


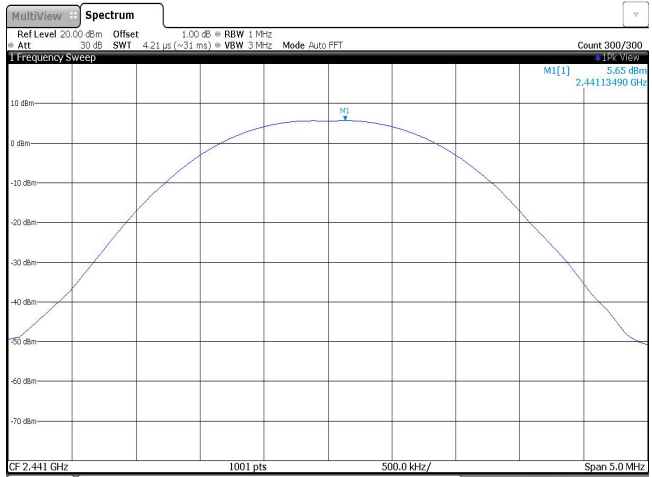
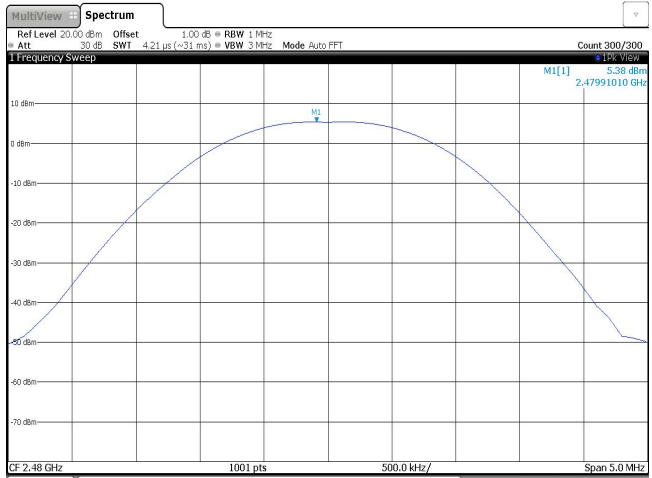
APPENDIX REPORT

Project No.	SHT2111009101EW	Radio Specification	Bluetooth EDR
Test sample No.	YPHT21110091003	Model No.	R4
Start test date	2021-11-10	Finish date	2021-11-11
Temperature	25.8℃	Humidity	34%
Test Engineer	Weiyang Xiang	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

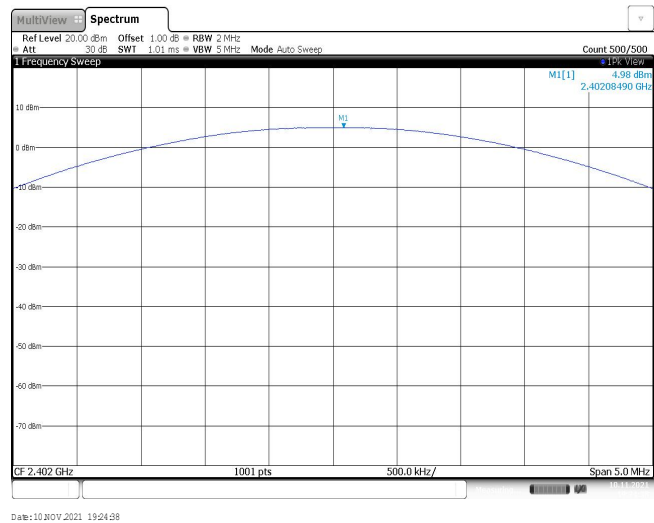
Modulation type	Channel	Peak Output power (dBm)	Average Output power (dBm)	Limit (dBm)	Result
GFSK	00	5.04	5.03	≤ 30.00	Pass
	39	5.65	5.62		
	78	5.38	5.36		
$\pi/4$ DQPSK	00	4.98	4.35	≤ 21.00	Pass
	39	5.50	4.85		
	78	5.43	4.82		
8DPSK	00	5.12	4.43	≤ 21.00	Pass
	39	4.61	3.92		
	78	5.80	5.12		

Modulation Type:	GFSK
CH00	 <p>The spectrum plot for CH00 shows a GFSK signal centered at 2.402 GHz. The peak level is 5.04 dBm. The plot includes a frequency sweep from 2.402 GHz to 2.4021500 GHz. The y-axis represents power in dBm, ranging from -70 to 10. The x-axis represents frequency in GHz, ranging from 2.402 to 2.4021500. The plot is titled 'Spectrum' and includes parameters: Ref Level 20.00 dBm, Offset 30 dB, SWI 4.21 us (<31 ms), VBW 3 MHz, Mode Auto FFT, Count 300/300, and Span 5.0 MHz.</p>
CH39	 <p>The spectrum plot for CH39 shows a GFSK signal centered at 2.441 GHz. The peak level is 5.65 dBm. The plot includes a frequency sweep from 2.441 GHz to 2.44113490 GHz. The y-axis represents power in dBm, ranging from -70 to 10. The x-axis represents frequency in GHz, ranging from 2.441 to 2.44113490. The plot is titled 'Spectrum' and includes parameters: Ref Level 20.00 dBm, Offset 30 dB, SWI 4.21 us (<31 ms), VBW 3 MHz, Mode Auto FFT, Count 300/300, and Span 5.0 MHz.</p>
CH78	 <p>The spectrum plot for CH78 shows a GFSK signal centered at 2.48 GHz. The peak level is 5.38 dBm. The plot includes a frequency sweep from 2.48 GHz to 2.47991010 GHz. The y-axis represents power in dBm, ranging from -70 to 10. The x-axis represents frequency in GHz, ranging from 2.48 to 2.47991010. The plot is titled 'Spectrum' and includes parameters: Ref Level 20.00 dBm, Offset 30 dB, SWI 4.21 us (<31 ms), VBW 3 MHz, Mode Auto FFT, Count 300/300, and Span 5.0 MHz.</p>

