

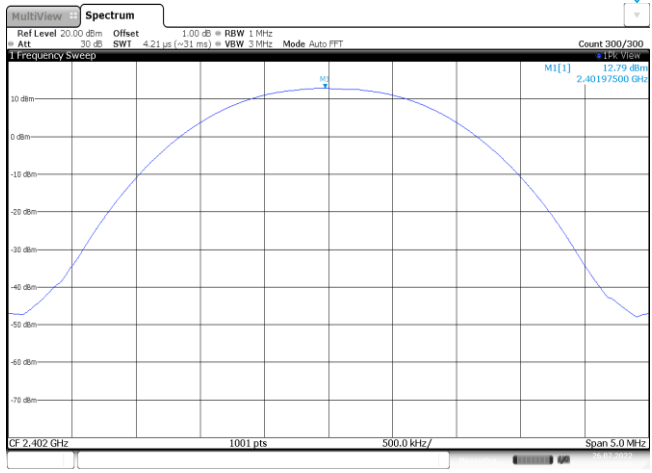
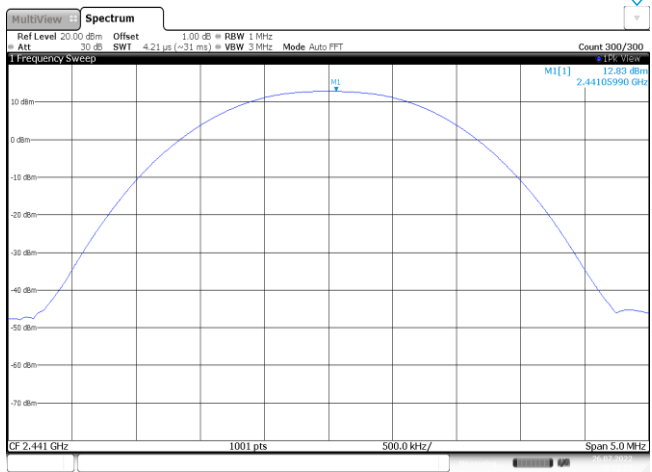
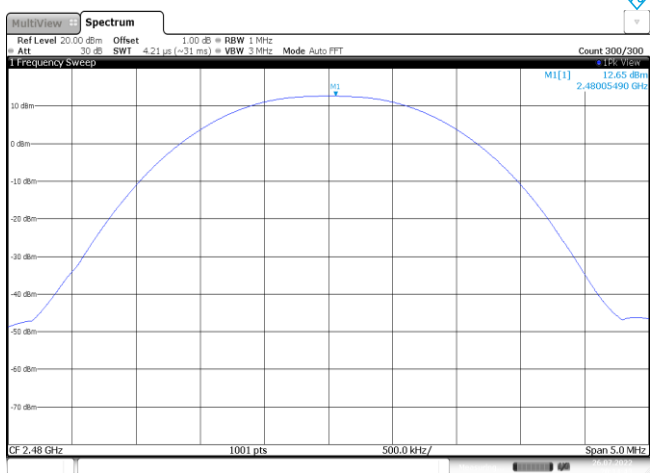
APPENDIX REPORT

Project No.	SHT2207080705EW	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℃	Humidity	42%
Test Engineer	Hailey Chen	Auditor	Xiaodong Zhu

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

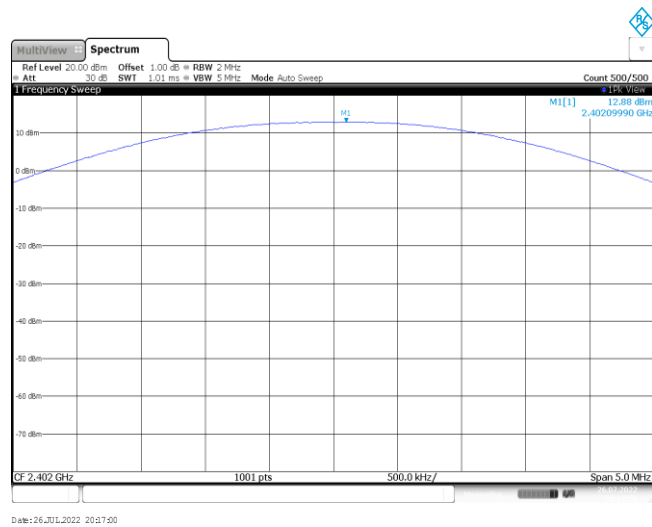
Modulation type	Channel	Peak Output power (dBm)	Average Output power (dBm)	Limit (dBm)	Result
GFSK	00	12.79	12.78	≤ 30.00	Pass
	39	12.83	12.82		
	78	12.65	12.64		
$\pi/4$ DQPSK	00	12.88	12.85	≤ 21.00	Pass
	39	12.75	12.70		
	78	12.65	12.61		
8DPSK	00	13.01	12.93	≤ 21.00	Pass
	39	12.86	12.80		
	78	12.75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

Modulation Type:	GFSK
CH00	 CH00
CH39	 CH39
CH78	 CH78

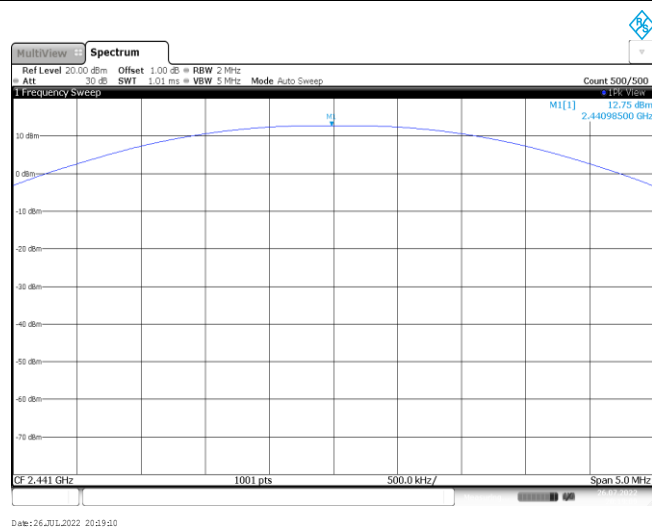
Modulation Type:

 $\pi/4$ DQPSK

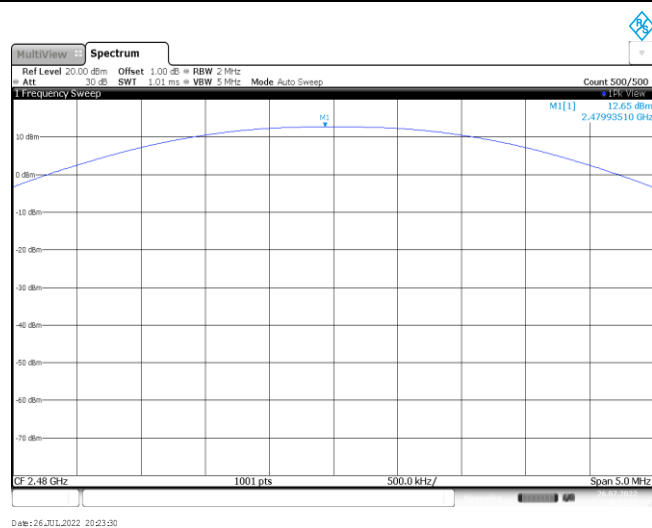
CH00



CH39



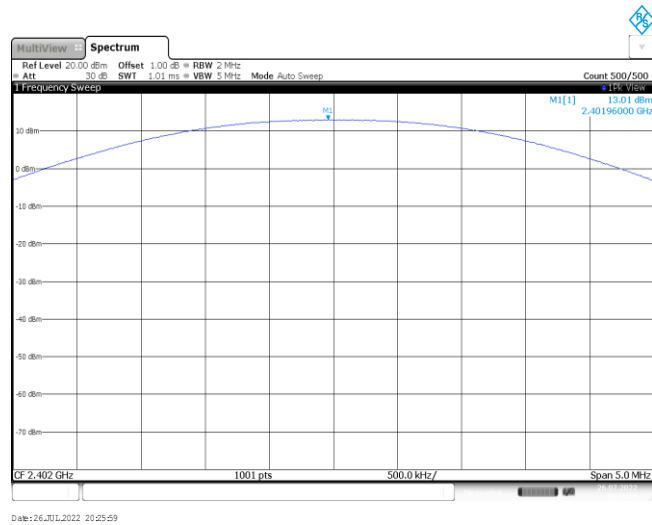
CH78



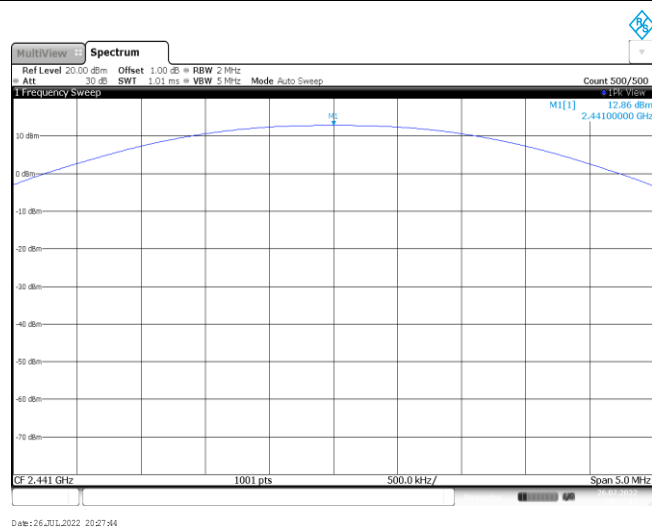
Modulation Type:

8DPSK

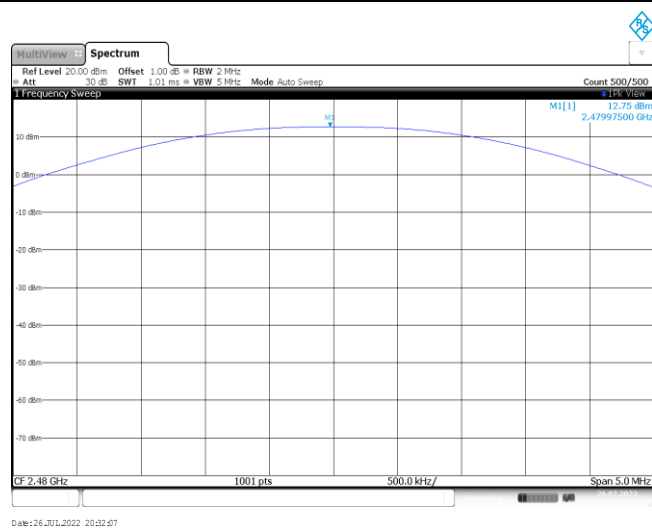
CH00



CH39



CH78



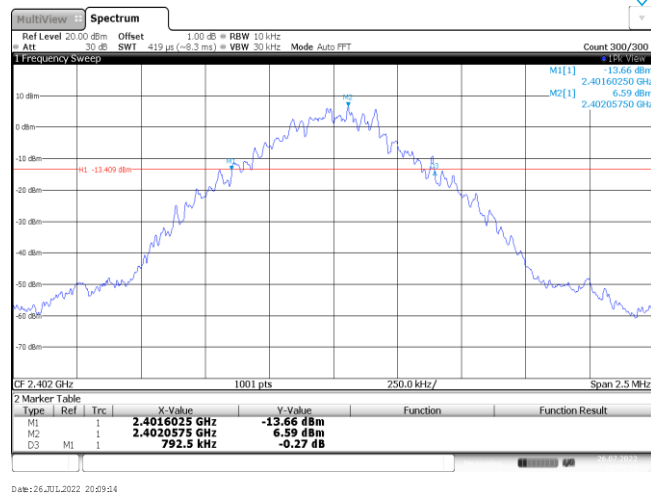
Appendix B : 20 dB Bandwidth

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		

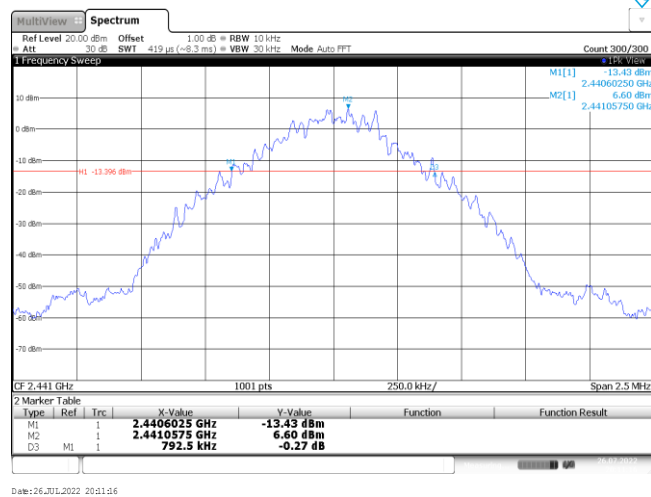
Modulation Type:

GFSK

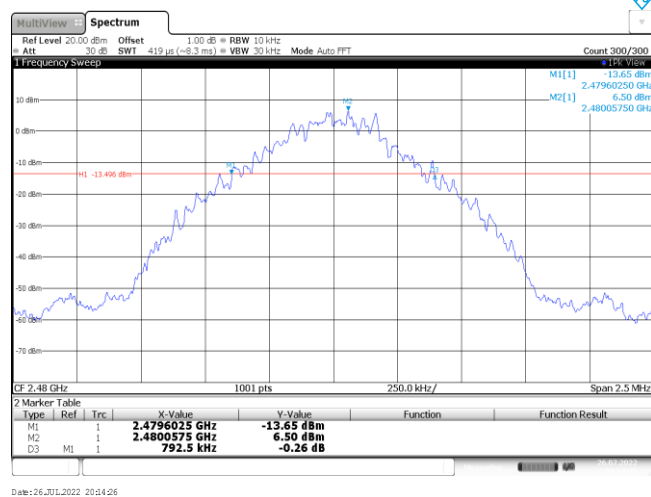
CH00



CH39



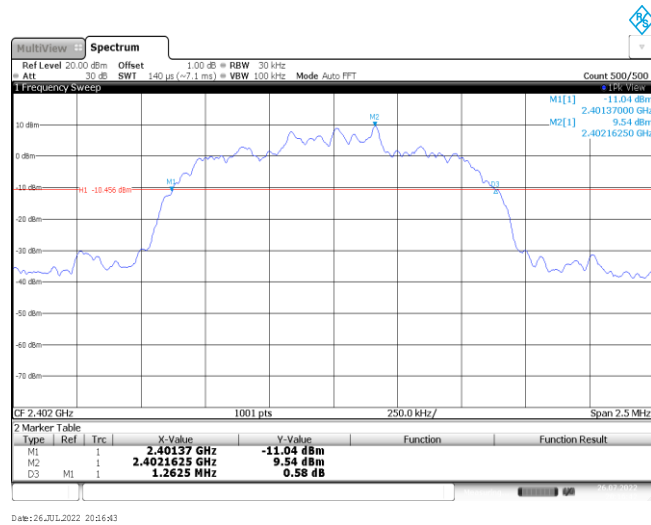
CH78



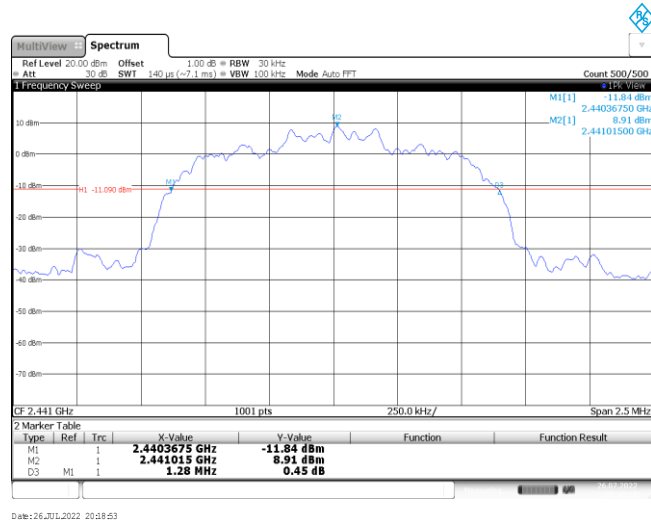
Modulation Type:

 $\pi/4$ DQPSK

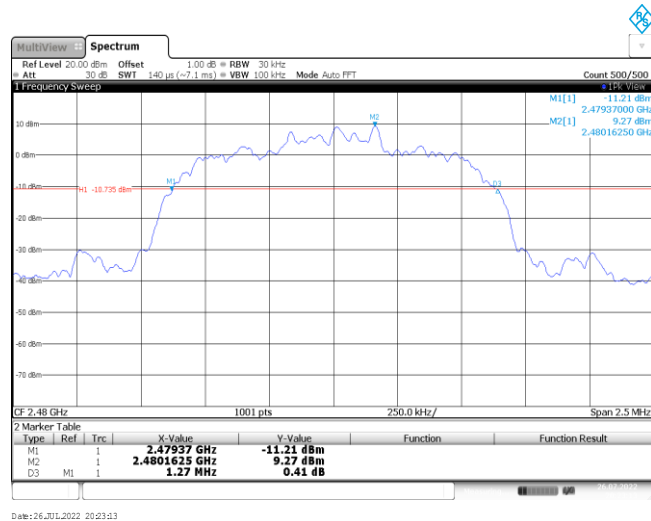
CH00



CH39



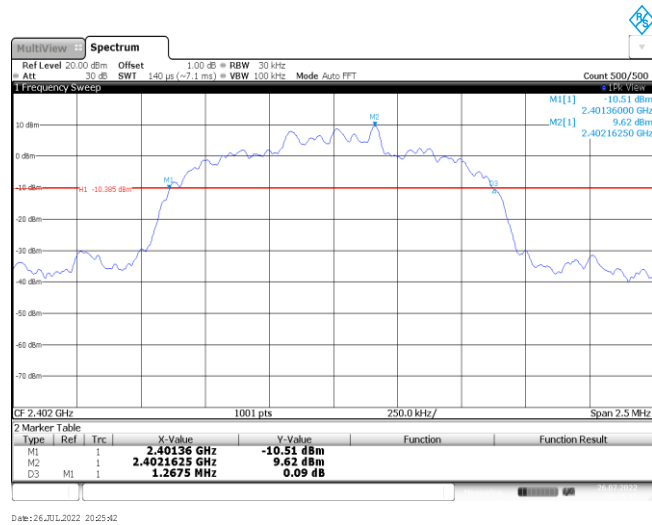
CH78



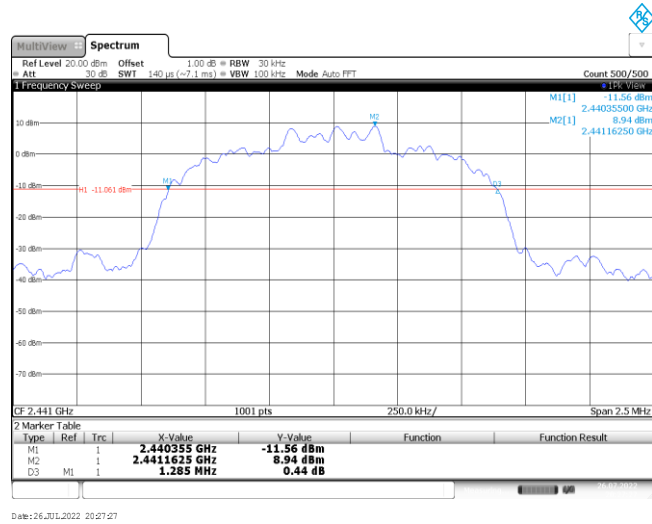
Modulation Type:

8DPSK

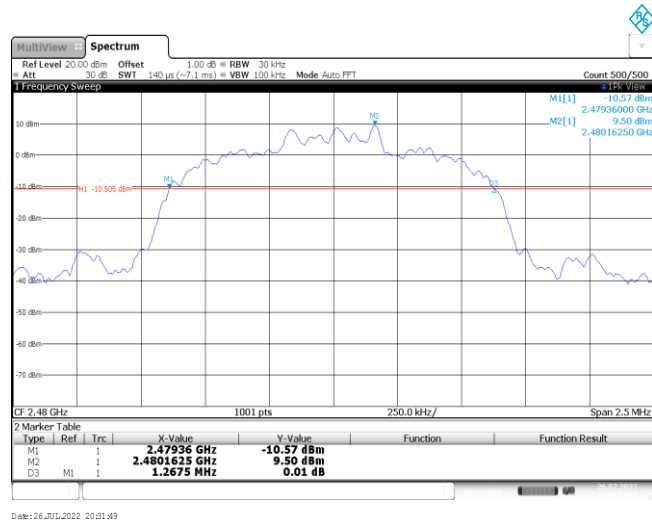
CH00



CH39



CH78



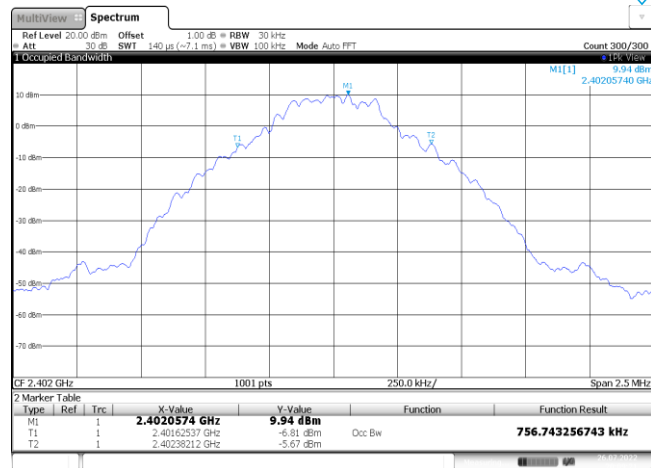
Appendix C: 99% Occupied Bandwidth

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:

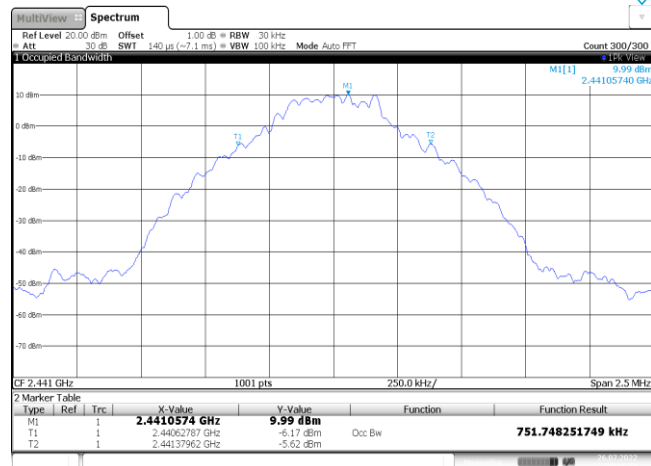
GFSK

CH00



Date: 26, JUL 2022 20:59:22

CH39



Date: 26, JUL 2022 20:11:24

CH78



Date: 26, JUL 2022 20:14:34

Modulation Type:

 $\pi/4$ DQPSK

CH00



Date: 26, JUL 2022 20:16:51

CH39



Date: 26, JUL 2022 20:19:01

CH78

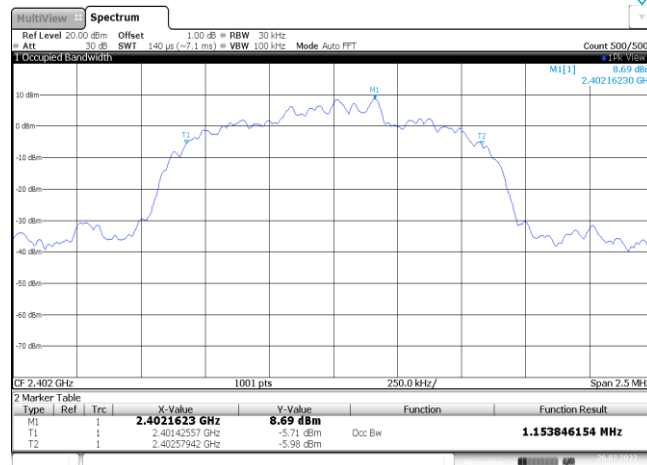


Date: 26, JUL 2022 20:23:21

Modulation Type:

8DPSK

CH00



Date: 26, Jul, 2022 20:25:50

CH39



Date: 26, Jul, 2022 20:27:35

CH78



Date: 26, Jul, 2022 20:31:57

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

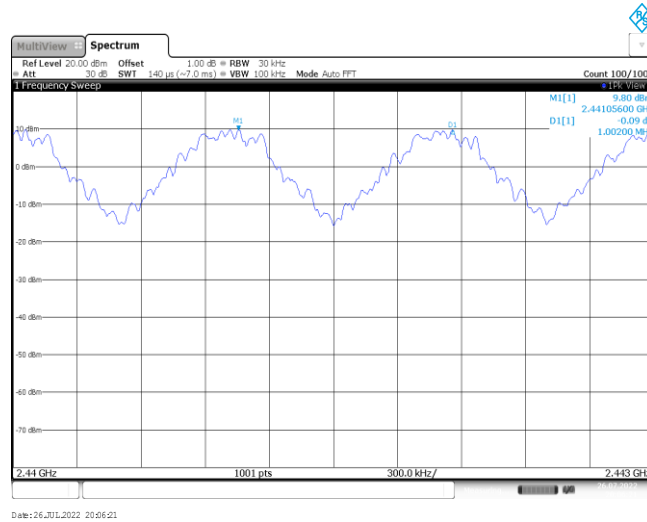
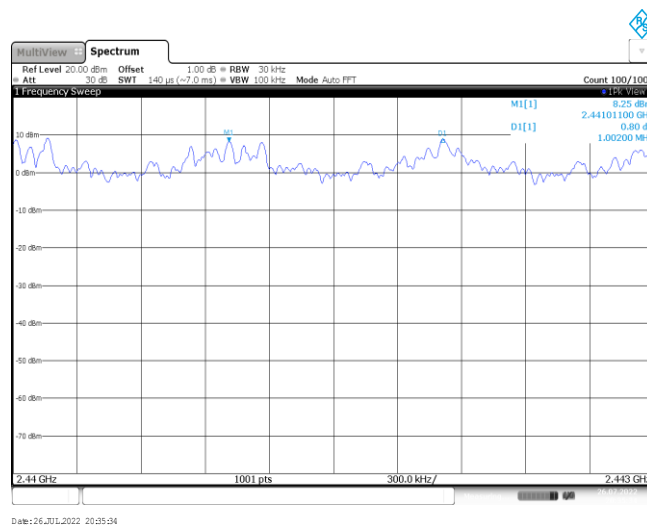
Note:

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

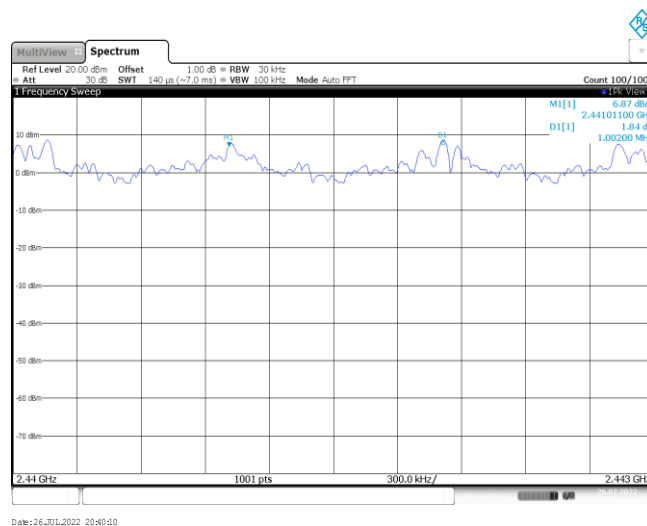
$\pi/4$ DQPSK limit = $2/3$ * The maximum 20 dB Bandwidth for $\pi/4$ DQPSK modulation on the appendix B.

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

GFSK

 $\pi/4$ DQPSK

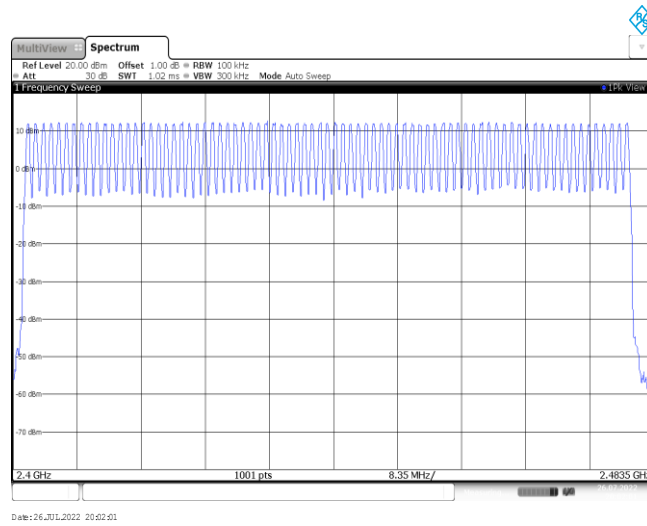
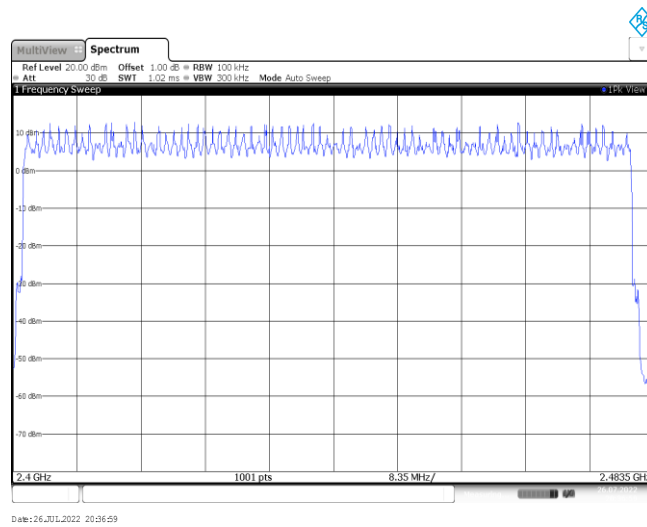
8DPSK



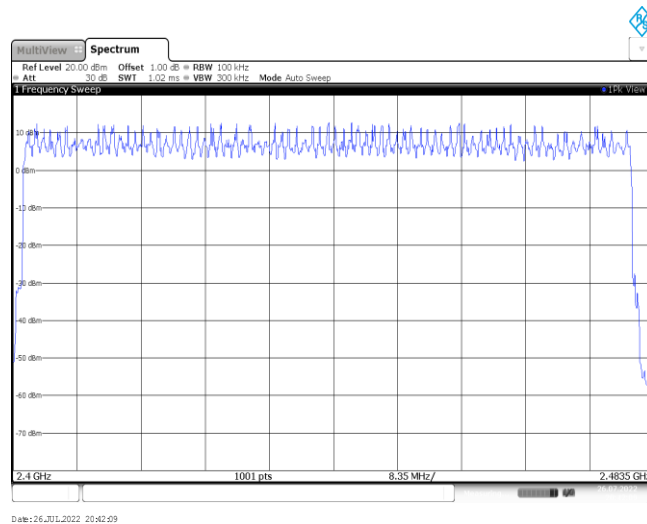
Appendix E: Hopping Channel Number

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

GFSK

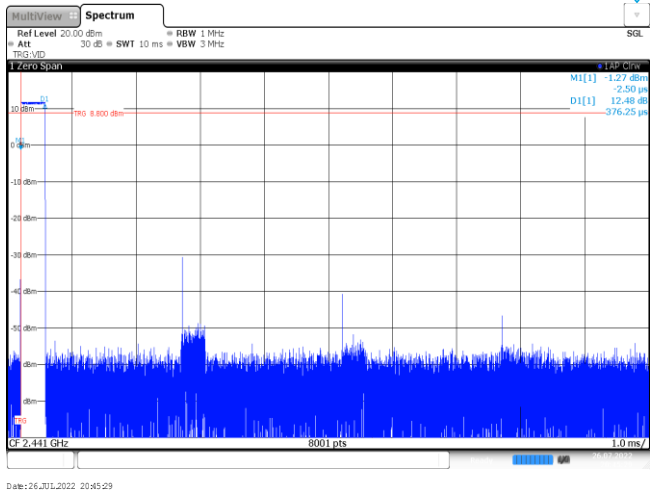
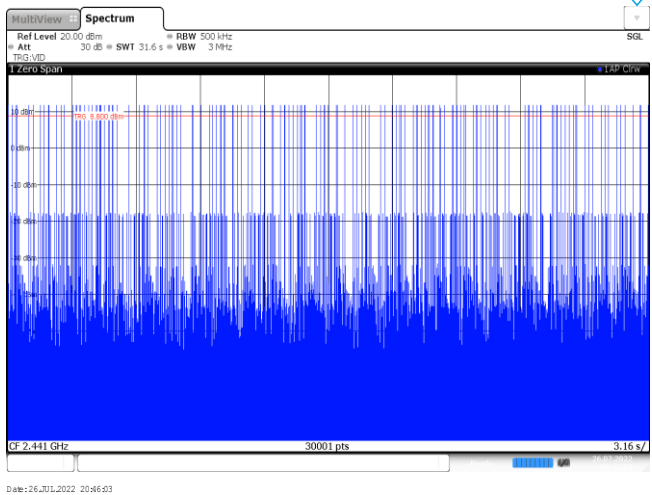
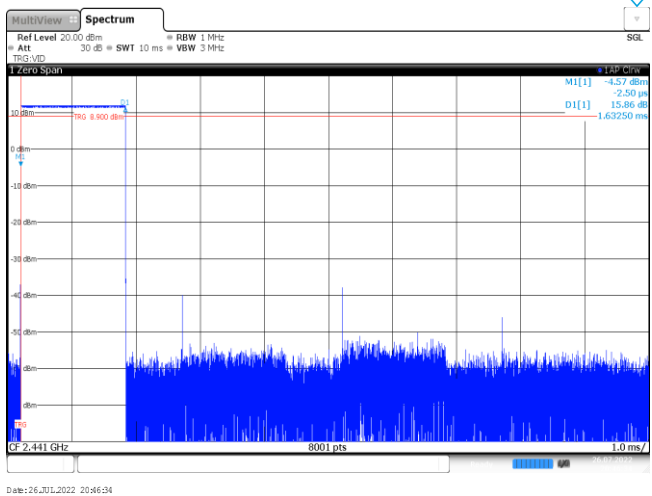
 $\pi/4$ DQPSK

8DPSK

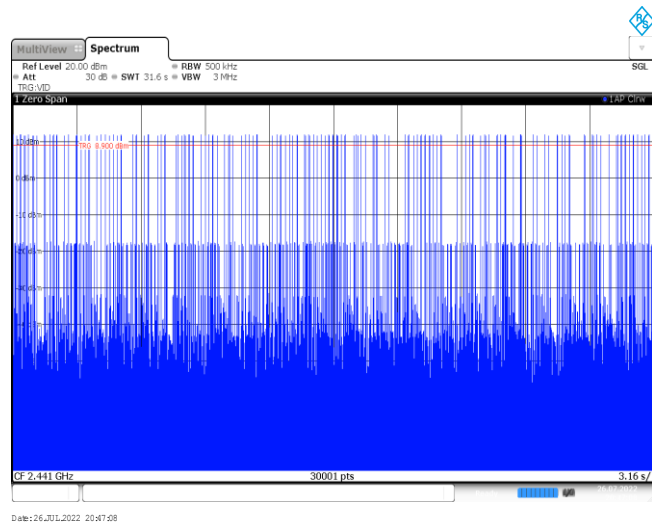


Appendix F: Dwell Time

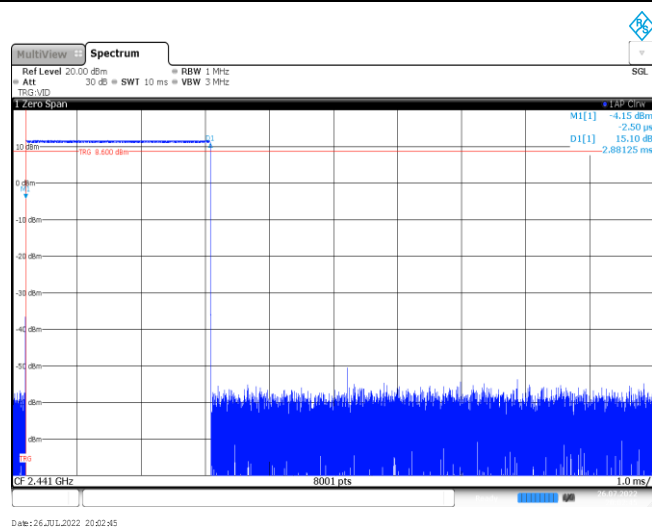
Modulation type	Packet	Burst Width [ms]	Total Hops[hop*ch]	Dwell time (Second)	Limit (Second)	Result
GFSK	DH1	0.38	154	0.06	≤ 0.40	Pass
	DH3	1.63	162	0.26		
	DH5	2.88	83	0.24		
$\pi/4$ DQPSK	2DH1	0.38	158	0.06	≤ 0.40	Pass
	2DH3	1.64	158	0.26		
	2DH5	2.88	81	0.23		
8DPSK	3DH1	0.38	158	0.06	≤ 0.40	Pass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

Modulation Type:	GFSK
DH1 Burst width	 The spectrum plot shows a signal at 2.441 GHz with a bandwidth of 8001 pts. The y-axis represents power in dBm, ranging from -10 to 10. The x-axis represents frequency in MHz, ranging from 2.440 to 2.442. The plot shows a narrowband signal with a peak power of approximately 10 dBm. The signal is centered at 2.441 GHz. The plot is titled 'Spectrum' and includes parameters: Ref Level 20.00 dBm, Att 30 dB, SWT 10 ms, VBW 3 MHz. The plot also shows a 'Zero Span' view. The date is 26 JUL 2022 20:45:29.
DH1 Burst number	 The spectrum plot shows a signal at 2.441 GHz with a bandwidth of 30001 pts. The y-axis represents power in dBm, ranging from -10 to 10. The x-axis represents frequency in MHz, ranging from 2.440 to 2.442. The plot shows a narrowband signal with a peak power of approximately 10 dBm. The signal is centered at 2.441 GHz. The plot is titled 'Spectrum' and includes parameters: Ref Level 20.00 dBm, Att 30 dB, SWT 31.6 s, VBW 3 MHz. The plot also shows a 'Zero Span' view. The date is 26 JUL 2022 20:46:03.
DH3 Burst width	 The spectrum plot shows a signal at 2.441 GHz with a bandwidth of 8001 pts. The y-axis represents power in dBm, ranging from -10 to 10. The x-axis represents frequency in MHz, ranging from 2.440 to 2.442. The plot shows a narrowband signal with a peak power of approximately 10 dBm. The signal is centered at 2.441 GHz. The plot is titled 'Spectrum' and includes parameters: Ref Level 20.00 dBm, Att 30 dB, SWT 10 ms, VBW 3 MHz. The plot also shows a 'Zero Span' view. The date is 26 JUL 2022 20:46:34.

