

FCC and ISED Test Report

Apple Inc
Model: A3239



In accordance with FCC 47 CFR Part 15C,
ISED RSS-247 and ISED RSS-GEN
(2.4 GHz Bluetooth BDR/EDR)

Prepared for: Apple Inc
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SIGNATURE

NAME	JOB TITLE	RESPONSIBLE FOR	ISSUE DATE
Steve Marshall	Senior Engineer	Authorised Signatory	07 October 2024

Signatures in this approval box have checked this document in line with the requirements of TUV SUD document control rules.

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC 47 CFR Part 15C, ISED RSS-247 and ISED RSS-GEN. The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Report Generation	Rachael Watkins	07 October 2024	

FCC Accreditation

553713/UK2026 Concorde Park, Fareham Test Laboratory

ISED Accreditation

28798/UK0003 Concorde Park, Fareham Test Laboratory

EXECUTIVE SUMMARY

A sample of this product was tested and found to be compliant with FCC 47 CFR Part 15C: 2023, ISED RSS-247: Issue 3 (2023-08) and ISED RSS-GEN: Issue 5 (2018-04) + A2 (2021-02) for the tests detailed in section 1.3.



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1 Report Summary

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
1	First Issue	07-October-2024

Table 1

1.2 Introduction

Applicant	Apple Inc
Manufacturer	Apple Inc
EUT/Sample Identification	Refer to section 1.6
Test Specification/Issue/Date	FCC 47 CFR Part 15C: 2023 ISED RSS-247: Issue 3 (2023-08) ISED RSS-GEN: Issue 5 (2018-04) + A2 (2021-02)
Start of Test	12-August-2024
Finish of Test	26-September-2024
Name of Engineer(s)	Tony Baby, Morsalin Hossain, Akhil Rajendran Bhaskaran Nair, Mahmud Chowdhury, Jayvir Makwana, Elliot Callender and Ian Hart.
Related Document(s)	ANSI C63.4 (2014) ANSI C63.10 (2020) KDB 662911 D01 v02r01



1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15C, ISSED RSS-247 and ISSED RSS-GEN is shown below.

Section	Specification Clause			Test Description	Result	Comments/Base Standard
	FCC Part 15C	RSS-247	RSS-GEN			
Configuration and Mode: 2.4 GHz Bluetooth BDR/EDR						
-	15.203	-	-	Antenna Requirement	N/T	The device complies with the provisions of this section, as it uses permanently attached integral antennas.
2.1	15.205	3.3	8.10	Restricted Band Edges	Pass	ANSI C63.10 (2020)
2.2	15.247 (a)(1)	5.1	-	Frequency Hopping Systems - Average Time of Occupancy	Pass	ANSI C63.10 (2020)
2.3	15.247 (a)(1)	5.1	-	Frequency Hopping Systems - Channel Separation	Pass	ANSI C63.10 (2020)
2.4	15.247 (a)(1)	5.1	-	Frequency Hopping Systems - Number of Hopping Channels	Pass	ANSI C63.10 (2020)
2.5	15.247 (a)(1)	5.1	6.7	Frequency Hopping Systems - 99% & 20 dB Bandwidth	Pass	ANSI C63.10 (2020)
2.6	15.247 (b)	5.4	6.12	Maximum Conducted Output Power	Pass	ANSI C63.10 (2020) KDB 662911 D01 v02r01
2.7	15.247 (d)	5.5	-	Authorised Band Edges	Pass	ANSI C63.10 (2020)
2.8	15.209 and 15.247 (d)	3.3 and 5.5	6.13 and 8.9	Spurious Radiated Emissions	Pass	ANSI C63.4 (2014) ANSI C63.10 (2020)

Table 2



1.4 Product Information

1.4.1 Technical Description

The equipment under test (EUT) was a desktop computer.

1.4.2 Test Modes

The EUT's 2.4 GHz Bluetooth radio supports SISO (Single Input/Single Output) operation on three different cores (Core 0, 1, and 2). It also supports MIMO (Multiple Input/Multiple Output) beamforming operation on Cores 0+1. The EUT supports Basic Rate and Enhanced Data Rate modes for FHSS operation.

Core 0 and core 1 also operate at two power settings: low power "iPA" and high power "ePA", with dedicated core 2 only supporting the lower power mode. The EUT uses different output powers per core dependent on how many cores are used.

After preliminary investigations, conducted tests on the EUT and Radiated Band Edge were performed in the following modes:

SISO modes:

- DH5 - iPA - Core 0
- 2-DH5 - iPA - Core 0
- 3-DH5 - iPA - Core 0
- DH5 - iPA - Core 2
- 2-DH5 - iPA - Core 2
- 3-DH5 - iPA - Core 2
- 2-DH5 - ePA - Core 0
- 3-DH5 - ePA - Core 0

MIMO modes:

- DH5 - iPA - Core 0 + Core 1
- 2-DH5 - iPA - Core 0 + Core 1
- 3-DH5 - iPA - Core 0 + Core 1
- 2-DH5 - ePA - Core 0 + Core 1
- 3-DH5 - ePA - Core 0 + Core 1

Spurious Radiated Emissions tests were limited to the modes shown below, with the device configured to operate at maximum output power. As this was deemed to be worst case.

SISO mode:

- DH5 - iPA - Core 2

MIMO modes:

- DH5 - iPA - Core 0 + Core 1
- 2-DH5 - ePA - Core 0 + Core 1



1.4.3 Test Setup

For conducted tests the EUT antennas were disconnected and replaced with U. FL to SMA test cables to enable conducted testing on each core. The loss of these test cables were known and compensated for in any conducted measurements.

For all tests the EUT was put into a continuous transmit/receive test mode with the chipset manufacturer's test commands. These ran the specified modulation types on either a fixed single channel or in Hopping mode, to ensure the measured signals were representative.

All testing was performed with the EUT powered via a 120 V AC, 60 Hz source.

1.4.4 Antenna Gain Table

Antenna Port	Frequency Range (MHz)	Peak Gain (dBi)	Conducted Cable Loss (dB)
Core 0	2400 to 2480	1.8	0.96
Core 1	2400 to 2480	1.1	0.96
Dedicated Core 2	2400 to 2480	0.2	0.96

Table 3

1.5 Deviations from the Standard

No deviations from the applicable test standard were made during testing.



1.6 Identification of the EUT

The table below details identification of the EUT(s) that have been used to carry out the testing within this report.

Model: A3239			
Serial Number	Hardware Version	Software Version	Firmware
N7C7VWDN4T	REV1.0	24A42521k	22.1.80.569
D4D3YLHFTQ	REV1.0	24A42521k	22.1.80.569
DLX7VG477R	REV1.0	24A42521d	22.1.80.569
J3FYV0C64X	REV1.0	24A42521d	22.1.80.569

Table 4

1.7 EUT Modification Record

The table below details modifications made to the EUT during the test programme.

The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
Model: A3239, Serial Number: N7C7VWDN4T			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A3239, Serial Number: D4D3YLHFTQ			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A3239, Serial Number: DLX7VG477R			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A3239, Serial Number: J3FYV0C64X			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 5



1.8 Test Location

TÜV SÜD conducted the following tests at our Concorde Park Test Laboratory.

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: 2.4 GHz Bluetooth BDR/EDR		
Restricted Band Edges	Tony Baby, Morsalin Hossain and Akhil Rajendran Bhaskaran Nair	UKAS
Frequency Hopping Systems - Average Time of Occupancy	Mahmud Chowdhury and Jayvir Makwana	UKAS
Frequency Hopping Systems - Channel Separation	Mahmud Chowdhury and Jayvir Makwana	UKAS
Frequency Hopping Systems - Number of Hopping Channels	Mahmud Chowdhury	UKAS
Frequency Hopping Systems - 99% & 20 dB Bandwidth	Mahmud Chowdhury and Jayvir Makwana	UKAS
Maximum Conducted Output Power	Mahmud Chowdhury and Jayvir Makwana	UKAS
Authorised Band Edges	Tony Baby, Morsalin Hossain and Akhil Rajendran Bhaskaran Nair	UKAS
Spurious Radiated Emissions	Elliot Callender, Ian Hart and Morsalin Hossain	UKAS

Table 6

Office Address:

TÜV SÜD
Concorde Park
Concorde Way
Fareham
Hampshire
PO15 5FG
United Kingdom



2 Test Details

2.1 Restricted Band Edges

2.1.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.205
ISED RSS-247, Clause 3.3
ISED RSS-GEN, Clause 8.10

2.1.2 Equipment Under Test and Modification State

A3239, S/N: D4D3YLHFTQ - Modification State 0

2.1.3 Date of Test

12-August-2024 to 14-August-2024

2.1.4 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 4.1.5.2.6.

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 dB μ V/m to μ V/m:

$10^{(\text{Field Strength in dB}\mu\text{V/m}/20)}$.

2.1.5 Environmental Conditions

Ambient Temperature	21.8 - 22.8 °C
Relative Humidity	43.4 - 48.3 %

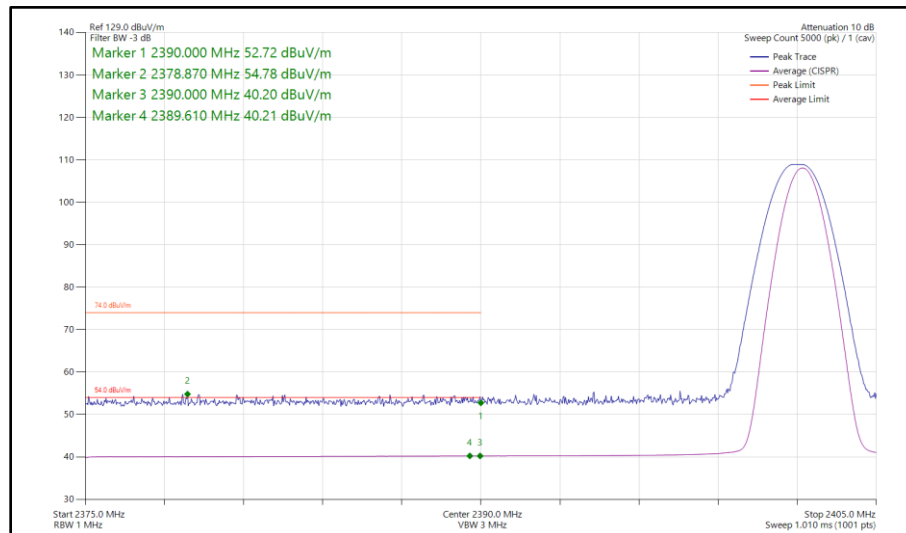
2.1.6 Test Results

2.4 GHz Bluetooth BDR/EDR

iPA - Core 0 (SISO)

Mode	Packet Type	TX Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
Static	DH5	2402	2390	54.78	40.21
Static	2DH5	2402	2390	54.88	40.23
Static	3DH5	2402	2390	55.46	40.23
Hopping	DH5	Hopping	2390	53.92	40.21
Hopping	2DH5	Hopping	2390	53.51	40.21
Hopping	3DH5	Hopping	2390	53.51	40.22
Static	DH5	2480	2483.5	54.40	40.80
Static	2DH5	2480	2483.5	53.90	40.68
Static	3DH5	2480	2483.5	53.91	40.72
Hopping	DH5	Hopping	2483.5	53.89	40.38
Hopping	2DH5	Hopping	2483.5	54.11	40.38
Hopping	3DH5	Hopping	2483.5	53.86	40.40

Table 7 - SISO Restricted Band Edge Results



**Figure 1 - Bluetooth DH5, SISO, Core 0 - 2402 MHz
Band Edge Frequency 2390 MHz**

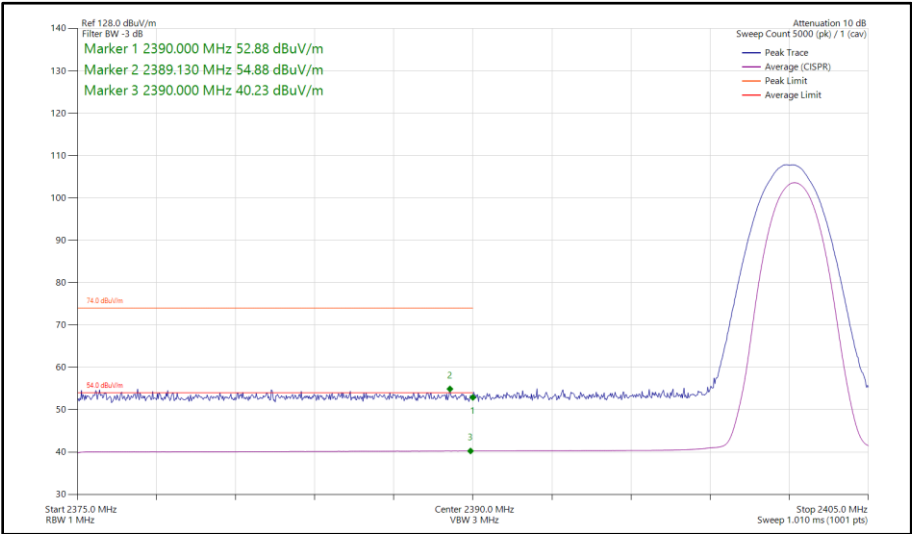


Figure 2 - Bluetooth 2DH5, SISO, Core 0 - 2402 MHz
Band Edge Frequency 2390 MHz

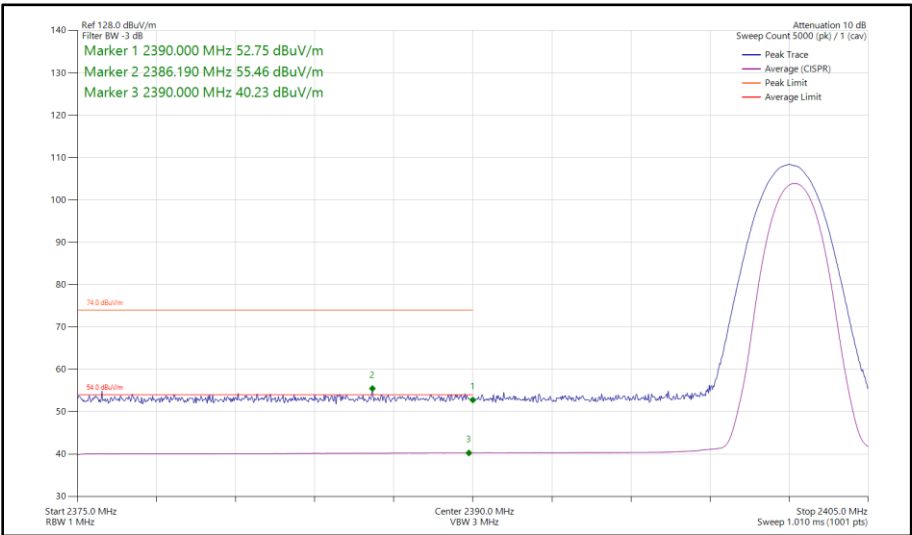
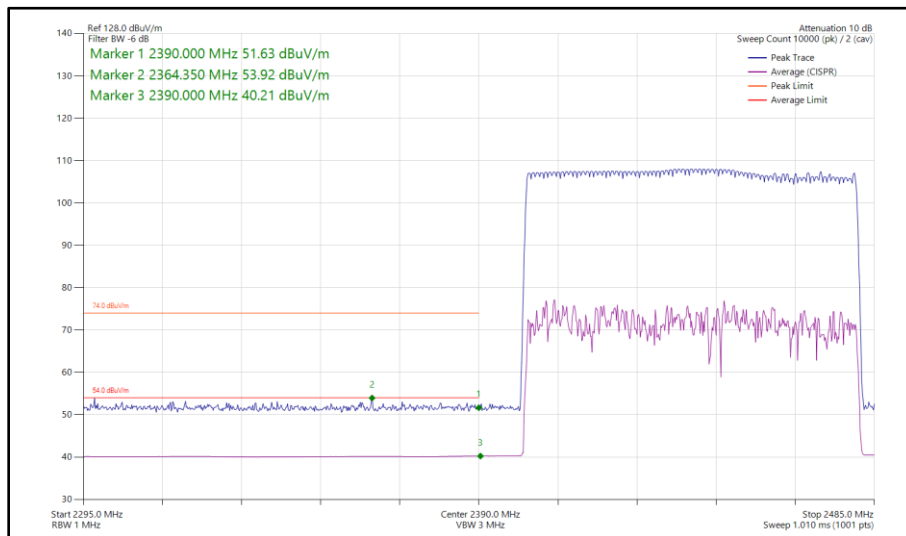
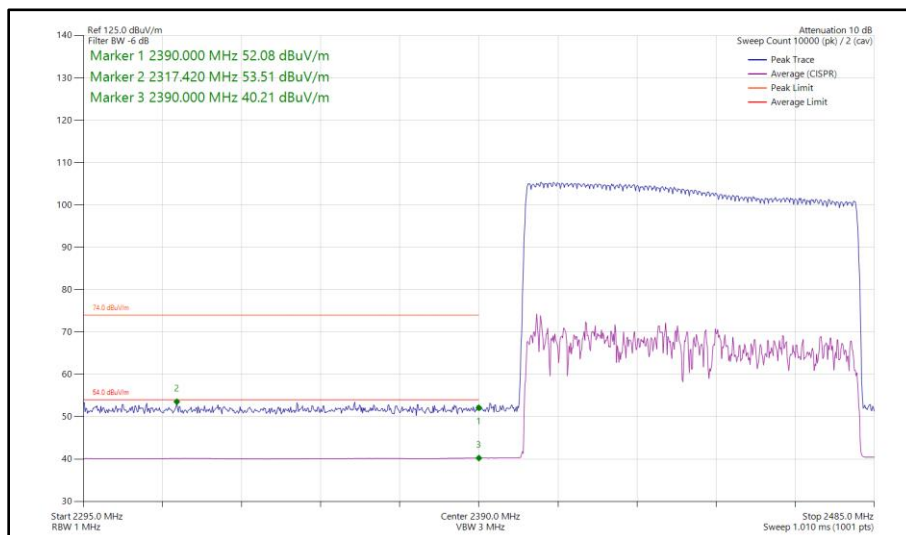


