

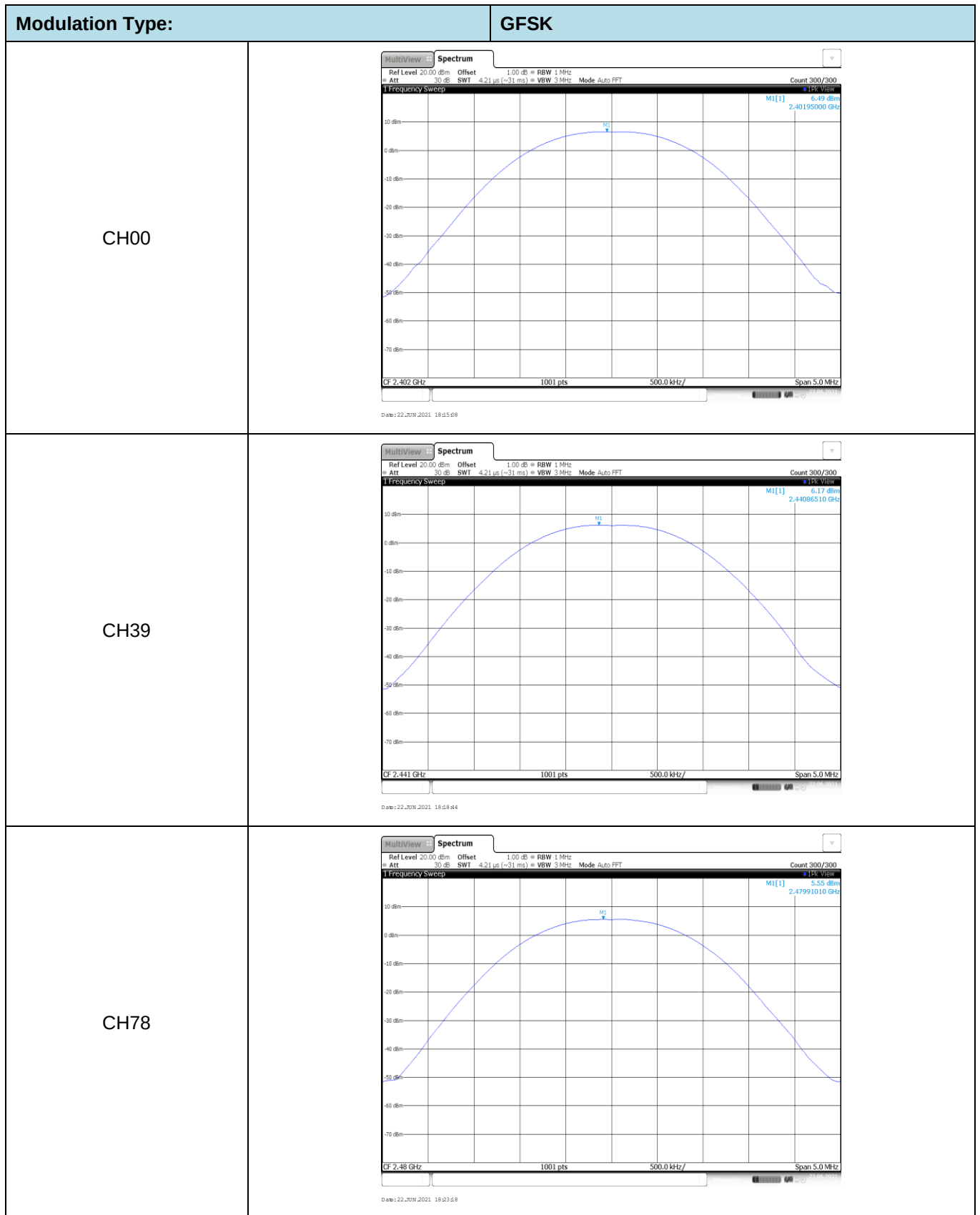
APPENDIX REPORT

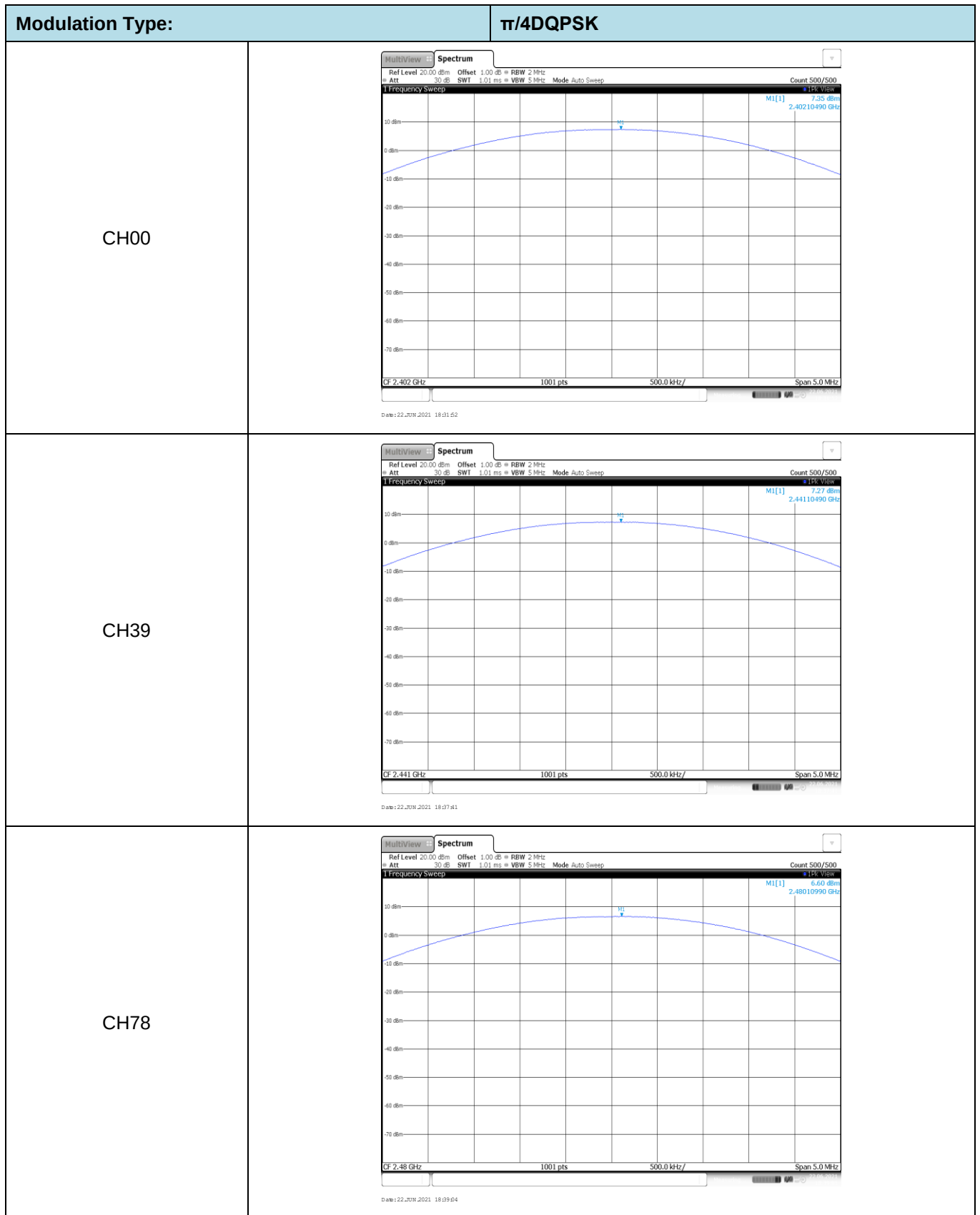
Project No.	SHT2106014501EW	Radio Specification	Bluetooth EDR
Test sample No.	YPHT21060145004	Model No.	T650m
Start test date	2021-06-22	Finish date	2021-06-22
Temperature	25.1°C	Humidity	38%
Test Engineer	Hailey Chen	Auditor	Xiaodong Zhu

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	6.49	6.47	≤ 30.00	Pass
	39	6.17	6.12		
	78	5.55	5.54		
$\pi/4$ DQPSK	00	7.35	6.73	≤ 21.00	Pass
	39	7.27	6.66		
	78	6.60	6.00		
8DPSK	00	7.62	6.85	≤ 21.00	Pass
	39	7.52	6.80		
	78	6.79	6.07		

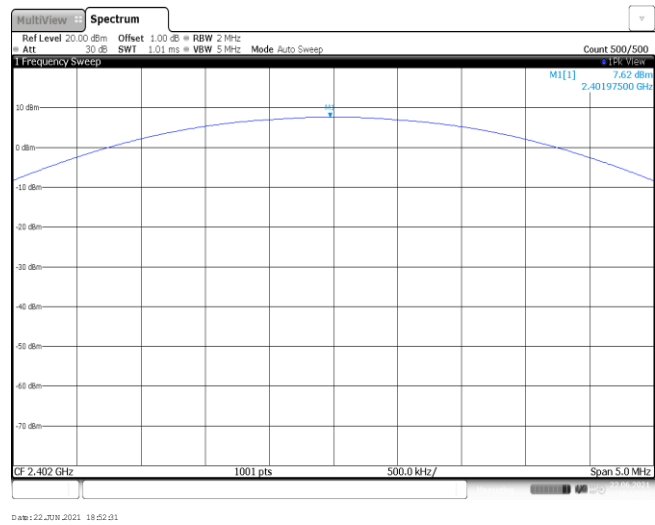




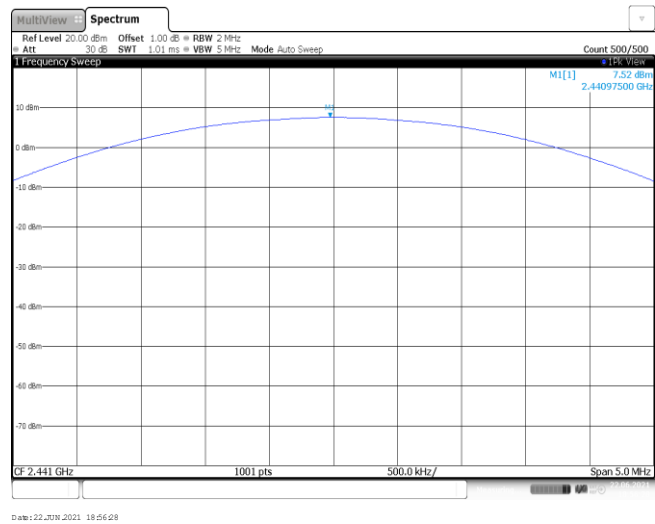
Modulation Type:

8DPSK

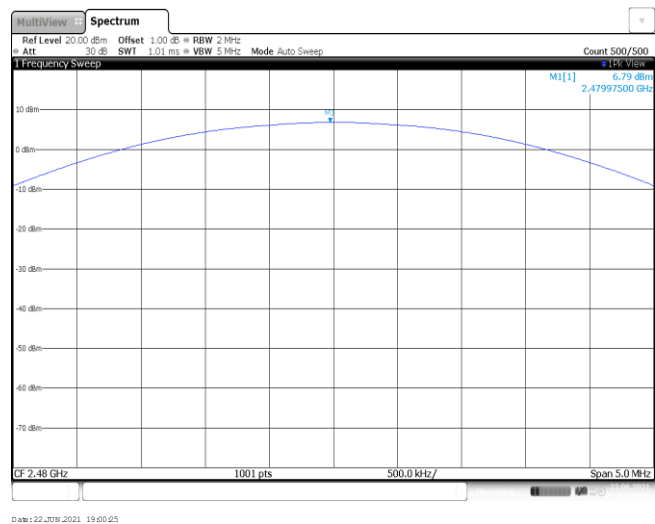
CH00



CH39



CH78



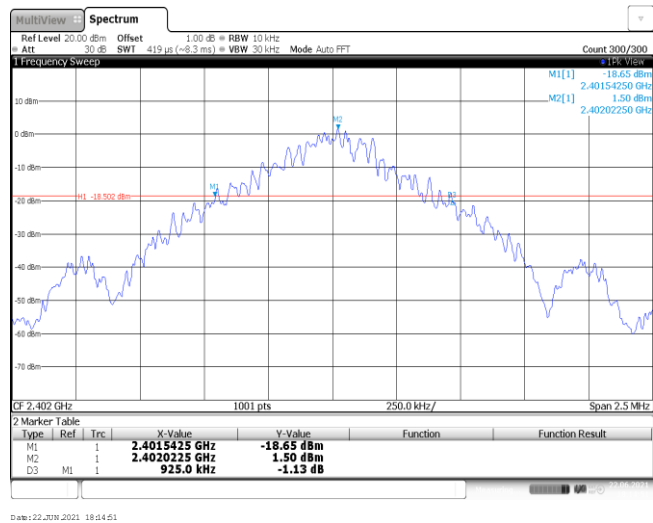
Appendix B : 20 dB Bandwidth

Modulation type	Channel	20 dB Bandwidth (kHz)	Limit (kHz)	Result
GFSK	00	925.00	-	Pass
	39	925.00		
	78	925.00		
$\pi/4$ DQPSK	00	1320.00	-	Pass
	39	1315.00		
	78	1295.00		
8DPSK	00	1300.00	-	Pass
	39	1302.50		
	78	1300.00		

