FCC Test Report (Part 15 Subpart C)

FCC ID：2AM8R-D450

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:

Product Name: Driveri

Model No.: D-450

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

Brand Name: netradyne

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 09, 2023 Date of Test: Aug 10, 2023 ~ Oct. 04, 2023

Date of Issue: Nov. 09, 2023 Test Result: **In Compliance/Pass**

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

This device has been tested and found to comply with the stated standard(s), which is(are) required by the council directive of 2014/53/EU and indicated in the test report and are applicable only to the tested sample identified in the report. Note: This report shall not be reproduced except in full, without the written approval of AA Electro Magnetic Test Laboratory Private Limited, this document may be altered or revised by AA Electro Magnetic Test Laboratory Private Limited, personal only, and shall be noted in the revision of the document. This test report must not be used by the client to claim product endorsement.

Prepared By: (+ signature) Ankur Kumar

Reviewed & Approved by: (+ signature)

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

1 Contents

Plot No.174, Udyog Vihar Phase 4, Sector -18, Gurgaon -122016, Haryana, India
Contact:0124-4235350, 4145343; e-mail: info @aaemtlabs.com; Website: www.aaemtlabs.com

Plot No.174, Udyog Vihar Phase 4, Sector -18, Gurgaon -122016, Haryana, India
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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**

Note: N/A is an abbreviation for Not Applicable.
Model description: N/A

(1)	Reference to the FCC Public Notice DA 00-705
(2)	Reference to ANSI C63.4:2013.

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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

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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:	netradyne
Derivative model No.:	D-450A, D-455
Serial No:	103262300022
Operation frequency:	2402 MHz to 2480 MHz
Number Of Channel:	79
Modulation Technology:	GFSK, π/4-DQPSK, 8DPSK (1/2/3Mbps)
Antenna Gain:	-2.6dBi
H/W No.:	103-00-00005
S/W No.:	13.0.16
Power Supply Range:	Input : 12VDC, 3A
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:	See the specific Note / Annexure if any in the whole /full report.

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		

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4.2 Description of Test conditions

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

1. Block diagram of EUT configuration(TX Mode)

Note: 1.The EUT was programmed to be in continuously transmitting mode and the transmit duty cycle is not less than 98%.

(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.

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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	Driveri/DCM LTE Module	Netradyne Inc.	2AM8R-DCM-NA1-200	DCM-NA1-200	N/A	N/A	N/A

5 Equipments List for All Test Items

No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal.Due Date
1	EMI- Test RECEIVER	Rohde and Schwarz	ESIB26	838786/010	2023/06/13	2025/06/13
2	Loop antenna	DA ZE Beijing	ZN30900C	18052	2021/09/15	2024/09/15
3	Horn antenna	DA ZE Beijing	ZN30701	18012	2021/09/15	2024/09/15
4	Horn antenna	DA ZE Beijing	ZN30702	18006	2021/09/15	2024/09/15
5	Horn antenna	DA ZE Beijing	ZN30703	18005	2021/09/15	2024/09/15
6	Pre-Amplifier	KELIANDA	LNA-0009295	-	2023/01/13	2024/01/13
7	Pre-Amplifier	HP	8447FOPTH64	-	2023/01/13	2024/01/13
8	Bi - Log Antenna	Schwarzbeck	VULB9161	-	2021/09/15	2024/09/15
9	EMI-RECEIVER	Rohde and Schwarz	ESHS 30	8260003/011	2023/07/27	2025/07/27
10	Spectrum Analyzer	ADVANTEST	R3132	191200845	2023/01/13	2024/01/13
11	LISN	Kyoritsu	KNW-407	8-1789-5	2023/01/13	2024/01/13
12	Network – LISN	Schwarzbeck	NNBM8125	81251314	2023/01/13	2024/01/13
13	Network – LISN	Schwarzbeck	NNBM8125	81251315	2023/01/13	2024/01/13
14	LISN	Rohde and Schwarz	ESH3-Z5	1.1.1	2023/07/27	2025/07/26
15	PULSE LIMITER	Rohde and Schwarz	ESH3-Z2	100681	2023/01/13	2024/01/13
16	50Ω Coaxial Switch	DAIWA	1565157	-	2023/01/13	2024/01/13
17	50Ω Coaxial Switch	-	-	-	2023/01/13	2024/01/13

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18	Wireless signal power meter	DARE!!	RPR3006W	RFSW190220	2023/01/13	2024/01/13
19	Signal Generator	KEYSIGHT	N5181A	512071	2023/01/13	2024/01/13
20	MXA Signal Analyzer	Keysight	N9020A	6272323218	27/07/23	27/07/25
21	RF Vector Signal Generator	Keysight	N5182B	512094	2023/01/13	2024/01/13
22	Spectrum analyzer	R&S	FSV-40N	101385	2023/01/13	2024/01/13
23	Radio Communication Tester	R&S	CMW 500	124589	2021/09/15	2024/09/15
24	DC Regulated Power	Metravi	RPS-3005	669076	2022/12/13	2023/12/12
25	Climatic Chamber	Sunrise Scientific Instruments	-	-	2022/11/22	2023/11/21
26	Attenuators	AGILENT	8494B	-	-	-
27	Attenuators	AGILENT	8495B	-	-	-

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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

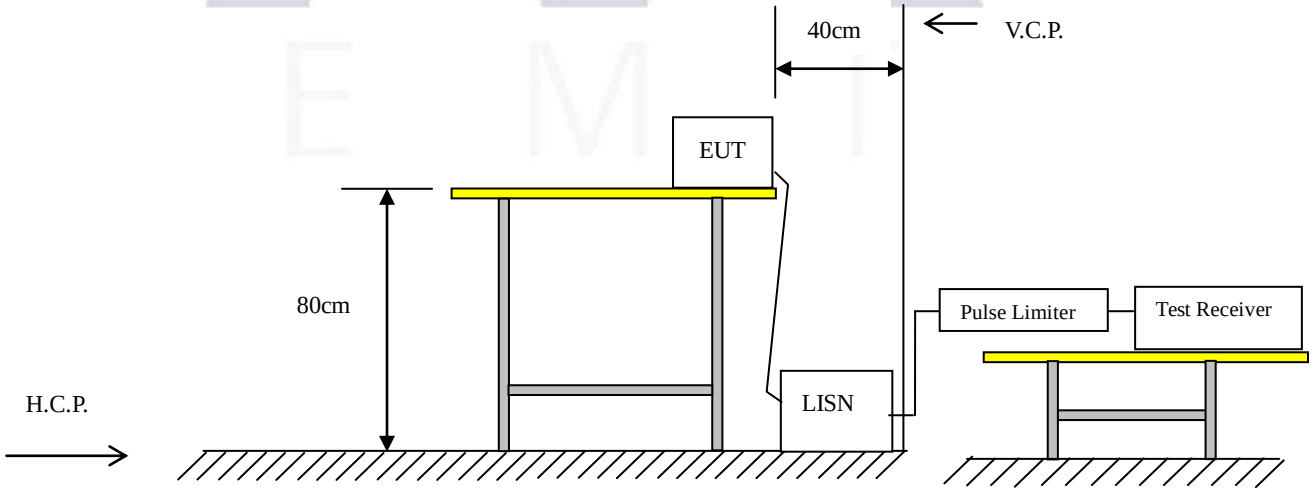
Frequency of Emission (MHz)	Conducted Limit (dBµV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

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



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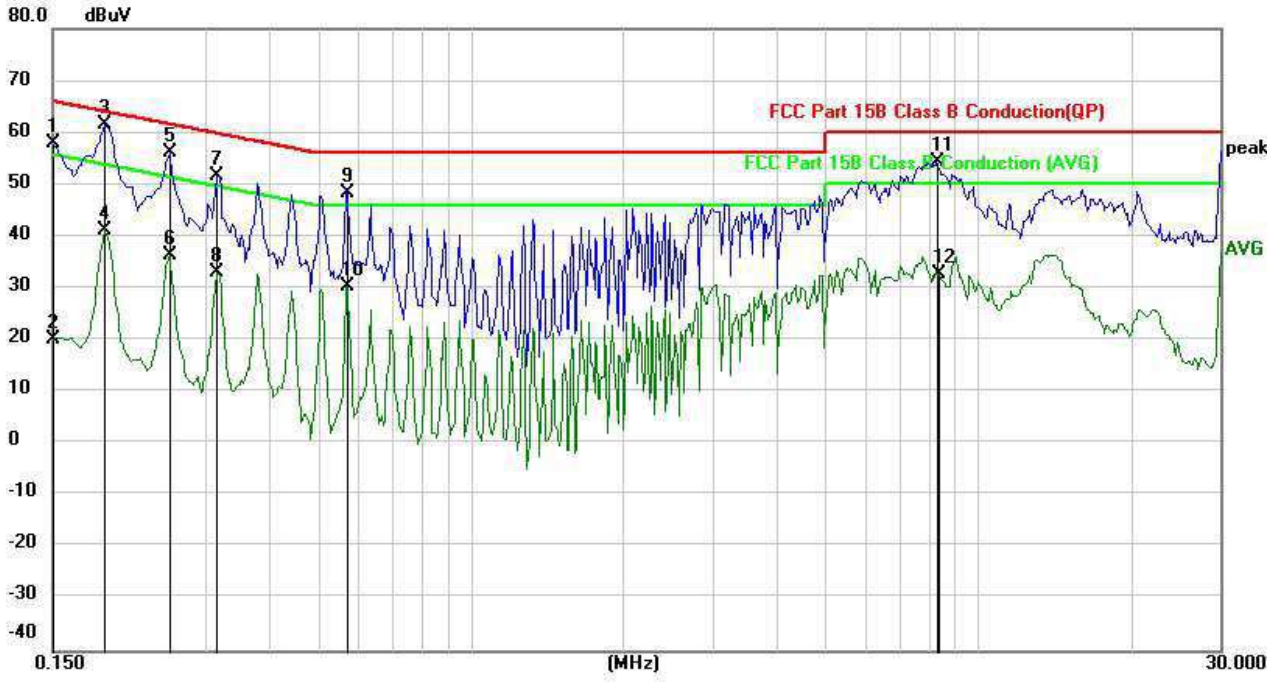
6.2.4 Test results

EUT:	Driveri	Model Name. :	D-450
Temperature:	25.8 ℃	Relative Humidity:	52%
Pressure:	1010hPa	Test Date :	2023-08-11
Test Mode:	TX CH00 (1Mbps worst case)	Phase :	Line
Test Voltage :	110VAC,60Hz		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1499	46.34	11.75	58.09	66.00	-7.91	QP
2		0.1499	8.42	11.75	20.17	56.00	-35.83	AVG
3	*	0.1900	49.45	11.97	61.42	64.03	-2.61	QP
4		0.1901	29.23	11.97	41.20	54.03	-12.83	AVG
5		0.2550	45.97	10.19	56.16	61.59	-5.43	QP
6		0.2550	26.24	10.19	36.43	51.59	-15.16	AVG
7		0.3150	41.22	10.56	51.78	59.84	-8.06	QP
8		0.3165	22.35	10.58	32.93	49.80	-16.87	AVG
9		0.5695	37.63	10.81	48.44	56.00	-7.56	QP
10		0.5695	19.58	10.81	30.39	46.00	-15.61	AVG
11		8.3000	43.32	10.99	54.31	60.00	-5.69	QP
12		8.3670	21.70	10.99	32.69	50.00	-17.31	AVG

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



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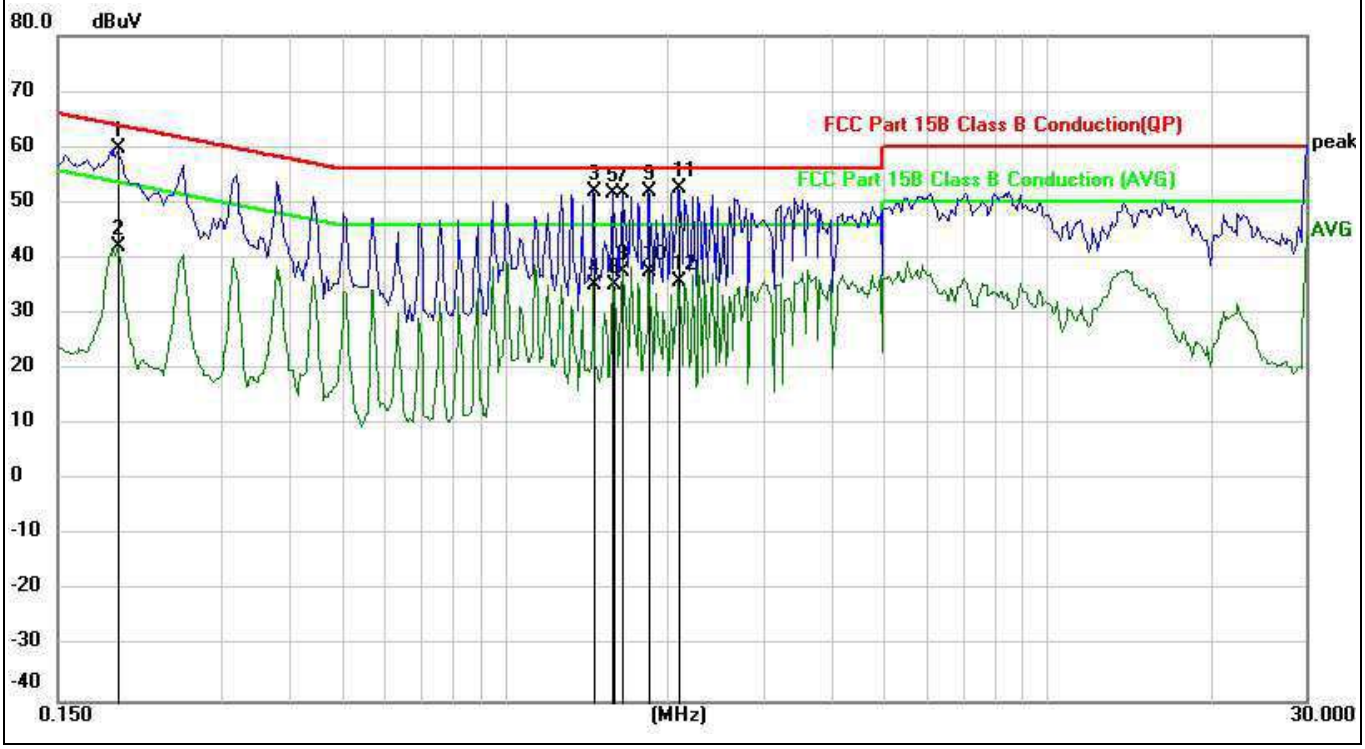
EUT:	Driveri	Model Name. :	D-450
Temperature:	25.8 ℃	Relative Humidity:	52%
Pressure:	1010hPa	Test Date :	2023-08-11
Test Mode:	TX CH00 (worst case)	Phase :	Neutral
Test Voltage :	110VAC,60Hz		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1932	47.80	11.86	59.66	63.89	-4.23	QP
2		0.1932	30.27	11.86	42.13	53.89	-11.76	AVG
3		1.4596	40.96	10.90	51.86	56.00	-4.14	QP
4		1.4596	24.30	10.90	35.20	46.00	-10.80	AVG
5		1.5800	40.81	10.90	51.71	56.00	-4.29	QP
6		1.5900	24.24	10.90	35.14	46.00	-10.86	AVG
7		1.6493	40.83	10.90	51.73	56.00	-4.27	QP
8		1.6532	26.73	10.90	37.63	46.00	-8.37	AVG
9		1.8400	40.94	10.90	51.84	56.00	-4.16	QP
10		1.8400	26.51	10.90	37.41	46.00	-8.59	AVG
11	*	2.0899	41.69	10.90	52.59	56.00	-3.41	QP
12		2.0899	24.88	10.90	35.78	46.00	-10.22	AVG

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



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6.3 Radiated Emissions Measurement

6.3.1 Applied procedures / Limit

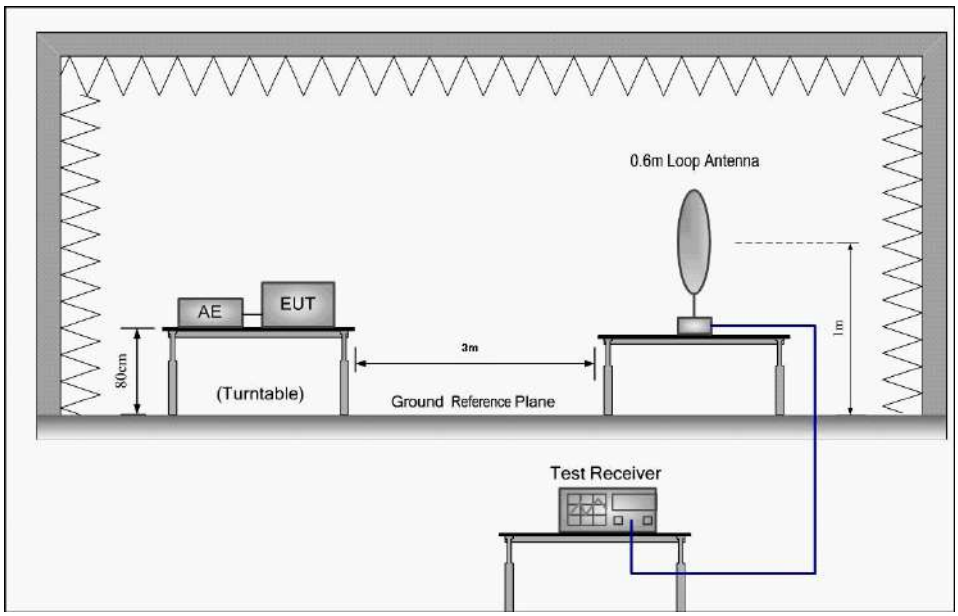
15.247(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that 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)
	µV/m	dBµV/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:



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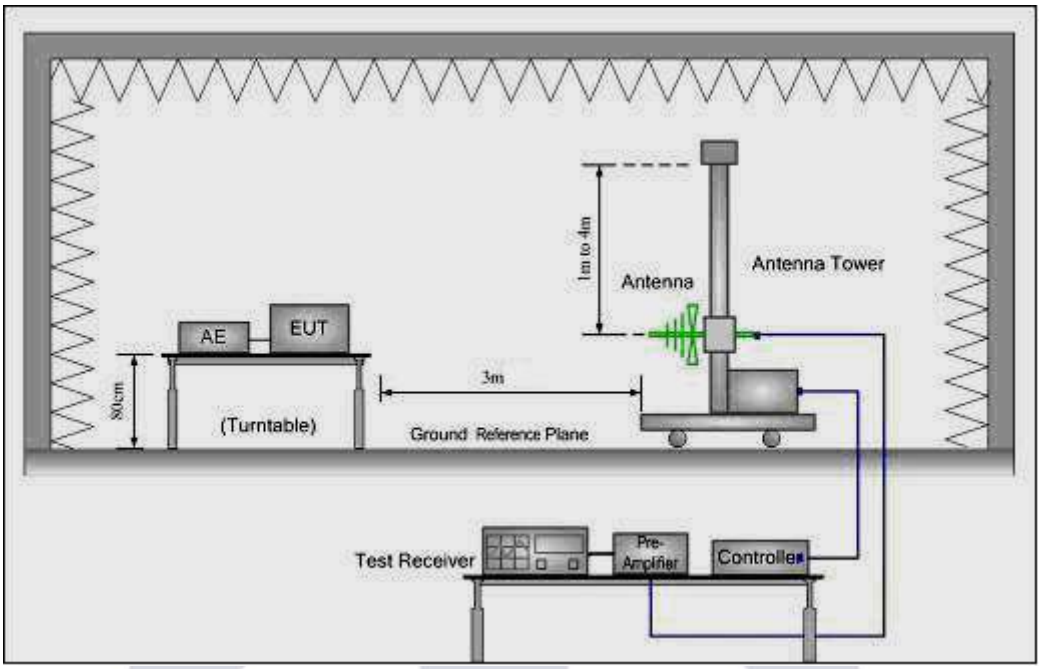
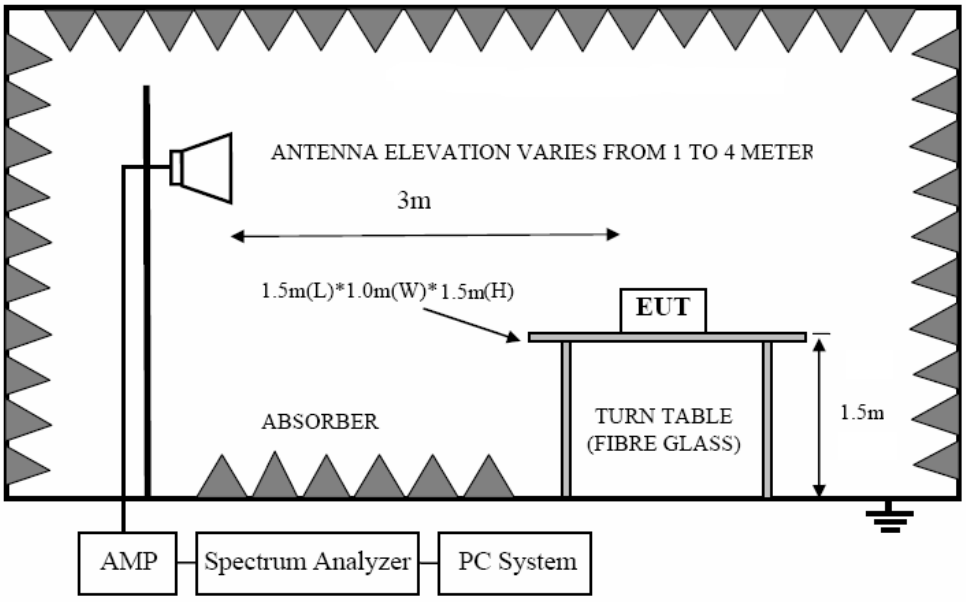
2) 30 MHz to 1 GHz emissions:



3) 1 GHz to 25 GHz emissions:



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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.

