Test report

466630-1R5TRFWL

Date of issue: September 6, 2022

Applicant:
Avnet, Inc.

Product:
Azure Sphere MT3620 Module

Model:
AES-MS-MT3620-M-G-3

FCC ID:
2AF62-AVT3620C3

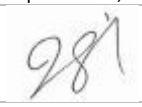
IC ID:
21571-AVT3620C3

Specifications:

- FCC 47 CFR Part 15, Subpart C – §15.247
  Operation within the bands 902 – 928 MHz, 2400 – 2483.5 MHz, 5727 – 5850 MHz
- Industry Canada RSS-247, Issue 2
  Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

Lab and test locations

Company name	Nemko USA Inc.
Address	2210 Faraday Ave, Suite 150
City	Carlsbad
State	California
Postal code	92008
Country	USA
Telephone	+1 760 444 3500
Website	www.nemko.com
FCC Site Number	Test Firm Registration Number: 392943 Designation Number: US5058
ISED Test Site	2040B-3

Tested by	Martha Espinoza, Wireless Test Engineer
Reviewed by	James Cunningham, EMC/MIL/WL Supervisor
Review date	September 6, 2022
Reviewer signature	

Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.
This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contain in this report are within Nemko USA's ISO/IEC 17025 accreditation.
This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

Copyright notification

Table of Contents

Section 1 Report summary

1.1 Applicant

Company name	Avnet, Inc.
Address	2211 South 47th street
City	Phoenix
Province/State	Arizona
Postal/Zip code	85034
Country	USA

1.2 Manufacturer

Company name	Avnet, Inc.
Address	2211 South 47th street
City	Phoenix
Province/State	Arizona
Postal/Zip code	85034
Country	USA

1.3 Test specifications

FCC 47 CFR Part 15, Subpart C – §15.247	Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz
IC RSS-247 Issue 2	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

1.4 Test methods

ANSI C63.10-2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
558074 D01 DTS Measurement Guidance v03r02 (June 5, 2014)	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247

1.5 Exclusions

None

1.6 Statement of compliance

In the configuration tested, the EUT was found compliant.

Testing was performed against all relevant requirements of the test standard. Results obtained indicate that the product under test complies in full with the requirements tested. The test results relate only to the items tested.

See "Summary of test results" for full details.

1.7 Test report revision history

Table 1.7-1: *Test report revision history*

Revision #	Details of changes made to test report
466630-1TRFWL	Original report issued
466630-1R1TRFWL	Company name, address and model name were changed by client request
466630-1R2TRFWL	Model name, FCC ID and IC ID were changed by client request
466630-1R3TRFWL	Editorial correction
466630-1R4TRFWL	Section 4.1 table corrected (modulation type); Applicant name corrected; Typo corrected at page 13; Product name corrected
466630-1R5TRFWL	Added EUT serial number

Notes: None

Section 2 Summary of test results

2.1 FCC Part 15 Subpart C, general requirements

Part	Test description	Verdict
§15.207(a)	Conducted limits	Pass
§15.31(e)	Variation of power source	Pass
§15.203	Antenna requirement	Pass

Notes: The integrated antenna is located within the protective cover of EUT

2.2 FCC Part 15.247

Part	Test description	Verdict
§15.247(a)(1)(i)	Frequency hopping systems operating in the 902–928 MHz band	Not applicable
§15.247(a)(1)(ii)	Frequency hopping systems operating in the 5725–5850 MHz band	Not applicable
§15.247(a)(1)(iii)	Frequency hopping systems operating in the 2400–2483.5 MHz band	Not applicable
§15.247(a)(2)	Minimum 6 dB bandwidth for systems using digital modulation techniques	Pass
§15.247(b)(1)	Maximum peak output power of frequency hopping systems operating in the 2400–2483.5 MHz band and 5725–5850 MHz band	Not applicable
§15.247(b)(2)	Maximum peak output power of Frequency hopping systems operating in the 902–928 MHz band	Not applicable
§15.247(b)(3)	Maximum peak output power of systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands	Pass
§15.247(b)(4)	Transmitting antennas of directional gain greater than 6 dBi	Not applicable
§15.247(c)(1)	Fixed point-to-point operation with directional antenna gains greater than 6 dBi	Not applicable
§15.247(c)(2)	Transmitters operating in the 2400–2483.5 MHz band that emit multiple directional beams	Not applicable
§15.247(d)	Spurious emissions	Pass
§15.247(e)	Power spectral density for digitally modulated devices	Pass
§15.247(f)	Time of occupancy for hybrid systems	Not applicable

2.3 IC RSS-247, Issue 2

Part	Test description	Verdict
5.1 (a)	Bandwidth of a frequency hopping channel	Not applicable
5.1 (b)	Minimum channel spacing for frequency hopping systems	Not applicable
5.1 (c)	Frequency hopping systems operating in the 902–928 MHz band	Not applicable
5.1 (d)	Frequency hopping systems operating in the 2400–2483.5 MHz band	Not applicable
5.1 (e)	Frequency hopping systems operating in the 5725–5850 MHz band	Not applicable
5.2 (a)	Minimum 6 dB bandwidth	Pass
5.2 (b)	Maximum power spectral density	Pass
5.3 (a)	Digital modulation turned off	Not applicable
5.3 (b)	Frequency hopping turned off	Not applicable
5.4 (a)	Frequency hopping systems operating in the 902–928 MHz band	Not applicable
5.4 (b)	Frequency hopping systems operating in the 2400–2483.5 MHz band	Not applicable
5.4 (c)	Frequency hopping systems operating in the 5725–5850 MHz	Not applicable
5.4 (d)	Systems employing digital modulation techniques	Pass
5.4 (e)	Point-to-point systems in 2400–2483.5 MHz and 5725–5850 MHz band	Not applicable
5.4 (f)	Transmitters which operate in the 2400–2483.5 MHz band with multiple directional beams	Not applicable
5.5	Out-of-band emissions	Pass

2.4 IC RSS-GEN, Issue 5

Part	Test description	Verdict
7.3	Receiver radiated emission limits	Not applicable
7.4	Receiver conducted emission limits	Not applicable
8.8	Power Line Conducted Emissions Limits for License-Exempt Radio Apparatus	Pass

Section 3 Equipment under test (EUT) details

3.1 Sample information

Receipt date	May 18, 2022
Nemko sample ID number	NEx: 466630

3.2 EUT information

Product name	Azure Sphere MT3620 Module
Model	AES-MS-MT3620-M-G-3
Serial number	00:02:B5:03:D5:FC
Part number	N/A

3.3 Technical information

Frequency band	2400 – 2483.5 MHz
Minimum frequency (MHz)	2412
Maximum frequency (MHz)	2462
Type of modulation	802.11b 802.11g 802.11n
Power requirements	3.3 V_{DC}
Antenna information	Chip Antenna Integrated: 2.2 dBi Gain

3.4 EUT exercise and monitoring details

The EUT was controlled by support laptop running RF_test_tool_GUI tool and set to transmit Wi-Fi signals at surveyed power levels while on the Low, Middle, and High channels—as applicable per test—using the 802.11b, 802.11g, 802.11n modulations schemes.

Table 3.4-1: *EUT sub assemblies*

Description	Brand name	Model/Part number	Serial number	Rev.
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Table 3.4-2: *EUT interface ports*

Description	Qty.
USB micro	1

Table 3.4-3: *Support equipment*

Description	Brand name	Model/Part number	Serial number	Rev.
Support Laptop	Dell	Inspiron 15	25951147526	--

Table 3.4-4: *Inter-connection cables*

Cable description	From	To	Length (m)
USB	Support laptop	EUT	1.0

3.5 EUT setup diagram

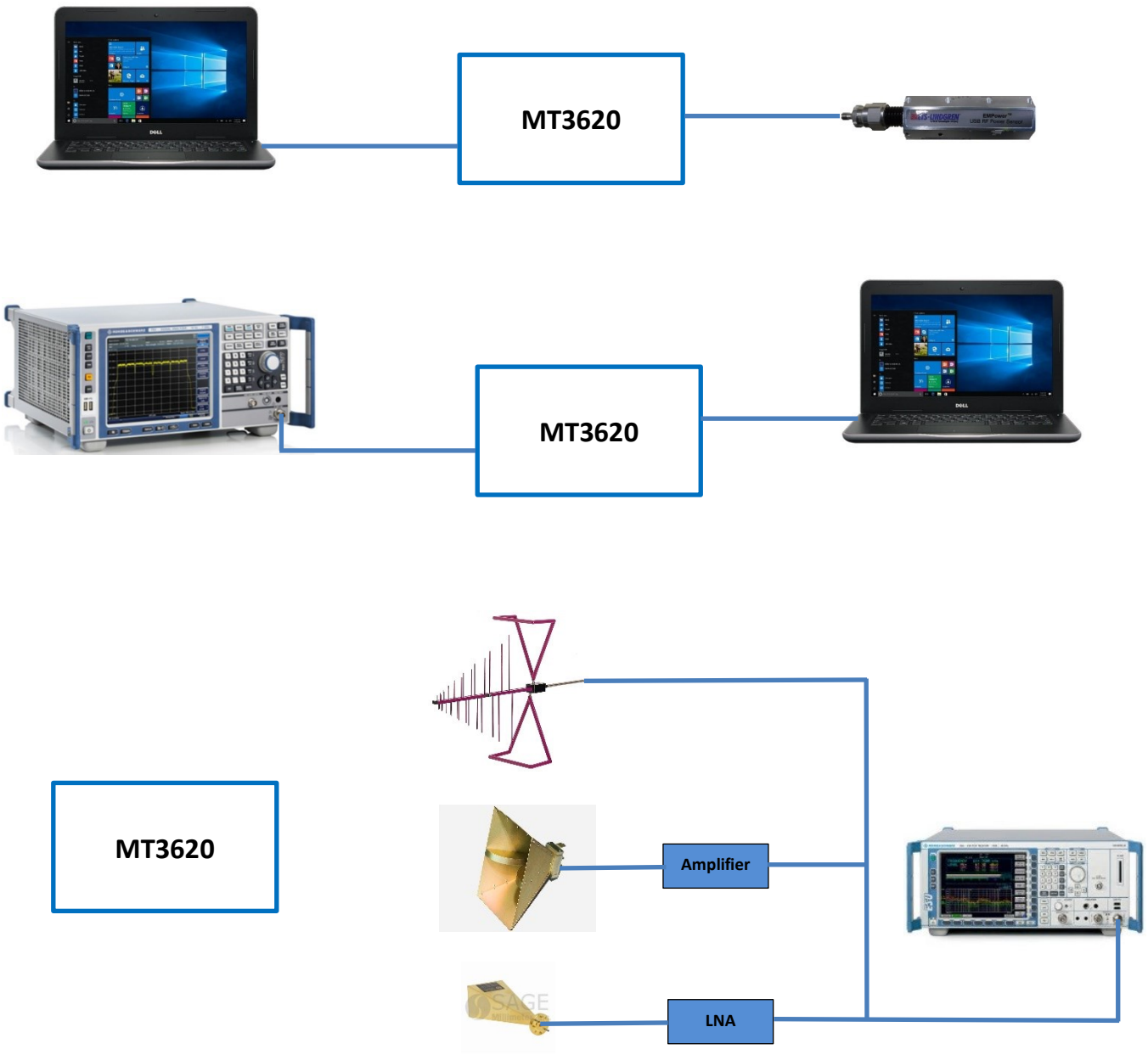

Figure 3.5-1: *Setup diagram*

Section 4 Engineering considerations

4.1 Surveyed power levels

In order to find an efficient method of comprehensively testing Wi-Fi within the 802.11b, 802.11g, 802.11n modulations schemes, the Maximum Peak Conducted Output Power of each modulation and data rate were surveyed and recorded. Each modulation scheme was then tested at the discrete data rate which produced the greatest Maximum Peak Conducted Output Power.

The following 802.11 modulation schemes with the identified data rates were tested through this report:
802.11b CCK 11 MBPS
802.11g OFDM 54 MBPS
802.11n MCS5

The following table lists all Maximum Peak Conducted Output Power measurements used to identify which data rate per modulation to test:

802.11b *Data Rate*	Modulation	Maximum Peak Conducted Output Power (dBm) CH1	Maximum Peak Conducted Output Power (dBm) CH6	Maximum Peak Conducted Output Power (dBm) CH11
1 Mbps	CCK	15.12	15.66	15.30
2 Mbps	CCK	14.92	15.46	15.28
5.5 Mbps	CCK	15.12	15.63	15.24
11 Mbps	CCK	15.08	**15.68**	15.10

802.11g *Data Rate*	Modulation	Maximum Peak Conducted Output Power (dBm) CH1	Maximum Peak Conducted Output Power (dBm) CH6	Maximum Peak Conducted Output Power (dBm) CH11
6 Mbps	OFDM	14.62	15.25	14.80
9 Mbps	OFDM	14.64	15.21	14.83
12 Mbps	OFDM	14.65	15.27	14.79
18 Mbps	OFDM	14.62	15.24	14.79
24 Mbps	OFDM	14.67	15.21	14.81
36 Mbps	OFDM	14.67	15.27	14.85
48 Mbps	OFMD	15.60	16.00	15.77
54 Mbps	OFDM	15.64	**16.17**	15.80

802.11n *MCS Index*	Modulation	Maximum Peak Conducted Output Power (dBm)	Maximum Peak Conducted Output Power (dBm) CH6	Maximum Peak Conducted Output Power (dBm) CH11
0	MCS	14.67	15.24	14.82
1	MCS	14.65	15.28	14.83
2	MCS	14.68	15.29	14.83
3	MCS	14.66	15.30	14.81
4	MCS	15.62	16.09	15.75
5	MCS	15.63	**16.11**	15.77
6	MCS	15.62	16.10	15.72
7	MCS	15.61	16.10	15.73

4.2 Modifications incorporated in the EUT

There were no modifications performed to the EUT during this assessment.

4.3 Technical judgment

The following power levels for the 2.4 GHz Wi-Fi modulations schemes listed below were needed to meet FCC 15.247 conformity, and will be needed in the final end-product, as set by the Test software:
802.11b CCK 11 MBPS as worst case. Power setting in test software: 16.5 dBm (client requested)
802.11g OFDM 54 MBPS as worst case. Power setting in test software: 16.5 dBm (client requested)
802.11n MCS5 as worst case. Power setting in test software: 16.5 dBm (client requested)

4.4 Deviations from laboratory tests procedures

No deviations were made from laboratory procedures.

Section 5 Test conditions

5.1 Atmospheric conditions

Temperature	15-30 °C
Relative humidity	20-75 %
Air pressure	86–106 kPa

When it is impracticable to carry out tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests shall be recorded and stated.

5.2 Power supply range

The normal test voltage for equipment to be connected to the mains shall be the nominal mains voltage. For the purpose of the present document, the nominal voltage shall be the declared voltage, or any of the declared voltages ±5 %, for which the equipment was designed.

Section 6 Measurement uncertainty

6.1 Uncertainty of measurement

Nemko USA Inc. has calculated measurement uncertainty and is documented in EMC/MUC/001 "Uncertainty in EMC measurements." Measurement uncertainty was calculated using the methods described in CISPR 16-4-2 Specification for radio disturbance and immunity measuring apparatus and methods – Part 4-2: Uncertainties, statistics, and limit modelling – Measurement instrumentation uncertainty. The expression of Uncertainty in EMC testing. Measurement uncertainty calculations assume a coverage factor of K=2 with 95% certainty.

Table 6.1-1: *Measurement uncertainty calculations*

Measurement		U_{cispr} **dB**	U_{lab} **dB**
Conducted disturbance at AC mains and other port power using a V-AMN	9 kHz to 150 kHz	3.8	2.9
	150 kHz to 30 MHz	3.4	2.3
Conducted disturbance at telecommunication port using AAN	150 kHz to 30 MHz	5.0	4.3
Conducted disturbance at telecommunication port using CVP	150 kHz to 30 MHz	3.9	2.9
Conducted disturbance at telecommunication port using CP	150 kHz to 30 MHz	2.9	1.4
Conducted disturbance at telecommunication port using CP and CVP	150 kHz to 30 MHz	4.0	3.1
Radiated disturbance (electric field strength in a SAC)	30 MHz to 1 GHz	6.3	5.5
Radiated disturbance (electric field strength in a FAR)	1 GHz to 6 GHz	5.2	4.7
Radiated disturbance (electric field strength in a FAR)	6 GHz to 18 GHz	5.5	5.0

Notes: Compliance assessment:

If U_{lab} is less than or equal to U_{cispr} then:

- compliance is deemed to occur is no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit

If U_{lab} is greater than U_{cispr} then:

- compliance is deemed to occur is no measured disturbance level, increased by (U_{lab} - U_{cispr}), exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by (U_{lab} - U_{cispr}), exceeds the disturbance limit

V-AMN: V type artificial mains network
AAN: Asymmetric artificial network
CP: Current probe
CVP: Capacitive voltage probe
SAC: Semi-anechoic chamber
FAR: Fully anechoic room

Section 7 Test Equipment

Table 6.1-1: *Test Equipment List*

Equipment	Manufacturer	Model no.	Asset no.	Cal cycle	Next cal.
EMI Test Receiver	Rohde & Schwarz	ESCI 7	E1026	22 Mar 2022	22 Mar 2023
Transient Limiter	Hewlett-Packard	11947A	681	VOU	VOU
Two Line V-Network	Rohde & Schwarz	ENV216	E1020	17 Jan 2022	17 Jan 2023
Signal and spectrum analyzer	Rohde & Schwarz	FSV40	E1120	09 Dec 2021	09 Dec 2023
Power sensor	ETS Lindgren	7002-006	E1062	01 Nov 2021	01 Nov 2022
EMI Test Receiver	Rohde & Schwarz	ESU40	E1131	02 Mar 2022	02 Mar 2023
System Controller	Sunol Sciences	SC104V	E1191	NCR	NCR
Bilog Antenna (30-1000 MHz)	Schaffner	CBL 6111D	1480	28 Oct 2022	28 Oct 2023
DRG Horn (1-18 GHz)	ETS-Lindgren	3117-PA	E1160	26 Jan 2022	26 Jan 2023
Horn antenna (18-26 GHz)	SAGE	SAR-2309-42-S2	E1143	13 Nov 2020	13 Nov 2022
Low noise amplifier	Sage Millimeter, Inc.	SBL-1834034030-KFKF	E1228	VOU	VOU
2.4GHz notch filter	Micro-Tonics	HPM50110-01	E1142	NCR	NCR

Notes: NCR - no calibration required
VOU - verify on use

Table 6.1-2: *Test Software*

Manufacturer of Software	Details
Rohde & Schwarz	EMC 32 V10.60.10 (AC conducted emissions)
Rohde & Schwarz	EMC 32 V10.60.15 (radiated emissions)

Notes: None

Section 8 Testing data

8.1 FCC 15.207(a) and IC RSS-GEN, Issue 5 8.8 AC power line conducted emissions

8.1.1 Definition and limits

Title 47 → Chapter I → Subchapter A → Part 15 → Subpart C → §15.207(a)
RSS-Gen → §8.8

For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 µH/50 Ω line impedance stabilization network (LISN). The lower limit applies at the boundary between the frequency ranges.

Table 8.1-1: *Conducted emissions limit*

Frequency of emission, MHz	Conducted limit, dBµV	
	Quasi-peak	Average
0.15–0.5	66 to 56*	56 to 46*
0.5–5	56	46
5–30	60	50

Note: * - Decreases with the logarithm of the frequency.

8.1.2 Test summary

Verdict	Pass		
Test date	May 30, 2022	Temperature	19 °C
Test engineer	Martha Espinoza, Wireless Test Engineer	Air pressure	1002 mbar
Test location	Ground Plane	Relative humidity	52 %

8.1.3 Notes

Testing was performed with the Wi-Fi transmitter operating on a fixed channel at surveyed power levels. Only max power from section 4.1 (middle channel, CH6) was tested within the 802.11b (11 MBPS), 802.11g (54 MBPS) and 802.11n (MCS5) modulations schemes.

Testing was performed according to ANSI C63.10 §6.2.

8.1.4 Setup details

Port under test	DC main
EUT setup configuration	Tabletop
Measurement details	A preview measurement was generated with the receiver in continuous scan mode. Emissions detected within 6 dB or above limit were re-measured with the appropriate detector against the correlating limit and recorded as the final measurement.