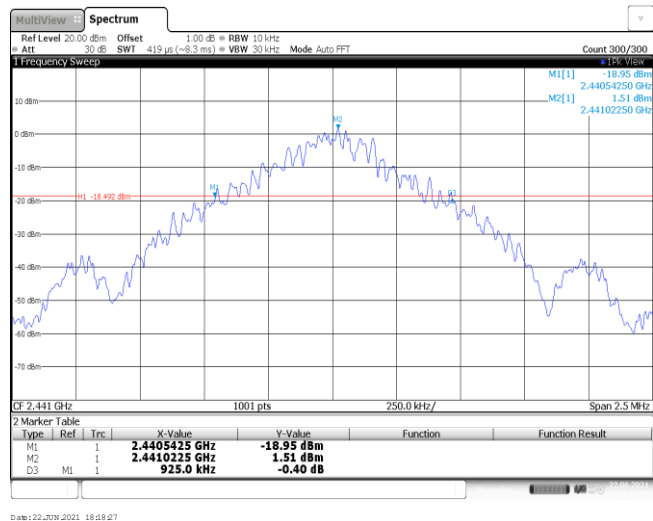
Modulation Type:

GFSK

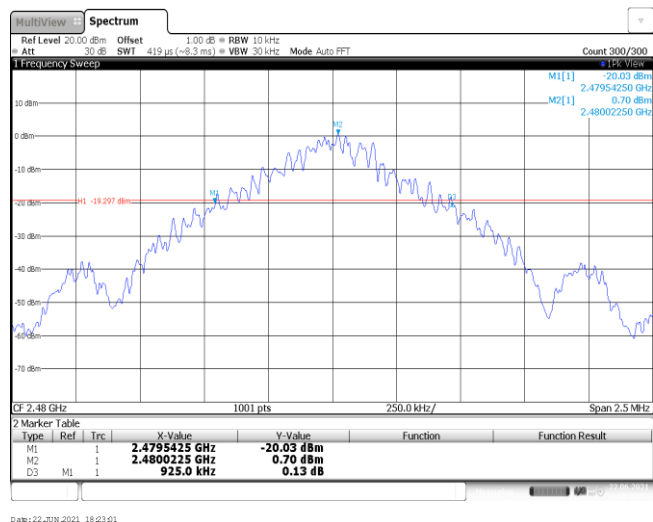
CH00



CH39



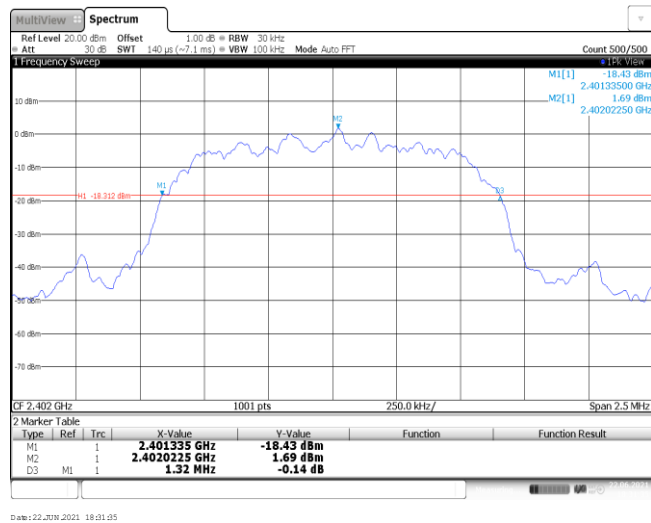
CH78



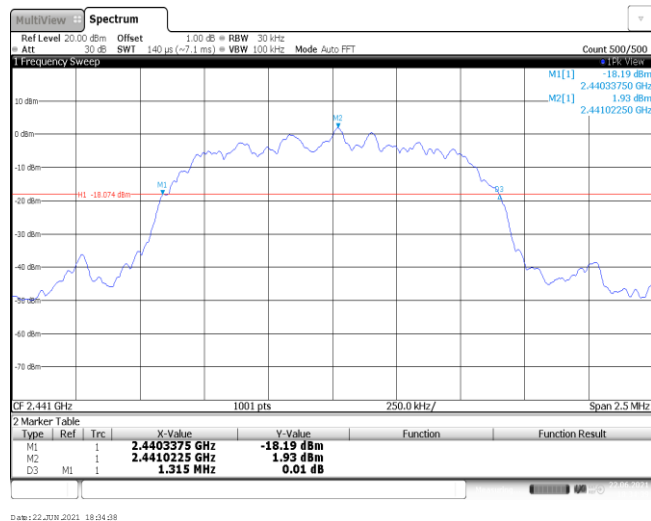
Modulation Type:

 $\pi/4$ DQPSK

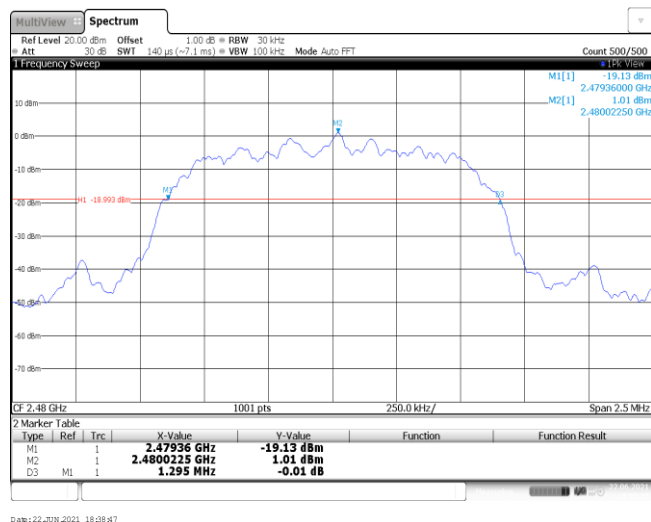
CH00



CH39



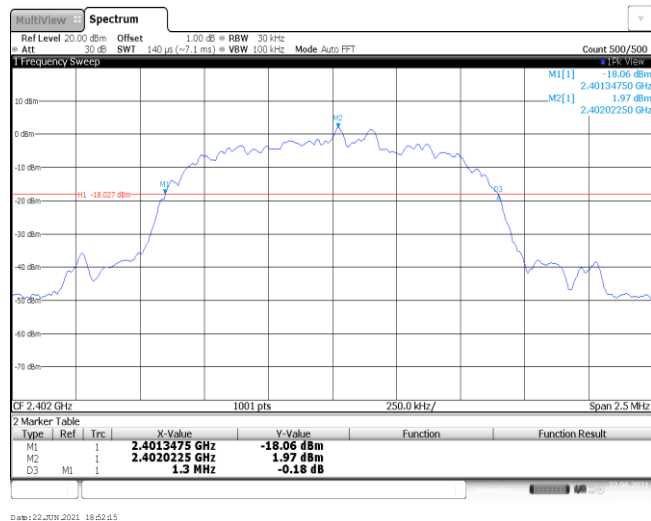
CH78



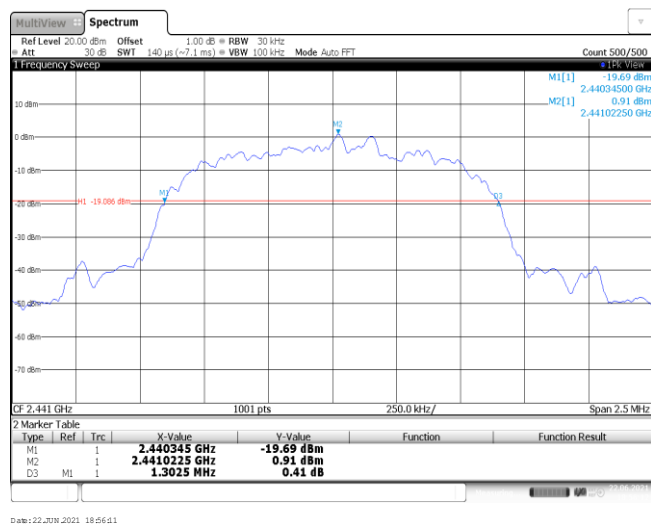
Modulation Type:

8DPSK

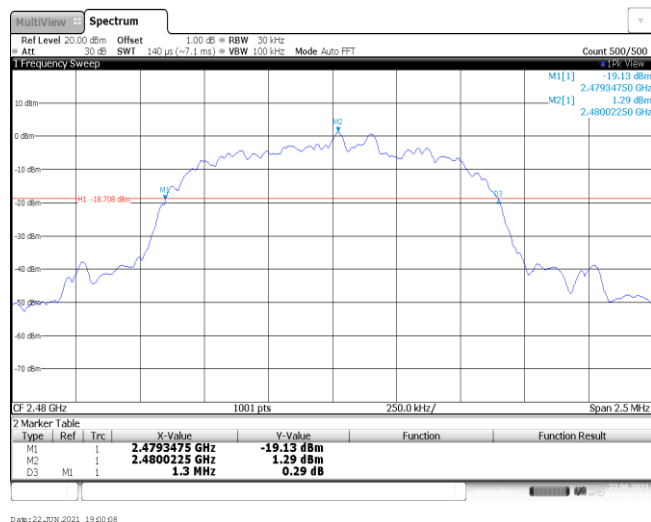
CH00



CH39



CH78



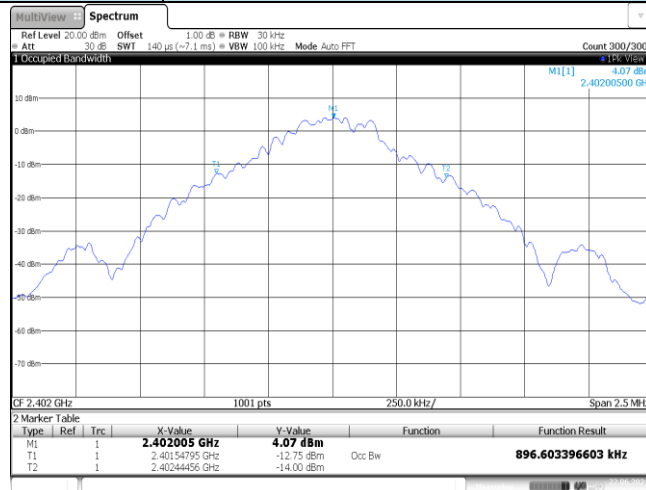
Appendix C: 99% Occupied Bandwidth

Modulation type	Channel	99% Occupied Bandwidth (MHz)	Limit (MHz)	Result
GFSK	00	0.90	-	Pass
	39	0.90		
	78	0.90		
$\pi/4$ DQPSK	00	1.17	-	Pass
	39	1.17		
	78	1.17		
8DPSK	00	1.17	-	Pass
	39	1.17		
	78	1.17		

Modulation Type:

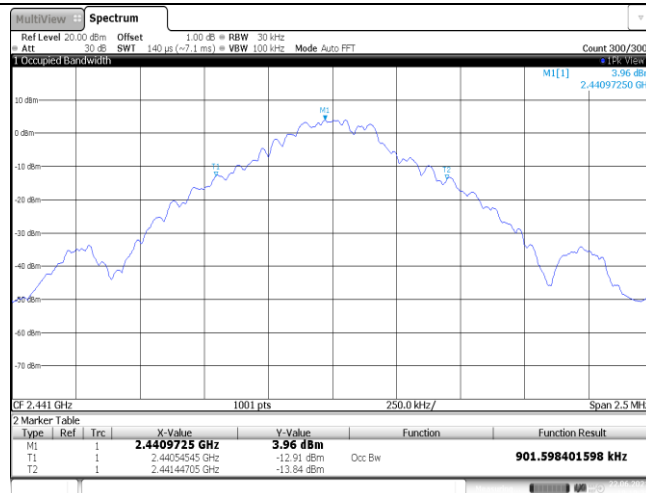
GFSK

CH00



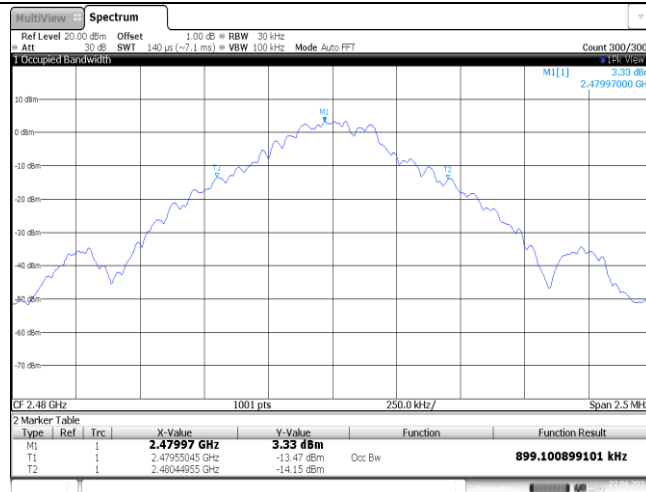
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CH39

