

# APPENDIX REPORT

Project No.	SHT2208180705EW	Radio Specification	Bluetooth EDR
Test sample No.	YPHT22060506003	Model No.	B8U
Start test date	2022-7-27	Finish date	2022-2-29
Temperature	27.2°C	Humidity	42%
Test Engineer	Hailey Chen	Auditor	Xiaodong Zhe

Appendix clause	Test item	Result
A	Peak Output Power	PASS
B	20 dB Bandwidth	PASS
C	99% Occupied Bandwidth	PASS
D	Carrier Frequencies Separation	PASS
E	Hopping Channel Number	PASS
F	Dwell Time	PASS
G	Duty Cycle Correction Factor (DCCF)	PASS
H	Band edge and Spurious Emissions(coducted)	PASS

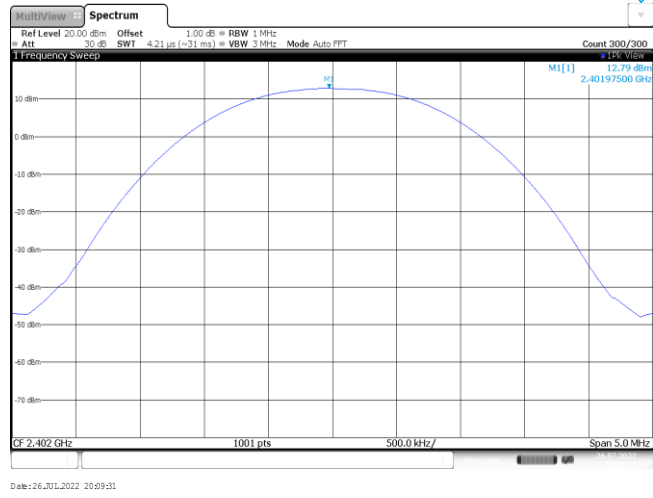
**Appendix A: Peak Output Power**

Modulation type	Channel	Peak Output power (dBm)	Average Output power (dBm)	Limit (dBm)	Result
GFSK	00	12.79	12.78	≤ 30.00	Pass
	39	12.83	12.82		
	78	12.65	12.64		
π/4DQPSK	00	12.88	12.85	≤ 21.00	Pass
	39	12.75	12.70		
	78	12.65	12.61		
8DPSK	00	13.01	12.93	≤ 21.00	Pass
	39	12.86	12.80		
	78	12.75	12.62		

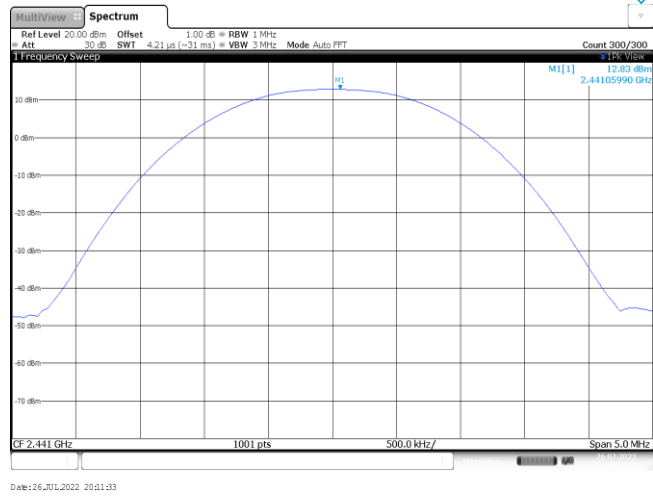
Modulation Type:

GFSK

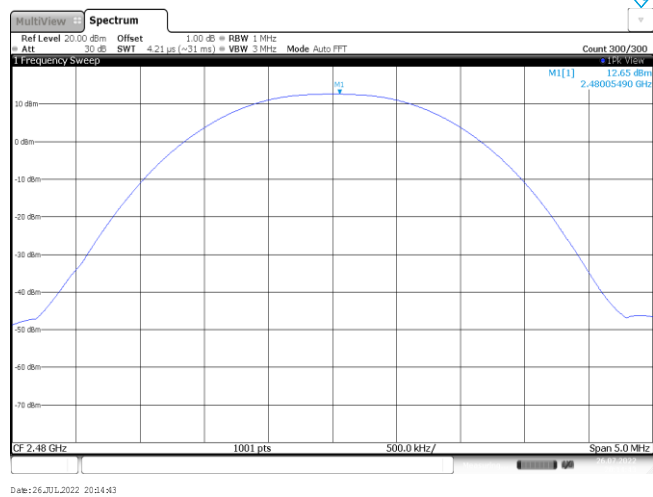
CH00



CH39



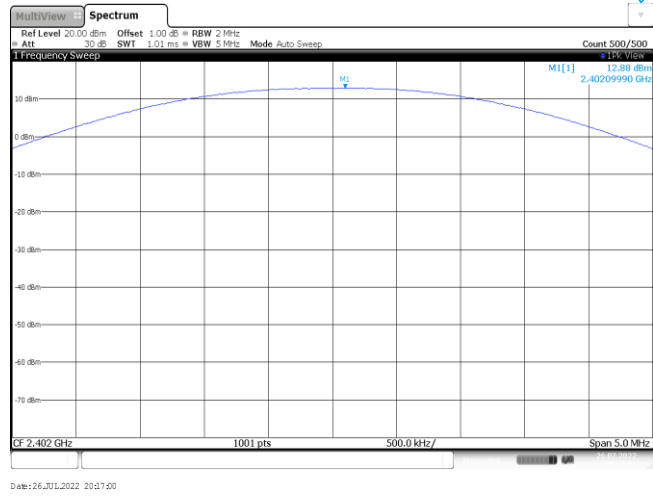
CH78



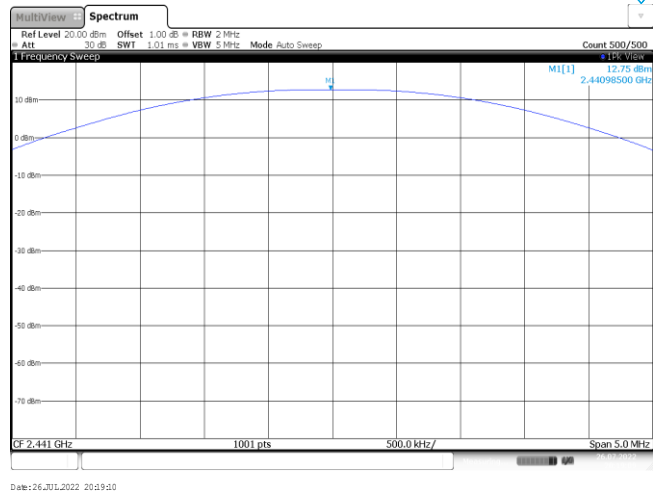
Modulation Type:

$\pi/4$ DQPSK

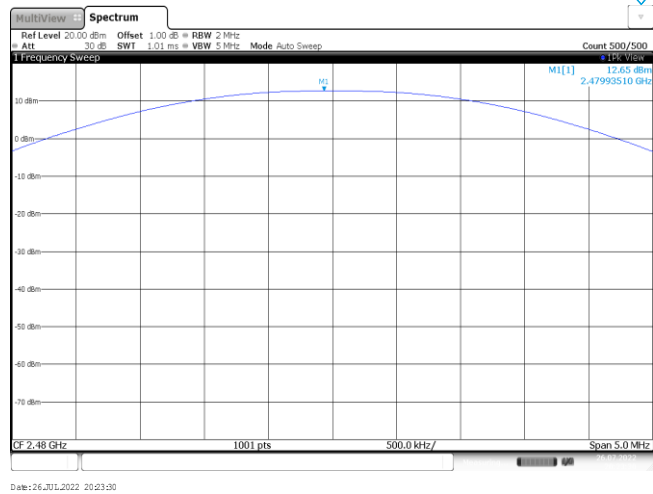
CH00



CH39

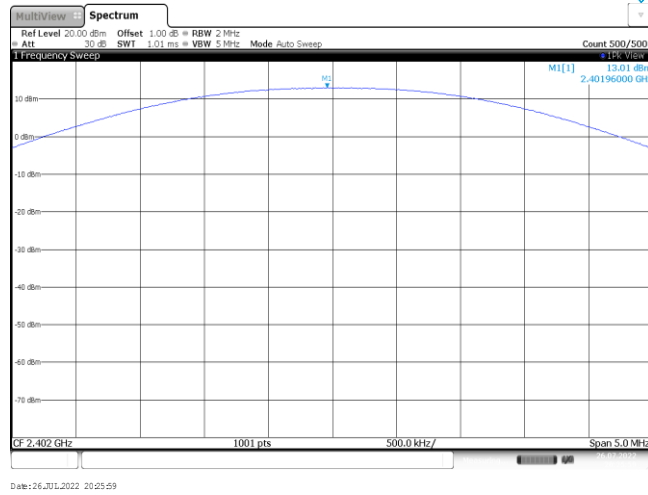


CH78

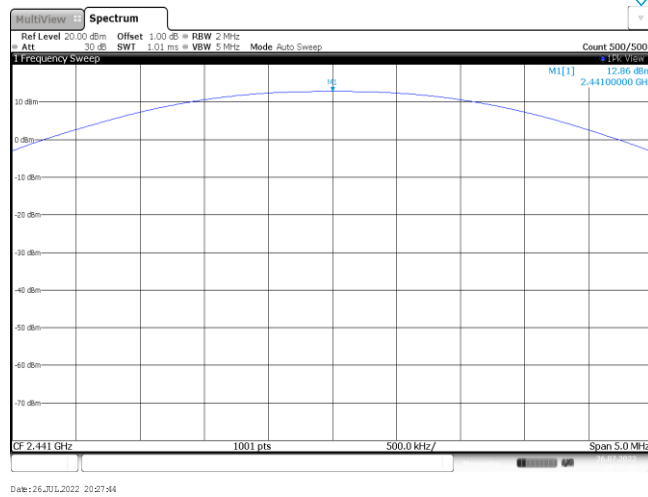


**Modulation Type: 8DPSK**

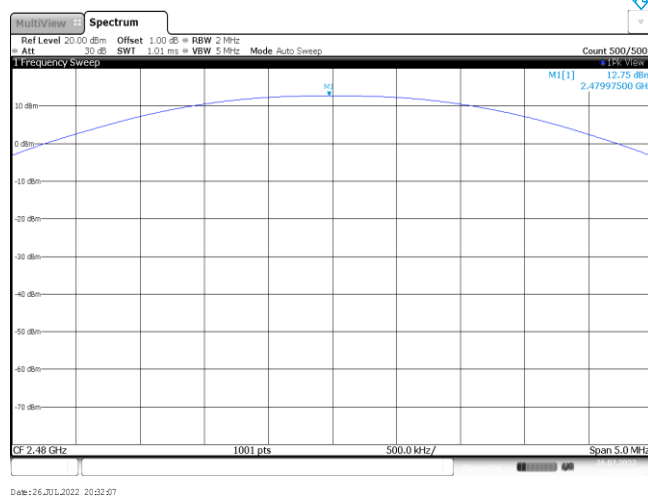
CH00



CH39



CH78

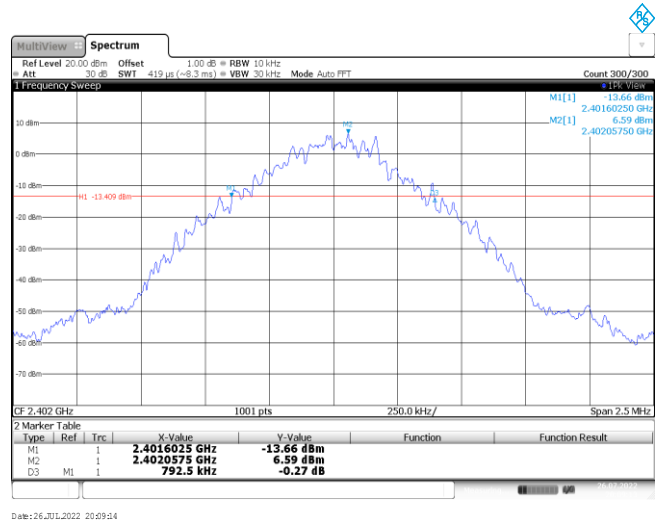


**Appendix B : 20 dB Bandwidth**

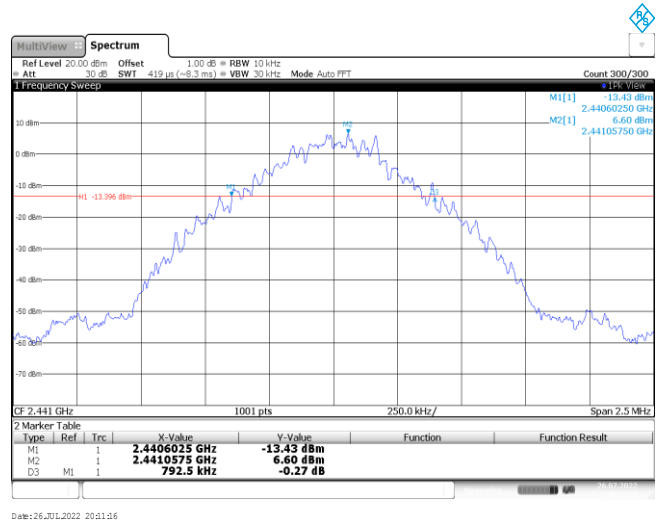
Modulation type	Channel	20 dB Bandwidth (kHz)	Limit (kHz)	Result
GFSK	00	792.50	-	Pass
	39	792.50		
	78	792.50		
$\pi/4$ DQPSK	00	1262.50	-	Pass
	39	1280.00		
	78	1270.00		
8DPSK	00	1267.50	-	Pass
	39	1285.00		
	78	1267.50		

