

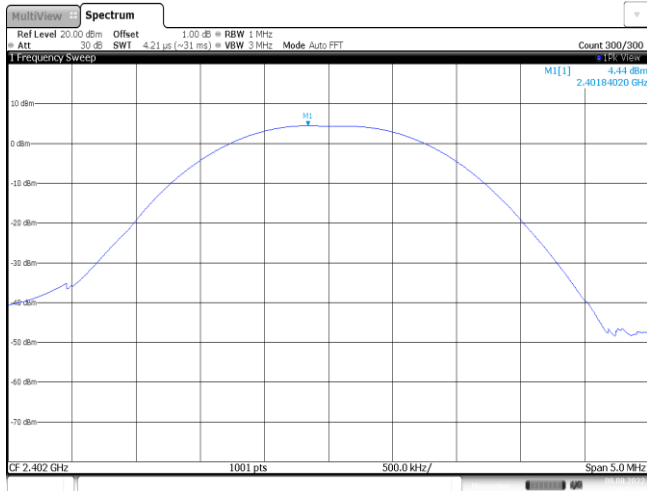
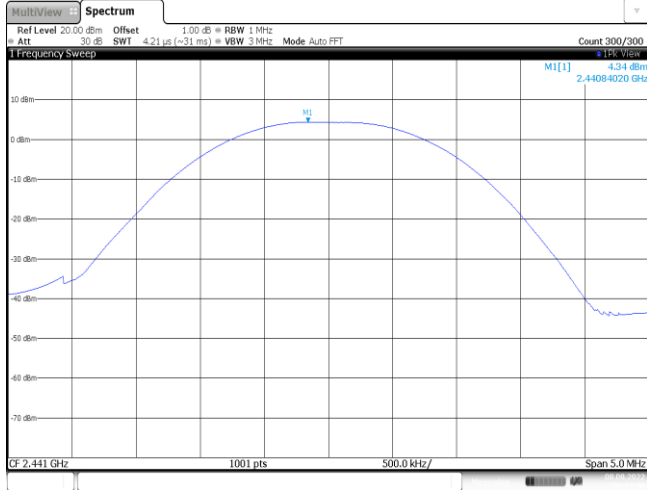
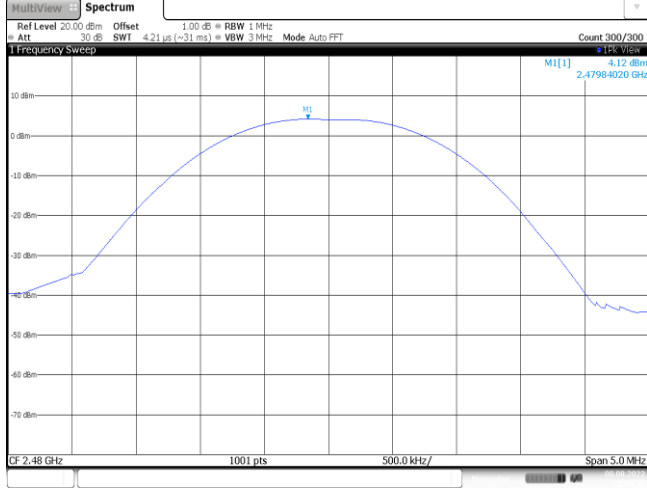
APPENDIX REPORT

Project No.	SHT2206011404EW	Radio Specification	Bluetooth EDR
Test sample No.	YPHT22060114003	Model No.	TRD1
Start test date	2022-08-08	Finish date	2022-08-08
Temperature	26.3℃	Humidity	34%
Test Engineer	Xiaoxiao Li	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

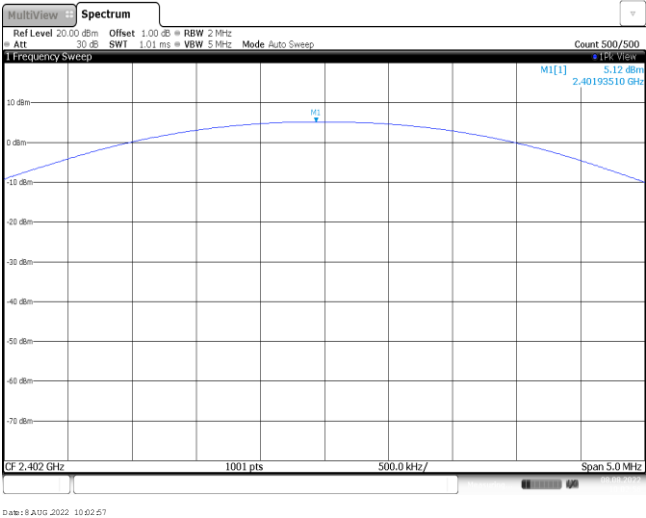
Modulation type	Channel	Peak Output power (dBm)	Average Output power (dBm)	Limit (dBm)	Result
GFSK	00	4.44	4.42	≤ 30.00	Pass
	39	4.34	4.33		
	78	4.12	4.11		
$\pi/4$ DQPSK	00	5.12	4.75	≤ 21.00	Pass
	39	4.98	4.60		
	78	4.82	4.43		

Modulation Type:		GFSK
CH00	 CH00	
CH39	 CH39	
CH78	 CH78	

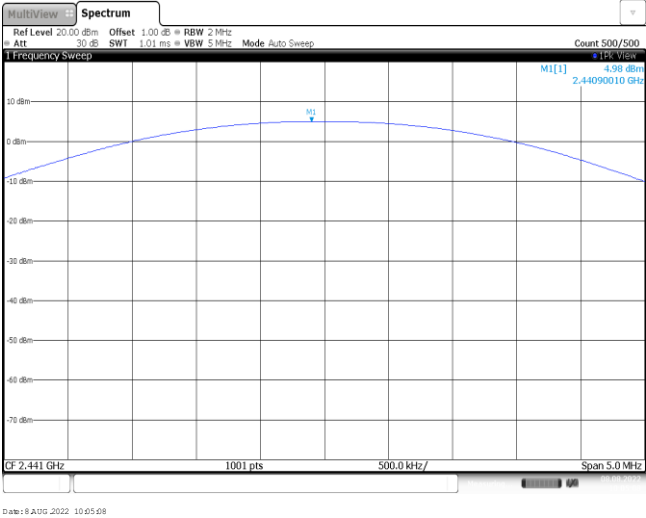
Modulation Type:

$\pi/4$ DQPSK

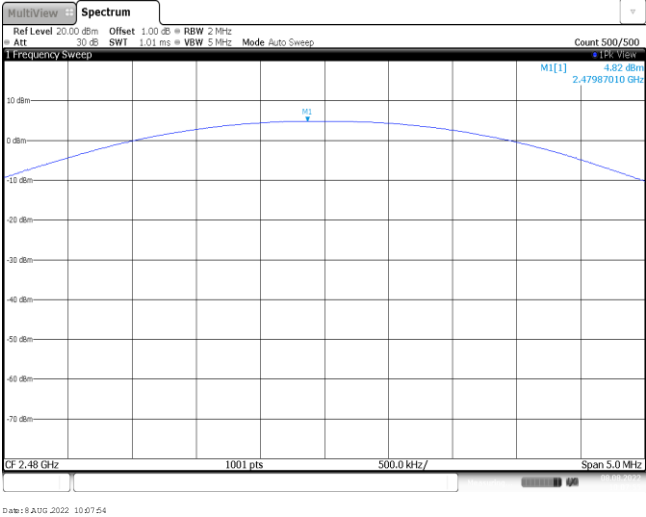
CH00



CH39



CH78



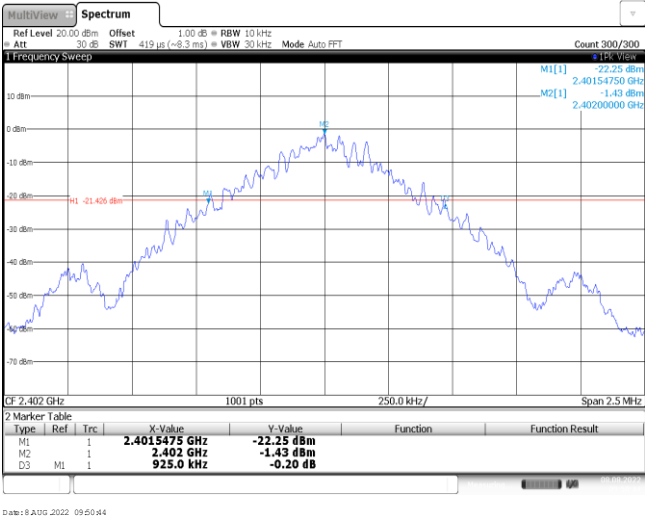
Appendix B : 20 dB Bandwidth

Modulation type	Channel	20 dB Bandwidth (kHz)	Limit (kHz)	Result
GFSK	00	925.00	-	Pass
	39	882.50		
	78	882.50		
$\pi/4$ DQPSK	00	1320.00	-	Pass
	39	1325.00		
	78	1327.50		

