Test report

REP010975-2TRFWL

Date of issue: June 7, 2024

Applicant:

Space Exploration Technologies Corporation

Product description:

Wireless Module

Model:	Product marketing name(s):
UTW-231	N/A
FCC ID:	ISED certification number:
2AWHPW231	26207-UTW231

Specifications:

- FCC 47 CFR Part 15, Subpart E
  Unlicensed National Information Infrastructure Devices
- Industry Canada RSS-247, Issue 3
  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.
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State	California
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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	Lan Sayasane, EMC Test Engineer Chenhao Ma, Wireless Test Technician
Reviewed by	James Cunningham, EMC/WL Manager
Review date	June 7, 2024
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 ANAB, NIST, or any agency of the U.S. Government.

Copyright notification

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Section 1 Report summary

1.1 Test specifications

FCC 47 CFR Part 15, Subpart E	Unlicensed National Information Infrastructure Devices
Industry Canada RSS-247, Issue 3	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

1.2 Exclusions

None.

1.3 Statement of compliance

Testing was performed against all relevant requirements of the test standard(s).

Results obtained indicate that the product under test complies in full with the tested requirements.

The test results relate only to the item(s) tested.

See “Section 2 Summary of test results” for full details.

1.4 Test report revision history

Table 1.4-1: *Test report revision history*

Revision #	Issue Date	Details of changes made to test report
REP010975-2TRFEMC	June 7, 2024	Original report issued

Section 2 Summary of test results

2.1 Sample information

Receipt date	26-Feb-24
Nemko sample ID number	REP010975

2.2 Testing period

Test start date	26-Feb-24
Test end date	28-May-2024

2.3 Test results

Table 2.3-1: *FCC 47 CFR Part 15, Subpart E requirements*

Part	Test description	Verdict
§15.407(a)(1) §15.407(a)(3)	RF output power	Pass
§15.407(a)(1) §15.407(a)(3)	Power spectral density	Pass
§15.407(e)	6 dB bandwidth	Pass
§15.407(g)	Frequency stability	Pass
§15.407(b)	AC conducted emissions	Pass
§15.407(b)	Unwanted emissions < 1 GHz	Pass
§15.407(b)	Unwanted emissions > 1 GHz	Pass
§15.203	Antenna requirement	Pass

Table 2.3-2: *ISED RSS-247 requirements*

Part	Test description	Verdict
6.2.4 (1)	Transmit power	Pass
6.2.4 (2)	Electric field strength spurious emissions 30 MHz – 40 GHz	Pass
6.2.4 (1)	Power spectral density	Pass
6.2.4 (1)	6 dB bandwidth	Pass

Table 2.3-3: *ISED RSS-GEN requirements*

Part	Test description	Verdict
6.7	Occupied bandwidth (99%)	Pass
7.3	Receiver radiated emission limits	Not applicable [1]
7.4	Receiver conducted emission limits	Not applicable [1]
8.8	Power Line Conducted Emissions Limits for Licence-Exempt Radio Apparatus	Pass

Notes: [1] Only applicable to scanner receivers or stand-alone receivers operating in the band 30-960 MHz

Section 3 Equipment under test (EUT) details

3.1 Disclaimer

This section contains information provided by the applicant and has been utilized to support the test plan. Inaccurate information provided by the applicant can affect the validity of the results within this test report. Nemko accepts no responsibility for the information contained within this section and the impact it may have on the test plan and resulting measurements.

3.2 Applicant

Company name	Space Exploration Technologies Corporation
Address	1 Rocket Road
City	Hawthorne
State	CA
Postal/Zip code	90240
Country	United States

3.3 Manufacturer

Company name	Space Exploration Technologies Corporation
Address	1 Rocket Road
City	Hawthorne
State	CA
Postal/Zip code	90240
Country	United States

3.4 EUT information

Product name	Wireless Module
Model	UTW-231
Variant(s)	N/A
Serial number	N/A
Part number	N/A
Power requirements	30 V DC / 2 A via 100-240 V AC/DC Adaptor
Description/theory of operation	Wi-Fi router supporting IEEE 802.11a/n/ax
Operational frequencies	5150-5250 MHz, 5725-5850 MHz (Note: Operation in 5150-5250 MHz band not supported for ISED Canada)
Software details	N/A

3.5 Transmitter Information

Frequency band	5150 – 5250 MHz 5725 – 5850 MHz (Note: Operation in 5150-5250 MHz band not supported for ISED Canada)
Transmitter type	☐ Frequency hopping spread spectrum (FHSS) ☒ Digital transmission system (DTS) ☐ Hybrid FHSS / DTS
Data rate	IEEE 802.11a: Up to 54 Mbps IEEE 802.11n: Up to 450 Mbps IEEE 802.11ax: Up to 1300 Mbps
Antenna information	EUT includes 3 antenna ports (denoted ANT1, ANT2, ANT3). Maximum gain of each antenna in the operating band: 5150 – 5250 MHz operation: ANT1: 4.29 dBi ANT2: 5.17 dBi ANT3: 5.40 dBi Maximum directional gain (for beamforming modes): 9.78 dBi 5725 – 5850 MHz operation: ANT1: 4.22 dBi ANT2: 5.02 dBi ANT3: 6.37 dBi Maximum directional gain (for beamforming modes): 10.02 dBi Calculated using equation 40 from ANSI C63.10:2020: $\text{Directional gain} = 10\log\left[\left(10^{G_1/20}+10^{G_2/20}+\ldots+10^{G_N/20}\right)^2 / N_{\text{ANT}}\right]$ dBi (40)
Number of channels:	IEEE 802.11a, IEEE 802.11n (HT20), IEEE 802.11ac (VHT20): 9 IEEE 802.11n (HT40), IEEE 802.11ac (VHT40): 4 IEEE 802.11ac (VHT80): 2
MIMO operation	IEEE 802.11n (HT20) and (HT40) and IEEE 802.11ac (VHT20), (VHT40), and (VHT80) support beamforming and cyclic delay diversity (CDD) modes of operation IEEE 802.11a only supports CDD mode

3.6 Channel list

For 5150 – 5250 MHz operation:

4 channels are available for IEEE 802.11a, IEEE 802.11n (HT20) and IEEE 802.11ac (VHT20) operational modes:

Channel	Frequency	Channel	Frequency
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

2 channels are available for IEEE 802.11n (HT40) and IEEE 802.11ac (VHT40) operational mode:

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHZ

1 channel is available for IEEE 802.11ac (VHT80) operational mode:

Channel	Frequency	Channel	Frequency
42	5210 MHz		

For 5725 – 5850 MHz operation:

5 channels are available for IEEE 802.11a, IEEE 802.11n (HT20) and IEEE 802.11ac (VHT20) operational modes:

Channel	Frequency	Channel	Frequency
149	5745 MHz	161	5805 MHz
153	5765 MHz	165	5825 MHz
157	5785 MHz		

2 channels are available for IEEE 802.11n (HT40) and IEEE 802.11ac (VHT40) operational mode:

Channel	Frequency	Channel	Frequency
151	5755 MHz	159	5795 MHz

1 channel is available for IEEE 802.11ac (VHT80) operational mode:

Channel	Frequency	Channel	Frequency
155	5775 MHz		

3.7 Operating modes

Pre-scanning was performed to identify:

a. Worst-case special orientation for maximum emission

b. Worst-case modulation/data rate settings for a given IEEE 802.11x operating mode

Based on this pre-scanning, the following channels/modes were selected for testing:

Test Item	Operating band	Mode	Signal mode	Tested channel(s)	Modulation / data rate
RF output power	5150 – 5250 MHz	IEEE 802.11a	CDD	36, 40, 48	BPSK 9Mbps
		IEEE 802.11n/ac (V)HT20	CDD	36, 40, 48	MCS1 QPSK
			beamforming	36, 40, 48	MCS6 64QAM
		IEEE 802.11n/ac (V)HT40	CDD	38, 46	MCS9 256QAM
			beamforming	38, 46	MCS6 64QAM
		IEEE 802.11ac HT80	CDD	42	MCS1 QPSK
			beamforming	42	MCS1 QPSK
	5725 – 5850 MHz	IEEE 802.11a	CDD	149, 157, 165	16QAM 48 Mbps
		IEEE 802.11n/ac (V)HT20	CDD	149, 157, 165	MCS0 BPSK
			beamforming	149, 157, 165	MCS1 QPSK
		IEEE 802.11n/ac (V)HT40	CDD	151, 159	MCS7 64QAM
			beamforming	151, 159	MCS4 16QAM
		IEEE 802.11ac HT80	CDD	155	MCS8 256QAM
			beamforming	155	MCS6 64QAM
DTS bandwidth	5725 – 5850 MHZ	IEEE 802.11a	CDD	149, 157, 165	16QAM 48 Mbps
		IEEE 802.11n/ac (V)HT20	CDD	149, 157, 165	MCS0 BPSK
		IEEE 802.11n/ac (V)HT40	CDD	151, 159	MCS7 64QAM
		IEEE 802.11ac HT80	CDD	155	MCS8 256QAM
Power spectral density	5150 – 5250 MHz	IEEE 802.11a	CDD	36, 40, 48	BPSK 9Mbps
		IEEE 802.11n/ac (V)HT20	CDD	36, 40, 48	MCS1 QPSK
		IEEE 802.11n/ac (V)HT40	CDD	38, 46	MCS9 256QAM
		IEEE 802.11ac HT80	CDD	42	MCS1 QPSK
	5725 – 5850 MHz	IEEE 802.11a	CDD	149, 157, 165	16QAM 48 Mbps
		IEEE 802.11n/ac (V)HT20	CDD	149, 157, 165	MCS0 BPSK
		IEEE 802.11n/ac (V)HT40	CDD	151, 159	MCS7 64QAM
		IEEE 802.11ac HT80	CDD	155	MCS8 256QAM
Frequency stability	5150 – 5250 MHz			40	
	5725 – 5850 MHz			157	
AC power line conducted emissions	5150 – 5250 MHz	IEEE 802.11a	CDD	40	BPSK 9Mbps
	5725 – 5850 MHz	IEEE 802.11a	CDD	157	16QAM 48 Mbps
Radiated emissions < 1 GHz	5150 – 5250 MHz	IEEE 802.11a	CDD	40	BPSK 9Mbps
	5725 – 5850 MHz	IEEE 802.11a	CDD	157	16QAM 48 Mbps
Radiated emissions > 1 GHz	5150 – 5250 MHz	IEEE 802.11a	CDD	36, 40, 48	BPSK 9Mbps
		IEEE 802.11n/ac (V)HT20	CDD	36, 40, 48	MCS1 QPSK
		IEEE 802.11n/ac (V)HT40	CDD	38, 46	MCS9 256QAM
		IEEE 802.11ac HT80	CDD	42	MCS1 QPSK
	5725 – 5850 MHz	IEEE 802.11a	CDD	149, 157, 165	16QAM 48 Mbps
		IEEE 802.11n/ac (V)HT20	CDD	149, 157, 165	MCS0 BPSK
		IEEE 802.11n/ac (V)HT40	CDD	151, 159	MCS7 64QAM
		IEEE 802.11ac HT80	CDD	155	MCS8 256QAM

3.8 EUT setup details

Table 3.8-1: *EUT sub assemblies*

Description	Brand name	Model/Part number	Serial number	Rev.
Wireless router	Starlink	UTR-232	UTA232W-CON-DUT-2	N/A
AC/DC adaptor	Starlink	UTP-231L	PMLV241080000674	N/A

Table 3.8-2: *EUT interface ports*

Description	Qty.
DC power input	1
Ethernet	1

Table 3.8-3: *Support equipment*

Description	Brand name	Model/Part number	Serial number	Rev.
Laptop PC				

Table 3.8-4: *Inter-connection cables*

Cable description	From	To	Length (m)
Ethernet	Laptop PC	Wireless router (EUT)	1
AC power	Facility power	AC/DC adaptor	1

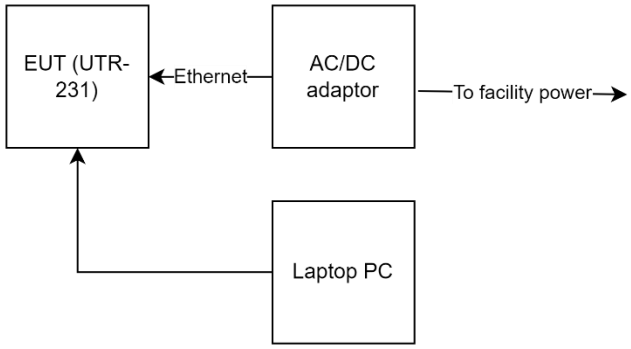

Figure 3.8-1: Test setup diagram

Section 4 Engineering considerations

4.1 Modifications incorporated in the EUT

None.

4.2 Technical judgement

None.

4.3 Deviations from laboratory test procedures

None.

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

7.1 Test equipment list

Table 7.1-1: *Test Equipment List*

Equipment	Manufacturer	Model no.	Asset no.	Cal cycle	Next cal.
Two Line V-Network	Rohde & Schwarz	ENV216	E1019	1 year	03-Oct-2024
EMI Test Receiver 9kHz to 7GHz	Rohde & Schwarz	ESCI 7	E1026	1 year	18-Apr-2025
Antenna, Bilog	Schaffner	CBL 6111D	1763	2 years	01-Jul-2024
Power Sensor	ETS-Lindgren	7002-006	E1061	1 year	27-Jul-2024
Power Sensor	ETS-Lindgren	7002-006	E1062	1 year	27-Jul-2024
Power Sensor	ETS-Lindgren	7002-006	EW110	1 year	14-Apr-2025
EMI Test Receiver	Rohde & Schwarz	ESU 40	E1121	1 year	23-Aug-2024
Transient Limiter	HP	11947A	E1159	1 year	28-Feb-2025
DRG Horn (medium)	ETS-Lindgren	3117-PA	E1160	2 years	13-Feb-2025
Signal & Spectrum Analyzer 2Hz / 43.5 GHz	Rohde & Schwarz	FSW43	E1302	1 year	22-Jan-2025

Notes: NCR: no calibration required
VBU: verify before use

7.2 Test software list

Table 7.2-1: *Test Software*

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

Section 8 Testing data

8.1 Duty cycle of test signal

8.1.1 References and limits

For information only.

8.1.2 Test summary

Verdict	Pass		
Test date	March 12, 2024	Temperature	19 °C
Test engineer	Chenhao Ma, Wireless Test Technician	Air pressure	1005 mbar
Test location	☐ 10m semi anechoic chamber ☐ 3m semi anechoic chamber ☒ Wireless bench: ☐ Other:	Relative humidity	57 %

8.1.3 Notes

None

8.1.4 Setup details

EUT power input during test	120 VAC / 60 Hz
EUT setup configuration	☒ Table-top ☐ Floor standing ☐ Other:

Measurements were performed with an RF power meter with built-in duty cycle and transmission duration measurement.

8.1.5 Test data (5150 – 5250 MHz operation)

IEEE 802.11a operation:

Table 8.1-1: *Duty cycle of test signal test data*

Duty Cycle (%)	Transmission Duration (ms)
97.350	1.396

IEEE 802.11n/ac operation:

Table 8.1-2: *Duty cycle of test signal test data*

Duty Cycle (%)	Transmission Duration (ms)
88.420	0.481

8.1.6 Test data (5725 – 5857 MHz operation)

IEEE 802.11a operation:

Table 8.1-3: *Duty cycle of test signal test data*

Duty Cycle (%)	Transmission Duration (ms)
95.81	1.396

IEEE 802.11n/ac operation:

Table 8.1-4: *Duty cycle of test signal test data*

Duty Cycle (%)	Transmission Duration (ms)
88.670	0.479

8.2 Variation of power source

8.2.1 References and limits

- FCC 47 CFR Part 15, Subpart A: §15.31(e)
- Test method: ANSI C63.10-2020 §5.13

§15.31(e):
For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

8.2.2 Test summary

Verdict	Pass		
Test date	March 1, 2024	Temperature	21 °C
Test engineer	Lan Sayasane, EMC Test Engineer	Air pressure	1006 mbar
Test location	☒ Wireless bench ☐ Other:	Relative humidity	54 %

8.2.3 Notes

Testing was performed with the transmitter operating on a fixed channel (middle) at maximum output power.

8.2.4 Setup details

EUT power input during test	120 VAC / 60 Hz

8.2.5 Test data

☐	EUT is battery operated. Therefore, all tests performed with a new fully charged battery
☒	EUT power supply voltage varied across supported range. No variation in transmitter output power observed therefore all tests performed at nominal power supply voltage.
☐	EUT power supply voltage varied across supported range. Transmitter output power variation was observed. All tests performed with the EUT operated at the worst-case operating voltage with respect to transmitter output power: V.

8.3 Antenna requirement

8.3.1 References and limits

- FCC 47 CFR Part 15, Subpart C: §15.203

§15.203:
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. Test summary

Verdict	Pass		
Test date	March 25, 2024	Temperature	20 °C
Test engineer	Chenhao Ma, Wireless Test Technician	Air pressure	1006 mbar
Test location	☒ Wireless bench ☐ Other:	Relative humidity	55 %

8.3.2 Notes

None

8.3.3 Test data

Antenna part number:	Not provided
Technical description:	Not provided
Peak gain (dBi):	EUT includes 3 antenna ports (denoted ANT1, ANT2, ANT3). Maximum gain of each antenna in the operating band: 5150 – 5250 MHz operation: ANT1: 4.29 dBi ANT2: 5.17 dBi ANT3: 5.40 dBi Maximum directional gain (for beamforming modes): 9.78 dBi 5725 – 5850 MHz operation: ANT1: 4.22 dBi ANT2: 5.02 dBi ANT3: 6.37 dBi Maximum directional gain (for beamforming modes): 10.02 dBi Calculated using equation 40 from ANSI C63.10:2020
Source of gain data:	☐ Declared by client ☐ Antenna data sheet or specification. Document name: ☒ Antenna gain test report. Document name: Test Summary_P24010066_WNC_Spacex mini desh_Gain_20240202.xls

8.4 6 dB bandwidth

8.4.1 References and limits

- FCC 47 CFR Part 15, Subpart E: §15.407(e)
- ISED: RSS-247 6.2.4 (2)
- Test method: ANSI C63.10-2020 §11.8.1

§15.407:
(e) Within the 5.725-5.850 GHz and 5.850-5.895 GHz bands, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

RSS-247:
6.2.4.2For equipment operating in the band 5725-5850 MHz, the 6 dB bandwidth shall be at least 500 kHz.