Receiver settings:

Resolution bandwidth	9 kHz
Video bandwidth	30 kHz
Detector mode	– Peak (Preview measurement) – Quasi-peak and CAverage (Final measurement)
Trace mode	Max Hold
Measurement time	– 100 ms (Peak and Average preview measurement) – 5000 ms (Quasi-peak final measurement) – 5000 ms (CAverage final measurement)

8.1.5 Test data

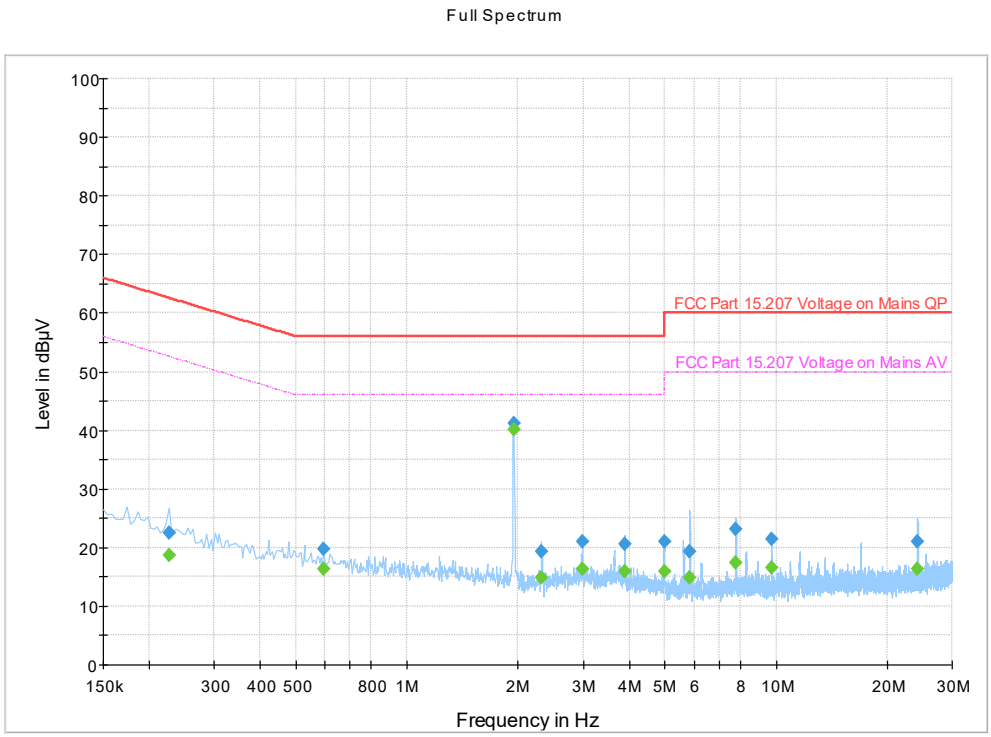

Figure 8.1-1: *DC conducted emissions spectral plot, Middle channel, 802.11b, CCK, 11MBPS*

Table 8.1-2: *DC conducted emissions data, 150 kHz – 30 MHz, Middle channel, 802.11b, CCK, 11MBPS*

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.226000	---	18.70	52.60	33.89	5000.0	9.000	L1	ON	19.5
0.226000	22.51	---	62.60	40.09	5000.0	9.000	L1	ON	19.5
0.594000	---	16.41	46.00	29.59	5000.0	9.000	L1	ON	19.4
0.594000	19.69	---	56.00	36.31	5000.0	9.000	L1	ON	19.4
1.946000	---	40.13	46.00	5.87	5000.0	9.000	L1	ON	19.4
1.946000	41.19	---	56.00	14.81	5000.0	9.000	L1	ON	19.4
2.310000	---	14.82	46.00	31.18	5000.0	9.000	L1	ON	19.4
2.310000	19.42	---	56.00	36.58	5000.0	9.000	L1	ON	19.4
2.986000	---	16.37	46.00	29.63	5000.0	9.000	L1	ON	19.3
2.986000	21.09	---	56.00	34.91	5000.0	9.000	L1	ON	19.3
3.894000	20.70	---	56.00	35.30	5000.0	9.000	N	ON	19.3
3.894000	---	15.92	46.00	30.08	5000.0	9.000	N	ON	19.3
4.982000	---	15.86	46.00	30.14	5000.0	9.000	N	ON	19.3
4.982000	20.93	---	56.00	35.07	5000.0	9.000	N	ON	19.3
5.846000	---	14.78	50.00	35.22	5000.0	9.000	N	ON	19.3
5.846000	19.31	---	60.00	40.69	5000.0	9.000	N	ON	19.3
7.782000	23.24	---	60.00	36.76	5000.0	9.000	L1	ON	19.3
7.782000	---	17.49	50.00	32.51	5000.0	9.000	L1	ON	19.3
9.726000	---	16.56	50.00	33.44	5000.0	9.000	N	ON	19.5
9.726000	21.35	---	60.00	38.65	5000.0	9.000	N	ON	19.5
24.226000	---	16.25	50.00	33.75	5000.0	9.000	N	ON	20.1
24.226000	21.05	---	60.00	38.95	5000.0	9.000	N	ON	20.1

Notes: Result (dBµV) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
Correction factor (dB) = LISN factor IL (dB) + cable loss (dB) + transient limiter (dB)

8.1.5 Test data, continued

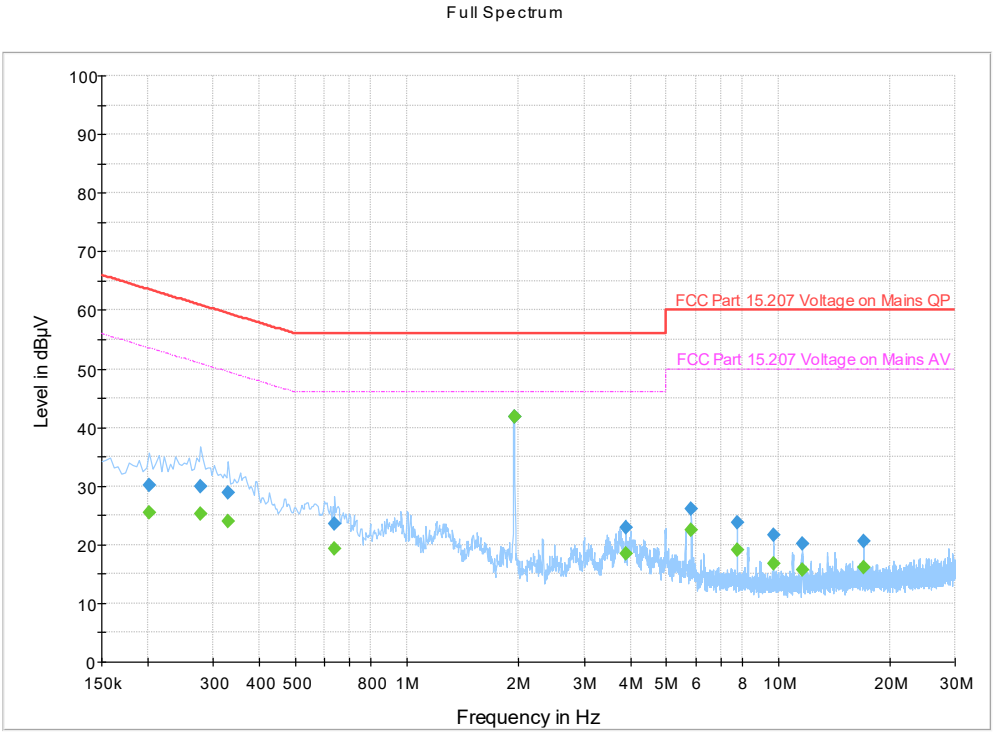

Figure 8.1-2: *DC conducted emissions spectral plot, Middle channel, 802.11g, OFDM, 54MBPS*

Table 8.1-3: *DC conducted emissions data, 150 kHz – 30 MHz, Middle channel, 802.11g, OFDM, 54MBPS*

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.202000	---	25.55	53.53	27.98	5000.0	9.000	L1	ON	19.5
0.202000	30.25	---	63.53	33.28	5000.0	9.000	L1	ON	19.5
0.278000	29.90	---	60.88	30.97	5000.0	9.000	N	ON	19.5
0.278000	---	25.22	50.88	25.66	5000.0	9.000	N	ON	19.5
0.330000	28.91	---	59.45	30.54	5000.0	9.000	L1	ON	19.4
0.330000	---	24.09	49.45	25.36	5000.0	9.000	L1	ON	19.4
0.638000	23.54	---	56.00	32.46	5000.0	9.000	L1	ON	19.4
0.638000	---	19.31	46.00	26.69	5000.0	9.000	L1	ON	19.4
1.942000	41.75	---	56.00	14.25	5000.0	9.000	L1	ON	19.4
1.942000	---	41.81	46.00	4.19	5000.0	9.000	L1	ON	19.4
3.886000	23.03	---	56.00	32.97	5000.0	9.000	L1	ON	19.3
3.886000	---	18.53	46.00	27.47	5000.0	9.000	L1	ON	19.3
5.826000	---	22.56	50.00	27.44	5000.0	9.000	L1	ON	19.3
5.826000	26.03	---	60.00	33.97	5000.0	9.000	L1	ON	19.3
7.774000	---	19.08	50.00	30.92	5000.0	9.000	N	ON	19.3
7.774000	23.79	---	60.00	36.21	5000.0	9.000	N	ON	19.3
9.718000	---	16.83	50.00	33.17	5000.0	9.000	N	ON	19.5
9.718000	21.67	---	60.00	38.33	5000.0	9.000	N	ON	19.5
11.654000	---	15.63	50.00	34.37	5000.0	9.000	L1	ON	19.8
11.654000	20.20	---	60.00	39.80	5000.0	9.000	L1	ON	19.8
17.034000	20.68	---	60.00	39.32	5000.0	9.000	L1	ON	20.3
17.034000	---	16.06	50.00	33.94	5000.0	9.000	L1	ON	20.3

Notes: Result (dBµV) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
Correction factor (dB) = LISN factor IL (dB) + cable loss (dB) + transient limiter (dB)

8.1.5 Test data, continued

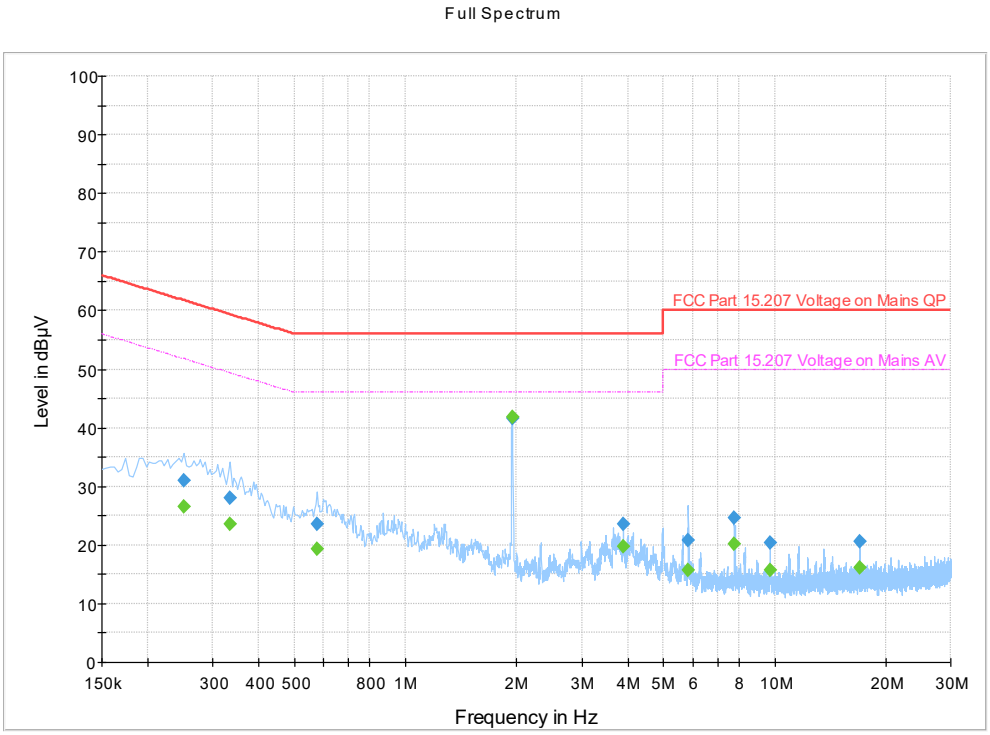

Figure 8.1-3: *DC conducted emissions spectral plot, Middle channel, 802.11n, MCS5*

Table 8.1-4: *DC conducted emissions data, 150 kHz – 30 MHz, Middle channel, 802.11n, MCS5*

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.250000	---	26.47	51.76	25.29	5000.0	9.000	L1	ON	19.5
0.250000	30.95	---	61.76	30.81	5000.0	9.000	L1	ON	19.5
0.334000	28.12	---	59.35	31.23	5000.0	9.000	N	ON	19.4
0.334000	---	23.67	49.35	25.69	5000.0	9.000	N	ON	19.4
0.574000	23.53	---	56.00	32.47	5000.0	9.000	N	ON	19.4
0.574000	---	19.35	46.00	26.65	5000.0	9.000	N	ON	19.4
1.942000	---	41.74	46.00	4.26	5000.0	9.000	L1	ON	19.4
1.942000	41.69	---	56.00	14.31	5000.0	9.000	L1	ON	19.4
3.886000	23.67	---	56.00	32.33	5000.0	9.000	L1	ON	19.3
3.886000	---	19.65	46.00	26.35	5000.0	9.000	L1	ON	19.3
5.842000	20.86	---	60.00	39.14	5000.0	9.000	L1	ON	19.3
5.842000	---	15.71	50.00	34.29	5000.0	9.000	L1	ON	19.3
7.770000	---	20.19	50.00	29.81	5000.0	9.000	N	ON	19.3
7.770000	24.54	---	60.00	35.46	5000.0	9.000	N	ON	19.3
9.730000	---	15.63	50.00	34.37	5000.0	9.000	N	ON	19.5
9.730000	20.42	---	60.00	39.58	5000.0	9.000	N	ON	19.5
17.042000	---	16.08	50.00	33.92	5000.0	9.000	N	ON	20.4
17.042000	20.66	---	60.00	39.34	5000.0	9.000	N	ON	20.4

Notes: Result (dBµV) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
Correction factor (dB) = LISN factor IL (dB) + cable loss (dB) + transient limiter (dB)

8.2 FCC 15.247(a)(2) and RSS-247 5.2(1) Minimum 6 dB bandwidth for systems using digital modulation techniques References

8.2.1 Definition and limits

Title 47 → Chapter I → Subchapter A → Part 15 → Subpart C → §15.247(a)(2)
RSS-247 → §5.2(a)

(a) Operation under the provisions of this Section is limited to frequency hopping and digitally modulated intentional radiators that comply with the following provisions:

(2) 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.

8.2.2 Test summary

Verdict	Pass		
Test date	May 19, 2022	Temperature	17 °C
Test engineer	Martha Espinoza, Wireless Test Engineer	Air pressure	1005 mbar
Test location	Wireless bench (Conducted)	Relative humidity	59 %

8.2.3 Notes

None

8.2.4 Setup details

EUT setup configuration	Table top
Test facility	Wireless Bench
Measurement method	558074 D01 DTS Measurement Guidance §8.2 ANSI C63.10 §11.8.1 using built-in marker function of the spectrum analyzer

Receiver/spectrum analyzer settings:

Resolution bandwidth	100 kHz
Video bandwidth	300 kHz
Detector mode	Peak
Trace mode	Max Hold
Measurement time	Long enough for trace to stabilize

8.2.5 Test data

Table 8.2-1: *6 dB occupied bandwidth test data*

Test Frequency (MHz)	Modulation scheme	Bandwidth (MHz)	Limit (kHz)
2412	802.11b CCK 11MBPS	8.492	> 500
2437	802.11b CCK 11MBPS	8.342	> 500
2462	802.11b CCK 11MBPS	8.242	> 500
2412	802.11g OFDM 54MBPS	12.865	> 500
2437	802.11g OFDM 54MBPS	12.967	> 500
2462	802.11g OFDM 54MBPS	12.866	> 500
2412	802.11n MCS5	12.866	> 500
2437	802.11n MCS5	12.865	> 500
2462	802.11n MCS5	12.815	> 500

