



Test Report No.: W7L-P240118W001RF01

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.

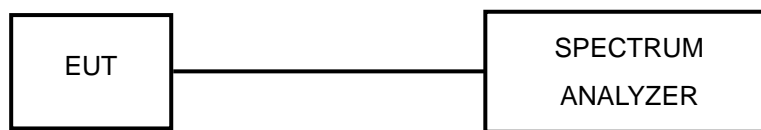
Please Refer to Appendix Of this test report.

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.



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3.4.5 DEVIATION FROM TEST STANDARD

No deviation.

3.4.6 TEST RESULTS

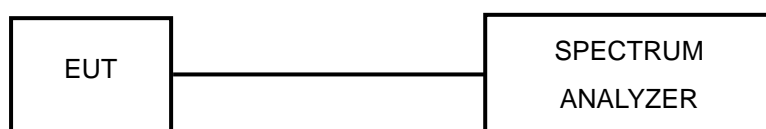
Please Refer to Appendix Of this test report

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

- Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 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.
- Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
- Repeat above procedures until all frequencies measured were complete.

3.5.5 DEVIATION FROM TEST STANDARD

No deviation.



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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

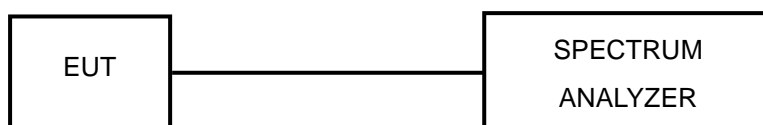
Please Refer to Appendix Of this test report.

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.

3.6.5 DEVIATION FROM TEST STANDARD

No deviation.

3.6.6 TEST RESULTS

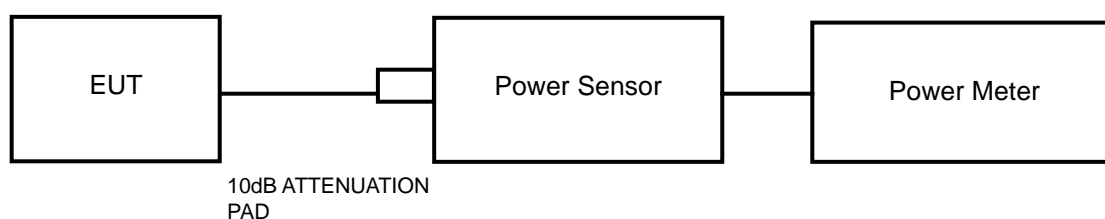
Please Refer to Appendix Of this test report.

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.



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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.



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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

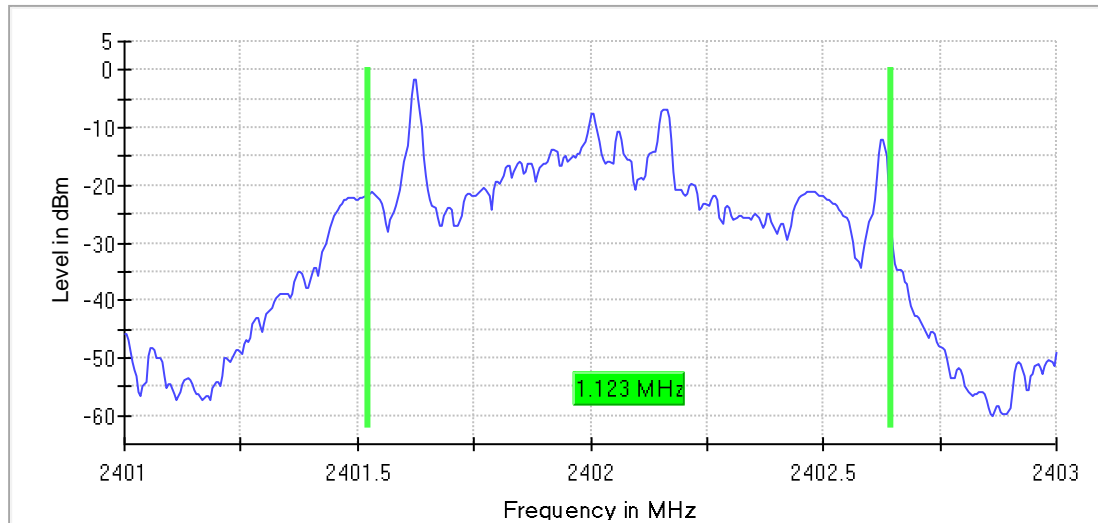
20DB EMISSION BANDWIDTH

TEST RESULT

TestMode	Antenna	Channel	20db EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	1.123	2401.521	2402.644	---	PASS
		2441	1.053	2440.586	2441.639	---	PASS
		2480	1.123	2479.516	2480.639	---	PASS
2DH5	Ant1	2402	1.078	2401.566	2402.644	---	PASS
		2441	1.073	2440.566	2441.639	---	PASS
		2480	1.078	2479.561	2480.639	---	PASS
3DH5	Ant1	2402	1.128	2401.516	2402.644	---	PASS
		2441	1.118	2440.521	2441.639	---	PASS
		2480	1.123	2479.516	2480.639	---	PASS

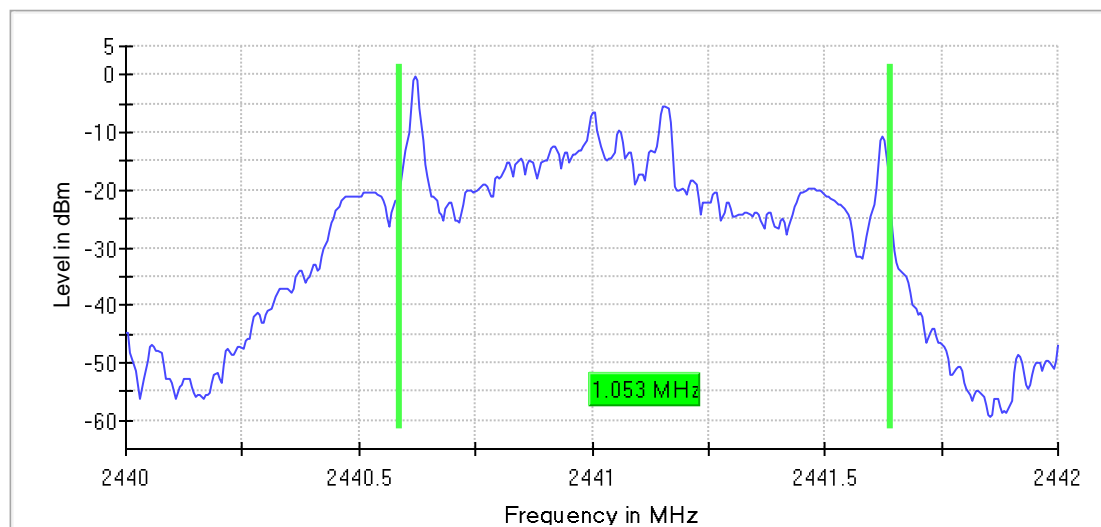
TEST GRAPHS

20 dB Bandwidth



DH5_Ant1_2402

20 dB Bandwidth



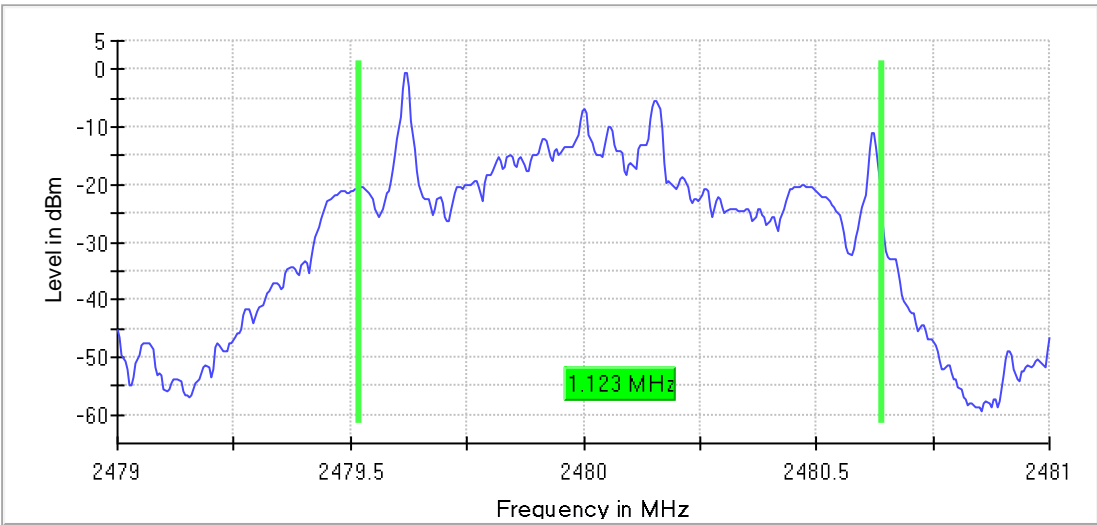
DH5_Ant1_2441



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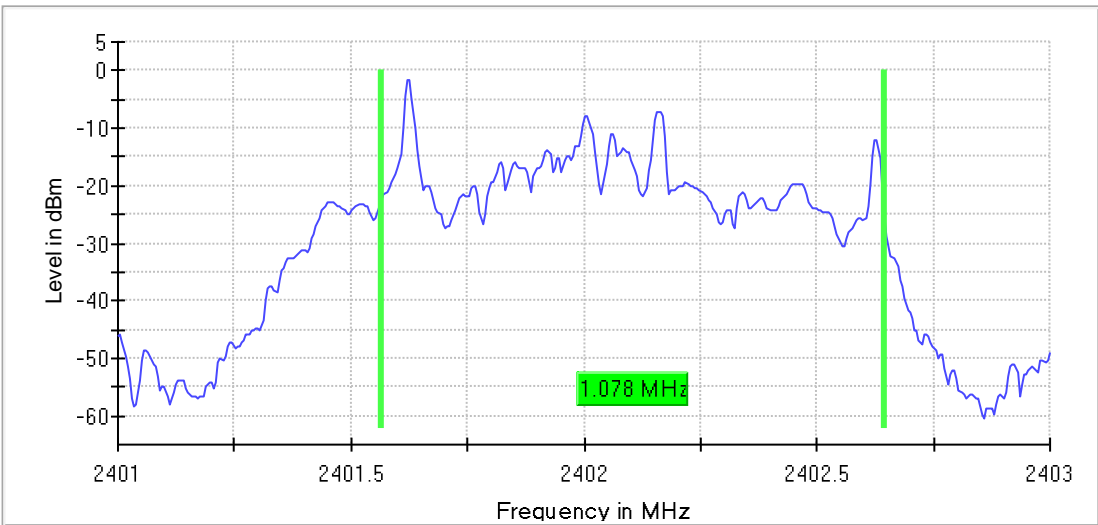
Test Report No.: W7L-P240118W001RF01

20 dB Bandwidth



DH5_Ant1_2480

20 dB Bandwidth

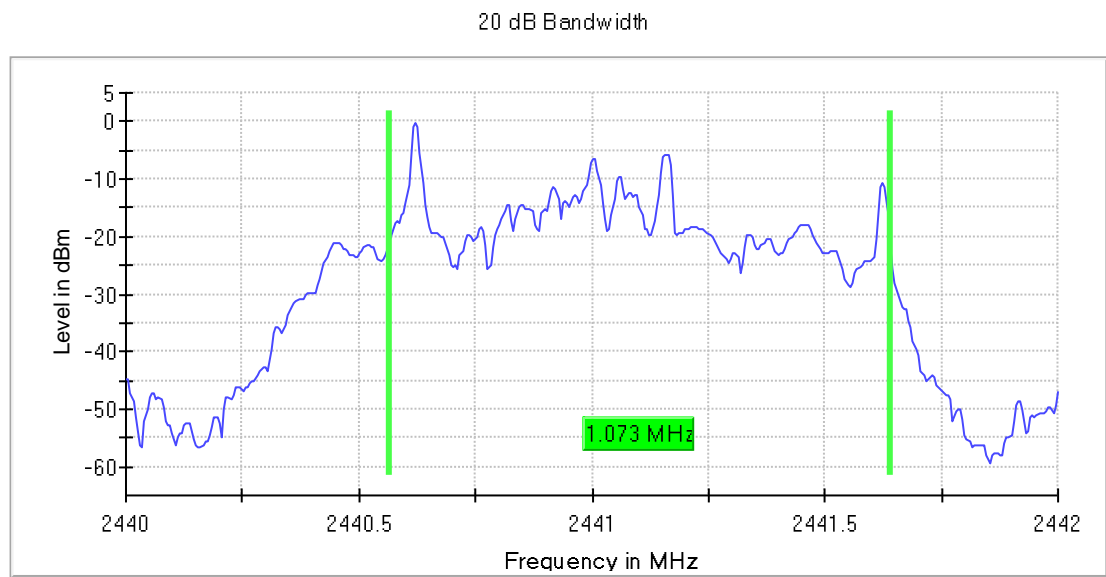


2DH5_Ant1_2402

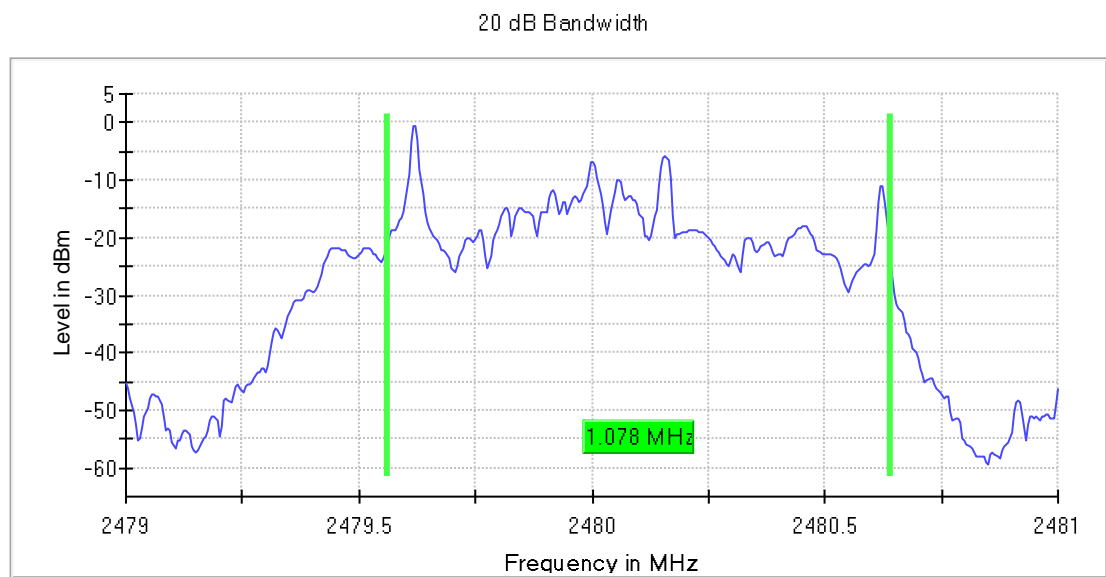


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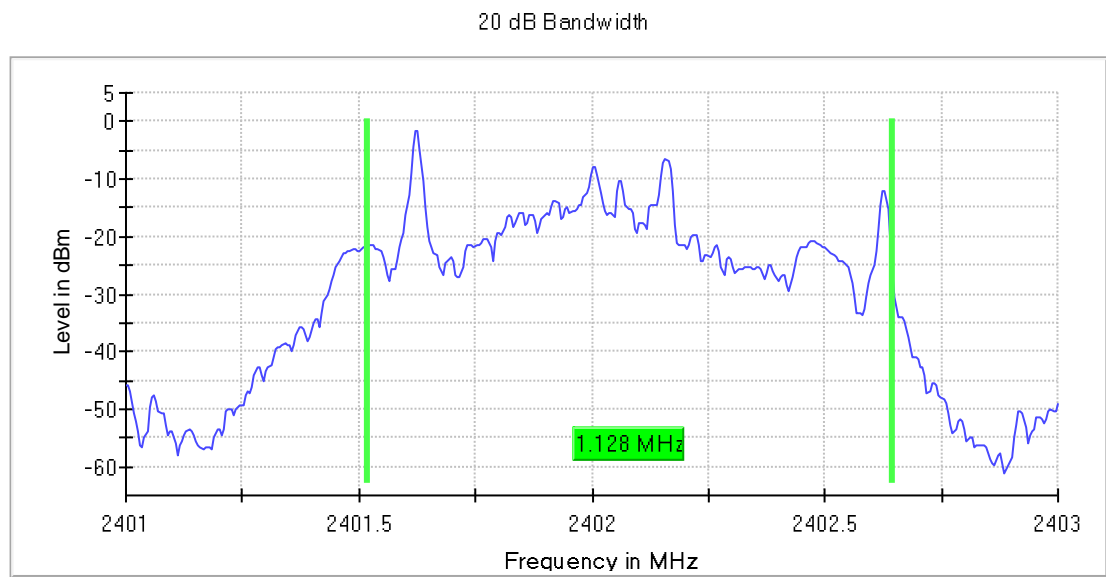
Test Report No.: W7L-P240118W001RF01