8.4.2 Test summary

Verdict	Pass		
Test date	March 27, 2024	Temperature	20 °C
Test engineer	Chenhao Ma, Wireless Test Technician	Air pressure	1005 mbar
Test location	☒ Wireless bench ☐ Other:	Relative humidity	51 %

8.4.3 Notes

Testing was performed with the transmitter operating on a fixed channel (lowest, middle, and highest) at maximum output power.

The spectral plots within this section have been corrected with all relevant transducer factors.

8.4.4 Setup details

EUT power input during test	120 VAC / 60 Hz
EUT setup configuration	☐ Table-top ☐ Floor standing ☐ Other:

Receiver/spectrum analyzer settings:

Resolution bandwidth	1 – 5 % of nominal bandwidth, minimum of 100 kHz
Video bandwidth	3 x resolution bandwidth
Detector mode	Peak
Trace mode	Max Hold
Measurement time	Long enough for trace to stabilize

8.4.5 Test data (5725 – 5850 MHz operation)

8.4.5.1 IEEE 802.11a (CDD) mode

Table 8.4-1: *6 dB bandwidth test data, IEEE 802.11a (CDD) mode*

Channel	Test Frequency (MHz)	Modulation	DTS Bandwidth (kHz)			Limit (kHz)
			ANT1	ANT2	ANT3	
149	5745	16QAM_48Mbps	16,170	15,960	16,100	≥ 500
157	5785		15,260	15,890	16,240	≥ 500
165	5825		15,820	16,310	16,100	≥ 500

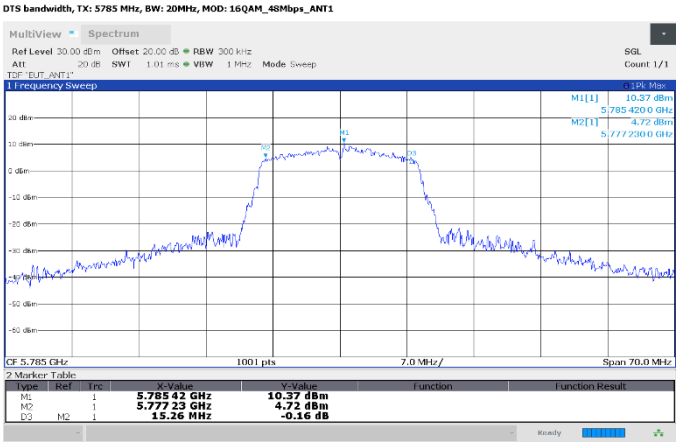

Figure 8.4-1: *6 dB bandwidth, IEEE 802.11a (CDD) mode, minimum measured DTS bandwidth*

8.4.5.2 IEEE 802.11n/ac (V)HT20 (CDD) mode

Table 8.4-2: *6 dB bandwidth test data, IEEE 802.11n/ac (V)HT20 (CDD) mode*

Channel	Test Frequency (MHz)	Modulation	DTS Bandwidth (kHz)			Limit (kHz)
			ANT1	ANT2	ANT3	
149	5745	MCS0_BPSK	16,940	17,080	16,940	≥ 500
157	5785		17,290	16,240	16,240	≥ 500
165	5825		17,080	17,010	17,290	≥ 500

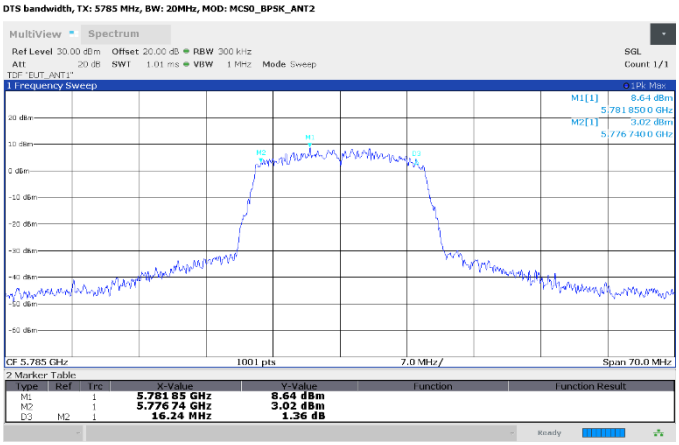

Figure 8.4-2: *6 dB bandwidth, IEEE 802.11n/ac (V)HT20 (CDD) mode, minimum measured DTS bandwidth*

8.4.5.3 IEEE 802.11n/ac (V)HT40 (CDD) mode

Table 8.4-3: *6 dB bandwidth test data, IEEE 802.11n/ac (V)HT40 (CDD) mode*

Channel	Modulation	DTS Bandwidth (kHz)	Limit (kHz)

	Test Frequency (MHz)		ANT1	ANT2	ANT3	
151	5755	MCS7_64QAM	35,280	36,540	34,300	≥ 500
159	5795		35,700	35,980	33,320	≥ 500

Figure 8.4-3: *6 dB bandwidth, IEEE 802.11n/ac (V)HT40 (CDD) mode, minimum measured DTS bandwidth*

8.4.5.4 IEEE 802.11n/ac (V)HT80 (CDD) mode

Table 8.4-4: *6 dB bandwidth test data, IEEE 802.11n/ac (V)HT80 (CDD) mode*

Channel	Test Frequency (MHz)	Modulation	DTS Bandwidth (kHz)			Limit (kHz)
			ANT1	ANT2	ANT3	
155	5775	MCS8_256QAM	75,880	75,320	76,160	≥ 500

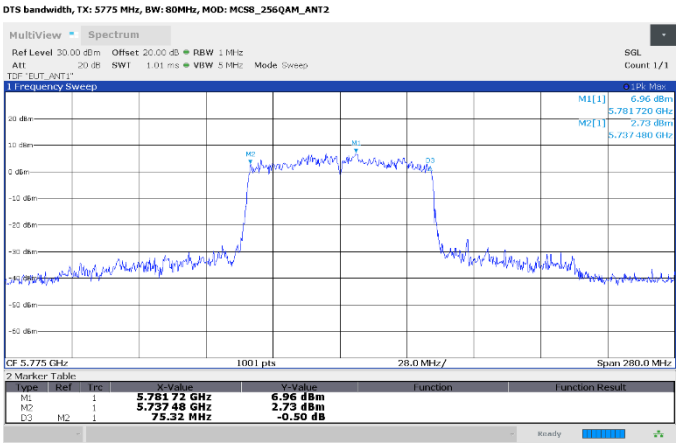

Figure 8.4-4: *6 dB bandwidth, IEEE 802.11n/ac (V)HT80 (CDD) mode, minimum measured DTS bandwidth*

8.5 99% occupied bandwidth

8.5.1 References and limits

- ISED: RSS-Gen: §6.7
- Test method: ANSI C63.4-2020: §6.9.2

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.

8.5.2 Test summary

Verdict	Pass		
Test date	March 27, 2024	Temperature	20 °C
Test engineer	Chenhao Ma, Wireless Test Technician	Air pressure	1005 mbar
Test location	☒ Wireless bench ☐ Other:	Relative humidity	51 %

8.5.3 Notes

Testing was performed with the transmitter operating on a fixed channel (lowest, middle, and highest) at maximum output power.

The spectral plots within this section have been corrected with all relevant transducer factors.

8.5.4 Setup details

EUT power input during test	120 VAC / 60 Hz
EUT setup configuration	☒ Table-top ☐ Floor standing ☐ Other:

Receiver settings:

Resolution bandwidth	1-5 % of occupied bandwidth
Video bandwidth	~ 3 x resolution bandwidth
Detector mode	Peak
Trace mode	Max Hold
Measurement time	Long enough for trace to stabilize

8.5.5 Test data (5725 – 5850 MHz operation)

8.5.5.1 IEEE 802.11a (CDD) mode

Table 8.5-1: *99% occupied bandwidth test data, IEEE 802.11a (CDD) mode*

Channel	Test Frequency (MHz)	Modulation	Occupied (99%) bandwidth (MHz)		
			ANT1	ANT2	ANT3
149	5745	16QAM_48Mbps	**16.653**	16.542	16.601
157	5785		16.589	16.432	16.531
165	5825		16.626	16.556	16.572

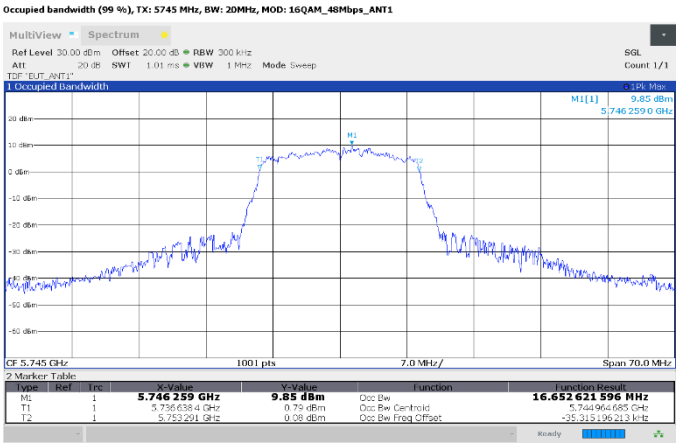

Figure 8.5-1: *99% occupied bandwidth, IEEE 802.11a (CDD) mode, maximum measured occupied bandwidth*

8.5.5.2 IEEE 802.11n/ac (V)HT20 (CDD) mode

Table 8.5-2: *99% occupied bandwidth test data, IEEE 802.11n/ac (V)HT20 (CDD) mode*

Channel	Test Frequency (MHz)	Modulation	Occupied (99%) bandwidth (MHz)		
			ANT1	ANT2	ANT3
149	5745	MCS0_BPSK	17.656	17.594	17.693
157	5785		**17.747**	17.694	17.648
165	5825		17.741	17.600	17.709

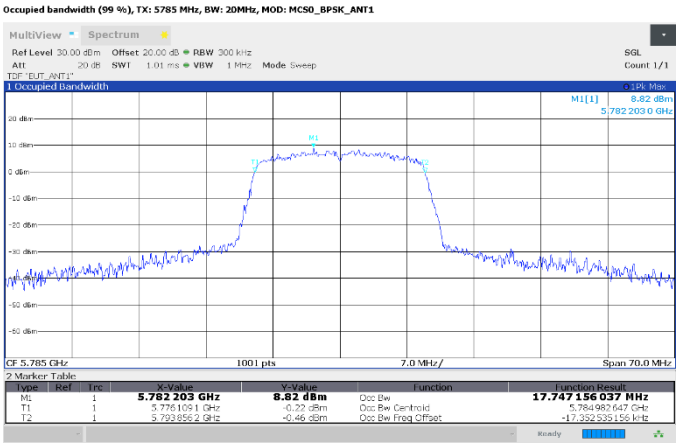

Figure 8.5-2: *99% occupied bandwidth, IEEE 802.11n/ac (V)HT20 (CDD) mode, maximum measured occupied bandwidth*

8.5.5.3 IEEE 802.11n/ac (V)HT40 (CDD) mode

Table 8.5-3: *99% occupied bandwidth test data, IEEE 802.11n/ac (V)HT40 (CDD) mode*

Channel	Test Frequency (MHz)	Modulation	Occupied (99%) bandwidth (MHz)		
			ANT1	ANT2	ANT3
151	5755	MCS7_64QAM	36.180	**36.259**	36.185
159	5795		36.079	36.190	36.163

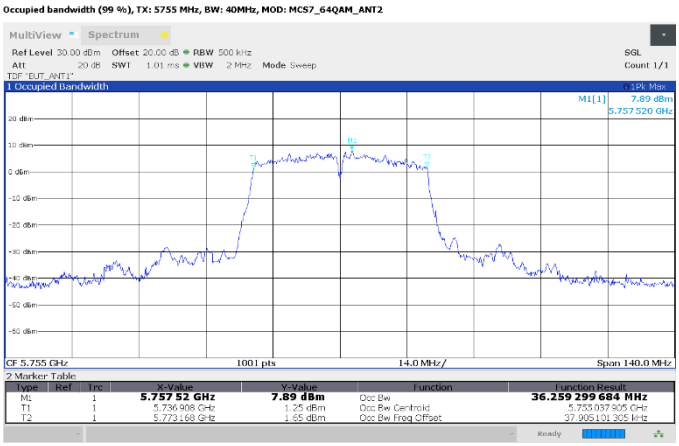

Figure 8.5-3: *99% occupied bandwidth, IEEE 802.11n/ac (V)HT40 (CDD) mode, maximum measured occupied bandwidth*

8.5.5.4 IEEE 802.11ac VHT80 (CDD) mode

Table 8.5-4: *99% occupied bandwidth test data, IEEE 802.11ac VHT80 (CDD) mode*

Channel	Test Frequency (MHz)	Modulation	Occupied (99%) bandwidth (MHz)		
			ANT1	ANT2	ANT3
155	5775	MCS8_256QAM	75.699	**75.854**	75.838

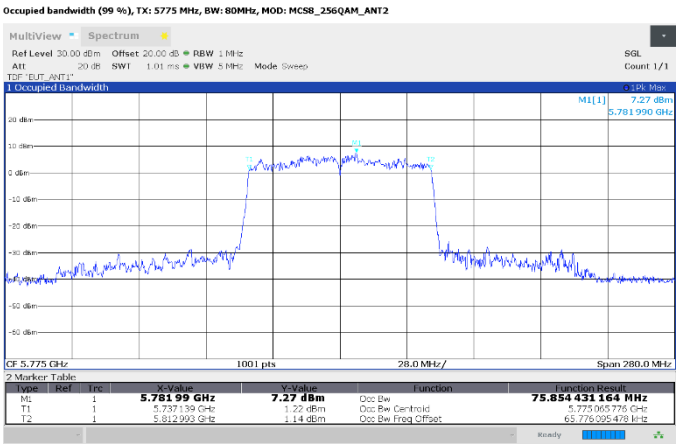

Figure 8.5-4: *99% occupied bandwidth, IEEE 802.11ac VHT80 (CDD) mode, maximum measured occupied bandwidth*

8.6 Maximum peak output power

8.6.1 References and limits

- FCC 47 CFR Part 15, Subpart E: §15.401(a)(1), §15.401(a)(3)
- ISED: RSS-247 6.2.4(2)
- Test method: ANSI C63.10-2020 §12.4.3.1 (Method PM)

§15.407(a)(1):

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

§15.407(a)(3):

(i) For the band 5.725-5.850 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(ii) For an indoor access point operating in the 5.850-5.895 GHz band, the maximum power spectral density must not exceed 20 dBm e.i.r.p. in any 1-megahertz band. In addition, the maximum e.i.r.p. over the frequency band of operation must not exceed 36 dBm. Indoor access points operating on a channel that spans the 5.725-5.850 GHz and 5.850-5.895 GHz bands must not exceed an e.i.r.p. of 36 dBm.

(iii) For client devices operating under the control of an indoor access point in the 5.850-5.895 GHz band, the maximum power spectral density must not exceed 14 dBm e.i.r.p. in any 1-megahertz band, and the maximum e.i.r.p. over the frequency band of operation must not exceed 30 dBm. Client devices operating on a channel that spans the 5.725-5.850 GHz and 5.850-5.895 GHz bands must not exceed an e.i.r.p. of 30 dBm.

(iv) For a subordinate device operating under the control of an indoor access point in the 5.850-5.895 GHz band, the maximum power spectral density must not exceed 20 dBm e.i.r.p in any 1-megahertz band, and the maximum e.i.r.p. over the frequency band of operation must not exceed 36 dBm.

(v) In the 5.850-5.895 GHz band, client devices must operate under the control of an indoor access point. In all cases, an exception exists for transmitting brief messages to an access point when attempting to join its network after detecting a signal that confirms that an access point is operating on a particular channel. Access points may connect to other access points. Client devices are prohibited from connecting directly to another client device.

RSS-247:

6.2.4.2 For equipment operating in the band 5725-5850 MHz, the 6 dB bandwidth shall be at least 500 kHz.
The maximum conducted output power shall not exceed 1 W. The output power spectral density shall not exceed 30 dBm in any 500 kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the output power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications and multiple collocated transmitters transmitting the same information.

8.6.2 Test summary

Verdict	Pass		
Test date	April 4, 2024	Temperature	19 °C
Test engineer	Chenhao Ma, Wireless Test Technician	Air pressure	1005 mbar
Test location	☒ Wireless bench ☐ Other:	Relative humidity	59 %

8.6.3 Notes

Testing was performed with the transmitter operating on a fixed channel (lowest, middle, and highest) at maximum output power.