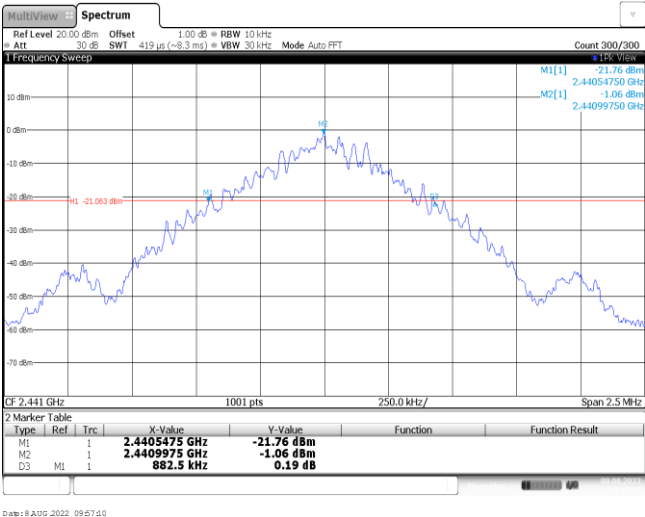
Modulation Type:

GFSK

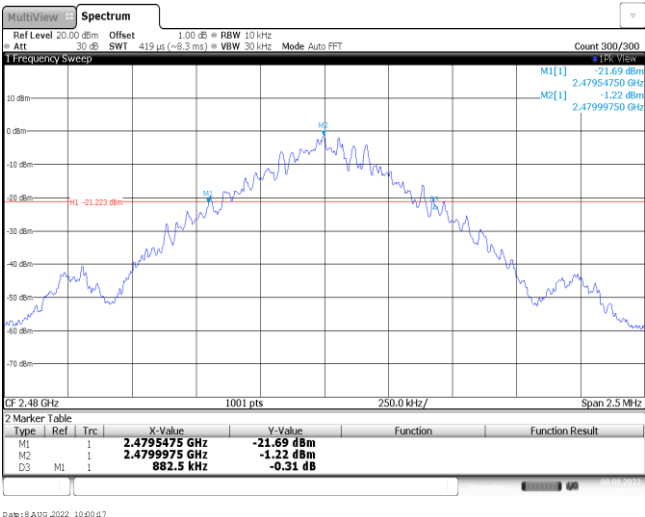
CH00



CH39



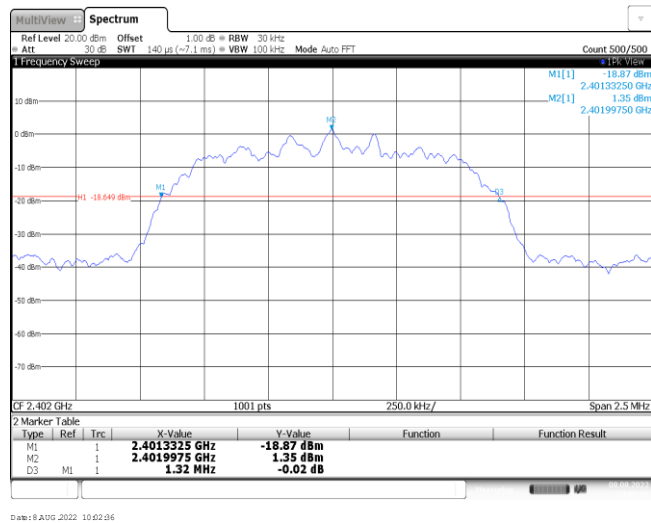
CH78



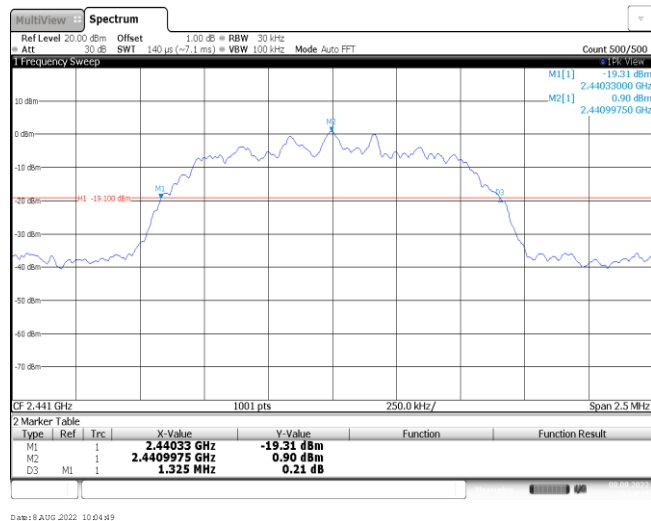
Modulation Type:

 $\pi/4$ DQPSK

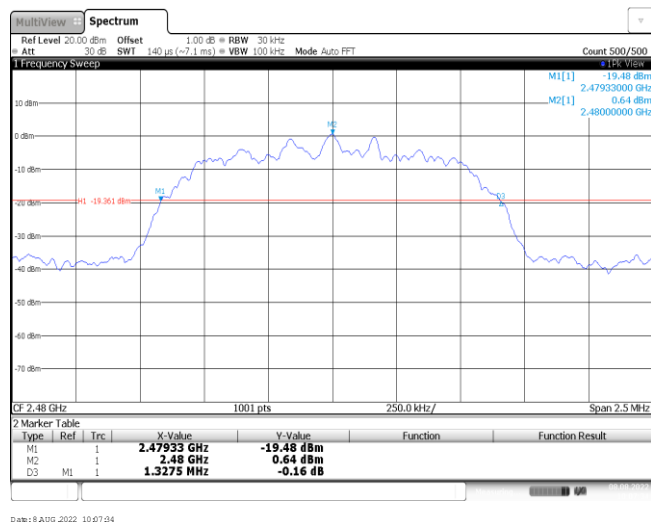
CH00



CH39



CH78



Appendix C: 99% Occupied Bandwidth

Modulation type	Channel	99% Occupied Bandwidth (MHz)	Limit (MHz)	Result
GFSK	00	0.87	-	Pass
	39	0.86		
	78	0.86		
$\pi/4$ DQPSK	00	1.18	-	Pass
	39	1.19		
	78	1.19		

Modulation Type:

GFSK

CH00



CH39



CH78



Modulation Type:

π /4DQPSK

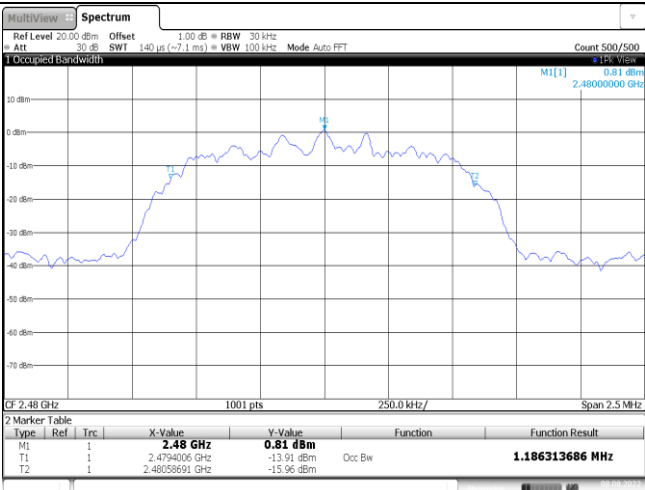
CH00



CH39



CH78



Appendix D: Carrier Frequencies Separation

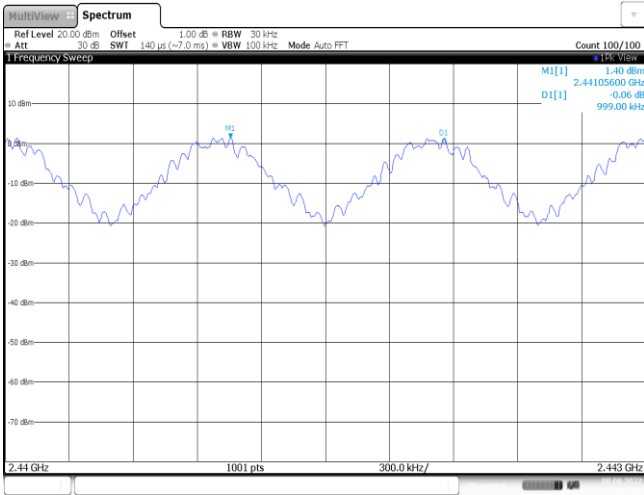
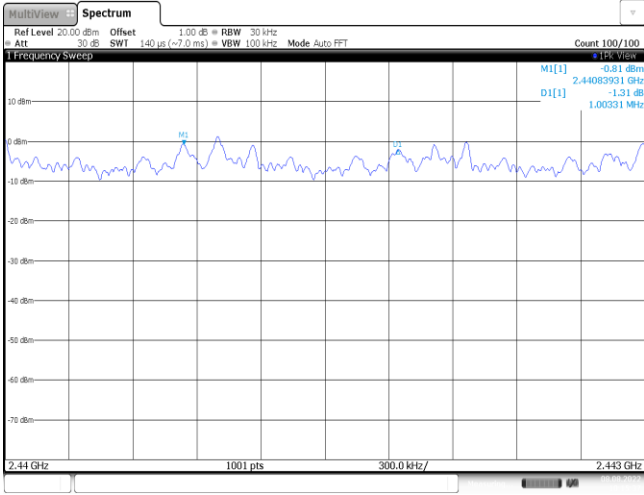
Modulation type	Channel	Carrier Frequencies Separation (MHz)	Limit (kHz) *	Result
GFSK	39	1.00	≥925	Pass
π/4DQPSK	39	1.00	≥885	Pass

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.

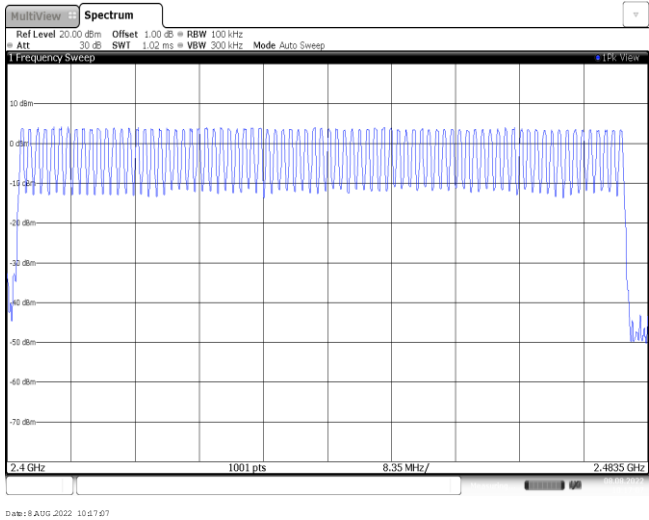
8DPSK limit = 2/3 * The maximum 20 dB Bandwidth for 8DPSK modulation on the appendix B

GFSK	 MultiView Spectrum Ref Level 20.00 dBm Offset 30 dB SW1 140 μs (~7.0 ms) RBW 30 kHz VBW 100 kHz Mode Auto FFT Count 100/100 Frequency Sweep M1[1] 2.44105600 GHz -0.06 dBm D1[1] 999.00 kHz 2.44 GHz 1001 pts 300.0 kHz/ 2.443 GHz Date: 8 AUG 2022 10:11:15
$\pi/4$DQPSK	 MultiView Spectrum Ref Level 20.00 dBm Offset 30 dB SW1 140 μs (~7.0 ms) RBW 30 kHz VBW 100 kHz Mode Auto FFT Count 100/100 Frequency Sweep M1[1] 2.44083931 GHz -1.31 dBm D1[1] 1.00331 MHz 2.44 GHz 1001 pts 300.0 kHz/ 2.443 GHz Date: 8 AUG 2022 10:15:37

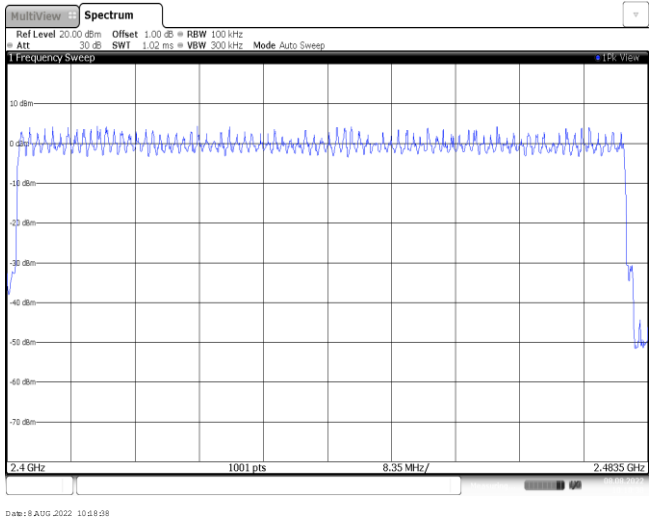
Appendix E: Hopping Channel Number

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

GFSK



$\pi/4$ DQPSK

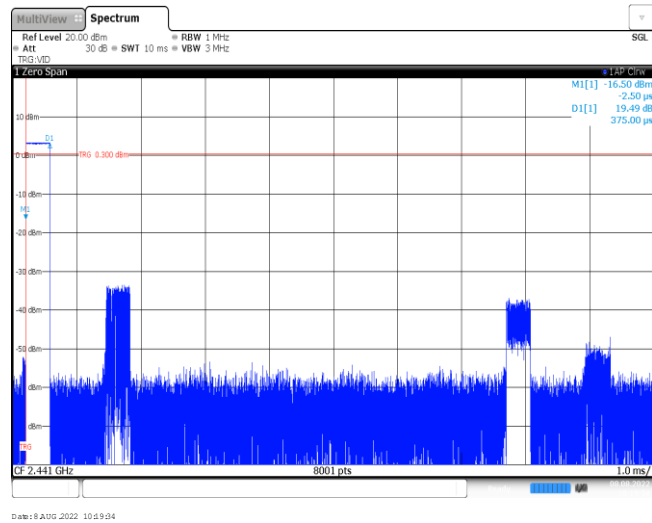
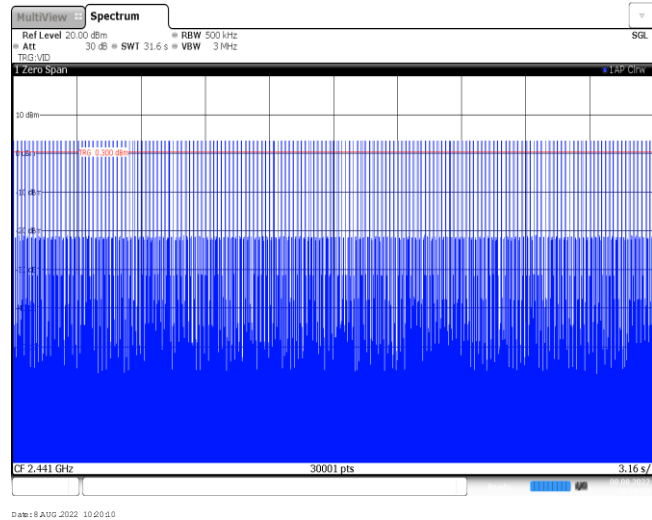
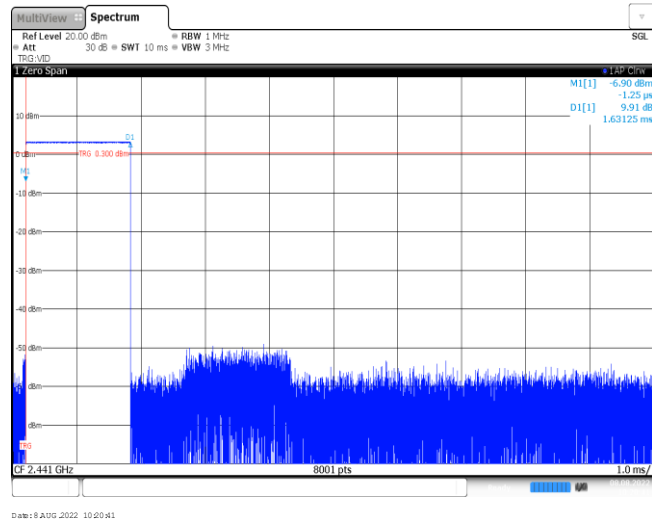


