



Date: 14 March 2023

**I.T.L. Product Testing Ltd.
FCC Radio Test Report**

for

PetPace Ltd.

Equipment under test:

Smart Pet Collar

PetPace Health 2.0

FCC ID: 2ACUD-PC2

Tested by:

M. Zohar

Approved by:

I. Mansky

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I.T.L. Product Testing Ltd. This report relates only to items tested.



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This report concerns:	Original Grant
Equipment type:	FCC: (DTS) Digital Transmission System
Limits used:	47CFR15 Section 15.247
Measurement procedure used:	KDB 558074 D01 v05r01, ANSI C63.10:2013

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1. General Information

1.1 Administrative Information

Manufacturer:	PetPace Ltd.
Equipment Under Test (E.U.T):	Smart Pet Collar
Model:	PetPace Health 2.0
Equipment Serial No.:	Not designated
Date of Receipt of E.U.T:	May 31, 2022
Start of Test:	May 31, 2022
End of Test:	December 2, 2022
Test Laboratory Location:	I.T.L. Product Testing Ltd. 1 Batsheva St., Lod 7120101, Israel
Test Specifications:	FCC Part 15, Subpart C, Section 15.247

1.2 List of Accreditations

The EMC laboratory of I.T.L. is accredited by the following bodies:

1. The American Association for Laboratory Accreditation (A2LA) (U.S.A.), Certificate No. 1152.01.
2. The Federal Communications Commission (FCC) (U.S.A.), FCC Designation No. IL1005.
3. Department of Innovation, Science and Economic Development (ISED) Canada, CAB identifier: IL1002

I.T.L. Product Testing Ltd. is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this test report have been determined in accordance with I.T.L.'s terms of accreditation unless stated otherwise in the report.

1.3 Product Description

The EUT is a pet “smartwatch” and owner’s (and veterinarians) monitoring tool of the pet's health, activity, and location.

The EUT has three communication modes: BLE, Wi-Fi, and LTE. A GPS module (FCC ID: 2ANPO00NRF9160) is used only for location measurement.

Type of Equipment			
☒	Stand Alone (Equipment with/without its own control provisions)		
☐	Combined (Equipment where radio part is fully integrated with another type of equipment)		
☐	Plug in card (Equipment intended for a variety of host systems)		
Intended Use		Condition of use	
☐	Fixed	Always of distance >2m from the people	
☐	Mobile	Always of distance >20cm from the people	
☒	Portable	Always of distance <20cm to human body	
Assigned frequency band		2.4GHz	
Operational frequencies		WiFi/b/g/n (2412-2462MHz) BLE (2402-2480MHz)	
Maximum rated output power		At transmitter 50Ω RF output connector [dBm]	WiFi/n 17dBm BLE, 0dBm
		Effective Radiated Power (for equipment without RF connector)	
Antenna Connection			
☐	Unique Coupling	☐	Standard Connection
☒		☒	Integral
☒		☒	With temporary RF connector
☐		☐	Without temporary RF connector
Antenna Gain(peak)		+2dBi	
Operating channel bandwidth		WiFi/b/g/n 20MHz BLE 2MHz	
Type of modulation		WiFi/b/g/n – DSSS BLE - GFSK, BPSK / DBPSK TX, OOK / ASK, OQPSK / (G)MSK, DSSS and FEC	
Bit rate		WiFi/n 6.5Mbps – 65Mbps	
Maximum transmitter duty cycle		98%	
Transmitter power source			
☐	AC	Nominal rated voltage	
☐	DC	Nominal rated voltage	
☒	Battery	Nominal rated voltage	4.2V

1.4 Test Methodology

Both conducted and radiated testing was performed according to the procedures in KDB 558074 D01 v05r01, ANSI C63.10: 2013. Radiated testing was performed at an antenna to EUT distance of three meters.

1.5 Test Facility

Emissions tests were performed at I.T.L.'s testing facility in Lod, Israel. I.T.L.'s EMC Laboratory is accredited by A2LA, certificate No. 1152.01 and its FCC Designation Number is IL1005.

1.6 Measurement Uncertainty

Conducted Emission

Conducted Emission (CISPR 11, EN 55011, CISPR 22, EN 55022, ANSI C63.4)

0.15 – 30 MHz:

Expanded Uncertainty (95% Confidence, K=2):

± 3.44 dB



Radiated Emission

Radiated Emission (CISPR 11, EN 55011, CISPR 22, EN 55022, ANSI C63.4)
for open site:

30-1000MHz:

Expanded Uncertainty (95% Confidence, K=2):
 ± 4.96 dB

1 GHz to 6 GHz

Expanded Uncertainty (95% Confidence, K=2):
 ± 5.19 dB

>6 GHz

Expanded Uncertainty (95% Confidence, K=2):
 ± 5.51 dB

2. System Test Configuration

2.1 Justification

1. The E.U.T contains two transceivers: IEEE 802.15.1 standard (BLE) and IEEE 802.11/b/g/n standard (Wi-Fi/b/g/n) with only 20MHz CBW.
2. For BLE, the unit was evaluated while transmitting at the low channel (2402MHz), the mid channel (2440MHz) and the high channel (2480MHz). For Wi-Fi /b/g/n, the unit was evaluated while transmitting at the low channel (2412MHz), the mid channel (2437MHz) and the high channel (2462MHz).
3. The evaluation was performed while the E.U.T was battery operated
4. Conducted emission tests were performed with the E.U.T. antenna terminal connected by a RF cable to the Spectrum Analyzer through external attenuator.
5. Final radiated emission for Wi-Fi /n modes tests were performed using the lowest and highest bit rates. The bit rates are shown in the table below:

Protocol Type	“Worst Case” Bit Rate
Wi-Fi/b	1,11 Mbit/s
Wi-Fi/g	6,54 Mbit/s
Wi-Fi/n	6.5,65 Mbit/s (MCS0,MCS7)

6. Final radiated emission tests was performed after exploratory emission testing that was performed in 3 orthogonal polarities to determine the “worst case” radiation and found at X axis

2.2 EUT Exercise Software

No special exercise software was used.

2.3 Special Accessories

No special accessories were used.

2.4 Equipment Modifications

Initially, the E.U.T failed in the restricted bands spurious emission tests (band edge and harmonics) at WI-FI /n transmission. The customer performed the following modifications:

- Added low-pass filter
- Reduced the voltage supply to the amplifier chip.

2.5 Configuration of Tested System



Figure 1. Configuration of Tested System Conducted



Figure 2. Configuration of Tested System Radiated

3. Test Setup Photos

See a separate file.

4. 6 dB Minimum Bandwidth

4.1 Test Specification

FCC Part 15, Subpart C, Section 247(a)(2)

4.2 Test Procedure

(Temperature (22°C)/ Humidity (61%RH))

The E.U.T operation mode and test set-up are as described in Section 2 of this report. The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator and an appropriate coaxial cable (total loss=32.0 dB). Special attention was taken to prevent Spectrum Analyzer RF input overload. The spectrum bandwidth of the E.U.T. at the point of 6 dB below maximum peak power was measured and recorded. The RBW was set to 100 kHz.

4.3 Test Limit

Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

4.4 Test Results

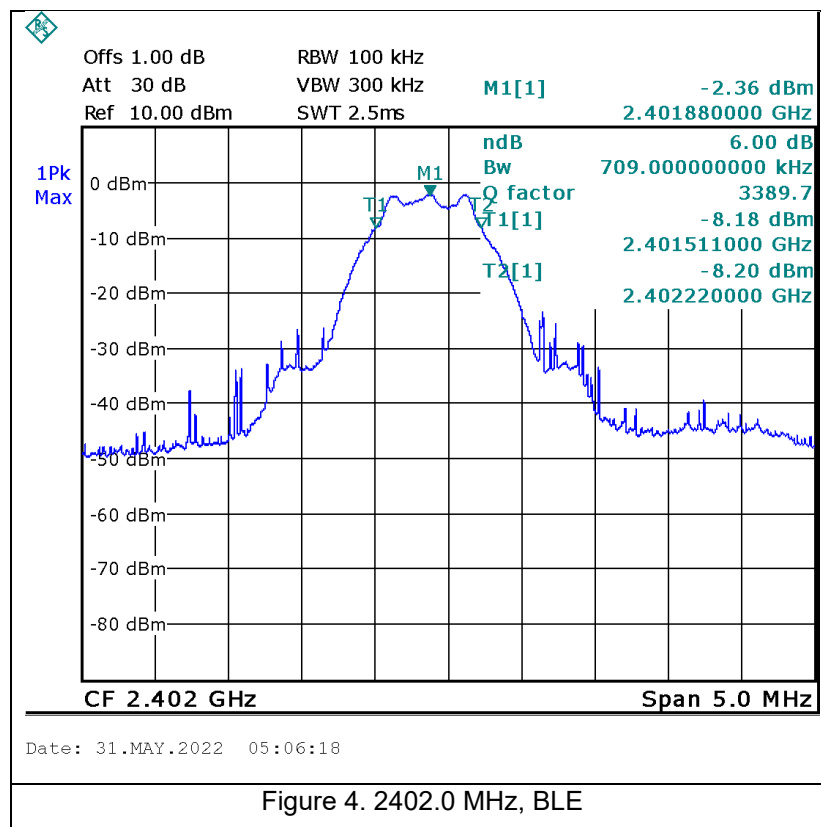
Protocol Type	Operation Frequency	Reading	Limit
	(MHz)	(kHz)	(kHz)
BLE	2402.0	709.0	>500.0
	2440.0	709.0	>500.0
	2480.0	709.0	>500.0
Wi-fi/b (1Mbit/s)	2412.0	8992.0	>500.0
	2437.0	8992.0	>500.0
	2462.0	9013.0	>500.0
Wi-fi/b (11Mbit/s)	2412.0	9820.0	>500.0
	2437.0	9341.0	>500.0
	2462.0	9900.0	>500.0
Wi-fi/g (6Mbit/s)	2412.0	15,888.0	>500.0
	2437.0	16,204.0	>500.0
	2462.0	16,287.0	>500.0
Wi-fi/g (54Mbit/s)	2412.0	16,571.0	>500.0
	2437.0	16,517.0	>500.0
	2462.0	16,527.0	>500.0
	2412.0	16,447.0	>500.0

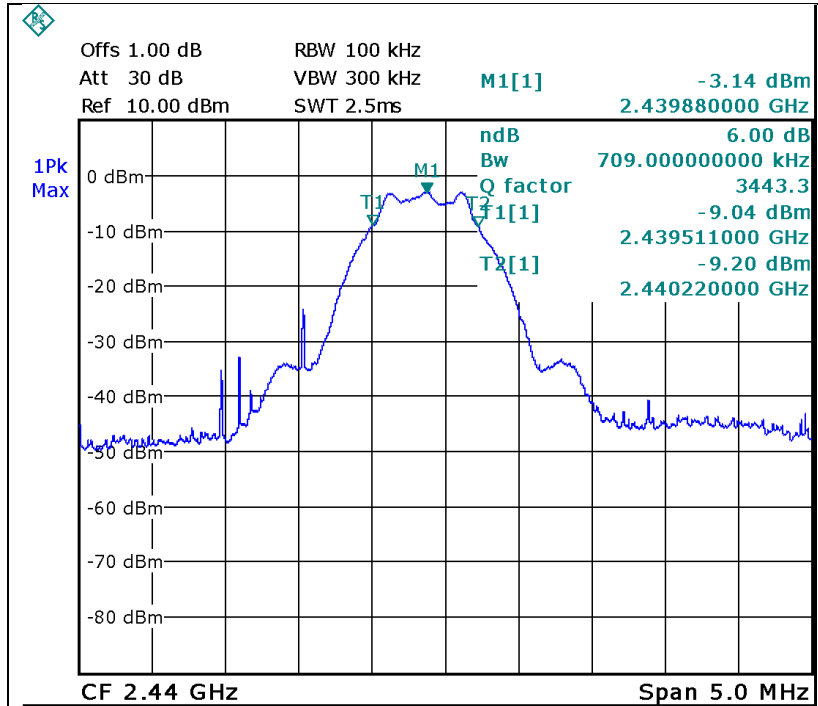
Wi-fi/n (6.5Mbit/s)	2437.0	16,870.0	>500.0
	2462.0	16,980.0	>500.0
Wi-fi/n (65Mbit/s)	2412.0	17,400.0	>500.0
	2437.0	17,750.0	>500.0
	2462.0	17,785.0	>500.0

Table 3 6 dB Minimum Bandwidth

JUDGEMENT: Passed

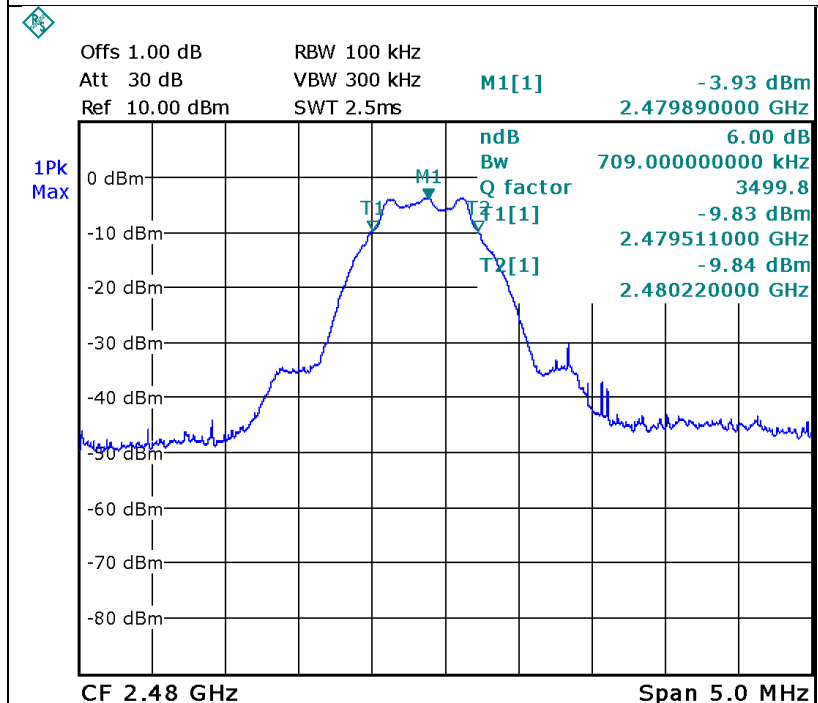
For additional information see Figure 4 to Figure 24.





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Figure 5. 2440.0 MHz, BLE



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Figure 6. 2480.0 MHz, BLE

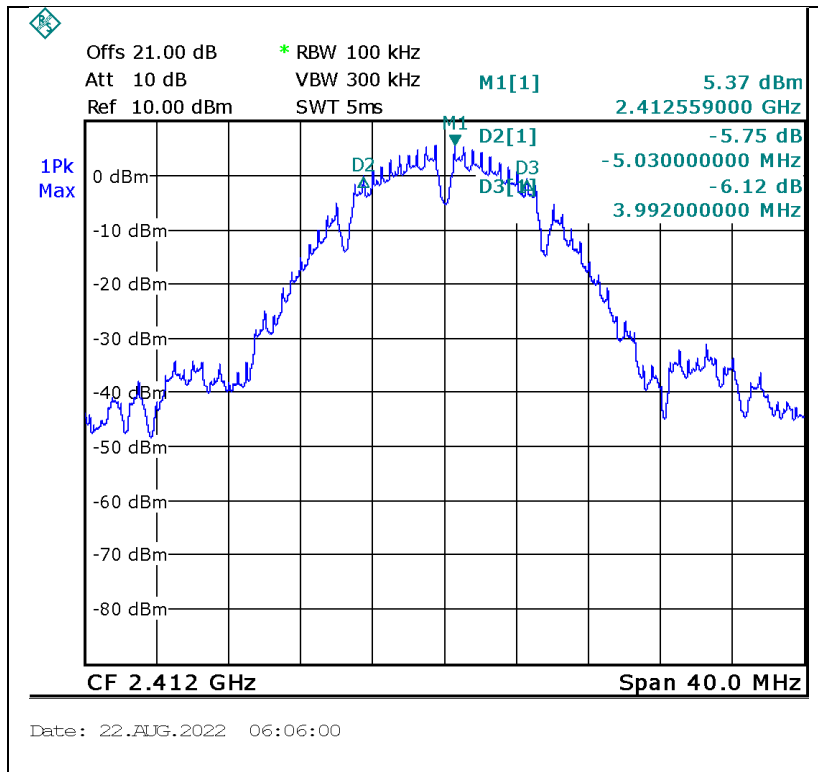


Figure 7. 2412.0 MHz, Wi-fi/b(1Mbit/s)

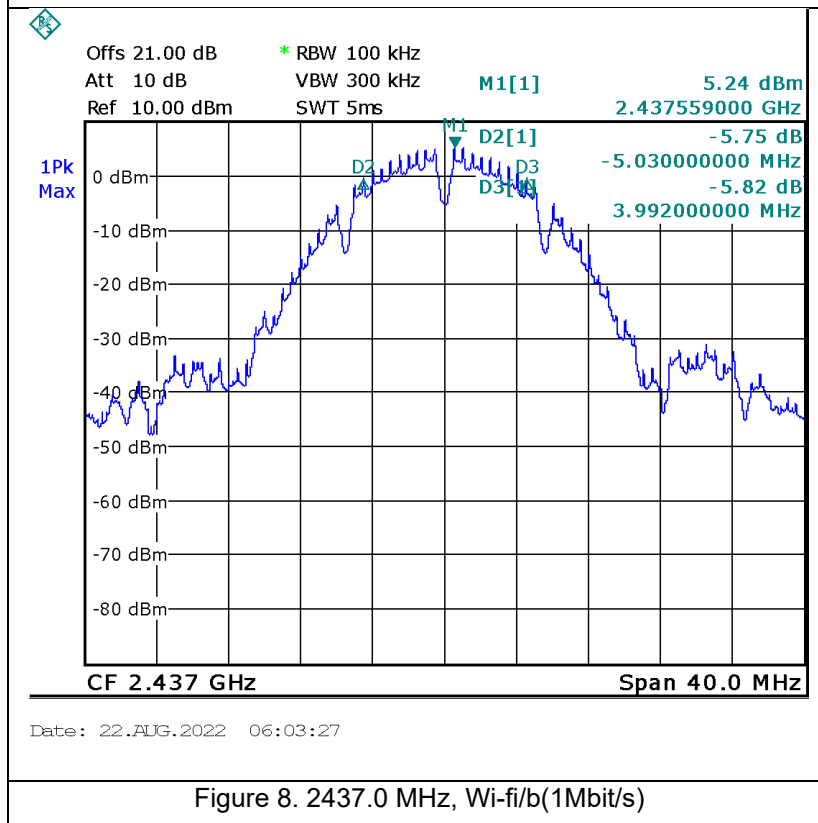


Figure 8. 2437.0 MHz, Wi-fi/b(1Mbit/s)

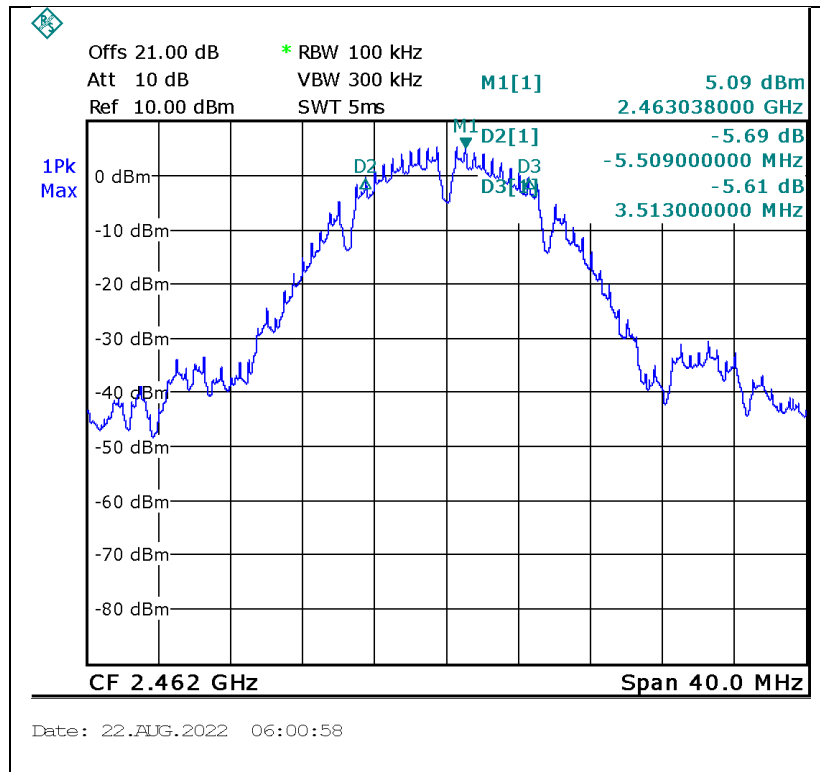


Figure 9. 2462.0 MHz, Wi-fi/b(1Mbit/s)

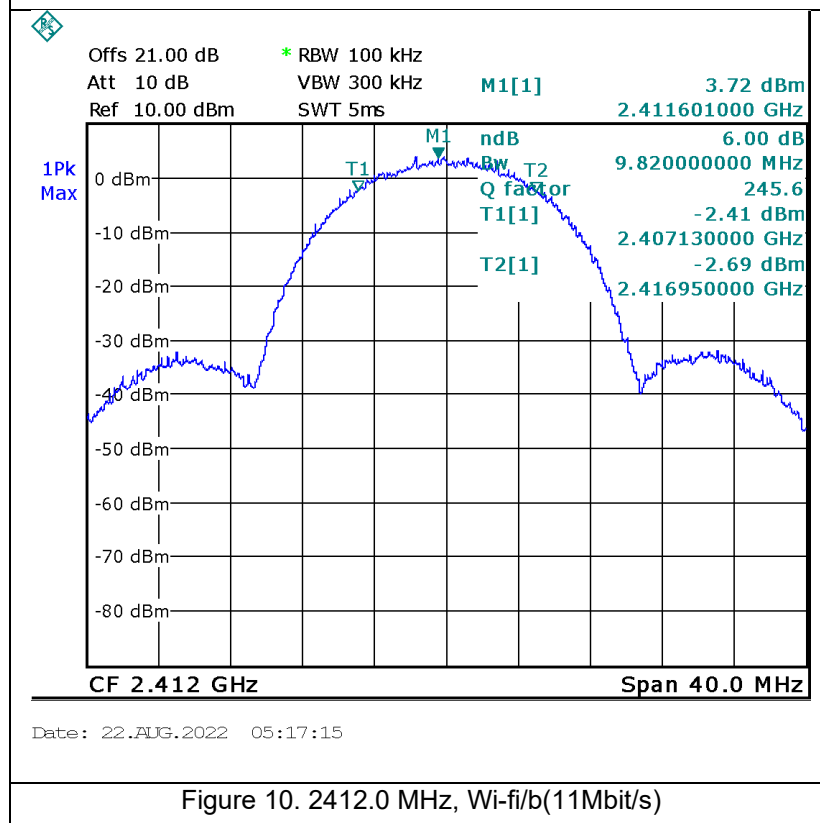


Figure 10. 2412.0 MHz, Wi-fi/b(11Mbit/s)

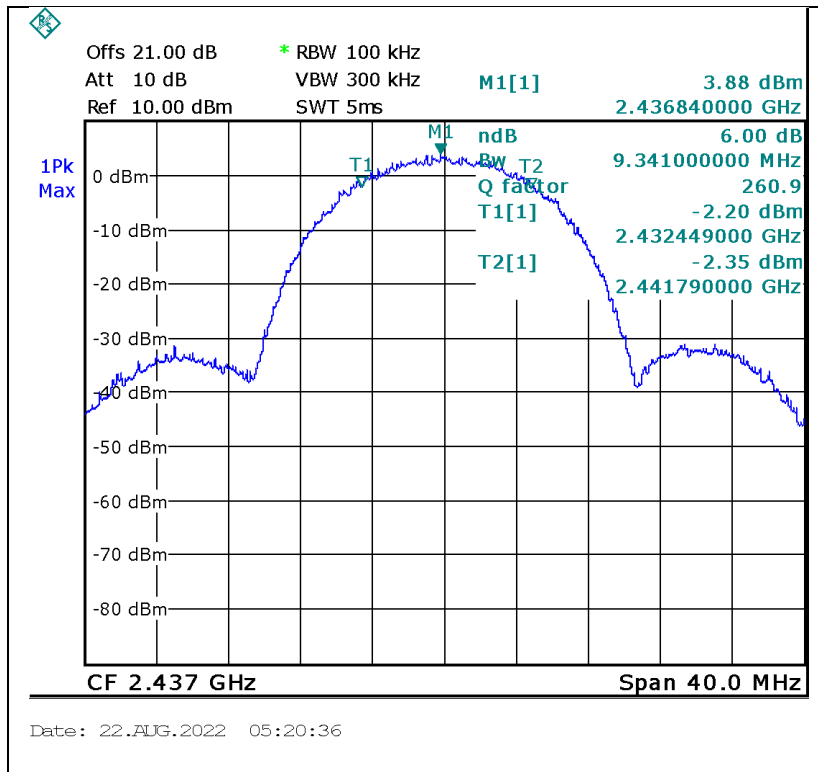


Figure 11. 2437.0 MHz, Wi-fi/b(11Mbit/s)

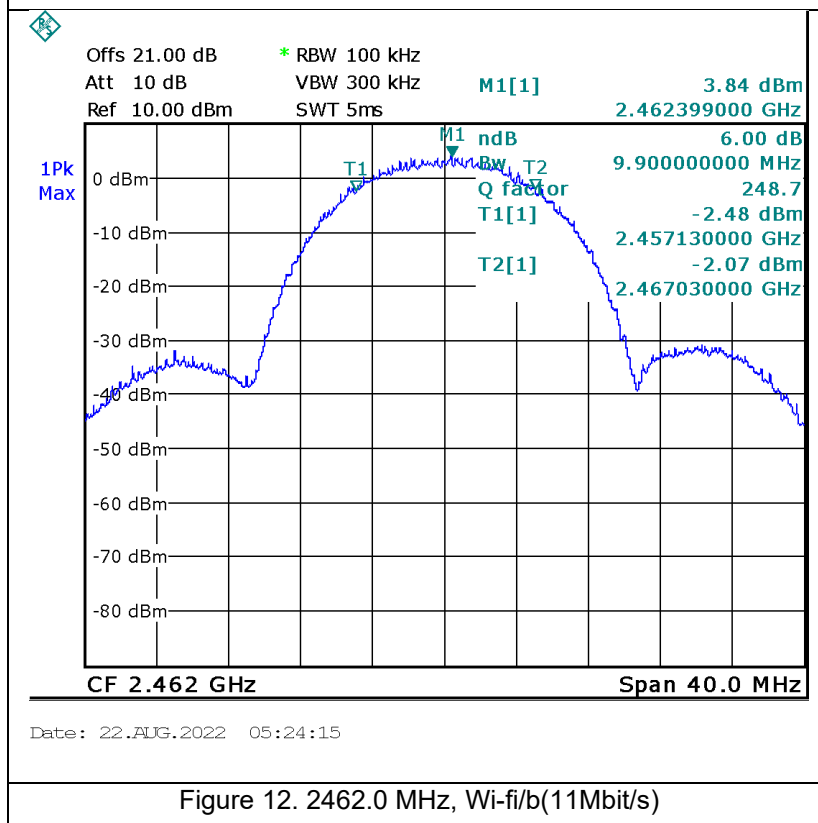


Figure 12. 2462.0 MHz, Wi-fi/b(11Mbit/s)

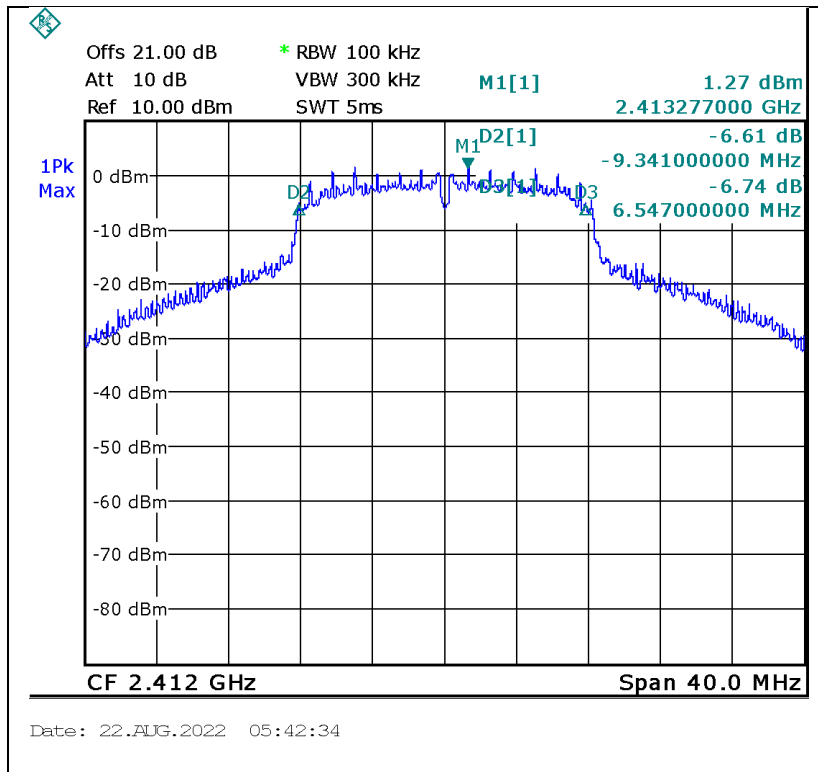


Figure 13. 2412.0 MHz, Wi-fi/g(6Mbit/s)

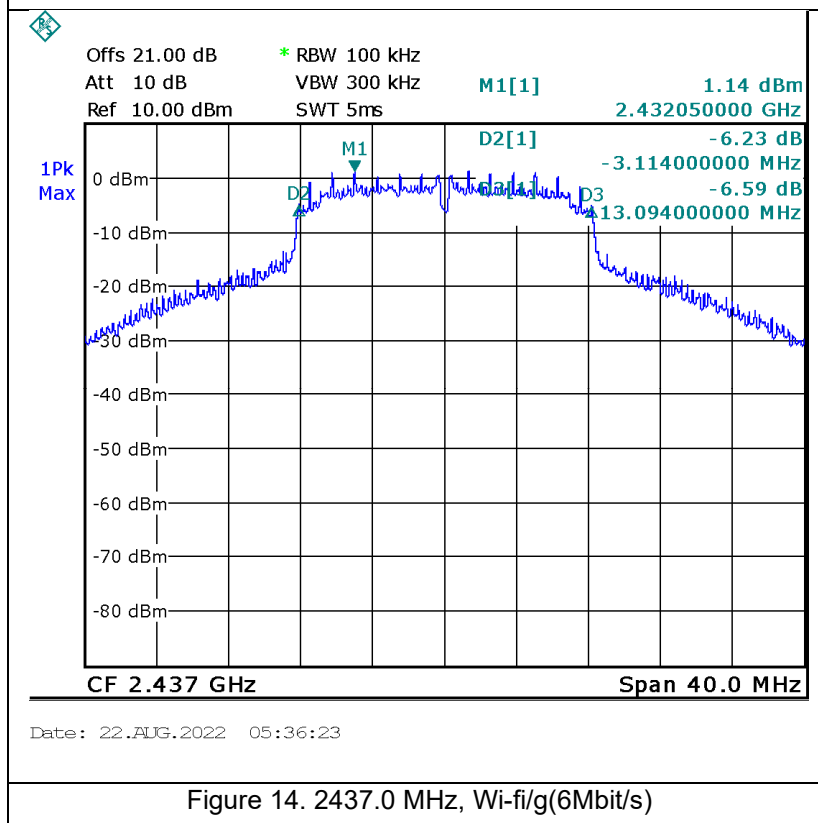


Figure 14. 2437.0 MHz, Wi-fi/g(6Mbit/s)

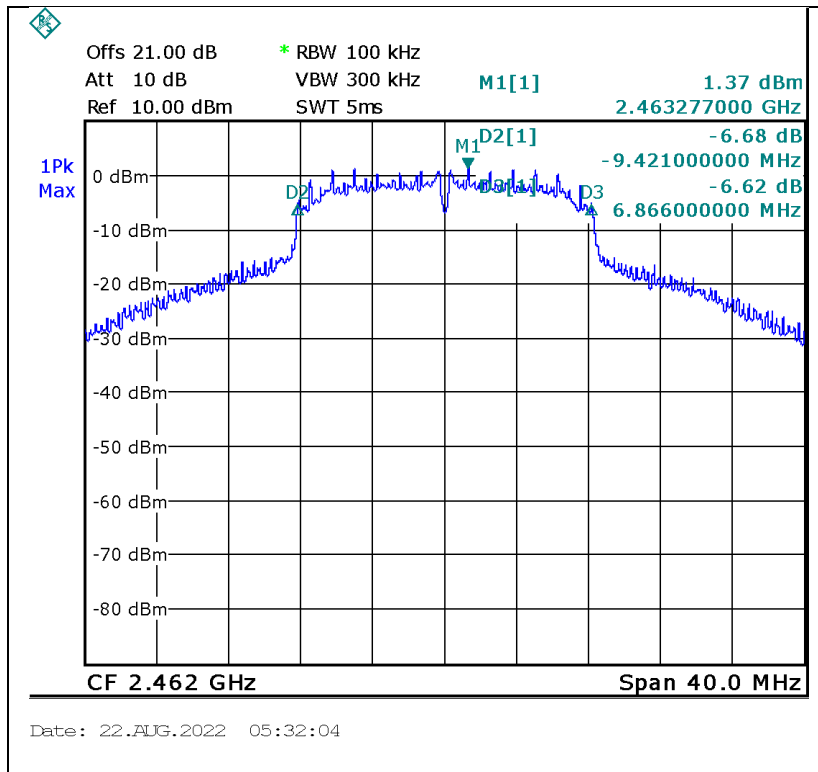


Figure 15. 2462.0 MHz, Wi-fi/g(6Mbit/s)