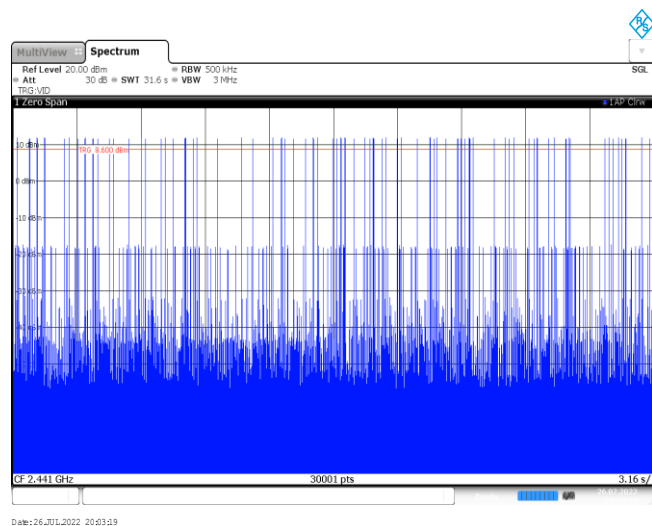
DH3
Burst number

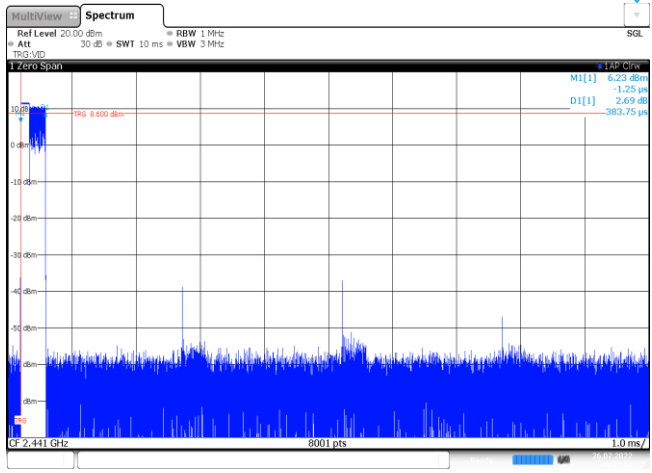
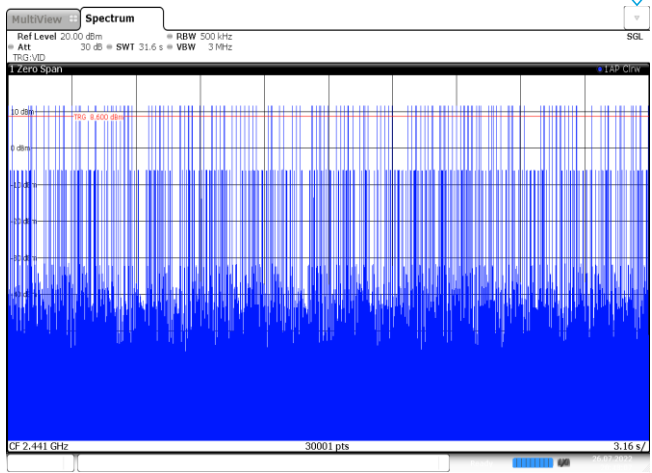
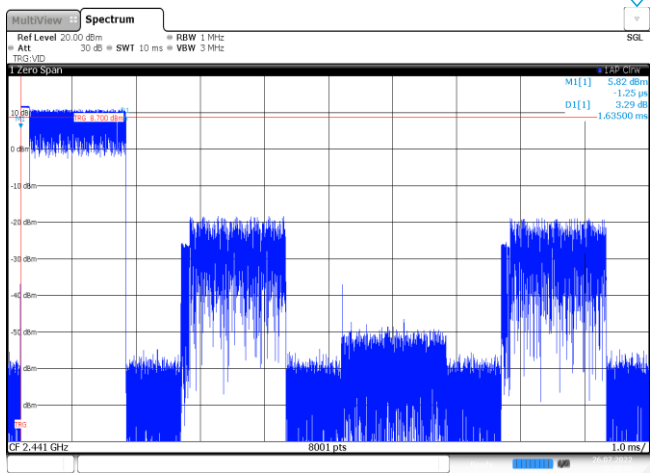


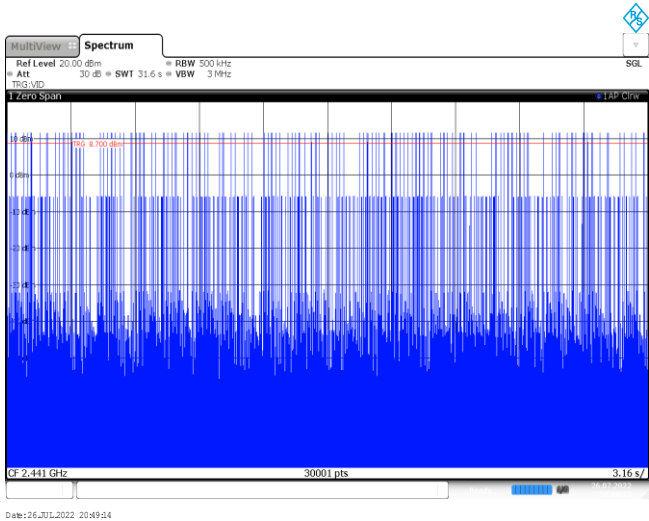
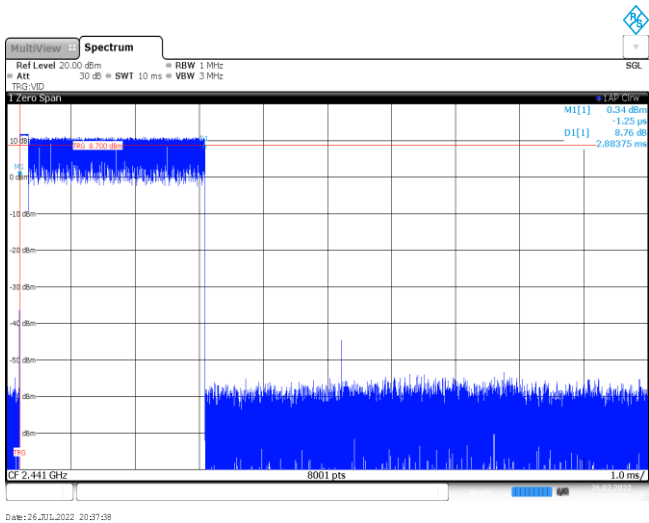
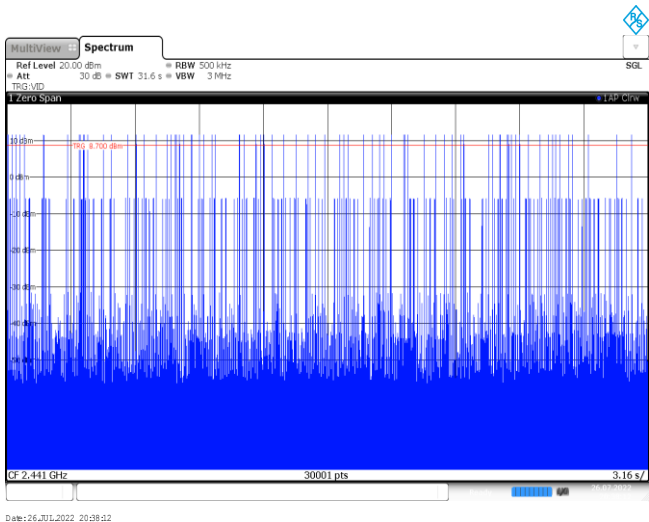
DH5
Burst width

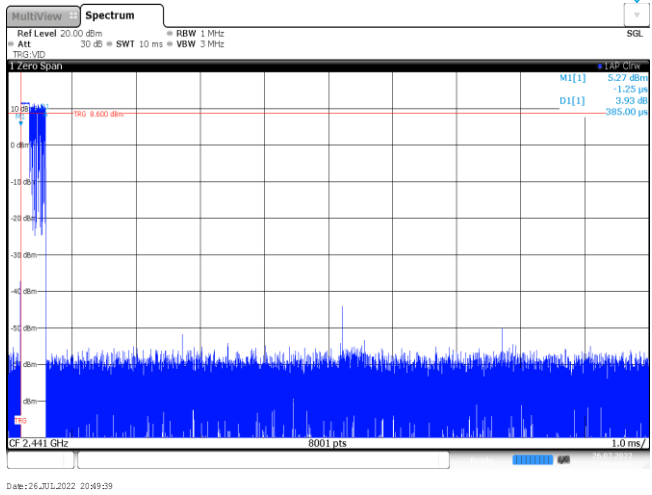
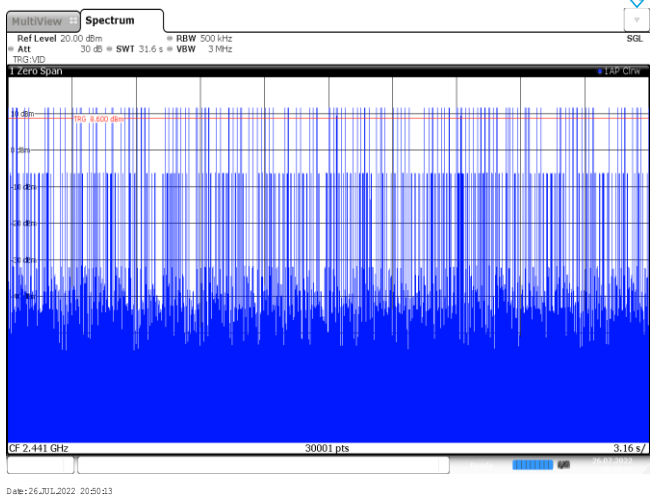
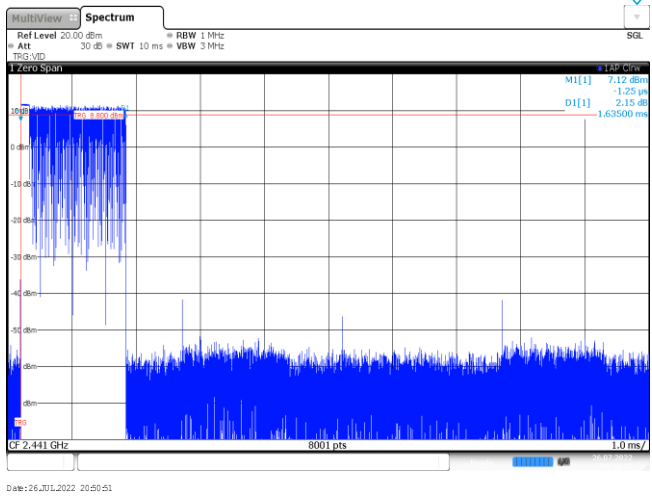