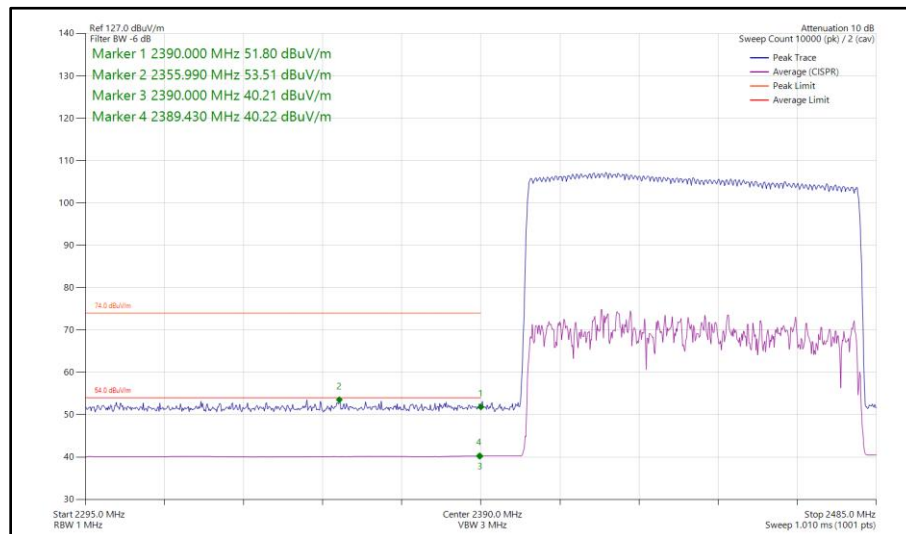
Figure 3 - Bluetooth 3DH5, SISO, Core 0 - 2402 MHz
Band Edge Frequency 2390 MHz



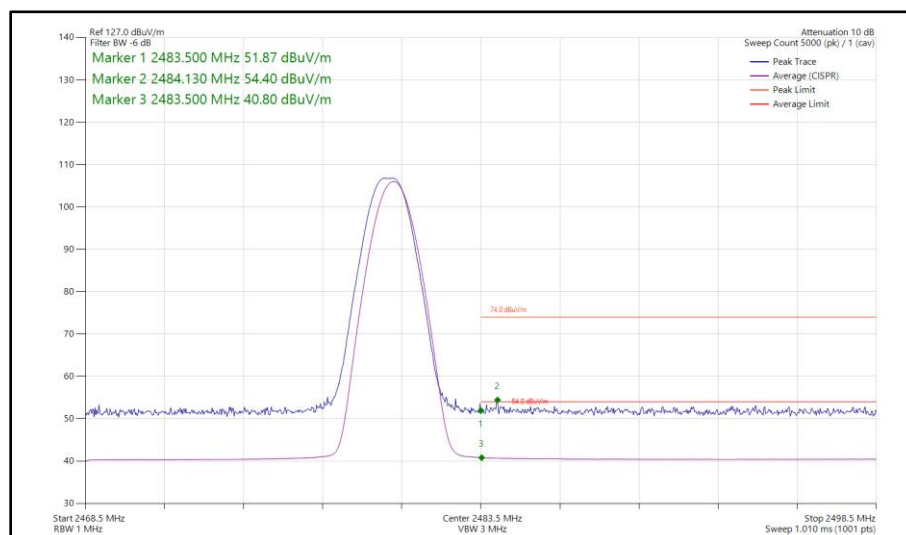
**Figure 4 - Bluetooth DH5, SISO, Core 0 - Hopping
Band Edge Frequency 2390 MHz**



**Figure 5 - Bluetooth 2DH5, SISO, Core 0 - Hopping
Band Edge Frequency 2390 MHz**



**Figure 6 - Bluetooth 3DH5, SISO, Core 0 - Hopping
Band Edge Frequency 2390 MHz**



**Figure 7 - Bluetooth DH5, SISO, Core 0 - 2480 MHz
Band Edge Frequency 2483.5 MHz**

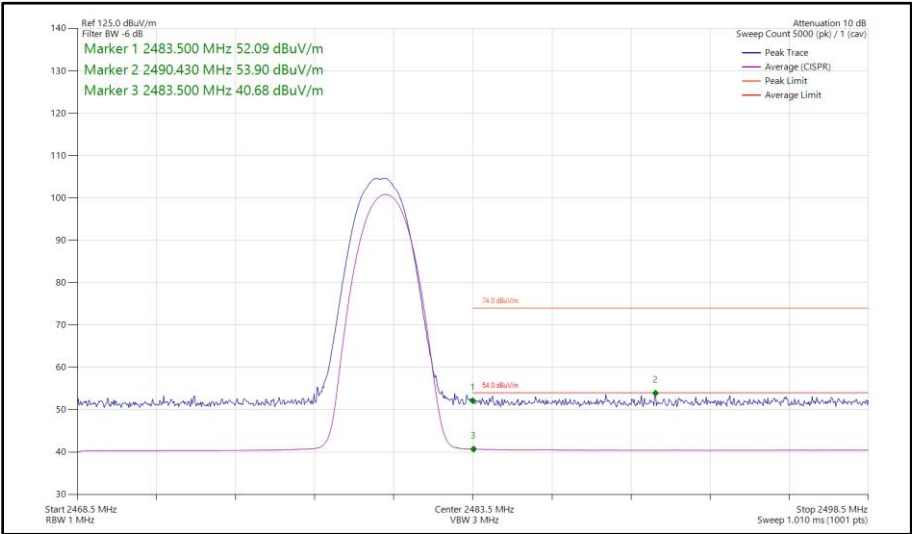


Figure 8 - Bluetooth 2DH5, SISO, Core 0 - 2480 MHz
Band Edge Frequency 2483.5 MHz

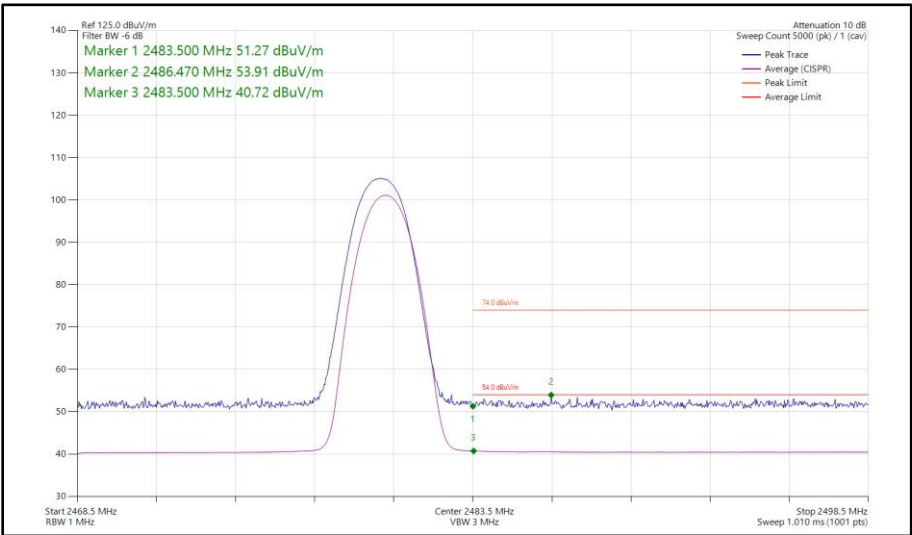
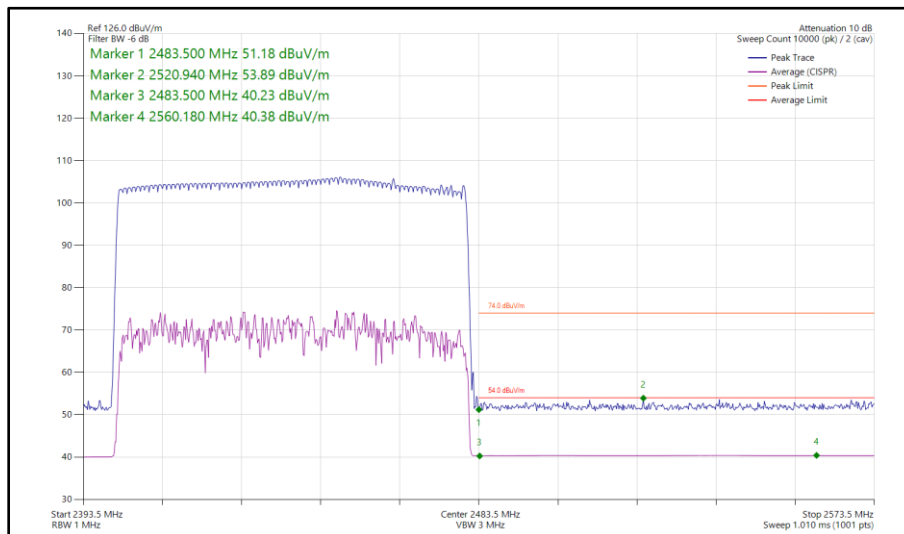
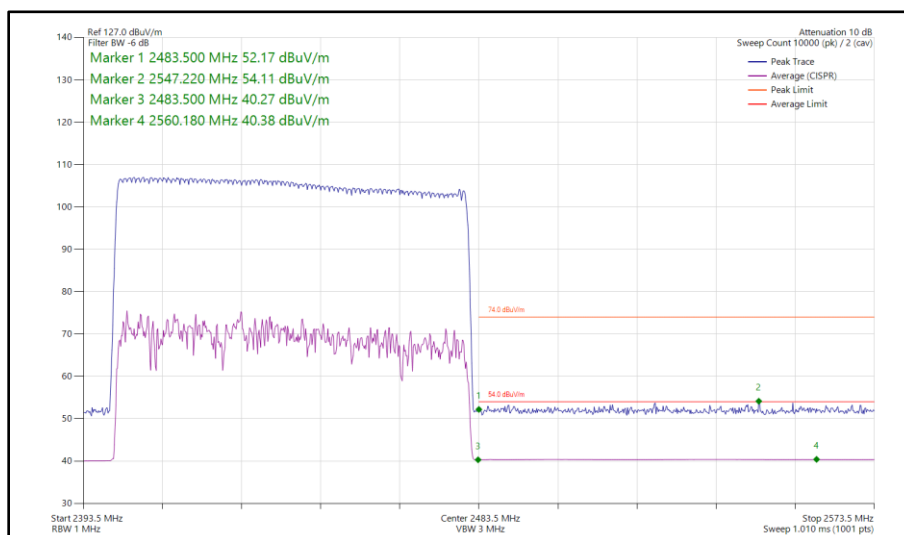


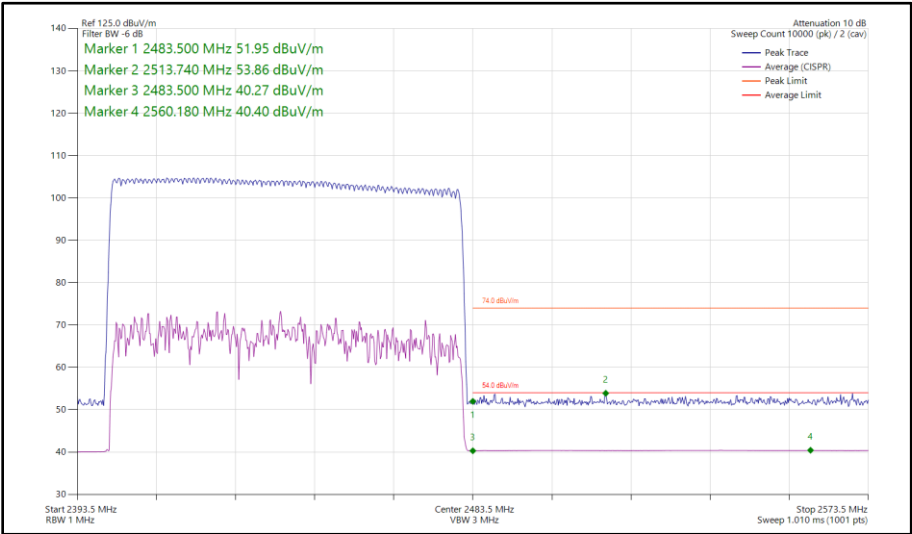
Figure 9 - Bluetooth 3DH5, SISO, Core 0 - 2480 MHz
Band Edge Frequency 2483.5 MHz



**Figure 10 - Bluetooth DH5, SISO, Core 0 - Hopping
Band Edge Frequency 2483.5 MHz**



**Figure 11 - Bluetooth 2DH5, SISO, Core 0 - Hopping
Band Edge Frequency 2483.5 MHz**



**Figure 12 - Bluetooth 3DH5, SISO, Core 0 - Hopping
Band Edge Frequency 2483.5 MHz**

iPA - Core 1 (SISO)

Mode	Packet Type	TX Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
Static	DH5	2402	2390	55.23	40.28
Static	2DH5	2402	2390	54.64	40.28
Static	3DH5	2402	2390	54.91	40.28
Hopping	DH5	Hopping	2390	53.24	40.23
Hopping	2DH5	Hopping	2390	53.33	40.24
Hopping	3DH5	Hopping	2390	54.36	40.25
Static	DH5	2480	2483.5	53.00	40.80
Static	2DH5	2480	2483.5	53.51	40.92
Static	3DH5	2480	2483.5	53.53	41.10
Hopping	DH5	Hopping	2483.5	53.34	40.40
Hopping	2DH5	Hopping	2483.5	54.29	40.40
Hopping	3DH5	Hopping	2483.5	53.84	40.41