Appendix F: Dwell Time

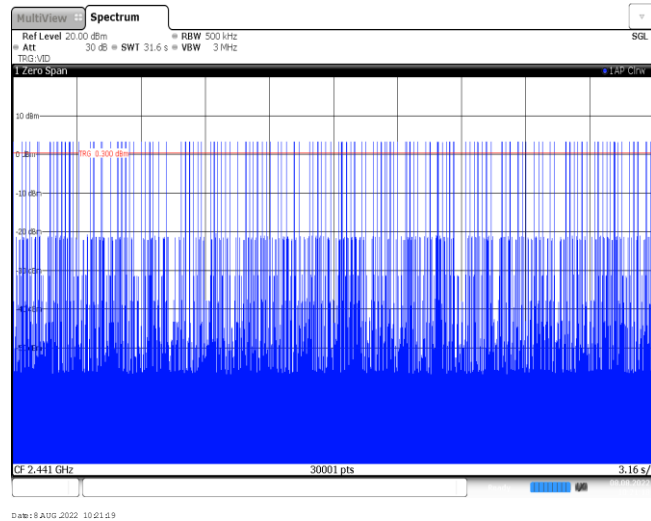
Modulation type	Packet	Burst Width [ms]	Total Hops[hop*ch]	Dwell time (Second)	Limit (Second)	Result
GFSK	DH1	0.38	318	0.12	≤ 0.40	Pass
	DH3	1.63	158	0.26		
	DH5	2.88	99	0.28		
$\pi/4$ DQPSK	2DH1	0.38	318	0.12	≤ 0.40	Pass
	2DH3	1.64	167	0.27		
	2DH5	2.89	100	0.29		

Modulation Type:

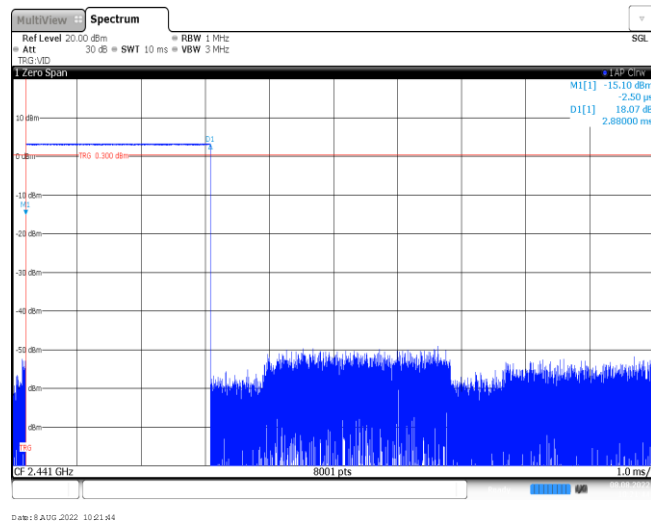
GFSK

DH1
Burst widthDH1
Burst numberDH3
Burst width

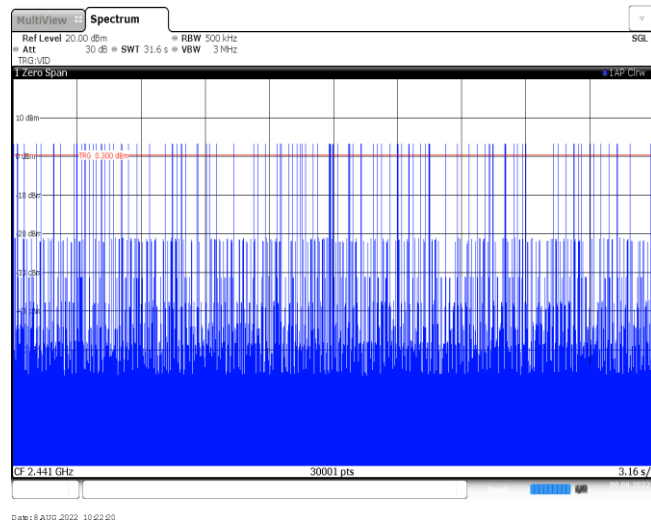
DH3
Burst number

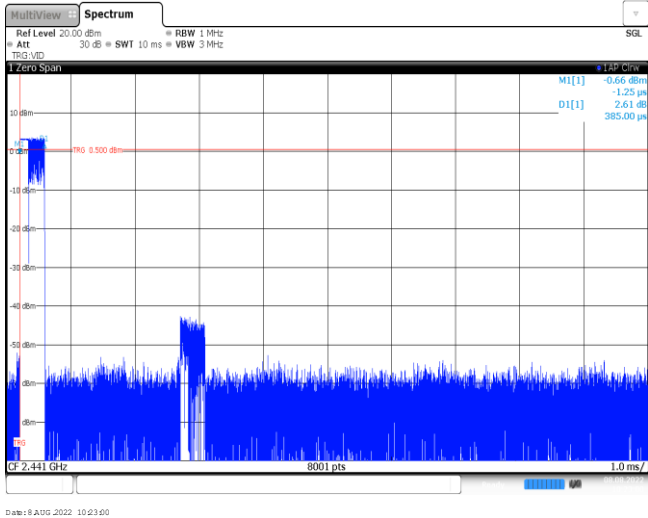
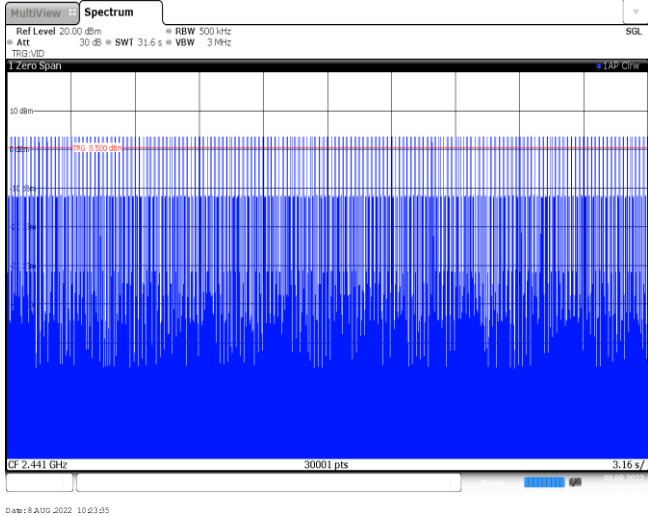
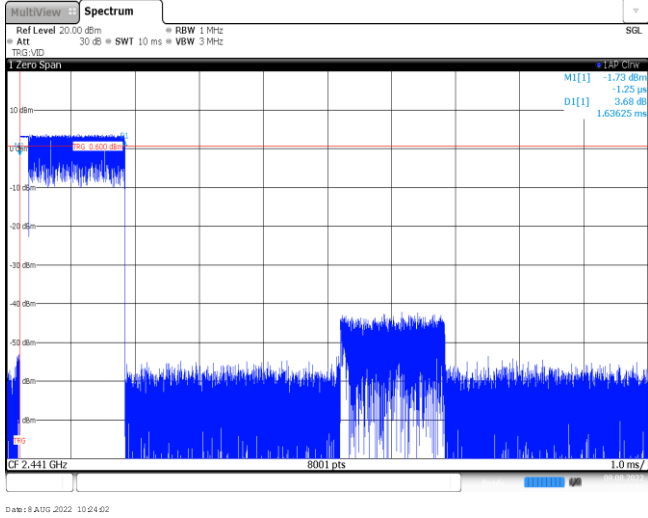


