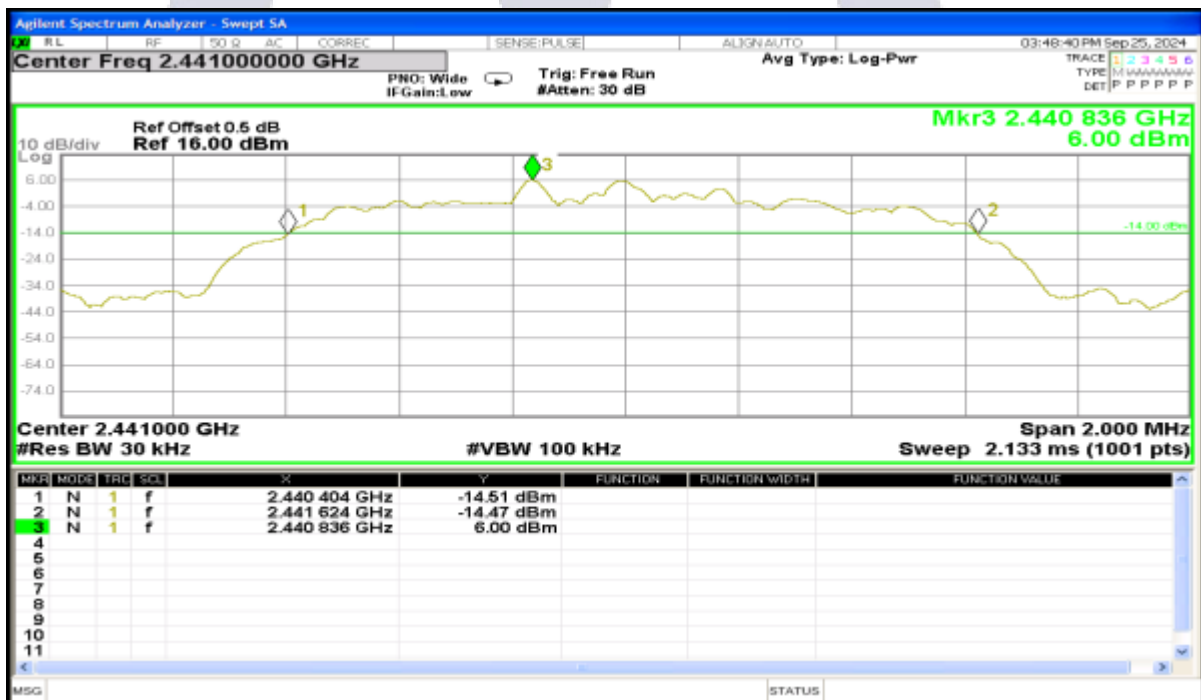


Report No.: AAEMT/RF/240830-01-02

### CH00-3Mbps

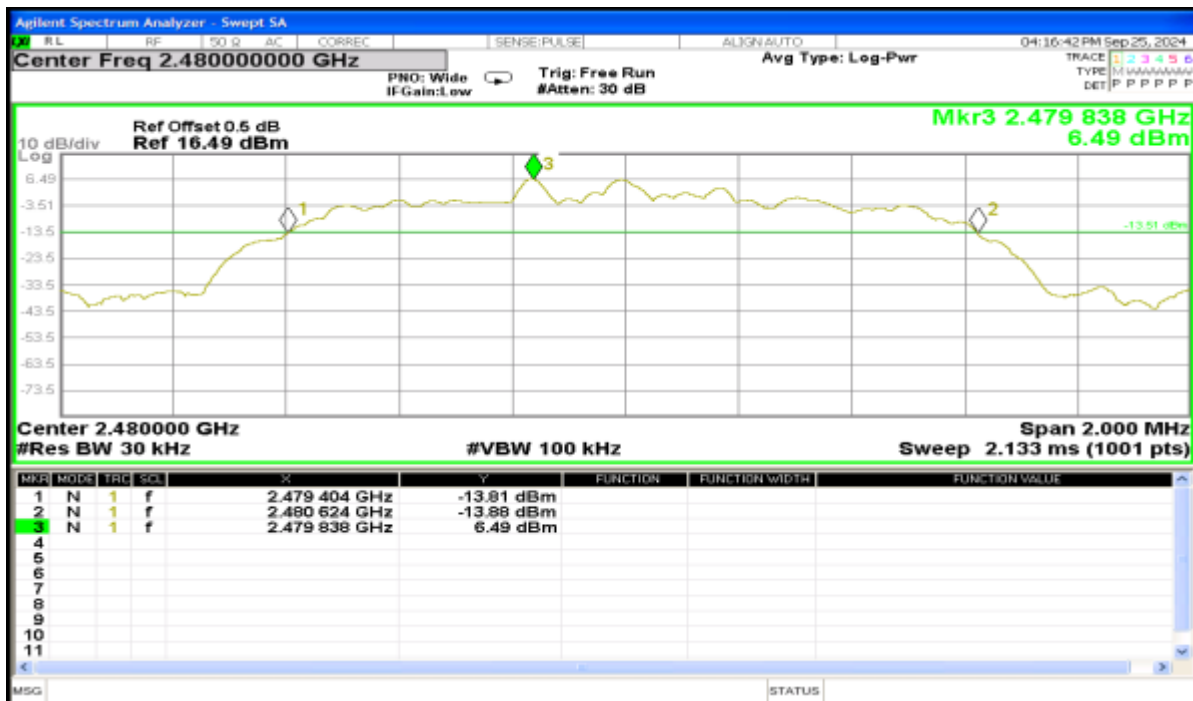


### CH 39-3Mbps



Report No.: AAEMT/RF/240830-01-02

### CH 78-3Mbps



## 6.5 Carrier Frequencies Separated

### 6.5.1 Applied procedures / Limit

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.

### 6.5.2 Test procedure

- (1) Connected the antenna port to the Spectrum Analyzer, set the Spectrum Analyzer as  
Span = wide enough to capture the peaks of two adjacent channels, Resolution (or IF)  
Bandwidth (RBW)  $\geq$  1% of the span, Video (or Average) Bandwidth (VBW)  $\geq$  RBW  
Sweep = auto, Detector function = peak, Trace = max hold
- (2) The EUT should be transmitting at its maximum data rate. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.
- (3) The above procedure shall be repeated at the lowest, the middle, and the highest frequency of the stated frequency range with modulated mode. also shall be performed at different modes of operation.

### 6.5.3 Deviation from standard

No deviation.

### 6.5.4 Test setup



### 6.5.5 Test results

EUT:	Driveri	Model Name. :	D-450
Temperature:	25.6 °C	Relative Humidity:	56%
Pressure:	1010 hPa	Test Power :	110V AC, 60Hz
Test Mode :	TX 1Mbps/ 2Mbps/ 3Mbps		

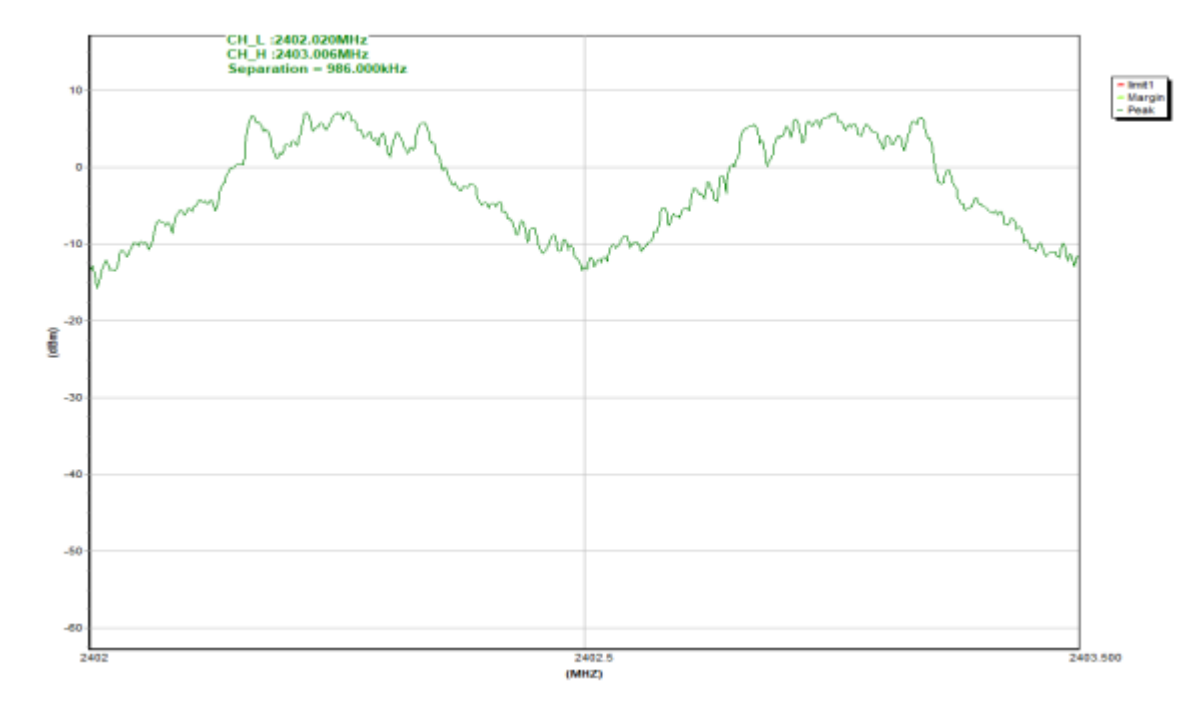
Channel		Channel frequency (MHz)	Channel Separation (MHz)	Conclusion
1Mbps	Low	2402	0.986	Pass
	Middle	2441	0.838	Pass
	Highest	2480	1.030	Pass
2Mbps	Low	2402	0.836	Pass
	Middle	2441	1.156	Pass
	Highest	2480	0.998	Pass
3Mbps	Low	2402	0.836	Pass
	Middle	2441	1.332	Pass
	Highest	2480	1.172	Pass

