

Appendix

Bluetooth

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1 Equipment List

Conducted Emission					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date	Cal.Duedate
				(yyyy-mm-dd)	(yyyy-mm-dd)
Shielding Room	ZhongYu Electron	GB-88	SEM001-06	2017/5/10	2020/5/9
LISN	Rohde & Schwarz	ENV216	SEM007-01	2018/9/2	2019/9/2
LISN	ETS-LINDGREN	Feb-16	SEM007-02	2018/4/2	2019/4/1
				2019/4/1	2020/3/31
Measurement Software	AUDIX	e3 V5.4.1221d	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM024-01	2018/7/12	2019/7/11
2 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T2-02	EMC0122	2019/2/11	2020/2/10
EMI Test Receiver	Rohde & Schwarz	ESCI	SEM004-02	2019/3/2	2020/3/1
RF conducted test					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date	Cal.Duedate
				(yyyy-mm-dd)	(yyyy-mm-dd)
DC Power Supply	Agilent Technologies Inc	66311B	W009-09	2018/9/15	2019/9/15
Signal Analyzer	Rohde & Schwarz	FSV	W025-05	2019/1/13	2020/1/12
Coaxial Cable	SGS	N/A	SEM031-01	2018/7/13	2019/7/12
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2018/9/2	2019/9/2
Temperature Chamber	GIANT FORCE	ICT-150-40-CP-AR	W027-03	2018/11/27	2019/11/27
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2018/9/2	2019/9/2

2 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Total RF power, conducted	±0.75dB
2	RF power density, conducted	±2.84dB
3	Spurious emissions, conducted	±0.75dB
4	Conduct emission test	±3.12 dB (9KHz- 30MHz)

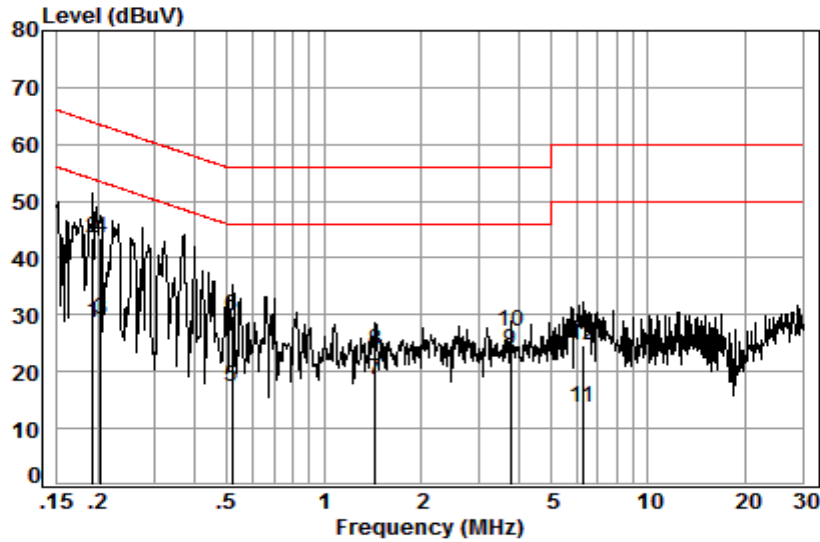
3 AC Power Line Conducted Emissions

Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

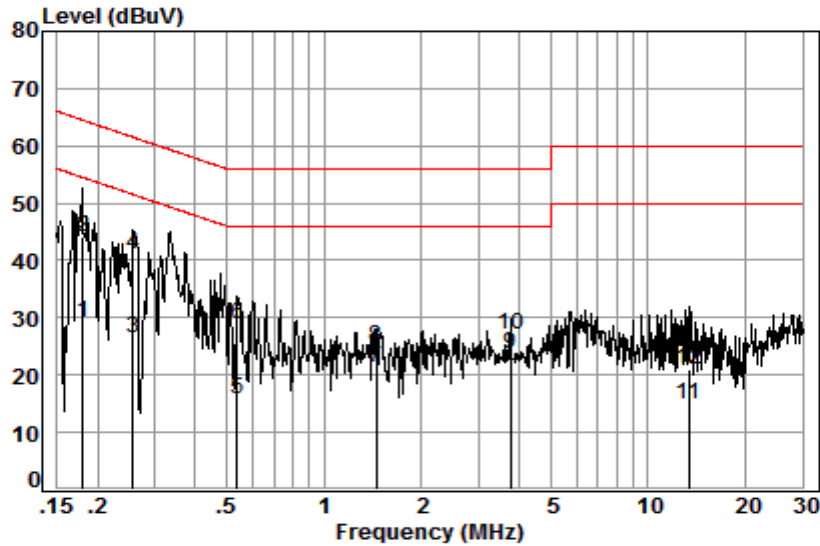
Live line:



Site : Shielding Room
Condition: Line
Job No. : 11707CR
Test mode: b

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.19	0.02	9.66	18.94	28.62	53.89	-25.27	Average
2	0.19	0.02	9.66	33.94	43.62	63.89	-20.27	QP
3	0.20	0.02	9.66	19.46	29.14	53.45	-24.31	Average
4	0.20	0.02	9.66	33.89	43.57	63.45	-19.88	QP
5	0.52	0.06	9.67	7.46	17.19	46.00	-28.81	Average
6	0.52	0.06	9.67	20.08	29.81	56.00	-26.19	QP
7	1.44	0.13	9.73	8.77	18.63	46.00	-27.37	Average
8	1.44	0.13	9.73	13.72	23.58	56.00	-32.42	QP
9	3.76	0.16	9.72	13.73	23.61	46.00	-22.39	Average
10	3.76	0.16	9.72	17.11	26.99	56.00	-29.01	QP
11	6.29	0.17	9.77	3.78	13.72	50.00	-36.28	Average
12	6.29	0.17	9.77	14.78	24.72	60.00	-35.28	QP

Neutral line:



Site : Shielding Room
Condition: Neutral
Job No. : 11707CR
Test mode: b

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.18	0.02	9.64	19.60	29.26	54.50	-25.24	Average
2	0.18	0.02	9.64	34.33	43.99	64.50	-20.51	QP
3	0.26	0.03	9.64	16.87	26.54	51.51	-24.97	Average
4	0.26	0.03	9.64	31.32	40.99	61.51	-20.52	QP
5	0.54	0.06	9.64	6.13	15.83	46.00	-30.17	Average
6	0.54	0.06	9.64	19.22	28.92	56.00	-27.08	QP
7	1.45	0.13	9.70	11.43	21.26	46.00	-24.74	Average
8	1.45	0.13	9.70	15.09	24.92	56.00	-31.08	QP
9	3.76	0.16	9.69	14.01	23.86	46.00	-22.14	Average
10	3.76	0.16	9.69	17.17	27.02	56.00	-28.98	QP
11	13.34	0.20	10.22	4.35	14.77	50.00	-35.23	Average
12	13.34	0.20	10.22	10.52	20.94	60.00	-39.06	QP

Remarks:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.

4 Conducted Peak Output Power

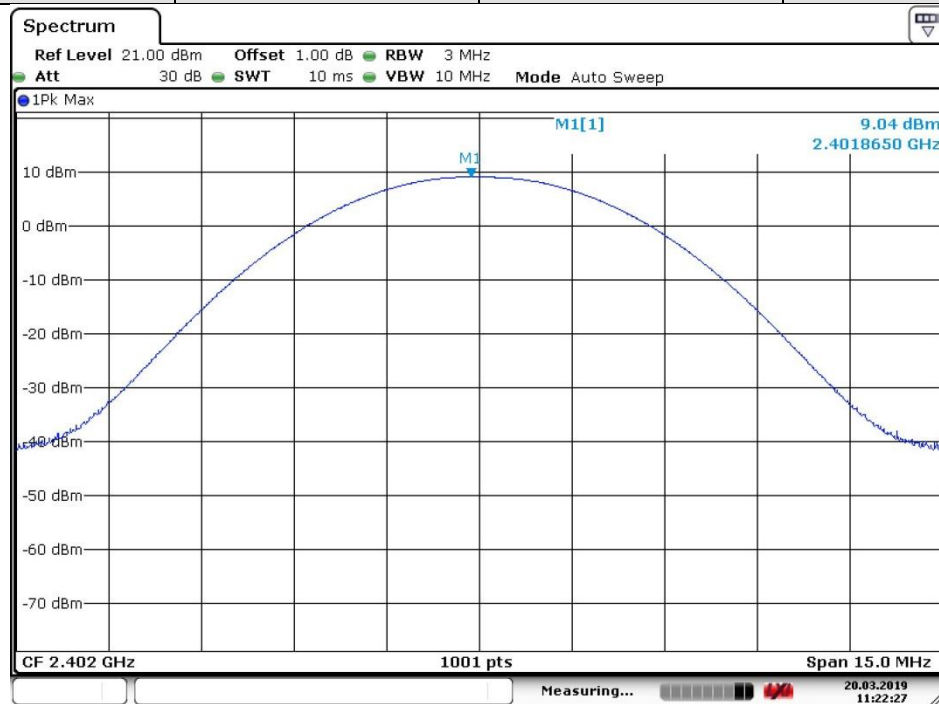
4.1 Test Results

Measurement Data of Peak power:

GFSK mode			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	9.04	20.97	Pass
Middle	8.79	20.97	Pass
Highest	8.36	20.97	Pass
$\pi/4$ DQPSK mode			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	9.94	20.97	Pass
Middle	9.67	20.97	Pass
Highest	9.32	20.97	Pass
8DPSK mode			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	10.05	20.97	Pass
Middle	9.80	20.97	Pass
Highest	9.47	20.97	Pass

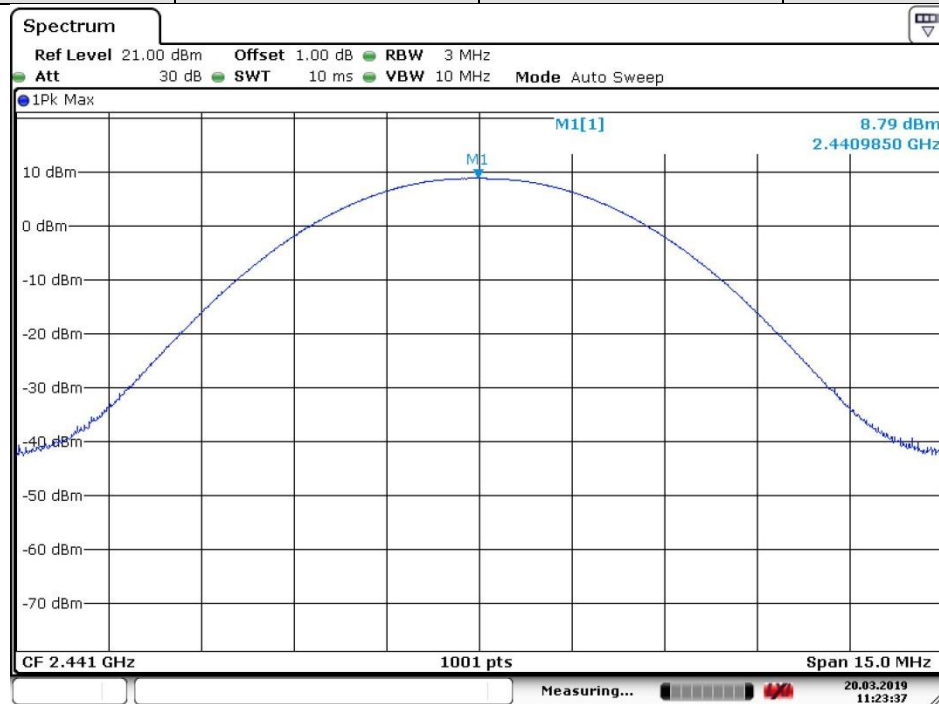
4.2 Test plots

Test mode:	GFSK	Test channel:	Lowest
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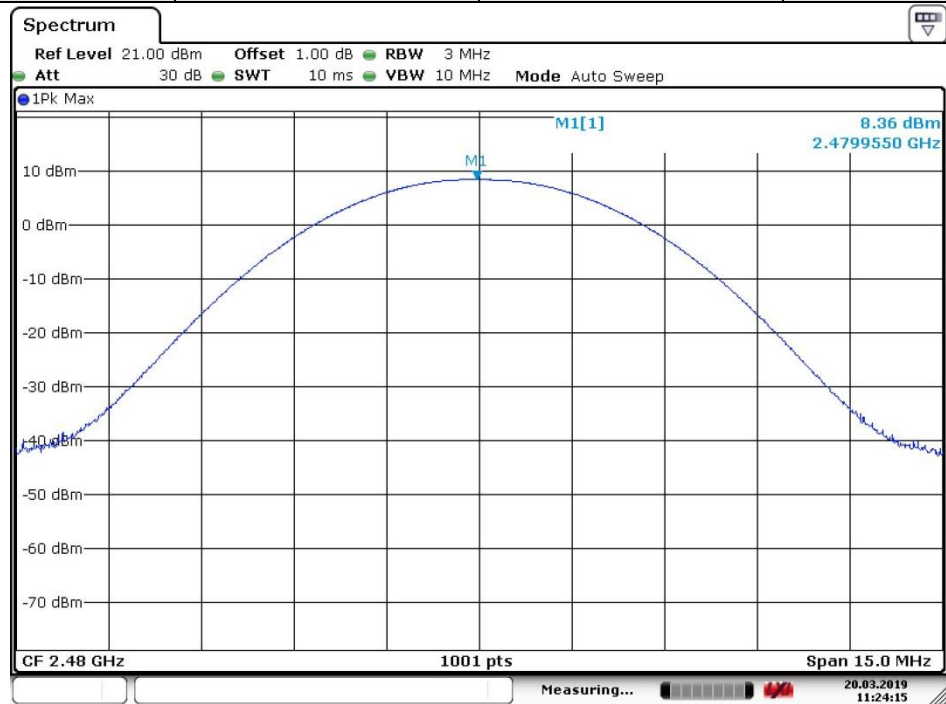
Date: 20.MAR.2019 11:22:28

Test mode:	GFSK	Test channel:	Middle
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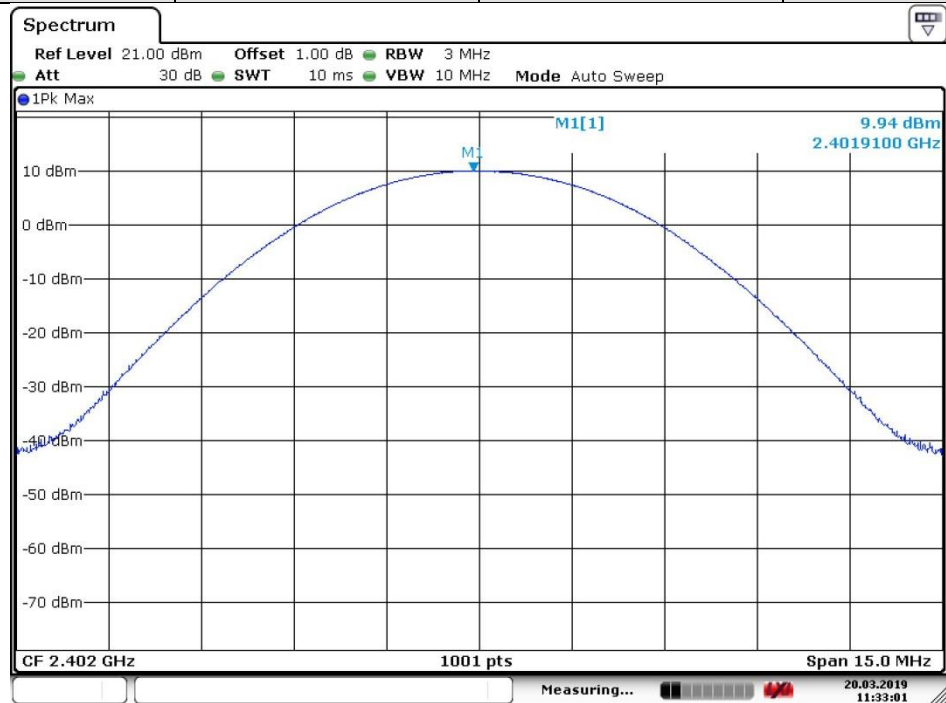
Date: 20.MAR.2019 11:23:38

