

# APPENDIX REPORT

Project No.	SHT2207065102EW	Radio Specification	Bluetooth EDR
Test sample No.	YPHT22070651006	Model No.	P280
Start test date	2022-07-26	Finish date	2022-07-26
Temperature	25.4℃	Humidity	36%
Test Engineer	Xiaoxiao Li	Auditor	Xiaodong Zhe

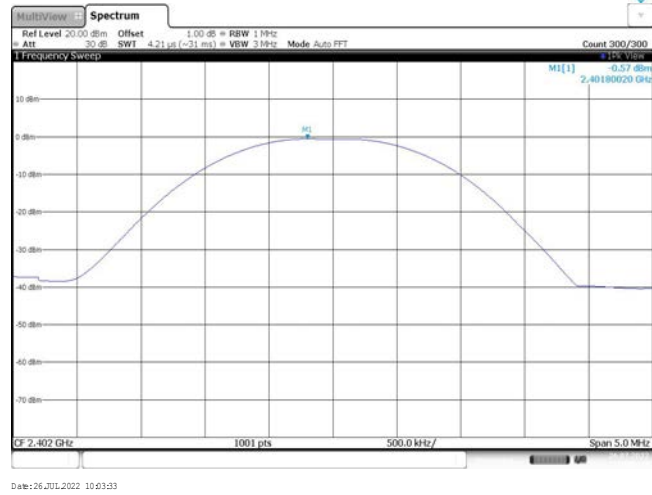
Appendix clause	Test item	Result
A	Peak Output Power	PASS
B	20 dB Bandwidth	PASS
C	99% Occupied Bandwidth	PASS
D	Carrier Frequencies Separation	PASS
E	Hopping Channel Number	PASS
F	Dwell Time	PASS
G	Duty Cycle Correction Factor (DCCF)	PASS
H	Band edge and Spurious Emissions(coducted)	PASS

**Appendix A: Peak Output Power**

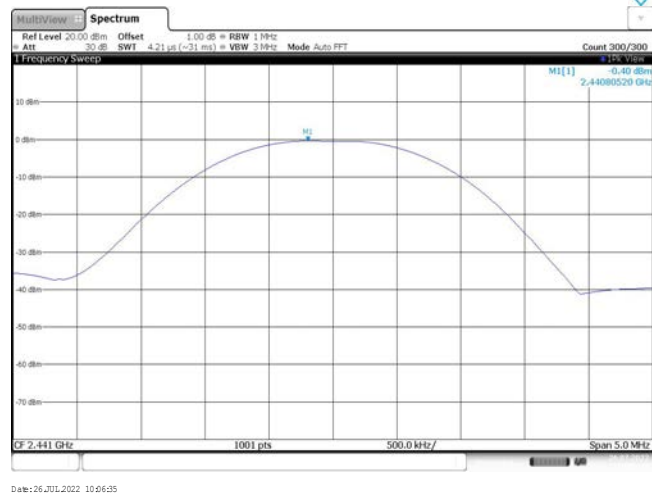
Modulation type	Channel	Peak Output power (dBm)	Average Output power (dBm)	Limit (dBm)	Result
GFSK	00	-0.57	-0.60	≤ 30.00	Pass
	39	-0.40	-0.41		
	78	-0.63	-0.65		
π/4DQPSK	00	0.42	-0.05	≤ 21.00	Pass
	39	0.50	0.05		
	78	0.25	-0.22		
8DPSK	00	0.78	0.19	≤ 21.00	Pass
	39	0.90	0.31		
	78	0.62	0.02		

**Modulation Type: GFSK**

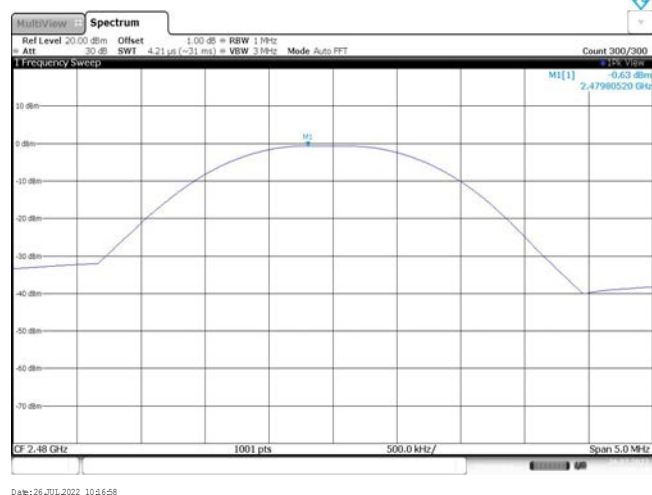
CH00



CH39

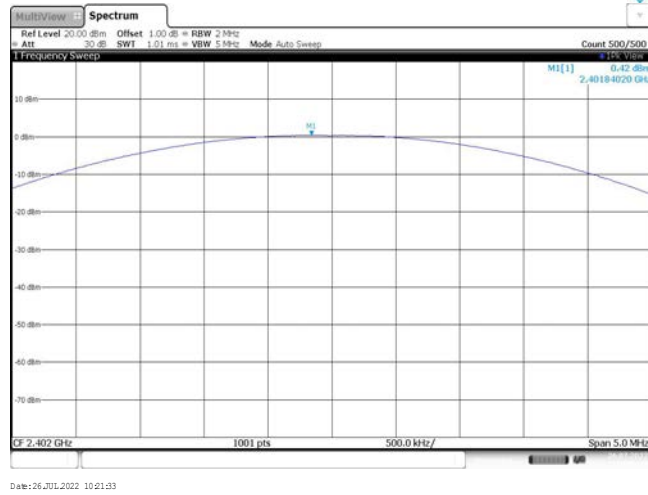


CH78

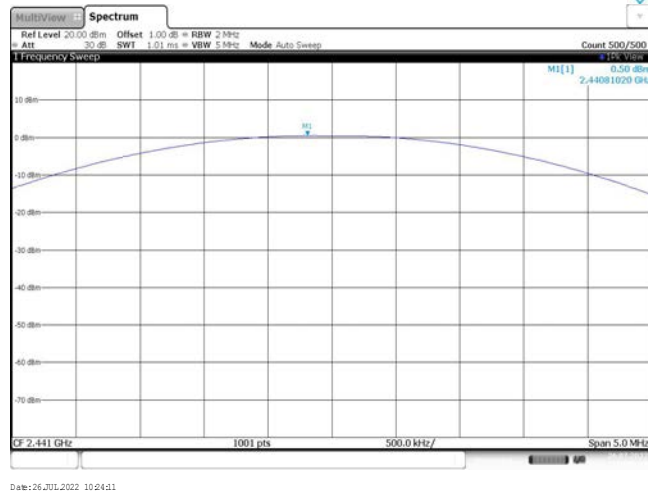


**Modulation Type:**  **$\pi/4$ DQPSK**

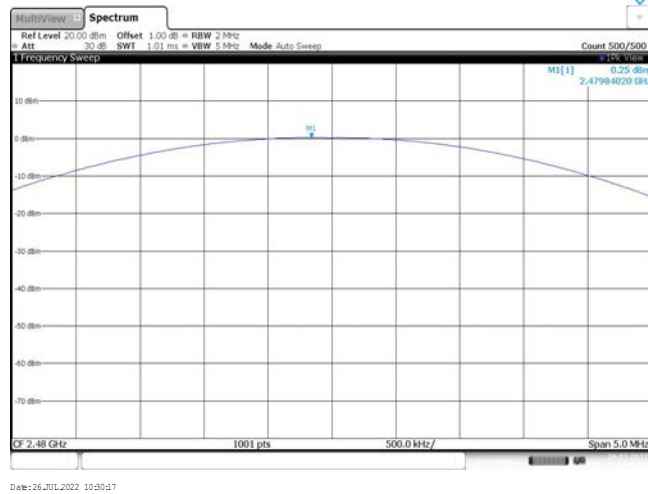
CH00



CH39



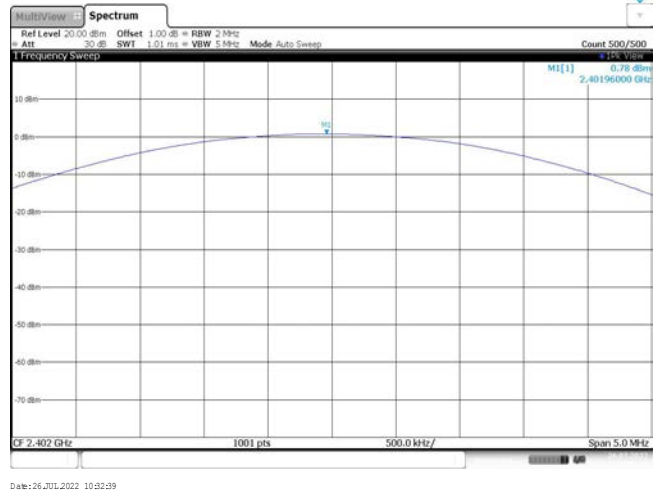
CH78



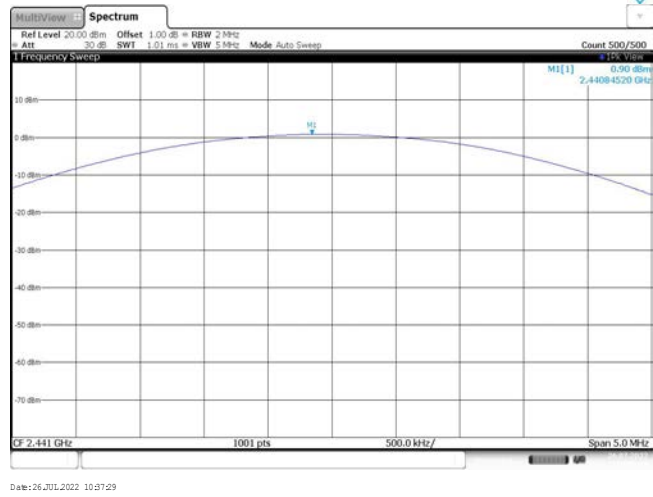
Modulation Type:

8DPSK

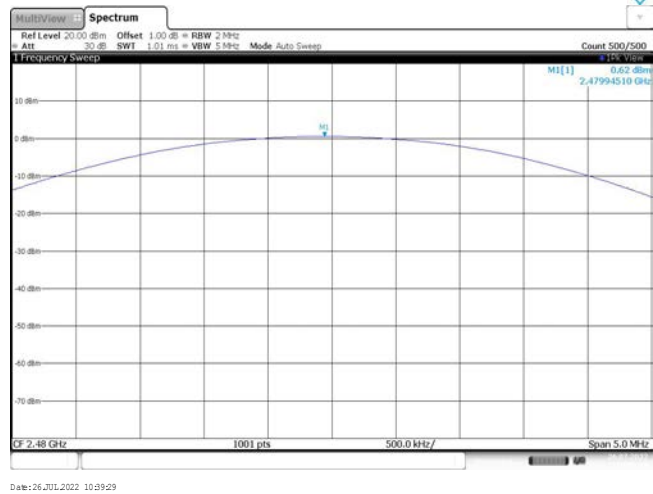
CH00



CH39



CH78



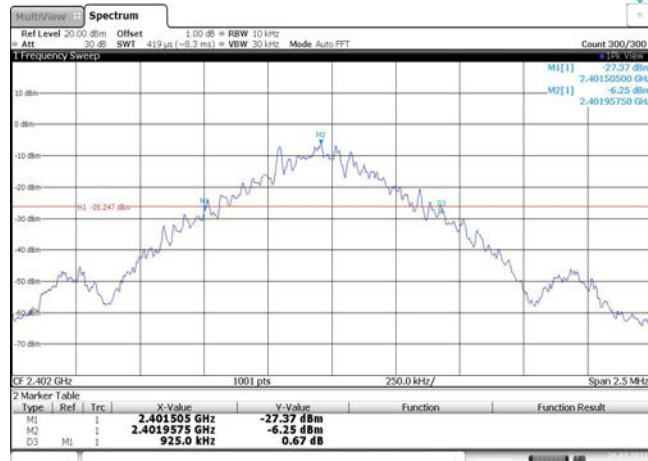
**Appendix B : 20 dB Bandwidth**

Modulation type	Channel	20 dB Bandwidth (kHz)	Limit (kHz)	Result
GFSK	00	925.00	-	Pass
	39	925.00		
	78	925.00		
$\pi/4$ DQPSK	00	1325.00	-	Pass
	39	1322.50		
	78	1320.00		
8DPSK	00	1300.00	-	Pass
	39	1310.00		
	78	1307.50		