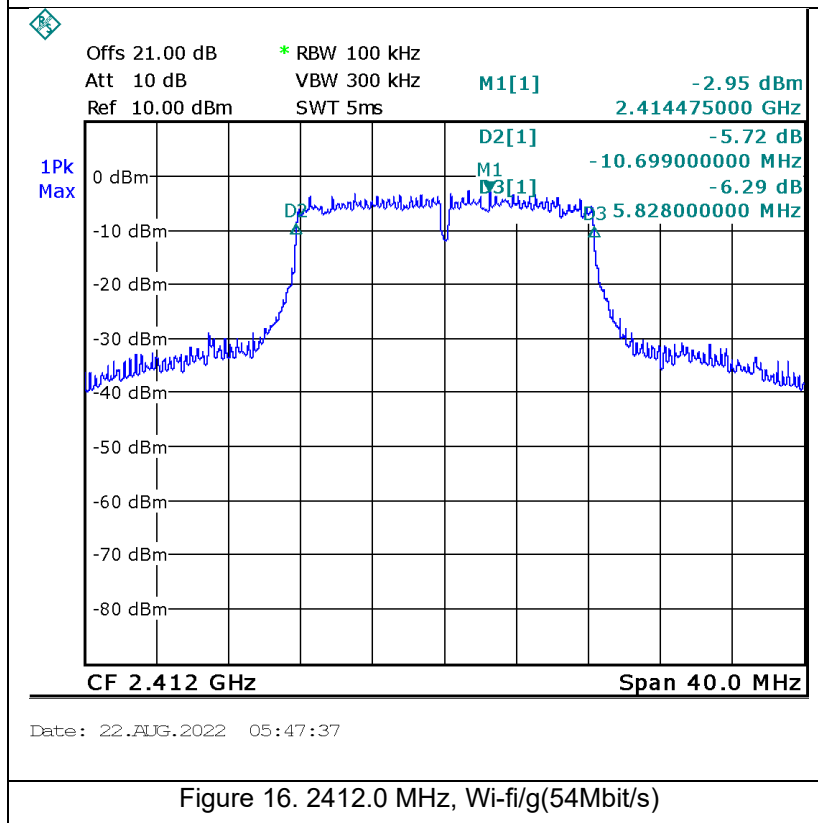


Figure 16. 2412.0 MHz, Wi-fi/g(54Mbit/s)

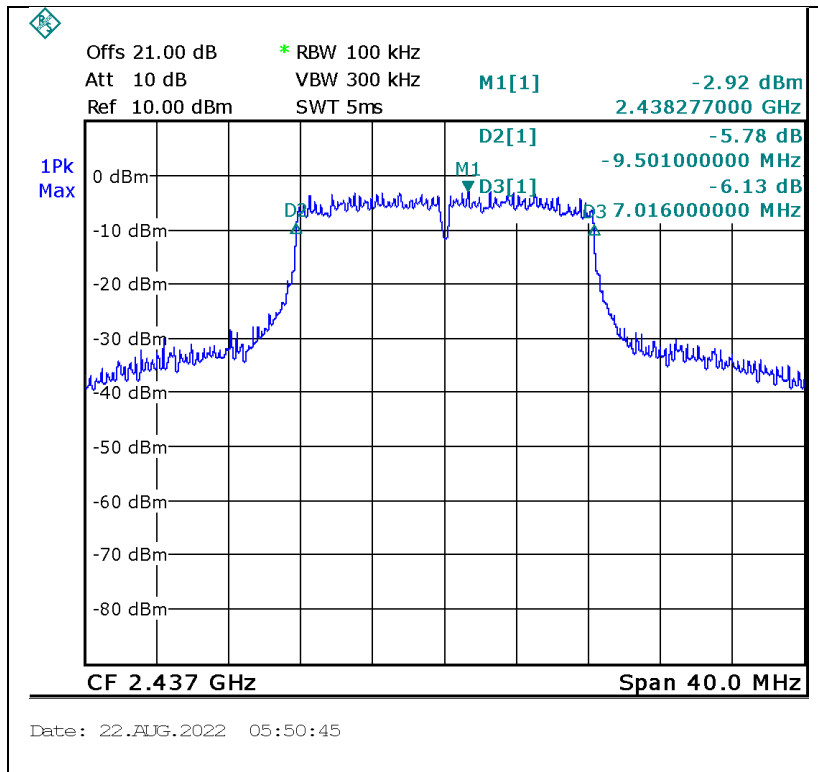


Figure 17. 2437.0 MHz, Wi-fi/g(54Mbit/s)

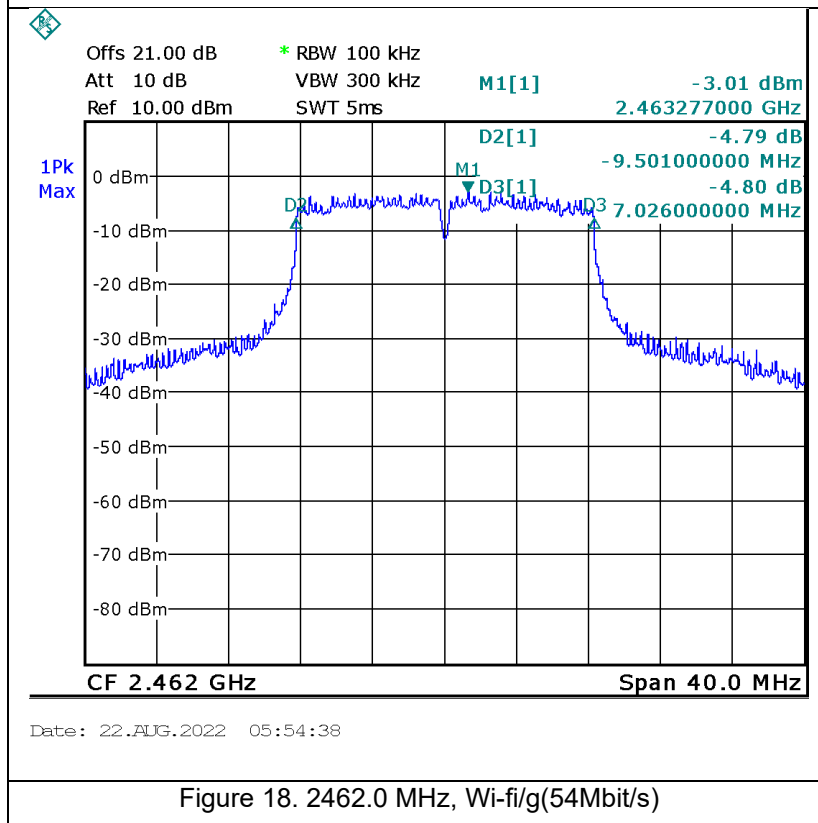
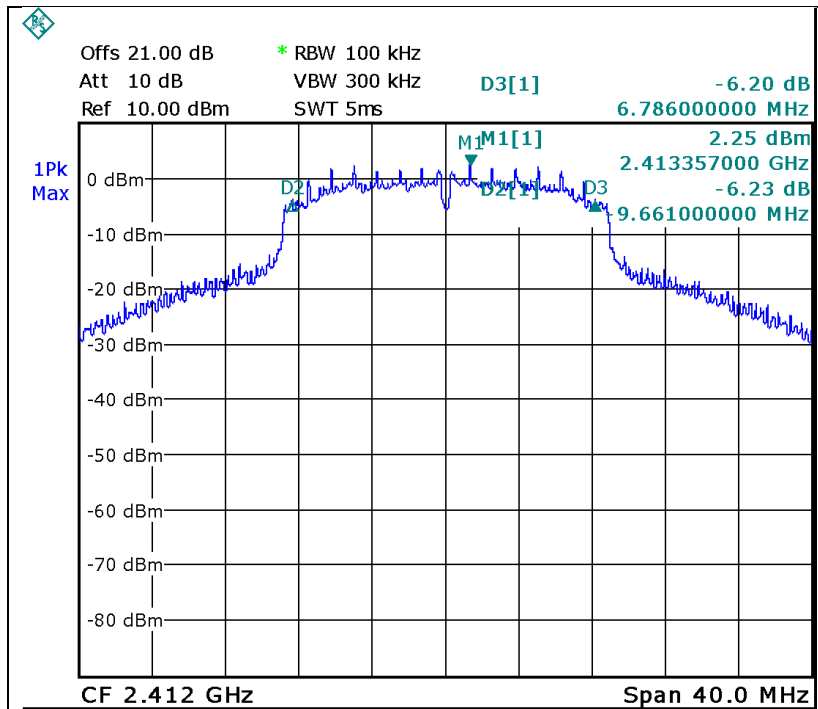
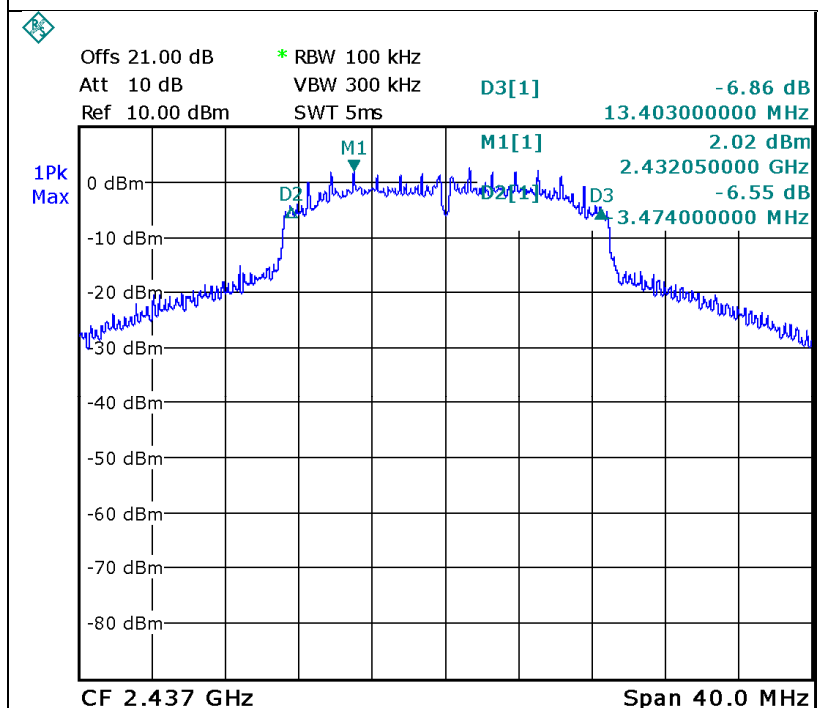


Figure 18. 2462.0 MHz, Wi-fi/g(54Mbit/s)



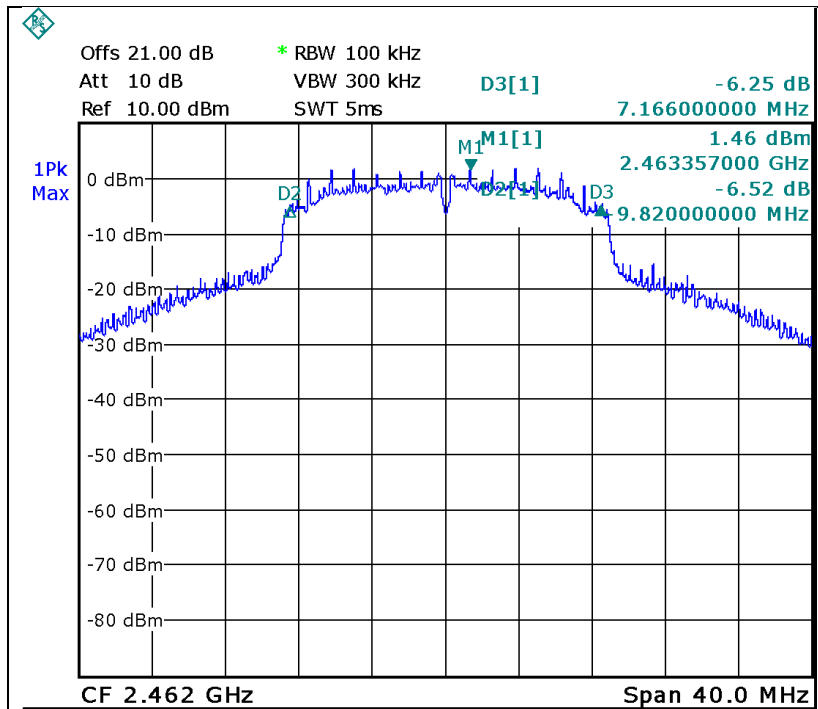
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Figure 19. 2412.0 MHz, Wi-fi/n(6.5Mbit/s)



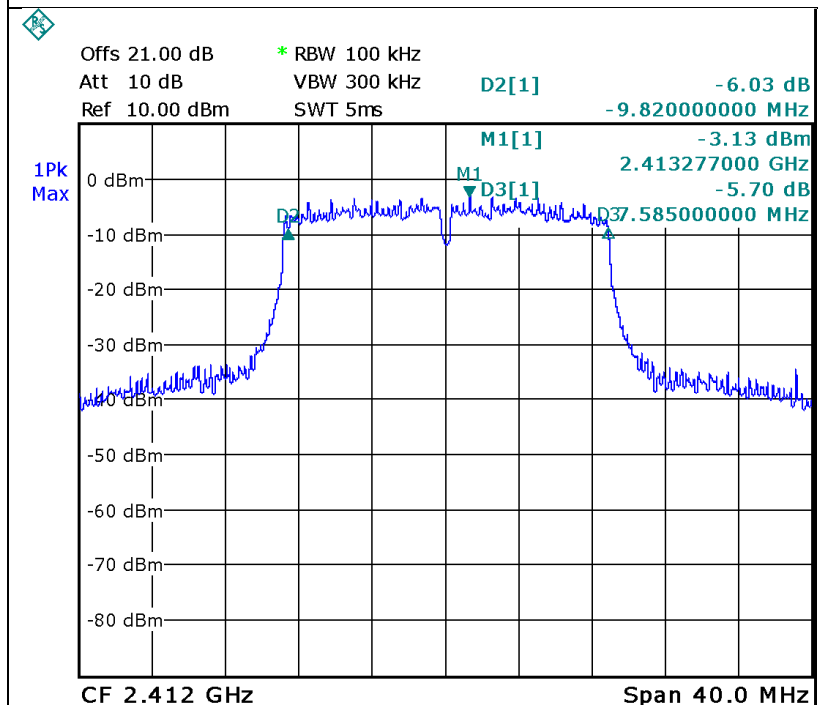
Date: 13.JUN.2022 06:11:32

Figure 20. 2437.0 MHz, Wi-fi/n(6.5Mbit/s)



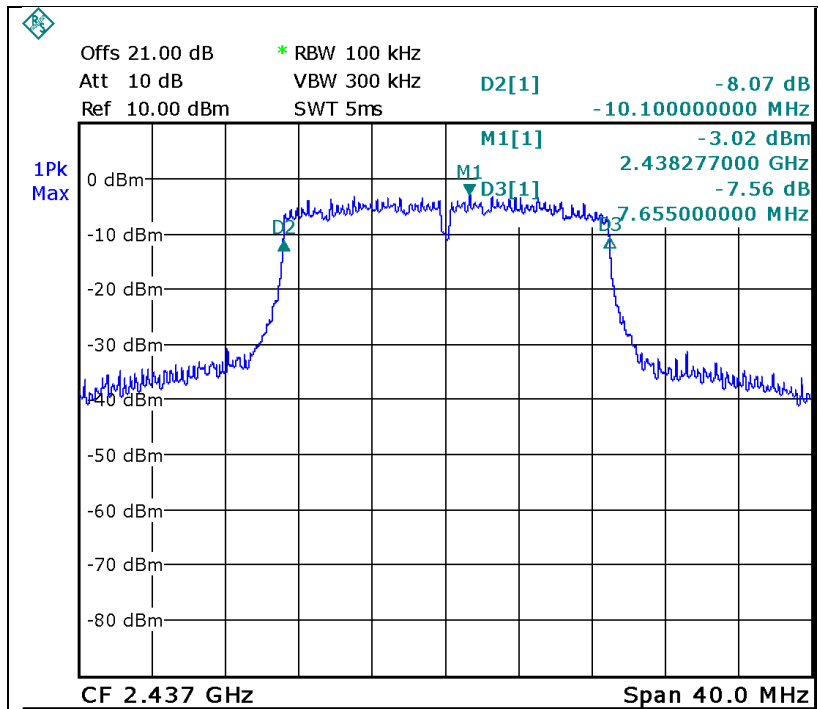
Date: 13.JUN.2022 06:15:13

Figure 21. 2462.0 MHz, Wi-fi/n(6.5Mbit/s)



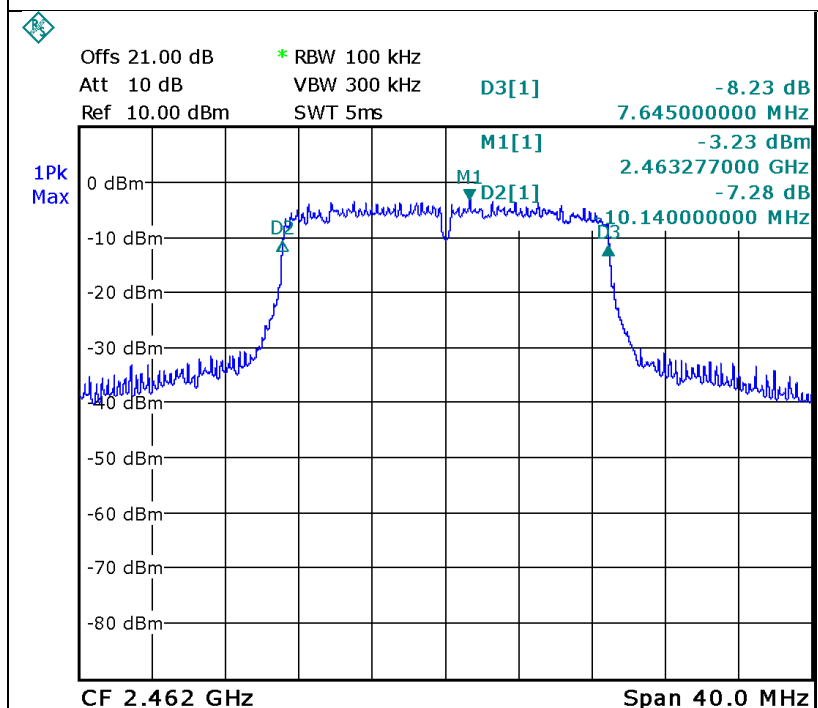
Date: 13.JUN.2022 05:57:56

Figure 22. 2412.0 MHz, Wi-fi/n(65Mbit/s)



Date: 13.JUN.2022 06:08:37

Figure 23. 2437.0 MHz, Wi-fi/n(65Mbit/s)



Date: 13.JUN.2022 06:25:19

Figure 24. 2462.0 MHz, Wi-fi/n(65Mbit/s)



4.5 Test Equipment Used; 6dB Bandwidth

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
Spectrum Analyzer	R&S	FSL6	100194	February 20, 2022	February 20, 2023
20dB/2W Attenuator	Midwest Microwave	ATT-0217-20-NNN-02	-	May 16, 2022	May 16, 2023
Low Loss cable	Huber Suhner	Sucofelex	27504/4PEA	May 16, 2022	May 16, 2023

Figure 25 Test Equipment Used

5. Maximum Conducted Output Power

5.1 Test Specification

FCC, Part 15, Subpart C, Section 247(b)(3)

5.2 Test Procedure

(Temperature (22°C)/ Humidity (70%RH))

The E.U.T operation mode and test set-up are as described in Section 2 of this report. The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator and an appropriate coaxial cable (total loss=21.0 dB). Special attention was taken to prevent Spectrum Analyzer RF input overload.

5.3 Test Limit

The maximum peak conducted output power of the intentional radiator for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.

5.4 Test Results

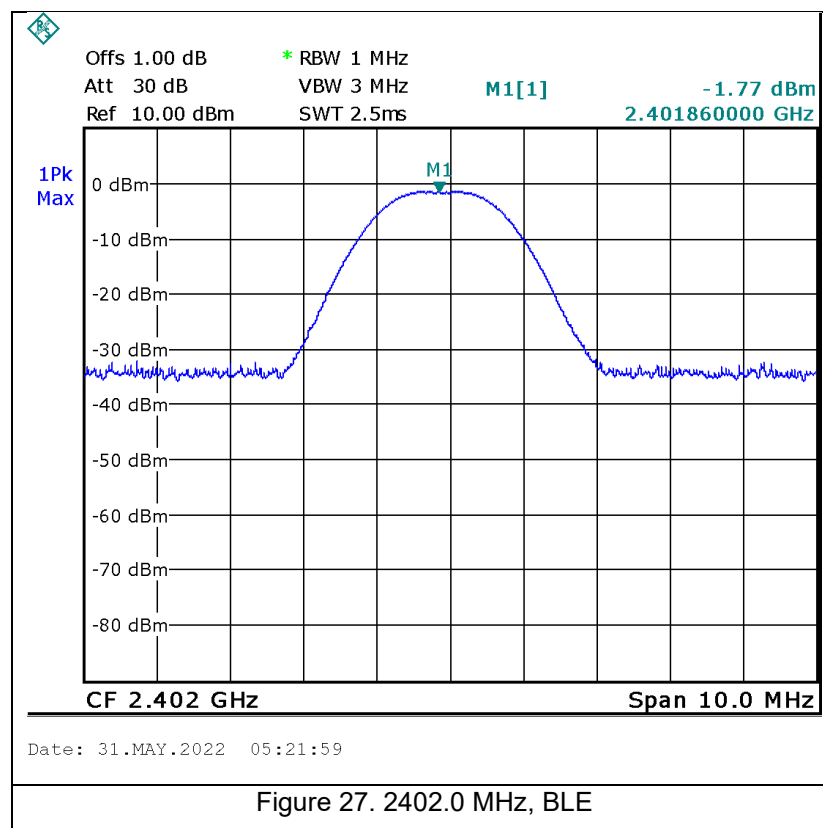
Protocol Type	Operation Frequency	Power	Power	Limit	Margin
	(MHz)	(dBm)	(mW)	(mW)	(mW)
BLE	2402.0	-1.77	0.665	1000.0	999.335
	2440.0	-2.57	0.553	1000.0	999.447
	2480.0	-2.9	0.513	1000.0	999.487
Wi-fi/b (1Mbit/s)	2412.0	17.8	60.255	1000.0	-939.744
	2437.0	17.7	58.884	1000.0	-941.115
	2462.0	17.6	57.543	1000.0	-942.456
Wi-fi/b (11Mbit/s)	2412.0	20.9	123.026	1000.0	-876.973
	2437.0	20.9	123.026	1000.0	-876.973
	2462.0	20.8	120.226	1000.0	-879.773
Wi-fi/g (6Mbit/s)	2412.0	20.2	104.712	1000.0	-895.287
	2437.0	20.1	102.329	1000.0	-897.670
	2462.0	20.0	100.000	1000.0	-900.000
Wi-fi/g (54Mbit/s)	2412.0	17.5	56.234	1000.0	-943.765
	2437.0	17.5	56.234	1000.0	-943.765
	2462.0	17.3	53.703	1000.0	-946.296
Wi-fi/n (6.5Mbit/s)	2412.0	20.8	120.226	1000.0	879.774
	2437.0	20.7	117.490	1000.0	882.510
	2462.0	20.92	123.595	1000.0	876.405

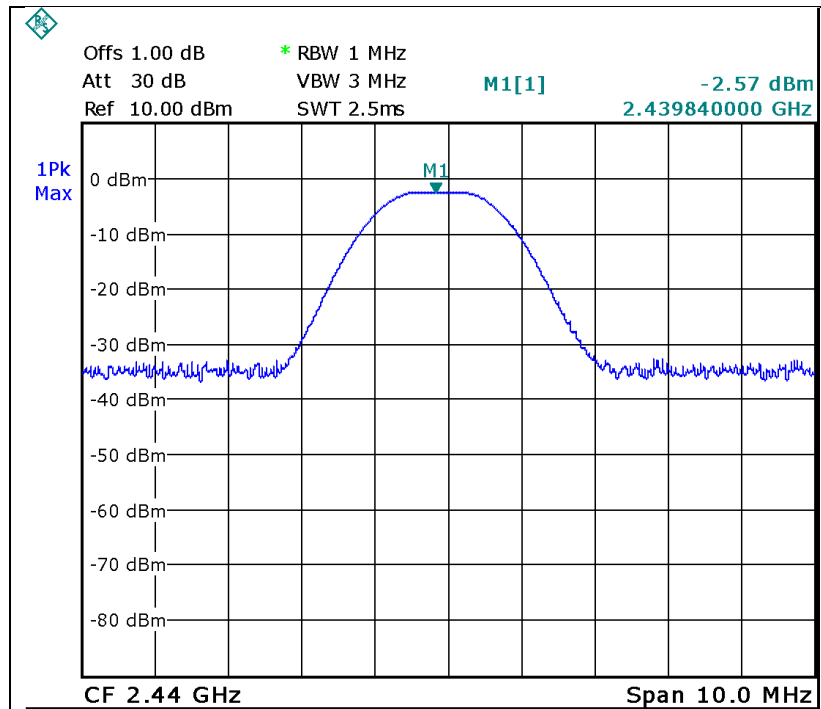
Protocol Type	Operation Frequency	Power	Power	Limit	Margin
	(MHz)	(dBm)	(mW)	(mW)	(mW)
Wi-fi/n (65Mbit/s)	2412.0	17.05	50.699	1000.0	949.301
	2437.0	17.4	54.954	1000.0	945.046
	2462.0	17.1	51.286	1000.0	948.714

Figure 26 Maximum Peak Power Output

JUDGEMENT: Passed

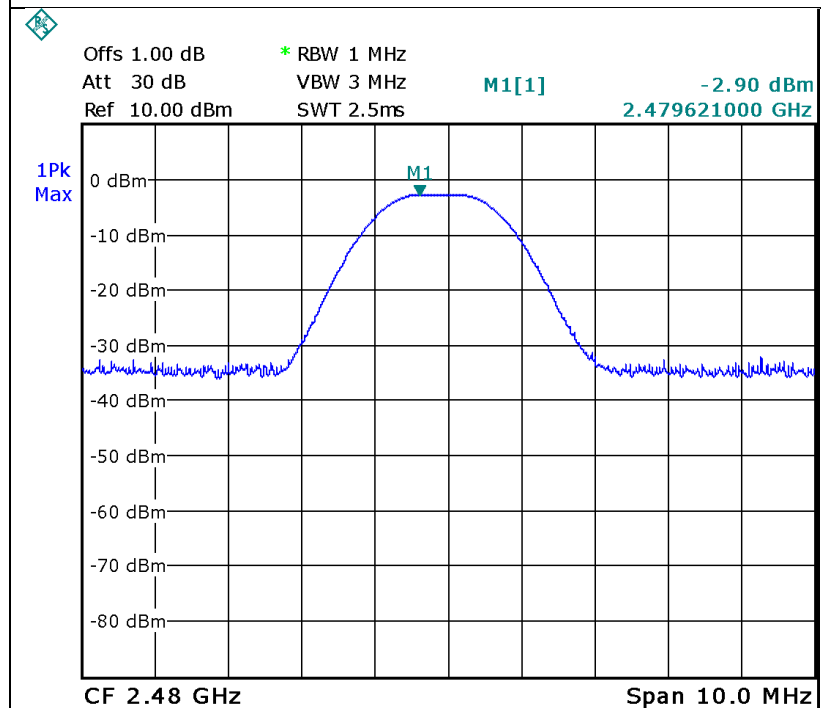
For additional information see Figure 27 to Figure 47.





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Figure 28. 2440.0 MHz, BLE



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Figure 29. 2480.0 MHz, BLE

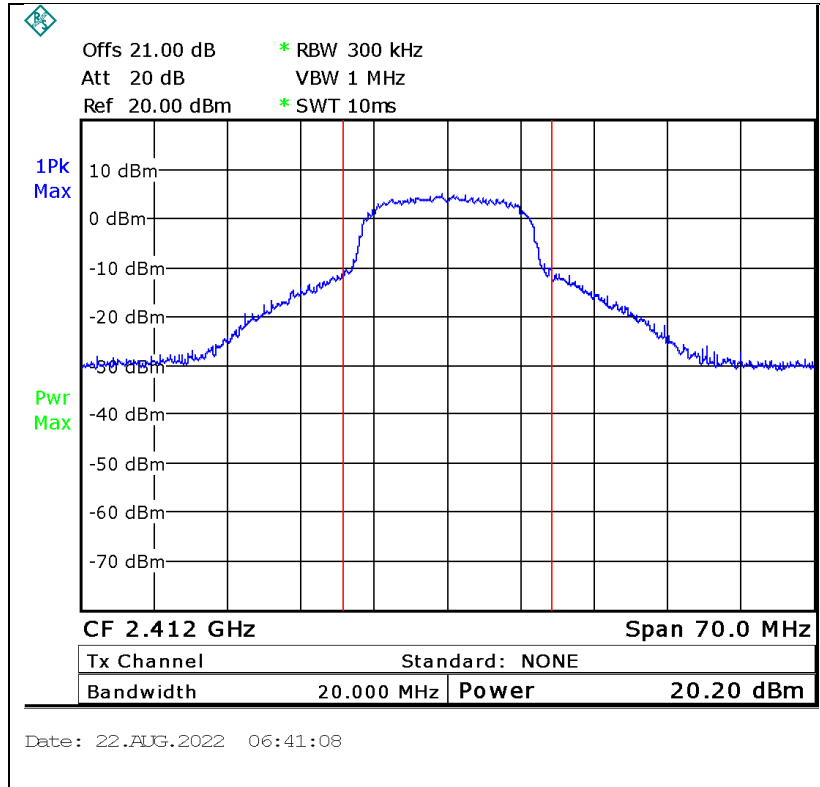


Figure 30. 2412.0 MHz, Wi-fi/g (6Mbit/s)

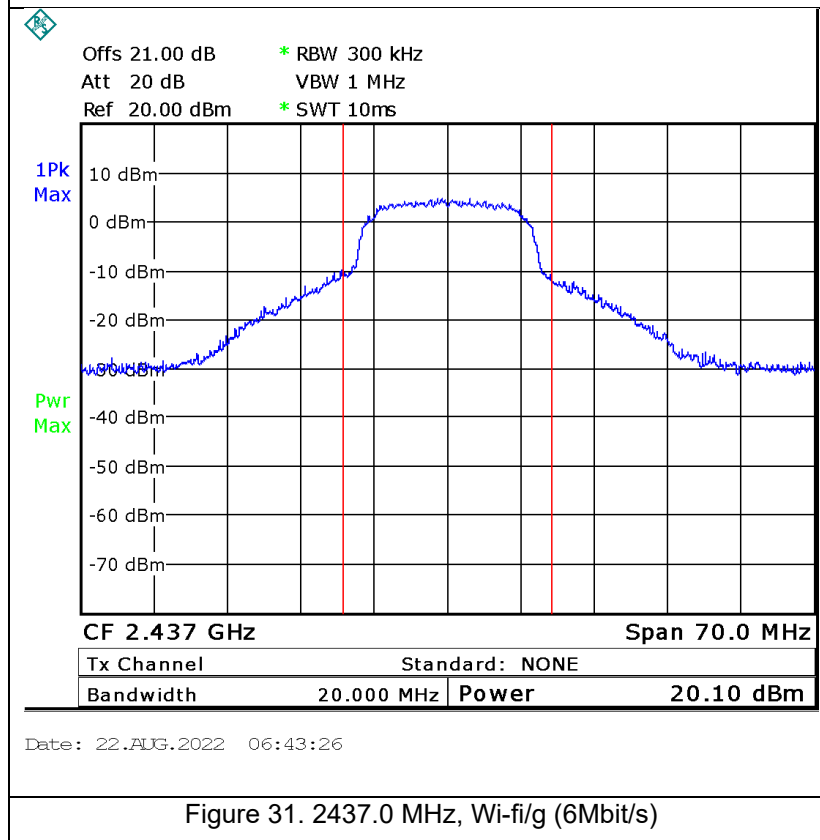


Figure 31. 2437.0 MHz, Wi-fi/g (6Mbit/s)

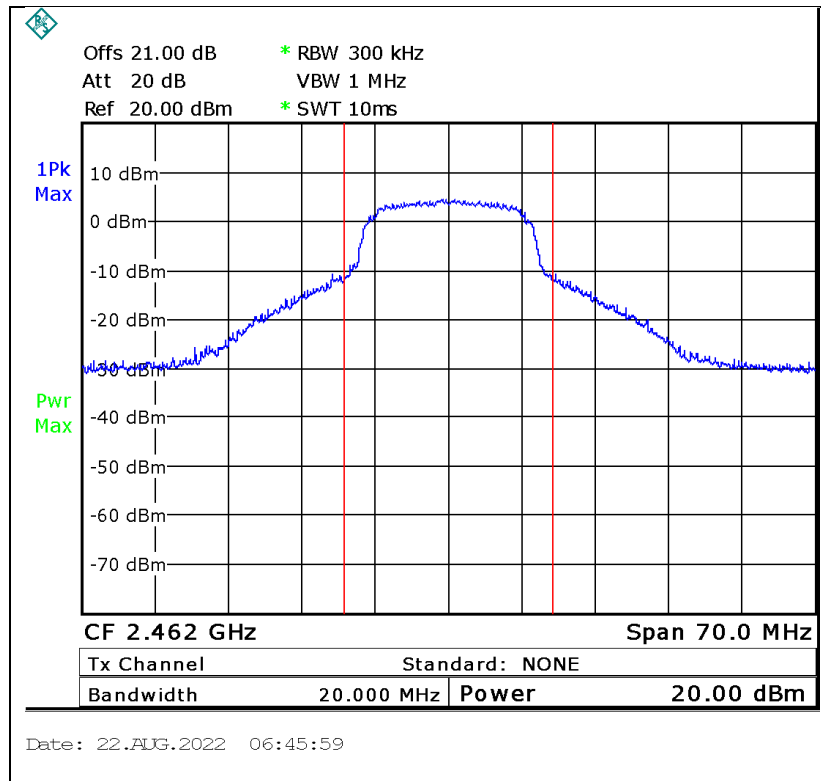


Figure 32. 2462.0 MHz, Wi-fi/g (6Mbit/s)