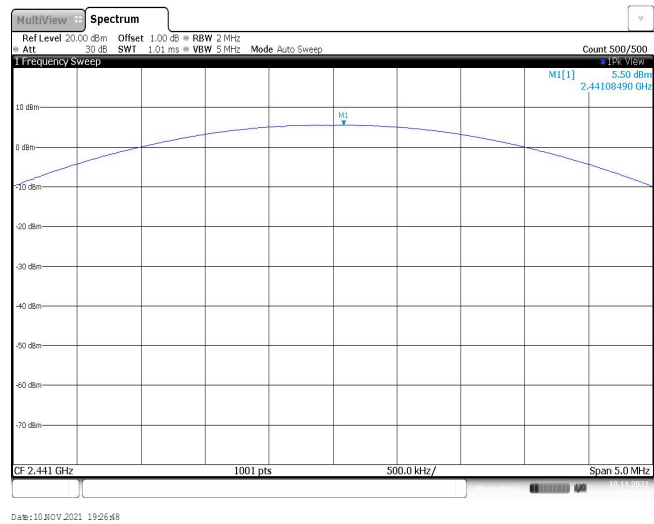
Modulation Type:

 $\pi/4$ DQPSK

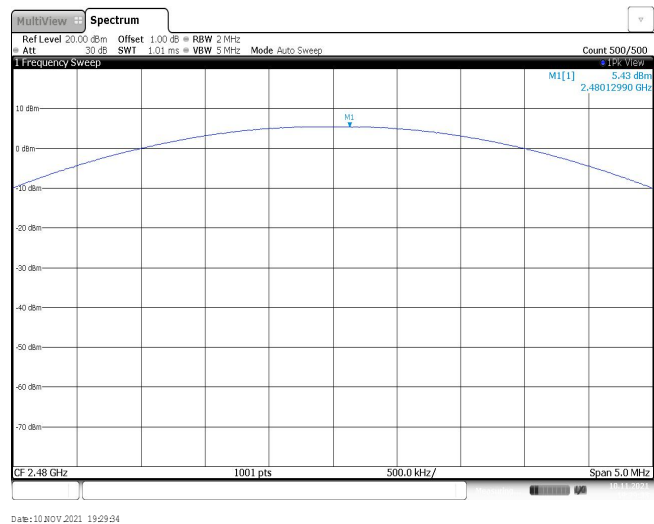
CH00



CH39



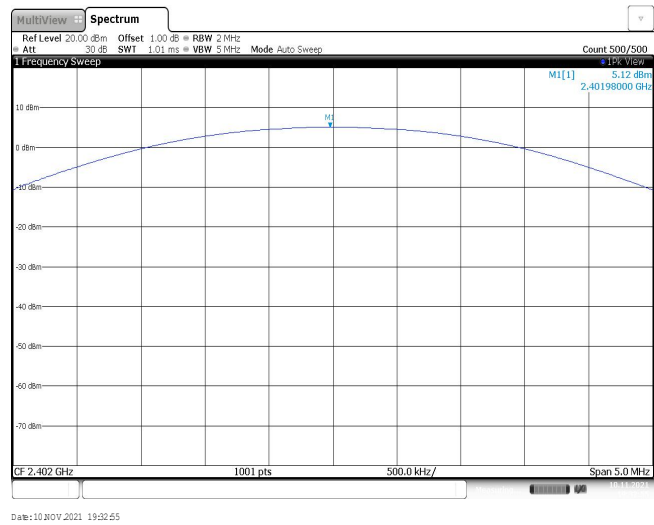
CH78



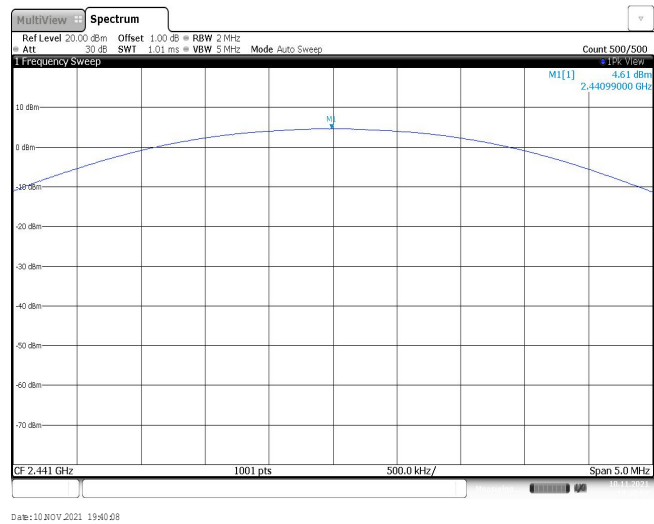
Modulation Type:

8DPSK

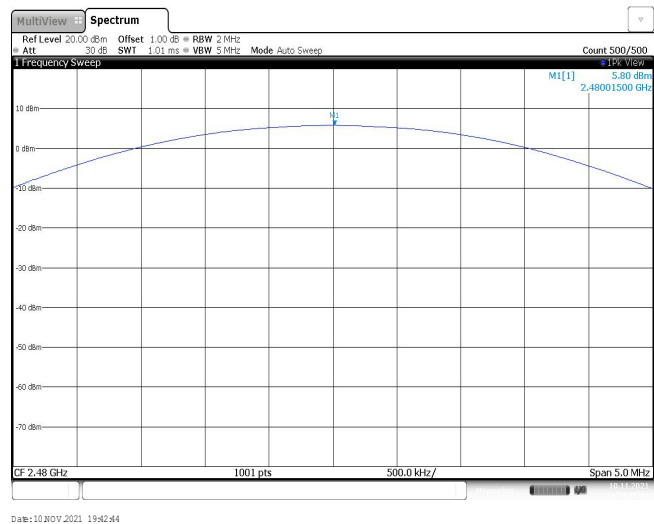
CH00



CH39



CH78



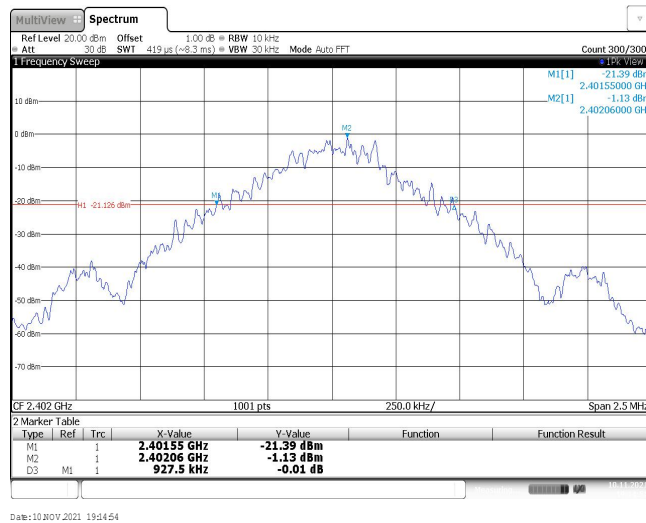
Appendix B : 20 dB Bandwidth

Modulation type	Channel	20 dB Bandwidth (kHz)	Limit (kHz)	Result
GFSK	00	927.50	-	Pass
	39	927.50		
	78	930.00		
$\pi/4$ DQPSK	00	1290.00	-	Pass
	39	1285.00		
	78	1290.00		
8DPSK	00	1295.00	-	Pass
	39	1280.00		
	78	1290.00		

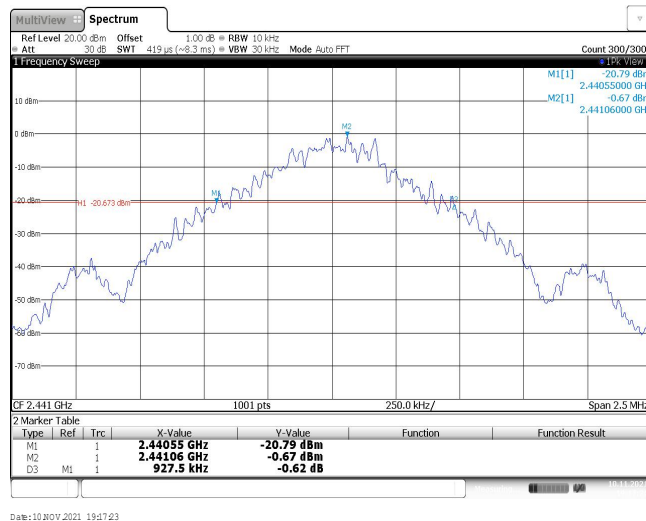
Modulation Type:

GFSK

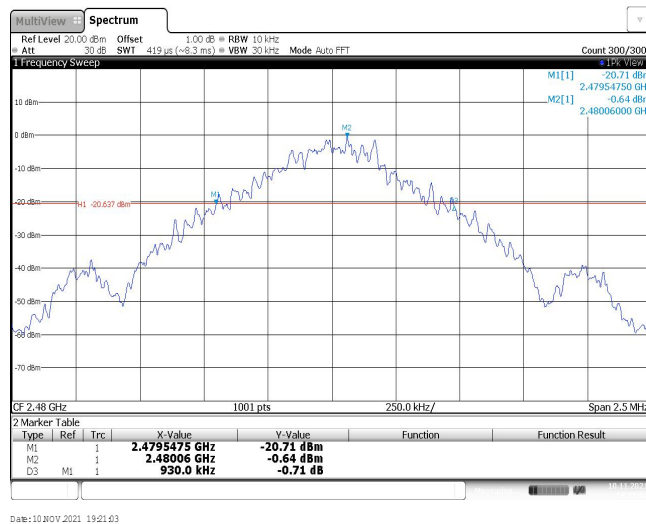
CH00



CH39



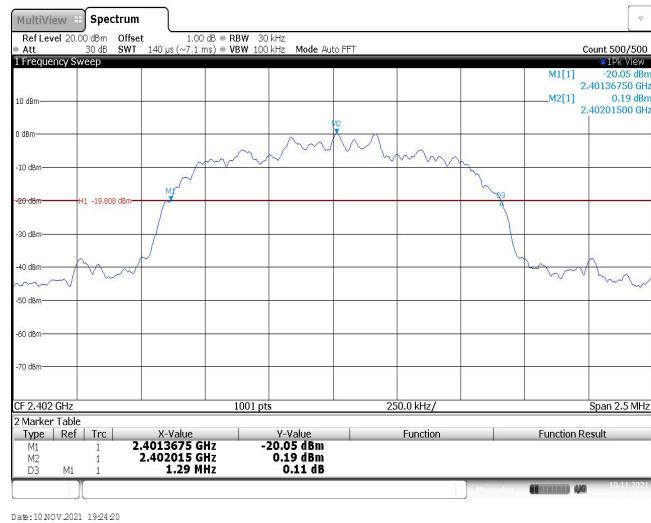
CH78



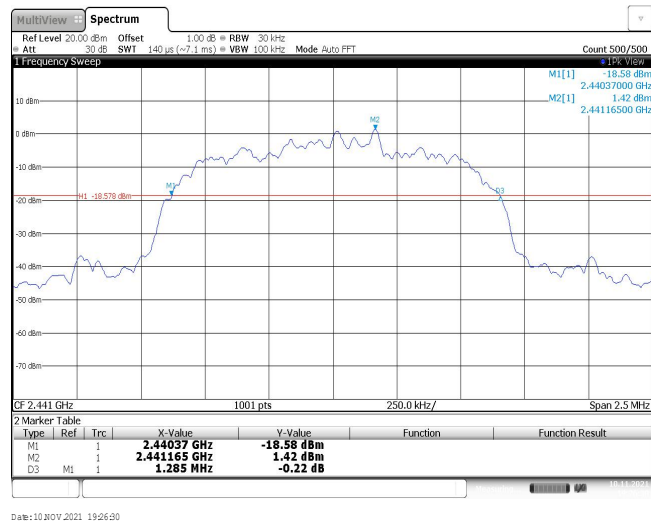
Modulation Type:

 $\pi/4$ DQPSK

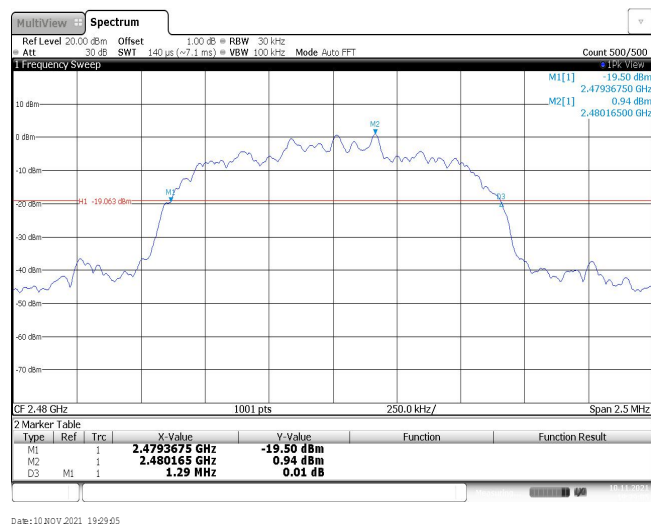
CH00



CH39



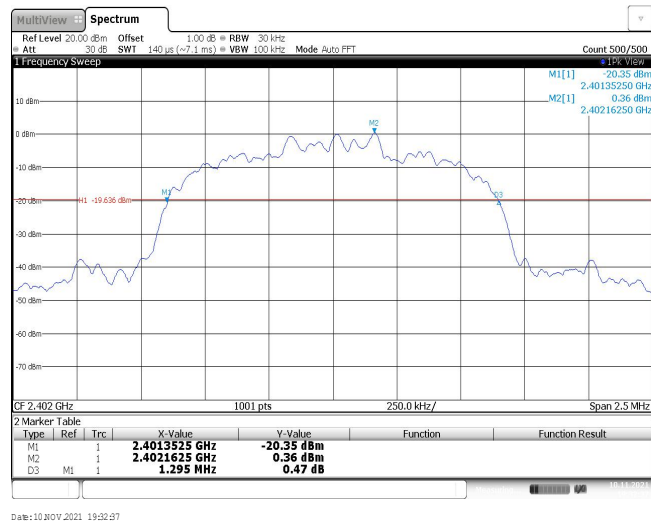
CH78



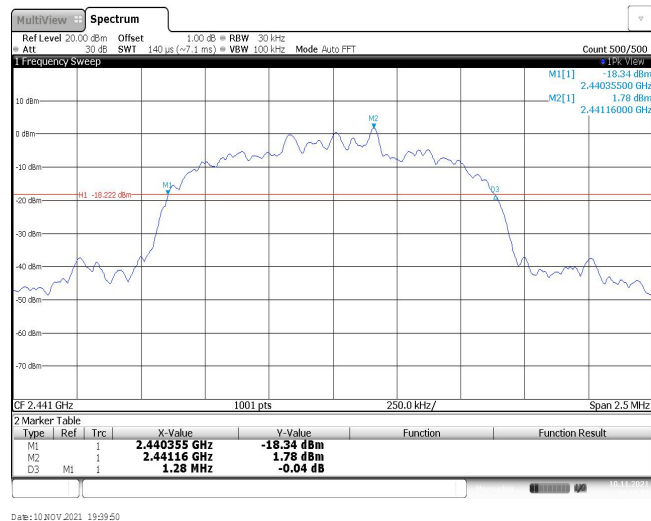
Modulation Type:

8DPSK

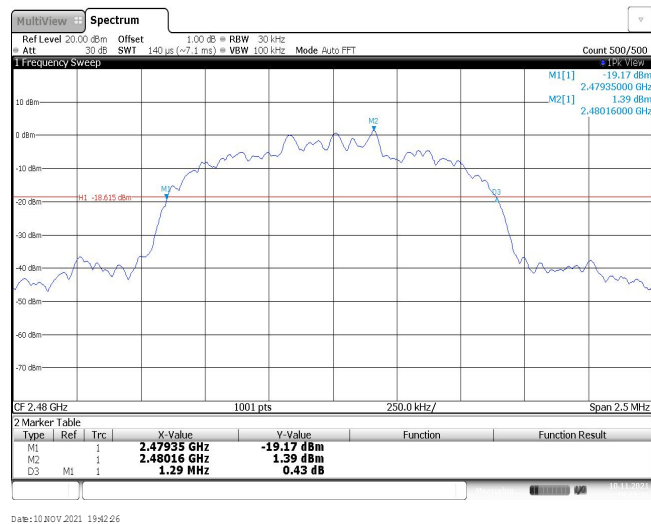
CH00



CH39



CH78



Appendix C: 99% Occupied Bandwidth

Modulation type	Channel	99% Occupied Bandwidth (MHz)	Limit (MHz)	Result
GFSK	00	0.91	-	Pass
	39	0.90		
	78	0.91		
$\pi/4$ DQPSK	00	1.17	-	Pass
	39	1.17		
	78	1.17		
8DPSK	00	1.16	-	Pass
	39	1.16		
	78	1.17		

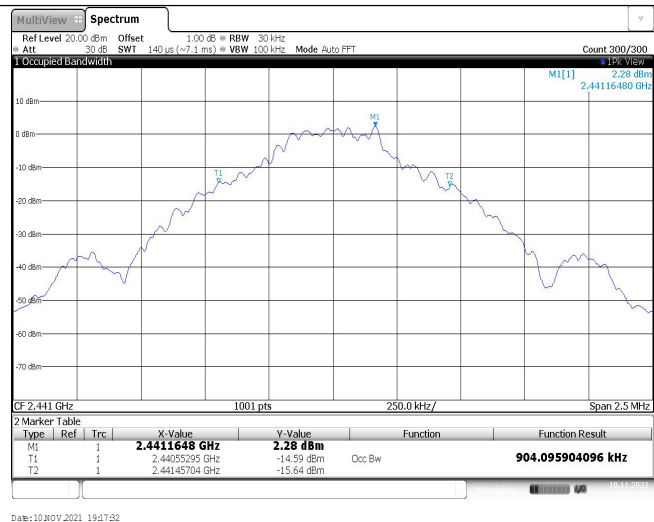
Modulation Type:

GFSK

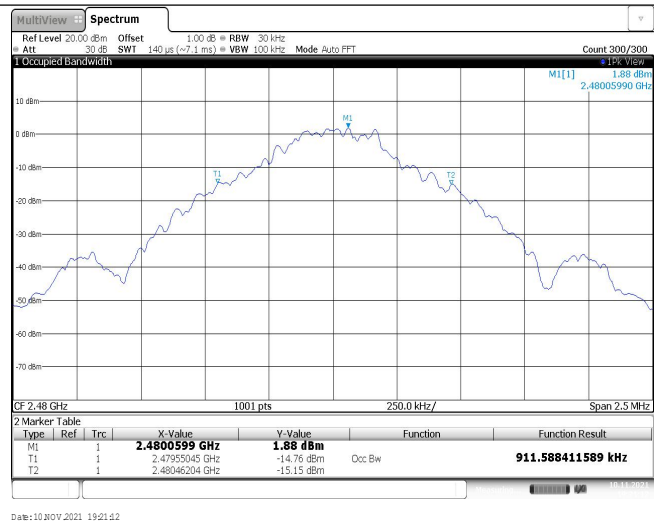
CH00



CH39



CH78



Modulation Type:

 $\pi/4$ DQPSK

CH00



CH39



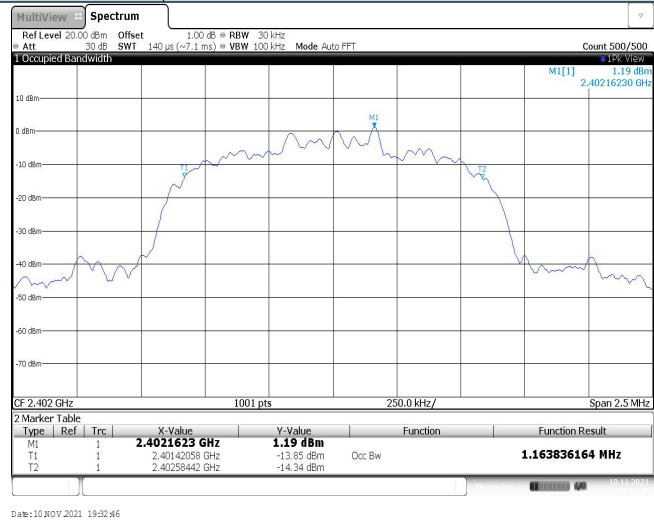
CH78



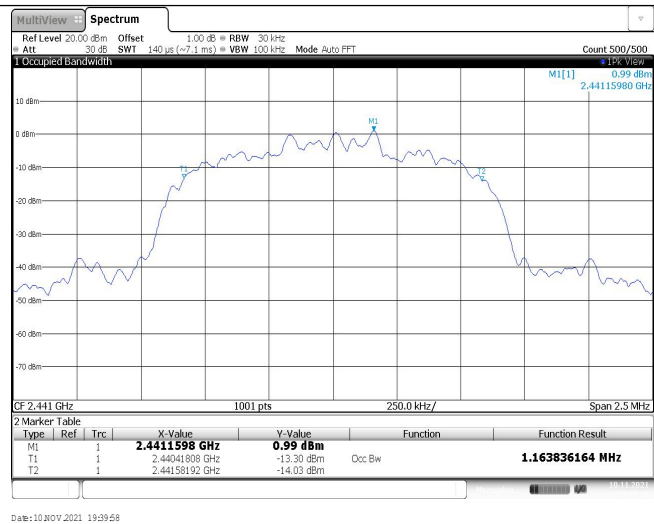
Modulation Type:

8DPSK

CH00



CH39



CH78



Appendix D: Carrier Frequencies Separation

Modulation type	Channel	Carrier Frequencies Separation (MHz)	Limit (kHz) *	Result
GFSK	39	1.00	≥930.00	Pass
π/4DQPSK	39	1.00	≥860.00	Pass
8DPSK	39	1.00	≥863.33	Pass

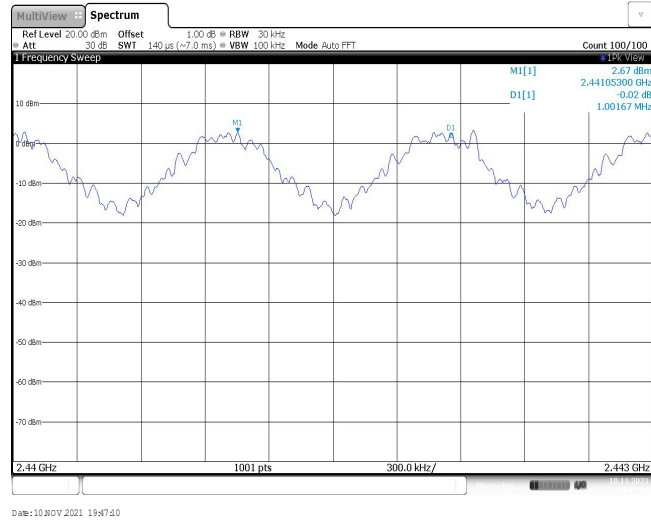
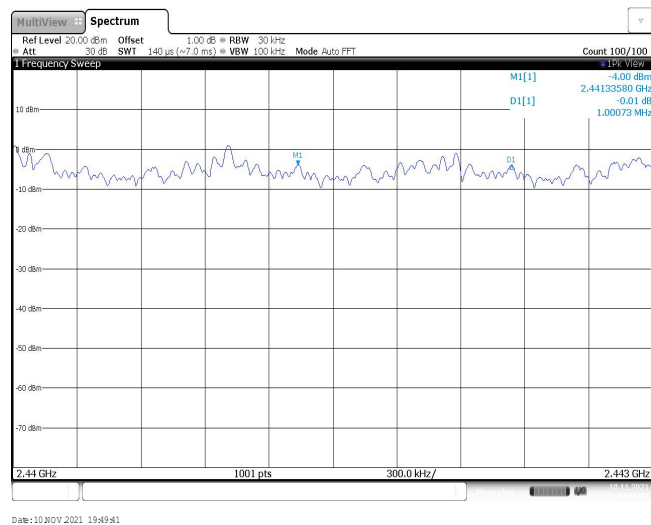
Note:

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

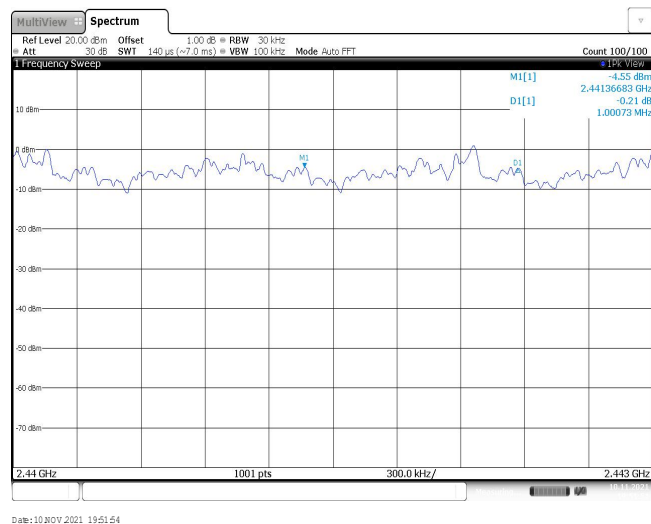
π/4DQPSK limit = $\frac{2}{3}$ * The maximum 20 dB Bandwidth for π/4DQPSK modulation on the appendix B.

8DPSK limit = $\frac{2}{3}$ * The maximum 20 dB Bandwidth for 8DPSK modulation on the appendix B

GFSK

 $\pi/4$ DQPSK

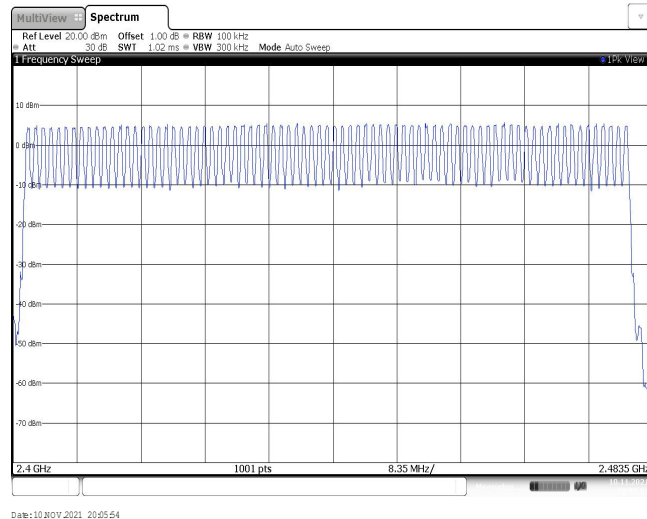
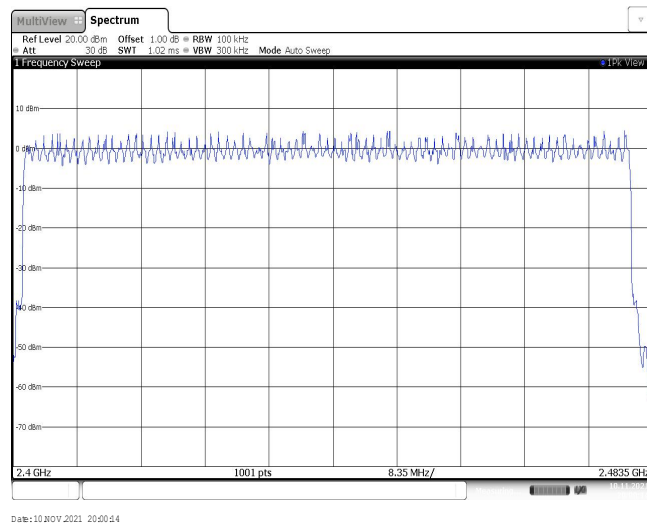
8DPSK