**Modulation Type: GFSK**

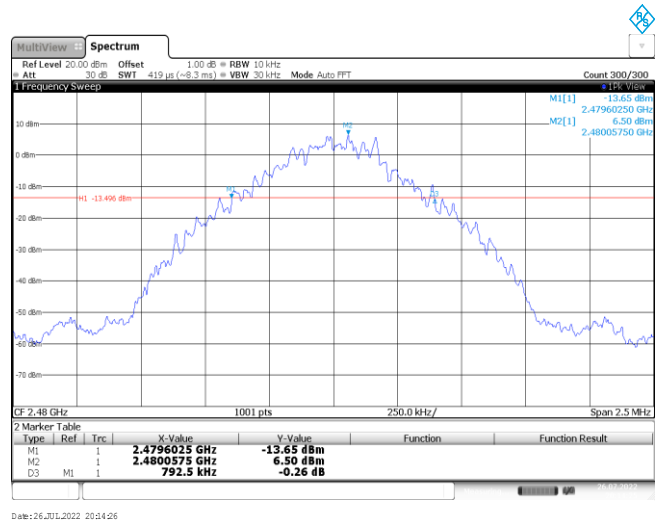
CH00



CH39



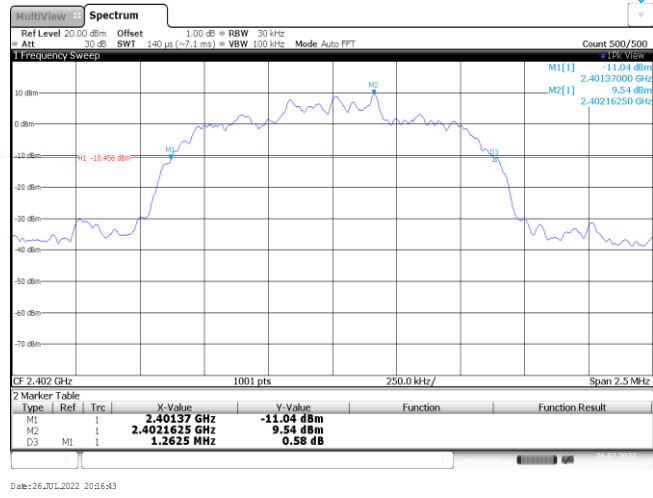
CH78



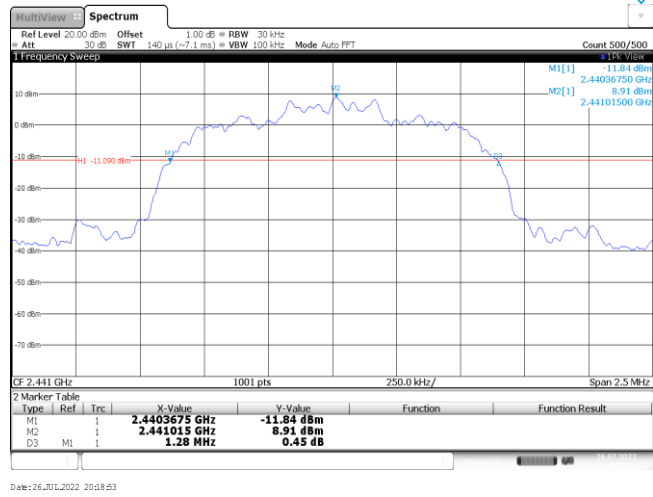
Modulation Type:

$\pi/4$ DQPSK

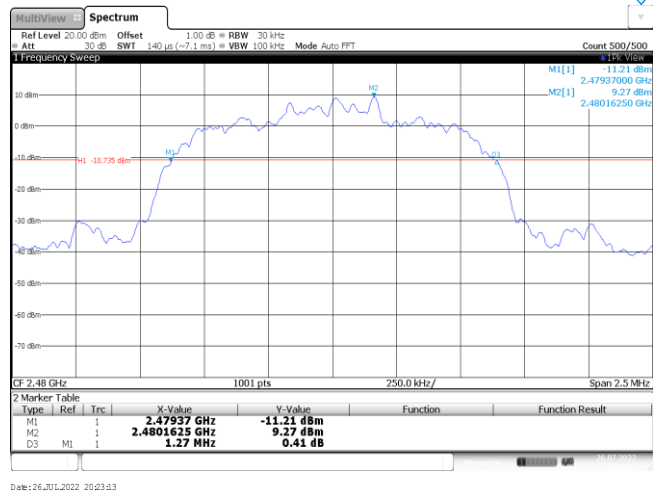
CH00



CH39



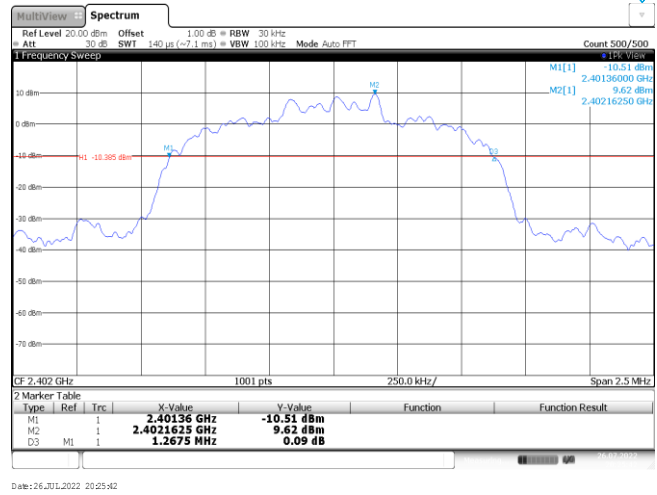
CH78



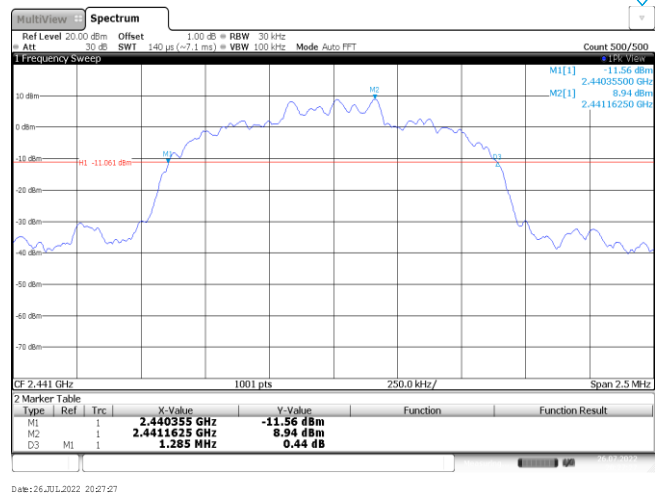


**Modulation Type: 8DPSK**

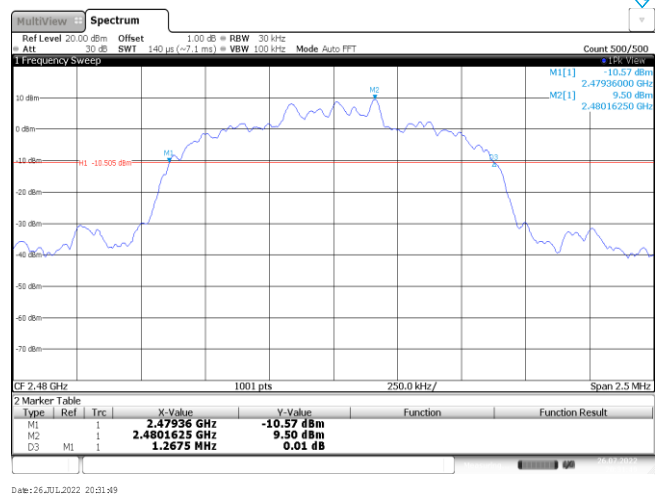
CH00



CH39



CH78

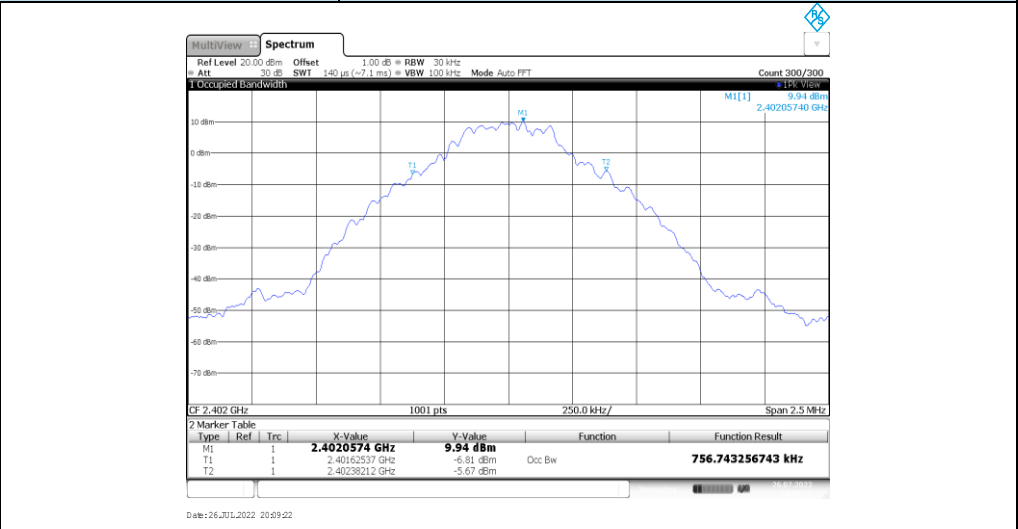


**Appendix C: 99% Occupied Bandwidth**

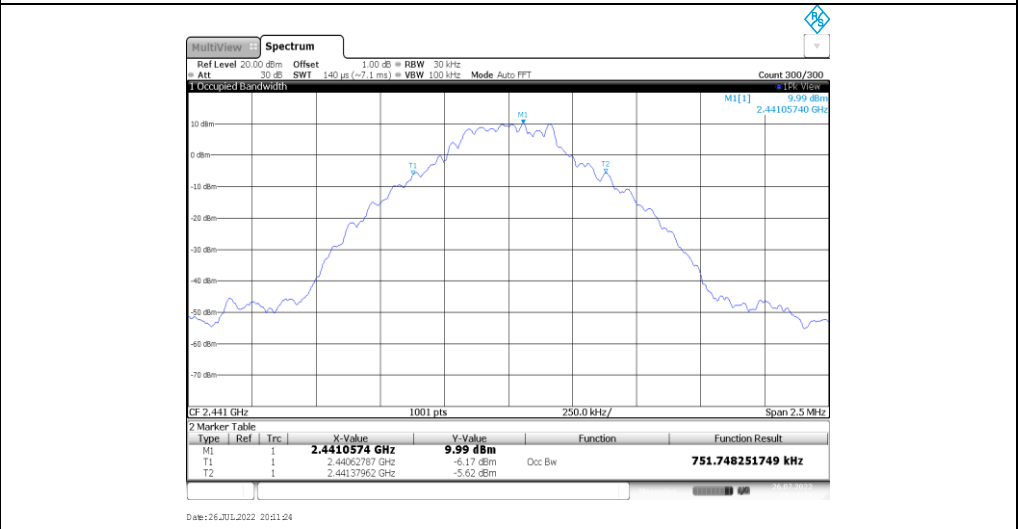
Modulation type	Channel	99% Occupied Bandwidth (MHz)	Limit (MHz)	Result
GFSK	00	0.76	-	Pass
	39	0.75		
	78	0.75		
$\pi/4$ DQPSK	00	1.15	-	Pass
	39	1.15		
	78	1.15		
8DPSK	00	1.15	-	Pass
	39	1.15		
	78	1.15		

