

## Table of Contents

<b>1.</b>	<b>MAXIMUM PEAK CONDUCTED OUTPUT POWER .....</b>	<b>2</b>
<b>1.1</b>	<b>TEST DATA .....</b>	<b>2</b>
<b>1.2</b>	<b>TEST PLOTS .....</b>	<b>2</b>
<b>2.</b>	<b>99% BANDWIDTH .....</b>	<b>6</b>
<b>2.1</b>	<b>TEST DATA .....</b>	<b>6</b>
<b>2.2</b>	<b>TEST PLOTS .....</b>	<b>6</b>
<b>3.</b>	<b>CONDUCTED SPURIOUS EMISSIONS .....</b>	<b>10</b>
<b>3.1</b>	<b>TEST DATA .....</b>	<b>10</b>
<b>4.</b>	<b>RADIATED SPURIOUS EMISSIONS .....</b>	<b>16</b>
<b>4.1</b>	<b>TEST DATA .....</b>	<b>16</b>
<b>4.2</b>	<b>RESTRICTED BANDS .....</b>	<b>34</b>
4.2.1	<i>Test Data .....</i>	34
<b>5.</b>	<b>20dB BANDWIDTH .....</b>	<b>36</b>
<b>5.1</b>	<b>TEST DATA .....</b>	<b>36</b>
<b>5.2</b>	<b>TEST PLOTS .....</b>	<b>36</b>
<b>6.</b>	<b>CARRIER FREQUENCY SEPARATION .....</b>	<b>40</b>
<b>6.1</b>	<b>TEST DATA .....</b>	<b>40</b>
<b>7.</b>	<b>NUMBER OF HOPPING FREQUENCY .....</b>	<b>43</b>
<b>7.1</b>	<b>TEST DATA .....</b>	<b>43</b>
<b>8.</b>	<b>TIME OF OCCUPANCY .....</b>	<b>44</b>
<b>8.1</b>	<b>TEST DATA .....</b>	<b>44</b>
<b>8.2</b>	<b>TEST PLOTS .....</b>	<b>45</b>
<b>9.</b>	<b>CONDUCTED EMISSIONS ON AC MAINS .....</b>	<b>55</b>
<b>9.1</b>	<b>TEST DATA .....</b>	<b>55</b>

## 1. Maximum Peak Conducted Output Power

### 1.1 Test Data

For GFSK

Channel	Frequency (MHz)	Measured Value (dBm)	Output Power (mW)	Limit (mW)
Low Channel	2402	-1.31	0.74	125
Middle Channel	2441	2.22	1.67	125
High Channel	2480	3.59	2.29	125

For 8DPSK

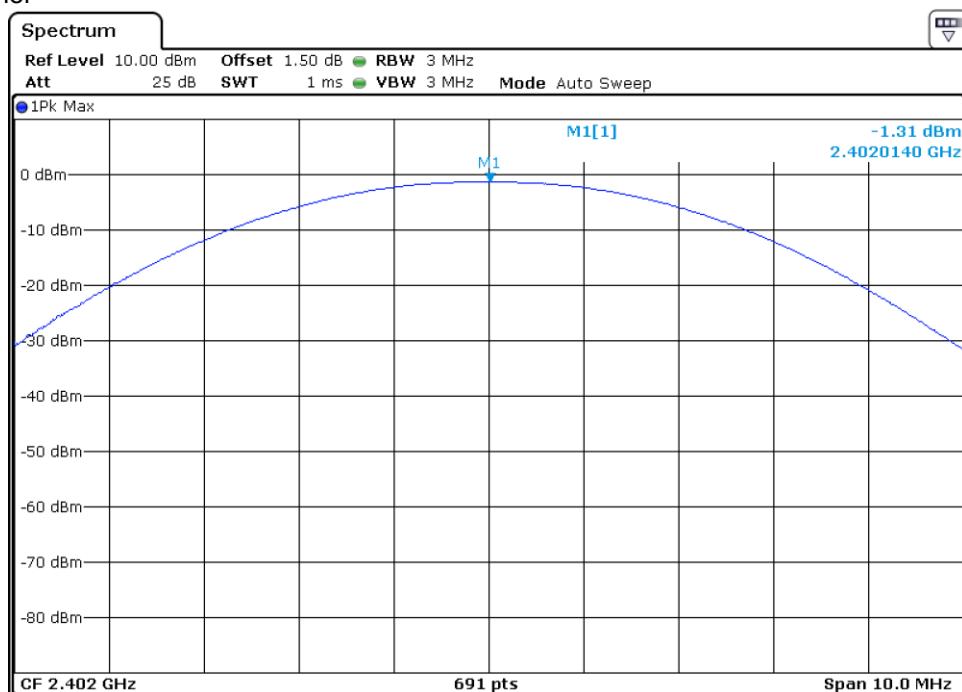
Channel	Frequency (MHz)	Measured Value (dBm)	Output Power (mW)	Limit (mW)
Low Channel	2402	0.36	1.09	125
Middle Channel	2441	3.74	2.37	125
High Channel	2480	4.82	3.03	125

Note: Only the worst case was shown in this test report and the worst case test mode is 3DH1.

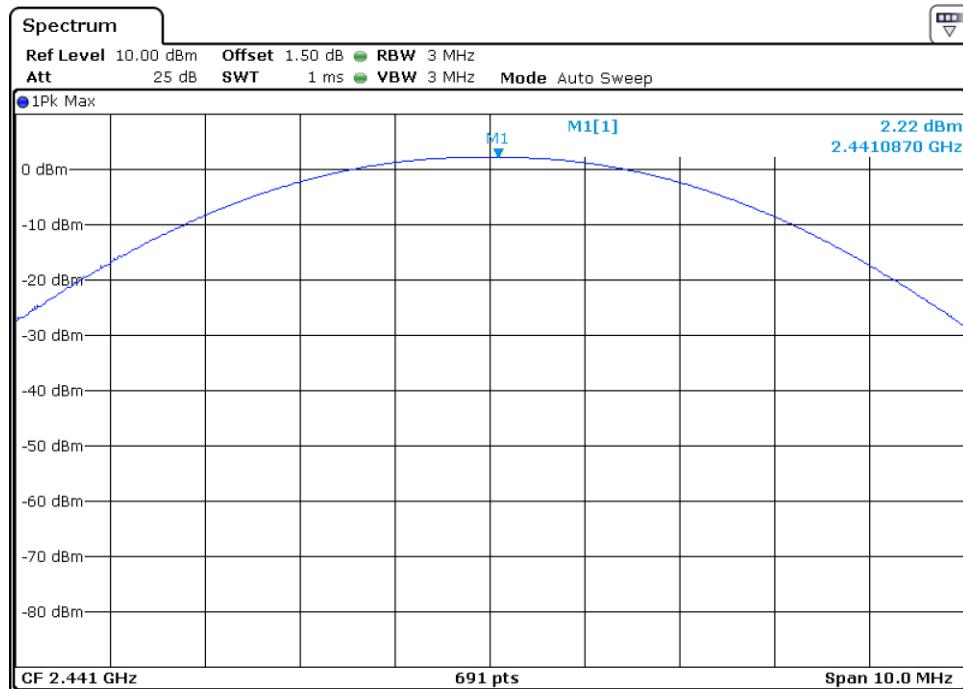
### 1.2 Test Plots

GFSK

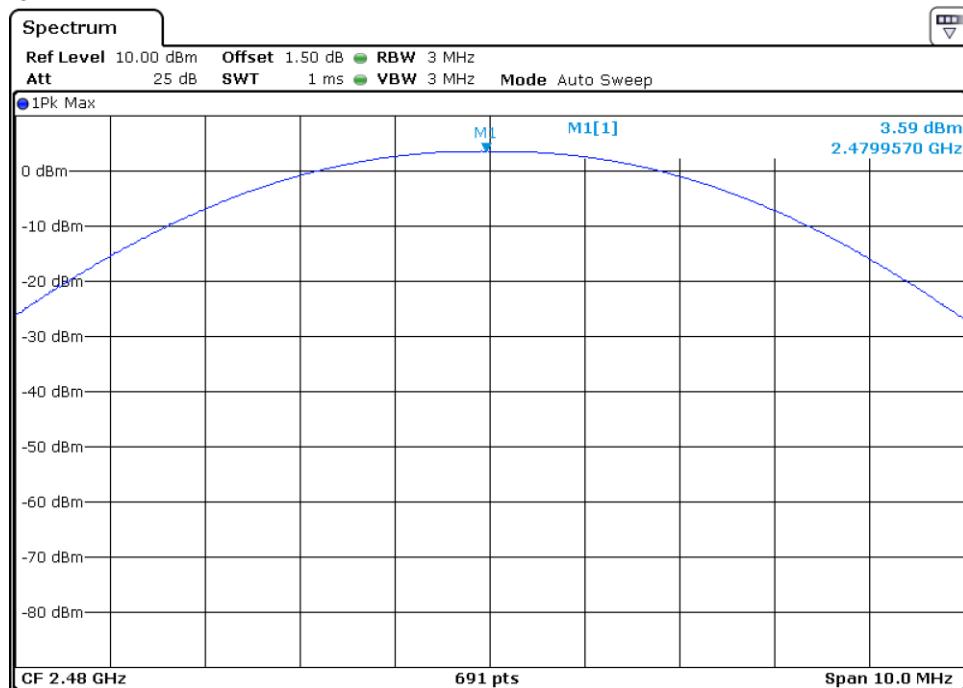
Lowest Channel



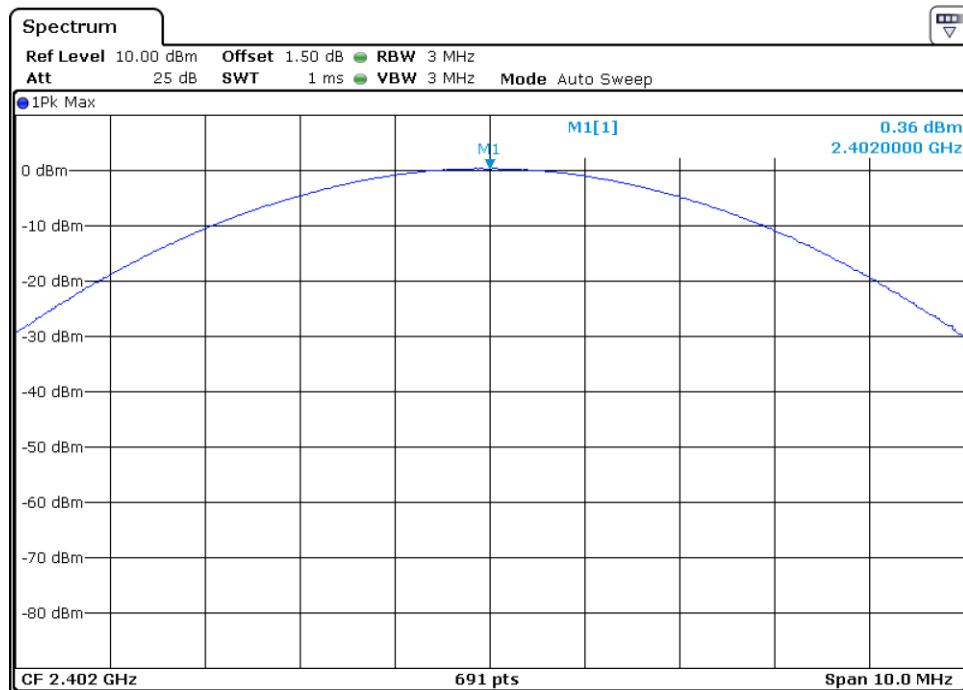
Middle Channel



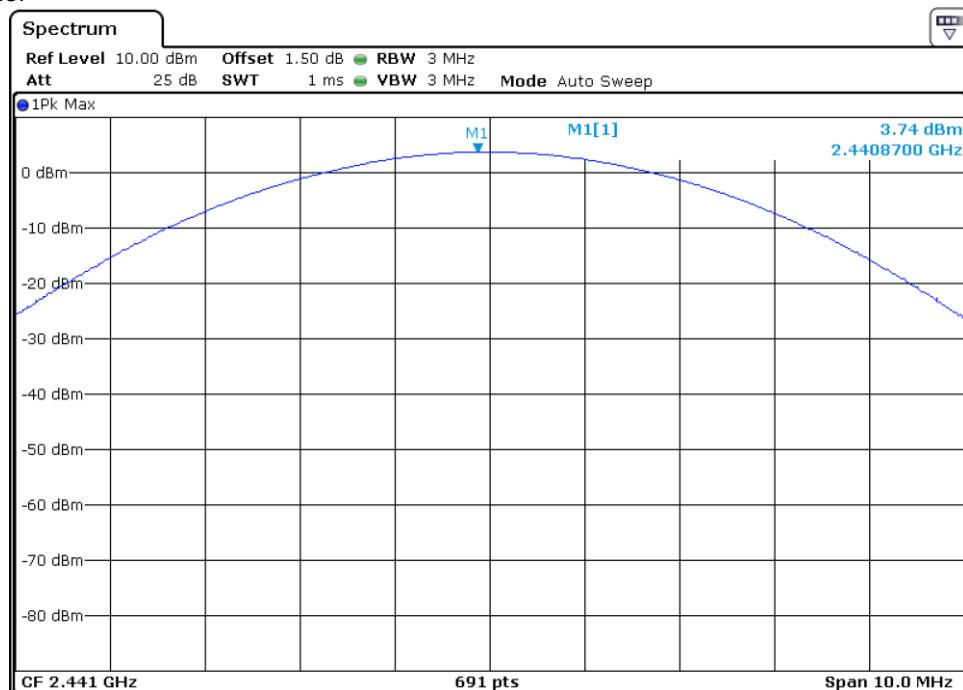
Highest Channel



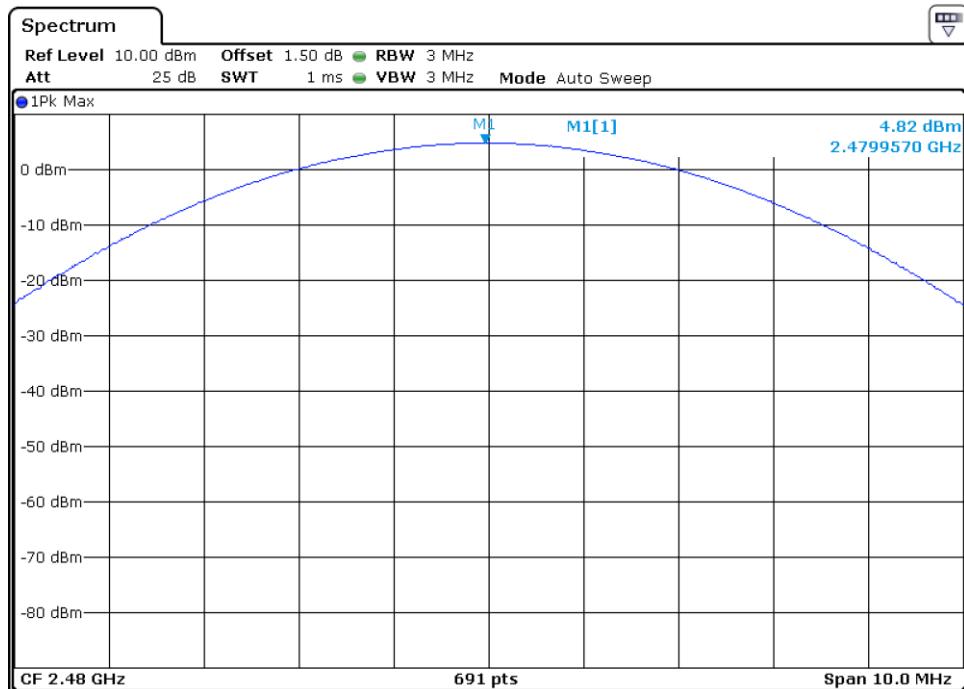
8DPSK  
Lowest Channel



Middle Channel



Highest Channel



## 2. 99% Bandwidth

### 2.1 Test Data

Test Mode	Test Channel (MHz)	99% Bandwidth (KHz)
GFSK	2402	876
	2441	880.37
	2480	884.37
8DPSK	2402	1399.7
	2441	1329.3
	2480	1265.6

### 2.2 Test Plots

GFSK

Lowest Channel:



Appendix A  
50090617 002



Produkte  
Products

Page 7 of 56

Middle Channel:

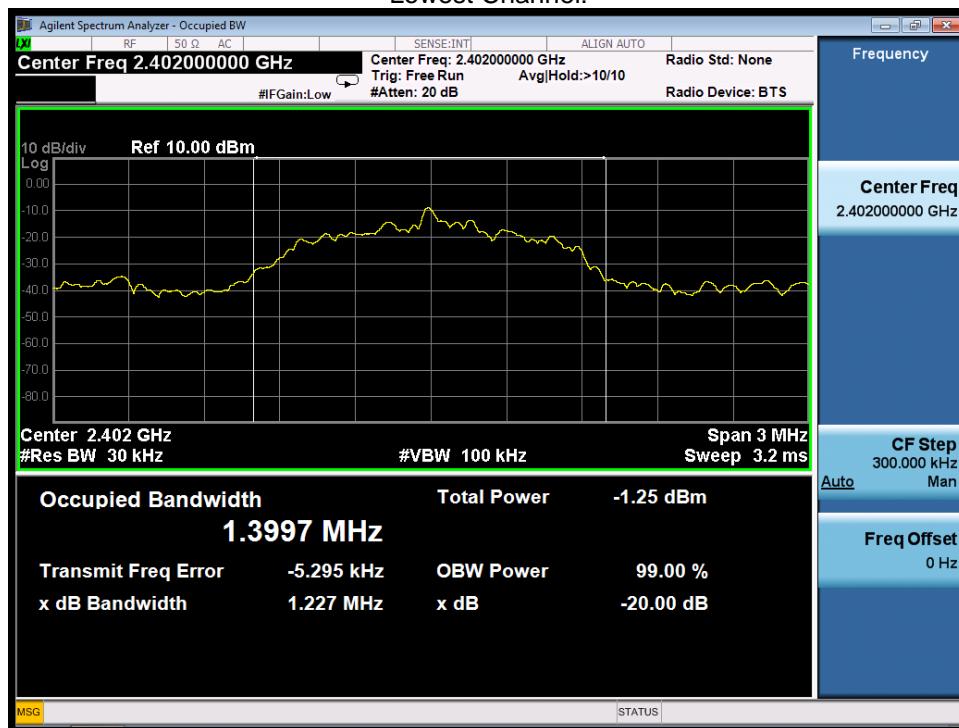


Highest Channel:

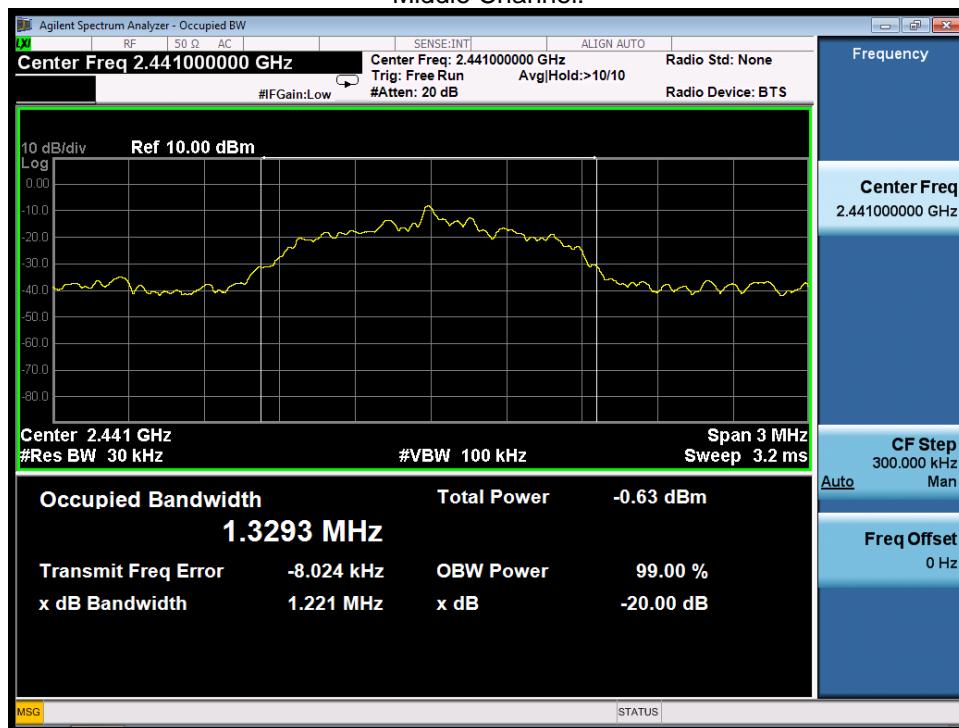


8DPSK

Lowest Channel:



Middle Channel:



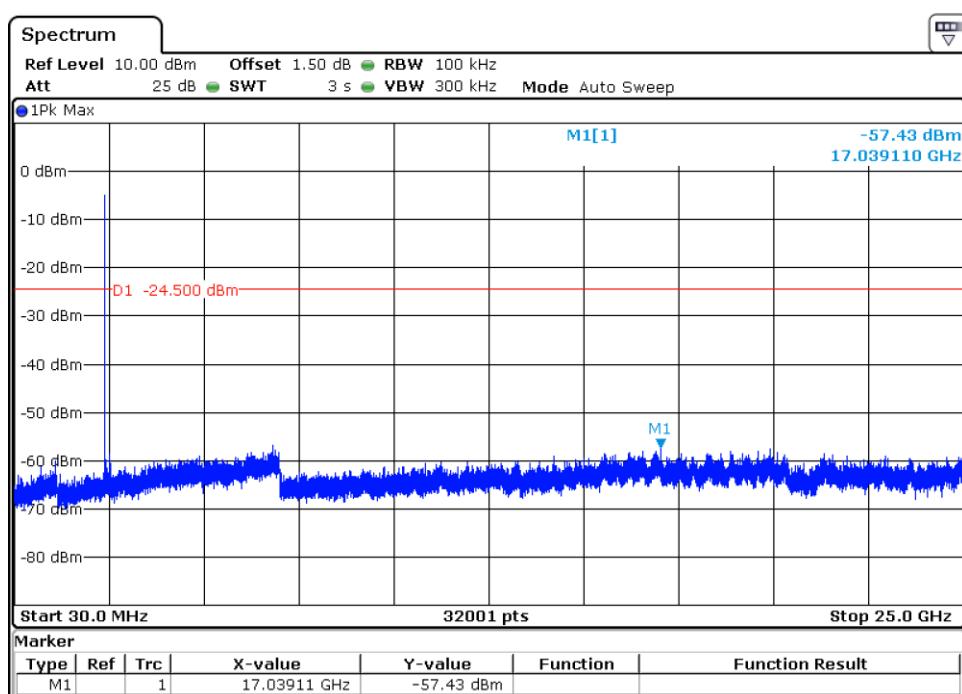
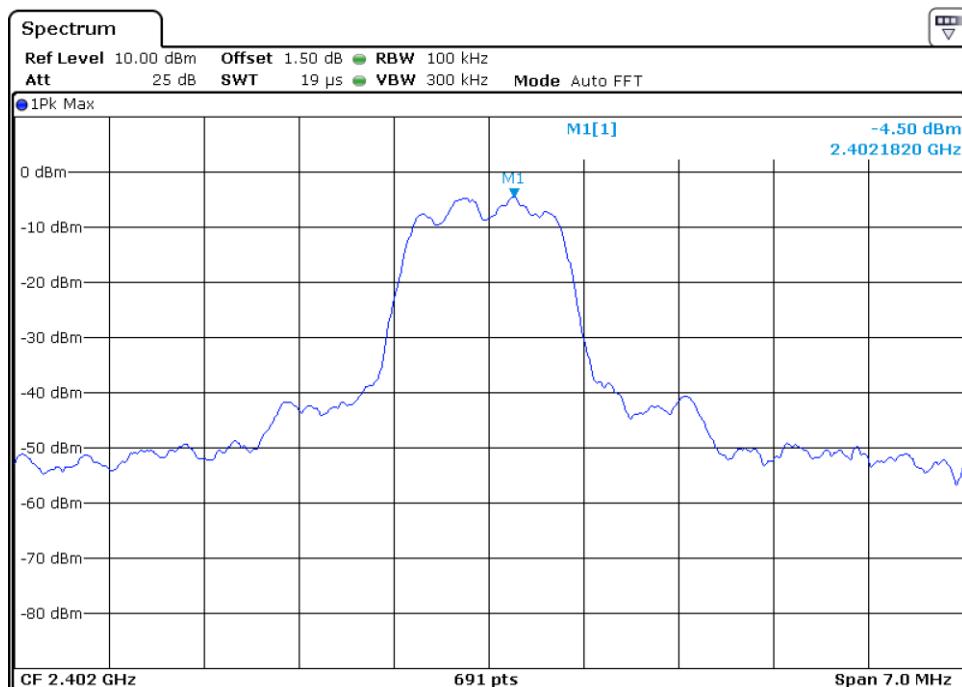
Highest Channel:

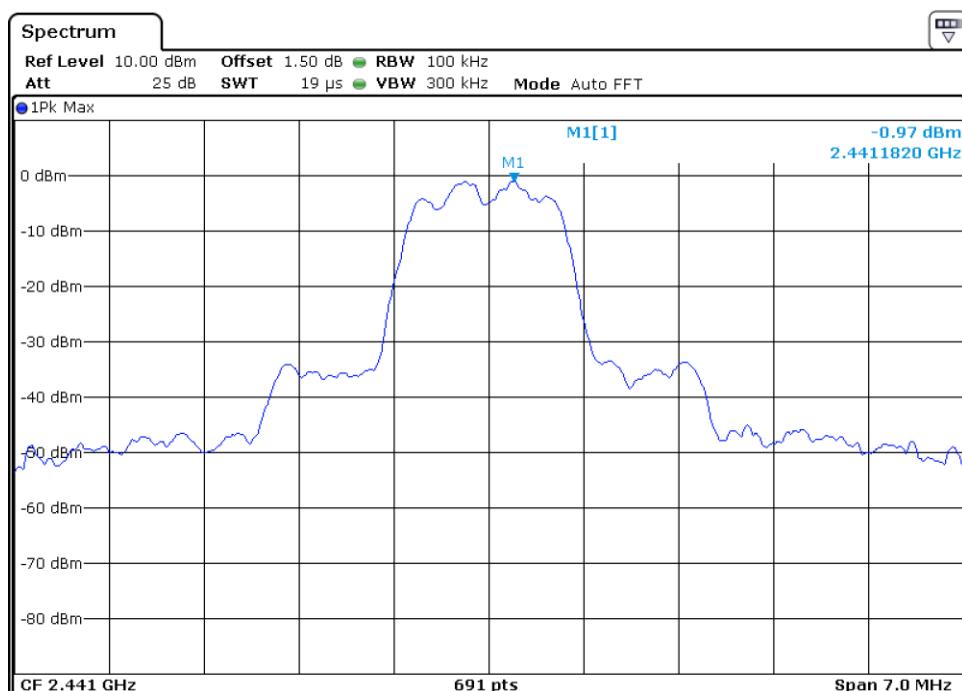
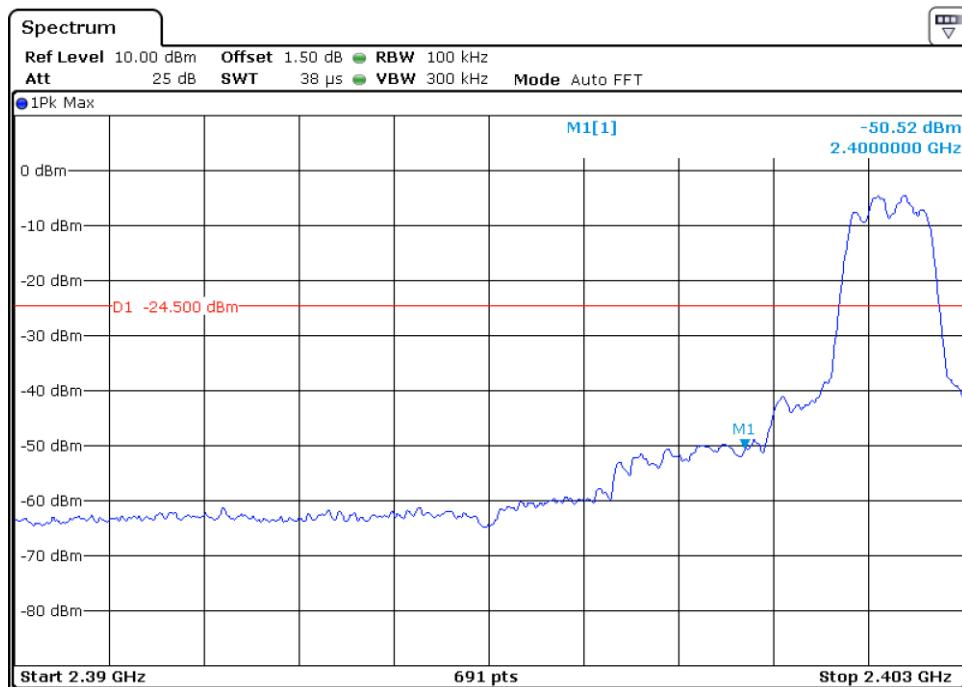


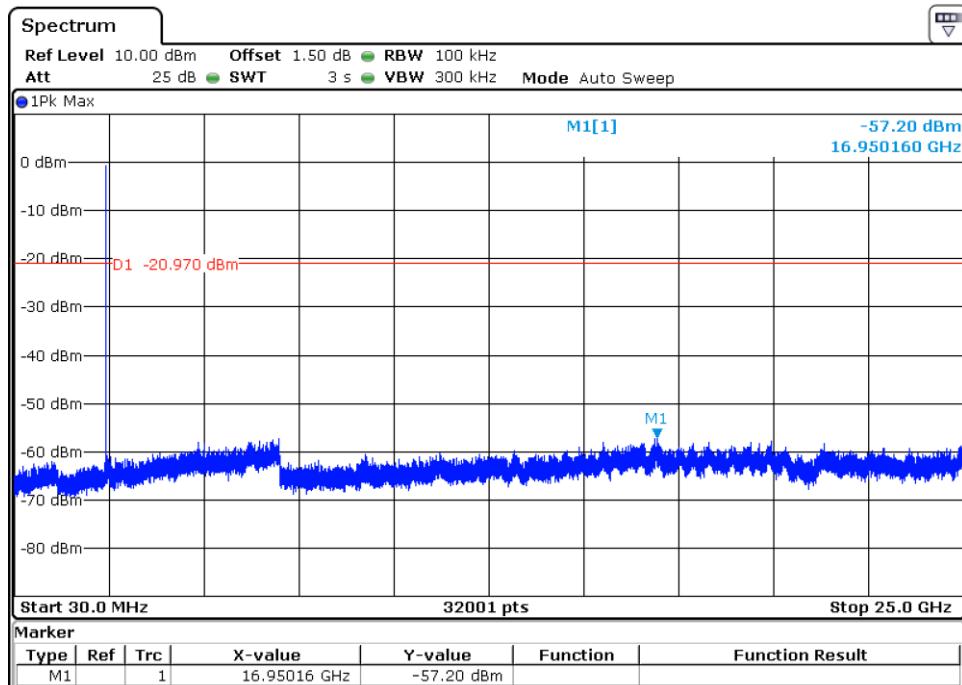
### 3. Conducted Spurious Emissions

#### 3.1 Test Data

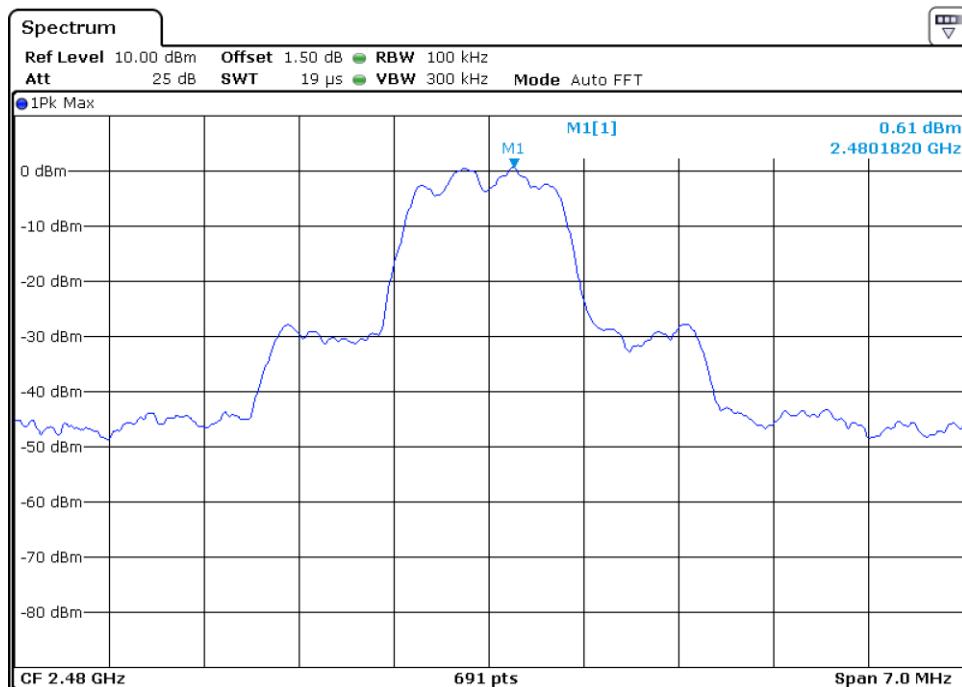
Lowest Channel

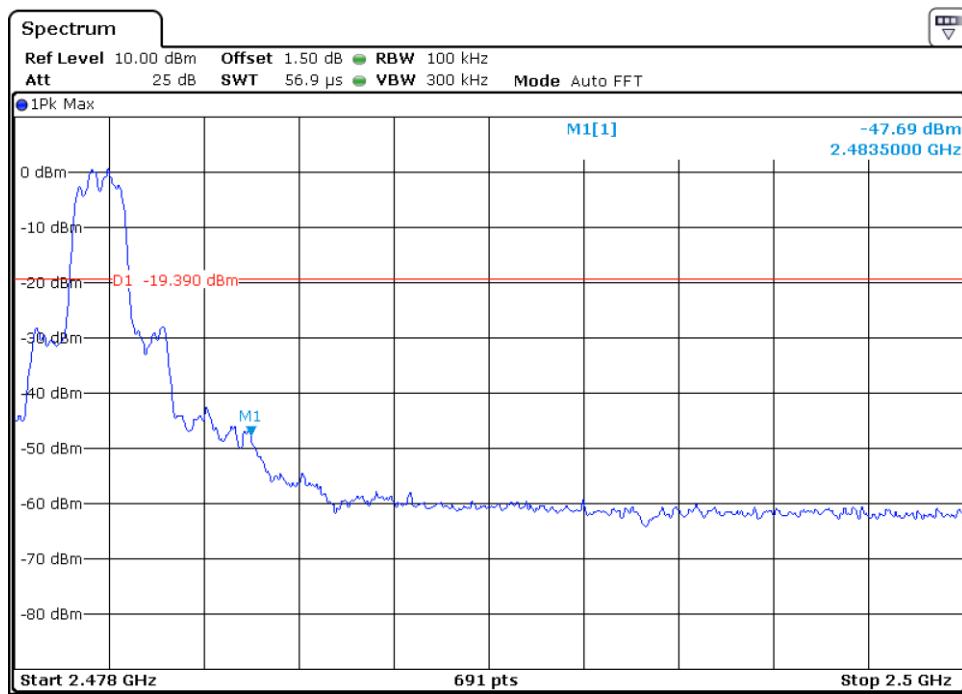
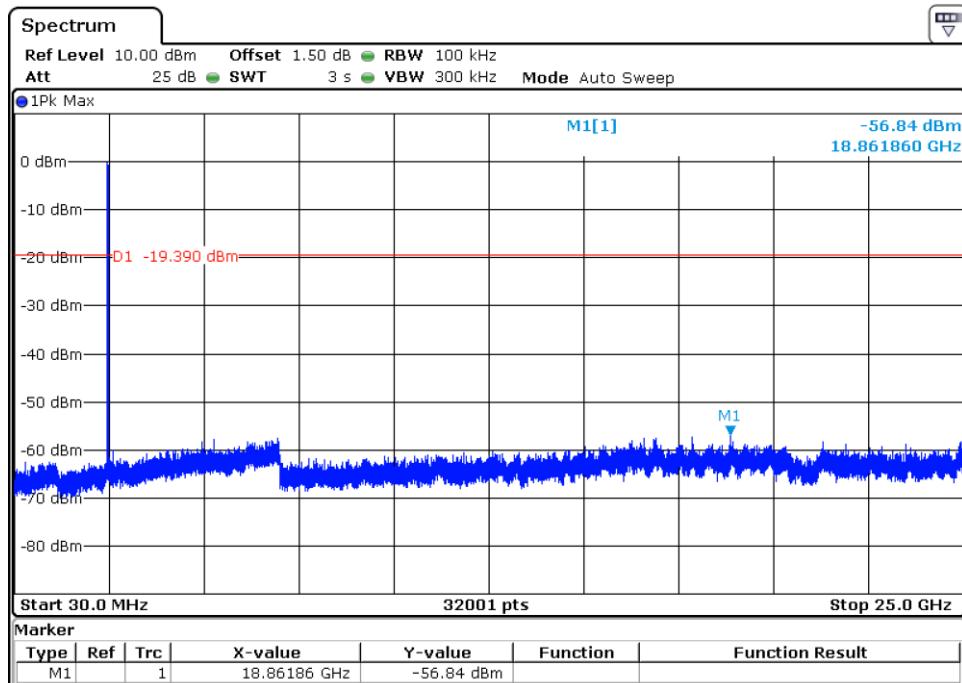




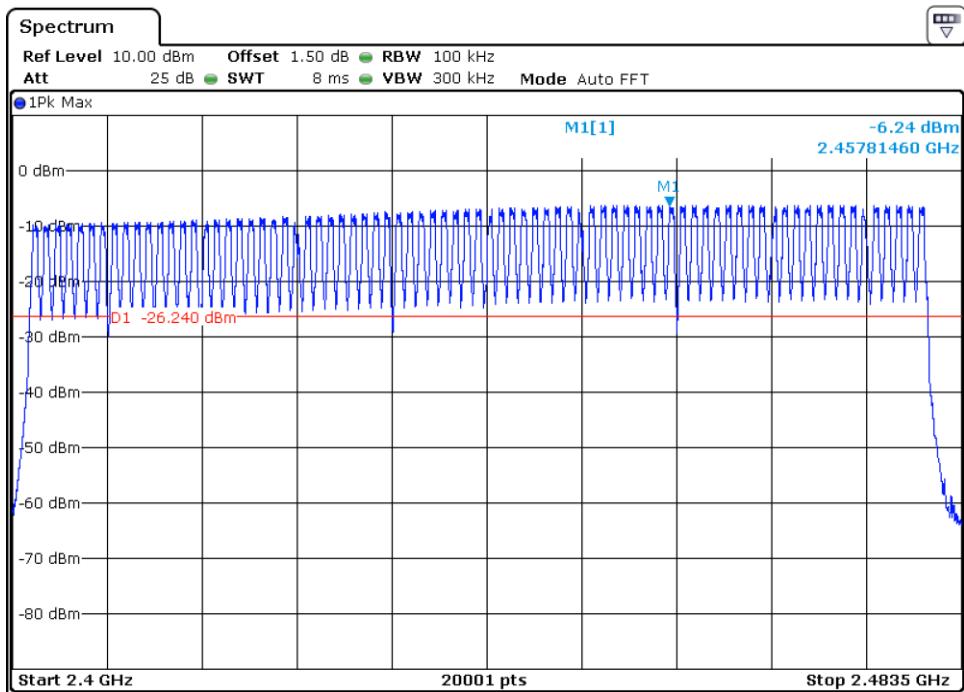


### Highest Channel

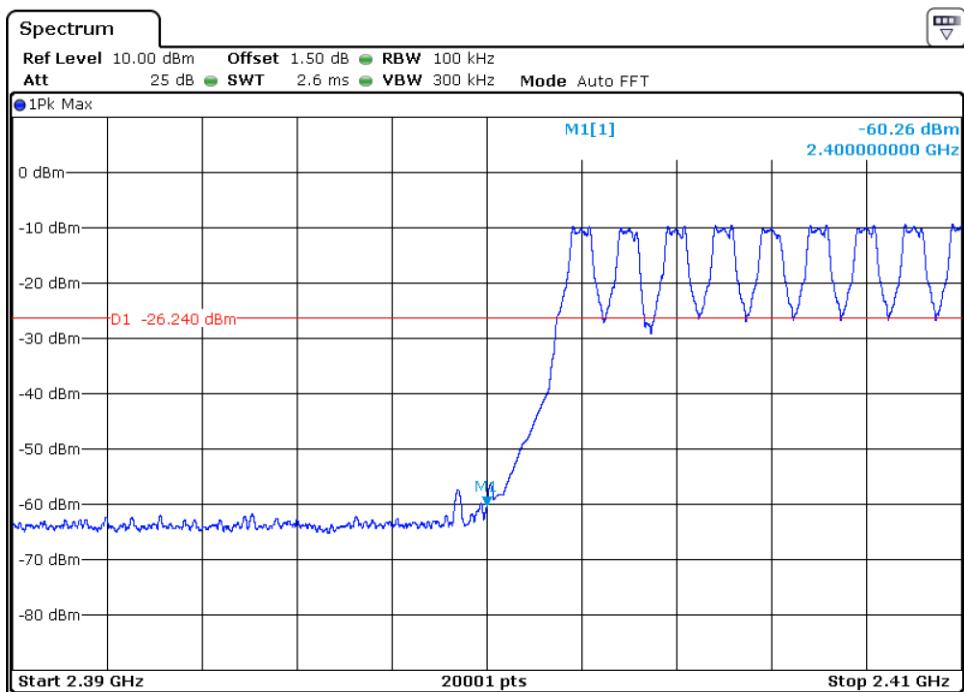




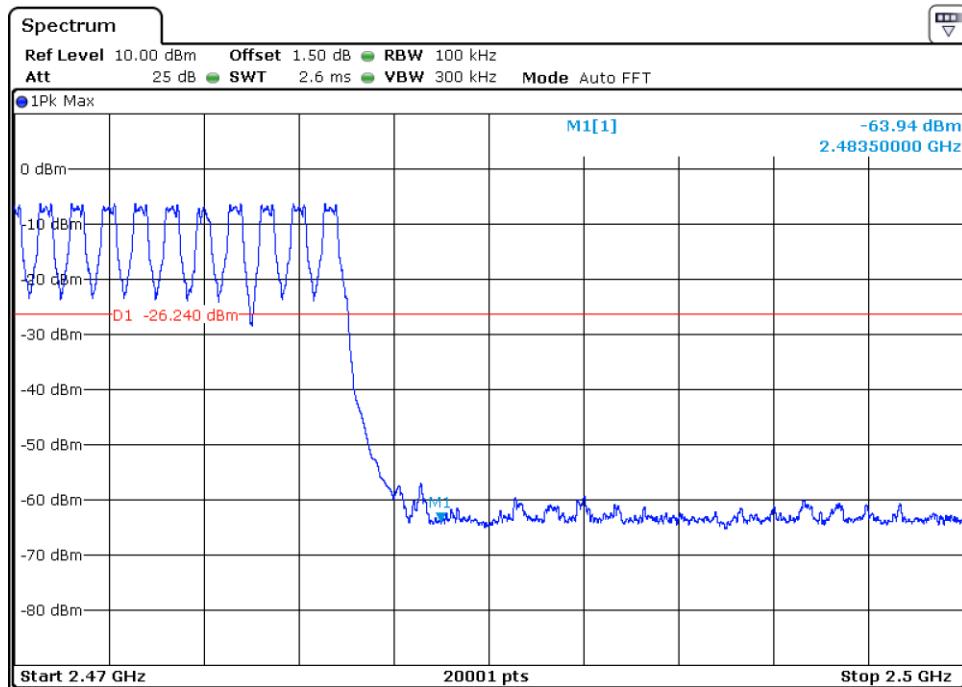
### Bandedge with Hopping



### Lowest Channel



Highest Channel



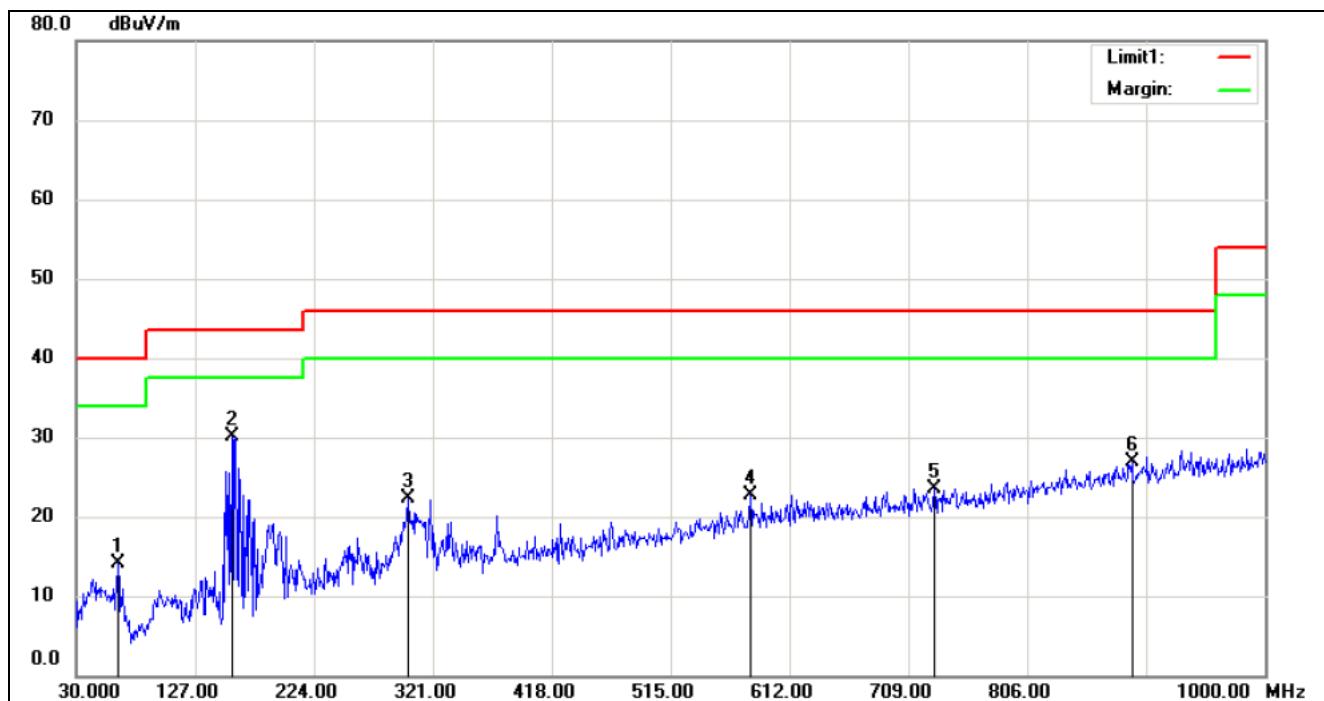
Note: Only the worst case were shown in this test report and the worst case test mode is 8DPSK, 3DH1

