

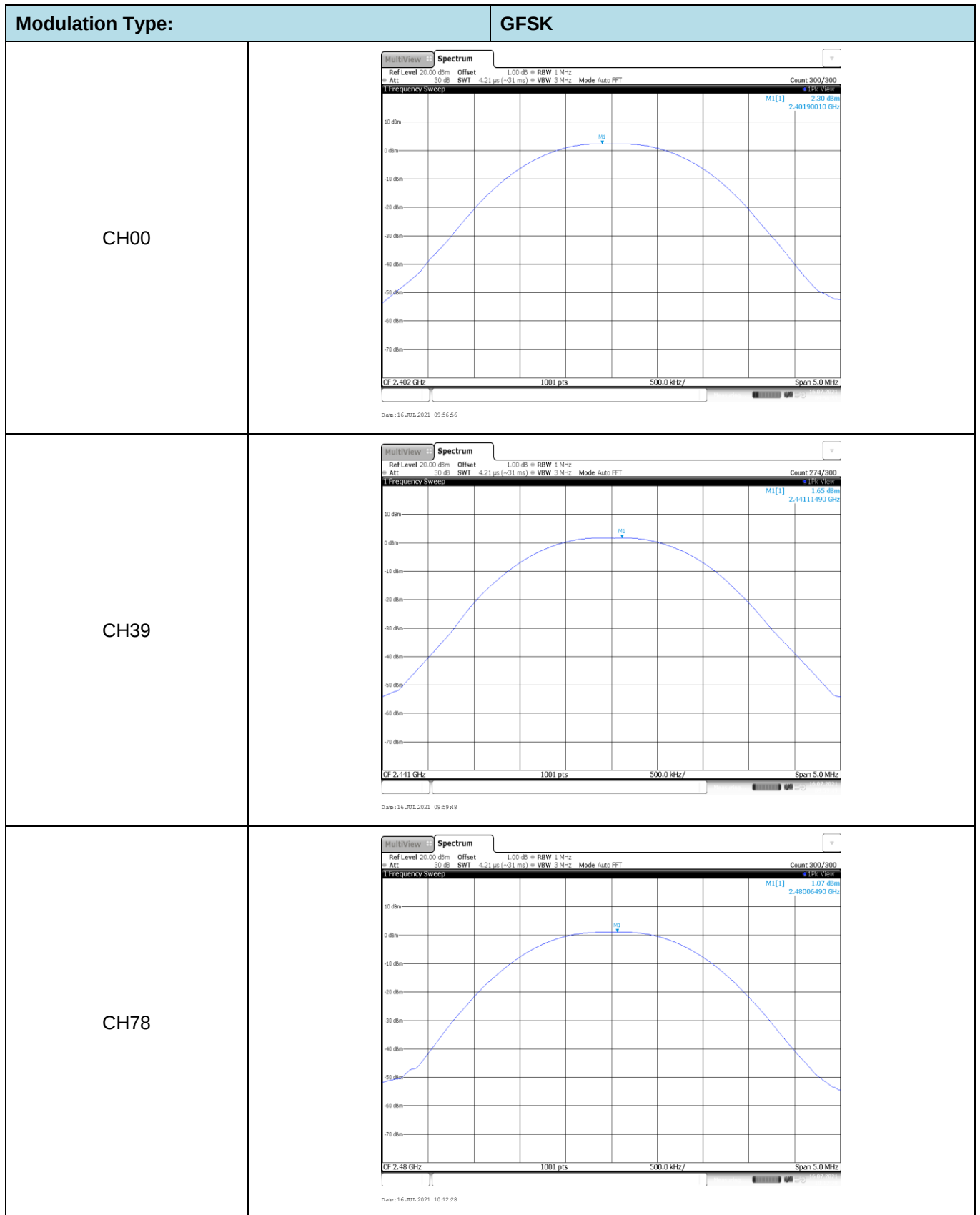
APPENDIX REPORT

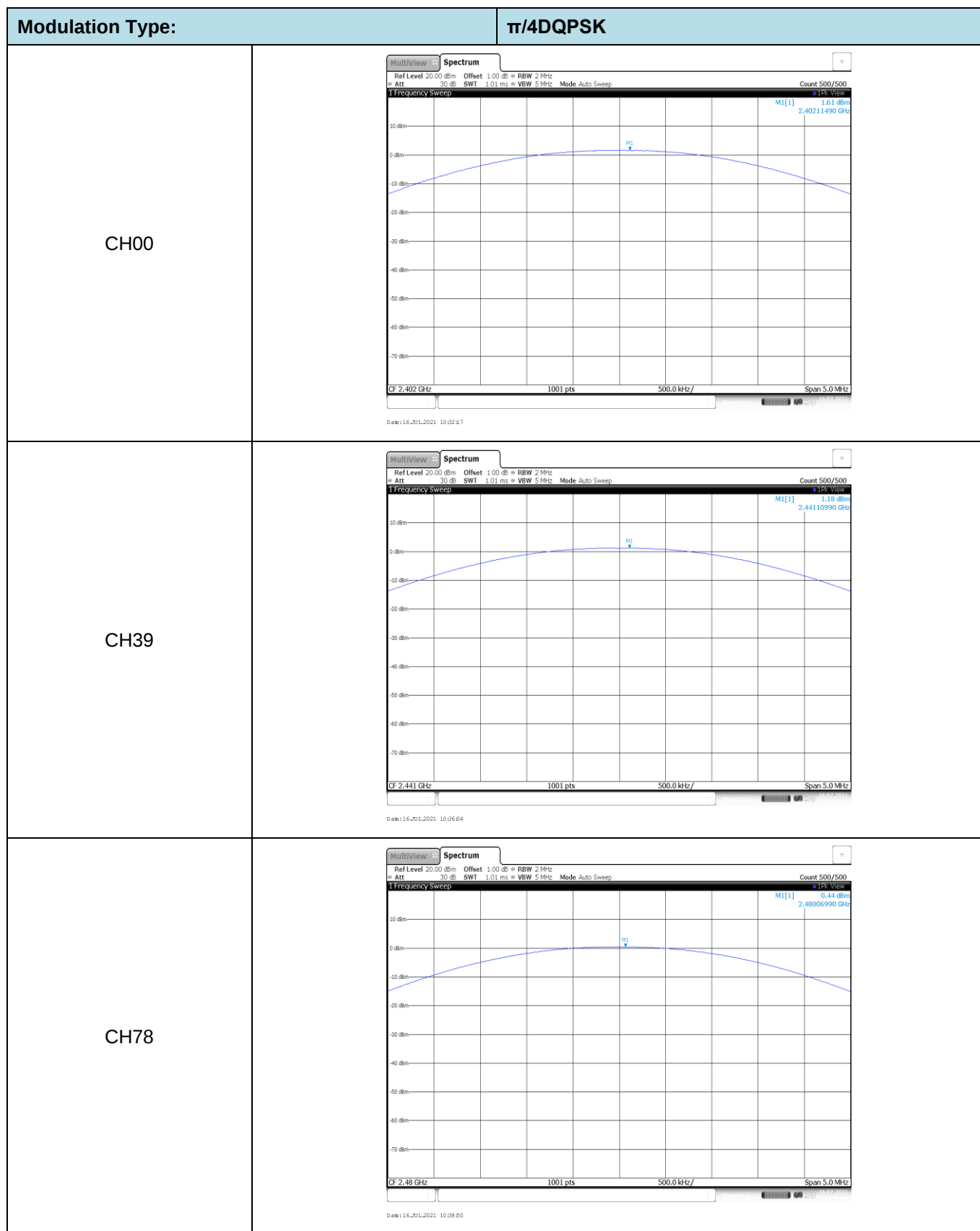
Project No.	SHT2104128003EW	Radio Specification	Bluetooth EDR
Test sample No.	YPHT21041280017	Model No.	E3PDA
Start test date	2021-07-16	Finish date	2021-07-16
Temperature	25.1°C	Humidity	34%
Test Engineer	Hailey Chen	Auditor	Xiaodong Zhuo

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	Output power (dBm)	Average Output power (dBm)	Limit (dBm)	Result
GFSK	00	2.30	2.29	≤ 30.00	Pass
	39	1.65	1.64		
	78	1.07	1.00		
$\pi/4$ DQPSK	00	1.61	0.99	≤ 21.00	Pass
	39	1.18	0.67		
	78	0.44	-0.10		
8DPSK	00	1.68	1.11	≤ 21.00	Pass
	39	1.24	0.73		
	78	0.53	-0.06		

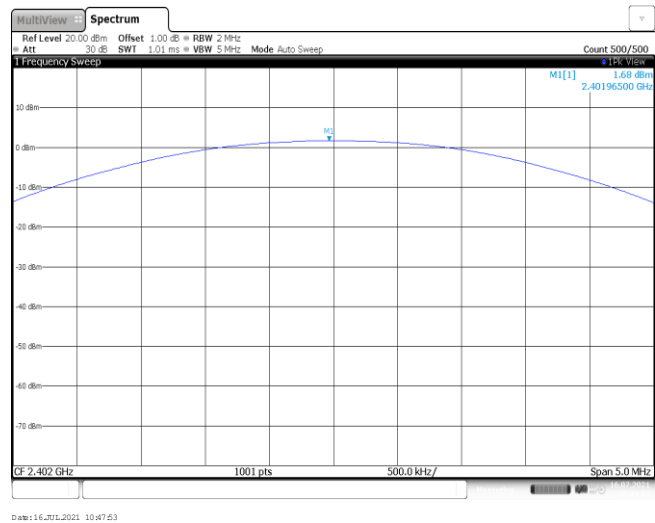




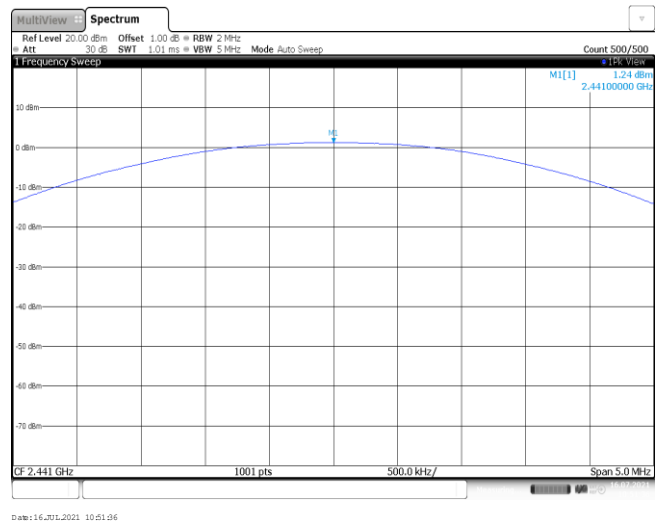
Modulation Type:

8DPSK

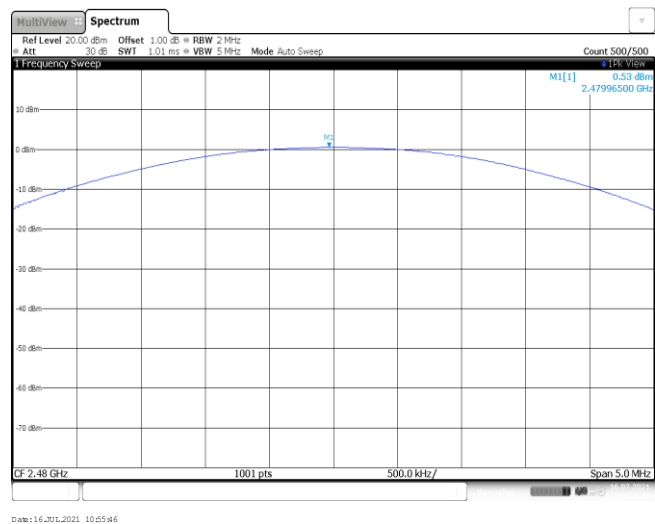
CH00



CH39



CH78



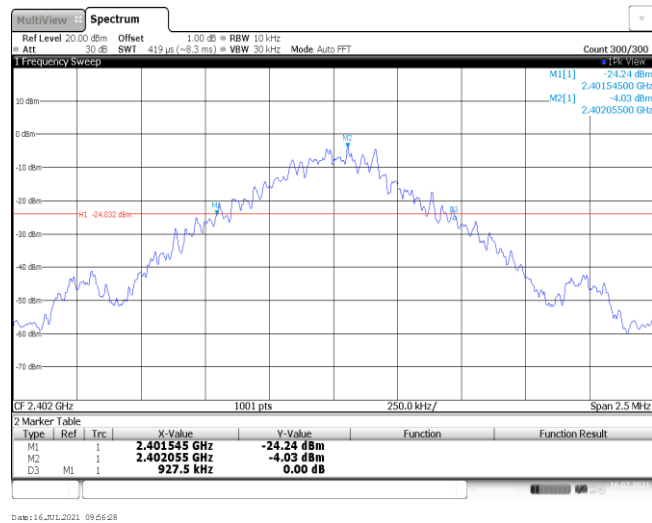
Appendix B : 20 dB Bandwidth

Modulation type	Channel	20 dB Bandwidth (kHz)	Limit (kHz)	Result
GFSK	00	927.50	-	Pass
	39	927.50		
	78	927.50		
$\pi/4$ DQPSK	00	1297.50	-	Pass
	39	1315.00		
	78	1302.50		
8DPSK	00	1290.00	-	Pass
	39	1302.50		
	78	1305.00		