**Modulation Type: GFSK**

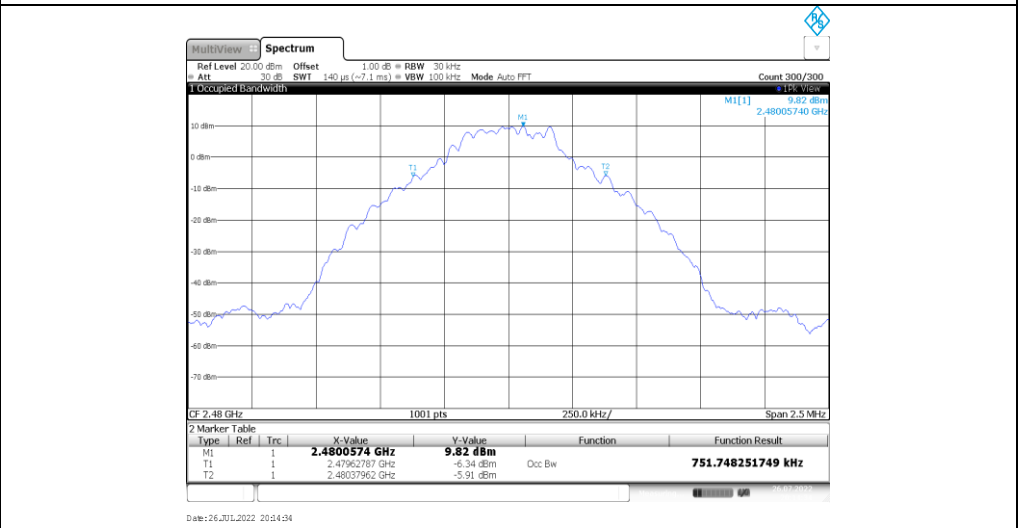
CH00



CH39

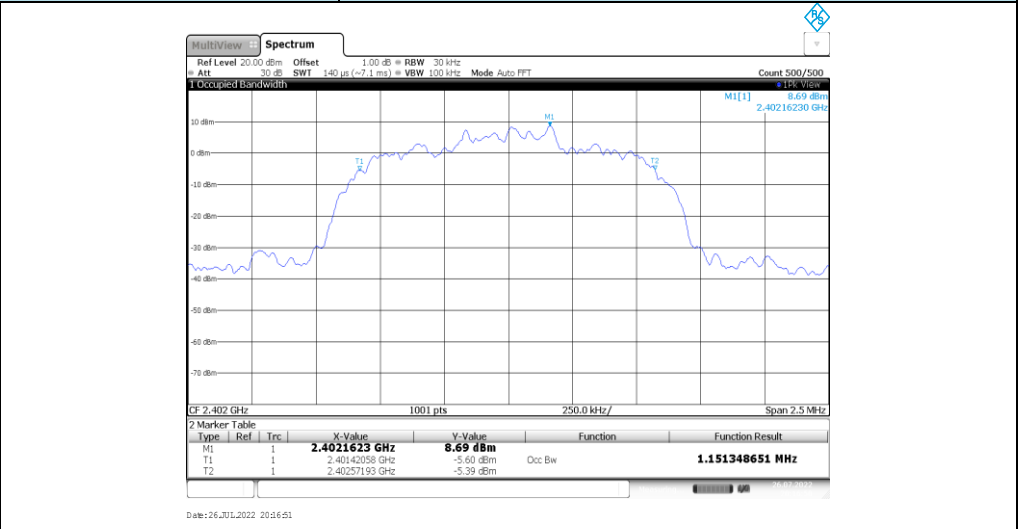


CH78

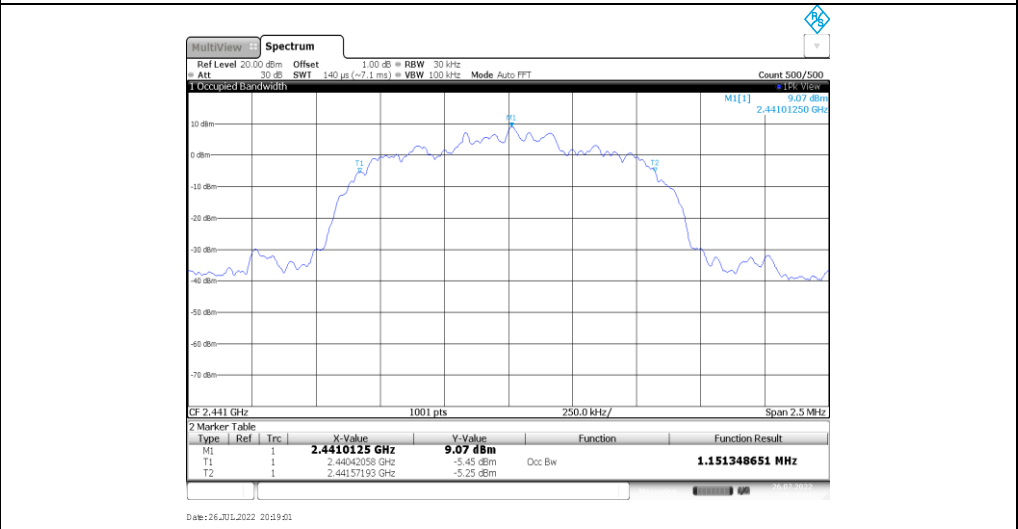


**Modulation Type:**  $\pi/4$ QPSK

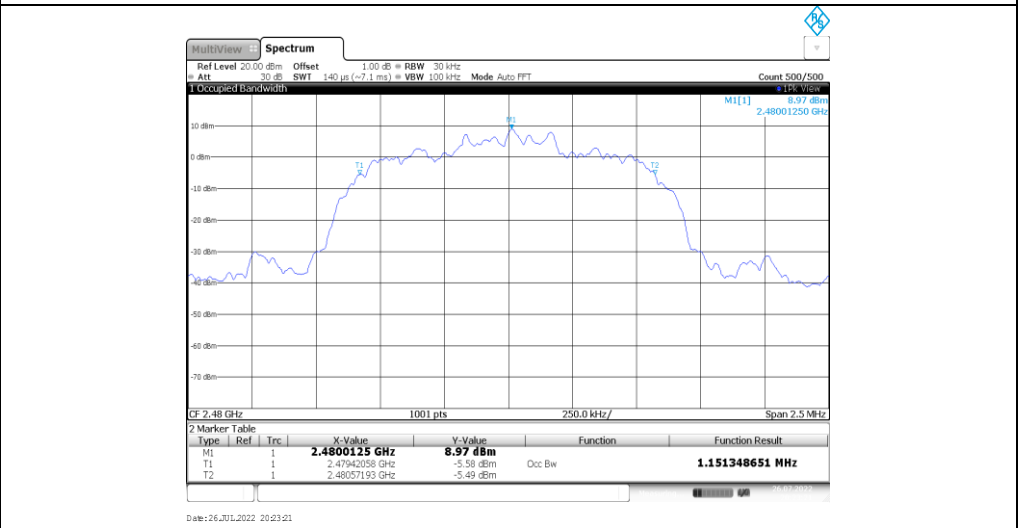
CH00



CH39

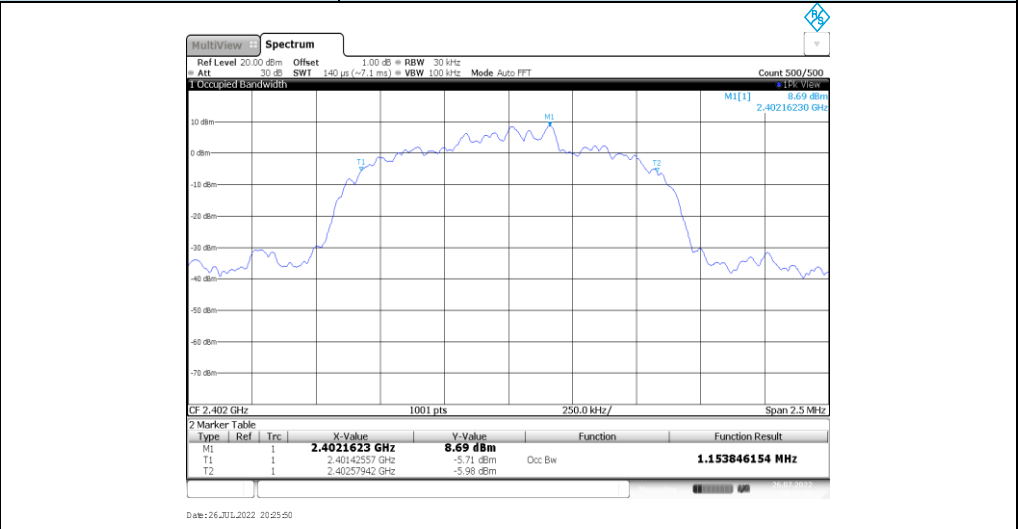


CH78

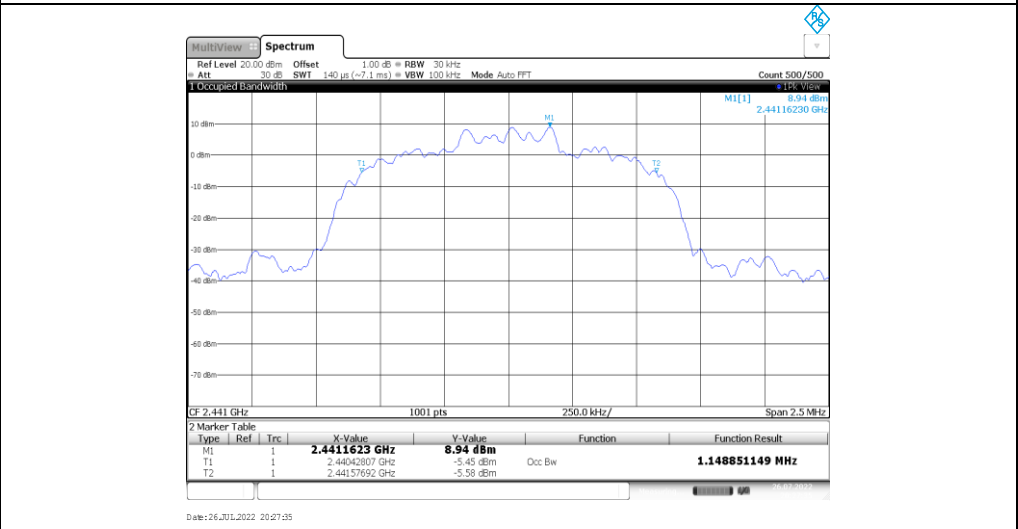


**Modulation Type: 8DPSK**

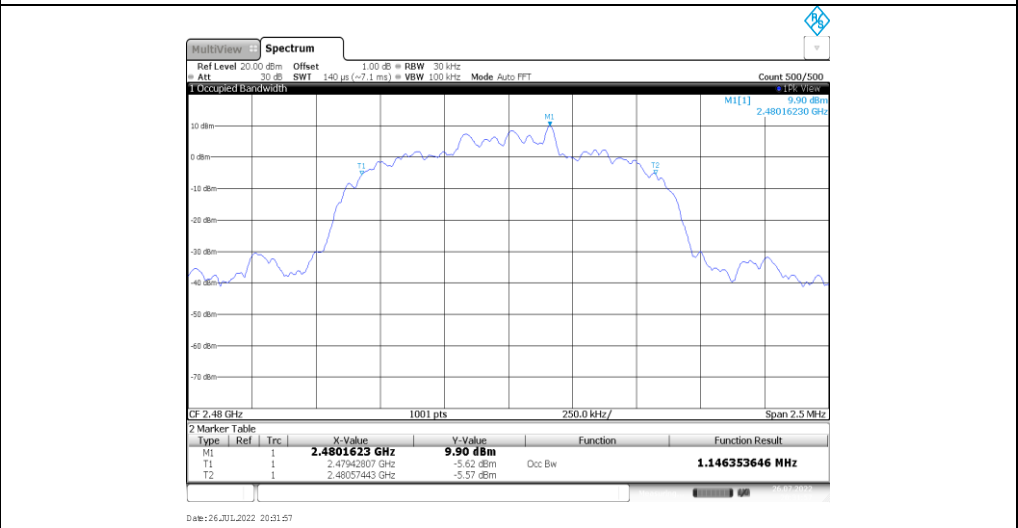
CH00



CH39



CH78



**Appendix D: Carrier Frequencies Separation**

Modulation type	Channel	Carrier Frequencies Separation (MHz)	Limit (kHz) *	Result
GFSK	39	1.00	≥792.50	Pass
$\pi/4$ DQPSK	39	1.00	≥825.33	Pass
8DPSK	39	1.00	≥856.67	Pass

**Note:**

\*: GFSK limit = The maximum 20 dB Bandwidth for GFSK modulation on the appendix B.

$\pi/4$ DQPSK limit =  $2/3$  \* The maximum 20 dB Bandwidth for  $\pi/4$ DQPSK modulation on the appendix B.

8DPSK limit =  $2/3$  \* The maximum 20 dB Bandwidth for 8DPSK modulation on the appendix B

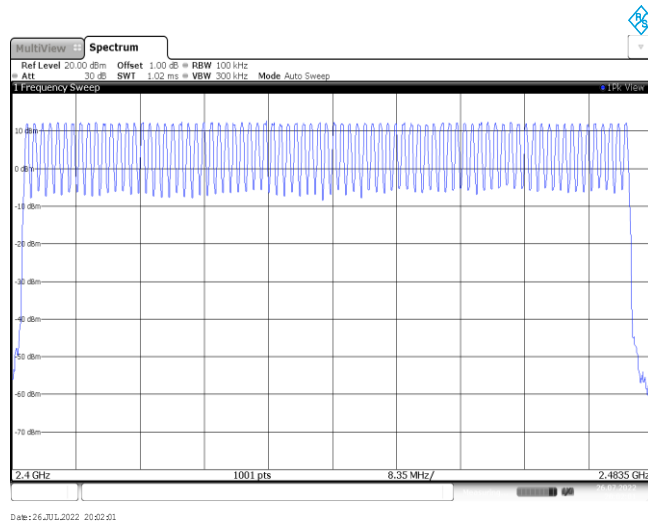
<p style="text-align: center;">GFSK</p>	<p style="text-align: center;">Date: 26.JUL.2022 20:56:21</p>
<p style="text-align: center;"><math>\pi/4</math>DQPSK</p>	<p style="text-align: center;">Date: 26.JUL.2022 20:35:34</p>
<p style="text-align: center;">8DPSK</p>	<p style="text-align: center;">Date: 26.JUL.2022 20:40:10</p>

**Appendix E: Hopping Channel Number**

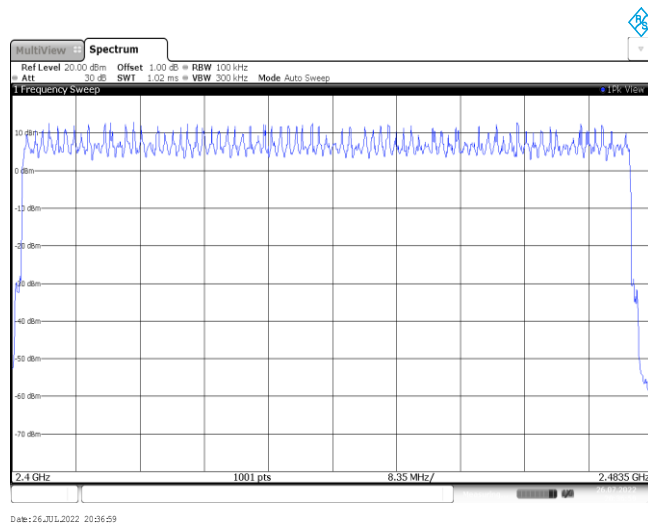
Modulation type	Channel number	Limit	Result
GFSK	79	≥15.00	Pass
π/4DQPSK	79		
8DPSK	79		



