

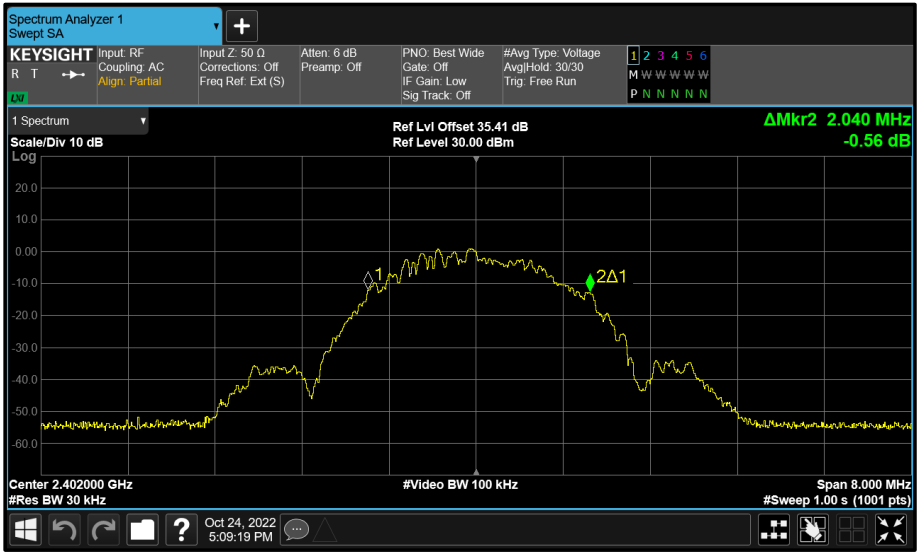


Figure 155 - Core 1 (B) 2402 MHz (CH37) 99% Bandwidth

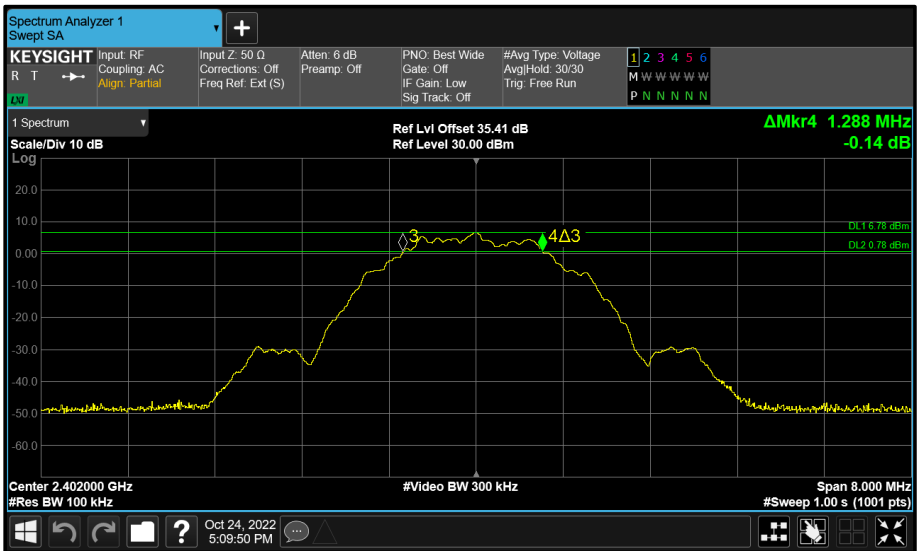


Figure 156 - Core 1 (B) 2402 MHz (CH37) 6 dB Bandwidth

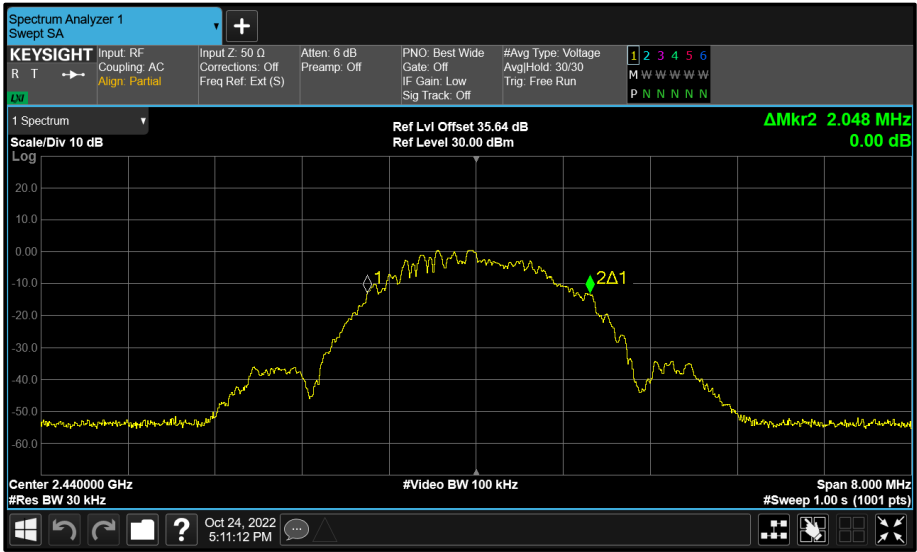


Figure 157 - Core 0 (A) 2440 MHz (CH17) 99% Bandwidth

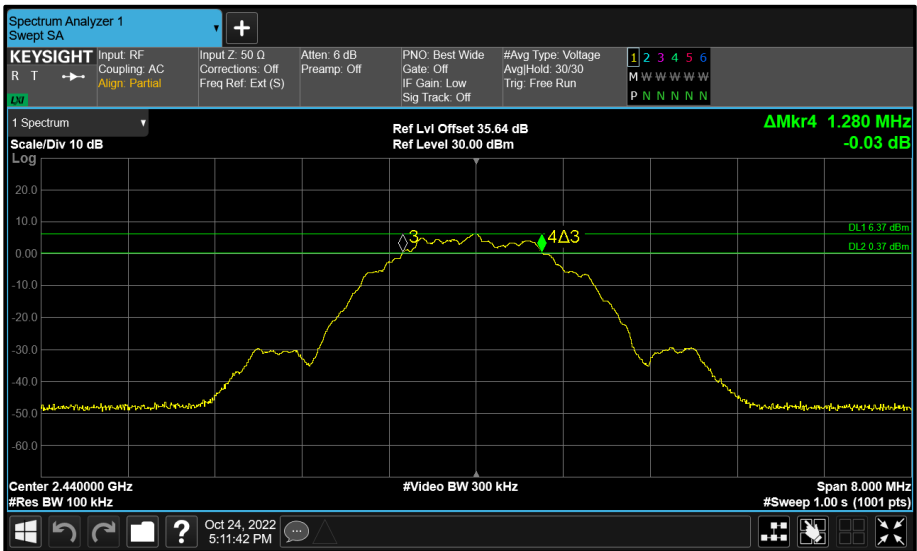


Figure 158 - Core 0 (A) 2440 MHz (CH17) 6 dB Bandwidth

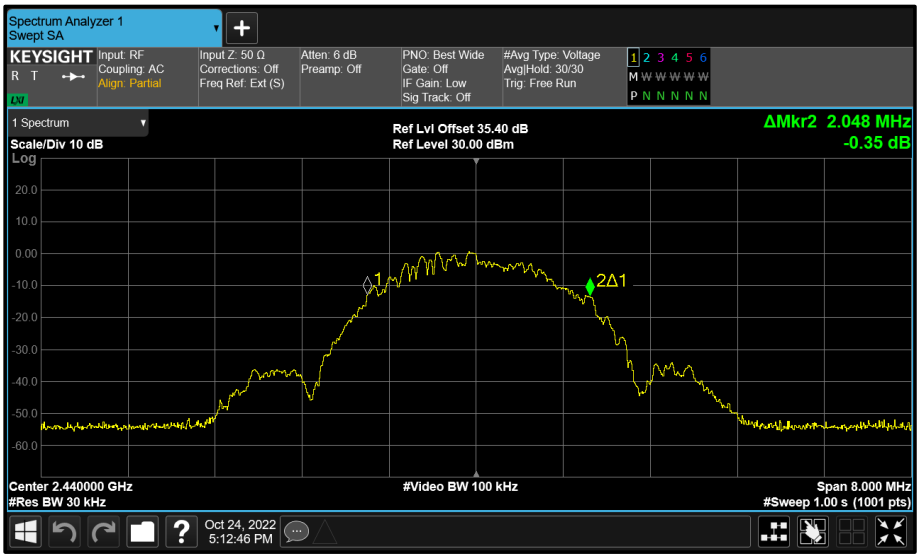


Figure 159 - Core 1 (B) 2440 MHz (CH17) 99% Bandwidth

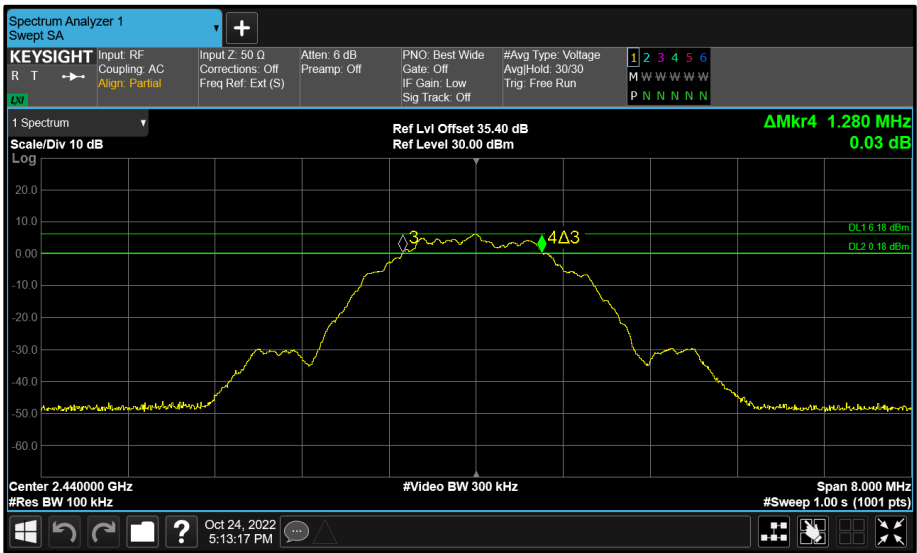
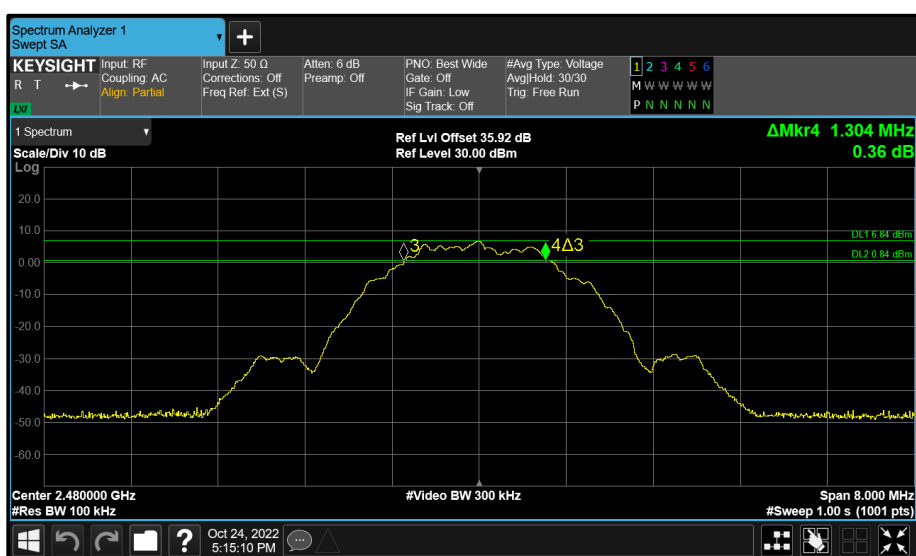
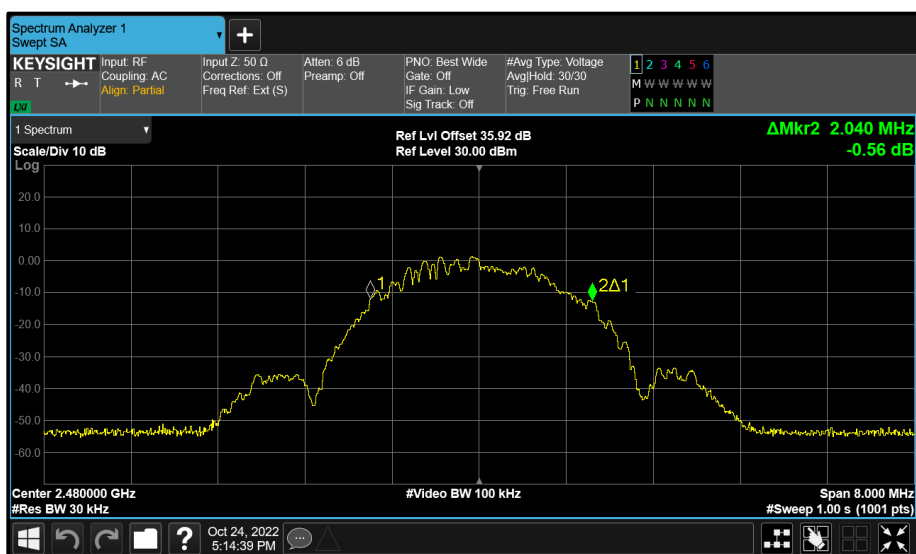


Figure 160 - Core 1 (B) 2440 MHz (CH17) 6 dB Bandwidth



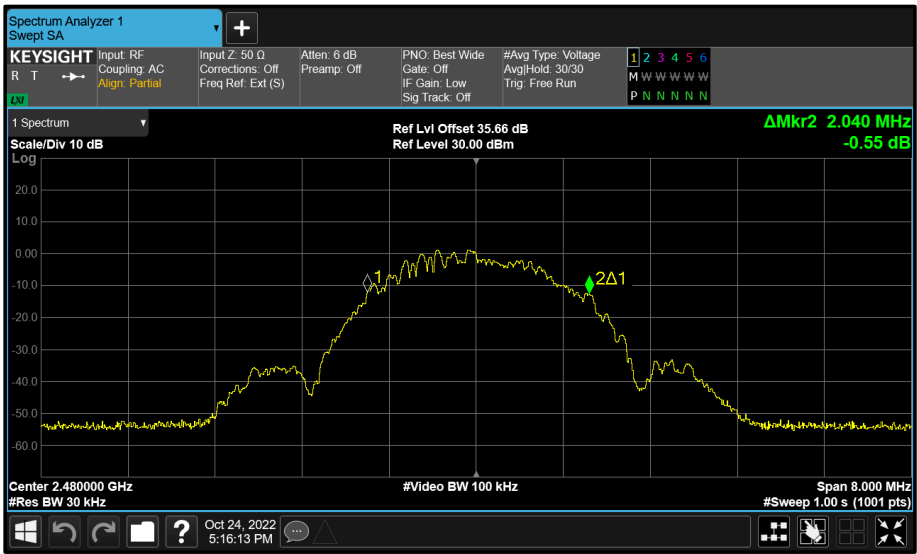


Figure 163 - Core 1 (B) 2480 MHz (CH39) 99% Bandwidth

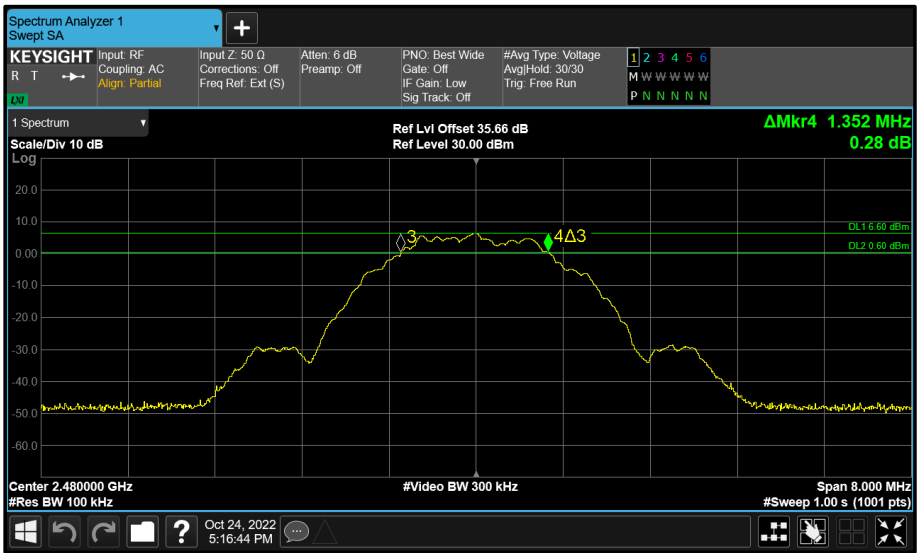


Figure 164 - Core 1 (B) 2480 MHz (CH39) 6 dB Bandwidth

FCC 47 CFR Part 15, Limit Clause 15.247(a)(2) and ISED RSS-247, Clause 5.2(a)

The minimum 6 dB Bandwidth shall be at least 500 kHz.