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6.3.4 Test Result

Radiated Emissions Test Data Below 30MHz

EUT:	Driveri	Model Name. :	D-450
Temperature:	25.4 ℃	Relative Humidity:	53%
Pressure:	1010hPa	Test Date :	2023-08-11
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 ℃	Relative Humidity:	53%
Pressure:	1010hPa	Test Date :	2023-08-11
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.		

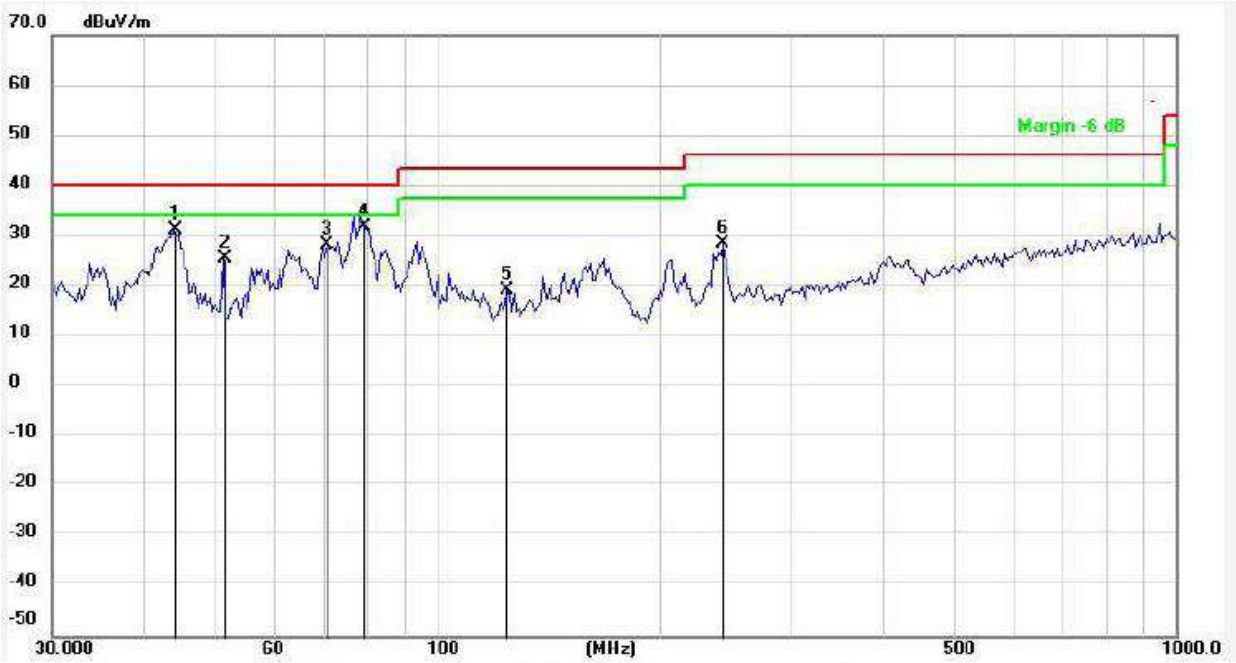
Test at Channel 00 (2.402 GHz) in transmitting status

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

Vertical:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

No.	Frequency (MHz)	Factor (dBuV/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	43.8452	-11.74	42.99	31.25	40.00	-8.75	QP
2	51.1756	-11.79	37.35	25.56	40.00	-14.44	QP
3	70.7047	-16.19	44.24	28.05	40.00	-11.95	QP
4	79.6764	-16.16	48.01	31.85	40.00	-8.15	QP
5	124.0501	-14.53	33.72	19.19	43.50	-24.31	QP
6	243.5431	-10.62	38.95	28.33	46.00	-17.67	QP

Measurement Level = Reading Level + Factor

Factor= Ant Factor + Cable Loss - Pre-amplifier

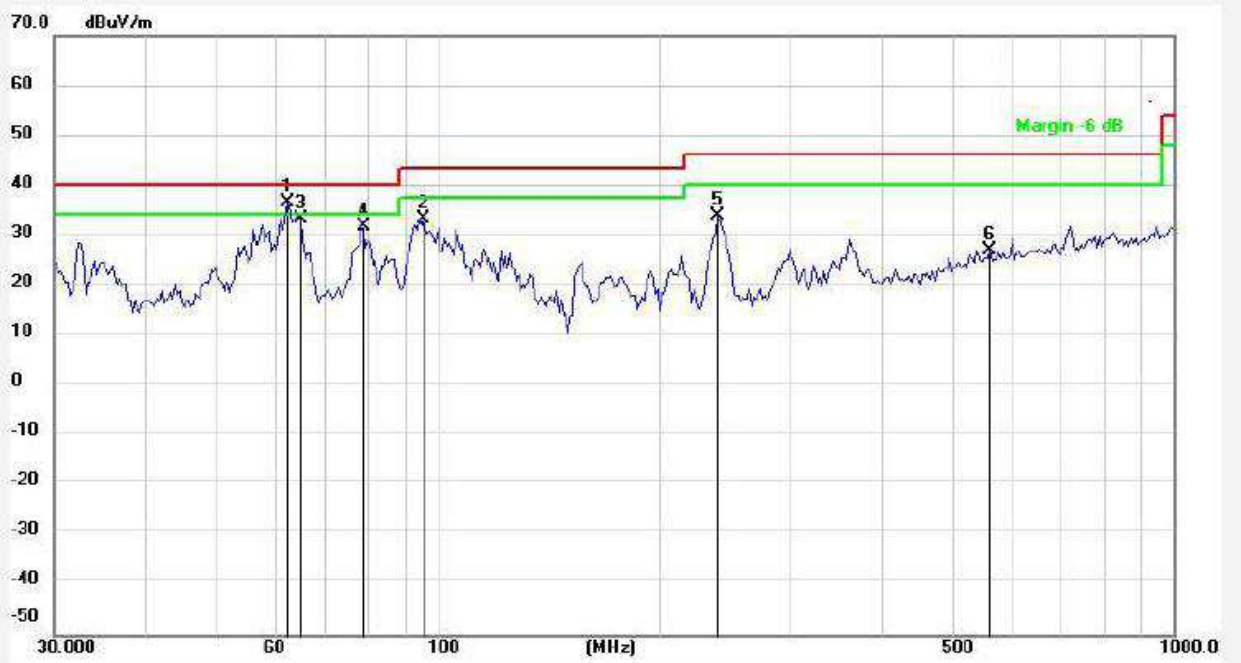
Test at Channel 00 (2.402 GHz) in transmitting status

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

Horizontal:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

No.	Frequency (MHz)	Factor (dBuV/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	62.3038	-11.21	47.75	36.54	40.00	-3.46	QP
2	95.6485	-9.93	43.28	33.35	43.50	-10.15	QP
3	64.9869	-12.25	45.36	33.11	40.00	-6.89	QP
4	78.5645	-14.17	45.94	31.77	40.00	-8.23	QP
5	240.1442	-8.80	42.79	33.99	46.00	-12.01	QP
6	562.0143	0.85	26.14	26.99	46.00	-19.01	QP

Measurement Level = Reading Level + Factor

Factor= Ant Factor + Cable Loss - Pre-amplifier

Radiated Emissions Test Data Above 1GHz

EUT:	Driveri	Model Name. :	D-450
Temperature:	25.4 ℃	Relative Humidity:	53%
Pressure:	1010hPa	Test Date :	2023-08-11
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.		

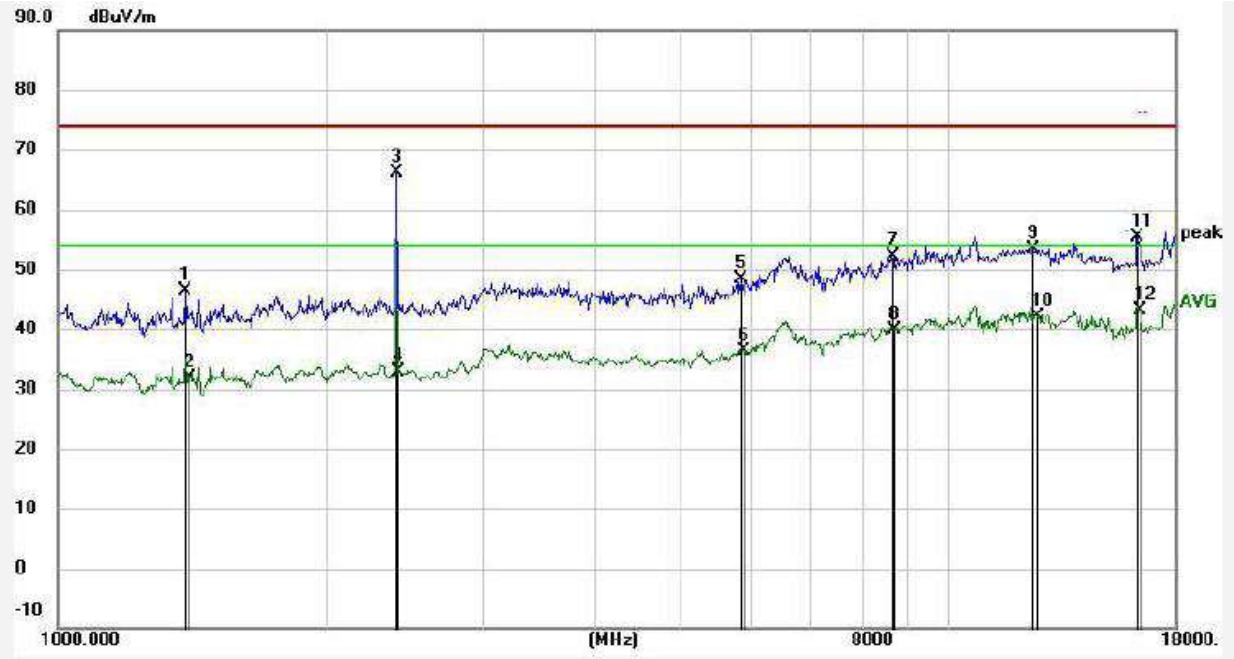
Test at Channel 00 (2.402 GHz) in transmitting status (Worst Case)

1000 MHz~18000 MHz Spurious Emissions .Quasi-Peak Measurement

Vertical:

Peak scan

Level (dBμV/m)



No.	Frequency (MHz)	Factor (dBuV/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	1390.276	-5.19	51.55	46.36	74.00	-27.64	peak
2	1402.384	-5.15	36.92	31.77	54.00	-22.23	AVG
3	2400.753	-1.44	67.46	66.02	74.00	-7.98	peak
4	2407.703	-1.43	34.34	32.91	54.00	-21.09	AVG
5	5847.517	5.09	43.38	48.47	74.00	-25.53	peak
6	5881.418	5.18	31.32	36.50	54.00	-17.50	AVG
7	8638.400	13.05	39.06	52.11	74.00	-21.89	peak
8	8688.481	13.13	26.85	39.98	54.00	-14.02	AVG
9	12433.621	15.91	37.35	53.26	74.00	-20.74	peak
10	12578.206	16.12	25.92	42.04	54.00	-11.96	AVG
11	16315.231	18.75	36.63	55.38	74.00	-18.62	peak
12	16362.457	19.05	24.16	43.21	54.00	-10.79	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.

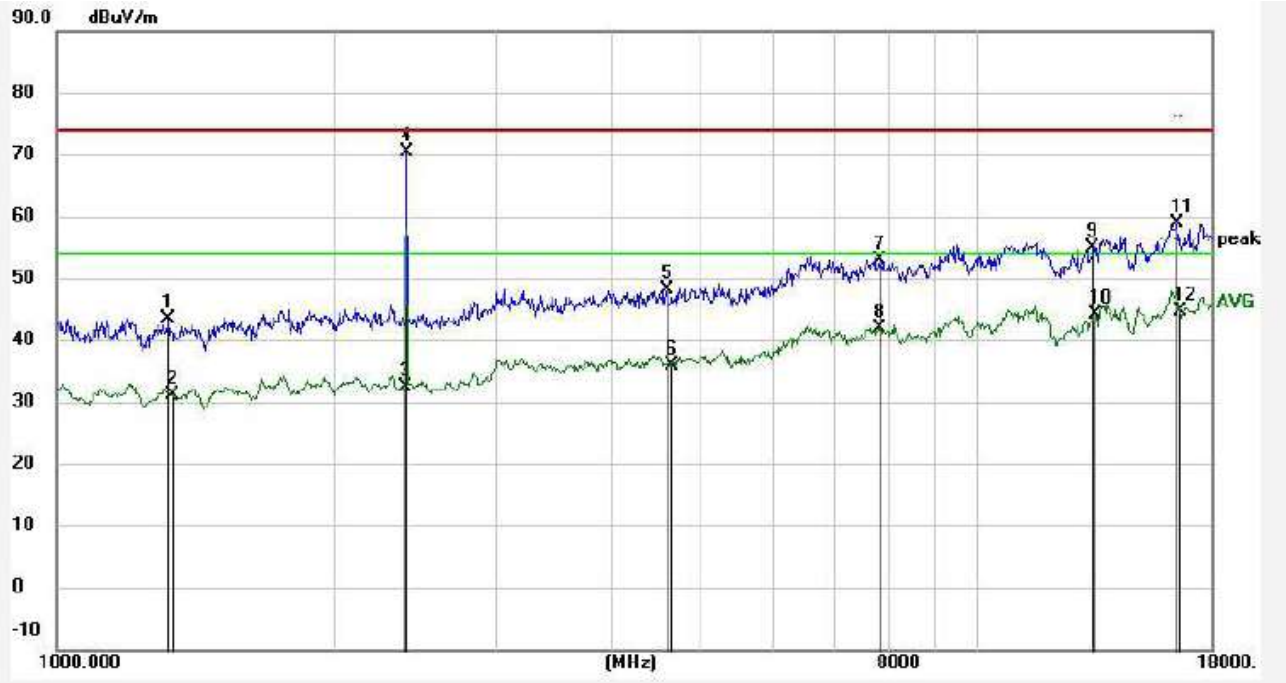
Test at Channel 00 (2.402 GHz) in transmitting status

1000 MHz~18000 MHz Spurious Emissions .Quasi-Peak Measurement

Horizontal:

Peak scan

Level (dBµV/m)



No.	Frequency (MHz)	Factor (dBuV/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	1323.614	-5.42	48.86	43.44	74.00	-30.56	peak
2	1331.288	-5.39	36.58	31.19	54.00	-22.81	AVG
3	2393.824	-1.45	33.74	32.29	54.00	-21.71	AVG
4	2400.753	-1.44	71.88	70.44	74.00	-3.56	peak
5	4600.276	2.66	45.40	48.06	74.00	-25.94	peak
6	4640.339	2.76	33.12	35.88	54.00	-18.12	AVG
7	7829.860	12.69	40.20	52.89	74.00	-21.11	peak
8	7852.524	12.62	29.33	41.95	54.00	-12.05	AVG
9	13365.322	18.81	36.11	54.92	74.00	-19.08	peak
10	13404.009	18.99	25.23	44.22	54.00	-9.78	AVG
11	16457.318	19.65	39.13	58.78	74.00	-15.22	peak
12	16600.642	20.12	24.61	44.73	54.00	-9.27	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.

Radiated Emissions Test Data Below 1GHz

EUT:	Driveri	Model Name. :	D-450
Temperature:	25.4 ℃	Relative Humidity:	53%
Pressure:	1010hPa	Test Date :	2023-08-11
Test Mode :	TX (1Mbps) CH39 (2441MHz)	Test Voltage :	110V AC, 60Hz
Measurement Distance	3 m	Frequency Range	30MHz to 1GHz
RBW/VBW	100KHz / 300KHz for spectrum, RBW=120KHz for receiver.		

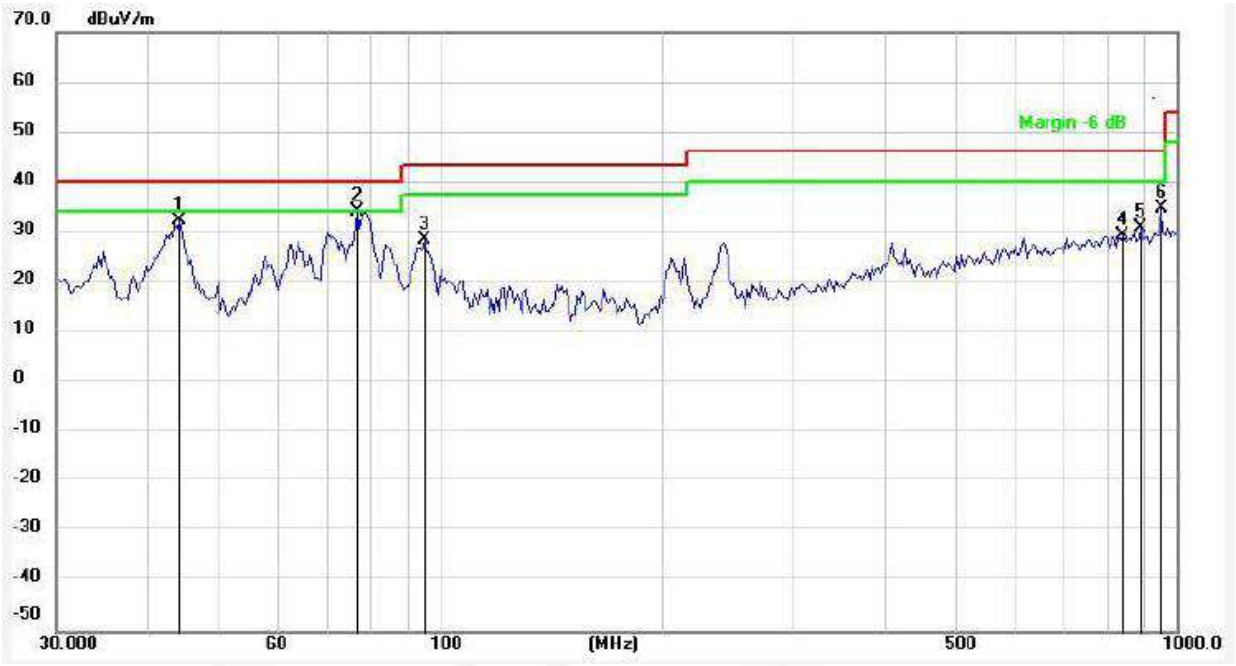
Test at Channel 39 (2.441 GHz) in transmitting status

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

Vertical:

Peak scan

Level (dBµV/m)



Quasi-peak measurement

No.	Frequency (MHz)	Factor (dBuV/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	44.1543	-11.73	44.16	32.43	40.00	-7.57	QP
2	76.9255	-16.17	50.47	34.30	40.00	-5.70	QP
3	94.9787	-12.02	40.57	28.55	43.50	-14.95	QP
4	844.8027	2.44	26.85	29.29	46.00	-16.71	QP
5	893.6556	3.17	27.78	30.95	46.00	-15.05	QP
6	952.0000	3.84	30.88	34.72	46.00	-11.28	QP

Measurement Level = Reading Level + Factor

Factor= Ant Factor + Cable Loss - Pre-amplifier

Plot No.174, Udyog Vihar Phase 4, Sector -18, Gurgaon -122016, Haryana, India
Contact:0124-4235350, 4145343; e-mail: info @aaemtlabs.com; Website: www.aaemtlabs.com

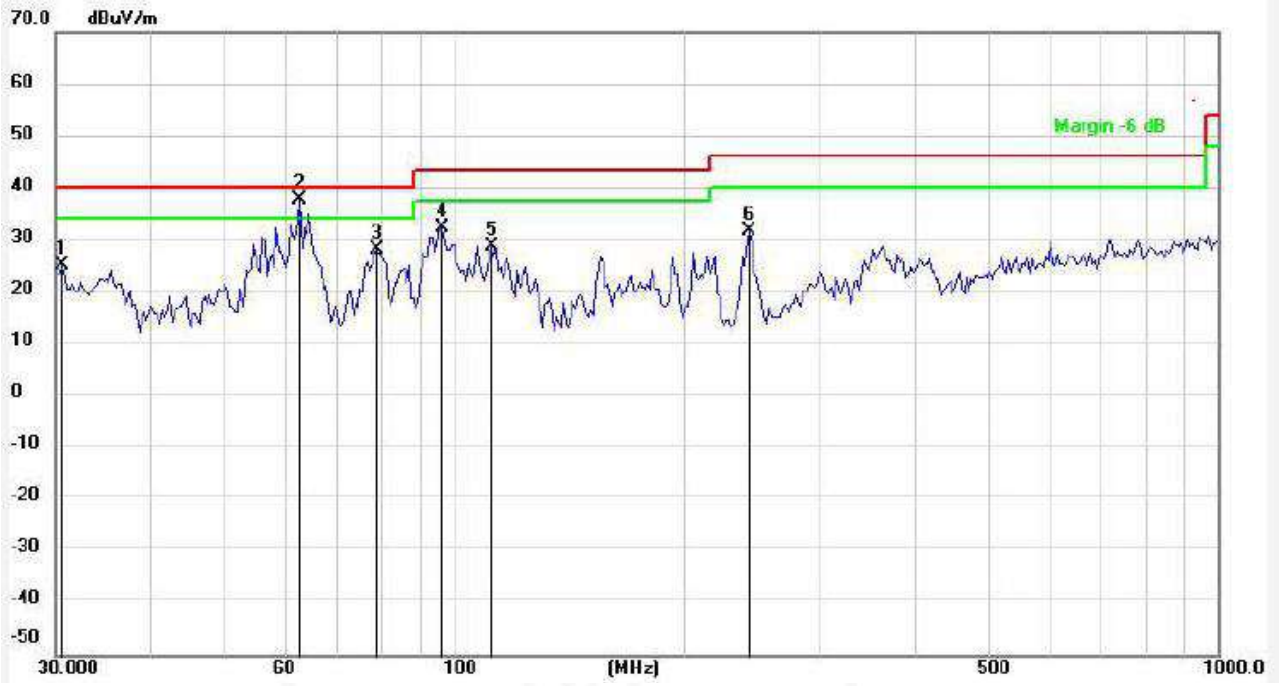
Test at Channel 39 (2.441 GHz) in transmitting status

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

Horizontal:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

No.	Frequency (MHz)	Factor (dBuV/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	30.6391	-11.20	36.28	25.08	40.00	-14.92	QP
2	62.7432	-11.38	49.11	37.73	40.00	-2.27	QP
3	79.1185	-14.16	42.39	28.23	40.00	-11.77	QP
4	96.3230	-9.83	42.11	32.28	43.50	-11.22	QP
5	111.6398	-10.50	39.37	28.87	43.50	-14.63	QP
6	243.5431	-8.62	40.30	31.68	46.00	-14.32	QP

Measurement Level = Reading Level + Factor

Factor= Ant Factor + Cable Loss - Pre-amplifier

Radiated Emissions Test Data Above 1GHz

EUT:	Driveri	Model Name. :	D-450
Temperature:	25.4 ℃	Relative Humidity:	53%
Pressure:	1010hPa	Test Date :	2023-08-11
Test Mode :	TX (1Mbps) CH39 (2441MHz)	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.		