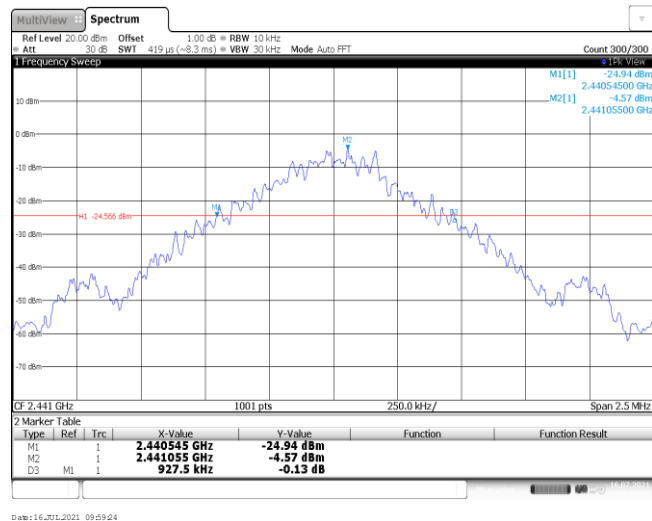
Modulation Type:

GFSK

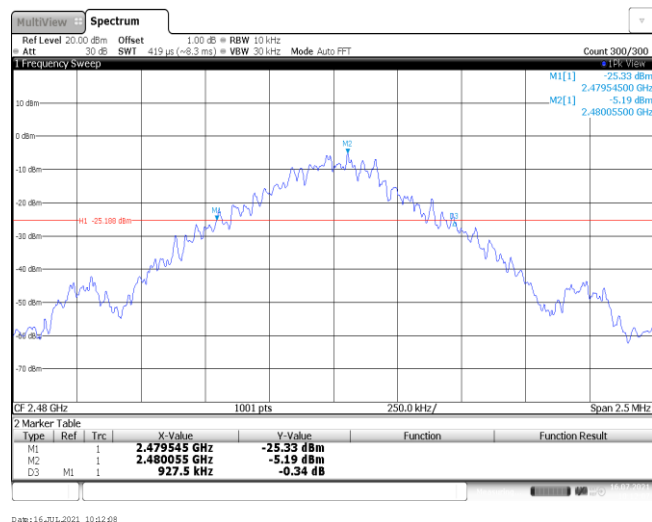
CH00



CH39



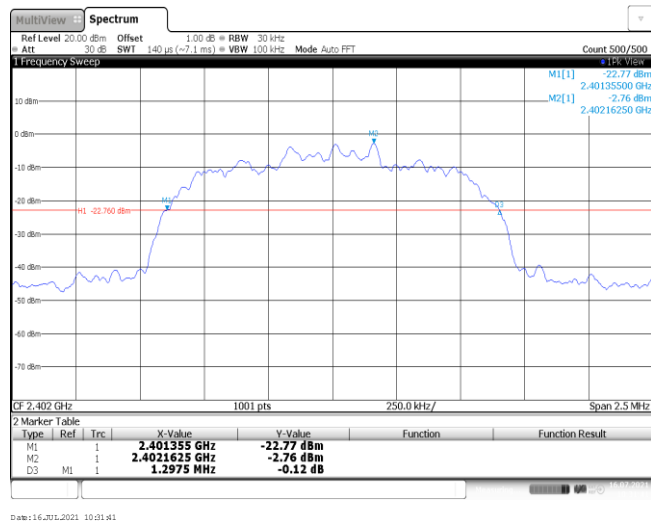
CH78



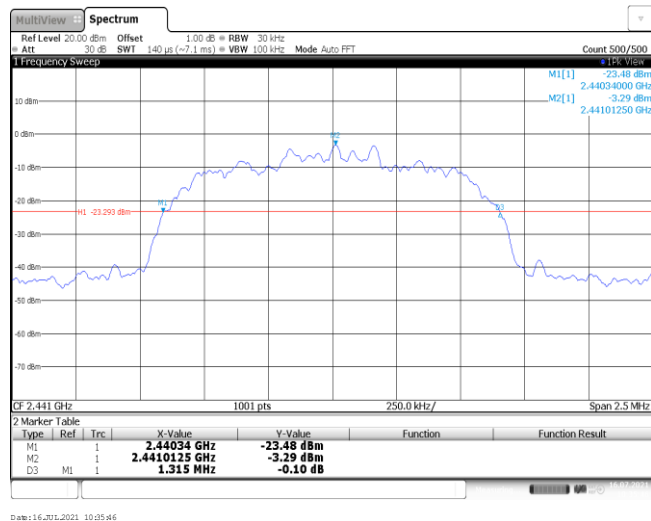
Modulation Type:

 $\pi/4$ DQPSK

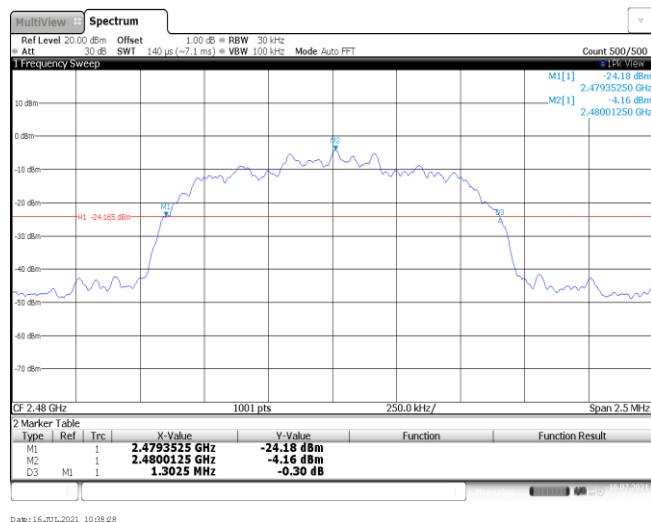
CH00



CH39



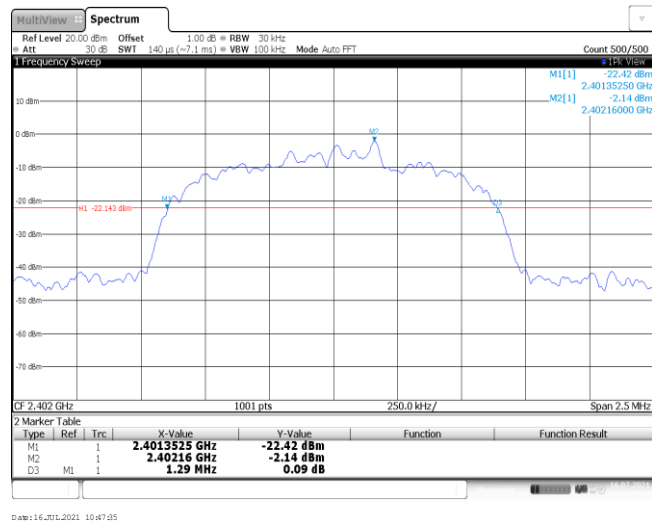
CH78



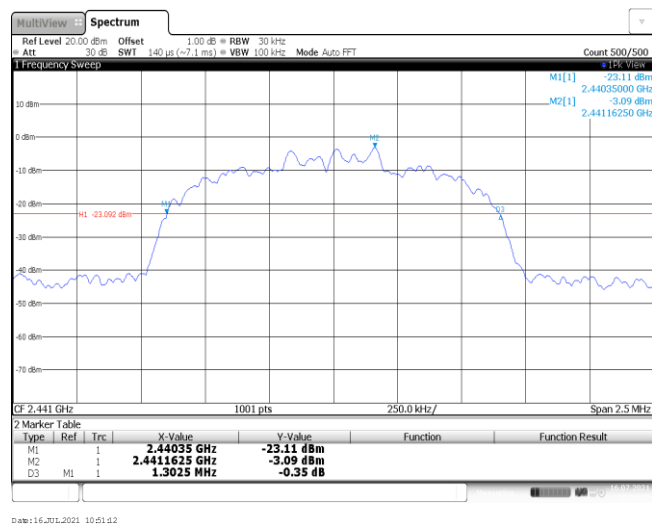
Modulation Type:

8DPSK

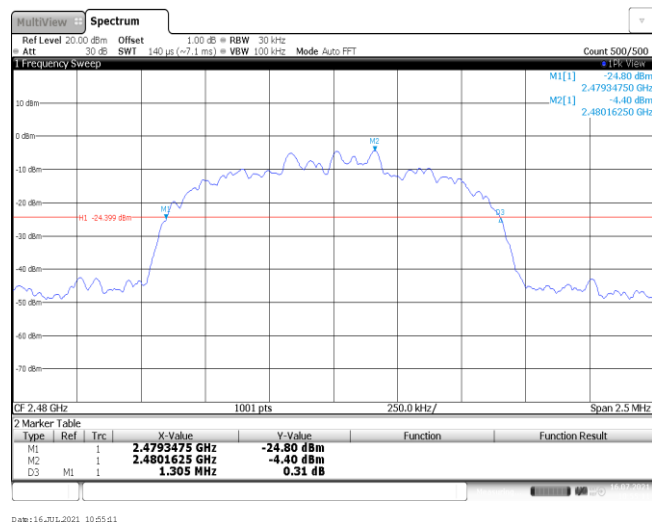
CH00



CH39



CH78



Appendix C: 99% Occupied Bandwidth

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

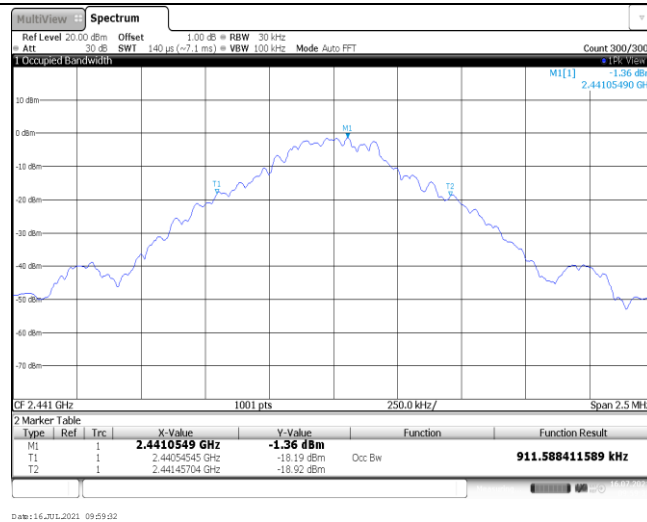
Modulation Type:

GFSK

CH00



CH39



CH78



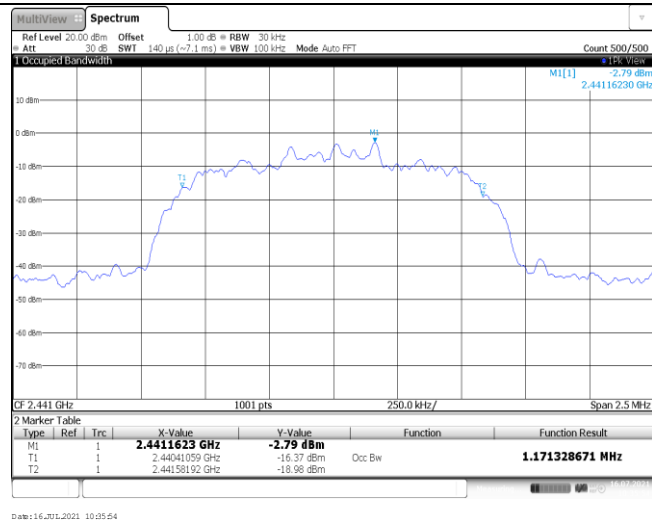
Modulation Type:

 $\pi/4$ DQPSK

CH00



CH39



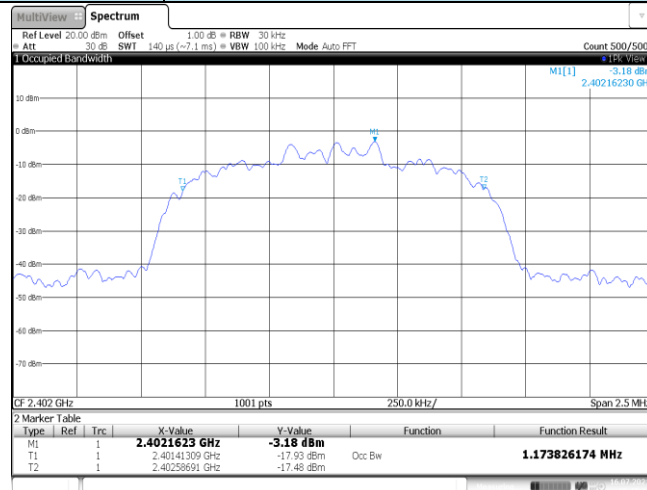
CH78



Modulation Type:

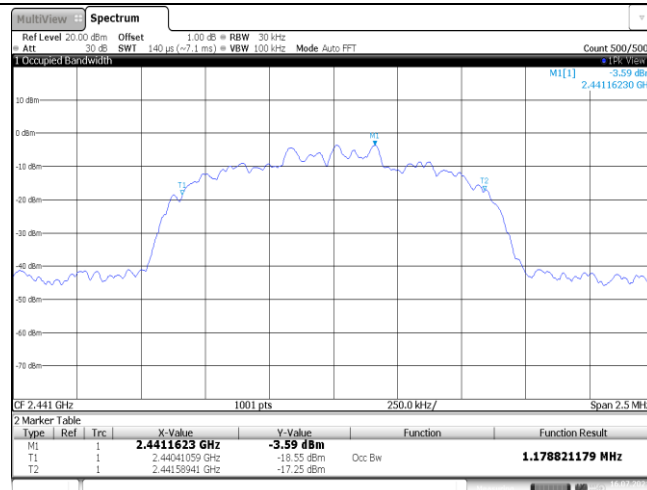
8DPSK

CH00



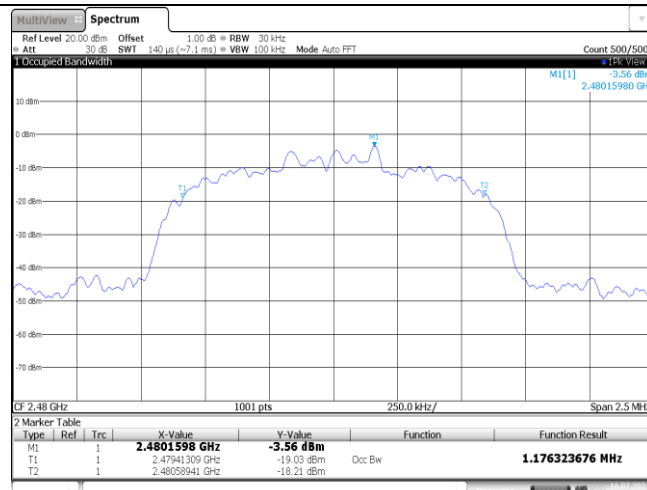
Date: 16-Jul-2021 10:47:44

CH39



Date: 16-Jul-2021 10:51:20

CH78



Date: 16-Jul-2021 10:55:20

Appendix D: Carrier Frequencies Separation

Modulation type	Channel	Carrier Frequencies Separation (MHz)	Limit (kHz) *	Result
GFSK	39	1.00	≥927.50	Pass
π/4DQPSK	39	1.00	≥876.67	Pass
8DPSK	39	1.00	≥870.00	Pass

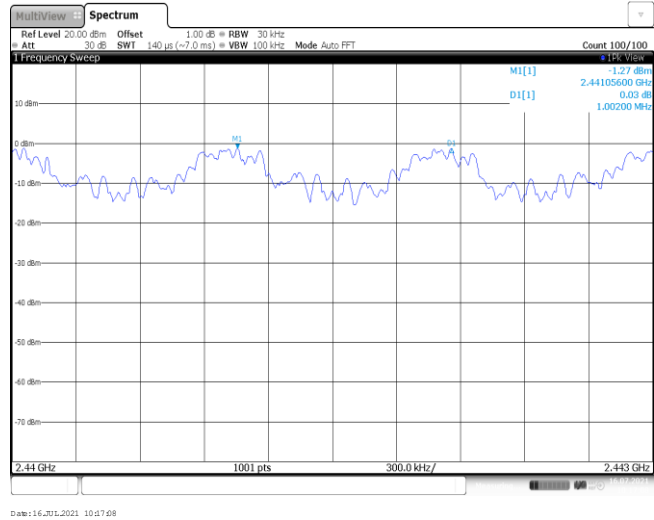
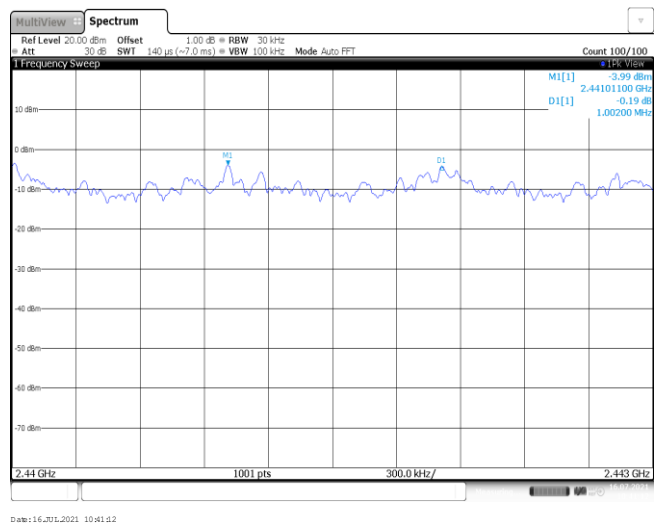
Note:

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

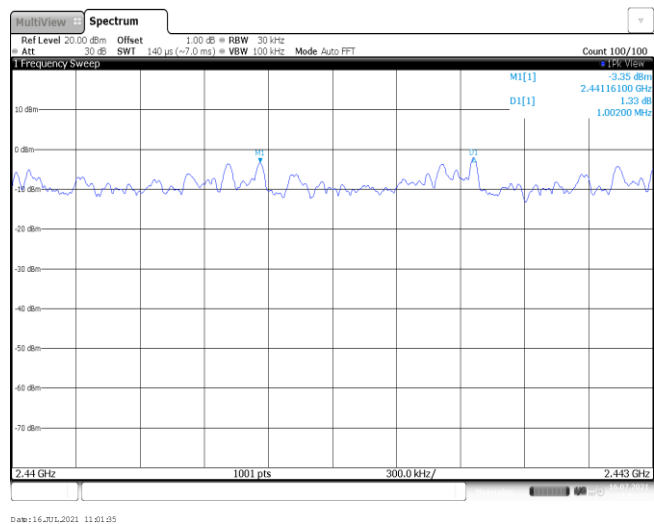
π/4DQPSK limit = 2/3 * The maximum 20 dB Bandwidth for π/4DQPSK modulation on the appendix B.

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

GFSK

 $\pi/4$ DQPSK

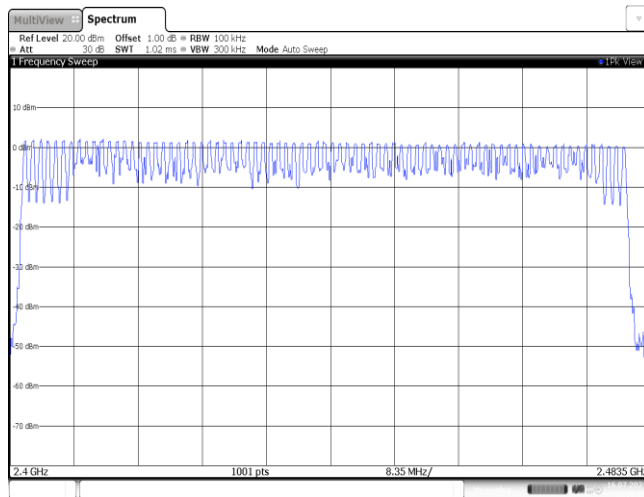
8DPSK



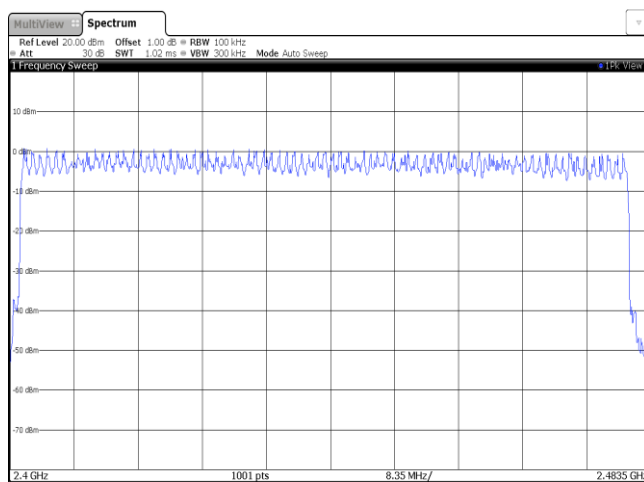
Appendix E: Hopping Channel Number

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

GFSK

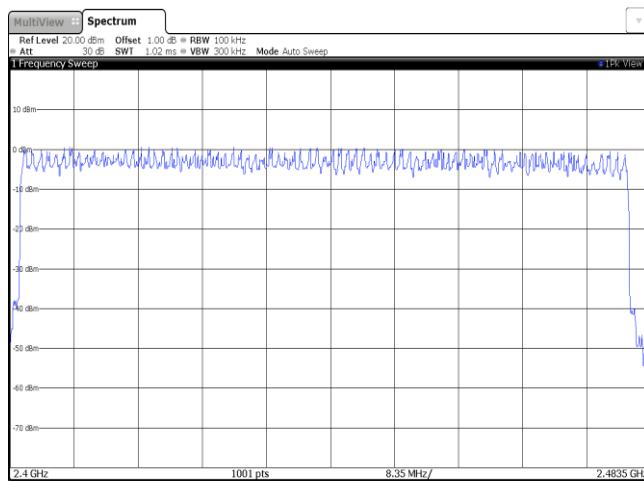


Date: 16-Jul-2021 10:28:06

 $\pi/4$ DQPSK

Date: 16-Jul-2021 10:43:59

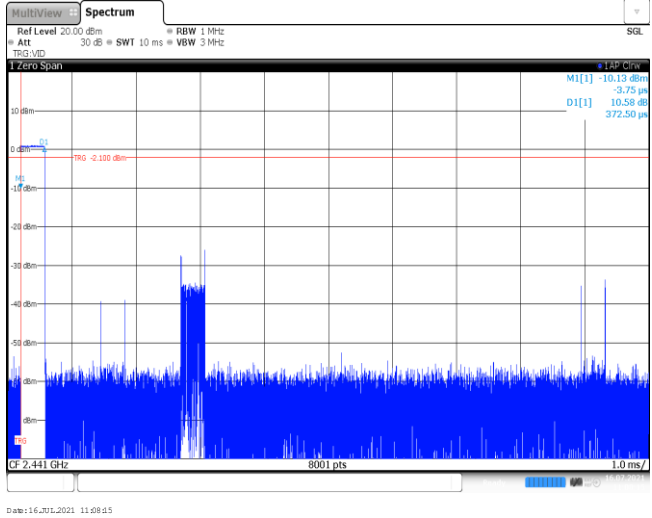
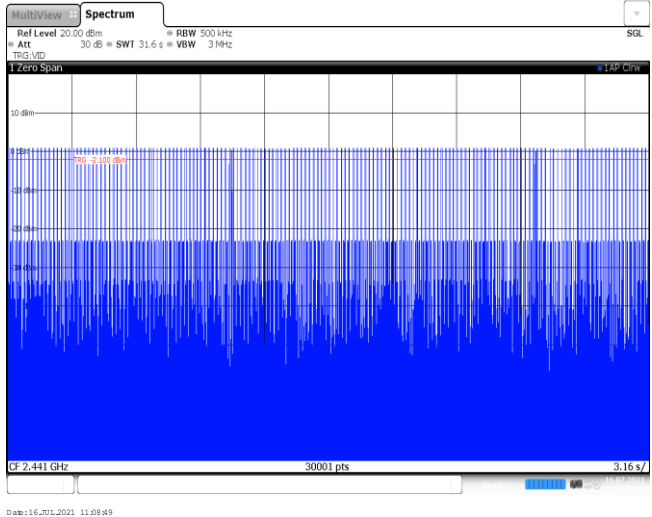
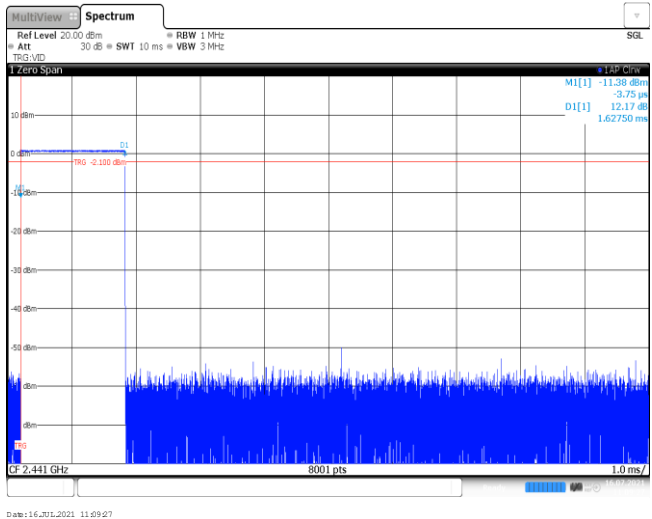
8DPSK



