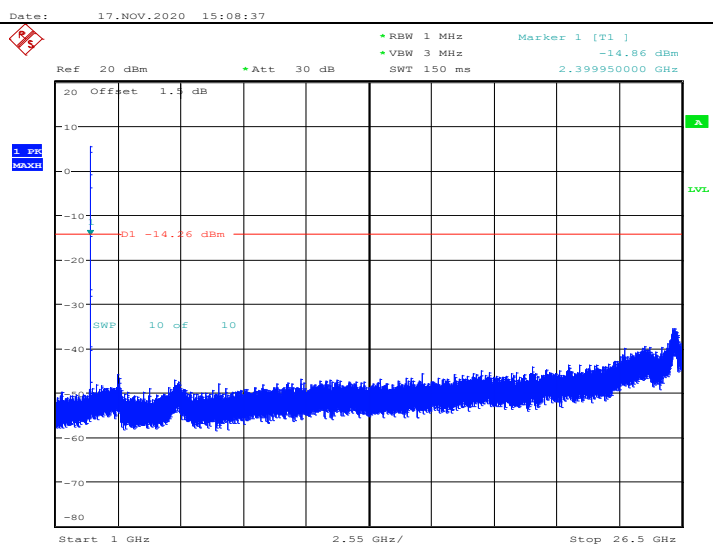
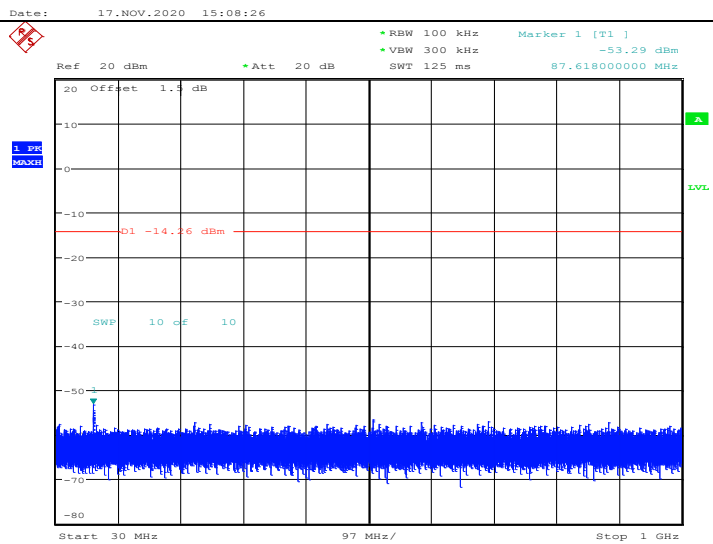
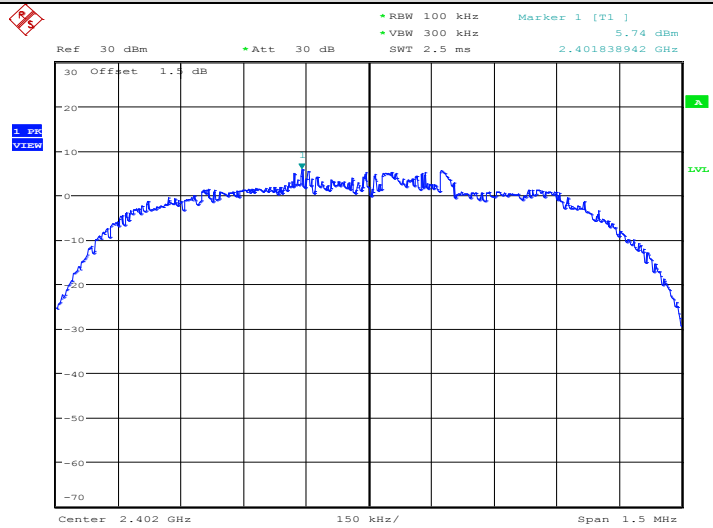




Test Mode: 8-DPSK Mode 2402MHz

CH00



Date: 17.NOV.2020 15:09:12

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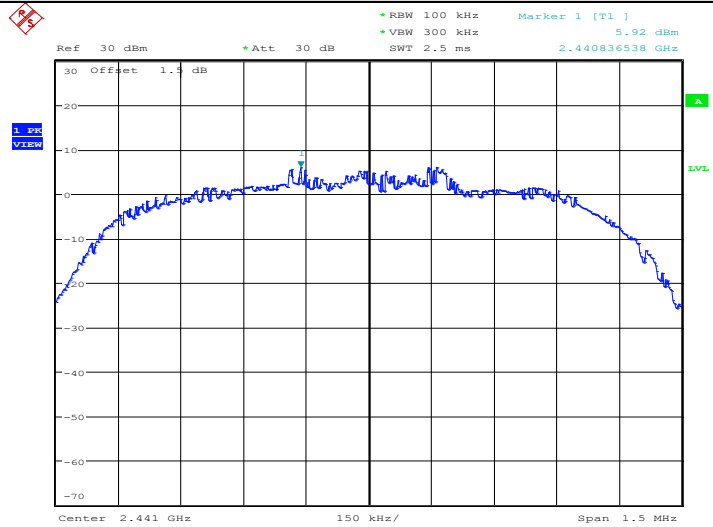
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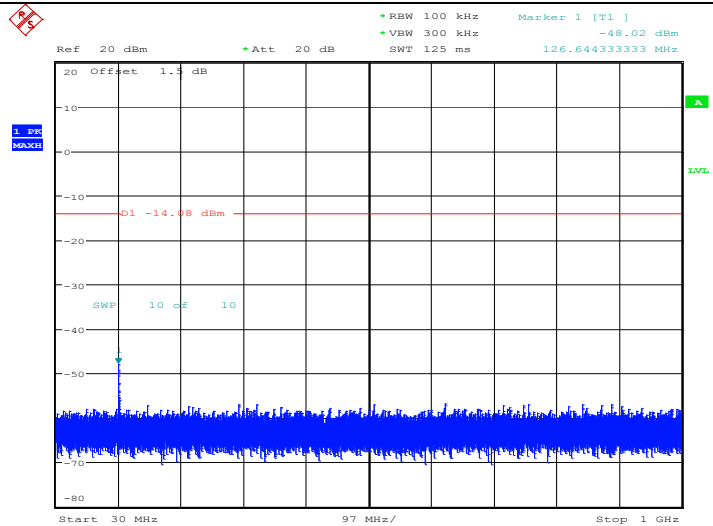


Test Mode: 8-DPSK Mode 2441 MHz

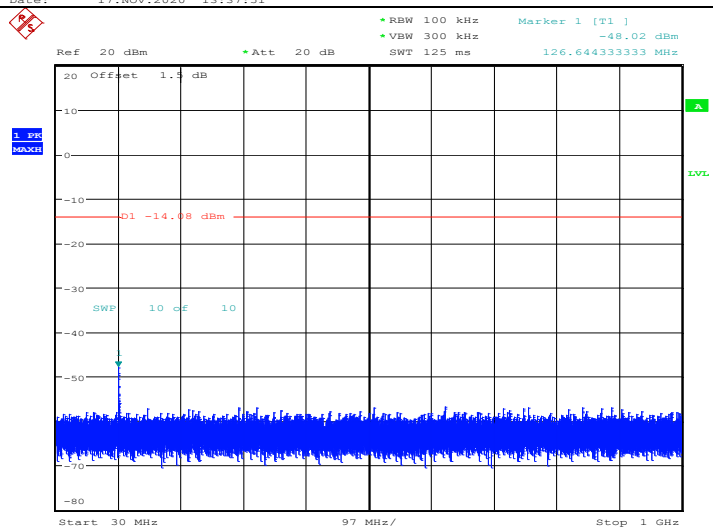
CH39



Date: 17.NOV.2020 13:37:40



Date: 17.NOV.2020 13:37:51



Date: 17.NOV.2020 13:37:51

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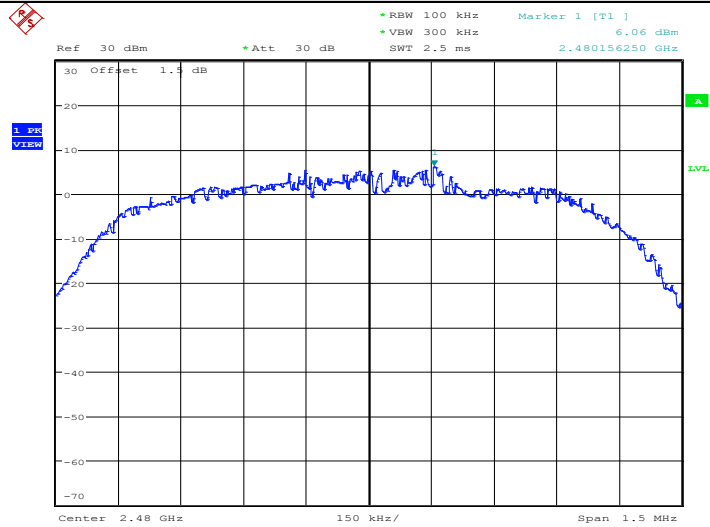