**Ch. Separation >2/3(20dB bandwidth)**



Report No.: AAEMT/RF/240830-01-02

### CH 00-1Mbps

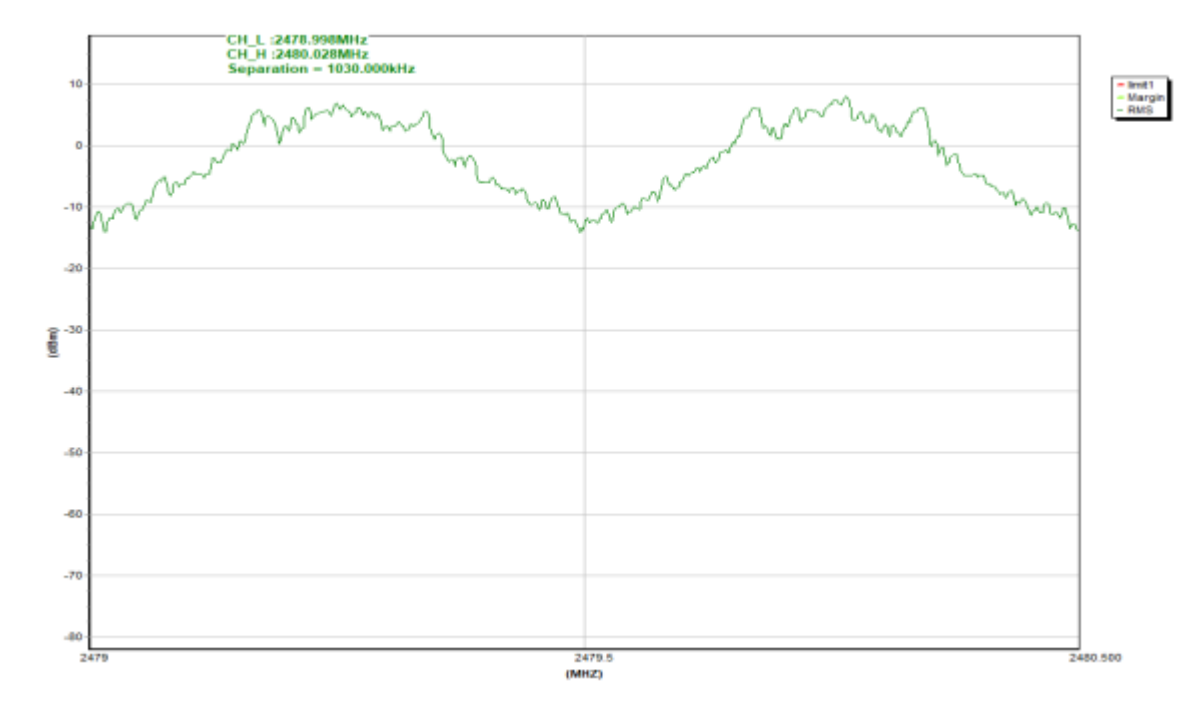


### CH 39-1Mbps



Report No.: AAEMT/RF/240830-01-02

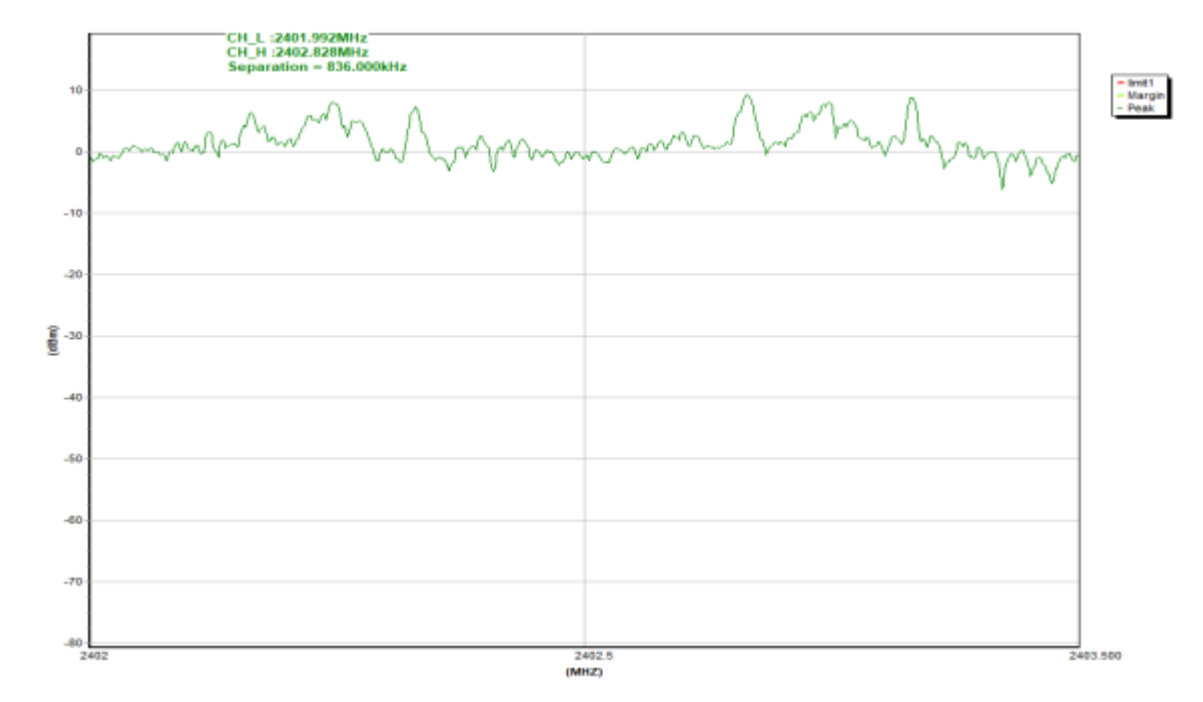
### CH 78-1Mbps



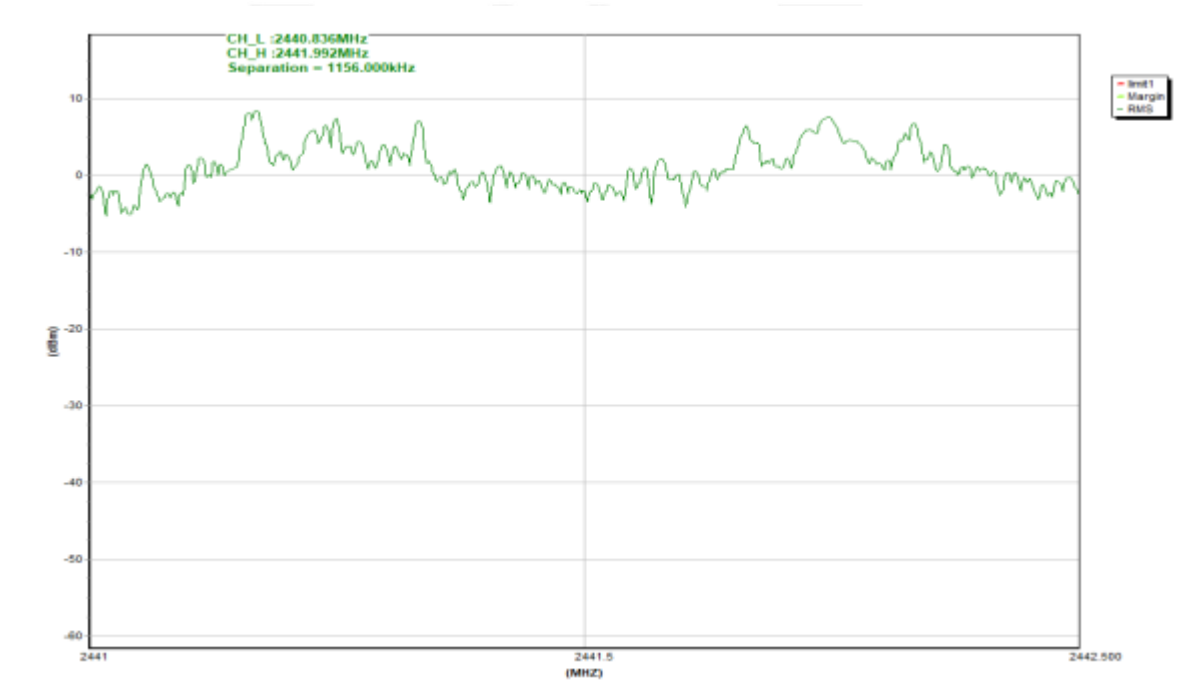
EMT

Report No.: AAEMT/RF/240830-01-02

### CH 00-2Mbps

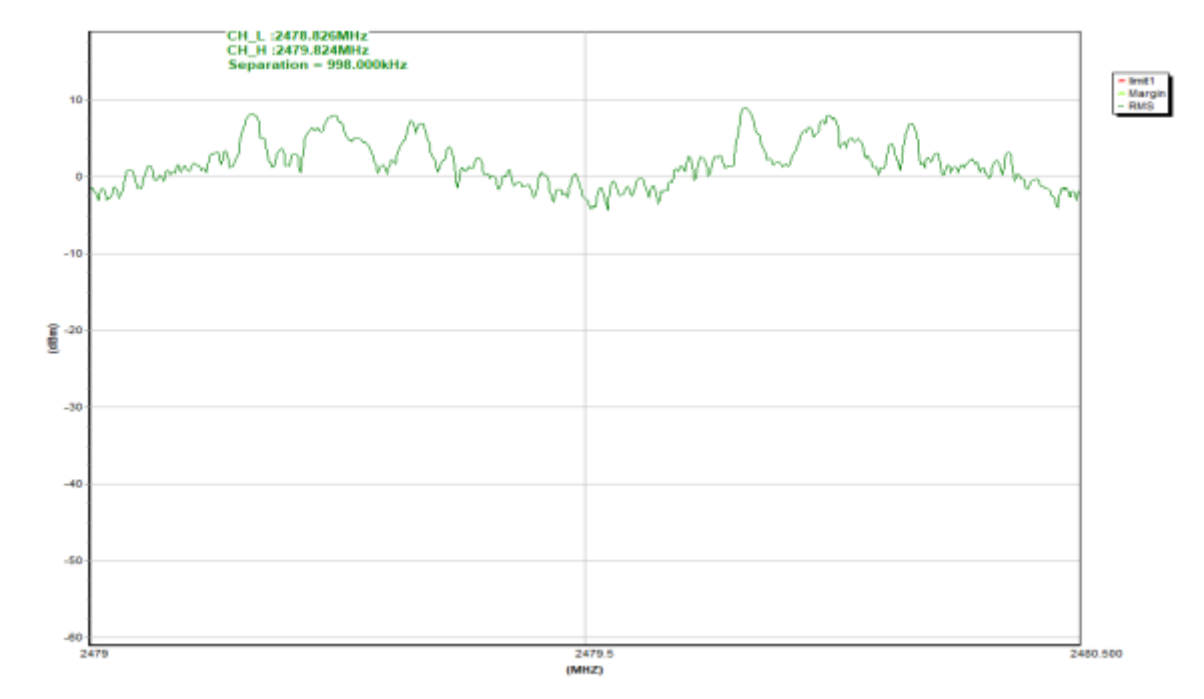


### CH 39-2Mbps



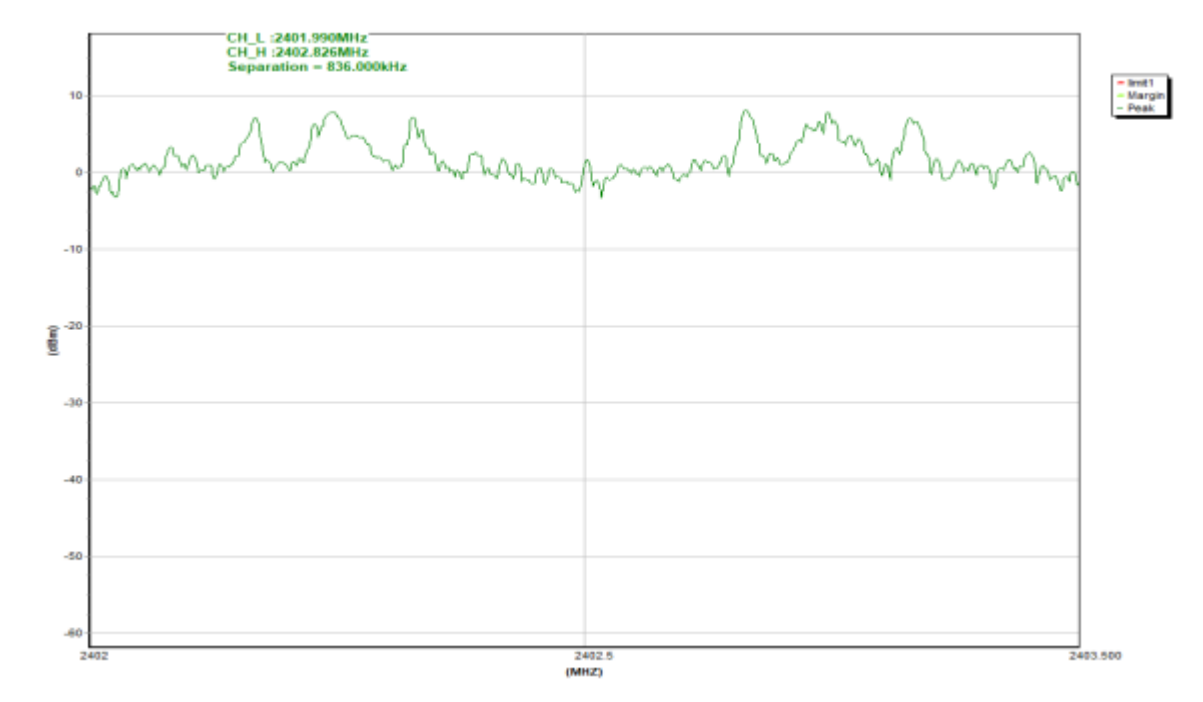
Report No.: AAEMT/RF/240830-01-02

### CH 78-2Mbps

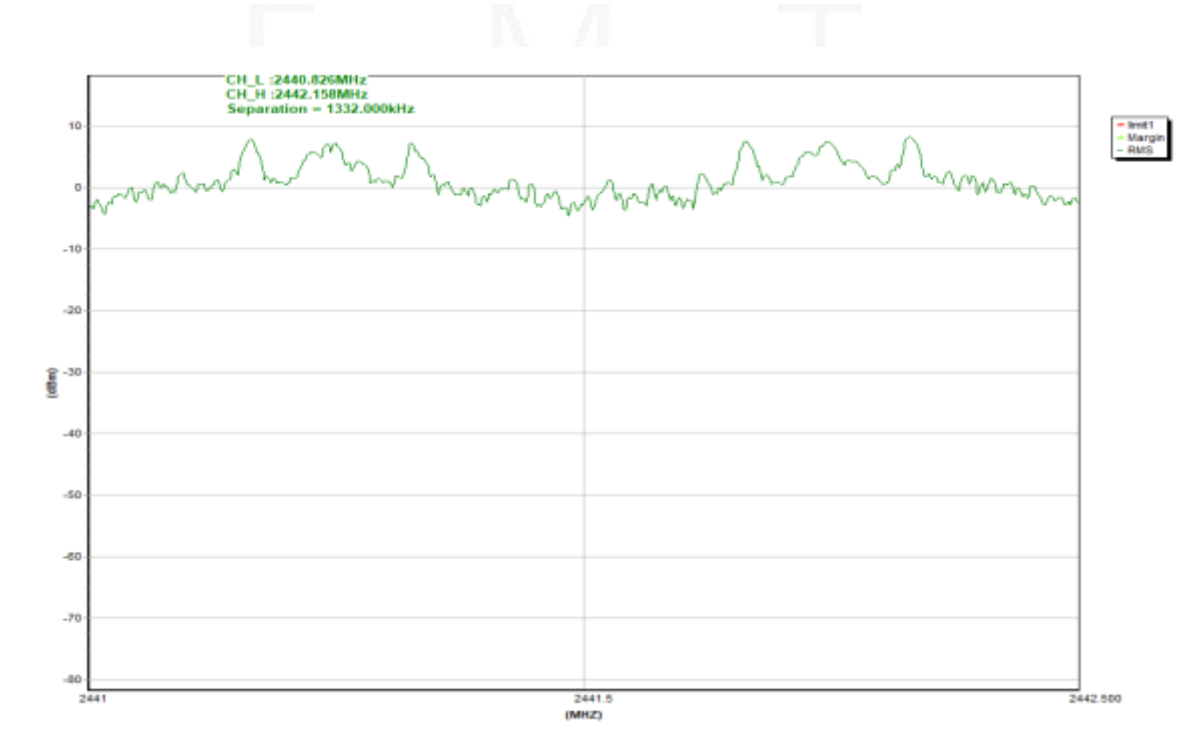


EMT

### CH 00-3Mbps

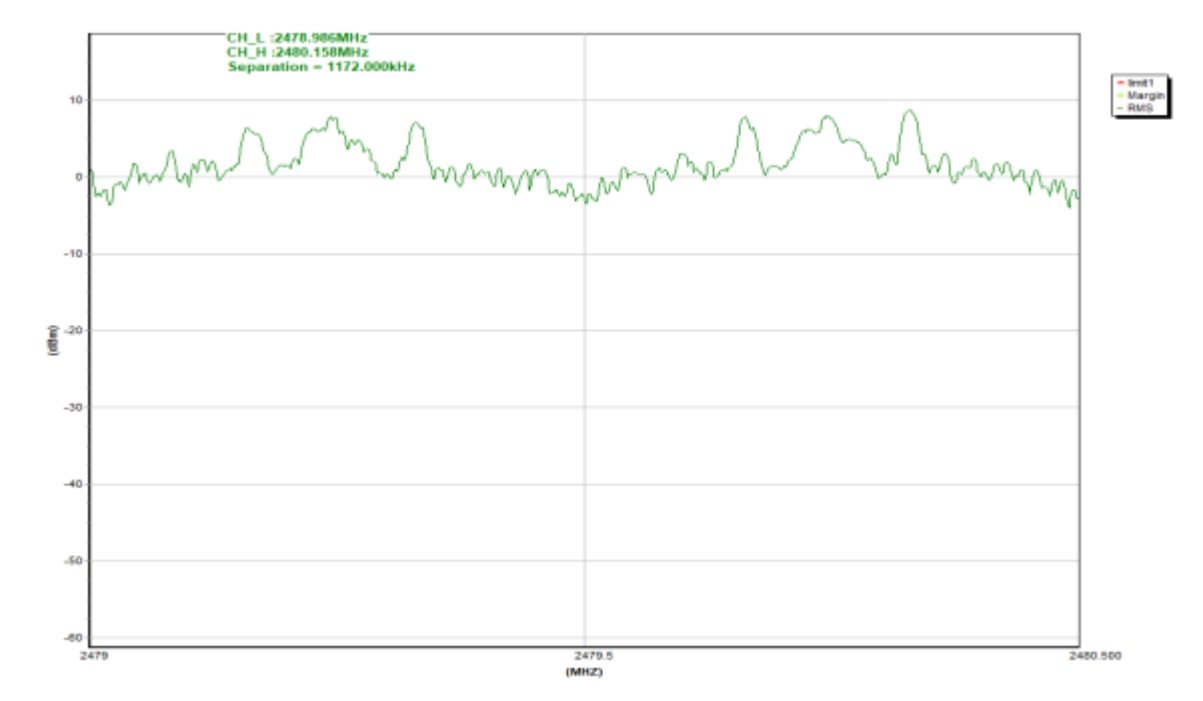


### CH 39-3Mbps



Report No.: AAEMT/RF/240830-01-02

### CH 78-3Mbps



EMT

## 6.6 Hopping Channel Number

### 6.6.1 Applied procedures / Limit

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.

### 6.6.2 Test procedure

- (1) Connected the antenna port to the Spectrum Analyzer , set the Spectrum Analyzer as  
Span = the frequency band of operation, RBW  $\geq$  1% of the span, VBW  $\geq$  RBW Sweep = auto  
Detector function = peak, Trace = max hold
- (2) The EUT should be have its hopping function enabled. Maxhold and record hopping channels It may prove necessary to break the span up to sections, in order to clearly show all of the hopping frequencies.

### 6.6.3 Deviation from standard

No deviation.

