

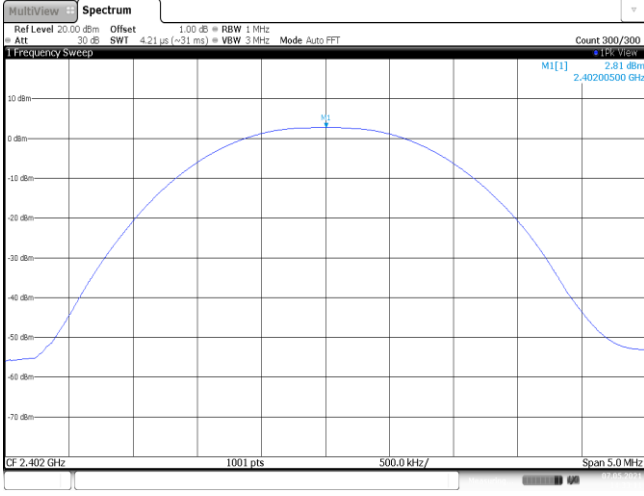
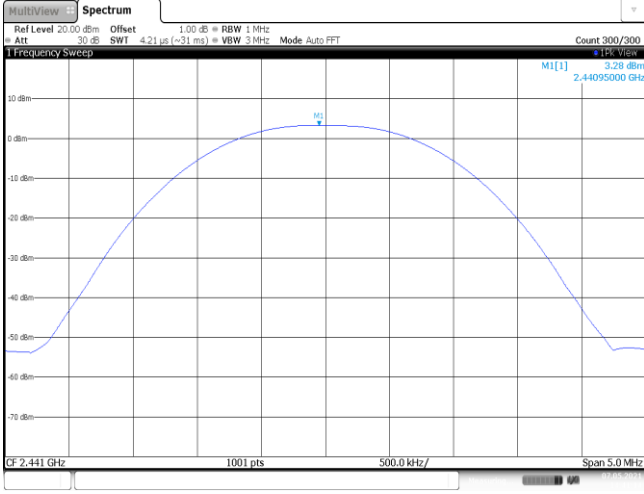
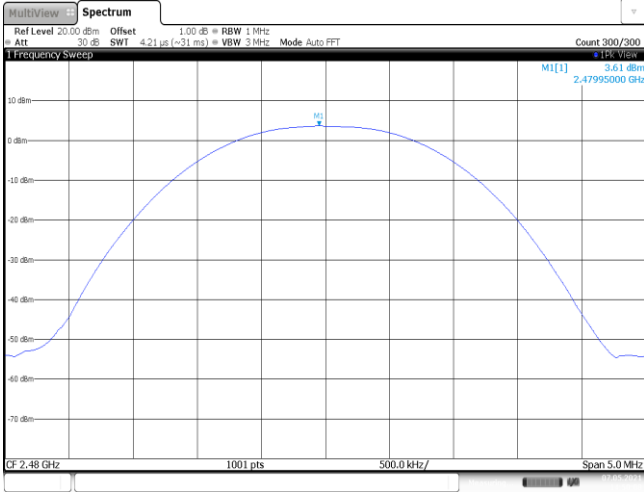
APPENDIX REPORT

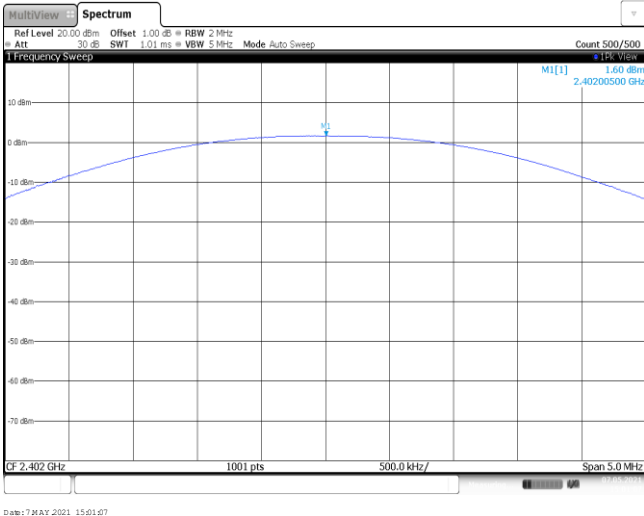
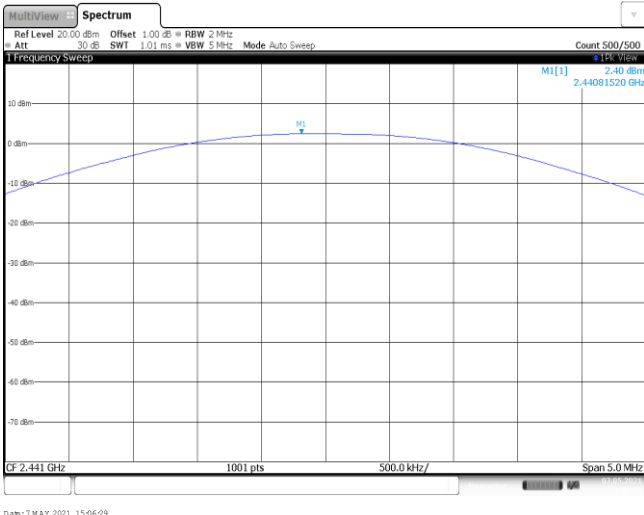
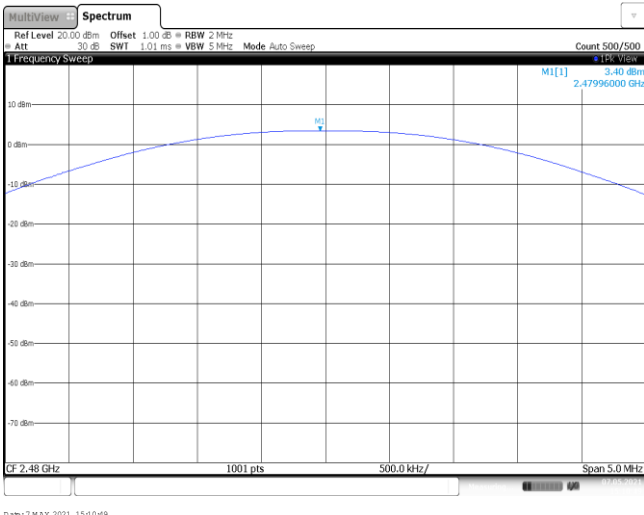
Project No.	SHT2104093301EW	Radio Specification	Bluetooth EDR
Test sample No.	YPHT21040933013	Model No.	CT9F08
Start test date	2021-05-07	Finish date	2021-05-07
Temperature	25.8°C	Humidity	41%
Test Engineer	Hailey Chen	Auditor	Xiaodong Zhu

Appendix clause	Test item	Result
A	Peak Output Power	PASS
B	20 dB Bandwidth	PASS
C	99% Occupied Bandwidth	PASS
D	Carrier Frequencies Separation	PASS
E	Hopping Channel Number	PASS
F	Dwell Time	PASS
G	Duty Cycle Correction Factor (DCCF)	PASS
H	Band edge and Spurious Emissions(coducted)	PASS

Appendix A: Peak Output Power

Modulation type	Channel	Output power (dBm)	Average Output power (dBm)	Limit (dBm)	Result
GFSK	00	2.81	2.71	≤ 30.00	Pass
	39	3.28	3.27		
	78	3.61	3.59		
$\pi/4$ DQPSK	00	1.60	0.85	≤ 21.00	Pass
	39	2.40	2.36		
	78	3.40	3.32		
8DPSK	00	1.26	1.23	≤ 21.00	Pass
	39	2.41	2.35		
	78	3.34	3.26		

Modulation Type:	GFSK
CH00	 Ref Level 20.00 dBm Offset 30 dB SWI 4.21 us (~31 ms) VBW 3 MHz Mode Auto FFT Count 300/300 1 Frequency Sweep M1[1] 2.91 dBm 2.40200000 GHz CF 2.402 GHz 1001 pts 500.0 kHz/ Span 5.0 MHz Date: 7 MAY 2021 14:03:12
CH39	 Ref Level 20.00 dBm Offset 30 dB SWI 4.21 us (~31 ms) VBW 3 MHz Mode Auto FFT Count 300/300 1 Frequency Sweep M1[1] 3.28 dBm 2.44095000 GHz CF 2.441 GHz 1001 pts 500.0 kHz/ Span 5.0 MHz Date: 7 MAY 2021 14:41:14
CH78	 Ref Level 20.00 dBm Offset 30 dB SWI 4.21 us (~31 ms) VBW 3 MHz Mode Auto FFT Count 300/300 1 Frequency Sweep M1[1] 3.61 dBm 2.47995000 GHz CF 2.48 GHz 1001 pts 500.0 kHz/ Span 5.0 MHz Date: 7 MAY 2021 14:50:08

Modulation Type:		$\pi/4$ DQPSK
CH00		
CH39		
CH78		

Modulation Type: 8DPSK	
CH00	MultiView Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 2 MHz Att 30 dB SWT 1.01 ms VBW 5 MHz Mode Auto Sweep Count 500/500 1 Frequency Sweep M1[1] 1.25 dBm 2.40202500 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: 7 MAY 2021 15:20:46
CH39	MultiView Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 2 MHz Att 30 dB SWT 1.01 ms VBW 5 MHz Mode Auto Sweep Count 500/500 1 Frequency Sweep M1[1] 2.41 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: 7 MAY 2021 15:24:08
CH78	MultiView Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 2 MHz Att 30 dB SWT 1.01 ms VBW 5 MHz Mode Auto Sweep Count 500/500 1 Frequency Sweep M1[1] 3.34 dBm 2.47994510 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: 7 MAY 2021 15:29:01

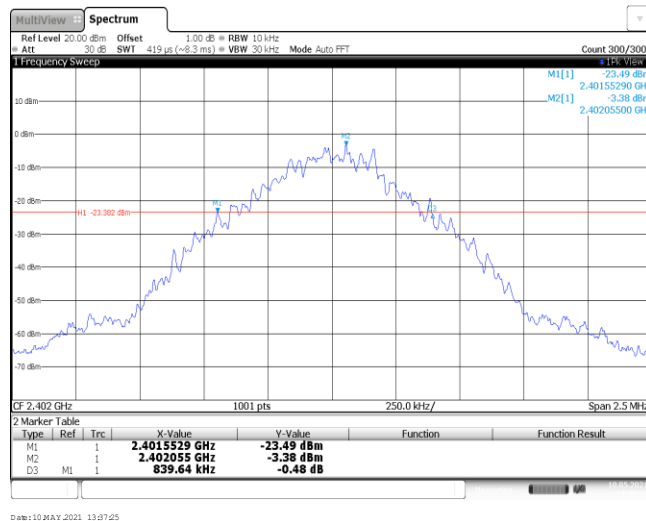
Appendix B : 20 dB Bandwidth

Modulation type	Channel	20 dB Bandwidth (kHz)	Limit (kHz)	Result
GFSK	00	839.64	-	Pass
	39	838.20		
	78	842.50		
$\pi/4$ DQPSK	00	1275.00	-	Pass
	39	1275.00		
	78	1275.00		
8DPSK	00	1262.50	-	Pass
	39	1282.50		
	78	1265.00		

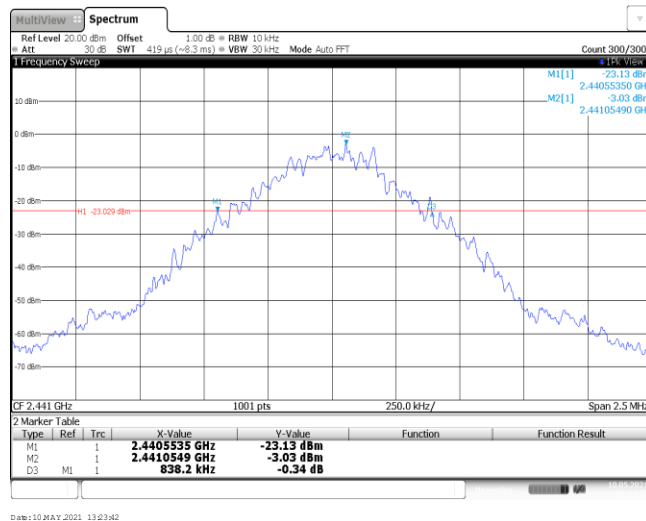
Modulation Type:

GFSK

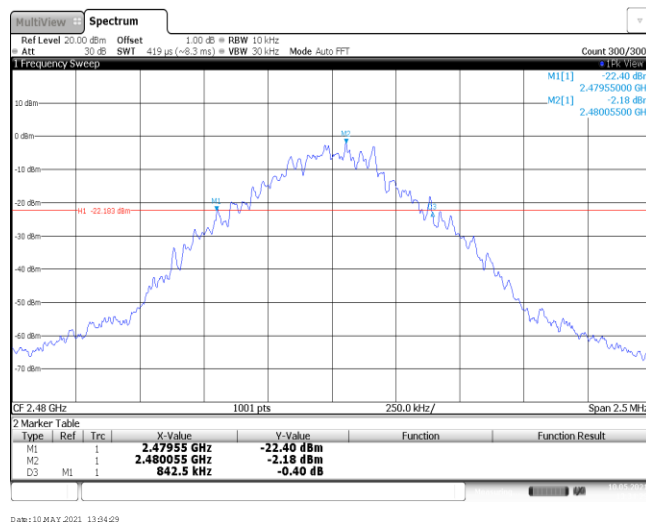
CH00



CH39



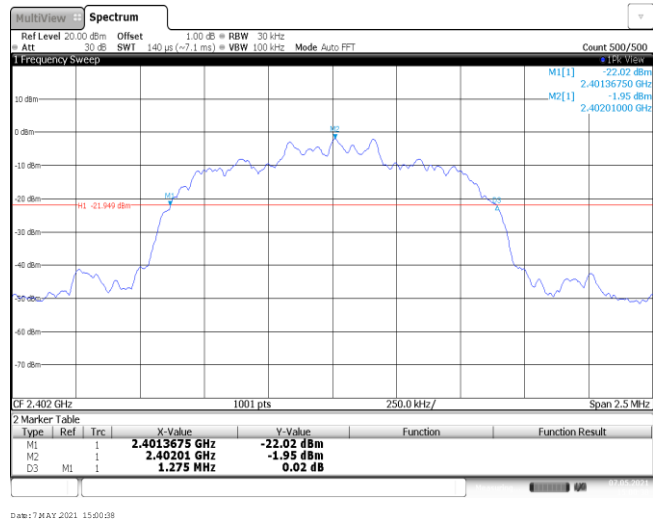
CH78



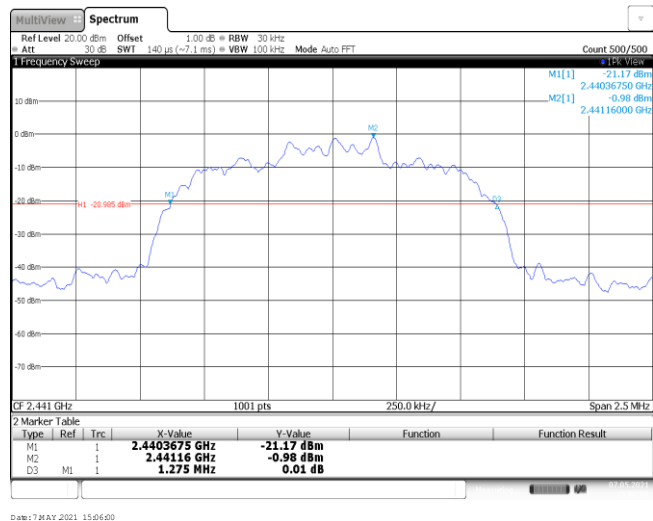
Modulation Type:

 $\pi/4$ DQPSK

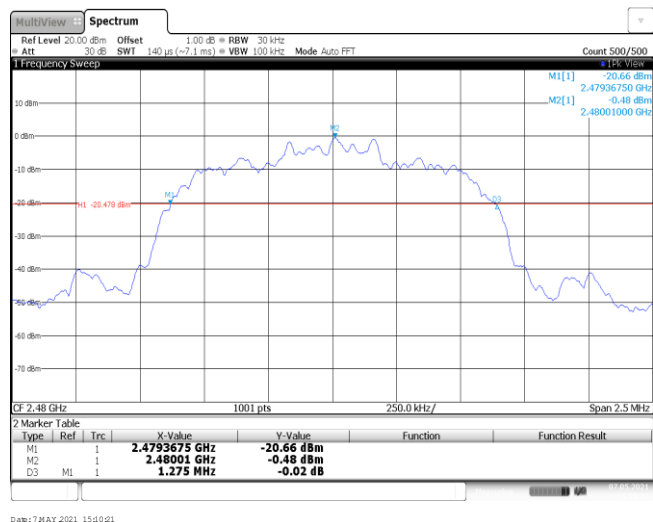
CH00



CH39



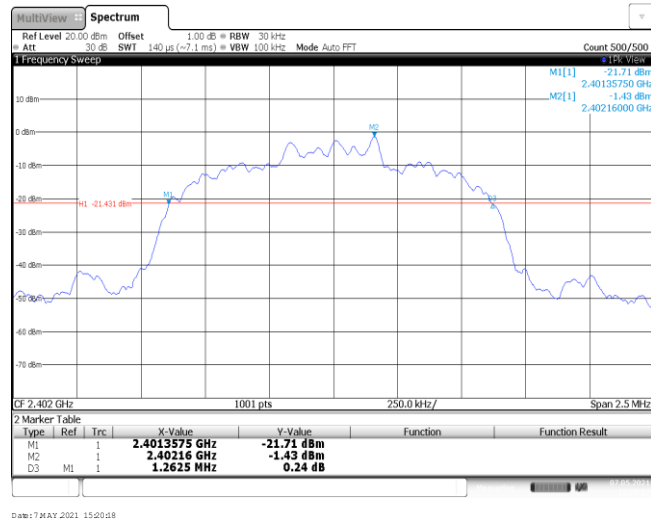
CH78



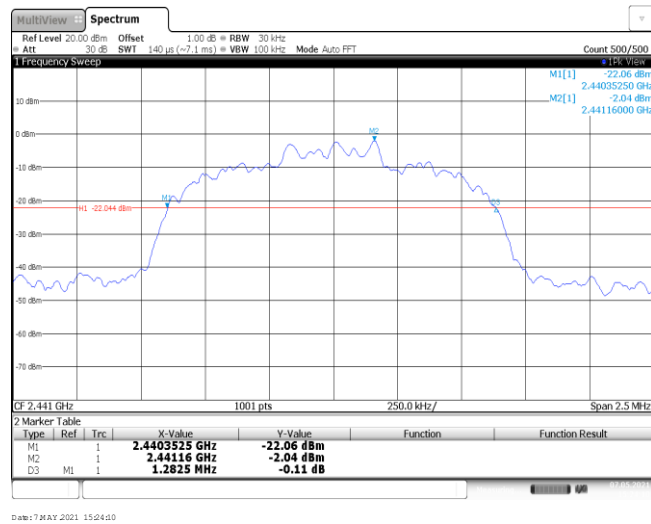
Modulation Type:

8DPSK

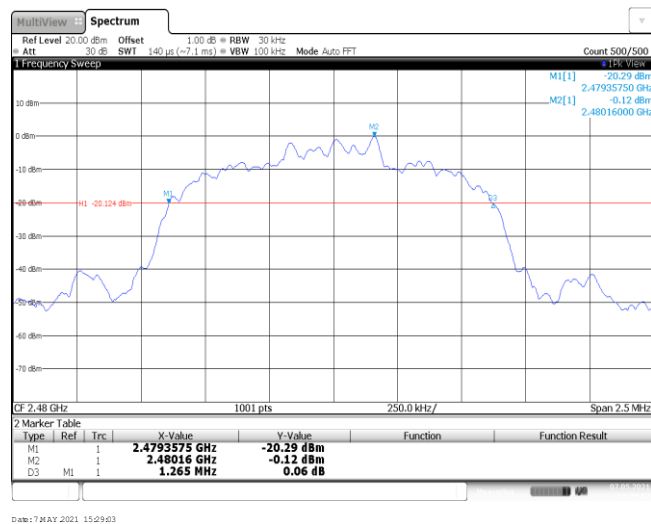
CH00



CH39

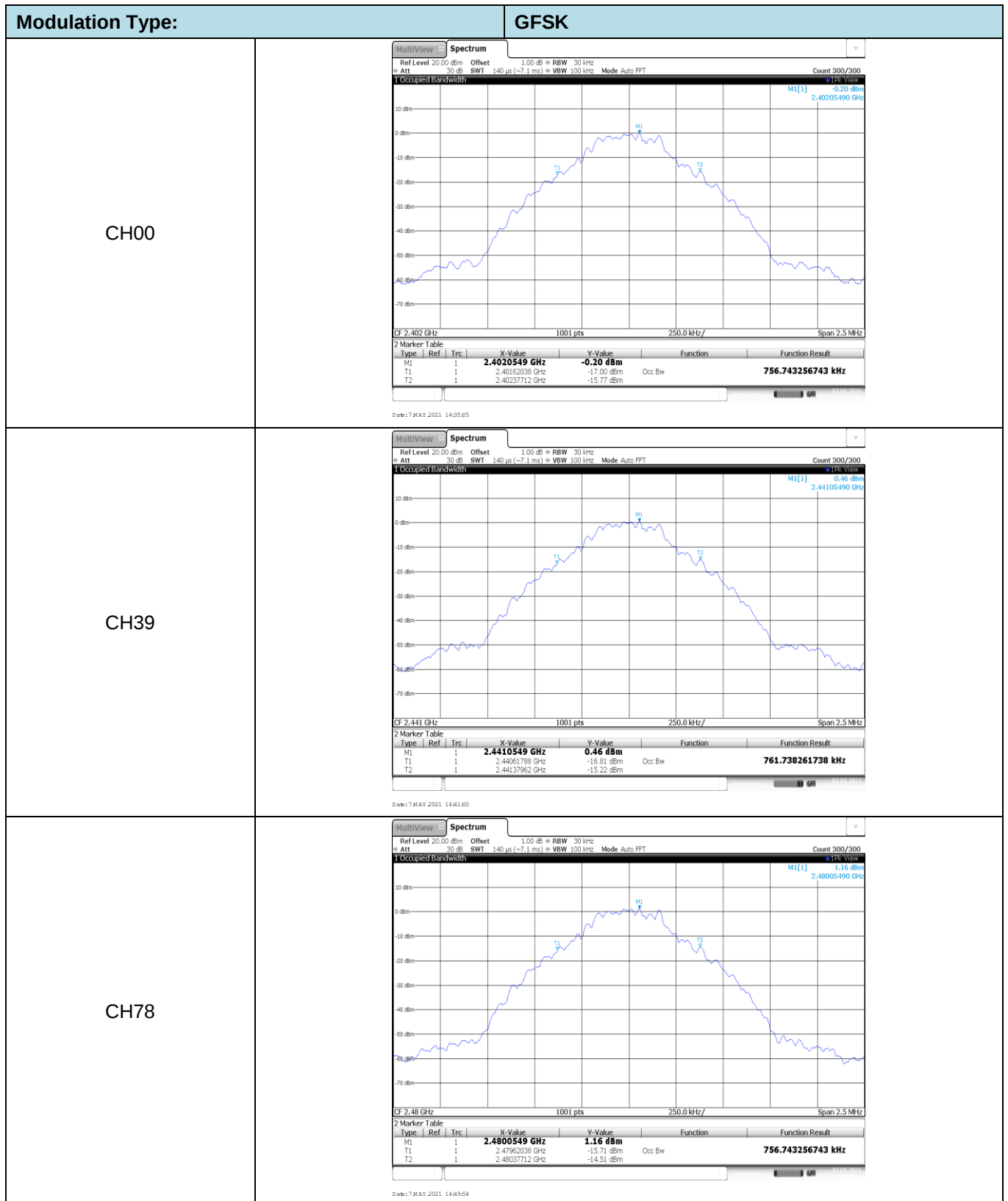


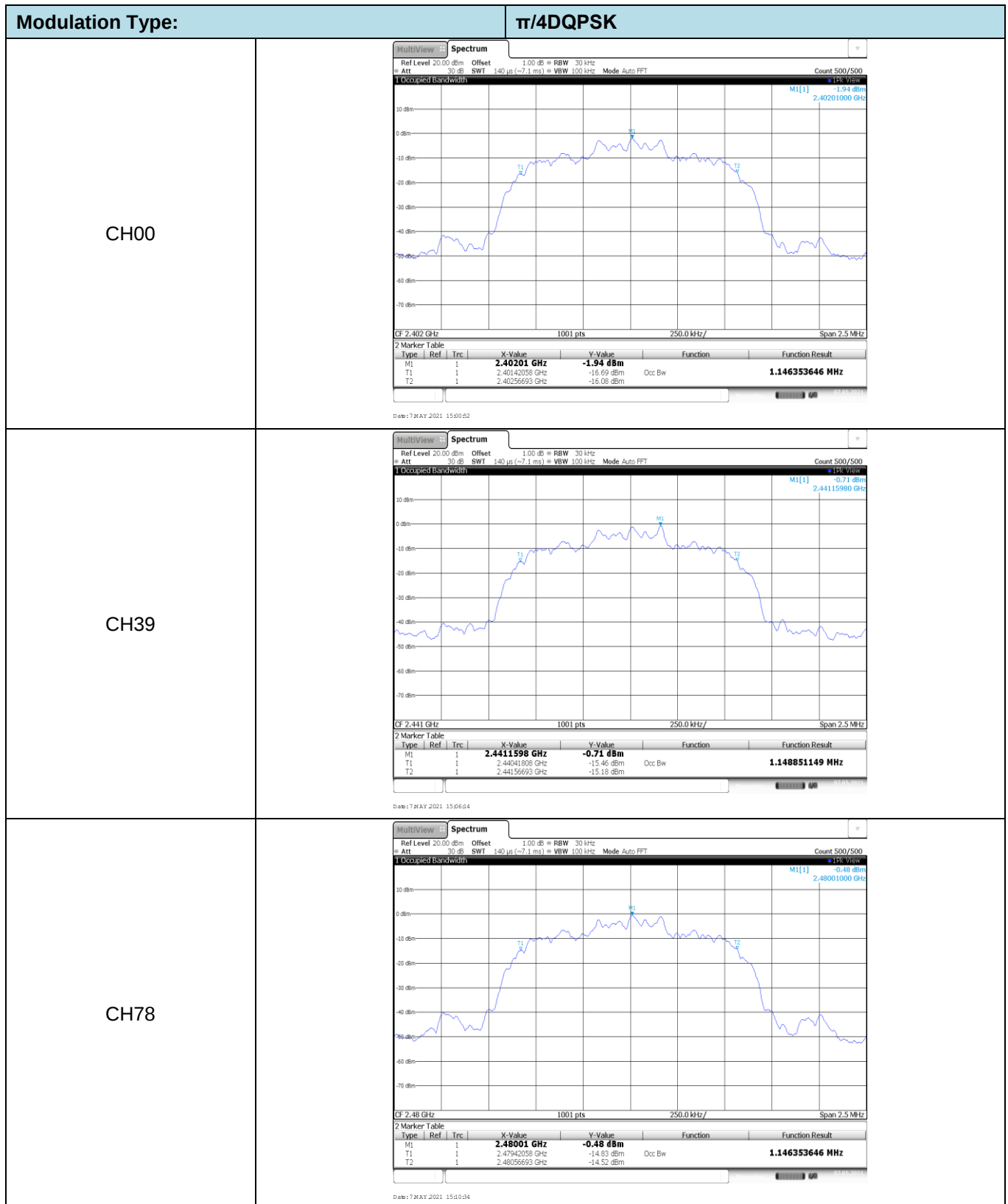
CH78

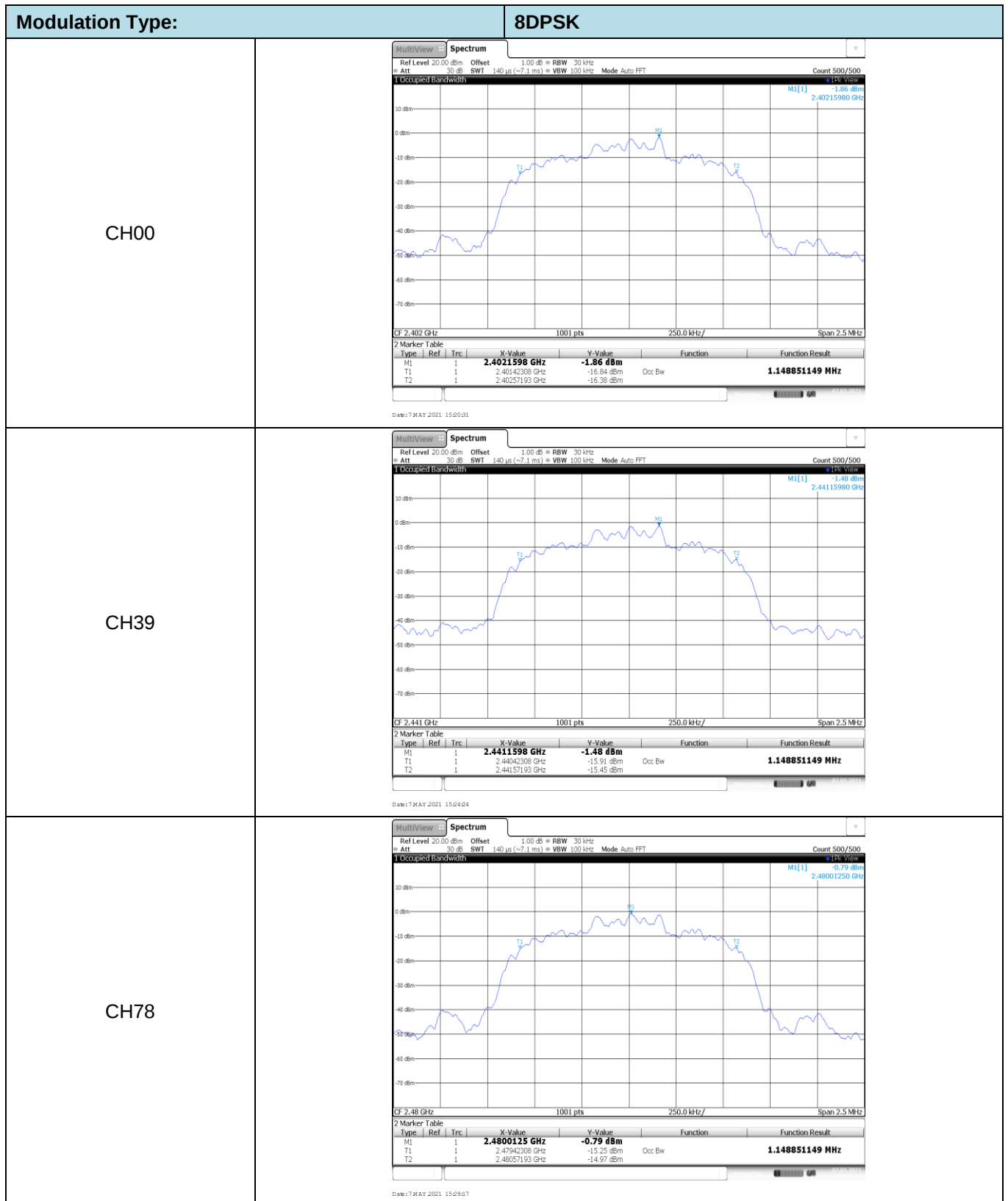


Appendix C: 99% Occupied Bandwidth

Modulation type	Channel	99% Occupied Bandwidth (MHz)	Limit (MHz)	Result
GFSK	00	0.76	-	Pass
	39	0.76		
	78	0.76		
$\pi/4$ DQPSK	00	1.15	-	Pass
	39	1.15		
	78	1.15		
8DPSK	00	1.15	-	Pass
	39	1.15		
	78	1.15		







Appendix D: Carrier Frequencies Separation

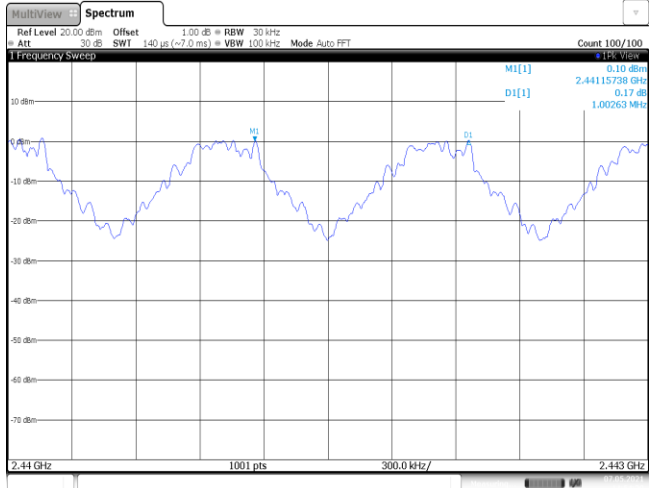
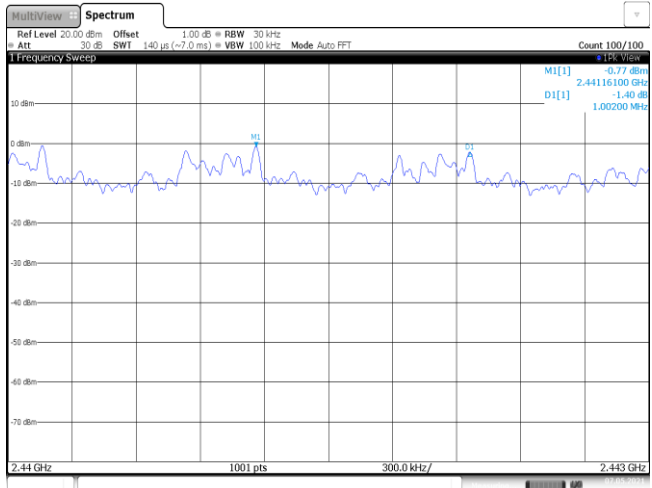
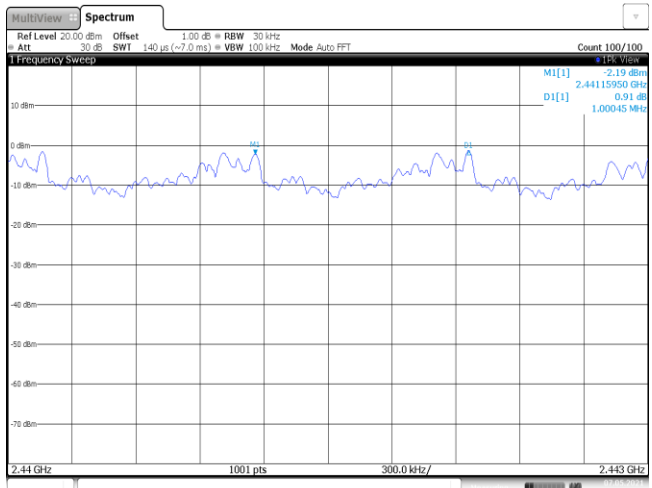
Modulation type	Channel	Carrier Frequencies Separation (MHz)	Limit (kHz) *	Result
GFSK	39	1.00	≥842.50	Pass
π/4DQPSK	39	1.00	≥850.00	Pass
8DPSK	39	1.00	≥855.00	Pass

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.

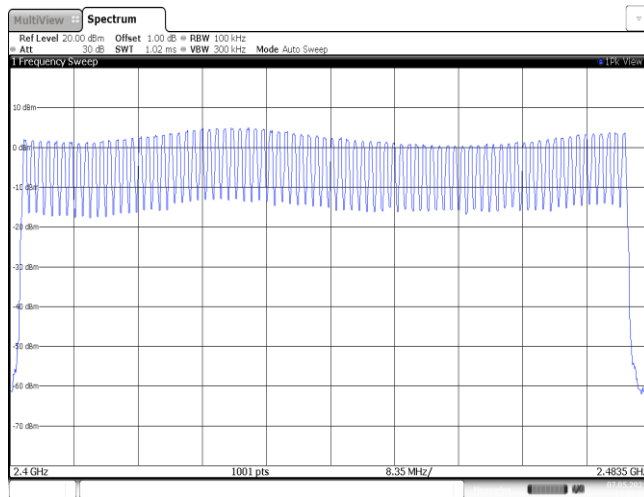
8DPSK limit = 2/3 * The maximum 20 dB Bandwidth for 8DPSK modulation on the appendix B

