



2.4.7 Test Location and Test Equipment Used

This test was carried out in RF Laboratory 1.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	08-Nov-2020
Multimeter	Iso-tech	IDM101	2424	12	12-Dec-2020
Hygrometer	Rotronic	I-1000	3220	12	25-Sep-2020
Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	08-Nov-2020
AC Programmable Power Supply	iTech	IT7324	5225	-	O/P Mon
MXA Signal Analyser	Keysight Technologies	N9020B	5528	24	04-Mar-2022
Signal Commissioning Unit	TUV SUD	SCU001	5546	12	15-Apr-2021

Table 23

O/P Mon – Output Monitored using calibrated equipment



2.5 Maximum Conducted Output Power

2.5.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (b)
ISED RSS-247, Clause 5.4
ISED RSS-GEN, Clause 6.12

2.5.2 Equipment Under Test and Modification State

A2348, S/N: C07CX00X02H6 - Modification State 0

2.5.3 Date of Test

12-October-2020

2.5.4 Test Method

Peak power measurements were performed in accordance with ANSI C63.10 11.9.1.3 PKPM1 and average measurements in accordance with clause 11.9.2.3.2 Method AVGPM-G.

All antennas used are less than 6 dBi (5.00 dBi, 0.25 dBi and 0 dBi for Cores 0, 1 & 2 respectively). This means for non-TxBF modes, the 1 Watt FCC conducted limit does not need to be reduced, and the ISED 1 Watt conducted limit is more stringent than the 4 Watt (36 dBm) EIRP limit. The conducted non-TxBF results presented below can therefore be directly compared to the 1 Watt (30 dBm) limit to show compliance.

For TxBF the combined powers were calculated using the measure and sum method. Both the power per chain and the antenna gains differed, therefore directional antenna gain was calculated using the worst-case highest antenna gain, two transmit chains, and a single correlated spatial stream as per the first formula in KDB 662911 D01 v02r01 section e) (ii) with $N_{SS} = 1$ and $G_{ANT MAX}$ of 5.00 dBi. This resulted in a directional gain of 8.01 dBi. This results in:

- the 1 Watt (30 dBm) FCC conducted limit for a maximum of 6 dBi antenna gain being reduced by 2.01 dB to 27.99 dBm.
- the 4 Watt (36 dBm) ISED EIRP limit minus 8.01 dBi directional gain, also resulting in an equivalent conducted limit of 27.99 dBm.

2.5.5 Environmental Conditions

Ambient Temperature	23.3 °C
Relative Humidity	39.4 %



2.5.6 Test Results

2.4 GHz Bluetooth (FHSS)

iPA

Antenna Port Configuration: SISO Core 0 / Core 2

Modulation: GFSK

Frequency (MHz)	Maximum Conducted Output Power (dBm)			
	Average Power		Peak Power	
	Core 0	Core 2	Core 0	Core 2
2402	12.4	12.0	13.0	13.0
2441	12.4	11.9	12.8	12.9
2480	12.3	12.0	12.6	12.9

Table 24 - Maximum Conducted Output Power Results

Modulation: $\pi/4$ DQPSK

Frequency (MHz)	Maximum Conducted Output Power (dBm)			
	Average Power		Peak Power	
	Core 0	Core 2	Core 0	Core 2
2402	8.4	8.3	10.6	10.8
2441	8.4	8.3	10.5	10.8
2480	8.2	8.4	10.3	10.9

Table 25 - Maximum Conducted Output Power Results

Modulation: 8DPSK

Frequency (MHz)	Maximum Conducted Output Power (dBm)			
	Average Power		Peak Power	
	Core 0	Core 2	Core 0	Core 2
2402	8.4	8.3	10.9	11.2
2441	8.4	8.3	10.7	11.1
2480	8.3	8.4	10.5	11.2

Table 26 - Maximum Conducted Output Power Results



Antenna Port Configuration: Beamforming Core 0 + Core 1

Modulation: GFSK (DH5)

Frequency (MHz)	Maximum Conducted Output Power (dBm)					
	Average Power			Peak Power		
	Core 0	Core 1	Σ	Core 0	Core 1	Σ
2402	12.0	12.2	15.1	12.6	13.0	15.8
2441	12.0	12.2	15.1	12.4	13.1	15.8
2480	12.1	12.4	15.2	12.4	13.1	15.8

Table 27 - Maximum Conducted Output Power Results

Modulation: $\pi/4$ DQPSK (2-DH5)

Frequency (MHz)	Maximum Conducted Output Power (dBm)					
	Average Power			Peak Power		
	Core 0	Core 1	Σ	Core 0	Core 1	Σ
2402	8.2	8.0	11.1	10.5	10.5	13.5
2441	8.4	8.3	11.3	10.5	10.8	13.6
2480	8.3	8.0	11.2	10.3	10.5	13.4

Table 28 - Maximum Conducted Output Power Results

Modulation: 8DPSK (3-DH5)

Frequency (MHz)	Maximum Conducted Output Power (dBm)					
	Average Power			Peak Power		
	Core 0	Core 1	Σ	Core 0	Core 1	Σ
2402	8.0	8.1	11.1	10.6	11.0	13.8
2441	8.3	8.4	11.4	10.7	11.2	14.0
2480	8.3	8.0	11.2	10.6	10.9	13.7

Table 29 - Maximum Conducted Output Power Results



ePA

Antenna Port: SISO Core 0

Modulation: GFSK (DH5)

Frequency (MHz)	Maximum Conducted Output Power (dBm)	
	Average Power	Peak Power
	Core 0	Core 0
2402	18.8	20.3
2441	19.7	21.1
2480	19.8	21.1

Table 30 - Maximum Conducted Output Power Results

Modulation: $\pi/4$ DQPSK (2-DH5)

Frequency (MHz)	Maximum Conducted Output Power (dBm)	
	Average Power	Peak Power
	Core 0	Core 0
2402	15.7	18.6
2441	15.5	18.4
2480	15.6	18.5

Table 31 - Maximum Conducted Output Power Results

Modulation: 8DPSK (3-DH5)

Frequency (MHz)	Maximum Conducted Output Power (dBm)	
	Average Power	Peak Power
	Core 0	Core 0
2402	15.9	19.2
2441	15.9	19.3
2480	16.0	19.3

Table 32 - Maximum Conducted Output Power Results



Antenna Port Configuration: Beamforming Core 0 + Core 1

Modulation: GFSK (DH5)

Frequency (MHz)	Maximum Conducted Output Power (dBm)					
	Average Power			Peak Power		
	Core 0	Core 1	Σ	Core 0	Core 1	Σ
2402	13.7	13.9	16.8	15.1	15.2	18.2
2441	13.9	13.6	16.8	15.2	15.0	18.1
2480	13.7	13.6	16.7	15.0	14.9	18.0

Table 33 - Maximum Conducted Output Power Results

Modulation: $\pi/4$ DQPSK (2-DH5)

Frequency (MHz)	Maximum Conducted Output Power (dBm)					
	Average Power			Peak Power		
	Core 0	Core 1	Σ	Core 0	Core 1	Σ
2402	13.1	13.4	16.3	16.0	16.3	19.2
2441	13.5	13.4	16.4	16.3	16.3	19.3
2480	13.7	13.6	16.6	16.6	16.5	19.6

Table 34 - Maximum Conducted Output Power Results

Modulation: 8DPSK (3-DH5)

Frequency (MHz)	Maximum Conducted Output Power (dBm)					
	Average Power			Peak Power		
	Core 0	Core 1	Σ	Core 0	Core 1	Σ
2402	13.6	13.4	16.5	16.8	16.7	19.7
2441	13.4	13.5	16.4	16.6	16.7	19.7
2480	13.8	13.8	16.8	17.0	17.0	20.0

Table 35 - Maximum Conducted Output Power Results

FCC 47 CFR Part 15, Limit Clause 15.247 (b)(3)

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.

ISED RSS-247, Limit Clause 5.4 (b)

For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1 W. The e.i.r.p. shall not exceed 4 W, except as provided in section 5.4(e) of the specification.



2.5.7 Test Location and Test Equipment Used

This test was carried out in RF Laboratory 1.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Multimeter	Iso-tech	IDM101	2424	12	12-Dec-2020
Hygrometer	Rotronic	A1	2760	12	02-Jan-2021
USB Power Sensor	Boonton	RTP5006	5184	12	09-Jan-2021
USB Power Sensor	Boonton	RTP5006	5186	12	28-Nov-2020
USB Power Sensor	Boonton	RTP5006	5187	12	09-Jan-2021
AC Programmable Power Supply	iTech	IT7324	5225	-	O/P Mon
Signal Commissioning Unit	TUV SUD	SCU001	5546	12	15-Apr-2021

Table 36

O/P Mon – Output Monitored using calibrated equipment



2.6 Authorised Band Edges

2.6.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (d)
ISED RSS-247, Clause 5.5

2.6.2 Equipment Under Test and Modification State

A2348, S/N: C07D100W02H7 - Modification State 0

2.6.3 Date of Test

18-August-2020 to 24-August-2020

2.6.4 Test Method

The test was performed in accordance with ANSI C63.10, clause 6.10.4.

2.6.5 Environmental Conditions

Ambient Temperature 20.7-27.2°C
Relative Humidity 48.1-61.1%

2.6.6 Test Results

2.4 GHz Bluetooth (FHSS)

iPA

Mode	Modulation	Core	Packet Type	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
Static	GFSK	0	DH5	2402	2400.0	-59.82
Static	$\pi/4$ DQPSK	0	2DH5	2402	2400.0	-52.97
Static	8-DPSK	0	3DH5	2402	2400.0	-52.33
Hopping	GFSK	0	DH5	2402	2400.0	-60.57
Hopping	$\pi/4$ DQPSK	0	2DH5	2402	2400.0	-53.67
Hopping	8-DPSK	0	3DH5	2402	2400.0	-53.37

Table 37 - Authorised Band Edge Results

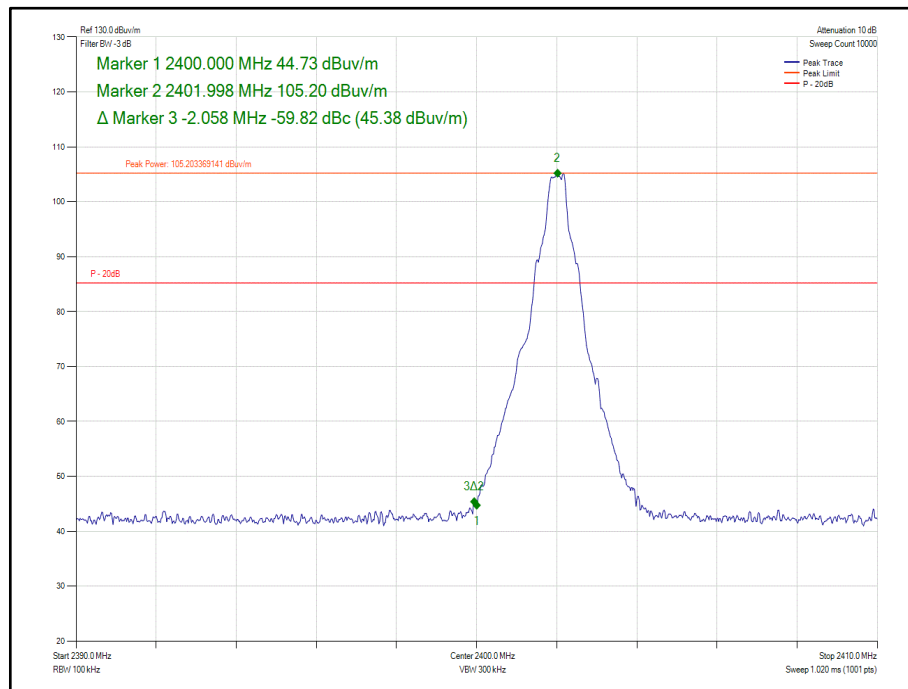


Figure 69 - Core 0 - Static - GFSK/DH5 - 2402 MHz - Band Edge Frequency 2400.0 MHz

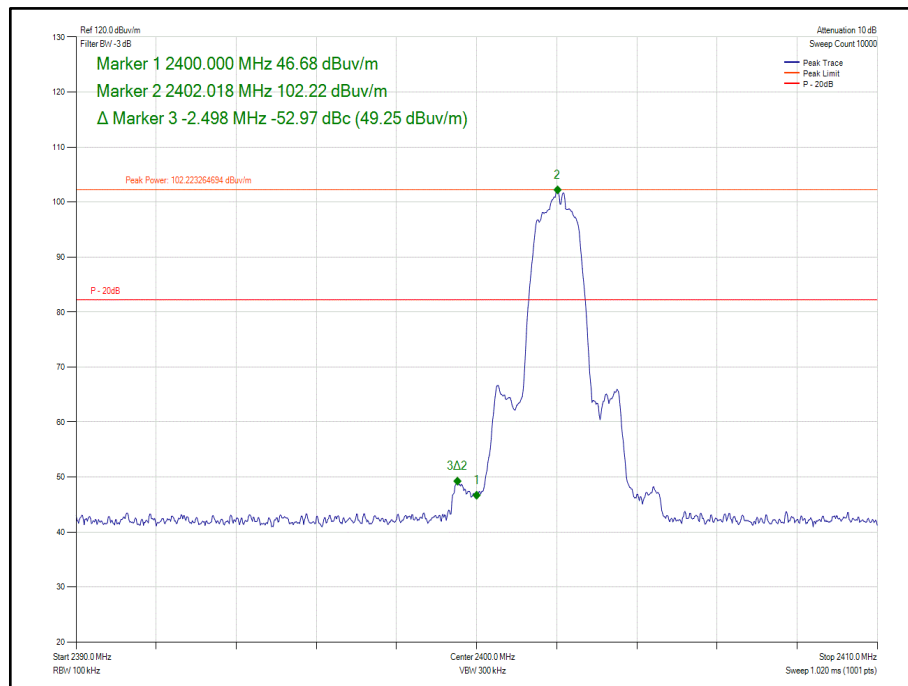


Figure 70 - Core 0 - Static - $\pi/4$ DQPSK/2DH5 - 2402 MHz - Band Edge Frequency 2400.0 MHz

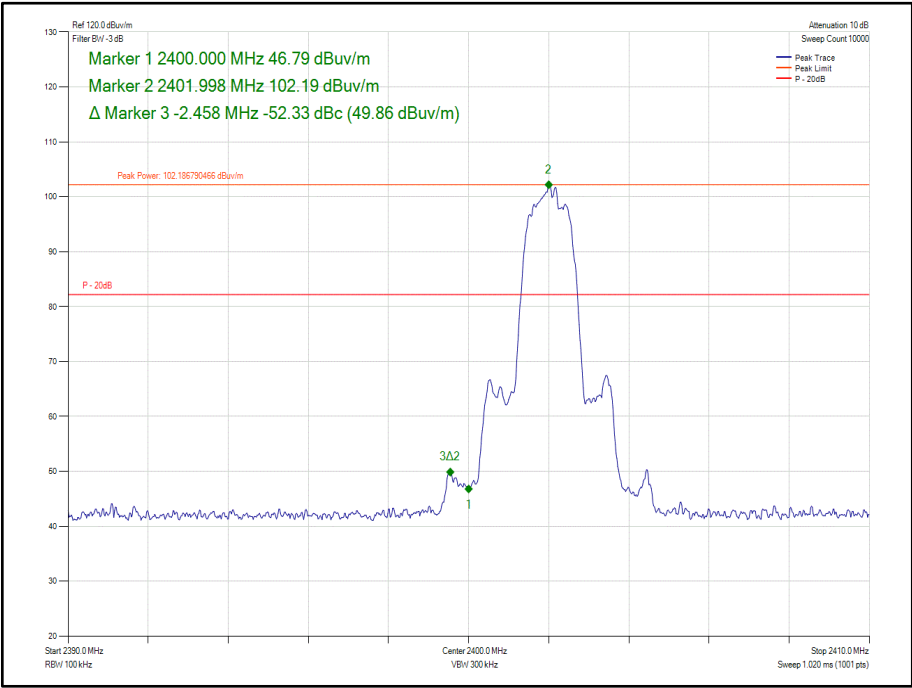


Figure 71 - Core 0 - Static - 8-DPSK/3DH5 - 2402 MHz - Band Edge Frequency 2400.0 MHz

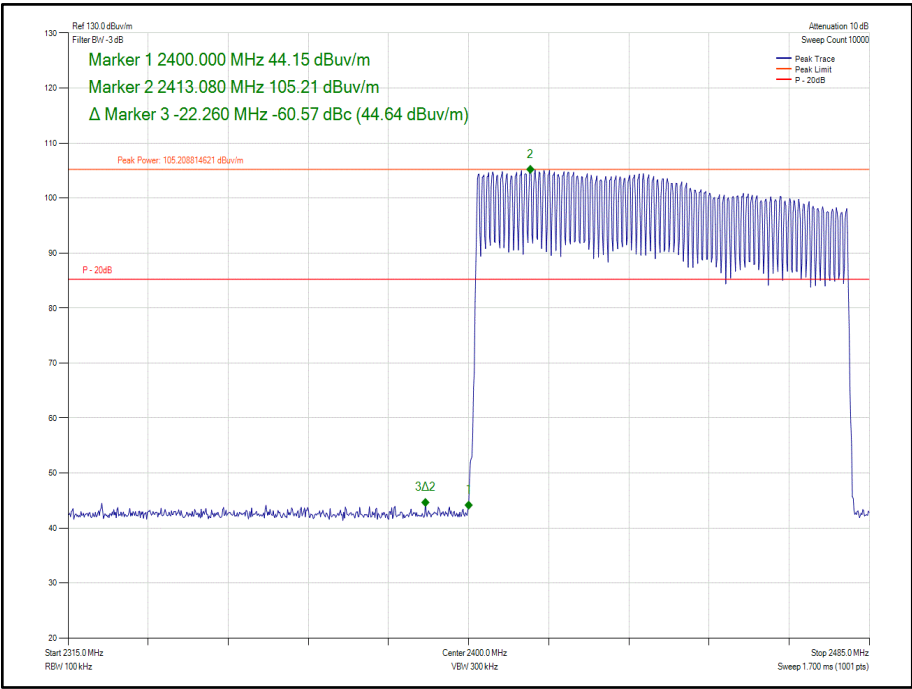


Figure 72 - Core 0 - Hopping - GFSK/DH5 - Band Edge Frequency 2400.0 MHz

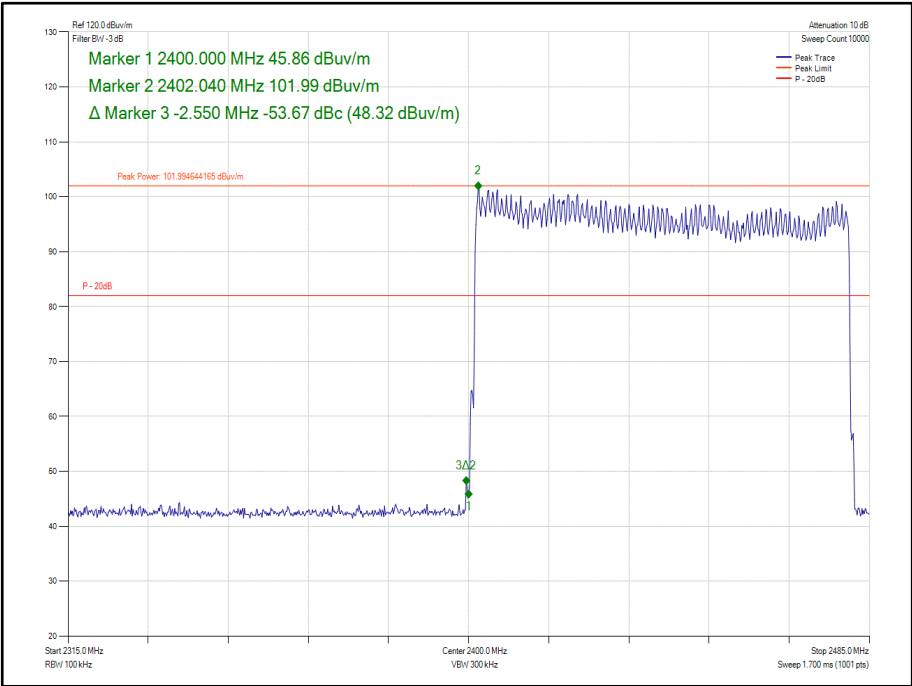


Figure 73 - Core 0 - Hopping - $\pi/4$ DQPSK/2DH5 - Band Edge Frequency 2400.0 MHz

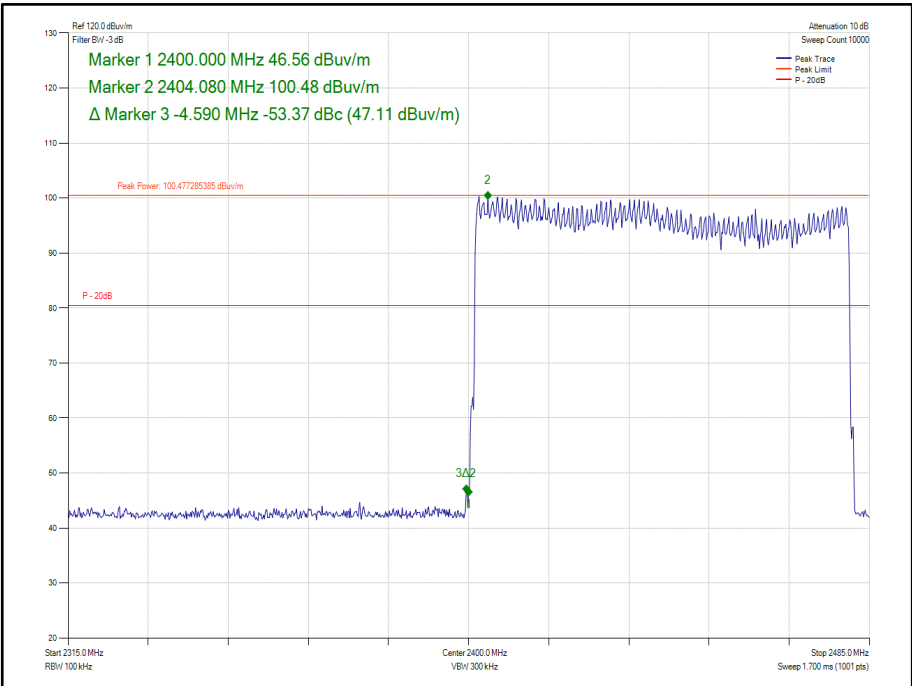


Figure 74 - Core 0 - Hopping - 8-DPSK/3DH5 - Band Edge Frequency 2400.0 MHz

Mode	Modulation	Core	Packet Type	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
Static	GFSK	1	DH5	2402	2400.0	-61.09
Static	$\pi/4$ DQPSK	1	2DH5	2402	2400.0	-55.86
Static	8-DPSK	1	3DH5	2402	2400.0	-55.79
Hopping	GFSK	1	DH5	2402	2400.0	-64.26
Hopping	$\pi/4$ DQPSK	1	2DH5	2402	2400.0	-58.62
Hopping	8-DPSK	1	3DH5	2402	2400.0	-56.84

Table 38 - Authorised Band Edge Results

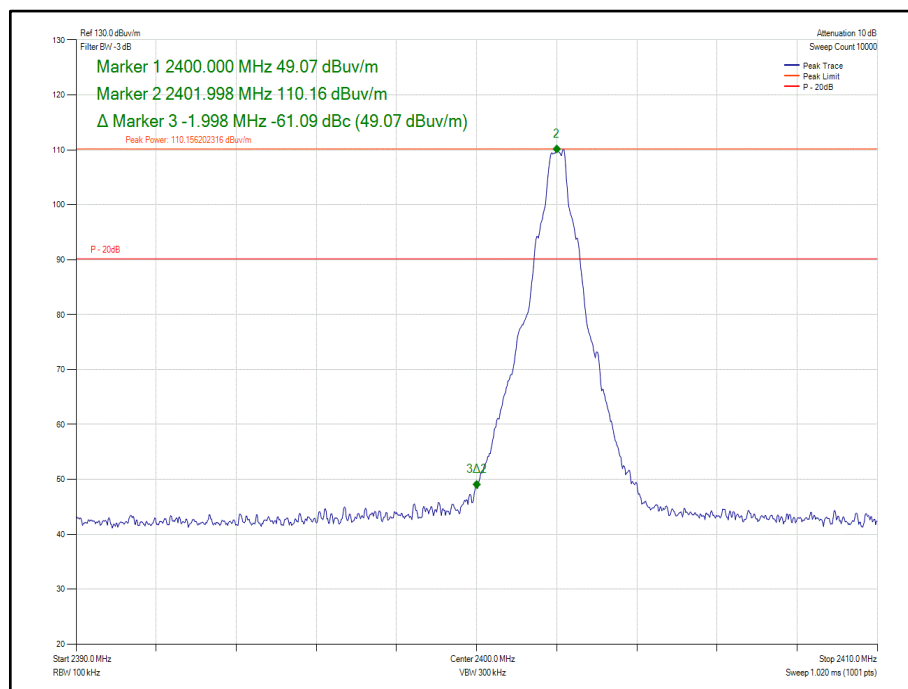


Figure 75 - Core 1 - Static - GFSK/DH5 - 2402 MHz - Band Edge Frequency 2400.0 MHz

