

Appendix A

RF Test Data for BT V4.1(BDR/EDR) (Conducted Measurement)

Product Name: Bluetooth Speaker

Trade Mark: AVGO

Test Model: K21

Environmental Conditions

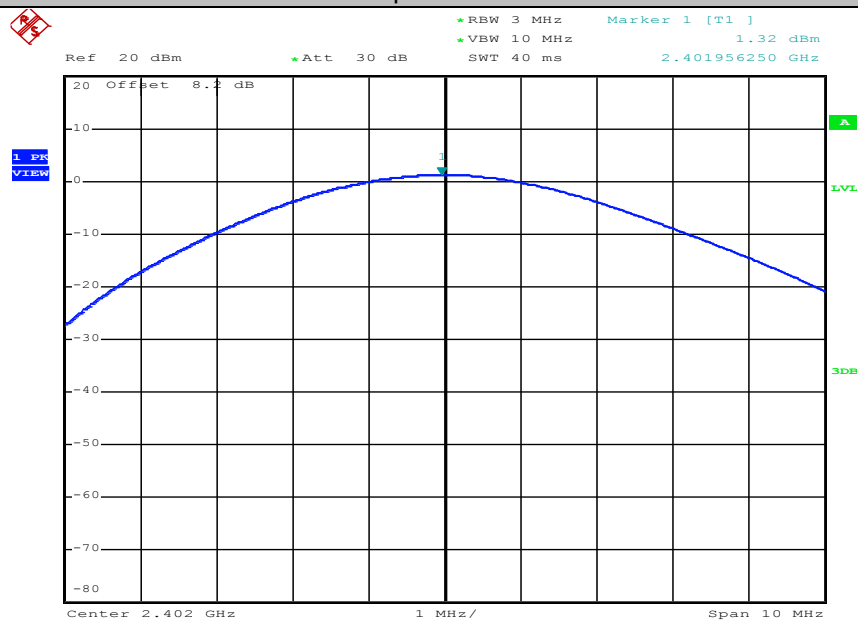
Temperature:	22.3° C
Relative Humidity:	53.1%
ATM Pressure:	100.0 kPa
Test Engineer:	JK Zhou
Supervised by:	Wang.Chuang

A.1 Maximum Conducted Peak Output Power

Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	1.320	21	PASS
	MCH	0.710	21	PASS
	HCH	0.920	21	PASS
$\pi/4$ DQPSK	LCH	0.470	21	PASS
	MCH	-0.170	21	PASS
	HCH	0.350	21	PASS
8DPSK	LCH	0.500	21	PASS
	MCH	-0.170	21	PASS
	HCH	0.310	21	PASS

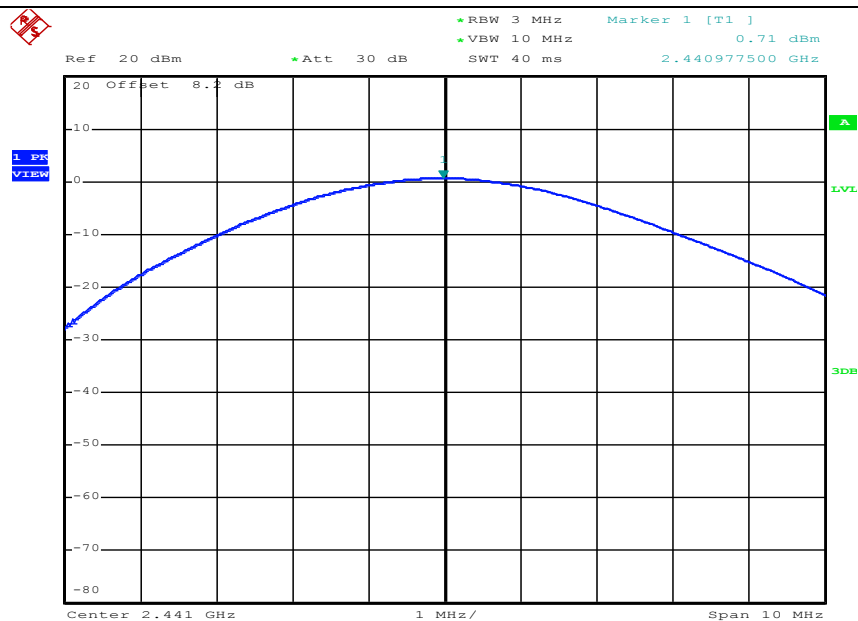
Test Graphs

GFSK/LCH



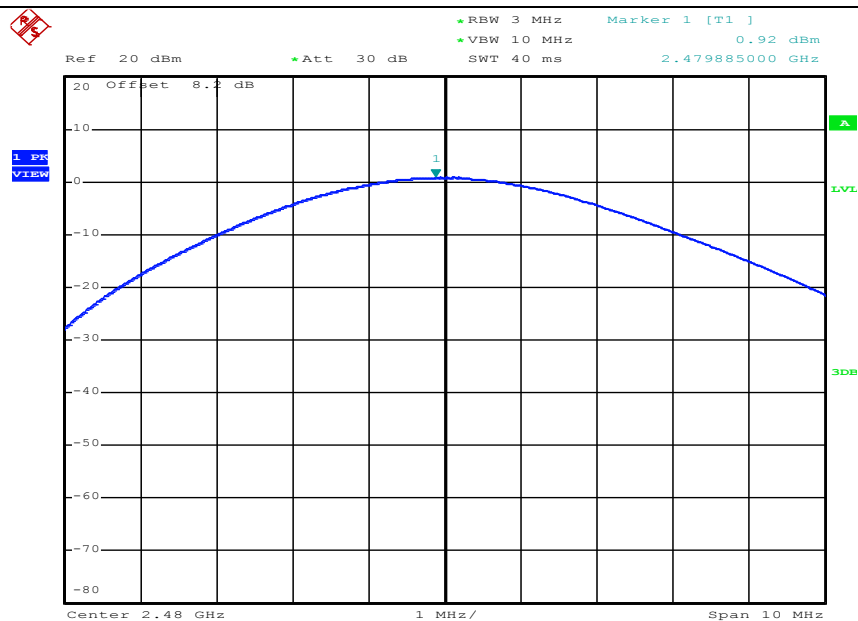
Date: 23.SEP.2019 15:06:52

GFSK/MCH

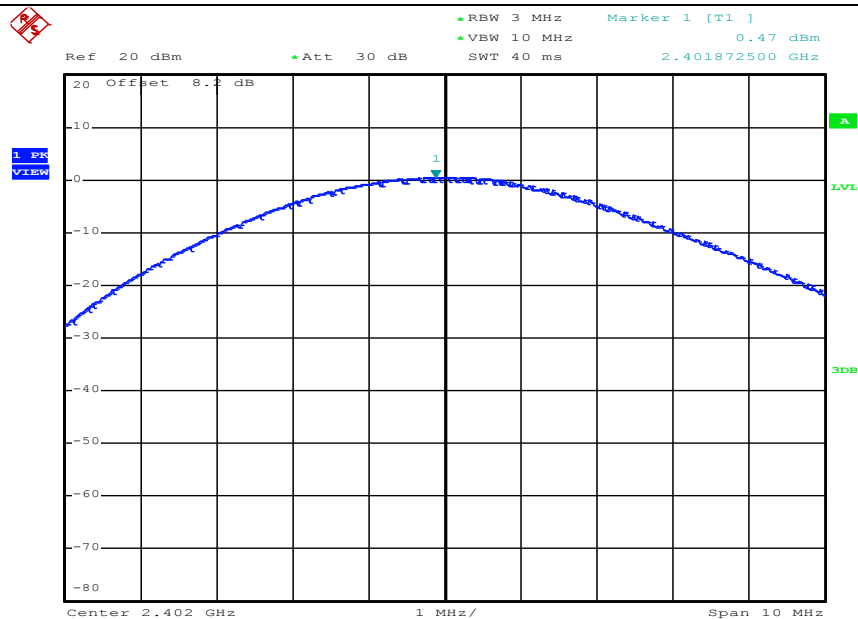


Date: 23.SEP.2019 15:07:18

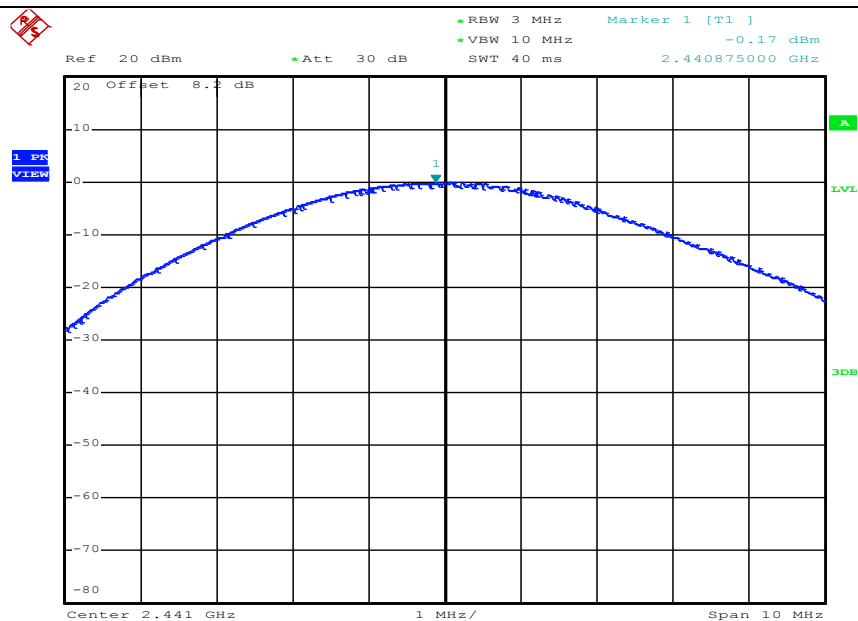
GFSK/HCH



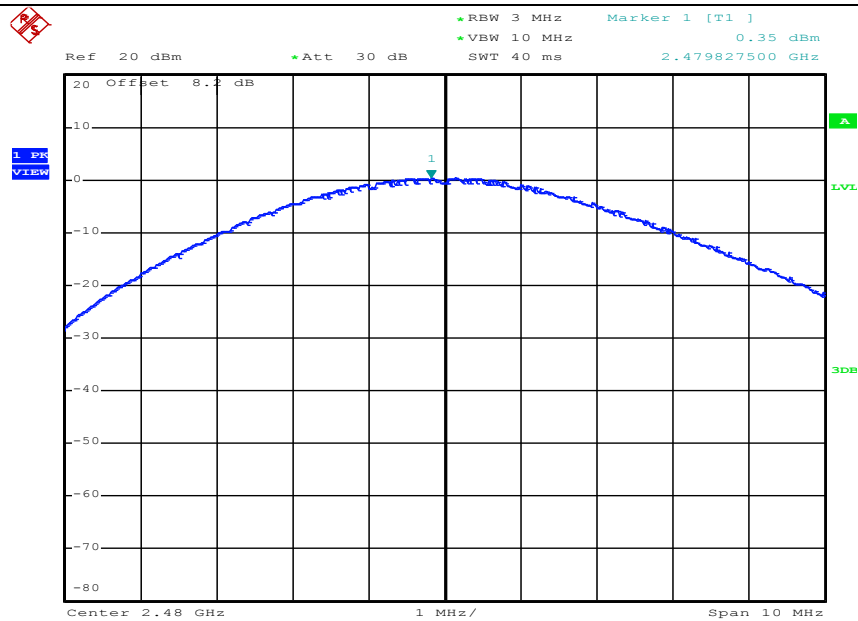
Date: 23.SEP.2019 15:07:41

 $\pi/4$ DQPSK/LCH

Date: 23.SEP.2019 15:08:14

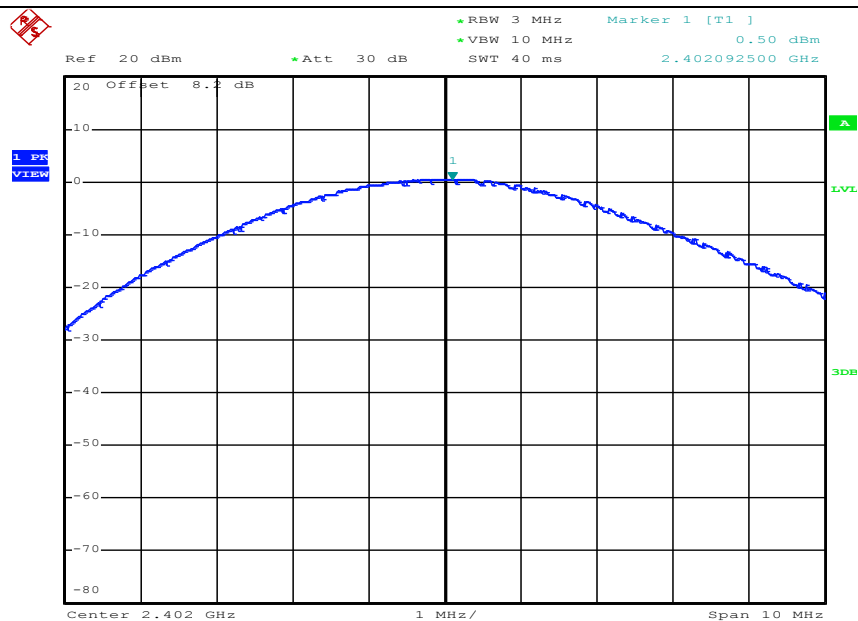
$\pi/4$ DQPSK/MCH

Date: 23.SEP.2019 15:08:40

 $\pi/4$ DQPSK/HCH

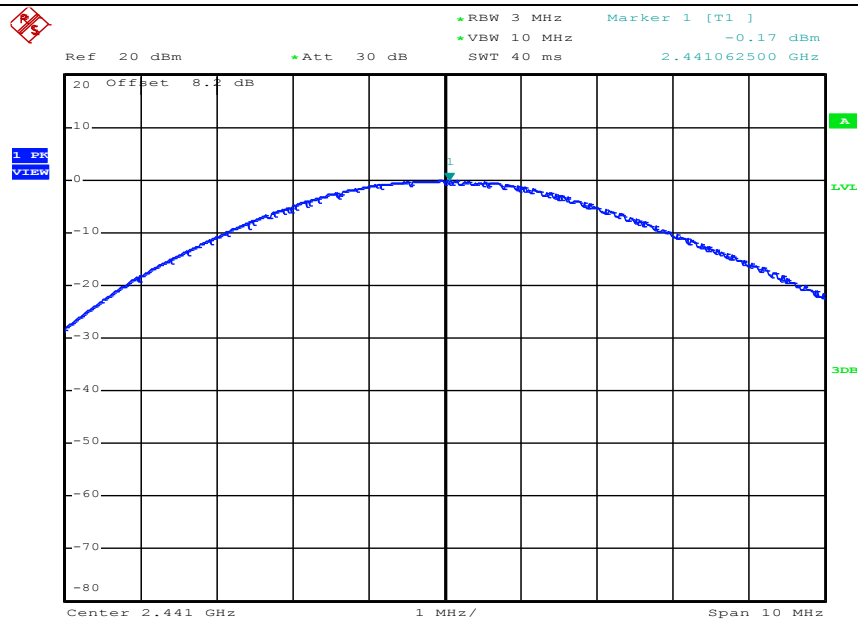
Date: 23.SEP.2019 15:09:05

8DPSK/LCH



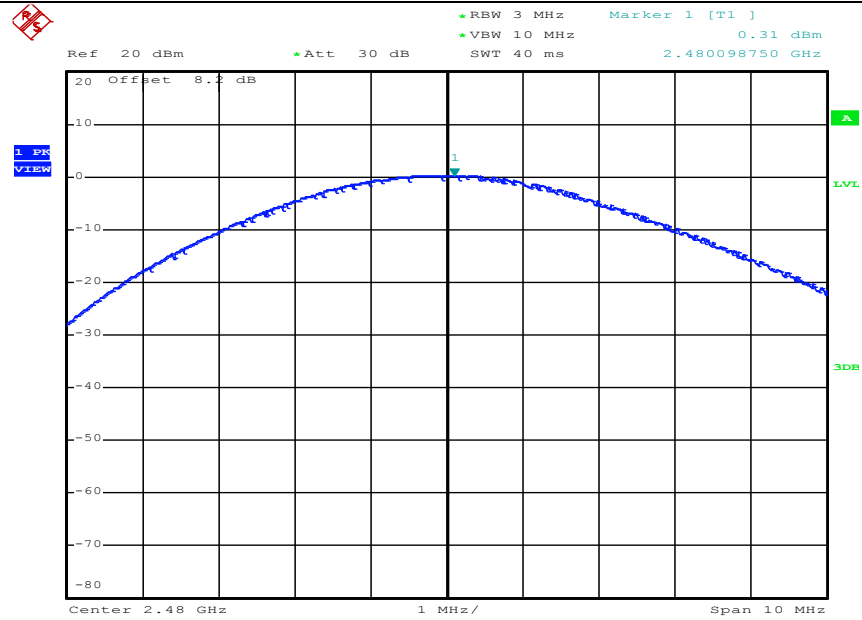
Date: 23.SEP.2019 15:09:36

8DPSK/MCH



Date: 23.SEP.2019 15:09:59

8DPSK/HCH



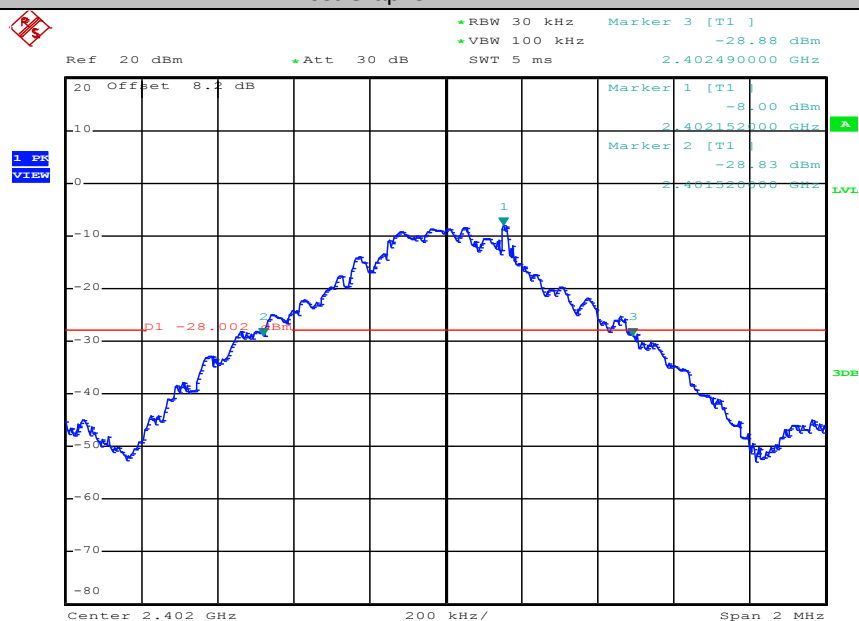
Date: 23.SEP.2019 15:11:06

A.2 20dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.970	Not Specified	PASS
	MCH	1.026	Not Specified	PASS
	HCH	1.038	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.306	Not Specified	PASS
	MCH	1.294	Not Specified	PASS
	HCH	1.284	Not Specified	PASS
8DPSK	LCH	1.294	Not Specified	PASS
	MCH	1.288	Not Specified	PASS
	HCH	1.288	Not Specified	PASS

