

APPENDIX REPORT

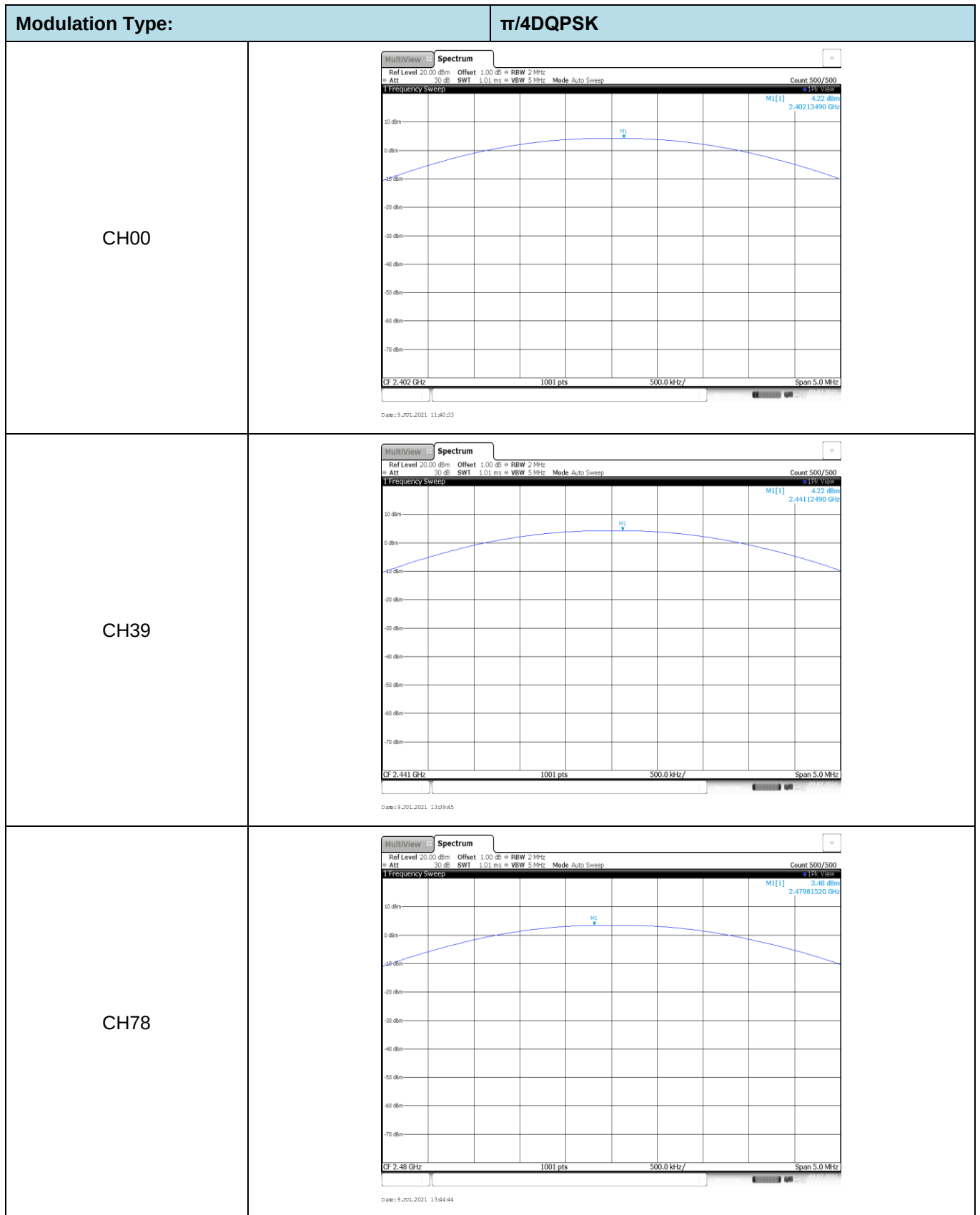
Project No.	SHT2105113201EW	Radio Specification	Bluetooth EDR
Test sample No.	YPHT21051132002	Model No.	SC400
Start test date	2021-07-09	Finish date	2021-07-09
Temperature	25.1°C	Humidity	33%
Test Engineer	Hailey Chen	Auditor	Xiaodong Zhuo

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	4.62	4.60	≤ 30.00	Pass
	39	4.61	4.59		
	78	4.01	4.00		
$\pi/4$ DQPSK	00	4.22	3.91	≤ 21.00	Pass
	39	4.22	3.93		
	78	3.48	3.19		
8DPSK	00	4.55	4.11	≤ 21.00	Pass
	39	4.41	3.96		
	78	3.81	3.43		

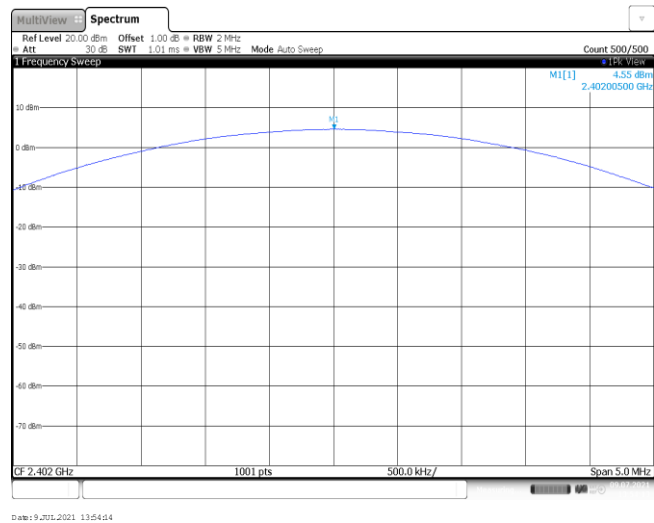
Modulation Type: GFSK	
CH00	MultiView Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 1 MHz Att 30 dB SWI 4.21 us (~31 ms) VBW 3 MHz Mode Auto FFT Count 300/300 1 Frequency Sweep M1[1] 4.62 dBm 2.40185510 GHz 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm CF 2.402 GHz 1001 pts 500.0 kHz/ Span 5.0 MHz Date: 9 JUL 2021 11:14:47
CH39	MultiView Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 1 MHz Att 30 dB SWI 4.21 us (~31 ms) VBW 3 MHz Mode Auto FFT Count 300/300 1 Frequency Sweep M1[1] 4.61 dBm 2.44086510 GHz 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm CF 2.441 GHz 1001 pts 500.0 kHz/ Span 5.0 MHz Date: 9 JUL 2021 11:19:20
CH78	MultiView Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 1 MHz Att 30 dB SWI 4.21 us (~31 ms) VBW 3 MHz Mode Auto FFT Count 300/300 1 Frequency Sweep M1[1] 4.01 dBm 2.47987510 GHz 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm CF 2.48 GHz 1001 pts 500.0 kHz/ Span 5.0 MHz Date: 9 JUL 2021 11:27:46



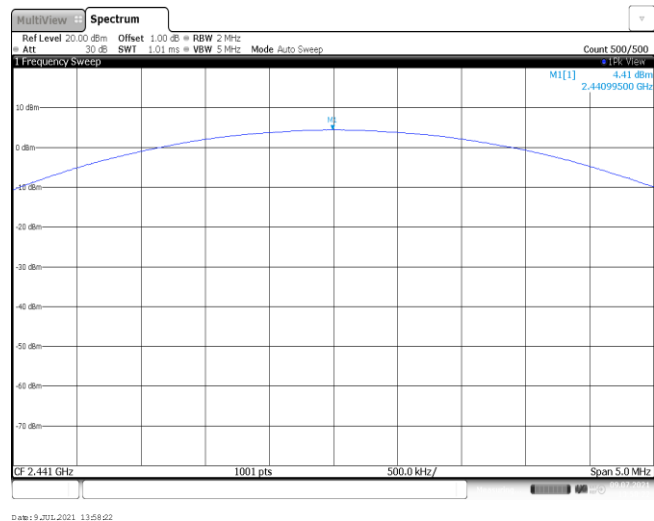
Modulation Type:

8DPSK

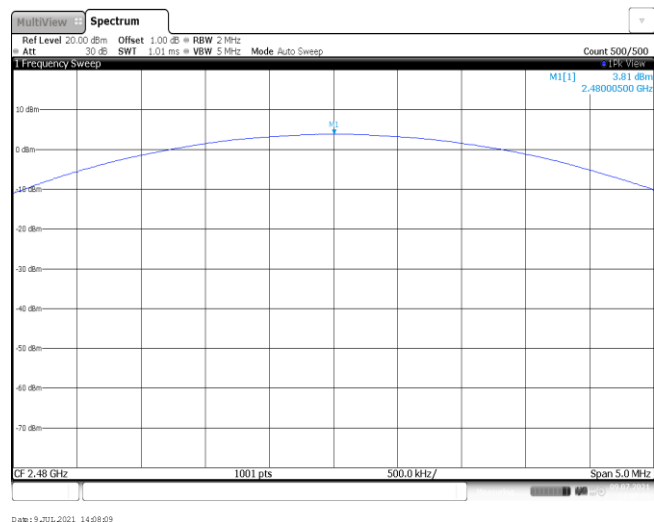
CH00



CH39



CH78



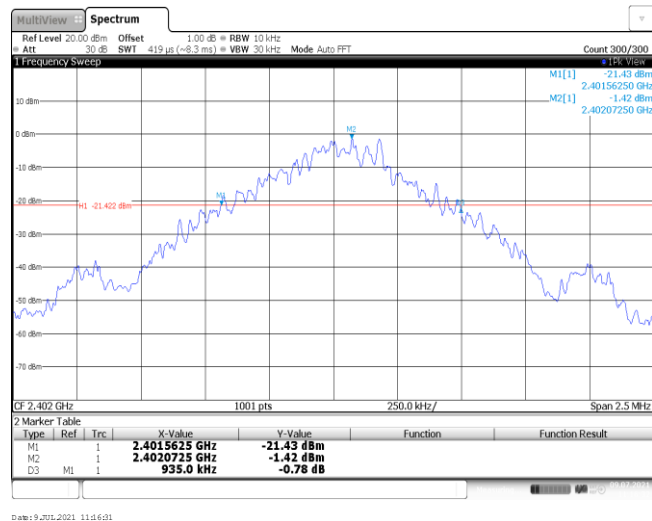
Appendix B : 20 dB Bandwidth

Modulation type	Channel	20 dB Bandwidth (kHz)	Limit (kHz)	Result
GFSK	00	935.00	-	Pass
	39	932.50		
	78	935.00		
$\pi/4$ DQPSK	00	1357.50	-	Pass
	39	1357.50		
	78	1355.00		
8DPSK	00	1340.00	-	Pass
	39	1340.00		
	78	1340.00		

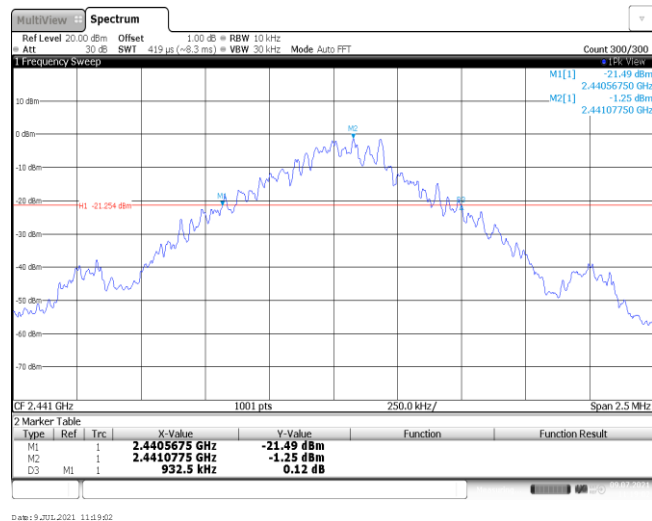
Modulation Type:

GFSK

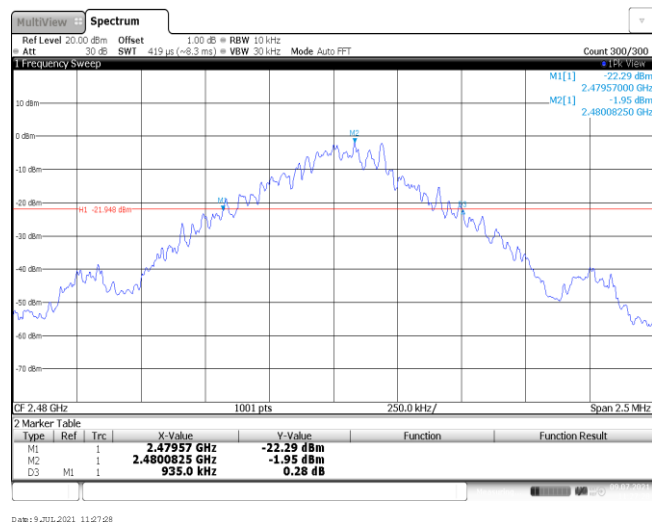
CH00



CH39



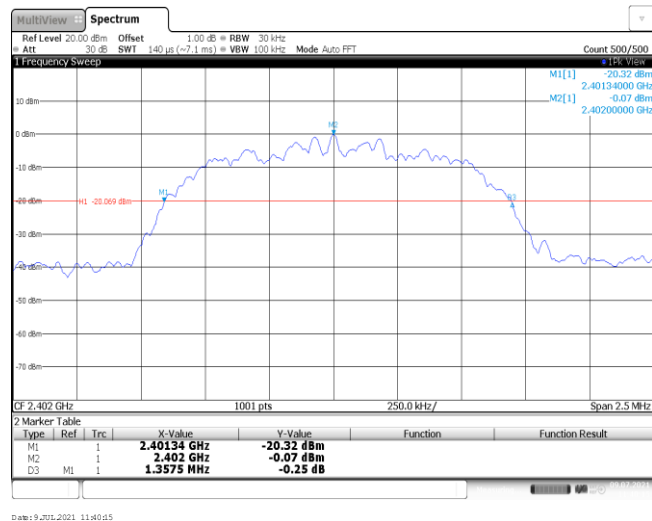
CH78



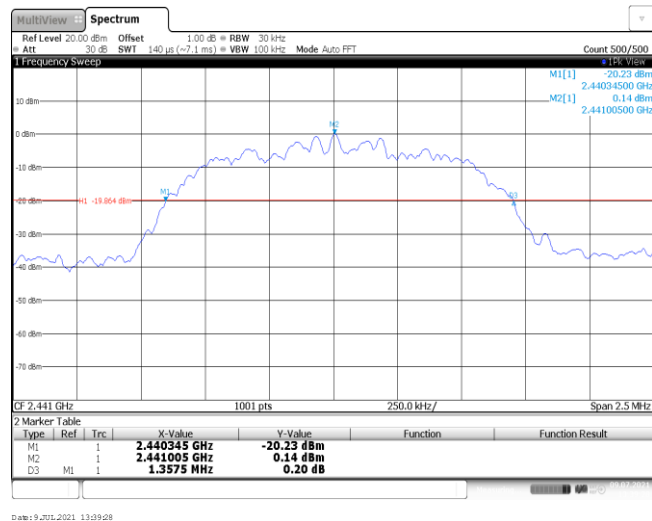
Modulation Type:

 $\pi/4$ DQPSK

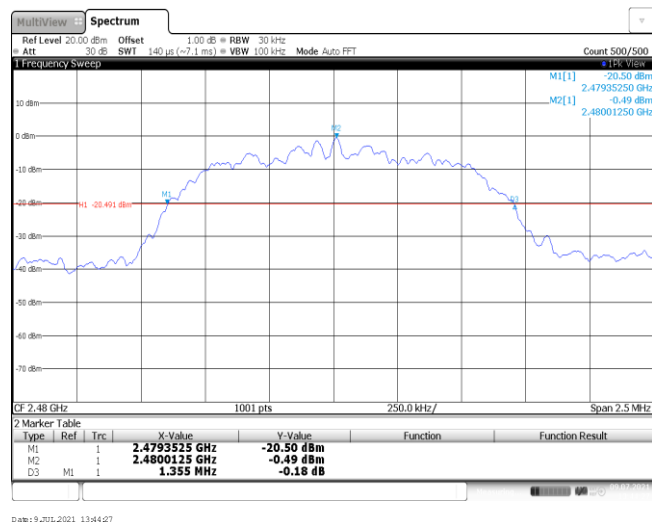
CH00



CH39



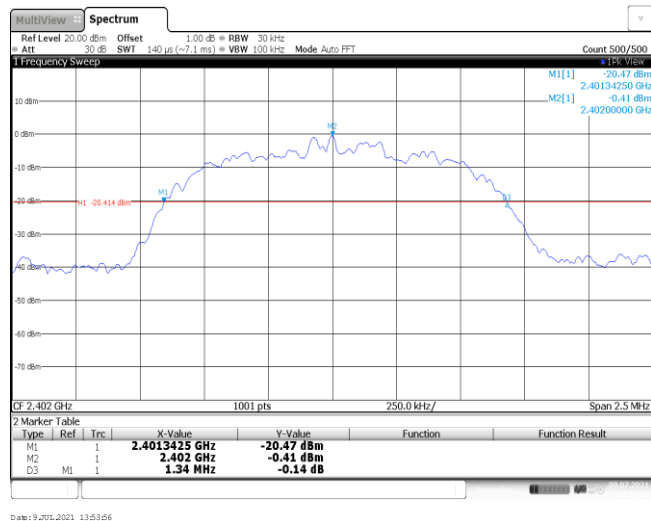
CH78



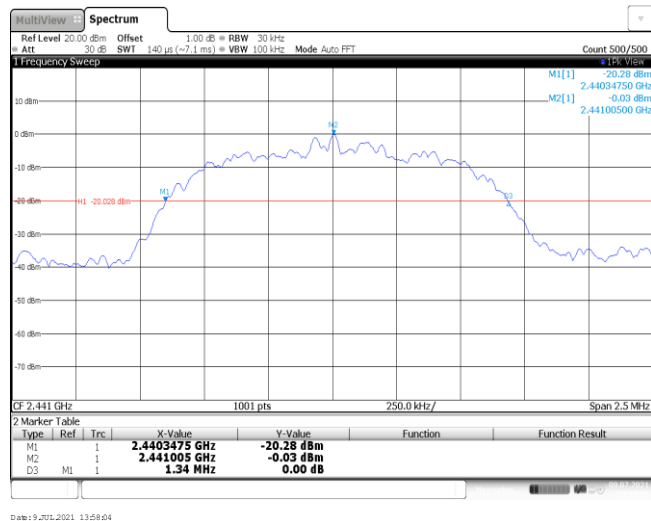
Modulation Type:

8DPSK

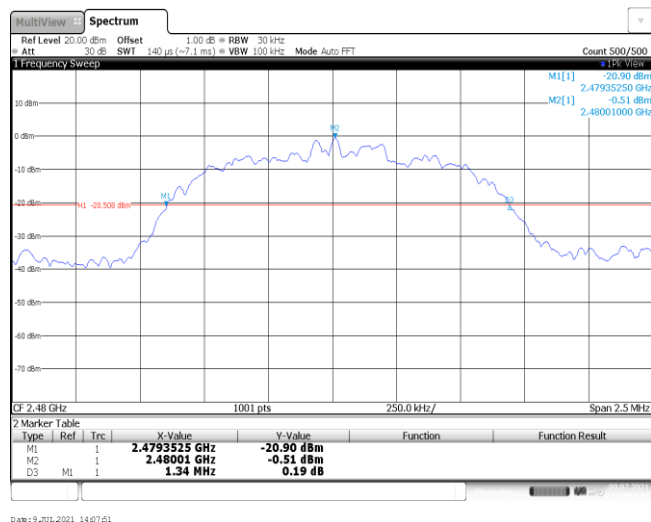
CH00



CH39



CH78



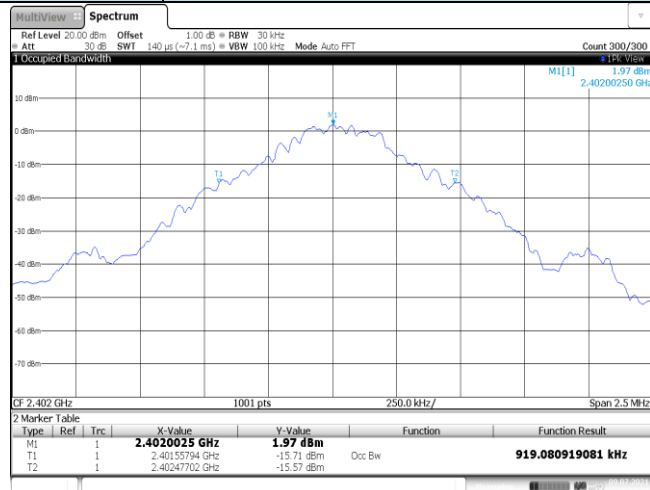
Appendix C: 99% Occupied Bandwidth

Modulation type	Channel	99% Occupied Bandwidth (MHz)	Limit (MHz)	Result
GFSK	00	0.92	-	Pass
	39	0.92		
	78	0.92		
$\pi/4$ DQPSK	00	1.21	-	Pass
	39	1.21		
	78	1.21		
8DPSK	00	1.22	-	Pass
	39	1.22		
	78	1.23		

Modulation Type:

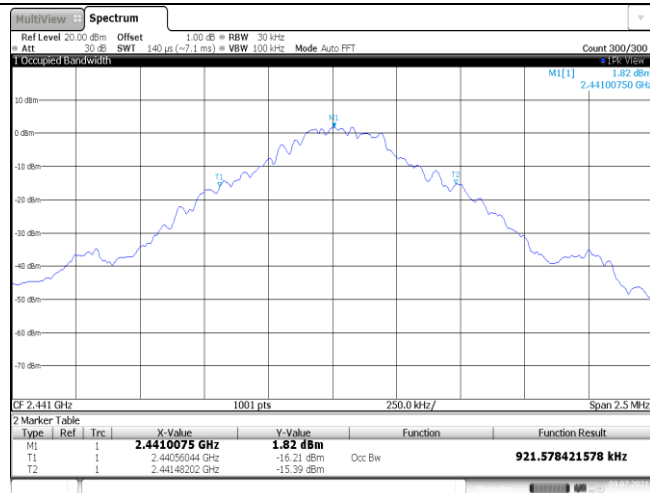
GFSK

CH00



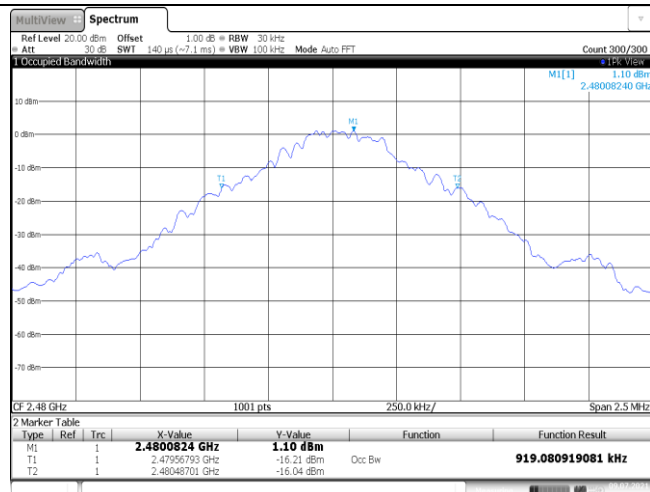
Date: 9 JUL 2021 11:16:40

CH39



Date: 9 JUL 2021 11:19:10

CH78



Date: 9 JUL 2021 11:27:36

Modulation Type:

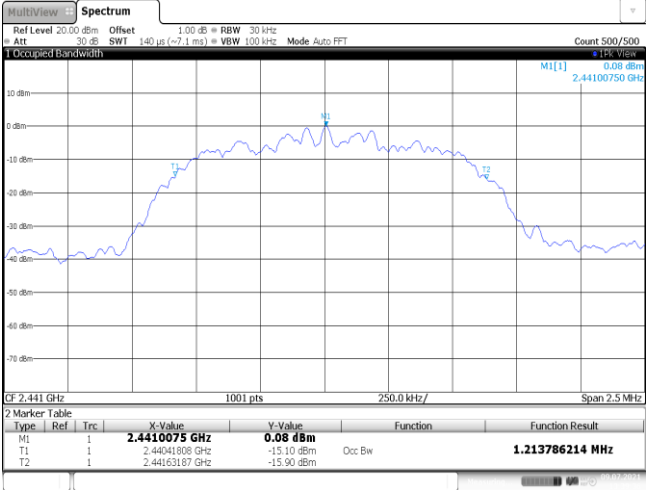
$\pi/4$ DQPSK

CH00



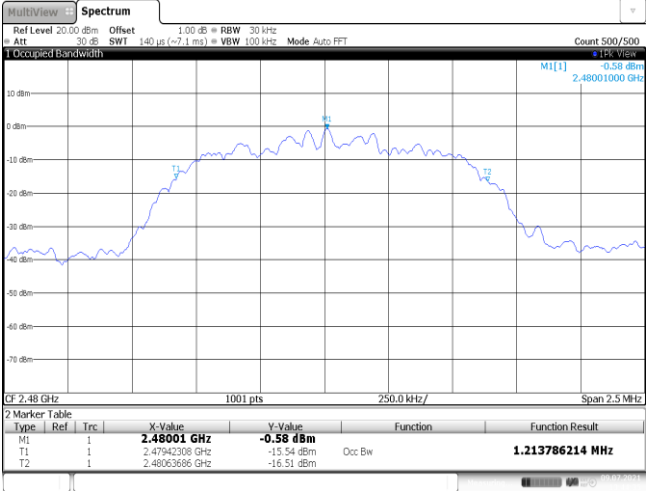
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CH39



Date: 9 JUL 2021 13:09:06

CH78

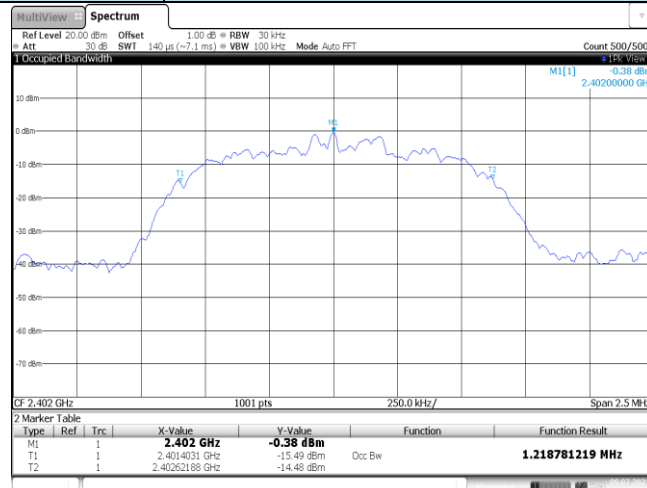


Date: 9 JUL 2021 13:44:35

Modulation Type:

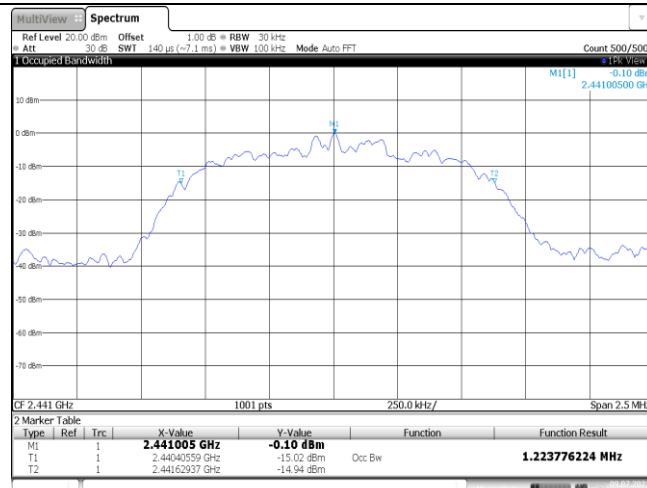
8DPSK

CH00



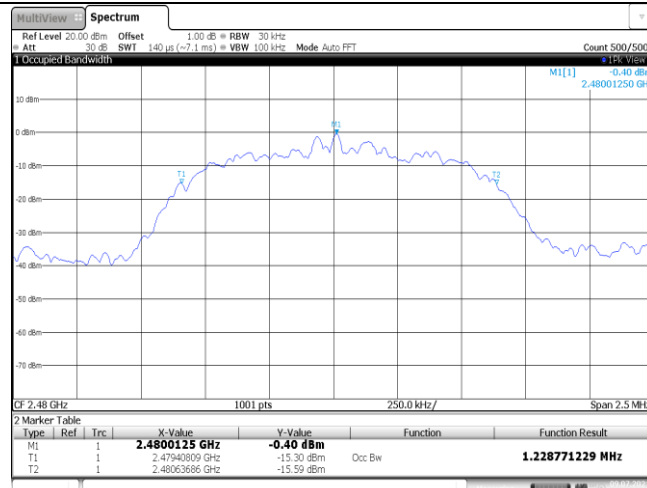
Date: 9 JUL 2021 13:54:05

CH39



Date: 9 JUL 2021 13:58:13

CH78



Date: 9 JUL 2021 14:07:59

Appendix D: Carrier Frequencies Separation

Modulation type	Channel	Carrier Frequencies Separation (MHz)	Limit (kHz) *	Result
GFSK	39	1.00	≥935.00	Pass
π/4DQPSK	39	1.00	≥905.00	Pass
8DPSK	39	1.00	≥893.33	Pass

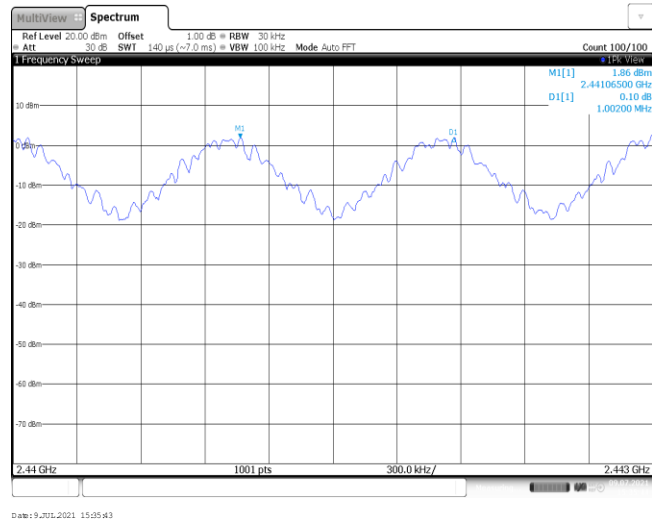
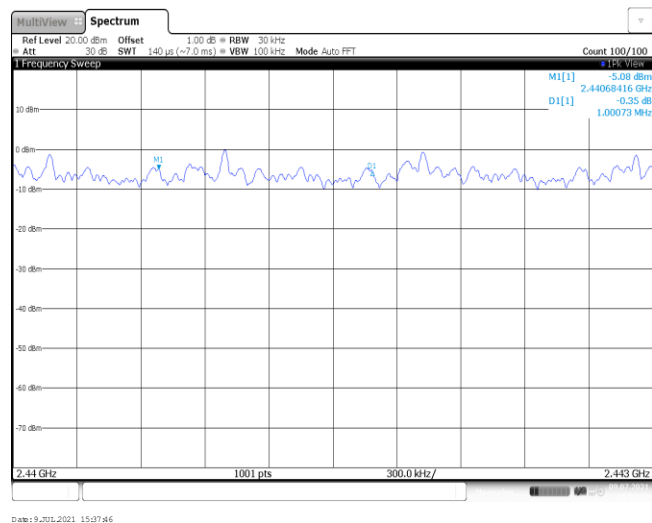
Note:

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

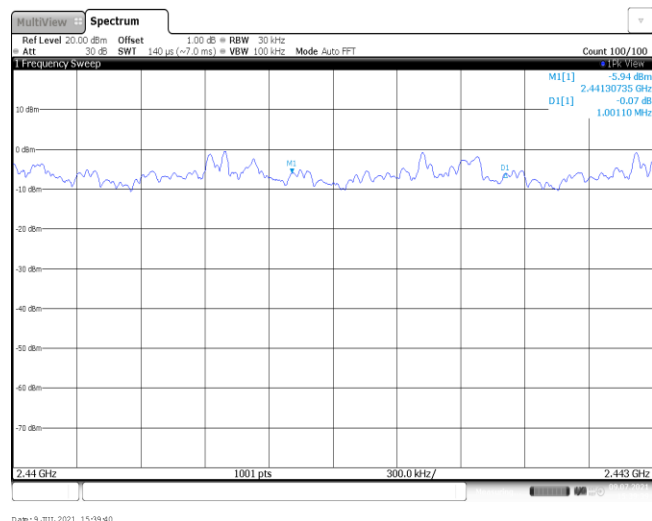
π/4DQPSK limit = 2/3 * The maximum 20 dB Bandwidth for π/4DQPSK modulation on the appendix B.

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

GFSK

 $\pi/4$ DQPSK

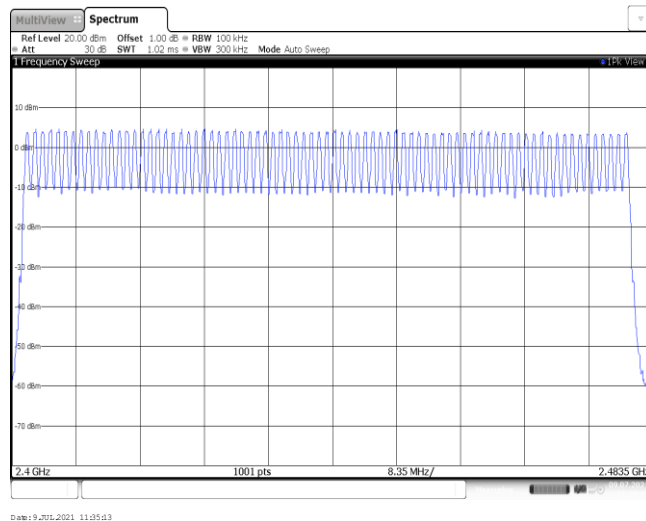
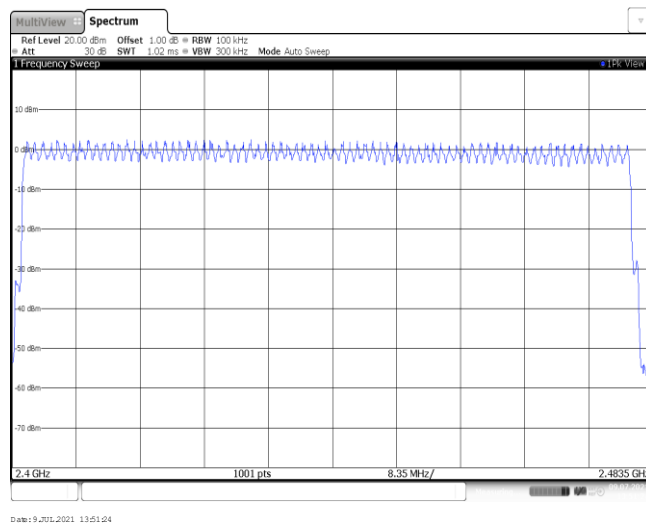
8DPSK