GFSK	 7 MAY 2021 14:54:30
$\pi/4$ DQPSK	 7 MAY 2021 15:44:16
8DPSK	 7 MAY 2021 15:36:28

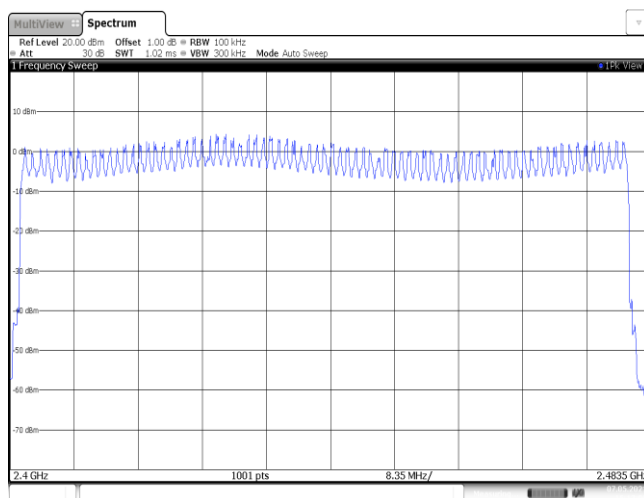
Appendix E: Hopping Channel Number

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

GFSK

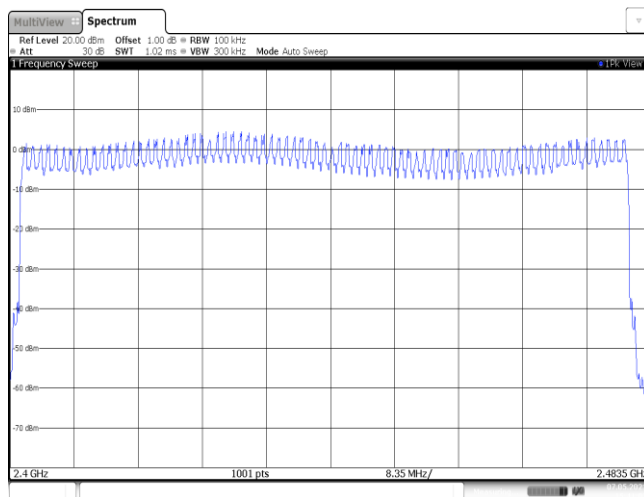


Date: 7 MAY 2021 14:57:02

 $\pi/4$ DQPSK

Date: 7 MAY 2021 15:17:09

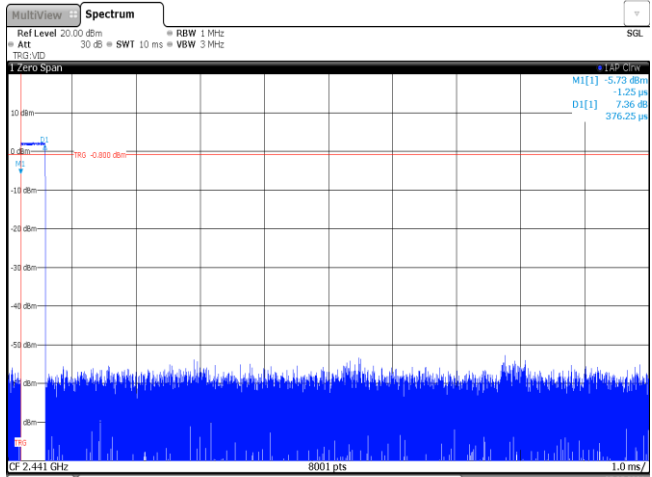
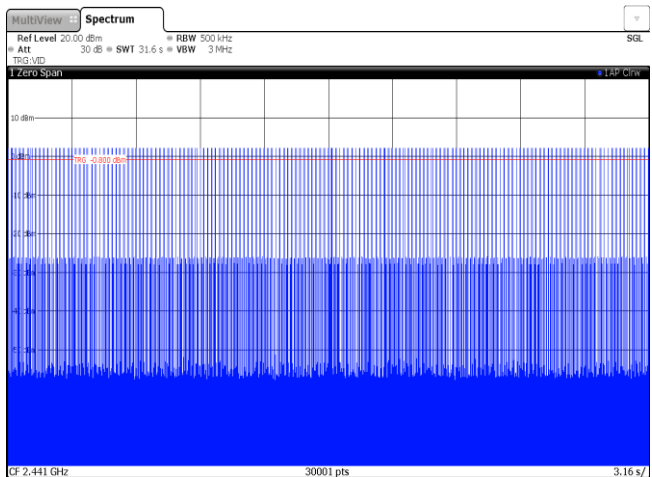
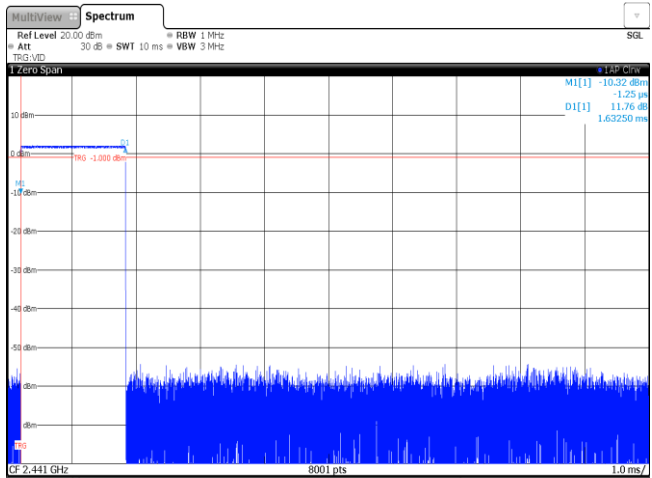
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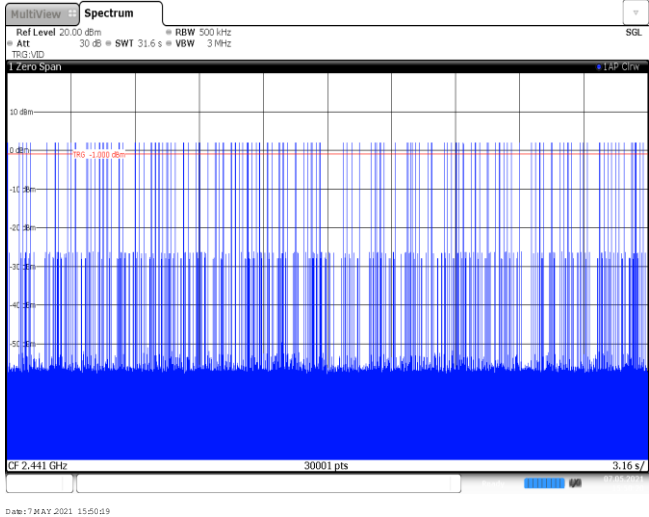
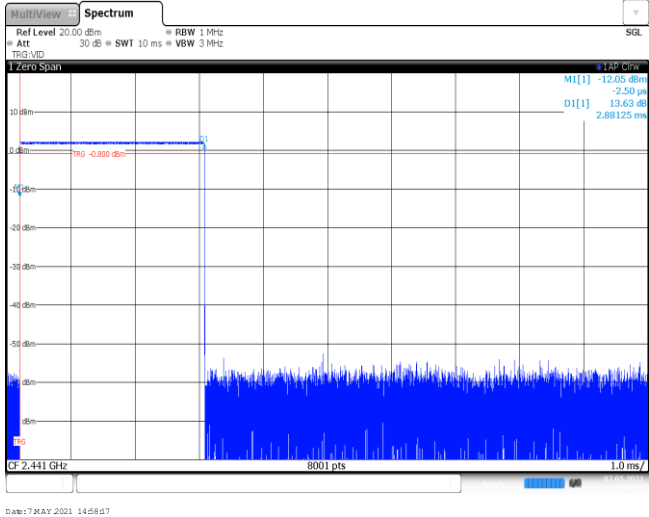
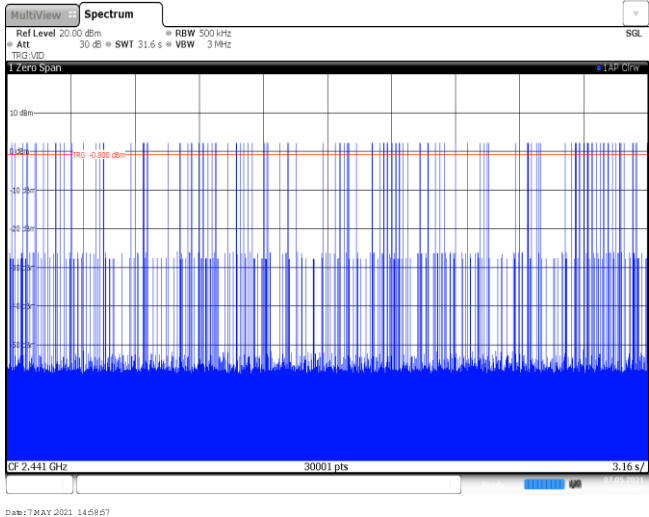


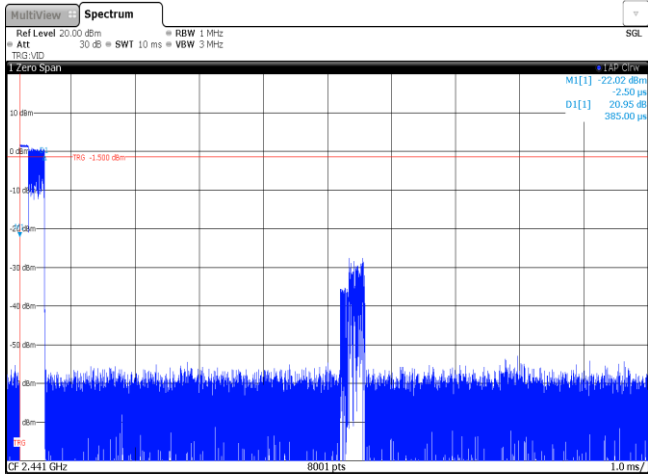
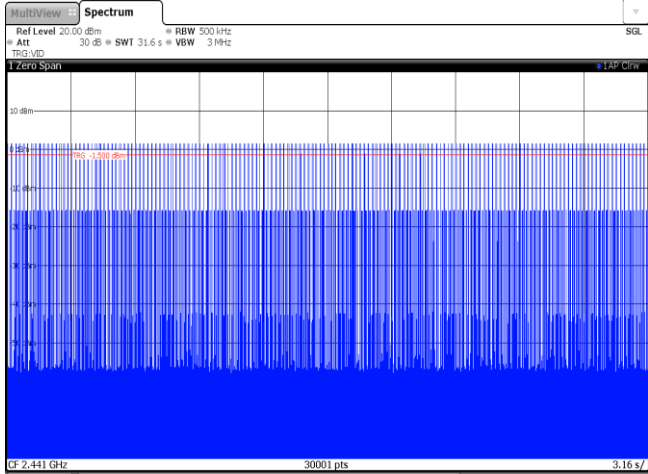
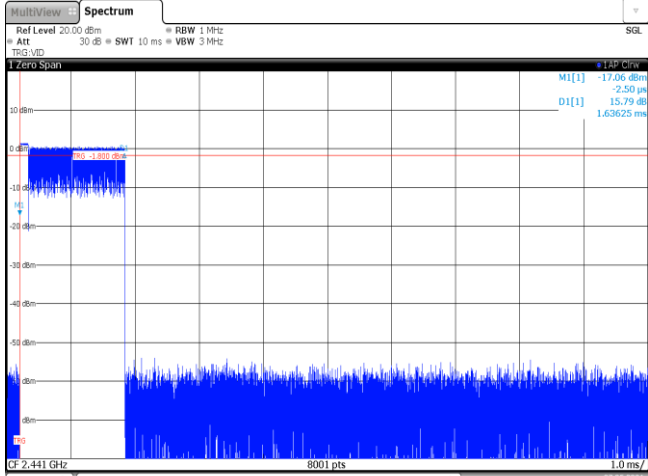
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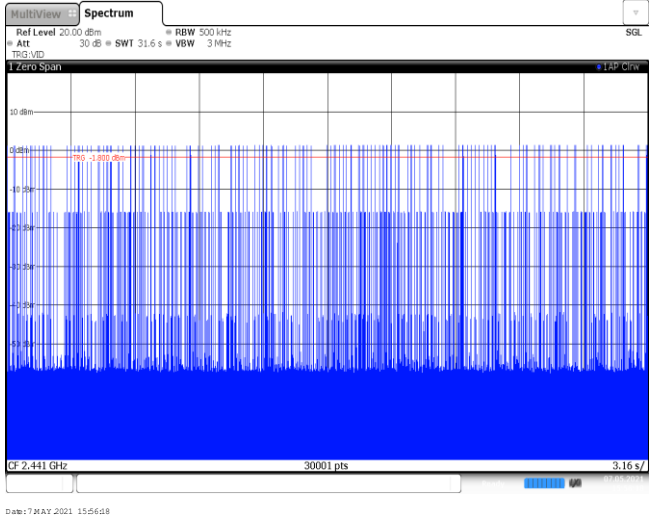
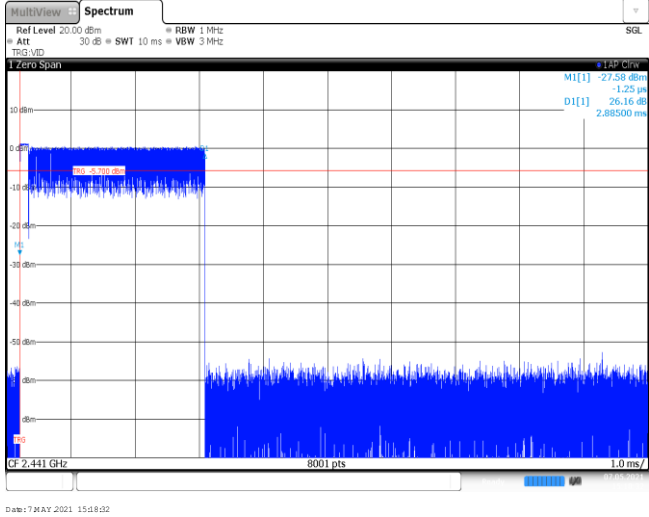
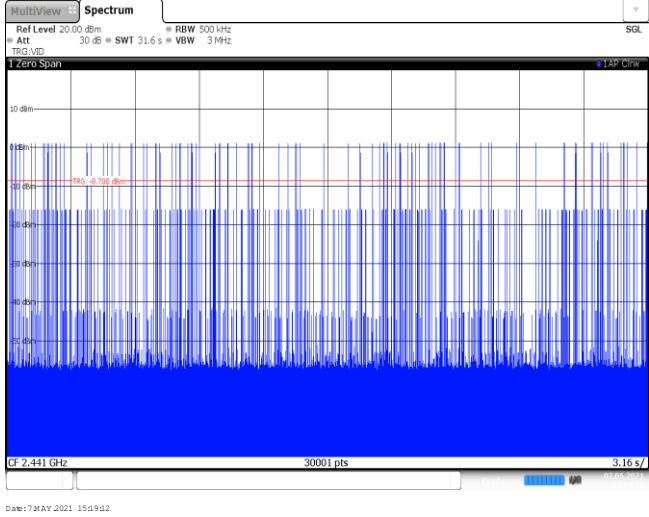
Appendix F: Dwell Time