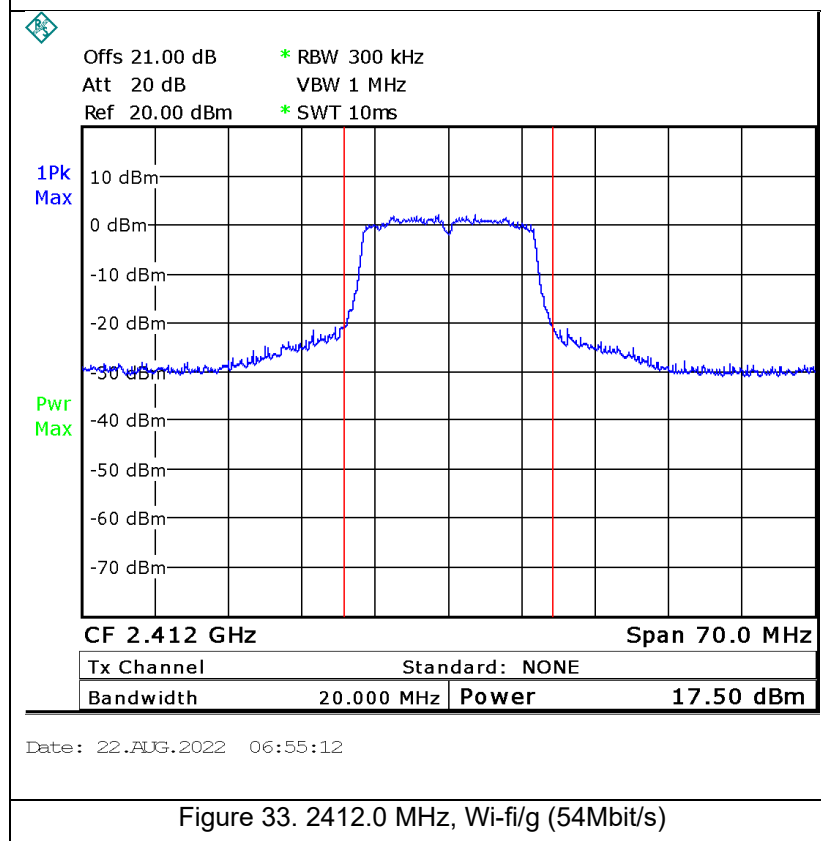


Figure 33. 2412.0 MHz, Wi-fi/g (54Mbit/s)

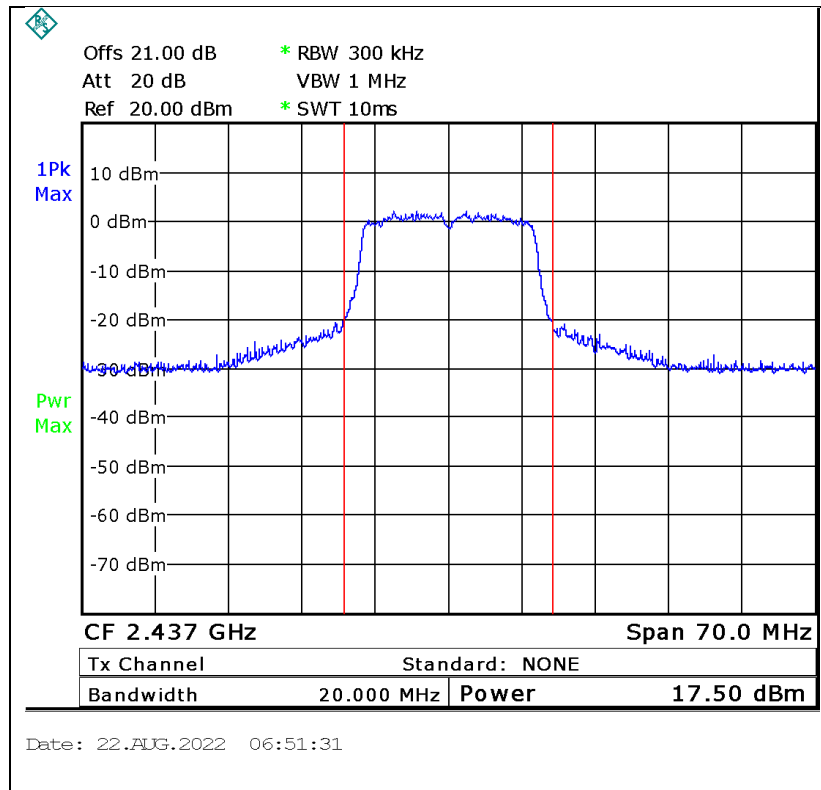


Figure 34. 2437.0 MHz, Wi-fi/g (54Mbit/s)

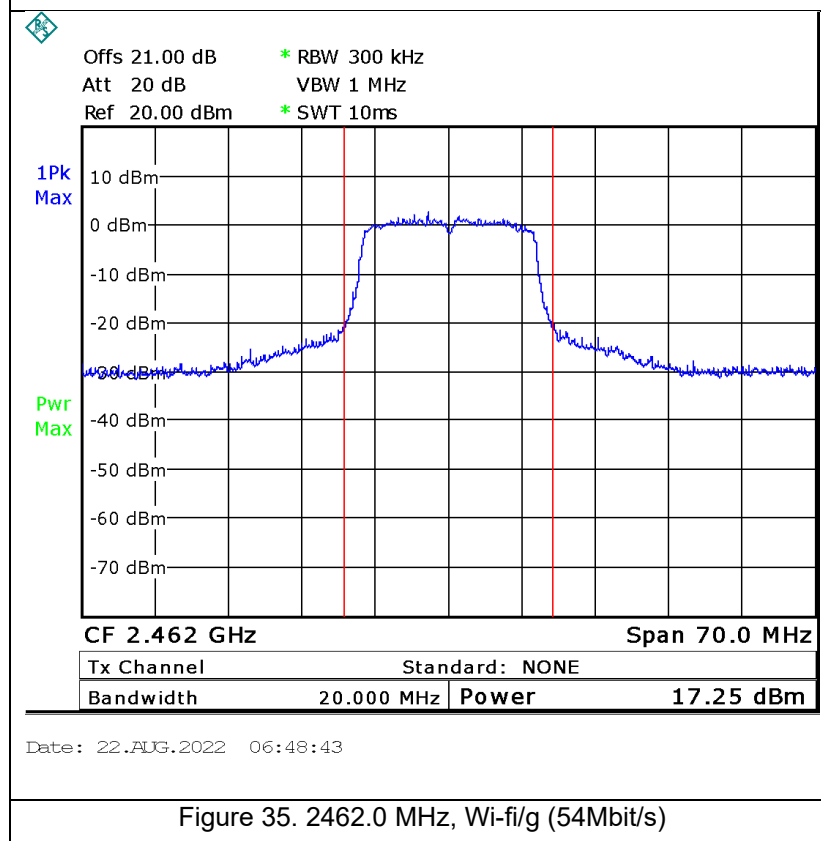


Figure 35. 2462.0 MHz, Wi-fi/g (54Mbit/s)

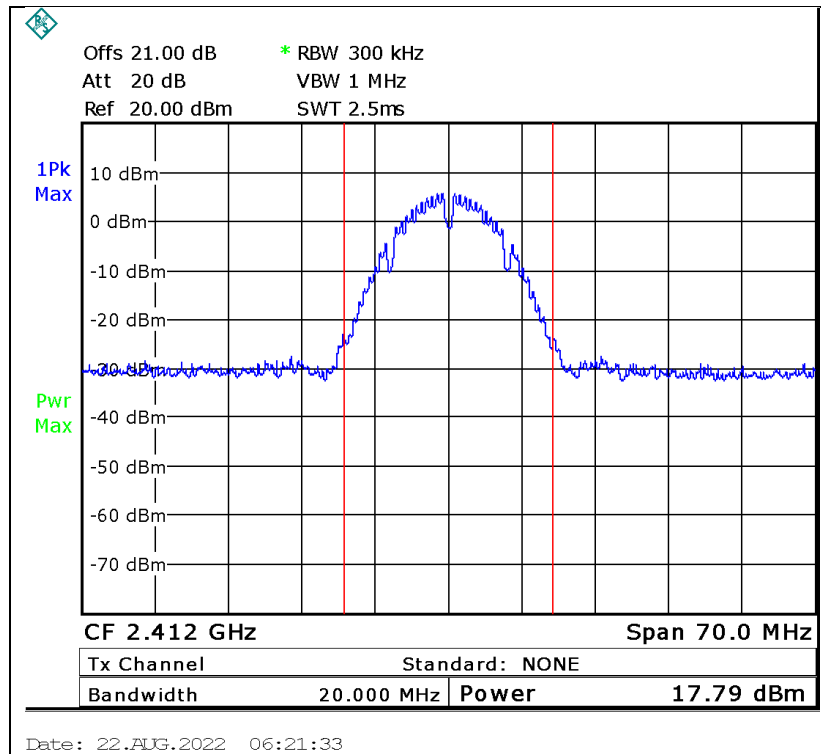


Figure 36. 2412.0 MHz, Wi-fi/b (1Mbit/s)

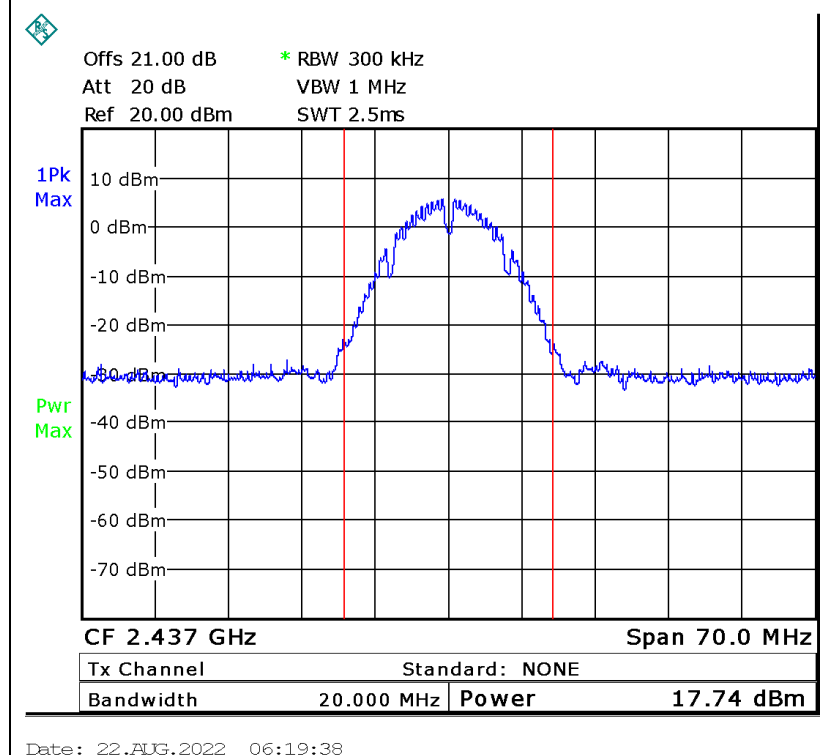


Figure 37. 2437.0 MHz, Wi-fi/b (1Mbit/s)

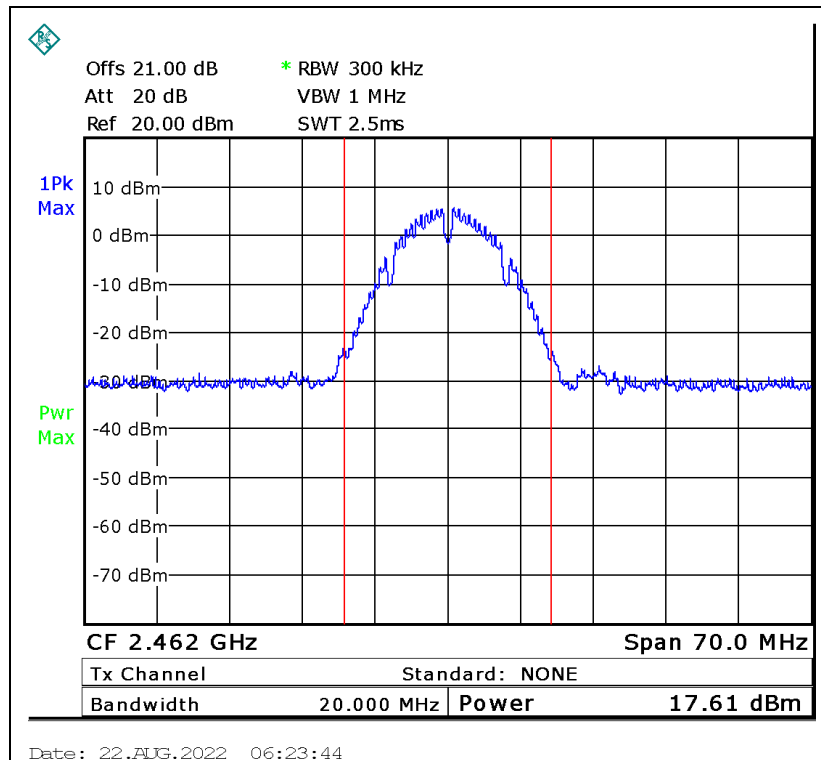


Figure 38. 2462.0 MHz, Wi-fi/b (1Mbit/s)

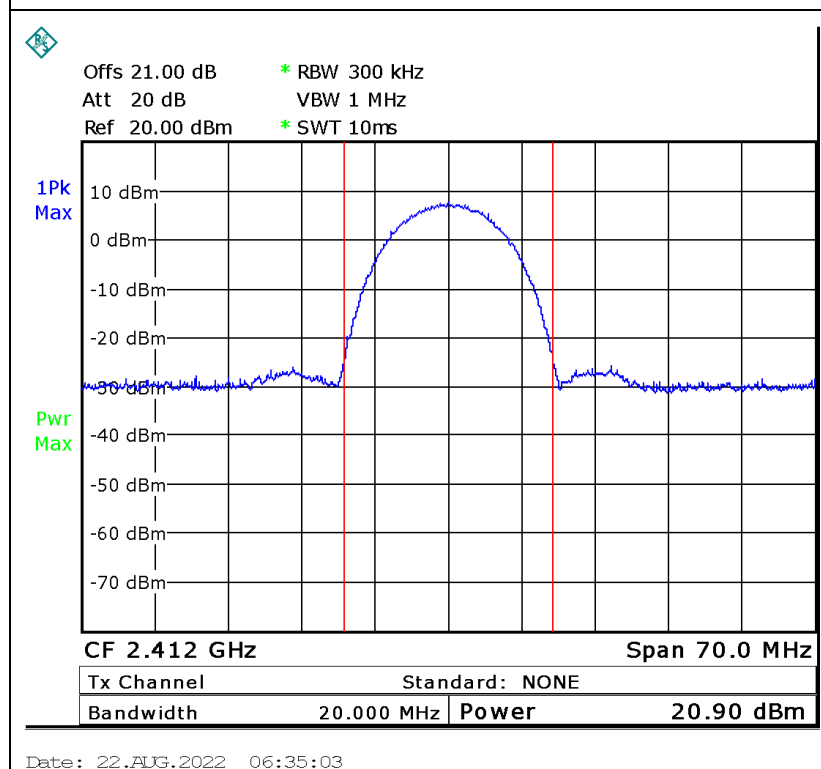


Figure 39. 2412.0 MHz, Wi-fi/b (11Mbit/s)

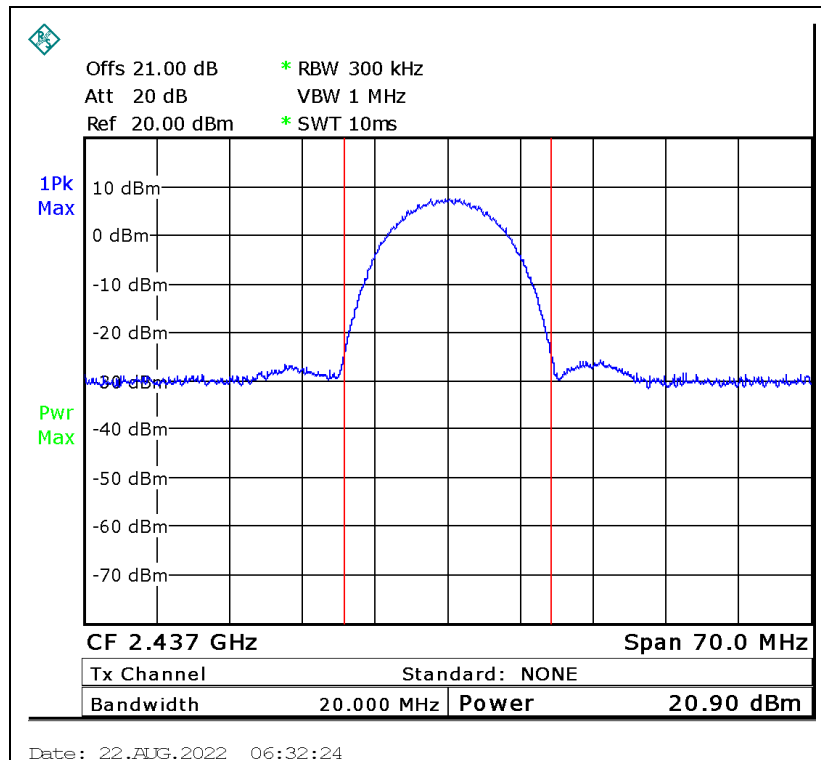


Figure 40. 2437.0 MHz, Wi-fi/b (11Mbit/s)

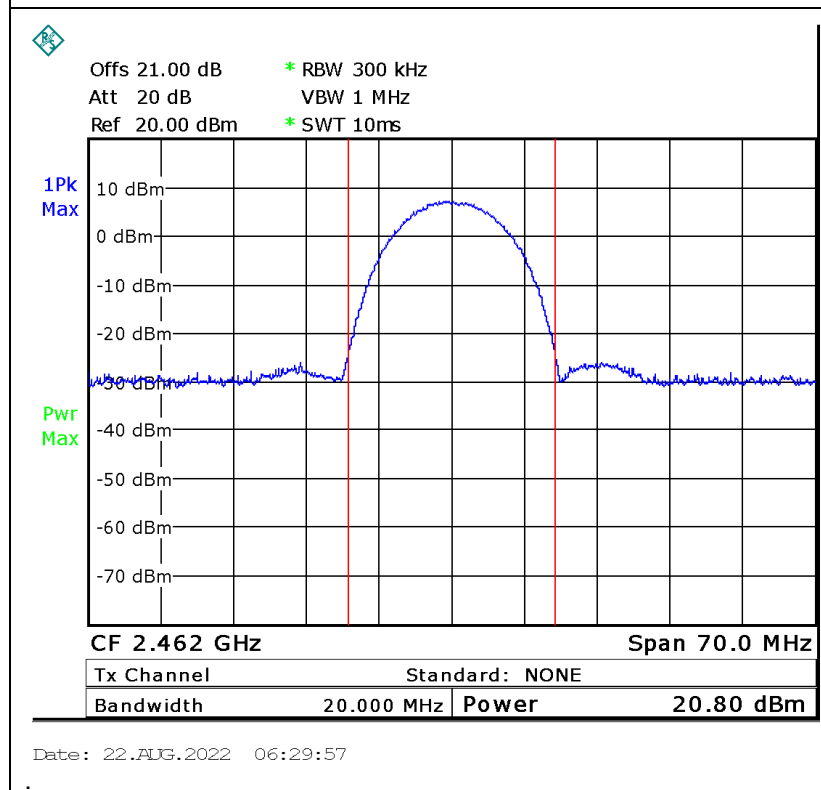


Figure 41. 2462.0 MHz, Wi-fi/b (11Mbit/s)

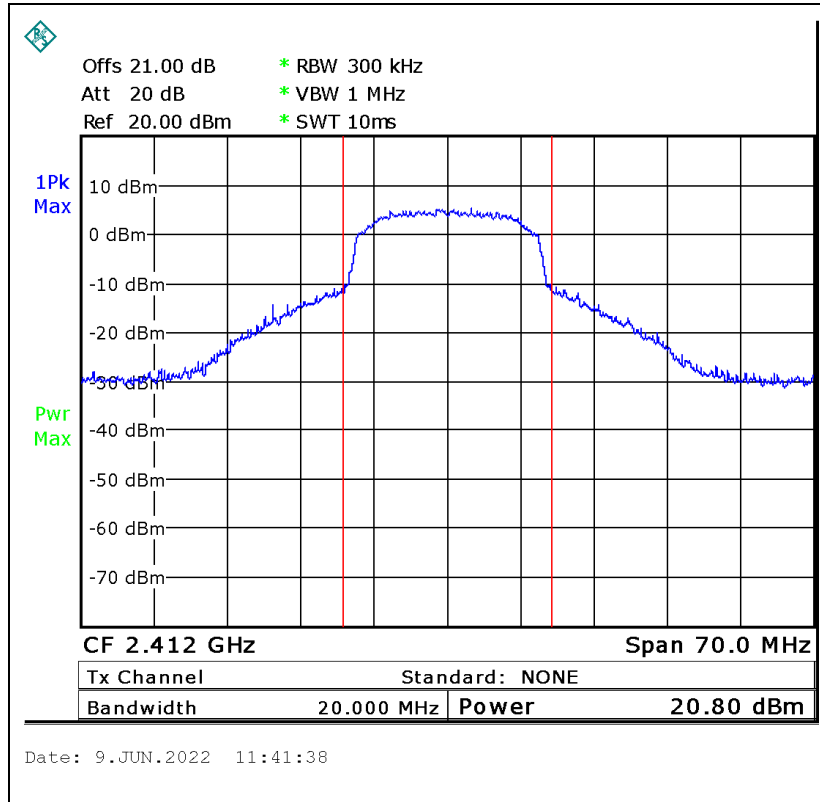


Figure 42. 2412.0 MHz, Wi-fi/n (6.5Mbit/s)

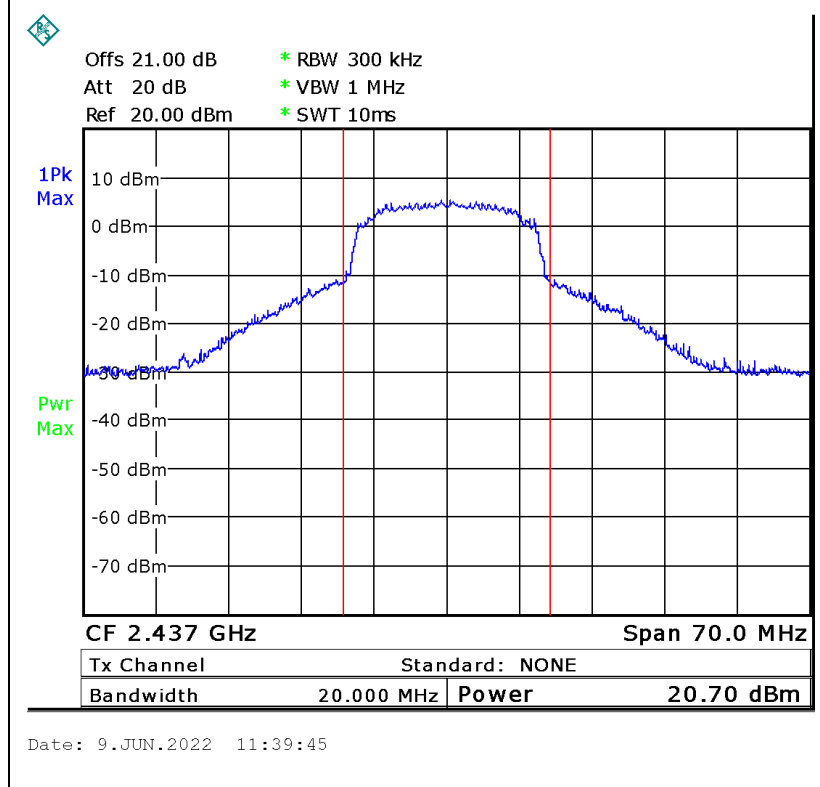


Figure 43. 2437.0 MHz, Wi-fi/n (6.5Mbit/s)

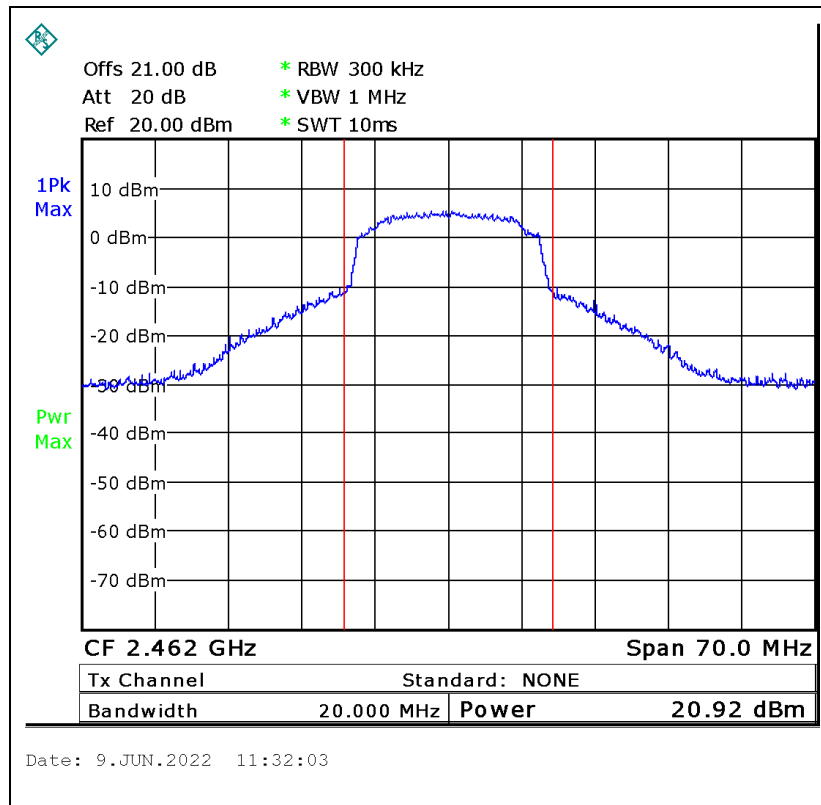


Figure 44. 2462.0 MHz, Wi-fi/n (6.5Mbit/s)

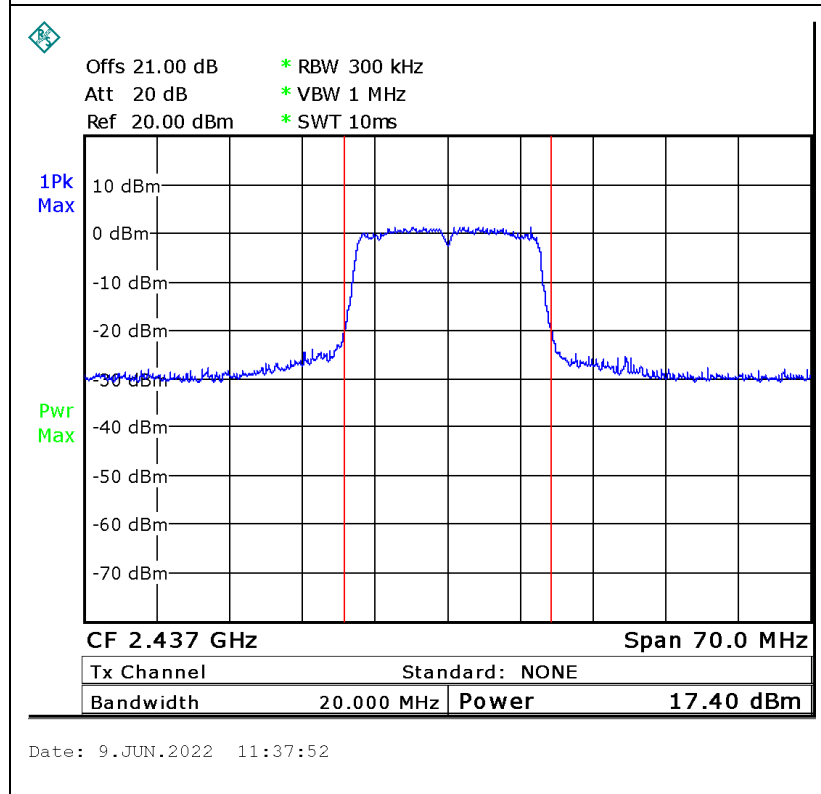


Figure 45. 2437.0 MHz, Wi-fi/n (65Mbit/s)

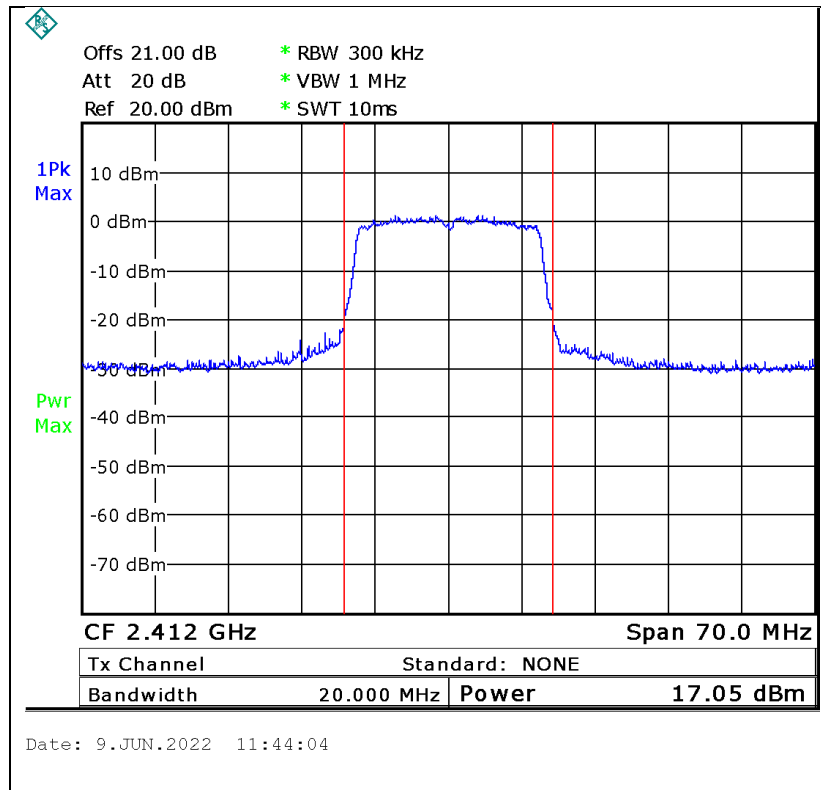


Figure 46. 2412.0 MHz, Wi-fi/n (65Mbit/s)

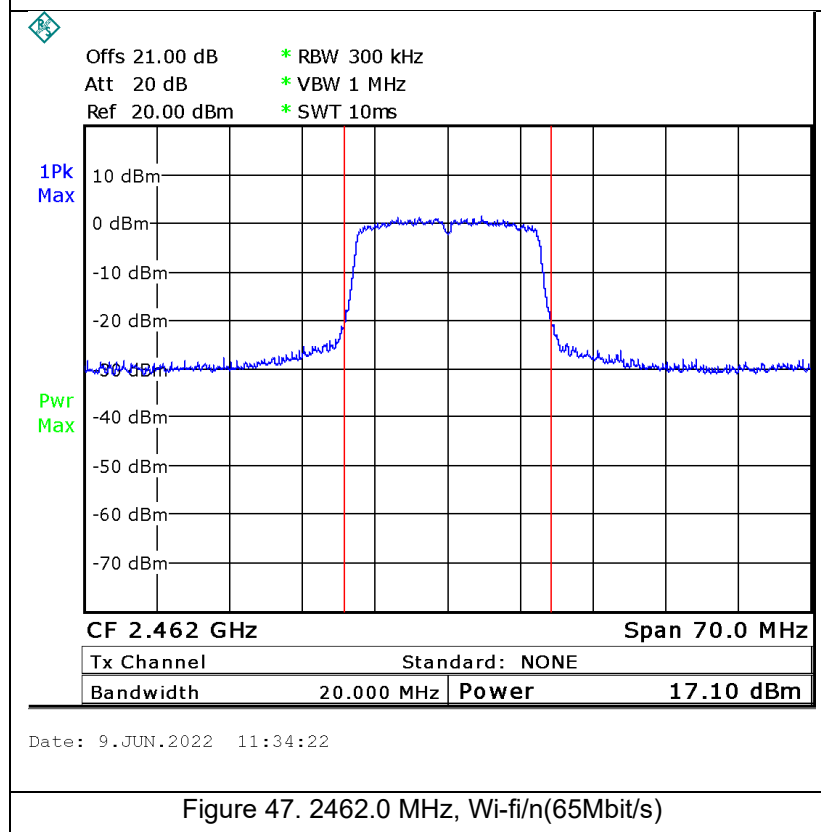


Figure 47. 2462.0 MHz, Wi-fi/n(65Mbit/s)



5.5 Test Equipment Used; Maximum Peak Power Output

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
Spectrum Analyzer	R&S	FSL6	100194	February 20, 2022	February 20, 2023
20dB/2W Attenuator	Midwest Microwave	ATT-0217-20-NNN-02	-	May 16, 2022	May 16, 2023
Low Loss cable	Huber Suhner	Sucofelex	27504/4PEA	May 16, 2022	May 16, 2023

Figure 48 Test Equipment Used

6. Band Edge Spectrum

6.1 Test Specification

FCC, Part 15, Subpart C, Section 247(d)

6.2 Test Procedure

(Temperature (20°C)/ Humidity (59%RH))

The E.U.T operation mode and test set-up are as described in Section 2 of this report. The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator and an appropriate coaxial cable (loss=21.0 dB). Special attention was taken to prevent Spectrum Analyzer RF input overload.

The RBW was set to 100 kHz.

6.3 Test Limit

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.

6.4 Test Results

Protocol Type	Operation Frequency (MHz)	Band Edge Frequency (MHz)	Spectrum Level (dBm)	Limit (dBm)	Margin (dB)
BLE	2402.0	2400.0	-49.3	-22.3	-27.0
	2480.0	2483.5	-47.0	-23.5	-23.5
Wi-Fi/b (1Mbit/s)	2412.0	2400.0	-37.0	-14.6	-22.4
	2462.0	2483.5	-39.0	-15.0	-24.0
Wi-fi/b (11Mbit/s)	2412.0	2400.0	-34.1	-16.7	-17.4
	2462.0	2483.5	-39.4	-16.7	-22.7
Wi-Fi/g (6Mbit/s)	2412.0	2400.0	-19.3	-18.7	-0.60
	2462.0	2483.5	-32.7	-19.5	-13.2
Wi-fi/g (54Mbit/s)	2412.0	2400.0	-32.8	-22.8	-10.0
	2462.0	2483.5	-38.4	-23.0	-15.4
Wi-Fi/n (6.5Mbit/s)	2412.0	2400.0	-18.9	-17.9	-1.05
	2462.0	2483.5	-32.5	-18.3	-14.2
Wi-fi/n (65Mbit/s)	2412.0	2400.0	-34.8	-23.0	-11.8
	2462.0	2483.5	-42.5	-22.9	-19.6

Figure 49 Band Edge Spectrum

JUDGEMENT:

Passed

For additional information see Figure 50 and Figure 63.