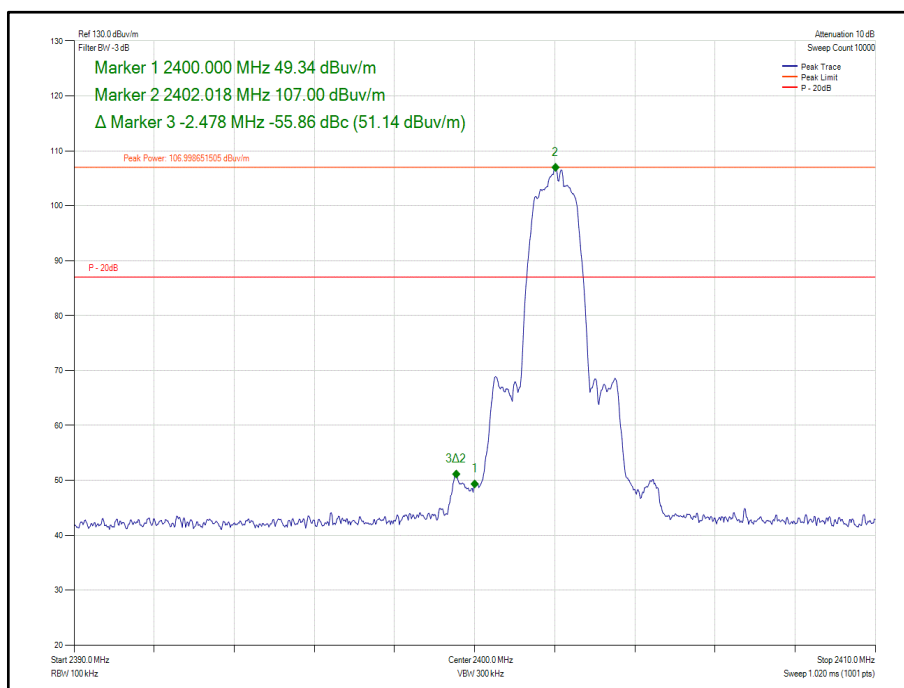


Figure 76 - Core 1 - Static - $\pi/4$ DQPSK/2DH5 - 2402 MHz - Band Edge Frequency 2400.0 MHz

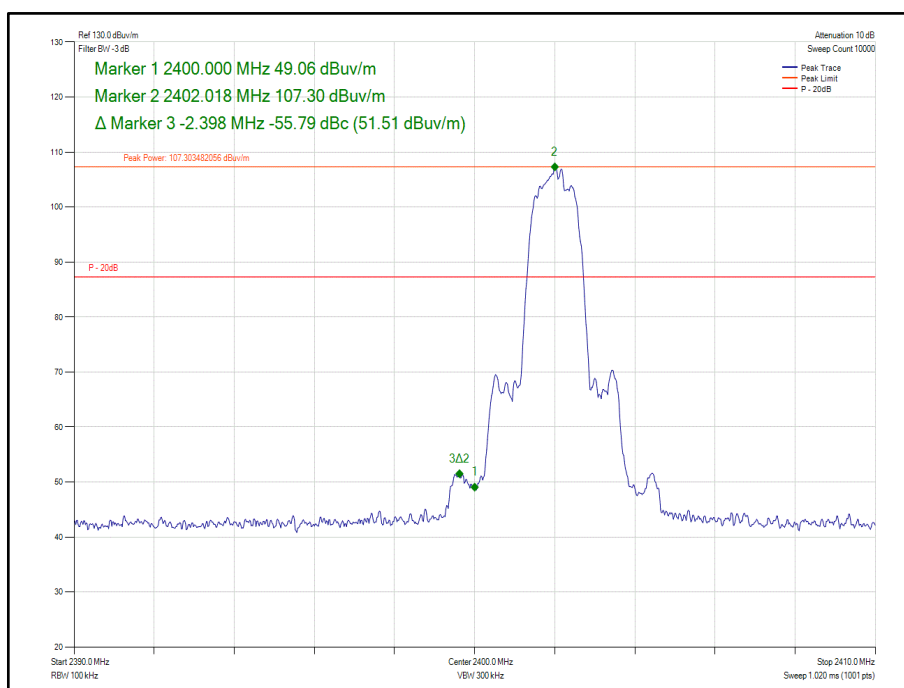


Figure 77 - Core 1 - Static - 8-DPSK/3DH5 - 2402 MHz - Band Edge Frequency 2400.0 MHz

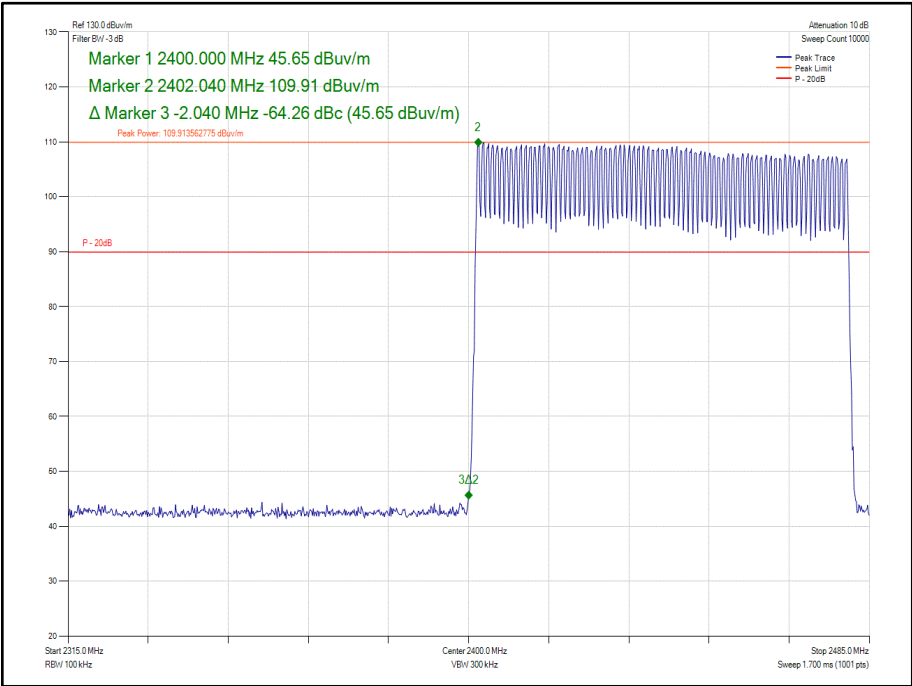


Figure 78 - Core 1 - Hopping - GFSK/DH5 - Band Edge Frequency 2400.0 MHz

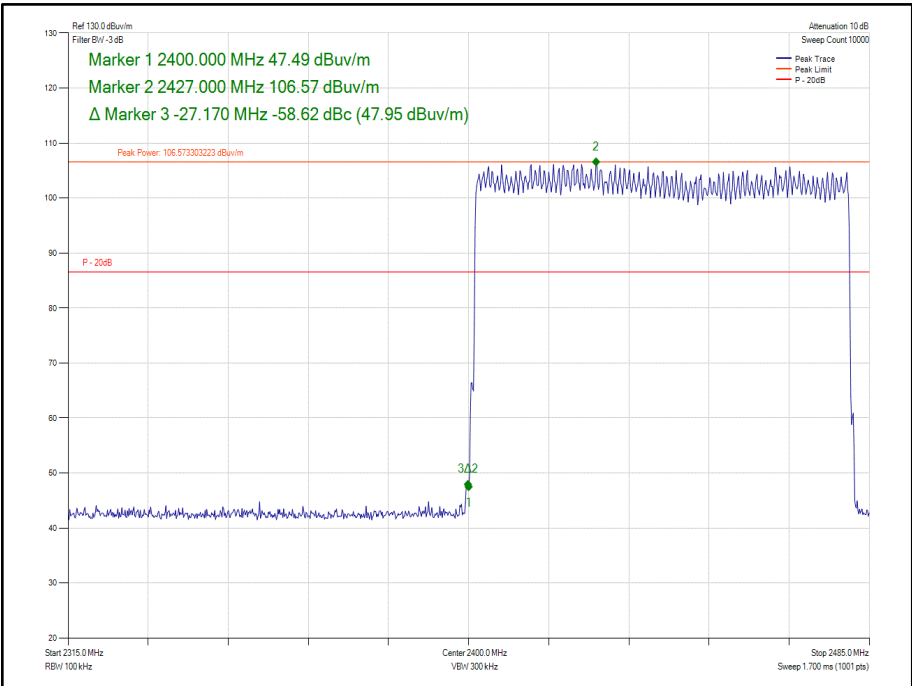


Figure 79 - Core 1 - Hopping - $\pi/4$ DQPSK/2DH5 - Band Edge Frequency 2400.0 MHz

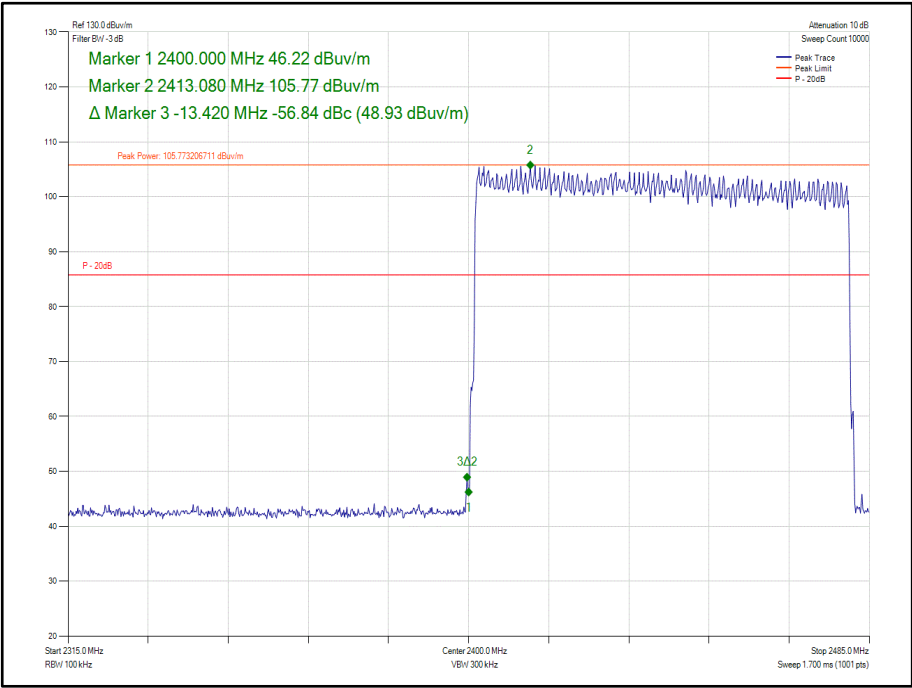


Figure 80 - Core 1 - Hopping - 8-DPSK/3DH5 - Band Edge Frequency 2400.0 MHz

Mode	Modulation	Core	Packet Type	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
Static	GFSK	2	DH5	2402	2400.0	-62.09
Static	$\pi/4$ DQPSK	2	2DH5	2402	2400.0	-50.60
Static	8-DPSK	2	3DH5	2402	2400.0	-50.16
Hopping	GFSK	2	DH5	2402	2400.0	-66.06
Hopping	$\pi/4$ DQPSK	2	2DH5	2402	2400.0	-52.04
Hopping	8-DPSK	2	3DH5	2402	2400.0	-51.06

Table 39 - Authorised Band Edge Results

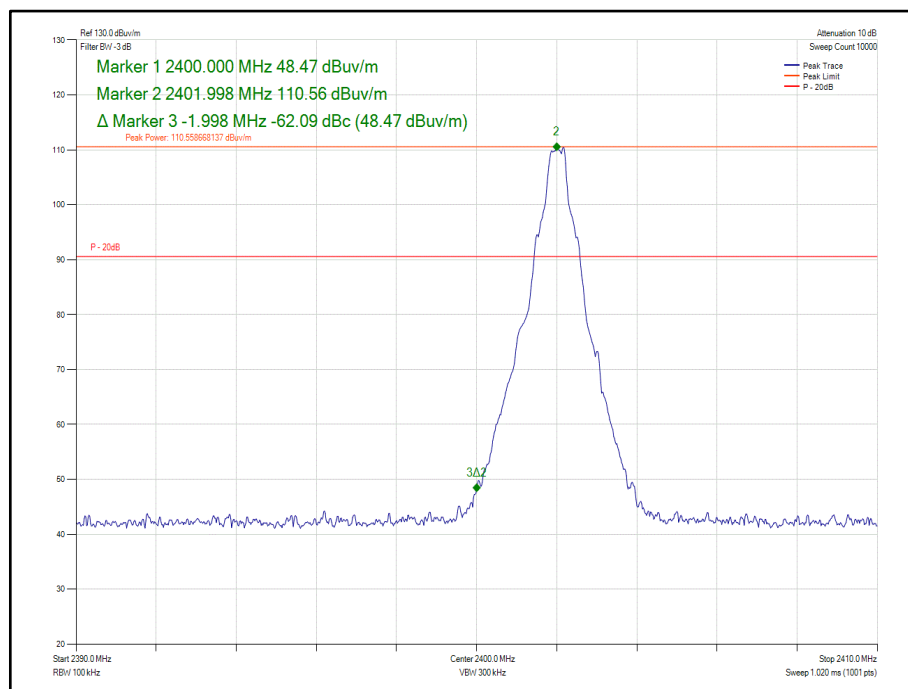


Figure 81 - Core 2 - Static - GFSK/DH5 - 2402 MHz - Band Edge Frequency 2400.0 MHz

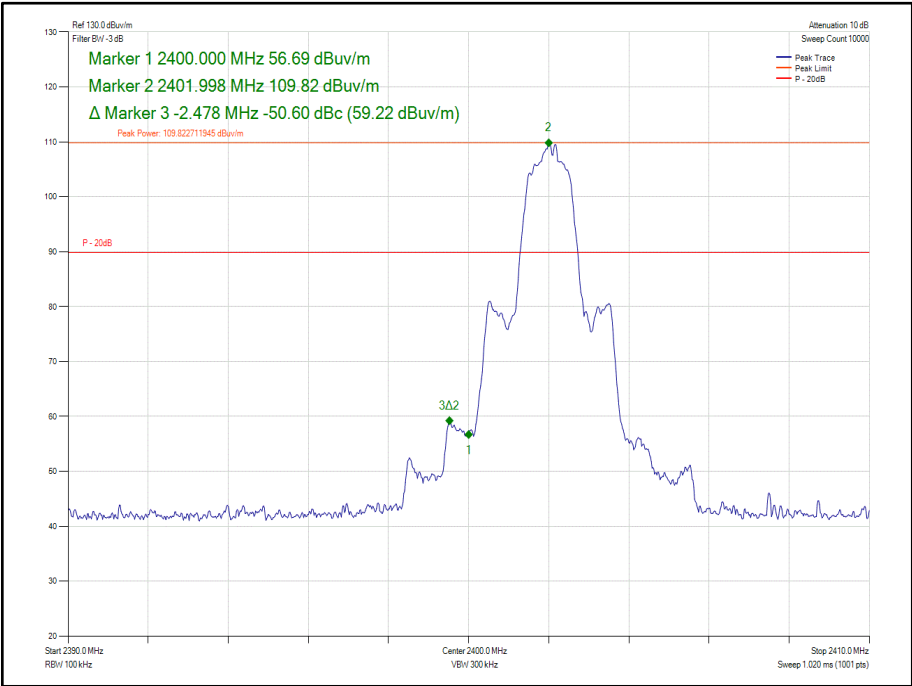


Figure 82 - Core 2 - Static - $\pi/4$ DQPSK/2DH5 - 2402 MHz - Band Edge Frequency 2400.0 MHz

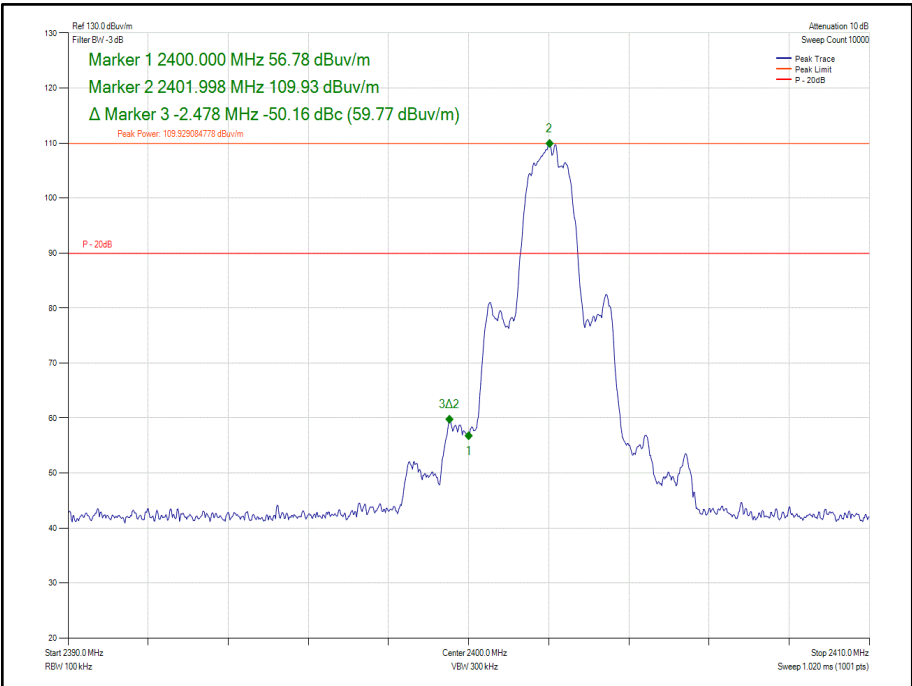


Figure 83 - Core 2 - Static - 8-DPSK/3DH5 - 2402 MHz - Band Edge Frequency 2400.0 MHz

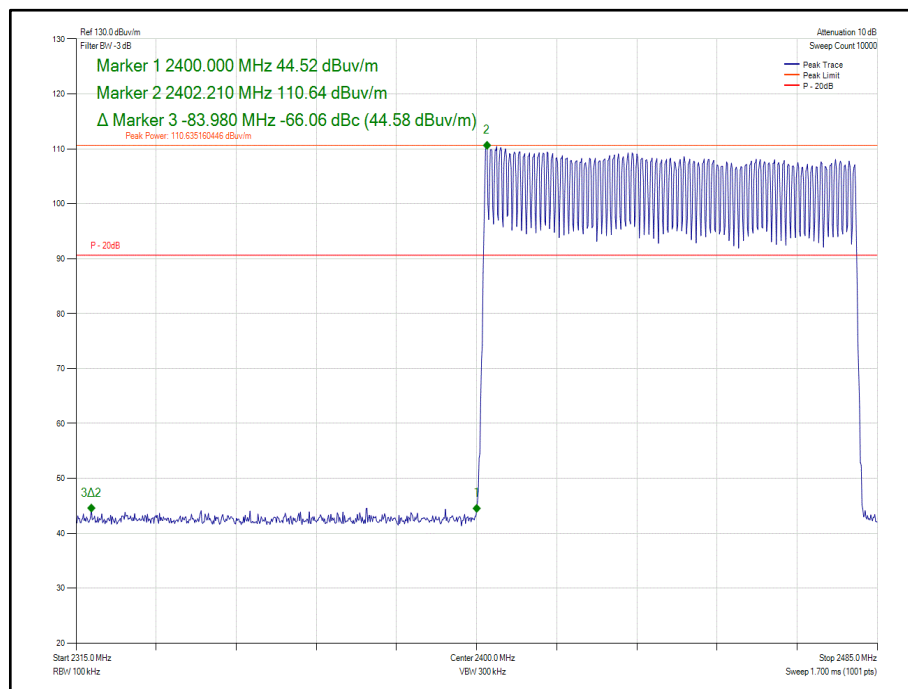


Figure 84 - Core 2 - Hopping - GFSK/DH5 - Band Edge Frequency 2400.0 MHz

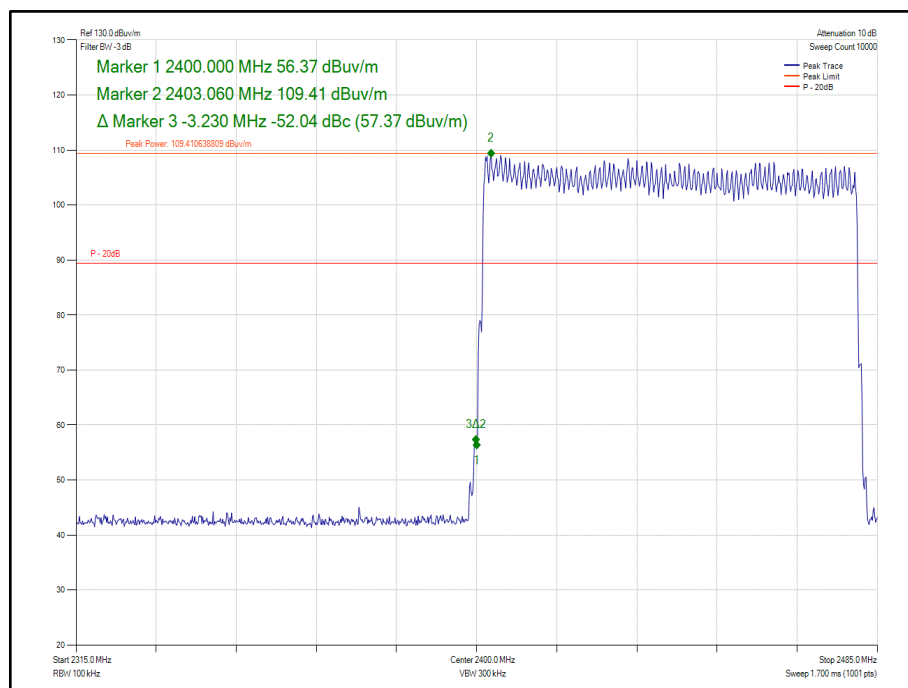


Figure 85 - Core 2 - Hopping - $\pi/4$ DQPSK/2DH5 - Band Edge Frequency 2400.0 MHz

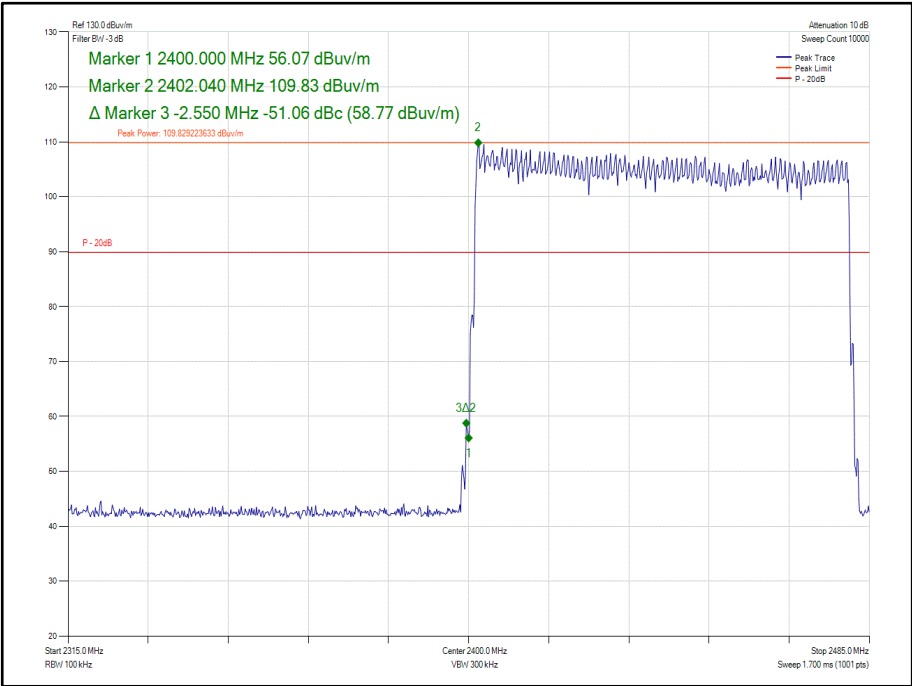


Figure 86 - Core 2 - Hopping - 8-DPSK/3DH5 - Band Edge Frequency 2400.0 MHz

Mode	Modulation	Core	Packet Type	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
Static	GFSK	0-1	DH5	2402	2400.0	-69.02
Static	$\pi/4$ DQPSK	0-1	2DH5	2402	2400.0	-55.73
Static	8-DPSK	0-1	3DH5	2402	2400.0	-55.43
Hopping	GFSK	0-1	DH5	2402	2400.0	-70.79
Hopping	$\pi/4$ DQPSK	0-1	2DH5	2402	2400.0	-60.86
Hopping	8-DPSK	0-1	3DH5	2402	2400.0	-58.93