8.6.4 Setup details

EUT power input during test	120 VAC / 60 Hz
EUT setup configuration	☒ Table-top ☐ Floor standing ☐ Other:

8.6.5 Test data (5150 – 5250 MHz operation)

8.6.5.1 IEEE 802.11a (CDD) mode

Table 8.6-1: *Maximum peak output power test data, IEEE 802.11a (CDD) mode*

Channel	Frequency (MHz)	Modulation	Average power (dBm)			Total power (mw)	Total power (dBm)	Power Limit (dBm)
			ANT1	ANT2	ANT3			
36	5180	BPSK 9 Mbps	23.79	23.27	23.22	661.550	28.21	30
40	5200		24.49	23.83	23.62	752.880	28.77	30
48	5240		24.55	24.03	23.79	777.363	28.91	30

The maximum gain is 5.40 dBi < 6 dBi, so the output power limit shall not be reduced.

8.6.5.2 IEEE 802.11n/ac (V)HT20 (CDD) mode

Table 8.6-2: *Maximum peak output power test data, IEEE 802.11n/ac (V)HT20 (CDD) mode*

Channel	Frequency (MHz)	Modulation	Average power (dBm)			Total power (mw)	Total power (dBm)	Power Limit (dBm)
			ANT1	ANT2	ANT3			
36	5180	MCS1 QPSK	24.49	24.03	23.92	780.724	28.92	30
40	5200		25.14	24.50	24.27	875.727	29.42	30
48	5240		24.52	23.89	23.72	763.550	28.83	30

The maximum gain is 5.40 dBi < 6 dBi, so the output power limit shall not be reduced.

8.6.5.3 IEEE 802.11n/ac (V)HT40 (CDD) mode

Table 8.6-3: *Maximum peak output power test data, IEEE 802.11n/ac (V)HT40 (CDD) mode*

Channel	Frequency (MHz)	Modulation	Average power (dBm)			Total power (mw)	Total power (dBm)	Power Limit (dBm)
			ANT1	ANT2	ANT3			
38	5190	MCS9_256QAM	24.47	23.84	23.76	759.685	28.81	30
46	5230		24.74	24.17	24.03	811.998	29.10	30

The maximum gain is 5.40 dBi < 6 dBi, so the output power limit shall not be reduced.

8.6.5.4 IEEE 802.11ac VHT80 (CDD) mode

Table 8.6-4: *Maximum peak output power test data, IEEE 802.11ac VHT80 (CDD) mode*

Channel	Frequency (MHz)	Modulation	Average power (dBm)			Total power (mw)	Total power (dBm)	Power Limit (dBm)
			ANT1	ANT2	ANT3			
42	5210	MCS1_QPSK	25.09	24.47	24.33	873.767	29.41	30

The maximum gain is 5.40 dBi < 6 dBi, so the output power limit shall not be reduced.

8.6.5.5 IEEE 802.11n/ac (V)HT20 (beamforming) mode

Table 8.6-5: *Maximum peak output power test data, IEEE 802.11n/ac (V)HT20 (beamforming) mode*

Channel	Frequency (MHz)	Modulation	Average power (dBm)			Total power (mw)	Total power (dBm)	Power Limit (dBm)
			ANT1	ANT2	ANT3			
36	5180	MCS6_64QAM	21.25	21.07	21.46	401.249	26.03	26.22
40	5200		21.35	21.13	21.39	403.897	26.06	26.22
48	5240		21.30	21.62	21.40	418.146	26.21	26.22

The maximum beamforming gain is 9.78 dBi < 6 dBi, so the output power limit is reduced by 9.78 – 6 = 3.78 dB.

8.6.5.6 IEEE 802.11n/ac (V)HT40 (beamforming) mode

Table 8.6-6: *Maximum peak output power test data, IEEE 802.11n/ac (V)HT40 (beamforming) mode*

Channel	Frequency (MHz)	Modulation	Average power (dBm)			Total power (mw)	Total power (dBm)	Power Limit (dBm)
			ANT1	ANT2	ANT3			
38	5190	MCS6_64QAM	21.26	21.03	21.80	411.781	26.15	26.22
46	5230		21.31	21.55	21.57	421.646	26.25	26.22

The maximum beamforming gain is 9.78 dBi < 6 dBi, so the output power limit is reduced by 9.78 – 6 = 3.78 dB.

8.6.5.7 IEEE 802.11ac VHT80 (beamforming) mode

Table 8.6-7: *Maximum peak output power test data, IEEE 802.11ac VHT80 (beamforming) mode*

Channel	Frequency (MHz)	Modulation	Average power (dBm)			Total power (mw)	Total power (dBm)	Power Limit (dBm)
			ANT1	ANT2	ANT3			
42	5210	MCS1_QPSK	21.36	20.81	21.92	412.873	26.16	26.22

The maximum beamforming gain is 9.78 dBi < 6 dBi, so the output power limit is reduced by 9.78 – 6 = 3.78 dB.

8.6.6 Test data (5725 – 5850 MHz operation)

8.6.6.1 IEEE 802.11a (CDD) mode

Table 8.6-8: *Maximum peak output power test data, IEEE 802.11a (CDD) mode*

Channel	Frequency (MHz)	Modulation	Average power (dBm)			Total power (mw)	Total power (dBm)	Power Limit (dBm)
			ANT1	ANT2	ANT3			
149	5745	16QAM 48Mbps	25.10	23.80	25.30	902.321	29.55	29.63
157	5785		24.89	22.87	24.43	779.293	28.92	29.63
165	5825		24.68	22.86	24.00	738.150	28.68	29.63

The maximum gain is 6.37 dBi < 6 dBi, so the output power limit shall be reduced by 6.37 – 6 = 0.37 dB.

8.6.6.2 IEEE 802.11n/ac (V)HT20 (CDD) mode

Table 8.6-9: *Maximum peak output power test data, IEEE 802.11n/ac (V)HT20 (CDD) mode*

Channel	Frequency (MHz)	Modulation	Average power (dBm)			Total power (mw)	Total power (dBm)	Power Limit (dBm)
			ANT1	ANT2	ANT3			
149	5745	MCS0_BPSK	25.30	23.70	25.38	918.411	29.63	29.63
157	5785		25.14	23.06	24.30	798.043	29.02	29.63
165	5825		24.97	23.13	24.27	786.941	28.96	29.63

The maximum gain is 6.37 dBi < 6 dBi, so the output power limit shall be reduced by 6.37 – 6 = 0.37 dB.

8.6.6.3 IEEE 802.11n/ac (V)HT40 (CDD) mode

Table 8.6-10: *Maximum peak output power test data, IEEE 802.11n/ac (V)HT40 (CDD) mode*

Channel	Frequency (MHz)	Modulation	Average power (dBm)			Total power (mw)	Total power (dBm)	Power Limit (dBm)
			ANT1	ANT2	ANT3			
151	5755	MCS7 64QAM	25.44	23.56	25.20	908.063	29.58	29.63
159	5795		25.16	23.14	24.69	828.600	29.18	29.63

The maximum gain is 6.37 dBi < 6 dBi, so the output power limit shall be reduced by 6.37 – 6 = 0.37 dB.

8.6.6.4 IEEE 802.11ac VHT80 (CDD) mode

Table 8.6-11: *Maximum peak output power test data, IEEE 802.11ac VHT80 (CDD) mode*

Channel	Frequency (MHz)	Modulation	Average power (dBm)			Total power (mw)	Total power (dBm)	Power Limit (dBm)
			ANT1	ANT2	ANT3			
155	5775	MCS8 256QAM	25.56	23.56	25.10	910.329	29.59	29.63

The maximum gain is 6.37 dBi < 6 dBi, so the output power limit shall be reduced by 6.37 – 6 = 0.37 dB.

8.6.6.5 IEEE 802.11n/ac (V)HT20 (beamforming) mode

Table 8.6-12: *Maximum peak output power test data, IEEE 802.11n/ac (V)HT20 (beamforming) mode*

Channel	Frequency (MHz)	Modulation	Average power (dBm)			Total power (mw)	Total power (dBm)	Power Limit (dBm)
			ANT1	ANT2	ANT3			
149	5745	MCS1 QPSK	21.21	20.34	21.02	366.747	25.64	25.98
157	5785		20.99	20.28	20.80	352.489	25.47	25.98
165	5825		20.87	20.43	20.95	357.039	25.53	25.98

The maximum beamforming gain is 10.02 dBi < 6 dBi, so the output power limit shall be reduced by 10.02 – 6 = 4.02 dB.

8.6.6.6 IEEE 802.11n/ac (V)HT40 (beamforming) mode

Table 8.6-13: *Maximum peak output power test data, IEEE 802.11n/ac (V)HT40 (beamforming) mode*

Channel	Frequency (MHz)	Modulation	Average power (dBm)			Total power (mw)	Total power (dBm)	Power Limit (dBm)
			ANT1	ANT2	ANT3			
151	5755	MCS4 16QAM	21.04	20.69	20.79	364.227	25.61	25.98
159	5795		20.85	20.74	20.67	356.876	25.53	25.98

The maximum beamforming gain is 10.02 dBi < 6 dBi, so the output power limit shall be reduced by 10.02 – 6 = 4.02 dB.

8.6.6.7 IEEE 802.11ac VHT80 (beamforming) mode

Table 8.6-14: *Maximum peak output power test data, IEEE 802.11ac VHT80 (beamforming) mode*

Channel	Frequency (MHz)	Modulation	Average power (dBm)			Total power (mw)	Total power (dBm)	Power Limit (dBm)
			ANT1	ANT2	ANT3			
155	5775	MCS6 64QAM	20.71	20.75	20.68	353.561	25.48	25.98

The maximum beamforming gain is 10.02 dBi < 6 dBi, so the output power limit shall be reduced by 10.02 – 6 = 4.02 dB.

8.7 Power spectral density

8.7.1 References and limits

- FCC 47 CFR Part 15, Subpart E: §15.401(a)(1), §15.401(a)(3)
- ISED: RSS-247 6.2.4(2)
- Test method: ANSI C63.10-2020 §12.6

§15.407(a)(1):

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

§15.407(a)(3):

(i) For the band 5.725-5.850 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(ii) For an indoor access point operating in the 5.850-5.895 GHz band, the maximum power spectral density must not exceed 20 dBm e.i.r.p. in any 1-megahertz band. In addition, the maximum e.i.r.p. over the frequency band of operation must not exceed 36 dBm. Indoor access points operating on a channel that spans the 5.725-5.850 GHz and 5.850-5.895 GHz bands must not exceed an e.i.r.p. of 36 dBm.

(iii) For client devices operating under the control of an indoor access point in the 5.850-5.895 GHz band, the maximum power spectral density must not exceed 14 dBm e.i.r.p. in any 1-megahertz band, and the maximum e.i.r.p. over the frequency band of operation must not exceed 30 dBm. Client devices operating on a channel that spans the 5.725-5.850 GHz and 5.850-5.895 GHz bands must not exceed an e.i.r.p. of 30 dBm.

(iv) For a subordinate device operating under the control of an indoor access point in the 5.850-5.895 GHz band, the maximum power spectral density must not exceed 20 dBm e.i.r.p in any 1-megahertz band, and the maximum e.i.r.p. over the frequency band of operation must not exceed 36 dBm.

(v) In the 5.850-5.895 GHz band, client devices must operate under the control of an indoor access point. In all cases, an exception exists for transmitting brief messages to an access point when attempting to join its network after detecting a signal that confirms that an access point is operating on a particular channel. Access points may connect to other access points. Client devices are prohibited from connecting directly to another client device.

RSS-247:

6.2.4.2 For equipment operating in the band 5725-5850 MHz, the 6 dB bandwidth shall be at least 500 kHz.
The maximum conducted output power shall not exceed 1 W. The output power spectral density shall not exceed 30 dBm in any 500 kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the output power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications and multiple collocated transmitters transmitting the same information.

8.7.2 Test summary

Verdict	Pass		
Test date	March 15, 2024	Temperature	20 °C
Test engineer	Chenhao Ma, Wireless Test Technician	Air pressure	1005 mbar
Test location	☒ Wireless bench ☐ Other:	Relative humidity	51 %

8.7.3 Notes

Testing was performed with the transmitter operating on a fixed channel (lowest, middle, and highest) at maximum output power.

The spectral plots within this section have been corrected with all relevant transducer factors.

8.7.4 Setup details

EUT power input during test	120 VAC / 60 Hz
EUT setup configuration	☒ Table-top ☐ Floor standing ☐ Other:

Spectrum analyzer settings:

Resolution bandwidth	1 MHz (5150 – 5250 MHz operation) 500 kHz (5725 – 5850 MHz operation)
Video bandwidth	3 MHz
Detector mode	Power Averaging (rms)
Trace mode	Trace averaging
Measurement time	100 sweeps

8.7.5 Test data (5150 – 5250 MHz operation)

8.7.5.1 IEEE 802.11a (CDD) mode

Table 8.7-1: *Power spectral density test data, IEEE 802.11a (CDD) mode*

Channel	Frequency (MHz)	Modulation	Average PSD (dBm/MHz)			Total PSD (dBm/MHz)	PSD Limit (dBm/MHz)
			ANT1	ANT2	ANT3		
36	5180	BPSK 9Mbps	7.79	8.41	6.70	12.46	17
40	5200		7.88	7.97	6.51	12.27	17
48	5240		8.24	**8.50**	7.22	12.79	17

The maximum gain is 5.40 dBi < 6 dBi, so the output power limit shall not be reduced.

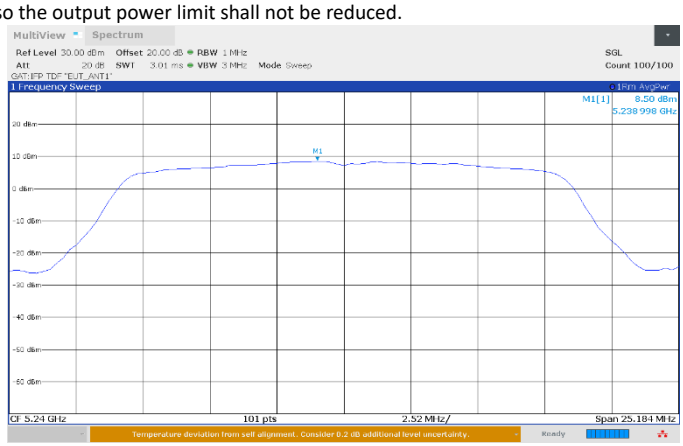

Figure 8.7-1: *Power spectral density, IEEE 802.11a (CDD) mode, maximum measured power spectral density*

8.7.5.2 IEEE 802.11n/ac (V)HT20 (CDD) mode

Table 8.7-2: *Power spectral density test data, IEEE 802.11n/ac (V)HT20 (CDD) mode*

Channel	Frequency (MHz)	Modulation	Average PSD (dBm/MHz)			Total PSD (dBm/MHz)	PSD Limit (dBm/MHz)
			ANT1	ANT2	ANT3		
36	5180	MCS1 QPSK	7.67	8.05	7.65	12.57	17
40	5200		7.53	8.13	7.80	12.60	17
48	5240		6.57	**8.18**	7.52	12.24	17

The maximum gain is 5.40 dBi < 6 dBi, so the output power limit shall not be reduced.

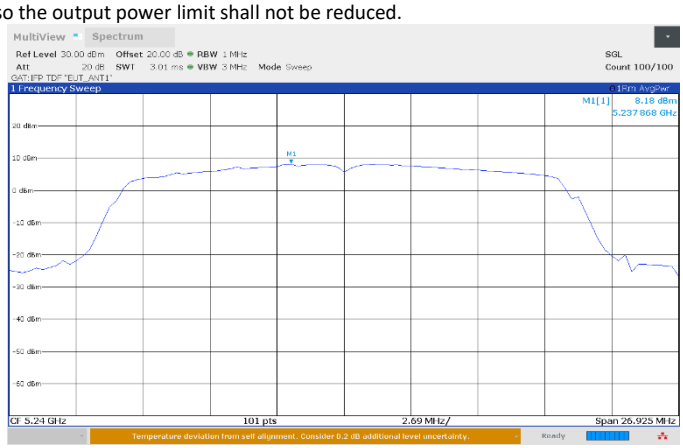

Figure 8.7-2: *Power spectral density, IEEE 802.11n/ac (V)HT20 (CDD) mode, maximum measured power spectral density*

8.7.5.3 IEEE 802.11n/ac (V)HT40 (CDD) mode

Table 8.7-3: *Power spectral density test data, IEEE 802.11n/ac (V)HT40 (CDD) mode*

Channel	Frequency (MHz)	Modulation	Average PSD (dBm/MHz)			Total PSD (dBm/MHz)	PSD Limit (dBm/MHz)
			ANT1	ANT2	ANT3		
38	5190	MCS9 256QAM	6.35	7.01	**7.36**	11.70	17
46	5230		6.83	6.64	6.85	11.55	17

The maximum gain is 5.40 dBi < 6 dBi, so the output power limit shall not be reduced.

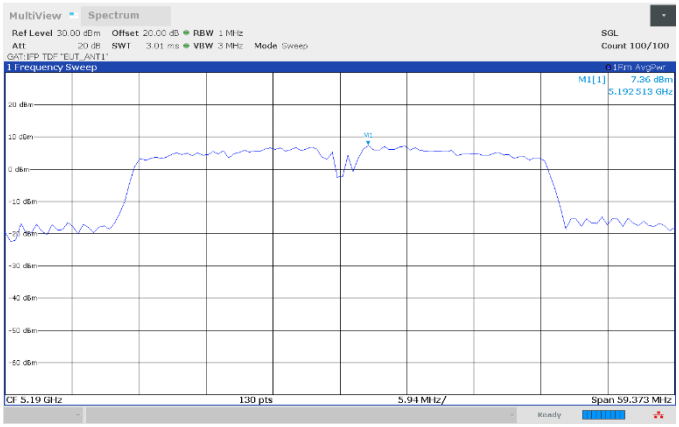

Figure 8.7-3: *Power spectral density, IEEE 802.11n/ac (V)HT40 (CDD) mode, maximum measured power spectral density*

8.7.5.4 IEEE 802.11ac VHT80 (CDD) mode

Table 8.7-4: *Power spectral density test data, IEEE 802.11ac VHT80 (CDD) mode*

Channel	Frequency (MHz)	Modulation	Average PSD (dBm/MHz)			Total PSD (dBm/MHz)	PSD Limit (dBm/MHz)
			ANT1	ANT2	ANT3		
42	5210	MCS1 QPSK	**4.55**	4.48	4.01	9.12	17

The maximum gain is 5.40 dBi < 6 dBi, so the output power limit shall not be reduced.

