

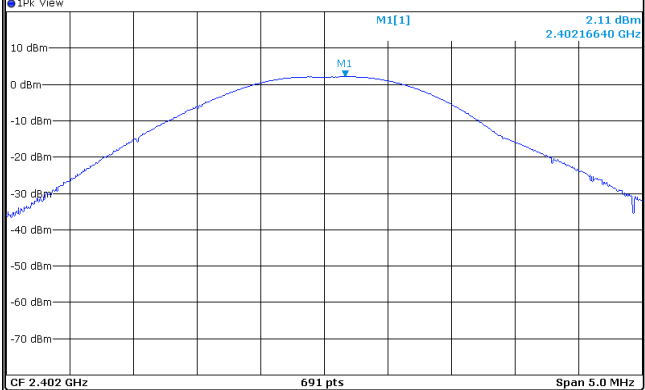
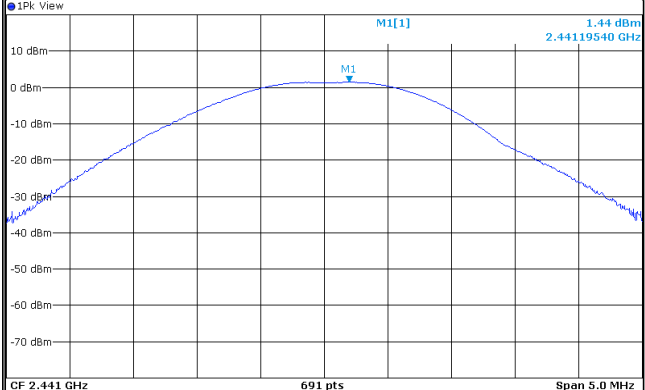
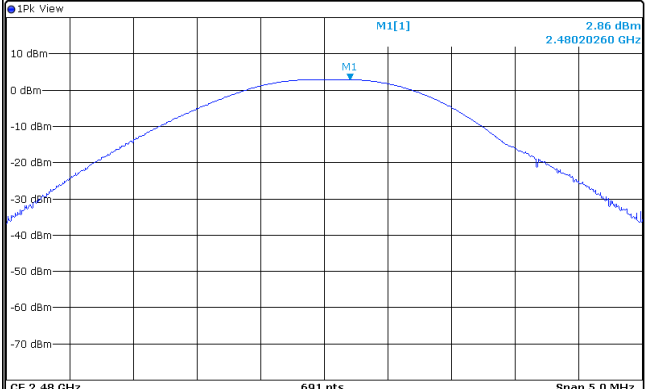
APPENDIX REPORT

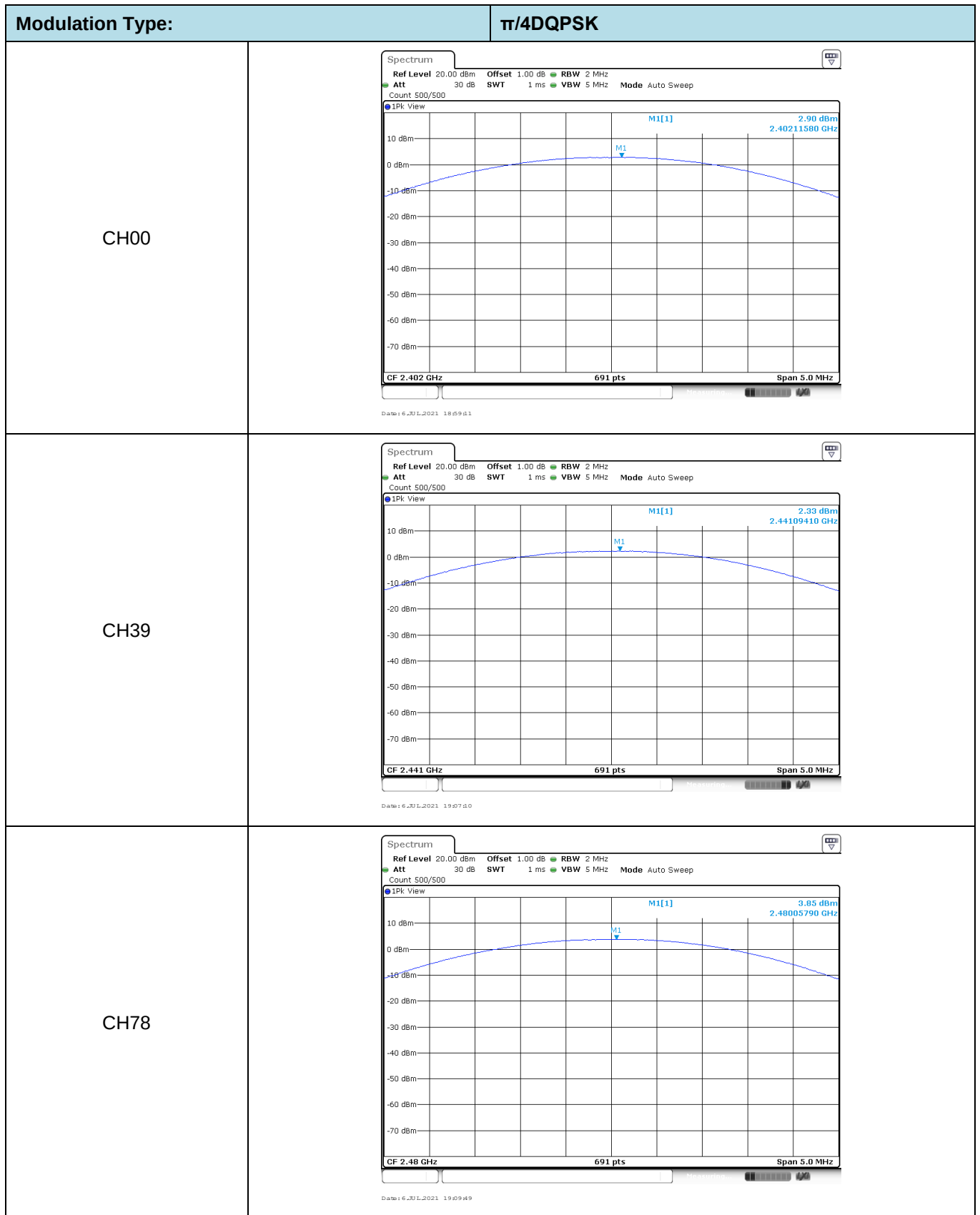
Project No.	SHT2107001003EW	Radio Specification	Bluetooth EDR
Test sample No.	YPHT21070010040	Model No.	E506
Start test date	2021/7/6	Finish date	2021/7/28
Temperature	24.1°C	Humidity	30%
Test Engineer	Jiongsheng.Feng	Auditor	Xiaodong Zheo

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	2.11	2.10	≤ 30.00	Pass
	39	1.44	1.43		
	78	2.86	2.84		
$\pi/4$ DQPSK	00	2.90	1.54	≤ 21.00	Pass
	39	2.33	0.62		
	78	3.85	2.49		
8DPSK	00	3.13	1.57	≤ 21.00	Pass
	39	2.57	0.60		
	78	4.17	2.71		

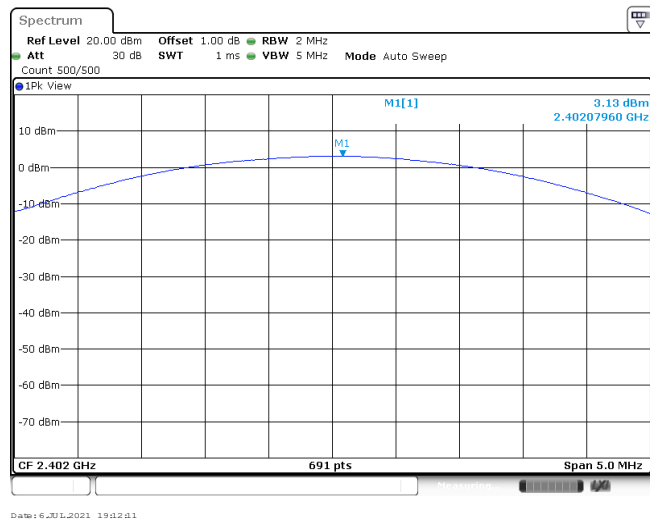
Modulation Type: GFSK	
CH00	Spectrum Ref Level 20.00 dBm Att 30 dB Count 300/300 Offset 1.00 dB SWT 1 ms RBW 1 MHz VBW 3 MHz Mode Auto Sweep 1Pk View M1[1] 2.11 dBm 2.40216640 GHz  CF 2.402 GHz691 ptsSpan 5.0 MHz Date: 6 JUL 2021 18:52:19
CH39	Spectrum Ref Level 20.00 dBm Att 30 dB Count 300/300 Offset 1.00 dB SWT 1 ms RBW 1 MHz VBW 3 MHz Mode Auto Sweep 1Pk View M1[1] 1.44 dBm 2.44119540 GHz  CF 2.441 GHz691 ptsSpan 5.0 MHz Date: 6 JUL 2021 18:54:45
CH78	Spectrum Ref Level 20.00 dBm Att 30 dB Count 300/300 Offset 1.00 dB SWT 1 ms RBW 1 MHz VBW 3 MHz Mode Auto Sweep 1Pk View M1[1] 2.86 dBm 2.48020260 GHz  CF 2.48 GHz691 ptsSpan 5.0 MHz Date: 6 JUL 2021 18:57:11



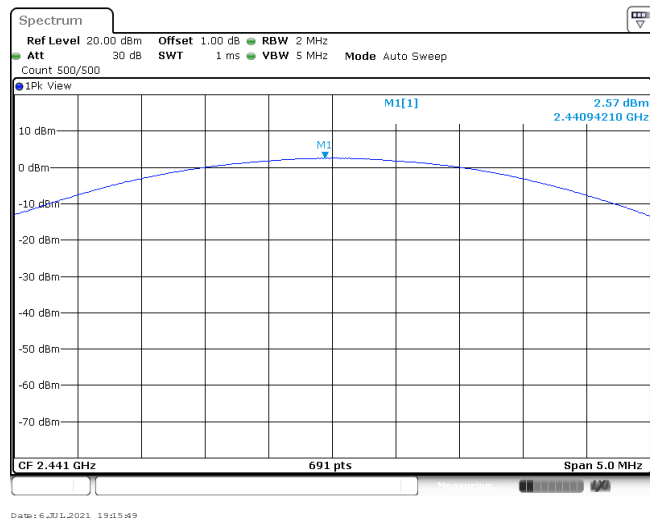
Modulation Type:

8DPSK

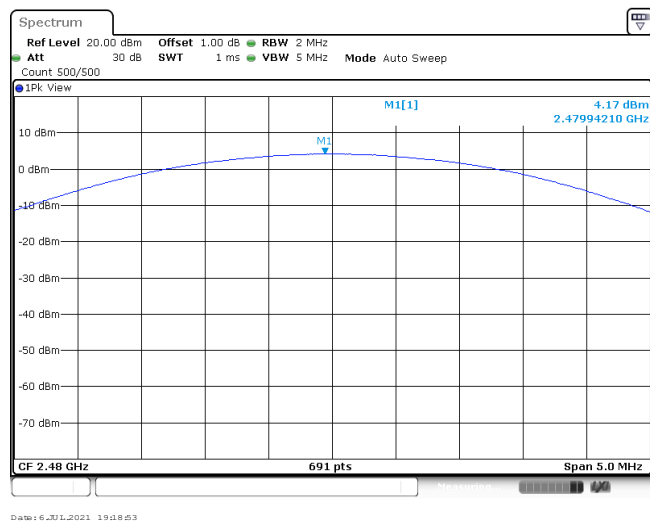
CH00



CH39



CH78



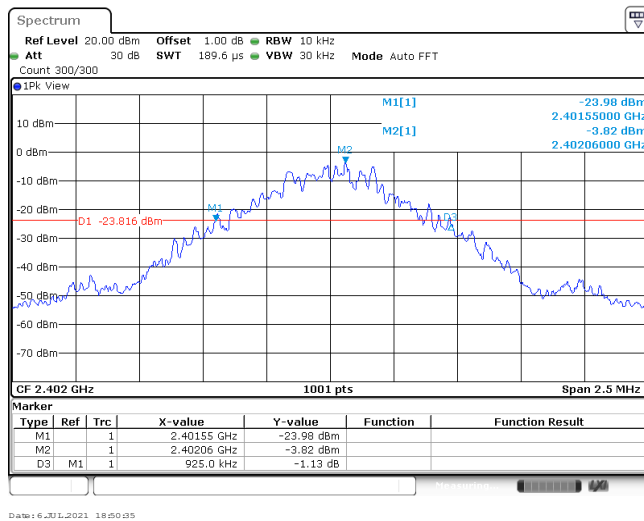
Appendix B : 20 dB Bandwidth

Modulation type	Channel	20 dB Bandwidth (kHz)	Limit (kHz)	Result
GFSK	00	925.00	-	Pass
	39	927.50		
	78	925.00		
$\pi/4$ DQPSK	00	1290.00	-	Pass
	39	1290.00		
	78	1290.00		
8DPSK	00	1297.50	-	Pass
	39	1300.00		
	78	1297.50		