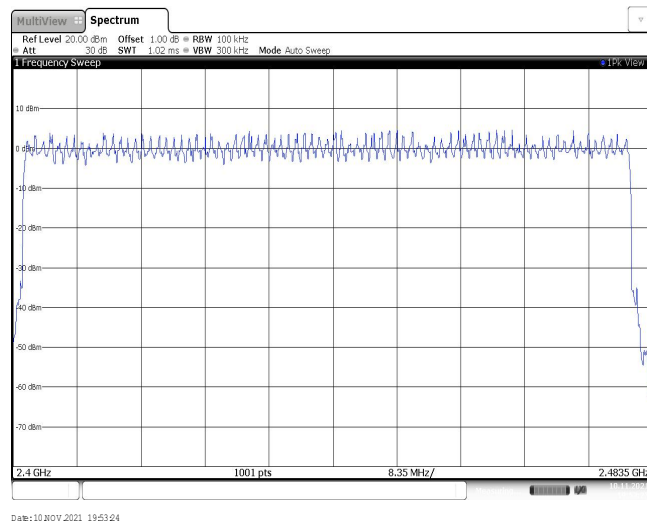
Appendix E: Hopping Channel Number

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

GFSK

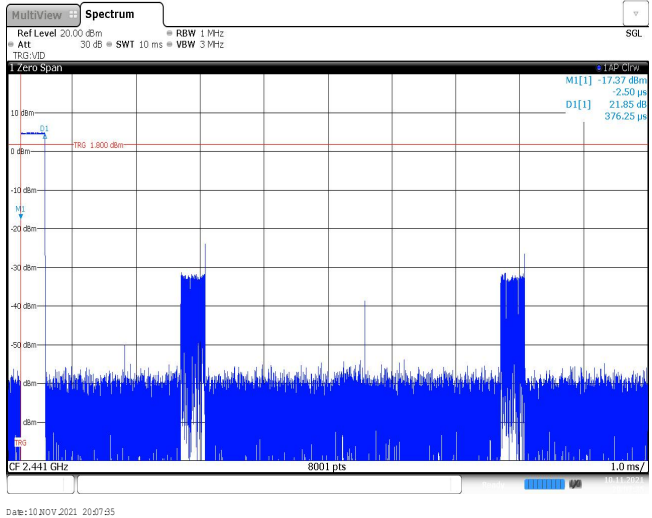
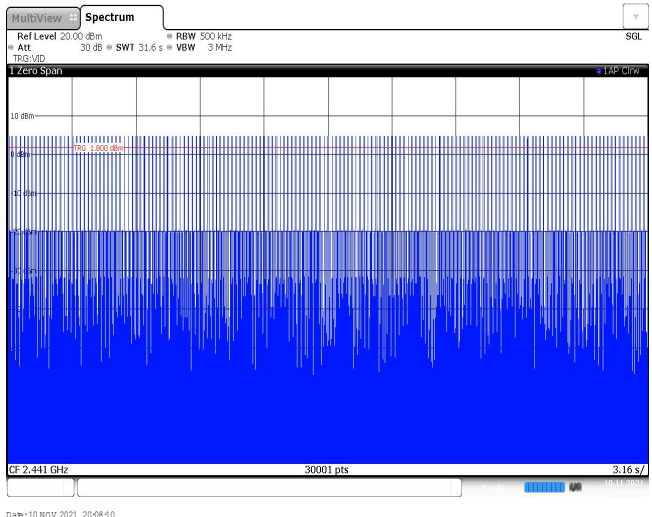
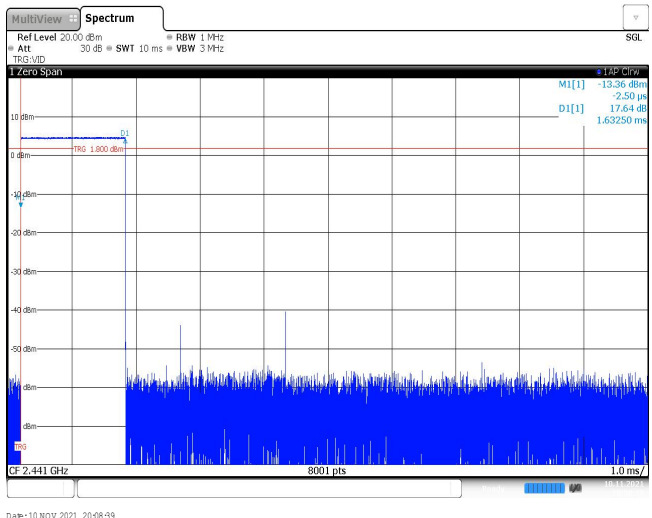
 $\pi/4$ DQPSK

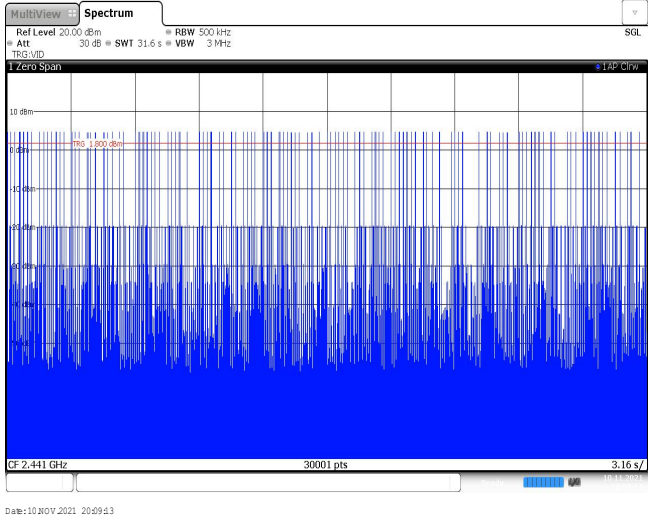
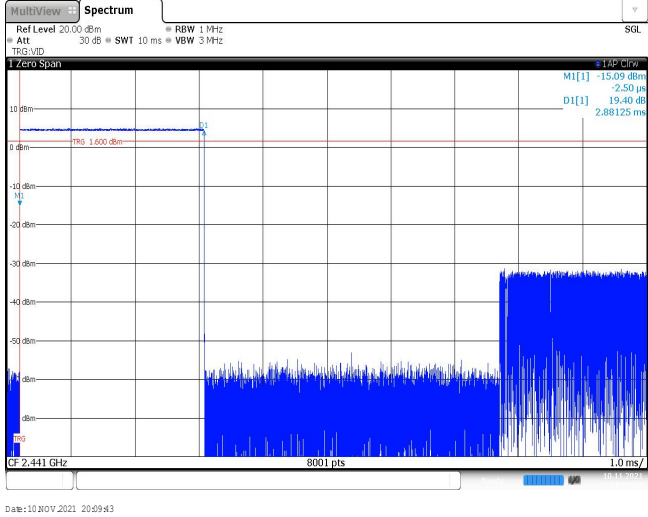
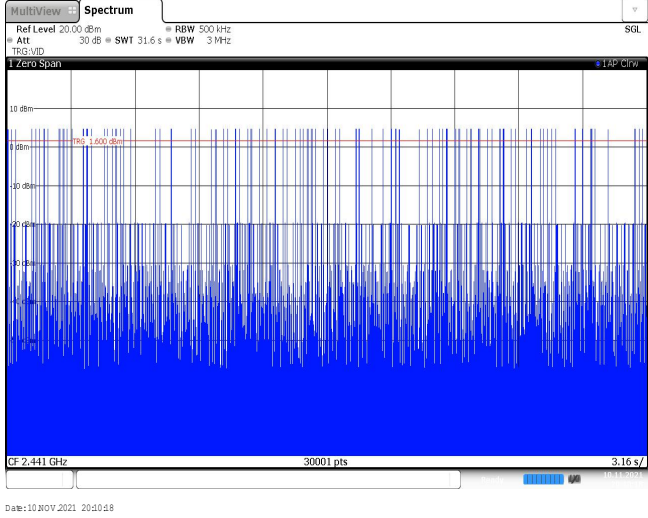
8DPSK