Test mode:	GFSK	Test channel:	Highest
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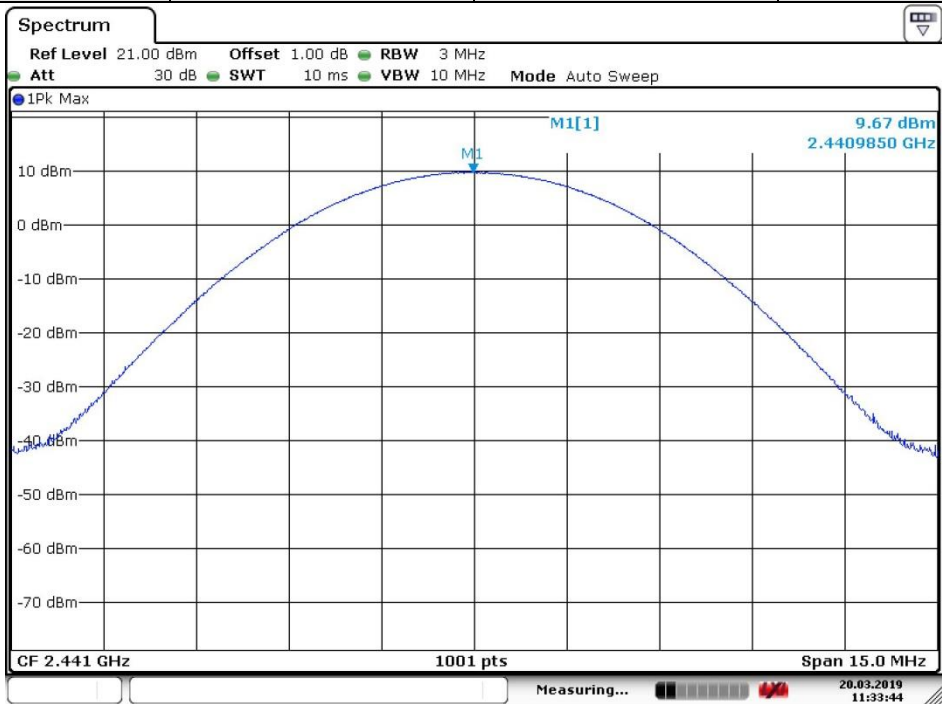
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Test mode:	$\pi/4$ DQPSK	Test channel:	Lowest
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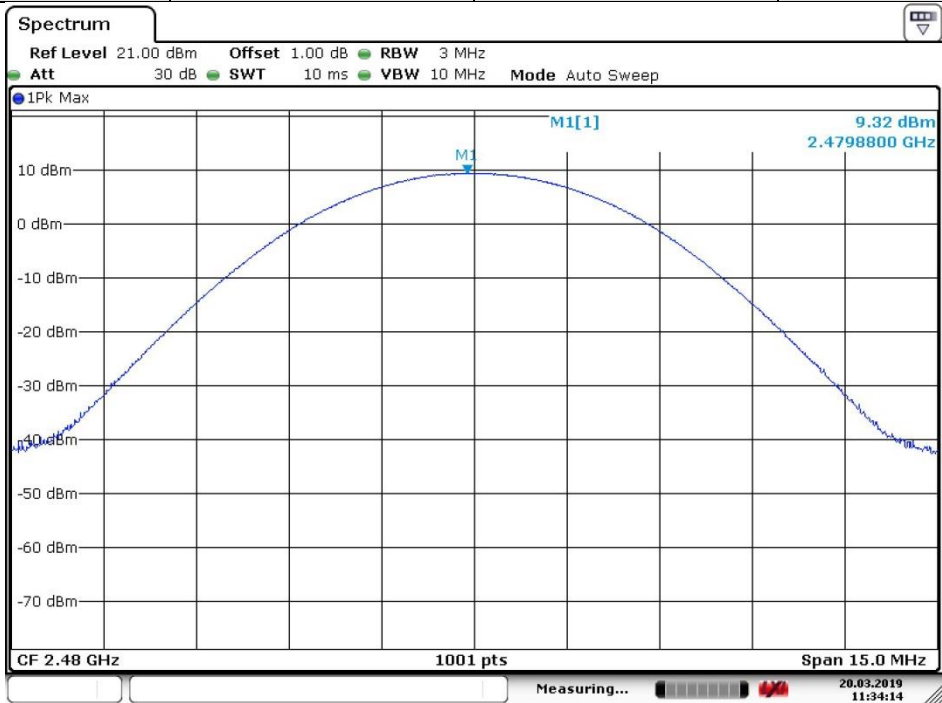
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Test mode:	$\pi/4$ DQPSK	Test channel:	Middle
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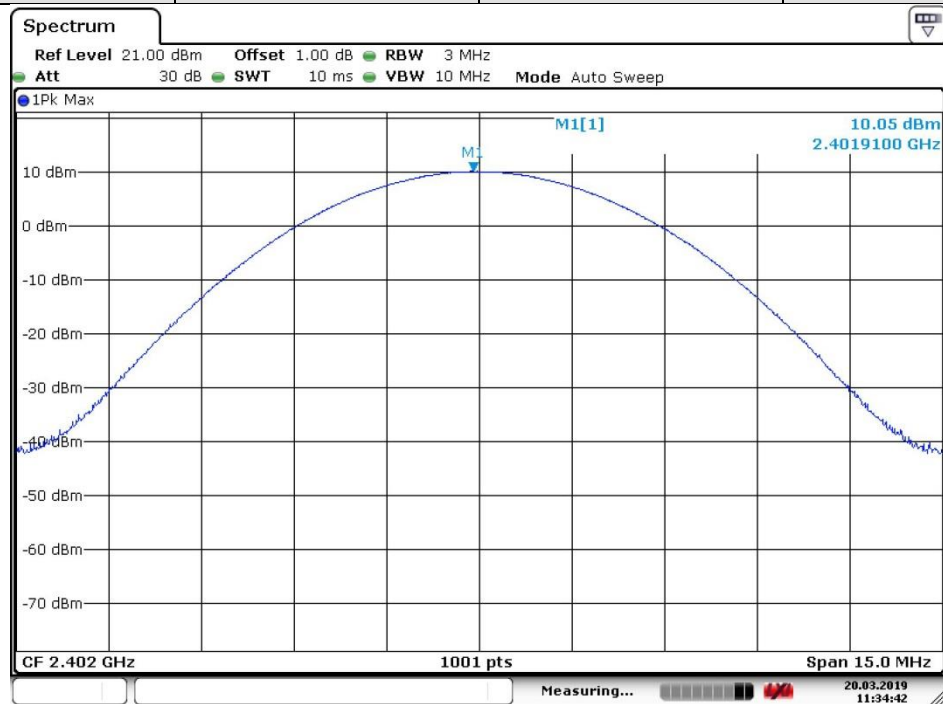
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Test mode:	$\pi/4$ DQPSK	Test channel:	Highest
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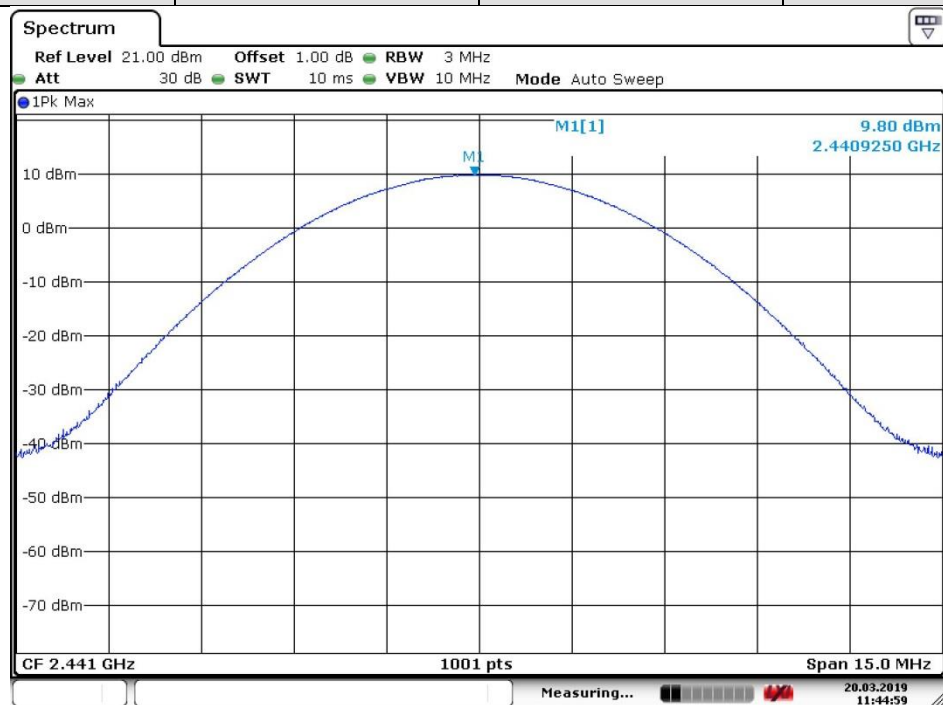
Date: 20.MAR.2019 11:34:14