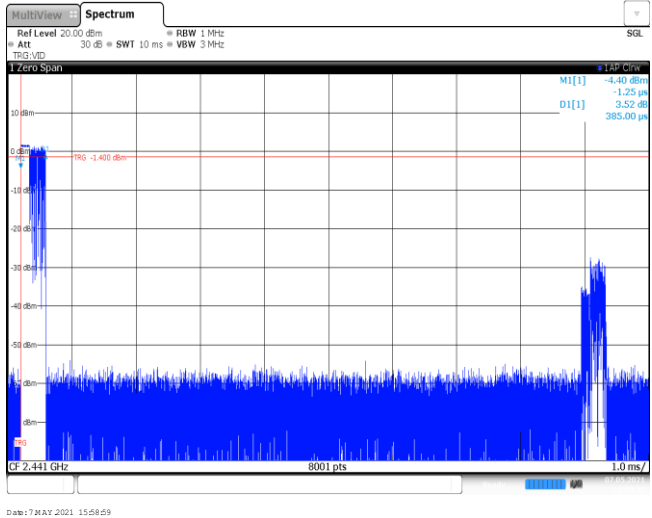
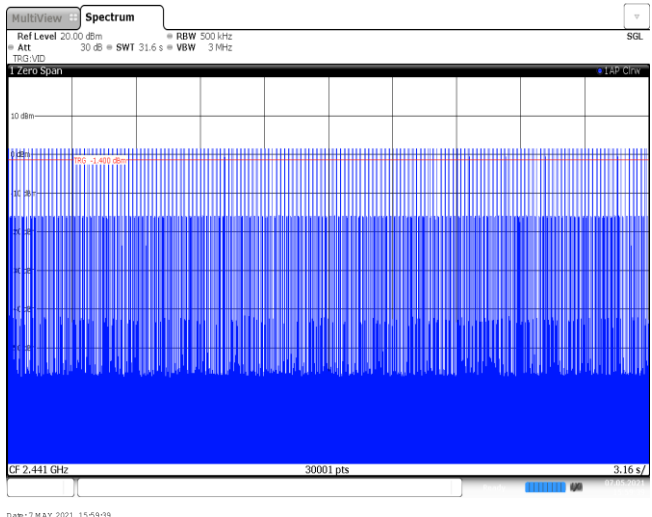
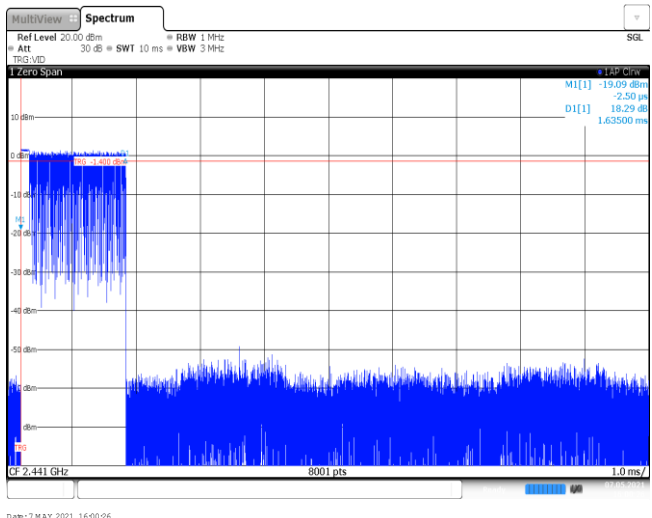
Modulation type	Packet	Burst Width [ms]	Total Hops[hop*ch]	Dwell time (Second)	Limit (Second)	Result
GFSK	DH1	0.38	314	0.12	≤ 0.40	Pass
	DH3	1.63	150	0.25		
	DH5	2.88	118	0.34		
$\pi/4$ DQPSK	2DH1	0.39	317	0.12	≤ 0.40	Pass
	2DH3	1.64	158	0.26		
	2DH5	2.89	101	0.29		
8DPSK	3DH1	0.39	316	0.12	≤ 0.40	Pass
	3DH3	1.64	161	0.26		
	3DH5	2.89	109	0.31		

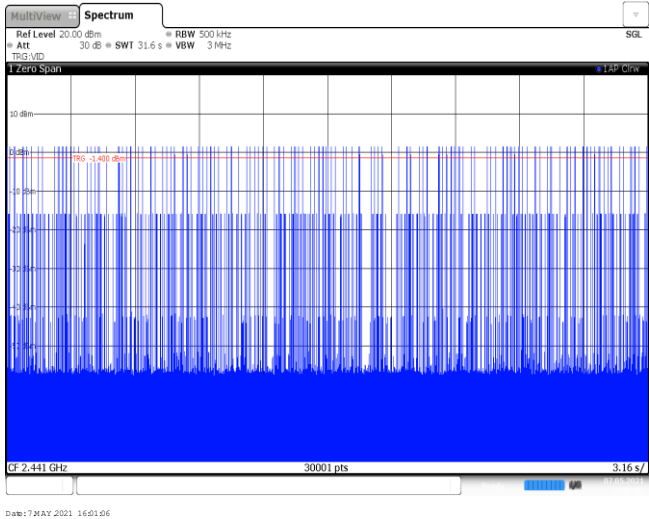
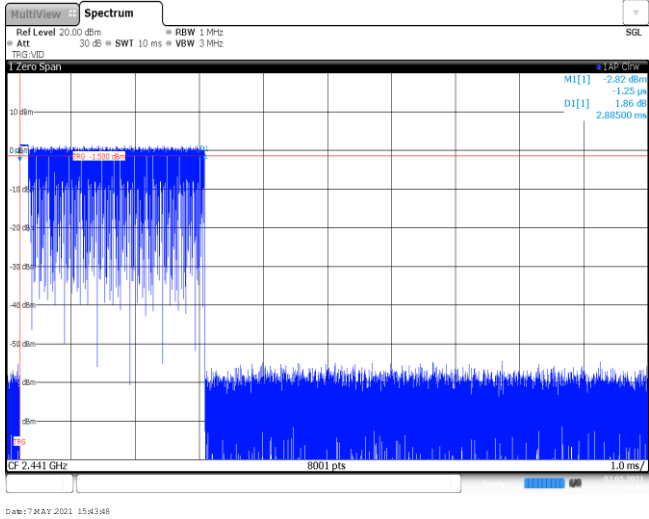
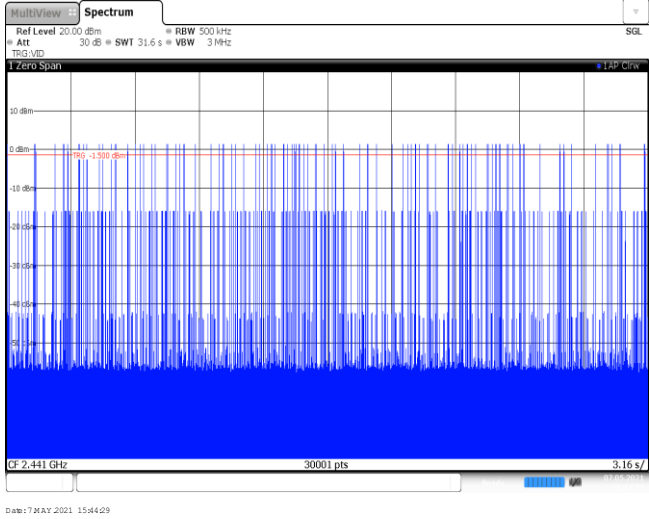
Modulation Type:	GFSK
DH1 Burst width	 The spectrum plot shows a signal at 2.441 GHz with a bandwidth of 8001 pts. The y-axis represents power in dBm, ranging from -80 to 10. The x-axis represents time in ms, ranging from 0 to 1.0 ms. The plot shows a burst of signal at the start, followed by a period of low power. The signal is identified as M1[1] with a power of -5.73 dBm, a duration of 1.25 μs, and a frequency of 7.36 dB. The plot also shows 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.
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 -80 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 is identified as M1[1] with a power of -10.32 dBm, a duration of 1.25 μs, and a frequency of 11.76 dB. The plot also shows 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.
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 -80 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 start, followed by a period of low power. The signal is identified as M1[1] with a power of -10.32 dBm, a duration of 1.25 μs, and a frequency of 11.76 dB. The plot also shows 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.

DH3 Burst number	
DH5 Burst width	
DH5 Burst number	

Modulation Type: $\pi/4$ DQPSK	
2DH1 Burst width	 Ref Level 20.00 dBm Att 30 dB RBW 1 MHz SWT 10 ms VBW 3 MHz 1 Zero Span CF 2.441 GHz 8001 pts 1.0 ms M1[1] -22.02 dBm D1[1] 20.95 dB 385.00 ps Date: 7 MAY 2021 15:54:01
2DH1 Burst number	 Ref Level 20.00 dBm Att 30 dB RBW 500 kHz SWT 31.6 s VBW 3 MHz 1 Zero Span CF 2.441 GHz 30001 pts 3.16 s M1[1] -22.02 dBm D1[1] 20.95 dB 385.00 ps Date: 7 MAY 2021 15:54:40
2DH3 Burst width	 Ref Level 20.00 dBm Att 30 dB RBW 1 MHz SWT 10 ms VBW 3 MHz 1 Zero Span CF 2.441 GHz 8001 pts 1.0 ms M1[1] -17.06 dBm D1[1] 15.79 dB 1.63625 ms Date: 7 MAY 2021 15:55:08

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

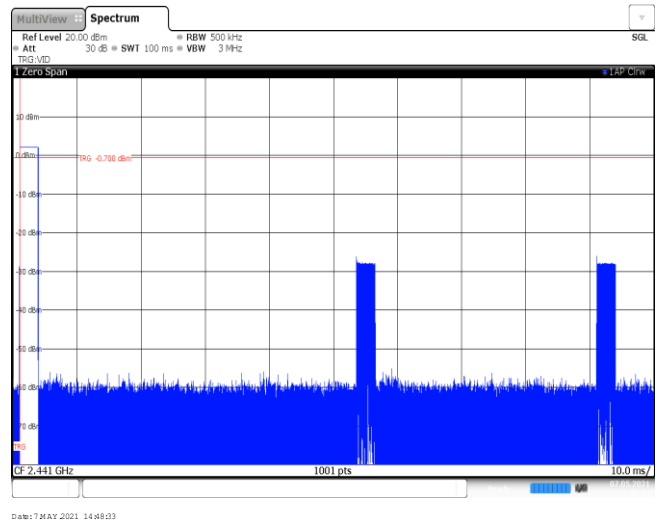
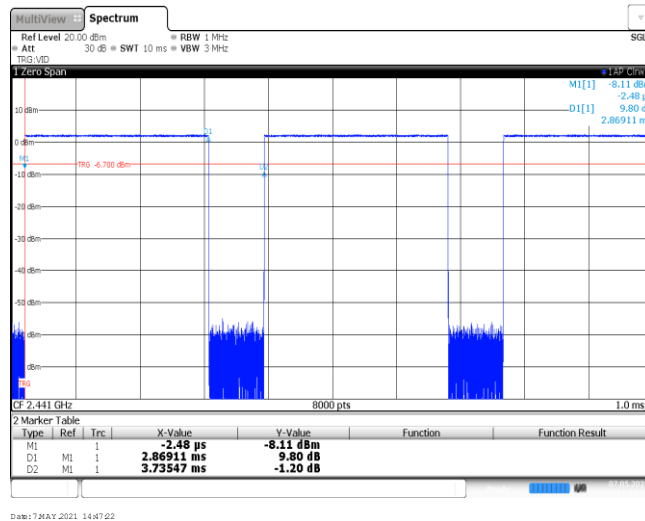
Modulation Type:	8DPSK
3DH1 Burst width	 The spectrum plot shows a signal at 2.441 GHz with a bandwidth of 1.0 ms. The plot displays a burst of signal activity. The y-axis represents power in dBm, ranging from -60 to 10. The x-axis represents time in ms, ranging from 0 to 1.0. The plot includes a red trace line at -3.400 dBm. The plot also shows a table of parameters: M[1] -4.40 dBm, D[1] -1.25 ps, D[1] 3.52 dB, and D[1] 385.00 ps.
3DH1 Burst number	 The spectrum plot shows a signal at 2.441 GHz with a bandwidth of 3.16 s. The plot displays a burst of signal activity. 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. The plot includes a red trace line at -3.400 dBm. The plot also shows a table of parameters: M[1] -15.09 dBm, D[1] 2.50 ps, D[1] 18.29 dB, and D[1] 1.63500 ms.
3DH3 Burst width	 The spectrum plot shows a signal at 2.441 GHz with a bandwidth of 1.0 ms. The plot displays a burst of signal activity. 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. The plot includes a red trace line at -3.400 dBm. The plot also shows a table of parameters: M[1] -15.09 dBm, D[1] 2.50 ps, D[1] 18.29 dB, and D[1] 1.63500 ms.

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

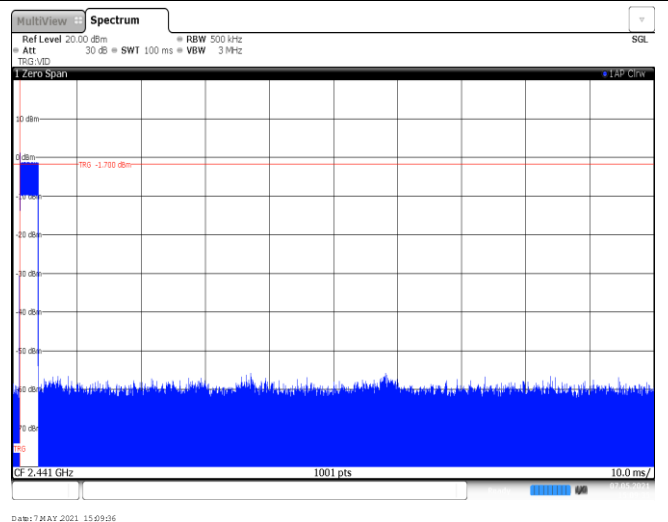
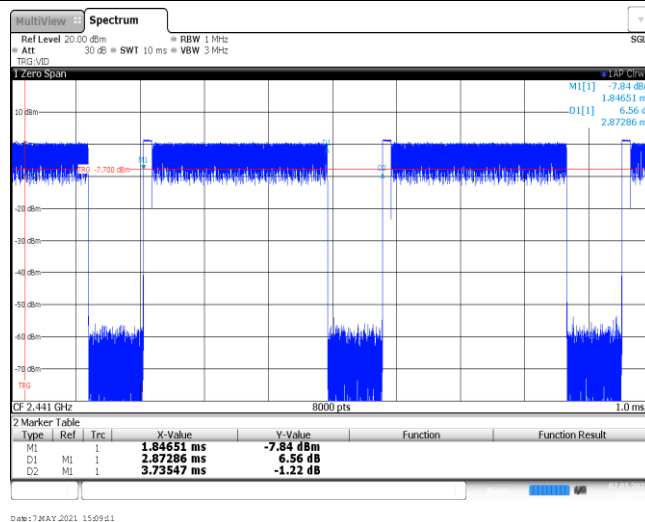
Appendix G: Duty Cycle Correction Factor (DCCF)

