

APPENDIX REPORT

Project No.	SHT2106117003EW	Radio Specification	Bluetooth EDR
Test sample No.	YPHT21061170022	Model No.	C6200
Start test date	2021-10-20	Finish date	2021-10-21
Temperature	26.2°C	Humidity	39%
Test Engineer	Xiaoqin Li	Auditor	Xiaodong Zhuo

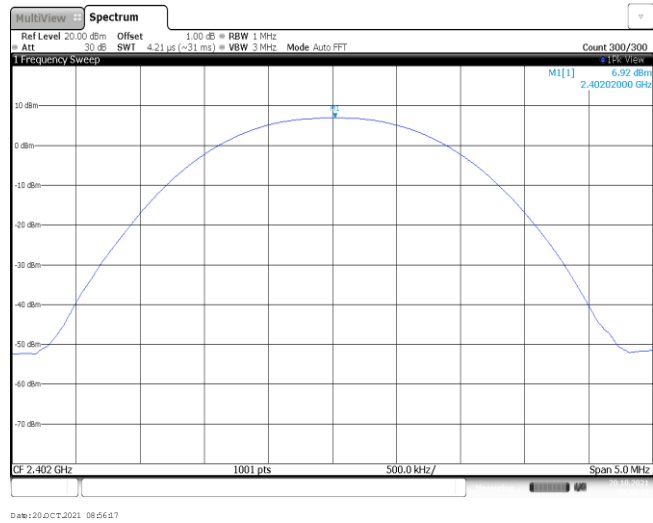
Appendix clause	Test item	Result
A	Peak Output Power	PASS
B	20 dB Bandwidth	PASS
C	99% Occupied Bandwidth	PASS
D	Carrier Frequencies Separation	PASS
E	Hopping Channel Number	PASS
F	Dwell Time	PASS
G	Duty Cycle Correction Factor (DCCF)	PASS
H	Band edge and Spurious Emissions(coducted)	PASS

Appendix A: Peak Output Power

Modulation type	Channel	Peak Output power (dBm)	Average Output power (dBm)	Limit (dBm)	Result
GFSK	00	6.92	6.90	≤ 30.00	Pass
	39	6.76	6.68		
	78	6.31	6.24		
π/4DQPSK	00	6.77	6.67	≤ 21.00	Pass
	39	6.38	6.30		
	78	5.72	5.63		
8DPSK	00	6.76	6.69	≤ 21.00	Pass
	39	6.39	6.31		
	78	5.72	5.63		

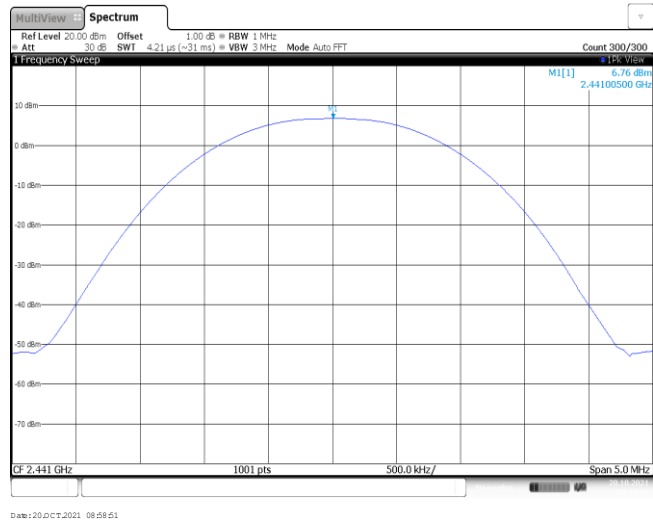
Modulation Type: GFSK

CH00



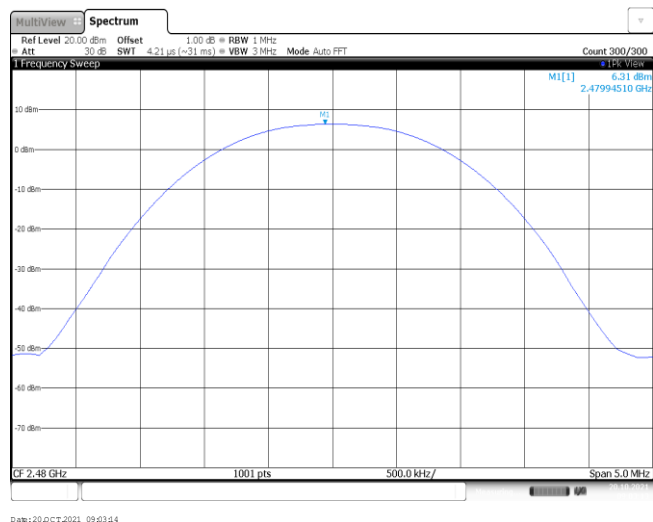
Date: 20 OCT 2021 08:56:17

CH39



Date: 20 OCT 2021 08:58:51

CH78

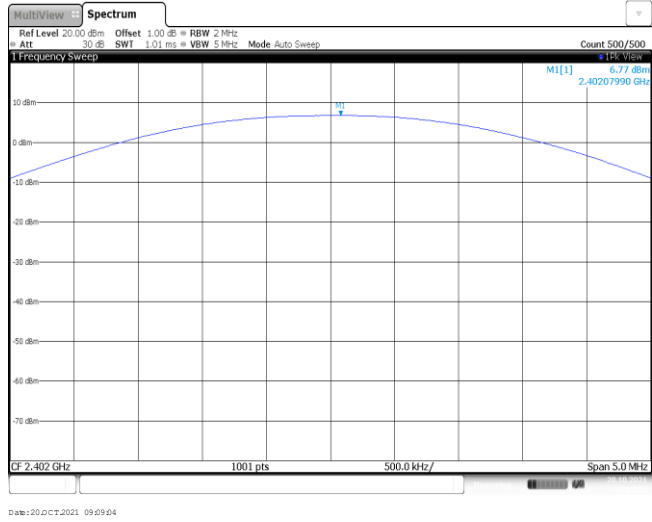


Date: 20 OCT 2021 09:03:14

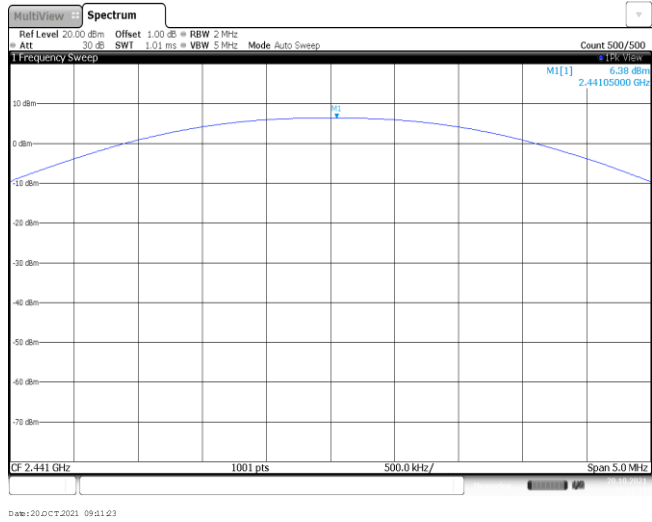
Modulation Type:

$\pi/4$ DQPSK

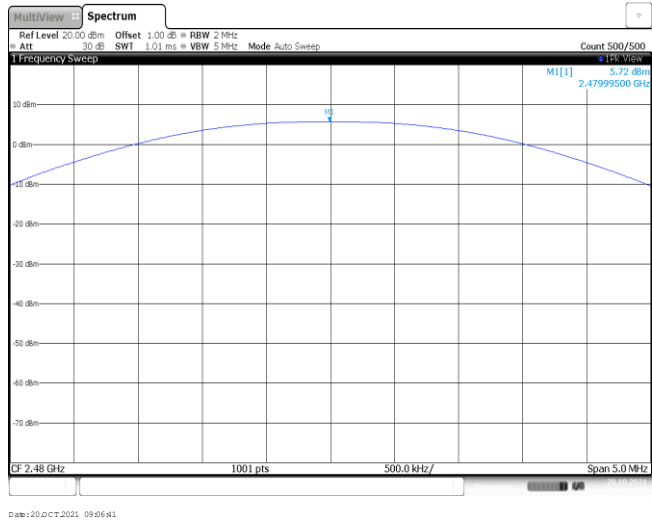
CH00



CH39

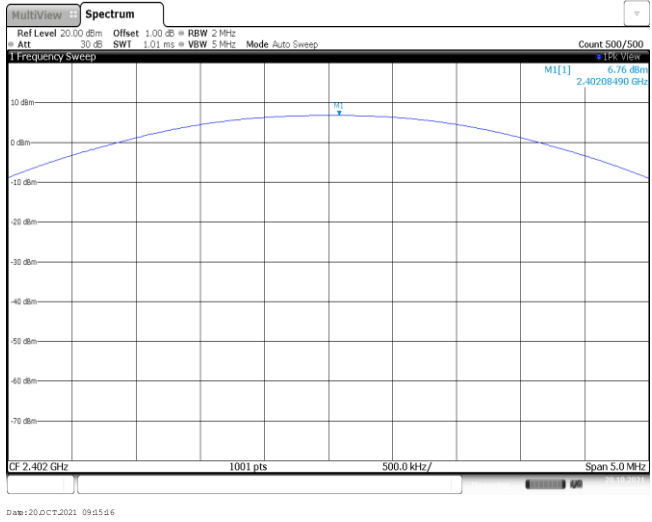


CH78



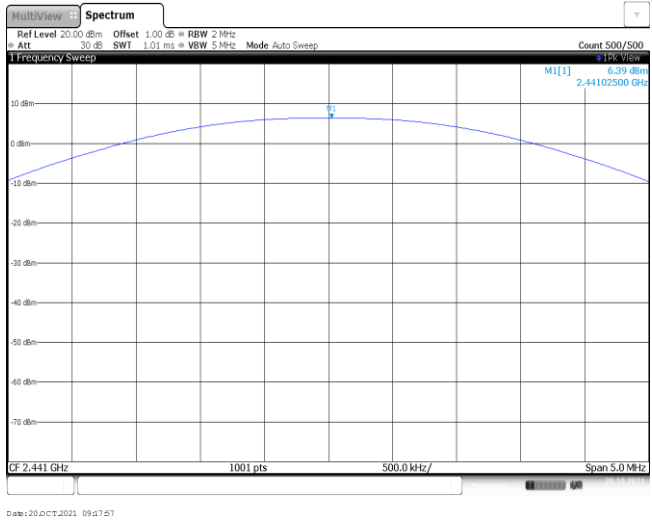
Modulation Type: 8DPSK

CH00



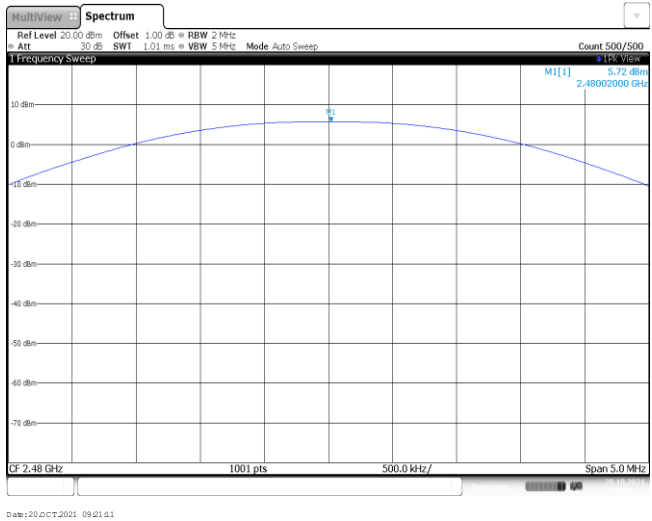
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CH39



