

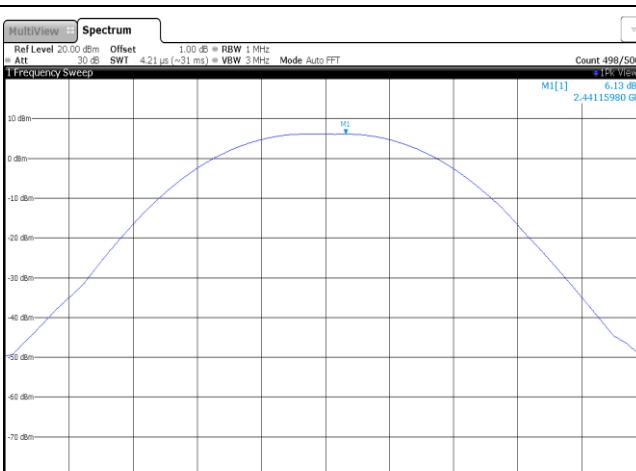
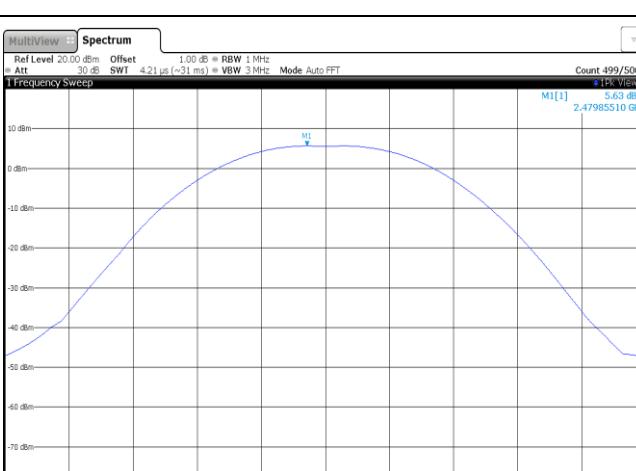
APPENDIX REPORT

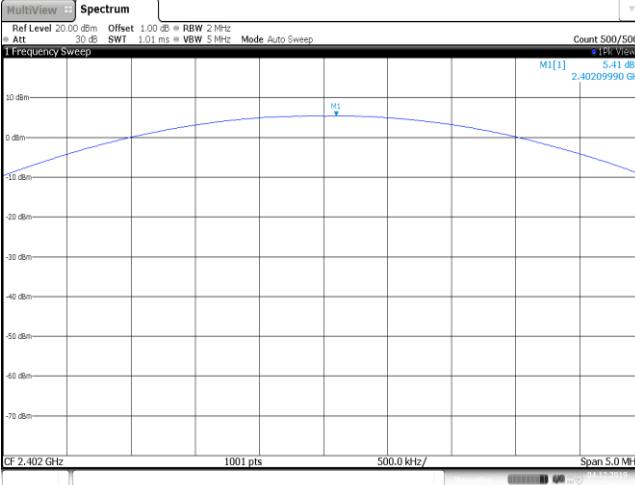
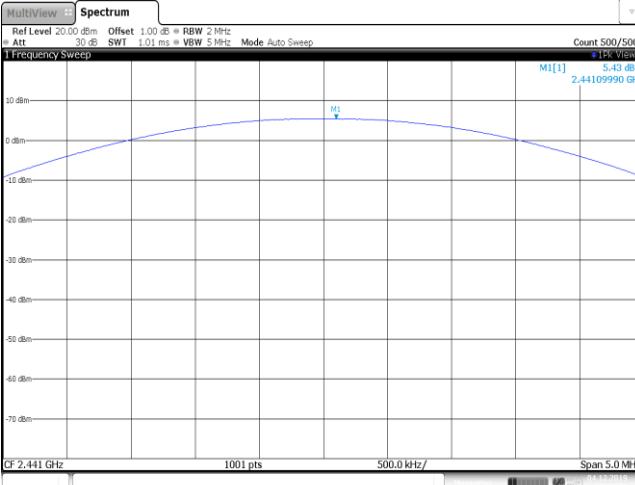
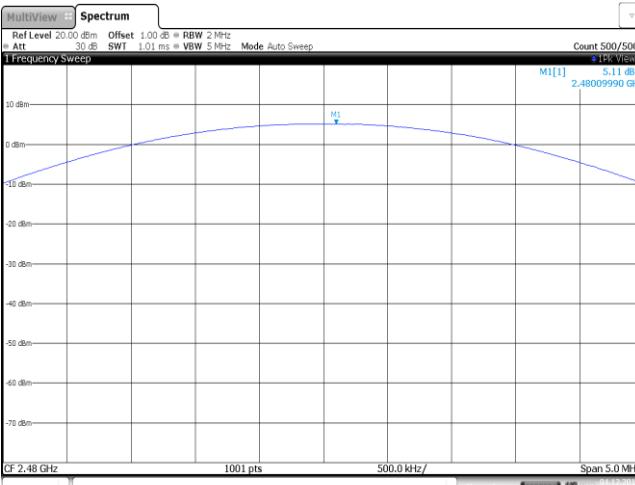
Project No.	SHT1911023801EW	Radio Specification	Bluetooth EDR
Test sample No.	YPHT19110238004	Model No.	XO-9860
Start test date	2019/12/4	Finish date	2019/12/4
Temperature	25°C	Humidity	50%
Test Engineer	Jiongsheng.Feng	Auditor	<i>William.wang</i>

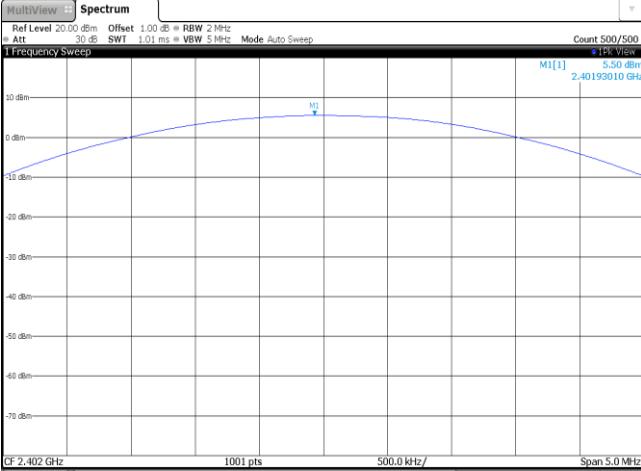
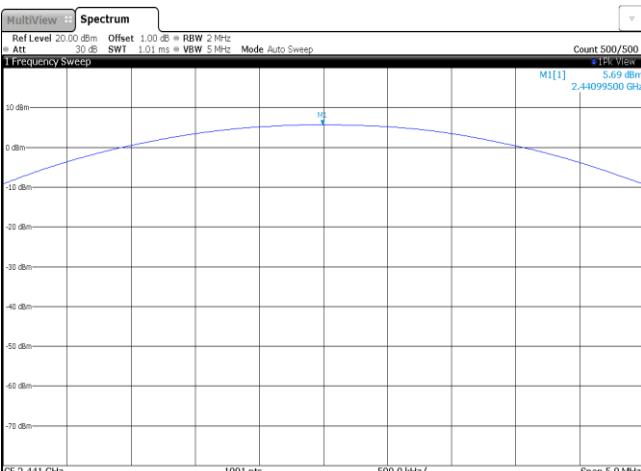
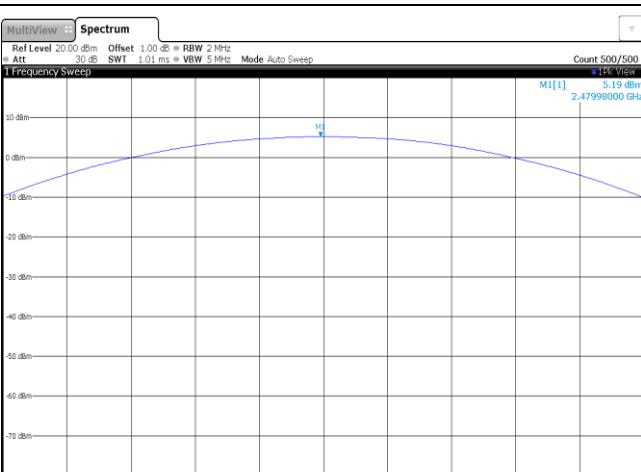
Appendix clause	Test item	Result
A	Peak Output Power	PASS
B	20 dB Bandwidth	PASS
C	99% Occupied Bandwidth	PASS
D	Carrier Frequencies Separation	PASS
E	Hopping Channel Number	PASS
F	Dwell Time	PASS
G	Duty Cycle Correction Factor (DCCF)	PASS
H	Band edge and Spurious Emissions(coducted)	PASS

Appendix A: Peak Output Power

Modulation type	Channel	Output power (dBm)	Average Output power (dBm)	Limit (dBm)	Result
GFSK	00	5.28	5.18	≤ 30.00	Pass
	39	6.13	6.04		
	78	5.63	5.57		
π/4DQPSK	00	5.41	4.78	≤ 21.00	Pass
	39	5.43	4.97		
	78	5.11	4.45		
8DPSK	00	5.50	4.84	≤ 21.00	Pass
	39	5.69	5.04		
	78	5.19	4.53		

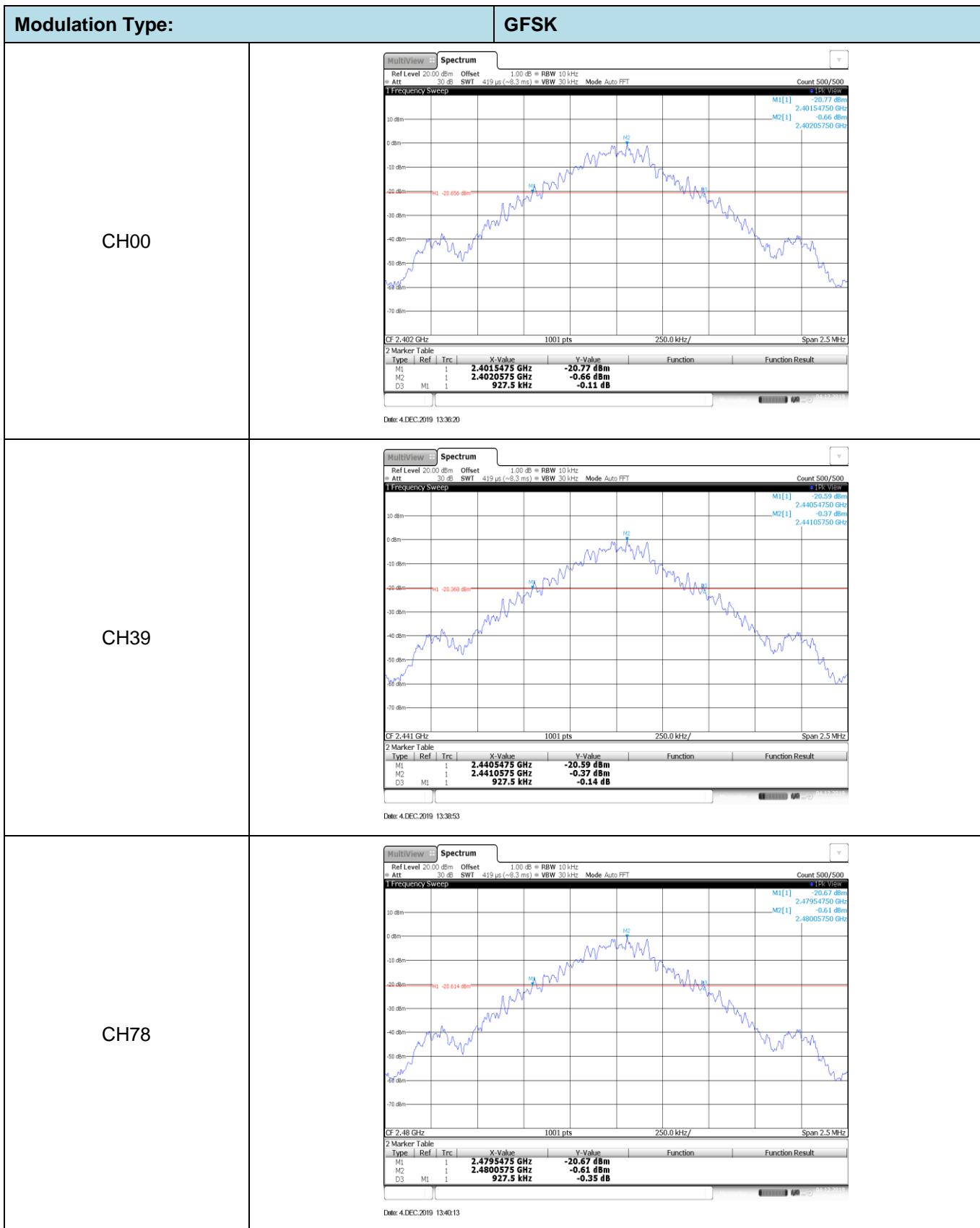
Modulation Type:		GFSK
CH00		 <p>Date: 4.DEC.2019 13:36:38</p>
CH39		 <p>Date: 4.DEC.2019 13:39:11</p>
CH78		 <p>Date: 4.DEC.2019 13:40:31</p>