2.2.7 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 Expiry Date
Multimeter	Fluke	79 Series III	611	12	21-Dec-2022
Hygrometer	Rotronic	I-1000	3220	12	05-Nov-2022
Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	01-Feb-2023
AC Programmable Power Supply	iTech	IT7324	5226	-	O/P Mon
MXA Signal Analyser	Keysight Technologies	N9020B	5529	24	13-Sep-2024
Signal Conditioning Unit	TUV SUD	SPECTRUM SCU002	5759	12	05-Jul-2023

Table 57

O/P Mon – Output Monitored using calibrated equipment



2.3 Maximum Conducted Output Power

2.3.1 Specification Reference

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

2.3.2 Equipment Under Test and Modification State

A2816, S/N: H12J4GXMVX - Modification State 0

2.3.3 Date of Test

24-October-2022

2.3.4 Test Method

The test was performed in accordance with ANSI C63.10 2013, clause 11.9.1.3 Method PKPM1 for FCC testing and ANSI C63.10 2020, clause 11.9.1.2 for ISED testing.

MIMO output port summing was performed in accordance with KDB 662911 D01

2.3.5 Environmental Conditions

Ambient Temperature	23.4 °C
Relative Humidity	51.4 %



2.3.6 Test Results

2.4 GHz Bluetooth - DTS

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (b)(3) RSS-247 5.4 d)	Test Method(s):	C63.10 11.9.1.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	ePA $\pi/4$ DQPSK (4-DH5)	Duty Cycle (%):	78.1
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	B (Core 1)	Peak Antenna Gain (dBi):	6.24

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2404	-	17.61	-	-	-	29.76	-12.15
2441	-	17.96	-	-	-	29.76	-11.80
2476	-	17.57	-	-	-	29.76	-12.19

Table 58 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
	A	B	C	D	Σ					
2404	-	17.61	-	-	-	30.00	-12.39	23.85	36.00	-12.15
2441	-	17.96	-	-	-	30.00	-12.04	24.20	36.00	-11.80
2476	-	17.57	-	-	-	30.00	-12.43	23.81	36.00	-12.19

Table 59 - ISED Maximum Conducted (peak) Output Power Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (b)(3) RSS-247 5.4 d)	Test Method(s):	C63.10 11.9.1.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	ePA $\pi/4$ DQPSK (8-DH5)	Duty Cycle (%):	78.2
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	B (Core 1)	Peak Antenna Gain (dBi):	6.24

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2404	-	17.98	-	-	-	29.76	-11.78
2441	-	17.69	-	-	-	29.76	-12.07
2476	-	17.72	-	-	-	29.76	-12.04

Table 60 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
	A	B	C	D	Σ					
2404	-	17.98	-	-	-	30.00	-12.02	24.22	36.00	-11.78
2441	-	17.69	-	-	-	30.00	-12.31	23.93	36.00	-12.07
2476	-	17.72	-	-	-	30.00	-12.28	23.96	36.00	-12.04

Table 61 - ISSED Maximum Conducted (peak) Output Power Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (b)(3) RSS-247 5.4 d)	Test Method(s):	C63.10 11.9.1.2
Additional Reference(s):	662911 D01 v02r01 F)2)d)(i), 662911 D01 v02r01 E)1)		

DUT Configuration			
Mode:	ePA $\pi/4$ DQPSK (4-DH5)	Duty Cycle (%):	78.1
Antenna Configuration:	Beamforming	DCCF (dB):	-
Active Port(s):	A+B (Core 0 + Core 1)	Peak Antenna Gain (dBi):	7.61

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2404	18.03	18.08	-	-	21.06	28.39	-7.33
2441	17.67	17.44	-	-	20.53	28.39	-7.86
2476	17.39	17.61	-	-	20.49	28.39	-7.90

Table 62 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
	A	B	C	D	Σ					
2404	18.03	18.08	-	-	21.06	30.00	-8.94	28.67	36.00	-7.33
2441	17.67	17.44	-	-	20.53	30.00	-9.47	28.14	36.00	-7.86
2476	17.39	17.61	-	-	20.49	30.00	-9.51	28.10	36.00	-7.90

Table 63 - ISSED Maximum Conducted (peak) Output Power Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (b)(3) RSS-247 5.4 d)	Test Method(s):	C63.10 11.9.1.2
Additional Reference(s):	662911 D01 v02r01 F)2)d)(i), 662911 D01 v02r01 E)1)		

DUT Configuration			
Mode:	ePA $\pi/4$ DQPSK (8-DH5)	Duty Cycle (%):	78.2
Antenna Configuration:	Beamforming	DCCF (dB):	-
Active Port(s):	A+B (Core 0 + Core 1)	Peak Antenna Gain (dBi):	7.61

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2404	17.96	17.94	-	-	20.94	28.39	-7.45
2441	17.72	17.67	-	-	20.66	28.39	-7.73
2476	17.58	17.81	-	-	20.54	28.39	-7.85

Table 64 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
	A	B	C	D	Σ					
2404	17.96	17.94	-	-	20.94	30.00	-9.06	28.55	36.00	-7.45
2441	17.72	17.67	-	-	20.66	30.00	-9.34	28.27	36.00	-7.73
2476	17.58	17.81	-	-	20.54	30.00	-9.46	28.15	36.00	-7.85

Table 65 - ISSED Maximum Conducted (peak) Output Power Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (b)(3) RSS-247 5.4 d)	Test Method(s):	C63.10 11.9.1.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	iPA $\pi/4$ DQPSK (4-DH5)	Duty Cycle (%):	78.1
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	B (Core 1)	Peak Antenna Gain (dBi):	6.24

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2404	-	8.88	-	-	-	29.76	-20.88
2441	-	8.76	-	-	-	29.76	-21.00
2476	-	9.04	-	-	-	29.76	-20.72

Table 66 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
	A	B	C	D	Σ					
2404	-	8.88	-	-	-	30.00	-21.12	15.12	36.00	-20.88
2441	-	8.76	-	-	-	30.00	-21.24	15.00	36.00	-21.00
2476	-	9.04	-	-	-	30.00	-20.96	15.28	36.00	-20.72

Table 67 - ISSED Maximum Conducted (peak) Output Power Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (b)(3) RSS-247 5.4 d)	Test Method(s):	C63.10 11.9.1.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	iPA $\pi/4$ DQPSK (8-DH5)	Duty Cycle (%):	78.2
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	B (Core 1)	Peak Antenna Gain (dBi):	6.24

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2404	-	8.94	-	-	-	29.76	-20.82
2441	-	8.77	-	-	-	29.76	-20.99
2476	-	9.00	-	-	-	29.76	-20.76

Table 68 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
	A	B	C	D	Σ					
2404	-	8.94	-	-	-	30.00	-21.06	15.18	36.00	-20.82
2441	-	8.77	-	-	-	30.00	-21.23	15.01	36.00	-20.99
2476	-	9.00	-	-	-	30.00	-21.00	15.24	36.00	-20.76

Table 69 - ISSED Maximum Conducted (peak) Output Power Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (b)(3) RSS-247 5.4 d)	Test Method(s):	C63.10 11.9.1.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	iPA $\pi/4$ DQPSK (4-DH5)	Duty Cycle (%):	78.1
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	C (Core 2)	Peak Antenna Gain (dBi):	2.05

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2404	-	-	8.91	-	-	30.00	-21.09
2441	-	-	8.75	-	-	30.00	-21.25
2476	-	-	8.87	-	-	30.00	-21.13

Table 70 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
	A	B	C	D	Σ					
2404	-	-	8.91	-	-	30.00	-21.09	10.96	36.00	-25.04
2441	-	-	8.75	-	-	30.00	-21.25	10.80	36.00	-25.20
2476	-	-	8.87	-	-	30.00	-21.13	10.92	36.00	-25.08

Table 71 - ISSED Maximum Conducted (peak) Output Power Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (b)(3) RSS-247 5.4 d)	Test Method(s):	C63.10 11.9.1.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	iPA $\pi/4$ DQPSK (8-DH5)	Duty Cycle (%):	78.2
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	C (Core 2)	Peak Antenna Gain (dBi):	2.05

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2404	-	-	9.09	-	-	30.00	-20.91
2441	-	-	8.92	-	-	30.00	-21.08
2476	-	-	8.99	-	-	30.00	-21.01

Table 72 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
	A	B	C	D	Σ					
2404	-	-	9.09	-	-	30.00	-20.91	11.14	36.00	-24.86
2441	-	-	8.92	-	-	30.00	-21.08	10.97	36.00	-25.03
2476	-	-	8.99	-	-	30.00	-21.01	11.04	36.00	-24.96

Table 73 - ISSED Maximum Conducted (peak) Output Power Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (b)(3) RSS-247 5.4 d)	Test Method(s):	C63.10 11.9.1.2
Additional Reference(s):	662911 D01 v02r01 F)2)d)(i), 662911 D01 v02r01 E)1)		

DUT Configuration			
Mode:	iPA $\pi/4$ DQPSK (4-DH5)	Duty Cycle (%):	78.1
Antenna Configuration:	Beamforming	DCCF (dB):	-
Active Port(s):	A+B (Core 0 + Core 1)	Peak Antenna Gain (dBi):	7.61

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2404	8.71	8.65	-	-	11.61	28.39	-16.78
2441	8.75	8.69	-	-	11.71	28.39	-16.68
2476	9.00	8.95	-	-	11.97	28.39	-16.42

Table 74 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
	A	B	C	D	Σ					
2404	8.71	8.65	-	-	11.61	30.00	-18.39	19.22	36.00	-16.78
2441	8.75	8.69	-	-	11.71	30.00	-18.29	19.32	36.00	-16.68
2476	9.00	8.95	-	-	11.97	30.00	-18.03	19.58	36.00	-16.42

Table 75 - ISSED Maximum Conducted (peak) Output Power Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (b)(3) RSS-247 5.4 d)	Test Method(s):	C63.10 11.9.1.2
Additional Reference(s):	662911 D01 v02r01 F)2)d)(i), 662911 D01 v02r01 E)1)		

DUT Configuration			
Mode:	iPA $\pi/4$ DQPSK (8-DH5)	Duty Cycle (%):	78.2
Antenna Configuration:	Beamforming	DCCF (dB):	-
Active Port(s):	A+B (Core 0 + Core 1)	Peak Antenna Gain (dBi):	7.61

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2404	8.77	8.52	-	-	11.62	28.39	-16.77
2441	8.88	8.80	-	-	11.77	28.39	-16.61
2476	8.97	9.14	-	-	12.03	28.39	-16.36

Table 76 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
	A	B	C	D	Σ					
2404	8.77	8.52	-	-	11.62	30.00	-18.38	19.23	36.00	-16.77
2441	8.88	8.80	-	-	11.77	30.00	-18.23	19.39	36.00	-16.61
2476	8.97	9.14	-	-	12.03	30.00	-17.97	19.64	36.00	-16.36

Table 77 - ISSED Maximum Conducted (peak) Output Power Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (b)(3) RSS-247 5.4 d)	Test Method(s):	C63.10 11.9.1.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	iPA GFSK (LE 1M)	Duty Cycle (%):	60.4
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	B (Core 1)	Peak Antenna Gain (dBi):	6.24

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2402	-	8.40	-	-	-	29.76	-21.36
2440	-	8.12	-	-	-	29.76	-21.64
2480	-	8.52	-	-	-	29.76	-21.24

Table 78 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
	A	B	C	D	Σ					
2402	-	8.40	-	-	-	30.00	-21.60	14.64	36.00	-21.36
2440	-	8.12	-	-	-	30.00	-21.88	14.36	36.00	-21.64
2480	-	8.52	-	-	-	30.00	-21.48	14.76	36.00	-21.24

Table 79 - ISSED Maximum Conducted (peak) Output Power Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (b)(3) RSS-247 5.4 d)	Test Method(s):	C63.10 11.9.1.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	iPA GFSK (LE 2M)	Duty Cycle (%):	31.3
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	B (Core 1)	Peak Antenna Gain (dBi):	6.24

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2402	-	8.46	-	-	-	29.76	-21.30
2440	-	8.67	-	-	-	29.76	-21.09
2480	-	8.62	-	-	-	29.76	-21.14

Table 80 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
	A	B	C	D	Σ					
2402	-	8.46	-	-	-	30.00	-21.54	14.70	36.00	-21.30
2440	-	8.67	-	-	-	30.00	-21.33	14.91	36.00	-21.09
2480	-	8.62	-	-	-	30.00	-21.38	14.86	36.00	-21.14

Table 81 - ISSED Maximum Conducted (peak) Output Power Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (b)(3) RSS-247 5.4 d)	Test Method(s):	C63.10 11.9.1.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	iPA GFSK (LE 1M)	Duty Cycle (%):	60.4
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	C (Core 2)	Peak Antenna Gain (dBi):	2.05

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2402	-	-	8.10	-	-	30.00	-21.90
2440	-	-	7.95	-	-	30.00	-22.05
2480	-	-	8.18	-	-	30.00	-21.82

Table 82 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
	A	B	C	D	Σ					
2402	-	-	8.10	-	-	30.00	-21.90	10.15	36.00	-25.85
2440	-	-	7.95	-	-	30.00	-22.05	10.00	36.00	-26.00
2480	-	-	8.18	-	-	30.00	-21.82	10.23	36.00	-25.77

Table 83 - ISSED Maximum Conducted (peak) Output Power Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (b)(3) RSS-247 5.4 d)	Test Method(s):	C63.10 11.9.1.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	iPA GFSK (LE 2M)	Duty Cycle (%):	31.3
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	C (Core 2)	Peak Antenna Gain (dBi):	2.05

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2402	-	-	8.07	-	-	30.00	-21.93
2440	-	-	8.53	-	-	30.00	-21.47
2480	-	-	8.24	-	-	30.00	-21.76