Table 40 - Authorised Band Edge Results

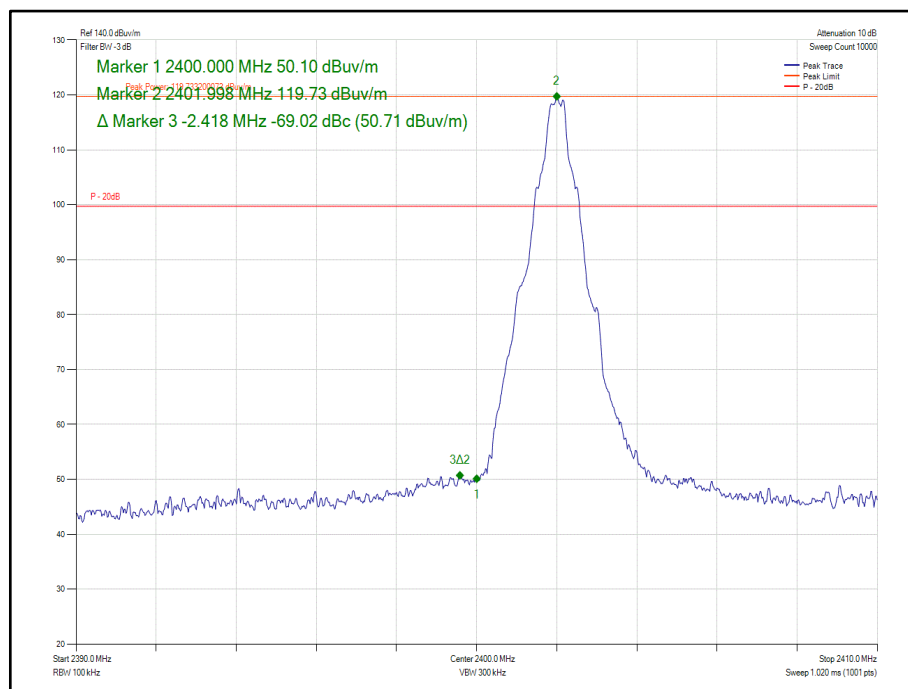


Figure 87 - Core 0-1 - Static - GFSK/DH5 - 2402 MHz - Band Edge Frequency 2400.0 MHz

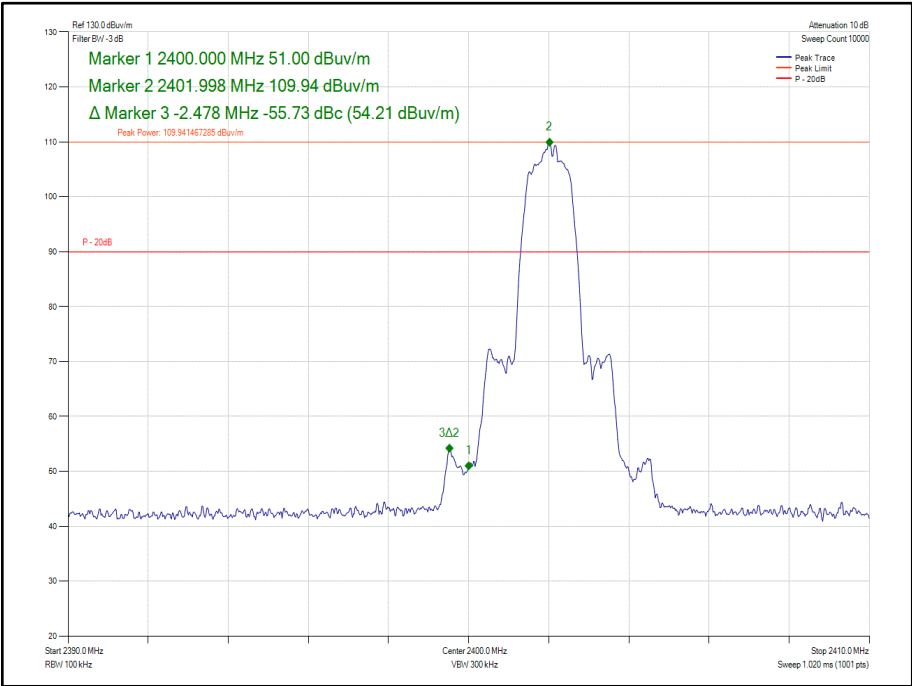


Figure 88 - Core 0-1 - Static - $\pi/4$ DQPSK/2DH5 - 2402 MHz - Band Edge Frequency 2400.0 MHz

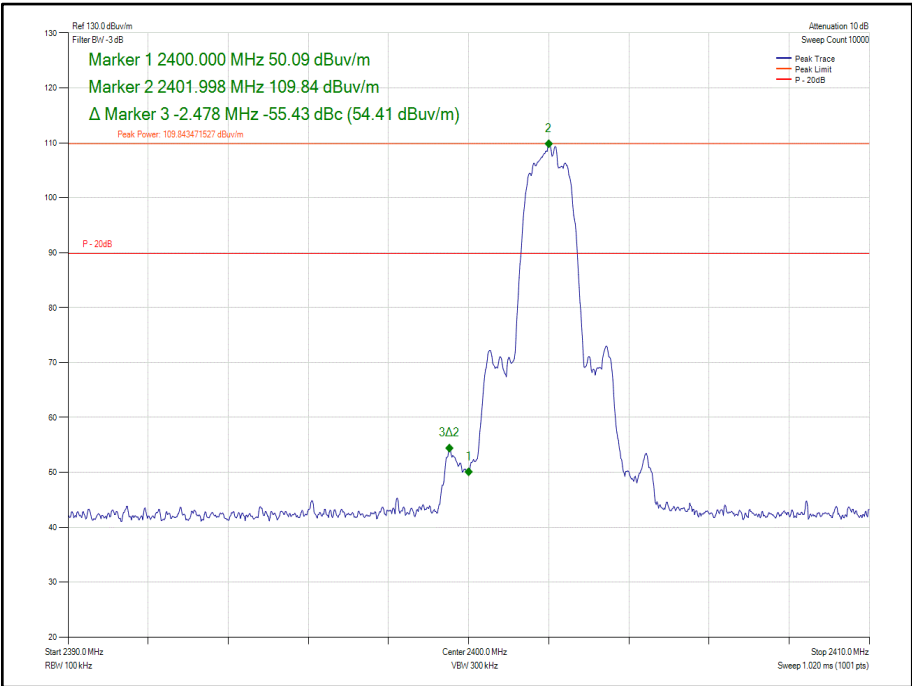


Figure 89 - Core 0-1 - Static - 8-DPSK/3DH5 - 2402 MHz - Band Edge Frequency 2400.0 MHz

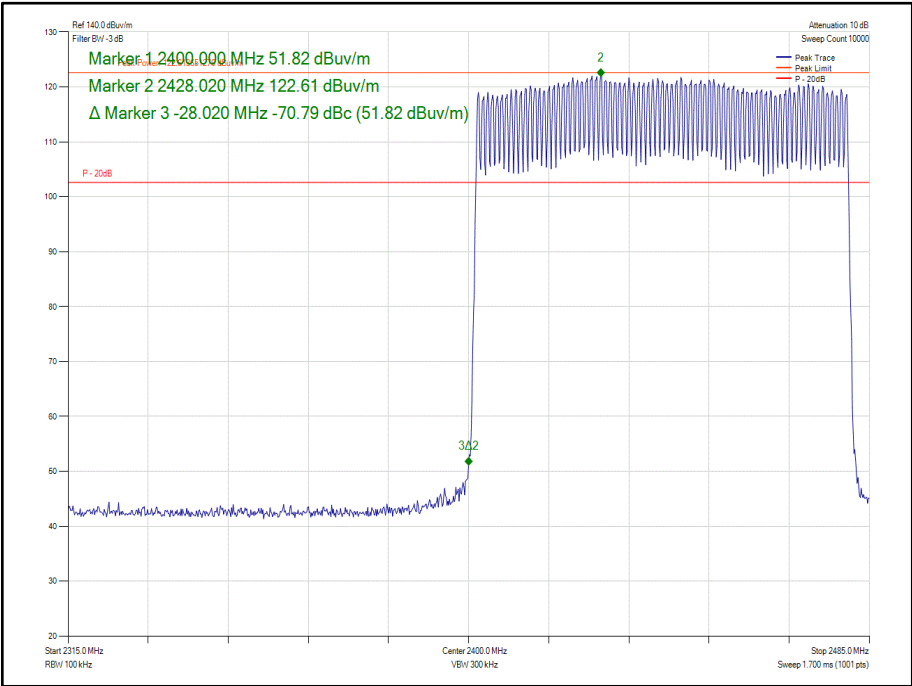


Figure 90 - Core 0-1 - Hopping - GFSK/DH5 - Band Edge Frequency 2400.0 MHz

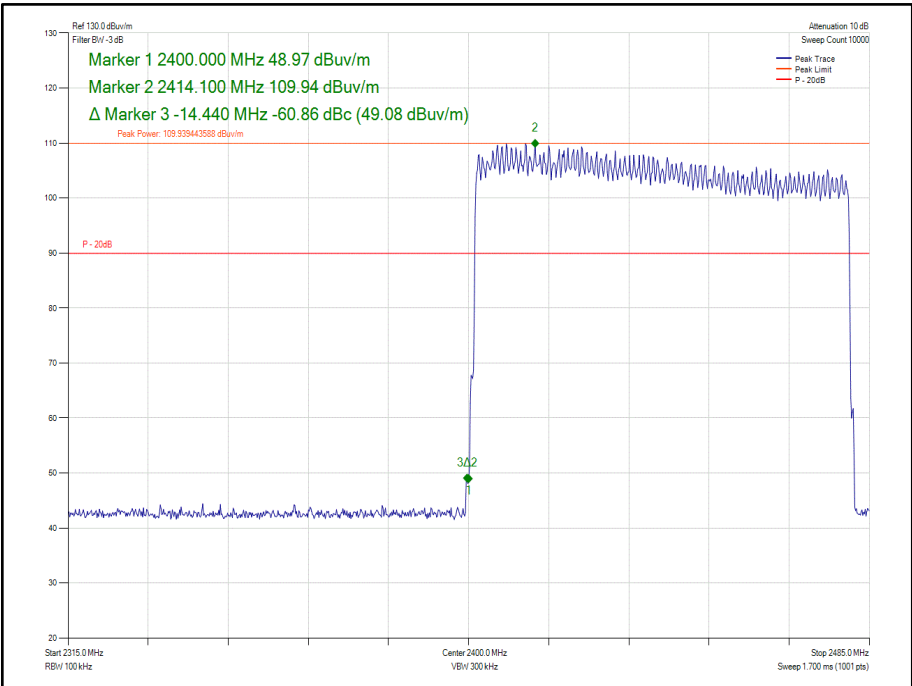


Figure 91 - Core 0-1 - Hopping - $\pi/4$ DQPSK/2DH5 - Band Edge Frequency 2400.0 MHz

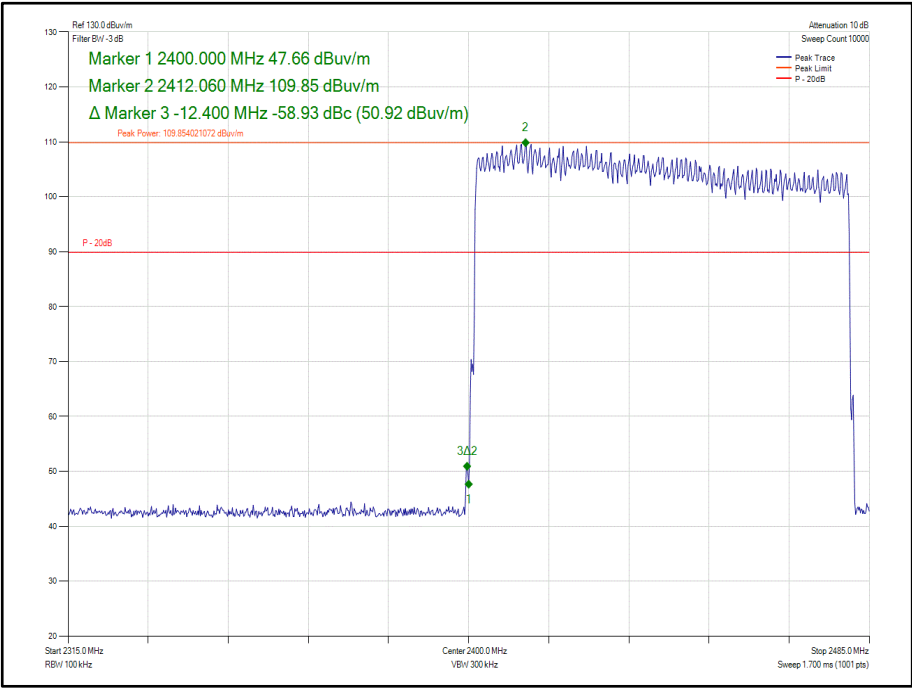


Figure 92 - Core 0-1 - Hopping - 8-DPSK/3DH5 - Band Edge Frequency 2400.0 MHz

ePA

Mode	Modulation	Core	Packet Type	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
Static	GFSK	0	DH5	2402	2400.0	-67.59
Static	$\pi/4$ DQPSK	0	2DH5	2402	2400.0	-62.07
Static	8-DPSK	0	3DH5	2402	2400.0	-62.10
Hopping	GFSK	0	DH5	2402	2400.0	-65.19
Hopping	$\pi/4$ DQPSK	0	2DH5	2402	2400.0	-63.93
Hopping	8-DPSK	0	3DH5	2402	2400.0	-63.95

Table 41 - Authorised Band Edge Results

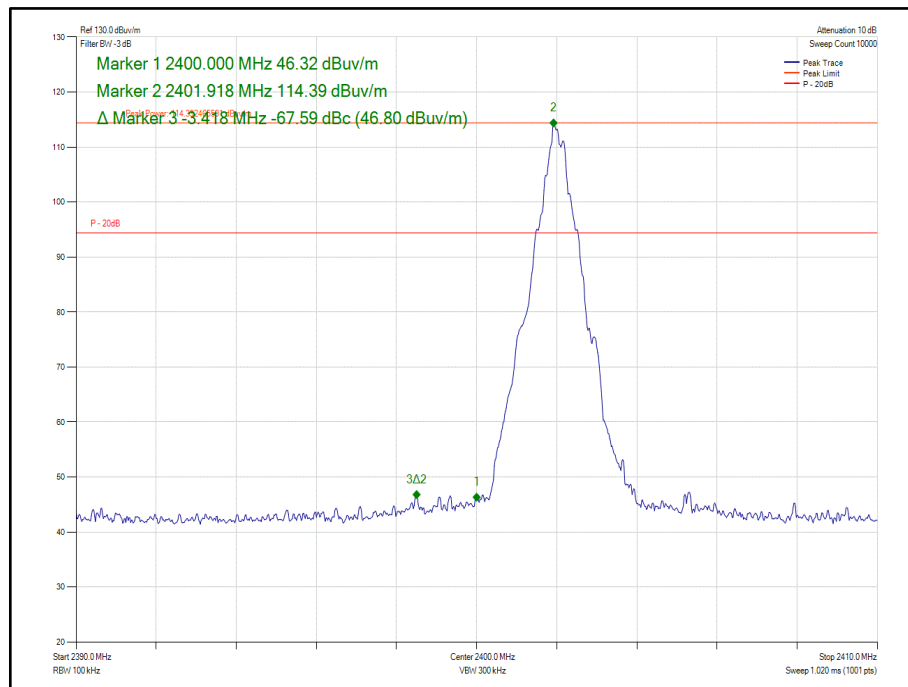


Figure 93 - Core 0 - Static - GFSK/DH5 - 2402 MHz - Band Edge Frequency 2400.0 MHz

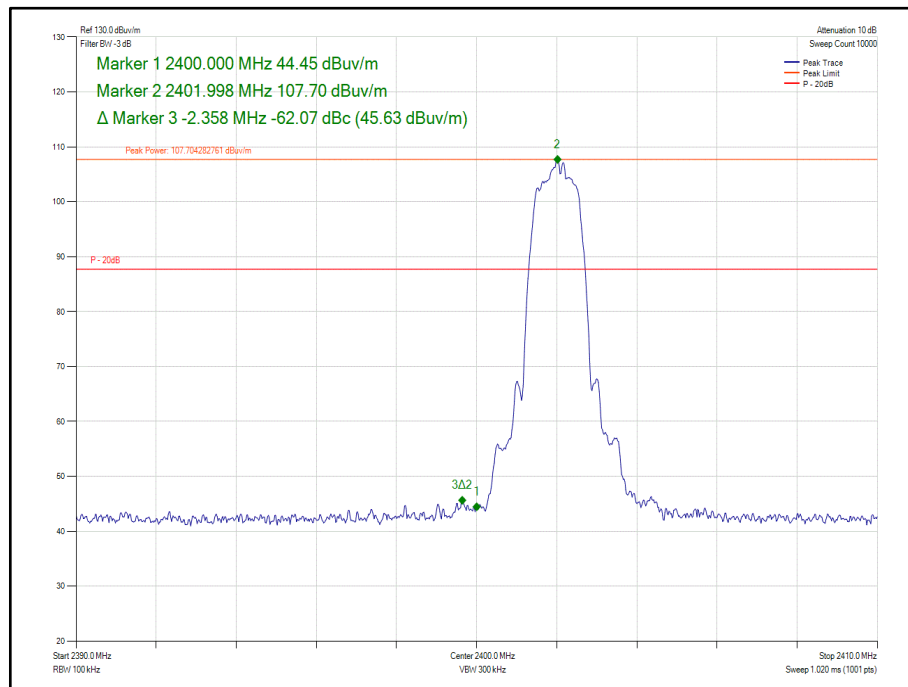


Figure 94 - Core 0 - Static - $\pi/4$ DQPSK/2DH5 - 2402 MHz - Band Edge Frequency 2400.0 MHz

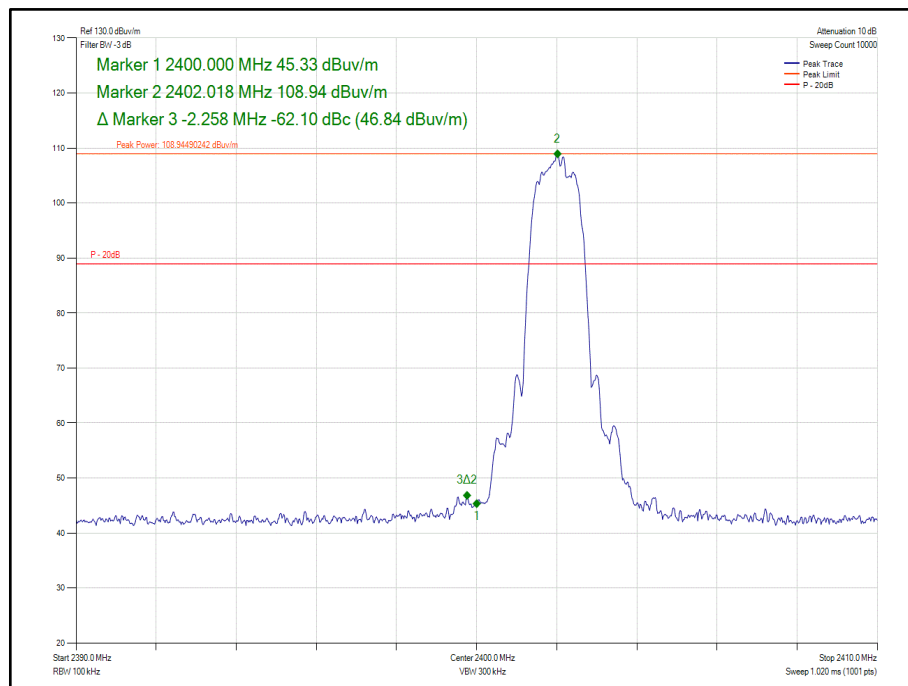


Figure 95 - Core 0 - Static - 8-DPSK/3DH5 - 2402 MHz - Band Edge Frequency 2400.0 MHz

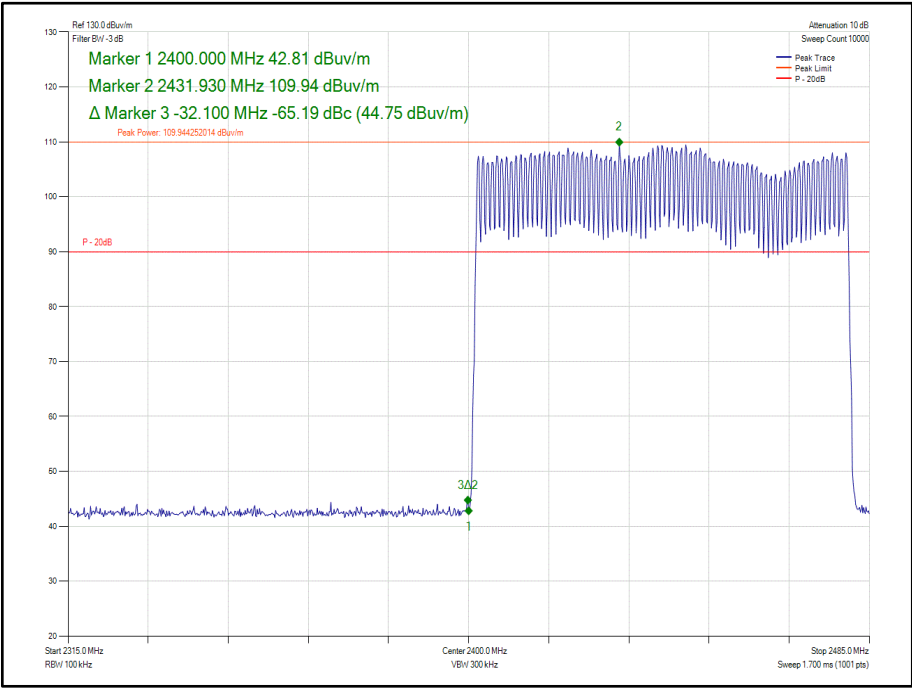


Figure 96 - Core 0 - Hopping - GFSK/DH5 - Band Edge Frequency 2400.0 MHz

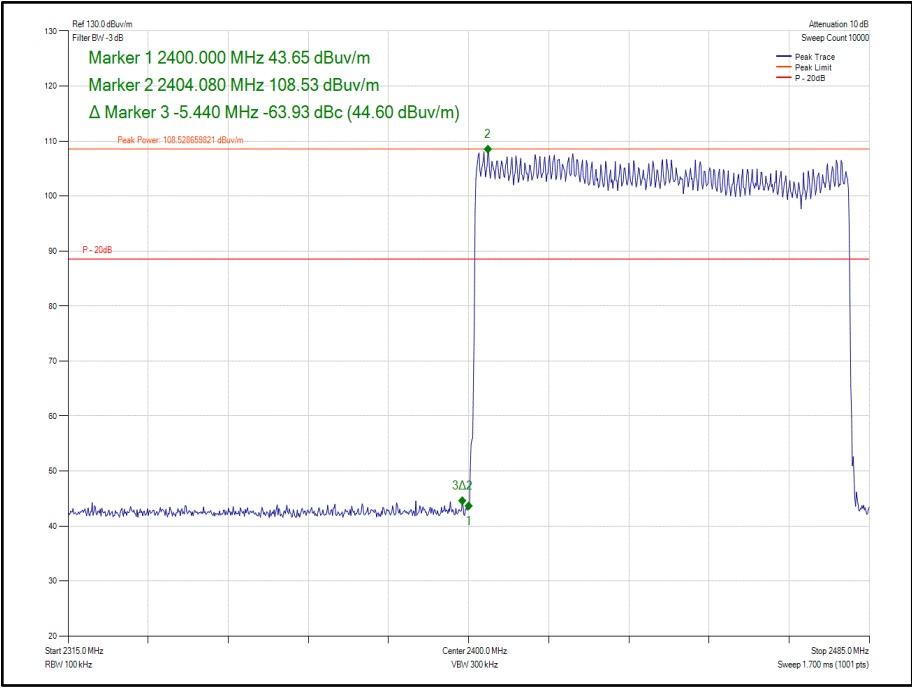


Figure 97 - Core 0 - Hopping - $\pi/4$ DQPSK/2DH5 - Band Edge Frequency 2400.0 MHz

