TEST REPORT

Product	:	PANEL PC
Trade mark	:	IEI
Model/Type reference	:	IOVU-210AD-RK39
Serial Model	:	N/A
Report Number	:	EED39N00008302
FCC ID	:	RFH-IOVU-210AD
Date of Issue	:	May 26, 2021

Test Standards	Result
☒ 47 CFR Part 15 Subpart C	PASS

Prepared for:

IEI INTEGRATION CORP.

NO.29,ZHONGXING RD.,XIZHI DIST.,NEW TAIPEI CITY 22161,TAIWAN

Prepared by:

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Compiled by: Jenny. Yu Reviewed by: Lily. Wang

Approved by: Jeff Tang Date: May 26, 2021

Check No.: 3915514199

Modification Record

No.	Last Report No.	Modification Description
1	EED39N00008302	First report

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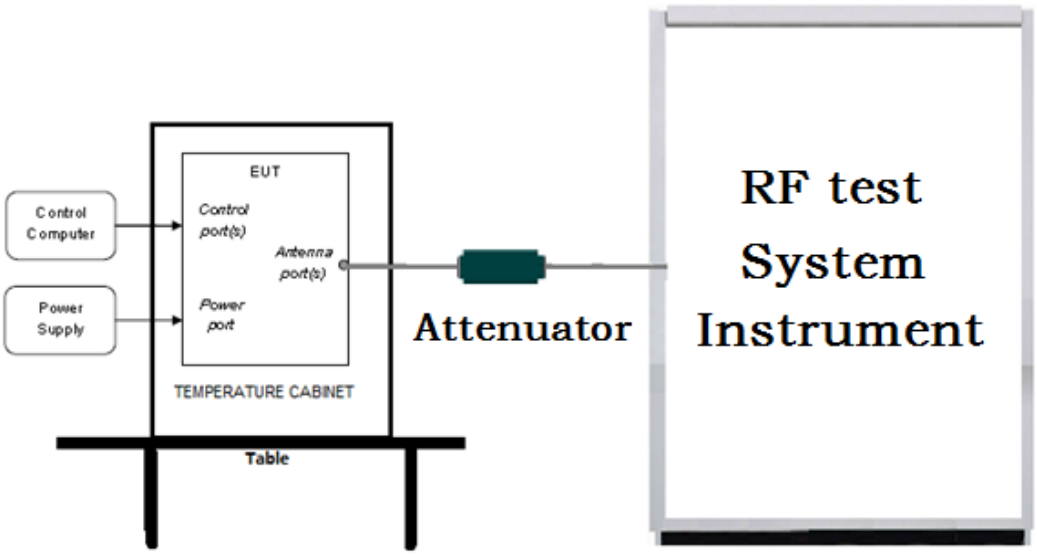
1. Test Summary

Test item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15 Subpart C Section 15.203/15.247 (c)	ANSI C63.10-2013	N/A
AC Power Line Conducted Emission	47 CFR Part 15 Subpart C Section 15.207	ANSI C63.10-2013	PASS
Maximum Conducted Output Power	47 CFR Part 15 Subpart C Section 15.247 (b)(1)	ANSI C63.10-2013	PASS
20dB Emission Bandwidth	47 CFR Part 15 Subpart C Section 15.247 (a)(1)	ANSI C63.10-2013	PASS
Carrier Frequencies Separation	47 CFR Part 15 Subpart C Section 15.247 (a)(1)	ANSI C63.10-2013	PASS
Number of hopping channels	47 CFR Part 15 Subpart C Section 15.247 (b)	ANSI C63.10-2013	PASS
Time of occupancy	47 CFR Part 15 Subpart C Section 15.247 (a)(1)	ANSI C63.10-2013	PASS
Band-edge for RF Conducted Emissions	47 CFR Part 15Subpart C Section 15.247(d)	ANSI C63.10-2013	PASS
Conducted Spurious Emissions	47 CFR Part 15 Subpart C Section 15.247(d)	ANSI C63.10-2013	PASS
Radiated Spurious emissions	47 CFR Part 15 Subpart C Section 15.205/15.209	ANSI C63.10-2013	PASS
Restricted bands around fundamental frequency (Radiated Emission)	47 CFR Part 15 Subpart C Section 15.205	ANSI C63.10-2013	PASS

2. Test Requirement

2.1. Test Setup

For Conducted Test Setup



For Radiated Emissions Test Setup

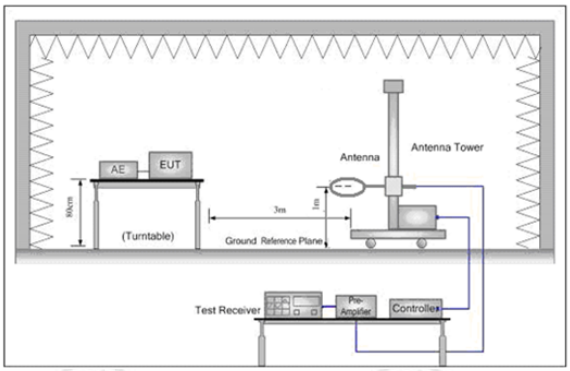


Figure 1. Below 30MHz

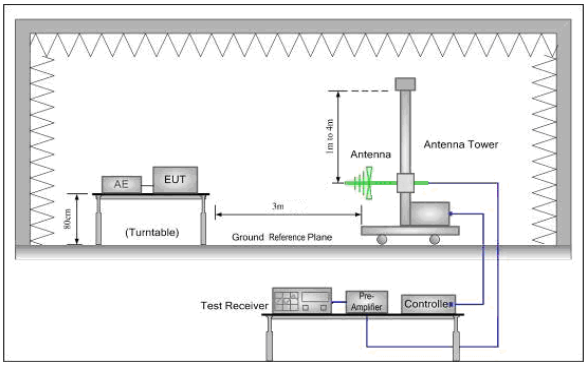


Figure 2. 30MHz to 1GHz

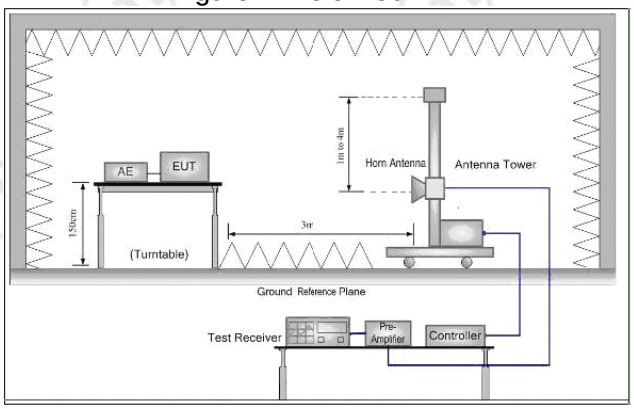
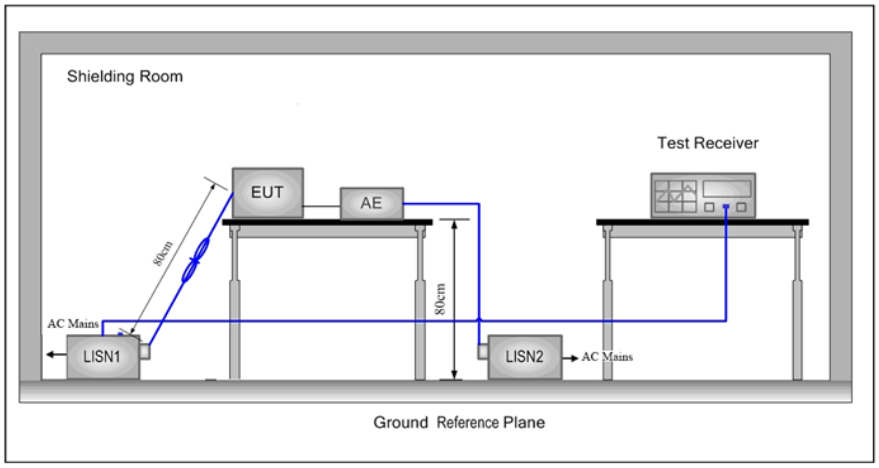


Figure 3. Above 1GHz

For Conducted Emissions Test Setup



2.2. Test Environment

Operating Environment:	
Temperature:	19.8 °C
Humidity:	55 % RH
Atmospheric Pressure:	1019mbar

2.3. Test Condition

Test Mode	Tx	RF Channel		
		Low(L)	Middle(M)	High(H)
GFSK/π/4DQPSK/8DPSK (DH1,DH3,DH5)	2402MHz ~2480 MHz	Channel 1	Channel 40	Channel79
		2402MHz	2441MHz	2480MHz
TX mode: The EUT transmitted the continuous modulation test signal at the specific channel(s).				

Test mode:
Through Pre-scan, 1-DH5 packet the power is the worst case of GFSK, 2-DH5 packet the power is the worst case of π/4DQPSK, 3-DH5 packet the power is the worst case of 8DPSK.

3. General Information

3.1. Client Information

Applicant:	IEI INTEGRATION CORP.
Address of Applicant:	NO.29,ZHONGXING RD.,XIZHI DIST.,NEW TAIPEI CITY 22161,TAIWAN
Manufacturer:	IEI INTEGRATION CORP.
Address of Manufacturer:	NO.29,ZHONGXING RD.,XIZHI DIST.,NEW TAIPEI CITY 22161,TAIWAN
Factory:	Armorlink SH Corp.
Address of Factory:	No.515,Shenfu Rd,Xinzhuang Industrial Development Zone,Minhang District,Shanghai,P.R.China

3.2. General Description of EUT

Product Name:	PANEL PC
Model No.(EUT):	IOVU-210AD-RK39
Trade Mark:	
EUT Supports Radios application:	2.4G WIFI: IEEE802.11b/g/n(20MHz), 2412MHz-2462MHz 5G WIFI: IEEE802.11a/ac(HT20)/ac(HT40)/ac(HT80),5150-5350MHz,5470-5725MHz, 5725-5850MHz. Bluetooth BR+EDR& Bluetooth V4.1 BLE NFC13.56MHz
Power Supply:	Model No: FSP060-DHAN3 Input: AC100-240V 1.8A, 50/60Hz Output: DC 12V 5.0A
Sample Received Date:	Feb 09,2021
Sample tested Date:	Feb 09,2021 to Apr 07,2021

3.3. Product Specification subjective to this standard

Operation Frequency:	2402MHz~2480MHz
Bluetooth Version:	Bluetooth V4.1
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	GFSK, π/4DQPSK, 8DPSK
Number of Channel:	79
Hopping Channel Type:	Adaptive Frequency Hopping systems
Test Software of EUT:	AMPK TOOL (manufacturer declare)
Antenna Type:	FPC Antenna
Antenna Gain①:	ANT1 Gain for BT :2.46dBi
Test Voltage:	AC120V/60Hz

Note: 1 The antenna gain is provided by the client and we Centre Testing International (Suzhou) CO., LTD. test lab is not responsible for the accuracy of the antenna gain information.

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2402MHz	21	2422MHz	41	2442MHz	61	2462MHz
2	2403MHz	22	2423MHz	42	2443MHz	62	2463MHz
3	2404MHz	23	2424MHz	43	2444MHz	63	2464MHz
4	2405MHz	24	2425MHz	44	2445MHz	64	2465MHz
5	2406MHz	25	2426MHz	45	2446MHz	65	2466MHz
6	2407MHz	26	2427MHz	46	2447MHz	66	2467MHz
7	2408MHz	27	2428MHz	47	2448MHz	67	2468MHz
8	2409MHz	28	2429MHz	48	2449MHz	68	2469MHz
9	2410MHz	29	2430MHz	49	2450MHz	69	2470MHz
10	2411MHz	30	2431MHz	50	2451MHz	70	2471MHz
11	2412MHz	31	2432MHz	51	2452MHz	71	2472MHz
12	2413MHz	32	2433MHz	52	2453MHz	72	2473MHz
13	2414MHz	33	2434MHz	53	2454MHz	73	2474MHz
14	2415MHz	34	2435MHz	54	2455MHz	74	2475MHz
15	2416MHz	35	2436MHz	55	2456MHz	75	2476MHz
16	2417MHz	36	2437MHz	56	2457MHz	76	2477MHz
17	2418MHz	37	2438MHz	57	2458MHz	77	2478MHz
18	2419MHz	38	2439MHz	58	2459MHz	78	2479MHz
19	2420MHz	39	2440MHz	59	2460MHz	79	2480MHz
20	2421MHz	40	2441MHz	60	2461MHz		

3.4. Description of Support Units

The EUT has been tested independently.

