

APPENDIX REPORT

Project No.	SHT2202072102EW	Radio Specification	Bluetooth EDR
Test sample No.	YPHT22020721001	Model No.	ABX00049
Start test date	2022-05-17	Finish date	2022-05-17
Temperature	24.0℃	Humidity	45%
Test Engineer	Xiaoqin Li	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

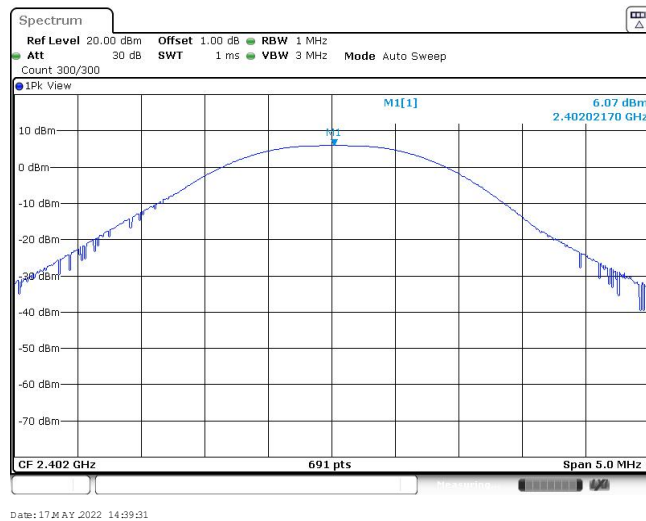
Appendix A: Peak Output Power

Modulation type	Channel	Peak Output power (dBm)	Average Output power (dBm)	Limit (dBm)	Result
GFSK	00	6.07	6.03	≤ 30.00	Pass
	39	6.97	6.79		
	78	7.34	7.23		
$\pi/4$ DQPSK	00	4.76	3.78	≤ 21.00	Pass
	39	6.40	5.44		
	78	7.10	6.63		
8DPSK	00	5.23	3.91	≤ 21.00	Pass
	39	6.61	5.42		
	78	7.24	6.60		

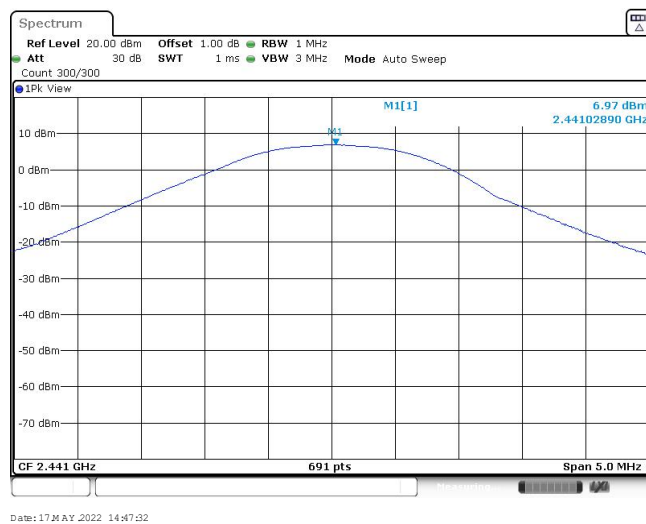
Modulation Type:

GFSK

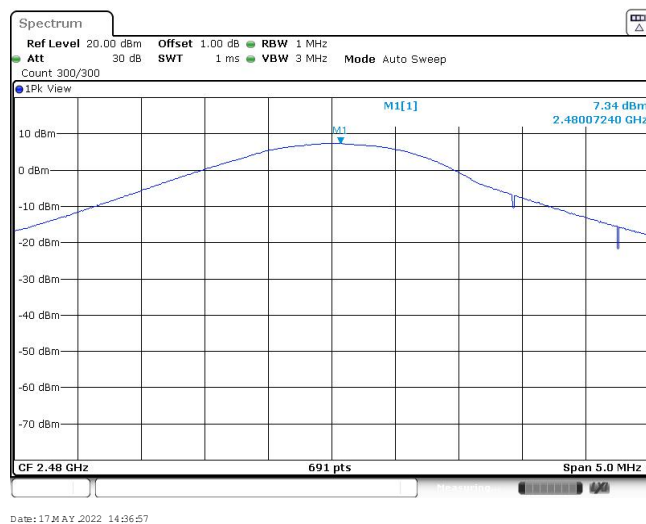
CH00



CH39



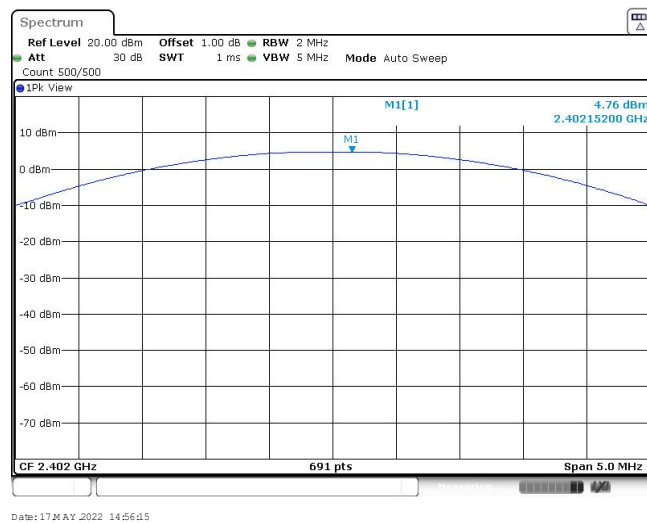
CH78



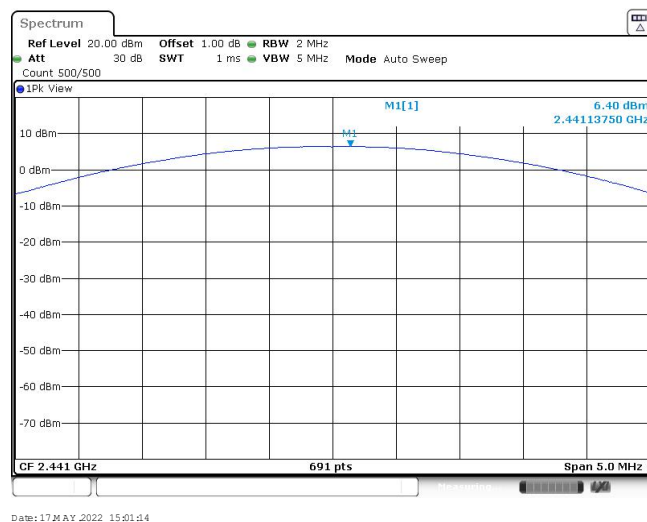
Modulation Type:

 $\pi/4$ DQPSK

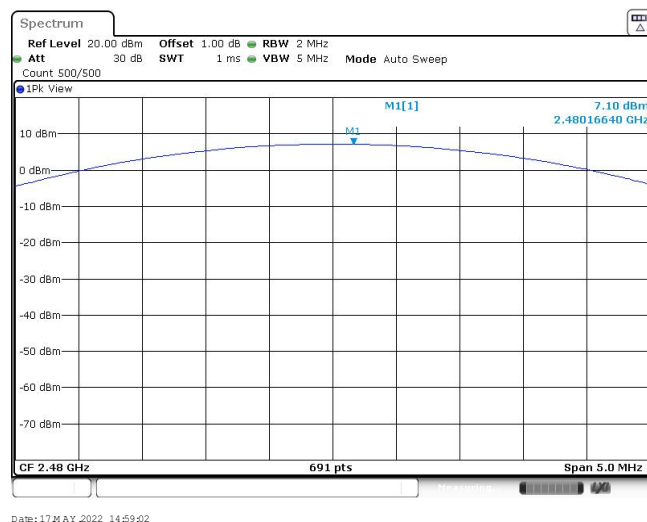
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CH39



