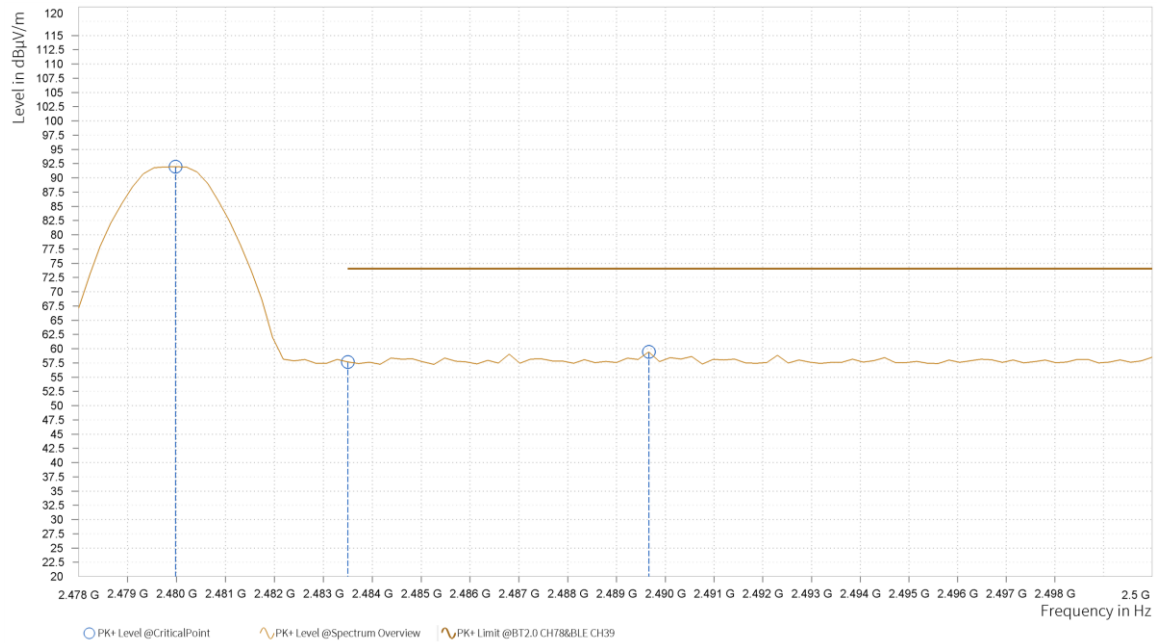




ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dB $\mu$ V/m]	PK+ Limit [dB $\mu$ V/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
6	2,479.980	91.95			37.87	V	226.6	2.00
6	2,483.500	57.67	74.00	16.33	37.88	V	226.6	1.00
6	2,489.660	59.43	74.00	14.57	37.89	V	6.9	2.00





## ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
6	2,479.980	86.09			37.87	V	227.9	2.00
6	2,483.500	43.36	54.00	10.64	37.88	V	90.5	2.00
6	2,496.480	43.45	54.00	10.55	37.91	V	5.1	1.00



## REMARKS:

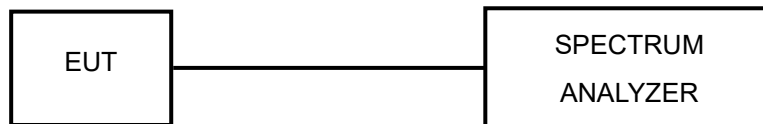
1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
2. Margin value = Limit value – Emission level.
3. 2402MHz: Fundamental frequency.



### 3.3.1 LIMIT OF HOPPING FREQUENCY USED

At least 15 channels frequencies, and should be equally spaced.

### 3.3.2 TEST SETUP





## 3.3.3 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	R&S	ESW 44	101973	Mar.28,24	Mar.27,26
Open Switch and Control Unit	R&S	OSP-B157W8	100836	N/A	N/A
Vector Signal Generator	R&S	SMBV100B	102176	Mar.29,24	Mar.28,26
Signal Generator	R&S	SMB100A03	182185	Mar.29,24	Mar.28,26
WIDEBANDRADIO COMMUNICATION TESTER	R&S	CMW500	169399	Jun.19,24	Jun.18,26
Hygrothermograph	DELI	20210528	SZ015	Sep.06,23	Sep.05,25
PC	LENOVO	E14	HRSW0024	N/A	N/A
CABLE	R&S	J12J103539-00-1	SEP-03-20-069	Apr.27,24	Apr.26,25
CABLE	R&S	J12J103539-00-1	SEP-03-20-069	Apr.26,25	Apr.25,26
CABLE	R&S	J12J103539-00-1	SEP-03-20-070	Apr.27,24	Apr.26,25
CABLE	R&S	J12J103539-00-1	SEP-03-20-070	Apr.26,25	Apr.25,26
Test Software	EMC32	EMC32	N/A	N/A	N/A
Temperature Chamber	votsch	VT4002	58566078100050	May.30,24	May.29,26
Power Meter	R&S	NRX	102380	Mar.28,24	Mar.27,26
Power Meter probe	R&S	NRP6A	102942	Mar.28,24	Mar.27,26

**NOTE:**

1. The calibration interval of the above test instruments is 12 /24 months and the calibrations are traceable to CEPREI/CHINA, GREGT/CHINA and NIM/CHINA.
2. The test was performed in RF Oven room.



### 3.3.4 TEST PROCEDURES

- a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
- b. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
- c. Set the SA on MaxHold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.
- d. Set the SA on View mode and then plot the result on SA screen.
- e. Repeat above procedures until all frequencies measured were completed.

### 3.3.5 DEVIATION FROM TEST STANDARD

No deviation.

### 3.3.6 TEST RESULTS

There are 79 hopping frequencies in the hopping mode. Please refer to next two pages for the test result. On the plots, it shows that the hopping frequencies are equally spaced.

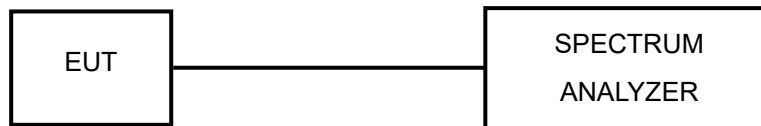
Please Refer to Appendix of this test report.

### 3.4 DWELL TIME ON EACH CHANNEL

#### 3.4.1 LIMIT OF DWELL TIME USED

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.

#### 3.4.2 TEST SETUP



#### 3.4.3 TEST INSTRUMENTS

Refer to section 3.3.3 to get information of above instrument.

#### 3.4.4 TEST PROCEDURES

- Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
- Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
- Adjust the center frequency of SA on any frequency be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
- Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
- Repeat above procedures until all different time-slot modes have been completed.



### 3.4.5 DEVIATION FROM TEST STANDARD

No deviation.

### 3.4.6 TEST RESULTS

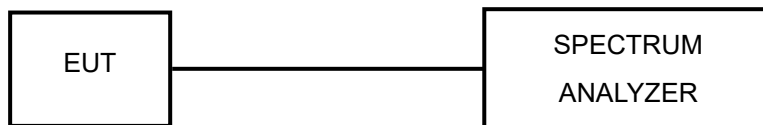
Please Refer to Appendix of this test report

### 3.5 CHANNEL BANDWIDTH

#### 3.5.1 LIMITS OF CHANNEL BANDWIDTH

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.

#### 3.5.2 TEST SETUP



#### 3.5.3 TEST INSTRUMENTS

Refer to section 3.3.3 to get information of above instrument.

#### 3.5.4 TEST PROCEDURE

- a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- c. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
- d. Repeat above procedures until all frequencies measured were complete.

#### 3.5.5 DEVIATION FROM TEST STANDARD

No deviation.





### 3.5.6 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

### 3.5.7 TEST RESULTS

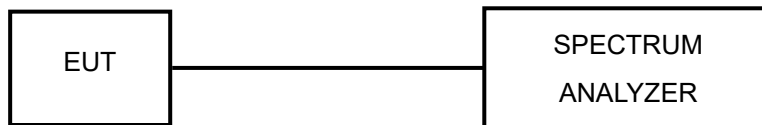
Please Refer to Appendix of this test report.

### 3.6 HOPPING CHANNEL SEPARATION

#### 3.6.1 LIMIT OF HOPPING CHANNEL SEPARATION

At least 25kHz or two-third of 20dB hopping channel bandwidth (whichever is greater).

#### 3.6.2 TEST SETUP



#### 3.6.3 TEST INSTRUMENTS

Refer to section 3.3.3 to get information of above instrument.

#### 3.6.4 TEST PROCEDURES

- 1 Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2 Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range.
- 3 By using the MaxHold function record the separation of two adjacent channels.
- 4 Measure the frequency difference of these two adjacent channels by SA MARK function. And then plot the result on SA screen.
- 5 Repeat above procedures until all frequencies measured were complete.

#### 3.6.1 DEVIATION FROM TEST STANDARD

No deviation.

#### 3.6.2 TEST RESULTS

Please Refer to Appendix of this test report.

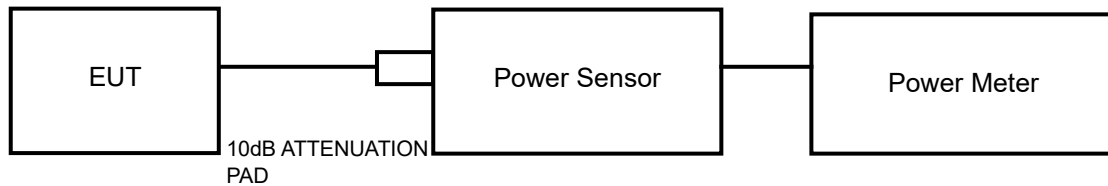


### 3.7 MAXIMUM OUTPUT POWER

#### 3.7.1 LIMITS OF MAXIMUM OUTPUT POWER MEASUREMENT

The Maximum Output Power Measurement is 125mW.

#### 3.7.2 TEST SETUP



#### 3.7.3 TEST INSTRUMENTS

Refer to section 3.3.3 to get information of above instrument.

#### 3.7.4 TEST PROCEDURES

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

### 3.7.5 DEVIATION FROM TEST STANDARD

No deviation.

### 3.7.6 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

### 3.7.7 TEST RESULTS

#### 3.7.7.1 MAXIMUM PEAK OUTPUT POWER

Please Refer to Appendix of this test report.

#### 3.7.7.2 AVERAGE OUTPUT POWER (FOR REFERENCE)

The average power sensor was used on the output port of the EUT. A power meter was used to read the response of the power sensor. Record the power level.

Please Refer to Appendix of this test report.



### **3.8 OUT OF BAND MEASUREMENT**

#### **3.8.1 LIMITS OF OUT OF BAND MEASUREMENT**

Below -20dB of the highest emission level of operating band (in 100KHz RBW).

#### **3.8.2 TEST INSTRUMENTS**

Refer to section 3.3.3 to get information of above instrument.

#### **3.8.3 TEST PROCEDURE**

The transmitter output was connected to the spectrum analyzer via a low loss cable. Spectrum Analyzer was set RBW to 100 kHz and VBW to 300 kHz with suitable frequency span including 100 MHz bandwidth from band edge. Detector = PEAK and Trace mode = Max Hold. The band edges was measured and recorded.

#### **3.8.4 DEVIATION FROM TEST STANDARD**

No deviation.

#### **3.8.5 EUT OPERATING CONDITION**

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

#### **3.8.6 TEST RESULTS**

The spectrum plots are attached on the following images. D1 line indicates the highest level. D2 line indicates the 20dB offset below D1. It shows compliance to the requirement.

Please Refer to Appendix of this test report.



## **4 PHOTOGRAPHS OF THE TEST CONFIGURATION**

Please refer to the attached file (Test Setup Photo).



## **5 MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB**

No any modifications are made to the EUT by the lab during the test.