Table 8 - SISO Restricted Band Edge Results

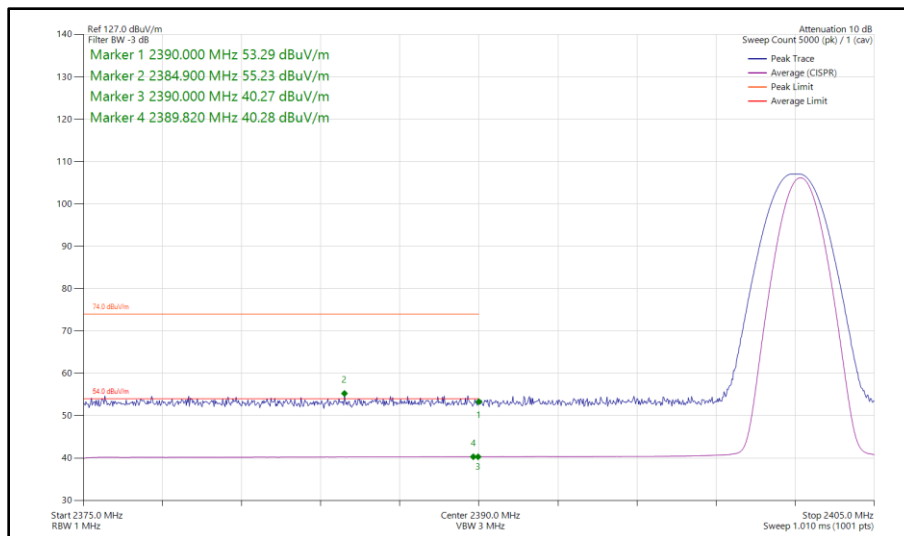


Figure 13 - Bluetooth DH5, SISO, Core 1 - 2402 MHz
Band Edge Frequency 2390 MHz

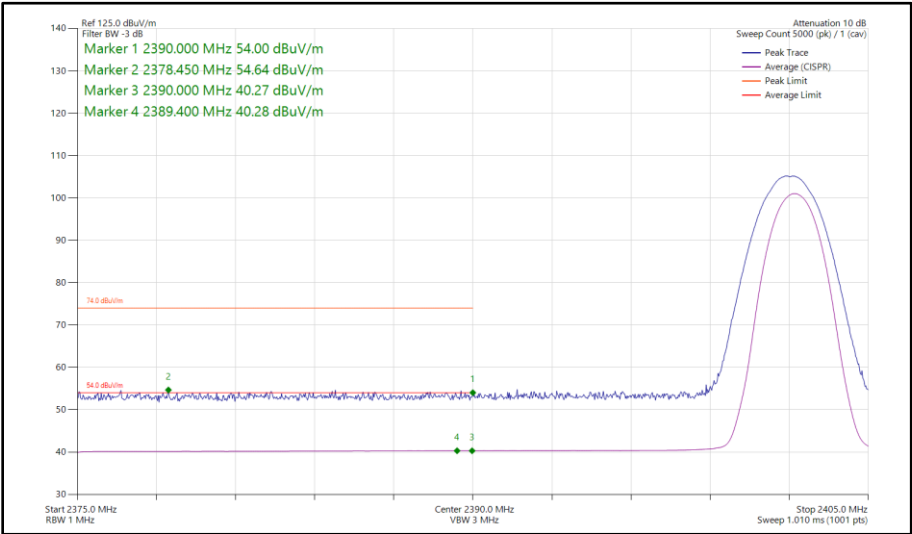


Figure 14 - Bluetooth 2DH5, SISO, Core 1 - 2402 MHz
Band Edge Frequency 2390 MHz

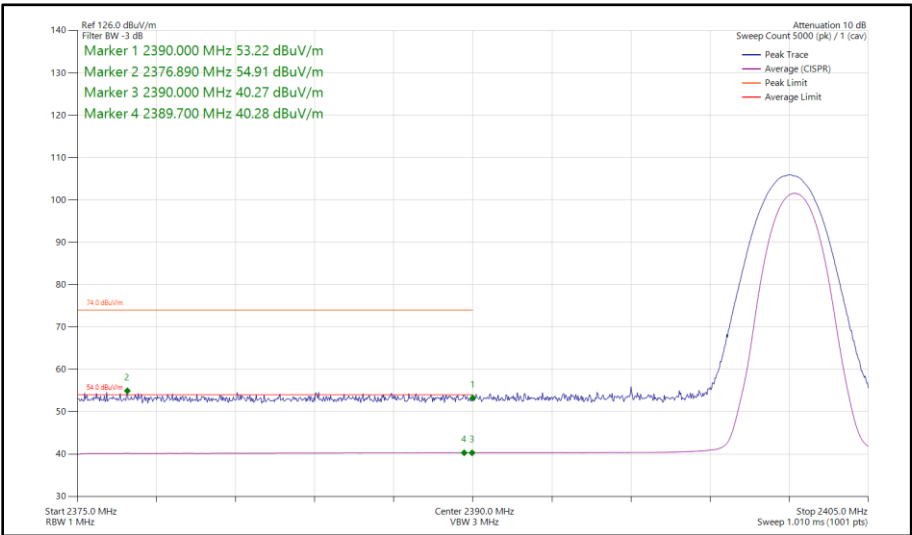


Figure 15 - Bluetooth 3DH5, SISO, Core 1 - 2402 MHz
Band Edge Frequency 2390 MHz

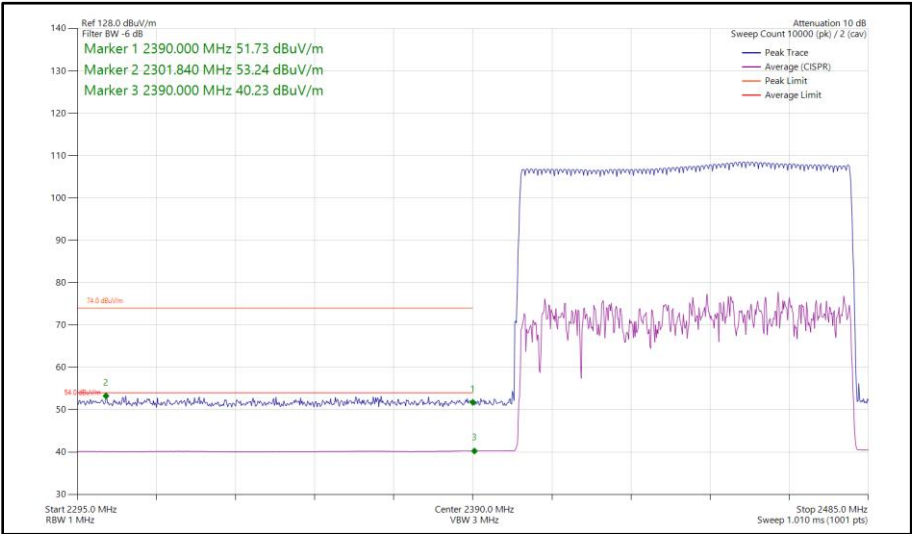


Figure 16 - Bluetooth DH5, SISO, Core 1 - Hopping
Band Edge Frequency 2390 MHz

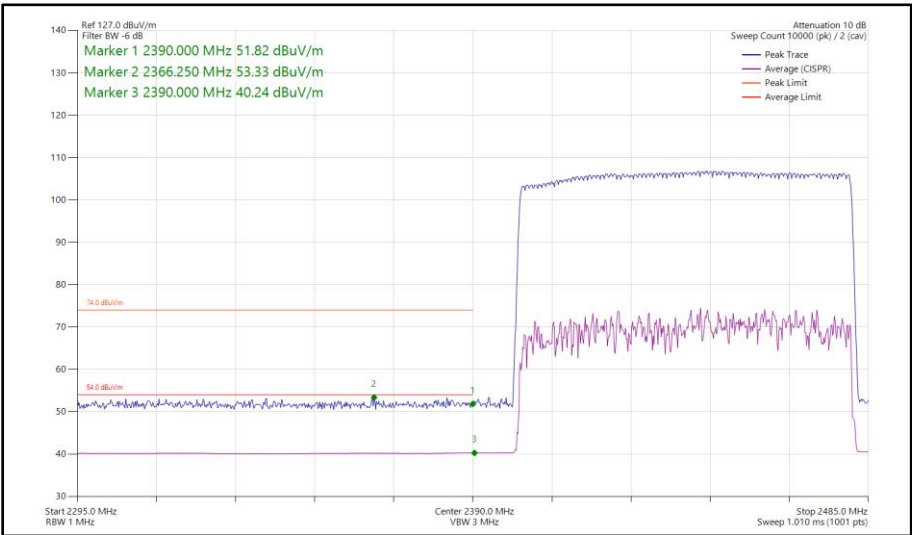
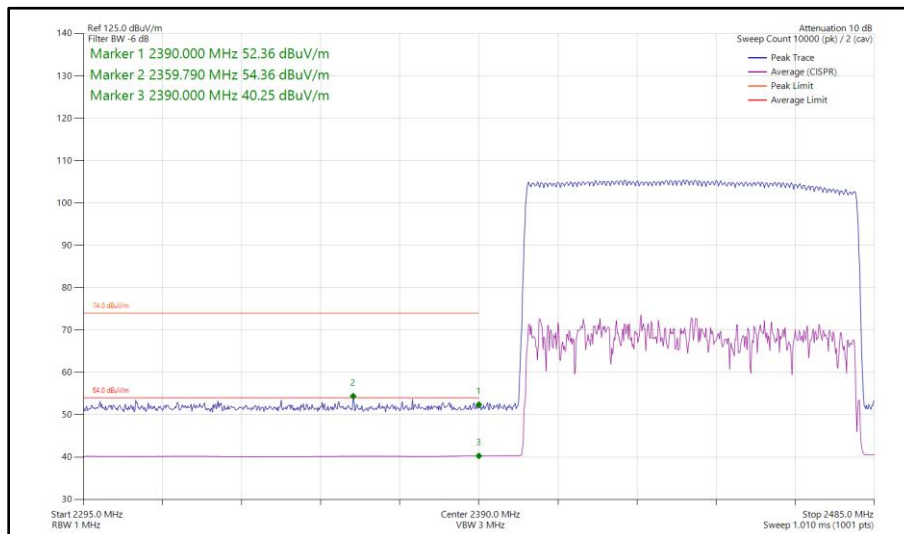
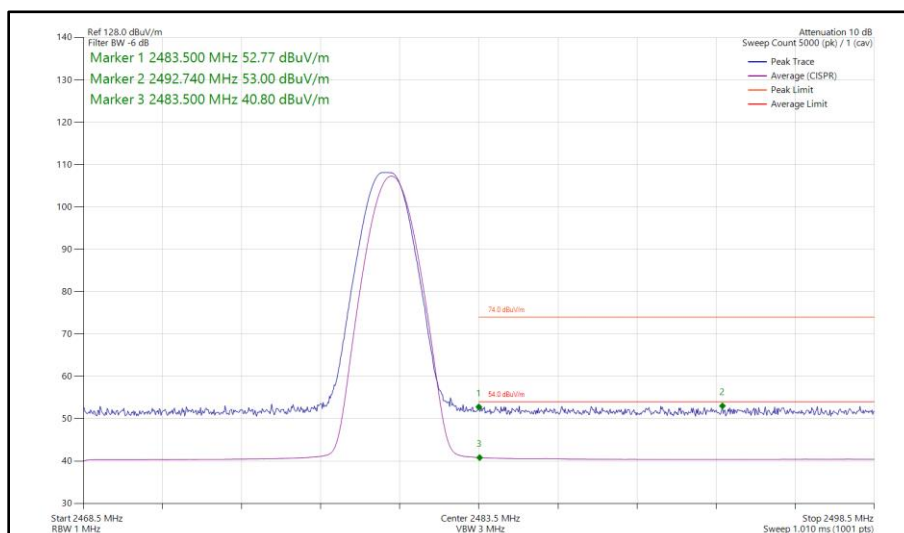


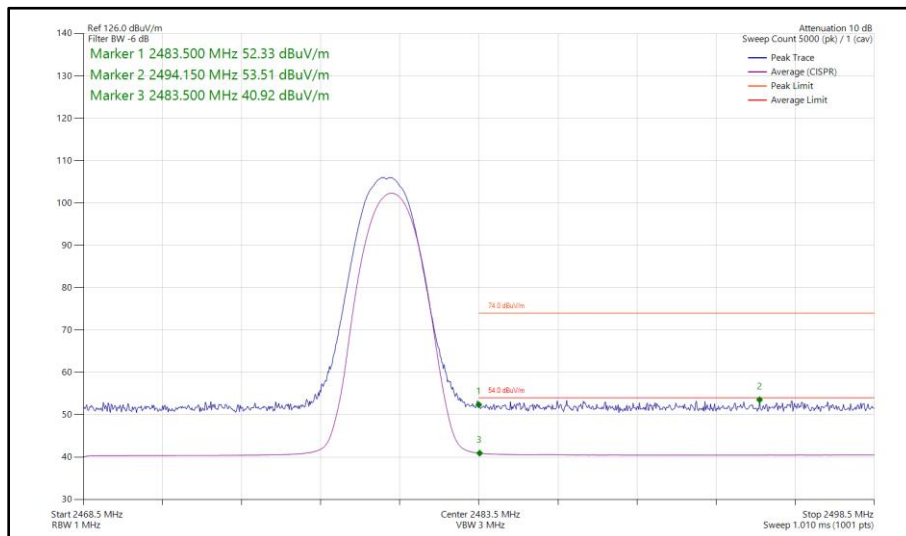
Figure 17 - Bluetooth 2DH5, SISO, Core 1 - Hopping
Band Edge Frequency 2390 MHz



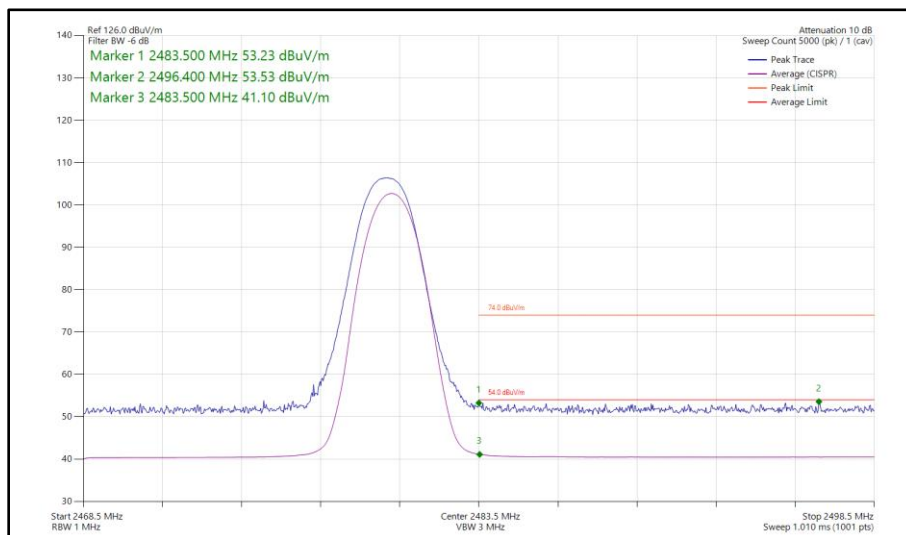
**Figure 18 - Bluetooth 3DH5, SISO, Core 1 - Hopping
Band Edge Frequency 2390 MHz**



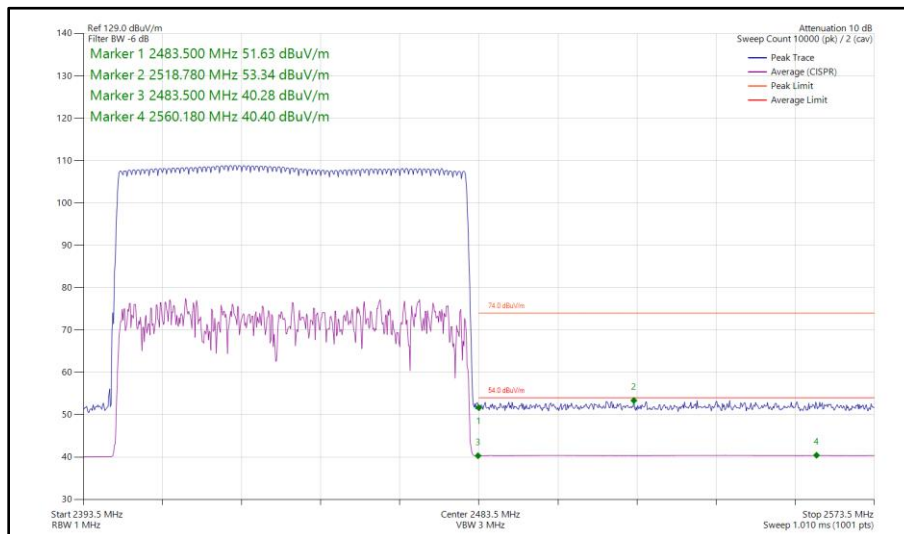
**Figure 19 - Bluetooth DH5, SISO, Core 1 - 2480 MHz
Band Edge Frequency 2483.5 MHz**



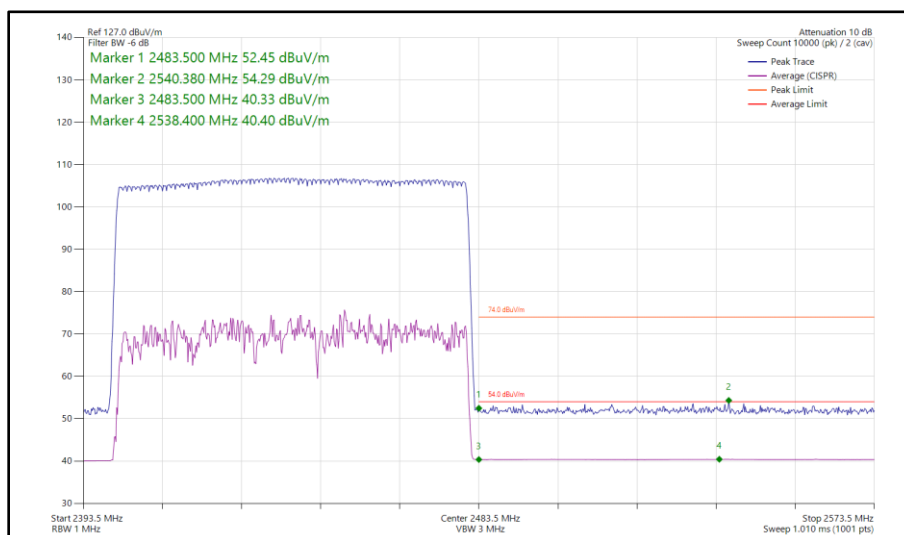
**Figure 20 - Bluetooth 2DH5, SISO, Core 1 - 2480 MHz
Band Edge Frequency 2483.5 MHz**