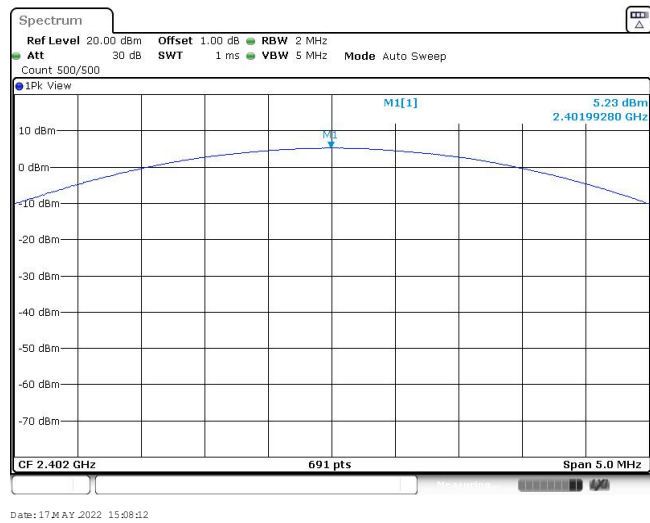
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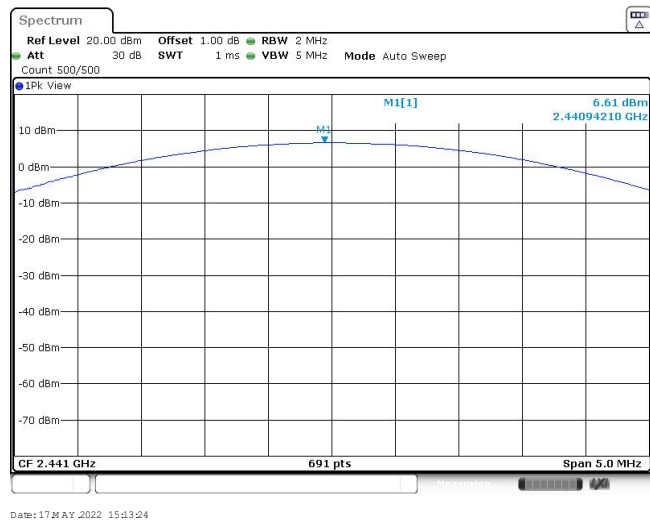
Modulation Type:

8DPSK

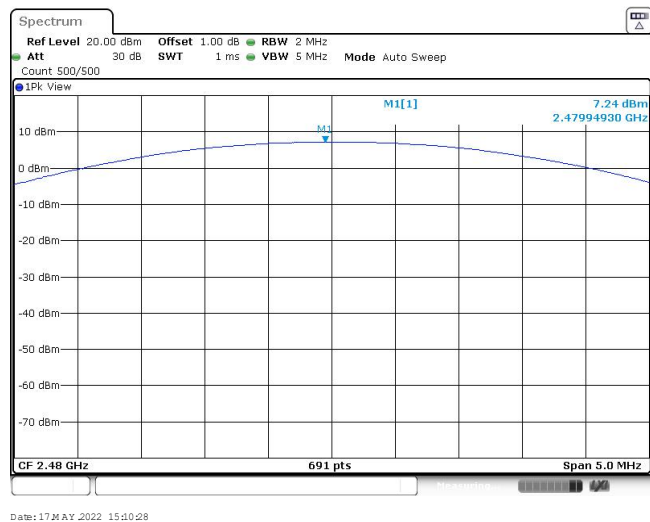
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CH39



CH78



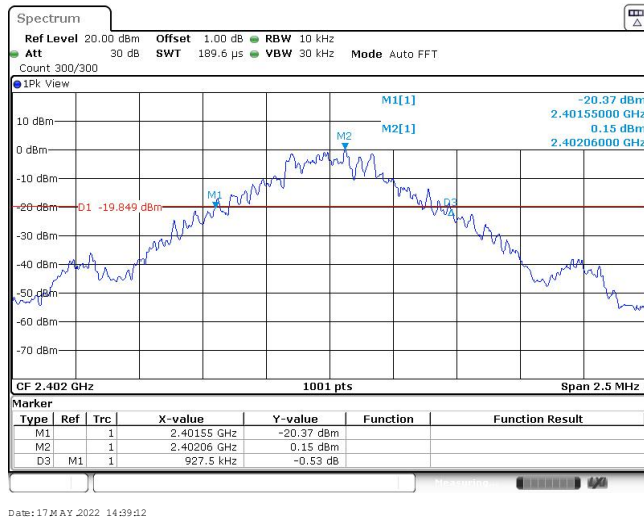
Appendix B : 20 dB Bandwidth

Modulation type	Channel	20 dB Bandwidth (kHz)	Limit (kHz)	Result
GFSK	00	927.50	-	Pass
	39	927.50		
	78	927.50		
$\pi/4$ DQPSK	00	1335.00	-	Pass
	39	1345.00		
	78	1347.50		
8DPSK	00	1322.50	-	Pass
	39	1317.50		
	78	1332.50		

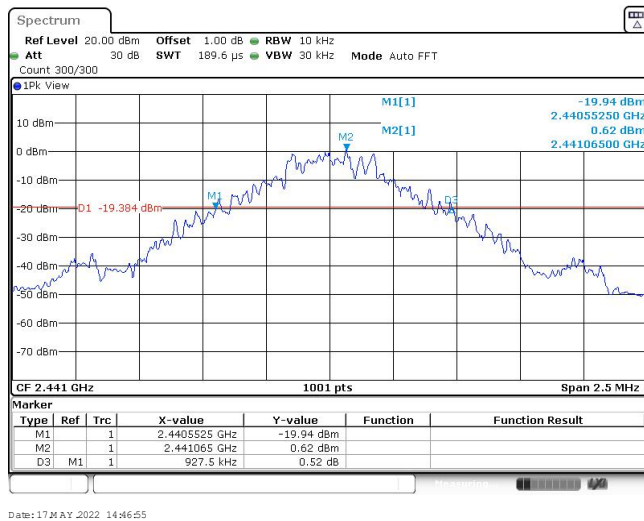
Modulation Type:

GFSK

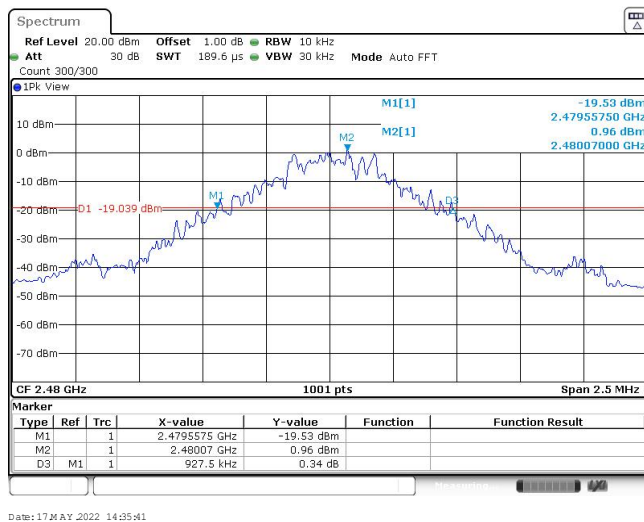
CH00



CH39



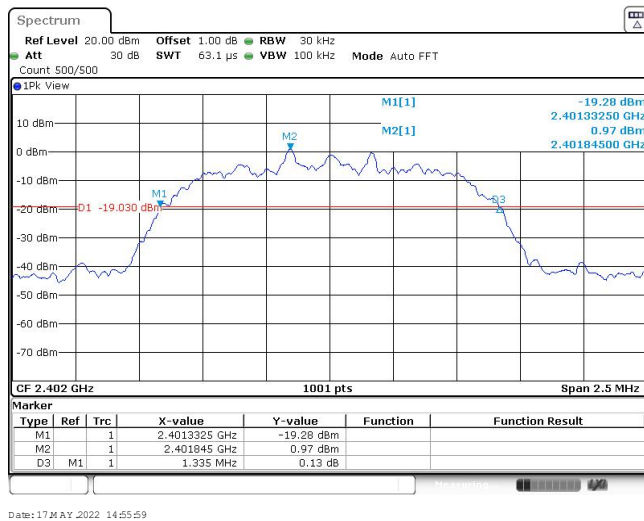
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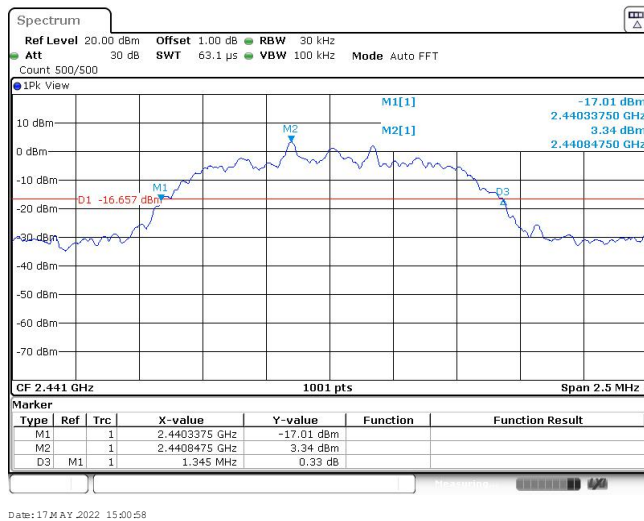
Modulation Type:

 $\pi/4$ DQPSK

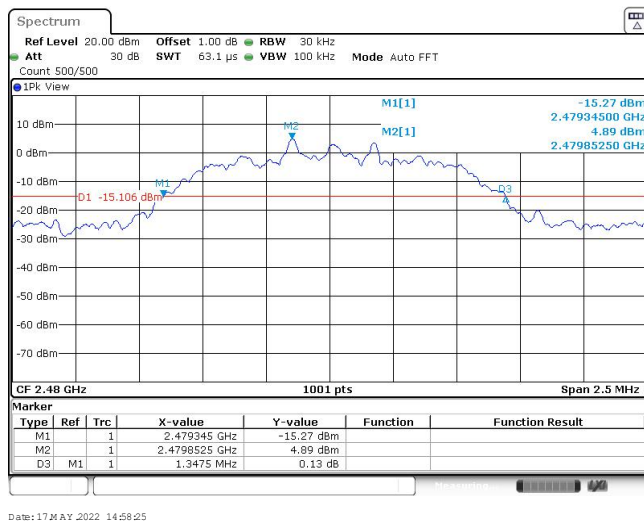
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CH39



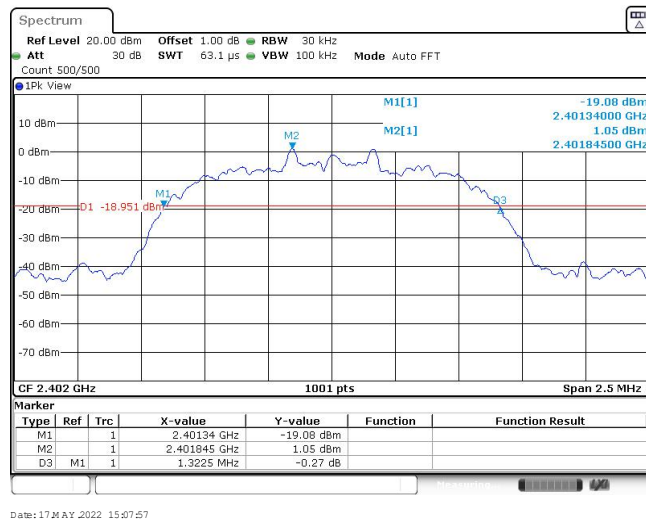
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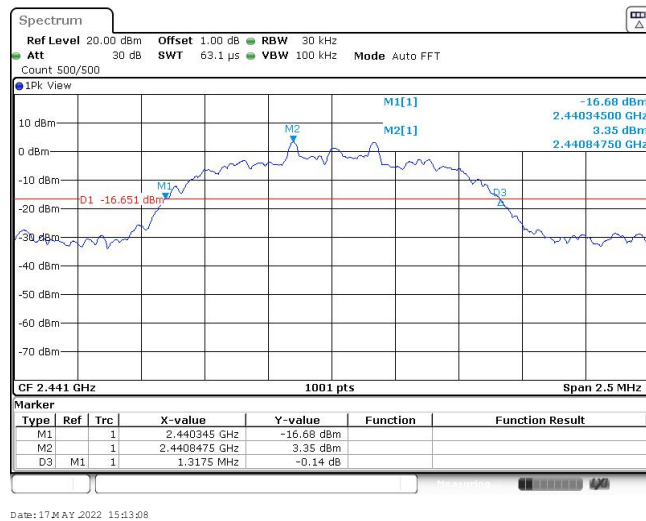
Modulation Type:

8DPSK

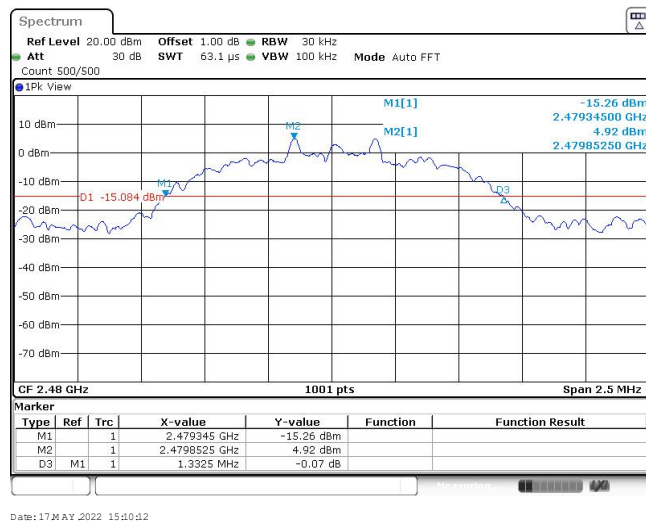
CH00



CH39

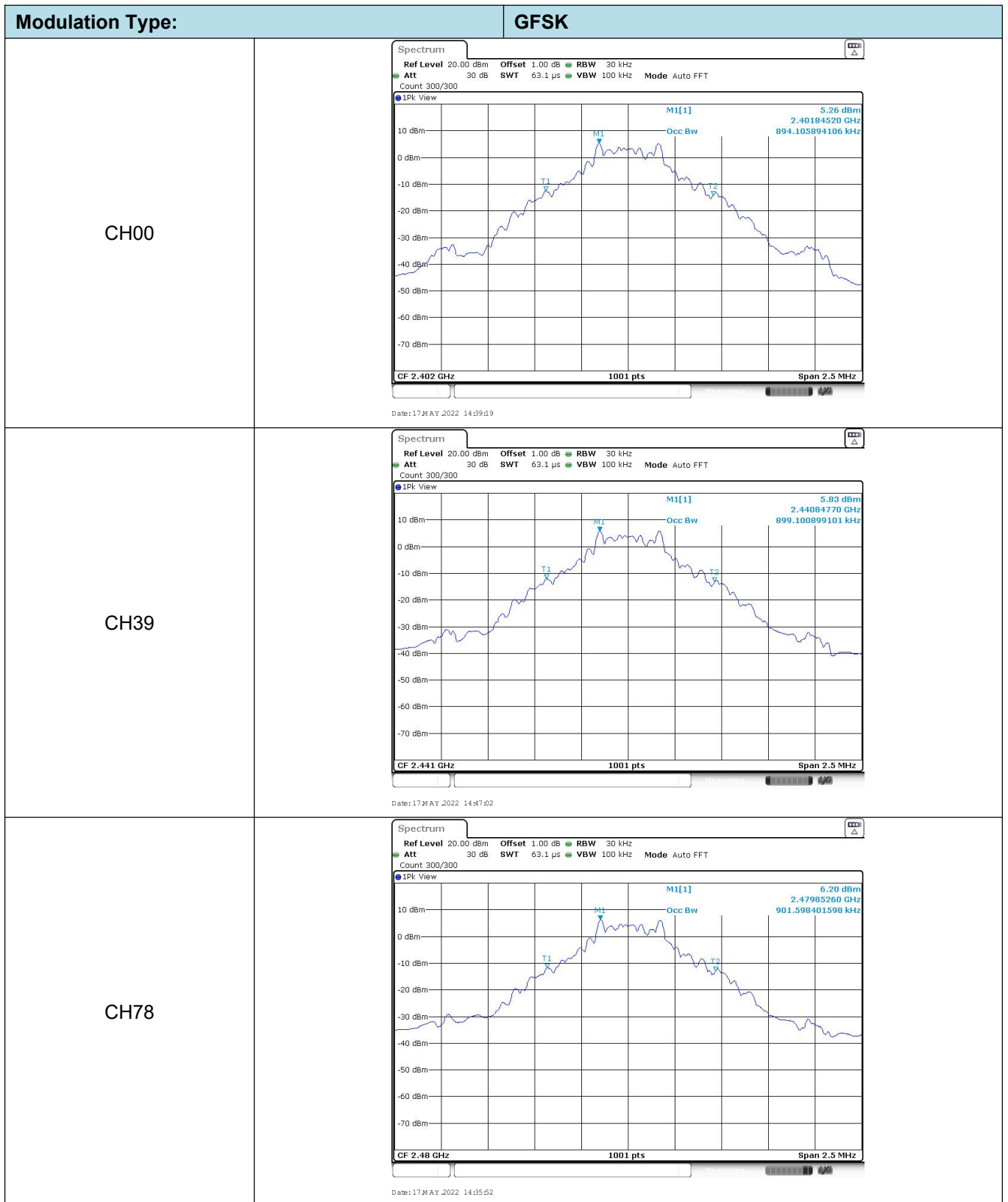


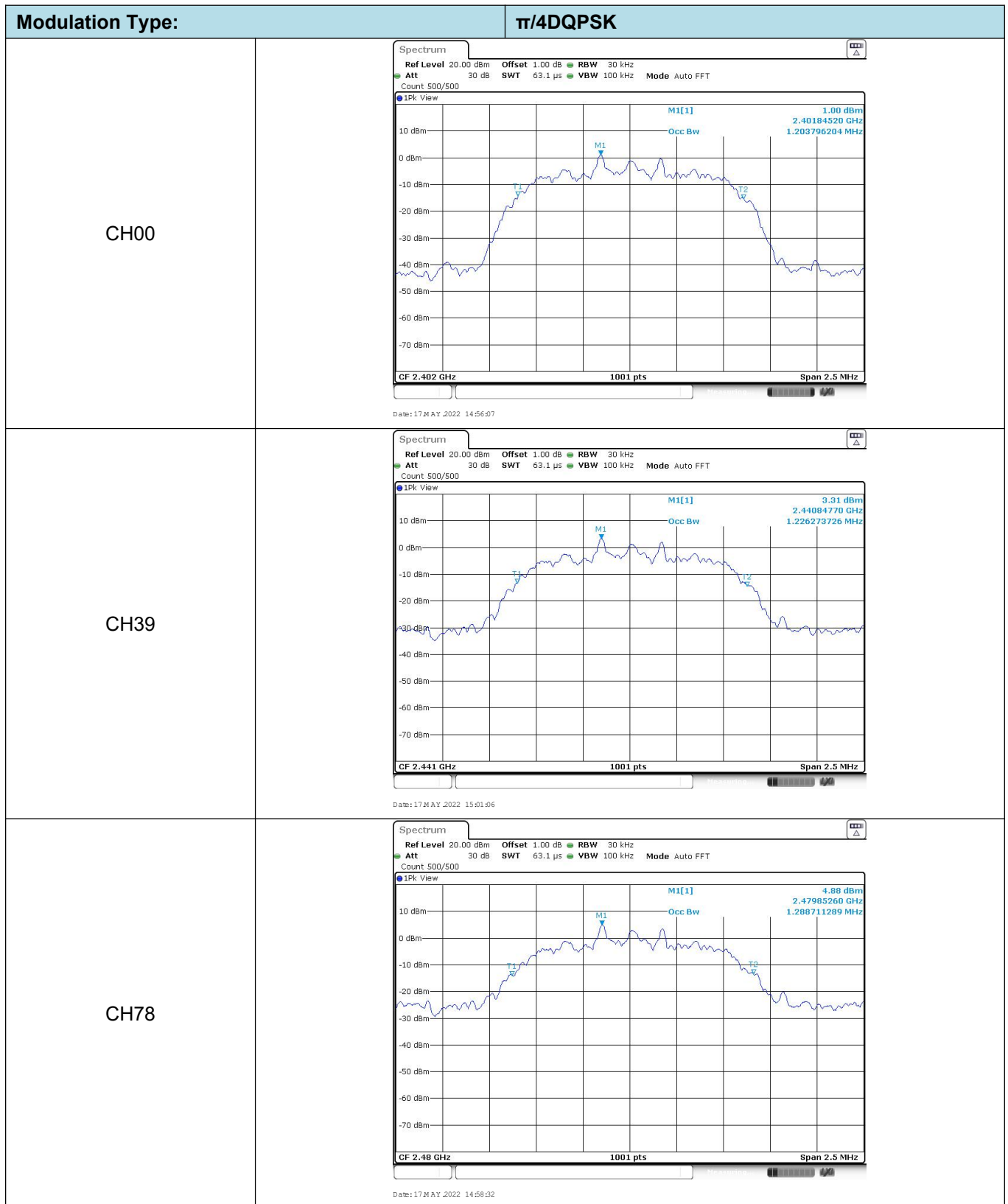
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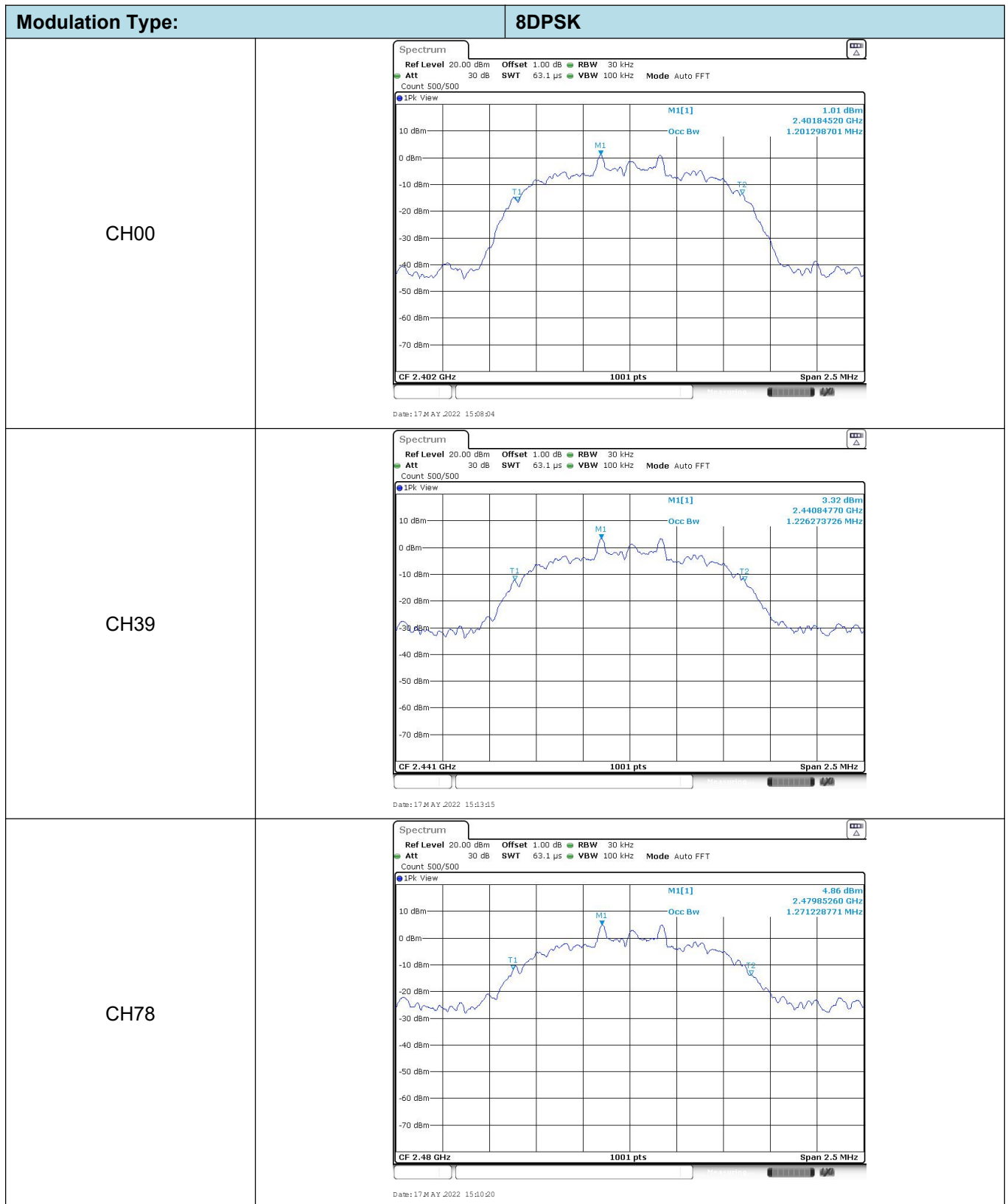