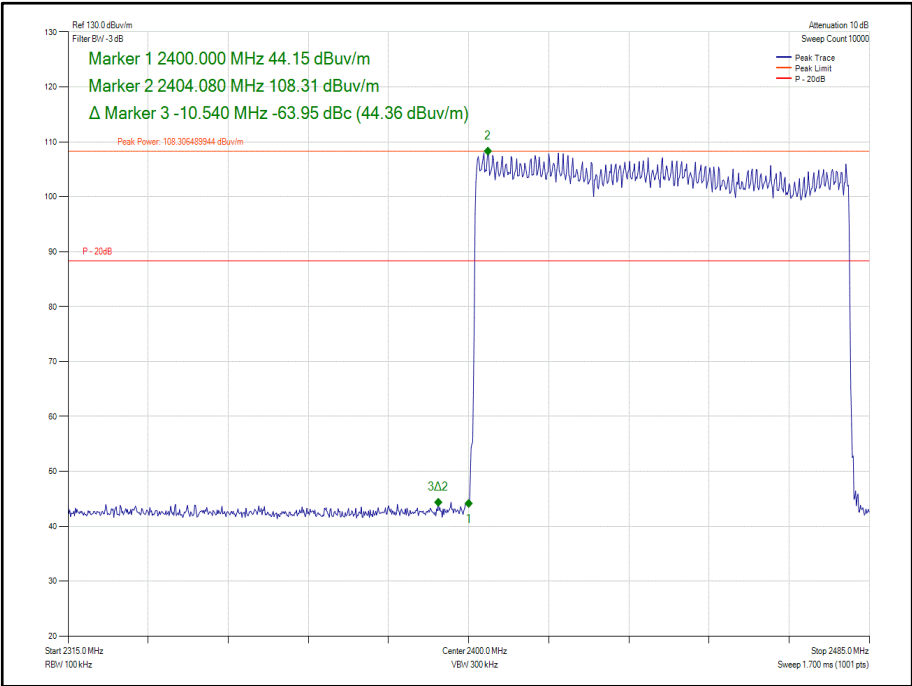


Figure 98 - Core 0 - Hopping - 8-DPSK/3DH5 - Band Edge Frequency 2400.0 MHz

Mode	Modulation	Core	Packet Type	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
Static	GFSK	1	DH5	2402	2400.0	-66.98
Static	$\pi/4$ DQPSK	1	2DH5	2402	2400.0	-63.15
Static	8-DPSK	1	3DH5	2402	2400.0	-63.37
Hopping	GFSK	1	DH5	2402	2400.0	-67.36
Hopping	$\pi/4$ DQPSK	1	2DH5	2402	2400.0	-64.44
Hopping	8-DPSK	1	3DH5	2402	2400.0	-63.60

Table 42 - Authorised Band Edge Results

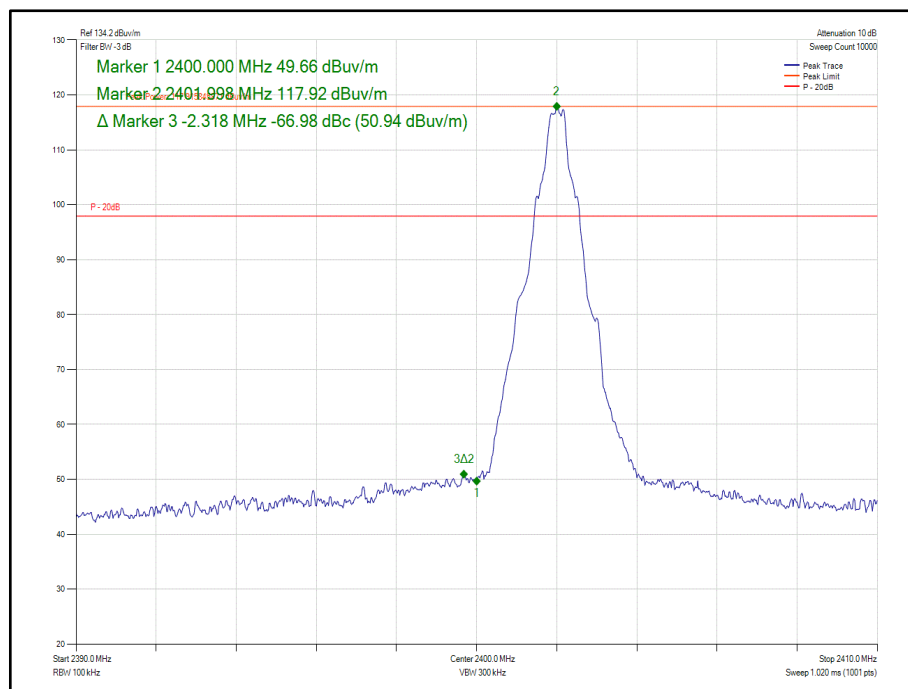


Figure 99 - Core 1 - Static - GFSK/DH5 - 2402 MHz - Band Edge Frequency 2400.0 MHz

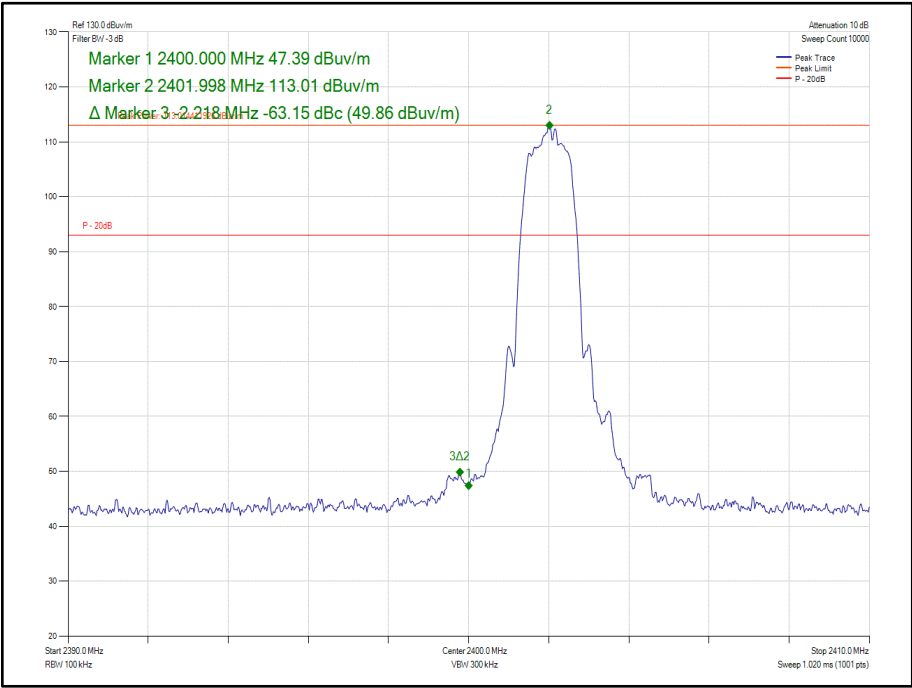


Figure 100 - Core 1 - Static - $\pi/4$ DQPSK/2DH5 - 2402 MHz - Band Edge Frequency 2400.0 MHz

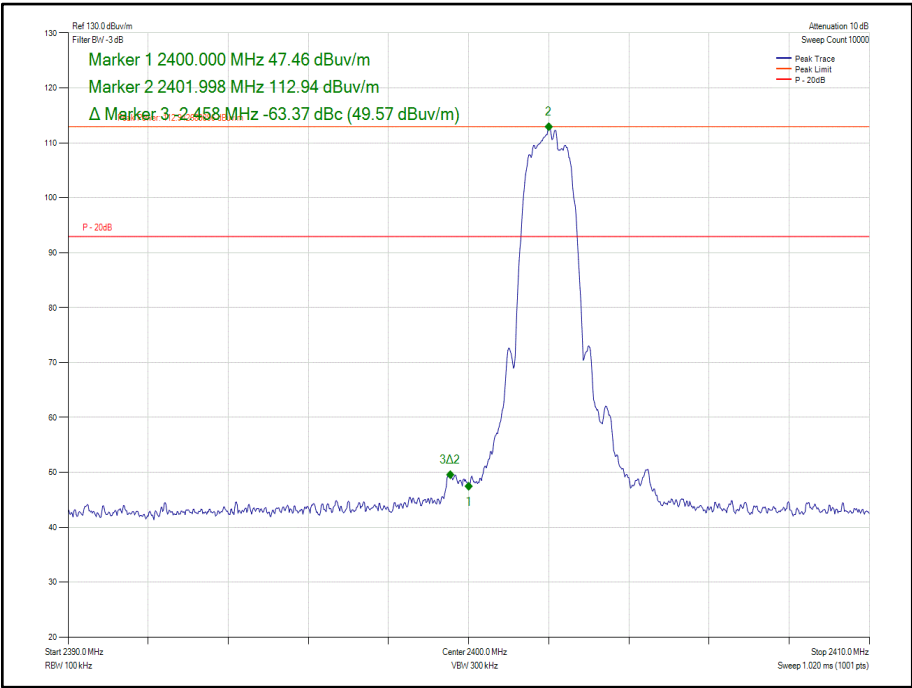


Figure 101 - Core 1 - Static - 8-DPSK/3DH5 - 2402 MHz - Band Edge Frequency 2400.0 MHz

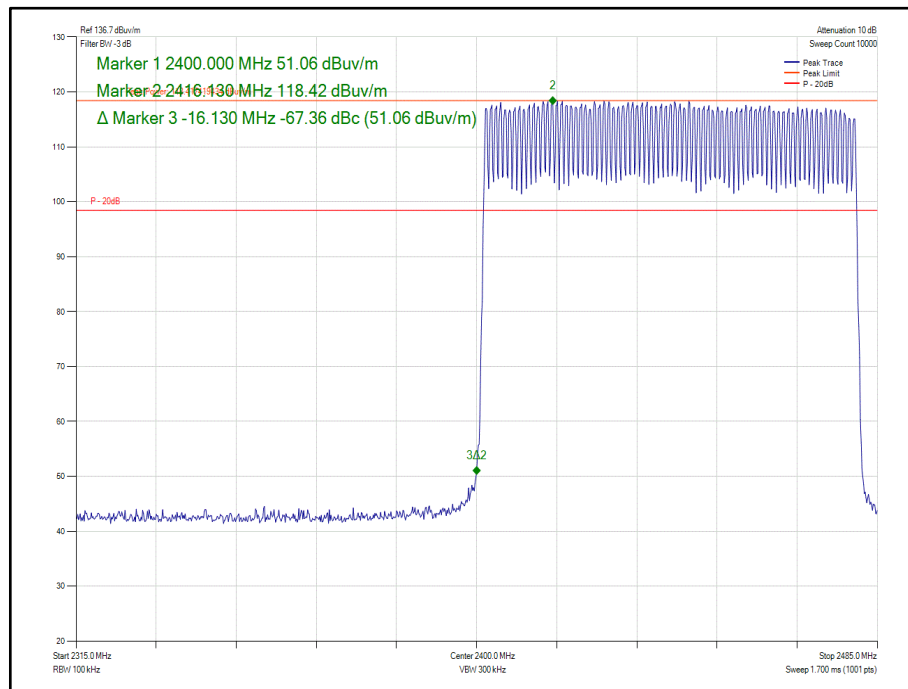


Figure 102 - Core 1 - Hopping - GFSK/DH5 - Band Edge Frequency 2400.0 MHz

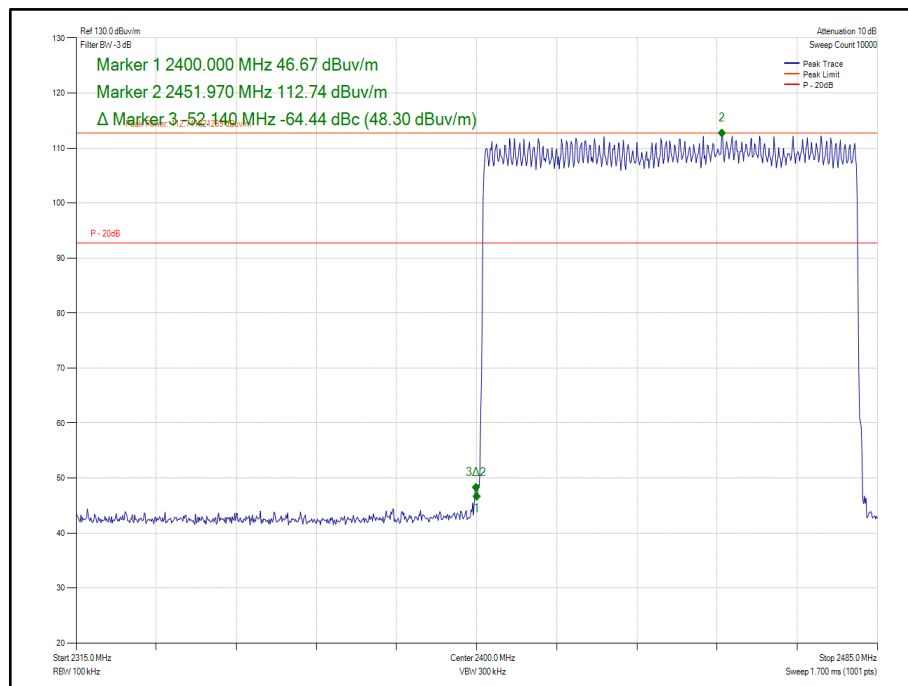


Figure 103 - Core 1 - Hopping - $\pi/4$ DQPSK/2DH5 - Band Edge Frequency 2400.0 MHz

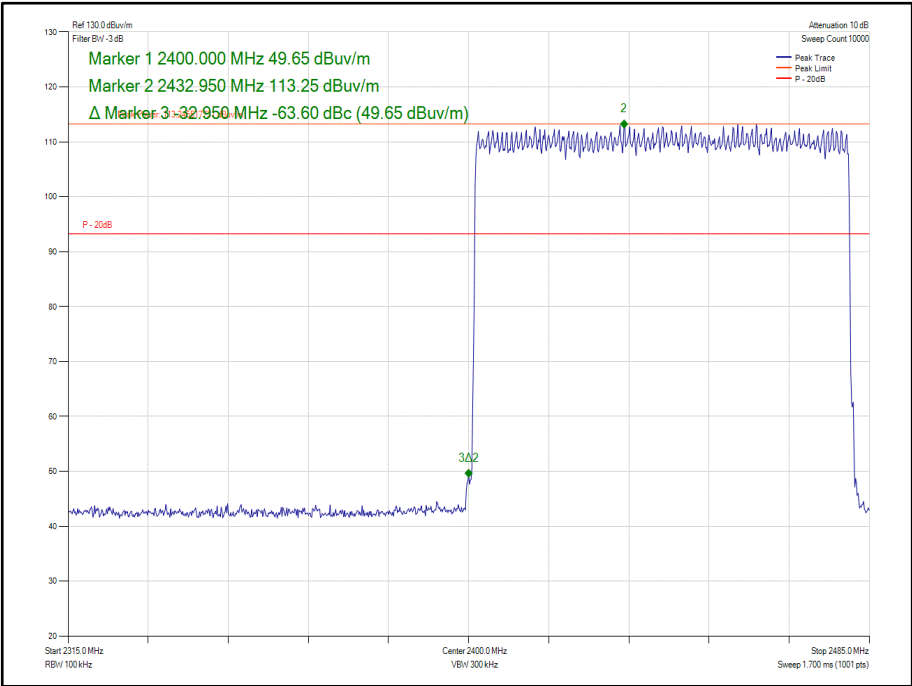


Figure 104 - Core 1 - Hopping - 8-DPSK/3DH5 - Band Edge Frequency 2400.0 MHz

Mode	Modulation	Core	Packet Type	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
Static	GFSK	0-1	DH5	2402	2400.0	-67.90
Static	$\pi/4$ DQPSK	0-1	2DH5	2402	2400.0	-63.93
Static	8-DPSK	0-1	3DH5	2402	2400.0	-63.40
Hopping	GFSK	0-1	DH5	2402	2400.0	-69.51
Hopping	$\pi/4$ DQPSK	0-1	2DH5	2402	2400.0	-64.94
Hopping	8-DPSK	0-1	3DH5	2402	2400.0	-66.45

Table 43 - MIMO 2TX Authorised Band Edge Results

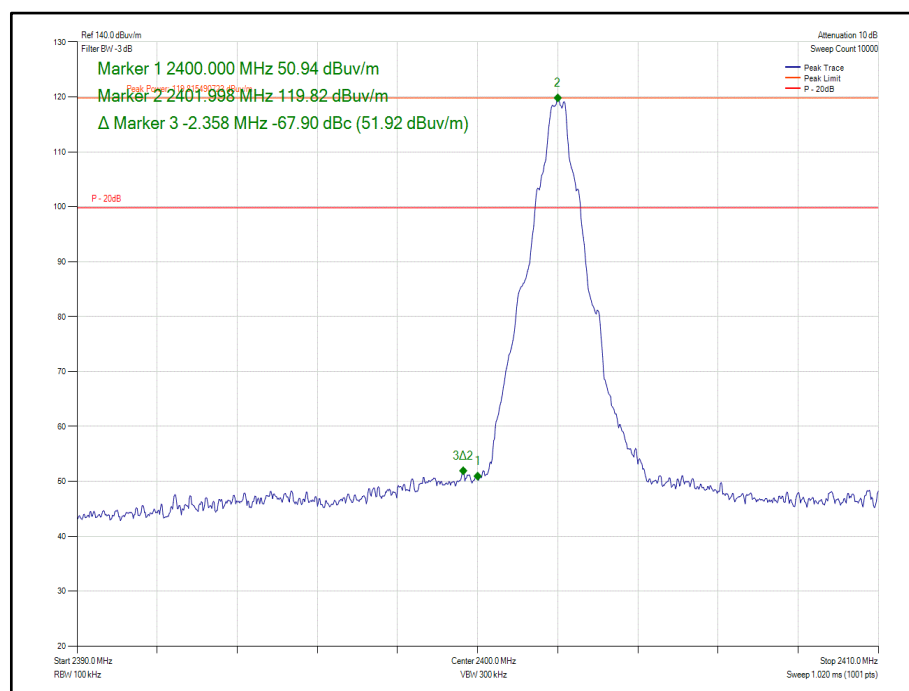


Figure 105 - Core 0-1 - Static - GFSK/DH5 - 2402 MHz - Band Edge Frequency 2400.0 MHz

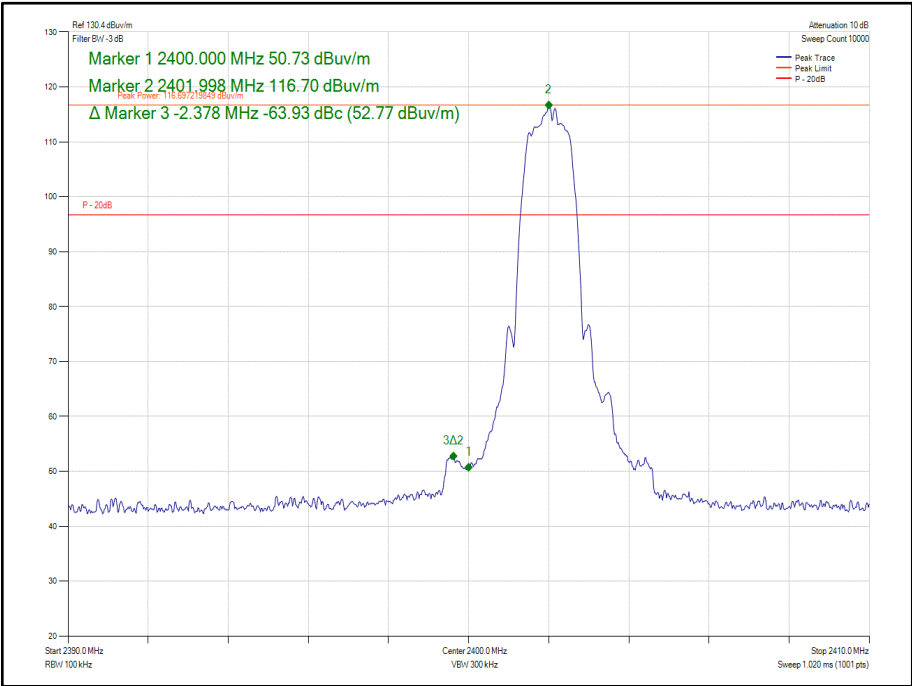


Figure 106 - Core 0-1 - Static - $\pi/4$ DQPSK/2DH5 - 2402 MHz - Band Edge Frequency 2400.0 MHz

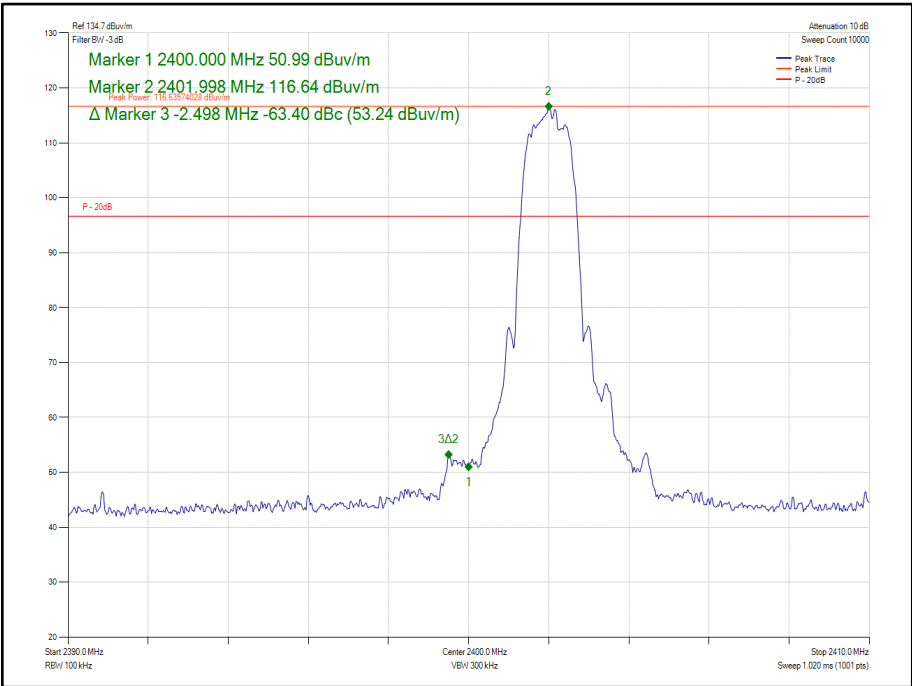


Figure 107 - Core 0-1 - Static - 8-DPSK/3DH5 - 2402 MHz - Band Edge Frequency 2400.0 MHz