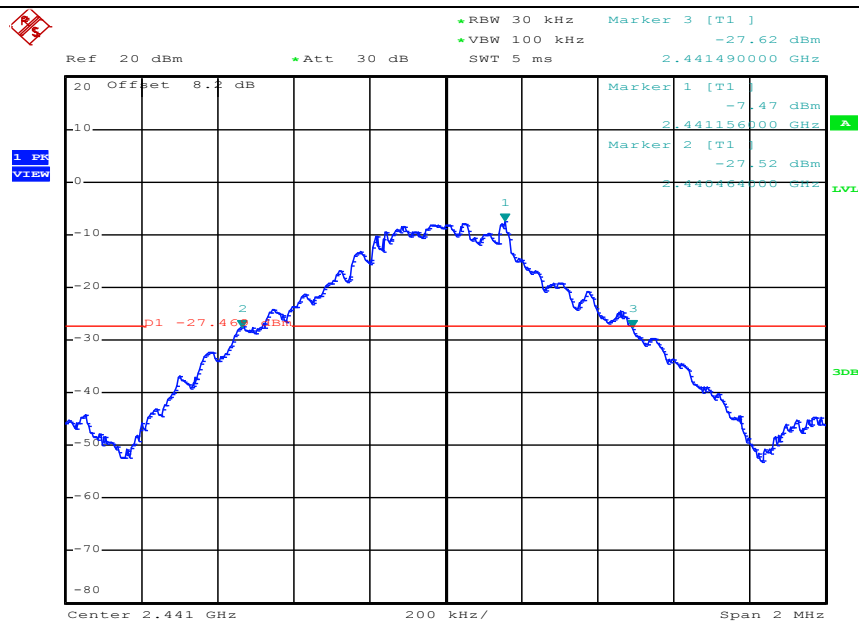
Test Graphs

GFSK/LCH



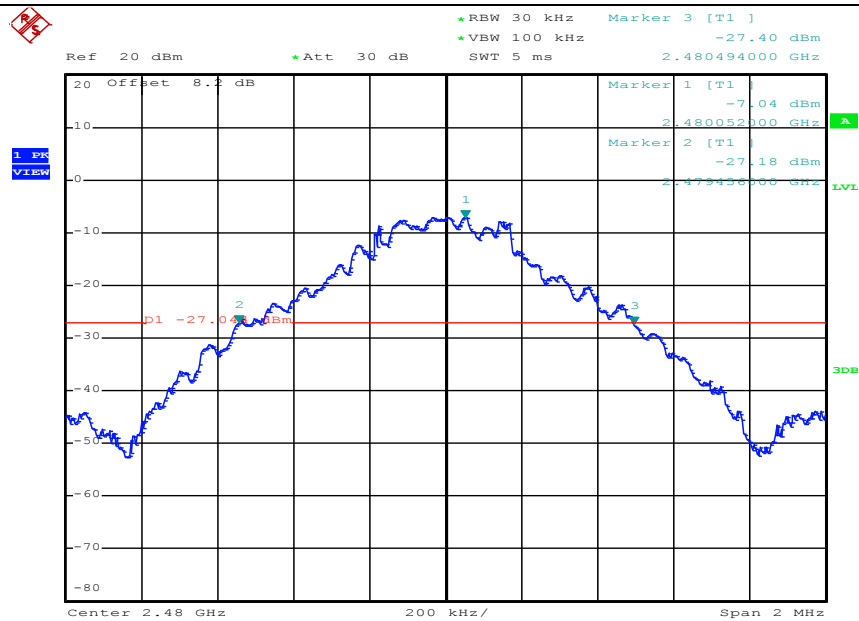
Date: 22.SEP.2019 15:58:09

GFSK/MCH

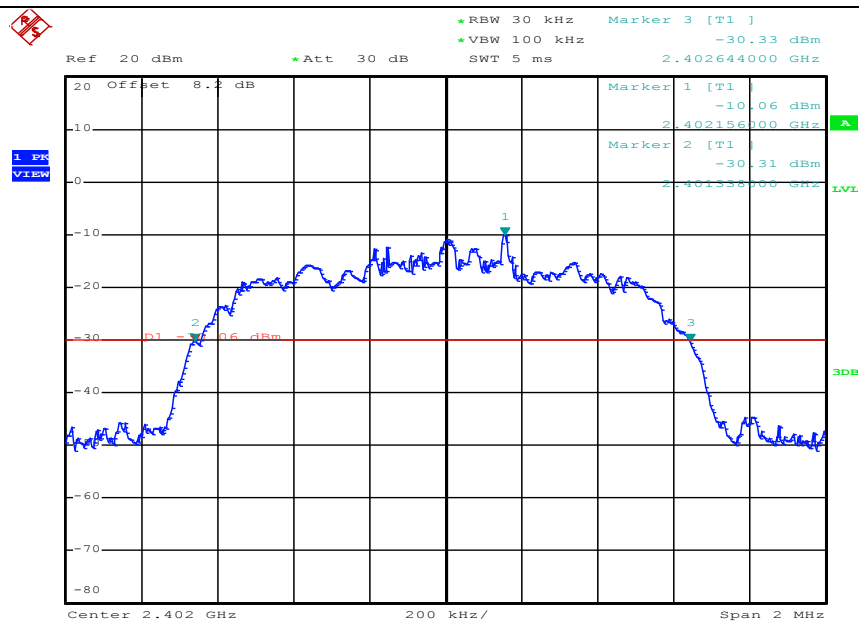
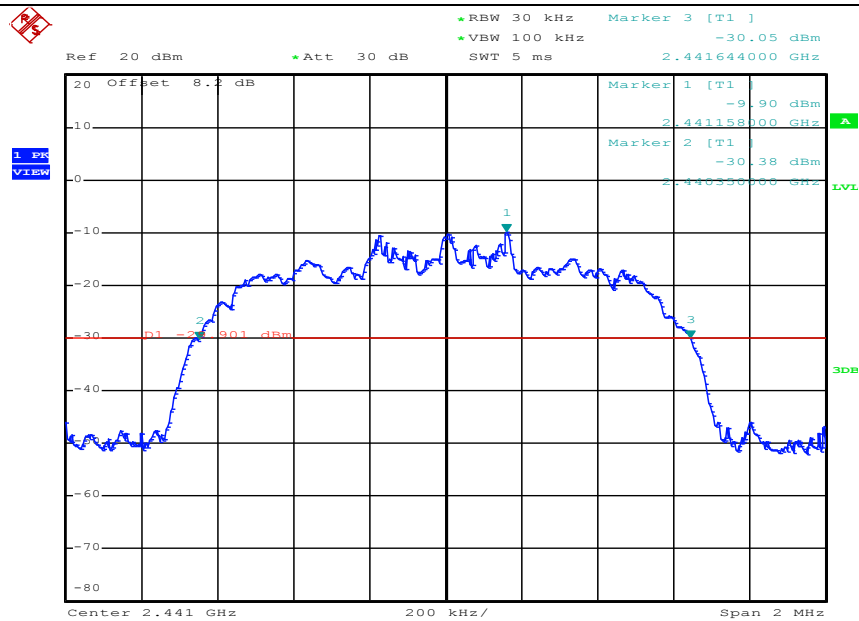


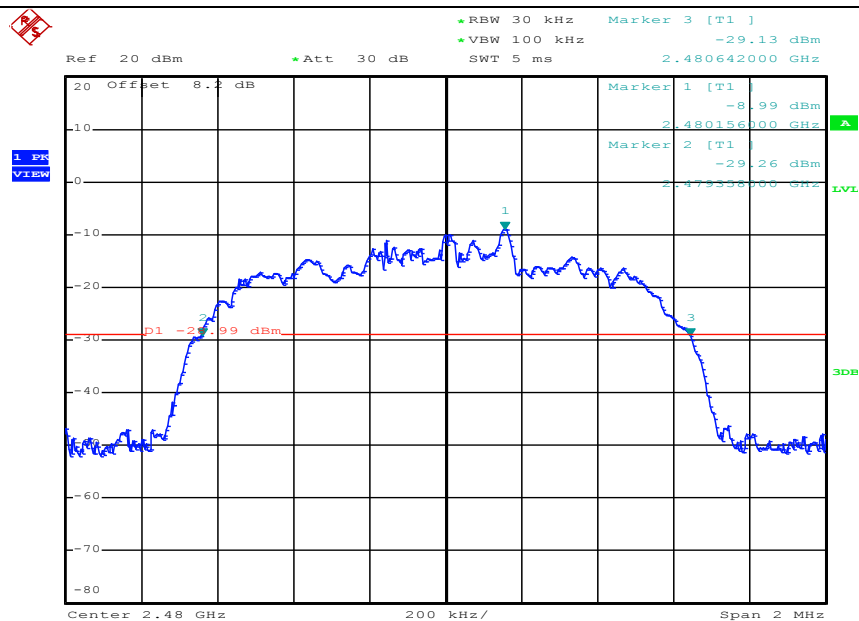
Date: 22.SEP.2019 16:02:51

GFSK/HCH



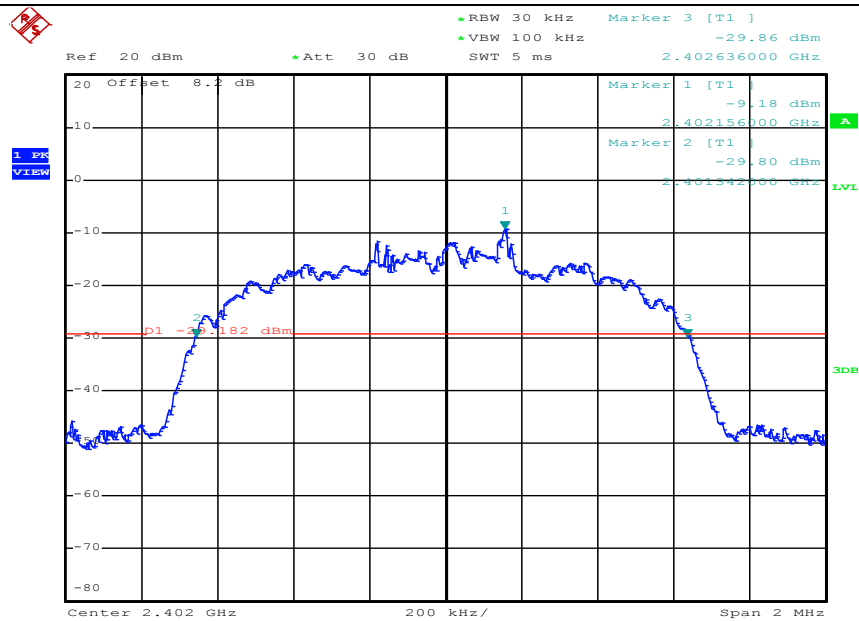
Date: 22.SEP.2019 16:04:33

$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

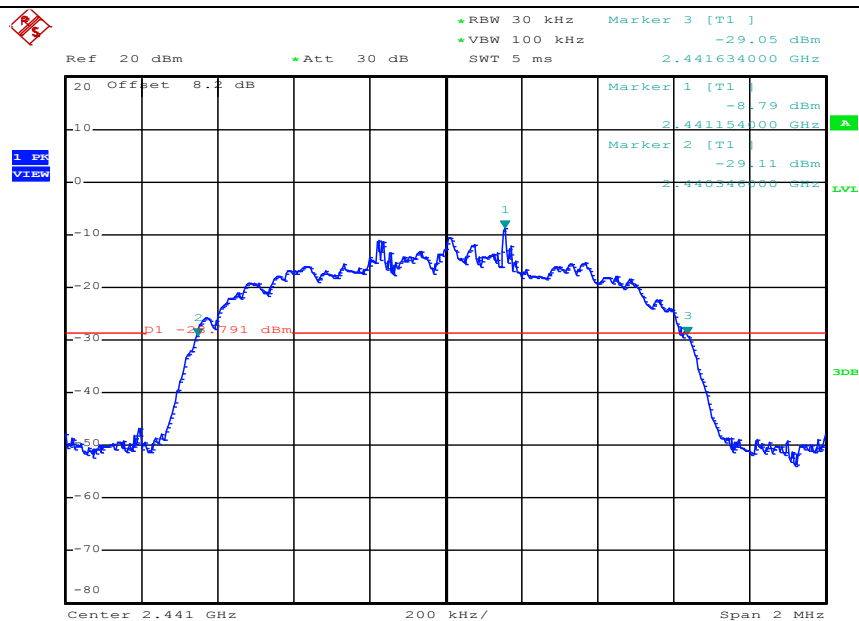
Date: 22.SEP.2019 16:12:53

8DPSK/LCH



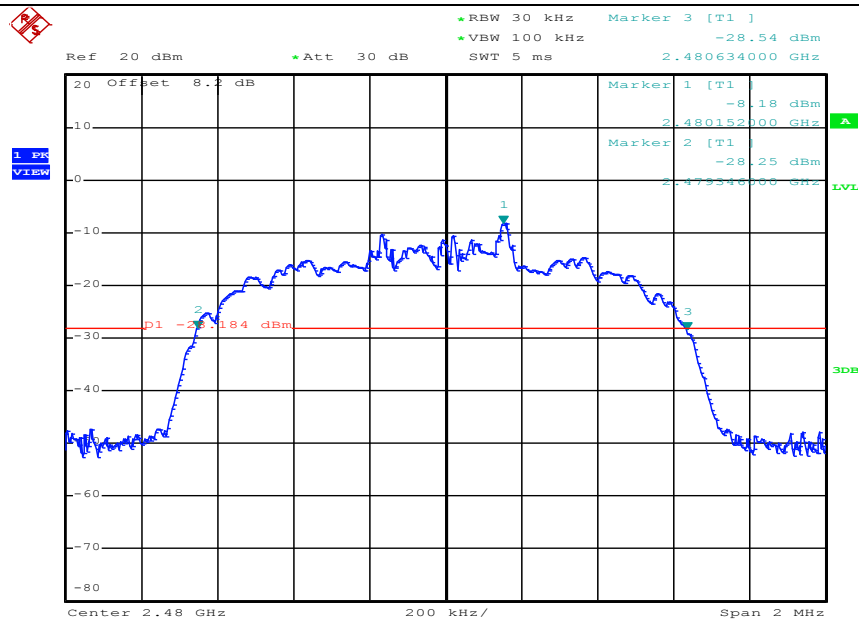
Date: 22.SEP.2019 16:15:29

8DPSK/MCH



Date: 22.SEP.2019 16:18:02

8DPSK/HCH



Date: 22.SEP.2019 16:19:44

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.822	0.647	PASS
	MCH	1.004	0.684	PASS
	HCH	1.042	0.692	PASS
$\pi/4$ DQPSK	LCH	1.142	0.871	PASS
	MCH	0.992	0.863	PASS
	HCH	1.122	0.856	PASS
8DPSK	LCH	1.050	0.863	PASS
	MCH	1.222	0.859	PASS
	HCH	0.976	0.859	PASS

Test Graphs

Ref 20 dBm • Att 30 dB • RBW 100 kHz Delta 1 [T1] -0.29 dB
SWT 40 ms 822.50000000 kHz • VBW 300 kHz

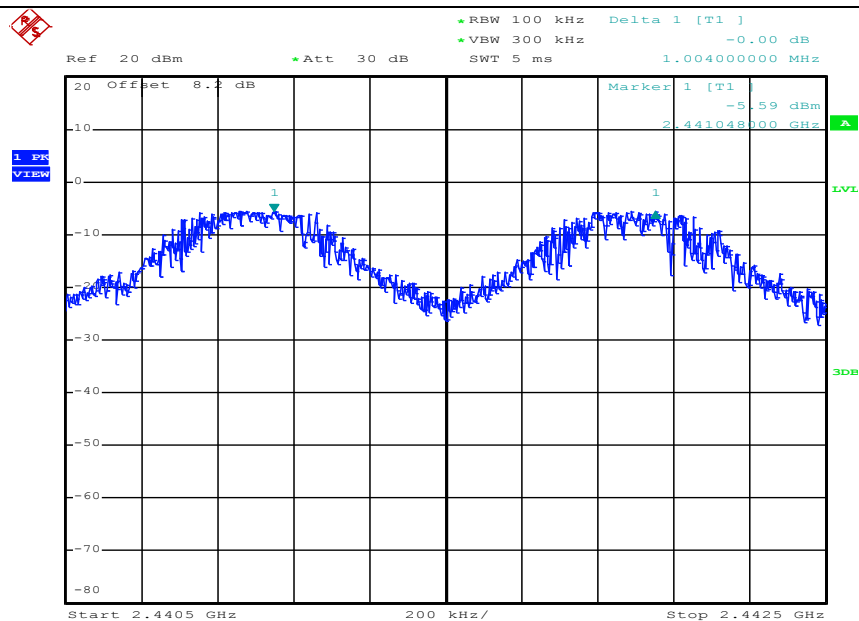
20 Offset 8.1 dB Marker 1 [T1] -2.44 dBm 2.402168000 GHz A