## 4. Radiated Spurious Emissions

### 4.1 Test Data

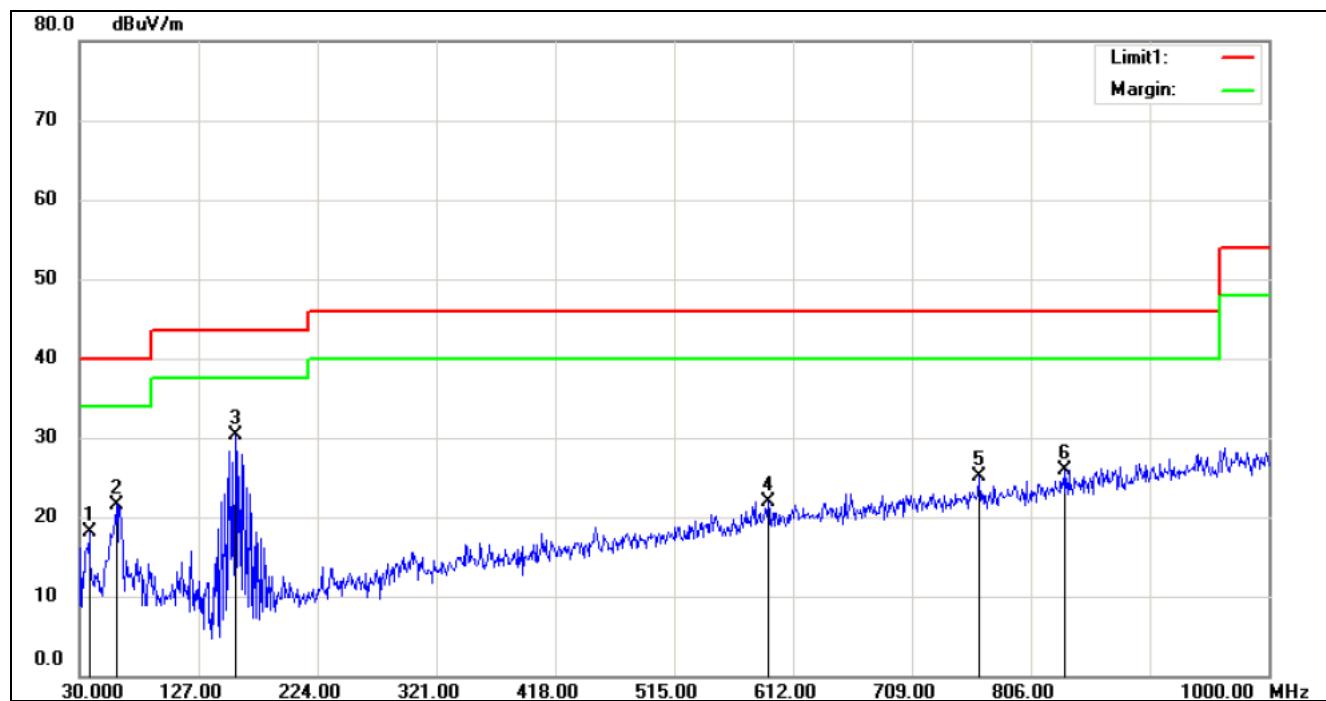
Spurious Emissions of 30MHz to 1GHz

EUT:	Bluetooth Stereo Speaker with Powerbank
Tested Model:	NS-SPBTBRICK-SB
Operating Condition:	Transmitting Low Channel (2402MHz)
Test Specification:	Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
1		63.9500	29.44	-15.29	14.15	40.00	-25.85	QP			
2	*	157.0700	47.89	-17.79	30.10	43.50	-13.40	QP			
3		300.6300	33.81	-11.44	22.37	46.00	-23.63	QP			
4		579.9900	26.98	-4.34	22.64	46.00	-23.36	QP			
5		730.3400	25.39	-1.84	23.55	46.00	-22.45	QP			
6		891.3600	25.96	1.04	27.00	46.00	-19.00	QP			

*Test Specification:* Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
1		37.7600	33.13	-14.93	18.20	40.00	-21.80	QP			
2		60.0700	36.42	-14.87	21.55	40.00	-18.45	QP			
3	*	157.0700	48.04	-17.79	30.25	43.50	-13.25	QP			
4		591.6300	25.95	-4.01	21.94	46.00	-24.06	QP			
5		763.3200	26.38	-1.29	25.09	46.00	-20.91	QP			
6		834.1300	25.93	-0.06	25.87	46.00	-20.13	QP			

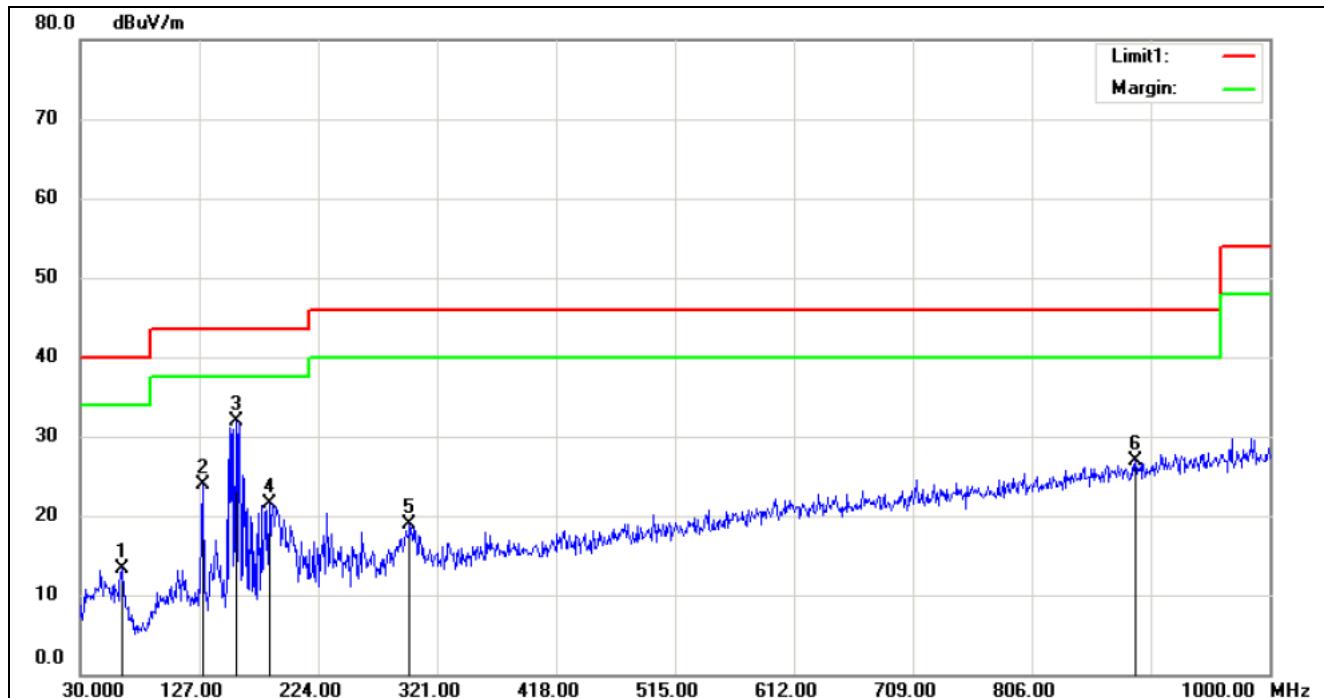
Appendix A  
50090617 002



Produkte  
Products

Page 18 of 56

<i>Operating Condition:</i>	<i>Transmitting Middle Channel (2441MHz)</i>
<i>Test Specification:</i>	<i>Horizontal</i>



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
1		63.9500	28.68	-15.29	13.39	40.00	-26.61	QP			
2		129.9100	42.07	-18.18	23.89	43.50	-19.61	QP			
3	*	157.0700	49.61	-17.79	31.82	43.50	-11.68	QP			
4		184.2300	37.51	-16.00	21.51	43.50	-21.99	QP			
5		298.6900	30.29	-11.48	18.81	46.00	-27.19	QP			
6		890.3900	25.84	1.02	26.86	46.00	-19.14	QP			

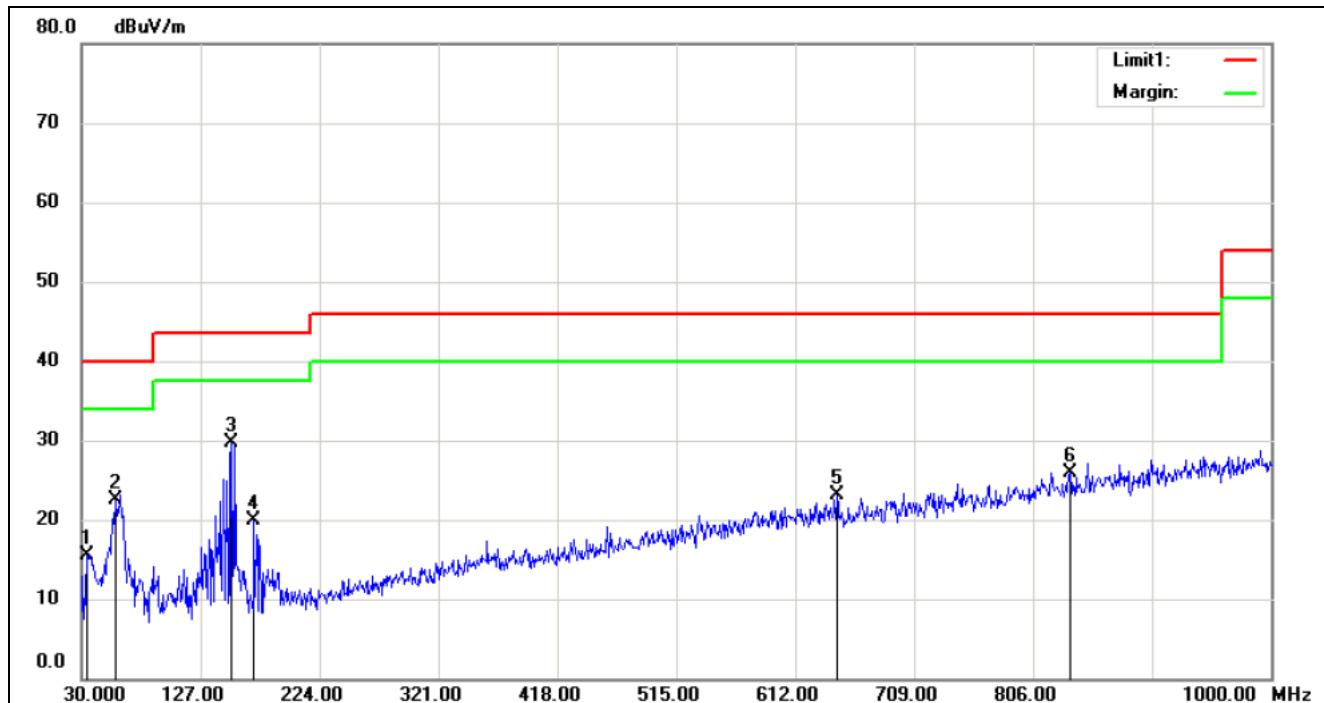
Appendix A  
50090617 002



Produkte  
Products

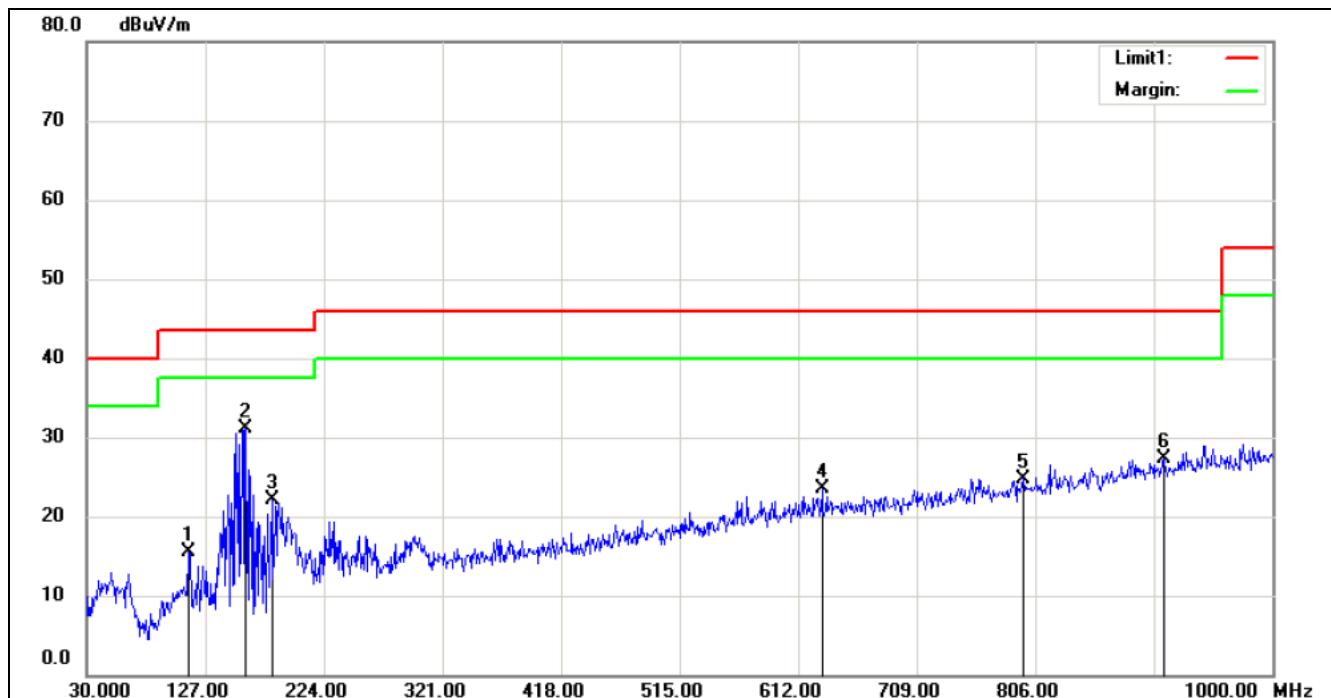
Page 19 of 56

*Test Specification:* Vertical



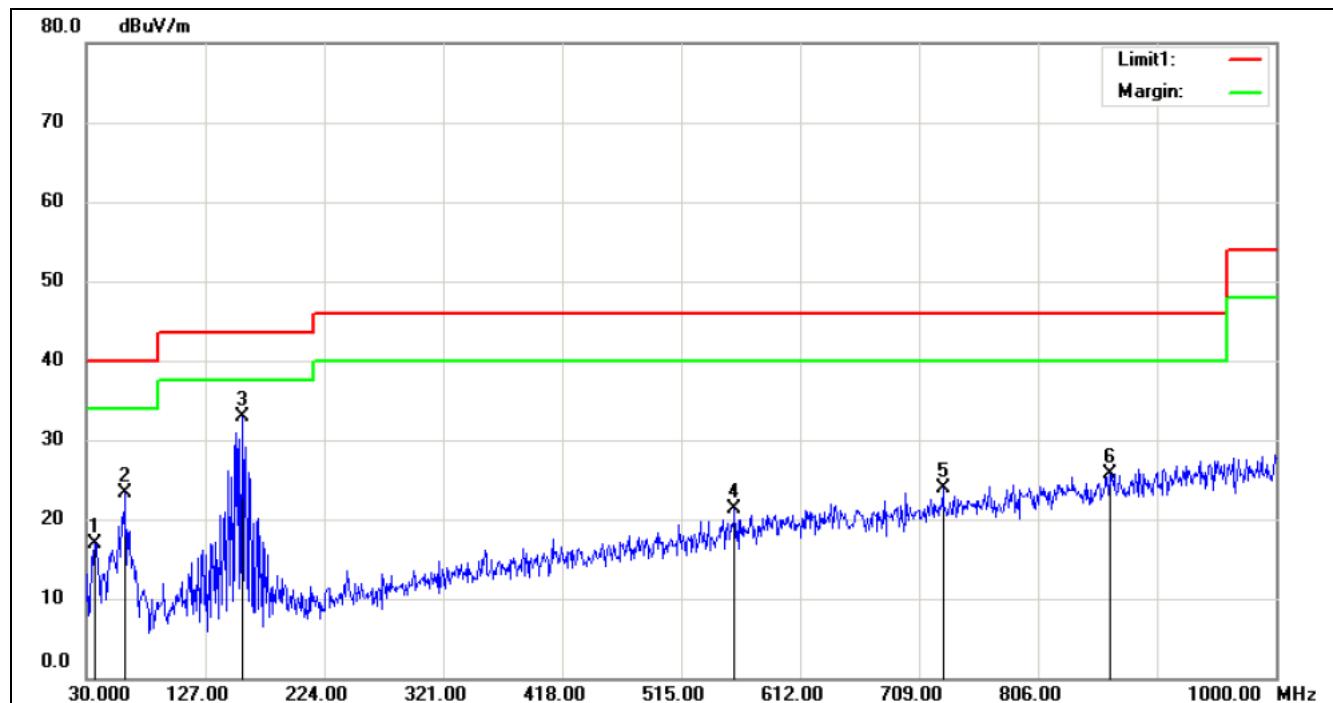
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
1		33.8800	31.88	-16.31	15.57	40.00	-24.43	QP			
2		58.1300	37.09	-14.60	22.49	40.00	-17.51	QP			
3 *		152.2200	47.84	-18.16	29.68	43.50	-13.82	QP			
4		170.6500	37.02	-17.13	19.89	43.50	-23.61	QP			
5		645.9500	26.20	-3.18	23.02	46.00	-22.98	QP			
6		836.0700	26.02	-0.04	25.98	46.00	-20.02	QP			

<i>Operating Condition:</i>	<i>Transmitting High Channel (2480MHz)</i>
<i>Test Specification:</i>	<i>Horizontal</i>



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
1		113.4200	30.85	-15.40	15.45	43.50	-28.05	QP			
2	*	159.9800	48.70	-17.56	31.14	43.50	-12.36	QP			
3		182.2900	38.37	-16.19	22.18	43.50	-21.32	QP			
4		631.4000	26.82	-3.36	23.46	46.00	-22.54	QP			
5		796.3000	25.60	-0.80	24.80	46.00	-21.20	QP			
6		910.7600	25.99	1.40	27.39	46.00	-18.61	QP			

*Test Specification:* Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
1		36.7900	32.37	-15.37	17.00	40.00	-23.00	QP			
2		62.0100	38.47	-15.07	23.40	40.00	-16.60	QP			
3 *		157.0700	50.72	-17.79	32.93	43.50	-10.57	QP			
4		558.6500	26.22	-4.92	21.30	46.00	-24.70	QP			
5		728.4000	25.85	-1.88	23.97	46.00	-22.03	QP			
6		864.2000	25.28	0.51	25.79	46.00	-20.21	QP			

Appendix A  
**50090617 002**

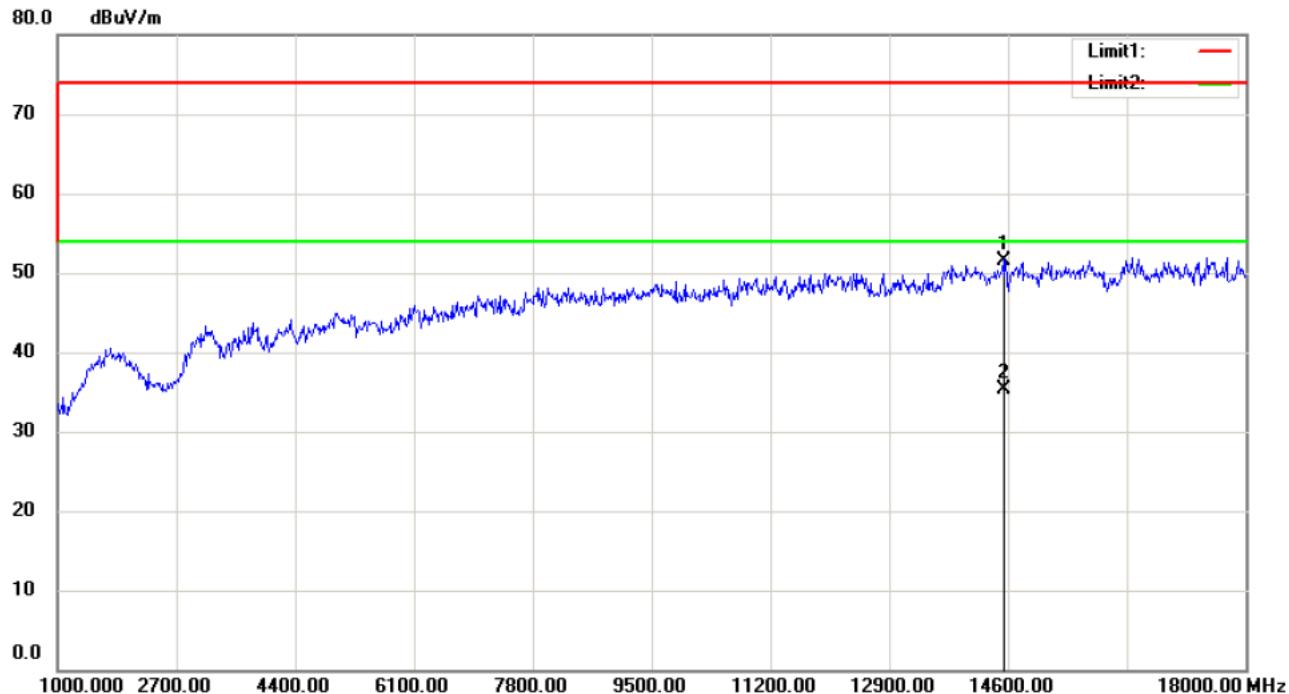


Produkte  
Products

Page 22 of 56

Radiated Spurious Emissions of Above 1GHz

<i>Operating Condition:</i>	<i>Transmitting Low Channel (2402MHz)</i>
<i>Test Specification:</i>	<i>Horizontal</i>



