

## Appendix A

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

Product Name: Bluetooth karaoke speaker

Trade Mark: N/A

Test Model: SP-052

Additional Model No.: MI-S041S-101, MI-S041S-199

#### Environmental Conditions

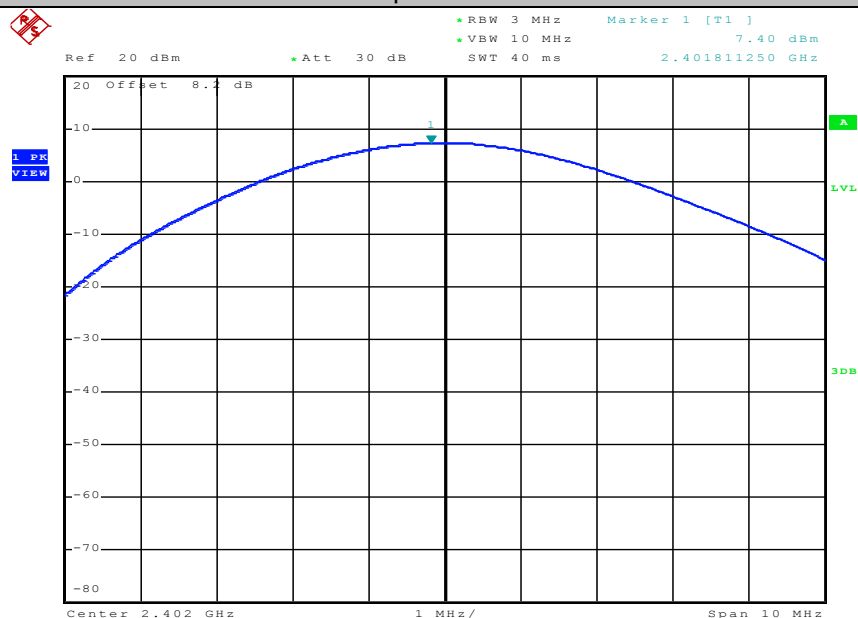
|                    |             |
|--------------------|-------------|
| Temperature:       | 24.8°C      |
| Relative Humidity: | 54.2%       |
| ATM Pressure:      | 100.0 kPa   |
| Test Engineer:     | Li Huan     |
| Supervised by:     | Wang.Chuang |

#### A.1 Maximum Conducted Peak Output Power

| Mode          | Channel. | Maximum Peak Output Power [dBm] | Limit [dBm] | Verdict |
|---------------|----------|---------------------------------|-------------|---------|
| GFSK          | LCH      | 7.400                           | 30          | PASS    |
|               | MCH      | 1.140                           | 30          | PASS    |
|               | HCH      | 1.780                           | 30          | PASS    |
| $\pi/4$ DQPSK | LCH      | 0.830                           | 21          | PASS    |
|               | MCH      | 0.380                           | 21          | PASS    |
|               | HCH      | 1.020                           | 21          | PASS    |

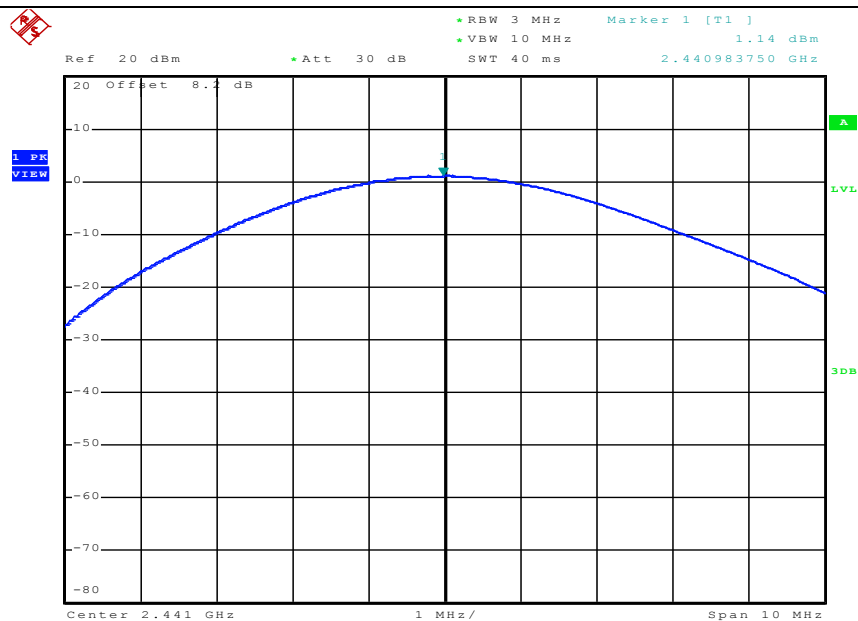
# Test Graphs

GFSK/LCH



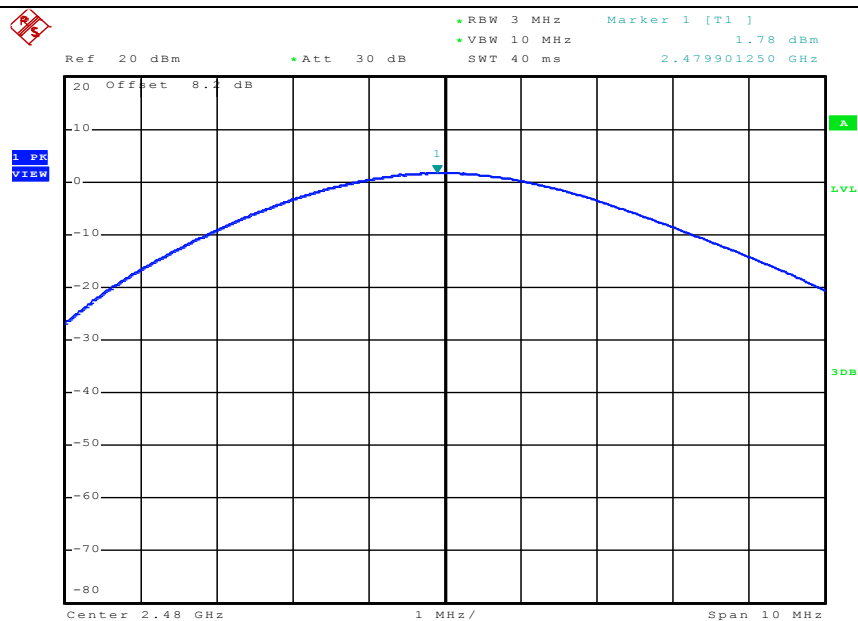
Date: 27.AUG.2019 14:50:09

GFSK/MCH

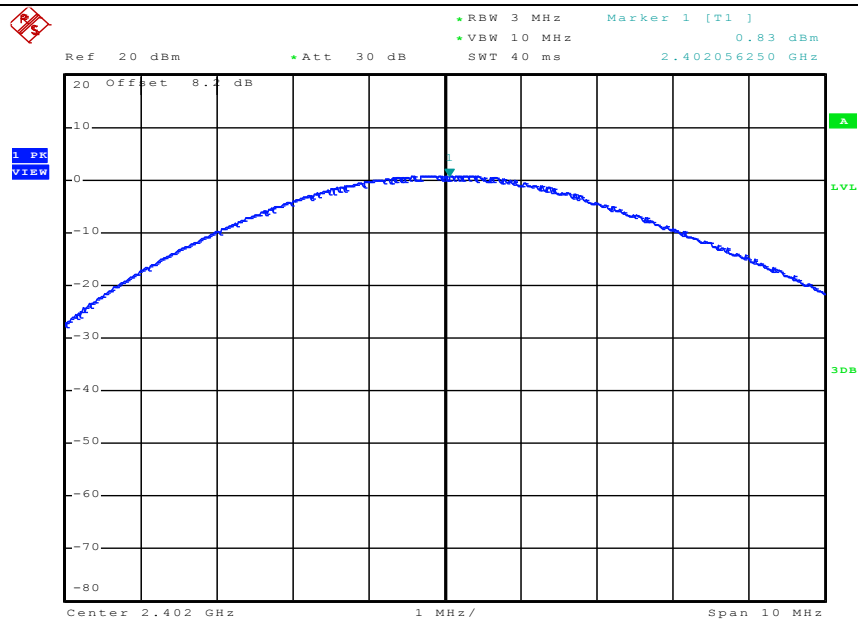


Date: 27.AUG.2019 14:54:18

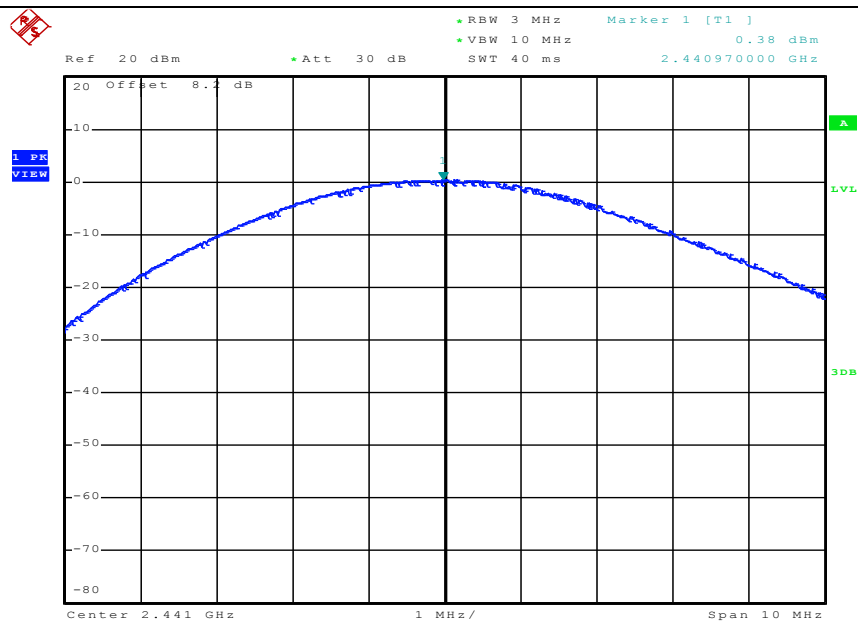
GFSK/HCH



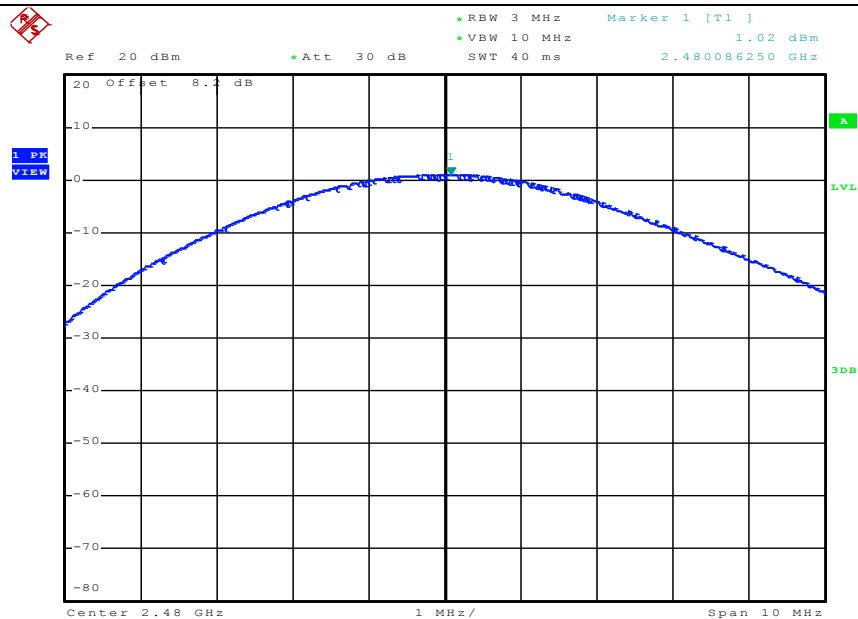
Date: 27.AUG.2019 14:55:59

 $\pi/4$ DQPSK/LCH

Date: 27.AUG.2019 14:58:30

$\pi/4$ DQPSK/MCH

Date: 27.AUG.2019 15:00:58

 $\pi/4$ DQPSK/HCH

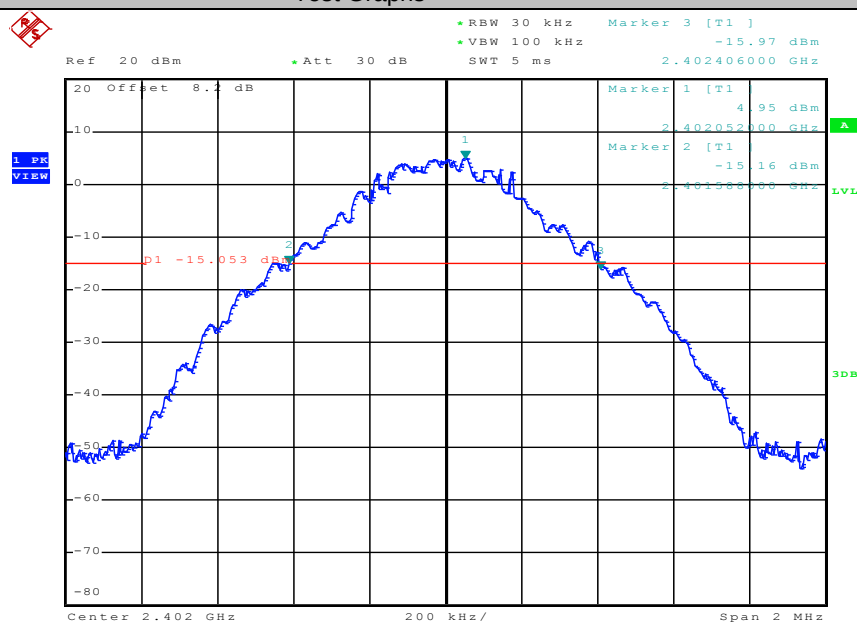
Date: 27.AUG.2019 15:02:40

## A.2 20dB Bandwidth

| Mode          | Channel. | 20dB Bandwidth [MHz] | Limit [MHz]   | Verdict |
|---------------|----------|----------------------|---------------|---------|
| GFSK          | LCH      | 0.818                | Not Specified | PASS    |
|               | MCH      | 0.858                | Not Specified | PASS    |
|               | HCH      | 0.862                | Not Specified | PASS    |
| $\pi/4$ DQPSK | LCH      | 1.286                | Not Specified | PASS    |
|               | MCH      | 1.260                | Not Specified | PASS    |
|               | HCH      | 1.262                | Not Specified | PASS    |