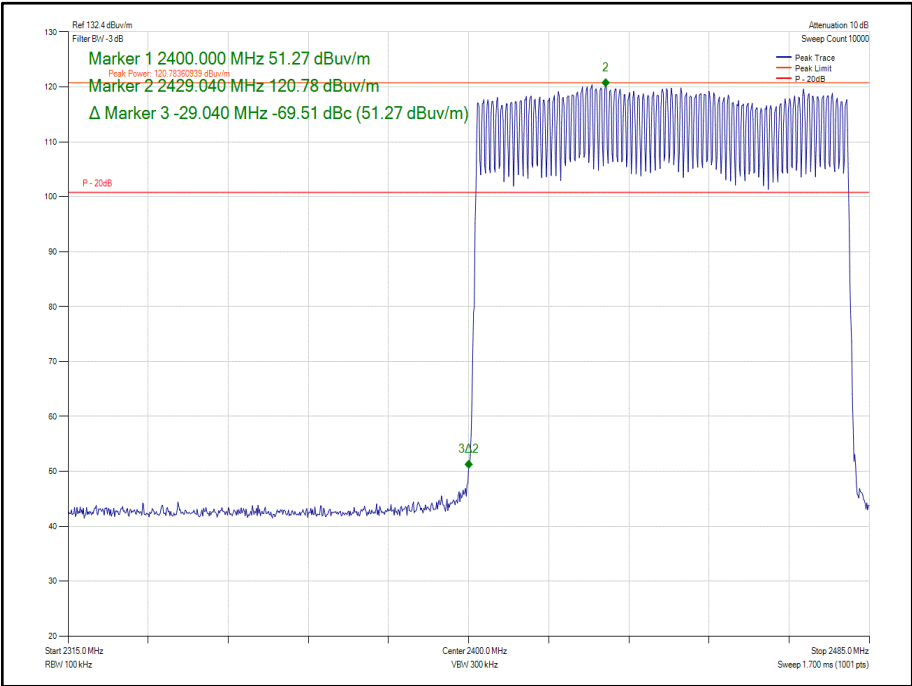


Figure 108 - Core 0-1 - Hopping - GFSK/DH5 - Band Edge Frequency 2400.0 MHz

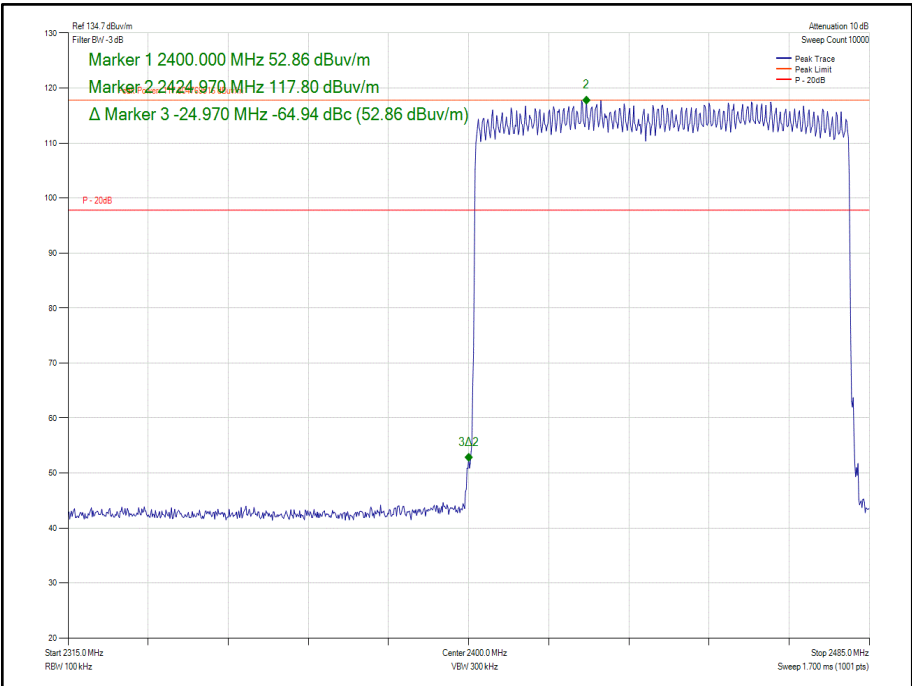


Figure 109 - Core 0-1 - Hopping - $\pi/4$ DQPSK/2DH5 - Band Edge Frequency 2400.0 MHz

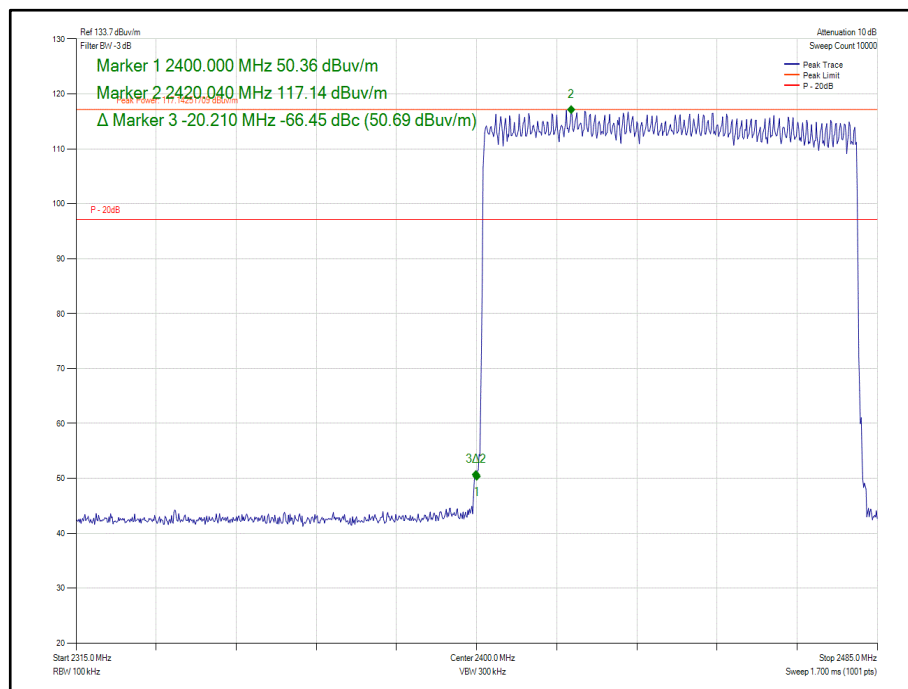


Figure 110 - Core 0-1 - Hopping - 8-DPSK/3DH5 - Band Edge Frequency 2400.0 MHz

FCC 47 CFR Part 15, Limit Clause 15.247 (d)

20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

ISED RSS-247, Limit Clause 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.



2.6.7 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 5 and RF Chamber 11.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Power Supply Unit	Farnell	LB30-4	158	12	O/P Mon
Screened Room (5)	Rainford	Rainford	1545	36	23-Jan-2021
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Mast Controller	Maturo GmbH	NCD	4810	-	TU
Tilt Antenna Mast	Maturo GmbH	TAM 4.0-P	4811	-	TU
Horn Antenna (1-10GHz)	Schwarzbeck	BBHA 9120 B	4848	12	10-Mar-2021
EMI Test Receiver	Rohde & Schwarz	ESW44	5084	12	28-Nov-2020
Cable (18 GHz)	Rosenberger	LU7-071-1000	5102	12	06-Oct-2020
Cable (18 GHz)	Rosenberger	LU7-071-1000	5103	12	06-Oct-2020
Cable (18 GHz)	Rosenberger	LU7-071-1000	5104	12	09-Dec-2020
EmX Emissions Software	TUV SUD	EmX	5125	-	Software
Screened Room (11)	Rainford	Rainford	5136	36	01-Nov-2021
Mast	Maturo	TAM 4.0-P	5158	-	TU
Mast and Turntable Controller	Maturo	Maturo NCD	5159	-	TU
Turntable	Maturo	TT 15WF	5160	-	TU
Horn Antenna (1-10GHz)	Schwarzbeck	BBHA 9120 B	5215	12	10-Mar-2021
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB-40	5475	12	17-Mar-2021
Attenuator 5W 10dB DC-18GHz	Aaren	AT40A-4041-D18-10	5494	12	14-Apr-2021
2m SMA Cable	Junkosha	MWX221-02000AMSAMS/A	5518	12	01-Apr-2021
8m N Type Cable	Junkosha	MWX221-08000NMSNMS/B	5522	12	24-Mar-2021
EMI Test Receiver	Rohde & Schwarz	ESW44	5527	12	06-Feb-2021

Table 44

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment



2.7 Restricted Band Edges

2.7.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.205
ISED RSS-GEN, Clause 8.10

2.7.2 Equipment Under Test and Modification State

A2348, S/N: C07D100W02H7 - Modification State 0

2.7.3 Date of Test

18-August-2020 to 24-August-2020

2.7.4 Test Method

This test was performed in accordance with ANSI C63.10, clause 6.10.5.

Plots for average measurements were taken in accordance with ANSI C63.10, clause 4.1.4.2.5. These are shown for information purposes and were used to determine the worst-case measurement point. Final average measurements were then taken in accordance with ANSI C63.10, clause 4.1.4.2.2 to obtain the measurement result recorded in the test results tables.

The following conversion can be applied to convert from dBμV/m to μV/m:
 $10^{(\text{Field Strength in dB}\mu\text{V/m}/20)}$

2.7.5 Environmental Conditions

Ambient Temperature 20.7-27.2°C
Relative Humidity 48.1-61.1%

2.7.6 Test Results

2.4 GHz Bluetooth (FHSS)

iPA

Mode	Modulation	Core	Packet Type	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
Static	GFSK	0	DH5	2402	2390.0	54.68	39.40
Static	π/4 DQPSK	0	2DH5	2402	2390.0	53.77	39.38
Static	8-DPSK	0	3DH5	2402	2390.0	53.74	39.37
Static	GFSK	0	DH5	2480	2483.5	52.50	40.17
Static	π/4 DQPSK	0	2DH5	2480	2483.5	52.34	39.91
Static	8-DPSK	0	3DH5	2480	2483.5	51.99	39.75

Table 45 - Restricted Band Edge Results

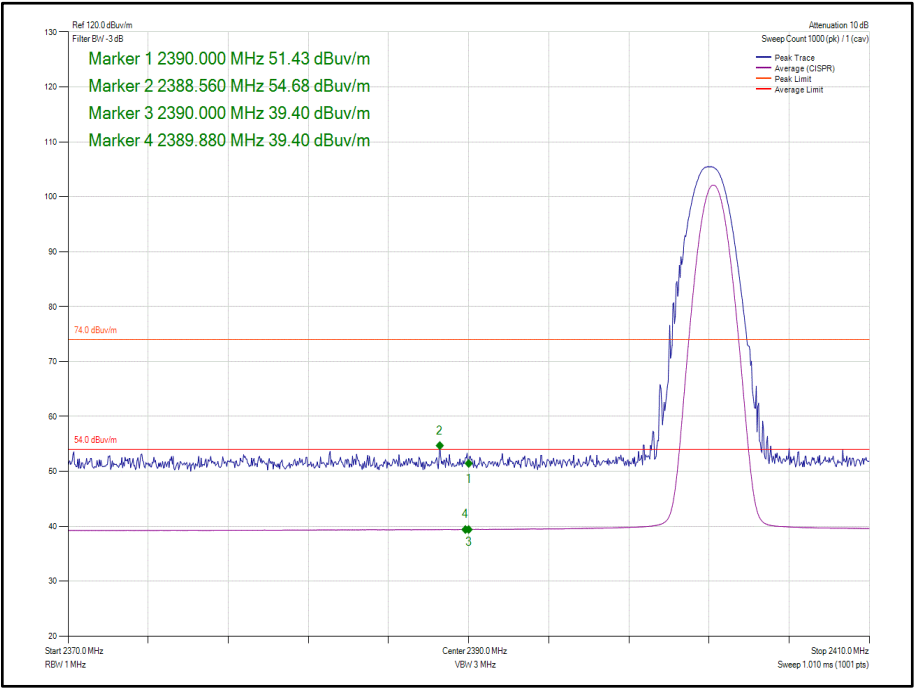


Figure 111 - Core 0 - Static - GFSK/DH5 - 2402 MHz - Band Edge Frequency 2390.0 MHz

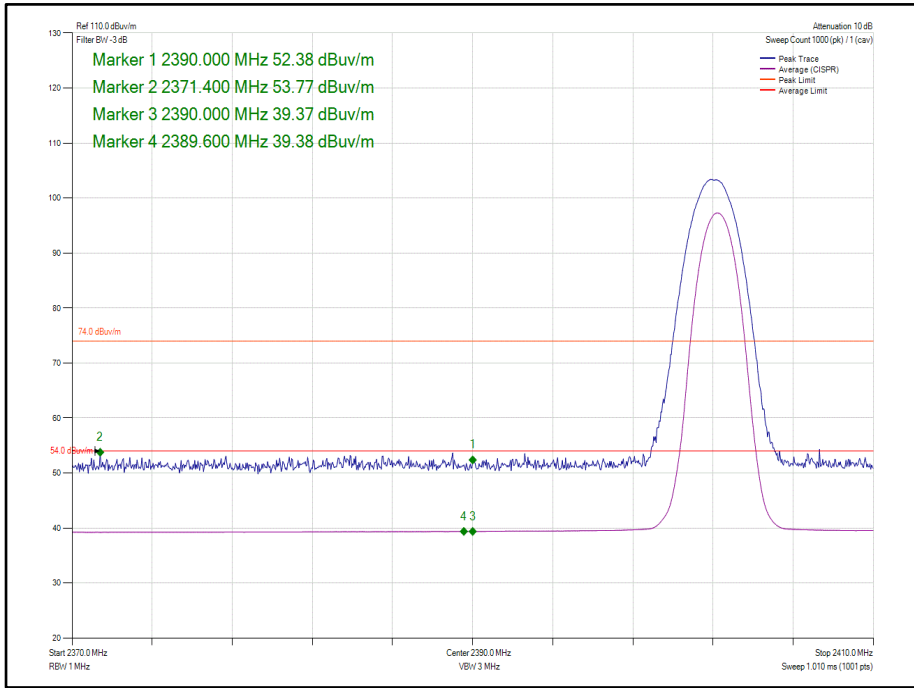


Figure 112 - Core 0 - Static - $\pi/4$ DQPSK/2DH5 - 2402 MHz - Band Edge Frequency 2390.0 MHz

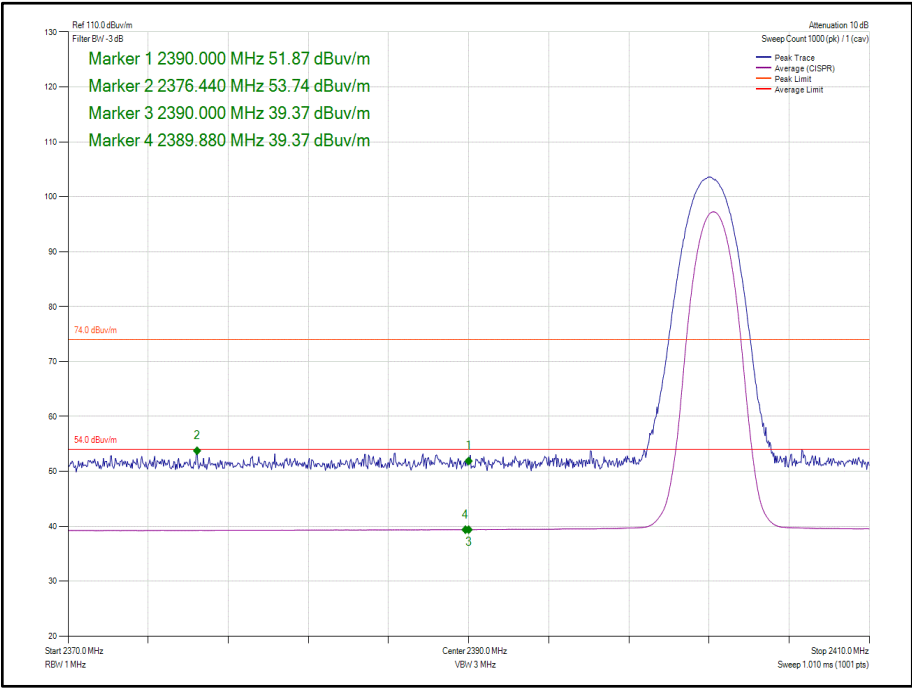


Figure 113 - Core 0 - Static - 8-DPSK/3DH5 - 2402 MHz Band Edge Frequency 2390.0 MHz

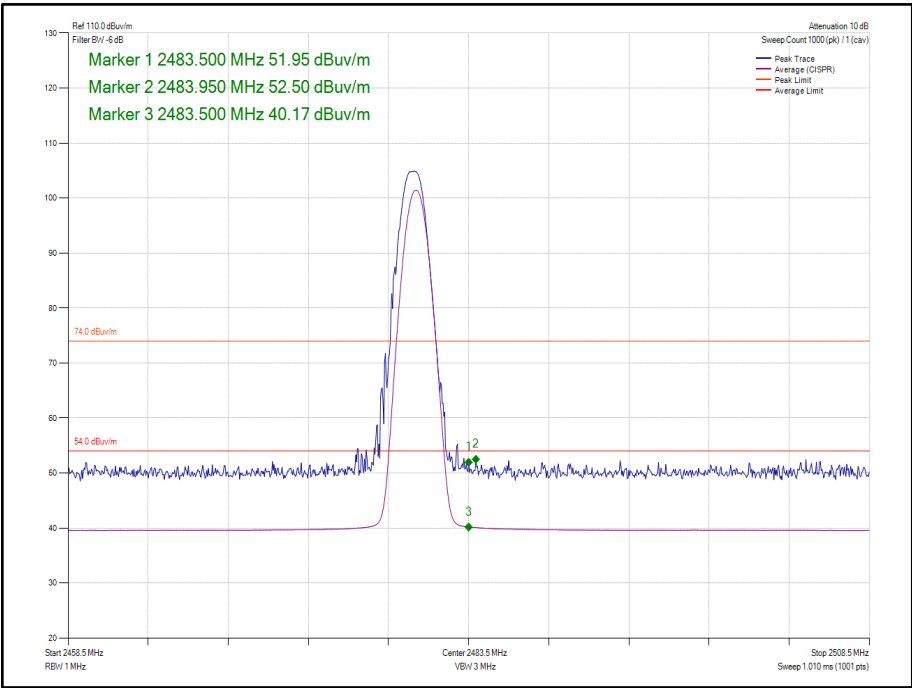


Figure 114 - Core 0 - Static - GFSK/DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

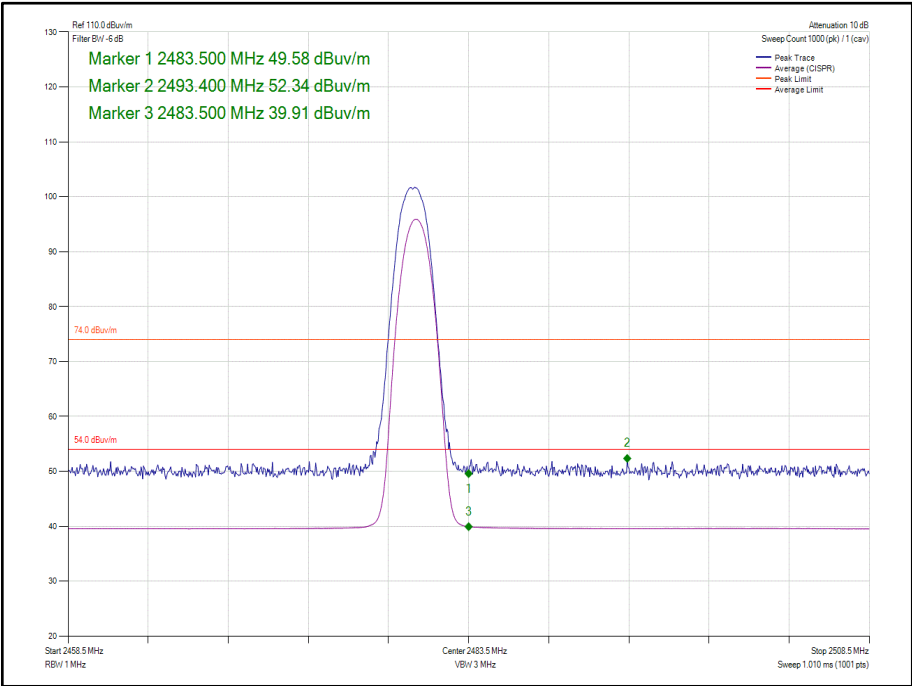


Figure 115 - Core 0 - Static - $\pi/4$ DQPSK/2DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

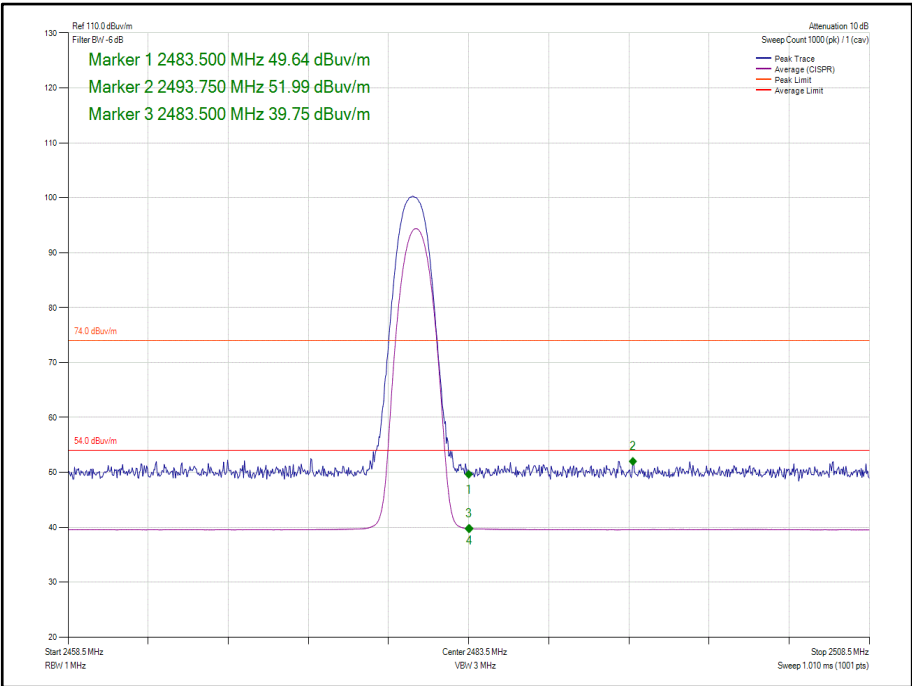


Figure 116 - Core 0 - Static - 8-DPSK/3DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

Mode	Modulation	Core	Packet Type	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
Static	GFSK	1	DH5	2402	2390.0	53.51	39.55
Static	$\pi/4$ DQPSK	1	2DH5	2402	2390.0	53.67	39.44
Static	8-DPSK	1	3DH5	2402	2390.0	53.73	39.44
Static	GFSK	1	DH5	2480	2483.5	53.50	41.04
Static	$\pi/4$ DQPSK	1	2DH5	2480	2483.5	52.56	40.45
Static	8-DPSK	1	3DH5	2480	2483.5	52.45	40.46

Table 46 - Restricted Band Edge Results

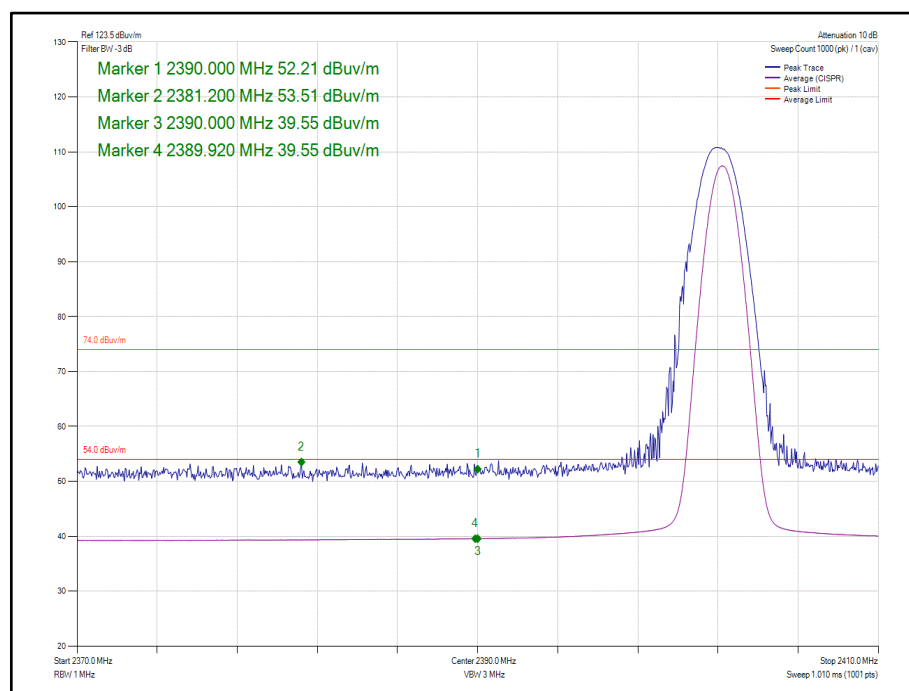


Figure 117 - Core 1 - Static - GFSK/DH5 - 2402 MHz - Band Edge Frequency 2390.0 MHz