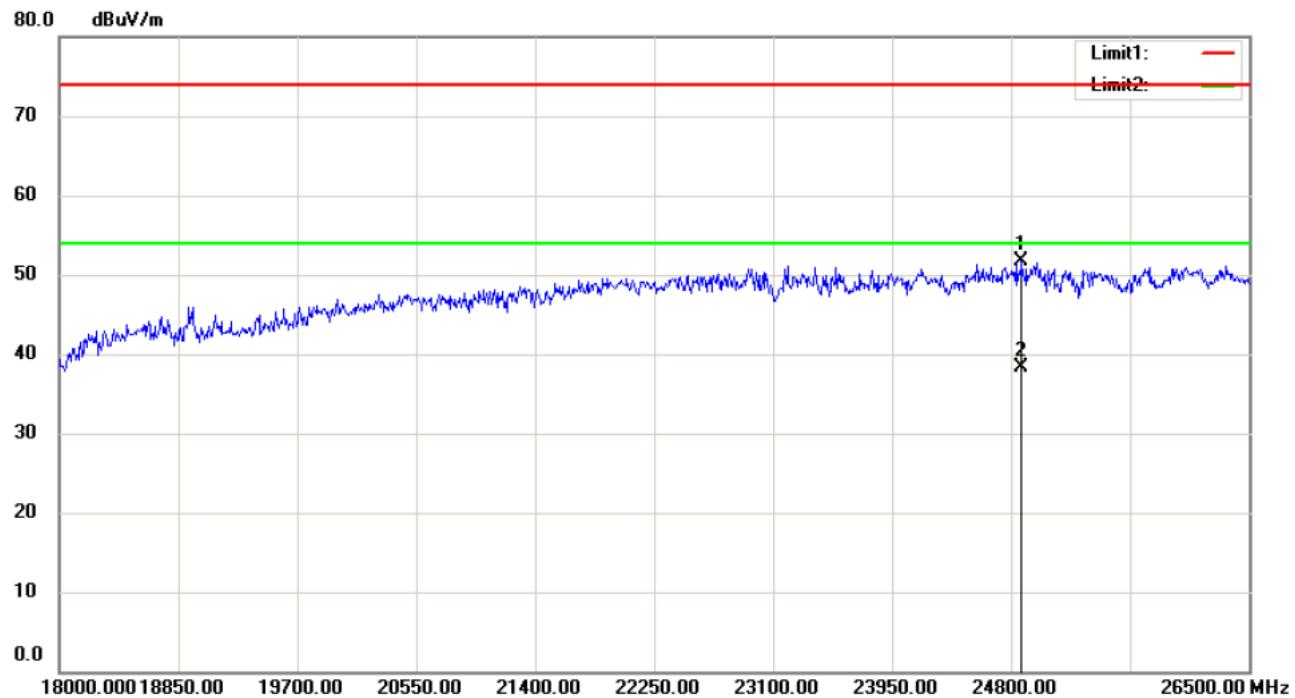
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	Antenna Height	Table Degree	Comment	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	
1		14532.00	53.34	-1.74	51.60	74.00	-22.40	peak			
2	*	14532.00	37.14	-1.74	35.40	54.00	-18.60	AVG			

Appendix A  
**50090617 002**



Produkte  
Products

Page 23 of 56



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB	Over Detector	Antenna Height cm	Table Degree degree	Comment
1		24876.50	88.80	-37.02	51.78	74.00	-22.22	peak		
2	*	24876.50	75.42	-37.02	38.40	54.00	-15.60	AVG		

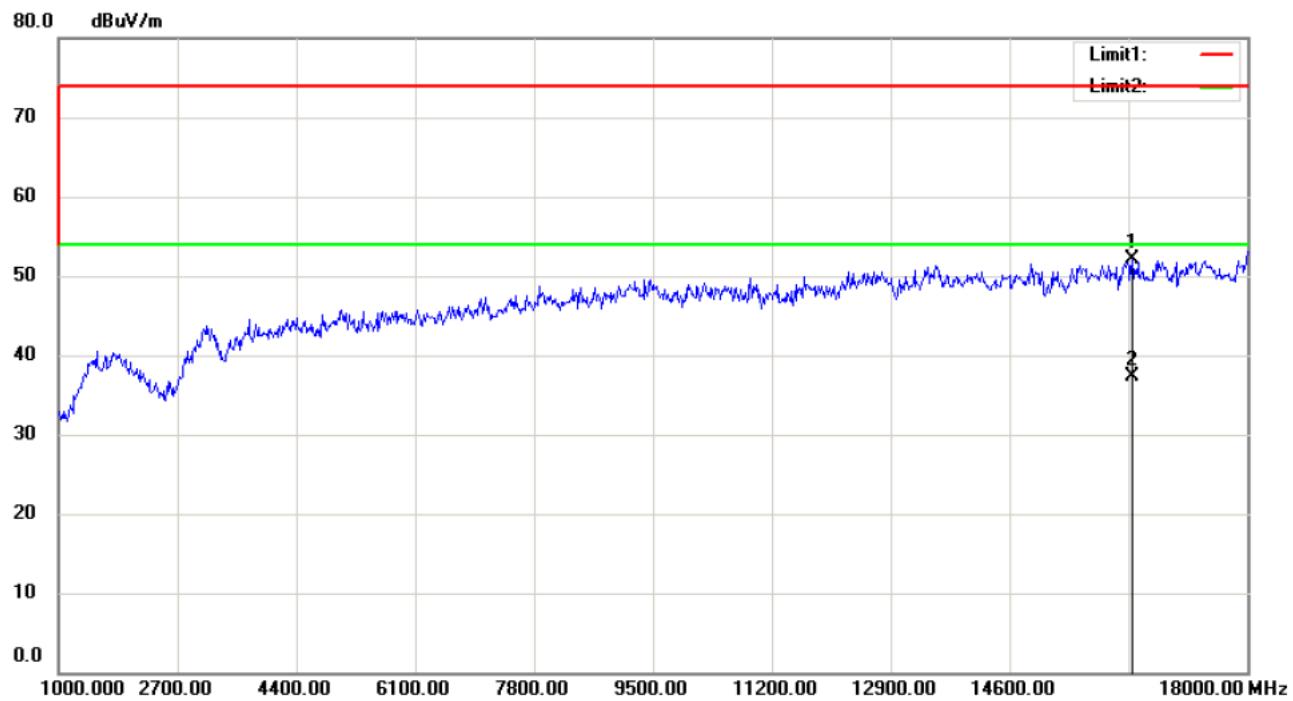
Appendix A  
**50090617 002**



**Produkte**  
*Products*

Page 24 of 56

*Test Specification:* Vertical



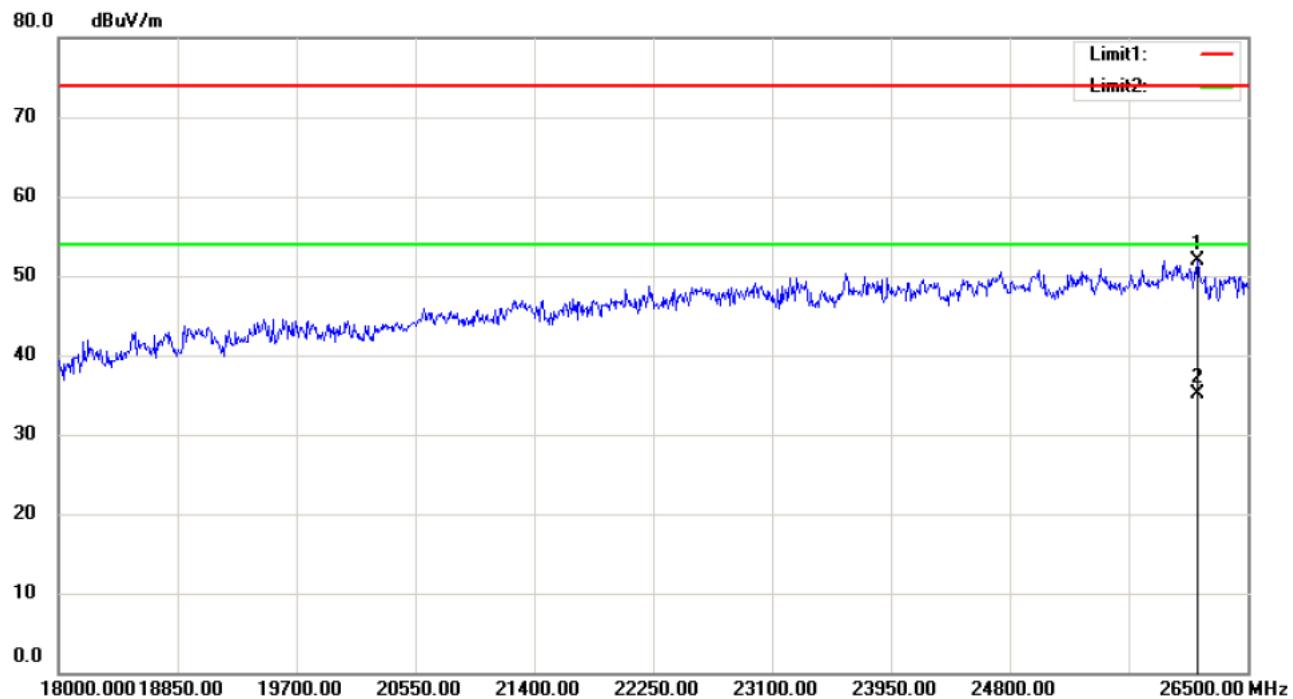
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
1		16351.00	56.66	-4.54	52.12	74.00	-21.88	peak			
2	*	16351.00	41.84	-4.54	37.30	54.00	-16.70	AVG			

Appendix A  
**50090617 002**



Produkte  
Products

Page 25 of 56



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
1		26143.00	87.58	-35.62	51.96	74.00	-22.04	peak			
2	*	26143.00	70.72	-35.62	35.10	54.00	-18.90	AVG			

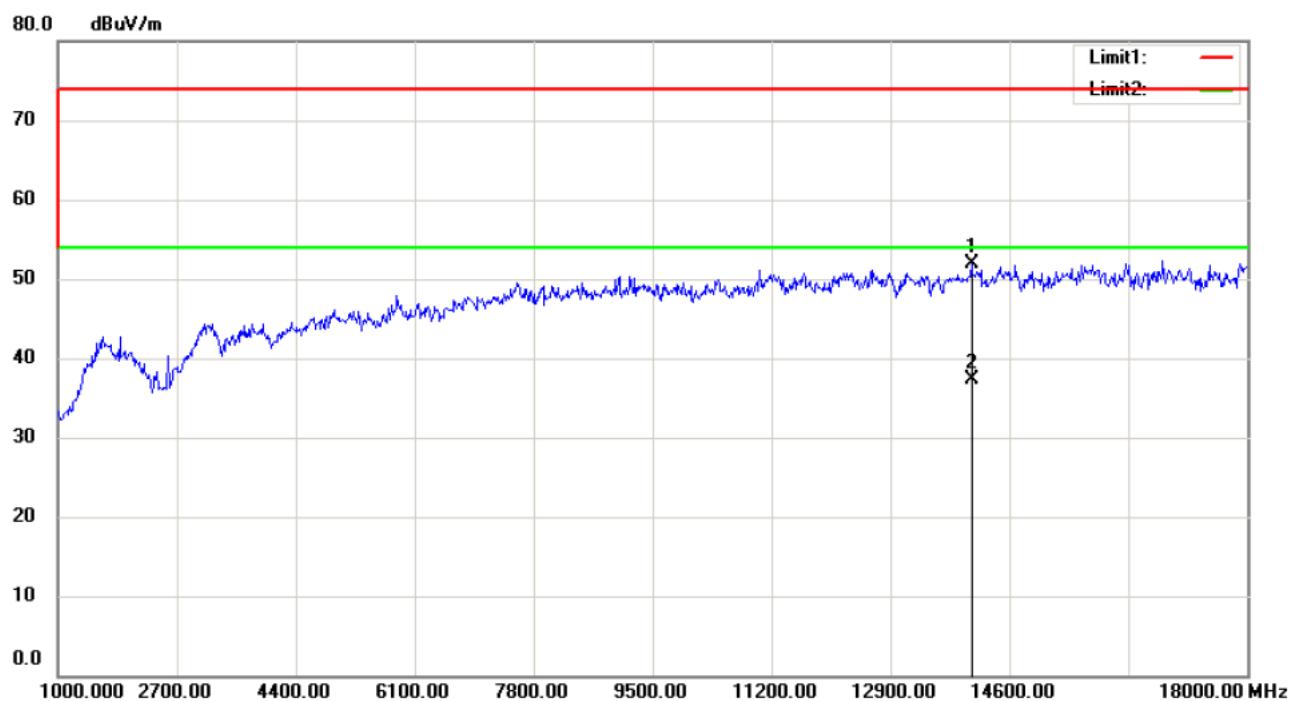
Appendix A  
50090617 002



Produkte  
Products

Page 26 of 56

<i>Operating Condition:</i>	<i>Transmitting Middle Channel (2441MHz)</i>
<i>Test Specification:</i>	<i>Horizontal</i>



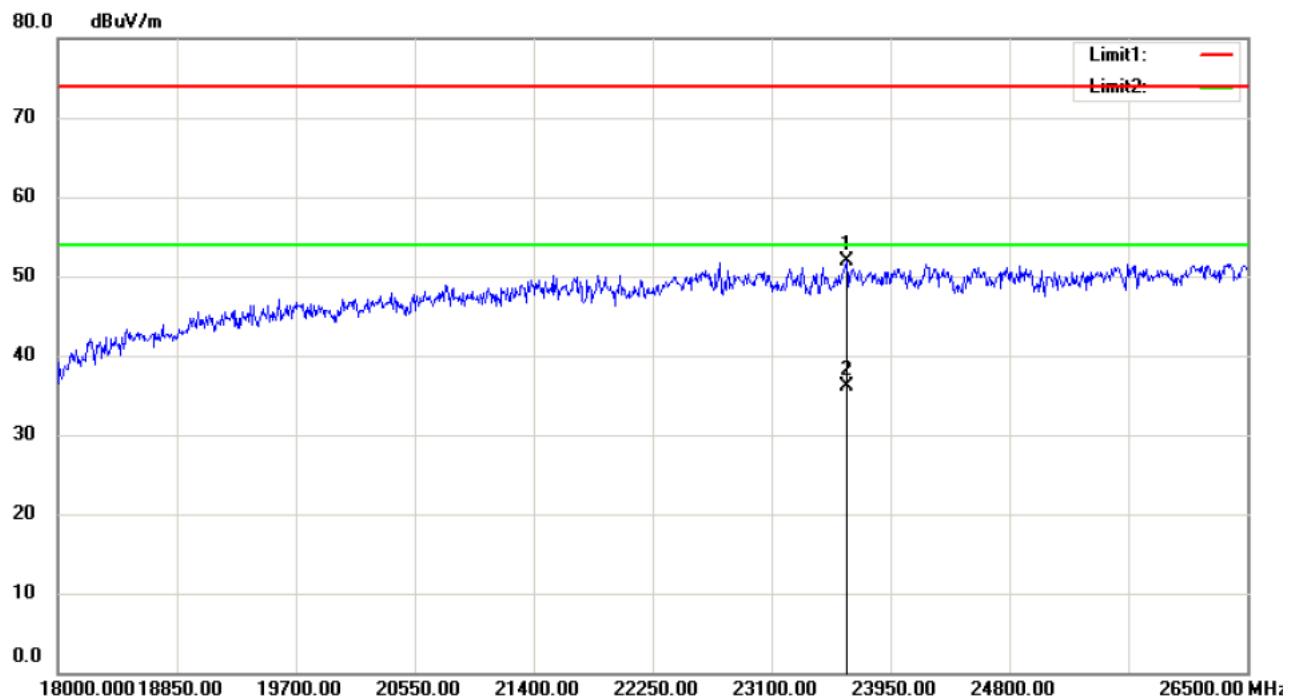
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1		14056.00	52.61	-0.79	51.82	74.00	-22.18	peak		
2	*	14056.00	38.19	-0.79	37.40	54.00	-16.60	AVG		

Appendix A  
**50090617 002**



Produkte  
Products

Page 27 of 56



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1		23635.50	89.32	-37.51	51.81	74.00	-22.19	peak		
2	*	23635.50	73.71	-37.51	36.20	54.00	-17.80	AVG		

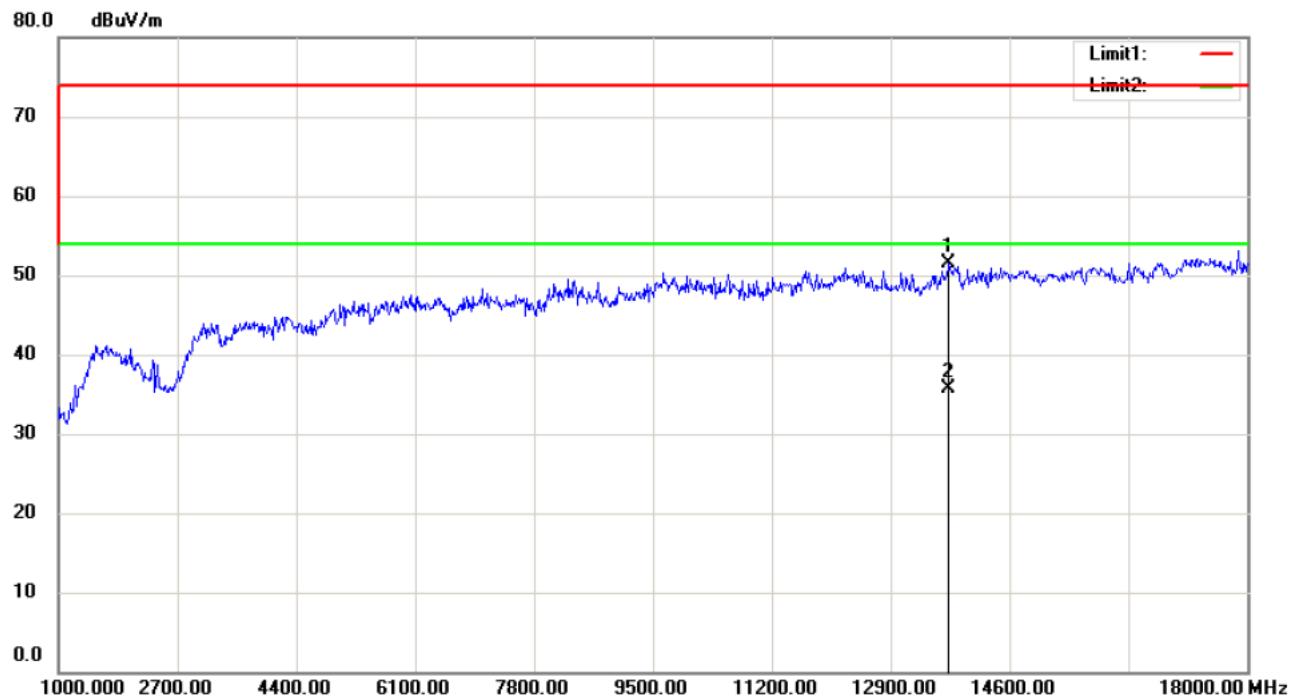
Appendix A  
**50090617 002**



Produkte  
Products

Page 28 of 56

*Test Specification:* Vertical



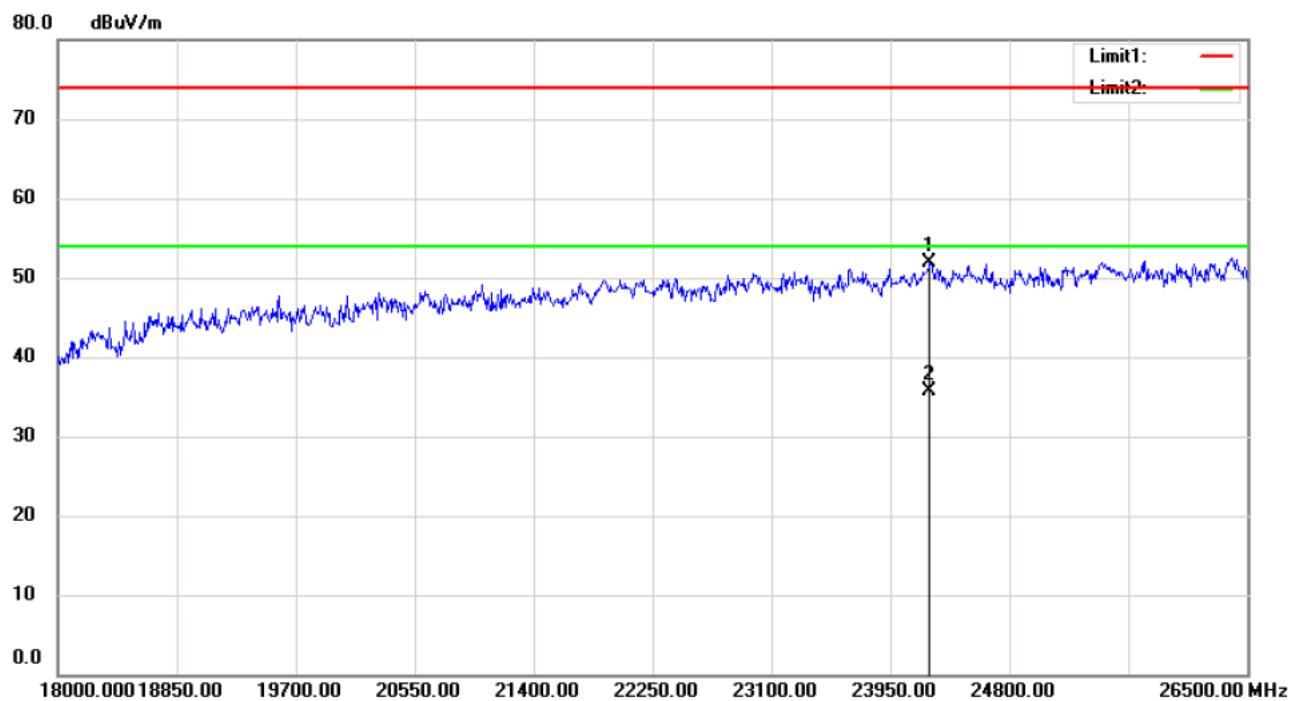
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
1		13733.00	53.22	-1.81	51.41	74.00	-22.59	peak			
2	*	13733.00	37.61	-1.81	35.80	54.00	-18.20	AVG			

Appendix A  
**50090617 002**



Produkte  
Products

Page 29 of 56



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
1		24230.50	88.97	-37.10	51.87	74.00	-22.13	peak			
2	*	24230.50	72.90	-37.10	35.80	54.00	-18.20	AVG			

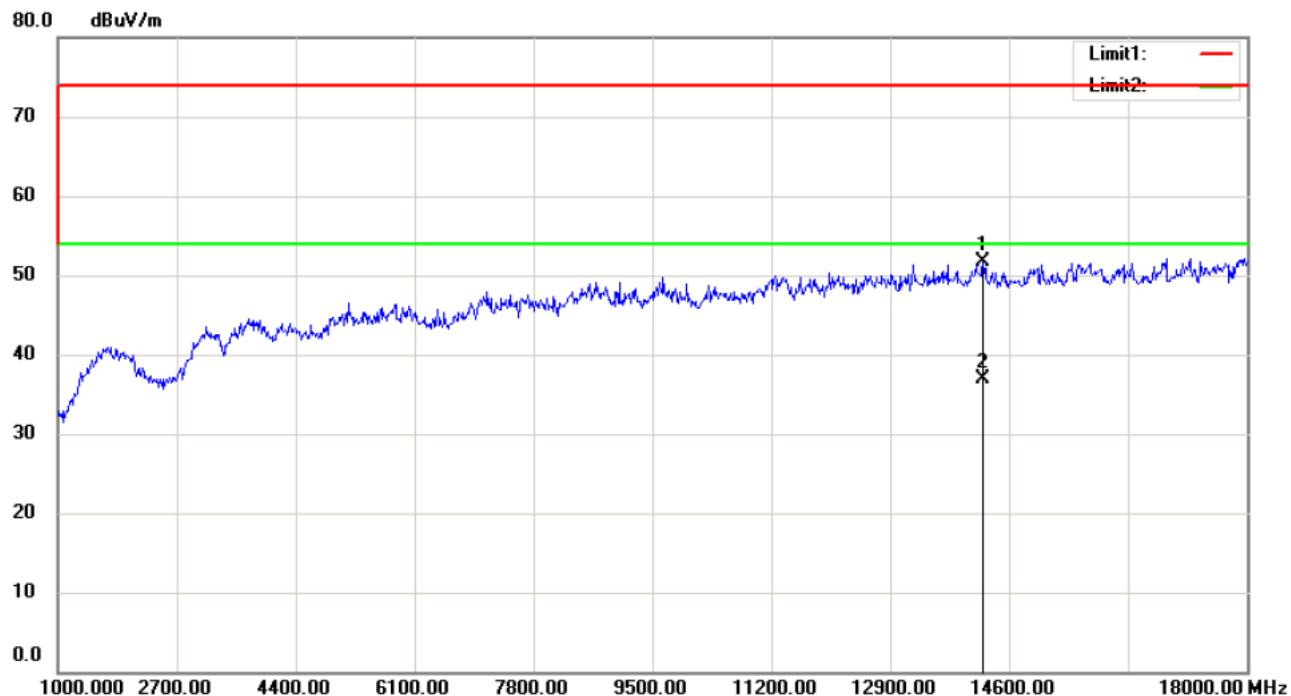
Appendix A  
**50090617 002**



**Produkte**  
*Products*

Page 30 of 56

<i>Operating Condition:</i>	<i>Transmitting High Channel (2480MHz)</i>
<i>Test Specification:</i>	<i>Horizontal</i>