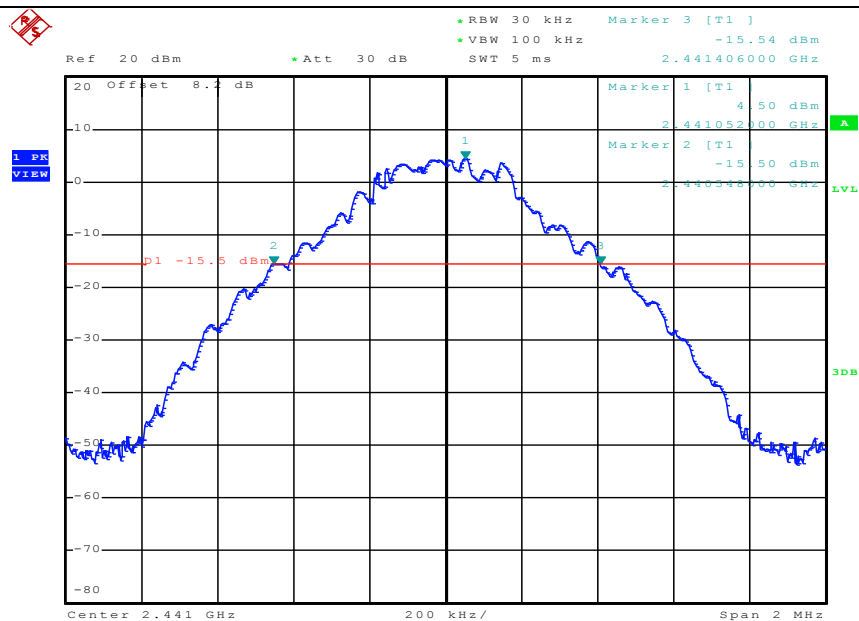
Test Graphs

GFSK/LCH



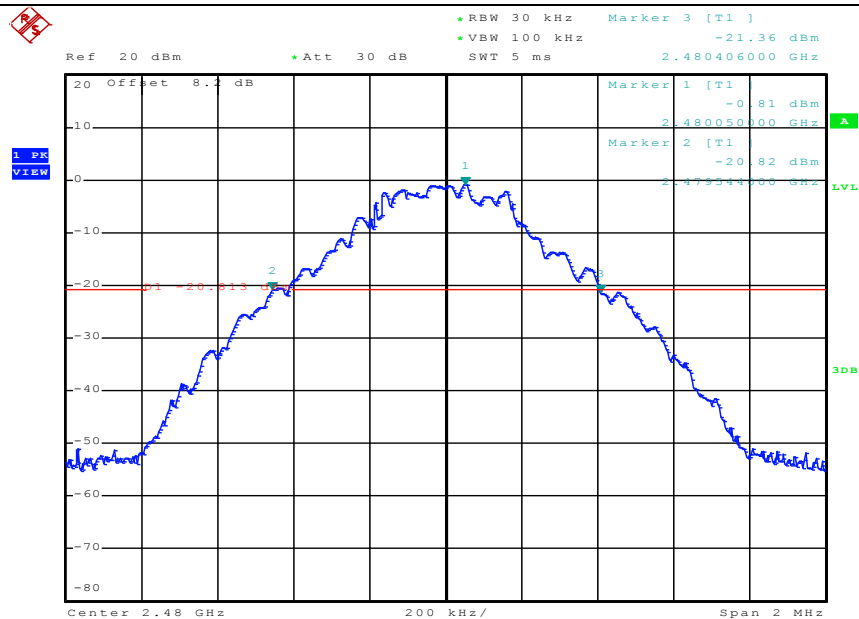
Date: 27.AUG.2019 14:49:32

GFSK/MCH

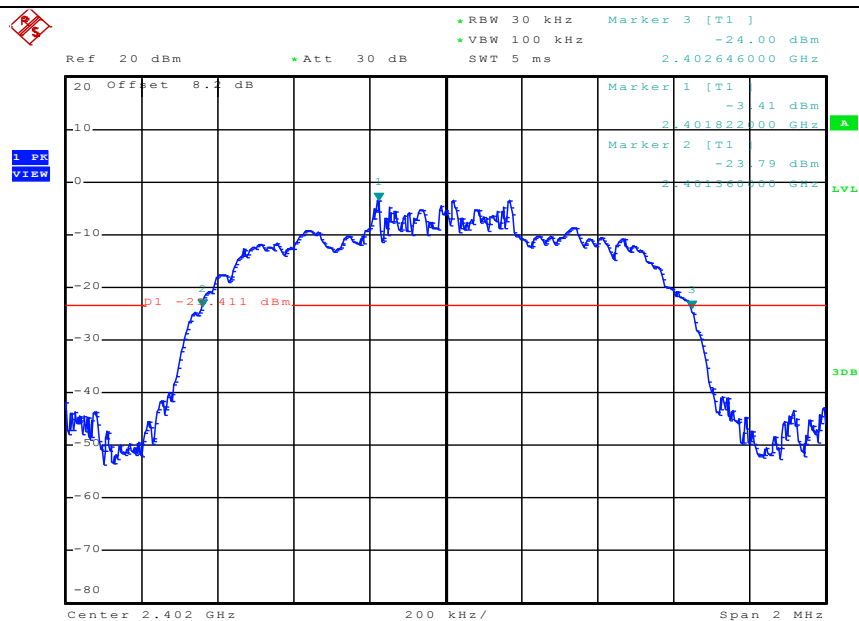


Date: 27.AUG.2019 14:51:59

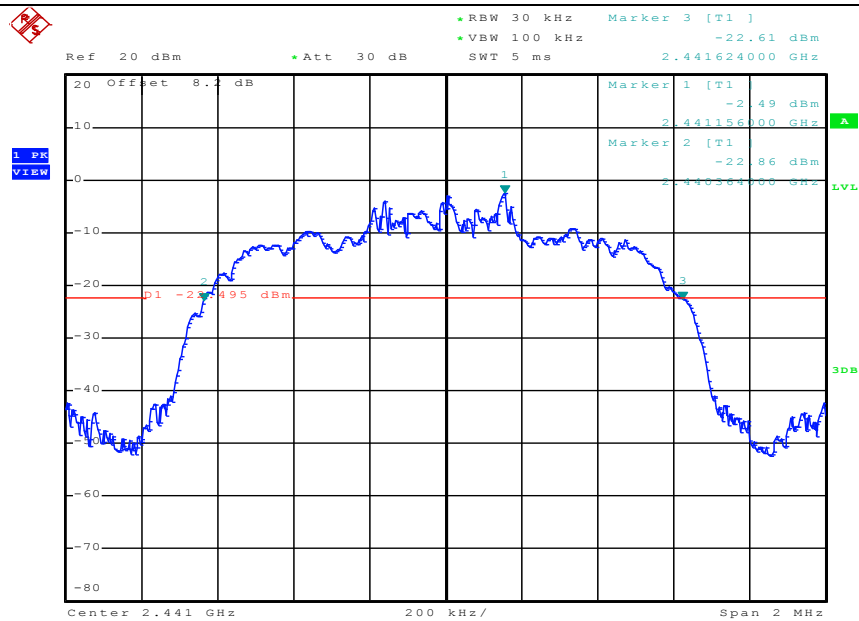
GFSK/HCH



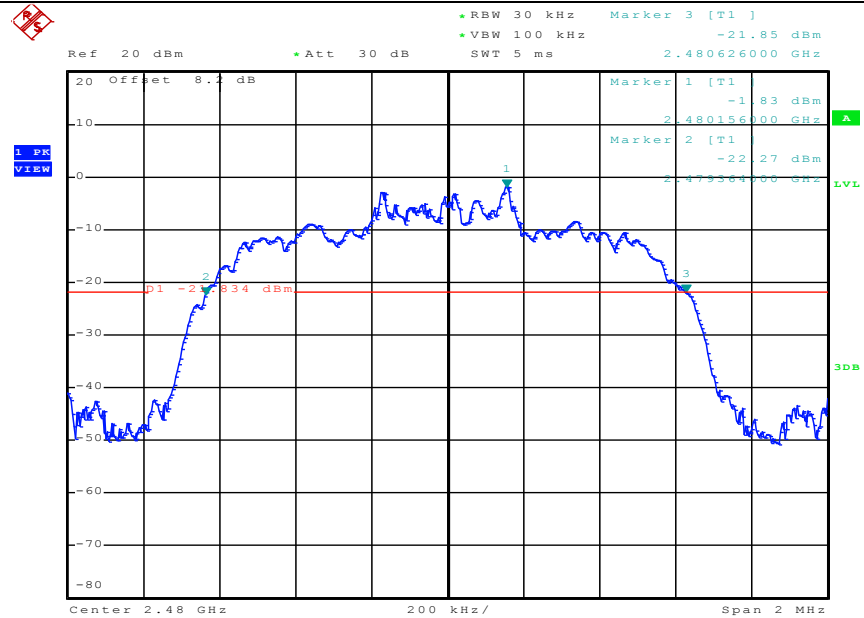
Date: 27.AUG.2019 14:55:23

$\pi/4$ DQPSK/LCH

Date: 27.AUG.2019 14:57:54

 $\pi/4$ DQPSK/MCH

Date: 27.AUG.2019 15:00:21

$\pi/4$ DQPSK/HCH

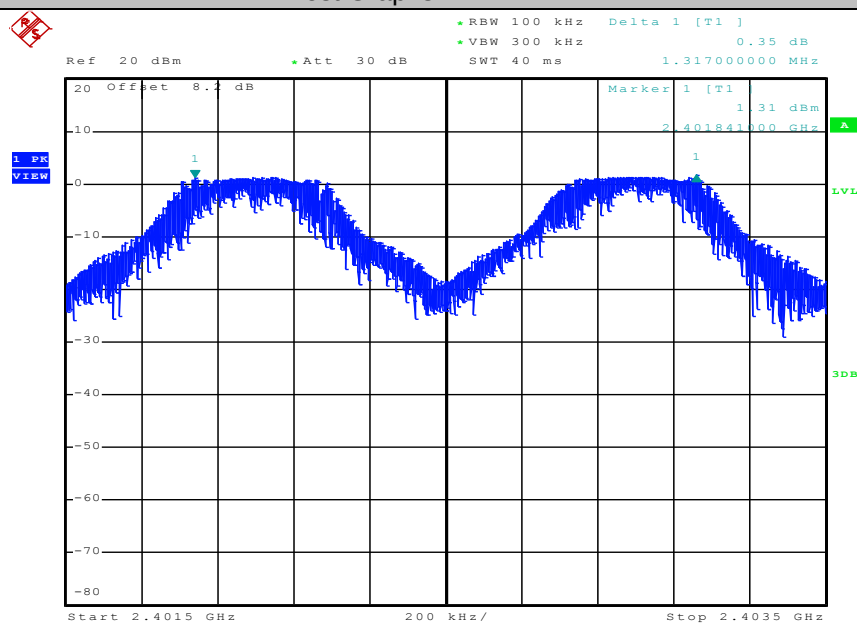
Date: 27.AUG.2019 15:02:03

### A.3 Carrier Frequency Separation

| Mode          | Channel. | Carrier Frequency Separation [MHz] | Limit [MHz] | Verdict |
|---------------|----------|------------------------------------|-------------|---------|
| GFSK          | LCH      | 1.317                              | 0.575       | PASS    |
|               | MCH      | 1.086                              | 0.575       | PASS    |
|               | HCH      | 1.042                              | 0.575       | PASS    |
| $\pi$ /4DQPSK | LCH      | 1.002                              | 0.857       | PASS    |
|               | MCH      | 1.308                              | 0.857       | PASS    |
|               | HCH      | 0.872                              | 0.857       | PASS    |