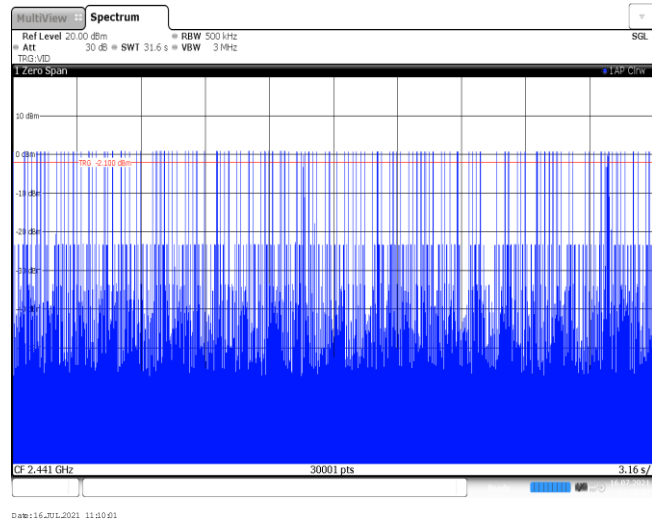
Date: 16-Jul-2021 11:04:14

Appendix F: Dwell Time

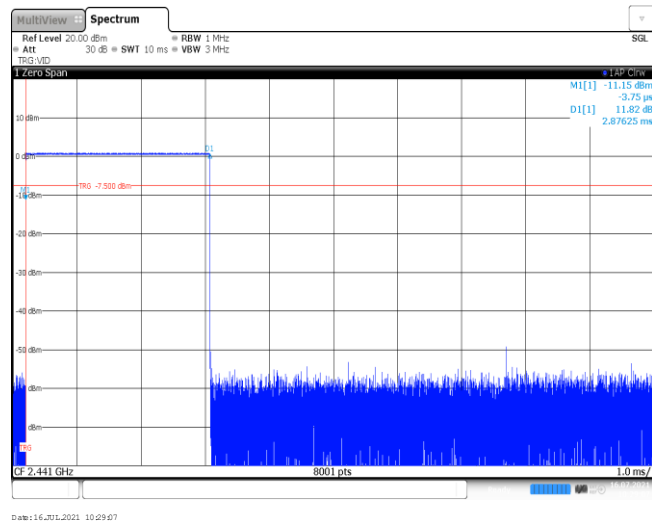
Modulation type	Packet	Burst Width [ms]	Total Hops[hop*ch]	Dwell time (Second)	Limit (Second)	Result
GFSK	DH1	0.37	315	0.12	≤ 0.40	Pass
	DH3	1.63	163	0.27		
	DH5	2.88	120	0.35		
$\pi/4$ DQPSK	2DH1	0.38	316	0.12	≤ 0.40	Pass
	2DH3	1.63	161	0.26		
	2DH5	2.88	113	0.33		
8DPSK	3DH1	0.38	315	0.12	≤ 0.40	Pass
	3DH3	1.63	164	0.27		
	3DH5	2.88	106	0.31		

Modulation Type:	GFSK
DH1 Burst width	 The spectrum plot shows a signal at 2.441 GHz with a bandwidth of 1 MHz. The signal is characterized by a sharp peak at approximately -10.13 dBm, with a duration of 3.75 µs. The plot includes a reference level of 20.00 dBm, an attenuation of 30 dB, a sweep time of 10 ms, and a video bandwidth of 3 MHz. The signal is identified as M1[1] and D1[1].
DH1 Burst number	 The spectrum plot shows a signal at 2.441 GHz with a bandwidth of 500 kHz. The signal is characterized by a dense burst of energy, with a duration of 3.16 s. The plot includes a reference level of 20.00 dBm, an attenuation of 30 dB, a sweep time of 31.6 s, and a video bandwidth of 3 MHz. The signal is identified as M1[1] and D1[1].
DH3 Burst width	 The spectrum plot shows a signal at 2.441 GHz with a bandwidth of 1 MHz. The signal is characterized by a sharp peak at approximately -11.38 dBm, with a duration of 1.62750 ms. The plot includes a reference level of 20.00 dBm, an attenuation of 30 dB, a sweep time of 10 ms, and a video bandwidth of 3 MHz. The signal is identified as M1[1] and D1[1].

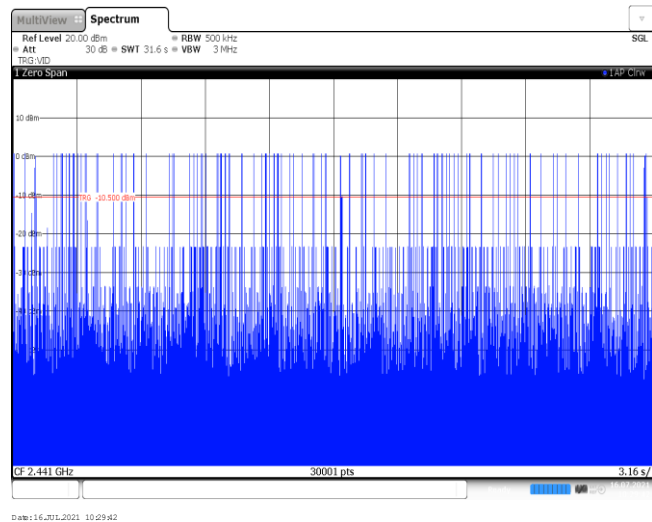
DH3
Burst number



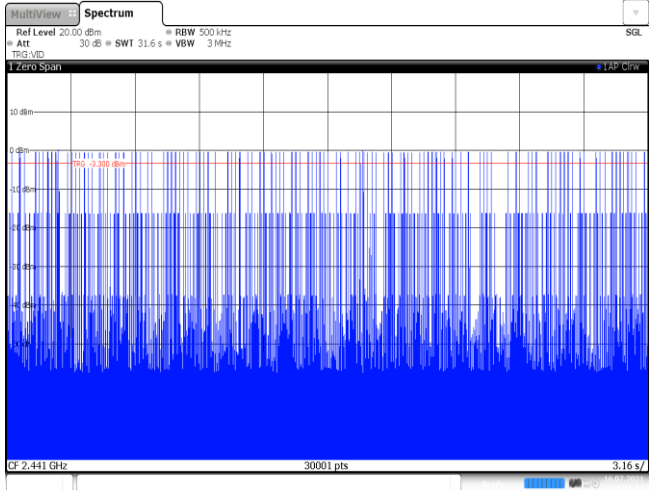
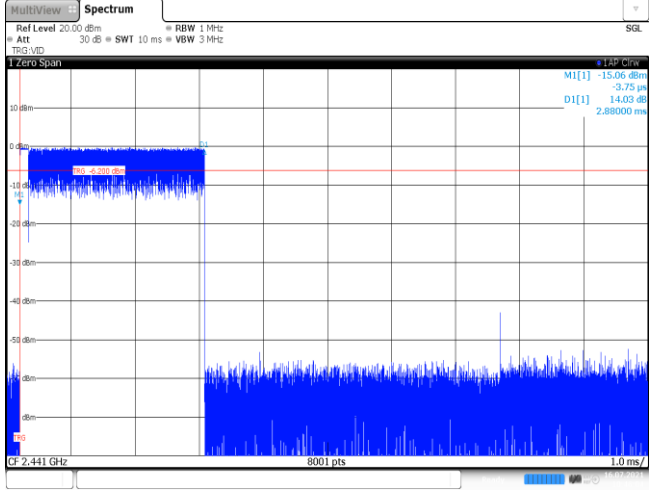
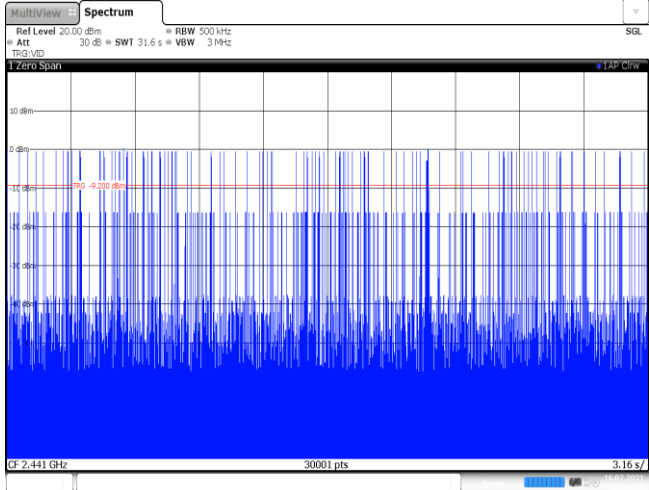
DH5
Burst width

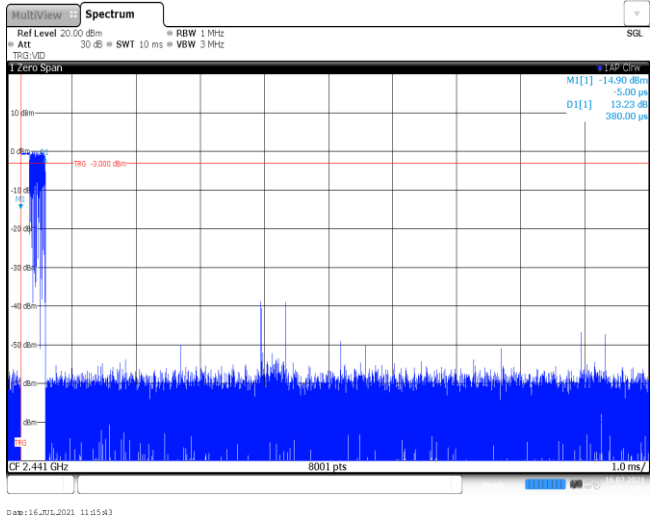
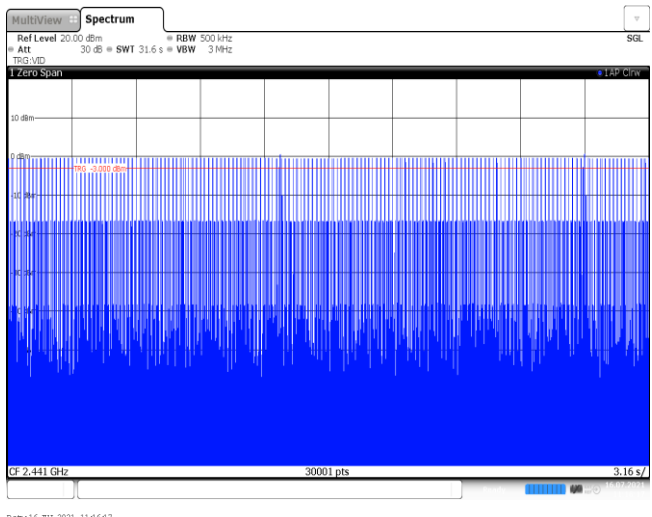
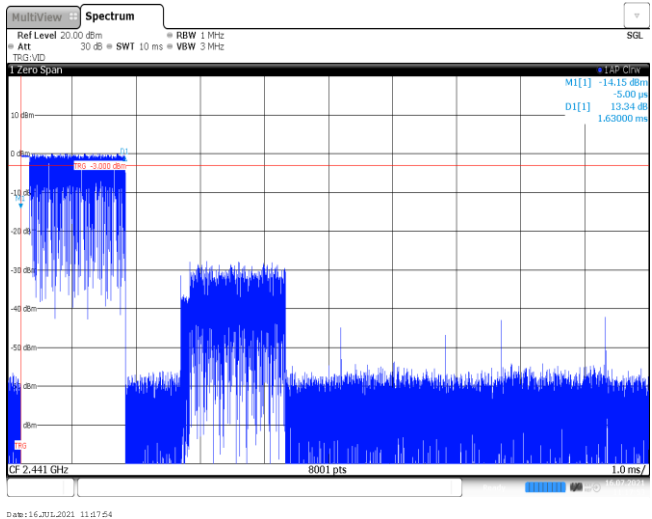


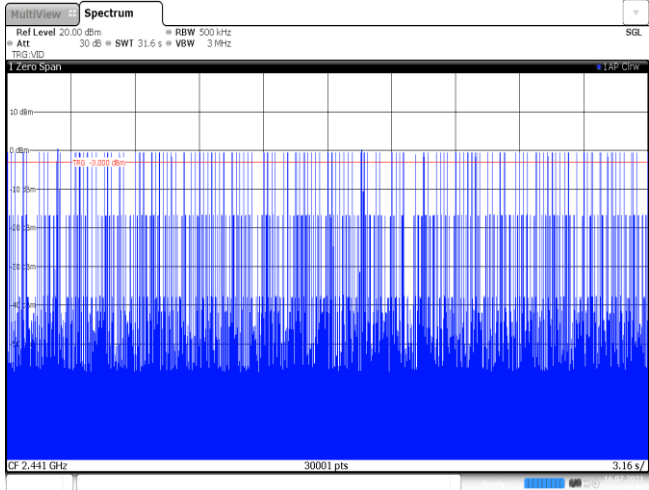
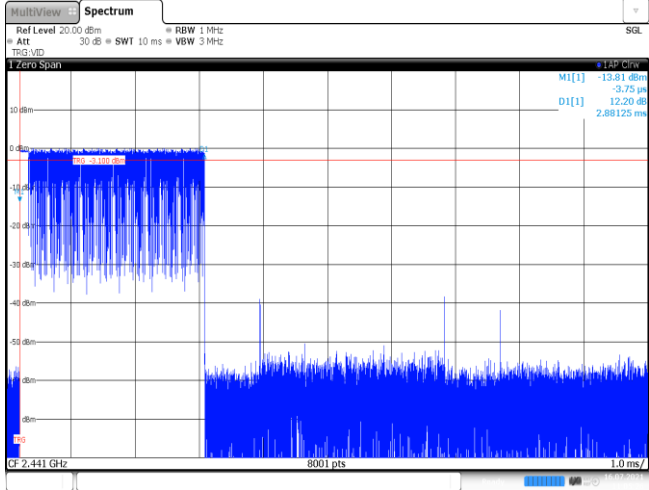
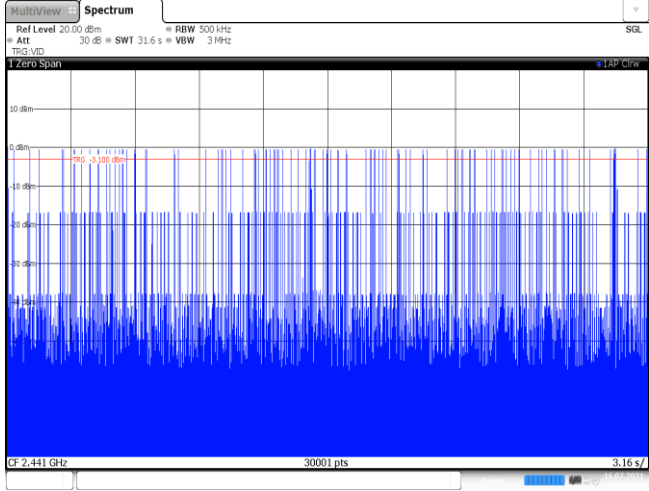
DH5
Burst number