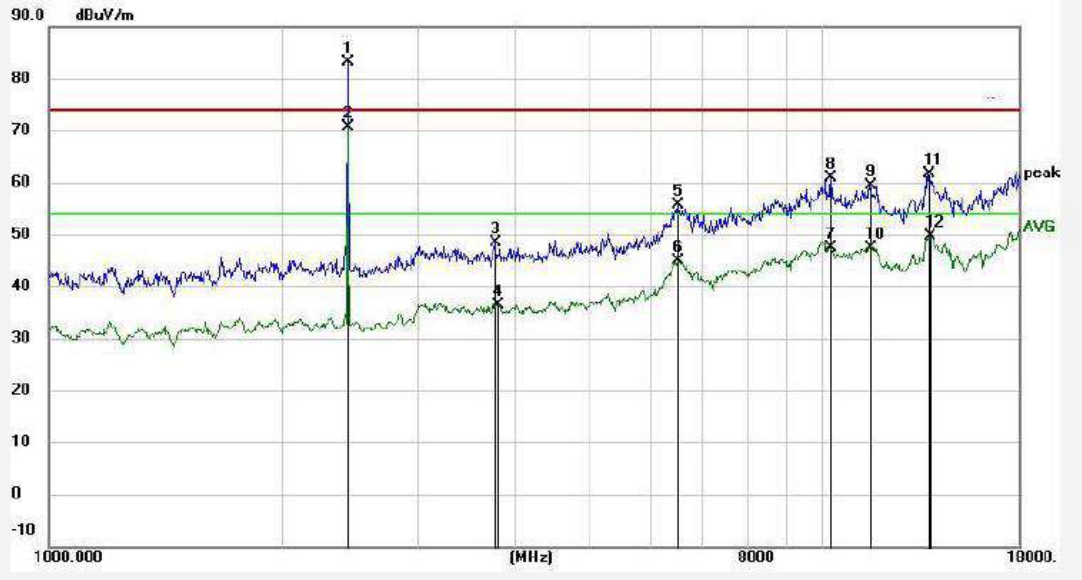
Test at Channel 39 (2.441 GHz) in transmitting status

1000 MHz~18000 MHz Spurious Emissions .Quasi-Peak Measurement

Vertical:

Peak scan

Level (dBμV/m)



No.	Frequency (MHz)	Factor (dBuV/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2435.701	-1.40	84.43	83.03	74.00	9.03	peak
2	2435.701	-1.40	72.00	70.60	54.00	16.60	AVG
3	3779.422	1.27	47.09	48.36	74.00	-25.64	peak
4	3801.333	1.32	35.01	36.33	54.00	-17.67	AVG
5	6507.536	12.12	43.46	55.58	74.00	-18.42	peak
6	6507.536	12.12	32.79	44.91	54.00	-9.09	AVG
7	10244.585	15.21	32.05	47.26	54.00	-6.74	AVG
8	10274.238	15.26	45.52	60.78	74.00	-13.22	peak
9	11533.485	16.28	43.21	59.49	74.00	-14.51	peak
10	11533.485	16.28	31.12	47.40	54.00	-6.60	AVG
11	13717.561	19.66	42.09	61.75	74.00	-12.25	peak
12	13837.024	19.78	29.88	49.66	54.00	-4.34	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.

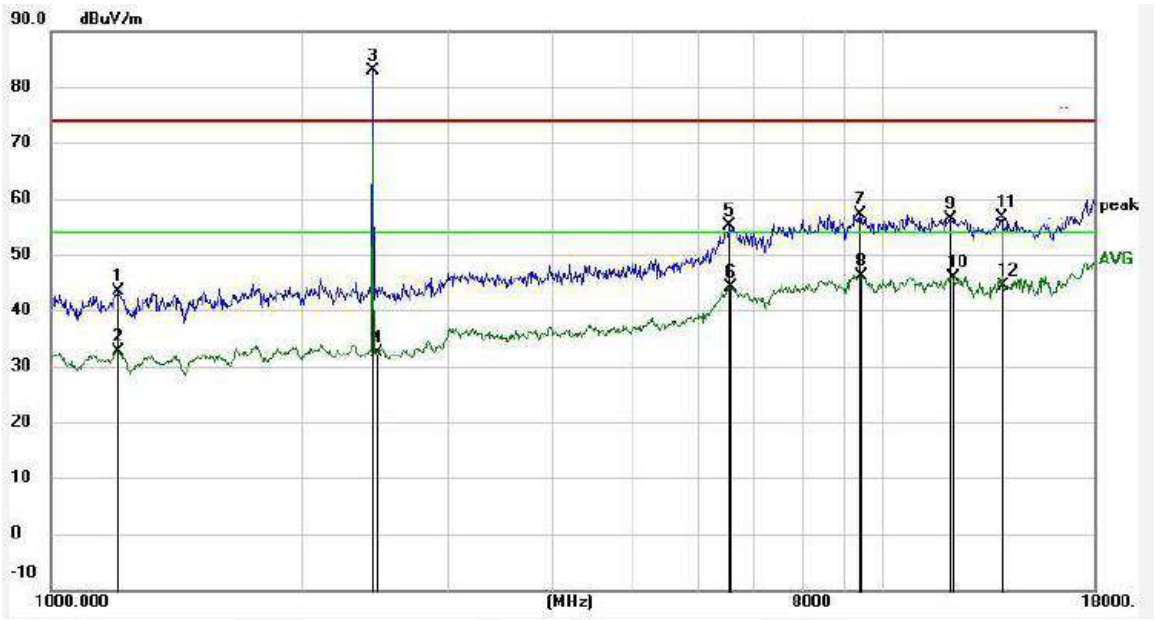
Test at Channel 39 (2.441 GHz) in transmitting status

1000 MHz~18000 MHz Spurious Emissions .Quasi-Peak Measurement

Horizontal:

Peak scan

Level (dBµV/m)



No.	Frequency (MHz)	Factor (dBuV/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	1203.199	-5.82	49.17	43.35	74.00	-30.65	peak
2	1203.199	-5.82	38.45	32.63	54.00	-21.37	AVG
3	2435.701	-1.40	84.36	82.96	74.00	8.96	peak
4	2456.913	-1.38	33.66	32.28	54.00	-21.72	AVG
5	6545.263	12.22	42.99	55.21	74.00	-18.79	peak
6	6564.209	12.27	31.82	44.09	54.00	-9.91	AVG
7	9393.689	14.15	42.96	57.11	74.00	-16.89	peak
8	9448.149	14.23	31.97	46.20	54.00	-7.80	AVG
9	12079.387	15.84	40.63	56.47	74.00	-17.53	peak
10	12149.417	15.85	30.09	45.94	54.00	-8.06	AVG
11	13917.244	19.86	36.66	56.52	74.00	-17.48	peak
12	13957.529	19.90	24.50	44.40	54.00	-9.60	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.

Radiated Emissions Test Data Below 1GHz

EUT:	Driveri	Model Name. :	D-450
Temperature:	25.4 ℃	Relative Humidity:	53%
Pressure:	1010hPa	Test Date :	2023-08-11
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.		

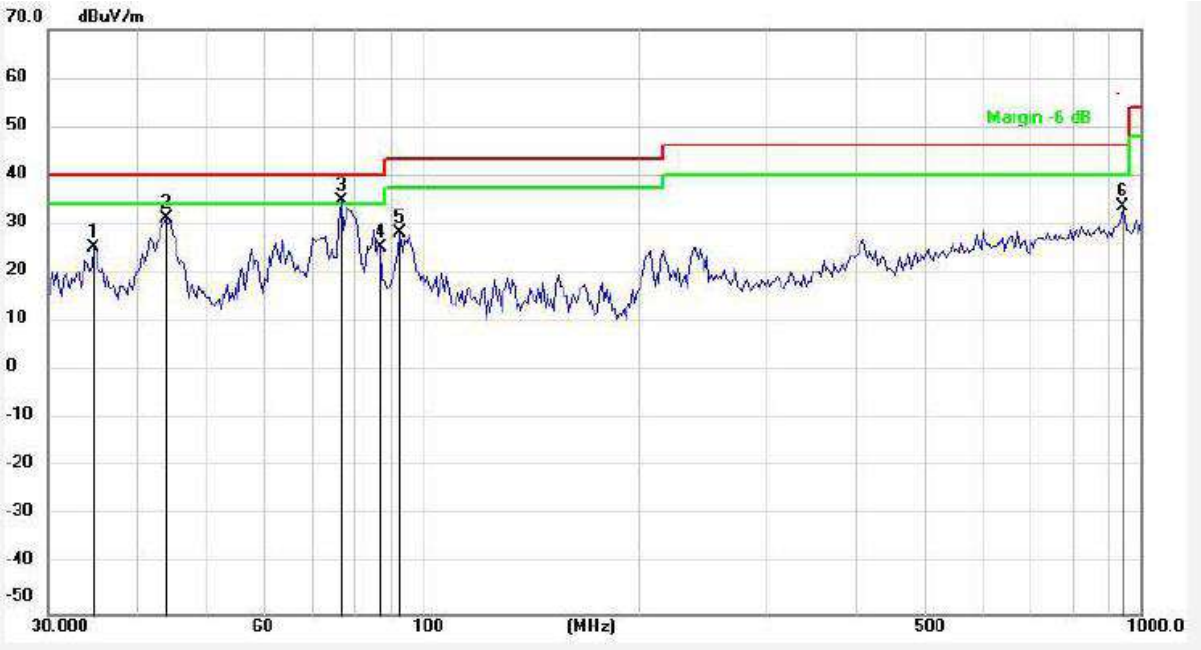
Test at Channel 78 (2.480 GHz) in transmitting status

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

Vertical:

Peak scan

Level (dBμV/m)



No.	Frequency (MHz)	Factor (dBuV/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	34.7704	-13.09	38.15	25.06	40.00	-14.94	QP
2	43.8451	-11.74	42.93	31.19	40.00	-8.81	QP
3	76.9255	-16.17	50.89	34.72	40.00	-5.28	QP
4	87.2979	-13.66	38.96	25.30	40.00	-14.70	QP
5	92.9974	-12.30	40.49	28.19	43.50	-15.31	QP
6	945.3336	3.78	29.79	33.57	46.00	-12.43	QP

Quasi-peak measurement

Measurement Level = Reading Level + Factor

Factor= Ant Factor + Cable Loss - Pre-amplifier

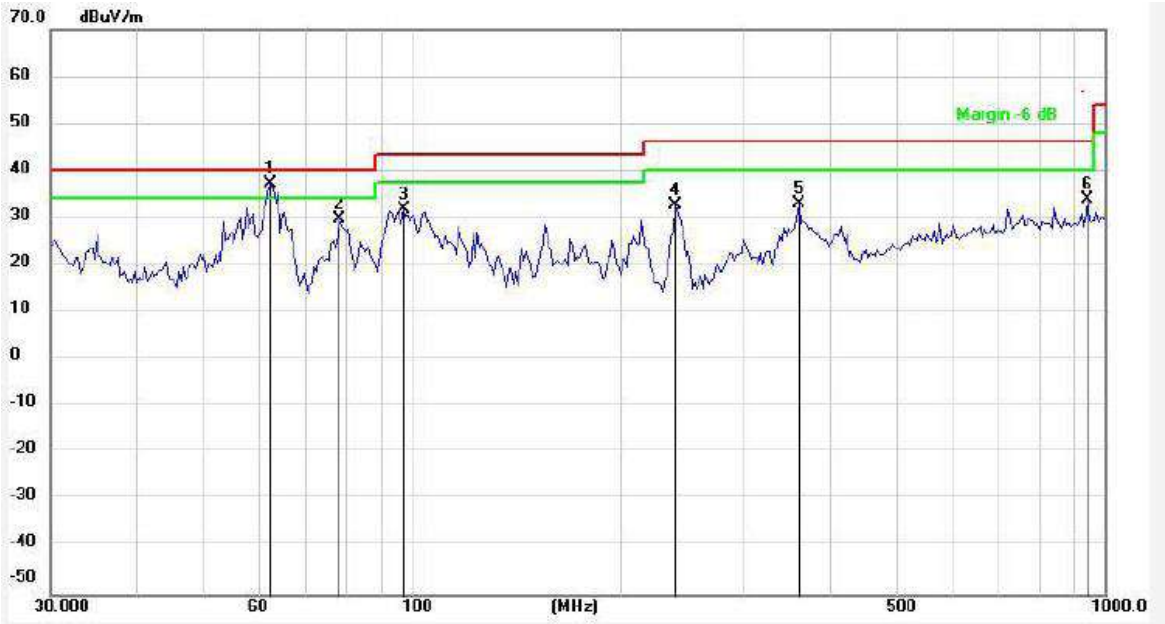
Test at Channel 78 (2.480 GHz) in transmitting status

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

Horizontal:

Peak scan

Level (dBμV/m)



No.	Frequency (MHz)	Factor (dBuV/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	62.3038	-11.21	48.25	37.04	40.00	-2.96	QP
2	78.5644	-14.17	43.96	29.79	40.00	-10.21	QP
3	97.0023	-9.73	41.63	31.90	43.50	-11.60	QP
4	240.1442	-8.80	41.41	32.61	46.00	-13.39	QP
5	360.9774	-4.71	37.75	33.04	46.00	-12.96	QP
6	945.3336	5.78	28.07	33.85	46.00	-12.15	QP

Quasi-peak measurement

Measurement Level = Reading Level + Factor

Factor= Ant Factor + Cable Loss - Pre-amplifier

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Contact:0124-4235350, 4145343; e-mail: info @aaemtlabs.com; Website: www.aaemtlabs.com

Radiated Emissions Test Data Above 1GHz

EUT:	Driveri	Model Name. :	D-450
Temperature:	25.4 ℃	Relative Humidity:	53%
Pressure:	1010hPa	Test Date :	2023-08-11
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.		

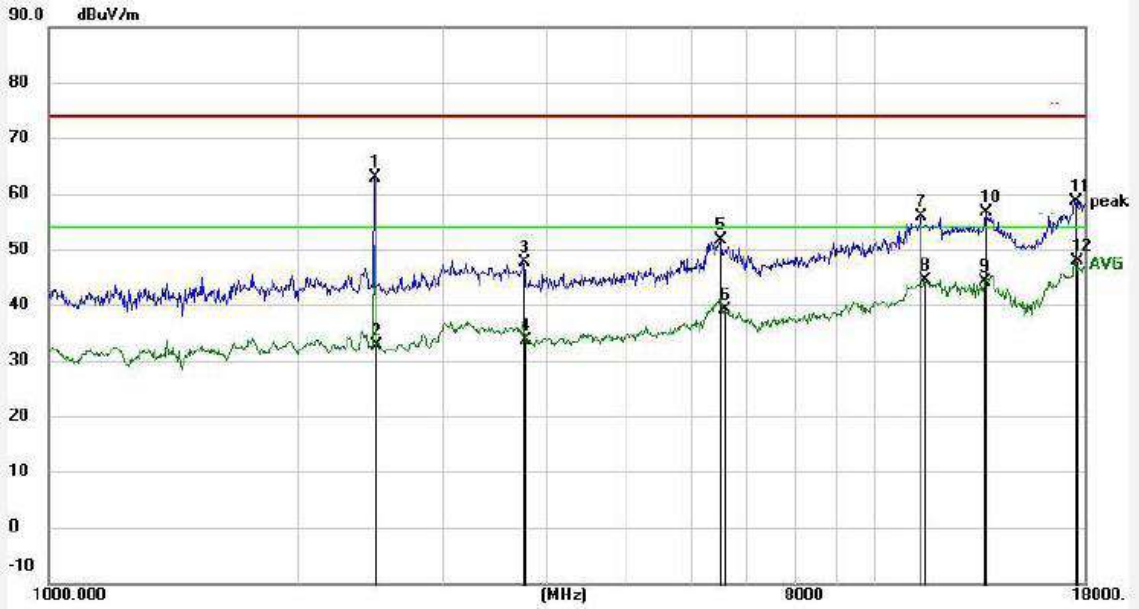
Test at Channel 78 (2.480 GHz) in transmitting status

1000 MHz~18000 MHz Spurious Emissions .Quasi-Peak Measurement

Vertical:

Peak scan

Level (dBμV/m)



No.	Frequency (MHz)	Factor (dBuV/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2478.310	-1.37	64.35	62.98	74.00	-11.02	peak
2	2492.678	-1.36	34.07	32.71	54.00	-21.29	AVG
3	3757.637	1.23	46.43	47.66	74.00	-26.34	peak
4	3790.361	1.30	32.26	33.56	54.00	-20.44	AVG
5	6507.536	12.12	39.58	51.70	74.00	-22.30	peak
6	6583.209	12.32	26.82	39.14	54.00	-14.86	AVG
7	11368.003	16.20	39.64	55.84	74.00	-18.16	peak
8	11500.197	16.31	28.13	44.44	54.00	-9.56	AVG
9	13599.128	19.54	24.60	44.14	54.00	-9.86	AVG
10	13638.492	19.58	37.02	56.60	74.00	-17.40	peak
11	17487.180	21.93	36.63	58.56	74.00	-15.44	peak
12	17537.798	21.94	25.84	47.78	54.00	-6.22	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.

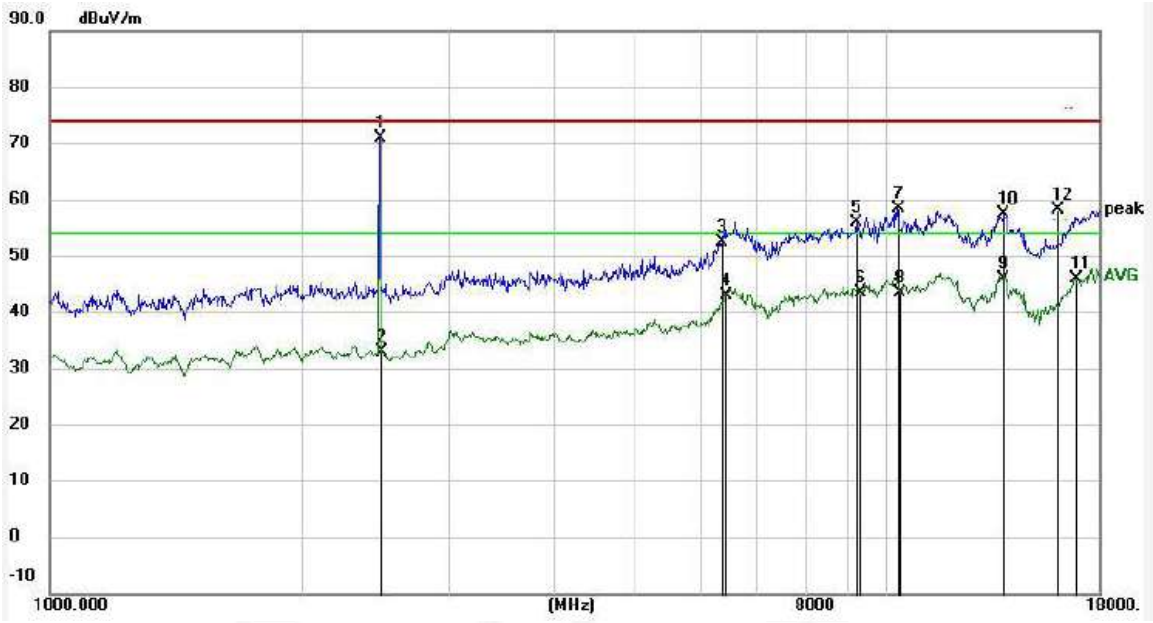
Test at Channel 78 (2.480 GHz) in transmitting status

1000 MHz~18000 MHz Spurious Emissions .Quasi-Peak Measurement

Horizontal:

Peak scan

Level (dBμV/m)



No.	Frequency (MHz)	Factor (dBuV/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2478.310	-1.37	72.33	70.96	74.00	-3.04	peak
2	2492.678	-1.36	34.19	32.83	54.00	-21.17	AVG
3	6358.789	10.21	42.20	52.41	74.00	-21.59	peak
4	6432.733	11.21	31.70	42.91	54.00	-11.09	AVG
5	9205.540	13.89	41.98	55.87	74.00	-18.13	peak
6	9285.710	13.99	29.47	43.46	54.00	-10.54	AVG
7	10303.978	15.31	43.12	58.43	74.00	-15.57	peak
8	10393.713	15.45	27.92	43.37	54.00	-10.63	AVG
9	13757.267	19.70	26.12	45.82	54.00	-8.18	AVG
10	13837.024	19.78	37.65	57.43	74.00	-16.57	peak
11	16842.294	20.61	25.15	45.76	54.00	-8.24	AVG
12	18000.000	21.68	36.33	58.01	74.00	-15.99	peak

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 3rd 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.
Test result: The unit does meet the FCC requirements.