Test mode:	8DPSK	Test channel:	Lowest
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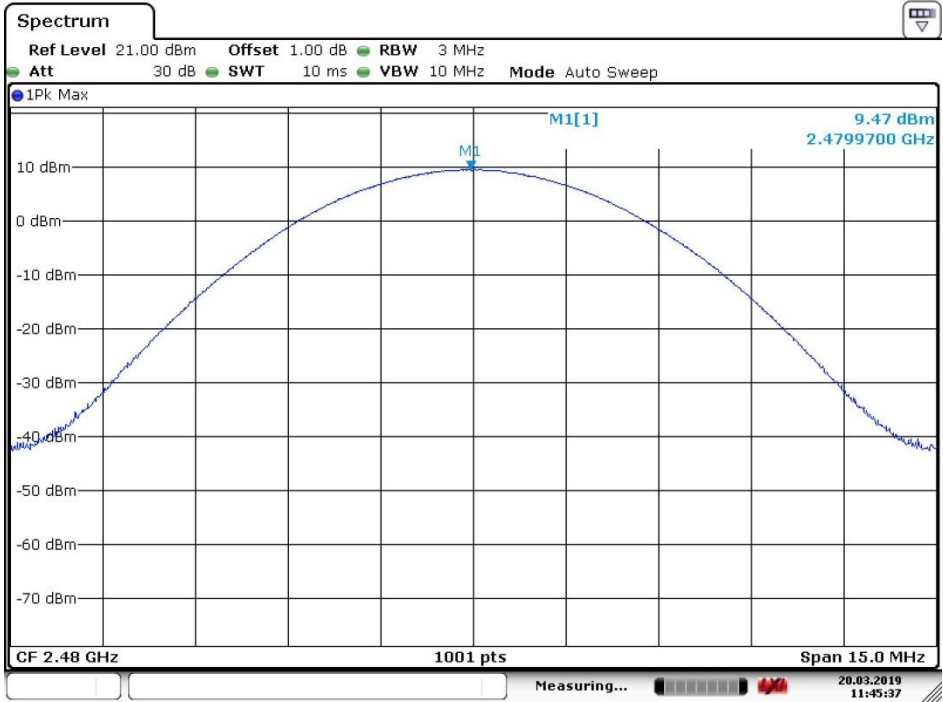
Date: 20.MAR.2019 11:34:43

Test mode:	8DPSK	Test channel:	Middle
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Date: 20.MAR.2019 11:44:59

Test mode:	8DPSK	Test channel:	Highest
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Date: 20.MAR.2019 11:45:36

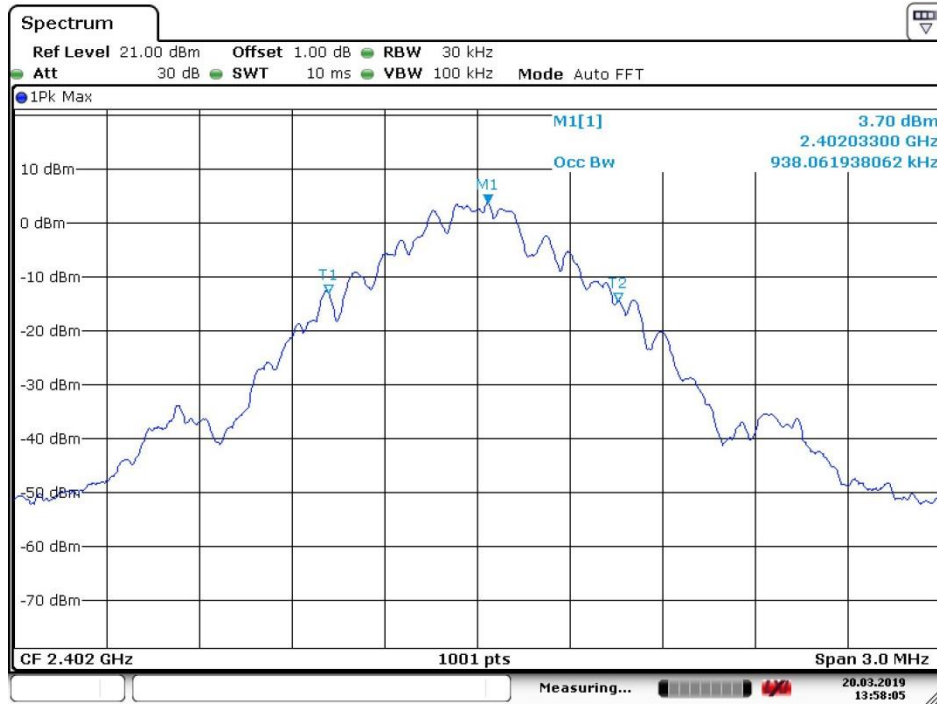
5 20dB Emission Bandwidth & 99% Occupied Bandwidth

5.1 Test Results

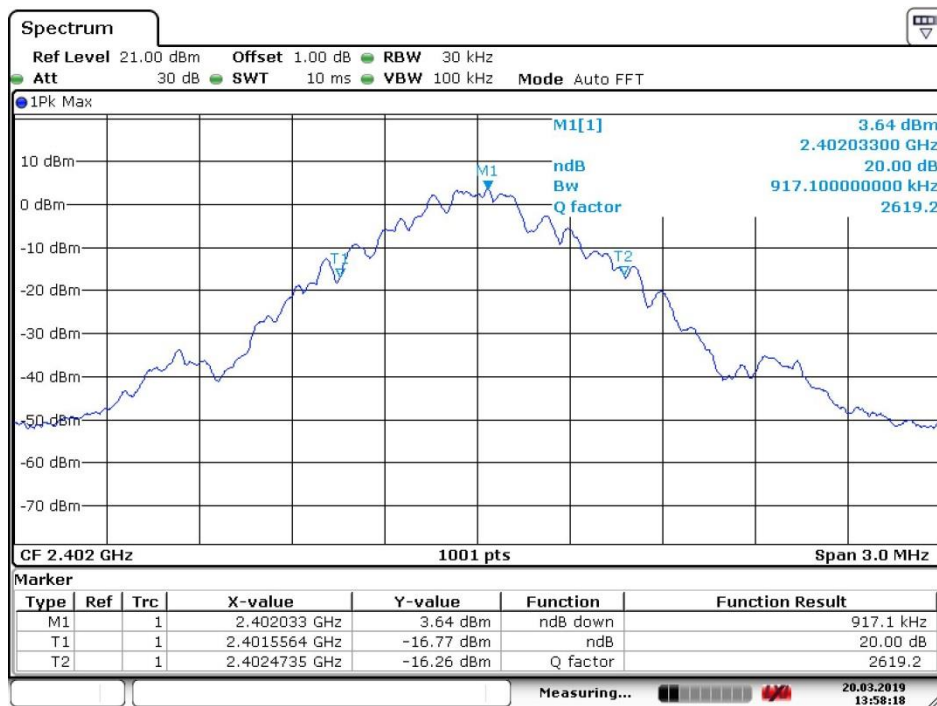
Mode	Test Channel	99% Occupied Bandwidth (KHz)	20dB Emission Bandwidth (KHz)	Result
GFSK	Lowest	938.06	917.1	Pass
	Middle	938.06	920.1	Pass
	Highest	941.06	920.1	Pass
$\pi/4$ DQPSK	Lowest	1219.78	1366.6	Pass
	Middle	1219.78	1366.6	Pass
	Highest	1216.78	1366.6	Pass
8DPSK	Lowest	1207.79	1306.7	Pass
	Middle	1204.80	1306.7	Pass
	Highest	1204.80	1306.7	Pass