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	1	-30.84
8DPSK	2441	2.87	100	1	-30.84

GFSK

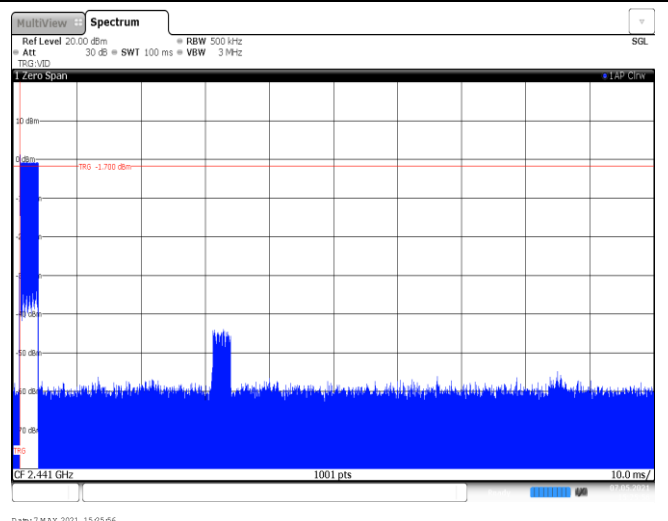
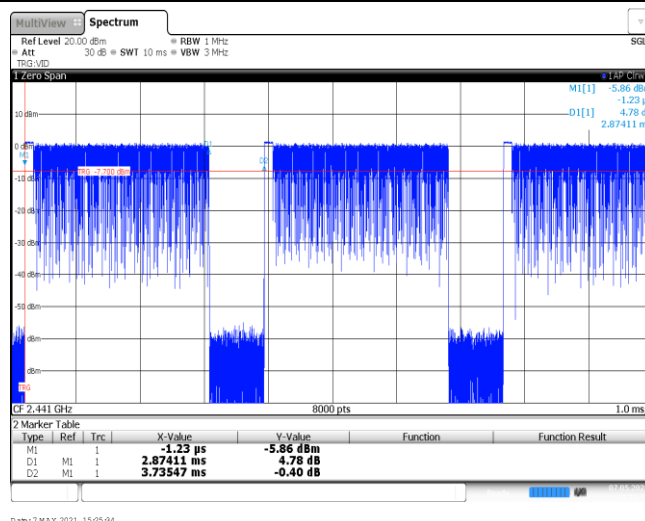
T_{on} time for single burst

Burst Quantity

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

Burst Quantity

8DPSK

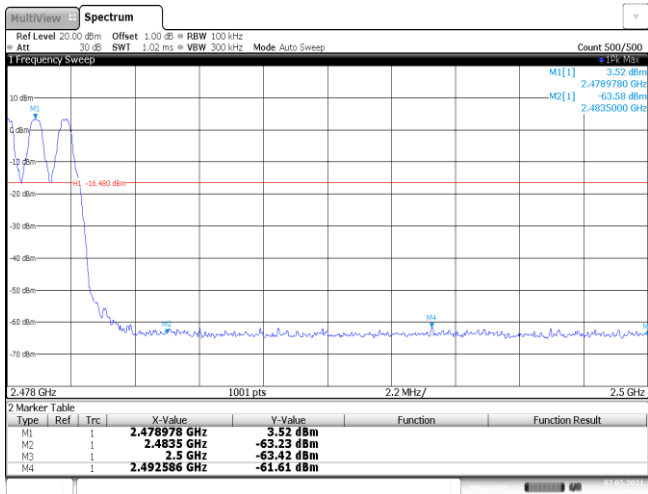
T_{on} time for single burst

Burst Quantity

Appendix H: Band edge and Spurious Emissions (conducted)

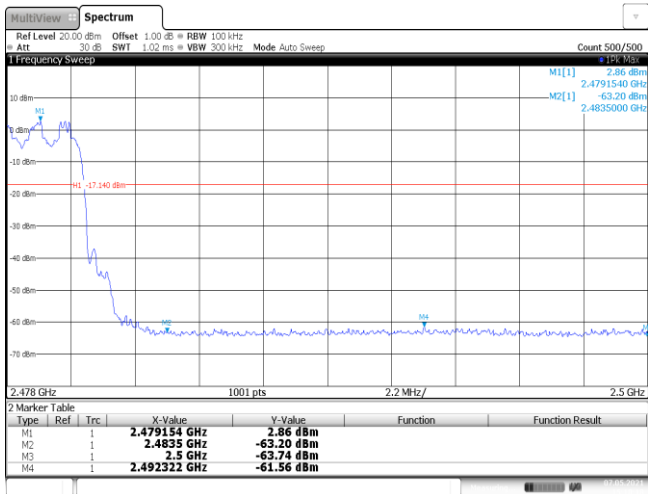
Test Item:	Band edge	Modulation type:	GFSK
CH00 No hopping mode	<		

CH78
Hopping mode



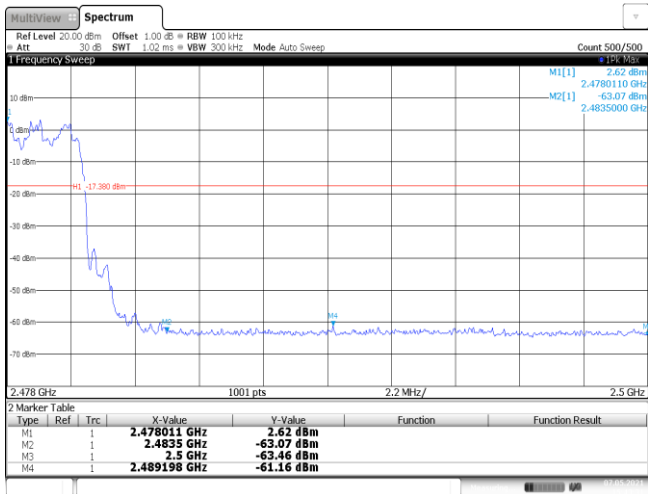
Test Item:	Band edge	Modulation type:	$\pi/4$ DQPSK
CH00 No hopping mode	<		

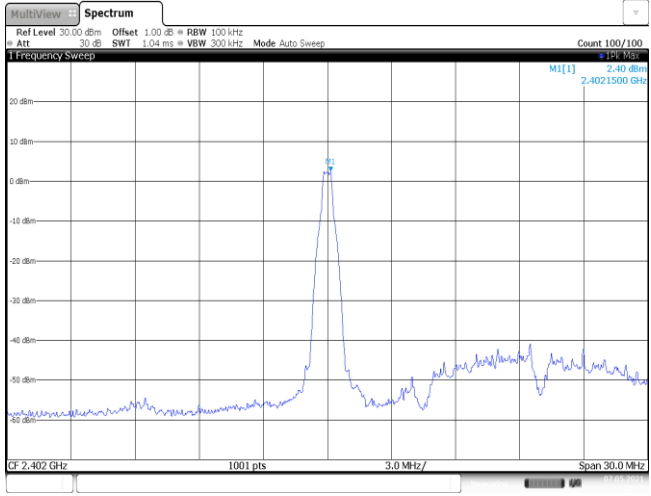
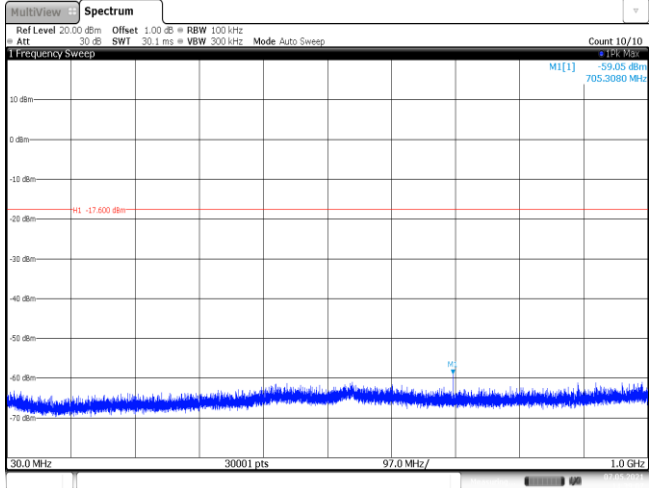
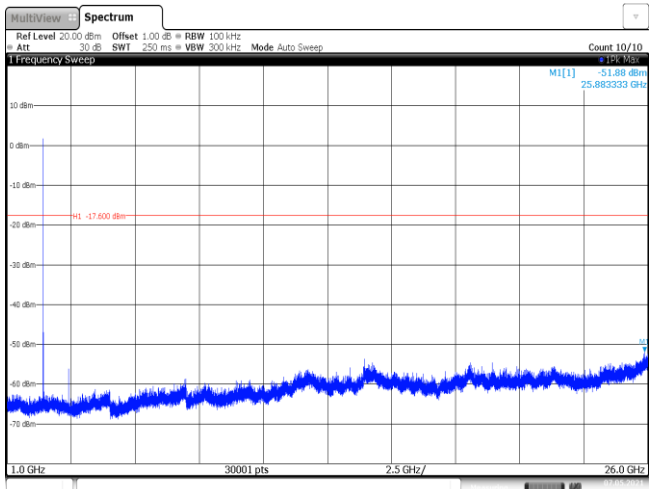
CH78
Hopping mode