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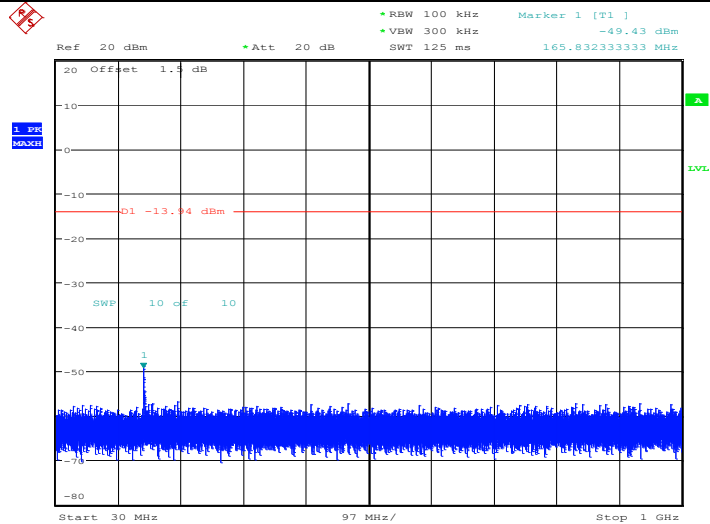


Test Mode: 8-DPSK Mode 2480 MHz

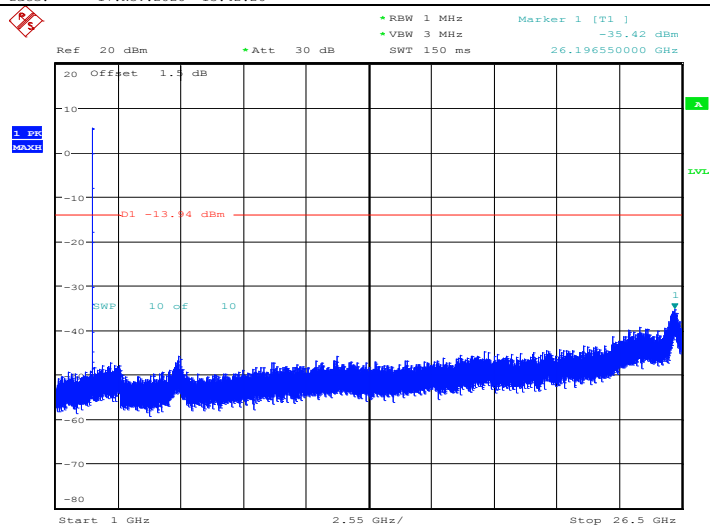
CH78



Date: 17.NOV.2020 13:42:15



Date: 17.NOV.2020 13:42:26



Date: 17.NOV.2020 13:43:01

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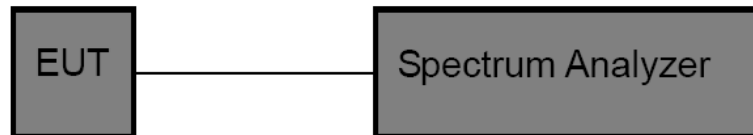


3.4. 20dB Bandwidth

Limit

N/A

Test Configuration



Test Procedure

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
2. Spectrum Setting:
 - (1) Set RBW = 100 kHz.
 - (2) Set the video bandwidth (VBW) ≥ 3 RBW.
 - (3) Detector = Peak.
 - (4) Trace mode = Max hold.
 - (5) Sweep = Auto couple.

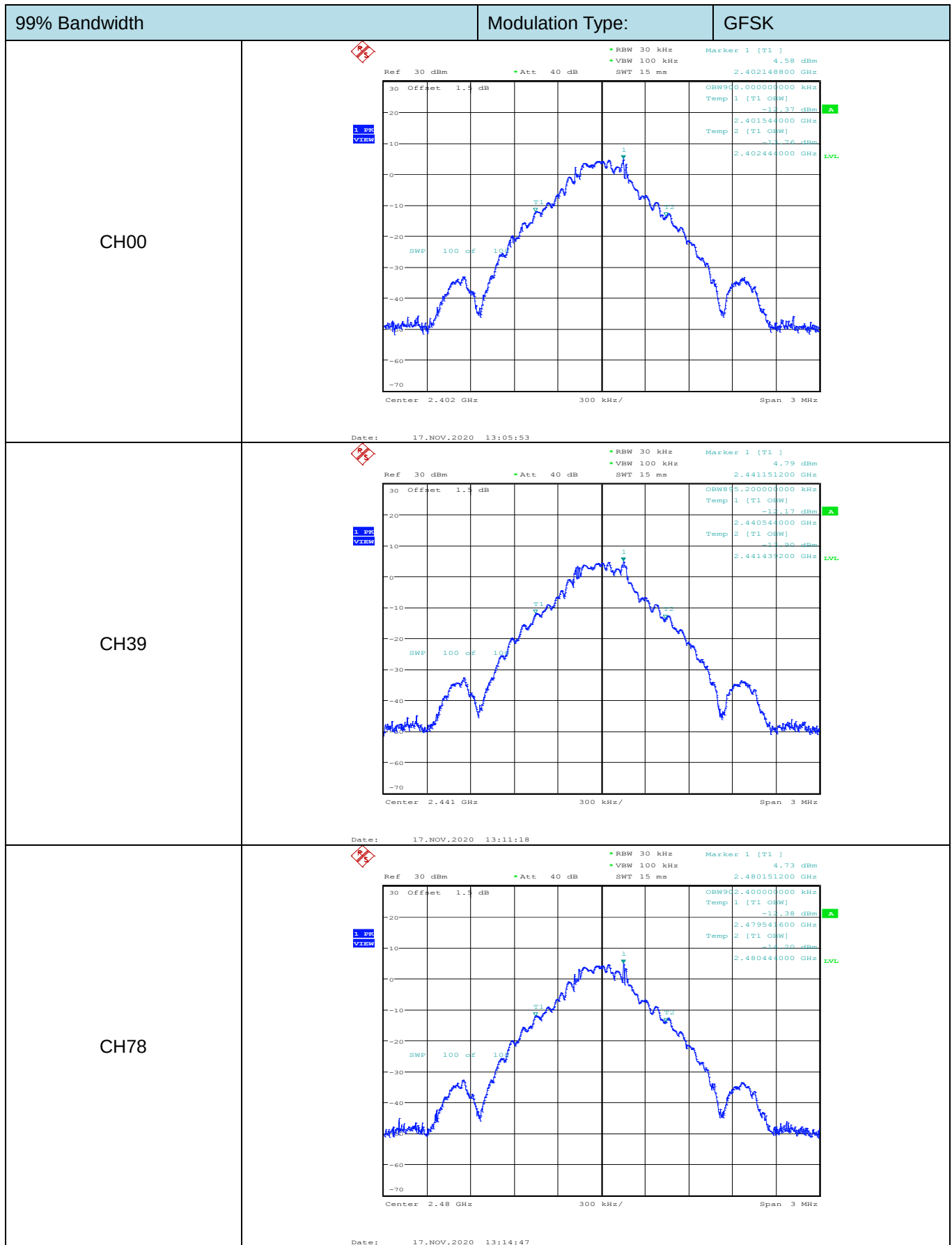
NOTE: The EUT was set to continuously transmitting in each mode and low, Middle and high channel for the test.

Test Mode

Please refer to the clause 2.3.

Test Results

Modulation type	Channel	99% Bandwidth (kHz)	20 dB Bandwidth (kHz)	20dB Bandwidth *2/3 (kHz)
GFSK	00	900.0	962.0	641.3
	39	895.0	962.0	641.3
	78	902.0	960.0	640.0
$\pi/4$ -DQPSK	00	1174.0	1286.0	857.3
	39	1176.0	1286.0	857.3
	78	1178.0	1291.0	860.7
8-DPSK	00	1178.0	1291.0	860.7
	39	1183.0	1291.0	860.7
	78	1188.0	1294.0	862.7