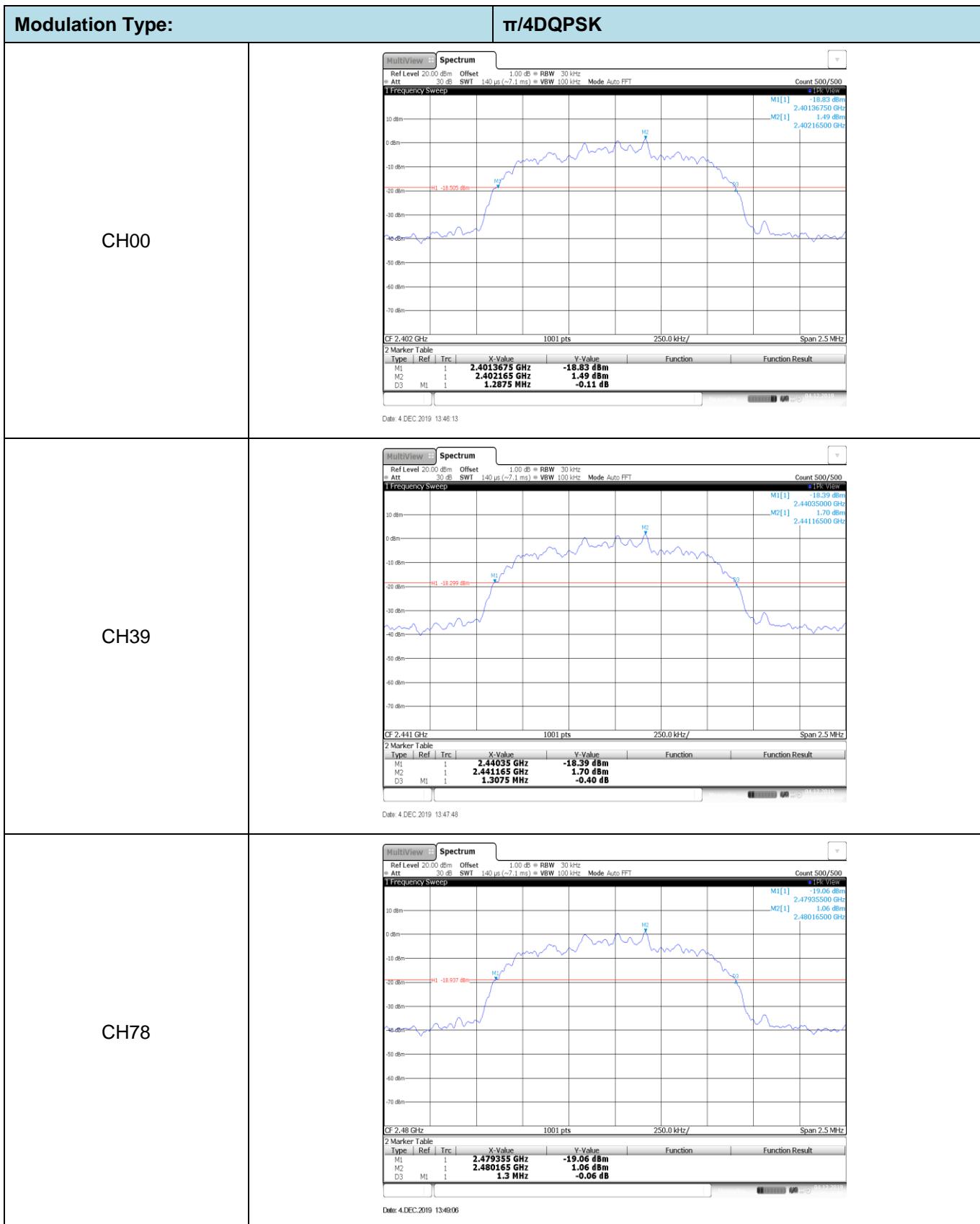
Modulation Type:		$\pi/4$ DQPSK
CH00		 <p>Date: 4 DEC 2019 13:48:30</p>
CH39		 <p>Date: 4 DEC 2019 13:48:05</p>
CH78		 <p>Date: 4 DEC 2019 13:49:24</p>

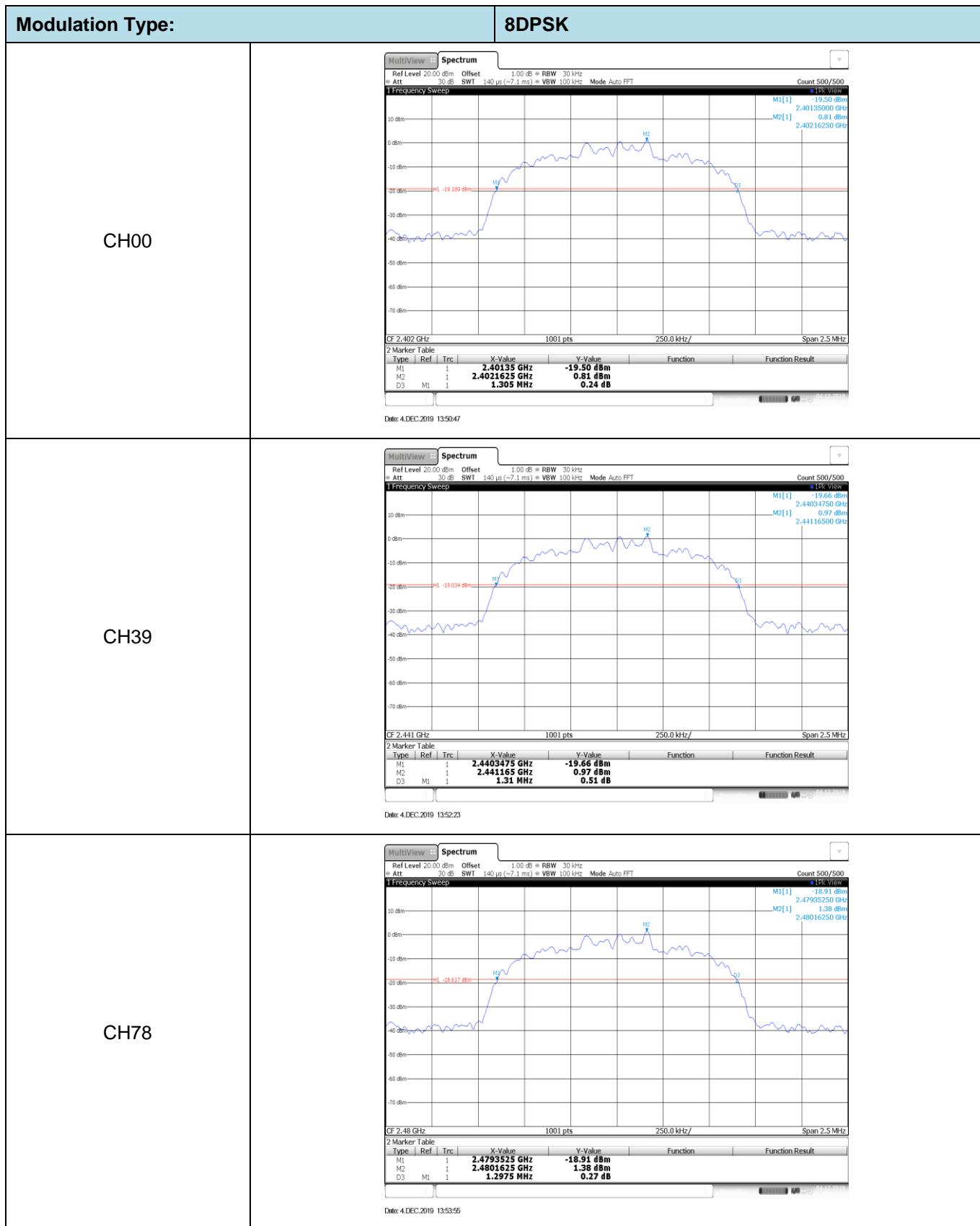
Modulation Type:		8DPSK
CH00		 <p>CH00 Spectrum Analysis</p> <p>Peak M1[1] at 2.40193010 GHz, 5.55 dBm</p> <p>Date: 4.DEC.2019 13:51:05</p>
CH39		 <p>CH39 Spectrum Analysis</p> <p>Peak M1[1] at 2.44095500 GHz, 5.69 dBm</p> <p>Date: 4.DEC.2019 13:52:41</p>
CH78		 <p>CH78 Spectrum Analysis</p> <p>Peak M1[1] at 2.47998000 GHz, 5.19 dBm</p> <p>Date: 4.DEC.2019 13:54:13</p>

Appendix B : 20 dB Bandwidth

Modulation type	Channel	20 dB Bandwidth (kHz)	Limit (kHz)	Result
GFSK	00	928.00	-	Pass
	39	928.00		
	78	928.00		
$\pi/4$ DQPSK	00	1288.00	-	Pass
	39	1308.00		
	78	1300.00		
8DPSK	00	1305.00	-	Pass
	39	1310.00		
	78	1298.00		

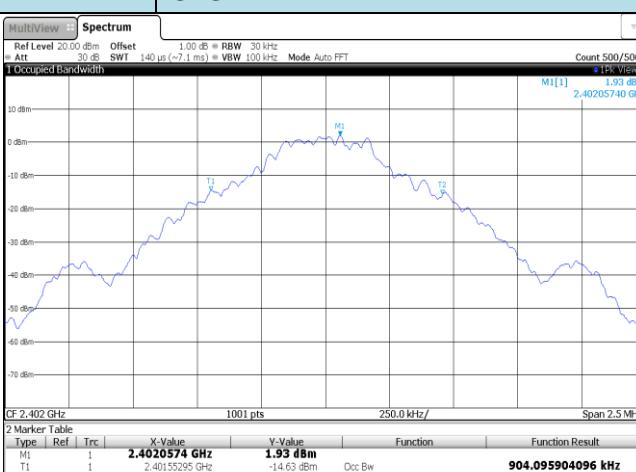
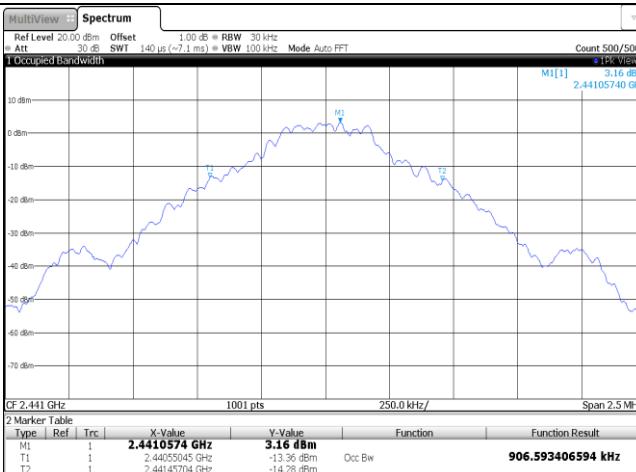
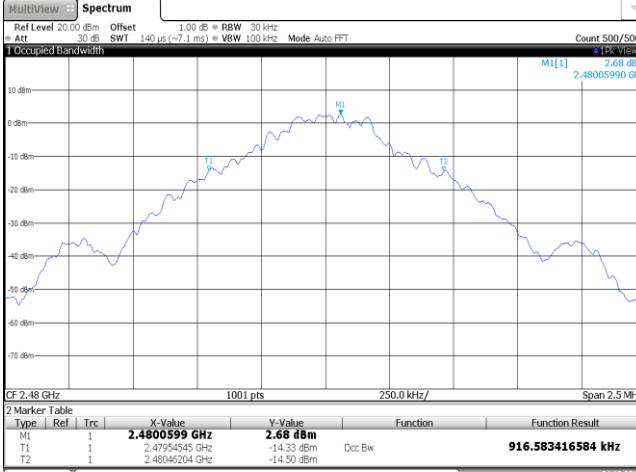