## 6 Appendix

### 20DB EMISSION BANDWIDTH

#### TEST RESULT

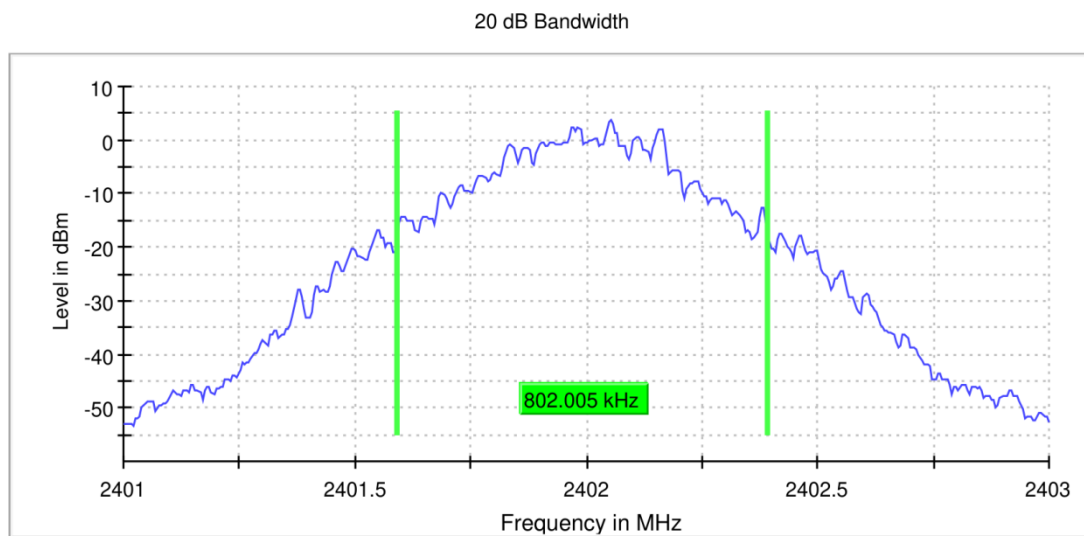
TestMode	Antenna	Channel	20db EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	ANT1	2402	0.802	2401.591	2402.393	---	PASS
		2441	0.802	2440.591	2441.393	---	PASS
		2480	0.802	2479.591	2480.393	---	PASS
2DH5	ANT1	2402	1.233	2401.386	2402.619	---	PASS
		2441	1.213	2440.386	2441.599	---	PASS
		2480	1.213	2479.386	2480.599	---	PASS
3DH5	ANT1	2402	1.263	2401.356	2402.619	---	PASS
		2441	1.253	2440.361	2441.614	---	PASS
		2480	1.248	2479.366	2480.614	---	PASS