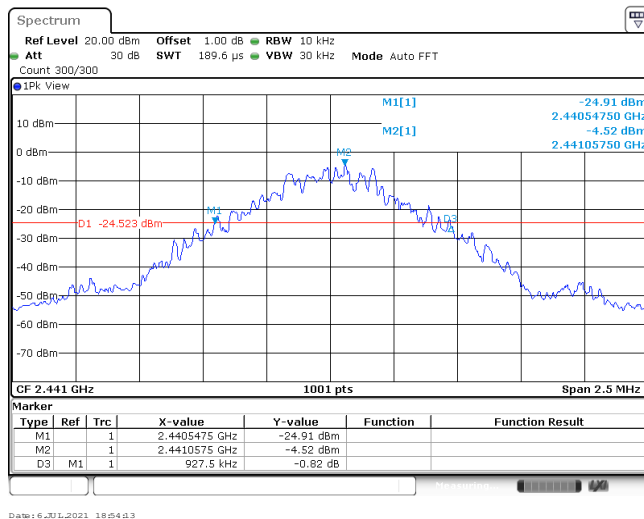
Modulation Type:

GFSK

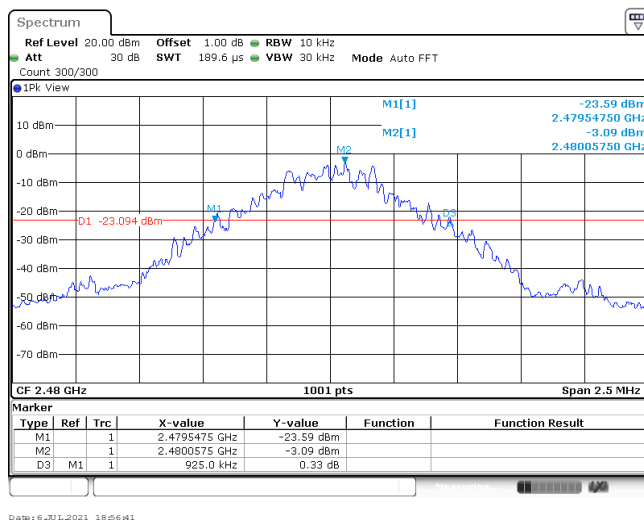
CH00



CH39



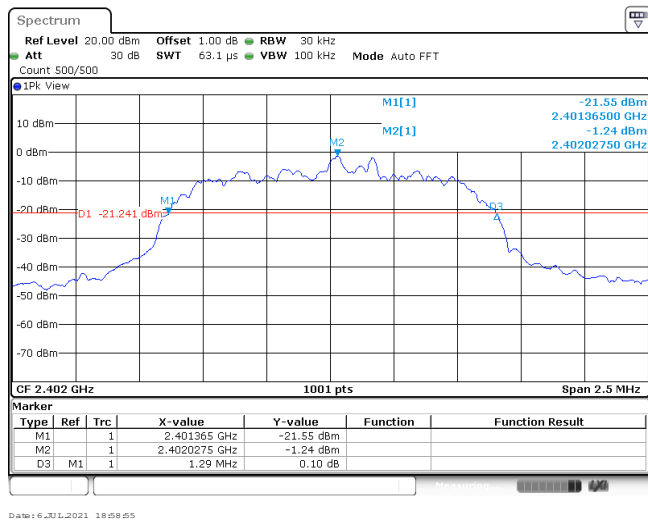
CH78



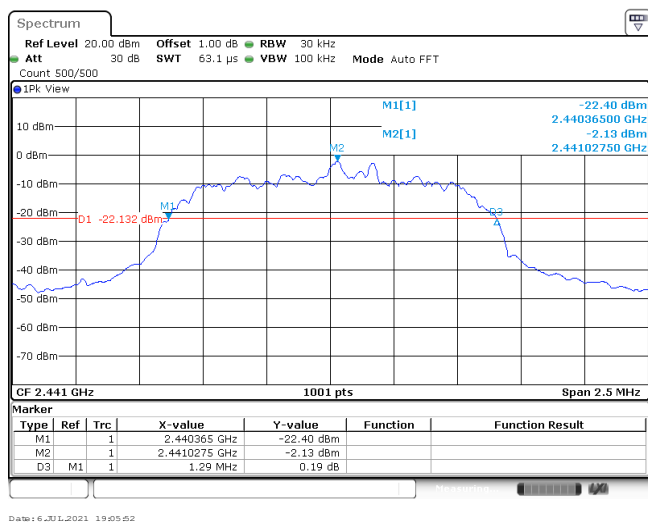
Modulation Type:

 $\pi/4$ DQPSK

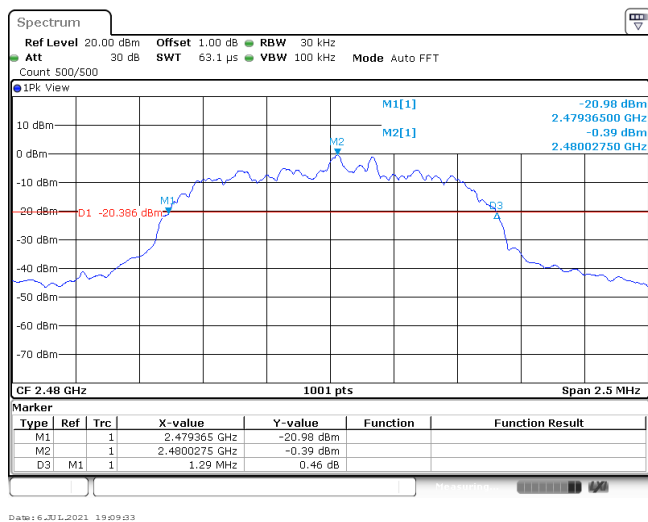
CH00



CH39



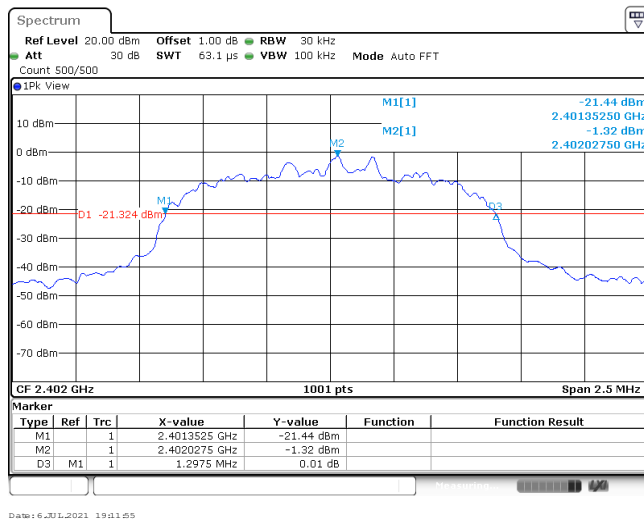
CH78



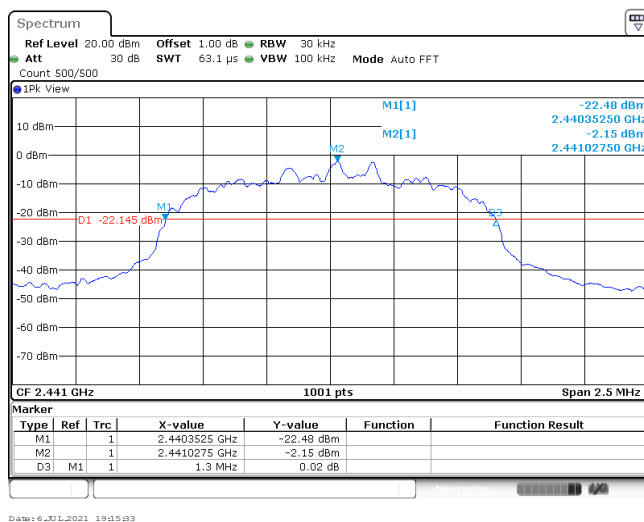
Modulation Type:

8DPSK

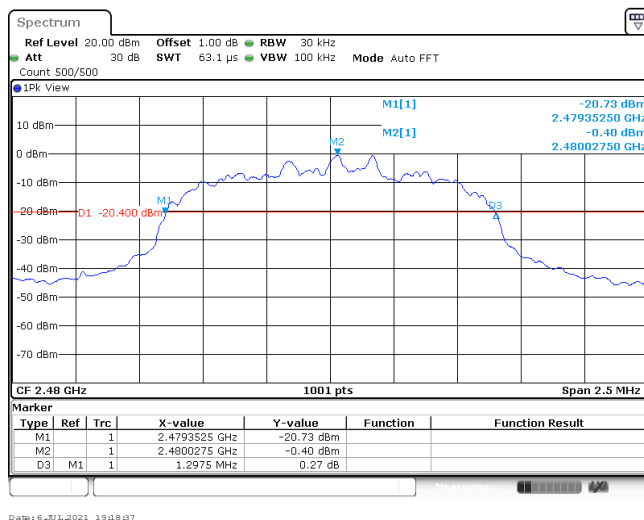
CH00



CH39

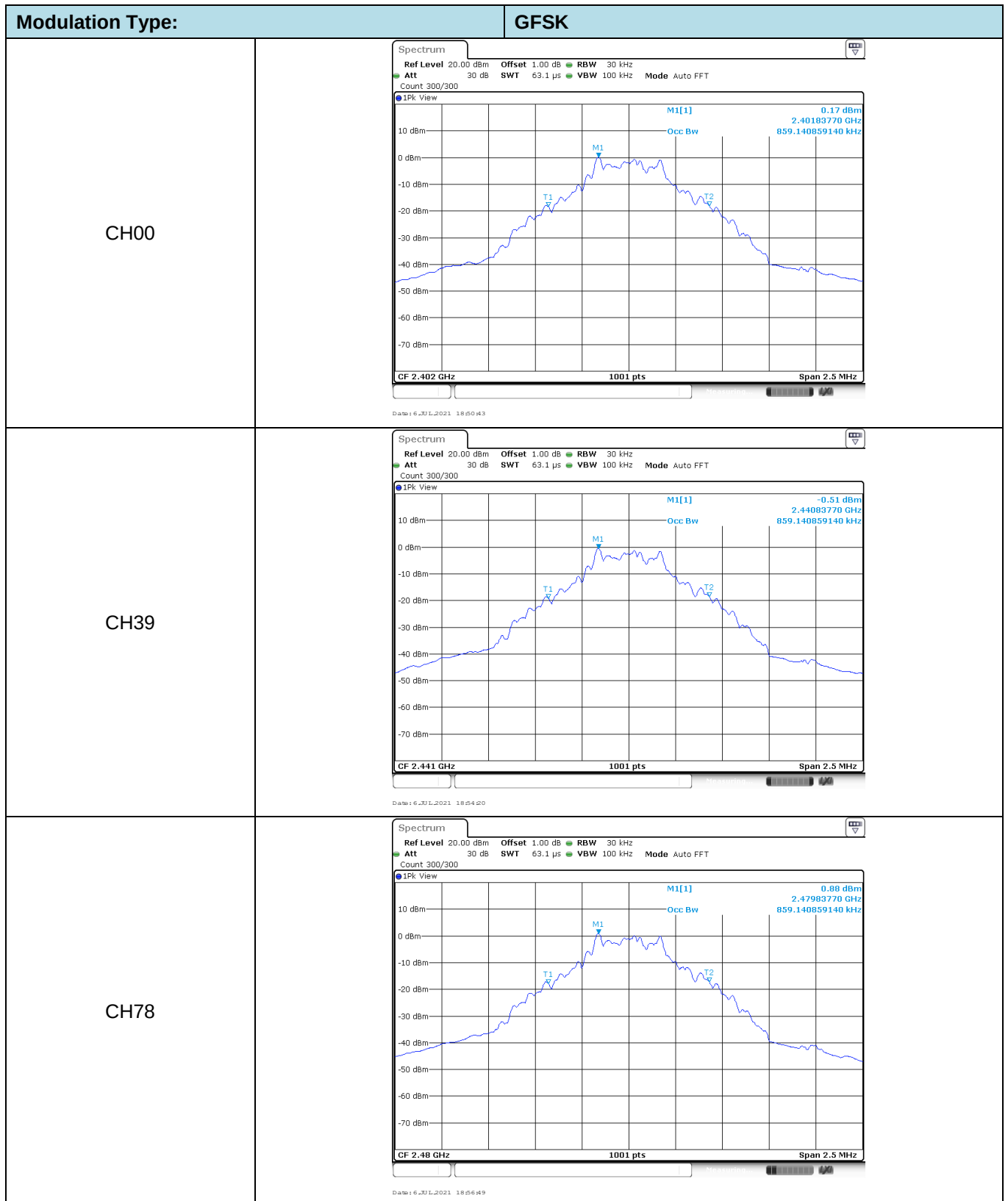


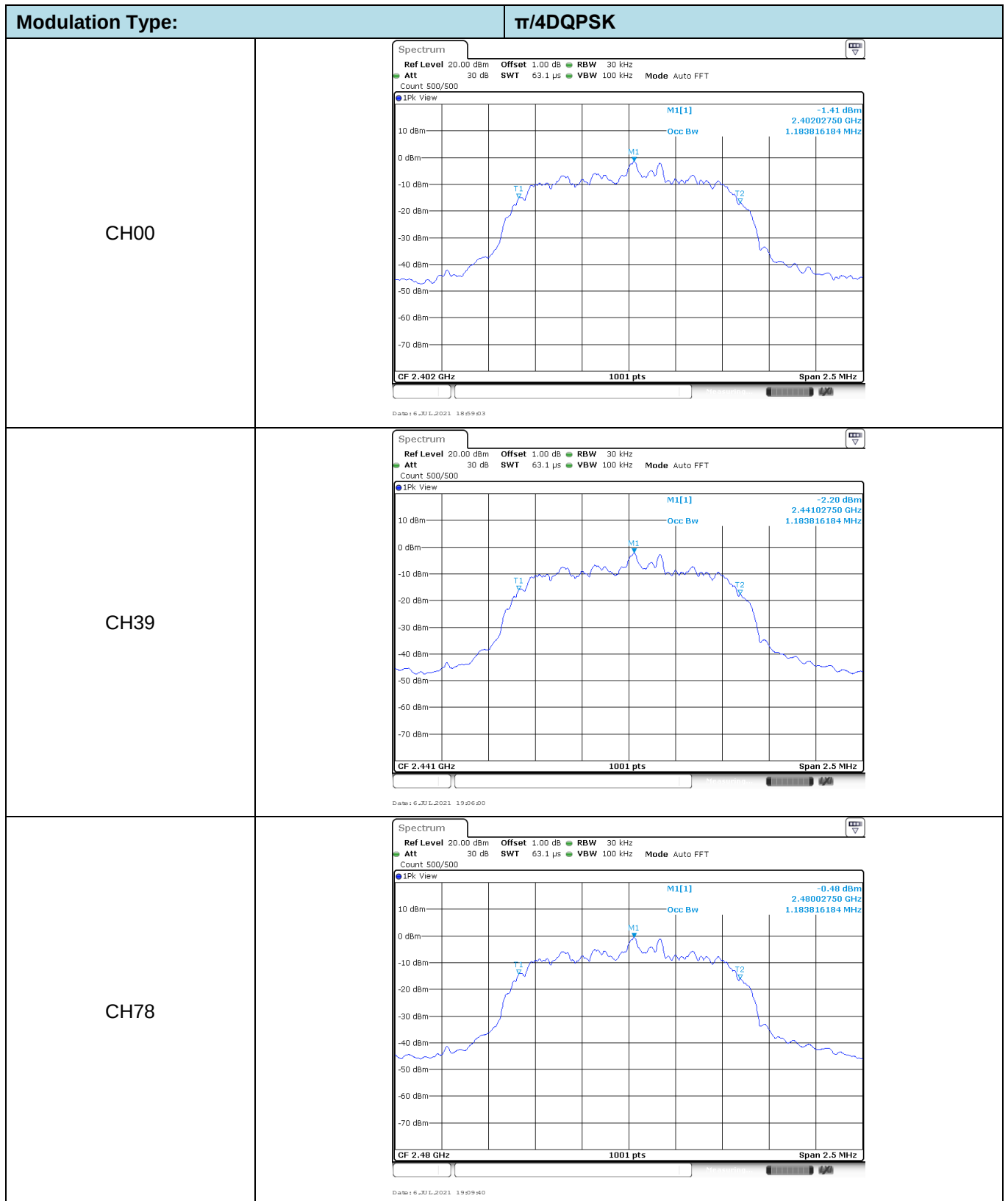
CH78

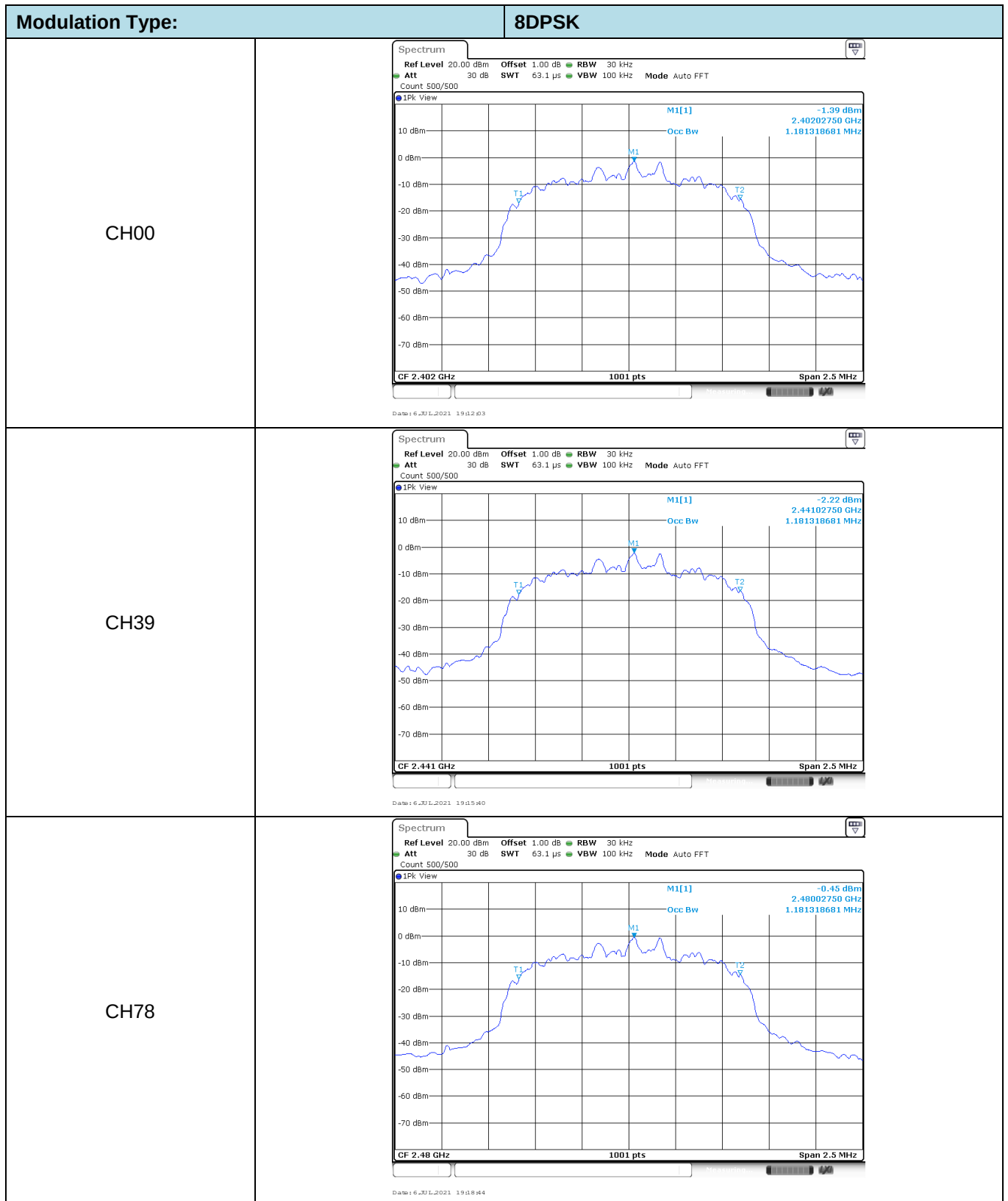


Appendix C: 99% Occupied Bandwidth

Modulation type	Channel	99% Occupied Bandwidth (MHz)	Limit (MHz)	Result
GFSK	00	0.86	-	Pass
	39	0.86		
	78	0.86		
$\pi/4$ DQPSK	00	1.18	-	Pass
	39	1.18		
	78	1.18		
8DPSK	00	1.18	-	Pass
	39	1.18		
	78	1.18		







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	≥860.00	Pass
8DPSK	39	1.00	≥866.67	Pass

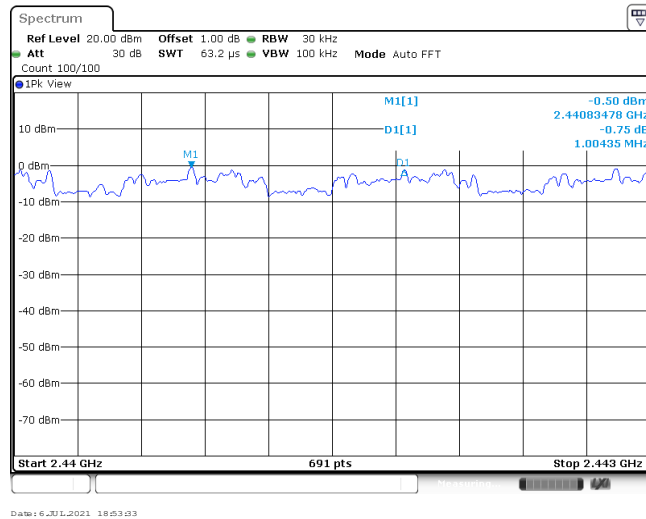
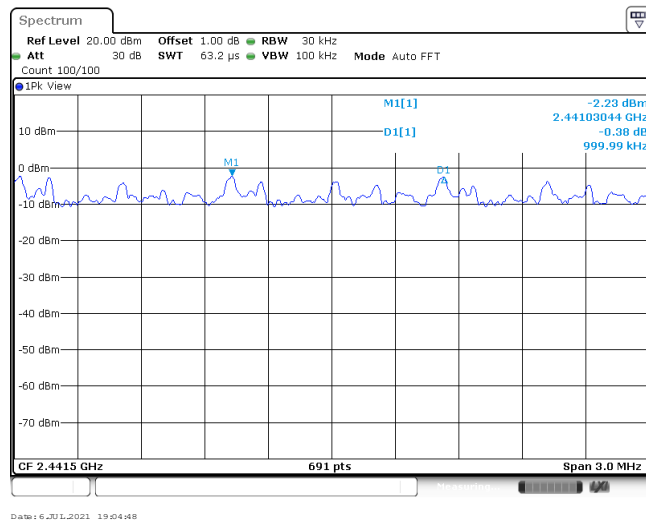
Note:

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

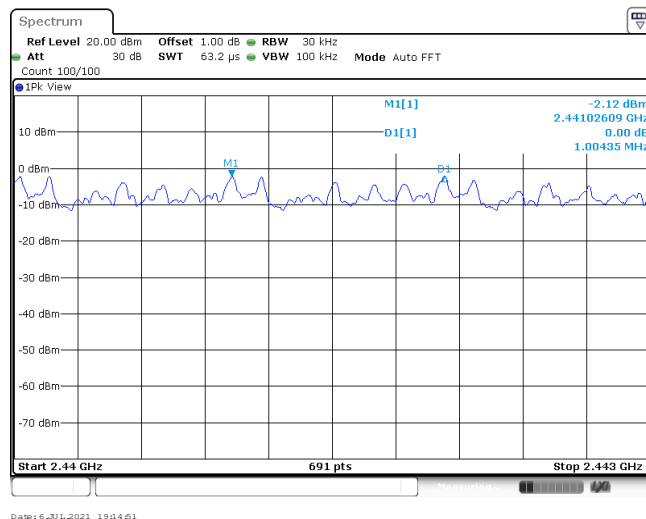
π/4DQPSK limit = 2/3 * The maximum 20 dB Bandwidth for π/4DQPSK modulation on the appendix B.