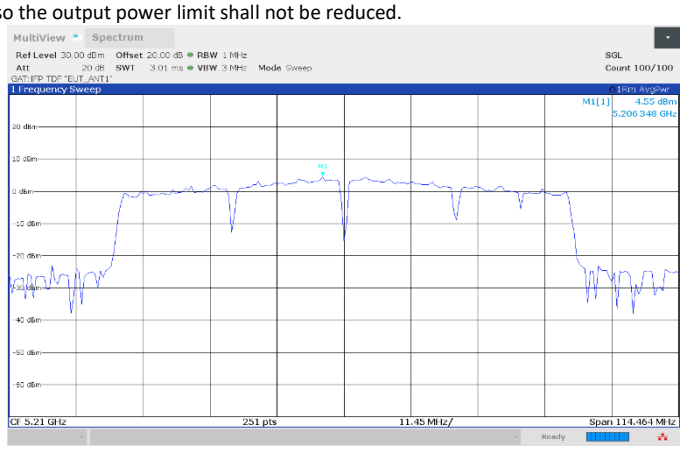

Figure 8.7-4: *Power spectral density, IEEE 802.11ac VHT80 (CDD) mode, maximum measured power spectral density*

8.7.6 Test data (5725 – 5850 MHz operation)

8.7.6.1 IEEE 802.11a (CDD) mode

Table 8.7-5: *Power spectral density test data, IEEE 802.11a (CDD) mode*

Channel	Frequency (MHz)	Modulation	Average PSD (dBm/500 kHz)			Total PSD (dBm/500 kHz)	PSD Limit (dBm/500 kHz)
			ANT1	ANT2	ANT3		
149	5745	16QAM 48 Mbps	2.95	2.96	3.26	7.83	29.63
157	5785		2.62	2.92	**3.28**	7.72	29.63
165	5825		3.00	3.05	3.03	7.80	29.63

The maximum gain is 6.37 dBi < 6 dBi, so the output power limit shall be reduced by 6.37 – 6 = 0.37 dB.

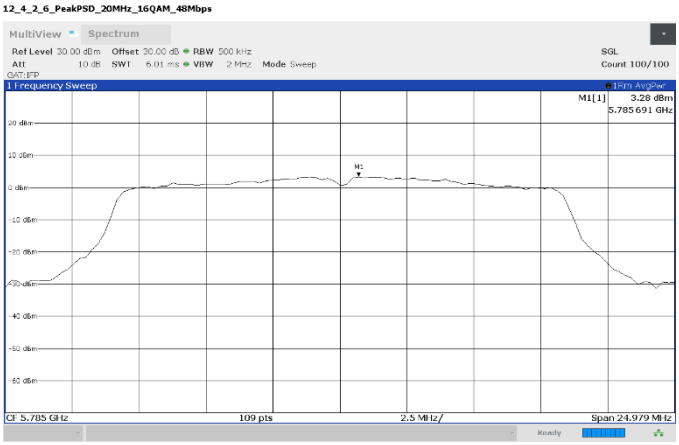

Figure 8.7-5: *Power spectral density, IEEE 802.11a (CDD) mode, maximum measured power spectral density*

8.7.6.2 IEEE 802.11n/ac (V)HT20 (CDD) mode

Table 8.7-6: *Power spectral density test data, IEEE 802.11n/ac (V)HT20 (CDD) mode*

Channel	Frequency (MHz)	Modulation	Average PSD (dBm/500 kHz)			Total PSD (dBm/500 kHz)	PSD Limit (dBm/500 kHz)
			ANT1	ANT2	ANT3		
149	5745	MCS0 BPSK	2.21	3.15	2.93	7.55	29.63
157	5785		2.37	2.88	2.78	7.45	29.63
165	5825		2.50	2.81	**3.01**	7.55	29.63

The maximum gain is 6.37 dBi < 6 dBi, so the output power limit shall be reduced by 6.37 – 6 = 0.37 dB.

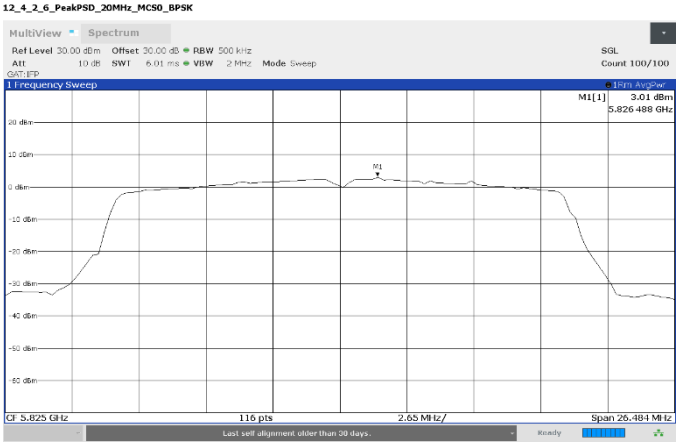

Figure 8.7-6: *Power spectral density, IEEE 802.11n/ac (V)HT20 (CDD) mode, maximum measured power spectral density*

8.7.6.3 IEEE 802.11n/ac (V)HT40 (CDD) mode

Table 8.7-7: *Power spectral density test data, IEEE 802.11n/ac (V)HT40 (CDD) mode*

Channel	Frequency (MHz)	Modulation	Average PSD (dBm/500 kHz)			Total PSD (dBm/500 kHz)	PSD Limit (dBm/500 kHz)
			ANT1	ANT2	ANT3		
151	5755	MCS7 64QAM	-0.45	-0.57	0.18	4.50	29.63
159	5795		-0.81	-0.54	**0.21**	4.41	29.63

The maximum gain is 6.37 dBi < 6 dBi, so the output power limit shall be reduced by 6.37 – 6 = 0.37 dB.

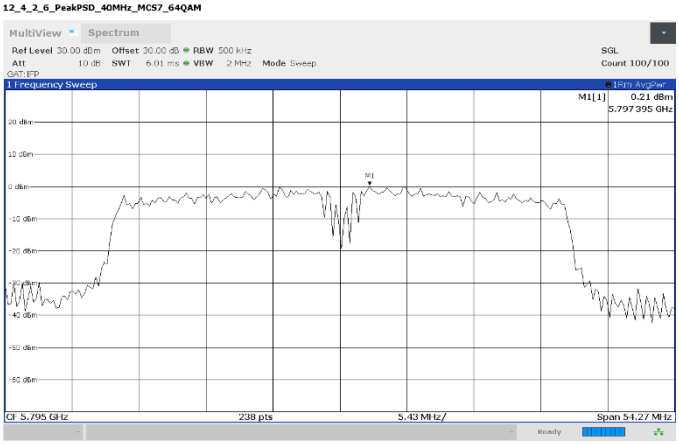

Figure 8.7-7: *Power spectral density, IEEE 802.11n/ac (V)HT40 (CDD) mode, maximum measured power spectral density*

8.7.6.4 IEEE 802.11ac VHT80 (CDD) mode

Table 8.7-8: *Power spectral density test data, IEEE 802.11ac VHT80 (CDD) mode*

Channel	Frequency (MHz)	Modulation	Average PSD (dBm/500 kHz)			Total PSD (dBm/500 kHz)	PSD Limit (dBm/500 kHz)
			ANT1	ANT2	ANT3		
155	5775	MCS8 256QAM	-2.30	-2.56	**-1.78**	2.57	29.63

The maximum gain is 6.37 dBi < 6 dBi, so the output power limit shall be reduced by 6.37 – 6 = 0.37 dB.

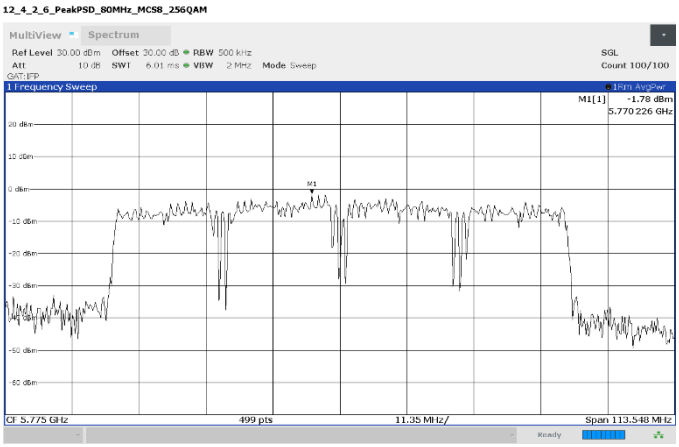

Figure 8.7-8: *Power spectral density, IEEE 802.11ac VHT80 (CDD) mode, maximum measured power spectral density*

8.8 Frequency stability

8.8.1 References and limits

- FCC 47 CFR Part 15, Subpart E: §15.407(g)
- Test method: ANSI C63.10-2020 §6.8

§15.407(g)):
Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

8.8.2 Test summary

Verdict	Pass		
Test date	March 27, 2024	Temperature	21 °C
Test engineer	Chenhao Ma, Wireless Test Technician	Air pressure	1006 mbar
Test location	☒ Wireless bench ☐ Other:	Relative humidity	55 %

8.8.3 Notes

Testing was performed with the transmitter operating on a fixed channel (middle) at maximum output power.

8.8.4 Setup details

EUT power input during test	120 VAC / 60 Hz
EUT setup configuration	☒ Table-top ☐ Floor standing ☐ Other:

8.8.5 Test data (5150 – 5250 MHz operation)

Operating frequency: Channel 40; 5200 MHz

Table 8.8-1: *Frequency stability test data, stability versus temperature*

Temp (°C)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured frequency (MHz)	Verdict	Measured frequency (MHz)	Verdict	Measured frequency (MHz)	Verdict	Measured frequency (MHz)	Verdict
50	120	5199.944	Pass	5199.916	Pass	5199.906	Pass	5199.900	Pass
40	120	5199.922	Pass	5199.992	Pass	5199.989	Pass	5199.992	Pass
30	120	5199.922	Pass	5199.977	Pass	5199.983	Pass	5199.971	Pass
20	120	5199.989	Pass	5199.923	Pass	5199.980	Pass	5199.940	Pass
10	120	5199.975	Pass	5199.997	Pass	5199.930	Pass	5199.944	Pass
0	120	5199.987	Pass	5199.987	Pass	5199.954	Pass	5199.970	Pass
-10	120	5199.938	Pass	5199.993	Pass	5199.961	Pass	5199.927	Pass
-20	120	5199.993	Pass	5199.977	Pass	5199.951	Pass	5199.951	Pass
-30	120	5199.919	Pass	5199.977	Pass	5199.946	Pass	5199.946	Pass

Table 8.8-2: *Frequency stability test data, stability versus voltage*

Temp (°C)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured frequency (MHz)	Verdict	Measured frequency (MHz)	Verdict	Measured frequency (MHz)	Verdict	Measured frequency (MHz)	Verdict
20	138	5199.972	Pass	5199.931	Pass	5199.960	Pass	5199.932	Pass
20	120	5199.989	Pass	5199.923	Pass	5199.980	Pass	5199.940	Pass
20	102	5199.963	Pass	5199.961	Pass	5199.951	Pass	5199.923	Pass

8.8.6 Test data (5725 – 5850 MHz operation)

Operating frequency: Channel 157; 5785 MHz

Table 8.8-3: *Frequency stability test data, stability versus temperature*

Temp (°C)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured frequency (MHz)	Verdict	Measured frequency (MHz)	Verdict	Measured frequency (MHz)	Verdict	Measured frequency (MHz)	Verdict
50	120	5874.978	Pass	5874.959	Pass	5874.902	Pass	5874.938	Pass
40	120	5874.974	Pass	5874.946	Pass	5874.921	Pass	5874.925	Pass
30	120	5874.911	Pass	5874.973	Pass	5874.948	Pass	5874.960	Pass
20	120	5874.952	Pass	5874.940	Pass	5874.917	Pass	5874.905	Pass
10	120	5874.943	Pass	5874.947	Pass	5874.911	Pass	5874.906	Pass
0	120	5874.952	Pass	5874.967	Pass	5874.961	Pass	5874.942	Pass
-10	120	5874.901	Pass	5874.950	Pass	5874.969	Pass	5874.964	Pass
-20	120	5874.956	Pass	5874.940	Pass	5874.944	Pass	5874.981	Pass
-30	120	5874.971	Pass	5874.959	Pass	5874.995	Pass	5874.905	Pass

Table 8.8-4: *Frequency stability test data, stability versus voltage*

Temp (°C)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured frequency (MHz)	Verdict	Measured frequency (MHz)	Verdict	Measured frequency (MHz)	Verdict	Measured frequency (MHz)	Verdict
20	138	5874.976	Pass	5874.956	Pass	5874.930	Pass	5874.982	Pass
20	120	5874.930	Pass	5874.989	Pass	5874.926	Pass	5874.970	Pass
20	102	5874.953	Pass	5874.969	Pass	5874.947	Pass	5874.910	Pass

8.9 AC conducted emissions

8.9.1 References and limits

- FCC 47 CFR Part 15, Subpart E: §15.407(b)(9)
- ISED: RSS-GEN §6.8
- Test method: ANSI C63.10-2020 §6.2

Table 8.9-1: *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.

8.9.2 Test summary

Verdict	Pass		
Test date	May 13, 2024	Temperature	21 °C
Test engineer	Chenhao Ma, Wireless Test Technician	Air pressure	1004 mbar
Test location	☒ Ground plane ☐ Other:	Relative humidity	55 %

8.9.3 Notes

Testing was performed with the transmitter operating on a fixed channel (lowest, middle, and highest) at maximum output power.

The spectral plots within this section have been corrected with all relevant transducer factors.

For EUT's supporting multiple modulation schemes and/or data rates, all modes are screened, and final testing is performed and reported with the worst-case. The following operational modes are reported here:
5150 – 5250 MHz Operation: IEEE 802.11a (CDD), Channel 40, BPSK 9Mbps
5725 – 5850 MHz Operation: IEEE 802.11a (CDD), Channel 157, 16QAM 48 Mbps

8.9.4 Setup details

Port under test	AC power input
EUT power input during test	120 VAC / 60 Hz
EUT setup configuration	☒ Table-top ☐ Floor standing ☐ Other:
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)

8.9.5 Test data (5150 – 5250 MHz operation)

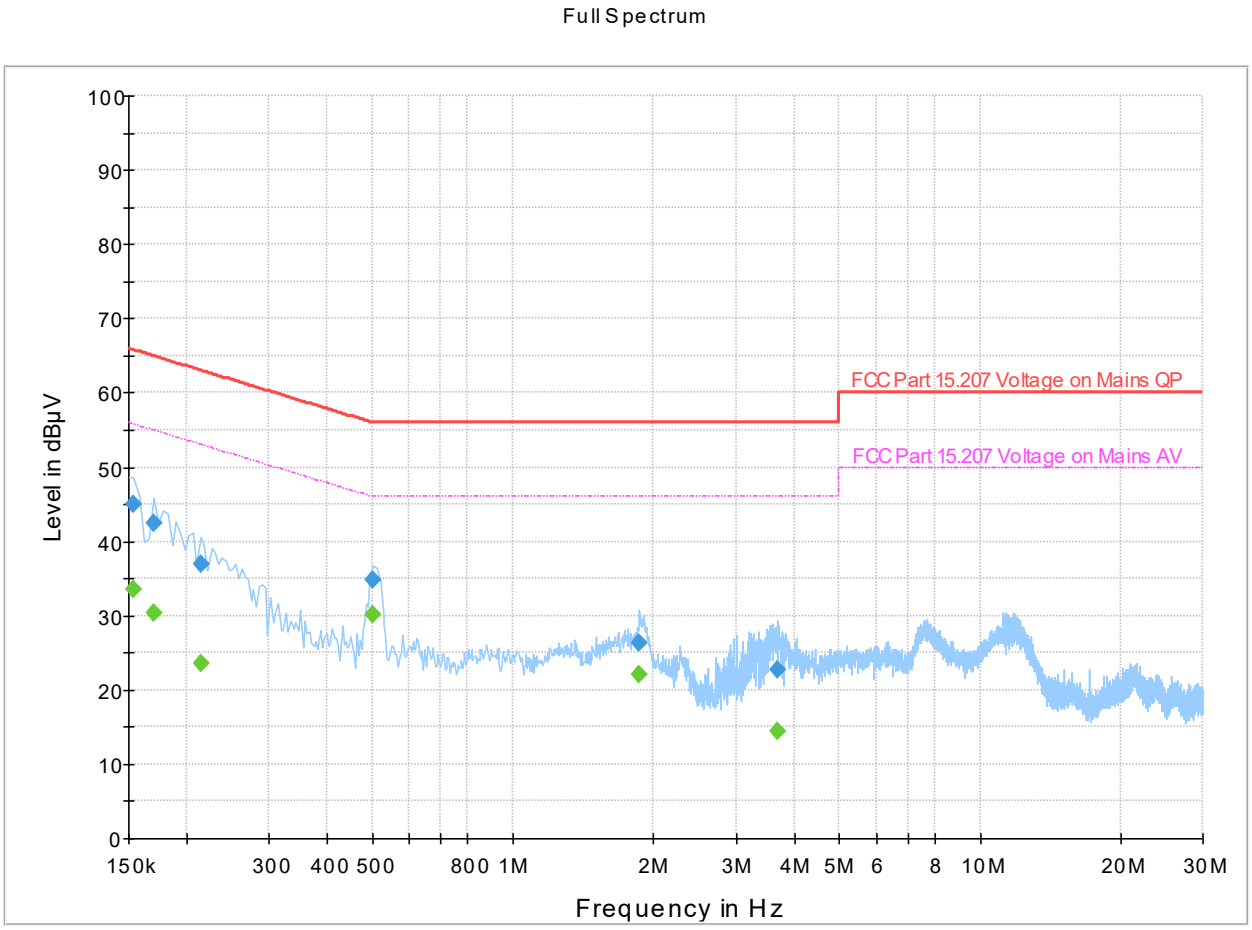

Figure 8.9-1: *Conducted emissions at mains port spectral plot (150 kHz - 30 MHz)*

Table 8.9-2*: Conducted emissions at mains port results*

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.154000	---	33.52	55.78	22.26	5000.0	9.000	N	ON	19.6
0.154000	45.04	---	65.78	20.75	5000.0	9.000	N	ON	19.6
0.170000	---	30.42	54.96	24.54	5000.0	9.000	N	ON	19.6
0.170000	42.37	---	64.96	22.59	5000.0	9.000	N	ON	19.6
0.214000	---	23.57	53.05	29.48	5000.0	9.000	L1	ON	19.7
0.214000	36.88	---	63.05	26.16	5000.0	9.000	L1	ON	19.7
0.502000	34.86	---	56.00	21.14	5000.0	9.000	L1	ON	19.7
0.502000	---	30.15	46.00	15.85	5000.0	9.000	L1	ON	19.7
1.866000	---	22.00	46.00	24.00	5000.0	9.000	N	ON	19.8
1.866000	26.37	---	56.00	29.63	5000.0	9.000	N	ON	19.8
3.682000	22.75	---	56.00	33.25	5000.0	9.000	L1	ON	19.9
3.682000	---	14.35	46.00	31.65	5000.0	9.000	L1	ON	19.9

Notes:
[1] Result (dBµV) = receiver analyzer value (dBµV) + correction factor (dB).
[2] Correction factors = LISN factor IL (dB) + cable loss (dB) + transient limiter (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.