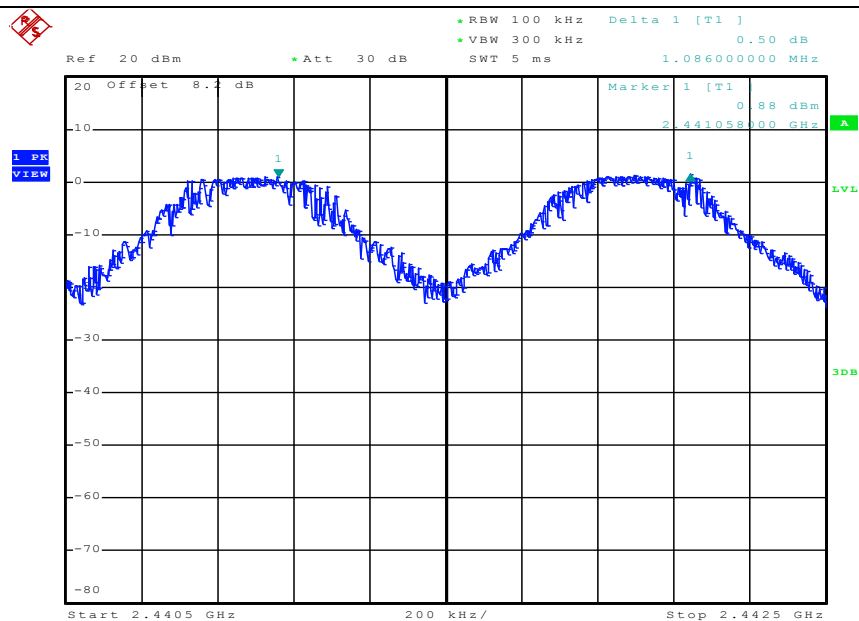
#### Test Graphs

GFSK/LCH



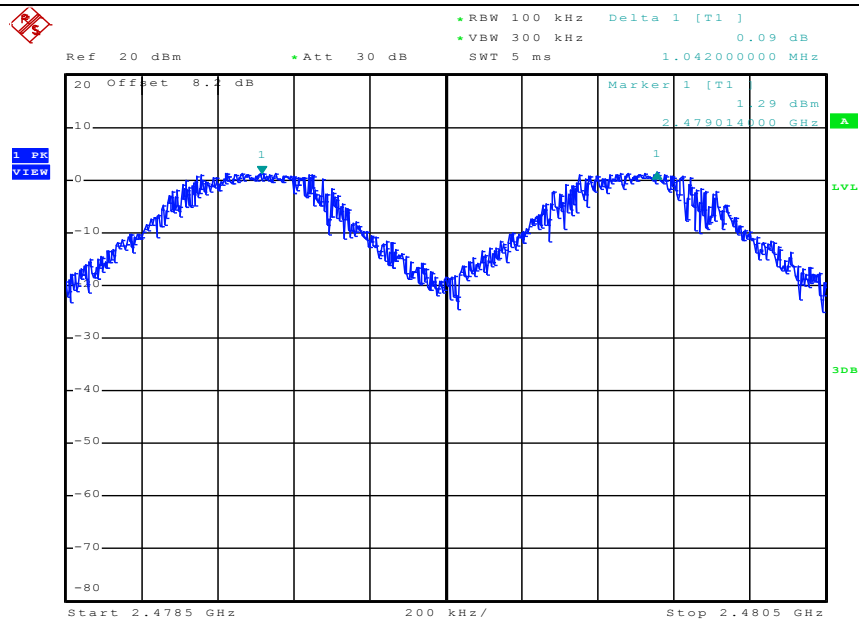
Date: 27.AUG.2019 15:05:33

GFSK/MCH

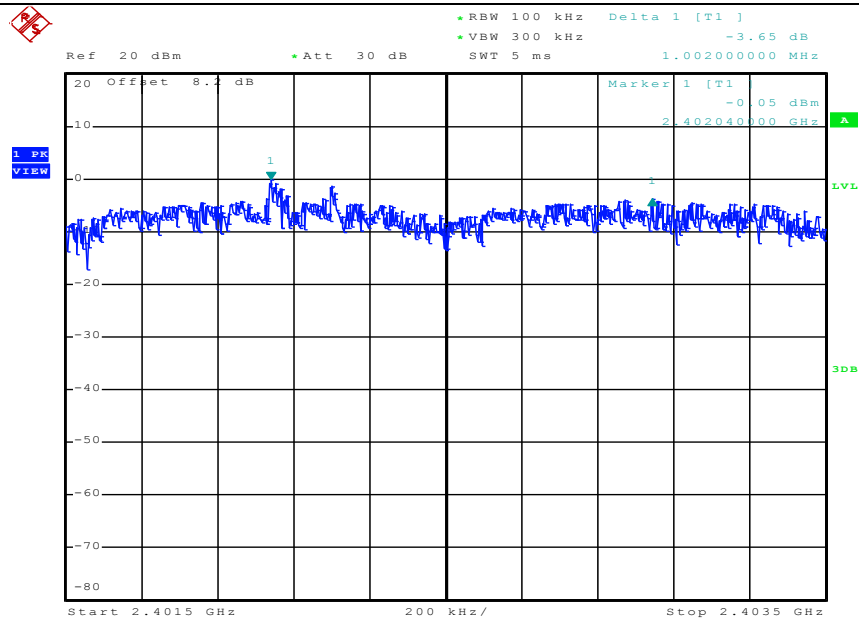


Date: 27.AUG.2019 15:07:16

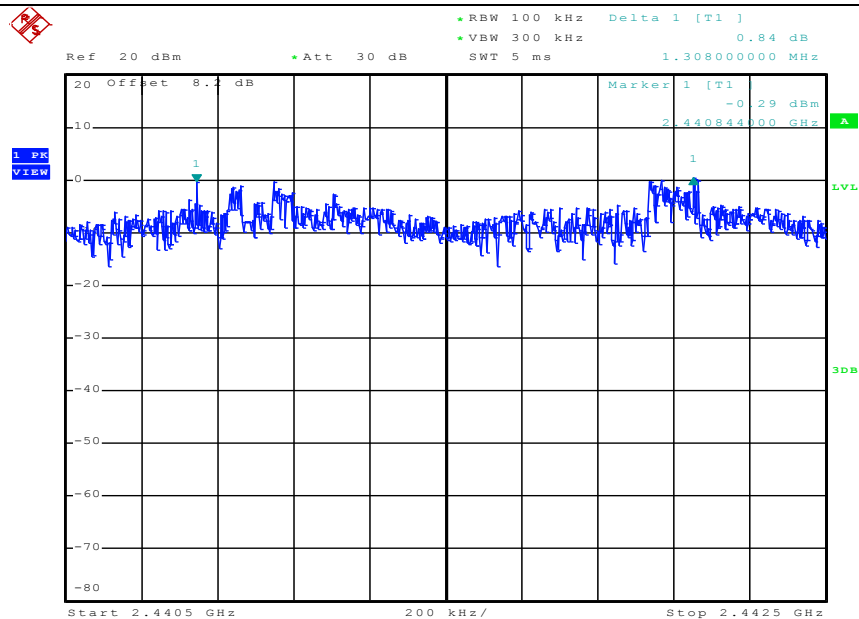
GFSK/HCH



Date: 27.AUG.2019 15:07:41

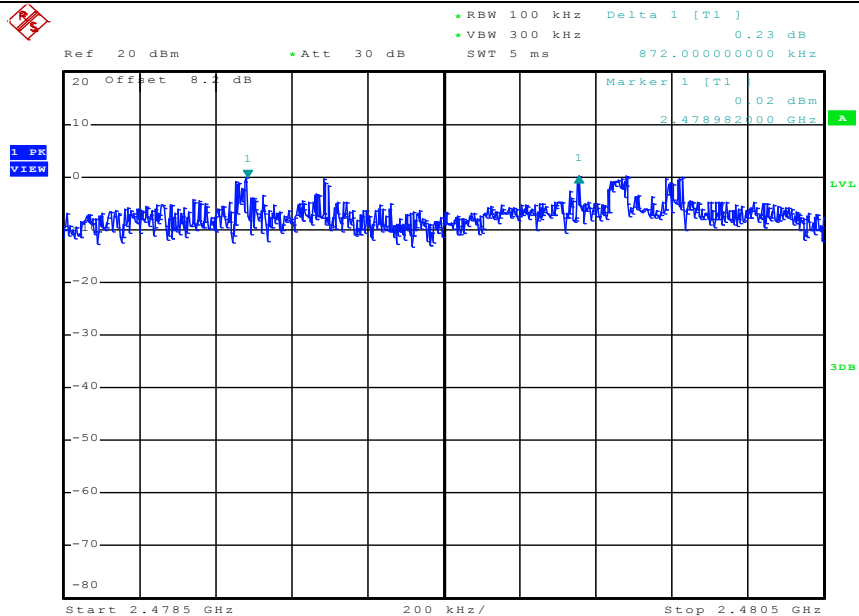
$\pi/4$ DQPSK/LCH

Date: 27.AUG.2019 15:12:20

 $\pi/4$ DQPSK/MCH

Date: 27.AUG.2019 15:14:28

$\pi/4$ DQPSK/HCH



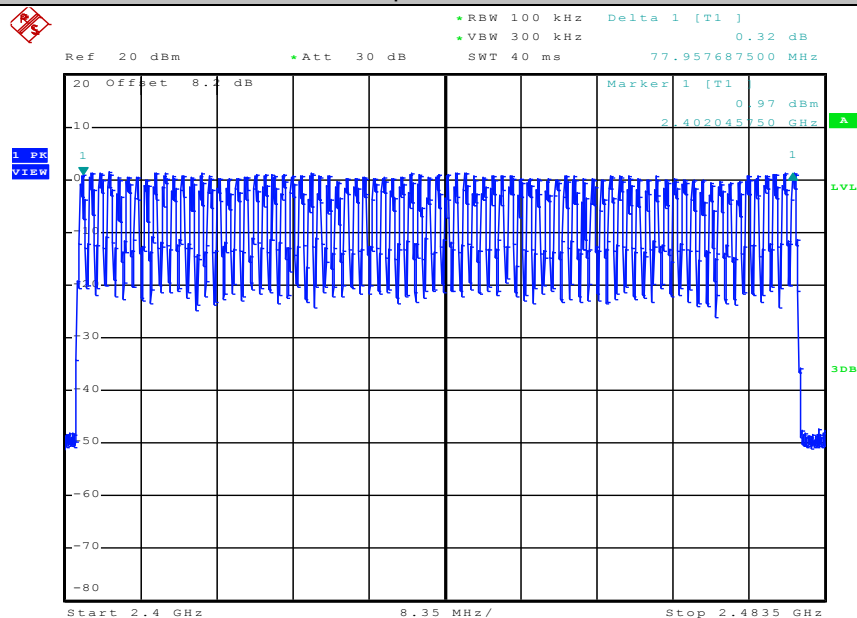
Date: 27.AUG.2019 15:19:20

## A.4 Hopping Channel Number

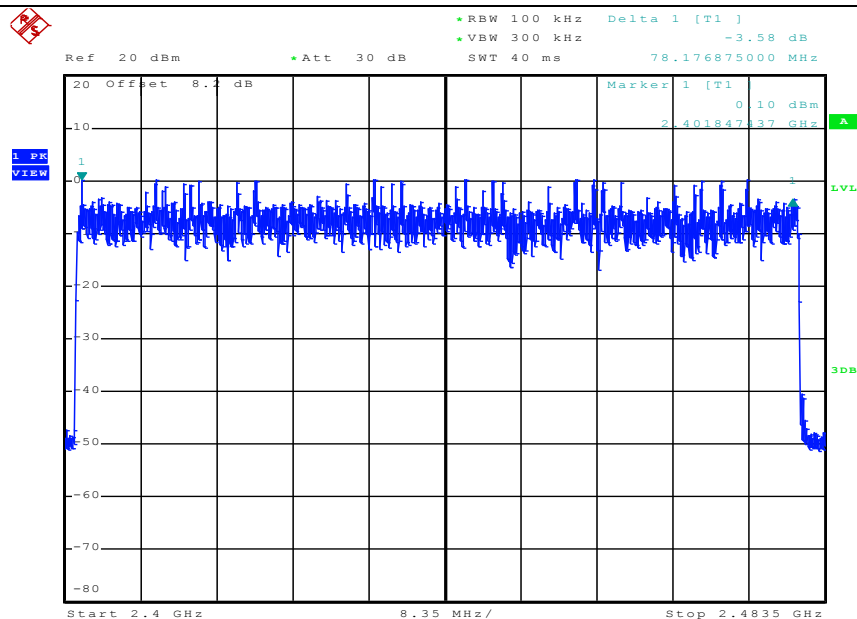
| Mode          | Channel. | Number of Hopping Channel [N] | Limit [N] | Verdict |
|---------------|----------|-------------------------------|-----------|---------|
| GFSK          | Hop      | 79                            | >=15      | PASS    |
| $\pi/4$ DQPSK | Hop      | 79                    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