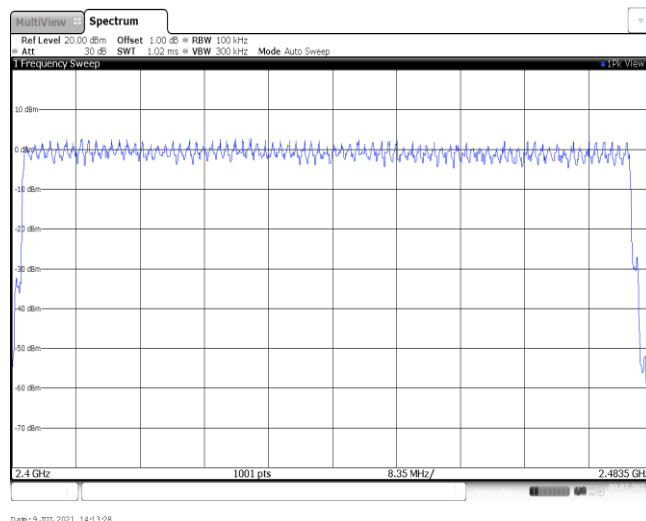
Appendix E: Hopping Channel Number

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

GFSK

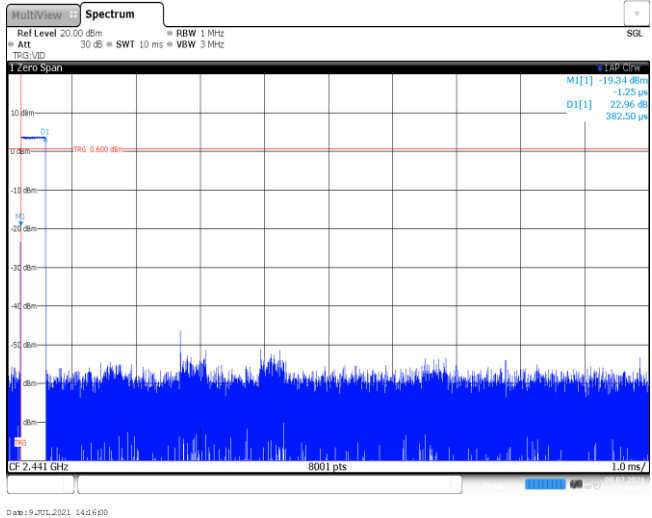
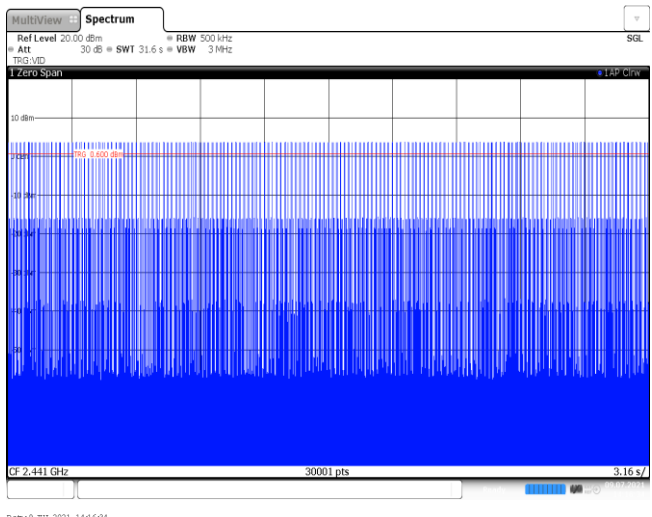
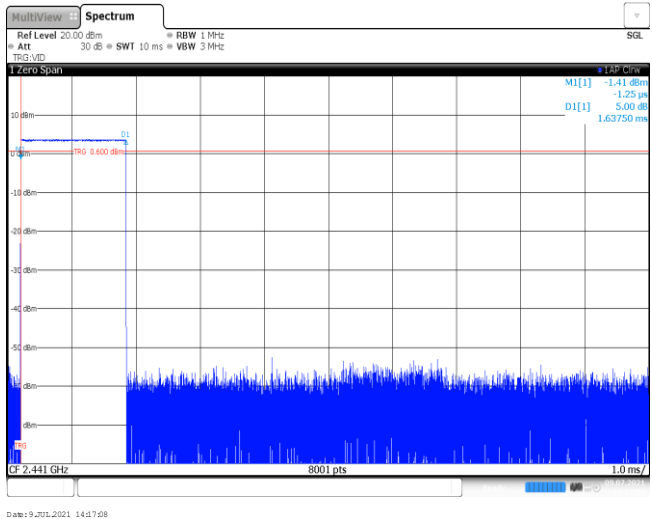
 $\pi/4$ DQPSK

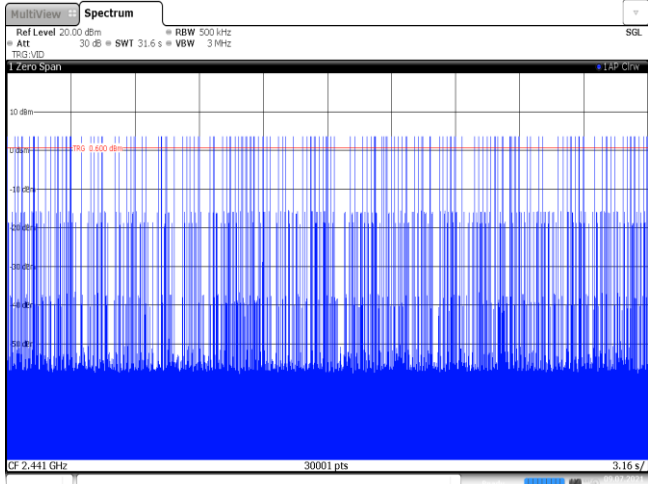
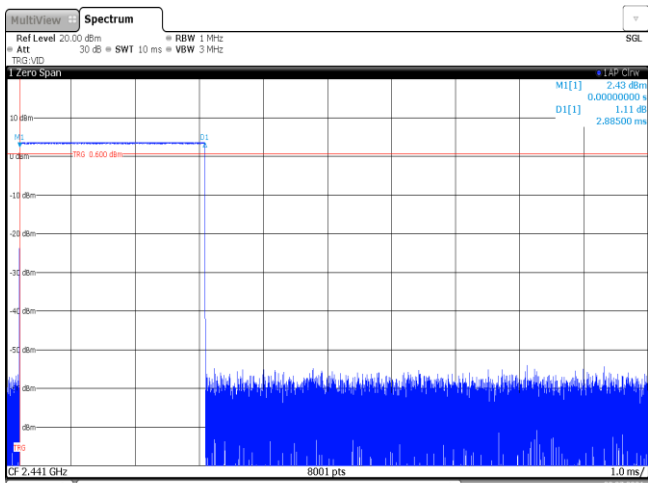
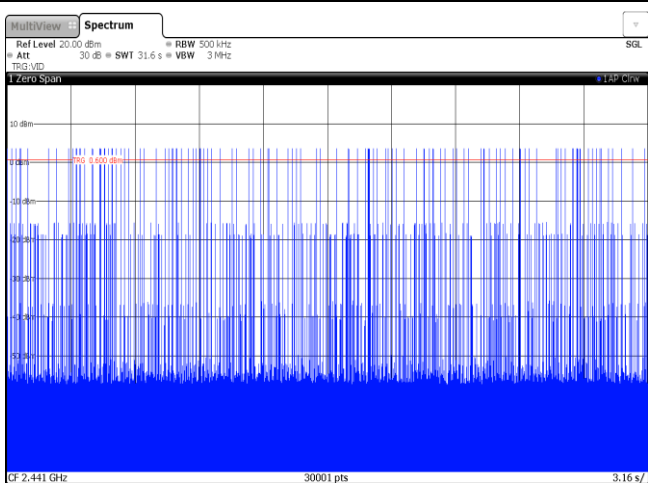
8DPSK



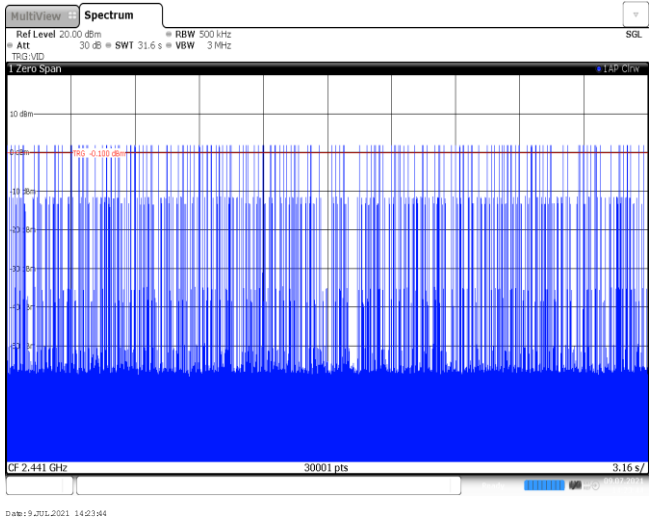
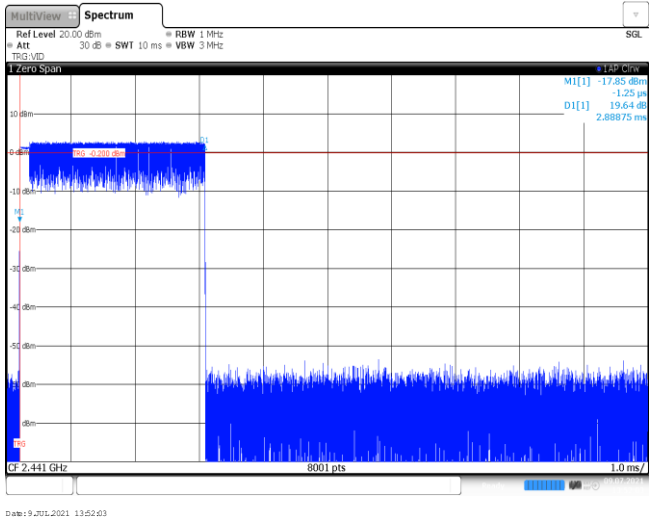
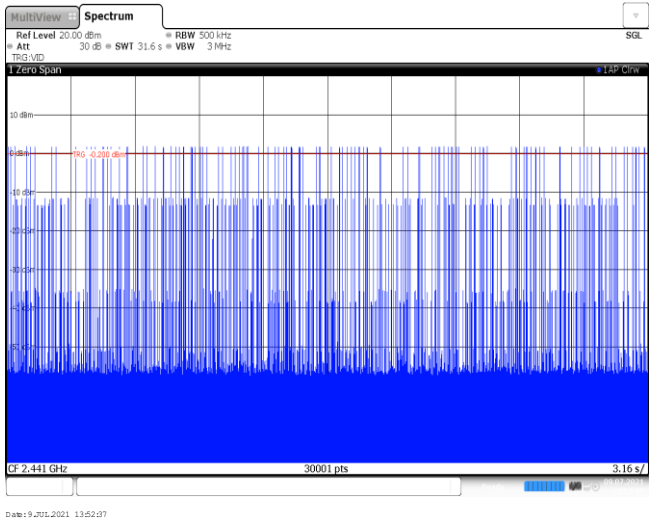
Appendix F: Dwell Time

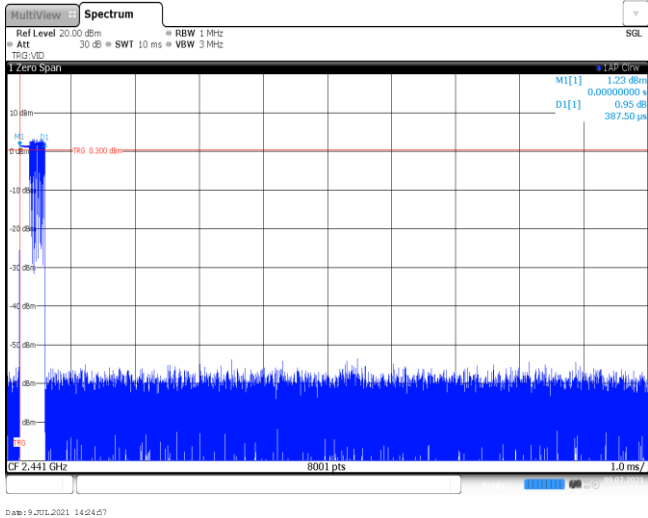
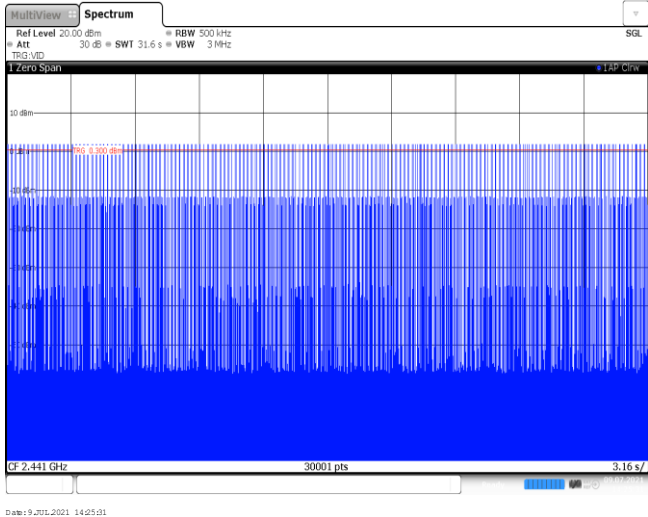
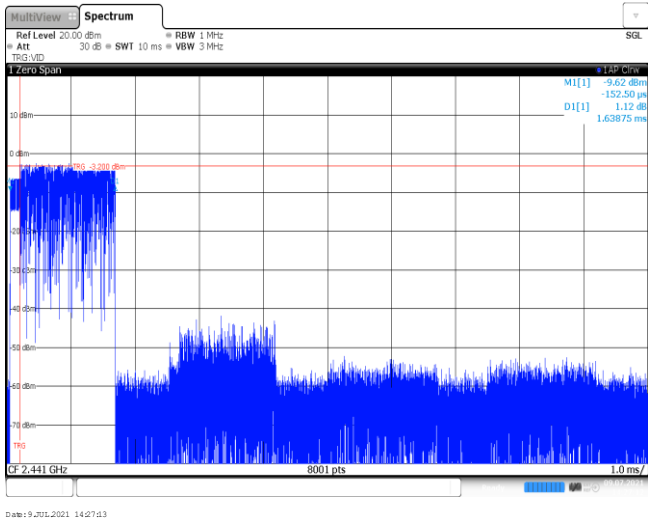
Modulation type	Packet	Burst Width [ms]	Total Hops[hop*ch]	Dwell time (Second)	Limit (Second)	Result
GFSK	DH1	0.38	314	0.12	≤ 0.40	Pass
	DH3	1.64	156	0.26		
	DH5	2.89	112	0.32		
$\pi/4$ DQPSK	2DH1	0.39	311	0.12	≤ 0.40	Pass
	2DH3	1.64	165	0.27		
	2DH5	2.89	113	0.33		
8DPSK	3DH1	0.39	314	0.12	≤ 0.40	Pass
	3DH3	1.64	168	0.28		
	3DH5	2.89	111	0.32		

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 the beginning, followed by a period of low power. The signal is identified as DH1.
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 burst of signal at the beginning, followed by a period of low power. The signal is identified as DH1.
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 the beginning, followed by a period of low power. The signal is identified as DH3.