8.2.5 Test data, continued

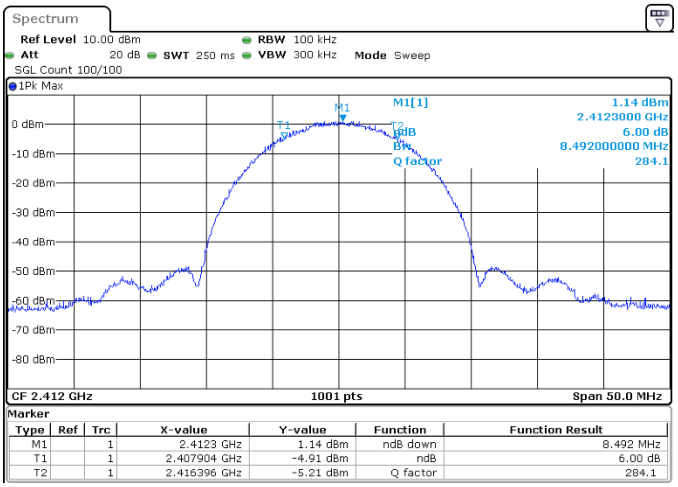

Figure 8.2-1: *6 dB OBW, Low channel, 802.11b, CCK, 11MBPS*

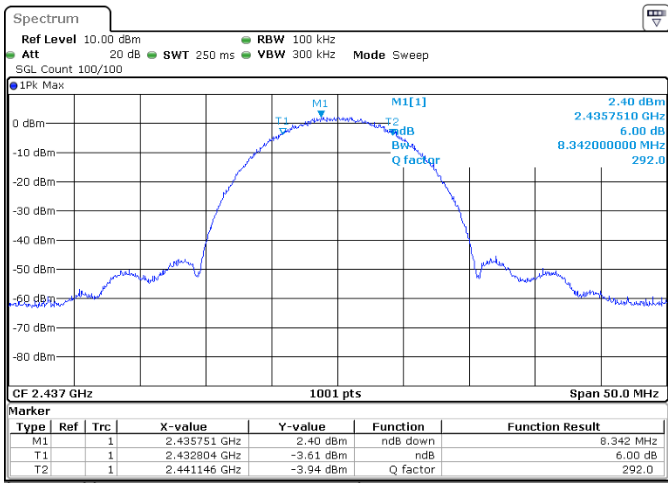

Figure 8.2-2: *6 dB OBW, Middle channel, 802.11b, CCK, 11MBPS*

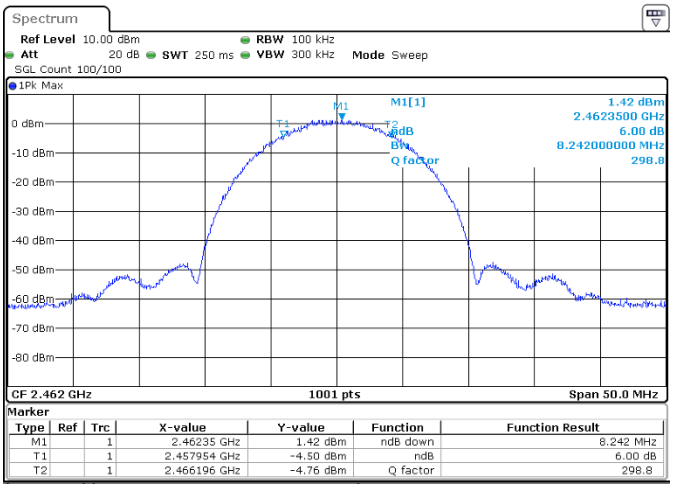

Figure 8.2-3: *6 dB OBW, High channel, 802.11b, CCK, 11MBPS*

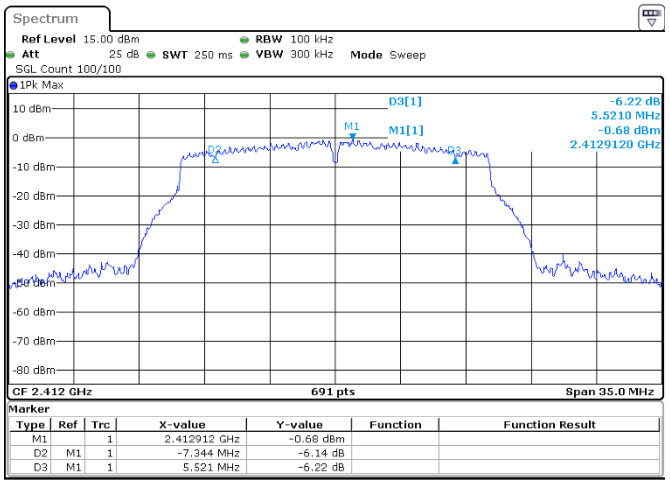

Figure 8.2-4: *6 dB OBW, Low channel, 802.11g, OFDM, 54MBPS*

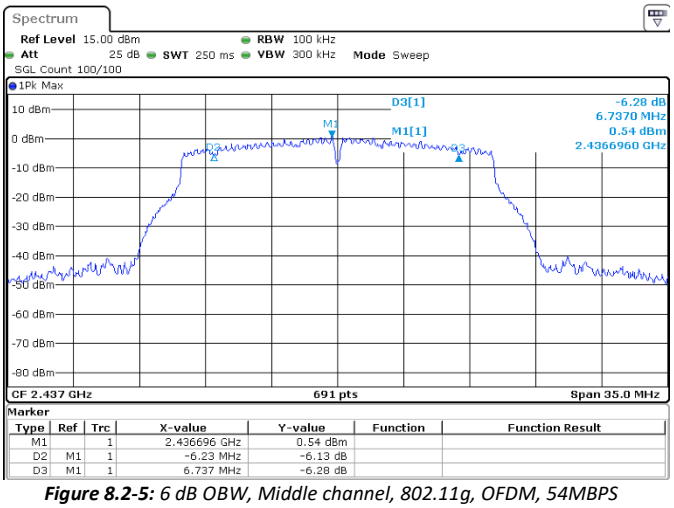

Figure 8.2-5: *6 dB OBW, Middle channel, 802.11g, OFDM, 54MBPS*

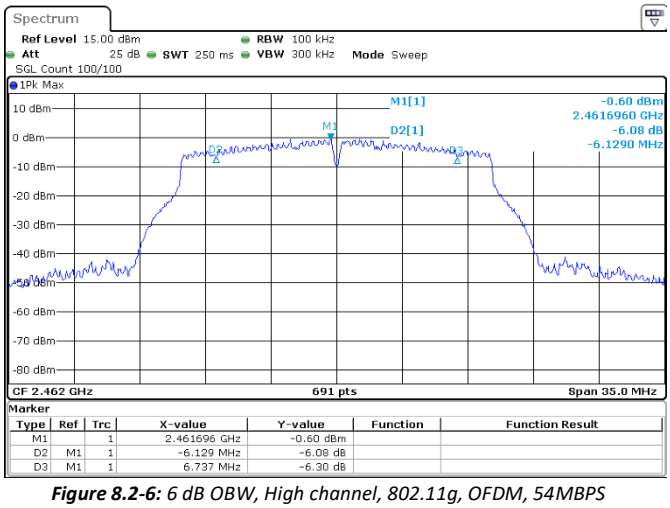

Figure 8.2-6: *6 dB OBW, High channel, 802.11g, OFDM, 54MBPS*

8.2.5 Test data, continued

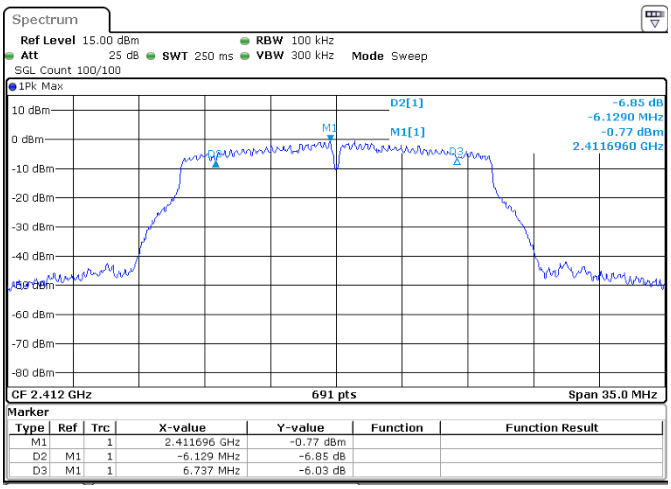

Figure 8.2-7: *6 dB OBW, Low channel, 802.11n, MCS5*

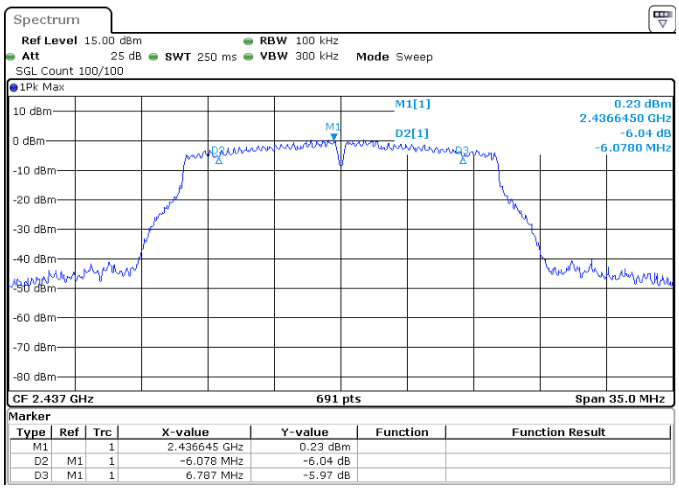

Figure 8.2-8: *6 dB OBW, Middle channel, 802.11n, MCS5*

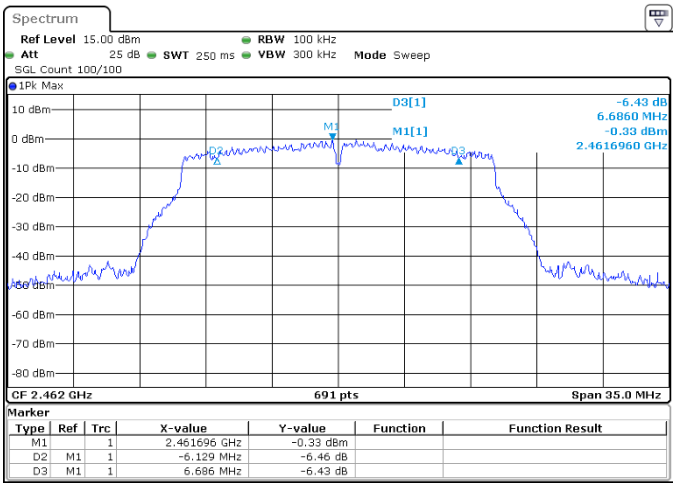

Figure 8.2-9: *6 dB OBW, High channel, 802.11n, MCS5*

8.3 FCC 15.247(b) and RSS-247 5.4 (4) Transmitter output power and e.i.r.p. requirements

8.3.1 Definition and limits

Title 47 → Chapter I → Subchapter A → Part 15 → Subpart C → §15.247(b)(2) / (3)

(b) The maximum peak conducted output power of the intentional radiator shall not exceed the following:

(3) For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 W (30 dBm). As an alternative to a peak power measurement, compliance with the one-Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

(4) The conducted output power limit specified in paragraph (b) of this Section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this Section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this Section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(i) Systems operating in the 2400–2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

RSS-247 → §5.4(d)

(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).

As an alternative to a peak power measurement, compliance can be based on a measurement of the maximum conducted output power. The maximum conducted output power is the total transmit power delivered to all antennas and antenna elements, averaged across all symbols in the signalling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or transmitting at a reduced power level. If multiple modes of operation are implemented, the maximum conducted output power is the highest total transmit power occurring in any mode.

8.3.2 Test summary

Verdict	Pass		
Test date	May 18, 2022	Temperature	21 °C
Test engineer	Martha Espinoza, Wireless Test Engineer	Air pressure	1006 mbar
Test location	Wireless bench (Conducted)	Relative humidity	56 %

8.3.3 Notes

Testing was performed with Wi-Fi transmitter operating on a fixed channel at surveyed power levels. Low, middle, and high channels were tested within the 802.11b, 802.11g, 802.11n modulations schemes.

The attenuation of the interconnecting cable and attenuator were included in the power meter software as a correction factor.

The antenna gain is 2.2 dBi per client declaration.

EIRP = Conducted Power + Declared Antenna Gain

8.3.4 Setup details

EUT setup configuration	Tabletop
Test facility	Wireless Bench
Measurement method	ANSI C63.10 §11.9.1.3 PKPM1 (Peak Power Meter) method

8.3.5 Test data

Table 8.3-1: *Output power*

Test Frequency (MHz)	Modulation scheme	Maximum Peak Conducted Output Power (dBm)	Conducted Limit (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)
2412	802.11b CCK 11MBPS	15.08	30.0	2.2	17.28	36.0
2437	802.11b CCK 11MBPS	15.68	30.0	2.2	17.88	36.0
2462	802.11b CCK 11MBPS	15.10	30.0	2.2	17.30	36.0
2412	802.11g OFDM 54MBPS	15.64	30.0	2.2	17.84	36.0
2437	802.11g OFDM 54MBPS	16.17	30.0	2.2	18.37	36.0
2462	802.11g OFDM 54MBPS	15.80	30.0	2.2	18.00	36.0
2412	802.11n MCS5	15.63	30.0	2.2	17.83	36.0
2437	802.11n MCS5	16.11	30.0	2.2	18.31	36.0
2462	802.11n MCS5	15.77	30.0	2.2	17.97	36.0

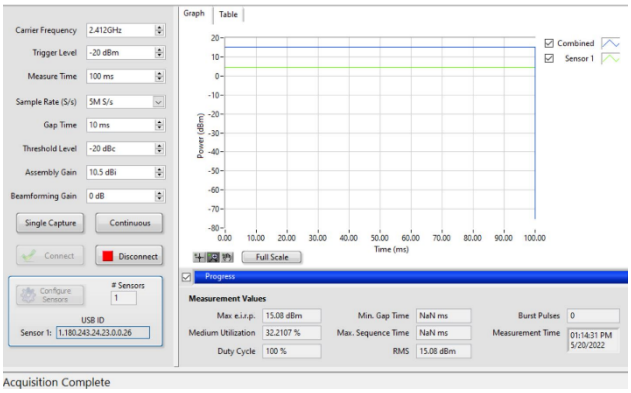

Figure 8.3-1: *Output power, Low channel, 802.11b, CCK, 11MBPS*

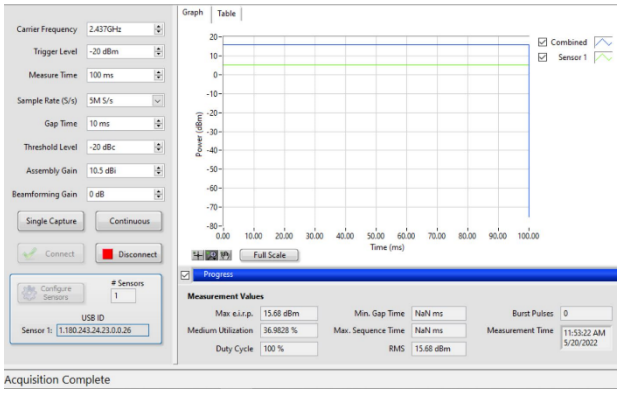

Figure 8.3-2: *Output power, Middle channel, 802.11b, CCK, 11MBPS*

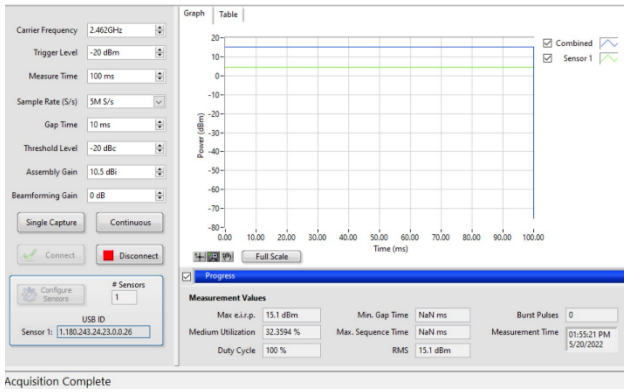

Figure 8.3-3: *Output power, High channel, 802.11b, CCK, 11MBPS*

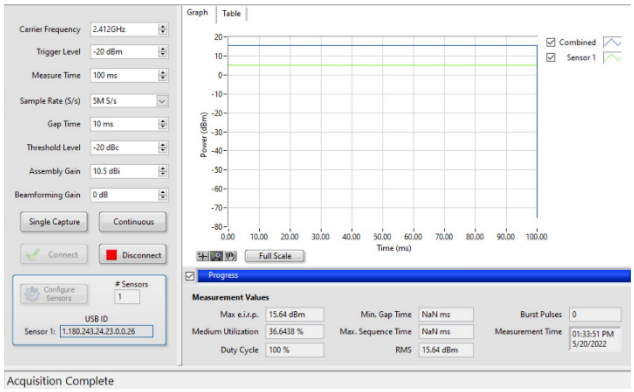

Figure 8.3-4: *Output power, Low channel, 802.11g, OFDM, 54MBPS*

8.3.5 Test data, continued

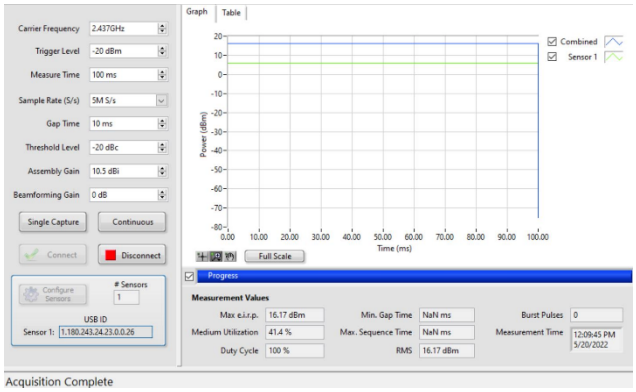

Figure 8.3-5: *Output power, Middle channel, 802.11g, OFDM, 54MBPS*

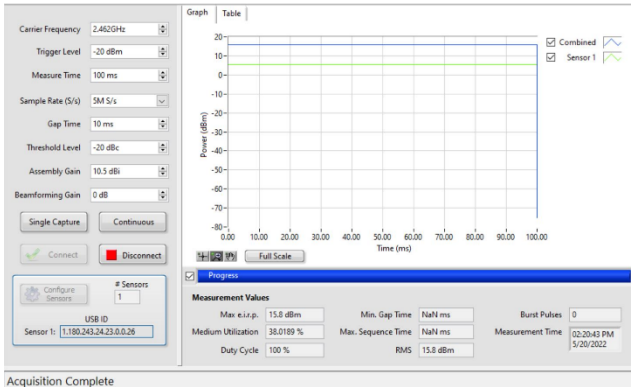

Figure 8.3-6: *Output power, High channel, 802.11g, OFDM, 54MBPS*

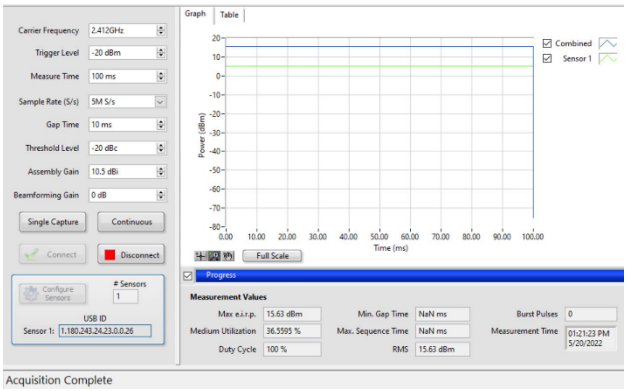

Figure 8.3-7: *Output power, Low channel, 802.11n, MCS5*

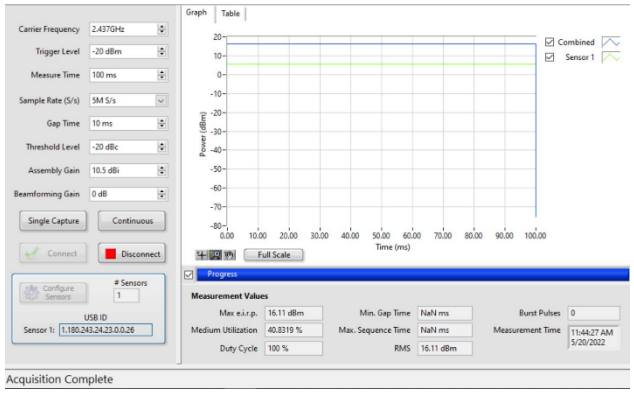

Figure 8.3-8: *Output power, Middle channel, 802.11n, MCS5*

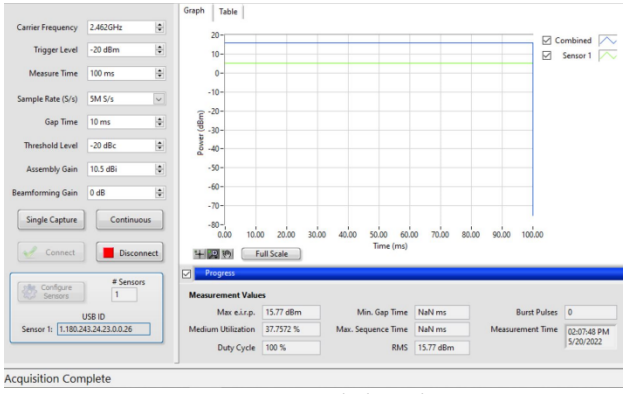

Figure 8.3-9: *Output power, High channel, 802.11n, MCS5*

8.4 FCC Part 15.247(d) and RSS-247 5.5 Conducted band-edge spurious emissions

8.4.1 Definition and limits

Title 47 → Chapter I → Subchapter A → Part 15 → Subpart C → §15.247(d)

(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) (see §15.205(c)).

RSS-247 → §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(d), 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.

8.4.2 Test summary

Verdict	Pass		
Test date	May 23, 2022	Temperature	23 °C
Test engineer	Martha Espinoza, Wireless Test Engineer	Air pressure	1006 mbar
Test location	Wireless bench (Conducted)	Relative humidity	61 %

8.4.3 Notes

Testing was performed with Wi-Fi transmitter operating on a fixed channel at surveyed power levels. Low and high channels were tested within the 802.11b, 802.11g, 802.11n modulations schemes.

For conducted measurements, an offset corresponding to the loss of the connected cable was added in the spectrum analyzer.

In each measurement, the limit was derived by subtracting 20 dB from a power spectral density reference measurement and the frequency limit were the band limits: 2400 MHz for lo channel and 2483.5 MHz for high channel.

8.4.4 Setup details

EUT setup configuration	Tabletop
Test facility	Wireless bench
Measurement details	Conducted band edge measurement performed as per C63.10 §6.10.4

Spectrum analyzer settings for conducted spurious emissions:

Resolution bandwidth	100 kHz
Video bandwidth	300 kHz
Detector mode	Peak
Trace mode	Max Hold
Measurement time	Long enough for trace to stabilize