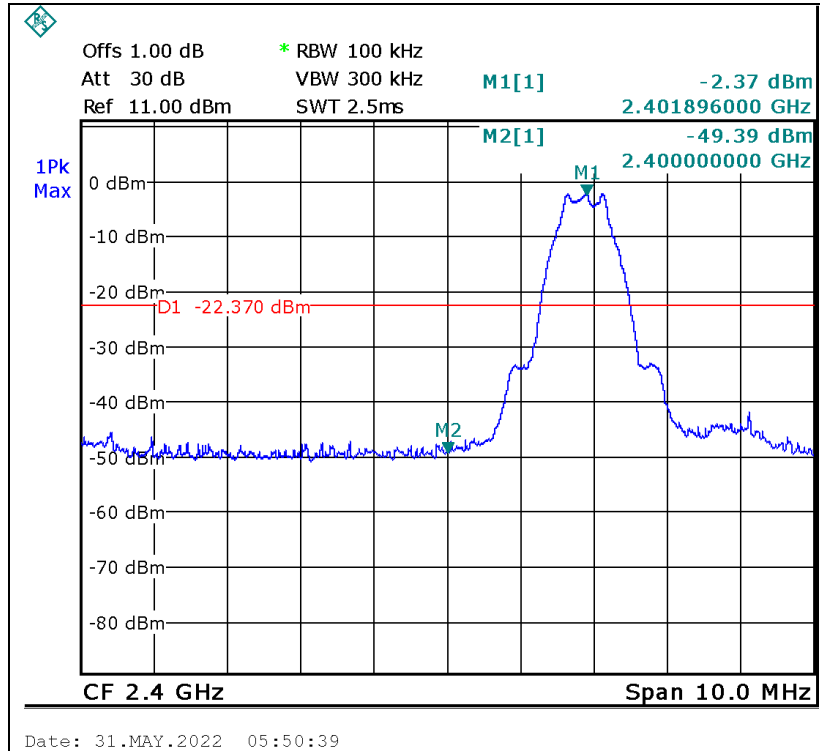


Figure 50. 2402.0 MHz, BLE

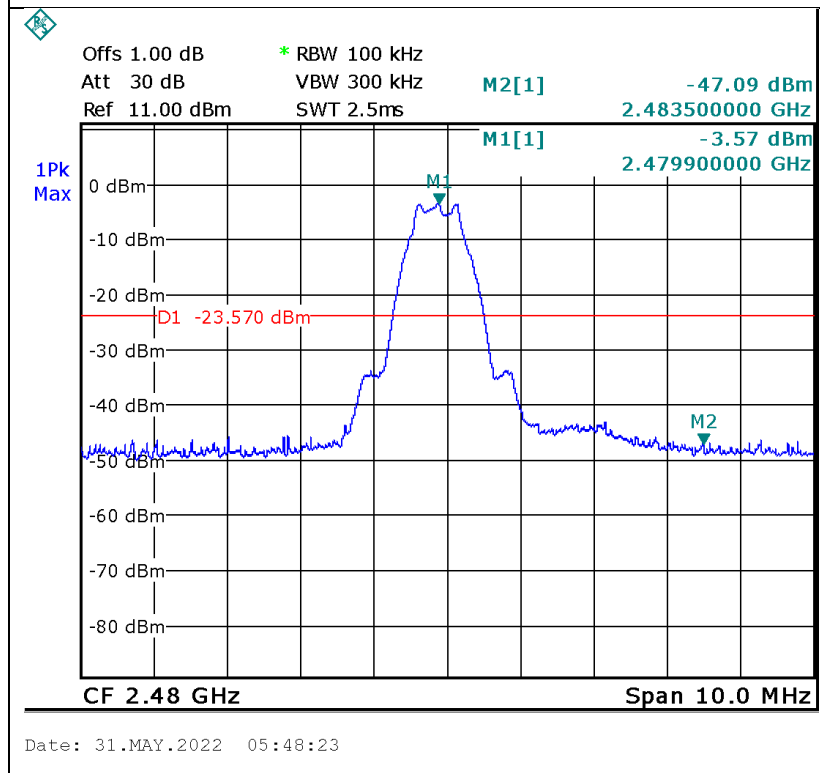
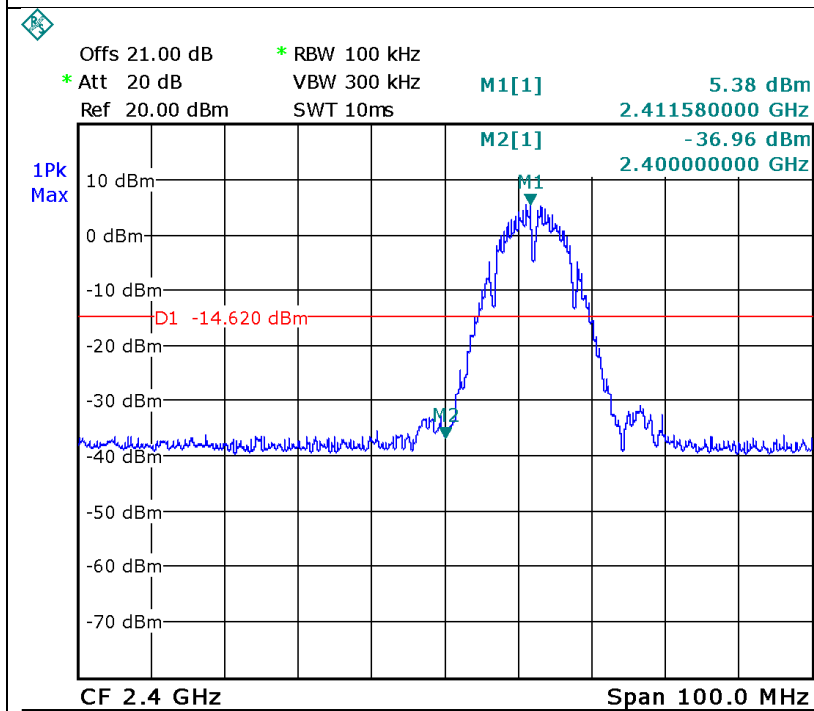
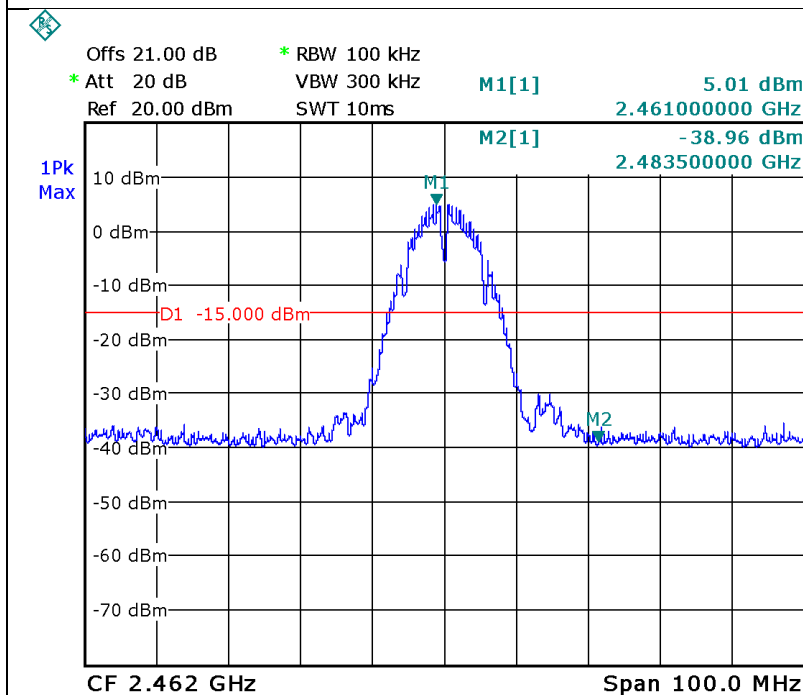


Figure 51. 2480.0 MHz, BLE



Date: 22.AUG.2022 07:02:26

Figure 52. 2412.0 MHz, Wi-fi/b(1Mbit/s)



Date: 22.AUG.2022 07:25:58

Figure 53. 2462.0 MHz, Wi-fi/b(1Mbit/s)

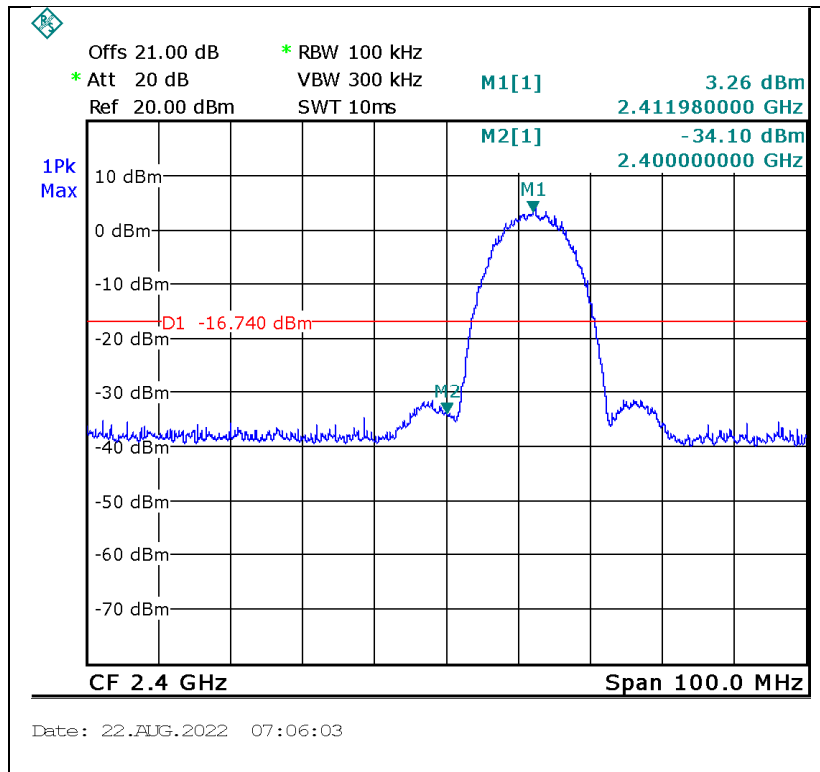


Figure 54. 2412.0 MHz, Wi-fi/b(11Mbit/s)

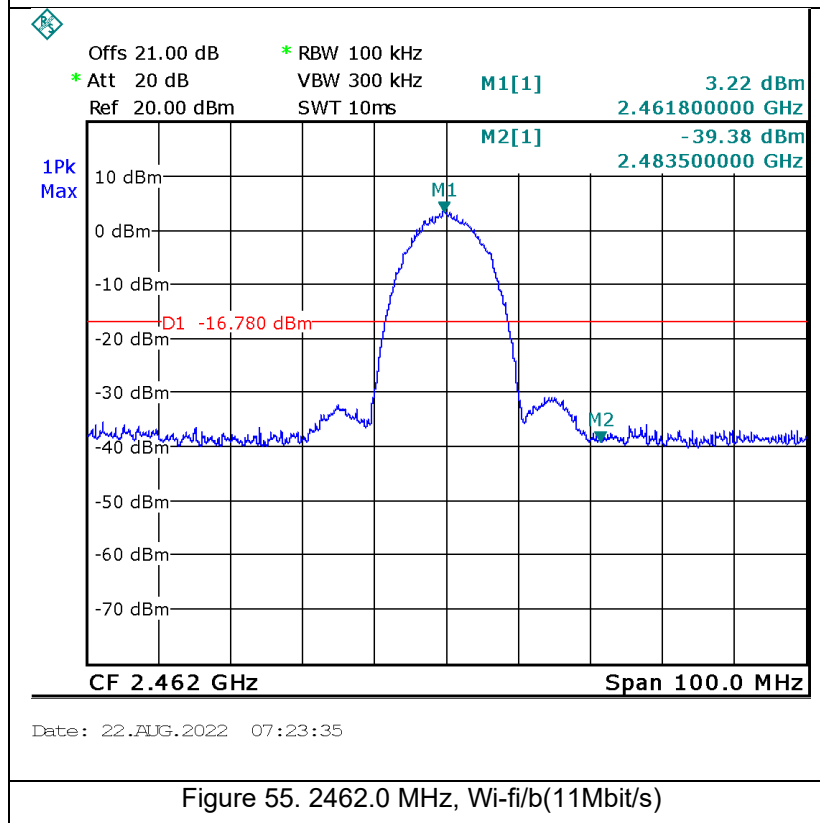


Figure 55. 2462.0 MHz, Wi-fi/b(11Mbit/s)

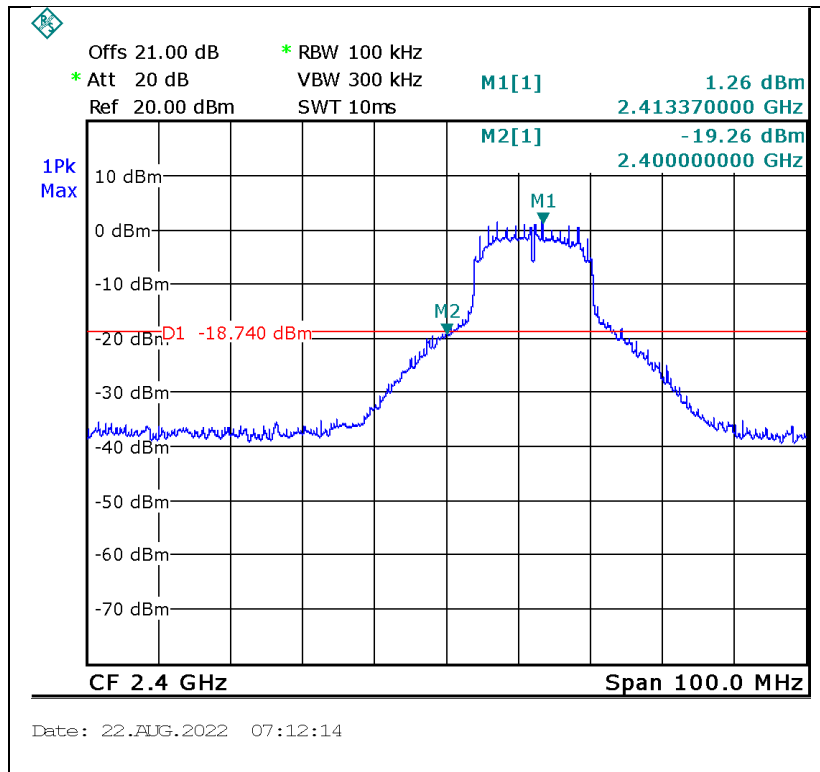


Figure 56. 2412.0 MHz, Wi-fi/g(6Mbit/s)

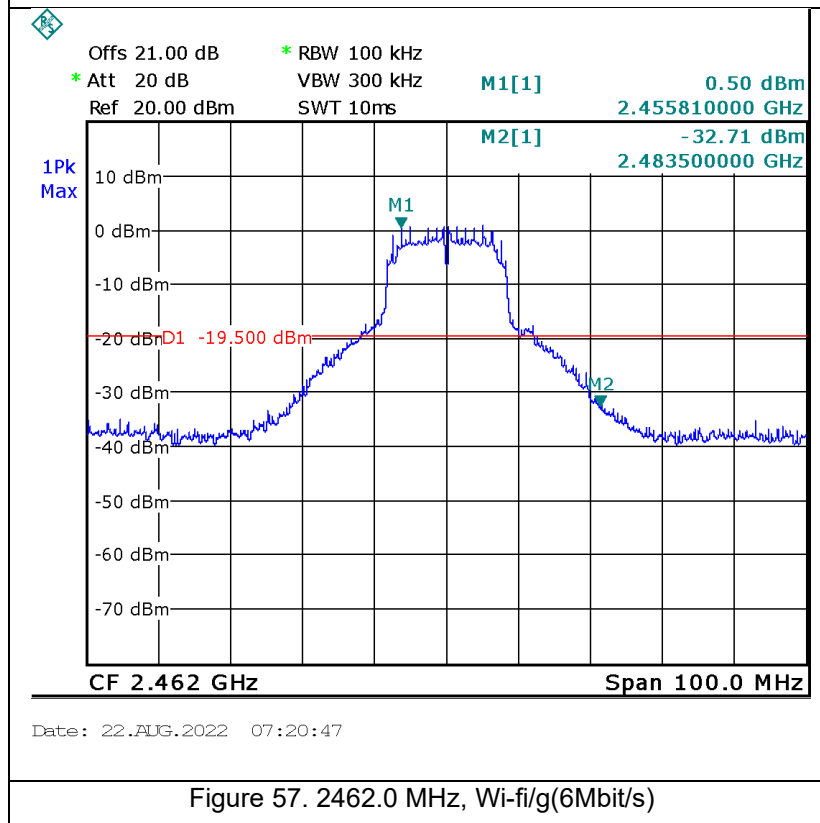


Figure 57. 2462.0 MHz, Wi-fi/g(6Mbit/s)

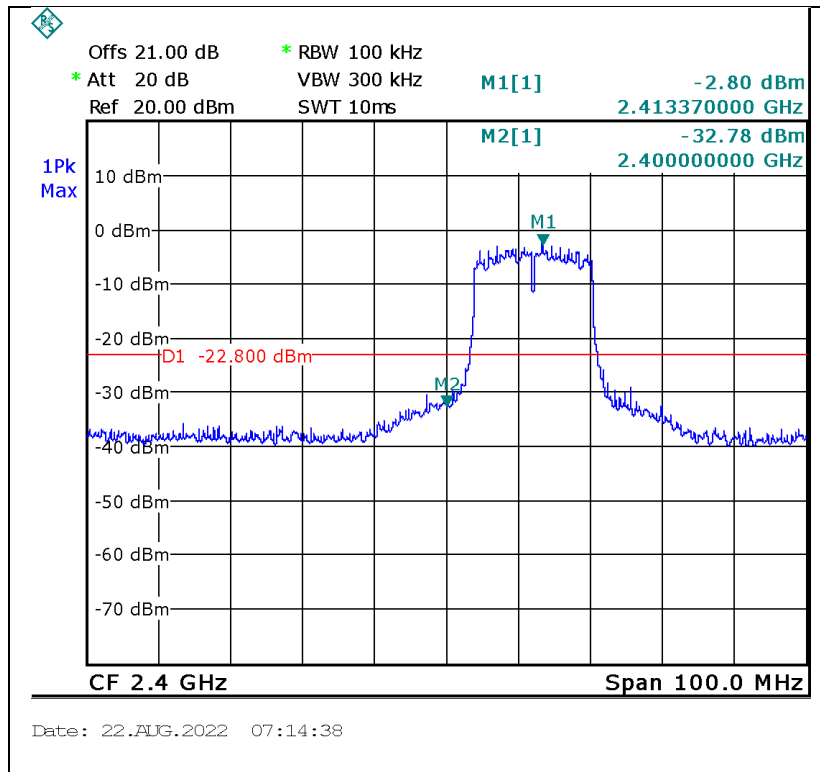


Figure 58. 2412.0 MHz, Wi-fi/g(54Mbit/s)

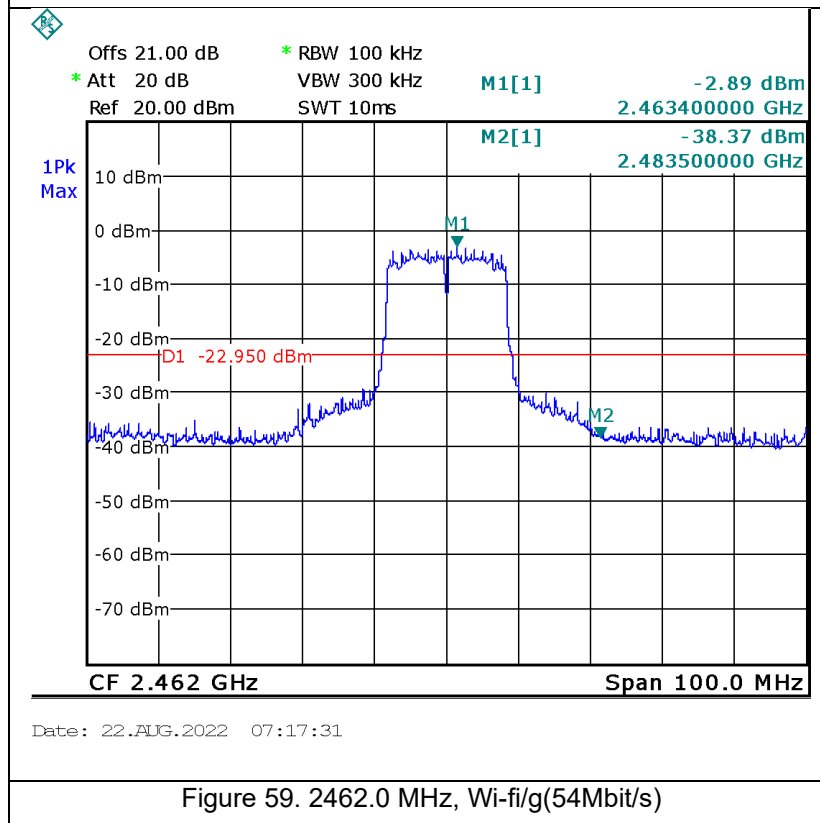
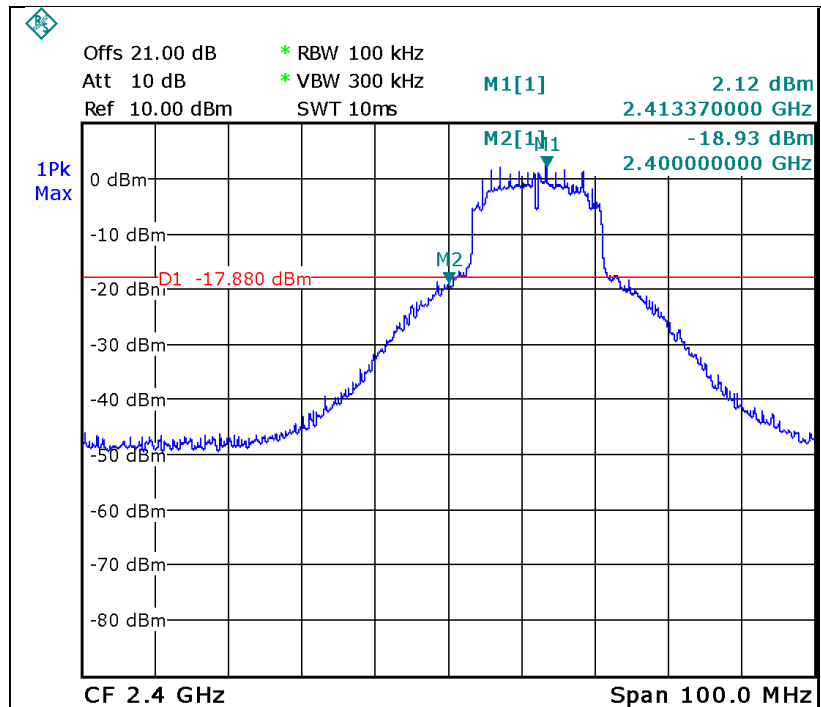
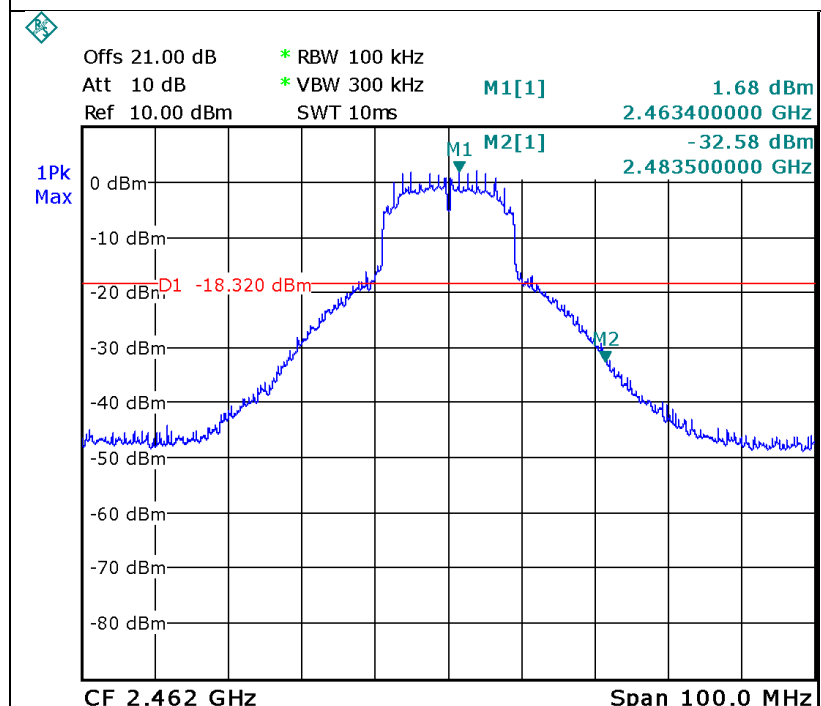


Figure 59. 2462.0 MHz, Wi-fi/g(54Mbit/s)



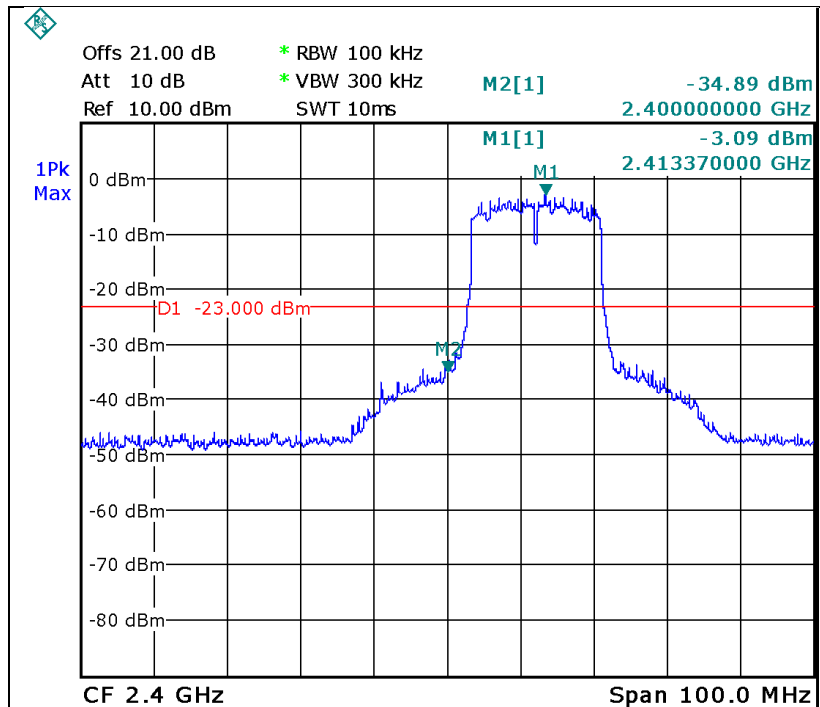
Date: 9.JUN.2022 11:53:15

Figure 60. 2412.0 MHz, Wi-fi/n(6.5Mbit/s)



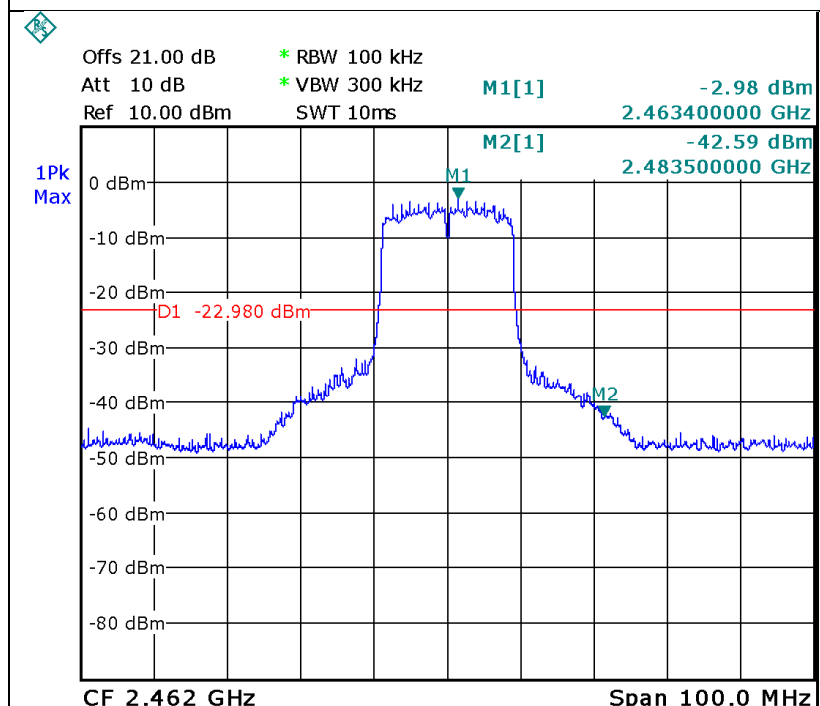
Date: 9.JUN.2022 11:56:00

Figure 61. 2462.0 MHz, Wi-fi/n(6.5Mbit/s)



Date: 9.JUN.2022 11:50:38

Figure 62. 2412.0 MHz, Wi-fi/n(65Mbit/s)



Date: 9.JUN.2022 11:59:00

Figure 63. 2462.0 MHz, Wi-fi/n(65Mbit/s)



6.5 Test Equipment Used; Band Edge

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
Spectrum Analyzer	R&S	FSL6	100194	February 20, 2022	February 20, 2023
20dB/2W Attenuator	Midwest Microwave	ATT-0217-20-NNN-02	-	May 16, 2022	May 16, 2023
Low Loss cable	Huber Suhner	Sucofelex	27504/4PEA	May 16, 2022	May 16, 2023

Figure 64 Test Equipment Used

7. Transmitted Power Density

7.1 Test Specification

FCC, Part 15, Subpart C, Section 247(e)

7.2 Test Procedure

(Temperature (22°C)/ Humidity (70%RH))

The E.U.T operation mode and test set-up are as described in Section 2 of this report. The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator and an appropriate coaxial cable (total loss= 21.0dB). Special attention was taken to prevent Spectrum Analyzer RF input overload.

The spectrum analyzer was set to 3 kHz RBW.

7.3 Test Limit

For digitally modulated systems, 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.

7.4 Test Results

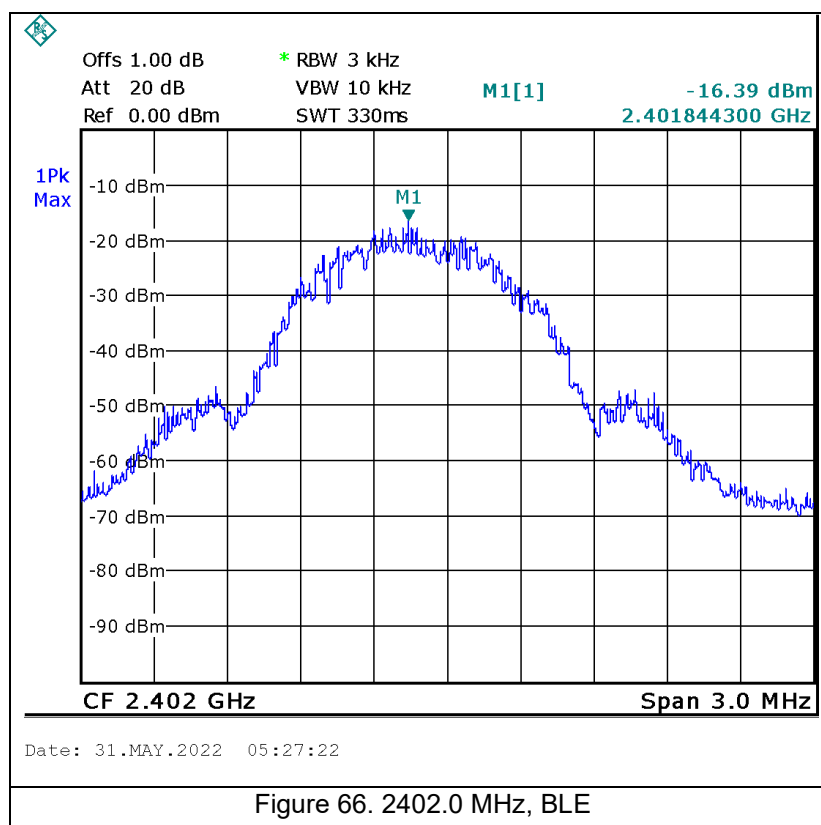
Protocol Type	Operation Frequency (MHz)	PSD Reading (dBm)	Limit (dBm)	Margin (dB)
BLE	2402.0	-16.3	8.0	24.3
	2440.0	-17.3	8.0	25.3
	2480.0	-17.7	8.0	25.7
Wi-fi/b (1Mbit/s)	2412.0	-10.3	8.0	-18.3
	2437.0	-8.5	8.0	-16.5
	2462.0	-8.8	8.0	-16.8
Wi-fi/b (11Mbit/s)	2412.0	-10.3	8.0	-18.3
	2437.0	-10.5	8.0	-18.5
	2462.0	-11.1	8.0	-19.1
Wi-fi/g (6Mbit/s)	2412.0	-11.9	8.0	-19.9
	2437.0	-9.8	8.0	-17.8
	2462.0	-10.4	8.0	-18.4
Wi-fi/g (54Mbit/s)	2412.0	-17.0	8.0	-25.0
	2437.0	-15.9	8.0	-23.9
	2462.0	-16.4	8.0	-24.4

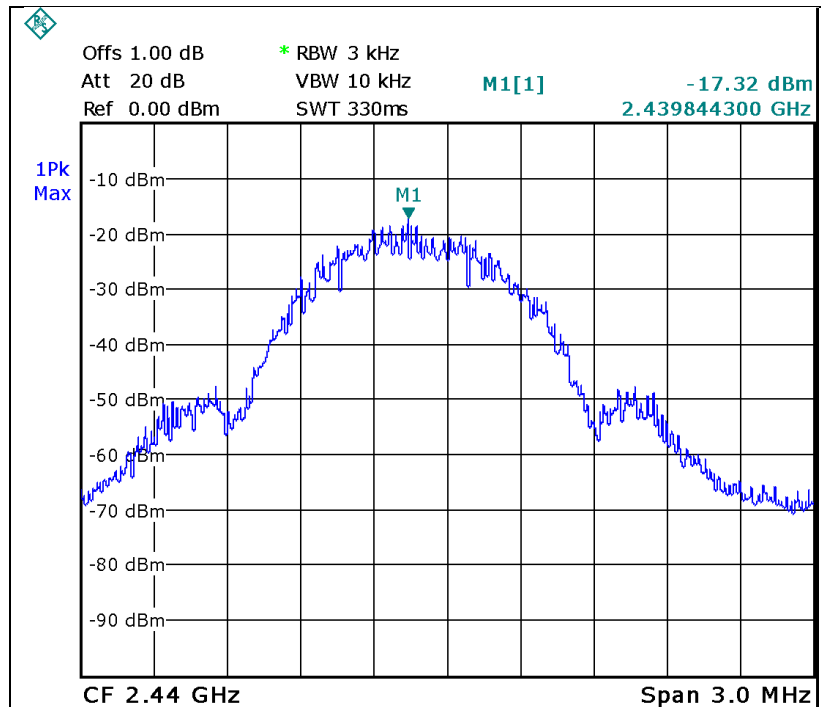
Protocol Type	Operation Frequency	PSD Reading	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Wi-fi/n (6.5Mbit/s)	2412.0	-11.1	8.0	19.1
	2437.0	-10.4	8.0	18.4
	2462.0	-10.7	8.0	18.7
Wi-fi/n (65Mbit/s)	2412.0	-17.8	8.0	25.8
	2437.0	-16.4	8.0	24.4
	2462.0	-17.1	8.0	25.1

Figure 65 Test Results

JUDGEMENT: Passed

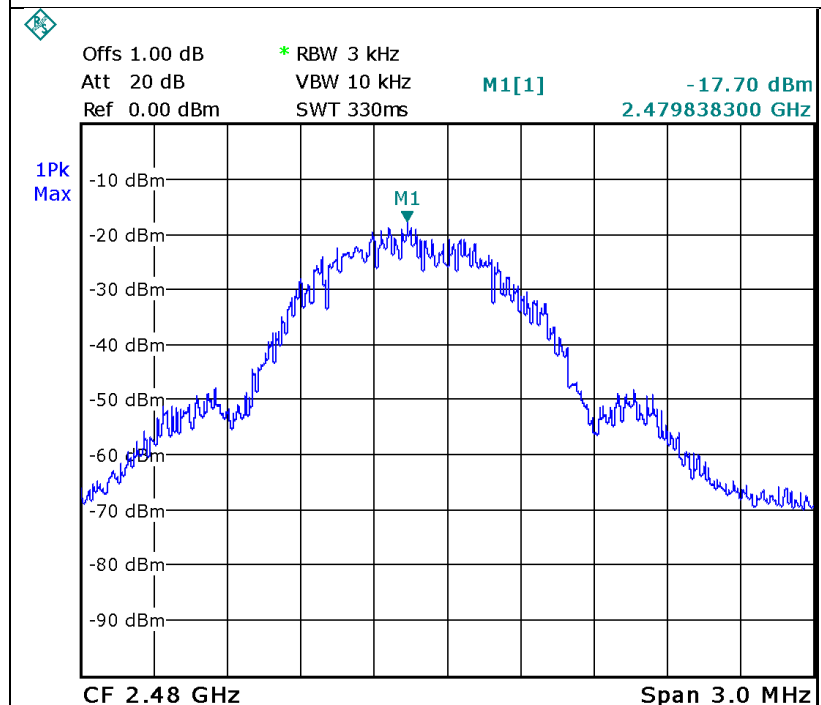
For additional information see Figure 66 to Figure 86.