**Figure 21 - Bluetooth 3DH5, SISO, Core 1 - 2480 MHz
Band Edge Frequency 2483.5 MHz**



**Figure 22 - Bluetooth DH5, SISO, Core 1 - Hopping
Band Edge Frequency 2483.5 MHz**



**Figure 23 - Bluetooth 2DH5, SISO, Core 1 - HHopping
Band Edge Frequency 2483.5 MHz**

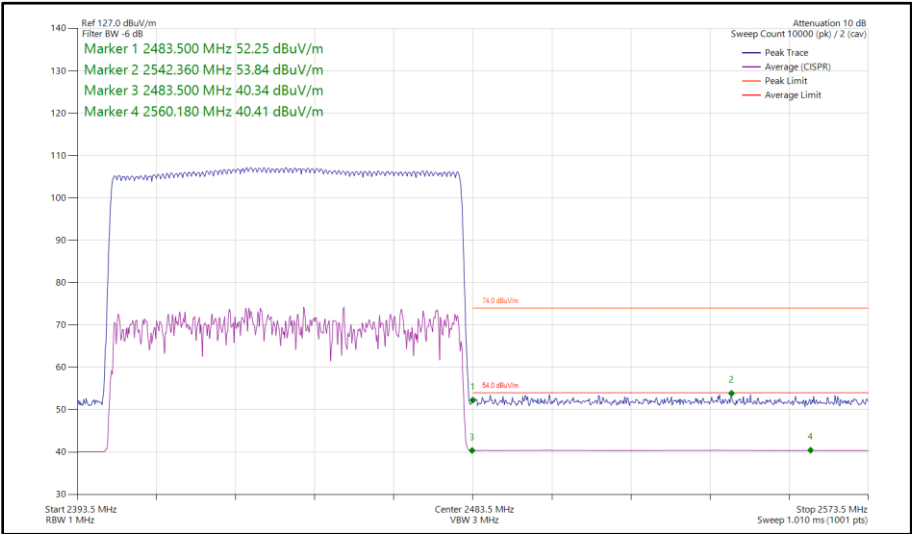


Figure 24 - Bluetooth 3DH5, SISO, Core 1 - Hopping
Band Edge Frequency 2483.5 MHz

iPA - Core 2 (SISO)

Mode	Packet Type	TX Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
Static	DH5	2402	2390	54.93	40.21
Static	2DH5	2402	2390	56.02	40.21
Static	3DH5	2402	2390	55.77	40.21
Hopping	DH5	Hopping	2390	53.72	40.19
Hopping	2DH5	Hopping	2390	54.08	40.20
Hopping	3DH5	Hopping	2390	53.28	40.20
Static	DH5	2480	2483.5	53.32	40.26
Static	2DH5	2480	2483.5	53.77	40.27
Static	3DH5	2480	2483.5	54.01	40.25
Hopping	DH5	Hopping	2483.5	53.55	40.40
Hopping	2DH5	Hopping	2483.5	53.61	40.40
Hopping	3DH5	Hopping	2483.5	53.93	40.41

Table 9 - SISO Restricted Band Edge Results

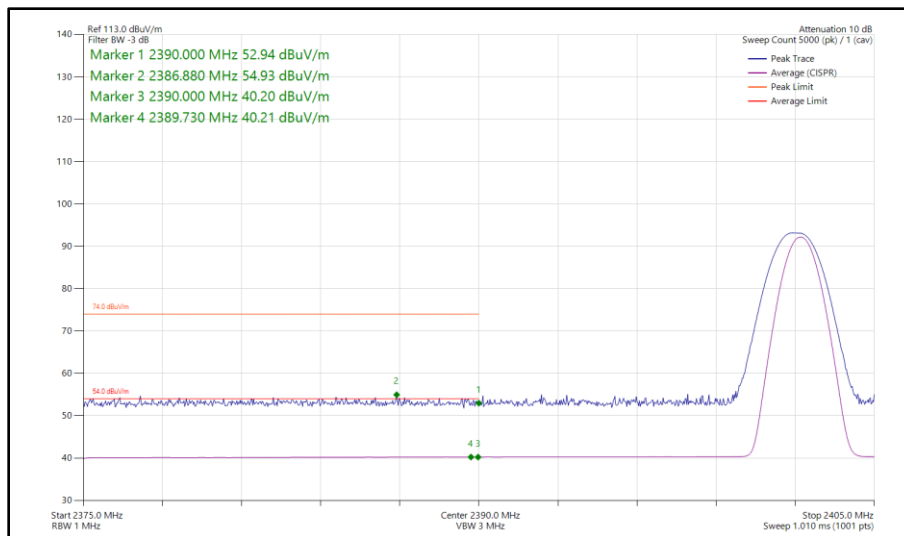


Figure 25 - Bluetooth DH5, SISO, Core 2 - 2402 MHz
Band Edge Frequency 2390 MHz

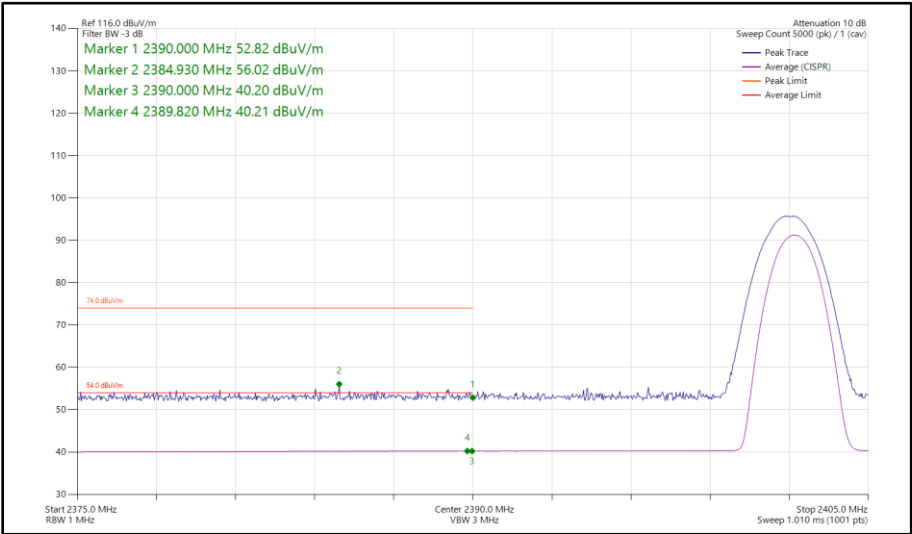


Figure 26 - Bluetooth 2DH5, SISO, Core 2 - 2402 MHz
Band Edge Frequency 2390 MHz

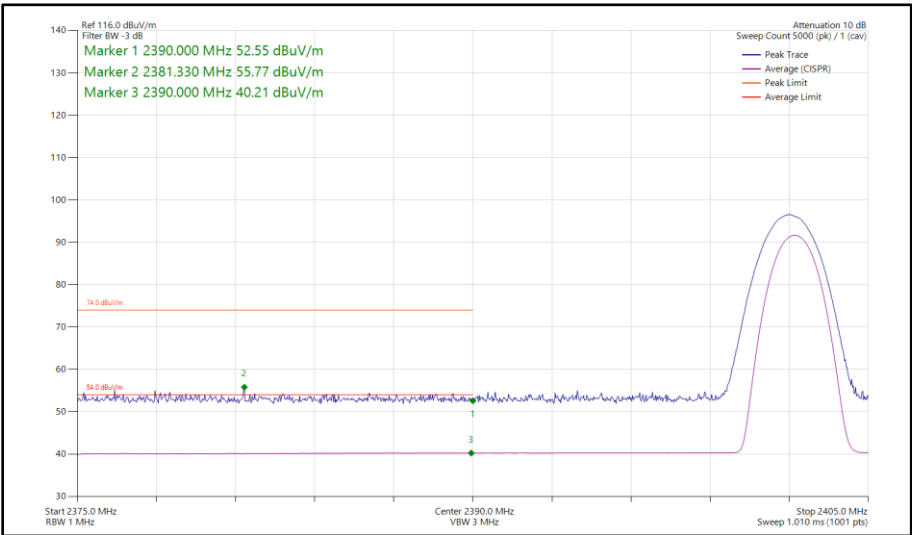


Figure 27 - Bluetooth 3DH5, SISO, Core 2 - 2402 MHz
Band Edge Frequency 2390 MHz

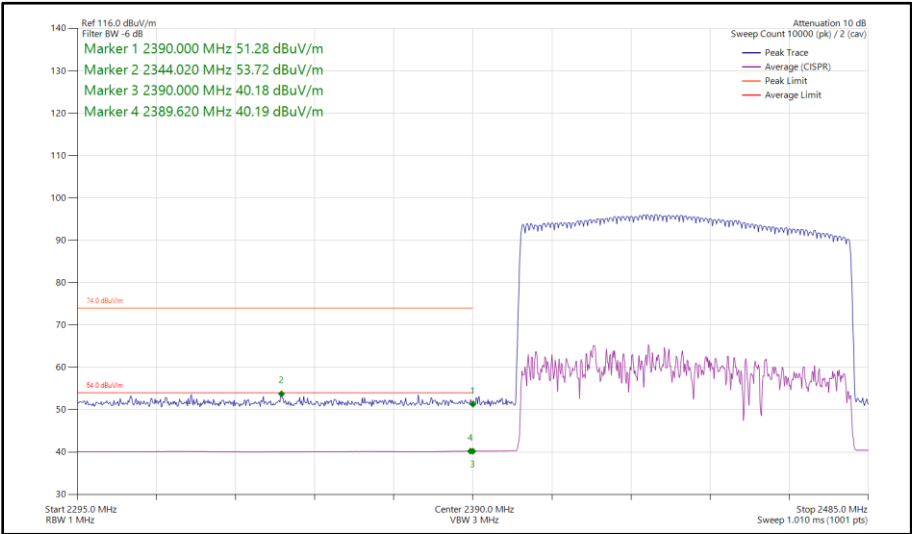


Figure 28 - Bluetooth DH5, SISO, Core 2 - Hopping
Band Edge Frequency 2390 MHz

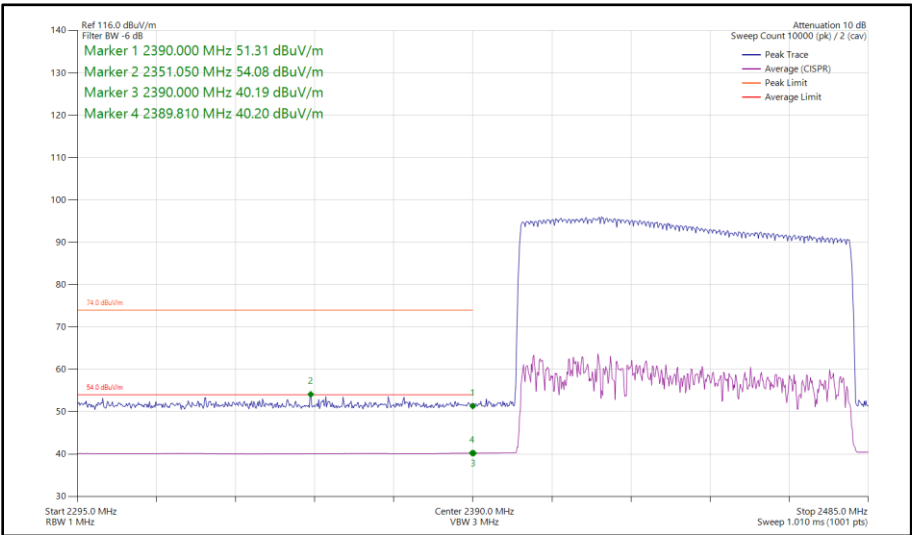


Figure 29 - Bluetooth 2DH5, SISO, Core 2 - Hopping
Band Edge Frequency 2390 MHz

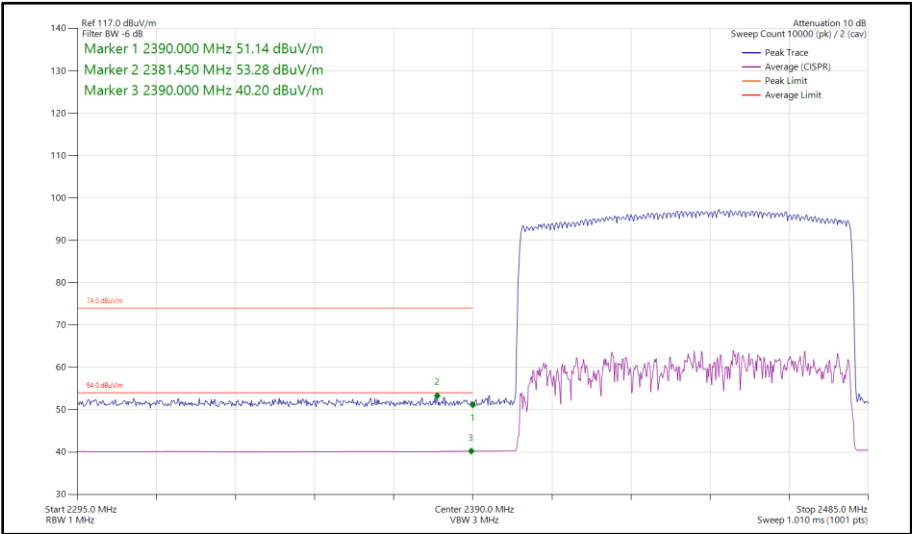


Figure 30 - Bluetooth 3DH5, SISO, Core 2 - Hopping
Band Edge Frequency 2390 MHz

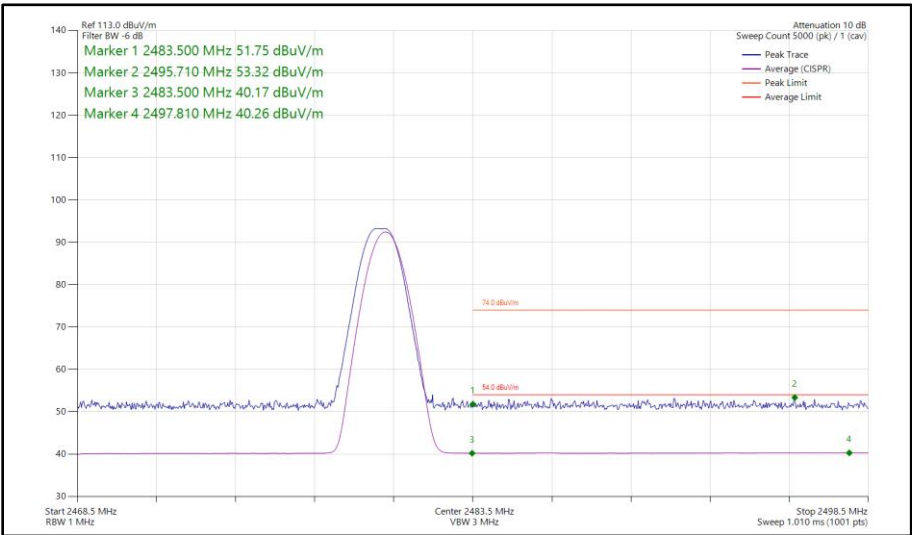


Figure 31 - Bluetooth DH5, SISO, Core 2 - 2480 MHz
Band Edge Frequency 2483.5 MHz

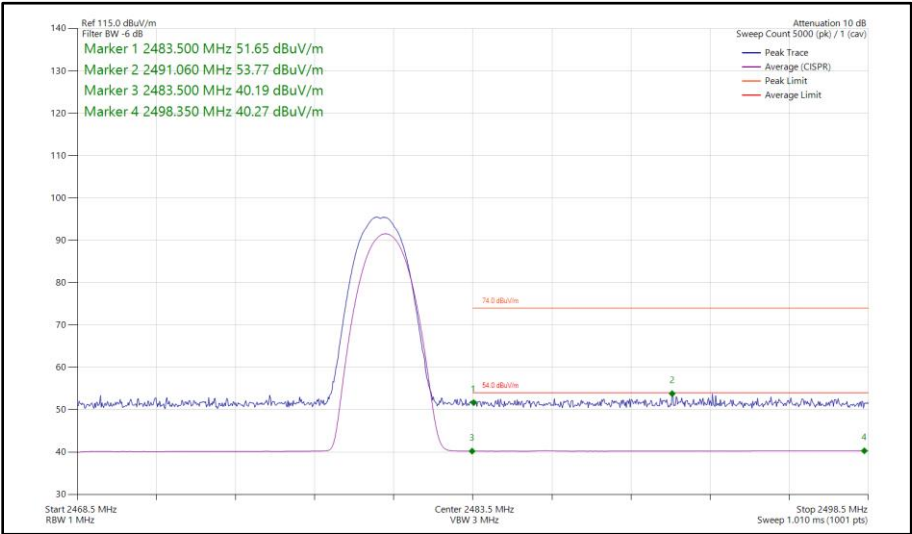


Figure 32 - Bluetooth 2DH5, SISO, Core 2 - 2480 MHz
Band Edge Frequency 2483.5 MHz