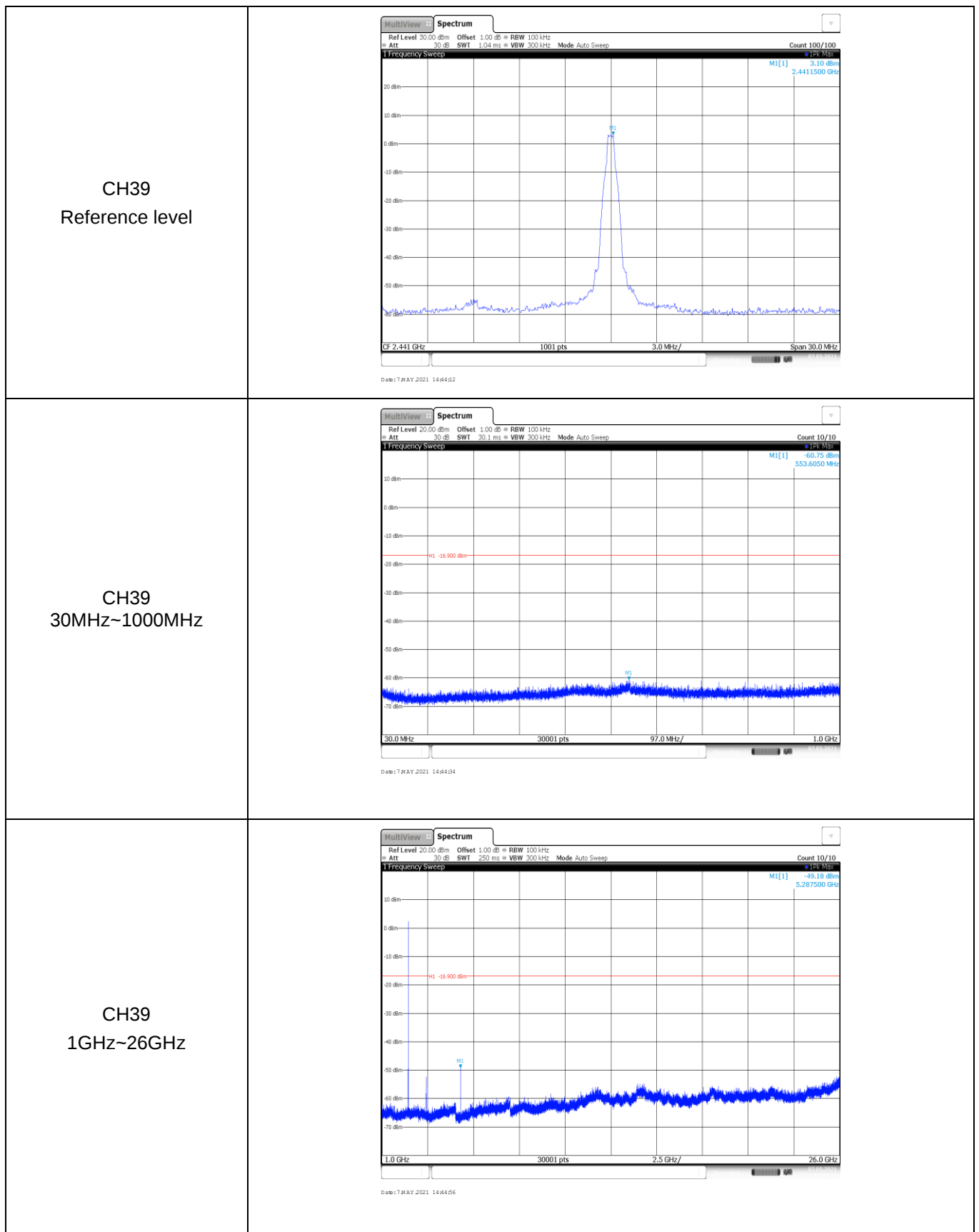


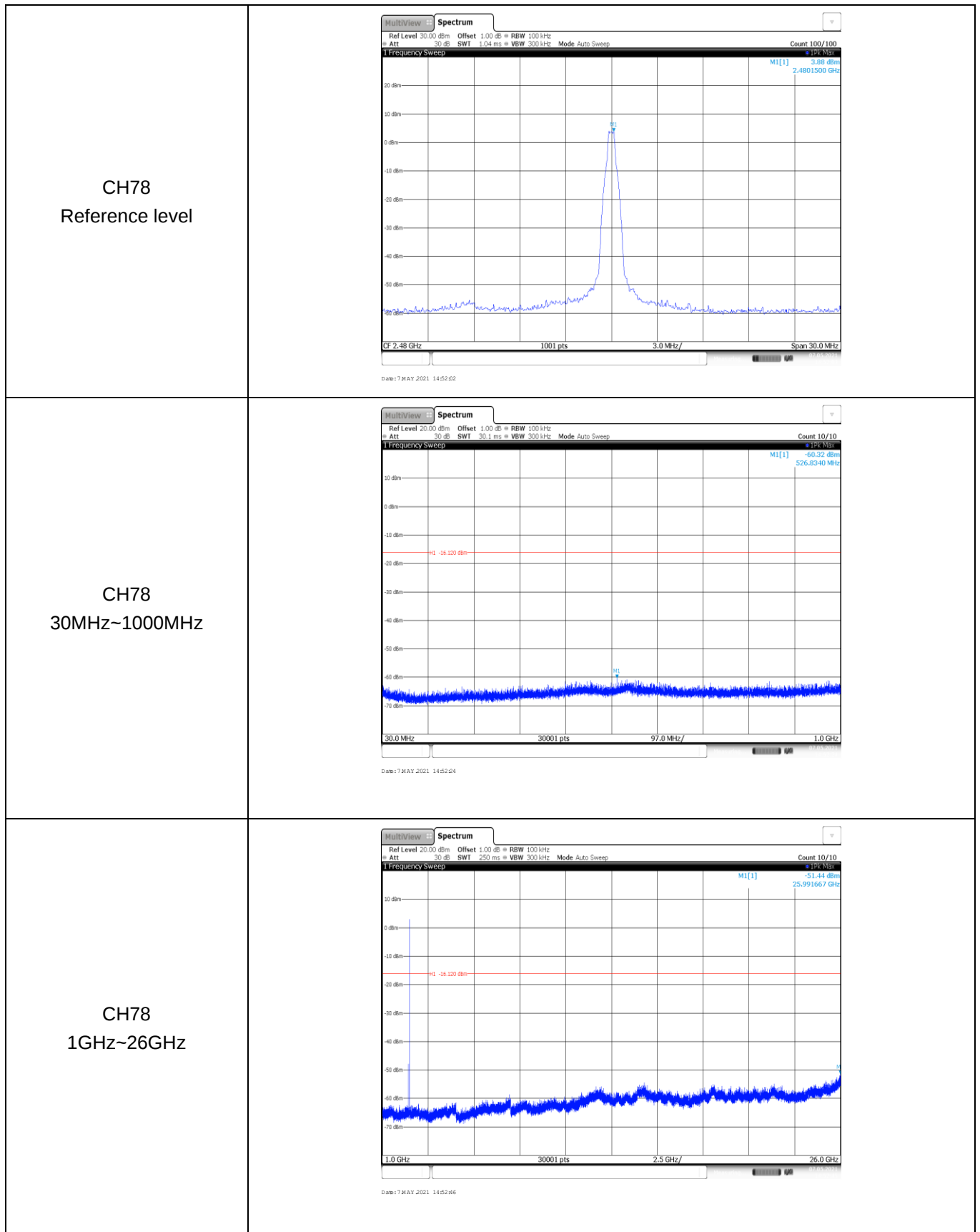
Test Item:	Band edge	Modulation type:	8DPSK
CH00 No hopping mode	</		

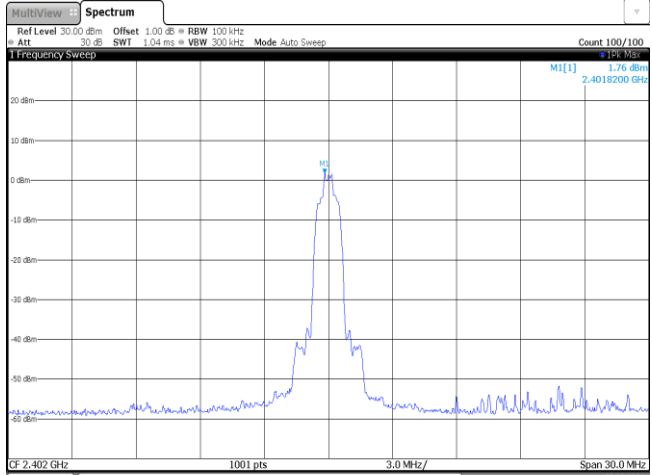
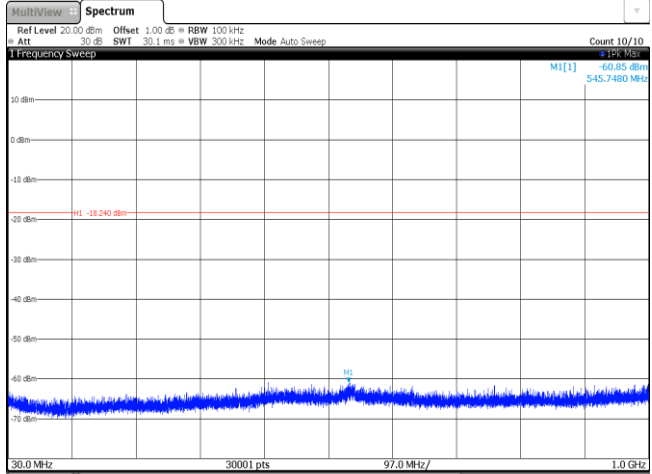
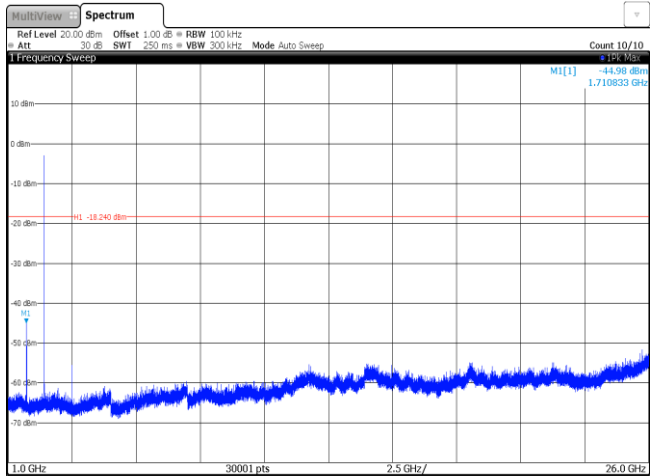
CH78
Hoppig mode

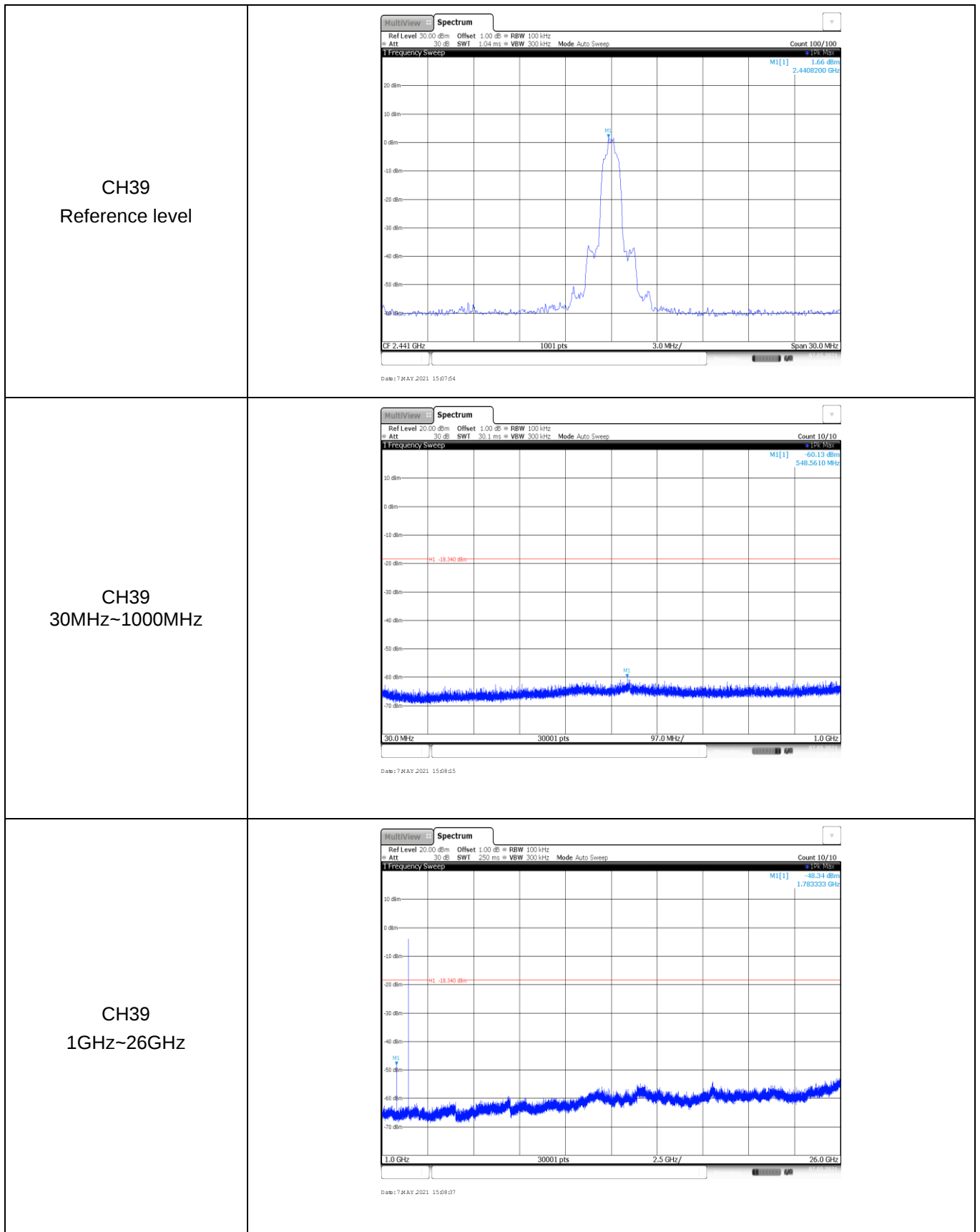


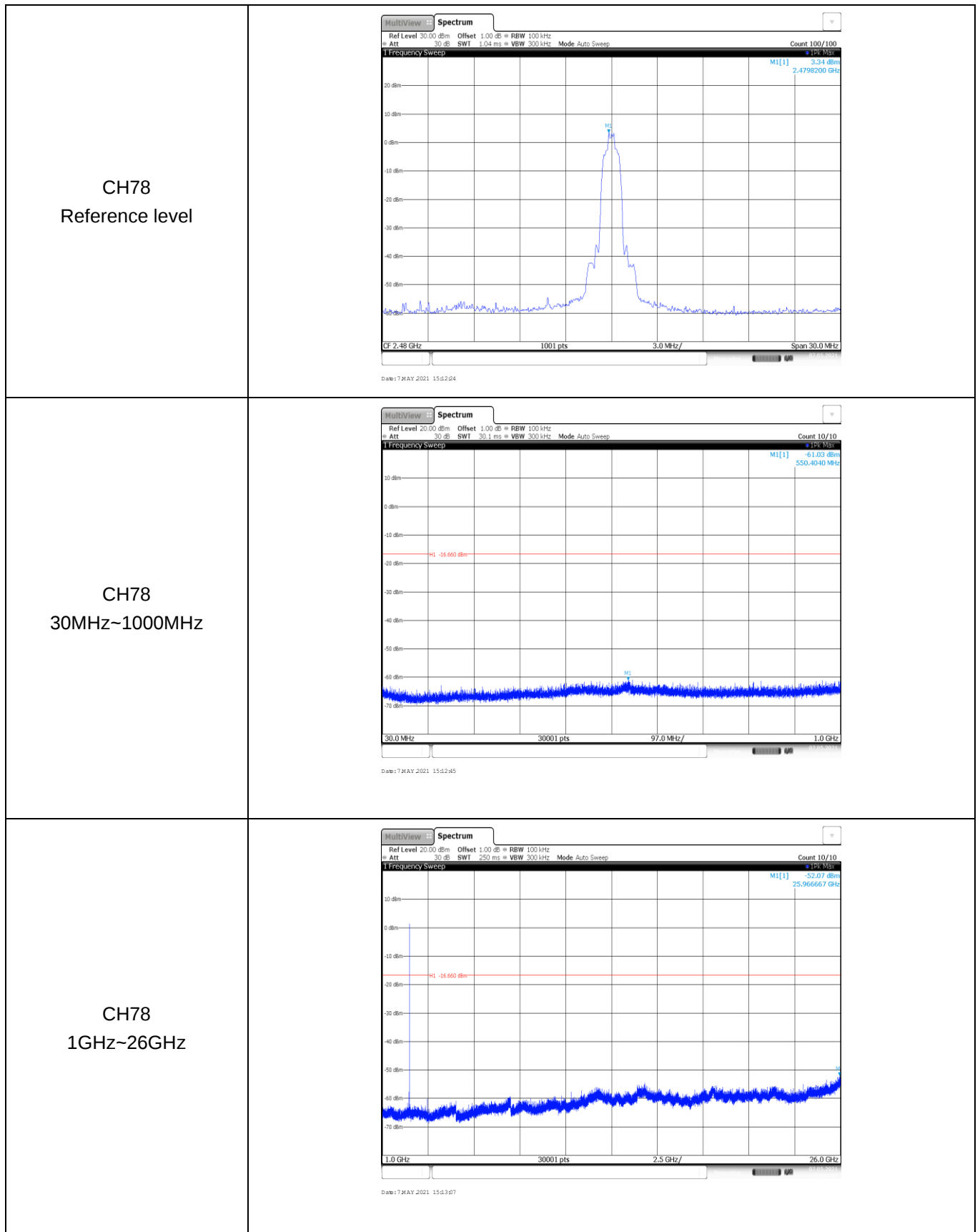
Test Item:	Spurious Emission	Modulation type:	GFSK
CH00 Reference level	 CH00 Reference level		
CH00 30MHz~1000MHz	 CH00 30MHz~1000MHz		
CH00 1GHz~26GHz	 CH00 1GHz~26GHz		