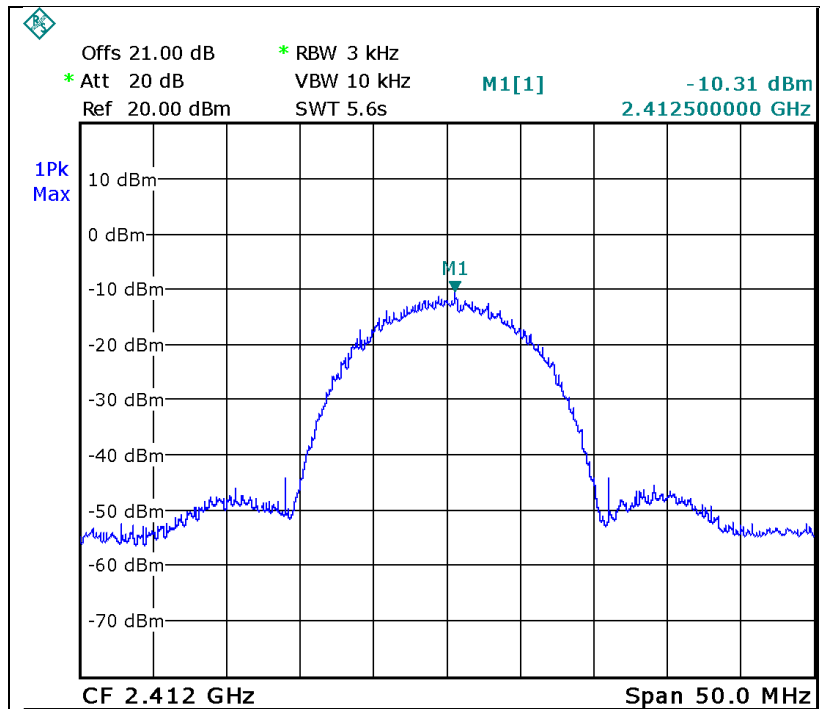
Date: 31.MAY.2022 05:26:37

Figure 67. 2440.0 MHz, BLE



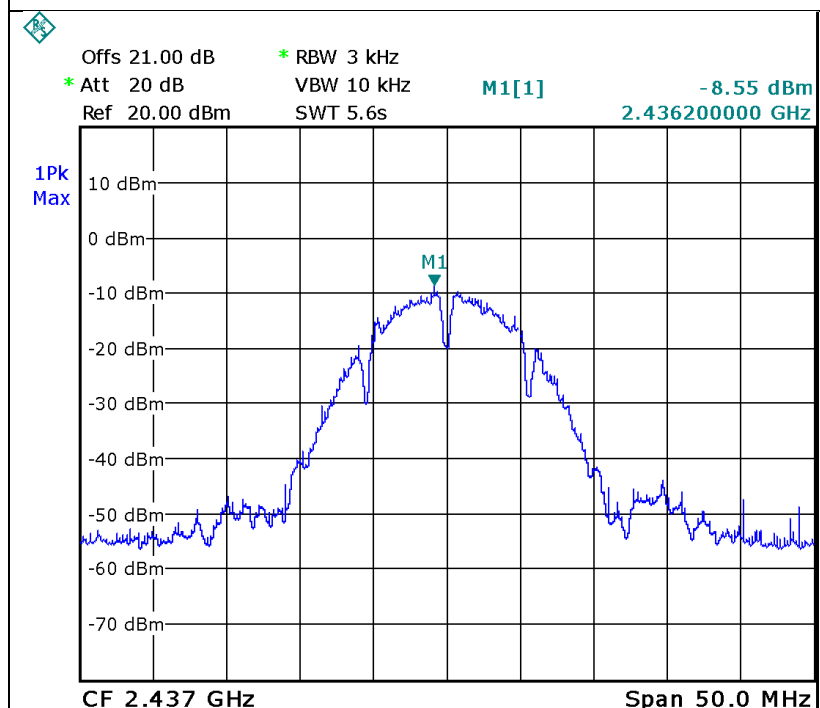
Date: 31.MAY.2022 05:25:49

Figure 68. 2480.0 MHz, BLE



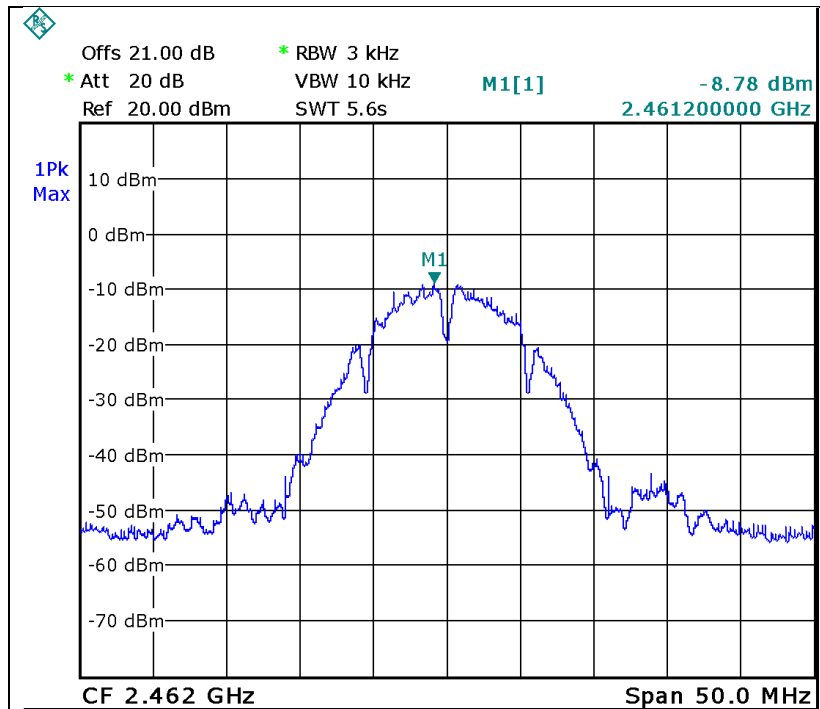
Date: 22.AUG.2022 07:38:52

Figure 69. 2412.0 MHz, Wi-fi/b(1Mbit/s)



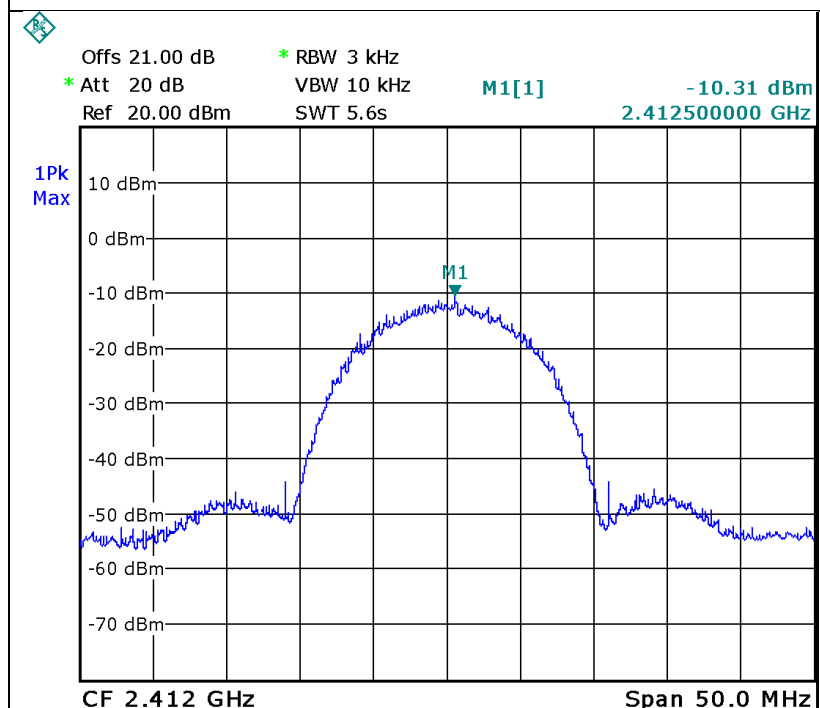
Date: 22.AUG.2022 07:31:44

Figure 70. 2437.0 MHz, Wi-fi/b(1Mbit/s)



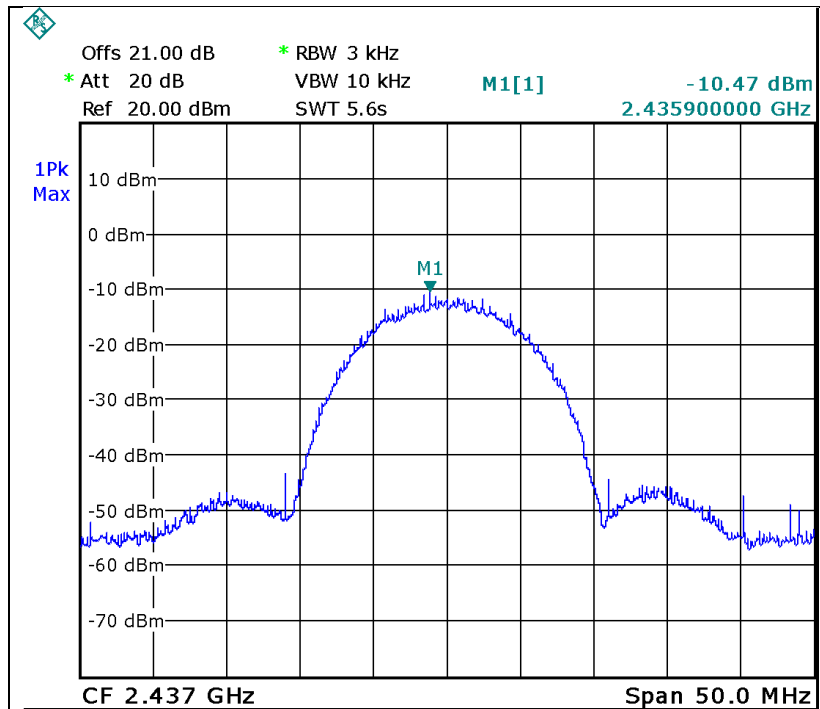
Date: 22.AUG.2022 07:30:00

Figure 71. 2462.0 MHz, Wi-fi/b(1Mbit/s)



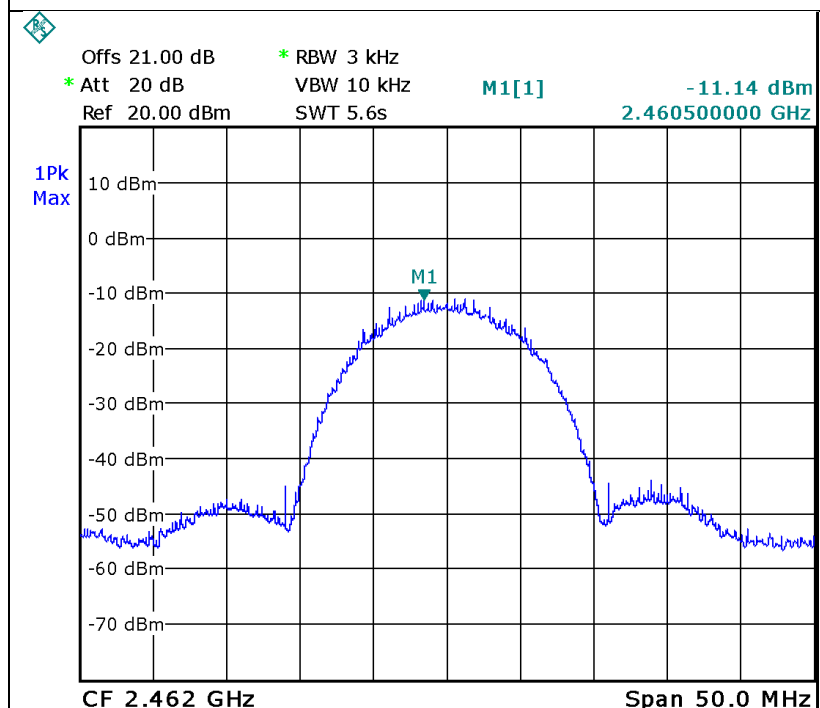
Date: 22.AUG.2022 07:38:52

Figure 72. 2412.0 MHz, Wi-fi/b(11Mbit/s)



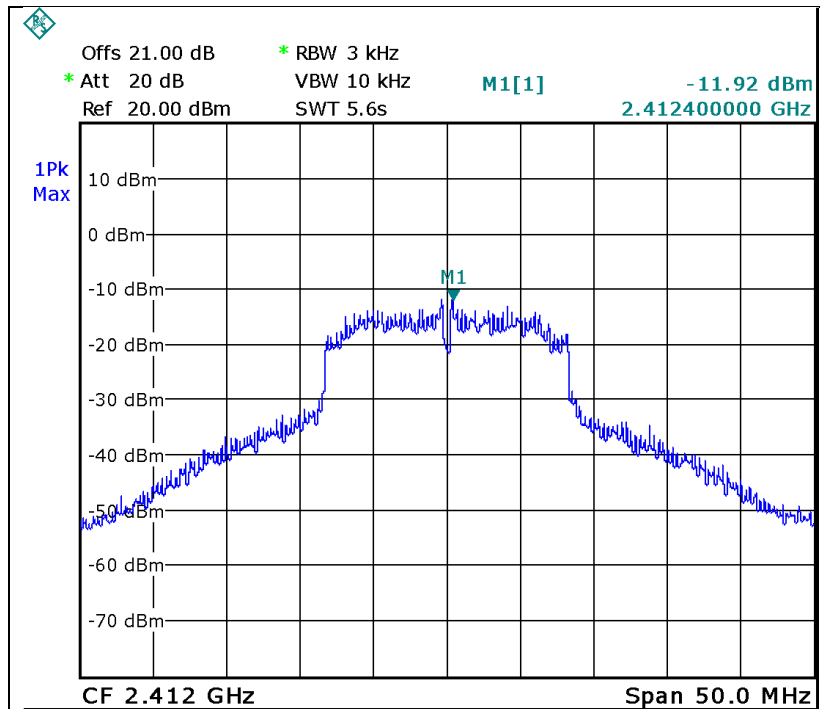
Date: 22.AUG.2022 07:37:14

Figure 73. 2437.0 MHz, Wi-fi/b(11Mbit/s))



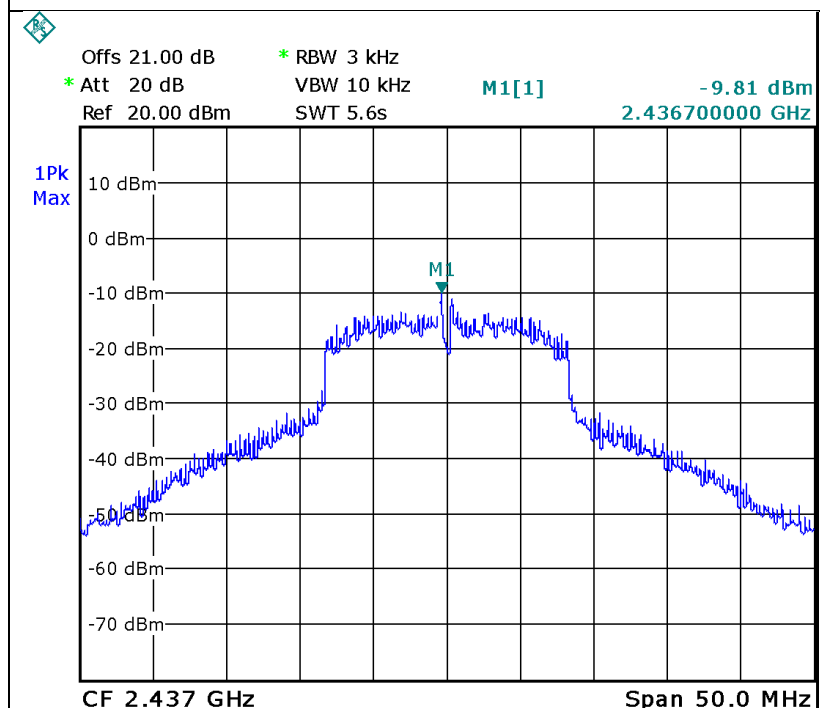
Date: 22.AUG.2022 07:35:18

Figure 74. 2462.0 MHz, Wi-fi/b(11Mbit/s))



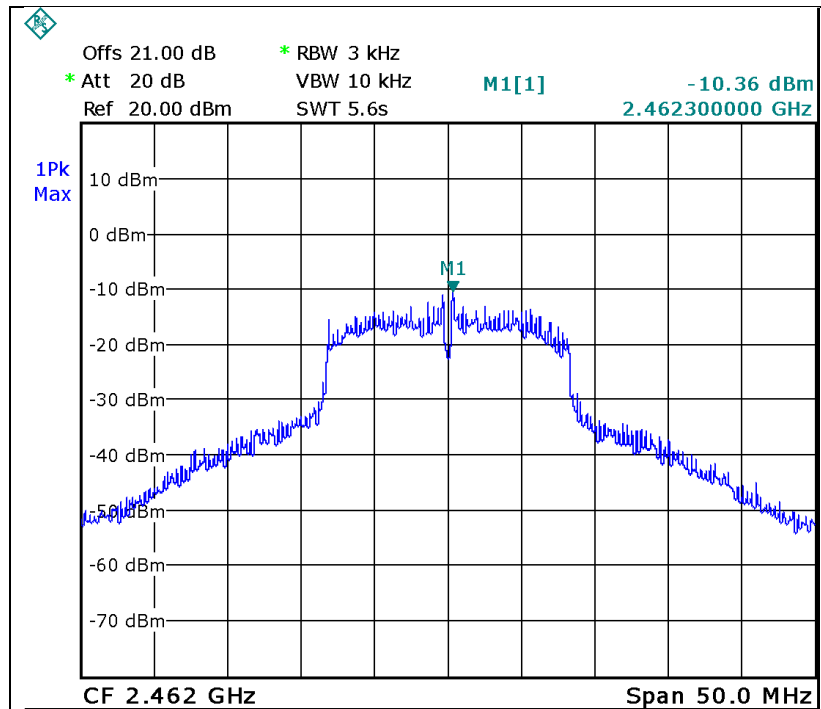
Date: 22.AUG.2022 07:40:41

Figure 75. 2412.0 MHz, Wi-fi/g(6Mbit/s)



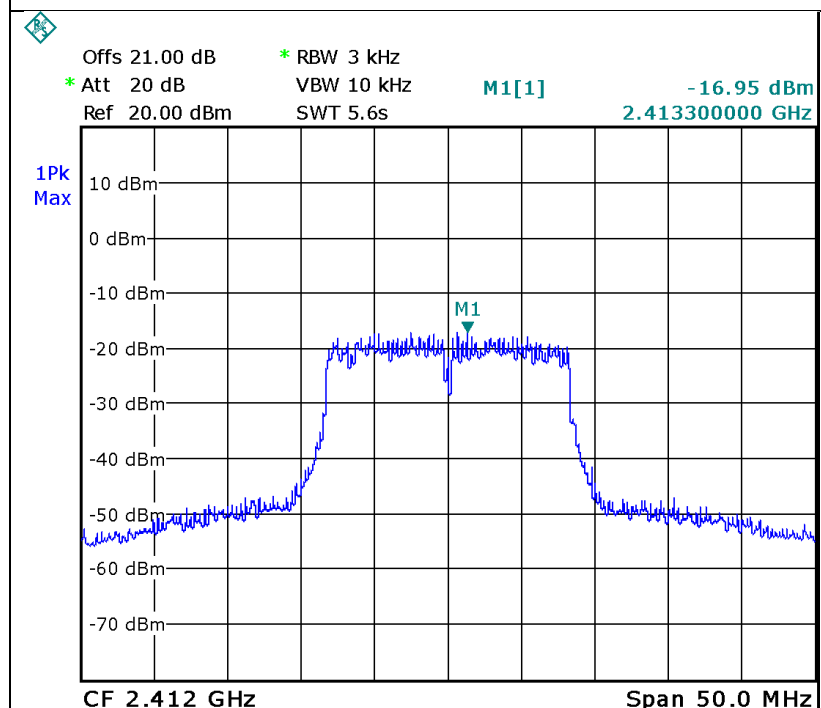
Date: 22.AUG.2022 07:42:28

Figure 76. 2437.0 MHz, Wi-fi/g(6Mbit/s)



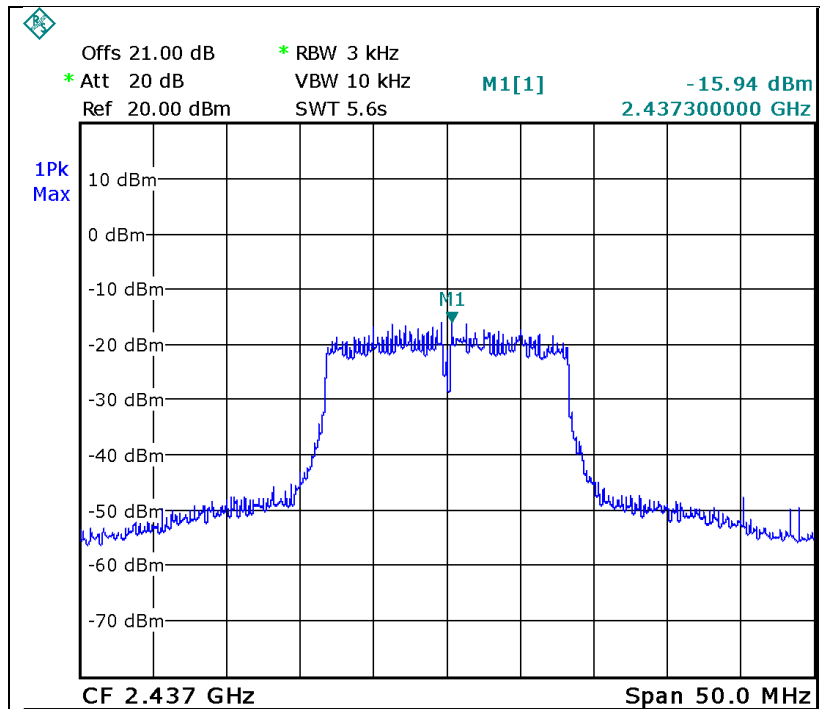
Date: 22.AUG.2022 07:44:17

Figure 77. 2462.0 MHz, Wi-fi/g(6Mbit/s)



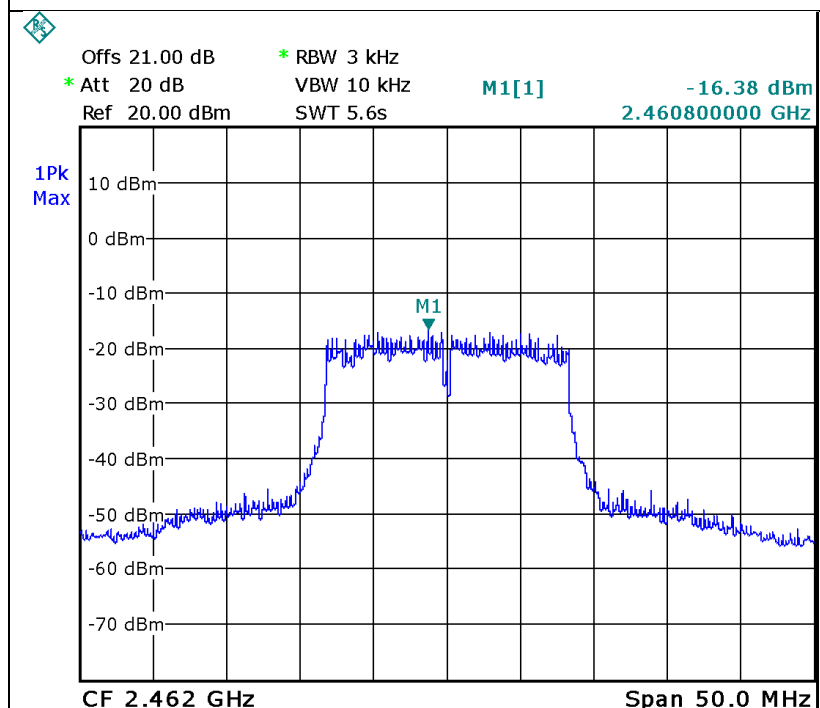
Date: 22.AUG.2022 07:49:50

Figure 78. 2412.0 MHz, Wi-fi/g(54Mbit/s)



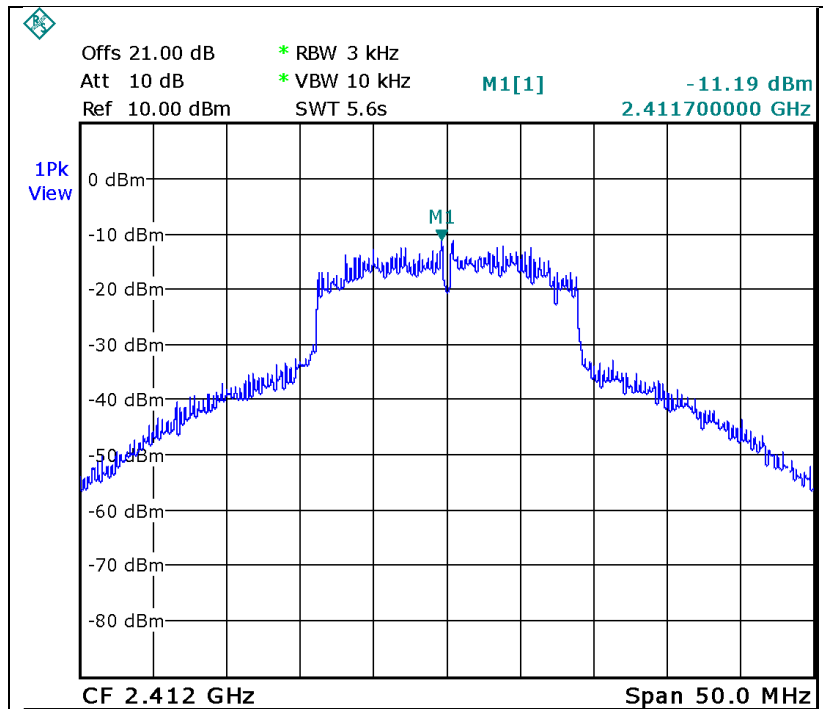
Date: 22.AUG.2022 07:48:06

Figure 79. 2437.0 MHz, Wi-fi/g(54Mbit/s)



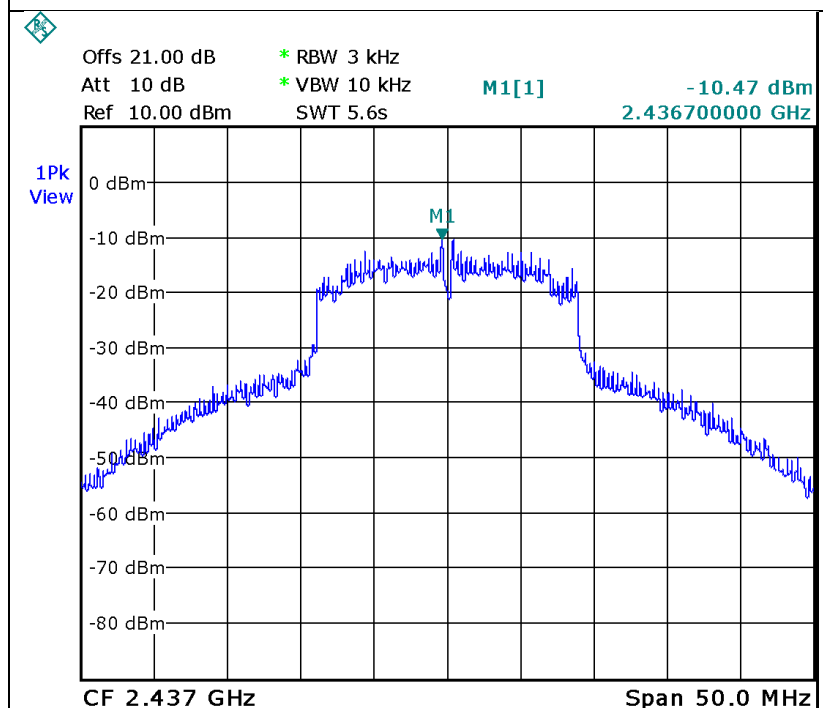
Date: 22.AUG.2022 07:46:21

Figure 80. 2462.0 MHz, Wi-fi/g(54Mbit/s)



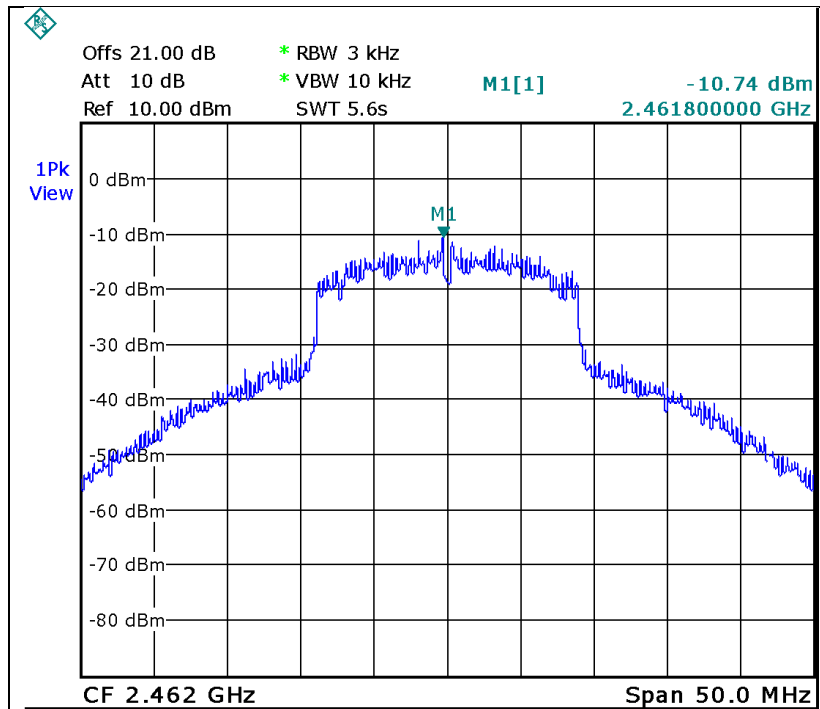
Date: 9.JUN.2022 12:25:58

Figure 81. 2412.0 MHz, Wi-fi/n(6.5Mbit/s)



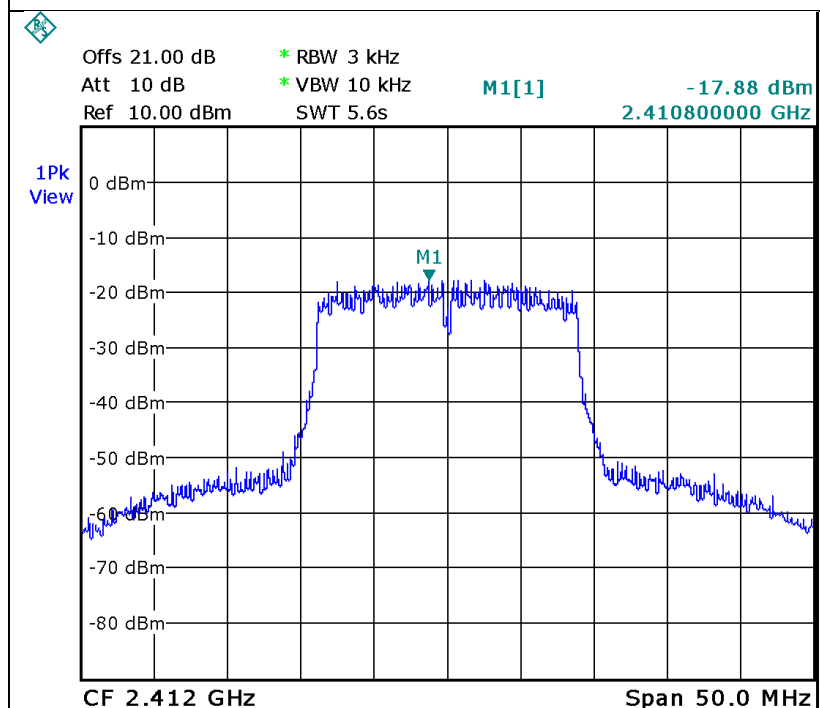
Date: 9.JUN.2022 12:17:38

Figure 82. 2437.0 MHz, Wi-fi/n(6.5Mbit/s)