8.4.5 Test data

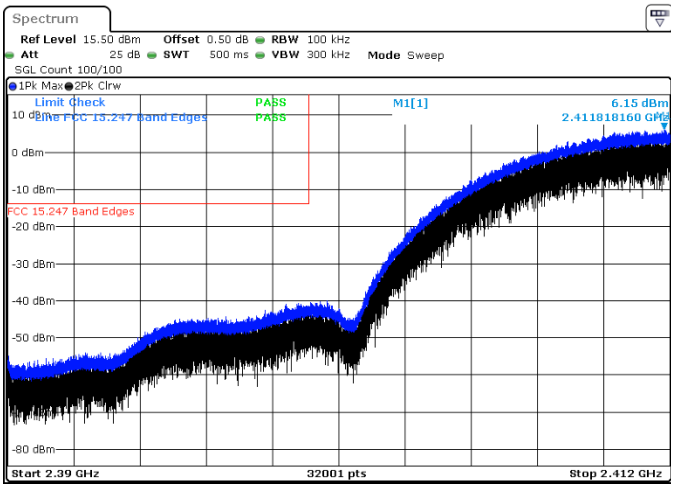

Figure 8.4-1: *Band Edge test, Low channel, 802.11b, CCK, 11MBPS*

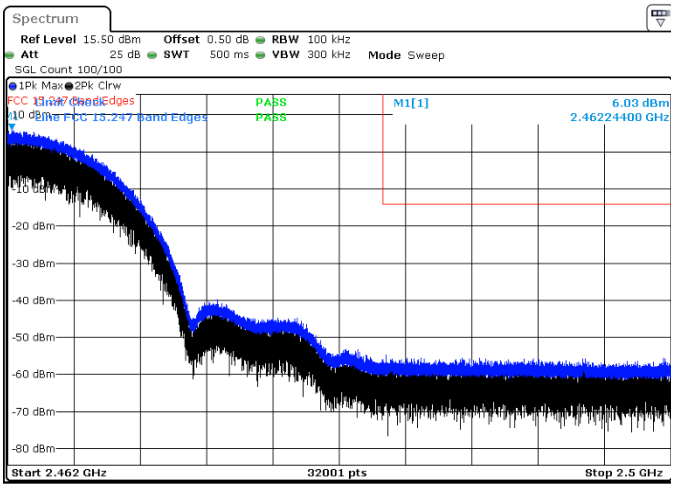

Figure 8.4-2: *Band Edge test, High channel, 802.11b, CCK, 11MBPS*

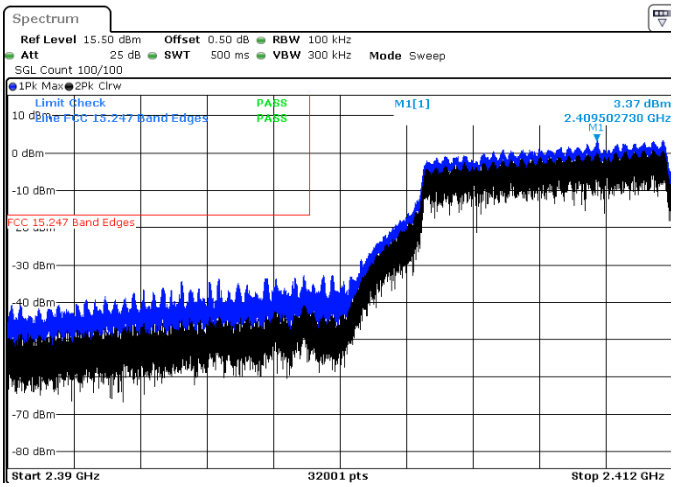

Figure 8.4-3: *Band Edge test, Low channel, 802.11g, OFDM, 54MBPS*

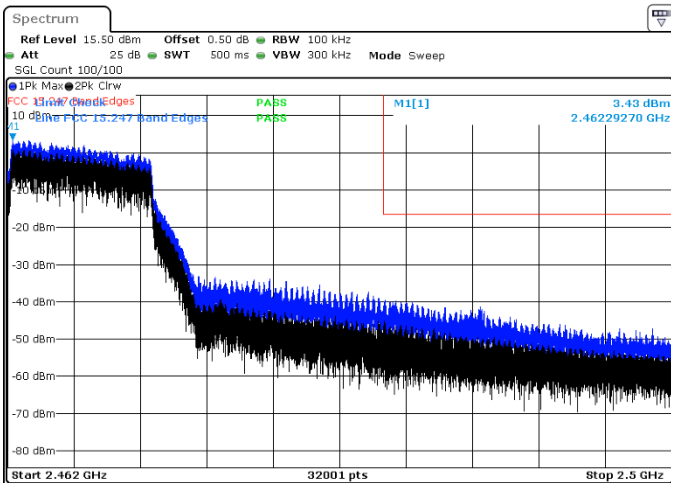

Figure 8.4-4: *Band Edge test, High channel, 802.11g, OFDM, 54MBPS*

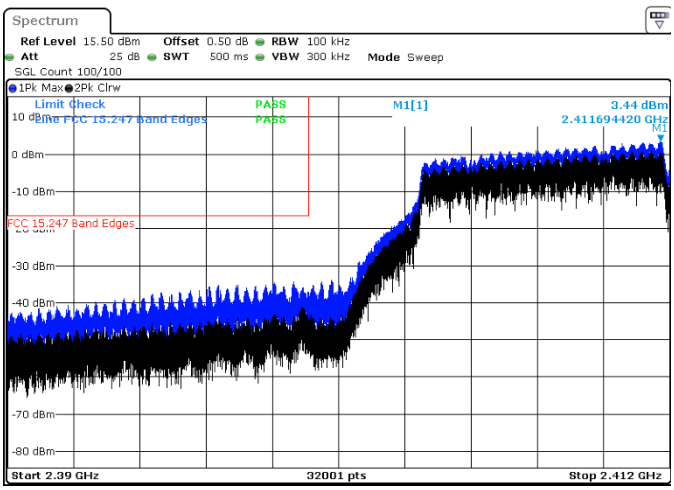

Figure 8.4-5: *Band Edge test, Low channel, 802.11n, MCS5*

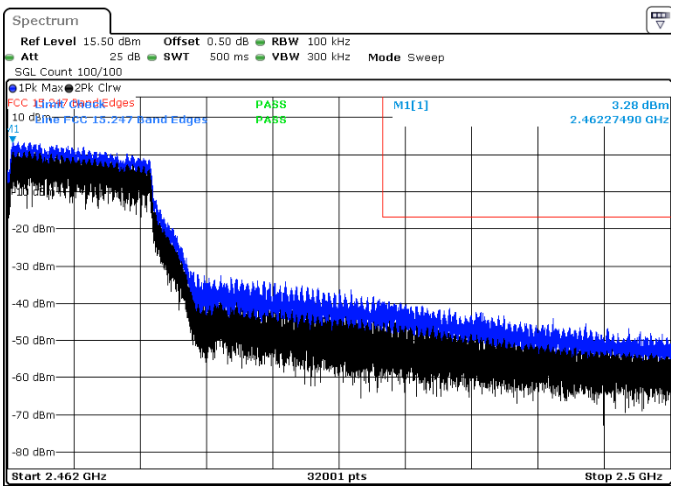

Figure 8.4-6: *Band Edge test, High channel, 802.11n, MCS5*

8.5 FCC 15.247(d) and RSS-247 5.5 Conducted spurious emissions

8.5.1 Definition and limits

Title 47 → Chapter I → Subchapter A → Part 15 → Subpart C → §15.247(d)

(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) (see §15.205(c)).

RSS-247 → §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(d), 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.

8.5.2 Test summary

Verdict	Pass		
Test date	May 23, 2022	Temperature	23 °C
Test engineer	Martha Espinoza, Wireless Test Engineer	Air pressure	1006 mbar
Test location	Wireless bench (Conducted)	Relative humidity	61 %

8.5.3 Notes

Testing was performed with Wi-Fi transmitter operating on a fixed channel at surveyed power levels. Low, middle, and high channels were tested within the 802.11b, 802.11g, 802.11n modulations schemes.

The spectrum was search from 100 kHz to 26 GHz (above the 10th harmonic of the highest transmit frequency of 2462 MHz).

For conducted measurements, an offset corresponding to the loss of the connected cable was added in the spectrum analyzer.

In each measurement, the limit was derived by subtracting 20 dB from a power spectral density reference measurement.

8.5.4 Setup details

EUT setup configuration	Tabletop
Test facility	Wireless bench
Measurement details	Conducted spurious emissions measurement performed as per C63.10 §11.11.3

Spectrum analyzer settings for conducted spurious emissions:

Resolution bandwidth	100 kHz
Video bandwidth	300 kHz
Detector mode	Peak
Trace mode	Max Hold
Measurement time	Long enough for trace to stabilize

8.5.5 Test data

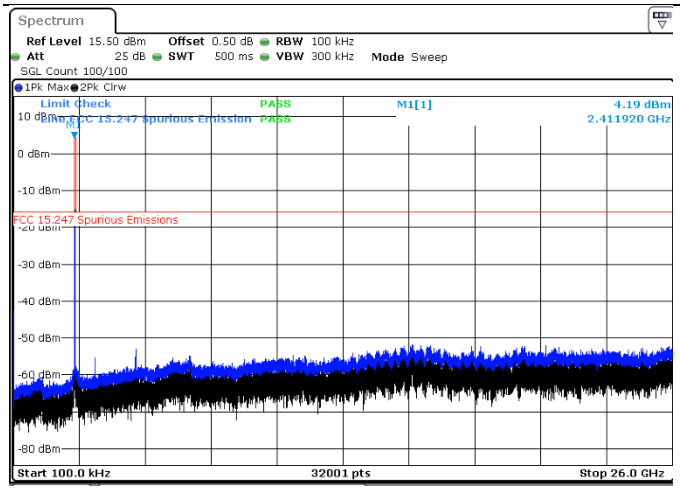

Figure 8.5-1: *Conducted spurious Emission, Low channel, 802.11b, CCK, 11MBPS*

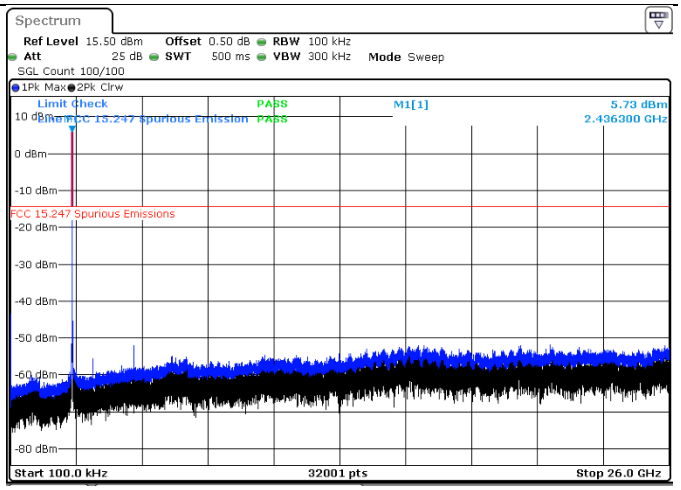

Figure 8.5-2: *Conducted spurious Emission, Middle channel, 802.11b, CCK, 11MBPS*

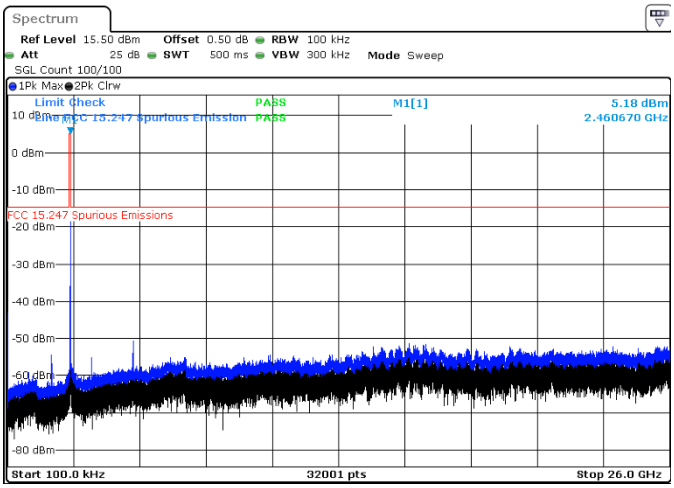

Figure 8.5-3: *Conducted spurious Emission, High channel, 802.11b, CCK, 11MBPS*

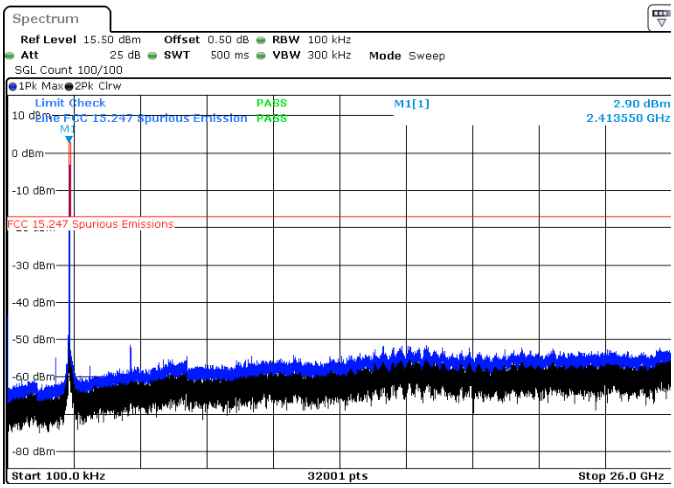

Figure 8.5-4: *Conducted spurious Emission, Low channel, 802.11g, OFDM, 54MBPS*

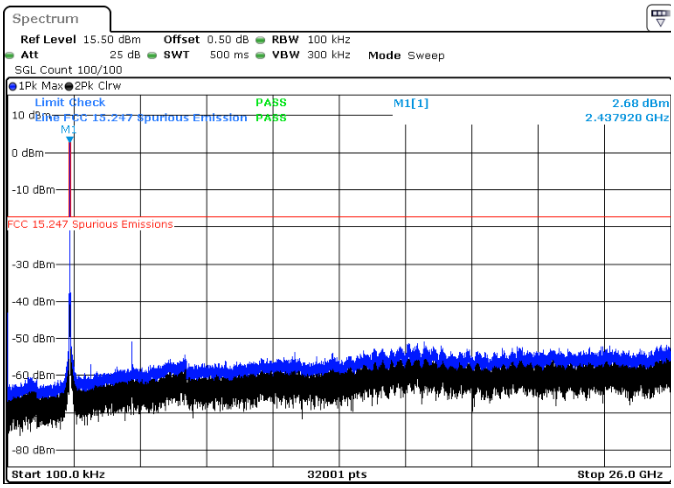

Figure 8.5-5: *Conducted spurious Emission, Middle channel, 802.11g, OFDM, 54MBPS*

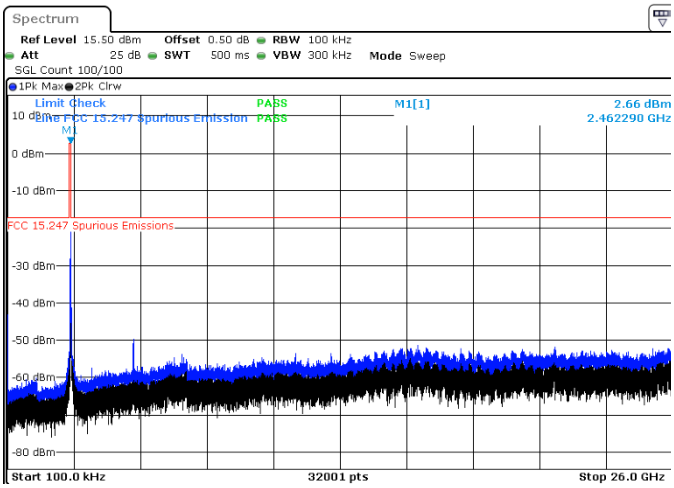

Figure 8.5-6: *Conducted spurious Emission, High channel, 802.11g, OFDM, 54MBPS*

8.5.5 Test data, continued

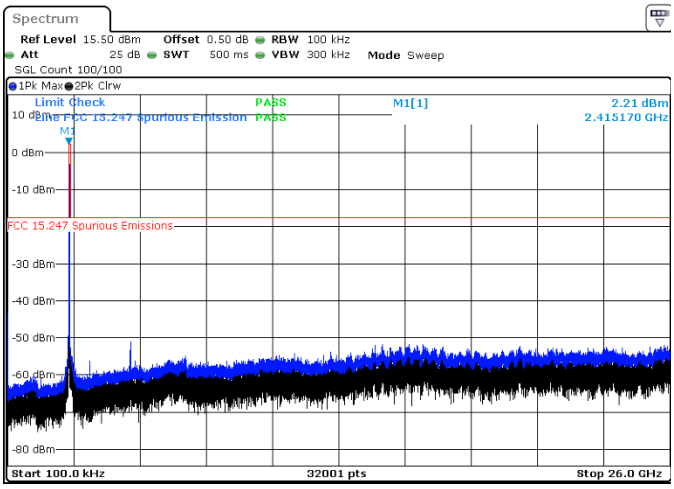

Figure 8.5-7: *Conducted spurious Emission, Low channel, 802.11n, MCS5*

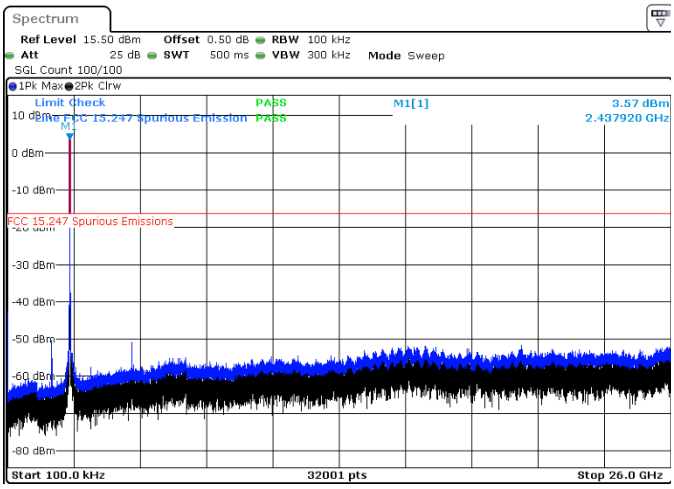

Figure 8.5-8: *Conducted spurious Emission, Middle channel, 802.11n, MCS5*

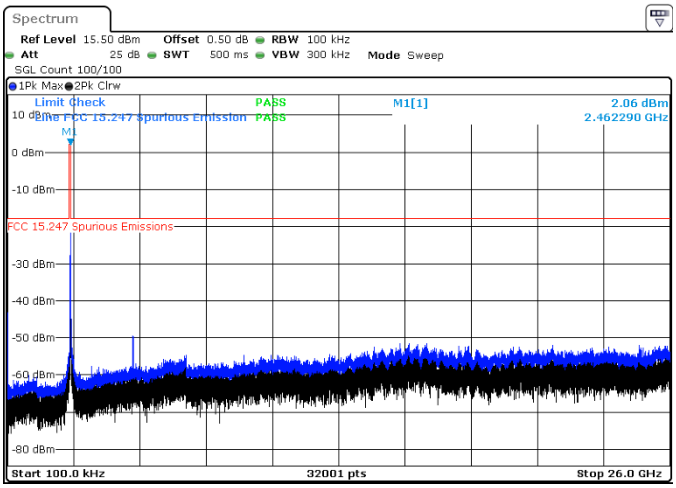

Figure 8.5-9: *Conducted spurious Emission, High channel, 802.11n, MCS5*

8.6 FCC 15.247(d) and RSS-247 5.5 Radiated restricted band-edges and spurious emission

8.6.1 Definition and limits

Title 47 → Chapter I → Subchapter A → Part 15 → Subpart C → §15.247(d)

(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) (see §15.205(c)).

RSS-247 → §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(d), 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.

Table 8.6-1: *FCC §15.209– Radiated emission limits*

Frequency, MHz	Field strength of emissions		Measurement distance, m
	µV/m	dBµV/m	
0.009–0.490	2400/F	$67.6 - 20 \times \log_{10}(F)$	300
0.490–1.705	24000/F	$87.6 - 20 \times \log_{10}(F)$	30
1.705–30.0	30	29.5	30
30–88	100	40.0	3
88–216	150	43.5	3
216–960	200	46.0	3
above 960	500	54.0	3

Notes: In the emission table above, the tighter limit applies at the band edges.
For frequencies above 1 GHz the limit on peak RF emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test.

Table 8.6-2: *FCC restricted frequency bands*

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
0.495–0.505	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2690–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	Above 38.6
13.36–13.41			

8.6.2 Test summary

Verdict	Pass		
Test date	May 24, 2022	Temperature	22 °C
Test engineer	Martha Espinoza, Wireless Test Engineer	Air pressure	1003 mbar
Test location	3m semi-anechoic chamber (Radiated)	Relative humidity	58 %
Test date	May 25, 2022	Temperature	23 °C
Test engineer	Martha Espinoza, Wireless Test Engineer	Air pressure	1002 mbar
Test location	3m semi-anechoic chamber (Radiated)	Relative humidity	60 %
Test date	May 26, 2022	Temperature	22 °C
Test engineer	Martha Espinoza, Wireless Test Engineer	Air pressure	1005 mbar
Test location	3m semi-anechoic chamber (Radiated)	Relative humidity	57 %

8.6.3 Notes

Testing was performed with Wi-Fi transmitter operating on a fixed channel at surveyed power levels. Low, middle, and high channels were tested under the protocol 802.11g, OFDM 54MBPS. This modulation scheme showed the maximum power in section 4.1 thus is considered as worst case

The spectrum was search from 30 MHz to 26 GHz (10th harmonic approximately).

Radiated measurements were performed at a 3 m measurement distance.

8.6.4 Setup details

EUT setup configuration	Tabletop
Test facility	3M Chamber
Measurement details	Radiated spurious emissions measurement performed as per C63.10 §11.12

Receiver settings for radiated measurements within restricted bands below 1 GHz:

Resolution bandwidth	120 kHz
Video bandwidth	300 kHz
Detector mode	Peak (preview measurements) Quasi-Peak (final measurements)
Trace mode	Max Hold

Receiver settings for radiated measurements within restricted bands above 1 GHz:

Resolution bandwidth	1 MHz
Video bandwidth	3 MHz
Detector mode	Average and peak (final measurements)
Trace mode	Max Hold

8.6.5 Test data

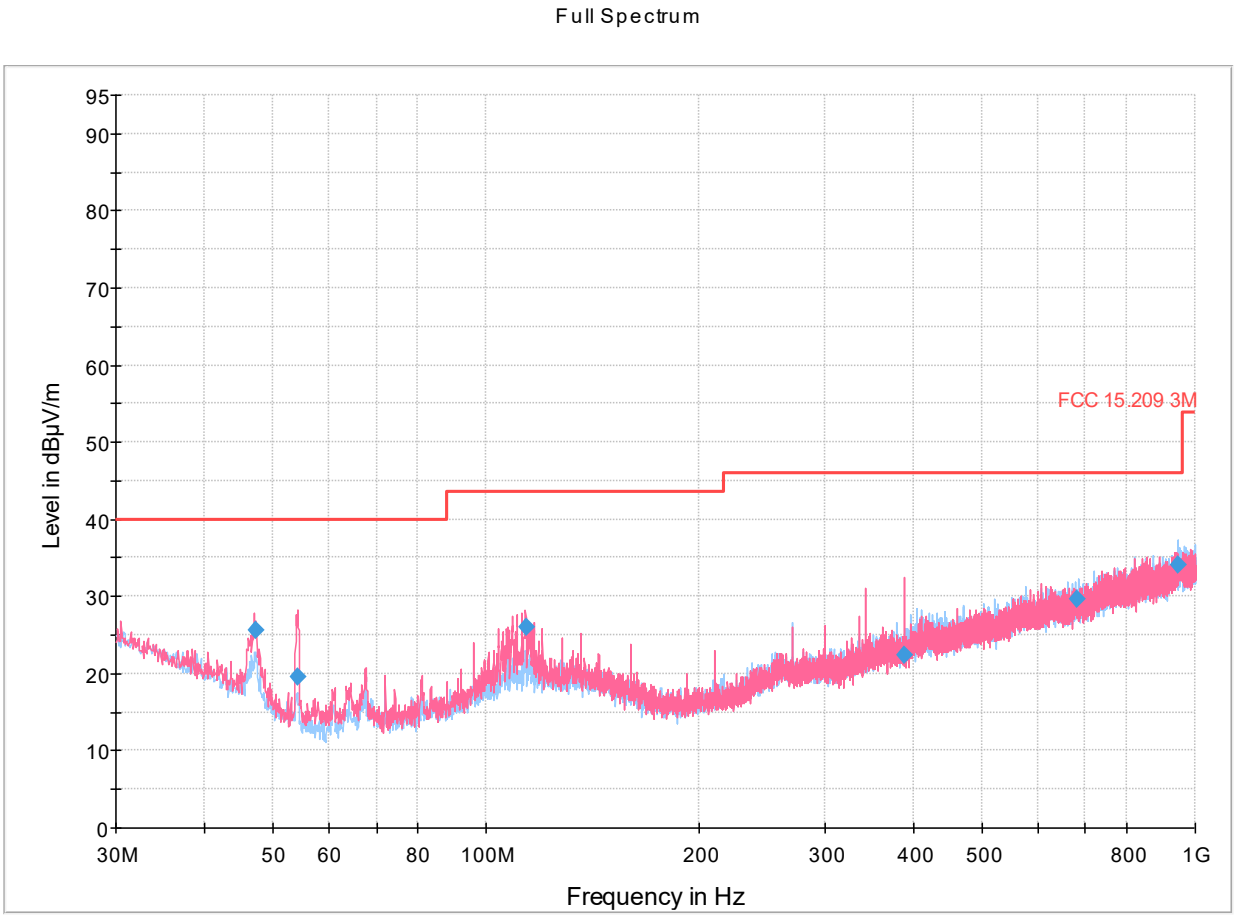

Figure 8.6-1: *Radiated spurious emissions plot, 30-1000 MHz, Low channel (2412 MHz), 802.11g, OFDM 54MBPS.*

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/ m)
47.255833	25.63	40.00	14.37	5000.0	120.000	100.0	V	242.0	17.4
54.209167	19.57	40.00	20.43	5000.0	120.000	100.0	V	10.0	14.2
113.661667	26.03	43.50	17.47	5000.0	120.000	385.0	V	315.0	19.2
389.543333	22.30	46.00	23.70	5000.0	120.000	150.0	V	33.0	24.9
682.661667	29.58	46.00	16.42	5000.0	120.000	160.0	H	158.0	30.5
946.437500	34.06	46.00	11.94	5000.0	120.000	128.0	H	0.0	34.8

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factor = antenna factor ACF (dB) + cable loss (dB)
[3] FCC 15.209 Limits are equivalent to FCC 15.247 Limits.