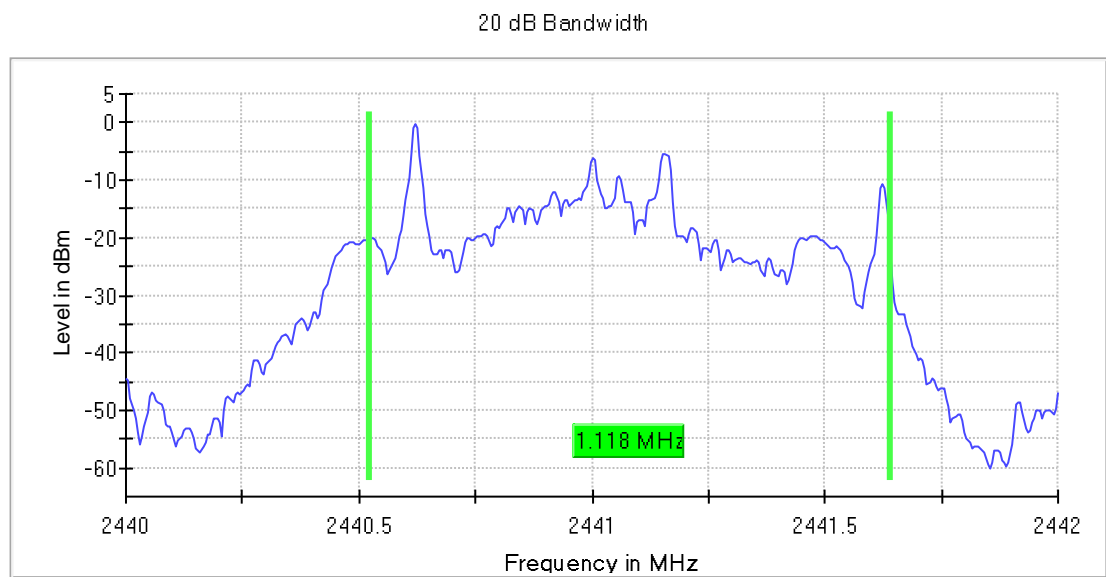
2DH5_Ant1_2441



2DH5_Ant1_2480



3DH5_Ant1_2402

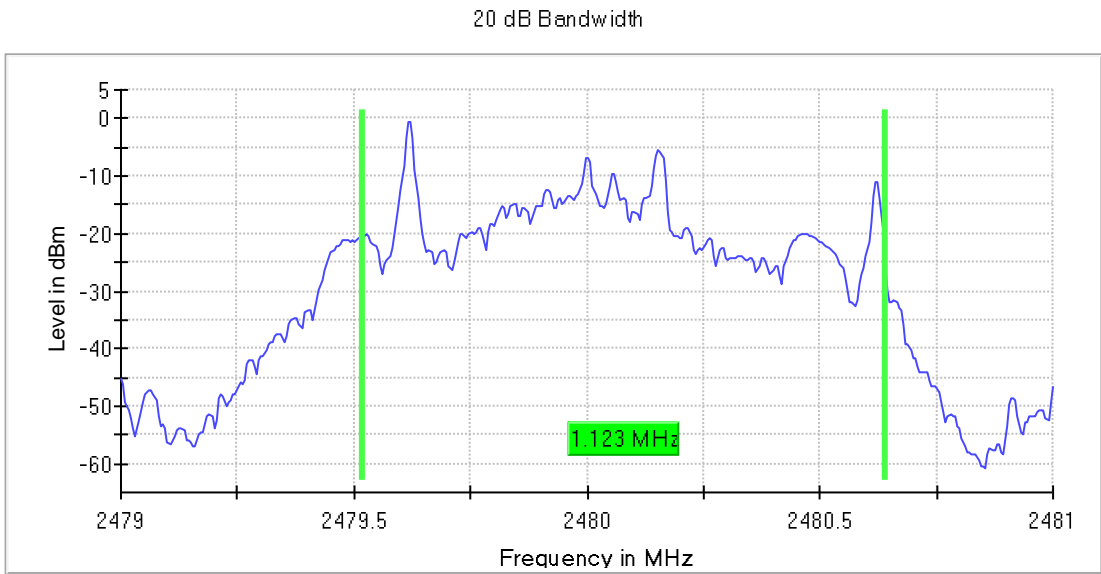


3DH5_Ant1_2441



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3DH5_Ant1_2480

RBW 10.000 kHz

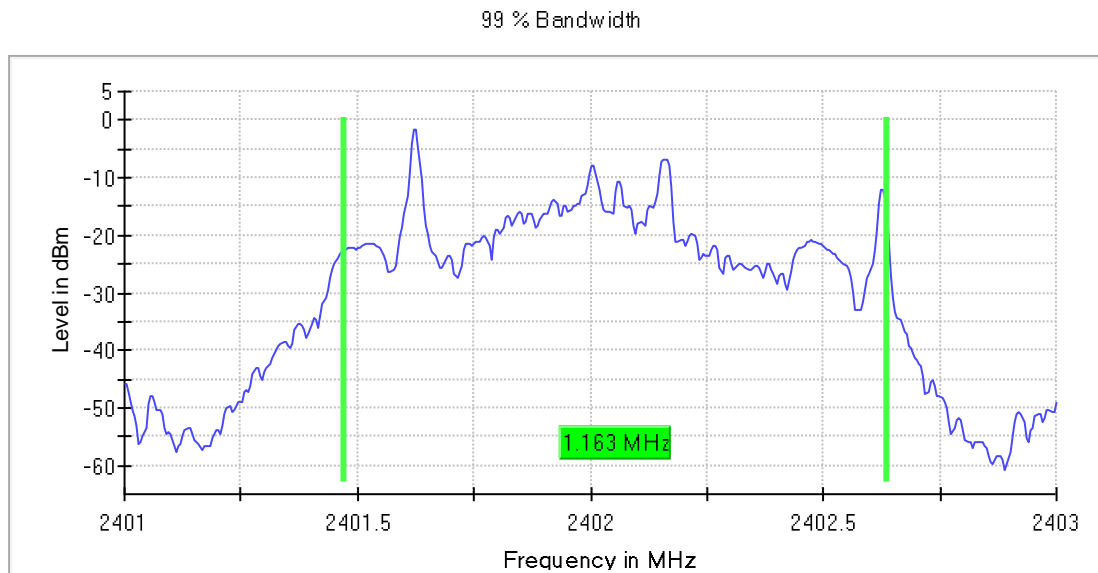
VBW 30.000 kHz

OCCUPIED CHANNEL BANDWIDTH

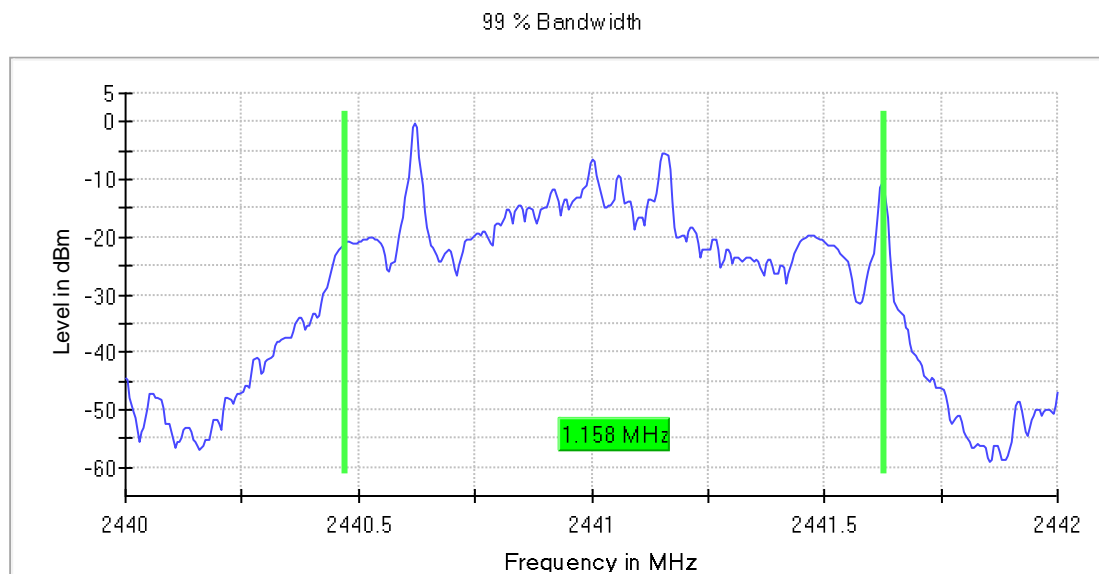
TEST RESULT

TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	1.163	2401.471	2402.634	---	PASS
		2441	1.158	2440.471	2441.629	---	PASS
		2480	1.163	2479.466	2480.629	---	PASS
2DH5	Ant1	2402	1.183	2401.451	2402.634	---	PASS
		2441	1.178	2440.451	2441.629	---	PASS
		2480	1.183	2479.446	2480.629	---	PASS
3DH5	Ant1	2402	1.158	2401.476	2402.634	---	PASS
		2441	1.158	2440.471	2441.629	---	PASS
		2480	1.163	2479.466	2480.629	---	PASS

TEST GRAPHS



DH5_Ant1_2402



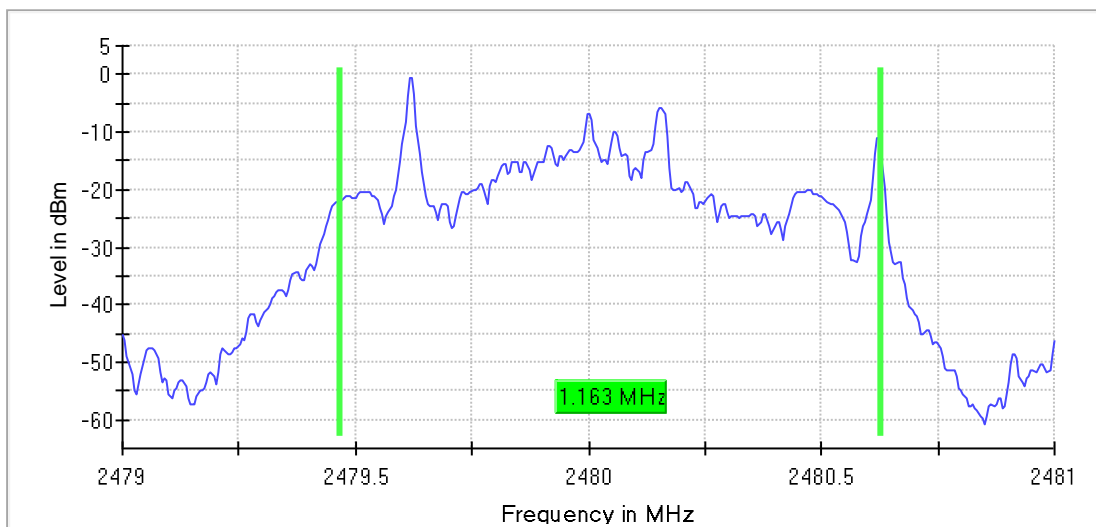
DH5_Ant1_2441



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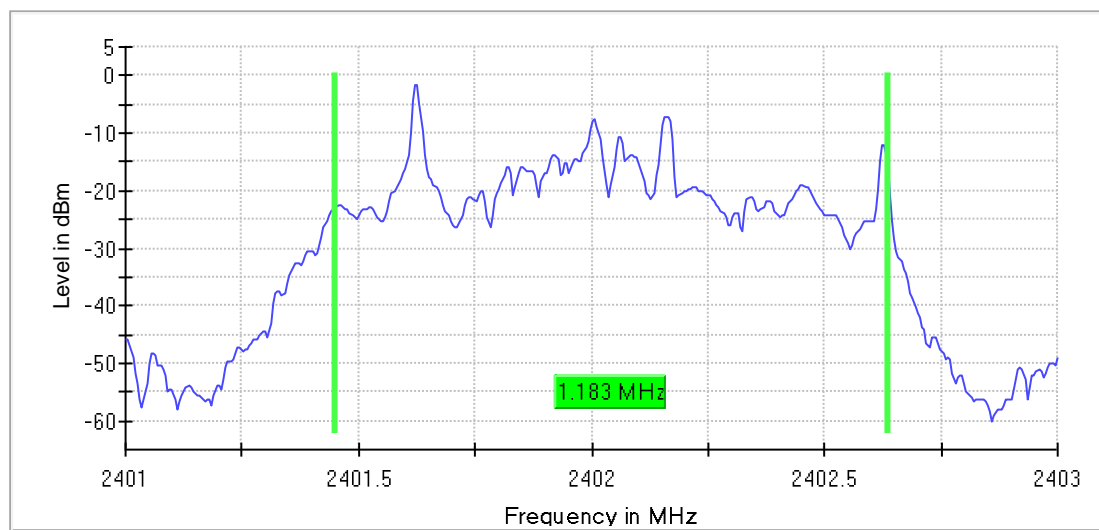
Test Report No.: W7L-P240118W001RF01

99 % Bandwidth



DH5_Ant1_2480

99 % Bandwidth

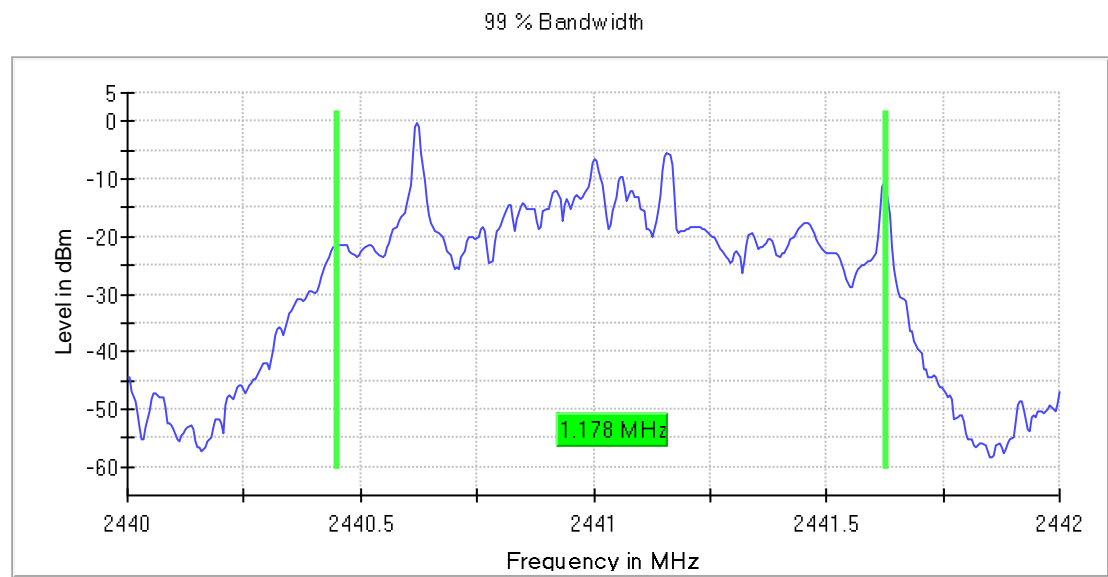


2DH5_Ant1_2402

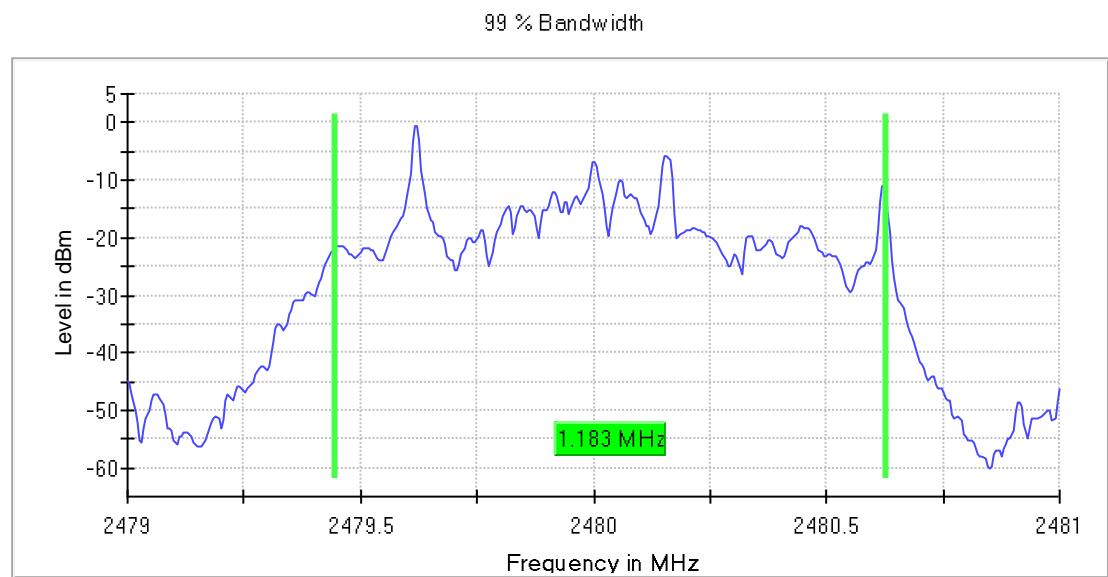


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Test Report No.: W7L-P240118W001RF01



2DH5_Ant1_2441

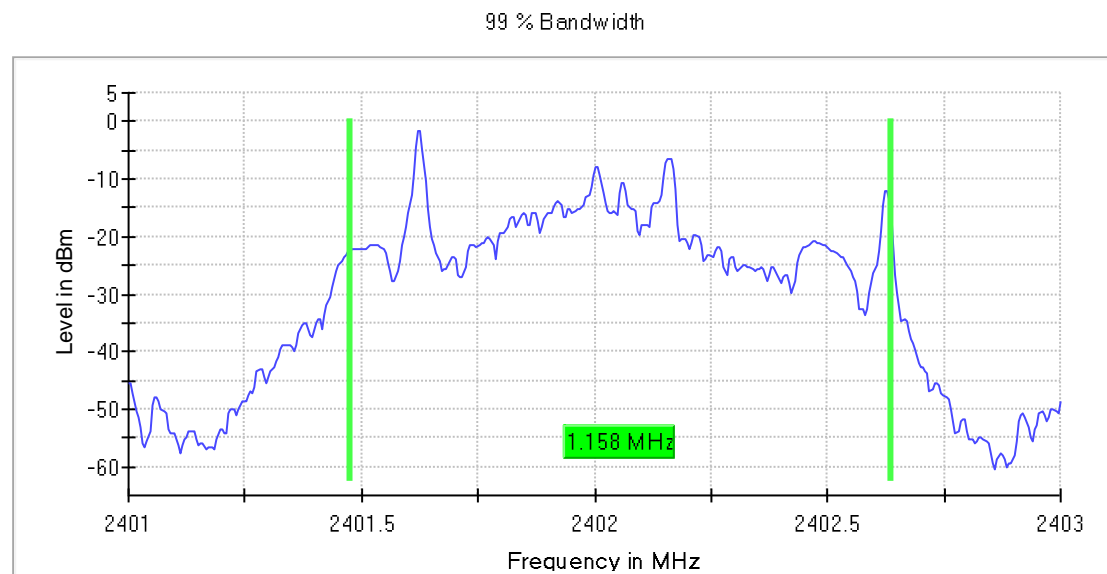


2DH5_Ant1_2480

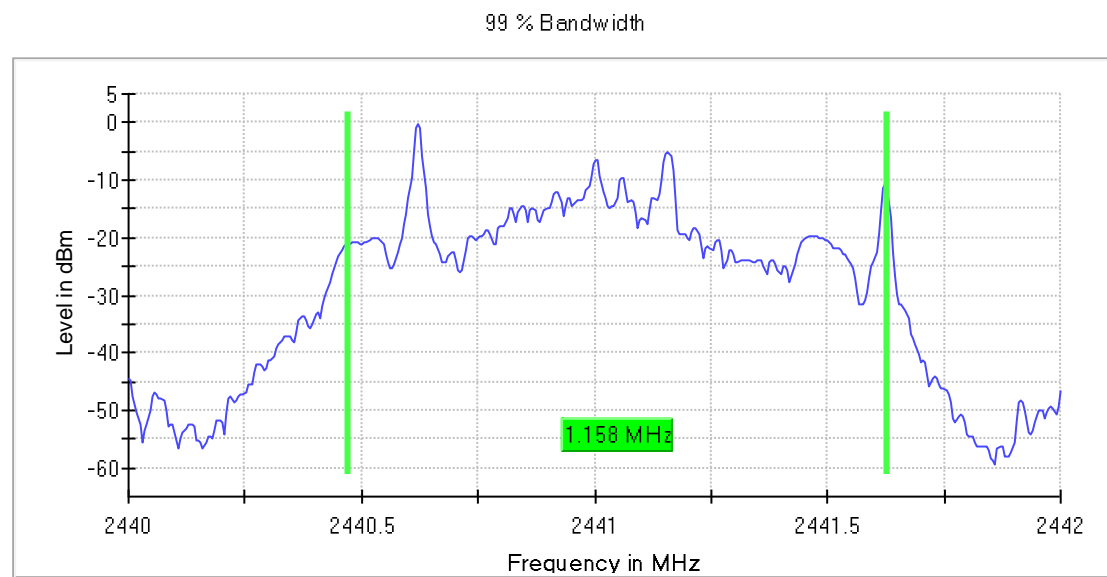


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Test Report No.: W7L-P240118W001RF01