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

GFSK

 $\pi/4$ DQPSK

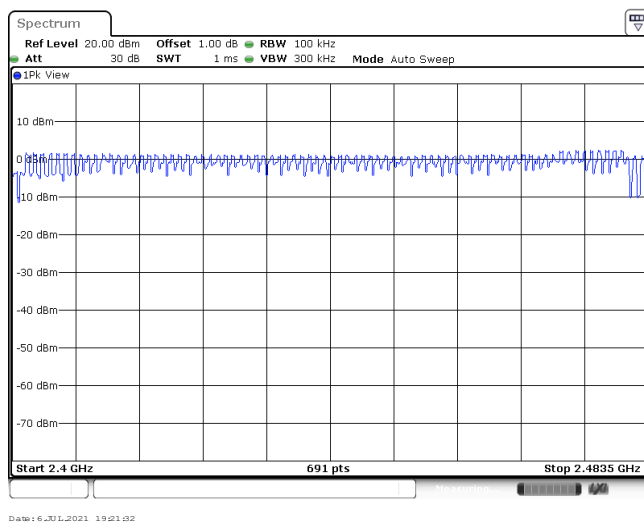
8DPSK



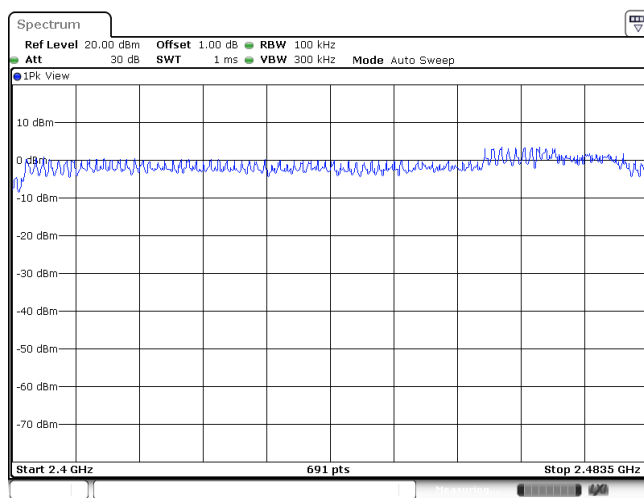
Appendix E: Hopping Channel Number

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

GFSK

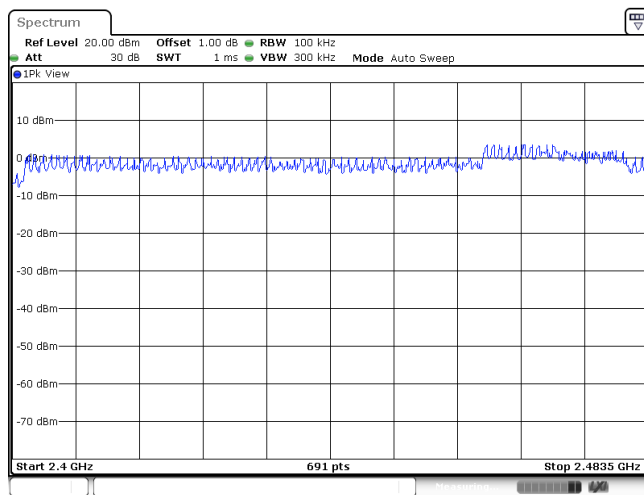


Date: 6 JUL 2021 19:21:52

 $\pi/4$ DQPSK

Date: 6 JUL 2021 19:27:27

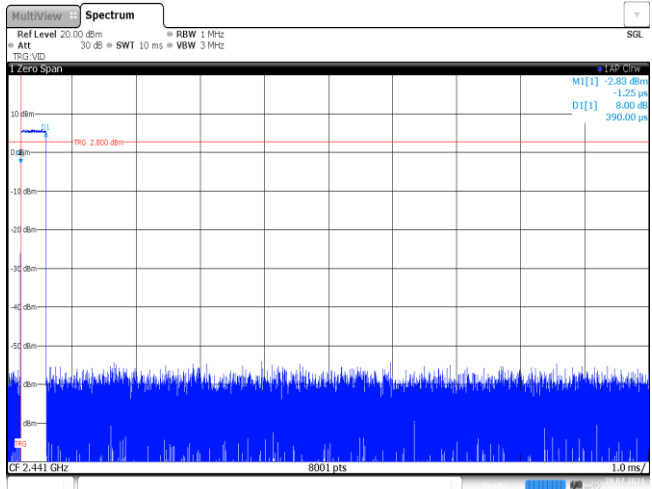
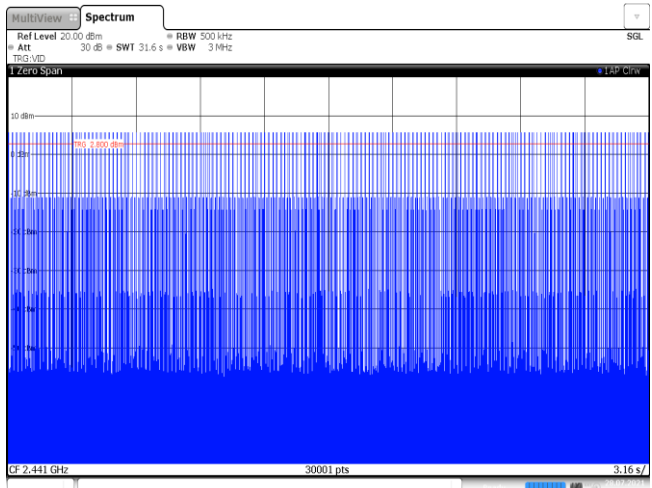
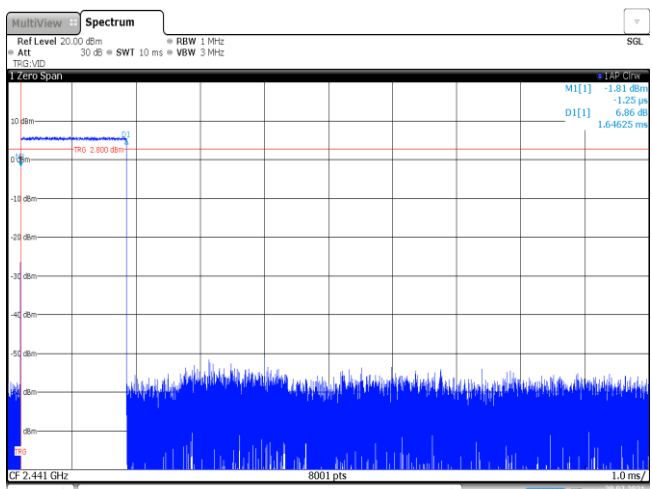
8DPSK



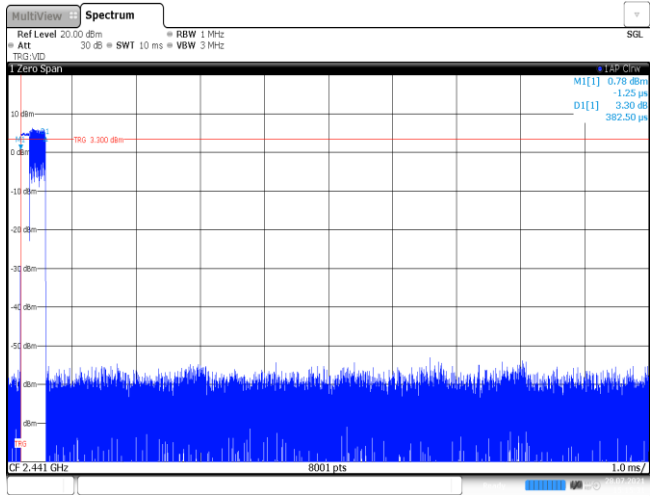
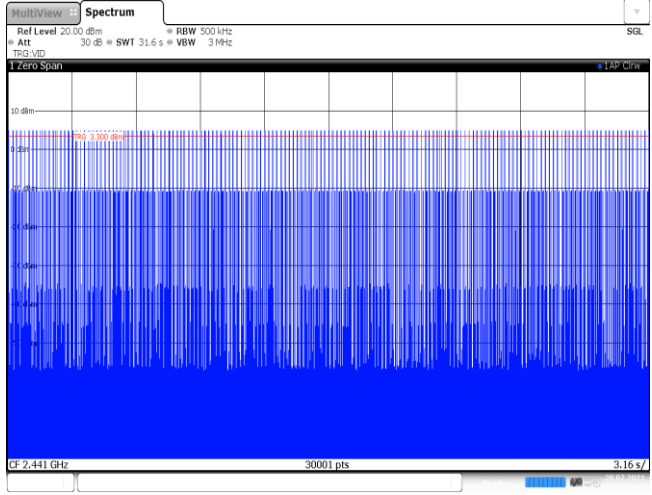
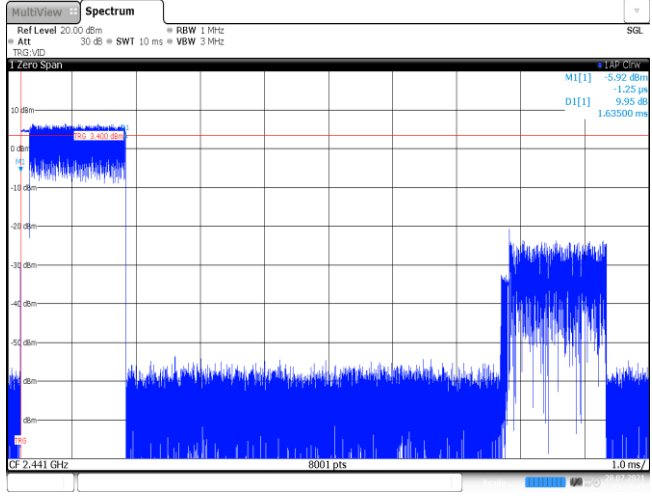
Date: 6 JUL 2021 19:30:40

Appendix F: Dwell Time

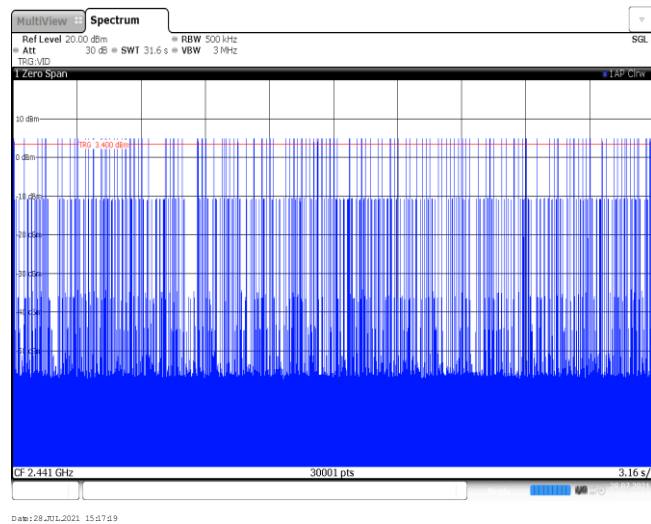
Modulation type	Packet	Burst Width [ms]	Total Hops[hop*ch]	Dwell time (Second)	Limit (Second)	Result
GFSK	DH1	0.39	319	0.12	≤ 0.40	Pass
	DH3	1.65	161	0.27		
	DH5	2.91	117	0.34		
$\pi/4$ DQPSK	2DH1	0.38	319	0.12	≤ 0.40	Pass
	2DH3	1.64	157	0.26		
	2DH5	2.88	107	0.31		
8DPSK	3DH1	0.38	321	0.12	≤ 0.40	Pass
	3DH3	1.63	155	0.25		
	3DH5	2.88	101	0.29		

Modulation Type:	GFSK
DH1 Burst width	 The spectrum plot shows a single burst of signal at 2.441 GHz. The y-axis represents power in dBm, ranging from -50 to 10. The x-axis represents frequency in MHz, ranging from 2.440 to 2.442. A red line indicates the signal level at approximately -2.83 dBm. The plot shows a sharp peak at the center frequency, with a bandwidth of approximately 1.25 MHz. The signal is identified as a GFSK burst.
DH1 Burst number	 The spectrum plot shows a continuous burst of signal at 2.441 GHz. The y-axis represents power in dBm, ranging from -50 to 10. The x-axis represents frequency in MHz, ranging from 2.440 to 2.442. A red line indicates the signal level at approximately -2.83 dBm. The plot shows a dense, continuous signal across the entire frequency range, indicating a high data rate or a long burst.
DH3 Burst width	 The spectrum plot shows a single burst of signal at 2.441 GHz. The y-axis represents power in dBm, ranging from -50 to 10. The x-axis represents frequency in MHz, ranging from 2.440 to 2.442. A red line indicates the signal level at approximately -1.81 dBm. The plot shows a sharp peak at the center frequency, with a bandwidth of approximately 1.25 MHz. The signal is identified as a GFSK burst.

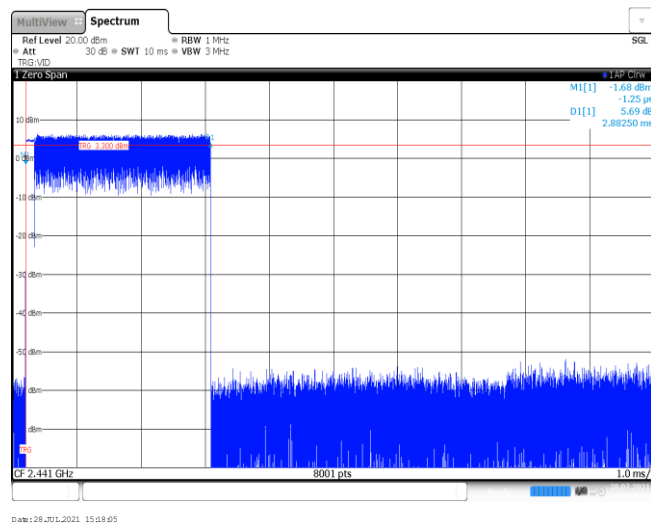
DH3 Burst number	
DH5 Burst width	
DH5 Burst number	

Modulation Type:	$\pi/4$ DQPSK
2DH1 Burst width	 The spectrum plot shows a single burst of signal at 2.441 GHz. The y-axis represents power in dBm, ranging from -50 to 10. The x-axis represents time in ms, ranging from 0 to 1.0. A red horizontal line indicates a threshold at -30.00 dBm. The signal is visible as a blue trace above this threshold. The plot is titled 'Spectrum' and includes parameters: Ref Level 20.00 dBm, Att 30 dB, RBW 1 MHz, VSW 3 MHz, and 8001 pts. The date is 28 JUL 2021 15:15:01.
2DH1 Burst number	 The spectrum plot shows multiple bursts of signal at 2.441 GHz. The y-axis represents power in dBm, ranging from -50 to 10. The x-axis represents time in ms, ranging from 0 to 3.16. A red horizontal line indicates a threshold at -30.00 dBm. The signal is visible as a blue trace above this threshold. The plot is titled 'Spectrum' and includes parameters: Ref Level 20.00 dBm, Att 30 dB, RBW 500 kHz, VSW 3 MHz, and 30001 pts. The date is 28 JUL 2021 15:16:05.
2DH3 Burst width	 The spectrum plot shows a single burst of signal at 2.441 GHz. The y-axis represents power in dBm, ranging from -50 to 10. The x-axis represents time in ms, ranging from 0 to 1.0. A red horizontal line indicates a threshold at -30.00 dBm. The signal is visible as a blue trace above this threshold. The plot is titled 'Spectrum' and includes parameters: Ref Level 20.00 dBm, Att 30 dB, RBW 1 MHz, VSW 3 MHz, and 8001 pts. The date is 28 JUL 2021 15:16:45.