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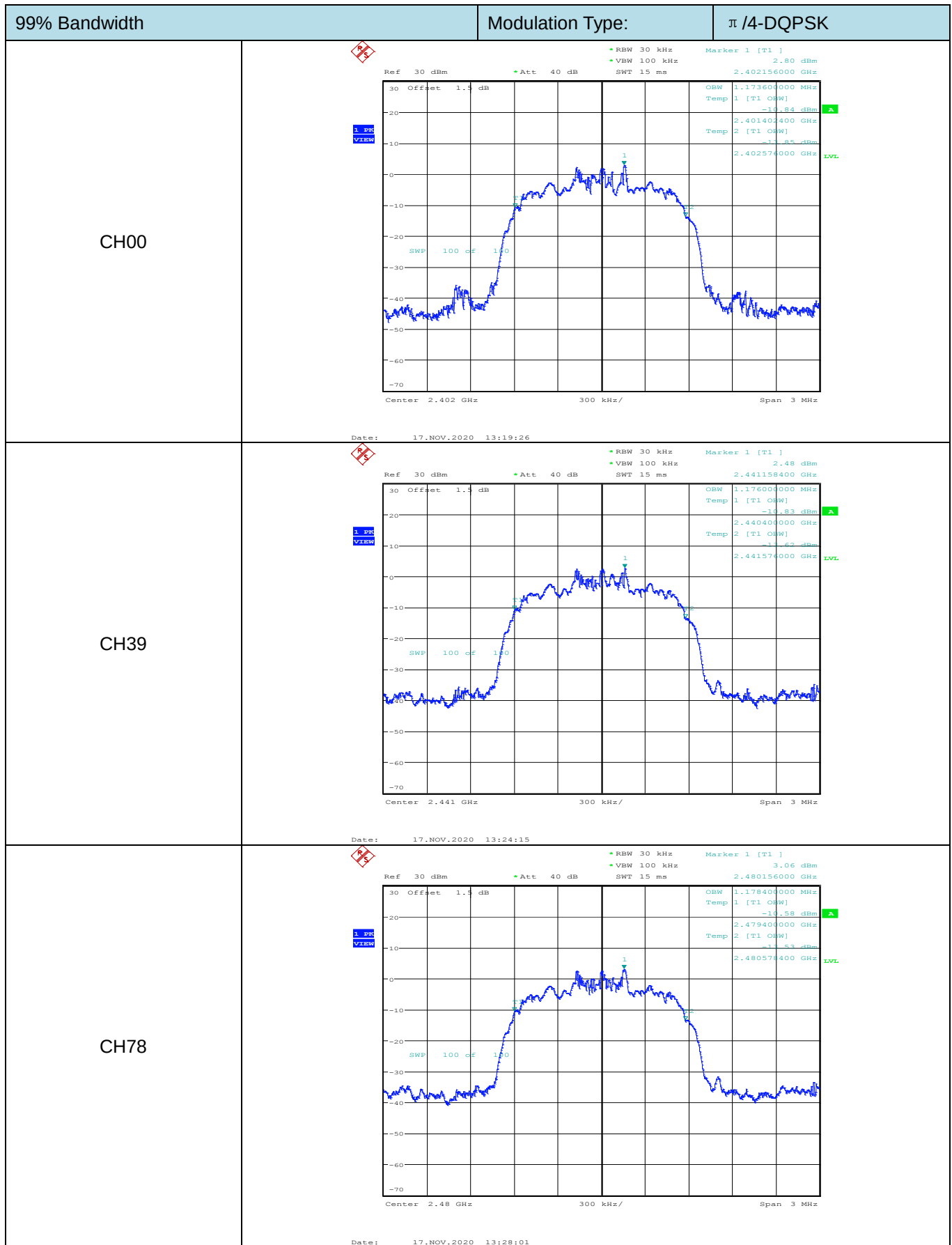
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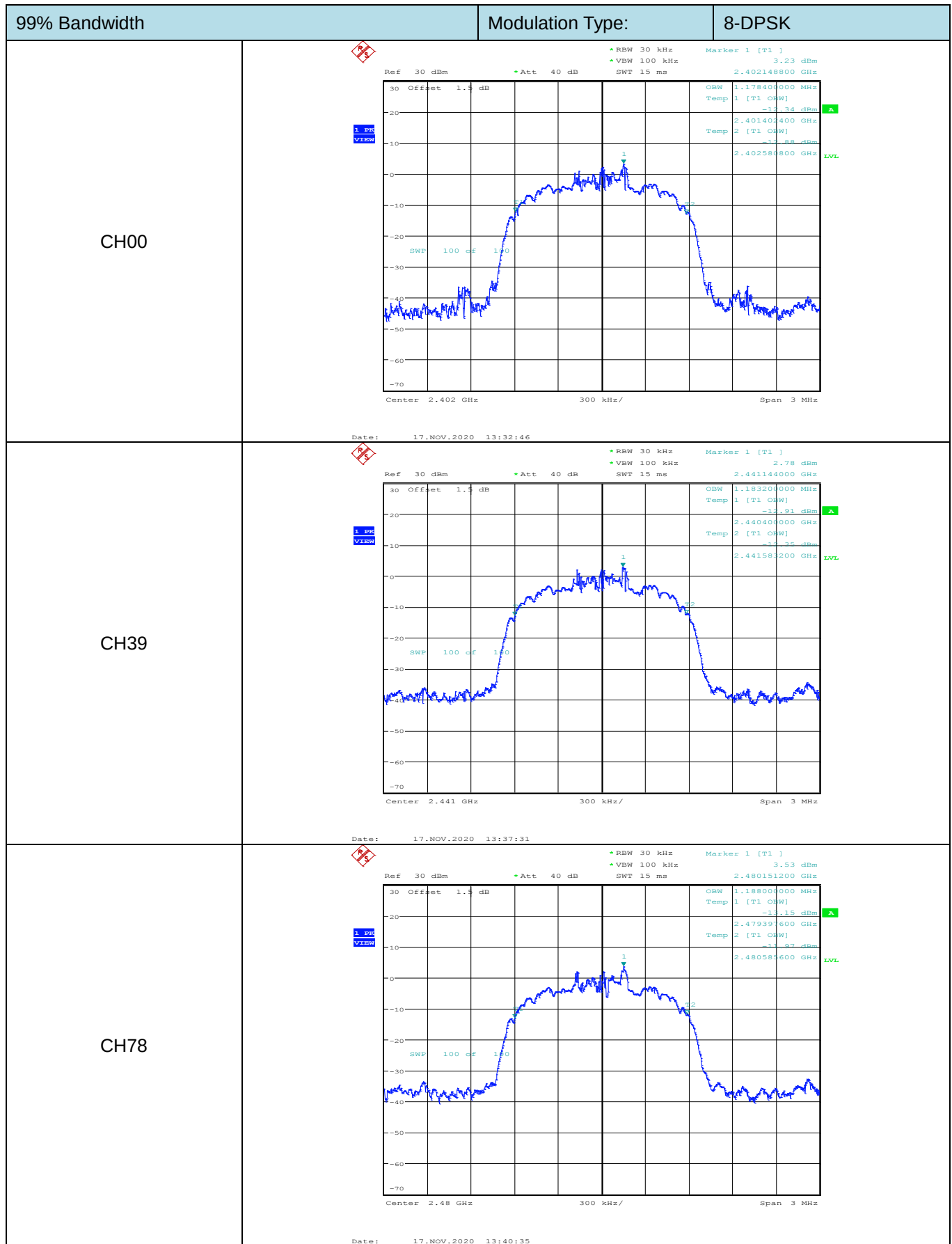
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20 dB Bandwidth

Modulation Type:

GFSK

CH00

1 pp
VIEW

Ref 30 dBm Att 40 dB RBW 30 kHz VBW 100 kHz SWT 15 ms Delta 3 [T1] -0.47 dB 962.40000000 kHz

Marker 1 [T1] -15.35 dBm 2.401521400 GHz

Marker 2 [T1] -1.74 dBm 2.403540000 GHz

D1 -15.256 dBm

SWP 100 cF 100

Center 2.402 GHz 300 kHz/ Span 3 MHz

CH39

1 pp
VIEW

Date: 17.NOV.2020 13:04:53

Ref 30 dBm Att 40 dB RBW 30 kHz VBW 100 kHz SWT 15 ms Delta 3 [T1] -0.37 dB 962.40000000 kHz

Marker 1 [T1] -15.38 dBm 2.440521000 GHz

Marker 2 [T1] -1.77 dBm 2.441151200 GHz

D1 -15.232 dBm

SWP 100 cF 100

Center 2.441 GHz 300 kHz/ Span 3 MHz

CH78

1 pp
VIEW

Date: 17.NOV.2020 13:10:18

Ref 30 dBm Att 40 dB RBW 30 kHz VBW 100 kHz SWT 15 ms Delta 3 [T1] 0.16 dB 960.00000000 kHz

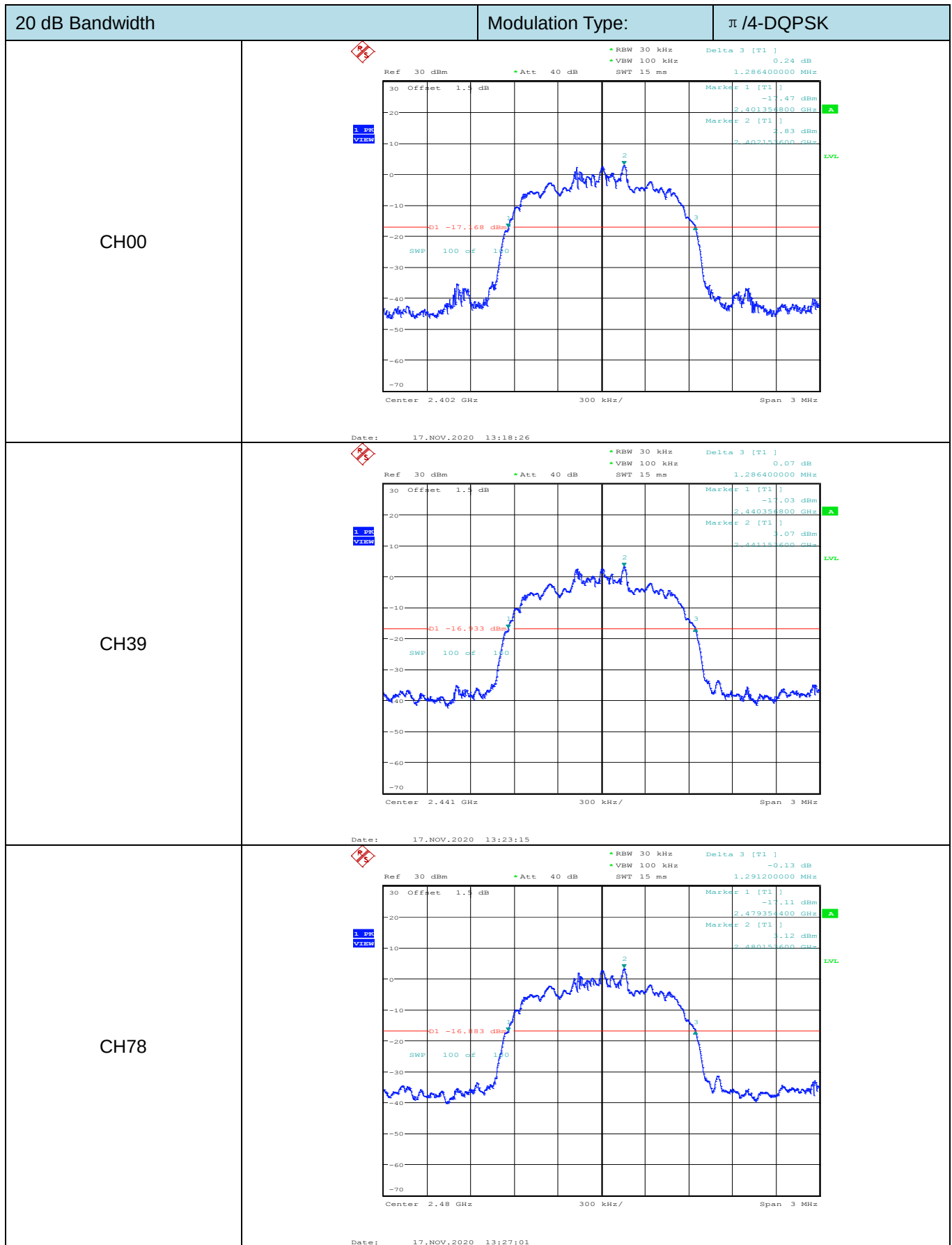
Marker 1 [T1] -15.39 dBm 2.479520000 GHz