**Modulation Type:**

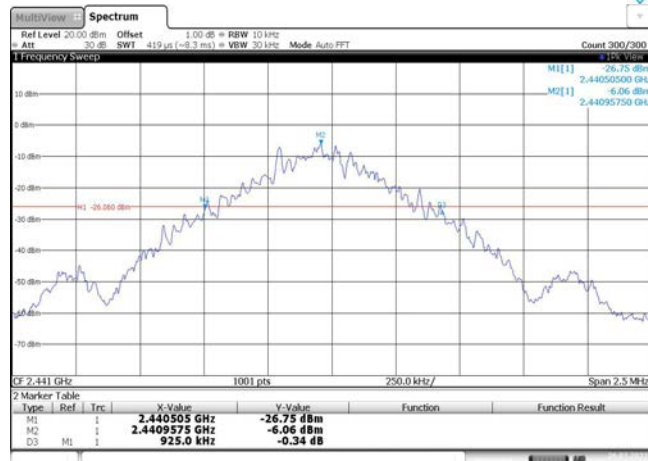
**GFSK**

CH00



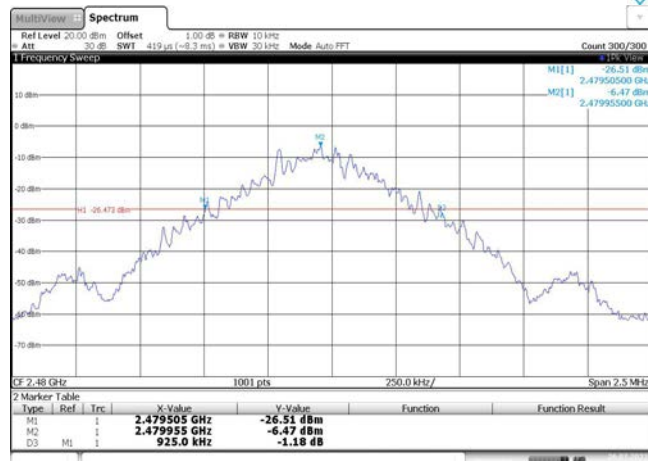
Date: 26.JUL.2022 10:33:5

CH39



Date: 26.JUL.2022 10:06:6

CH78



Date: 26.JUL.2022 10:33:9

**Modulation Type:**

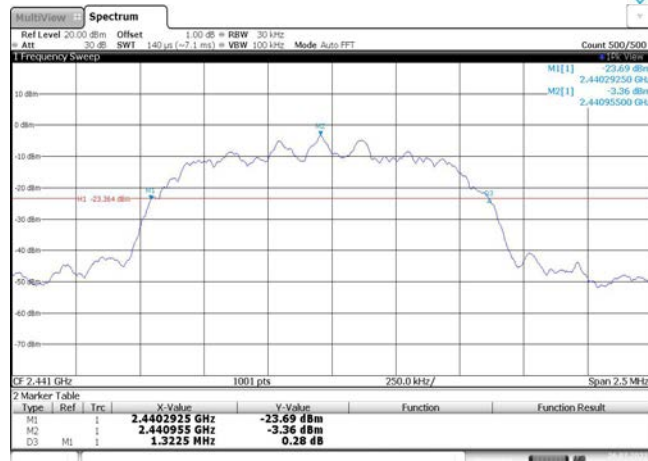
**$\pi/4$ DQPSK**

CH00



Date:26.JUL.2022 10:21:15

CH39



Date:26.JUL.2022 10:23:53

CH78



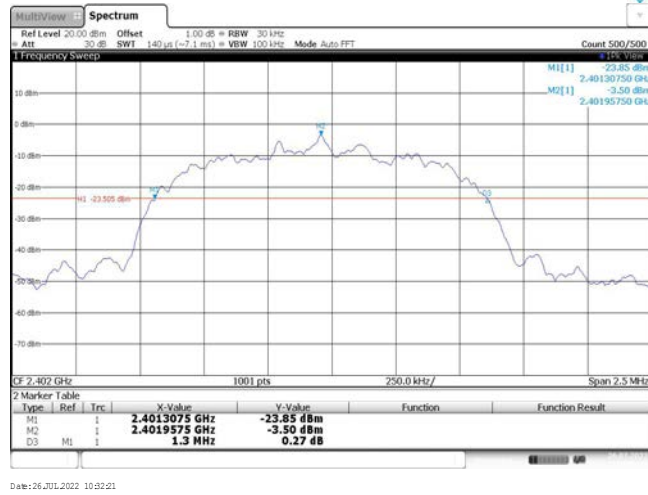
Date:26.JUL.2022 10:29:59



**Modulation Type:**

**8DPSK**

CH00



CH39



CH78



**Appendix C: 99% Occupied Bandwidth**

Modulation type	Channel	99% Occupied Bandwidth (MHz)	Limit (MHz)	Result
GFSK	00	0.87	-	Pass
	39	0.87		
	78	0.87		
$\pi/4$ DQPSK	00	1.18	-	Pass
	39	1.18		
	78	1.18		
8DPSK	00	1.19	-	Pass
	39	1.19		
	78	1.18		

**Modulation Type: GFSK**

CH00



Date: 26.7.2022 10:53:24

CH39



Date: 26.7.2022 10:56:25

CH78



Date: 26.7.2022 10:53:28

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

CH00



Date: 26.7.2022 10:21:24

CH39



Date: 26.7.2022 10:24:02

CH78



Date: 26.7.2022 10:30:08

**Modulation Type: 8DPSK**

CH00



Date: 26.7.2022 10:32:30

CH39



Date: 26.7.2022 10:37:19

CH78



Date: 26.7.2022 10:39:19

**Appendix D: Carrier Frequencies Separation**

Modulation type	Channel	Carrier Frequencies Separation (MHz)	Limit (kHz) *	Result
GFSK	39	1.00	≥925.00	Pass
π/4DQPSK	39	1.00	≥833.33	Pass
8DPSK	39	1.00	≥873.33	Pass

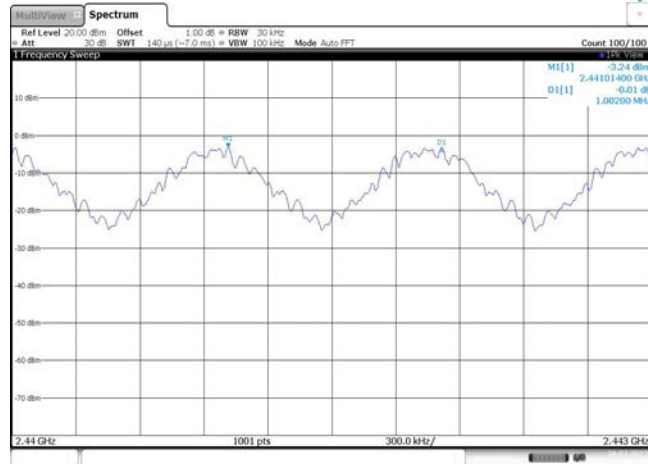
**Note:**

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

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

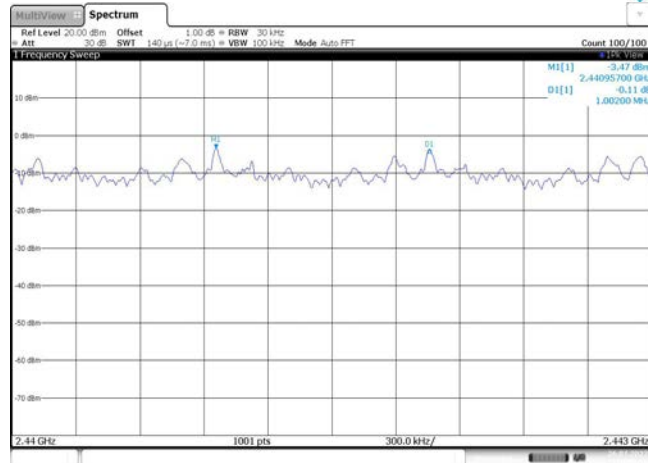
8DPSK limit = 2/3 \* The maximum 20 dB Bandwidth for 8DPSK modulation on the appendix B