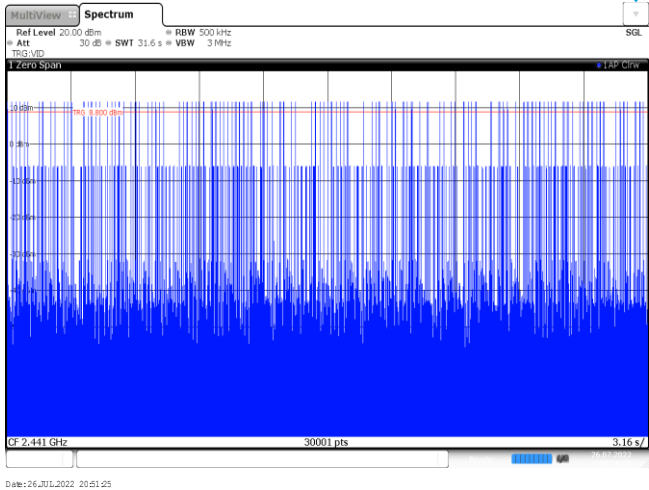
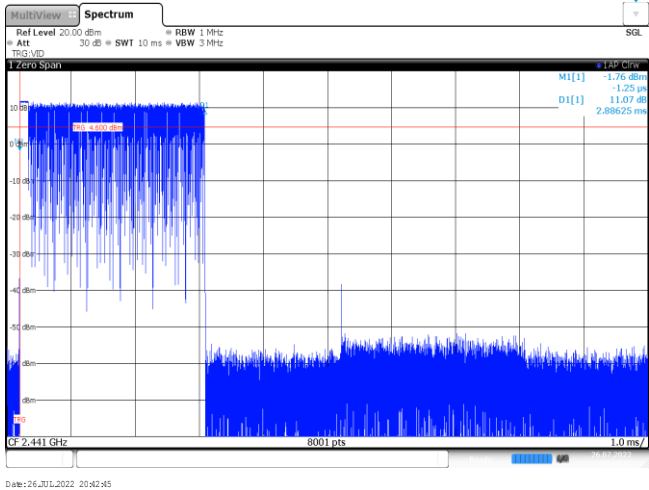
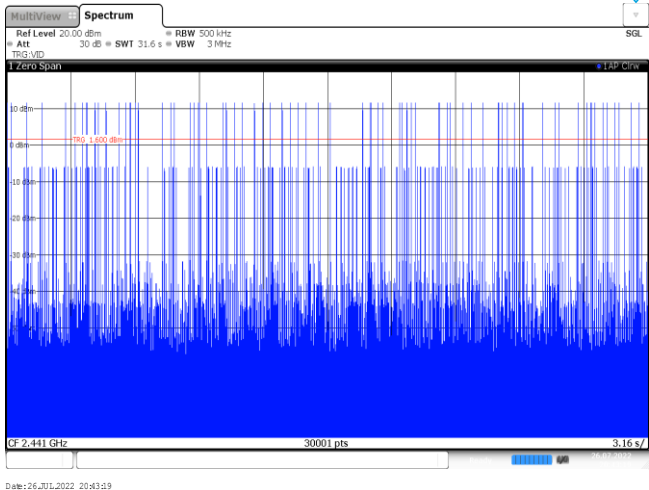
DH5
Burst number



Modulation Type:	$\pi/4$ DQPSK
2DH1 Burst width	 The spectrum plot shows a single burst of signal at 2.441 GHz. The y-axis represents power in dBm, ranging from -10 to 10. The x-axis represents frequency in MHz, ranging from 2.440 to 2.442. The plot shows a sharp peak at the center frequency, with a bandwidth of approximately 1 MHz. The signal level is around 0 dBm. The plot is titled 'Spectrum' and includes parameters: Ref Level 20.00 dBm, Att 30 dB, SWT 10 ms, RBW 1 MHz, VBW 3 MHz. The plot is also labeled '1 Zero Span' and 'CF 2.441 GHz'.
2DH1 Burst number	 The spectrum plot shows a continuous signal at 2.441 GHz. The y-axis represents power in dBm, ranging from -10 to 10. The x-axis represents frequency in MHz, ranging from 2.440 to 2.442. The plot shows a dense, continuous signal across the entire frequency range. The signal level is around 0 dBm. The plot is titled 'Spectrum' and includes parameters: Ref Level 20.00 dBm, Att 30 dB, SWT 31.6 s, RBW 500 kHz, VBW 3 MHz. The plot is also labeled '1 Zero Span' and 'CF 2.441 GHz'.
2DH3 Burst width	 The spectrum plot shows a burst of signal at 2.441 GHz. The y-axis represents power in dBm, ranging from -10 to 10. The x-axis represents frequency in MHz, ranging from 2.440 to 2.442. The plot shows a burst of signal with a bandwidth of approximately 1 MHz. The signal level is around 0 dBm. The plot is titled 'Spectrum' and includes parameters: Ref Level 20.00 dBm, Att 30 dB, SWT 10 ms, RBW 1 MHz, VBW 3 MHz. The plot is also labeled '1 Zero Span' and 'CF 2.441 GHz'.

2DH3 Burst number	
2DH5 Burst width	
2DH5 Burst number	

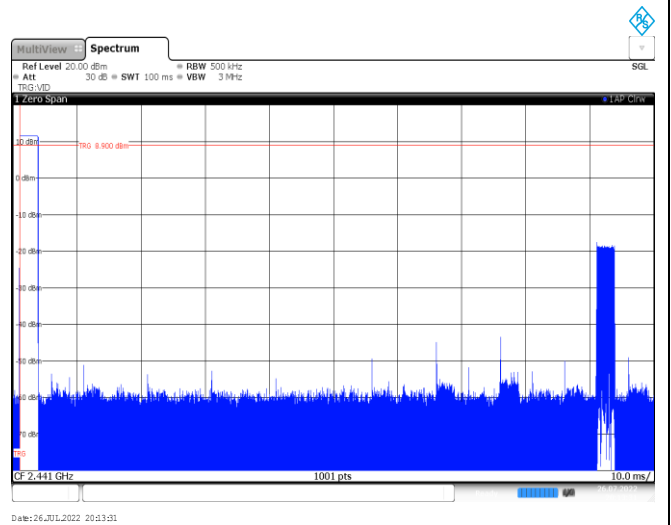
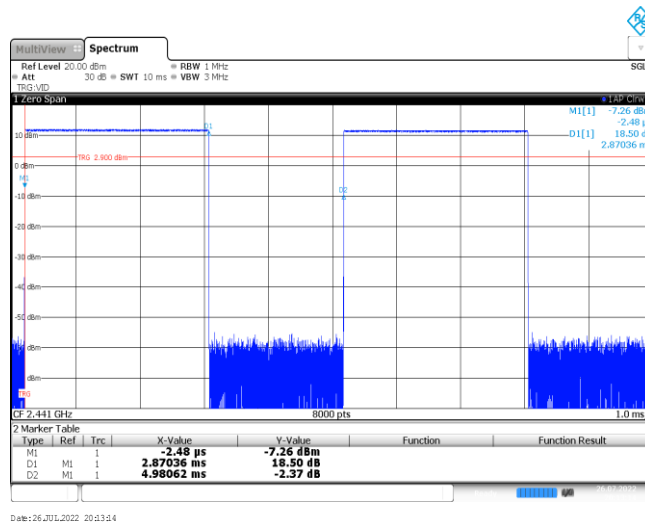
Modulation Type:	8DPSK
3DH1 Burst width	 The spectrum plot shows a signal at 2.441 GHz with a bandwidth of 8001 pts. The y-axis represents power in dBm, ranging from -50 to 10. A red line indicates a reference level at -8.600 dBm. The signal is characterized by a sharp peak at the center frequency, with a bandwidth of approximately 1.0 ms. The plot is titled 'Spectrum' and includes parameters: Ref Level 20.00 dBm, Att 30 dB, SWT 10 ms, RBW 1 MHz, VBW 3 MHz. The date is 26 JUL 2022 20:49:39.
3DH1 Burst number	 The spectrum plot shows a signal at 2.441 GHz with a bandwidth of 30001 pts. The y-axis represents power in dBm, ranging from -50 to 10. A red line indicates a reference level at -8.600 dBm. The signal is characterized by a sharp peak at the center frequency, with a bandwidth of approximately 3.16 s. The plot is titled 'Spectrum' and includes parameters: Ref Level 20.00 dBm, Att 30 dB, SWT 31.6 s, RBW 500 kHz, VBW 3 MHz. The date is 26 JUL 2022 20:50:13.
3DH3 Burst width	 The spectrum plot shows a signal at 2.441 GHz with a bandwidth of 8001 pts. The y-axis represents power in dBm, ranging from -50 to 10. A red line indicates a reference level at -8.600 dBm. The signal is characterized by a sharp peak at the center frequency, with a bandwidth of approximately 1.0 ms. The plot is titled 'Spectrum' and includes parameters: Ref Level 20.00 dBm, Att 30 dB, SWT 10 ms, RBW 1 MHz, VBW 3 MHz. The date is 26 JUL 2022 20:50:51.

3DH3 Burst number	
3DH5 Burst width	
3DH5 Burst number	

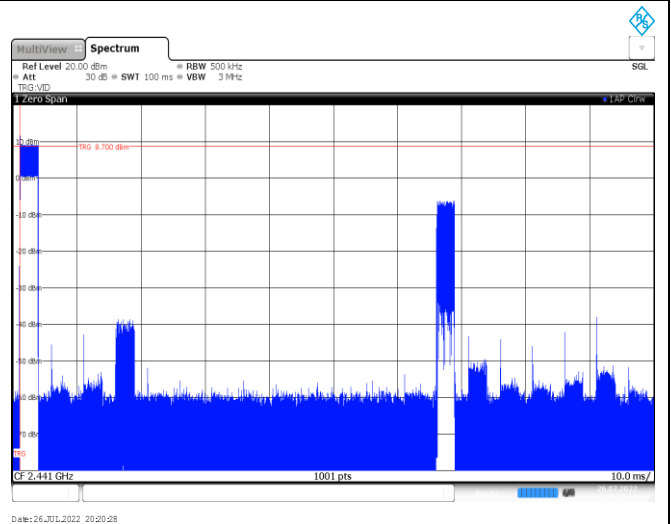
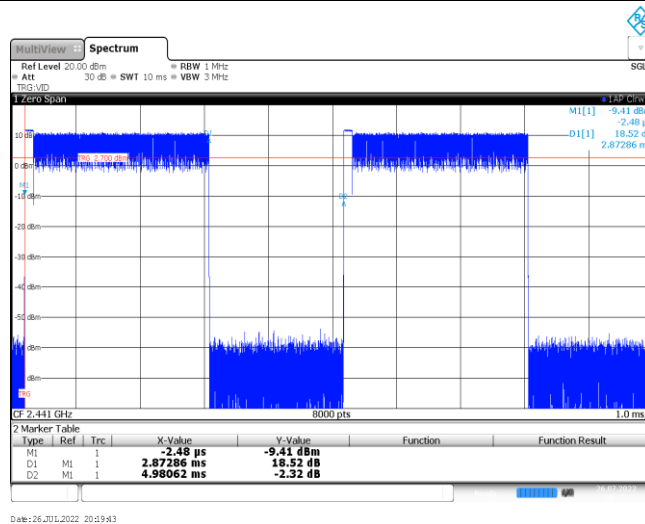
Appendix G: Duty Cycle Correction Factor (DCCF)

DCCF Calculate Formula					
DCCF=20 * Log(duty cycle) = 20 * Log($T_{\text{on time}} / T_{\text{period}}$)					
Modulation type	Test Frequency (MHz)	$T_{\text{on time}}$ 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

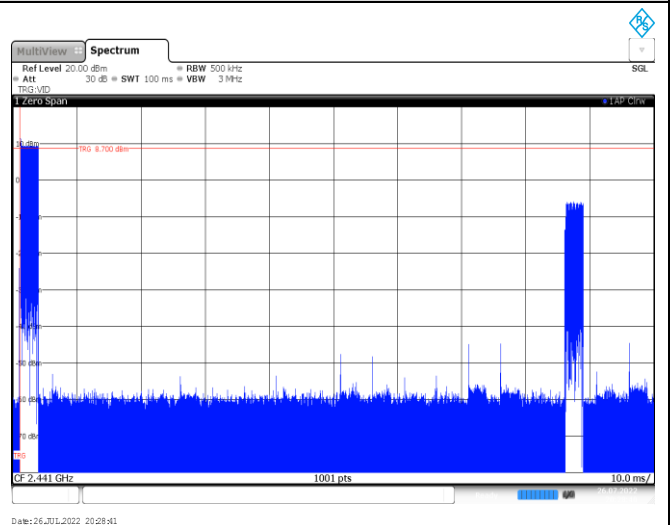
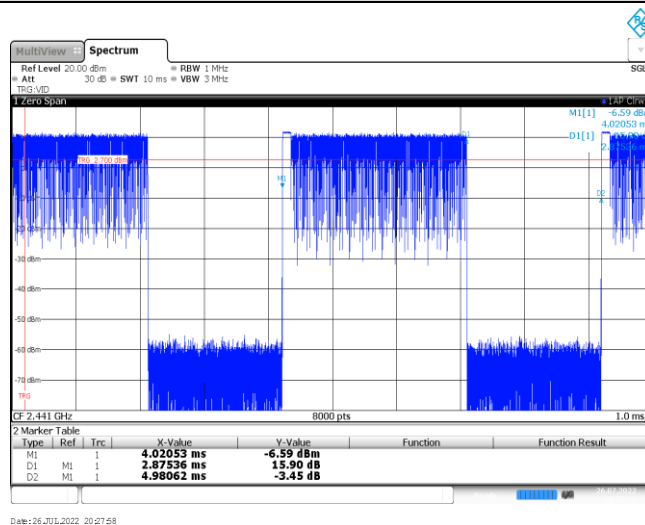
T_{on} time for single burst