### 6.6.4 Test setup



### 6.6.5 Test result

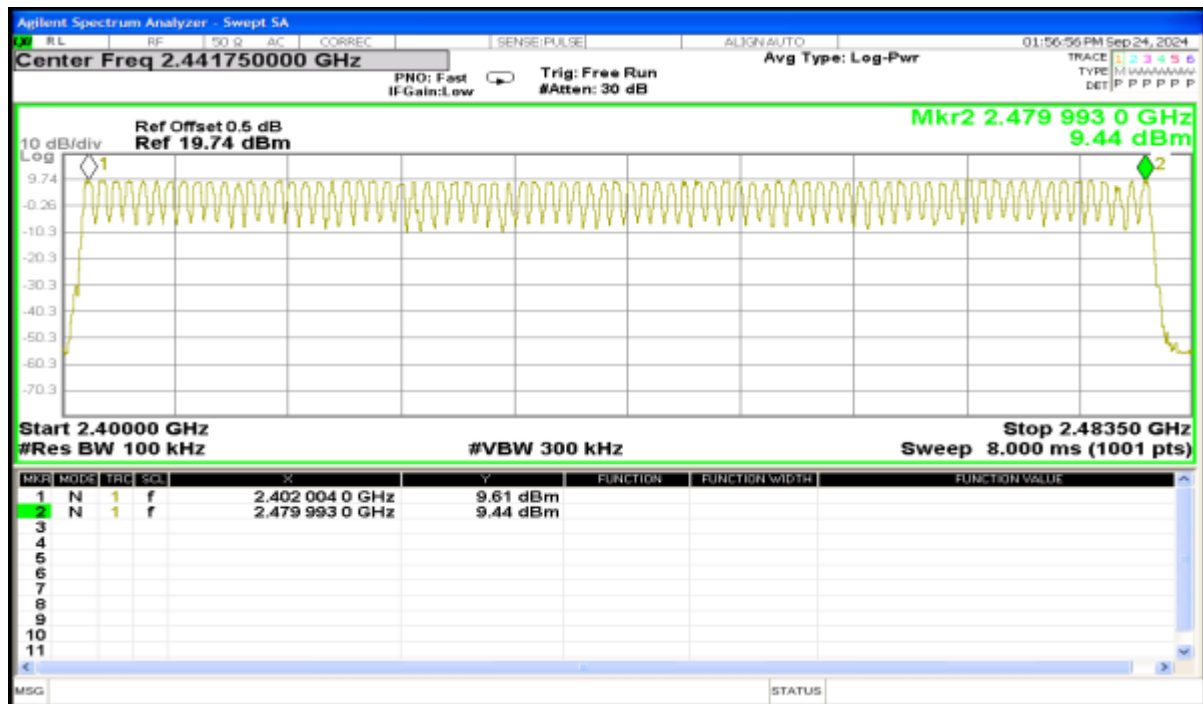
Hopping Channel Number result		
Operating Mode: 1Mbps/ 2Mbps/3Mbps Mode		Test date:2023-09-15
Result	Limit	Conclusion
79	>15	Pass



Report No.: AAEMT/RF/240830-01-02

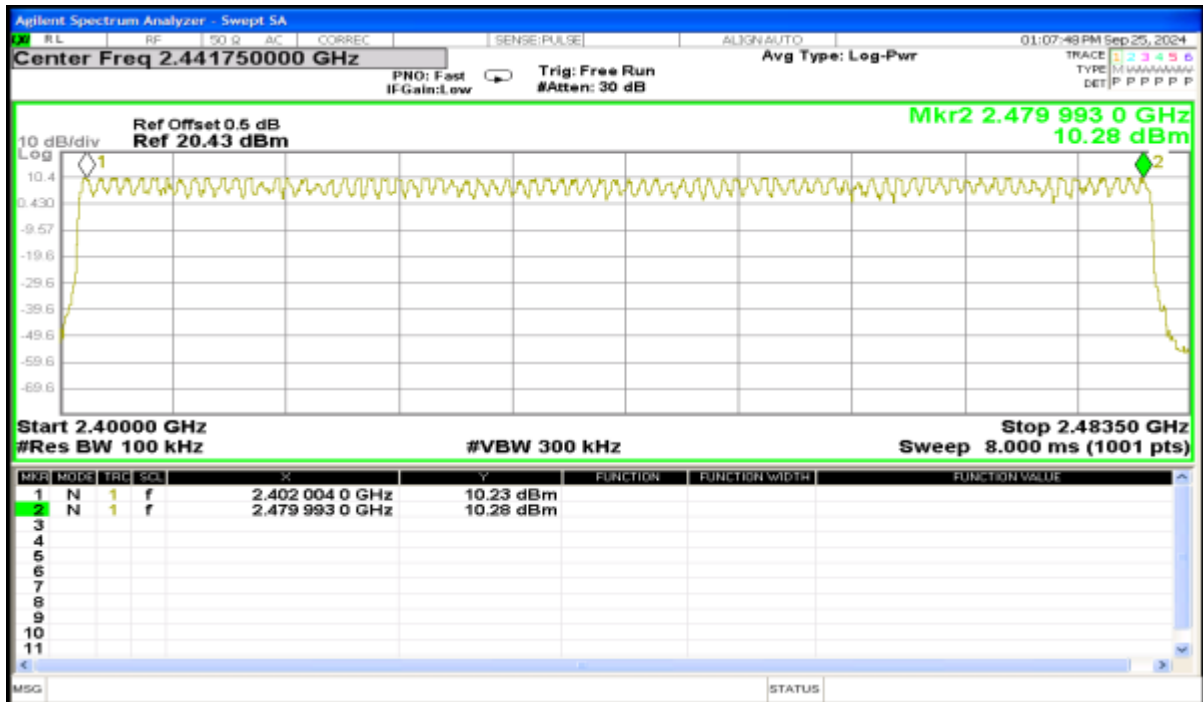
EUT:	Driveri	Model Name. :	D-450
Temperature:	25.4 °C	Relative Humidity:	55%
Pressure:	1010 hPa	Test Power :	110V AC, 60Hz
Test Mode :	TX 1Mbps/ 2Mbps/ 3Mbps		

### 1Mbps

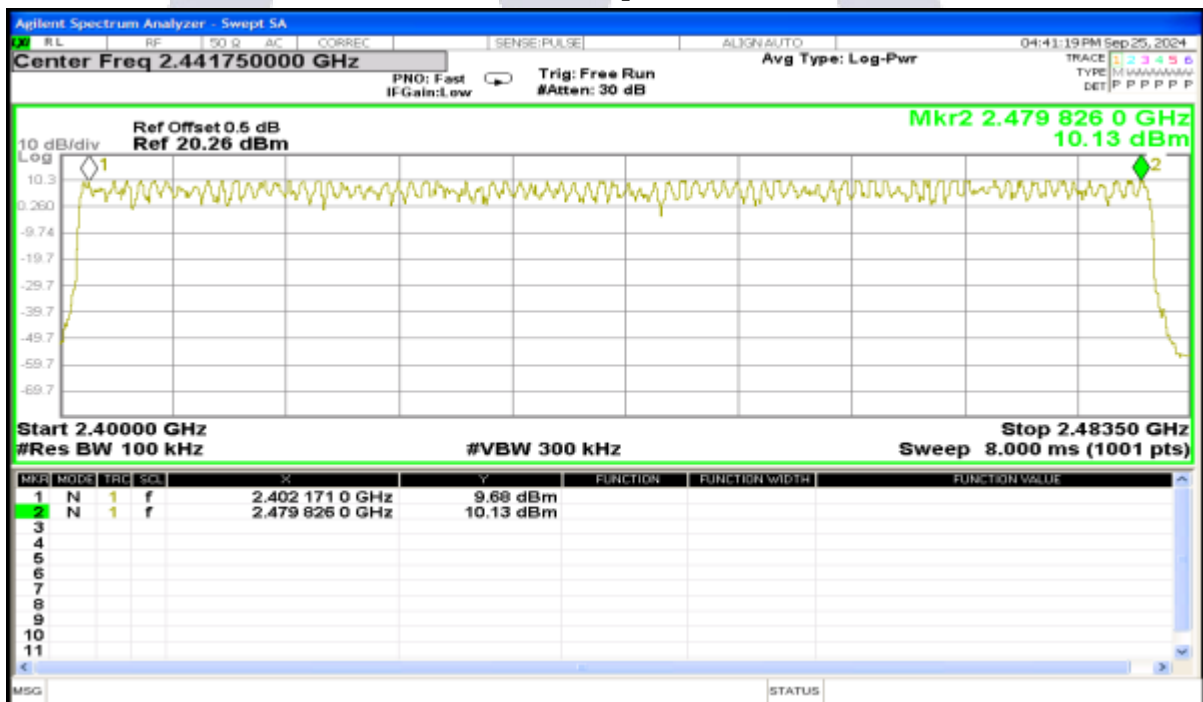


Report No.: AAEMT/RF/240830-01-02

### 2Mbps



### 3Mbps



## 6.7 Dwell time

### 6.7.1 Applied procedures / Limit

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.

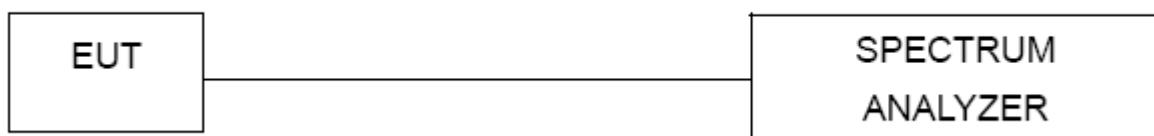
### 6.7.2 Test procedure

- (1) Place the EUT on the table in the chamber or connect the antenna port of the EUT to spectrum analyzer and set it in transmitting mode.
- (2) Set RBW of spectrum analyzer to 1MHz, VBW  $\geq$  RBW
- (3) Use a video trigger with the trigger level set to enable triggering only on full pulses.
- (4) Sweep Time is more than once pulse time.
- (5) Set the center frequency on any frequency would be measure and set the frequency span to zero span.
- (6) Measure the maximum time duration of one single pulse.
- (7) Set the EUT for DH5, DH3 and DH1 packet transmitting.
- (8) Measure the maximum time duration of one single pulse.
- (9) A Period Time =  $79 \times 0.4 = 31.6$  S
  - DH1 Time Slot: Reading \*  $(1600/2) \times 31.6/79$
  - DH3 Time Slot: Reading \*  $(1600/4) \times 31.6/79$
  - DH5 Time Slot: Reading \*  $(1600/6) \times 31.6/79$

### 6.7.3 Deviation from standard

No deviation.

### 6.7.4 Test setup

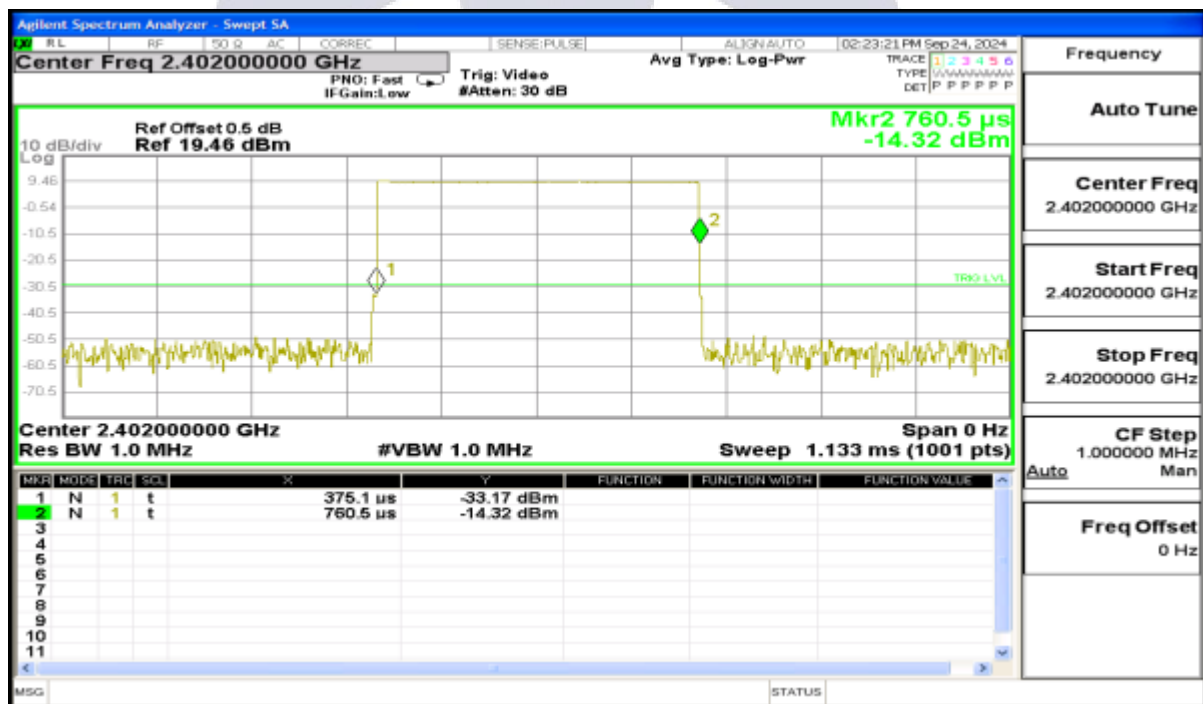


### 6.7.5 Test result

EUT:	Driveri	Model Name. :	D-450
Temperature:	25.4 °C	Relative Humidity:	55%
Pressure:	1010 hPa	Test Power :	110V AC, 60Hz
Test Mode :	CH00-DH1/DH3/DH5 (1Mbps Mode)		

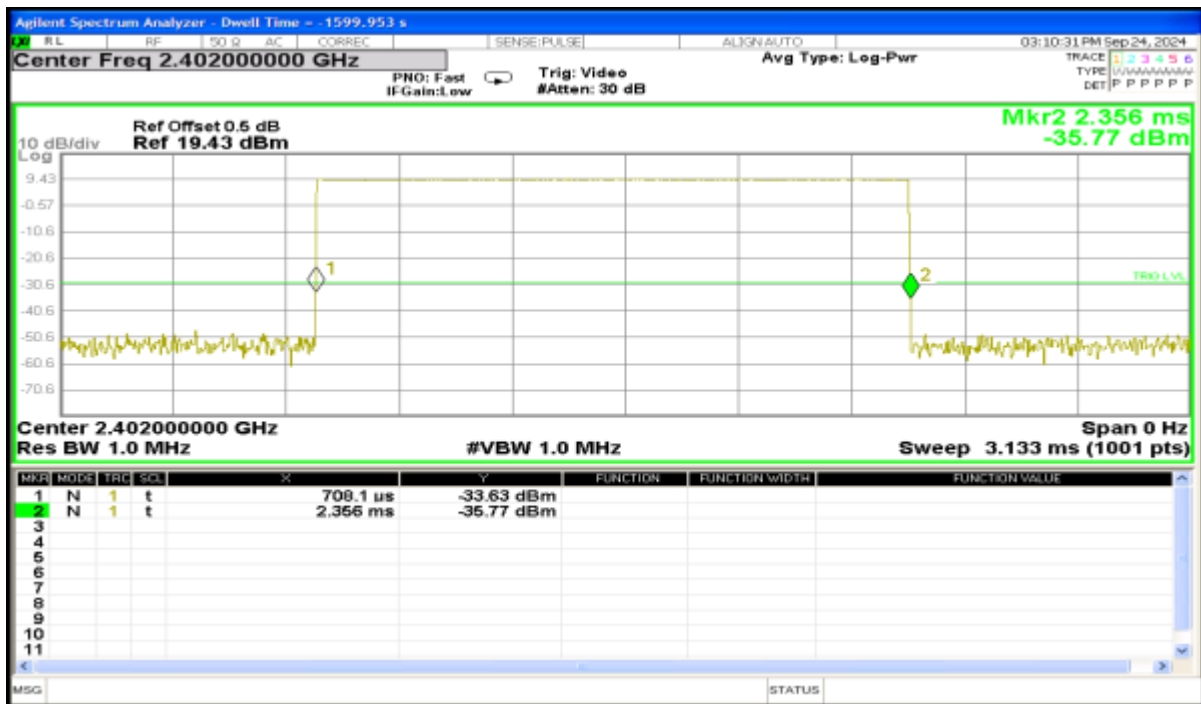
Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (ms)	Limits (s)
DH1	2402 MHz	0.385	117.547	0.4000
DH3	2402 MHz	1.648	243.934	0.4000
DH5	2402 MHz	2.892	303.660	0.4000