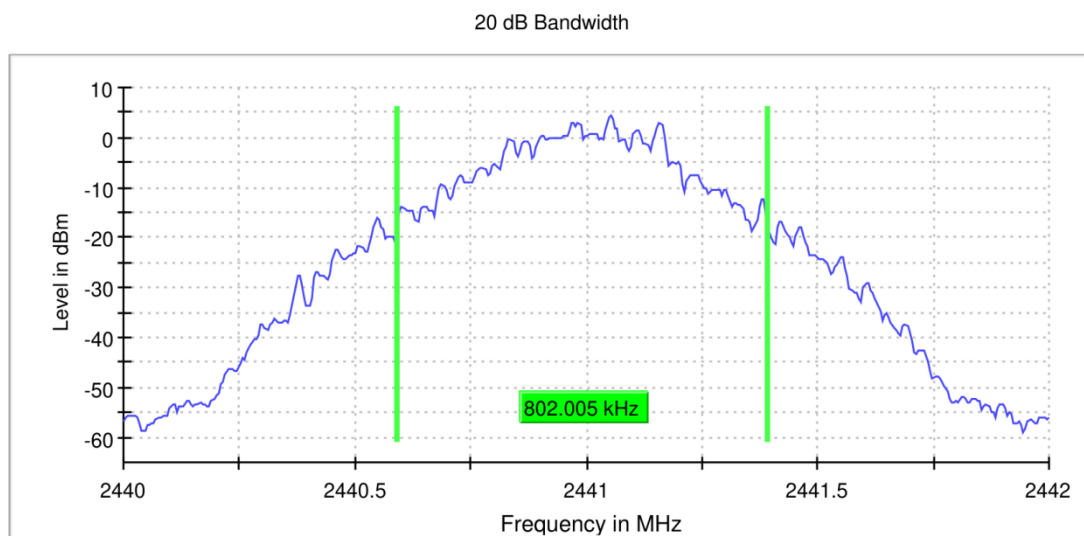


## TEST GRAPHS

DH5\_ANT1\_2402



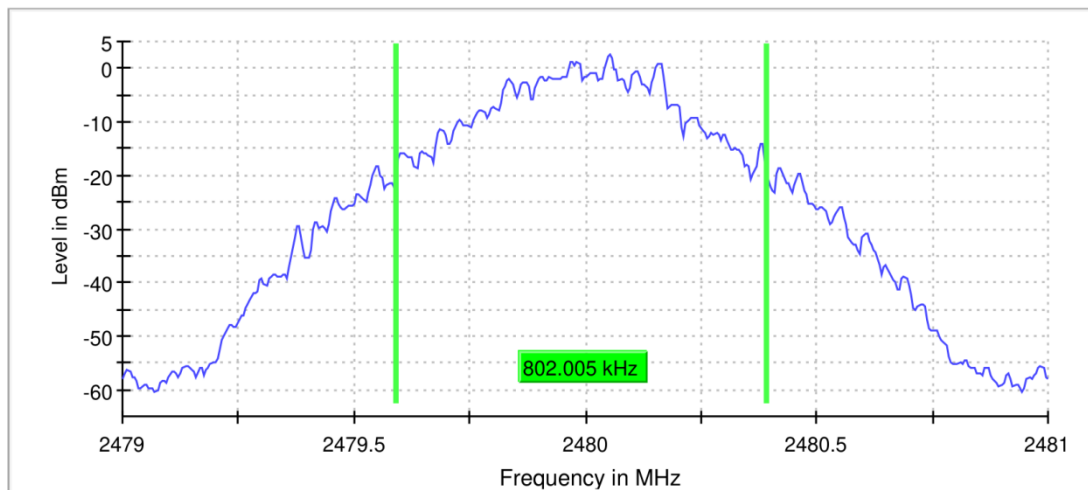
DH5\_ANT1\_2441



DH5\_ANT1\_2480

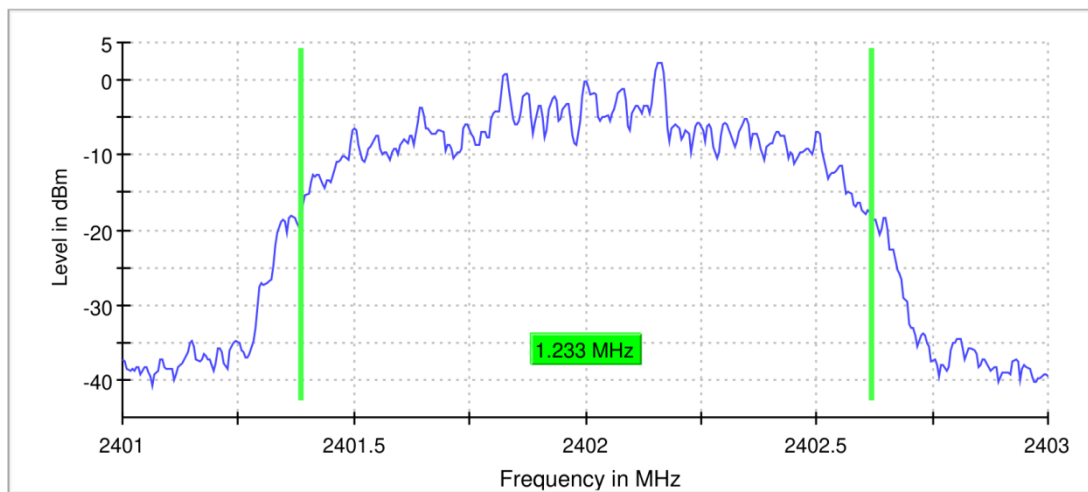


20 dB Bandwidth



2DH5\_ANT1\_2402

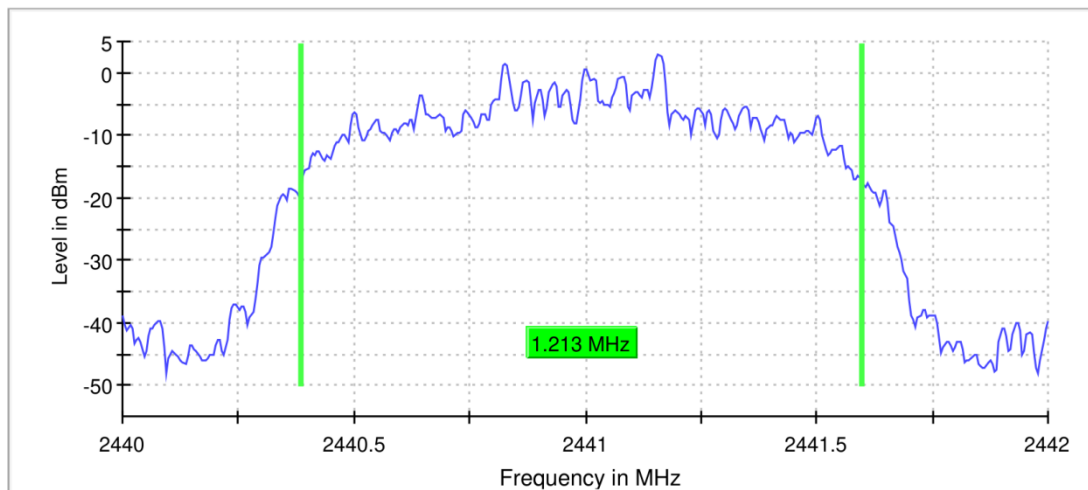
20 dB Bandwidth



2DH5\_ANT1\_2441

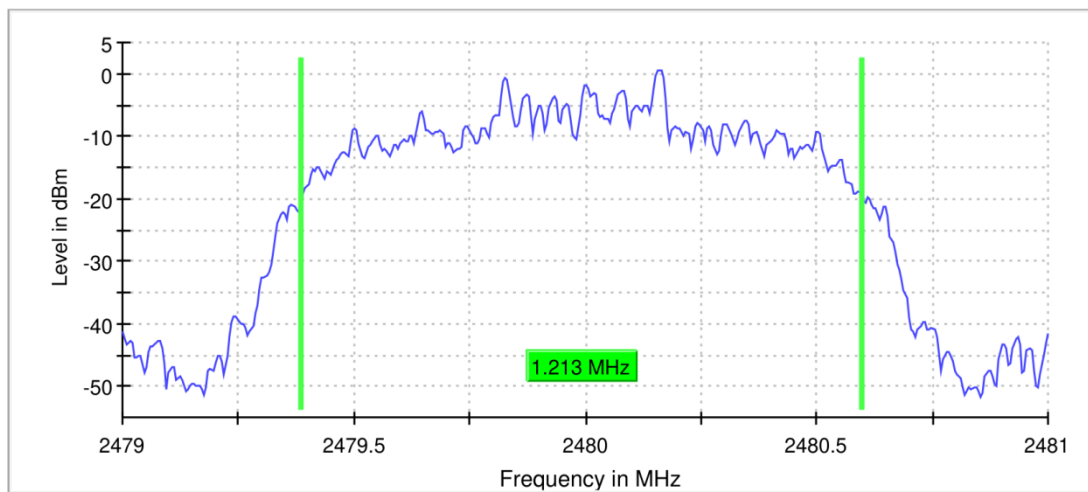


20 dB Bandwidth



2DH5\_ANT1\_2480

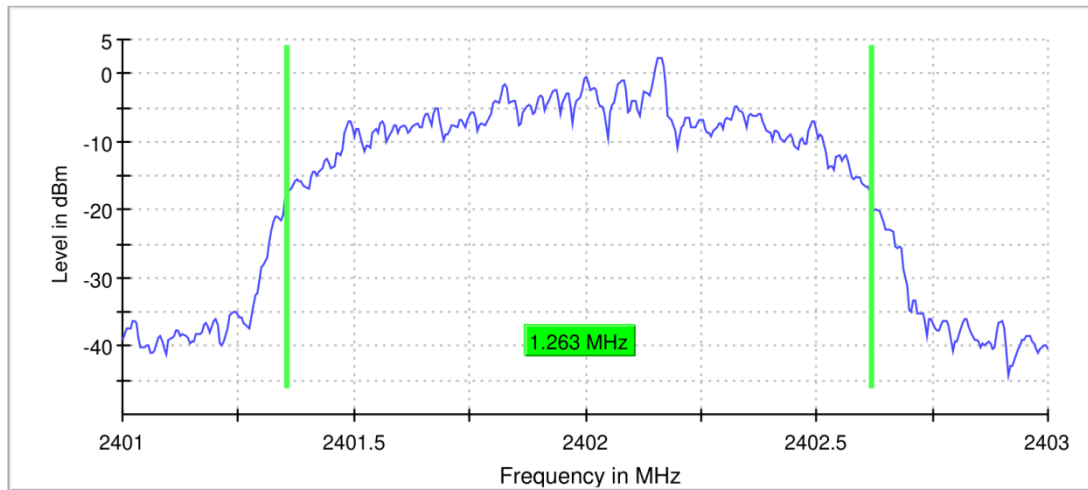
20 dB Bandwidth



3DH5\_ANT1\_2402

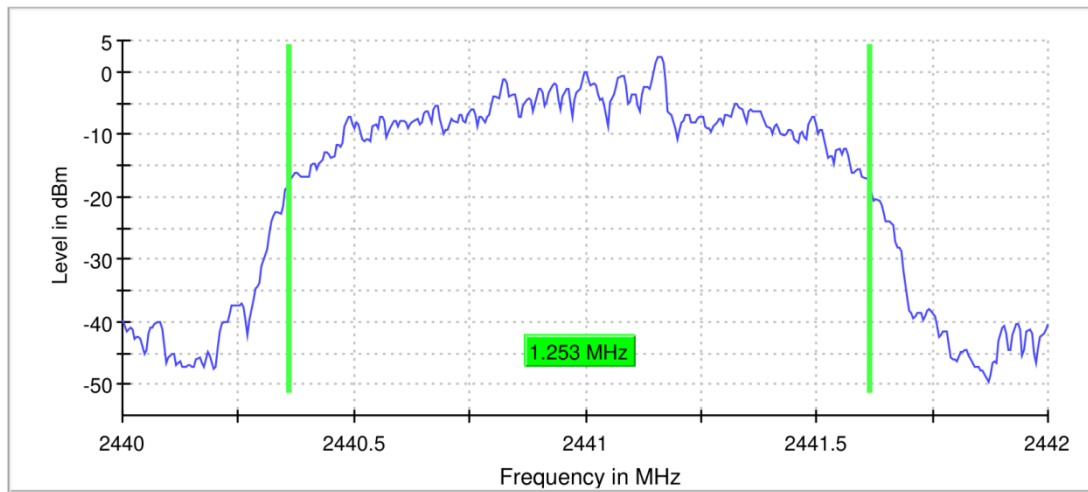


20 dB Bandwidth

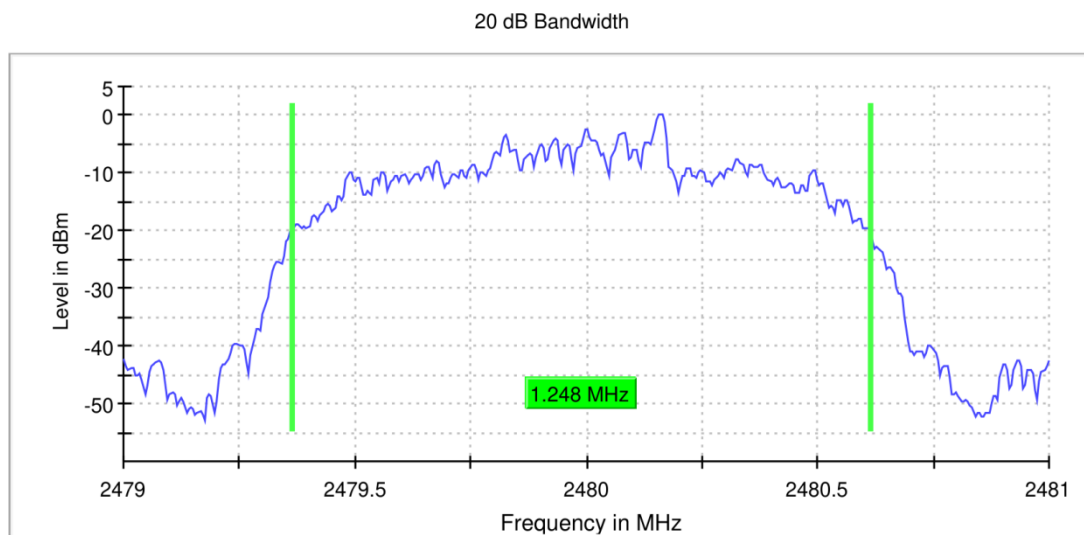


3DH5\_ANT1\_2441

20 dB Bandwidth



3DH5\_ANT1\_2480



RBW 30.000 kHz

VBW 100.000 kHz

**OCCUPIED CHANNEL BANDWIDTH****TEST RESULT**

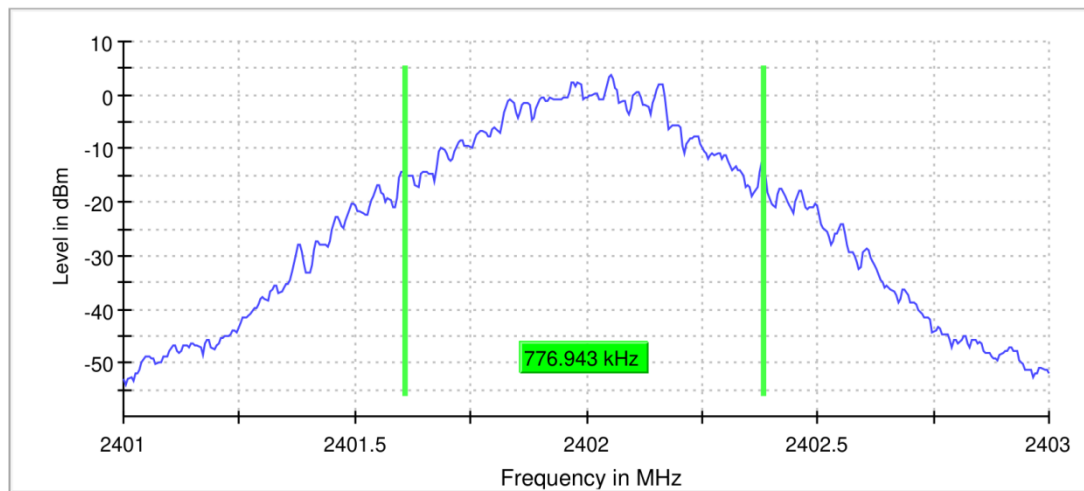
TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	ANT1	2402	0.777	2401.607	2402.383	---	PASS
		2441	0.762	2440.617	2441.378	---	PASS
		2480	0.762	2479.617	2480.378	---	PASS
2DH5	ANT1	2402	1.163	2401.411	2402.574	---	PASS
		2441	1.143	2440.416	2441.559	---	PASS
		2480	1.138	2479.421	2480.559	---	PASS
3DH5	ANT1	2402	1.168	2401.406	2402.574	---	PASS
		2441	1.158	2440.411	2441.569	---	PASS
		2480	1.153	2479.416	2480.569	---	PASS