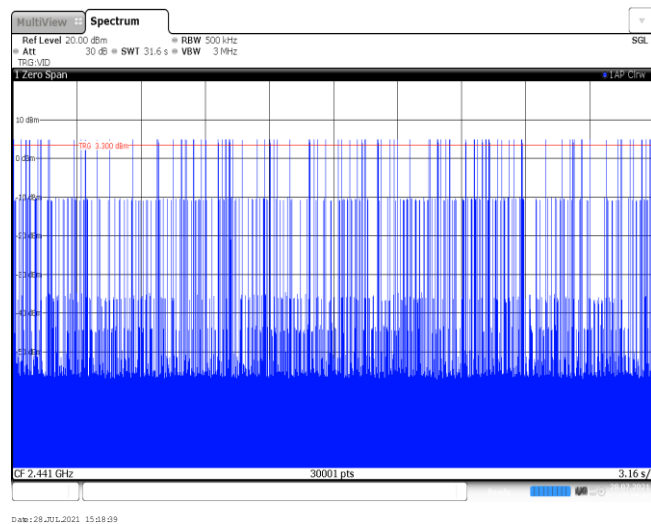
2DH3
Burst number



2DH5
Burst width

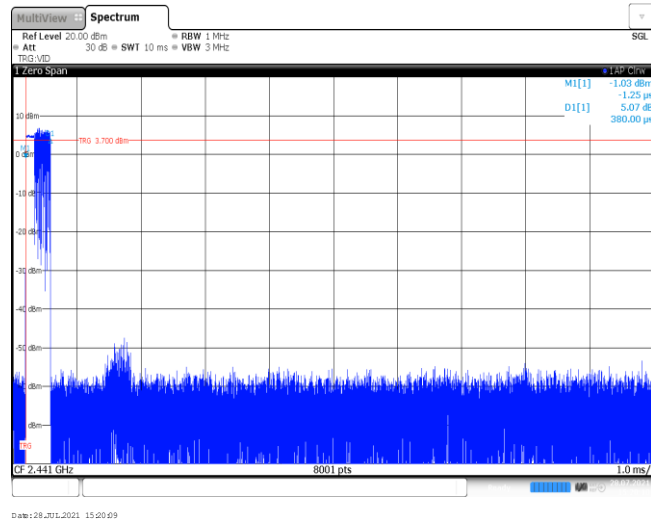
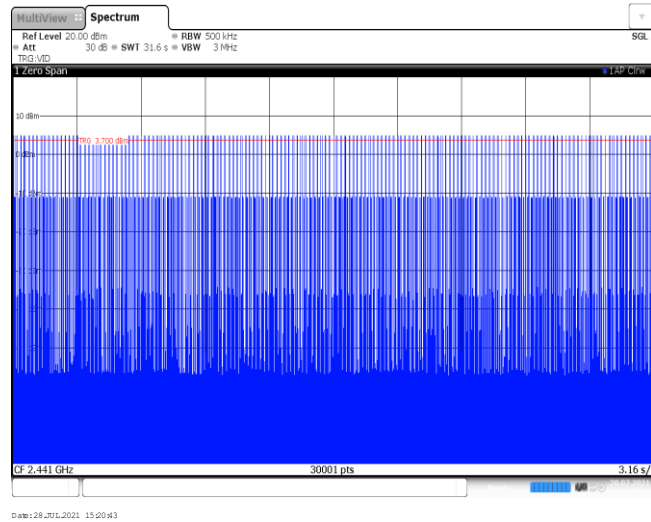
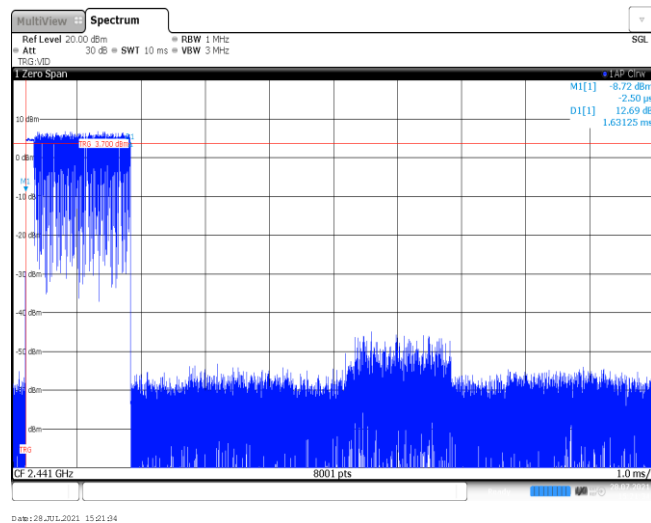


2DH5
Burst number



Modulation Type:

8DPSK

3DH1
Burst width3DH1
Burst number3DH3
Burst width

MultiView Spectrum

Ref Level 20.00 dBm RBW 500 kHz
 Att 30 dB SWT 31.6 s VBW 3 kHz
 TRG_VID SGL

1 Zero Span 14P CW

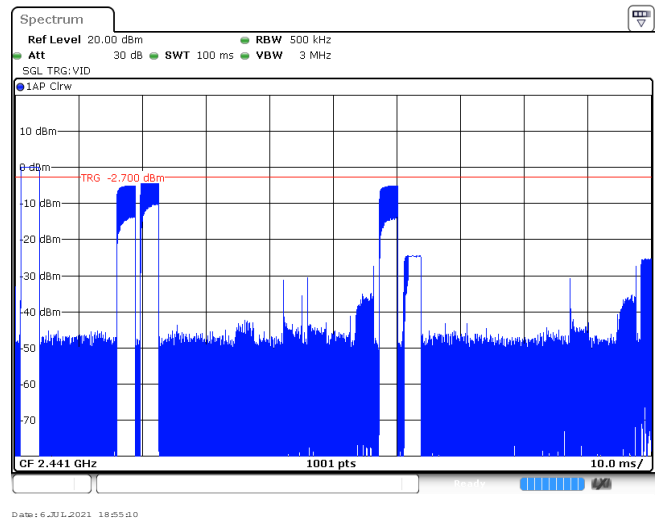
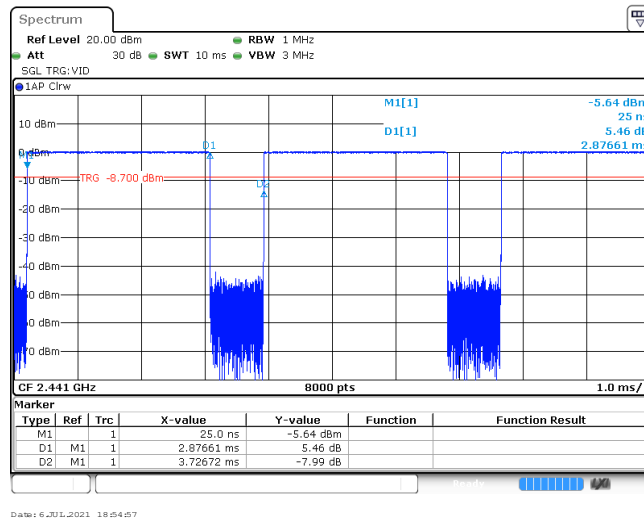
CF 2.441 GHz 30001 pts 3.16 s

Date: 28.11.2021 15:03:42

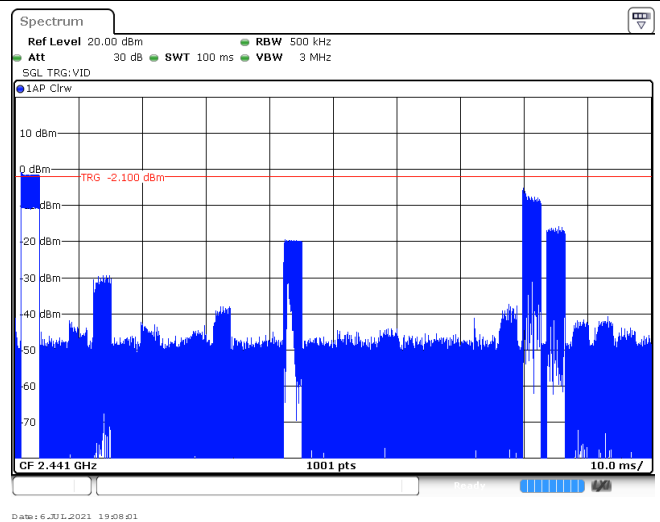
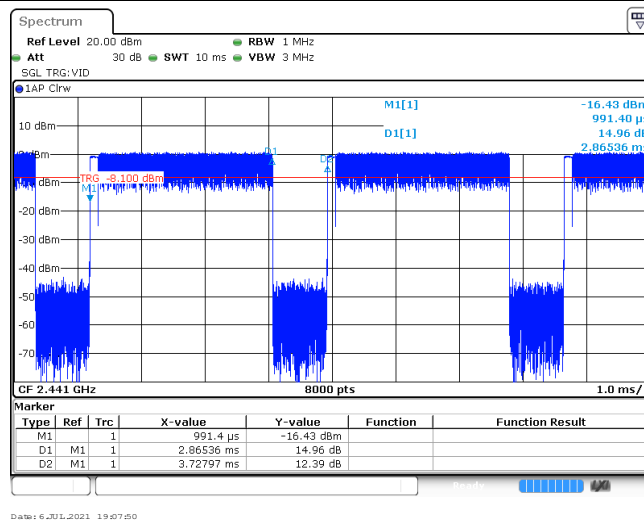
Appendix G: Duty Cycle Correction Factor (DCCF)

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	4	-18.77
$\pi/4$ DQPSK	2441	2.87	100	4	-18.80
8DPSK	2441	2.86	100	4	-18.83

GFSK

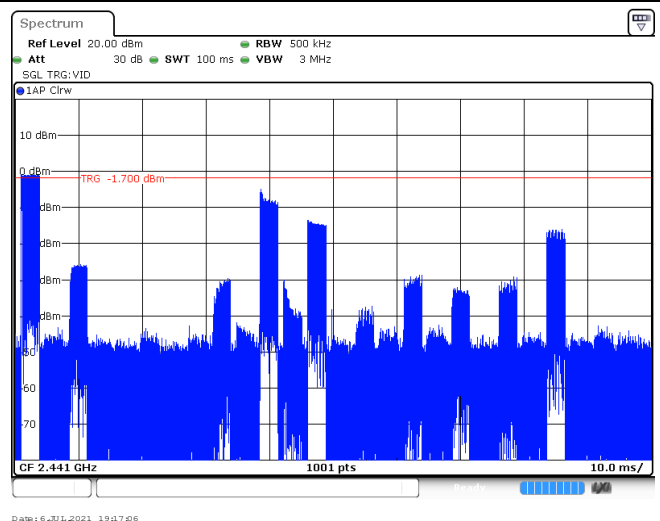
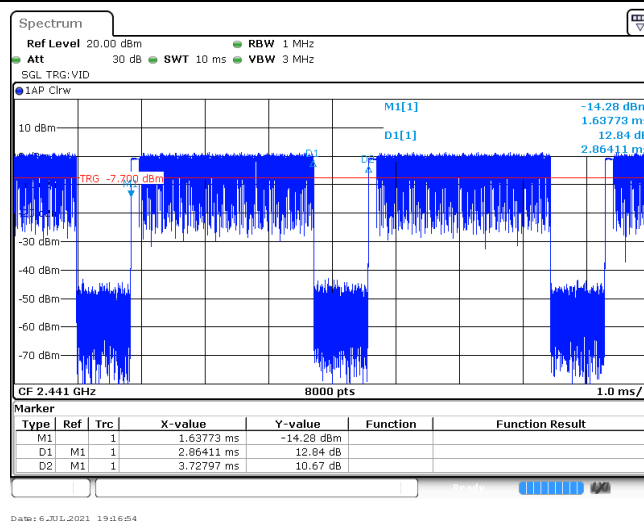
T_{on} time for single burst