Table 84 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
	A	B	C	D	Σ					
2402	-	-	8.07	-	-	30.00	-21.93	10.12	36.00	-25.88
2440	-	-	8.53	-	-	30.00	-21.47	10.58	36.00	-25.42
2480	-	-	8.24	-	-	30.00	-21.76	10.29	36.00	-25.71

Table 85 - ISSED Maximum Conducted (peak) Output Power Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (b)(3) RSS-247 5.4 d)	Test Method(s):	C63.10 11.9.1.2
Additional Reference(s):	662911 D01 v02r01 F)2)d)(i), 662911 D01 v02r01 E)1)		

DUT Configuration			
Mode:	iPA GFSK (LE 1M)	Duty Cycle (%):	60.4
Antenna Configuration:	Beamforming	DCCF (dB):	-
Active Port(s):	A+B (Core 0 + Core 1)	Peak Antenna Gain (dBi):	7.61

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2402	8.49	8.39	-	-	11.43	28.39	-16.96
2440	8.22	7.95	-	-	11.08	28.39	-17.31
2480	7.97	8.04	-	-	10.97	28.39	-17.42

Table 86 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
	A	B	C	D	Σ					
2402	8.49	8.39	-	-	11.43	30.00	-18.57	19.04	36.00	-16.96
2440	8.22	7.95	-	-	11.08	30.00	-18.92	18.69	36.00	-17.31
2480	7.97	8.04	-	-	10.97	30.00	-19.03	18.58	36.00	-17.42

Table 87 - ISSED Maximum Conducted (peak) Output Power Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (b)(3) RSS-247 5.4 d)	Test Method(s):	C63.10 11.9.1.2
Additional Reference(s):	662911 D01 v02r01 F)2)d)(i), 662911 D01 v02r01 E)1)		

DUT Configuration			
Mode:	iPA GFSK (LE 2M)	Duty Cycle (%):	31.3
Antenna Configuration:	Beamforming	DCCF (dB):	-
Active Port(s):	A+B (Core 0 + Core 1)	Peak Antenna Gain (dBi):	7.61

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)
	A	B	C	D	Σ		
2402	8.49	8.49	-	-	11.49	28.39	-16.90
2440	8.18	8.20	-	-	11.17	28.39	-17.22
2480	8.58	8.51	-	-	11.47	28.39	-16.92

Table 88 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Maximum Conducted Output Power (dBm)					Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
	A	B	C	D	Σ					
2402	8.49	8.49	-	-	11.49	30.00	-18.51	19.10	36.00	-16.90
2440	8.18	8.20	-	-	11.17	30.00	-18.83	18.78	36.00	-17.22
2480	8.58	8.51	-	-	11.47	30.00	-18.53	19.08	36.00	-16.92

Table 89 - ISED Maximum Conducted (peak) 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 (d)

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.



2.3.7 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 Expiry Date
Multimeter	Fluke	79 Series III	611	12	21-Dec-2022
Hygrometer	Rotronic	I-1000	3220	12	05-Nov-2022
AC Programmable Power Supply	iTech	IT7324	5226	-	O/P Mon
Signal Conditioning Unit	TUV SUD	SPECTRUM SCU002	5759	12	05-Jul-2023
USB Power Sensor	Boonton	RTP5008	5830	12	07-Jul-2023
USB Power Sensor	Boonton	RTP5008	5832	12	07-Jul-2023
USB Power Sensor	Boonton	RTP5008	5833	12	07-Jul-2023

Table 90

O/P Mon – Output Monitored using calibrated equipment



2.4 Spurious Radiated Emissions

2.4.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.209 and 15.247 (d)
ISED RSS-247, Clause 3.3 and 5.5
ISED RSS-GEN, Clause 6.13 and 8.9

2.4.2 Equipment Under Test and Modification State

BB211, S/N: V712HT2WFF - Modification State 0

2.4.3 Date of Test

11-October-2022 to 13-October-2022

2.4.4 Test Method

This test was performed in accordance with ANSI C63.10, clause 6.3, 6.5 and 6.6.

For frequencies > 1 GHz, plots for average measurements were taken in accordance with ANSI C63.10, clause 11.12.2.5.2.

Ports on the EUT were terminated with loads as described in ANSI C63.4 clause 6.2.4. For EUT's with multiple connectors of the same type, additional interconnecting cables were connected, and pre-scans performed to determine whether the level of the emissions were increased by >2 dB.

In the 30 MHz to 1 GHz range pre-scans were only performed on the mid channel (2440 MHz) only.

The plots shown are the characterisation of the EUT. The limits on the plots represent the most stringent case for restricted bands, (74/54 dBuV/m) when compared to 20 dBc outside restricted bands. The limits shown have been used as a threshold to determine where further measurements are necessary. Where results are within 10 dB of the limits shown on the plots, further investigation was carried out and reported in results tables.

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

Above 18 GHz, the measurement distance was reduced to 1 m. The limit line was increased by $20 \cdot \text{LOG}(3/1) = 9.54$ dB.

At a measurement distance of 1 meter the limit line was increased by $20 \cdot \text{LOG}(3/1) = 9.54$ dB.

Where formal measurements have been necessary, the results have been presented in the emissions table.

2.4.5 Test Setup Diagram

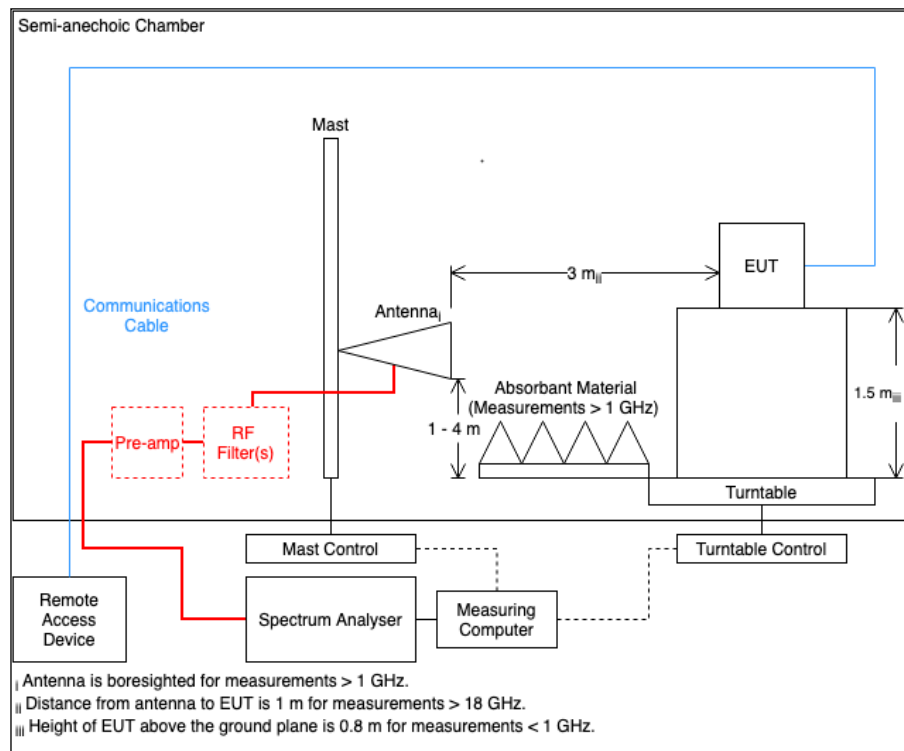


Figure 165

2.4.6 Environmental Conditions

Ambient Temperature	20.3 - 22.3 °C
Relative Humidity	38.4 - 55.9 %



2.4.7 Test Results

2.4 GHz Bluetooth - DTS

Frequency (MHz)	Level (dBuv/m)	Limit (dBuv/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 91 - 2402 MHz (CH37), LE1M, iPA, Core 0 + Core 1, 1 GHz to 26 GHz

*No emissions found within 10 dB of the limit.

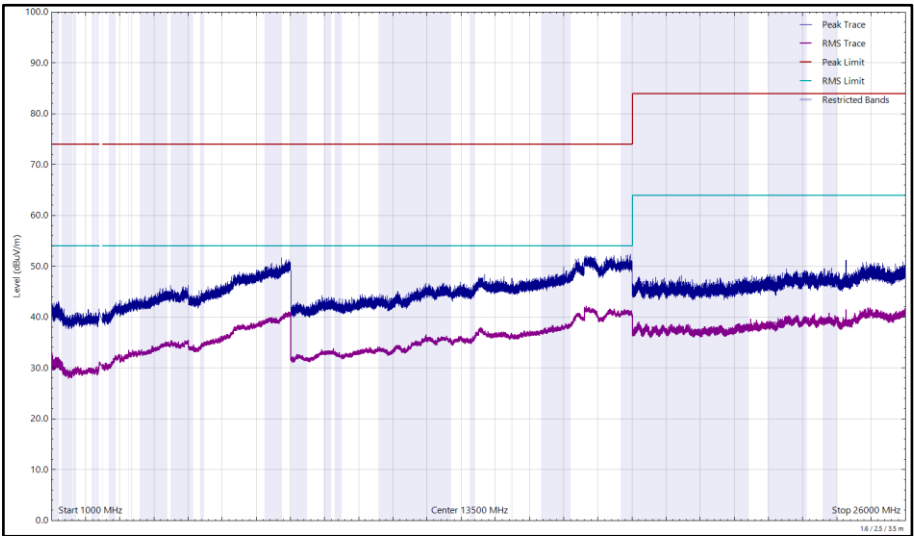


Figure 166 - 2402 MHz (CH37), LE1M, iPA, Core 0 + Core 1, 1 GHz to 26 GHz, Horizontal

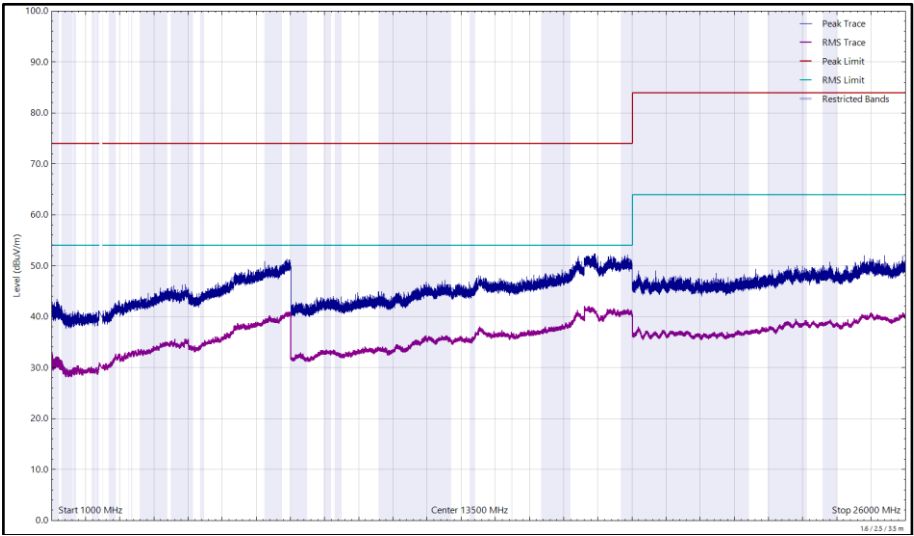


Figure 167 - 2402 MHz (CH37), LE1M, iPA, Core 0 + Core 1, 1 GHz to 26 GHz, Vertical



Frequency (MHz)	Level (dBuv/m)	Limit (dBuv/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 92 - 2402 MHz (CH37), LE1M, iPA, Core 2, 1 GHz to 26 GHz

*No emissions found within 10 dB of the limit.

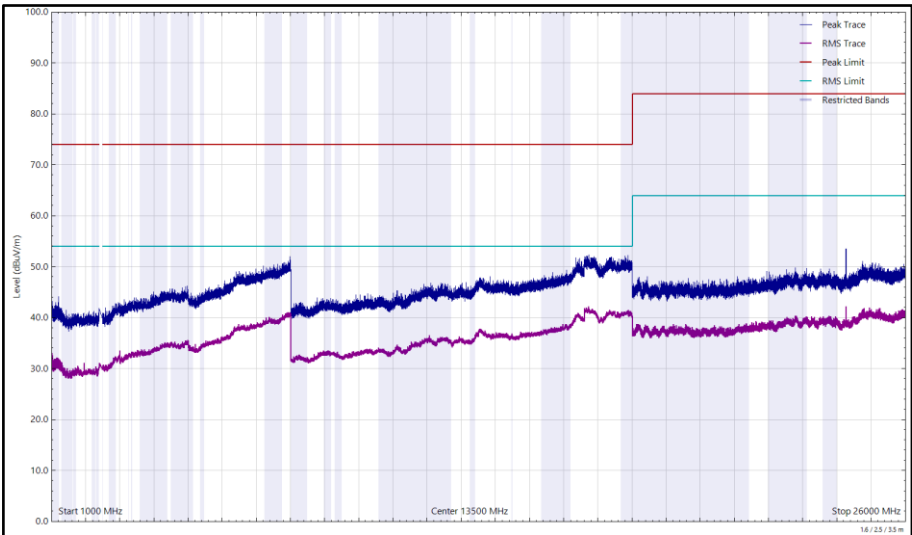


Figure 168 - 2402 MHz (CH37), LE1M, iPA, Core 2, 1 GHz to 26 GHz, Horizontal

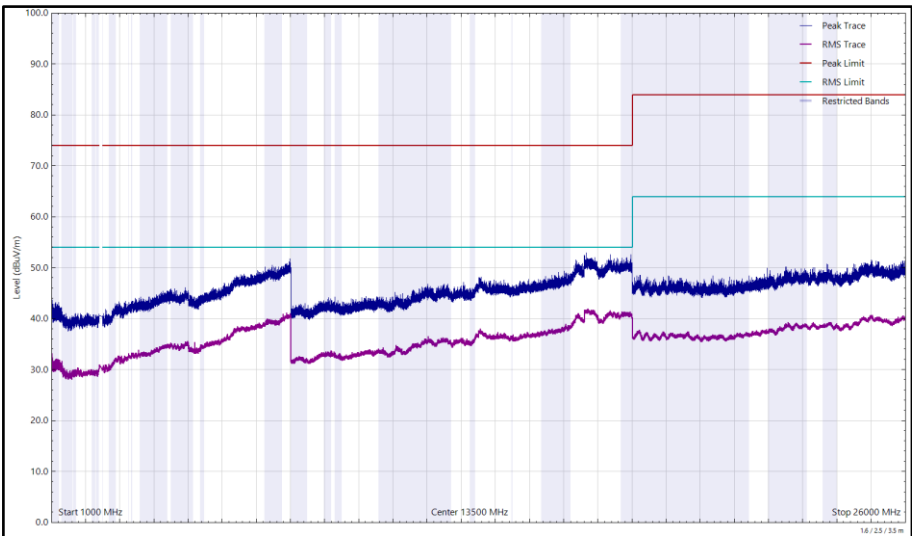


Figure 169 - 2402 MHz (CH37), LE1M, iPA, Core 2, 1 GHz to 26 GHz, Vertical



Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 93 - 2480 MHz (CH39), LE1M, iPA, Core 0 + Core 1, 1 GHz to 26 GHz

*No emissions found within 10 dB of the limit.