DH3 Burst number	 MultiView Spectrum Ref Level 20.00 dBm Att 30 dB RBW 500 kHz SWT 31.6 s VBW 3 MHz Zero Span 11AP C100 CF 2.441 GHz 30001 pts 3.16 s
DH5 Burst width	 MultiView Spectrum Ref Level 20.00 dBm Att 30 dB RBW 1 MHz SWT 10 ms VBW 3 MHz Zero Span 11AP C100 M1[1] 2.43 dBm D1[1] 1.11 dB 2.88500 ms CF 2.441 GHz 8001 pts 1.0 ms
DH5 Burst number	 MultiView Spectrum Ref Level 20.00 dBm Att 30 dB RBW 500 kHz SWT 31.6 s VBW 3 MHz Zero Span 11AP C100 CF 2.441 GHz 30001 pts 3.16 s

Appendix report page: 21 of 41

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

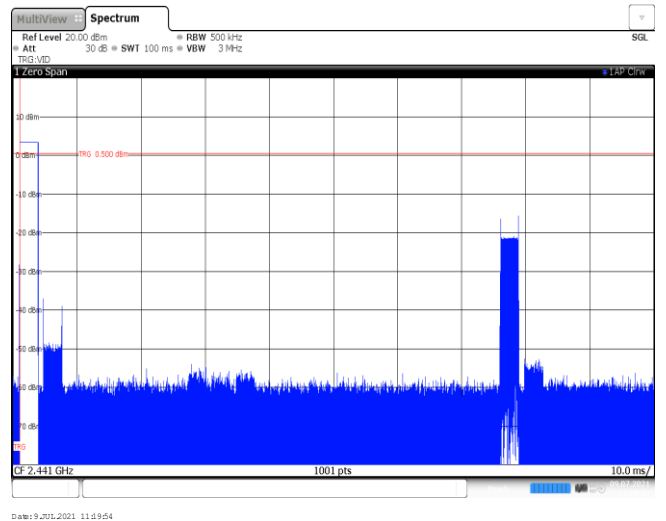
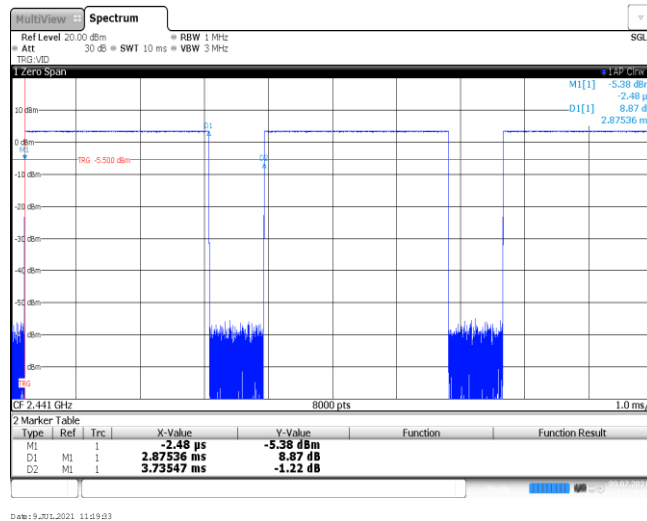
Modulation Type: 8DPSK	
3DH1 Burst width	
3DH1 Burst number	
3DH3 Burst width	

3DH3 Burst number	This spectrum plot shows a dense, continuous burst of signal across the entire frequency range from 2.441 GHz to 3.16 GHz. The signal level is consistently high, reaching approximately 20 dBm. The plot is titled 'Spectrum' and includes parameters: Ref Level 20.00 dBm, Att 30 dB, RBW 500 kHz, and VBW 3 MHz. The x-axis is labeled 'CF 2.441 GHz' and the y-axis is labeled 'dBm'. The plot shows 30001 pts.
3DH5 Burst width	This spectrum plot shows a burst of signal with a clear width measurement. The signal is concentrated in the lower frequency range, with a peak level of approximately 20 dBm. The plot is titled 'Spectrum' and includes parameters: Ref Level 20.00 dBm, Att 30 dB, RBW 1 MHz, and VBW 3 MHz. The x-axis is labeled 'CF 2.441 GHz' and the y-axis is labeled 'dBm'. The plot shows 8001 pts. A measurement box indicates a width of 2.890000 ms.
3DH5 Burst number	This spectrum plot shows a dense, continuous burst of signal across the entire frequency range from 2.441 GHz to 3.16 GHz. The signal level is consistently high, reaching approximately 20 dBm. The plot is titled 'Spectrum' and includes parameters: Ref Level 20.00 dBm, Att 30 dB, RBW 500 kHz, and VBW 3 MHz. The x-axis is labeled 'CF 2.441 GHz' and the y-axis is labeled 'dBm'. The plot shows 30001 pts.

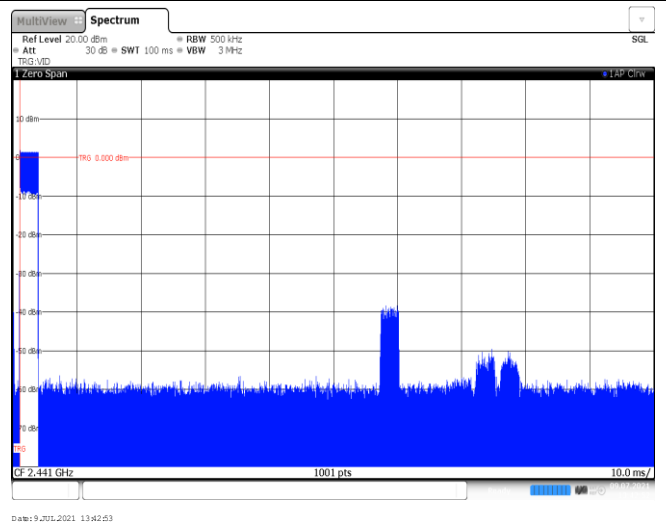
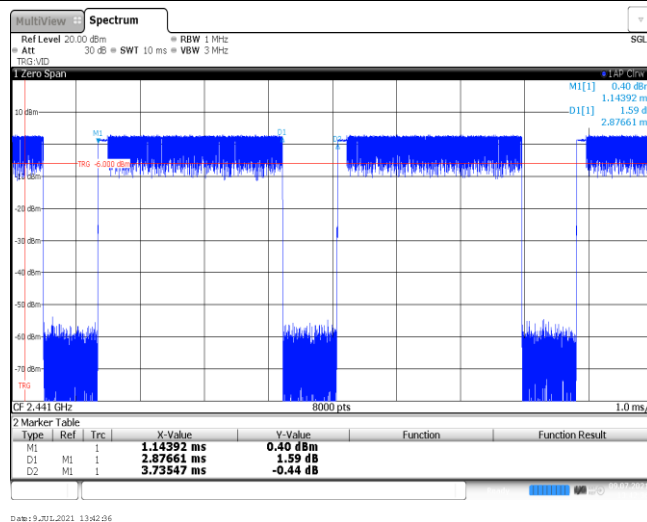
Appendix G: Duty Cycle Correction Factor (DCCF)

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	2.88	100	2	-24.79
$\pi/4$ DQPSK	2441	2.88	100	1	-30.81
8DPSK	2441	2.88	100	1	-30.81

GFSK

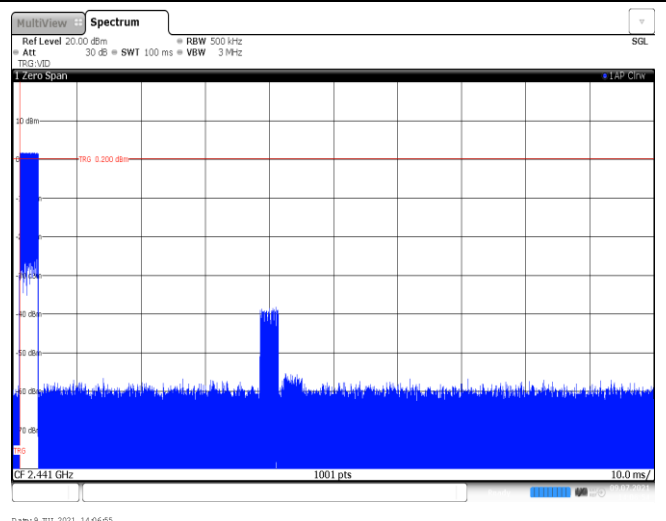
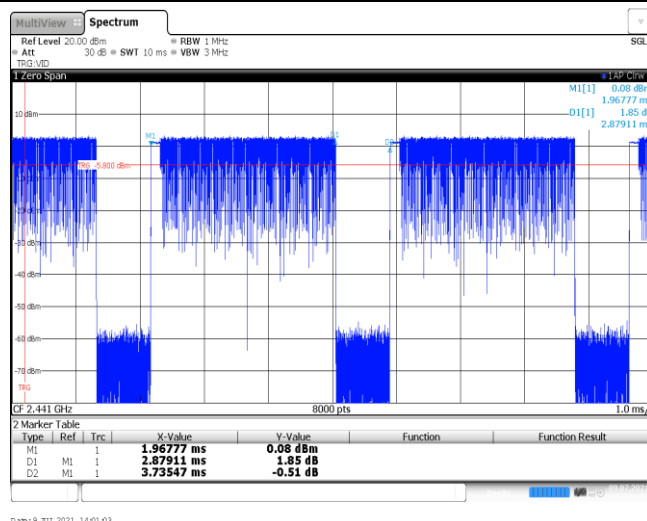
T_{on} time for single burst

Burst Quantity

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

Burst Quantity

8DPSK

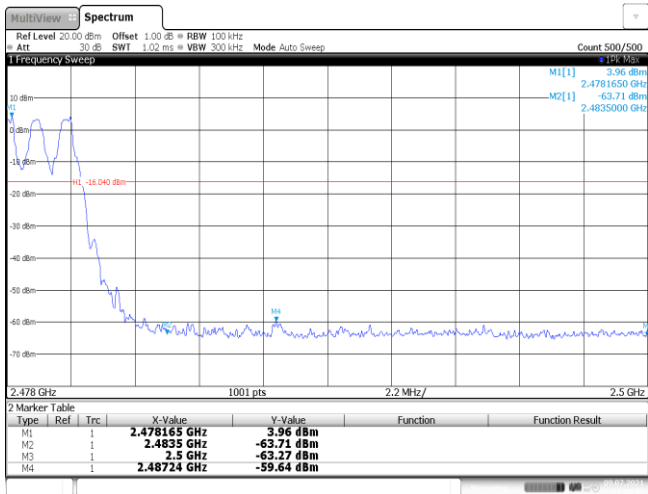
T_{on} time for single burst

Burst Quantity

Appendix H: Band edge and Spurious Emissions (conducted)