1 PR VIEW LVL

3dB

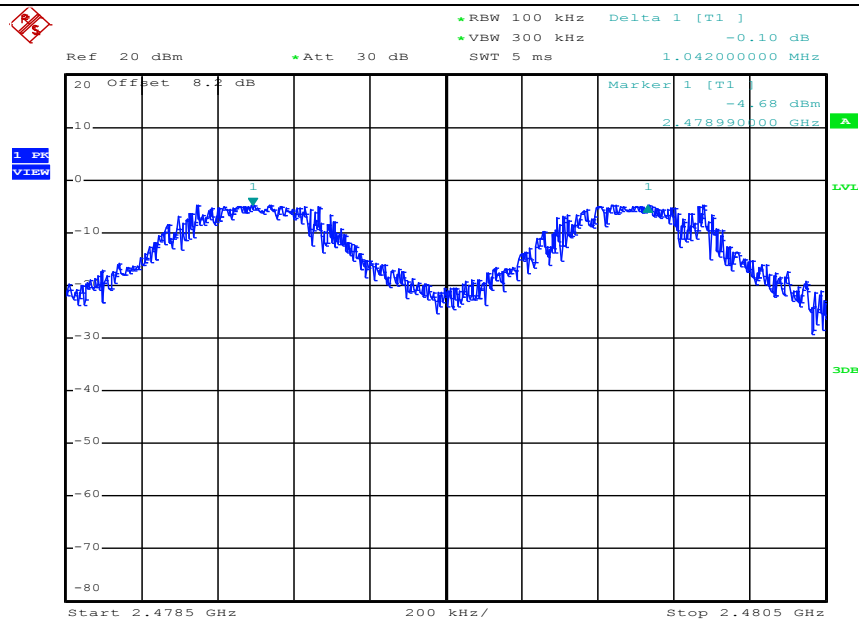
Start 2.4015 GHz 200 kHz/ Stop 2.4035 GHz

GFSK/MCH

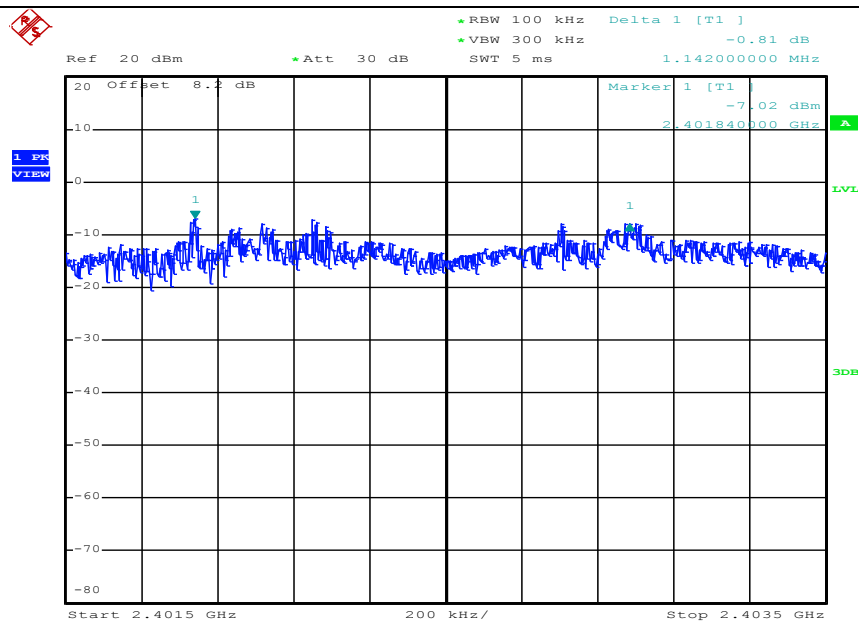


Date: 22.SEP.2019 15:38:17

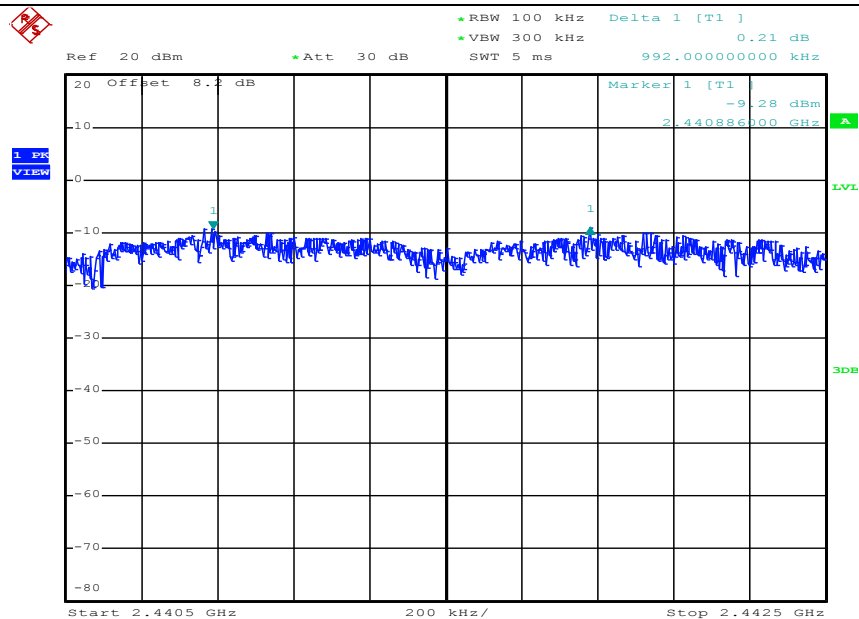
GFSK/HCH



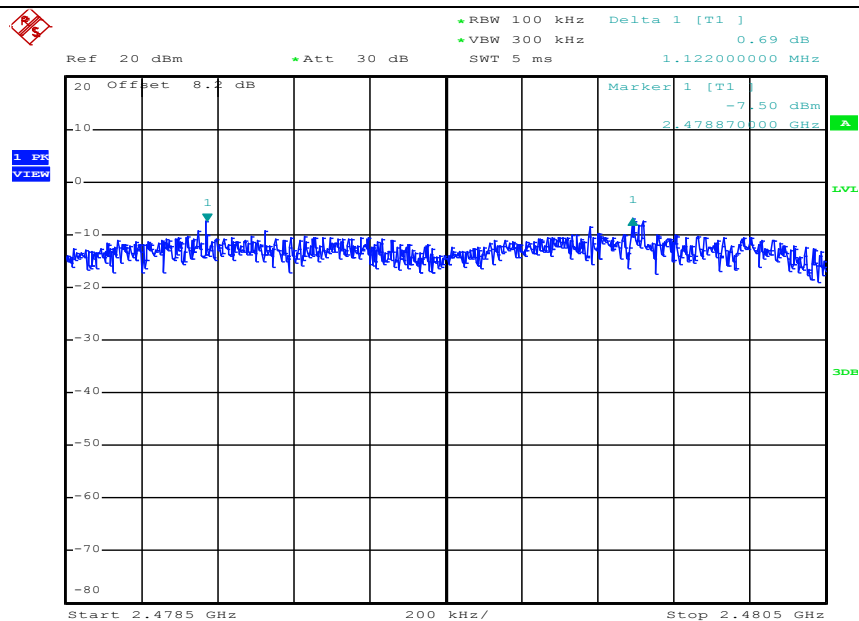
Date: 22.SEP.2019 15:38:45

$\pi/4$ DQPSK/LCH

Date: 22.SEP.2019 15:42:50

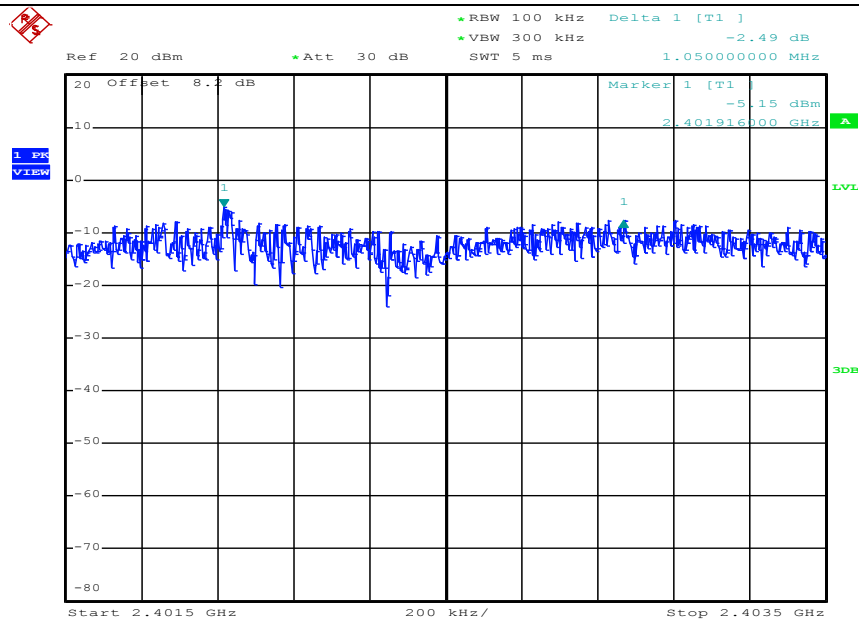
 $\pi/4$ DQPSK/MCH

Date: 22.SEP.2019 15:44:48

π /4DQPSK/HCH

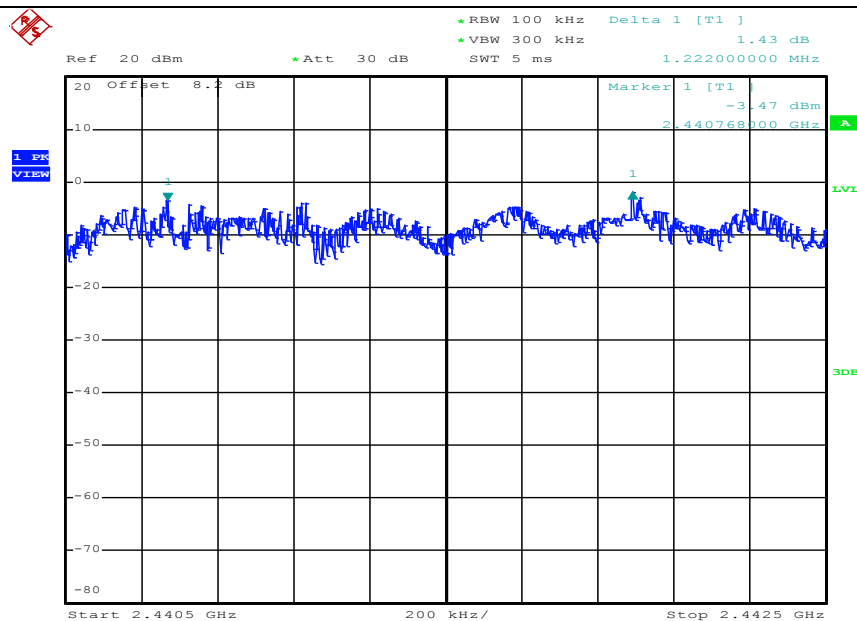
Date: 22.SEP.2019 15:45:25

8DPSK/LCH



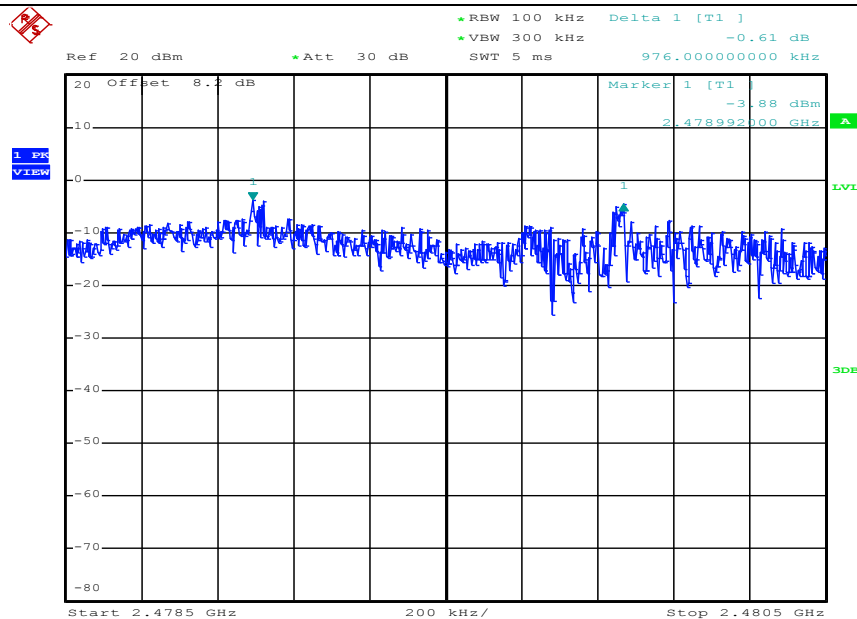
Date: 10.AUG.2019 20:38:13

8DPSK/MCH



Date: 10.AUG.2019 14:29:13

8DPSK/HCH



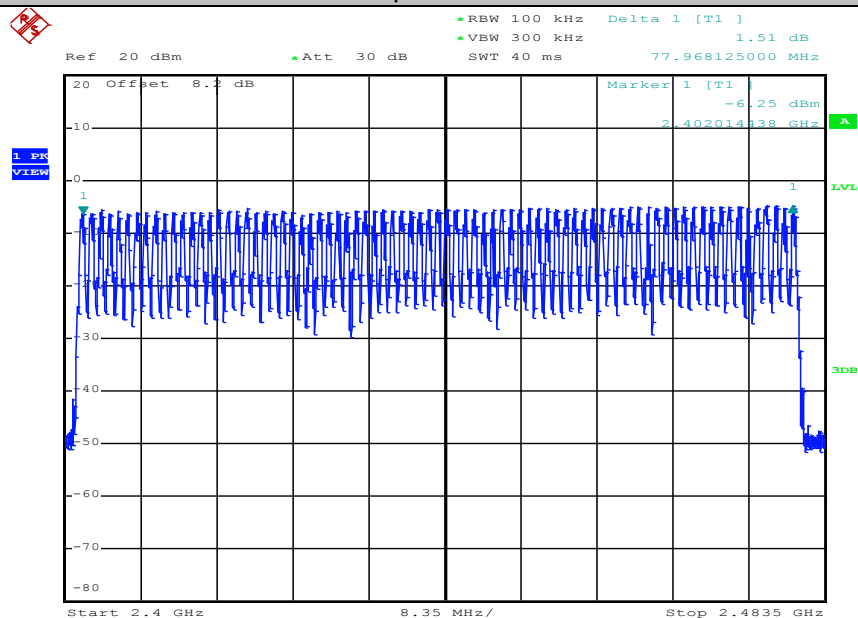
Date: 10.AUG.2019 20:40:37

A.4 Hopping Channel Number

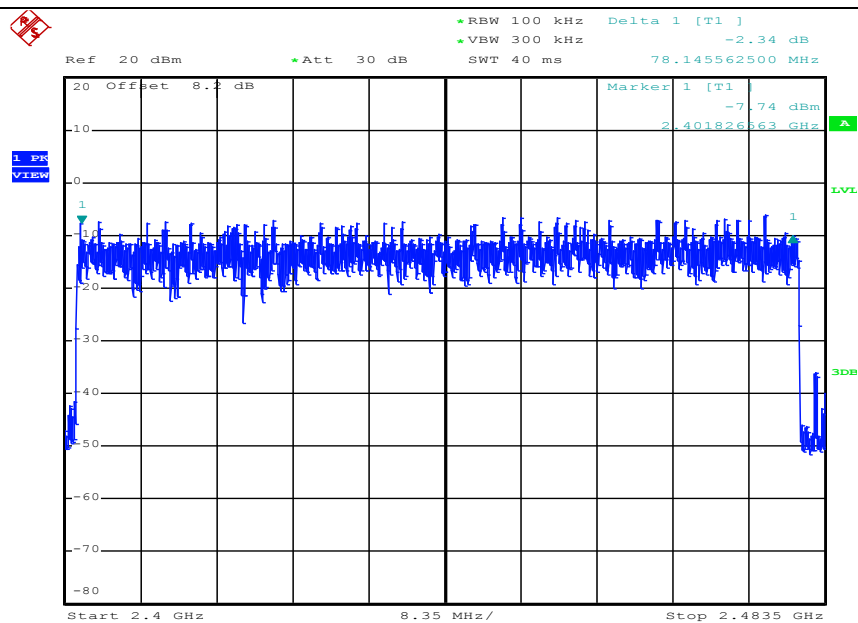
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	>=15	PASS
$\pi/4$ DQPSK	Hop	79	>=15	PASS
8DPSK	Hop	79	>=15	PASS