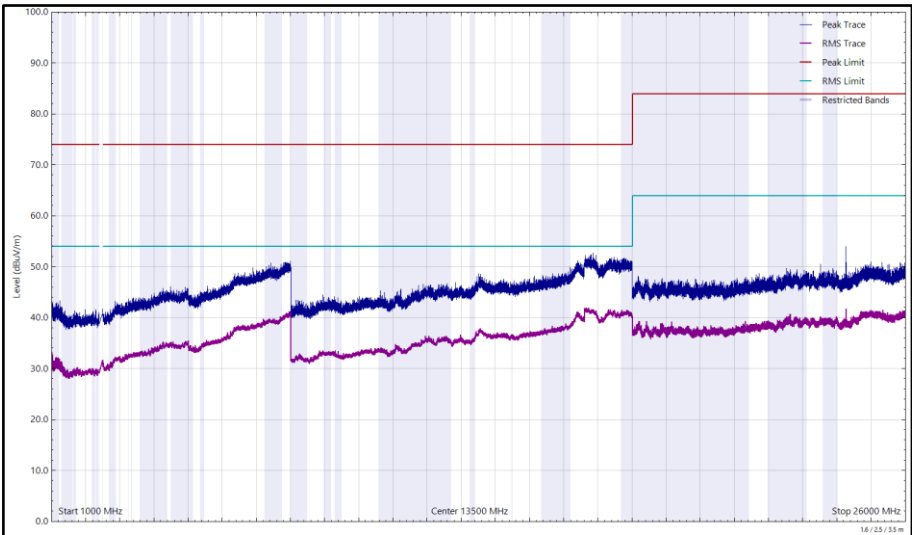


Figure 170 - 2480 MHz (CH39), LE1M, iPA, Core 0 + Core 1, 1 GHz to 26 GHz, Horizontal

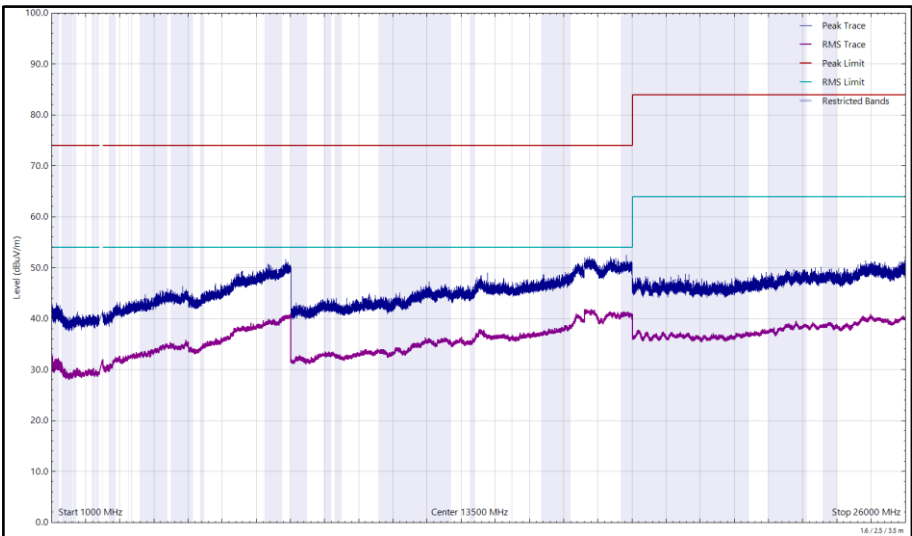


Figure 171 - 2480 MHz (CH39), LE1M, iPA, Core 0 + Core 1, 1 GHz to 26 GHz, Vertical



Frequency (MHz)	Level (dBuv/m)	Limit (dBuv/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 94 - 2480 MHz (CH39), LE1M, iPA, Core 2, 1 GHz to 26 GHz

*No emissions found within 10 dB of the limit.

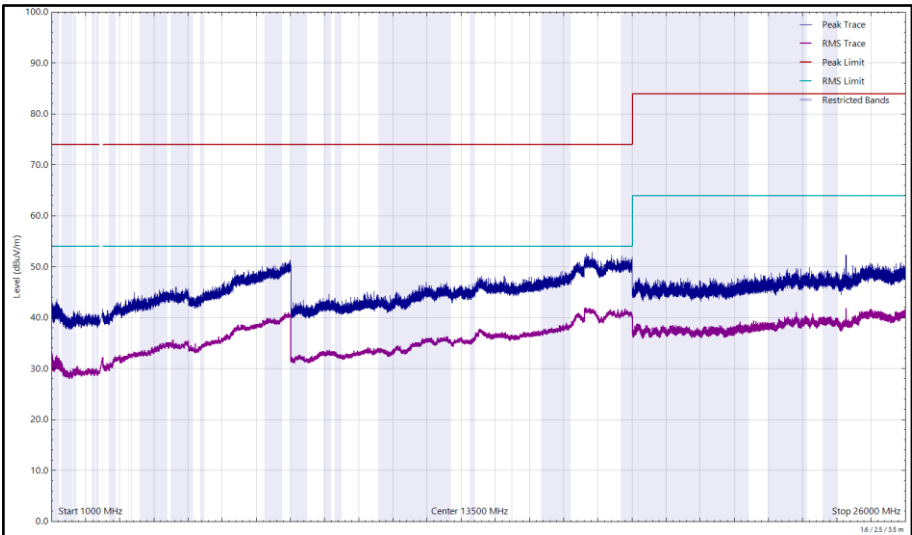


Figure 172 - 2480 MHz (CH39), LE1M, iPA, Core 2, 1 GHz to 26 GHz, Horizontal

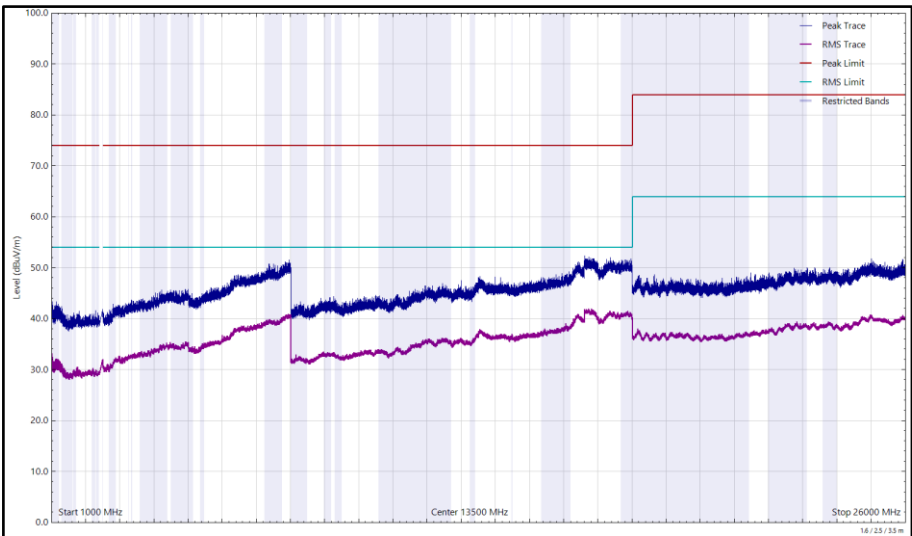


Figure 173 - 2480 MHz (CH39), LE1M, iPA, Core 2, 1 GHz to 26 GHz, Vertical



Frequency (MHz)	Level (dBuv/m)	Limit (dBuv/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 95 - 2440 MHz (CH17), LE1M, iPA, Core 2, 30 MHz to 26 GHz

*No emissions found within 6 dB of the limit.

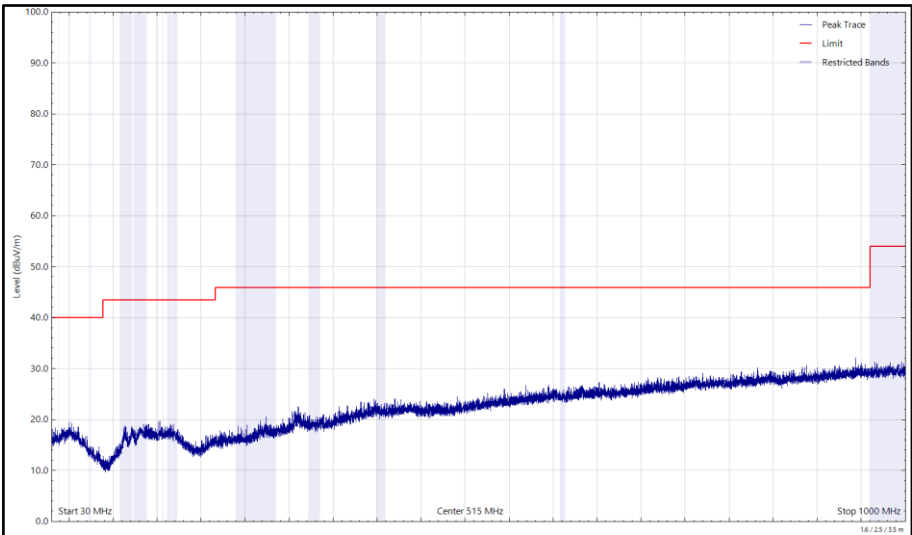


Figure 174 - 2440 MHz (CH17), LE1M, iPA, Core 2, 30 MHz to 1 GHz, Horizontal (Peak)

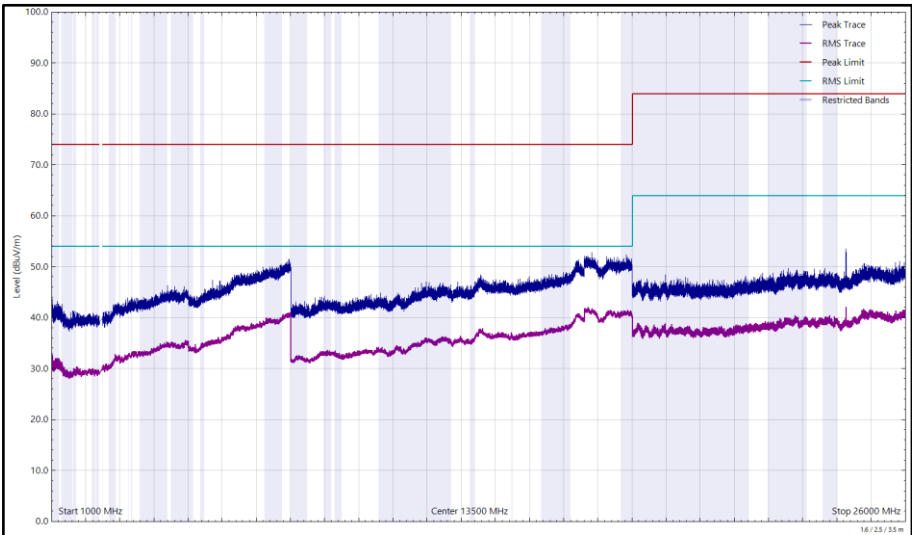


Figure 175 - 2440 MHz (CH17), LE1M, iPA, Core 2, 1 GHz to 26 GHz, Horizontal

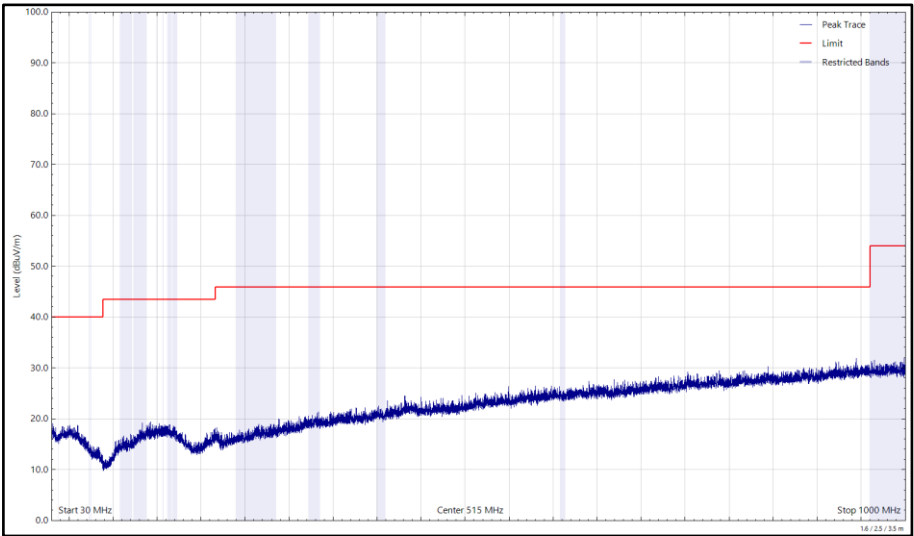


Figure 176 - 2440 MHz (CH17), LE1M, iPA, Core 2, 30 MHz to 1 GHz, Vertical (Peak)

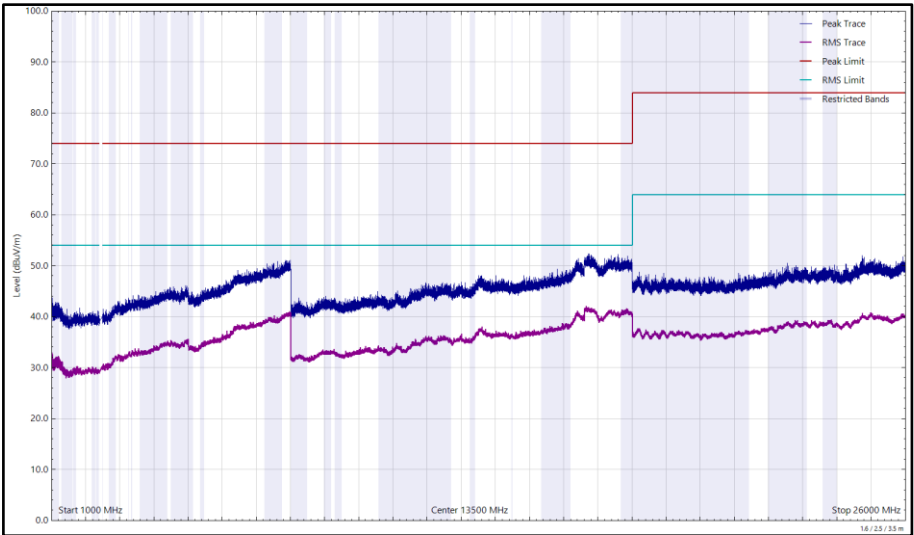


Figure 177 - 2440 MHz (CH17), LE1M, iPA, Core 2, 1 GHz to 26 GHz, Vertical



Frequency (MHz)	Level (dBuv/m)	Limit (dBuv/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 96 - 2440 MHz (CH17), LE1M, iPA, Core 0 + Core 1, 30 MHz to 26 GHz

*No emissions found within 10 dB of the limit.