3DH5_Ant1_2402

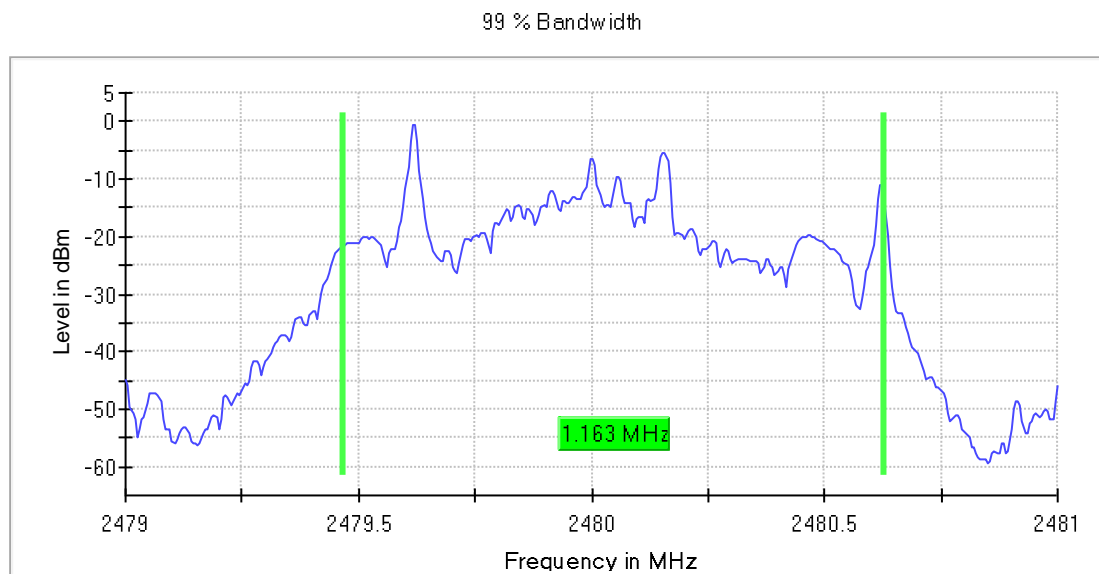


3DH5_Ant1_2441



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Test Report No.: W7L-P240118W001RF01



3DH5_Ant1_2480

RBW 10.000 kHz

VBW 30.000 kHz

MAXIMUM CONDUCTED OUTPUT POWER

TEST RESULT

TestMode	Antenna	Frequency [MHz]	Average power [dBm]	Peak Power [dBm]	Peak Power [mw]	Conducted Limit [dBm]	Verdict
DH5	Ant1	2402	-0.75	1.15	1.30	≤30.00	PASS
		2441	0.17	2.41	1.74	≤30.00	PASS
		2480	0.21	2.21	1.66	≤30.00	PASS
2DH5	Ant1	2402	-0.78	1.16	1.31	≤30.00	PASS
		2441	0.24	2.35	1.72	≤30.00	PASS
		2480	0.22	2.22	1.67	≤30.00	PASS
3DH5	Ant1	2402	-0.68	1.13	1.30	≤30.00	PASS
		2441	0.15	2.27	1.68	≤30.00	PASS
		2480	0.22	2.19	1.66	≤30.00	PASS



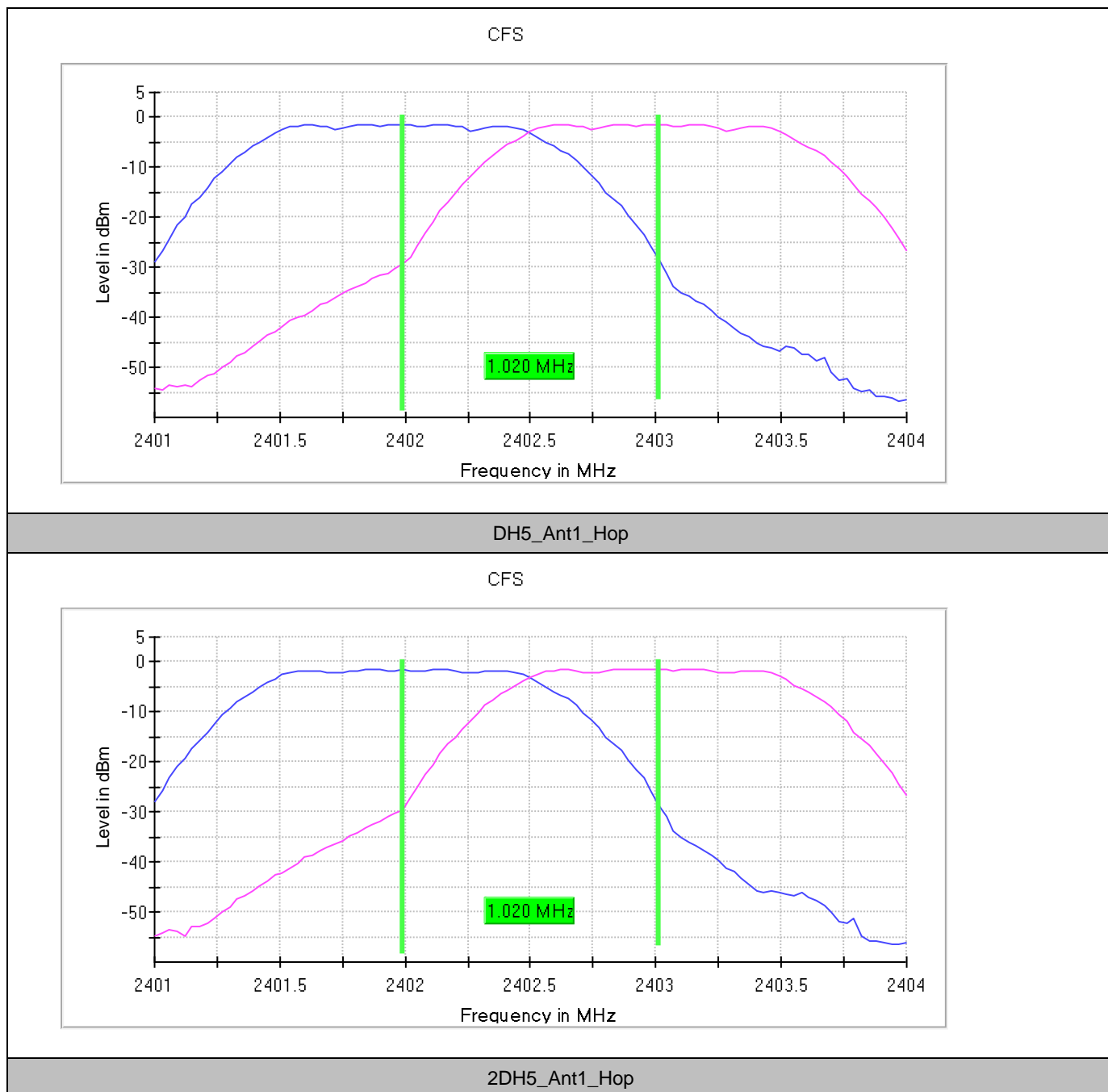
Test Report No.: W7L-P240118W001RF01

CARRIER FREQUENCY SEPARATION

TEST RESULT

TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
DH5	Ant1	Hop	1.020	≥ 0.6321	PASS
2DH5	Ant1	Hop	1.020	≥ 0.8743	PASS
3DH5	Ant1	Hop	1.020	≥ 0.8636	PASS

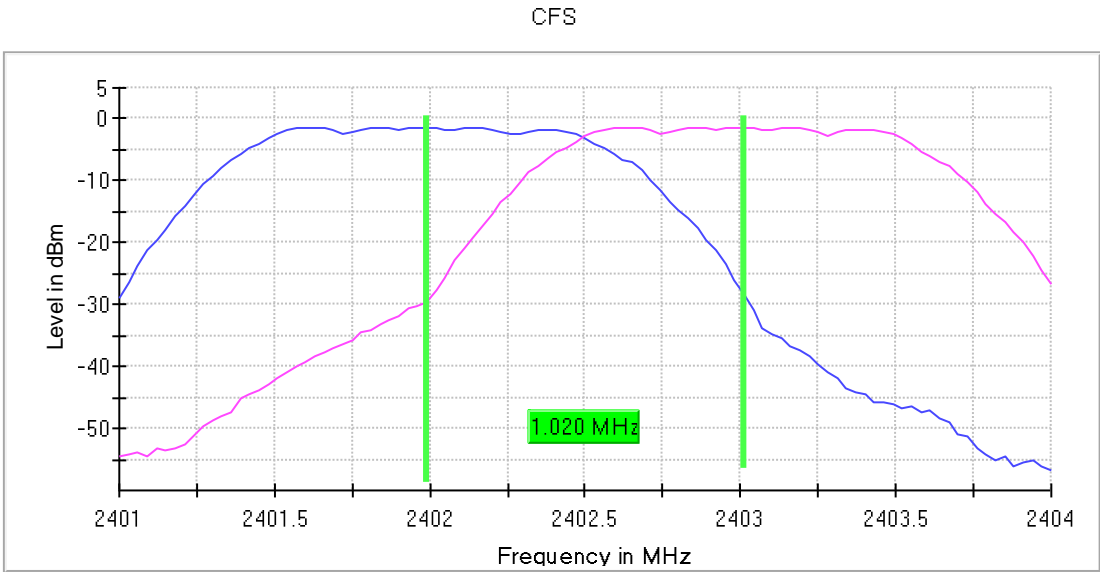
TEST GRAPHS





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Test Report No.: W7L-P240118W001RF01



3DH5_Ant1_Hop

RBW 300.000 kHz

VBW 300.000 kHz

TIME OF OCCUPANCY

TEST RESULT

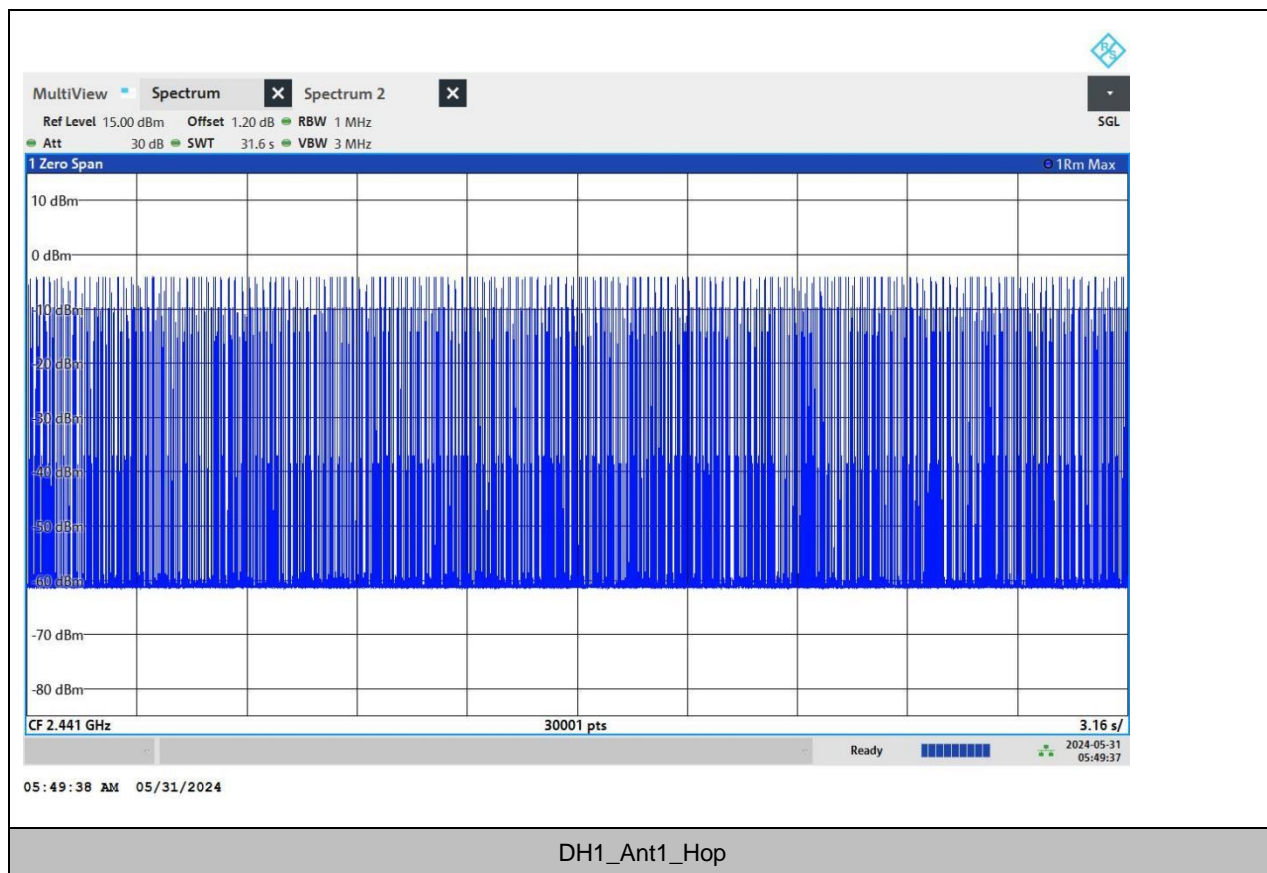
TestMode	Antenna	Channel	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH1	Ant1	Hop	249	0.384	95.616	≤0.4	PASS
DH3	Ant1	Hop	166	1.632	270.912	≤0.4	PASS
DH5	Ant1	Hop	128	2.888	369.664	≤0.4	PASS
2DH1	Ant1	Hop	241	0.388	93.508	≤0.4	PASS
2DH3	Ant1	Hop	179	1.632	292.128	≤0.4	PASS
2DH5	Ant1	Hop	141	2.888	407.208	≤0.4	PASS
3DH1	Ant1	Hop	264	0.387	102.168	≤0.4	PASS
3DH3	Ant1	Hop	181	1.632	295.392	≤0.4	PASS
3DH5	Ant1	Hop	125	2.888	361.000	≤0.4	PASS



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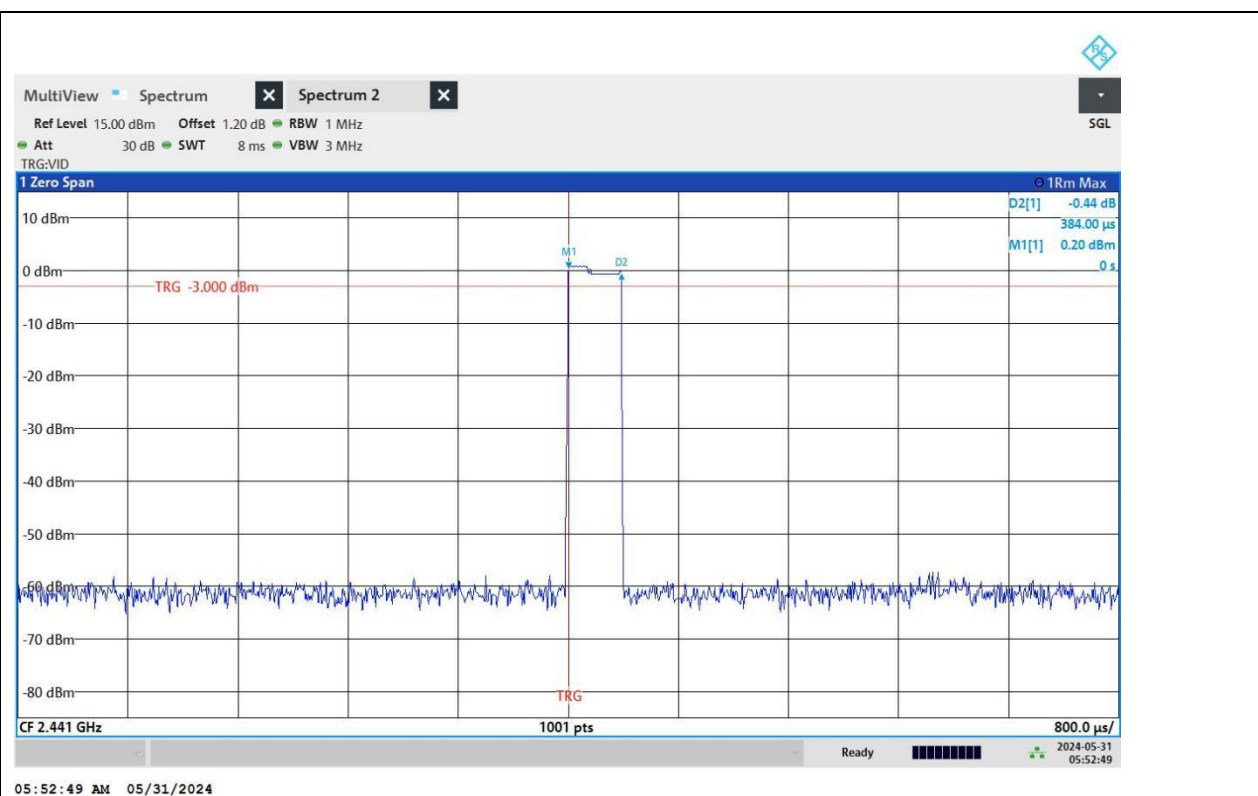
TEST GRAPHS



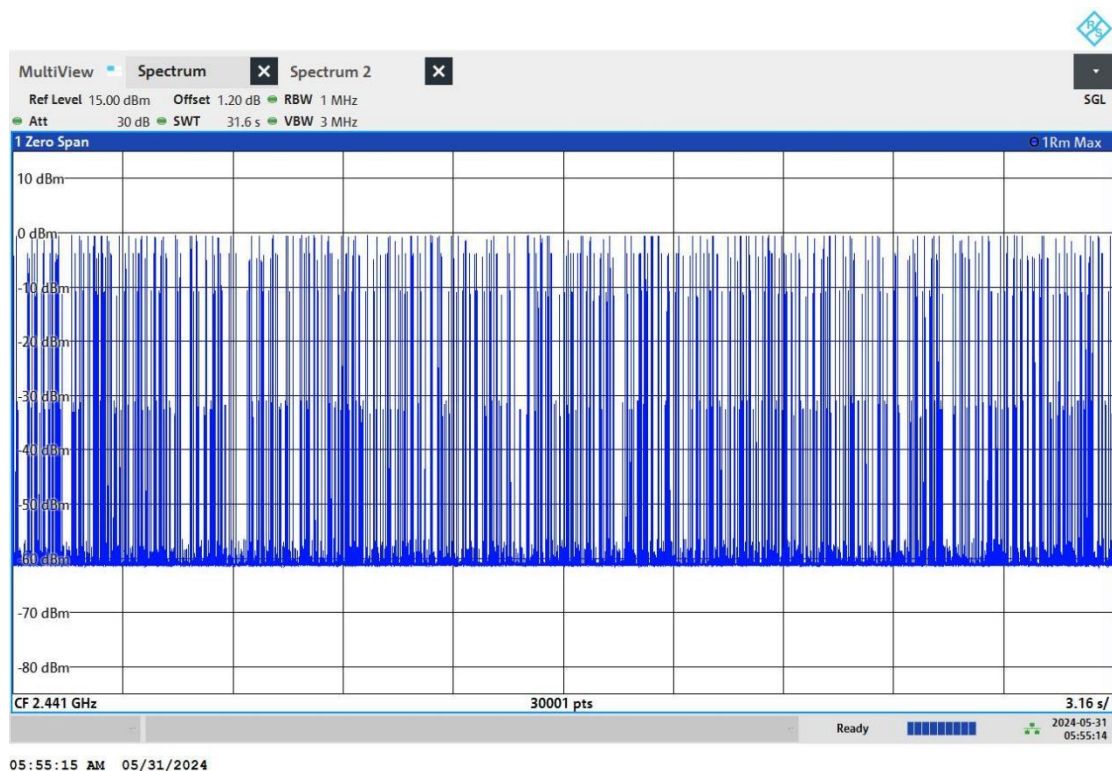


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Test Report No.: W7L-P240118W001RF01