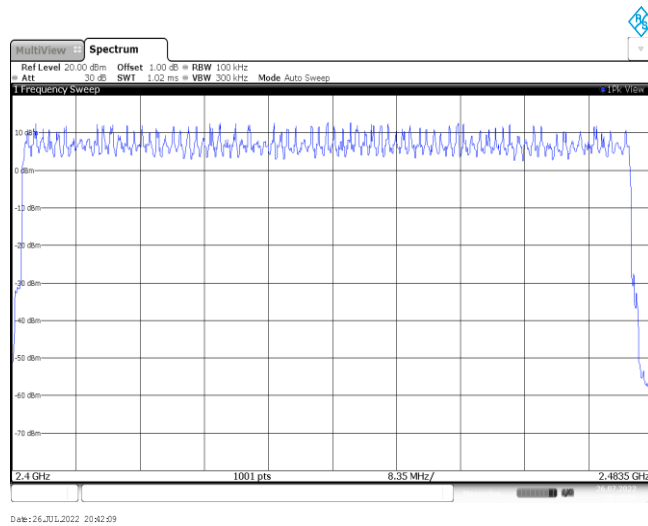
GFSK



$\pi/4$ DQPSK



8DPSK

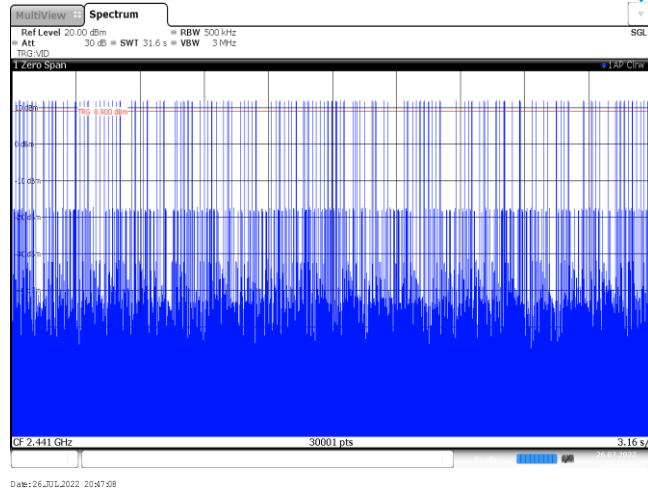


**Appendix F: Dwell Time**

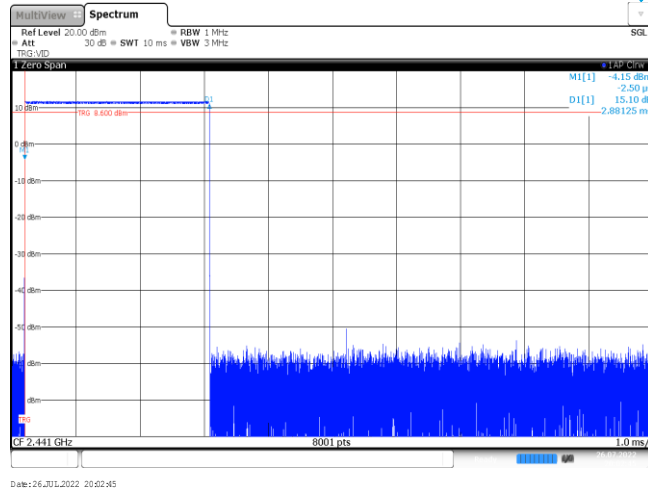
Modulation type	Packet	Burst Width [ms]	Total Hops[hop*ch]	Dwell time (Second)	Limit (Second)	Result
GFSK	DH1	0.38	154	0.06	≤ 0.40	Pass
	DH3	1.63	162	0.26		
	DH5	2.88	83	0.24		
π/4DQPSK	2DH1	0.38	158	0.06	≤ 0.40	Pass
	2DH3	1.64	158	0.26		
	2DH5	2.88	81	0.23		
8DPSK	3DH1	0.38	158	0.06	≤ 0.40	Pass
	3DH3	1.64	164	0.27		
	3DH5	2.89	77	0.22		

Modulation Type: GFSK	
DH1 Burst width	<p>Ref Level 20.00 dBm = RBW 1 MHz Att 30 dB = SWT 10 ms = VBW 3 MHz TRIG:VID 1 Zero Span M1[1] -1.27 dBm D1[1] 12.48 dB 376.25 μs CF 2.441 GHz 8001 pts 1.0 ms/</p> <p>Date: 26.07.2022 20:45:29</p>
DH1 Burst number	<p>Ref Level 20.00 dBm = RBW 500 kHz Att 30 dB = SWT 31.6 s = VBW 3 MHz TRIG:VID 1 Zero Span M1[1] -1.27 dBm D1[1] 12.48 dB 3.16 s CF 2.441 GHz 30001 pts 3.16 s/</p> <p>Date: 26.07.2022 20:46:03</p>
DH3 Burst width	<p>Ref Level 20.00 dBm = RBW 1 MHz Att 30 dB = SWT 10 ms = VBW 3 MHz TRIG:VID 1 Zero Span M1[1] -4.57 dBm D1[1] 15.86 dB 1.630250 ms CF 2.441 GHz 8001 pts 1.0 ms/</p> <p>Date: 26.07.2022 20:46:34</p>