GFSK



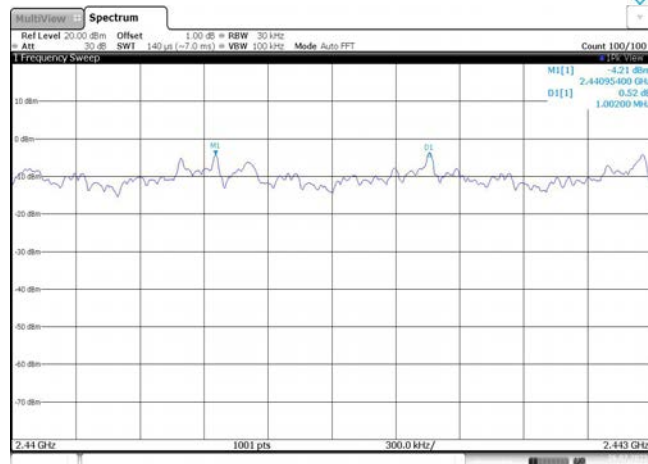
Date:26.JUL.2022 10:41:40

$\pi/4$ DQPSK



Date:26.JUL.2022 10:42:27

8DPSK



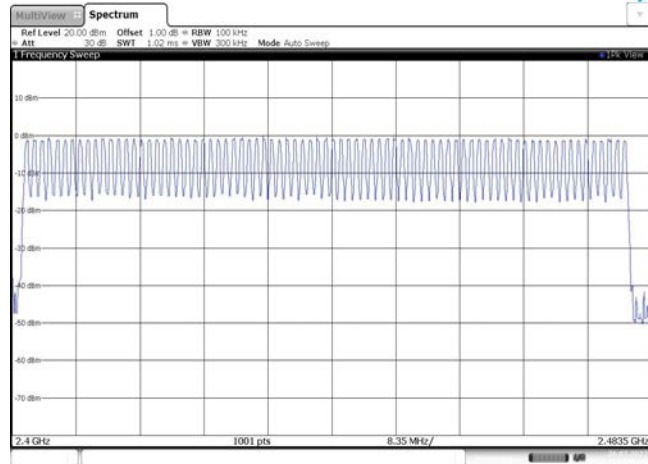
Date:26.JUL.2022 10:45:15

**Appendix E: Hopping Channel Number**

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

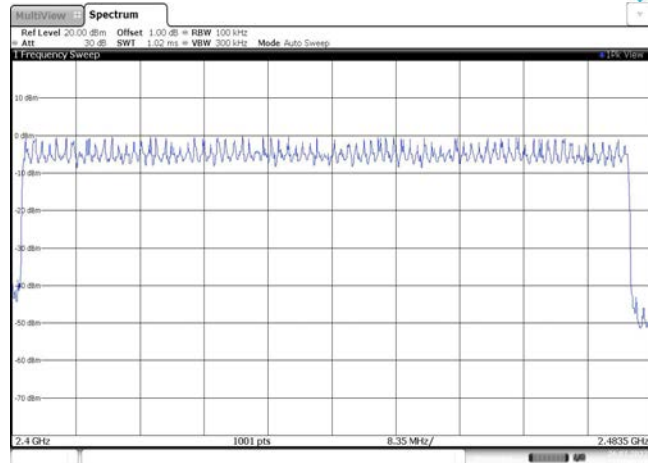


GFSK



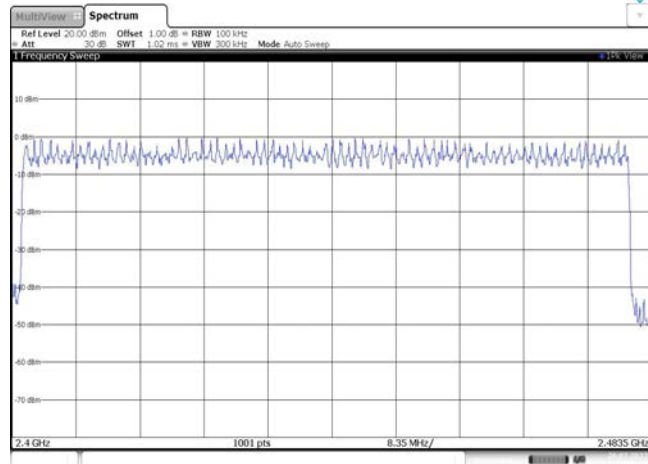
Date: 26.07.2022 10:46:44

$\pi/4$ DQPSK



Date: 26.07.2022 10:48:07

8DPSK



Date: 26.07.2022 10:49:54

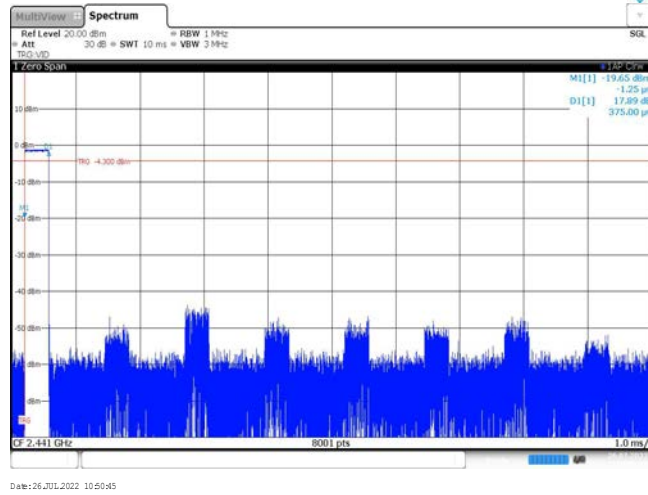
**Appendix F: Dwell Time**

Modulation type	Packet	Burst Width [ms]	Total Hops[hop*ch]	Dwell time (Second)	Limit (Second)	Result
GFSK	DH1	0.38	319	0.12	≤ 0.40	Pass
	DH3	1.63	154	0.25		
	DH5	2.88	117	0.34		
π/4DQPSK	2DH1	0.38	317	0.12	≤ 0.40	Pass
	2DH3	1.64	146	0.24		
	2DH5	2.89	112	0.32		
8DPSK	3DH1	0.38	318	0.12	≤ 0.40	Pass
	3DH3	1.64	155	0.25		
	3DH5	2.89	107	0.31		

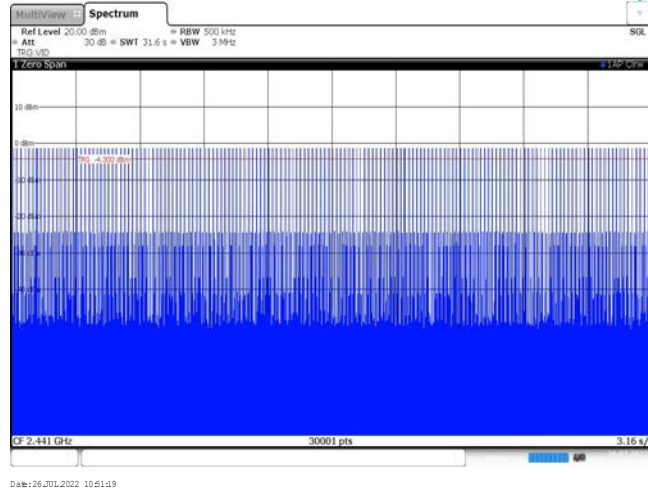
**Modulation Type:**

**GFSK**

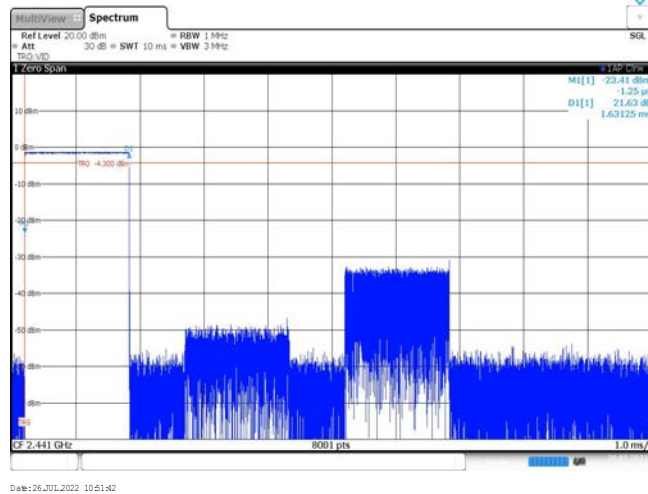
DH1  
Burst width



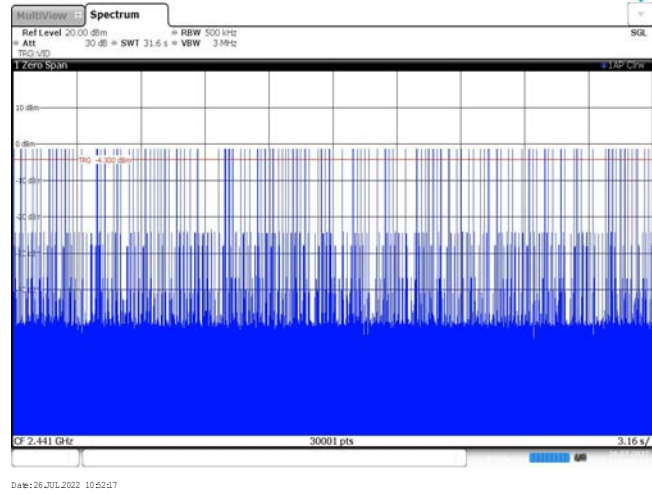
DH1  
Burst number



DH3  
Burst width

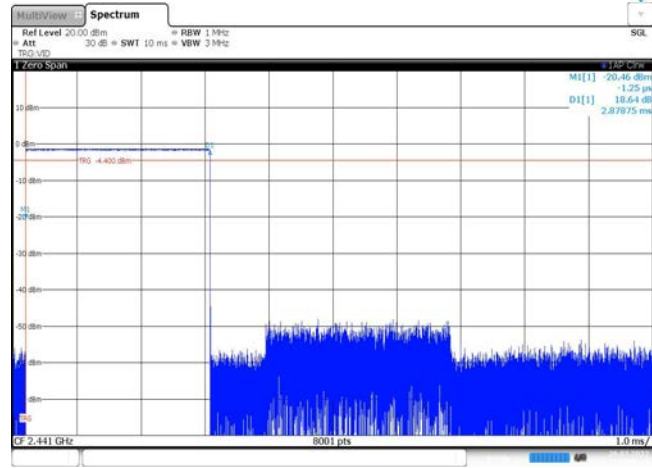


DH3  
Burst number



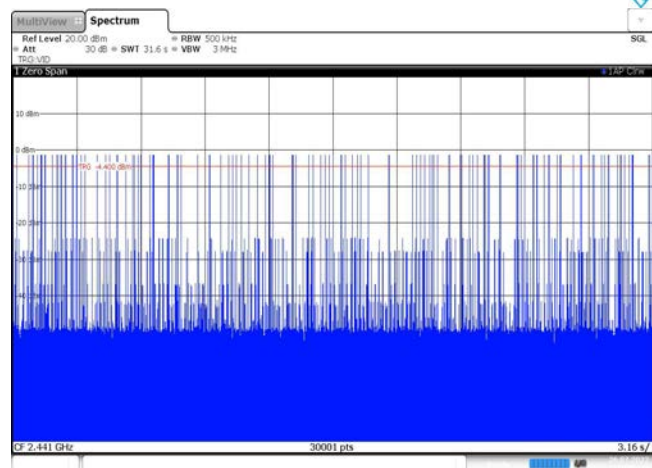
Date: 26 JUL 2022 10:52:17

DH5  
Burst width



Date: 26 JUL 2022 10:52:49

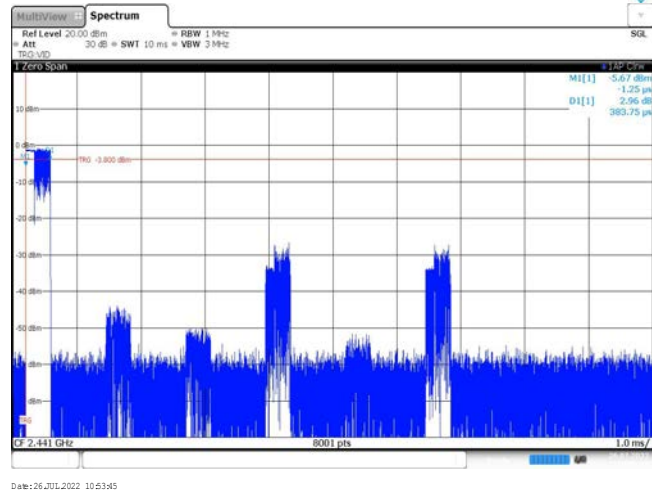
DH5  
Burst number



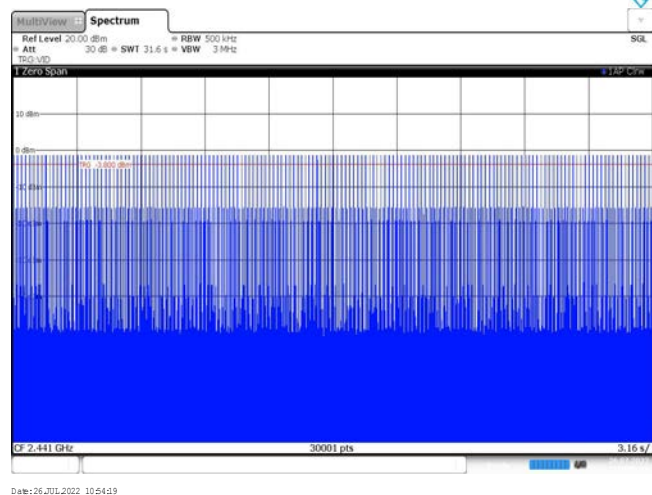
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**Modulation Type:**  $\pi/4$ DQPSK