Appendix report page: 21 of 41

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

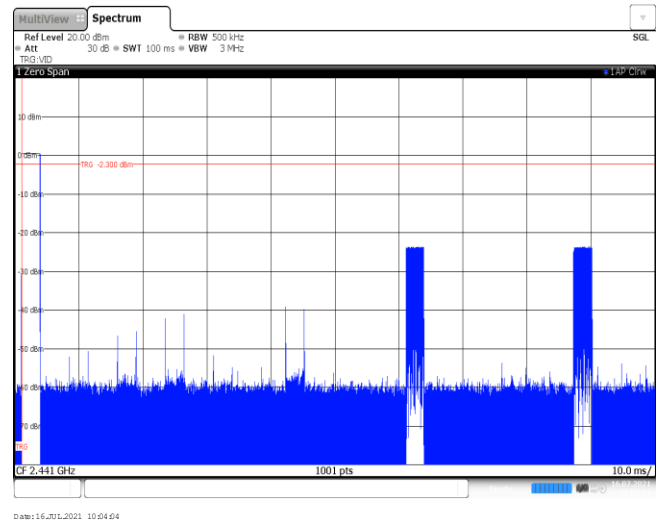
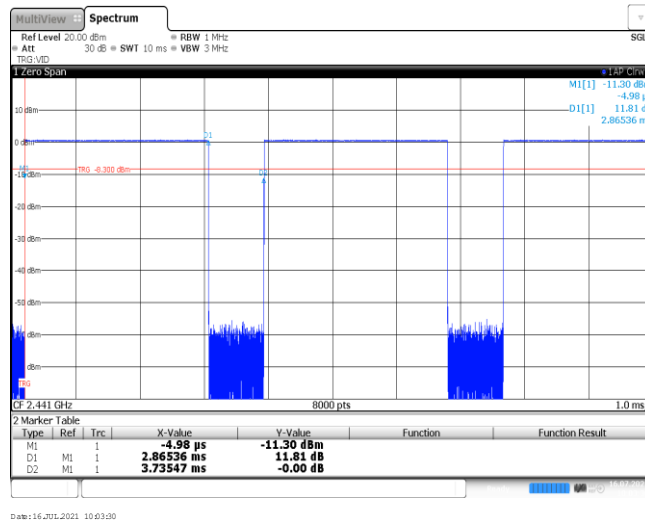
Modulation Type:	8DPSK
3DH1 Burst width	 The spectrum plot shows a signal centered at 2.441 GHz. The y-axis represents power in dBm, ranging from -60 to 10. The x-axis represents frequency in MHz, ranging from 2.435 to 2.447. The signal is a burst with a width of approximately 1.0 ms. The plot shows a sharp peak at the center frequency, with a power level of approximately -14.50 dBm. The background noise floor is around -13.23 dBm. The plot is labeled 'Spectrum' and '1 Zero Span'. The date is 16.10.2021 11:15:43.
3DH1 Burst number	 The spectrum plot shows a signal centered at 2.441 GHz. The y-axis represents power in dBm, ranging from -60 to 10. The x-axis represents frequency in MHz, ranging from 2.435 to 2.447. The signal is a burst with a width of approximately 3.16 s. The plot shows a sharp peak at the center frequency, with a power level of approximately -14.50 dBm. The background noise floor is around -13.23 dBm. The plot is labeled 'Spectrum' and '1 Zero Span'. The date is 16.10.2021 11:16:47.
3DH3 Burst width	 The spectrum plot shows a signal centered at 2.441 GHz. The y-axis represents power in dBm, ranging from -60 to 10. The x-axis represents frequency in MHz, ranging from 2.435 to 2.447. The signal is a burst with a width of approximately 1.0 ms. The plot shows a sharp peak at the center frequency, with a power level of approximately -14.15 dBm. The background noise floor is around -13.34 dBm. The plot is labeled 'Spectrum' and '1 Zero Span'. The date is 16.10.2021 11:17:54.

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

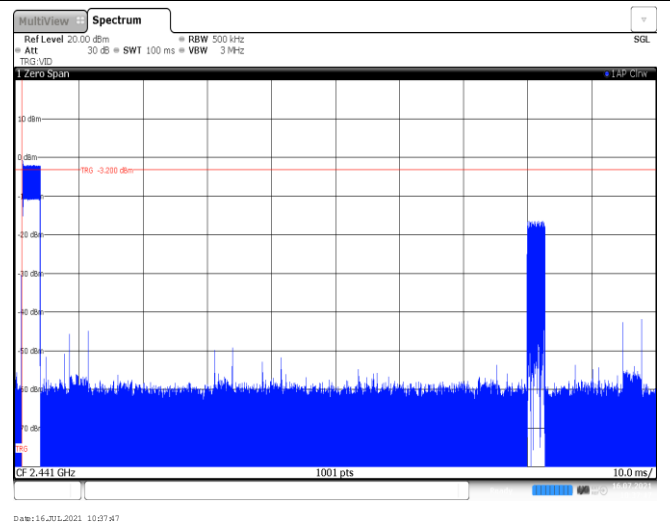
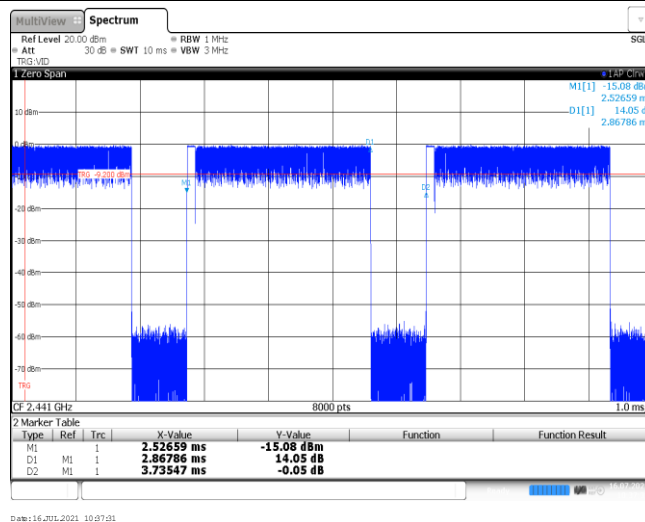
Appendix G: Duty Cycle Correction Factor (DCCF)

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	3	-21.30
$\pi/4$ DQPSK	2441	2.87	100	2	-24.82
8DPSK	2441	2.87	100	2	-24.82

GFSK

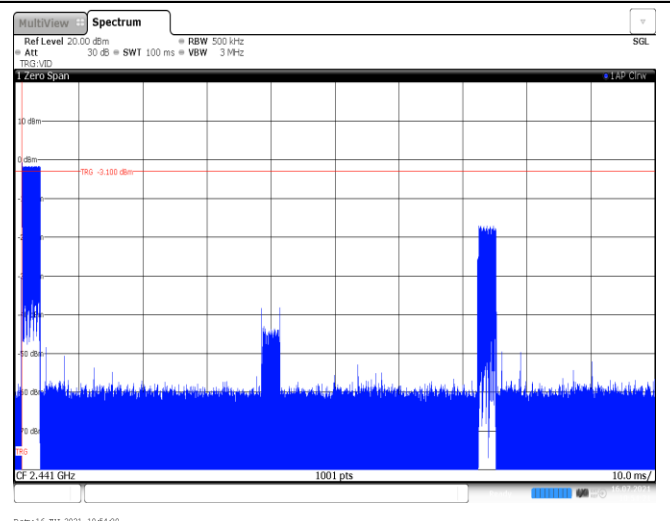
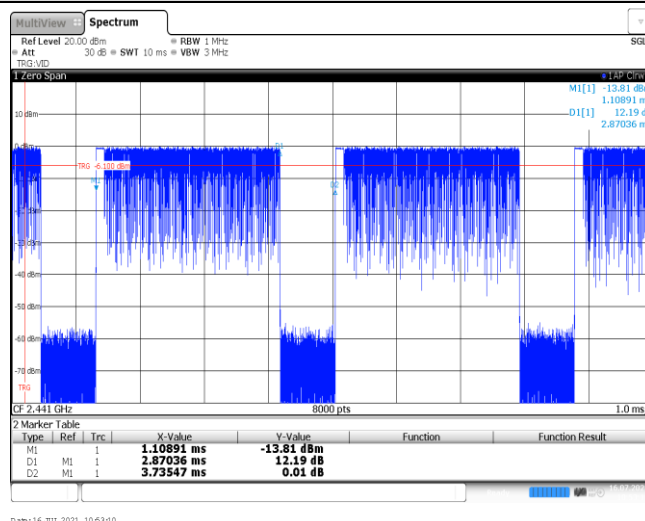
T_{on} time for single burst

Burst Quantity

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

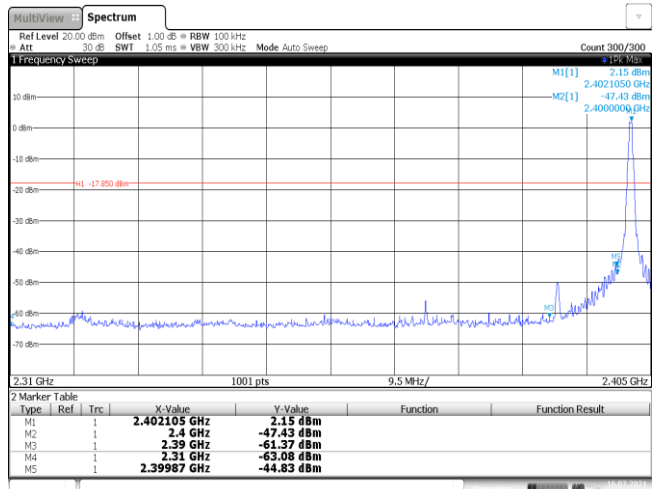
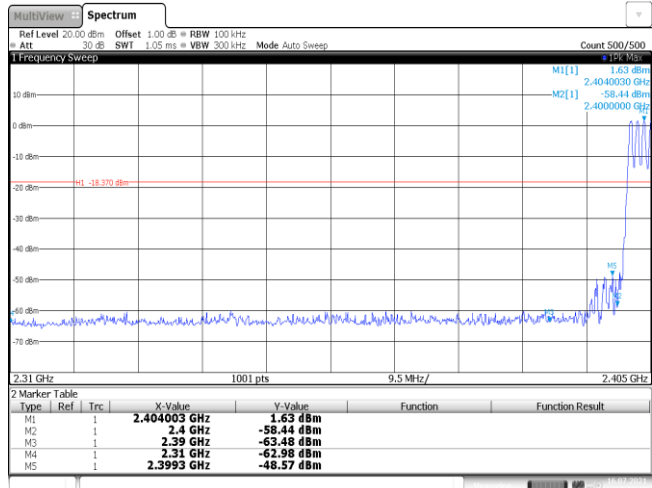
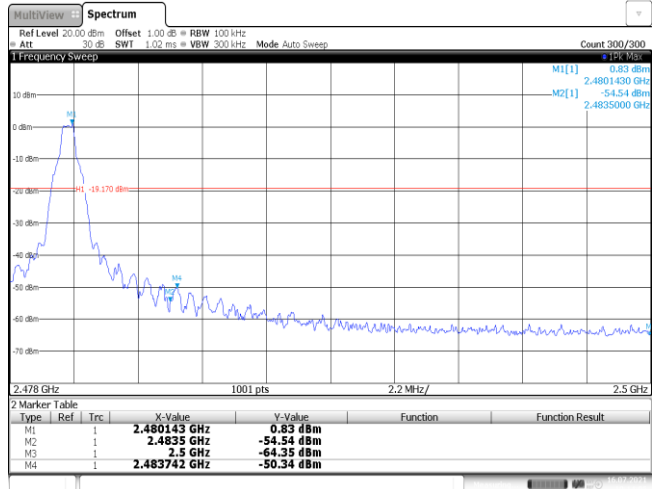
Burst Quantity