6.3.5 TEST RESULTS (Restricted Bands Requirements)

EUT:	Driveri	Model Name. :	D-450
Temperature:	25.4 ℃	Relative Humidity:	53%
Pressure:	1010hPa	Test Date :	2023-08-11
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	43.64	32.69	-5.79	37.85	26.90	74	54
	H	2390	42.81	34.49	-5.79	37.02	28.70	74	54
	V	2483.5	44.09	33.04	-4.98	39.11	28.06	74	54
	H	2483.5	43.67	34.18	-4.98	38.69	29.20	74	54
Data rate 2Mbps	V	2390	46.79	32.68	-5.79	41.00	26.89	74	54
	H	2390	45.00	34.96	-5.79	39.21	29.17	74	54
	V	2483.5	45.72	33.85	-4.98	40.74	28.87	74	54
	H	2483.5	45.14	33.22	-4.98	40.16	28.24	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 20dBbandwidth of hopping channel shell be a minimum limit for the hopping channel separation.

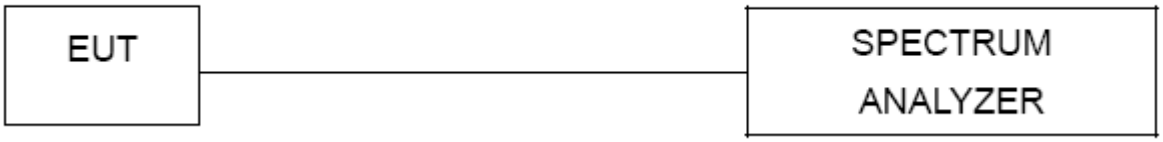
6.4.2 Test procedure

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

6.4.3 Deviation from standard

No deviation.

6.4.4 Test setup



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6.4.5 Test results

EUT:	Driveri	Model Name. :	D-450
Temperature:	25.3 ℃	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	1042	N/A	Pass
	Middle	2441	1040	N/A	Pass
	High	2480	1040	N/A	Pass
2Mbps	Low	2402	1324	N/A	Pass
	Middle	2441	1332	N/A	Pass
	High	2480	1320	N/A	Pass
3Mbps	Low	2402	1268	N/A	Pass
	Middle	2441	1268	N/A	Pass
	High	2480	1262	N/A	Pass

CH00-1Mbps

CH 39-1Mbps

CH 78-1Mbps

CH 00-2Mbps

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CH 39-2Mbps

CH 78-2Mbps

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CH00-3Mbps

CH 39-3Mbps

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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) ≥ 1% of the span, Video (or Average) Bandwidth (VBW) ≥ 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 ℃	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	1.000	Pass
	Middle	2441	0.990	Pass
	Highest	2480	1.004	Pass
2Mbps	Low	2402	1.002	Pass
	Middle	2441	1.000	Pass
	Highest	2480	0.998	Pass
3Mbps	Low	2402	1.002	Pass
	Middle	2441	0.994	Pass
	Highest	2480	0.840	Pass

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

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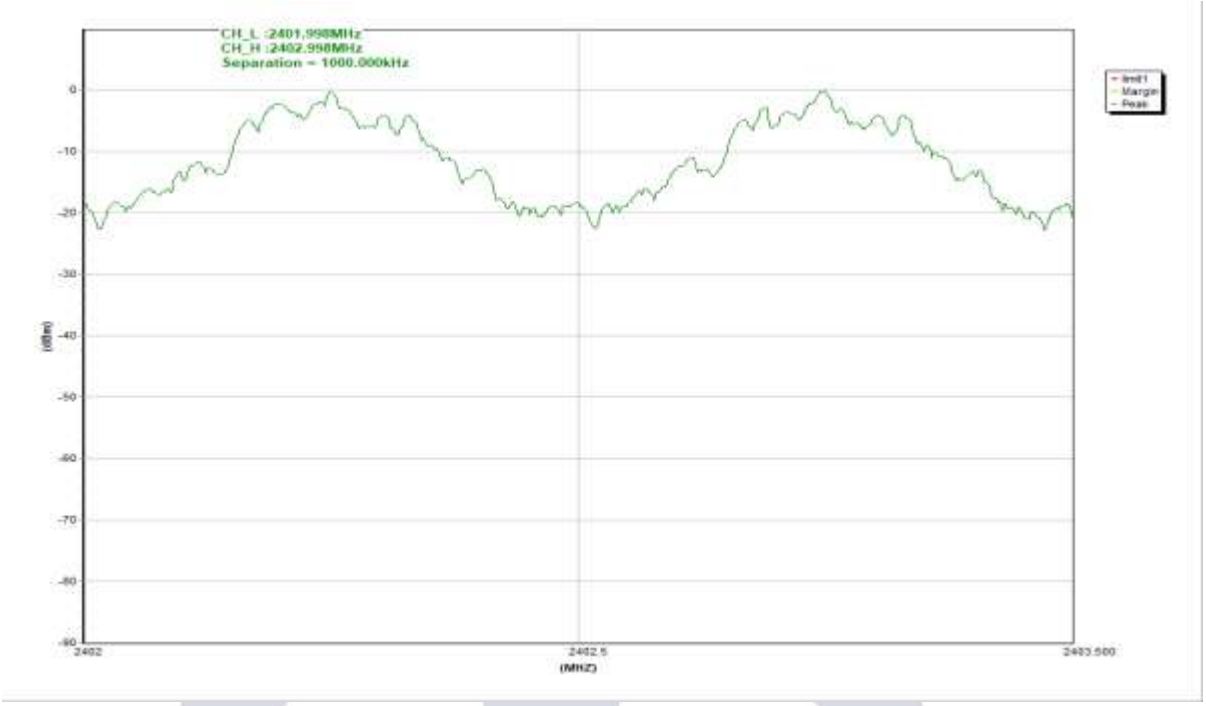
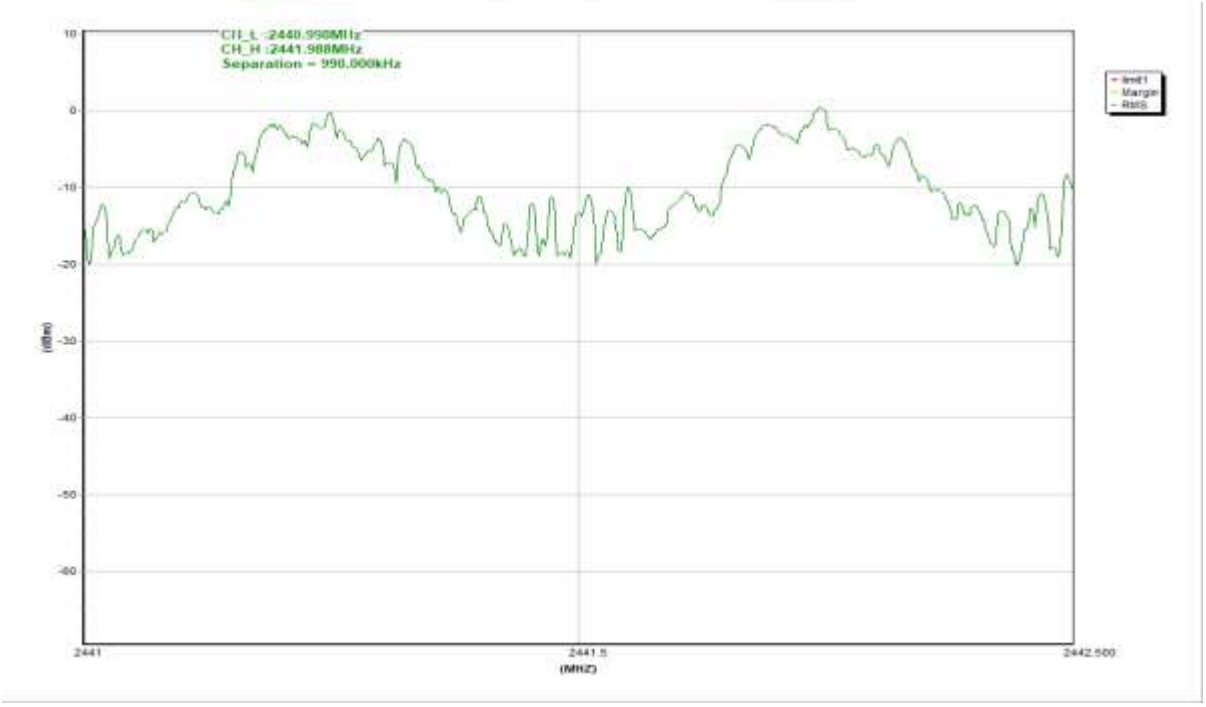
CH 00-1Mbps



CH 39-1Mbps



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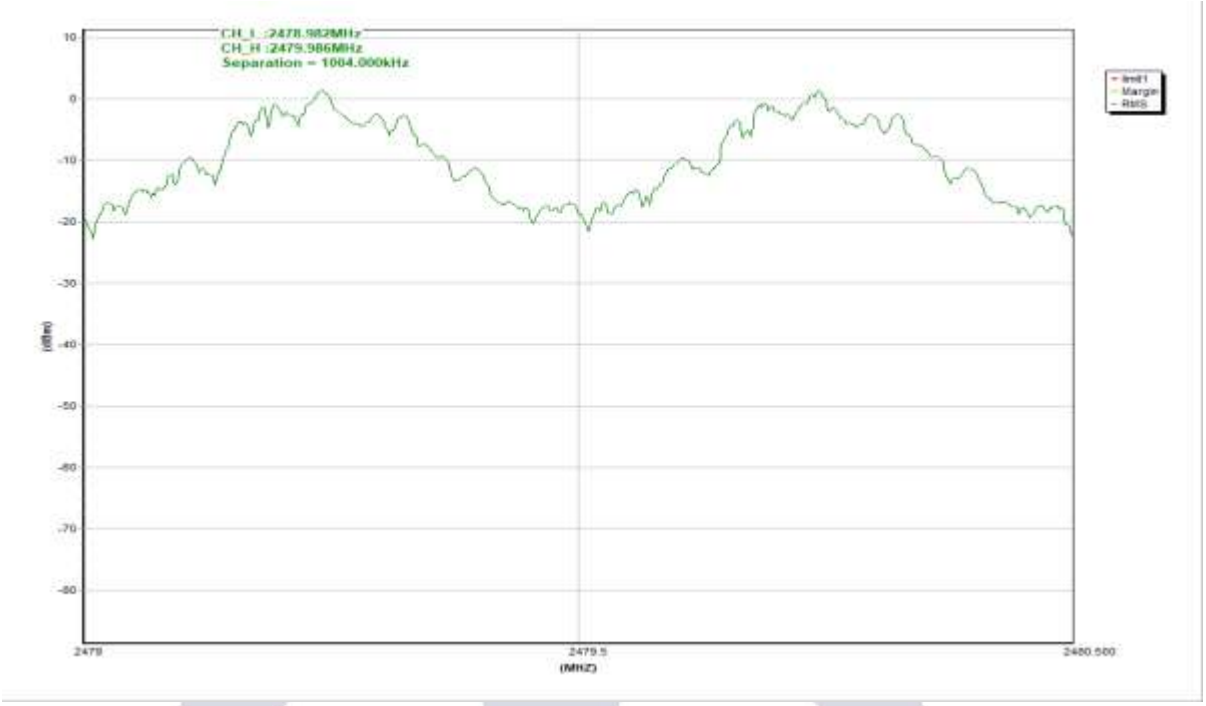

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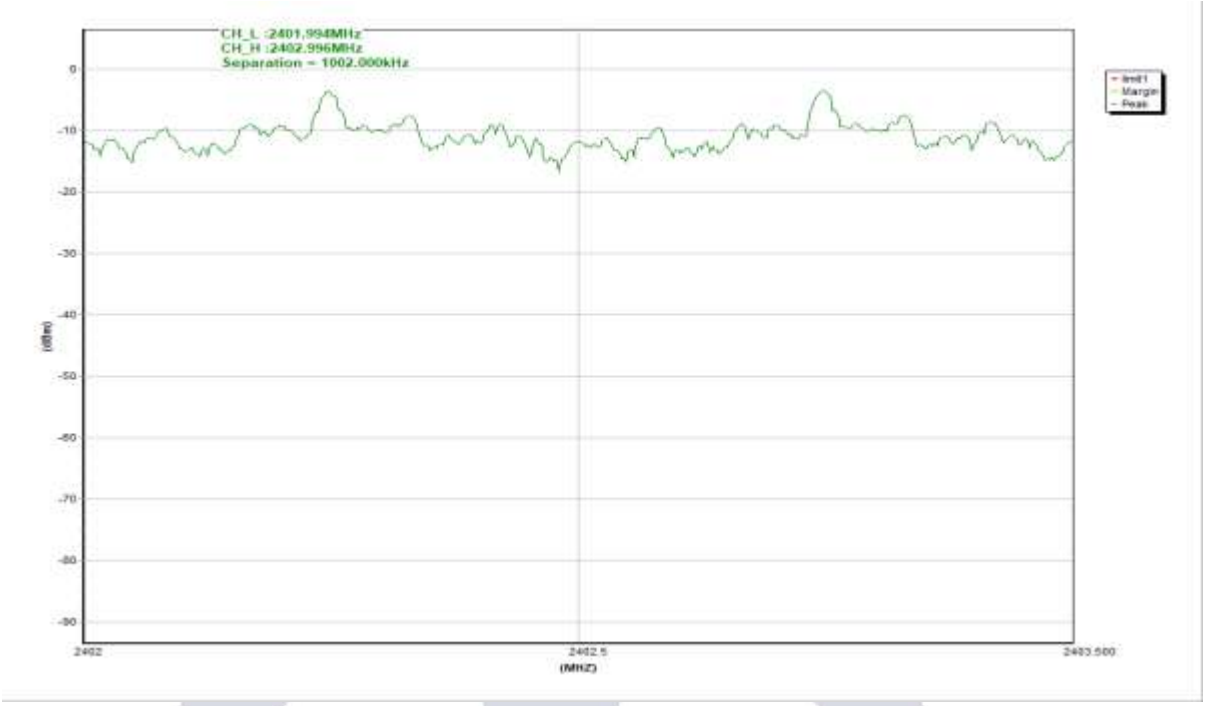
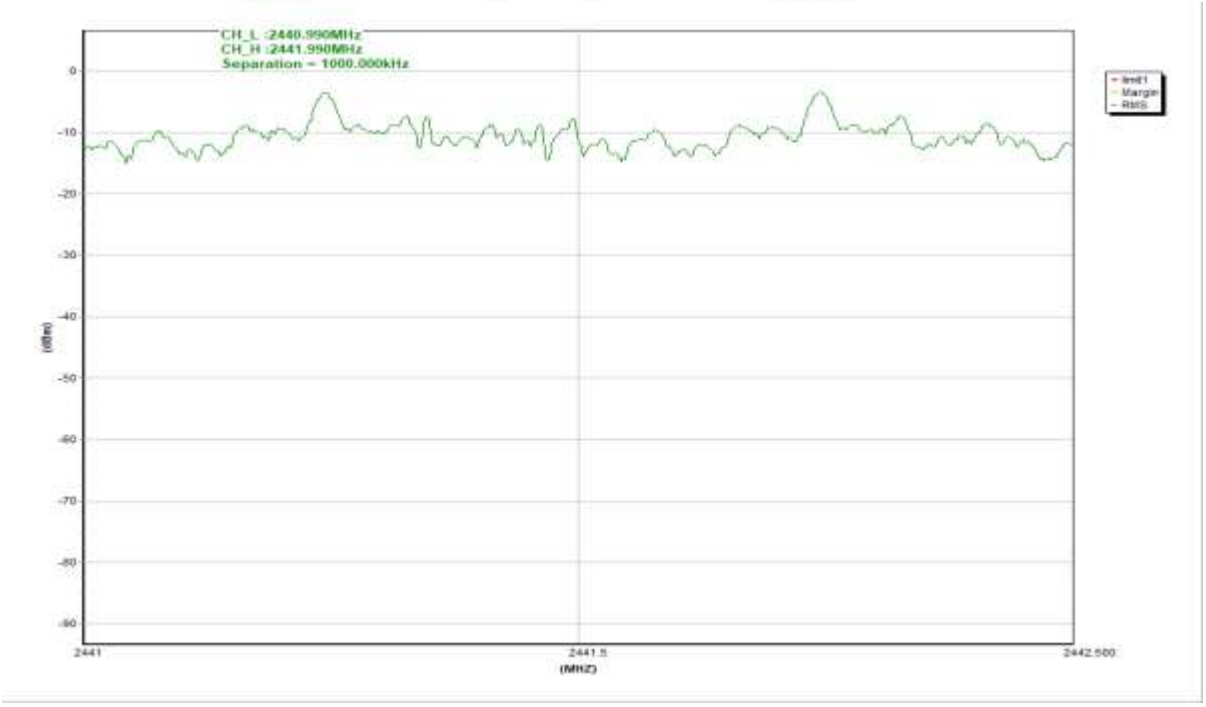
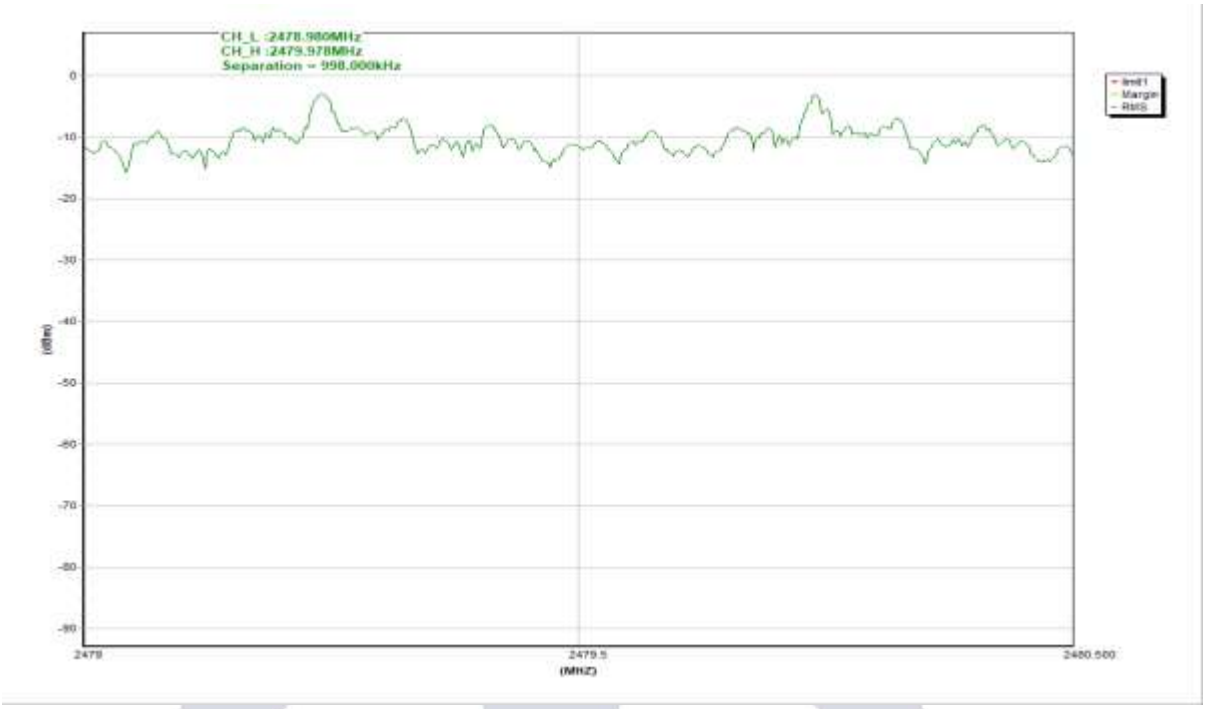
CH 00-2Mbps



