

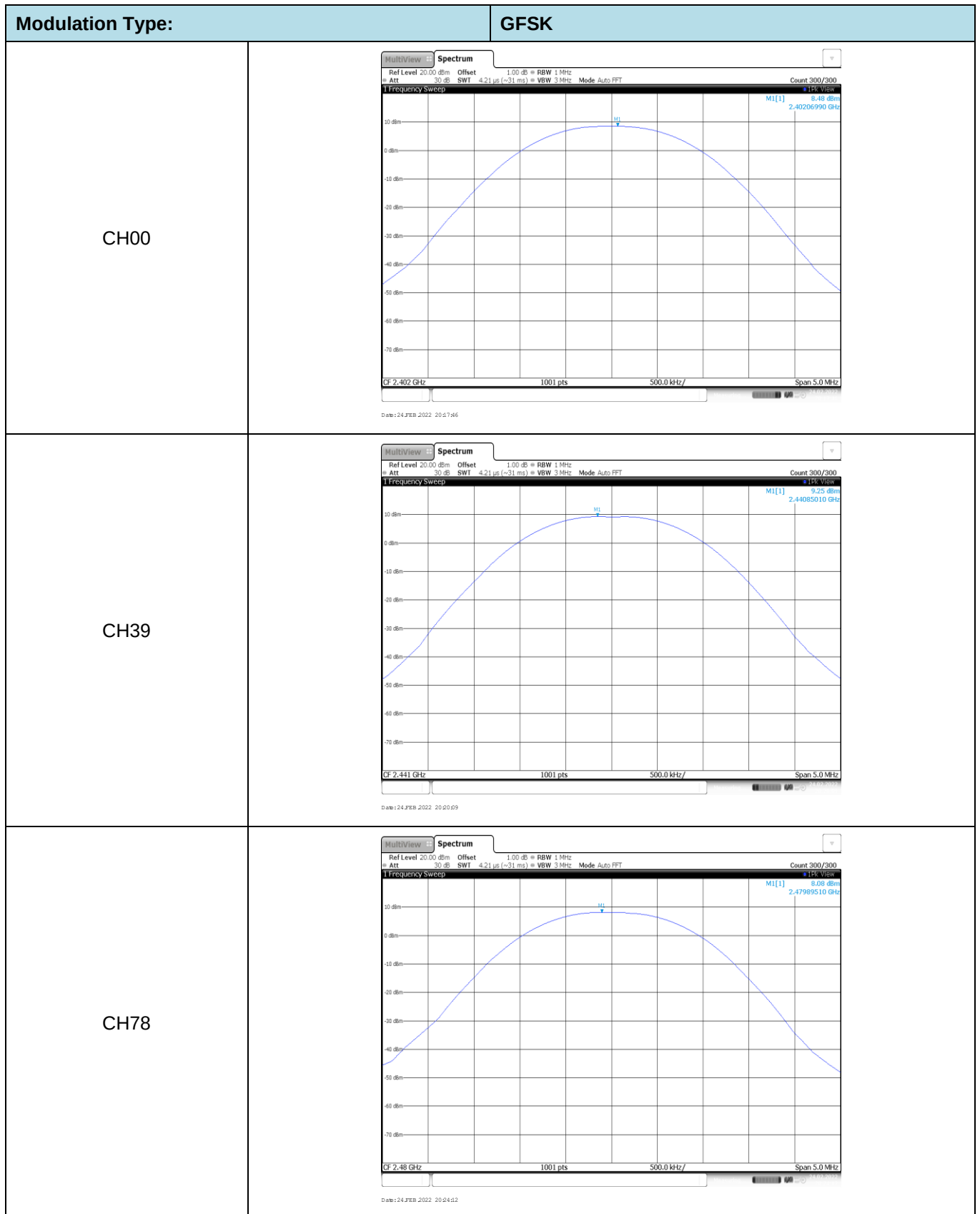
APPENDIX REPORT

Project No.	SHT2202018603EW	Radio Specification	Bluetooth EDR
Test sample No.	YPHT22020186003	Model No.	EyeOn-12WC
Start test date	2022-02-24	Finish date	2022-02-25
Temperature	24.2℃	Humidity	40%
Test Engineer	Hailey Chen	Auditor	Xiaodong Zhao

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

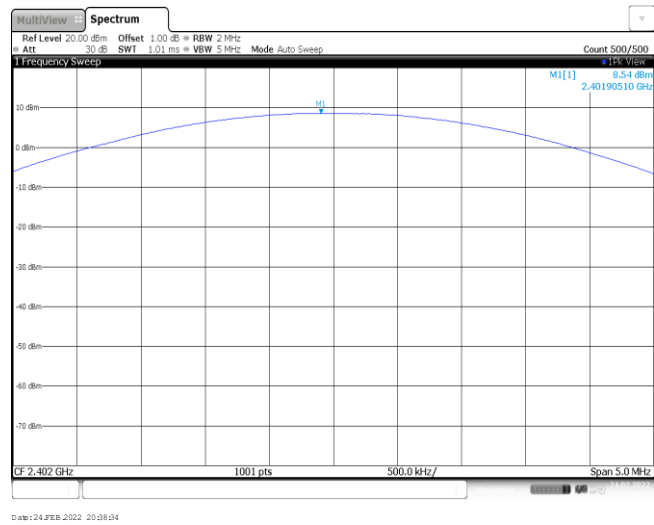
Modulation type	Channel	Peak Output power (dBm)	Average Output power (dBm)	Limit (dBm)	Result
GFSK	00	8.48	8.45	≤ 30.00	Pass
	39	9.25	9.18		
	78	8.08	8.14		
$\pi/4$ DQPSK	00	8.54	8.02	≤ 21.00	Pass
	39	9.27	8.70		
	78	8.07	7.50		
8DPSK	00	8.42	8.04	≤ 21.00	Pass
	39	9.43	8.87		
	78	8.17	7.65		



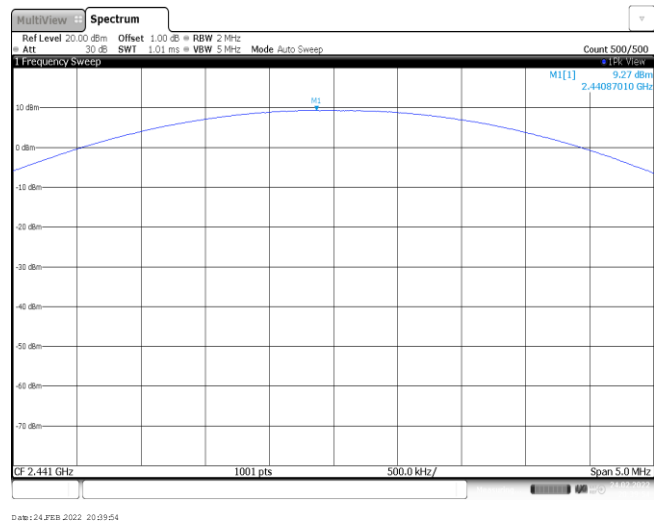
Modulation Type:

 $\pi/4$ DQPSK

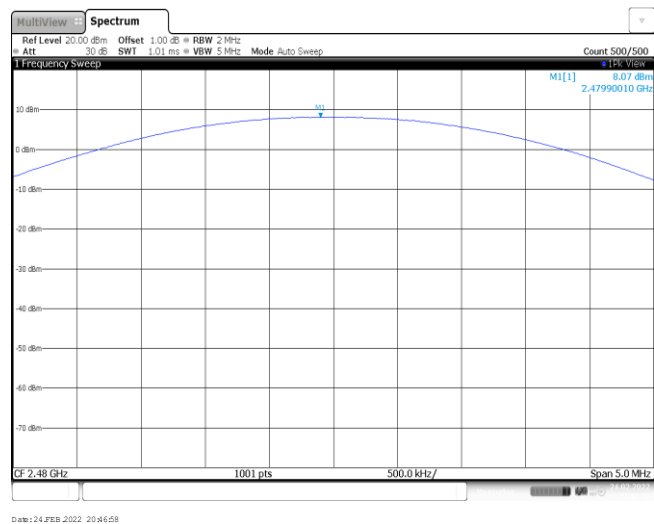
CH00



CH39



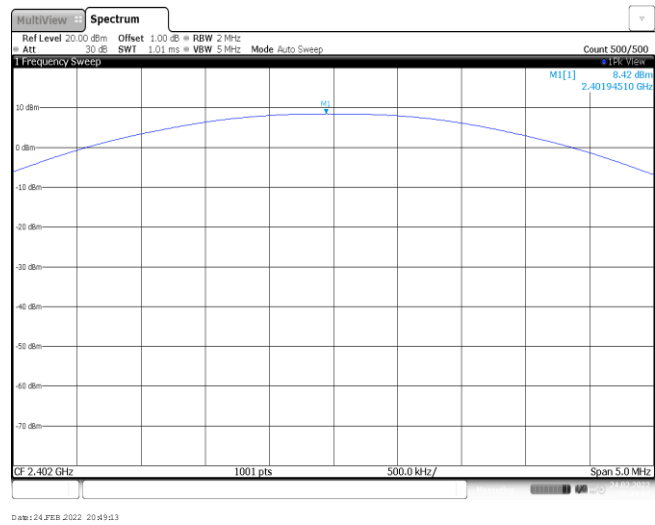
CH78



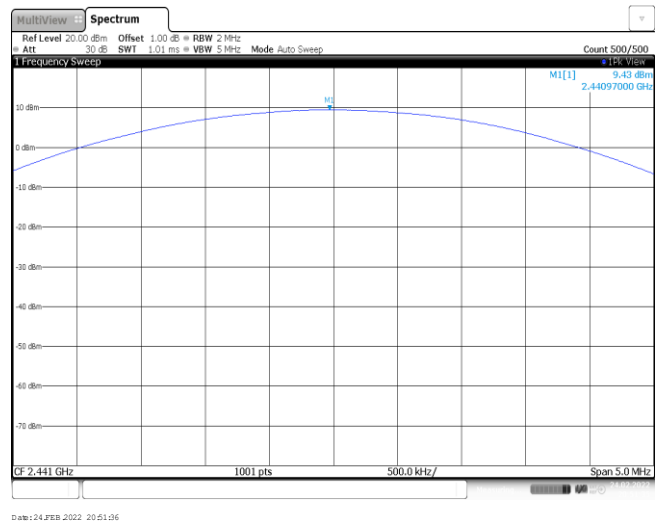
Modulation Type:

8DPSK

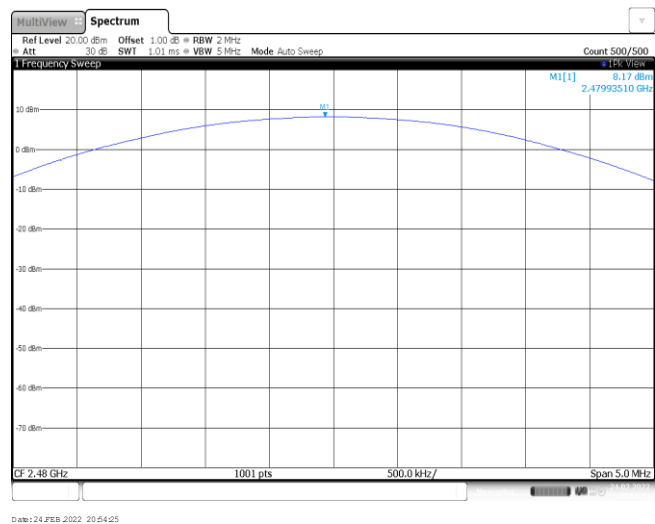
CH00



CH39



CH78



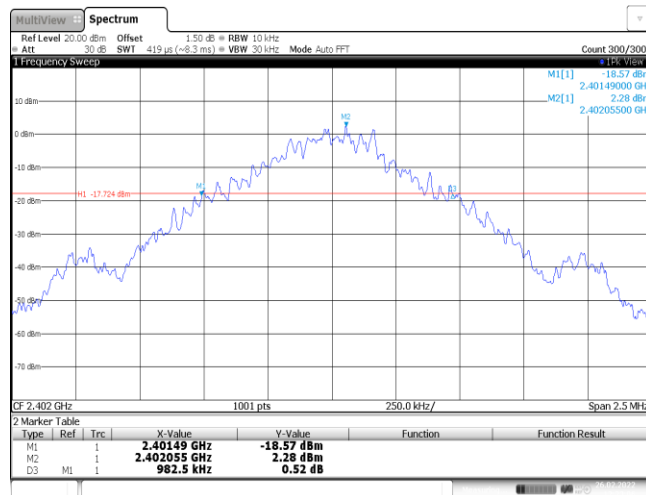
Appendix B : 20 dB Bandwidth

Modulation type	Channel	20 dB Bandwidth (kHz)	Limit (kHz)	Result
GFSK	00	982.50	-	Pass
	39	930.00		
	78	932.50		
$\pi/4$ DQPSK	00	1315.00	-	Pass
	39	1287.50		
	78	1310.00		
8DPSK	00	1305.00	-	Pass
	39	1295.00		
	78	1307.50		

Modulation Type:

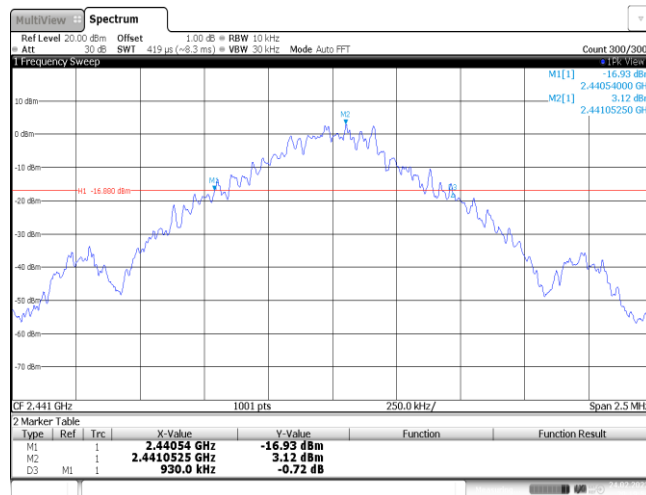
GFSK

CH00



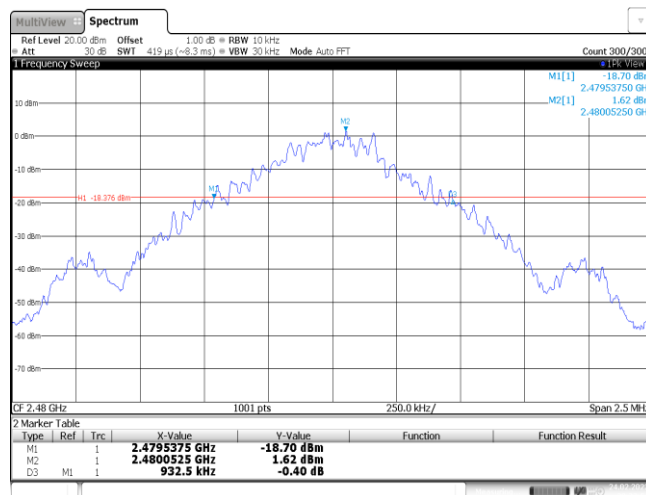
Date: 26.FEB.2022 12:23:07

CH39



Date: 24.FEB.2022 20:19:51

CH78

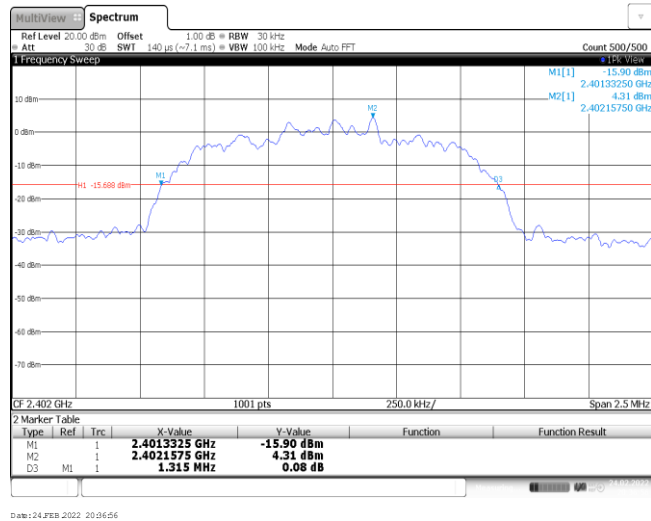


Date: 24.FEB.2022 20:23:53

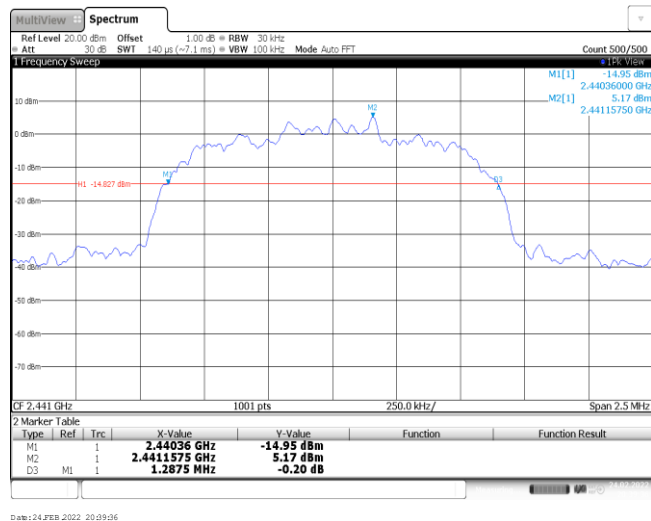
Modulation Type:

 π /4DQPSK

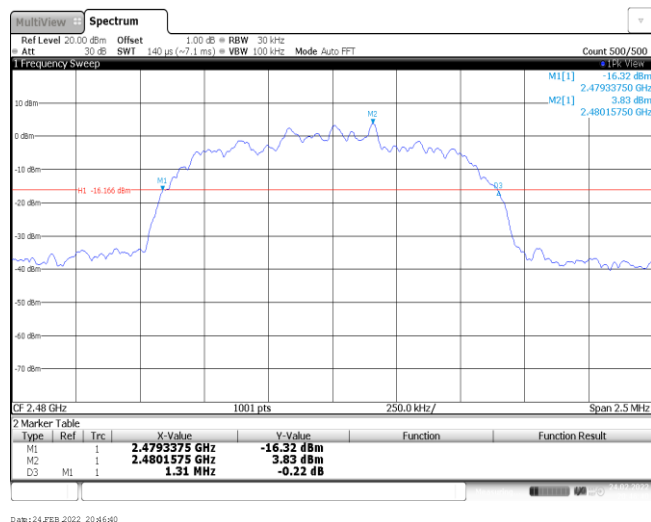
CH00



CH39



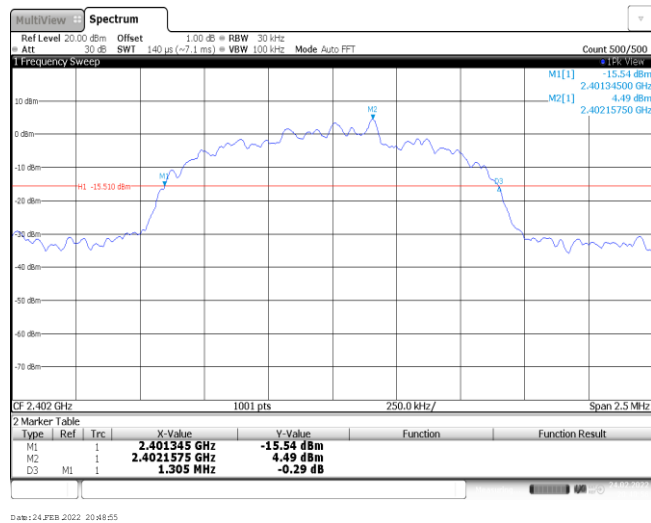
CH78



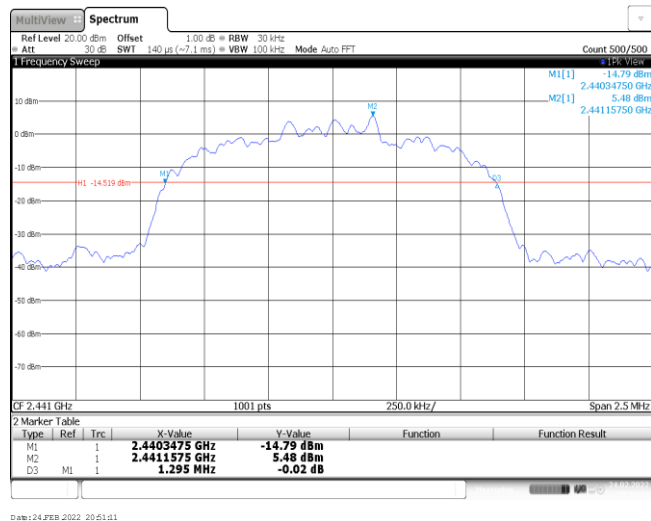
Modulation Type:

8DPSK

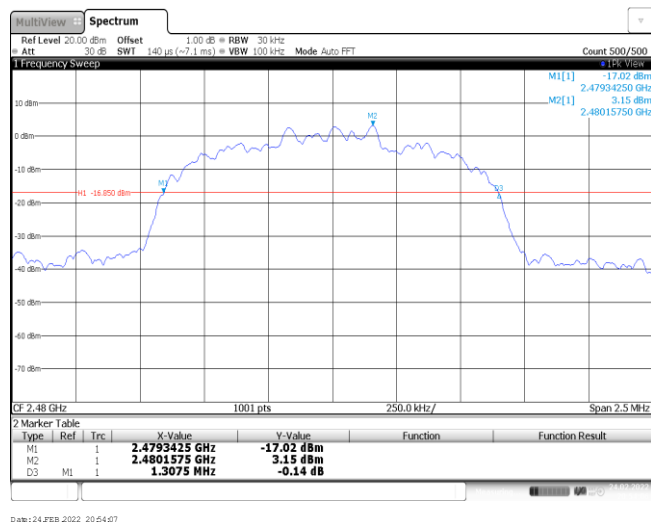
CH00



CH39



CH78



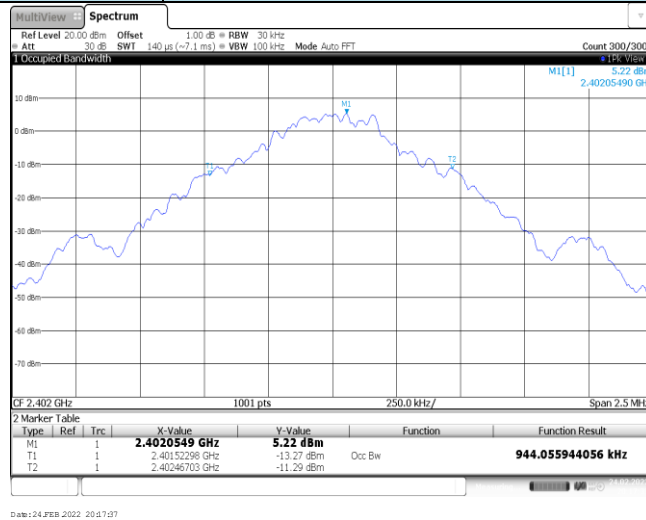
Appendix C: 99% Occupied Bandwidth

Modulation type	Channel	99% Occupied Bandwidth (MHz)	Limit (MHz)	Result
GFSK	00	0.94	-	Pass
	39	0.90		
	78	0.91		
$\pi/4$ DQPSK	00	1.18	-	Pass
	39	1.17		
	78	1.17		
8DPSK	00	1.19	-	Pass
	39	1.17		
	78	1.18		

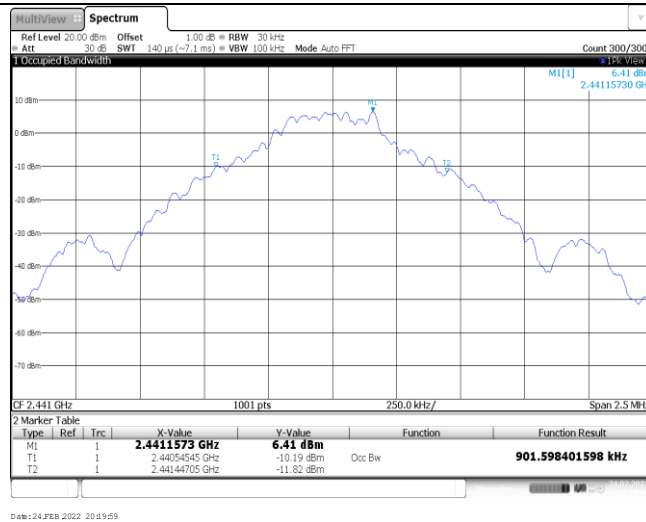
Modulation Type:

GFSK

CH00



CH39



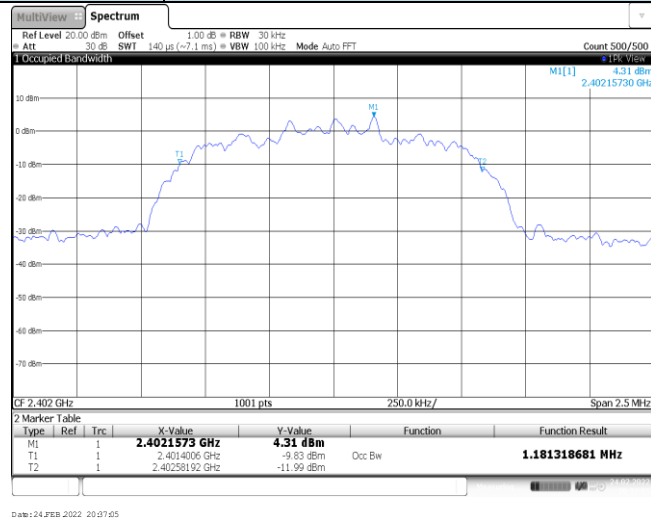
CH78



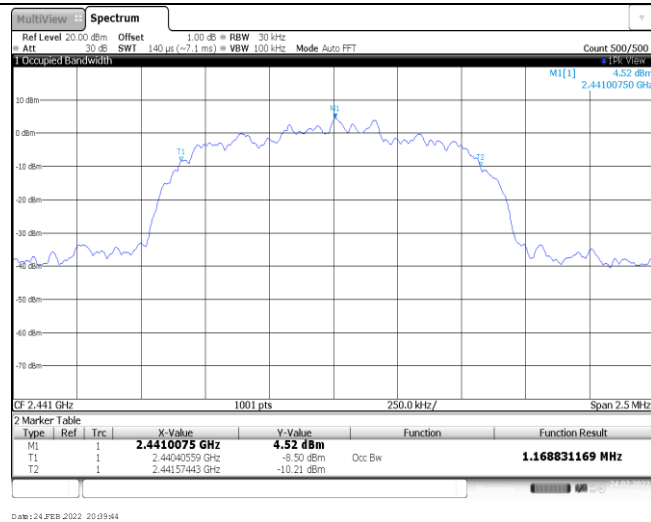
Modulation Type:

 π /4DQPSK

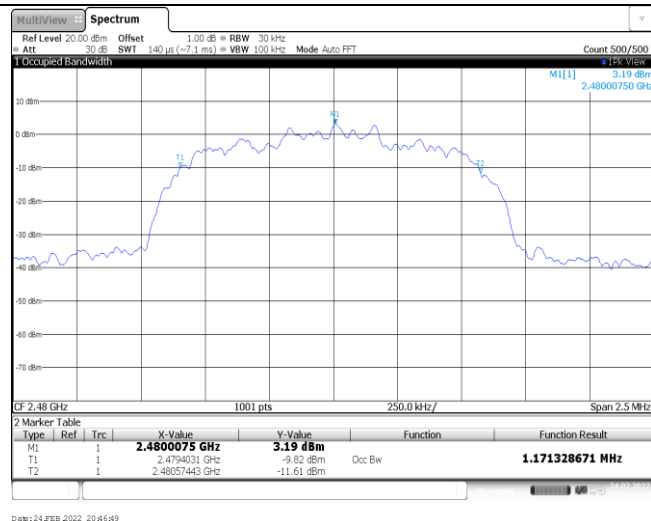
CH00



CH39



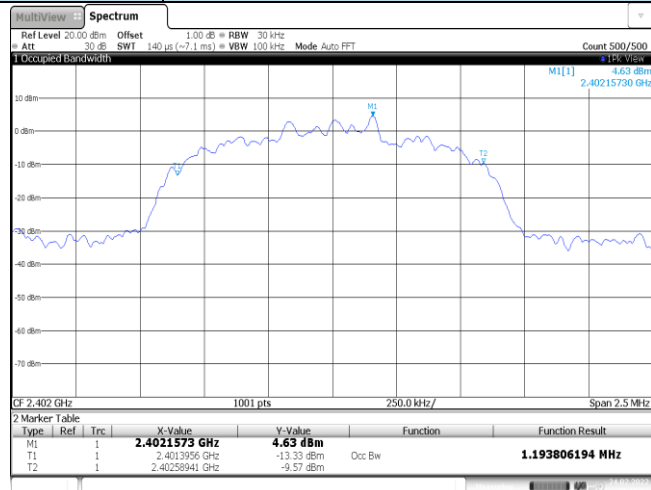
CH78



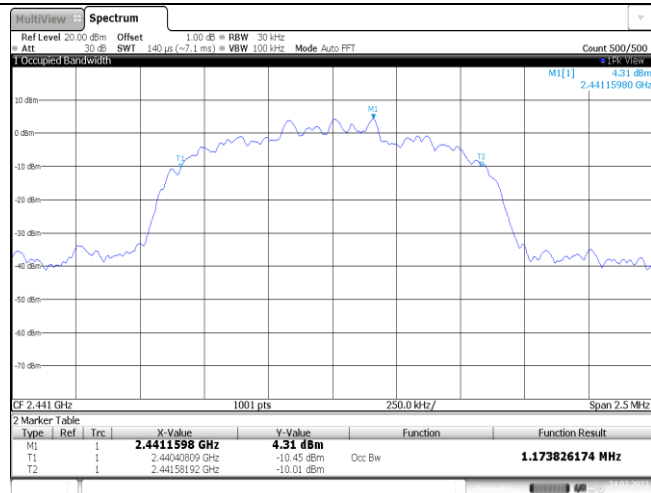
Modulation Type:

8DPSK

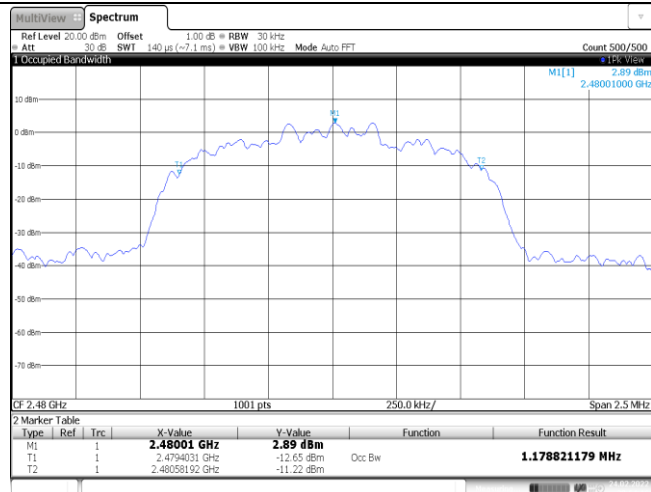
CH00



CH39



CH78



Appendix D: Carrier Frequencies Separation

Modulation type	Channel	Carrier Frequencies Separation (MHz)	Limit (kHz) *	Result
GFSK	39	1.00	≥982.50	Pass
π/4DQPSK	39	1.00	≥876.67	Pass
8DPSK	39	1.00	≥871.67	Pass

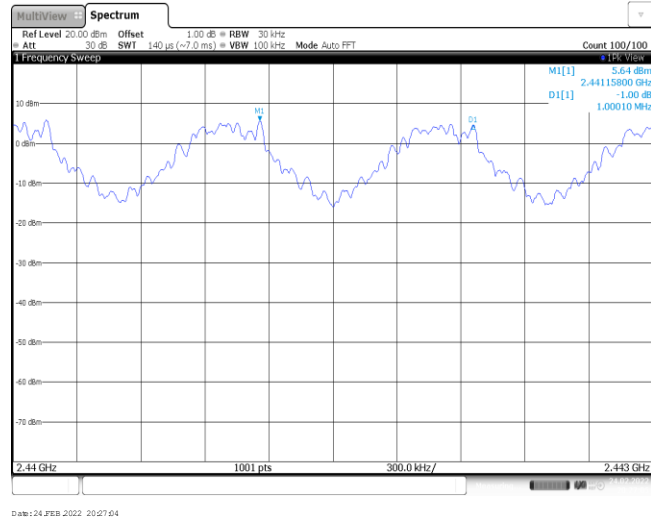
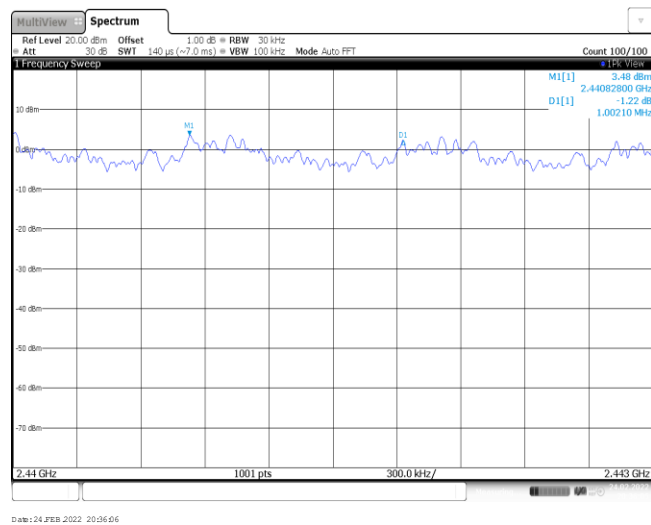
Note:

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

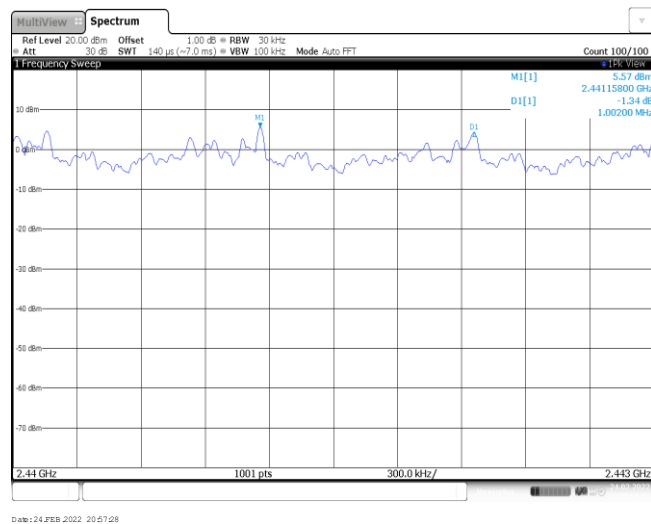
π/4DQPSK limit = $\frac{2}{3}$ * The maximum 20 dB Bandwidth for π/4DQPSK modulation on the appendix B.

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

GFSK

 $\pi/4$ DQPSK

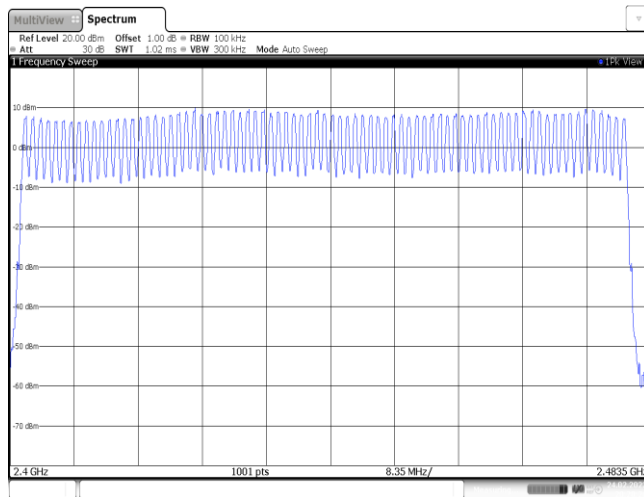
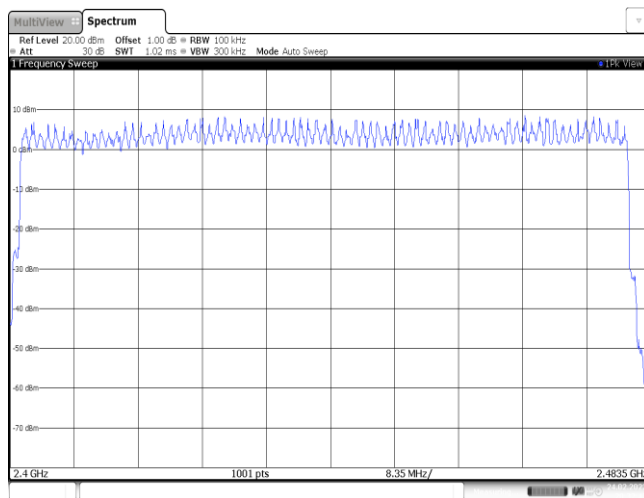
8DPSK



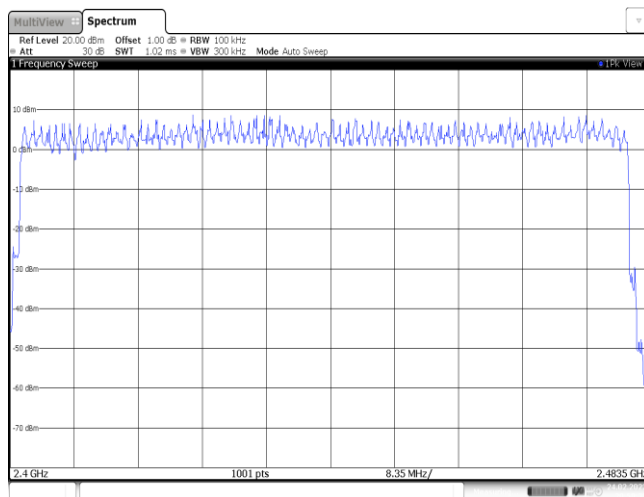
Appendix E: Hopping Channel Number

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

GFSK

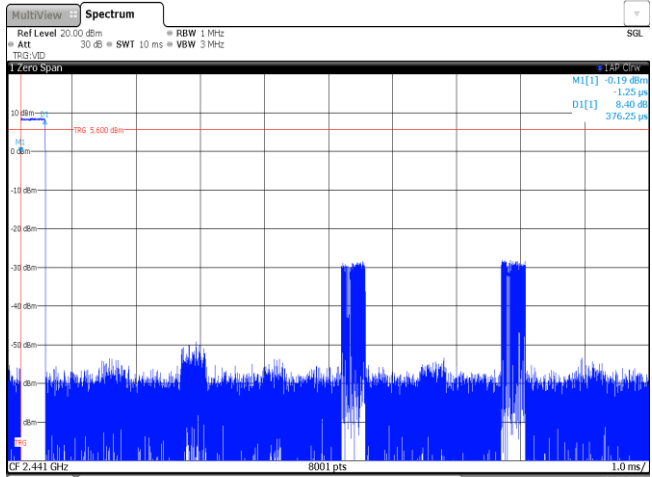
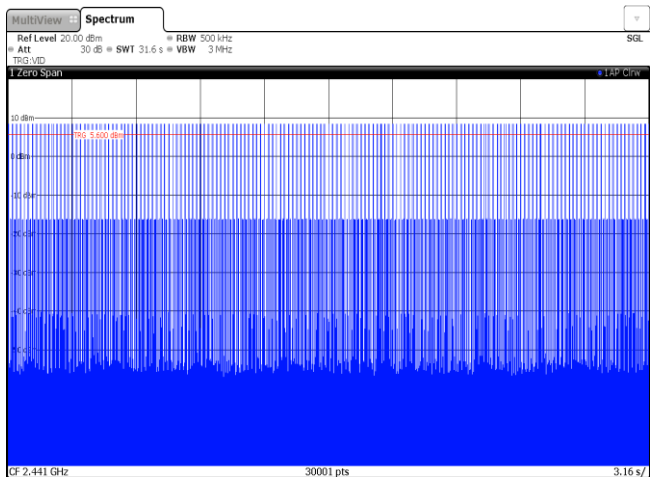
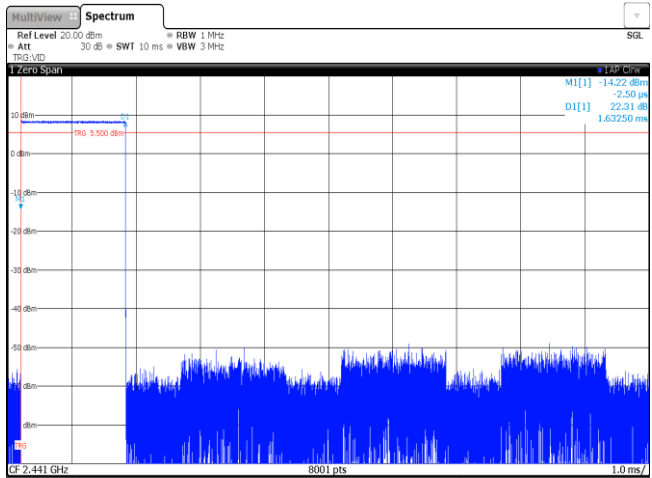
 $\pi/4$ DQPSK