DH1_Ant1_Hop



DH3_Ant1_Hop

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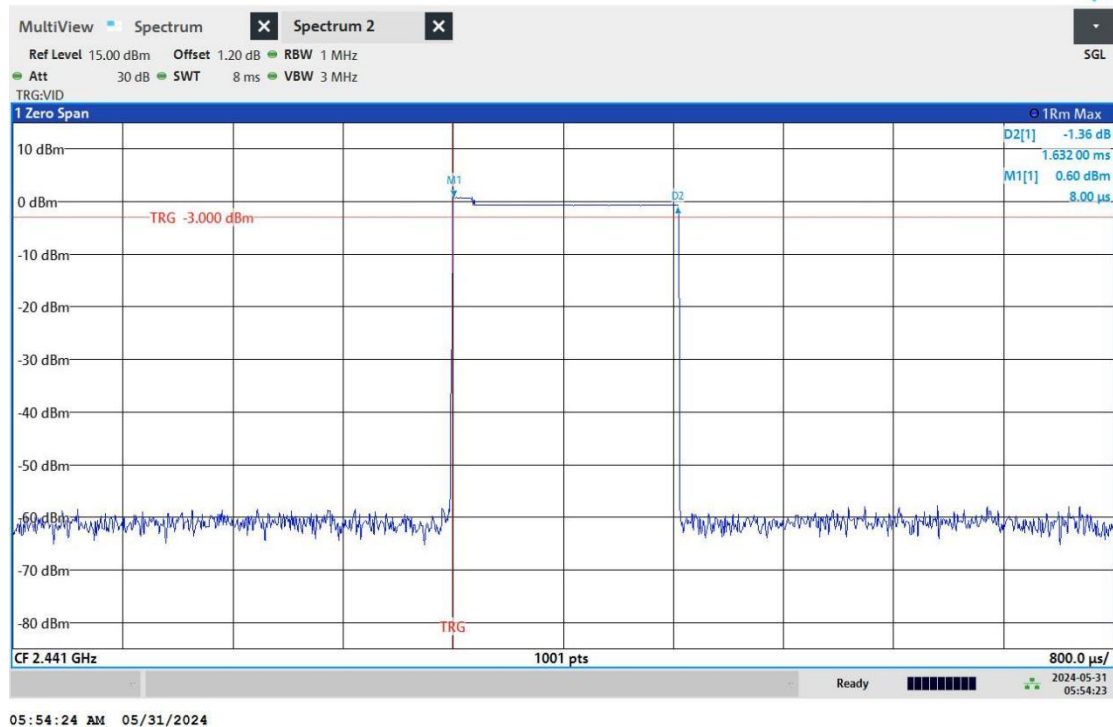
Tower N, Innovation Center, 88 Zhuyi Road, High-tech
District, Suzhou City, Anhui Province

Tel: +86(0557) 368 1008

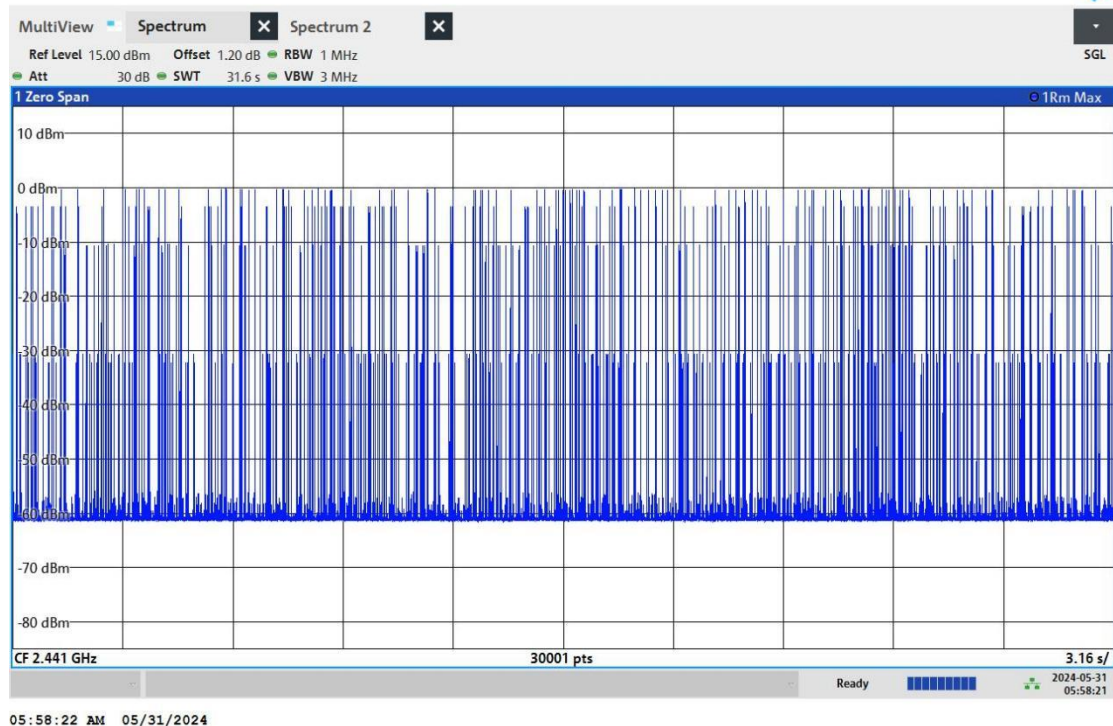


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DH3_Ant1_Hop

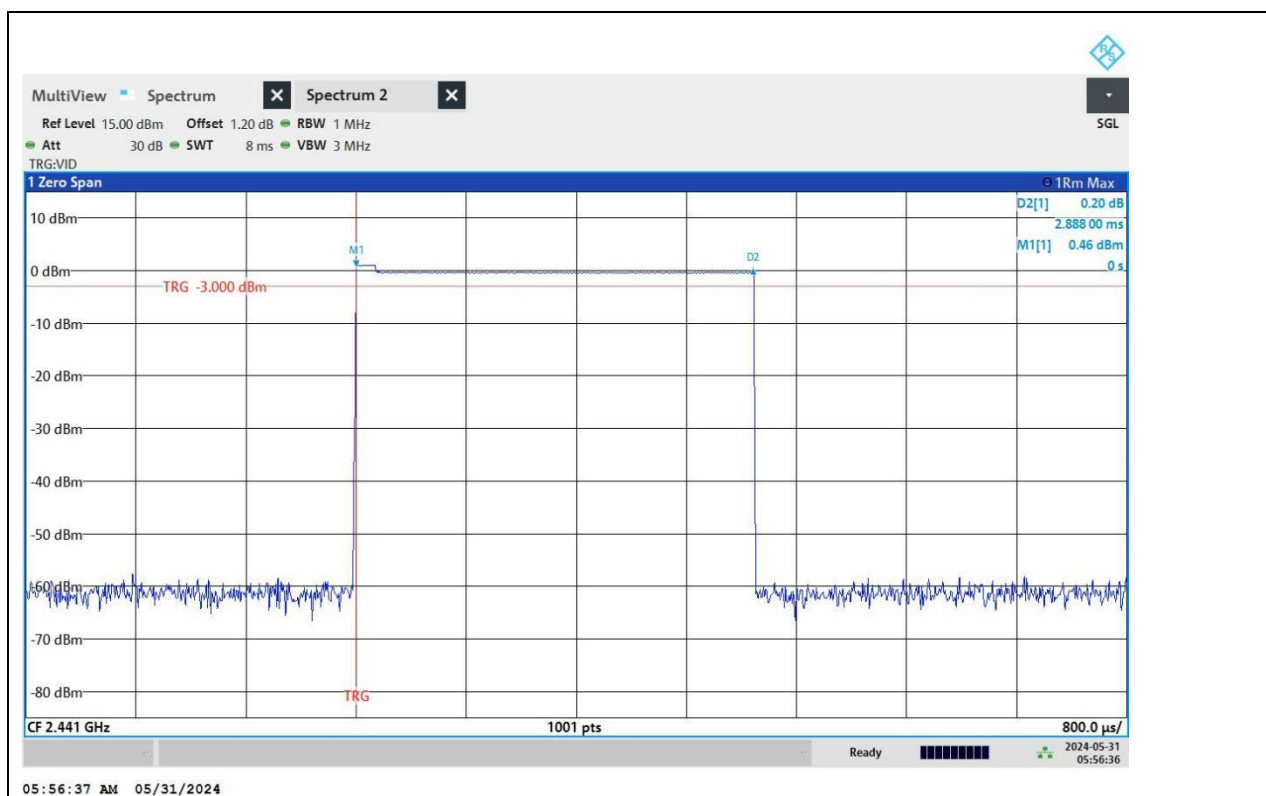


DH5_Ant1_Hop

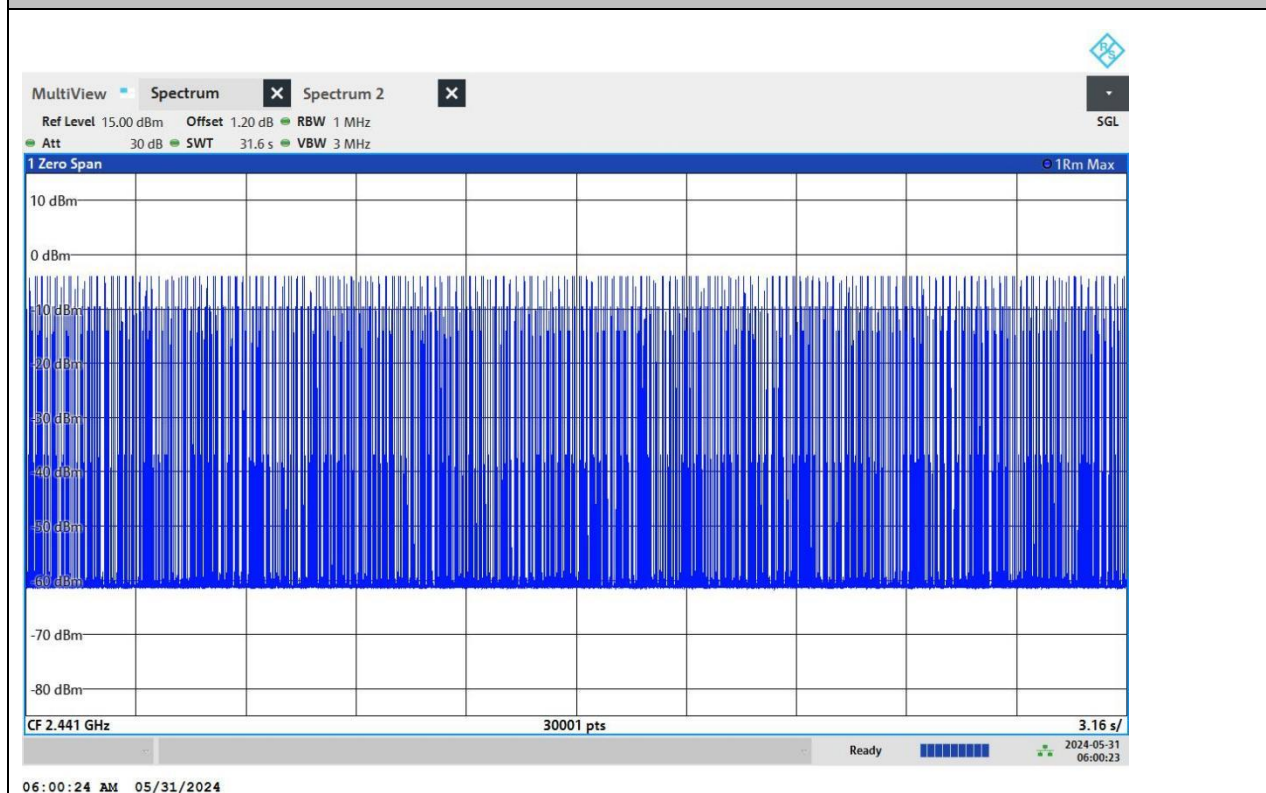


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Test Report No.: W7L-P240118W001RF01



DH5_Ant1_Hop



2DH1_Ant1_Hop

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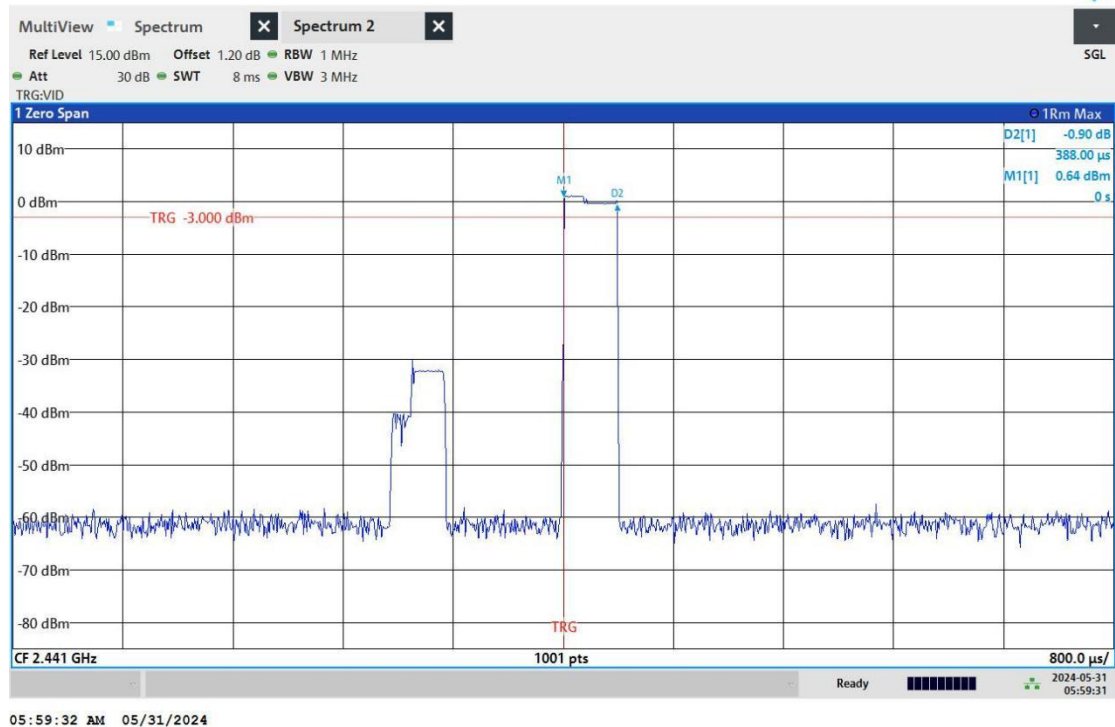
Tower N, Innovation Center, 88 Zhuyi Road, High-tech
District, Suzhou City, Anhui Province

Tel: +86(0557) 368 1008

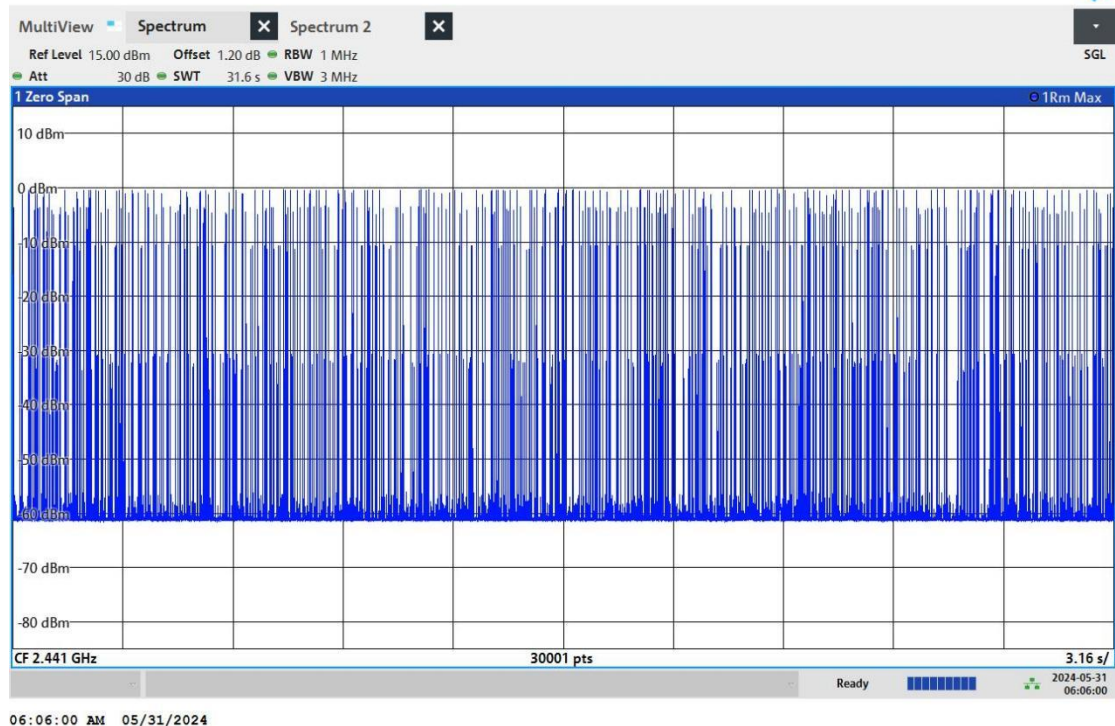


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Test Report No.: W7L-P240118W001RF01



2DH1_Ant1_Hop



2DH3_Ant1_Hop

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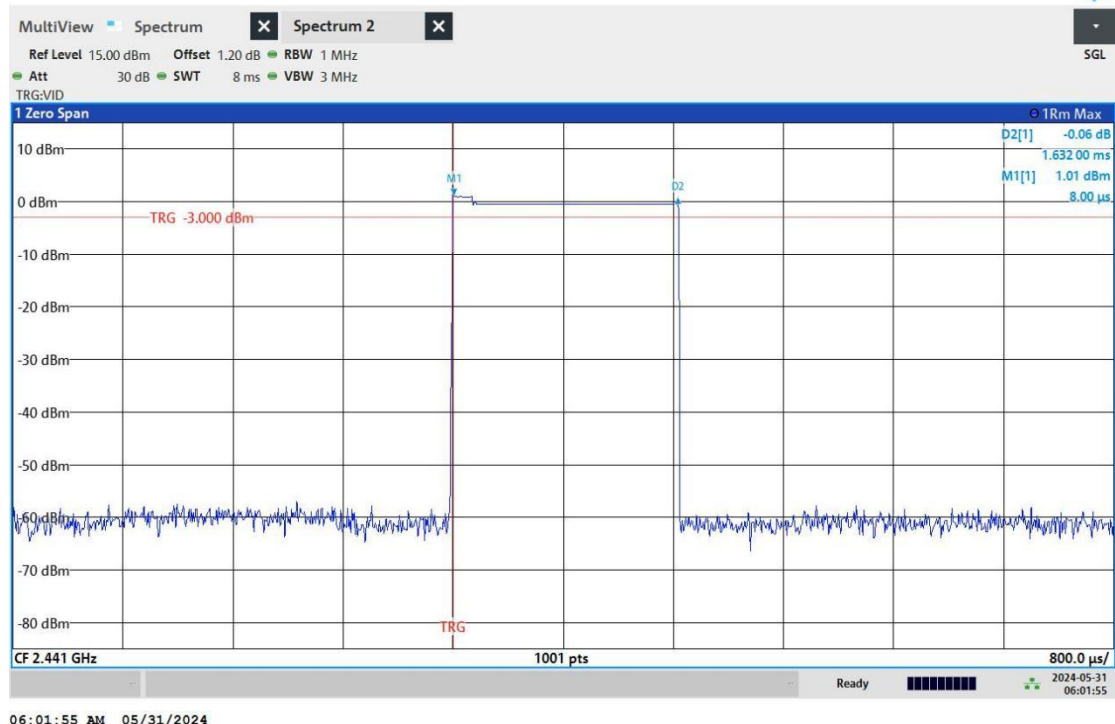
Tower N, Innovation Center, 88 Zhuyi Road, High-tech
District, Suzhou City, Anhui Province