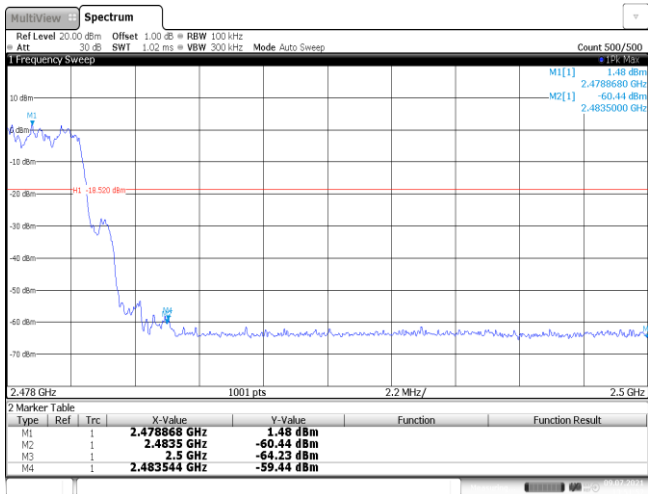
Test Item:	Band edge	Modulation type:	GFSK
CH00 No hopping mode	</		

CH78
Hopping mode



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] 2.05 dBm 2.401821 GHz M2[1] -52.57 dBm 2.400000 GHz 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm 2.31 GHz 1001 pts 9.5 MHz/ 2.405 GHz <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>2.05 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>2.4 GHz</td><td>-52.57 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>2.39 GHz</td><td>-63.43 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>2.31 GHz</td><td>-63.95 dBm</td><td></td><td></td></tr><tr><td>M5</td><td>1</td><td></td><td>2.39968 GHz</td><td>-52.09 dBm</td><td></td><td></td></tr></table> Date: 9 JUL 2021 11:41:13			Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		2.401821 GHz	2.05 dBm			M2	1		2.4 GHz	-52.57 dBm			M3	1		2.39 GHz	-63.43 dBm			M4	1		2.31 GHz	-63.95 dBm			M5	1		2.39968 GHz	-52.09 dBm		
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																																							
M1	1		2.401821 GHz	2.05 dBm																																									
M2	1		2.4 GHz	-52.57 dBm																																									
M3	1		2.39 GHz	-63.43 dBm																																									
M4	1		2.31 GHz	-63.95 dBm																																									
M5	1		2.39968 GHz	-52.09 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] 1.28 dBm 2.402105 GHz M2[1] -55.13 dBm 2.400000 GHz 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm 2.31 GHz 1001 pts 9.5 MHz/ 2.405 GHz <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>1.28 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>2.4 GHz</td><td>-55.13 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>2.39 GHz</td><td>-63.07 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>2.31 GHz</td><td>-63.86 dBm</td><td></td><td></td></tr><tr><td>M5</td><td>1</td><td></td><td>2.399965 GHz</td><td>-54.95 dBm</td><td></td><td></td></tr></table> Date: 9 JUL 2021 13:51:38			Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		2.402105 GHz	1.28 dBm			M2	1		2.4 GHz	-55.13 dBm			M3	1		2.39 GHz	-63.07 dBm			M4	1		2.31 GHz	-63.86 dBm			M5	1		2.399965 GHz	-54.95 dBm		
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																																							
M1	1		2.402105 GHz	1.28 dBm																																									
M2	1		2.4 GHz	-55.13 dBm																																									
M3	1		2.39 GHz	-63.07 dBm																																									
M4	1		2.31 GHz	-63.86 dBm																																									
M5	1		2.399965 GHz	-54.95 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] 1.48 dBm 2.480187 GHz M2[1] -56.77 dBm 2.483500 GHz 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm 2.478 GHz 1001 pts 2.2 MHz/ 2.5 GHz <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>2.480187 GHz</td><td>1.48 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>2.4835 GHz</td><td>-56.77 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>2.5 GHz</td><td>-63.85 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>2.483522 GHz</td><td>-56.96 dBm</td><td></td><td></td></tr></table> Date: 9 JUL 2021 13:45:31			Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		2.480187 GHz	1.48 dBm			M2	1		2.4835 GHz	-56.77 dBm			M3	1		2.5 GHz	-63.85 dBm			M4	1		2.483522 GHz	-56.96 dBm									
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																																							
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M2	1		2.4835 GHz	-56.77 dBm																																									
M3	1		2.5 GHz	-63.85 dBm																																									
M4	1		2.483522 GHz	-56.96 dBm																																									

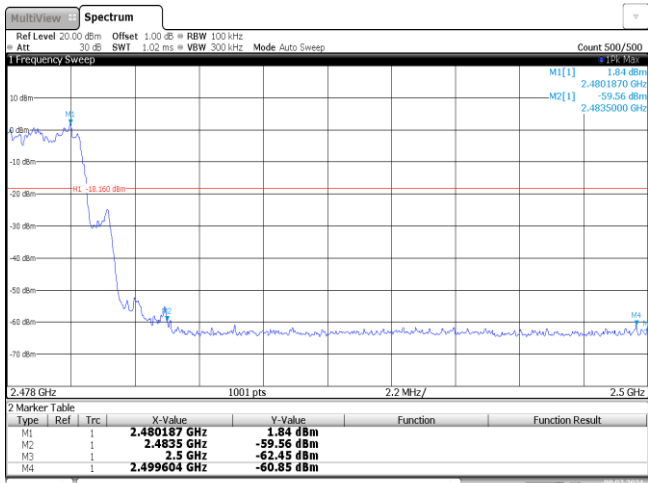
CH78
Hopping mode

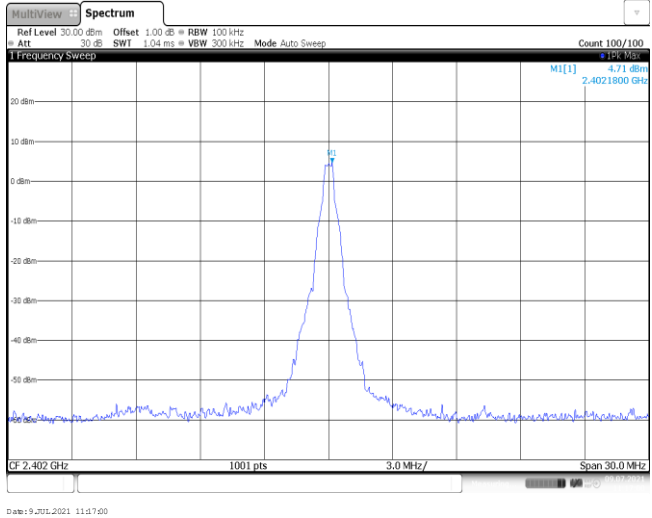
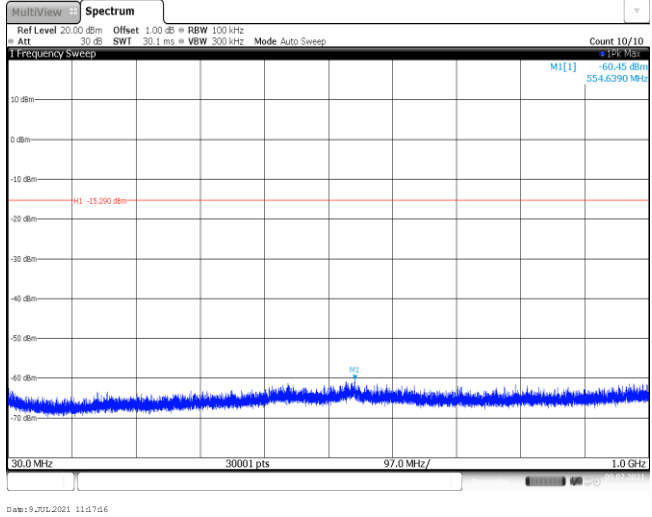
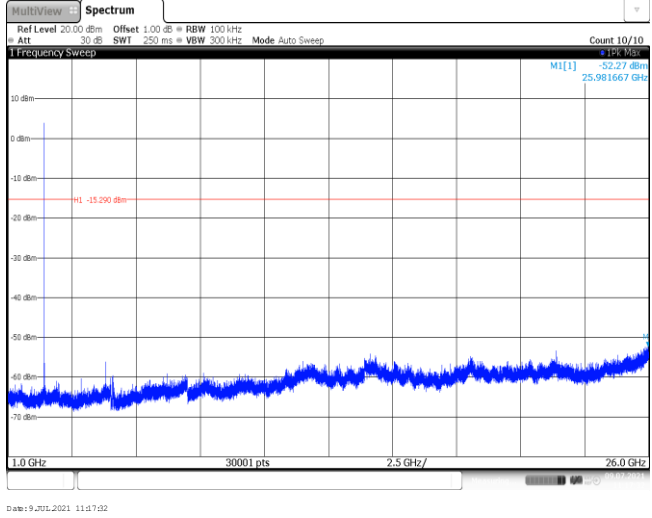


Date: 9/20/2021 13:51:52

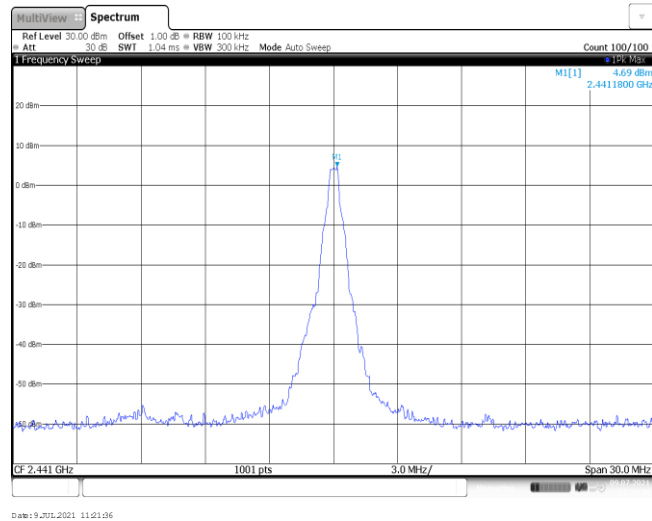
Test Item:	Band edge	Modulation type:	8DPSK
CH00 No hopping mode	<		

CH78
Hoppig mode

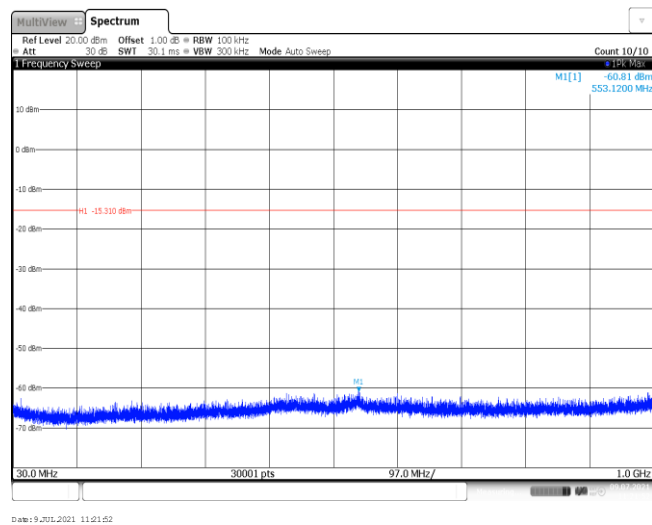


Test Item:	Spurious Emission	Modulation type:	GFSK
CH00 Reference level			
CH00 30MHz~1000MHz			
CH00 1GHz~26GHz			