## TEST GRAPHS

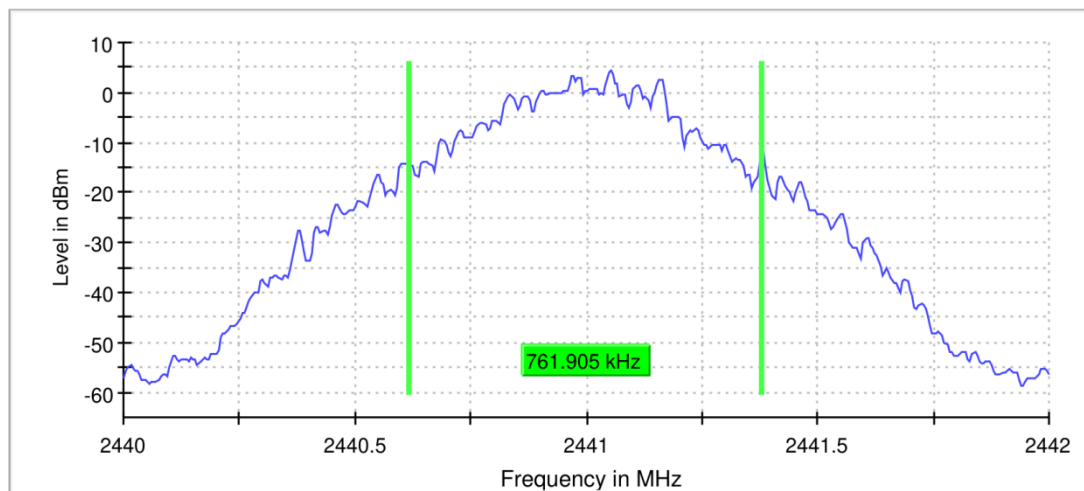
DH5\_ANT1\_2402

99 % Bandwidth



DH5\_ANT1\_2441

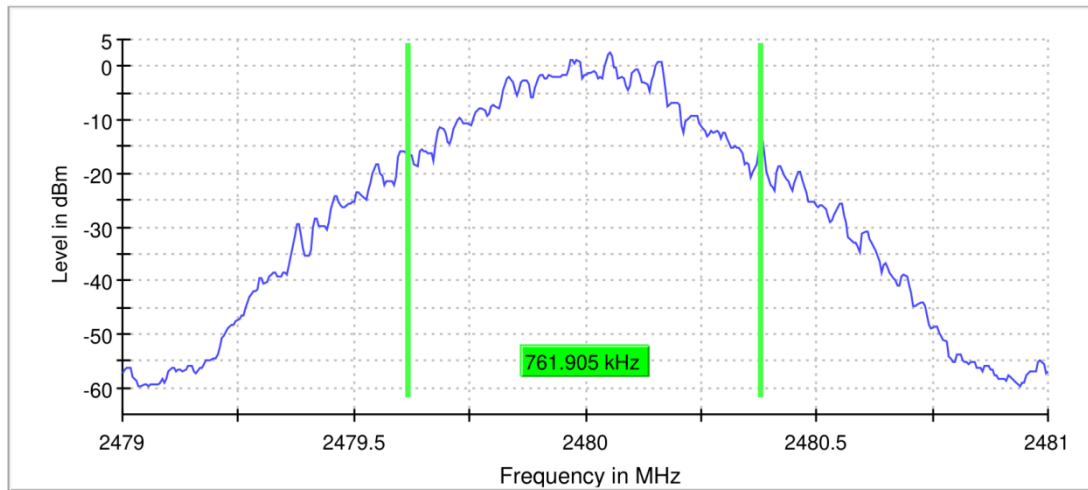
99 % Bandwidth



DH5\_ANT1\_2480

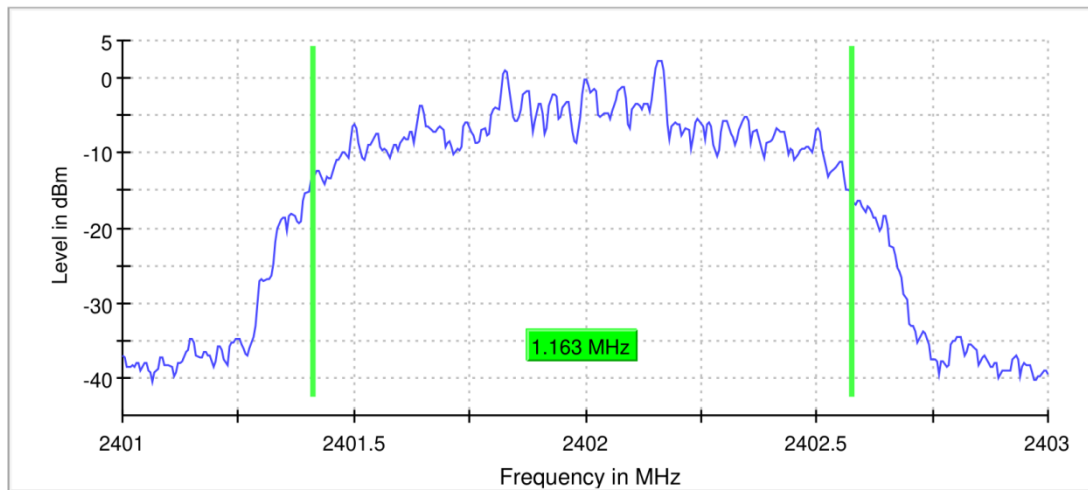


99 % Bandwidth



2DH5\_ANT1\_2402

99 % Bandwidth

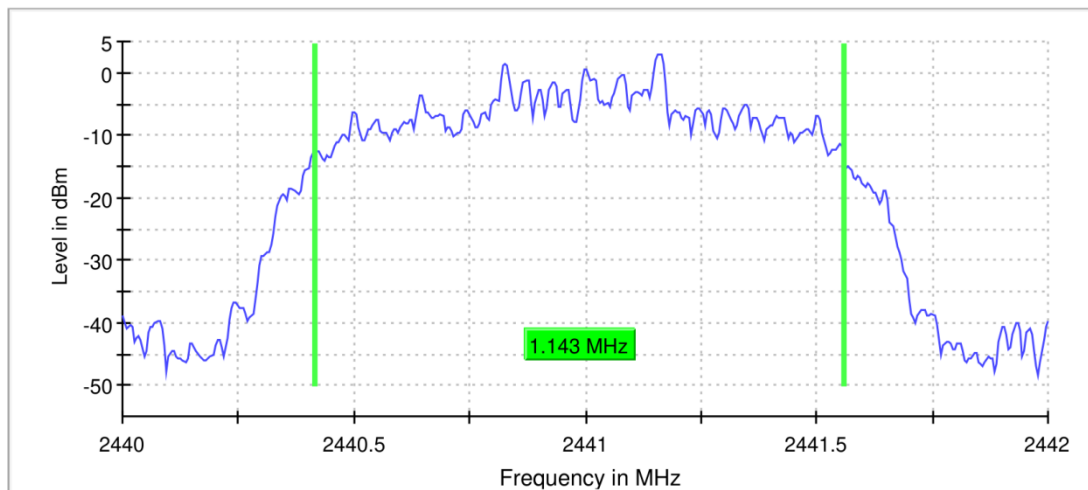


2DH5\_ANT1\_2441



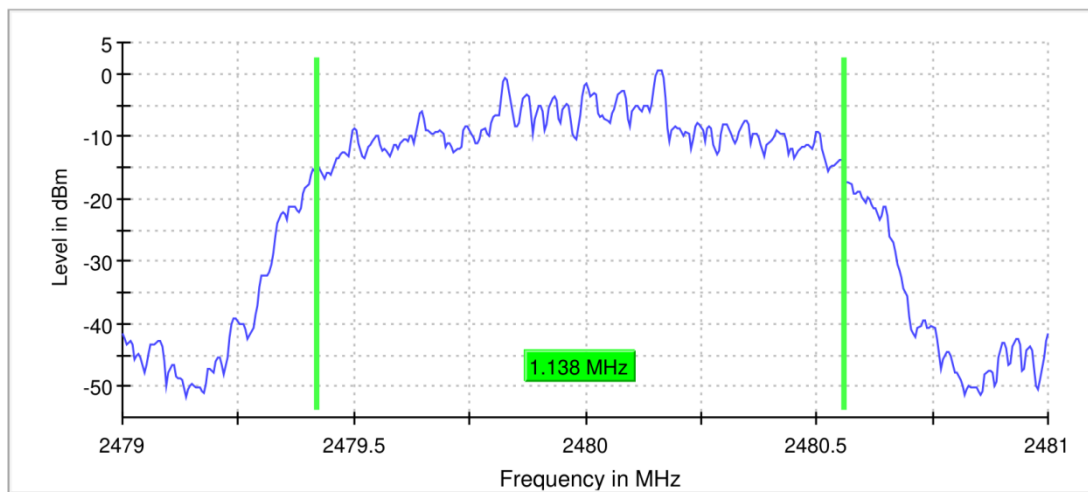


99 % Bandwidth



2DH5\_ANT1\_2480

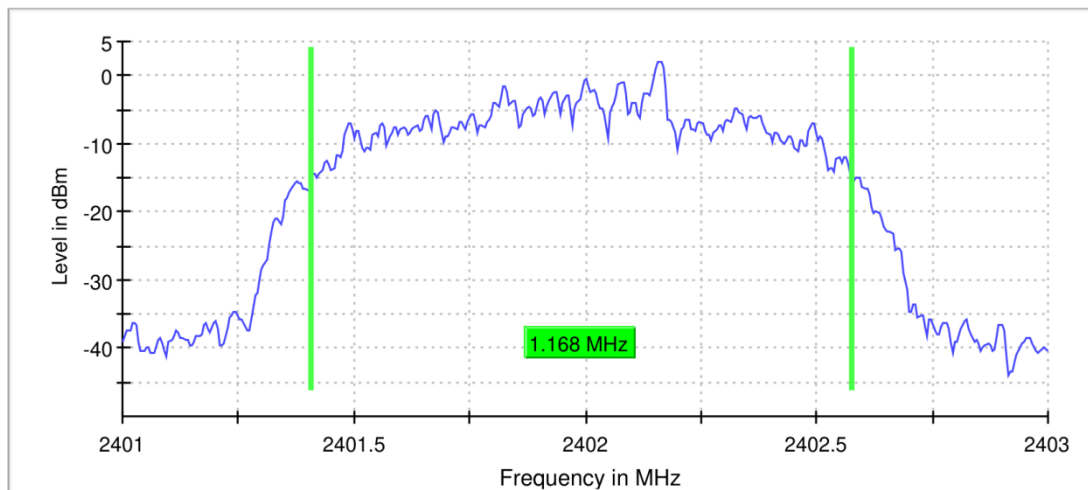
99 % Bandwidth



3DH5\_ANT1\_2402

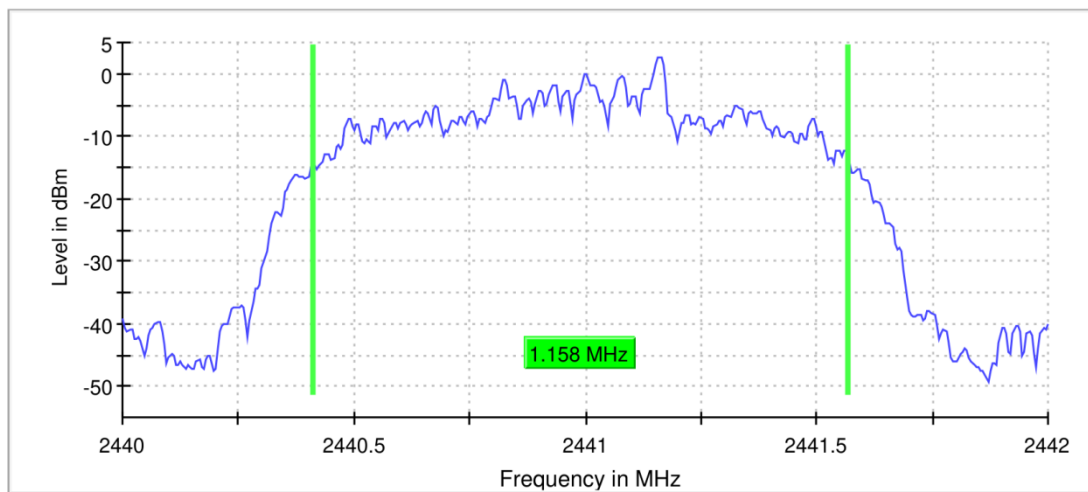


99 % Bandwidth

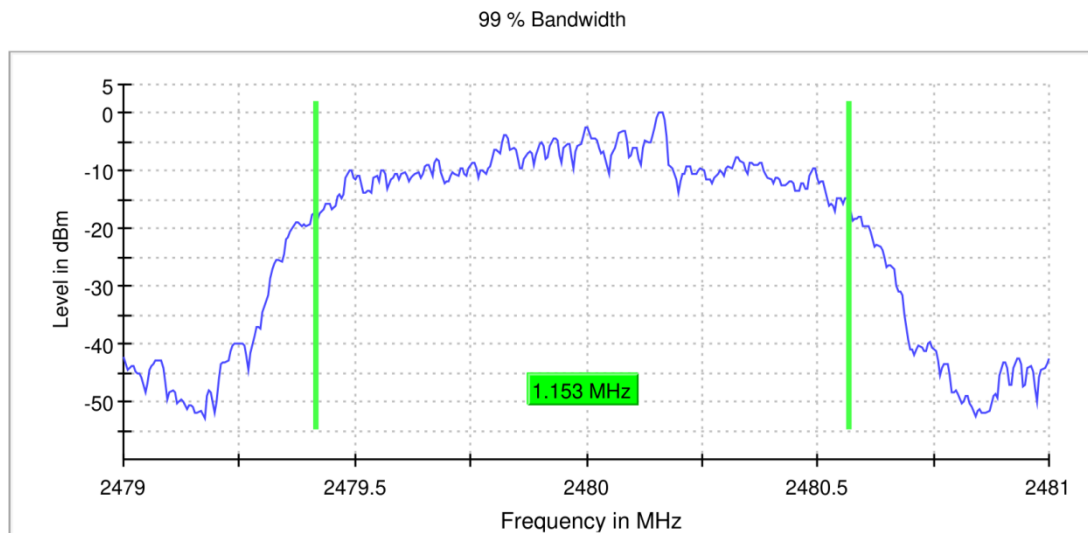


3DH5\_ANT1\_2441

99 % Bandwidth



3DH5\_ANT1\_2480



RBW 30.000 kHz

VBW 100.000 kHz



## MAXIMUM CONDUCTED OUTPUT POWER

### TEST RESULT

TestMode	Antenna	Frequency [MHz]	Average power [dBm]	Peak Power [dBm]	Peak Powert [mw]	Conducted Limit [dBm]	Verdict
DH5	Ant1	2402	9.12	10.01	10.02	≤20.97	PASS
		2441	9.43	10.11	10.26	≤20.97	PASS
		2480	9.85	10.59	11.46	≤20.97	PASS
2DH5	Ant1	2402	6.38	9.39	8.69	≤20.97	PASS
		2441	6.32	9.48	8.87	≤20.97	PASS
		2480	6.57	9.77	9.48	≤20.97	PASS
3DH5	Ant1	2402	4.48	7.36	5.45	≤20.97	PASS
		2441	4.63	7.79	6.01	≤20.97	PASS
		2480	5.83	8.97	7.89	≤20.97	PASS



## CARRIER FREQUENCY SEPARATION

### TEST RESULT

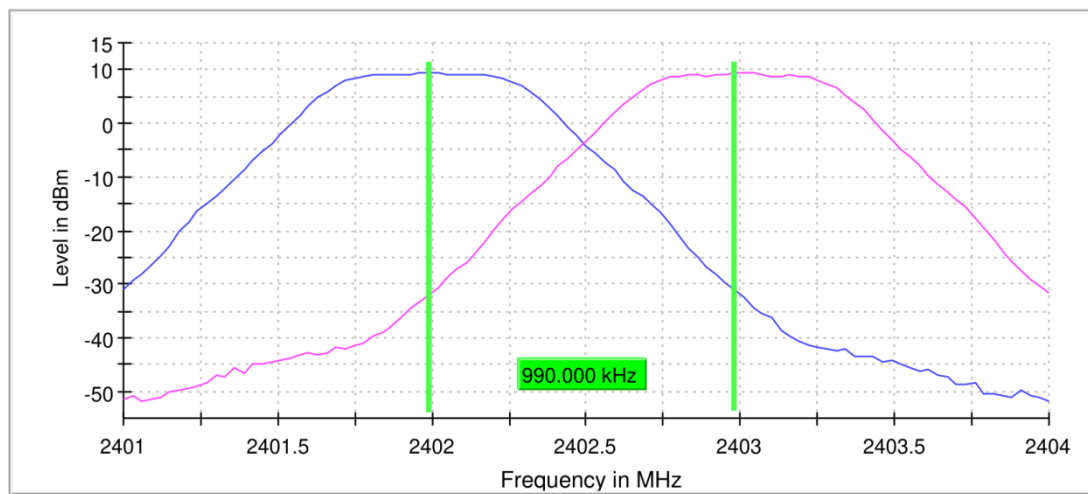
TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
DH5	ANT1	Hop	0.990	$\geq 0.5347$	PASS
2DH5	ANT1	Hop	0.990	$\geq 0.8087$	PASS
3DH5	ANT1	Hop	0.990	$\geq 0.8320$	PASS