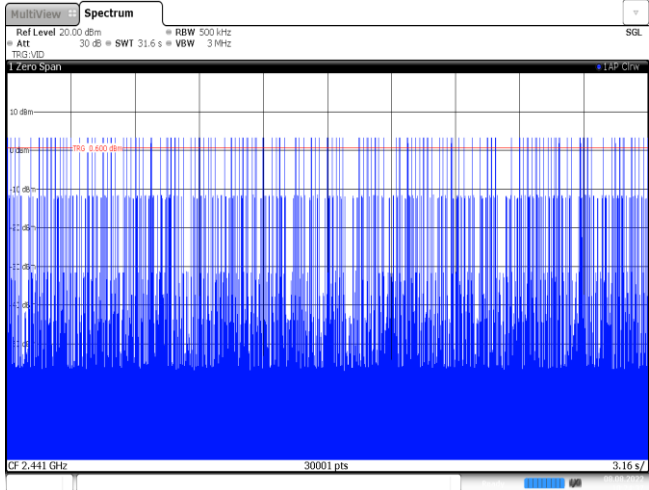
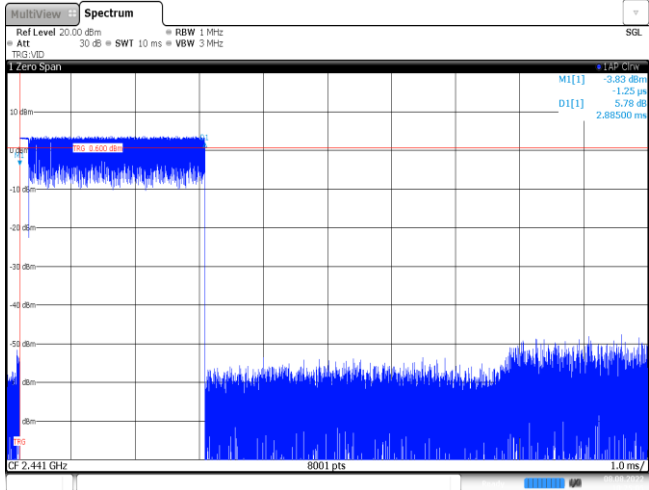
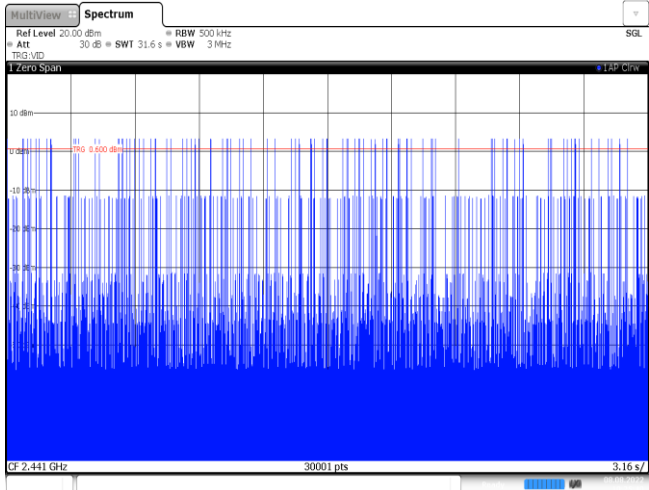
DH5
Burst width



DH5
Burst number



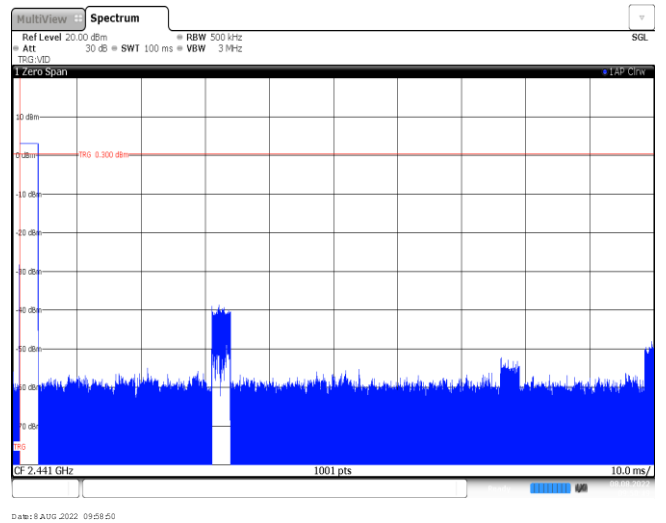
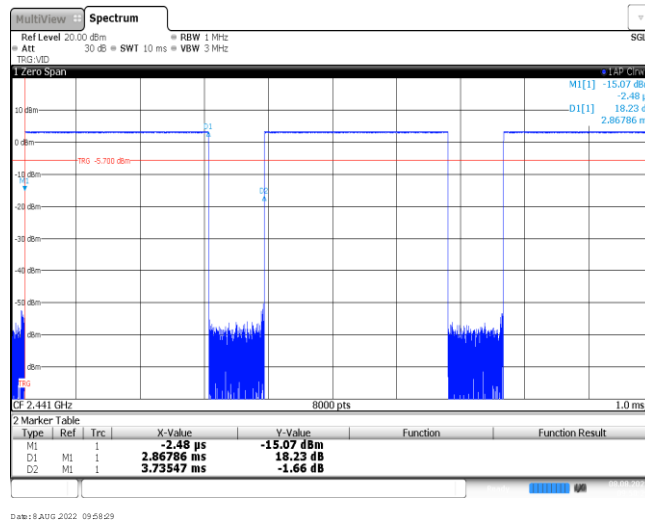
Modulation Type: $\pi/4$ DQPSK	
2DH1 Burst width	
2DH1 Burst number	
2DH3 Burst width	

2DH3 Burst number	 The spectrum plot shows a dense, continuous signal across the frequency range from 2.441 GHz to 3.16 GHz. The signal level is relatively constant, with a peak around 0 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 x-axis is labeled 'CF 2.441 GHz' and '30001 pts'. The y-axis is labeled '1 Zero Span' and '3.16 s'.
2DH5 Burst width	 The spectrum plot shows a signal burst that is wider than the previous one. The signal level is around 0 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 x-axis is labeled 'CF 2.441 GHz' and '8001 pts'. The y-axis is labeled '1 Zero Span' and '1.0 ms'. Additional parameters are shown: M[1] 0.53 dBm, D1[1] -1.25 dB, 5.78 dB, 2.88500 ms.
2DH5 Burst number	 The spectrum plot shows a dense, continuous signal across the frequency range from 2.441 GHz to 3.16 GHz. The signal level is relatively constant, with a peak around 0 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 x-axis is labeled 'CF 2.441 GHz' and '30001 pts'. The y-axis is labeled '1 Zero Span' and '3.16 s'.

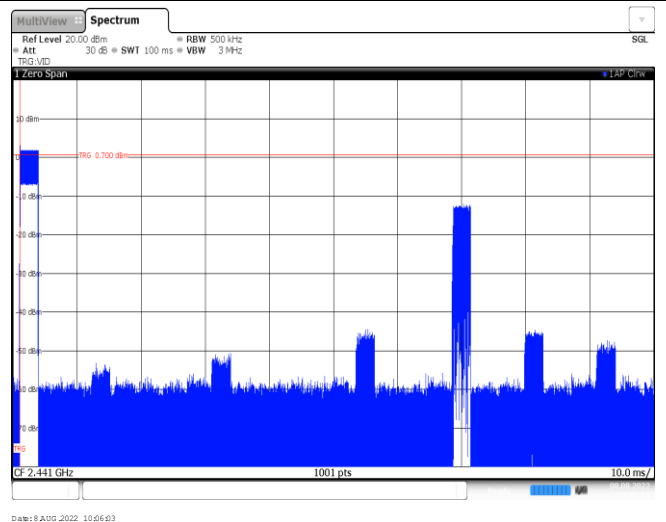
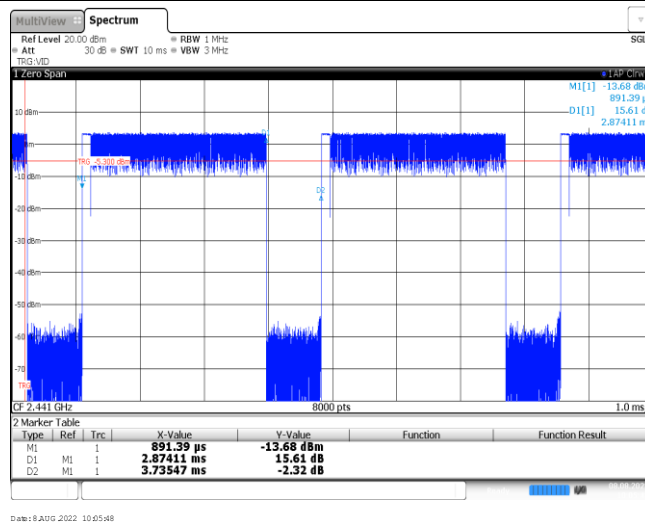
Appendix G: Duty Cycle Correction Factor (DCCF)

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	1	-30.84
$\pi/4$ DQPSK	2441	2.87	100	2	-24.82

GFSK

T_{on} time for single burst

Burst Quantity

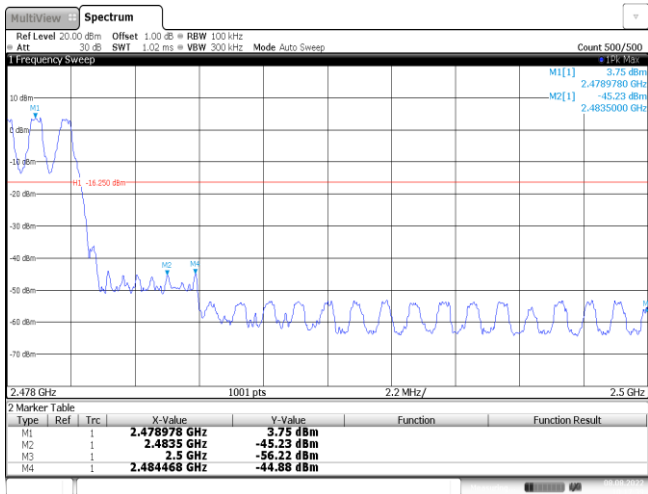
 $\pi/4$ DQPSKT_{on} time for single burst