3.5. Test Location

All test facilities used to collect the test data are located at Building 18, Zhihui New Town Ecological Industrial Park, No. 1206, Jinyang East Road, Lujia Town, Kunshan, Jiangsu, China.

3.6. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

A2LA-Lab Cert. No. 5734.01

Centre Testing International (Suzhou) CO., LTD. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration. Laboratories and any additional program requirements in the identified field of testing.

FCC-Designation No.:CN1290

Centre Testing International Group Co., Ltd EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The American association for Centre Testing International Group Co., Ltd. EMC laboratory accreditation Designation No.:CN1290

3.7. Deviation from Standards

None.

3.8. Abnormalities from Standard Conditions

None.

3.9. Other Information Requested by the Customer

None.

3.10. Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Occupied Bandwidth	0.56%
2	RF Power conducted	0.59 dB
3	Power Spectral Density, conducted	2.37 dB
4	Unwanted Emission, conducted	2.68 dB
5	All Emission, radiated	4.41 dB(30MHz-1GHz)
		4.99 dB(1GHz-18GHz)
		5.307 dB(18GHz-40GHz)
6	Temperature test	0.54°C
7	Humidity test	1.62%
8	DC and low frequency voltages test	1.14%

4. Equipment List

RF test system					
Equipment	**Manufacturer**	**Mode No.**	**Serial Number**	**Cal. Date (mm-dd-yyyy)**	**Cal. Due date (mm-dd-yyyy)**
Signal Generator	R&S	SMB100A	182002	2020-10-23	2021-10-22
Communication test set test set	R&S	CMW500	107929	2020-04-27	2021-04-26
Spectrum Analyzer	R&S	FSV40	101588	2020-10-23	2021-10-22
Vector signal generator	R&S	SMBV100B	101985	2020-10-23	2021-10-22
Temperature/ Humidity Indicator	testo	608-H1	1945222628	2020-12-10	2021-11-08
Switch Automatic control	R&S	OSP-B157W8	101111	2020-10-23	2021-10-22
High-low temperature chamber	GIANT FORCE	GTH-800-40-CP	MAA1908-003	2020-12-08	2021-12-07
Automatic test software	Shenzhen JS TONSCEND	/	V2.6.77.0518	/	/

966 Semi-anechoic Chamber					
Equipment	**Manufacturer**	**Mode No.**	**Serial Number**	**Cal. Date (mm-dd-yyyy)**	**Cal. Due date (mm-dd-yyyy)**
Receiver	R&S	ESU8	100537	2020-12-10	2021-12-09
Spectrum analyzer	R&S	FSV40	101185	2020-12-10	2021-12-09
Preamplifier (30MHz~1GHz)	SONOMA	317	393347	2020-12-04	2021-12-03
Preamplifier (1GHz~18GHz)	R&S	SCU-18D	1987397	2020-12-10	2021-12-09
Preamplifier (18GHz~40GHz)	/	MTLNA18040030235	12009007	2020-10-23	2021-10-22
Loop Antenna (9kHz~30MHz)	TESEQ	HLA6121	54575	2021-02-27	2022-02-26
Antenna (30MHz~1GHz)	SCHWARZBECK	VULB9163	9163-965	2020-10-16	2021-10-15
Antenna (1GHz~18GHz)	R&S	HF907	102524	2020-12-15	2021-12-14
Antenna (18GHz~40GHz)	R&S	BBHA9170	1032	2020-10-23	2021-10-22
Band rejection filter	Xi'an xingbo	XBLBQ-DZA81	200827-1-02	/	/

5. Radio Technical Requirements Specification

5.1. Reference Documents for Testing

No.	Identity	Document Title unlicensed
1	FCC Part15C	Subpart C-Intentional Radiators
2	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

5.2. Test Results List

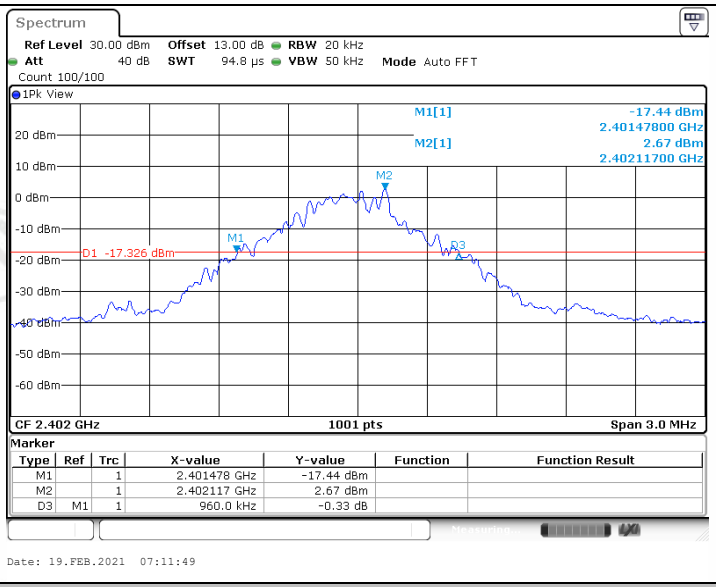
Test requirement	Test method	Test item	Verdict	Note
Part15C Section 15.247 (a)(1)	ANSI 63.10	20dB Emission Bandwidth	PASS	Appendix A)
Part15C Section 15.247 (b)(1)	ANSI 63.10	Maximum conducted output power	PASS	Appendix B)
Part15C Section 15.247 (a)(1)	ANSI 63.10	Carrier Frequencies Separation	PASS	Appendix C)
Part15C Section 15.247 (a)(1	ANSI 63.10	Time of occupancy	PASS	Appendix D)
Part15C Section 15.247 (b)	ANSI 63.10	Number of hopping channels	PASS	Appendix E)
Part15C Section 15.247(d)	ANSI 63.10	Band-edge for RF Conducted Emissions	PASS	Appendix F)
Part15C Section 15.247(d)	ANSI 63.10	Conducted Spurious Emissions	PASS	Appendix G)
Part15C Section 15.203/15.247 (c)	ANSI 63.10	Antenna Requirement	PASS	Appendix H)
Part15C Section 15.207	ANSI 63.10	AC Power Line Conducted Emission	PASS	Appendix I)
Part15C Section 15.205/15.209	ANSI 63.10	Restricted bands around fundamental frequency (Radiated) Emission)	PASS	Appendix J)
Part15C Section 15.205/15.209	ANSI 63.10	Radiated Spurious Emissions	PASS	Appendix K)

Appendix A): 20dB Emission Bandwidth

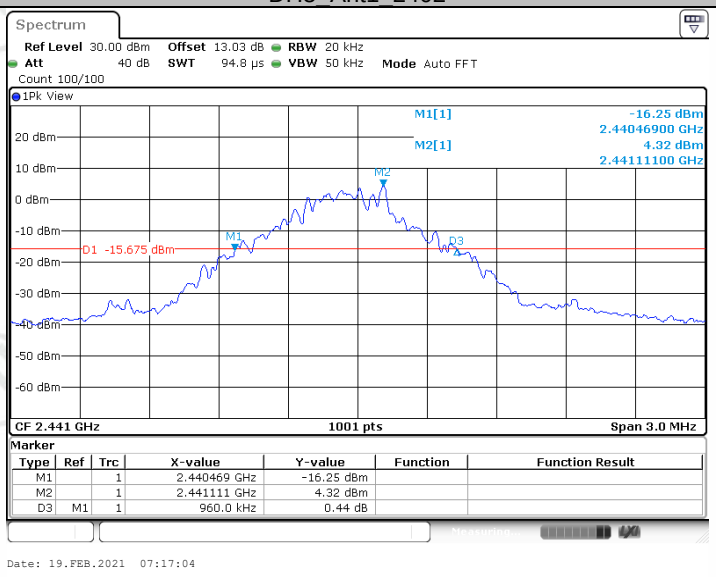
Result Table:

Test Mode	Antenna	Channel	20db EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	0.960	2401.478	2402.438	---	PASS
		2441	0.960	2440.469	2441.429	---	PASS
		2480	0.960	2479.463	2480.423	---	PASS
2DH5	Ant1	2402	1.344	2401.289	2402.633	---	PASS
		2441	1.341	2440.283	2441.624	---	PASS
		2480	1.344	2479.274	2480.618	---	PASS
3DH5	Ant1	2402	1.320	2401.286	2402.606	---	PASS
		2441	1.320	2440.277	2441.597	---	PASS
		2480	1.320	2479.271	2480.591	---	PASS

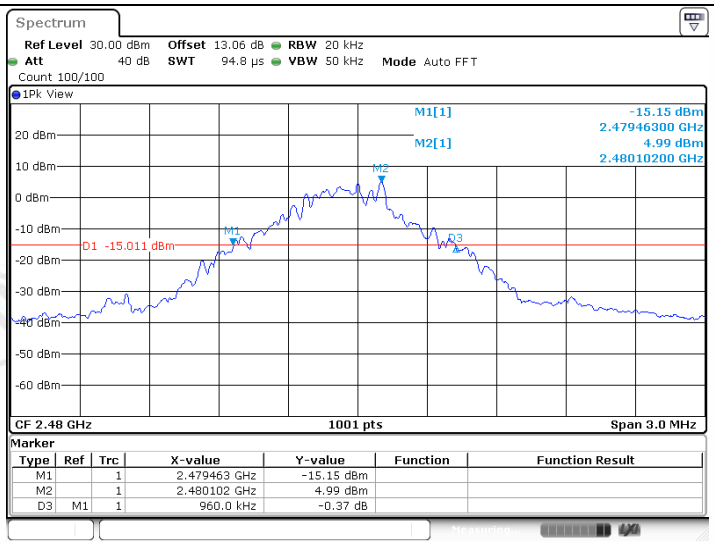
Test Graph:



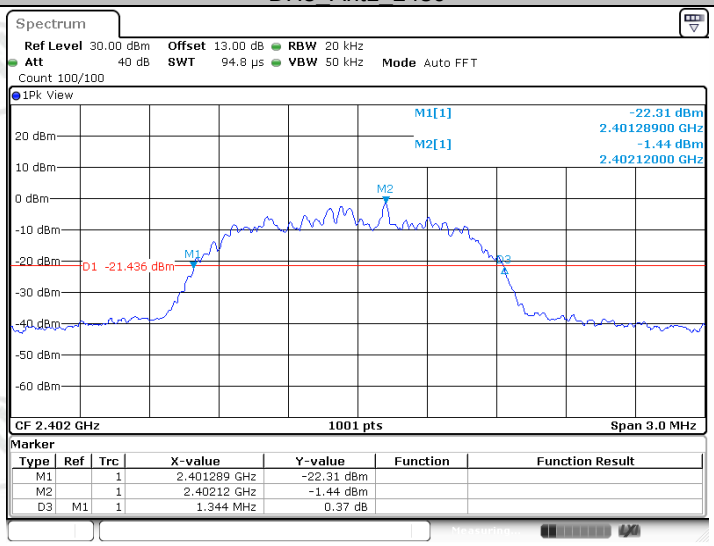
DH5_Ant1_2402



DH5_Ant1_2441



DH5_Ant1_2480



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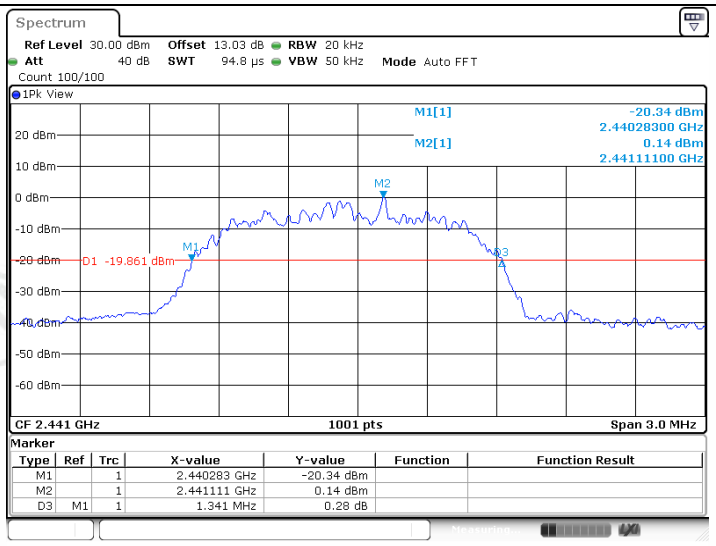

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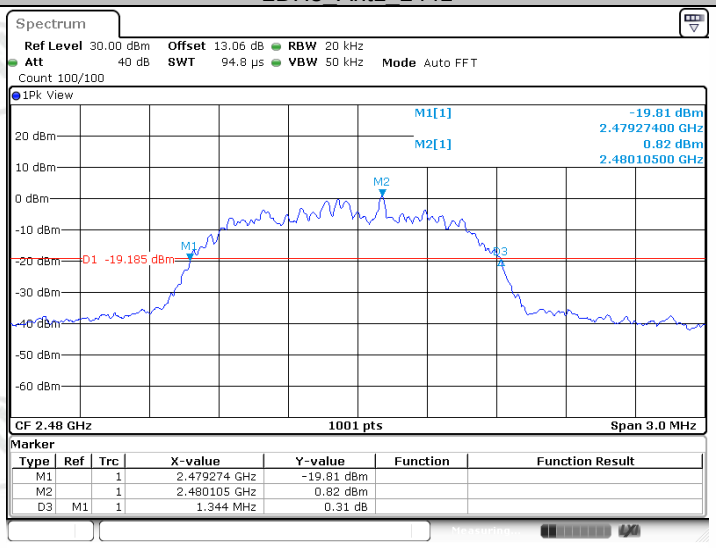

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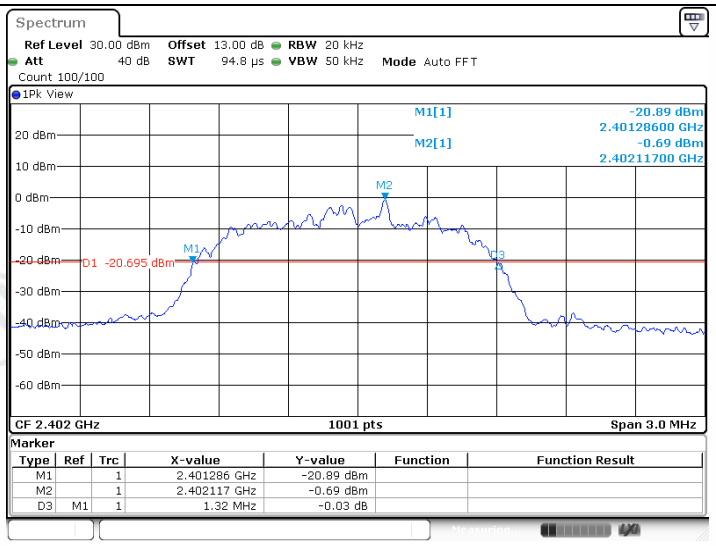

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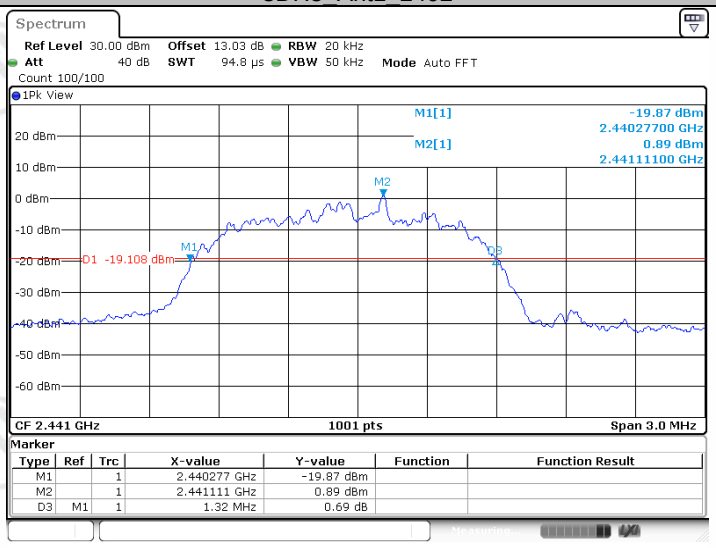

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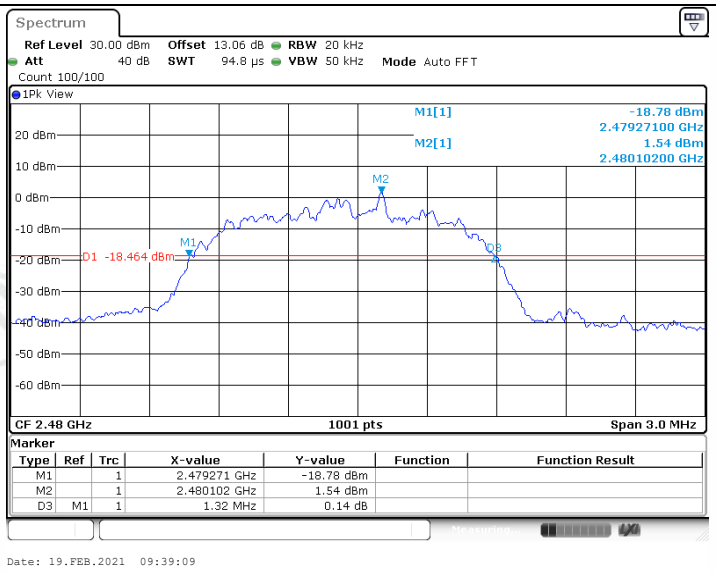


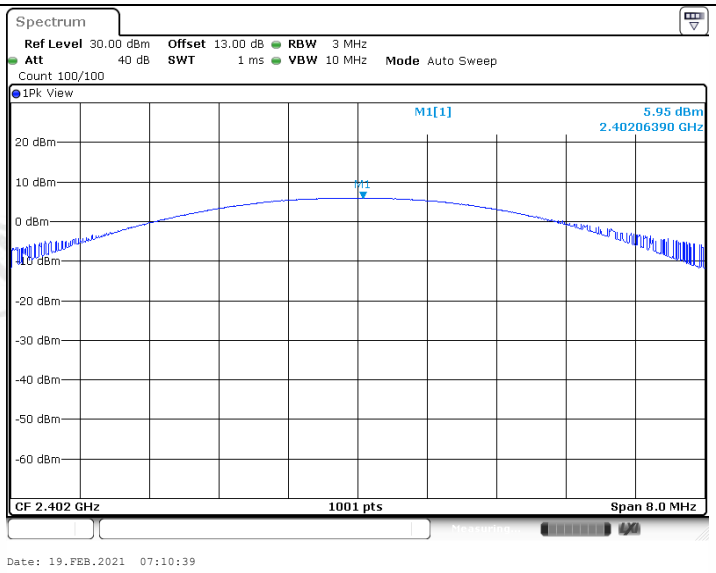
3DH5_Ant1_2480

Appendix B): Maximum conducted output power

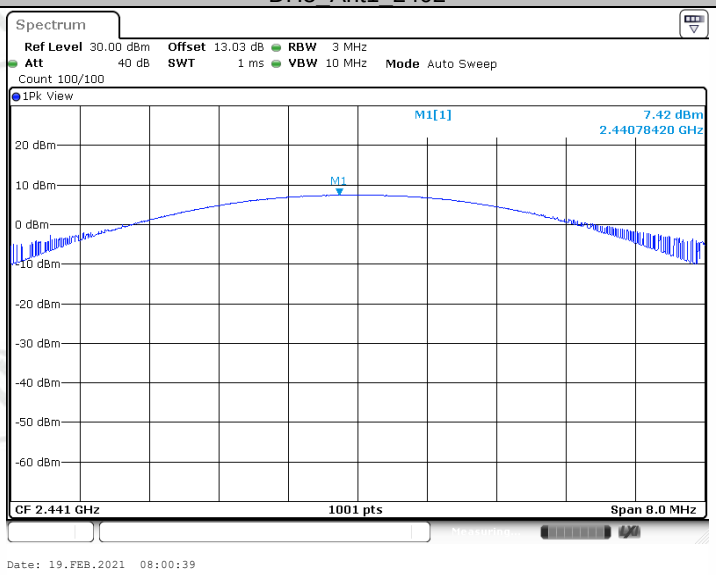
Result Table:

Test Mode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
DH5	Ant1	2402	5.95	<=20.97	PASS
		2441	7.42	<=20.97	PASS
		2480	8.17	<=20.97	PASS
2DH5	Ant1	2402	5.04	<=30	PASS
		2441	6.54	<=30	PASS
		2480	7.14	<=30	PASS
3DH5	Ant1	2402	5.52	<=30	PASS
		2441	6.97	<=30	PASS
		2480	7.53	<=30	PASS

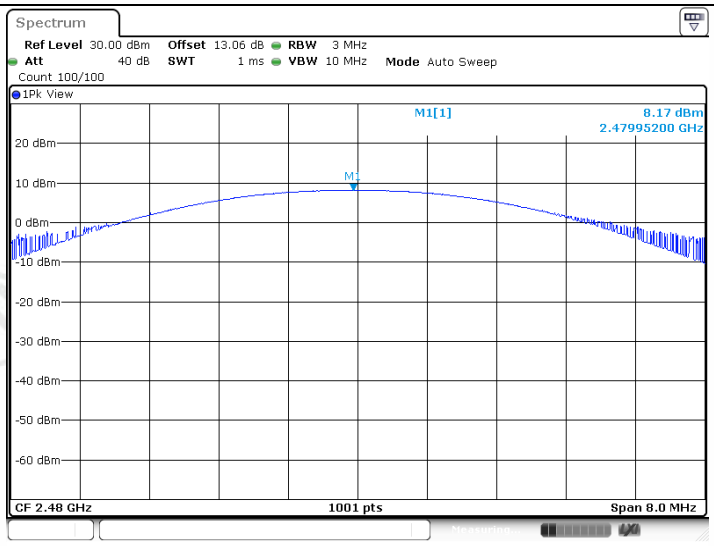
Test Graph:



DH5_Ant1_2402



DH5_Ant1_2441



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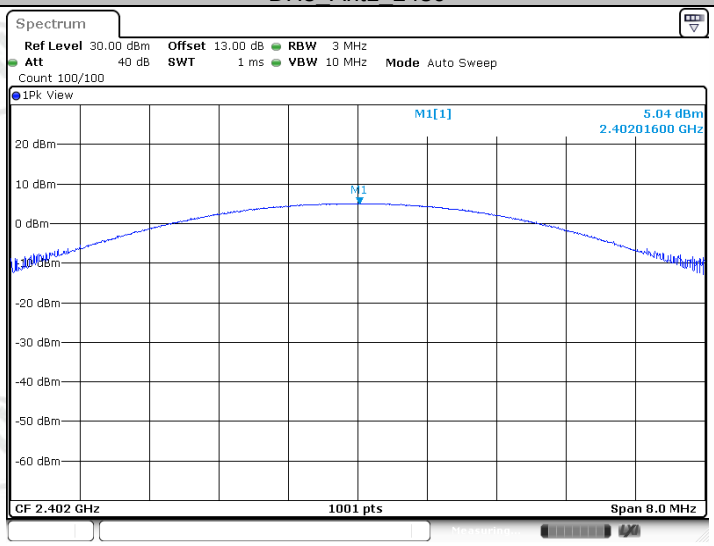
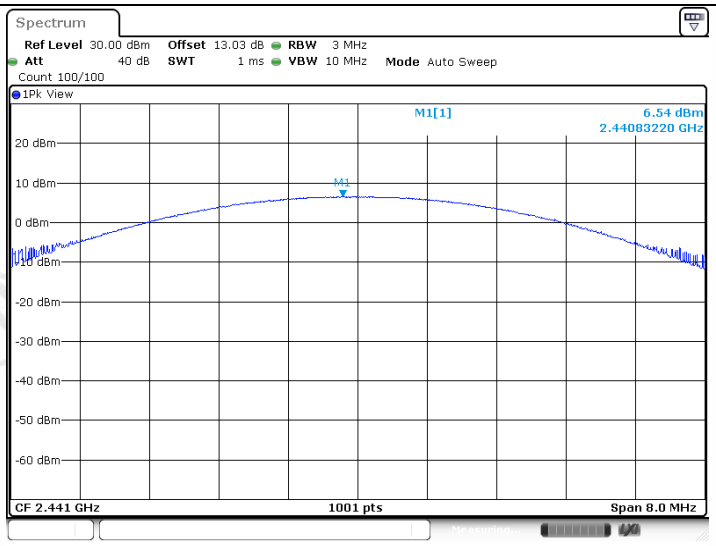


2DH5_Ant1_2402



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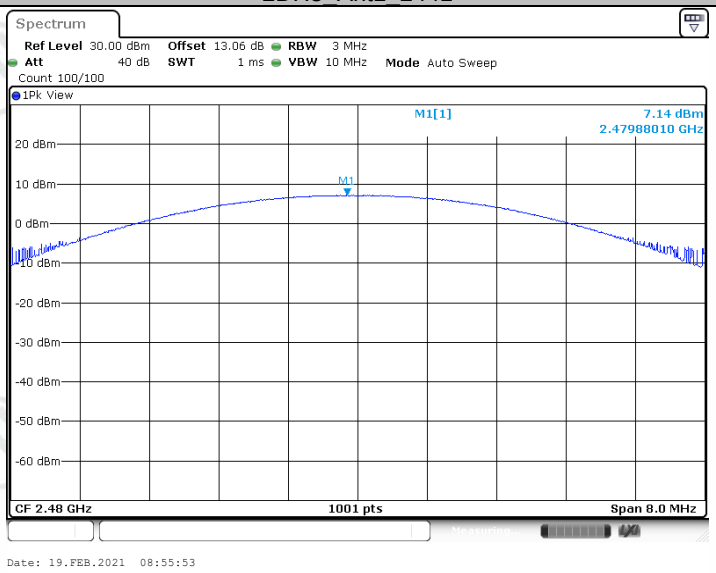

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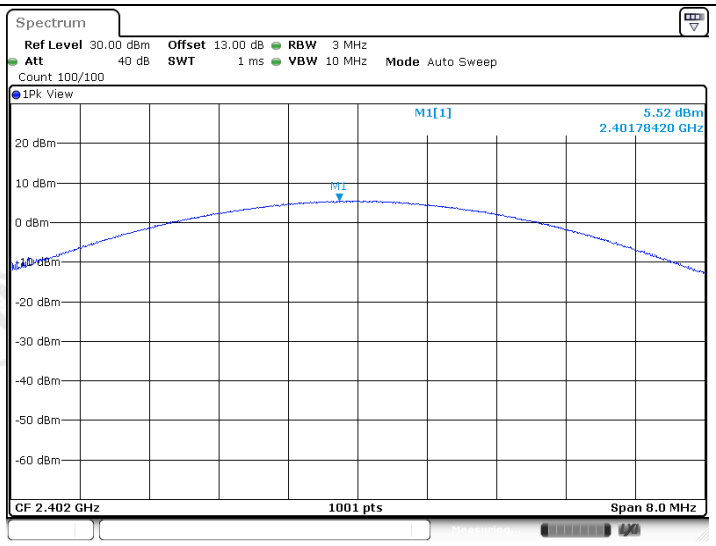

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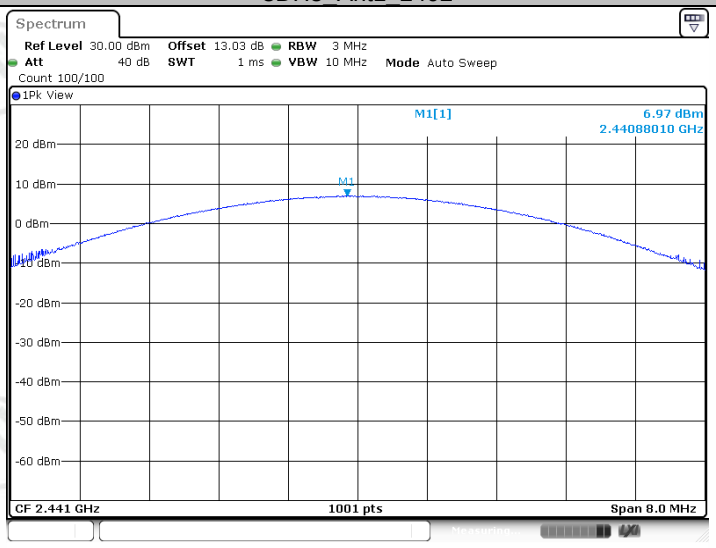

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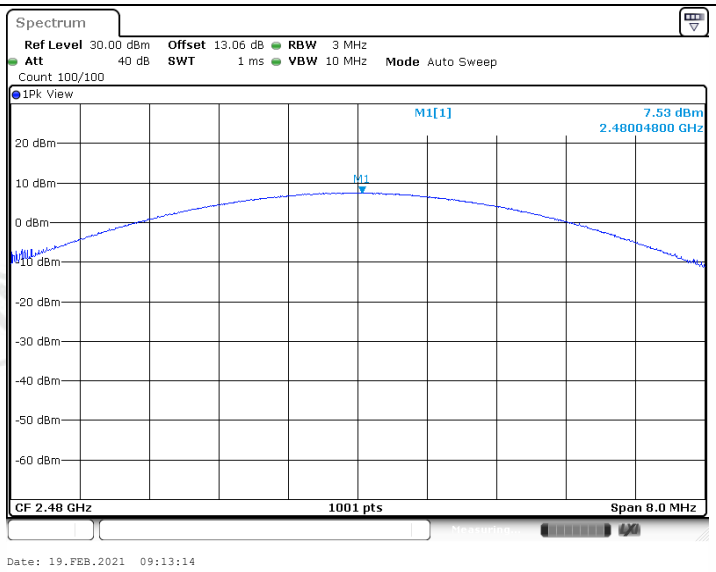


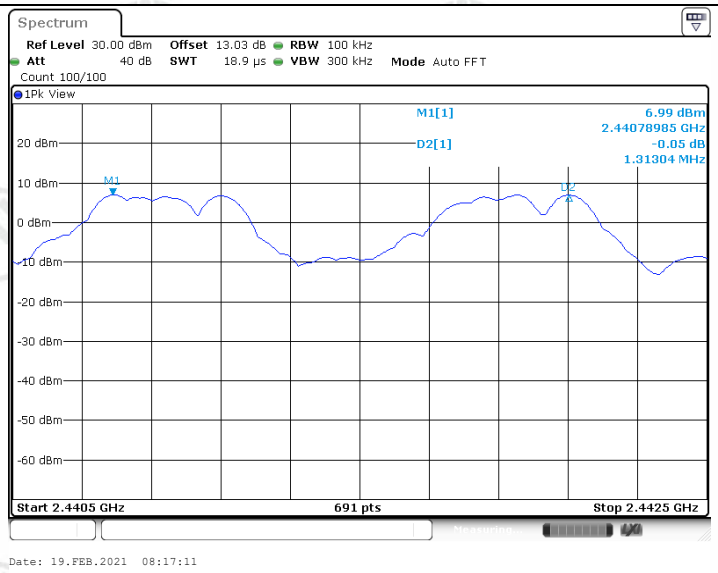
3DH5_Ant1_2480

Appendix C): Carrier frequency separation

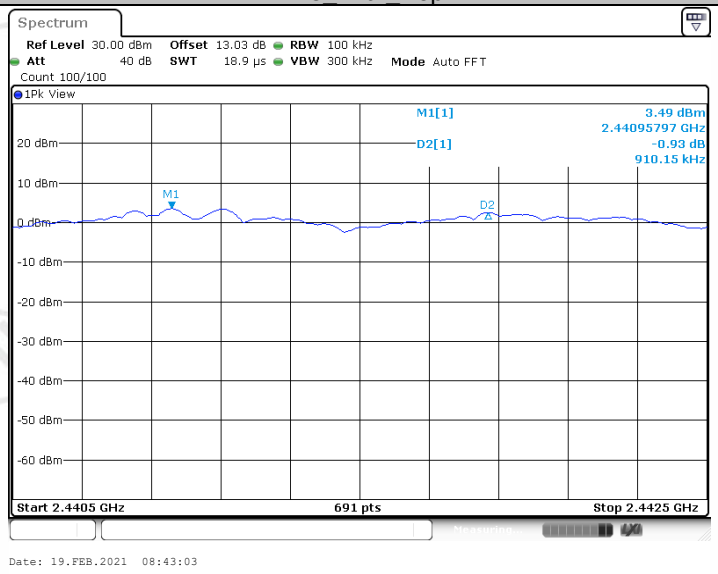
Result Table:

Test Mode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
DH5	Ant1	Hop	1.313	>=0.960	PASS
2DH5	Ant1	Hop	0.91	>=0.896	PASS
3DH5	Ant1	Hop	1.067	>=0.880	PASS

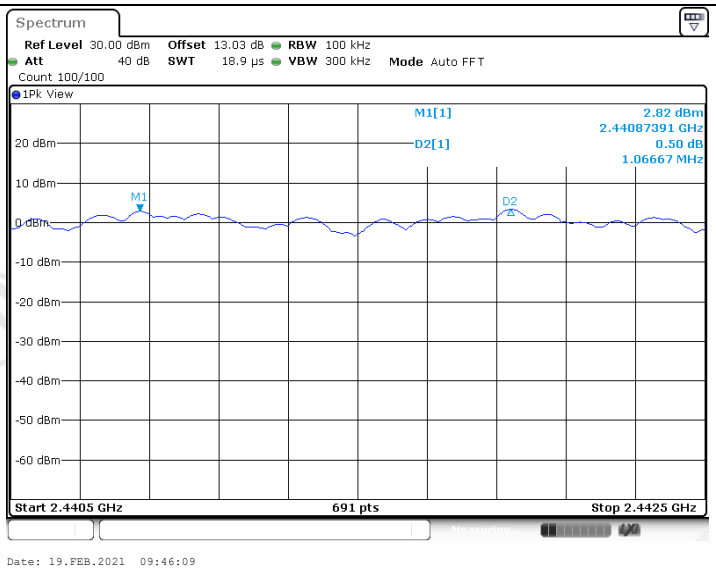
Test Graph:



DH5_Ant1_Hop



2DH5_Ant1_Hop



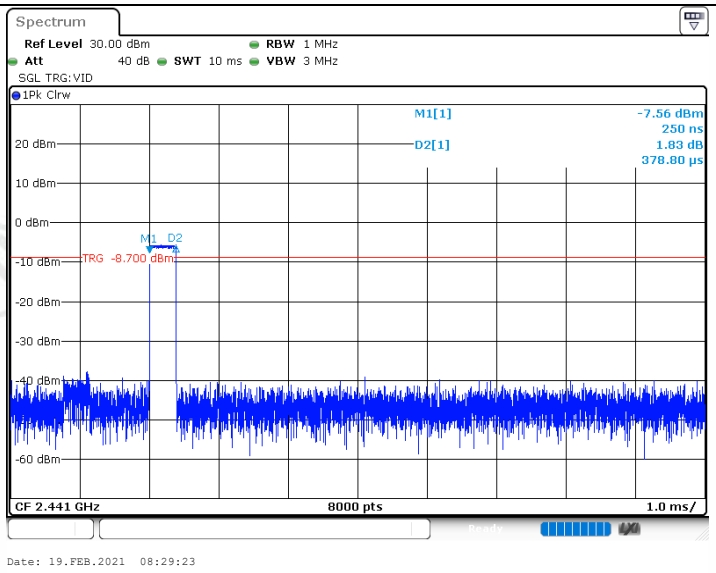
3DH5_Ant1_Hop

Appendix D): Time of occupancy

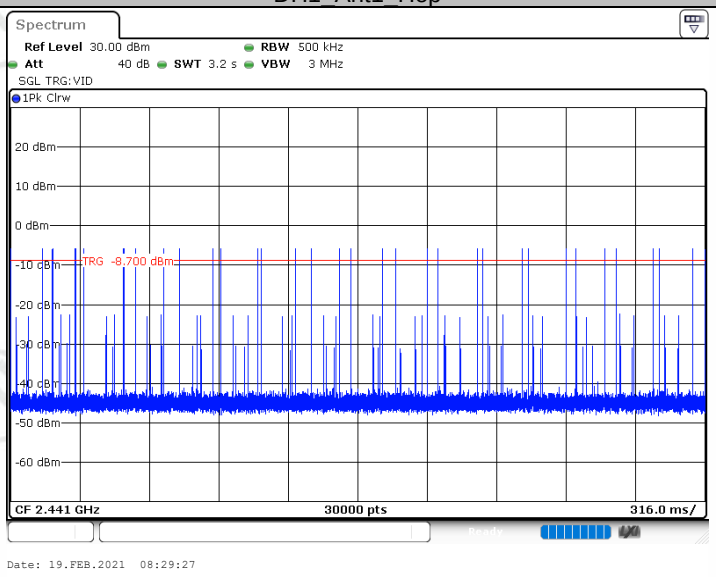
Result Table:

Test Mode	Antenna	Channel	Burst Width [ms]	Total Hops [Num]	Result[s]	Limit[s]	Verdict
DH1	Ant1	Hop	0.38	320	0.121	<=0.4	PASS
DH3	Ant1	Hop	1.14	150	0.172	<=0.4	PASS
DH5	Ant1	Hop	0.14	330	0.046	<=0.4	PASS
2DH1	Ant1	Hop	0.39	330	0.127	<=0.4	PASS
2DH3	Ant1	Hop	1.14	140	0.16	<=0.4	PASS
2DH5	Ant1	Hop	-0.70	150	-0.105	<=0.4	PASS
3DH1	Ant1	Hop	0.39	320	0.124	<=0.4	PASS
3DH3	Ant1	Hop	1.15	180	0.206	<=0.4	PASS
3DH5	Ant1	Hop	1.78	170	0.303	<=0.4	PASS

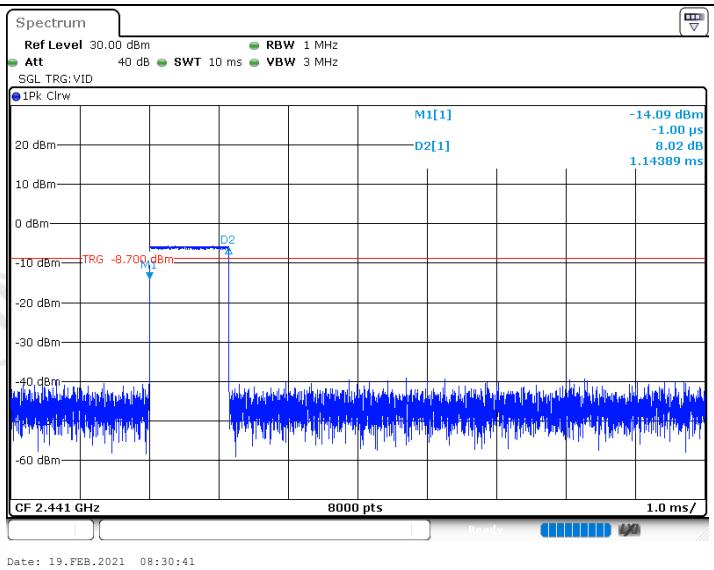
Test Graph:



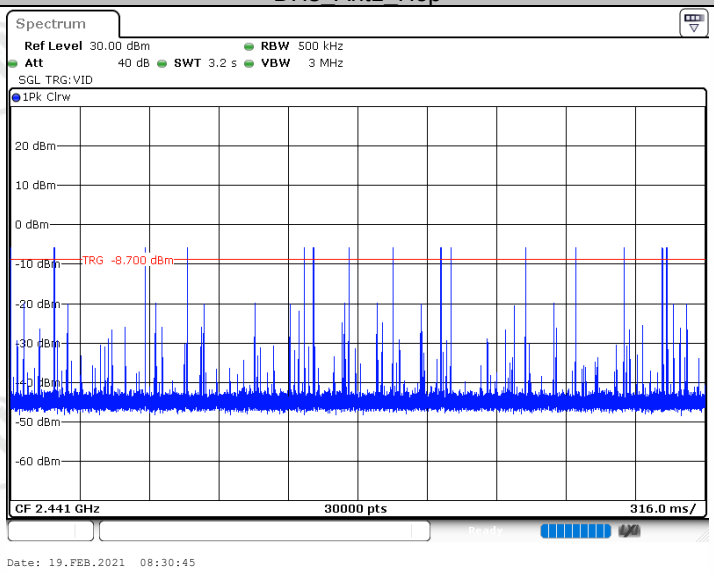
DH1_Ant1_Hop



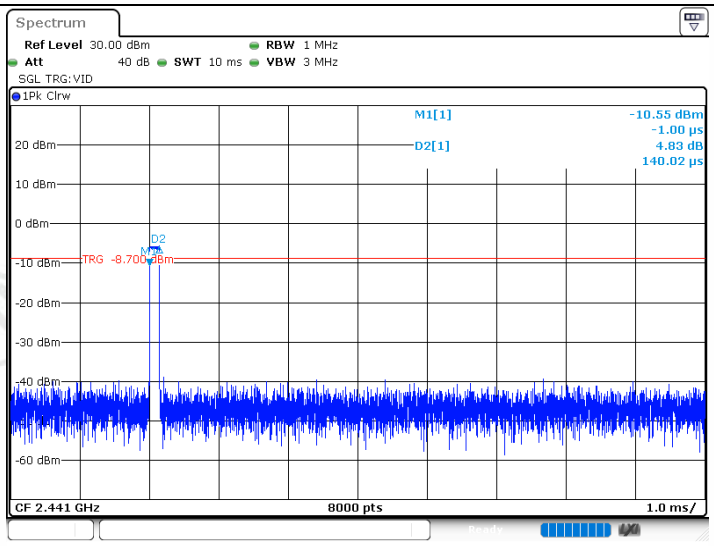
DH1_Ant1_Hop



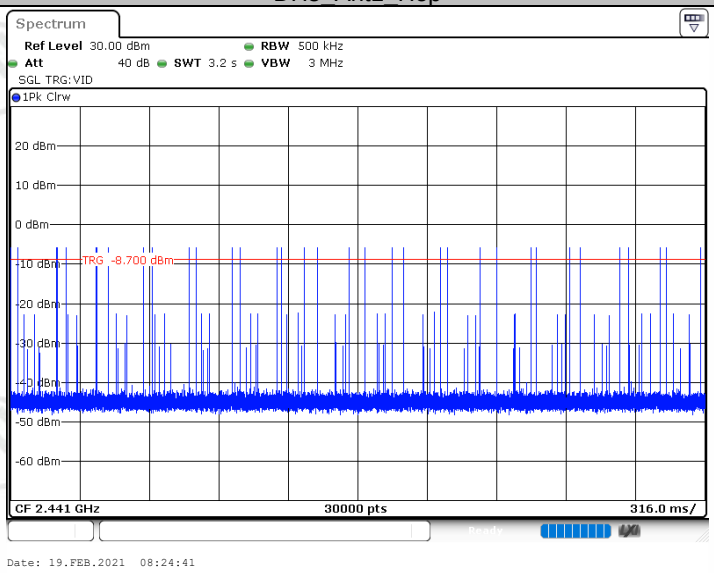
DH3_Ant1_Hop



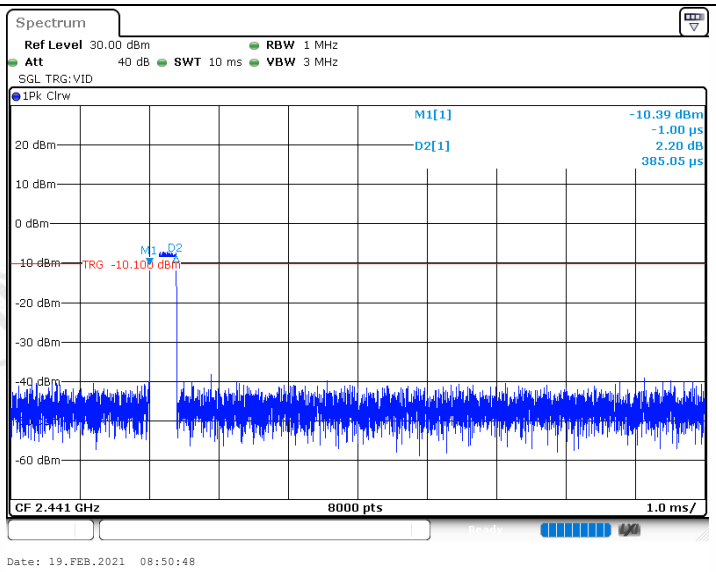
DH3_Ant1_Hop



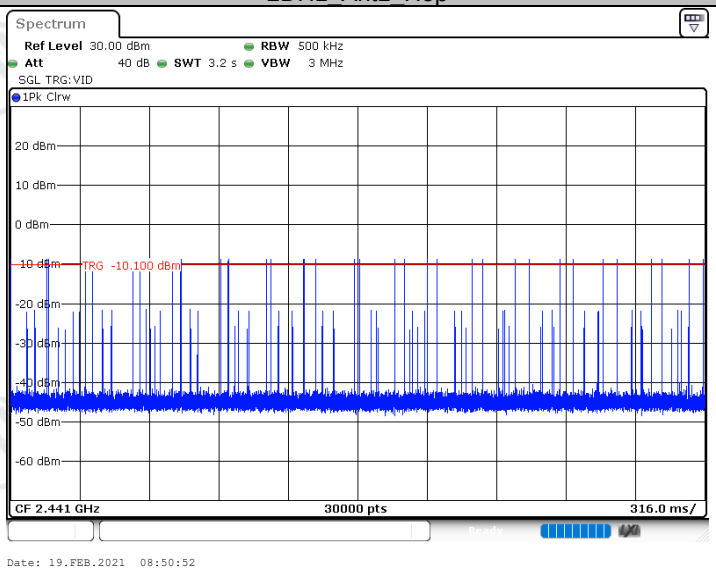
DH5_Ant1_Hop



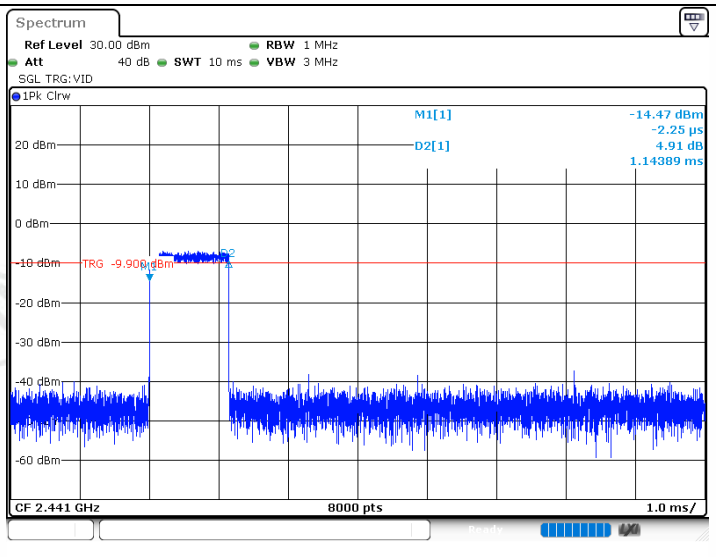
DH5_Ant1_Hop



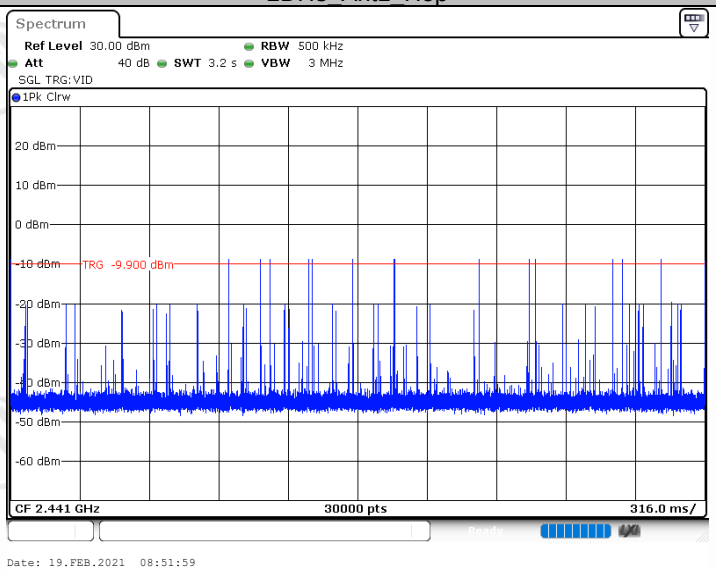
2DH1_Ant1_Hop



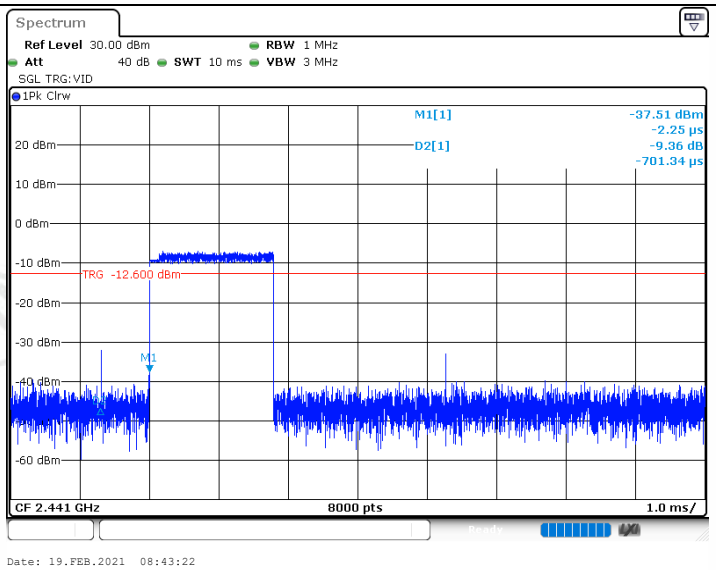
2DH1_Ant1_Hop



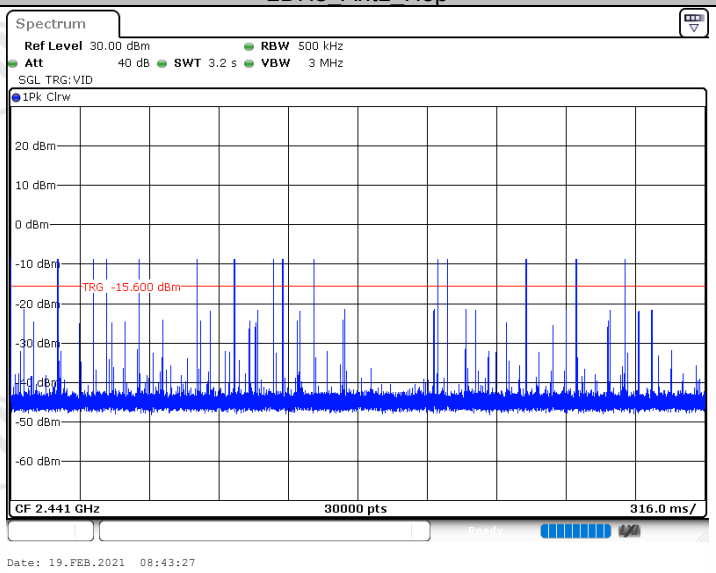
2DH3_Ant1_Hop



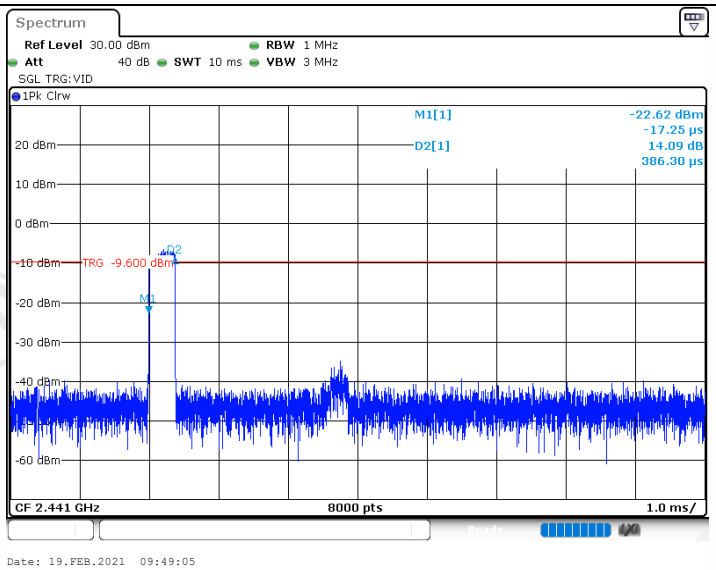
2DH3_Ant1_Hop



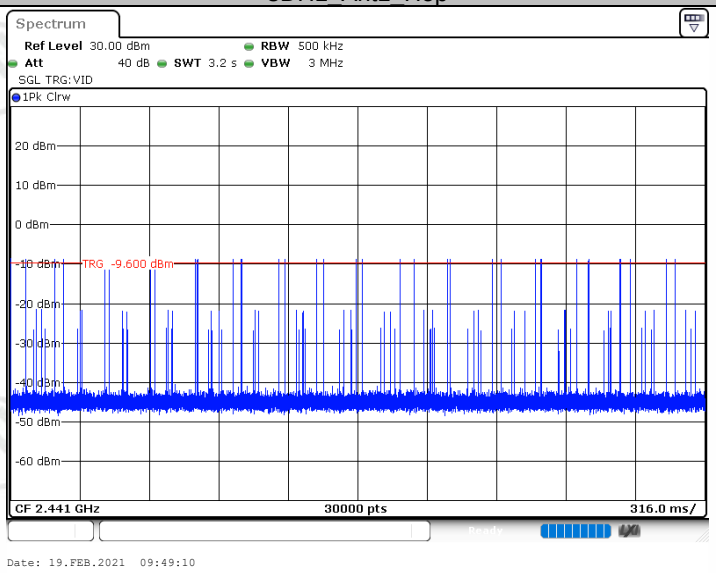
2DH5_Ant1_Hop



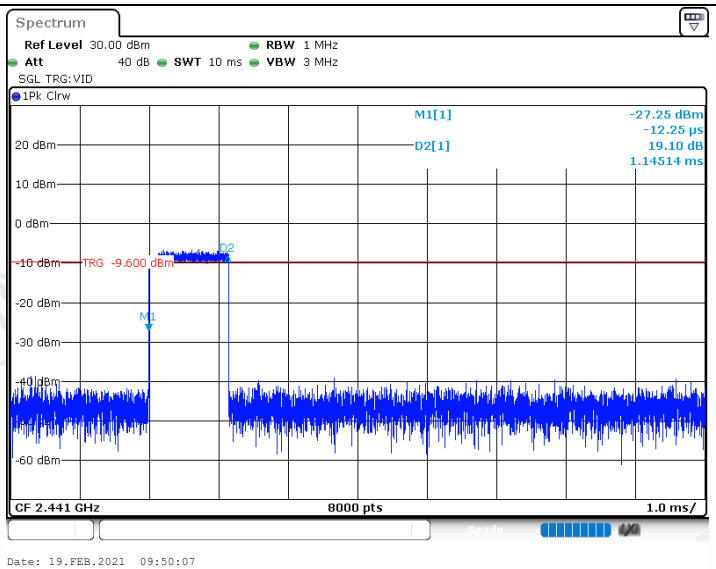
2DH5_Ant1_Hop



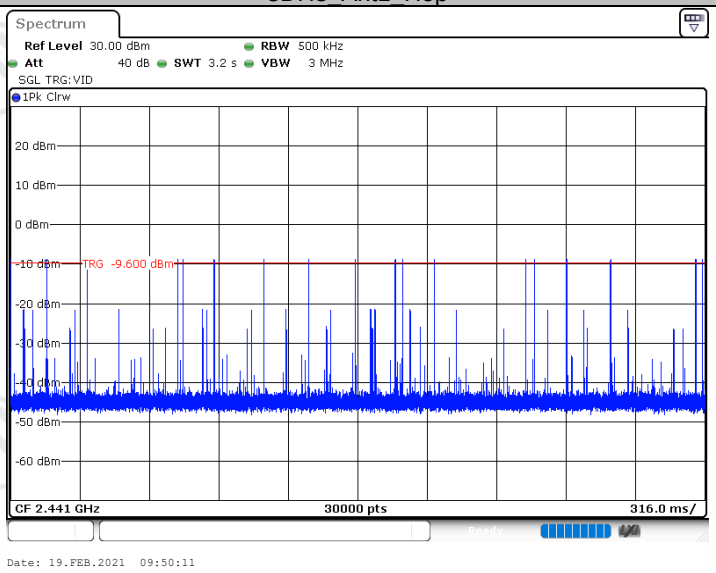
3DH1_Ant1_Hop



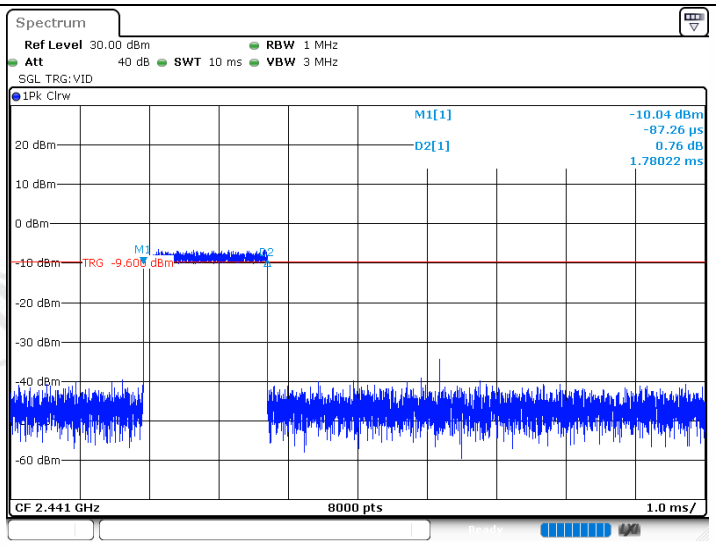
3DH1_Ant1_Hop



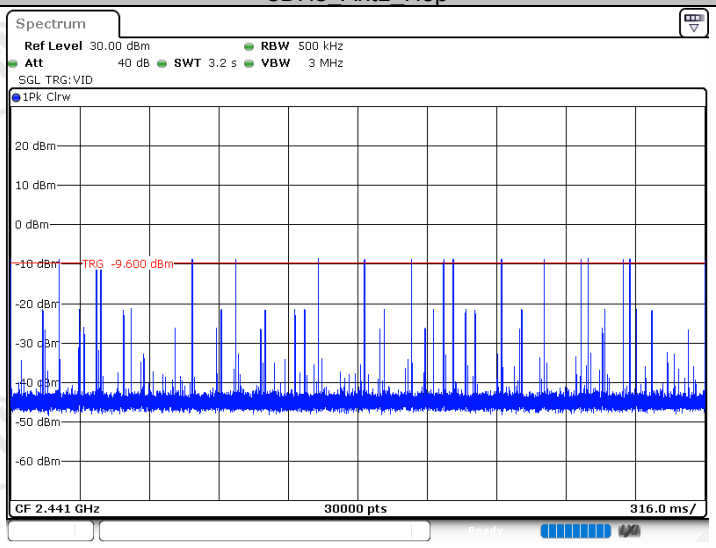
3DH3_Ant1_Hop



3DH3_Ant1_Hop



3DH5_Ant1_Hop



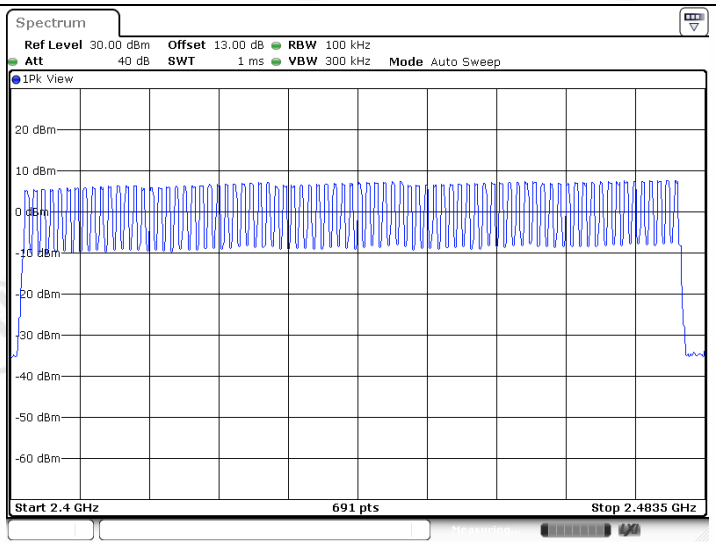
3DH5_Ant1_Hop

Appendix E): Number of hopping channels

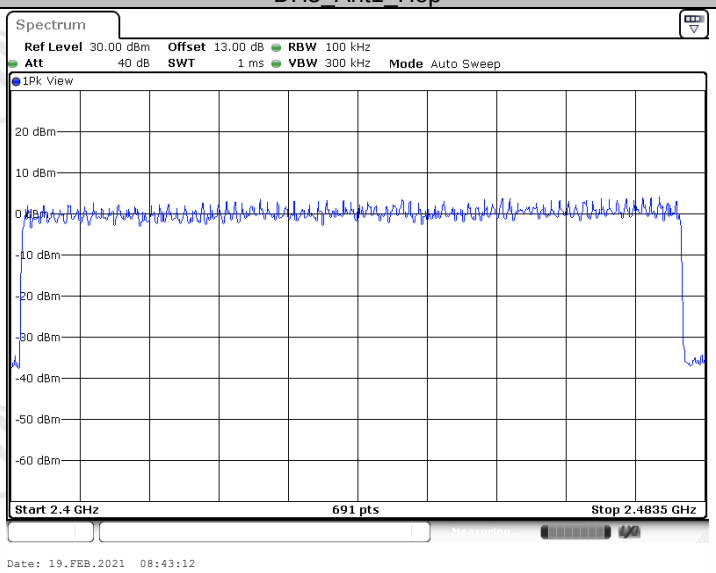