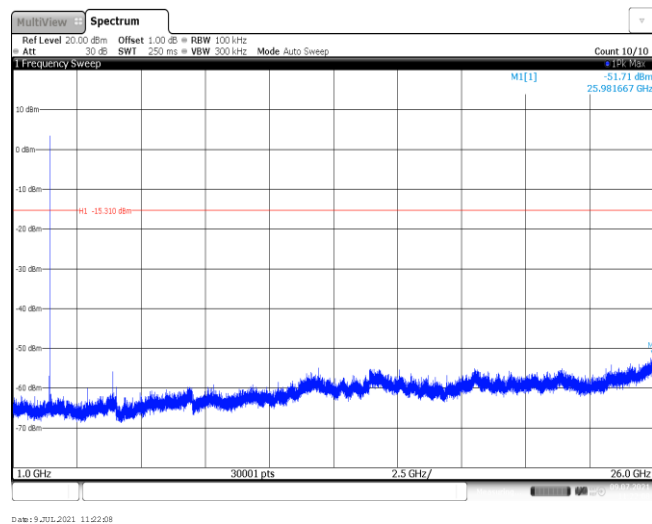
CH39
Reference level



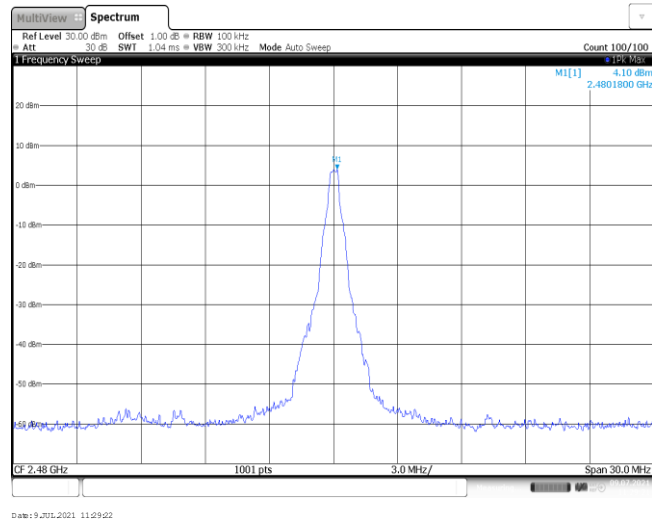
CH39
30MHz~1000MHz



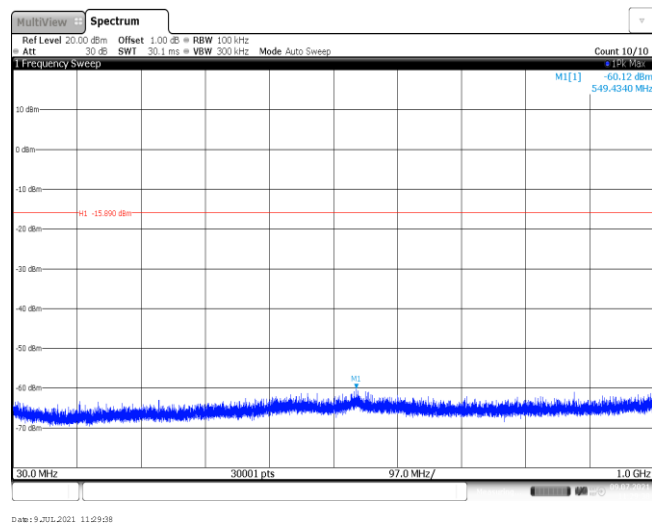
CH39
1GHz~26GHz



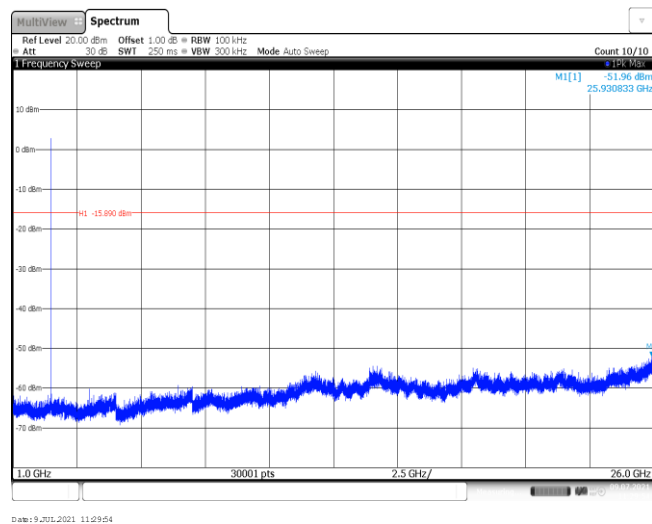
CH78
Reference level

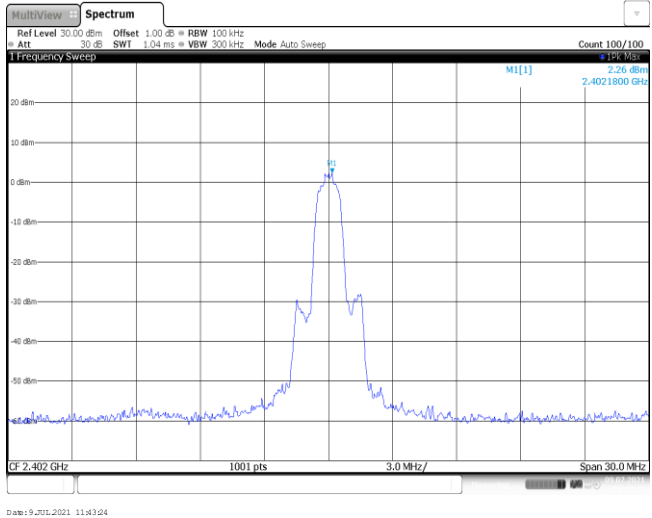
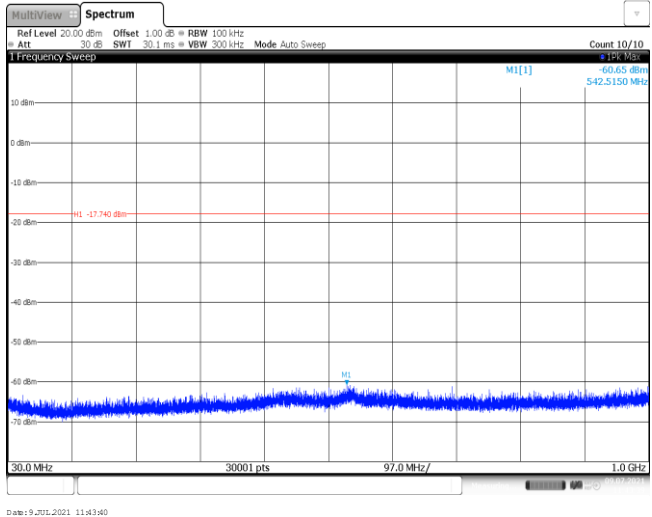
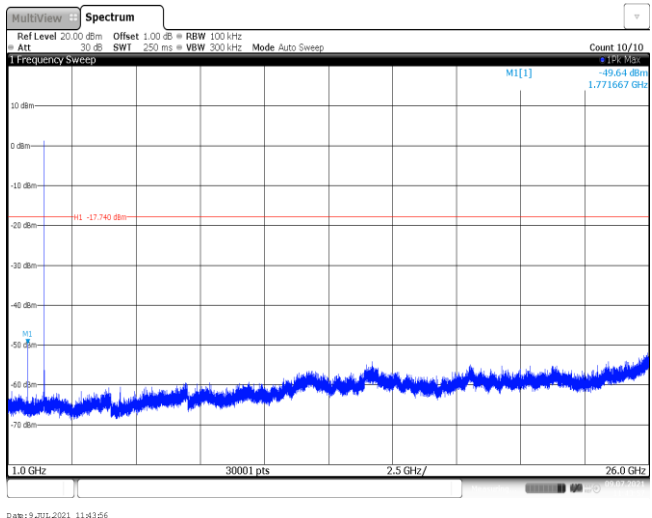


CH78
30MHz~1000MHz

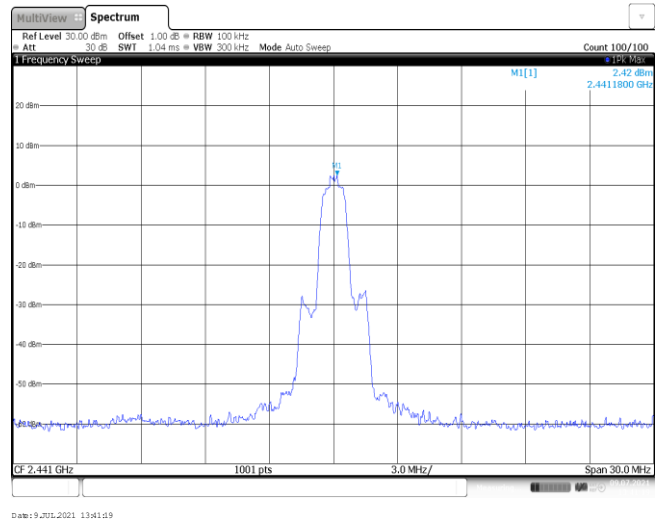


CH78
1GHz~26GHz

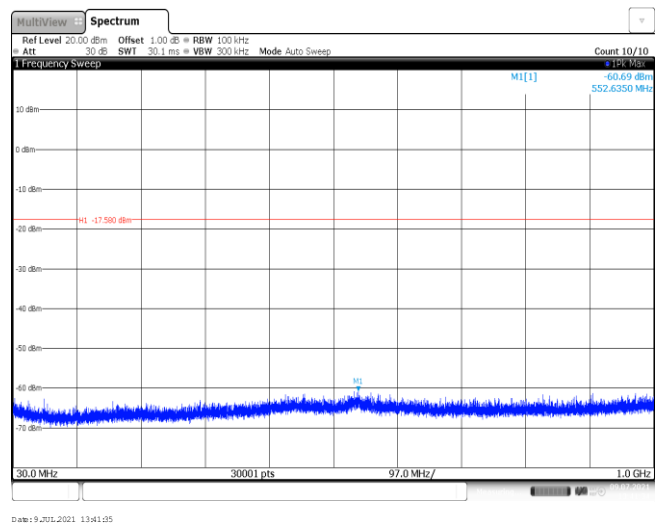


Test Item:	Spurious Emission	Modulation type:	$\pi/4$ DQPSK
CH00 Reference level			
CH00 30MHz~1000MHz			
CH00 1GHz~26GHz			