Date: 20 OCT 2021 09:17:57

CH78



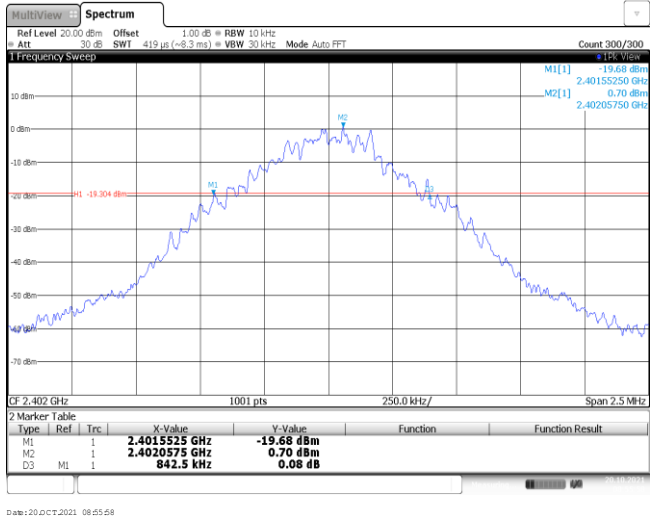
Date: 20 OCT 2021 09:21:11

Appendix B : 20 dB Bandwidth

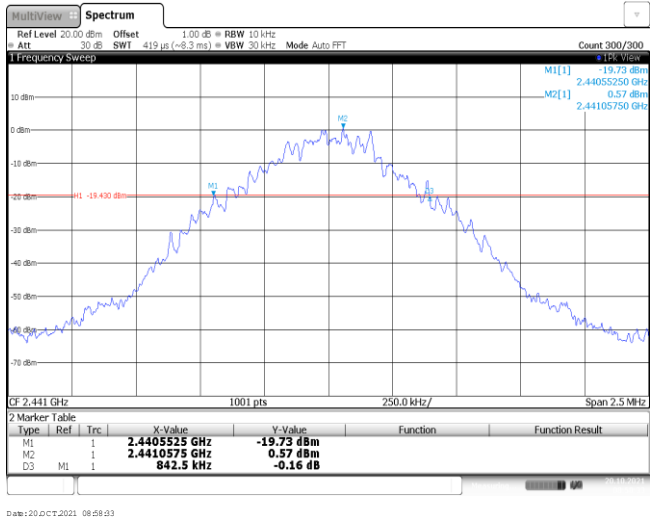
Modulation type	Channel	20 dB Bandwidth (kHz)	Limit (kHz)	Result
GFSK	00	842.50	-	Pass
	39	842.50		
	78	795.00		
$\pi/4$ DQPSK	00	1280.00	-	Pass
	39	1280.00		
	78	1260.00		
8DPSK	00	1290.00	-	Pass
	39	1285.00		
	78	1277.50		

Modulation Type: GFSK

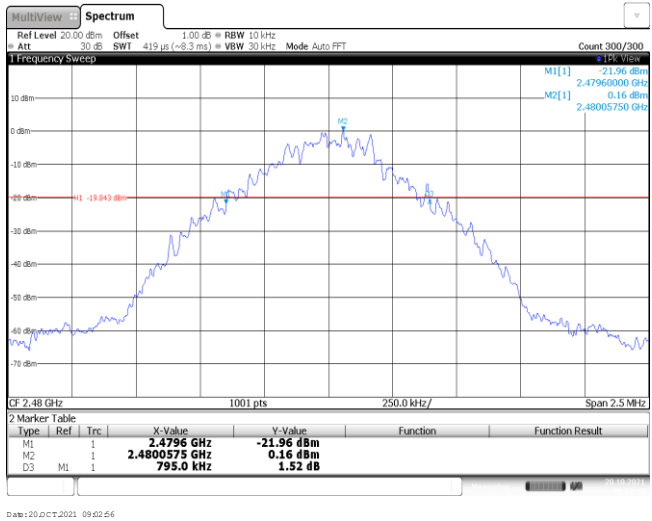
CH00



CH39

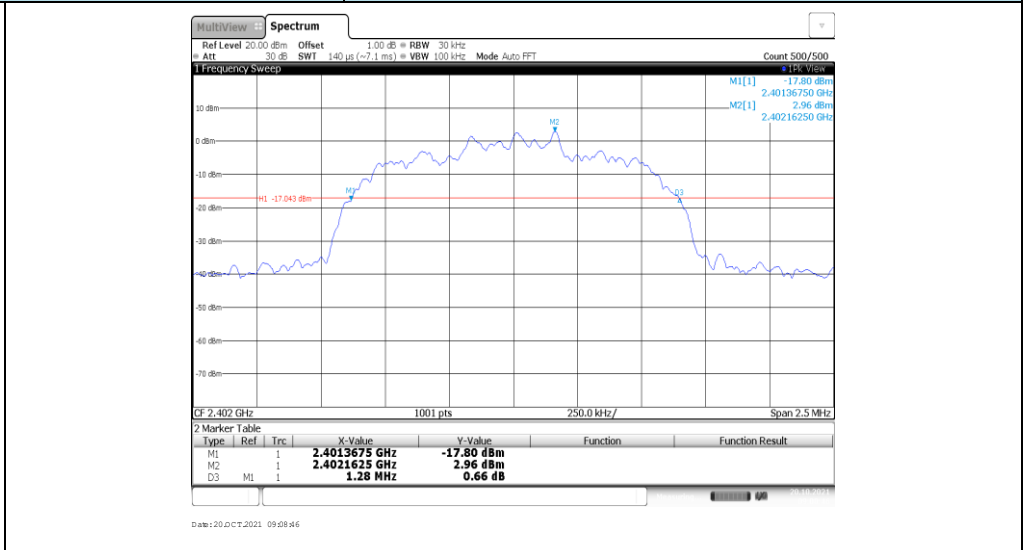


CH78

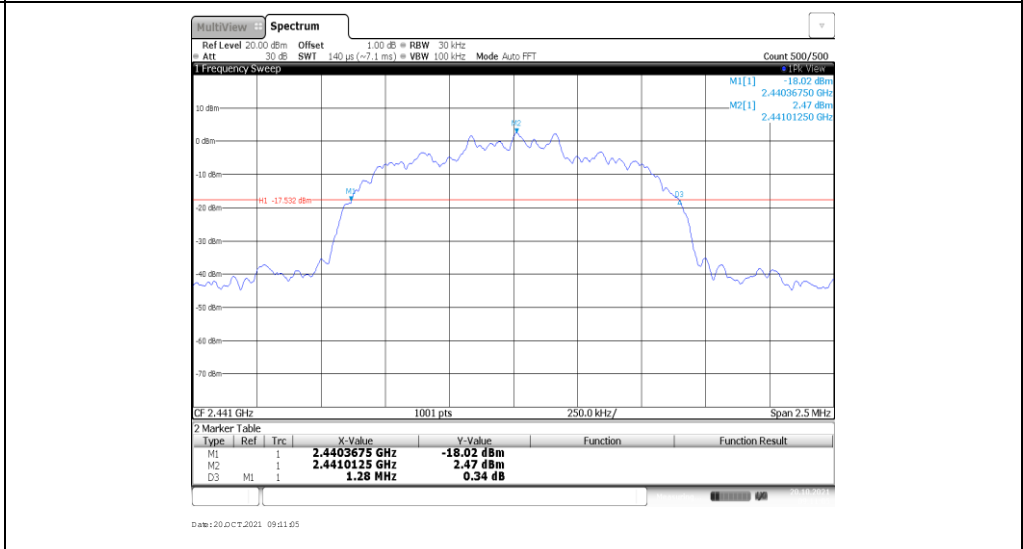


Modulation Type: **$\pi/4$ DQPSK**

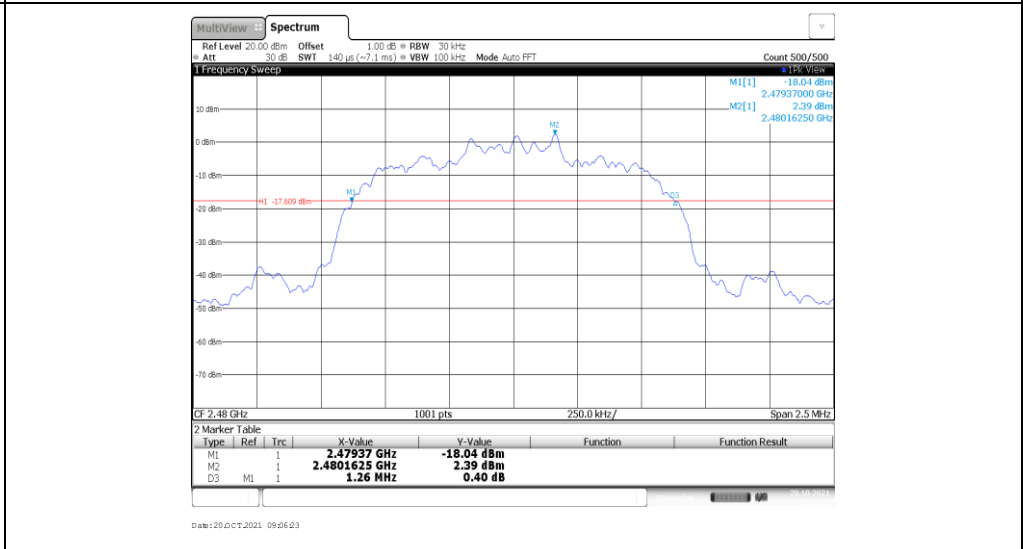
CH00



CH39

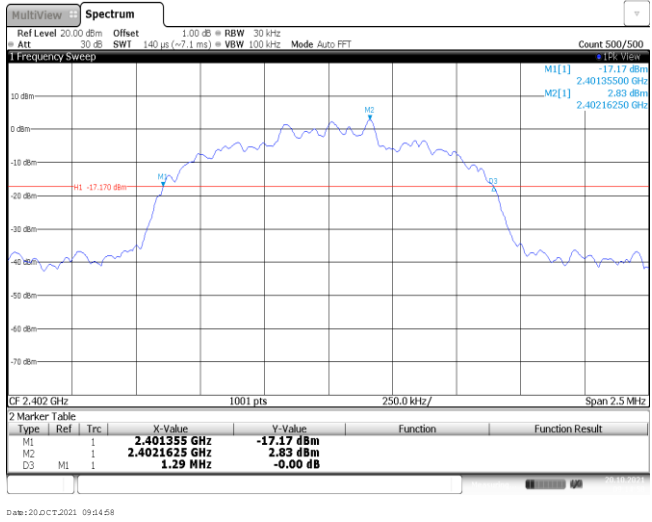


CH78



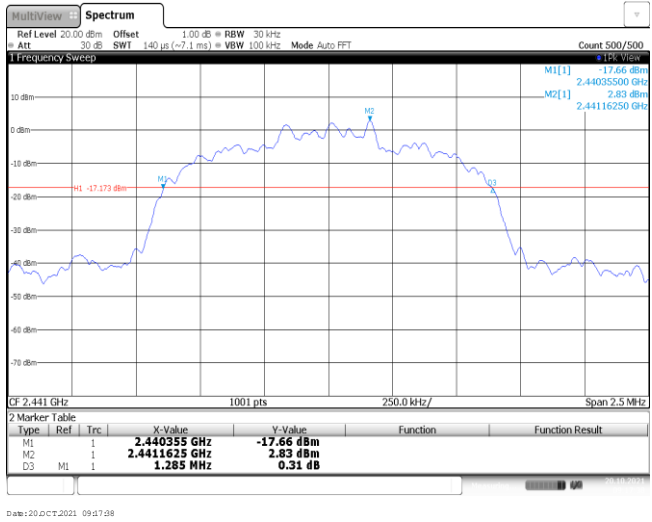
Modulation Type: 8DPSK

CH00



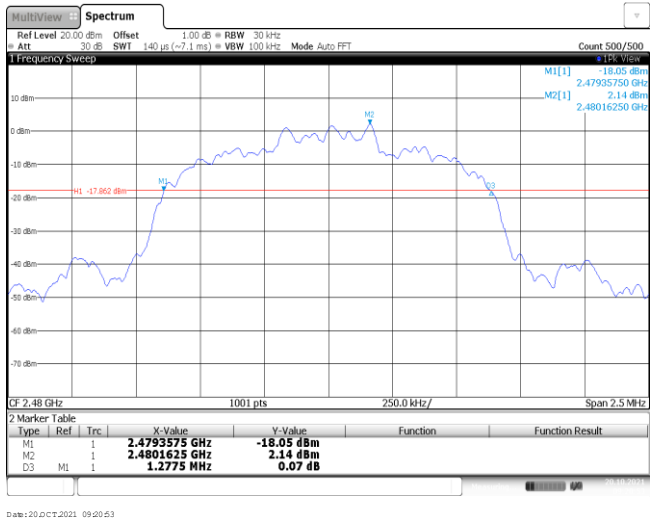
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CH39



Date: 20/0CT/2021 09:17:28

CH78



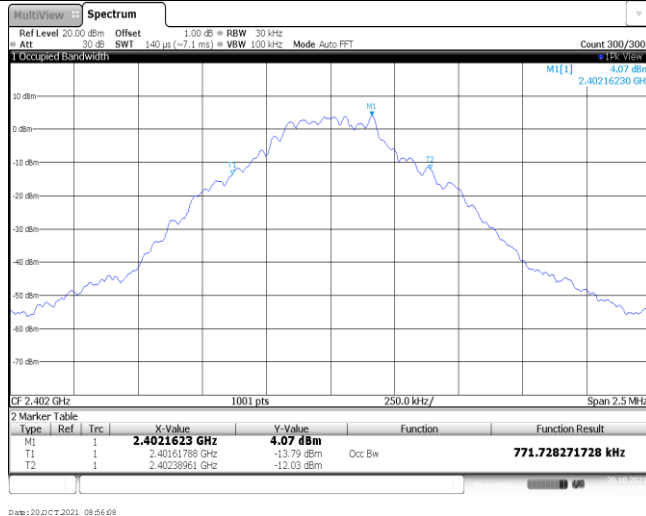
Date: 20/0CT/2021 09:20:53

Appendix C: 99% Occupied Bandwidth

Modulation type	Channel	99% Occupied Bandwidth (MHz)	Limit (MHz)	Result
GFSK	00	0.77	-	Pass
	39	0.76		
	78	0.76		
$\pi/4$ DQPSK	00	1.16	-	Pass
	39	1.15		
	78	1.15		
8DPSK	00	1.16	-	Pass
	39	1.15		
	78	1.15		