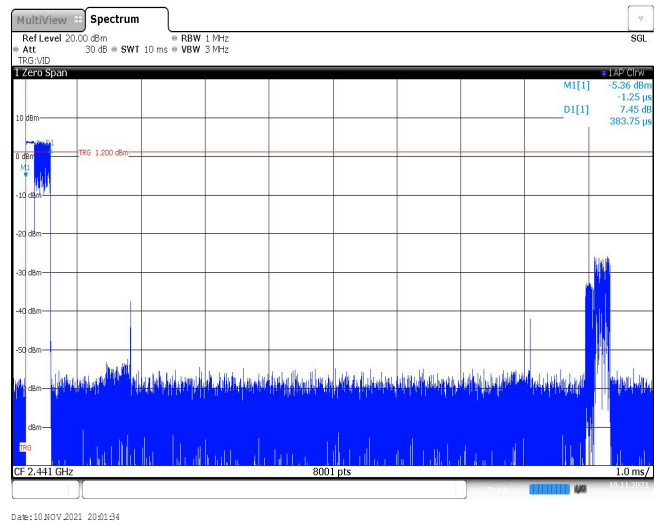
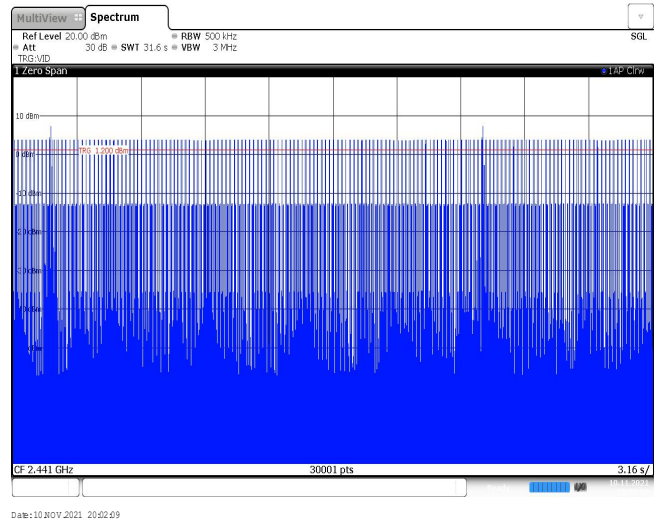
Appendix F: Dwell Time

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	1.63	159	0.26		
	DH5	2.88	114	0.33		
$\pi/4$ DQPSK	2DH1	0.38	317	0.12	≤ 0.40	Pass
	2DH3	1.64	158	0.26		
	2DH5	2.89	113	0.33		
8DPSK	3DH1	0.39	314	0.12	≤ 0.40	Pass
	3DH3	1.63	162	0.27		
	3DH5	2.89	113	0.33		

Modulation Type:	GFSK
DH1 Burst width	 <p>The spectrum plot shows two distinct bursts of signal. The first burst is at approximately 2.441 GHz with a peak level of -17.57 dBm. The second burst is at approximately 2.441 GHz with a peak level of -21.85 dBm. The plot includes a trigger level at -18.00 dBm and a trigger delay of 1.800 dBm. The x-axis is labeled 'CF 2.441 GHz' and the y-axis is labeled 'dBm'. The plot shows a noise floor around -90 dBm.</p> <p>Ref Level 20.00 dBm Att 30 dB RBW 1 MHz SWT 10 ms VBW 3 MHz TRG VID SGL 1 Zero Span M1[1] -17.57 dBm D1[1] -21.85 dB 376.25 μs CF 2.441 GHz 8001 pts 1.0 ms/ Date: 10 NOV 2021 20:07:55</p>
DH1 Burst number	 <p>The spectrum plot shows a continuous burst of signal. The plot includes a trigger level at -18.00 dBm and a trigger delay of 1.800 dBm. The x-axis is labeled 'CF 2.441 GHz' and the y-axis is labeled 'dBm'. The plot shows a noise floor around -90 dBm.</p> <p>Ref Level 20.00 dBm Att 30 dB RBW 500 kHz SWT 31.6 s VBW 3 MHz TRG VID SGL 1 Zero Span CF 2.441 GHz 30001 pts 3.16 s/ Date: 10 NOV 2021 20:08:10</p>
DH3 Burst width	 <p>The spectrum plot shows a single burst of signal. The plot includes a trigger level at -18.00 dBm and a trigger delay of 1.800 dBm. The x-axis is labeled 'CF 2.441 GHz' and the y-axis is labeled 'dBm'. The plot shows a noise floor around -90 dBm.</p> <p>Ref Level 20.00 dBm Att 30 dB RBW 1 MHz SWT 10 ms VBW 3 MHz TRG VID SGL 1 Zero Span M1[1] -13.36 dBm D1[1] 17.64 dB 1.63250 ms CF 2.441 GHz 8001 pts 1.0 ms/ Date: 10 NOV 2021 20:08:29</p>

DH3 Burst number	 <p>The screenshot shows a spectrum analyzer interface with the title 'Spectrum'. The y-axis represents power in dBm, ranging from -60 to 10. The x-axis represents frequency in GHz, centered at 2.441 GHz. A red horizontal line is drawn at approximately -15 dBm. The plot shows a dense, noisy signal across the entire frequency range. The status bar at the bottom indicates 'CF 2.441 GHz', '30001 pts', and '3.16 s'. The date '10 NOV 2021 20:09:43' is displayed at the bottom left.</p>
DH5 Burst width	 <p>The screenshot shows a spectrum analyzer interface with the title 'Spectrum'. The y-axis represents power in dBm, ranging from -60 to 10. The x-axis represents frequency in GHz, centered at 2.441 GHz. A red horizontal line is drawn at approximately -15 dBm. The plot shows a noisy signal that is mostly below -40 dBm, with a distinct burst of higher power (around -15 dBm) visible on the right side. The status bar at the bottom indicates 'CF 2.441 GHz', '8001 pts', and '1.0 ms'. The date '10 NOV 2021 20:09:43' is displayed at the bottom left.</p>
DH5 Burst number	 <p>The screenshot shows a spectrum analyzer interface with the title 'Spectrum'. The y-axis represents power in dBm, ranging from -60 to 10. The x-axis represents frequency in GHz, centered at 2.441 GHz. A red horizontal line is drawn at approximately -15 dBm. The plot shows a dense, noisy signal across the entire frequency range, similar to the DH3 plot. The status bar at the bottom indicates 'CF 2.441 GHz', '30001 pts', and '3.16 s'. The date '10 NOV 2021 20:10:18' is displayed at the bottom left.</p>

Modulation Type:

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