### Test Graphs

GFSK/Hop



Date: 27.AUG.2019 15:10:56

 $\pi/4$ DQPSK/Hop

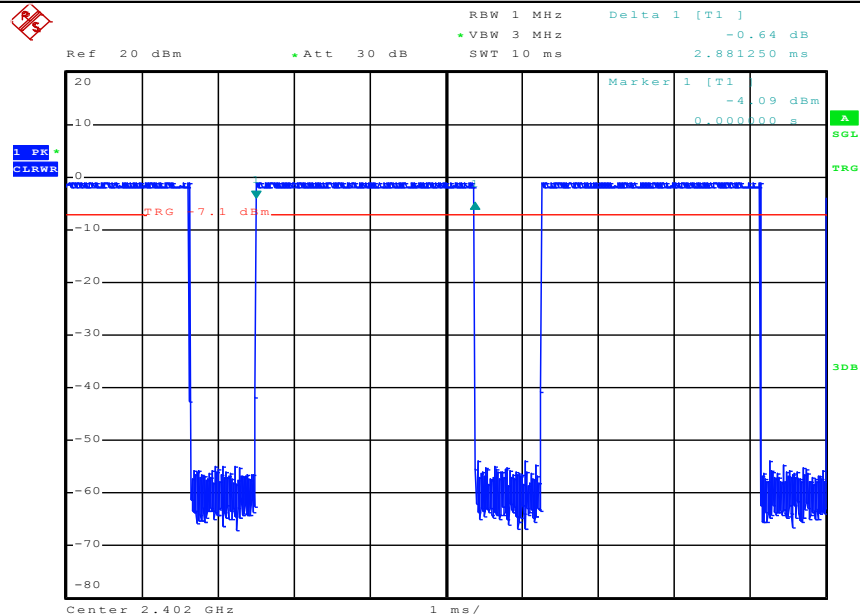
Date: 27.AUG.2019 15:18:32

## A.5 Dwell Time

| Mode          | Packet | Channel | Burst Width<br>[ms/hop/ch] | Total<br>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                 | 0.307         | 0.4       | PASS    |
|               | 2DH5   | HCH     | 2.88                       | 106.7                 | 0.307         | 0.4       | PASS    |

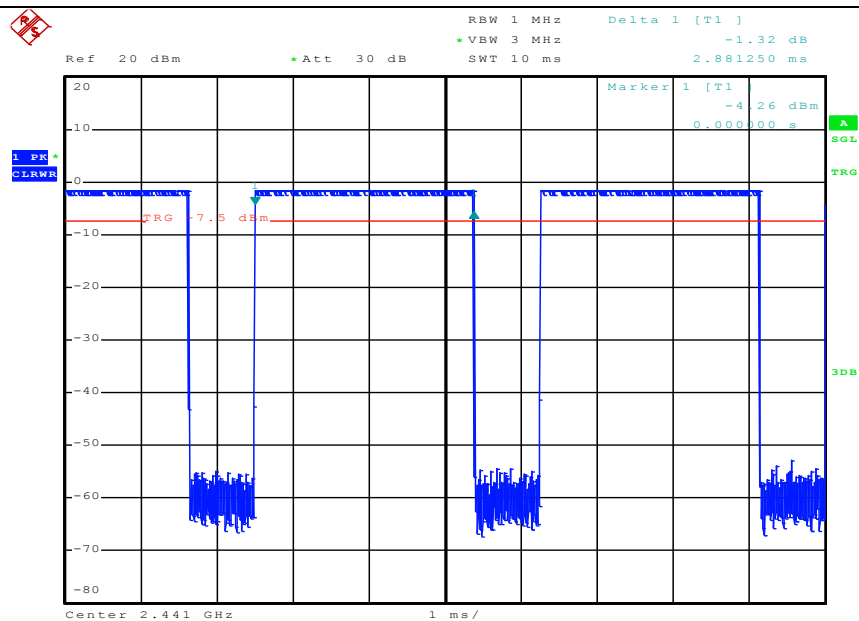
### Test Graphs

GFSK\_DH5/LCH



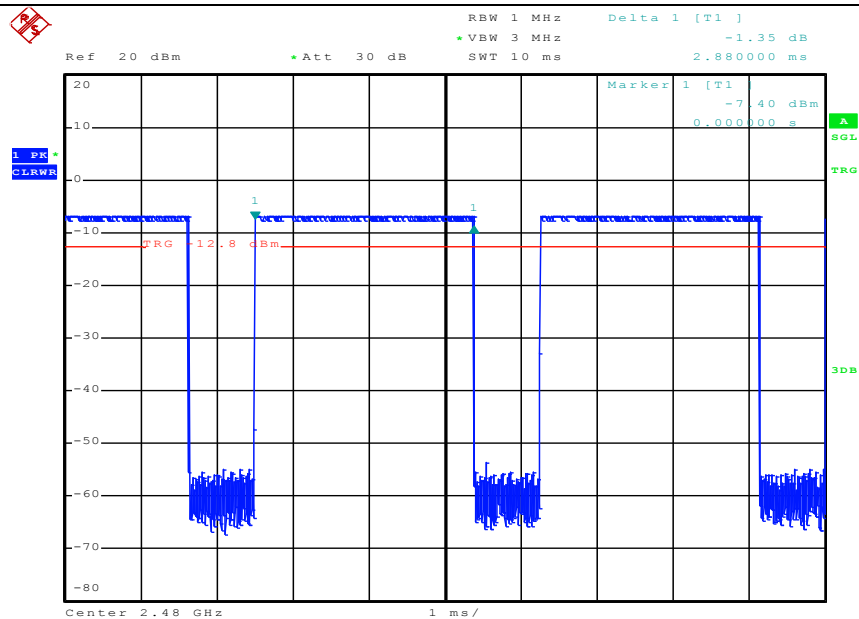
Date: 27.AUG.2019 14:49:54

GFSK\_DH5/MCH



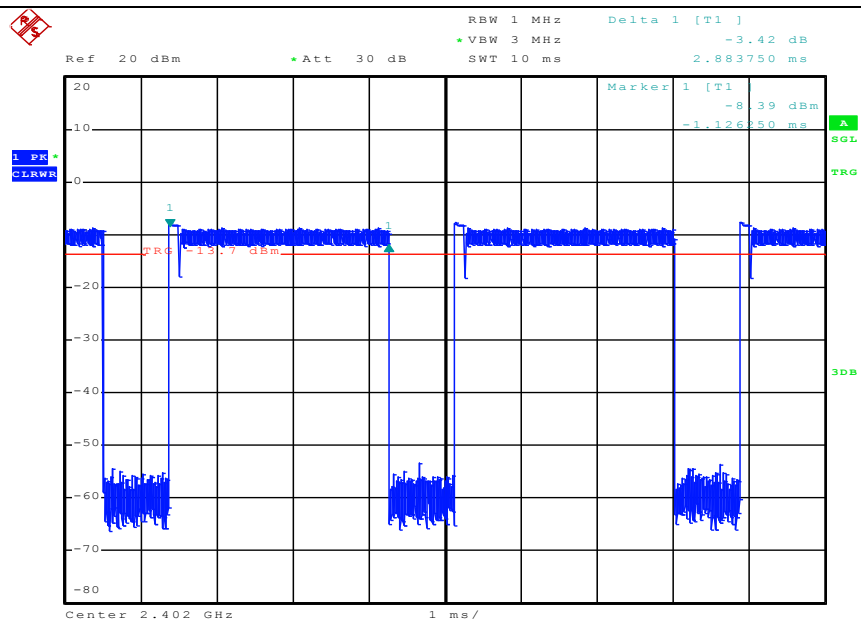
Date: 27.AUG.2019 14:52:20

GFSK\_DH5/HCH



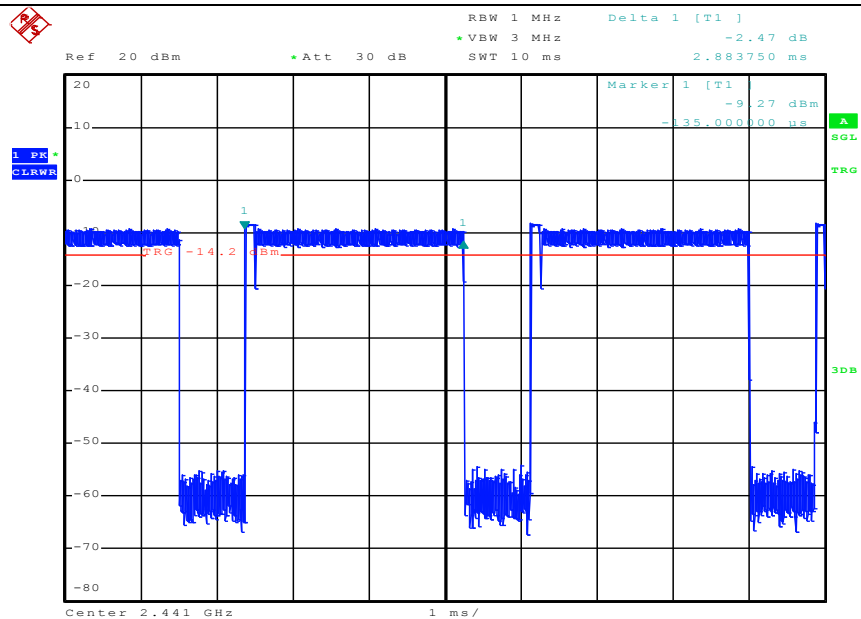
Date: 27.AUG.2019 14:55:44

$\pi/4$ DQPSK  
\_2DH5/LCH



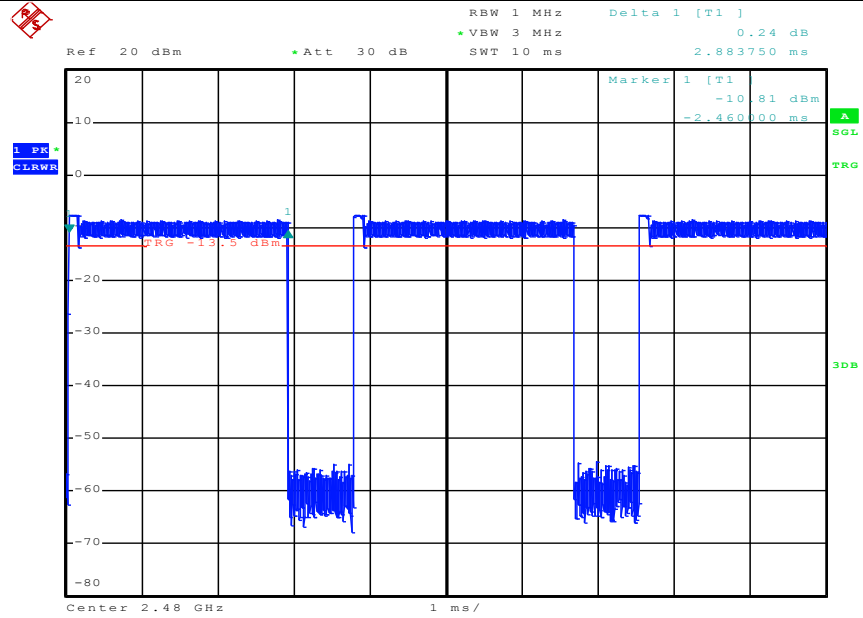
Date: 27.AUG.2019 14:58:15

$\pi/4$ DQPSK  
\_2DH5/MCH



Date: 27.AUG.2019 15:00:43

$\pi/4$ DQPSK  
\_2DH5/HCH



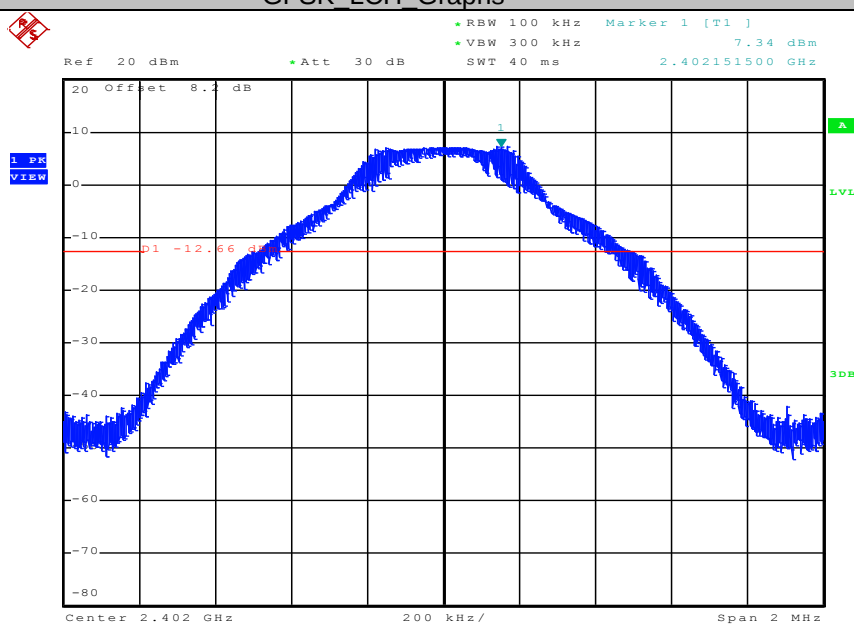
Date: 27.AUG.2019 15:02:25

## A.6 RF Conducted Spurious Emissions

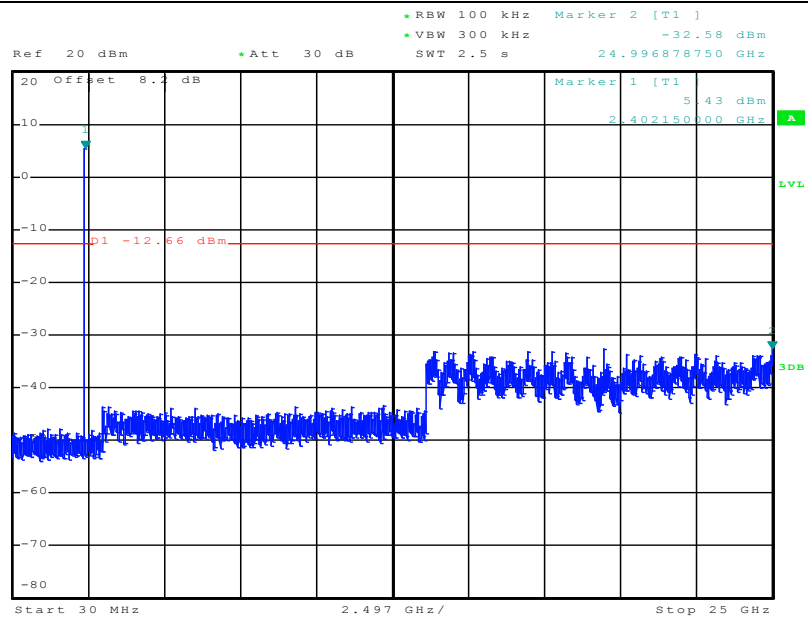
| Mode          | Channel | Pref [dBm] | Max. Level [dBm] | Limit [dBm] | Verdict |
|---------------|---------|------------|------------------|-------------|---------|
| GFSK          | LCH     | 7.34       | -32.580          | -12.660     | PASS    |
|               | MCH     | 1.03       | -32.670          | -18.970     | PASS    |
|               | HCH     | 1.59       | -32.600          | -18.410     | PASS    |
| $\pi/4$ DQPSK | LCH     | 0.82       | -32.720          | -19.180     | PASS    |
|               | MCH     | 0.37       | -32.390          | -19.630     | PASS    |
|               | HCH     | 0.96       | -32.520          | -19.040     | PASS    |