8.9.6 Test data (5725 – 5850 MHz operation)

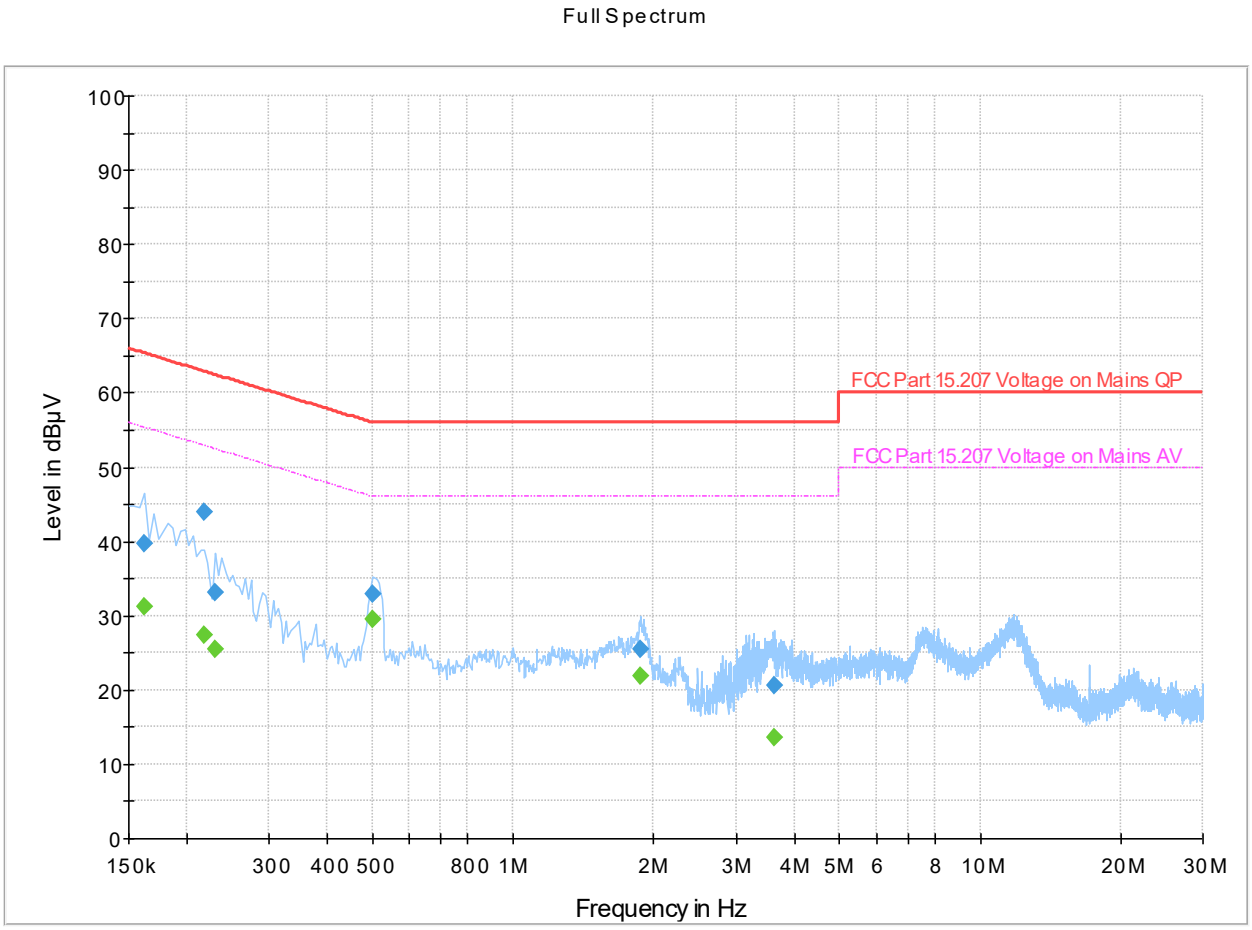

Figure 8.9-2: *Conducted emissions at mains port spectral plot (150 kHz - 30 MHz)*

Table 8.9-3*: Conducted emissions at mains port results*

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.162000	---	31.14	55.36	24.22	5000.0	9.000	L1	ON	19.7
0.162000	39.70	---	65.36	25.66	5000.0	9.000	L1	ON	19.7
0.218000	43.95	---	62.90	18.95	5000.0	9.000	N	ON	19.7
0.218000	---	27.44	52.90	25.46	5000.0	9.000	N	ON	19.7
0.230000	33.06	---	62.45	29.39	5000.0	9.000	N	ON	19.7
0.230000	---	25.50	52.45	26.95	5000.0	9.000	N	ON	19.7
0.502000	---	29.48	46.00	16.52	5000.0	9.000	L1	ON	19.7
0.502000	32.91	---	56.00	23.09	5000.0	9.000	L1	ON	19.7
1.878000	---	21.90	46.00	24.10	5000.0	9.000	N	ON	19.8
1.878000	25.46	---	56.00	30.54	5000.0	9.000	N	ON	19.8
3.634000	---	13.64	46.00	32.36	5000.0	9.000	N	ON	19.8
3.634000	20.61	---	56.00	35.39	5000.0	9.000	N	ON	19.8

Notes: [1] Result (dBµV) = receiver analyzer value (dBµV) + correction factor (dB).
[2] Correction factors = LISN factor IL (dB) + cable loss (dB) + transient limiter (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.

8.10 Spurious emissions

8.10.1 References and limits

- FCC 47 CFR Part 15, Subpart C: §15.407(b)
- RSS-247: §6.2.4(3)
- Test method: ANSI C63.10-2020 §12.7 (antenna port conducted spurious emissions)

§15.407(b): Undesirable emission limits. Except as shown in paragraph (b)(10) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(4) For transmitters operating solely in the 5.725-5.850 GHz band:

(i) All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

(ii) Devices certified before March 2, 2017, with antenna gain greater than 10 dBi may demonstrate compliance with the emission limits in § 15.247(d), but manufacturing, marketing, and importing of devices certified under this alternative must cease by March 2, 2018. Devices certified before March 2, 2018, with antenna gain of 10 dBi or less may demonstrate compliance with the emission limits in § 15.247(d), but manufacturing, marketing, and importing of devices certified under this alternative must cease before March 2, 2020.

(5) For transmitters operating solely in the 5.850-5.895 GHz band or operating on a channel that spans across 5.725-5.895 GHz:

(i) For an indoor access point or subordinate device, all emissions at or above 5.895 GHz shall not exceed an e.i.r.p. of 15 dBm/MHz and shall decrease linearly to an e.i.r.p. of −7 dBm/MHz at or above 5.925 GHz.

(ii) For a client device, all emissions at or above 5.895 GHz shall not exceed an e.i.r.p. of −5 dBm/MHz and shall decrease linearly to an e.i.r.p. of −27 dBm/MHz at or above 5.925 GHz.

(iii) For a client device or indoor access point or subordinate device, all emissions below 5.725 GHz shall not exceed an e.i.r.p. of −27 dBm/MHz at 5.65 GHz increasing linearly to 10 dBm/MHz at 5.7 GHz, and from 5.7 GHz increasing linearly to a level of 15.6 dBm/MHz at 5.72 GHz, and from 5.72 GHz increasing linearly to a level of 27 dBm/MHz at 5.725 GHz.

(6) For transmitters operating within the 5.925-7.125 GHz band: Any emissions outside of the 5.925-7.125 GHz band must not exceed an e.i.r.p. of −27 dBm/MHz.

(7) For transmitters operating within the 5.925-7.125 GHz bands: Power spectral density must be suppressed by 20 dB at 1 MHz outside of channel edge, by 28 dB at one channel bandwidth from the channel center, and by 40 dB at one- and one-half times the channel bandwidth away from channel center. At frequencies between one megahertz outside an unlicensed device's channel edge and one channel bandwidth from the center of the channel, the limits must be linearly interpolated between 20 dB and 28 dB suppression, and at frequencies between one and one- and one-half times an unlicensed device's channel bandwidth, the limits must be linearly interpolated between 28 dB and 40 dB suppression. Emissions removed from the channel center by more than one- and one-half times the channel bandwidth must be suppressed by at least 40 dB.

(8) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.

(9) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in § 15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in § 15.207.

(10) The provisions of § 15.205 apply to intentional radiators operating under this section.

(11) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency band edges as the design of the equipment permits.

RSS-247:

6.2.2.4 Devices operating in the band 5725-5850 MHz shall comply with the following e.i.r.p. spectral density limits:

- 27 dBm/MHz at frequencies from the band edges decreasing linearly to 15.6 dBm/MHz at 5 MHz above or below the band edges.
- 15.6 dBm/MHz at 5 MHz above or below the band edges decreasing linearly to 10 dBm/MHz at 25 MHz above or below the band edges.
- 10 dBm/MHz at 25 MHz above or below the band edges decreasing linearly to -27 dBm/MHz at 75 MHz above or below the band edges; and
- -27 dBm/MHz at frequencies more than 75 MHz above or below the band edges.

8.10.2 Test summary

Verdict	Pass		
Test date	May 29, 2024	Temperature	19 °C
Test engineer	Chenhao Ma, Wireless Test Technician	Air pressure	1006 mbar
Test location	☐ Wireless bench (conducted tests) ☐ 10 m semi-anechoic chamber (radiated tests) ☒ 3 m semi-anechoic chamber (radiated tests) ☐ Other:	Relative humidity	48 %

8.10.3 Notes

Testing was performed with the transmitter operating on a fixed channel at full power. Low, middle, and high channels were tested. The spectrum was searched from 30 MHz to 26 GHz (above the 10th harmonic of the highest transmit frequency).

For radiated measurements, the EUT was investigated to identify the worst-case orientation with respect to the fundamental transmitter power. All measurements were performed with the EUT in that worst-case orientation.

The spectral plots within this section have been corrected with all relevant transducer factors.

Radiated emissions are reported for the modulation / data rate settings that produced the highest transmitter output power as a worst-case.

8.10.4 Setup details

EUT power input during test	120 VAC / 60 Hz
EUT setup configuration	☐ Table-top ☐ Floor standing ☐ Other:

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)

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

Resolution bandwidth	1 MHz
Video bandwidth	3 MHz
Detector mode	Peak (preview measurements) Peak and average (final measurements)

8.10.5 Test data (emissions < 1 GHz)

8.10.5.1 5150 – 5250 MHz operation

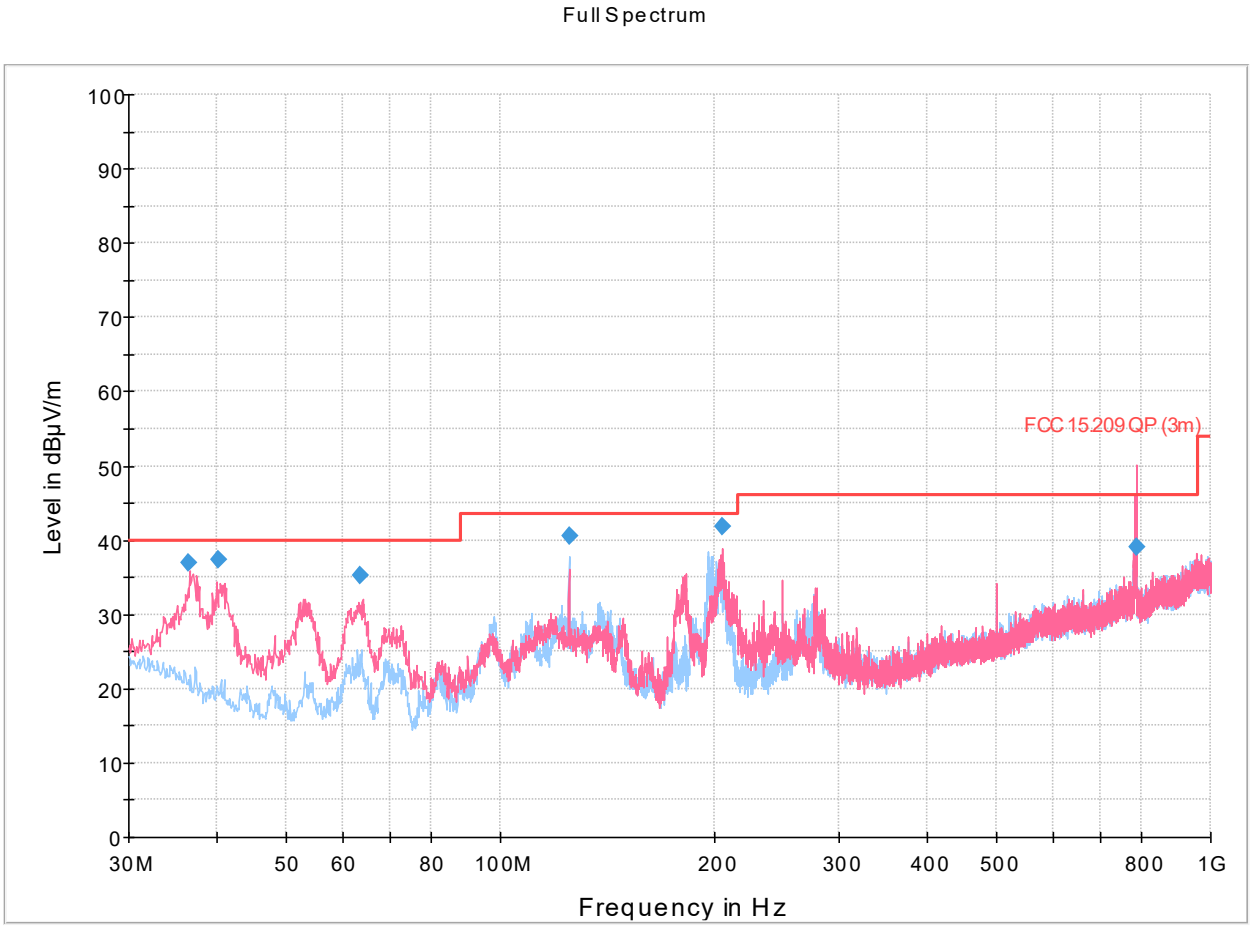

Figure 8.10-1: *Radiated emissions spectral plot (30 MHz - 1 GHz)*

Table 8.10-1*: Radiated emissions results*

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
36.476000	37.01	40.00	2.99	5000.0	100.000	113.0	V	280.0	21.3
40.190000	37.44	40.00	2.56	5000.0	100.000	100.0	V	182.0	19.0
63.573000	35.17	40.00	4.83	5000.0	100.000	123.0	V	12.0	12.2
125.003000	40.59	43.50	2.91	5000.0	100.000	248.0	H	260.0	18.4
205.587000	41.83	43.50	1.67	5000.0	100.000	100.0	V	115.0	16.6
785.916000	39.07	46.00	6.93	5000.0	100.000	257.0	V	328.0	32.0

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.