8DPSK

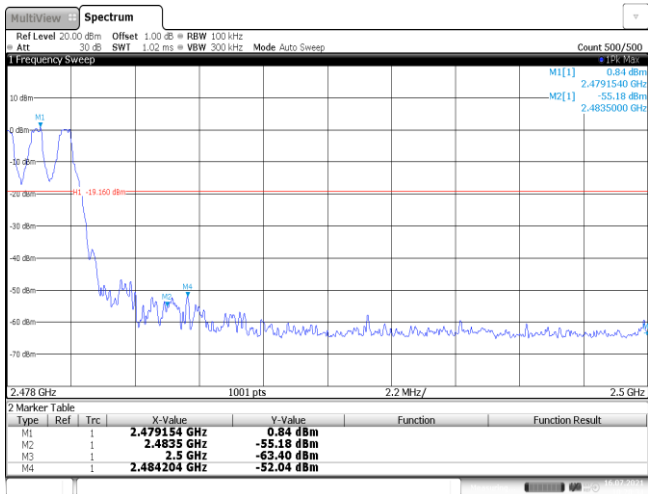
T_{on} time for single burst

Burst Quantity

Appendix H: Band edge and Spurious Emissions (conducted)

Test Item:	Band edge	Modulation type:	GFSK																																										
CH00 No hopping mode	 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>2.15 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>2.4 GHz</td><td>-47.43 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>2.39 GHz</td><td>-61.37 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>2.31 GHz</td><td>-63.08 dBm</td><td></td><td></td></tr><tr><td>M5</td><td>1</td><td></td><td>2.39987 GHz</td><td>-44.83 dBm</td><td></td><td></td></tr></table> Date: 16.JUL.2021 09:57:51	Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		2.402105 GHz	2.15 dBm			M2	1		2.4 GHz	-47.43 dBm			M3	1		2.39 GHz	-61.37 dBm			M4	1		2.31 GHz	-63.08 dBm			M5	1		2.39987 GHz	-44.83 dBm				
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																																							
M1	1		2.402105 GHz	2.15 dBm																																									
M2	1		2.4 GHz	-47.43 dBm																																									
M3	1		2.39 GHz	-61.37 dBm																																									
M4	1		2.31 GHz	-63.08 dBm																																									
M5	1		2.39987 GHz	-44.83 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>2.404003 GHz</td><td>1.63 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>2.4 GHz</td><td>-58.44 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>2.39 GHz</td><td>-63.48 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>2.31 GHz</td><td>-62.98 dBm</td><td></td><td></td></tr><tr><td>M5</td><td>1</td><td></td><td>2.3993 GHz</td><td>-48.57 dBm</td><td></td><td></td></tr></table> Date: 16.JUL.2021 10:28:20	Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		2.404003 GHz	1.63 dBm			M2	1		2.4 GHz	-58.44 dBm			M3	1		2.39 GHz	-63.48 dBm			M4	1		2.31 GHz	-62.98 dBm			M5	1		2.3993 GHz	-48.57 dBm				
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																																							
M1	1		2.404003 GHz	1.63 dBm																																									
M2	1		2.4 GHz	-58.44 dBm																																									
M3	1		2.39 GHz	-63.48 dBm																																									
M4	1		2.31 GHz	-62.98 dBm																																									
M5	1		2.3993 GHz	-48.57 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>2.480143 GHz</td><td>0.83 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>2.4835 GHz</td><td>-54.54 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>2.5 GHz</td><td>-64.35 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>2.483742 GHz</td><td>-50.34 dBm</td><td></td><td></td></tr></table> Date: 16.JUL.2021 10:14:05	Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		2.480143 GHz	0.83 dBm			M2	1		2.4835 GHz	-54.54 dBm			M3	1		2.5 GHz	-64.35 dBm			M4	1		2.483742 GHz	-50.34 dBm											
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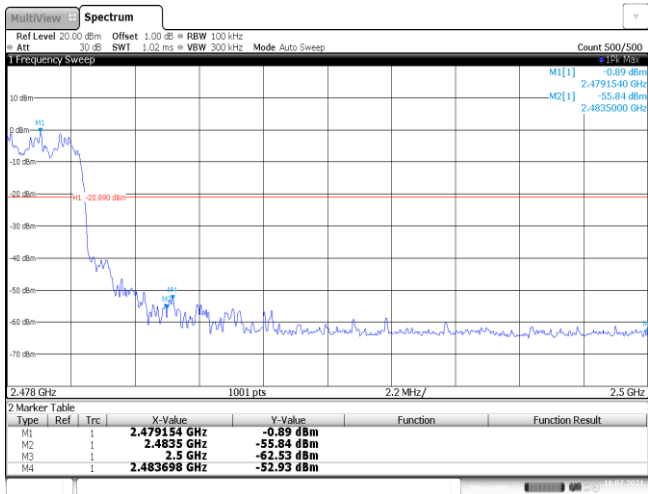
CH78
Hopping mode



Date: 16 JUL 2021 10:28:34

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

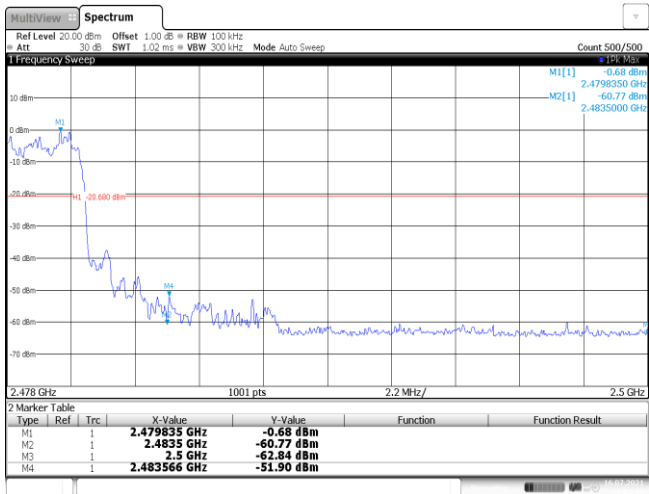
CH78
Hopping mode



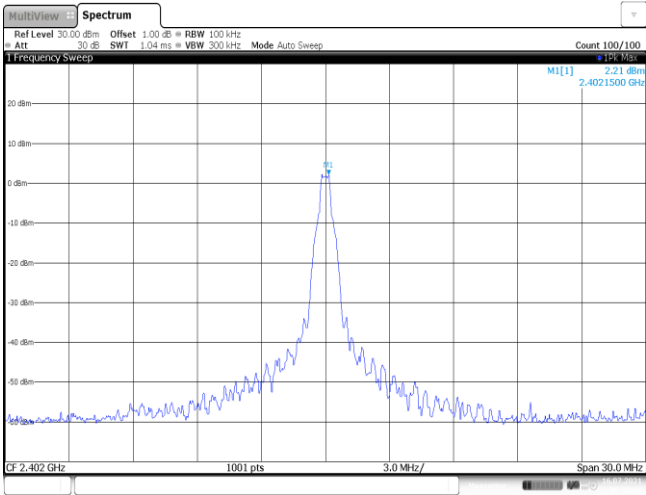
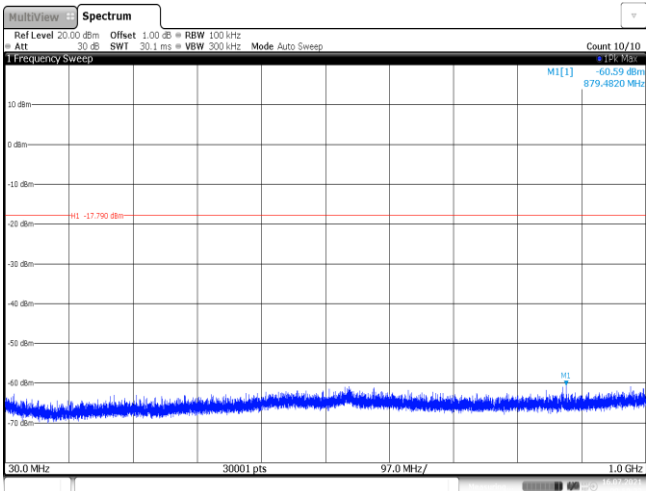
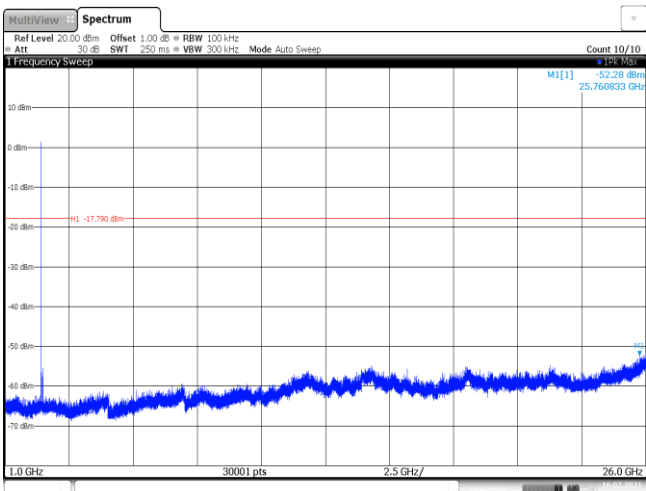
Date: 16-Jul-2021 10:45:03

Test Item:	Band edge	Modulation type:	8DPSK
CH00 No hopping mode	MultiView Spectrum 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 1 Frequency Sweep <		

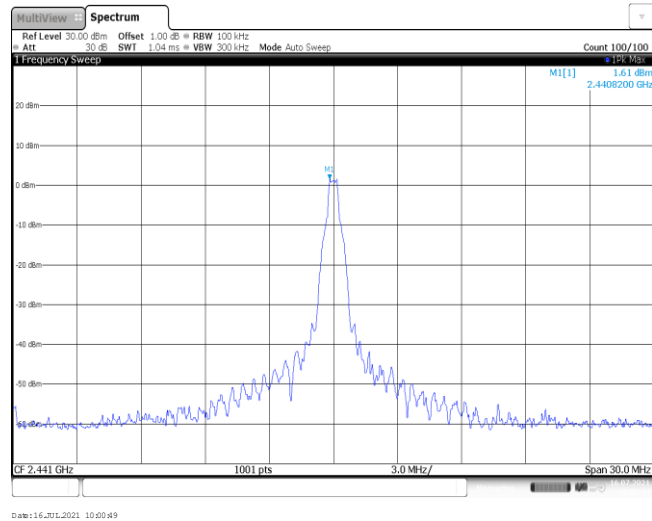
CH78
Hoppig mode



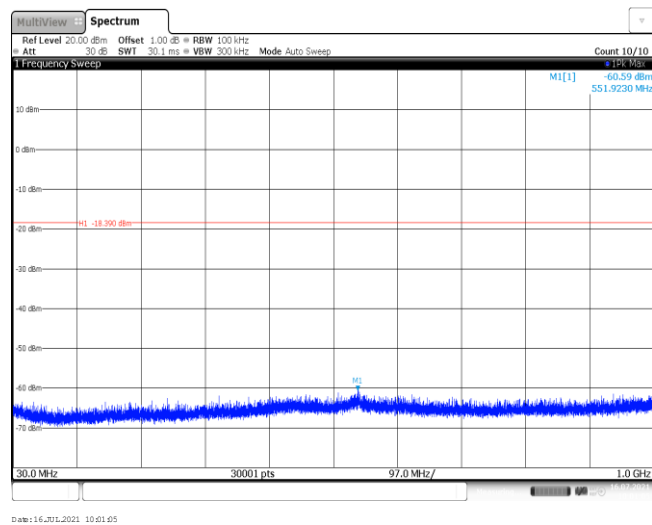
Date: 16-Jul-2021 11:05:14

Test Item:	Spurious Emission	Modulation type:	GFSK
CH00 Reference level	 The spectrum plot shows a single sharp peak at 2.4021500 GHz. The y-axis represents power in dBm, ranging from -70 to 20. The x-axis represents frequency in MHz, ranging from 2.400 to 2.404. The peak is labeled with a value of 2.21 dBm. The plot is titled 'Spectrum' and includes parameters: 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. The x-axis is labeled 'Frequency Sweep' and 'CF 2.402 GHz'. The y-axis is labeled 'dBm'.		
CH00 30MHz~1000MHz	 The spectrum plot shows a noisy baseline across the frequency range from 30.0 MHz to 1.0 GHz. The y-axis represents power in dBm, ranging from -70 to 10. The x-axis represents frequency in MHz, ranging from 30.0 to 1.0. A red horizontal line is drawn at -17.90 dBm. The plot is titled 'Spectrum' and includes parameters: 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. The x-axis is labeled 'Frequency Sweep' and '30.0 MHz'. The y-axis is labeled 'dBm'.		
CH00 1GHz~26GHz	 The spectrum plot shows a noisy baseline across the frequency range from 1.0 GHz to 26.0 GHz. The y-axis represents power in dBm, ranging from -70 to 10. The x-axis represents frequency in GHz, ranging from 1.0 to 26.0. A red horizontal line is drawn at -17.90 dBm. The plot is titled 'Spectrum' and includes parameters: 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. The x-axis is labeled 'Frequency Sweep' and '1.0 GHz'. The y-axis is labeled 'dBm'.		