Test Graphs

GFSK/Hop

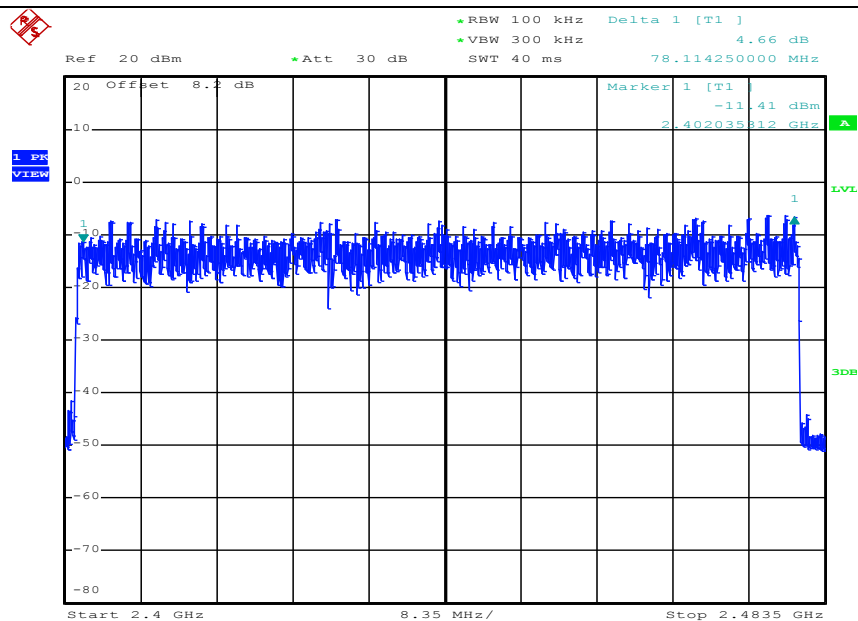


Date: 22.SEP.2019 15:42:02

 $\pi/4$ DQPSK/Hop

Date: 22.SEP.2019 15:49:19

8DPSK/Hop



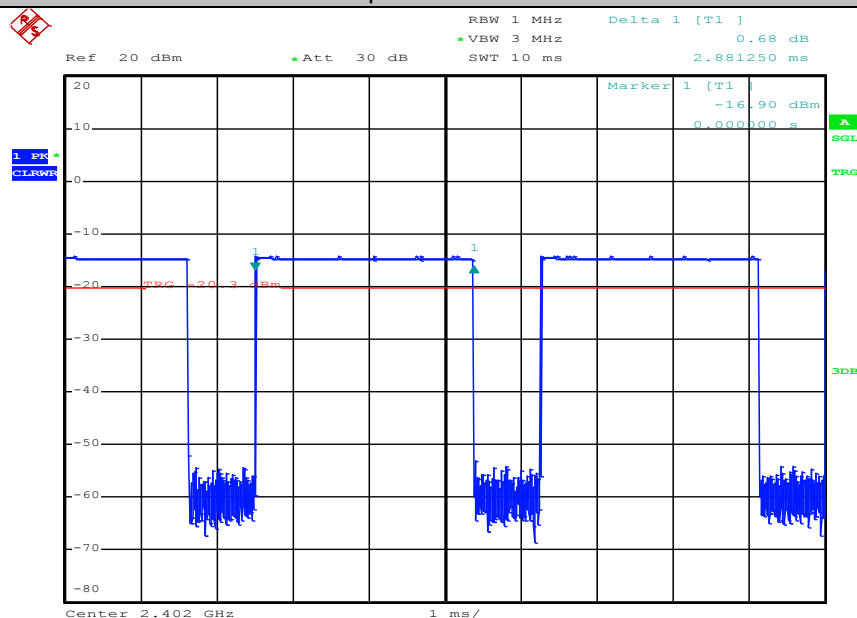
Date: 22.SEP.2019 15:57:21

A.5 Dwell Time

Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.88	106.7	0.308	0.4	PASS
	2DH5	HCH	2.88	106.7	0.307	0.4	PASS
8DPSK	3DH5	LCH	2.88	106.7	0.308	0.4	PASS
	3DH5	MCH	2.88	106.7	0.308	0.4	PASS
	3DH5	HCH	2.88	106.7	0.308	0.4	PASS

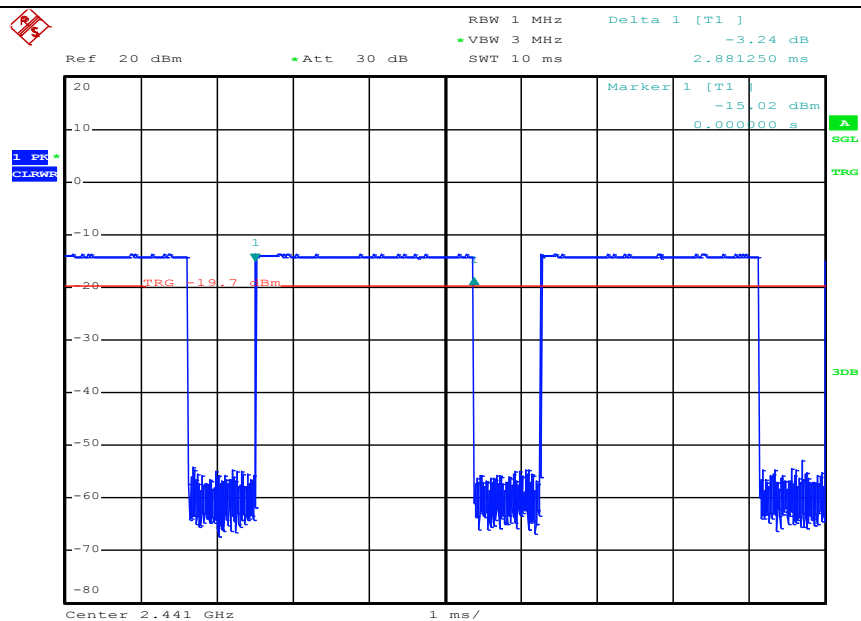
Test Graphs

GFSK_DH5/LCH



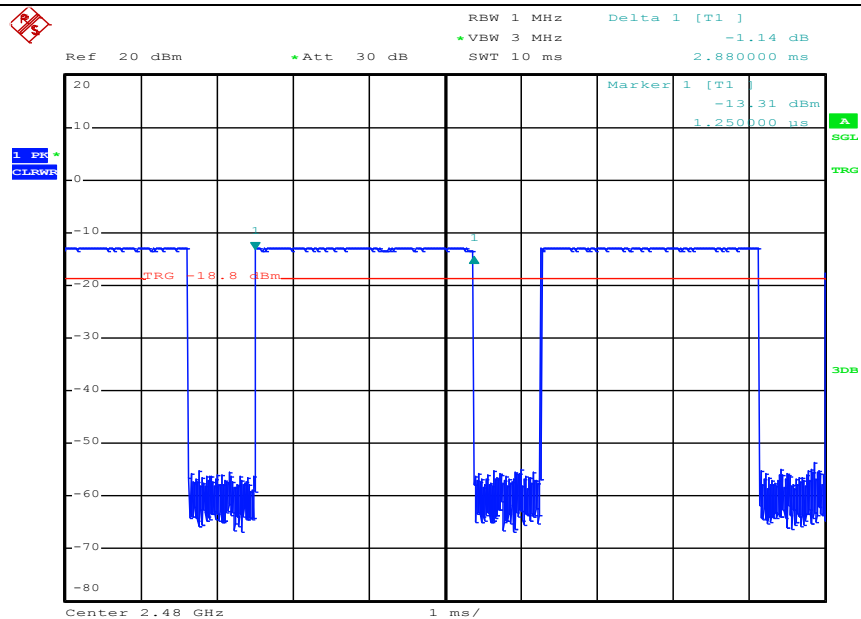
Date: 22.SEP.2019 15:58:31

GFSK_DH5/MCH



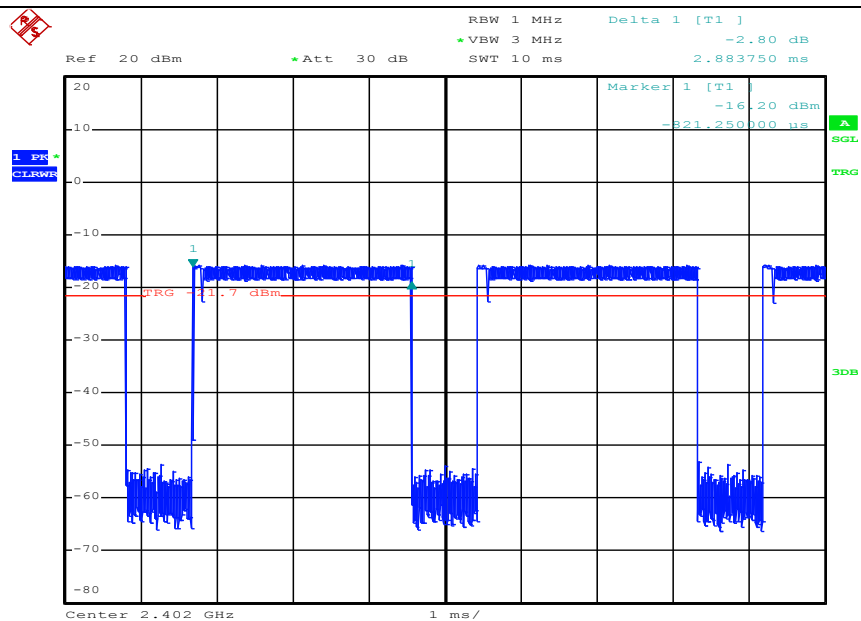
Date: 22.SEP.2019 16:03:12

GFSK_DH5/HCH



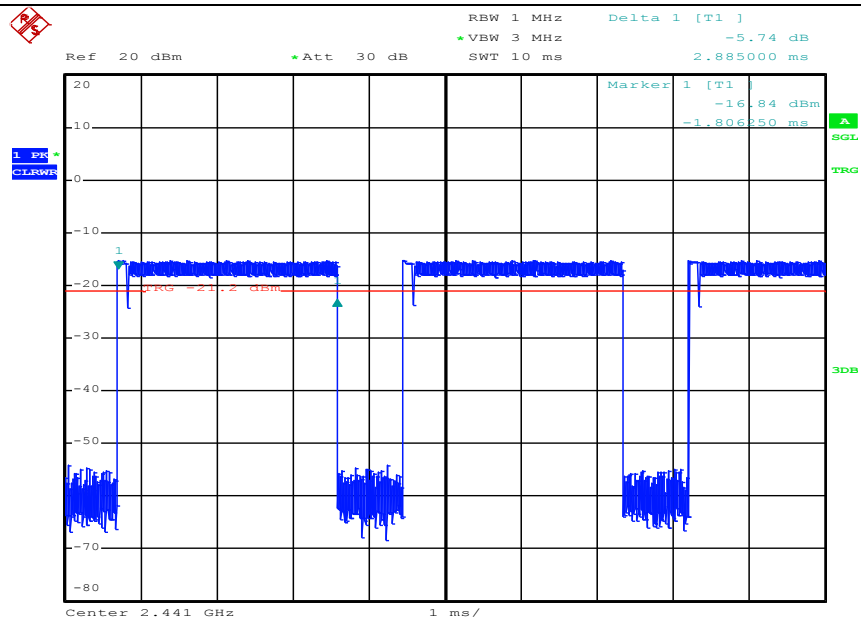
Date: 22.SEP.2019 16:04:55

$\pi/4$ DQPSK
_2DH5/LCH



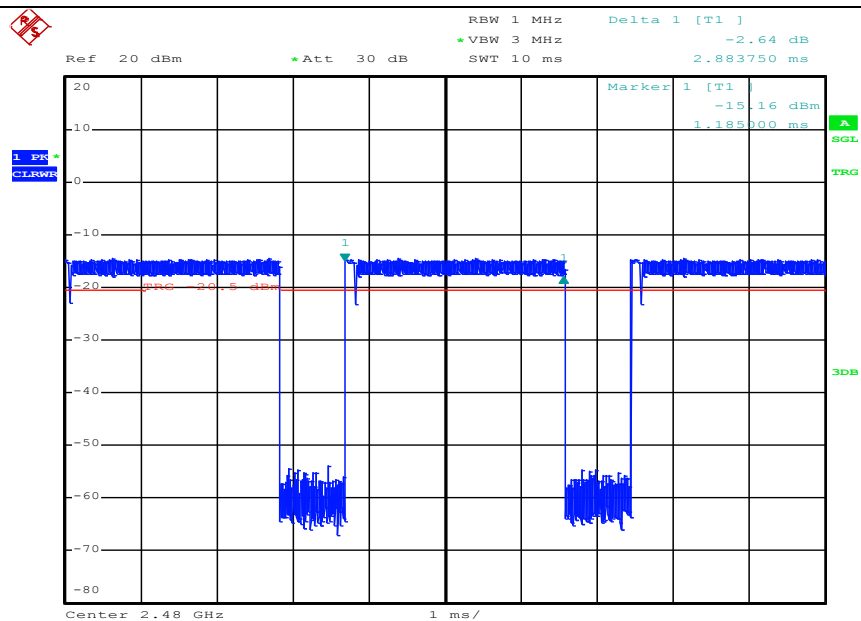
Date: 22.SEP.2019 16:08:27

$\pi/4$ DQPSK
_2DH5/MCH



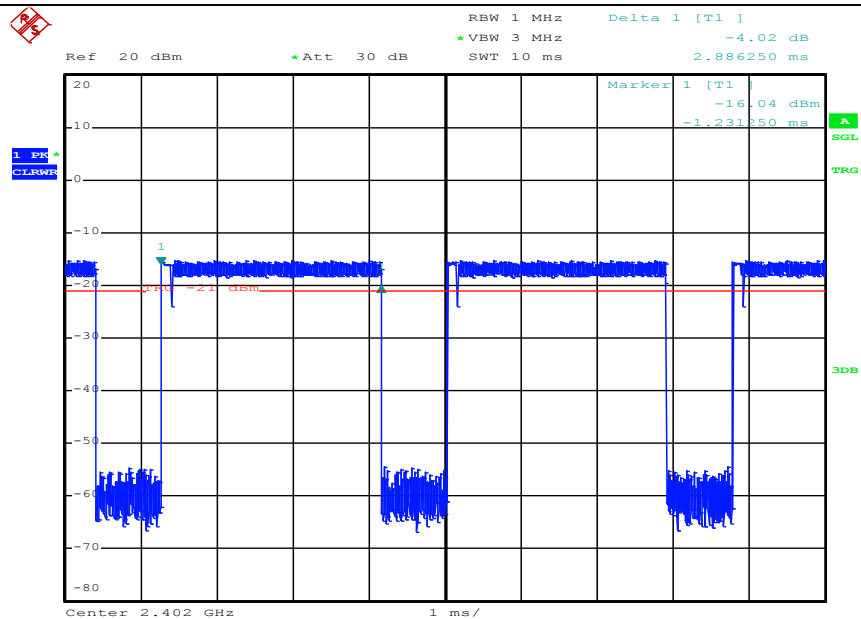
Date: 22.SEP.2019 16:11:34

$\pi/4$ DQPSK
_2DH5/HCH



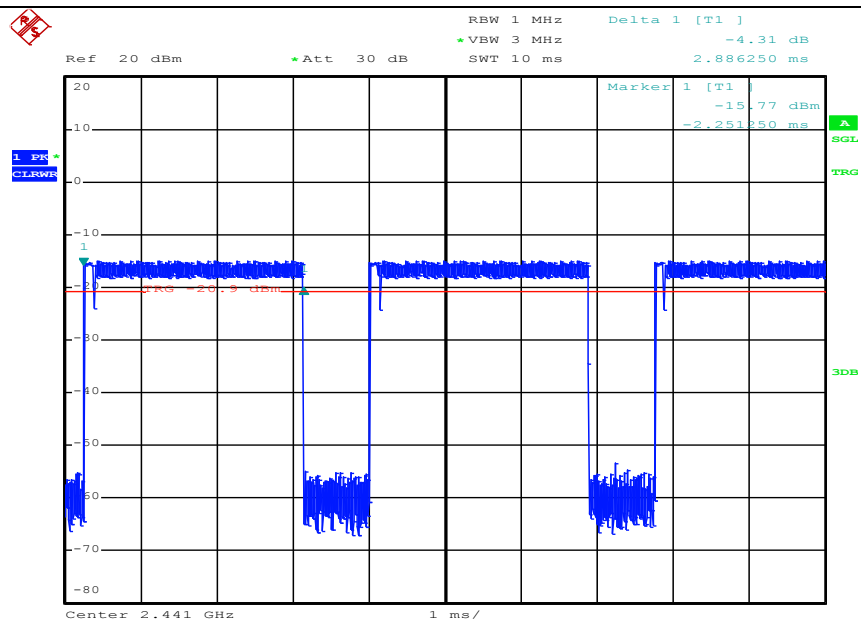
Date: 22.SEP.2019 16:13:15

8DPSK_3DH5/LCH



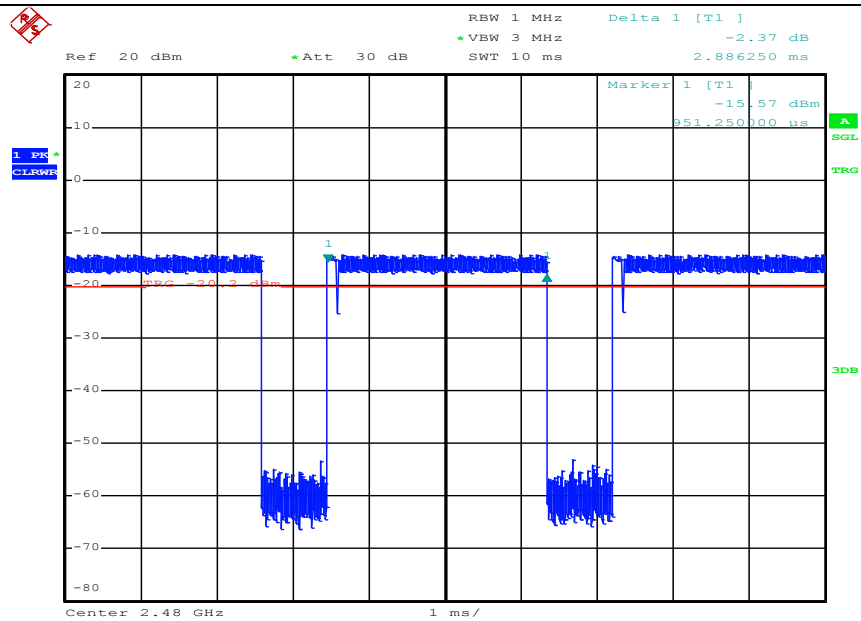
Date: 22.SEP.2019 16:15:51

8DPSK_3DH5/MCH



Date: 22.SEP.2019 16:18:24

8DPSK_3DH5/HCH



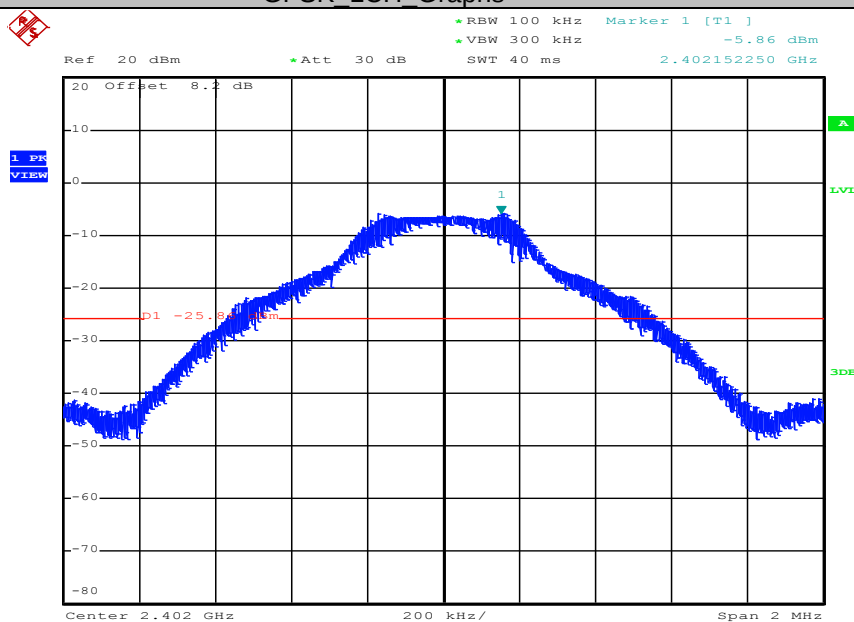
Date: 22.SEP.2019 16:20:05

A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-5.86	-31.590	-25.860	PASS
	MCH	-5.22	-32.750	-25.220	PASS
	HCH	-4.42	-32.860	-24.420	PASS
$\pi/4$ DQPSK	LCH	-7.21	-31.460	-27.210	PASS
	MCH	-6.82	-32.040	-26.820	PASS
	HCH	-6.14	-32.720	-26.140	PASS
8DPSK	LCH	-7.03	-31.830	-27.030	PASS
	MCH	-6.69	-32.170	-26.690	PASS
	HCH	-6.04	-32.930	-26.040	PASS