8.10.5.2 5725 – 5850 MHz operation

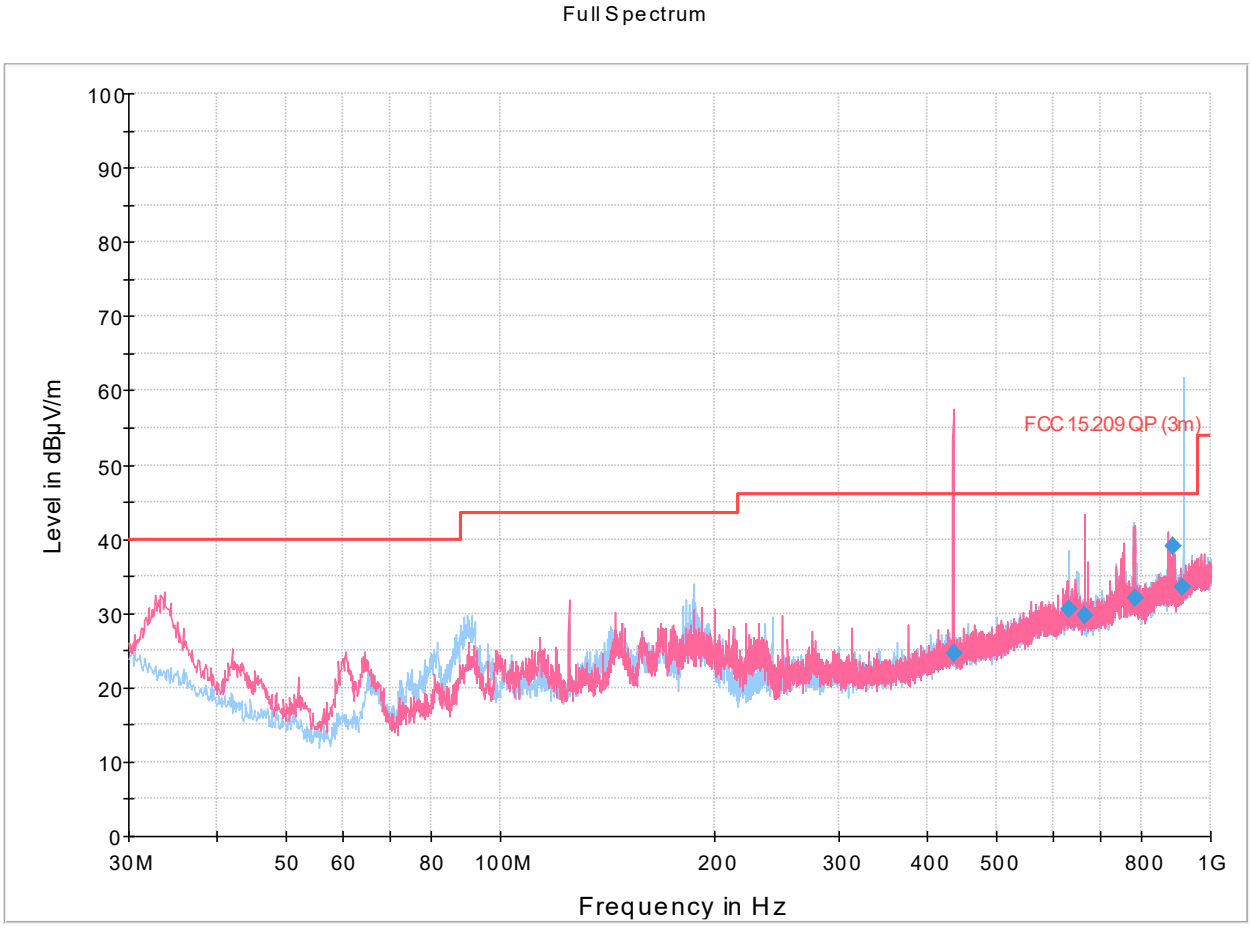

Figure 8.10-2: *Radiated emissions spectral plot (30 MHz - 1 GHz)*

Table 8.10-2*: Radiated emissions results*

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
434.982000	24.59	46.00	21.41	5000.0	120.000	157.0	V	100.0	25.4
632.266000	30.49	46.00	15.51	5000.0	120.000	357.0	H	75.0	30.3
666.282000	29.69	46.00	16.31	5000.0	120.000	257.0	V	186.0	30.1
781.031000	32.11	46.00	13.89	5000.0	120.000	324.0	V	66.0	32.1
884.908000	38.98	46.00	7.02	5000.0	120.000	348.0	V	170.0	33.2
913.588000	33.63	46.00	12.37	5000.0	120.000	247.0	H	321.0	33.8

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.

8.10.6 Test data (emissions > 1 GHz)

8.10.6.1 5150 – 5250 MHz operation

IEEE 802.11a (CDD) mode

Note: Spurious emissions limit of -27 dBm/MHz corresponds to field strength at 3m measurement distance of 68.23 dBµV/m. Emissions in restricted bands must meet the limits of FCC 15.209.

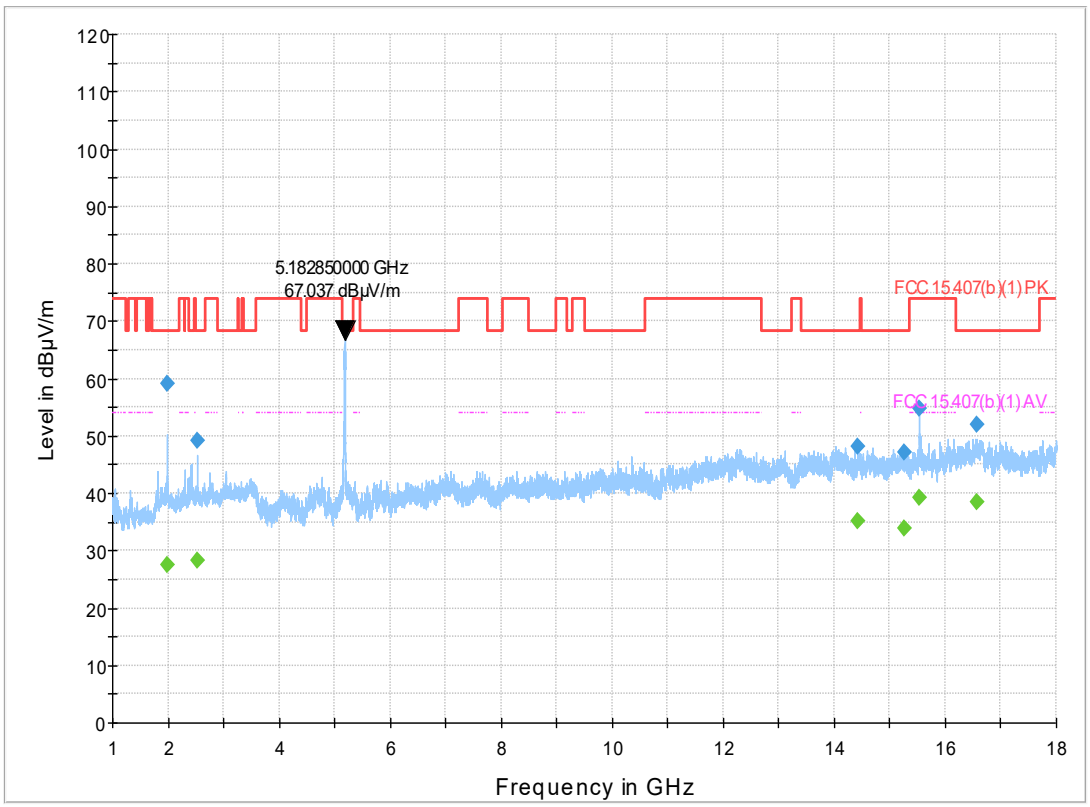

Figure 8.10-3: *Radiated emissions spectral plot (1 GHz - 18 GHz), 5180 MHz operation*

Table 8.10-3*: Radiated emissions results*

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)
1992.900000	59.20	---	68.23	9.03	5000.0	1000.000	130.0	H	222.0	-6.0
1992.900000	---	27.39	---	---	5000.0	1000.000	130.0	H	222.0	-6.0
2524.050000	49.28	---	68.23	18.95	5000.0	1000.000	302.0	V	347.0	-3.8
2524.050000	---	28.34	---	---	5000.0	1000.000	302.0	V	347.0	-3.8
14428.100000	48.24	---	68.23	19.99	5000.0	1000.000	120.0	H	349.0	16.6
14428.100000	---	35.05	---	---	5000.0	1000.000	120.0	H	349.0	16.6
15254.100000	---	33.79	---	---	5000.0	1000.000	304.0	V	134.0	18.1
15254.100000	47.12	---	68.23	21.11	5000.0	1000.000	304.0	V	134.0	18.1
15539.050000	54.84	---	73.98	19.14	5000.0	1000.000	163.0	H	0.0	19.4
15539.050000	---	39.32	53.98	14.66	5000.0	1000.000	163.0	H	0.0	19.4
16559.900000	---	38.43	---	---	5000.0	1000.000	339.0	H	345.0	22.3
16559.900000	51.99	---	68.23	16.24	5000.0	1000.000	339.0	H	345.0	22.3

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
A notch filter was used to suppress the fundamental emission to prevent overloading of measurement equipment.
Marked emission at 5182 MHz is the transmitter fundamental emission and is not evaluated against the limits.

Full Spectrum

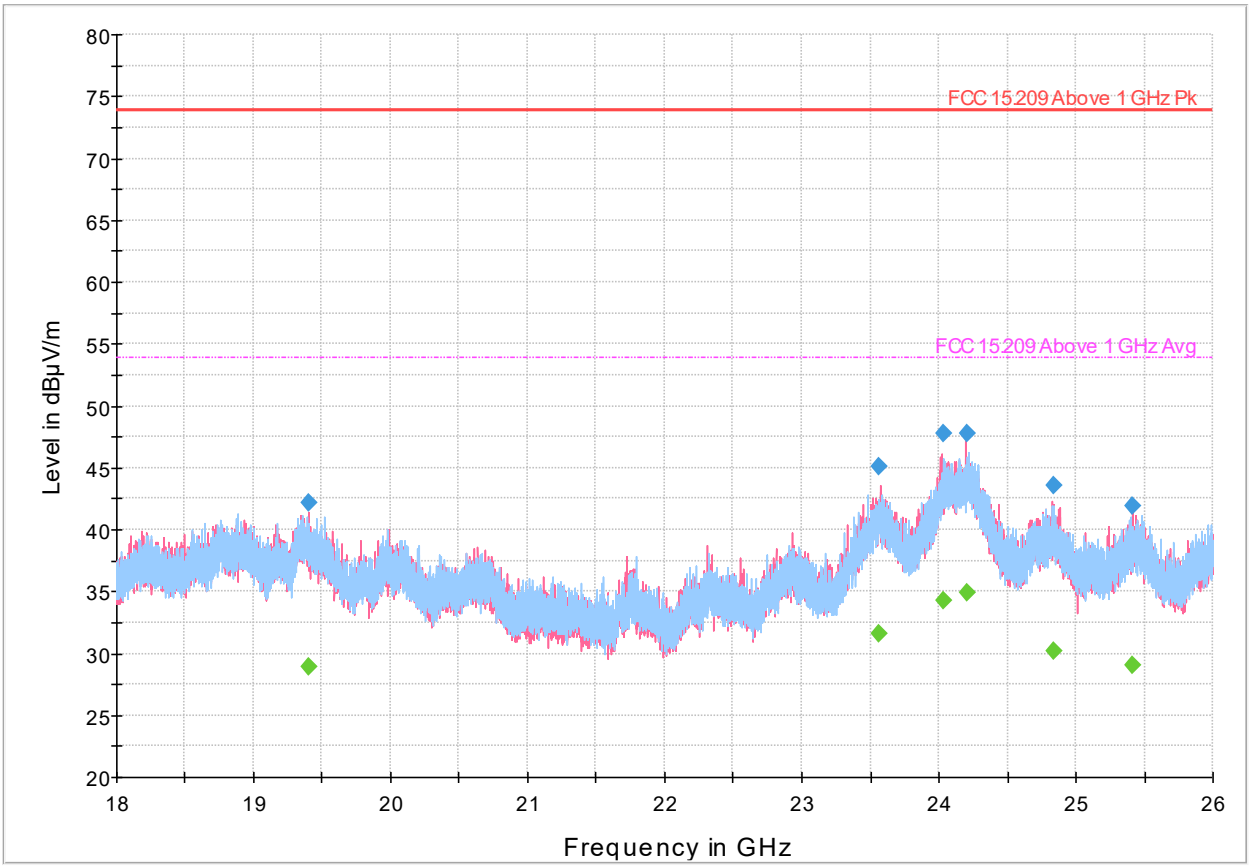

Figure 8.10-4: *Radiated emissions spectral plot (18 GHz - 26 GHz), 5180 MHz operation*

Table 8.10-4*: Radiated emissions results*

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)
19402.500000	42.13	---	73.90	31.77	5000.0	1000.000	104.0	V	21.0	16.6
19402.500000	---	28.88	53.90	25.02	5000.0	1000.000	104.0	V	21.0	16.6
23568.500000	45.08	---	73.90	28.82	5000.0	1000.000	149.0	V	177.0	23.8
23568.500000	---	31.59	53.90	22.31	5000.0	1000.000	149.0	V	177.0	23.8
24029.700000	---	34.29	53.90	19.61	5000.0	1000.000	373.0	V	105.0	27.6
24029.700000	47.75	---	73.90	26.15	5000.0	1000.000	373.0	V	105.0	27.6
24201.300000	---	34.88	53.90	19.02	5000.0	1000.000	240.0	V	32.0	27.1
24201.300000	47.73	---	73.90	26.17	5000.0	1000.000	240.0	V	32.0	27.1
24834.700000	---	30.20	53.90	23.70	5000.0	1000.000	222.0	V	0.0	22.3
24834.700000	43.63	---	73.90	30.27	5000.0	1000.000	222.0	V	0.0	22.3
25414.500000	---	29.09	53.90	24.81	5000.0	1000.000	194.0	V	238.0	21.6
25414.500000	41.96	---	73.90	31.94	5000.0	1000.000	194.0	V	238.0	21.6

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
Results show compliance with 68.23 dBµV/m (at 3m) limit (-27 dBm/MHz)

Full Spectrum

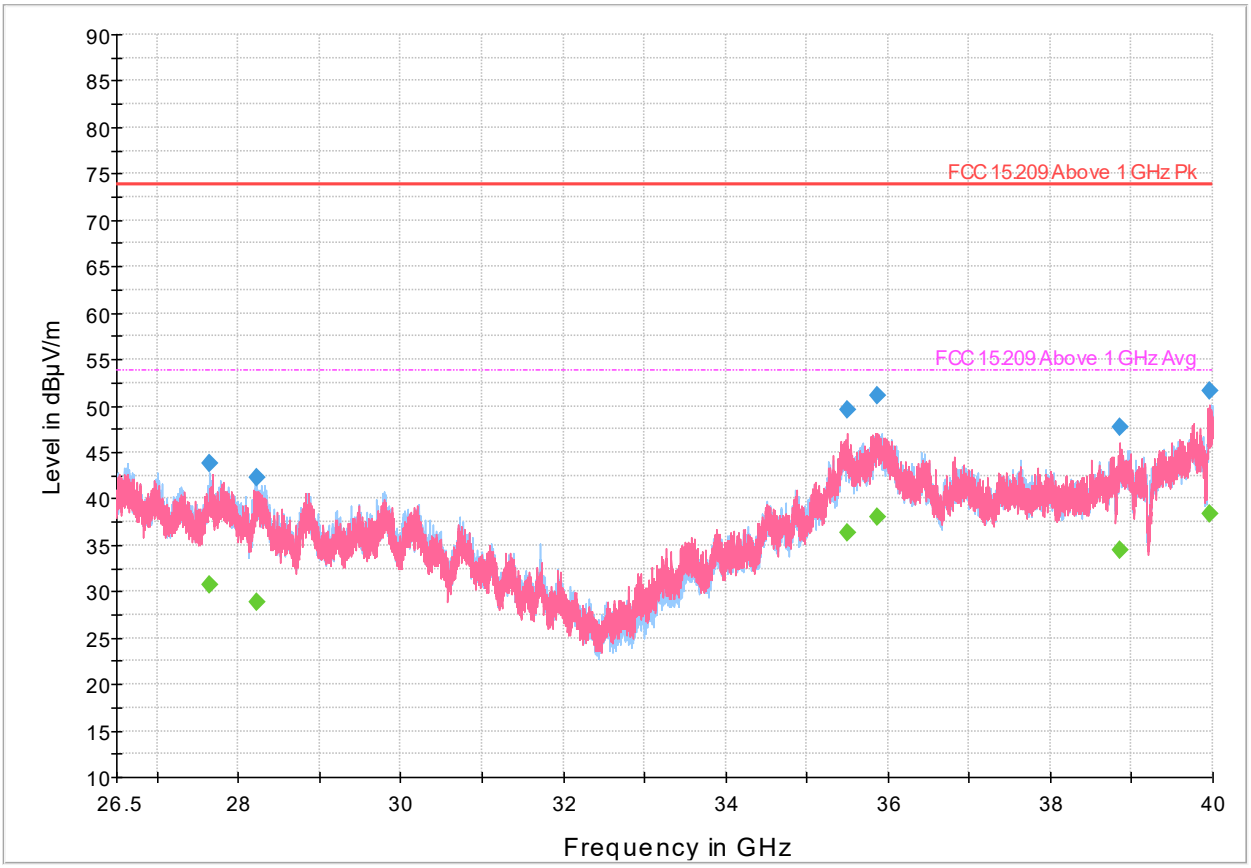

Figure 8.10-5: *Radiated emissions spectral plot (26.5 GHz - 40 GHz), 5180 MHz operation*