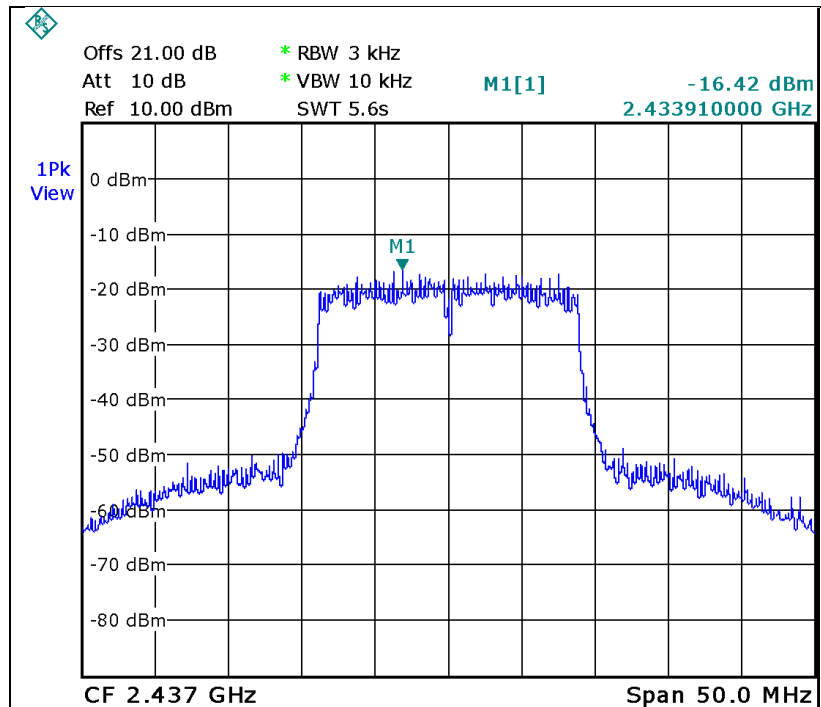
Date: 9.JUN.2022 12:24:32

Figure 83. 2462.0 MHz, Wi-fi/n(6.5Mbit/s)



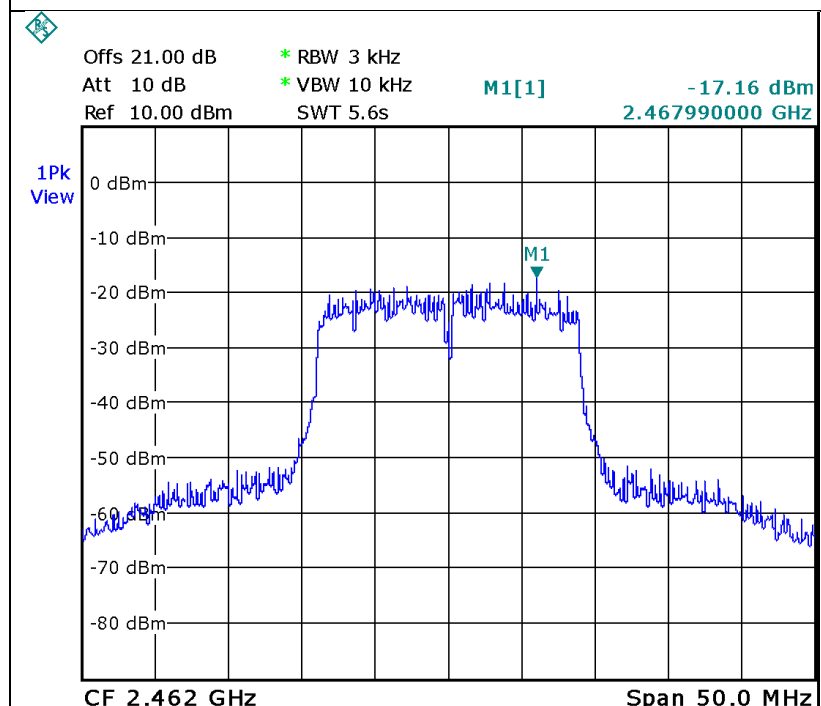
Date: 9.JUN.2022 12:27:19

Figure 84. 2412.0 MHz, Wi-fi/n(65Mbit/s)



Date: 9.JUN.2022 12:20:44

Figure 85. 2437.0 MHz, Wi-fi/n(65Mbit/s)



Date: 9.JUN.2022 12:12:57

Figure 86. 2462.0 MHz, Wi-fi/n(65Mbit/s)



7.5 Test Equipment Used; Transmitted Power Density

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
Spectrum Analyzer	R&S	FSL6	100194	February 20, 2022	February 20, 2023
20dB/2W Attenuator	Midwest Microwave	ATT-0217-20-NNN-02	-	May 16, 2022	May 16, 2023
Low Loss cable	Huber Suhner	Sucofelex	27504/4PEA	May 16, 2022	May 16, 2023

Figure 87 Test Equipment Used

8. Occupied Bandwidth

8.1 Test Specification

FCC, Part 2, Sub part J, Section 2.1049

8.2 Test Procedure

(Temperature (22°C)/ Humidity (56%RH))

The E.U.T. operation mode and test set-up are as described in Section 2 of this report. The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator and an appropriate coaxial cable (total loss= 21.0dB). Special attention was taken to prevent Spectrum Analyzer RF input overload.

The RBW set to the range of 1% to 5% of the OBW.

The span was set between 1.5 to 5 times of the OBW.
99% occupied bandwidth function was set on.

8.3 Test Limit

N/A

8.4 Test Results

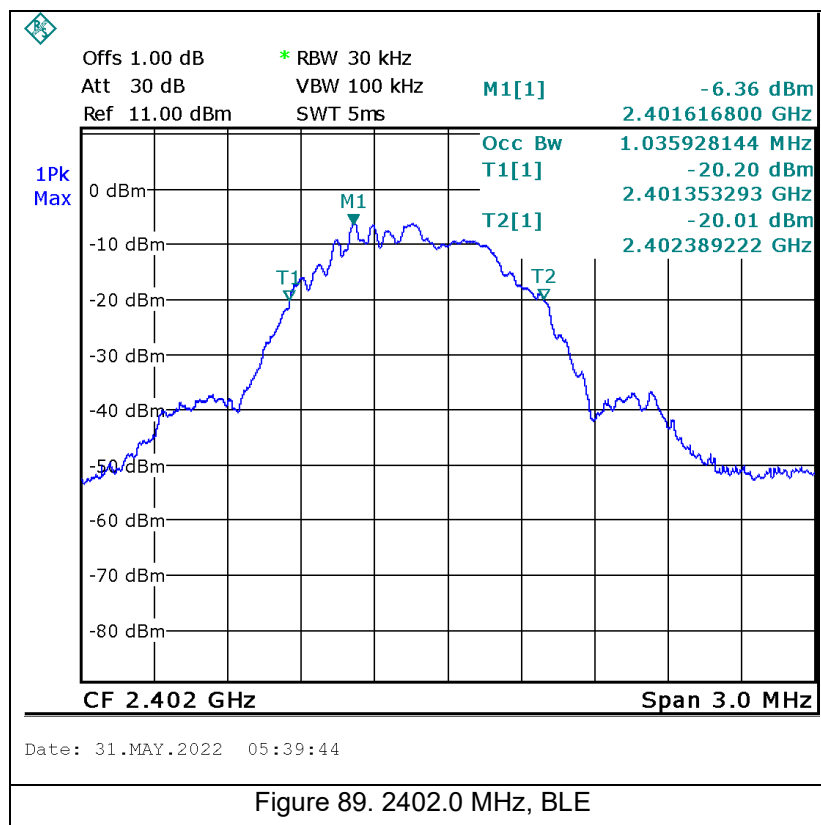
Protocol Type	Operation Frequency	Reading
	(MHz)	(kHz)
BLE	2402.0	1.036
	2440.0	1.036
	2480.0	1.042
Wi-fi/b (1Mbit/s)	2412.0	14.07
	2437.0	14.07
	2462.0	14.07
Wi-fi/b (11Mbit/s)	2412.0	14.77
	2437.0	14.77
	2462.0	14.77
Wi-fi/g (6Mbit/s)	2412.0	24.05
	2437.0	24.15
	2462.0	23.85
Wi-fi/g (54Mbit/s)	2412.0	16.96
	2437.0	16.96
	2462.0	16.96
	2412.0	23.45

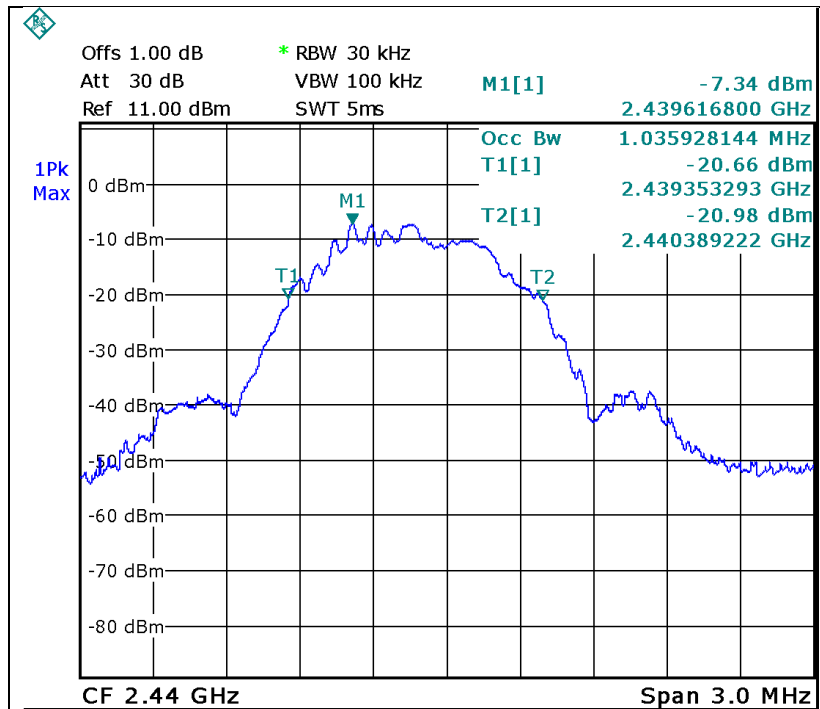
Protocol Type	Operation Frequency	Reading
	(MHz)	(kHz)
Wi-fi/n(6.5Mbit/s)	2437.0	23.35
	2462.0	23.15
Wi-fi/n(65Mbit/s)	2412.0	17.86
	2437.0	17.86
	2462.0	17.86

Figure 88. Bandwidth Test Results

JUDGEMENT: N/A

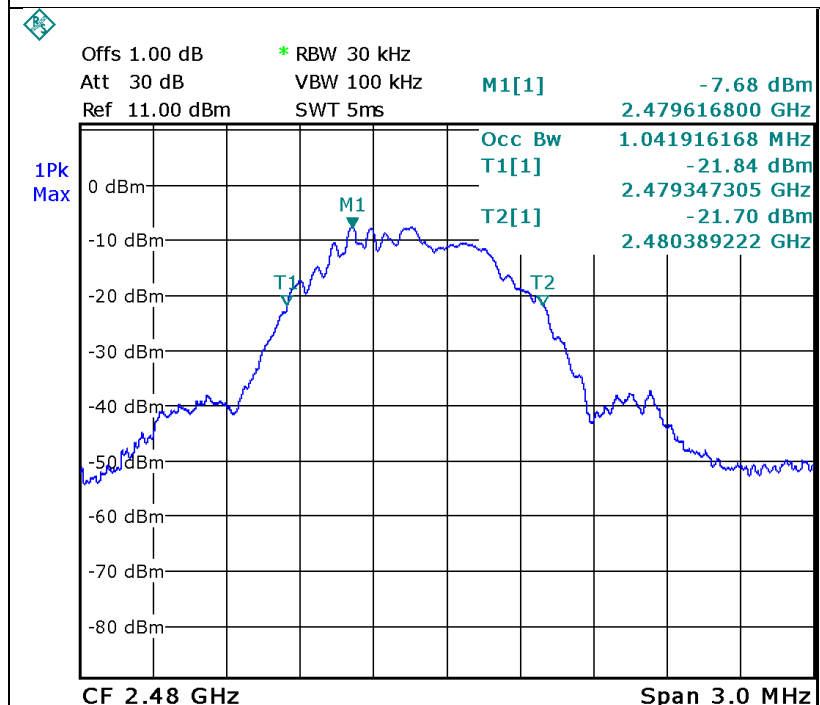
See additional information in Figure 89 to Figure 109.





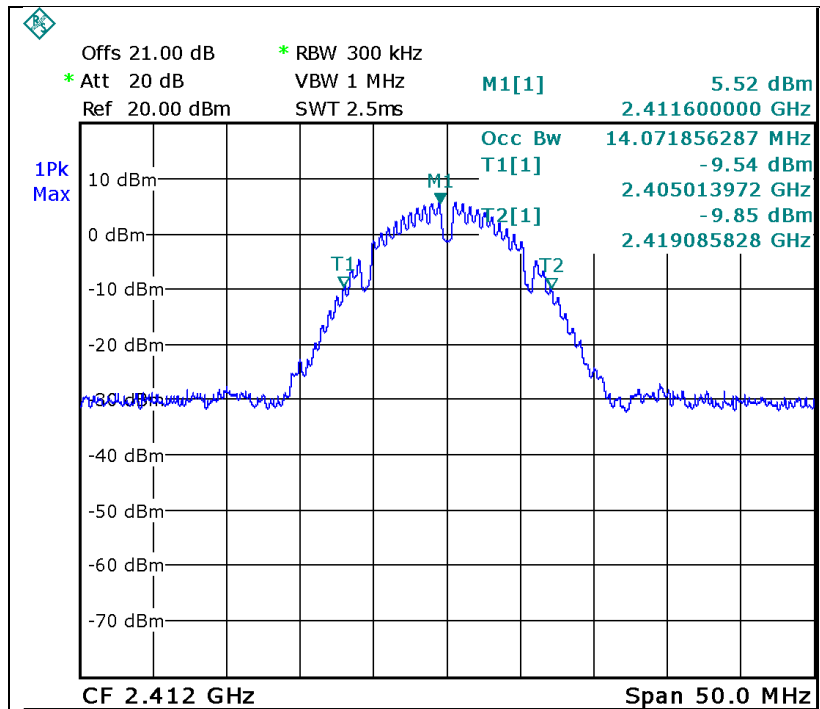
Date: 31.MAY.2022 05:40:47

Figure 90. 2440.0 MHz, BLE



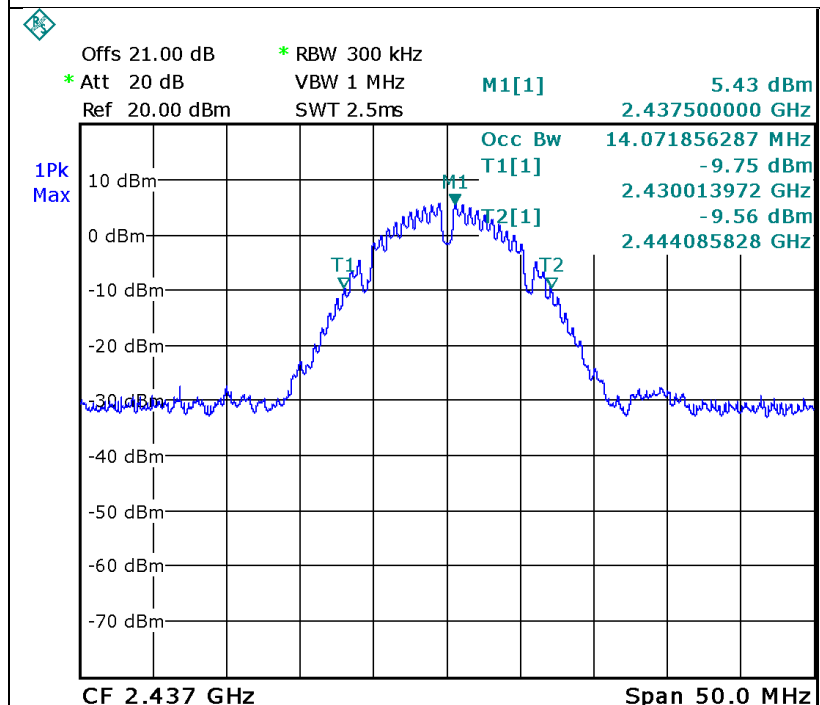
Date: 31.MAY.2022 05:41:30

Figure 91. 2480.0 MHz, BLE



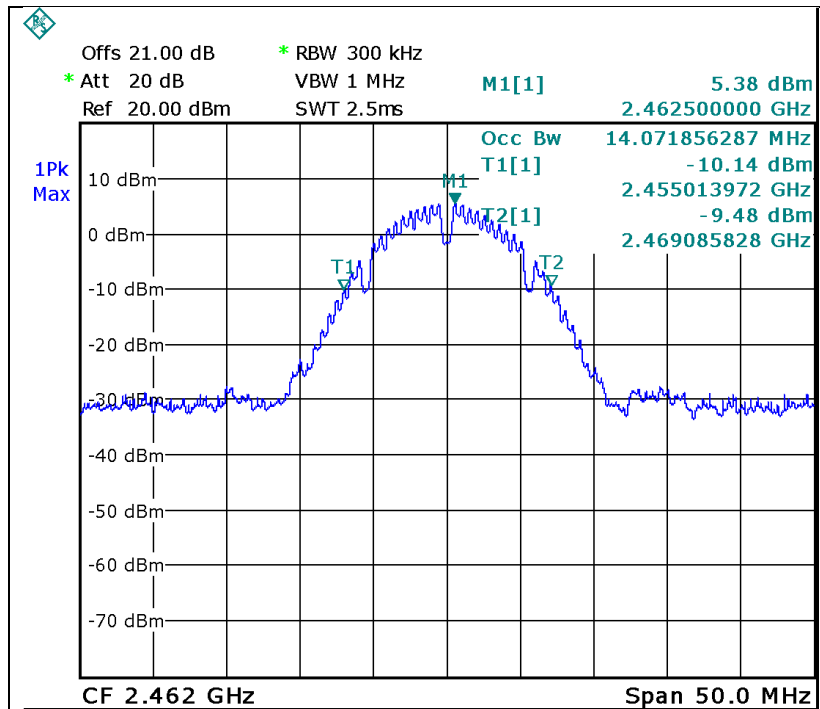
Date: 22.AUG.2022 07:54:47

Figure 92. 2412.0 MHz, Wi-fi/b(1Mbit/s)



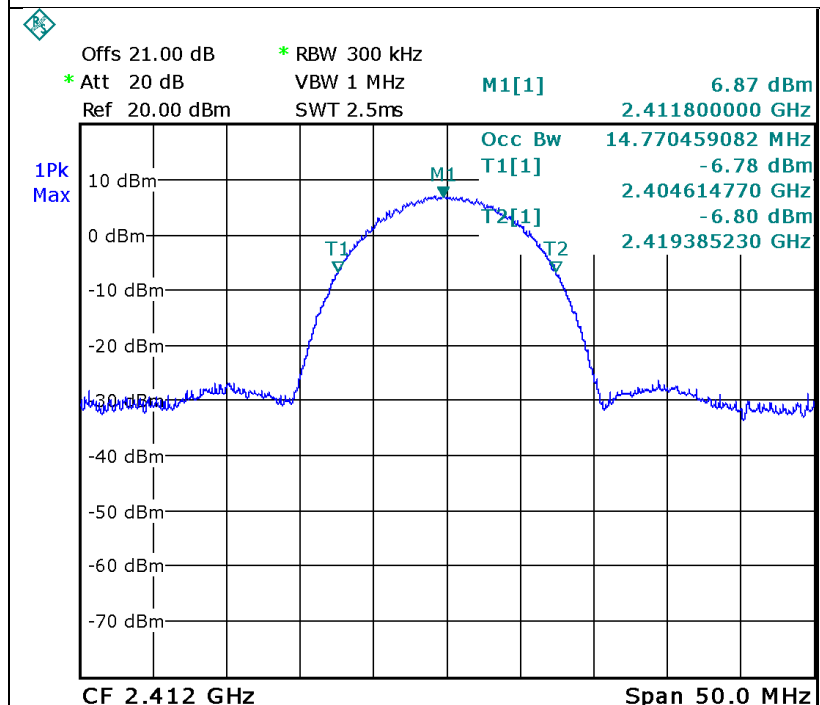
Date: 22.AUG.2022 07:56:17

Figure 93. 2437.0 MHz, Wi-fi/b(1Mbit/s)



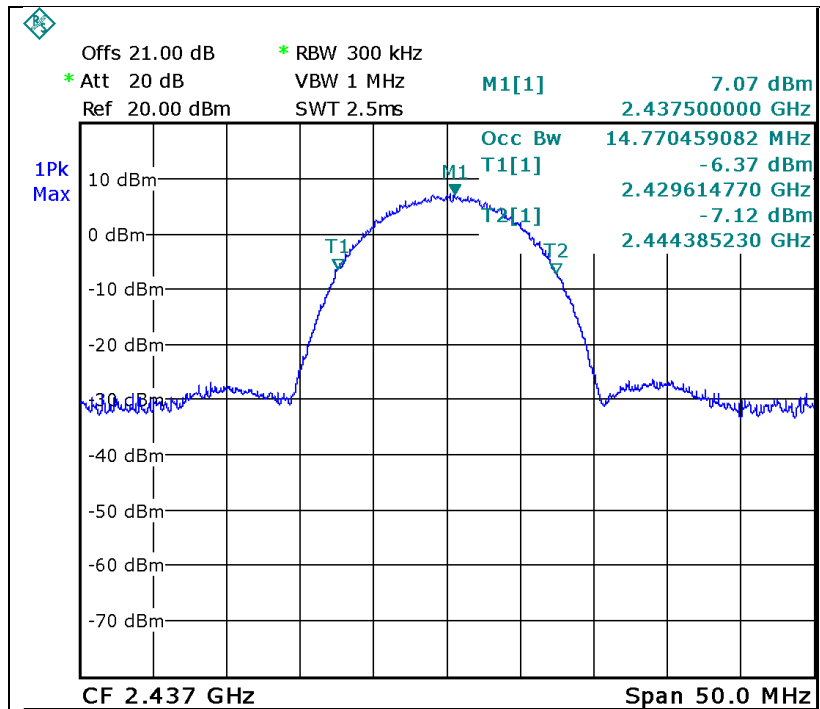
Date: 22.AUG.2022 07:57:42

Figure 94. 2462.0 MHz, Wi-fi/b(1Mbit/s)



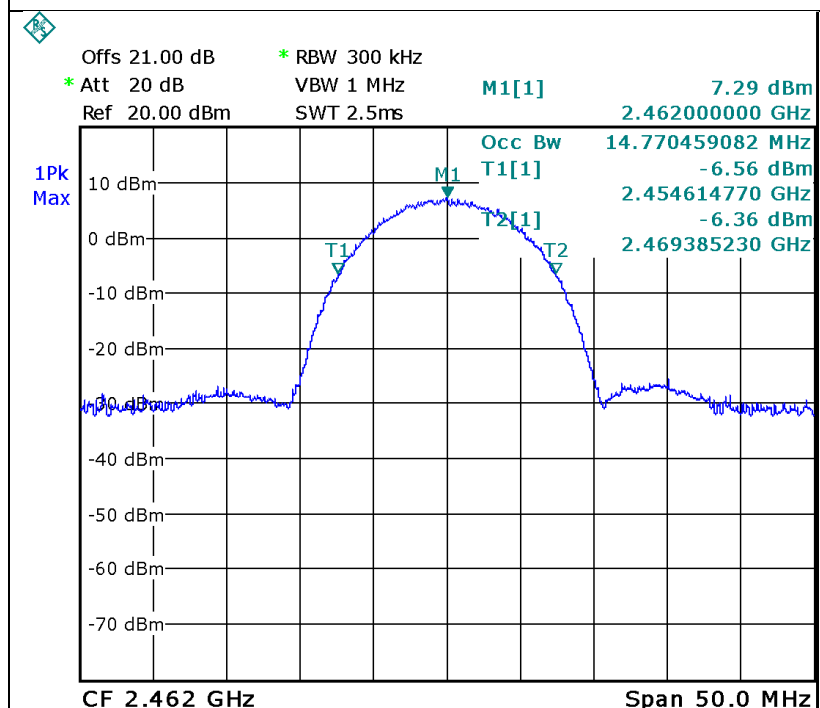
Date: 22.AUG.2022 08:02:38

Figure 95. 2412.0 MHz, Wi-fi/b(11Mbit/s)



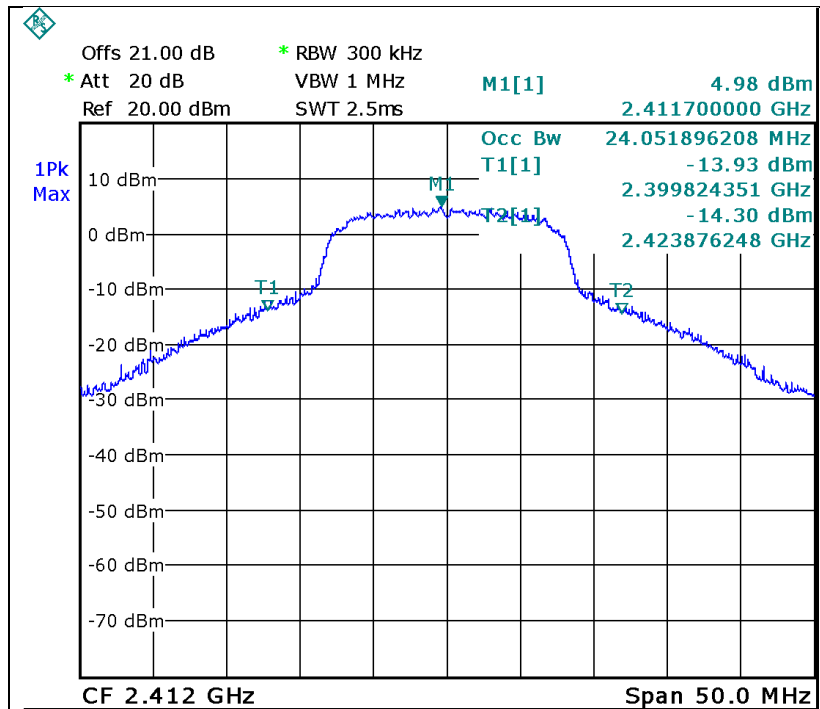
Date: 22.AUG.2022 08:01:23

Figure 96. 2437.0 MHz, Wi-fi/b(11Mbit/s)



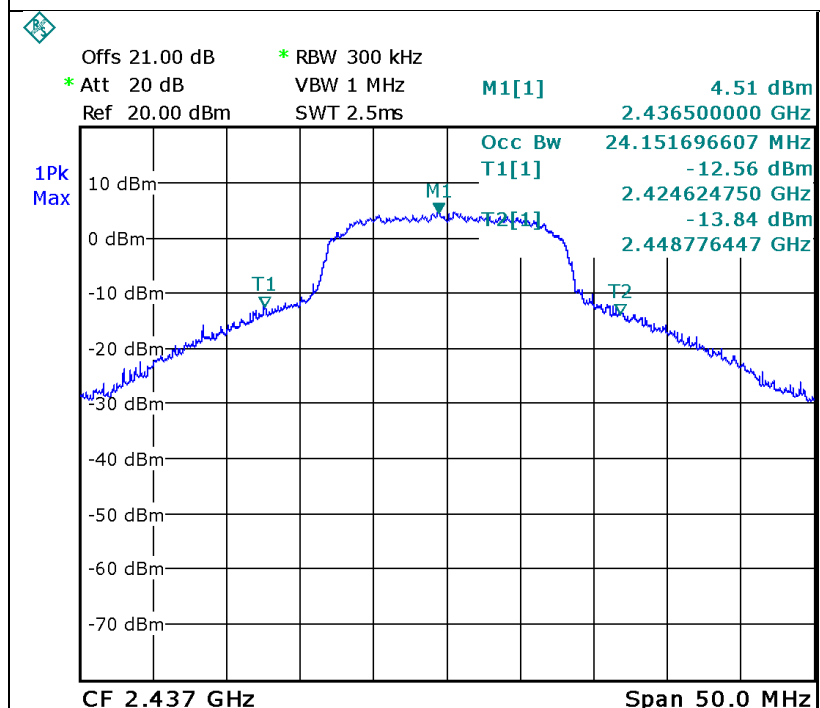
Date: 22.AUG.2022 08:00:05

Figure 97. 2462.0 MHz, Wi-fi/b(11Mbit/s)



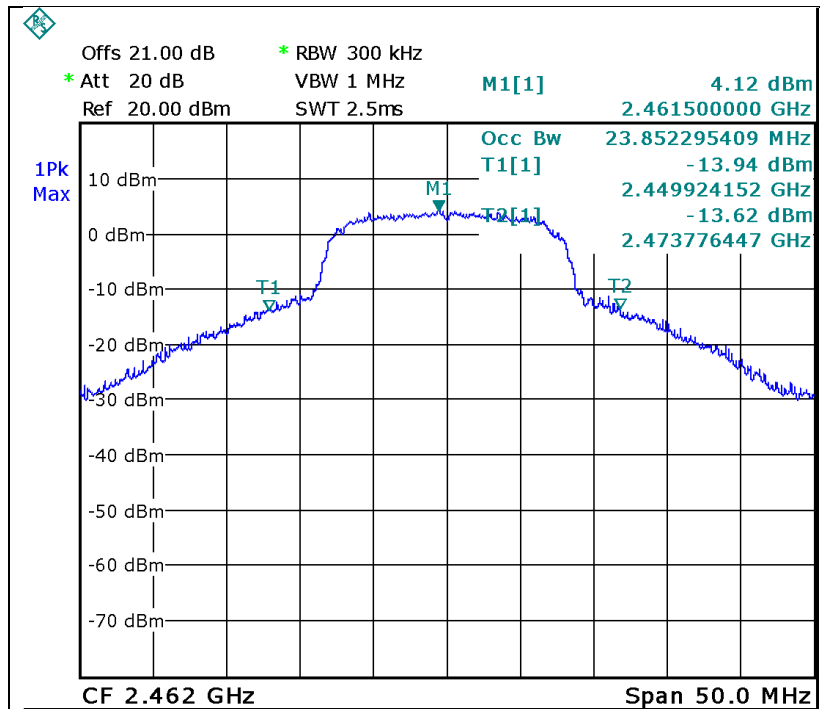
Date: 22.AUG.2022 08:08:28

Figure 98. 2412.0 MHz, Wi-fi/g(6Mbit/s)



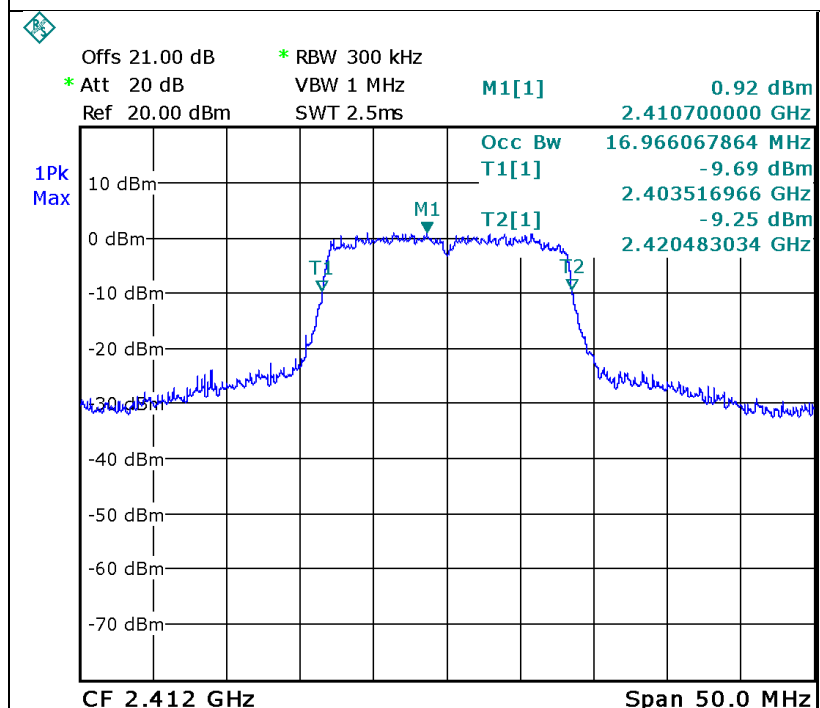
Date: 22.AUG.2022 08:14:02

Figure 99. 2437.0 MHz, Wi-fi/g(6Mbit/s)



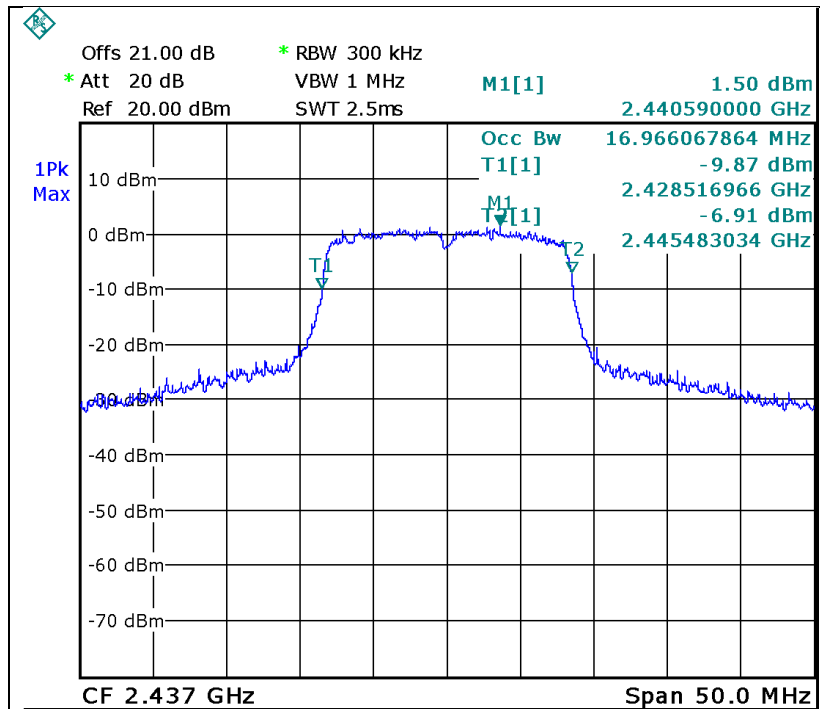
Date: 22.AUG.2022 08:17:29

Figure 100. 2462.0 MHz, Wi-fi/g(6Mbit/s)