Marker 2 [T1] -1.77 dBm 2.480151600 GHz

D1 -15.228 dBm

SWP 100 cF 100

Center 2.48 GHz 300 kHz/ Span 3 MHz



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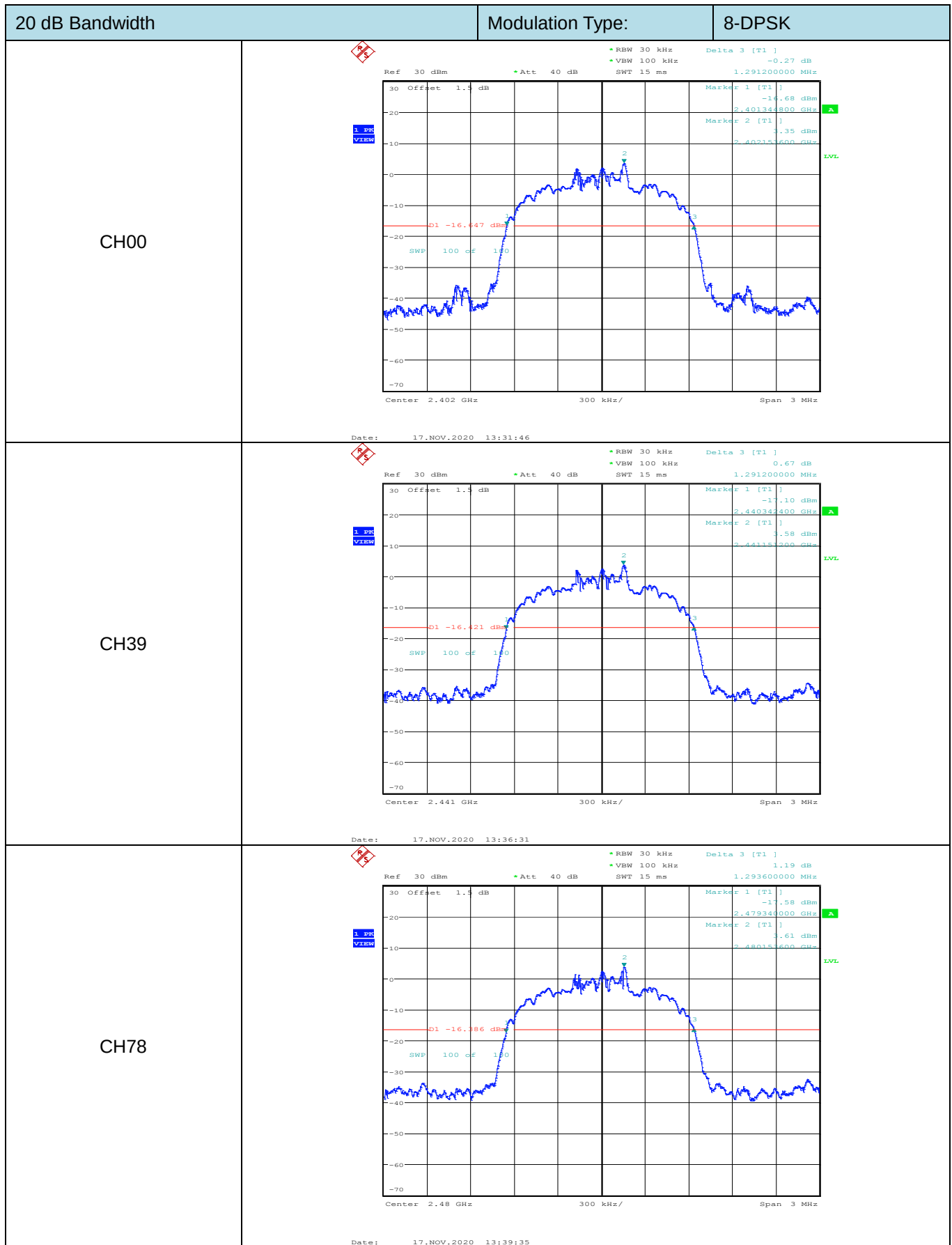
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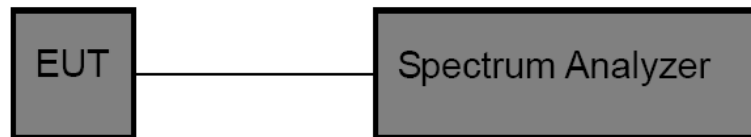
3.5. Channel Separation

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(1)/ RSS-247 5.1 b :

Test Item	Limit	Frequency Range(MHz)
Channel Separation	>25KHz or >two-thirds of the 20 dB bandwidth Which is greater	2400~2483.5

Test Configuration



Test Procedure

3. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
4. Spectrum Setting:
 - (1) Set RBW = 100 kHz.
 - (2) Set the video bandwidth (VBW) ≥ 3 RBW.
 - (3) Detector = Peak.
 - (4) Trace mode = Max hold.
 - (5) Sweep = Auto couple.

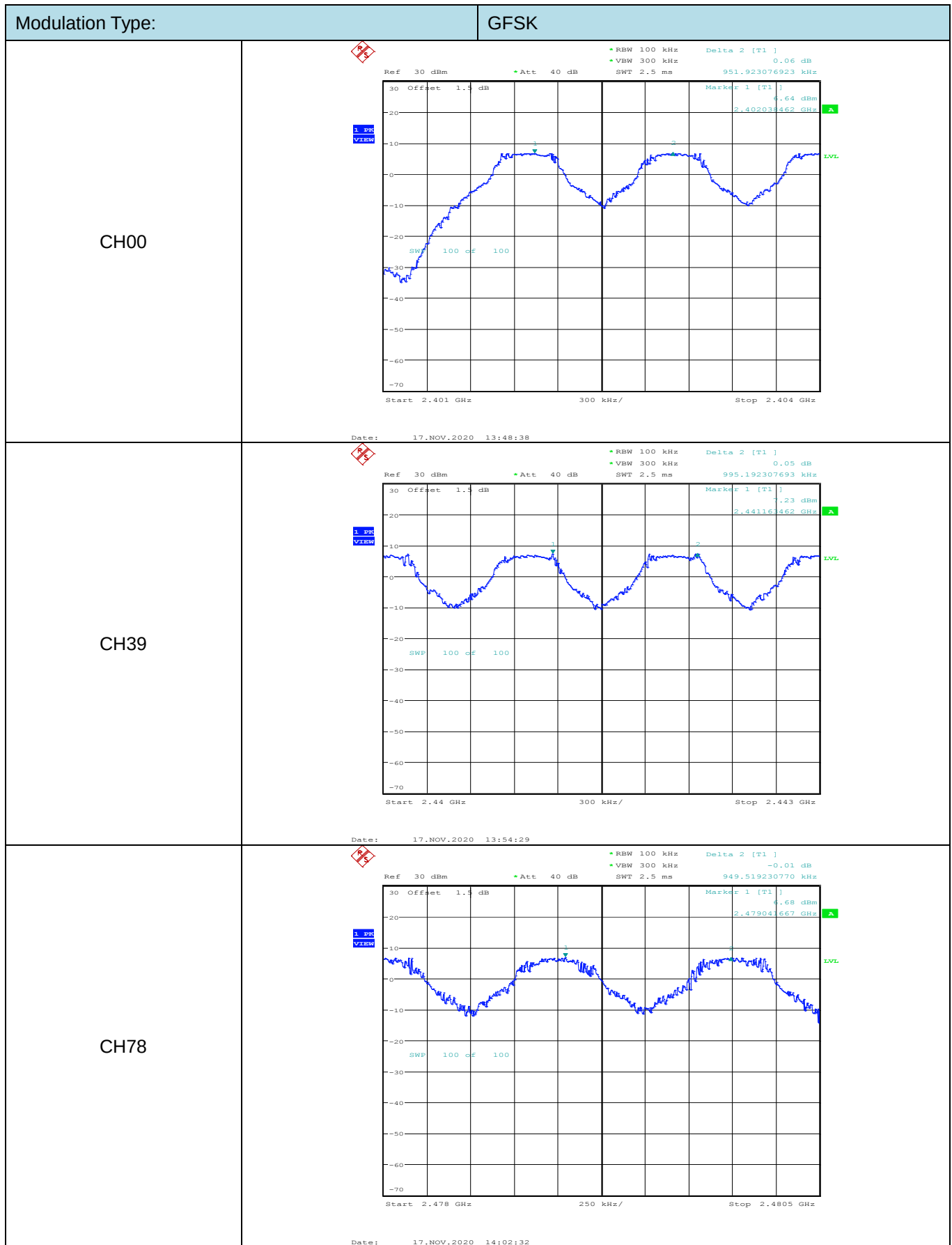
NOTE: The EUT was set to continuously transmitting in each mode and low, Middle and high channel for the test.