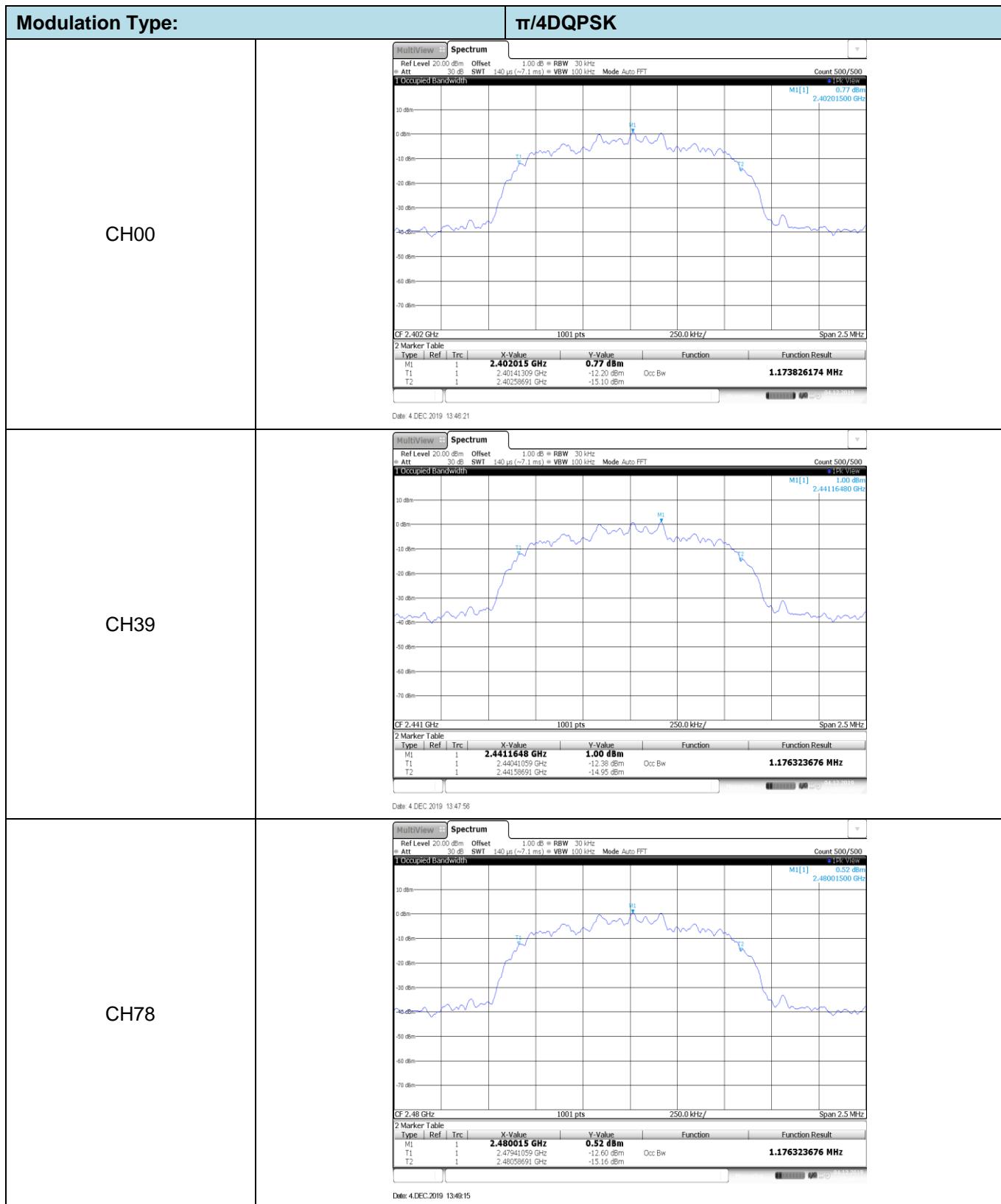


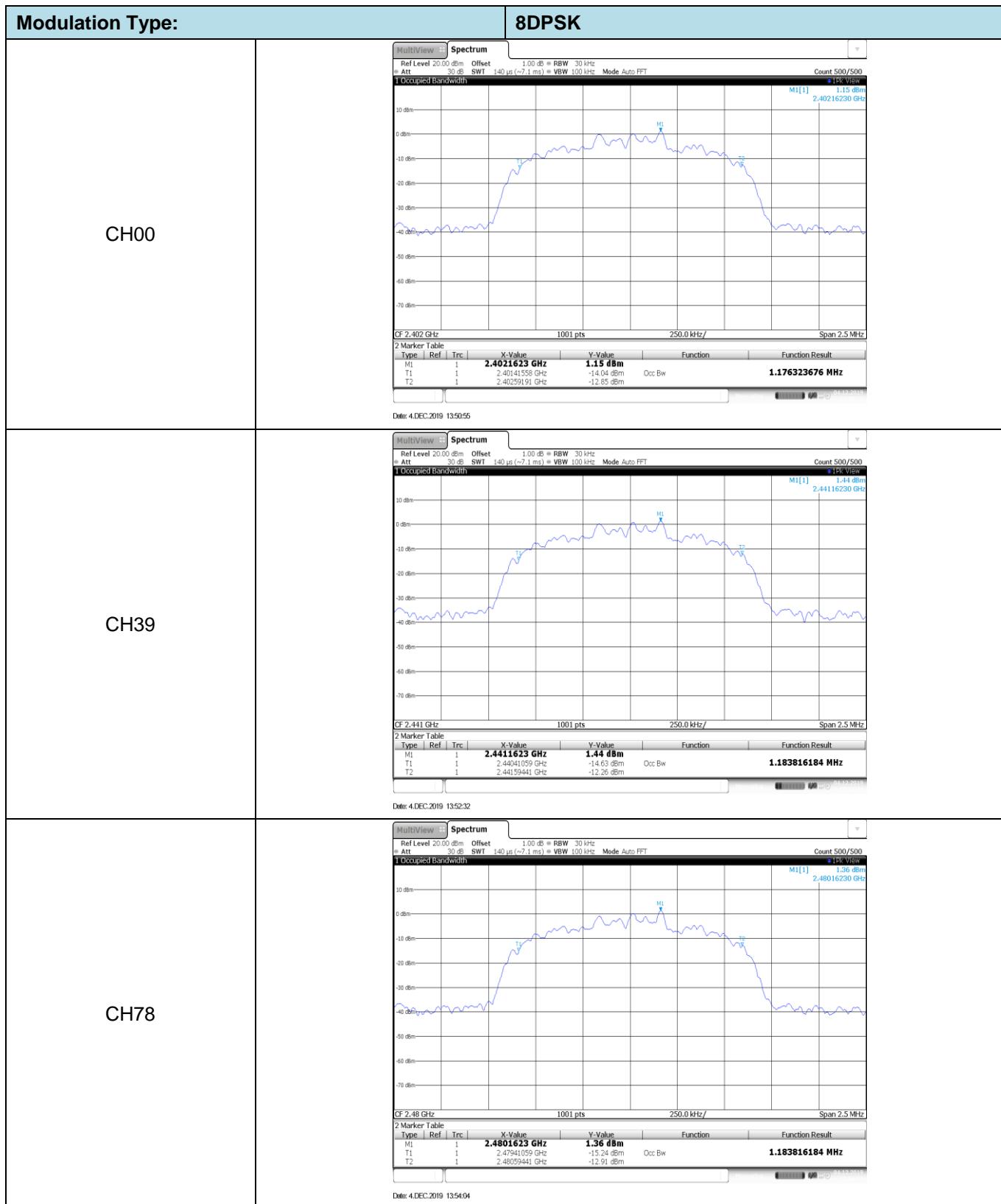


Appendix C: 99% Occupied Bandwidth

Modulation type	Channel	99% Occupied Bandwidth (MHz)	Limit (MHz)	Result
GFSK	00	0.90	-	Pass
	39	0.91		
	78	0.92		
$\pi/4$ DQPSK	00	1.17	-	Pass
	39	1.18		
	78	1.18		
8DPSK	00	1.18	-	Pass
	39	1.18		
	78	1.18		

Modulation Type:		GFSK																												
CH00		 <p>CF 2.402 GHz 1001 pts 250.0 kHz/ Span 2.5 MHz</p> <p>2 Marker Table</p> <table border="1"> <thead> <tr> <th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr> </thead> <tbody> <tr> <td>M1</td><td>1</td><td></td><td>2.4020574 GHz</td><td>1.93 dBm</td><td></td><td></td></tr> <tr> <td>T1</td><td>1</td><td></td><td>2.40155295 GHz</td><td>-14.63 dBm</td><td>Osc Bw</td><td>904.095904096 kHz</td></tr> <tr> <td>T2</td><td>1</td><td></td><td>2.40245704 GHz</td><td>-15.73 dBm</td><td></td><td></td></tr> </tbody> </table> <p>Date: 4.DEC.2019 13:36:28</p>	Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		2.4020574 GHz	1.93 dBm			T1	1		2.40155295 GHz	-14.63 dBm	Osc Bw	904.095904096 kHz	T2	1		2.40245704 GHz	-15.73 dBm		
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																								
M1	1		2.4020574 GHz	1.93 dBm																										
T1	1		2.40155295 GHz	-14.63 dBm	Osc Bw	904.095904096 kHz																								
T2	1		2.40245704 GHz	-15.73 dBm																										
CH39		 <p>CF 2.441 GHz 1001 pts 250.0 kHz/ Span 2.5 MHz</p> <p>2 Marker Table</p> <table border="1"> <thead> <tr> <th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr> </thead> <tbody> <tr> <td>M1</td><td>1</td><td></td><td>2.4410574 GHz</td><td>3.16 dBm</td><td></td><td></td></tr> <tr> <td>T1</td><td>1</td><td></td><td>2.44055945 GHz</td><td>-13.36 dBm</td><td>Osc Bw</td><td>906.593406594 kHz</td></tr> <tr> <td>T2</td><td>1</td><td></td><td>2.44145704 GHz</td><td>-14.28 dBm</td><td></td><td></td></tr> </tbody> </table> <p>Date: 4.DEC.2019 13:36:01</p>	Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		2.4410574 GHz	3.16 dBm			T1	1		2.44055945 GHz	-13.36 dBm	Osc Bw	906.593406594 kHz	T2	1		2.44145704 GHz	-14.28 dBm		
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																								
M1	1		2.4410574 GHz	3.16 dBm																										
T1	1		2.44055945 GHz	-13.36 dBm	Osc Bw	906.593406594 kHz																								
T2	1		2.44145704 GHz	-14.28 dBm																										
CH78		 <p>CF 2.48 GHz 1001 pts 250.0 kHz/ Span 2.5 MHz</p> <p>2 Marker Table</p> <table border="1"> <thead> <tr> <th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr> </thead> <tbody> <tr> <td>M1</td><td>1</td><td></td><td>2.48005990 GHz</td><td>2.68 dBm</td><td></td><td></td></tr> <tr> <td>T1</td><td>1</td><td></td><td>2.47954545 GHz</td><td>-14.33 dBm</td><td>Osc Bw</td><td>916.583416584 kHz</td></tr> <tr> <td>T2</td><td>1</td><td></td><td>2.48046204 GHz</td><td>-14.50 dBm</td><td></td><td></td></tr> </tbody> </table> <p>Date: 4.DEC.2019 13:40:21</p>	Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		2.48005990 GHz	2.68 dBm			T1	1		2.47954545 GHz	-14.33 dBm	Osc Bw	916.583416584 kHz	T2	1		2.48046204 GHz	-14.50 dBm		
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																								
M1	1		2.48005990 GHz	2.68 dBm																										
T1	1		2.47954545 GHz	-14.33 dBm	Osc Bw	916.583416584 kHz																								
T2	1		2.48046204 GHz	-14.50 dBm																										





Appendix D: Carrier Frequencies Separation

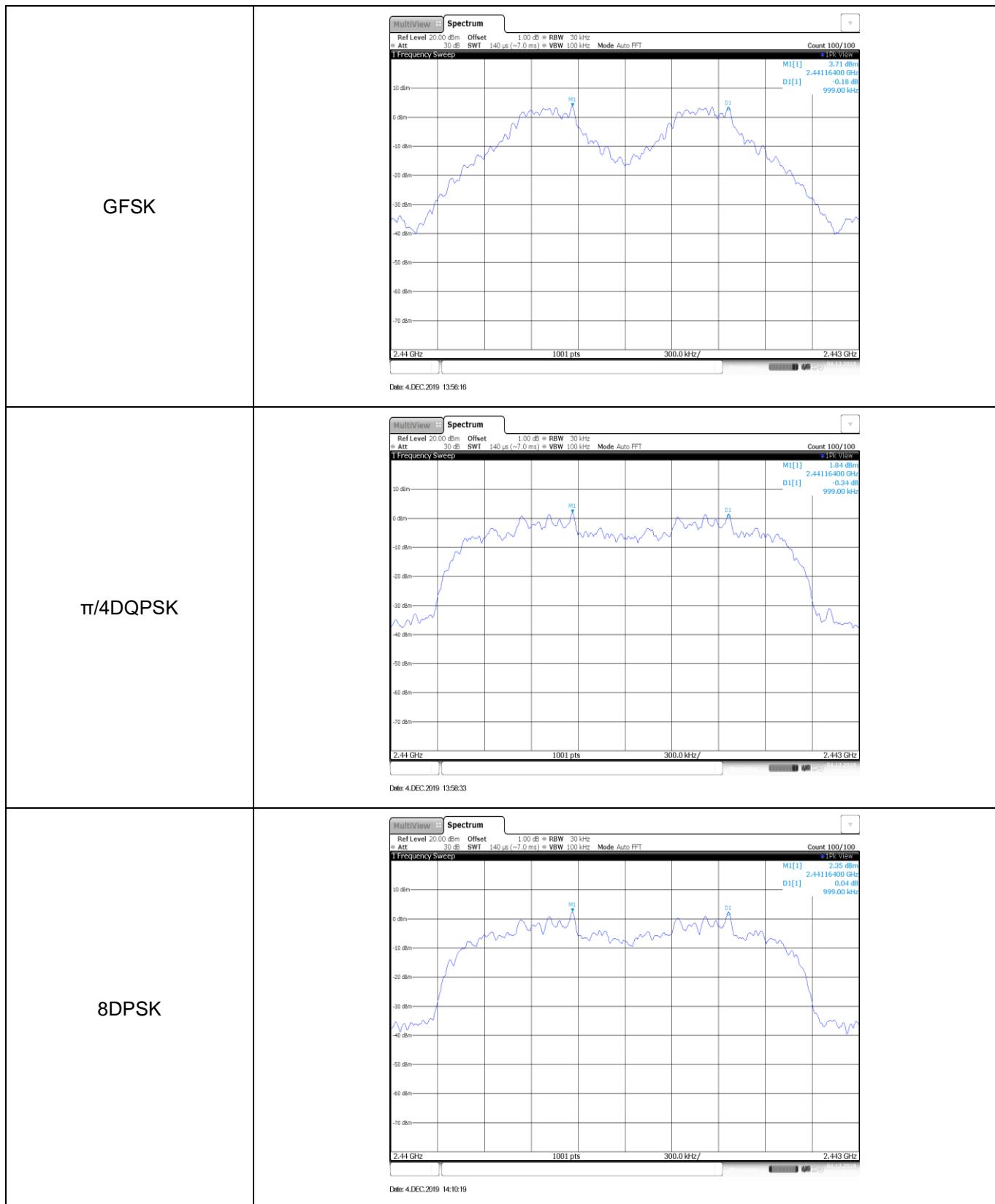
Modulation type	Channel	Carrier Frequencies Separation (MHz)	Limit (kHz) *	Result
GFSK	39	1.00	≥928.00	Pass
π/4DQPSK	39	1.00	≥872.00	Pass
8DPSK	39	1.00	≥873.33	Pass

Note:

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

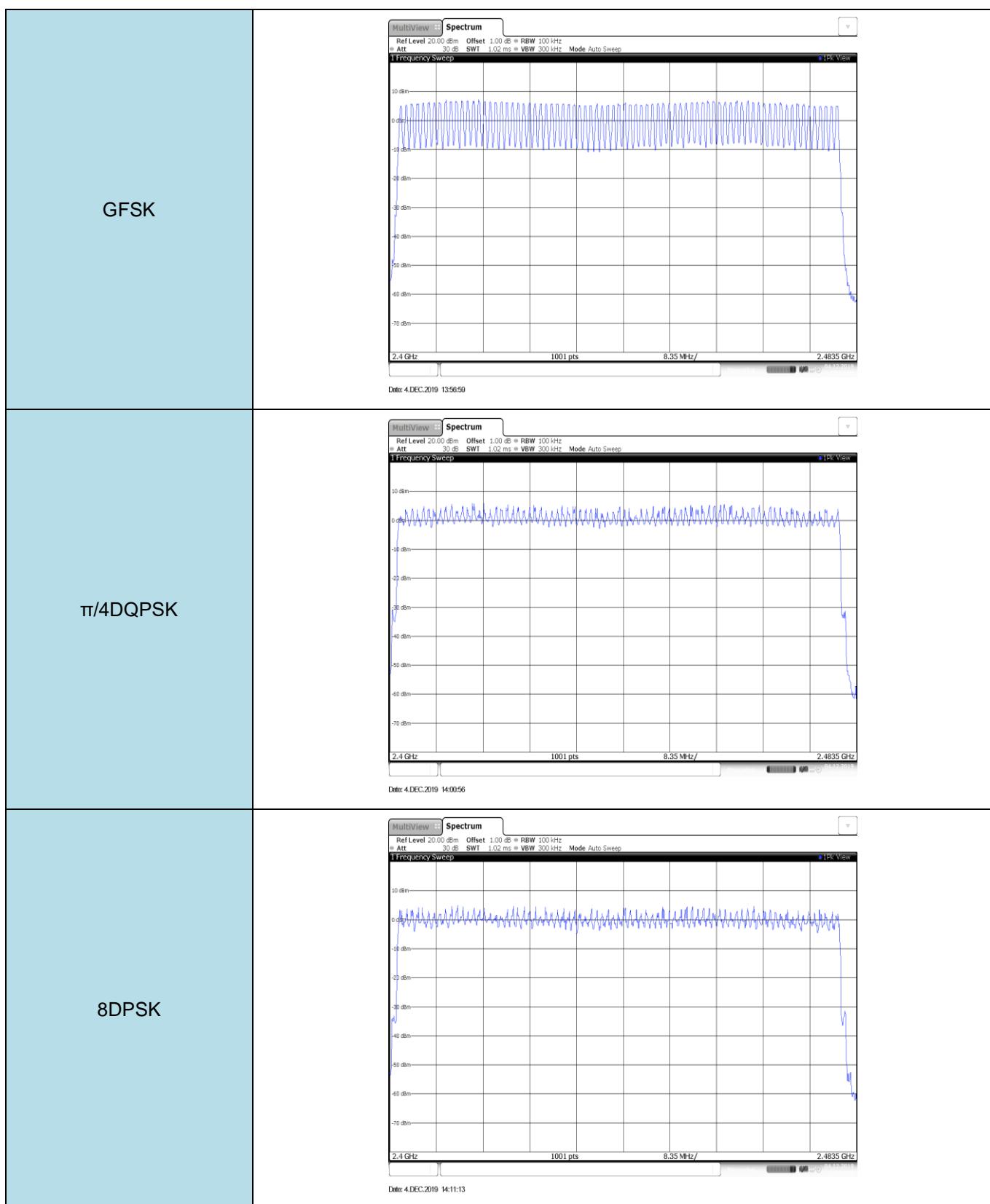
π/4DQPSK limit = 2/3 * The maximum 20 dB Bandwidth for π/4DQPSK modulation on the appendix B.