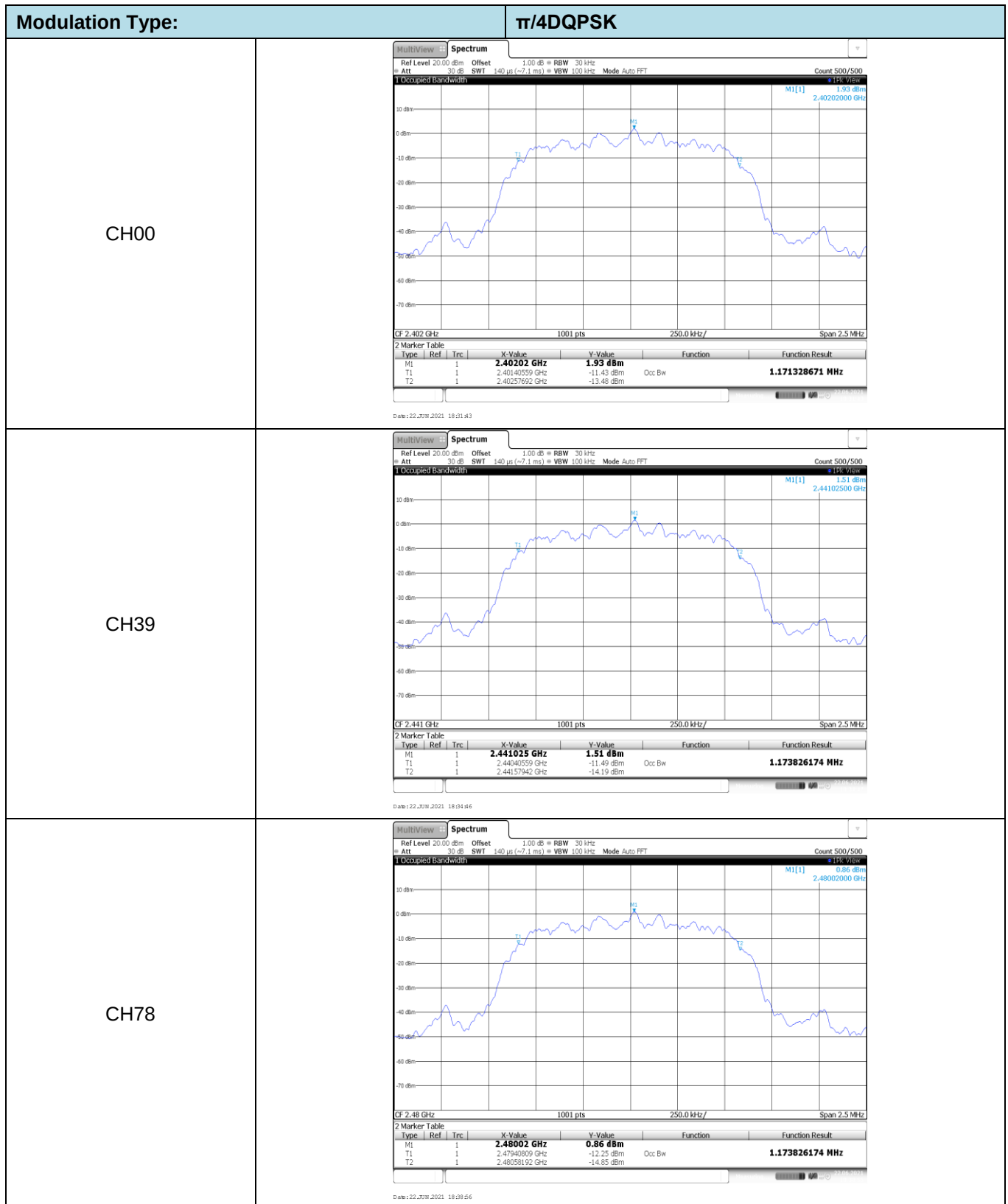


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CH78



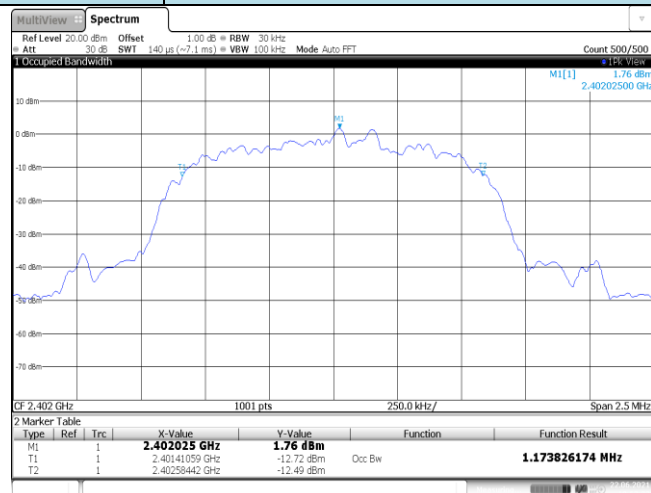
Date: 22_JUN 2021 18:23:09



Modulation Type:

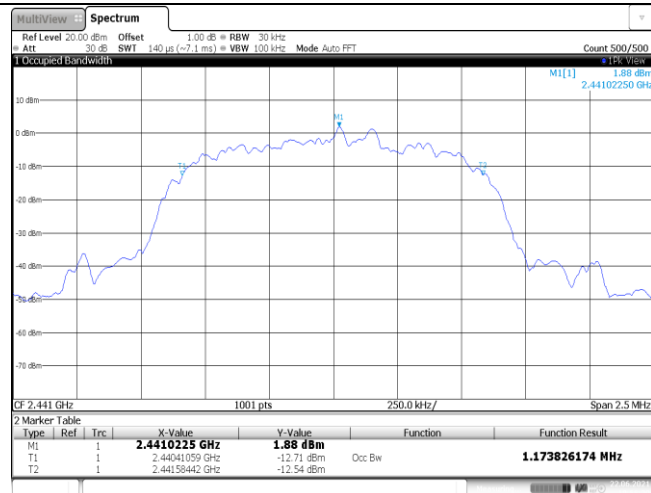
8DPSK

CH00



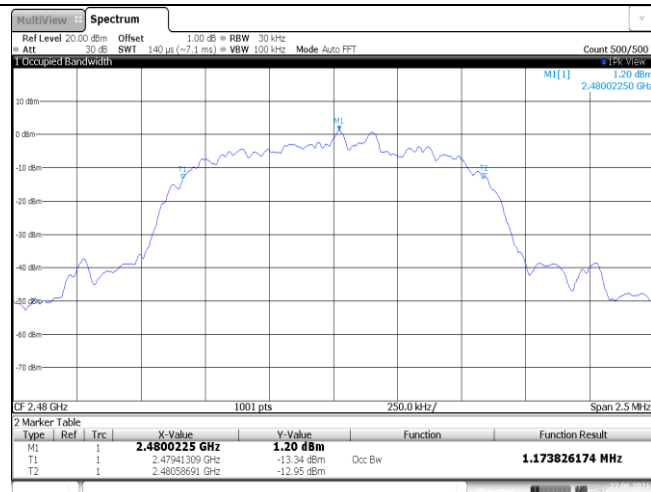
Date: 22_JUN 2021 18:52:23

CH39



Date: 22_JUN 2021 18:56:20

CH78



Date: 22_JUN 2021 19:00:16

Appendix D: Carrier Frequencies Separation

Modulation type	Channel	Carrier Frequencies Separation (MHz)	Limit (kHz) *	Result
GFSK	39	1.00	≥925.00	Pass
π/4DQPSK	39	1.00	≥880.00	Pass
8DPSK	39	1.00	≥868.33	Pass

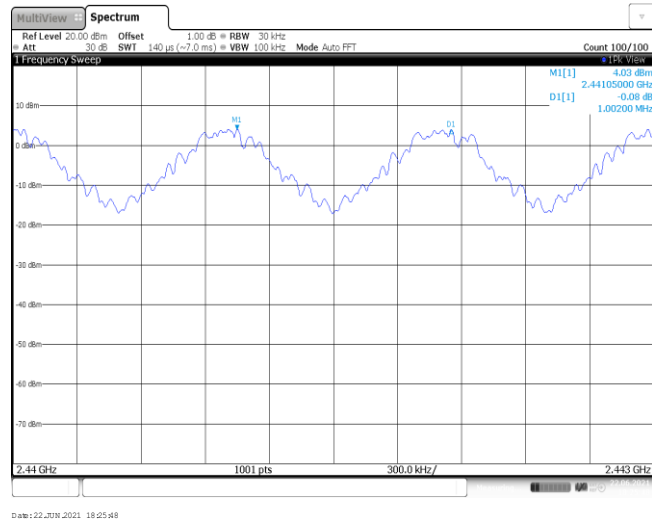
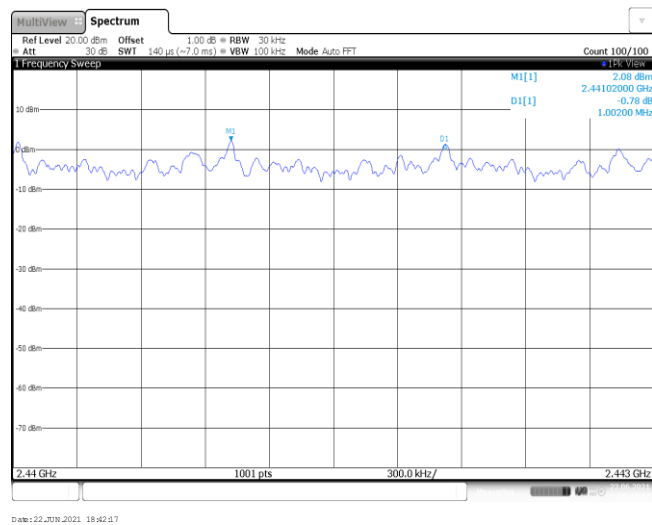
Note:

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

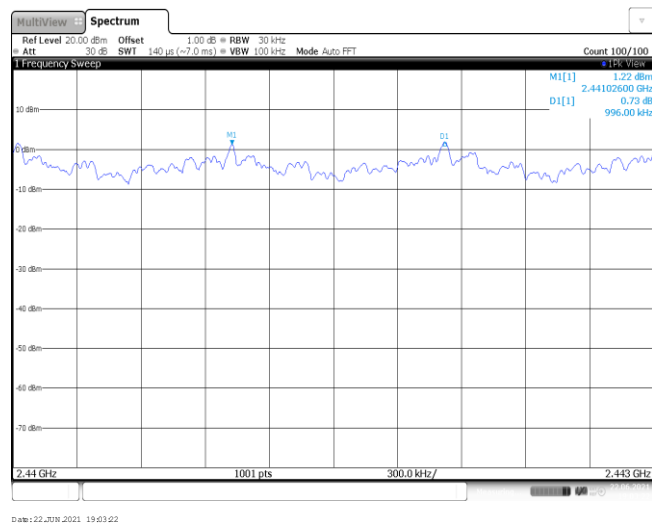
π/4DQPSK limit = 2/3 * The maximum 20 dB Bandwidth for π/4DQPSK modulation on the appendix B.