Modulation Type: GFSK

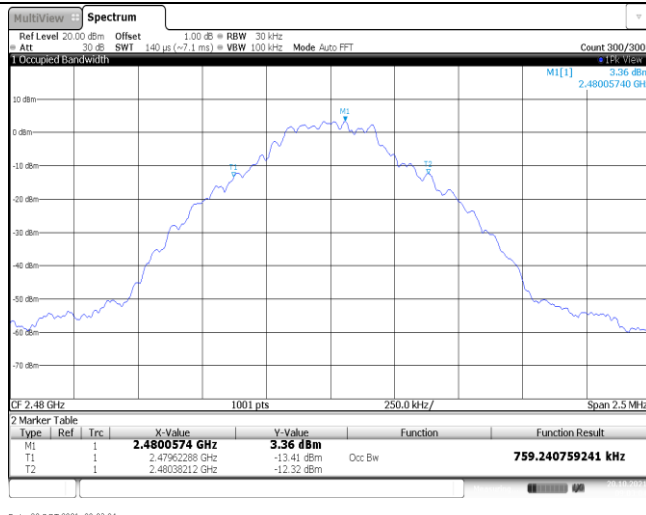
CH00



CH39



CH78



Modulation Type: **$\pi/4$ DQPSK**

CH00



Date: 20/0CT.2021 09:08:55

CH39



Date: 20/0CT.2021 09:11:14

CH78



Date: 20/0CT.2021 09:06:01

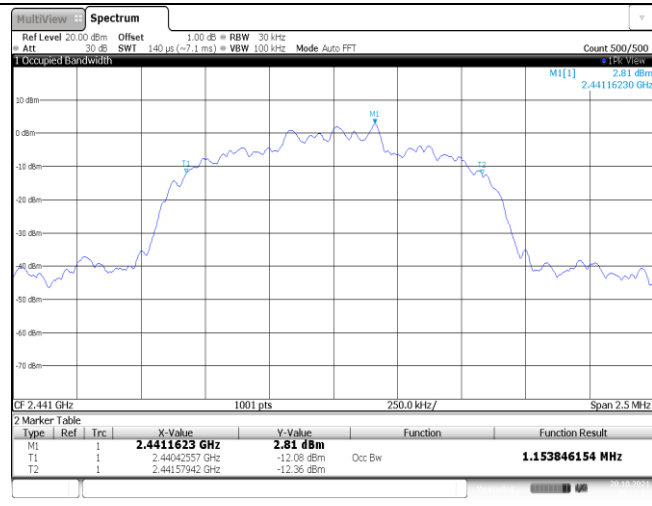
Modulation Type: 8DPSK

CH00



Date: 20/10/2021 09:15:07

CH39



Date: 20/10/2021 09:17:47

CH78



Date: 20/10/2021 09:21:02

Appendix D: Carrier Frequencies Separation

Modulation type	Channel	Carrier Frequencies Separation (MHz)	Limit (kHz) *	Result
GFSK	39	1.00	≥842.50	Pass
$\pi/4$ DQPSK	39	1.00	≥853.33	Pass
8DPSK	39	1.00	≥860.00	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.

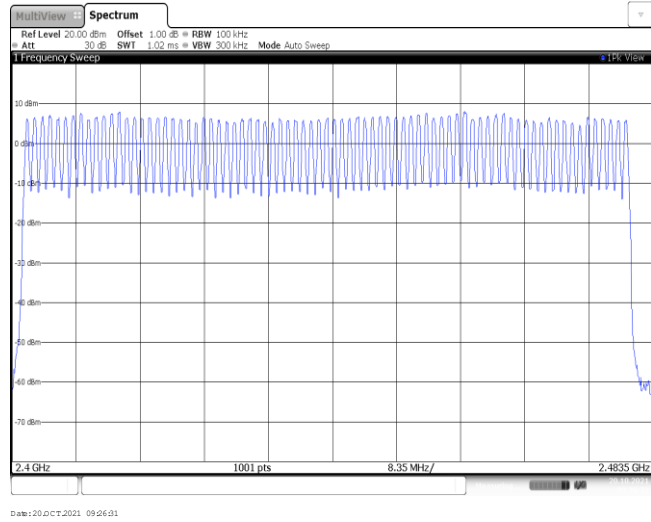
8DPSK limit = $2/3$ * The maximum 20 dB Bandwidth for 8DPSK modulation on the appendix B

<p style="text-align: center;">GFSK</p>	<p style="text-align: center;">Date: 20.0CT.2021 09:25:18</p>
<p style="text-align: center;">$\pi/4$DQPSK</p>	<p style="text-align: center;">Date: 20.0CT.2021 09:30:31</p>
<p style="text-align: center;">8DPSK</p>	<p style="text-align: center;">Date: 20.0CT.2021 09:35:22</p>

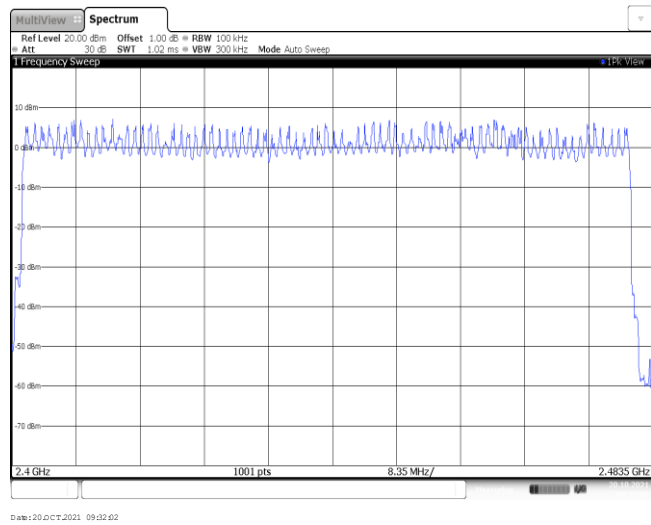
Appendix E: Hopping Channel Number

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

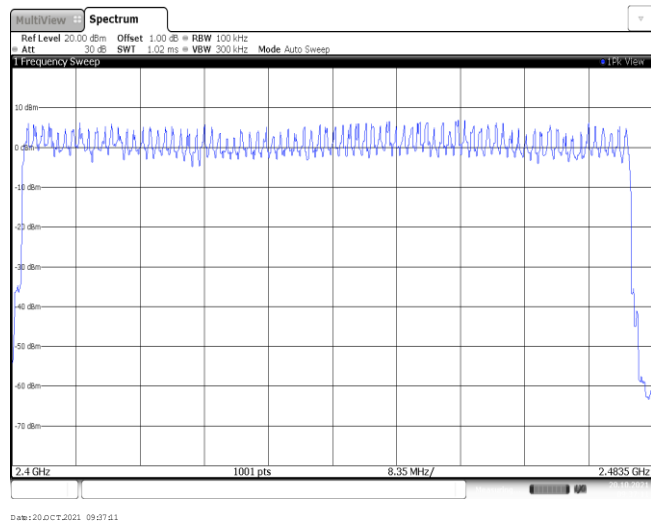
GFSK



$\pi/4$ DQPSK

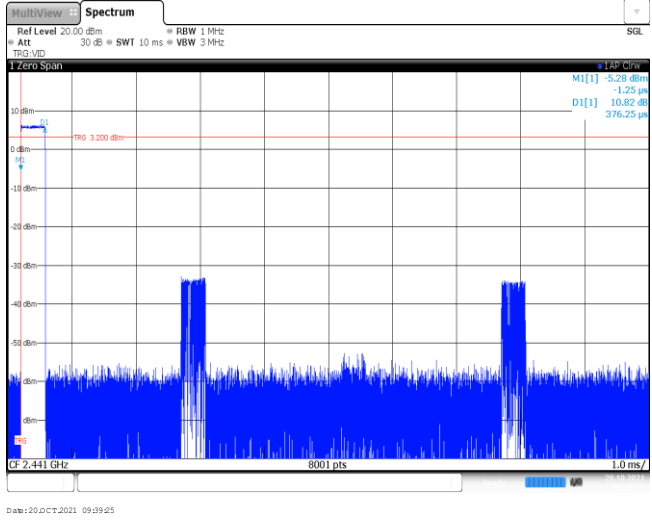
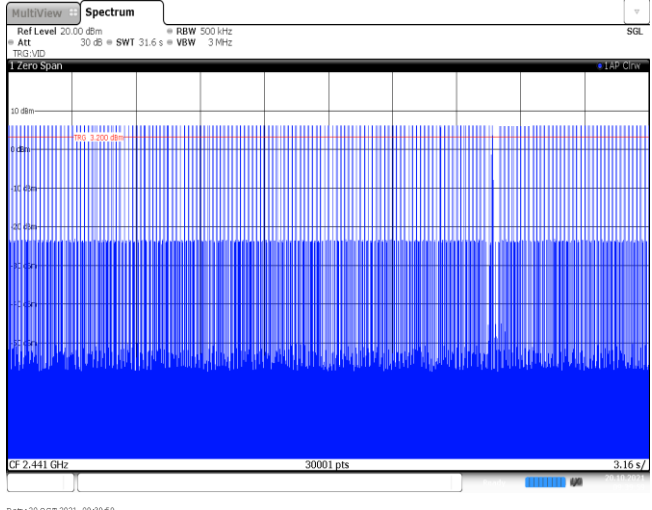
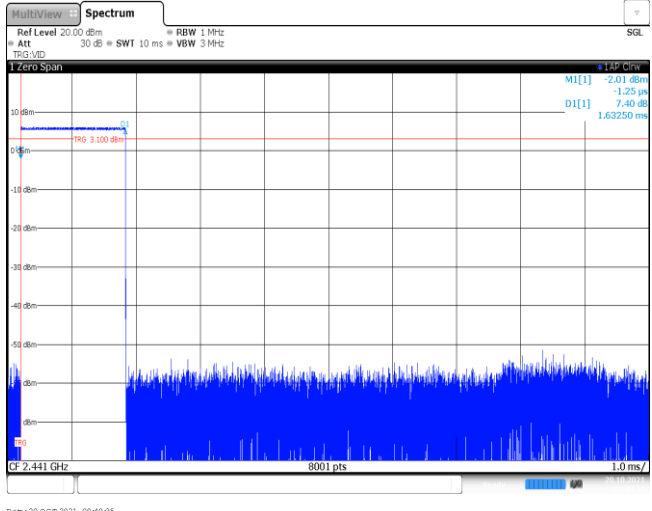


8DPSK

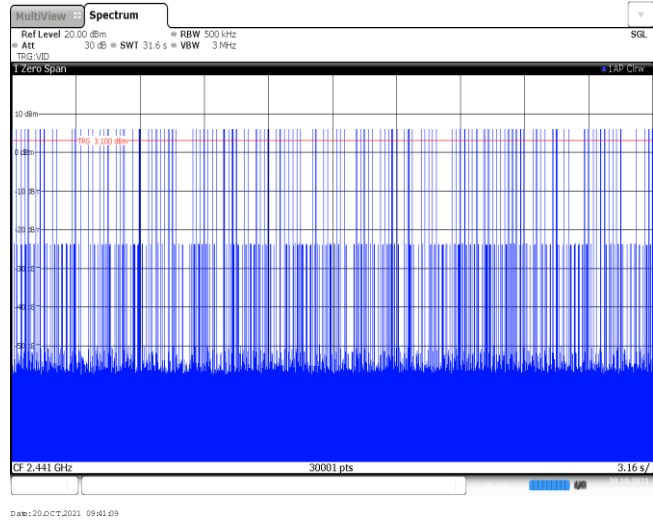


Appendix F: Dwell Time

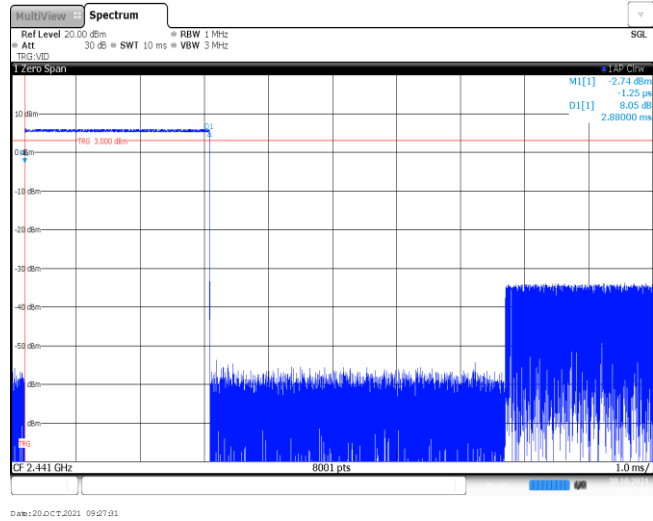
Modulation type	Packet	Burst Width [ms]	Total Hops[hop*ch]	Dwell time (Second)	Limit (Second)	Result
GFSK	DH1	0.38	311	0.12	≤ 0.40	Pass
	DH3	1.63	159	0.26		
	DH5	2.88	106	0.31		
π/4DQPSK	2DH1	0.38	314	0.12	≤ 0.40	Pass
	2DH3	1.64	158	0.26		
	2DH5	2.88	100	0.29		
8DPSK	3DH1	0.39	314	0.12	≤ 0.40	Pass
	3DH3	1.64	15	0.26		
	3DH5	2.89	111	0.32		