8DPSK

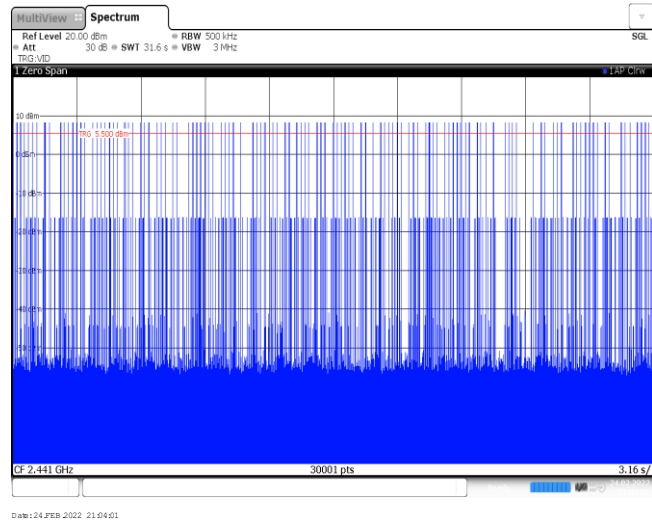


Appendix F: Dwell Time

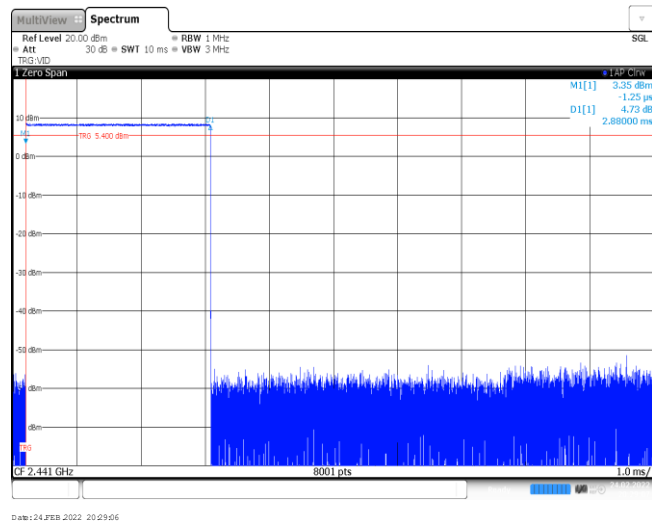
Modulation type	Packet	Burst Width [ms]	Total Hops[hop*ch]	Dwell time (Second)	Limit (Second)	Result
GFSK	DH1	0.38	317	0.12	≤ 0.40	Pass
	DH3	1.63	161	0.26		
	DH5	2.88	108	0.31		
$\pi/4$ DQPSK	2DH1	0.38	313	0.12	≤ 0.40	Pass
	2DH3	1.64	158	0.26		
	2DH5	2.88	114	0.33		
8DPSK	3DH1	0.38	316	0.12	≤ 0.40	Pass
	3DH3	1.64	162	0.27		
	3DH5	2.89	96	0.28		

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 -60 to 10. The x-axis represents time in ms, ranging from 0 to 1.0 ms. The plot shows a burst of signal at approximately 0.5 ms and 0.8 ms. The signal level is around -10 dBm. The plot is titled 'Spectrum' and includes parameters: Ref Level 20.00 dBm, Att 30 dB, RBW 1 MHz, SWT 10 ms, VBW 3 MHz. The plot also shows a 'Zero Span' view and a '1AP Chirp' view.
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 -60 to 10. The x-axis represents time in s, ranging from 0 to 3.16 s. The plot shows a continuous burst of signal. The signal level is around -10 dBm. The plot is titled 'Spectrum' and includes parameters: Ref Level 20.00 dBm, Att 30 dB, RBW 500 kHz, SWT 31.6 s, VBW 3 MHz. The plot also shows a 'Zero Span' view and a '1AP Chirp' view.
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 -60 to 10. The x-axis represents time in ms, ranging from 0 to 1.0 ms. The plot shows a burst of signal at approximately 0.5 ms and 0.8 ms. The signal level is around -10 dBm. The plot is titled 'Spectrum' and includes parameters: Ref Level 20.00 dBm, Att 30 dB, RBW 1 MHz, SWT 10 ms, VBW 3 MHz. The plot also shows a 'Zero Span' view and a '1AP Chirp' view.

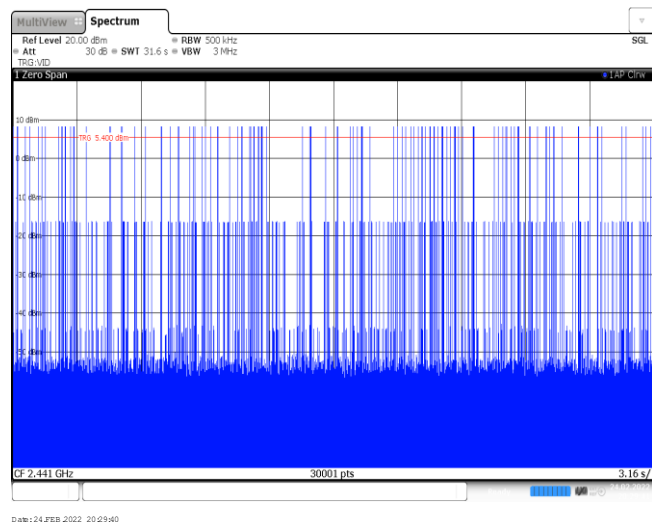
DH3
Burst number

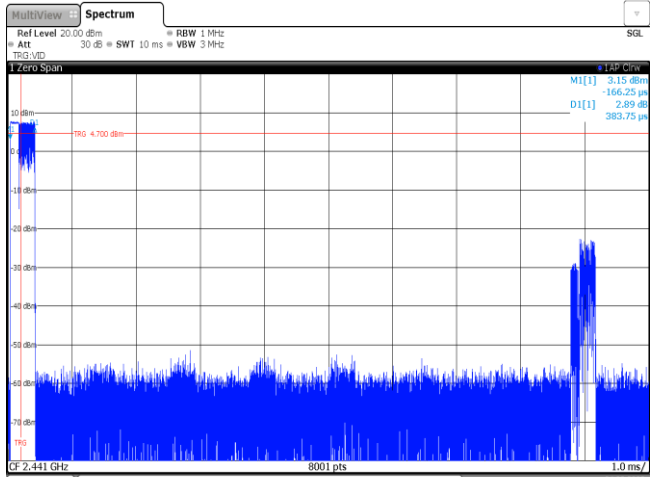
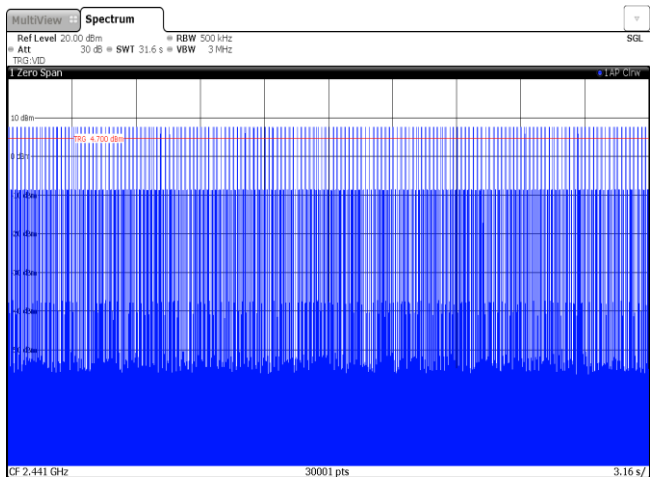
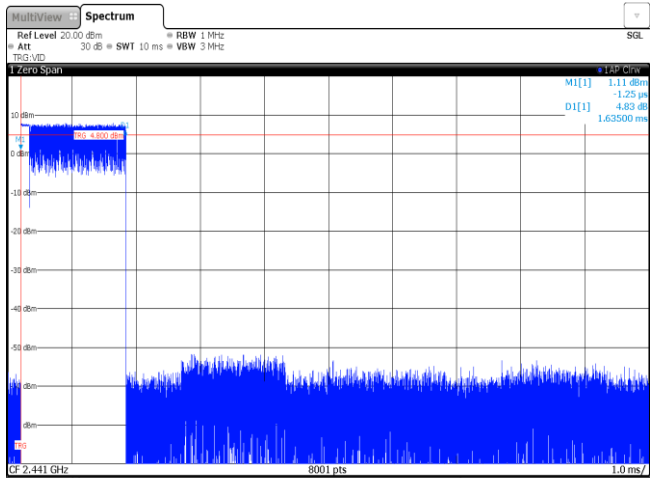


DH5
Burst width

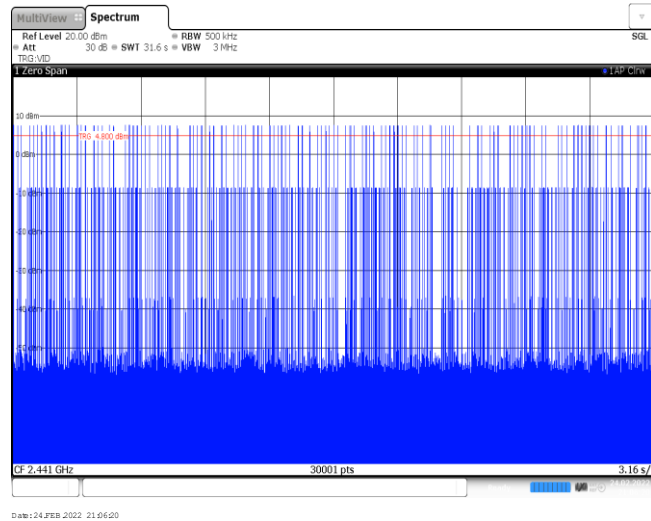


DH5
Burst number

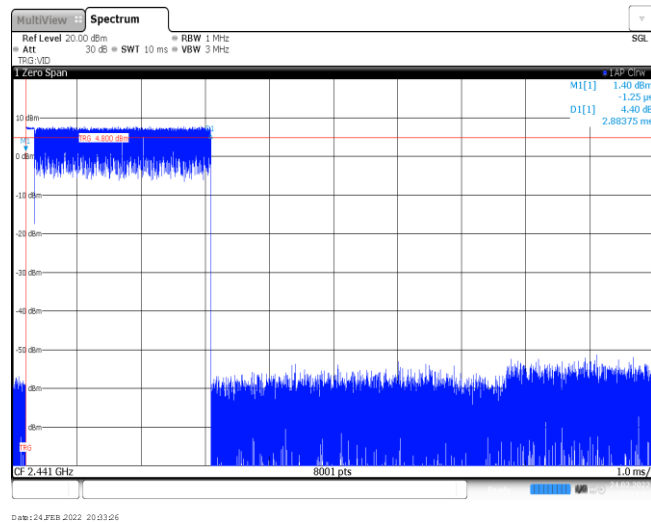


Modulation Type:	$\pi/4$ DQPSK
2DH1 Burst width	 The spectrum plot shows a signal at 2.441 GHz with a bandwidth of 8001 pts. The y-axis represents power in dBm, ranging from -60 to 10. A red horizontal line indicates a reference level at -4.700 dBm. The signal is characterized by a sharp peak at the carrier frequency, with a noise floor around -60 dBm. The plot includes parameters: Ref Level 20.00 dBm, Att 30 dB, SWT 10 ms, VBW 3 MHz, RBW 1 MHz, and TSG V/D. The date is 24.FEB.2022 21:04:25.
2DH1 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 -60 to 10. The signal is characterized by a dense, continuous burst of energy across the entire bandwidth, with a noise floor around -60 dBm. The plot includes parameters: Ref Level 20.00 dBm, Att 30 dB, SWT 31.6 s, VBW 3 MHz, RBW 500 kHz, and TSG V/D. The date is 24.FEB.2022 21:05:09.
2DH3 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 -60 to 10. A red horizontal line indicates a reference level at -4.800 dBm. The signal is characterized by a sharp peak at the carrier frequency, with a noise floor around -60 dBm. The plot includes parameters: Ref Level 20.00 dBm, Att 30 dB, SWT 10 ms, VBW 3 MHz, RBW 1 MHz, and TSG V/D. The date is 24.FEB.2022 21:05:46.

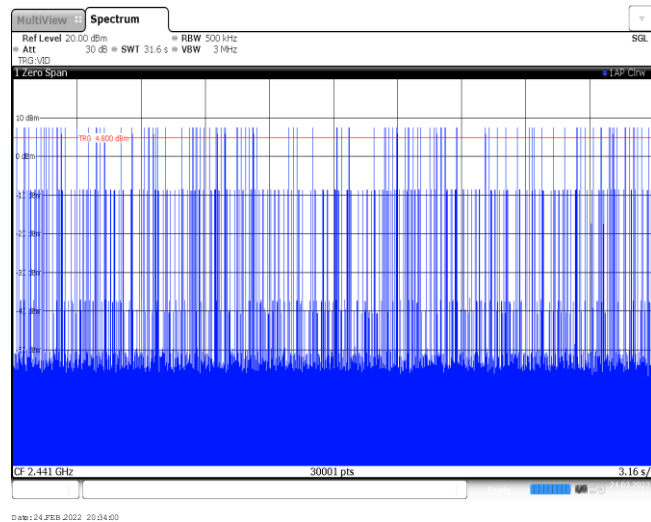
2DH3
Burst number



2DH5
Burst width

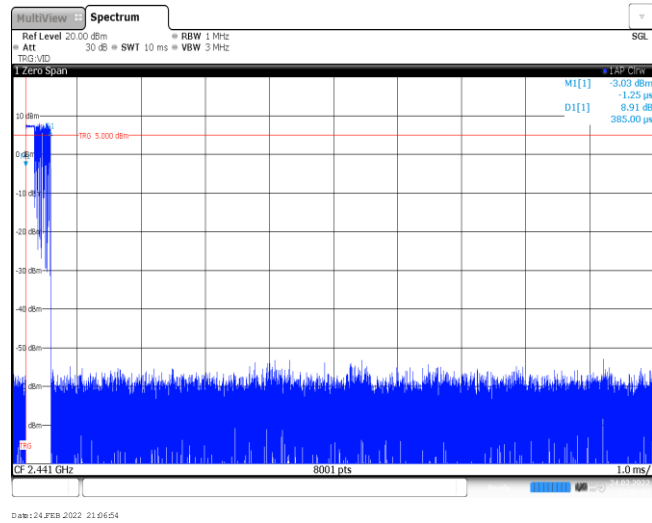
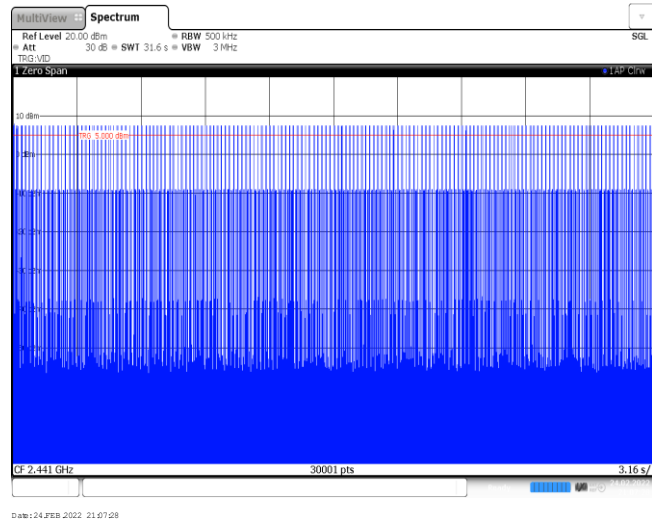
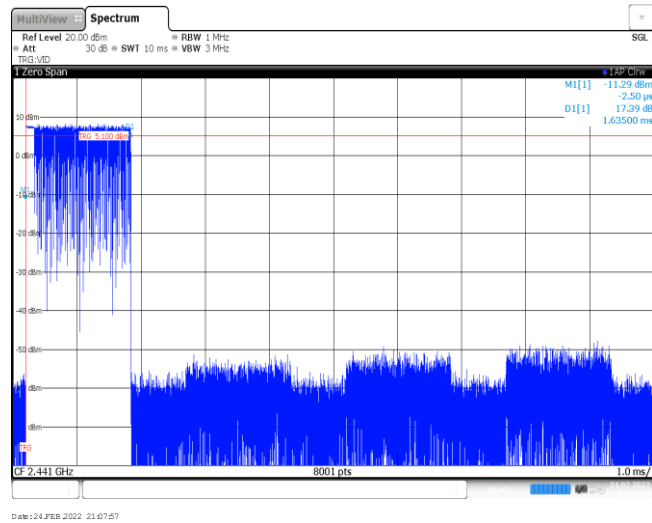