Table 8.6-3: *Radiated spurious emissions results, 30-1000 MHz, Low channel (2412 MHz), 802.11g, OFDM 54MBPS*

8.6.5 Test data, continued

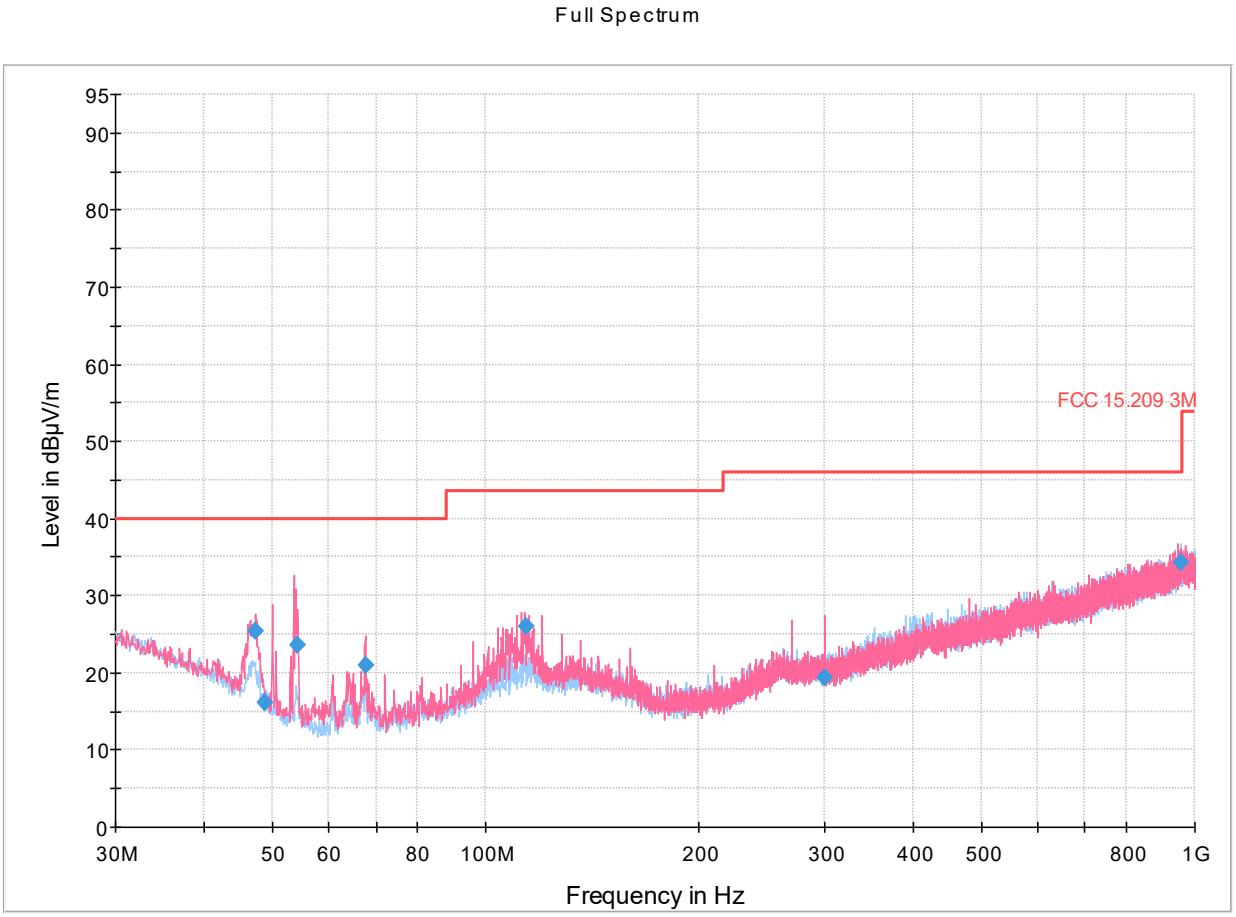

Figure 8.6-2: *Radiated spurious emissions plot, 30-1000 MHz, Middle channel (2437 MHz), 802.11g, OFDM 54MBPS.*

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
47.259167	25.33	40.00	14.67	5000.0	120.000	100.0	V	312.0	17.4
48.765833	16.07	40.00	23.93	5000.0	120.000	100.0	V	184.0	16.6
54.242500	23.65	40.00	16.35	5000.0	120.000	128.0	V	183.0	14.2
67.546667	21.05	40.00	18.95	5000.0	120.000	162.0	V	256.0	13.4
113.661667	26.11	43.50	17.39	5000.0	120.000	400.0	V	56.0	19.2
300.503333	19.41	46.00	26.59	5000.0	120.000	400.0	V	229.0	22.2
957.124167	34.23	46.00	11.77	5000.0	120.000	400.0	H	258.0	34.9

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factor = antenna factor ACF (dB) + cable loss (dB)
[3] FCC 15.209 Limits are equivalent to FCC 15.247 Limits.

Table 8.6-4: *Radiated spurious emissions results, 30-1000 MHz, Middle channel (2437 MHz), 802.11g, OFDM 54MBPS*

8.6.5 Test data, continued

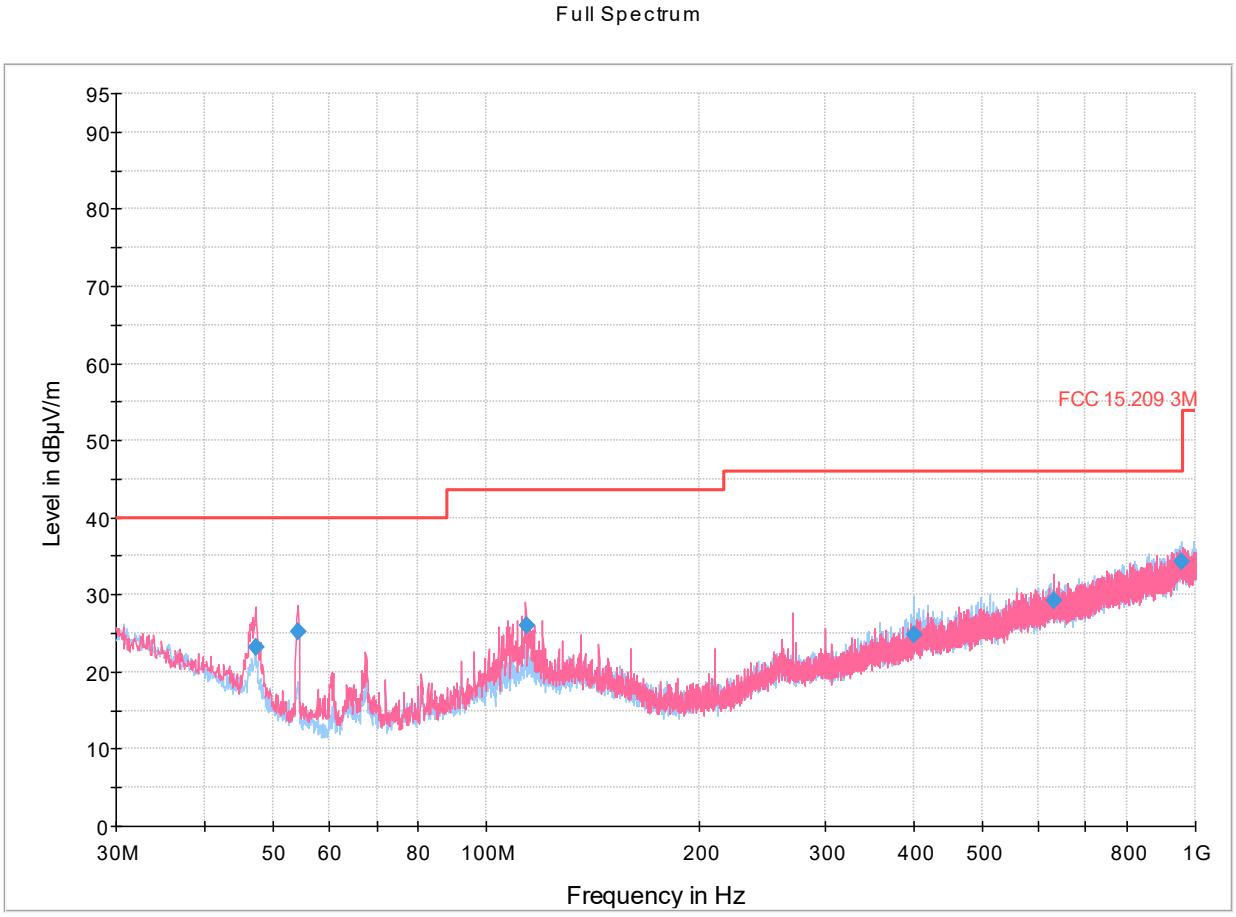

Figure 8.6-3: *Radiated spurious emissions plot, 30-1000 MHz, High channel (2462 MHz), 802.11g, OFDM 54MBPS.*

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
47.177500	23.24	40.00	16.76	5000.0	120.000	119.0	V	10.0	17.5
54.289167	25.16	40.00	14.84	5000.0	120.000	118.0	V	10.0	14.2
113.661667	26.08	43.50	17.42	5000.0	120.000	396.0	V	192.0	19.2
400.777500	24.79	46.00	21.21	5000.0	120.000	109.0	H	0.0	25.4
630.345833	29.34	46.00	16.66	5000.0	120.000	256.0	V	323.0	30.0
953.485833	34.29	46.00	11.71	5000.0	120.000	181.0	H	58.0	35.0

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factor = antenna factor ACF (dB) + cable loss (dB)
[3] FCC 15.209 Limits are equivalent to FCC 15.247 Limits.

Table 8.6-5: *Radiated spurious emissions results, 30-1000 MHz, High channel (2462 MHz), 802.11g, OFDM 54MBPS*

8.6.5 Test data, continued

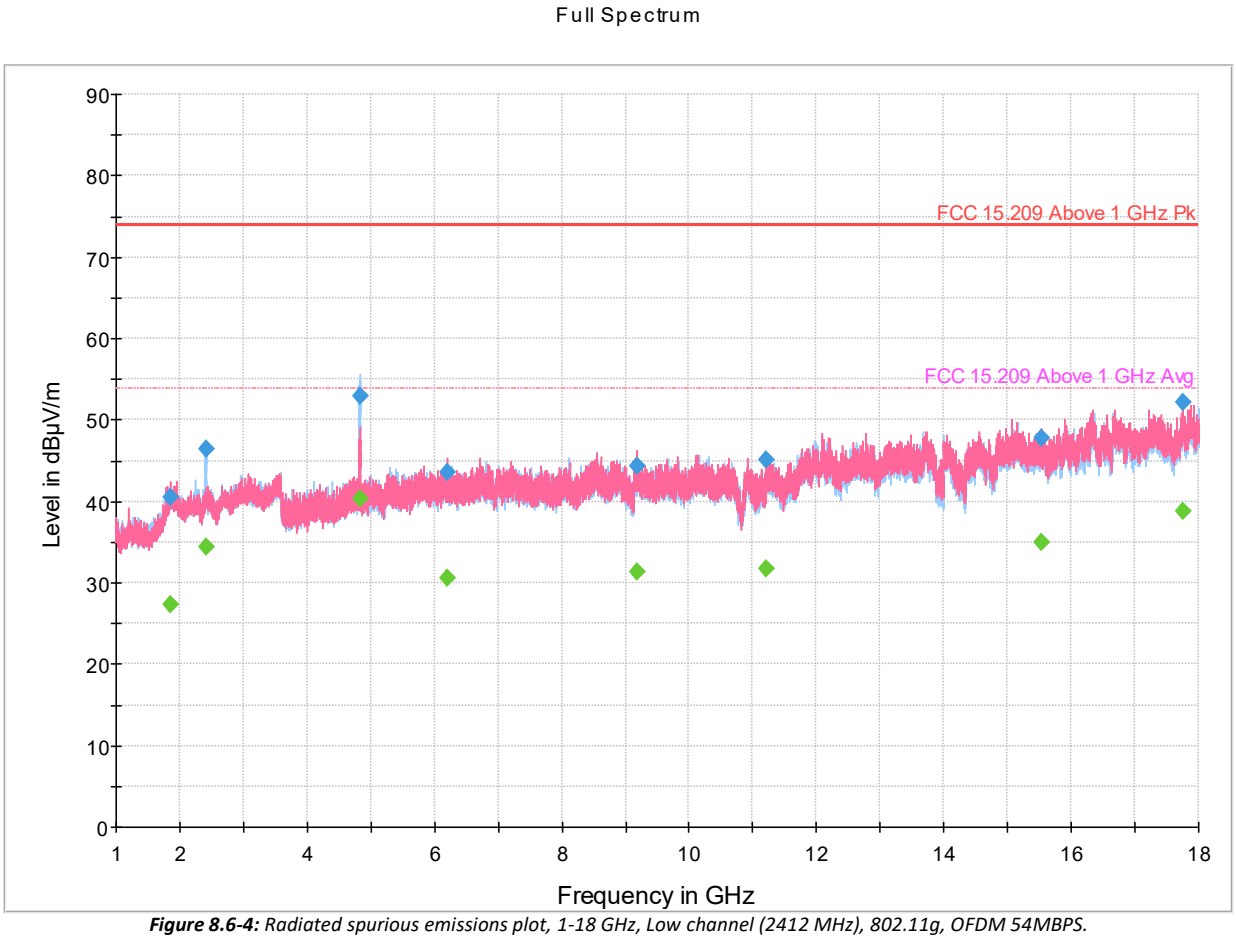

Figure 8.6-4: *Radiated spurious emissions plot, 1-18 GHz, Low channel (2412 MHz), 802.11g, OFDM 54MBPS.*

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1858.433333	40.55	---	73.90	33.35	5000.0	1000.000	384.0	V	323.0	-6.8
1858.433333	---	27.39	53.90	26.51	5000.0	1000.000	384.0	V	323.0	-6.8
2407.100000	FUNDAMENTAL[4]				5000.0	1000.000	174.0	H	0.0	-5.6
2407.100000	FUNDAMENTAL[4]				5000.0	1000.000	174.0	H	0.0	-5.6
4826.833333	---	40.31	53.90	13.59	5000.0	1000.000	182.0	H	33.0	0.5
4826.833333	52.94	---	73.90	20.96	5000.0	1000.000	182.0	H	33.0	0.5
6192.133333	43.61	---	73.90	30.29	5000.0	1000.000	180.0	V	37.0	3.4
6192.133333	---	30.63	53.90	23.27	5000.0	1000.000	180.0	V	37.0	3.4
9191.500000	---	31.36	53.90	22.54	5000.0	1000.000	377.0	V	205.0	7.2
9191.500000	44.26	---	73.90	29.64	5000.0	1000.000	377.0	V	205.0	7.2
11213.36666	---	31.66	53.90	22.24	5000.0	1000.000	165.0	H	142.0	9.2
11213.36666	45.01	---	73.90	28.89	5000.0	1000.000	165.0	H	142.0	9.2
15527.26666	---	34.97	53.90	18.93	5000.0	1000.000	241.0	V	143.0	18.1
15527.26666	47.69	---	73.90	26.21	5000.0	1000.000	241.0	V	143.0	18.1
17754.23333	---	38.88	53.90	15.02	5000.0	1000.000	165.0	V	58.0	20.3
17754.23333	52.10	---	73.90	21.80	5000.0	1000.000	165.0	V	58.0	20.3

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factor = antenna factor ACF (dB) + cable loss (dB)
[3] FCC 15.209 Limits are equivalent to FCC 15.247 Limits.
[4] The fundamental signal is not part of the scope of this test. A 2.4 GHz notch filter was used for this measurement to avoid the saturation of the amplifier.

Table 8.6-6: *Radiated spurious emissions results, 1-18 GHz, Low channel (2412 MHz), 802.11g, OFDM 54MBPS*

8.6.5 Test data, continued

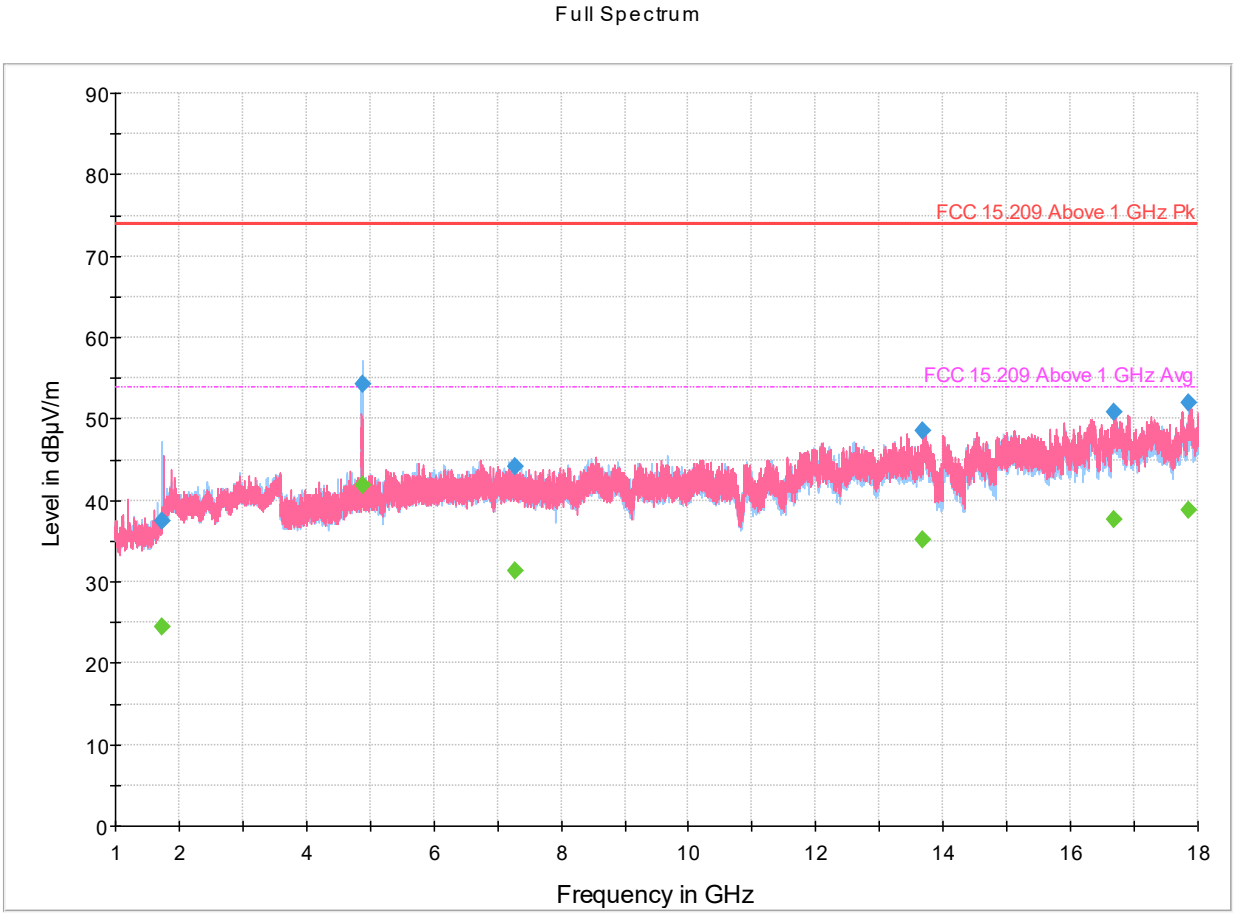

Figure 8.6-5: *Radiated spurious emissions plot, 1-18 GHz, Middle channel (2437 MHz), 802.11g, OFDM 54MBPS.*