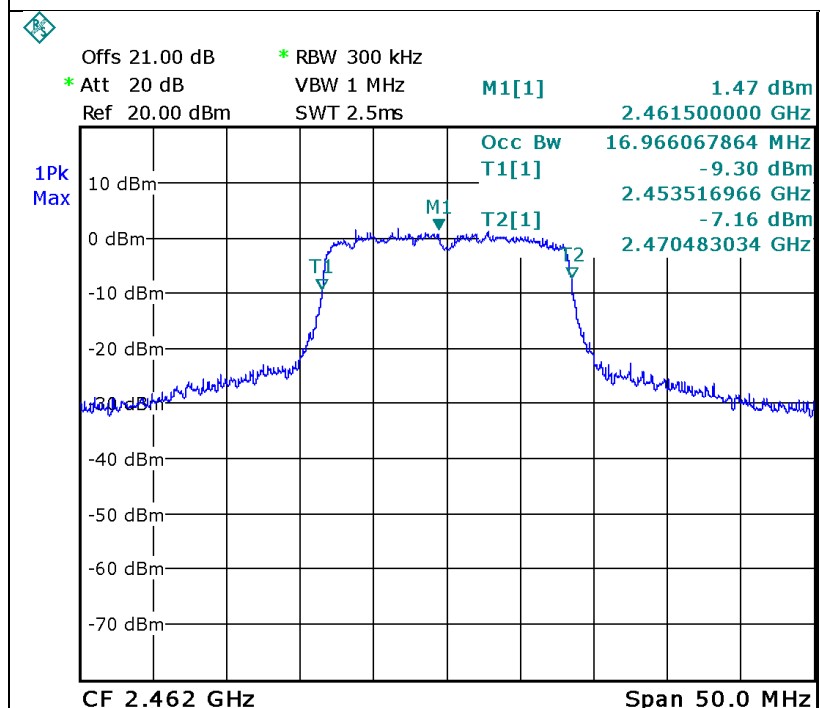
Date: 22.AUG.2022 08:23:23

Figure 101. 2412.0 MHz, Wi-fi/g(54Mbit/s)



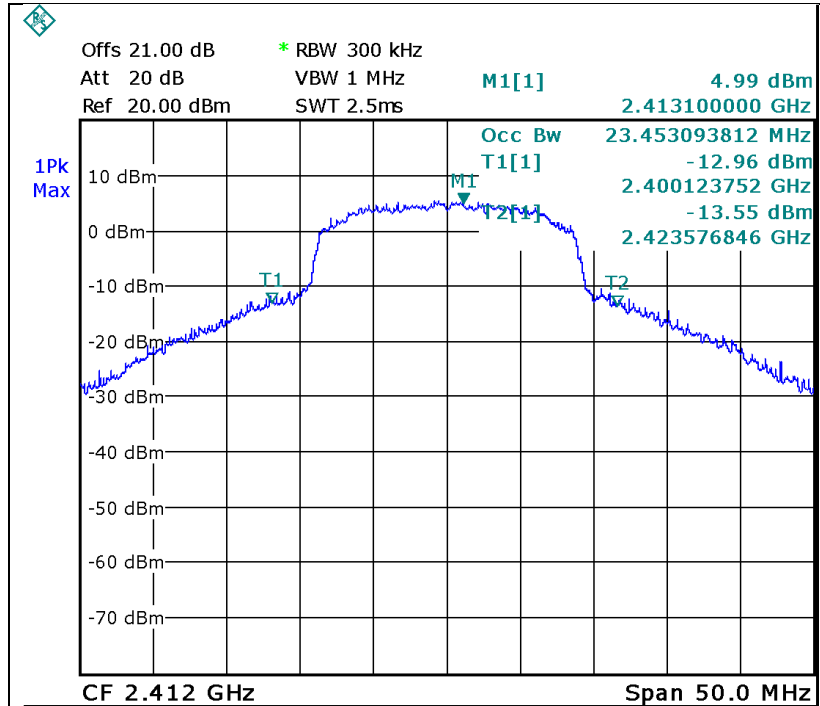
Date: 22.AUG.2022 08:22:02

Figure 102. 2437.0 MHz, Wi-fi/g(54Mbit/s)



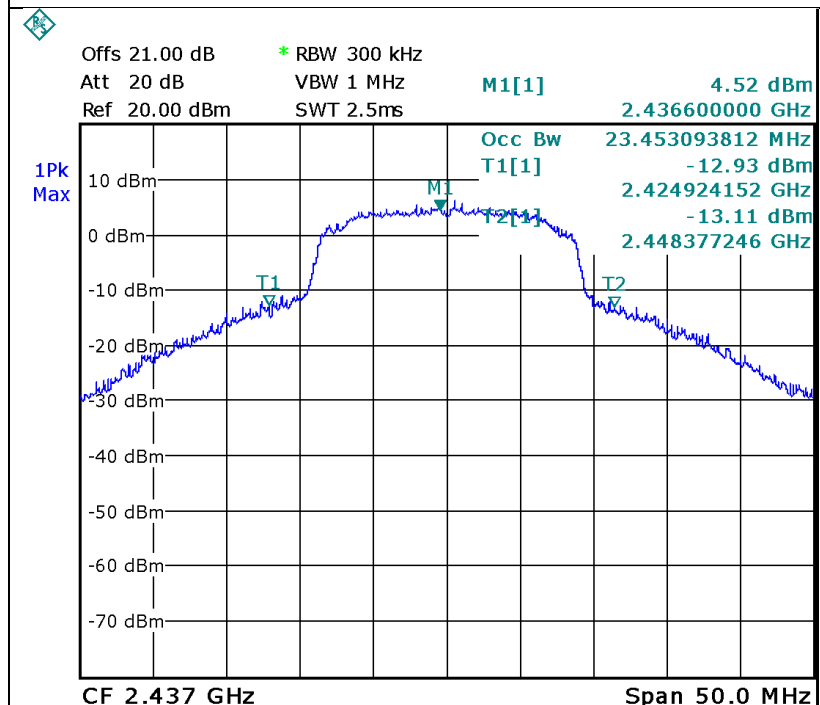
Date: 22.AUG.2022 08:19:54

Figure 103. 2462.0 MHz, Wi-fi/g(54Mbit/s)



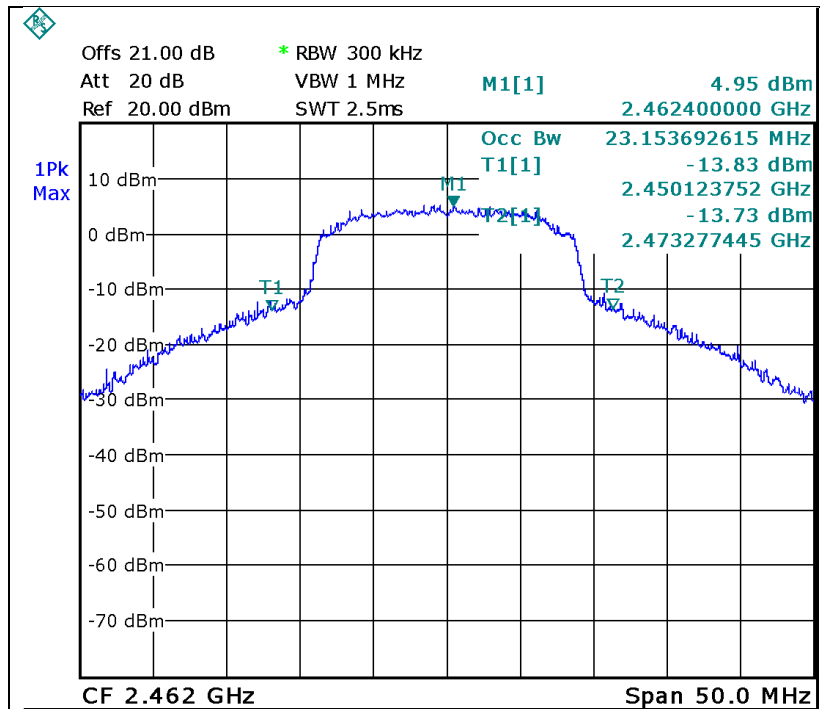
Date: 9.JUN.2022 12:36:35

Figure 104. 2412.0 MHz, Wi-fi/n(6.5Mbit/s)



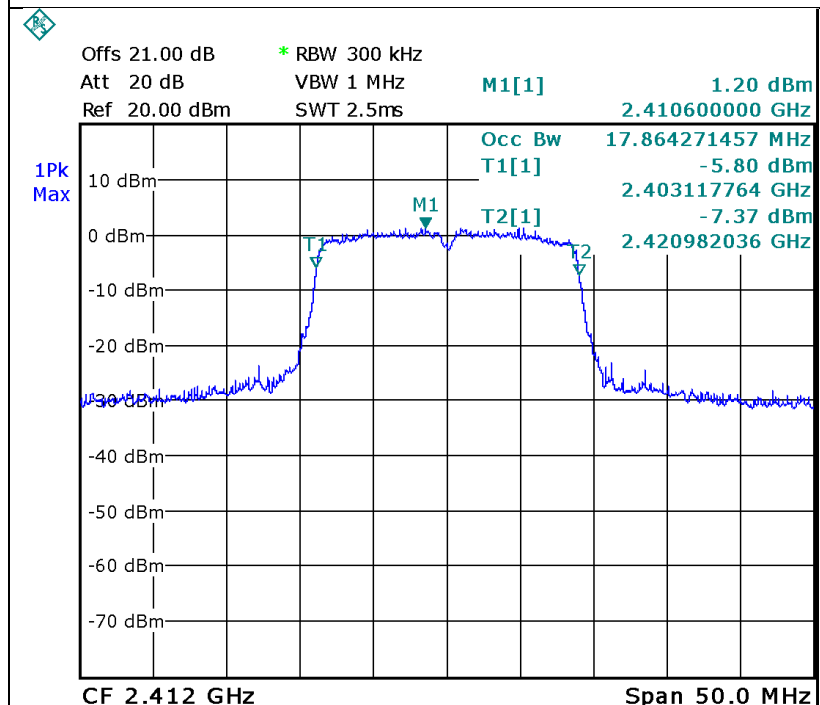
Date: 9.JUN.2022 12:38:25

Figure 105. 2437.0 MHz, Wi-fi/n(6.5Mbit/s)



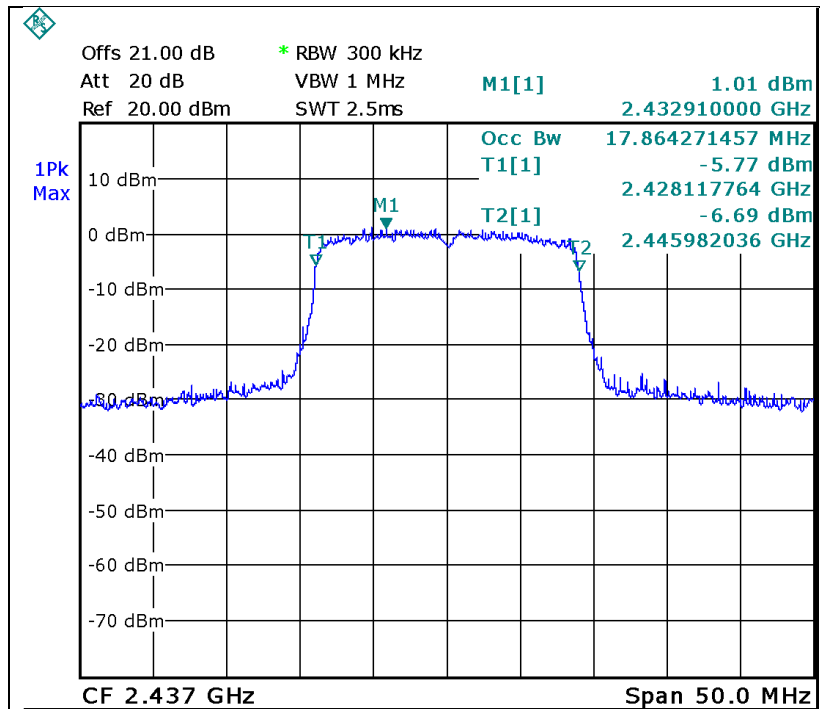
Date: 9.JUN.2022 12:43:09

Figure 106. 2462.0 MHz, Wi-fi/n(6.5Mbit/s)



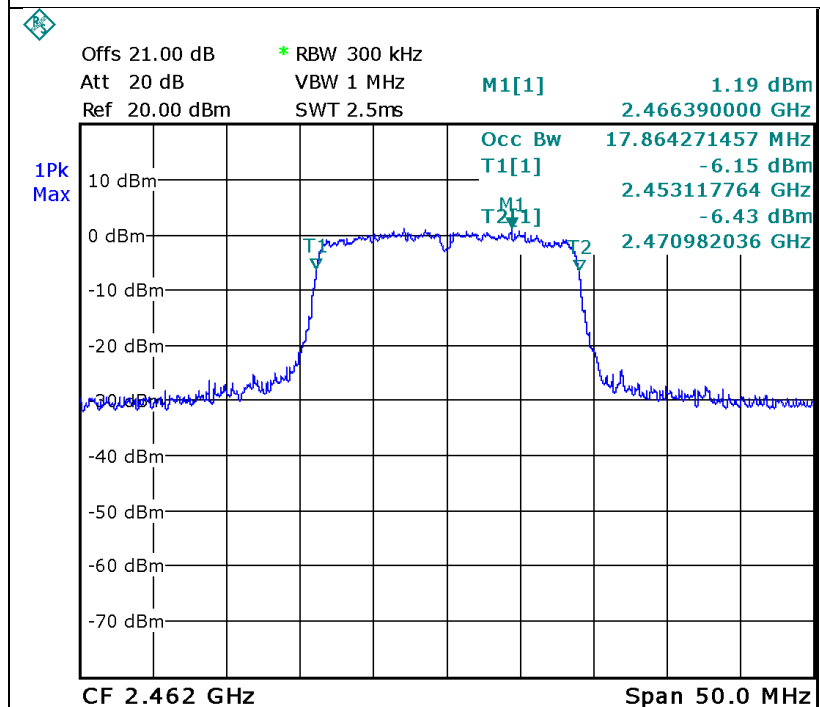
Date: 9.JUN.2022 12:34:27

Figure 107. 2412.0 MHz, Wi-fi/n(65Mbit/s)



Date: 9.JUN.2022 12:39:57

Figure 108. 2437.0 MHz, Wi-fi/n(65Mbit/s)



Date: 9.JUN.2022 12:42:02

Figure 109. 2462.0 MHz, Wi-fi/n(65Mbit/s)



8.5 Test Equipment Used; Bandwidth

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
Spectrum Analyzer	R&S	FSL6	100194	February 20, 2022	February 20, 2023
20dB/2W Attenuator	Midwest Microwave	ATT-0217-20-NNN-02	-	May 16, 2022	May 16, 2023
Low Loss cable	Huber Suhner	Sucofelex	27504/4PEA	May 16, 2022	May 16, 2023

Figure 110 Test Equipment Used



9. Emissions in Non-Restricted Frequency Bands

9.1 Test Specification

FCC, Part 15, Subpart C, Section 247(d)

9.2 Test Procedure

(Temperature (20°C)/ Humidity (62%RH))

The E.U.T. operation mode and test set-up are as described in Section 2 of this report. The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator and an appropriate coaxial cable (max total loss=24.0 dB). Special attention was taken to prevent Spectrum Analyzer RF input overload. RBW was set to 100kHz, detector set to max peak and trace to “max hold”.

9.3 Test Limit

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.

9.4 Test Results

JUDGEMENT: Passed

The EUT met the requirements of the F.C.C. Part 15, Subpart C, Section 247(d) specification.

For additional information see *Figure 111* to *Figure 131*.

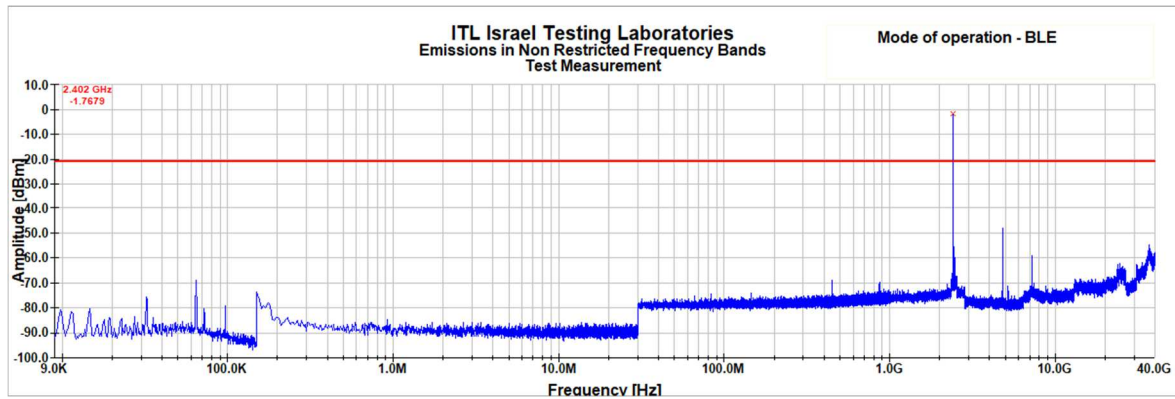


Figure 111 2402.0 MHz, BLE

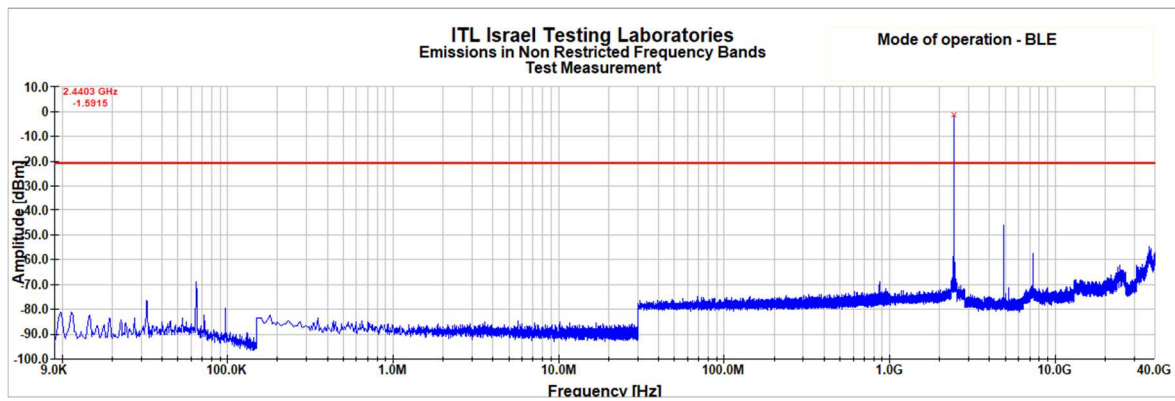


Figure 112 2440.0 MHz, BLE

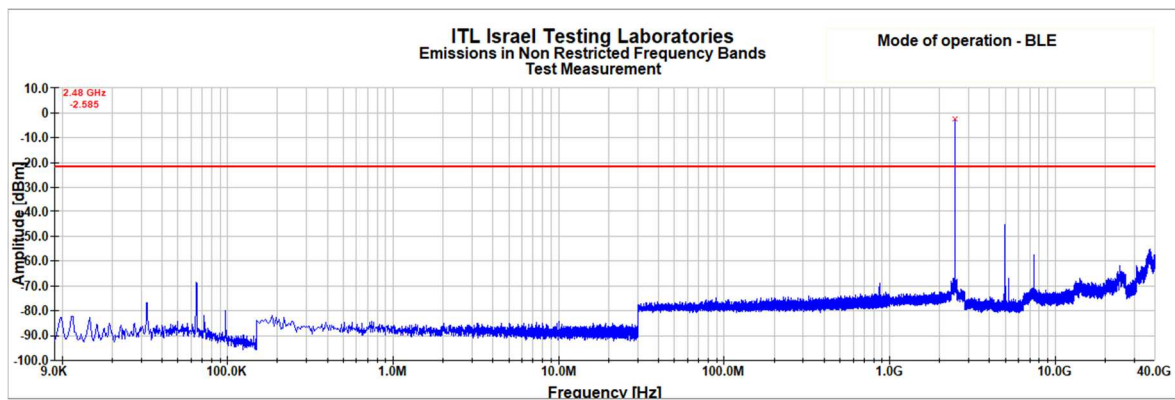


Figure 113 2480.0 MHz, BLE

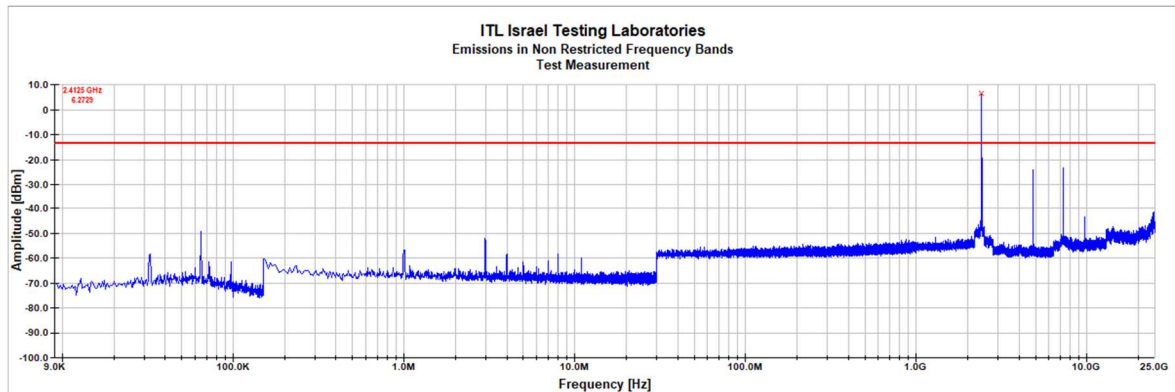


Figure 114 2412.0 MHz, WI-FI/b(1Mbit/s)

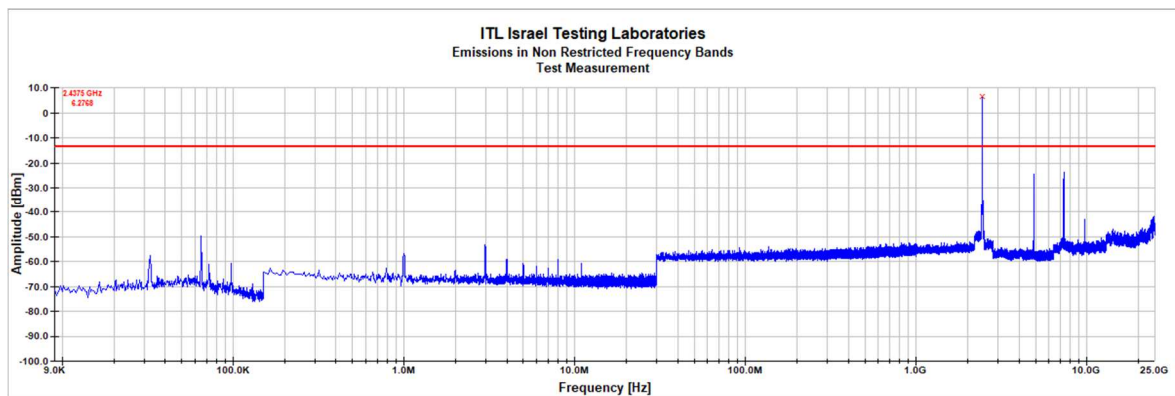


Figure 115 2437.0 MHz, WI-FI/b(1Mbit/s)

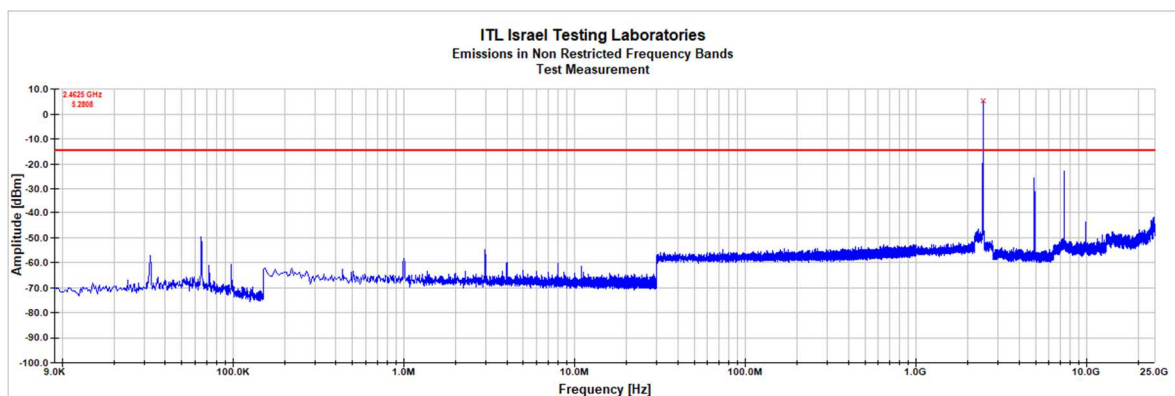


Figure 116 2462.0 MHz, WI-FI/b(1Mbit/s)

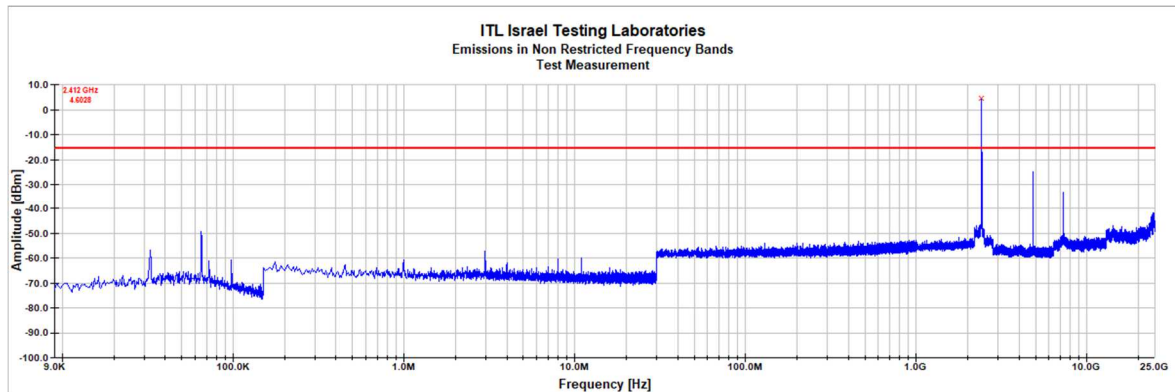


Figure 117 2412.0 MHz, WI-FI/b(11Mbit/s)

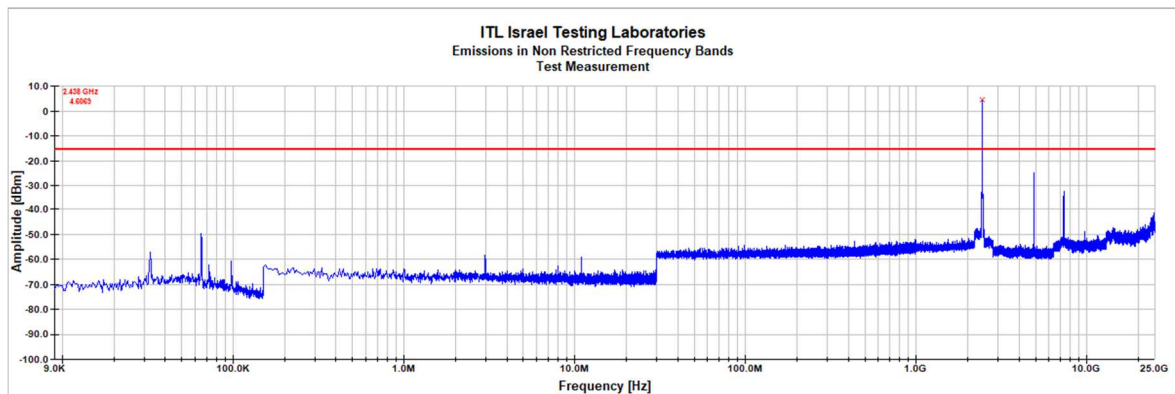


Figure 118 2437.0 MHz, WI-FI/b(11Mbit/s)

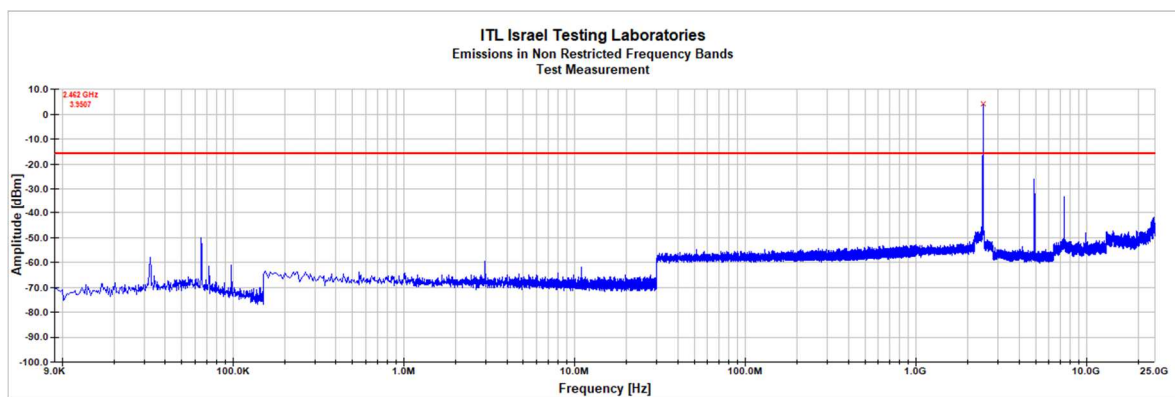


Figure 119 2462.0 MHz, WI-FI/b(11Mbit/s)

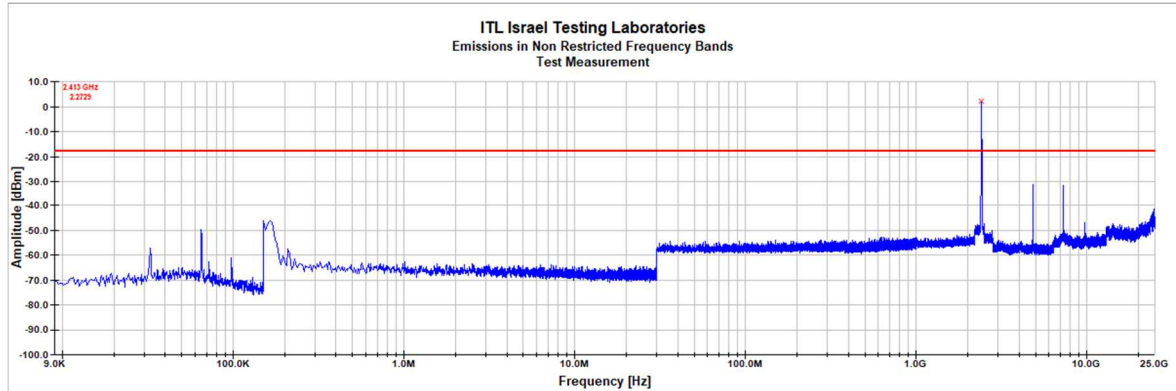


Figure 120 2412.0 MHz, WI-FI/g(6Mbit/s)

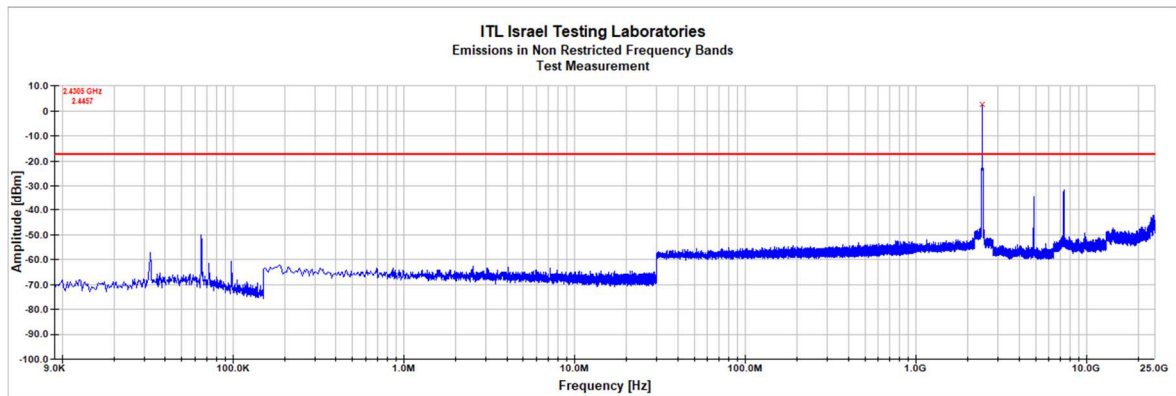


Figure 121 2437.0 MHz, WI-FI/g(6Mbit/s)

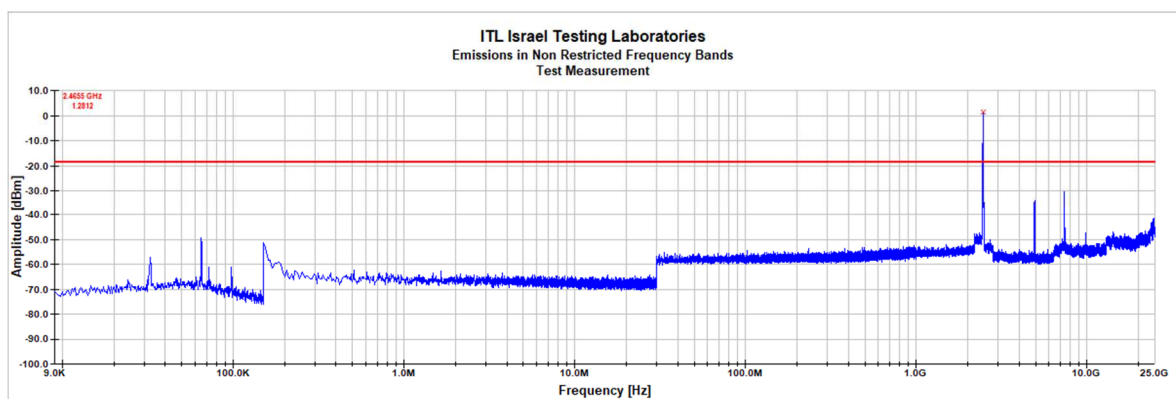


Figure 122 2462.0 MHz, WI-FI/g(6Mbit/s)