Tel: +86(0557) 368 1008

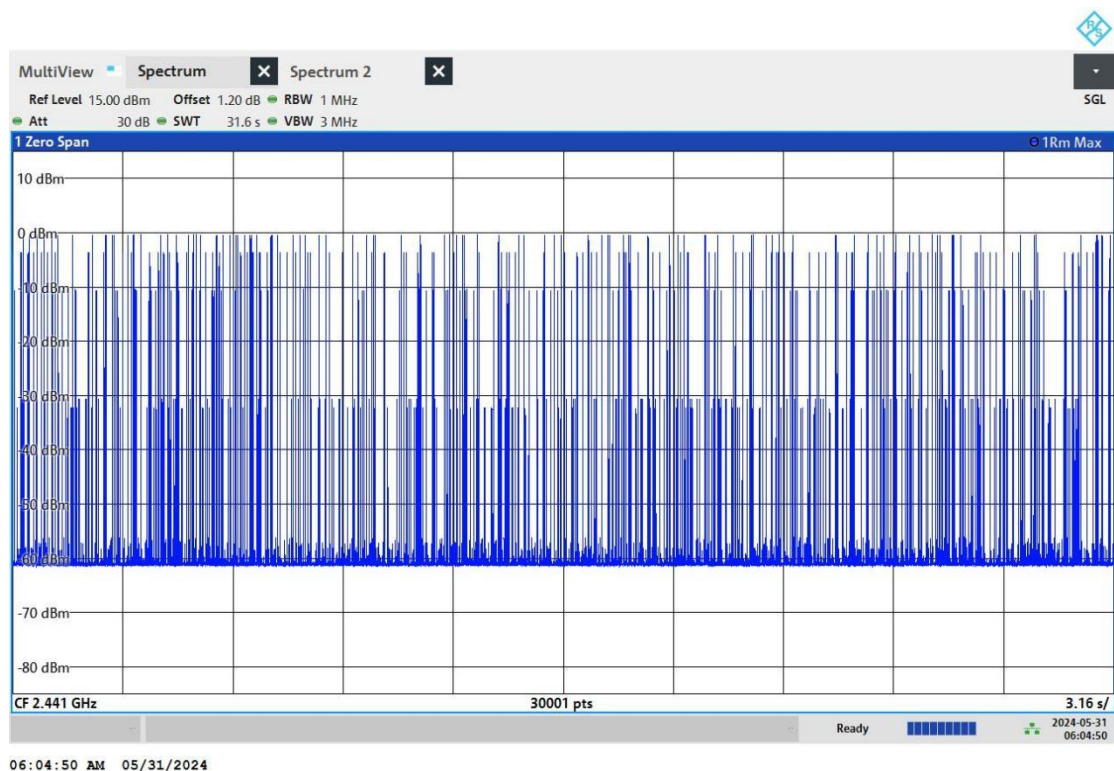


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VERITAS

Test Report No.: W7L-P240118W001RF01



2DH3_Ant1_Hop



2DH5_Ant1_Hop

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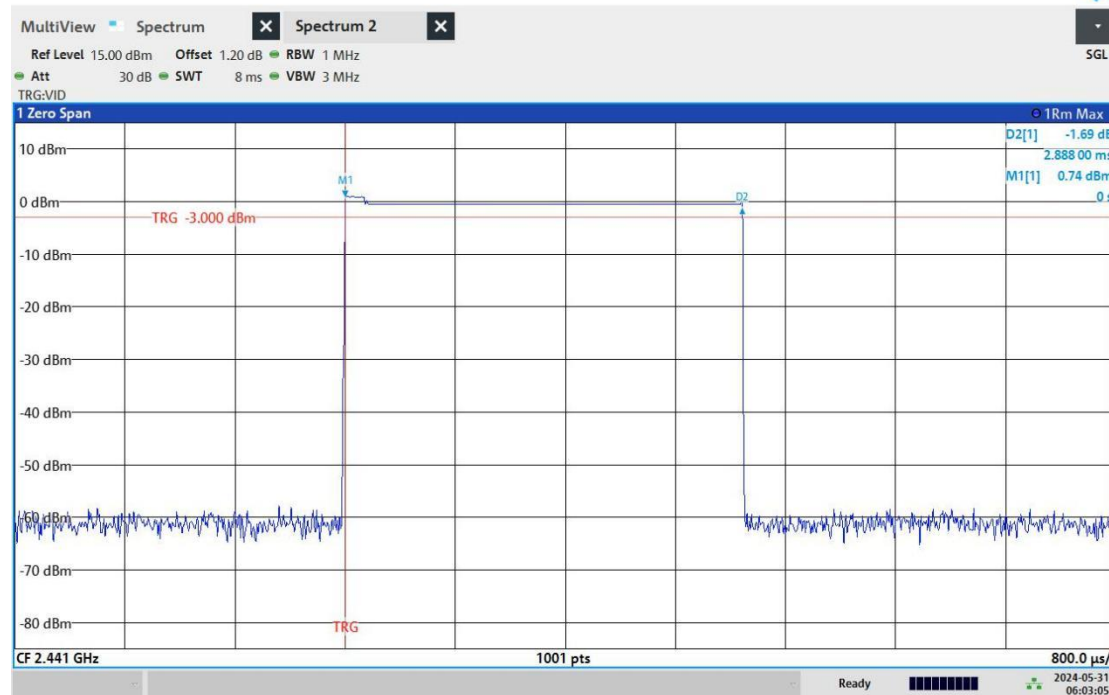
Tower N, Innovation Center, 88 Zhuyi Road, High-tech
District, Suzhou City, Anhui Province

Tel: +86(0557) 368 1008



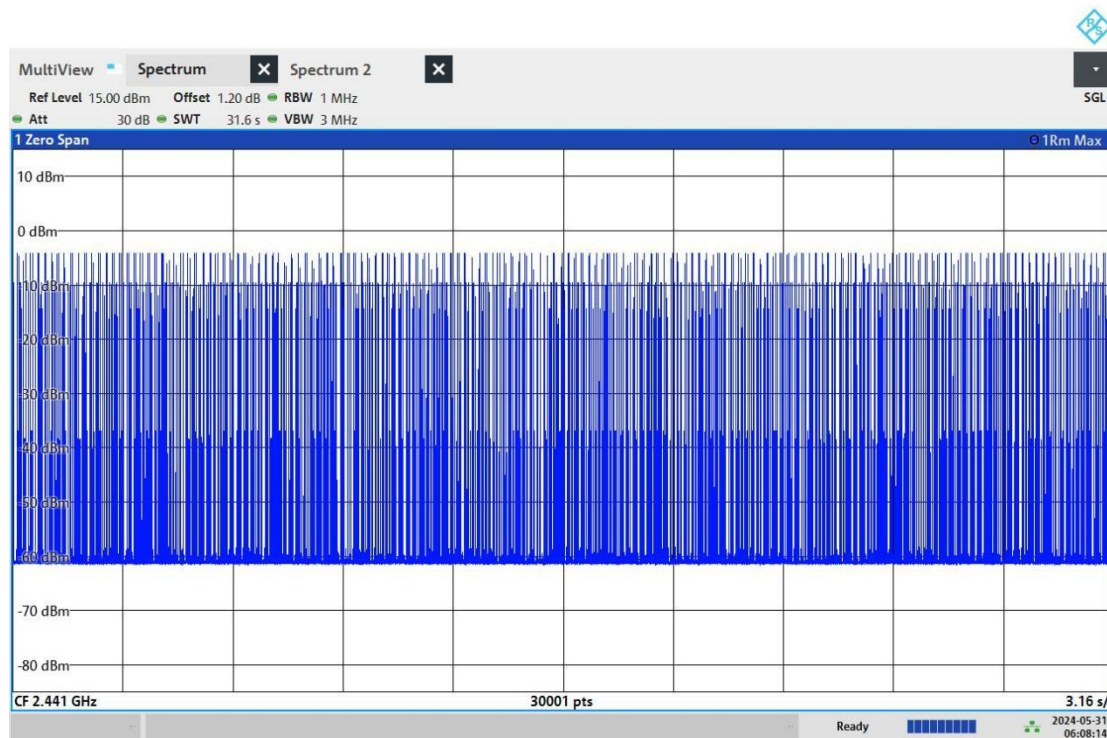
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VERITAS

Test Report No.: W7L-P240118W001RF01



06:03:05 AM 05/31/2024

2DH5_Ant1_Hop



06:08:14 AM 05/31/2024

3DH1_Ant1_Hop

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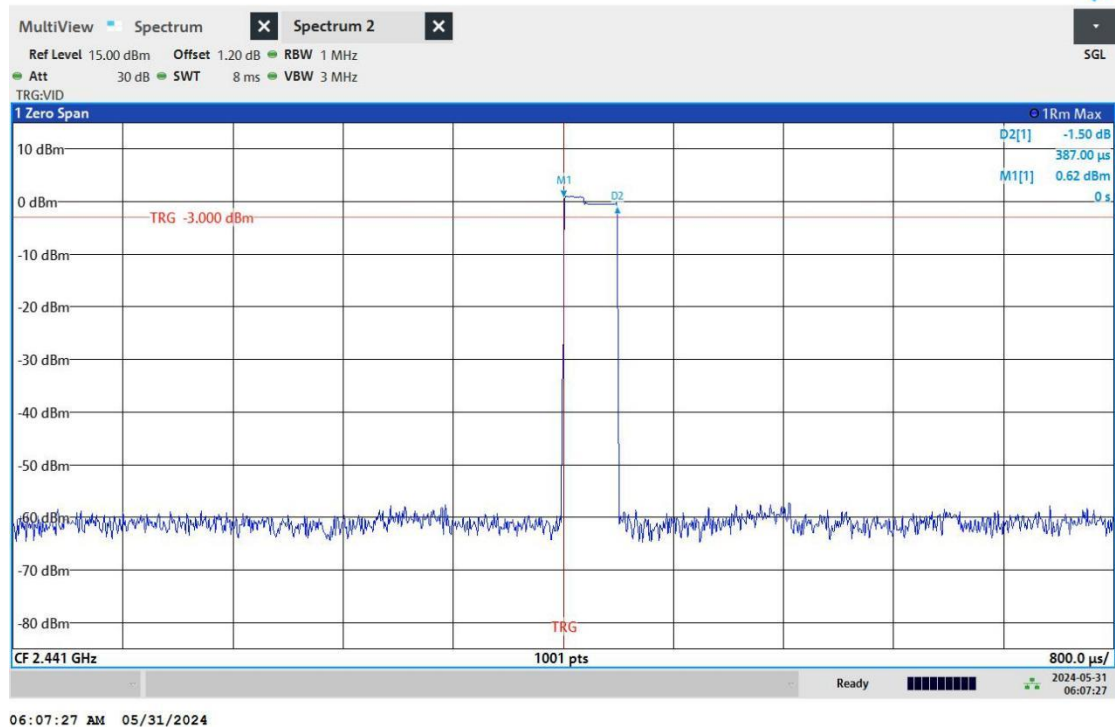
Tower N, Innovation Center, 88 Zhuyi Road, High-tech
District, Suzhou City, Anhui Province

Tel: +86(0557) 368 1008

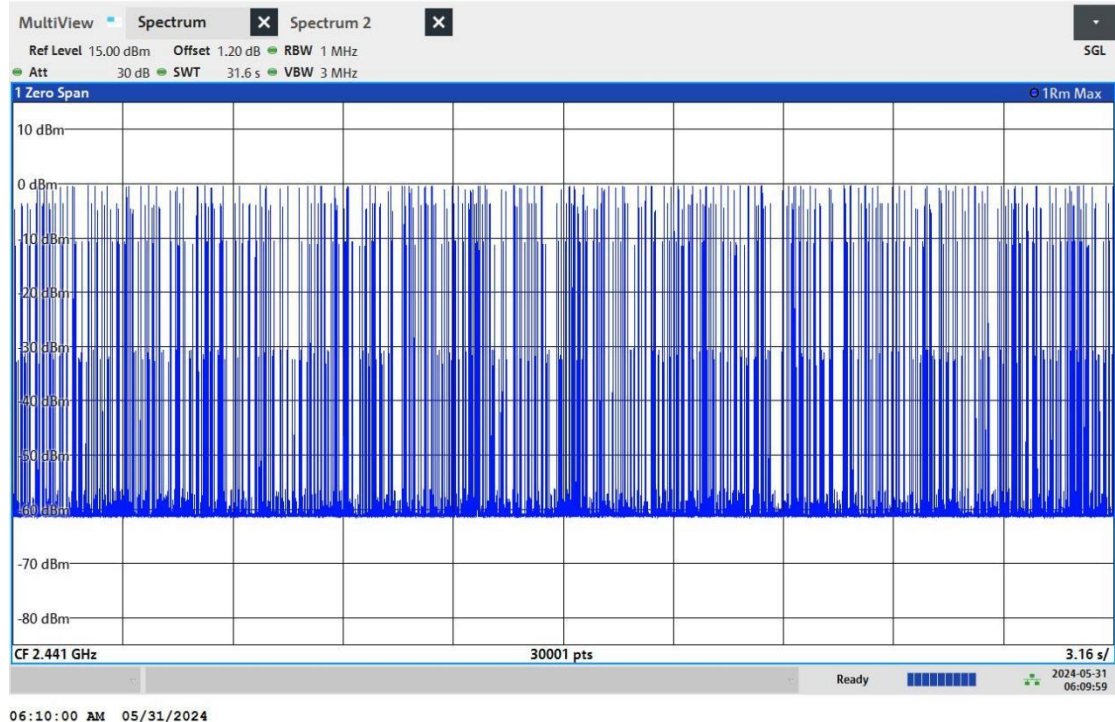


BUREAU
VERITAS

Test Report No.: W7L-P240118W001RF01



3DH1_Ant1_Hop



3DH3_Ant1_Hop

Huarui 7Layers High Technology
(Suzhou) Co., Ltd

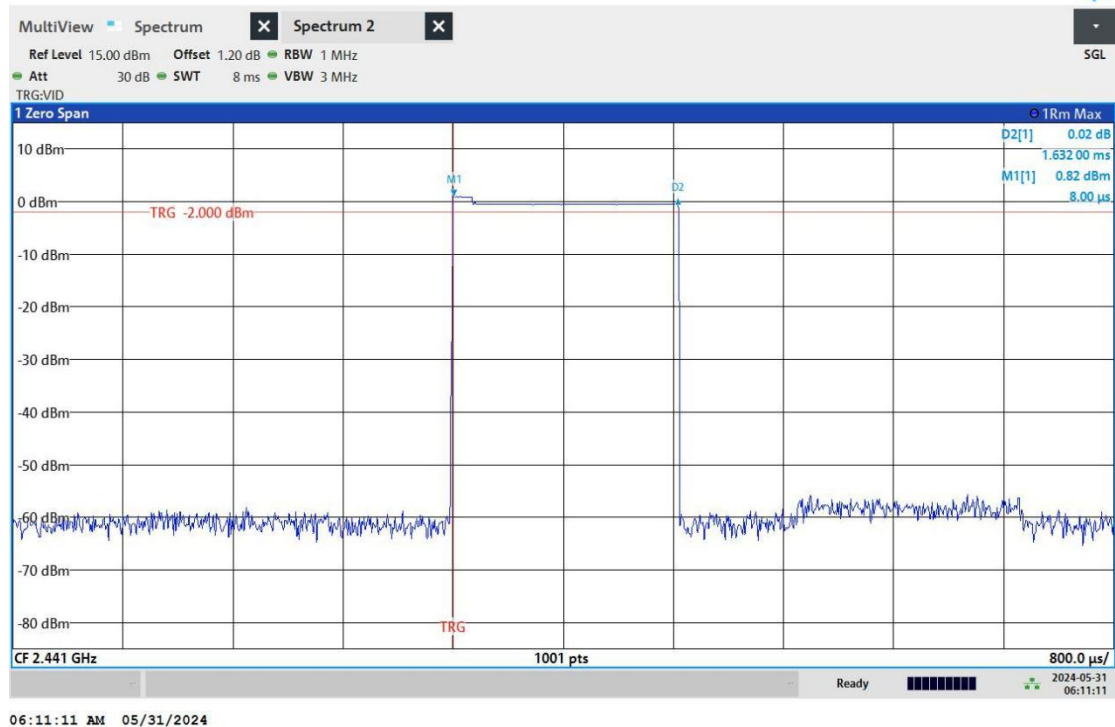
Tower N, Innovation Center, 88 Zhuyi Road, High-tech
District, Suzhou City, Anhui Province

Tel: +86(0557) 368 1008

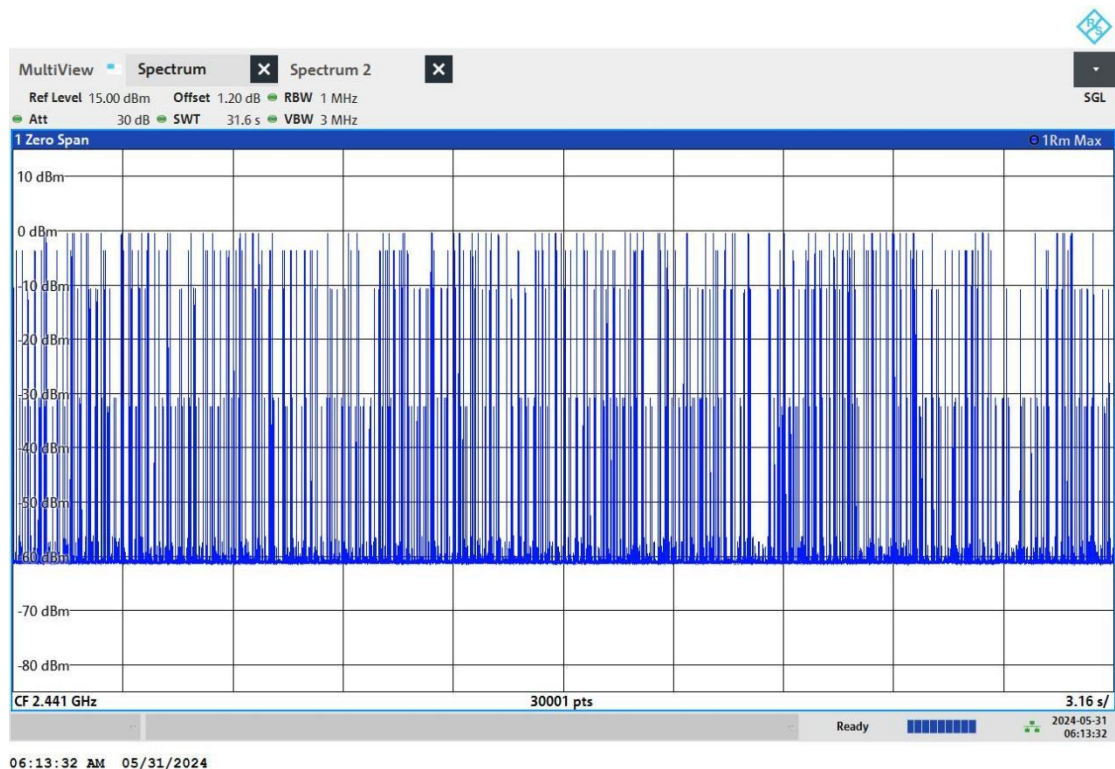


BUREAU
VERITAS

Test Report No.: W7L-P240118W001RF01



3DH3_Ant1_Hop



3DH5_Ant1_Hop

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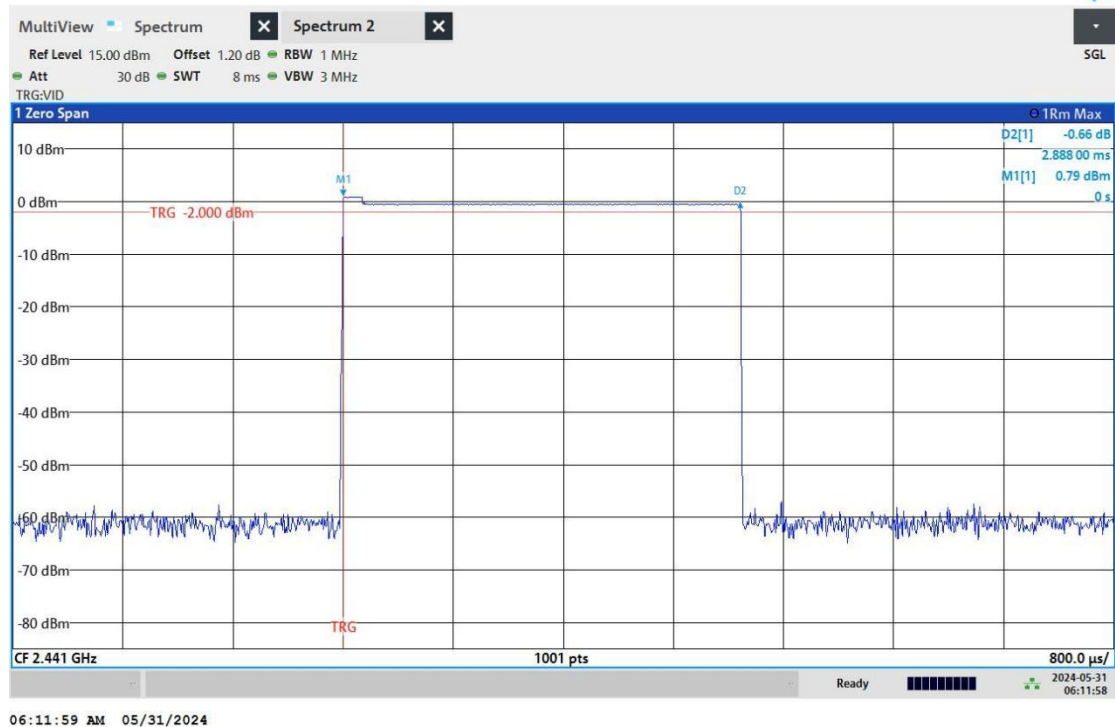
Tower N, Innovation Center, 88 Zhuyi Road, High-tech
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Tel: +86(0557) 368 1008