GFSK LCH Graphs

Pref



Date: 22.SEP.2019 16:01:26

Ref 20 dBm Att 30 dB RBW 100 kHz VBW 300 kHz Marker 2 [T1] 24.996878750 GHz

20 Offset 8.2 dB

Marker 1 [T1] -7.00 dBm 2.402150000 GHz

1 dB VIEW

p1 -25.86 dBm

3dB

Start 30 MHz 2.497 GHz/ Stop 25 GHz

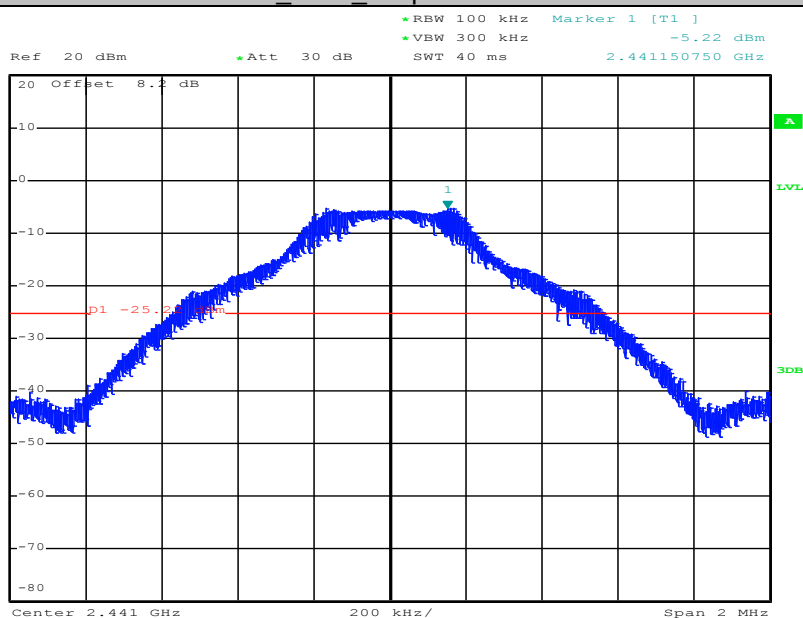
Date: 22.SEP.2019 16:01:41

GFSK_MCH_Graphs

Pref



1 PR
VIEW

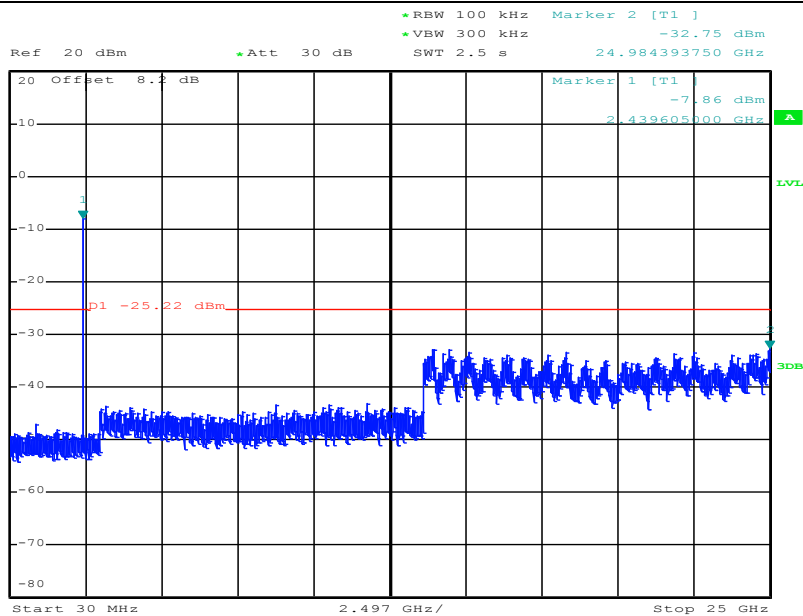


Date: 22.SEP.2019 16:03:40

Puw



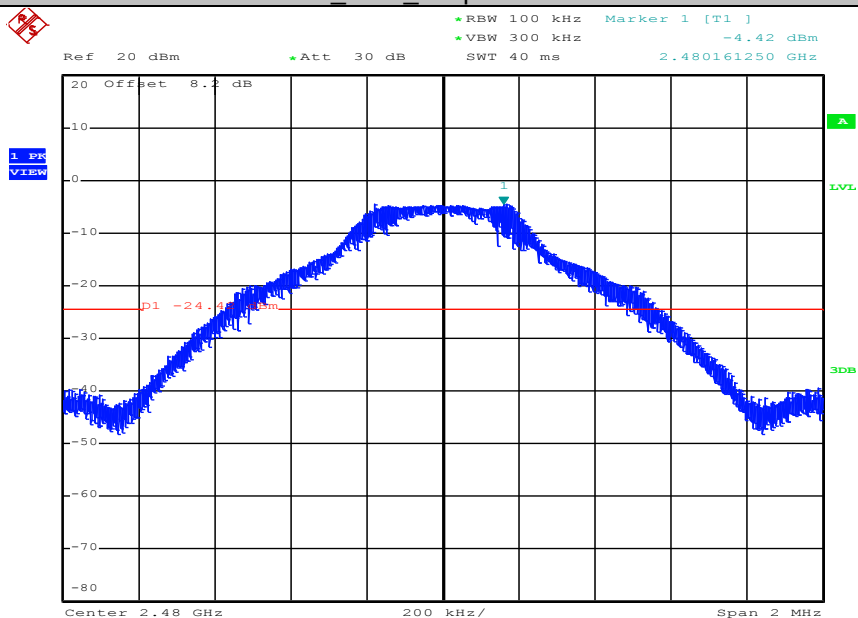
1 PR
VIEW



Date: 22.SEP.2019 16:03:55

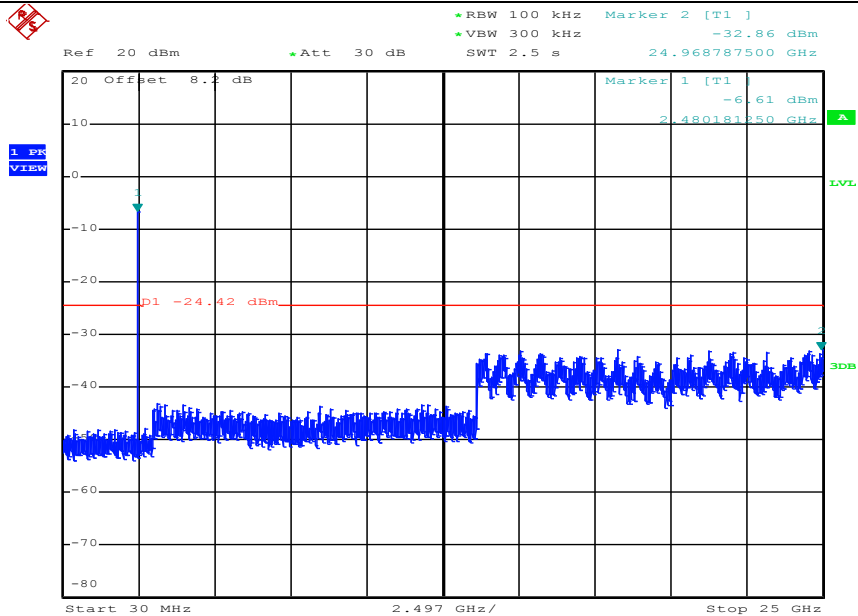
GFSK_HCH_Graphs

Pref



Date: 22.SEP.2019 16:05:40

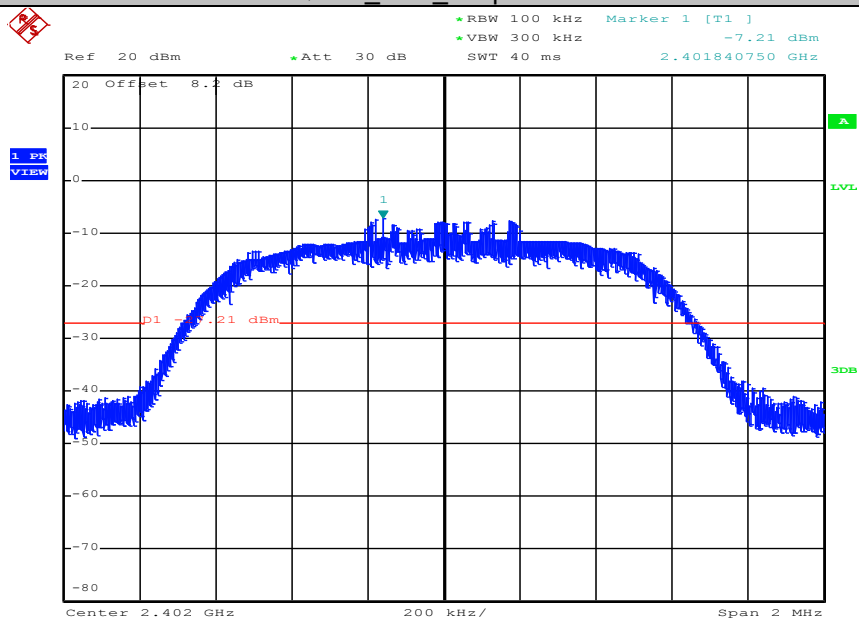
Puw



Date: 22.SEP.2019 16:05:54

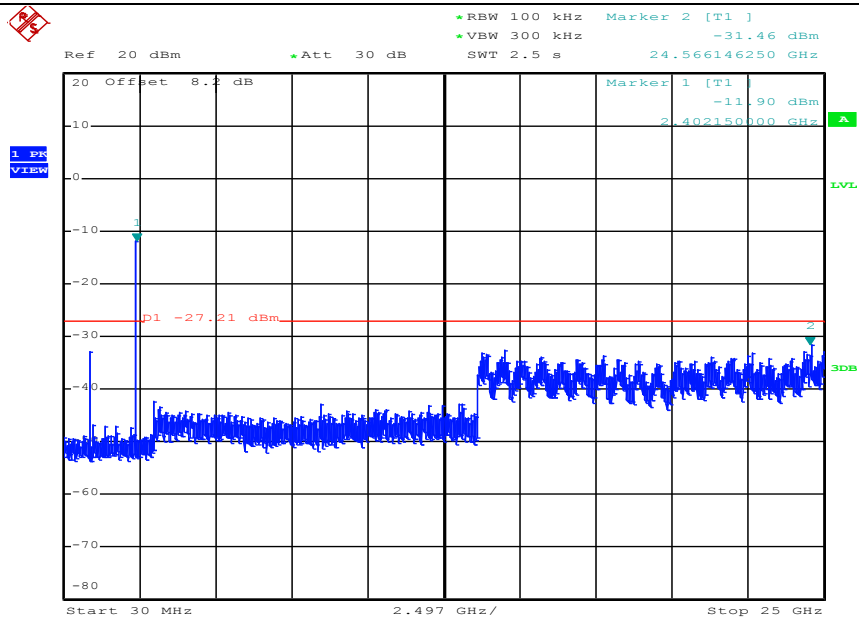
$\pi/4$ DQPSK_LCH_Graphs

Pref



Date: 22.SEP.2019 16:09:12

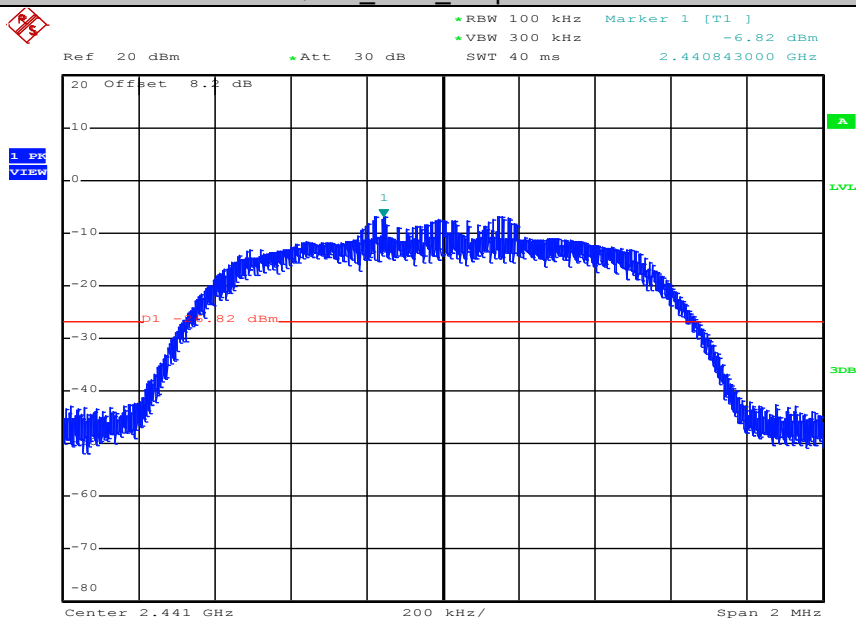
Puw



Date: 22.SEP.2019 16:09:26

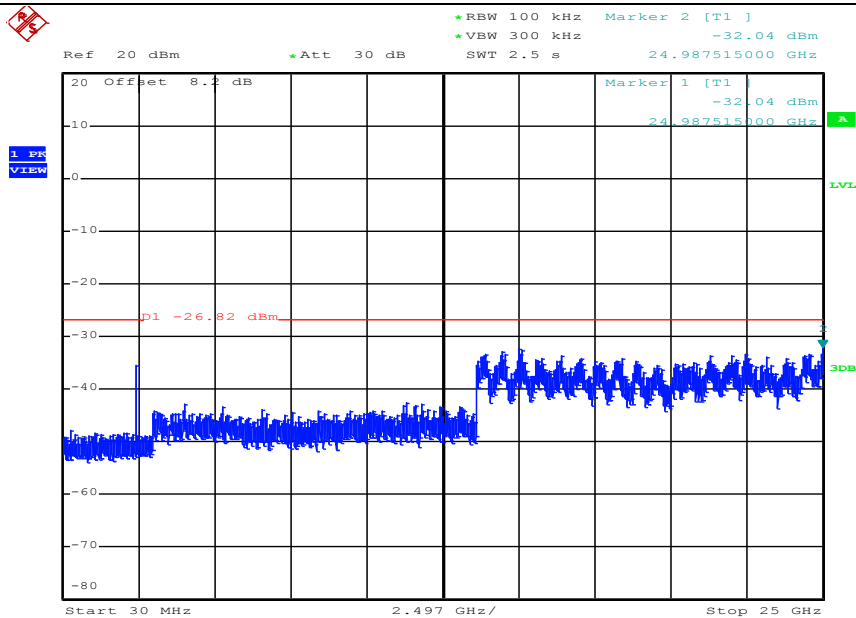
$\pi/4$ DQPSK_MCH_Graphs

Pref



Date: 22.SEP.2019 16:12:02

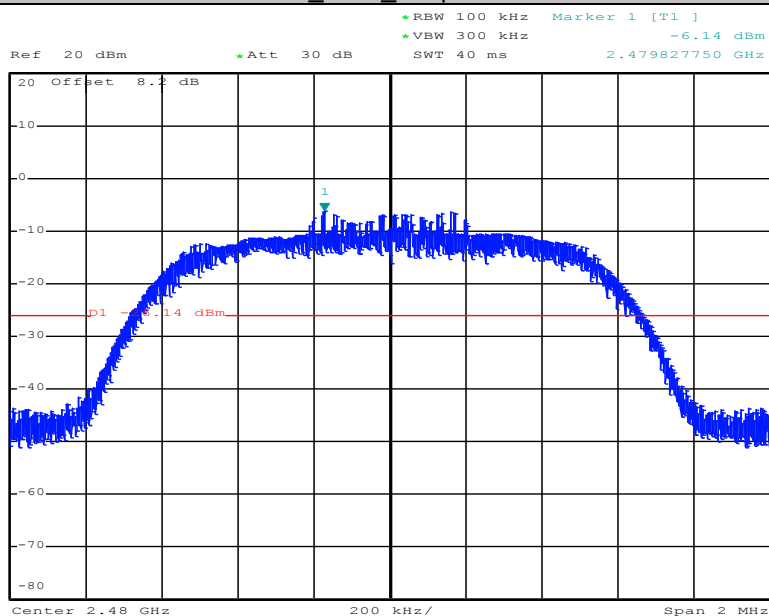
Puw



Date: 22.SEP.2019 16:12:16

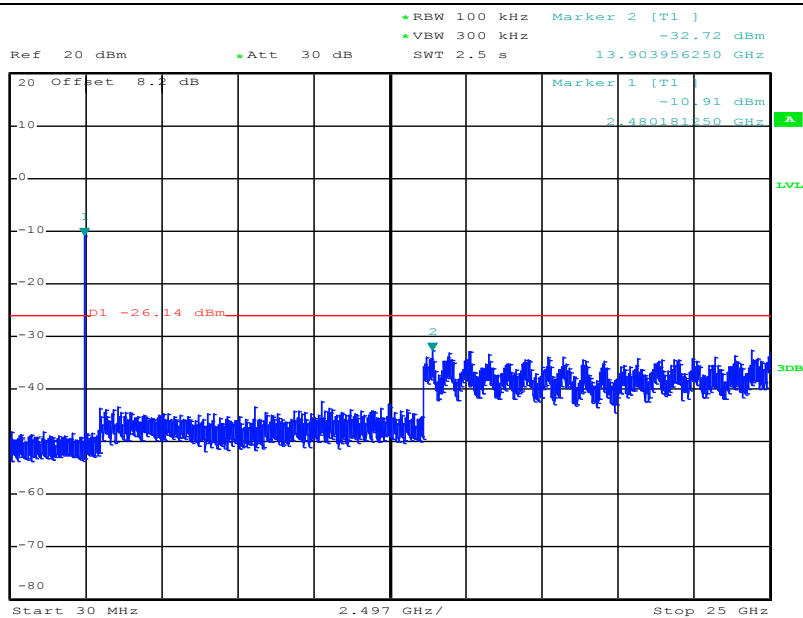
$\pi/4$ DQPSK_HCH_Graphs

Pref

1 PR
VIEW