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



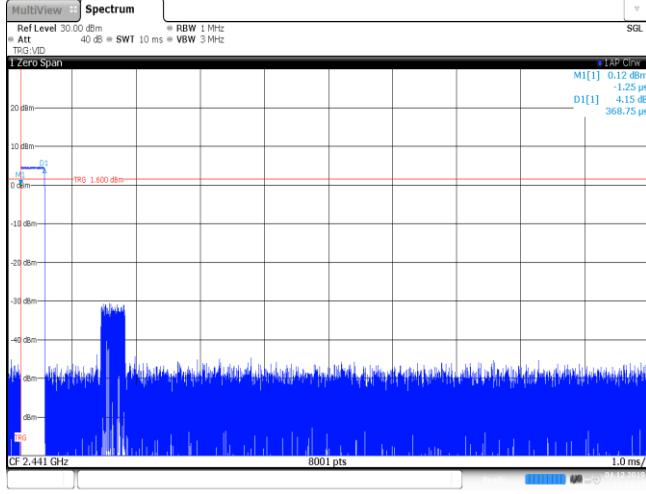
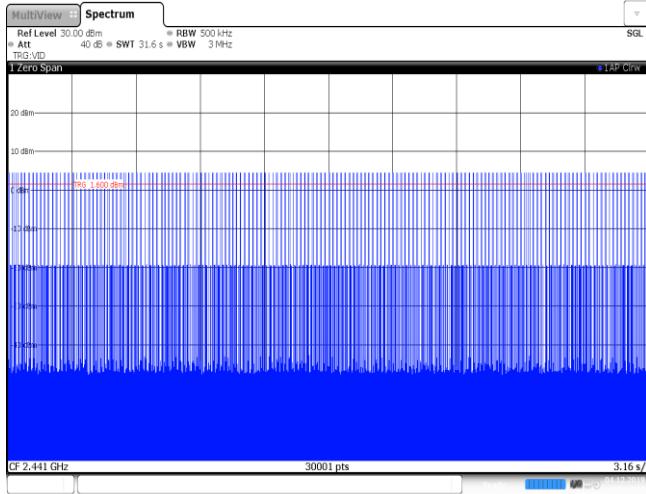
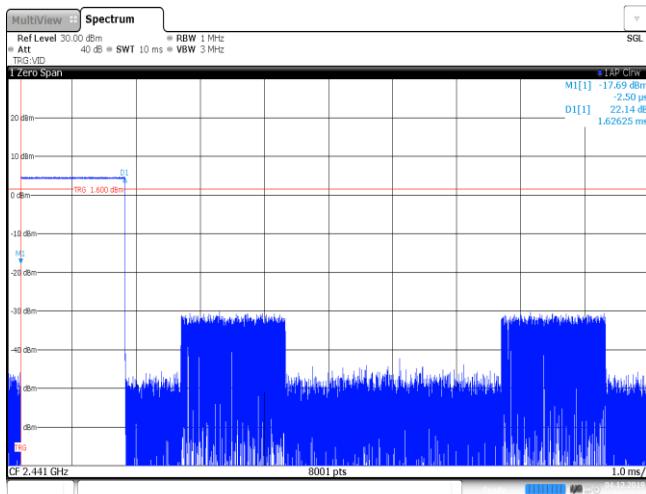
Appendix E: Hopping Channel Number

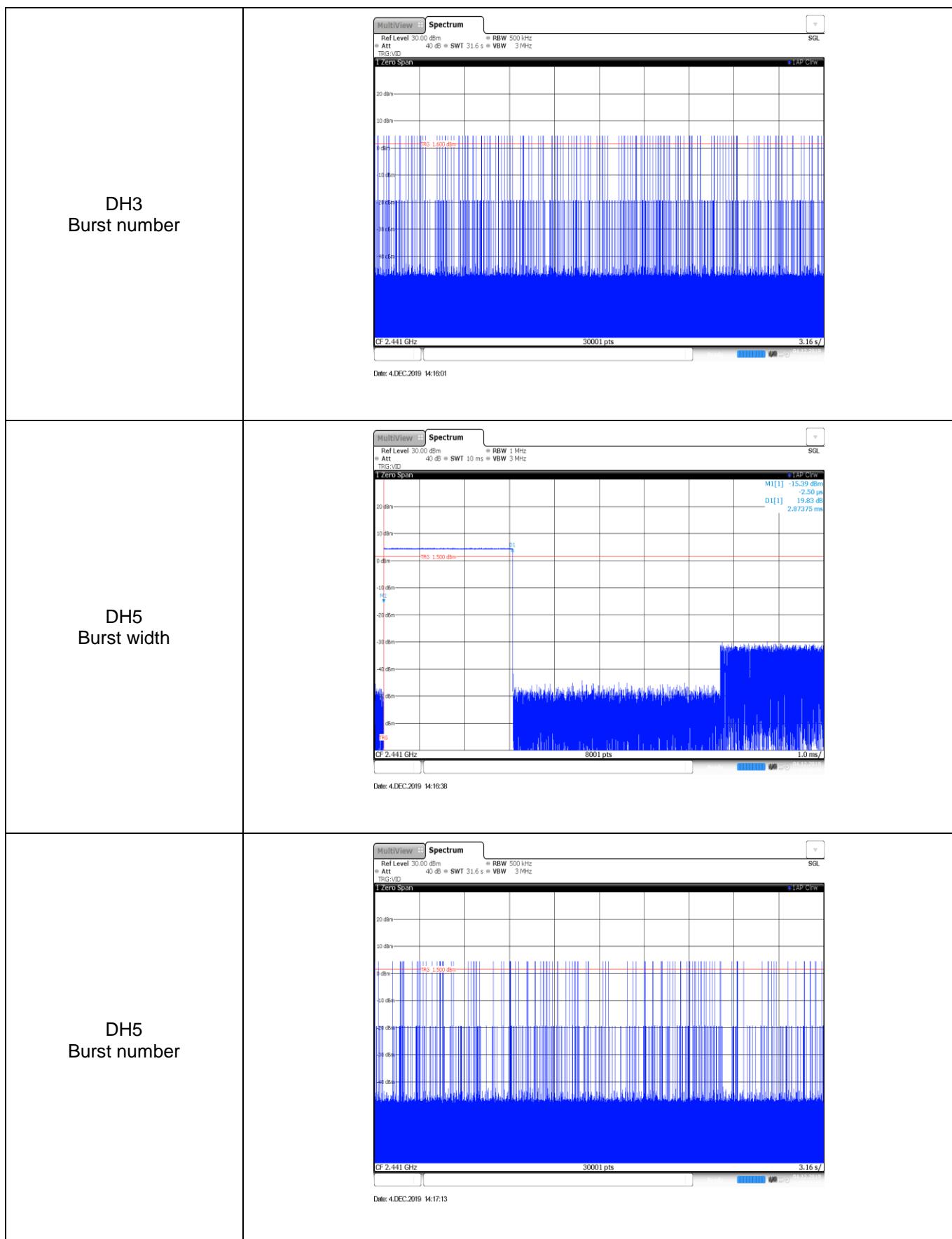
Modulation type	Channel number	Limit	Result
GFSK	79	≥ 15.00	Pass
$\pi/4$ DQPSK	79		
8DPSK	79		

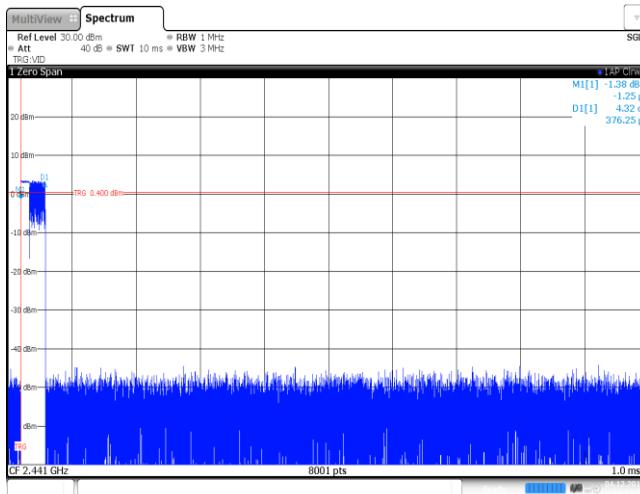
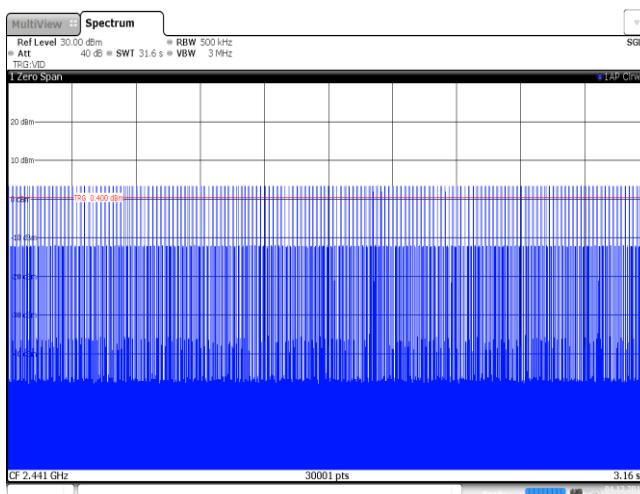
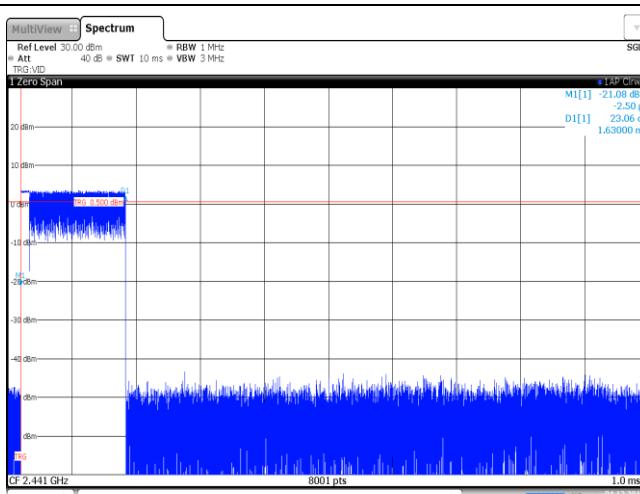