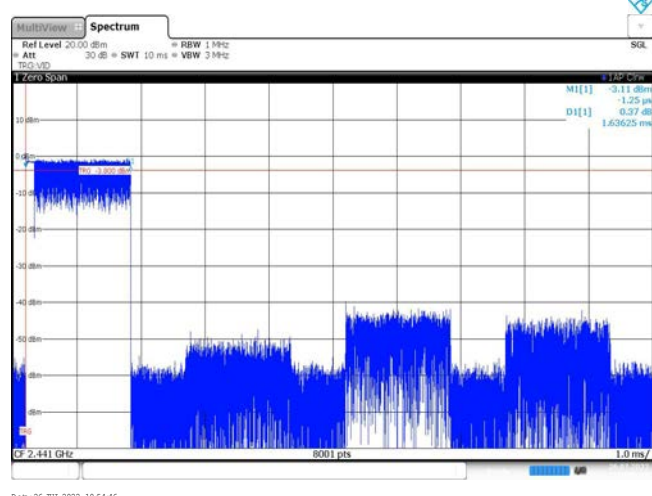
2DH1  
Burst width



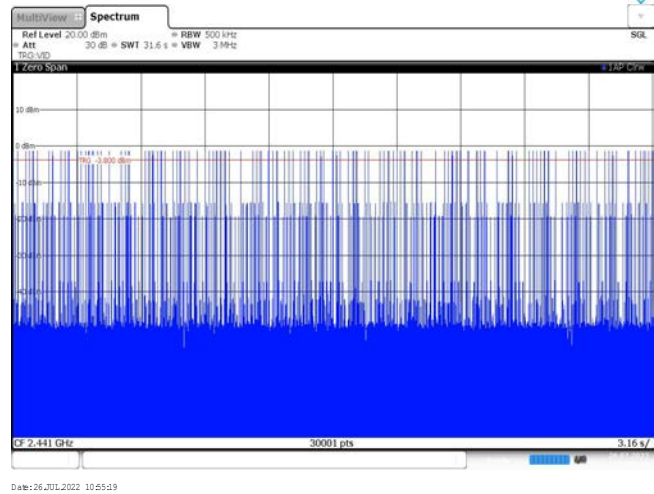
2DH1  
Burst number



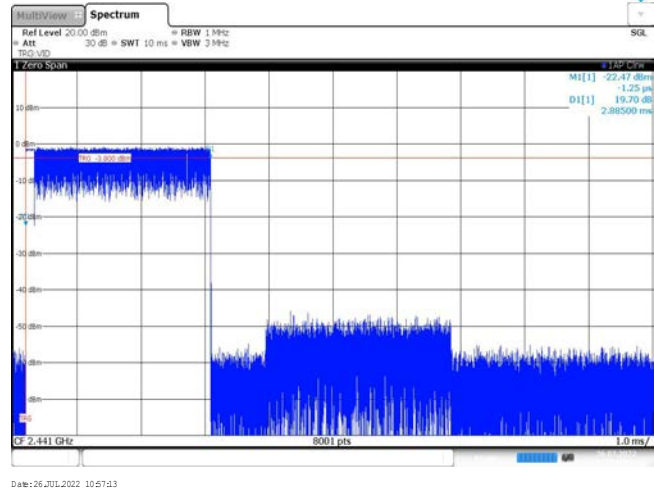
2DH3  
Burst width



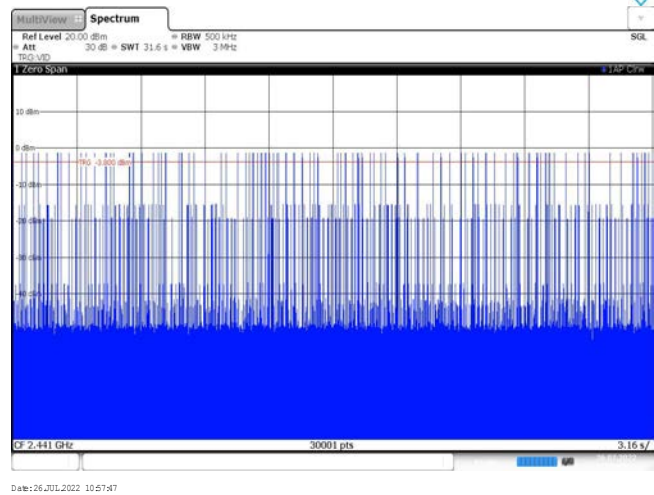
2DH3  
Burst number



2DH5  
Burst width

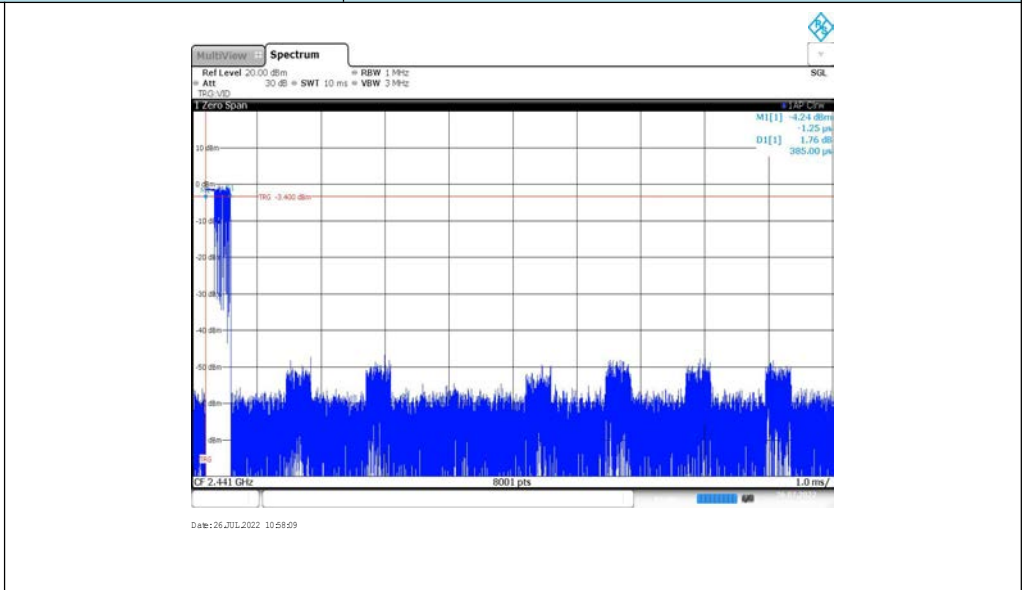


2DH5  
Burst number

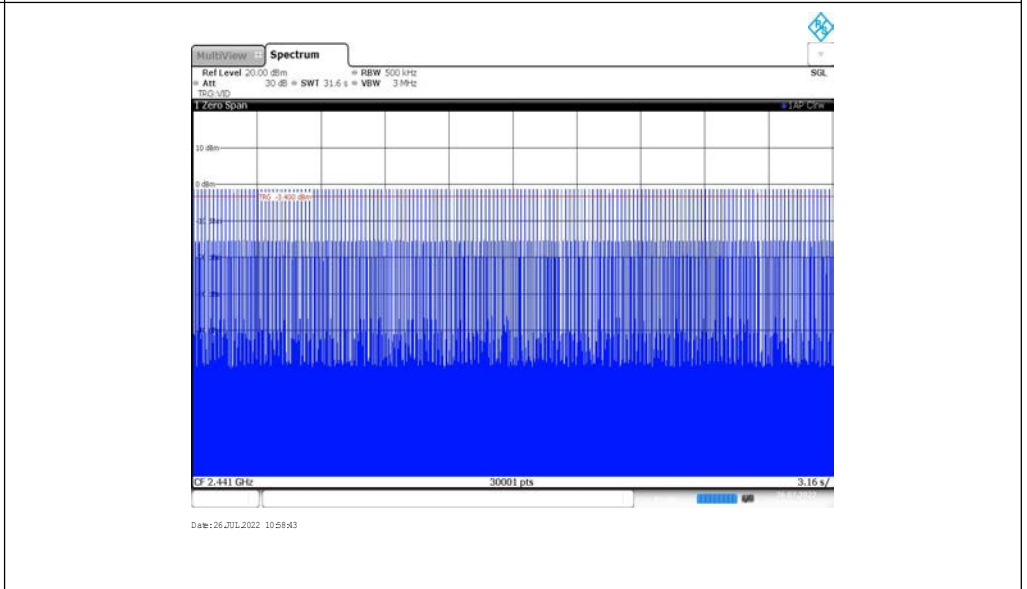


**Modulation Type: 8DPSK**

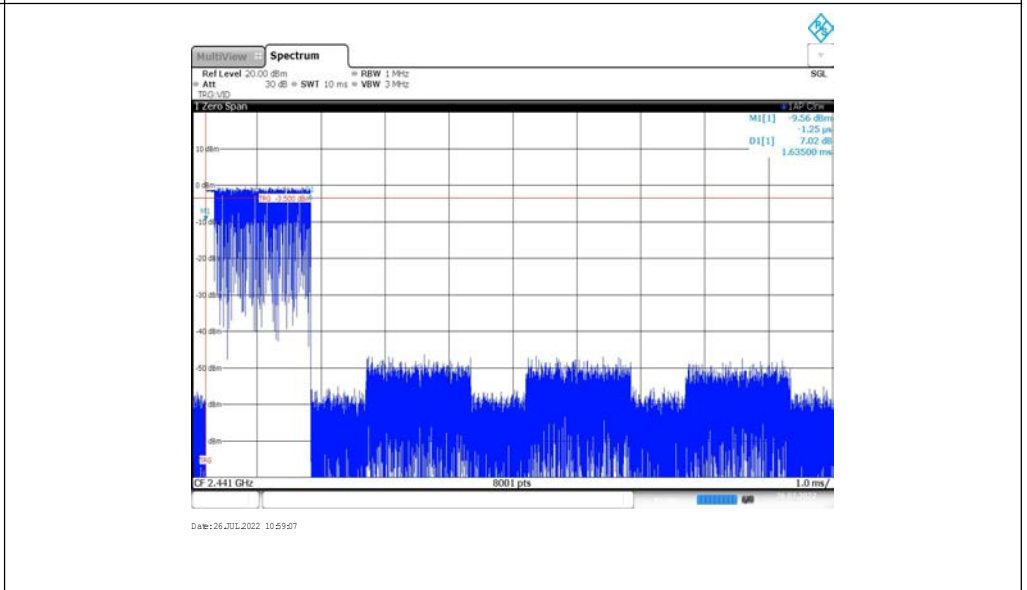
3DH1  
Burst width



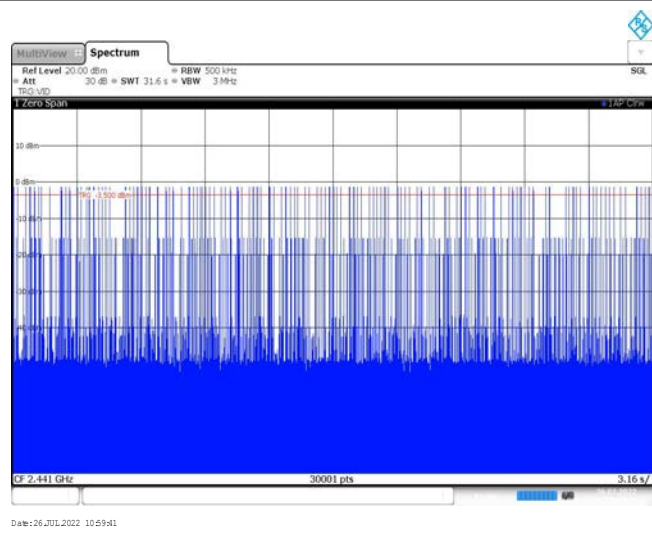
3DH1  
Burst number



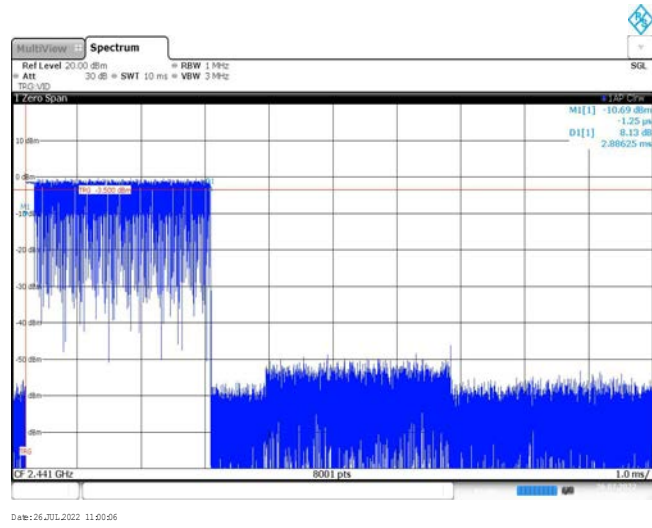
3DH3  
Burst width



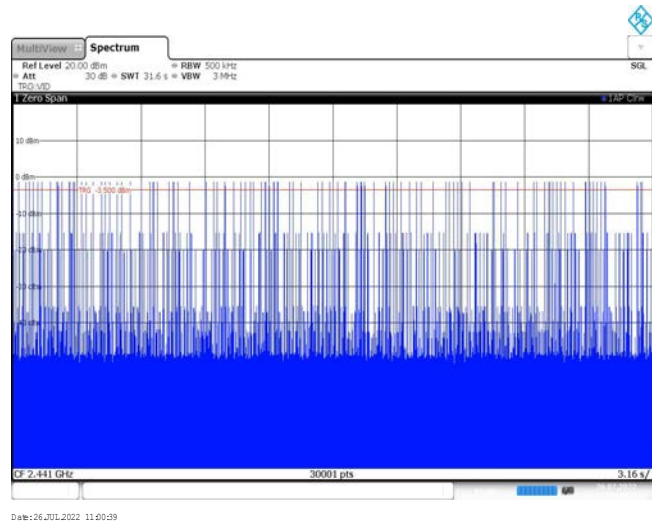
3DH3  
Burst number



3DH5  
Burst width



3DH5  
Burst number

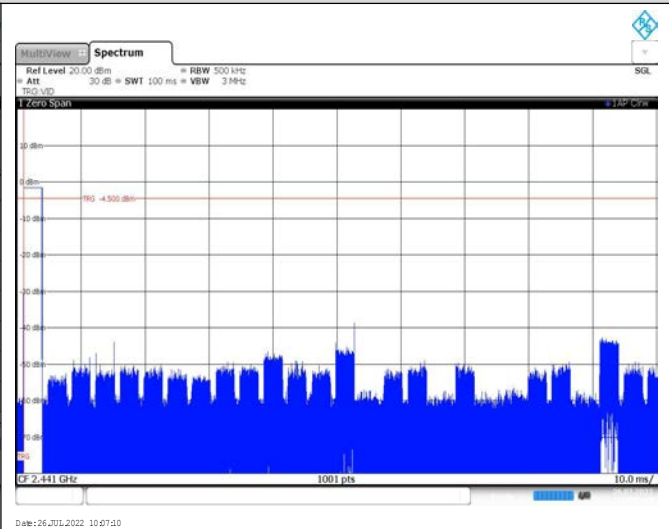
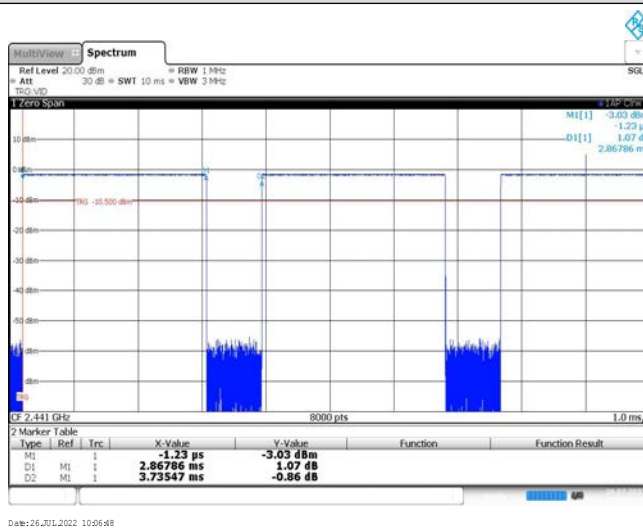




**Appendix G: Duty Cycle Correction Factor (DCCF)**

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	1	-30.84