#### CH 00- DH1

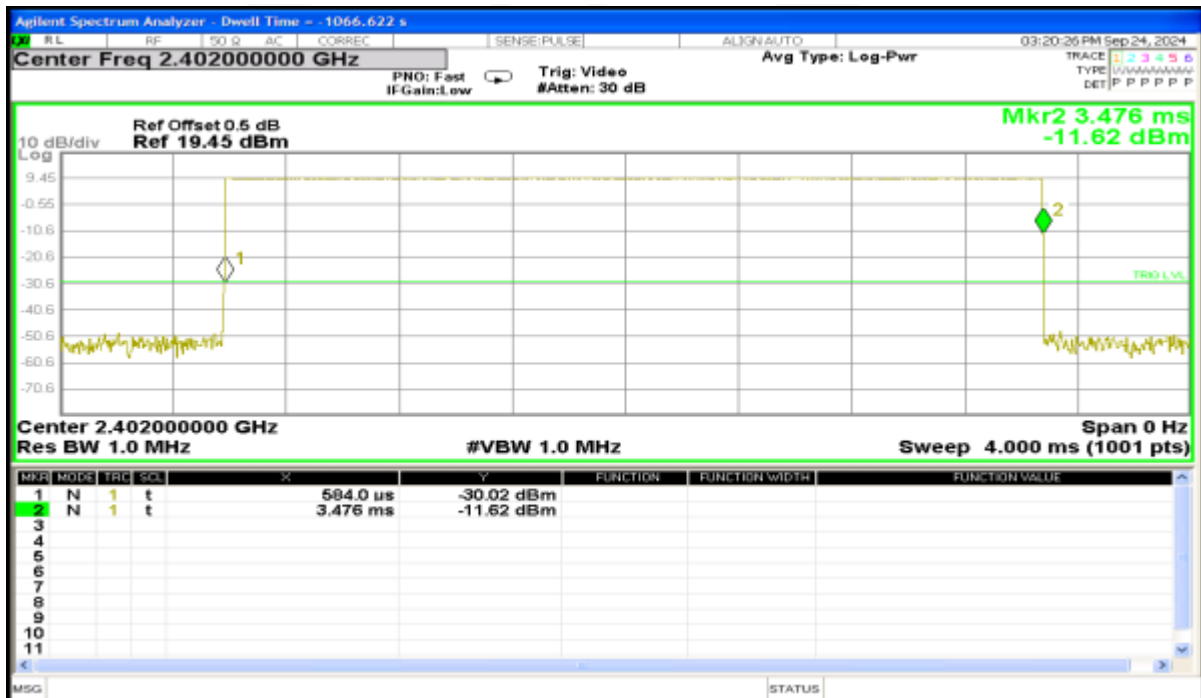


Report No.: AAEMT/RF/240830-01-02

### CH 00- DH3



### CH 00- DH5

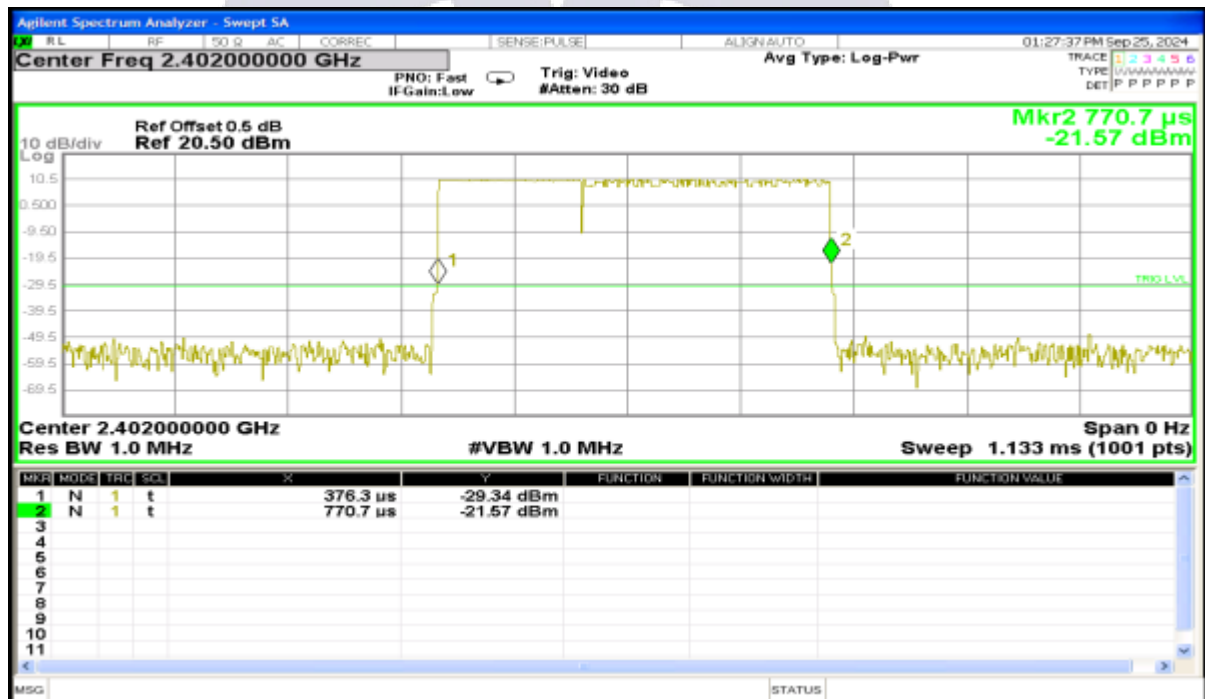


Report No.: AAEMT/RF/240830-01-02

EUT:	Driveri	Model Name. :	D-450
Temperature:	25.4 °C	Relative Humidity:	55%
Pressure:	1010 hPa	Test Power :	110V AC, 60Hz
Test Mode :	CH00-2DH1/2DH3/2DH5 (2Mbps Mode)		

Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (ms)	Limits (s)
2DH1	2402 MHz	0.394	125.814	0.4000
2DH3	2402 MHz	1.651	260.905	0.4000
2DH5	2402 MHz	2.900	316.100	0.4000

CH 00- 2DH1



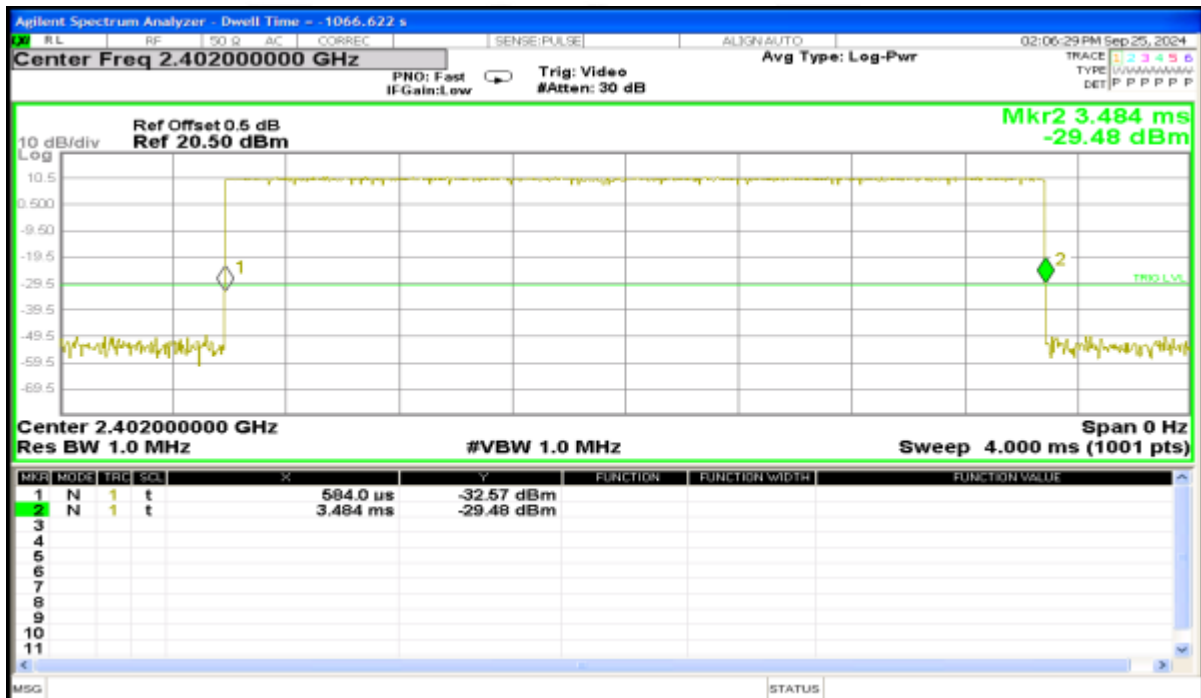


Report No.: AAEMT/RF/240830-01-02

### CH 00- 2DH3



### CH 00- 2DH5





Report No.: AAEMT/RF/240830-01-02

EUT:	Driveri	Model Name. :	D-450
Temperature:	25.4 °C	Relative Humidity:	55%
Pressure:	1010 hPa	Test Power :	110V AC, 60Hz
Test Mode :	CH00-3DH1/3DH3/3DH5 (3Mbps Mode)		

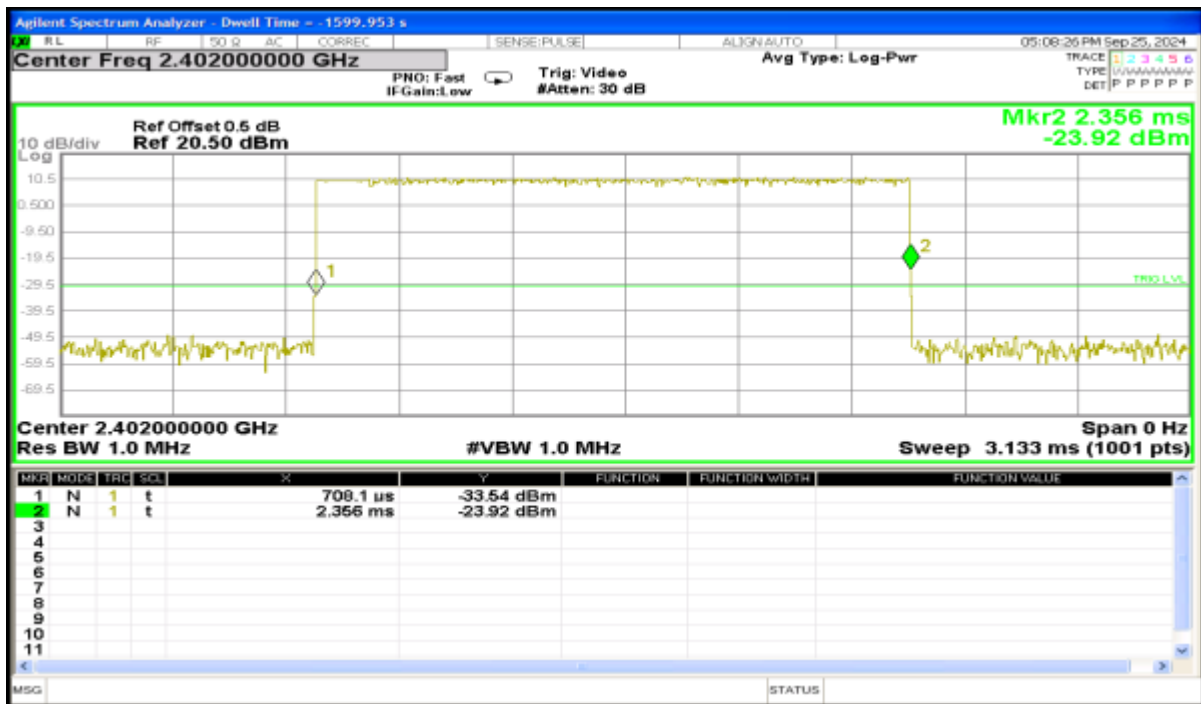
Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (ms)	Limits (s)
3DH1	2402 MHz	0.394	125.025	0.4000
3DH3	2402 MHz	1.648	255.471	0.4000
3DH5	2402 MHz	2.900	313.200	0.4000

### CH 00- 3DH1

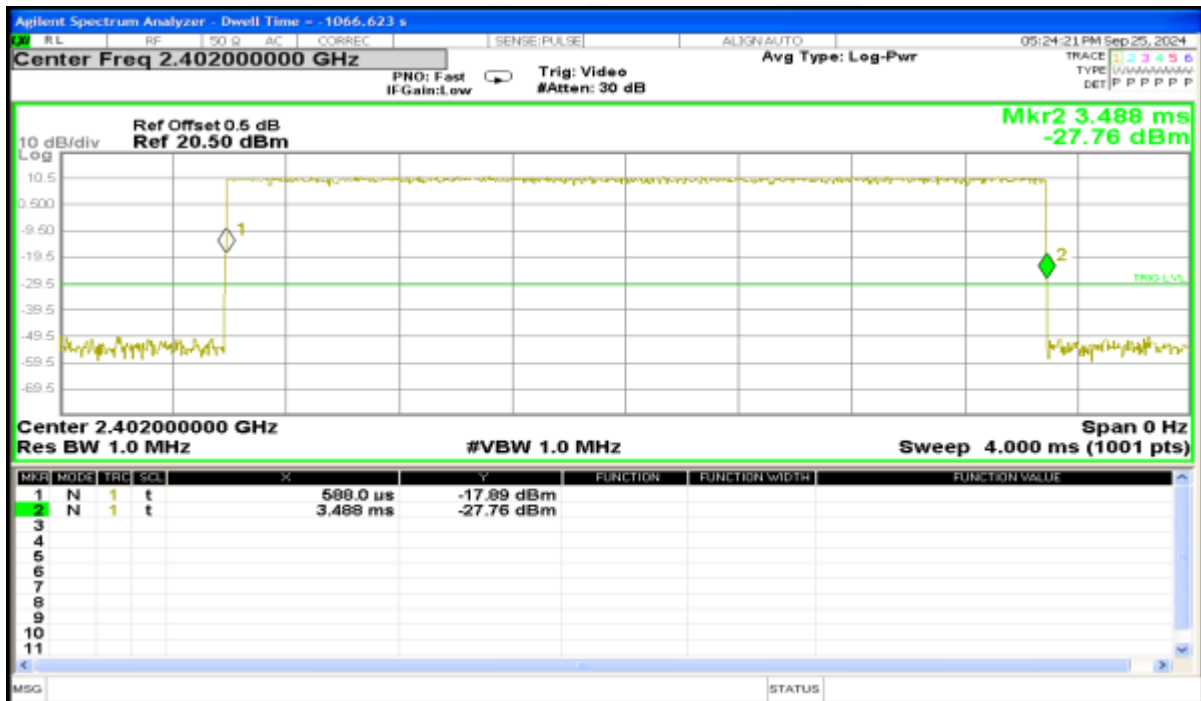


Report No.: AAEMT/RF/240830-01-02

### CH 00- 3DH3



### CH 00- 3DH5



## 6.8 Maximum Peak Output Power

### 6.8.1 Applied procedures / Limit

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.

### 6.8.2 Test procedure

- (1) Connected the antenna port to the Spectrum Analyzer, set the Spectrum Analyzer as  
Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel  
RBW > the 20 dB bandwidth of the emission being measured, VBW ≥ RBW, Sweep = auto  
Detector function = peak, Trace = max hold
- (2) The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power.
- (3) The above procedure shall be repeated at the lowest, the middle, and the highest frequency of the stated frequency range with modulated mode. Also shall be performed at different modes of operation.

### 6.8.3 Deviation from standard

No deviation.

### 6.8.4 Test setup



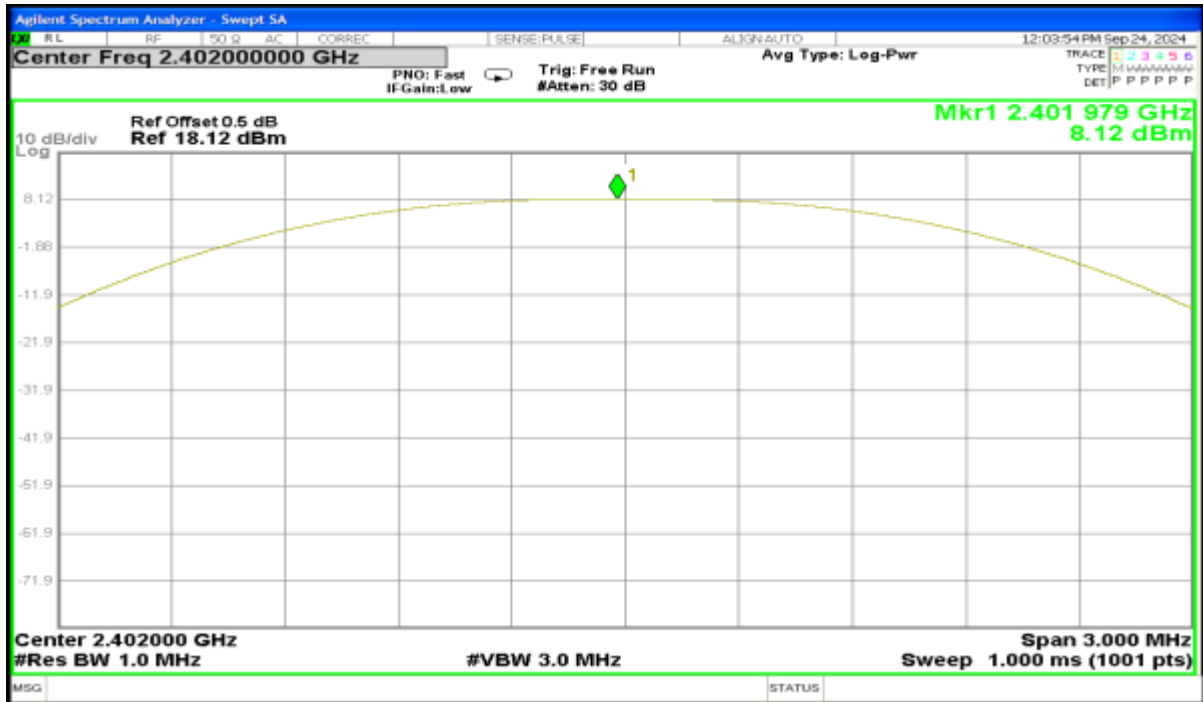
### 6.8.5 Test results

EUT:	Driveri	Model Name. :	D-450
Temperature:	25.4 °C	Relative Humidity:	55%
Pressure:	1010 hPa	Test Power :	110V AC, 60Hz
Test Mode :	TX 1Mbps/ 2Mbps/3Mbps		
Note: All the data rates have be tested and the worst-case as the table below.			