2DH5
Burst number

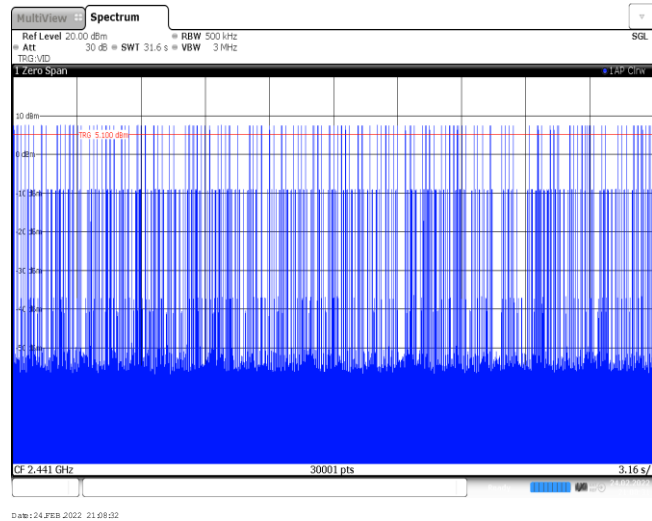


Modulation Type:

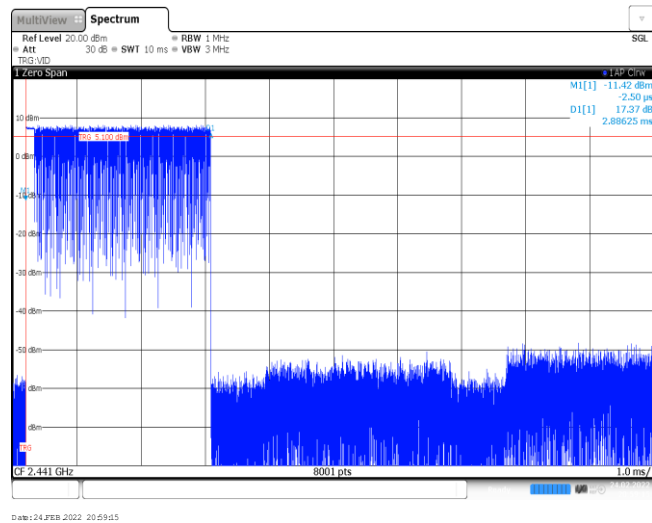
8DPSK

3DH1
Burst width3DH1
Burst number3DH3
Burst width

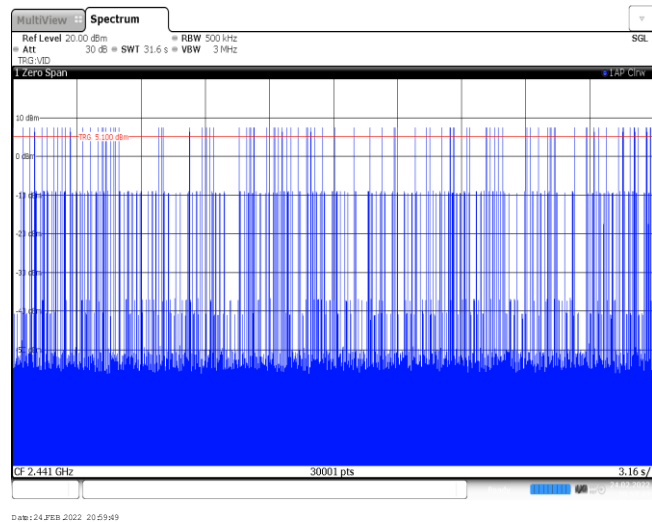
3DH3
Burst number



3DH5
Burst width



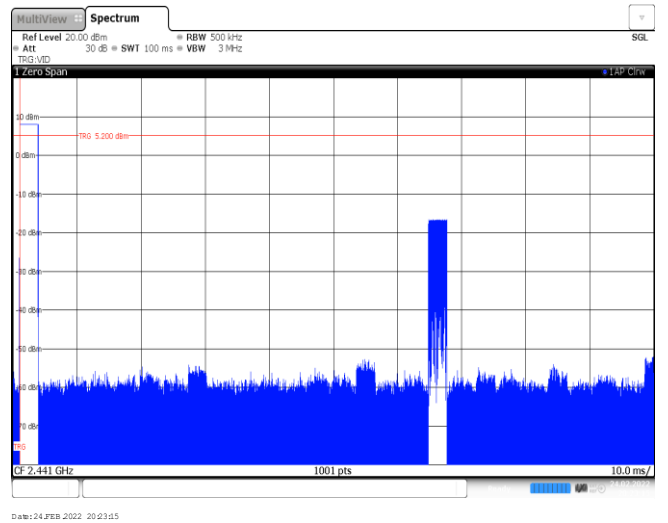
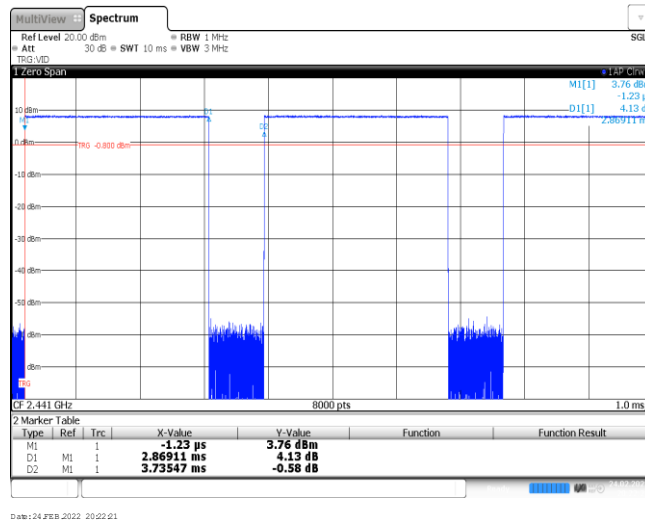
3DH5
Burst number



Appendix G: Duty Cycle Correction Factor (DCCF)

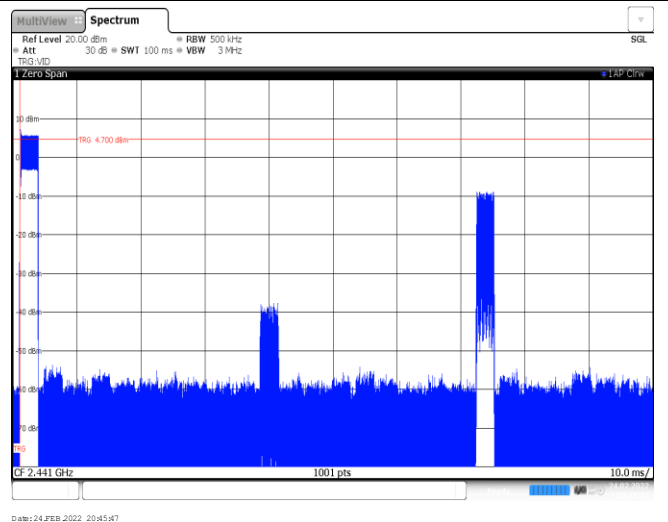
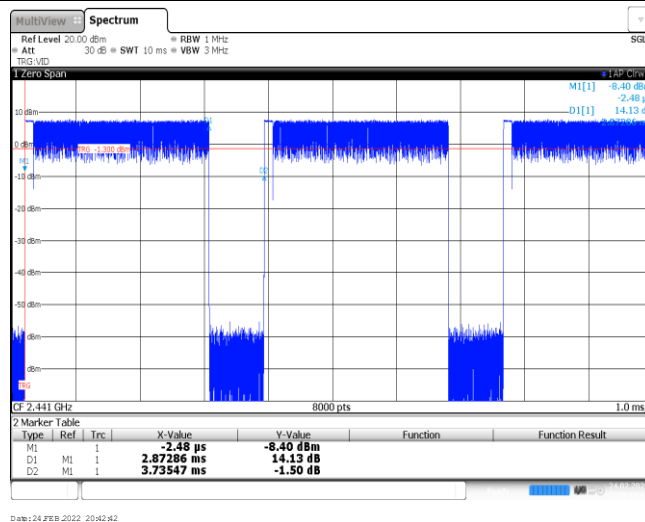
DCCF Calculate Formula					
$DCCF = 20 * \text{Log}(\text{duty cycle}) = 20 * \text{Log}(T_{\text{on time}} / T_{\text{period}})$					
Modulation type	Test Frequency (MHz)	$T_{\text{on time}}$ for single burst [ms]	T_{period} [ms]	Burst Quantity	DCCF [dB]
GFSK	2441	2.87	100	2	-24.82
$\pi/4$ DQPSK	2441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

GFSK



Ton time for single burst

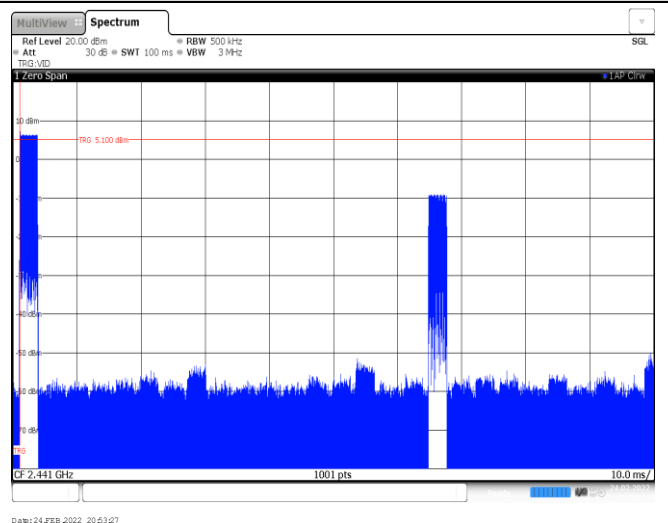
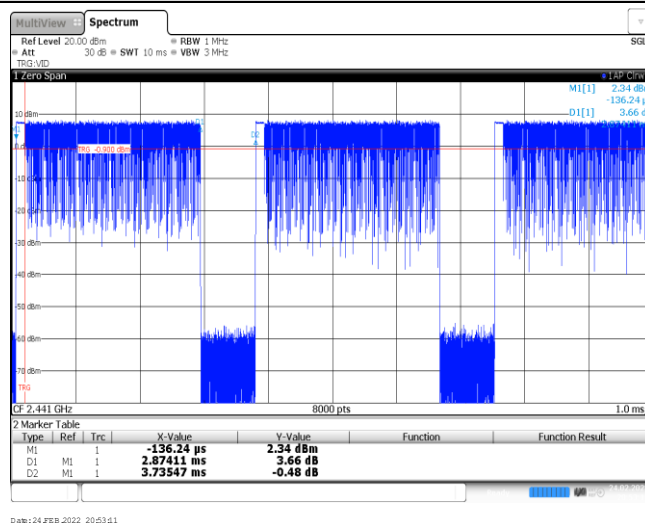
Burst Quantity

 $\pi/4$ DQPSK

Ton time for single burst

Burst Quantity

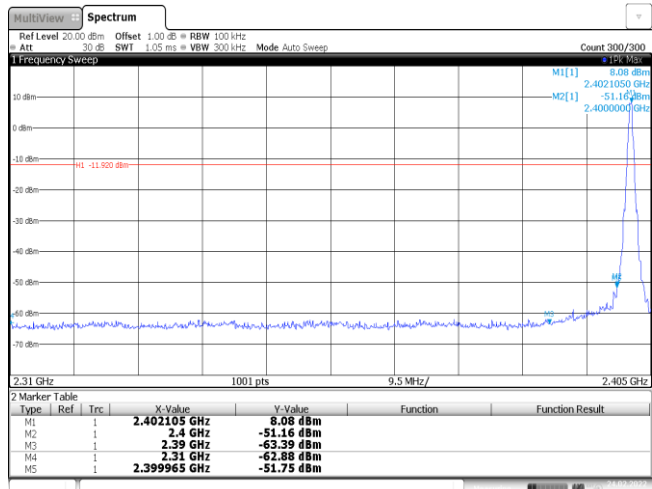
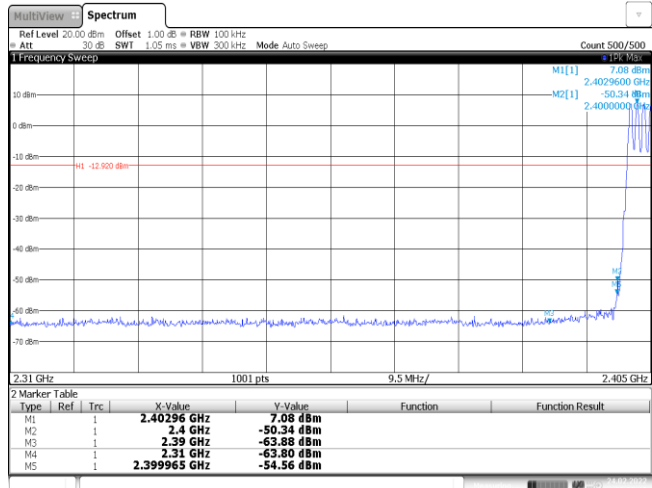
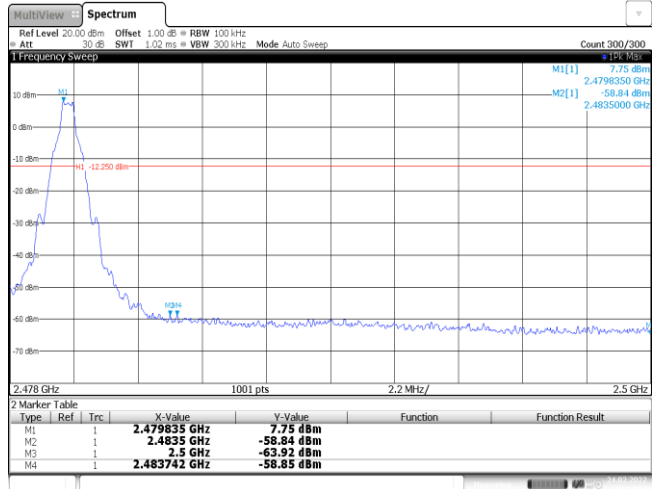
8DPSK