Burst Quantity

Appendix H: Band edge and Spurious Emissions (conducted)

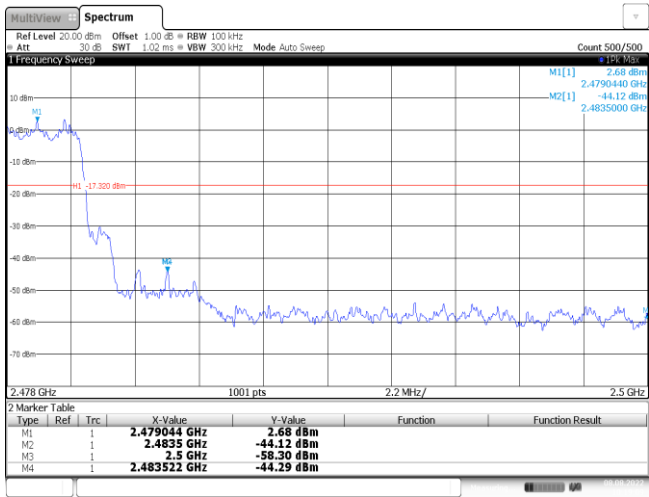
Test Item:	Band edge	Modulation type:	GFSK
CH00 No hopping mode	</		

CH78
Hopping mode

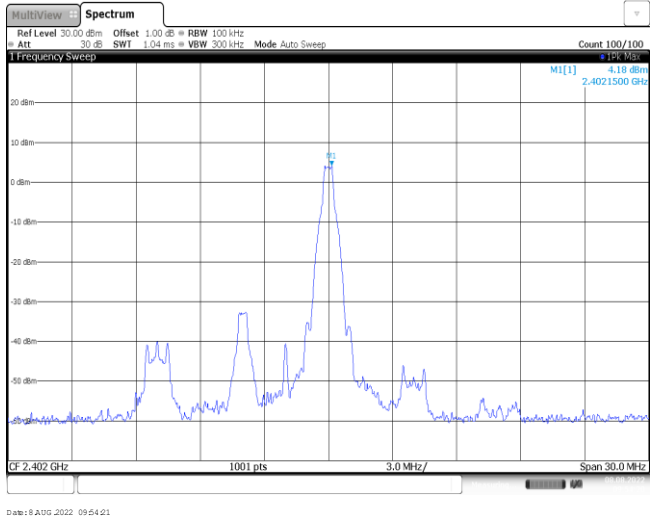
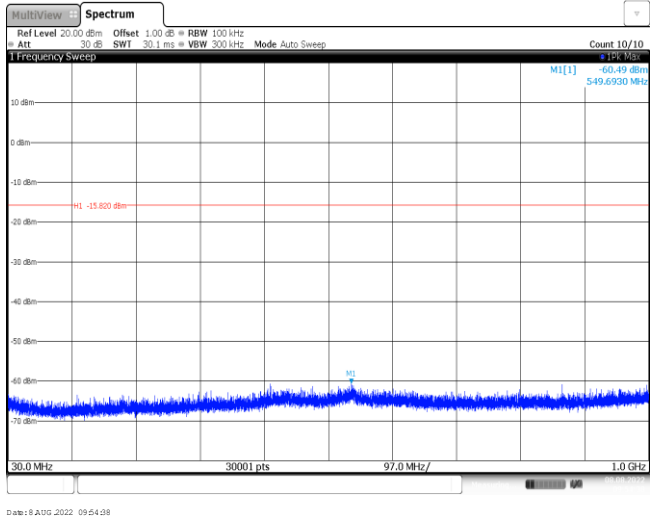
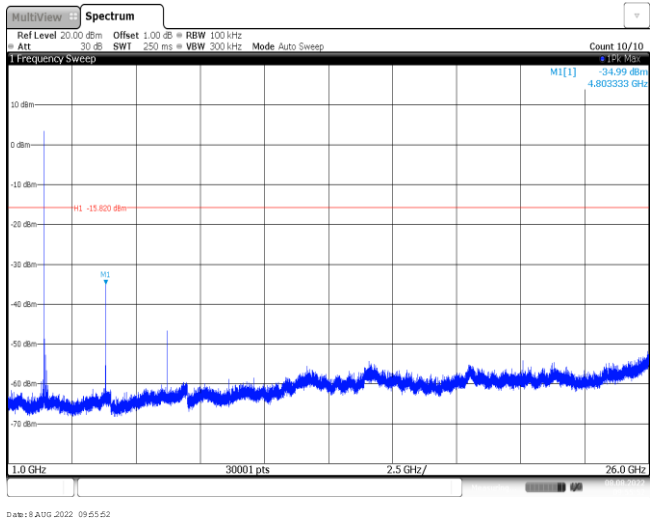


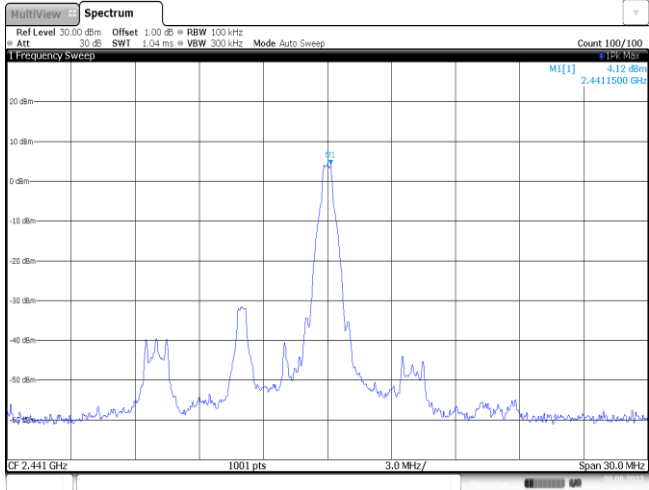
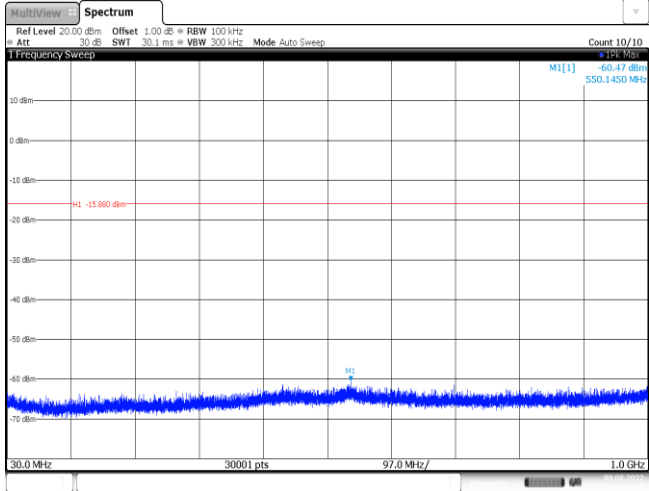
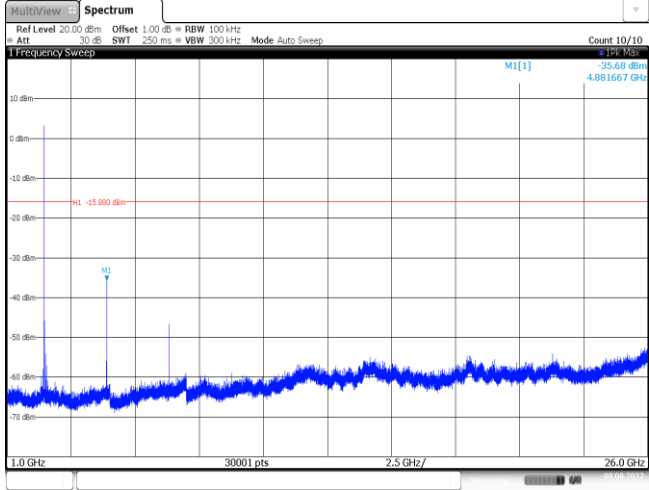
Test Item:	Band edge	Modulation type:	$\pi/4$ DQPSK																																										
CH00 No hopping mode	MultiView Spectrum Ref Level 20.00 dBm Offset 1.00 dB BW 100 kHz ATT 30 dB SWI 1.05 ms VBW 300 kHz Mode Auto Sweep Count 500/500 1 Frequency Sweep 30 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm M1 4.13 dBm 2.402010 GHz -39.36 dBm 2.400000 GHz 2.31 GHz 1001 pts 9.5 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>2.40201 GHz</td><td>4.13 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>2.4 GHz</td><td>-39.36 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>2.39 GHz</td><td>-62.02 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>2.31 GHz</td><td>-64.58 dBm</td><td></td><td></td></tr><tr><td>M5</td><td>1</td><td></td><td>2.39816 GHz</td><td>-32.72 dBm</td><td></td><td></td></tr></table> Date: 8 AUG 2022 10:03:07			Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		2.40201 GHz	4.13 dBm			M2	1		2.4 GHz	-39.36 dBm			M3	1		2.39 GHz	-62.02 dBm			M4	1		2.31 GHz	-64.58 dBm			M5	1		2.39816 GHz	-32.72 dBm		
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																																							
M1	1		2.40201 GHz	4.13 dBm																																									
M2	1		2.4 GHz	-39.36 dBm																																									
M3	1		2.39 GHz	-62.02 dBm																																									
M4	1		2.31 GHz	-64.58 dBm																																									
M5	1		2.39816 GHz	-32.72 dBm																																									
CH00 Hopping mode	MultiView Spectrum Ref Level 20.00 dBm Offset 1.00 dB BW 100 kHz ATT 30 dB SWI 1.05 ms VBW 300 kHz Mode Auto Sweep Count 500/500 1 Frequency Sweep 30 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm M1 0.65 dBm 2.4027700 GHz -37.61 dBm 2.4000000 GHz 2.31 GHz 1001 pts 9.5 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>2.40277 GHz</td><td>0.65 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>2.4 GHz</td><td>-37.61 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>2.39 GHz</td><td>-62.08 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>2.31 GHz</td><td>-62.38 dBm</td><td></td><td></td></tr><tr><td>M5</td><td>1</td><td></td><td>2.397875 GHz</td><td>-34.01 dBm</td><td></td><td></td></tr></table> Date: 8 AUG 2022 10:08:53			Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		2.40277 GHz	0.65 dBm			M2	1		2.4 GHz	-37.61 dBm			M3	1		2.39 GHz	-62.08 dBm			M4	1		2.31 GHz	-62.38 dBm			M5	1		2.397875 GHz	-34.01 dBm		
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																																							
M1	1		2.40277 GHz	0.65 dBm																																									
M2	1		2.4 GHz	-37.61 dBm																																									
M3	1		2.39 GHz	-62.08 dBm																																									
M4	1		2.31 GHz	-62.38 dBm																																									
M5	1		2.397875 GHz	-34.01 dBm																																									
CH78 No hopping mode	MultiView Spectrum Ref Level 20.00 dBm Offset 1.00 dB BW 100 kHz ATT 30 dB SWI 1.02 ms VBW 300 kHz Mode Auto Sweep Count 500/500 1 Frequency Sweep 30 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm M1 3.94 dBm 2.4798350 GHz -43.44 dBm 2.4855000 GHz 2.478 GHz 1001 pts 2.2 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>3.94 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>2.4835 GHz</td><td>-43.44 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>2.5 GHz</td><td>-62.86 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>2.483522 GHz</td><td>-43.56 dBm</td><td></td><td></td></tr></table> Date: 8 AUG 2022 10:08:01			Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		2.479835 GHz	3.94 dBm			M2	1		2.4835 GHz	-43.44 dBm			M3	1		2.5 GHz	-62.86 dBm			M4	1		2.483522 GHz	-43.56 dBm									
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																																							
M1	1		2.479835 GHz	3.94 dBm																																									
M2	1		2.4835 GHz	-43.44 dBm																																									
M3	1		2.5 GHz	-62.86 dBm																																									
M4	1		2.483522 GHz	-43.56 dBm																																									