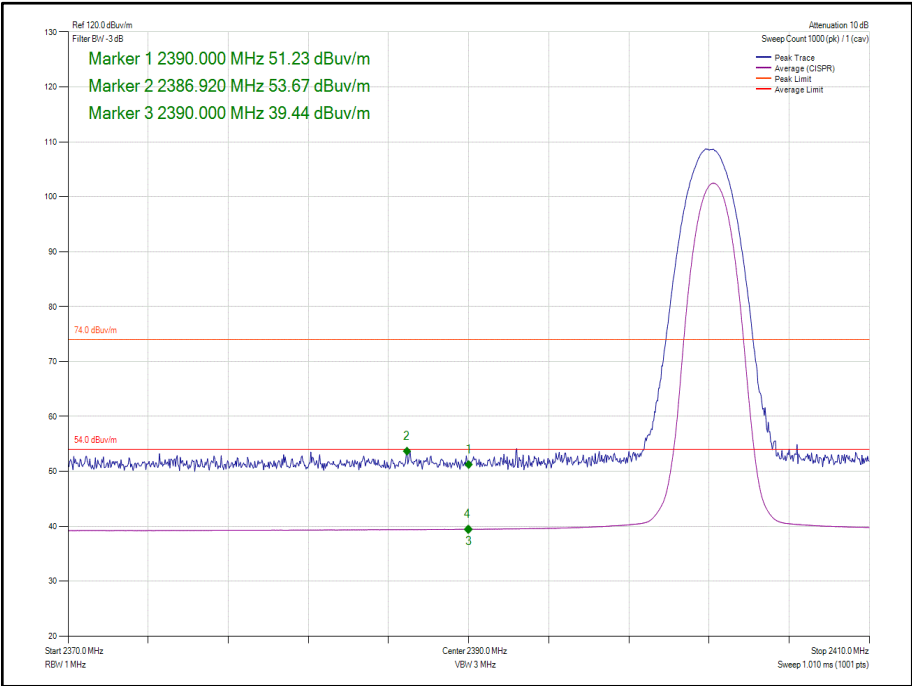


Figure 118 - Core 1 - Static - $\pi/4$ DQPSK/2DH5 - 2402 MHz - Band Edge Frequency 2390.0 MHz

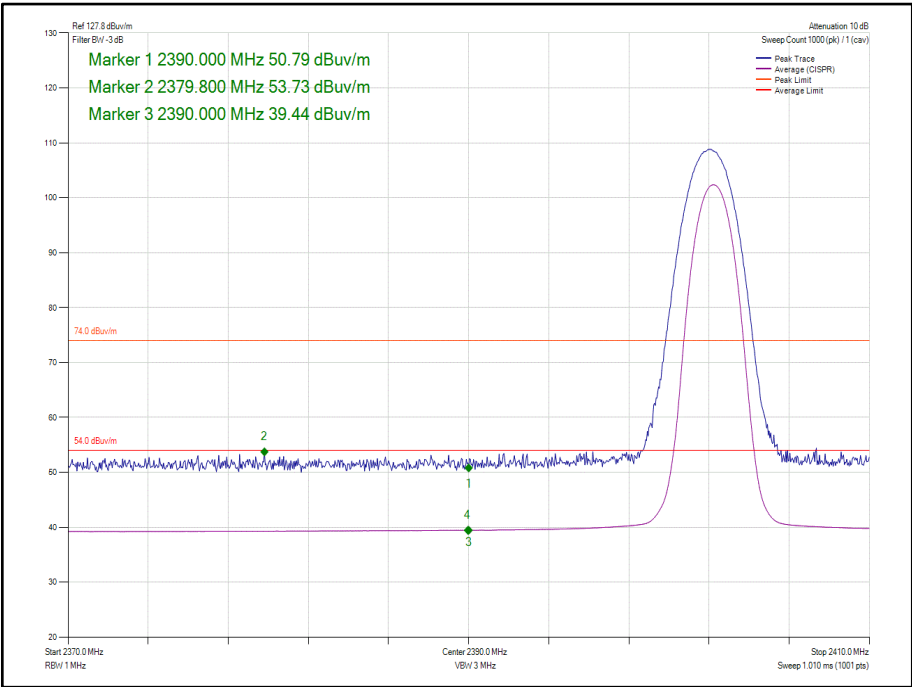


Figure 119 - Core 1 - Static - 8-DPSK/3DH5 - 2402 MHz Band Edge Frequency 2390.0 MHz

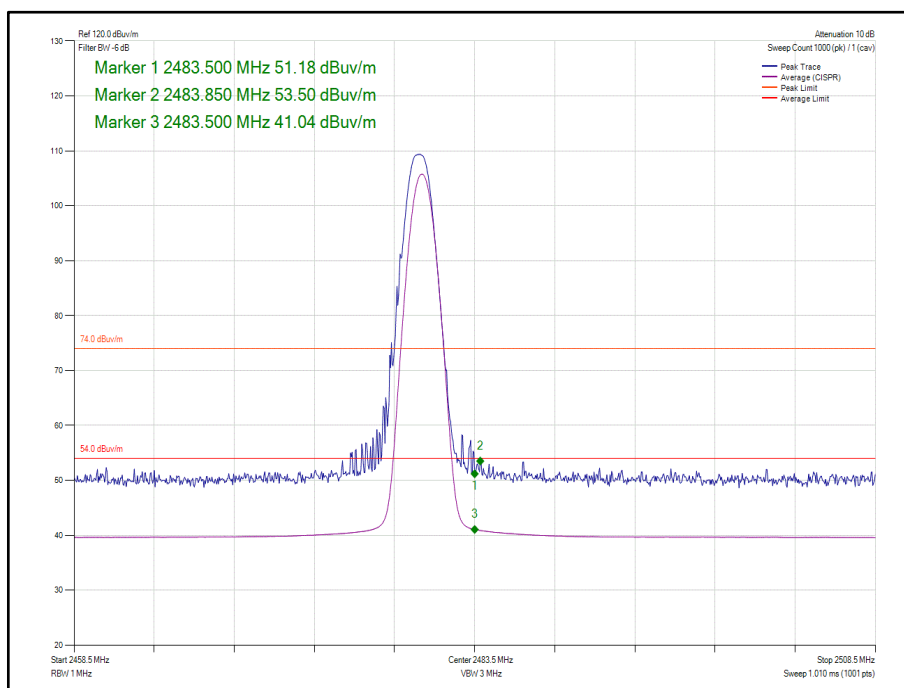


Figure 120 - Core 1 - Static - GFSK/DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

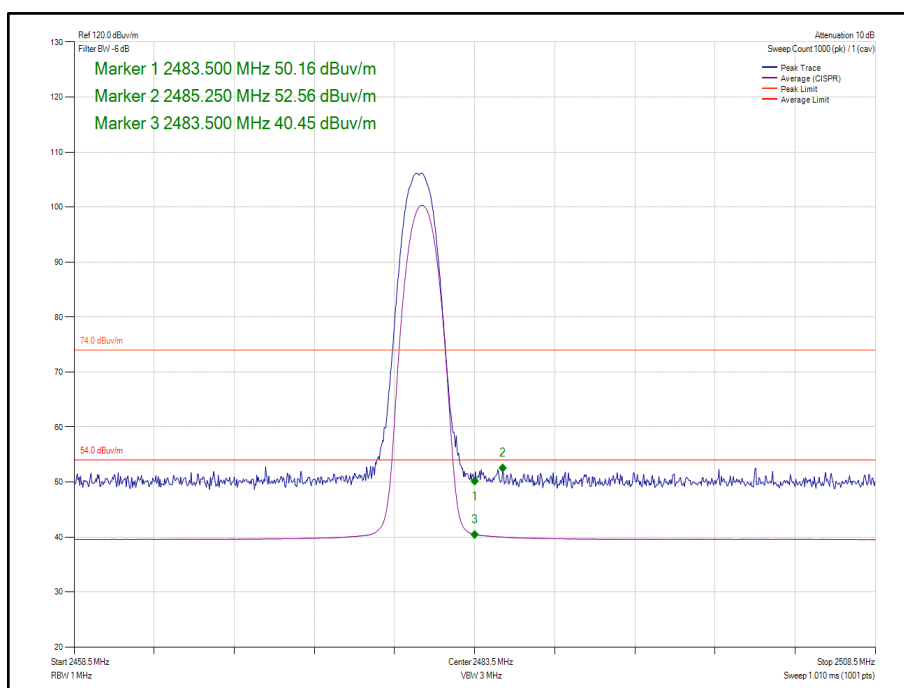


Figure 121 - Core 1 - Static - $\pi/4$ DQPSK/2DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

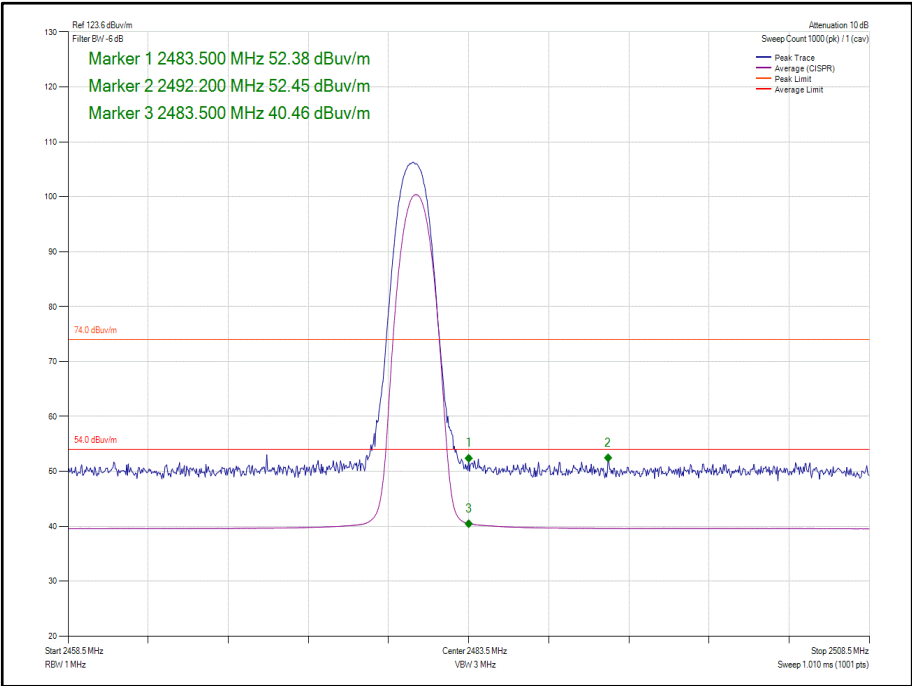


Figure 122 - Core 1 - Static - 8-DPSK/3DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

Mode	Modulation	Core	Packet Type	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
Static	GFSK	2	DH5	2402	2390.0	53.52	39.41
Static	$\pi/4$ DQPSK	2	2DH5	2402	2390.0	53.73	39.41
Static	8-DPSK	2	3DH5	2402	2390.0	53.52	39.42
Static	GFSK	2	DH5	2480	2483.5	52.72	40.05
Static	$\pi/4$ DQPSK	2	2DH5	2480	2483.5	53.62	40.55
Static	8-DPSK	2	3DH5	2480	2483.5	52.52	40.58

Table 47 - Restricted Band Edge Results

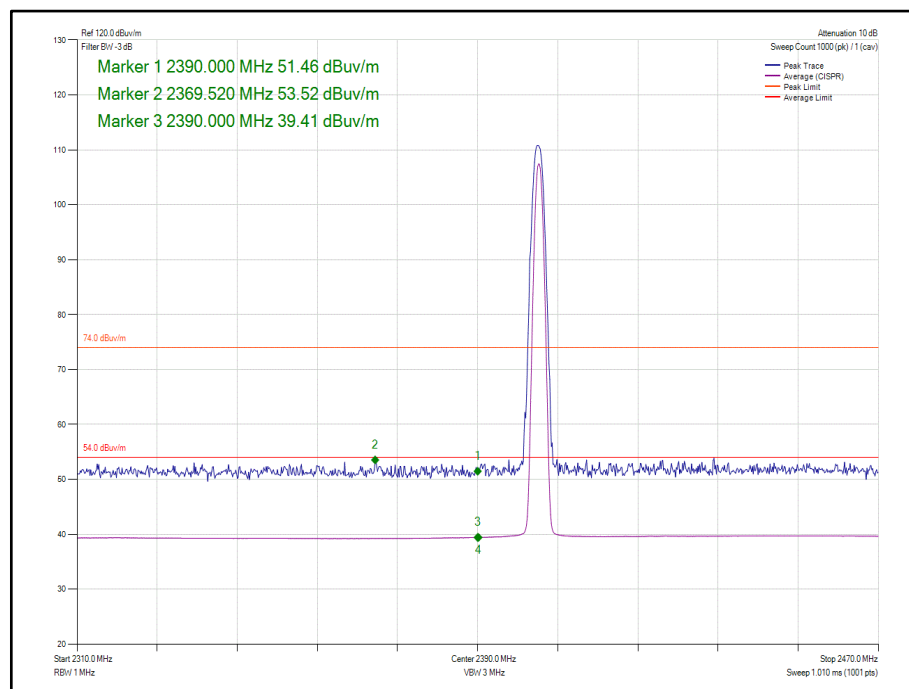


Figure 123 Core 2 - Static - GFSK/DH5 - 2402 MHz - Band Edge Frequency 2390.0 MHz

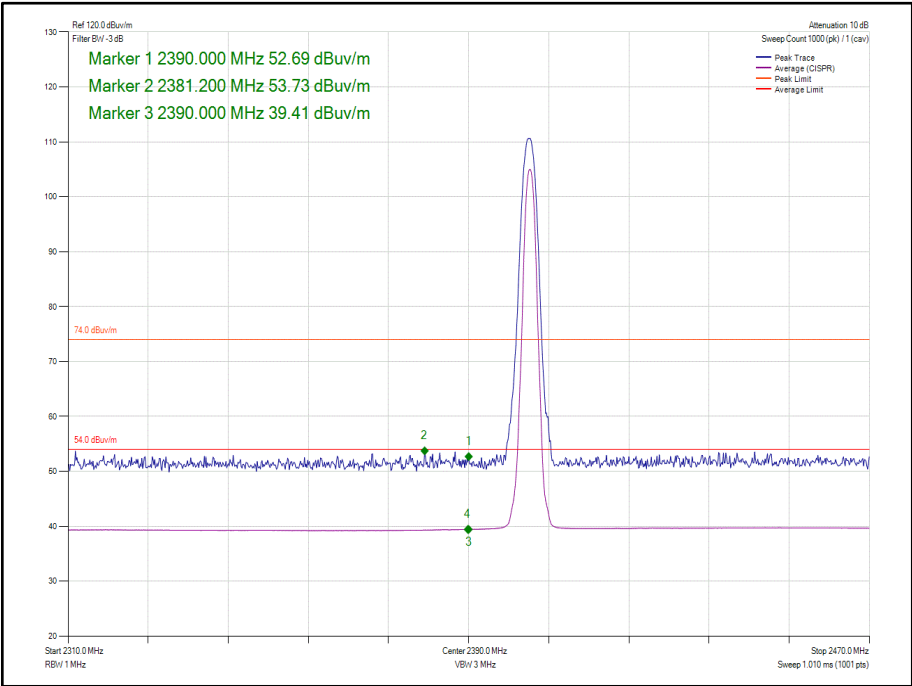


Figure 124 Core 2 - Static - $\pi/4$ DQPSK/2DH5 - 2402 MHz - Band Edge Frequency 2390.0 MHz

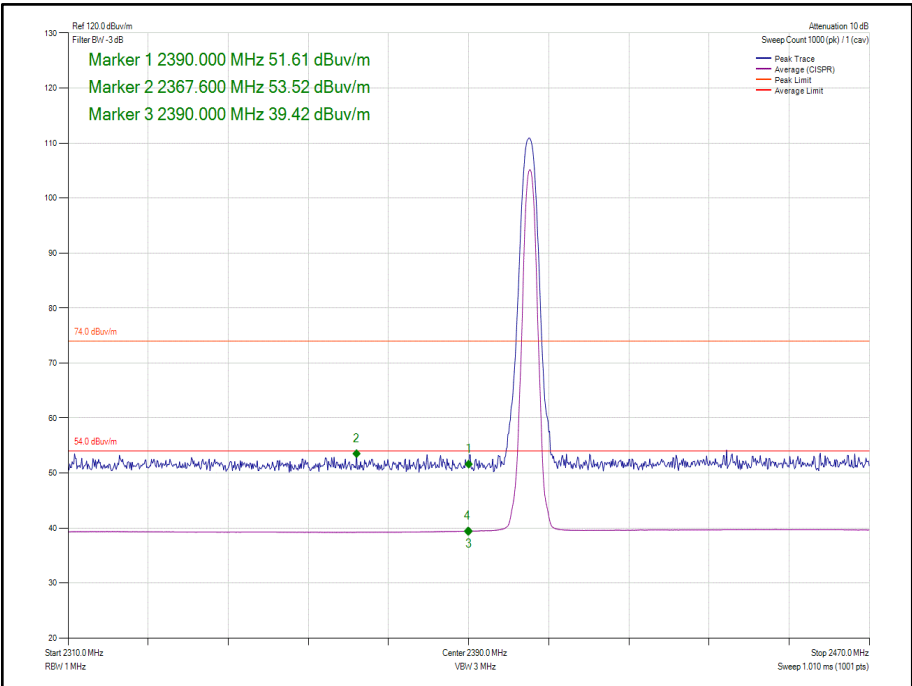


Figure 125 Core 2 - Static - 8-DPSK/3DH5 - 2402 MHz Band Edge Frequency 2390.0 MHz

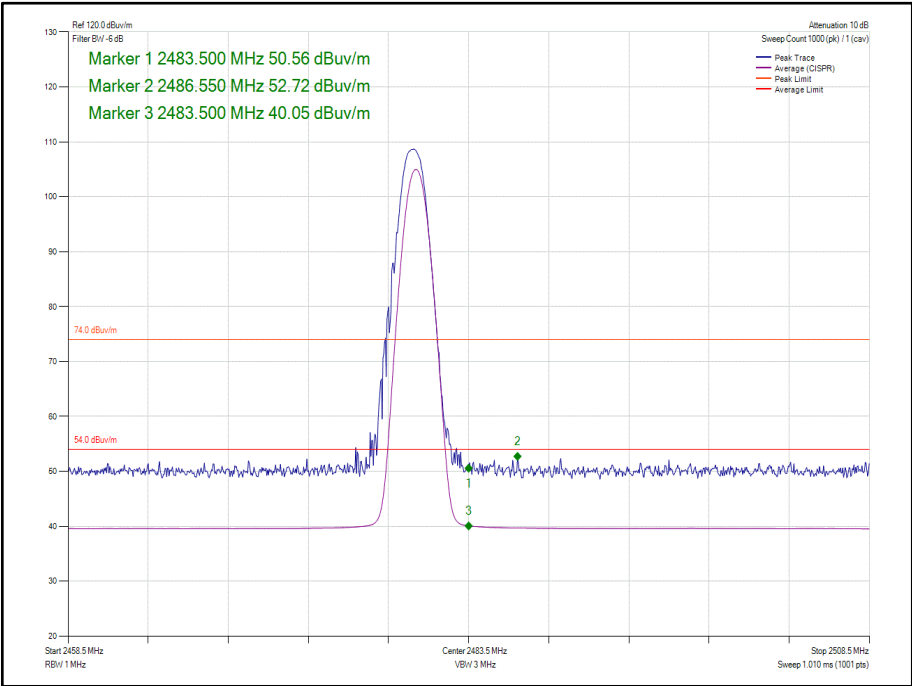


Figure 126 Core 2 - Static - GFSK/DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

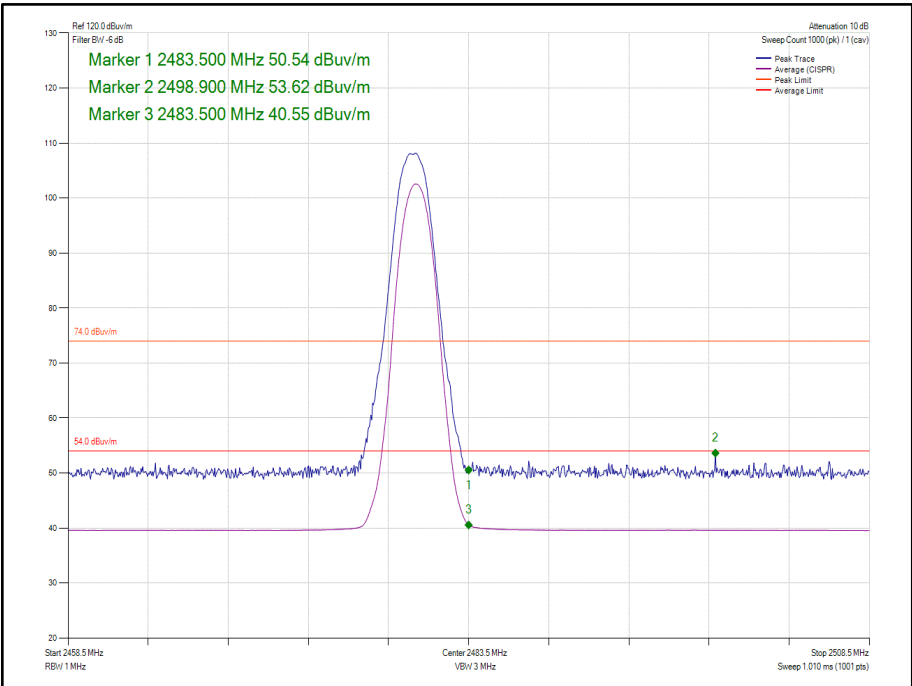


Figure 127 Core 2 - Static - $\pi/4$ DQPSK/2DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

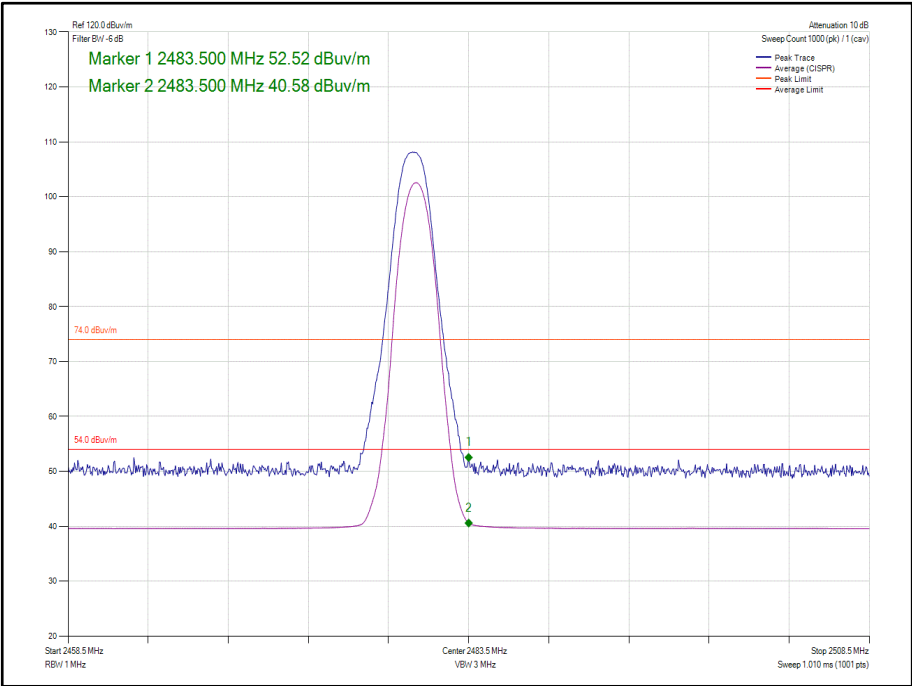


Figure 128 Core 2 - Static - 8-DPSK/3DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

Mode	Modulation	Core	Packet Type	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
Static	GFSK	0-1	DH5	2402	2390.0	59.58	40.57
Static	$\pi/4$ DQPSK	0-1	2DH5	2402	2390.0	53.49	39.47
Static	8-DPSK	0-1	3DH5	2402	2390.0	53.85	39.45
Static	GFSK	0-1	DH5	2480	2483.5	58.22	45.11
Static	$\pi/4$ DQPSK	0-1	2DH5	2480	2483.5	52.55	40.14
Static	8-DPSK	0-1	3DH5	2480	2483.5	52.54	40.14

Table 48 - MIMO 2Tx Restricted Band Edge Results

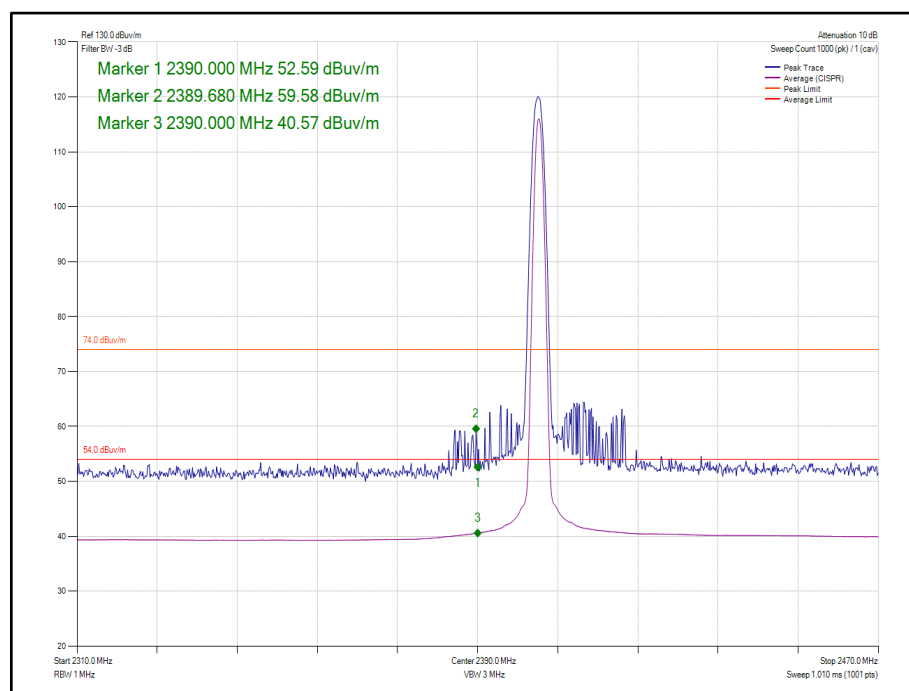


Figure 129 Core 0-1 – Static - GFSK/DH5 - 2402 MHz - Band Edge Frequency 2390.0 MHz