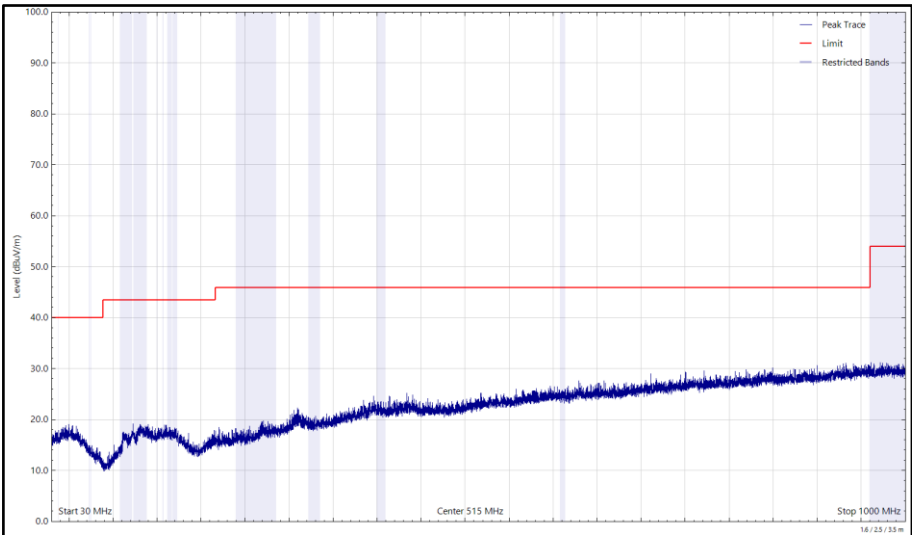


Figure 178 - 2440 MHz (CH17), LE1M, iPA, Core 0 + Core 1, 30 MHz to 1 GHz, Horizontal (Peak)

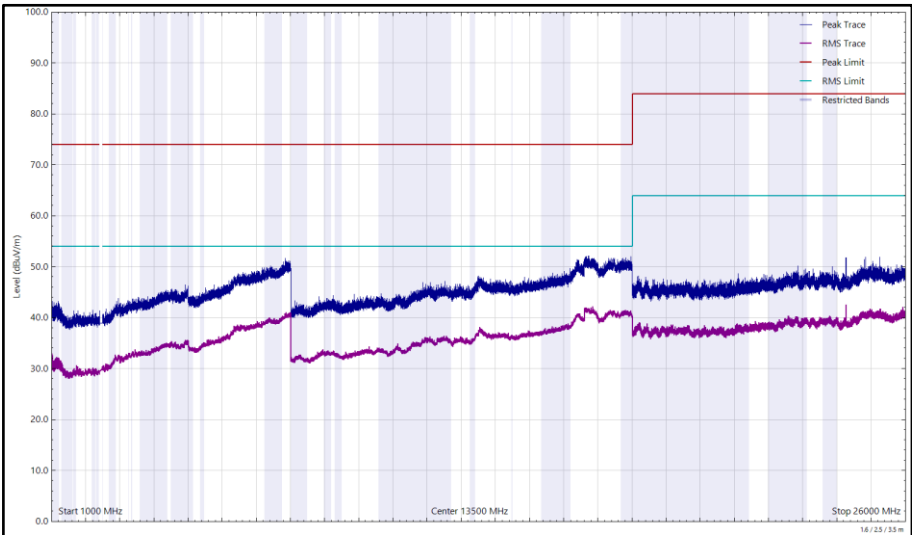


Figure 179 - 2440 MHz (CH17), LE1M, iPA, Core 0 + Core 1, 1 GHz to 26 GHz, Horizontal

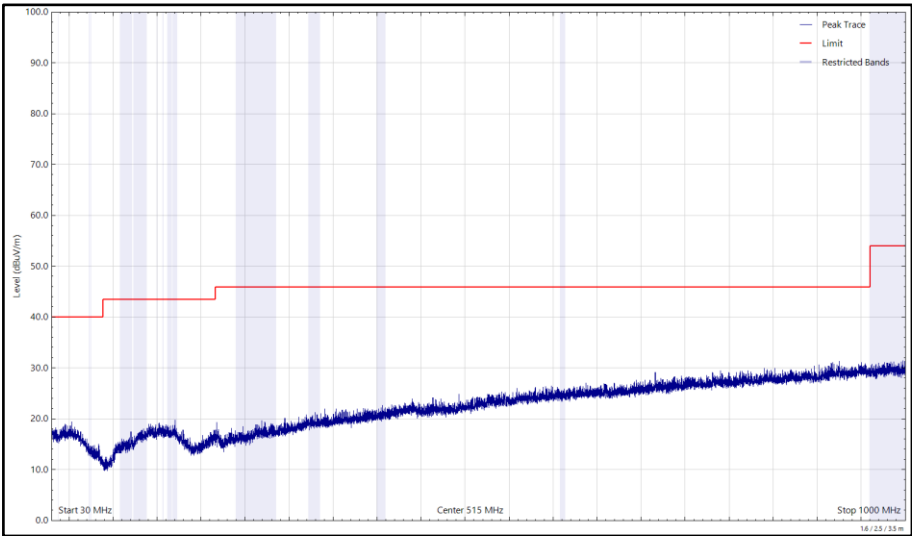


Figure 180 - 2440 MHz (CH17), LE1M, iPA, Core 0 + Core 1, 30 MHz to 1 GHz, Vertical (Peak)

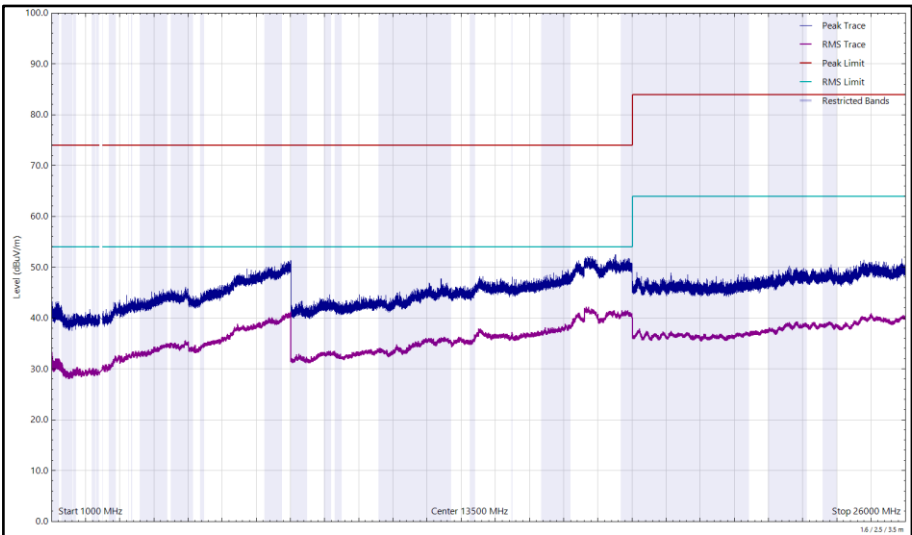


Figure 181 - 2440 MHz (CH17), LE1M, iPA, Core 0 + Core 1, 1 GHz to 26 GHz, Vertical



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

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator 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 the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in 15.209(a)

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.

In addition, radiated emissions which fall in the restricted bands, as defined in RSS-GEN, clause 8.10, must also comply with the radiated emission limits specified in RSS-GEN clause 8.9.

2.4.8 Test Location and Test Equipment Used

This test was carried out in RF Chamber 11.

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Expiry Date
Pre-Amplifier (8 GHz to 18 GHz)	Phase One	PS04-0086	1533	12	21-Feb-2023
True RMS Multimeter	Fluke	179	4006	12	29-Mar-2023
Quad Power Supply	Rohde & Schwarz	HMP4040	4955	-	O/P Mon
Band Reject Filter - 2.425 GHz	Wainwright	WRCGV14-2390-2400-2450-2460-50SS	5066	12	08-Nov-2022
Band Reject Filter - 2.4585 GHz	Wainwright	WRCGV14-2423.5-2433.5-2483.5-2493.5-50SS	5068	12	08-Nov-2022
EMI Test Receiver	Rohde & Schwarz	ESW44	5084	12	17-May-2023
Cable (18 GHz)	Rosenberger	LU7-071-1000	5102	12	20-Oct-2022
Cable (18 GHz)	Rosenberger	LU7-071-1000	5103	12	17-Nov-2022
Emissions Software	TUV SUD	EmX V3.1.4 V.3.1.4	5125	-	Software
Screened Room (11)	Rainford	Rainford	5136	36	24-Nov-2024
Mast	Maturo	TAM 4.0-P	5158	-	TU
Mast and Turntable Controller	Maturo	Maturo NCD	5159	-	TU



Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Expiry Date
Turntable	Maturo	TT 15WF	5160	-	TU
Antenna (DRG 1-10.5GHz)	Schwarzbeck	BBHA9120B	5215	12	28-May-2023
DRG Horn Antenna (7.5-18GHz)	Schwarzbeck	HWRD750	5216	12	29-May-2023
Antenna (DRG, 15 GHz to 40 GHz)	Schwarzbeck	BBHA 9170	5217	12	25-Jan-2023
3 GHz High pass filter	Wainwright	WHKX12-2580-3000-18000-80SS	5220	12	23-Mar-2023
Preamplifier (30dB 1GHz to 18GHz)	Schwarzbeck	BBV 9718 C	5261	12	08-Apr-2023
Thermo-Hygro-Barometer	PCE Instruments	OCE-THB-40	5470	12	07-Apr-2023
2m SMA Cable	Junkosha	MWX221-02000AMSAMS/A	5518	12	12-Apr-2023
8m N Type Cable	Junkosha	MWX221-08000NMSNMS/B	5522	12	24-Mar-2023
7 GHz High pass Filter	Wainwright	WHKX12-5850-6800-18000-80SS	5550	12	19-May-2023
Cable (K Type 2m)	Junkosha	MWX241-02000KMSKMS/B	5936	12	14-May-2023
TRILOG Super Broadband Test Antenna	Schwarzbeck	VULB 9168	5942	24	03-Feb-2024

Table 97

TU - Traceability Unscheduled
O/P Mon – Output Monitored using calibrated equipment



2.5 Authorised Band Edges

2.5.1 Specification Reference

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

2.5.2 Equipment Under Test and Modification State

A2816, S/N: V712HT2WFF - Modification State 0
A2816, S/N: Q64HTFJ22X - Modification State 0

2.5.3 Date of Test

23-June-2022 to 29-June-2022

2.5.4 Test Method

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

2.5.5 Environmental Conditions

Ambient Temperature	20.1 - 24.2 °C
Relative Humidity	43.7 - 60.4 %



2.5.6 Test Results

2.4 GHz Bluetooth - DTS

iPA - LE1M

Modulation	Packet Type	Core	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
GFSK	DH1	1	2402	2400.0	-59.50

Table 98 - Authorised Band Edge Results

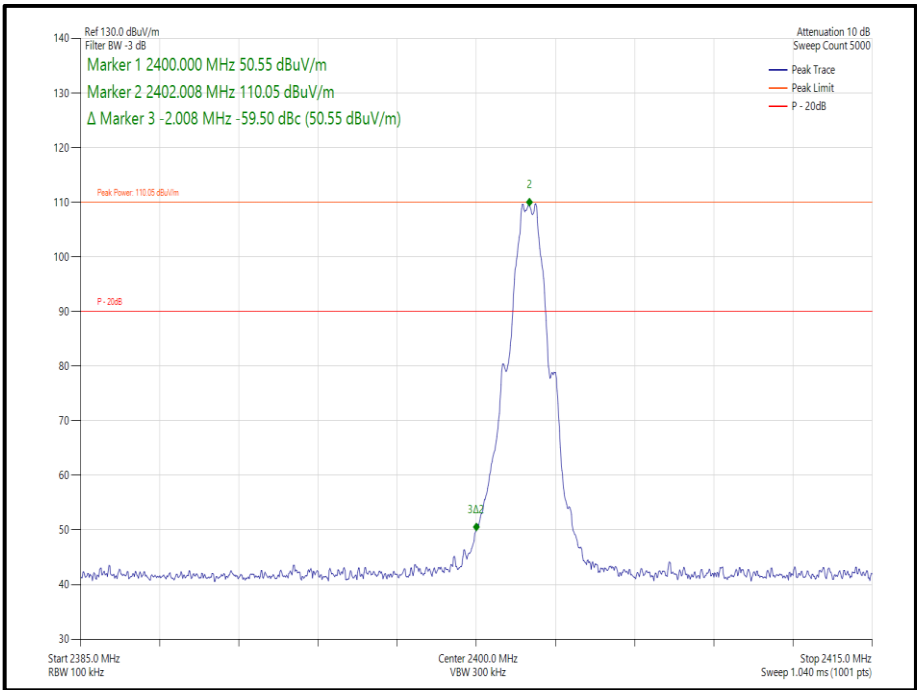


Figure 182 Core 1 - GFSK/DH1 - Core 1 - 2402 MHz – Band Edge Frequency 2400.0 MHz



iPA - LE1M

Modulation	Packet Type	Core	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
GFSK	DH1	2	2402	2400.0	-62.00

Table 99 - Authorised Band Edge Results

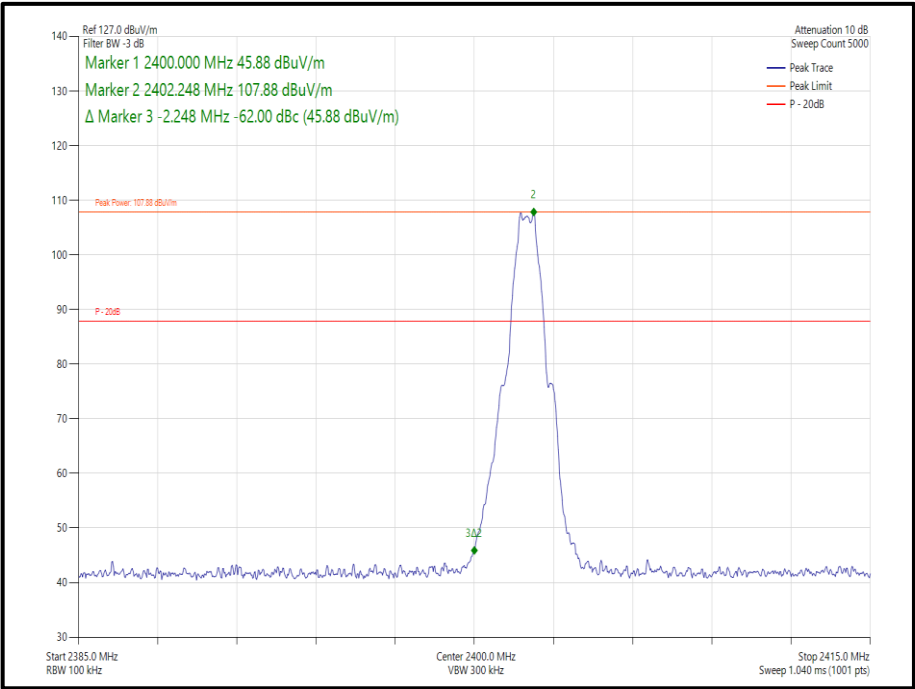


Figure 183 Core 2 - GFSK/DH1 - 2402 MHz – Band Edge Frequency 2400.0 MHz



iPA - LE1M

Modulation	Packet Type	Core	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
GFSK	DH1	0-1	2402	2400.0	-59.57