GFSK LCH Graphs

Pref



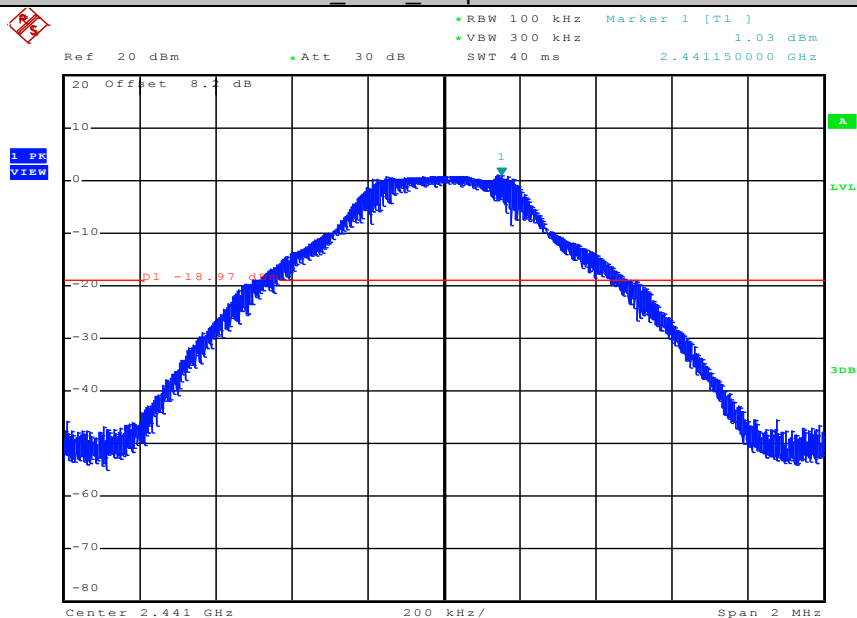
Date: 27.AUG.2019 14:50:38

P<sub>uw</sub>1. PK  
VIEW

Date: 27.AUG.2019 14:50:53

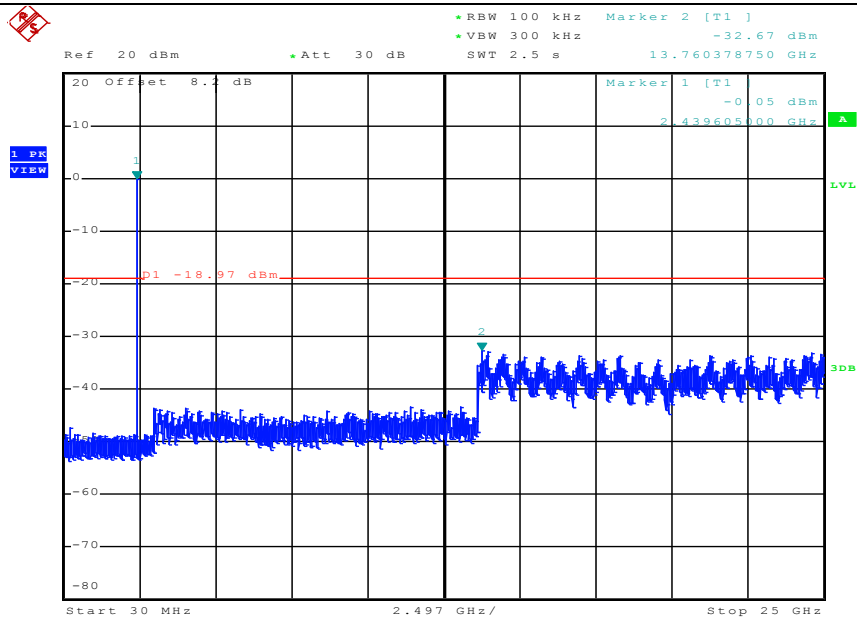
## GFSK\_MCH\_Graphs

Pref



Date: 27.AUG.2019 14:54:31

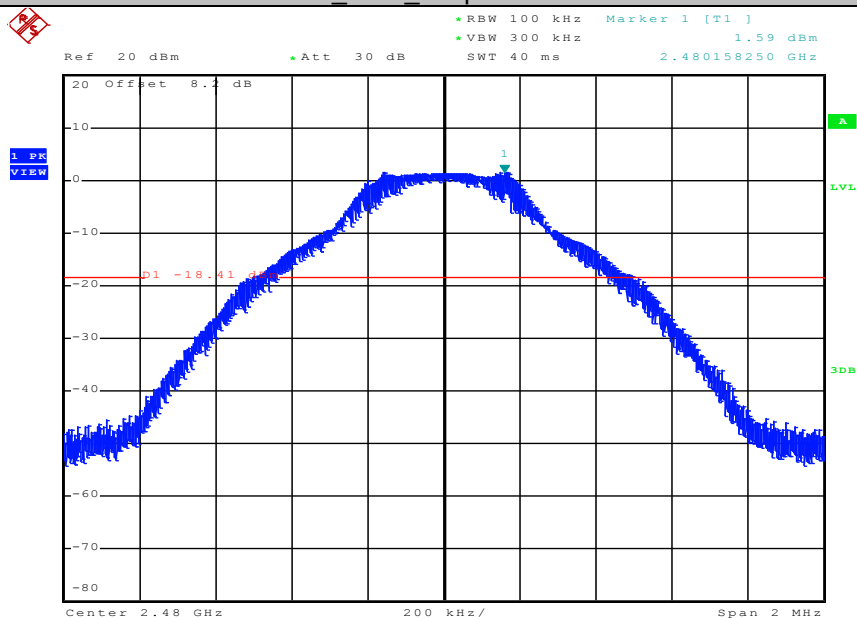
Puw



Date: 27.AUG.2019 14:54:45

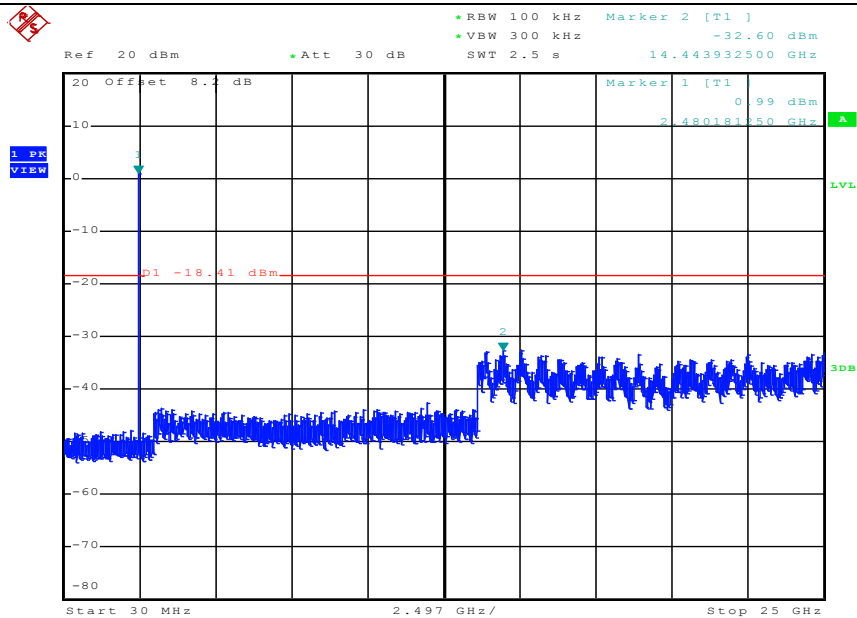
# GFSK\_HCH\_Graphs

Pref



Date: 27.AUG.2019 14:56:28

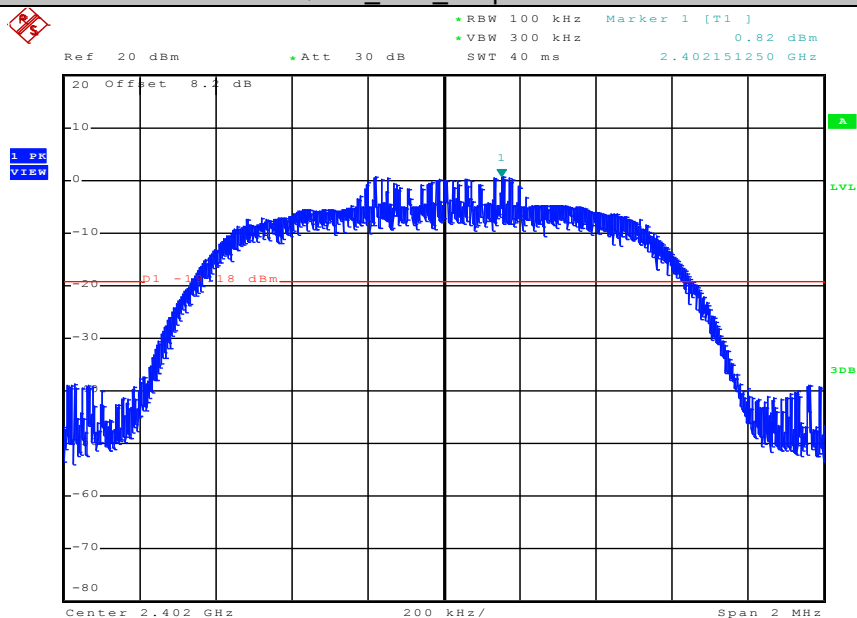
Puw



Date: 27.AUG.2019 14:56:43

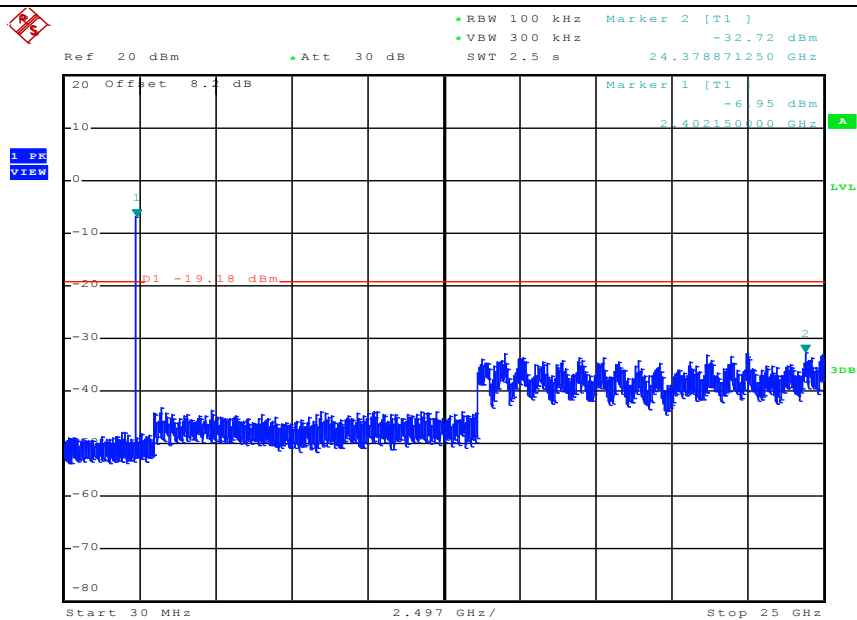
$\pi/4$ DQPSK\_LCH\_Graphs

Pref



Date: 27.AUG.2019 14:59:00

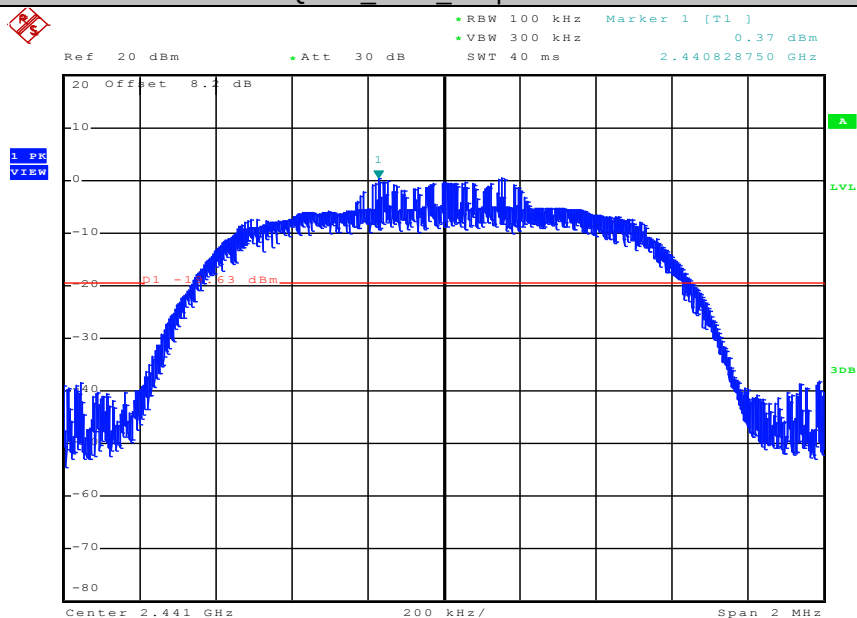
Puw



Date: 27.AUG.2019 14:59:14

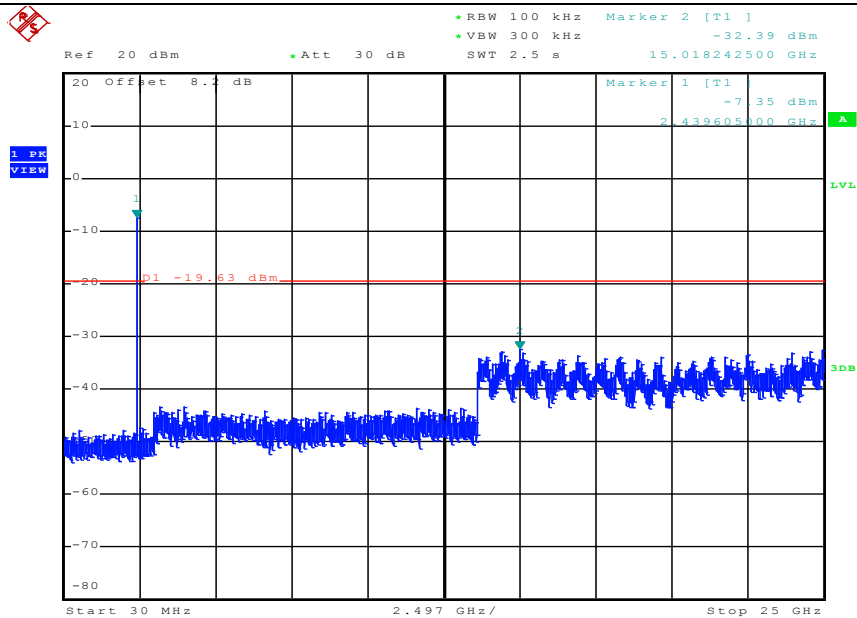
$\pi/4$ DQPSK\_MCH\_Graphs

Pref



Date: 27.AUG.2019 15:01:10

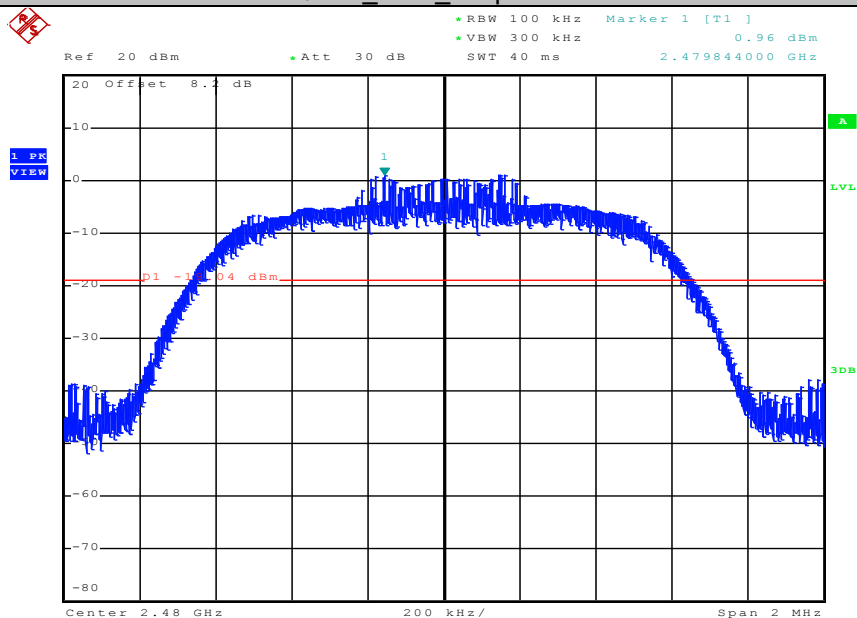
Puw



Date: 27.AUG.2019 15:01:25

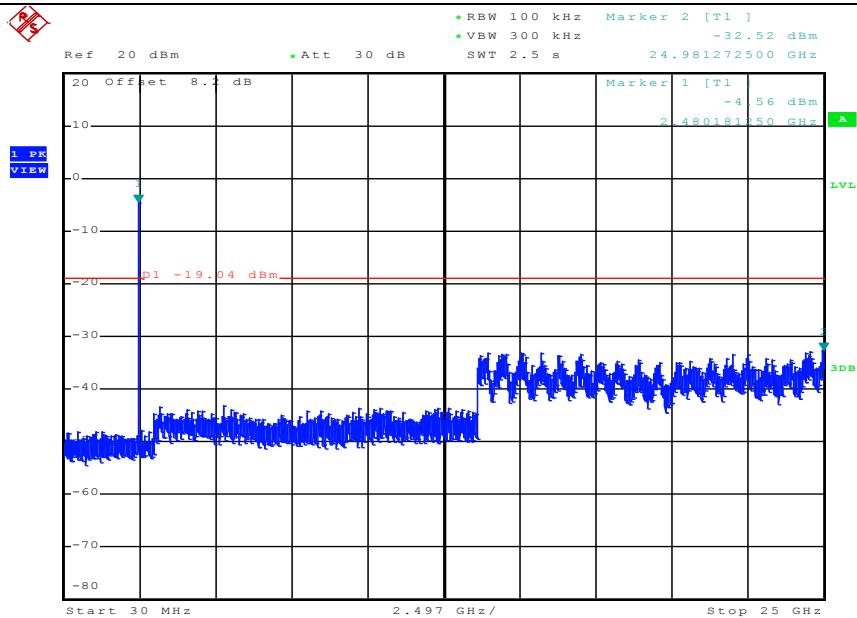
$\pi/4$ DQPSK\_HCH\_Graphs

Pref



Date: 27.AUG.2019 15:03:10

Puw



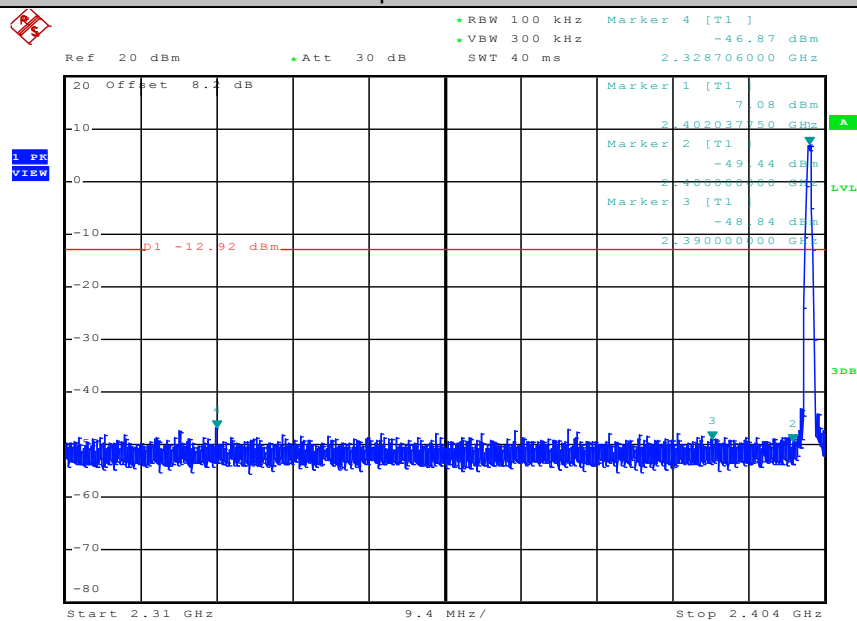
Date: 27.AUG.2019 15:03:25

## 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                    | 7.080               | Off               | -46.874                  | -12.92      | PASS    |
|               |         |                         | 1.320               | On                | -47.424                  | -18.68      | PASS    |
|               | HCH     | 2480                    | 1.310               | Off               | -47.364                  | -18.69      | PASS    |
|               |         |                         | 1.240               | On                | -46.425                  | -18.76      | PASS    |
| $\pi/4$ DQPSK | LCH     | 2402                    | 0.840               | Off               | -46.972                  | -19.16      | PASS    |
|               |         |                         | 0.280               | On                | -46.720                  | -19.72      | PASS    |
|               | HCH     | 2480                    | 0.410               | Off               | -48.008                  | -19.59      | PASS    |
|               |         |                         | 0.090               | On                | -46.972                  | -19.91      | PASS    |