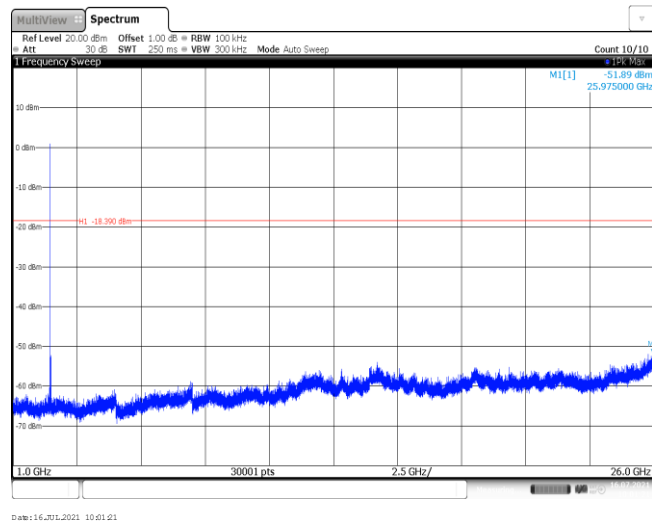
CH39
Reference level



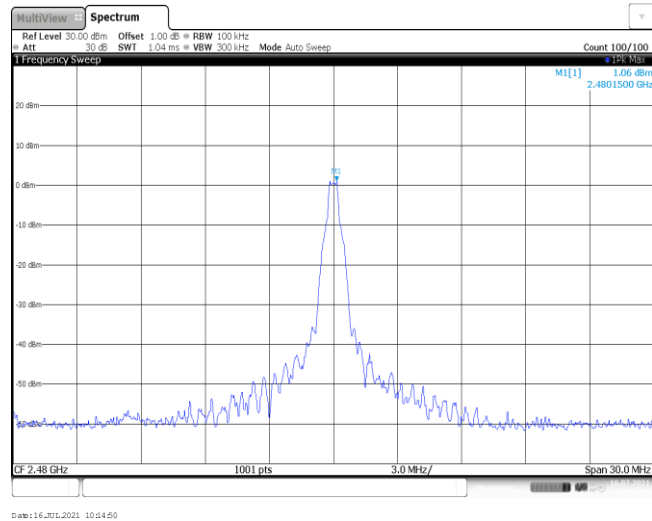
CH39
30MHz~1000MHz



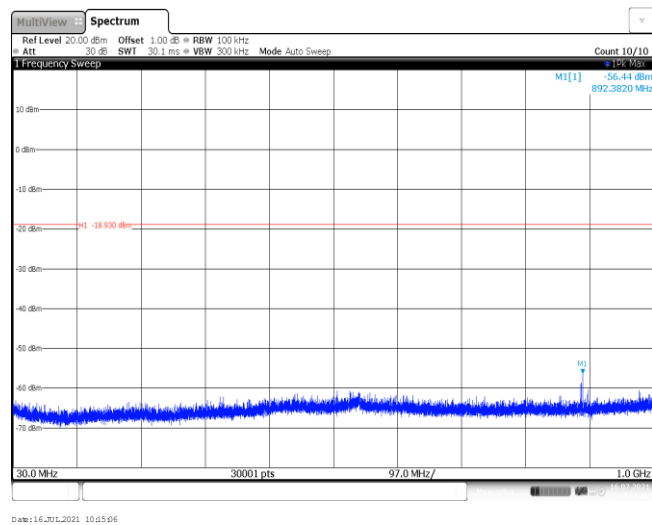
CH39
1GHz~26GHz



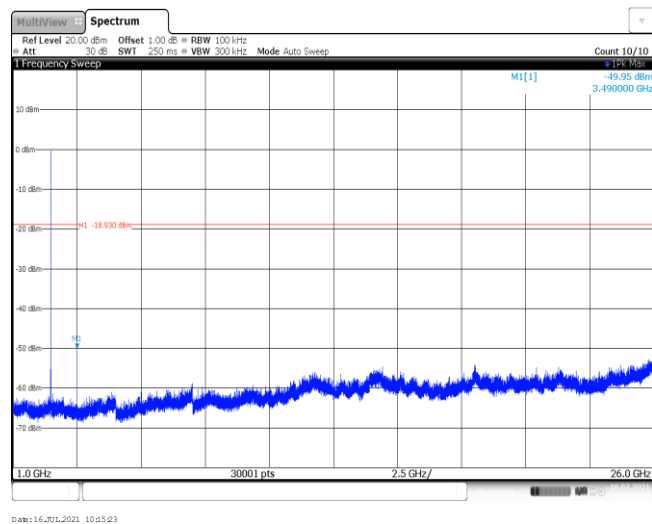
CH78
Reference level

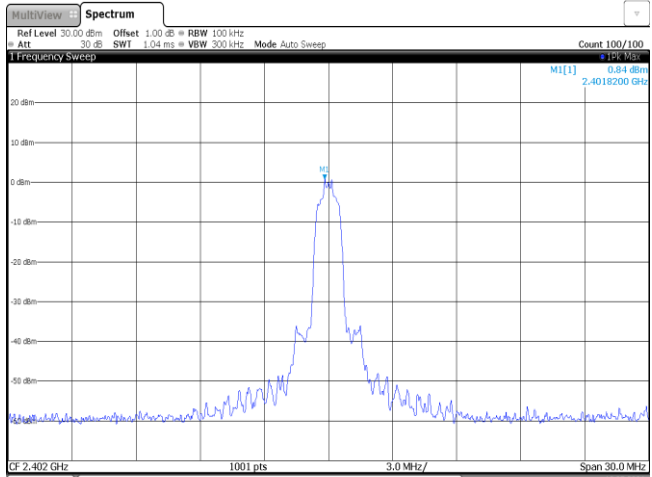
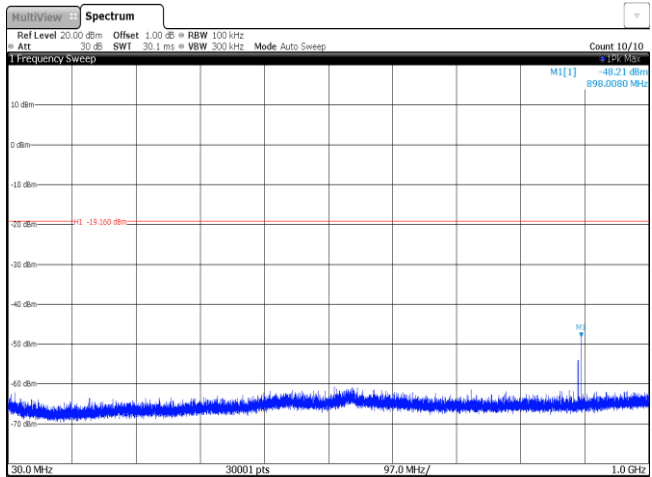
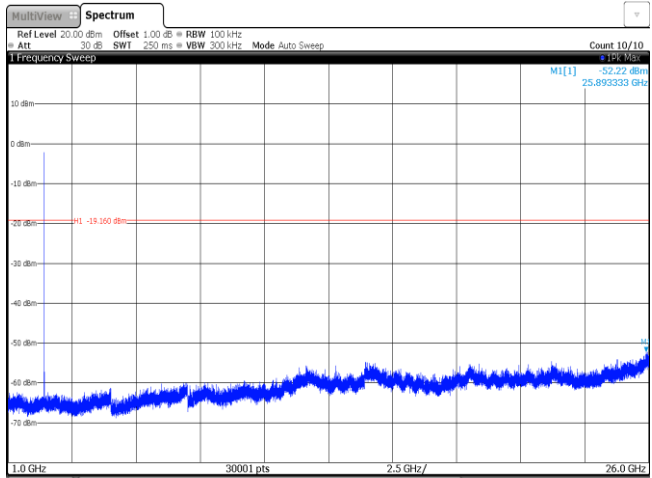


CH78
30MHz~1000MHz

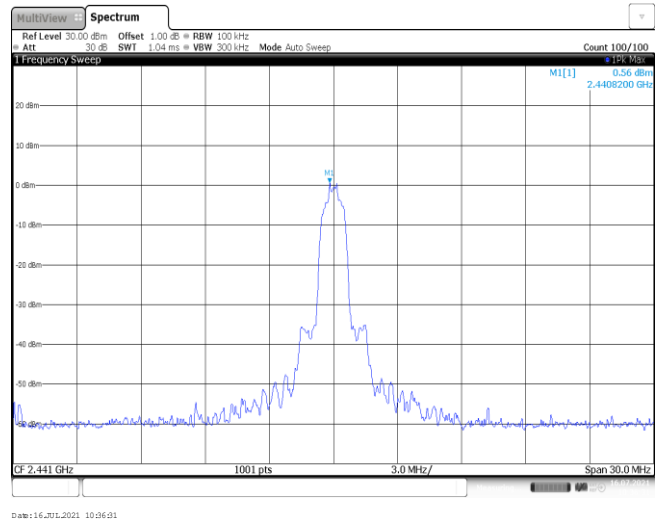


CH78
1GHz~26GHz

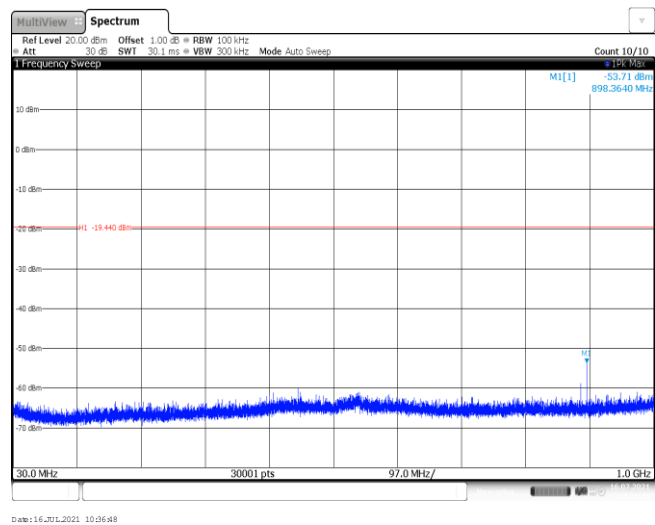


Test Item:	Spurious Emission	Modulation type:	$\pi/4$ DQPSK
CH00 Reference level	 Date: 16 JUL 2021 10:33:20		
CH00 30MHz~1000MHz	 Date: 16 JUL 2021 10:33:36		
CH00 1GHz~26GHz	 Date: 16 JUL 2021 10:33:53		