$\pi/4$ DQPSK	2441	2.87	100	1	-30.84
8DPSK	2441	2.88	100	2	-24.79

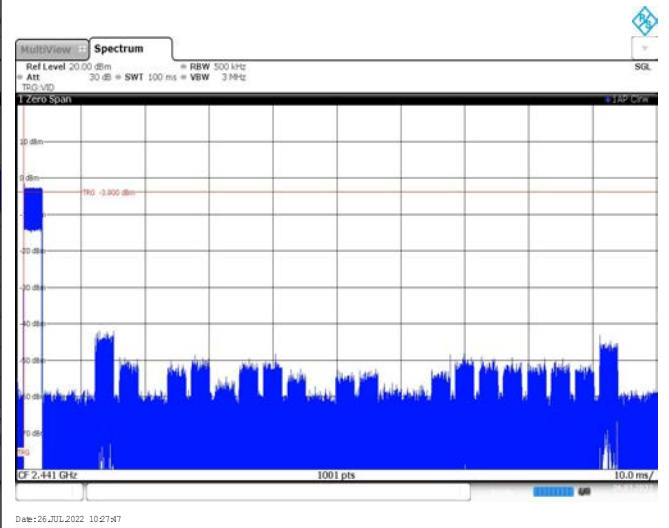
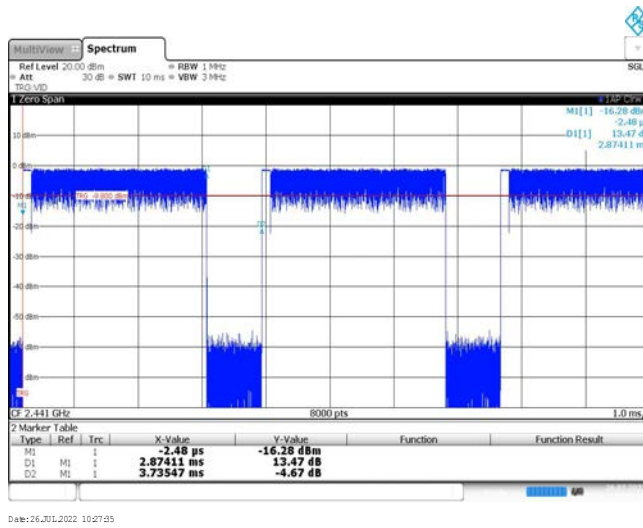
GFSK



Ton time for single burst

Burst Quantity

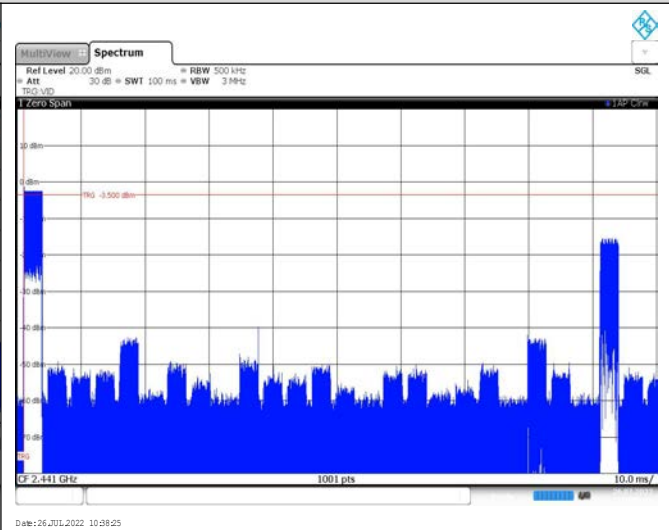
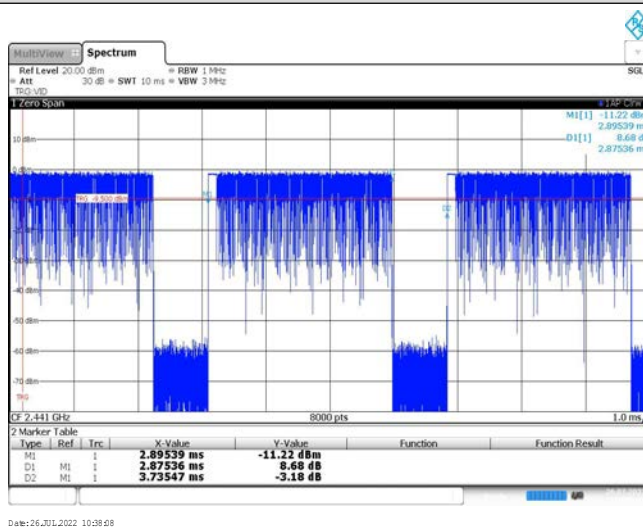
$\pi/4$  DQPSK



Ton time for single burst

Burst Quantity

8DPSK



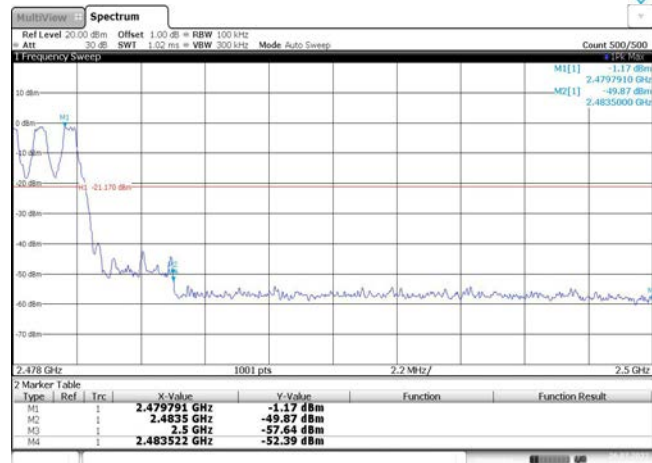
Ton time for single burst

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>			

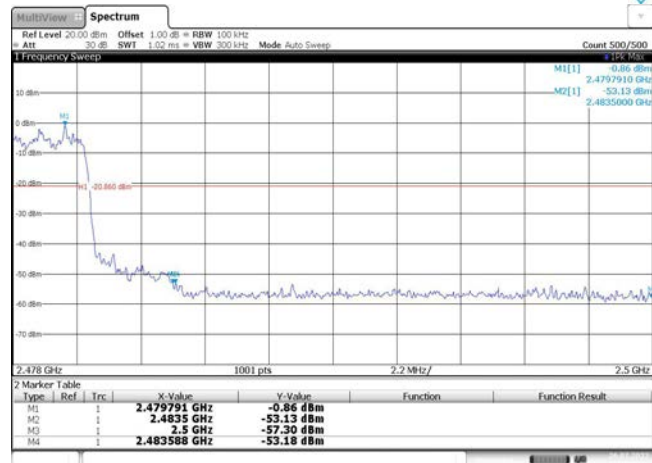
CH78  
Hopping mode



Date: 26 JUL 2022 10:47:13

Test Item:	Band edge	Modulation type:	$\pi/4$ DQPSK
<p>CH00 No hopping mode</p>	<p>Date: 26.JUL.2022 10:22:16</p>		
<p>CH00 Hopping mode</p>	<p>Date: 26.JUL.2022 10:49:21</p>		
<p>CH78 No hopping mode</p>	<p>Date: 26.JUL.2022 10:30:59</p>		