Burst Quantity

 $\pi/4$ DQPSKT_{on} time for single burst

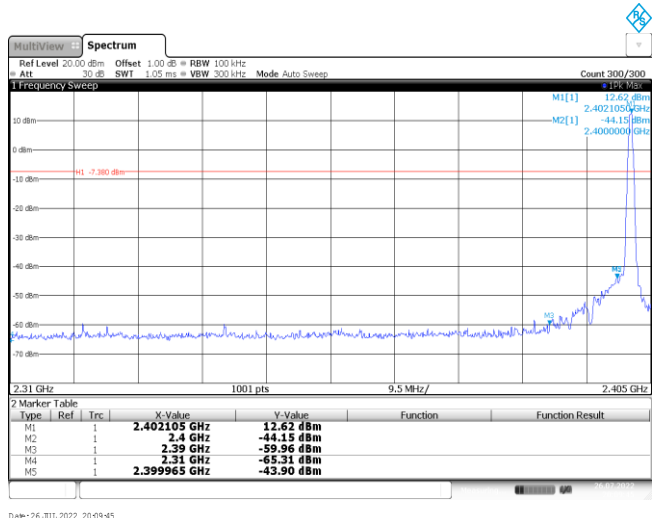
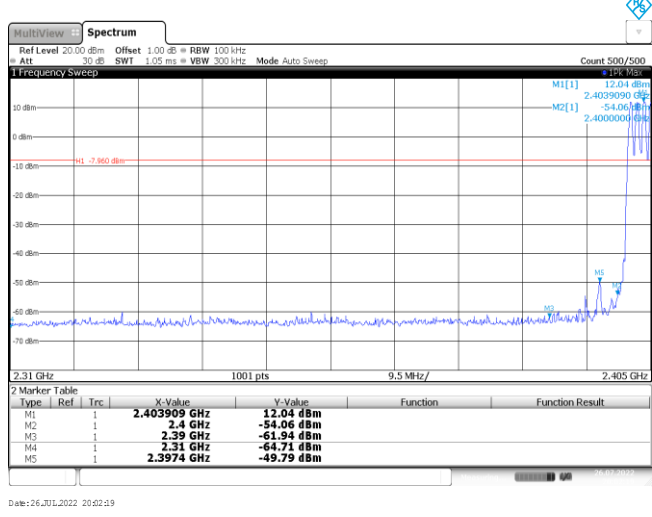
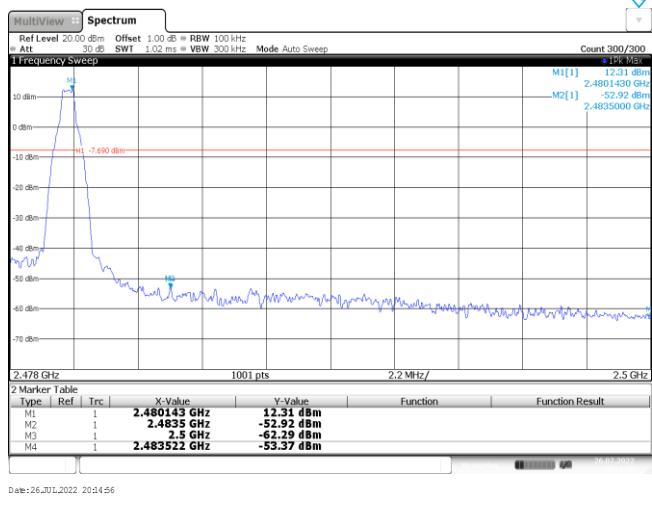
Burst Quantity

8DPSK

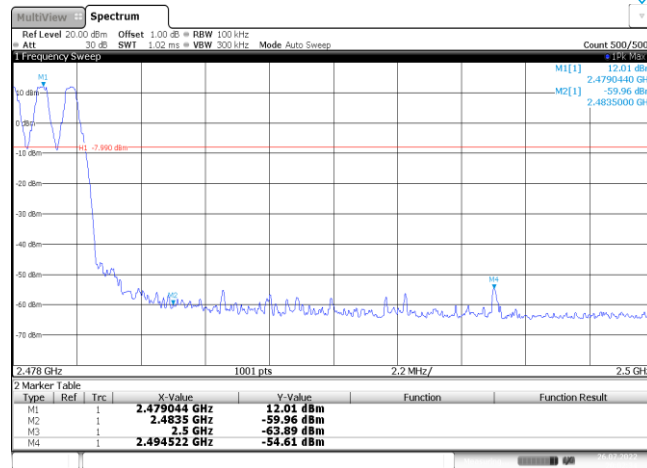
T_{on} time for single burst

Burst Quantity

Appendix H: Band edge and Spurious Emissions (conducted)

Test Item:	Band edge	Modulation type:	GFSK																																										
CH00 No hopping mode	<table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td></td><td>2.402105 GHz</td><td>12.62 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>2.4 GHz</td><td>-44.15 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>2.39 GHz</td><td>-59.96 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>2.31 GHz</td><td>-65.31 dBm</td><td></td><td></td></tr><tr><td>M5</td><td>1</td><td></td><td>2.399965 GHz</td><td>-43.90 dBm</td><td></td><td></td></tr></table> Date: 26.JUL.2022 20:59:45			Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		2.402105 GHz	12.62 dBm			M2	1		2.4 GHz	-44.15 dBm			M3	1		2.39 GHz	-59.96 dBm			M4	1		2.31 GHz	-65.31 dBm			M5	1		2.399965 GHz	-43.90 dBm		
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																																							
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CH00 Hopping mode	<table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td></td><td>2.403909 GHz</td><td>12.04 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>2.4 GHz</td><td>-54.06 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>2.39 GHz</td><td>-61.94 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>2.31 GHz</td><td>-64.71 dBm</td><td></td><td></td></tr><tr><td>M5</td><td>1</td><td></td><td>2.3974 GHz</td><td>-49.79 dBm</td><td></td><td></td></tr></table> Date: 26.JUL.2022 20:02:19			Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		2.403909 GHz	12.04 dBm			M2	1		2.4 GHz	-54.06 dBm			M3	1		2.39 GHz	-61.94 dBm			M4	1		2.31 GHz	-64.71 dBm			M5	1		2.3974 GHz	-49.79 dBm		
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CH78 No hopping mode	<table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td></td><td>2.480143 GHz</td><td>12.31 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>2.4835 GHz</td><td>-52.92 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>2.5 GHz</td><td>-62.29 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>2.483522 GHz</td><td>-53.37 dBm</td><td></td><td></td></tr></table> Date: 26.JUL.2022 20:14:56			Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		2.480143 GHz	12.31 dBm			M2	1		2.4835 GHz	-52.92 dBm			M3	1		2.5 GHz	-62.29 dBm			M4	1		2.483522 GHz	-53.37 dBm									
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																																							
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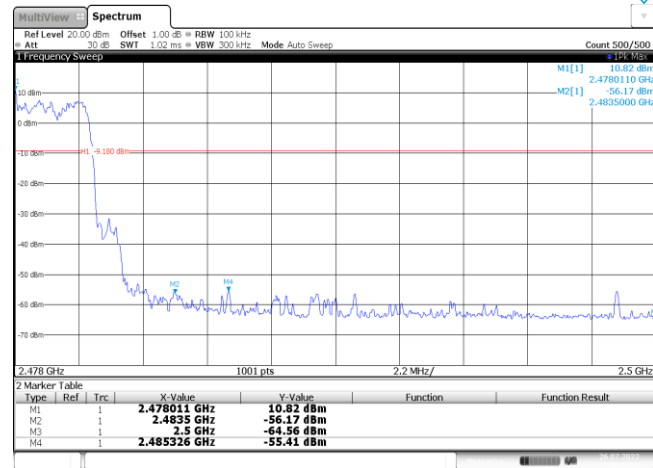
CH78
Hopping mode



Date: 26 JUL 2022 20:02:33

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

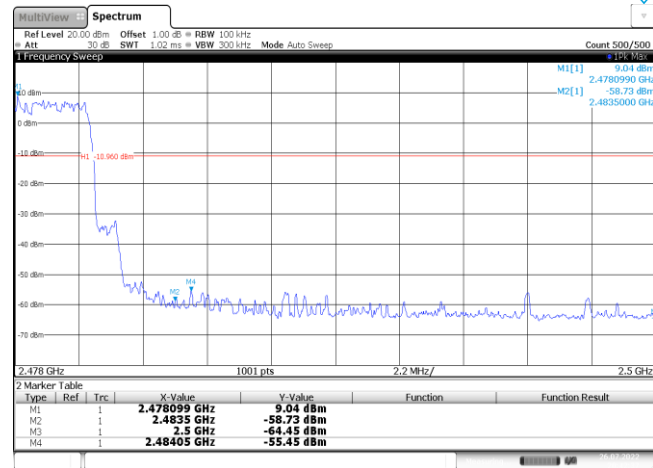
CH78
Hopping mode



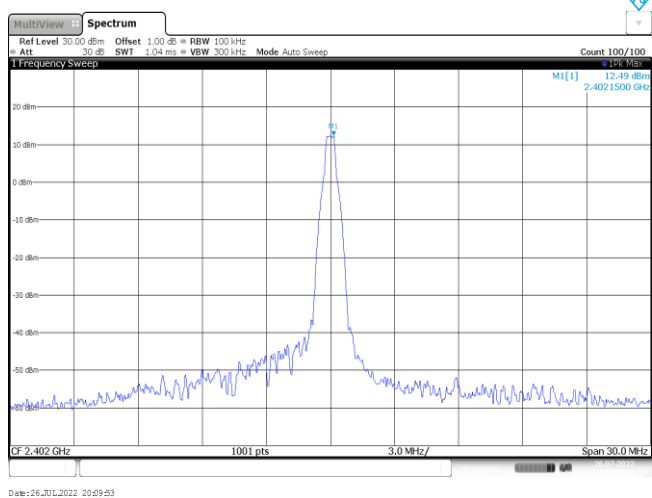
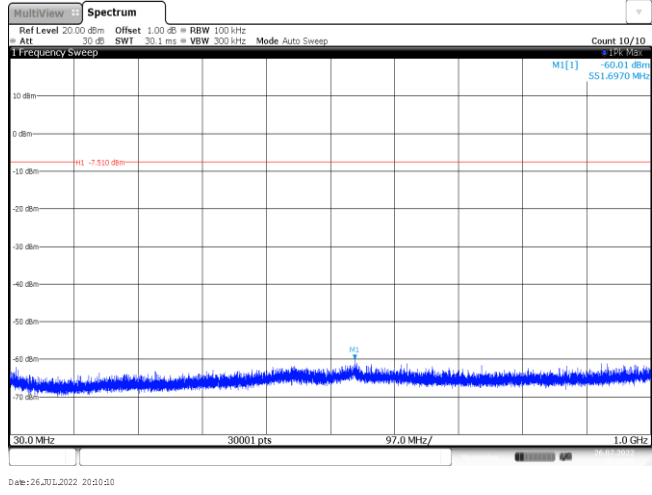
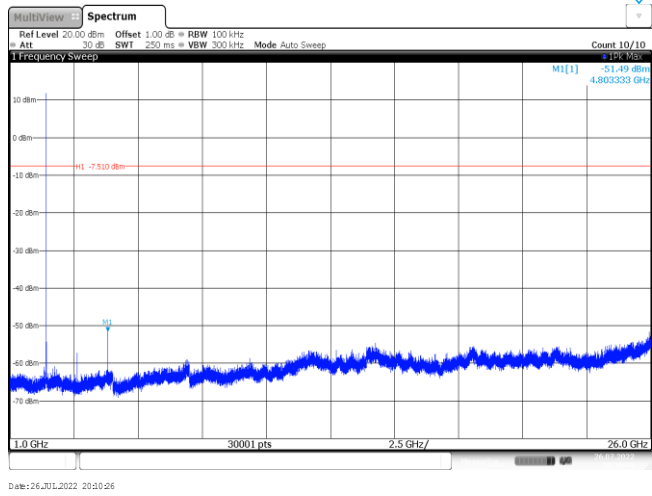
Date: 26 JUL 2022 20:37:27