Table 100 - Authorised Band Edge Results

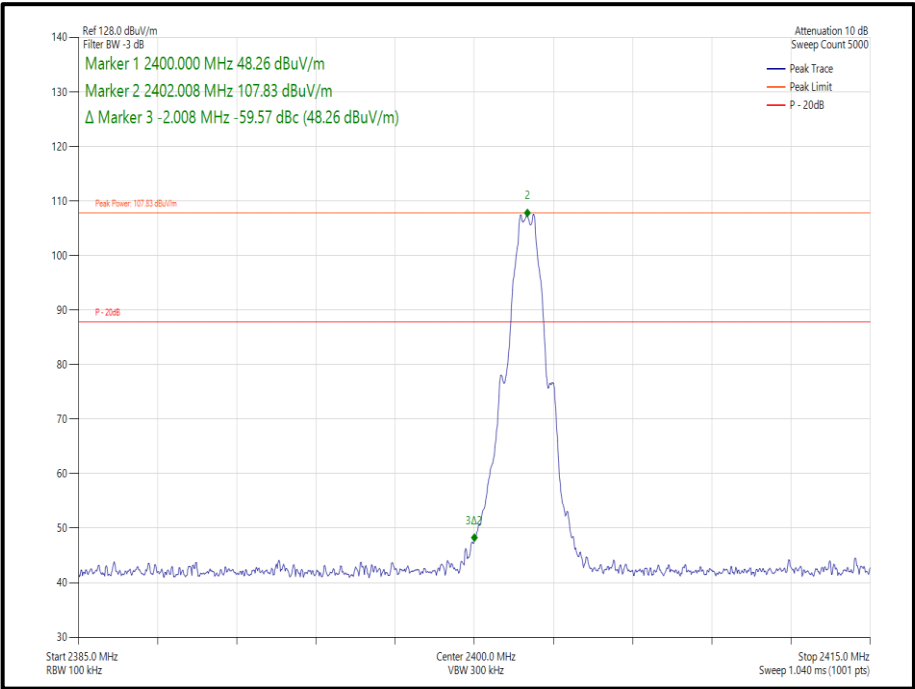


Figure 184 Core 0-1 - GFSK/DH1 - 2402 MHz – Band Edge Frequency 2400.0 MHz



iPA – LE2M

Modulation	Packet Type	Core	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
GFSK	DH1	1	2402	2400.0	-33.60

Table 101 - Authorised Band Edge Results

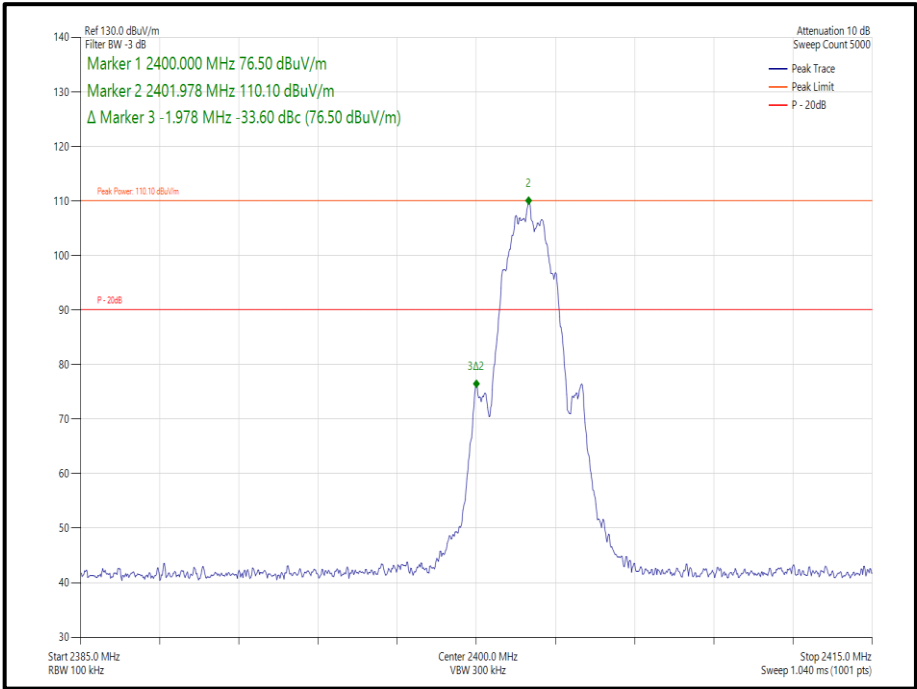


Figure 185 Core 1 - GFSK/DH1 - 2402 MHz – Band Edge Frequency 2400.0 MHz

Modulation	Packet Type	Core	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
GFSK	DH1	2	2402	2400.0	-35.63

Ref 125.0 dBuV/m
Filter BW -3 dB

Marker 1 2400.000 MHz 69.82 dBuV/m
Marker 2 2401.978 MHz 105.45 dBuV/m
Δ Marker 3 -1.978 MHz -35.63 dBc (69.82 dBuV/m)

Attenuation 10 dB
Sweep Count 5000

Peak Power: 105.45 dBuV/m

P - 20dB

Peak Trace
Peak Limit
P - 20dB

Start 2385.0 MHz
RBW 100 kHz

Center 2400.0 MHz
VBW 300 kHz

Stop 2415.0 MHz
Sweep 1.040 ms (1001 pts)

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iPA – LE2M

Modulation	Packet Type	Core	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
GFSK	DH1	0-1	2402	2400.0	-33.80

Table 103 - Authorised Band Edge Results

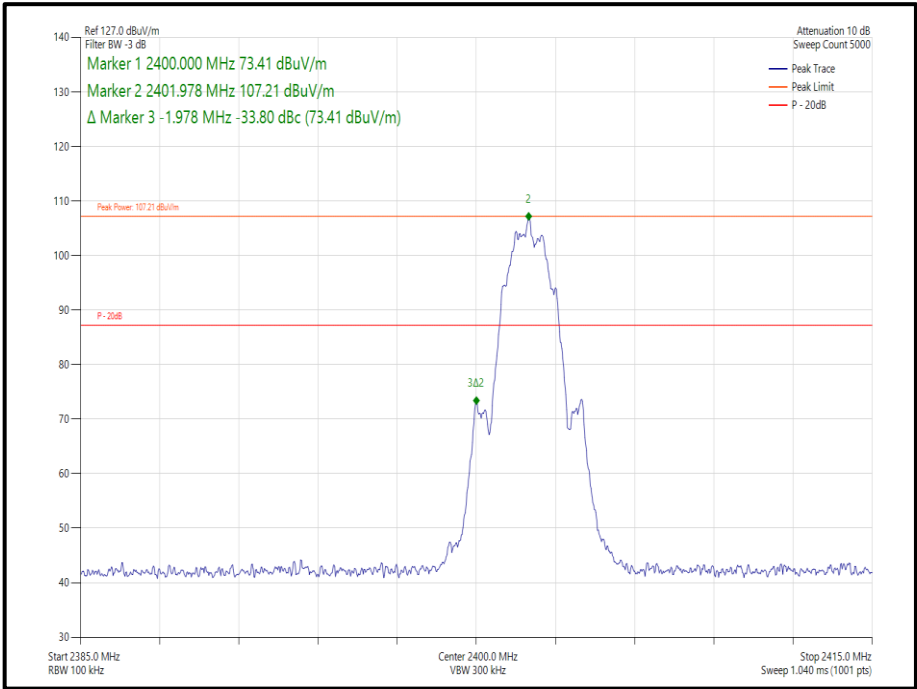


Figure 187 Core 0-1 - GFSK/DH1 - 2402 MHz – Band Edge Frequency 2400.0 MHz



ePA - HDR4

Modulation	Packet Type	Core	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
$\pi/4$ DQPSK	4-DH5	1	2404	2400.0	-61.66

Table 104 - Authorised Band Edge Results

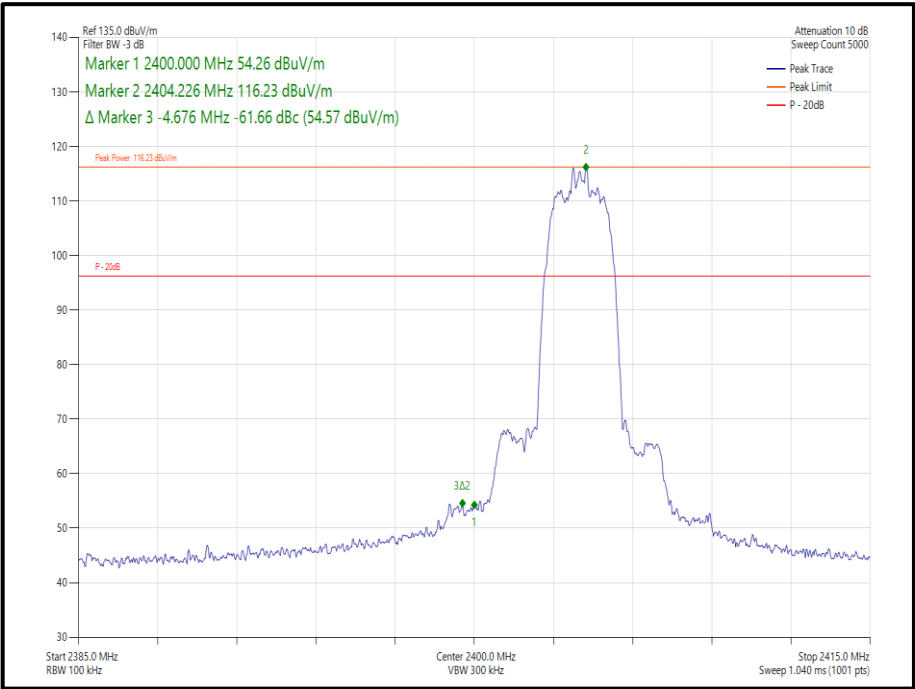


Figure 188 Core 1 - $\pi/4$ DQPSK/4-DH5 - 2404 MHz – Band Edge Frequency 2400.0 MHz



iPA - HDR4

Modulation	Packet Type	Core	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
$\pi/4$ DQPSK	4-DH5	1	2404	2400.0	-59.85

Table 105 - Authorised Band Edge Results

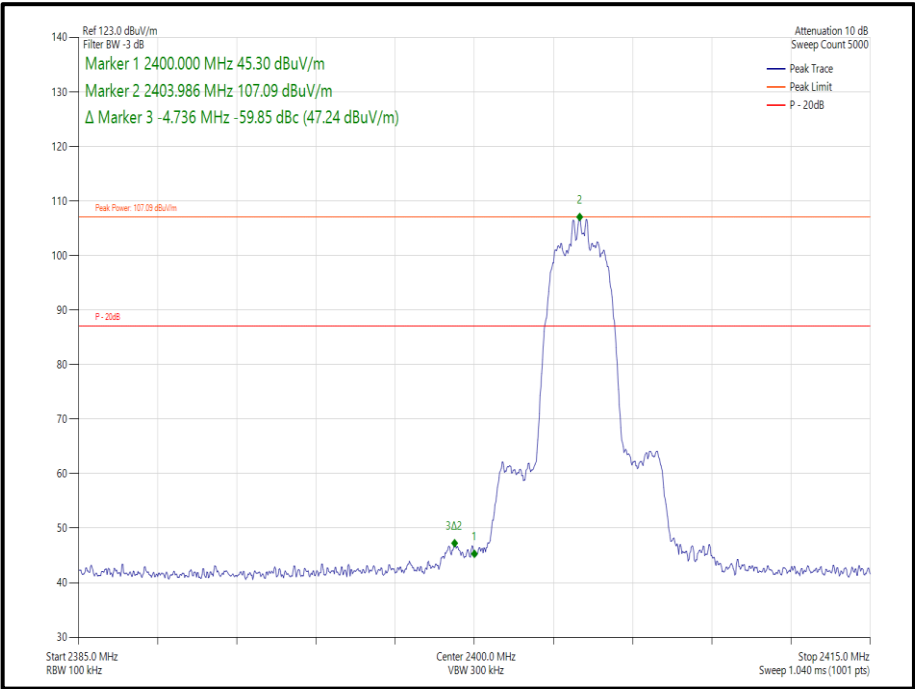


Figure 189 Core 1 - $\pi/4$ DQPSK/4-DH5 - 2404 MHz – Band Edge Frequency 2400.0 MHz



ePA - HDR4

Modulation	Packet Type	Core	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
$\pi/4$ DQPSK	4-DH5	0-1	2404	2400.0	-62.58

Table 106 - Authorised Band Edge Results

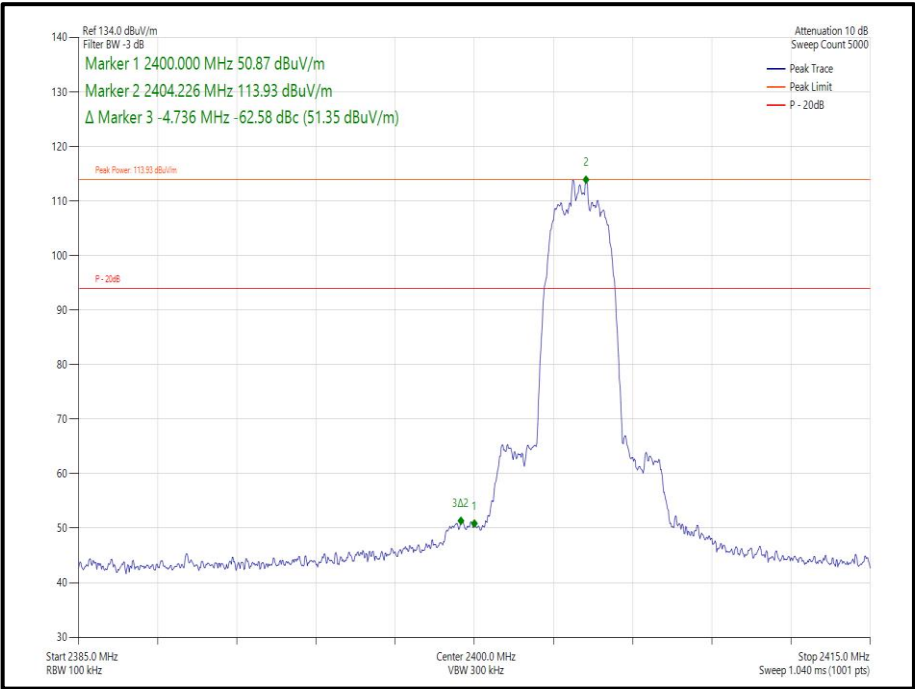


Figure 190 Core 0-1 - $\pi/4$ DQPSK/4-DH5 - 2404 MHz – Band Edge Frequency 2400.0 MHz



iPA - HDR4

Modulation	Packet Type	Core	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
$\pi/4$ DQPSK	4-DH5	0-1	2404	2400.0	-60.35

Table 107 - Authorised Band Edge Results

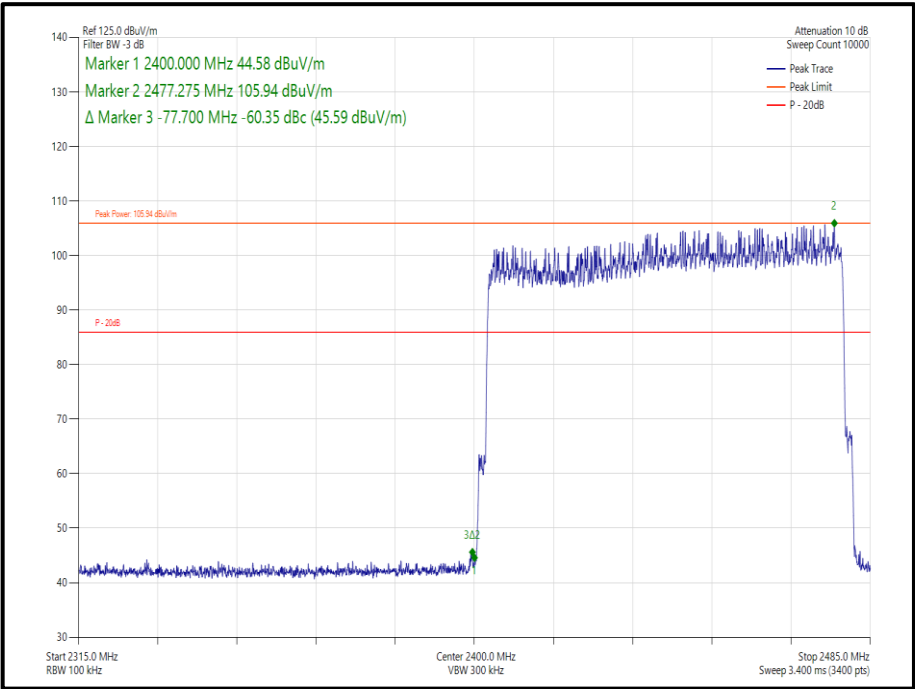


Figure 191 Core 0-1 - $\pi/4$ DQPSK/4-DH5 - 2404 MHz – Band Edge Frequency 2400.0 MHz



iPA - HDR4

Modulation	Packet Type	Core	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
$\pi/4$ DQPSK	4-DH5	2	2404	2400.0	-57.81