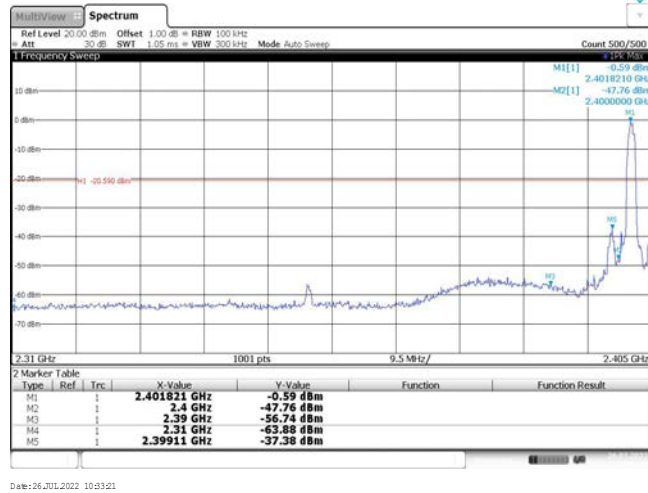
CH78  
Hopping mode



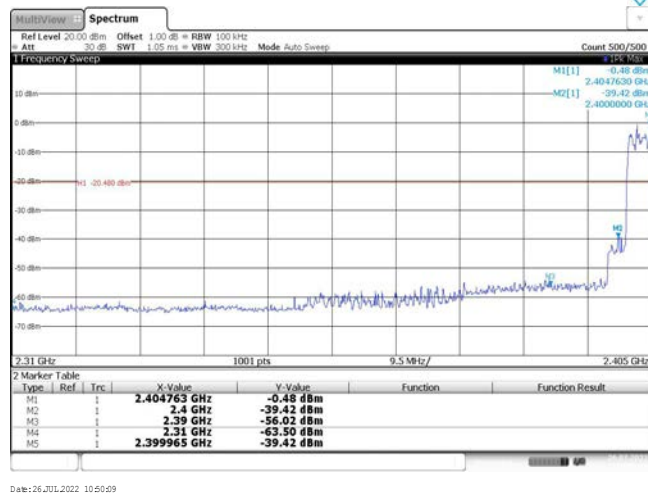
Date: 26 JUL 2022 10:48:36

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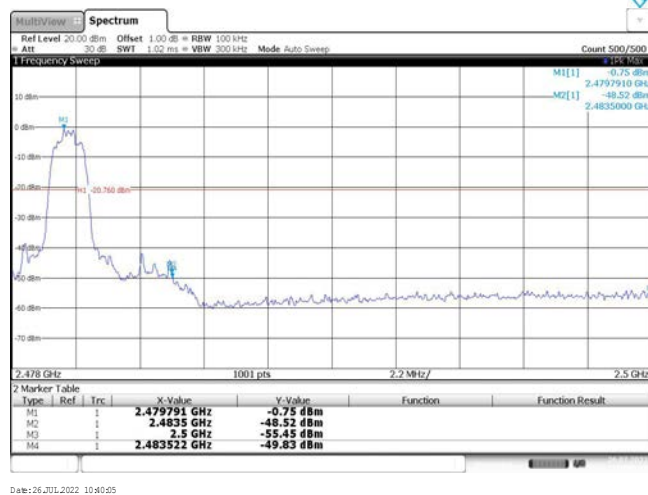
CH00  
No hopping mode



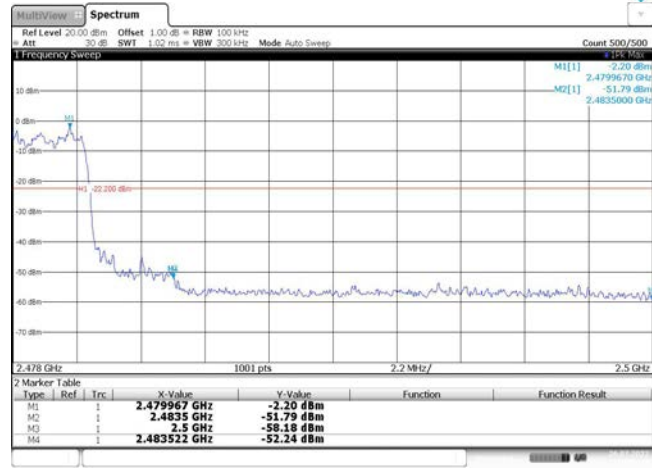
CH00  
Hopping mode



CH78  
No hopping mode

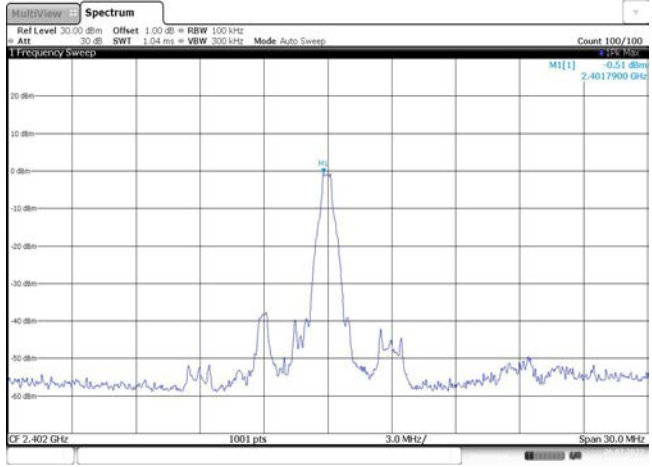
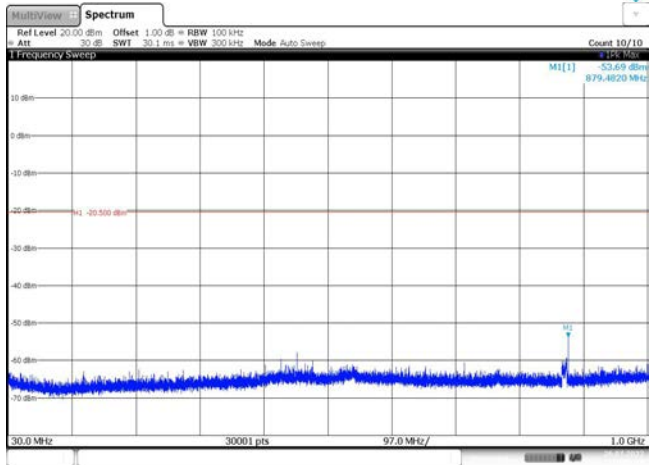
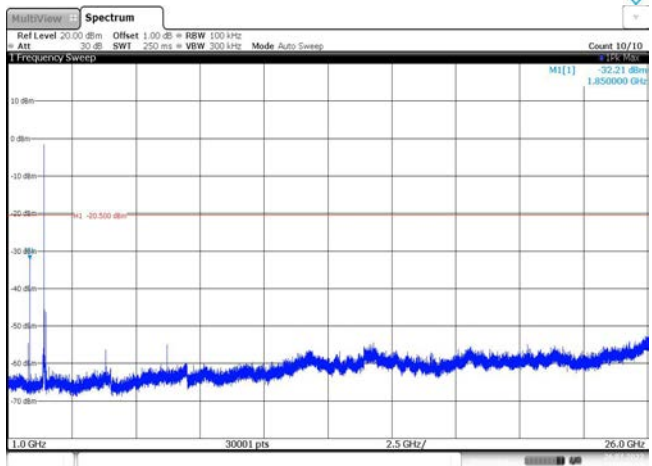


CH78  
Hoppig mode

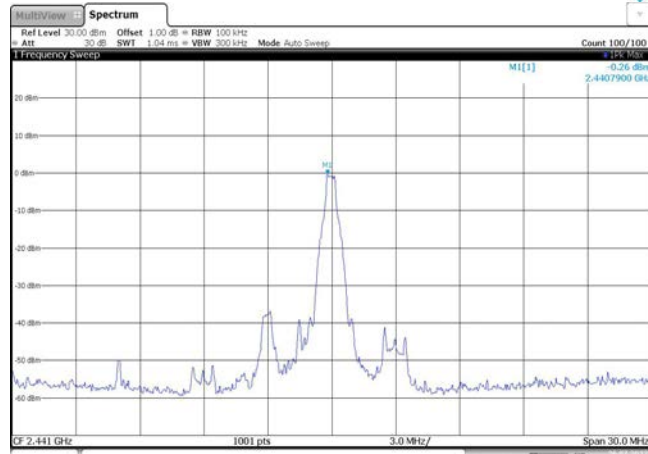


Date: 26 JUL 2022 10:50:23



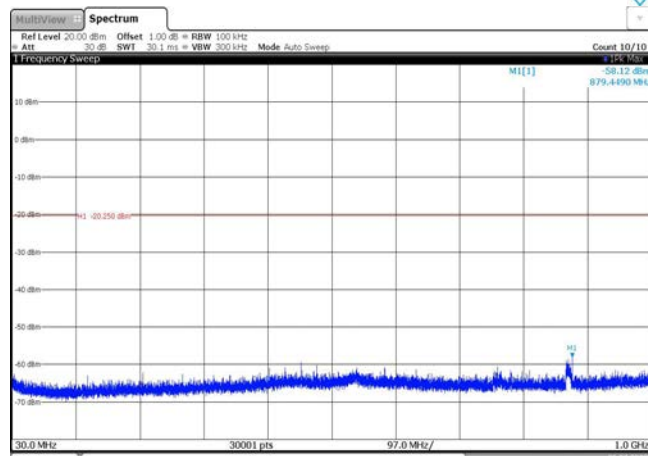
Test Item:	Spurious Emission	Modulation type:	GFSK
<p>CH00 Reference level</p>	 <p>MultiView Spectrum                      Ref Level 30.00 dBm Offset 1.00 dB BW 100 kHz                      Att 30 dB SWI 1.04 ms VBW 300 kHz Mode Auto Sweep                      Count 100/100                      Frequency Sweep                      MI[1] -0.51 dBm                      2.4017900 GHz                      CF 2.402 GHz 1001 pts 3.0 MHz/ Span 30.0 MHz                      Date: 26.JUL.2022 10:24:26</p>		
<p>CH00 30MHz~1000MHz</p>	 <p>MultiView Spectrum                      Ref Level 20.00 dBm Offset 1.00 dB BW 100 kHz                      Att 30 dB SWI 30.1 ms VBW 300 kHz Mode Auto Sweep                      Count 10/10                      Frequency Sweep                      MI[1] -32.69 dBm                      879.4620 MHz                      CF 30.0 MHz 30001 pts 97.0 MHz/ Span 1.0 GHz                      Date: 26.JUL.2022 10:24:42</p>		
<p>CH00 1GHz~26GHz</p>	 <p>MultiView Spectrum                      Ref Level 20.00 dBm Offset 1.00 dB BW 100 kHz                      Att 30 dB SWI 250 ms VBW 300 kHz Mode Auto Sweep                      Count 10/10                      Frequency Sweep                      MI[1] -32.21 dBm                      1.850000 GHz                      CF 1.0 GHz 30001 pts 2.5 GHz/ Span 26.0 GHz                      Date: 26.JUL.2022 10:24:59</p>		