BUREAU
VERITAS

Test Report No.: W7L-P240118W001RF01



3DH5_Ant1_Hop



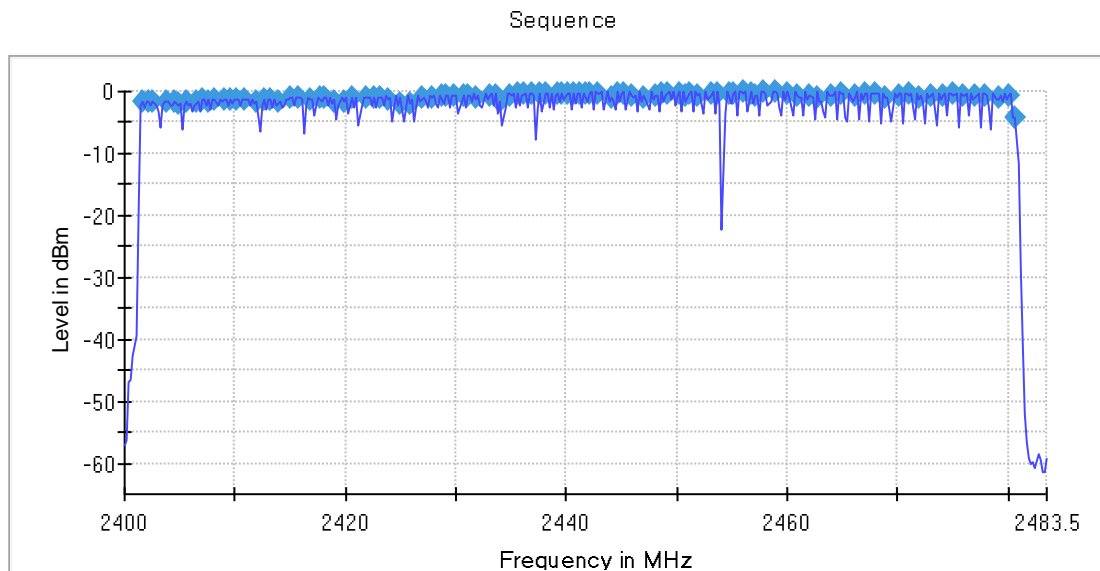
Test Report No.: W7L-P240118W001RF01

NUMBER OF HOPPING CHANNELS

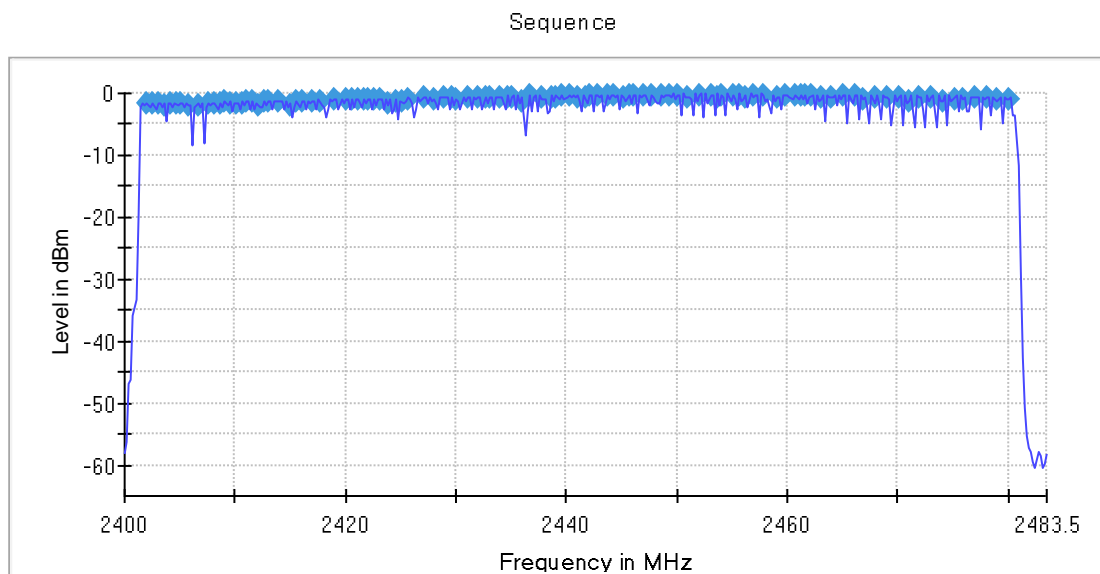
TEST RESULT

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

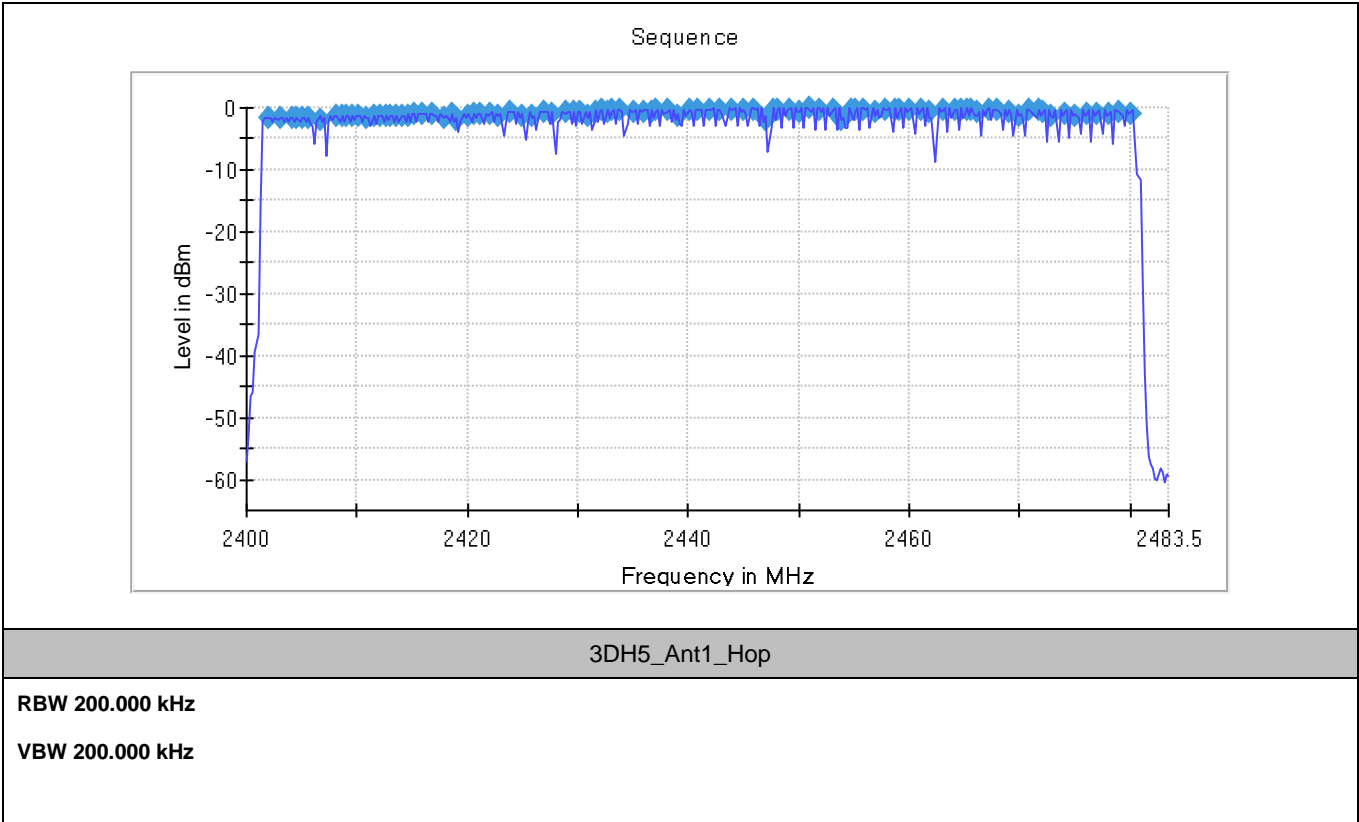


2DH5_Ant1_Hop



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VERITAS

Test Report No.: W7L-P240118W001RF01

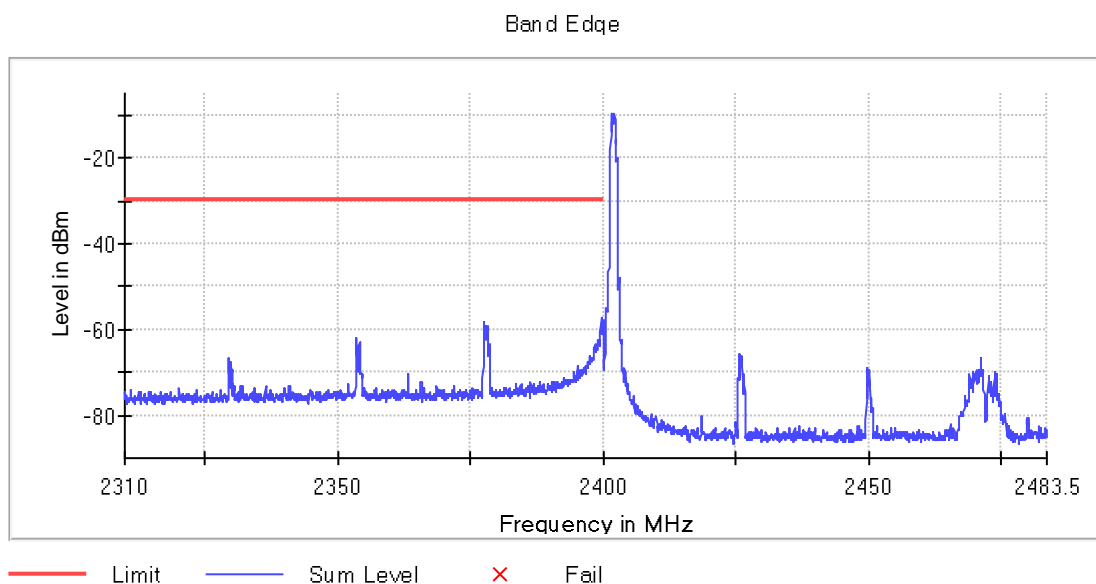


BAND EDGE MEASUREMENTS

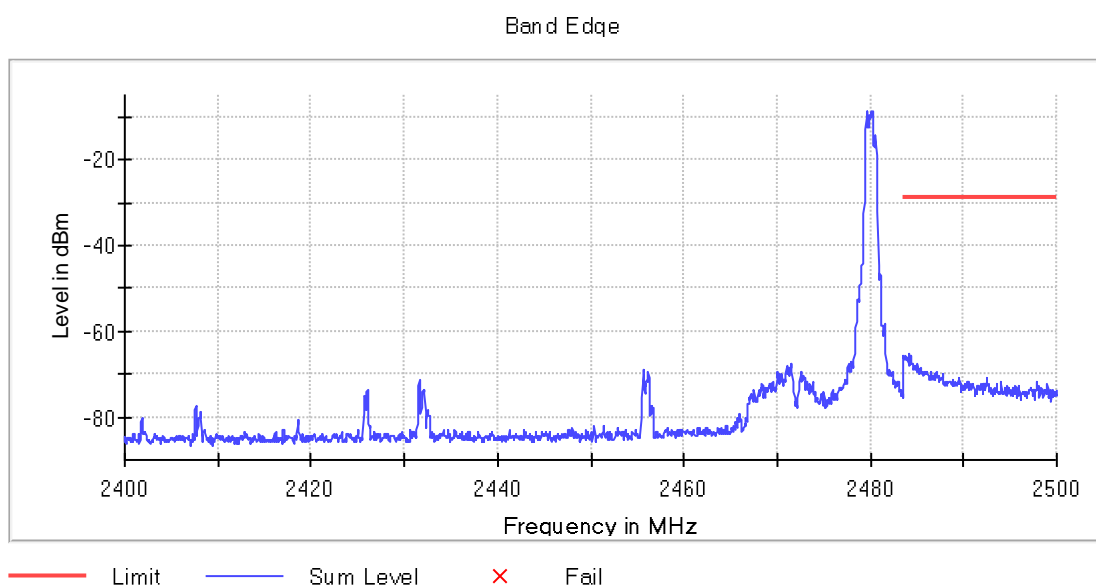
TEST RESULT

TestMode	Antenna	ChName	Channel	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	Low	2402	See test graph	See test graph	See test graph	PASS
		High	2480	See test graph	See test graph	See test graph	PASS
		Low	Hop_2402	See test graph	See test graph	See test graph	PASS
		High	Hop_2480	See test graph	See test graph	See test graph	PASS
2DH5	Ant1	Low	2402	See test graph	See test graph	See test graph	PASS
		High	2480	See test graph	See test graph	See test graph	PASS
		Low	Hop_2402	See test graph	See test graph	See test graph	PASS
		High	Hop_2480	See test graph	See test graph	See test graph	PASS
3DH5	Ant1	Low	2402	See test graph	See test graph	See test graph	PASS
		High	2480	See test graph	See test graph	See test graph	PASS
		Low	Hop_2402	See test graph	See test graph	See test graph	PASS
		High	Hop_2480	See test graph	See test graph	See test graph	PASS

TEST GRAPHS



DH5_Ant1_Low_2402

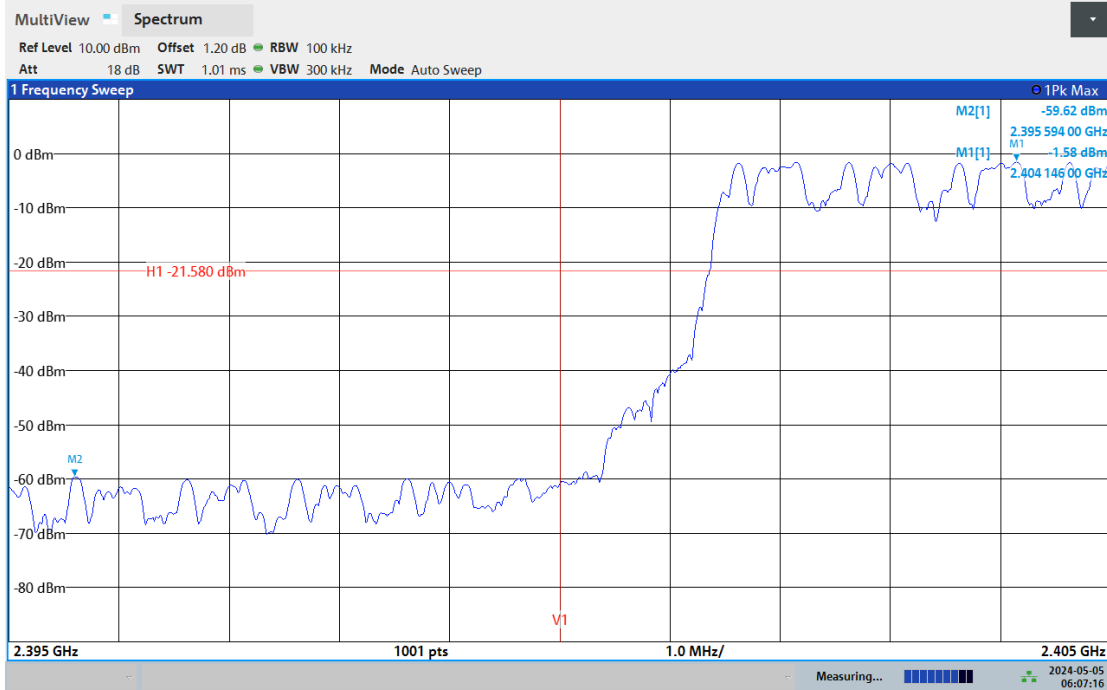


DH5_Ant1_High_2480



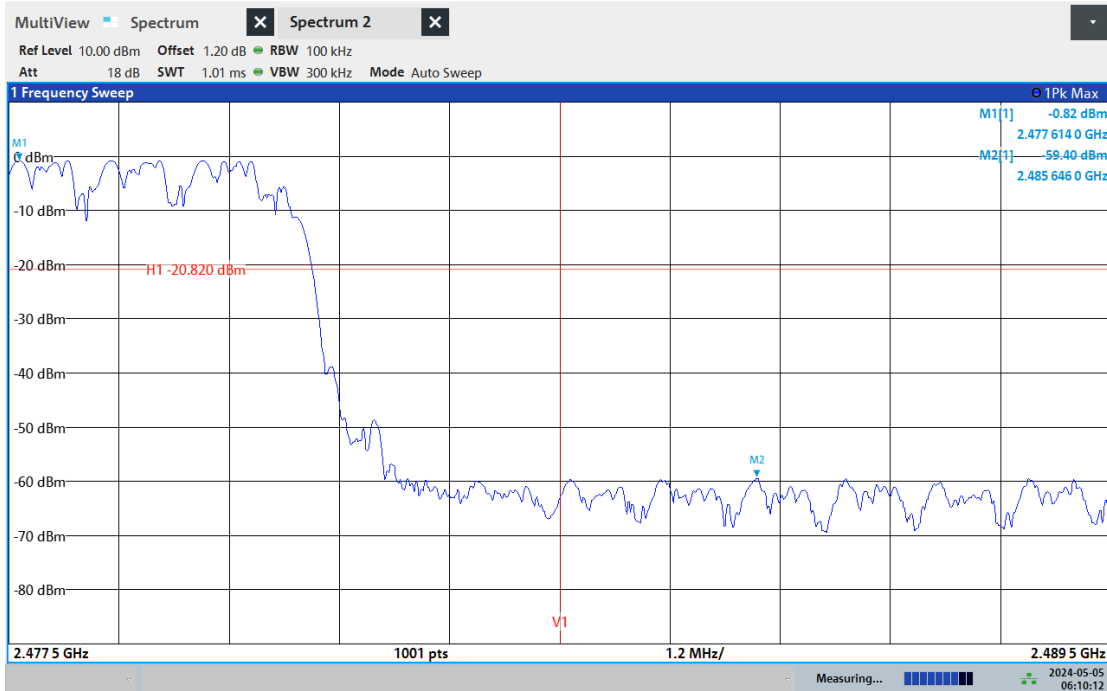
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VERITAS