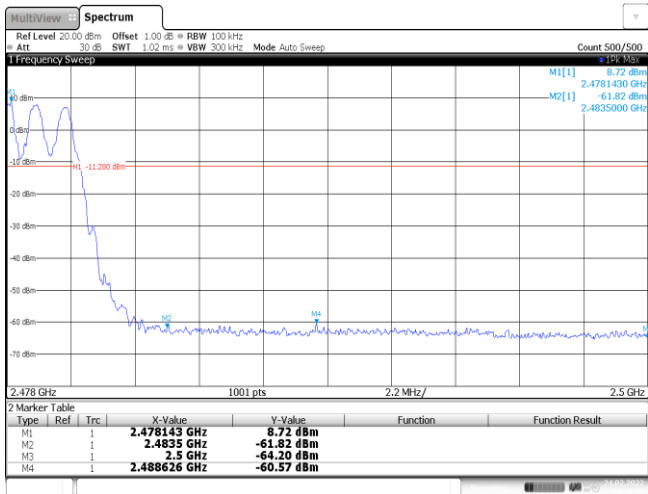
Ton time for single burst

Burst Quantity

Appendix H: Band edge and Spurious Emissions (conducted)

Test Item:	Band edge	Modulation type:	GFSK																																										
CH00 No hopping mode	 2 Marker Table <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>8.08 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>2.4 GHz</td><td>-51.16 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>2.39 GHz</td><td>-63.39 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>2.31 GHz</td><td>-62.88 dBm</td><td></td><td></td></tr><tr><td>M5</td><td>1</td><td></td><td>2.399965 GHz</td><td>-51.75 dBm</td><td></td><td></td></tr></table> Date: 24.FEB.2022 20:18:27	Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		2.402105 GHz	8.08 dBm			M2	1		2.4 GHz	-51.16 dBm			M3	1		2.39 GHz	-63.39 dBm			M4	1		2.31 GHz	-62.88 dBm			M5	1		2.399965 GHz	-51.75 dBm				
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																																							
M1	1		2.402105 GHz	8.08 dBm																																									
M2	1		2.4 GHz	-51.16 dBm																																									
M3	1		2.39 GHz	-63.39 dBm																																									
M4	1		2.31 GHz	-62.88 dBm																																									
M5	1		2.399965 GHz	-51.75 dBm																																									
CH00 Hopping mode	 2 Marker Table <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>2.40296 GHz</td><td>7.08 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>2.4 GHz</td><td>-50.34 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>2.39 GHz</td><td>-63.88 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>2.31 GHz</td><td>-63.80 dBm</td><td></td><td></td></tr><tr><td>M5</td><td>1</td><td></td><td>2.399965 GHz</td><td>-54.56 dBm</td><td></td><td></td></tr></table> Date: 24.FEB.2022 20:28:40	Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		2.40296 GHz	7.08 dBm			M2	1		2.4 GHz	-50.34 dBm			M3	1		2.39 GHz	-63.88 dBm			M4	1		2.31 GHz	-63.80 dBm			M5	1		2.399965 GHz	-54.56 dBm				
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																																							
M1	1		2.40296 GHz	7.08 dBm																																									
M2	1		2.4 GHz	-50.34 dBm																																									
M3	1		2.39 GHz	-63.88 dBm																																									
M4	1		2.31 GHz	-63.80 dBm																																									
M5	1		2.399965 GHz	-54.56 dBm																																									
CH78 No hopping mode	 2 Marker Table <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>2.479835 GHz</td><td>7.75 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>2.48335 GHz</td><td>-58.84 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>2.5 GHz</td><td>-63.92 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>2.483742 GHz</td><td>-58.85 dBm</td><td></td><td></td></tr></table> Date: 24.FEB.2022 20:24:49	Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		2.479835 GHz	7.75 dBm			M2	1		2.48335 GHz	-58.84 dBm			M3	1		2.5 GHz	-63.92 dBm			M4	1		2.483742 GHz	-58.85 dBm											
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																																							
M1	1		2.479835 GHz	7.75 dBm																																									
M2	1		2.48335 GHz	-58.84 dBm																																									
M3	1		2.5 GHz	-63.92 dBm																																									
M4	1		2.483742 GHz	-58.85 dBm																																									

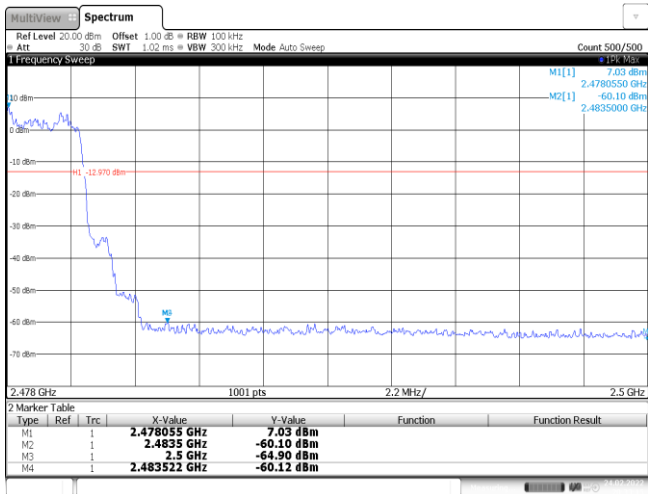
CH78
Hopping mode



Date: 24 FEB 2022 20:29:54

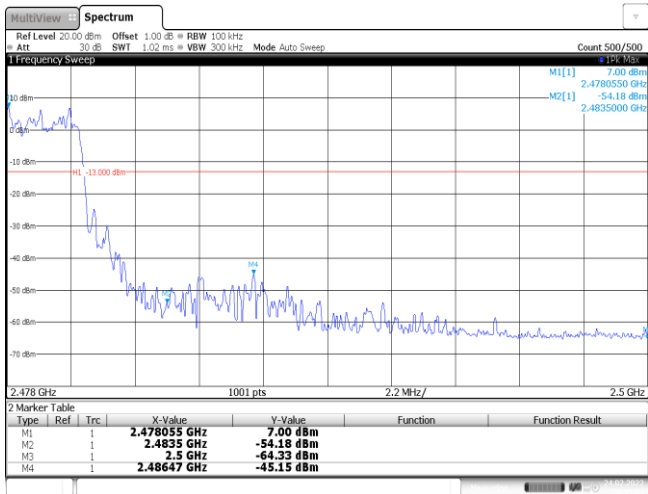
Test Item:	Band edge	Modulation type:	$\pi/4$ DQPSK																																										
CH00 No hopping mode	MultiViewSpectrum Ref Level 20.00 dBm Offset 1.00 dB BW 100 kHz Att 30 dB SW 1.05 ms VBW 300 kHz Mode Auto Sweep Count 500/500 Frequency Sweep M1[1] 7.50 dBm 2.401821 GHz M2[1] -43.57 dBm 2.400000 GHz -12.500 dBm M1 2.31 GHz1001 pts9.5 MHz/2.405 GHz 2 Marker Table <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>2.401821 GHz</td><td>7.50 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>2.4 GHz</td><td>-43.57 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>2.39 GHz</td><td>-61.88 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>2.31 GHz</td><td>-64.85 dBm</td><td></td><td></td></tr><tr><td>M5</td><td>1</td><td></td><td>2.39987 GHz</td><td>-44.25 dBm</td><td></td><td></td></tr></table> Date: 24.FEB.2022 20:37:29			Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		2.401821 GHz	7.50 dBm			M2	1		2.4 GHz	-43.57 dBm			M3	1		2.39 GHz	-61.88 dBm			M4	1		2.31 GHz	-64.85 dBm			M5	1		2.39987 GHz	-44.25 dBm		
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																																							
M1	1		2.401821 GHz	7.50 dBm																																									
M2	1		2.4 GHz	-43.57 dBm																																									
M3	1		2.39 GHz	-61.88 dBm																																									
M4	1		2.31 GHz	-64.85 dBm																																									
M5	1		2.39987 GHz	-44.25 dBm																																									
CH00 Hopping mode	MultiViewSpectrum Ref Level 20.00 dBm Offset 1.00 dB BW 100 kHz Att 30 dB SW 1.05 ms VBW 300 kHz Mode Auto Sweep Count 500/500 Frequency Sweep M1[1] 6.61 dBm 2.404953 GHz M2[1] -47.06 dBm 2.400000 GHz -13.000 dBm M1 2.31 GHz1001 pts9.5 MHz/2.405 GHz 2 Marker Table <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>2.404953 GHz</td><td>6.61 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>2.4 GHz</td><td>-47.06 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>2.39 GHz</td><td>-63.40 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>2.31 GHz</td><td>-64.94 dBm</td><td></td><td></td></tr><tr><td>M5</td><td>1</td><td></td><td>2.399965 GHz</td><td>-45.25 dBm</td><td></td><td></td></tr></table> Date: 24.FEB.2022 20:31:01			Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		2.404953 GHz	6.61 dBm			M2	1		2.4 GHz	-47.06 dBm			M3	1		2.39 GHz	-63.40 dBm			M4	1		2.31 GHz	-64.94 dBm			M5	1		2.399965 GHz	-45.25 dBm		
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																																							
M1	1		2.404953 GHz	6.61 dBm																																									
M2	1		2.4 GHz	-47.06 dBm																																									
M3	1		2.39 GHz	-63.40 dBm																																									
M4	1		2.31 GHz	-64.94 dBm																																									
M5	1		2.399965 GHz	-45.25 dBm																																									
CH78 No hopping mode	MultiViewSpectrum Ref Level 20.00 dBm Offset 1.00 dB BW 100 kHz Att 30 dB SW 1.02 ms VBW 300 kHz Mode Auto Sweep Count 500/500 Frequency Sweep M1[1] 6.93 dBm 2.479835 GHz M2[1] -59.72 dBm 2.483500 GHz -13.000 dBm M1 2.478 GHz1001 pts2.2 MHz/2.5 GHz 2 Marker Table <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>2.479835 GHz</td><td>6.93 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>2.4835 GHz</td><td>-59.72 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>2.5 GHz</td><td>-64.37 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>2.489352 GHz</td><td>-59.21 dBm</td><td></td><td></td></tr></table> Date: 24.FEB.2022 20:47:30			Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		2.479835 GHz	6.93 dBm			M2	1		2.4835 GHz	-59.72 dBm			M3	1		2.5 GHz	-64.37 dBm			M4	1		2.489352 GHz	-59.21 dBm									
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																																							
M1	1		2.479835 GHz	6.93 dBm																																									
M2	1		2.4835 GHz	-59.72 dBm																																									
M3	1		2.5 GHz	-64.37 dBm																																									
M4	1		2.489352 GHz	-59.21 dBm																																									

CH78
Hopping mode

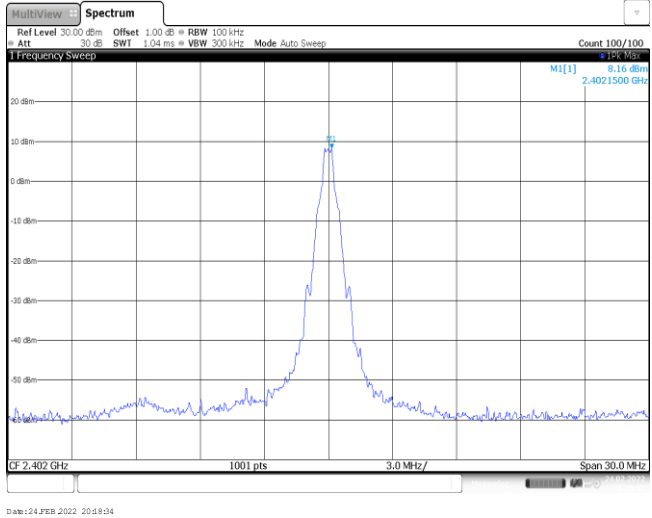
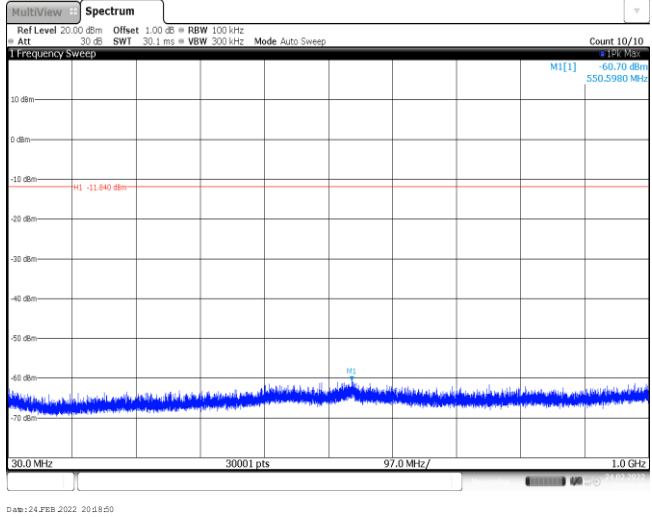
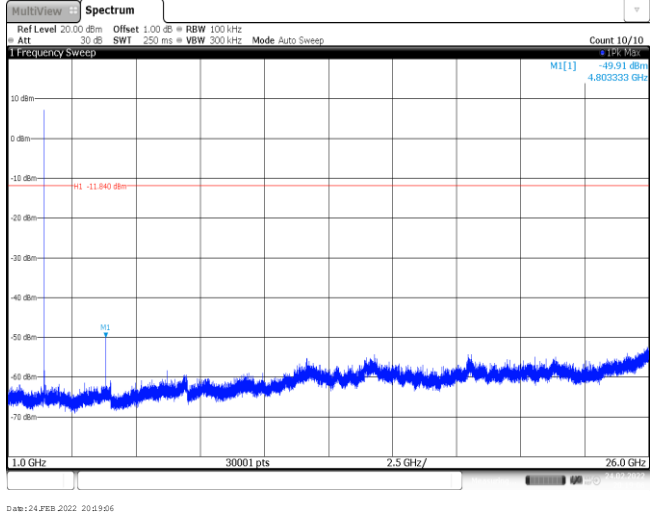