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1742.633333	37.44	---	73.90	36.46	5000.0	1000.000	158.0	H	315.0	-9.4
1742.633333	---	24.52	53.90	29.38	5000.0	1000.000	158.0	H	315.0	-9.4
4872.933333	---	41.82	53.90	12.08	5000.0	1000.000	191.0	H	32.0	0.3
4872.933333	54.24	---	73.90	19.66	5000.0	1000.000	191.0	H	32.0	0.3
7282.066667	---	31.28	53.90	22.62	5000.0	1000.000	400.0	V	357.0	4.4
7282.066667	44.16	---	73.90	29.74	5000.0	1000.000	400.0	V	357.0	4.4
13678.40000	---	35.20	53.90	18.70	5000.0	1000.000	285.0	H	118.0	15.8
13678.40000	48.44	---	73.90	25.46	5000.0	1000.000	285.0	H	118.0	15.8
16678.33333	---	37.63	53.90	16.27	5000.0	1000.000	100.0	V	263.0	20.3
16678.33333	50.85	---	73.90	23.05	5000.0	1000.000	100.0	V	263.0	20.3
17865.16666	52.04	---	73.90	21.86	5000.0	1000.000	191.0	V	83.0	21.3
17865.16666	---	38.76	53.90	15.14	5000.0	1000.000	191.0	V	83.0	21.3

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factor = antenna factor ACF (dB) + cable loss (dB)
[3] FCC 15.209 Limits are equivalent to FCC 15.247 Limits.
[4] A 2.4 GHz notch filter was used for this measurement to avoid the saturation of the amplifier

Table 8.6-7: *Radiated spurious emissions results, 1-18 GHz, Middle channel (2437 MHz), 802.11g, OFDM 54MBPS*

8.6.5 Test data, continued

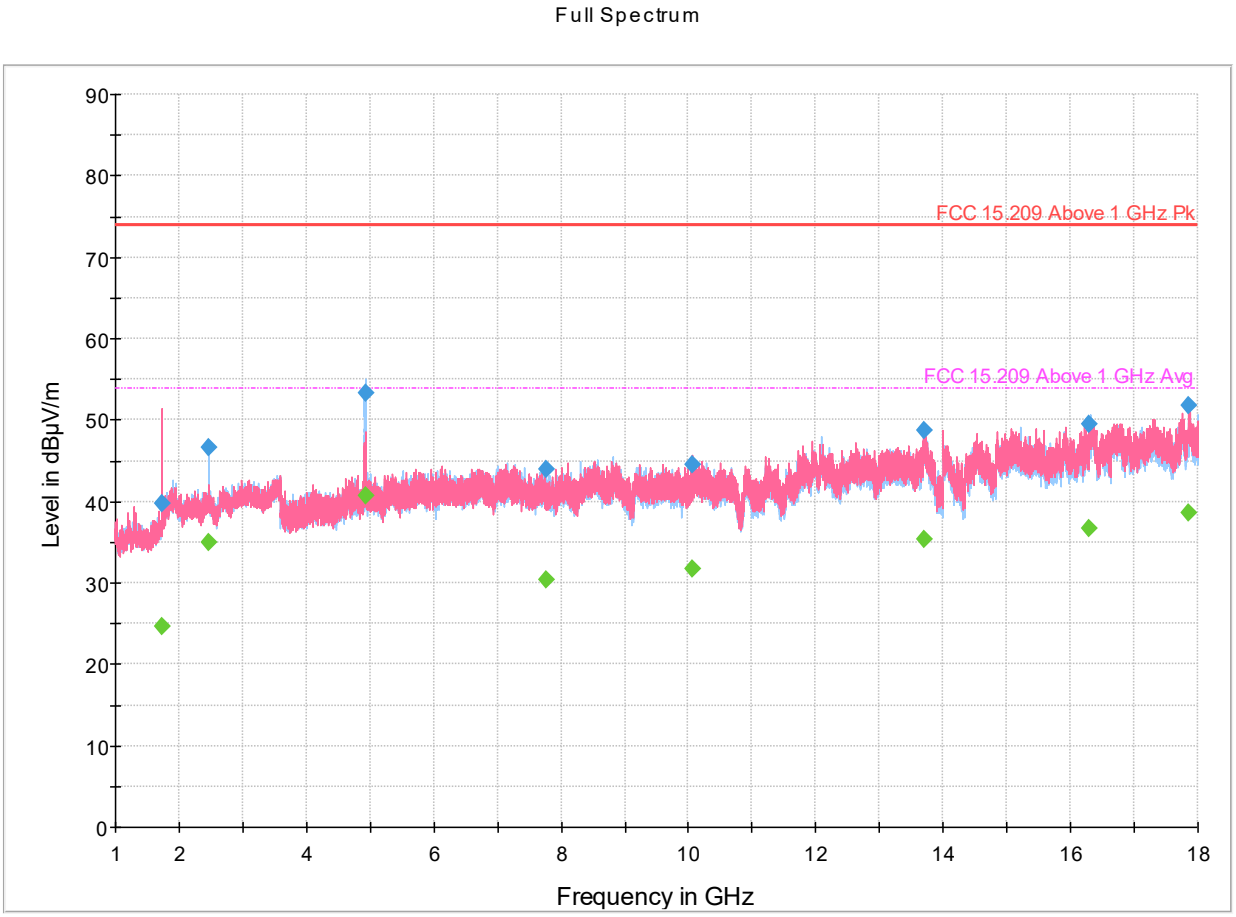

Figure 8.6-6: *Radiated spurious emissions plot, 1-18 GHz, High channel (2462 MHz), 802.11g, OFDM 54MBPS.*

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1740.166667	---	24.66	53.90	29.24	5000.0	1000.000	222.0	V	0.0	-9.5
1740.166667	39.81	---	73.90	34.09	5000.0	1000.000	222.0	V	0.0	-9.5
2464.066667	FUNDAMENTAL[4]				5000.0	1000.000	148.0	H	332.0	-5.5
2464.066667	FUNDAMENTAL[4]				5000.0	1000.000	148.0	H	332.0	-5.5
4923.500000	---	40.74	53.90	13.16	5000.0	1000.000	156.0	H	33.0	0.3
4923.500000	53.39	---	73.90	20.51	5000.0	1000.000	156.0	H	33.0	0.3
7764.200000	---	30.45	53.90	23.45	5000.0	1000.000	126.0	H	136.0	5.2
7764.200000	44.03	---	73.90	29.87	5000.0	1000.000	126.0	H	136.0	5.2
10056.200000	---	31.66	53.90	22.24	5000.0	1000.000	129.0	V	0.0	8.9
10056.200000	44.56	---	73.90	29.34	5000.0	1000.000	129.0	V	0.0	8.9
13689.766667	---	35.39	53.90	18.51	5000.0	1000.000	258.0	V	33.0	15.9
13689.766667	48.78	---	73.90	25.12	5000.0	1000.000	258.0	V	33.0	15.9
16294.600000	---	36.70	53.90	17.20	5000.0	1000.000	353.0	H	335.0	21.3
16294.600000	49.57	---	73.90	24.33	5000.0	1000.000	353.0	H	335.0	21.3
17856.766667	51.81	---	73.90	22.09	5000.0	1000.000	163.0	V	46.0	21.3
17856.766667	---	38.56	53.90	15.34	5000.0	1000.000	163.0	V	46.0	21.3

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factor = antenna factor ACF (dB) + cable loss (dB)
[3] FCC 15.209 Limits are equivalent to FCC 15.247 Limits.
[4] The fundamental signal is not part of the scope of this test. A 2.4 GHz notch filter was used for this measurement to avoid the saturation of the amplifier

Table 8.6-8: *Radiated spurious emissions results, 1-18 GHz, High channel (2462 MHz), 802.11g, OFDM 54MBPS*

8.6.5 Test data, continued

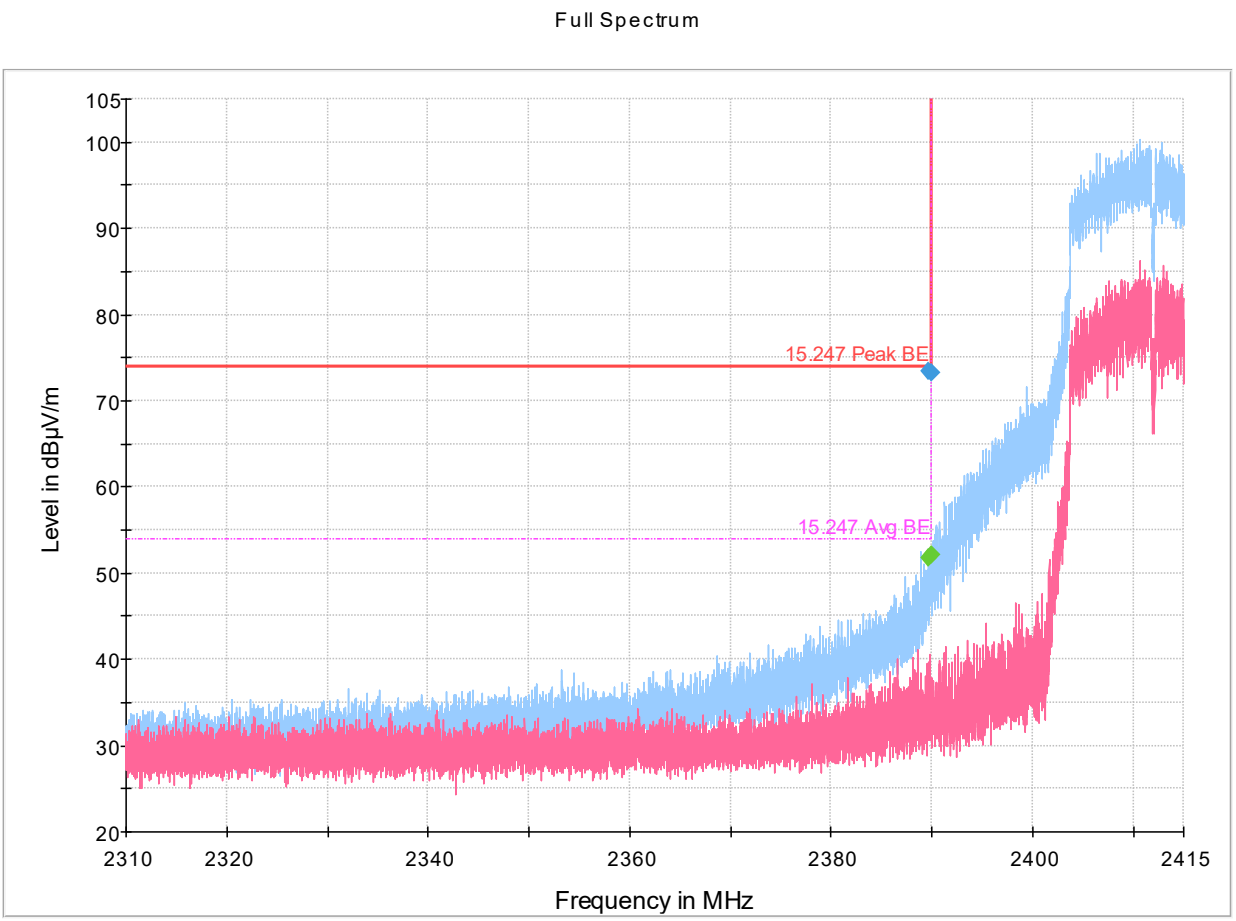

Figure 8.6-7: *Low band edge plot, 2310-2415 MHz, Low channel (2412 MHz), 802.11g, OFDM 54MBPS.*

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2389.726500	---	51.79	53.90	2.11	5000.0	1000.000	126.0	H	0.0	31.9
2389.726500	73.48	---	73.90	0.42	5000.0	1000.000	126.0	H	0.0	31.9
2390.000000	---	52.13	53.90	1.77	5000.0	1000.000	127.0	H	0.0	31.9
2390.000000	73.29	---	73.90	0.61	5000.0	1000.000	127.0	H	0.0	31.9

Table 8.6-9: *Low band edge plot, 2310-2415 MHz, Low channel (2412 MHz), 802.11g, OFDM 54MBPS*

8.6.5 Test data, continued

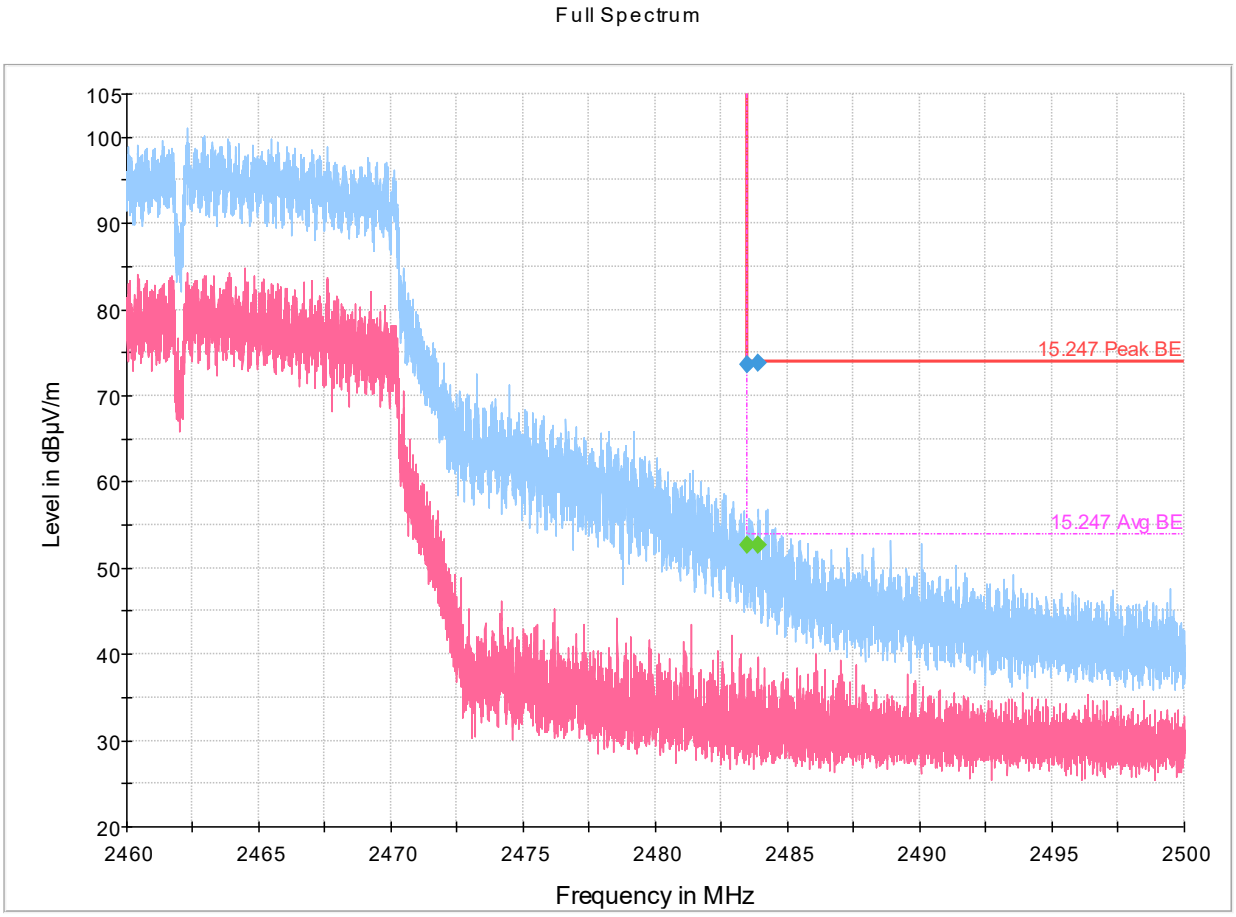

Figure 8.6-8: *High band edge plot, 2460-2500 MHz, High channel (2462 MHz), 802.11g, OFDM 54MBPS.*

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2483.500000	73.61	---	73.90	0.29	5000.0	1000.000	146.0	H	0.0	31.9
2483.500000	---	52.69	53.90	1.21	5000.0	1000.000	146.0	H	0.0	31.9
2483.878667	---	52.59	53.90	1.31	5000.0	1000.000	150.0	H	357.0	31.9
2483.878667	73.75	---	73.90	0.15	5000.0	1000.000	150.0	H	357.0	31.9

Table 8.6-10: *High band edge plot, 2460-2500 MHz, High channel (2462 MHz), 802.11g, OFDM 54MBPS*

8.6.5 Test data, continued

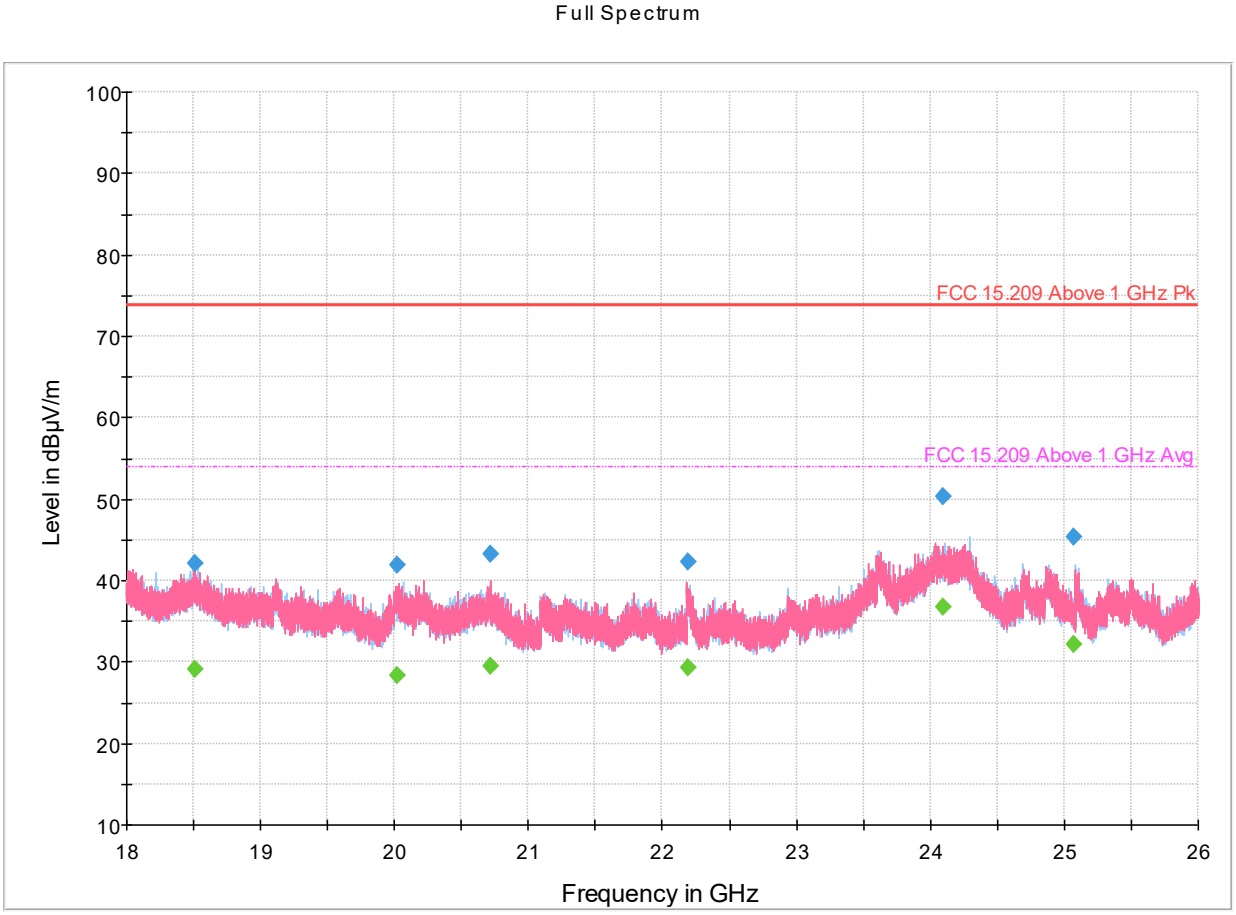

Figure 8.6-9: *Radiated spurious emissions plot, 18-26 GHz, Low channel (2412 MHz), 802.11g, OFDM 54MBPS.*

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
18507.533333	42.07	---	73.90	31.83	5000.0	1000.000	356.0	V	194.0	17.7
18507.533333	---	29.15	53.90	24.75	5000.0	1000.000	356.0	V	194.0	17.7
20017.666667	---	28.44	53.90	25.46	5000.0	1000.000	100.0	H	230.0	18.5
20017.666667	41.87	---	73.90	32.03	5000.0	1000.000	100.0	H	230.0	18.5
20722.733333	43.27	---	73.90	30.63	5000.0	1000.000	100.0	V	96.0	20.1
20722.733333	---	29.45	53.90	24.45	5000.0	1000.000	100.0	V	96.0	20.1
22193.666667	---	29.38	53.90	24.52	5000.0	1000.000	288.0	V	11.0	19.9
22193.666667	42.29	---	73.90	31.61	5000.0	1000.000	288.0	V	11.0	19.9
24100.466667	50.37	---	73.90	23.53	5000.0	1000.000	215.0	H	220.0	29.6
24100.466667	---	36.77	53.90	17.13	5000.0	1000.000	215.0	H	220.0	29.6
25074.200000	45.33	---	73.90	28.57	5000.0	1000.000	183.0	H	21.0	24.4
25074.200000	---	32.09	53.90	21.81	5000.0	1000.000	183.0	H	21.0	24.4

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factor = antenna factor ACF (dB) + cable loss (dB)
[3] FCC 15.209 Limits are equivalent to FCC 15.247 Limits.