## TEST GRAPHS

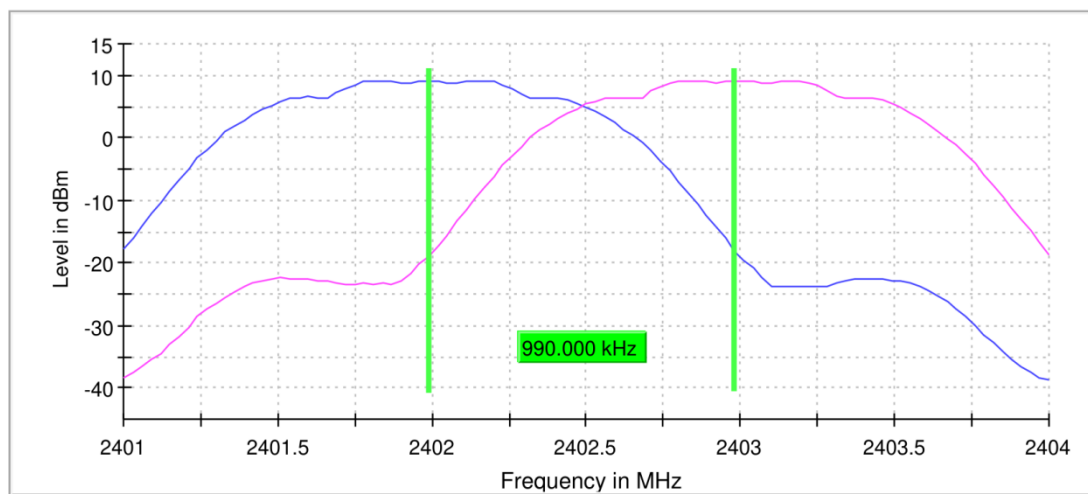
DH5\_ANT1\_Hop

CFS

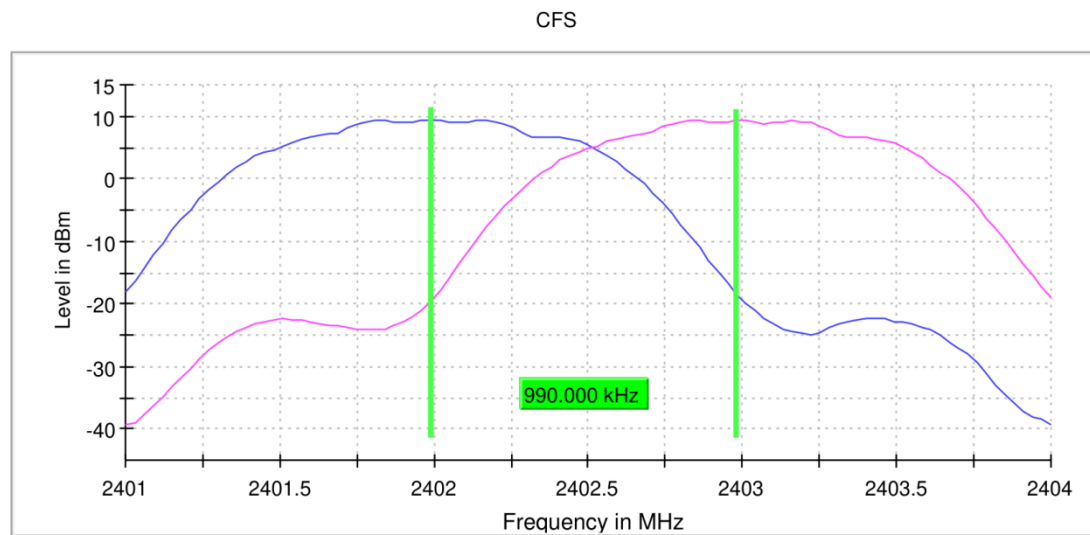


2DH5\_ANT1\_Hop

CFS



3DH5\_ANT1\_Hop



RBW 300.000 kHz

VBW 300.000 kHz

**TIME OF OCCUPANCY****TEST RESULT**

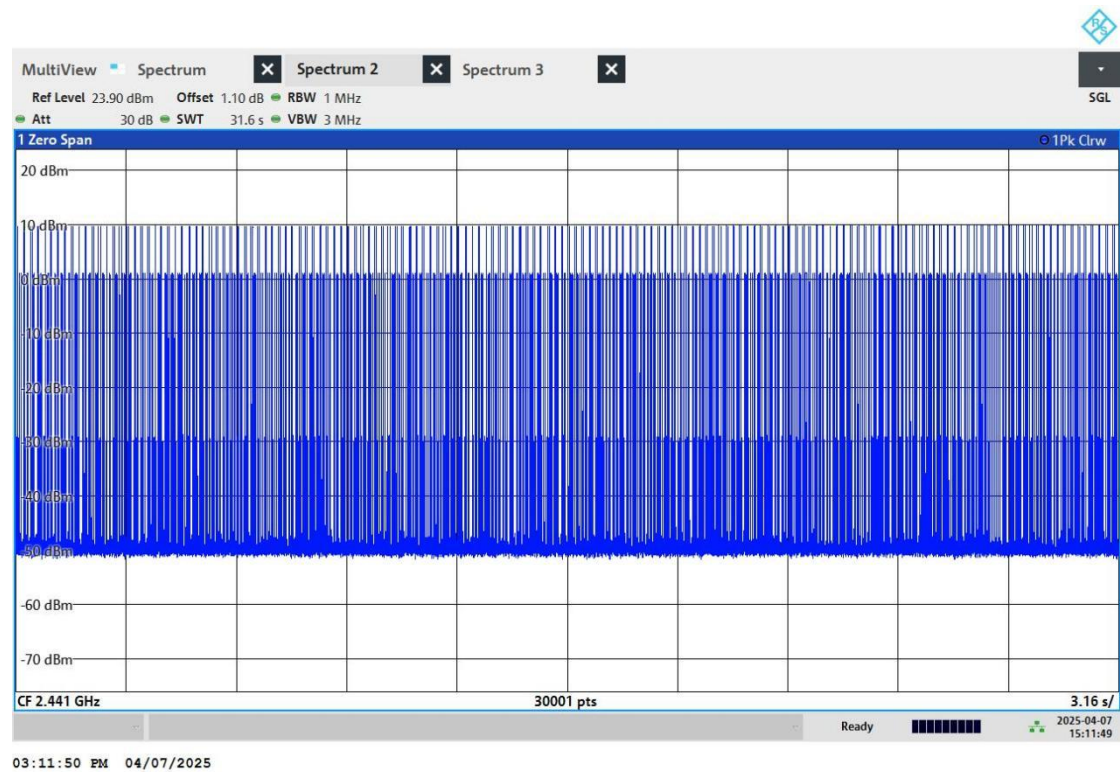
TestMode	Antenna	Channel	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH1	ANT1	Hop	0.376	301	0.113	≤0.4	PASS
DH3	ANT1	Hop	1.632	145	0.237	≤0.4	PASS
DH5	ANT1	Hop	2.880	98	0.283	≤0.4	PASS
2DH1	ANT1	Hop	0.384	303	0.116	≤0.4	PASS
2DH3	ANT1	Hop	1.640	149	0.244	≤0.4	PASS
2DH5	ANT1	Hop	2.888	110	0.318	≤0.4	PASS
3DH1	ANT1	Hop	0.384	312	0.120	≤0.4	PASS
3DH3	ANT1	Hop	1.640	165	0.271	≤0.4	PASS
3DH5	ANT1	Hop	2.888	108	0.312	≤0.4	PASS