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

GFSK

 $\pi/4$ DQPSK

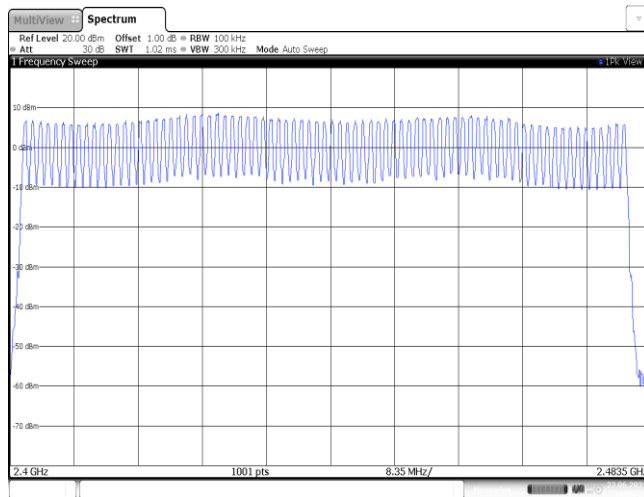
8DPSK



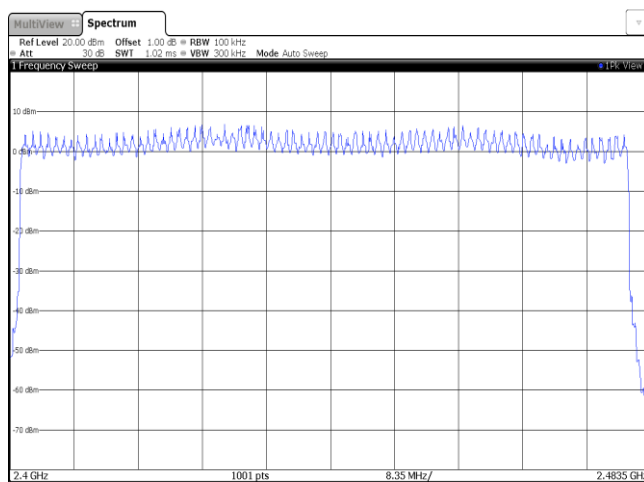
Appendix E: Hopping Channel Number

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

GFSK

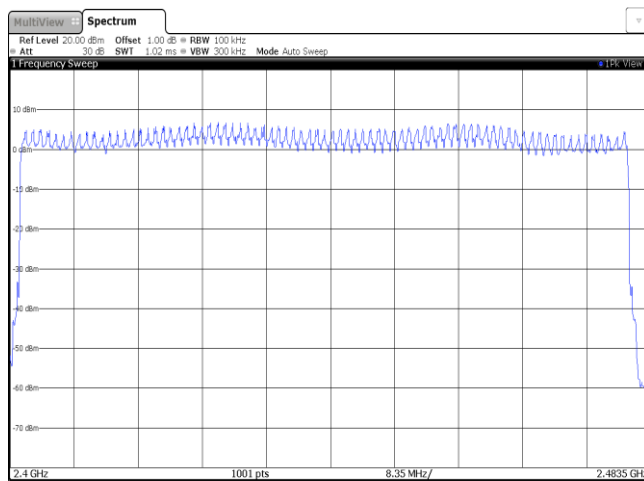


Date: 22_JUN 2021 18:28:11

 $\pi/4$ DQPSK

Date: 22_JUN 2021 18:44:53

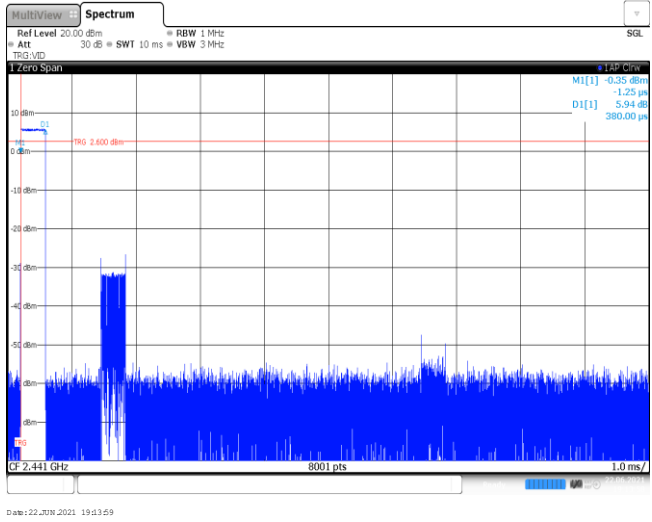
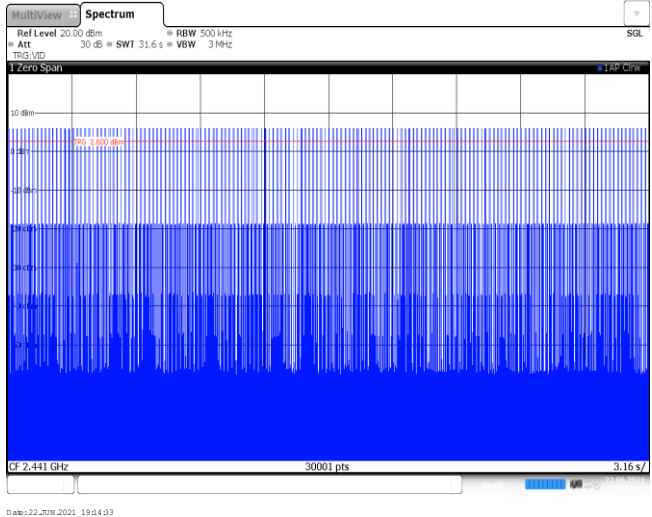
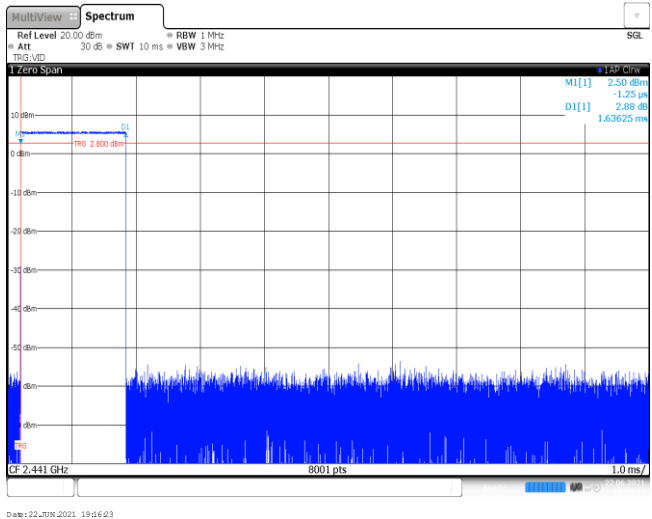
8DPSK



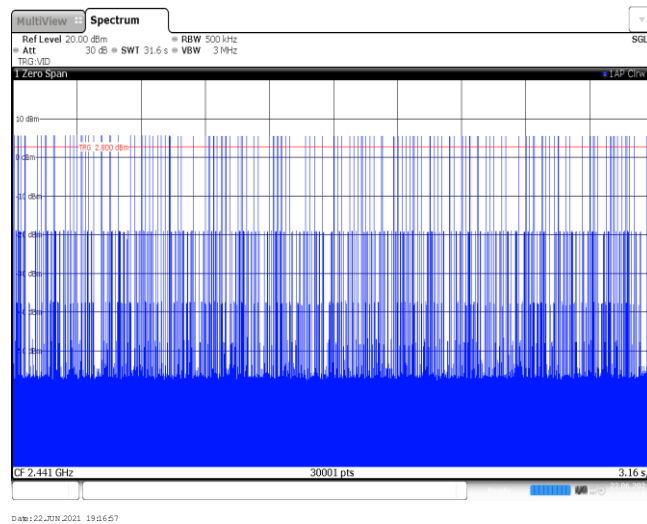
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Appendix F: Dwell Time

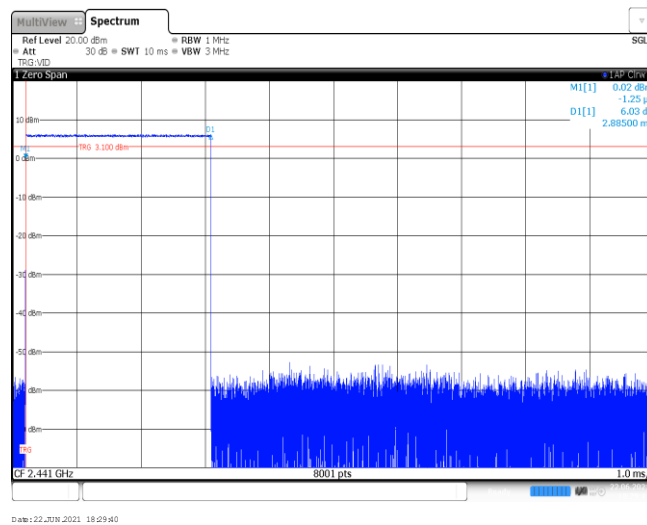
Modulation type	Packet	Burst Width [ms]	Total Hops[hop*ch]	Dwell time (Second)	Limit (Second)	Result
GFSK	DH1	0.38	317	0.12	≤ 0.40	Pass
	DH3	1.64	143	0.23		
	DH5	2.89	111	0.32		
$\pi/4$ DQPSK	2DH1	0.39	313	0.12	≤ 0.40	Pass
	2DH3	1.64	158	0.26		
	2DH5	2.89	107	0.31		
8DPSK	3DH1	0.39	317	0.12	≤ 0.40	Pass
	3DH3	1.64	164	0.27		
	3DH5	2.89	113	0.33		

Modulation Type:	GFSK
DH1 Burst width	 The spectrum plot shows a single burst of energy 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 2.440 to 2.442. A red horizontal line indicates the noise floor at -20.00 dBm. The burst reaches a peak power of approximately -10 dBm. The plot is titled 'Spectrum' and includes parameters: Ref Level 20.00 dBm, Att 30 dB, RBW 1 MHz, SWT 10 ms, VBW 3 MHz. The date is 22_JUN 2021 19:13:59.
DH1 Burst number	 The spectrum plot shows a continuous burst of energy 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 2.440 to 2.442. A red horizontal line indicates the noise floor at -20.00 dBm. The burst reaches a peak power of approximately -10 dBm. The plot is titled 'Spectrum' and includes parameters: Ref Level 20.00 dBm, Att 30 dB, RBW 500 kHz, SWT 31.6 s, VBW 3 MHz. The date is 22_JUN 2021 19:14:03.
DH3 Burst width	 The spectrum plot shows a single burst of energy 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 2.440 to 2.442. A red horizontal line indicates the noise floor at -20.00 dBm. The burst reaches a peak power of approximately -10 dBm. The plot is titled 'Spectrum' and includes parameters: Ref Level 20.00 dBm, Att 30 dB, RBW 1 MHz, SWT 10 ms, VBW 3 MHz. The date is 22_JUN 2021 19:16:23.

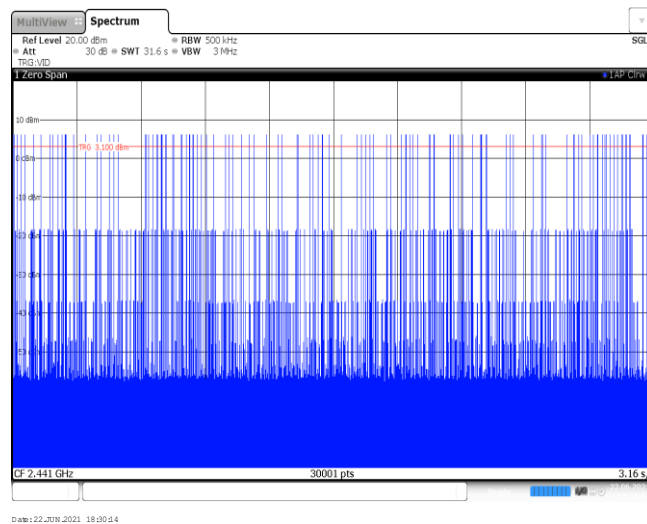
DH3
Burst number

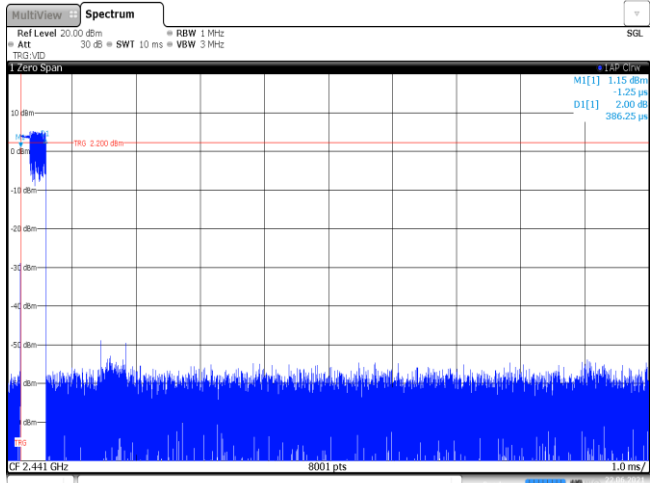
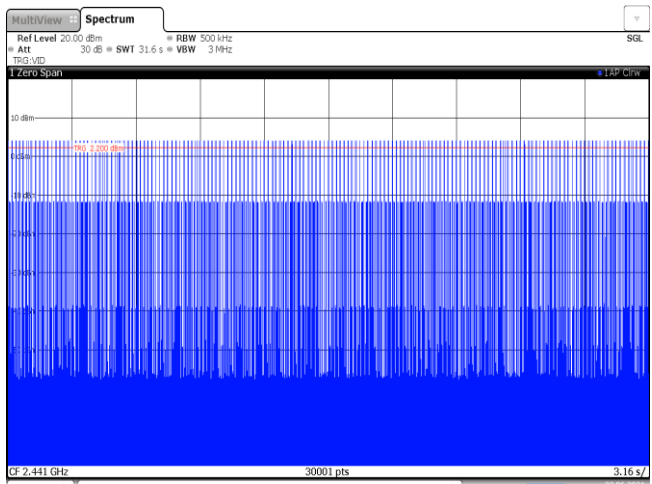
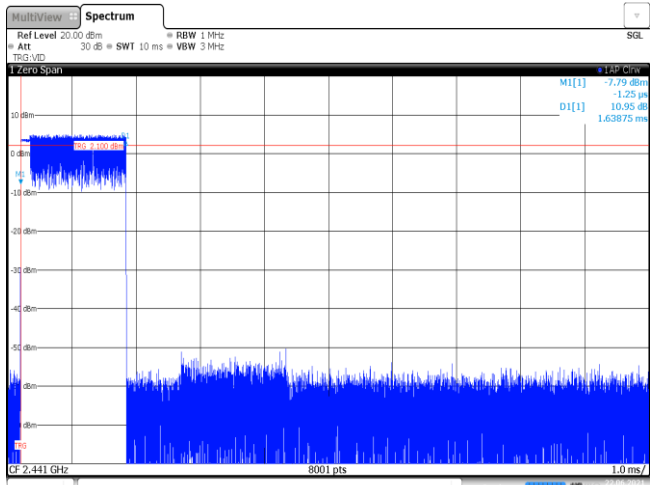