Table 8.6-11: *Radiated spurious emissions results, 18-26 GHz, Low channel (2412 MHz), 802.11g, OFDM 54MBPS*

8.6.5 Test data, continued

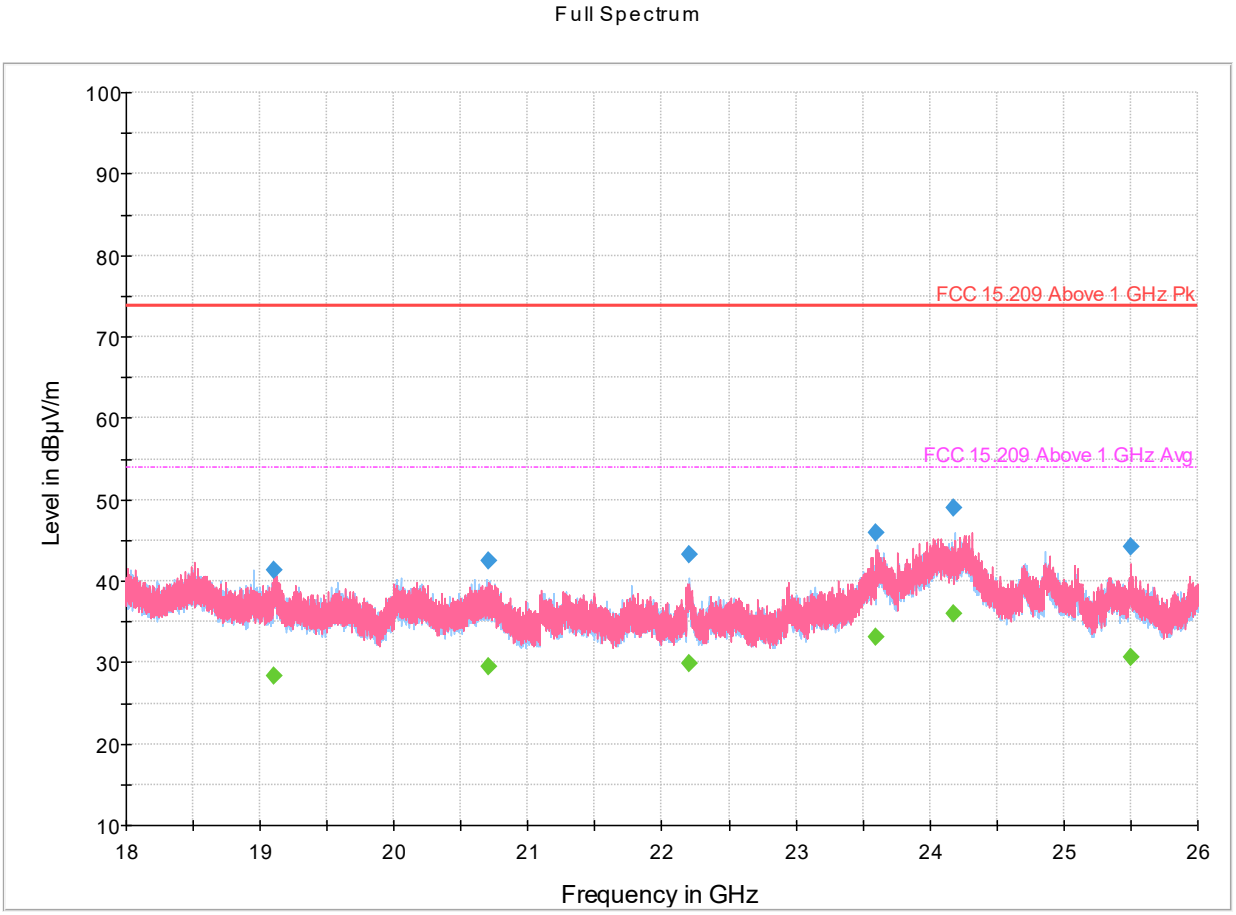

Figure 8.6-10: *Radiated spurious emissions plot, 18-26 GHz, Middle channel (2437 MHz), 802.11g, OFDM 54MBPS.*

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
19105.933333	---	28.37	53.90	25.53	5000.0	1000.000	400.0	V	291.0	17.7
19105.933333	41.42	---	73.90	32.48	5000.0	1000.000	400.0	V	291.0	17.7
20705.266667	---	29.54	53.90	24.36	5000.0	1000.000	356.0	V	0.0	20.1
20705.266667	42.50	---	73.90	31.40	5000.0	1000.000	356.0	V	0.0	20.1
22201.133333	43.27	---	73.90	30.63	5000.0	1000.000	400.0	H	196.0	20.0
22201.133333	---	29.88	53.90	24.02	5000.0	1000.000	400.0	H	196.0	20.0
23602.200000	45.93	---	73.90	27.97	5000.0	1000.000	322.0	H	0.0	25.8
23602.200000	---	33.16	53.90	20.74	5000.0	1000.000	322.0	H	0.0	25.8
24176.466667	48.94	---	73.90	24.96	5000.0	1000.000	257.0	H	46.0	29.3
24176.466667	---	36.04	53.90	17.86	5000.0	1000.000	257.0	H	46.0	29.3
25498.066667	44.17	---	73.90	29.73	5000.0	1000.000	110.0	V	11.0	24.2
25498.066667	---	30.62	53.90	23.28	5000.0	1000.000	110.0	V	11.0	24.2

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factor = antenna factor ACF (dB) + cable loss (dB)
[3] FCC 15.209 Limits are equivalent to FCC 15.247 Limits.

Table 8.6-12: *Radiated spurious emissions results, 18-26 GHz, Middle channel (2437 MHz), 802.11g, OFDM 54MBPS*

8.6.5 Test data, continued

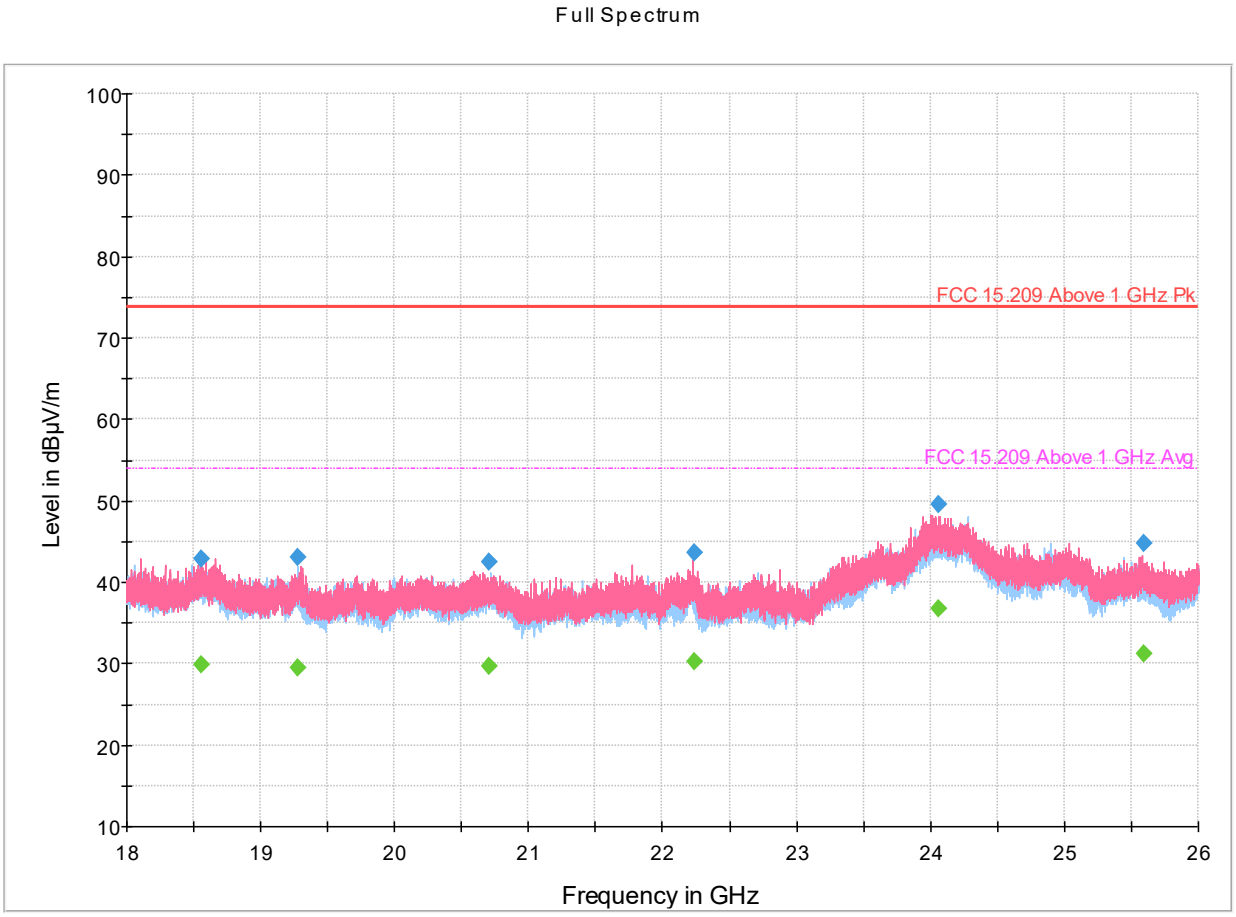

Figure 8.6-11: *Radiated spurious emissions plot, 18-26 GHz, High channel (2462 MHz), 802.11g, OFDM 54MBPS.*

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
18552.066667	---	29.92	53.90	23.98	5000.0	1000.000	233.0	H	22.0	17.9
18552.066667	42.93	---	73.90	30.97	5000.0	1000.000	233.0	H	22.0	17.9
19273.800000	43.15	---	73.90	30.75	5000.0	1000.000	139.0	H	134.0	18.3
19273.800000	---	29.45	53.90	24.45	5000.0	1000.000	139.0	H	134.0	18.3
20708.733333	42.56	---	73.90	31.34	5000.0	1000.000	161.0	H	0.0	20.2
20708.733333	---	29.75	53.90	24.15	5000.0	1000.000	161.0	H	0.0	20.2
22235.266667	43.57	---	73.90	30.33	5000.0	1000.000	379.0	V	339.0	19.9
22235.266667	---	30.29	53.90	23.61	5000.0	1000.000	379.0	V	339.0	19.9
24061.800000	---	36.68	53.90	17.22	5000.0	1000.000	245.0	V	0.0	29.7
24061.800000	49.62	---	73.90	24.28	5000.0	1000.000	245.0	V	0.0	29.7
25590.733333	44.86	---	73.90	29.04	5000.0	1000.000	386.0	V	21.0	24.2
25590.733333	---	31.15	53.90	22.75	5000.0	1000.000	386.0	V	21.0	24.2

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factor = antenna factor ACF (dB) + cable loss (dB)
[3] FCC 15.209 Limits are equivalent to FCC 15.247 Limits.

Table 8.6-13: *Radiated spurious emissions results, 18-26 GHz, High channel (2462 MHz), 802.11g, OFDM 54MBPS*

8.7 FCC 15.247(e) and RSS-247 5.2(b) Power spectral density of digital transmission system

8.7.1 References

Title 47 → Chapter I → Subchapter A → Part 15 → Subpart C → §15.247(e) / ANSI C63.10: 2013

(e) 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. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this Section. The same method of determining the conducted output power shall be used to determine the power spectral density.

RSS-247 → §5.2(b)

(a) 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. This power spectral density shall be determined in accordance with the provisions of Section 5.4(4), (i.e. the power spectral density shall be determined using the same method as is used to determine the conducted output power).

8.7.2 Test summary

Verdict	Pass		
Test date	May 20, 2022	Temperature	19 °C
Test engineer	Martha Espinoza, Wireless Test Engineer	Air pressure	1002 mbar
Test location	Wireless bench (Conducted)	Relative humidity	53%

8.7.3 Notes

Testing was performed with Wi-Fi transmitter operating on a fixed channel at surveyed power levels. Low, middle, and high channels were tested within the 802.11b, 802.11g, 802.11n modulations schemes.

The EUT antenna port was connected to the spectrum analyzer via low loss cable. The loss of this assembly was added using the corresponding offset in the spectrum analyzer.

8.7.4 Setup details

EUT setup configuration	Tabletop
Test facility	Wireless Bench
Measurement details	Measurement performed as per C63.10 §11.10.2 (Method PKPSD)

Receiver/spectrum analyzer settings:

Resolution bandwidth	3 kHz
Video bandwidth	10 kHz (≥ 3 x RBW)
Frequency span	1 MHz (1.5 x DTS bandwidth)
Detector mode	Peak
Trace mode	Max Hold
Measurement time	Long enough for trace to stabilize

8.7.5 Test data

Table 8.7-1: *Power spectral density of DTS*

Transmitter Frequency (MHz)	Modulation scheme	Measured Level (dBm/3 kHz)	Limit (dBm/3 kHz)
2412	802.11b CCK 11MBPS	-8.90	8.00
2437	802.11b CCK 11MBPS	-7.55	8.00
2462	802.11b CCK 11MBPS	-8.00	8.00
2412	802.11g OFDM 54MBPS	-10.23	8.00
2437	802.11g OFDM 54MBPS	-9.76	8.00
2462	802.11g OFDM 54MBPS	-9.83	8.00
2412	802.11n MCS5	-10.00	8.00
2437	802.11n MCS5	-9.15	8.00
2462	802.11n MCS5	-9.98	8.00

8.7.6 Test data, continued

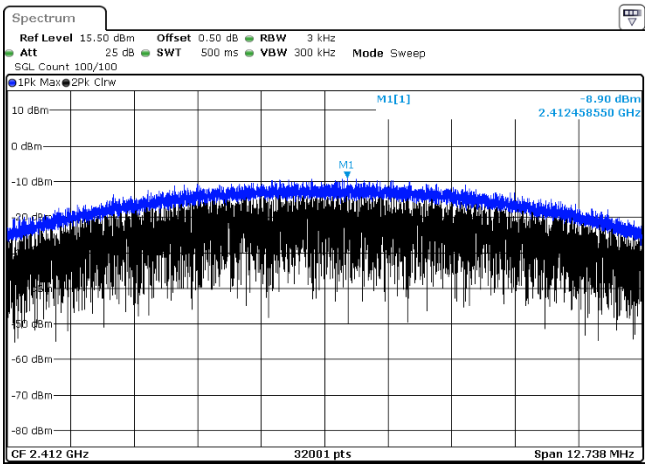

Figure 8.7-1: *PSD, Low channel, 802.11b, CCK, 11MBPS*

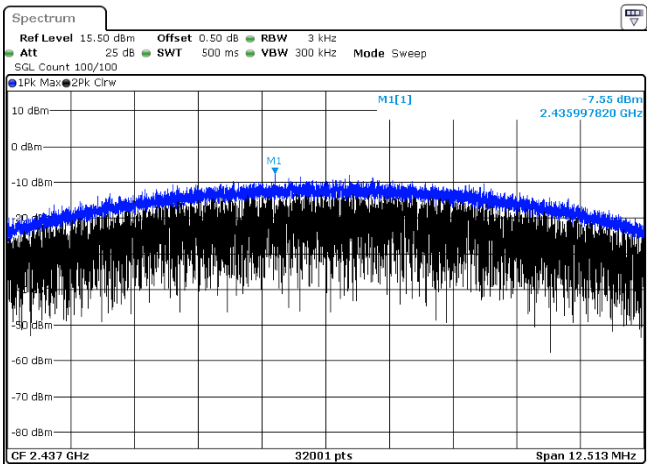

Figure 8.7-2: *PSD, Middle channel, 802.11b, CCK, 11MBPS*

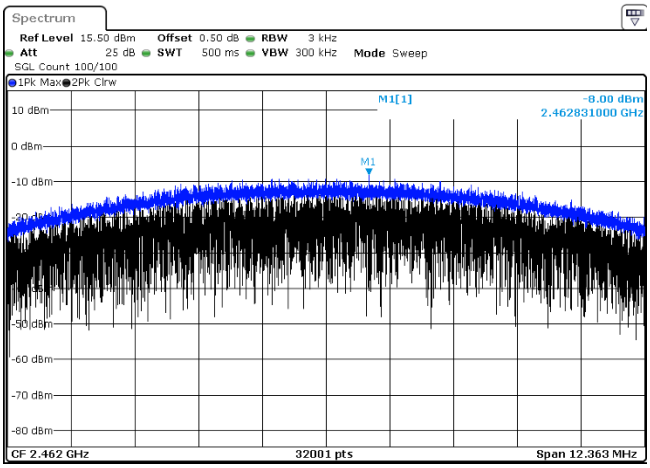

Figure 8.7-3: *PSD, High channel, 802.11b, CCK, 11MBPS*

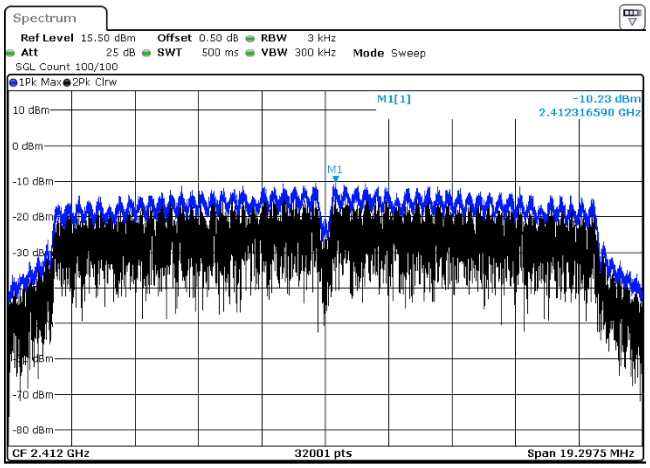

Figure 8.7-4: *PSD, Low channel, 802.11g, OFDM, 54MBPS*

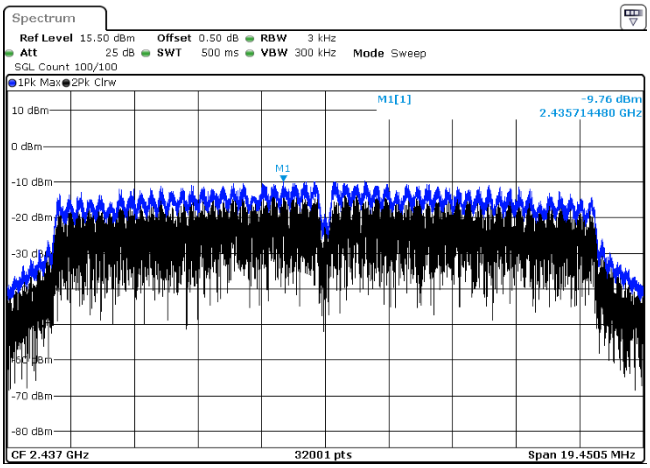

Figure 8.7-5: *PSD, Middle channel, 802.11g, OFDM, 54MBPS*

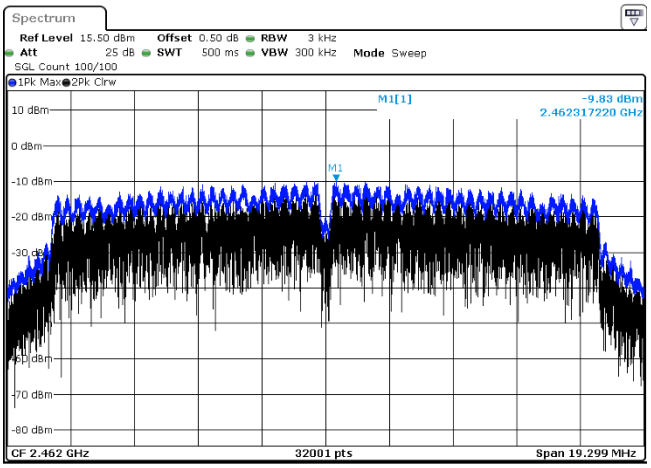

Figure 8.7-6: *PSD, High channel, 802.11g, OFDM, 54MBPS*

8.7.7 Test data, continued

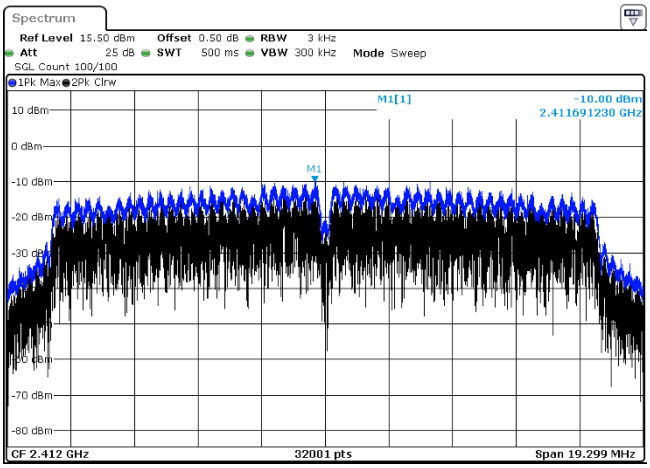

Figure 8.7-7: *PSD, Low channel, 802.11n, MCS5*

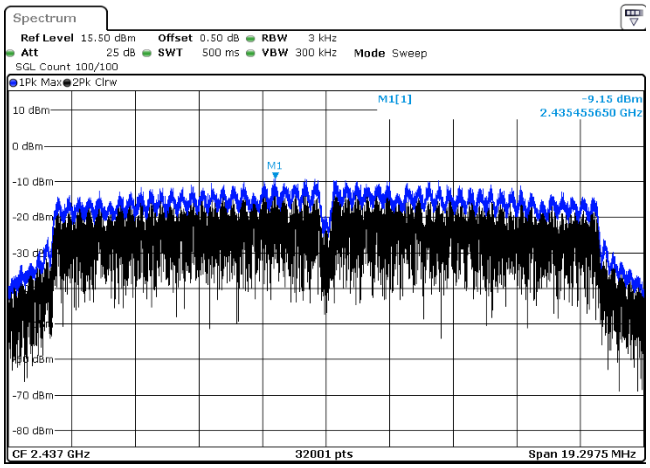

Figure 8.7-8: *PSD, Middle channel, 802.11n, MCS5*

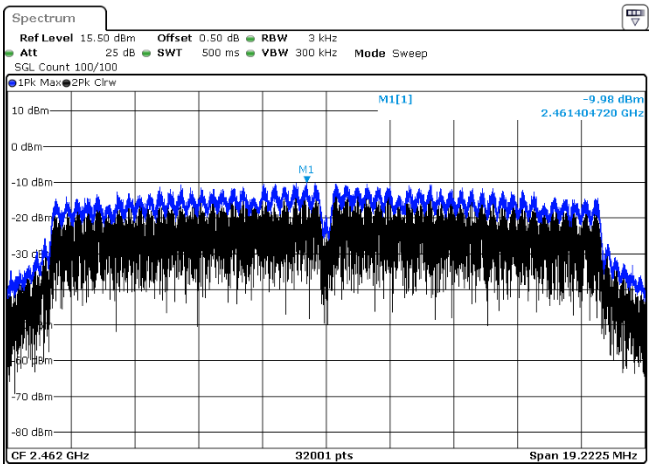

Figure 8.7-9: *PSD, High channel, 802.11n, MCS5*

8.8 RSS-GEN 6.7 Occupied bandwidth (or 99% emission bandwidth)

8.8.1 References

RSS-Gen → §6.7

The occupied bandwidth or the "99% emission bandwidth" is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