Date: 22.SEP.2019 16:13:59

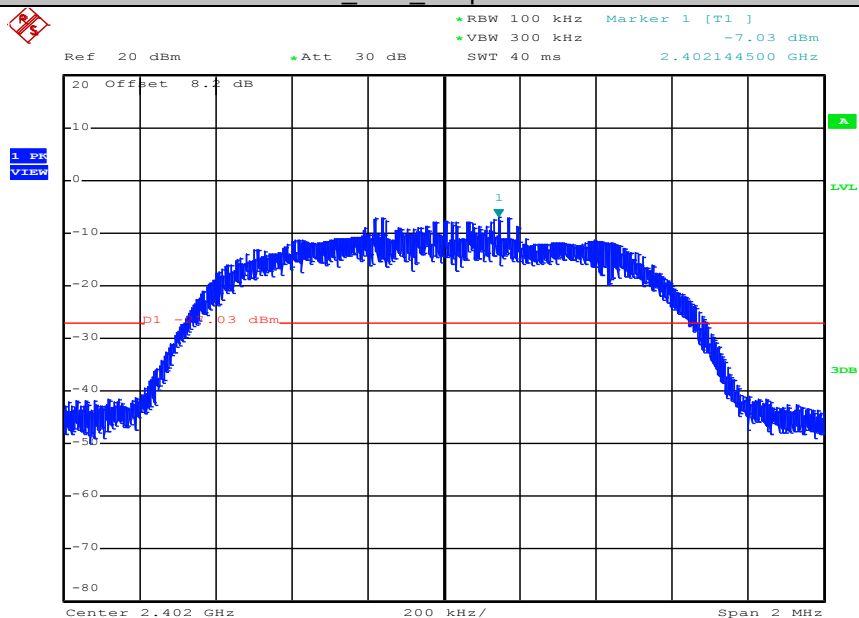
Puw

1 PR
VIEW

Date: 22.SEP.2019 16:14:14

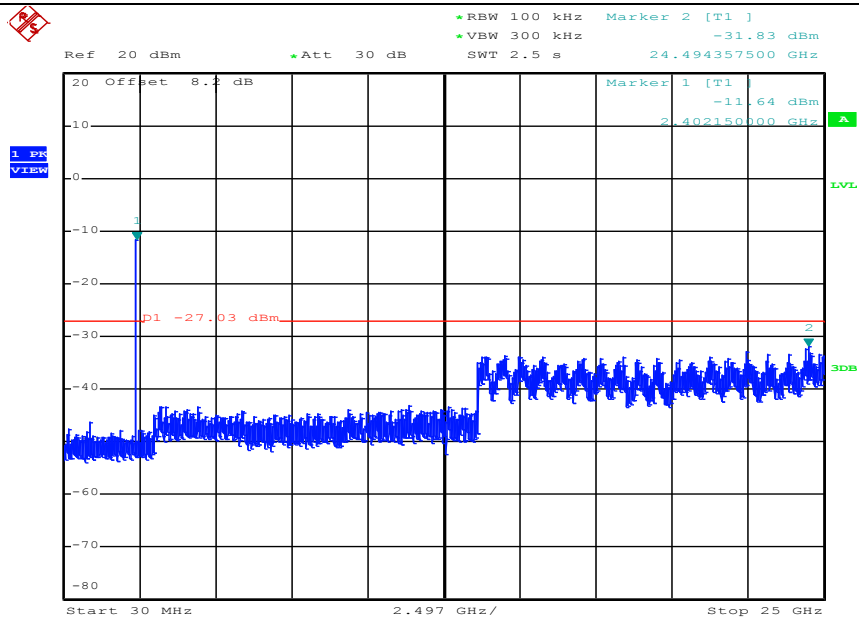
8DPSK_LCH_Graphs

Pref



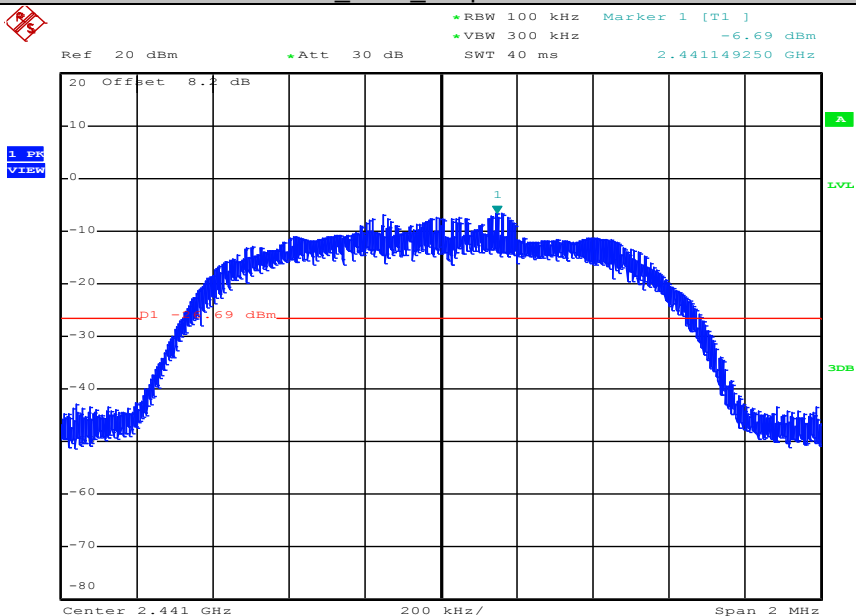
Date: 22.SEP.2019 16:16:36

Puw



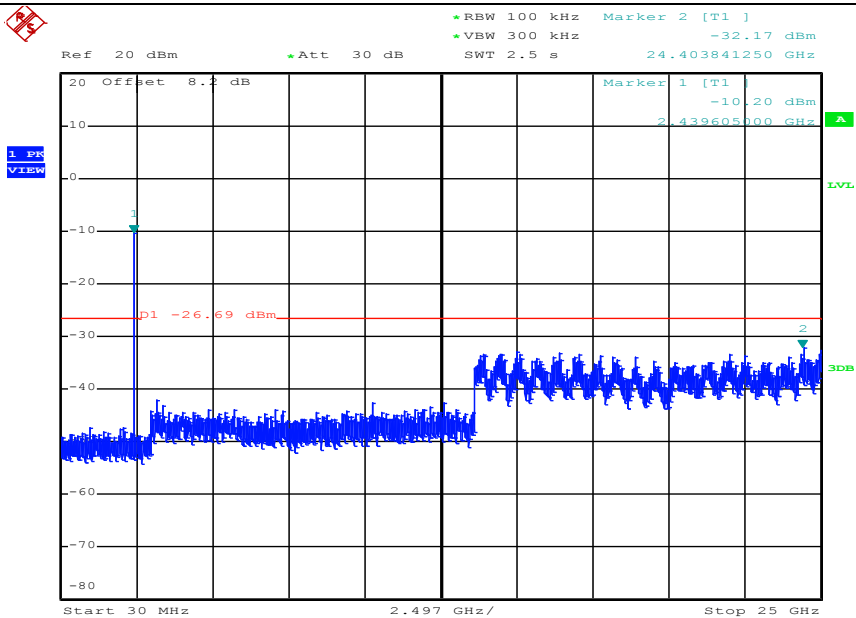
Date: 22.SEP.2019 16:16:50

Pref



Date: 22.SEP.2019 16:18:52

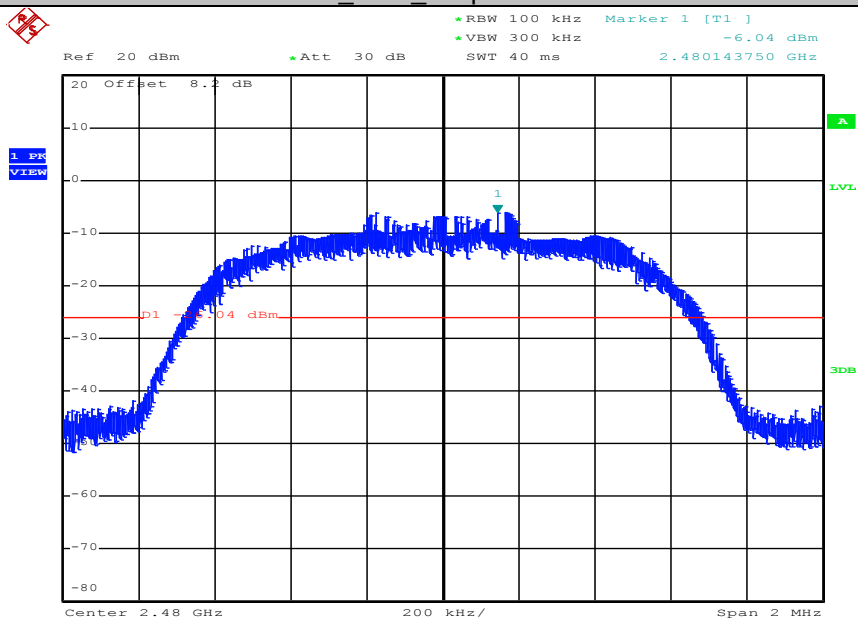
PuW



Date: 22.SEP.2019 16:19:06

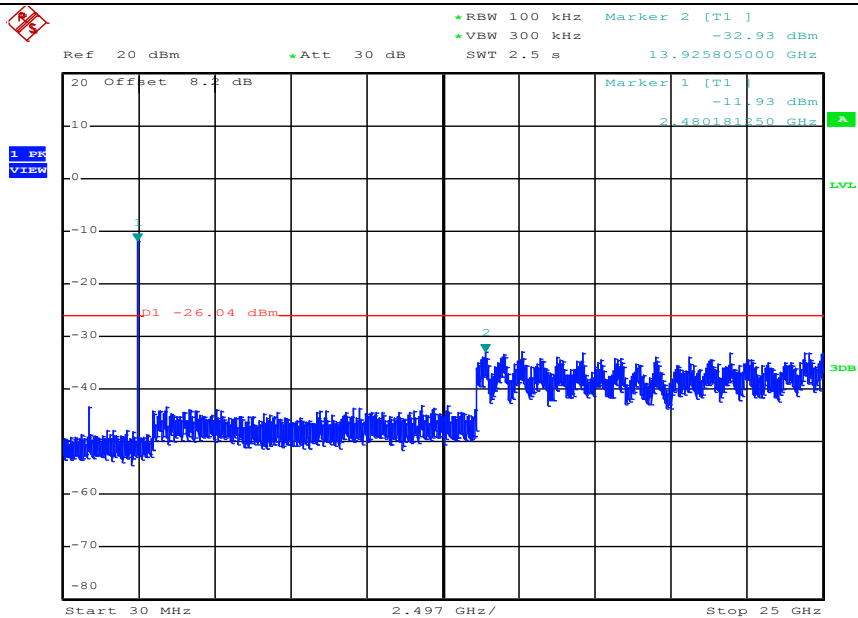
8DPSK_HCH_Graphs

Pref



Date: 22.SEP.2019 16:20:50

Puw



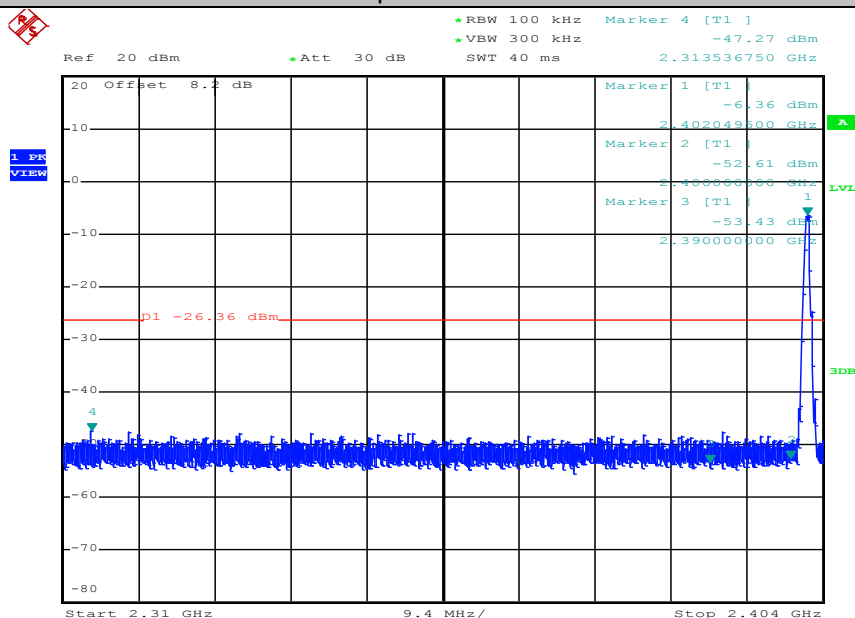
Date: 22.SEP.2019 16:21:04

A.7 Band-edge for RF Conducted Emissions

Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	-6.360	Off	-47.269	-26.36	PASS
			-5.320	On	-46.398	-25.32	PASS
	HCH	2480	-4.450	Off	-47.398	-24.45	PASS
			-4.650	On	-47.197	-24.65	PASS
$\pi/4$ DQPSK	LCH	2402	-7.920	Off	-47.142	-27.92	PASS
			-7.060	On	-46.968	-27.06	PASS
	HCH	2480	-6.140	Off	-46.898	-26.14	PASS
			-6.940	On	-46.425	-26.94	PASS
8DPSK	LCH	2402	-7.360	Off	-46.841	-27.36	PASS
			-6.990	On	-46.833	-26.99	PASS
	HCH	2480	-6.660	Off	-47.134	-26.66	PASS
			-6.660	On	-46.882	-26.66	PASS