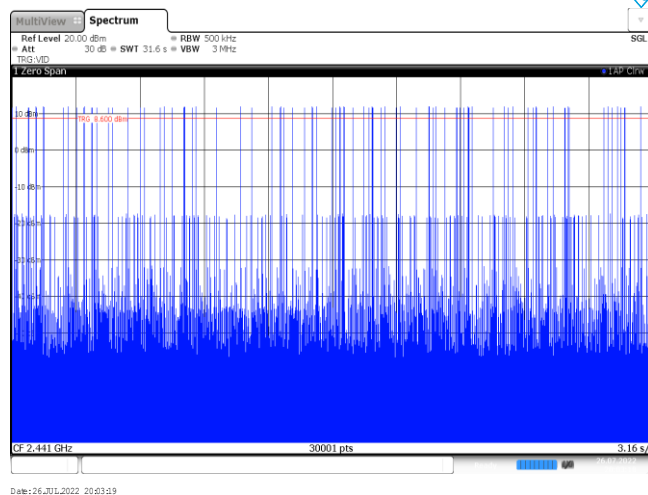
DH3  
Burst number



DH5  
Burst width

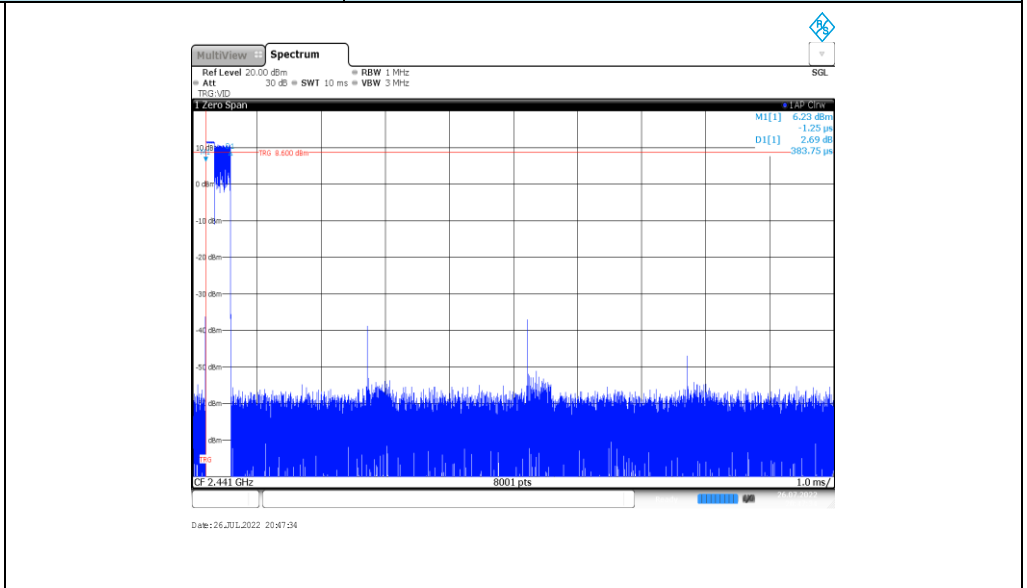


DH5  
Burst number

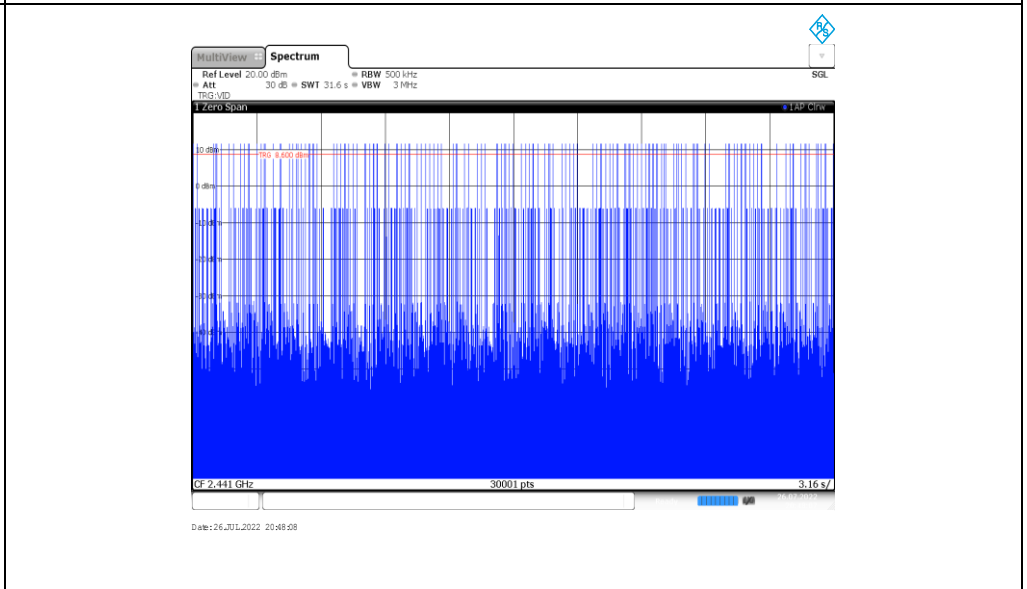


**Modulation Type:**  $\pi/4$ DQPSK

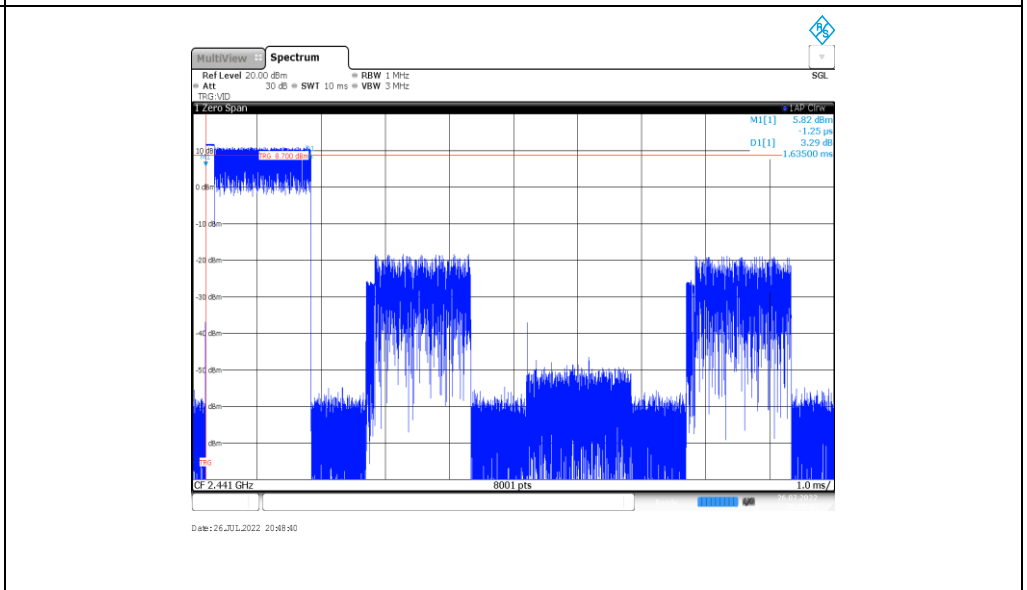
2DH1  
Burst width



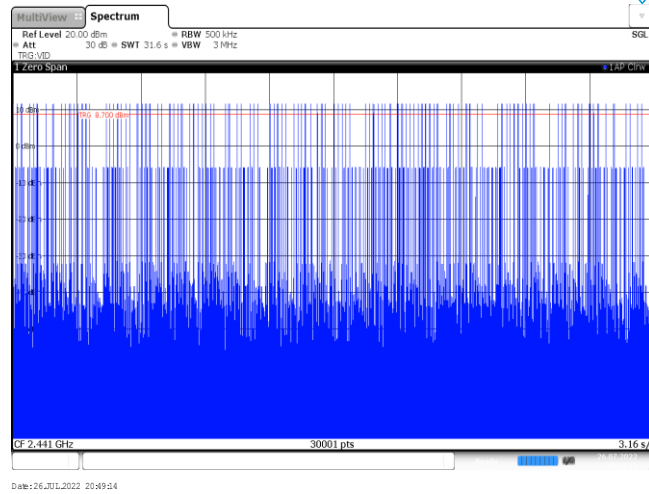
2DH1  
Burst number



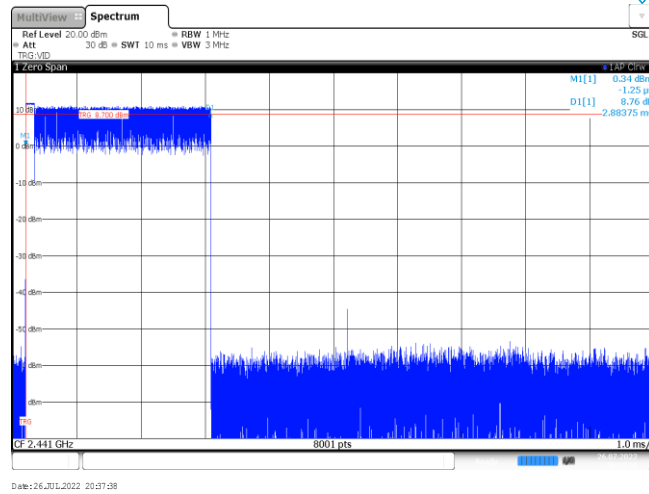
2DH3  
Burst width



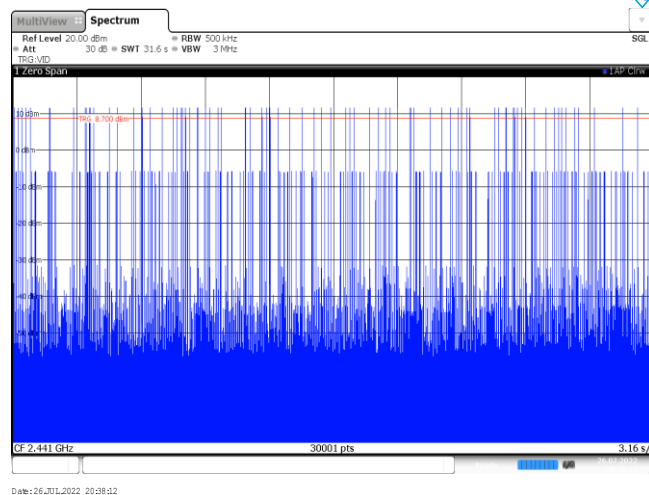
2DH3  
Burst number



2DH5  
Burst width

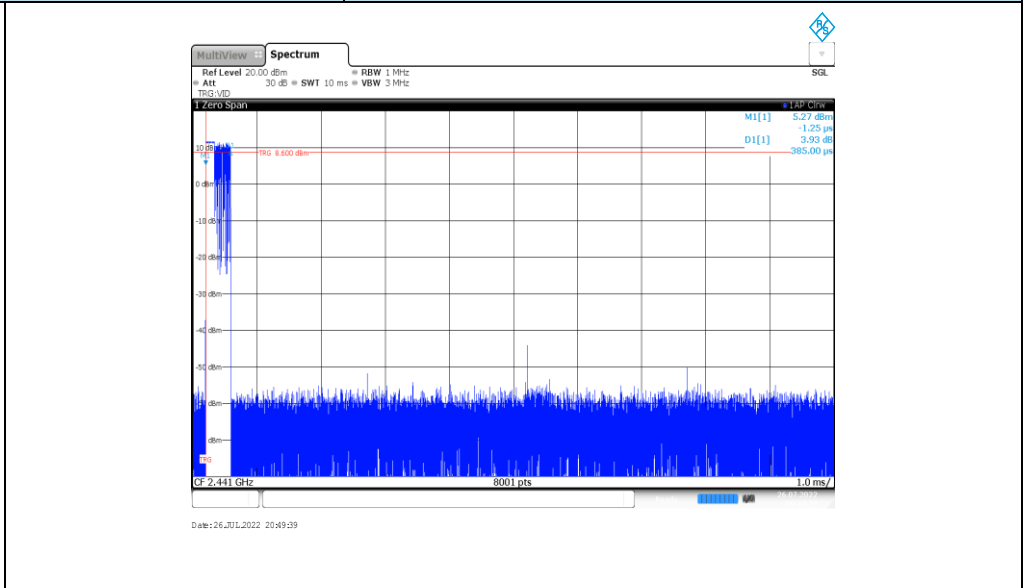


2DH5  
Burst number

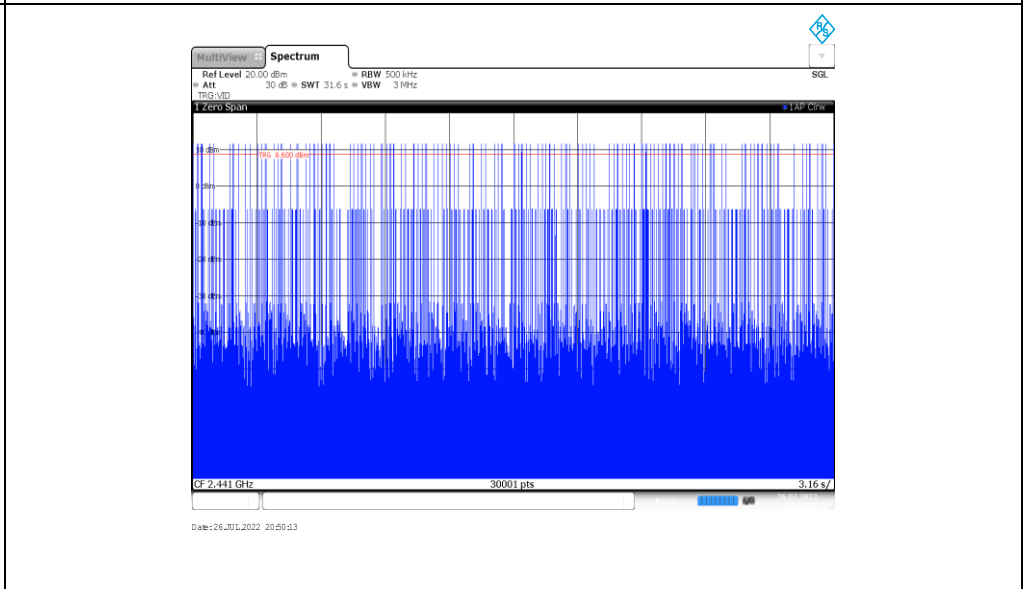


**Modulation Type: 8DPSK**

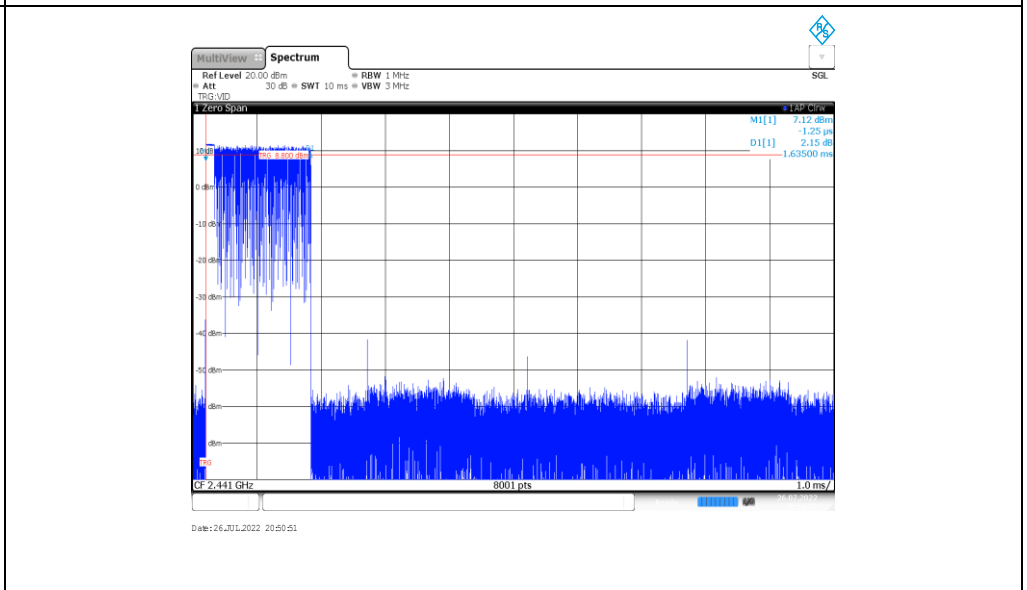
3DH1  
Burst width



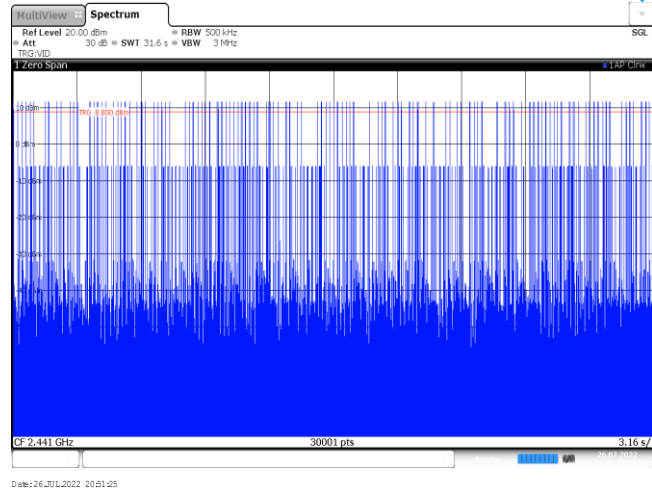
3DH1  
Burst number



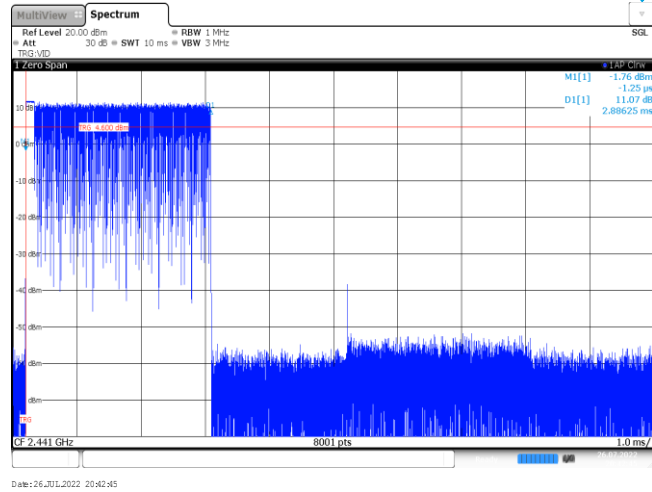
3DH3  
Burst width



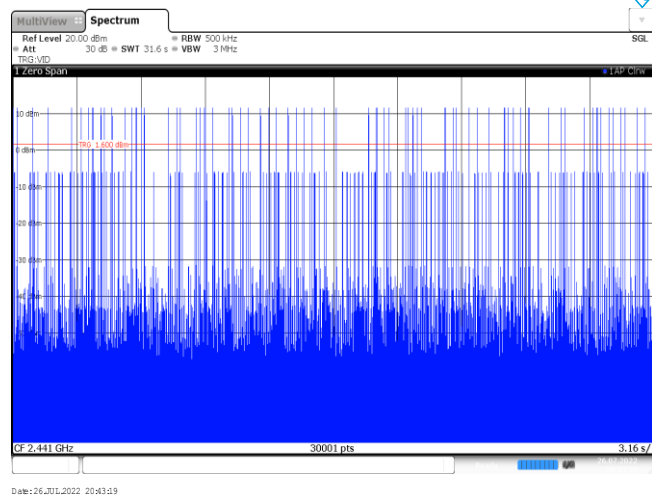
3DH3  
Burst number



3DH5  
Burst width



3DH5  
Burst number

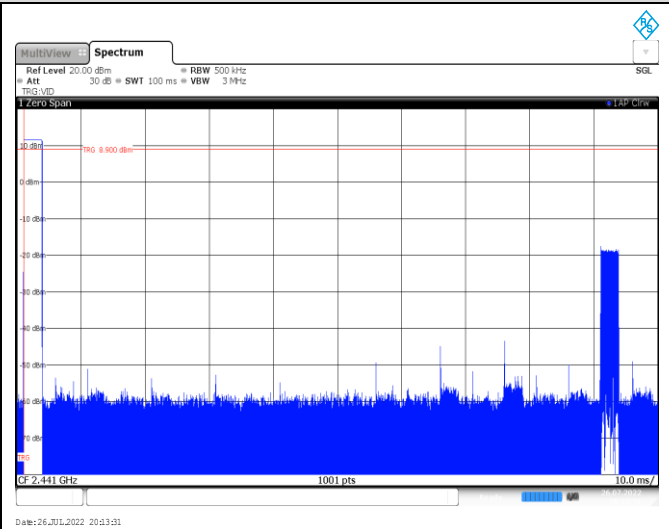
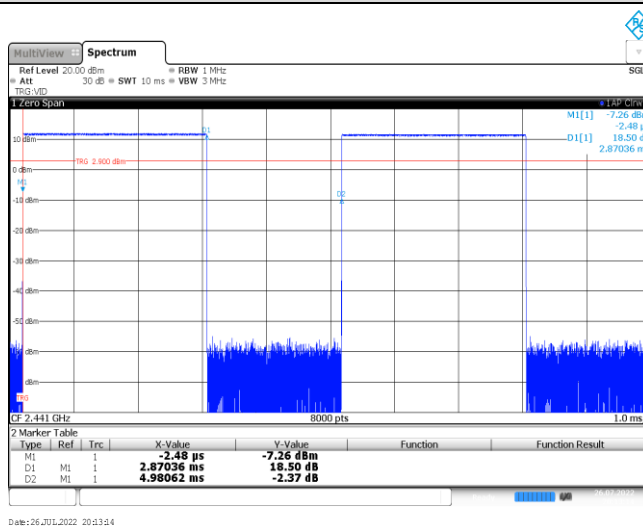




**Appendix G: Duty Cycle Correction Factor (DCCF)**

DCCF Calculate Formula					
DCCF=20 * Log(duty cycle) = 20 * Log( $T_{on\ time} / T_{period}$ )					
Modulation type	Test Frequency (MHz)	$T_{on\ time}$ for single burst [ms]	$T_{period}$ [ms]	Burst Quantity	DCCF [dB]
GFSK	2441	2.87	100	2	-24.82
$\pi/4$ DQPSK	2441	2.87	100	2	-24.82
8DPSK	2441	2.88	100	2	-24.79

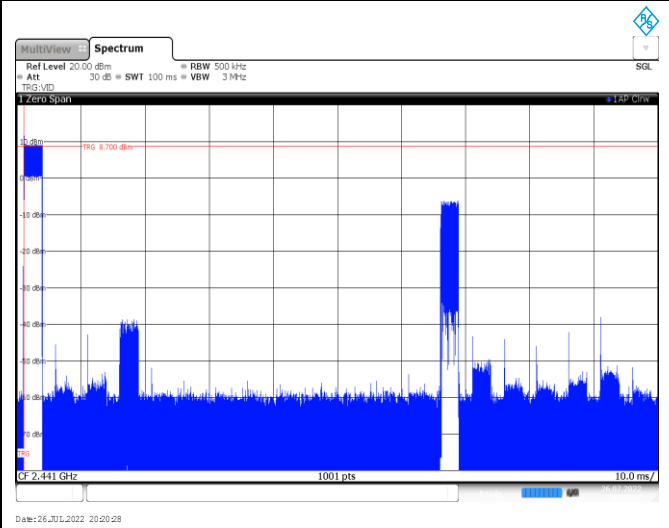
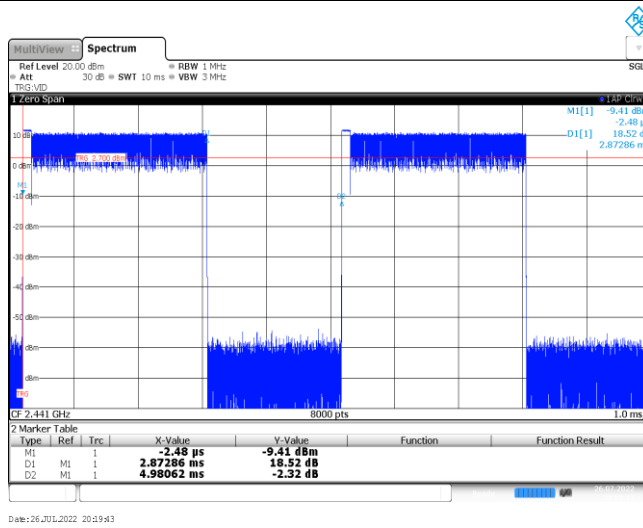
GFSK