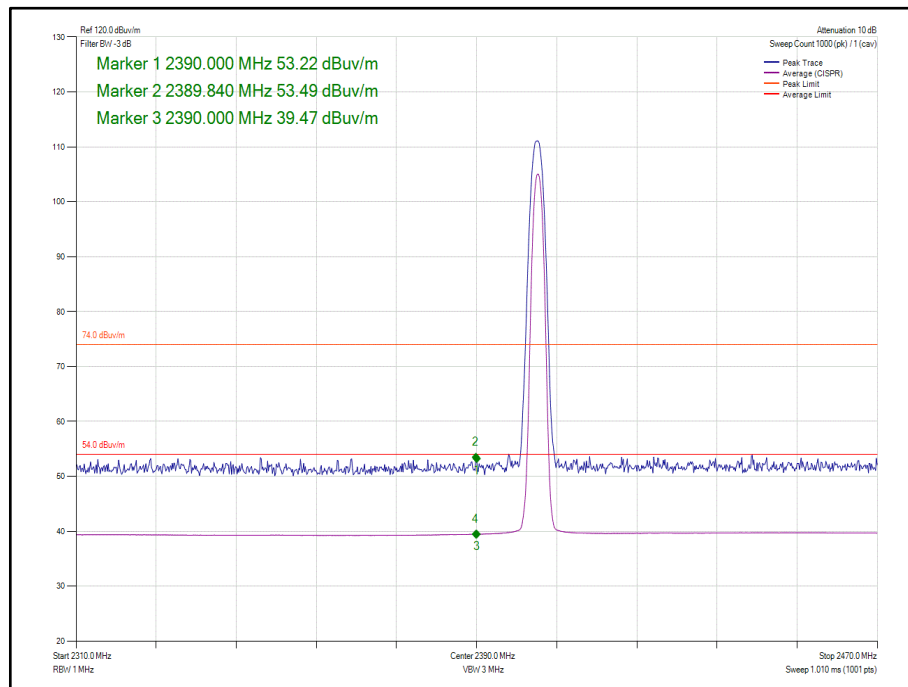


Figure 130 Core 0-1 - Static - $\pi/4$ DQPSK/2DH5 - 2402 MHz - Band Edge Frequency 2390.0 MHz

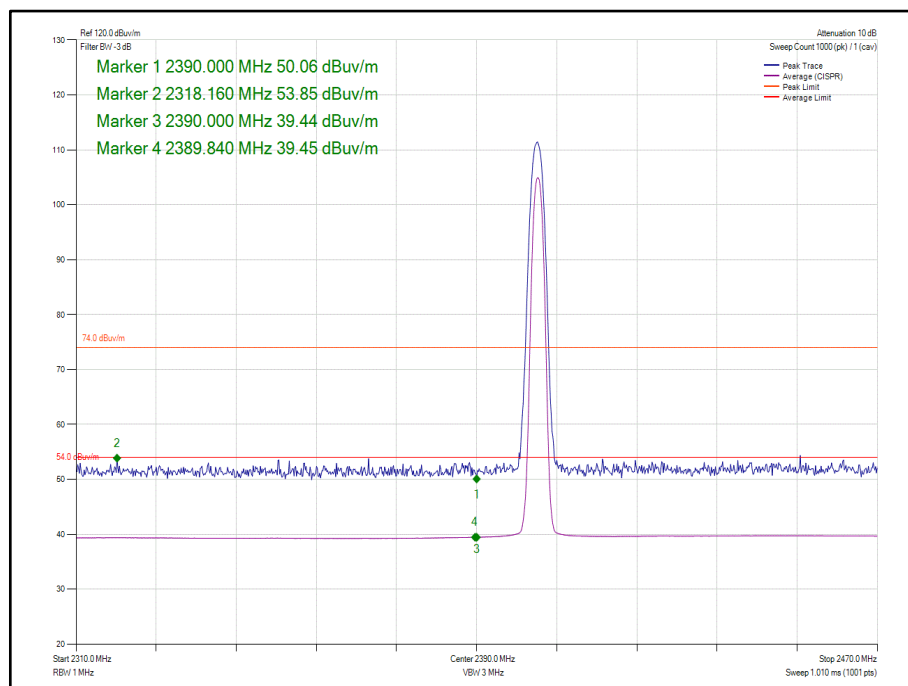


Figure 131 Core 0-1 - Static - 8-DPSK/3DH5 - 2402 MHz Band Edge Frequency 2390.0 MHz

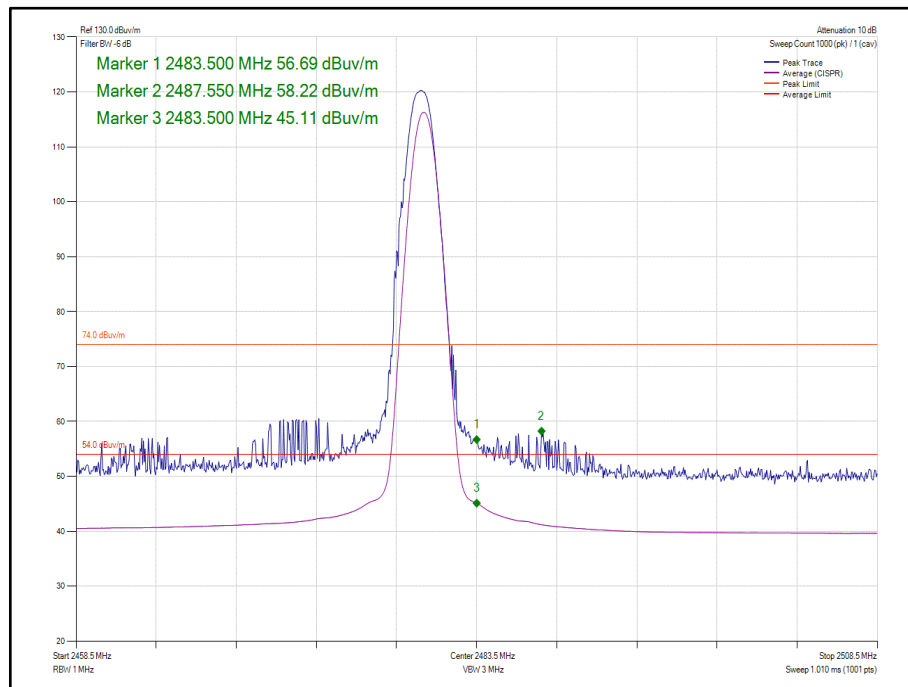


Figure 132 Core 0-1 - Static - GFSK/DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

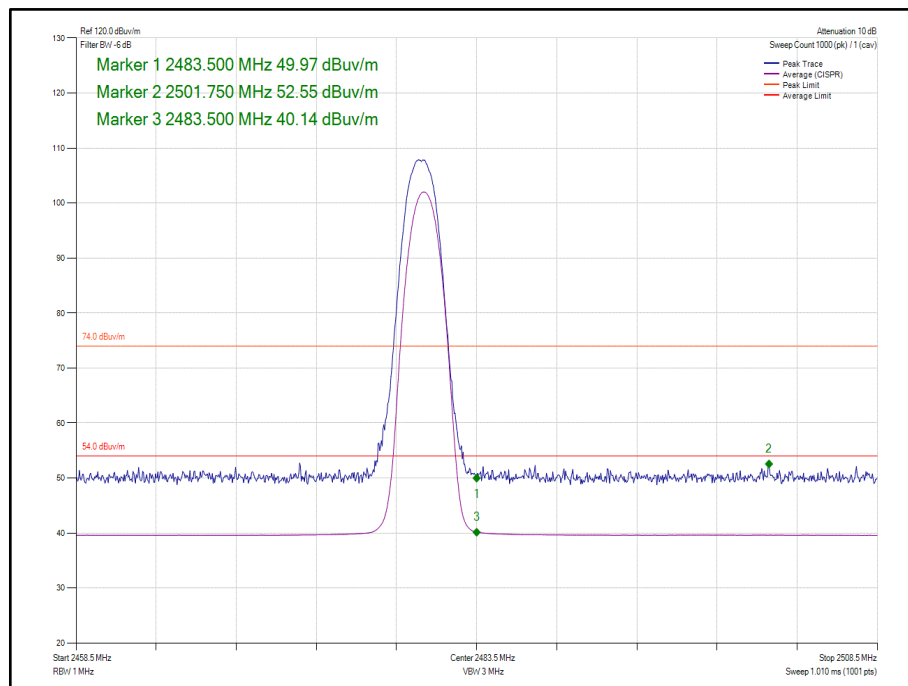


Figure 133 Core 0-1 - Static - $\pi/4$ DQPSK/2DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

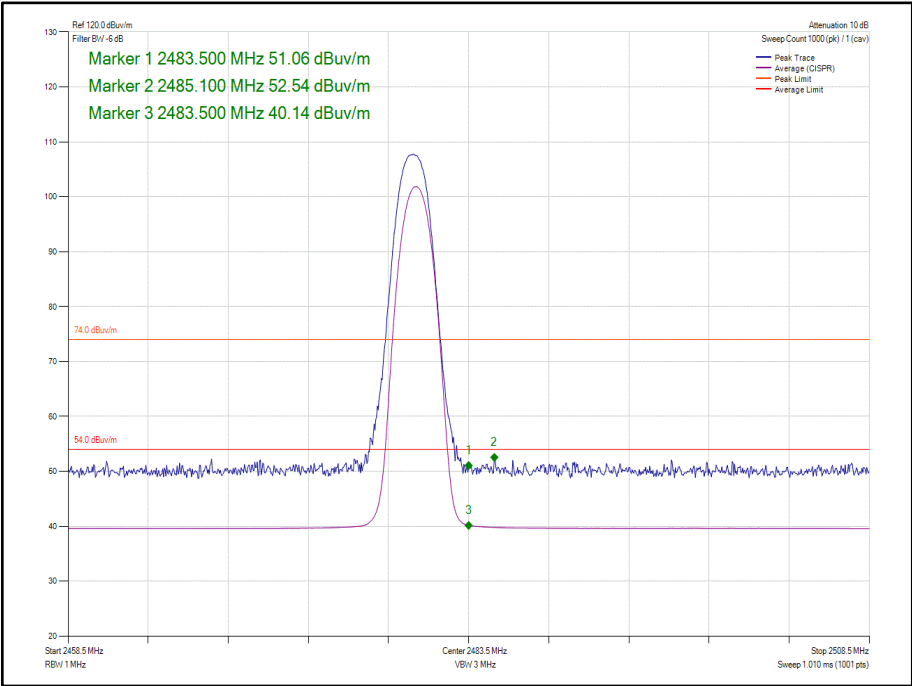


Figure 134 Core 0-1 – Static - Core - 8-DPSK/3DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

ePA

Mode	Modulation	Core	Packet Type	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
Static	GFSK	0	DH5	2402	2390.0	53.99	39.61
Static	$\pi/4$ DQPSK	0	2DH5	2402	2390.0	53.89	39.51
Static	8-DPSK	0	3DH5	2402	2390.0	53.55	39.65
Static	GFSK	0	DH5	2480	2483.5	54.79	42.66
Static	$\pi/4$ DQPSK	0	2DH5	2480	2483.5	53.00	40.31
Static	8-DPSK	0	3DH5	2480	2483.5	53.08	40.81

Table 49 - Restricted Band Edge Results

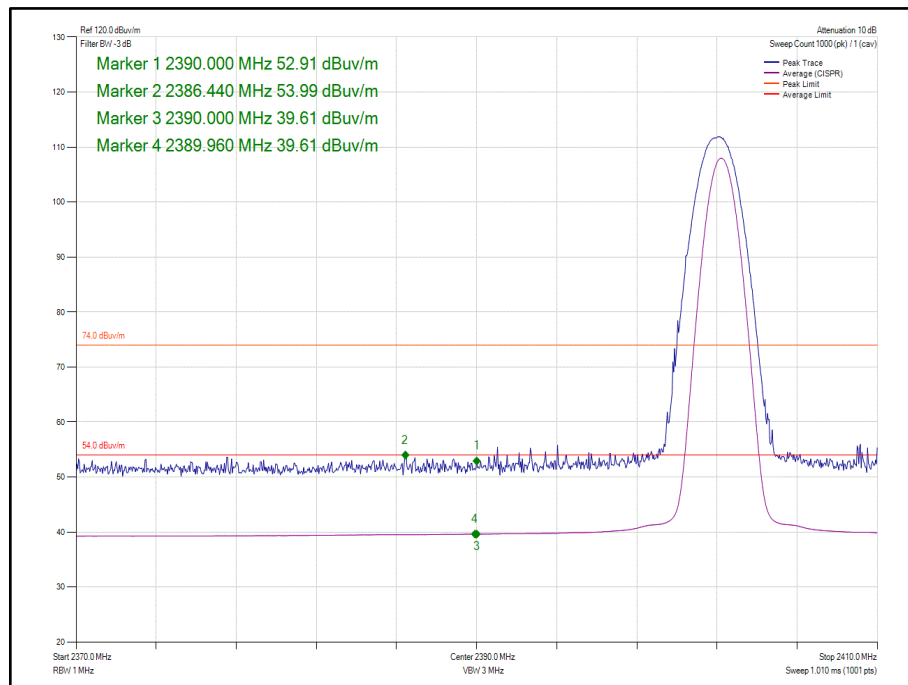


Figure 135 - Core 0 - Static - GFSK/DH5 - 2402 MHz - Band Edge Frequency 2390.0 MHz

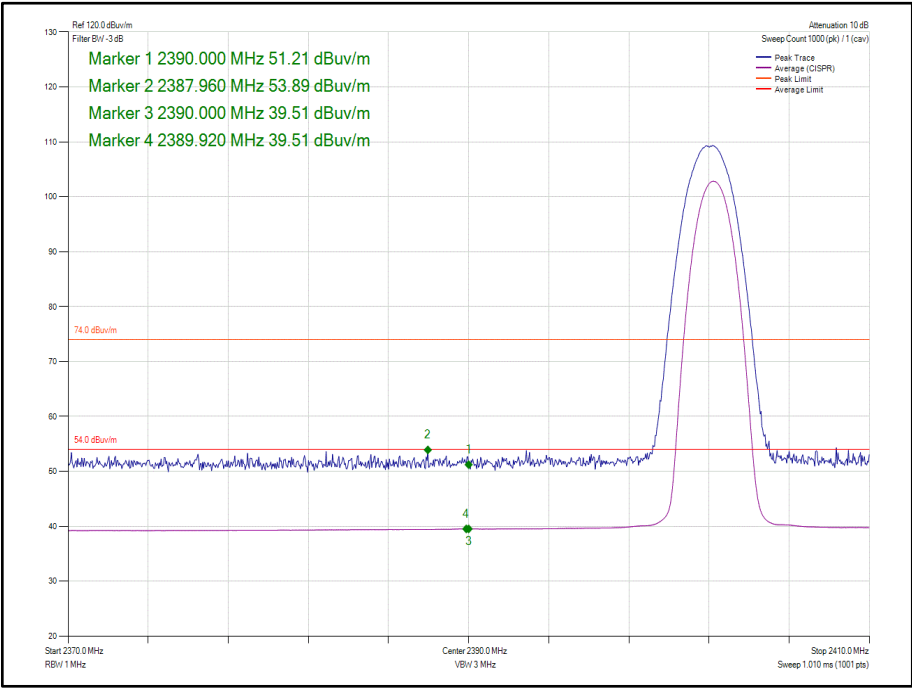


Figure 136 - Core 0 - Static - $\pi/4$ DQPSK/2DH5 - 2402 MHz - Band Edge Frequency 2390.0 MHz

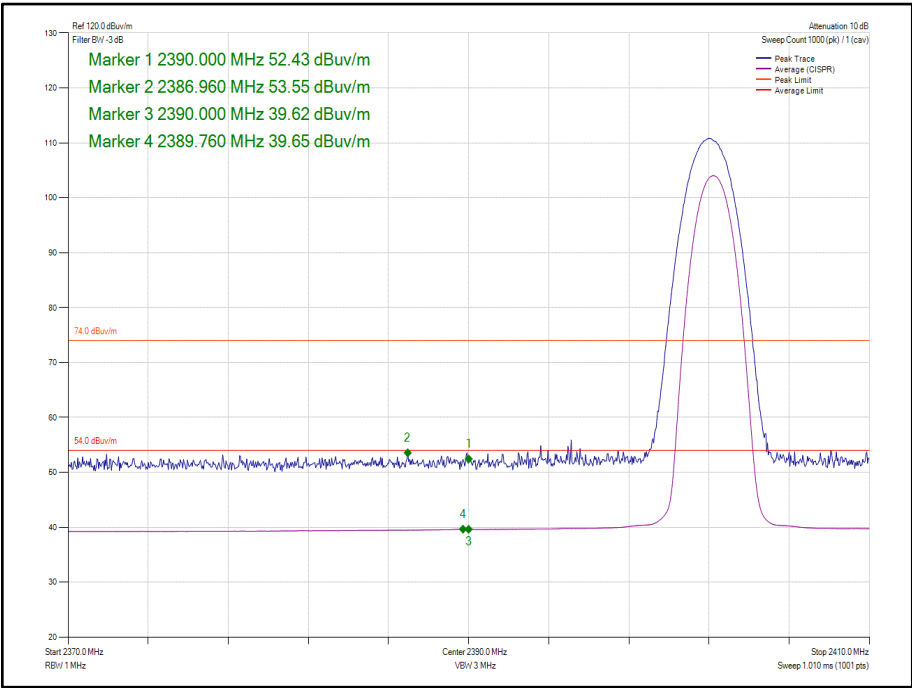


Figure 137 - Core 0 - Static - 8-DPSK/3DH5 - 2402 MHz Band Edge Frequency 2390.0 MHz

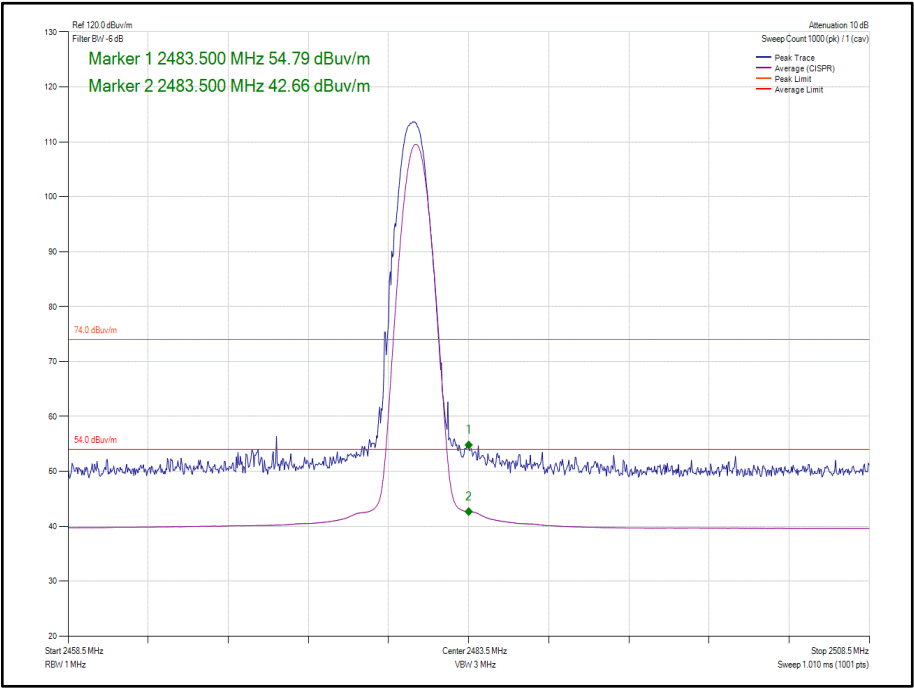


Figure 138 - Core 0 - Static - GFSK/DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

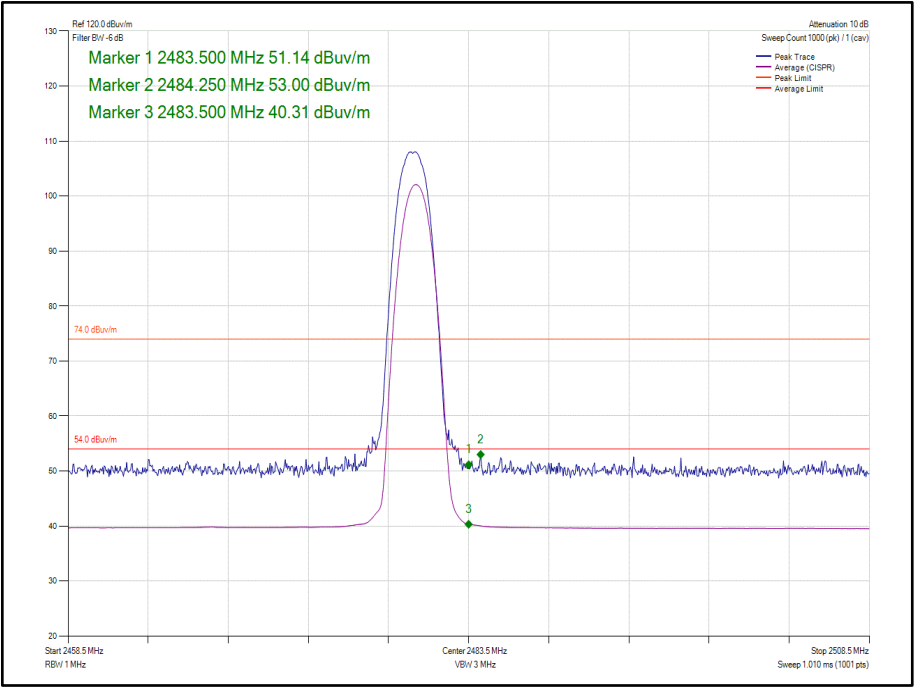


Figure 139 - Core 0 - Static - $\pi/4$ DQPSK/2DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

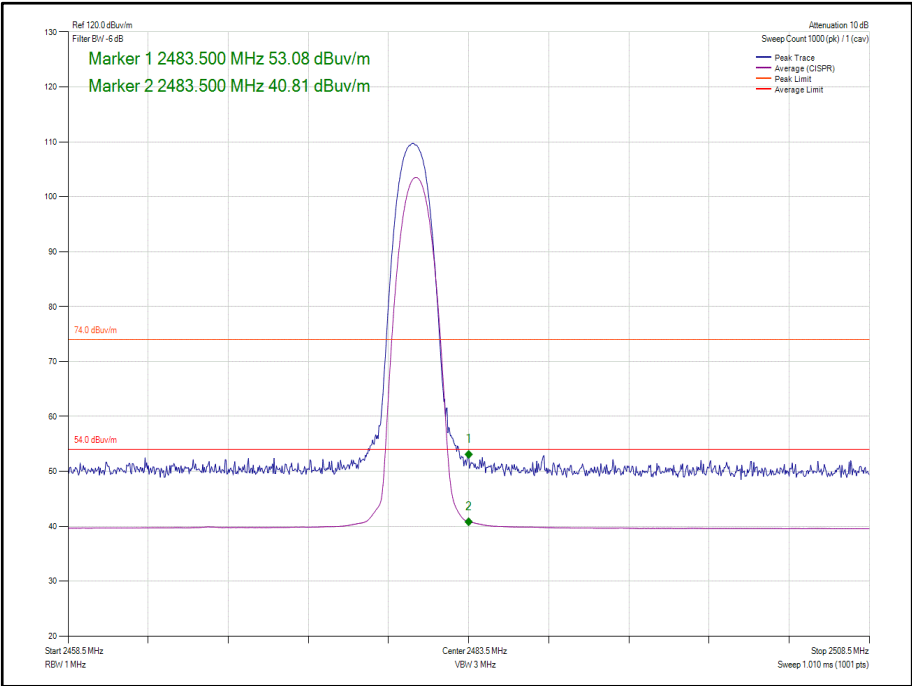


Figure 140 - Core 0 - Static – 8 - DPSK/3DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