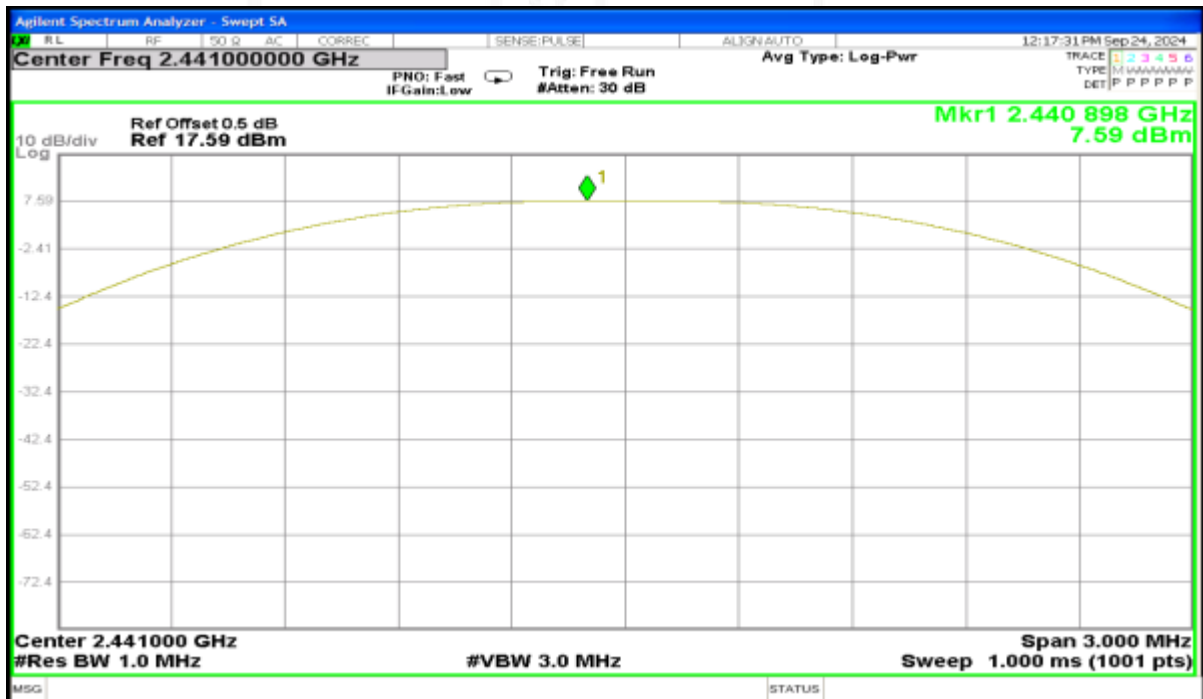
Test Mode	Frequency	Peak Output Power (dBm)	Limit (dBm)	Result
Data rate 1Mbps	2402 MHz	8.12	30	Pass
	2441 MHz	7.59	30	Pass
	2480 MHz	7.38	30	Pass
Data rate 2Mbps	2402 MHz	10.95	30	Pass
	2441 MHz	8.77	30	Pass
	2480 MHz	9.20	30	Pass
Data rate 3Mbps	2402 MHz	9.50	30	Pass
	2441 MHz	8.72	30	Pass
	2480 MHz	9.08	30	Pass
Cable loss = 1.0 dBm				