Burst Quantity

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

Burst Quantity

8DPSK

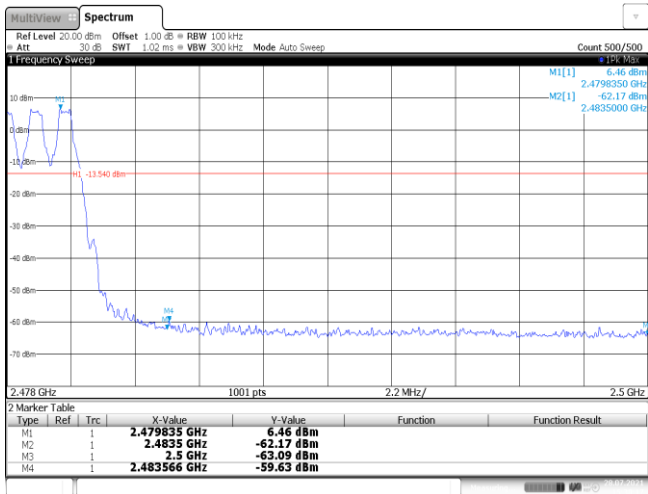
T_{on} time for single burst

Burst Quantity

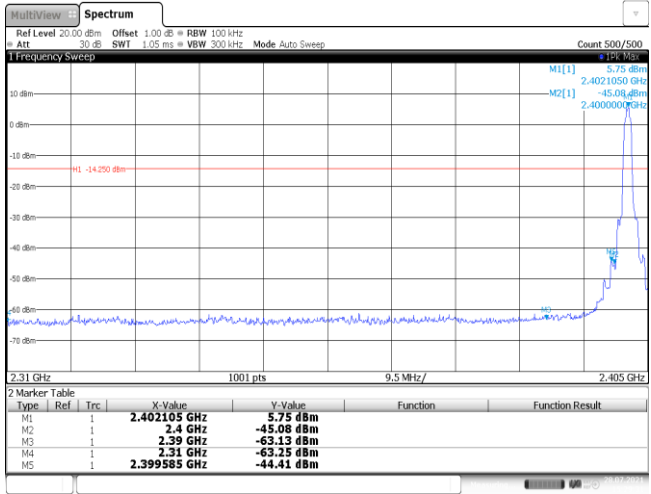
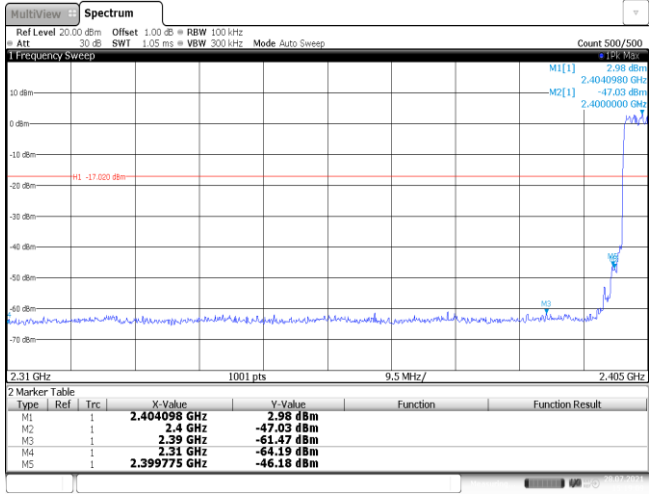
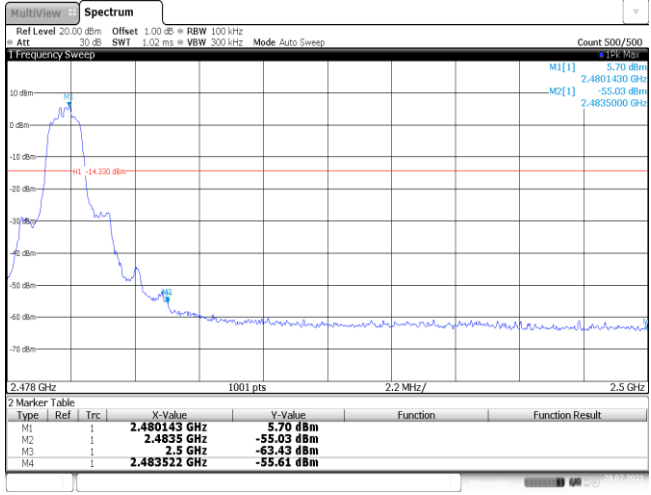
Appendix H: Band edge and Spurious Emissions (conducted)

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

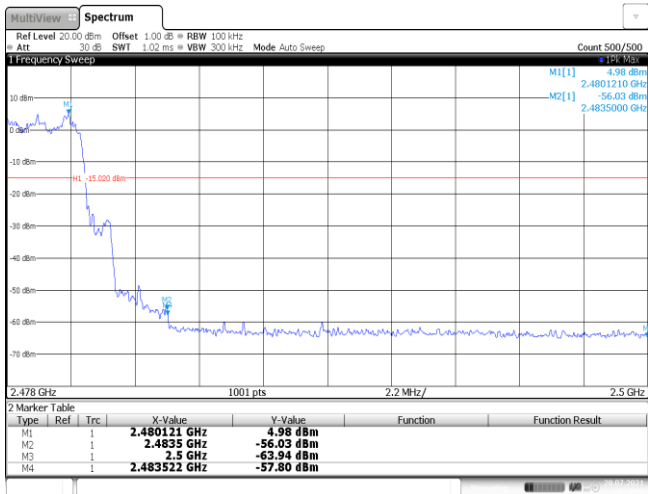
CH78
Hopping mode



Date: 28 Jul 2021 15:08:17

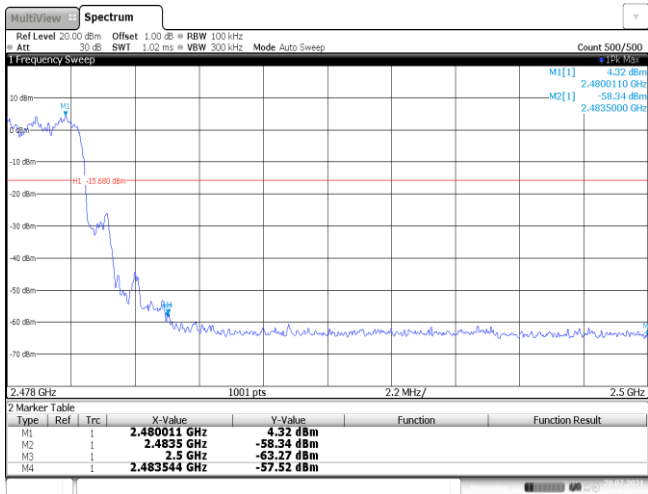
Test Item:	Band edge	Modulation type:	$\pi/4$ DQPSK
CH00 No hopping mode			
CH00 Hopping mode			
CH78 No hopping mode			

CH78
Hopping mode

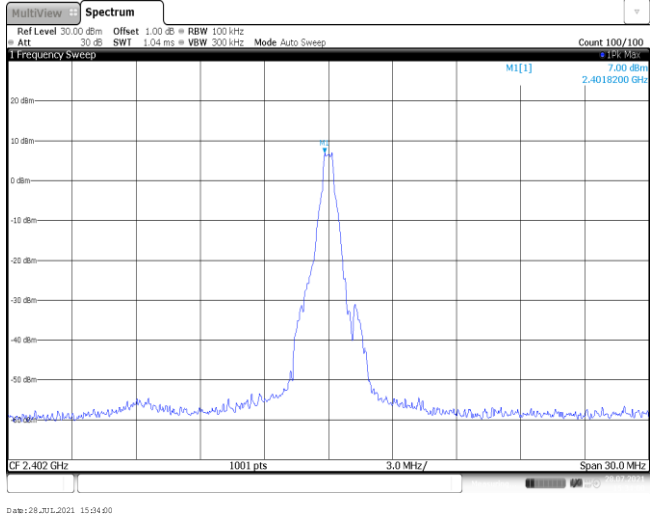
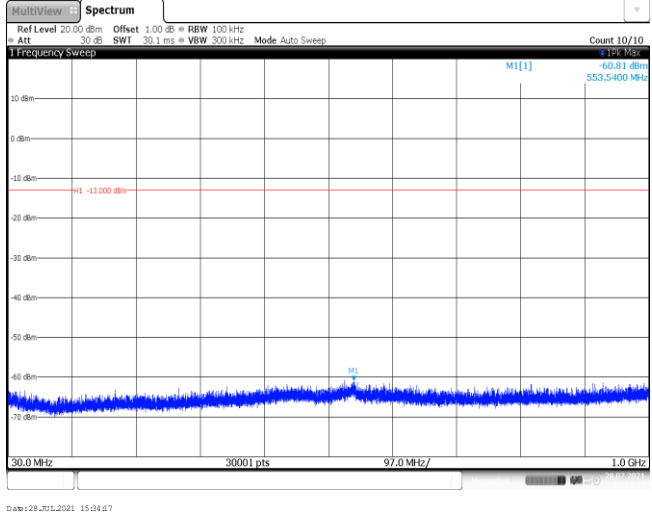
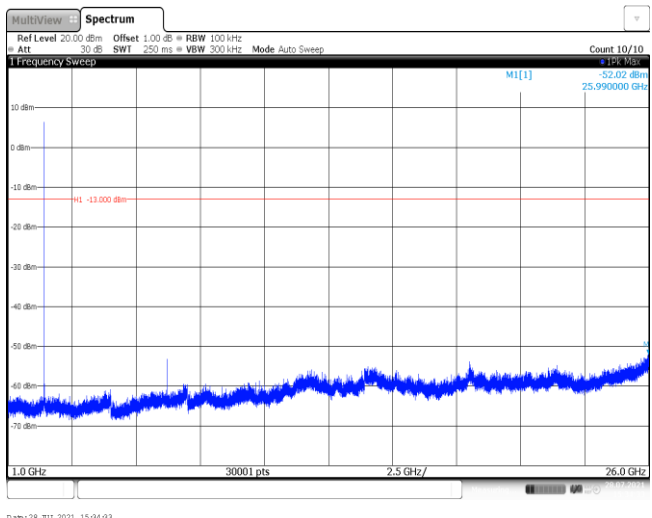


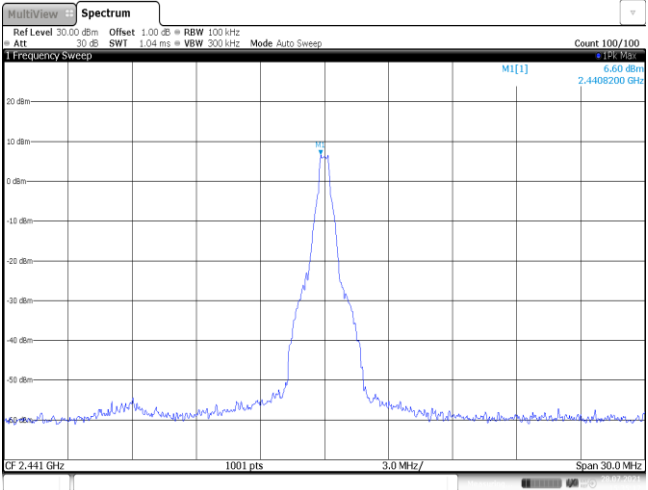
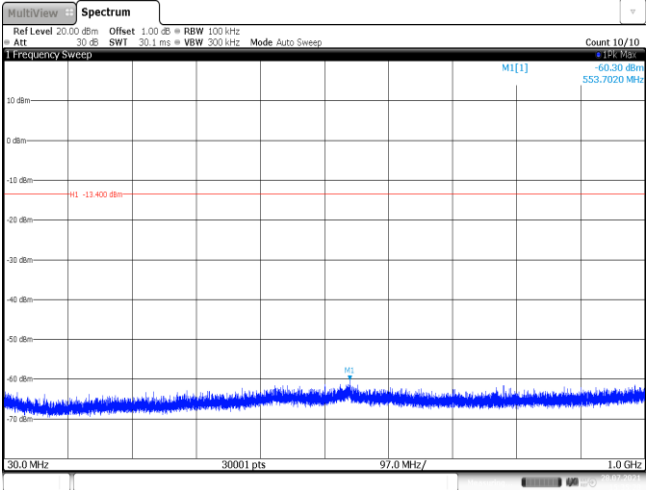
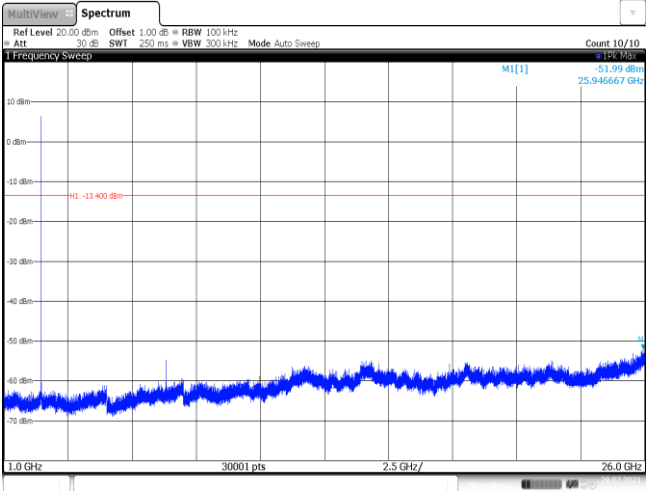
Test Item:	Band edge	Modulation type:	8DPSK
CH00 No hopping mode	</		