Modulation Type:	GFSK
<p>DH1 Burst width</p>	
<p>DH1 Burst number</p>	
<p>DH3 Burst width</p>	

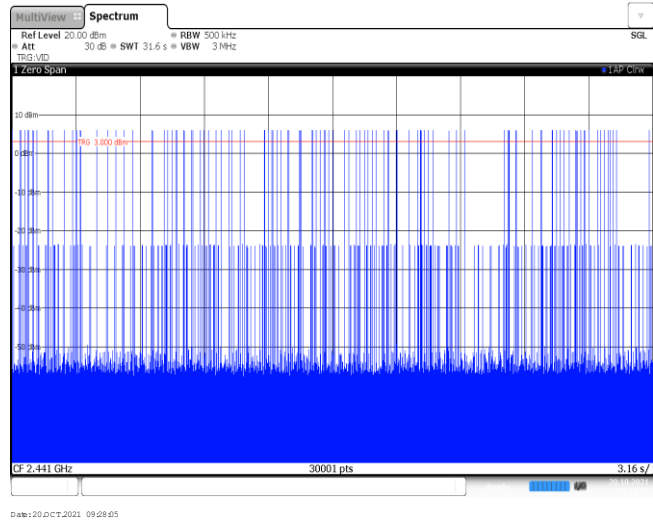
DH3
Burst number



DH5
Burst width

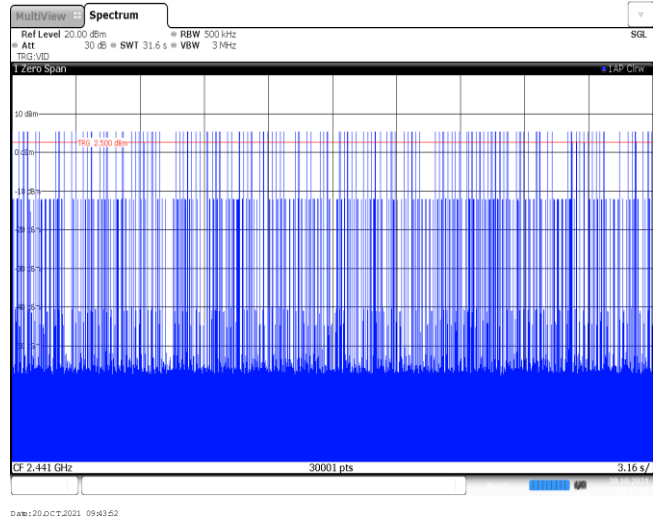


DH5
Burst number

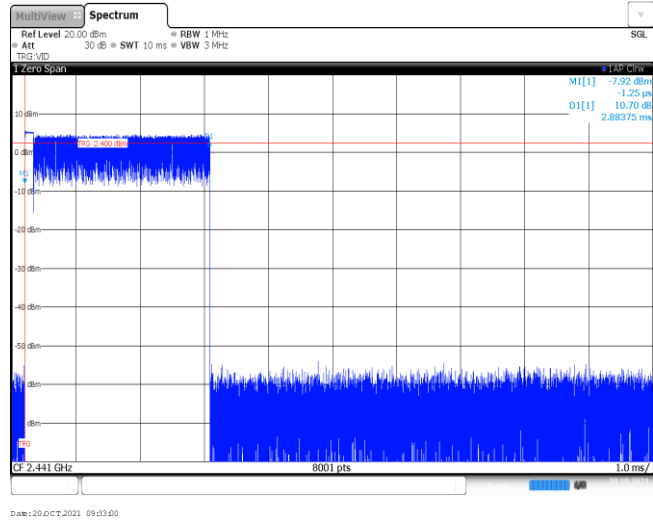


Modulation Type: $\pi/4$ DQPSK	
2DH1 Burst width	<p>Ref Level 20.00 dBm Att 30 dB RBW 1 MHz SWT 10 ms VBW 3 MHz</p> <p>M[1] -9.69 dBm -1.25 μs D1[1] 11.56 dB 383.75 μs</p> <p>CF 2.441 GHz 8001 pts 1.0 ms/</p> <p>Date: 20.10.2021 09:41:50</p>
2DH1 Burst number	<p>Ref Level 20.00 dBm Att 30 dB RBW 500 kHz SWT 31.6 s VBW 3 MHz</p> <p>CF 2.441 GHz 30001 pts 3.16 s/</p> <p>Date: 20.10.2021 09:42:24</p>
2DH3 Burst width	<p>Ref Level 20.00 dBm Att 30 dB RBW 1 MHz SWT 10 ms VBW 3 MHz</p> <p>M[1] -4.27 dBm -1.25 μs D1[1] 7.04 dB 1.63625 ms</p> <p>CF 2.441 GHz 8001 pts 1.0 ms/</p> <p>Date: 20.10.2021 09:43:18</p>