Test Report No.: W7L-P240118W001RF01



06:07:16 AM 05/05/2024

DH5_Ant1_Low_Hop_2402



06:10:12 AM 05/05/2024

DH5_Ant1_High_Hop_2480

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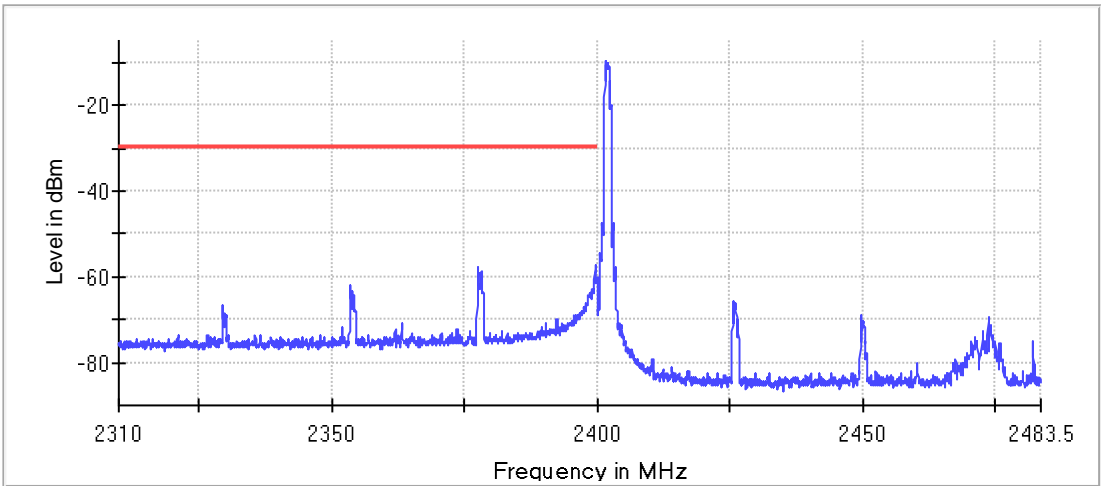
Tel: +86(0557) 368 1008



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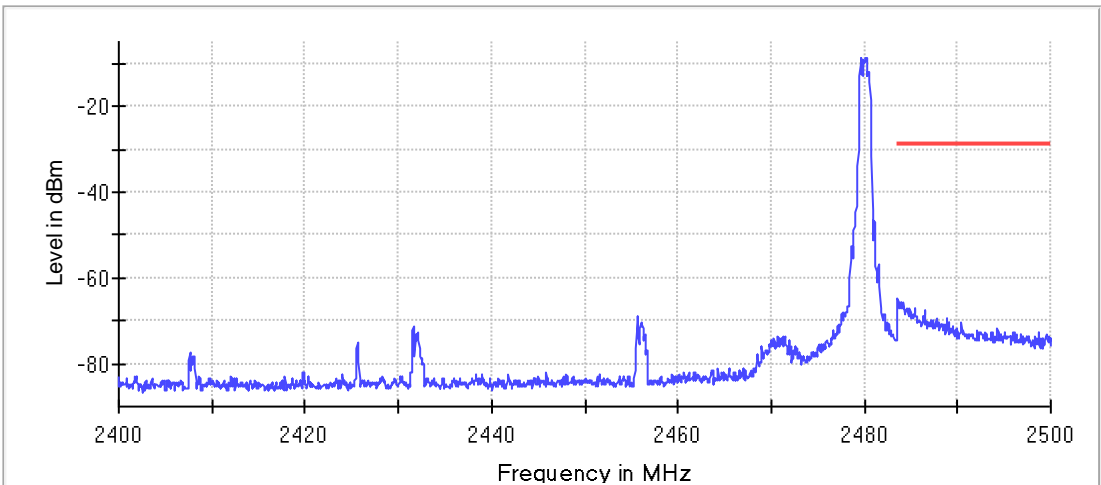
Test Report No.: W7L-P240118W001RF01

Band Edge



2DH5_Ant1_Low_2402

Band Edge

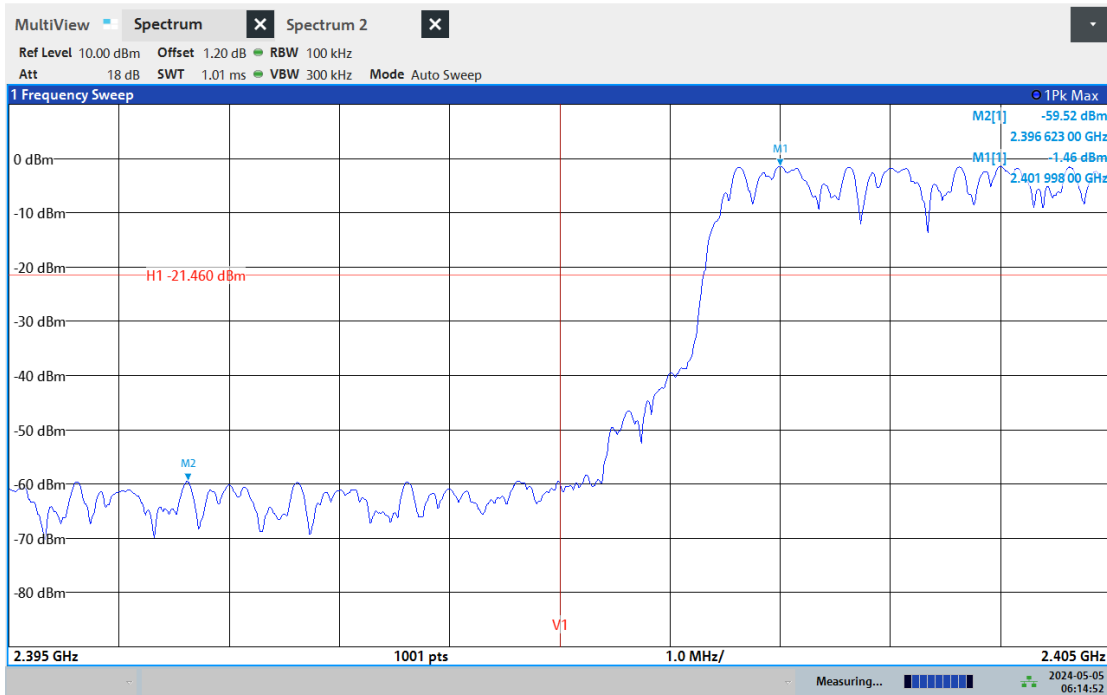


2DH5_Ant1_High_2480



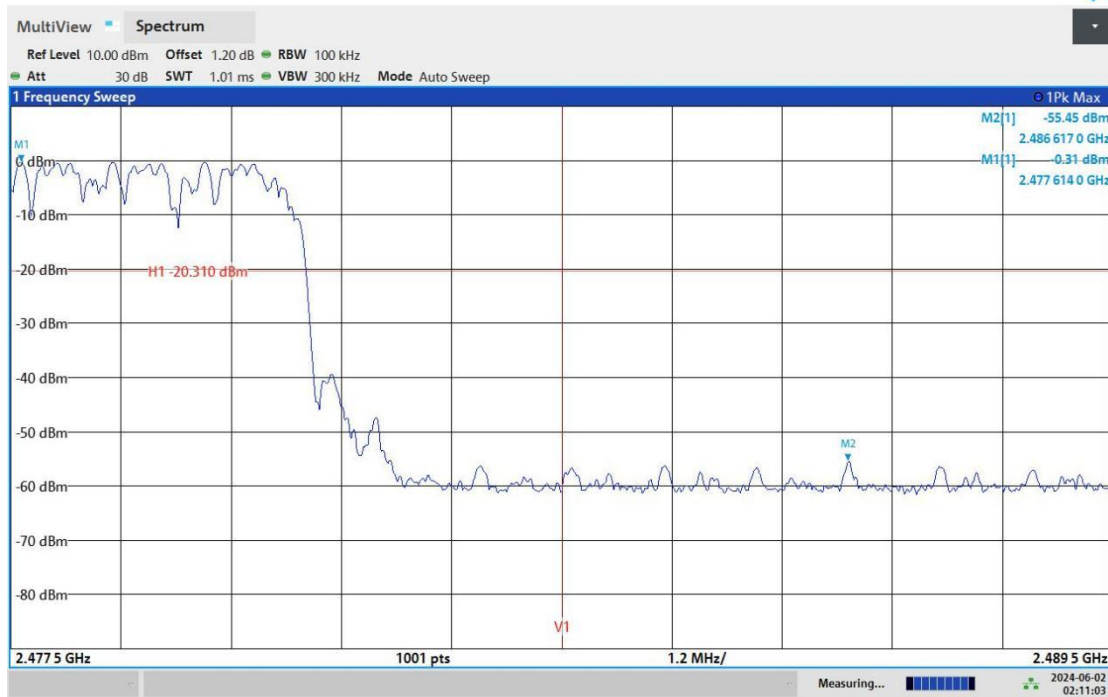
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Test Report No.: W7L-P240118W001RF01



06:14:52 AM 05/05/2024

2DH5_Ant1_Low_Hop_2402



02:11:04 AM 06/02/2024

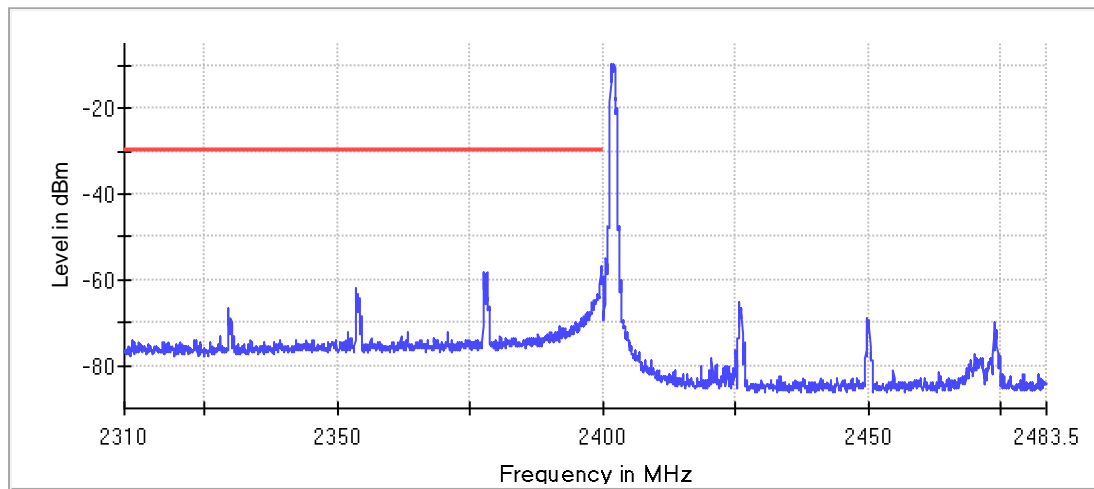
2DH5_Ant1_High_Hop_2480

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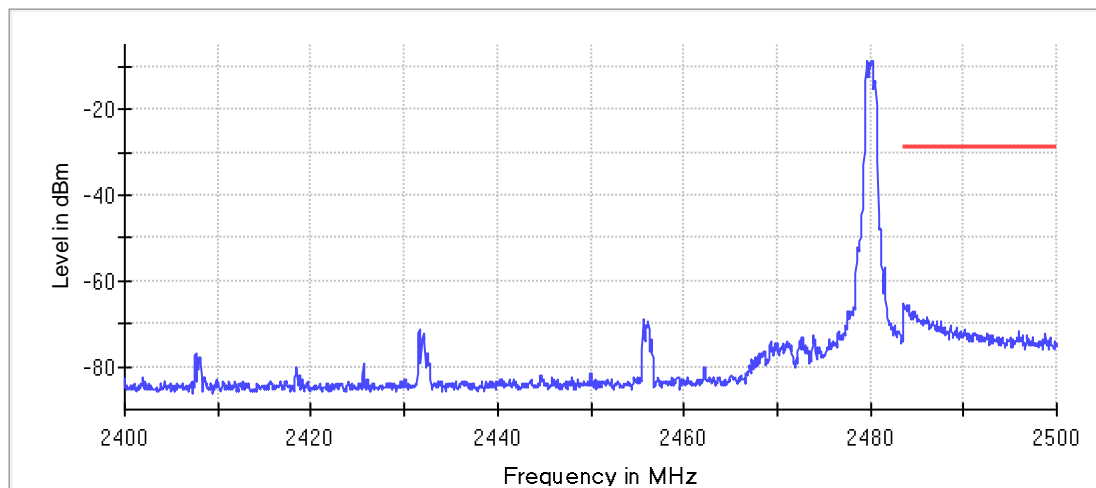
Tel: +86(0557) 368 1008

Band Edge



3DH5_Ant1_Low_2402

Band Edge

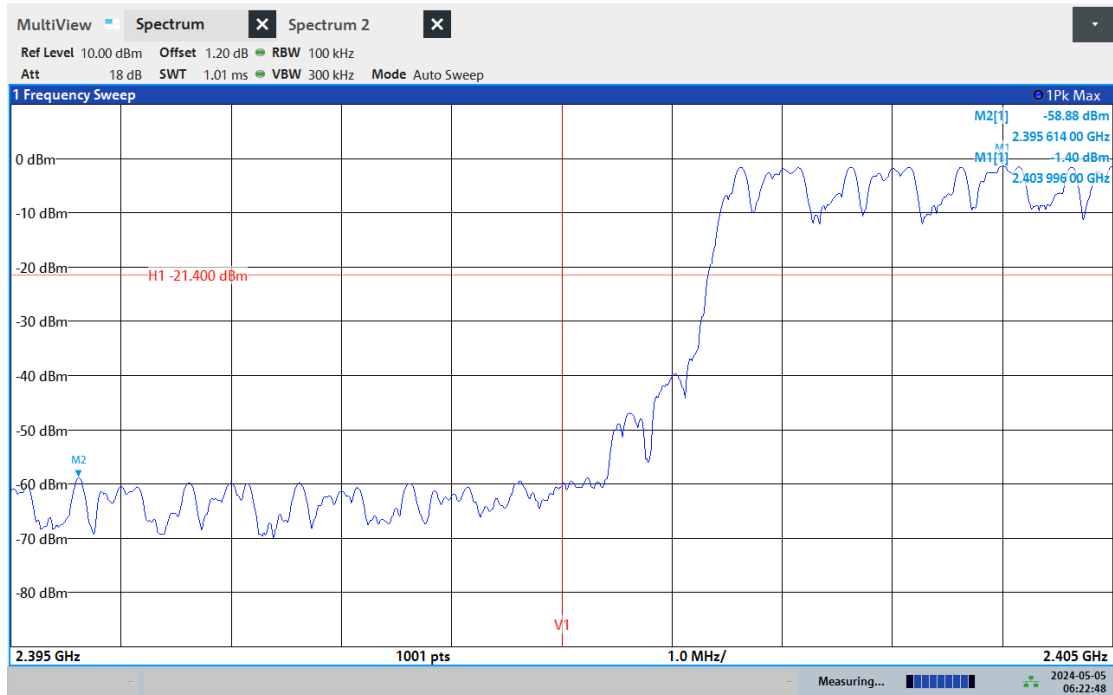


3DH5_Ant1_High_2480



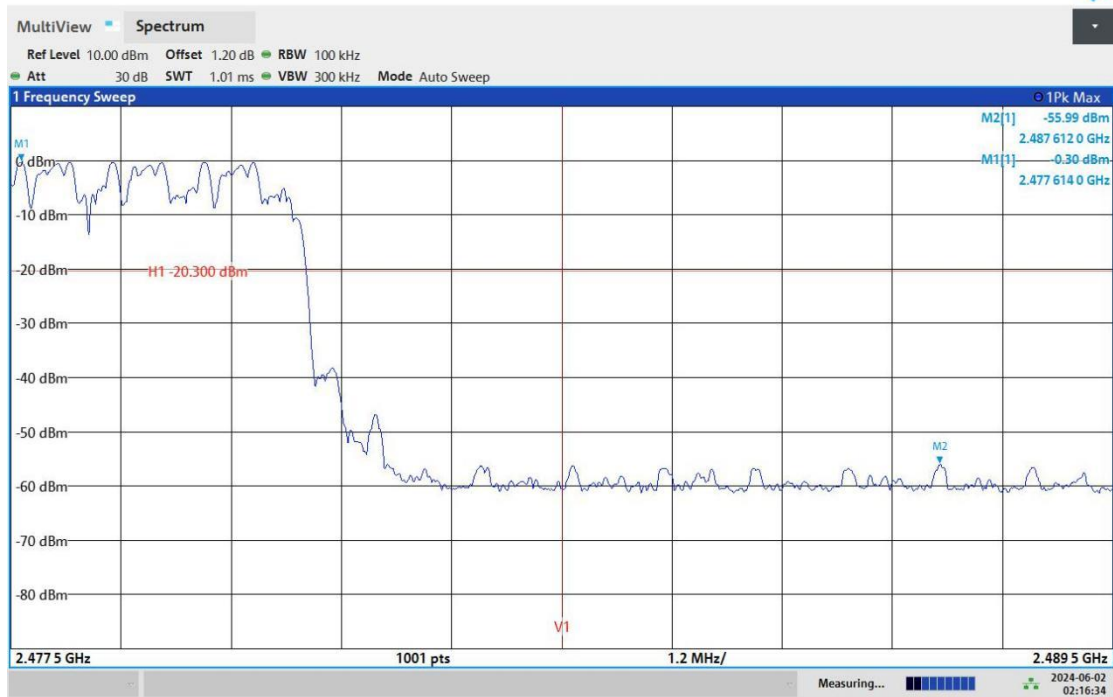
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VERITAS

Test Report No.: W7L-P240118W001RF01



06:22:48 AM 05/05/2024

3DH5_Ant1_Low_Hop_2402



02:16:34 AM 06/02/2024

3DH5_Ant1_High_Hop_2480

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Test Report No.: W7L-P240118W001RF01

RBW 100.000 kHz

VBW 300.000 kHz

CONDUCTED SPURIOUS EMISSION

TEST RESULT

TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	2402	30~26000	See test graph	See test graph	≤-9.16	PASS
		2441	30~26000	See test graph	See test graph	≤-9.20	PASS
		2480	30~26000	See test graph	See test graph	≤-10.85	PASS
2DH5	Ant1	2402	30~26000	See test graph	See test graph	≤-11.52	PASS
		2441	30~26000	See test graph	See test graph	≤-11.75	PASS
		2480	30~26000	See test graph	See test graph	≤-13.09	PASS
3DH5	Ant1	2402	30~26000	See test graph	See test graph	≤-11.43	PASS
		2441	30~26000	See test graph	See test graph	≤-11.79	PASS
		2480	30~26000	See test graph	See test graph	≤-13.10	PASS