Result Table:

Test Mode	Antenna	Channel	Result [Num]	Limit [Num]	Verdict
DH5	Ant1	Hop	79	>=15	PASS
2DH5	Ant1	Hop	79	>=15	PASS
3DH5	Ant1	Hop	79	>=15	PASS

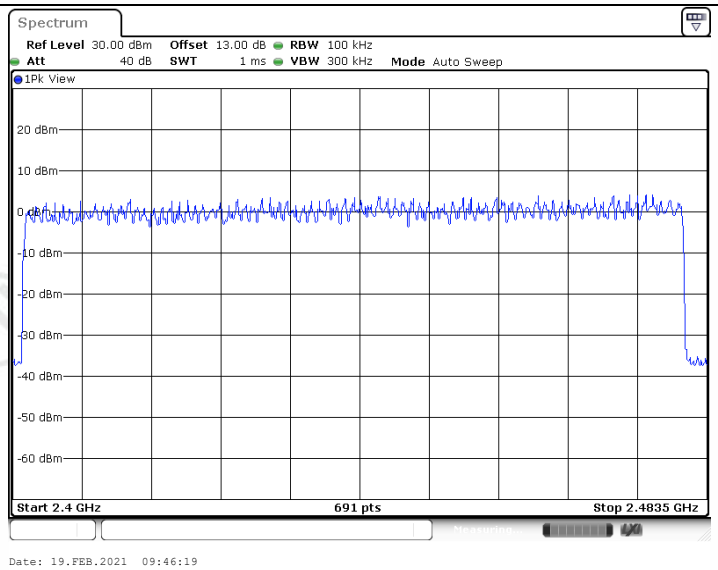
Test Graph:



DH5_Ant1_Hop



2DH5_Ant1_Hop



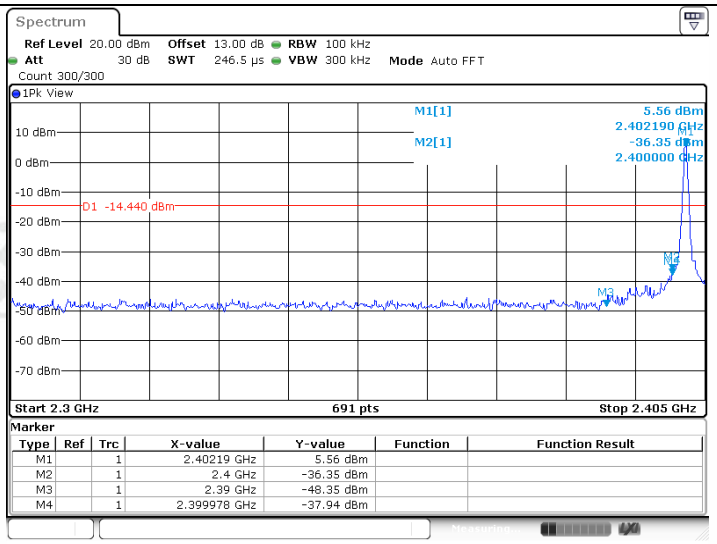
3DH5_Ant1_Hop

Appendix F): Band-edge for RF Conducted Emissions

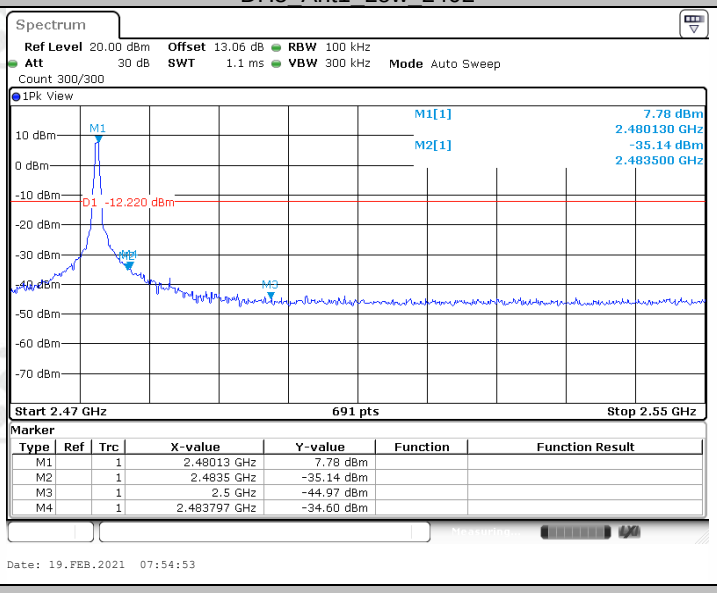
Result Table:

Test Mode	Antenna	Ch Name	Channel	Ref Level [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	Low	2402	5.56	-37.94	<=-14.44	PASS
		High	2480	7.78	-34.6	<=-12.22	PASS
		Low	Hop_2402	4.87	-45.52	<=-15.13	PASS
		High	Hop_2480	7.42	-44.52	<=-12.58	PASS
2DH5	Ant1	Low	2402	2.01	-38.24	<=-17.99	PASS
		High	2480	4.28	-37.53	<=-15.72	PASS
		Low	Hop_2402	-0.32	-45.92	<=-20.32	PASS
		High	Hop_2480	4.22	-44.32	<=-15.78	PASS
3DH5	Ant1	Low	2402	2.12	-37.29	<=-17.88	PASS
		High	2480	4.33	-39	<=-15.67	PASS
		Low	Hop_2402	-0.34	-45.52	<=-20.34	PASS
		High	Hop_2480	4.27	-44.11	<=-15.73	PASS

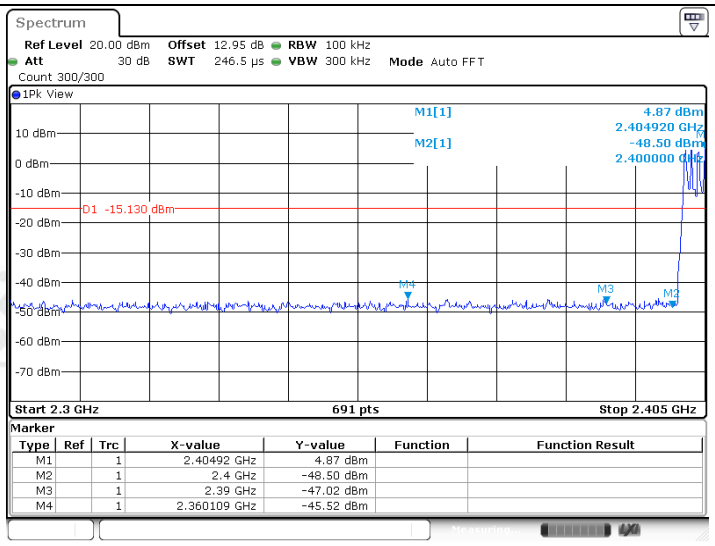
Test Graph:



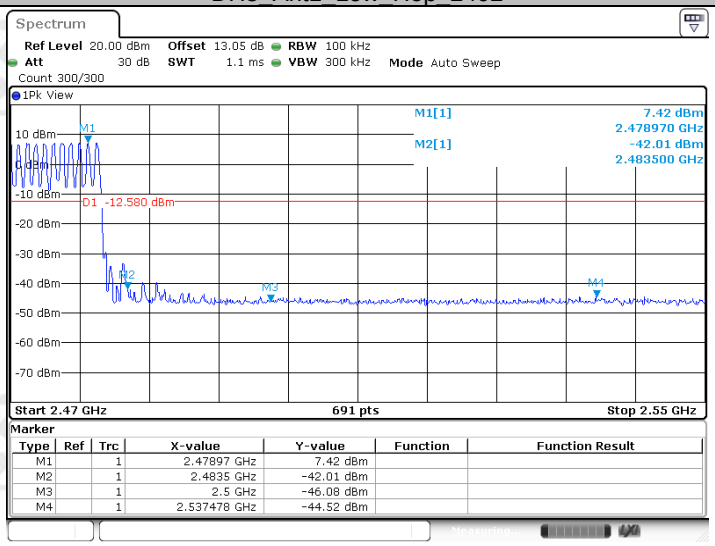
DH5_Ant1_Low_2402



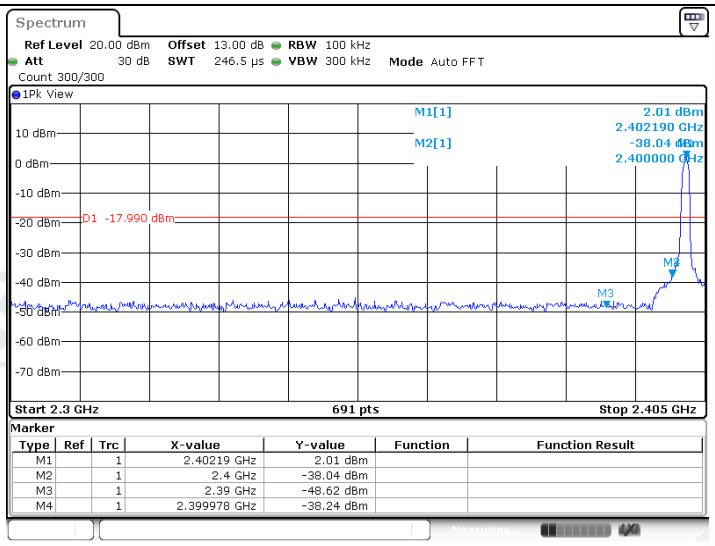
DH5_Ant1_High_2480



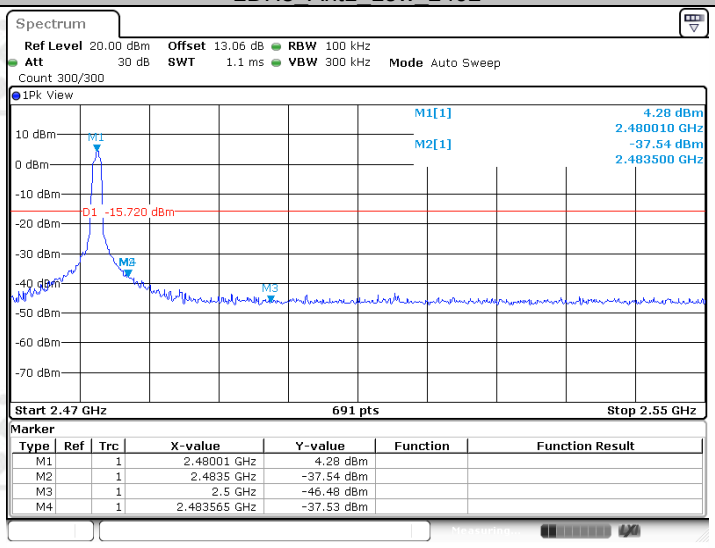
DH5_Ant1_Low_Hop_2402



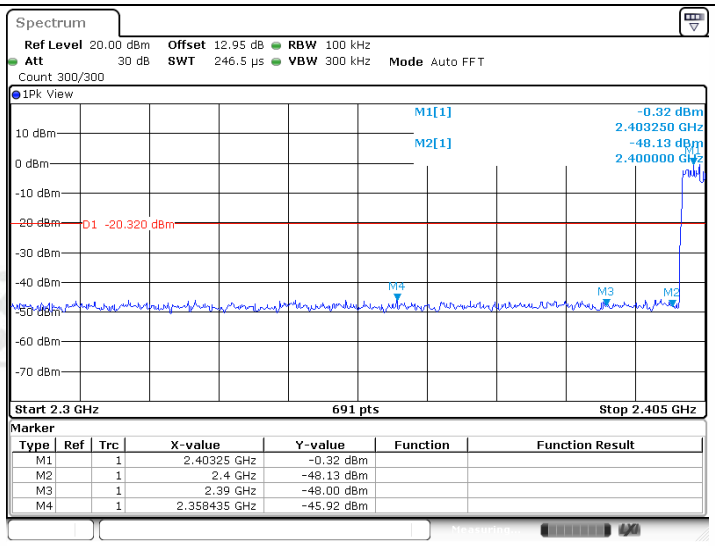
DH5_Ant1_High_Hop_2480



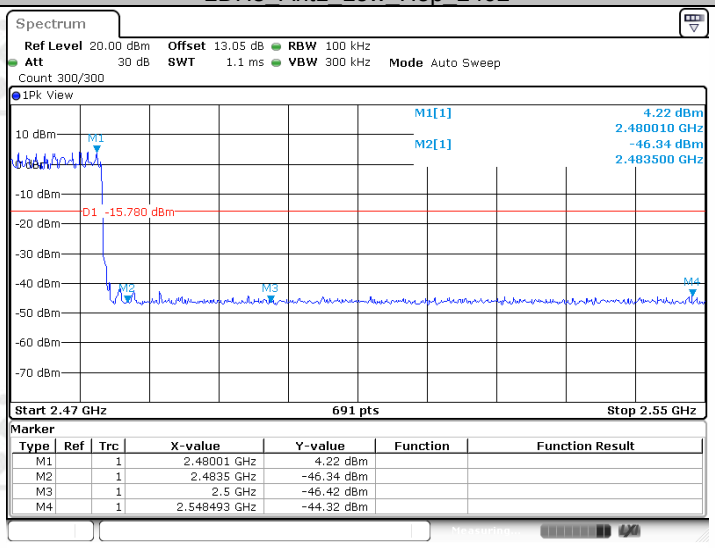
2DH5_Ant1_Low_2402



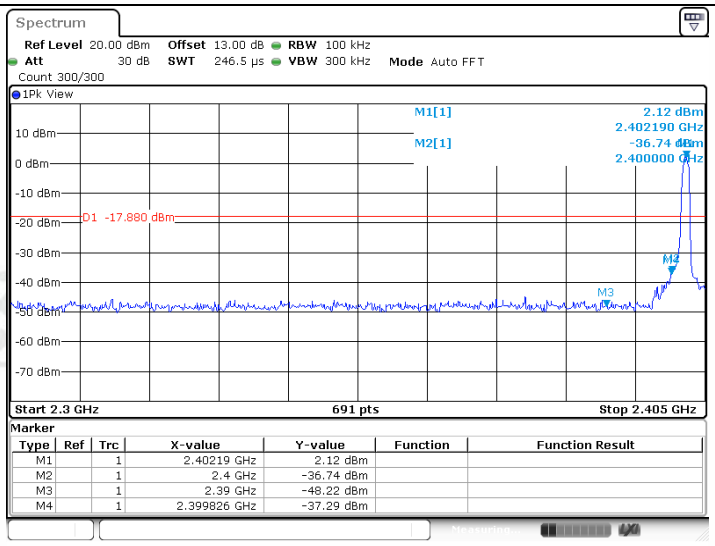
2DH5_Ant1_High_2480



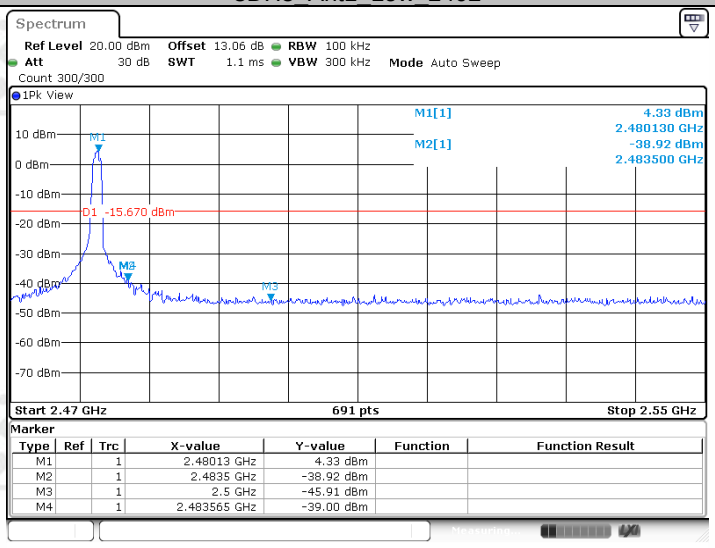
2DH5_Ant1_Low_Hop_2402



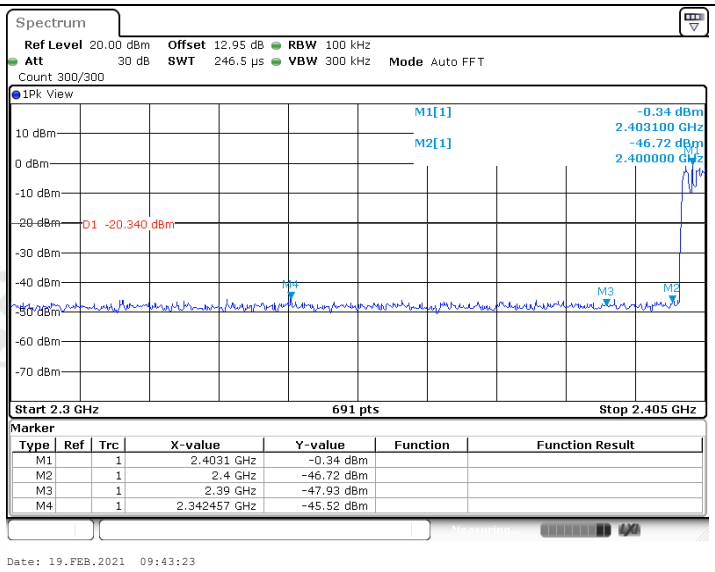
2DH5_Ant1_High_Hop_2480



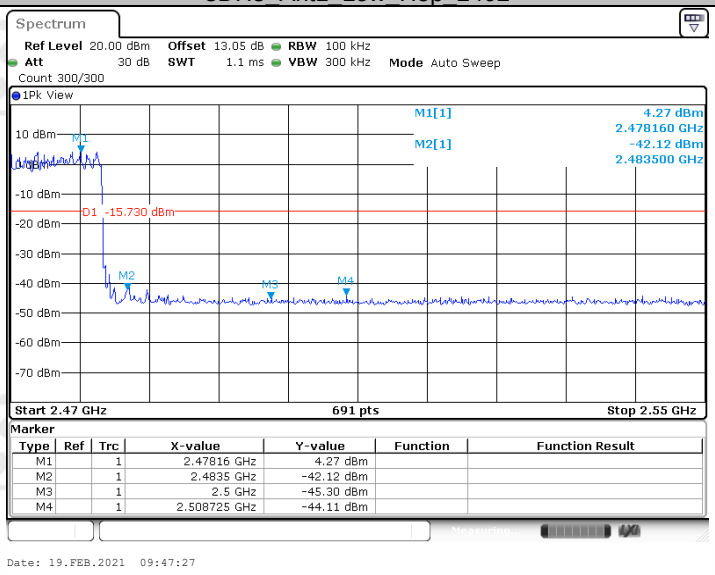
3DH5_Ant1_Low_2402



3DH5_Ant1_High_2480



3DH5_Ant1_Low_Hop_2402



3DH5_Ant1_High_Hop_2480