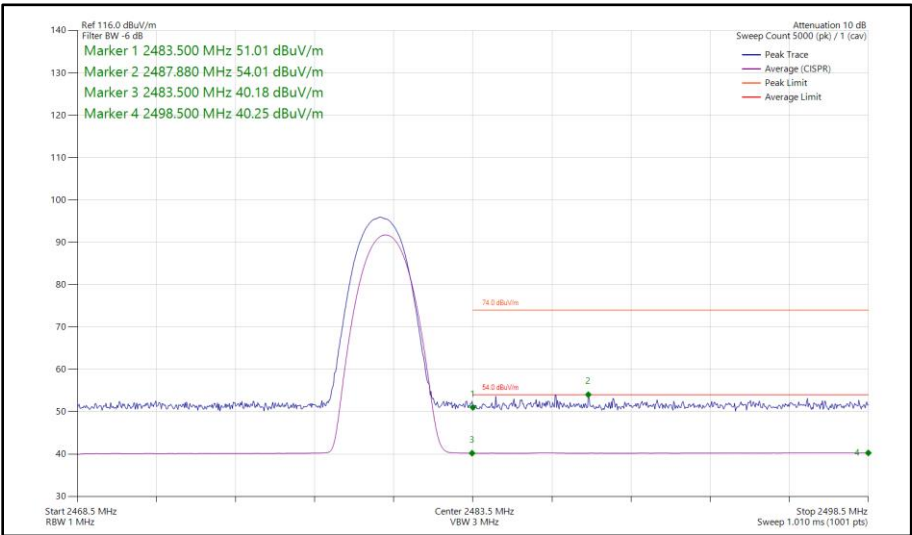


Figure 33 - Bluetooth 3DH5, SISO, Core 2 - 2480 MHz
Band Edge Frequency 2483.5 MHz

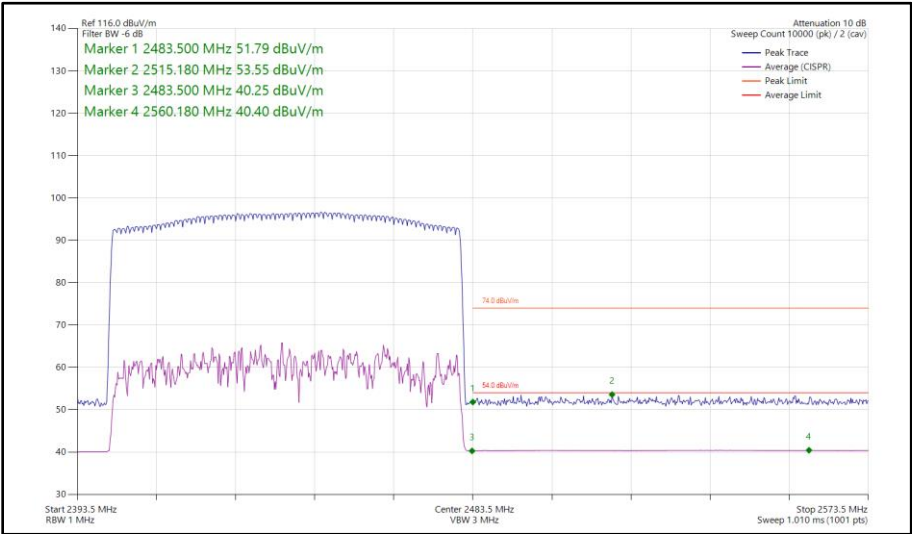


Figure 34 - Bluetooth DH5, SISO, Core 2 - Hopping
Band Edge Frequency 2483.5 MHz

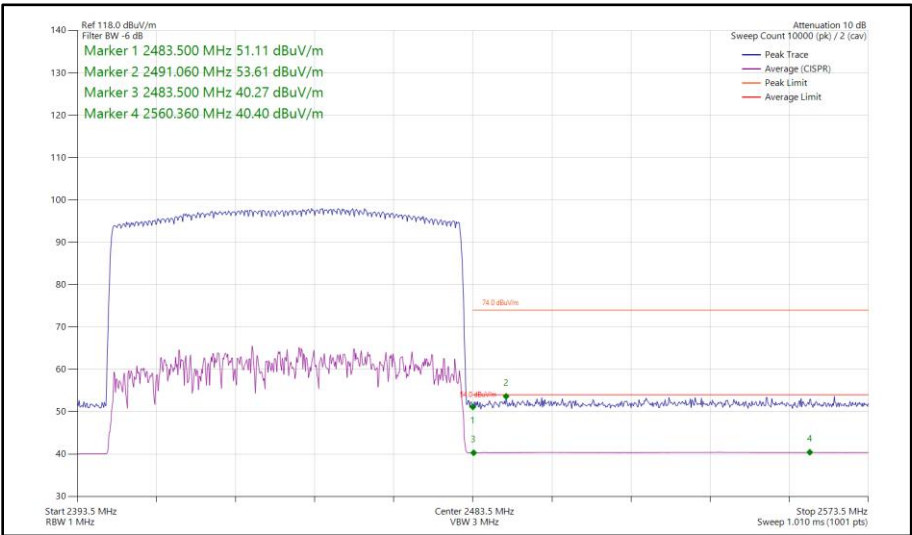
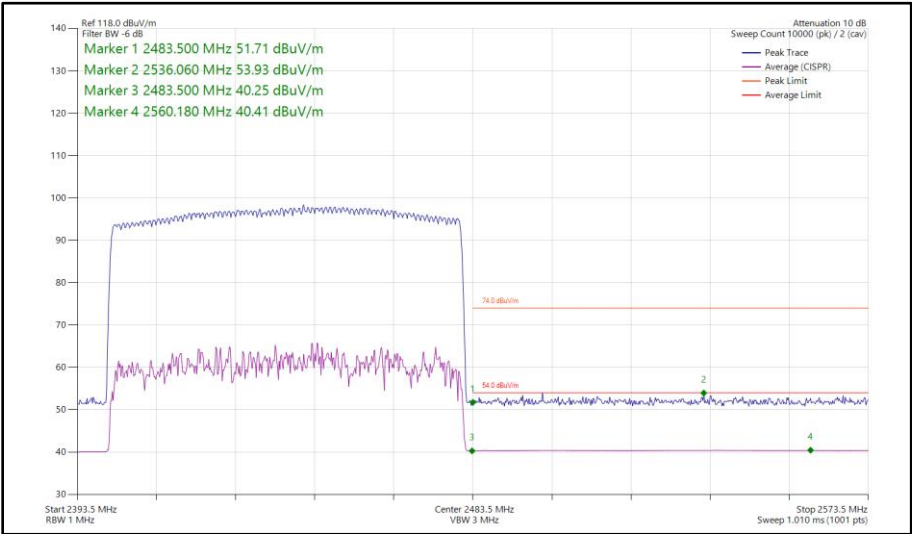


Figure 35 - Bluetooth 2DH5, SISO, Core 2 - Hopping
Band Edge Frequency 2483.5 MHz



**Figure 36 - Bluetooth 3DH5, SISO, Core 2 - Hopping
Band Edge Frequency 2483.5 MHz**

iPA - Core 0-1 (MIMO)

Mode	Packet Type	TX Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
Static	DH5	2402	2390	55.23	40.33
Static	2DH5	2402	2390	55.00	40.35
Static	3DH5	2402	2390	55.01	40.35
Hopping	DH5	Hopping	2390	53.31	40.25
Hopping	2DH5	Hopping	2390	53.75	40.24
Hopping	3DH5	Hopping	2390	53.90	40.26
Static	DH5	2480	2483.5	53.76	41.71
Static	2DH5	2480	2483.5	53.53	41.22
Static	3DH5	2480	2483.5	53.77	41.42
Hopping	DH5	Hopping	2483.5	54.11	40.42
Hopping	2DH5	Hopping	2483.5	53.96	40.46
Hopping	3DH5	Hopping	2483.5	54.26	40.44

Table 10 - MIMO Restricted Band Edge Results

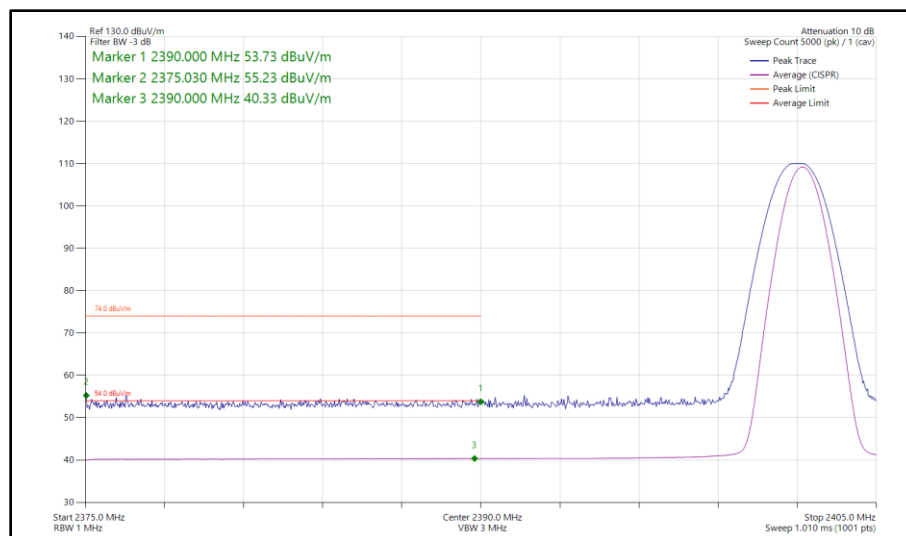
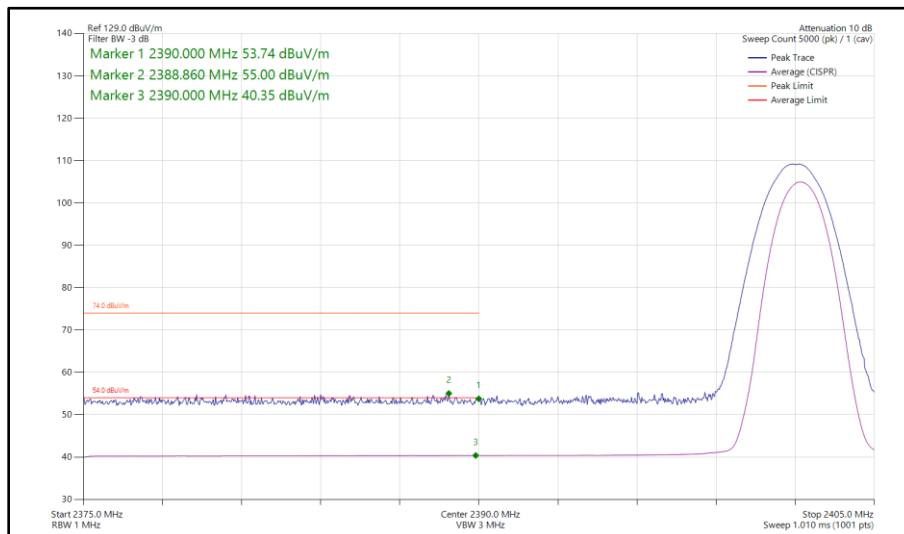
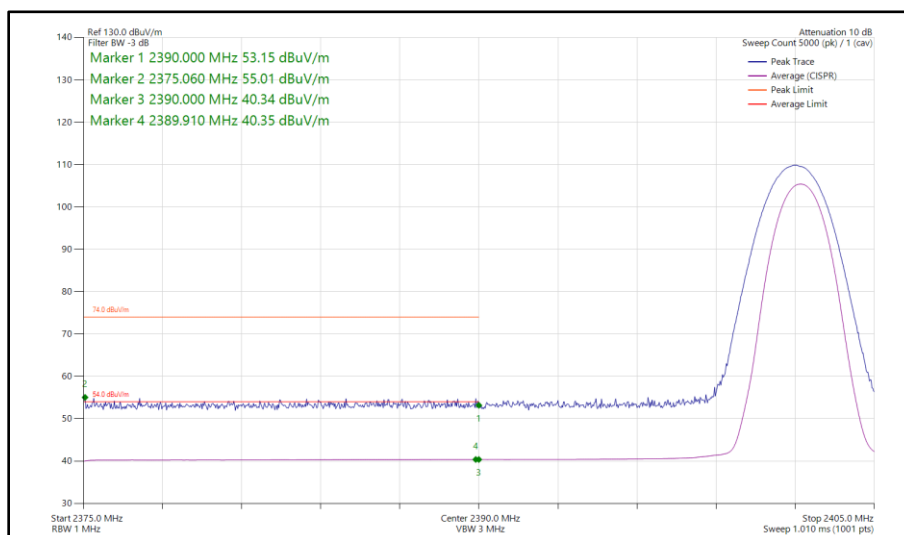


Figure 37 - Bluetooth DH5, MIMO, Core 0-1 - 2402 MHz
Band Edge Frequency 2390 MHz