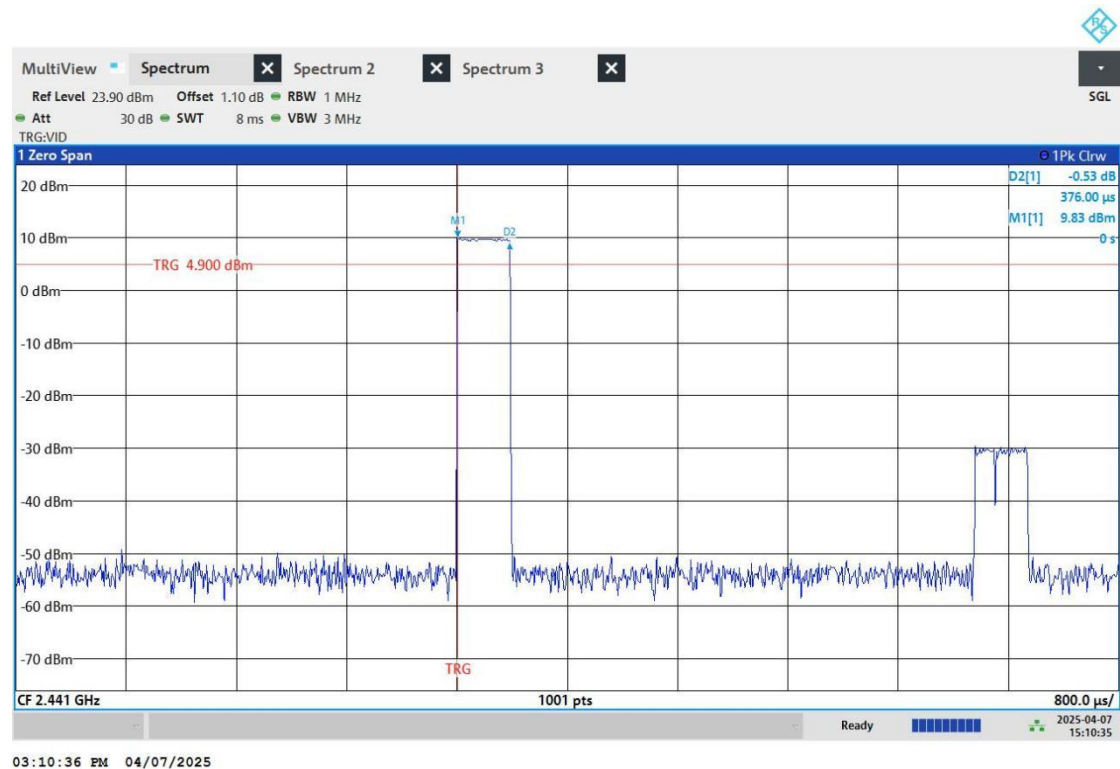


## TEST GRAPHS

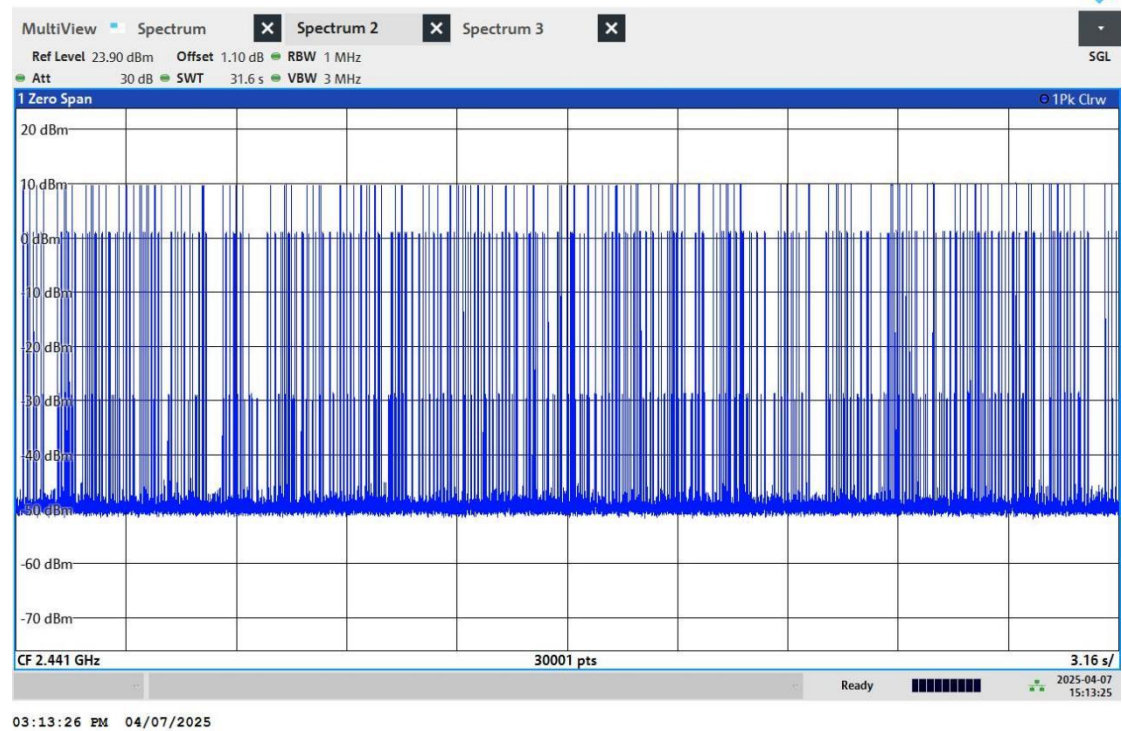
DH1\_ANT1\_Hop



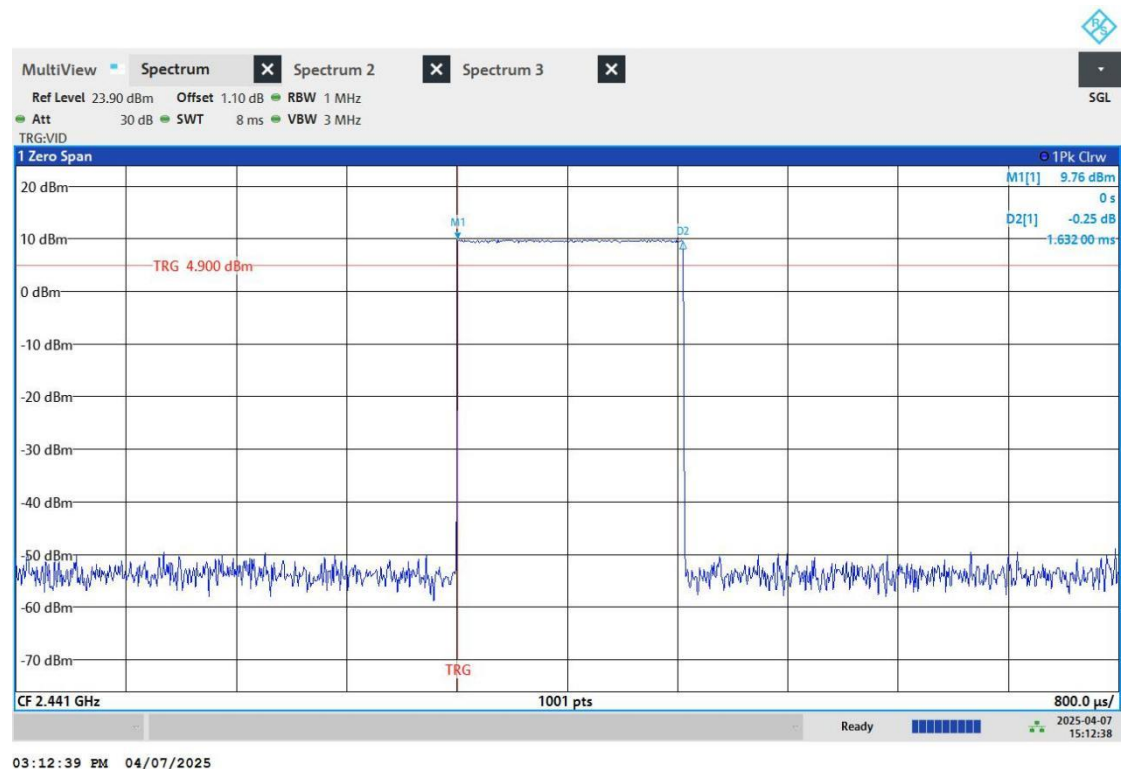
DH1\_ANT1\_Hop



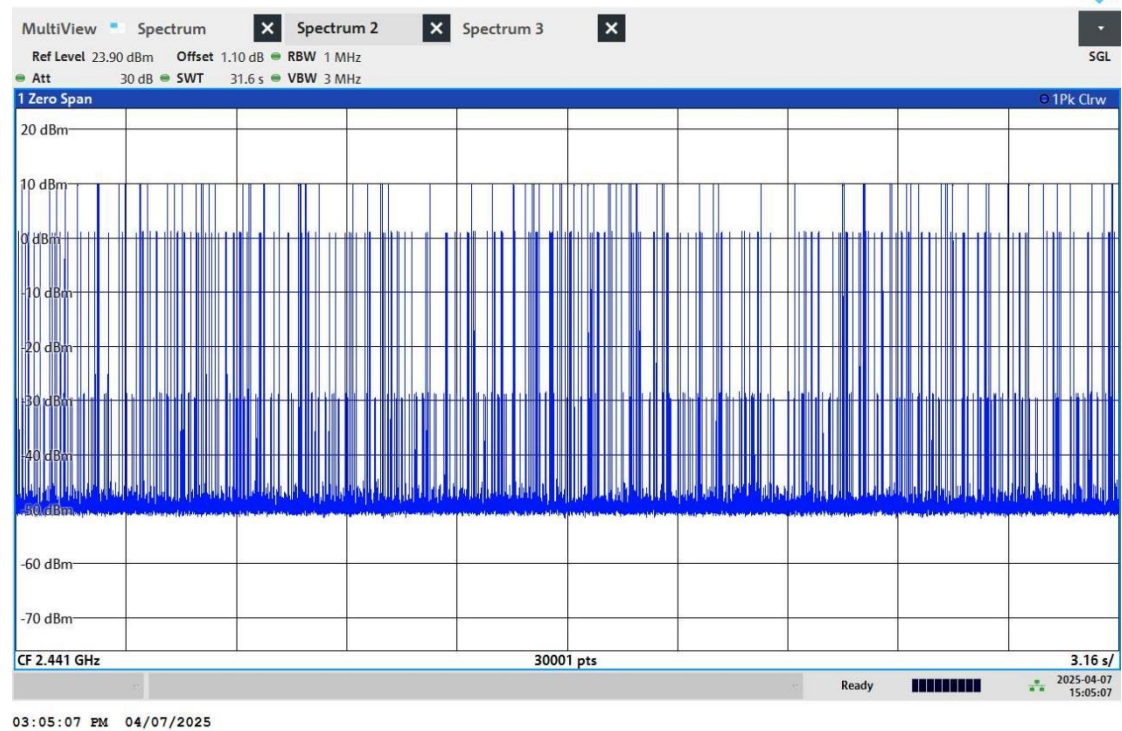
DH3\_ANT1\_Hop



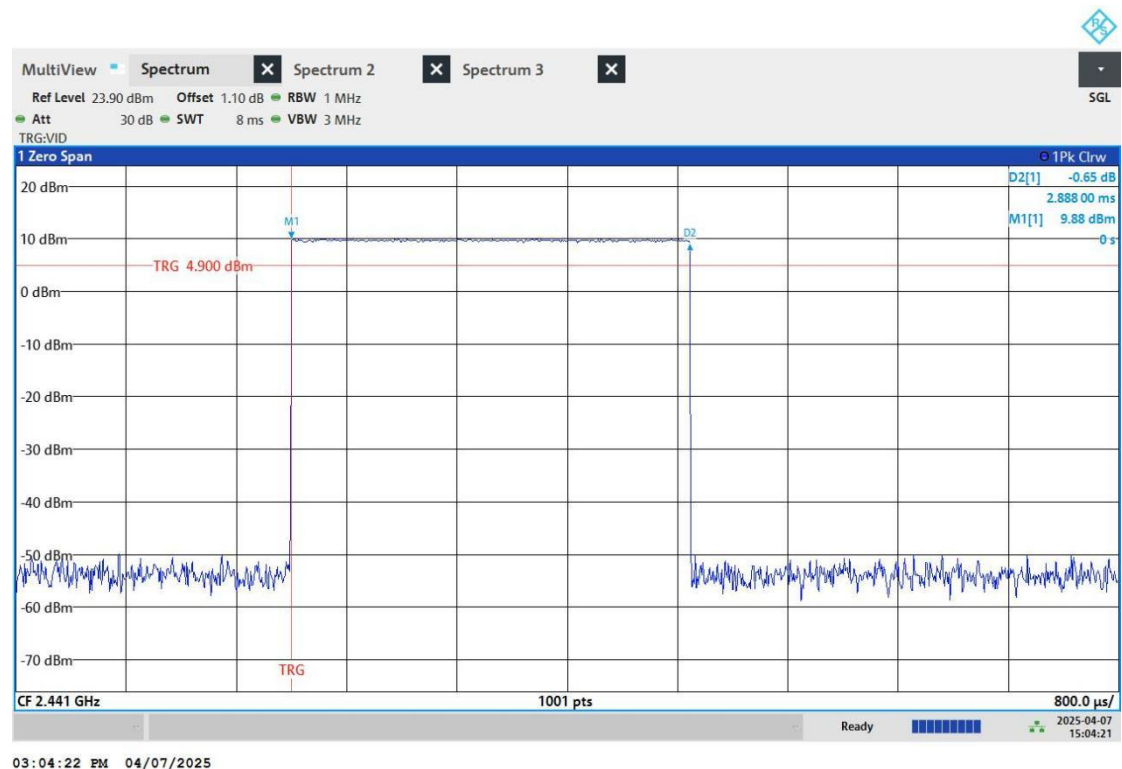
### DH3\_ANT1\_Hop



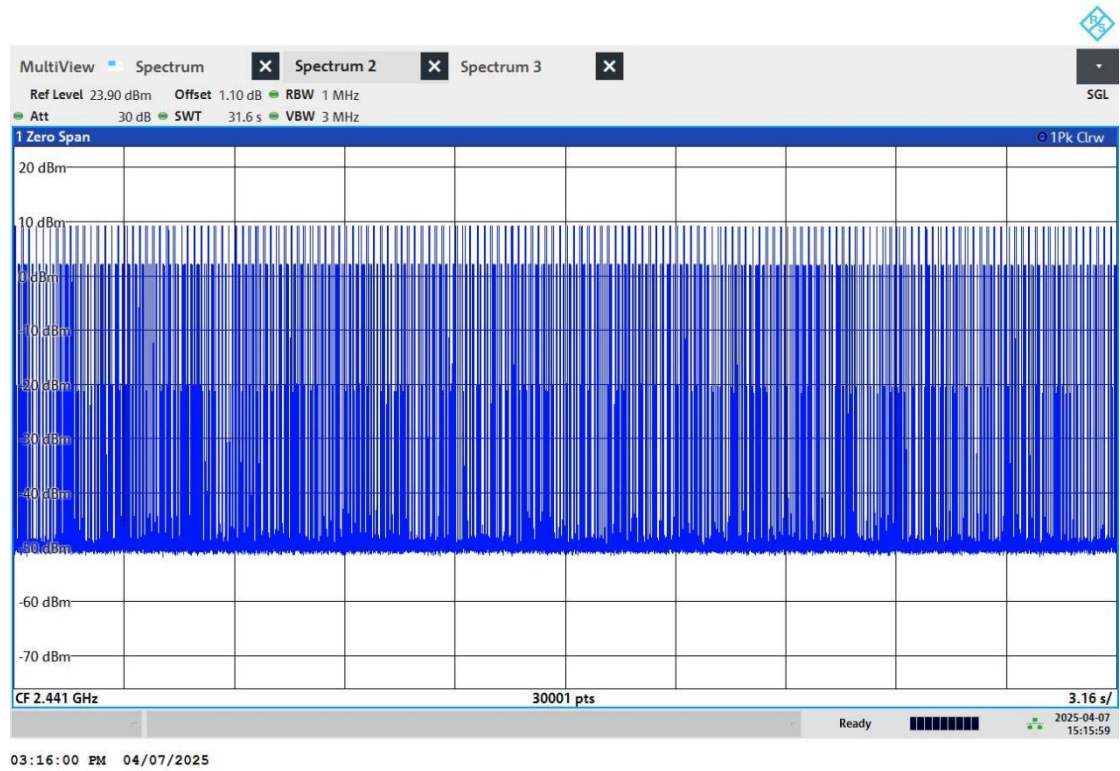
### DH5\_ANT1\_Hop



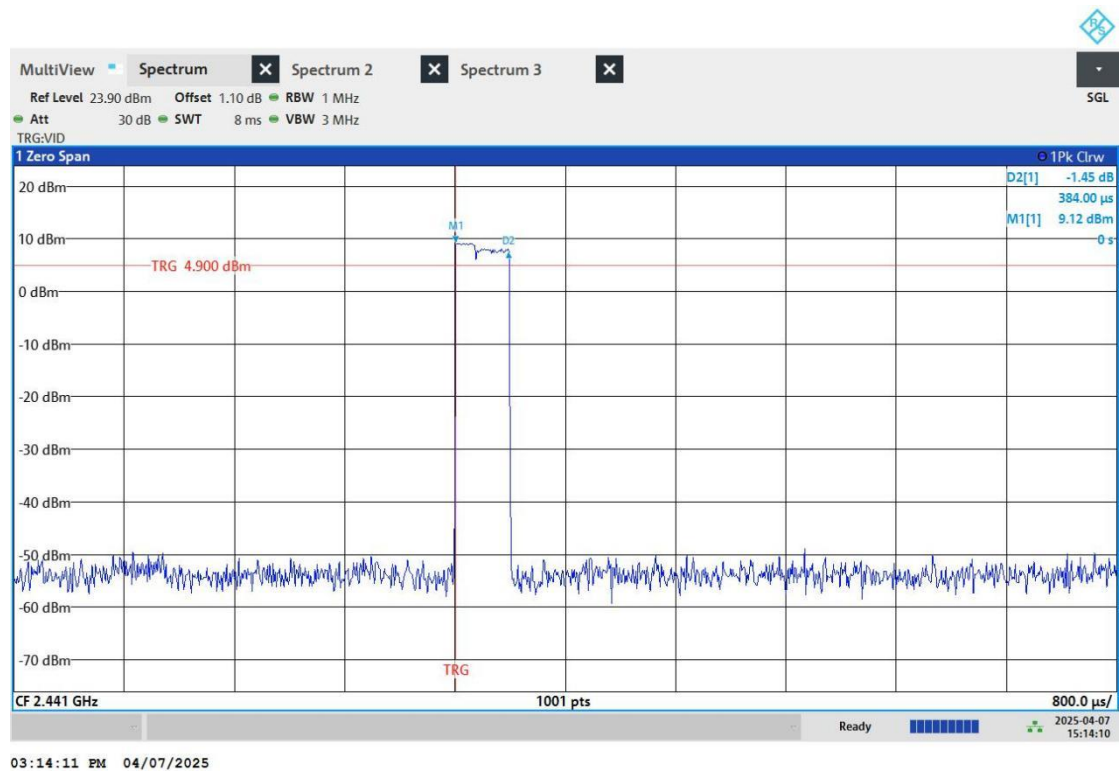
### DH5\_ANT1\_Hop



### 2DH1\_ANT1\_Hop

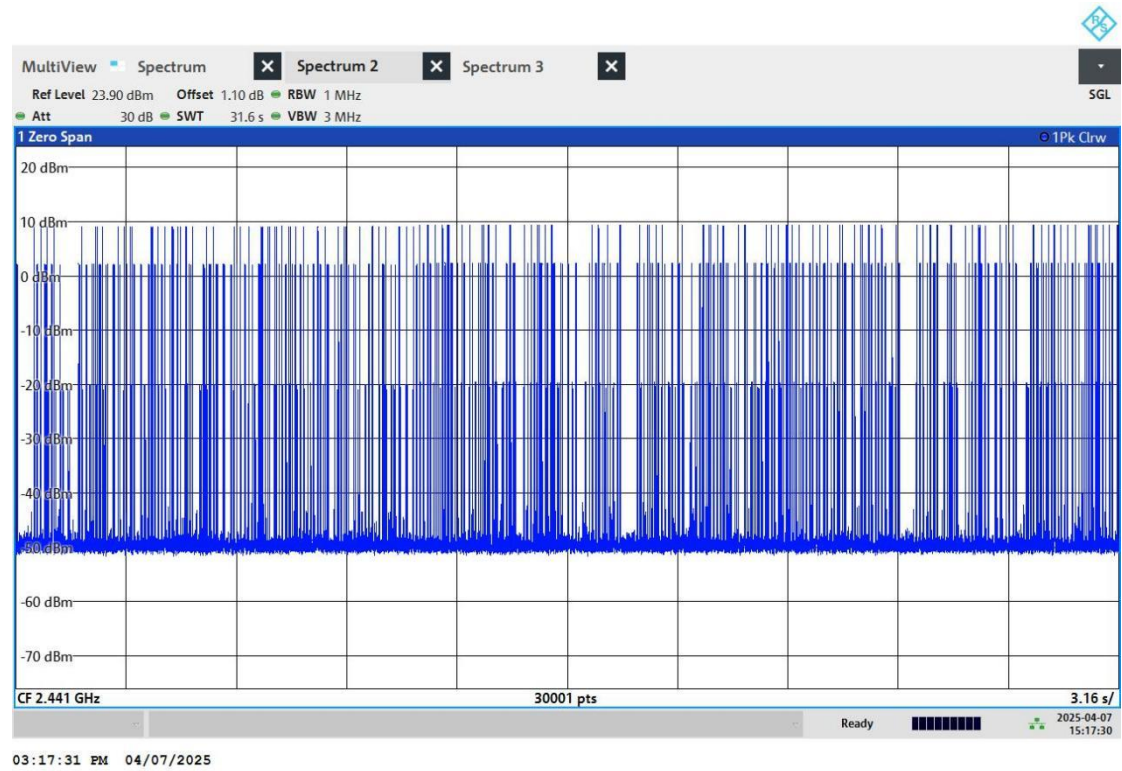