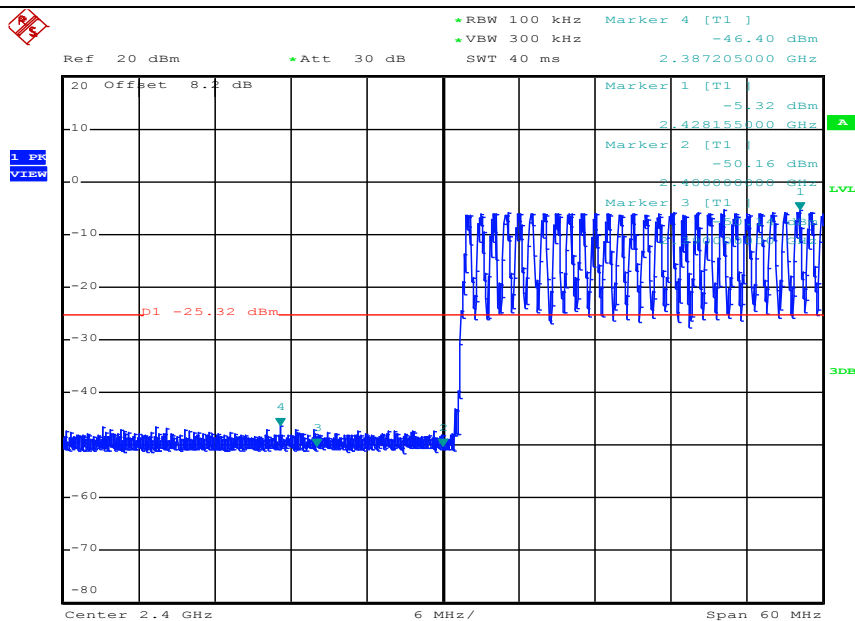
Test Graphs

GFSK/LCH/No Hop



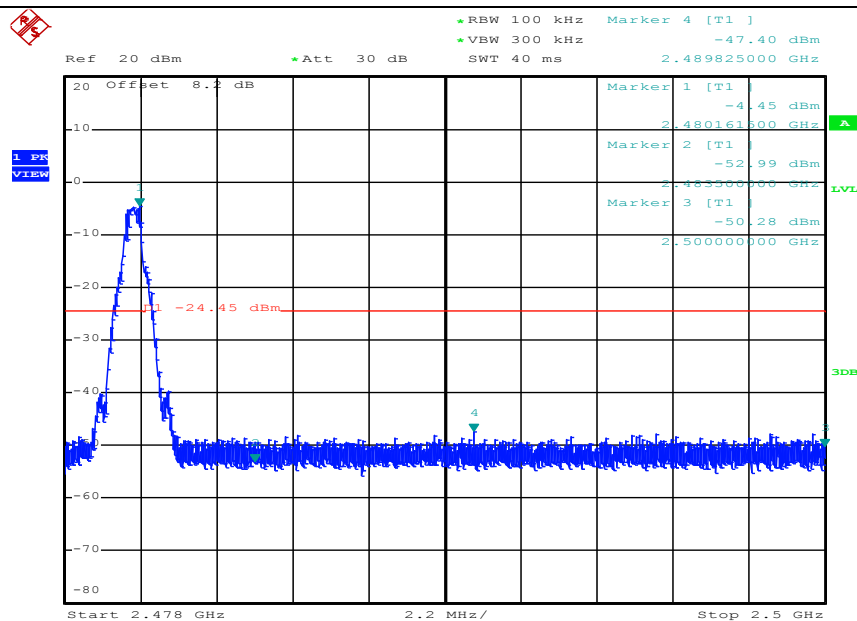
Date: 22.SEP.2019 16:01:14

GFSK/LCH/Hop



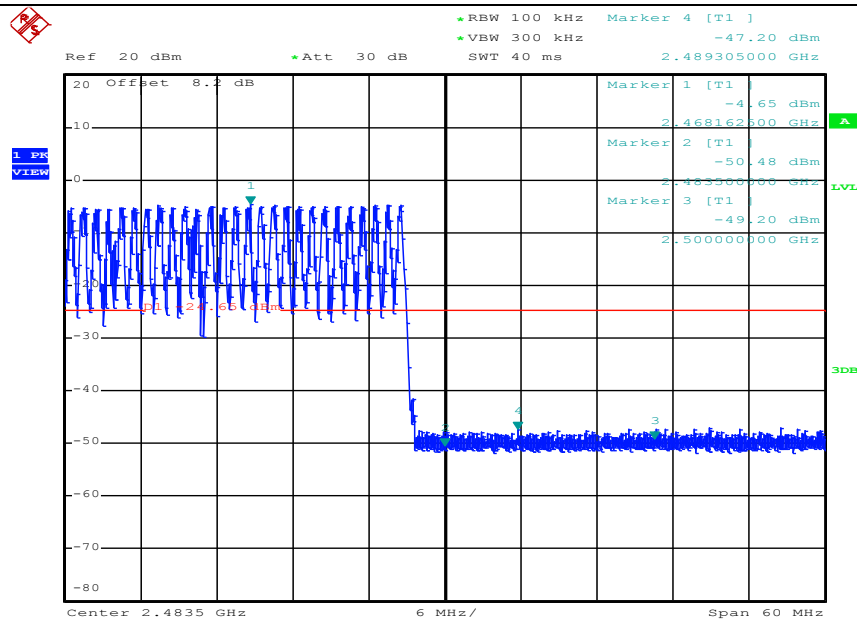
Date: 22.SEP.2019 15:37:51

GFSK/HCH/No Hop



Date: 22.SEP.2019 16:05:27

GFSK/HCH/Hop

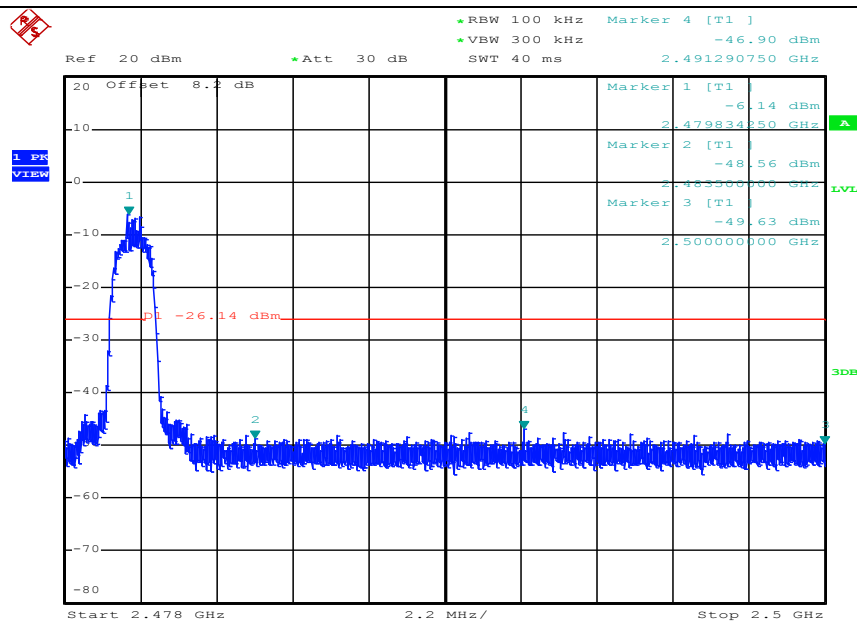


Date: 22.SEP.2019 15:40:11

Date: 22.SEP.2019 16:08:59

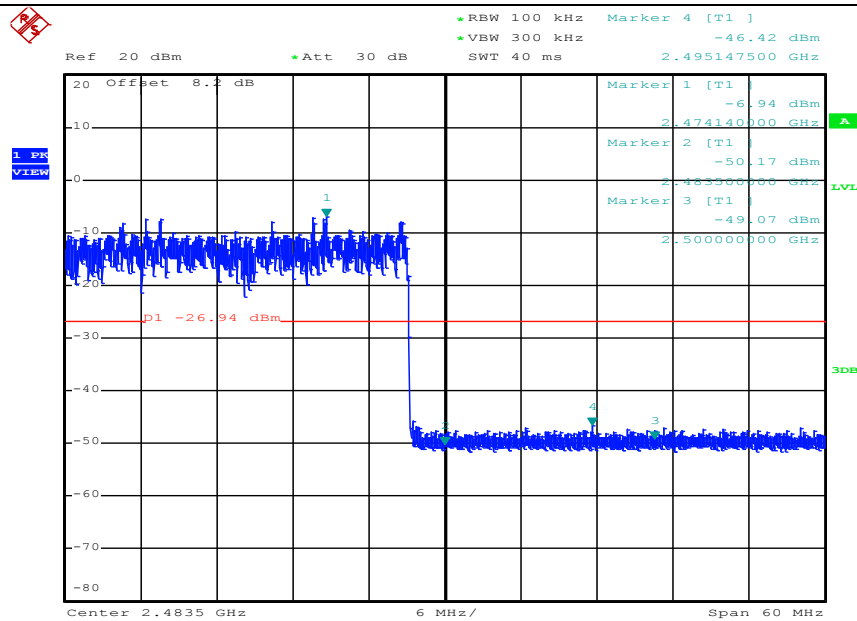
Date: 22.SEP.2019 15:44:18

$\pi/4$ DQPSK/HCH/No
Hop



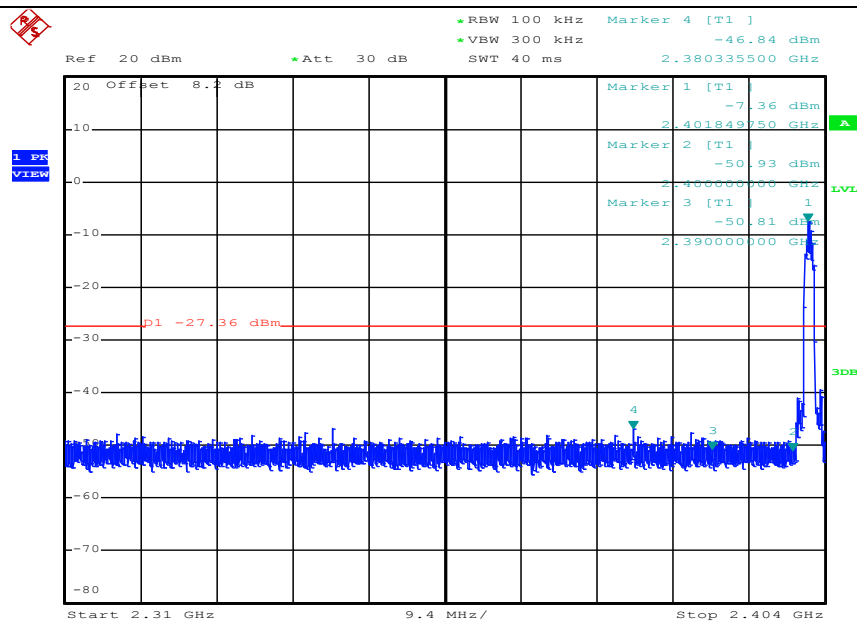
Date: 22.SEP.2019 16:13:46

$\pi/4$ DQPSK/HCH/Hop



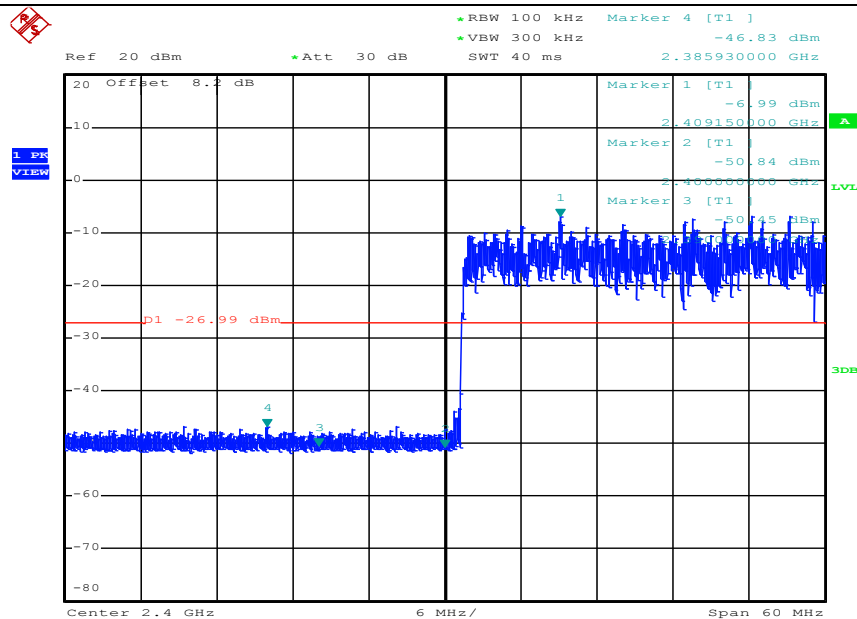
Date: 22.SEP.2019 15:47:17

8DPSK/LCH/No Hop



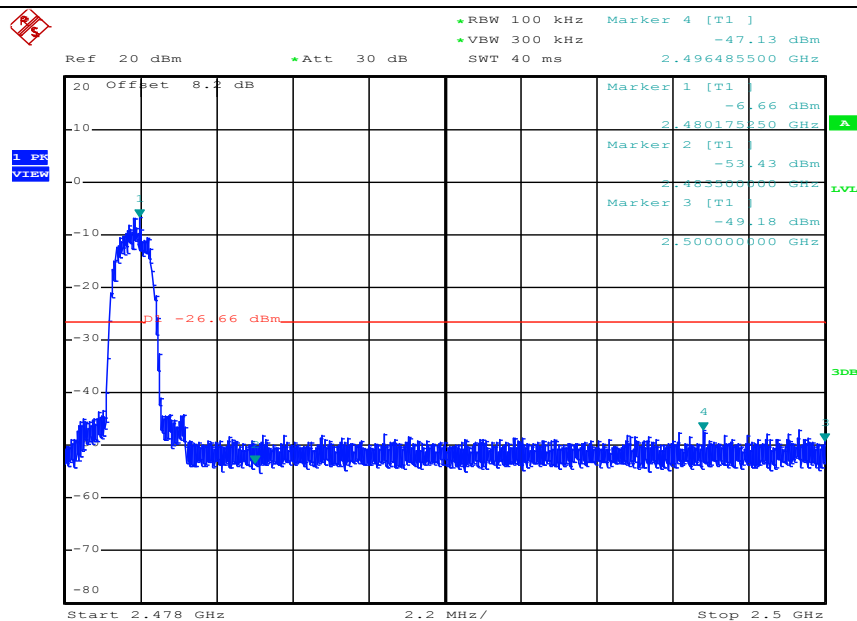
Date: 22.SEP.2019 16:16:23

8DPSK/LCH/Hop



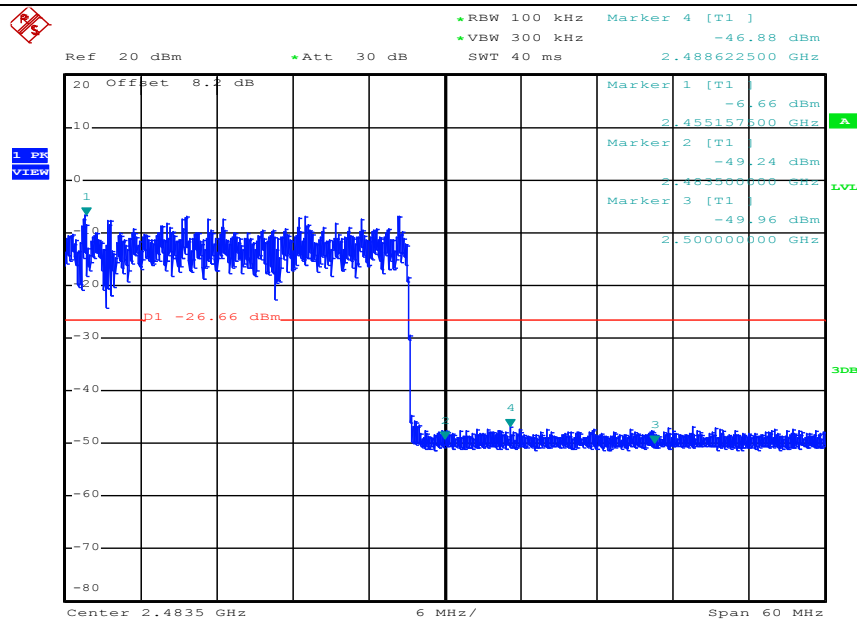
Date: 22.SEP.2019 15:51:28

8DPSK/HCH/No Hop



Date: 22.SEP.2019 16:20:37

8DPSK/HCH/Hop

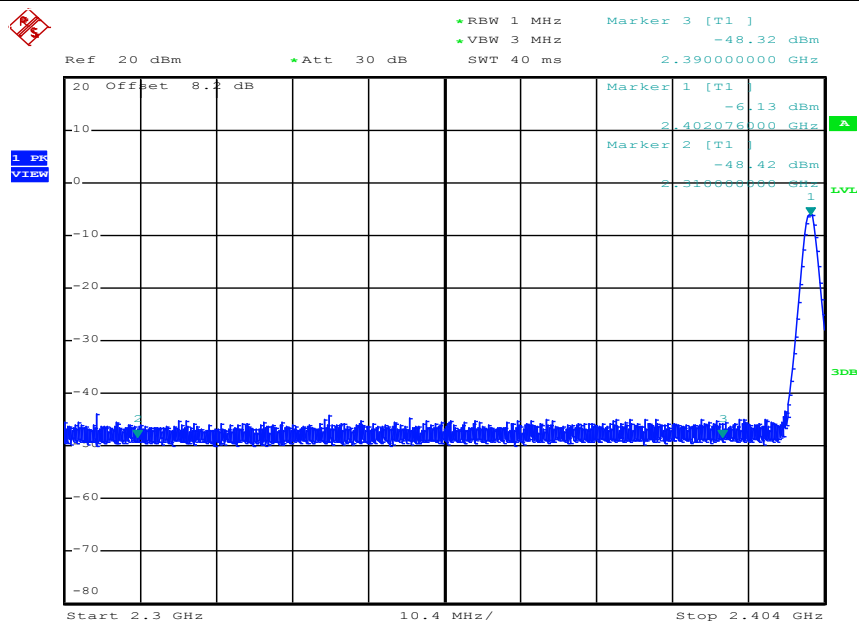


Date: 22.SEP.2019 15:55:08

A.8 Restrict-band band-edge measurements

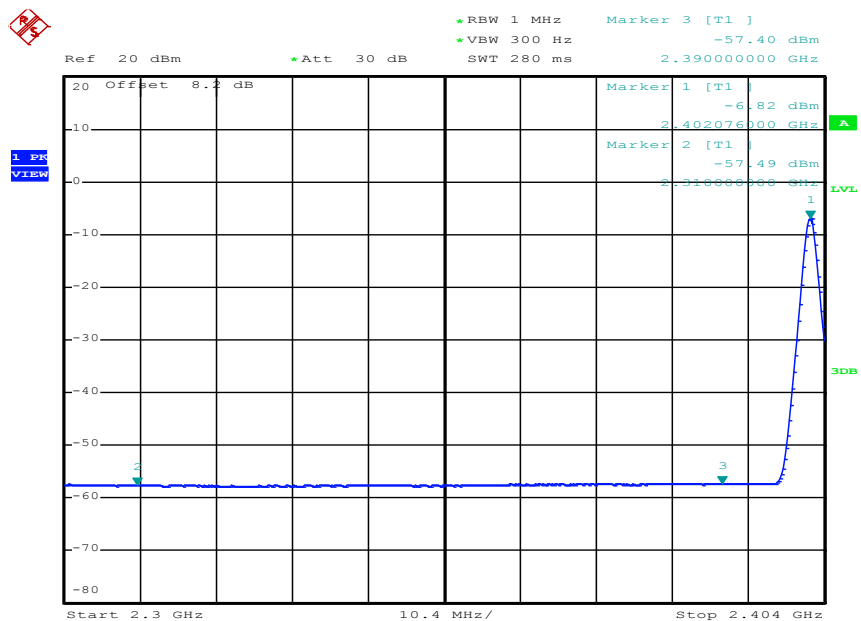
Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-48.42	2.0	0	46.84	PEAK	74	PASS
	Off	2310.0	-57.49	2.0	0	37.77	AV	54	PASS
	Off	2390.0	-48.32	2.0	0	46.94	PEAK	74	PASS
	Off	2390.0	-57.40	2.0	0	37.86	AV	54	PASS
	Off	2483.5	-42.31	2.0	0	52.95	PEAK	74	PASS
	Off	2483.5	-47.40	2.0	0	47.86	AV	54	PASS
	Off	2500.0	-48.13	2.0	0	47.13	PEAK	74	PASS
	Off	2500.0	-57.94	2.0	0	37.32	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-47.62	2.0	0	47.64	PEAK	74	PASS
	Off	2310.0	-57.67	2.0	0	37.59	AV	54	PASS
	Off	2390.0	-47.97	2.0	0	47.29	PEAK	74	PASS
	Off	2390.0	-57.36	2.0	0	37.90	AV	54	PASS
	Off	2483.5	-42.90	2.0	0	52.36	PEAK	74	PASS
	Off	2483.5	-50.02	2.0	0	45.24	AV	54	PASS
	Off	2500.0	-47.16	2.0	0	48.10	PEAK	74	PASS
	Off	2500.0	-57.96	2.0	0	37.30	AV	54	PASS
8DPSK	Off	2310.0	-48.62	2.0	0	46.64	PEAK	74	PASS
	Off	2310.0	-57.59	2.0	0	37.67	AV	54	PASS
	Off	2390.0	-47.95	2.0	0	47.31	PEAK	74	PASS
	Off	2390.0	-57.33	2.0	0	37.93	AV	54	PASS
	Off	2483.5	-44.16	2.0	0	51.10	PEAK	74	PASS
	Off	2483.5	-49.88	2.0	0	45.38	AV	54	PASS
	Off	2500.0	-47.93	2.0	0	47.33	PEAK	74	PASS
	Off	2500.0	-57.94	2.0	0	37.32	AV	54	PASS

Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



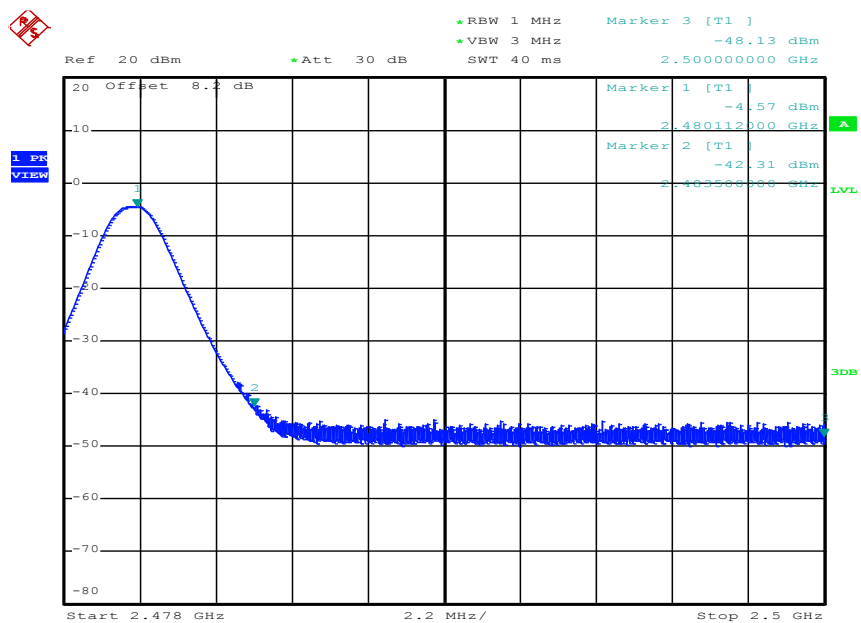
Date: 22.SEP.2019 16:02:00

Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)



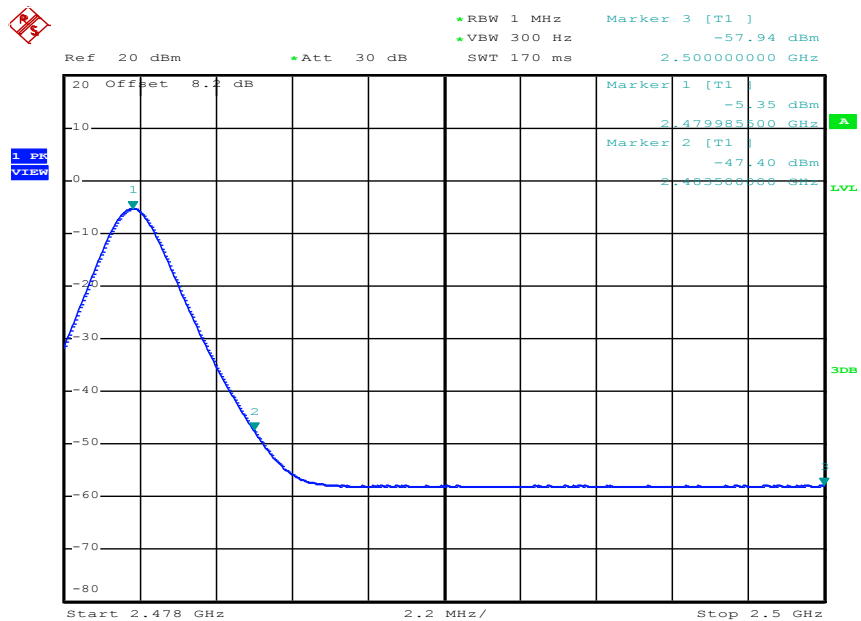
Date: 22.SEP.2019 16:02:13

Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)

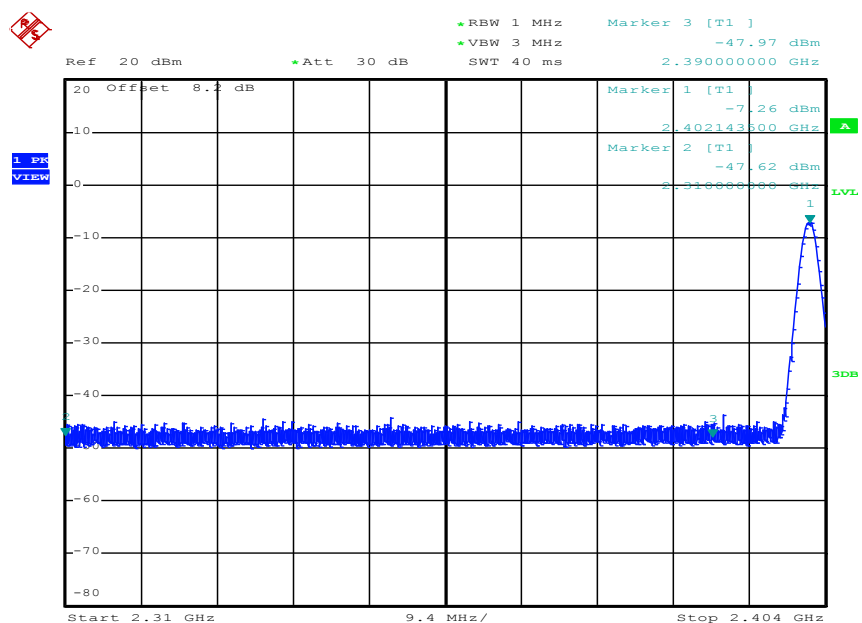


Date: 22.SEP.2019 16:07:06

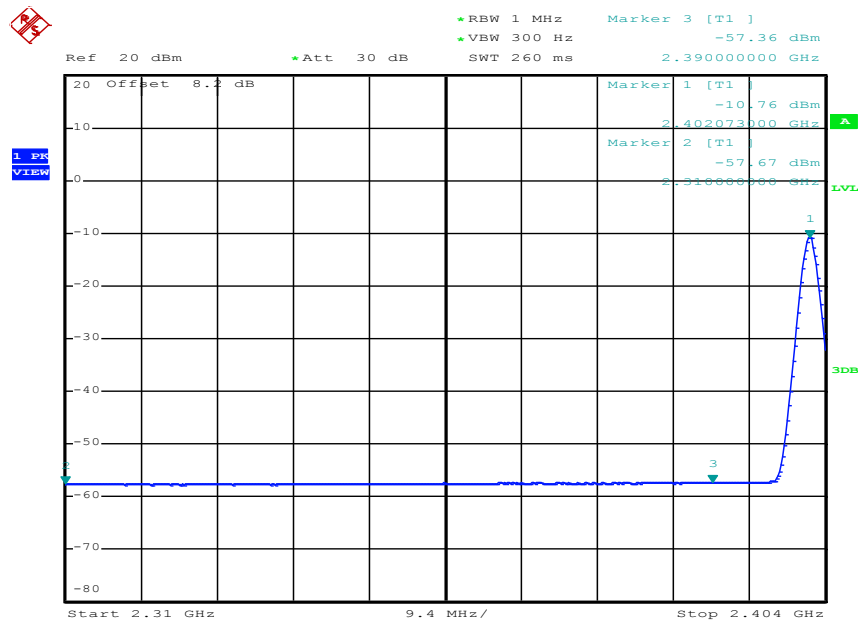
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



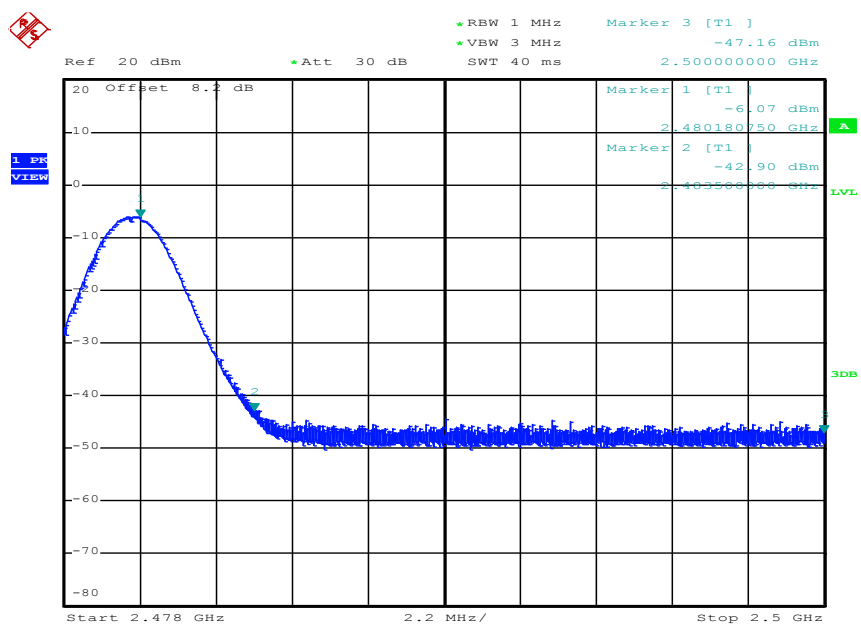
Date: 22.SEP.2019 16:07:20

Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)

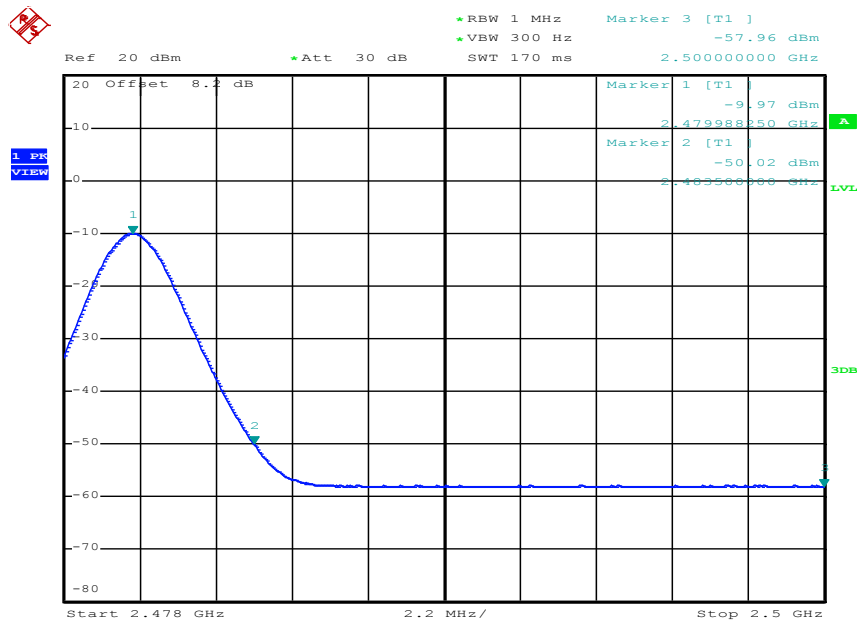
Date: 22.SEP.2019 16:09:45

Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)

Date: 22.SEP.2019 16:09:58

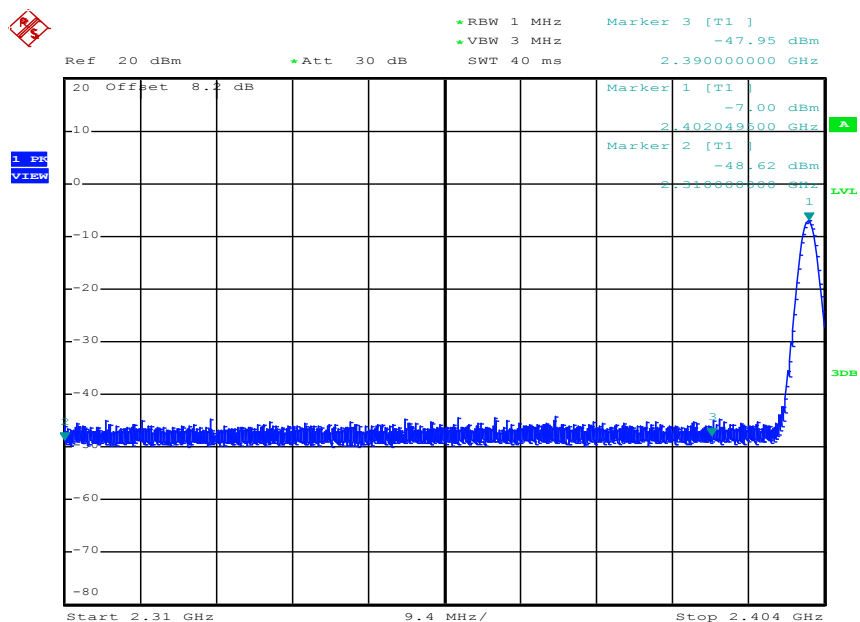
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (High Channel)

Date: 22.SEP.2019 16:14:33

Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (High Channel)

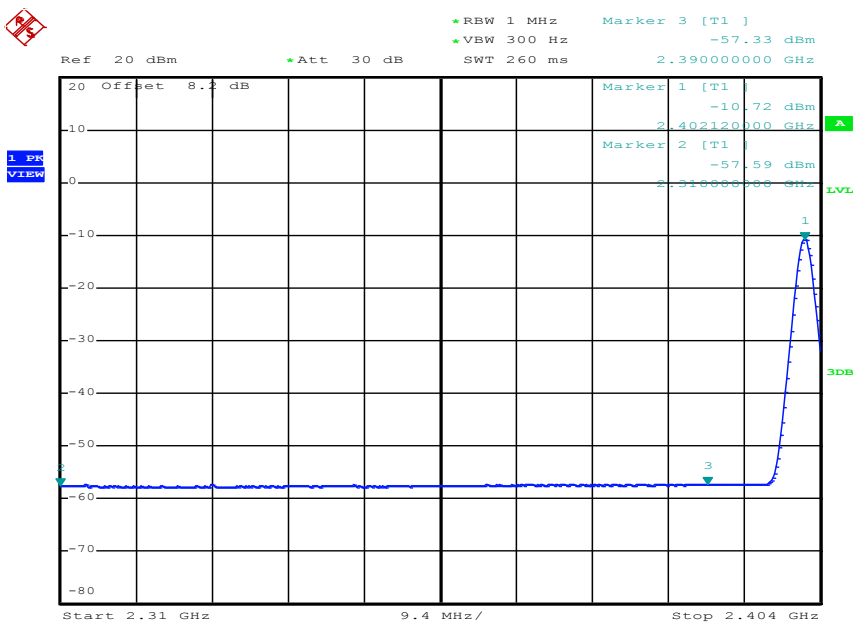
Date: 22.SEP.2019 16:14:46

Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



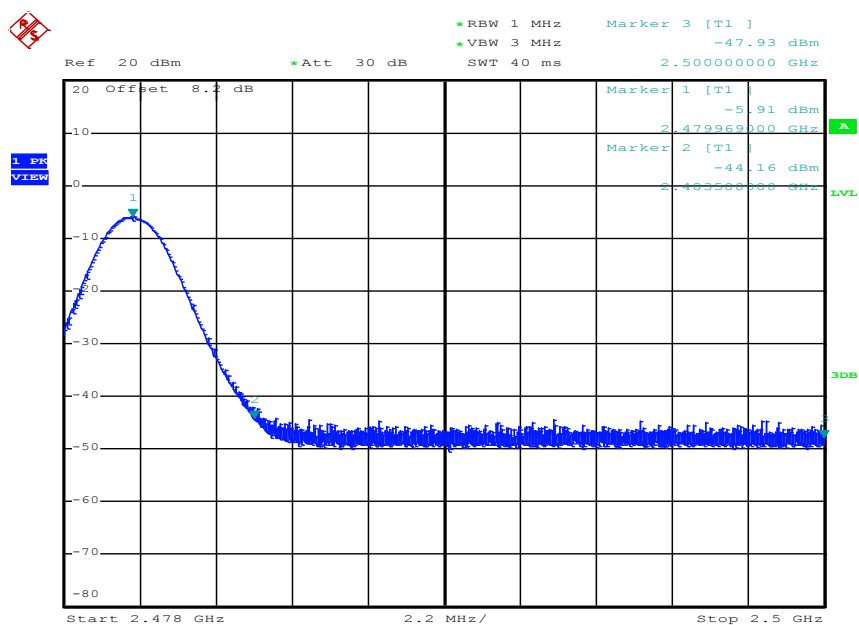
Date: 22.SEP.2019 16:17:09

Restrict-band band-edge measurements_Hopping Off_8DPSK_Average (Low Channel)



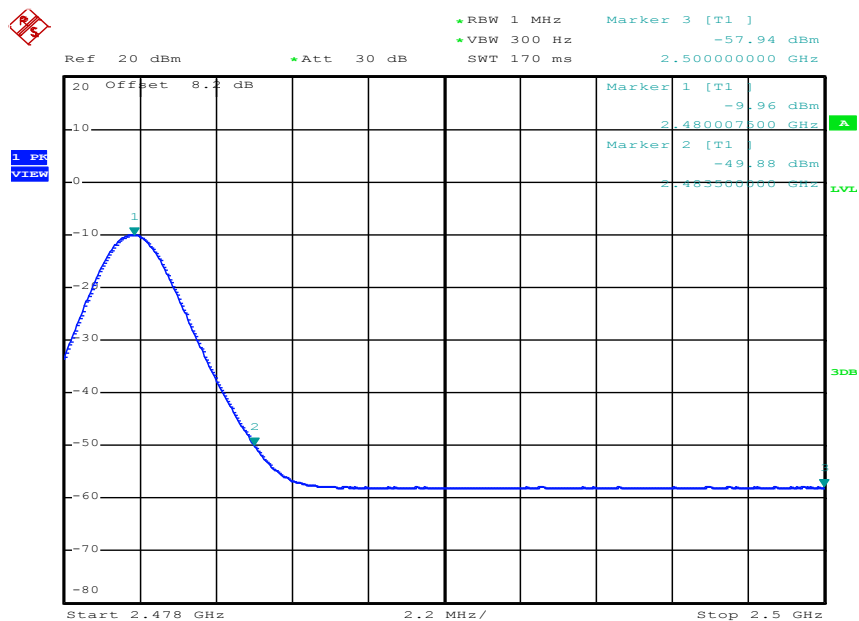
Date: 22.SEP.2019 16:17:22

Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (High Channel)



Date: 22.SEP.2019 16:21:23

Restrict-band band-edge measurements_Hopping Off_8DPSK_Average (High Channel)



Date: 22.SEP.2019 16:21:37