**Figure 38 - Bluetooth 2DH5, MIMO, Core 0-1 - 2402 MHz
Band Edge Frequency 2390 MHz**



**Figure 39 - Bluetooth 3DH5, MIMO, Core 0-1 - 2402 MHz
Band Edge Frequency 2390 MHz**

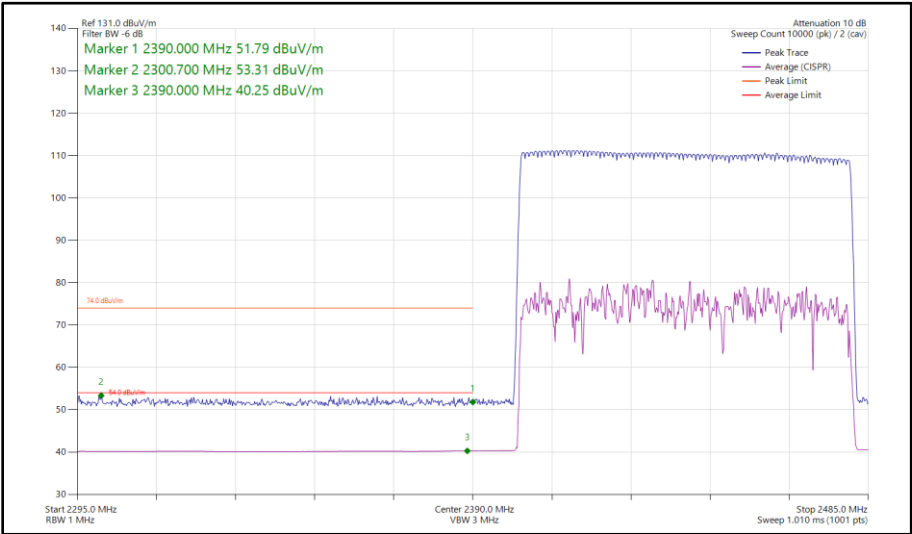


Figure 40 - Bluetooth DH5, MIMO, Core 0-1 - Hopping
Band Edge Frequency 2390 MHz

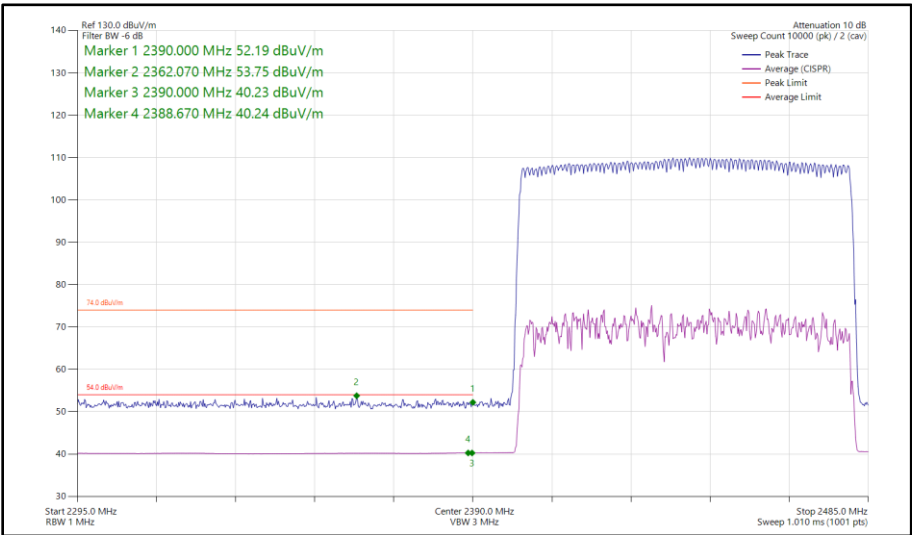
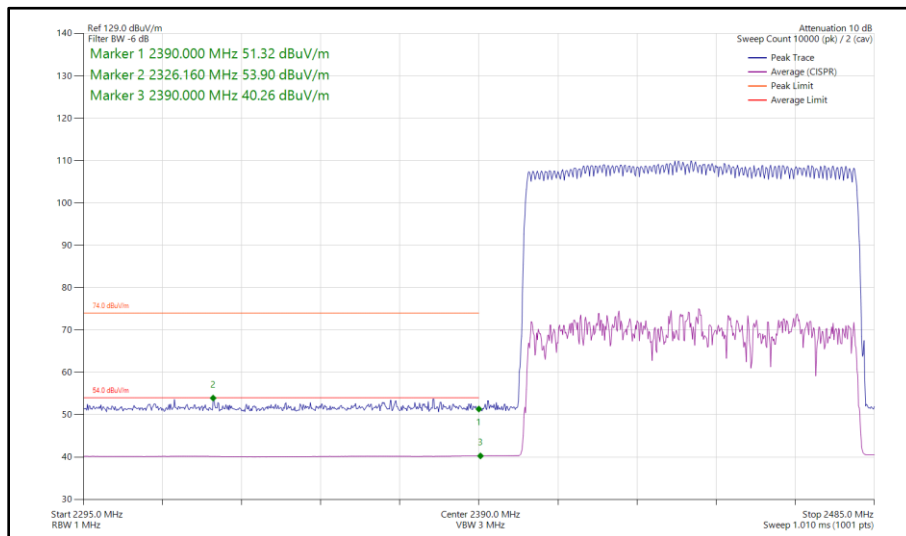
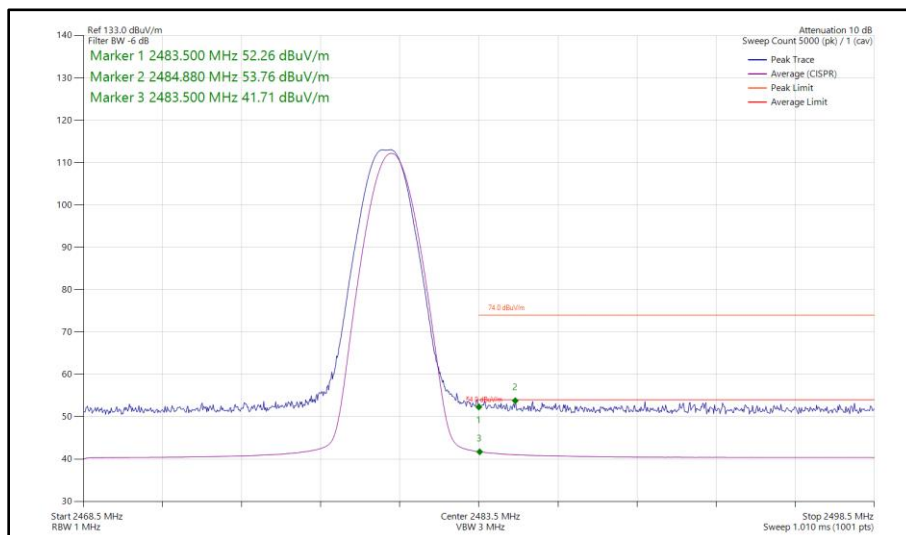


Figure 41 - Bluetooth 2DH5, MIMO, Core 0-1 - Hopping
Band Edge Frequency 2390 MHz



**Figure 42 - Bluetooth 3DH5, MIMO, Core 0-1 - Hopping
Band Edge Frequency 2390 MHz**



**Figure 43 - Bluetooth DH5, MIMO, Core 0-1 - 2480 MHz
Band Edge Frequency 2483.5 MHz**

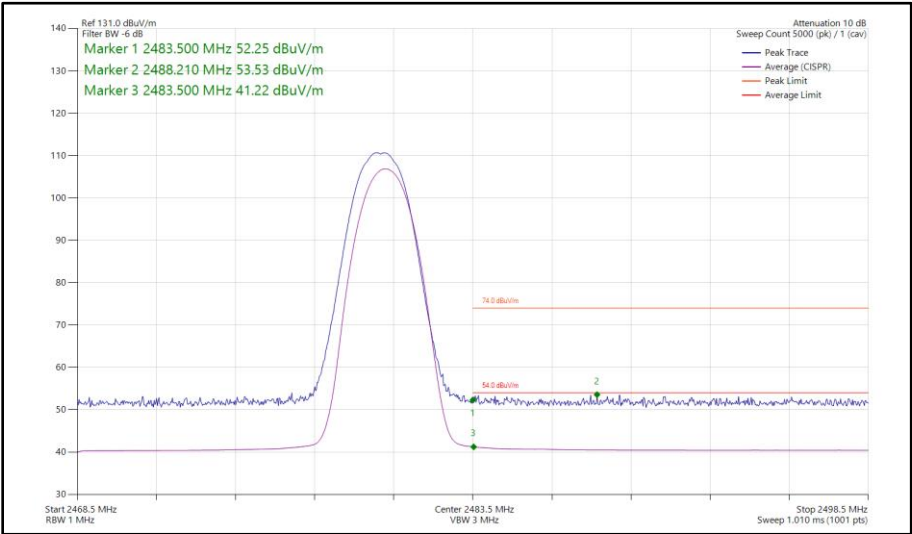


Figure 44 - Bluetooth 2DH5, MIMO, Core 0-1 - 2480 MHz
Band Edge Frequency 2483.5 MHz

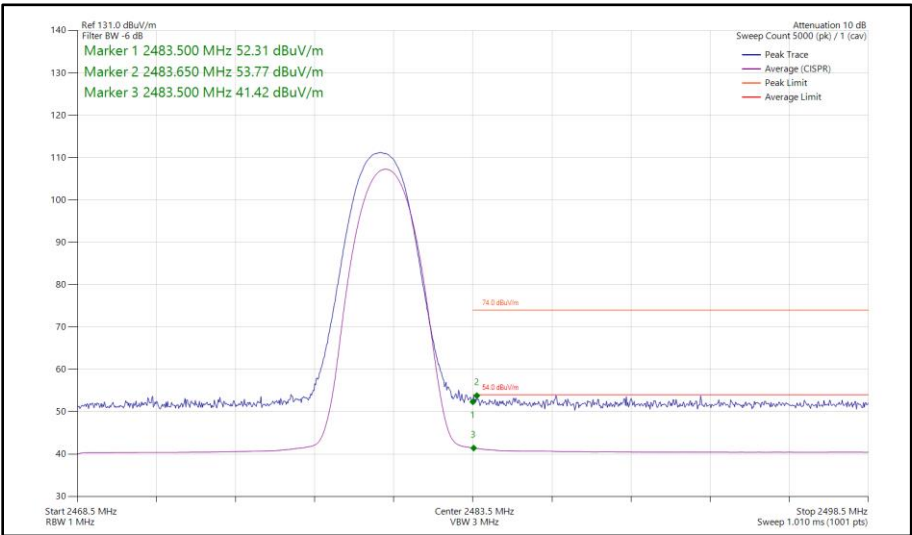


Figure 45 - Bluetooth 3DH5, MIMO, Core 0-1 - 2480 MHz
Band Edge Frequency 2483.5 MHz

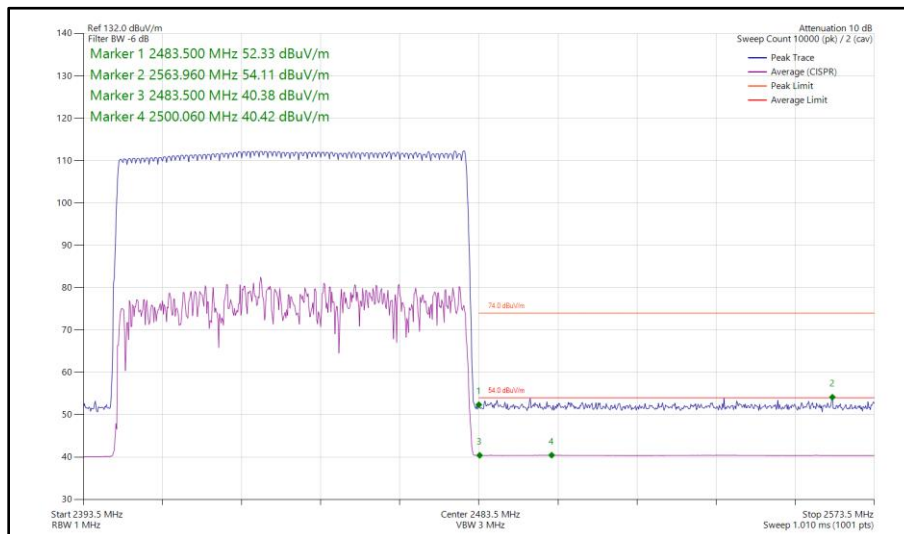


Figure 46 - Bluetooth DH5, MIMO, Core 0-1 - Hopping Band Edge Frequency 2483.5 MHz

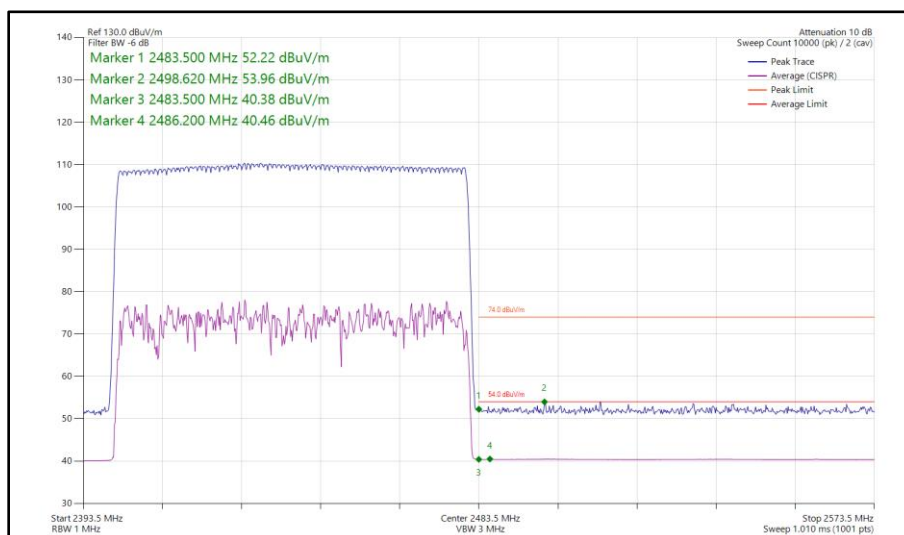
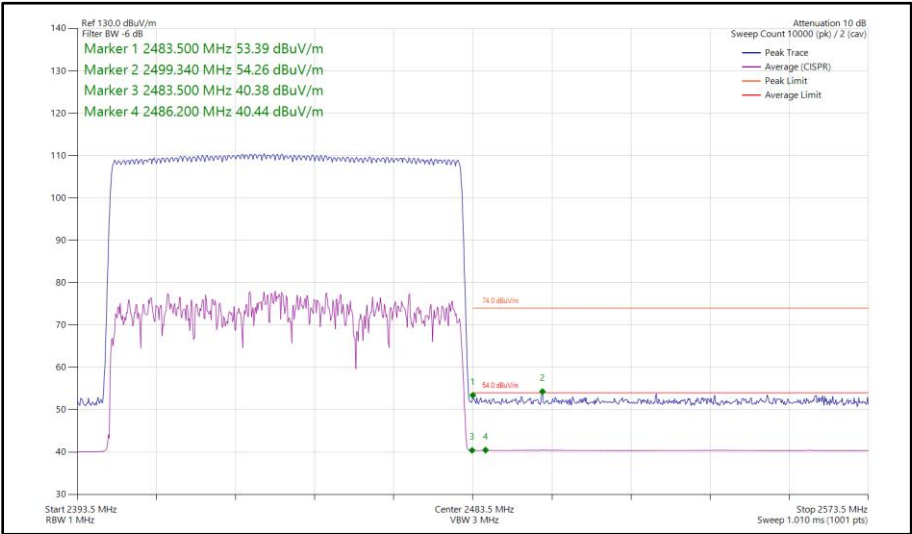


Figure 47 - Bluetooth 2DH5, MIMO, Core 0-1 - Hopping Band Edge Frequency 2483.5 MHz

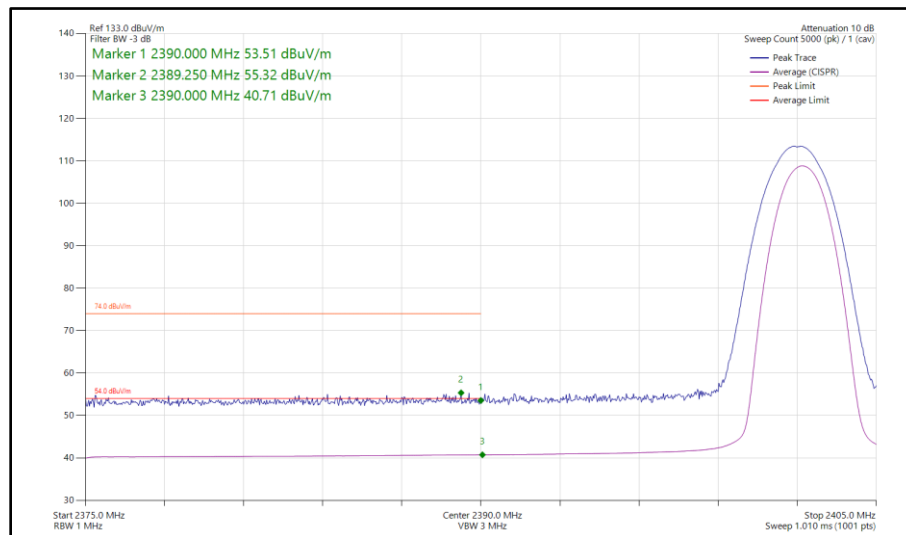


**Figure 48 - Bluetooth 3DH5, MIMO, Core 0-1 - Hopping
Band Edge Frequency 2483.5 MHz**

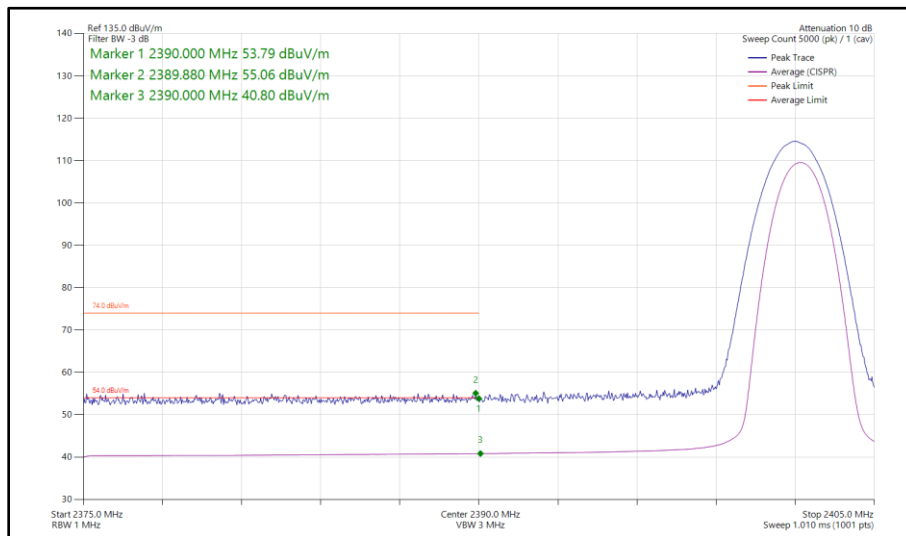
ePA - Core 0 (SISO)

Mode	Packet Type	TX Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
Static	2DH5	2402	2390	55.32	40.71
Static	3DH5	2402	2390	55.06	40.80
Hopping	2DH5	Hopping	2390	53.53	40.25
Hopping	3DH5	Hopping	2390	53.60	40.26
Static	2DH5	2480	2483.5	54.06	42.15
Static	3DH5	2480	2483.5	55.81	43.61
Hopping	2DH5	Hopping	2483.5	54.74	40.48
Hopping	3DH5	Hopping	2483.5	54.09	40.49

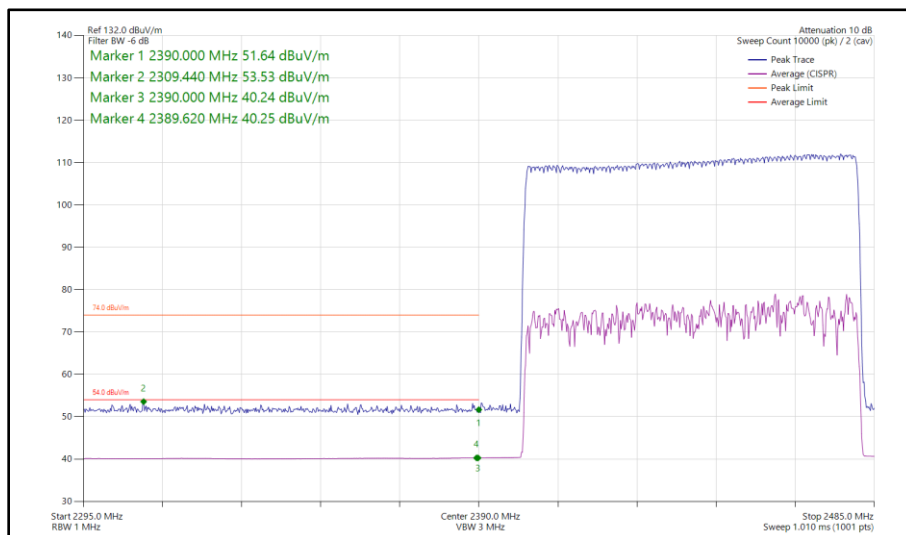
Table 11 - SISO Restricted Band Edge Results