Test Item:	Band edge	Modulation type:	8DPSK
CH00 No hopping mode			

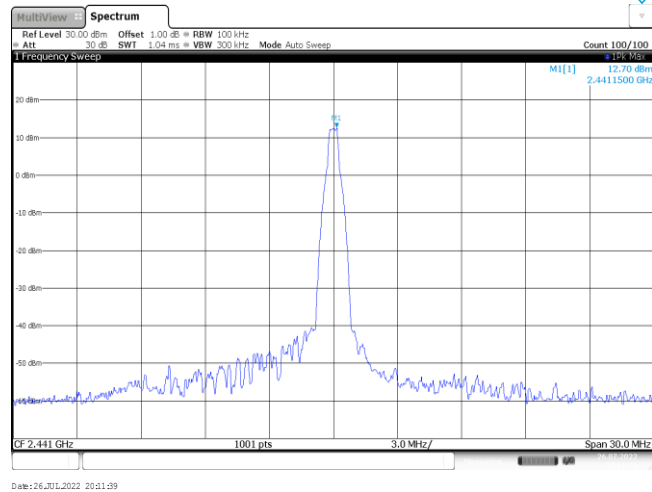
CH78
Hoppig mode



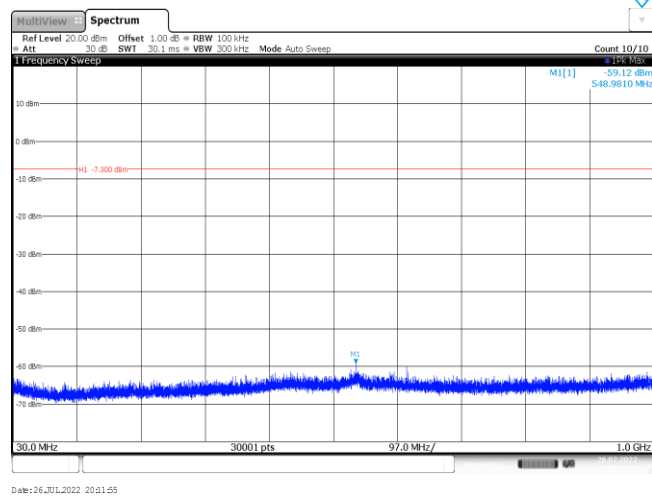
Date: 26 JUL 2022 20:42:37

Test Item:	Spurious Emission	Modulation type:	GFSK
CH00 Reference level	 CH00 Reference level		
CH00 30MHz~1000MHz	 CH00 30MHz~1000MHz		
CH00 1GHz~26GHz	 CH00 1GHz~26GHz		

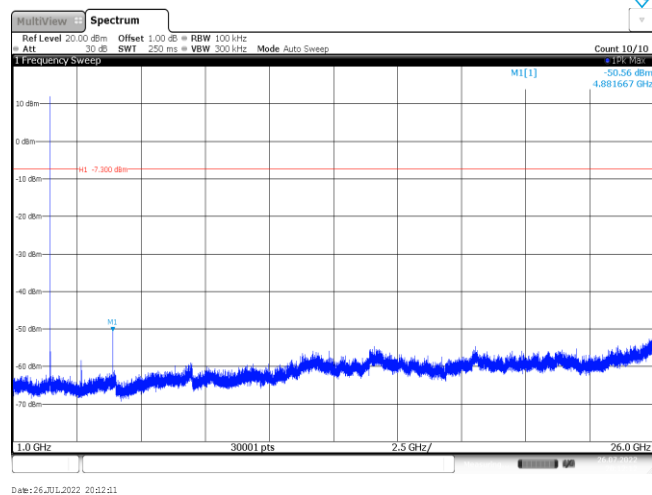
CH39
Reference level



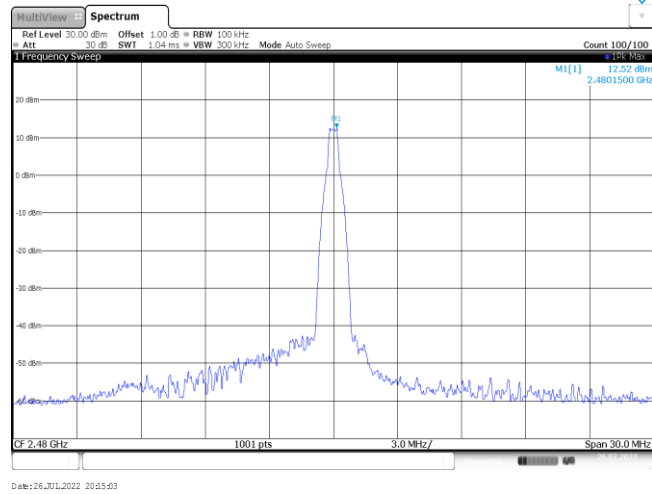
CH39
30MHz~1000MHz



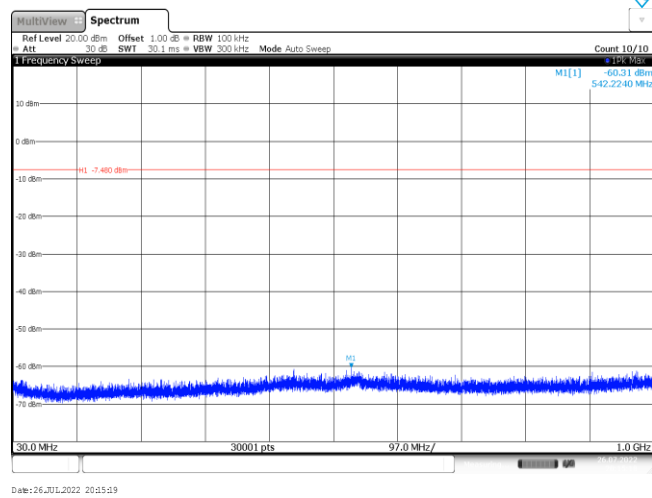
CH39
1GHz~26GHz



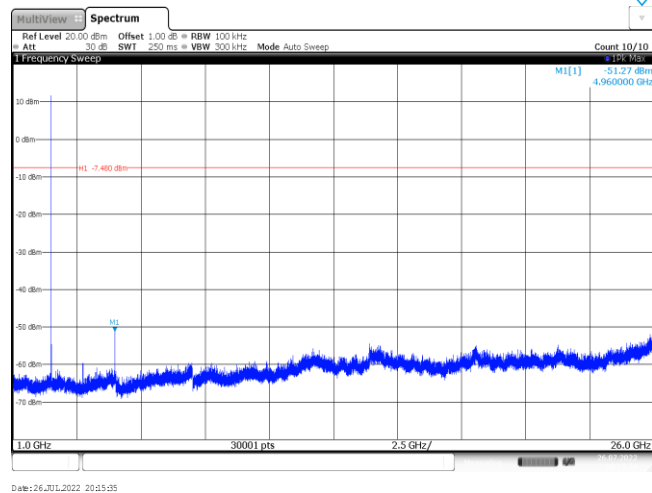
CH78
Reference level

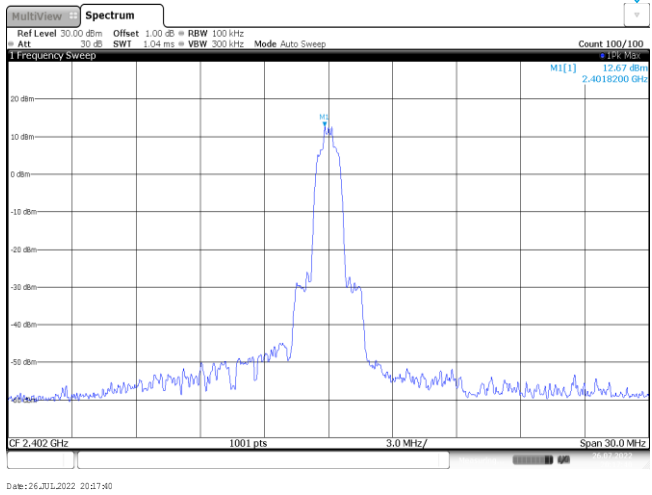
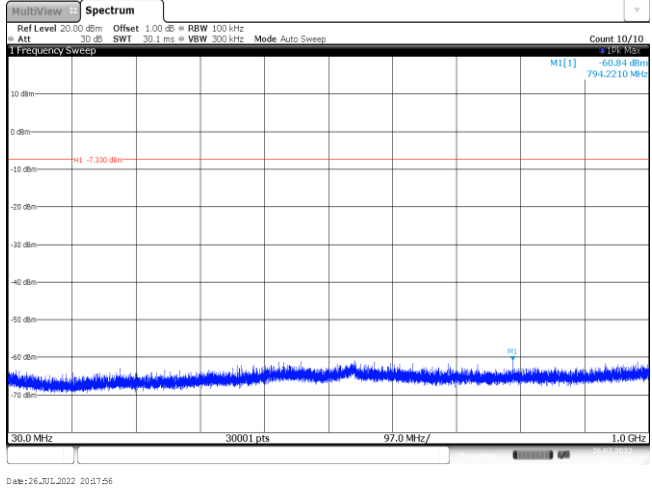
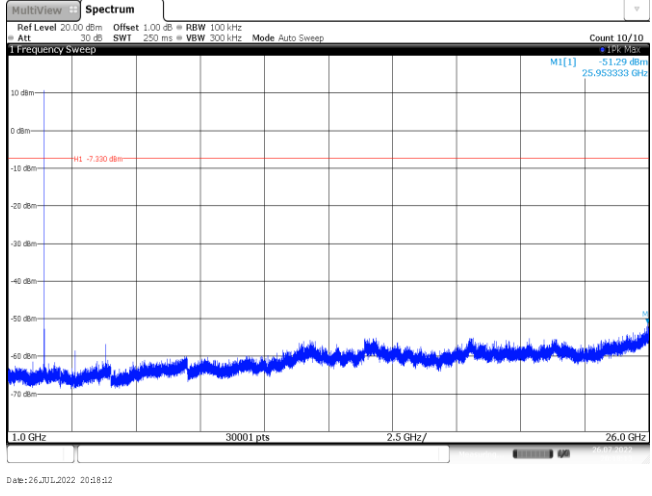


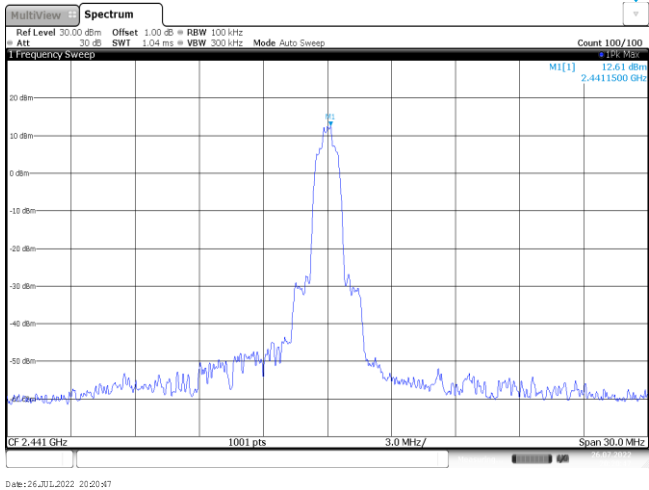
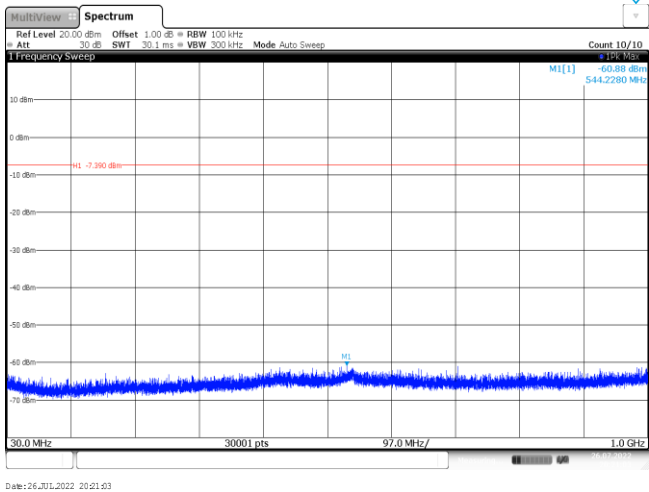
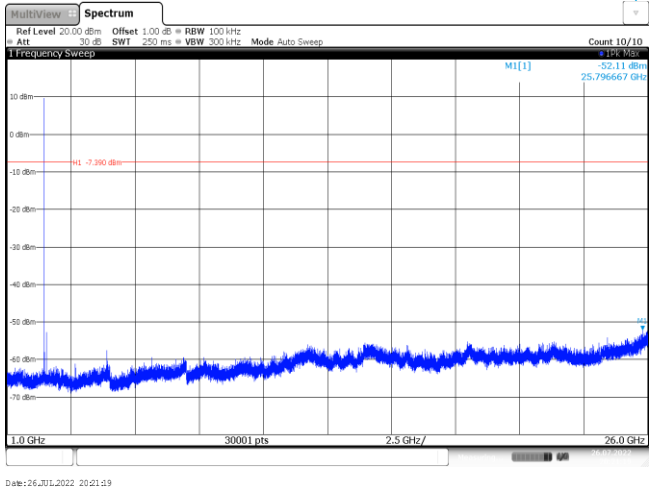
CH78
30MHz~1000MHz