T<sub>on</sub> time for single burst

Burst Quantity

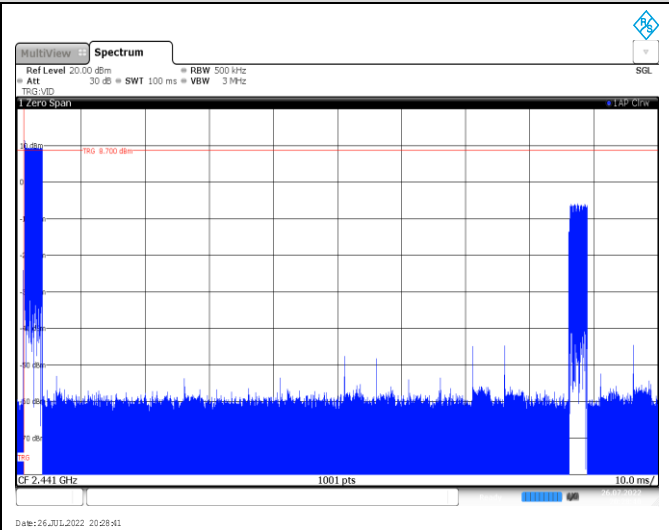
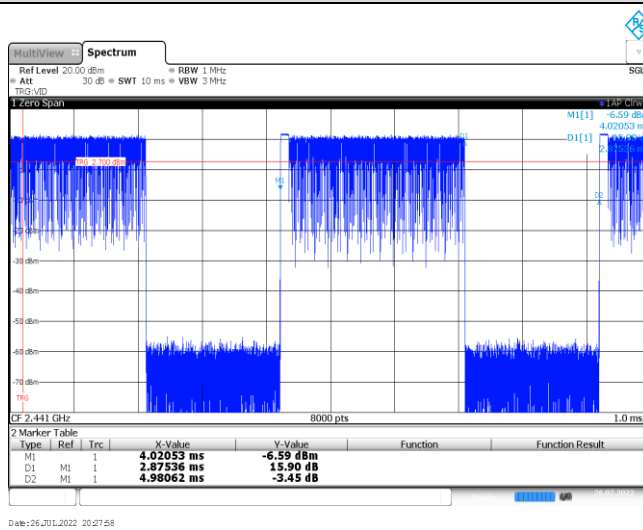
$\pi/4$  DQPSK



T<sub>on</sub> time for single burst

Burst Quantity

8DPSK



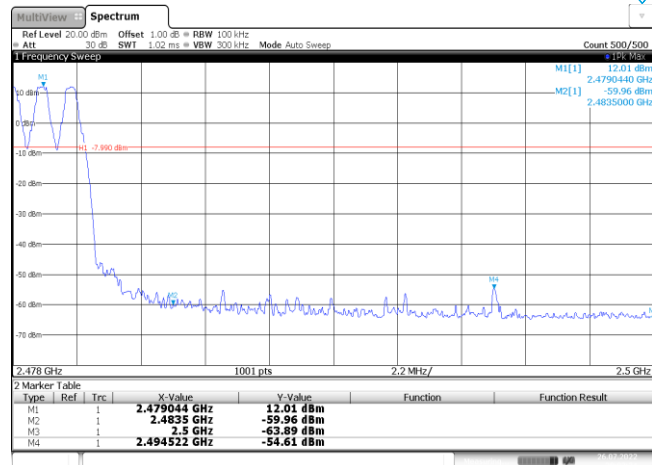
T<sub>on</sub> time for single burst

Burst Quantity

### Appendix H: Band edge and Spurious Emissions (conducted)

Test Item:	Band edge	Modulation type:	GFSK
<p>CH00 No hopping mode</p>			
<p>CH00 Hopping mode</p>			
<p>CH78 No hopping mode</p>			

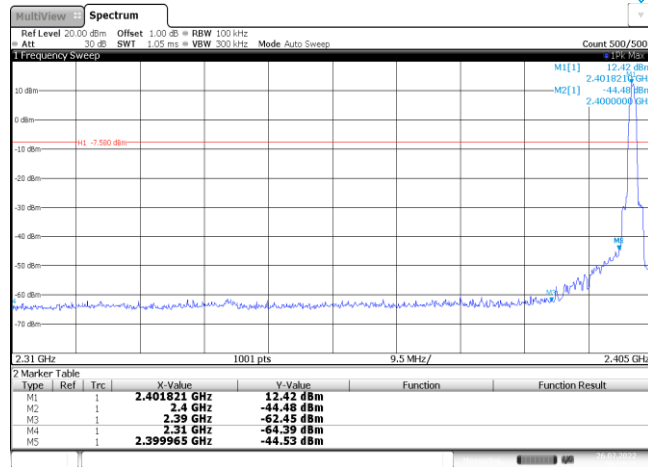
CH78  
Hopping mode



Date: 26 JUL 2022 20:02:33

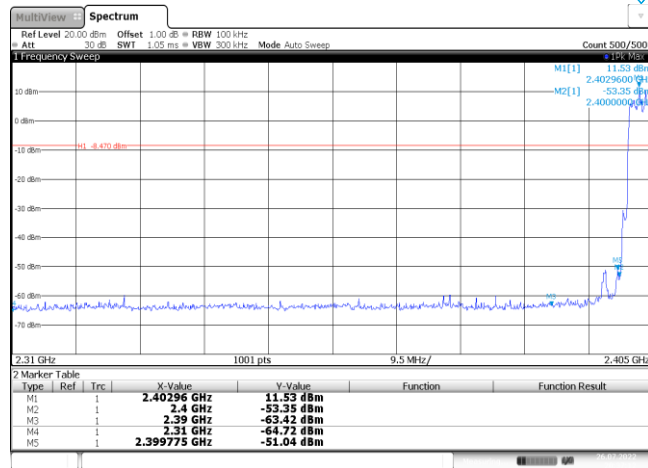
<b>Test Item:</b>	<b>Band edge</b>	<b>Modulation type:</b>	<b><math>\pi/4</math>DQPSK</b>
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CH00  
No hopping mode



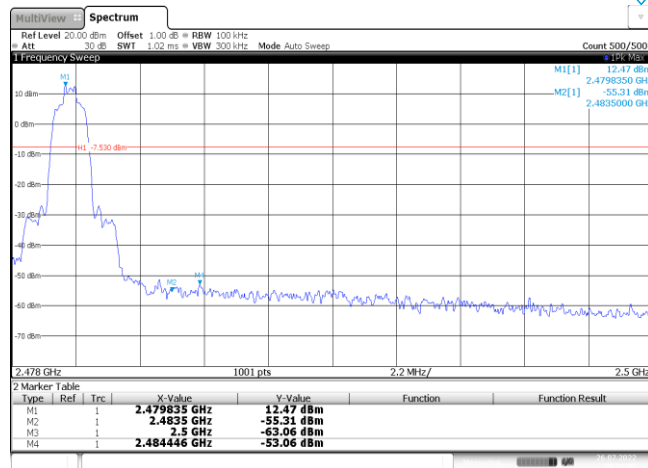
Date: 26.JUL.2022 20:17:33

CH00  
Hopping mode



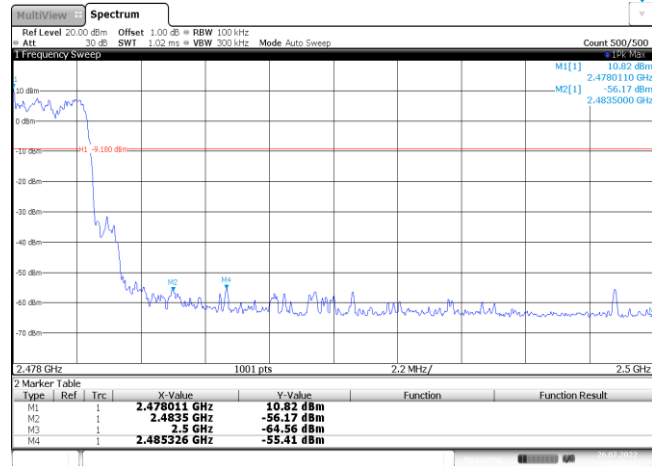
Date: 26.JUL.2022 20:57:13

CH78  
No hopping mode



Date: 26.JUL.2022 20:24:03

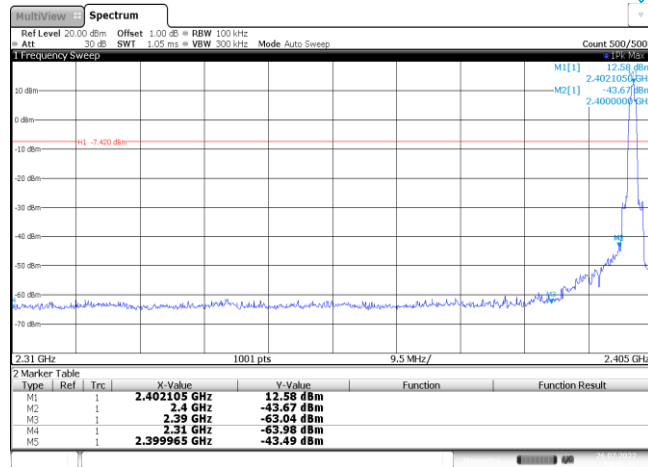
CH78  
Hopping mode



Date: 26.JUL.2022 20:57:27

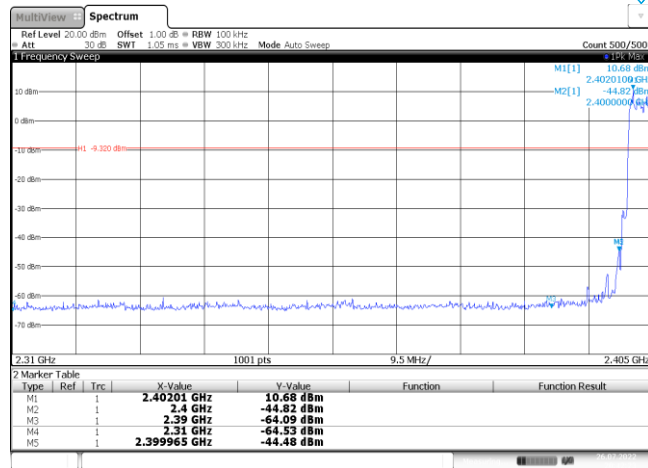
<b>Test Item:</b>	<b>Band edge</b>	<b>Modulation type:</b>	<b>8DPSK</b>
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CH00  
No hopping mode



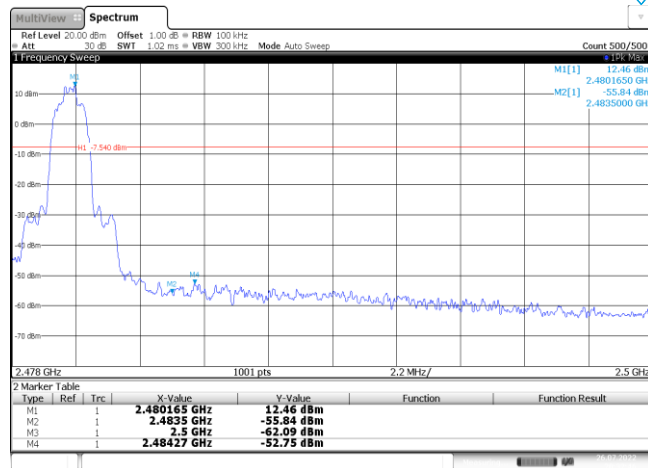
Date: 26 JUL 2022 20:26:13

CH00  
Hopping mode



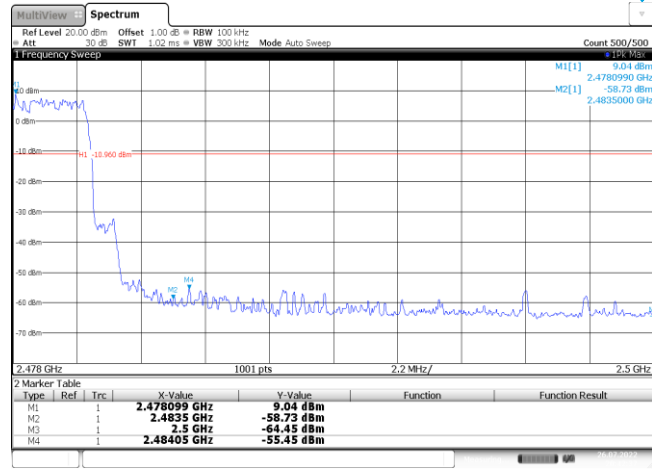
Date: 26 JUL 2022 20:42:23

CH78  
No hopping mode



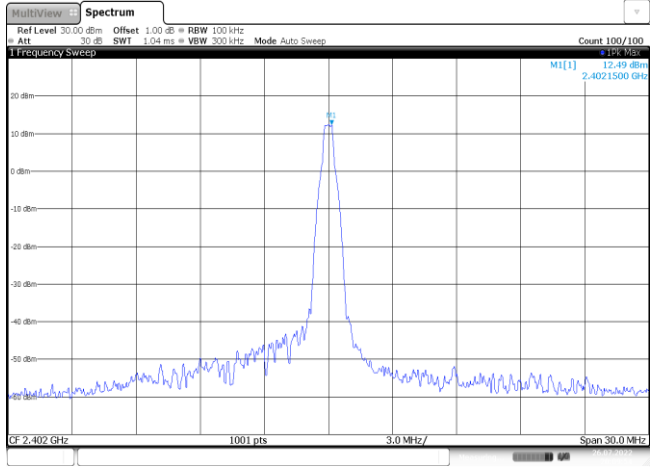
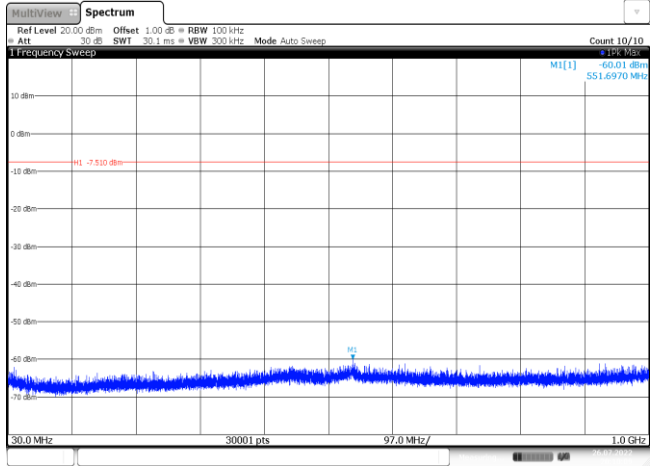
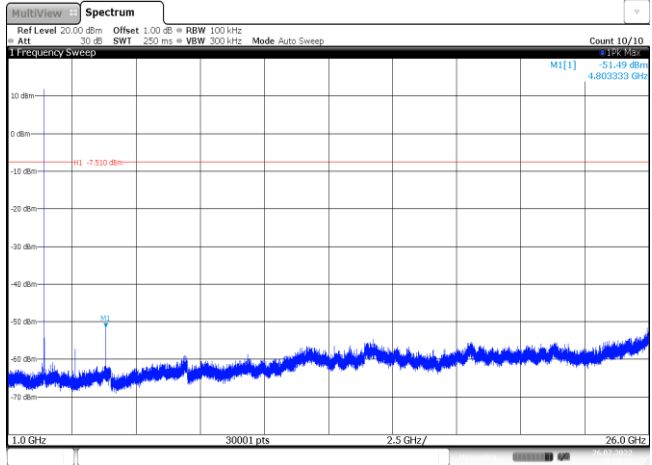
Date: 26 JUL 2022 20:32:46