Mode	Modulation	Core	Packet Type	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
Static	GFSK	1	DH5	2402	2390.0	60.10	40.47
Static	$\pi/4$ DQPSK	1	2DH5	2402	2390.0	56.19	40.39
Static	8-DPSK	1	3DH5	2402	2390.0	56.05	40.41
Static	GFSK	1	DH5	2480	2483.5	60.64	45.37
Static	$\pi/4$ DQPSK	1	2DH5	2480	2483.5	56.51	42.19
Static	8-DPSK	1	3DH5	2480	2483.5	56.28	42.31

Table 50 - Restricted Band Edge Results

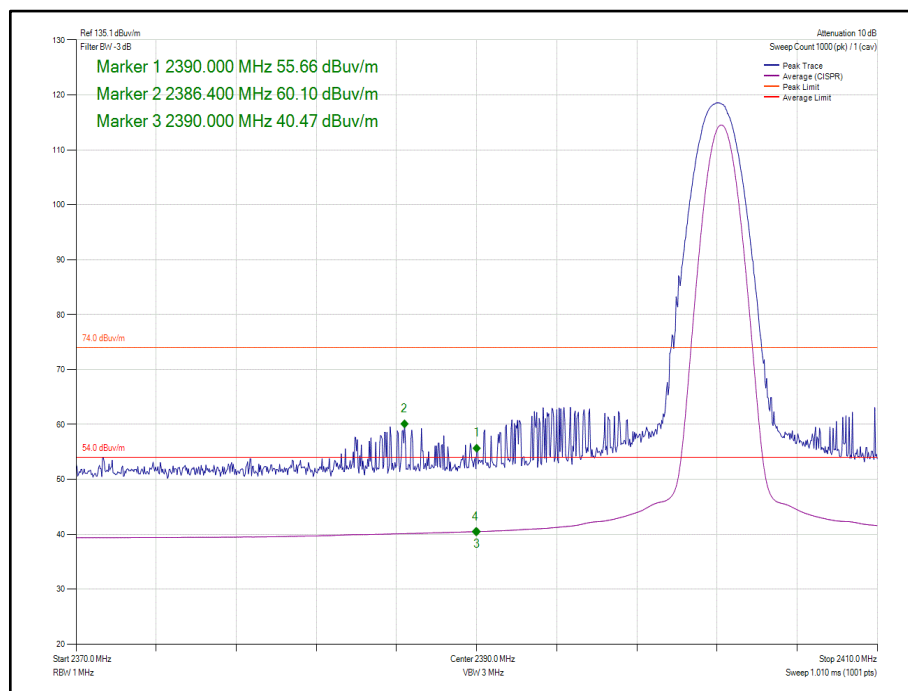


Figure 141 - Core 1 - Static - GFSK/DH5 - 2402 MHz - Band Edge Frequency 2390.0 MHz

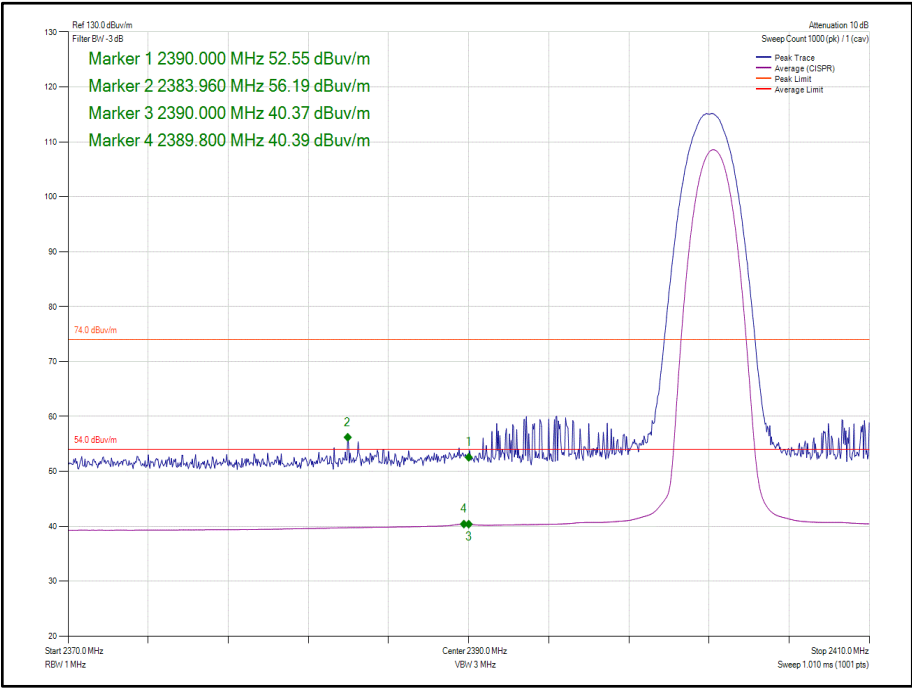


Figure 142 - Core 1 - Static - $\pi/4$ DQPSK/2DH5 - 2402 MHz - Band Edge Frequency 2390.0 MHz

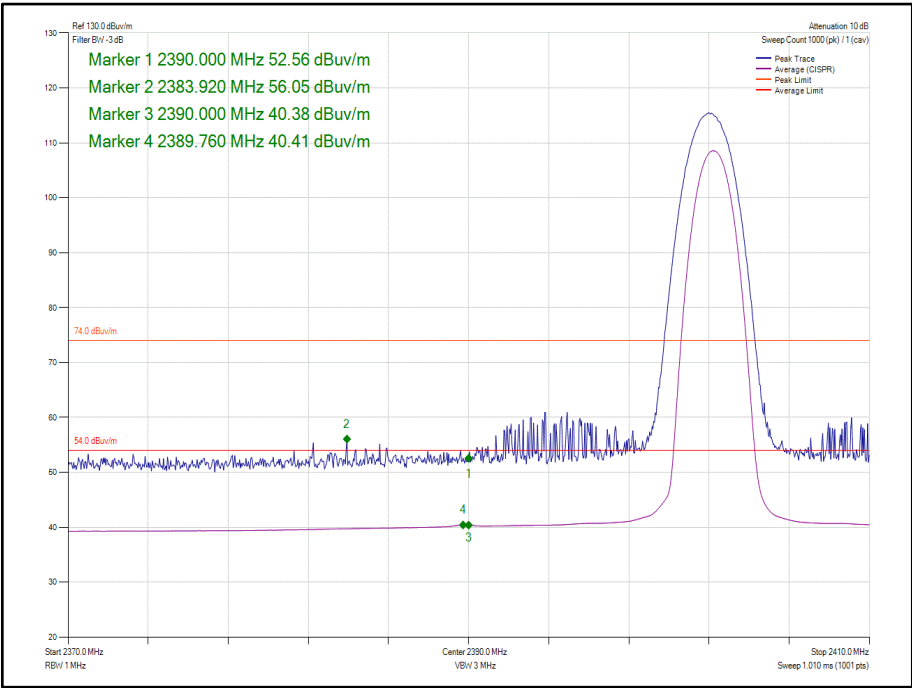


Figure 143 - Core 1 - Static - 8-DPSK/3DH5 - 2402 MHz Band Edge Frequency 2390.0 MHz

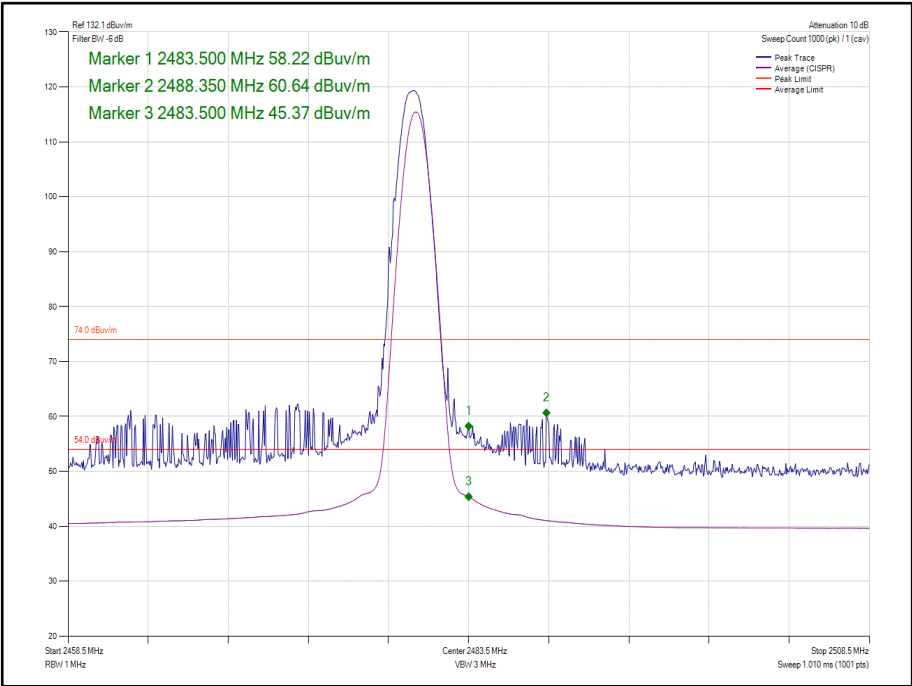


Figure 144 - Core 1 - Static - GFSK/DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

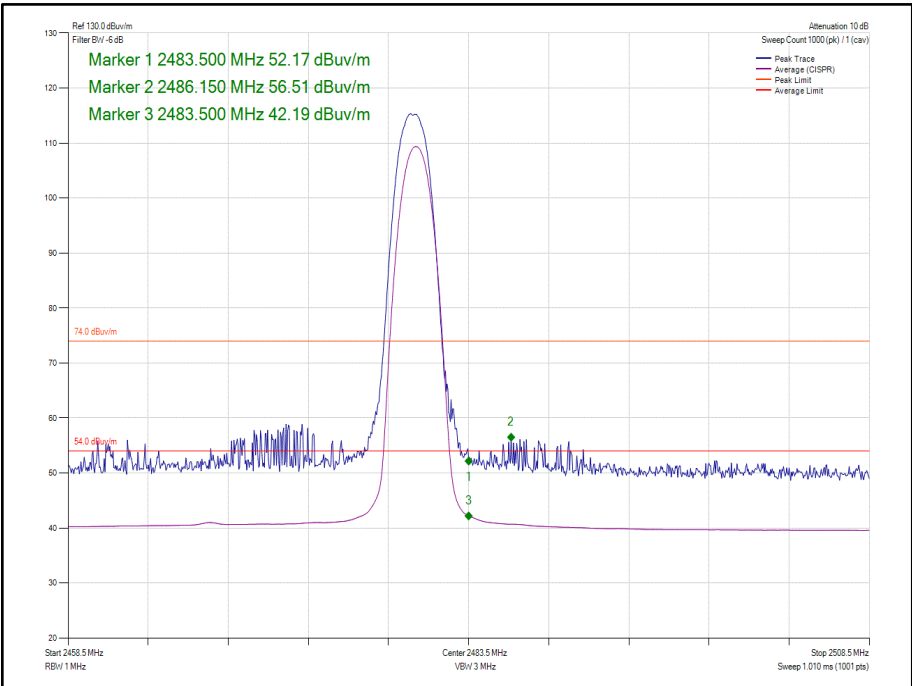


Figure 145 - Core 1 - Static - $\pi/4$ DQPSK/2DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

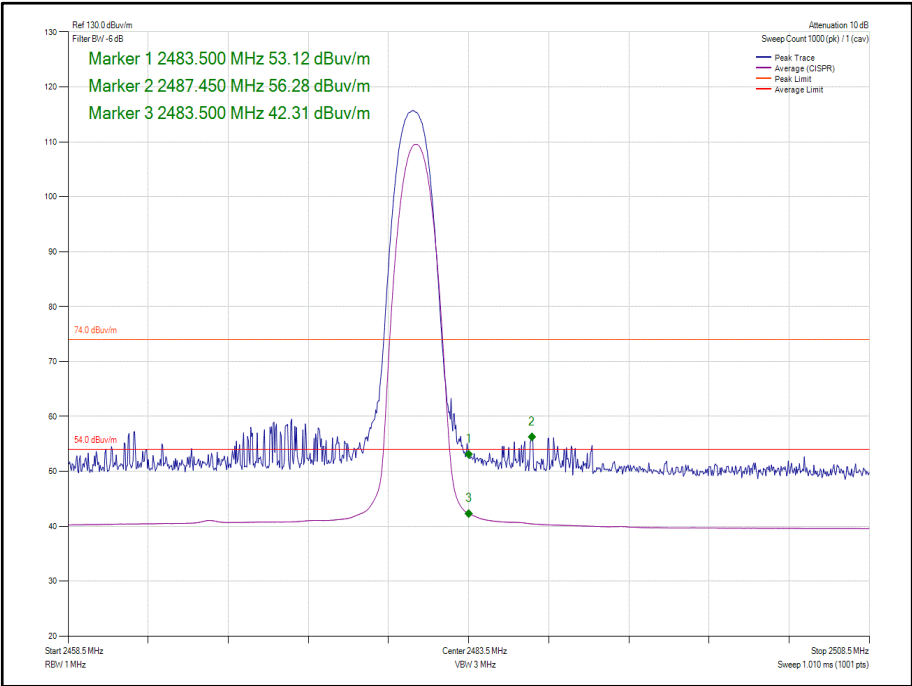


Figure 146 - Core 1 - Static - 8-DPSK/3DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

Mode	Modulation	Core	Packet Type	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
Static	GFSK	0-1	DH5	2402	2390.0	58.76	40.83
Static	$\pi/4$ DQPSK	0-1	2DH5	2402	2390.0	53.61	40.61
Static	8-DPSK	0-1	3DH5	2402	2390.0	53.73	40.57
Static	GFSK	0-1	DH5	2480	2483.5	57.78	45.01
Static	$\pi/4$ DQPSK	0-1	2DH5	2480	2483.5	55.24	42.33
Static	8-DPSK	0-1	3DH5	2480	2483.5	55.86	42.40

Table 51 - MIMO 2Tx Restricted Band Edge Results

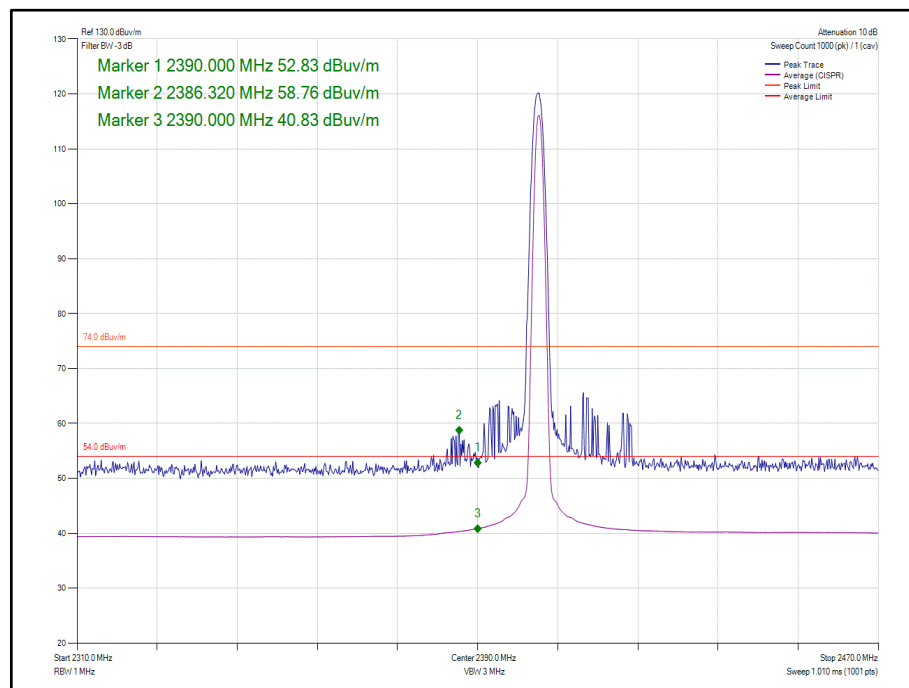


Figure 147 Core 0-1 - Static - GFSK/DH5 - 2402 MHz - Band Edge Frequency 2390.0 MHz

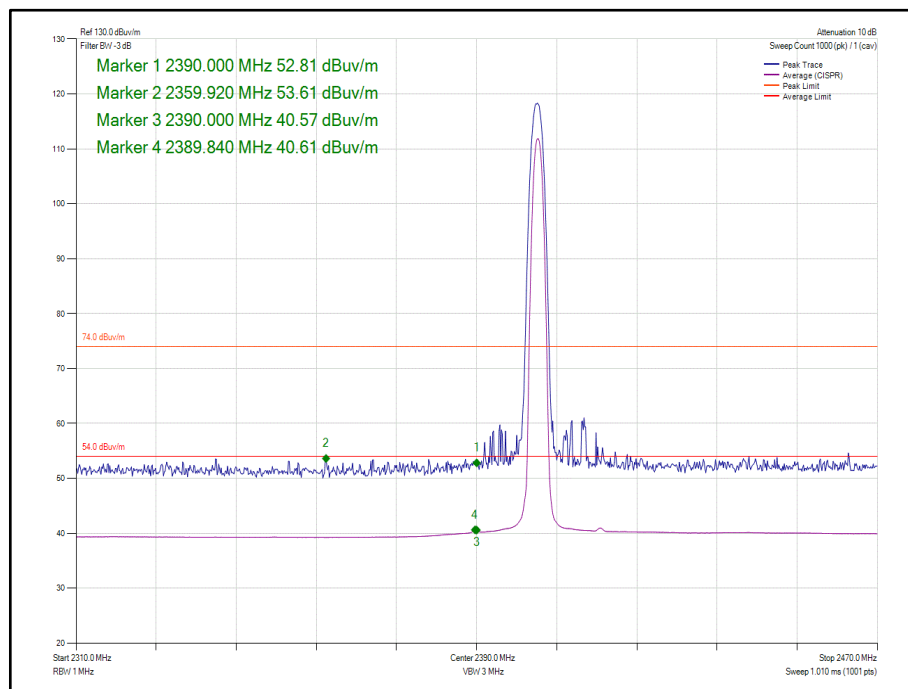


Figure 148 Core 0-1 - Static - $\pi/4$ DQPSK/2DH5 - 2402 MHz - Band Edge Frequency 2390.0 MHz

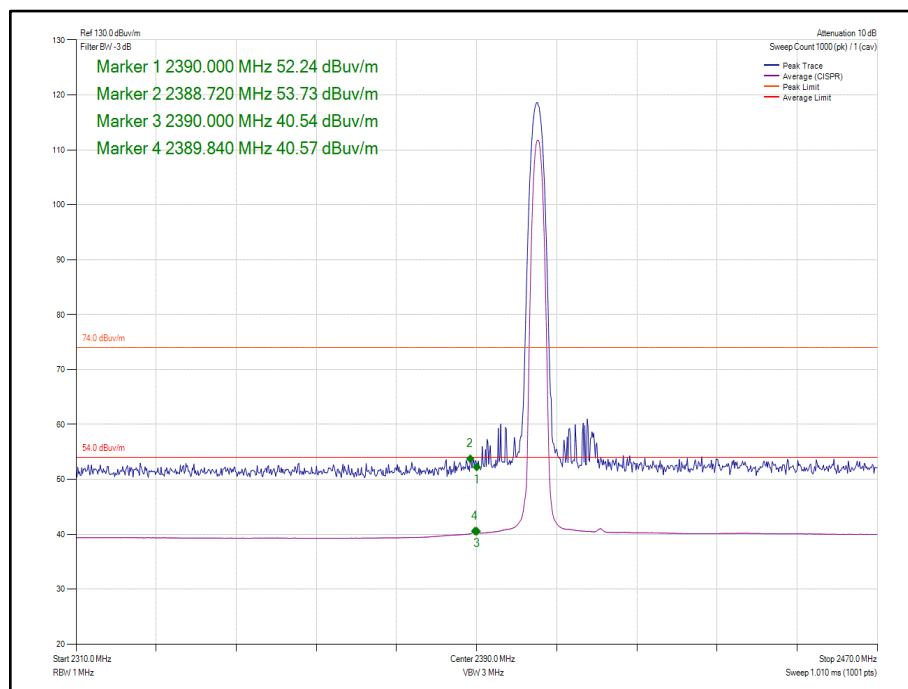


Figure 149 Core 0-1 - Static - 8-DPSK/3DH5 - 2402 MHz Band Edge Frequency 2390.0 MHz

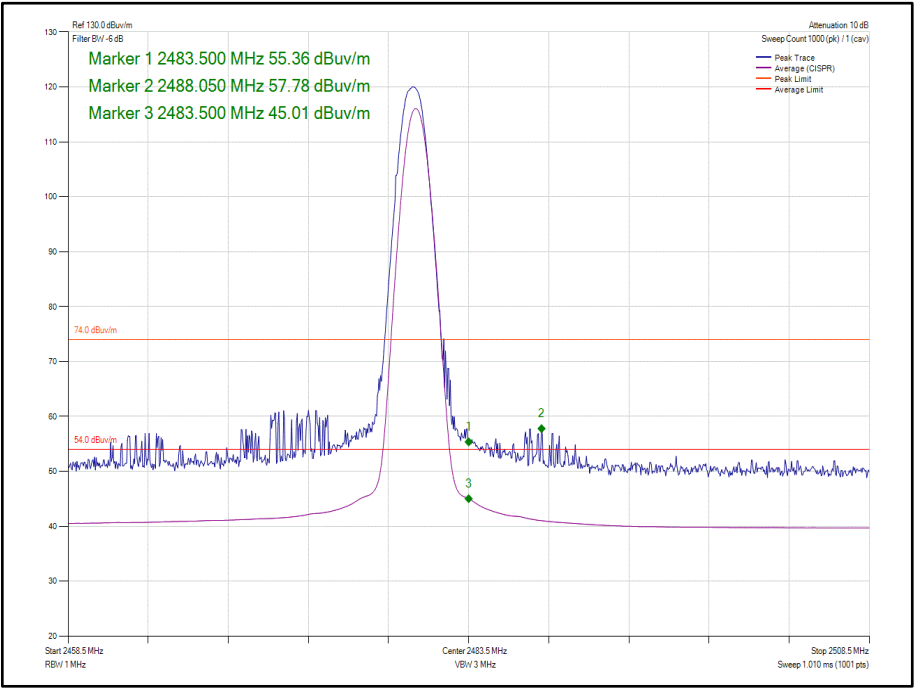


Figure 150 Core 0-1 - Static - GFSK/DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz

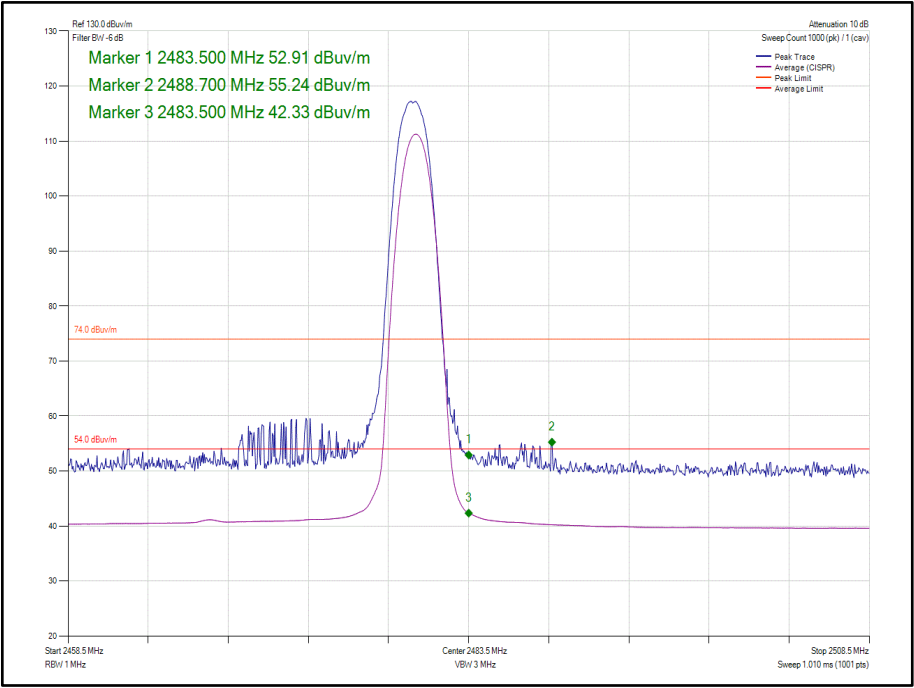


Figure 151 Core 0-1 - Static - $\pi/4$ DQPSK/2DH5 - 2480 MHz - Band Edge Frequency 2483.5 MHz