Table 108 - Authorised Band Edge Results

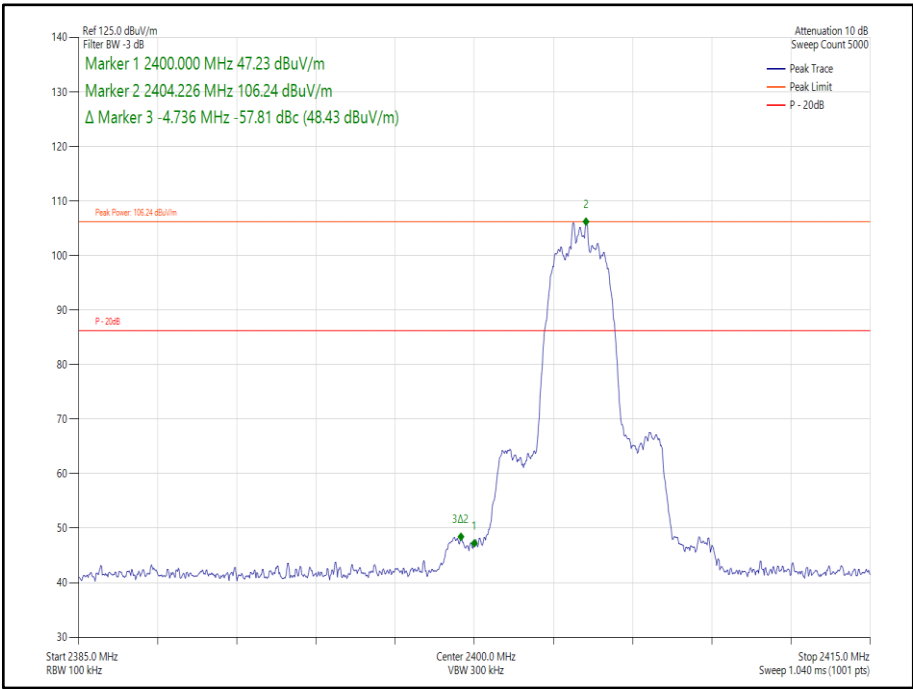


Figure 192 Core 2 - $\pi/4$ DQPSK/4-DH5 - 2404 MHz – Band Edge Frequency
2400.0 MHz



ePA – HDR8

Modulation	Packet Type	Core	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
$\pi/4$ DQPSK	8-DH5	1	2404	2400.0	-50.31

Table 109 - Authorised Band Edge Results

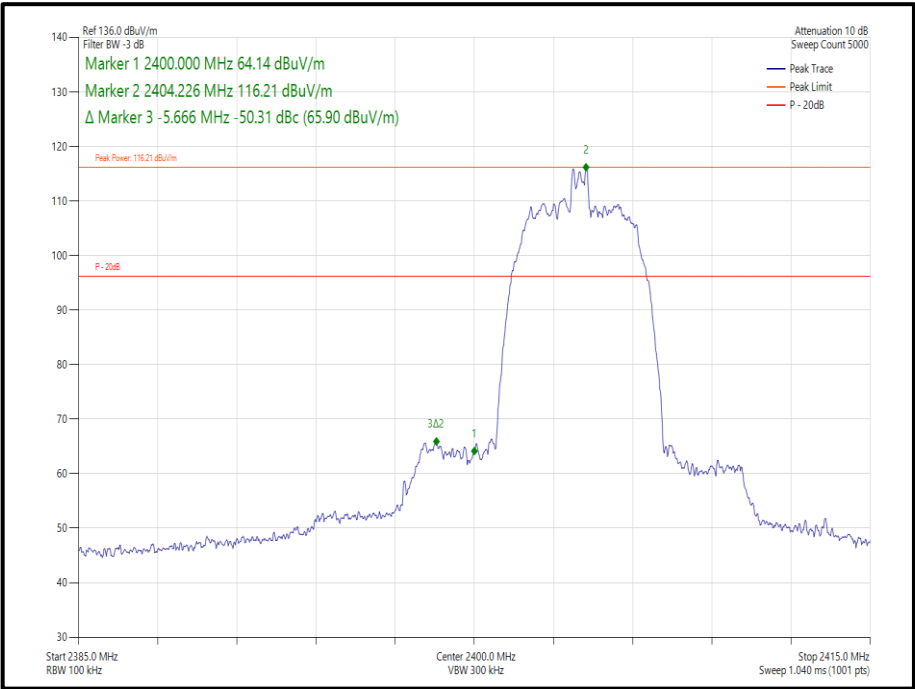


Figure 193 Core 1 - $\pi/4$ DQPSK/8-DH5 - 2404 MHz – Band Edge Frequency 2400.0 MHz



iPA – HDR8

Modulation	Packet Type	Core	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
$\pi/4$ DQPSK	8-DH5	1	2404	2400.0	-45.10

Table 110 - Authorised Band Edge Results

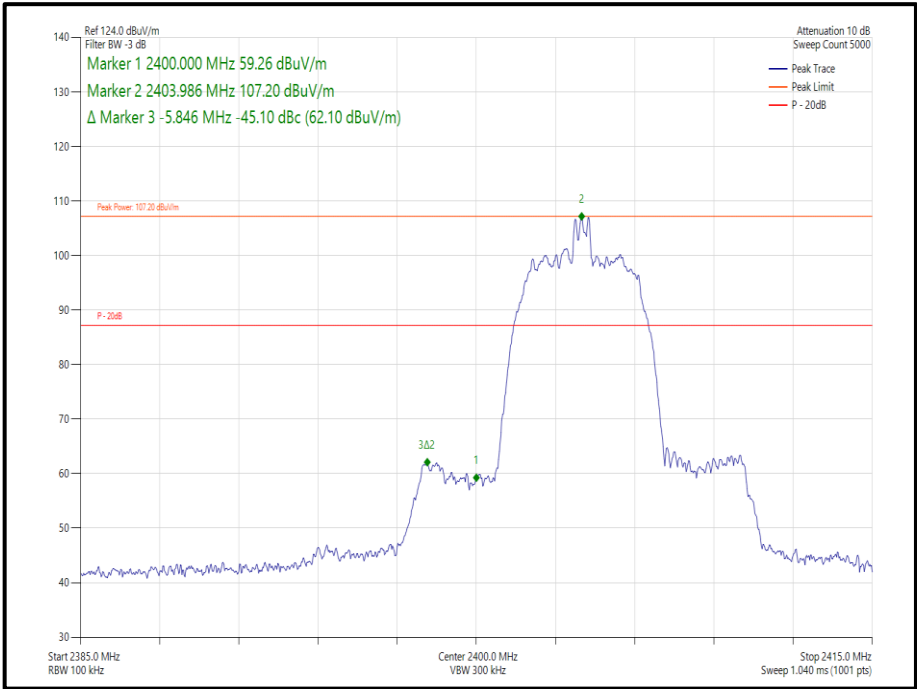


Figure 194 Core 1 - $\pi/4$ DQPSK/8-DH5 - 2404 MHz – Band Edge Frequency 2400.0 MHz



iPA – HDR8

Modulation	Packet Type	Core	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
$\pi/4$ DQPSK	8-DH5	2	2404	2400.0	-42.22

Table 111 - Authorised Band Edge Results

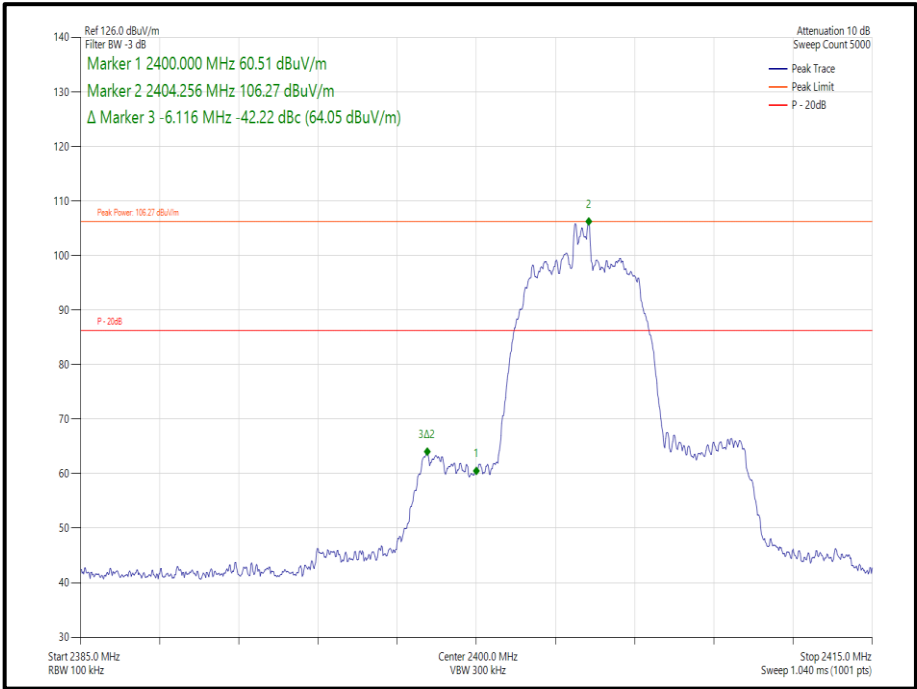


Figure 195 Core 2 - $\pi/4$ DQPSK/8-DH5 - 2404 MHz – Band Edge Frequency 2400.0 MHz



ePA – HDR8

Modulation	Packet Type	Core	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
$\pi/4$ DQPSK	8-DH5	0-1	2404	2400.0	-50.93

Table 112 - Authorised Band Edge Results

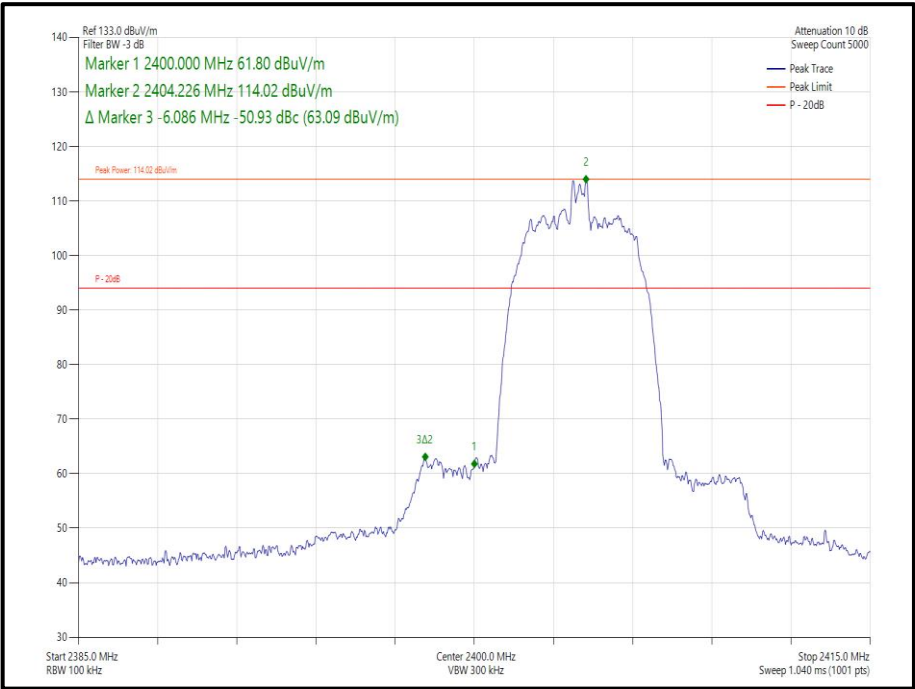


Figure 196 Core 0-1 - $\pi/4$ DQPSK/8-DH5 - 2404 MHz – Band Edge Frequency 2400.0 MHz



iPA – HDR8

Modulation	Packet Type	Core	Tx Frequency (MHz)	Band Edge Frequency (MHz)	Level (dBc)
$\pi/4$ DQPSK	8-DH5	0-1	2404	2400.0	-45.71

Table 113 - Authorised Band Edge Results

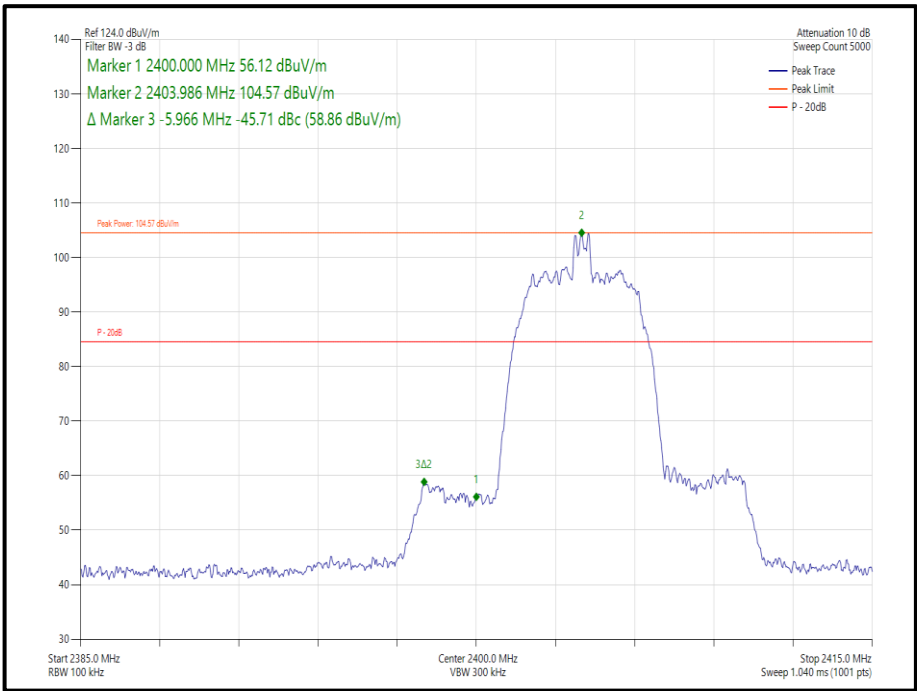


Figure 197 Core 0-1 - $\pi/4$ DQPSK/8-DH5 - 2404 MHz – Band Edge Frequency 2400.0 MHz

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.



2.5.7 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 5.