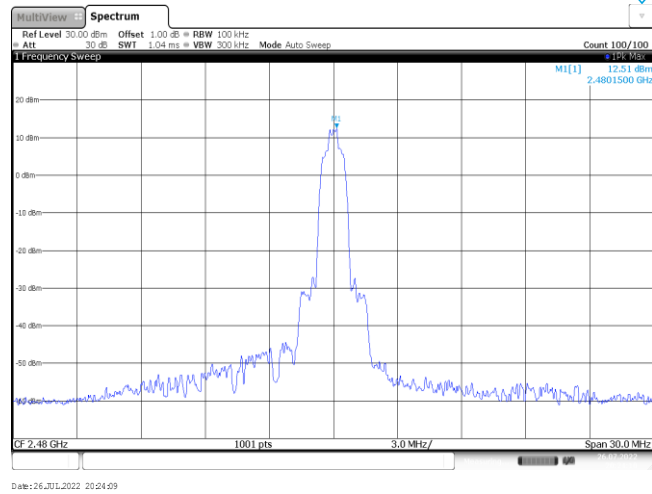
CH78
1GHz~26GHz



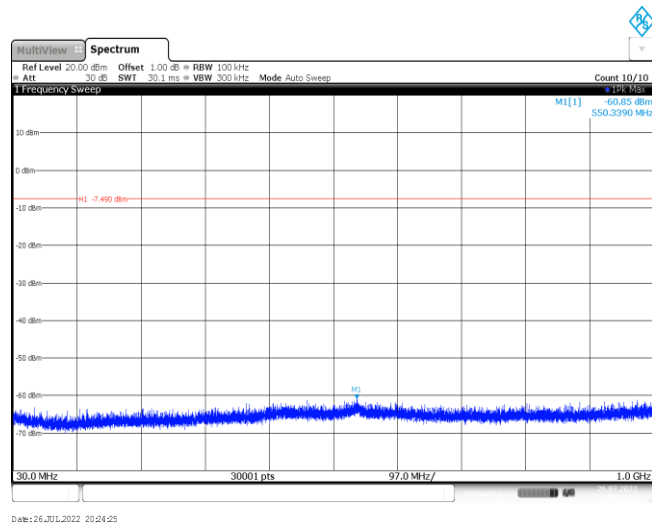
Test Item:	Spurious Emission	Modulation type:	$\pi/4$ DQPSK
CH00 Reference level			
CH00 30MHz~1000MHz			
CH00 1GHz~26GHz			

CH39 Reference level	
CH39 30MHz~1000MHz	
CH39 1GHz~26GHz	

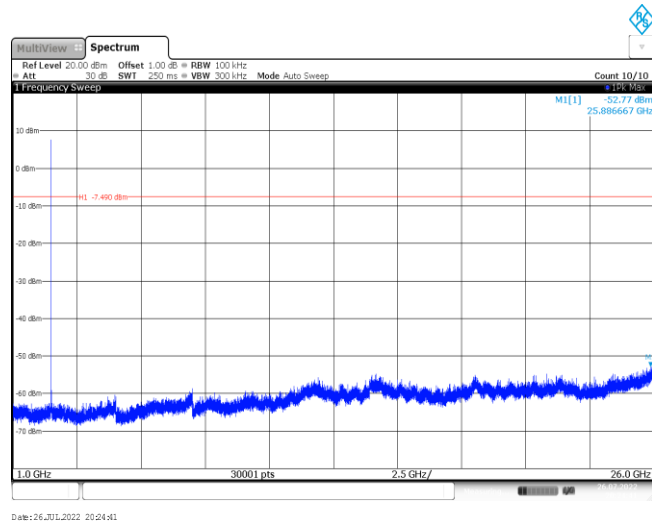
CH78
Reference level

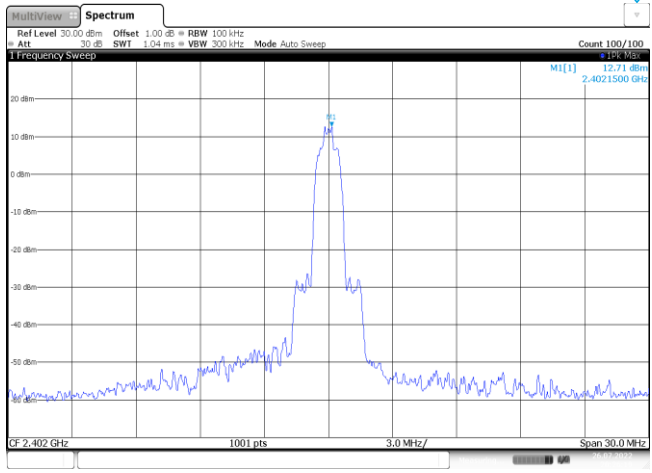
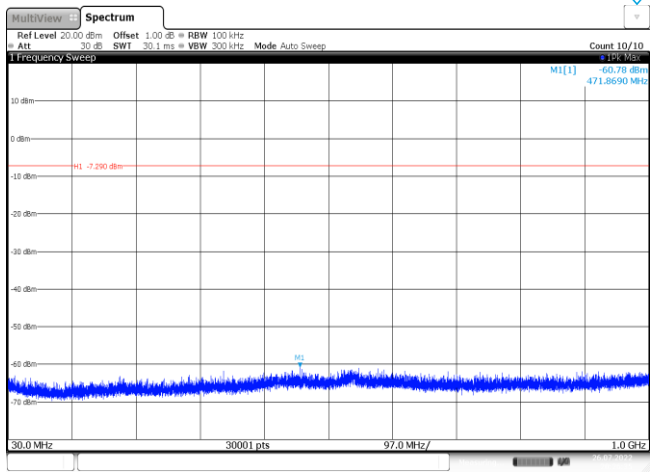
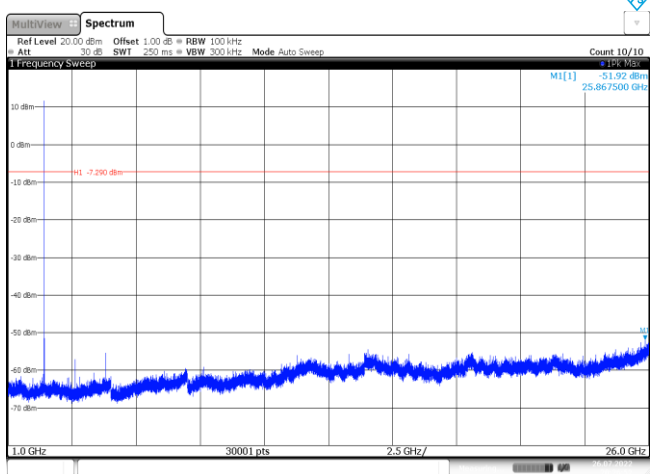


CH78
30MHz~1000MHz

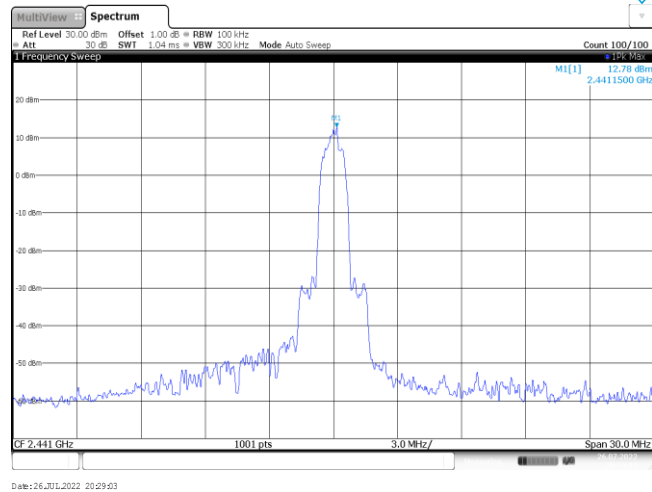


CH78
1GHz~26GHz

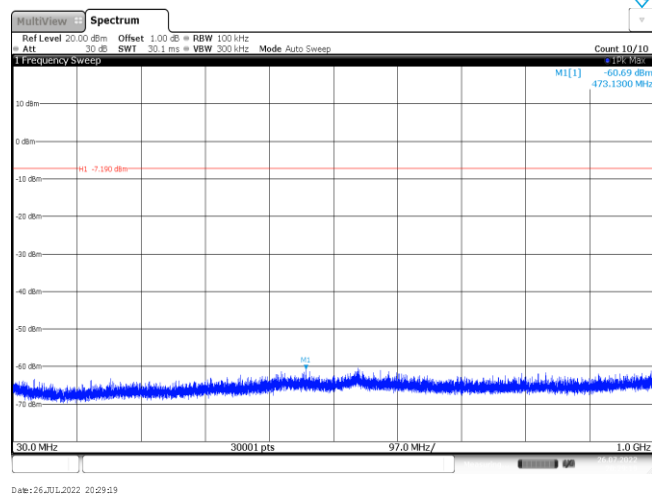


Test Item:	Spurious Emission	Modulation type:	8DPSK
CH00 Reference level			
CH00 30MHz~1000MHz			
CH00 1GHz~26GHz			

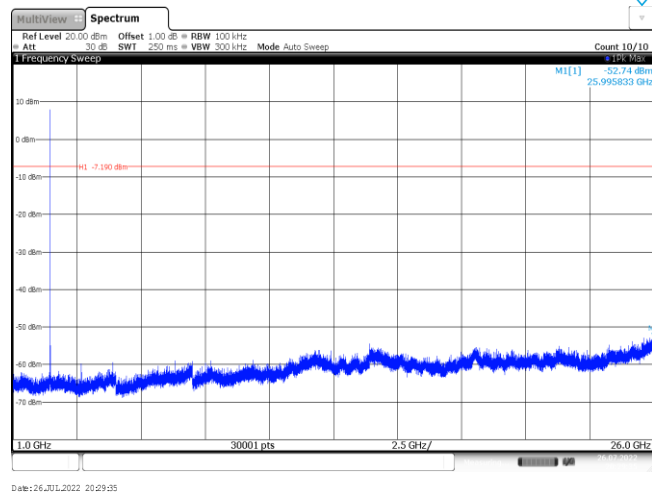
CH39
Reference level



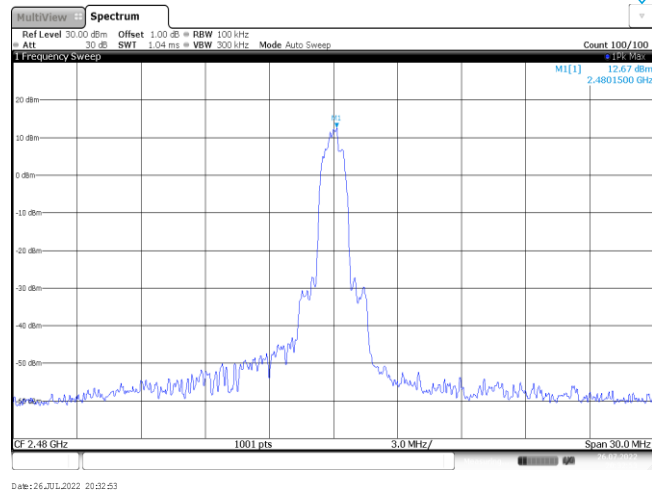
CH39
30MHz~1000MHz



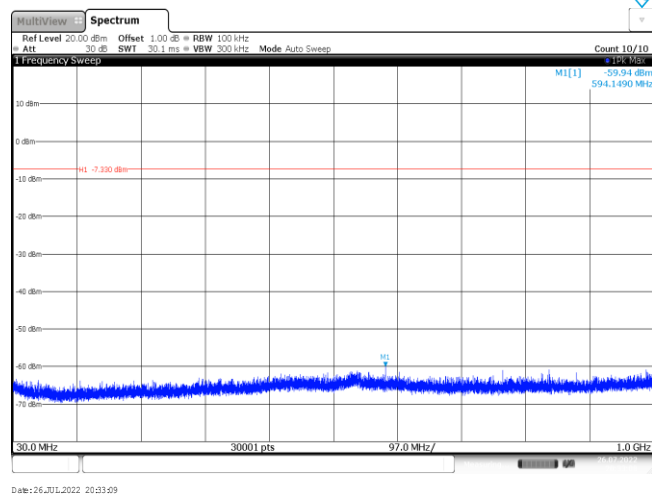
CH39
1GHz~26GHz



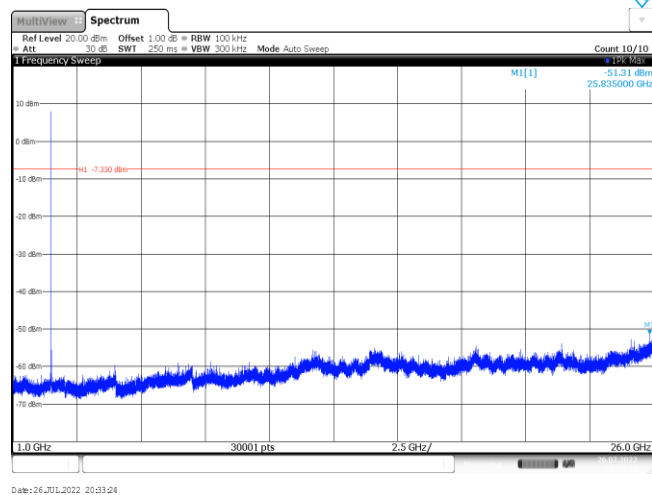
CH78
Reference level



CH78
30MHz~1000MHz



CH78
1GHz~26GHz



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