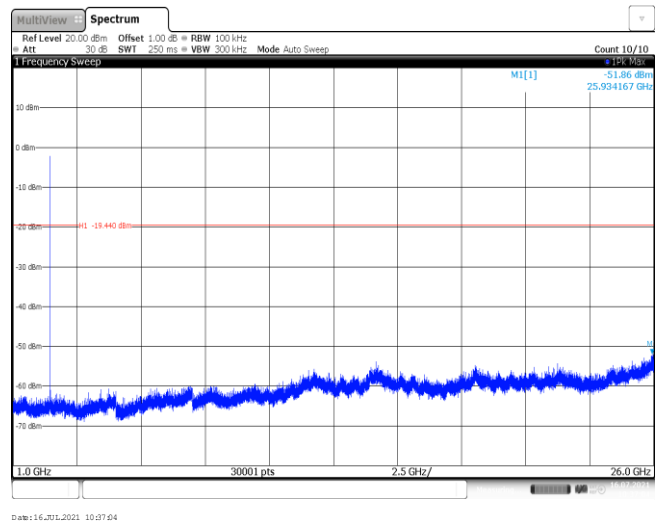
CH39
Reference level



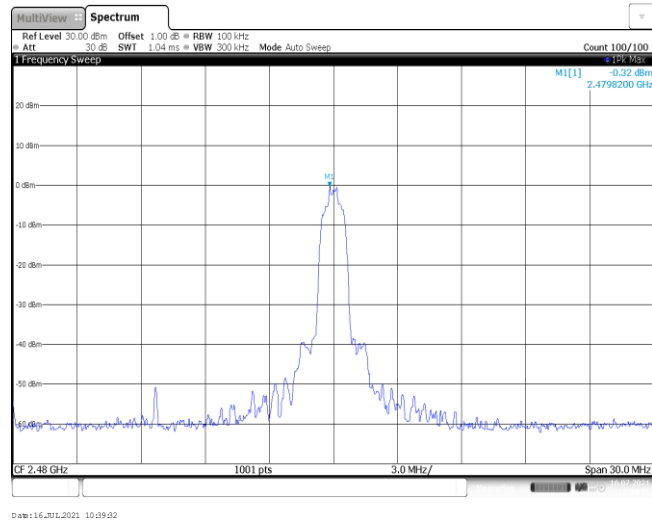
CH39
30MHz~1000MHz



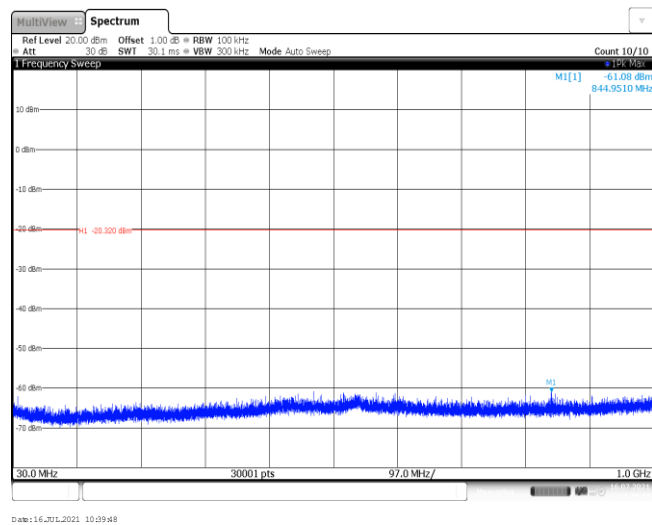
CH39
1GHz~26GHz



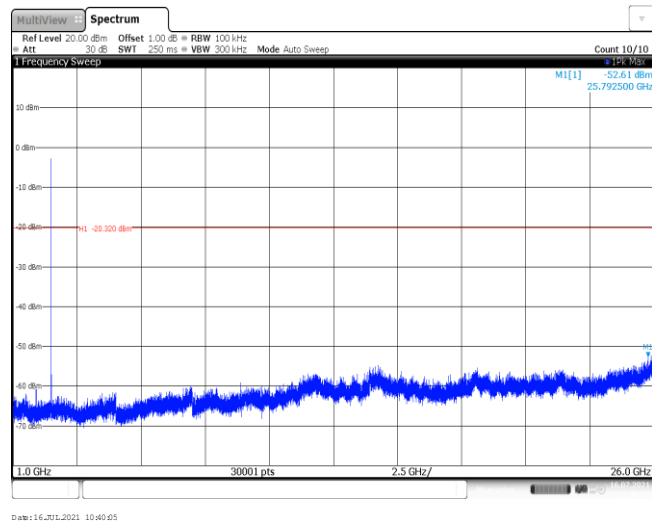
CH78
Reference level

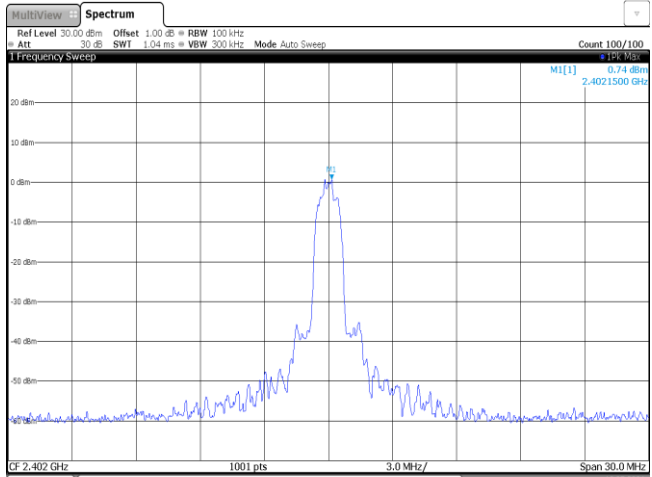
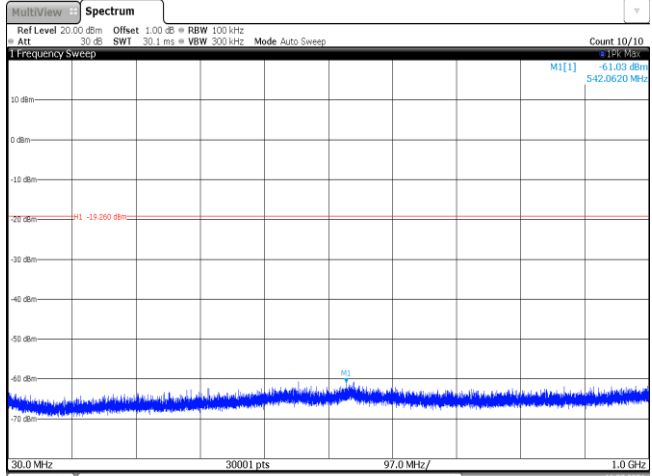
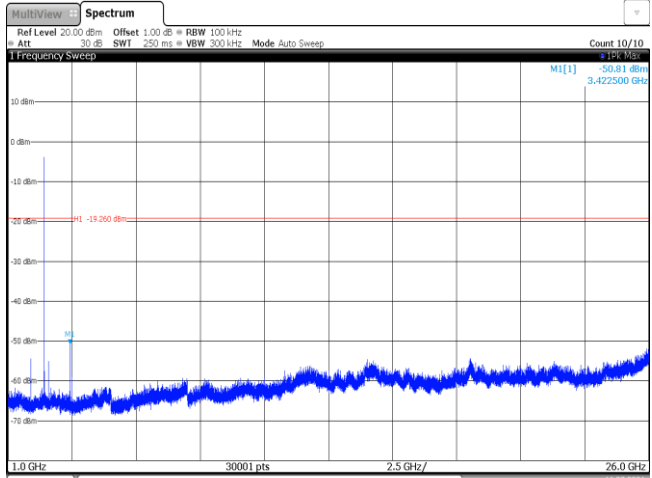


CH78
30MHz~1000MHz

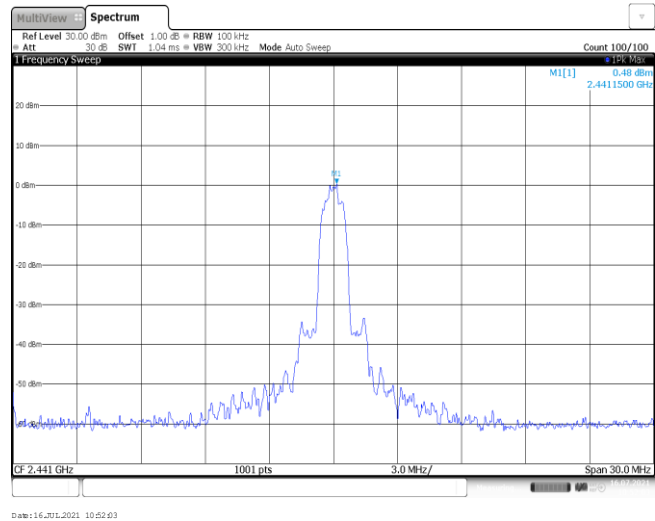


CH78
1GHz~26GHz

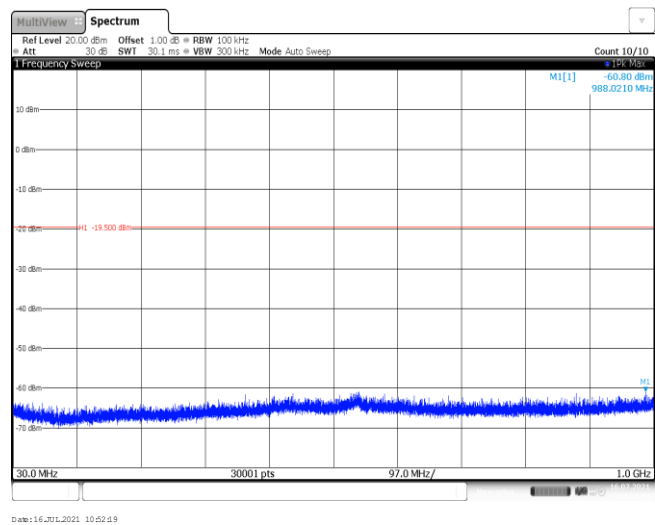


Test Item:	Spurious Emission	Modulation type:	8DPSK
CH00 Reference level	 Ref Level 30.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SW1 1.04 ms VBW 300 kHz Mode Auto Sweep Count 100/100 M1[1] 0.74 dBm 2.4021500 GHz CF 2.402 GHz 1001 pts 3.0 MHz/ Span 30.0 MHz Date: 16 JUL 2021 10:49:34		
CH00 30MHz~1000MHz	 Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SW1 30.1 ms VBW 300 kHz Mode Auto Sweep Count 10/10 M1[1] -61.03 dBm 542.0620 MHz 30.0 MHz 30001 pts 97.0 MHz/ 1.0 GHz Date: 16 JUL 2021 10:49:50		
CH00 1GHz~26GHz	 Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SW1 250 ms VBW 300 kHz Mode Auto Sweep Count 10/10 M1[1] -50.81 dBm 3.422500 GHz 1.0 GHz 30001 pts 2.5 GHz/ 26.0 GHz Date: 16 JUL 2021 10:50:06		

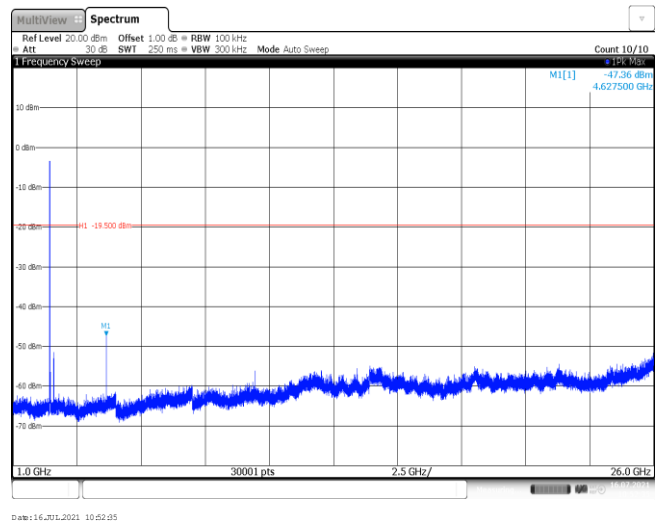
CH39
Reference level



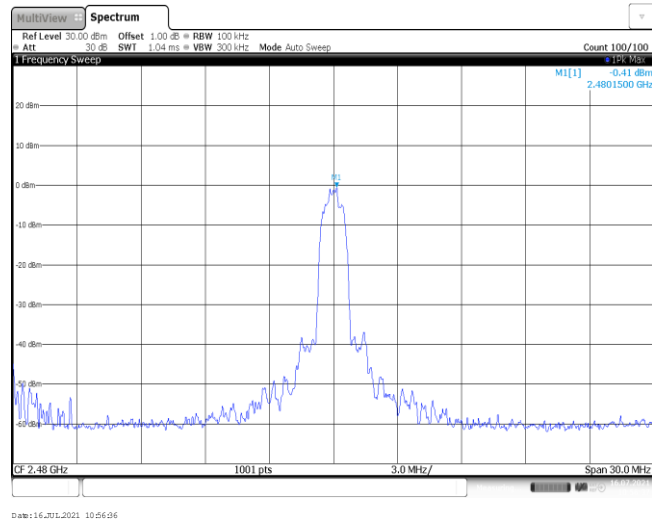
CH39
30MHz~1000MHz



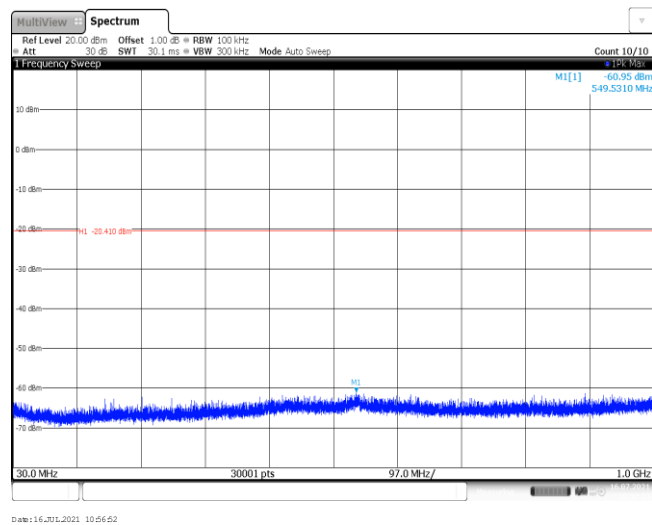
CH39
1GHz~26GHz



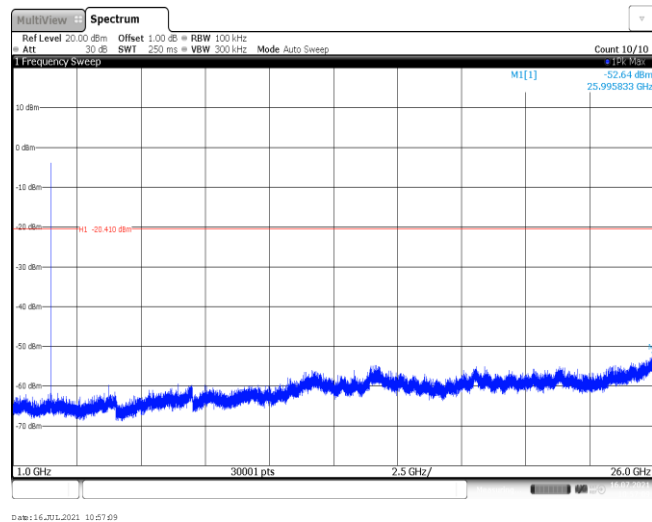
CH78
Reference level



CH78
30MHz~1000MHz



CH78
1GHz~26GHz



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