Test Mode

Please refer to the clause 2.3.

Test Results

Modulation type	Channel	Carrier Frequencies Separation (MHz)	Limit (kHz)	Result
GFSK	00	0.952	641.0	Pass
	39	0.995	962.0	
	78	0.950	641.0	
$\pi/4$ -DQPSK	00	1.019	861.0	Pass
	39	0.995	861.0	
	78	1.014	861.0	
8-DPSK	00	1.173	863.0	Pass
	39	1.014	863.0	
	78	0.982	863.0	



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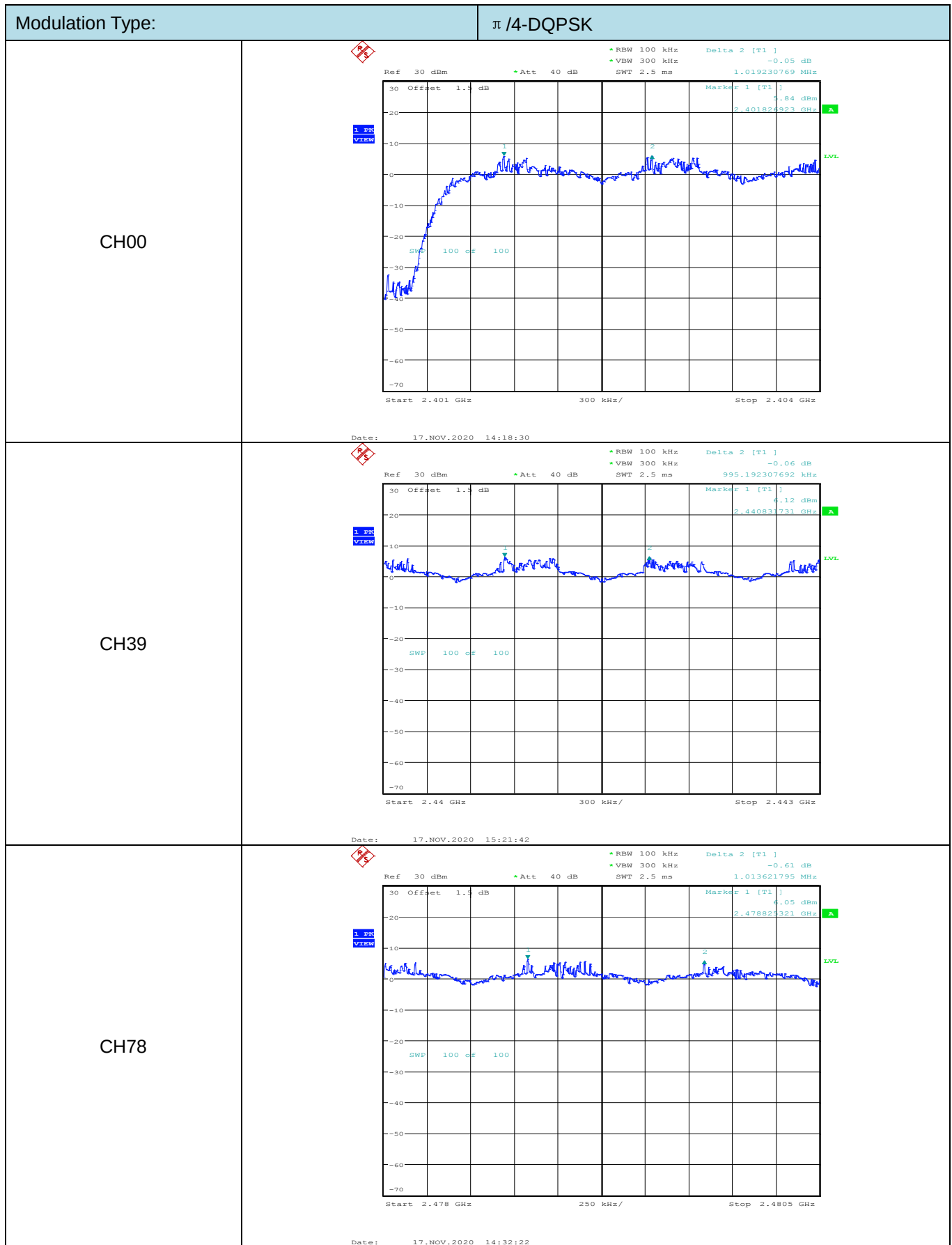
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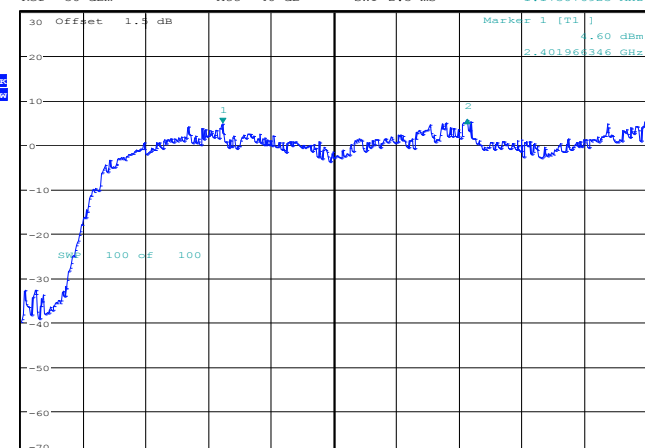
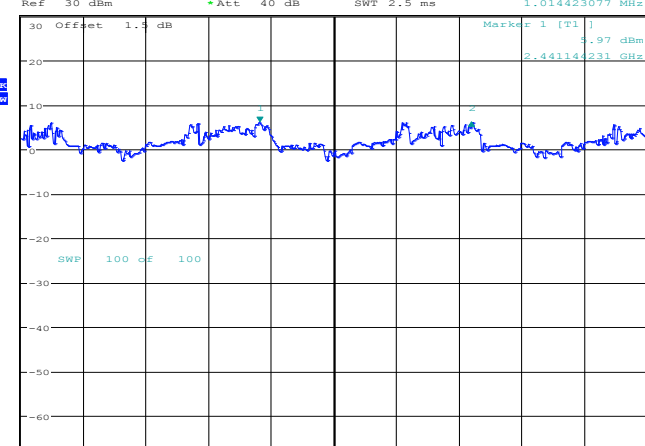
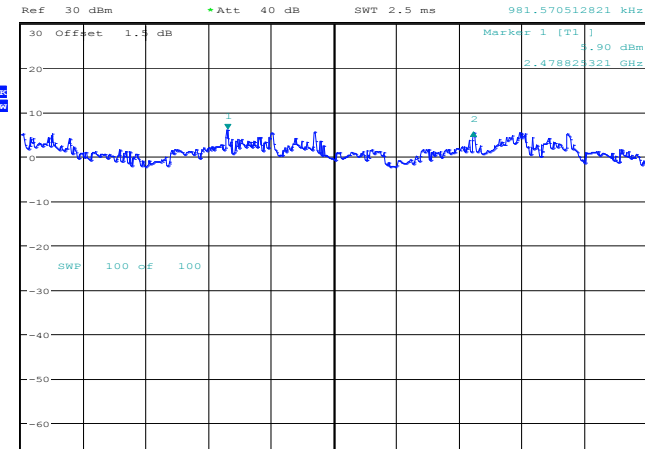
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Modulation Type:	8-DPSK
CH00	 Ref 30 dBm Att 40 dB RBW 100 kHz Delta 2 [T1] 1.03 dB VBW 300 kHz 1.173076923 MHz SWT 2.5 ms Offset 1.5 dB Marker 1 [T1] 4.60 dBm 2.401964346 GHz Start 2.401 GHz 300 kHz/ Stop 2.404 GHz
CH39	 Date: 17.NOV.2020 14:45:12 Ref 30 dBm Att 40 dB RBW 100 kHz Delta 2 [T1] 0.08 dB VBW 300 kHz 1.014423077 MHz SWT 2.5 ms Offset 1.5 dB Marker 1 [T1] 4.97 dBm 2.44114231 GHz Start 2.44 GHz 300 kHz/ Stop 2.443 GHz
CH78	 Date: 17.NOV.2020 14:53:51 Ref 30 dBm Att 40 dB RBW 100 kHz Delta 2 [T1] -0.62 dB VBW 300 kHz 981.570512821 kHz SWT 2.5 ms Offset 1.5 dB Marker 1 [T1] 5.90 dBm 2.478823321 GHz Start 2.478 GHz 250 kHz/ Stop 2.4805 GHz



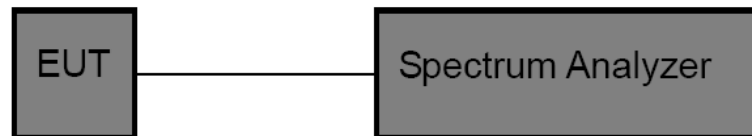
3.6. Number of Hopping Channel

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(iii)/ RSS-247 5.1 d:

Section	Test Item	Limit
15.247 (a)(iii)/ RSS-247 5.1 d:	Number of Hopping Channel	>15

Test Configuration



Test Procedure

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
2. Spectrum Setting:
 - (1) Peak Detector: RBW=100 kHz, VBW $\geq$ RBW, Sweep time= Auto.