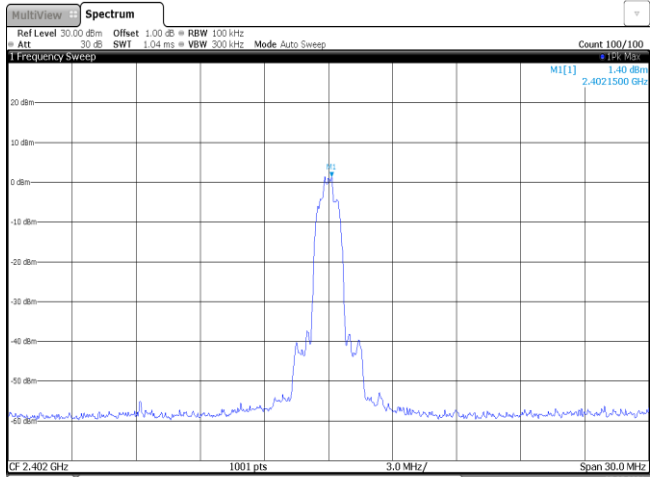
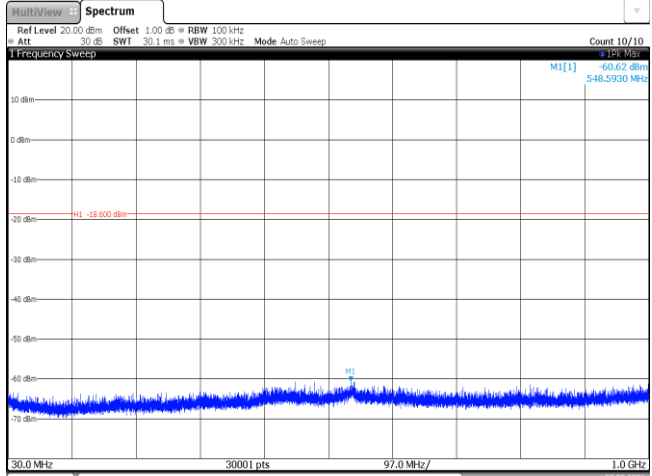
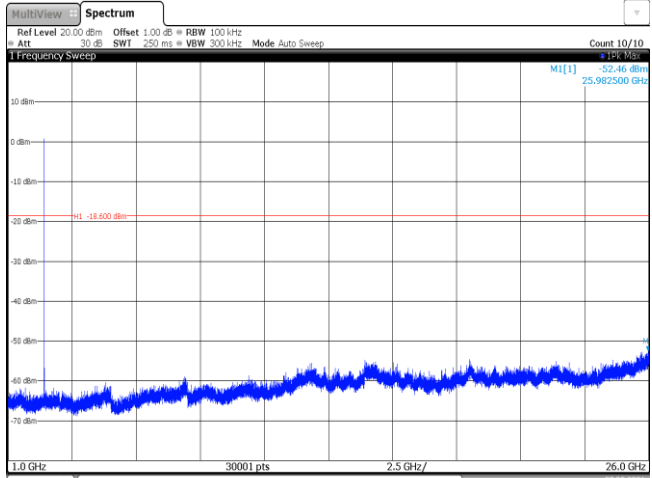


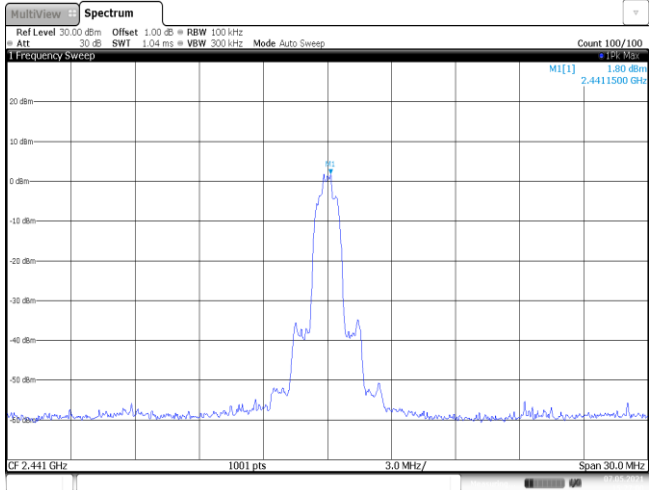
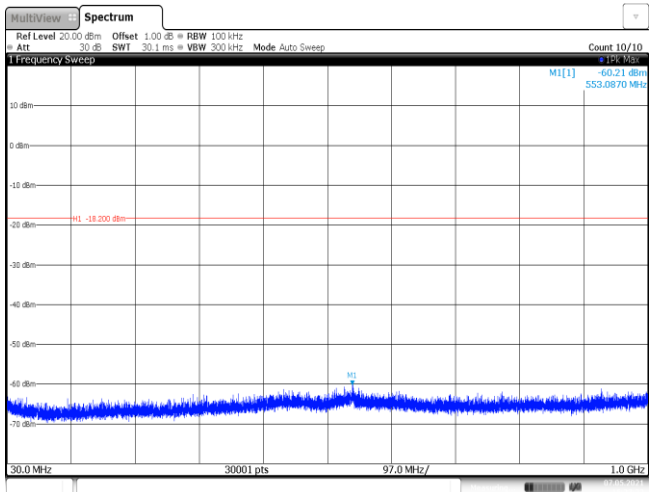
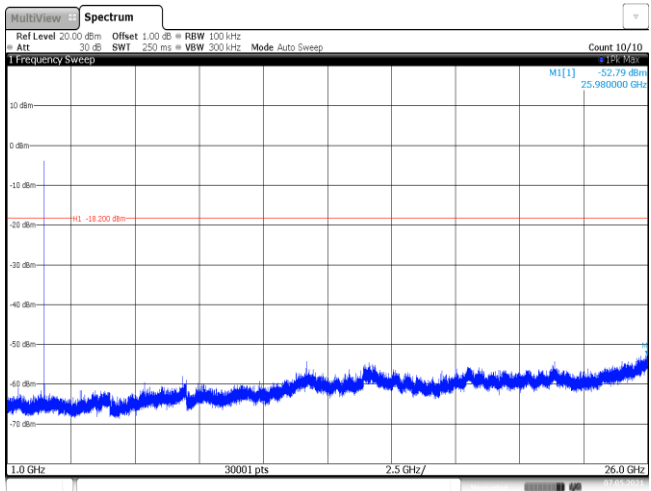


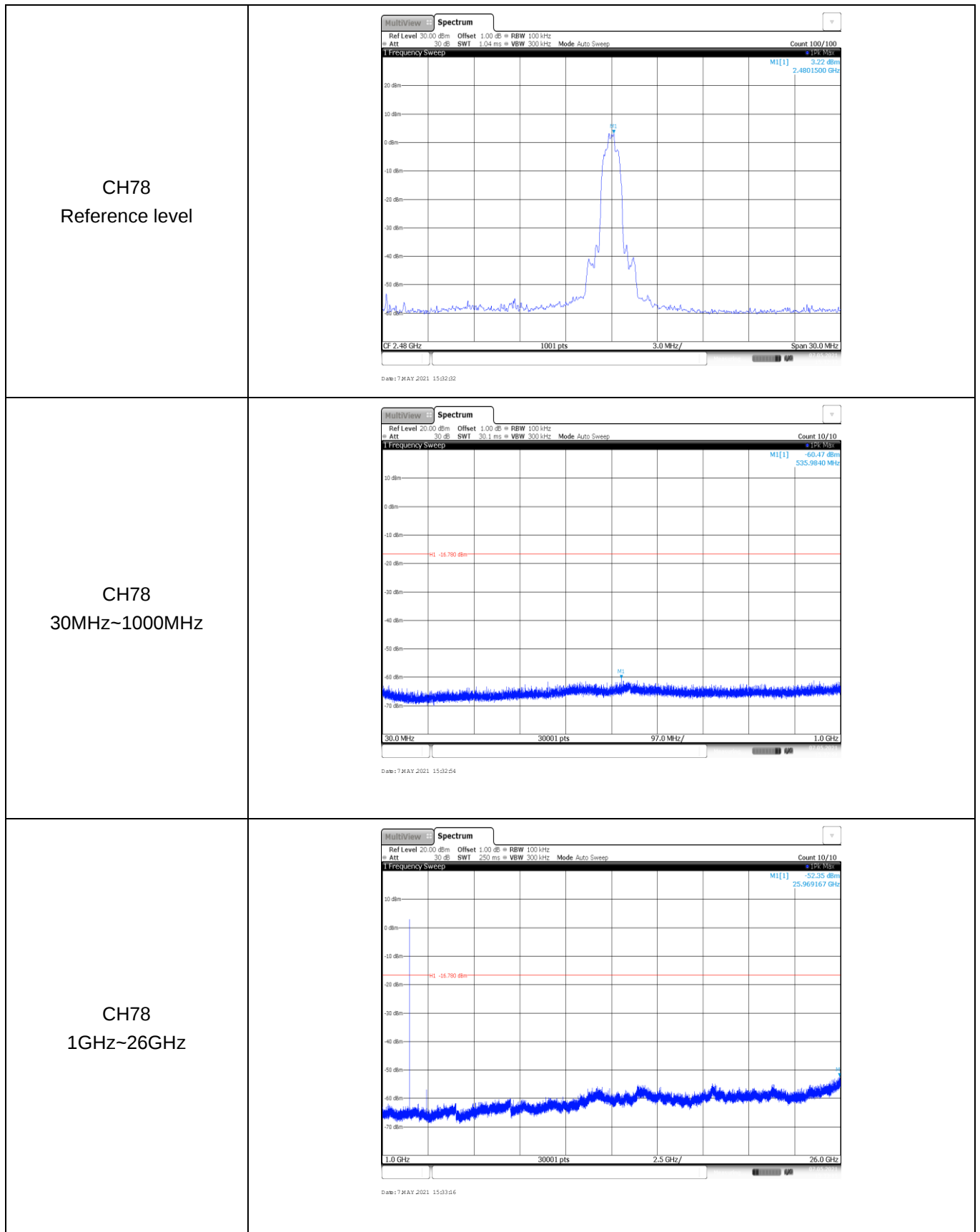
Test Item:	Spurious Emission	Modulation type:	$\pi/4$ DQPSK
CH00 Reference level	 CH00 Reference level		
CH00 30MHz~1000MHz	 CH00 30MHz~1000MHz		
CH00 1GHz~26GHz	 CH00 1GHz~26GHz		





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 SWI 1.04 ms VBW 300 kHz Mode Auto Sweep Count 100/100 M1[1] 1.40 dBm 2.4021500 GHz CF 2.402 GHz 1001 pts 3.0 MHz/ Span 30.0 MHz Date: 7 MAY 2021 15:22:24		
CH00 30MHz~1000MHz	 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 M1[1] -60.62 dBm 548.5930 MHz H1 -18.00 dBm 30.0 MHz 30001 pts 97.0 MHz/ 1.0 GHz Date: 7 MAY 2021 15:22:45		
CH00 1GHz~26GHz	 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 M1[1] -52.46 dBm 25.982500 GHz H1 -18.00 dBm 1.0 GHz 30001 pts 2.5 GHz/ 26.0 GHz Date: 7 MAY 2021 15:23:08		

CH39 Reference level	 The spectrum plot shows a single sharp peak at 2.441 GHz. The y-axis represents power in dBm, ranging from -80 to 20. The x-axis represents frequency in MHz, with a span of 30.0 MHz. The peak is labeled with a magnitude of 1.80 dBm. The plot is titled 'Spectrum' and includes parameters: Ref Level 30.00 dBm, Offset 1.00 dB, RBW 100 kHz, Att 30 dB, SWF 1.04 ms, VBW 300 kHz, Mode Auto Sweep, Count 100/100. The date is 7 MAY 2021 15:27:00.
CH39 30MHz~1000MHz	 The spectrum plot shows a wideband signal from 30 MHz to 1000 MHz. 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 is titled 'Spectrum' and includes parameters: Ref Level 20.00 dBm, Offset 1.00 dB, RBW 100 kHz, Att 30 dB, SWF 30.1 ms, VBW 300 kHz, Mode Auto Sweep, Count 10/10. The date is 7 MAY 2021 15:27:22.
CH39 1GHz~26GHz	 The spectrum plot shows a wideband signal from 1 GHz to 26 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 is titled 'Spectrum' and includes parameters: Ref Level 20.00 dBm, Offset 1.00 dB, RBW 100 kHz, Att 30 dB, SWF 250 ms, VBW 300 kHz, Mode Auto Sweep, Count 10/10. The date is 7 MAY 2021 15:27:44.



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