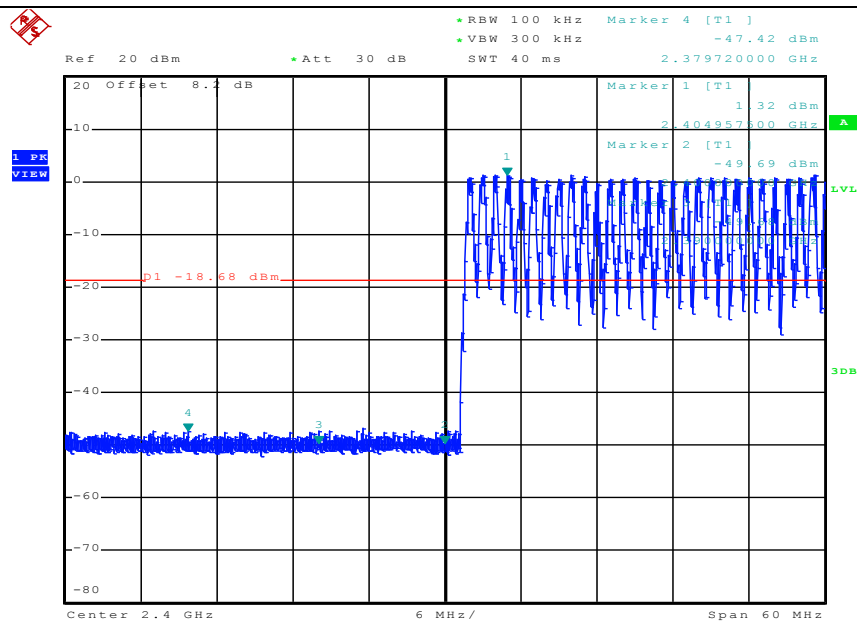
## Test Graphs

GFSK/LCH/No Hop



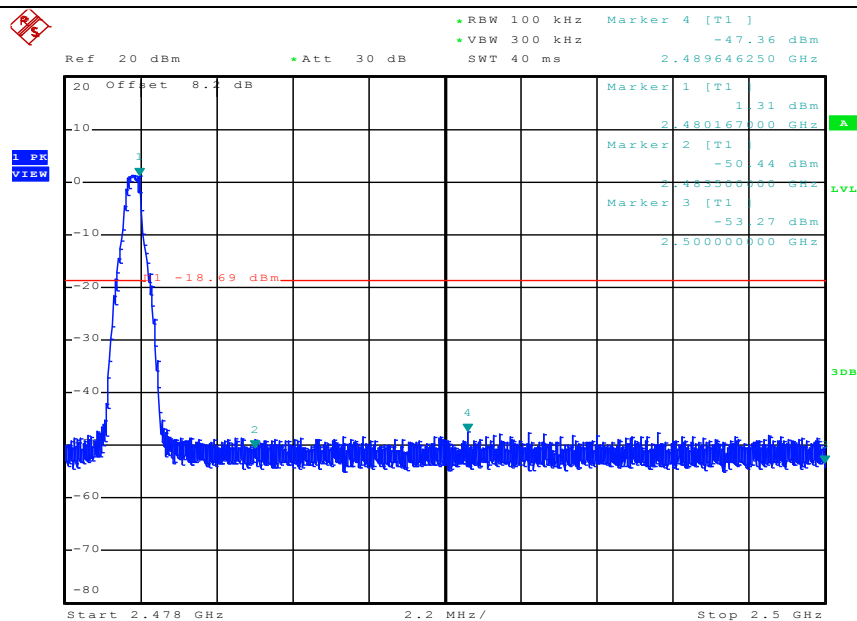
Date: 27.AUG.2019 14:50:25

GFSK/LCH/Hop



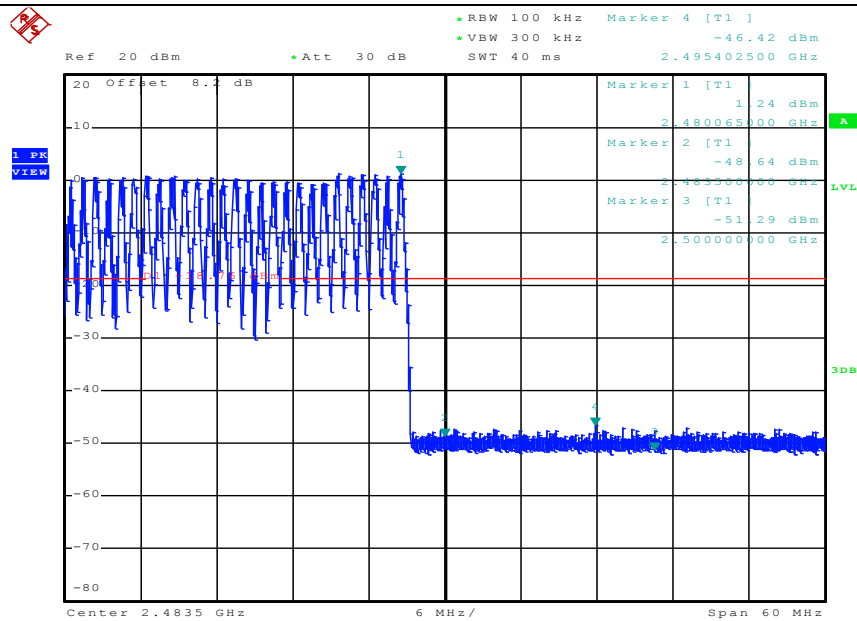
Date: 27.AUG.2019 15:06:56

GFSK/HCH/No Hop



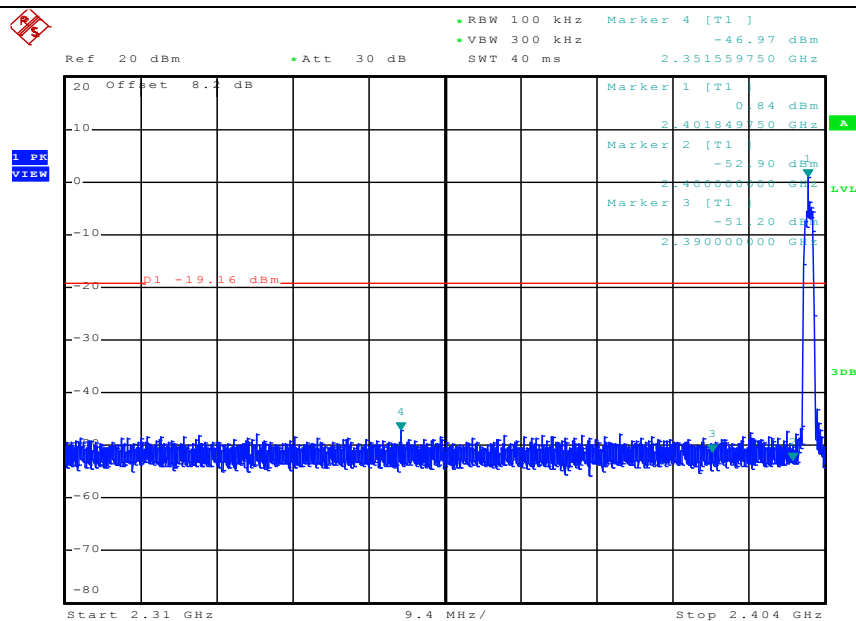
Date: 27.AUG.2019 14:56:15

GFSK/HCH/Hop



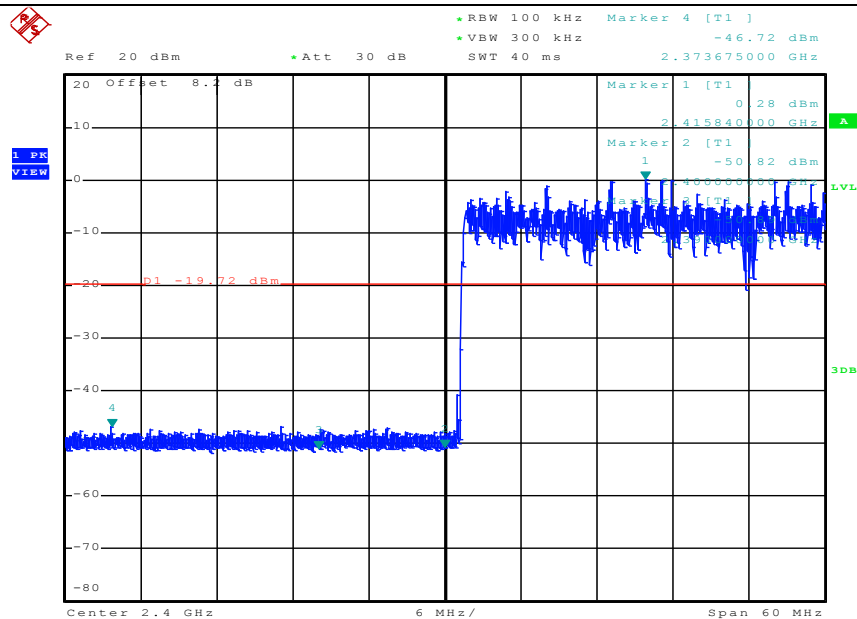
Date: 27.AUG.2019 15:08:47

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



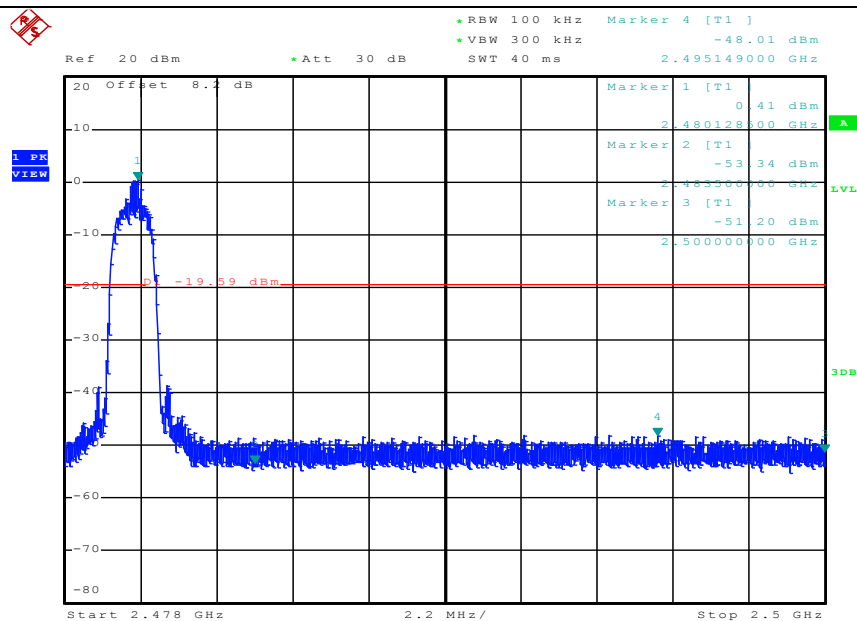
Date: 27.AUG.2019 14:58:47

$\pi/4$ DQPSK/LCH/Hop



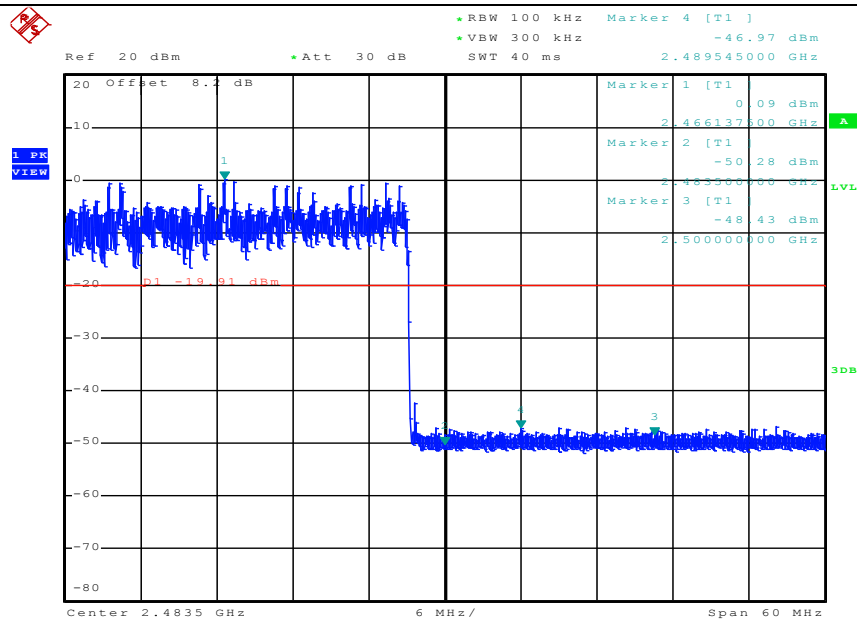
Date: 27.AUG.2019 15:13:59

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



Date: 27.AUG.2019 15:02:57

$\pi/4$ DQPSK/HCH/Hop

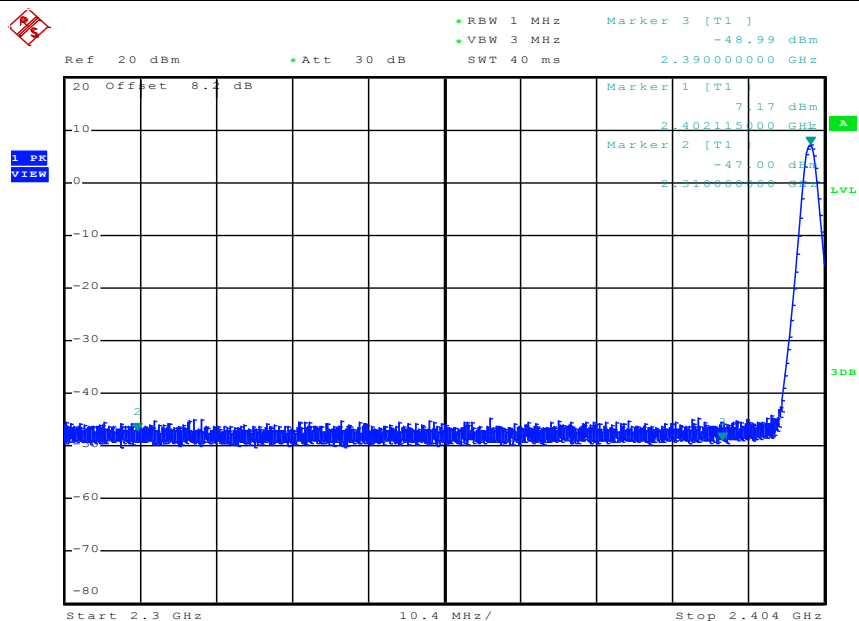


Date: 27.AUG.2019 15:16:32

## A.8 Restrict-band band-edge measurements

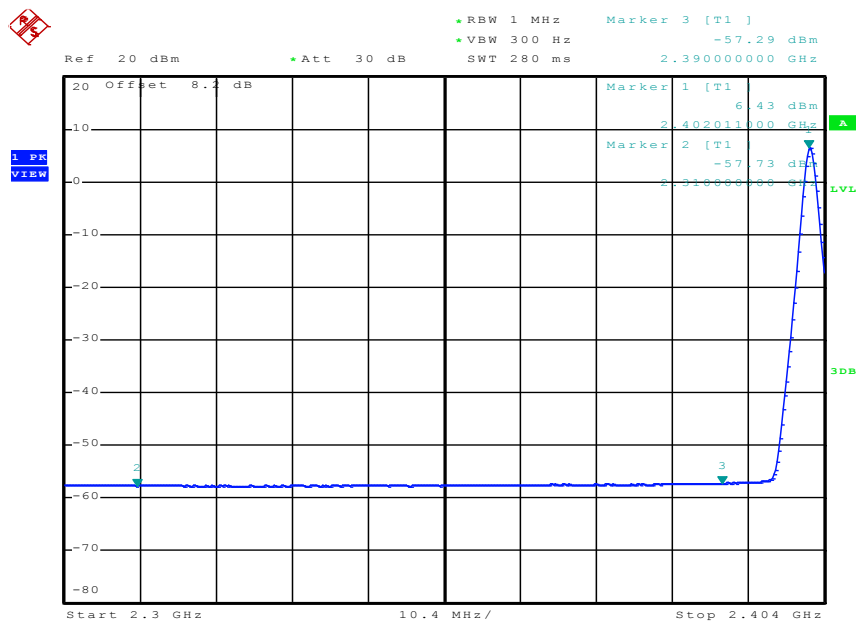
| Test Mode     | Hopping | Freq.  | Power [dBm] | Gain | Ground Factor | E [dBuV/m] | Detector | Limit [dBuV/m] | Verdict |
|---------------|---------|--------|-------------|------|---------------|------------|----------|----------------|---------|
| GFSK          | Off     | 2310.0 | -47.00      | 2.0  | 0             | 48.26      | PEAK     | 74             | PASS    |
|               | Off     | 2310.0 | -57.73      | 2.0  | 0             | 37.53      | AV       | 54             | PASS    |
|               | Off     | 2390.0 | -48.99      | 2.0  | 0             | 46.27      | PEAK     | 74             | PASS    |
|               | Off     | 2390.0 | -57.29      | 2.0  | 0             | 37.97      | AV       | 54             | PASS    |
|               | Off     | 2483.5 | -38.23      | 2.0  | 0             | 57.03      | PEAK     | 74             | PASS    |
|               | Off     | 2483.5 | -41.53      | 2.0  | 0             | 53.73      | AV       | 54             | PASS    |
|               | Off     | 2500.0 | -48.14      | 2.0  | 0             | 47.12      | PEAK     | 74             | PASS    |
|               | Off     | 2500.0 | -57.97      | 2.0  | 0             | 37.29      | AV       | 54             | PASS    |
| $\pi/4$ DQPSK | Off     | 2310.0 | -49.64      | 2.0  | 0             | 45.62      | PEAK     | 74             | PASS    |
|               | Off     | 2310.0 | -57.61      | 2.0  | 0             | 37.65      | AV       | 54             | PASS    |
|               | Off     | 2390.0 | -48.50      | 2.0  | 0             | 46.76      | PEAK     | 74             | PASS    |
|               | Off     | 2390.0 | -57.30      | 2.0  | 0             | 37.96      | AV       | 54             | PASS    |
|               | Off     | 2483.5 | -39.01      | 2.0  | 0             | 56.25      | PEAK     | 74             | PASS    |
|               | Off     | 2483.5 | -44.55      | 2.0  | 0             | 50.71      | AV       | 54             | PASS    |
|               | Off     | 2500.0 | -47.71      | 2.0  | 0             | 47.55      | PEAK     | 74             | PASS    |
|               | Off     | 2500.0 | -58.08      | 2.0  | 0             | 37.18      | AV       | 54             | PASS    |