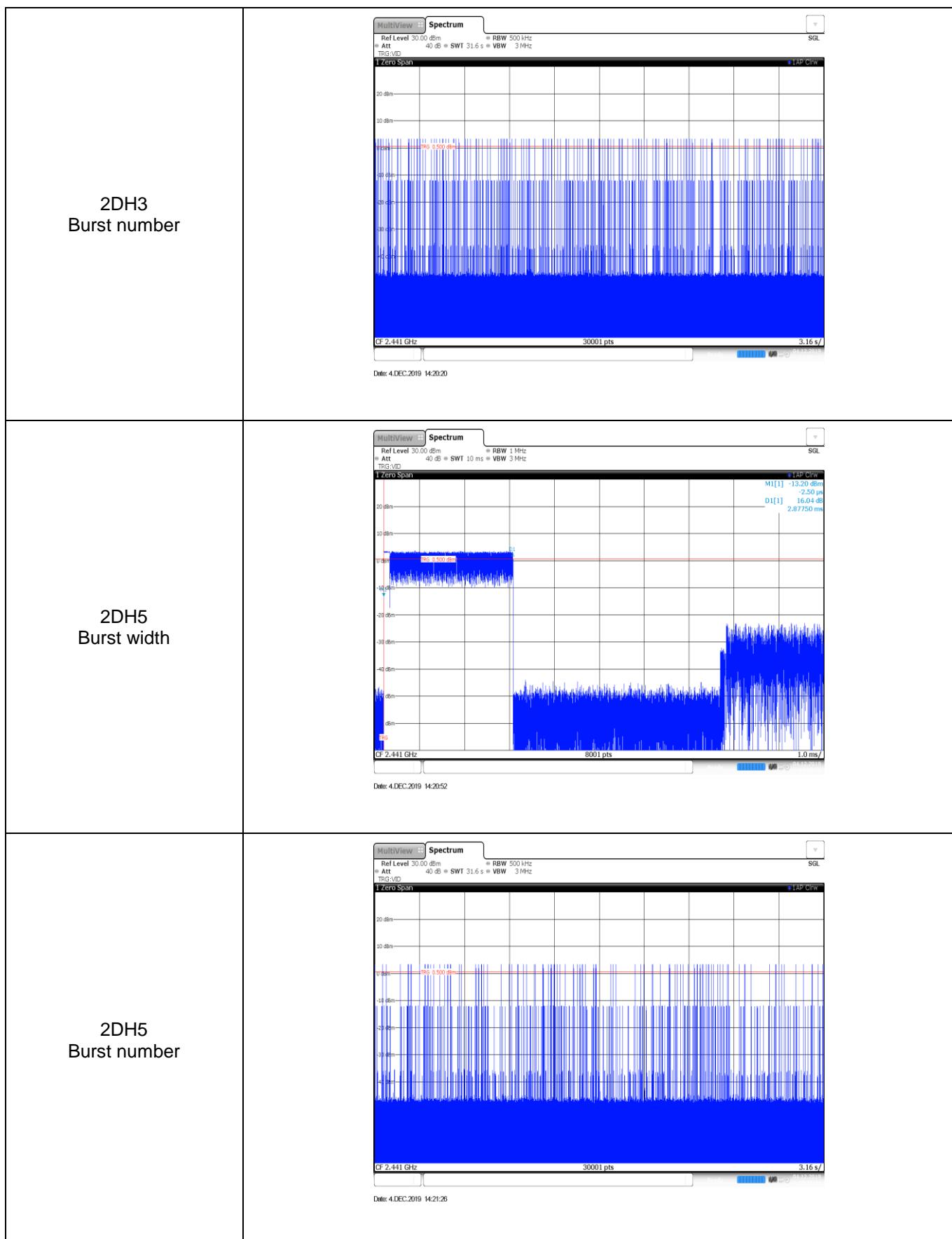
Appendix F: Dwell Time

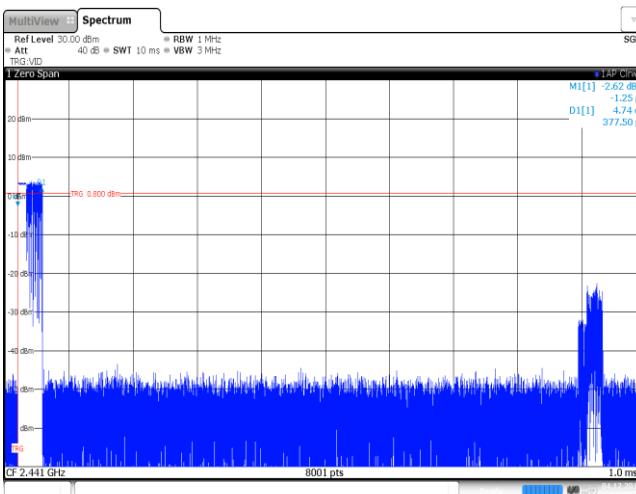
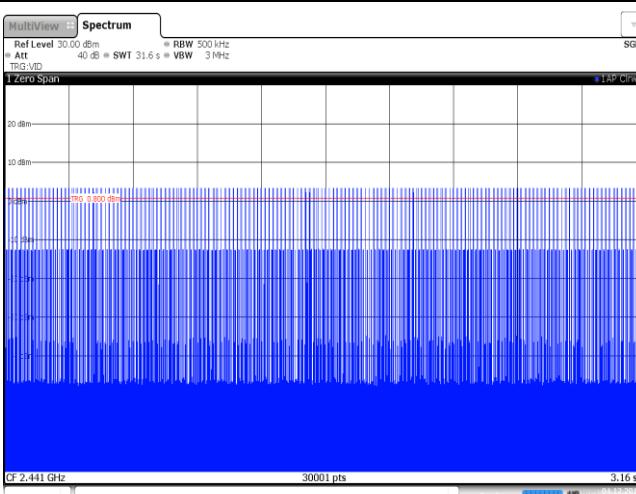
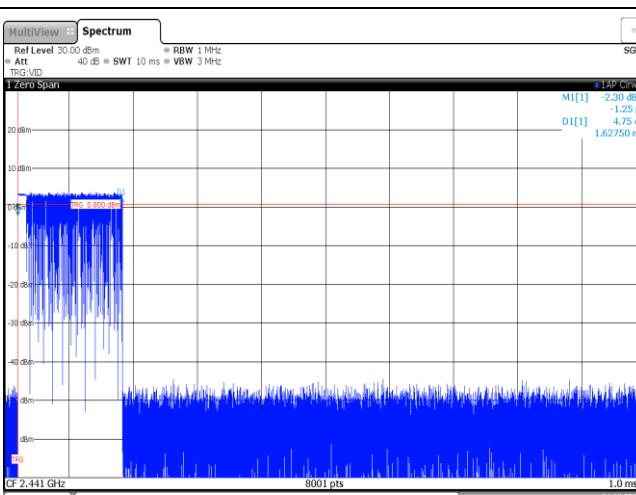
Modulation type	Packet	Burst Width [ms]	Total Hops[hop*ch]	Dwell time (Second)	Limit (Second)	Result
GFSK	DH1	0.37	314.00	0.12	≤ 0.40	Pass
	DH3	1.63	158.00	0.26		
	DH5	2.87	106.00	0.31		
$\pi/4$ DQPSK	2DH1	0.38	315.00	0.12	≤ 0.40	Pass
	2DH3	1.63	162.00	0.26		
	2DH5	2.88	105.00	0.30		
8DPSK	3DH1	0.38	314.00	0.12	≤ 0.40	Pass
	3DH3	1.63	158.00	0.26		
	3DH5	2.88	106.00	0.31		

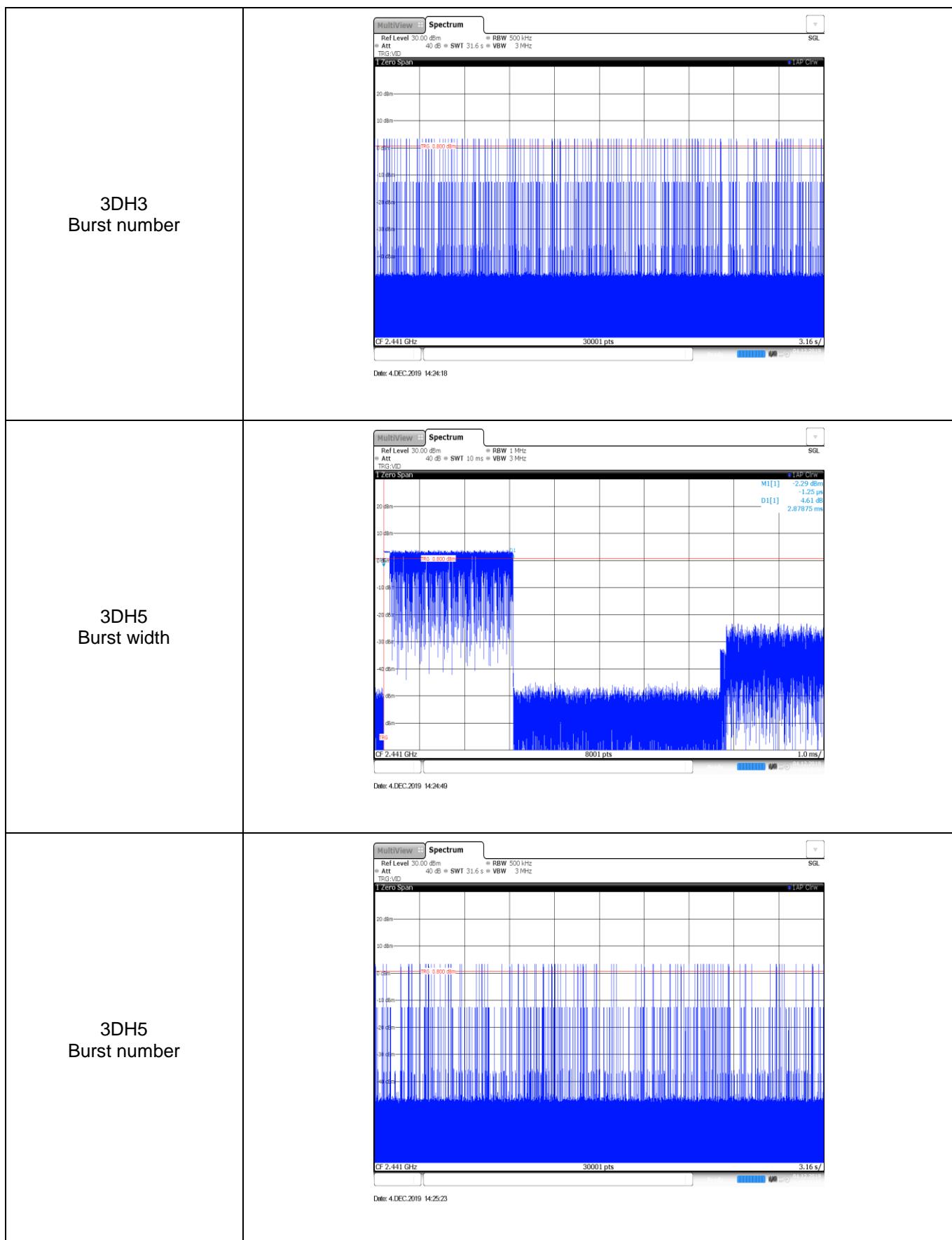
Modulation Type:	GFSK
DH1 Burst width	
DH1 Burst number	
DH3 Burst width	



Modulation Type:	$\pi/4$ DQPSK
2DH1 Burst width	
2DH1 Burst number	
2DH3 Burst width	

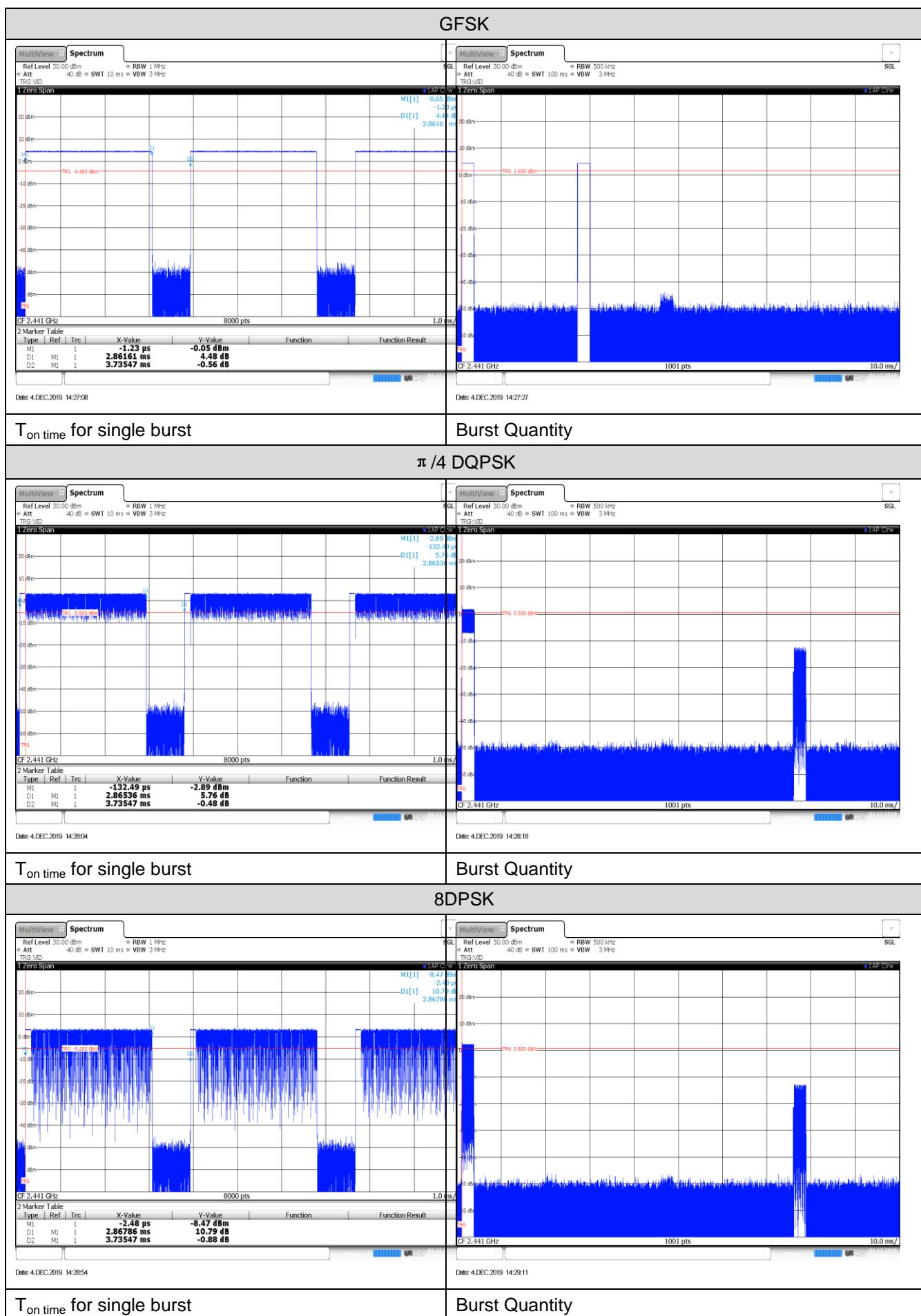


Modulation Type:	8DPSK
3DH1 Burst width	
3DH1 Burst number	
3DH3 Burst width	

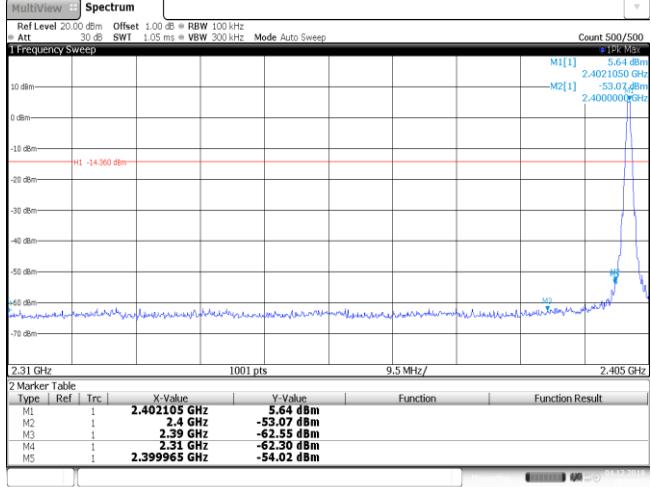
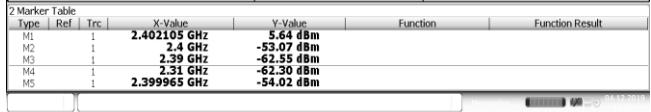
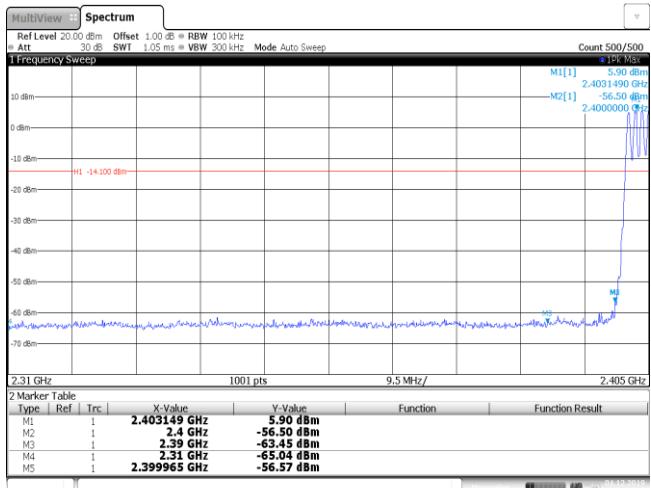
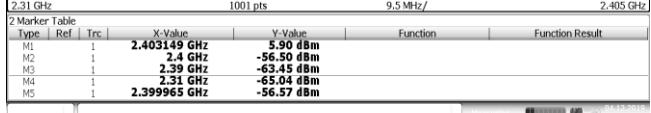
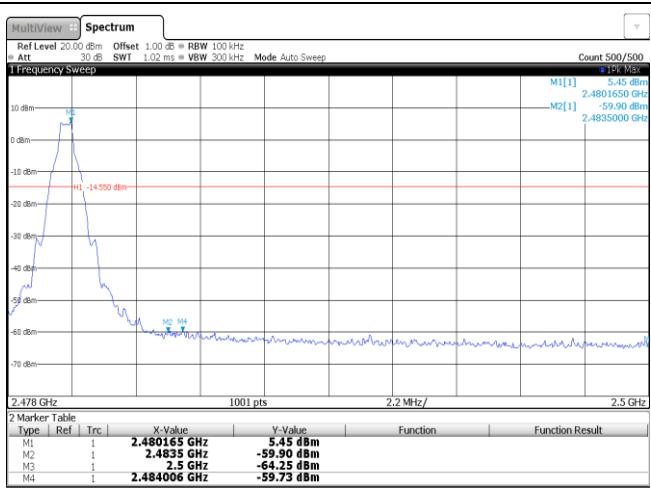