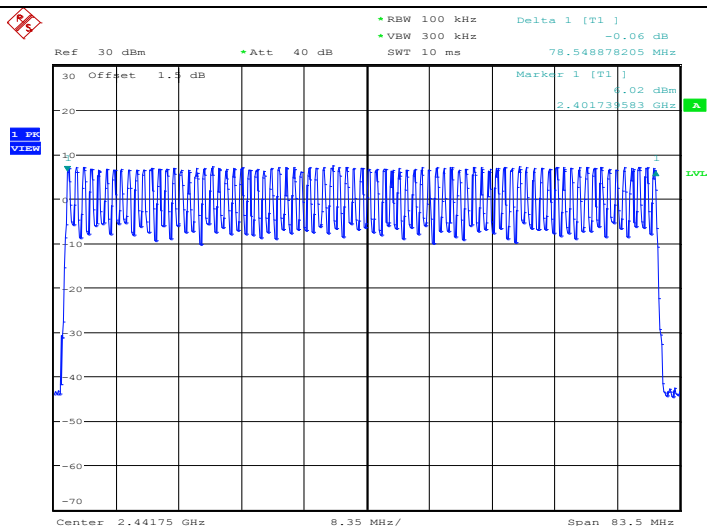
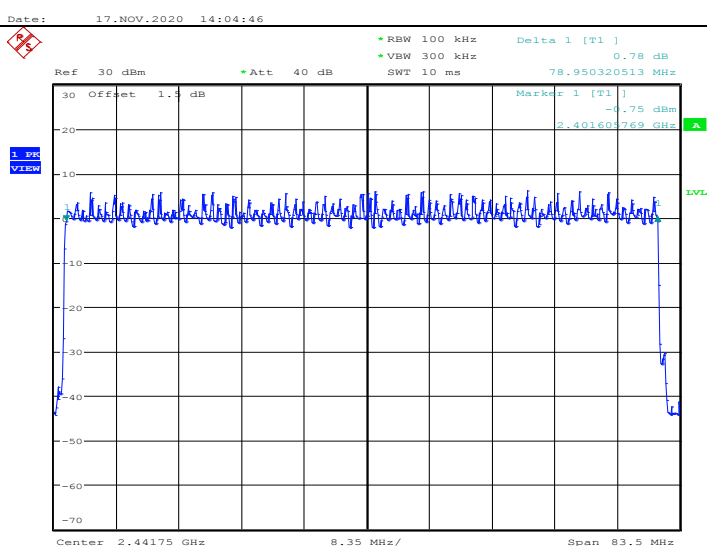
Test Mode

Please refer to the clause 2.3.

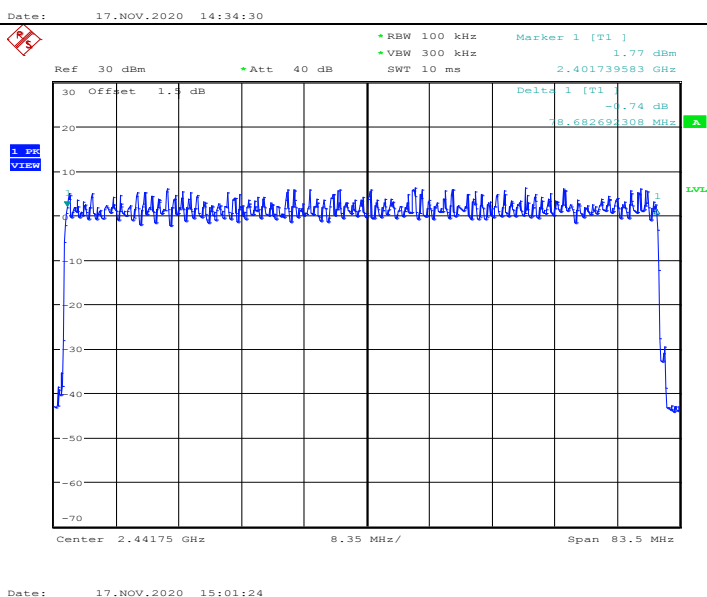
Test Result

Modulation type	Channel number	Limit	Result
GFSK	79	≥ 15.00	Pass
$\pi/4$ -DQPSK	79		
8DPSK	79		

GFSK

 $\pi/4$ -DQPSK

8-DPSK



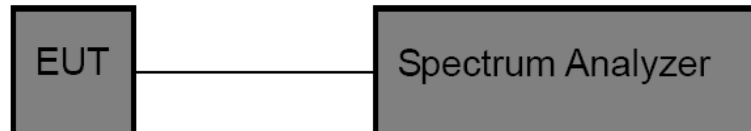


3.7. Dwell Time

Limit

Section	Test Item	Limit
15.247(a)(iii)/ RSS-247 5.1 d	Average Time of Occupancy	0.4 sec

Test Configuration



Test Procedure

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
2. Spectrum Setting:
 - (1) Spectrum Setting: RBW=1MHz, VBW $\geq$ RBW.
 - (2) Use video trigger with the trigger level set to enable triggering only on full pulses.
 - (3) Sweep Time is more than once pulse time.
 - (4) Set the center frequency on any frequency would be measure and set the frequency span to zero.
 - (5) Measure the maximum time duration of one single pulse.
 - (6) Set the EUT for packet transmitting.

Test Mode

Please refer to the clause 2.3.

**Test Result**

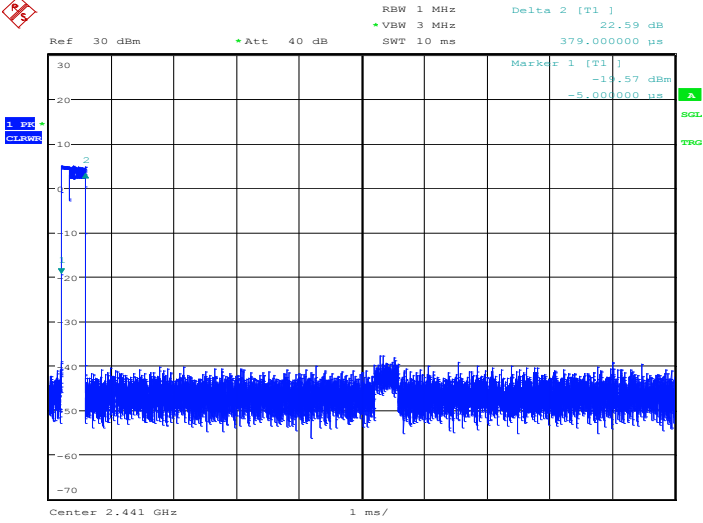
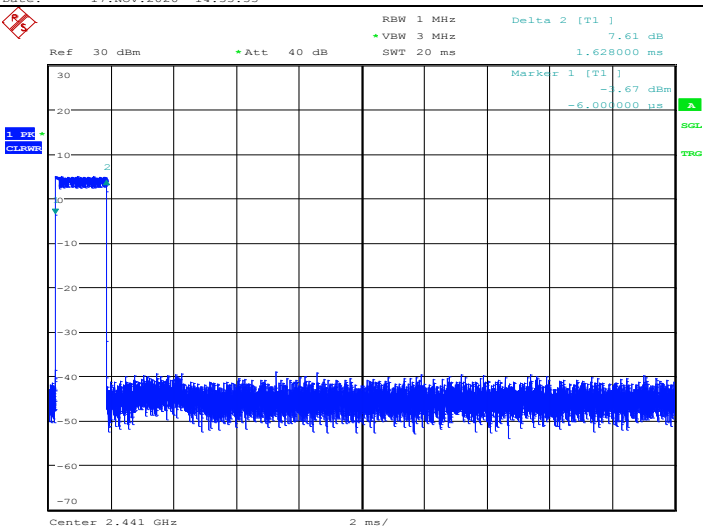
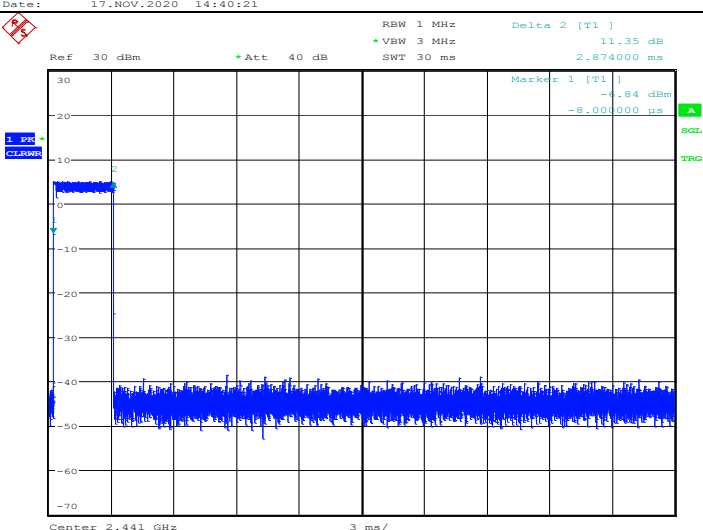
Modulation type	Channel	Channel (MHz)	Pulse Time (ms)	Total of Dwell (ms)	Period Time (ms)	Limit (Second)	Result
GFSK	DH1	2441	0.37	118.40	31.60	≤ 0.40	Pass
	DH3	2441	1.62	259.20	31.60		
	DH5	2441	2.87	306.13	31.60		
$\pi/4$ -DQPSK	2DH1	2441	0.38	121.60	31.60	≤ 0.40	Pass
	2DH3	2441	1.63	260.80	31.60		
	2DH5	2441	2.87	306.13	31.60		
8-DPSK	3DH1	2441	0.01	3.20	31.60	≤ 0.40	Pass
	3DH3	2441	1.62	259.20	31.60		
	3DH5	2441	2.88	307.20	31.60		