5.2 Test plots

GFSK_Lowest Channel

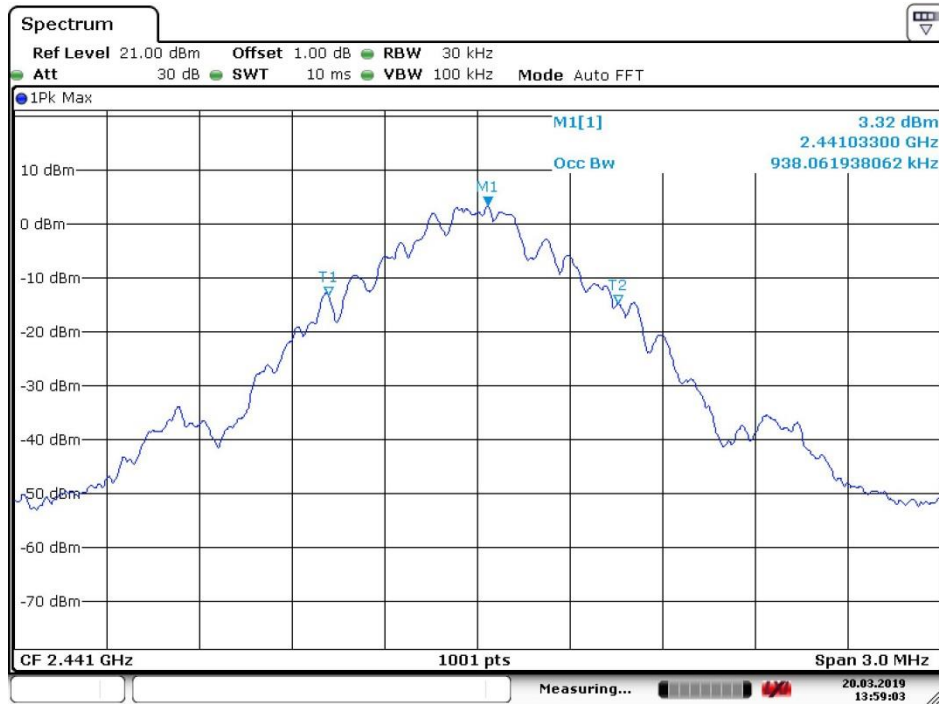


Date: 20.MAR.2019 13:58:05

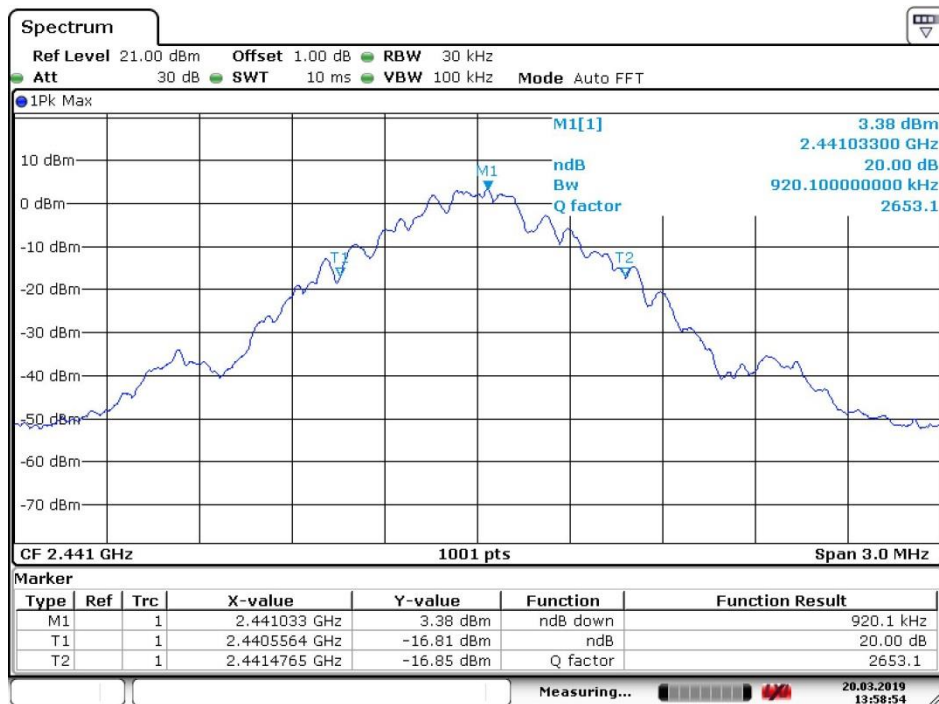


Date: 20.MAR.2019 13:58:19

GFSK_Middle Channel

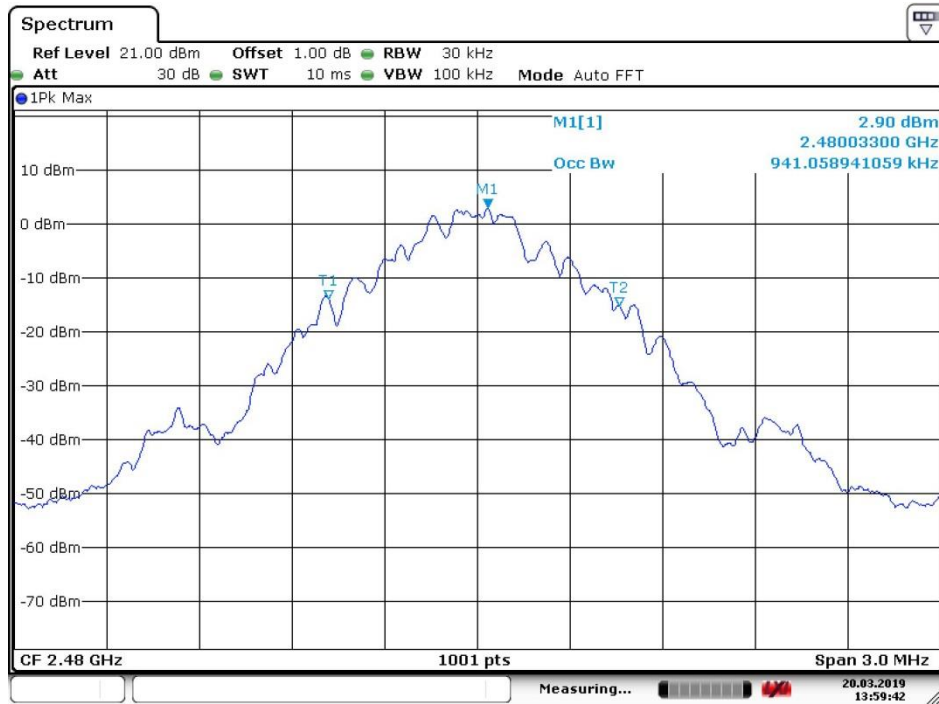


Date: 20.MAR.2019 13:59:04

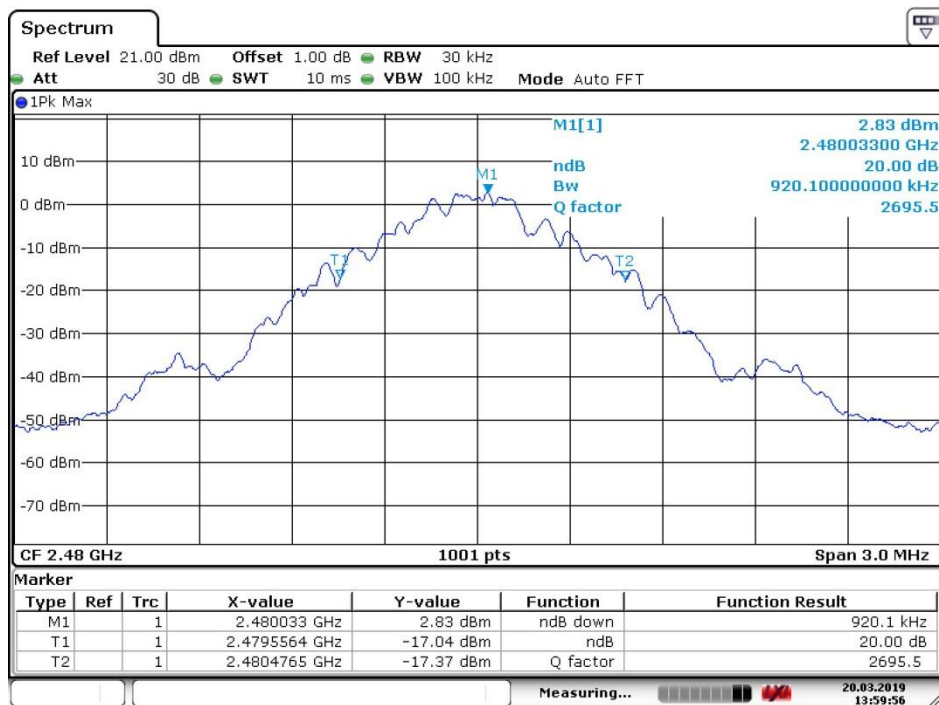


Date: 20.MAR.2019 13:58:54