8.8.2 Test summary

Test date	May 19, 2022	Temperature	17 °C
Test engineer	Martha Espinoza, Wireless Test Engineer	Air pressure	1005 mbar
Test location	Wireless bench (Conducted)	Relative humidity	59 %

8.8.3 Notes

Testing was performed with Wi-Fi transmitter operating on a fixed channel at surveyed power levels. Low, middle, and high channels were tested within the 802.11b, 802.11g, 802.11n modulations schemes.

8.8.4 Setup details

EUT setup configuration	Tabletop
Test facility	Wireless Bench
Measurement details	Measurement performed as per C63.10 §6.9.3 using the built-in function of the spectrum analyzer

Receiver/spectrum analyzer settings:

Resolution bandwidth	500 kHz
Video bandwidth	2 MHz
Detector mode	Peak
Trace mode	Max Hold
Measurement time	Long enough for trace to stabilize

8.8.5 Test data

Table 8.8-1: *99% Occupied bandwidth*

Transmitter Frequency (MHz)	Modulation scheme	99%Bandwidth (MHz)
2412	802.11b CCK 11MBPS	13.236
2437	802.11b CCK 11MBPS	13.286
2462	802.11b CCK 11MBPS	13.286
2412	802.11g OFDM 54MBPS	16.833
2437	802.11g OFDM 54MBPS	16.833
2462	802.11g OFDM 54MBPS	16.833
2412	802.11n MCS5	16.833
2437	802.11n MCS5	16.833
2462	802.11n MCS5	16.833

8.8.5 Test data, continued

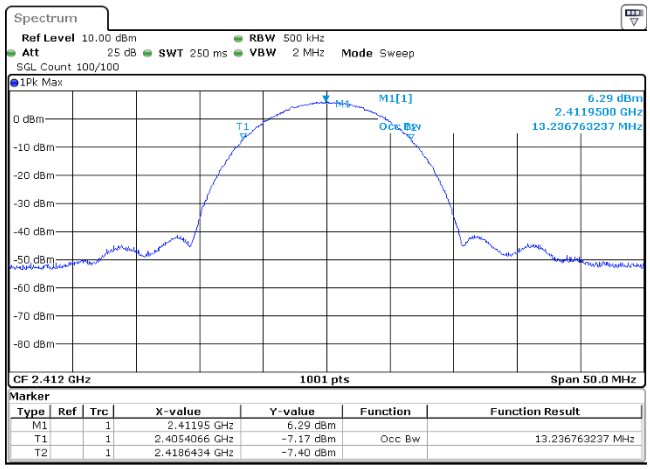

Figure 8.8-1: *99% OBW, Low channel, 802.11b, CCK, 11MBPS*

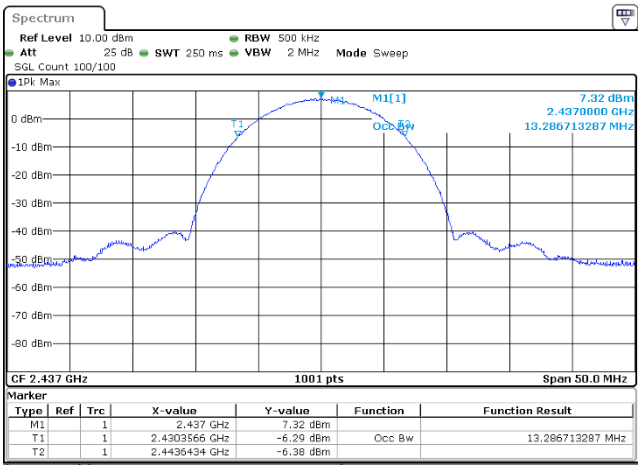

Figure 8.8-2: *99% OBW, Middle channel, 802.11b, CCK, 11MBPS*

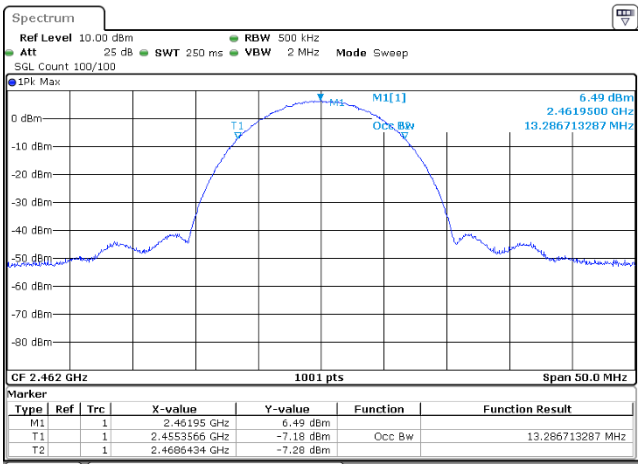

Figure 8.8-3: *99% OBW, High channel, 802.11b, CCK, 11MBPS*

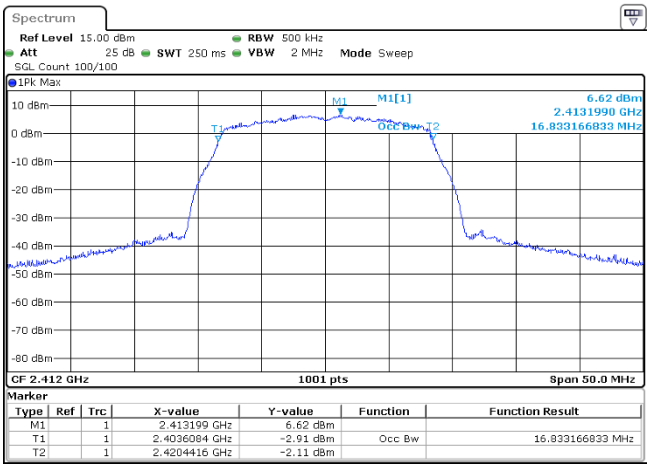

Figure 8.8-4: *99% OBW, Low channel, 802.11g, OFDM, 54MBPS*

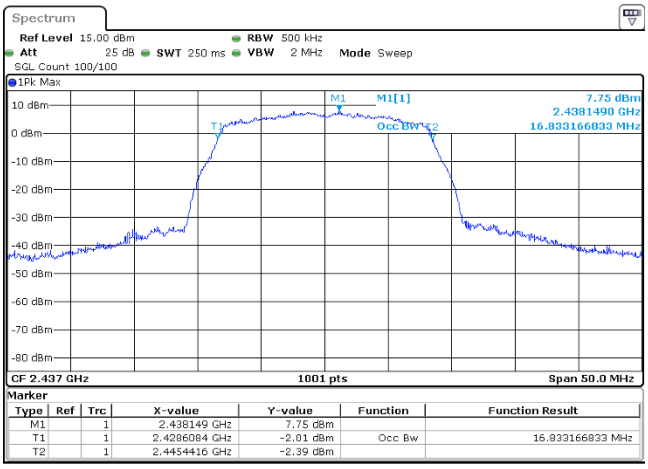

Figure 8.8-5: *99% OBW, Middle channel, 802.11g, OFDM, 54MBPS*

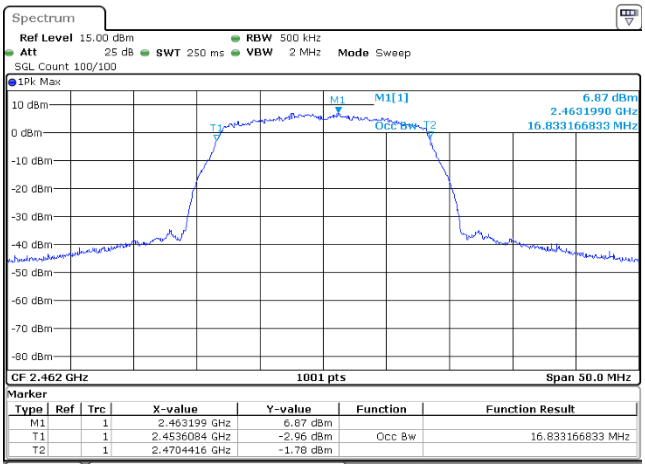

Figure 8.8-6: *99% OBW, High channel, 802.11g, OFDM, 54MBPS*

8.8.5 Test data, continued

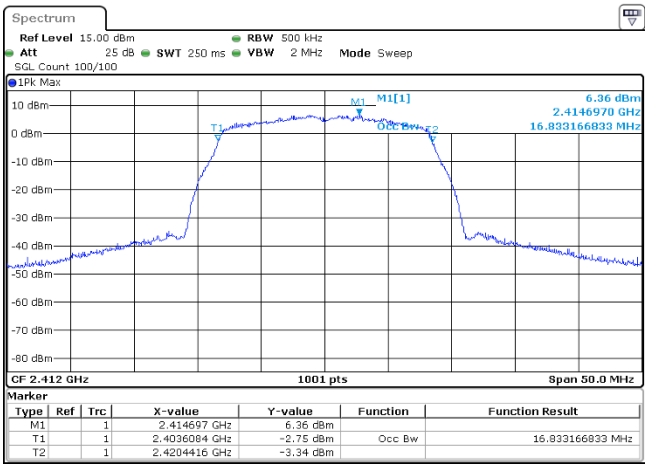

Figure 8.8-7: *99% OBW, Low channel, 802.11n, MCS5*

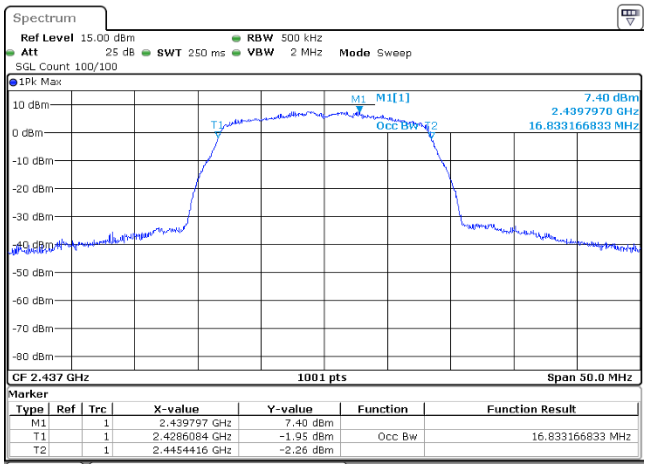

Figure 8.8-8: *99% OBW, Middle channel, 802.11n, MCS5*

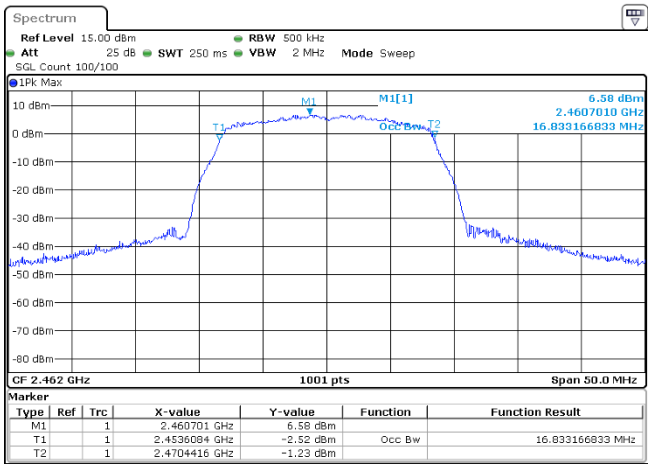

Figure 8.8-9: *99% OBW, High channel, 802.11n, MCS5*

Section 9 Block diagrams of test set-ups

9.1 Radiated emissions set-up

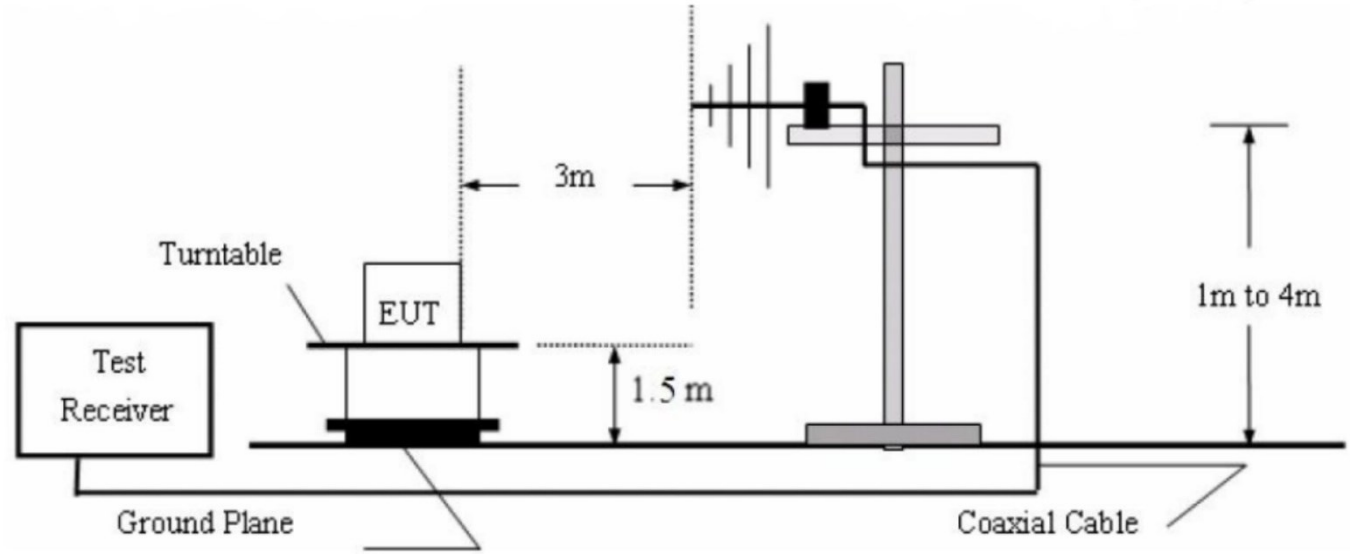

Figure 9.1-1: *30 MHz - 1000 MHz Setup*

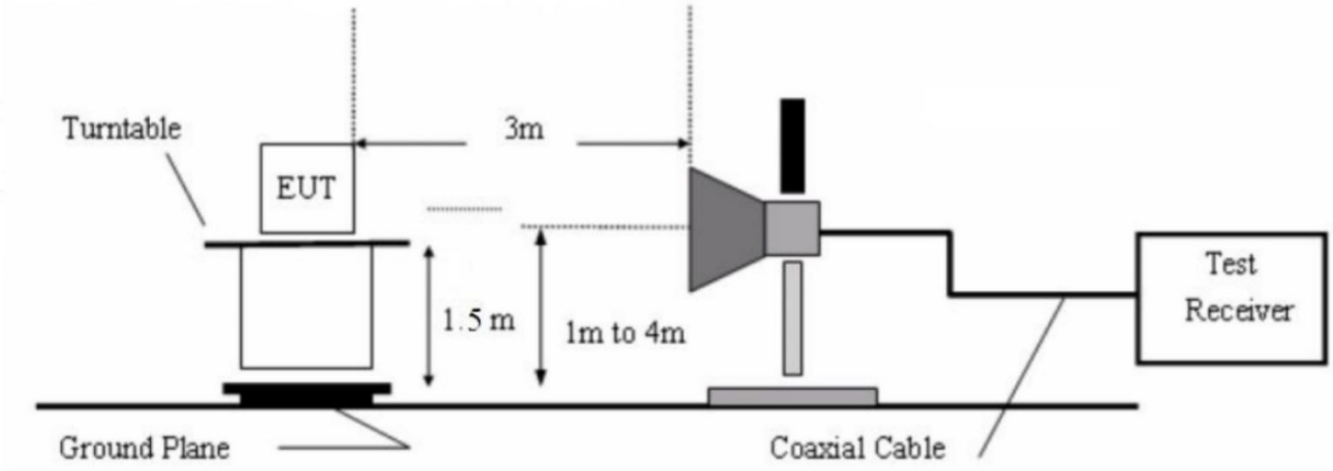

Figure 9.1-2: *1 GHz - 26 GHz Setup*

9.2 Conducted emissions set-up

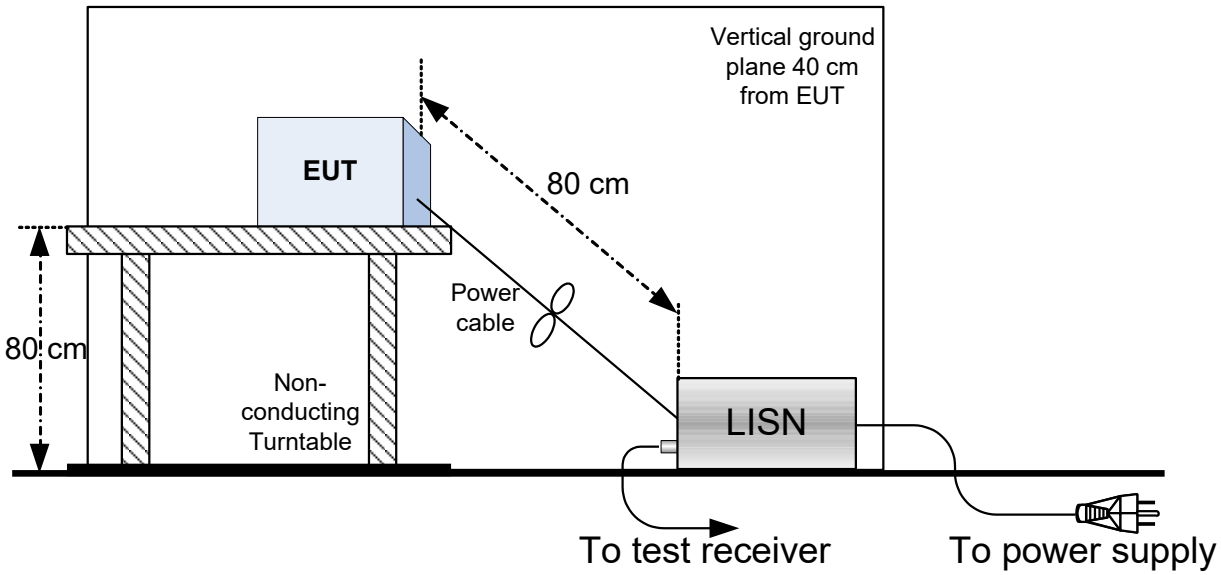

Figure 9.2-1: *150 kHz to 30 MHz Conducted Emissions Setup*