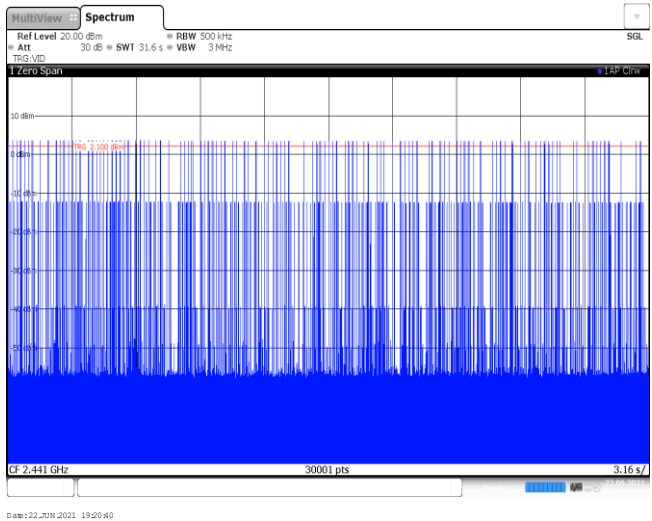
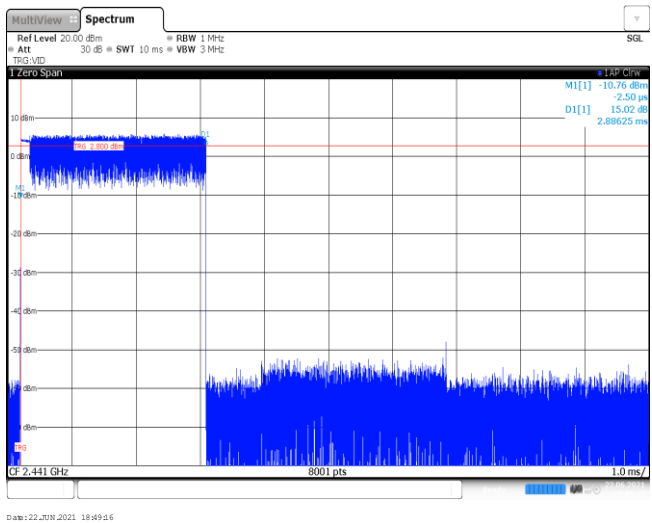
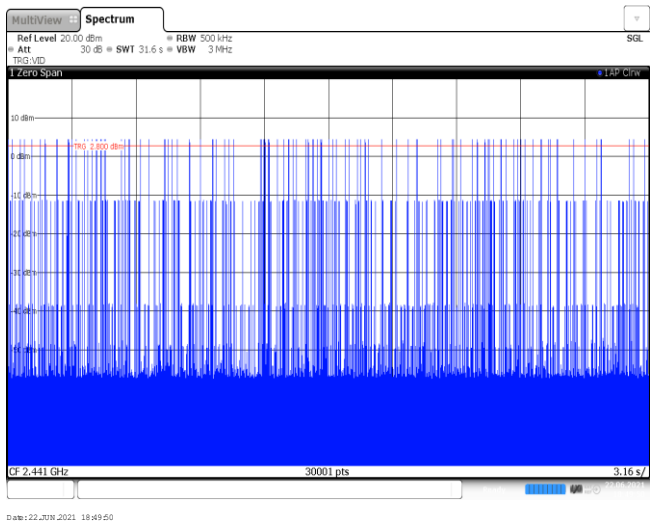
DH5
Burst width



DH5
Burst number

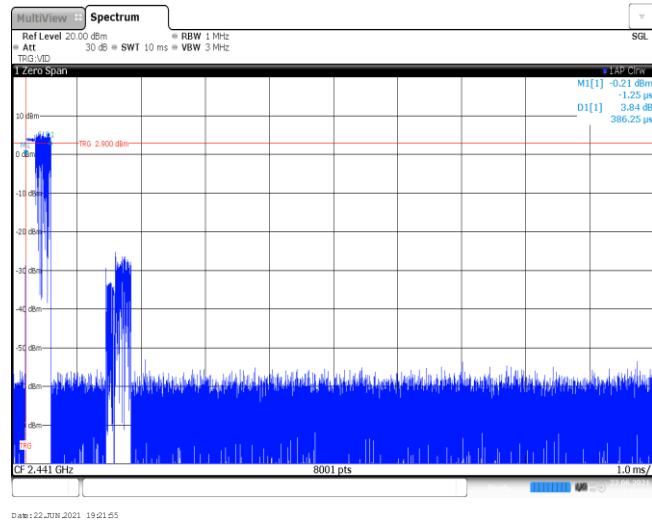
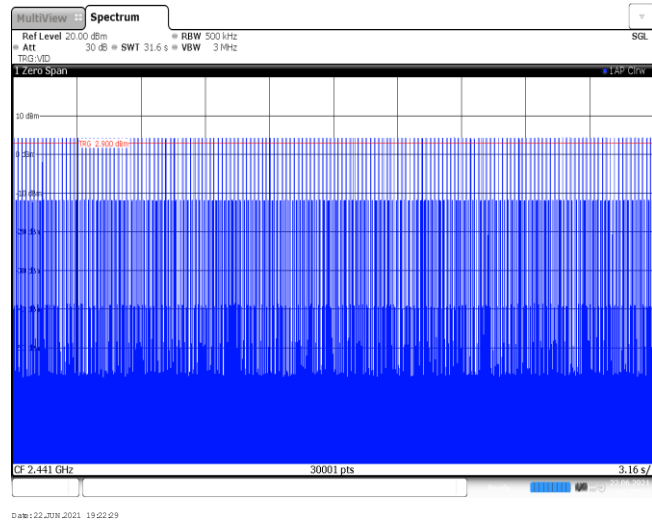
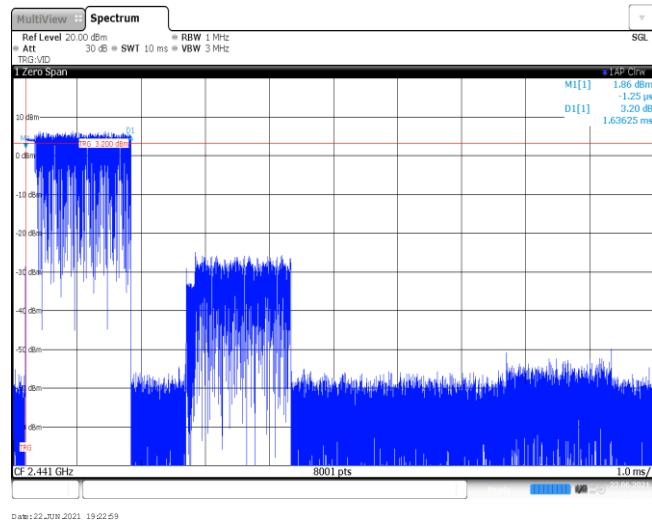


Modulation Type:	$\pi/4$ DQPSK
2DH1 Burst width	 The spectrum plot shows a signal at 2.441 GHz with a bandwidth of 1.0 ms. The plot displays a burst of signal at the top, with a peak level of -7.75 dBm. The signal is modulated with $\pi/4$DQPSK. The plot includes a reference level of 20.00 dBm, an attenuation of 30 dB, a resolution bandwidth of 1 MHz, and a video bandwidth of 3 MHz. The plot also shows the signal-to-noise ratio (SNR) and the signal-to-interference-plus-noise ratio (SINR).
2DH1 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 at the top, with a peak level of -7.75 dBm. The signal is modulated with $\pi/4$DQPSK. The plot includes a reference level of 20.00 dBm, an attenuation of 30 dB, a resolution bandwidth of 500 kHz, and a video bandwidth of 3 MHz. The plot also shows the signal-to-noise ratio (SNR) and the signal-to-interference-plus-noise ratio (SINR).
2DH3 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 at the top, with a peak level of -7.75 dBm. The signal is modulated with $\pi/4$DQPSK. The plot includes a reference level of 20.00 dBm, an attenuation of 30 dB, a resolution bandwidth of 1 MHz, and a video bandwidth of 3 MHz. The plot also shows the signal-to-noise ratio (SNR) and the signal-to-interference-plus-noise ratio (SINR).

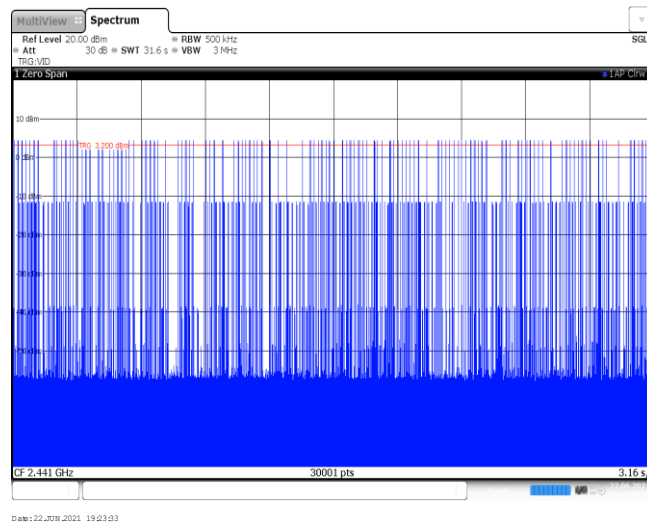
2DH3 Burst number	
2DH5 Burst width	
2DH5 Burst number	

Modulation Type:

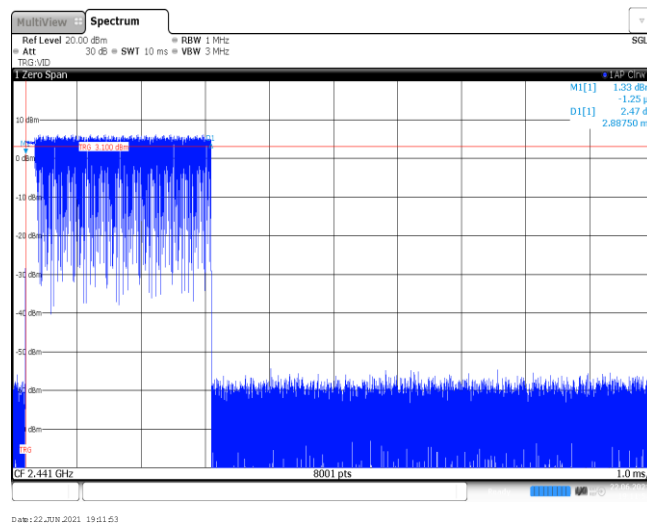
8DPSK

3DH1
Burst width3DH1
Burst number3DH3
Burst width

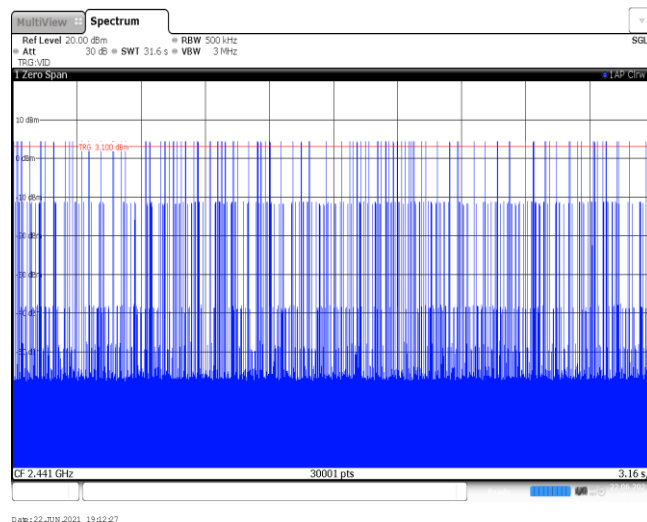
3DH3
Burst number



3DH5
Burst width



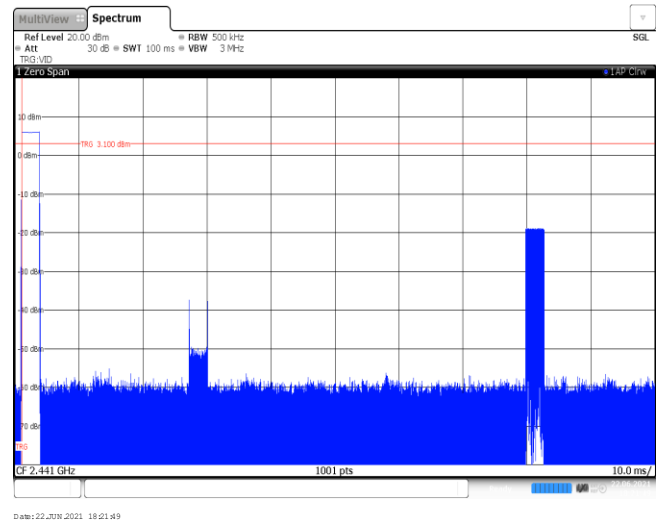
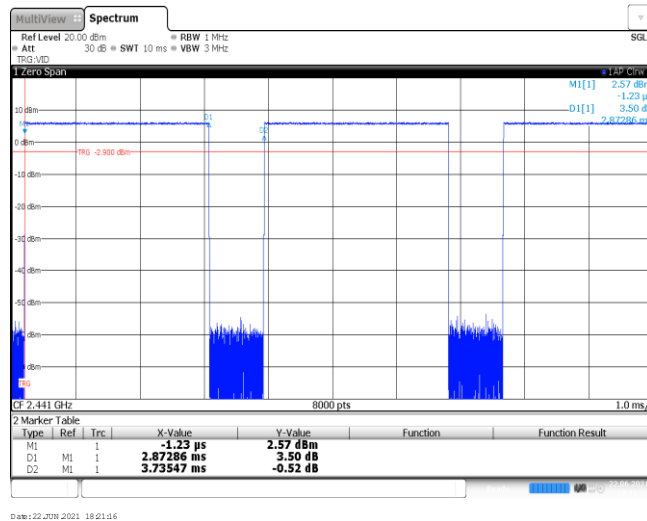
3DH5
Burst number