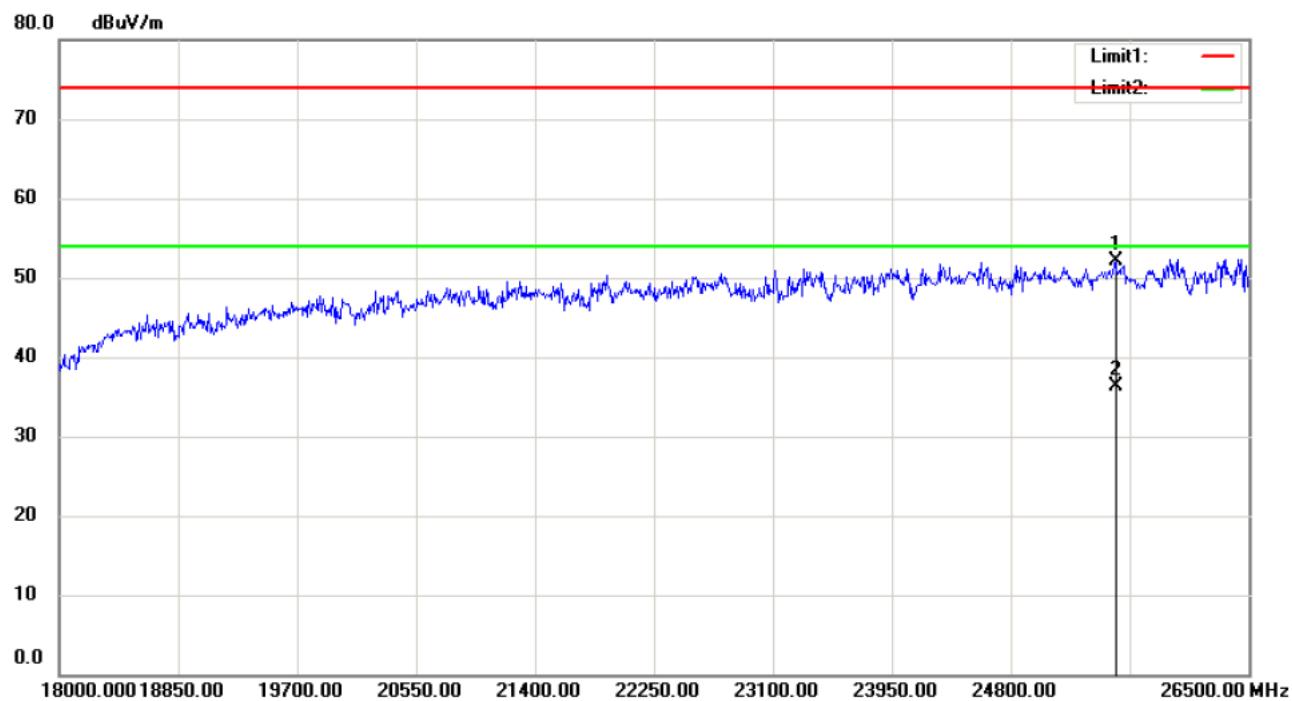
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1		14226.00	52.84	-1.13	51.71	74.00	-22.29	peak		
2	*	14226.00	38.03	-1.13	36.90	54.00	-17.10	AVG		

Appendix A  
**50090617 002**



Produkte  
Products

Page 31 of 56



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB	Over Detector	Antenna Height cm	Table Degree degree	Comment
1		25548.00	88.43	-36.34	52.09	74.00	-21.91	peak		
2	*	25548.00	72.74	-36.34	36.40	54.00	-17.60	AVG		

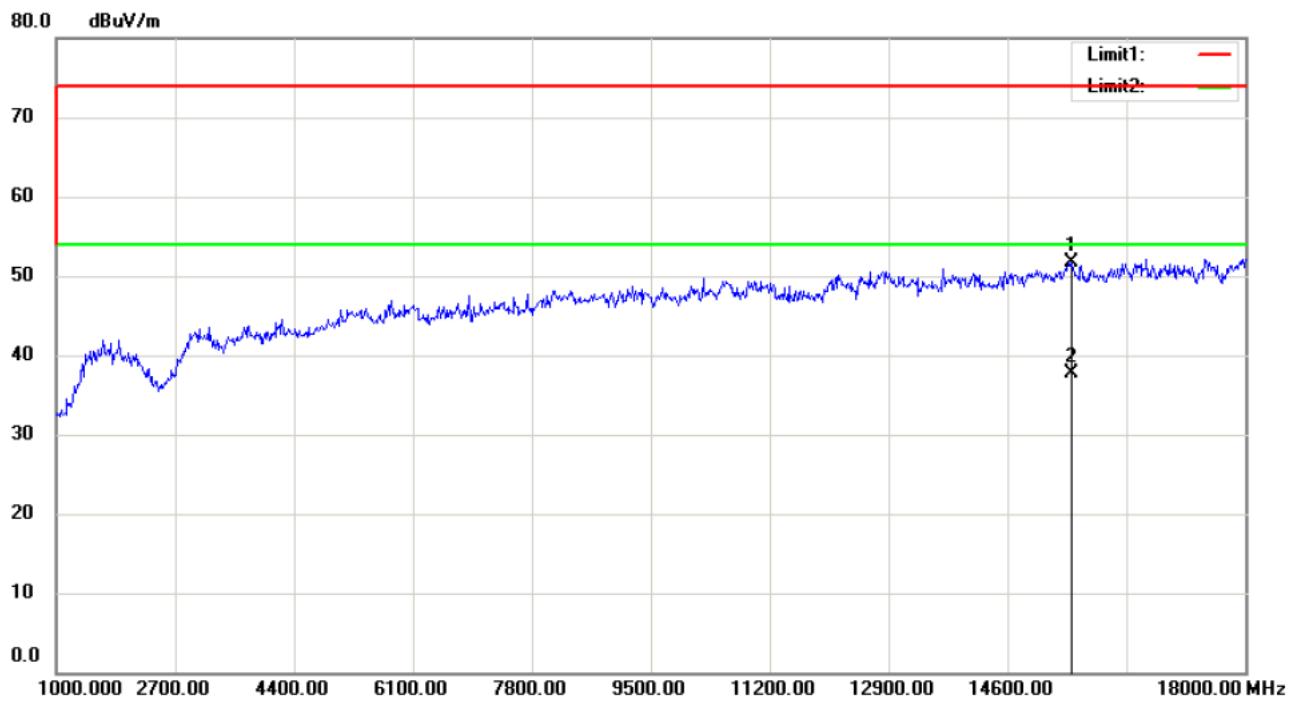
Appendix A  
**50090617 002**



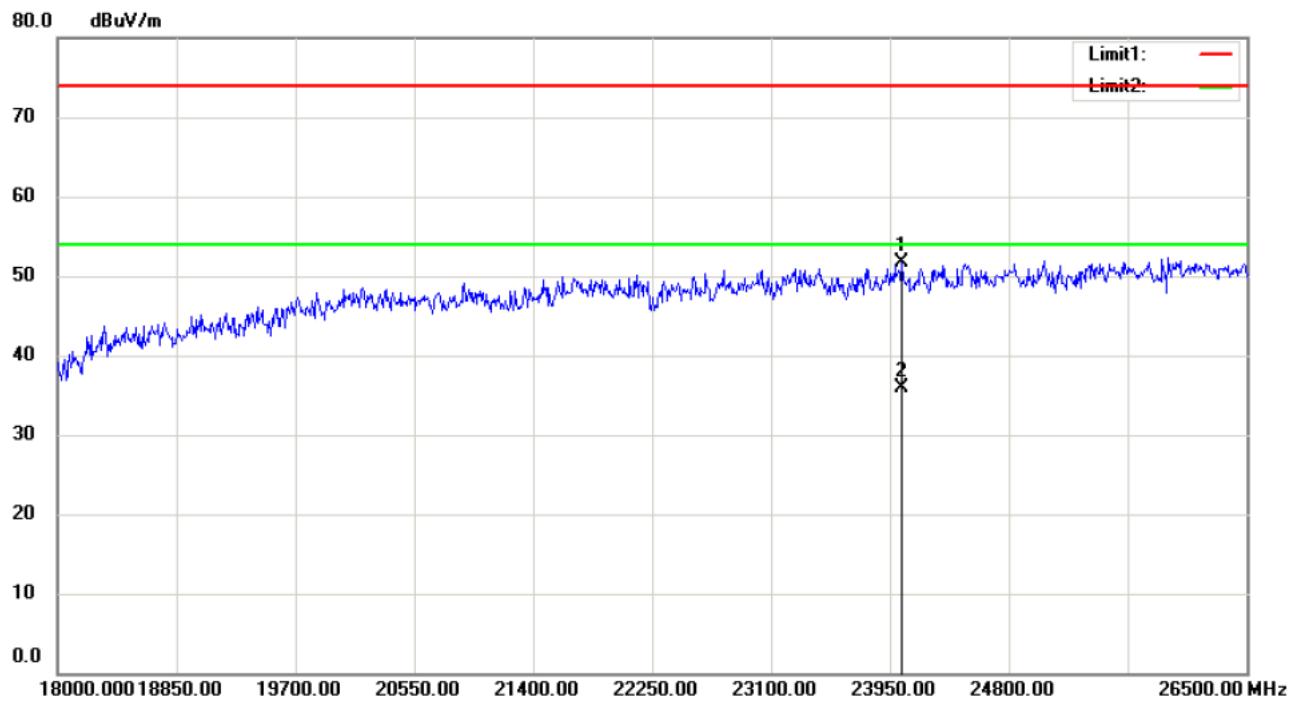
Produkte  
Products

Page 32 of 56

*Test Specification:* | Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1		15518.00	56.43	-4.68	51.75	74.00	-22.25	peak		
2	*	15518.00	42.48	-4.68	37.80	54.00	-16.20	AVG		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
1		24035.00	88.78	-37.13	51.65	74.00	-22.35	peak			
2	*	24035.00	73.03	-37.13	35.90	54.00	-18.10	AVG			

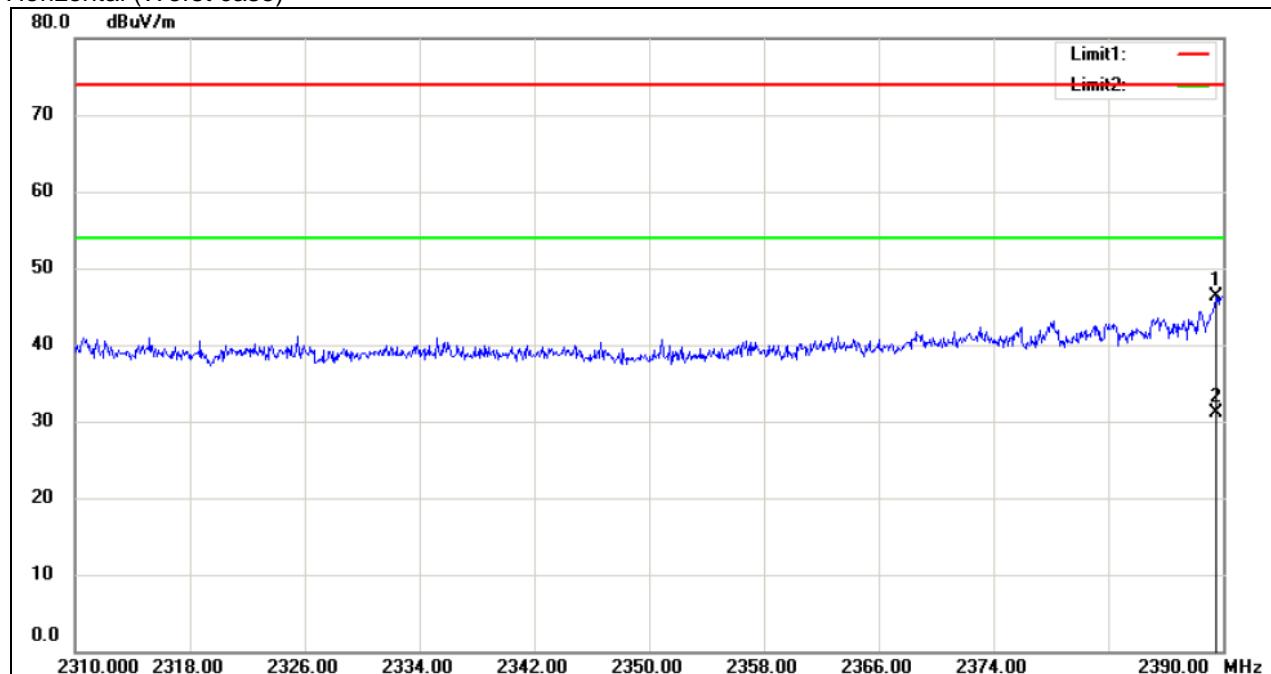
Note:

- 1, The EUT was rotated through three orthogonal axes to determine the attitude that maximizes the emissions. After that the EUT was manually handled to find the orientation that has the maximum emission, which is the orientation shown in the test set-up photos.
- 2, Testing is carried out with frequency rang 9kHz to the tenth harmonics.
- 3, Only the worst case were shown in this test report and the worst case test mode is 8DPSK, 3DH1.
- 4, The margin is greater than 20 dB are not shown in this Appendix.

## 4.2 Restricted bands

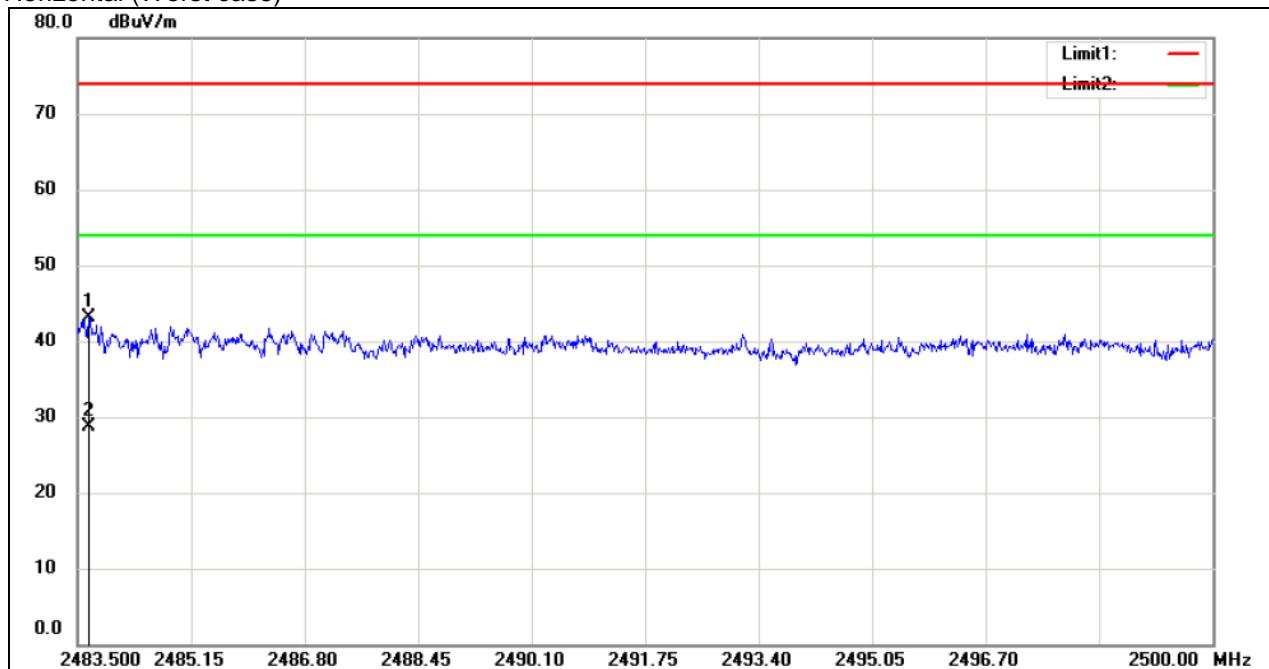
### 4.2.1 Test Data

Lowest Channel  
Horizontal (Worst case)



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
1		2389.520	63.47	-17.15	46.32	74.00	-27.68	peak			
2	*	2389.520	48.35	-17.15	31.20	54.00	-22.80	AVG			

Highest Channel  
Horizontal (Worst case)



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
1		2483.665	59.95	-16.75	43.20	74.00	-30.80	peak			
2	*	2483.665	45.55	-16.75	28.80	54.00	-25.20	AVG			

Note:

1, The EUT was rotated through three orthogonal axes to determine the attitude that maximizes the emissions. After that the EUT was manually handled to find the orientation that has the maximum emission, which is the orientation shown in the test set-up photos.

2, Only the worst case were shown in this test report and the worst case test mode is 8DPSK, 3DH1.

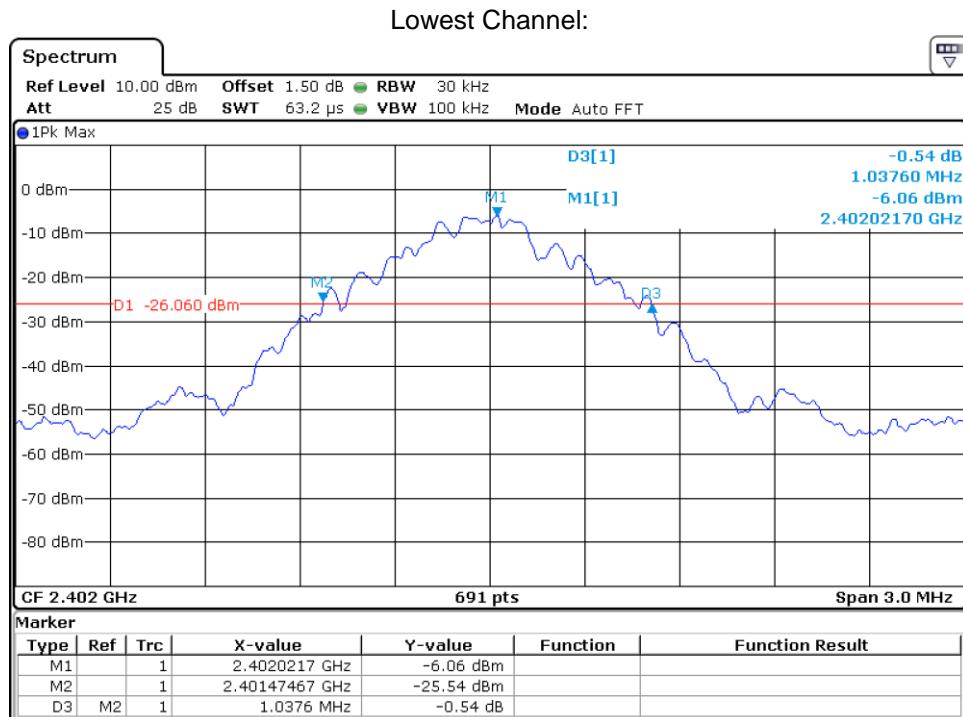
## 5. 20dB Bandwidth

### 5.1 Test Data

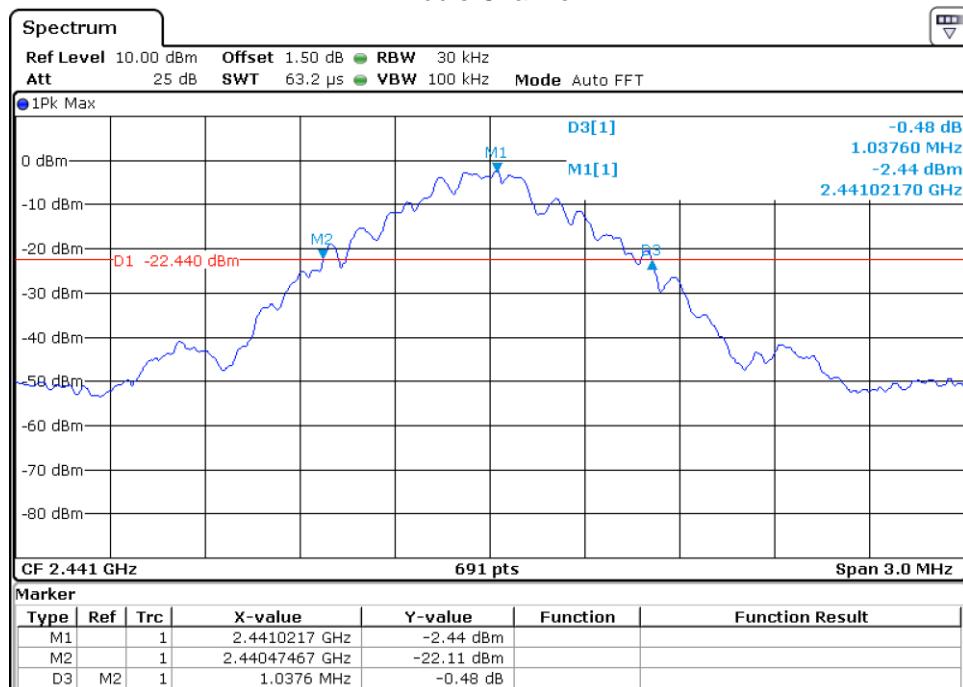
Test Mode	Test Channel (MHz)	20 dB Bandwidth (KHz)
GFSK	2402	1.0376
	2441	1.0376
	2480	1.0376
8DPSK	2402	1.3589
	2441	1.3589
	2480	1.3676

### 5.2 Test Plots

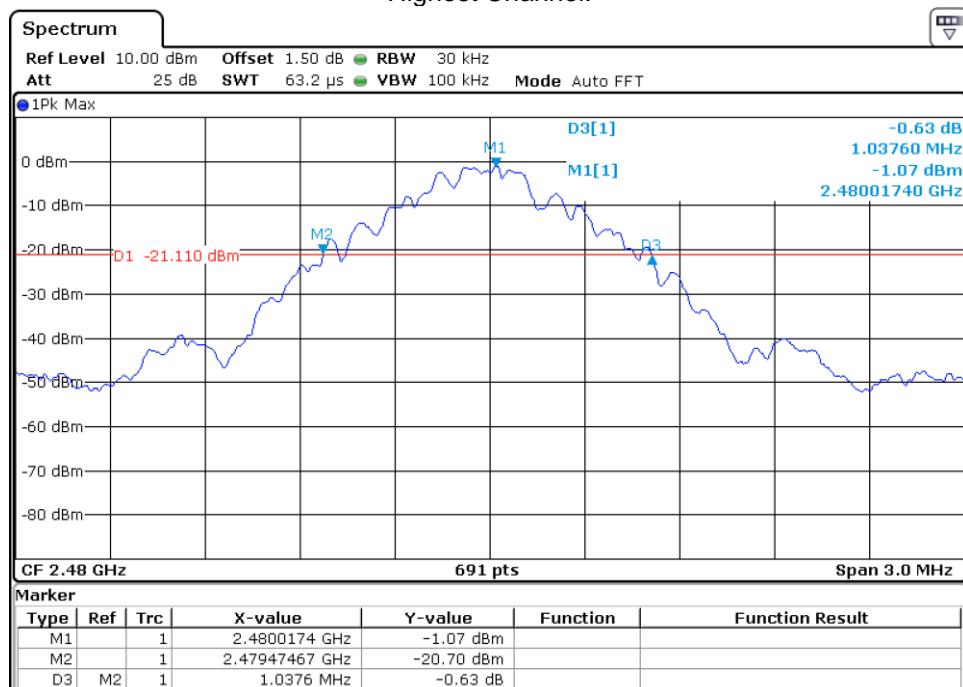
GFSK



Middle Channel:

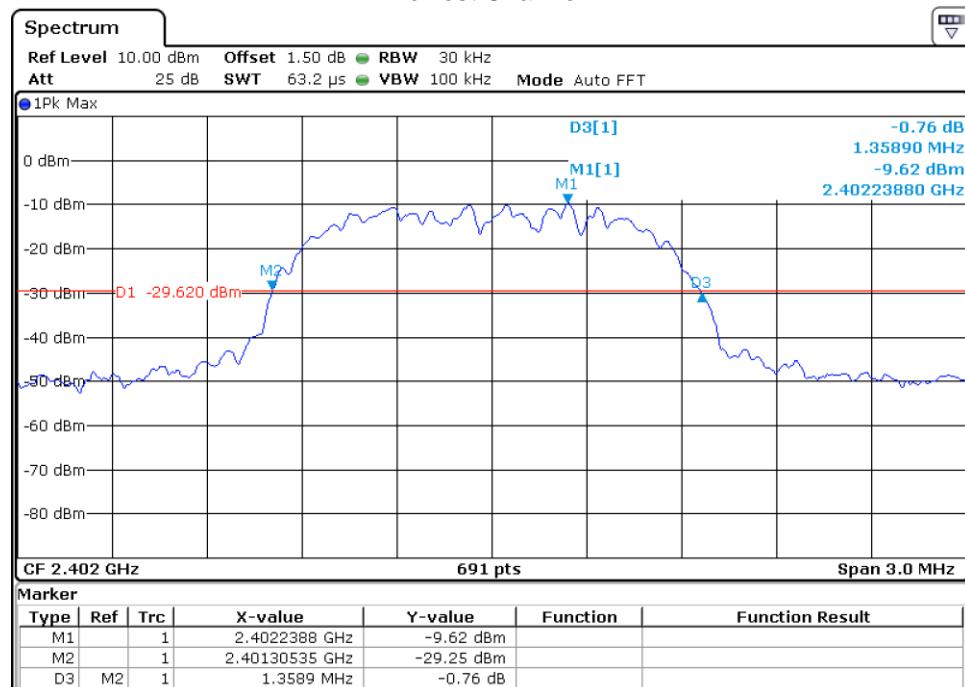


Highest Channel:

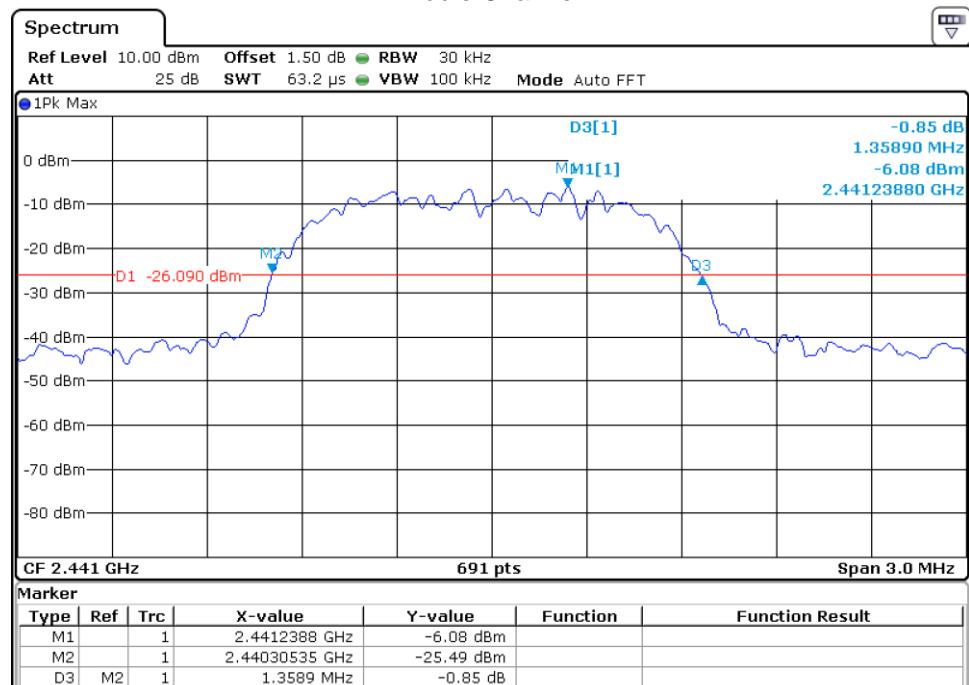


8DPSK

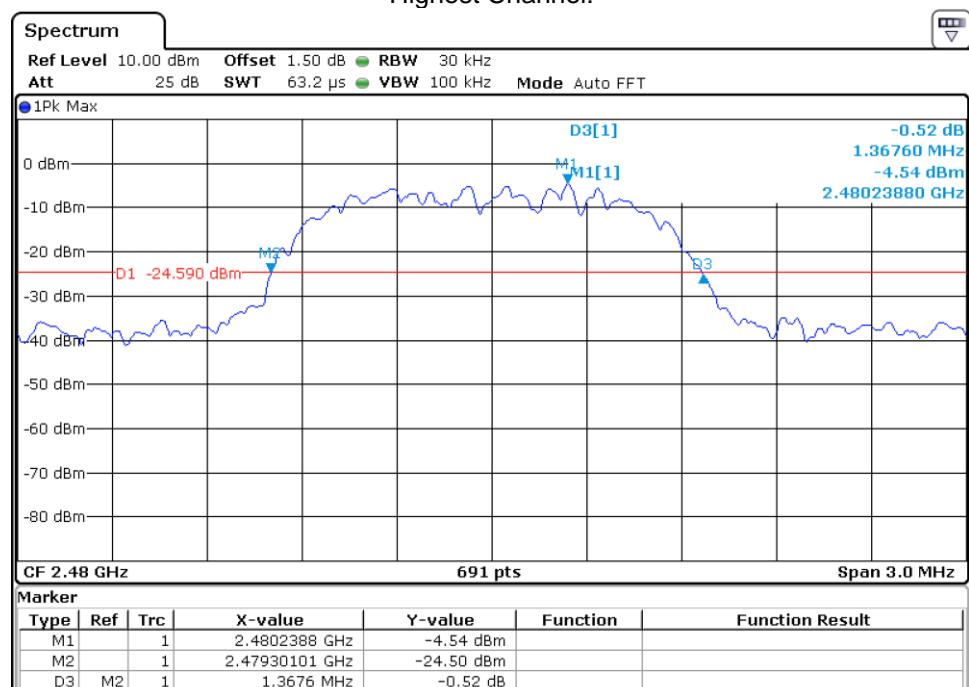
Lowest Channel:



Middle Channel:



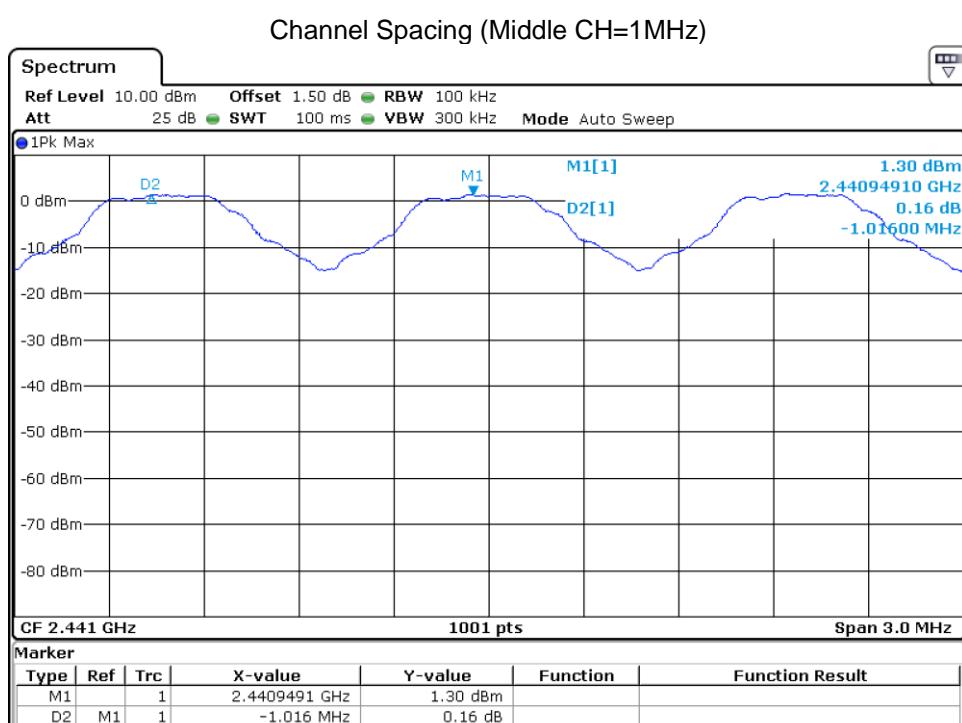
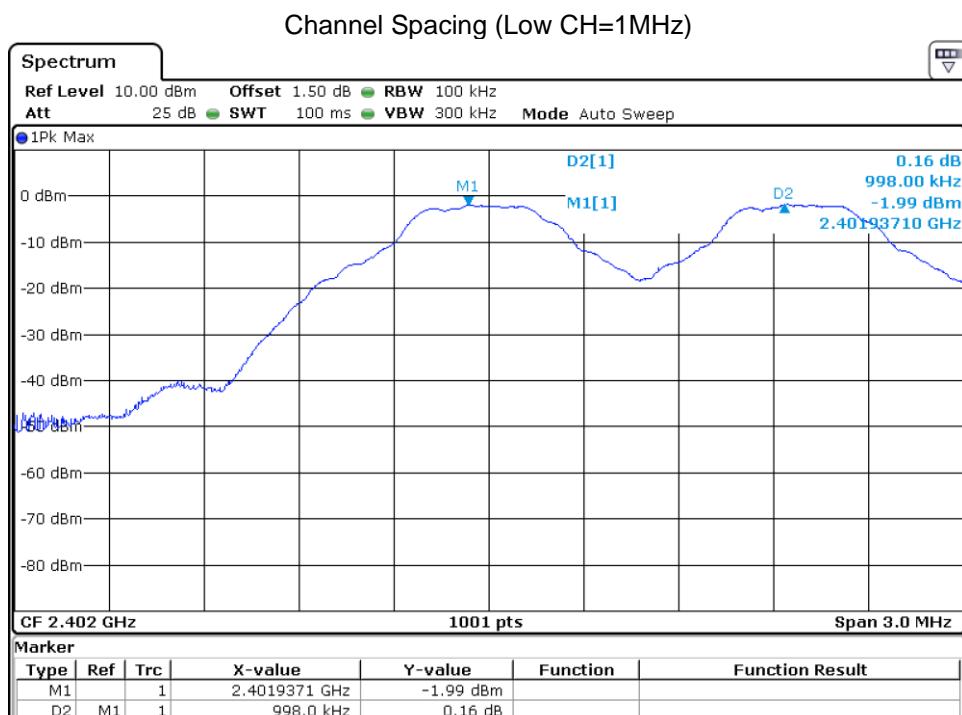
Highest Channel:



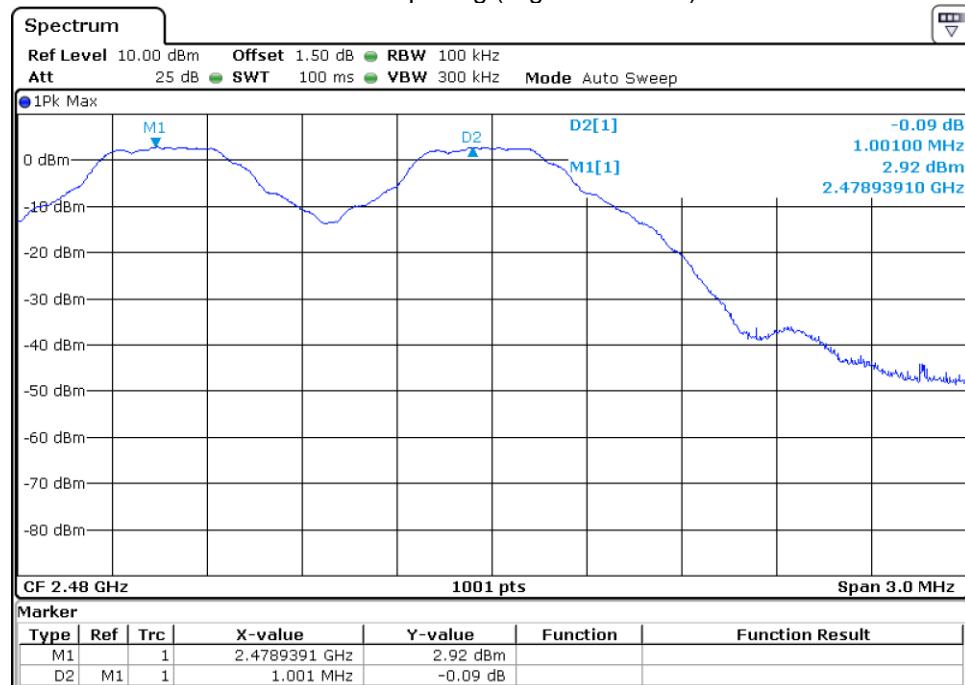
## 6. Carrier Frequency Separation

### 6.1 Test Data

GFSK

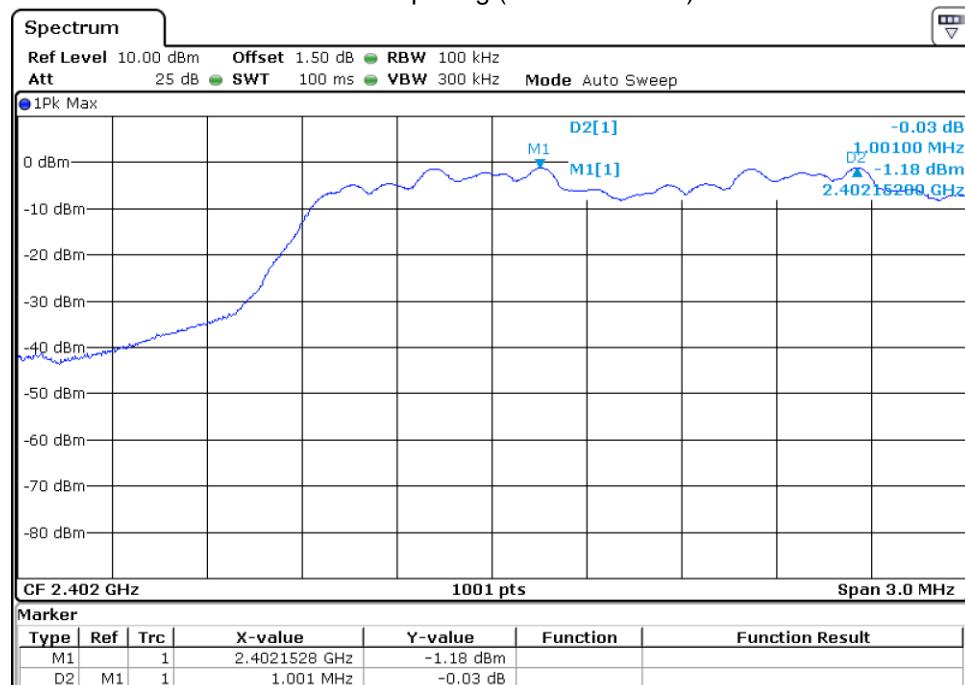


Channel Spacing (High CH=1MHz)

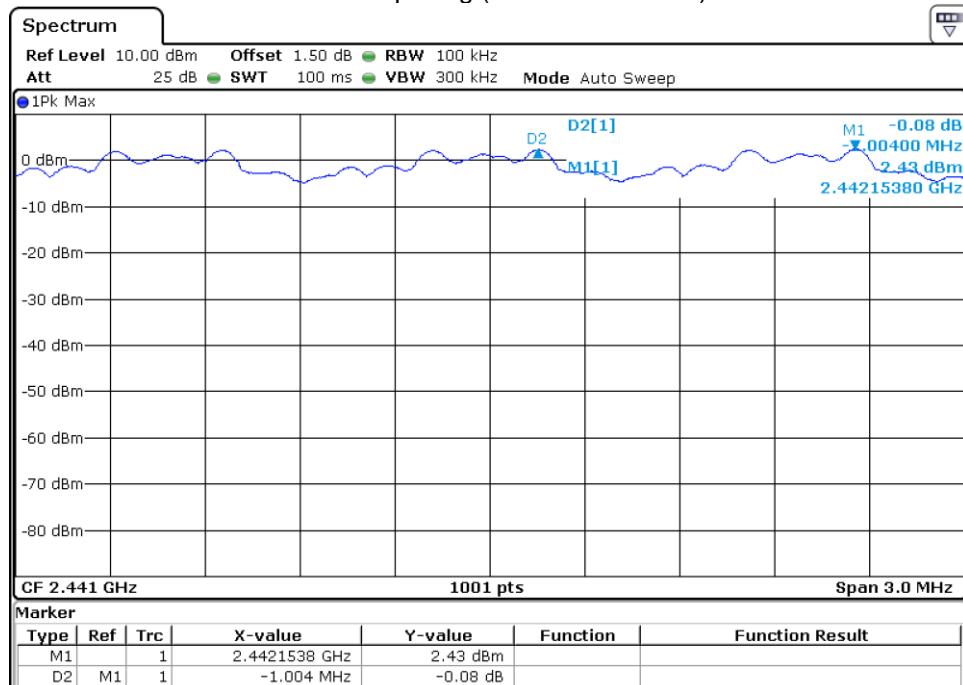


8DPSK

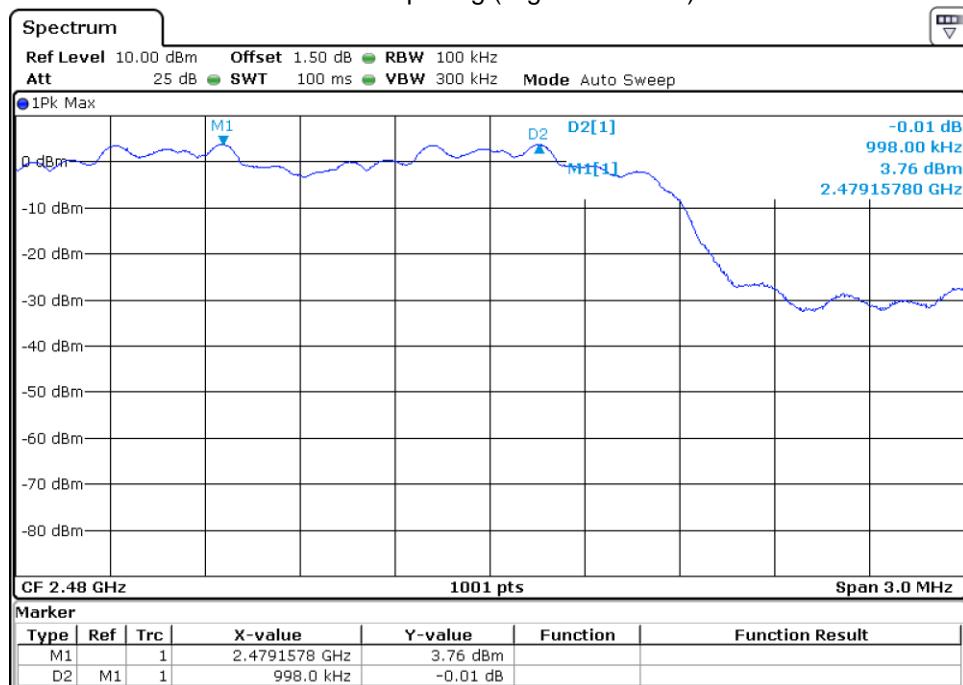
Channel Spacing (Low CH=1MHz)



Channel Spacing (Middle CH=1MHz)



Channel Spacing (High CH=1MHz)

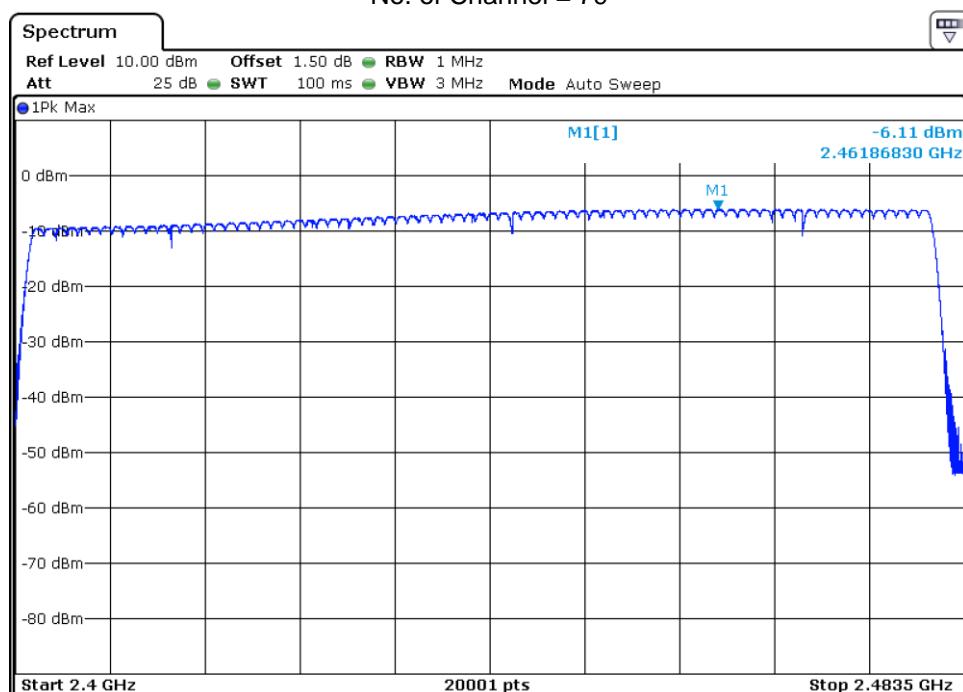


## 7. Number of Hopping Frequency

### 7.1 Test Data

GFSK

No. of Channel = 79



## 8. Time of Occupancy

### 8.1 Test Data

The dwell time within a period in data mode is independent from the packet type (packet length).  
 Test data is corrected with the worse case, which the packet length is DH1, DH3, and DH5.