Report No.: AAEMT/RF/240830-01-02

### CH 00-1Mbps

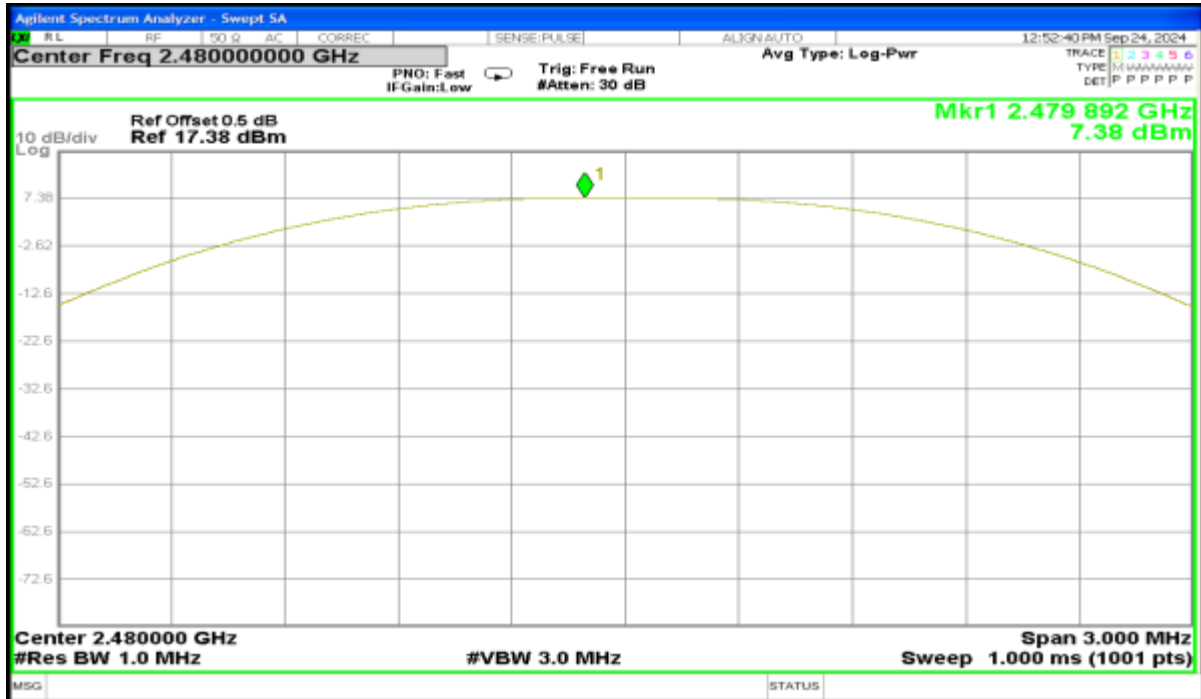


### CH 39-1Mbps

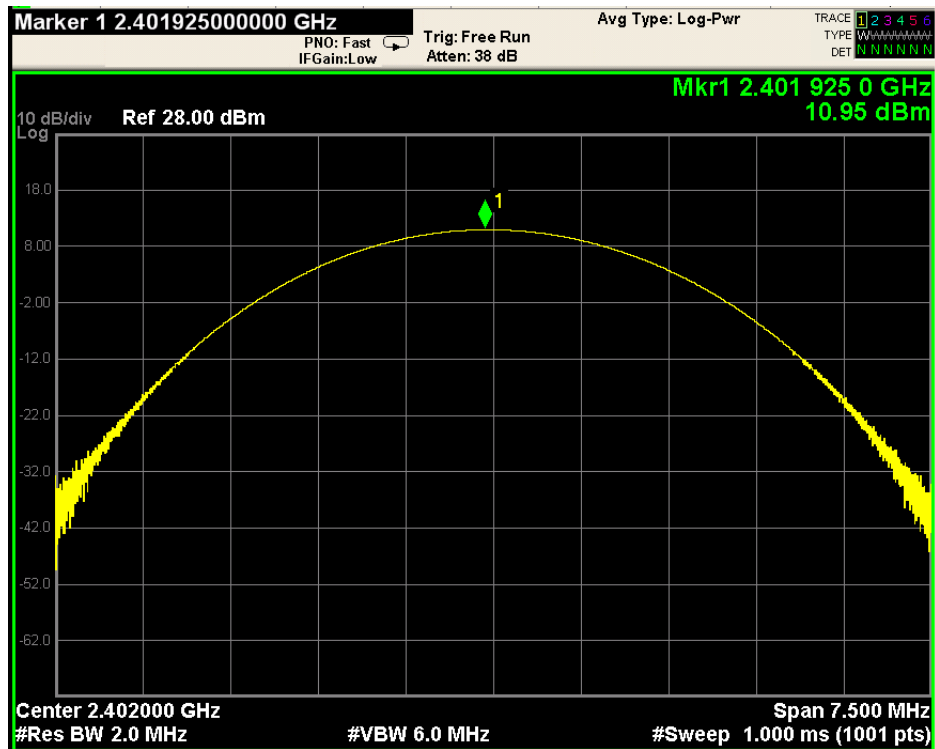


Report No.: AAEMT/RF/240830-01-02

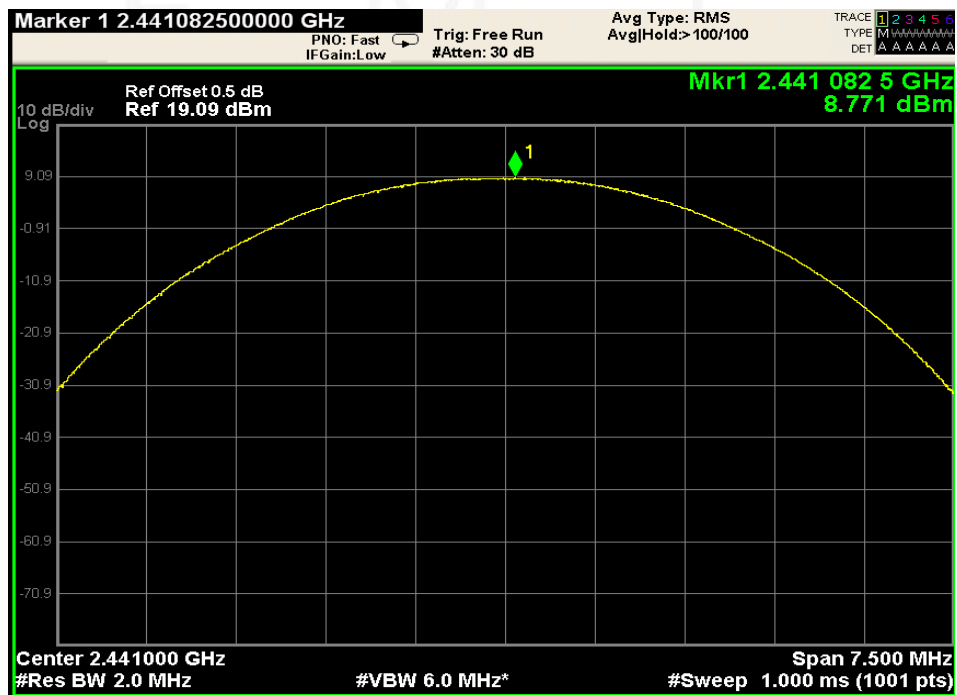
### CH 78-1Mbps



### CH 00-2Mbps



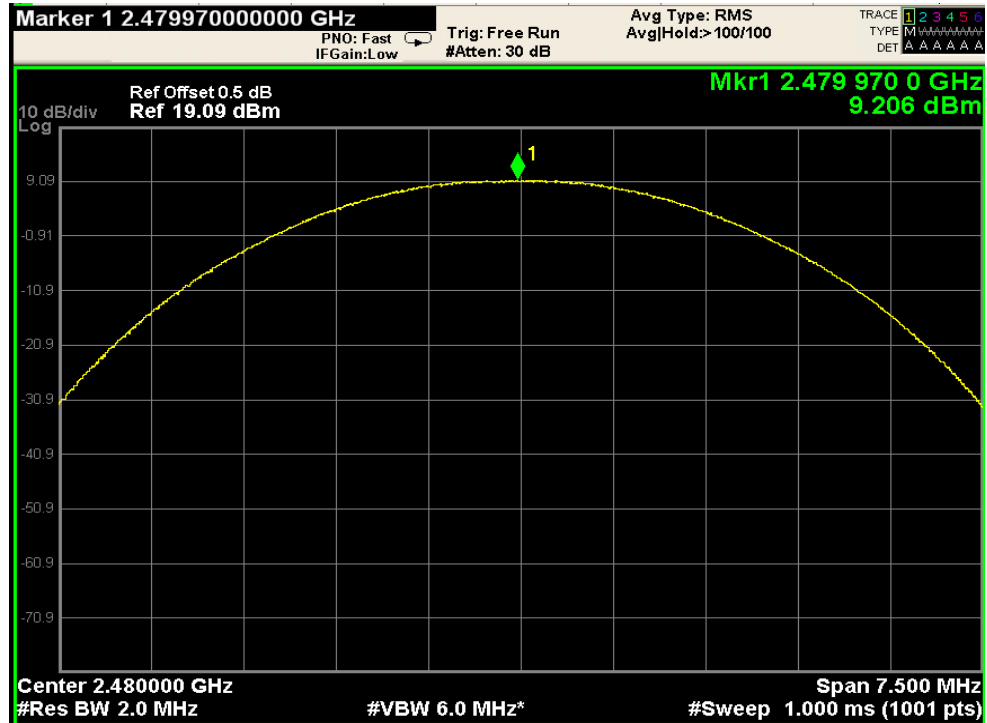
### CH 39-2Mbps





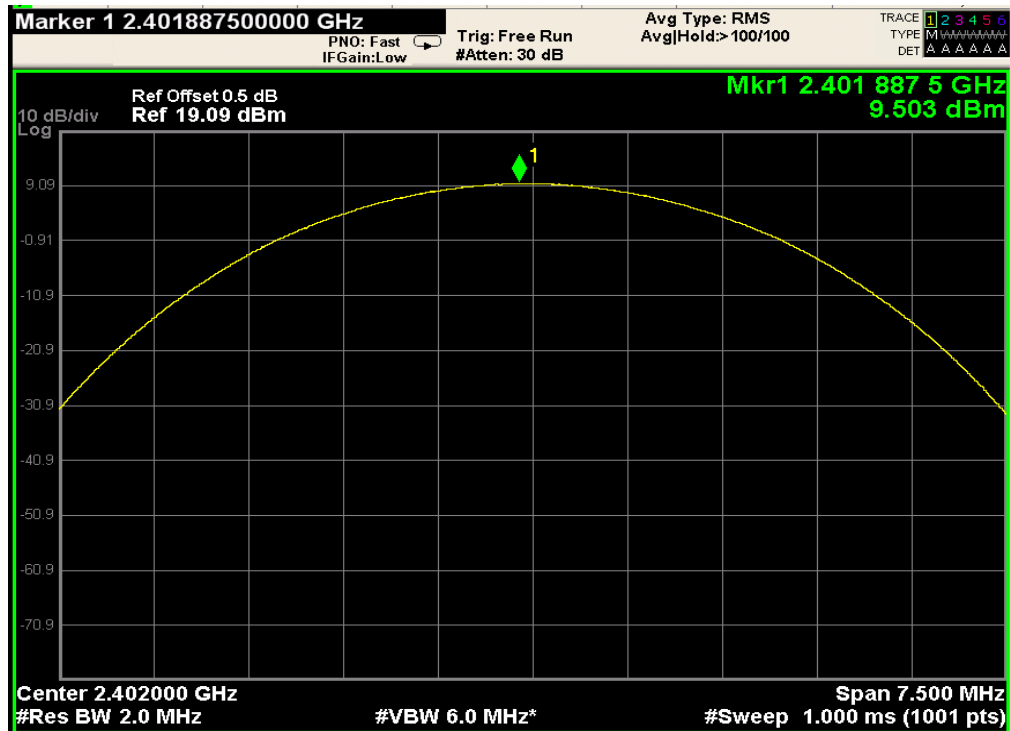
Report No.: AAEMT/RF/240830-01-02

### CH 78-2Mbps

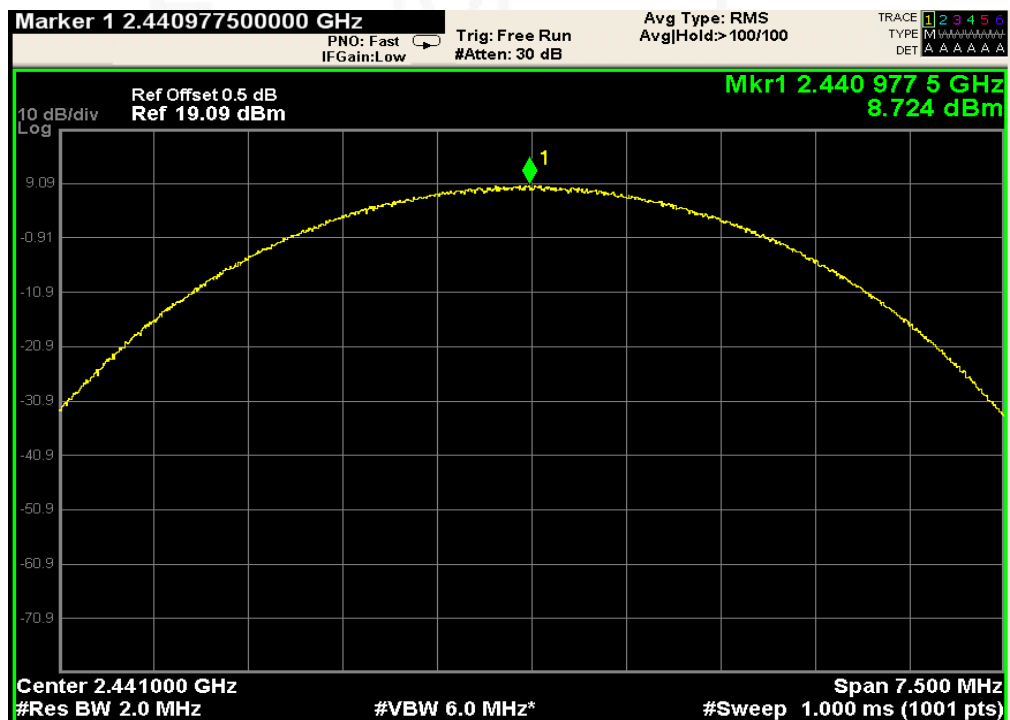


Report No.: AAEMT/RF/240830-01-02

### CH 00-3Mbps

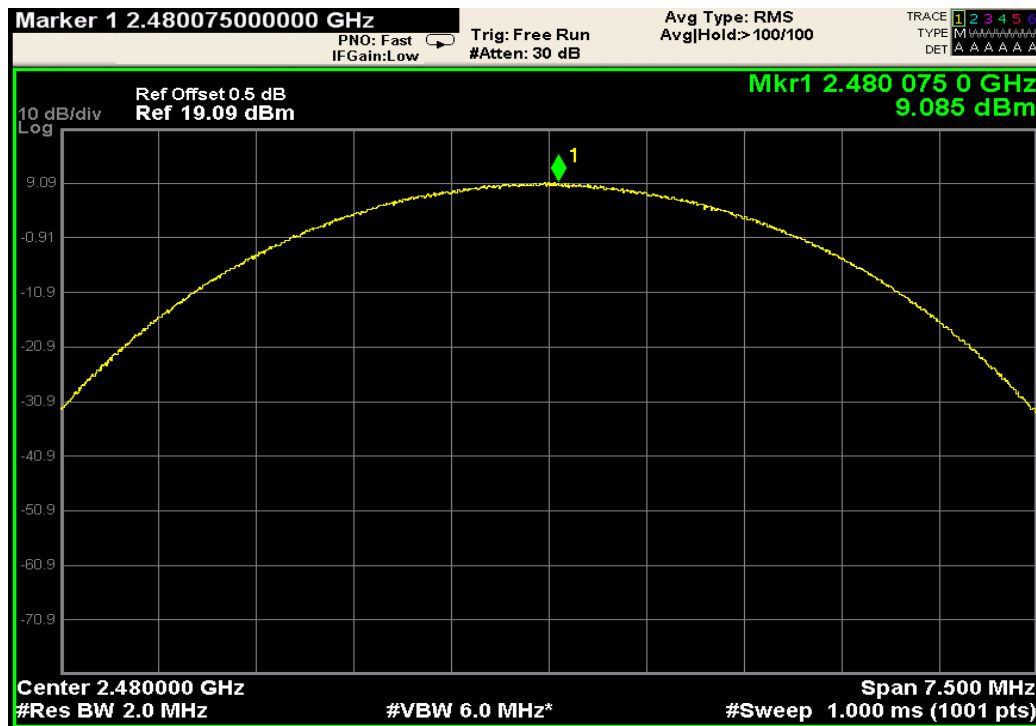


### CH 39-3Mbps



Report No.: AAEMT/RF/240830-01-02

CH 78-3Mbps



## 6.9 Band edge

### 6.9.1 Applied procedures / Limit

15.247(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

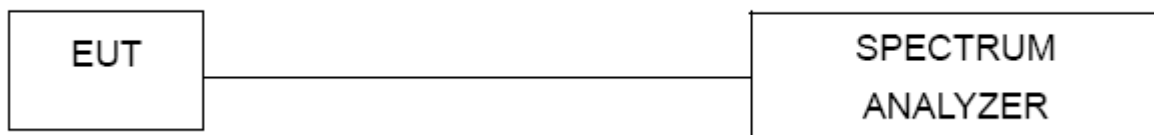
### 6.9.2 Test procedure

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- Span = wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation,  $RBW \geq 1\%$  of the span,  $VBW \geq RBW$ , Sweep = auto, Detector function = peak, Trace = max hold

### 6.9.3 Deviation from standard

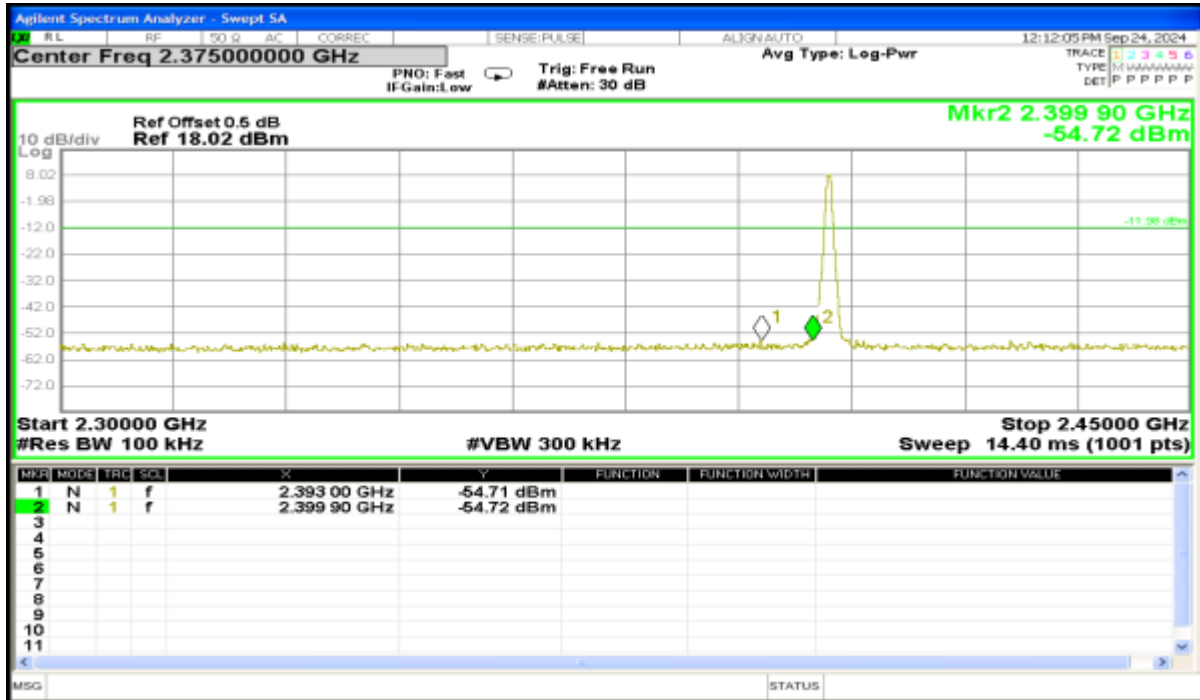
No deviation.