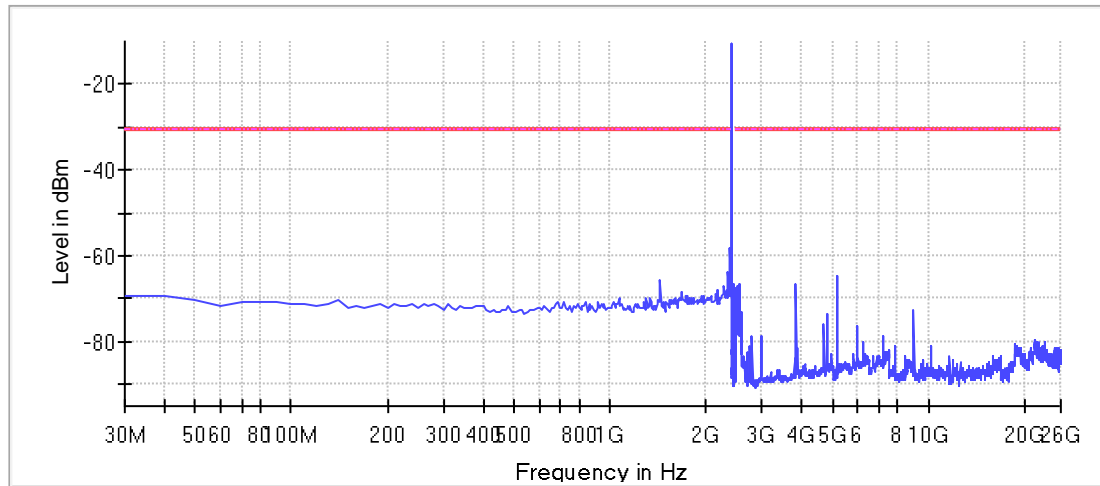


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VERITAS

Test Report No.: W7L-P240118W001RF01

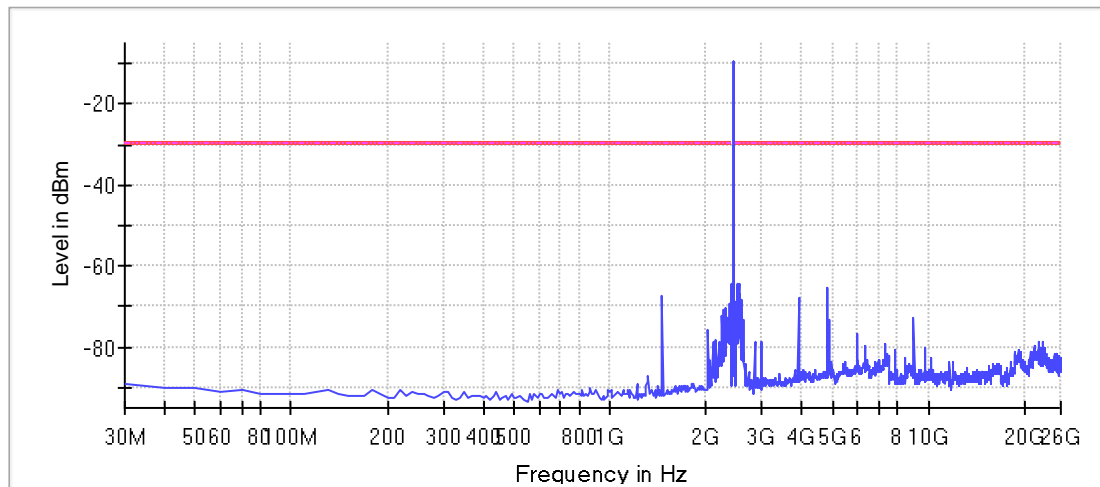
TEST GRAPHS

Spurious



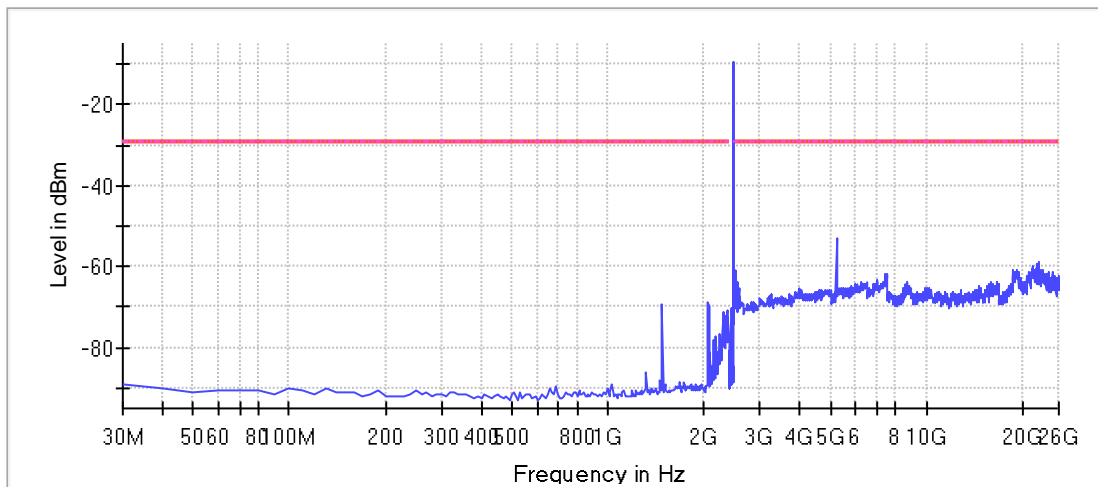
DH5_Ant1_2402_30~26000

Spurious



DH5_Ant1_2441_30~26000

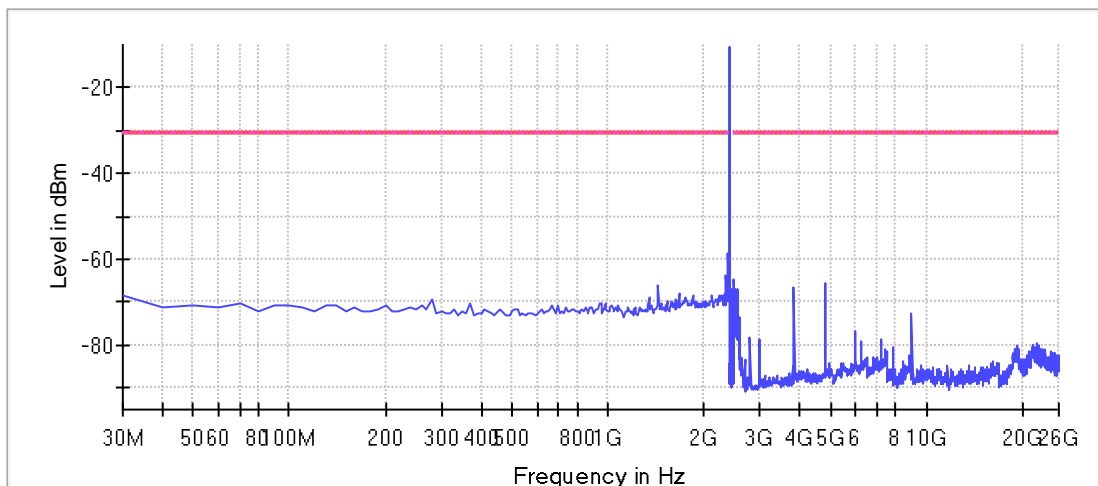
Spurious



— Limit — Sum Level - - - Threshold X Critical X Final Critical

DH5_Ant1_2480_30~26000

Spurious



— Limit — Sum Level - - - Threshold X Critical X Final Critical

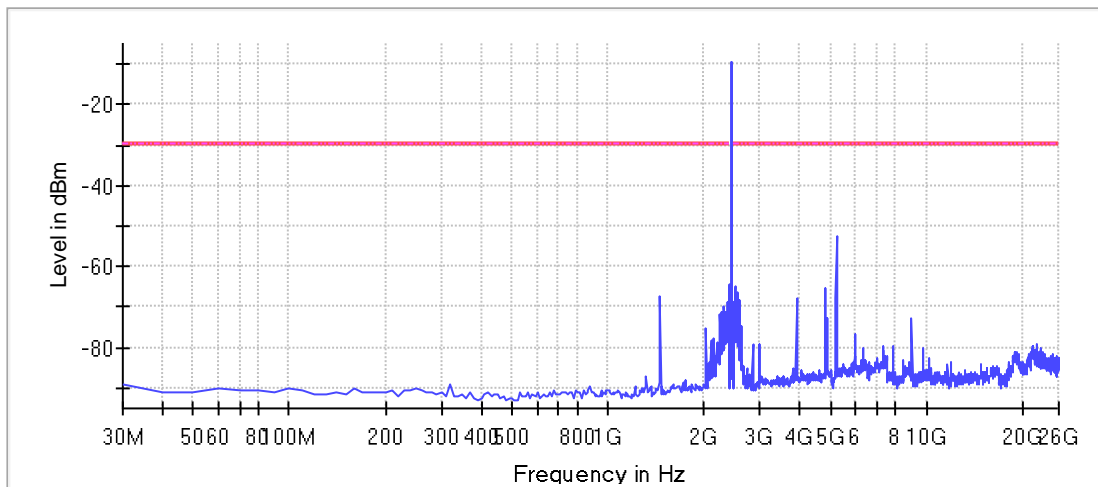
2DH5_Ant1_2402_30~26000



BUREAU
VERITAS

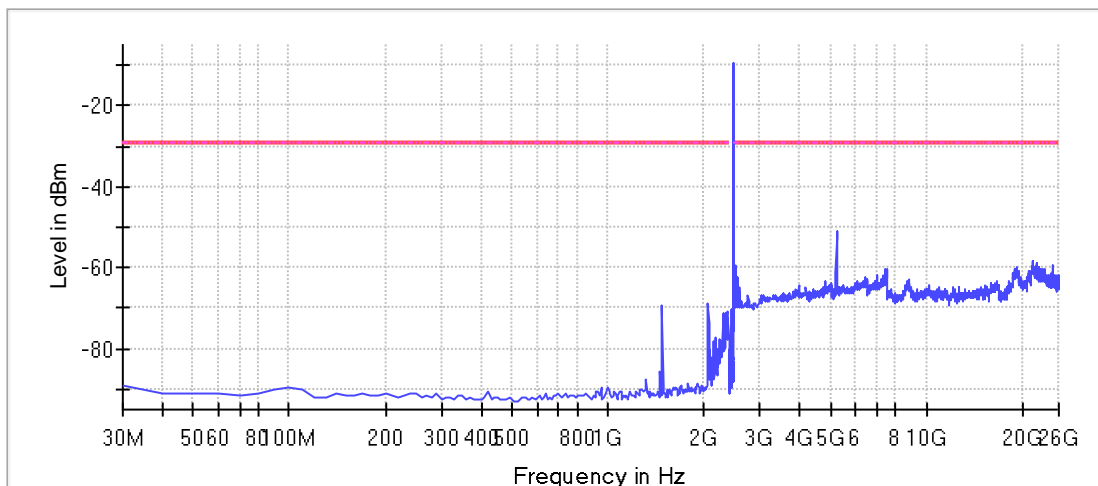
Test Report No.: W7L-P240118W001RF01

Spurious



2DH5_Ant1_2441_30~26000

Spurious



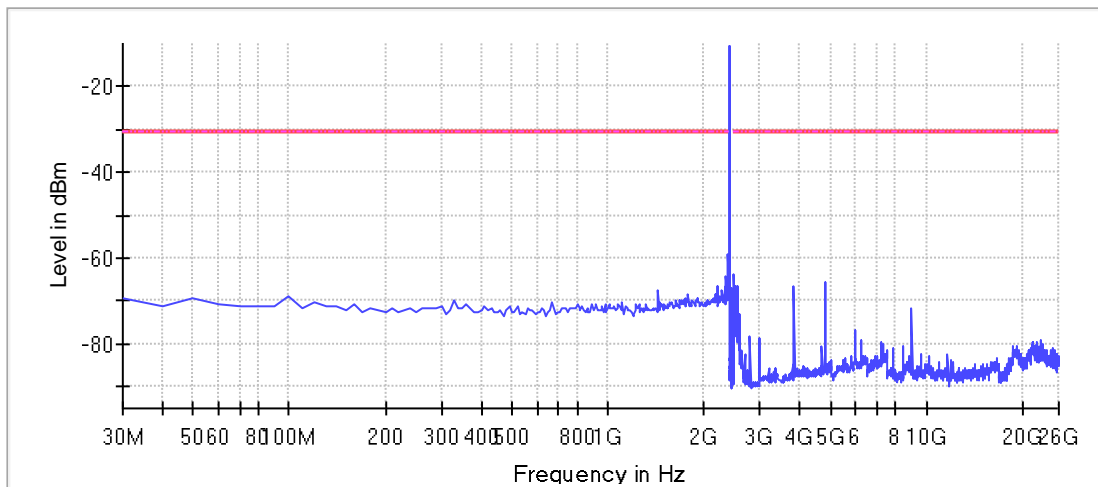
2DH5_Ant1_2480_30~26000



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VERITAS

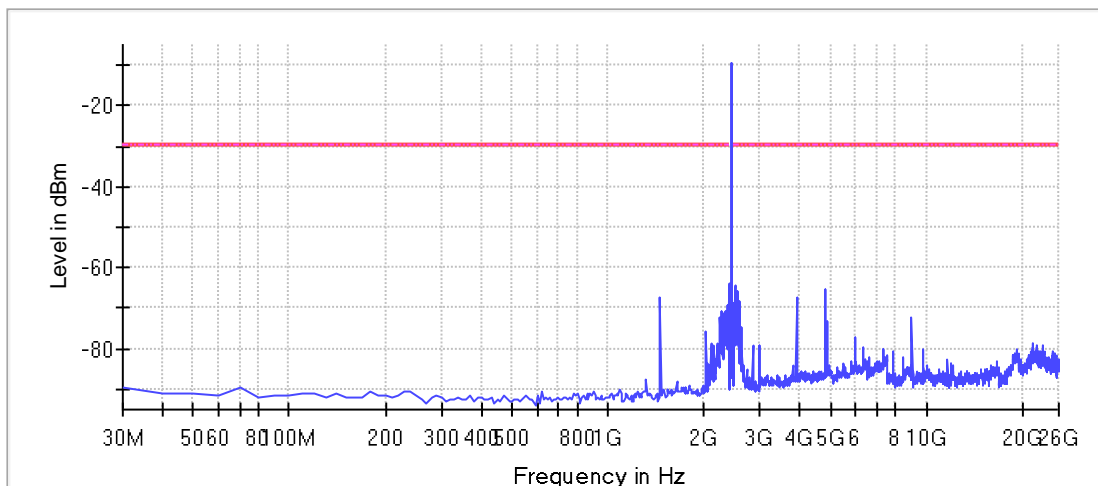
Test Report No.: W7L-P240118W001RF01

Spurious



3DH5_Ant1_2402_30~26000

Spurious

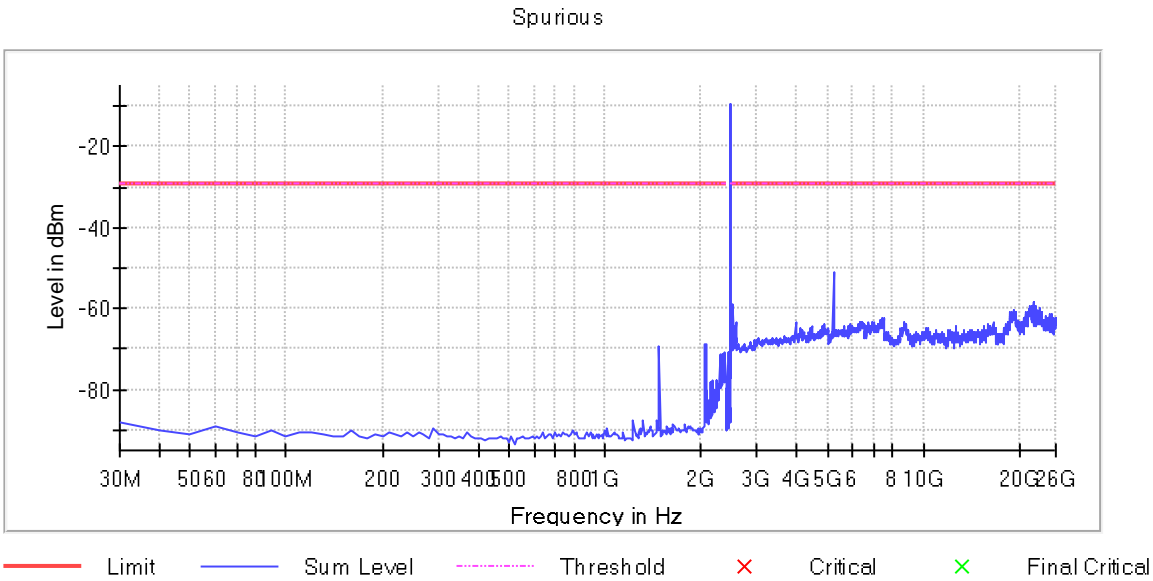


3DH5_Ant1_2441_30~26000



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VERITAS

Test Report No.: W7L-P240118W001RF01



3DH5_Ant1_2480_30~26000

RBW 100.000 kHz

VBW 300.000 kHz



Test Report No.: W7L-P240118W001RF01

DUTY CYCLE

TEST RESULT

TestMode	Antenna	Channel	ON Time [ms]	Period [ms]	X	DC [%]	xFactor	Limit	Verdict
DH5	Ant1	2402	2.8950	3.7500	0.7720	77.20%	1.12	---	PASS
2DH5	Ant1	2402	2.8950	3.7500	0.7720	77.20%	1.12	---	PASS
3DH5	Ant1	2402	2.8950	3.7500	0.7720	77.20%	1.12	---	PASS



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VERITAS

Test Report No.: W7L-P240118W001RF01

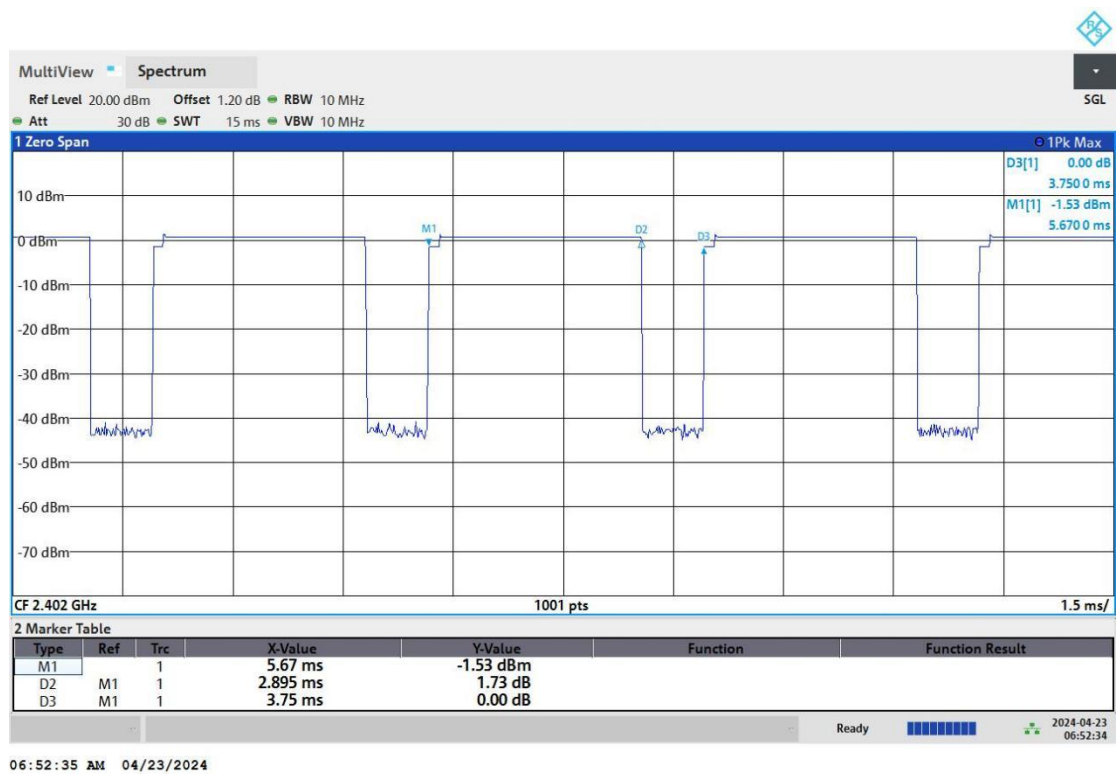
TEST GRAPHS





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Test Report No.: W7L-P240118W001RF01



2DH5_Ant1_2402



3DH5_Ant1_2402

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Test Report No.: W7L-P240118W001RF01

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