CH 39-2Mbps



CH 78-2Mbps



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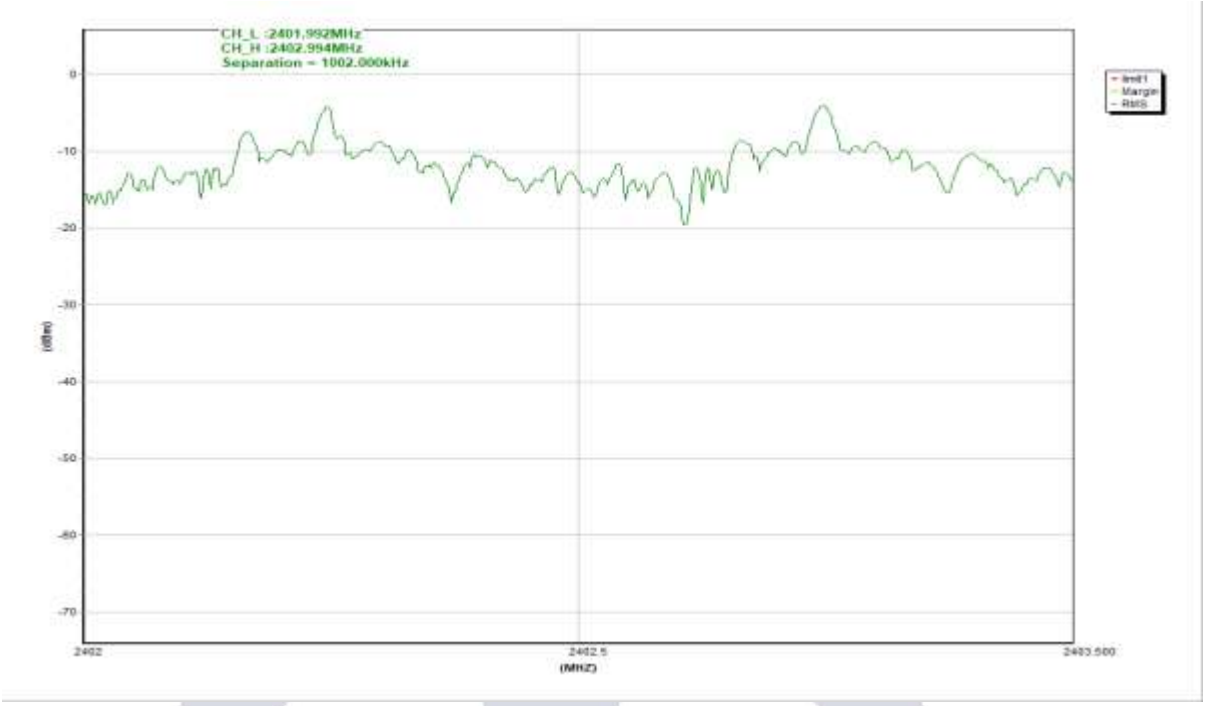
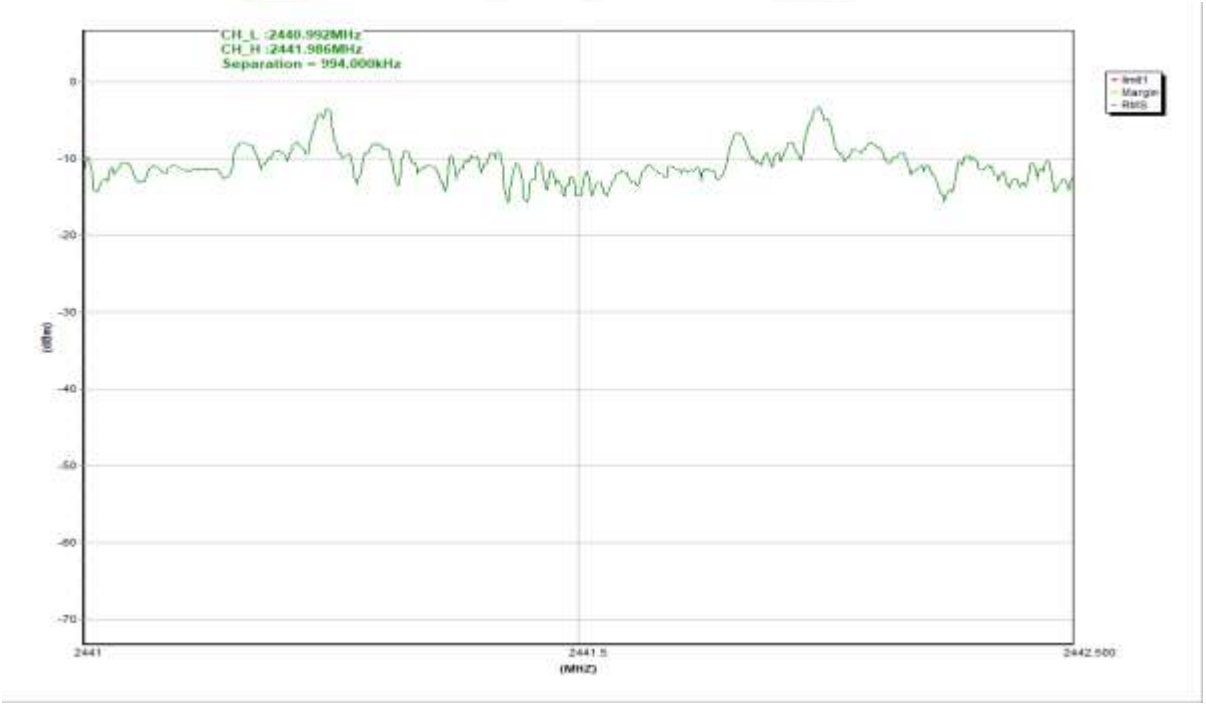
CH 00-3Mbps



CH 39-3Mbps



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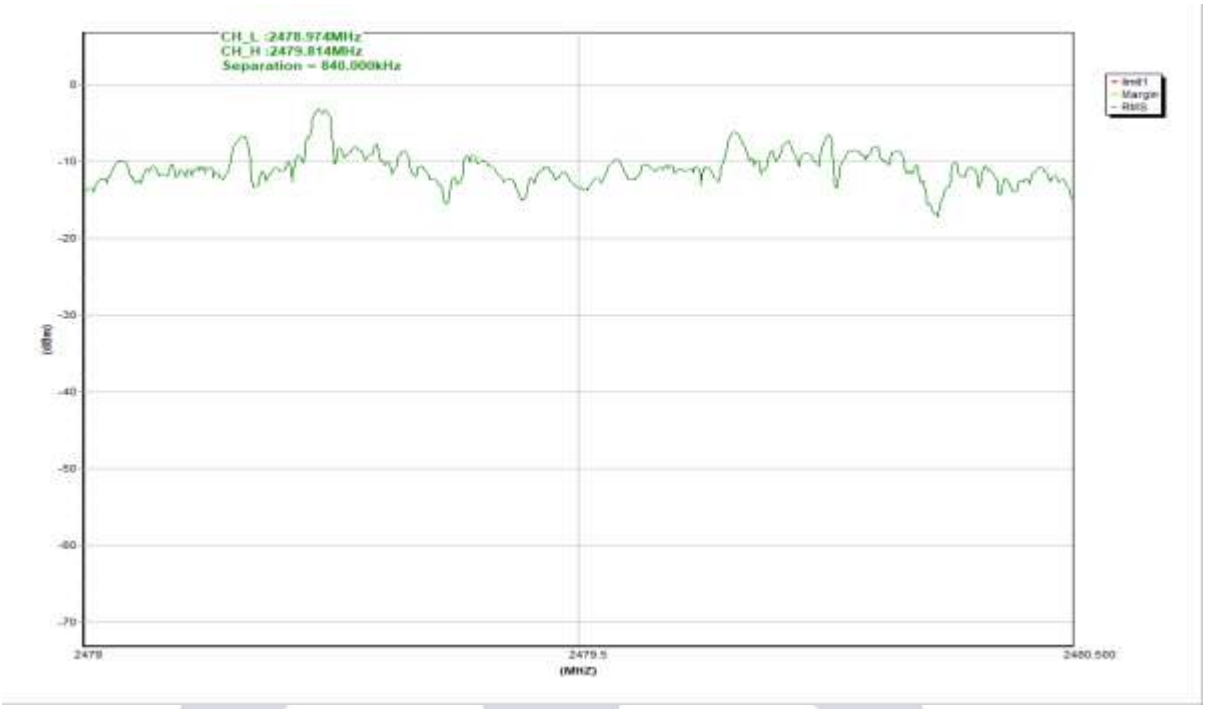
CH 78-3Mbps



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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

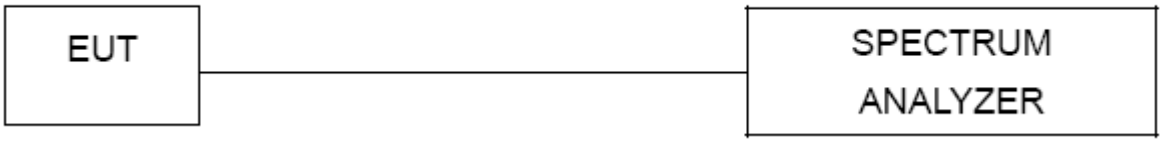
(1) Connected the antenna port to the Spectrum Analyzer , set the Spectrum Analyzer as
Span = the frequency band of operation, RBW ≥ 1% of the span, VBW ≥ RBW Sweep = auto
Detector function = peak, Trace = max hold

(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

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

1Mbps

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2Mbps

3Mbps

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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.

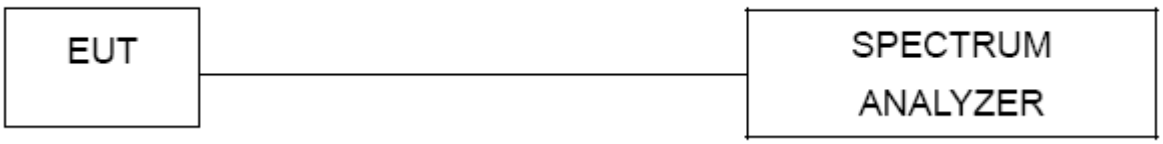
6.7.2 Test procedure

(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 ≥ 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*0.4=31.6 S
DH1 Time Slot: Reading * (1600/2)*31.6/79
DH3 Time Slot: Reading * (1600/4)*31.6/79
DH5 Time Slot: Reading * (1600/6)*31.6/79

6.7.3 Deviation from standard

No deviation.

6.7.4 Test setup

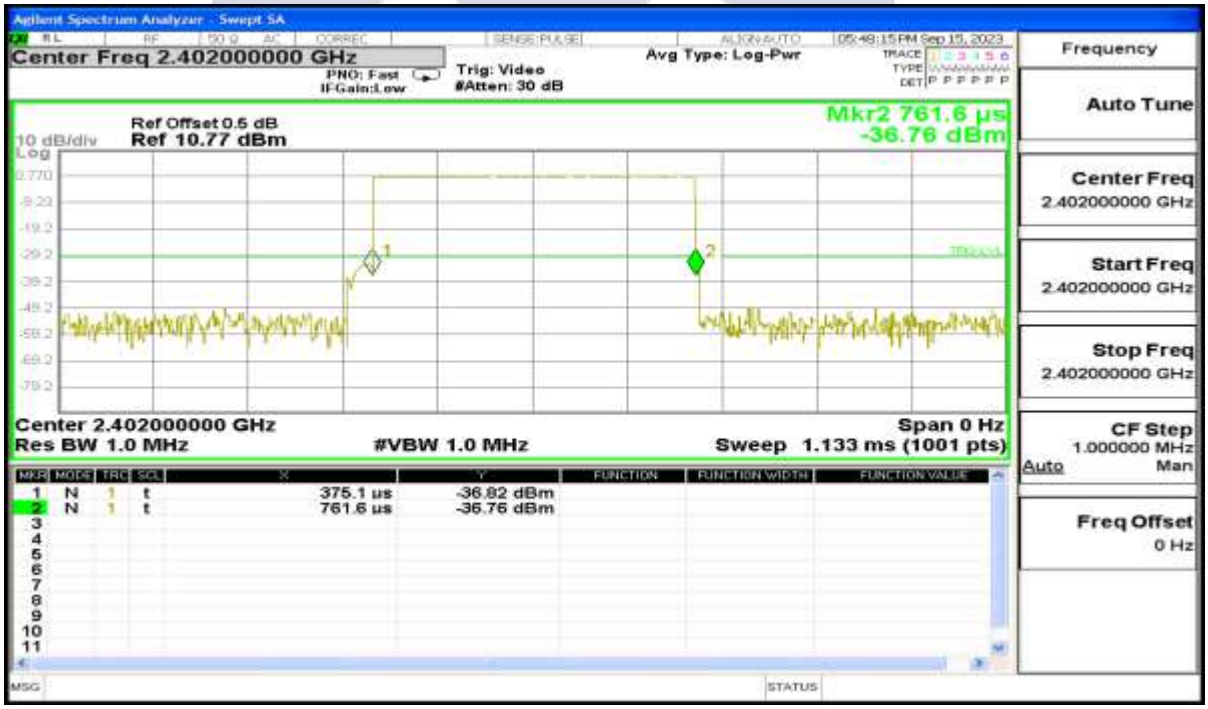


6.7.5 Test result

EUT:	Driveri	Model Name. :	D-450
Temperature:	25.4 ℃	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	0.387	118.269	0.4000
DH3	2402 MHz	1.648	240.637	0.4000
DH5	2402 MHz	2.896	292.496	0.4000

CH 00- DH1



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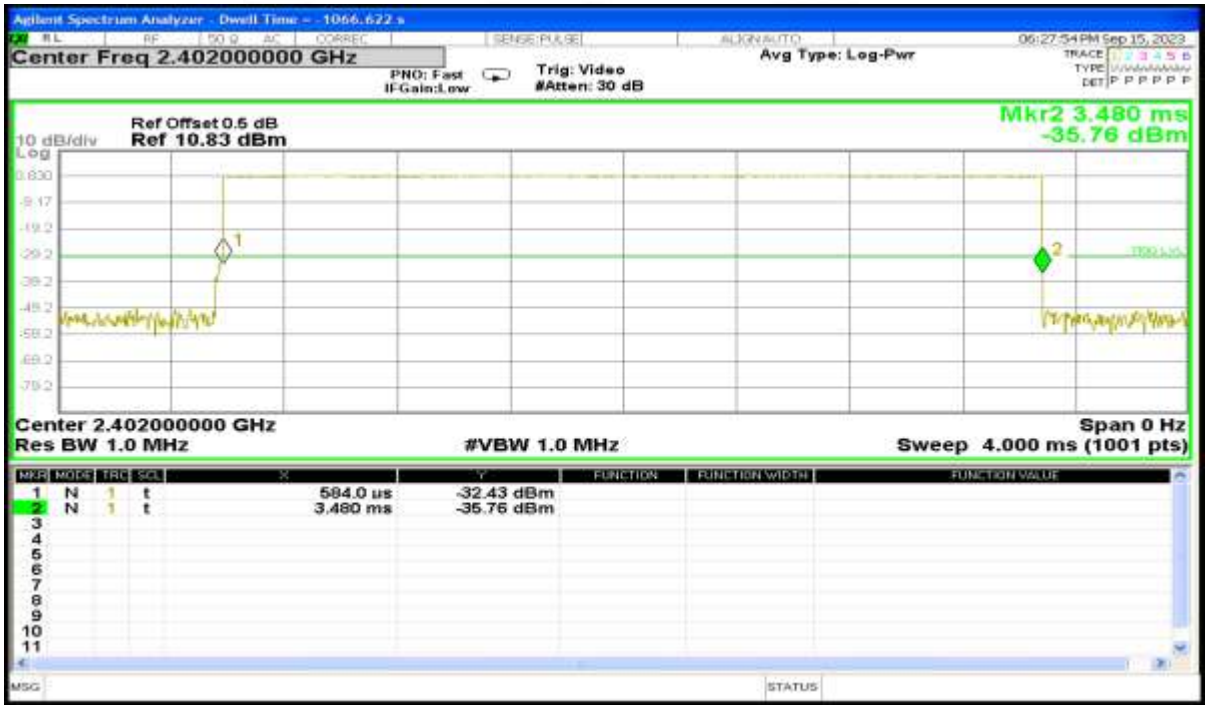
CH 00- DH3

CH 00- DH5



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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	0.392	120.013l	0.4000
2DH3	2402 MHz	1.648	238.989	0.4000
2DH5	2402 MHz	2.896	289.600	0.4000

CH 00- 2DH1

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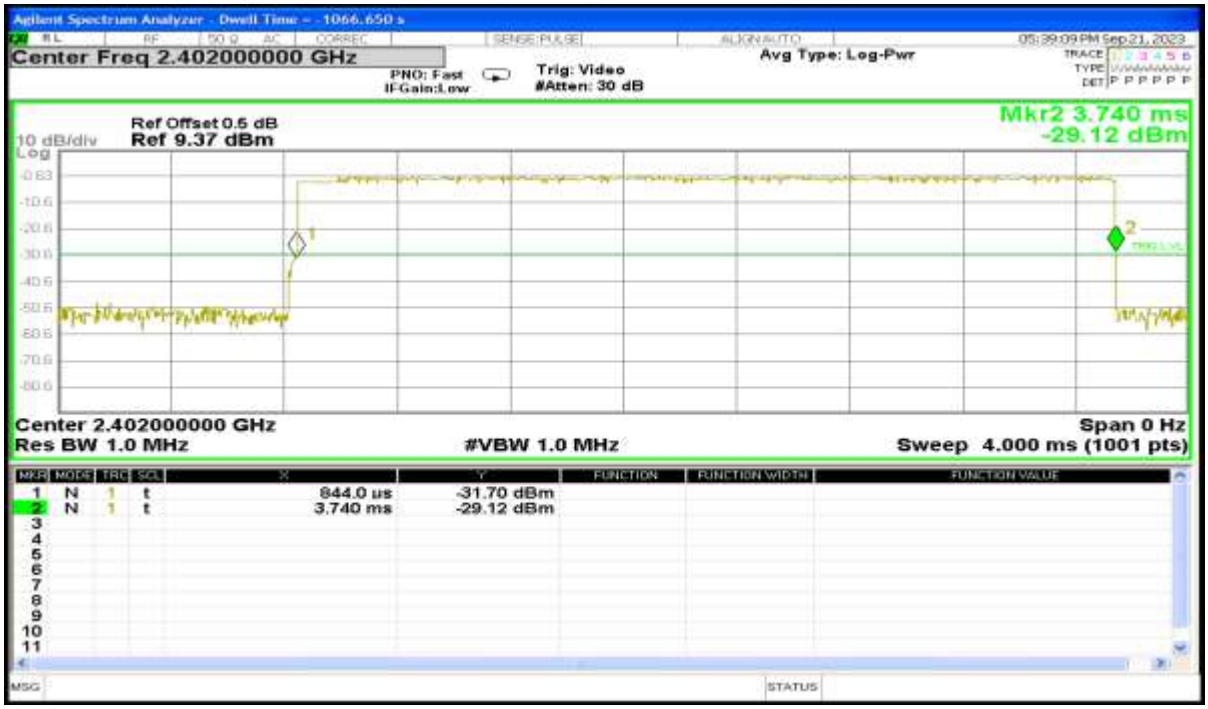
CH 00- 2DH3

CH 00- 2DH5



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	0.392	120.013	0.4000
3DH3	2402 MHz	1.645	240.170	0.4000
3DH5	2402 MHz	2.900	292.900	0.4000

CH 00- 3DH1

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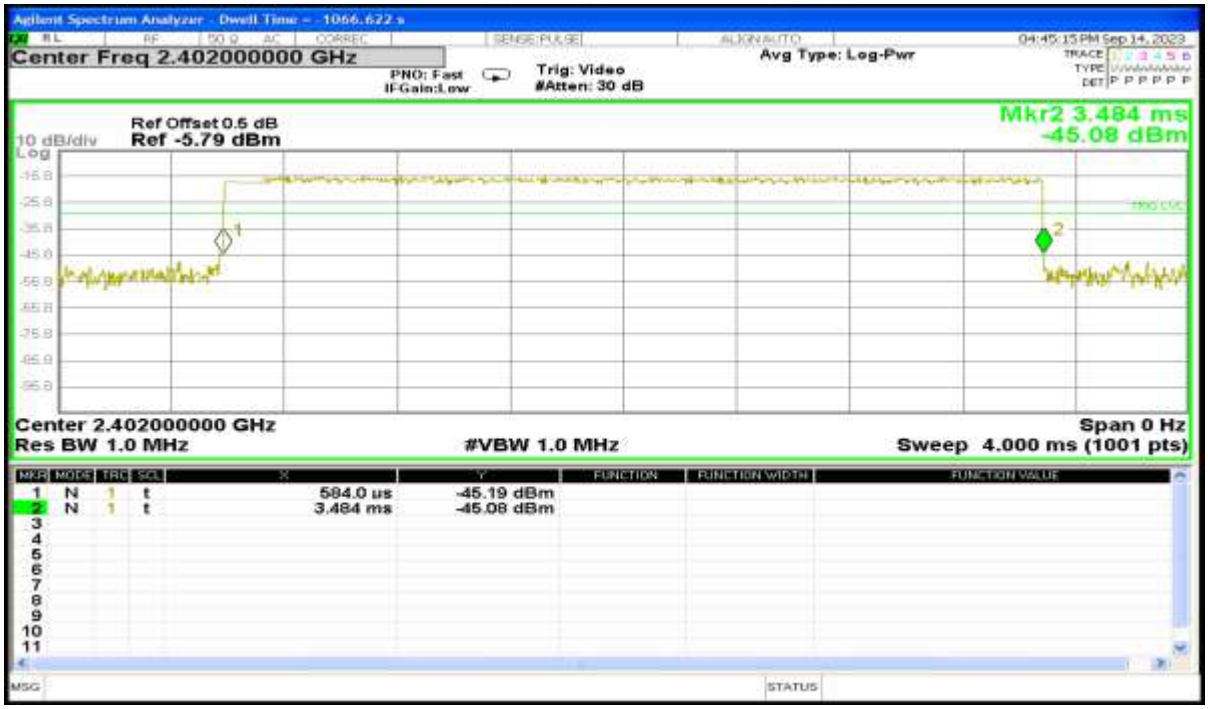
CH 00- 3DH3

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: 1watt. 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

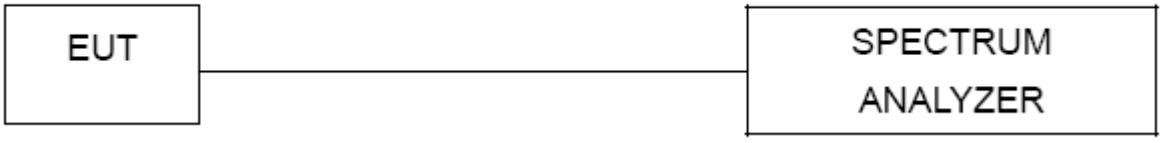
(2) The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power.