Table 8.10-5*: Radiated emissions results*

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)
27642.212500	43.86	---	73.90	30.04	5000.0	1000.000	156.0	H	5.0	9.5
27642.212500	---	30.66	53.90	23.24	5000.0	1000.000	156.0	H	5.0	9.5
28222.918750	42.34	---	73.90	31.56	5000.0	1000.000	116.0	H	137.0	10.8
28222.918750	---	28.81	53.90	25.09	5000.0	1000.000	116.0	H	137.0	10.8
35507.087500	---	36.35	53.90	17.55	5000.0	1000.000	131.0	V	7.0	19.5
35507.087500	49.54	---	73.90	24.36	5000.0	1000.000	131.0	V	7.0	19.5
35867.143750	---	38.01	53.90	15.89	5000.0	1000.000	134.0	V	-1.0	20.7
35867.143750	51.14	---	73.90	22.76	5000.0	1000.000	134.0	V	-1.0	20.7
38853.831250	---	34.42	53.90	19.48	5000.0	1000.000	177.0	V	111.0	16.6
38853.831250	47.68	---	73.90	26.22	5000.0	1000.000	177.0	V	111.0	16.6
39960.606250	---	38.35	53.90	15.55	5000.0	1000.000	182.0	V	176.0	20.6
39960.606250	51.56	---	73.90	22.34	5000.0	1000.000	182.0	V	176.0	20.6

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
Results show compliance with 68.23 dBµV/m (at 3m) limit (-27 dBm/MHz)

Full Spectrum

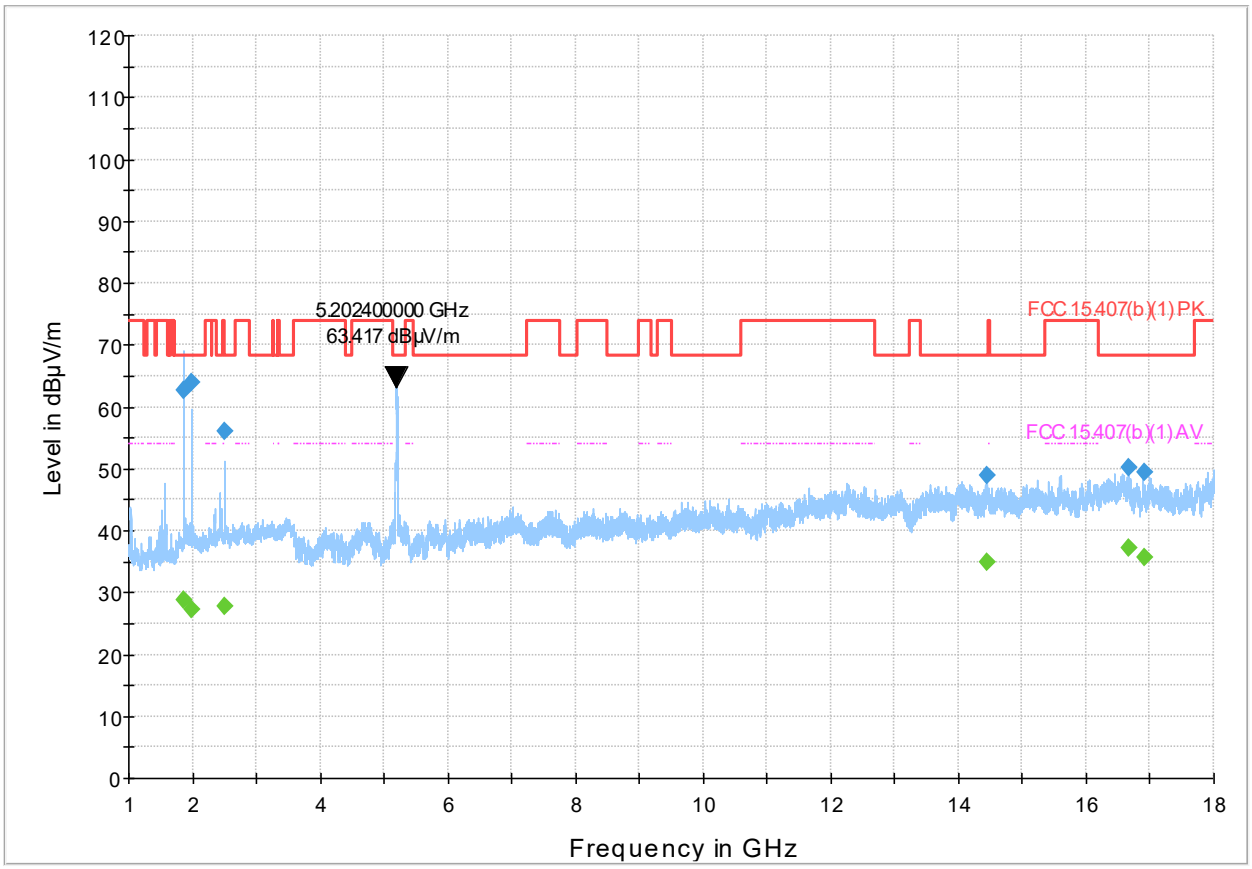

Figure 8.10-6: *Radiated emissions spectral plot (1 GHz - 18 GHz), 5200 MHz operation*

Table 8.10-6*: Radiated emissions results*

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)
1873.050000	62.61	---	68.23	5.62	5000.0	1000.000	376.0	H	85.0	-6.1
1873.050000	---	28.73	---	---	5000.0	1000.000	376.0	H	85.0	-6.1
1992.750000	---	27.38	---	---	5000.0	1000.000	127.0	V	74.0	-6.0
1992.750000	63.82	---	68.23	4.41	5000.0	1000.000	127.0	V	74.0	-6.0
2494.300000	---	27.76	53.98	26.22	5000.0	1000.000	301.0	H	166.0	-4.0
2494.300000	55.96	---	73.98	18.02	5000.0	1000.000	301.0	H	166.0	-4.0
14440.600000	---	35.00	---	---	5000.0	1000.000	360.0	H	222.0	17.1
14440.600000	48.97	---	68.23	19.26	5000.0	1000.000	360.0	H	222.0	17.1
16659.150000	50.09	---	68.23	18.14	5000.0	1000.000	104.0	H	210.0	23.1
16659.150000	---	37.22	---	---	5000.0	1000.000	104.0	H	210.0	23.1
16904.850000	---	35.70	---	---	5000.0	1000.000	284.0	V	294.0	20.4
16904.850000	49.31	---	68.23	18.92	5000.0	1000.000	284.0	V	294.0	20.4

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
A notch filter was used to suppress the fundamental emission to prevent overloading of measurement equipment.
Marked emission at 5202 MHz is the transmitter fundamental emission and is not evaluated against the limits.

Full Spectrum

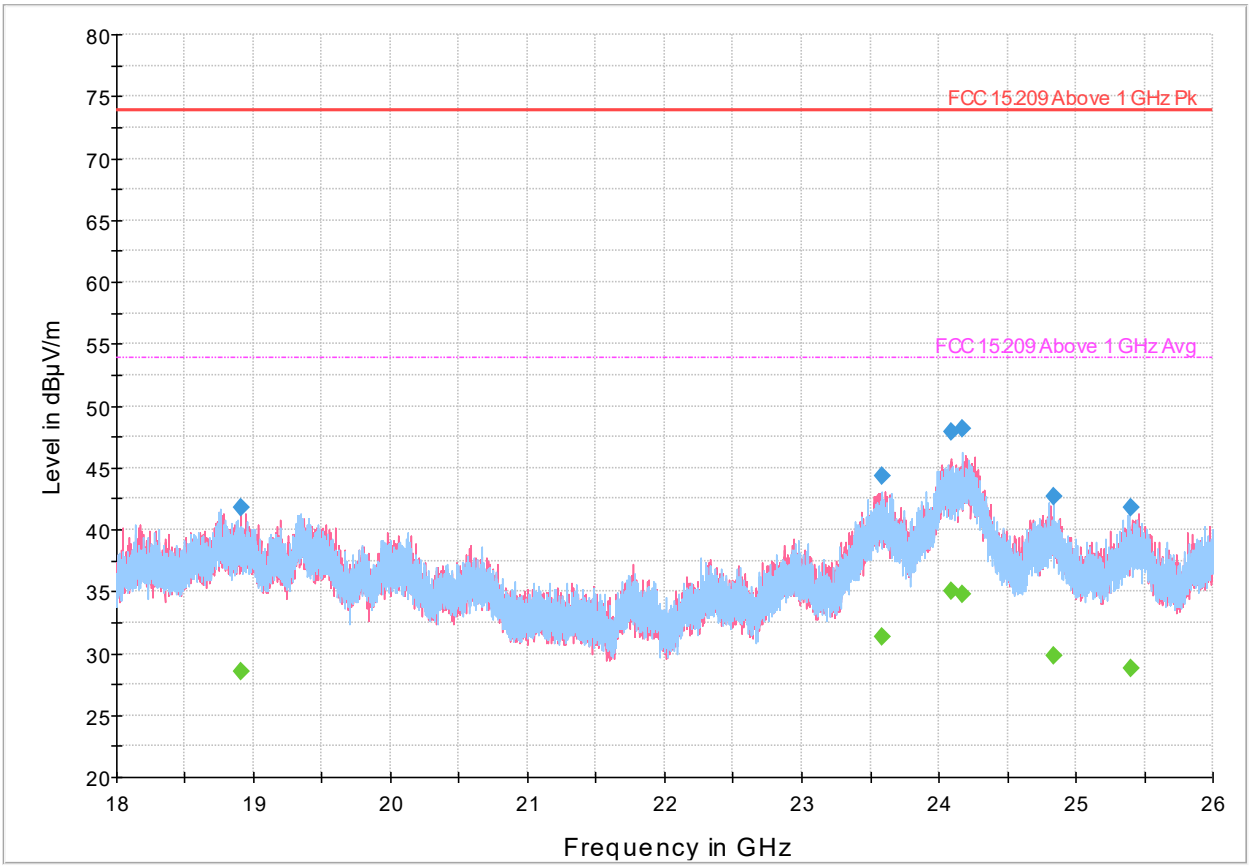

Figure 8.10-7: *Radiated emissions spectral plot (18 GHz - 26 GHz), 5200 MHz operation*

Table 8.10-7*: Radiated emissions results*

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)
18908.500000	---	28.56	53.90	25.34	5000.0	1000.000	157.0	V	0.0	15.9
18908.500000	41.75	---	73.90	32.15	5000.0	1000.000	157.0	V	0.0	15.9
23582.900000	44.28	---	73.90	29.62	5000.0	1000.000	256.0	H	232.0	23.9
23582.900000	---	31.31	53.90	22.59	5000.0	1000.000	256.0	H	232.0	23.9
24086.500000	47.89	---	73.90	26.01	5000.0	1000.000	385.0	V	0.0	27.5
24086.500000	---	35.07	53.90	18.83	5000.0	1000.000	385.0	V	0.0	27.5
24172.500000	48.19	---	73.90	25.71	5000.0	1000.000	386.0	H	120.0	27.2
24172.500000	---	34.79	53.90	19.11	5000.0	1000.000	386.0	H	120.0	27.2
24843.300000	---	29.77	53.90	24.13	5000.0	1000.000	268.0	H	194.0	22.3
24843.300000	42.66	---	73.90	31.24	5000.0	1000.000	268.0	H	194.0	22.3
25396.900000	41.79	---	73.90	32.11	5000.0	1000.000	146.0	H	43.0	21.5
25396.900000	---	28.73	53.90	25.17	5000.0	1000.000	146.0	H	43.0	21.5

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
Results show compliance with 68.23 dBµV/m (at 3m) limit (-27 dBm/MHz)

Full Spectrum

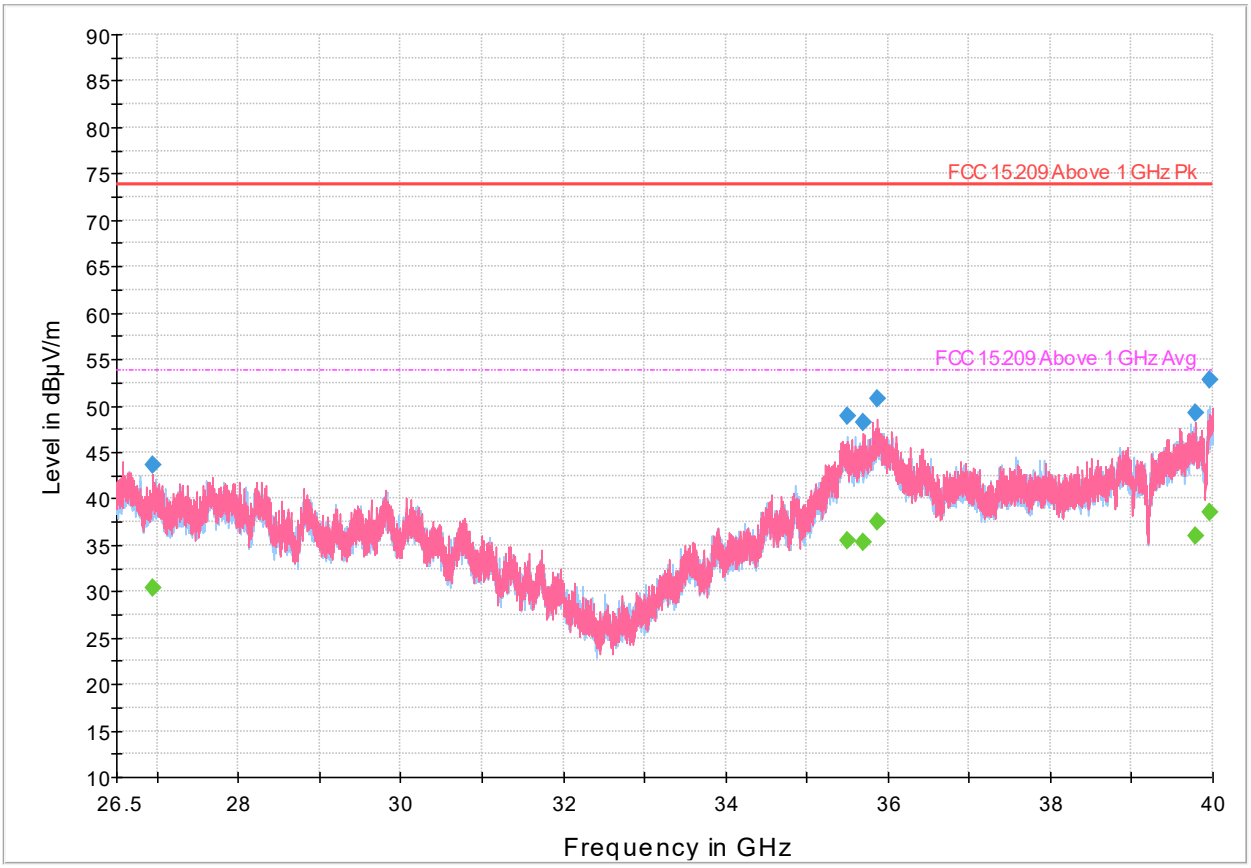

Figure 8.10-8: *Radiated emissions spectral plot (26.5 GHz - 40 GHz), 5200 MHz operation*

Table 8.10-8*: Radiated emissions results*

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)
26951.500000	---	30.45	53.90	23.45	5000.0	1000.000	132.0	V	236.0	9.4
26951.500000	43.66	---	73.90	30.24	5000.0	1000.000	132.0	V	236.0	9.4
35499.775000	48.82	---	73.90	25.08	5000.0	1000.000	159.0	H	109.0	19.5
35499.775000	---	35.49	53.90	18.41	5000.0	1000.000	159.0	H	109.0	19.5
35700.812500	---	35.33	53.90	18.57	5000.0	1000.000	155.0	V	8.0	20.2
35700.812500	48.28	---	73.90	25.62	5000.0	1000.000	155.0	V	8.0	20.2
35873.875000	50.79	---	73.90	23.11	5000.0	1000.000	186.0	V	10.0	20.7
35873.875000	---	37.59	53.90	16.31	5000.0	1000.000	186.0	V	10.0	20.7
39790.787500	49.19	---	73.90	24.71	5000.0	1000.000	195.0	V	290.0	18.8
39790.787500	---	36.01	53.90	17.89	5000.0	1000.000	195.0	V	290.0	18.8
39963.118750	52.74	---	73.90	21.16	5000.0	1000.000	159.0	H	270.0	20.6
39963.118750	---	38.45	53.90	15.45	5000.0	1000.000	159.0	H	270.0	20.6

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
Results show compliance with 68.23 dBµV/m (at 3m) limit (-27 dBm/MHz)