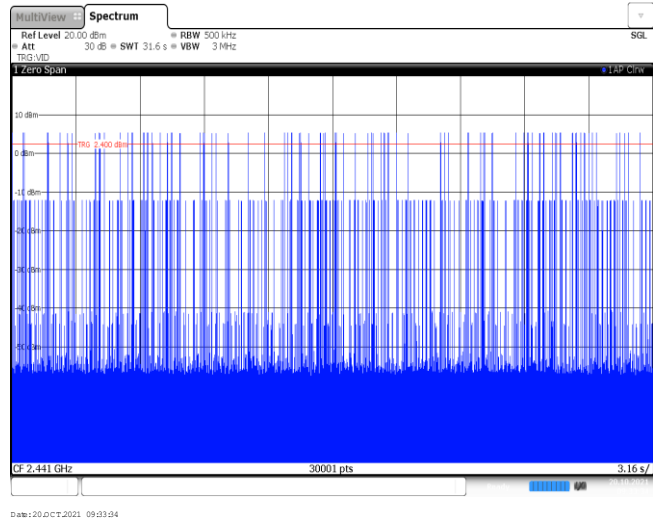
2DH3
Burst number



2DH5
Burst width

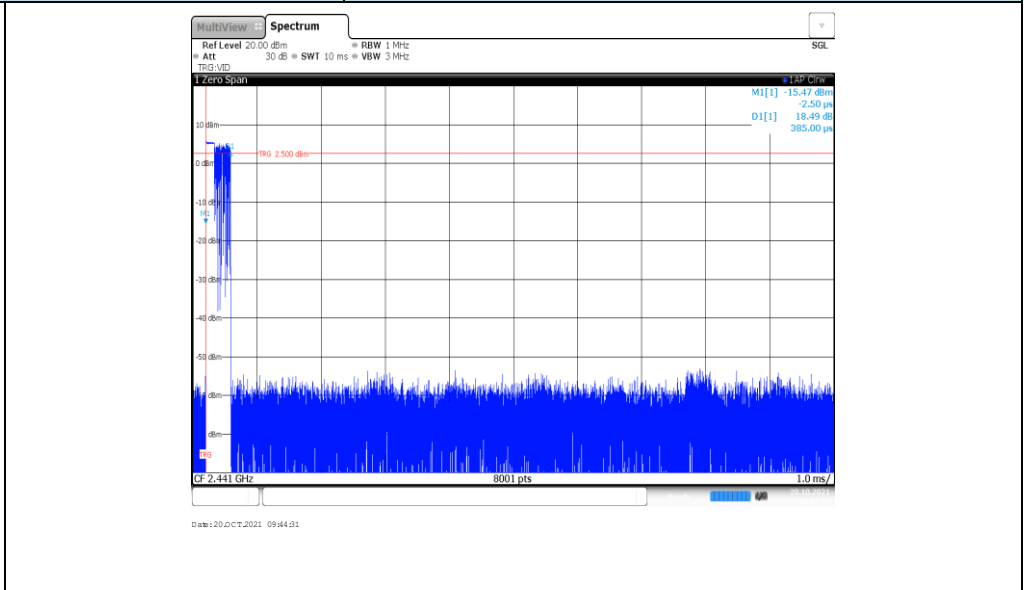


2DH5
Burst number

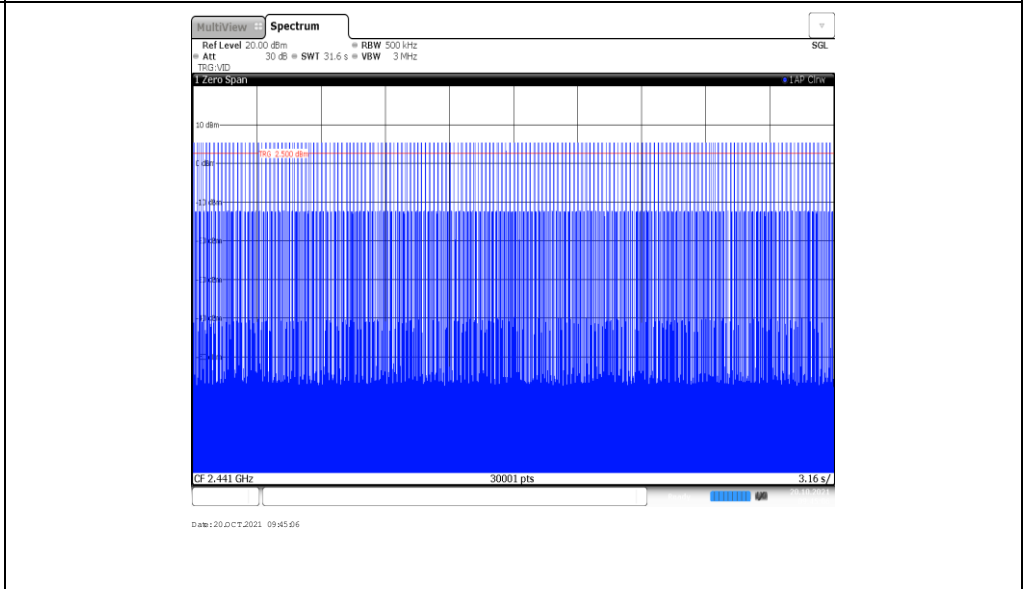


Modulation Type: 8DPSK

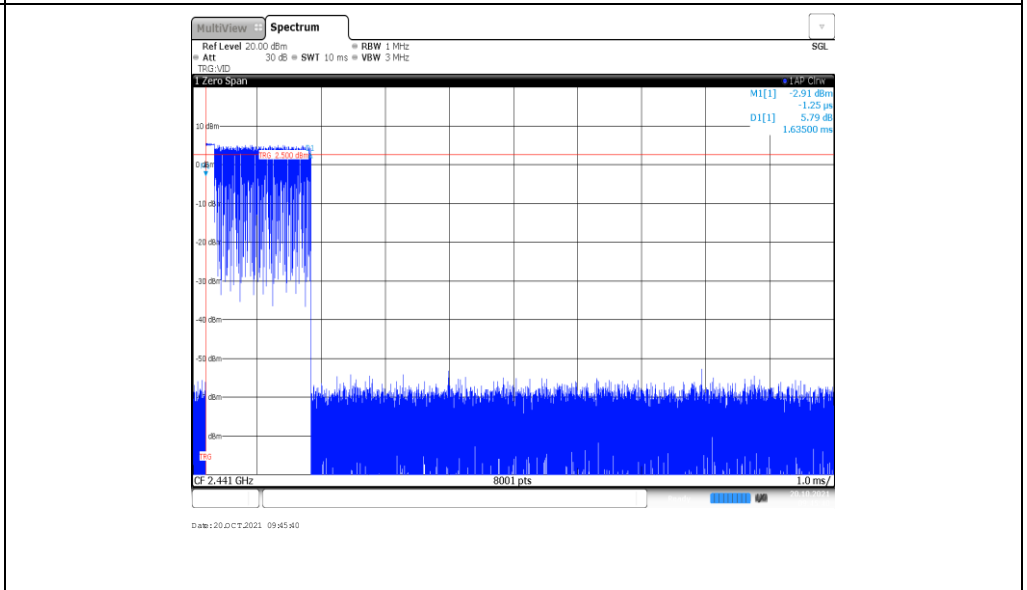
3DH1
Burst width



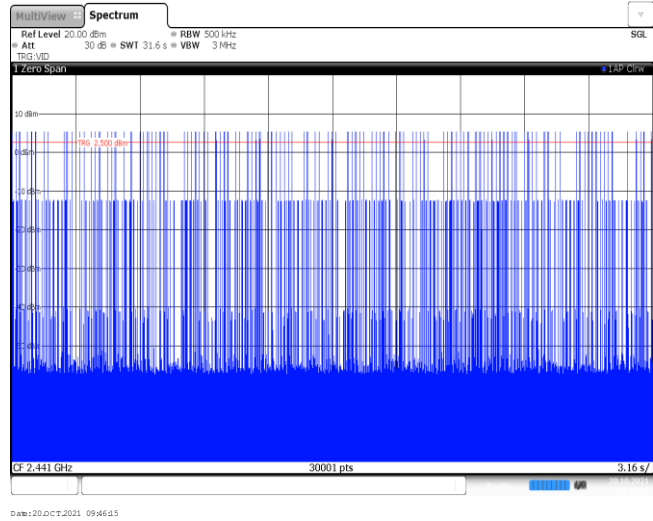
3DH1
Burst number



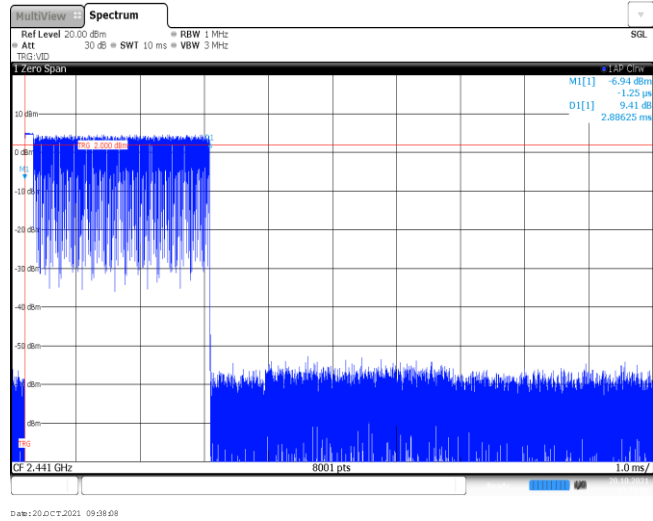
3DH3
Burst width



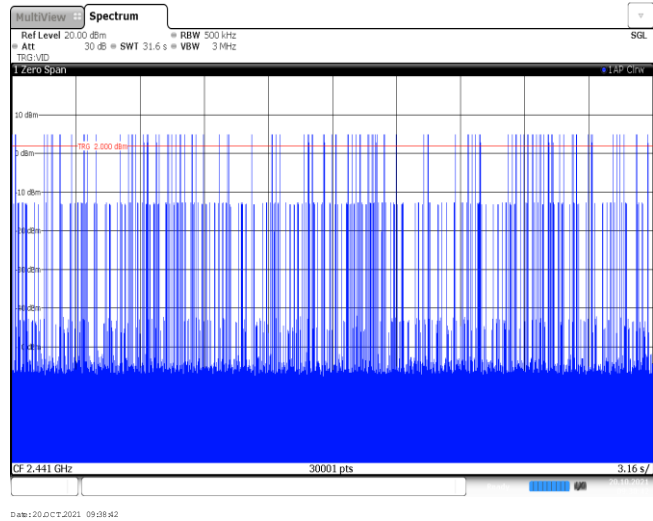
3DH3
Burst number



3DH5
Burst width



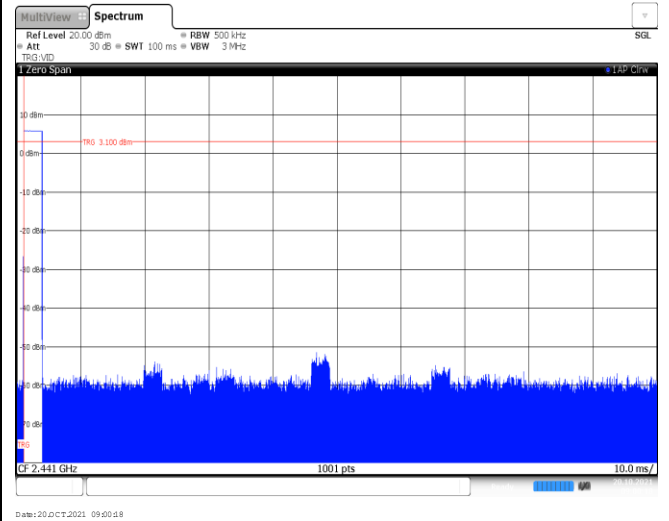
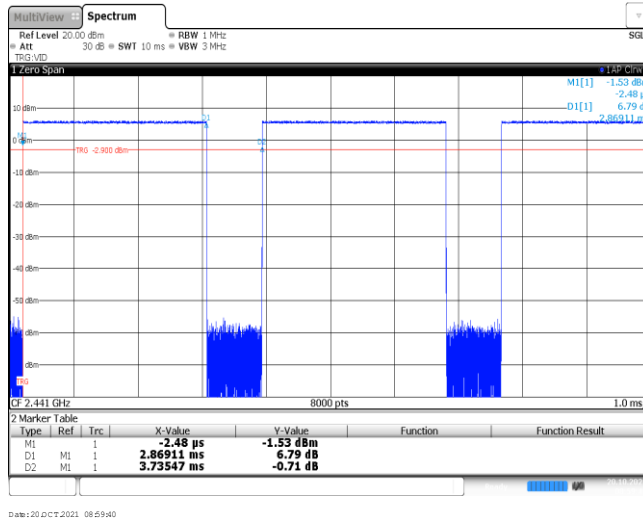
3DH5
Burst number



Appendix G: Duty Cycle Correction Factor (DCCF)

DCCF Calculate Formula					
DCCF=20 * Log(duty cycle) = 20 * Log($T_{on\ time} / T_{period}$)					
Modulation type	Test Frequency (MHz)	$T_{on\ time}$ for single burst [ms]	T_{period} [ms]	Burst Quantity	DCCF [dB]
GFSK	2441	2.87	100	1	-30.84
$\pi/4$ DQPSK	2441	2.87	100	1	-30.84
8DPSK	2441	2.88	100	1	-30.81

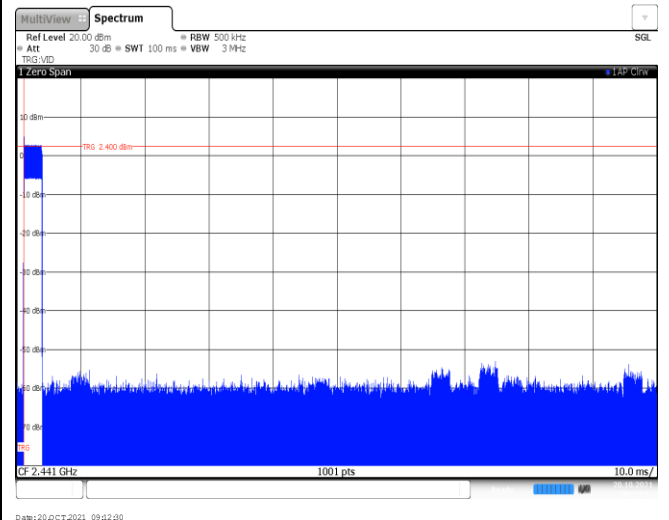
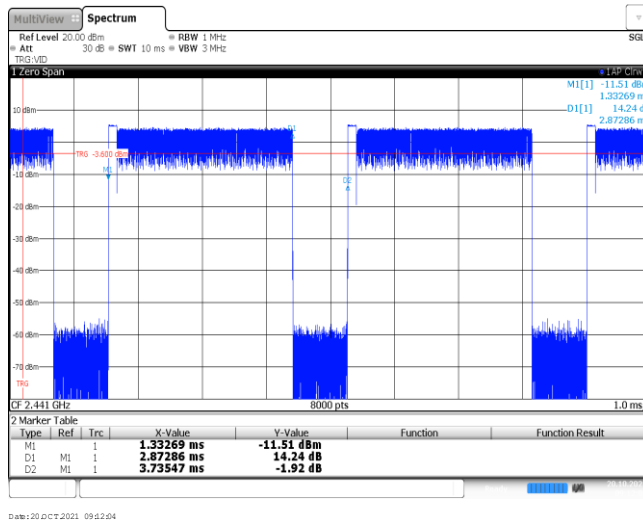
GFSK



Ton time for single burst

Burst Quantity

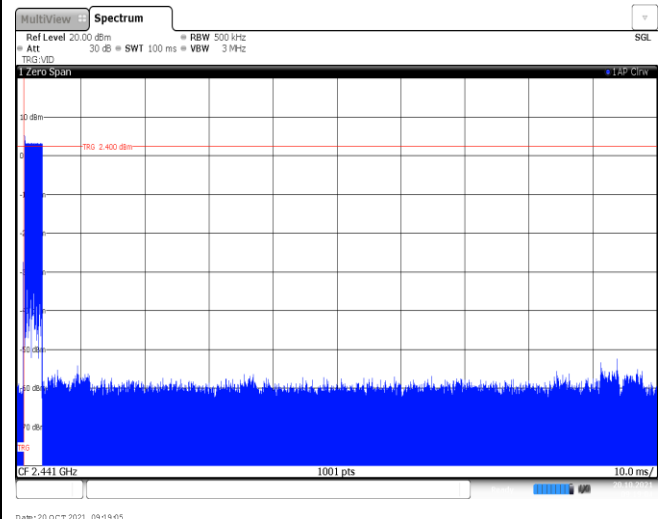
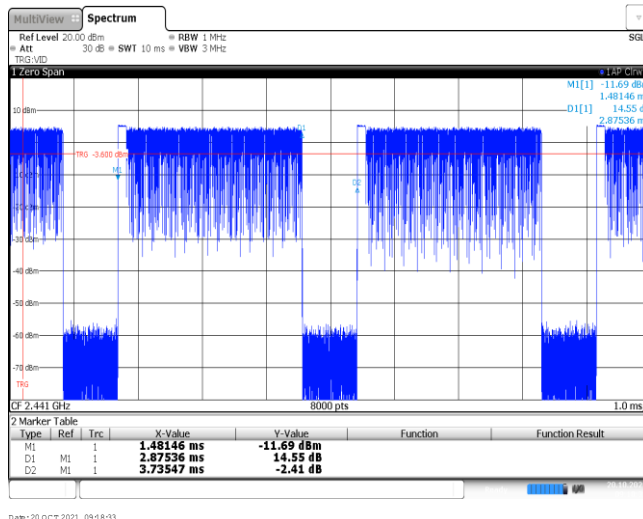
$\pi/4$ DQPSK



Ton time for single burst

Burst Quantity

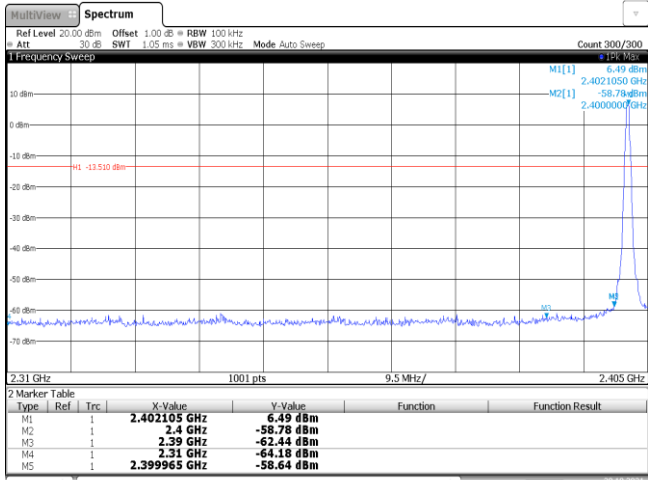
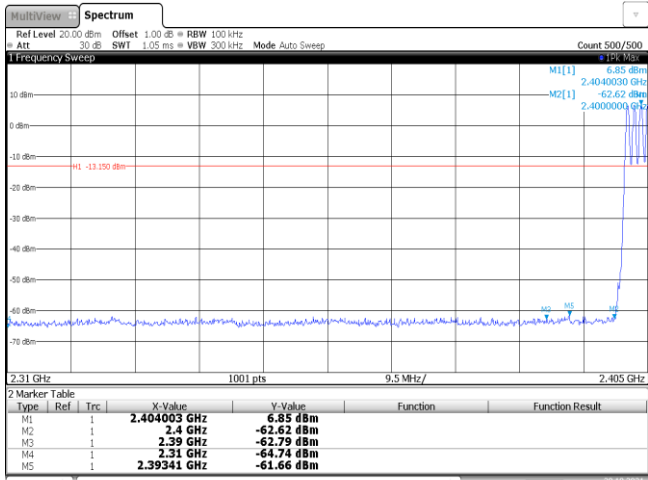
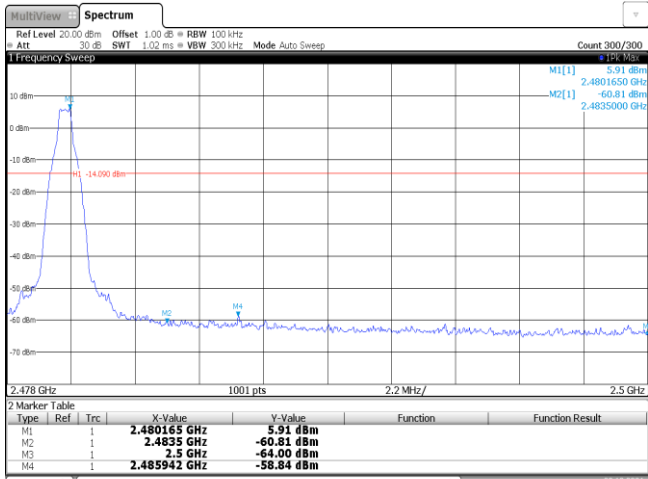
8DPSK