Test Item:	Band edge	Modulation type:	8DPSK
CH00 No hopping mode	</		

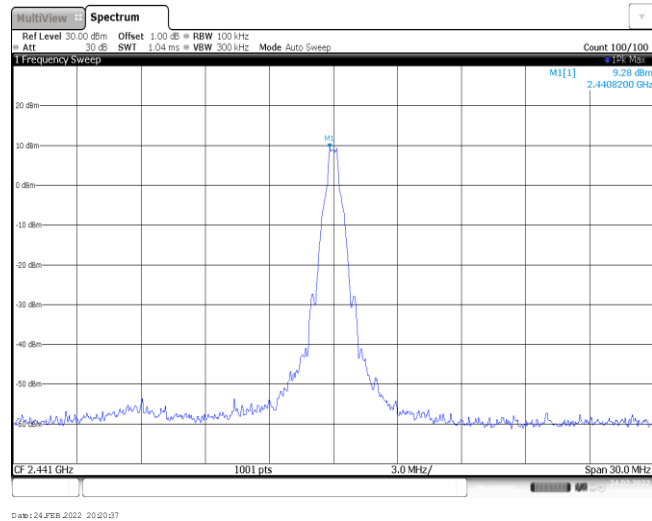
CH78
Hoppig mode



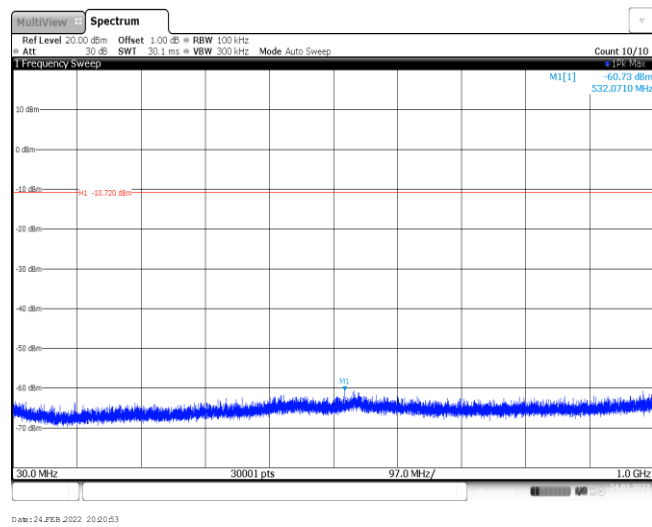
Date: 24 FEB 2022 20:59:04

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

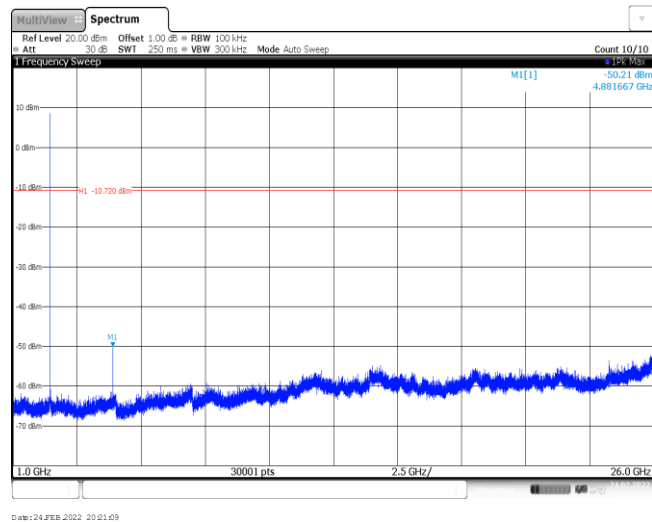
CH39
Reference level



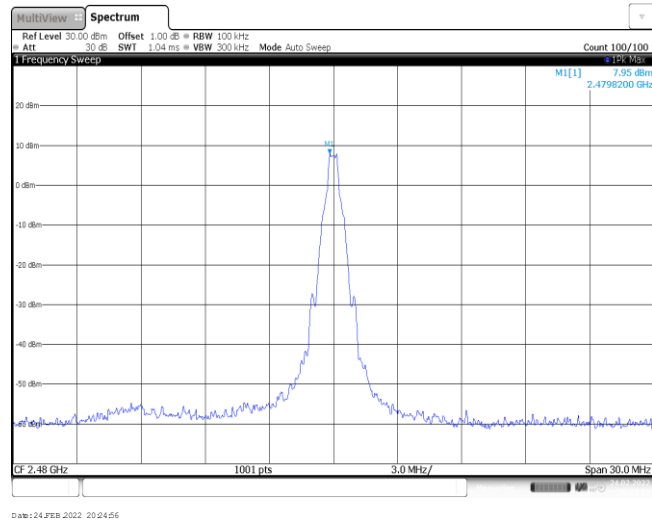
CH39
30MHz~1000MHz



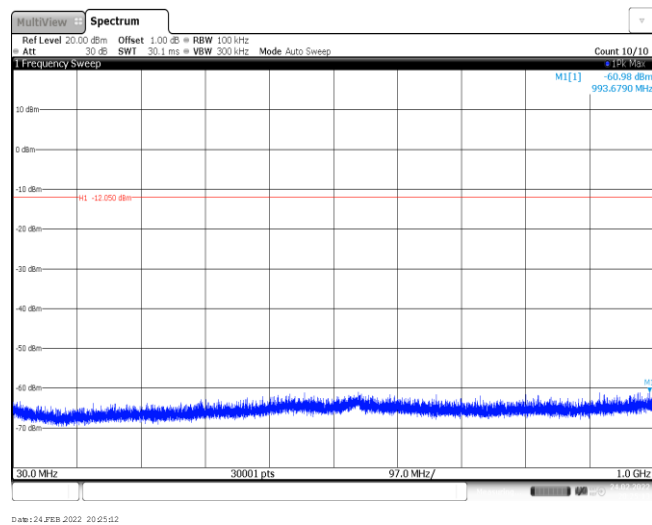
CH39
1GHz~26GHz



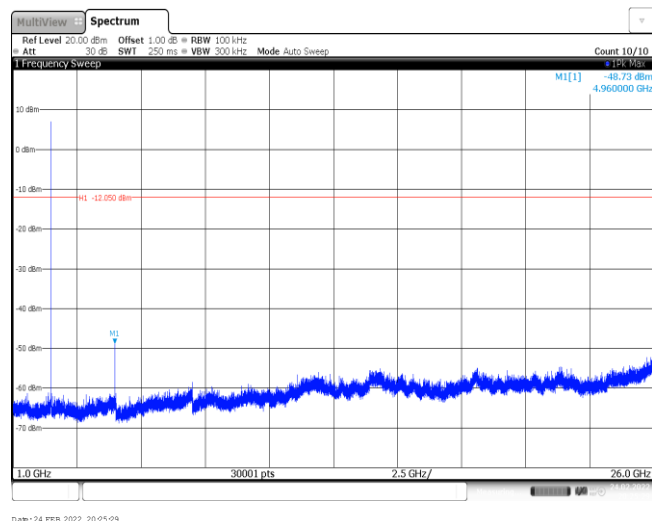
CH78
Reference level

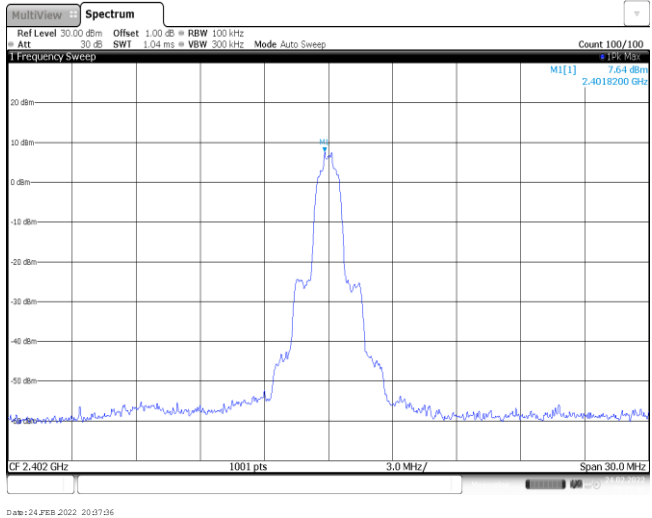
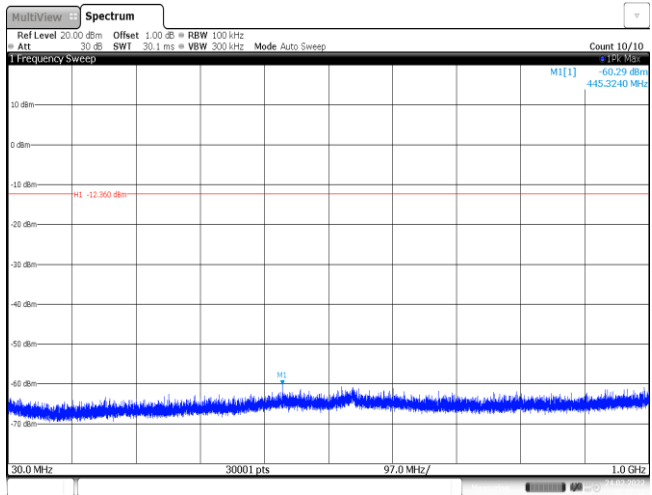
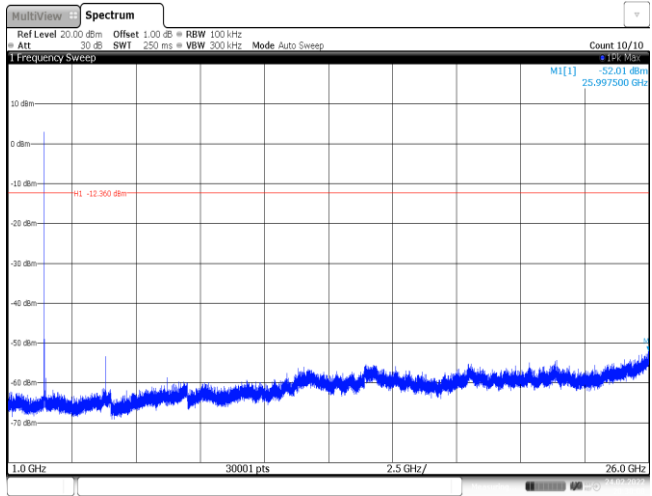


CH78
30MHz~1000MHz

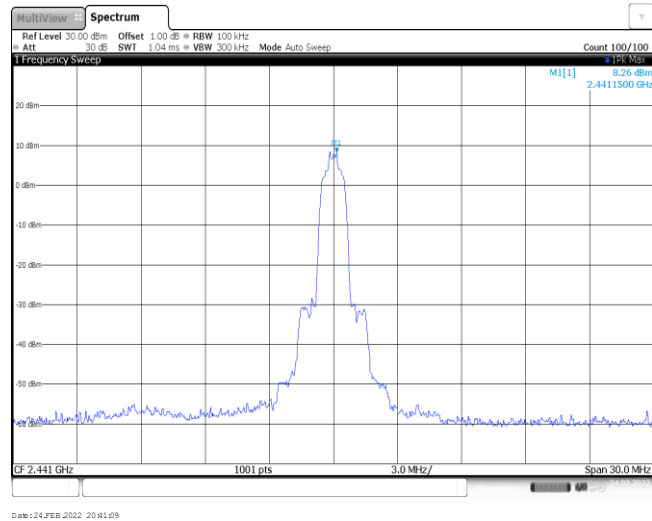


CH78
1GHz~26GHz

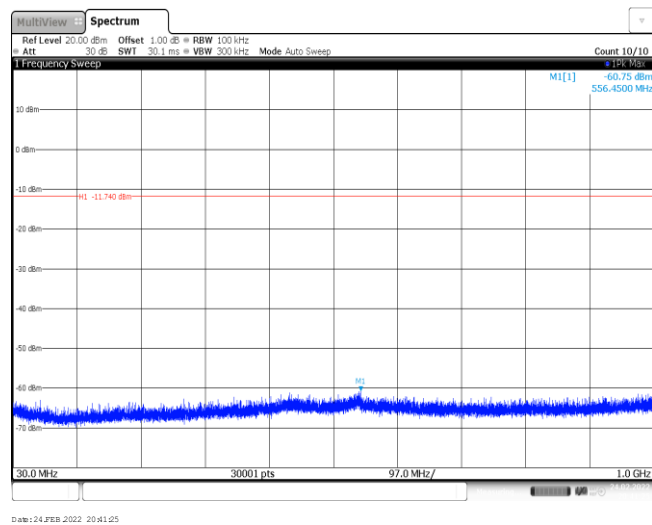


Test Item:	Spurious Emission	Modulation type:	$\pi/4$ DQPSK
CH00 Reference level			
CH00 30MHz~1000MHz			
CH00 1GHz~26GHz			