CH39  
Reference level



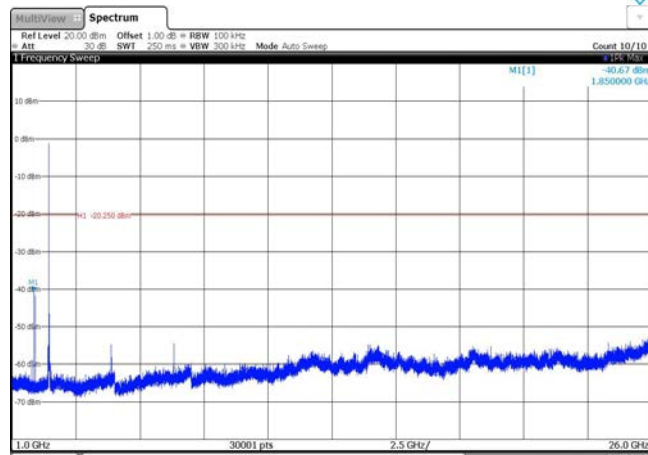
Date:26.JUL.2022 10:10:23

CH39  
30MHz~1000MHz



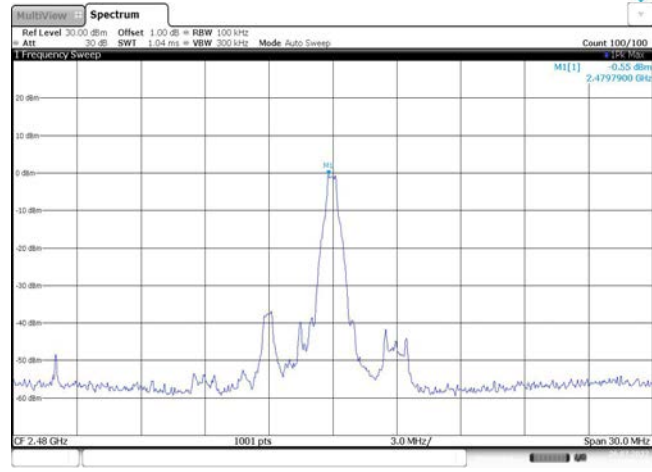
Date:26.JUL.2022 10:10:39

CH39  
1GHz~26GHz

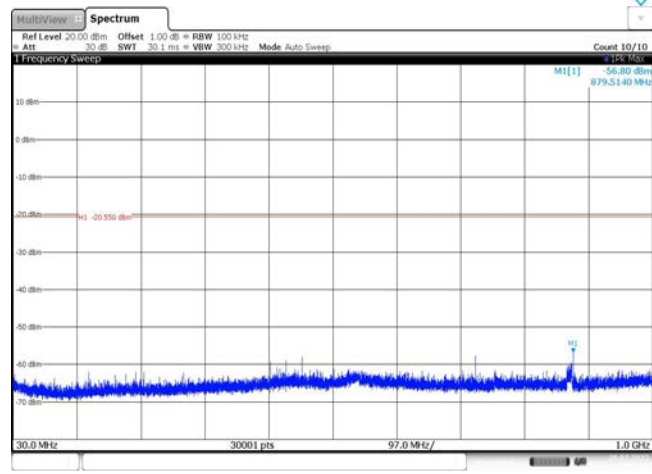


Date:26.JUL.2022 10:10:56

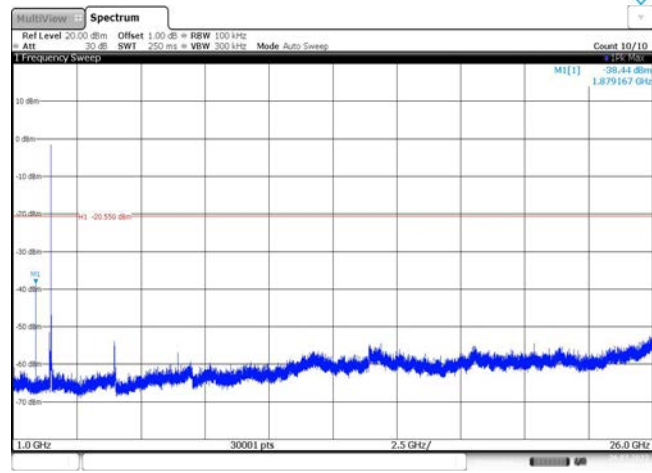
CH78  
Reference level

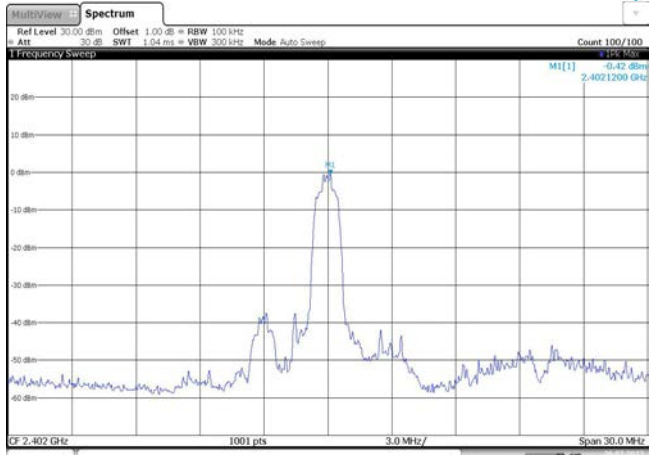
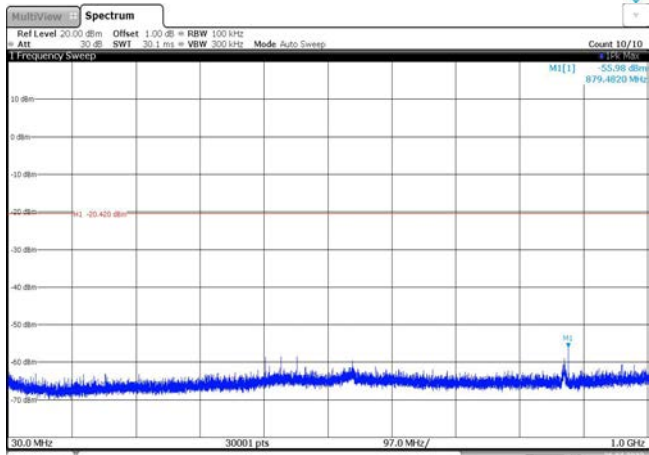
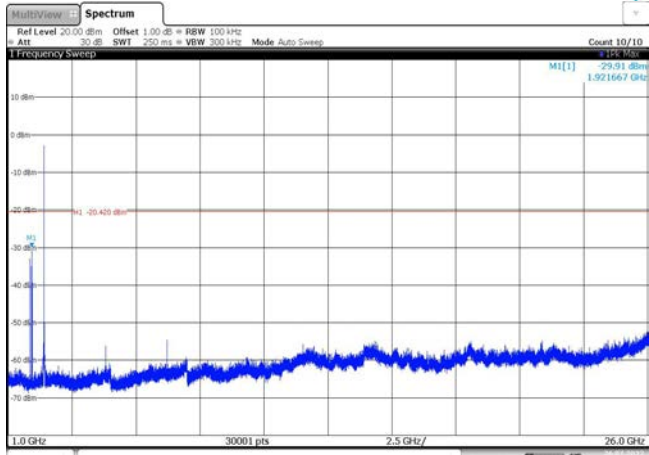


CH78  
30MHz~1000MHz

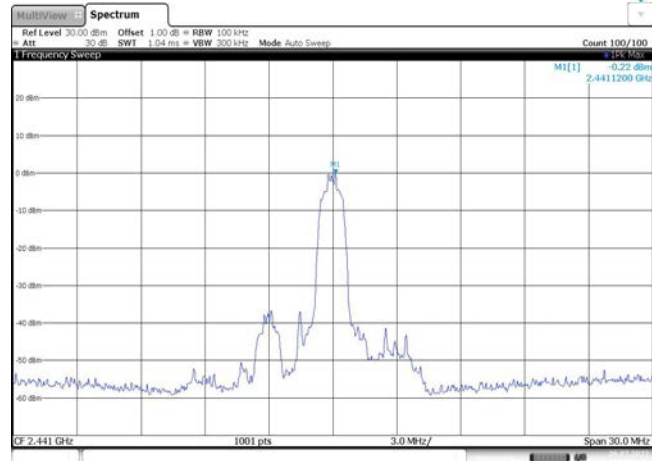


CH78  
1GHz~26GHz

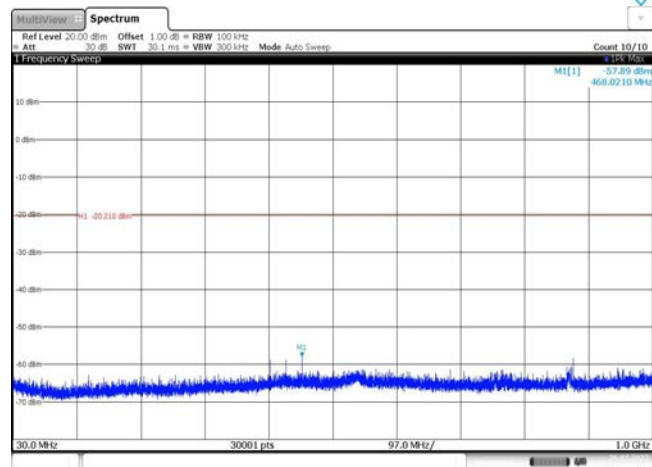


Test Item:	Spurious Emission	Modulation type:	$\pi/4$ DQPSK
<p>CH00 Reference level</p>	 <p>MultiView Spectrum Ref Level 30.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWI 1.04 ms VBW 300 kHz Mode Auto Sweep Count 100/100 M1[1] -0.43 dBm 2.4021200 GHz Frequency Sweep CF 2.402 GHz 1001 pts 3.0 MHz/ Span 30.0 MHz Date: 26.7.2022 10:22:24</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 M1[1] -55.98 dBm 879.4820 MHz Frequency Sweep 30.0 MHz 30001 pts 97.0 MHz/ 1.0 GHz Date: 26.7.2022 10:22:40</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 M1[1] -23.93 dBm 1.921667 GHz Frequency Sweep 1.0 GHz 30001 pts 2.5 GHz/ 26.0 GHz Date: 26.7.2022 10:22:57</p>		