### 2DH1\_ANT1\_Hop

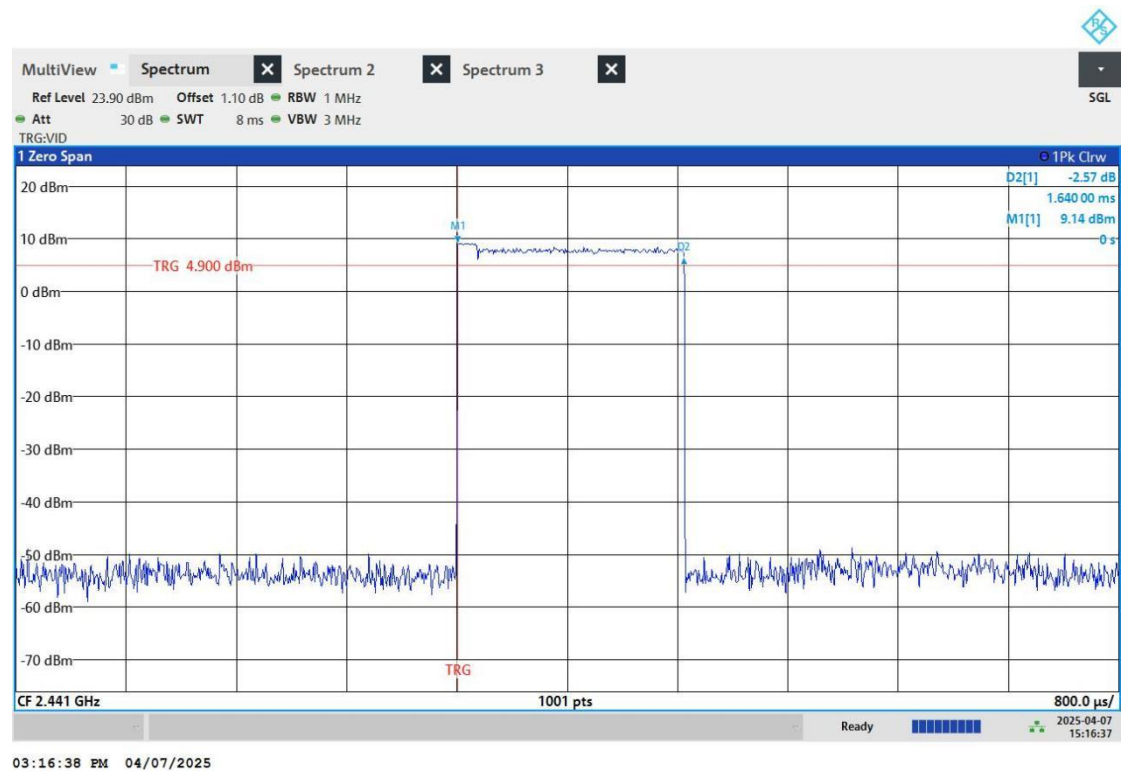


### 2DH3\_ANT1\_Hop

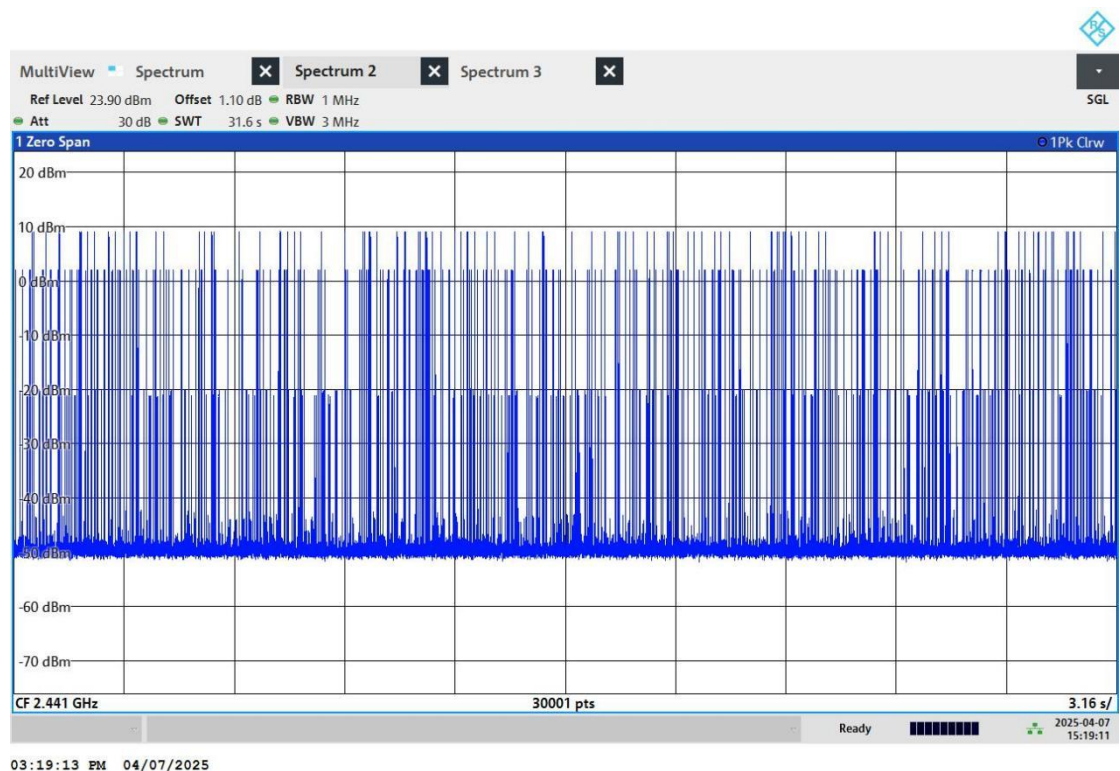




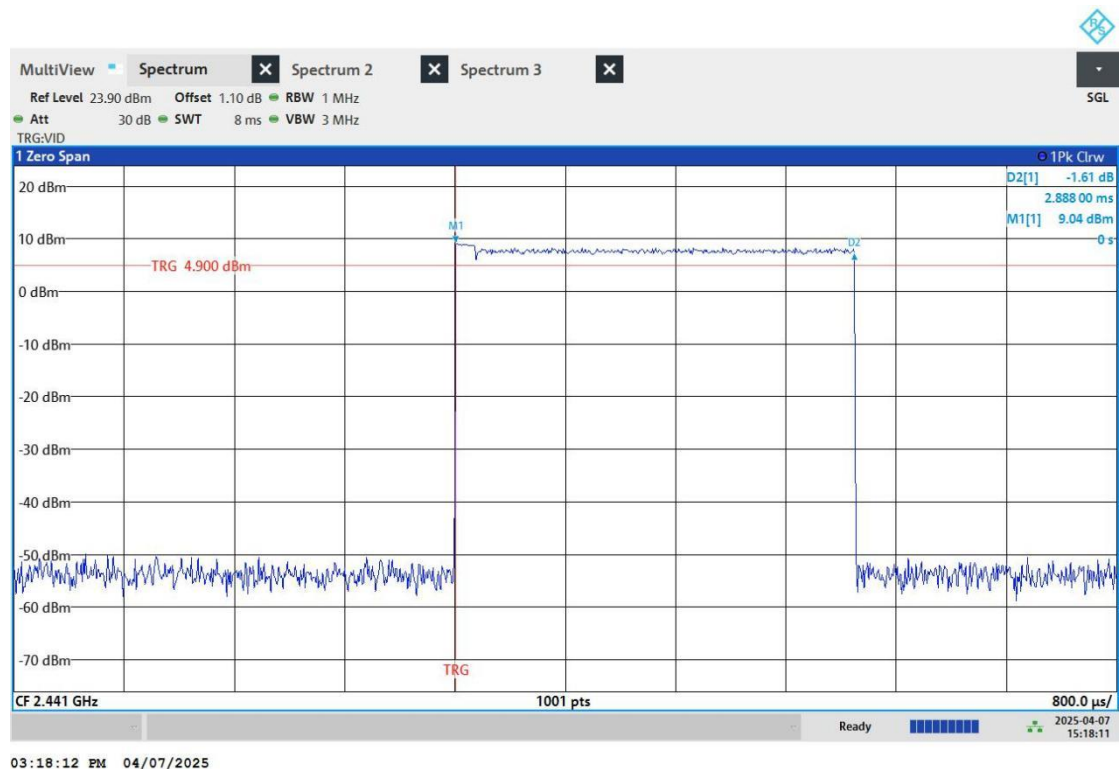
### 2DH3\_ANT1\_Hop



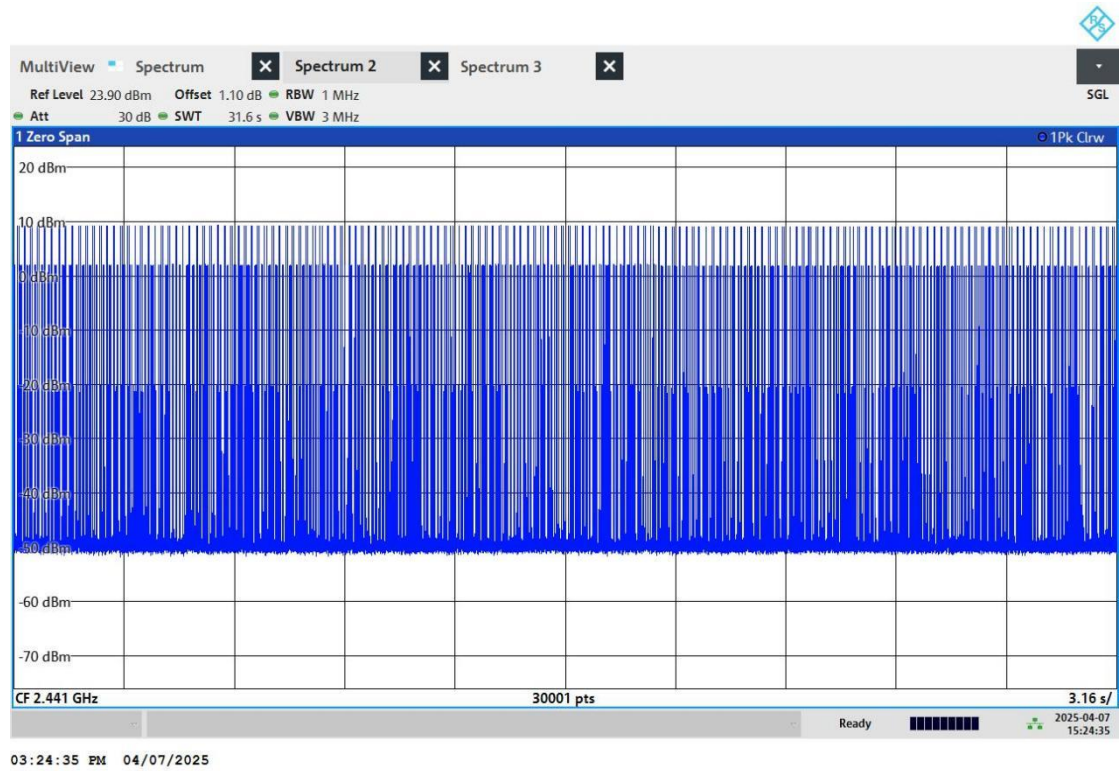
### 2DH5\_ANT1\_Hop



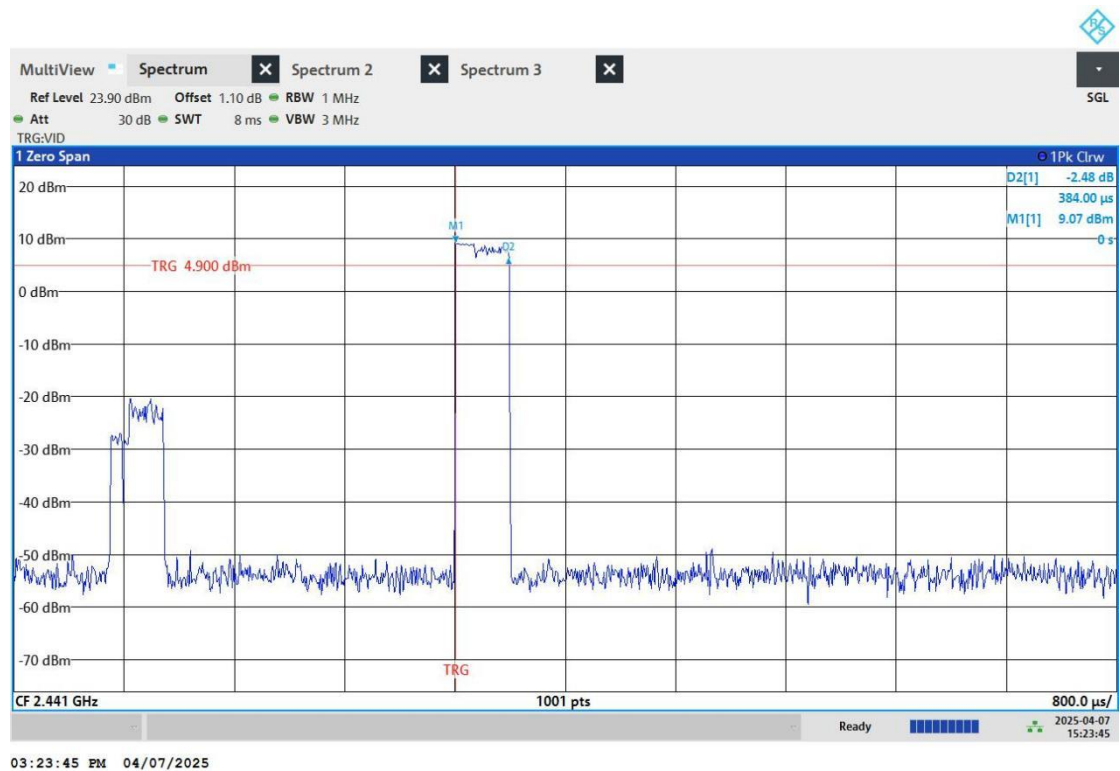
### 2DH5\_ANT1\_Hop



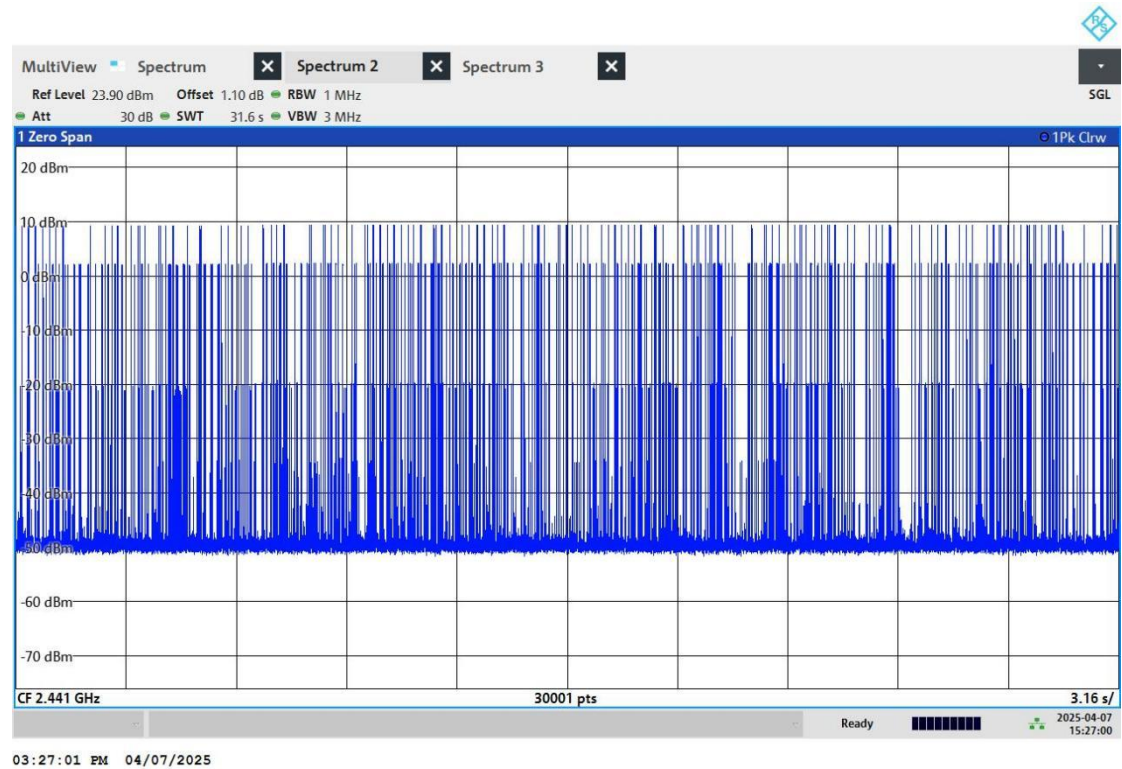
### 3DH1\_ANT1\_Hop



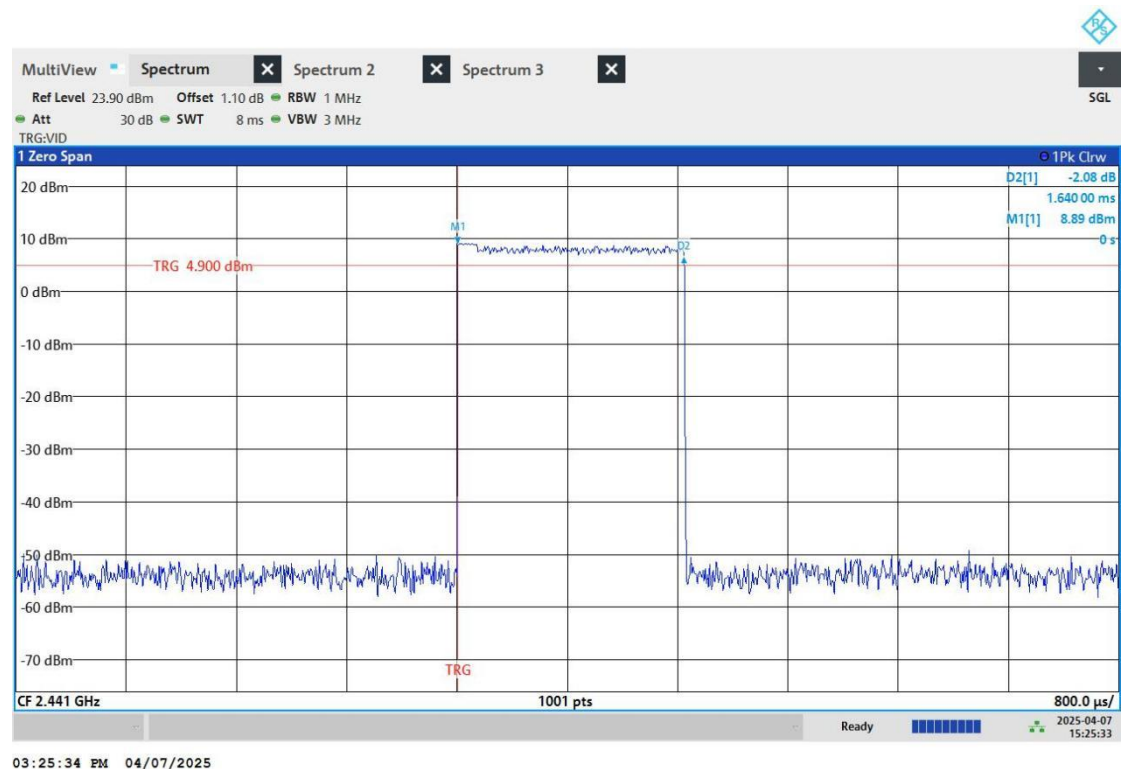
### 3DH1\_ANT1\_Hop



### 3DH3\_ANT1\_Hop

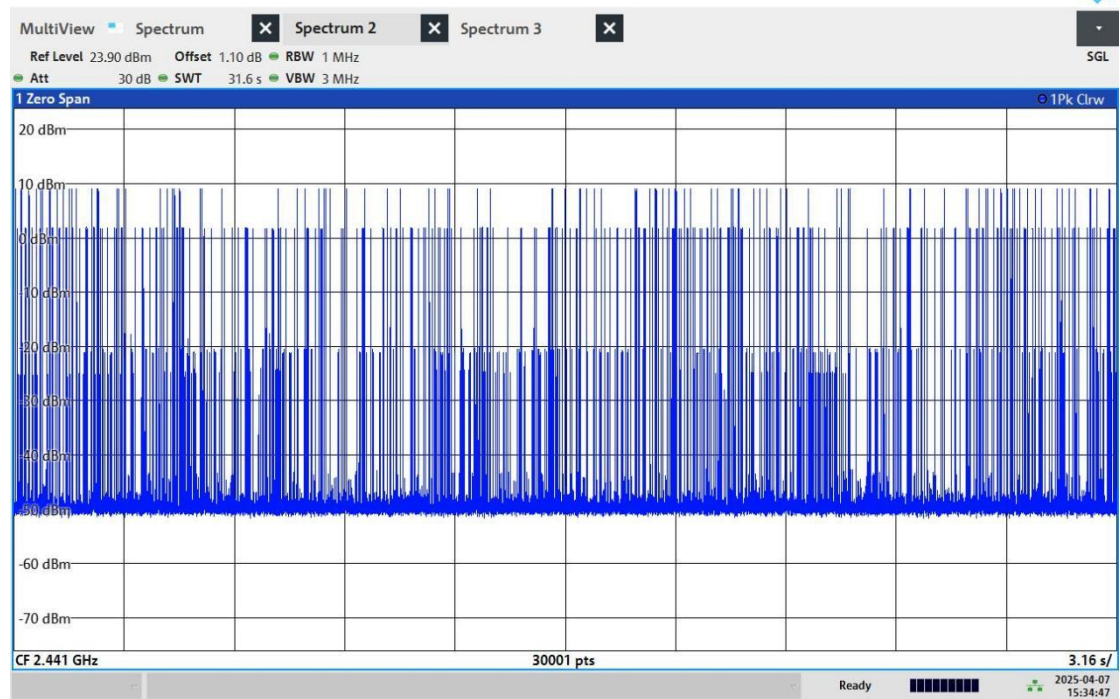