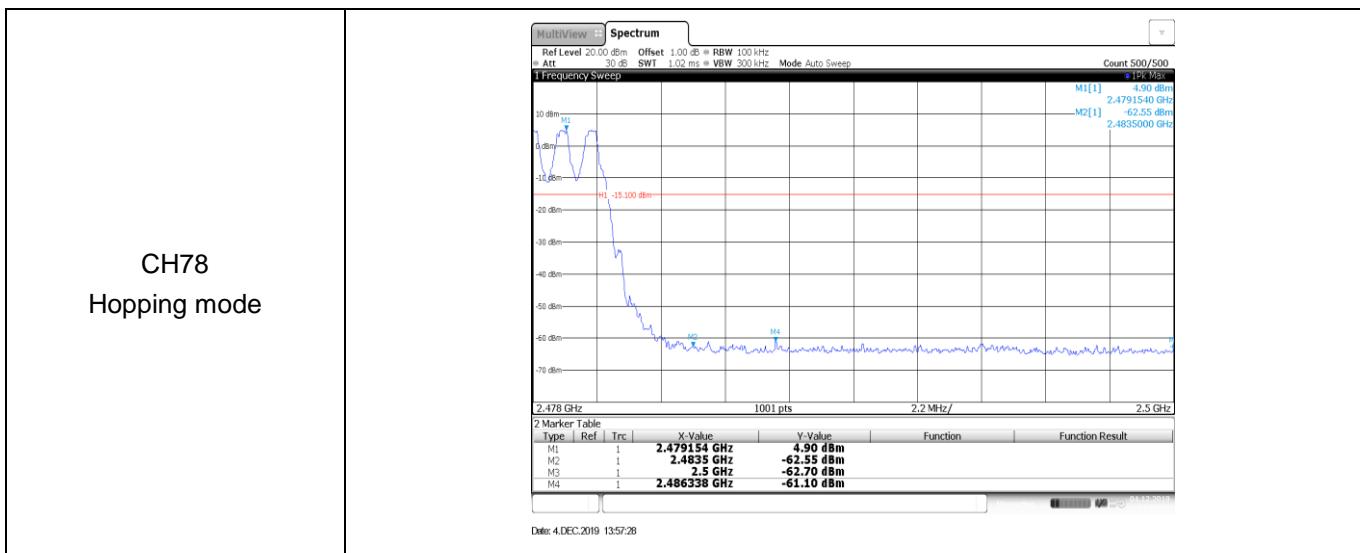
Appendix G: Duty Cycle Correction Factor (DCCF)

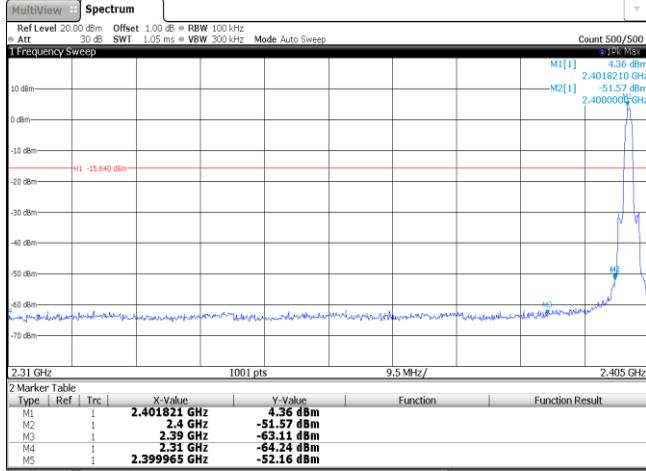
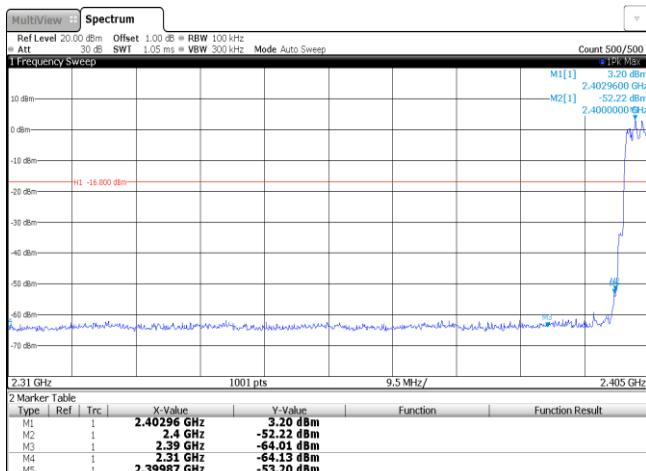
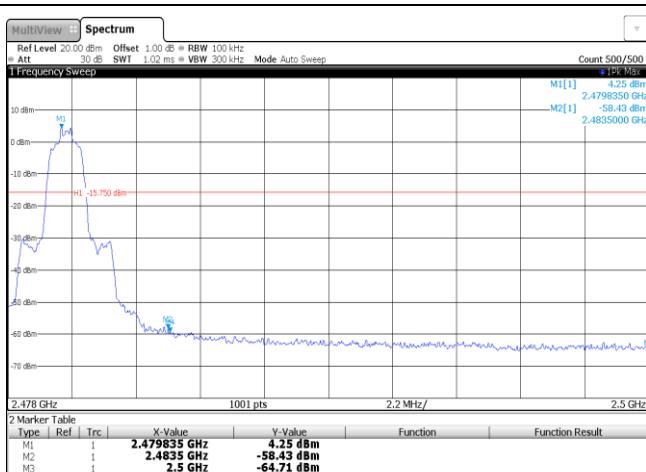
DCCF Calculate Formula					
$DCCF = 20 * \log(\text{duty cycle}) = 20 * \log(T_{\text{on time}} / T_{\text{period}})$					
Modulation type	Test Frequency (MHz)	$T_{\text{on time}}$ for single burst [ms]	T_{period} [ms]	Burst Quantity	DCCF [dB]
GFSK	2441	2.86	100	2	-24.85
$\pi/4$ DQPSK	2441	2.87	100	2	-24.82
8DPSK	2441	2.87	100	2	-24.82

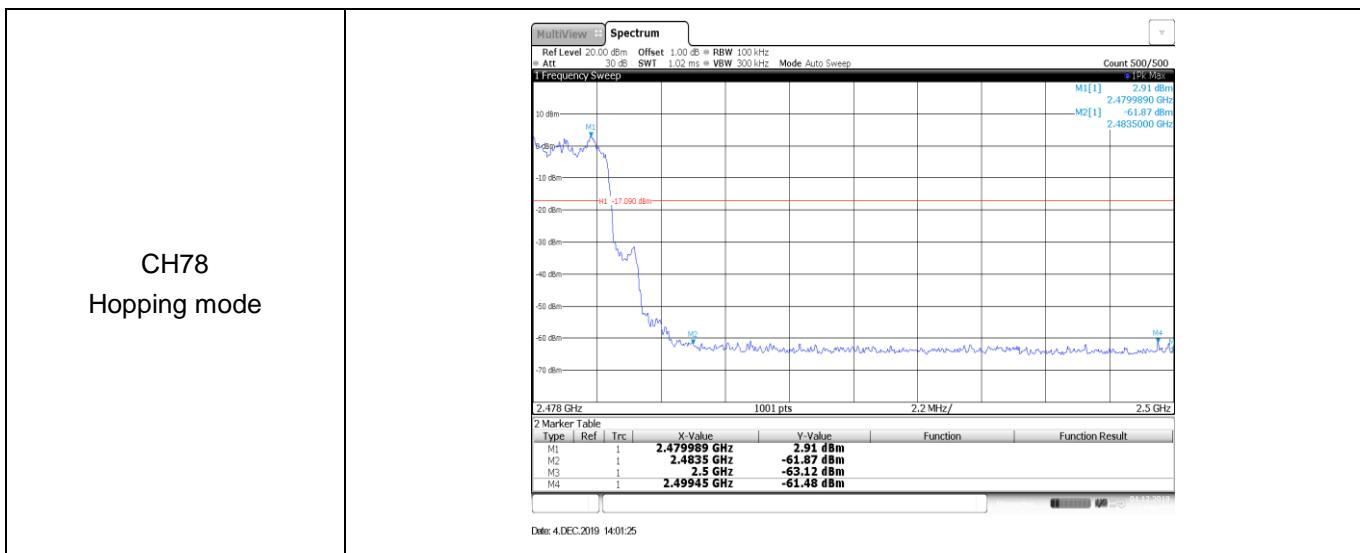


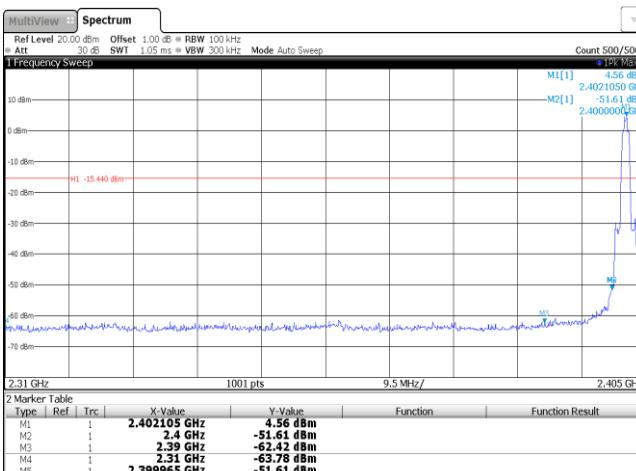
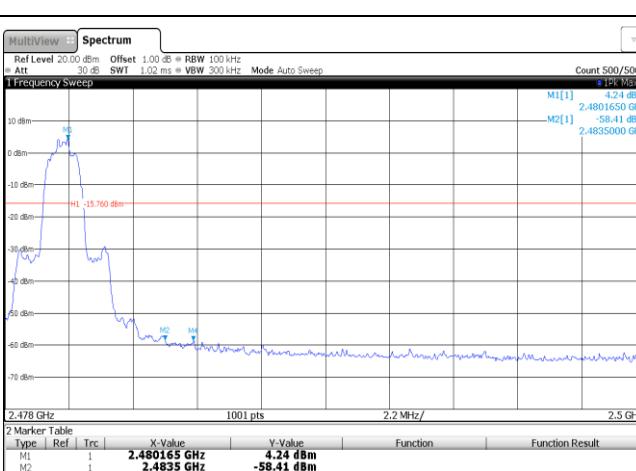
Appendix H: Band edge and Spurious Emissions (conducted)

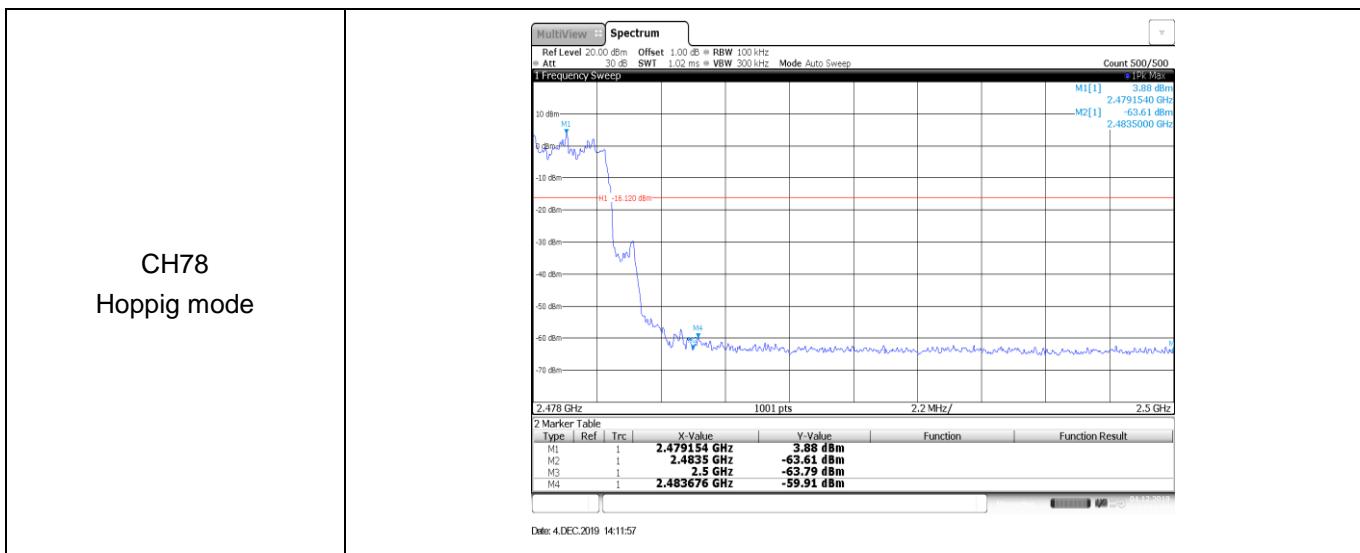
Test Item:	Band edge	Modulation type:	GFSK
CH00 No hopping mode			
CH00 Hopping mode			
CH78 No hopping mode			

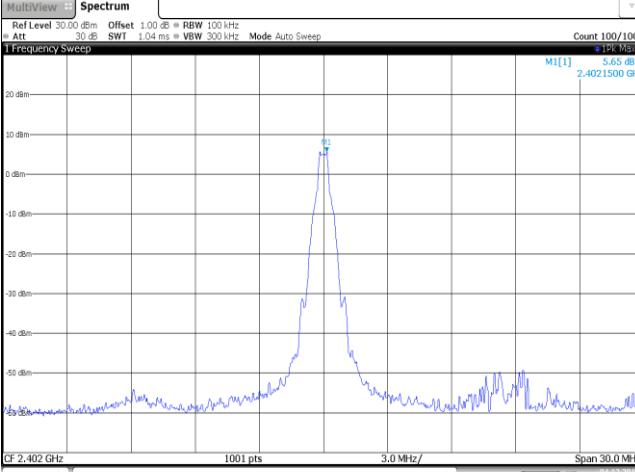
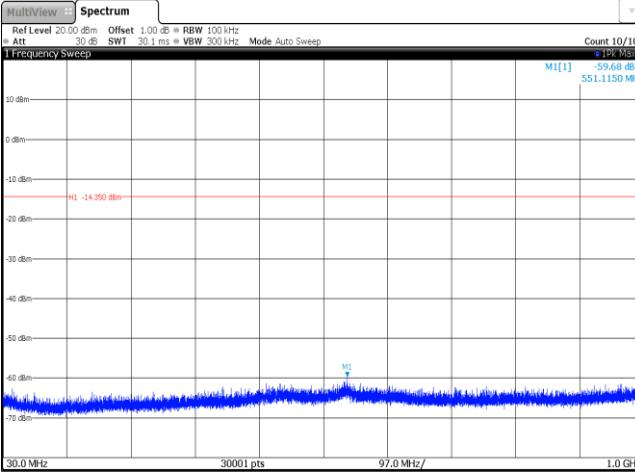
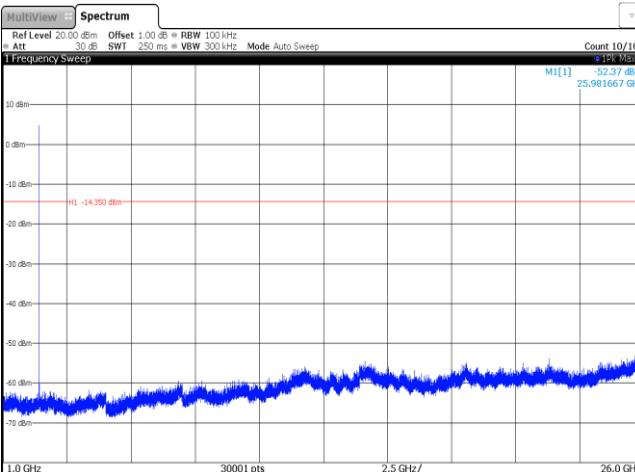