CH78
Hoppig mode

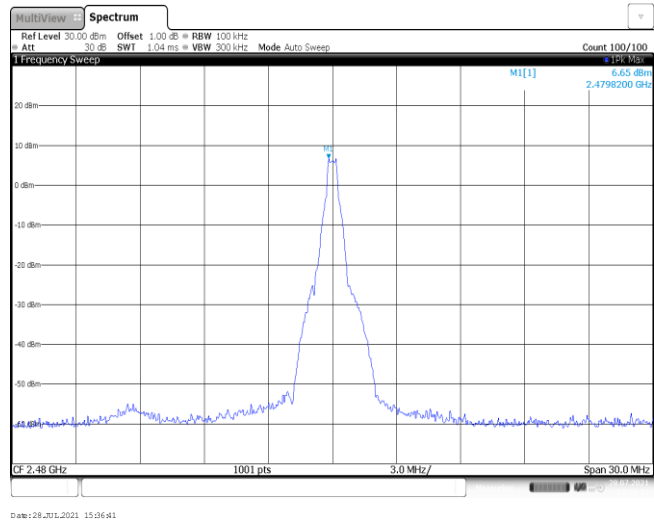


Date: 28 Jul 2021 15:24:45

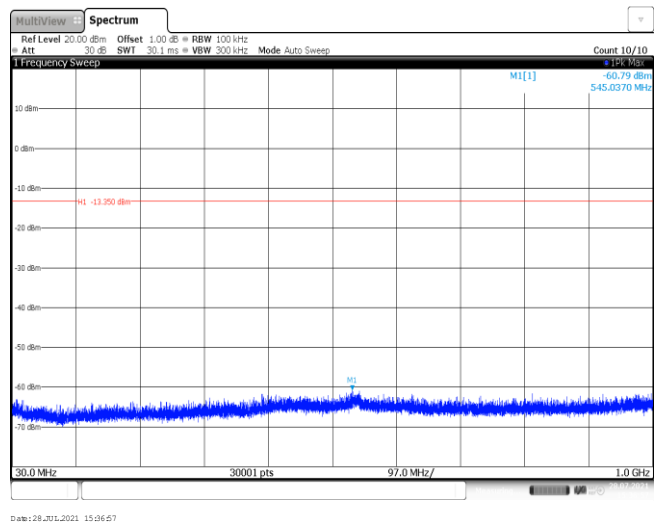
Test Item:	Spurious Emission	Modulation type:	GFSK
CH00 Reference level	 The spectrum plot shows a single sharp peak at 2.4018200 GHz. The y-axis represents power in dBm, ranging from -70 to 20. The x-axis represents frequency in MHz, ranging from 2.402 to 2.403. The peak is labeled M1[1] with a value of -60.81 dBm. The plot is titled 'Spectrum' and includes parameters: Ref Level 30.00 dBm, Att 30 dB, Offset 1.00 dB, RBW 100 kHz, SWI 1.04 ms, VBW 300 kHz, Mode Auto Sweep, Count 100/100. The date is 28-Jul-2021 15:34:00.		
CH00 30MHz~1000MHz	 The spectrum plot shows a flat noise floor across the 30.0 MHz to 1000 MHz range. The y-axis represents power in dBm, ranging from -70 to 20. The x-axis represents frequency in MHz, ranging from 30.0 to 1000.0. The plot is titled 'Spectrum' and includes parameters: Ref Level 20.00 dBm, Att 30 dB, Offset 1.00 dB, RBW 100 kHz, SWI 30.1 ms, VBW 300 kHz, Mode Auto Sweep, Count 10/10. The date is 28-Jul-2021 15:34:17.		
CH00 1GHz~26GHz	 The spectrum plot shows a flat noise floor across the 1.0 GHz to 26.0 GHz range. The y-axis represents power in dBm, ranging from -70 to 20. The x-axis represents frequency in GHz, ranging from 1.0 to 26.0. The plot is titled 'Spectrum' and includes parameters: Ref Level 20.00 dBm, Att 30 dB, Offset 1.00 dB, RBW 100 kHz, SWI 250 ms, VBW 300 kHz, Mode Auto Sweep, Count 10/10. The date is 28-Jul-2021 15:34:03.		

CH39 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] 6.60 dBm 2.4408200 GHz CF 2.441 GHz 1001 pts 3.0 MHz/ Span 30.0 MHz Date: 28-Jul-2021 15:35:12
CH39 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] -63.30 dBm 553.7020 MHz M1 -13.400 dBm 30.0 MHz 30001 pts 97.0 MHz/ 1.0 GHz Date: 28-Jul-2021 15:35:28
CH39 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] -51.99 dBm 25.946667 GHz M1 -13.400 dBm 1.0 GHz 30001 pts 2.5 GHz/ 26.0 GHz Date: 28-Jul-2021 15:35:45

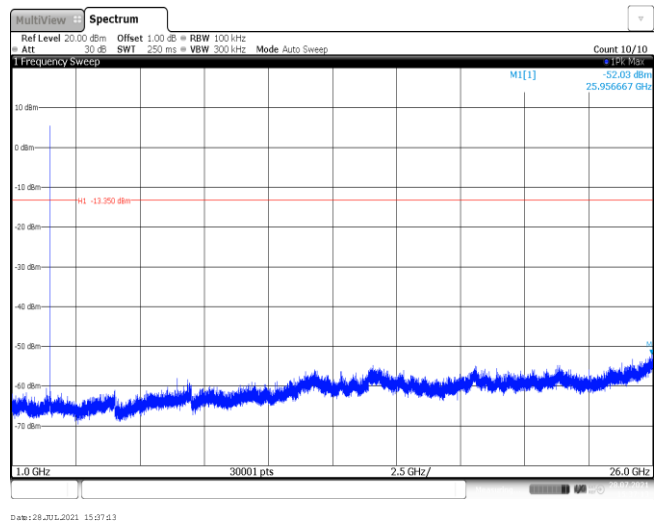
CH78
Reference level

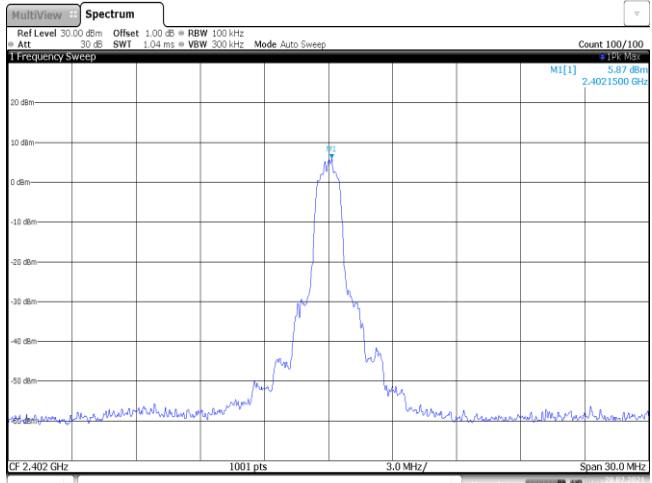
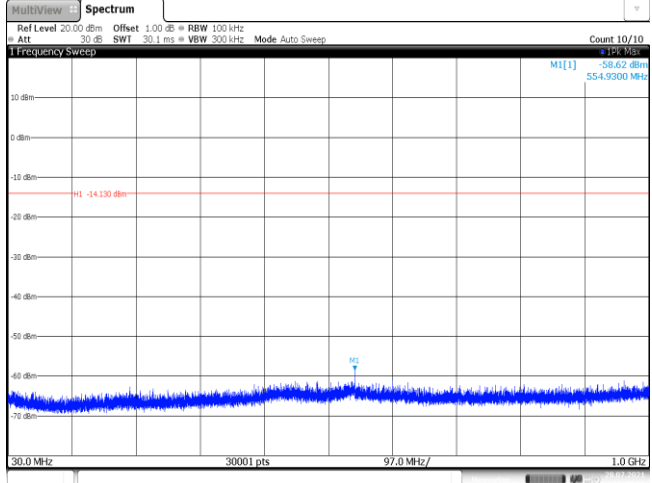
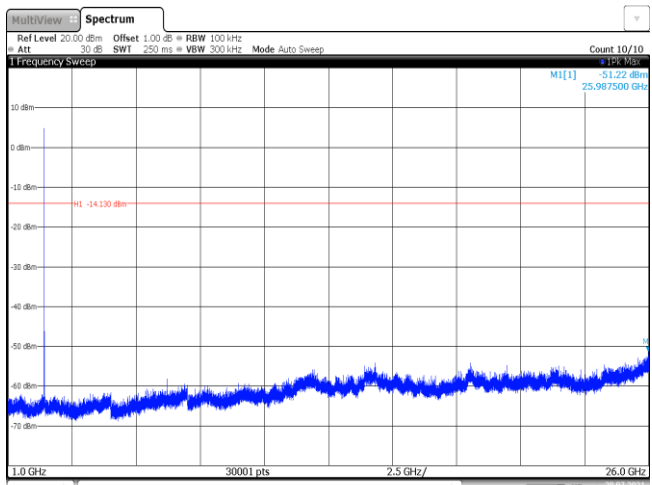


CH78
30MHz~1000MHz

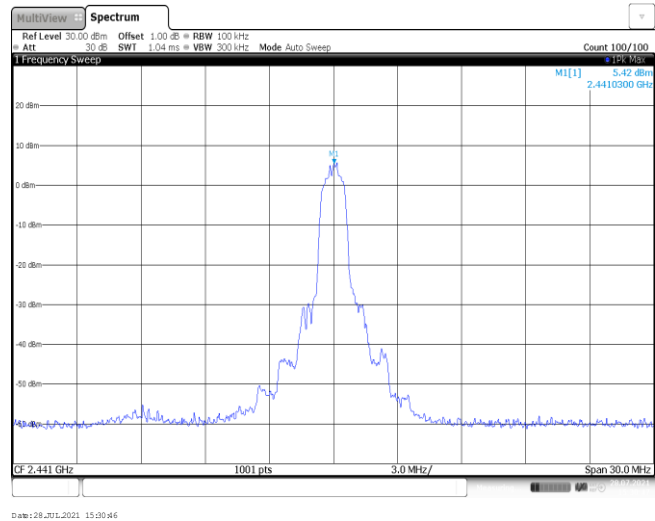


CH78
1GHz~26GHz

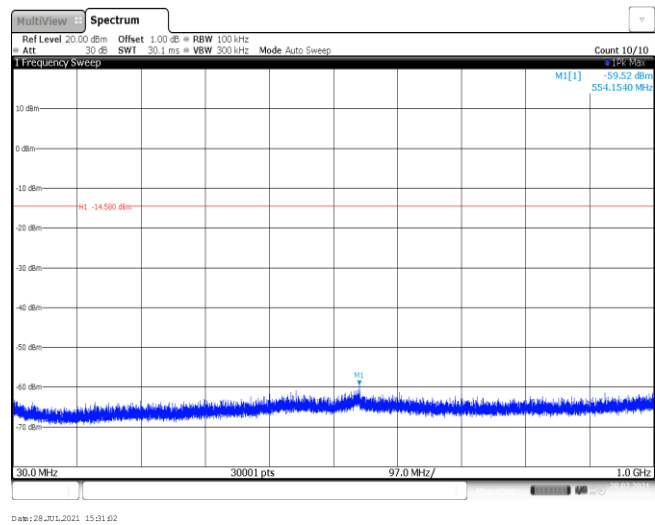


Test Item:	Spurious Emission	Modulation type:	$\pi/4$ DQPSK
CH00 Reference level	 Count 100/100 M1[1] -50.62 dBm 2.4021500 GHz CF 2.402 GHz 1001 pts 3.0 MHz/ Span 30.0 MHz Date: 28-Jul-2021 15:29:39		
CH00 30MHz~1000MHz	 Count 10/10 M1[1] -50.62 dBm 554.9300 MHz M1 -14.130 dBm 30.0 MHz 30001 pts 97.0 MHz/ 1.0 GHz Date: 28-Jul-2021 15:29:55		
CH00 1GHz~26GHz	 Count 10/10 M1[1] -51.22 dBm 25.987500 GHz M1 -14.130 dBm 1.0 GHz 30001 pts 2.5 GHz/ 26.0 GHz Date: 28-Jul-2021 15:30:11		