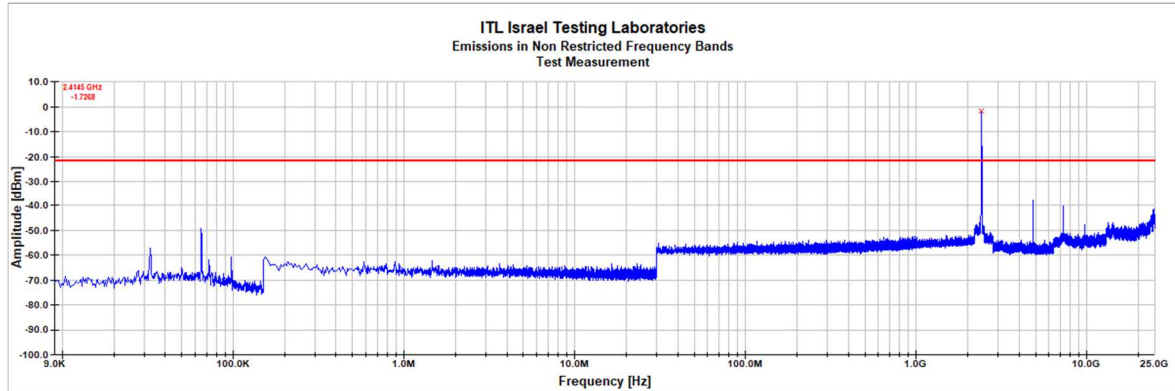


Figure 123 2412.0 MHz, WI-FI/g(54Mbit/s)

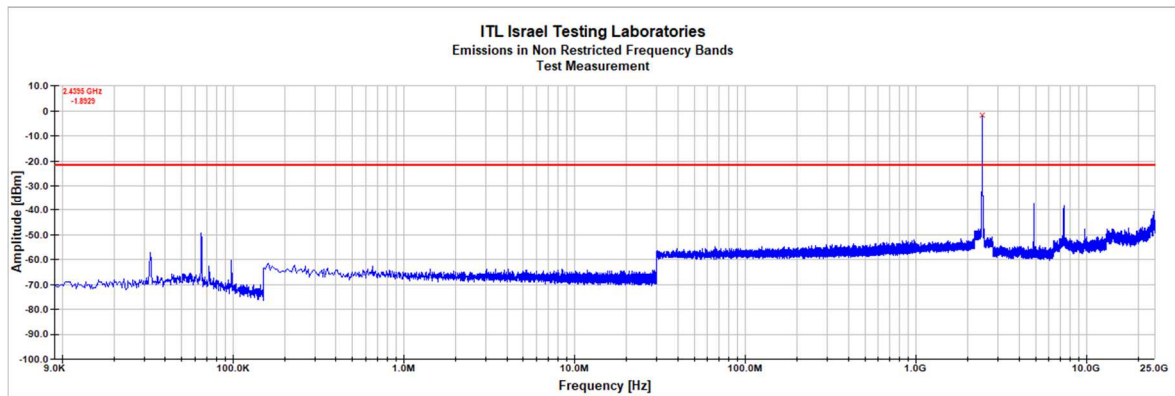


Figure 124 2437.0 MHz, WI-FI/g(54Mbit/s)

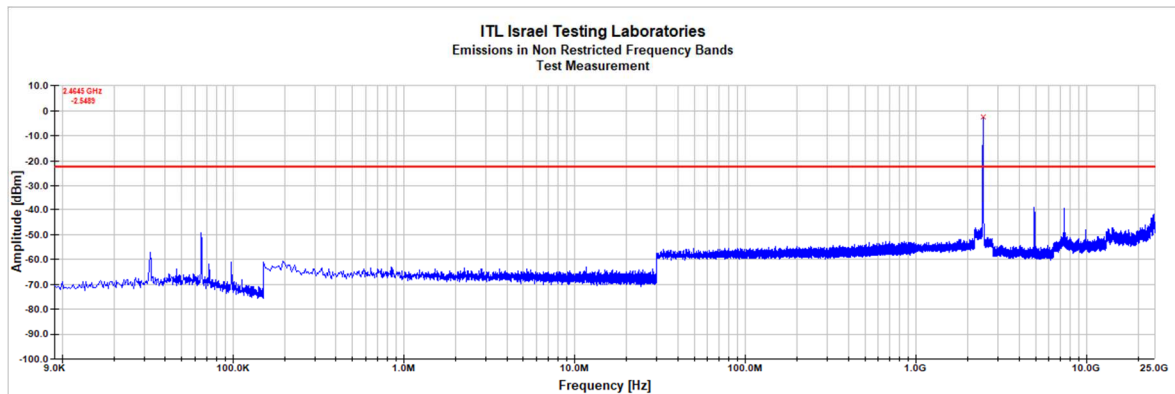


Figure 125 2462.0 MHz, WI-FI/g(54Mbit/s)

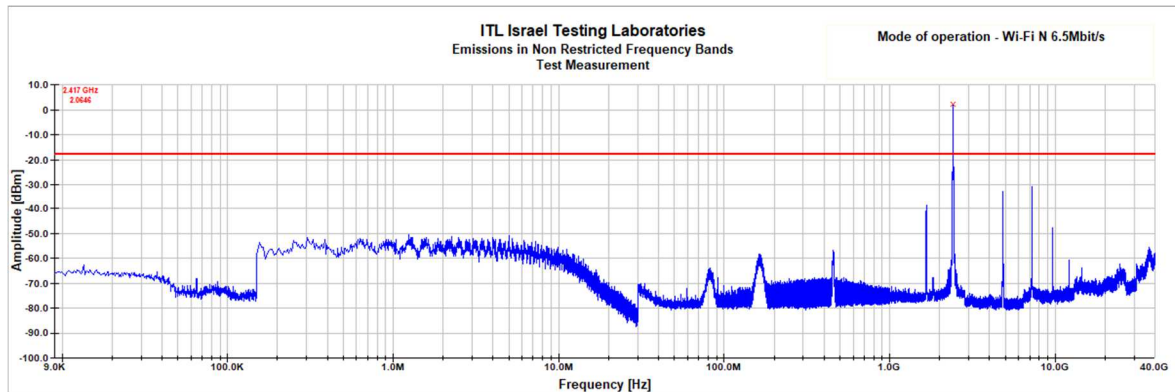


Figure 126 2412.0 MHz, WI-FI/n(6.5Mbit/s)

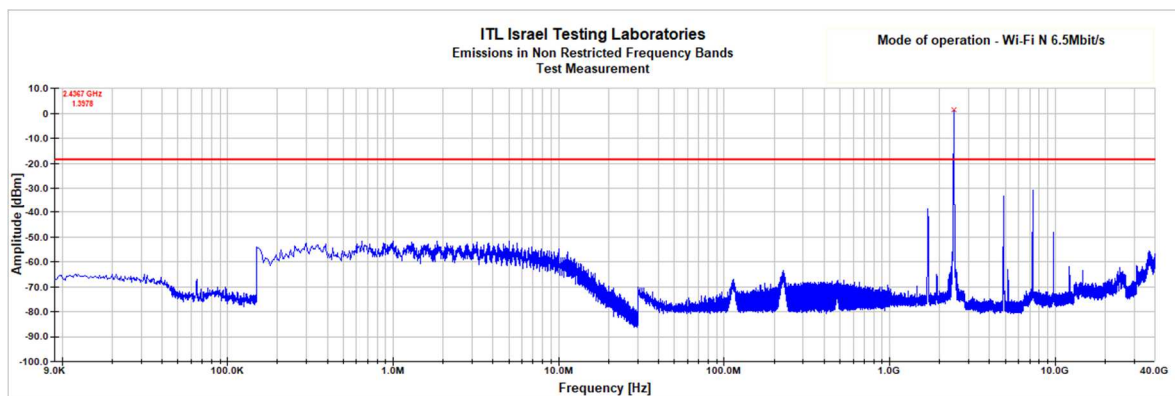


Figure 127 2437.0 MHz, WI-FI/n(6.5Mbit/s)

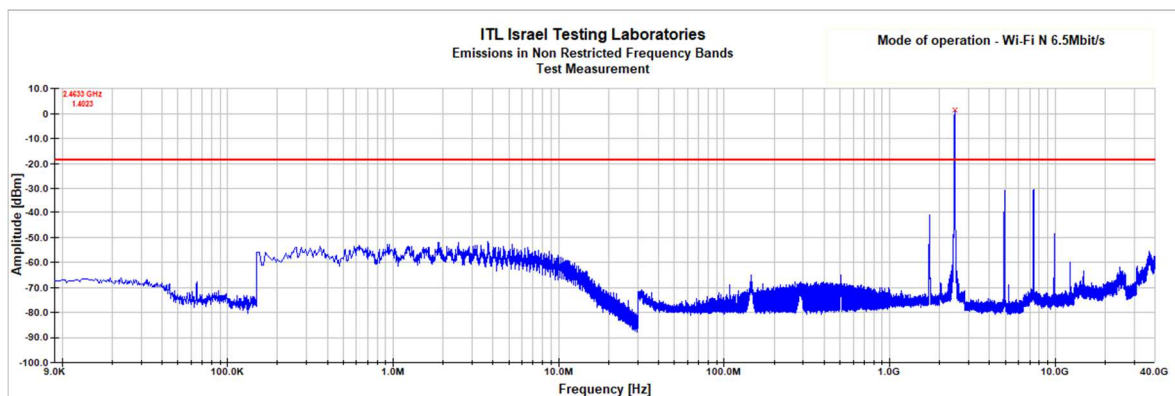


Figure 128 2462.0 MHz, WI-FI/n(6.5Mbit/s)

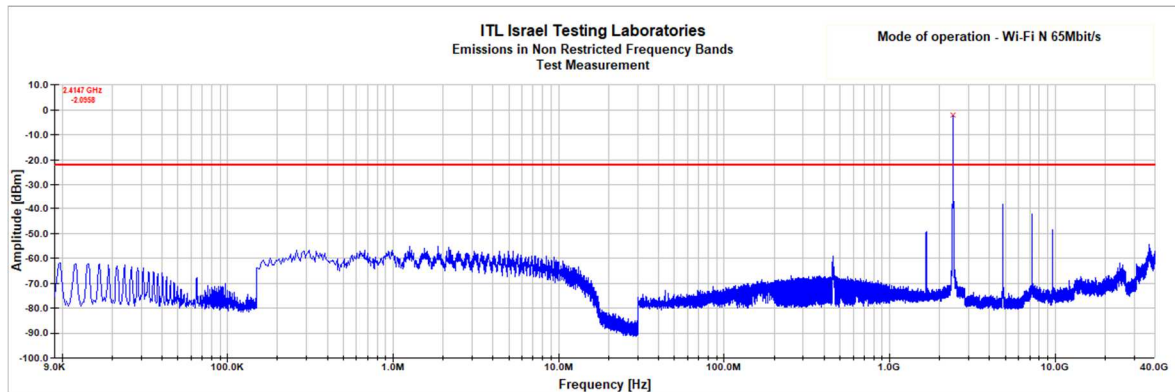


Figure 129 2412.0 MHz, WI-FI/n(65Mbit/s)

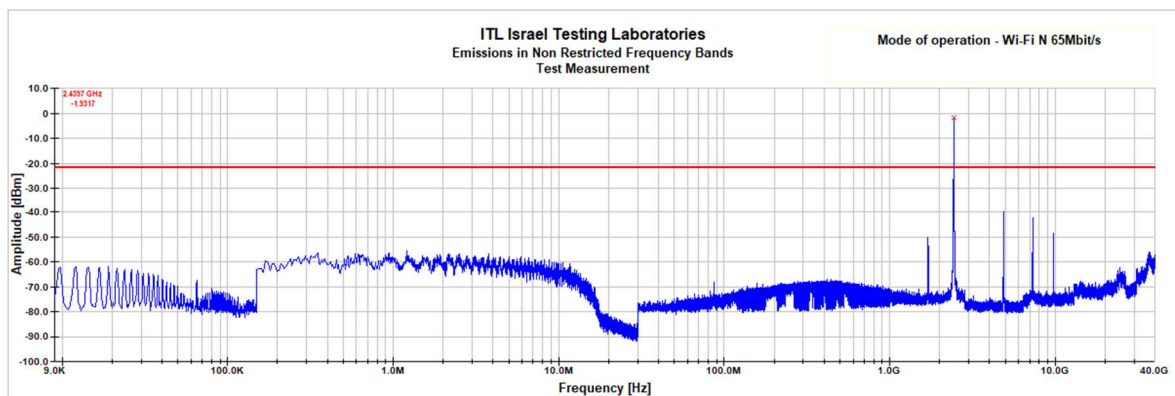


Figure 130 2437.0 MHz, WI-FI/n(65Mbit/s)

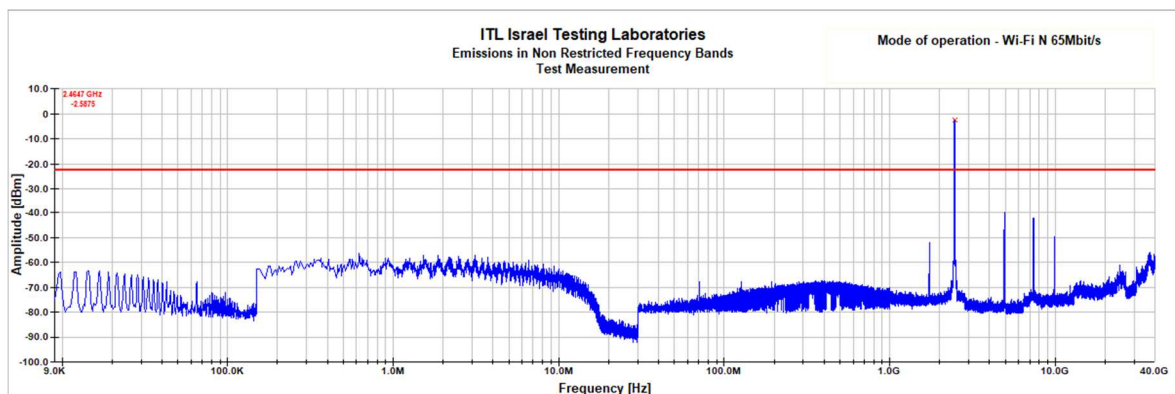


Figure 131 2462.0 MHz, WI-FI/n(65Mbit/s)

Note: All peaks in plots are the fundamental transmission frequency.



9.5 Test Instrumentation Used, Emission in non-Restricted Frequency Bands

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
Spectrum Analyzer	R&S	FSL6	100194	February 20, 2022	February 20, 2023
20dB/2W Attenuator	Midwest Microwave	ATT-0217-20-NNN-02	-	May 16, 2022	May 16, 2023
Low Loss cable	Huber Suhner	Sucofelex	27504/4PEA	May 16, 2022	May 16, 2023

Figure 132 Test Equipment Used

10. Emissions in Restricted Frequency Bands

10.1 Test Specification

FCC Part 15, Subpart C, Sections 15.209, 15.205, 15.247(d)

10.2 Test Procedure

(Temperature (23°C)/ Humidity (65%RH))

The E.U.T. operation mode and test set-up are as described in Section 2 of this report.

For measurements between 0.009-30MHz:

The E.U.T was tested inside the shielded room and placed on a non-metallic table, 0.8 meters above the ground. The emissions were measured at a distance of 3 meters. The readings were maximized by the turntable azimuth between 0-360°, and the antenna polarization.

The frequency range 0.009MHz-30MHz was scanned.

For measurements between 30-1000MHz:

A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The emissions were measured at a distance of 3 meters. The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization. The frequency range 30MHz -1000MHz was scanned and the list of the highest emissions was verified and updated accordingly.

For measurements between 1GHz-25GHz:

The E.U.T was tested inside the shielded room and placed on a non-metallic table, 1.5 meters above the ground. The emissions were measured at a distance of 3 meters. The readings were maximized by the turntable azimuth between 0-360°, and the antenna polarization.

The frequency range 1GHz -25GHz was scanned.

Tests done for all “worst case”, each protocol type. The highest radiation describes in the tables below

10.3 FCC Test Limit

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) (see §15.205(c)).

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement distance (meters)	Field Strength* (dBμV/m)	Field Strength* (dBμV/m)@3m
0.009-0.490	2400/F(kHz)	300	48.5-13.8	128.5-73.8
0.490-1.705	24000/F(kHz)	30	33.8-23.0	73.8-63.0

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement distance (meters)	Field Strength* (dBμV/m)	Field Strength* (dBμV/m)@3m
1.705-30.0	30	30	29.5	69.5
30-88	100	3	40.0	40.0
88-216	150	3	43.5	43.5
216-960	200	3	46.0	46.0
Above 960	500	3	54.0	54.0

*The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector. For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

Figure 133 FCC Table of Limits

10.4 Test Results

JUDGEMENT: Passed by -0.2 dB

BLE:

For the operation frequency of 2402.0 MHz, the margin between the emission level and the specification limit is in the worst case -12.3 dB at the frequency of 2390.0 MHz, horizontal polarization.

For the operation frequency of 2480.0 MHz, the margin between the emission level and the specification limit is in the worst case -7.0 dB at the frequency of 2483.5 MHz, vertical polarization.

Wi-Fi:

For the operation frequency of 2437.0 MHz, the margin between the emission level and the specification limit is in the worst case -12.3 dB at the frequency of 2390.0 MHz, horizontal polarization.

For the operation frequency of 2480.0 MHz, the margin between the emission level and the specification limit is in the worst case -4.0 dB at the frequency of 4874.0 MHz, horizontal polarization.

For the operation frequency of 2462.0 MHz, the margin between the emission level and the specification limit is in the worst case -0.2 dB at the frequency of 2483.5 MHz, vertical polarization.

The EUT met the requirements of the F.C.C. Part 15, Subpart C Sections 15.209, 15.205, 15.247(d) specifications.

The details of the highest emissions are given in Figure 134 to Figure 139.

Radiated Emission

E.U.T Description Smart Pet Collar
Type PetPace Health 2.0
Serial Number: Not designated

Specifications: FCC, Part 15, Subpart C, Sections 15.209, 15.205, 15.247(d)

Antenna Polarization: Horizontal/Vertical Frequency Range: 9kHz to 25.0 GHz
Protocol Type: BLE Detector: Peak, Average

Operation Frequency	Freq.	Pol	Peak Reading	Peak Limit	Peak Margin	Average Reading	Average Limit	Average Margin
(MHz)	(MHz)	(H/V)	(dBμV/m)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
2402.0	2390.0	V	52.2(N.L)	74.0	-21.8	41.5(N.L)	54.0	-12.5
	2390.0	H	52.5(N.L)	74.0	-21.5	41.7(N.L)	54.0	-12.3
	4804.0	V	48.6	74.0	-25.4	-	54.0	-
	4804.0	H	51.4	74.0	-22.6	-	54.0	-
2440.0	4880.0	V	49.3	74.0	-24.7	-	54.0	-
	4880.0	H	50.9	74.0	-23.1	-	54.0	-
2480.0	4960.0	V	48.9	74.0	-25.1	-	54.0	-
	4960.0	H	51.4	74.0	-22.6	-	54.0	-
	2483.5	V	56.4	74.0	-17.6	47.0	54.0	-7.0
	2483.5	H	56.8	74.0	-17.2	46.9	54.0	-7.1

Figure 134. Radiated Emission Results

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

“Peak Amp” includes correction factor.

* “Correction Factor” = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

Antenna Polarization: Horizontal/Vertical Frequency Range: 9kHz to 25.0 GHz
Protocol Type: WI-FI/b 1Mbps Detector: Peak, Average

Operation Frequency	Freq.	Pol	Peak Reading	Peak Limit	Peak Margin	Average Reading	Average Limit	Average Margin
(MHz)	(MHz)	(H/V)	(dBμV/m)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
2412.0	2390.0	V	52.5	74.0	-21.5	-	54.0	-
	2390.0	H	52.2	74.0	-21.8	-	54.0	-
	4824.0	V	50.2	74.0	-23.8	-	54.0	-
	4824.0	H	50.5	74.0	-23.5	-	54.0	-
2437.0	4874.0	V	53.6	74.0	-20.4	48.5	54.0	-5.5
	4874.0	H	53.2	74.0	-20.8	48.4	54.0	-5.6
2462.0	4924.0	V	53.4	74.0	-20.6	47.7	54.0	-6.3
	4924.0	H	52.8	74.0	-21.2	-	54.0	-
	2483.5	V	57.5	74.0	-16.5	49.7	54.0	-4.3
	2483.5	H	56.7	74.0	-17.3	48.0	54.0	-6.0

Figure 135. Radiated Emission Results

Antenna Polarization: Horizontal/Vertical Frequency Range: 9kHz to 25.0 GHz
Protocol Type: WI-FI/b 11Mbps Detector: Peak, Average

Operation Frequency	Freq.	Pol	Peak Reading	Peak Limit	Peak Margin	Average Reading	Average Limit	Average Margin
(MHz)	(MHz)	(H/V)	(dBμV/m)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
2412.0	2390.0	V	52.1	74.0	-21.9	-	54.0	-
	2390.0	H	52.3	74.0	-21.7	-	54.0	-
	4824.0	V	50.9	74.0	-23.1	-	54.0	-
	4824.0	H	50.8	74.0	-23.2	-	54.0	-
2437.0	4874.0	V	54.1	74.0	-19.9	48.9	54.0	-5.1
	4874.0	H	54.0	74.0	-20.0	50.0	54.0	-4.0
2462.0	4924.0	V	53.9	74.0	-20.1	47.5	54.0	-6.5
	4924.0	H	52.3	74.0	-21.7	46.5	54.0	-7.5
	2483.5	V	56.8	74.0	-17.2	49.5	54.0	-4.5
	2483.5	H	56.2	74.0	-17.8	48.1	54.0	-5.9

Figure 136. Radiated Emission Results

Antenna Polarization: Horizontal/Vertical Frequency Range: 9kHz to 25.0 GHz
Protocol Type: WI-FI/g 6Mbps Detector: Peak, Average

Operation Frequency	Freq.	Pol	Peak Reading	Peak Limit	Peak Margin	Average Reading	Average Limit	Average Margin
(MHz)	(MHz)	(H/V)	(dBμV/m)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
2412.0	2390.0	V	52.1	74.0	-21.9	-	54.0	-
	2390.0	H	52.3	74.0	-21.7	-	54.0	-
	4824.0	V	50.9	74.0	-23.1	-	54.0	-
	4824.0	H	50.8	74.0	-23.2	-	54.0	-
2437.0	4874.0	V	53.1	74.0	-20.9	-	54.0	-
	4874.0	H	53.0	74.0	-21.0	-	54.0	-
2462.0	4924.0	V	52.7	74.0	-21.3	-	54.0	-
	4924.0	H	52.3	74.0	-21.7	-	54.0	-
	2483.5	V	64.2	74.0	-9.8	52.5	54.0	-1.5
	2483.5	H	65.0	74.0	-9.0	53.8	54.0	-0.2

Figure 137. Radiated Emission Results

Antenna Polarization: Horizontal/Vertical Frequency Range: 9kHz to 25.0 GHz
Protocol Type: WI-FI/n 6.5Mbps Detector: Peak, Average

Operation Frequency	Freq.	Pol	Peak Reading	Peak Limit	Peak Margin	Average Reading	Average Limit	Average Margin
(MHz)	(MHz)	(H/V)	(dBμV/m)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
2412.0	2390.0	V	56.3	74.0	-17.7	50.6	54.0	-3.4
	2390.0	H	55.8	74.0	-18.2	50.5	54.0	-3.5
	4824.0	V	55.3	74.0	-18.7	45.0	54.0	-9.0
	4824.0	H	51.2	74.0	-22.8	-	54.0	-
2437.0	4874.0	V	50.2	74.0	-23.8	-	54.0	-
	4874.0	H	51.5	74.0	-22.5	-	54.0	-
2462.0	4924.0	V	54.5	74.0	-19.5	44.0	54.0	-10.0
	4924.0	H	50.0	74.0	-24.0	-	54.0	-
	2483.5	V	66.5	74.0	-7.5	53.8	54.0	-0.2
	2483.5	H	66.1	74.0	-7.9	53.5	54.0	-0.5

Figure 138. Radiated Emission Results



Antenna Polarization: Horizontal/Vertical Frequency Range: 9kHz to 25.0 GHz
Protocol Type: Wi-Fi/n 65Mbps Detector: Peak, Average

Operation Frequency	Freq.	Pol	Peak Reading	Peak Limit	Peak Margin	Average Reading	Average Limit	Average Margin
(MHz)	(MHz)	(H/V)	(dBμV/m)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
2412.0	2390.0	V	55.3	74.0	-18.7	50.0	54.0	-4.0
	2390.0	H	55.0	74.0	-19.0	49.8	54.0	-4.2
	4824.0	V	52.6	74.0	-21.4	-	54.0	-
	4824.0	H	52.1	74.0	-21.9	-	54.0	-
2437.0	4874.0	V	53.0	74.0	-21.0	-	54.0	-
	4874.0	H	52.5	74.0	-21.5	-	54.0	-
2462.0	4924.0	V	54.5	74.0	-19.5	44.0	54.0	-10.0
	4924.0	H	50.2	74.0	-23.8	-	54.0	-
	2483.5	V	66.5	74.0	-7.5	53.8	54.0	-0.2
	2483.5	H	66.1	74.0	-7.9	53.5	54.0	-0.5

Figure 139. Radiated Emission Results

10.5 Test Instrumentation Used; Emissions in Restricted Frequency Bands

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
Active Loop Antenna	EMCO	6502	2950	July 5, 2022	July 5, 2023
EMI Receiver	HP(Agilent)	8542E	3906A00276	February 22, 2022	February 22, 2023
RF Filter	HP(Agilent)	85420E	3705A00248	February 22, 2022	February 22, 2023
EMC Analyzer	HP Agilent/ Keysight	8593EM	3826A00265	February 20, 2022	February 20, 2023
Wideband RF Amplifier 100K-26.5GHz	OSR	N.A.	N.A	May 16, 2022	May 16, 2023
Log-periodic Antenna	EMCO	3146	9505-4081	April 27, 2021	April 27, 2024
Biconical Antenna	EMCO	3110B	9912-3337	January 18, 2022	January 18, 2024



Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
Multi device Controller	EMCO	2090	9908-1456	NCR	NCR
LOD Semi anechoic Civil Chamber	ETS	S81	SL 11643	NCR	NCR
Pass Band Filter	Meuro	MFL040120 H50	902252	May 16, 2022	May 16, 2023
Spectrum Analyzer	Rohde & Schwarz	FSL6	100194	February 20, 2022	February 20, 2023
EMI Test Receiver	Rohde & Schwarz	ESCI7	100724	February 20, 2022	February 20, 2023
Wideband RF Amplifier 100K-26.5GHz	OSR	N.A.	N.A	May 16, 2022	May 16, 2023
10 m RF cable	Commscope ORS (Serge)	0623 WBC-400	G020133	May 16, 2022	May 16, 2023
35m coaxial cable for oats	EIM (Huber Suhner)	RG214-11N(X2) RG214/U	(blank)	June 22, 2022	June 22, 2023
Antenna Mast	ETS	2070-2	9608-1497	NCR	NCR
Turntable	ETS	2087	-	NCR	NCR
Active Loop Antenna	EMCO	6502	2950	July 5, 2022	July 5, 2023

Figure 140 Test Equipment Used



11. Antenna Gain/Information

The antenna gain is 2.0 dBi, type: integral.

12. Appendix A - Correction Factors

12.1 ITL #1911: OATS RF Cable

Frequency (MHz)	Cable Loss (dB)		Frequency (MHz)	Cable Loss (dB)
1.00	0.50		450.00	5.83
10.00	1.00		500.00	6.33
20.00	1.34		550.00	6.67
30.00	1.50		600.00	6.83
50.00	1.83		650.00	7.17
100.00	2.67		700.00	7.66
150.00	3.17		750.00	7.83
200.00	3.83		800.00	8.16
250.00	4.17		850.00	8.50
300.00	4.50		900.00	8.83
350.00	5.17		950.00	8.84
400.00	5.50		1000.00	9.00

12.2 ITL #1840: Semi-Anechoic Chamber RF Cable

Frequency (MHz)	Cable Loss (dB)		Frequency (MHz)	Cable Loss (dB)
1,000.0	-1.40		10,000.0	-6.00
1,500.0	-1.70		10,500.0	-6.20
2,000.0	-2.00		11,000.0	-6.20
2,500.0	-2.30		11,500.0	-6.00
3,000.0	-2.60		12,000.0	-6.00
3,500.0	-2.80		12,500.0	-6.10
4,000.0	-3.10		13,000.0	-6.30
4,500.0	-3.30		13,500.0	-6.50
5,000.0	-3.60		14,000.0	-6.70
5,500.0	-3.70		14,500.0	-7.00
6,000.0	-4.00		15,000.0	-7.30
6,500.0	-4.40		15,500.0	-7.50
7,000.0	-4.7		16,000.0	-7.60
7,500.0	-4.80		16,500.0	-8.00
8,000.0	-5.00		17,000.0	-8.00
8,500.0	-5.10		17,500.0	-8.10
9,000.0	-5.60		18,000.0	-8.20
9,500.0	-5.80			

12.3 ITL # 1075: Active Loop Antenna

Frequency (MHz)	MAF (dBs/m)	AF (dB/m)		Frequency (MHz)	MAF (dBs/m)	AF (dB/m)
0.01	-33.10	18.40		3.00	-40.00	11.50
0.02	-37.20	14.30		4.00	-40.10	11.40
0.03	-38.20	13.30		5.00	-40.20	11.30
0.05	-39.80	11.70		6.00	-40.40	11.10



0.10	-40.10	11.40
0.20	-40.30	11.20
0.30	-40.30	11.20
0.50	-40.30	11.20
0.70	-40.30	11.20
1.00	-40.10	11.40
2.00	-40.00	11.50

7.00	-40.40	11.10
8.00	-40.40	11.10
9.00	-40.50	11.00
10.00	-40.50	11.00
20.00	-41.50	10.00
30.00	-43.50	8.00

12.4 ITL #1356: Biconical Antenna

Frequency (MHz)	AF (dB/m)		Frequency (MHz)	AF (dB/m)
30.00	13.00		90.00	8.23
35.00	10.89		100.00	11.12
40.00	10.59		120.00	13.16
45.00	10.63		140.00	13.07
50.00	10.12		160.00	14.80
60.00	9.26		180.00	16.95
70.00	7.74		200.00	17.17
80.00	6.63			

12.5 ITL # 1349: Log Periodic Antenna

Frequency (MHz)	AF (dB/m)
200.00	11.58
250.00	12.04
300.00	14.76
400.00	15.55
500.00	17.85
600.00	18.66
700.00	20.87
800.00	21.15
900.00	22.32
1000.00	24.22

12.6 ITL # 1352: 1-18 GHz Horn Antenna

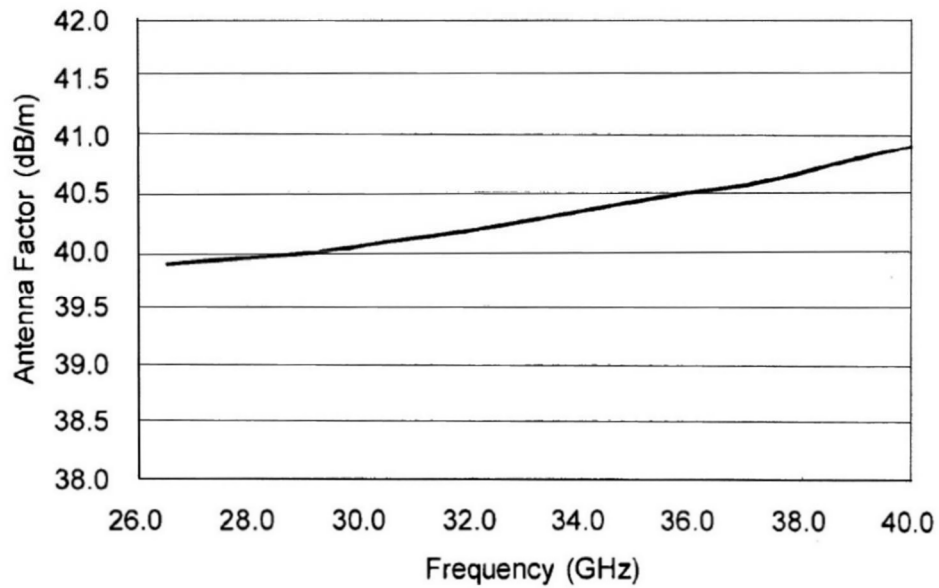
Frequency (GHz)	AF (dB/m)		Frequency (GHz)	AF (dB/m)
0.75	25.00		9.50	38.00
1.00	23.50		10.00	38.50
1.50	26.00		10.50	38.50
2.00	29.00		11.00	38.50
2.50	27.50		11.50	38.50
3.00	30.00		12.00	38.00
3.50	31.50		12.50	38.50
4.00	32.50		13.00	40.00
4.50	32.50		13.50	41.00
5.00	33.00		14.00	40.00
5.50	35.00		14.50	39.00
6.00	36.50		15.00	38.00
6.50	36.50		15.50	37.50
7.00	37.50		16.00	37.50
7.50	37.50		16.50	39.00
8.00	37.50		17.00	40.00
8.50	38.00		17.50	42.00
9.00	37.50		18.00	42.50

12.7 ITL # 1353: 18-26.5 GHz Horn Antenna

Frequency (MHz)	Measured antenna factor (dB/m) ¹		Frequency (MHz)	Measured antenna factor (dB/m) ¹
18,000.00	32.40		22,500.00	33.00
18,500.00	32.00		23,000.00	33.10
19,000.00	32.30		23,500.00	33.80
19,500.00	32.40		24,000.00	33.50
20,000.00	32.30		24,500.00	33.50
20,500.00	32.80		25,000.00	33.80
21,000.00	32.80		25,500.00	33.90
21,500.00	32.70		26,000.00	34.20
22,000.00	33.10		26,500.00	34.70

¹ The antenna factor shall be added to the receiver's reading in dBμV, to obtain field strength in dBμ V/m

12.8 ITL # 1777: 26.5-40 GHz Horn Antenna



End of Test Report