### 6.9.4 Test setup

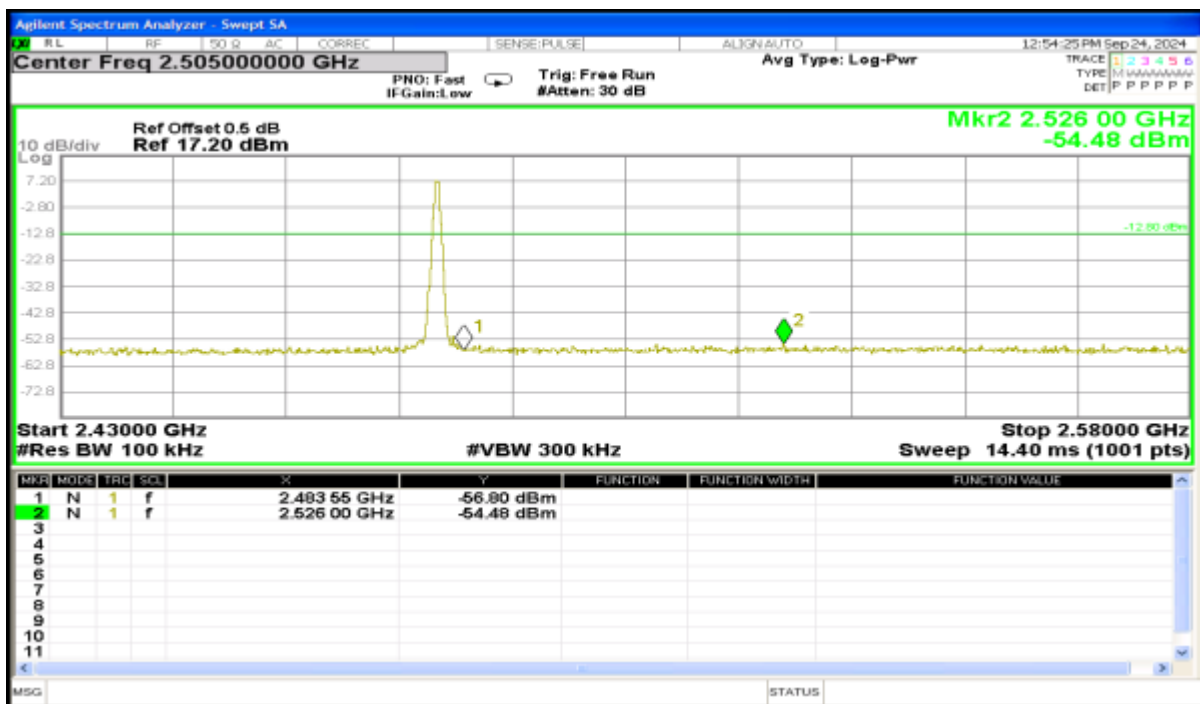


## 6.9.5 Test results

### CH00 (Lower) Data rate 1Mbps

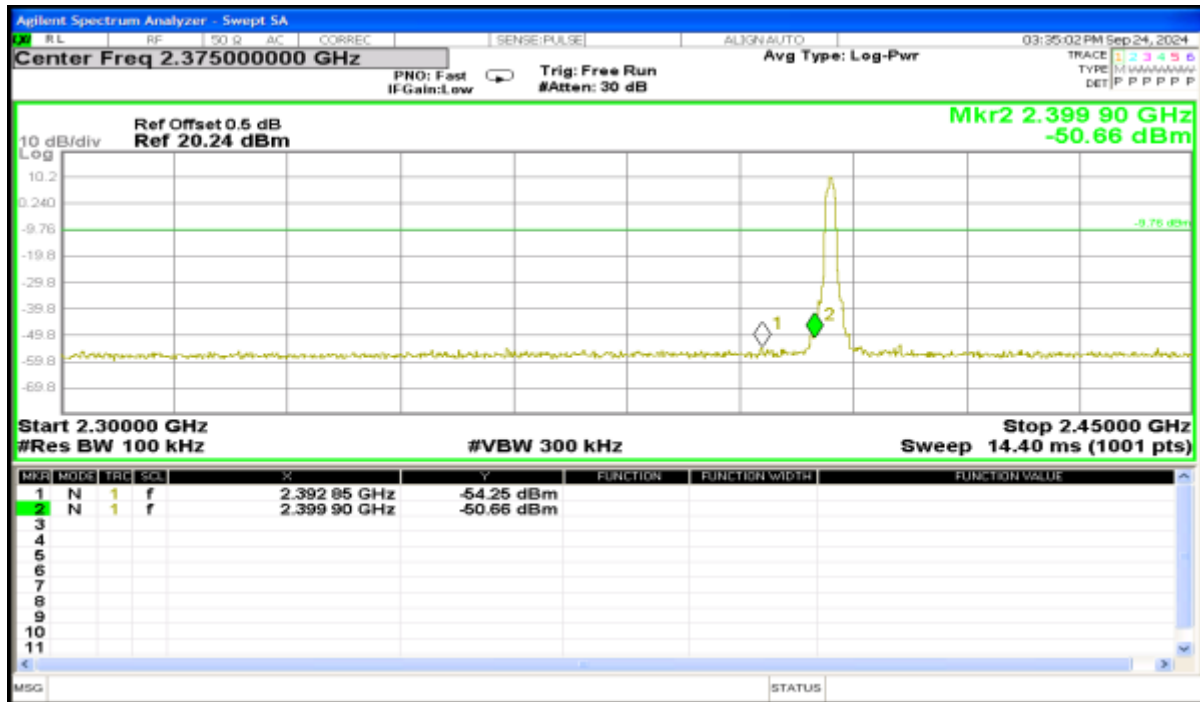


### CH 78 (Upper) Data rate 1Mbps

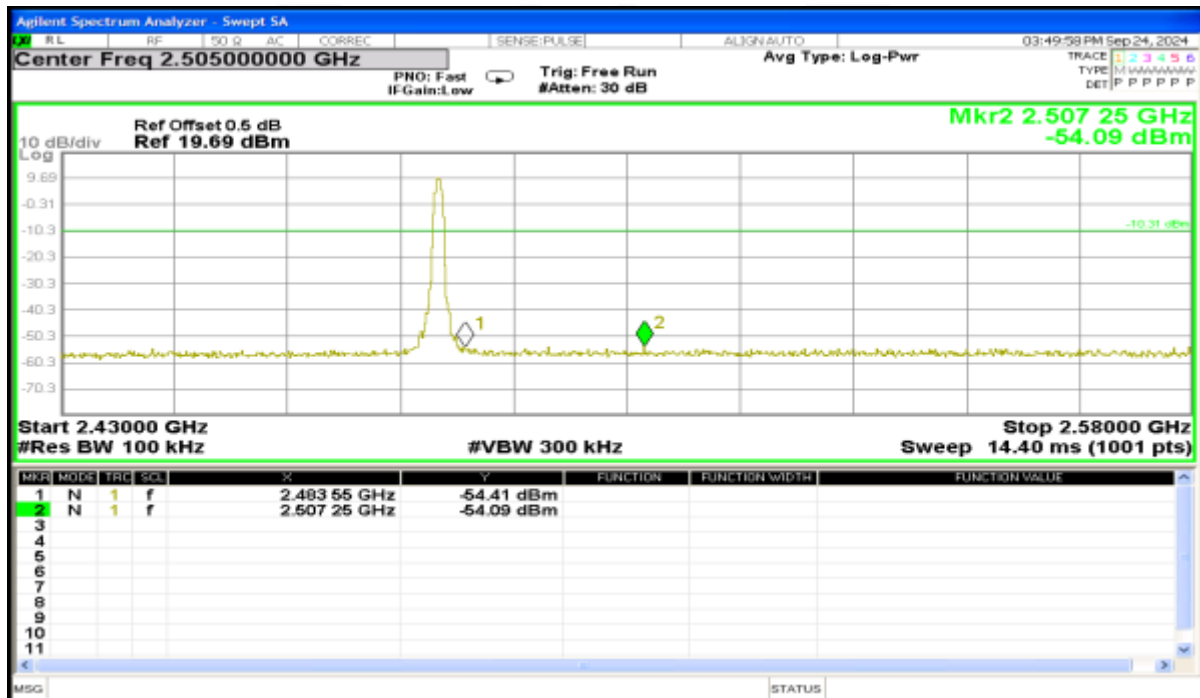


Report No.: AAEMT/RF/240830-01-02

### CH00 (Lower) Data rate 2Mbps

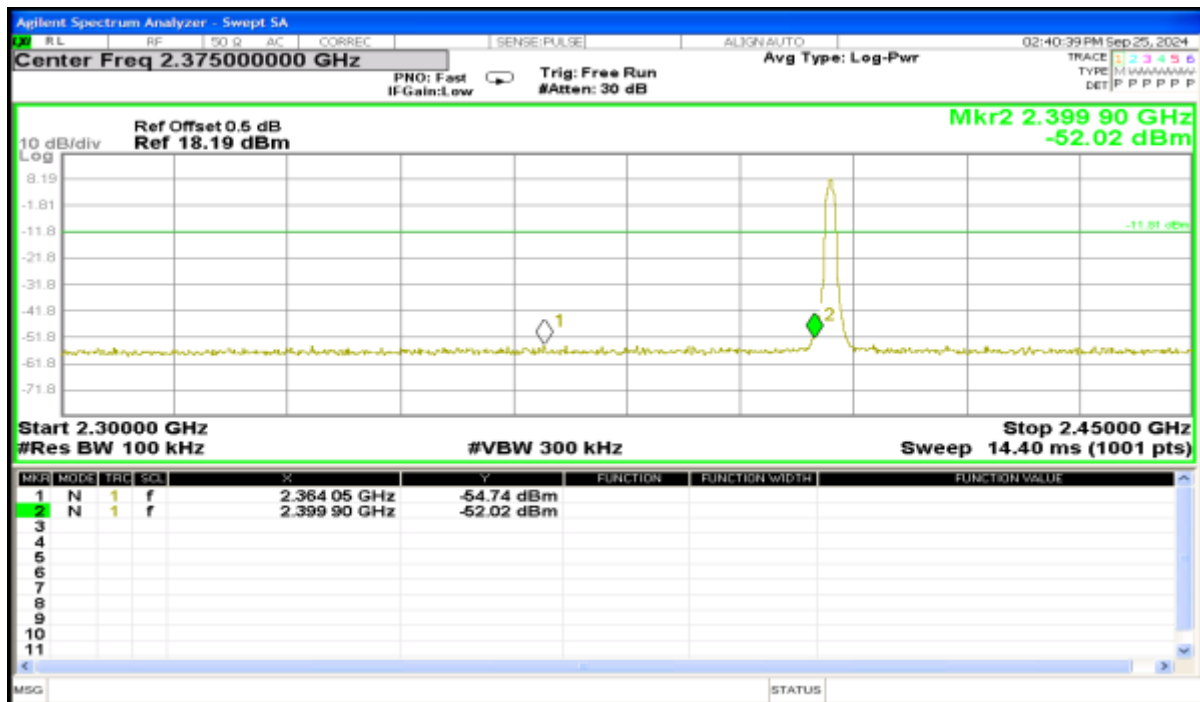


### CH 78 (Upper) Data rate 2Mbps

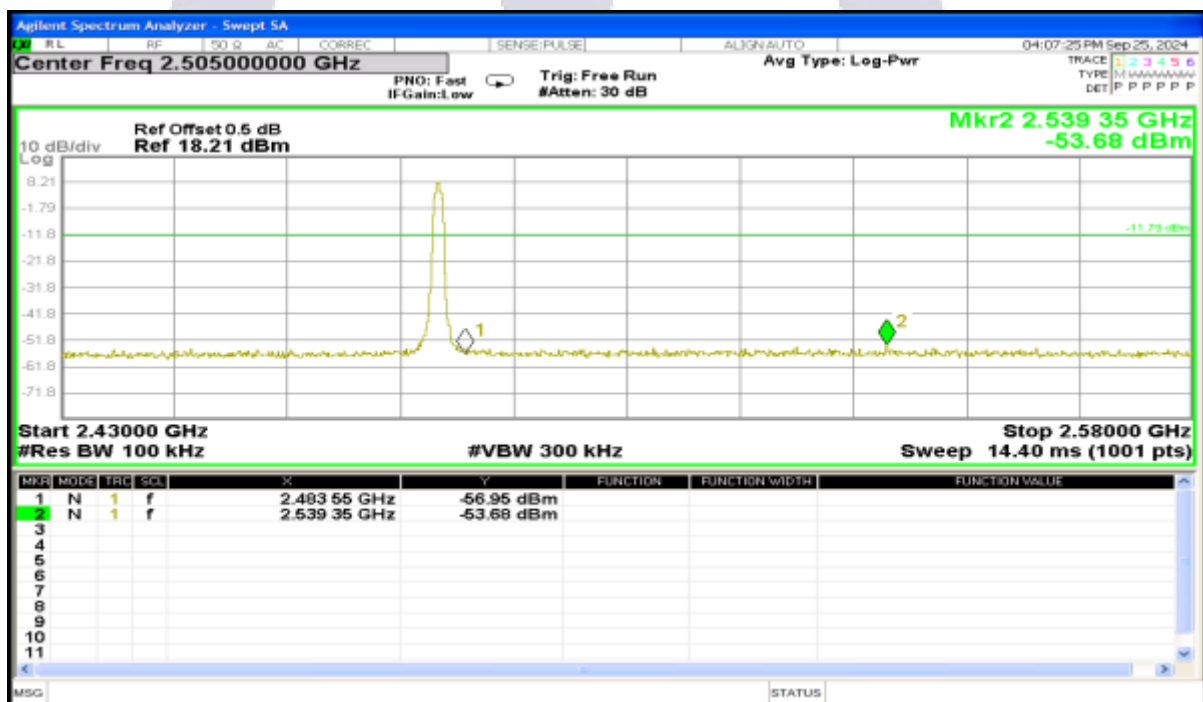


Report No.: AAEMT/RF/240830-01-02

CH00 (Lower) Data rate 3Mbps



CH 78 (Upper) Data rate 3Mbps





## 6.10 Conducted Spurious Emissions

### 6.10.1 Applied procedures / Limit

15.247(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

### 6.10.2 Test procedure

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10<sup>th</sup> harmonic. Typically, several plots are required to cover this entire span. RBW = 100 kHz  
VBW ≥ RBW, Sweep = auto, Detector function = peak, Trace = max hold  
Sweep points ≥ investigated frequency range/RBW.

### 6.10.3 Deviation from standard

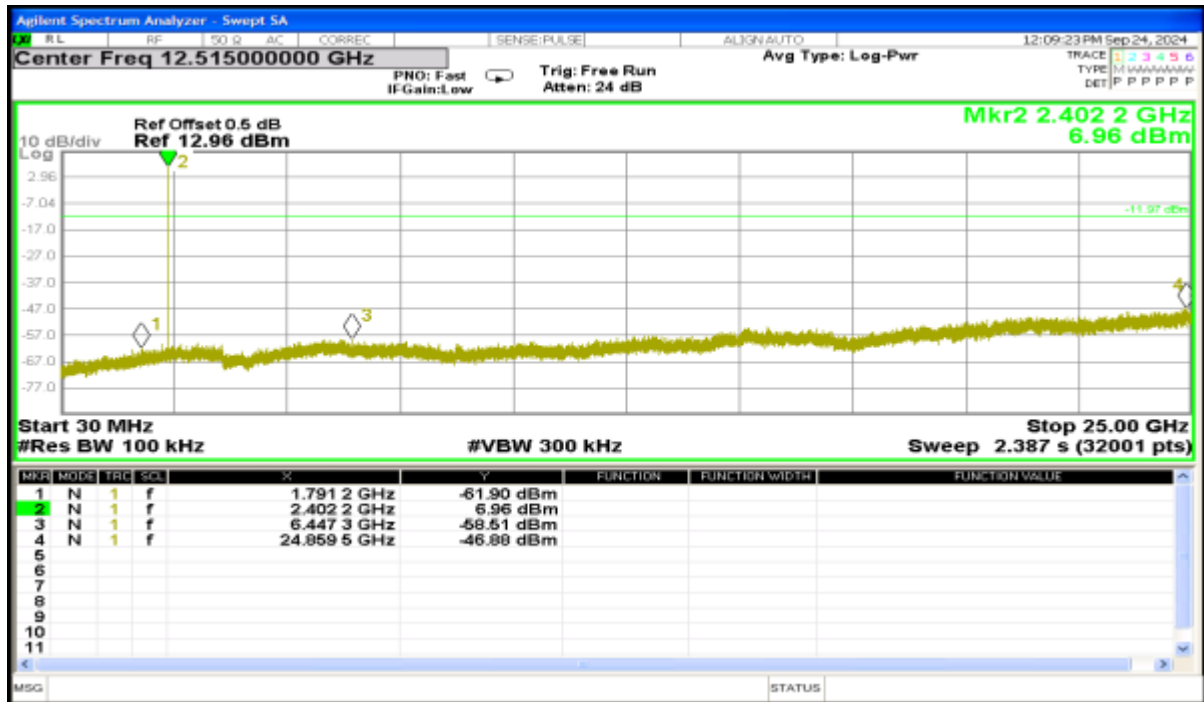
No deviation.