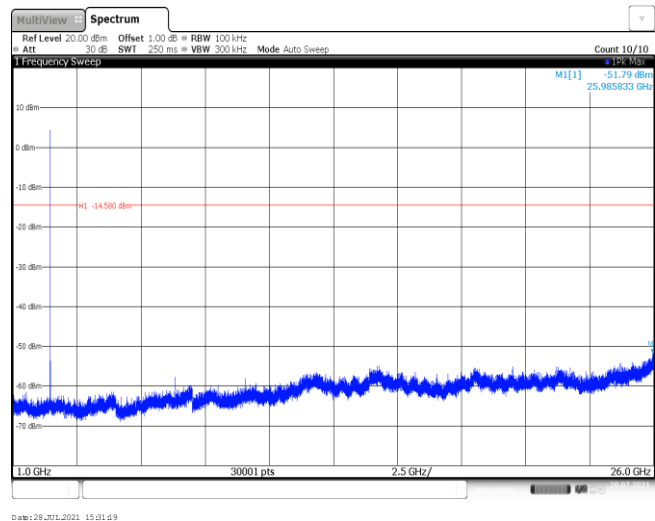
CH39
Reference level



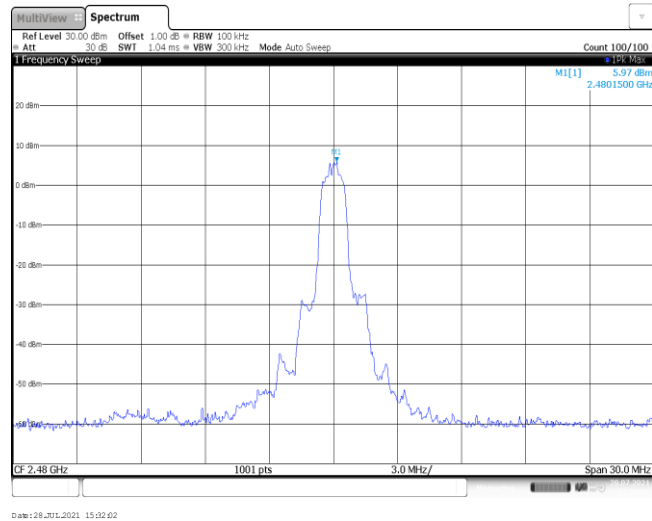
CH39
30MHz~1000MHz



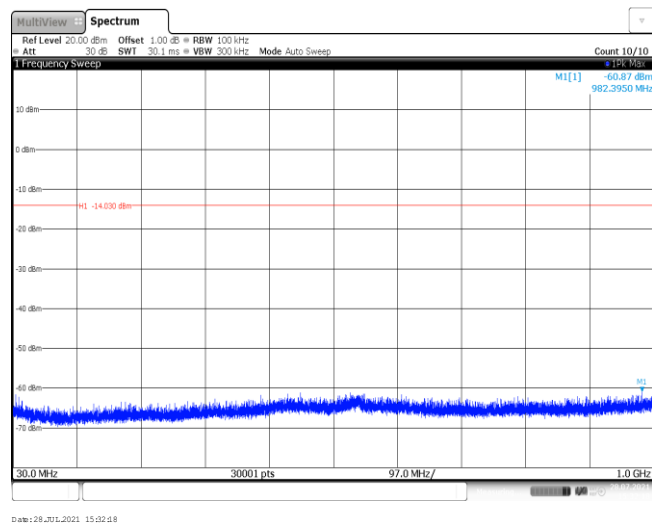
CH39
1GHz~26GHz



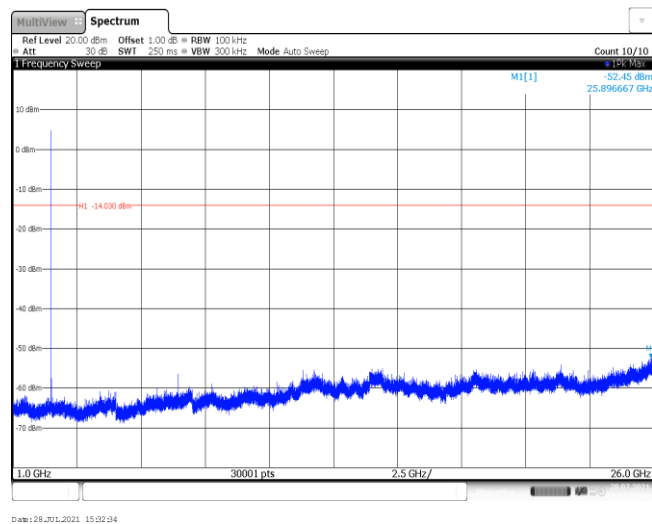
CH78
Reference level

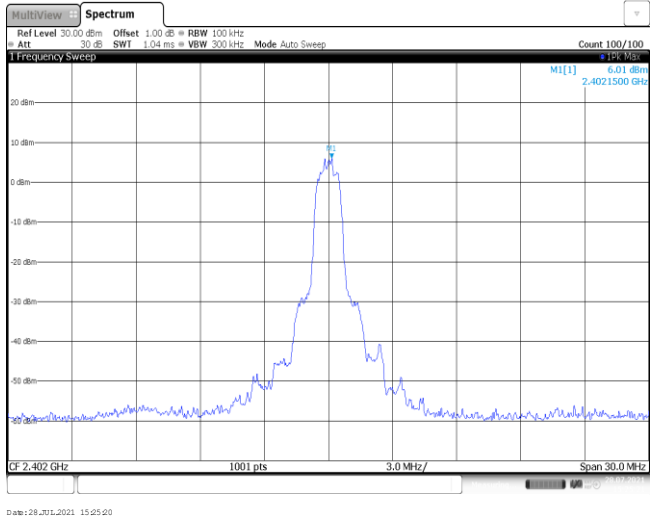
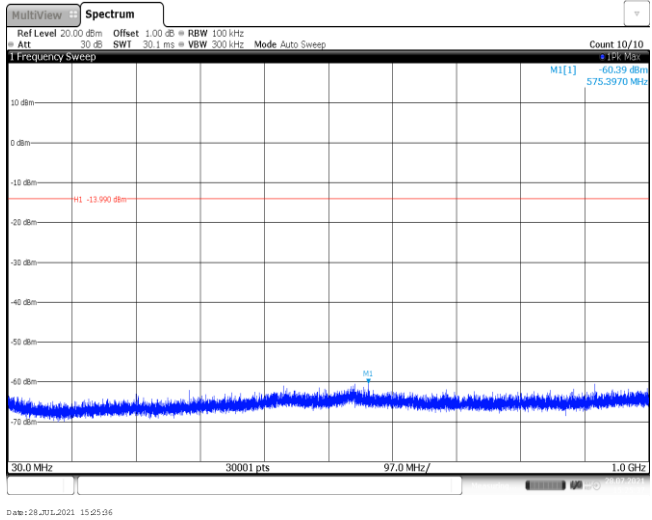
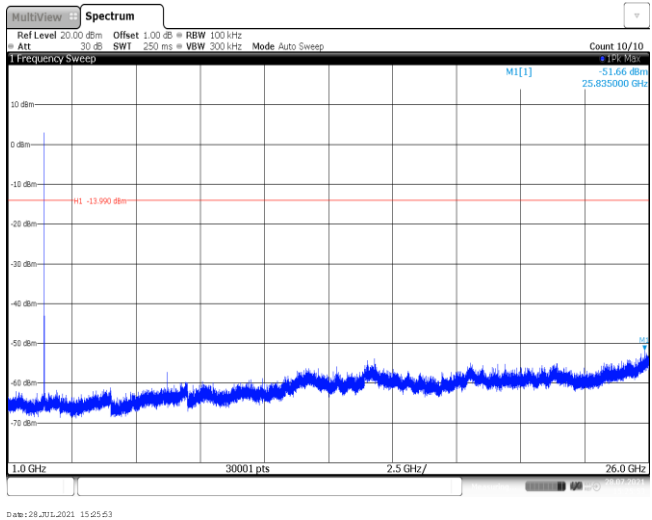


CH78
30MHz~1000MHz

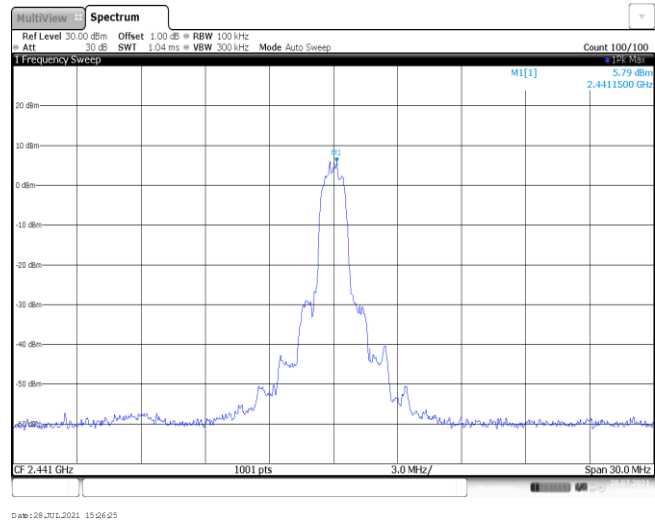


CH78
1GHz~26GHz

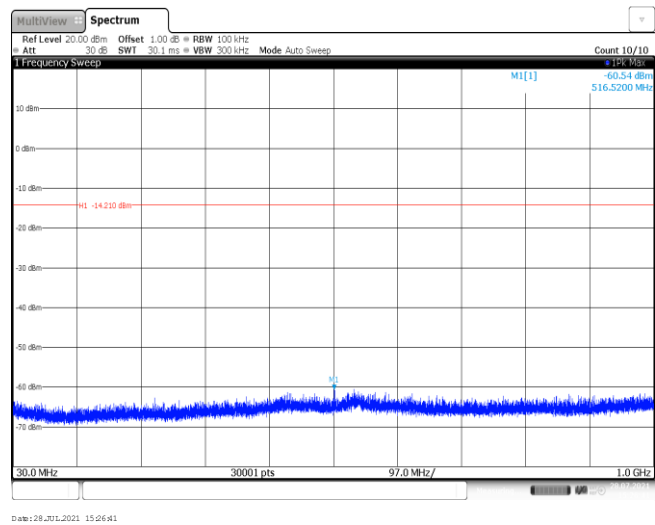


Test Item:	Spurious Emission	Modulation type:	8DPSK
CH00 Reference level			
CH00 30MHz~1000MHz			
CH00 1GHz~26GHz			

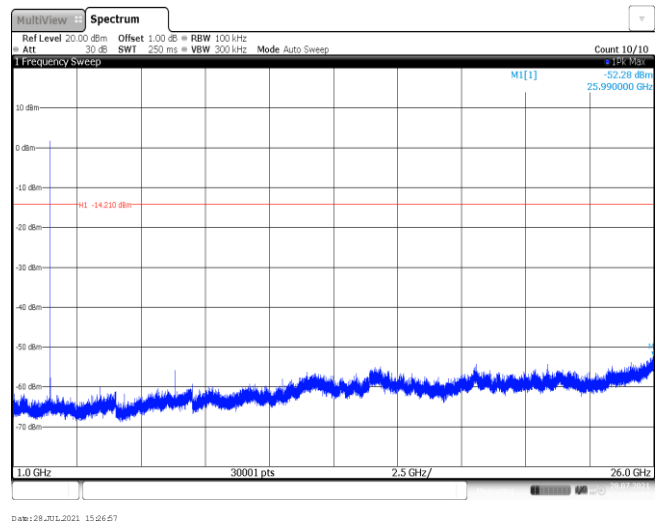
CH39
Reference level

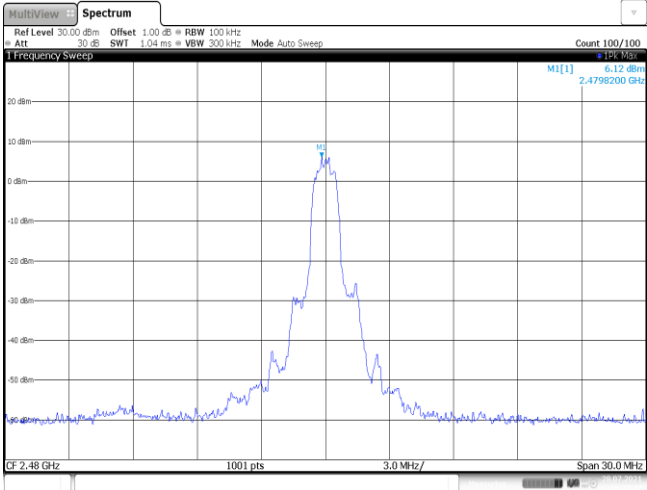
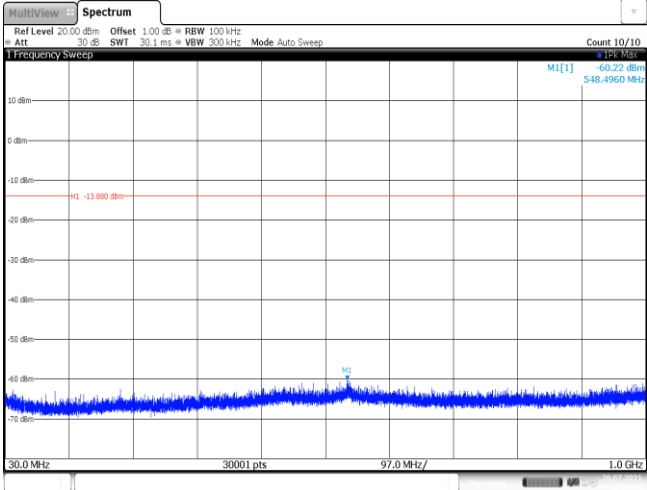
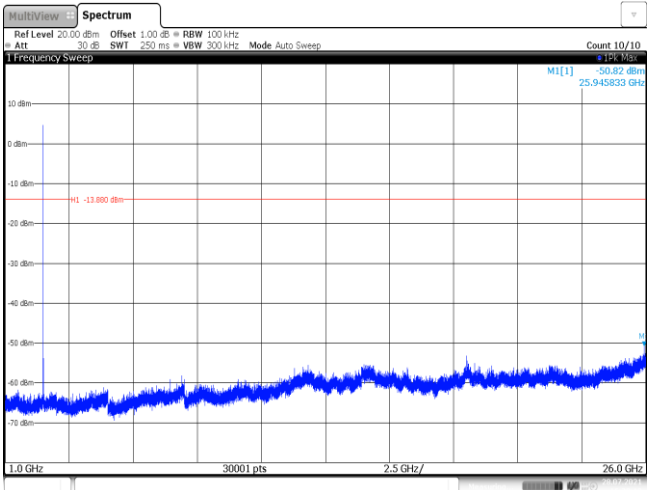


CH39
30MHz~1000MHz



CH39
1GHz~26GHz



CH78 Reference level	
CH78 30MHz~1000MHz	
CH78 1GHz~26GHz	

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