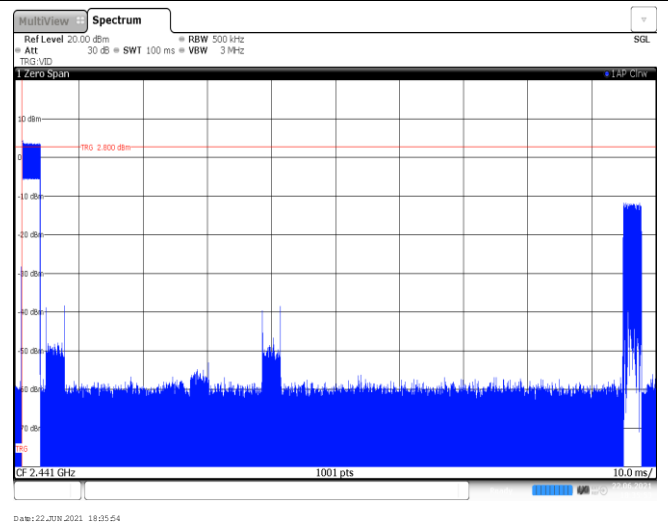
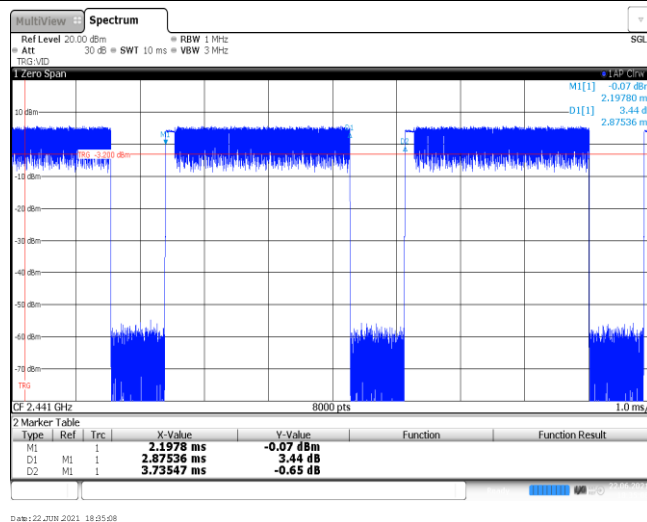
Appendix G: Duty Cycle Correction Factor (DCCF)

DCCF Calculate Formula					
$DCCF = 20 * \text{Log}(\text{duty cycle}) = 20 * \text{Log}(T_{\text{on time}} / T_{\text{period}})$					
Modulation type	Test Frequency (MHz)	$T_{\text{on time}}$ for single burst [ms]	T_{period} [ms]	Burst Quantity	DCCF [dB]
GFSK	2441	2.87	100	2	-24.82
$\pi/4$ DQPSK	2441	2.88	100	2	-24.79
8DPSK	2441	2.88	100	1	-30.81

GFSK

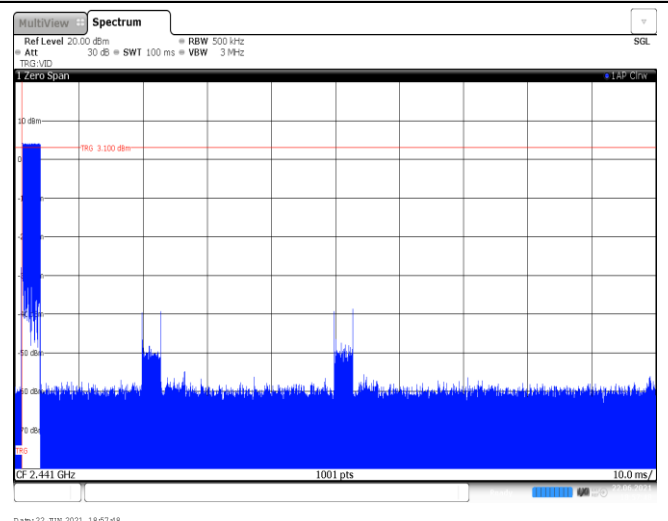
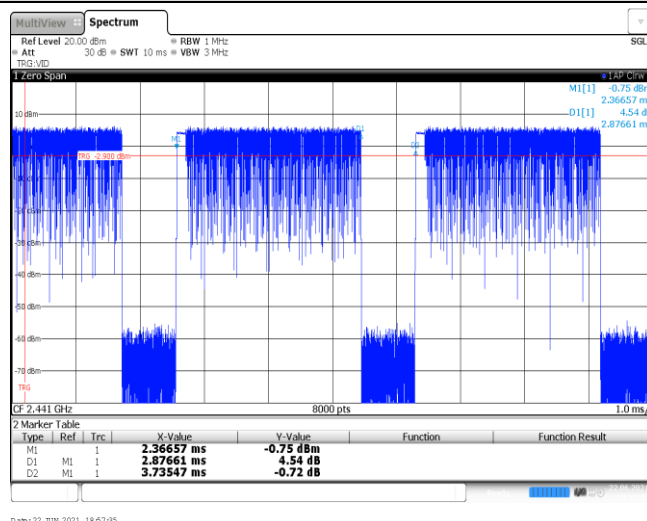
T_{on} time for single burst

Burst Quantity

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

Burst Quantity

8DPSK

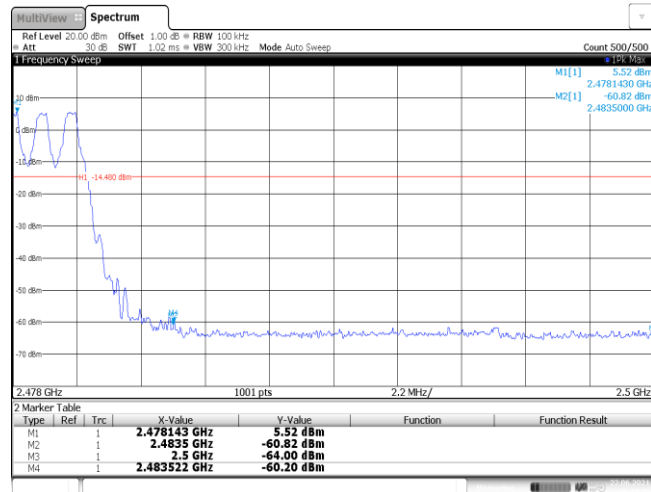
T_{on} time for single burst

Burst Quantity

Appendix H: Band edge and Spurious Emissions (conducted)

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

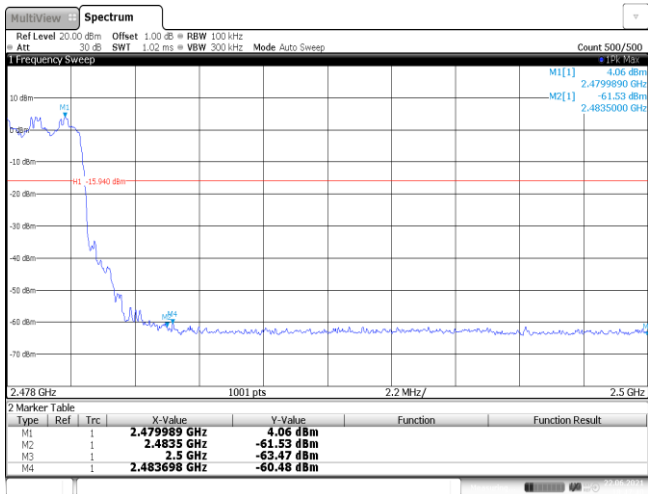
CH78
Hopping mode



Date: 22_JUN 2021 18:28:39

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

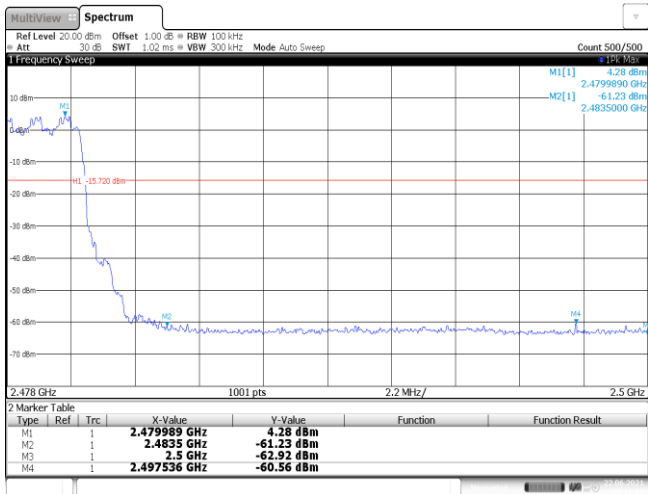
CH78
Hopping mode



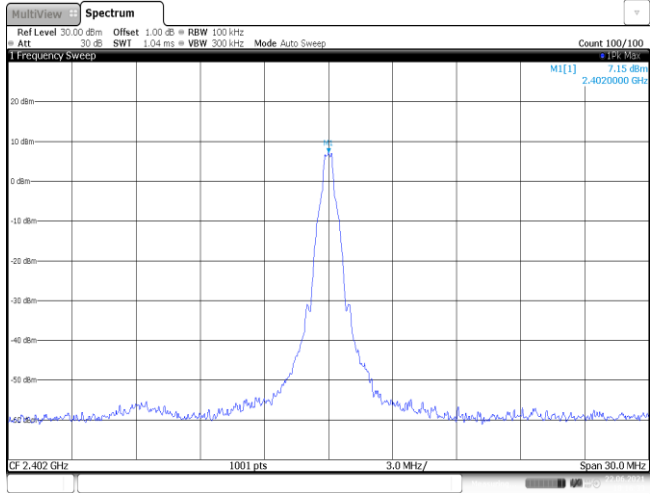
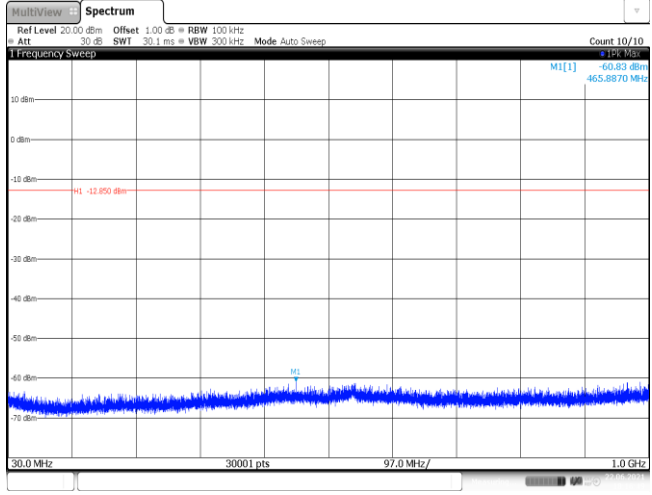
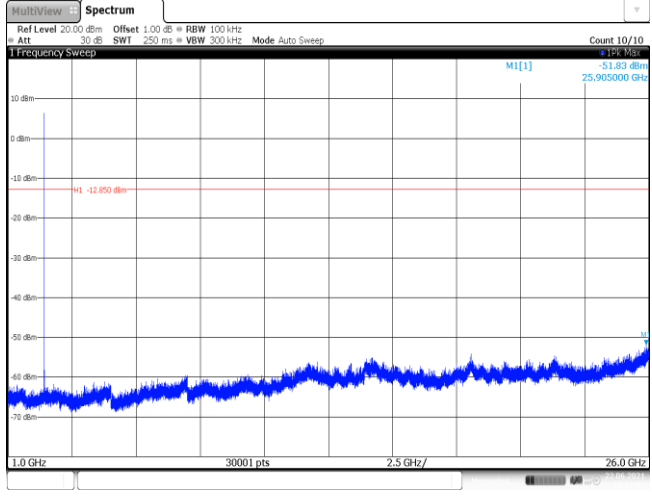
Date: 22 JUN 2021 18:47:39