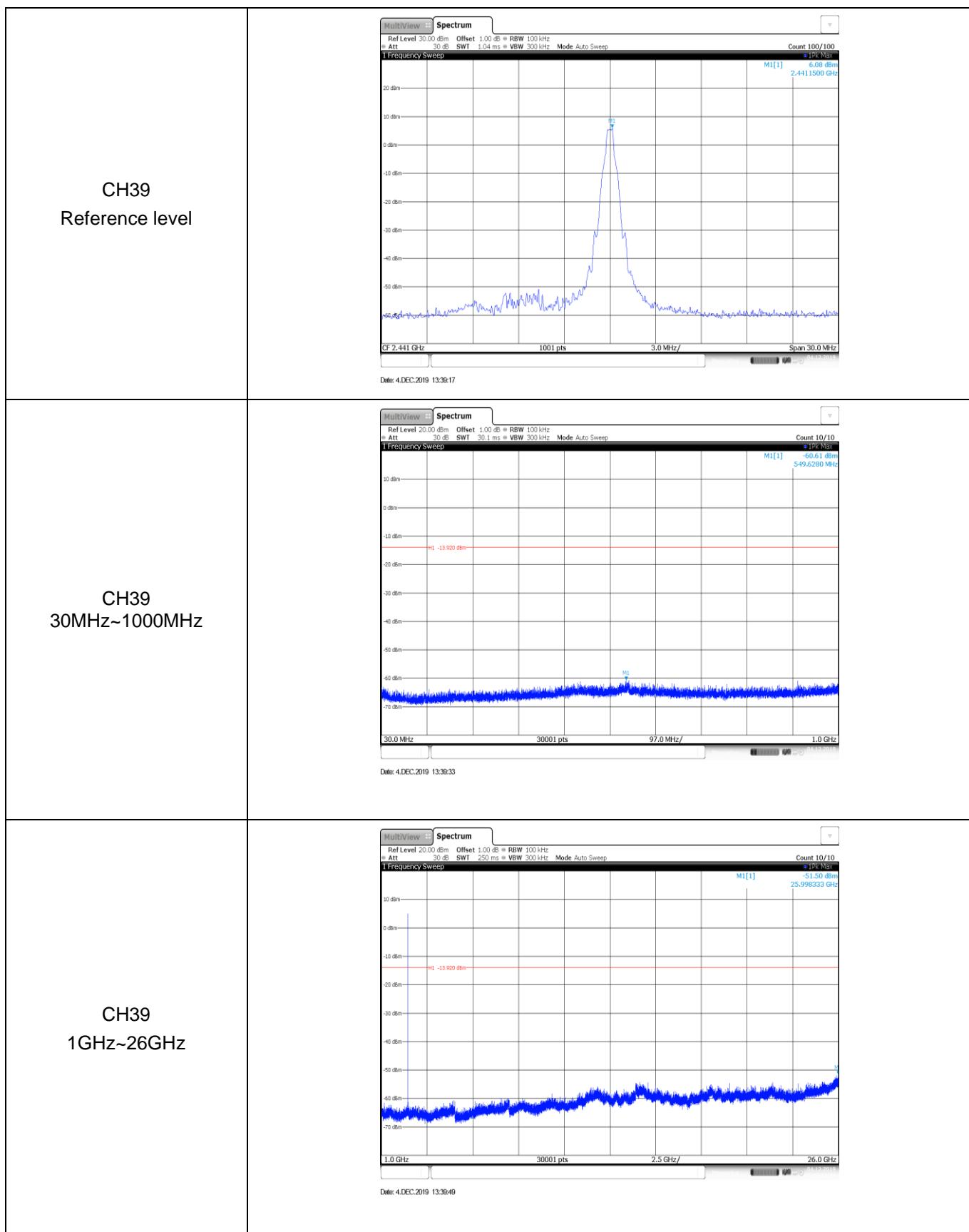
Test Item:	Band edge	Modulation type:	$\pi/4$ DQPSK
CH00 No hopping mode			
CH00 Hopping mode			
CH78 No hopping mode			

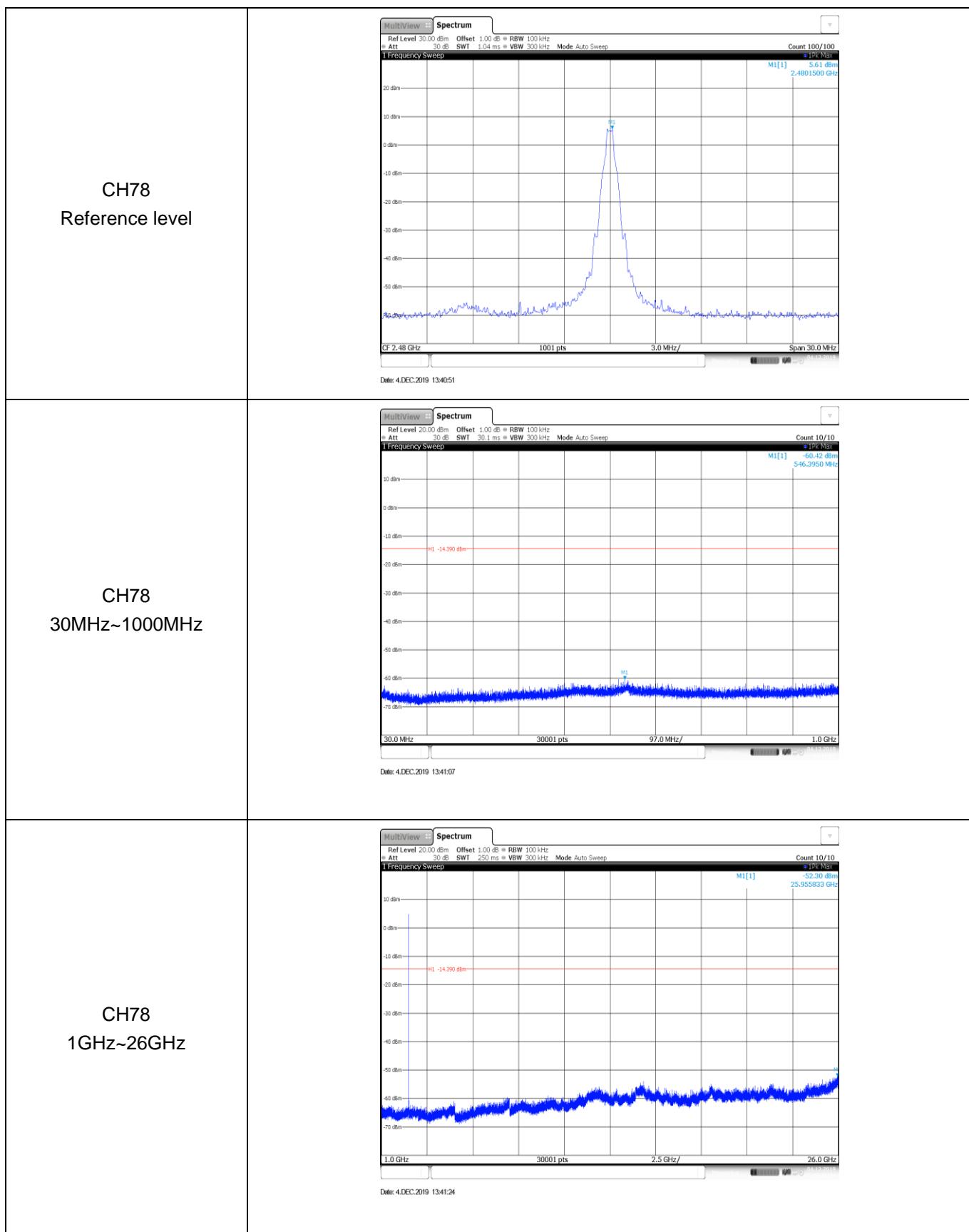


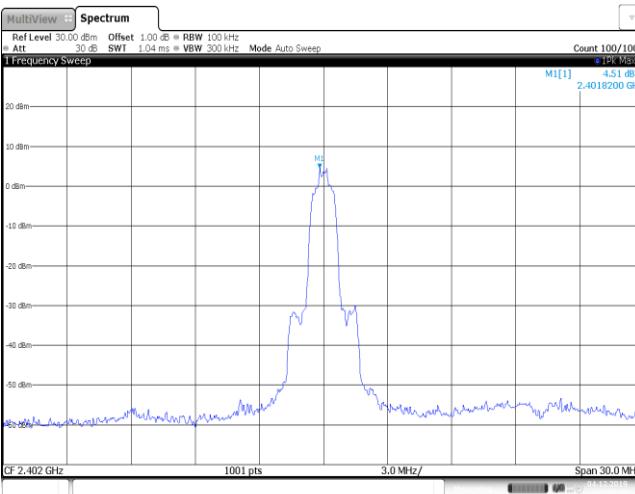
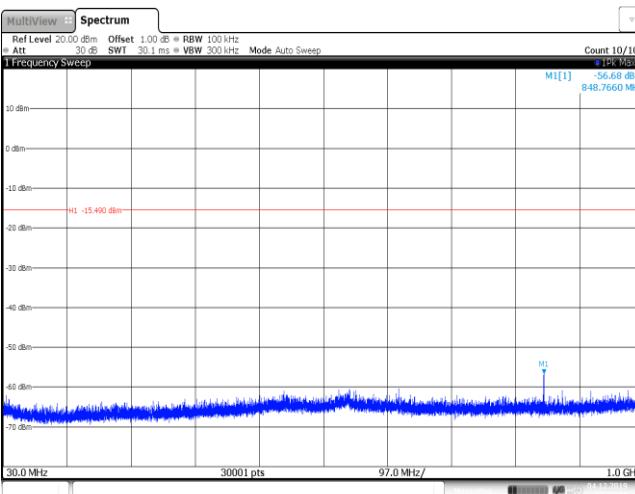
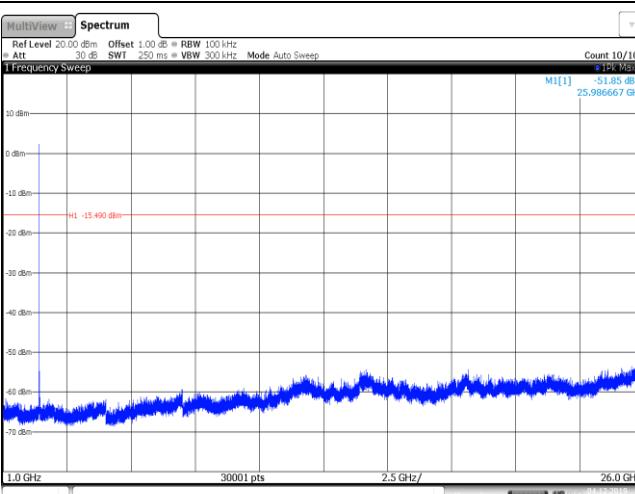
Test Item:	Band edge	Modulation type:	8DPSK
CH00 No hopping mode			
CH00 Hopping mode			
CH78 No hopping mode			