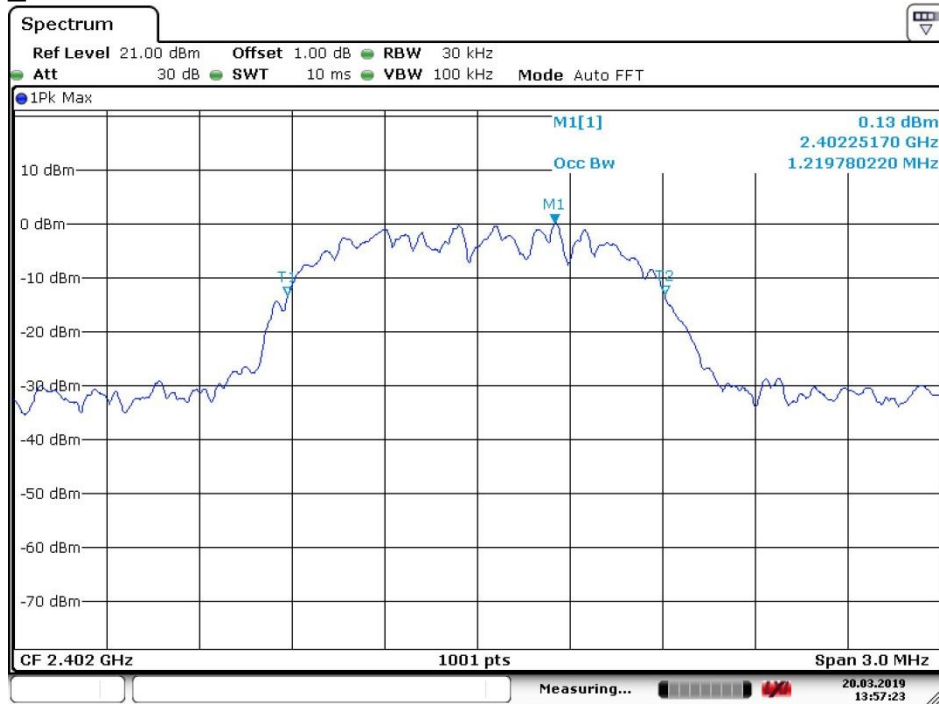
GFSK_Highest Channel



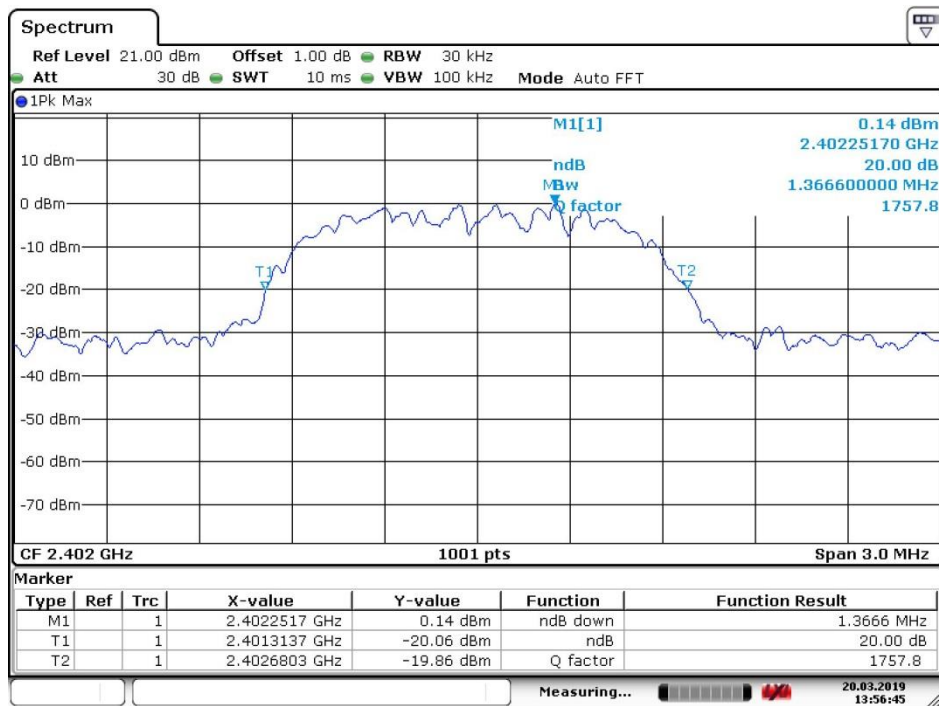
Date: 20.MAR.2019 13:59:42



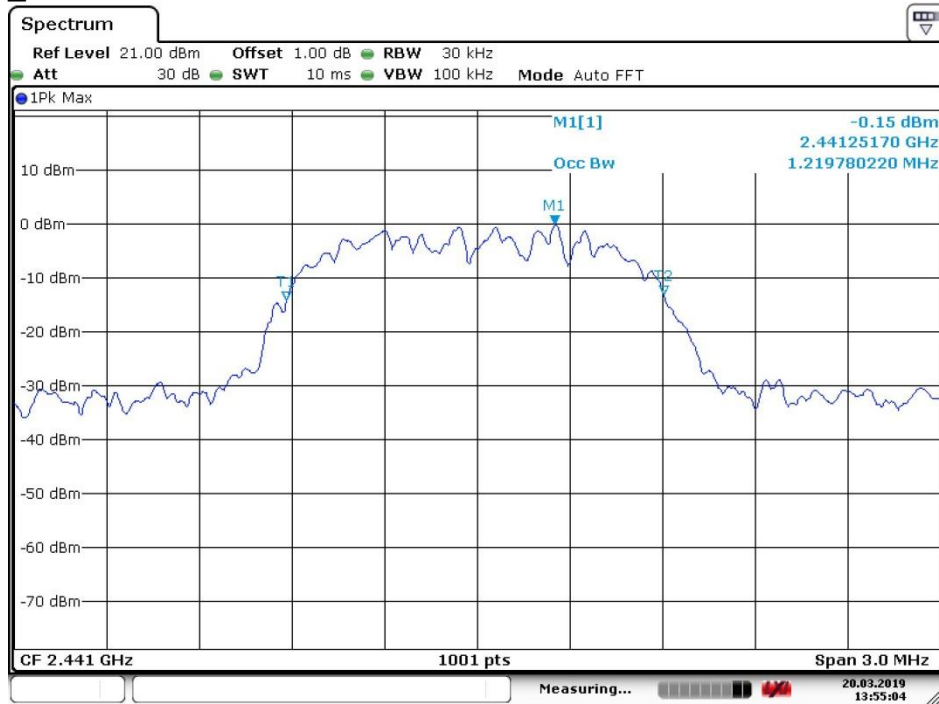
Date: 20.MAR.2019 13:59:56

$\pi/4$ DQPSK Lowest Channel

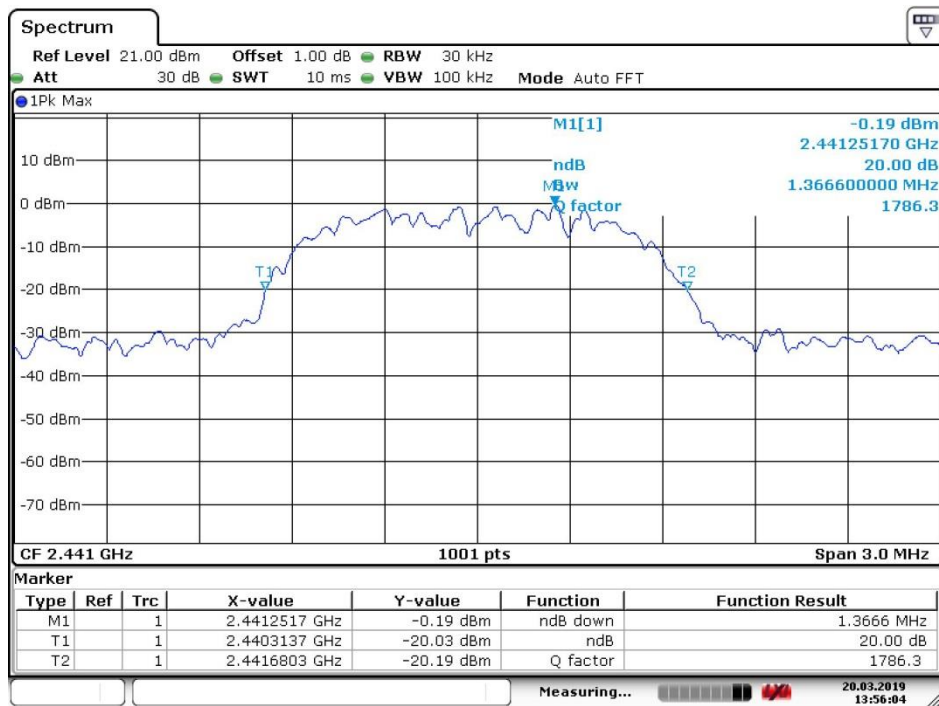
Date: 20.MAR.2019 13:57:23



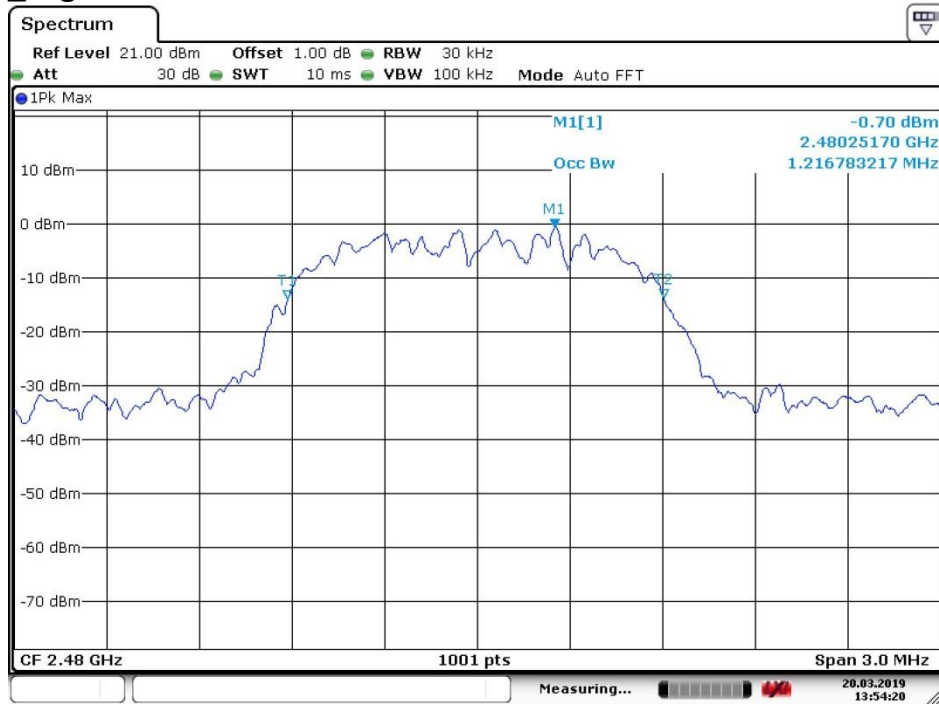
Date: 20.MAR.2019 13:56:46