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

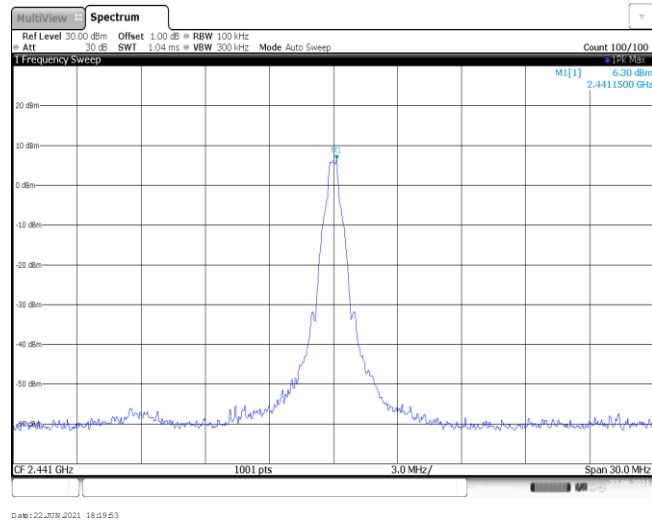
CH78
Hoppig mode



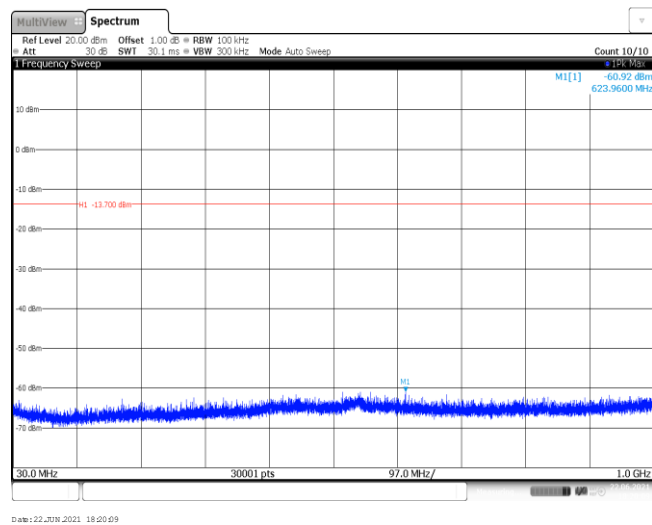
Date: 22 JUN 2021 19:11:42

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

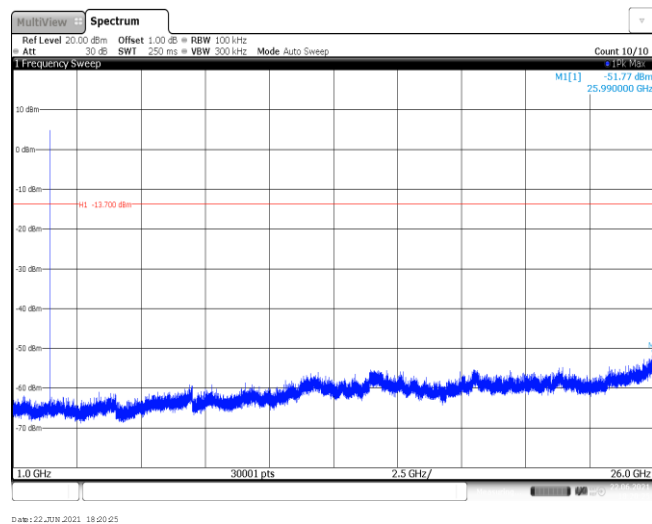
CH39
Reference level



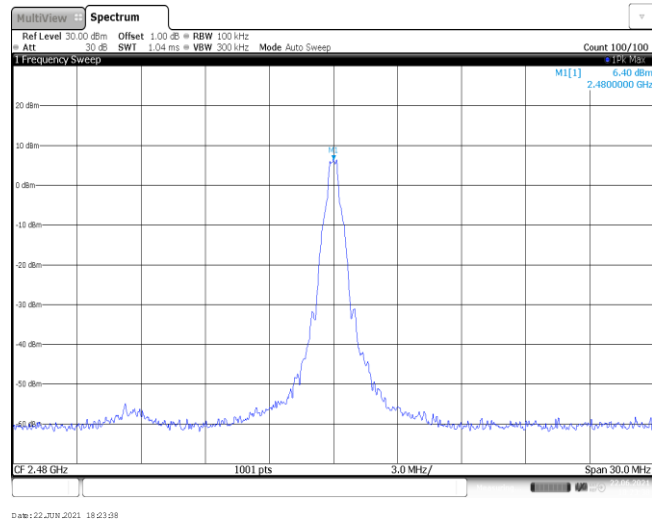
CH39
30MHz~1000MHz



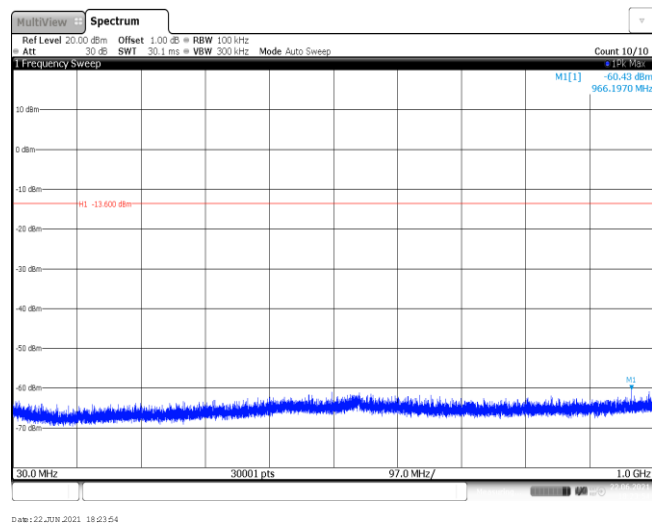
CH39
1GHz~26GHz



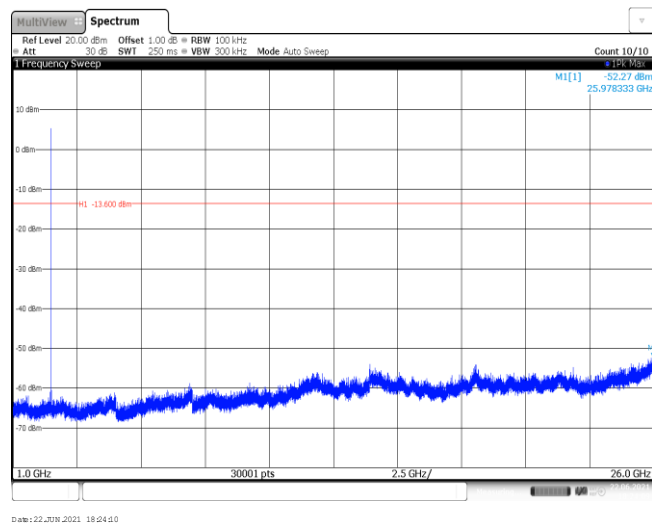
CH78
Reference level

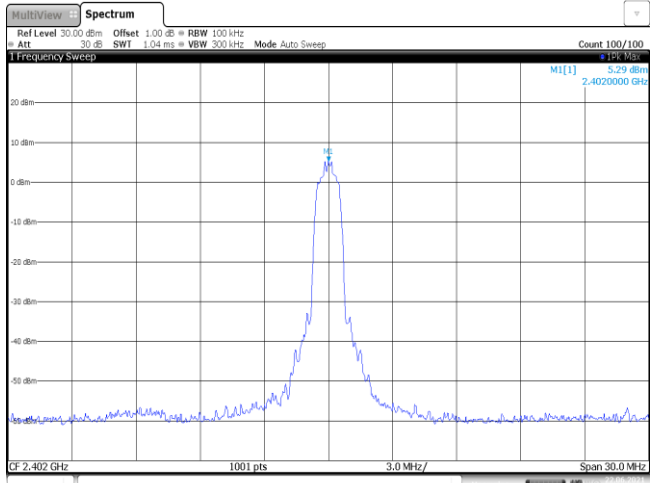
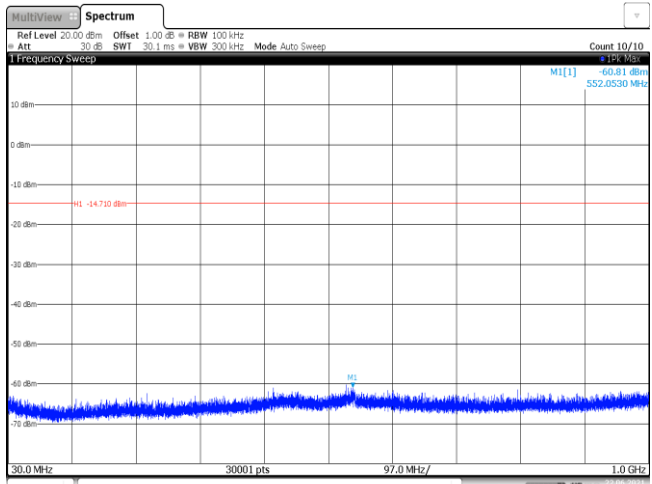
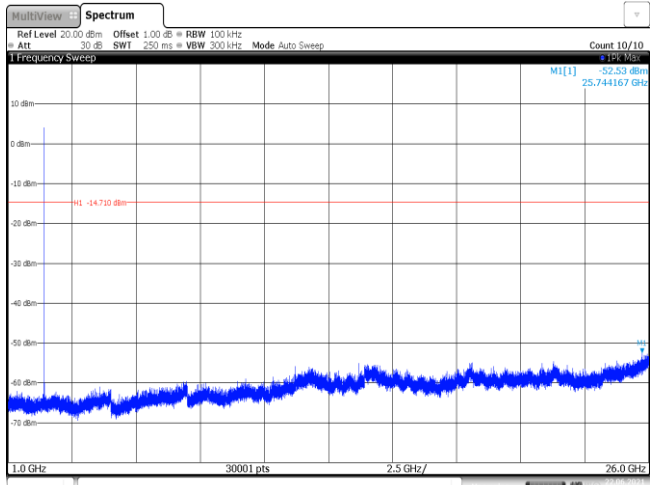


CH78
30MHz~1000MHz

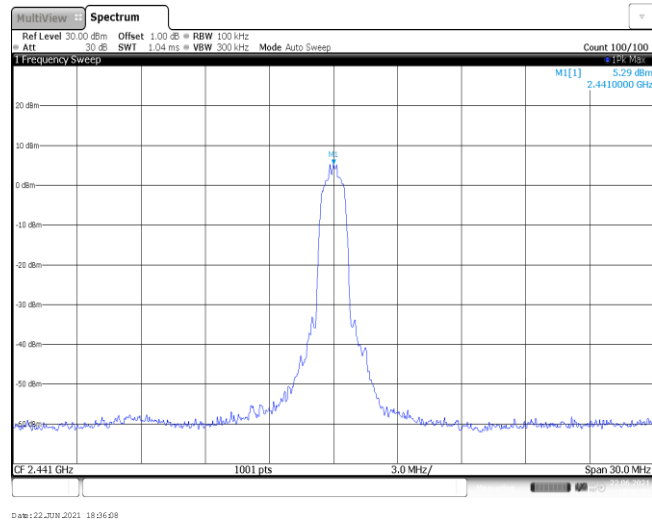


CH78
1GHz~26GHz

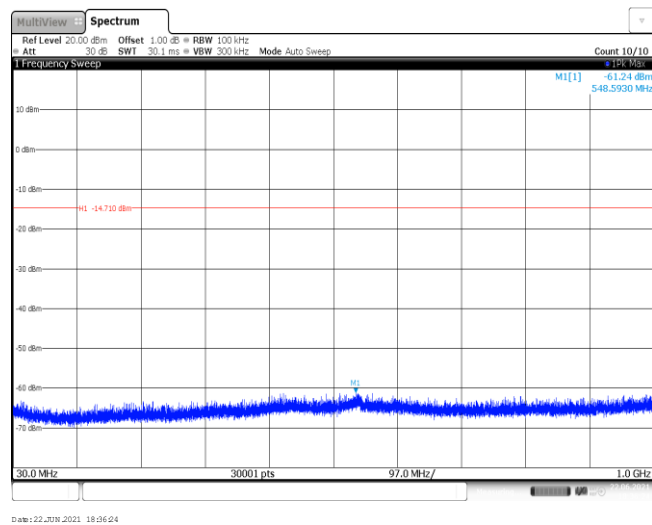


Test Item:	Spurious Emission	Modulation type:	$\pi/4$ DQPSK
CH00 Reference level	 Ref Level 30.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWI 1.04 ms VBW 300 kHz Mode Auto Sweep Count 100/100 M1[1] 5.29 dBm 2.402000 GHz CF 2.402 GHz 1001 pts 3.0 MHz/ Span 30.0 MHz Date: 22_JUN 2021 18:02:45		
CH00 30MHz~1000MHz	 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] -60.81 dBm 552.0530 MHz 30.0 MHz 30001 pts 97.0 MHz/ 1.0 GHz Date: 22_JUN 2021 18:03:01		
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] -52.53 dBm 25.744167 GHz 1.0 GHz 30001 pts 2.5 GHz/ 26.0 GHz Date: 22_JUN 2021 18:03:17		