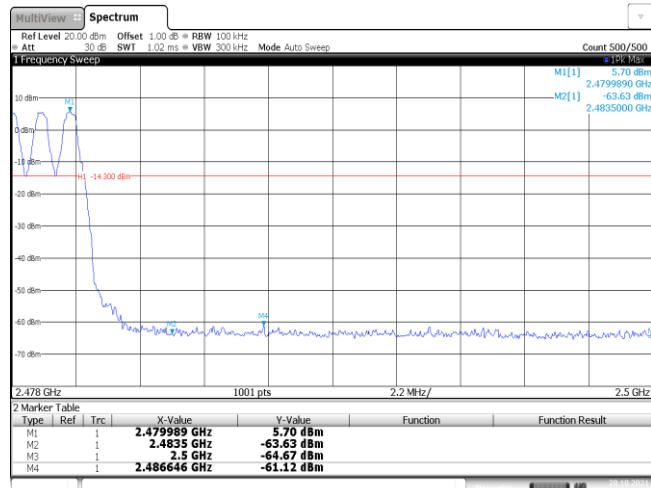
Ton time for single burst

Burst Quantity

Appendix H: Band edge and Spurious Emissions (conducted)

Test Item:	Band edge	Modulation type:	GFSK
<p>CH00 No hopping mode</p>			
<p>CH00 Hopping mode</p>			
<p>CH78 No hopping mode</p>			

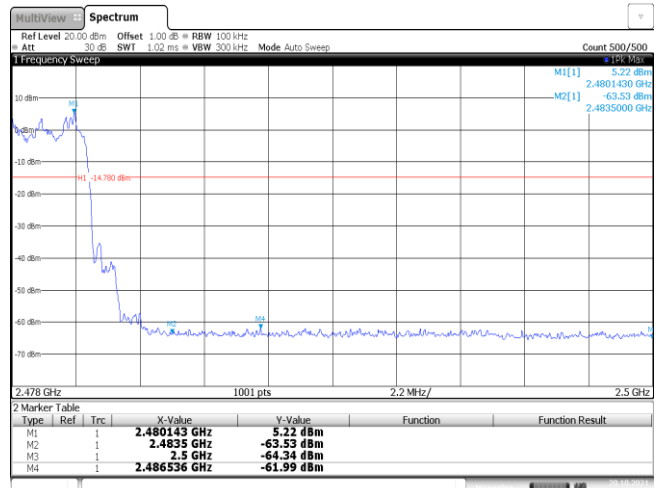
CH78
Hopping mode



Date: 20 OCT 2021 09:27:00

Test Item:	Band edge	Modulation type:	$\pi/4$ DQPSK																																										
<p>CH00 No hopping mode</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>2.402105 GHz</td> <td>6.13 dBm</td> <td></td> <td></td> </tr> <tr> <td>M2</td> <td>1</td> <td></td> <td>2.4 GHz</td> <td>-49.35 dBm</td> <td></td> <td></td> </tr> <tr> <td>M3</td> <td>1</td> <td></td> <td>2.39 GHz</td> <td>-63.31 dBm</td> <td></td> <td></td> </tr> <tr> <td>M4</td> <td>1</td> <td></td> <td>2.31 GHz</td> <td>-65.09 dBm</td> <td></td> <td></td> </tr> <tr> <td>M5</td> <td>1</td> <td></td> <td>2.399965 GHz</td> <td>-49.38 dBm</td> <td></td> <td></td> </tr> </tbody> </table> <p>Date: 20 OCT 2021 09:09:25</p>			Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		2.402105 GHz	6.13 dBm			M2	1		2.4 GHz	-49.35 dBm			M3	1		2.39 GHz	-63.31 dBm			M4	1		2.31 GHz	-65.09 dBm			M5	1		2.399965 GHz	-49.38 dBm		
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																																							
M1	1		2.402105 GHz	6.13 dBm																																									
M2	1		2.4 GHz	-49.35 dBm																																									
M3	1		2.39 GHz	-63.31 dBm																																									
M4	1		2.31 GHz	-65.09 dBm																																									
M5	1		2.399965 GHz	-49.38 dBm																																									
<p>CH00 Hopping mode</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>2.403149 GHz</td> <td>5.34 dBm</td> <td></td> <td></td> </tr> <tr> <td>M2</td> <td>1</td> <td></td> <td>2.4 GHz</td> <td>-52.79 dBm</td> <td></td> <td></td> </tr> <tr> <td>M3</td> <td>1</td> <td></td> <td>2.39 GHz</td> <td>-63.17 dBm</td> <td></td> <td></td> </tr> <tr> <td>M4</td> <td>1</td> <td></td> <td>2.31 GHz</td> <td>-63.89 dBm</td> <td></td> <td></td> </tr> <tr> <td>M5</td> <td>1</td> <td></td> <td>2.39968 GHz</td> <td>-52.23 dBm</td> <td></td> <td></td> </tr> </tbody> </table> <p>Date: 20 OCT 2021 09:02:16</p>			Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		2.403149 GHz	5.34 dBm			M2	1		2.4 GHz	-52.79 dBm			M3	1		2.39 GHz	-63.17 dBm			M4	1		2.31 GHz	-63.89 dBm			M5	1		2.39968 GHz	-52.23 dBm		
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																																							
M1	1		2.403149 GHz	5.34 dBm																																									
M2	1		2.4 GHz	-52.79 dBm																																									
M3	1		2.39 GHz	-63.17 dBm																																									
M4	1		2.31 GHz	-63.89 dBm																																									
M5	1		2.39968 GHz	-52.23 dBm																																									
<p>CH78 No hopping mode</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>2.479835 GHz</td> <td>5.46 dBm</td> <td></td> <td></td> </tr> <tr> <td>M2</td> <td>1</td> <td></td> <td>2.4835 GHz</td> <td>-59.93 dBm</td> <td></td> <td></td> </tr> <tr> <td>M3</td> <td>1</td> <td></td> <td>2.5 GHz</td> <td>-63.29 dBm</td> <td></td> <td></td> </tr> <tr> <td>M4</td> <td>1</td> <td></td> <td>2.484226 GHz</td> <td>-59.32 dBm</td> <td></td> <td></td> </tr> </tbody> </table> <p>Date: 20 OCT 2021 09:07:15</p>			Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		2.479835 GHz	5.46 dBm			M2	1		2.4835 GHz	-59.93 dBm			M3	1		2.5 GHz	-63.29 dBm			M4	1		2.484226 GHz	-59.32 dBm									
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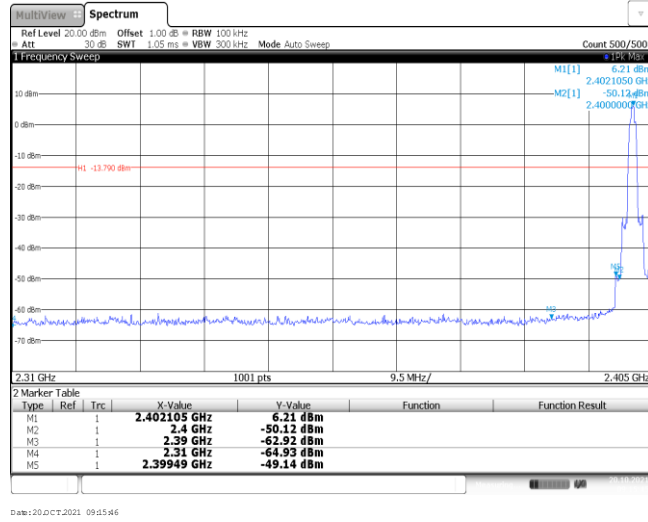
CH78
Hopping mode



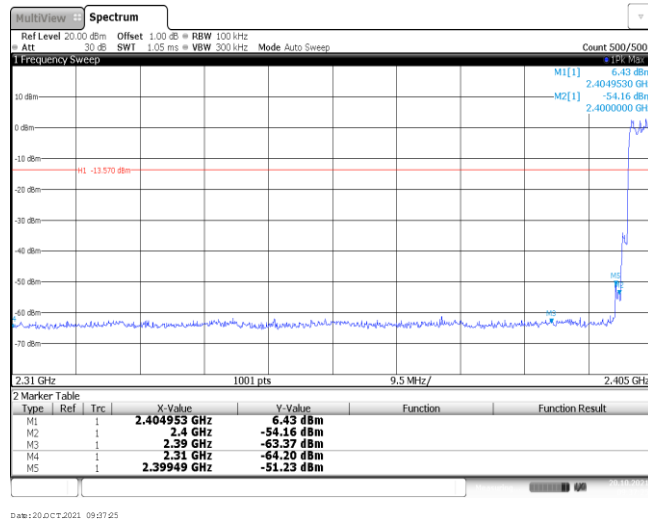
Date: 20 OCT 2021 09:02:00

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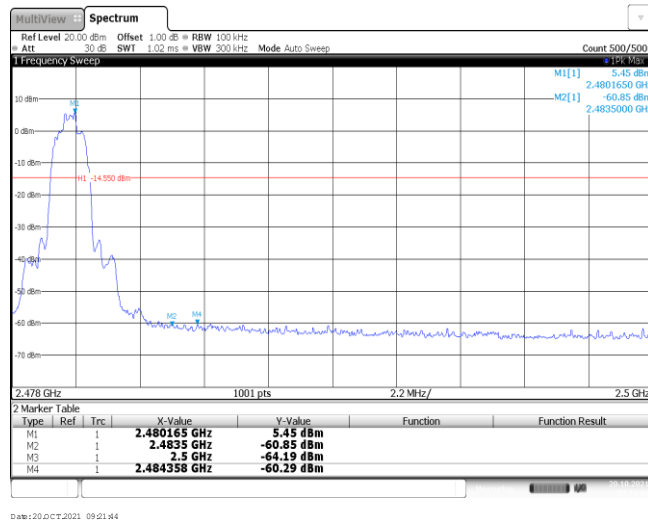
CH00
No hopping mode