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Expiry Date
Screened Room (5)	Rainford	Rainford	1545	36	15-Apr-2024
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
Antenna (DRG 1-10.5GHz)	Schwarzbeck	BBHA9120B	4848	12	28-May-2023
Cable (SMA to SMA, 2 m)	Junkosha	MWX221-02000AMSAMS/A	5517	12	12-Apr-2023
Cable (N-Type to N-Type, 8 m)	Junkosha	MWX221-08000NMSNMS/B	5520	0	Class 1 (Int)
EMI Test Receiver	Rohde & Schwarz	ESW44	5527	12	28-Apr-2023
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB 40	5604	12	22-Sep-2022

Table 114

TU - Traceability Unscheduled



2.6 Power Spectral Density

2.6.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (e)
ISED RSS-247, Clause 5.2
ISED RSS-GEN, Clause 6.12

2.6.2 Equipment Under Test and Modification State

A2816, S/N: H12J4GXMVX - Modification State 0

2.6.3 Date of Test

24-October-2022

2.6.4 Test Method

This test was performed in accordance with ANSI C63.10, clause 11.10.2.

Where the EUT duty cycle was < 98 % and repeatable within 2 %, the spectrum analyser was set to trace (power) averaging and a duty cycle correction was added as calculated in the result tables below (Method AVGPSD-2).

MIMO output port summing was performed in accordance with KDB 662911 D01 E)2)b).

2.6.5 Environmental Conditions

Ambient Temperature	23.4 °C
Relative Humidity	51.4 %



2.6.6 Test Results

2.4 GHz Bluetooth - DTS

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (e) RSS-247 5.2 b)	Test Method(s):	C63.10 11.10.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	ePA $\pi/4$ DQPSK (4-DH5)	Duty Cycle (%):	78.1
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	B (Core 1)	Peak Antenna Gain (dBi):	-

Test Frequency (MHz)	RBW (kHz)	PSD (dBm/RBW)					Limit (dBm/3 kHz)	Margin (dB)
		A	B	C	D	Σ		
2404	3.0	-	-2.05	-	-	-	8.00	-10.05
2441	3.0	-	-1.00	-	-	-	8.00	-9.00
2476	3.0	-	-1.41	-	-	-	8.00	-9.41

Table 115 - Maximum Power Spectral Density Results

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (e) RSS-247 5.2 b)	Test Method(s):	C63.10 11.10.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	ePA $\pi/4$ DQPSK (8-DH5)	Duty Cycle (%):	78.2
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	B (Core 1)	Peak Antenna Gain (dBi):	-

Test Frequency (MHz)	RBW (kHz)	PSD (dBm/RBW)					Limit (dBm/3 kHz)	Margin (dB)
		A	B	C	D	Σ		
2404	3.0	-	-1.16	-	-	-	8.00	-9.16
2441	3.0	-	-1.37	-	-	-	8.00	-9.37
2476	3.0	-	-1.32	-	-	-	8.00	-9.32

Table 116 - Maximum Power Spectral Density Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (e) RSS-247 5.2 b)	Test Method(s):	C63.10 11.10.2
Additional Reference(s):	662911 D01 v02r01 E)2)b)		

DUT Configuration			
Mode:	ePA $\pi/4$ DQPSK (4-DH5)	Duty Cycle (%):	78.1
Antenna Configuration:	Beamforming	DCCF (dB):	-
Active Port(s):	A+B (Core 0 + Core 1)	Peak Antenna Gain (dBi):	-

Test Frequency (MHz)	RBW (kHz)	PSD (dBm/RBW)					Limit (dBm/3 kHz)	Margin (dB)
		A	B	C	D	Σ		
2404	3.0	-1.23	-0.98	-	-	1.90	8.00	-6.10
2441	3.0	-1.55	-1.70	-	-	1.39	8.00	-6.61
2476	3.0	-1.98	-1.41	-	-	1.32	8.00	-6.68

Table 117 - Maximum Power Spectral Density Results

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (e) RSS-247 5.2 b)	Test Method(s):	C63.10 11.10.2
Additional Reference(s):	662911 D01 v02r01 E)2)b)		

DUT Configuration			
Mode:	ePA $\pi/4$ DQPSK (8-DH5)	Duty Cycle (%):	78.2
Antenna Configuration:	Beamforming	DCCF (dB):	-
Active Port(s):	A+B (Core 0 + Core 1)	Peak Antenna Gain (dBi):	-

Test Frequency (MHz)	RBW (kHz)	PSD (dBm/RBW)					Limit (dBm/3 kHz)	Margin (dB)
		A	B	C	D	Σ		
2404	3.0	-1.15	-1.19	-	-	1.84	8.00	-6.16
2441	3.0	-1.39	-1.64	-	-	1.50	8.00	-6.50
2476	3.0	-1.93	-1.12	-	-	1.50	8.00	-6.50

Table 118 - Maximum Power Spectral Density Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (e) RSS-247 5.2 b)	Test Method(s):	C63.10 11.10.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	iPA $\pi/4$ DQPSK (4-DH5)	Duty Cycle (%):	78.1
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	B (Core 1)	Peak Antenna Gain (dBi):	-

Test Frequency (MHz)	RBW (kHz)	PSD (dBm/RBW)					Limit (dBm/3 kHz)	Margin (dB)
		A	B	C	D	Σ		
2404	3.0	-	-10.10	-	-	-	8.00	-18.10
2441	3.0	-	-10.37	-	-	-	8.00	-18.37
2476	3.0	-	-10.19	-	-	-	8.00	-18.19

Table 119 - Maximum Power Spectral Density Results

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (e) RSS-247 5.2 b)	Test Method(s):	C63.10 11.10.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	iPA $\pi/4$ DQPSK (8-DH5)	Duty Cycle (%):	78.2
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	B (Core 1)	Peak Antenna Gain (dBi):	-

Test Frequency (MHz)	RBW (kHz)	PSD (dBm/RBW)					Limit (dBm/3 kHz)	Margin (dB)
		A	B	C	D	Σ		
2404	3.0	-	-9.90	-	-	-	8.00	-17.90
2441	3.0	-	-10.27	-	-	-	8.00	-18.27
2476	3.0	-	-9.73	-	-	-	8.00	-17.73

Table 120 - Maximum Power Spectral Density Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (e) RSS-247 5.2 b)	Test Method(s):	C63.10 11.10.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	iPA $\pi/4$ DQPSK (4-DH5)	Duty Cycle (%):	78.1
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	C (Core 2)	Peak Antenna Gain (dBi):	-

Test Frequency (MHz)	RBW (kHz)	PSD (dBm/RBW)					Limit (dBm/3 kHz)	Margin (dB)
		A	B	C	D	Σ		
2404	3.0	-	-	-10.04	-	-	8.00	-18.04
2441	3.0	-	-	-10.42	-	-	8.00	-18.42
2476	3.0	-	-	-10.41	-	-	8.00	-18.41

Table 121 - Maximum Power Spectral Density Results

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (e) RSS-247 5.2 b)	Test Method(s):	C63.10 11.10.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	iPA $\pi/4$ DQPSK (8-DH5)	Duty Cycle (%):	78.2
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	C (Core 2)	Peak Antenna Gain (dBi):	-

Test Frequency (MHz)	RBW (kHz)	PSD (dBm/RBW)					Limit (dBm/3 kHz)	Margin (dB)
		A	B	C	D	Σ		
2404	3.0	-	-	-9.75	-	-	8.00	-17.75
2441	3.0	-	-	-11.10	-	-	8.00	-19.10
2476	3.0	-	-	-9.78	-	-	8.00	-17.78

Table 122 - Maximum Power Spectral Density Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (e) RSS-247 5.2 b)	Test Method(s):	C63.10 11.10.2
Additional Reference(s):	662911 D01 v02r01 E)2)b)		

DUT Configuration			
Mode:	iPA $\pi/4$ DQPSK (4-DH5)	Duty Cycle (%):	78.1
Antenna Configuration:	Beamforming	DCCF (dB):	-
Active Port(s):	A+B (Core 0 + Core 1)	Peak Antenna Gain (dBi):	-

Test Frequency (MHz)	RBW (kHz)	PSD (dBm/RBW)					Limit (dBm/3 kHz)	Margin (dB)
		A	B	C	D	Σ		
2404	3.0	-10.29	-10.46	-	-	-7.36	8.00	-15.36
2441	3.0	-10.77	-10.29	-	-	-7.51	8.00	-15.51
2476	3.0	-10.55	-9.97	-	-	-7.24	8.00	-15.24

Table 123 - Maximum Power Spectral Density Results

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (e) RSS-247 5.2 b)	Test Method(s):	C63.10 11.10.2
Additional Reference(s):	662911 D01 v02r01 E)2)b)		

DUT Configuration			
Mode:	iPA $\pi/4$ DQPSK (8-DH5)	Duty Cycle (%):	78.2
Antenna Configuration:	Beamforming	DCCF (dB):	-
Active Port(s):	A+B (Core 0 + Core 1)	Peak Antenna Gain (dBi):	-

Test Frequency (MHz)	RBW (kHz)	PSD (dBm/RBW)					Limit (dBm/3 kHz)	Margin (dB)
		A	B	C	D	Σ		
2404	3.0	-10.01	-10.47	-	-	-7.22	8.00	-15.22
2441	3.0	-10.38	-10.59	-	-	-7.48	8.00	-15.48
2476	3.0	-9.92	-9.80	-	-	-6.85	8.00	-14.85

Table 124 - Maximum Power Spectral Density Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (e) RSS-247 5.2 b)	Test Method(s):	C63.10 11.10.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	iPA GFSK (LE 1M)	Duty Cycle (%):	60.4
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	B (Core 1)	Peak Antenna Gain (dBi):	-

Test Frequency (MHz)	RBW (kHz)	PSD (dBm/RBW)					Limit (dBm/3 kHz)	Margin (dB)
		A	B	C	D	Σ		
2402	3.0	-	-6.58	-	-	-	8.00	-14.58
2440	3.0	-	-7.03	-	-	-	8.00	-15.03
2480	3.0	-	-6.33	-	-	-	8.00	-14.33

Table 125 - Maximum Power Spectral Density Results

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (e) RSS-247 5.2 b)	Test Method(s):	C63.10 11.10.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	iPA GFSK (LE 2M)	Duty Cycle (%):	31.3
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	B (Core 1)	Peak Antenna Gain (dBi):	-

Test Frequency (MHz)	RBW (kHz)	PSD (dBm/RBW)					Limit (dBm/3 kHz)	Margin (dB)
		A	B	C	D	Σ		
2402	3.0	-	-8.76	-	-	-	8.00	-16.76
2440	3.0	-	-8.68	-	-	-	8.00	-16.68
2480	3.0	-	-8.54	-	-	-	8.00	-16.54

Table 126 - Maximum Power Spectral Density Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (e) RSS-247 5.2 b)	Test Method(s):	C63.10 11.10.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	iPA GFSK (LE 1M)	Duty Cycle (%):	60.4
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	C (Core 2)	Peak Antenna Gain (dBi):	-

Test Frequency (MHz)	RBW (kHz)	PSD (dBm/RBW)					Limit (dBm/3 kHz)	Margin (dB)
		A	B	C	D	Σ		
2402	3.0	-	-	-6.87	-	-	8.00	-14.87
2440	3.0	-	-	-7.16	-	-	8.00	-15.16
2480	3.0	-	-	-6.78	-	-	8.00	-14.78

Table 127 - Maximum Power Spectral Density Results

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (e) RSS-247 5.2 b)	Test Method(s):	C63.10 11.10.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	iPA GFSK (LE 2M)	Duty Cycle (%):	31.3
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	C (Core 2)	Peak Antenna Gain (dBi):	-

Test Frequency (MHz)	RBW (kHz)	PSD (dBm/RBW)					Limit (dBm/3 kHz)	Margin (dB)
		A	B	C	D	Σ		
2402	3.0	-	-	-9.02	-	-	8.00	-17.02
2440	3.0	-	-	-8.78	-	-	8.00	-16.78
2480	3.0	-	-	-8.79	-	-	8.00	-16.79

Table 128 - Maximum Power Spectral Density Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (e) RSS-247 5.2 b)	Test Method(s):	C63.10 11.10.2
Additional Reference(s):	662911 D01 v02r01 E)2)b)		

DUT Configuration			
Mode:	iPA GFSK (LE 1M)	Duty Cycle (%):	60.4
Antenna Configuration:	Beamforming	DCCF (dB):	-
Active Port(s):	A+B (Core 0 + Core 1)	Peak Antenna Gain (dBi):	-

Test Frequency (MHz)	RBW (kHz)	PSD (dBm/RBW)					Limit (dBm/3 kHz)	Margin (dB)
		A	B	C	D	Σ		
2402	3.0	-6.47	-6.72	-	-	-3.58	8.00	-11.58
2440	3.0	-6.96	-7.14	-	-	-4.04	8.00	-12.04
2480	3.0	-6.92	-6.87	-	-	-3.88	8.00	-11.88

Table 129 - Maximum Power Spectral Density Results

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (e) RSS-247 5.2 b)	Test Method(s):	C63.10 11.10.2
Additional Reference(s):	662911 D01 v02r01 E)2)b)		

DUT Configuration			
Mode:	iPA GFSK (LE 2M)	Duty Cycle (%):	31.3
Antenna Configuration:	Beamforming	DCCF (dB):	-
Active Port(s):	A+B (Core 0 + Core 1)	Peak Antenna Gain (dBi):	-

Test Frequency (MHz)	RBW (kHz)	PSD (dBm/RBW)					Limit (dBm/3 kHz)	Margin (dB)
		A	B	C	D	Σ		
2402	3.0	-8.71	-8.92	-	-	-5.80	8.00	-13.80
2440	3.0	-9.19	-9.13	-	-	-6.15	8.00	-14.15
2480	3.0	-8.64	-8.58	-	-	-5.60	8.00	-13.60

Table 130 - Maximum Power Spectral Density Results



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

The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

ISED RSS-247, Limit Clause 5.2(b)

The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission

2.6.7 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 Expiry Date
Multimeter	Fluke	79 Series III	611	12	21-Dec-2022
Hygrometer	Rotronic	I-1000	3220	12	05-Nov-2022
Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	01-Feb-2023
AC Programmable Power Supply	iTech	IT7324	5226	-	O/P Mon
MXA Signal Analyser	Keysight Technologies	N9020B	5529	24	13-Sep-2024
Signal Conditioning Unit	TUV SUD	SPECTRUM SCU002	5759	12	05-Jul-2023

Table 131

O/P Mon – Output Monitored using calibrated equipment



3 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

Test Name	Measurement Uncertainty
Restricted Band Edges	30 MHz to 1 GHz: ± 5.2 dB 1 GHz to 40 GHz: ± 6.3 dB
Emission Bandwidth	± 73.60 kHz
Maximum Conducted Output Power	± 1.38 dB
Spurious Radiated Emissions	30 MHz to 1 GHz: ± 5.2 dB 1 GHz to 40 GHz: ± 6.3 dB
Authorised Band Edges	30 MHz to 1 GHz: ± 5.2 dB 1 GHz to 40 GHz: ± 6.3 dB
Power Spectral Density	± 1.49 dB

Table 132

Measurement Uncertainty Decision Rule – Accuracy Method

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115:2021, Clause 4.4.3 (Procedure 2). The measurement results are directly compared with the test limit to determine conformance with the requirements of the standard.

Risk: The uncertainty of measurement about the measured result is negligible with regard to the final pass/fail decision. The measurement result can be directly compared with the test limit to determine conformance with the requirement (compare IEC Guide 115). The level of risk to falsely accept and falsely reject items is further described in ILAC-G8.