CH78  
Hoppig mode

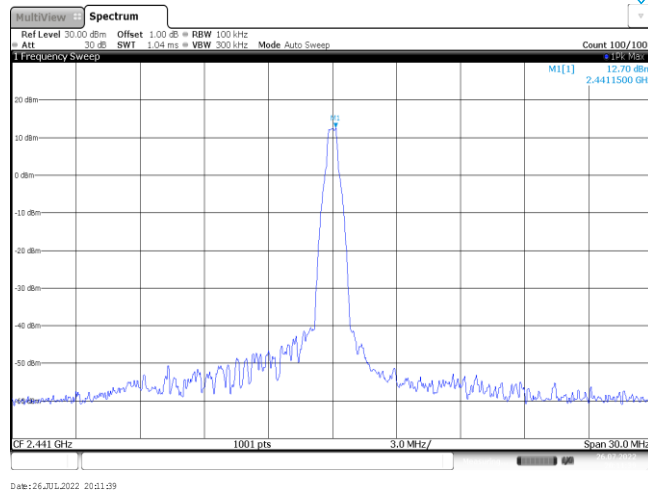


Date: 26.01.2022 20:42:37

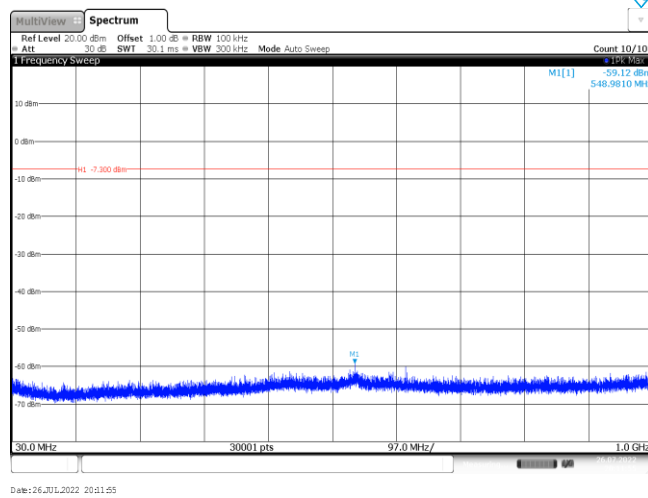


Test Item:	Spurious Emission	Modulation type:	GFSK
<p>CH00 Reference level</p>	 <p>Date: 26.JUL.2022 20:19:53</p>		
<p>CH00 30MHz~1000MHz</p>	 <p>Date: 26.JUL.2022 20:10:10</p>		
<p>CH00 1GHz~26GHz</p>	 <p>Date: 26.JUL.2022 20:10:26</p>		

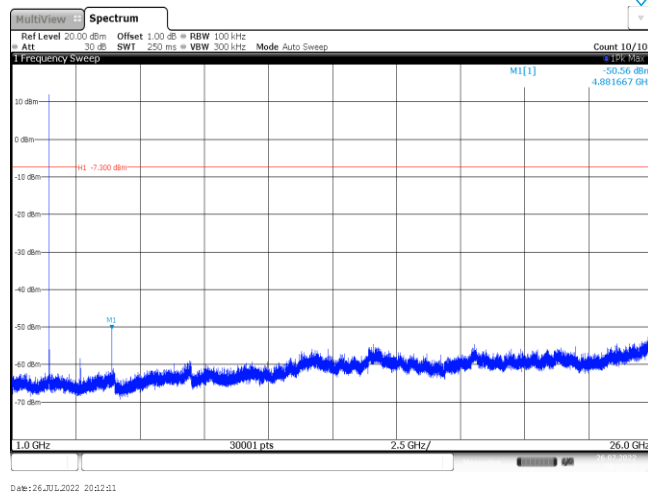
CH39  
Reference level



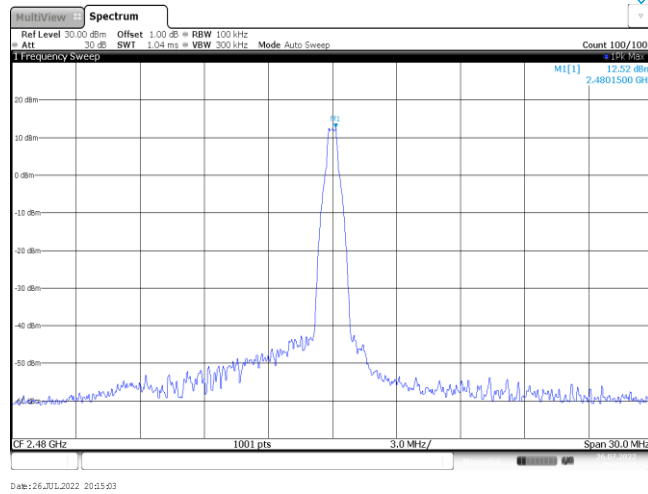
CH39  
30MHz~1000MHz



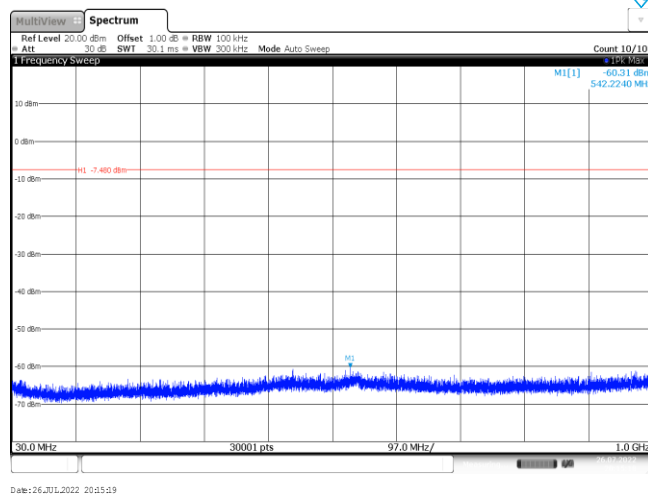
CH39  
1GHz~26GHz



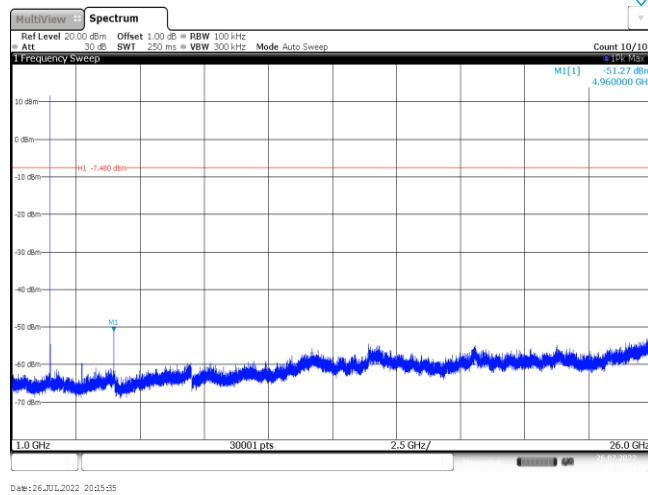
CH78  
Reference level

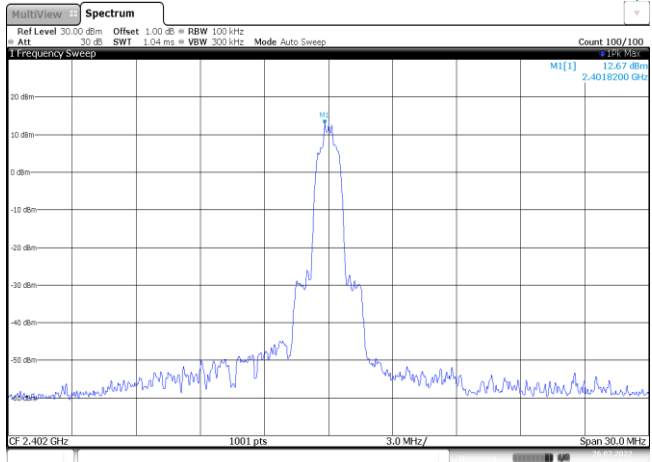
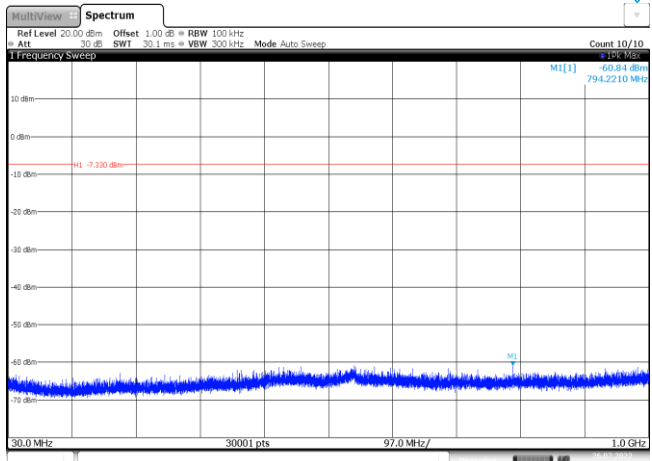
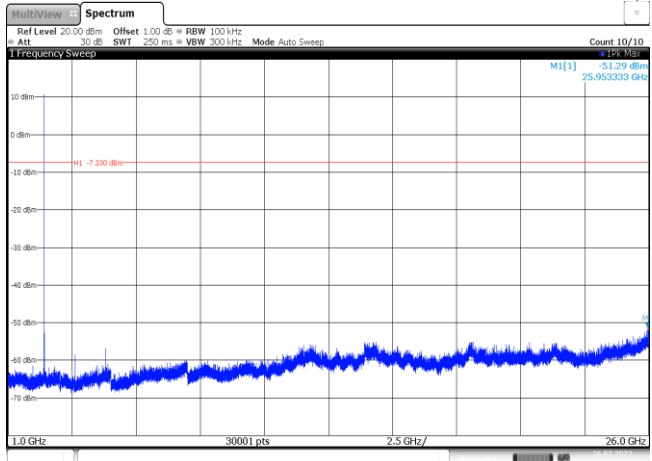


CH78  
30MHz~1000MHz

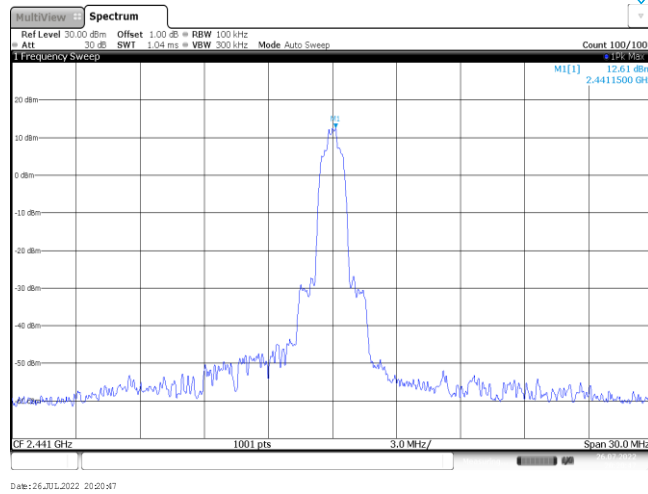


CH78  
1GHz~26GHz

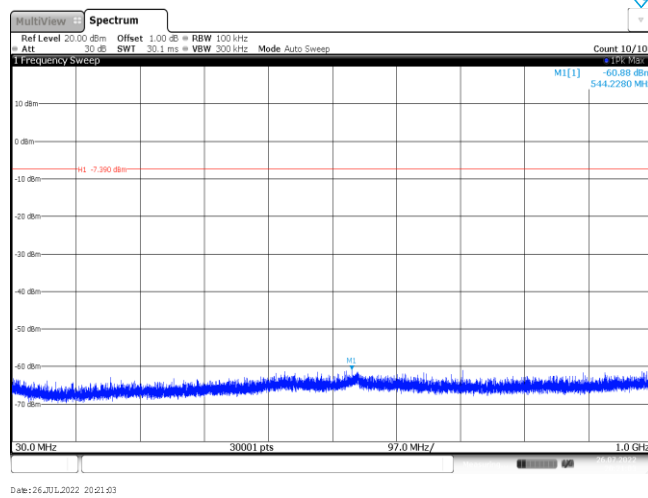


Test Item:	Spurious Emission	Modulation type:	π/4DQPSK
<p>CH00 Reference level</p>	 <p>MultiView Spectrum Ref Level 30.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWI 1.04 ms VBW 300 kHz Mode Auto Sweep Count 100/100 1 Frequency Sweep M1[1] 12.67 dBm 2.4018200 GHz CF 2.402 GHz 1001 pts 3.0 MHz/ Span 30.0 MHz Date: 26.JUL.2022 20:17:40</p>		
<p>CH00 30MHz~1000MHz</p>	 <p>MultiView Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWI 30.1 ms VBW 300 kHz Mode Auto Sweep Count 10/10 1 Frequency Sweep M1[1] -60.84 dBm 794.2210 MHz M1 -7.330 dBm 30.0 MHz 30001 pts 97.0 MHz/ 1.0 GHz Date: 26.JUL.2022 20:17:56</p>		
<p>CH00 1GHz~26GHz</p>	 <p>MultiView Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWI 250 ms VBW 300 kHz Mode Auto Sweep Count 10/10 1 Frequency Sweep M1[1] -61.23 dBm 25.953333 GHz M1 -7.330 dBm 1.0 GHz 30001 pts 2.5 GHz/ 26.0 GHz Date: 26.JUL.2022 20:18:12</p>		