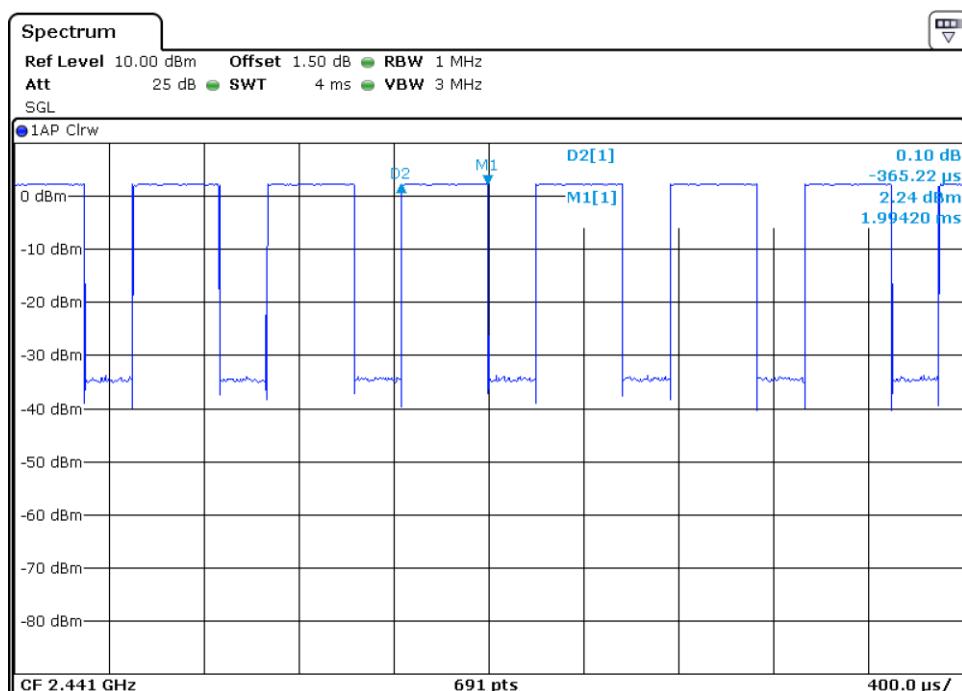
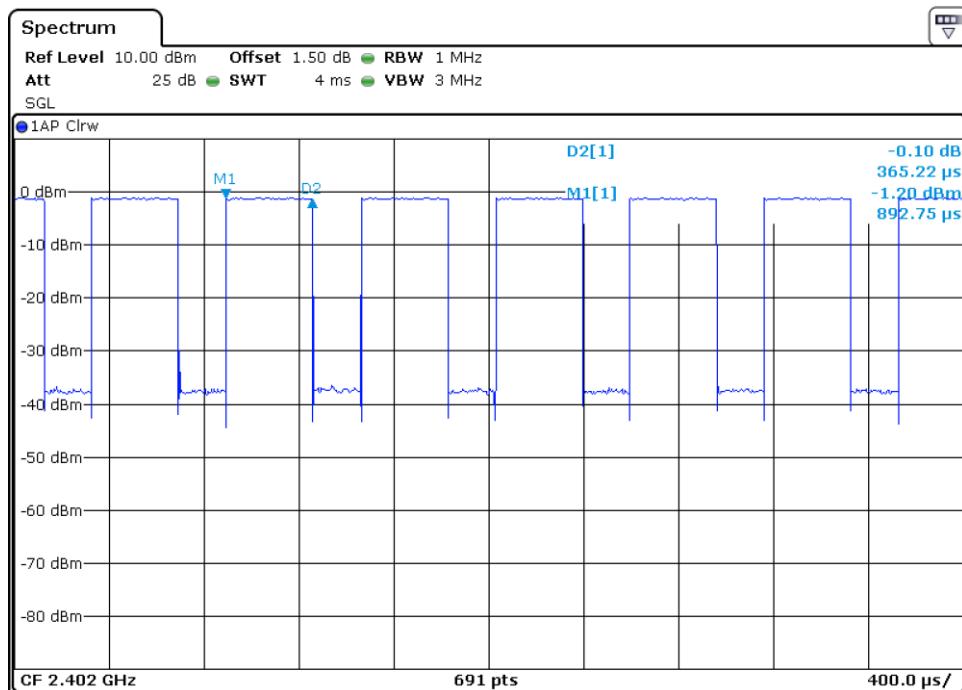
The test period:  $T = 0.4 \text{ Second} * 79 \text{ Channel} = 31.6 \text{ s}$

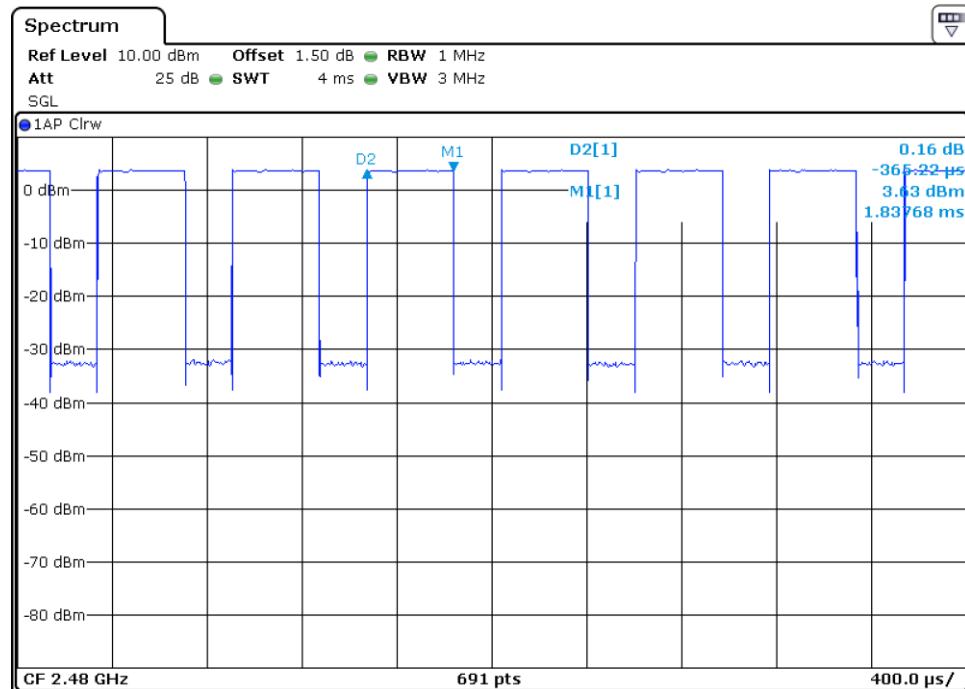
Dwell time = time slot length \* (Hopping rate / Number of hopping channels) \* Period

Modulation	Test Channel	Packet	Time Slot Length (ms)	Dwell Time (ms)	Limit (ms)
GFSK	2402MHz	DH1	0.36522	116.87	400
		DH3	0.36522	116.87	400
		DH5	0.36522	116.87	400
	2441MHz	DH1	1.6319	261.104	400
		DH3	1.6420	262.72	400
		DH5	1.6217	259.472	400
	2480MHz	DH1	2.8594	305.003	400
		DH3	2.8594	305.003	400
		DH5	2.8594	305.003	400
8DPSK	2402MHz	3DH1	0.384	122.88	400
		3DH3	0.384	122.88	400
		3DH5	0.380	121.60	400
	2441MHz	3DH1	1.624	259.84	400
		3DH3	1.624	259.84	400
		3DH5	1.617	258.72	400
	2480MHz	3DH1	2.8594	305.003	400
		3DH3	2.8739	306.549	400
		3DH5	2.8739	306.549	400

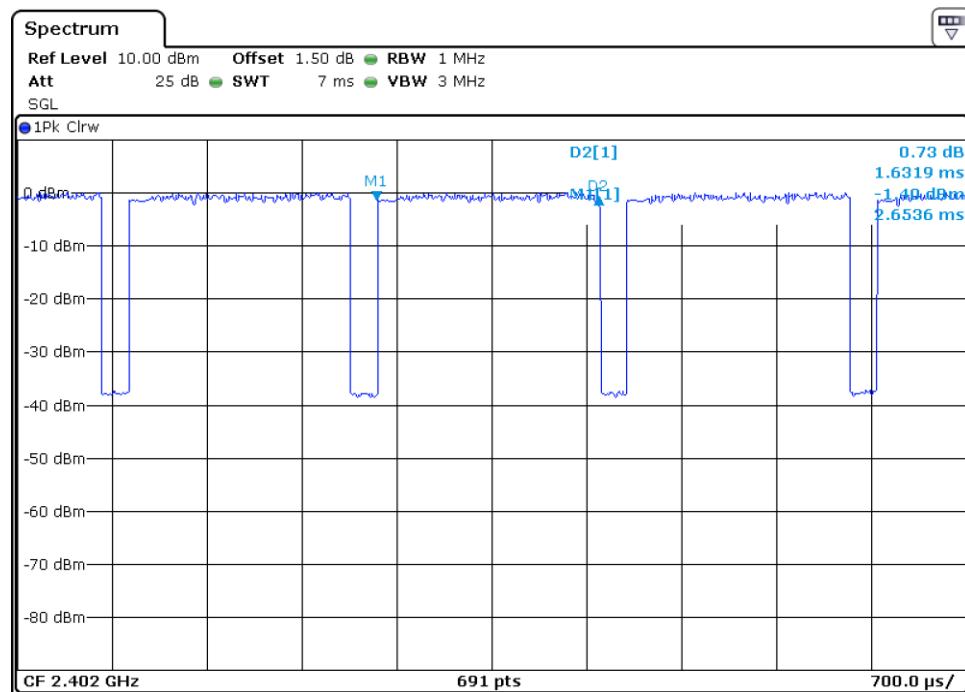
## 8.2 Test Plots

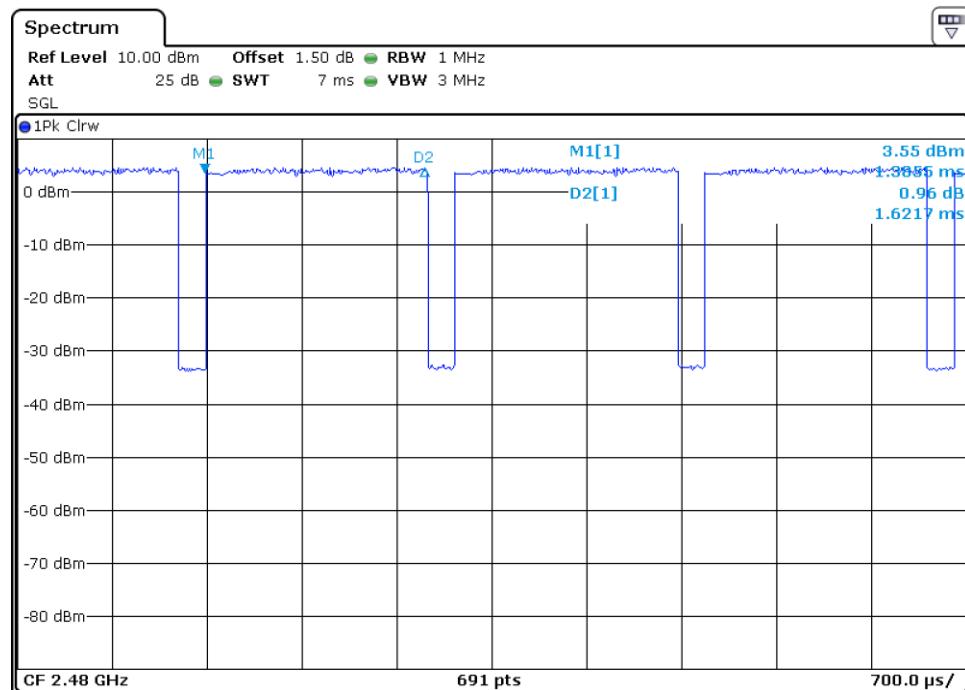
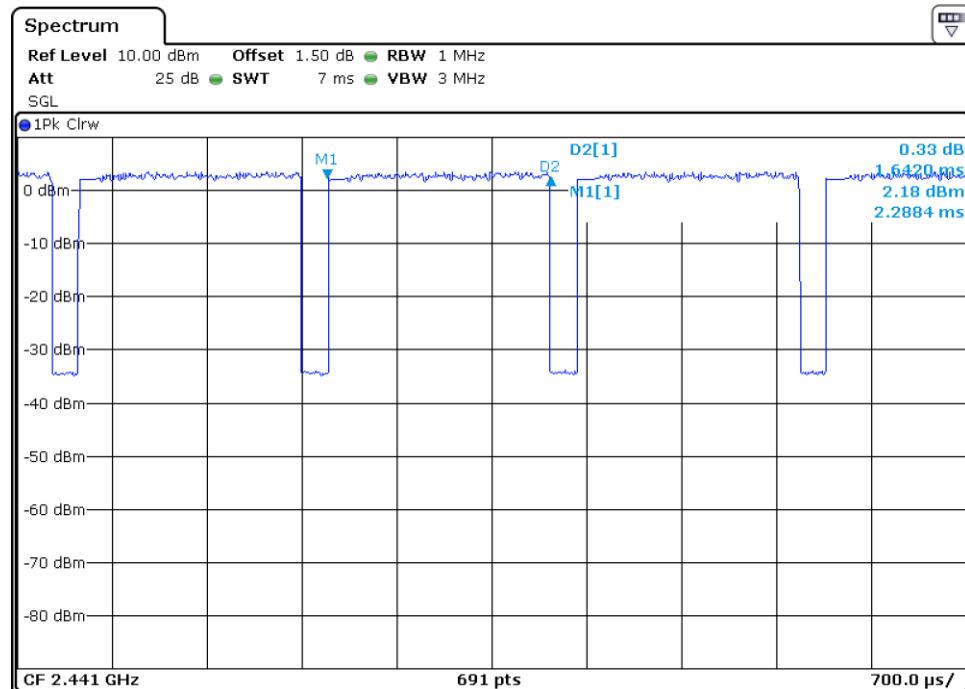
DH1 time slot (Low, Middle, High Channels)



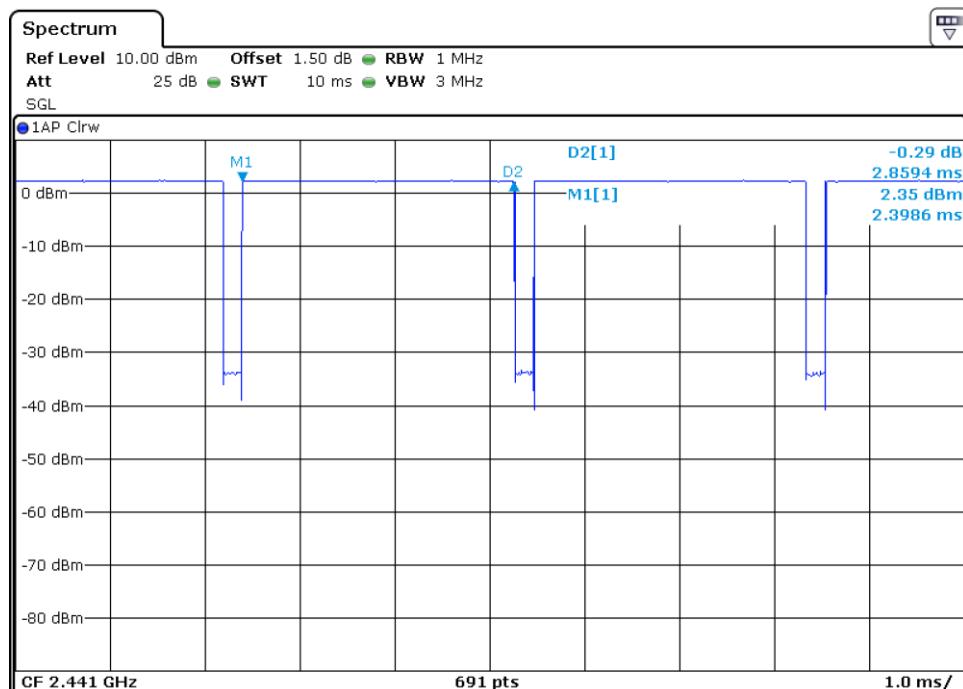
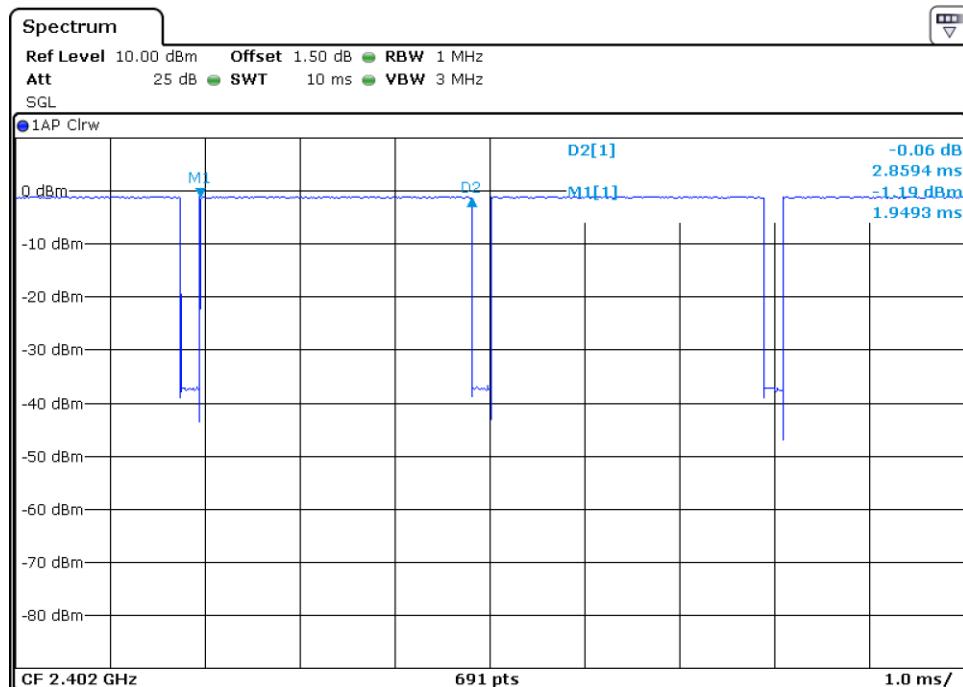


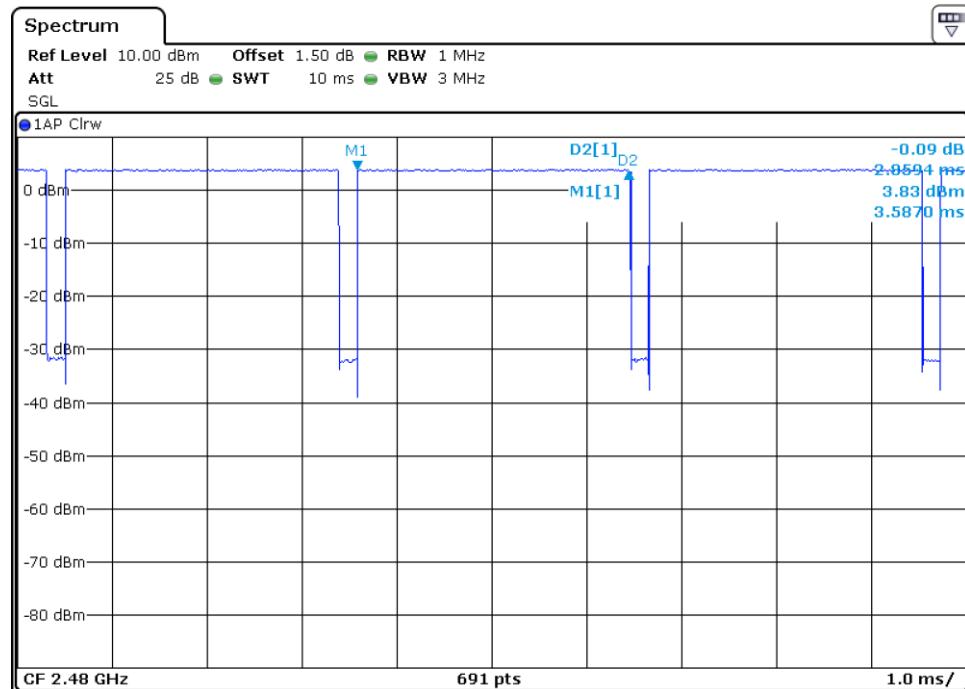
DH3 time slot (Low, Middle, High Channels)



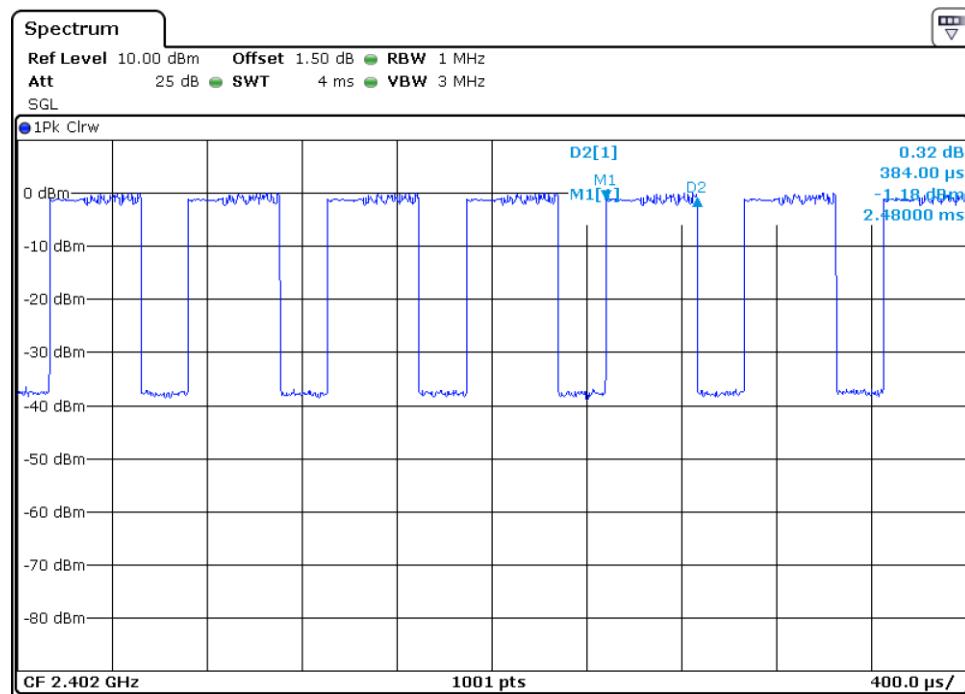


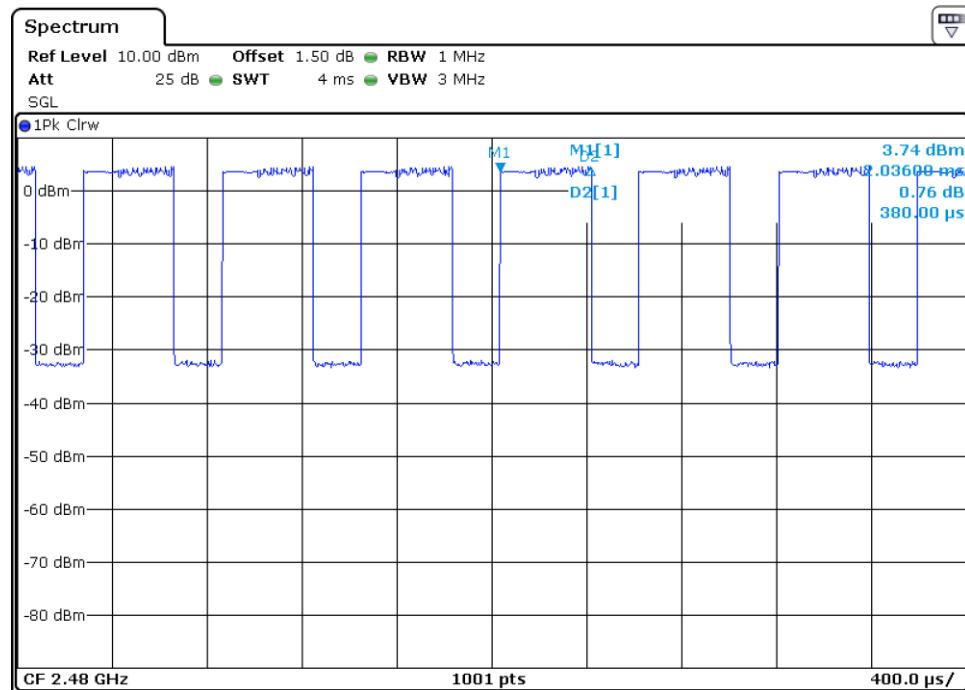
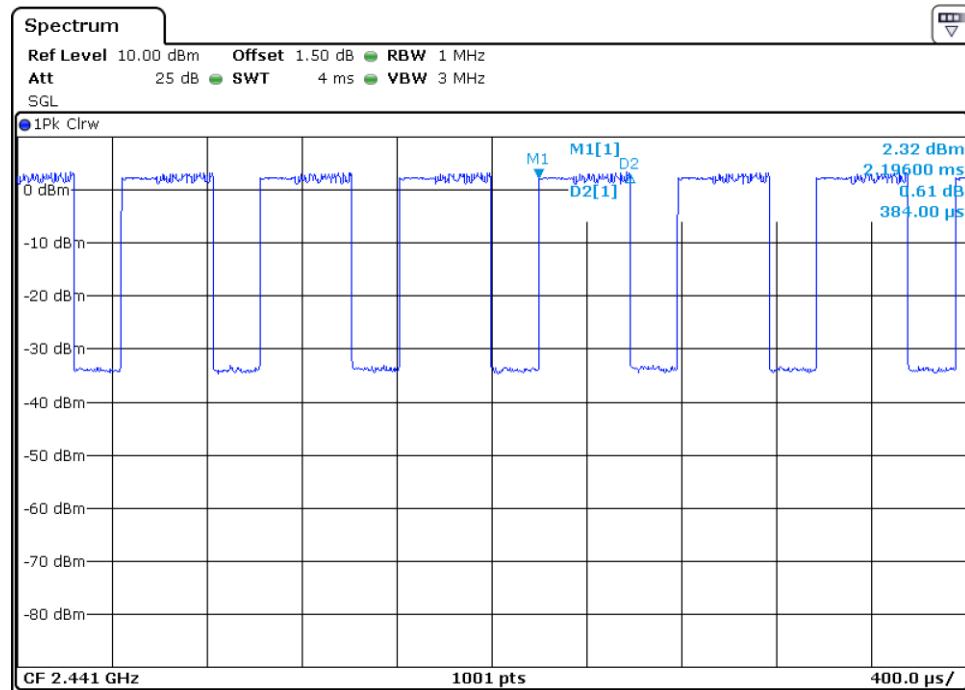
DH5 time slot (Low, Middle, High Channels)