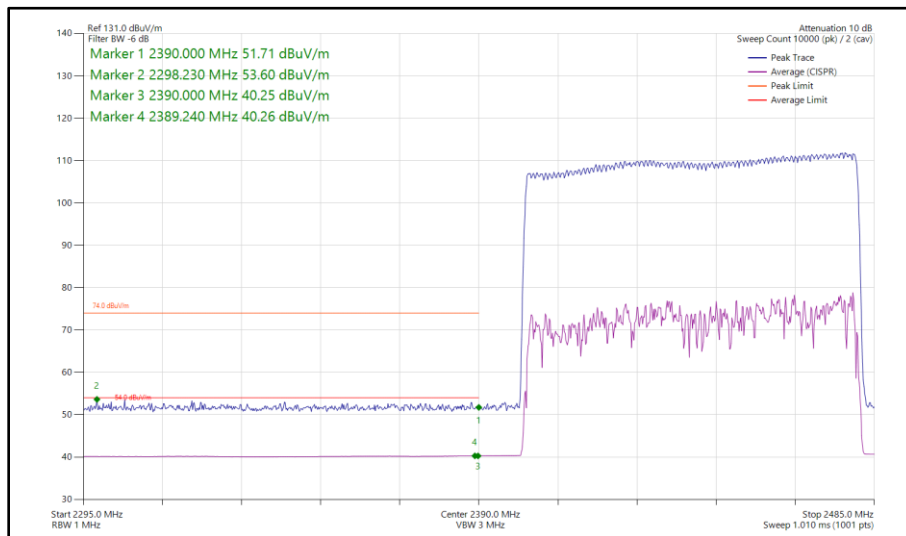
**Figure 49 - Bluetooth 2DH5, SISO, Core 0 - 2402 MHz
Band Edge Frequency 2390 MHz**



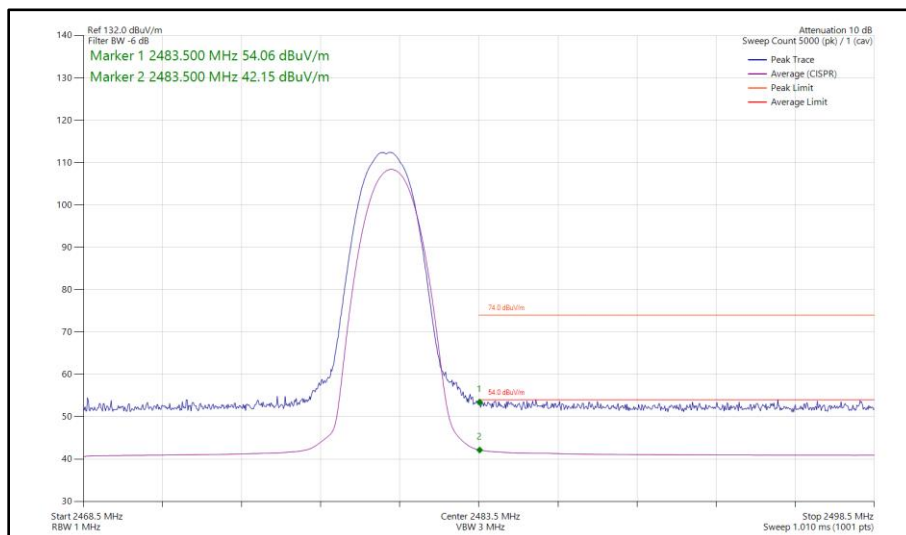
**Figure 50 - Bluetooth 3DH5, SISO, Core 0 - 2402 MHz
Band Edge Frequency 2390 MHz**



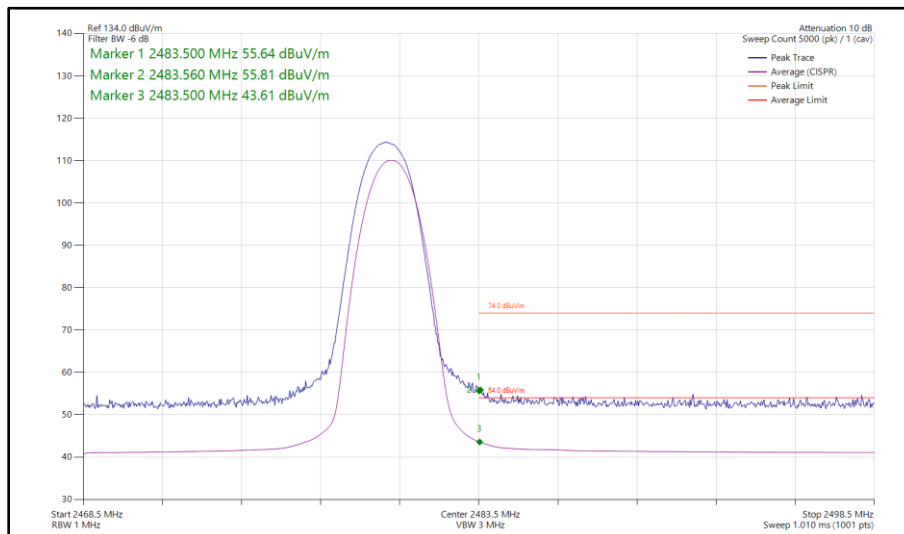
**Figure 51 - Bluetooth 2DH5, SISO, Core 0 - Hopping
Band Edge Frequency 2390 MHz**



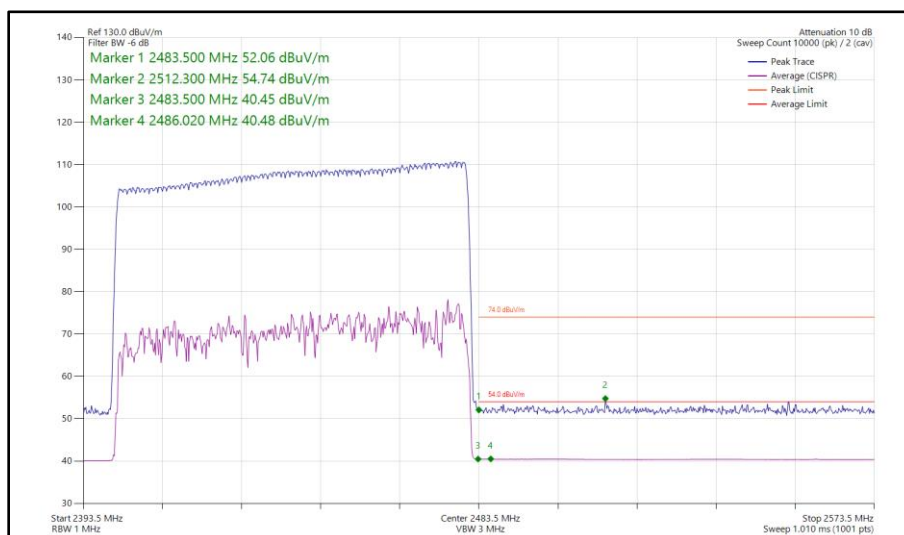
**Figure 52 - Bluetooth 3DH5, SISO, Core 0 - Hopping
Band Edge Frequency 2390 MHz**



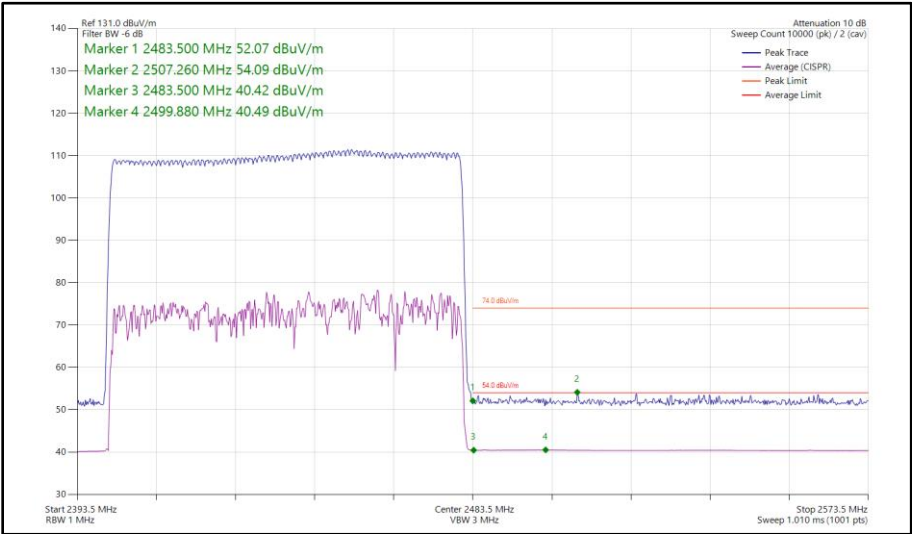
**Figure 53 - Bluetooth 2DH5, SISO, Core 0 - 2480 MHz
Band Edge Frequency 2483.5 MHz**



**Figure 54 - Bluetooth 3DH5, SISO, Core 0 - 2480 MHz
Band Edge Frequency 2483.5 MHz**



**Figure 55 - Bluetooth 2DH5, SISO, Core 0 - Hopping
Band Edge Frequency 2483.5 MHz**

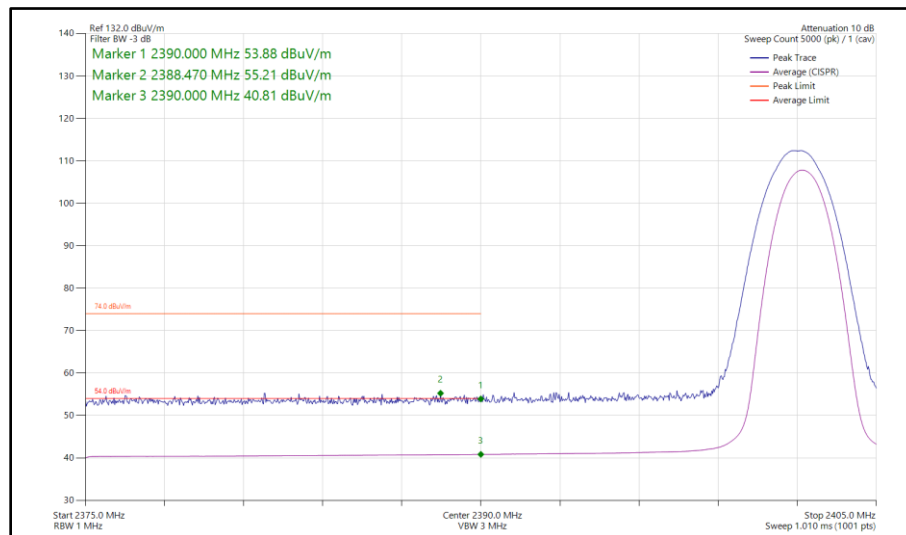


**Figure 56 - Bluetooth 3DH5, SISO, Core 0 - Hopping
Band Edge Frequency 2483.5 MHz**

ePA - Core 1 (SISO)

Mode	Packet Type	TX Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
Static	2DH5	2402	2390	55.21	40.81
Static	3DH5	2402	2390	55.38	40.91
Hopping	2DH5	Hopping	2390	54.20	40.36
Hopping	3DH5	Hopping	2390	53.75	40.34
Static	2DH5	2480	2483.5	53.95	41.84
Static	3DH5	2480	2483.5	54.73	43.15
Hopping	2DH5	Hopping	2483.5	53.72	40.52
Hopping	3DH5	Hopping	2483.5	54.07	40.54

Table 12 - SISO Restricted Band Edge Results



**Figure 57 - Bluetooth 2DH5, SISO, Core 1 - 2402 MHz
Band Edge Frequency 2390 MHz**

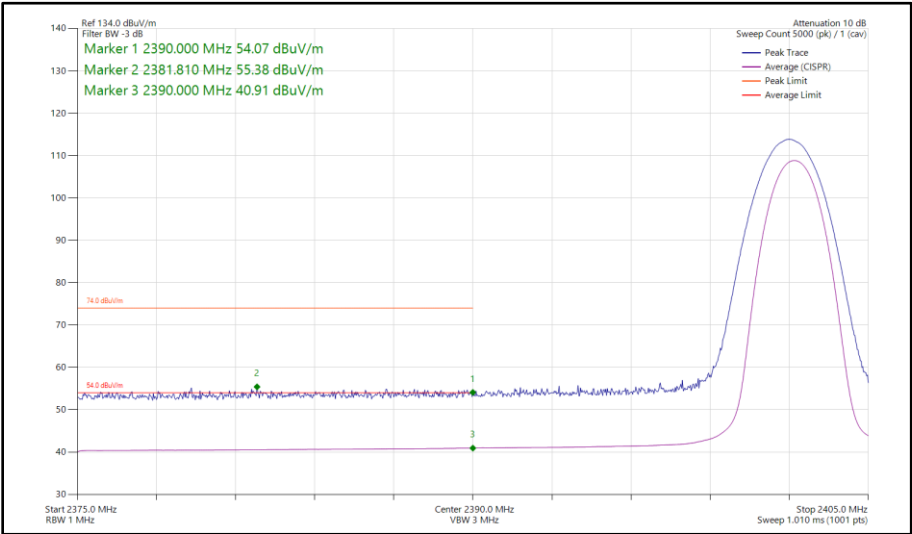


Figure 58 - Bluetooth 3DH5, SISO, Core 1 - 2402 MHz
Band Edge Frequency 2390 MHz

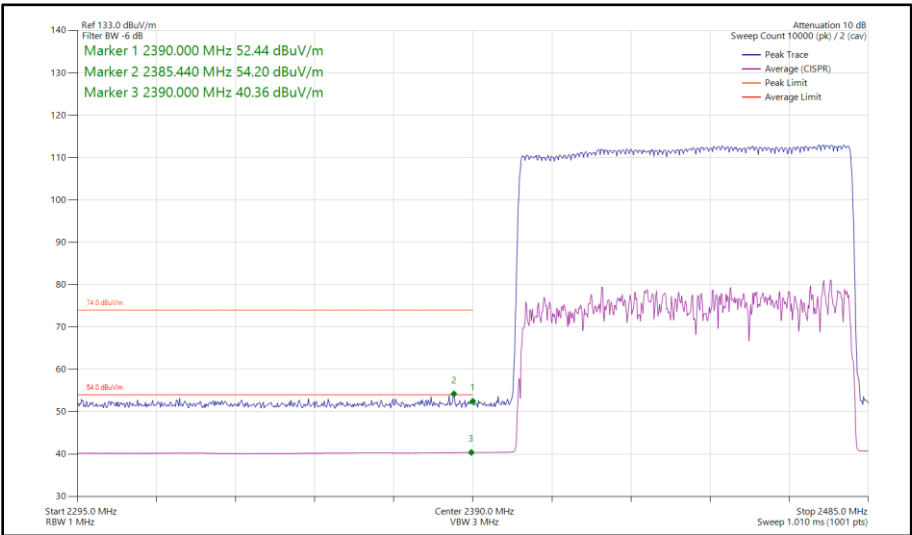
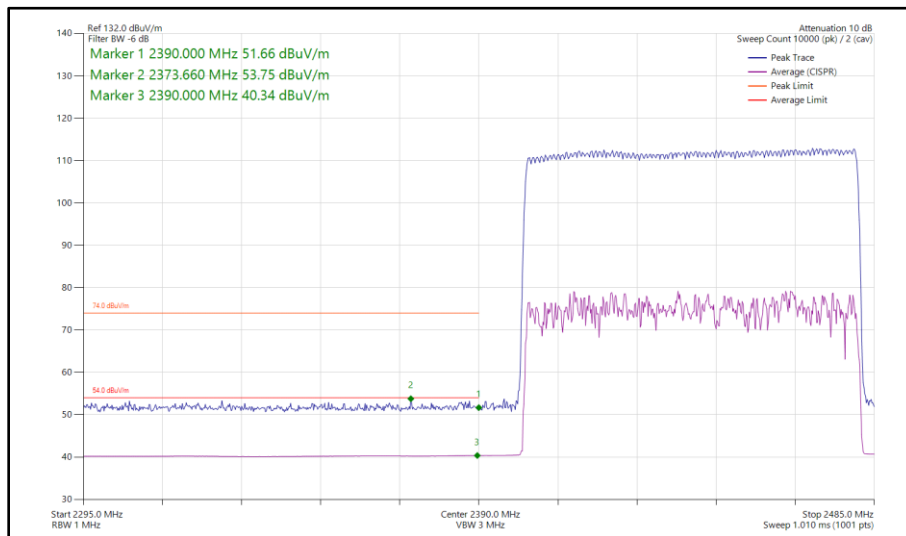
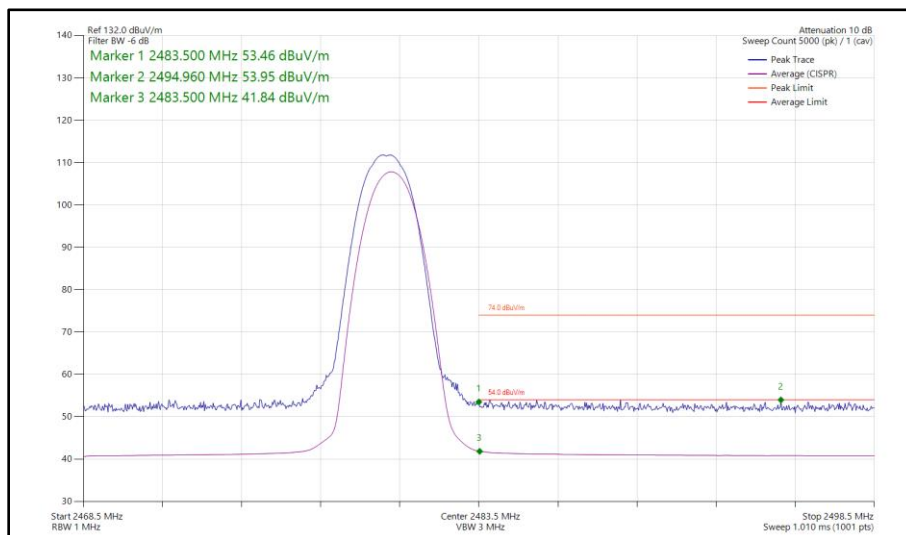