Note: 1DH1/2DH1/3DH1 Total of Dwell= Pulse Time*(1600/2)*31.6/79

1DH3/2DH3/3DH3 Total of Dwell= Pulse Time*(1600/4)*31.6/79

1DH5/2DH5/3DH5 Total of Dwell= Pulse Time*(1600/6)*31.6/79



Modulation Type:		$\pi/4$ -DQPSK
2DH1		
2DH3		
2DH5		

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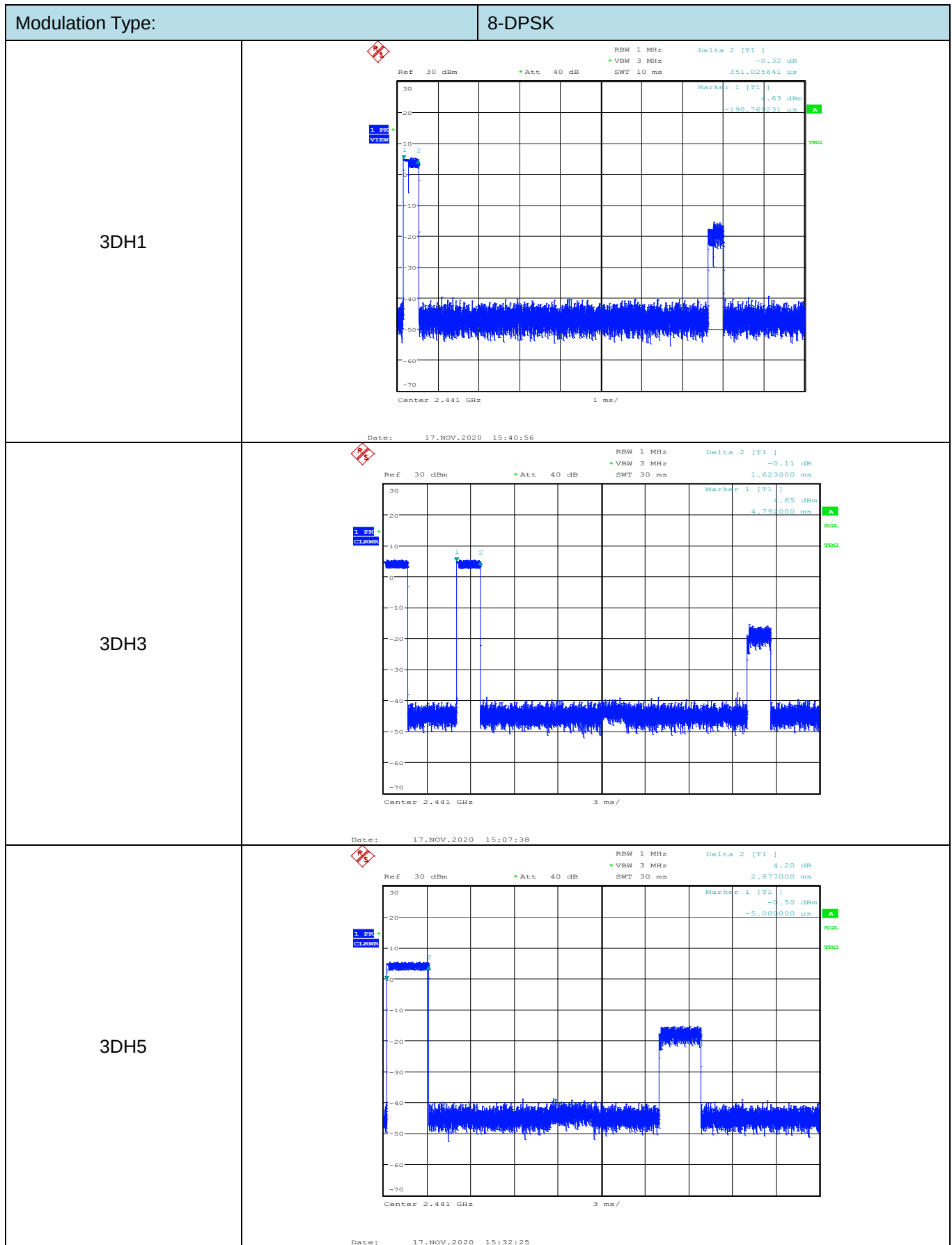
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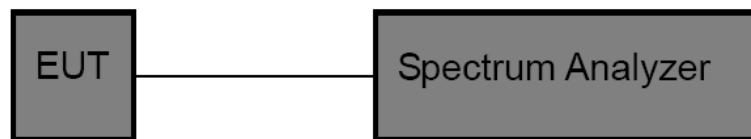
3.8. Peak Output Power

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (b)(1) / RSS-247 5.4 b:

Test Item	Limit	Frequency Range(MHz)
Peak Output Power	Hopping Channels>75 Power<1W(30dBm) Other <125mW(21dBm)	2400~2483.5

Test Configuration



Test Procedure

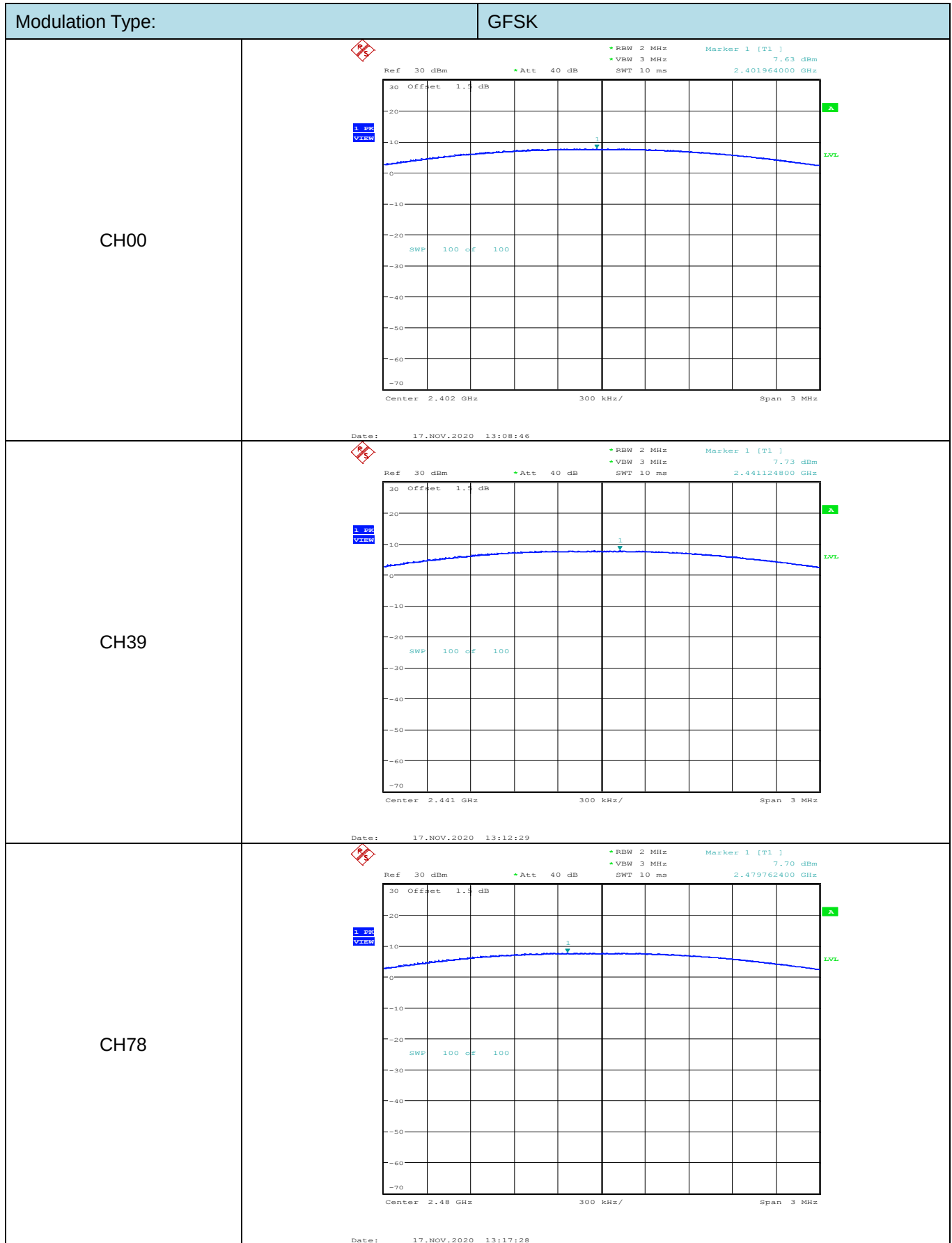
1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
2. Spectrum Setting:
Peak Detector: RBW=1 MHz, VBW=3 MHz for bandwidth less than 1MHz.
RBW=3 MHz, VBW=3 MHz for bandwidth more than 1MHz.