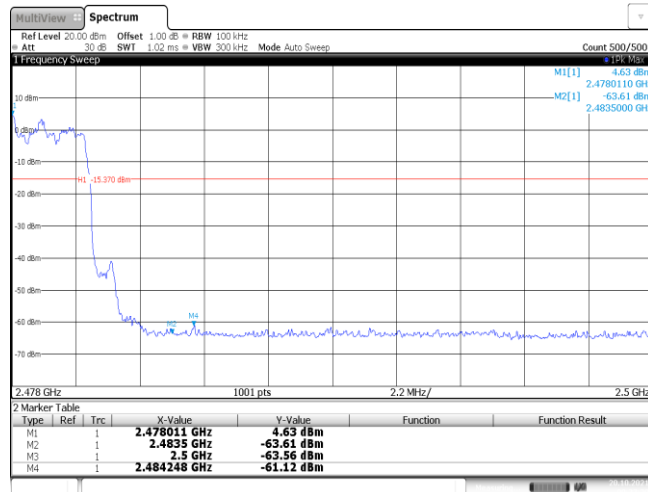
CH00
Hopping mode



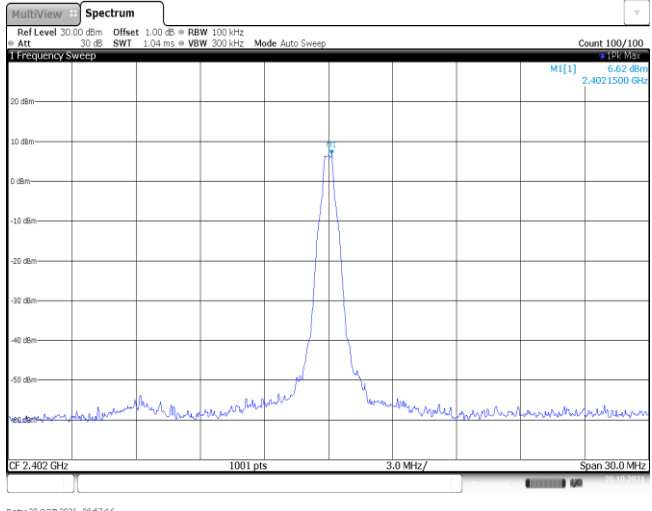
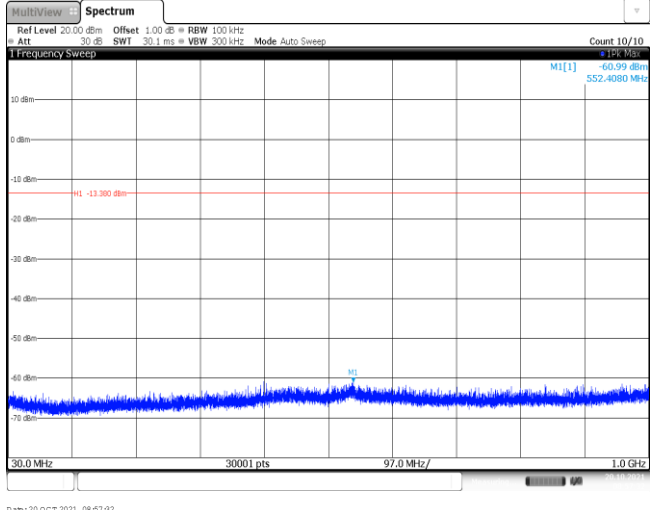
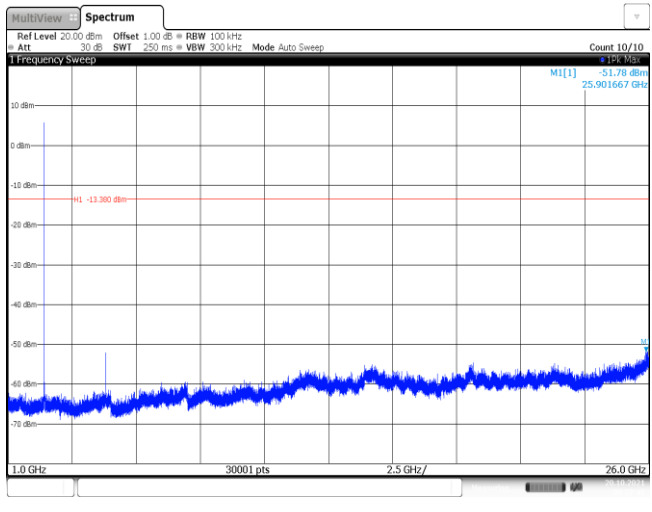
CH78
No hopping mode



CH78
Hoppig mode

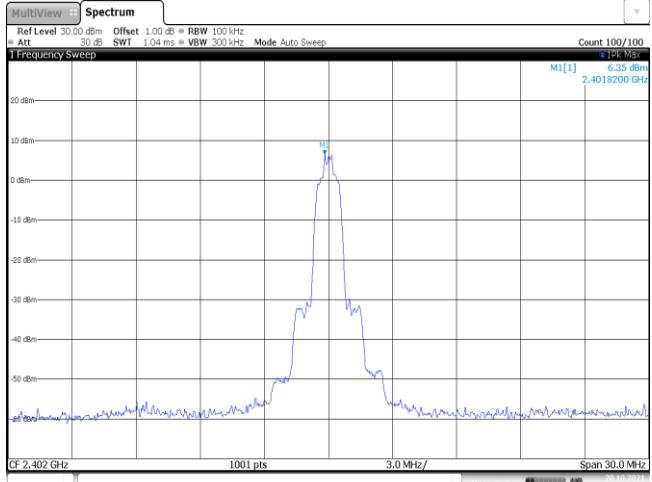
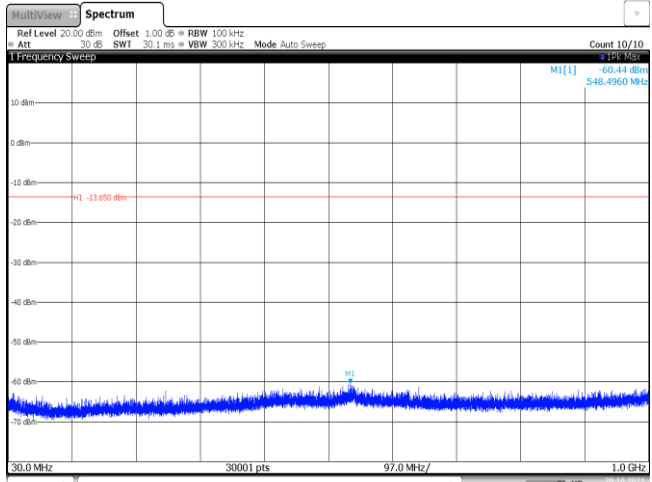
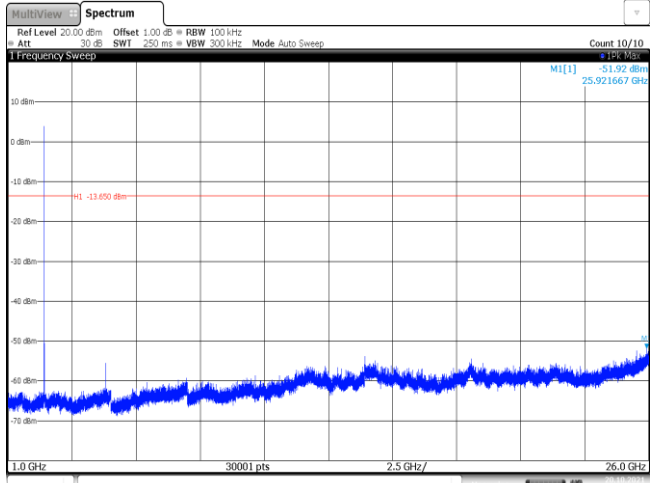


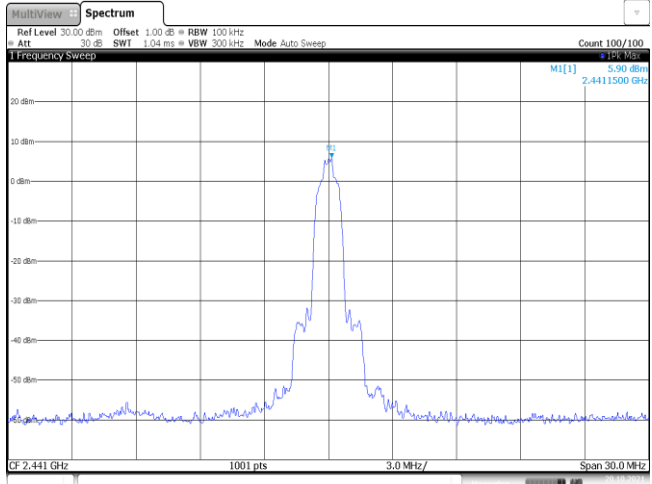
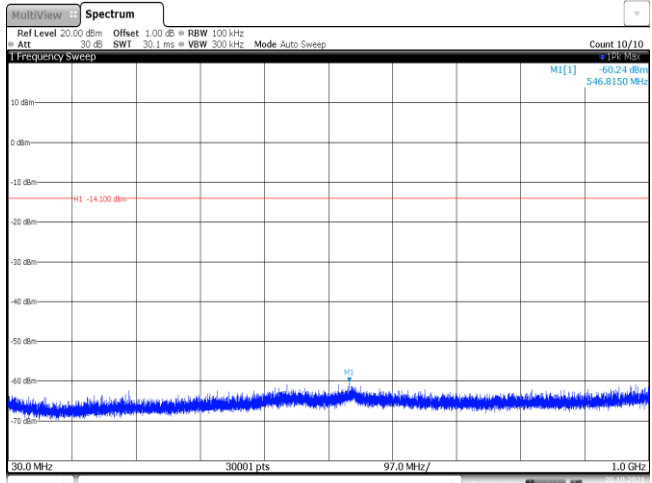
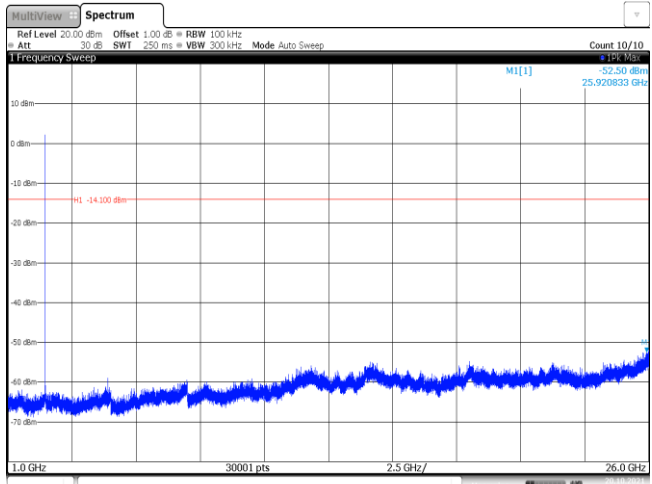
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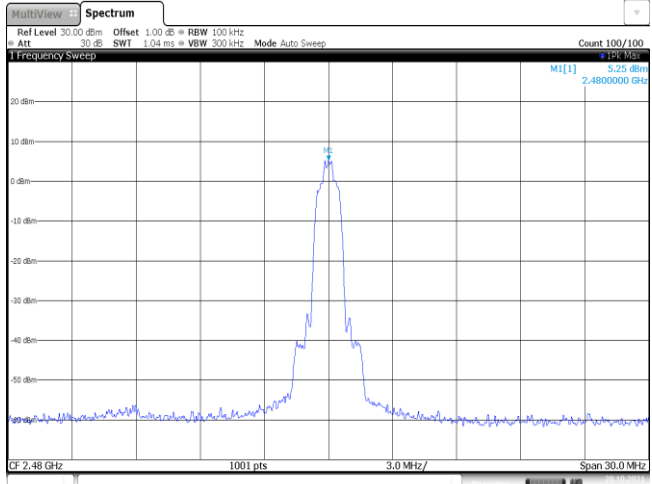
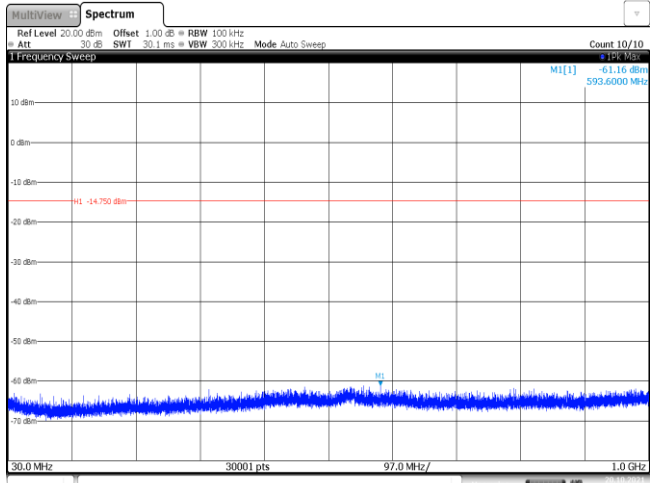
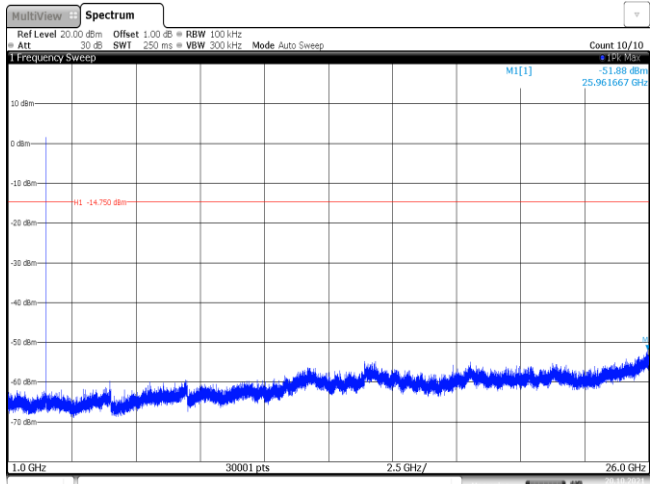
Test Item:	Spurious Emission	Modulation type:	GFSK
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<p>CH00 30MHz~1000MHz</p>			
<p>CH00 1GHz~26GHz</p>			