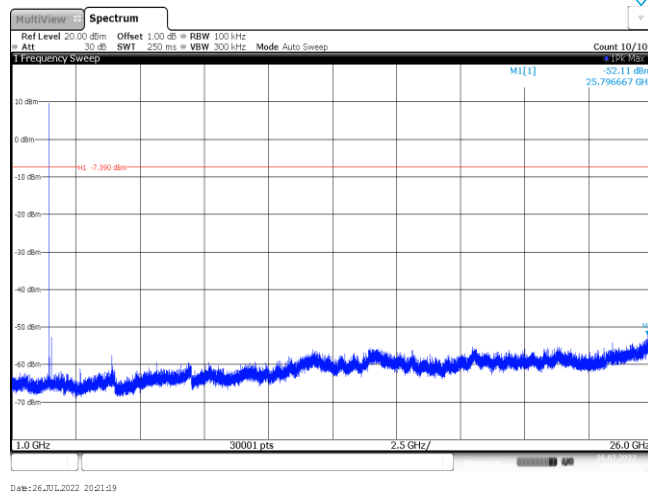
CH39  
Reference level



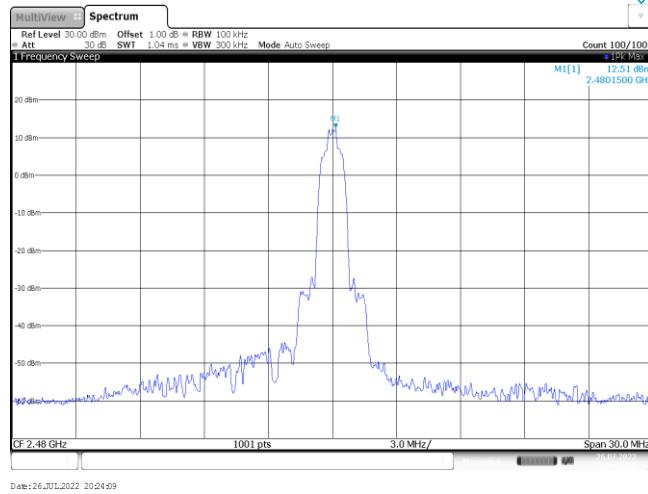
CH39  
30MHz~1000MHz



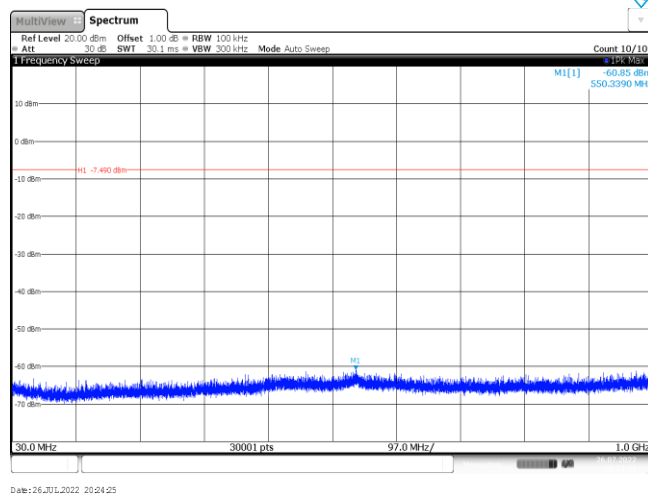
CH39  
1GHz~26GHz



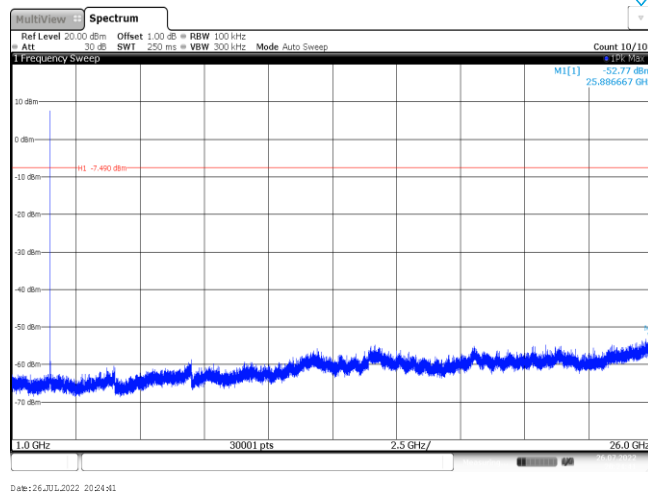
CH78  
Reference level

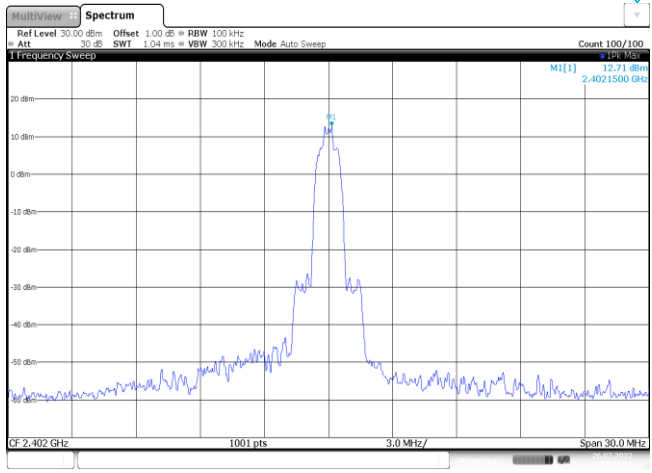
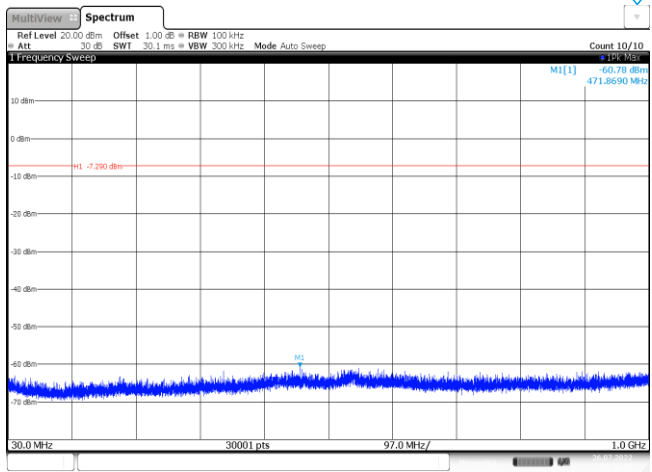
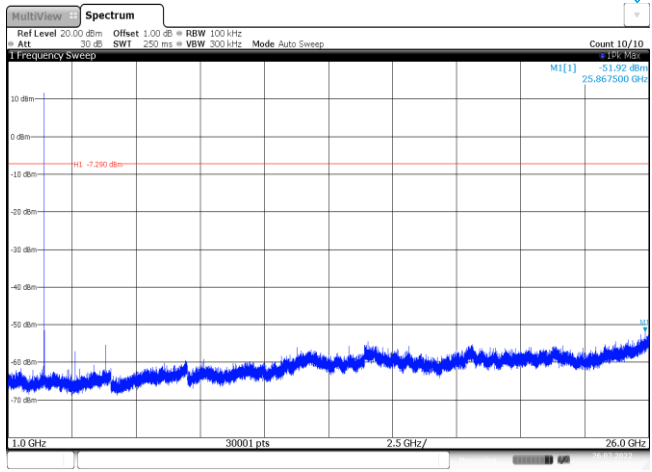


CH78  
30MHz~1000MHz

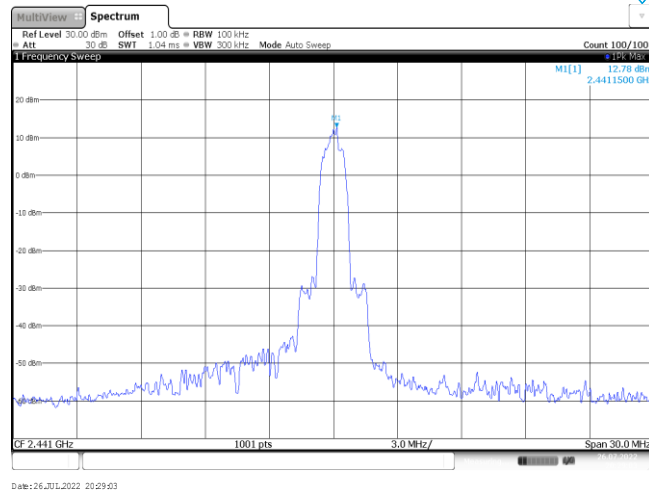


CH78  
1GHz~26GHz

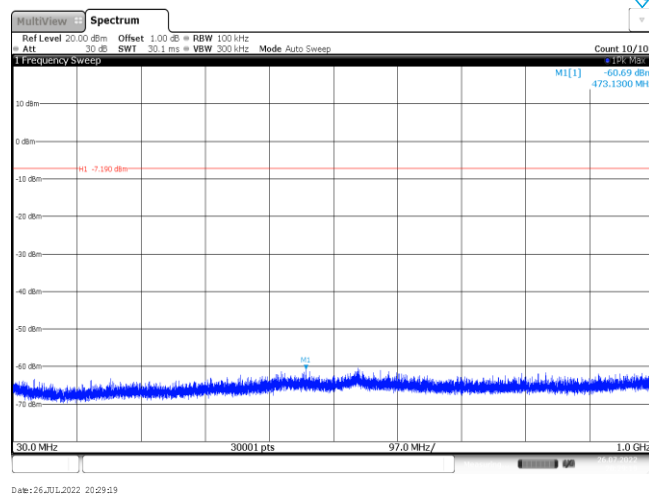


Test Item:	Spurious Emission	Modulation type:	8DPSK
<p>CH00 Reference level</p>	 <p>Date: 26.JUL.2022 20:26:39</p>		
<p>CH00 30MHz~1000MHz</p>	 <p>Date: 26.JUL.2022 20:26:35</p>		
<p>CH00 1GHz~26GHz</p>	 <p>Date: 26.JUL.2022 20:26:51</p>		

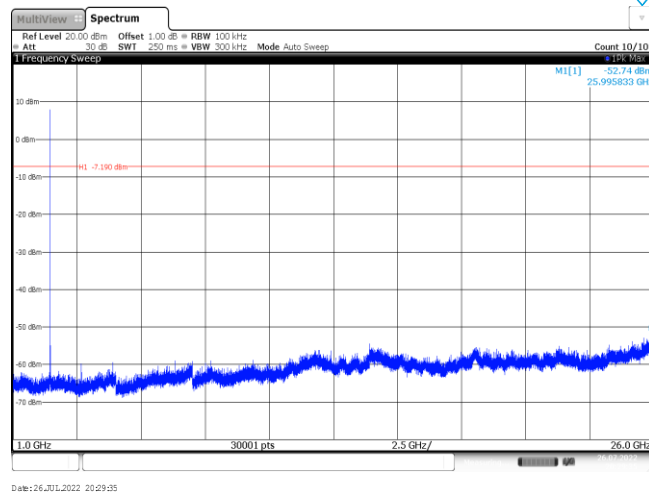
CH39  
Reference level



CH39  
30MHz~1000MHz

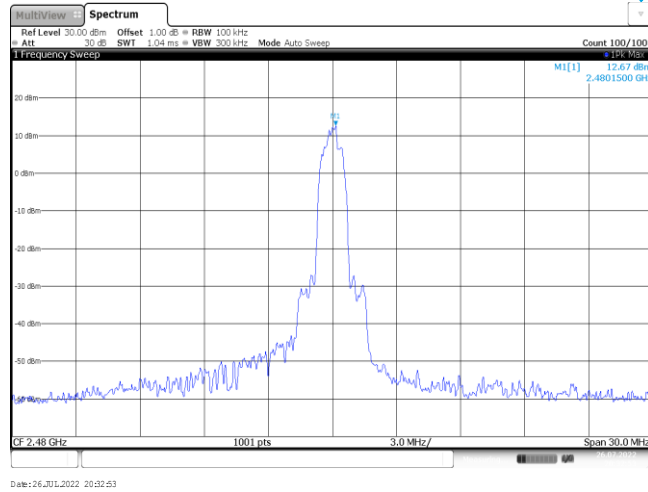


CH39  
1GHz~26GHz

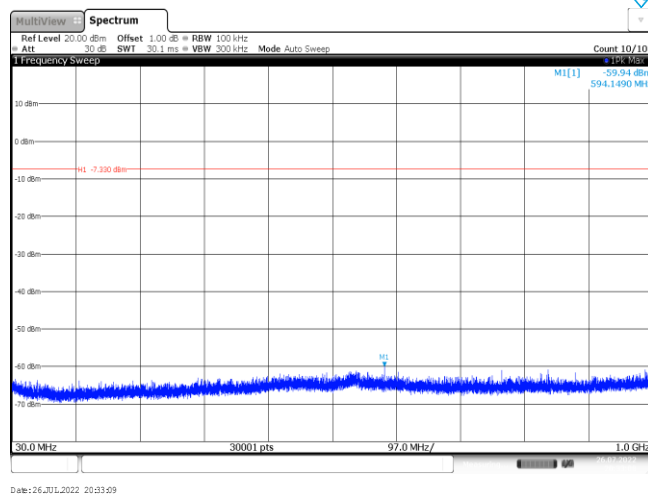




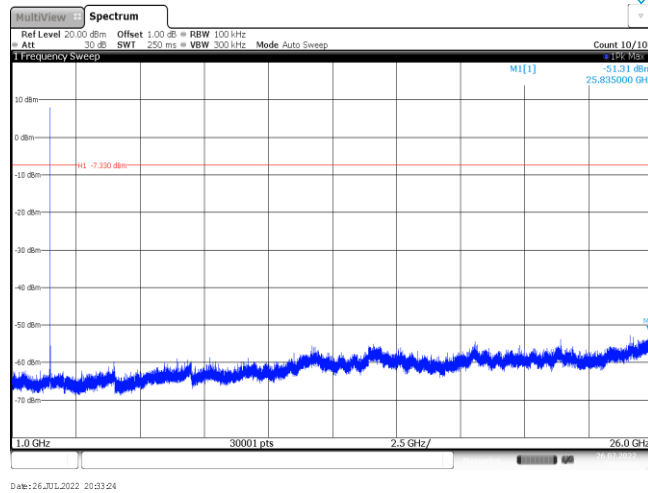
CH78  
Reference level



CH78  
30MHz~1000MHz



CH78  
1GHz~26GHz



-----End of Report-----