$\pi/4$ DQPSK_Middle Channel

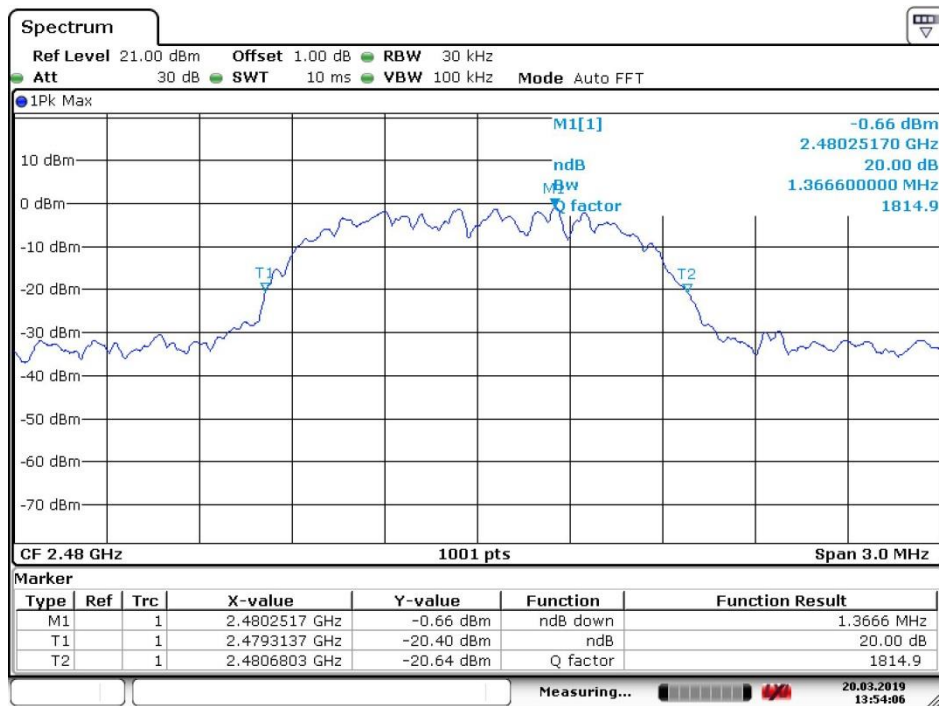
Date: 20.MAR.2019 13:55:04



Date: 20.MAR.2019 13:56:04

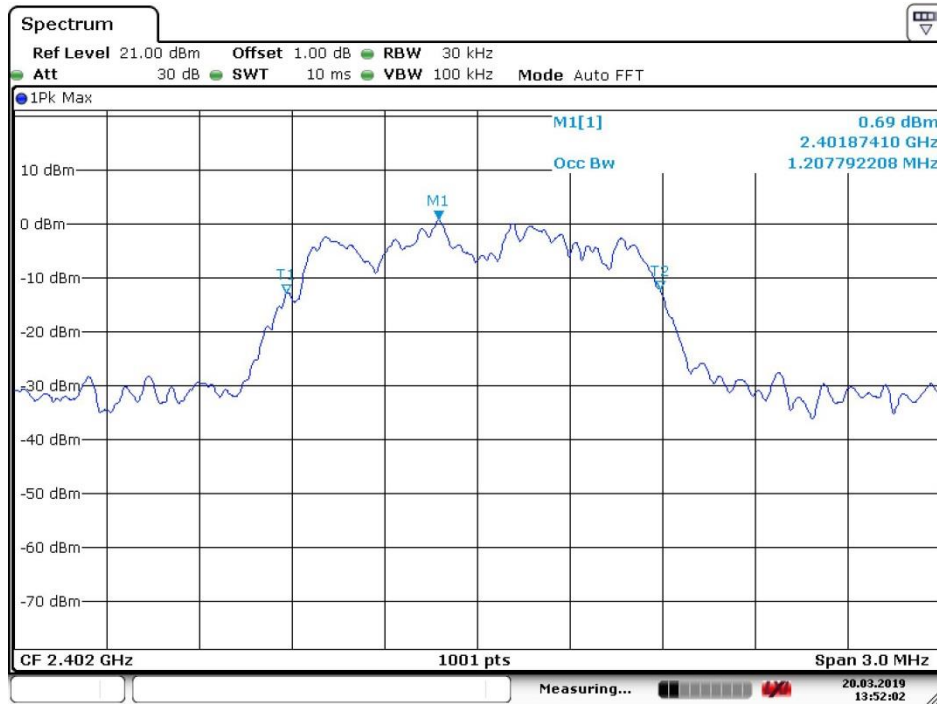
$\pi/4$ DQPSK_Highest Channel

Date: 20.MAR.2019 13:54:21

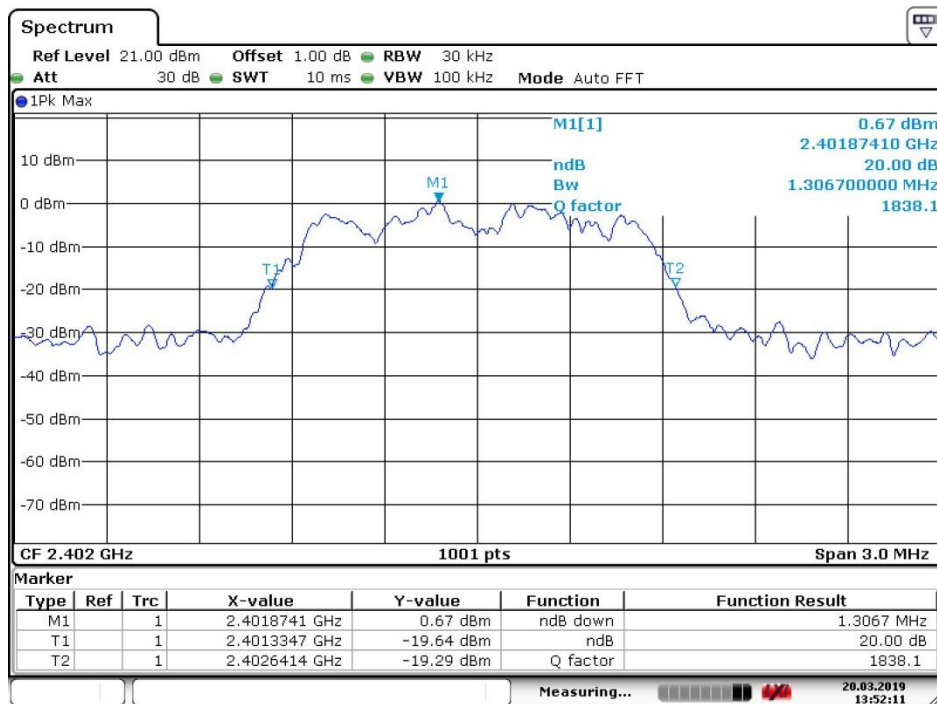


Date: 20.MAR.2019 13:54:06

8DPSK_Lowest Channel

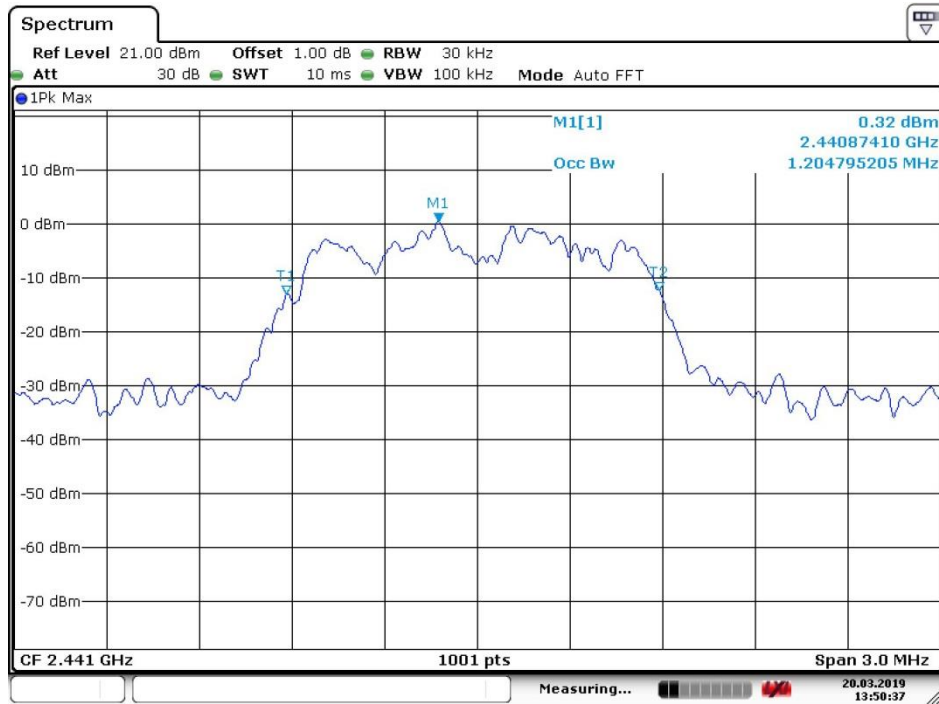