### 3DH3\_ANT1\_Hop



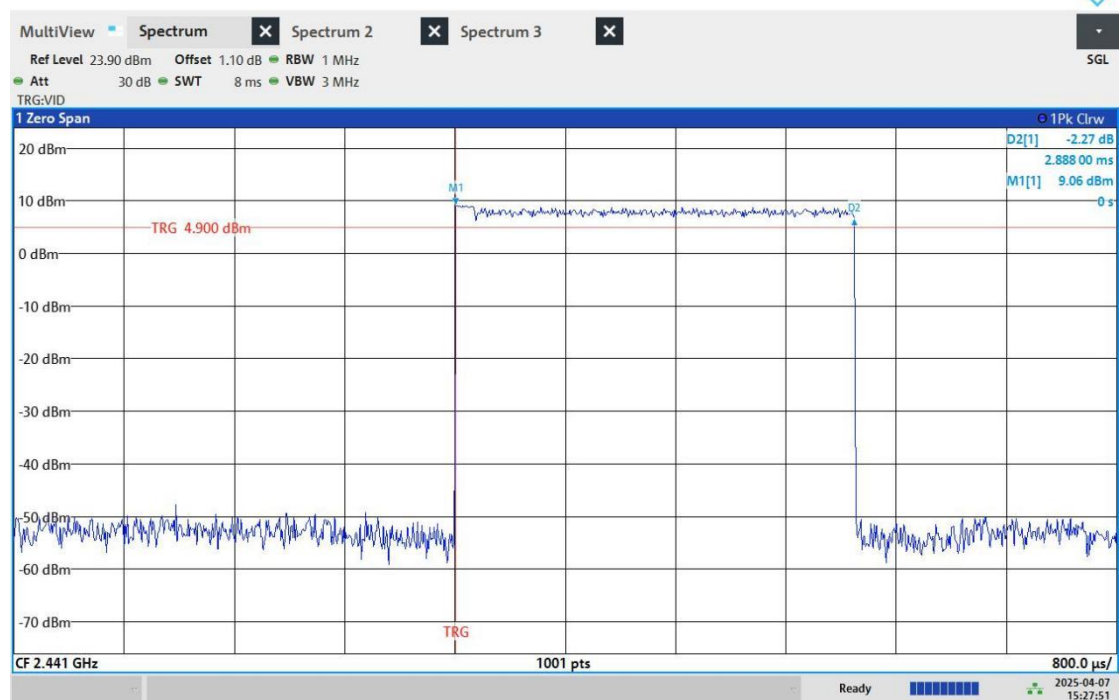
### 3DH5\_ANT1\_Hop





03:34:47 PM 04/07/2025

### 3DH5\_ANT1\_Hop



03:27:51 PM 04/07/2025



## NUMBER OF HOPPING CHANNELS

### TEST RESULT

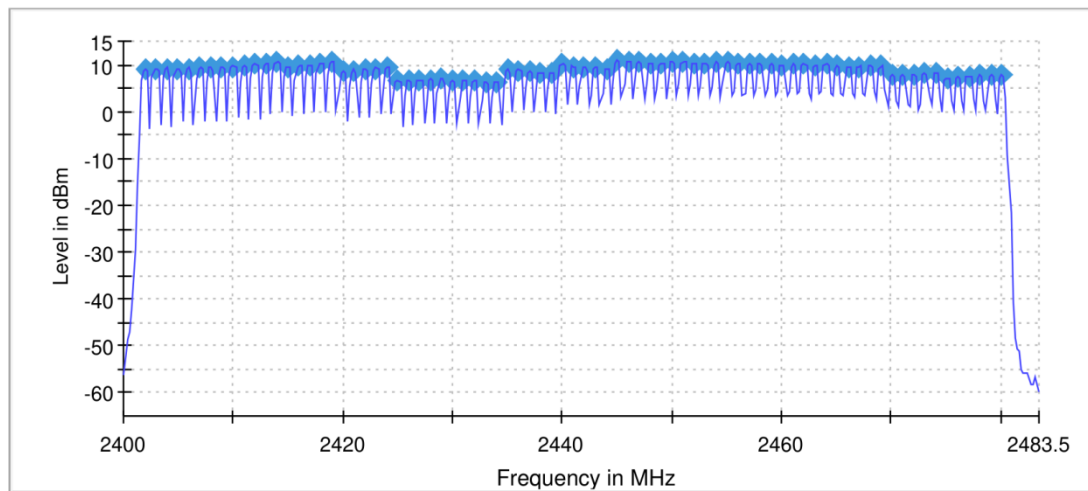
TestMode	Antenna	Channel	Result[Num]	Limit[Num]	Verdict
DH5	ANT1	Hop	79	≥15	PASS
2DH5	ANT1	Hop	79	≥15	PASS
3DH5	ANT1	Hop	79	≥15	PASS



## TEST GRAPHS

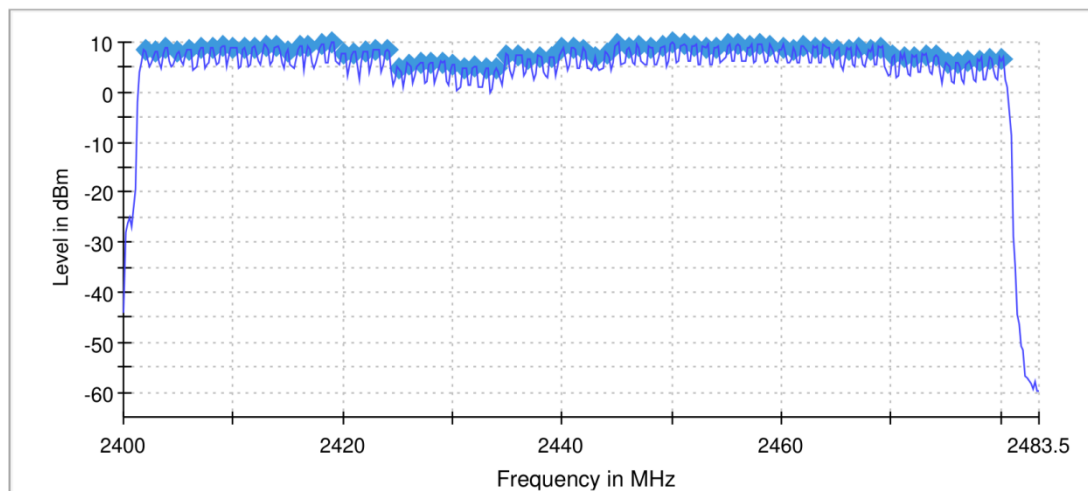
DH5\_ANT1\_Hop

Sequence



2DH5\_ANT1\_Hop

Sequence



3DH5\_ANT1\_Hop