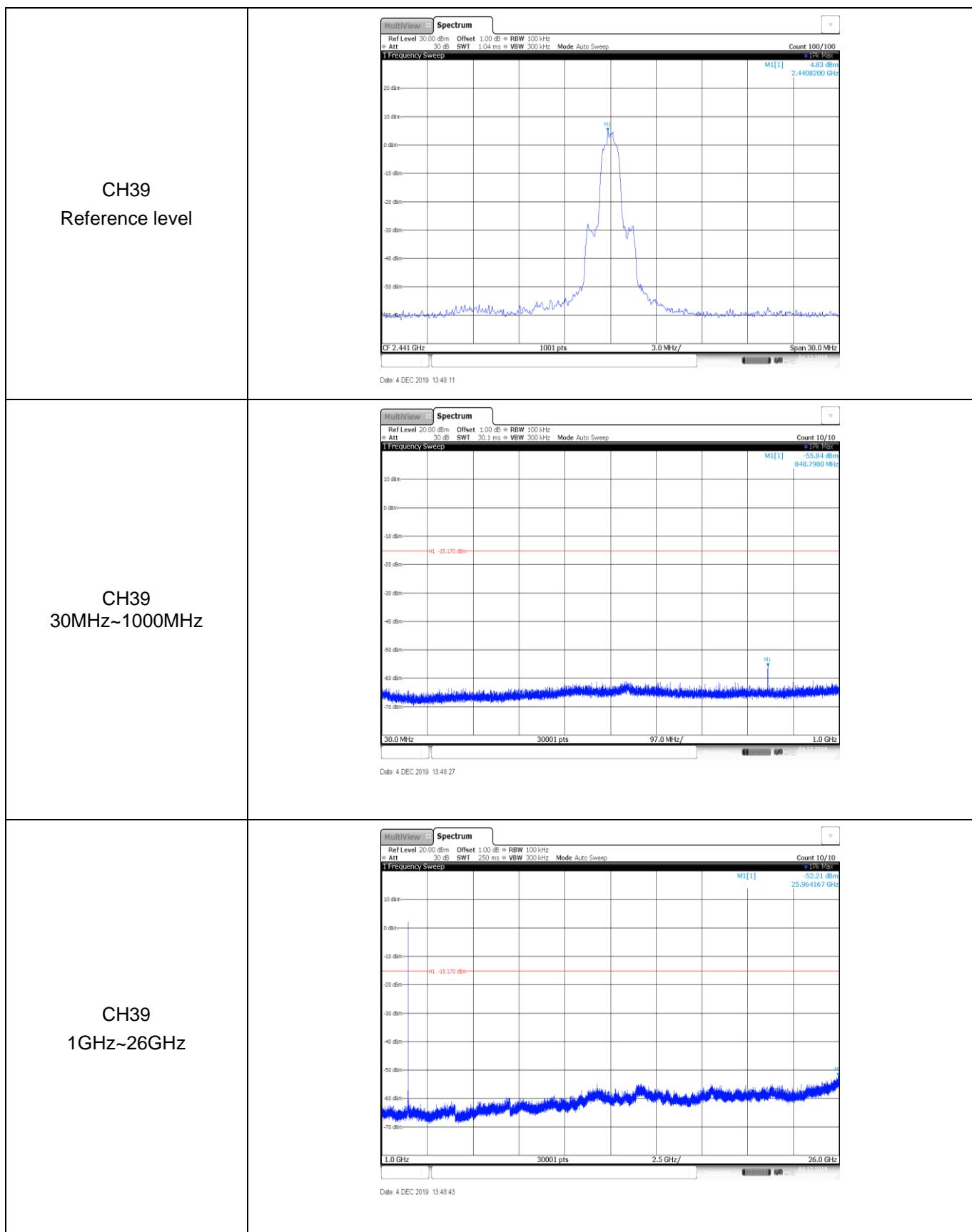


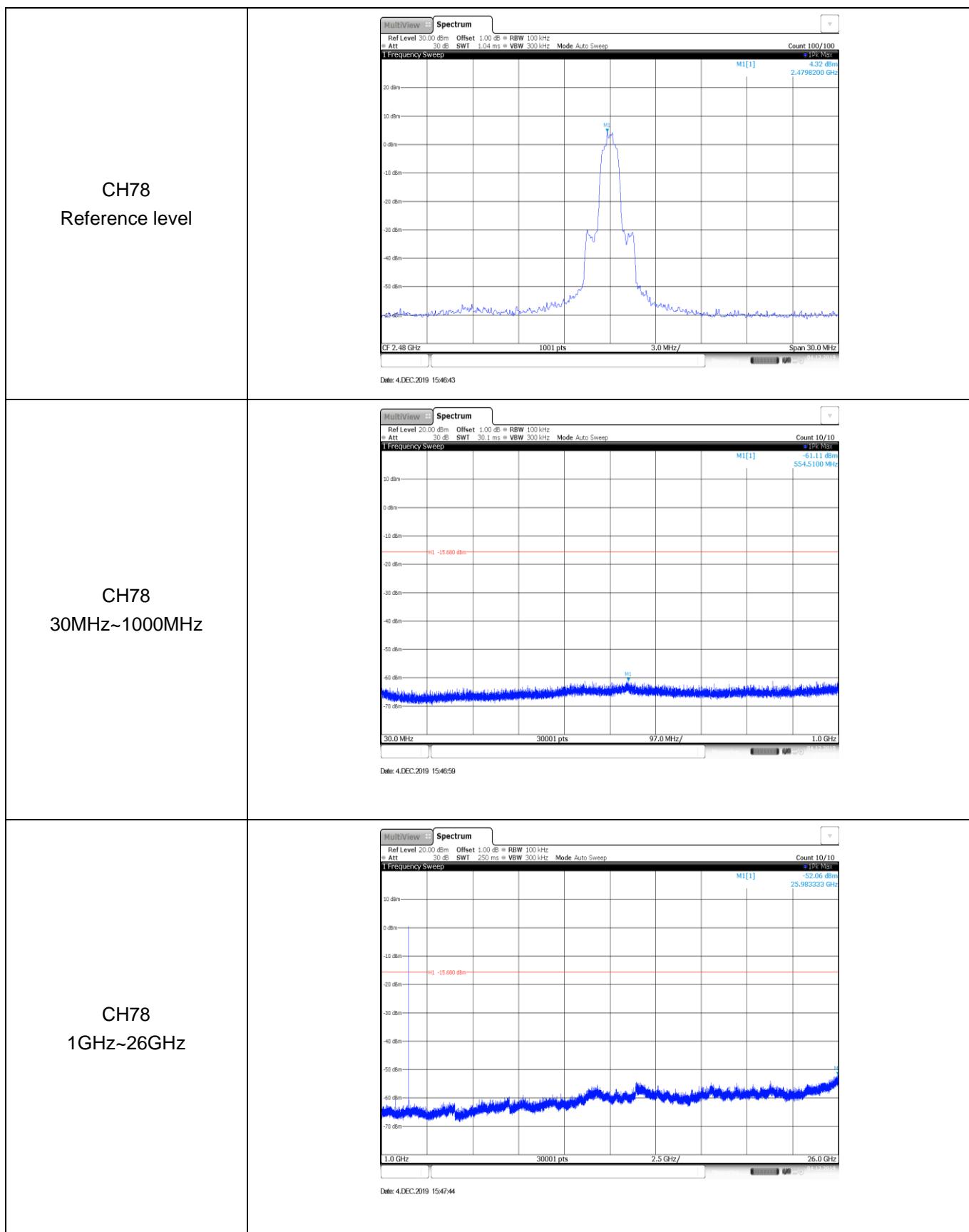
Test Item:	Spurious Emission	Modulation type:	GFSK
CH00 Reference level	 <p>Detailed description: This spectrum plot shows a single dominant peak at 2.402 GHz. The y-axis ranges from -50 dBm to 20 dBm, and the x-axis spans from 2.402 GHz to 3.0 GHz. The peak is labeled M1[1] at 5.65 dBm.</p>		
CH00 30MHz~1000MHz	 <p>Detailed description: This plot shows a flat noise floor across the 30 MHz to 1000 MHz range. A horizontal red line indicates a reference level at -14.250 dBm. The y-axis ranges from -70 dBm to 10 dBm, and the x-axis spans from 30.0 MHz to 1.0 GHz.</p>		
CH00 1GHz~26GHz	 <p>Detailed description: This plot shows a flat noise floor across the 1 GHz to 26 GHz range. A horizontal red line indicates a reference level at -14.250 dBm. The y-axis ranges from -70 dBm to 10 dBm, and the x-axis spans from 1.0 GHz to 26.0 GHz.</p>		

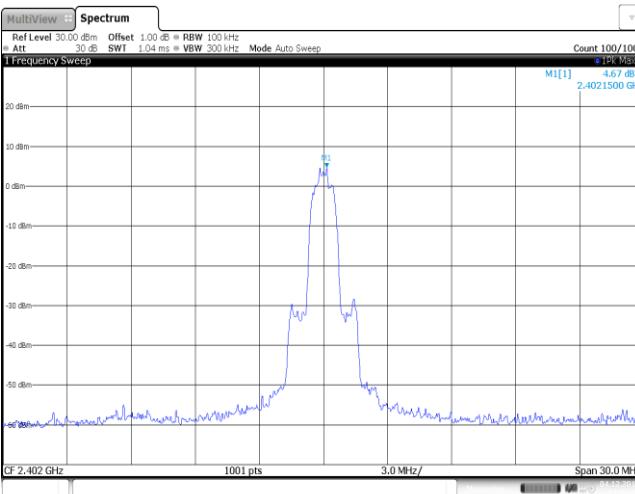
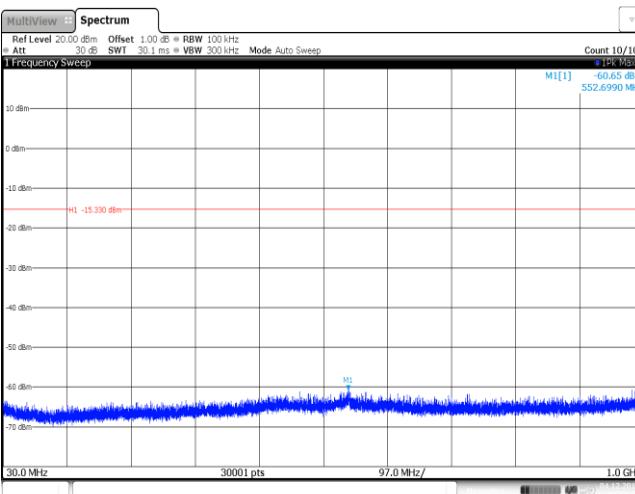
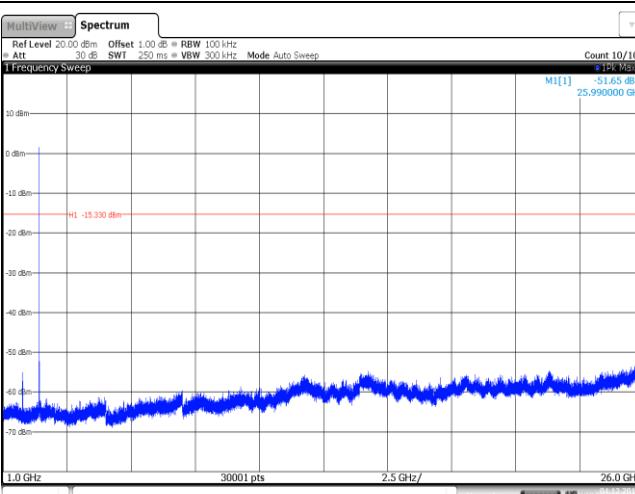


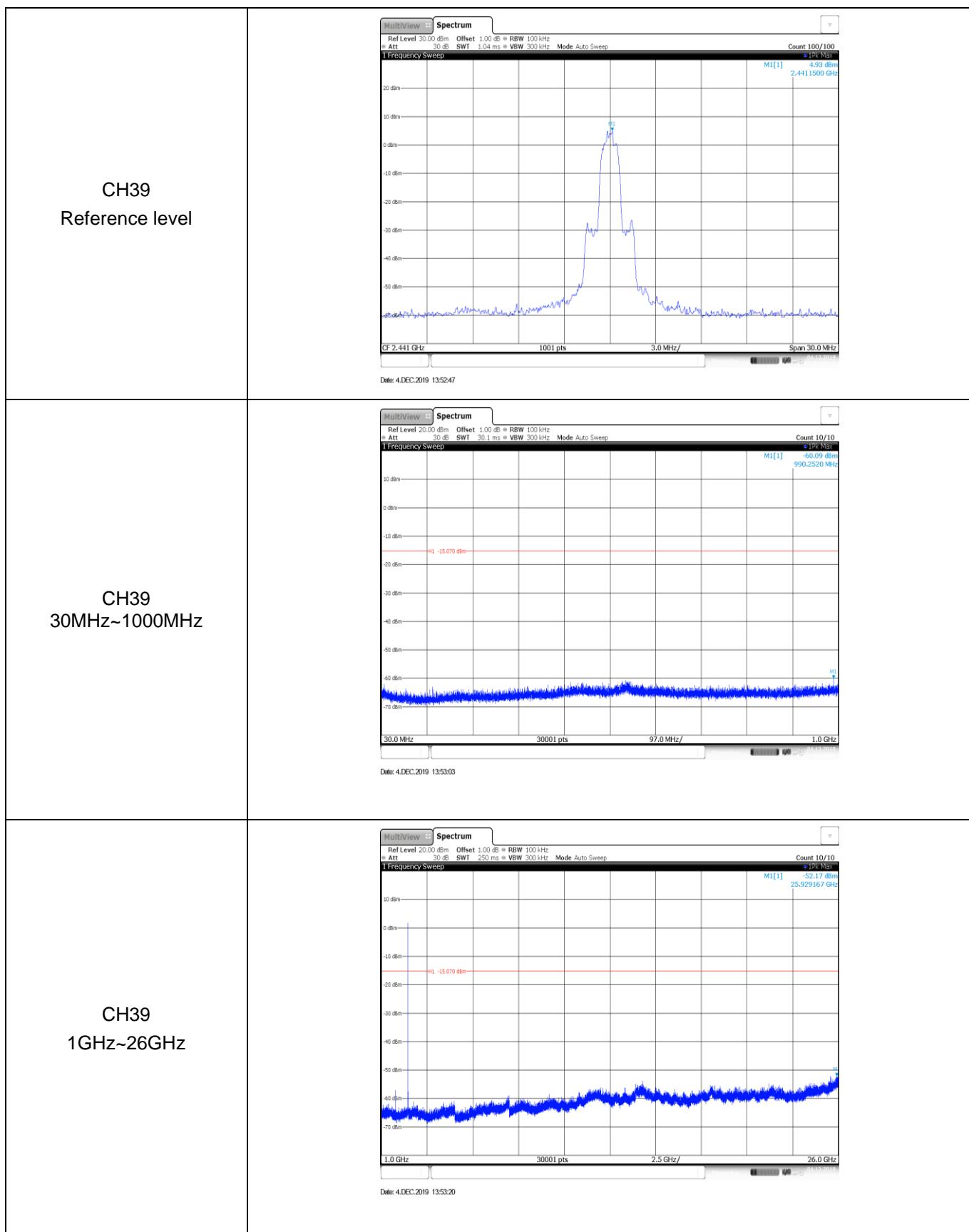


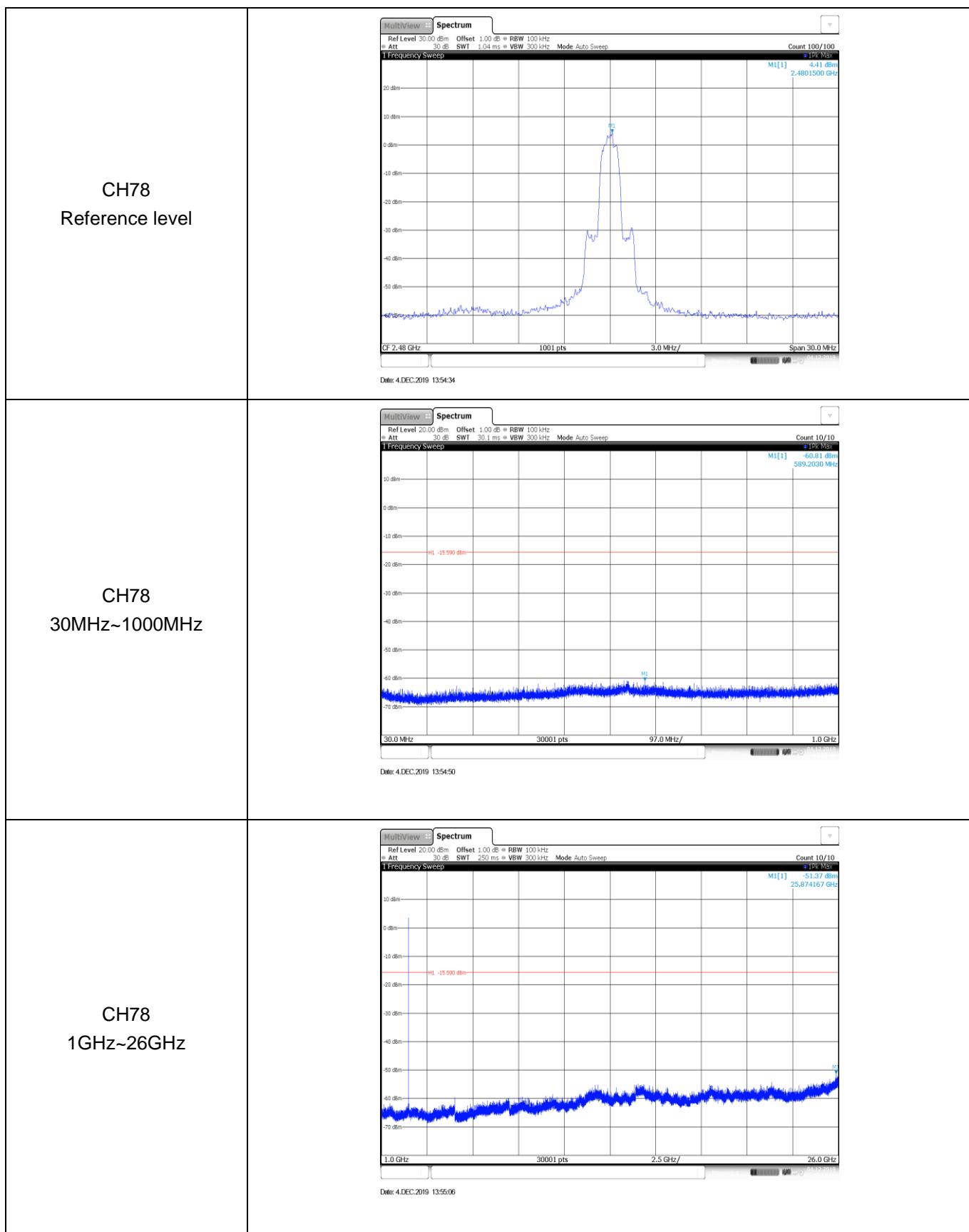
Test Item:	Spurious Emission	Modulation type:	$\pi/4$ DQPSK
CH00 Reference level			
CH00 30MHz~1000MHz			
CH00 1GHz~26GHz			





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





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