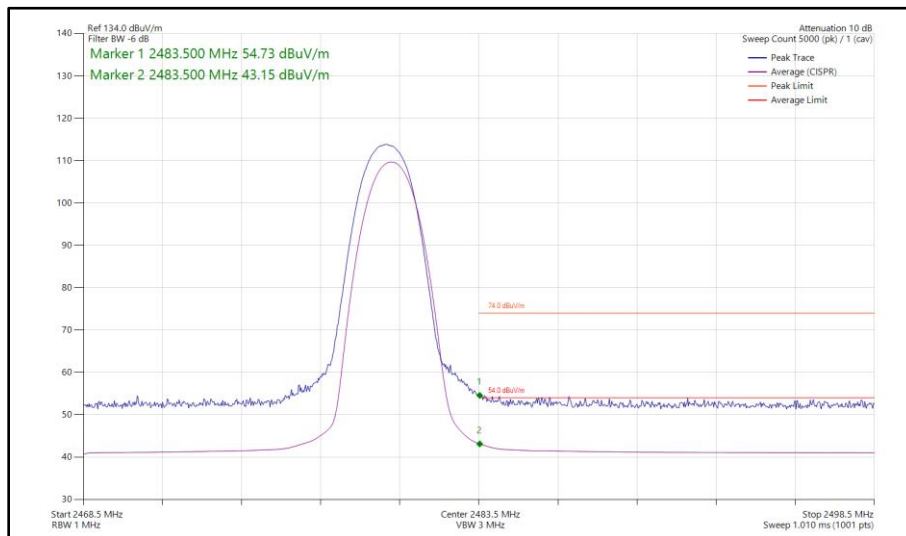
Figure 59 - Bluetooth 2DH5, SISO, Core 1 - Hopping
Band Edge Frequency 2390 MHz



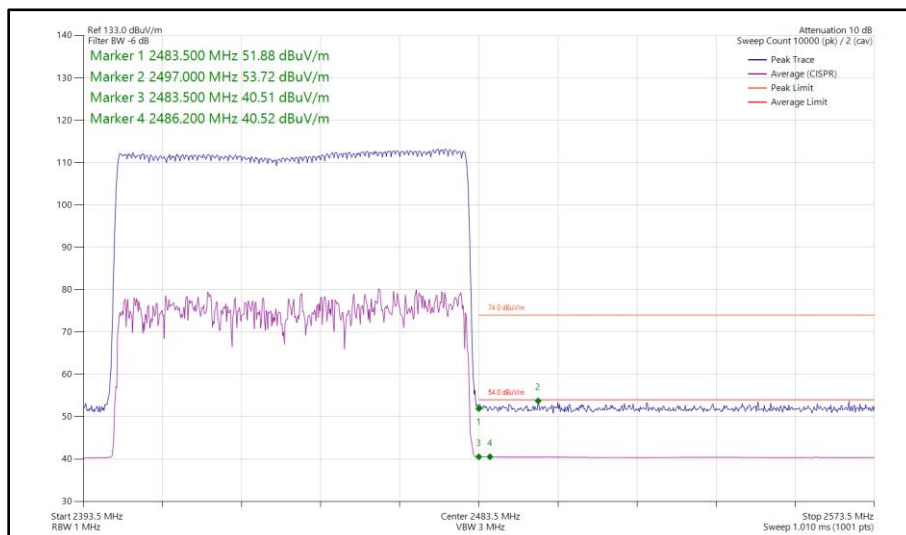
**Figure 60 - Bluetooth 3DH5, SISO, Core 1 - Hopping
Band Edge Frequency 2390 MHz**



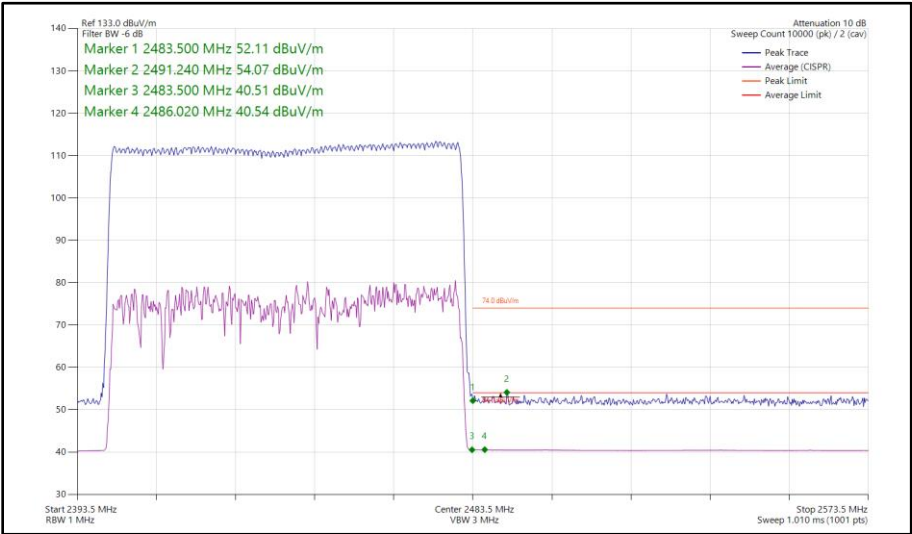
**Figure 61 - Bluetooth 2DH5, SISO, Core 1 - 2480 MHz
Band Edge Frequency 2483.5 MHz**



**Figure 62 - Bluetooth 3DH5, SISO, Core 1 - 2480 MHz
Band Edge Frequency 2483.5 MHz**



**Figure 63 - Bluetooth 2DH5, SISO, Core 1 - Hopping
Band Edge Frequency 2483.5 MHz**

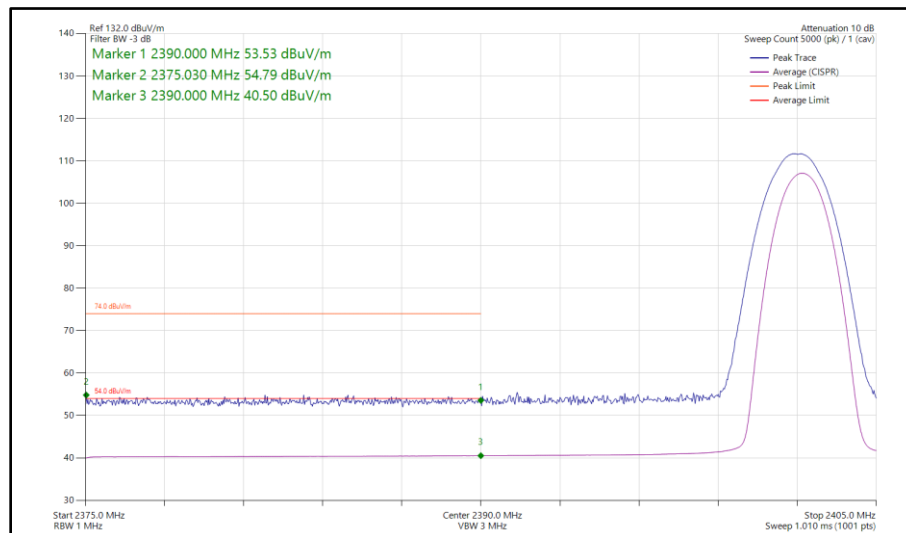


**Figure 64 - Bluetooth 3DH5, SISO, Core 1 - Hopping
Band Edge Frequency 2483.5 MHz**

ePA - Core 0-1 (MIMO)

Mode	Packet Type	TX Frequency (MHz)	Band Edge Frequency (MHz)	Peak Level (dBμV/m)	Average Level (dBμV/m)
Static	2DH5	2402	2390	54.79	40.50
Static	3DH5	2402	2390	55.51	40.55
Hopping	2DH5	Hopping	2390	53.59	40.34
Hopping	3DH5	Hopping	2390	53.52	40.29
Static	2DH5	2480	2483.5	53.86	41.55
Static	3DH5	2480	2483.5	54.94	42.42
Hopping	2DH5	Hopping	2483.5	53.43	40.51
Hopping	3DH5	Hopping	2483.5	53.83	40.53

Table 13 - MIMO Restricted Band Edge Results



**Figure 65 - Bluetooth 2DH5, MIMO, Core 0-1 - 2402 MHz
Band Edge Frequency 2390 MHz**

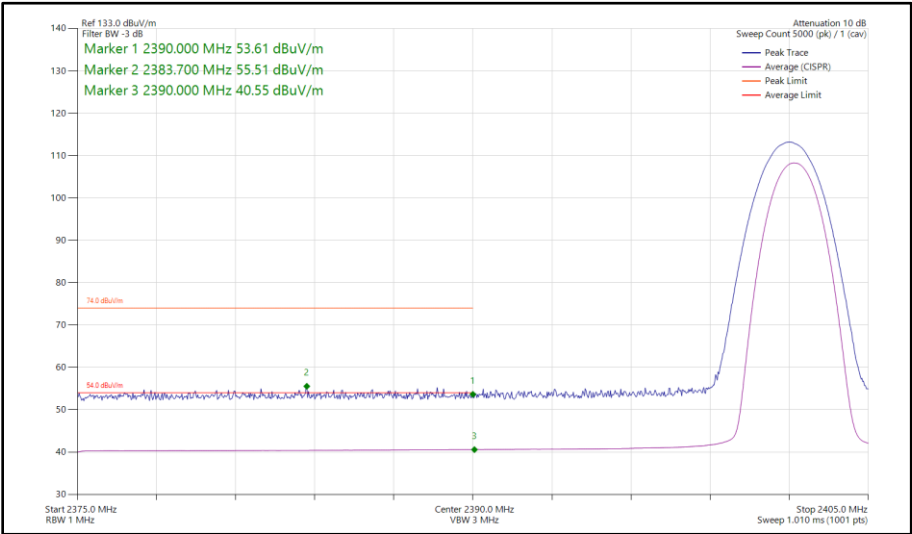


Figure 66 - Bluetooth 3DH5, MIMO, Core 0-1 - 2402 MHz
Band Edge Frequency 2390 MHz

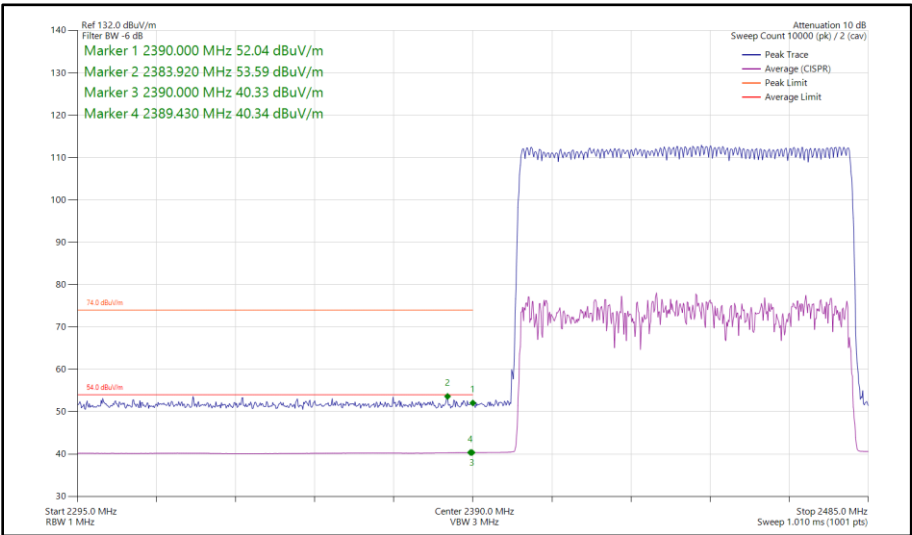


Figure 67 - Bluetooth 2DH5, MIMO, Core 0-1 - Hopping
Band Edge Frequency 2390 MHz

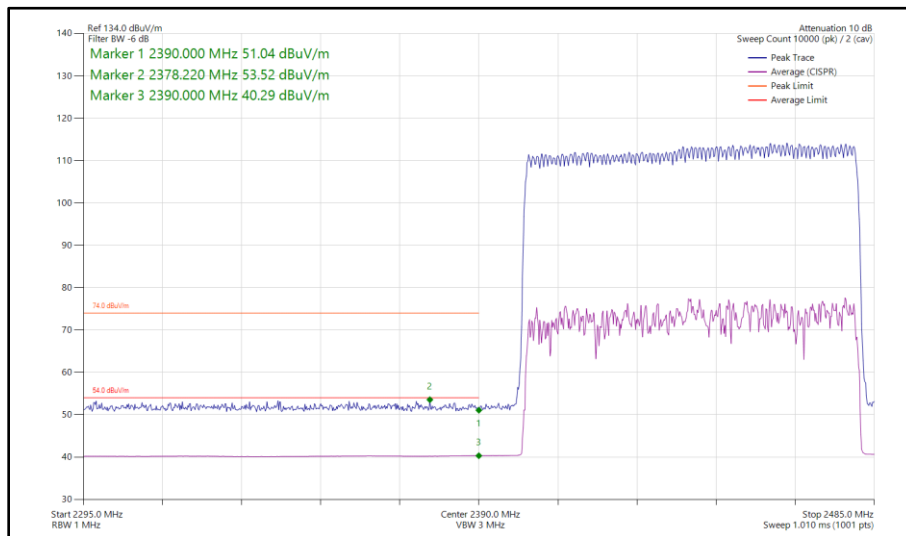


Figure 68 - Bluetooth 3DH5, MIMO, Core 0-1 - Hopping Band Edge Frequency 2390 MHz

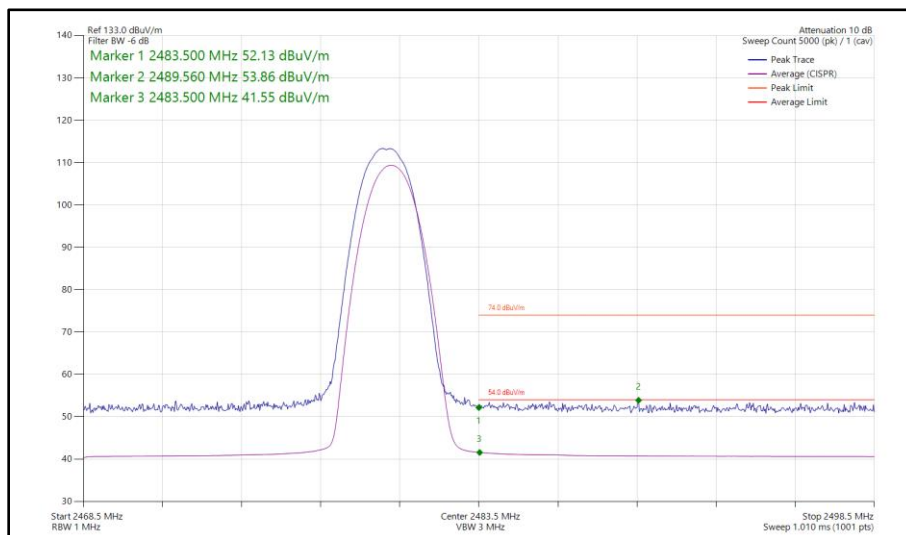


Figure 69 - Bluetooth 2DH5, MIMO, Core 0-1 - 2480 MHz Band Edge Frequency 2483.5 MHz