Appendix C: 99% Occupied Bandwidth

Modulation type	Channel	99% Occupied Bandwidth (MHz)	Limit (MHz)	Result
GFSK	00	0.89	-	Pass
	39	0.90		
	78	0.90		
$\pi/4$ DQPSK	00	1.20	-	Pass
	39	1.23		
	78	1.29		
8DPSK	00	1.20	-	Pass
	39	1.23		
	78	1.27		







Appendix D: Carrier Frequencies Separation

Modulation type	Channel	Carrier Frequencies Separation (MHz)	Limit (kHz) *	Result
GFSK	39	1.00	≥ 927.50	Pass
$\pi/4$ DQPSK	39	1.00	≥ 898.33	Pass
8DPSK	39	1.00	≥ 888.33	Pass

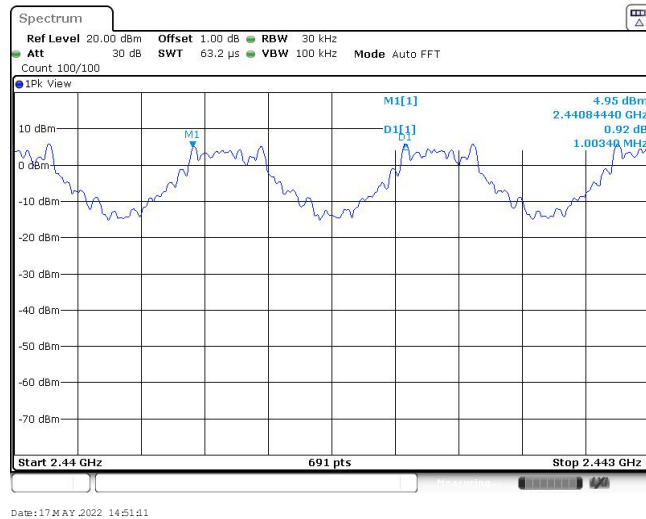
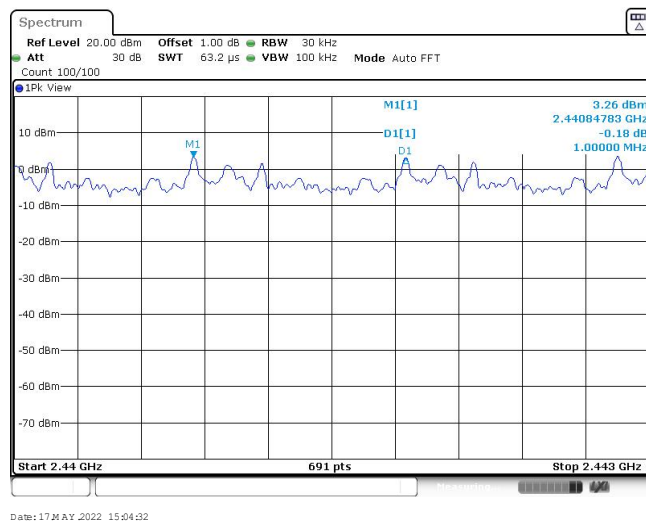
Note:

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

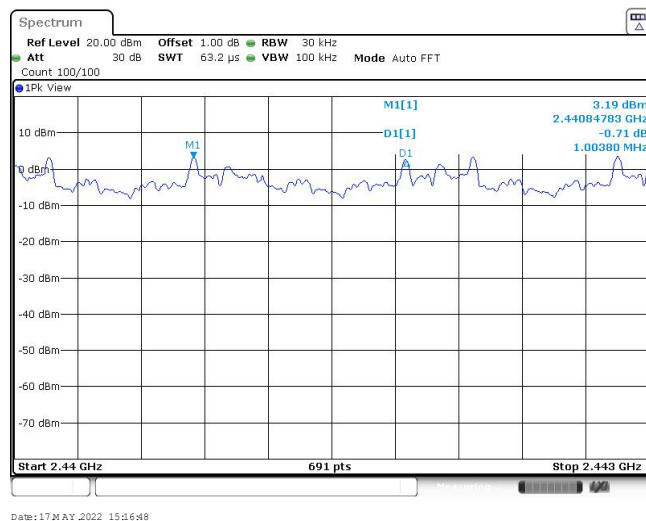
$\pi/4$ DQPSK limit = $2/3$ * The maximum 20 dB Bandwidth for $\pi/4$ DQPSK modulation on the appendix B.

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

GFSK

 $\pi/4$ DQPSK

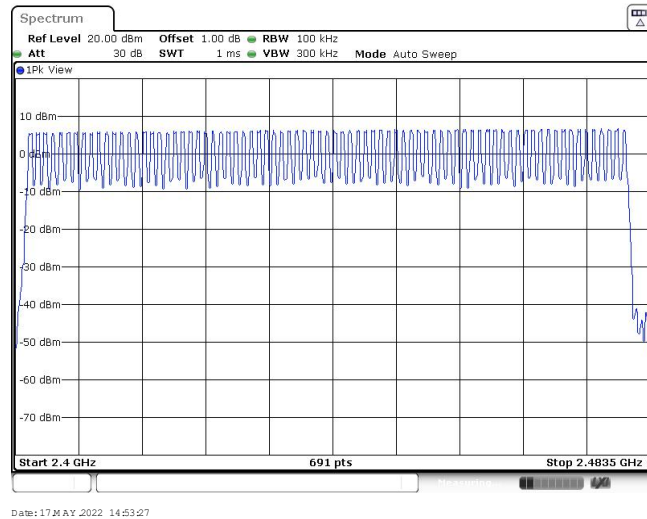
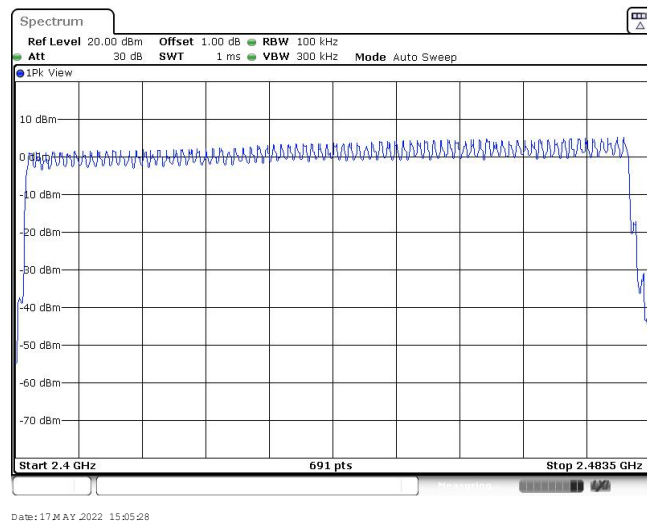
8DPSK