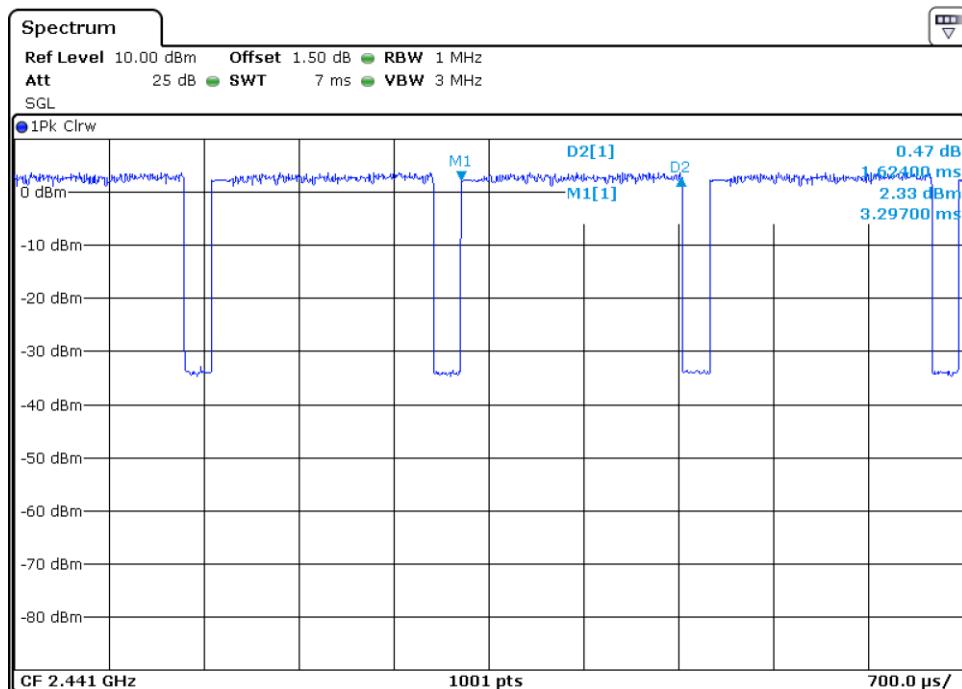
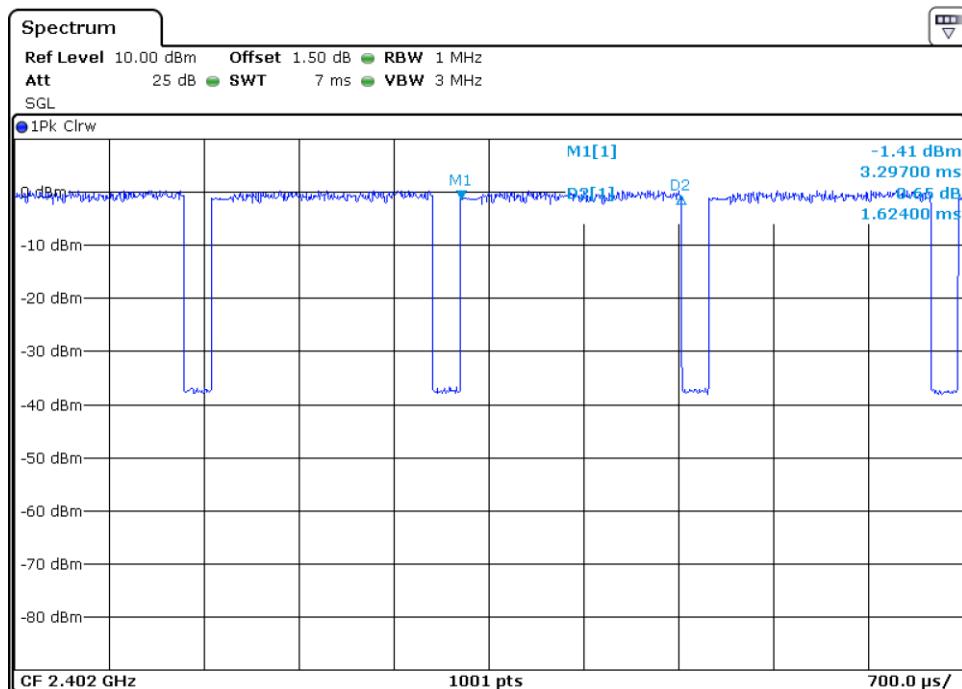


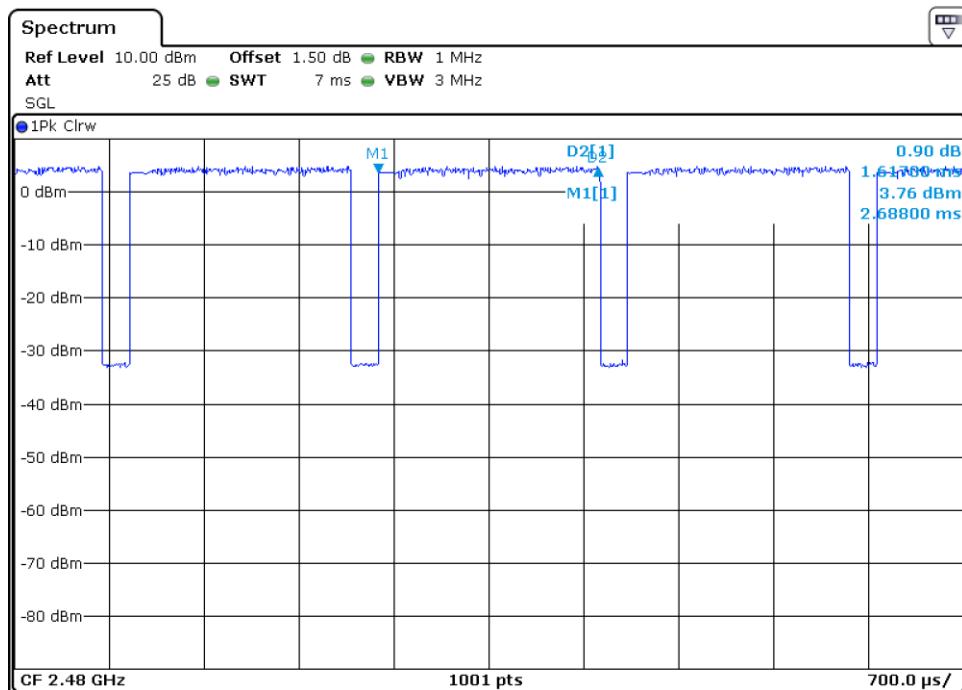
3DH1 time slot (Low, Middle, High Channels)



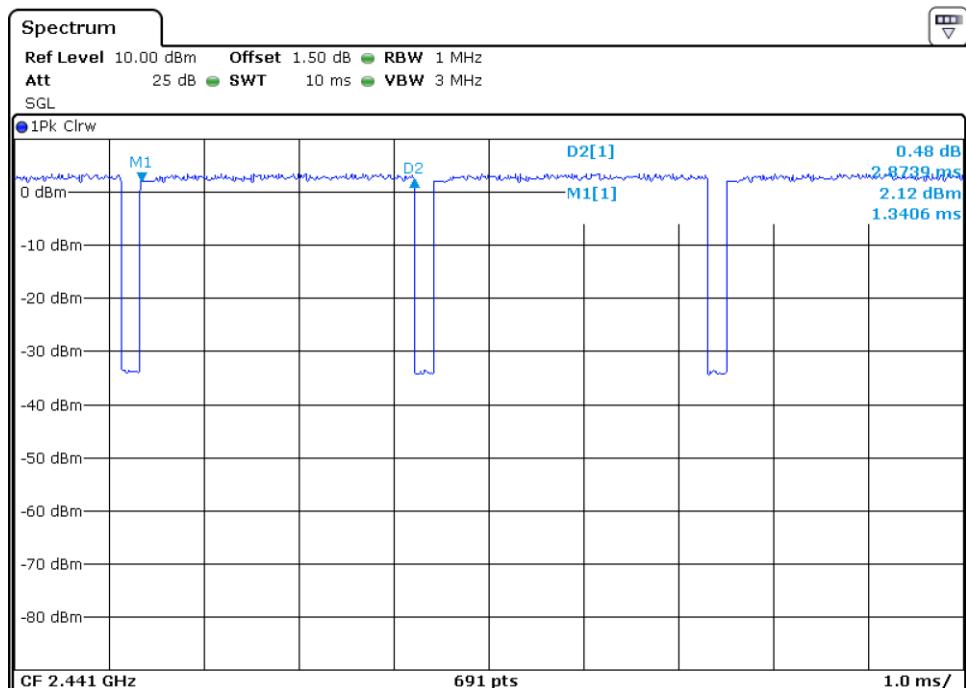
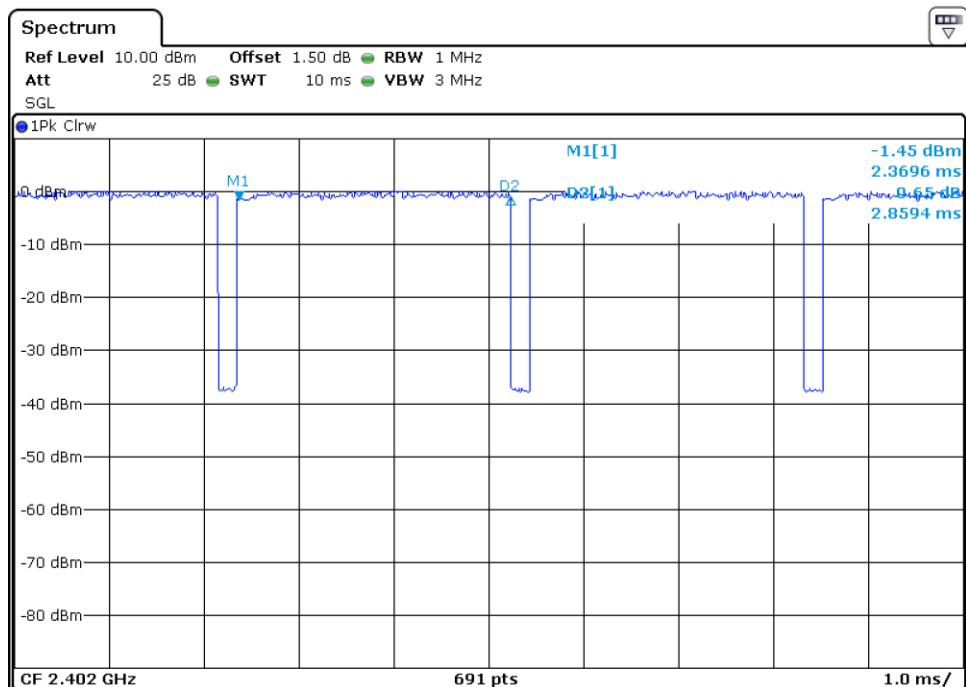


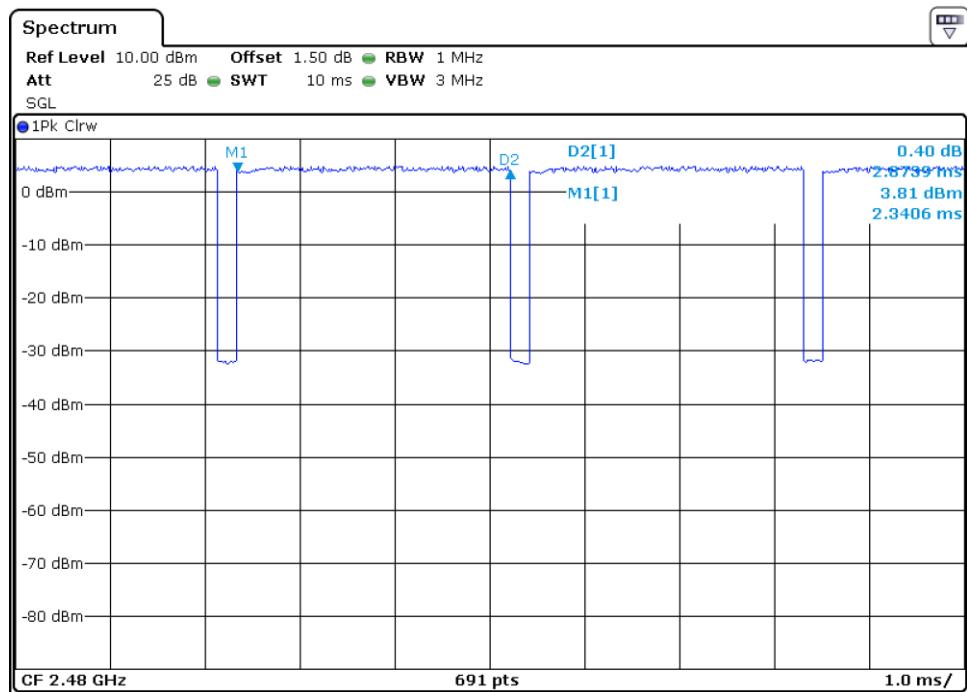
3DH3 time slot (Low, Middle, High Channels)





3DH5 time slot (Low, Middle, High Channels)

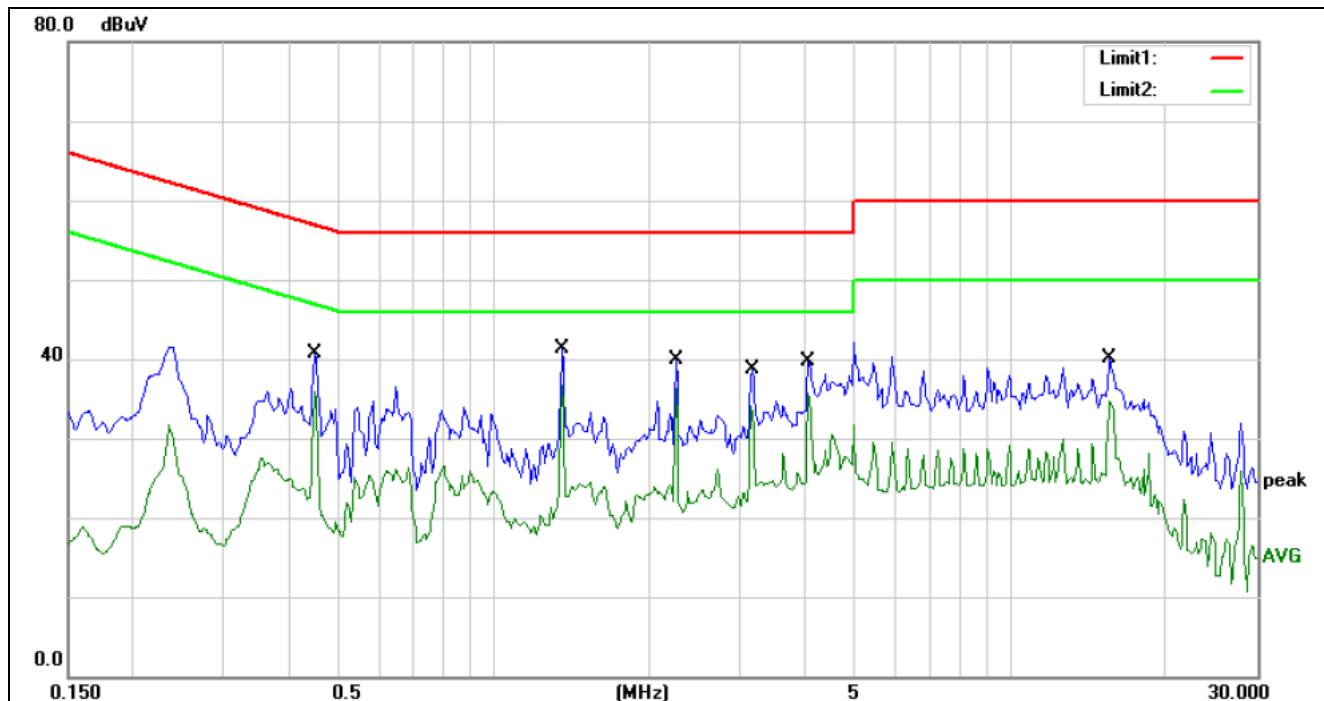




## 9. Conducted Emissions on AC Mains

### 9.1 Test Data

EUT:	Bluetooth Stereo Speaker with Powerbank
Tested Model:	NS-SPBTBRICK-SB
Operating Condition:	BT Transmitting
Line:	Neutral



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
1		0.4500	40.74	0.00	40.74	56.88	-16.14	QP	
2		0.4500	35.88	0.00	35.88	46.88	-11.00	AVG	
3		1.3550	41.32	0.00	41.32	56.00	-14.68	QP	
4	*	1.3550	36.63	0.00	36.63	46.00	-9.37	AVG	
5		2.2550	39.82	0.00	39.82	56.00	-16.18	QP	
6		2.2550	36.32	0.00	36.32	46.00	-9.68	AVG	
7		3.1550	37.80	0.00	37.80	56.00	-18.20	QP	
8		3.1550	34.19	0.00	34.19	46.00	-11.81	AVG	
9		4.0650	39.62	0.00	39.62	56.00	-16.38	QP	
10		4.0650	35.69	0.00	35.69	46.00	-10.31	AVG	
11		15.4800	40.08	0.00	40.08	60.00	-19.92	QP	
12		15.4800	34.67	0.00	34.67	50.00	-15.33	AVG	

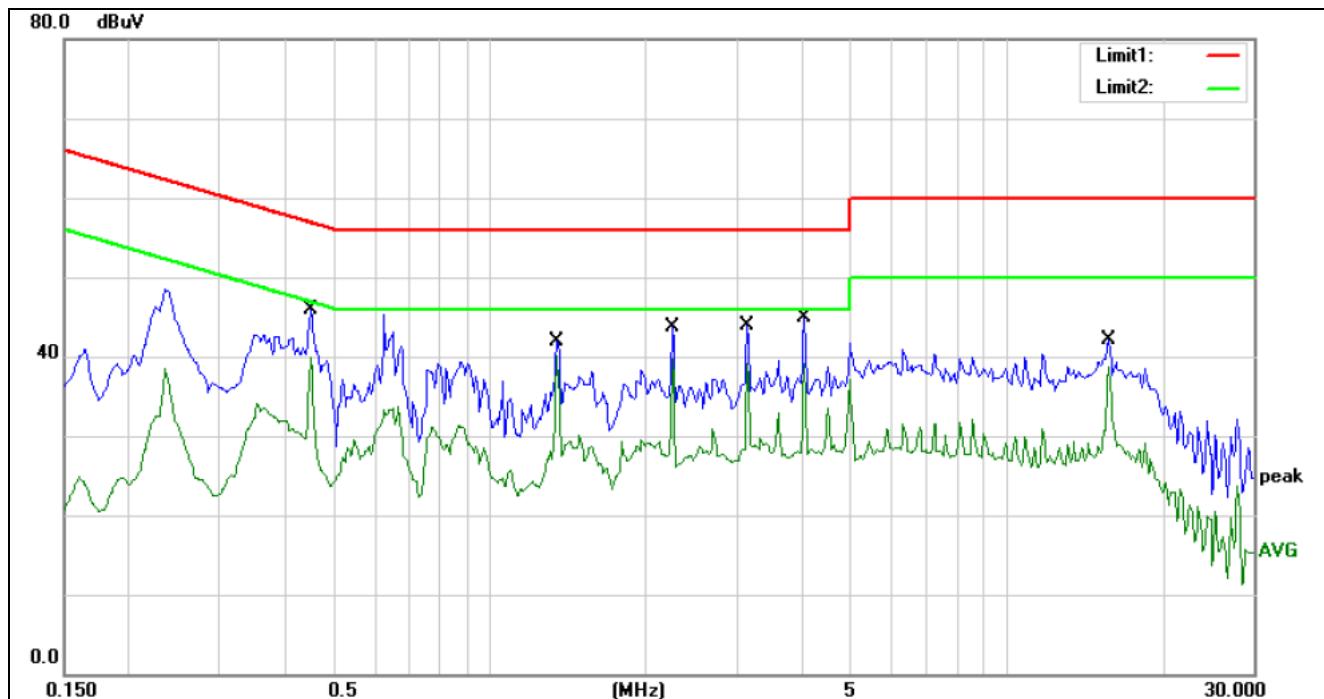
Appendix A  
**50090617 002**



Produkte  
*Products*

Page 56 of 56

*Line:* **Live**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dB	Over Detector	Comment
1		0.4500	45.93	0.00	45.93	56.88	-10.95	QP
2		0.4500	40.00	0.00	40.00	46.88	-6.88	Avg
3		1.3500	41.88	0.00	41.88	56.00	-14.12	QP
4	*	1.3500	40.17	0.00	40.17	46.00	-5.83	Avg
5		2.2550	43.73	0.00	43.73	56.00	-12.27	QP
6		2.2550	39.75	0.00	39.75	46.00	-6.25	Avg
7		3.1500	43.82	0.00	43.82	56.00	-12.18	QP
8		3.1500	39.12	0.00	39.12	46.00	-6.88	Avg
9		4.0500	44.84	0.00	44.84	56.00	-11.16	QP
10		4.0500	39.02	0.00	39.02	46.00	-6.98	Avg
11		15.7200	42.09	0.00	42.09	60.00	-17.91	QP
12		15.7200	38.77	0.00	38.77	50.00	-11.23	Avg