Test Mode

Please refer to the clause 2.3.

Test Result

Modulation type	Channel	Output power (dBm)	Limit (dBm)	Result
GFSK	00	7.63	≤ 30.00	Pass
	39	7.73		
	78	7.70		
π/4-DQPSK	00	6.85	≤ 21.00	Pass
	39	6.98		
	78	6.91		
8-DPSK	00	7.17	≤ 21.00	Pass
	39	7.26		
	78	7.12		



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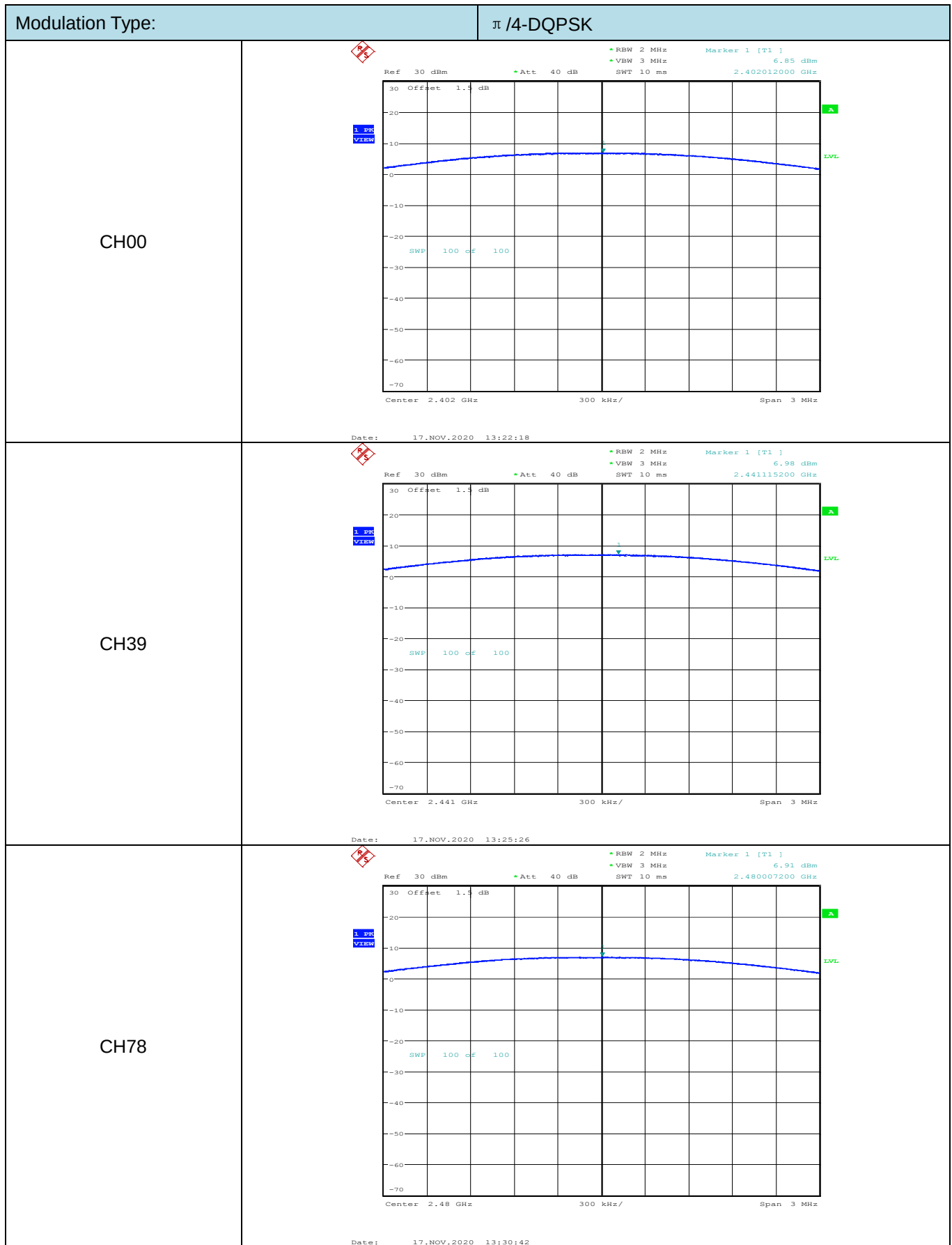
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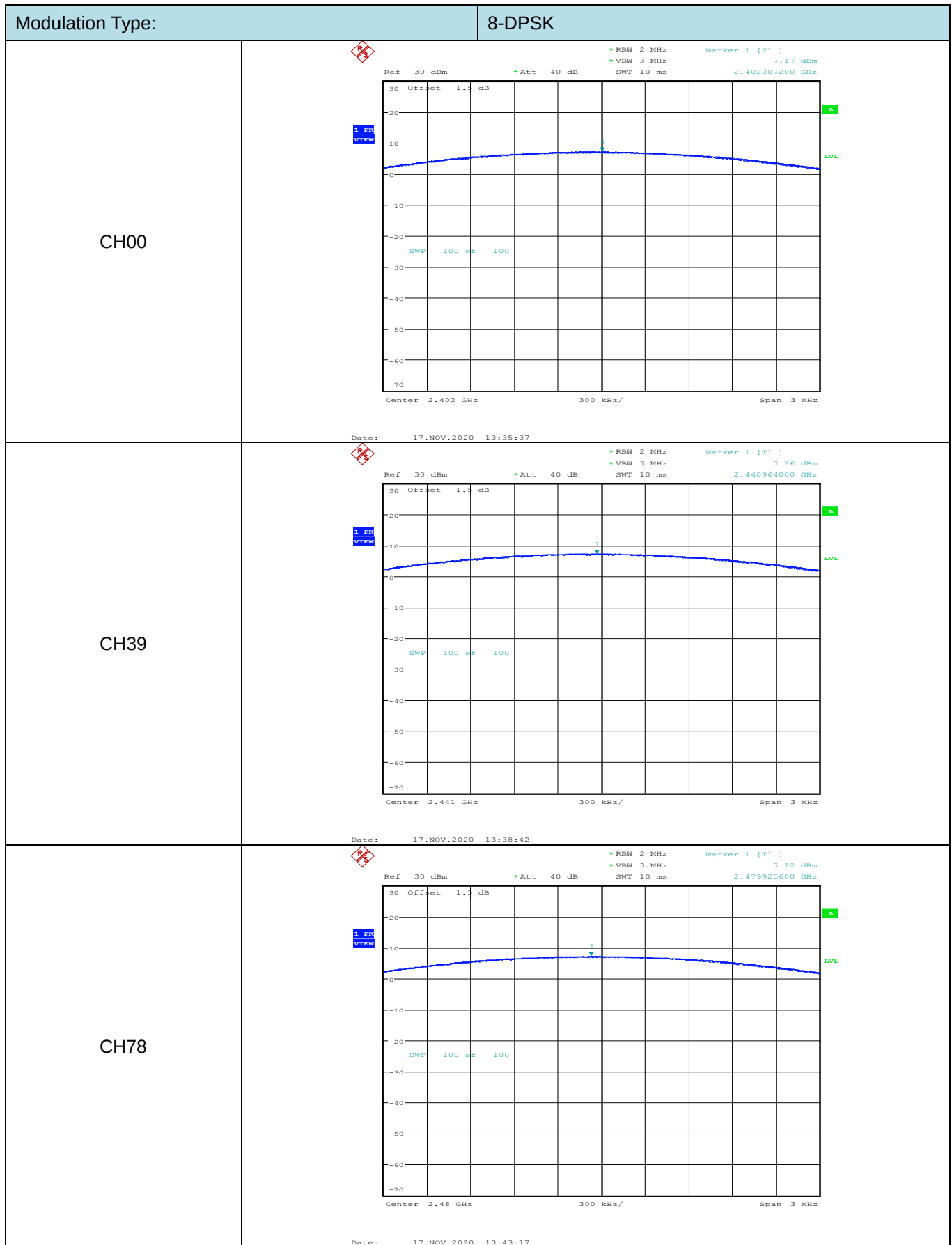
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3.9. Antenna requirement

Requirement

FCC CFR Title 47 Part 15 Subpart C Section 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. The use of a permanently attached antenna or of antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1)(i):

(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.

Test Result

The directional gain of the antenna less than 6dBi, please refer to the EUT internal photographs antenna photo.

*****THE END*****