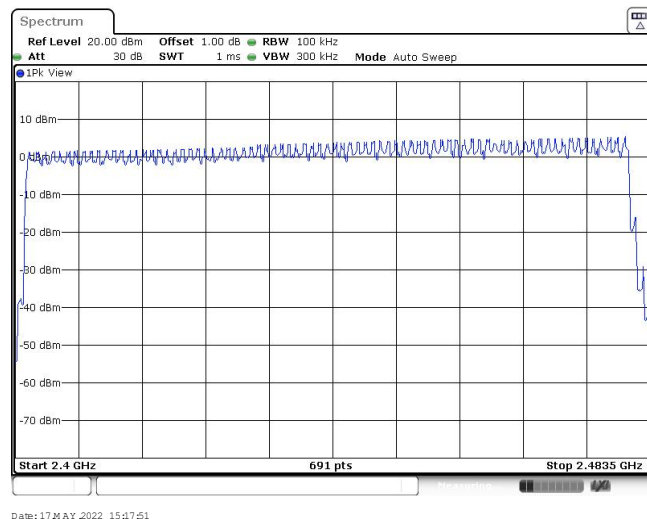
Appendix E: Hopping Channel Number

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

GFSK

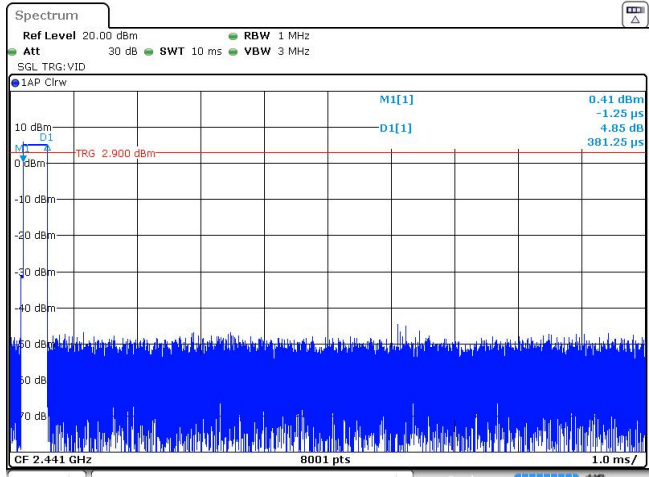
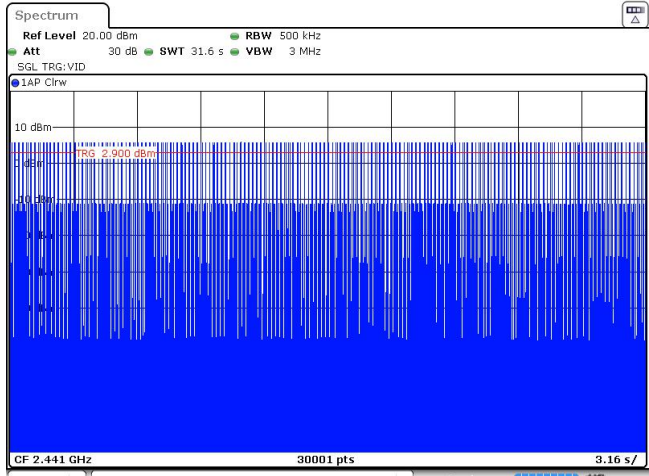
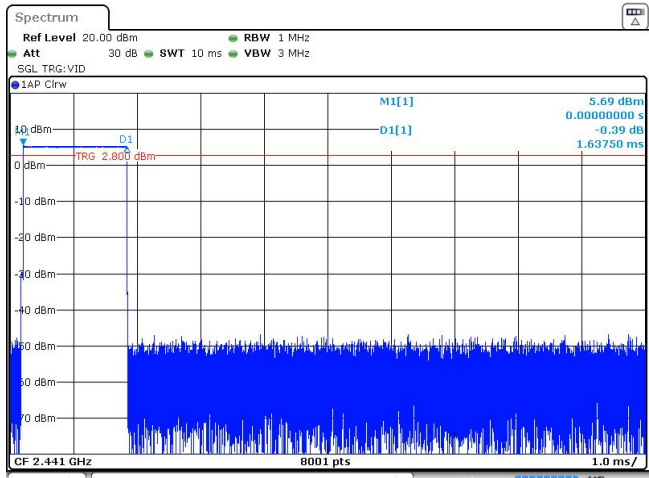
 $\pi/4$ DQPSK

8DPSK

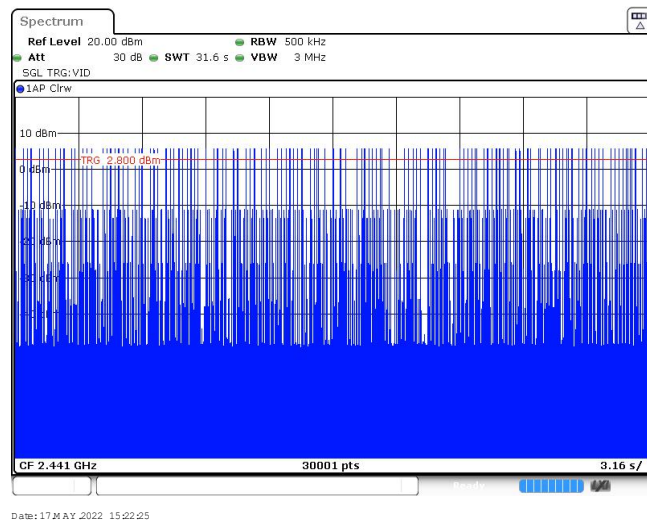


Appendix F: Dwell Time

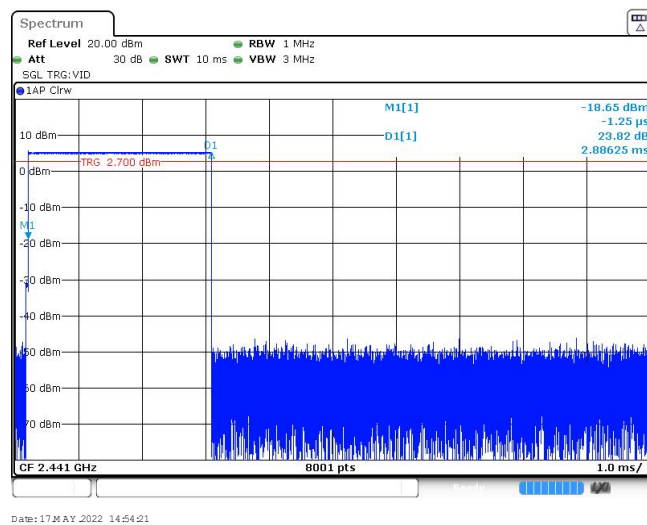
Modulation type	Packet	Burst Width [ms]	Total Hops[hop*ch]	Dwell time (Second)	Limit (Second)	Result
GFSK	DH1	0.38	318	0.12	≤ 0.40	Pass
	DH3	1.64	166	0.27		
	DH5	2.89	101	0.29		
$\pi/4$ DQPSK	2DH1	0.39	319	0.12	≤ 0.40	Pass
	2DH3	1.64	160	0.26		
	2DH5	2.89	94	0.27		
8DPSK	3DH1	0.39	317	0.12	≤ 0.40	Pass
	3DH3	1.64	160	0.26		
	3DH5	2.89	93	0.27		

Modulation Type:	GFSK
DH1 Burst width	 Spectrum plot showing DH1 Burst width. The plot displays a signal at 2.441 GHz with a bandwidth of 8001 pts. The y-axis ranges from -70 dBm to 10 dBm. The x-axis ranges from 0 to 1.0 ms. The plot shows a burst of signal at approximately 0.41 dBm, with a duration of 1.25 μs. The plot also shows a trigger level of 2.900 dBm. The plot includes a table of parameters: M1[1] 0.41 dBm, D1[1] -1.25 μs, and D1[1] 4.85 dB. The plot also shows a trigger level of 2.900 dBm and a duration of 381.25 μs. Date: 17 MAY 2022 15:20:47
DH1 Burst number	 Spectrum plot showing DH1 Burst number. The plot displays a signal at 2.441 GHz with a bandwidth of 30001 pts. The y-axis ranges from -70 dBm to 10 dBm. The x-axis ranges from 0 to 3.16 s. The plot shows a burst of signal at approximately 0.41 dBm, with a duration of 1.25 μs. The plot also shows a trigger level of 2.900 dBm. The plot includes a table of parameters: M1[1] 0.41 dBm, D1[1] -1.25 μs, and D1[1] 4.85 dB. The plot also shows a trigger level of 2.900 dBm and a duration of 381.25 μs. Date: 17 MAY 2022 15:21:20
DH3 Burst width	 Spectrum plot showing DH3 Burst width. The plot displays a signal at 2.441 GHz with a bandwidth of 8001 pts. The y-axis ranges from -70 dBm to 10 dBm. The x-axis ranges from 0 to 1.0 ms. The plot shows a burst of signal at approximately 5.69 dBm, with a duration of 0.00000000 s. The plot also shows a trigger level of 2.800 dBm. The plot includes a table of parameters: M1[1] 5.69 dBm, D1[1] 0.00000000 s, and D1[1] -0.39 dB. The plot also shows a trigger level of 2.800 dBm and a duration of 1.63750 ms. Date: 17 MAY 2022 15:21:52