(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

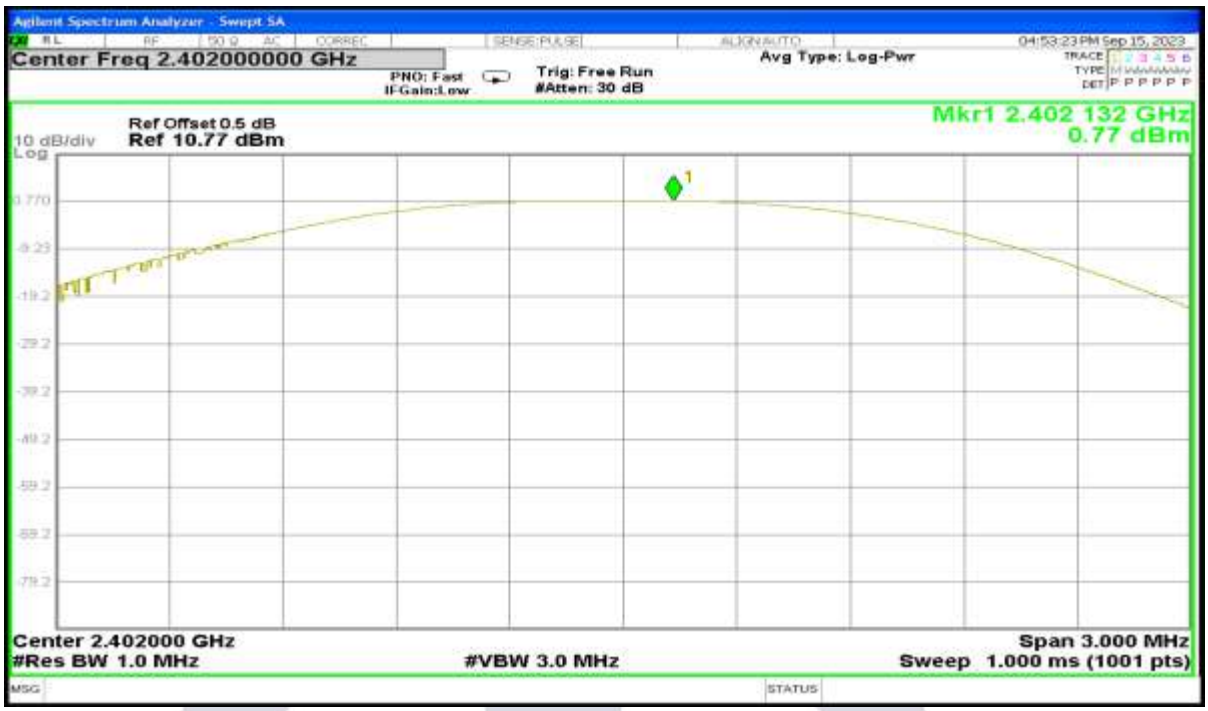


6.8.5 Test results

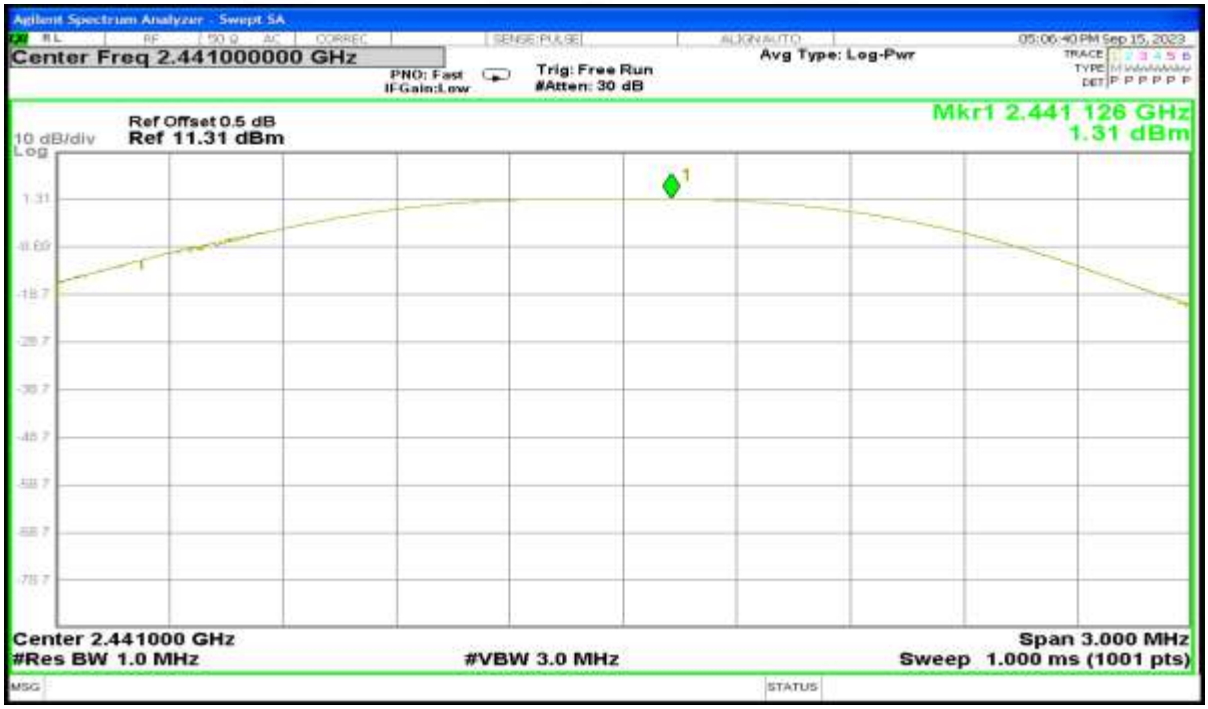
EUT:	Driveri	Model Name. :	D-450
Temperature:	25.4 ℃	Relative Humidity:	55%
Pressure:	1010 hPa	Test Power :	110V AC, 60Hz
Test Mode :	TX 1Mbps/ 2Mbps/3Mbps		
Note: All the data rates have be tested and the worst-case as the table below.			

Test Mode	Frequency	Peak Output Power (dBm)	Limit (dBm)	Result
Data rate 1Mbps	2402 MHz	0.77	21	Pass
	2441 MHz	1.31	21	Pass
	2480 MHz	2.13	21	Pass
Data rate 2Mbps	2402 MHz	-0.63	21	Pass
	2441 MHz	0.11	21	Pass
	2480 MHz	0.60	21	Pass
Data rate 3Mbps	2402 MHz	-0.49	21	Pass
	2441 MHz	0.23	21	Pass
	2480 MHz	0.86	21	Pass
Cable loss = 1.0 dBm				

CH 00-1Mbps



CH 39-1Mbps



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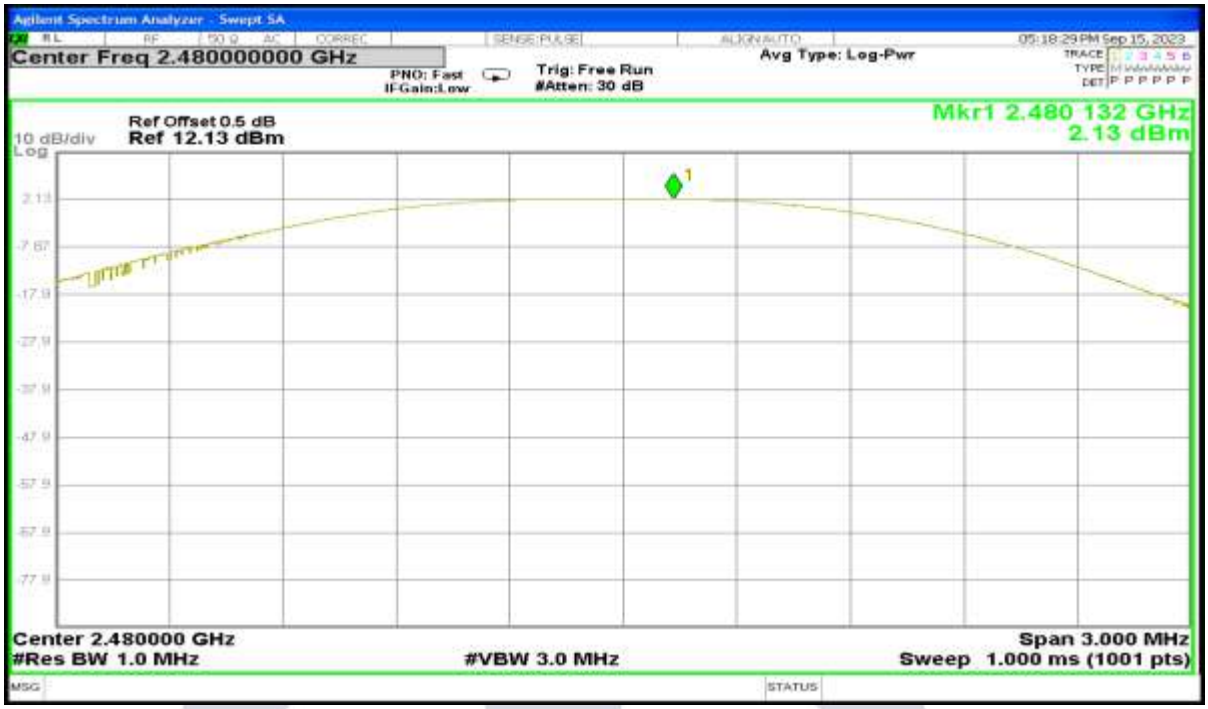
CH 78-1Mbps



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CH 00-2Mbps

CH 39-2Mbps

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CH 00-3Mbps

CH 39-3Mbps

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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)).

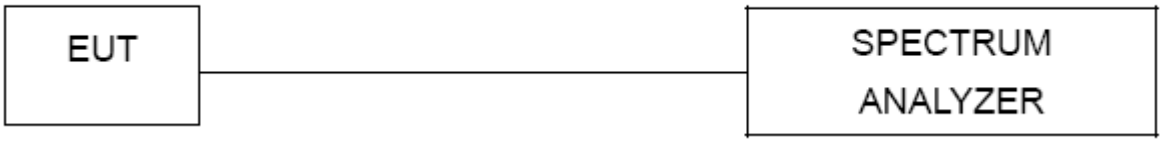
6.9.2 Test procedure

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

6.9.3 Deviation from standard

No deviation.

6.9.4 Test setup



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6.9.5 Test results

CH00 (Lower) Data rate 1Mbps

CH 78 (Upper) Data rate 1Mbps

CH00 (Lower) Data rate 2Mbps

CH 78 (Upper) Data rate 2Mbps

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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)).

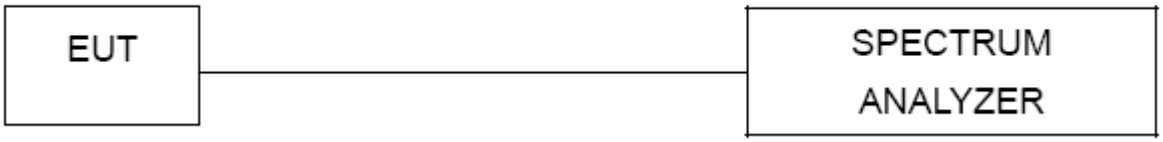
6.10.2 Test procedure

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b. 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 10th 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



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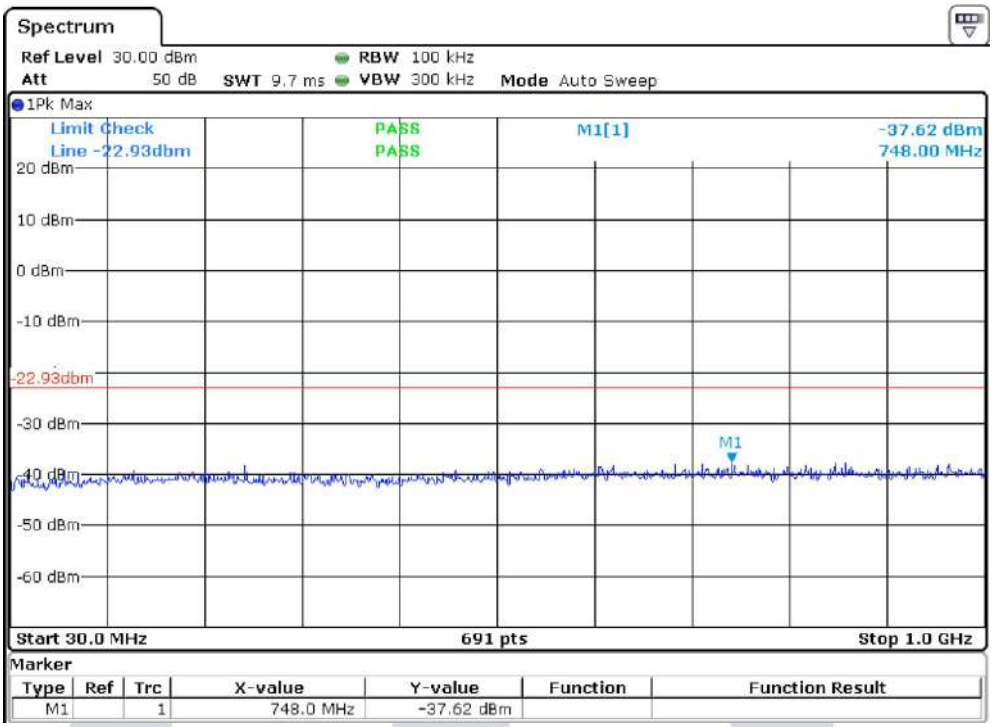
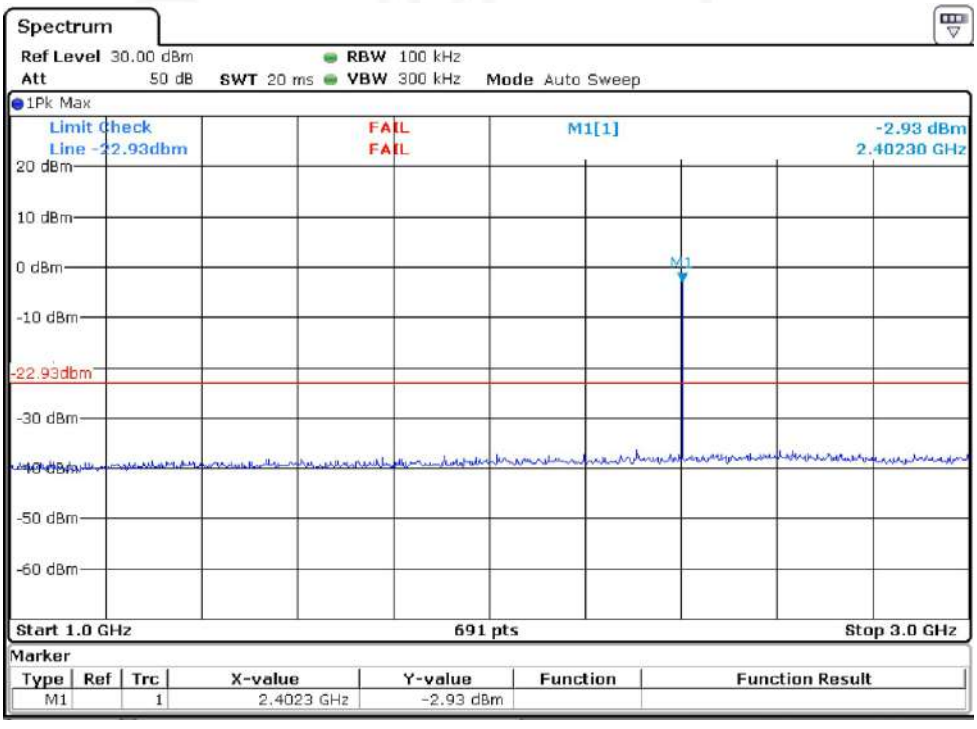
6.10.5 Test results

CH00 Data rate 1Mbps



CH00 Data rate 1Mbps



Note: Marker 1 is the intentional frequency from EUT, Hence considered as pass.

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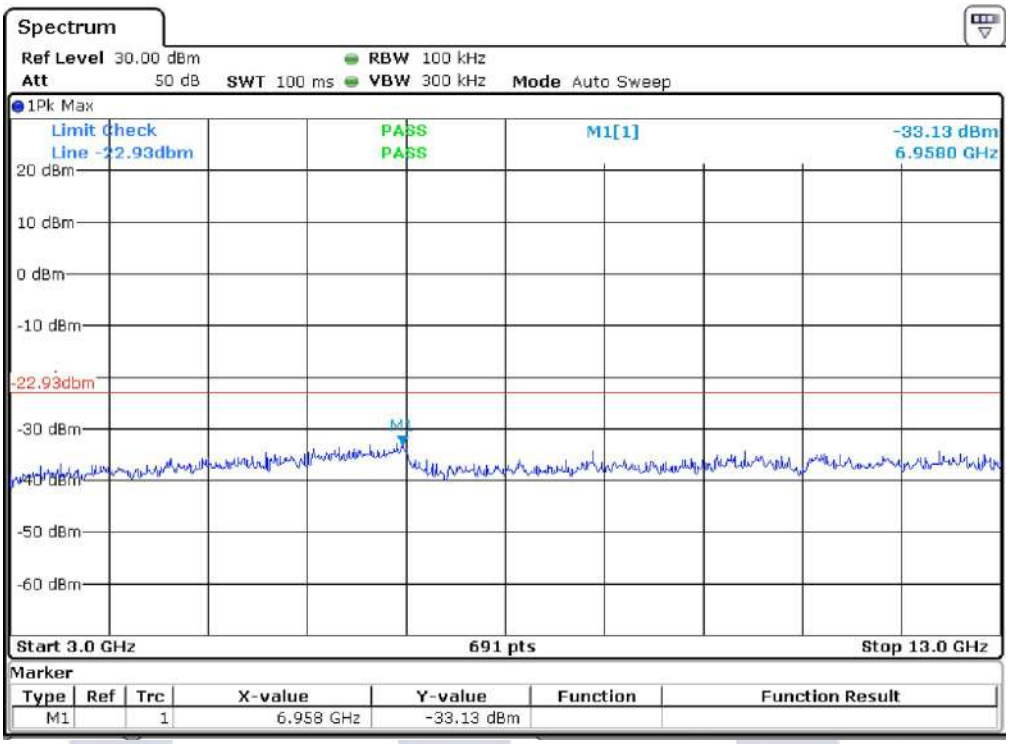
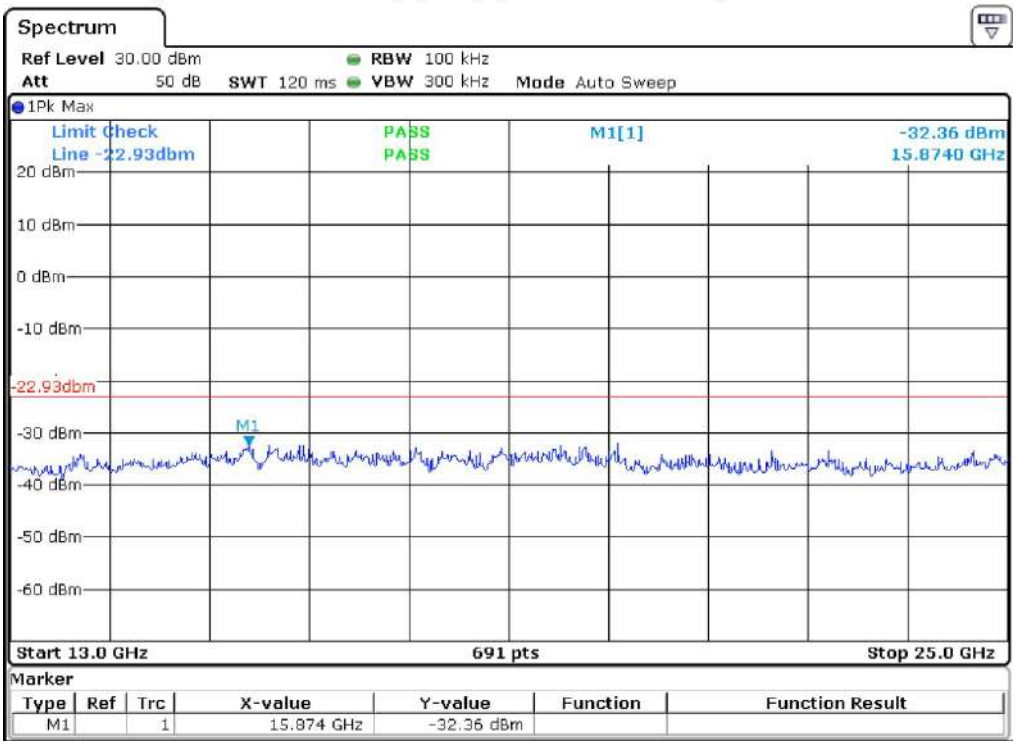
CH00 Data rate 1Mbps