### 6.10.4 Test setup

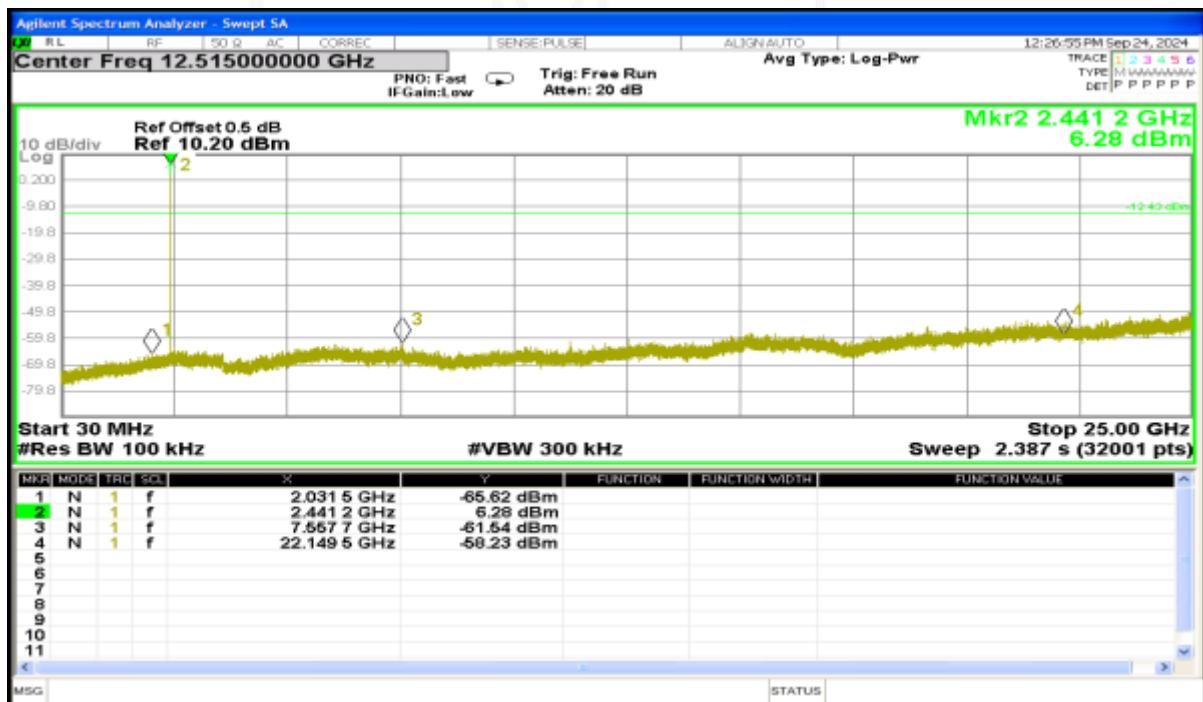


## 6.10.5 Test results

### CH00 Data rate 1Mbps

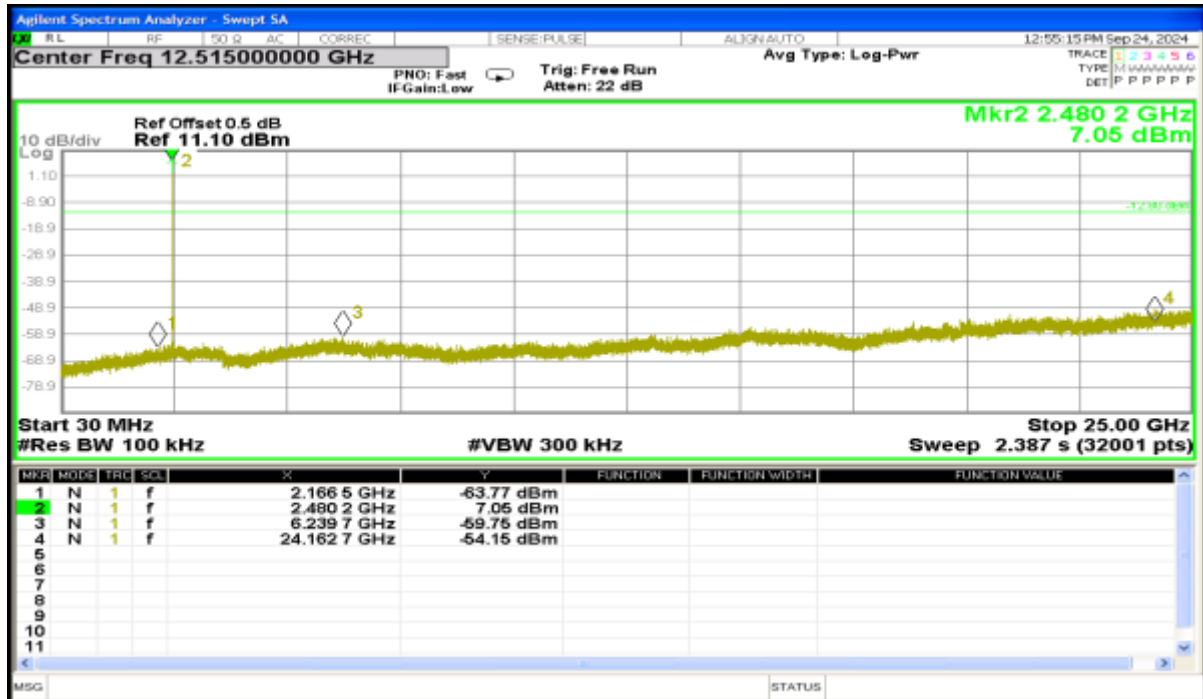


### CH39 Data rate 1Mbps

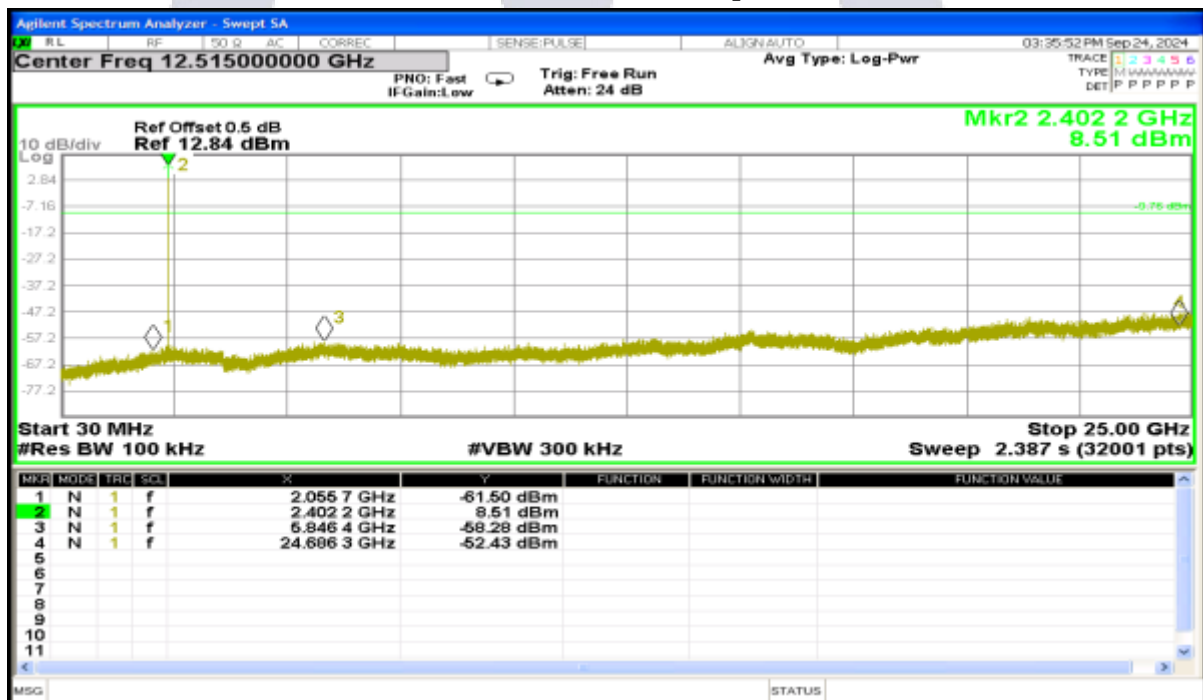


Report No.: AAEMT/RF/240830-01-02

### CH78 Data rate 1Mbps

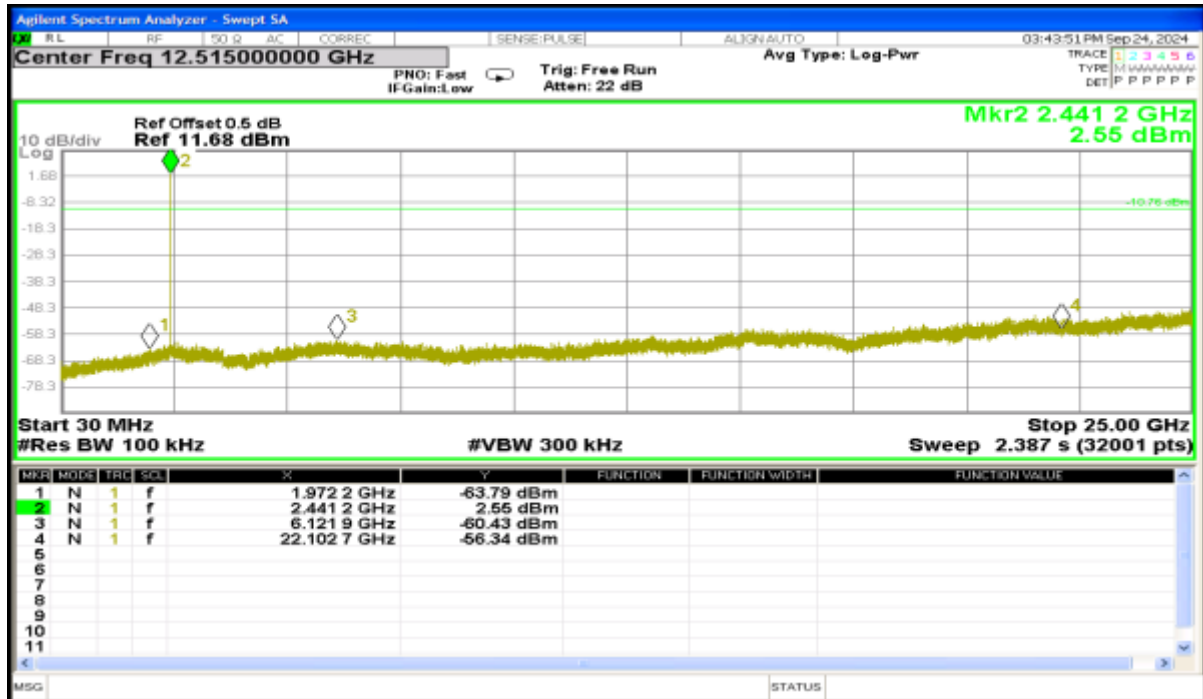


### CH00 Data rate 2Mbps

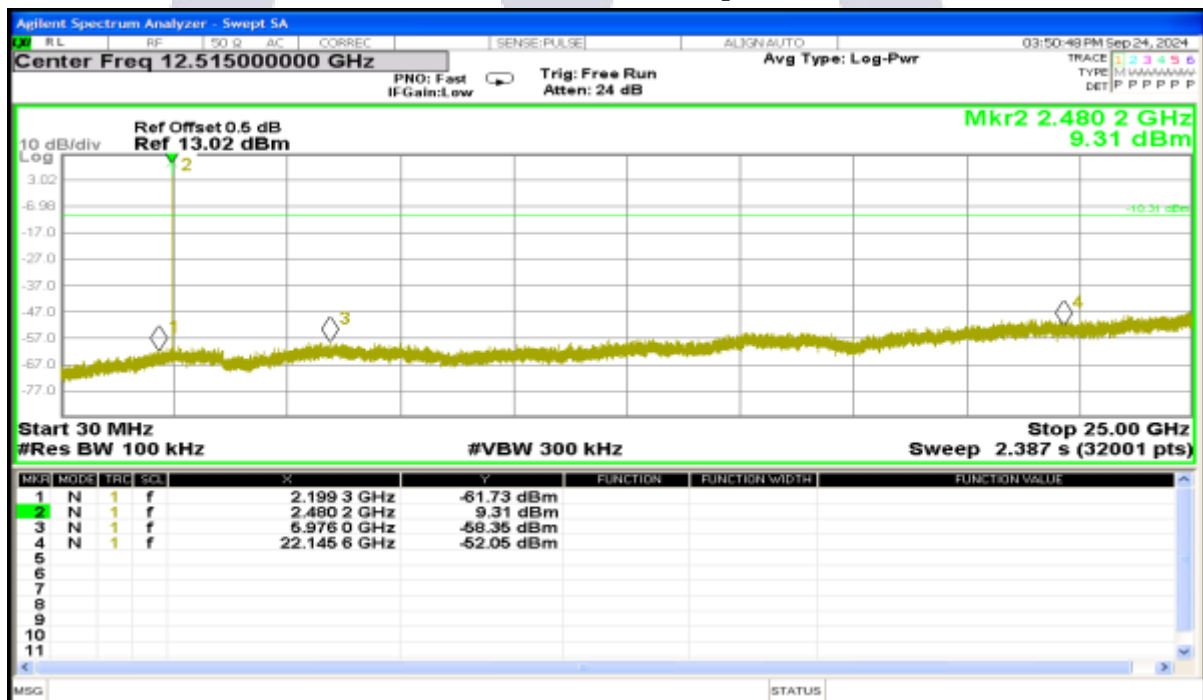


Report No.: AAEMT/RF/240830-01-02

CH39 Data rate 2Mbps

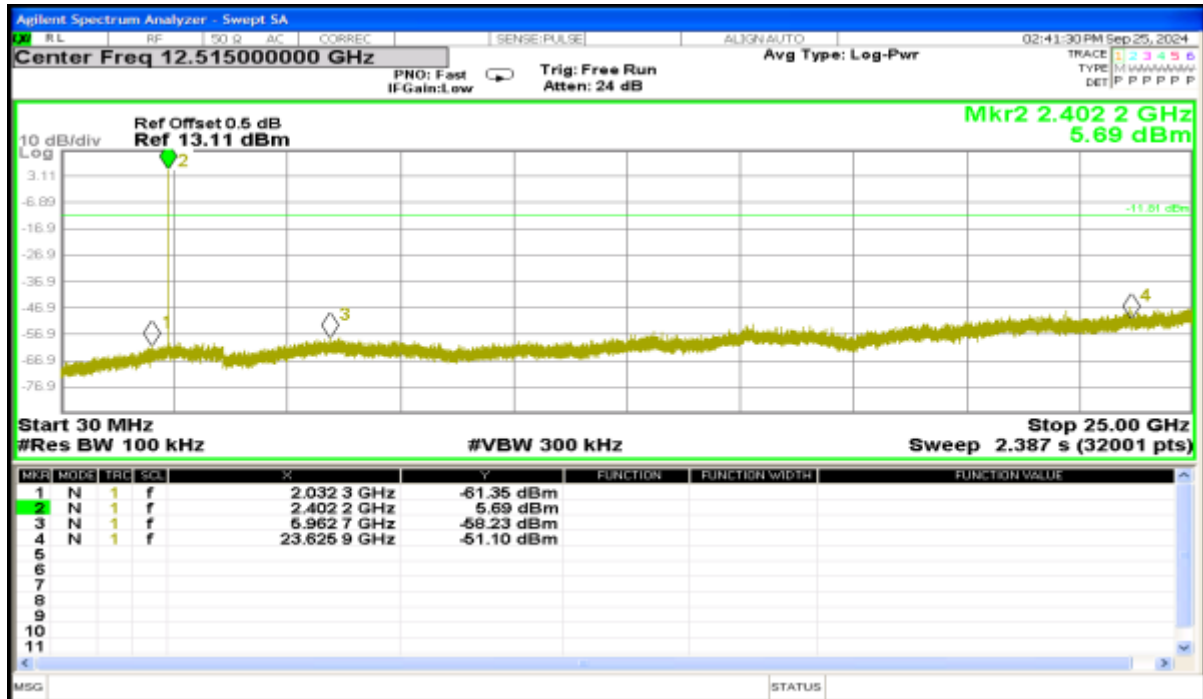


CH78 Data rate 2Mbps

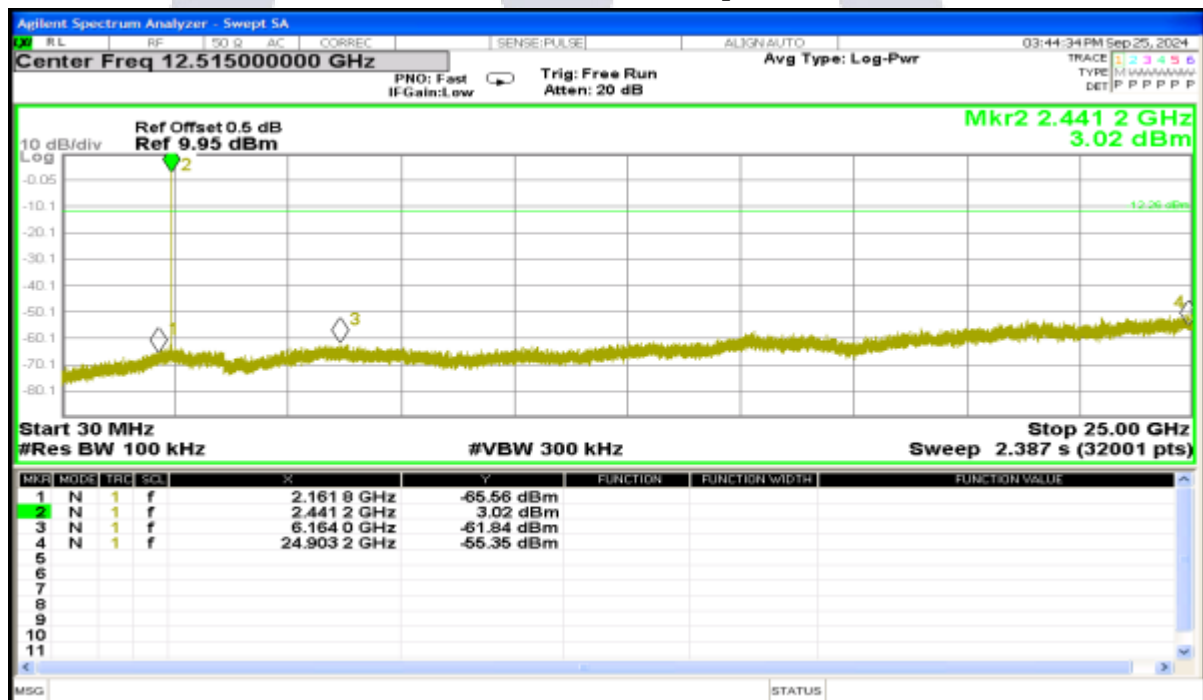


Report No.: AAEMT/RF/240830-01-02

### CH00 Data rate 3Mbps

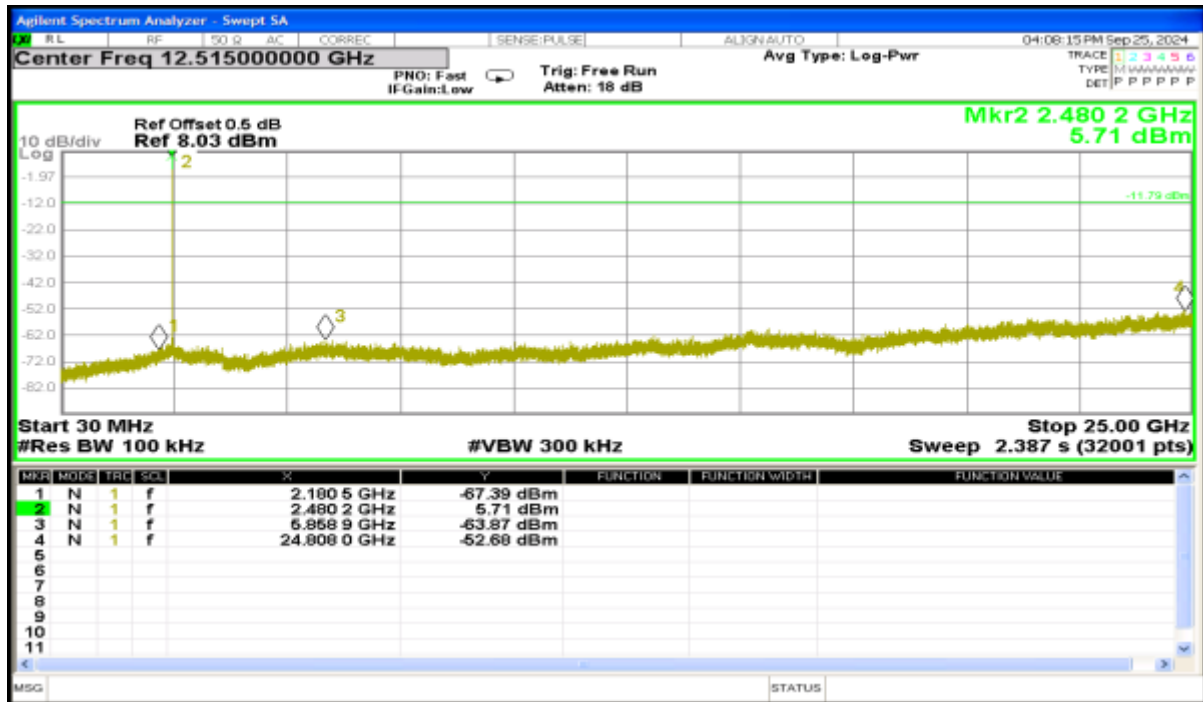


### CH39 Data rate 3Mbps



Report No.: AAEMT/RF/240830-01-02

### CH78 Data rate 3Mbps



**\*\*End of Report\*\***