Date: 20.MAR.2019 13:52:02

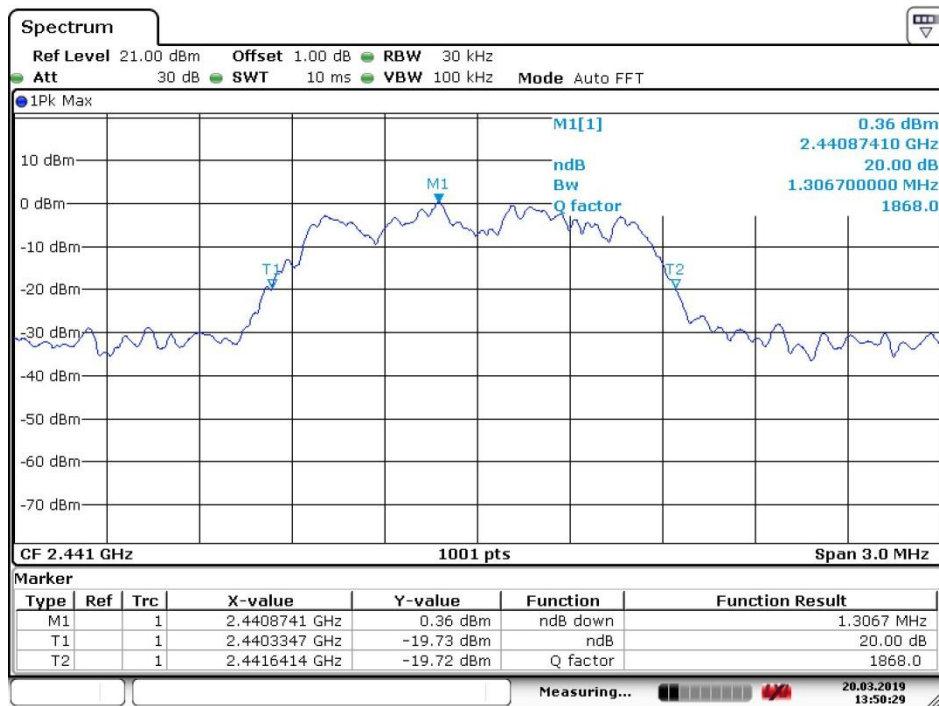


Date: 20.MAR.2019 13:52:12

8DPSK _Middle Channel

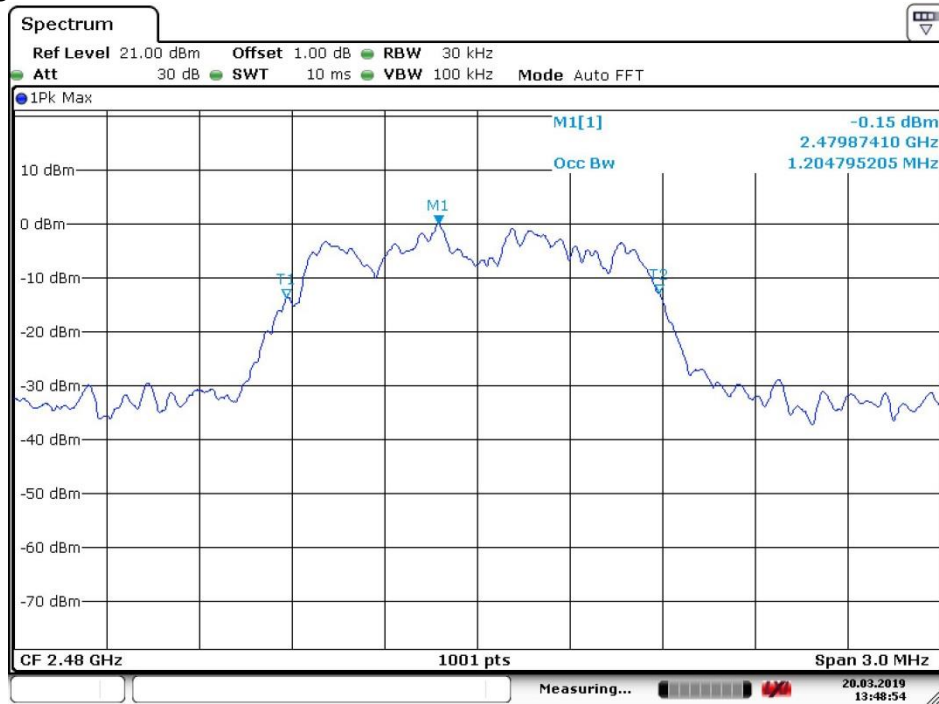


Date: 20.MAR.2019 13:50:37

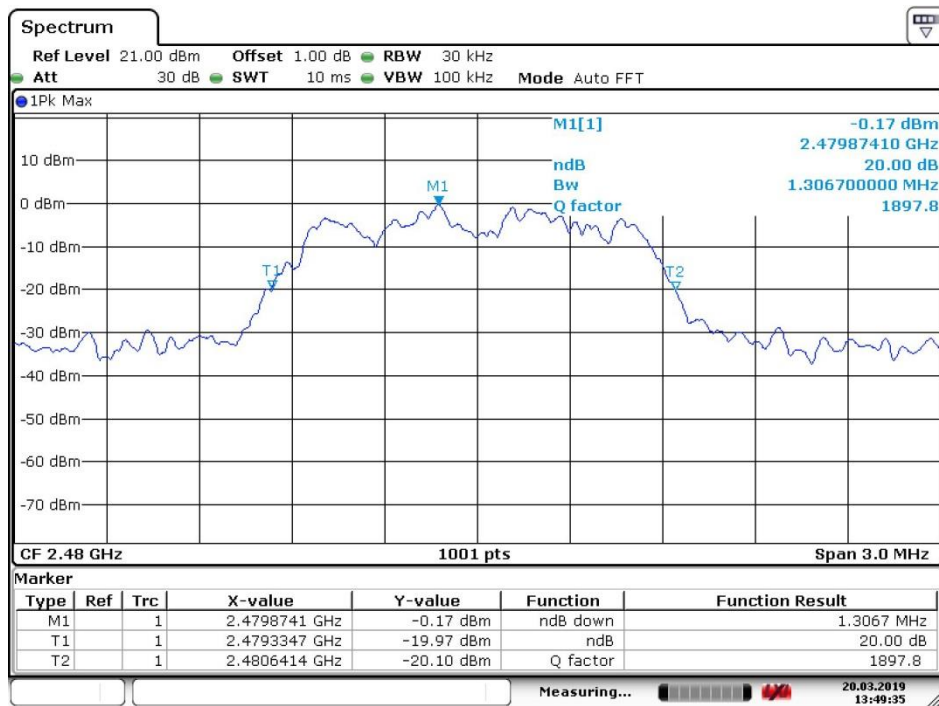


Date: 20.MAR.2019 13:50:29

8DPSK_Highest Channel



Date: 20.MAR.2019 13:48:54



Date: 20.MAR.2019 13:49:35