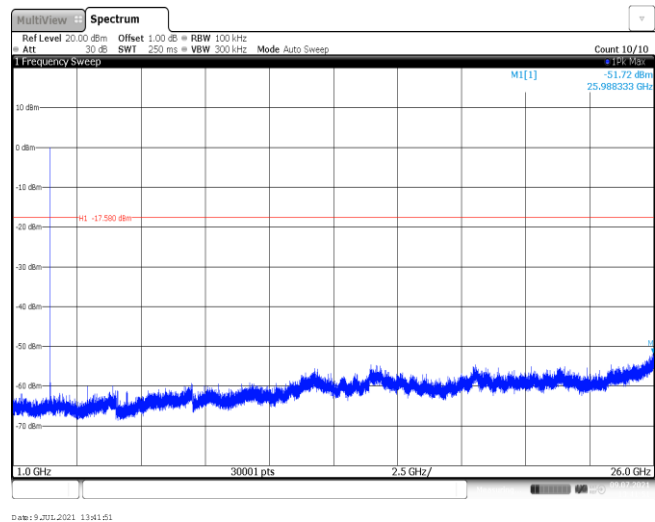
CH39
Reference level



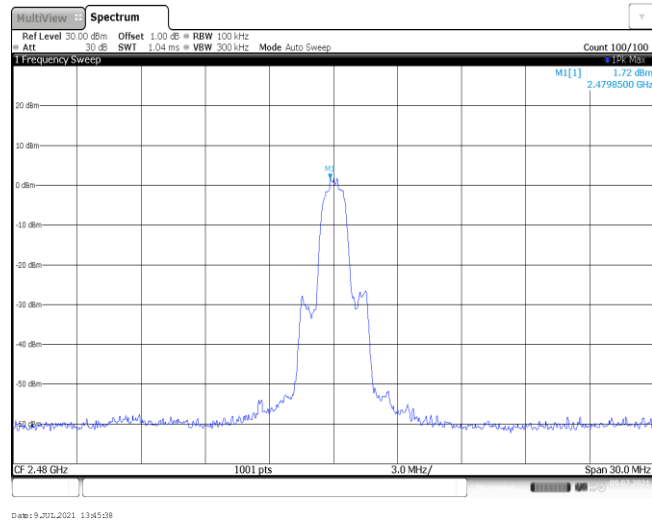
CH39
30MHz~1000MHz



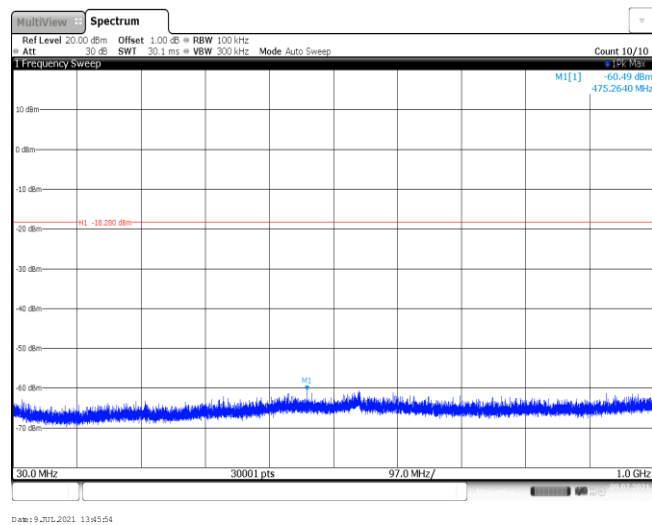
CH39
1GHz~26GHz



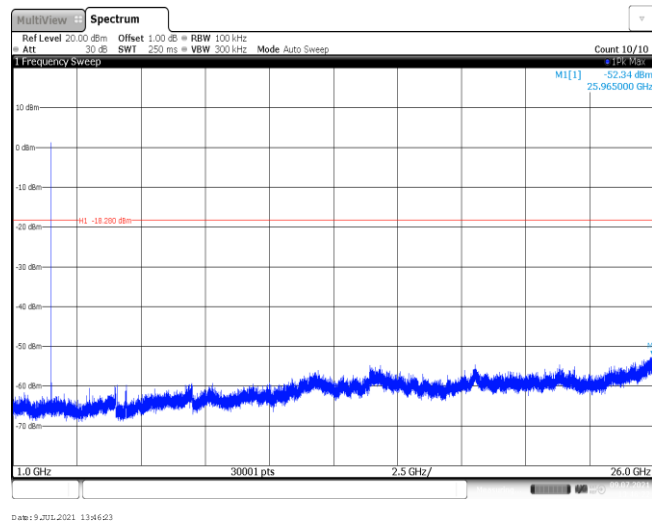
CH78
Reference level

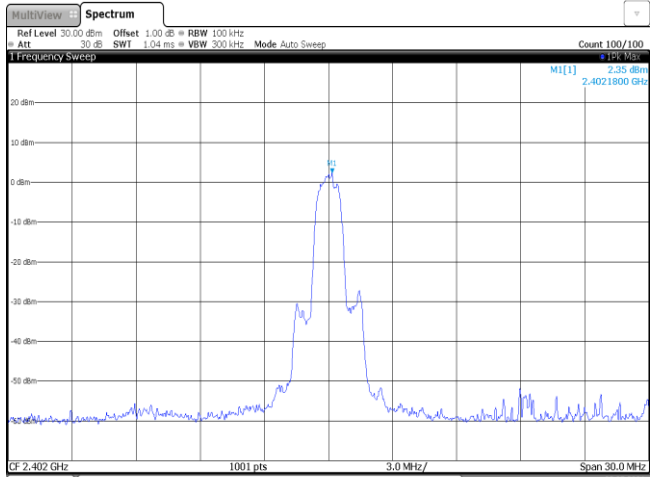
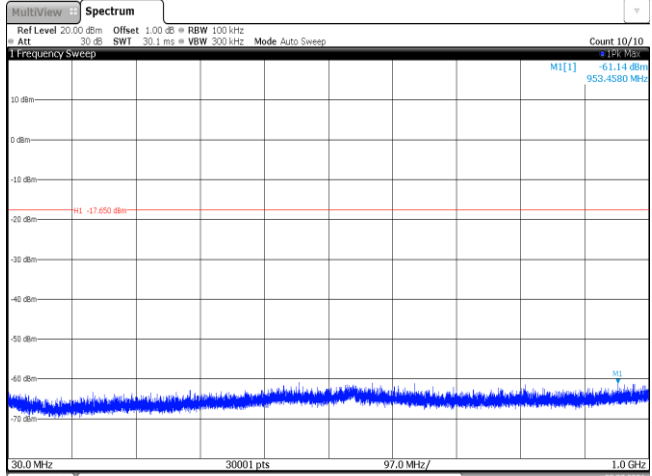
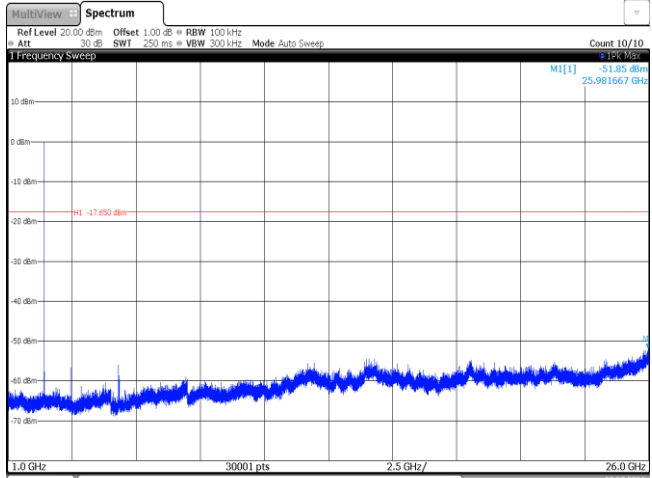


CH78
30MHz~1000MHz

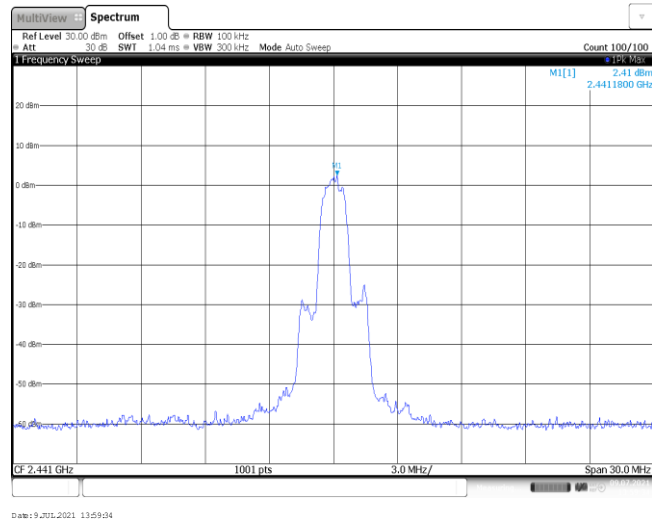


CH78
1GHz~26GHz

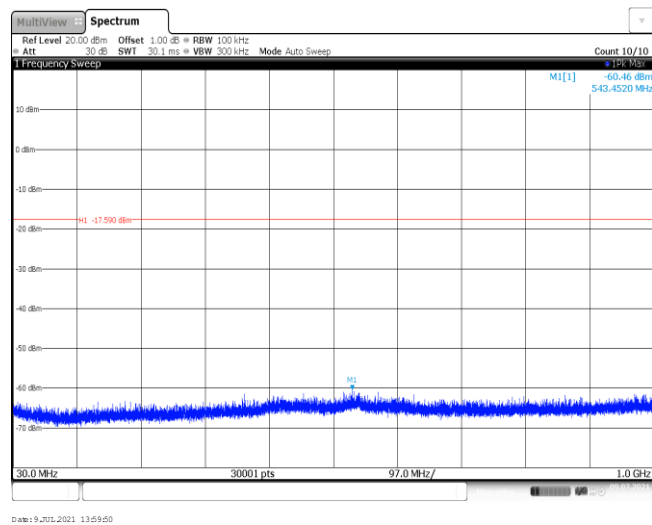


Test Item:	Spurious Emission	Modulation type:	8DPSK
CH00 Reference level	 CH00 Reference level		
CH00 30MHz~1000MHz	 CH00 30MHz~1000MHz		
CH00 1GHz~26GHz	 CH00 1GHz~26GHz		

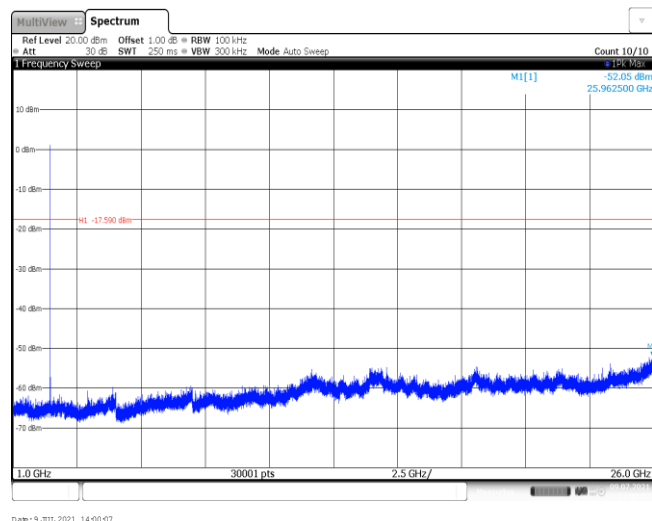
CH39
Reference level



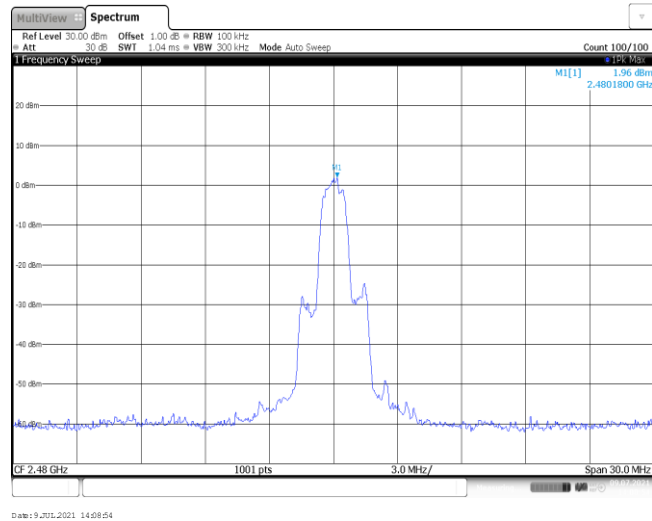
CH39
30MHz~1000MHz



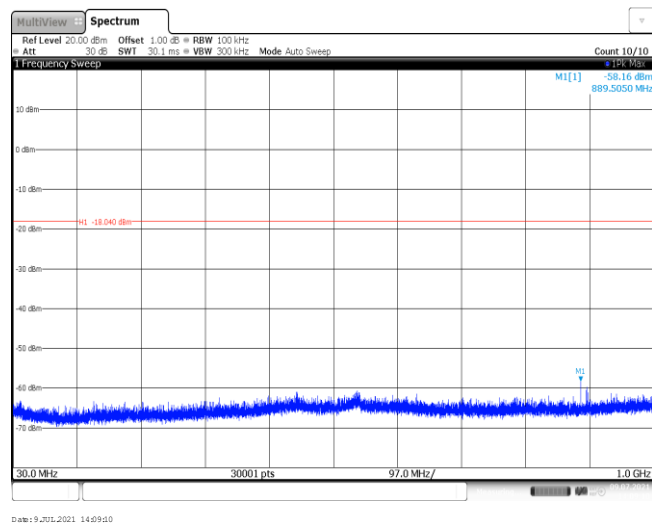
CH39
1GHz~26GHz



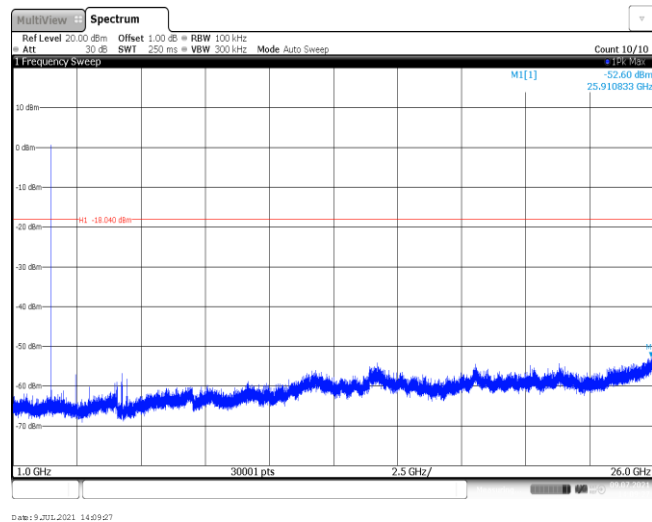
CH78
Reference level



CH78
30MHz~1000MHz



CH78
1GHz~26GHz



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