CH78
Hopping mode

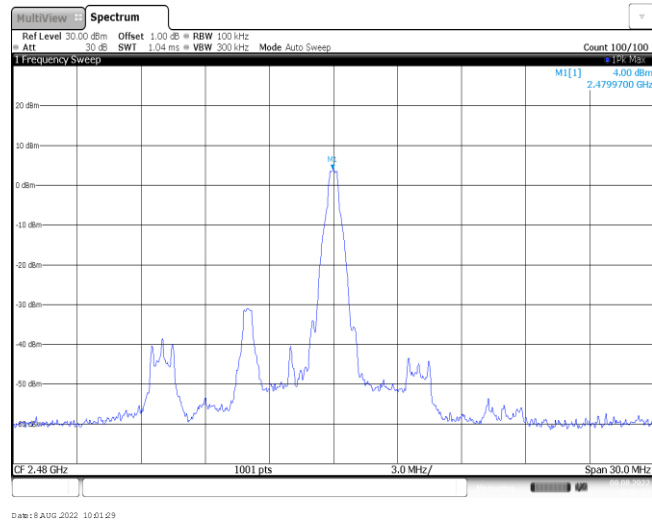


Date: 8 AUG 2022 10:49:40

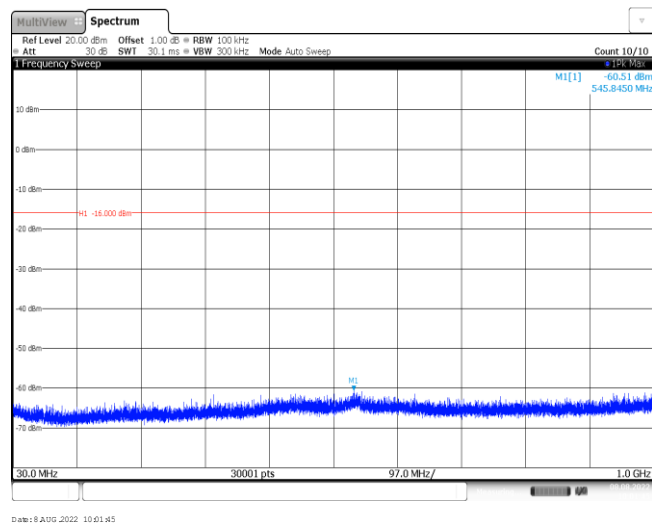
Test Item:	Spurious Emission	Modulation type:	GFSK
CH00 Reference level			
CH00 30MHz~1000MHz			
CH00 1GHz~26GHz			

CH39 Reference level	 Ref Level 30.00 dBm Offset 1.00 dB BW 100 kHz Att 30 dB SW 1.04 ms VBW 300 kHz Mode Auto Sweep Count 100/100 MI[1] 4.12 dBm 2.441500 GHz CF 2.441 GHz 1001 pts 3.0 MHz/ Span 30.0 MHz Date: 8 AUG 2022 09:59:11
CH39 30MHz~1000MHz	 Ref Level 20.00 dBm Offset 1.00 dB BW 100 kHz Att 30 dB SW 30.1 ms VBW 300 kHz Mode Auto Sweep Count 10/10 MI[1] -60.47 dBm 550.1450 MHz H1 -15.880 dBm 30.0 MHz 30001 pts 97.0 MHz/ 1.0 GHz Date: 8 AUG 2022 09:59:27
CH39 1GHz~26GHz	 Ref Level 20.00 dBm Offset 1.00 dB BW 100 kHz Att 30 dB SW 250 ms VBW 300 kHz Mode Auto Sweep Count 10/10 MI[1] -35.68 dBm 4.881667 GHz H1 -15.880 dBm 1.0 GHz 30001 pts 2.5 GHz/ 26.0 GHz Date: 8 AUG 2022 09:59:47