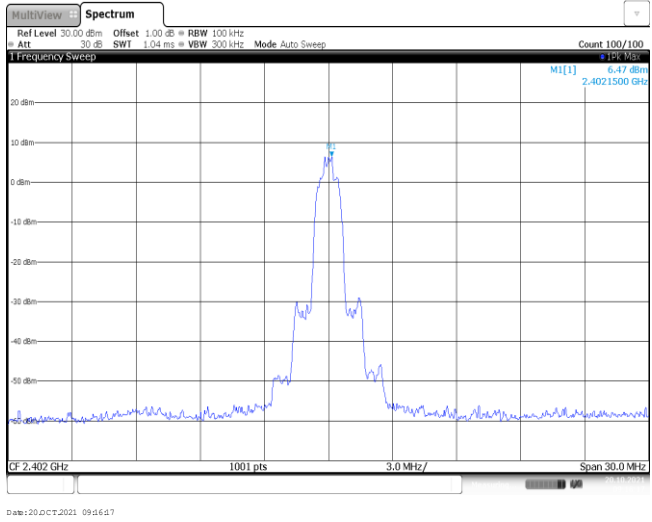
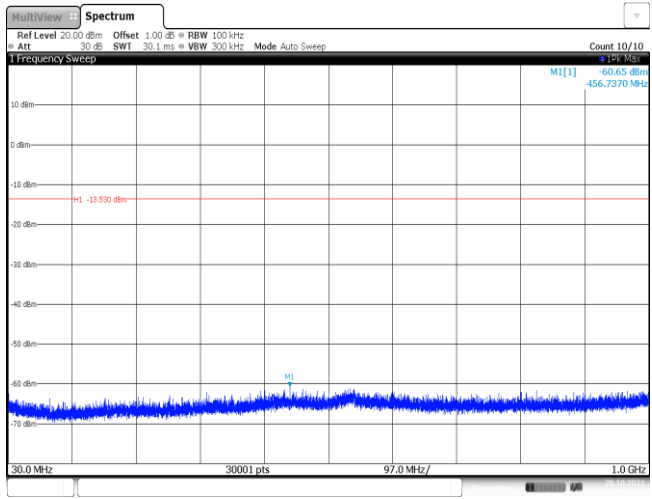
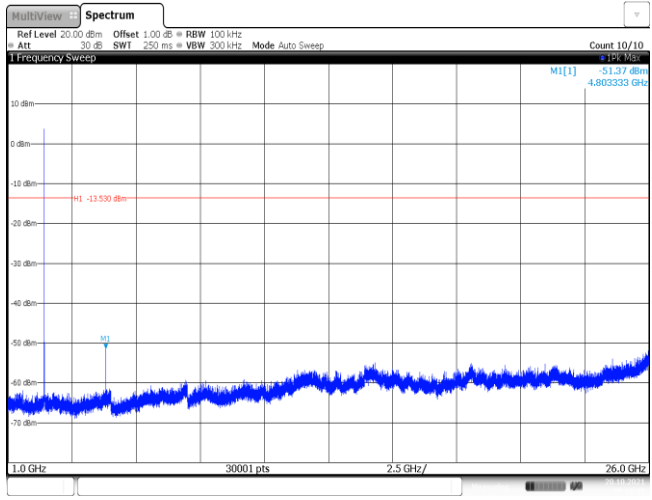
<p>CH39 Reference level</p>	<p>Ref Level 30.00 dBm Offset 1.00 dB RBW 100 kHz Att -30 dB SWI 1.04 ms VBW 300 kHz Mode Auto Sweep Count 100/100 M1[1] 6.57 dBm 2.4410000 GHz</p> <p>CF 2.441 GHz 1001 pts 3.0 MHz/ Span 30.0 MHz</p> <p>Date: 20.10.2021 09:01:28</p>
<p>CH39 30MHz~1000MHz</p>	<p>Ref Level 20.00 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] -60.72 dBm 446.8110 MHz</p> <p>M1 -13.400 dBm</p> <p>30.0 MHz 30001 pts 97.0 MHz/ 1.0 GHz</p> <p>Date: 20.10.2021 09:01:44</p>
<p>CH39 1GHz~26GHz</p>	<p>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] -52.35 dBm 25.854167 GHz</p> <p>M1 -13.400 dBm</p> <p>1.0 GHz 30001 pts 2.5 GHz/ 26.0 GHz</p> <p>Date: 20.10.2021 09:02:00</p>

<p>CH78 Reference level</p>	<p>Ref Level 30.00 dBm Offset 1.00 dB RBW 100 kHz Att -30 dB SWF 1.04 ms VBW 300 kHz Mode Auto Sweep Count 100/100 M1[1] 6.10 dBm 2.4801500 GHz CF 2.48 GHz 1001 pts 3.0 MHz/ Span 30.0 MHz Date: 20.0CT.2021 09:04:08</p>
<p>CH78 30MHz~1000MHz</p>	<p>Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att -30 dB SWF 30.1 ms VBW 300 kHz Mode Auto Sweep Count 10/10 M1[1] -60.57 dBm 546.5240 MHz M1 -13.900 dBm 30.0 MHz 30001 pts 97.0 MHz/ 1.0 GHz Date: 20.0CT.2021 09:04:25</p>
<p>CH78 1GHz~26GHz</p>	<p>Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att -30 dB SWF 250 ms VBW 300 kHz Mode Auto Sweep Count 10/10 M1[1] -52.54 dBm 25.748333 GHz M1 -13.900 dBm 1.0 GHz 30001 pts 2.5 GHz/ 26.0 GHz Date: 20.0CT.2021 09:04:41</p>

Test Item:	Spurious Emission	Modulation type:	π/4DQPSK
<p>CH00 Reference level</p>	 <p>Ref Level 30.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SW1 1.04 ms VBW 300 kHz Mode Auto Sweep Count 100/100 MI[1] 6.35 dBm 2.4016200 GHz CF 2.402 GHz 1001 pts 3.0 MHz/ Span 30.0 MHz Date: 20 OCT 2021 09:09:42</p>		
<p>CH00 30MHz~1000MHz</p>	 <p>Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SW1 30.1 ms VBW 300 kHz Mode Auto Sweep Count 10/10 MI[1] -60.44 dBm 548.4960 MHz MI -13.650 dBm 30.0 MHz 30001 pts 97.0 MHz/ 1.0 GHz Date: 20 OCT 2021 09:09:58</p>		
<p>CH00 1GHz~26GHz</p>	 <p>Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SW1 250 ms VBW 300 kHz Mode Auto Sweep Count 10/10 MI[1] -51.92 dBm 25.921667 GHz MI -13.650 dBm 1.0 GHz 30001 pts 2.5 GHz/ 26.0 GHz Date: 20 OCT 2021 09:10:15</p>		

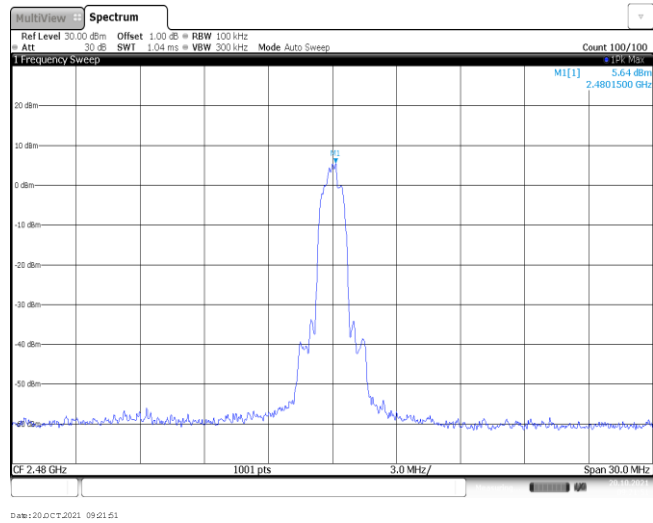
<p>CH39 Reference level</p>	 <p>Date: 20.10.2021 09:13:04</p>
<p>CH39 30MHz~1000MHz</p>	 <p>Date: 20.10.2021 09:13:21</p>
<p>CH39 1GHz~26GHz</p>	 <p>Date: 20.10.2021 09:13:27</p>

<p>CH78 Reference level</p>	 <p>Ref Level 30.00 dBm Offset 1.00 dB RBW 100 kHz Att -30 dB SWT 1.04 ms VBW 300 kHz Mode Auto Sweep Count 100/100 MI[1] 5.25 dBm 2.480000 GHz</p> <p>CF 2.48 GHz 1001 pts 3.0 MHz/ Span 30.0 MHz</p> <p>Date: 20.0CT.2021 09:07:22</p>
<p>CH78 30MHz~1000MHz</p>	 <p>Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att -30 dB SWT 30.1 ms VBW 300 kHz Mode Auto Sweep Count 10/10 MI[1] -61.16 dBm 593.6000 MHz</p> <p>MI -14.750 dBm</p> <p>30.0 MHz 30001 pts 97.0 MHz/ 1.0 GHz</p> <p>Date: 20.0CT.2021 09:07:38</p>
<p>CH78 1GHz~26GHz</p>	 <p>Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att -30 dB SWT 250 ms VBW 300 kHz Mode Auto Sweep Count 10/10 MI[1] -51.88 dBm 25.961667 GHz</p> <p>MI -14.750 dBm</p> <p>1.0 GHz 30001 pts 2.5 GHz/ 26.0 GHz</p> <p>Date: 20.0CT.2021 09:07:55</p>

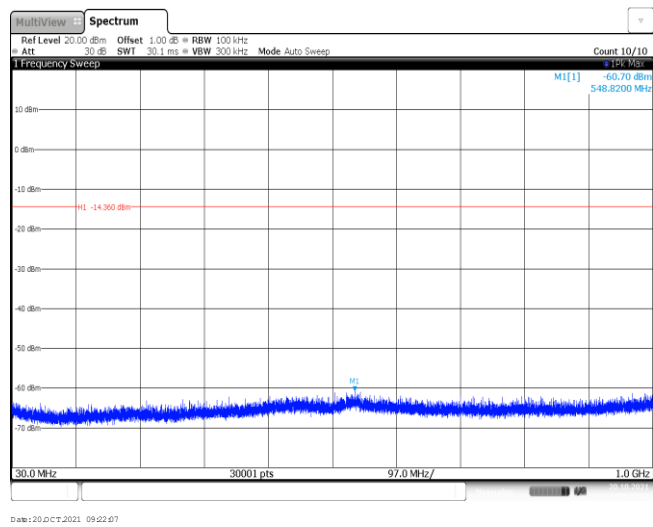
Test Item:	Spurious Emission	Modulation type:	8DPSK
<p>CH00 Reference level</p>			
<p>CH00 30MHz~1000MHz</p>			
<p>CH00 1GHz~26GHz</p>			

<p>CH39 Reference level</p>	<p>Ref Level 30.00 dBm Offset 1.00 dB RBW 100 kHz Att -30 dB SWF 1.04 ms VBW 300 kHz Mode Auto Sweep Count 100/100 MI[1] 6.23 dBm 2.441500 GHz CF 2.441 GHz 1001 pts 3.0 MHz/ Span 30.0 MHz Date: 20.10.2021 09:19:40</p>
<p>CH39 30MHz~1000MHz</p>	<p>Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att -30 dB SWF 30.1 ms VBW 300 kHz Mode Auto Sweep Count 10/10 MI[1] -60.98 dBm 553.4750 MHz 30.0 MHz 30001 pts 97.0 MHz/ 1.0 GHz Date: 20.10.2021 09:19:57</p>
<p>CH39 1GHz~26GHz</p>	<p>Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att -30 dB SWF 250 ms VBW 300 kHz Mode Auto Sweep Count 10/10 MI[1] -51.91 dBm 25.896667 GHz 1.0 GHz 30001 pts 2.5 GHz/ 26.0 GHz Date: 20.10.2021 09:20:15</p>

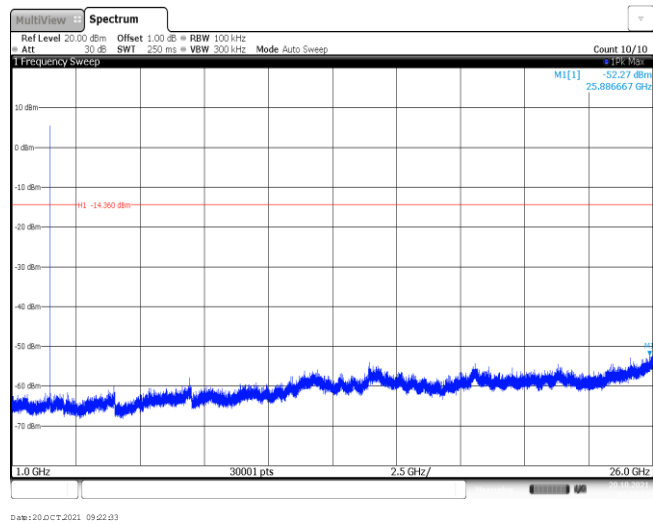
CH78
Reference level



CH78
30MHz~1000MHz



CH78
1GHz~26GHz



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