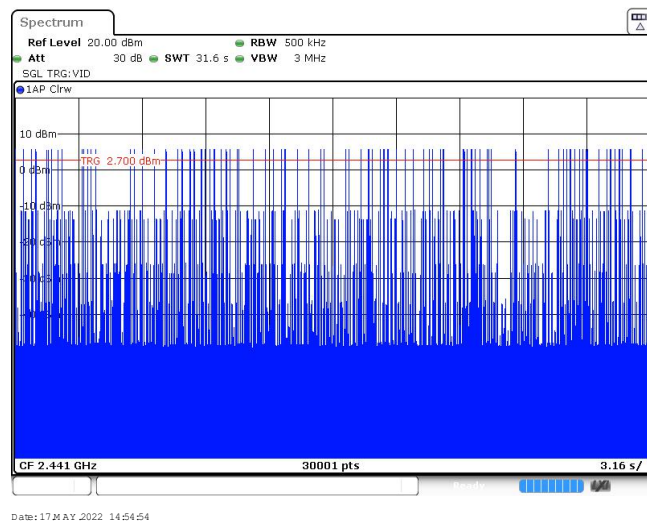
DH3
Burst number



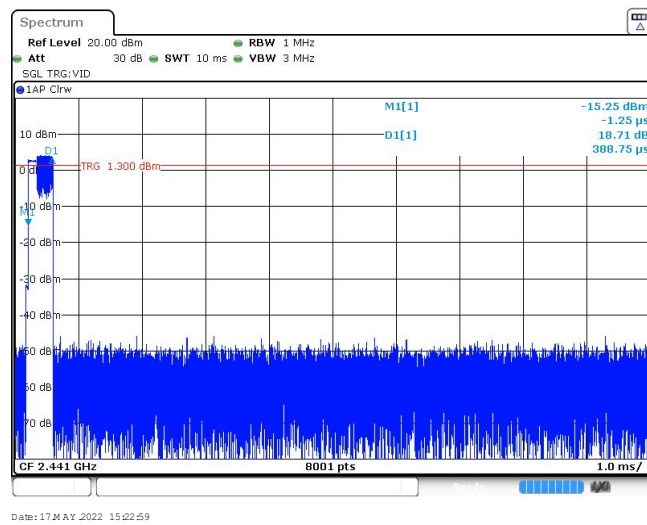
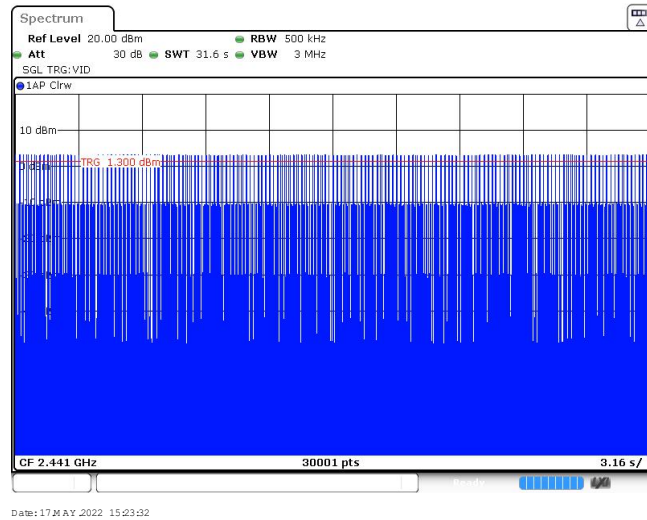
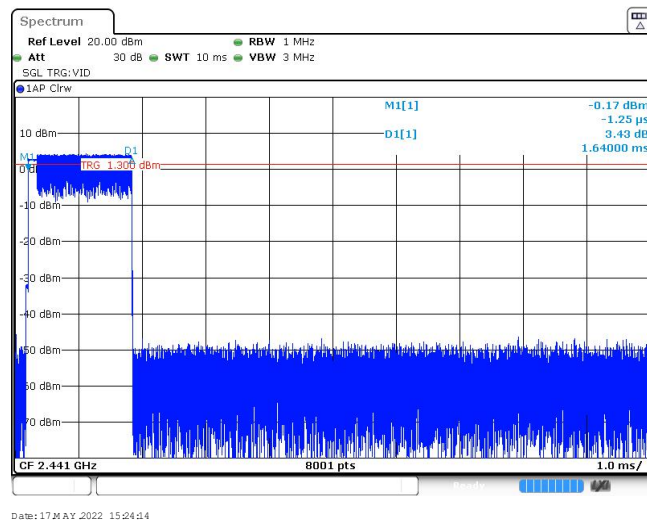
DH5
Burst width



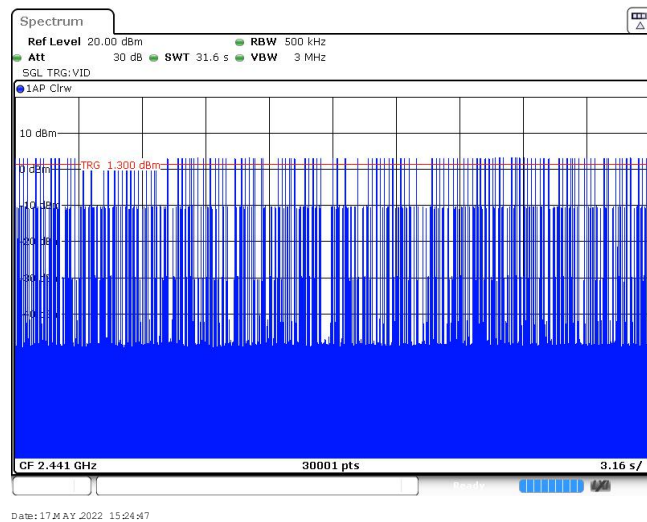
DH5
Burst number



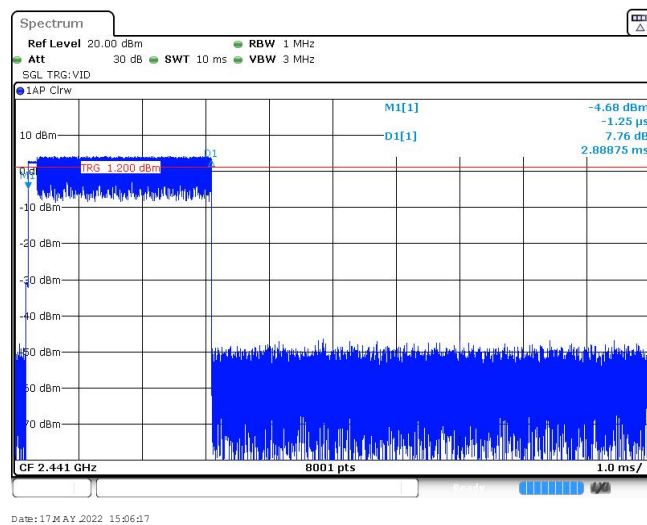
Modulation Type:

 $\pi/4$ DQPSK2DH1
Burst width2DH1
Burst number2DH3
Burst width

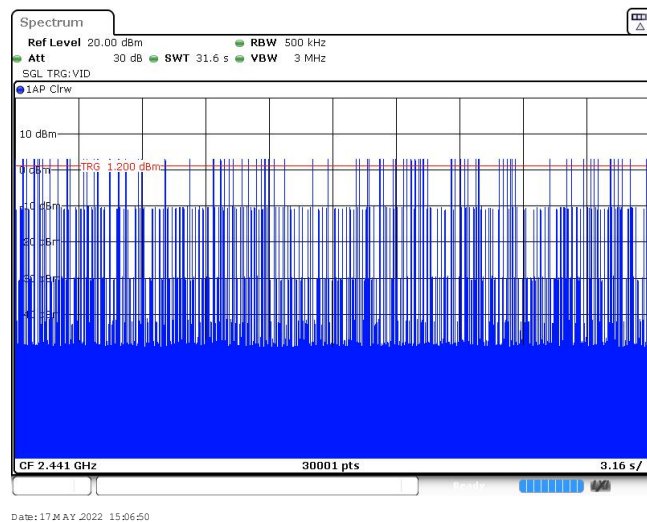
2DH3
Burst number



2DH5
Burst width

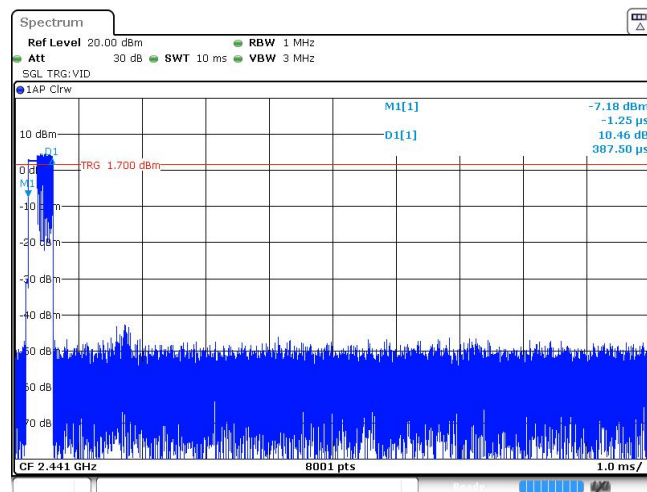


2DH5
Burst number

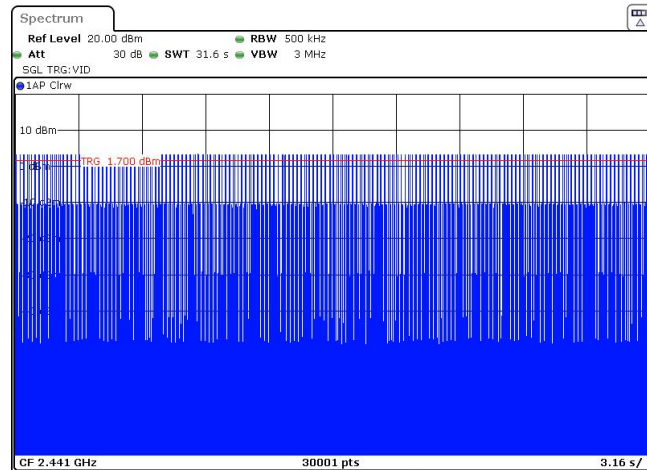


Modulation Type:

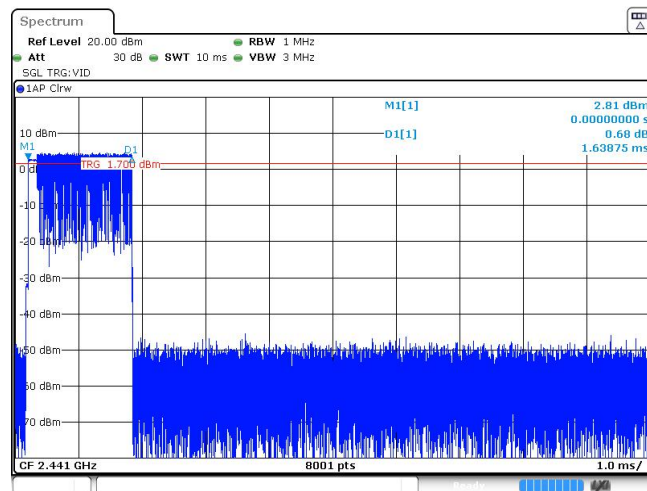
8DPSK

3DH1
Burst width

Date: 17 MAY 2022 15:26:31

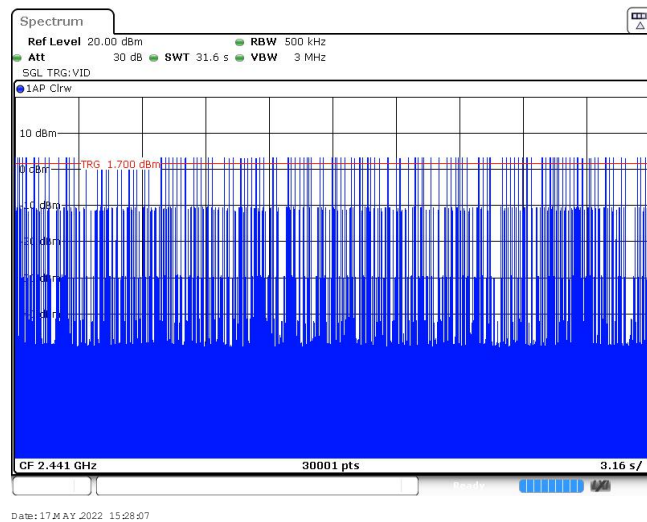
3DH1
Burst number

Date: 17 MAY 2022 15:27:04

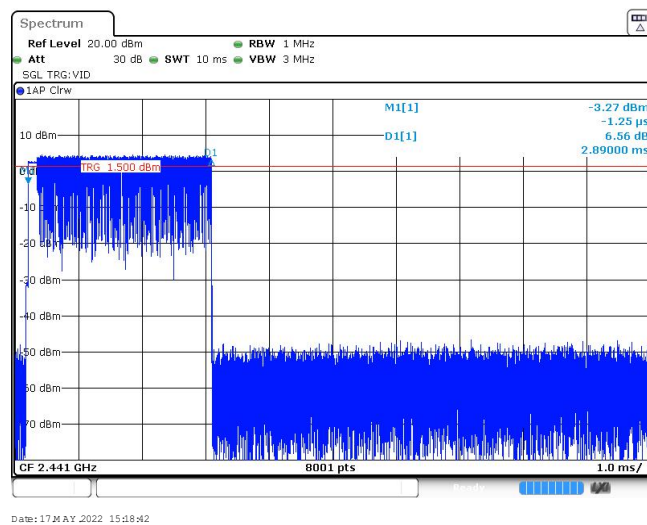
3DH3
Burst width

Date: 17 MAY 2022 15:27:34

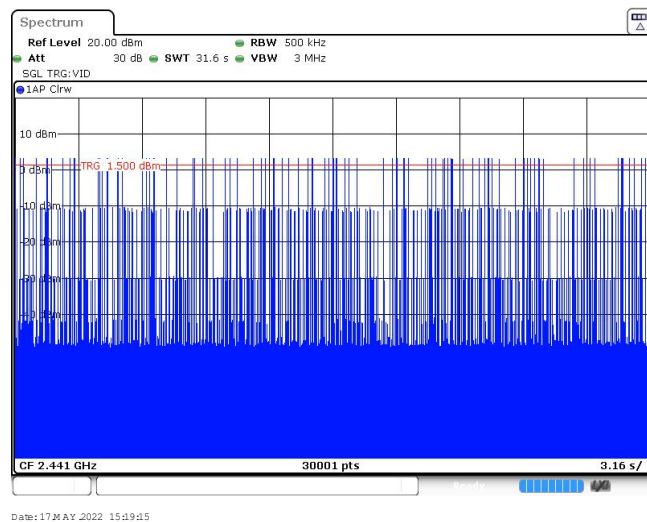
3DH3
Burst number



3DH5
Burst width



3DH5
Burst number



Appendix G: Duty Cycle Correction Factor (DCCF)**DCCF Calculate Formula**

$$\text{DCCF} = 20 * \text{Log}(\text{duty cycle}) = 20 * \text{Log}(T_{\text{on time}} / T_{\text{period}})$$

Modulation type	Test Frequency (MHz)	T _{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	2.87	100	2	-24.82
8DPSK	2441	2.87	100	1	-30.84