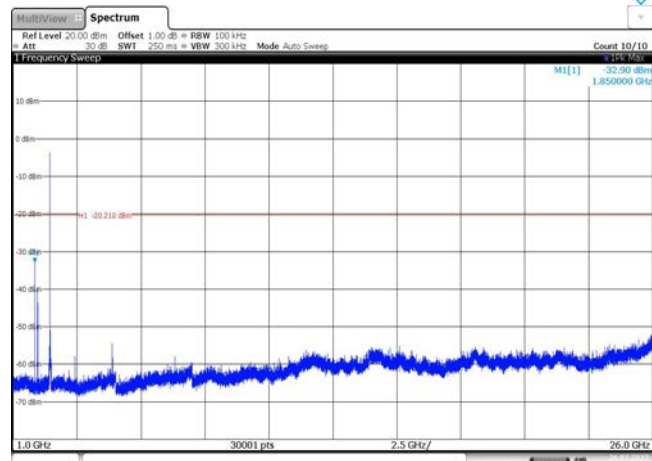
CH39  
Reference level



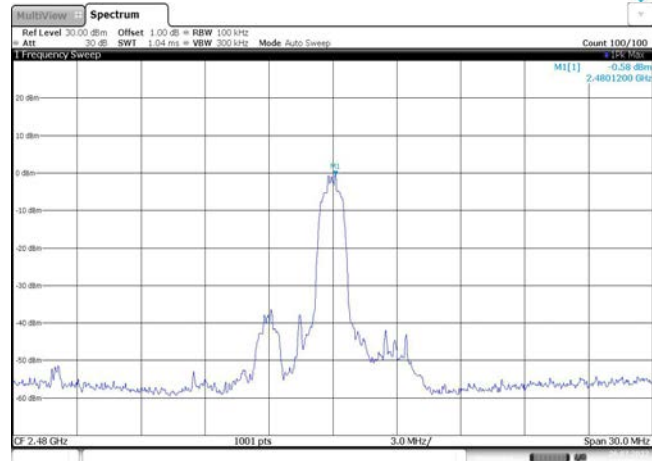
CH39  
30MHz~1000MHz



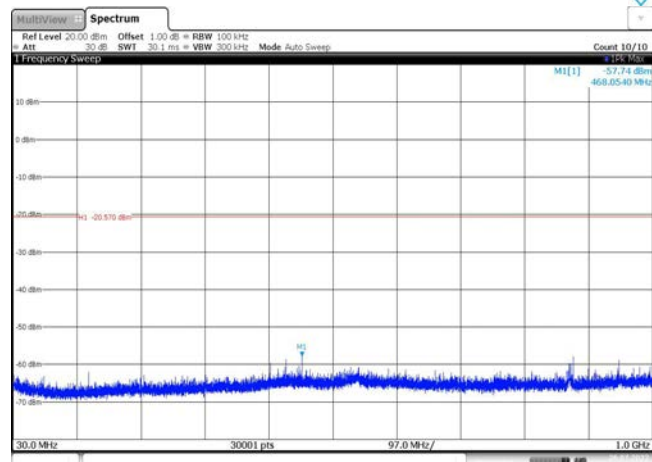
CH39  
1GHz~26GHz



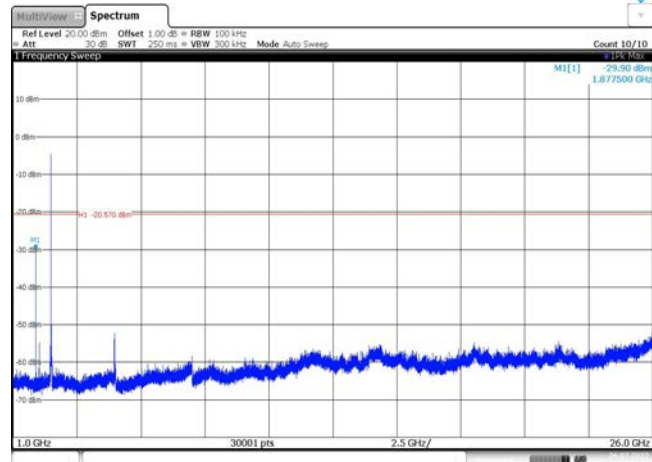
CH78  
Reference level

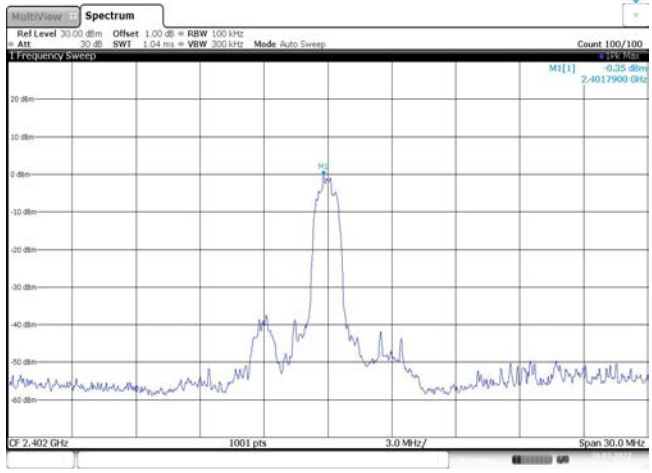
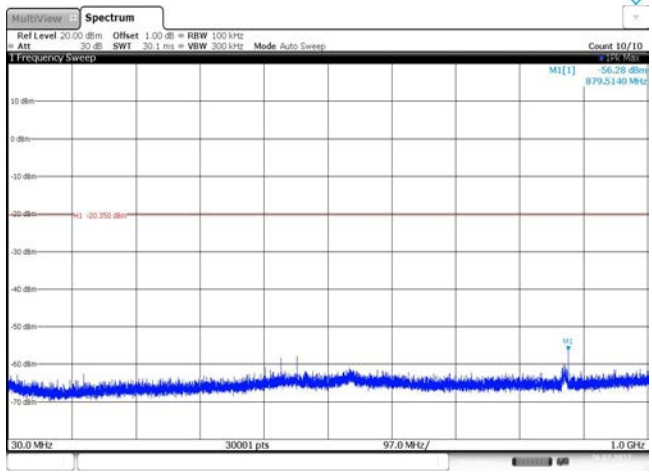
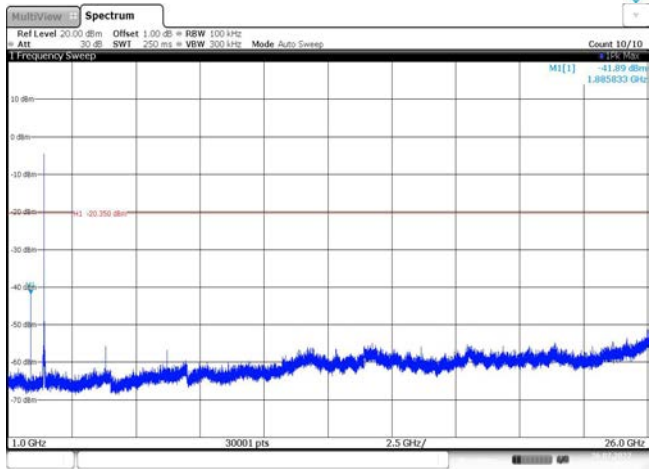


CH78  
30MHz~1000MHz

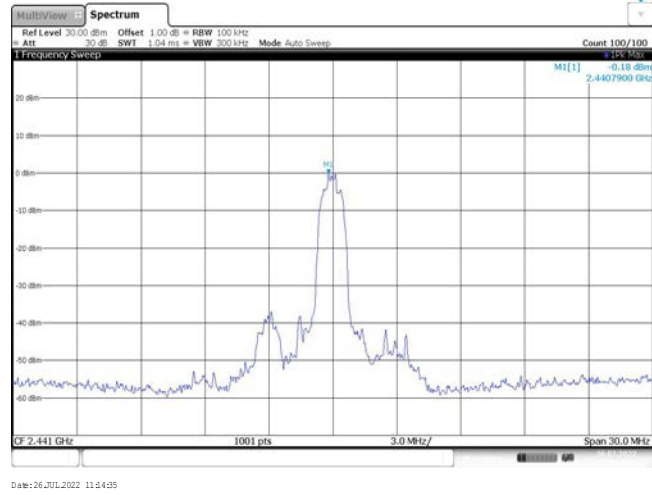


CH78  
1GHz~26GHz

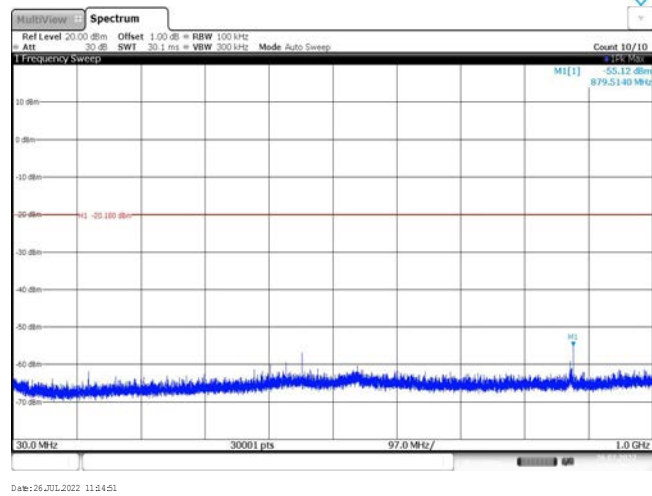


Test Item:	Spurious Emission	Modulation type:	8DPSK
<p>CH00 Reference level</p>			
<p>CH00 30MHz~1000MHz</p>			
<p>CH00 1GHz~26GHz</p>			

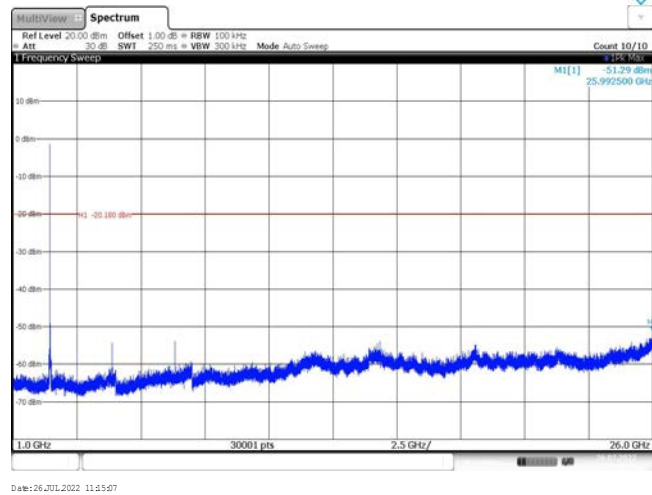
CH39  
Reference level



CH39  
30MHz~1000MHz

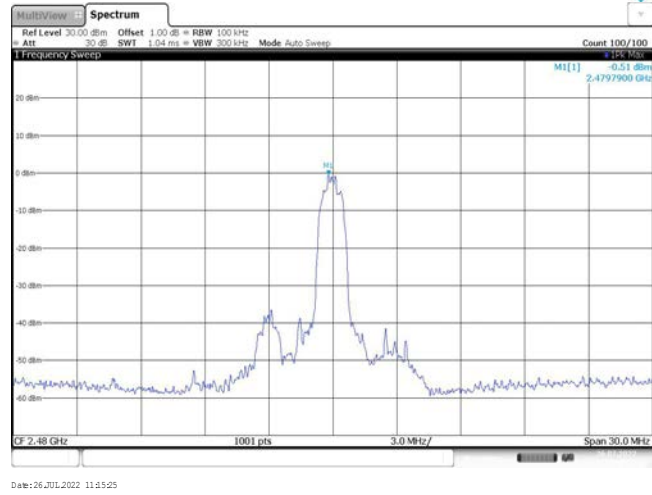


CH39  
1GHz~26GHz



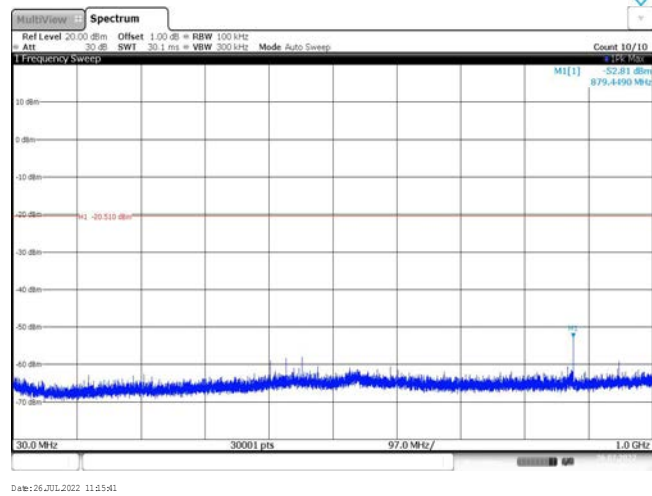


CH78  
Reference level



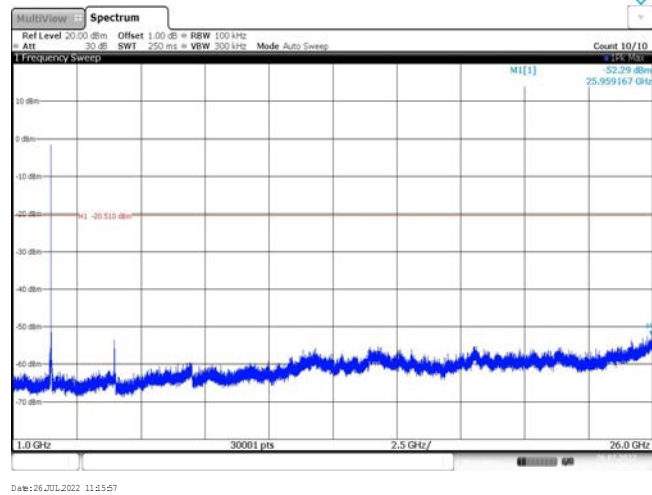
Date:26.JUL.2022 11:15:25

CH78  
30MHz~1000MHz



Date:26.JUL.2022 11:15:41

CH78  
1GHz~26GHz



Date:26.JUL.2022 11:15:57

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