## Restrict-band band-edge measurements\_Hopping Off\_GFSK\_PEAK (Low Channel)



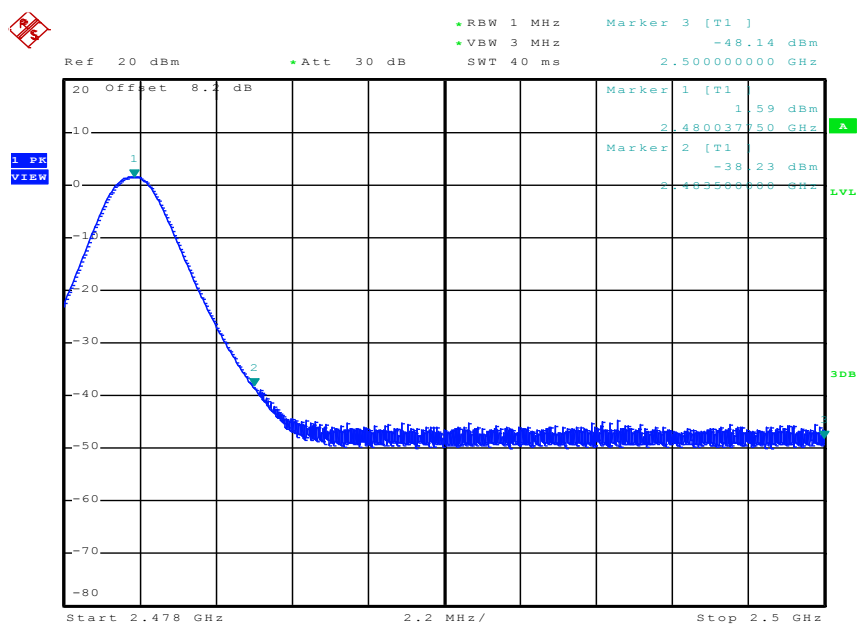
Date: 27.AUG.2019 14:51:12

## Restrict-band band-edge measurements\_Hopping Off\_GFSK\_Average (Low Channel)



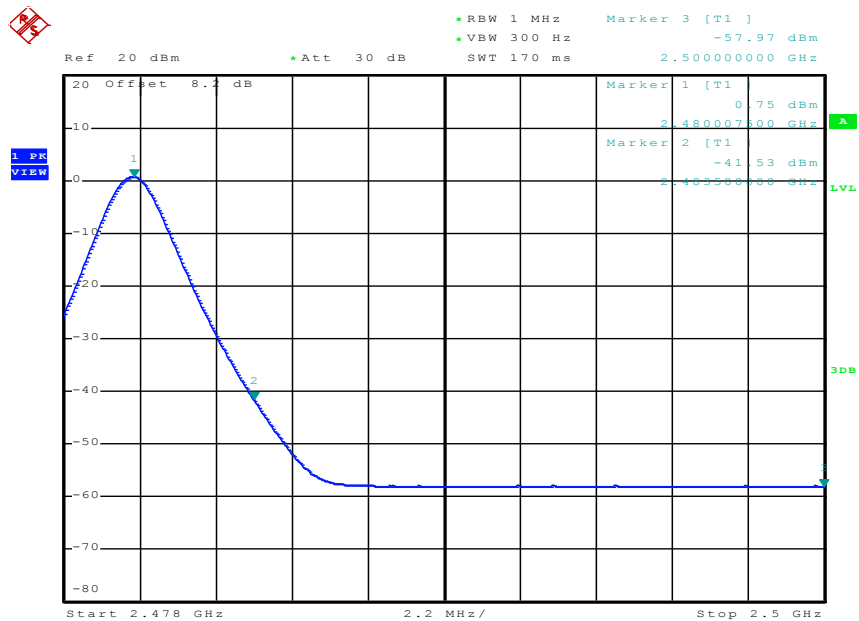
Date: 27.AUG.2019 14:51:25

## Restrict-band band-edge measurements\_Hopping Off\_GFSK\_PEAK (High Channel)

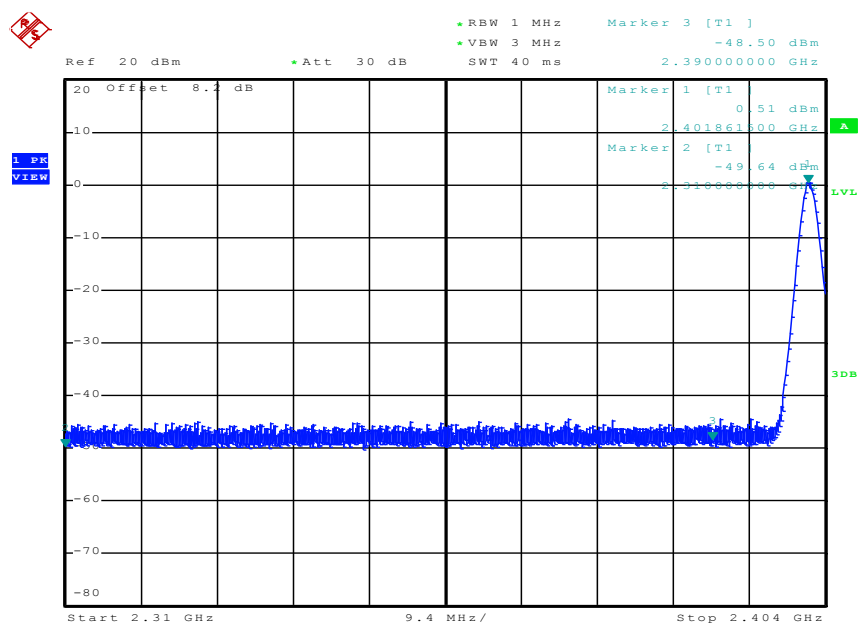


Date: 27.AUG.2019 14:57:02

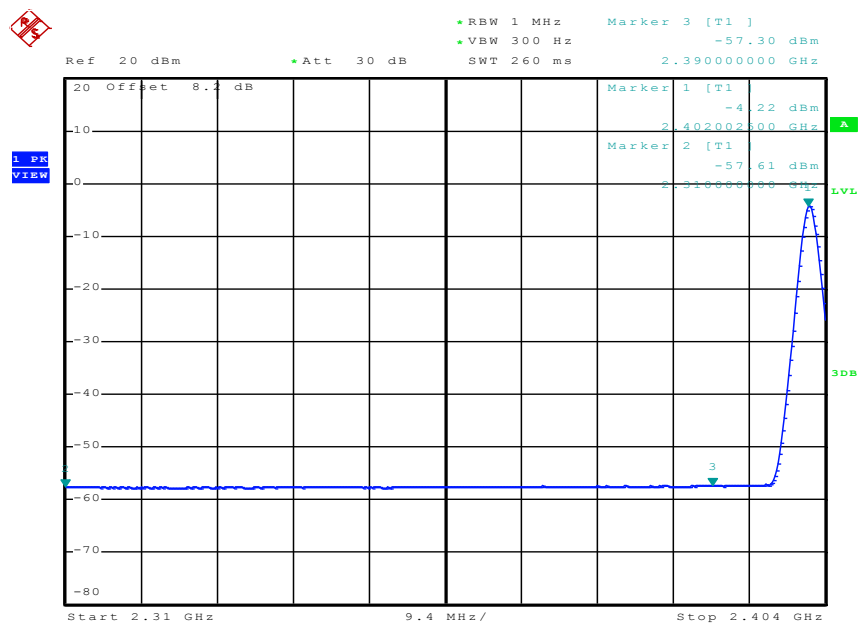
## Restrict-band band-edge measurements\_Hopping Off\_GFSK\_Average (High Channel)



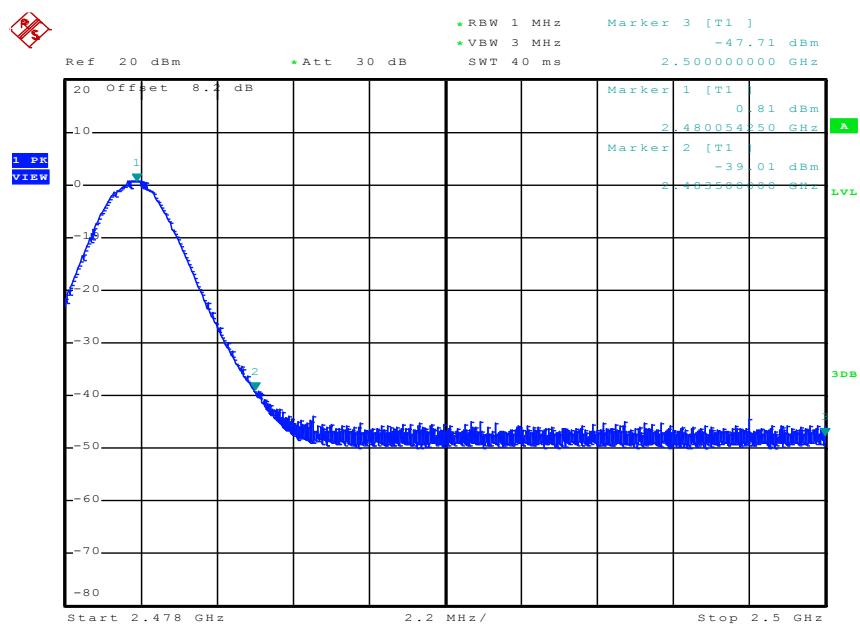
Date: 27.AUG.2019 14:57:15

Restrict-band band-edge measurements\_Hopping Off  $\pi/4$ -DQPSK\_PEAK (Low Channel)

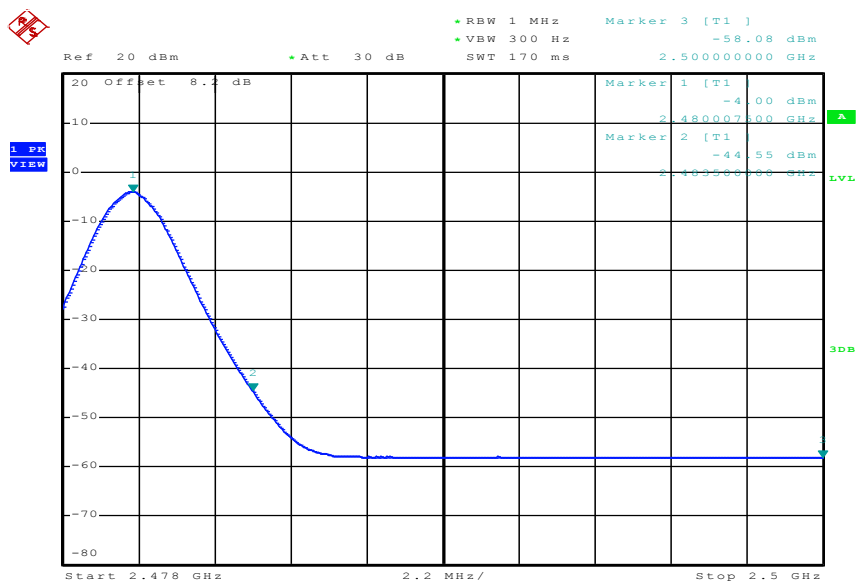
Date: 27.AUG.2019 14:59:33

Restrict-band band-edge measurements\_Hopping Off  $\pi/4$ -DQPSK\_Average (Low Channel)

Date: 27.AUG.2019 14:59:47

Restrict-band band-edge measurements\_Hopping Off  $\pi/4$ -DQPSK\_PEAK (High Channel)

Date: 27.AUG.2019 15:03:44

Restrict-band band-edge measurements\_Hopping Off  $\pi/4$ -DQPSK\_Average (High Channel)

Date: 27.AUG.2019 15:03:57