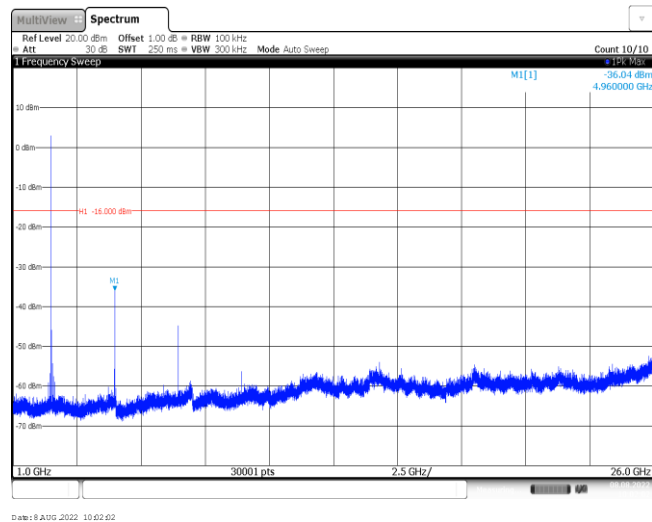
CH78
Reference level

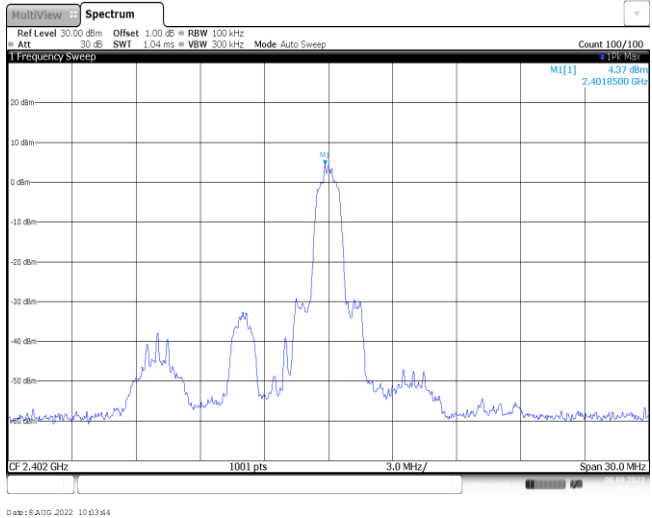
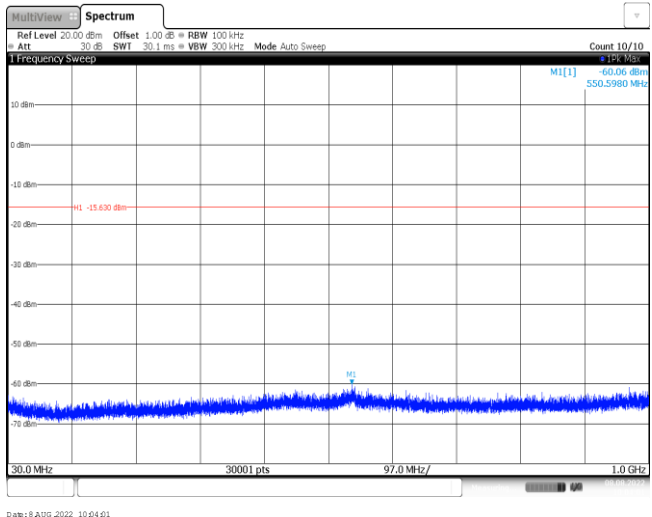
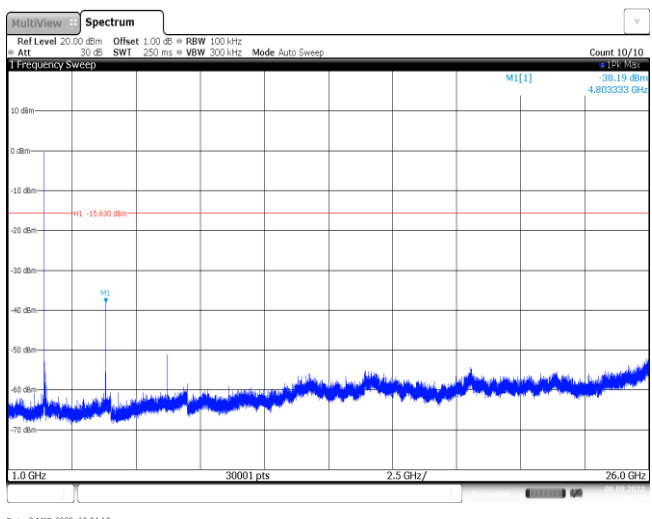


CH78
30MHz~1000MHz

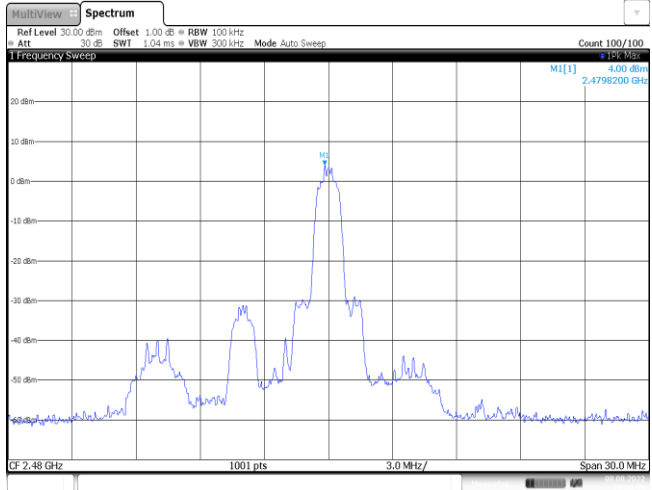
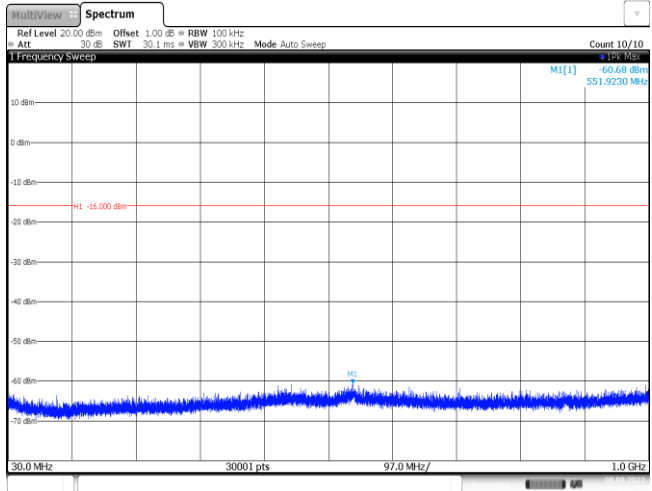
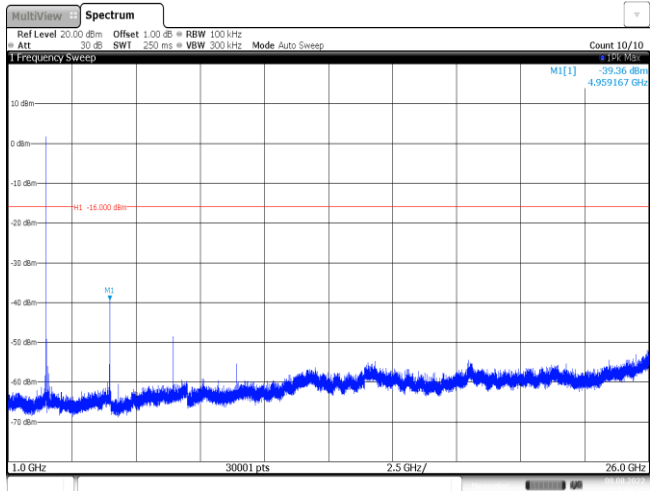


CH78
1GHz~26GHz



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

CH39 Reference level	A spectrum plot titled 'Spectrum' showing a frequency sweep. The y-axis represents power in dBm, ranging from -80 to 20. The x-axis represents frequency in GHz, with a span of 30.0 MHz centered at 2.441 GHz. A prominent peak is visible at 2.441 GHz, reaching approximately 10 dBm. The plot includes technical details: Ref Level 30.00 dBm, Offset 1.00 dB, RBW 100 kHz, Mode Auto Sweep, Count 100/100, and Date: 8 AUG 2022 10:06:28.
CH39 30MHz~1000MHz	A spectrum plot titled 'Spectrum' showing a frequency sweep from 30.0 MHz to 1.0 GHz. The y-axis represents power in dBm, ranging from -80 to 10. The x-axis represents frequency in MHz, with a span of 97.0 MHz. The plot shows a relatively flat noise floor around -60 dBm. A red horizontal line is drawn at -15.650 dBm. The plot includes technical details: Ref Level 20.00 dBm, Offset 1.00 dB, RBW 100 kHz, Mode Auto Sweep, Count 10/10, and Date: 8 AUG 2022 10:06:45.
CH39 1GHz~26GHz	A spectrum plot titled 'Spectrum' showing a frequency sweep from 1.0 GHz to 26.0 GHz. The y-axis represents power in dBm, ranging from -80 to 10. The x-axis represents frequency in GHz, with a span of 2.5 GHz. The plot shows a noise floor that rises from -70 dBm at 1.0 GHz to -35 dBm at 26.0 GHz. A red horizontal line is drawn at -15.650 dBm. The plot includes technical details: Ref Level 20.00 dBm, Offset 1.00 dB, RBW 100 kHz, Mode Auto Sweep, Count 10/10, and Date: 8 AUG 2022 10:07:02.

CH78 Reference level	 Date: 8 AUG 2022 10:28:39
CH78 30MHz~1000MHz	 Date: 8 AUG 2022 10:28:57
CH78 1GHz~26GHz	 Date: 8 AUG 2022 10:29:15

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