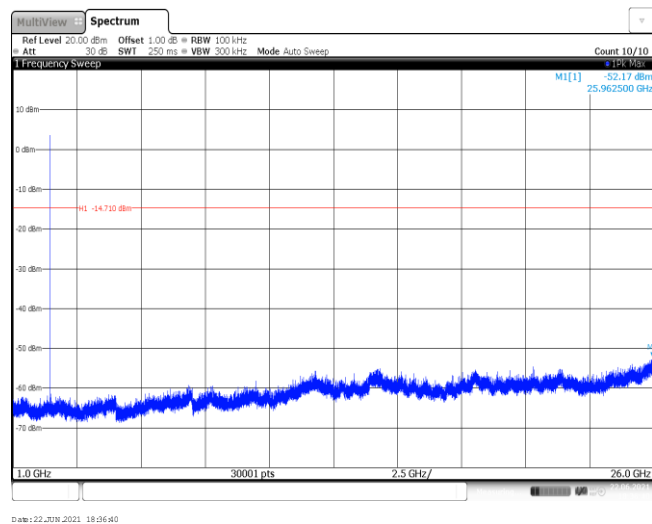
CH39
Reference level



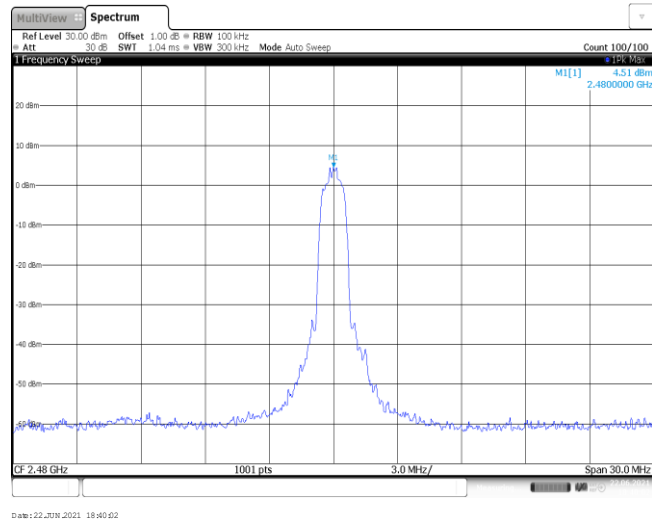
CH39
30MHz~1000MHz



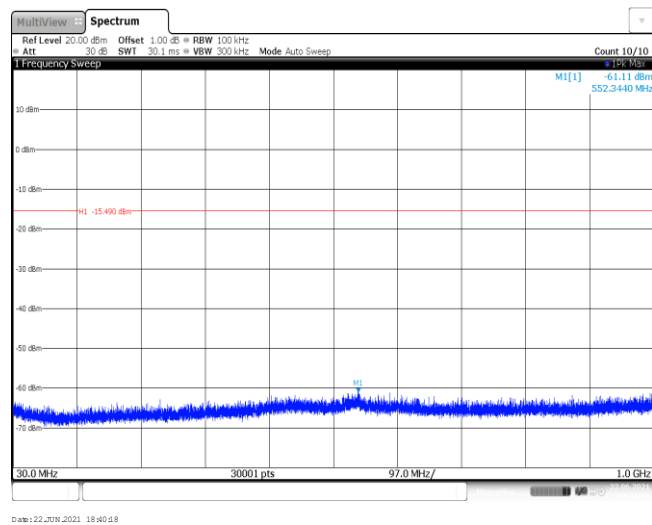
CH39
1GHz~26GHz



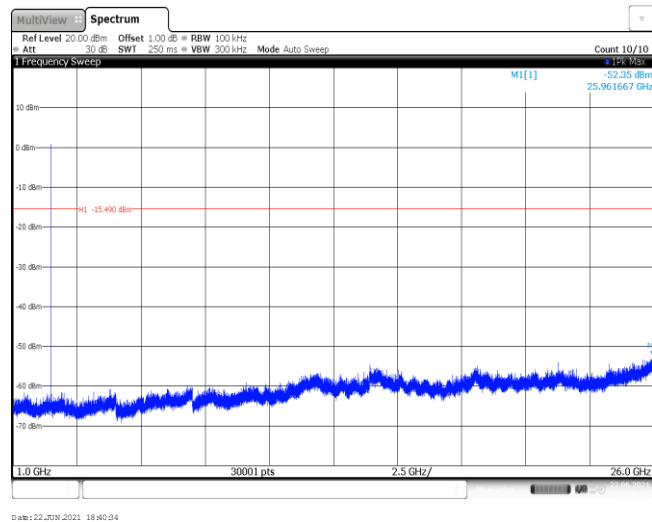
CH78
Reference level

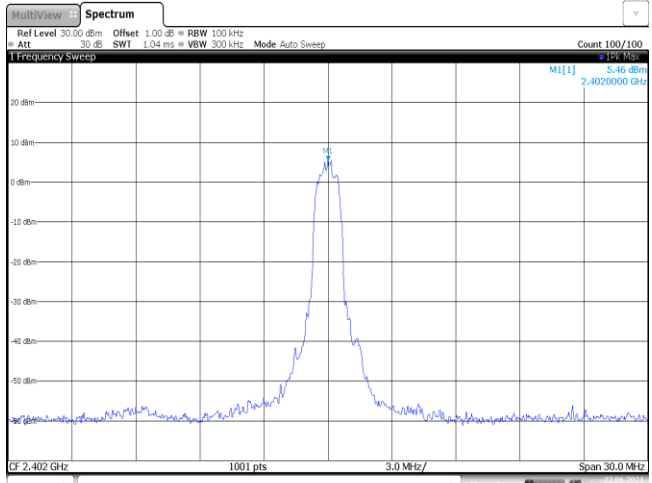
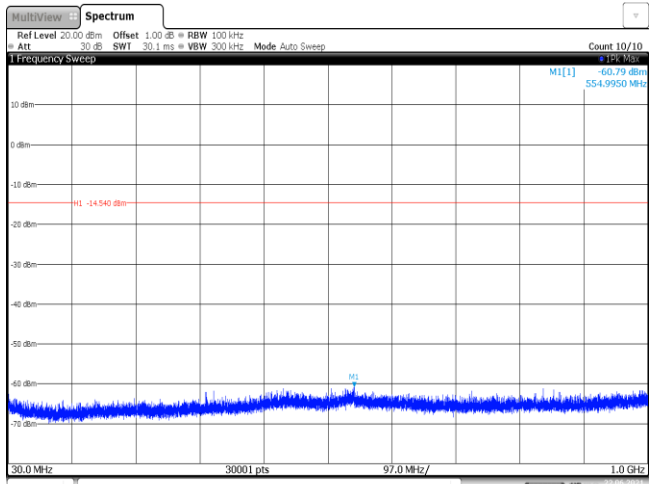
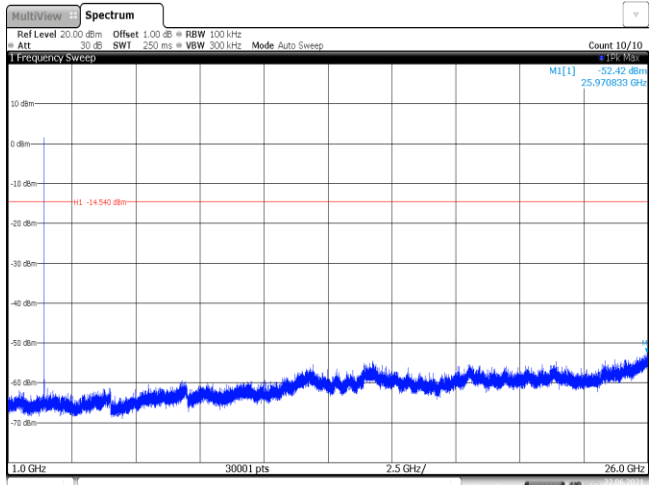


CH78
30MHz~1000MHz

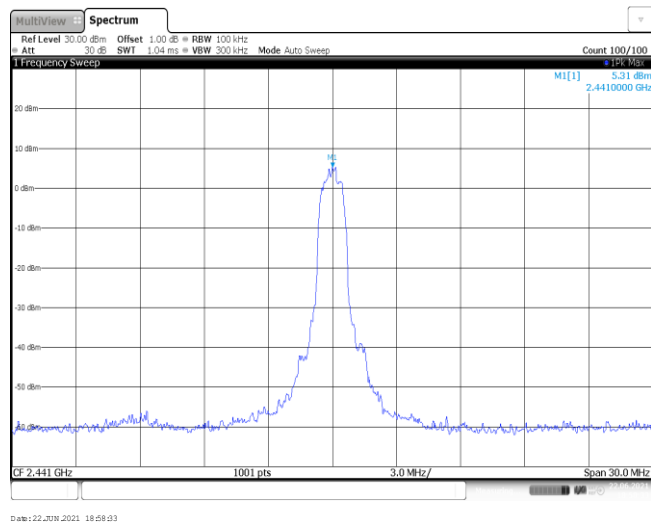


CH78
1GHz~26GHz

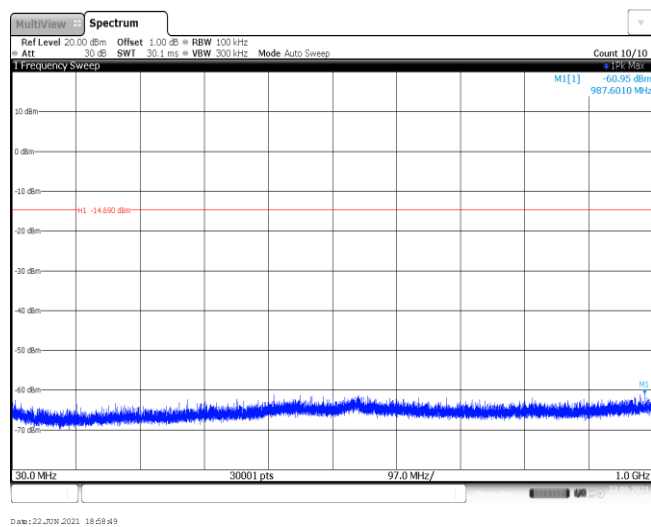


Test Item:	Spurious Emission	Modulation type:	8DPSK
CH00 Reference level	 Ref Level 30.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWI 1.04 ms VBW 300 kHz Mode Auto Sweep Count 100/100 M1[1] 5.46 dBm 2.4020000 GHz CF 2.402 GHz 1001 pts 3.0 MHz/ Span 30.0 MHz Date: 22 JUN 2021 20:22:45		
CH00 30MHz~1000MHz	 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] -52.42 dBm 554.9950 MHz M1 -14.540 dBm 30.0 MHz 30001 pts 97.0 MHz/ 1.0 GHz Date: 22 JUN 2021 20:22:52		
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] -52.42 dBm 25.970833 GHz M1 -14.540 dBm 1.0 GHz 30001 pts 2.5 GHz/ 26.0 GHz Date: 22 JUN 2021 20:22:49		

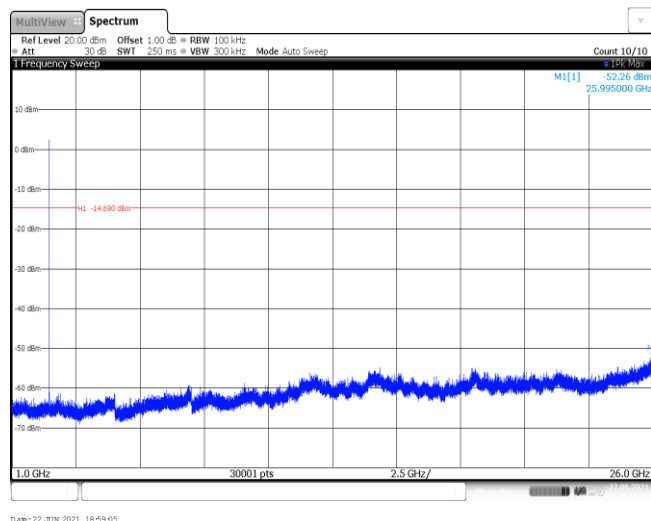
CH39
Reference level



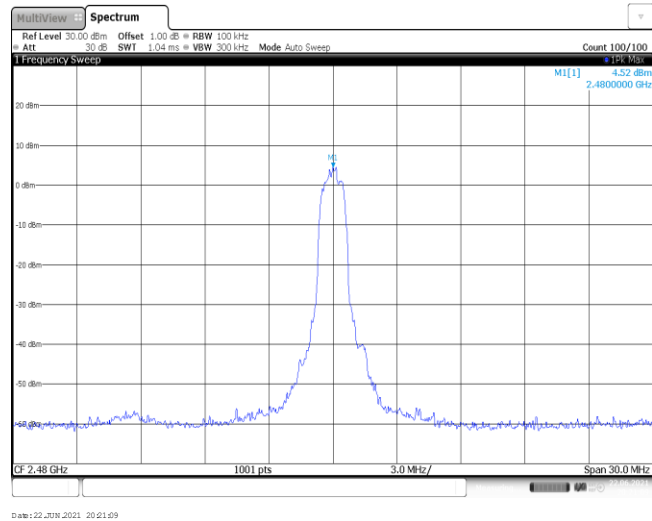
CH39
30MHz~1000MHz



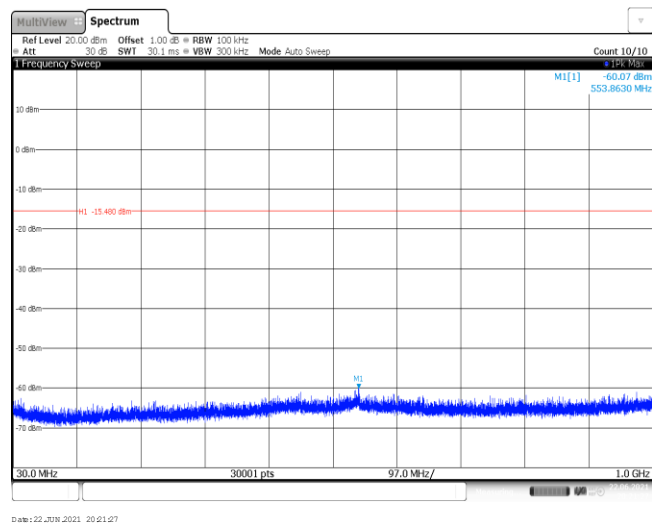
CH39
1GHz~26GHz



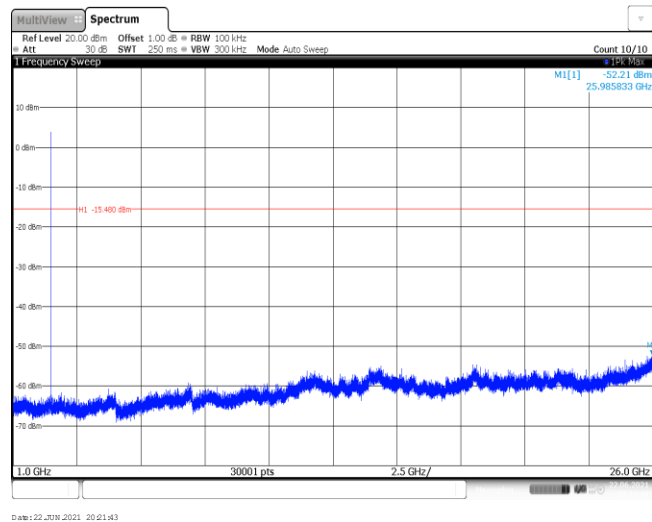
CH78
Reference level



CH78
30MHz~1000MHz



CH78
1GHz~26GHz



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