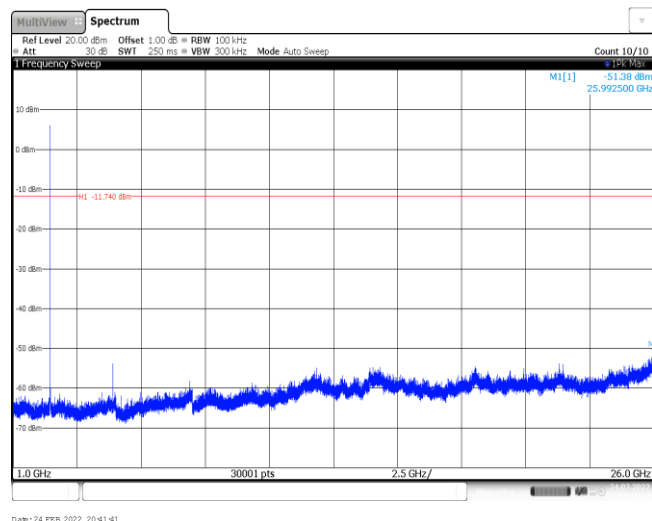
CH39
Reference level



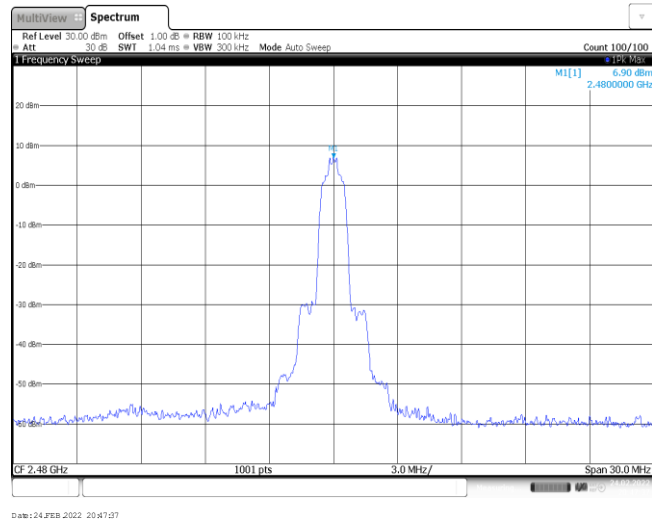
CH39
30MHz~1000MHz



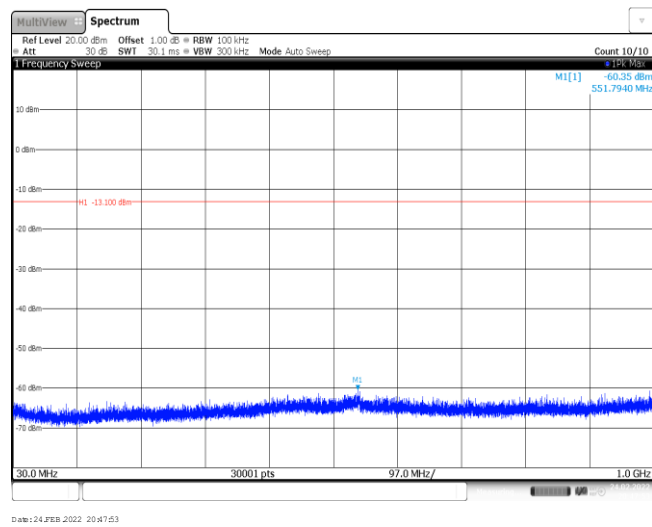
CH39
1GHz~26GHz



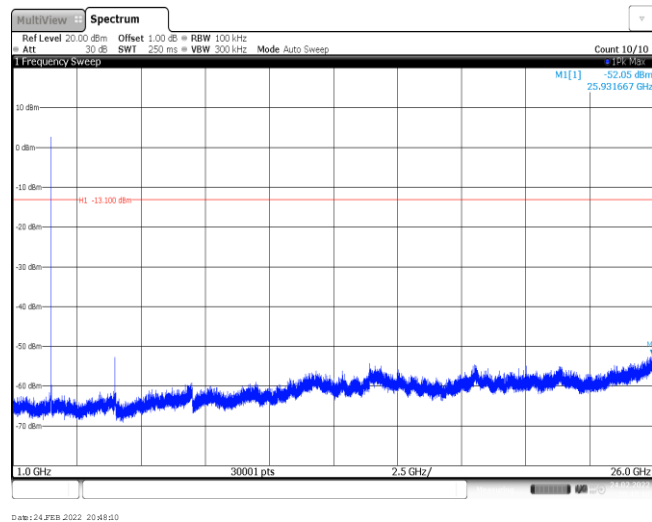
CH78
Reference level

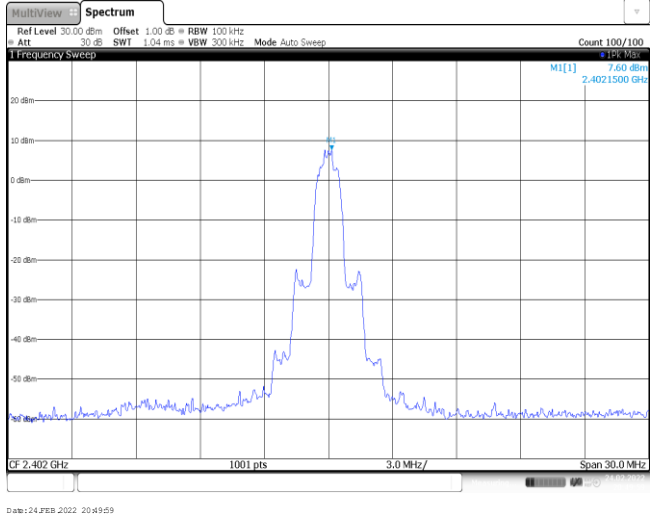
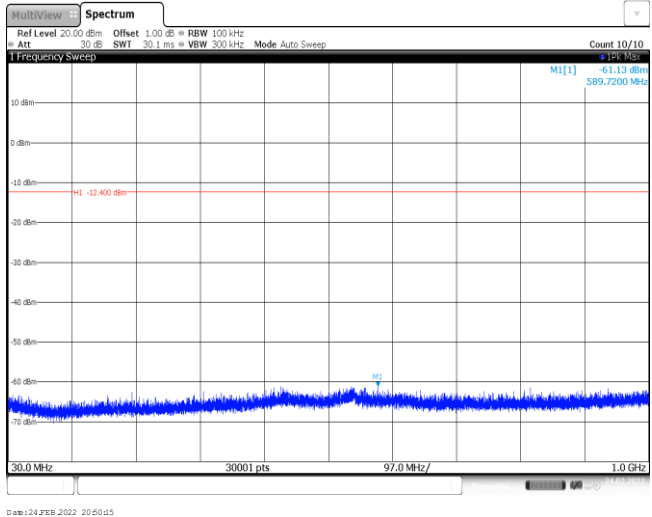
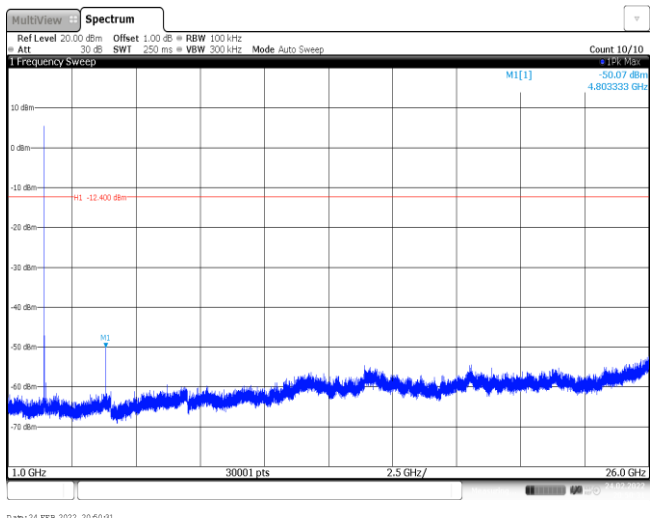


CH78
30MHz~1000MHz

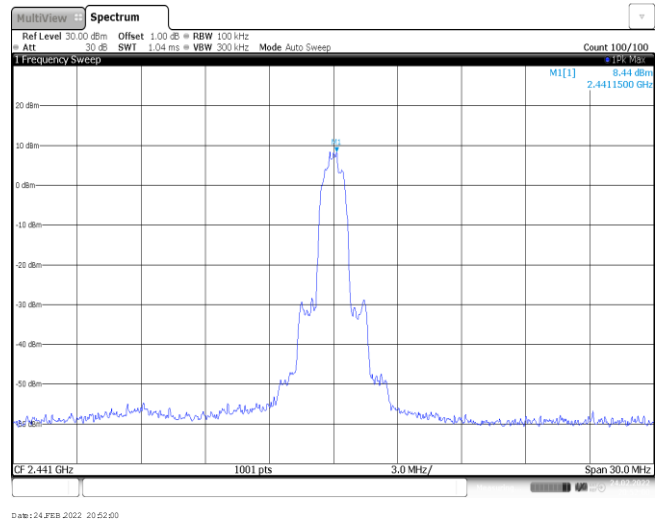


CH78
1GHz~26GHz

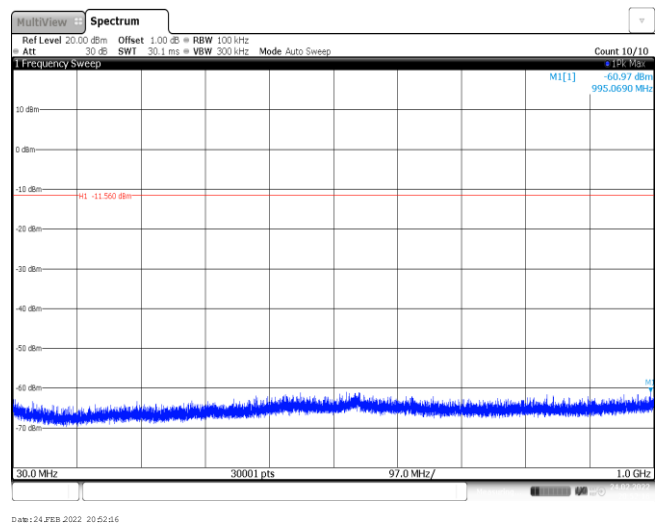


Test Item:	Spurious Emission	Modulation type:	8DPSK
CH00 Reference level			
CH00 30MHz~1000MHz			
CH00 1GHz~26GHz			

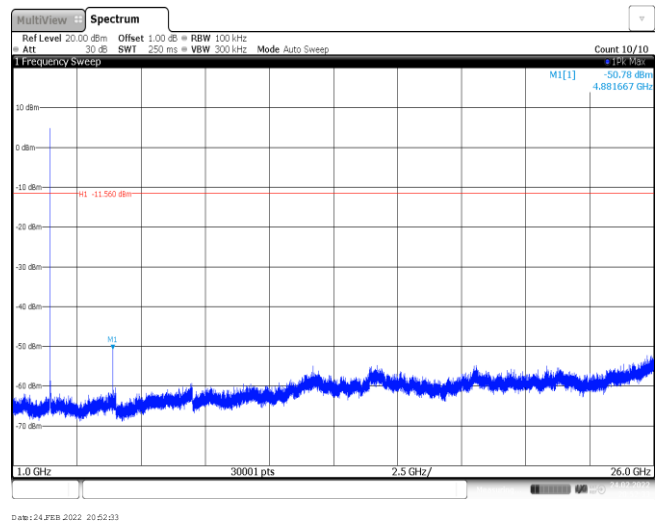
CH39
Reference level



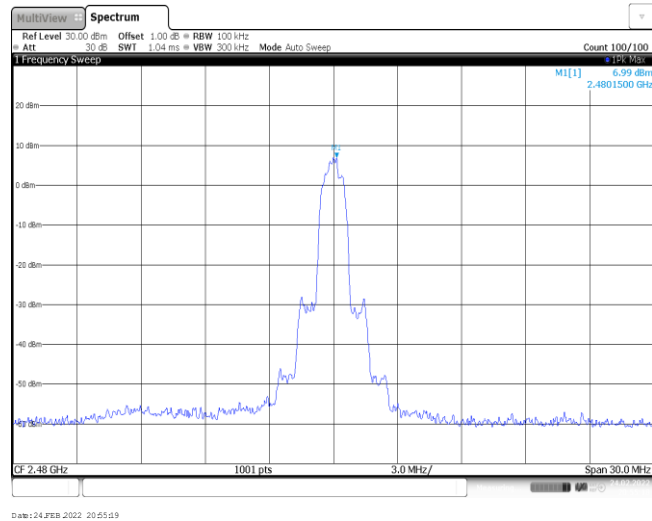
CH39
30MHz~1000MHz



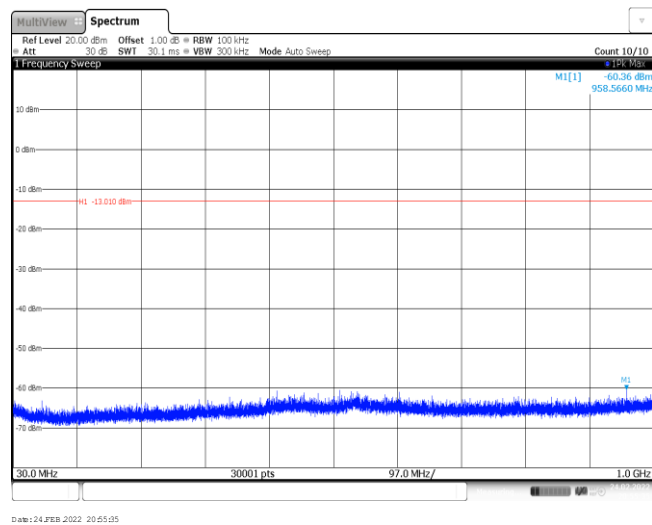
CH39
1GHz~26GHz



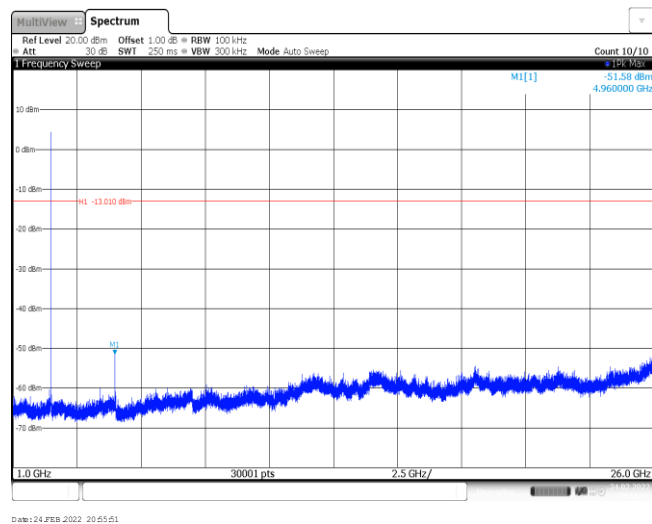
CH78
Reference level



CH78
30MHz~1000MHz



CH78
1GHz~26GHz



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