CH00 Data rate 1Mbps



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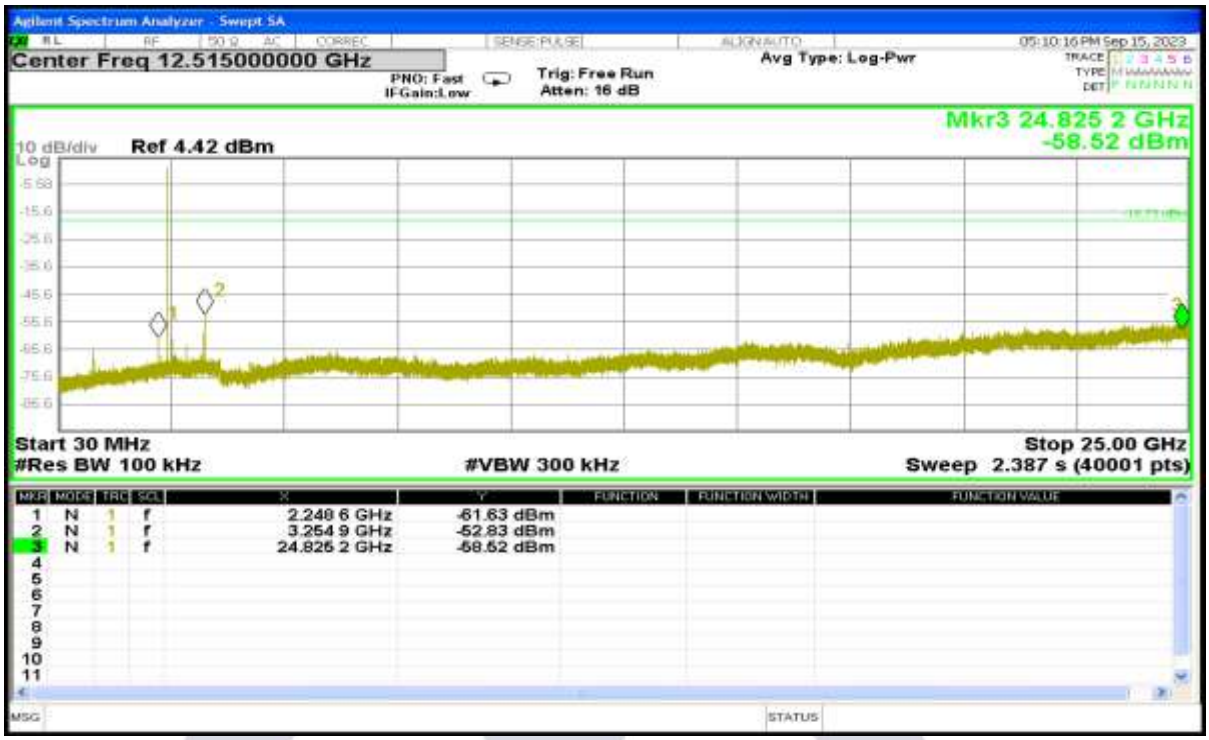
CH39 Data rate 1Mbps



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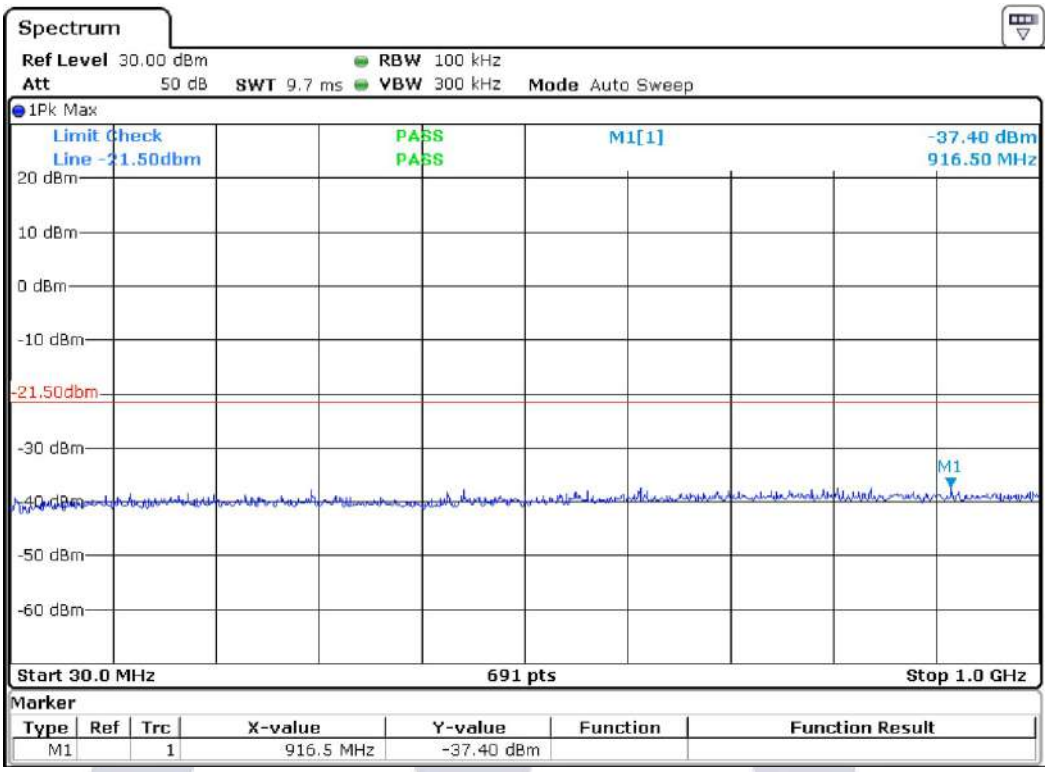
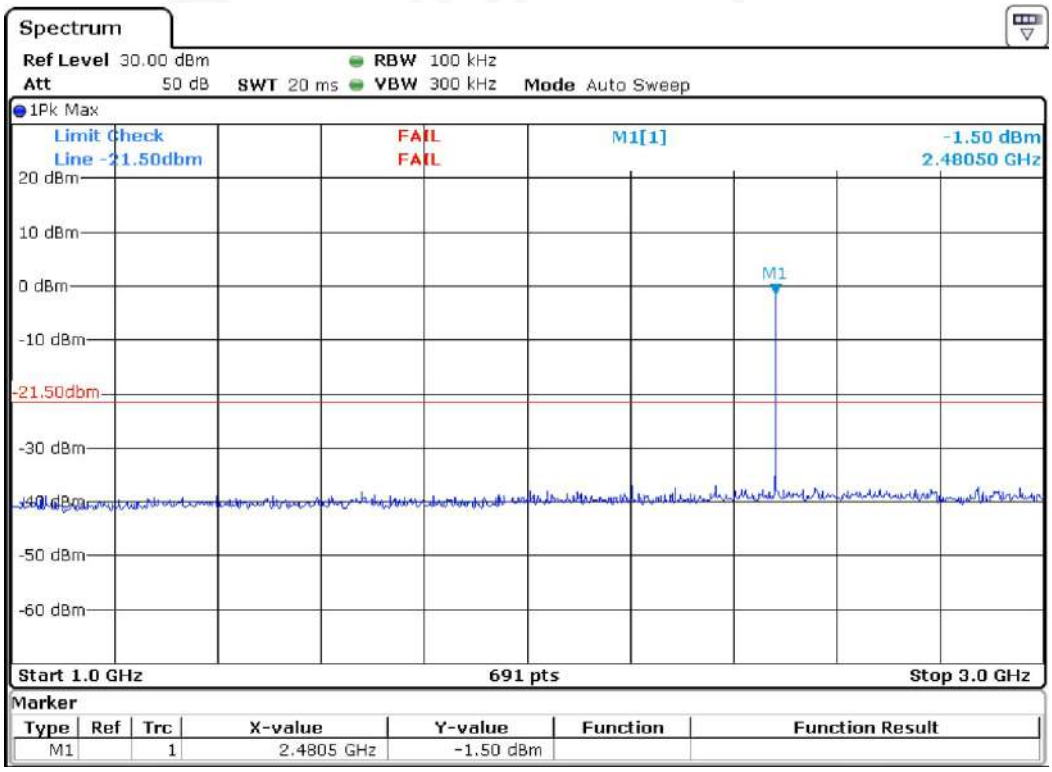
CH78 Data rate 1Mbps

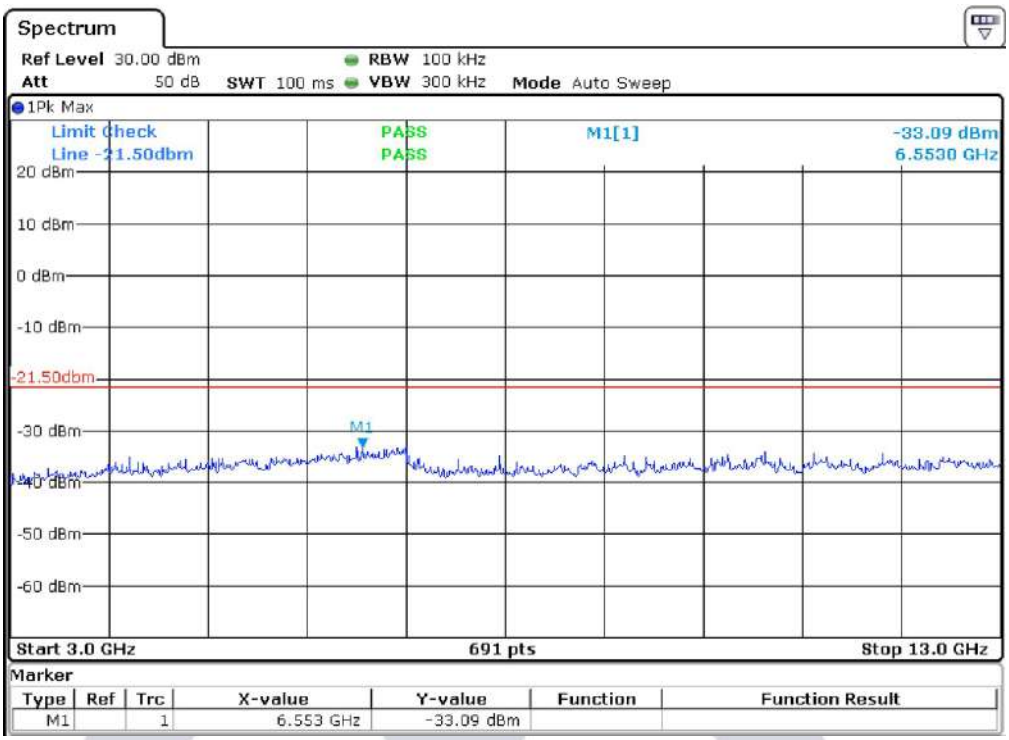


CH78 Data rate 1Mbps

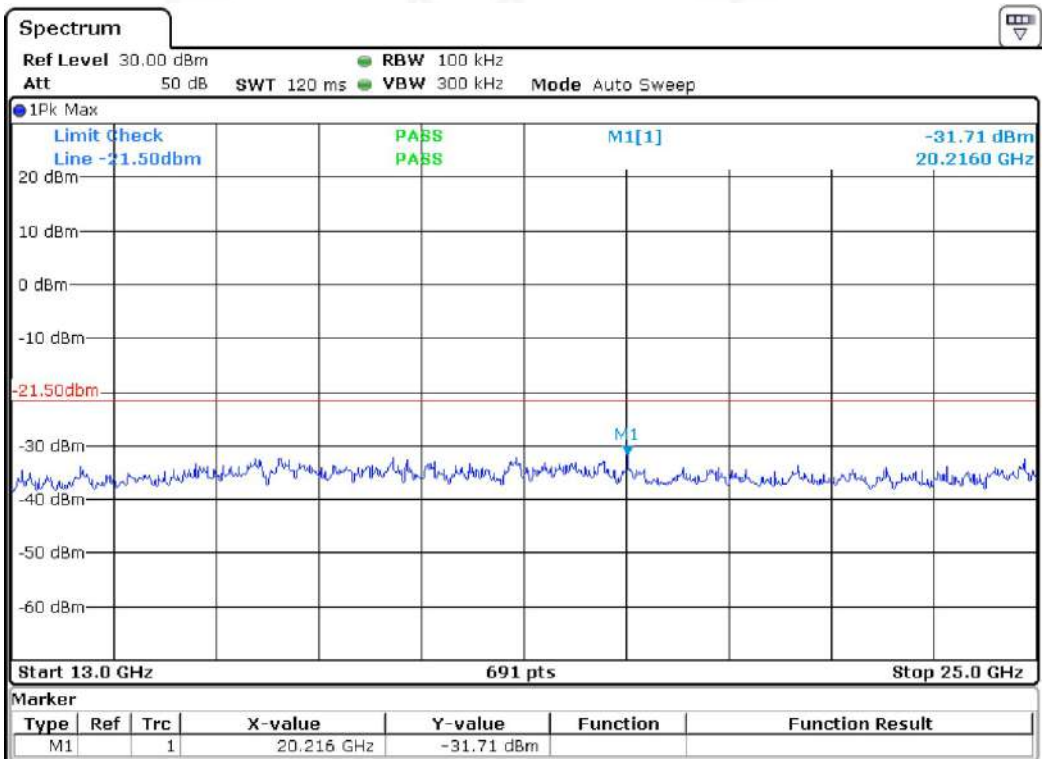


Note: Marker 1 is the intentional frequency from EUT, Hence considered as pass.

CH78 Data rate 1Mbps



CH78 Data rate 1Mbps



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CH00 Data rate 2Mbps

CH39 Data rate 2Mbps

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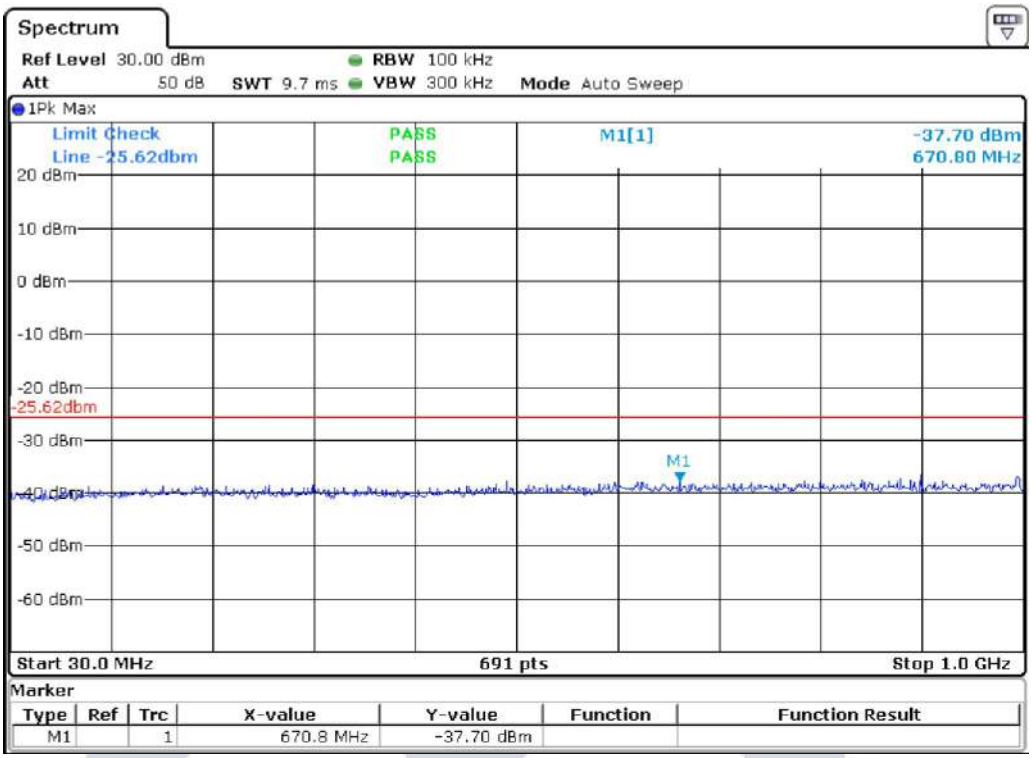
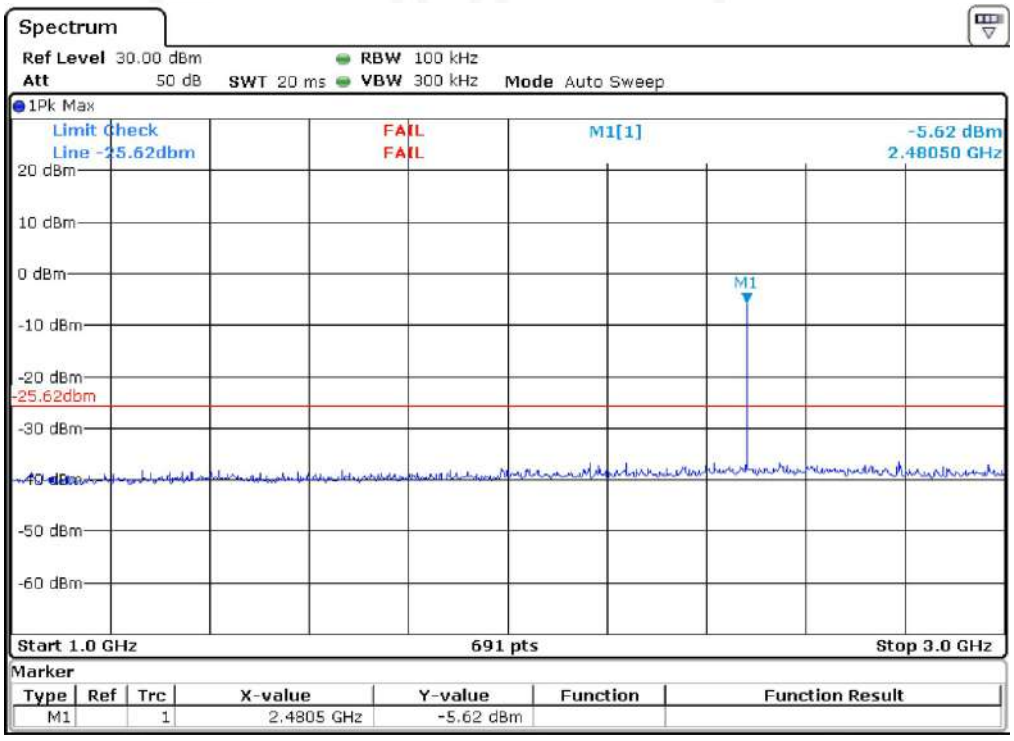
CH78 Data rate 2Mbps

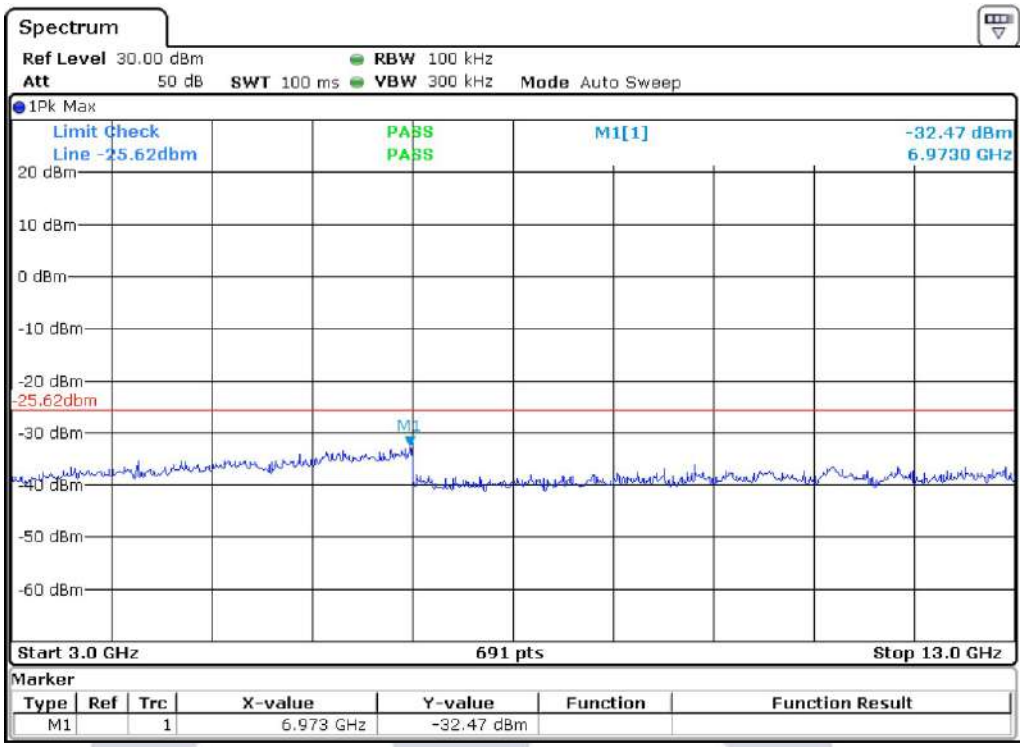


CH78 Data rate 2Mbps

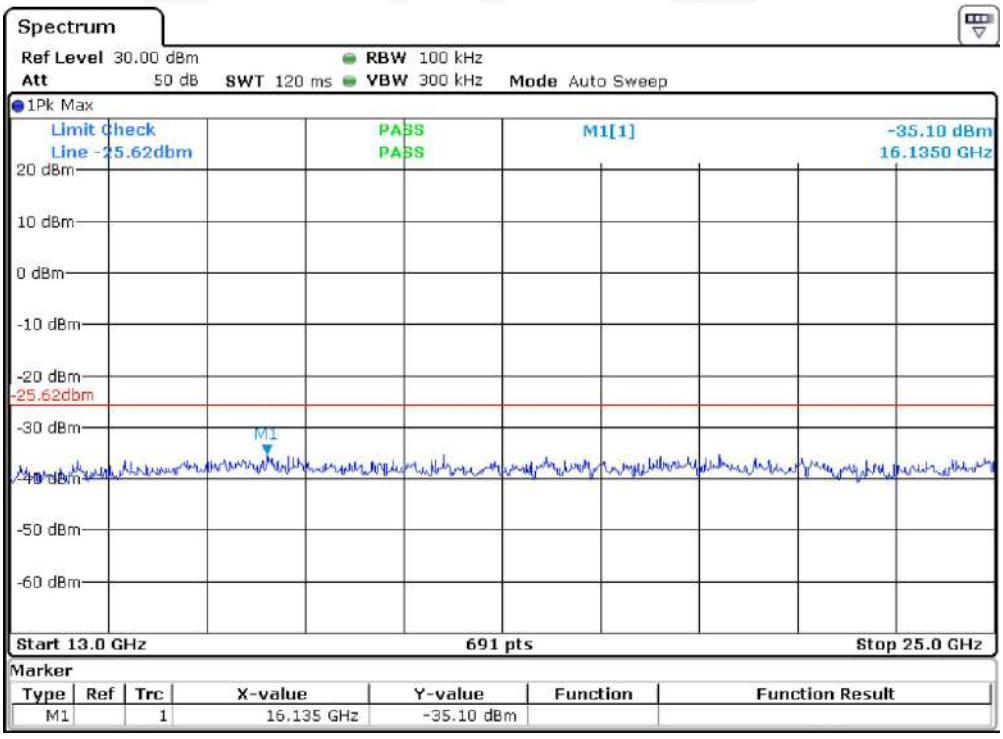


Note: Marker 1 is the intentional frequency from EUT, Hence considered as pass.

CH78 Data rate 2Mbps



CH78 Data rate 2Mbps



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CH00 Data rate 3Mbps

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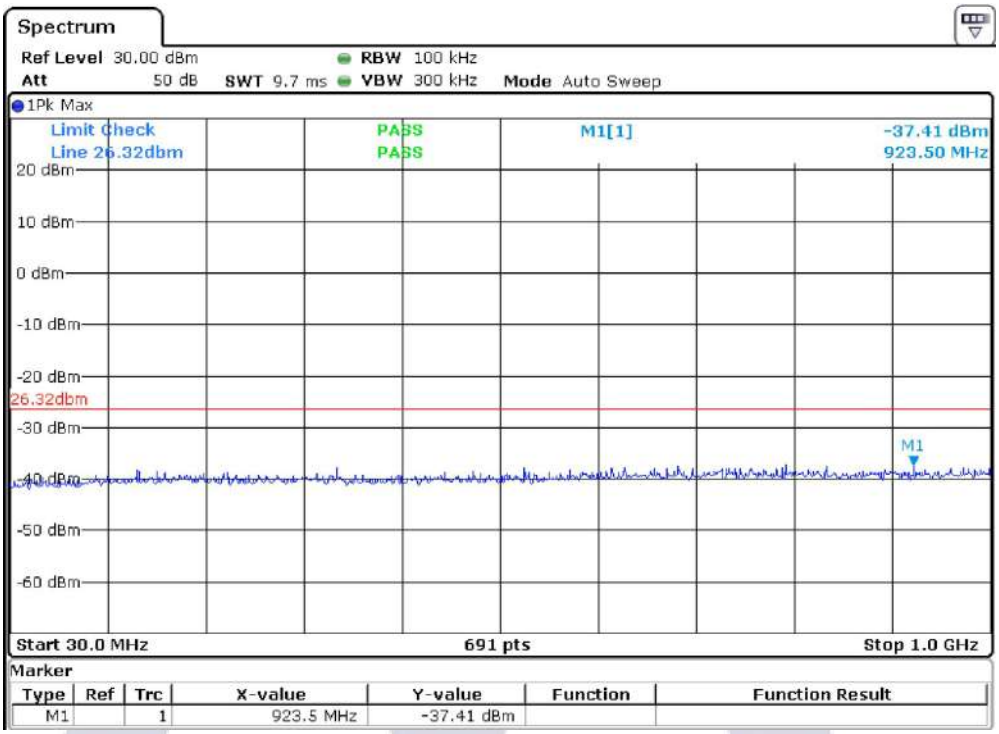
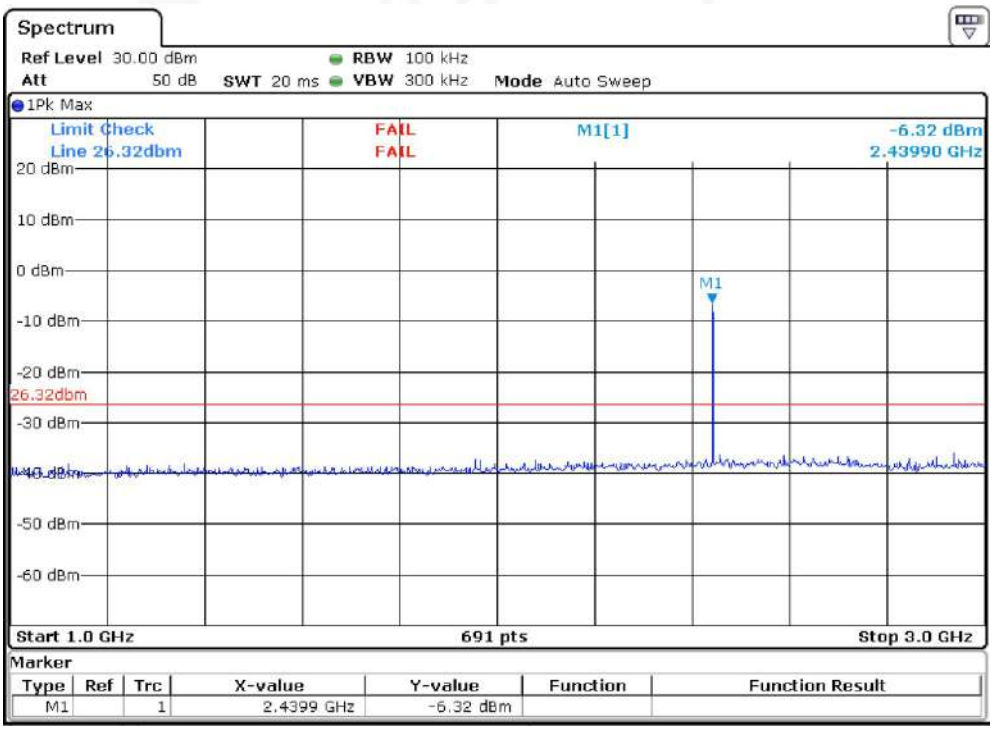
CH39 Data rate 3Mbps

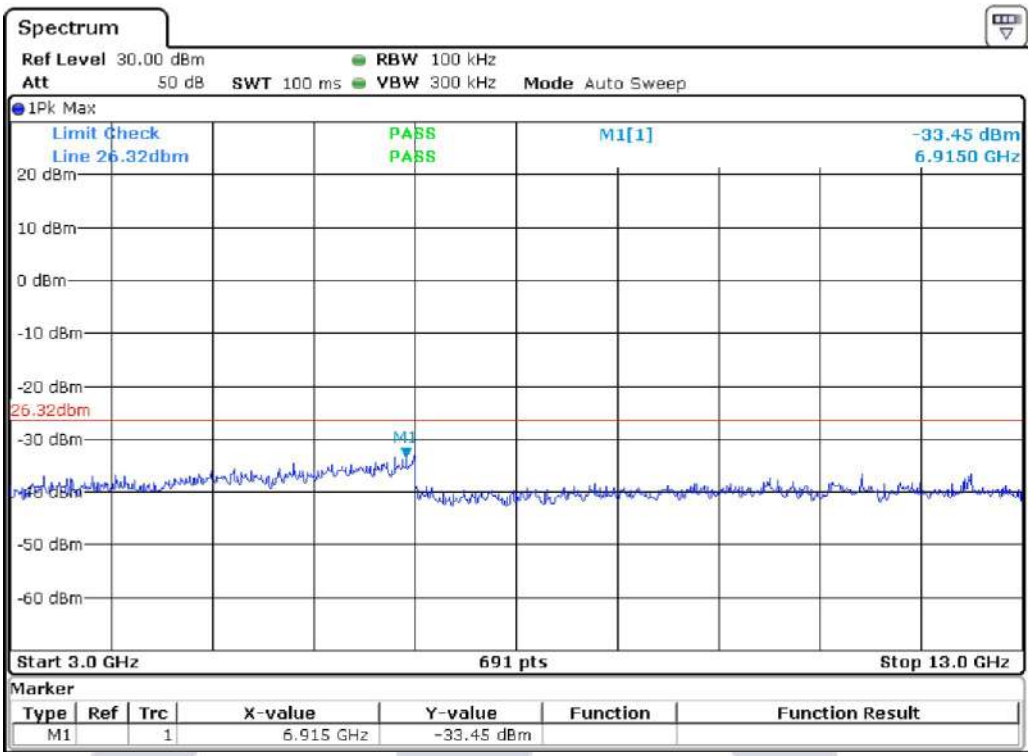


CH39 Data rate 3Mbps

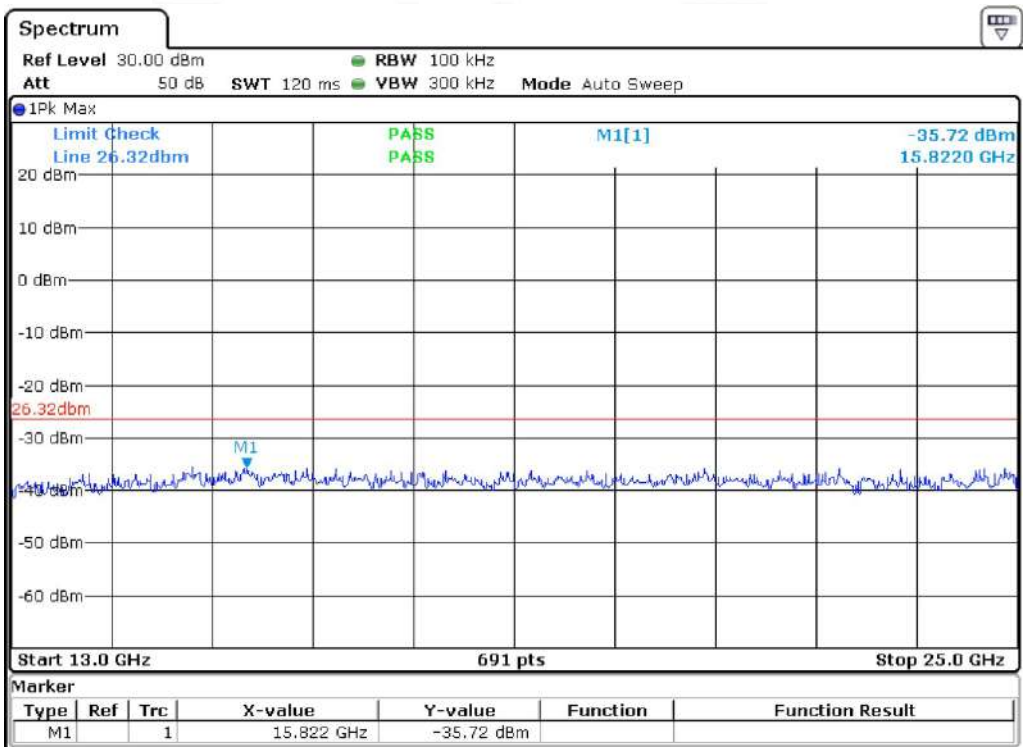


Note: Marker 1 is the intentional frequency from EUT, Hence considered as pass.

CH39 Data rate 3Mbps



CH39 Data rate 3Mbps



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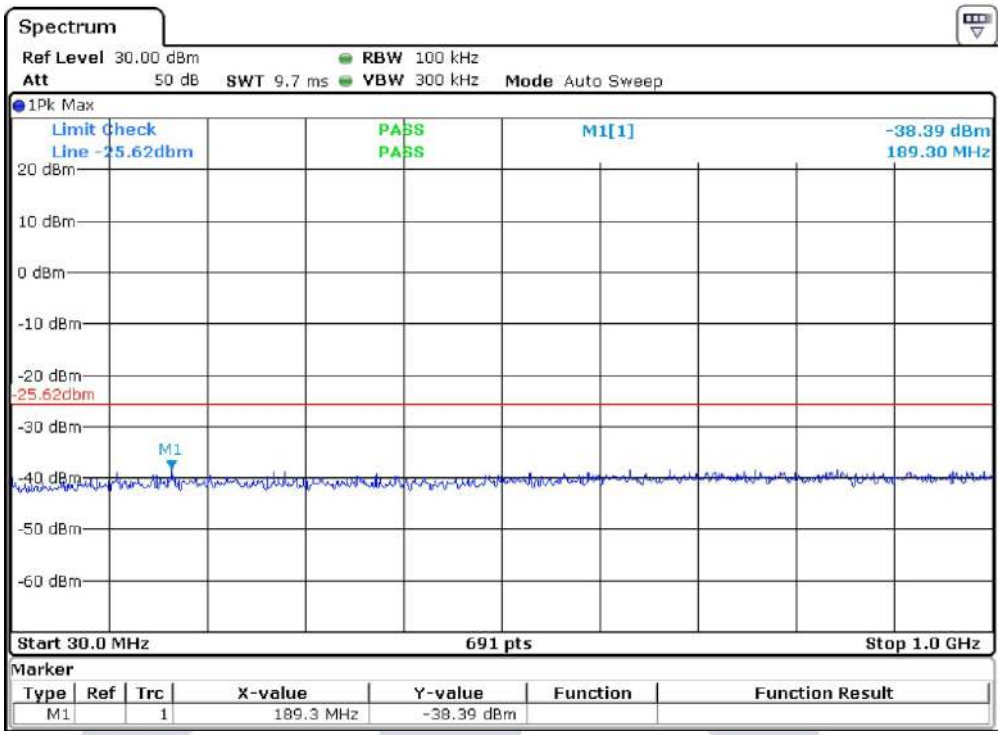
CH78 Data rate 3Mbps



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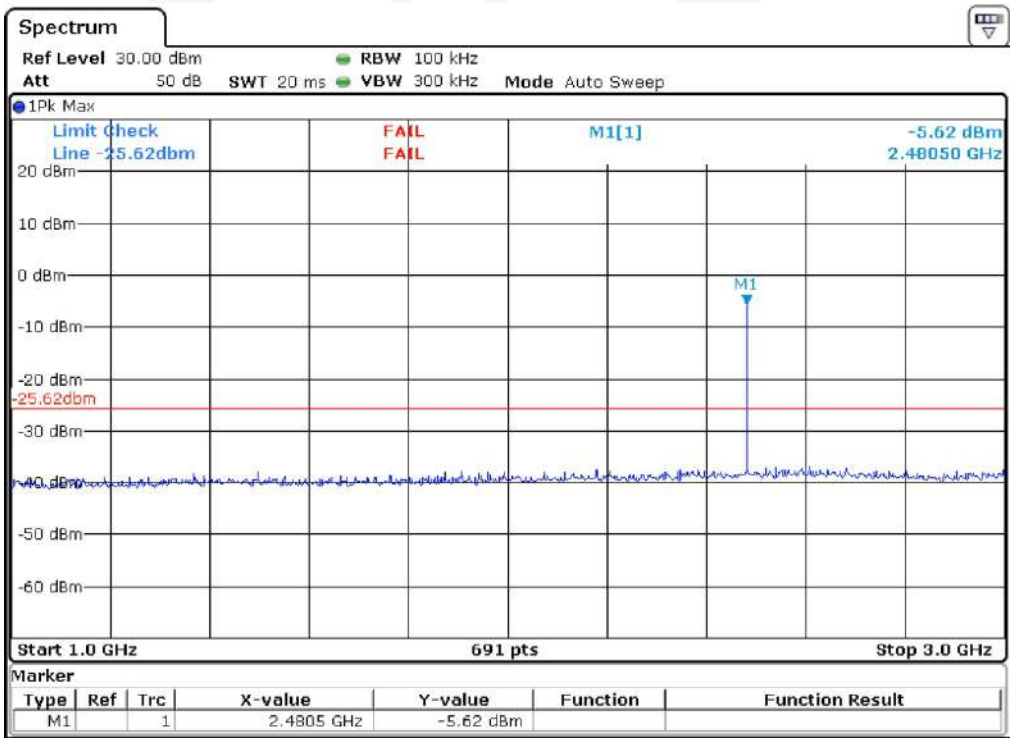
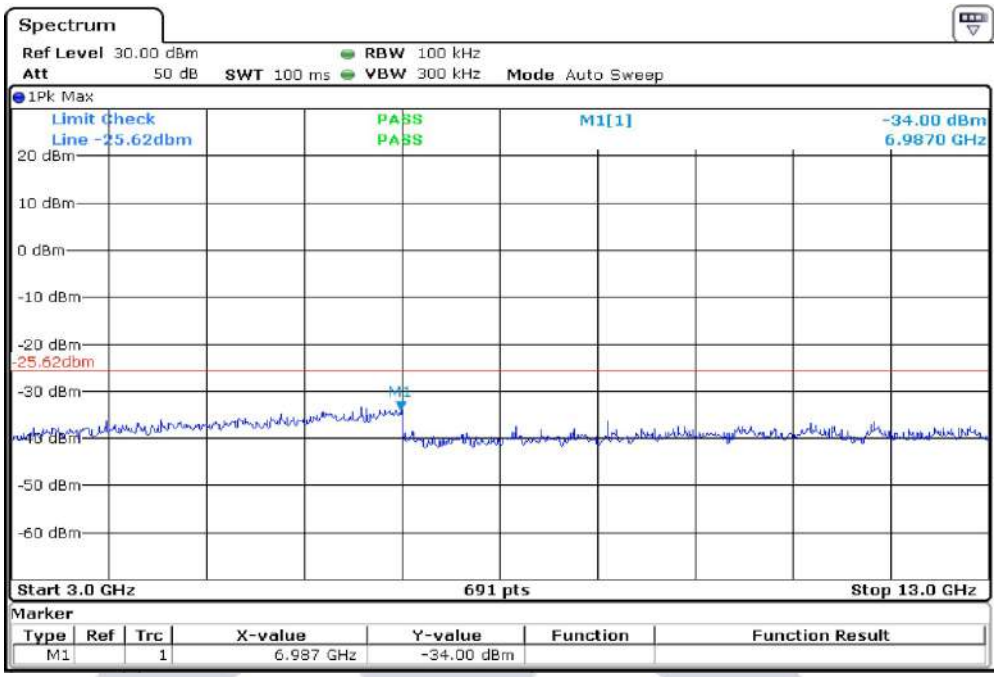
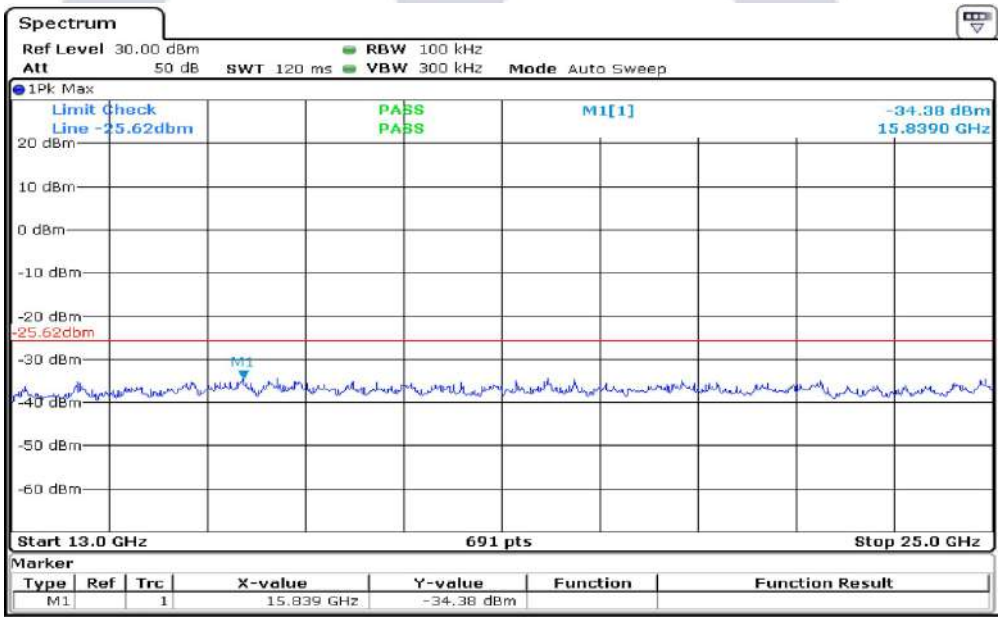


Note: Marker 1 is the intentional frequency from EUT, Hence considered as pass.

CH78 Data rate 3Mbps



CH78 Data rate 3Mbps



****End of Report****