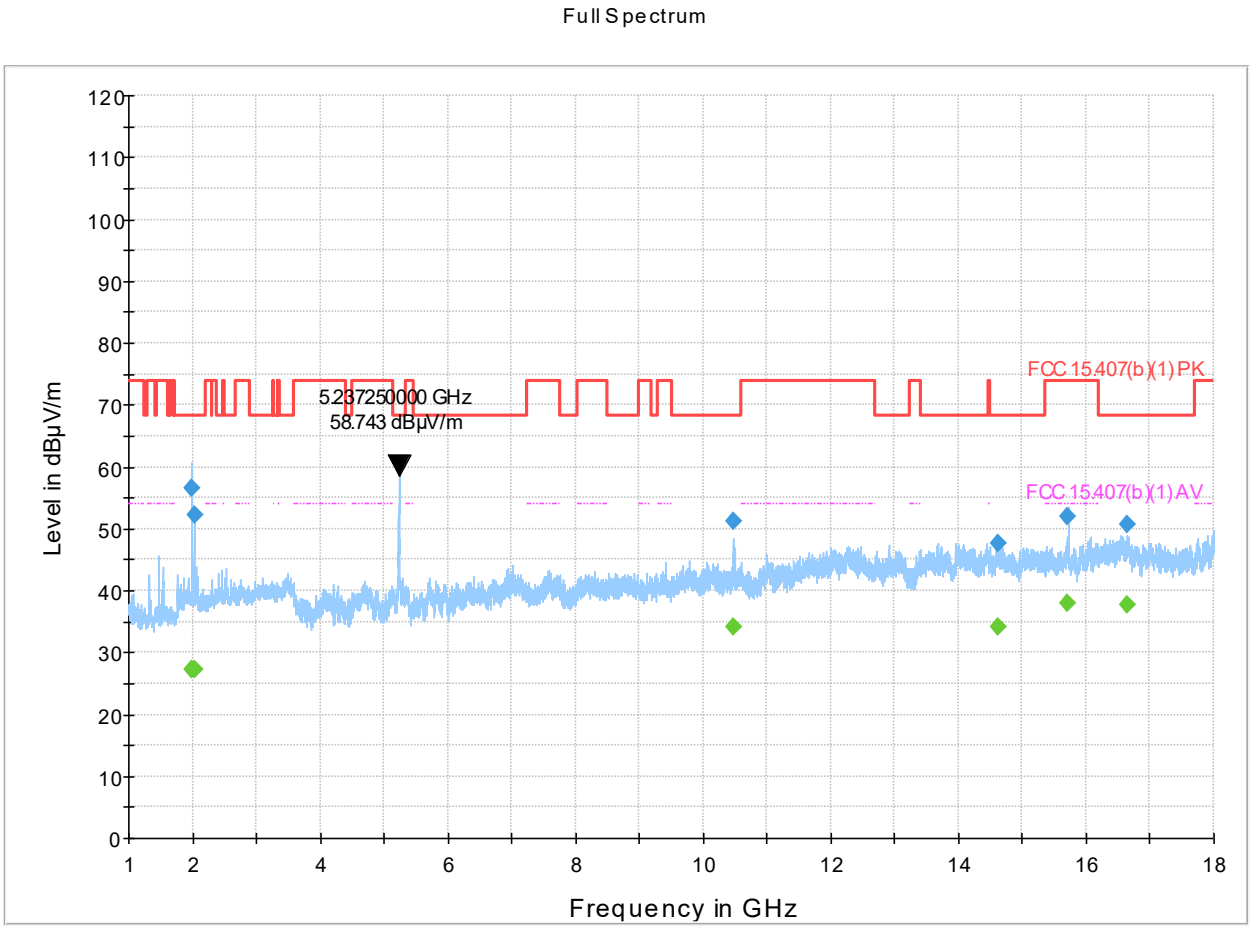

Figure 8.10-9: *Radiated emissions spectral plot (1 GHz - 18 GHz), 5240 MHz operation*

Table 8.10-9*: Radiated emissions results*

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)
1997.350000	---	27.16	---	---	5000.0	1000.000	360.0	H	43.0	-6.1
1997.350000	56.54	---	68.23	11.69	5000.0	1000.000	360.0	H	43.0	-6.1
2026.850000	---	27.18	---	---	5000.0	1000.000	133.0	H	355.0	-6.0
2026.850000	52.30	---	68.23	15.93	5000.0	1000.000	133.0	H	355.0	-6.0
10483.050000	51.26	---	68.23	16.97	5000.0	1000.000	146.0	H	0.0	10.5
10483.050000	---	34.24	---	---	5000.0	1000.000	146.0	H	0.0	10.5
14616.000000	47.69	---	68.23	20.54	5000.0	1000.000	150.0	H	0.0	16.7
14616.000000	---	34.26	---	---	5000.0	1000.000	150.0	H	0.0	16.7
15717.000000	---	38.00	53.98	15.98	5000.0	1000.000	154.0	H	53.0	20.0
15717.000000	51.86	---	73.98	22.12	5000.0	1000.000	154.0	H	53.0	20.0
16642.950000	---	37.69	---	---	5000.0	1000.000	231.0	V	178.0	23.3
16642.950000	50.72	---	68.23	17.51	5000.0	1000.000	231.0	V	178.0	23.3

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
A notch filter was used to suppress the fundamental emission to prevent overloading of measurement equipment.
Marked emission at 5237 MHz is the transmitter fundamental emission and is not evaluated against the limits.

Full Spectrum

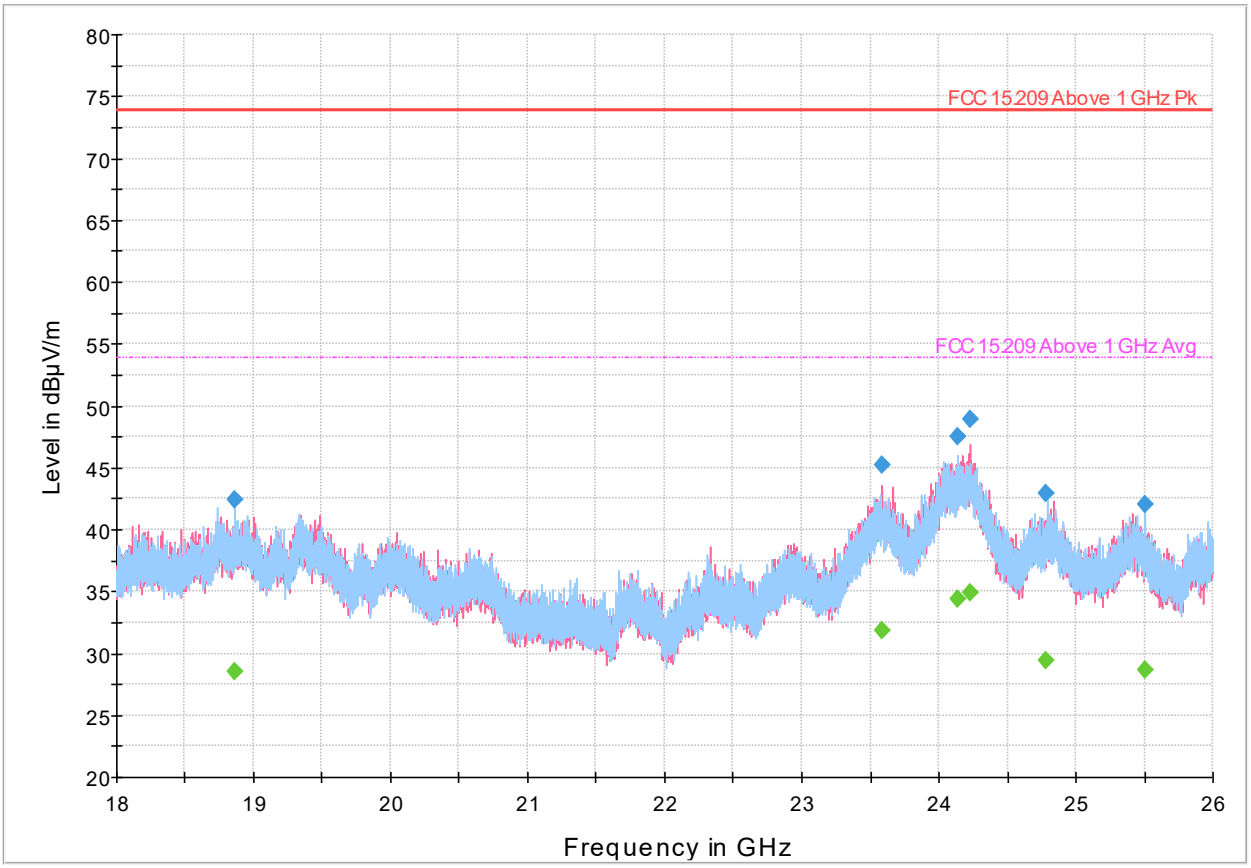

Figure 8.10-10: *Radiated emissions spectral plot (18 GHz - 26 GHz), 5240 MHz operation*

Table 8.10-10*: Radiated emissions results*

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)
18859.900000	42.40	---	73.90	31.50	5000.0	1000.000	191.0	H	181.0	15.9
18859.900000	---	28.52	53.90	25.38	5000.0	1000.000	191.0	H	181.0	15.9
23582.500000	---	31.86	53.90	22.04	5000.0	1000.000	281.0	V	263.0	23.9
23582.500000	45.20	---	73.90	28.70	5000.0	1000.000	281.0	V	263.0	23.9
24143.300000	47.55	---	73.90	26.35	5000.0	1000.000	295.0	H	170.0	27.3
24143.300000	---	34.35	53.90	19.55	5000.0	1000.000	295.0	H	170.0	27.3
24234.900000	48.89	---	73.90	25.01	5000.0	1000.000	361.0	V	273.0	27.0
24234.900000	---	34.89	53.90	19.01	5000.0	1000.000	361.0	V	273.0	27.0
24786.500000	---	29.46	53.90	24.44	5000.0	1000.000	336.0	H	75.0	22.3
24786.500000	42.98	---	73.90	30.92	5000.0	1000.000	336.0	H	75.0	22.3
25503.500000	42.05	---	73.90	31.85	5000.0	1000.000	164.0	H	0.0	22.0
25503.500000	---	28.64	53.90	25.26	5000.0	1000.000	164.0	H	0.0	22.0

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
Results show compliance with 68.23 dBµV/m (at 3m) limit (-27 dBm/MHz)

Full Spectrum

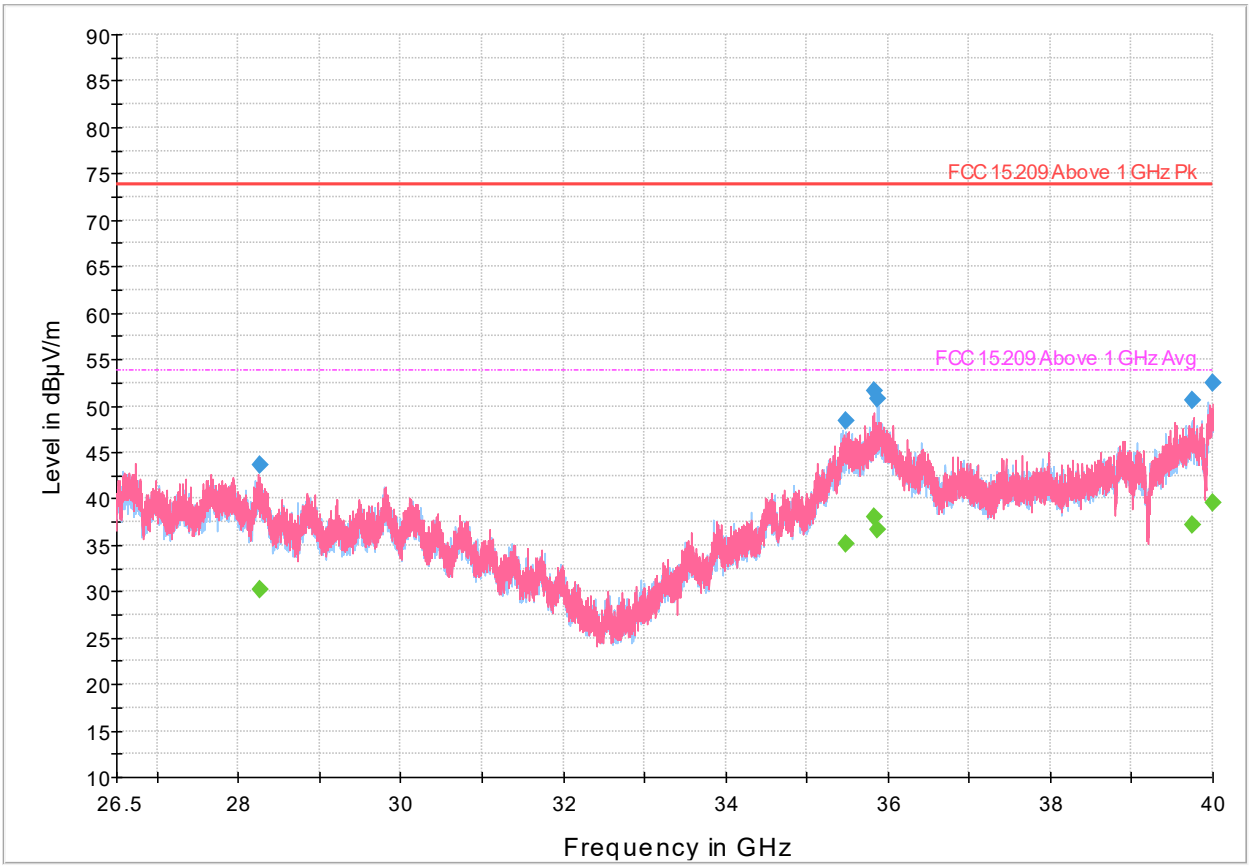

Figure 8.10-11: *Radiated emissions spectral plot (26.5 GHz - 40 GHz), 5240 MHz operation*

Table 8.10-11*: Radiated emissions results*

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)
28265.781250	43.62	---	73.90	30.28	5000.0	1000.000	175.0	V	308.0	10.7
28265.781250	---	30.29	53.90	23.61	5000.0	1000.000	175.0	V	308.0	10.7
35489.893750	---	35.18	53.90	18.72	5000.0	1000.000	174.0	H	10.0	19.4
35489.893750	48.34	---	73.90	25.56	5000.0	1000.000	174.0	H	10.0	19.4
35830.475000	---	38.11	53.90	15.79	5000.0	1000.000	185.0	V	122.0	20.6
35830.475000	51.56	---	73.90	22.34	5000.0	1000.000	185.0	V	122.0	20.6
35862.362500	---	36.59	53.90	17.31	5000.0	1000.000	108.0	H	10.0	20.7
35862.362500	50.83	---	73.90	23.07	5000.0	1000.000	108.0	H	10.0	20.7
39756.925000	50.63	---	73.90	23.27	5000.0	1000.000	175.0	V	0.0	18.5
39756.925000	---	37.09	53.90	16.81	5000.0	1000.000	175.0	V	0.0	18.5
39991.900000	---	39.47	53.90	14.43	5000.0	1000.000	182.0	V	177.0	21.0
39991.900000	52.48	---	73.90	21.42	5000.0	1000.000	182.0	V	177.0	21.0

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
Results show compliance with 68.23 dBµV/m (at 3m) limit (-27 dBm/MHz)

Full Spectrum

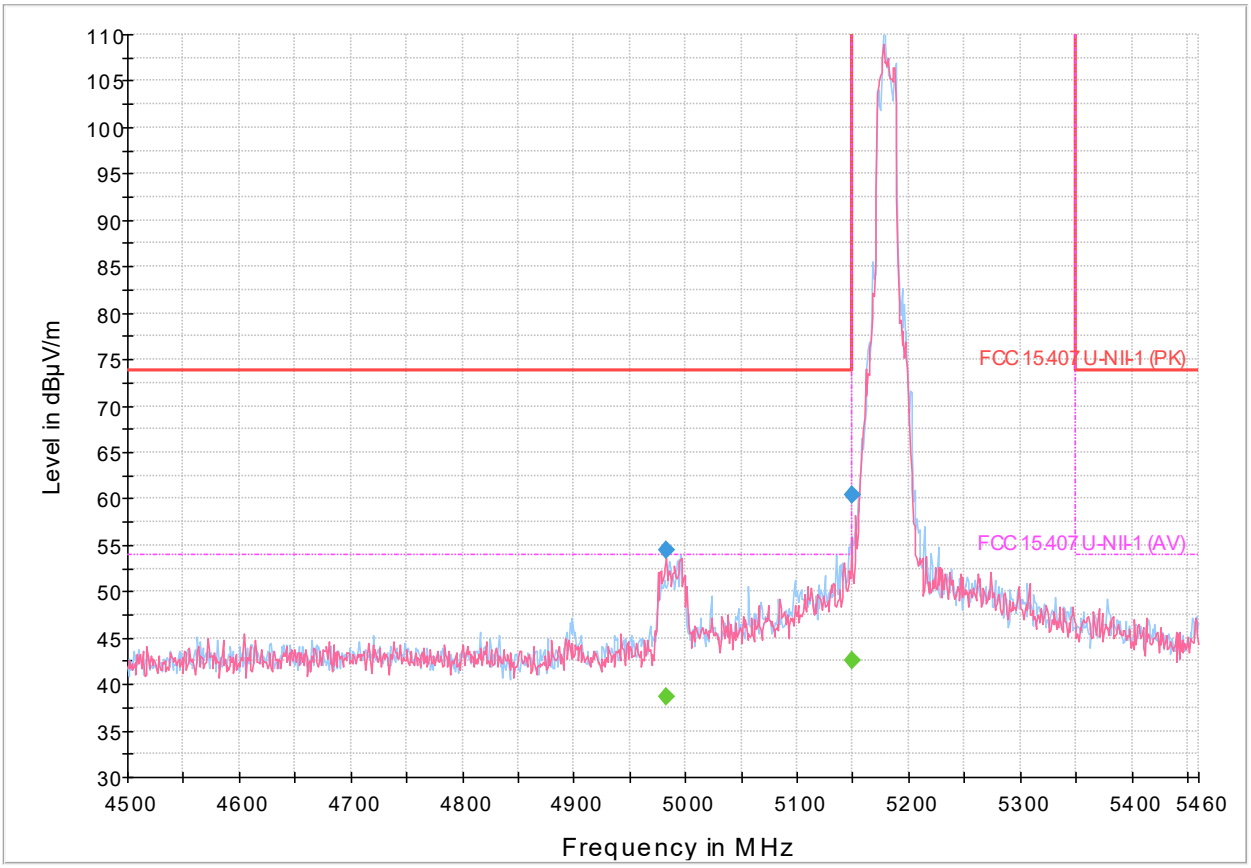

Figure 8.10-12: *Radiated emissions spectral plot (4.5 GHz - 5.46 GHz), 5180 MHz operation*

Table 8.10-12*: Radiated emissions results*

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)
4982.880000	54.42	---	73.90	19.48	5000.0	1000.000	113.0	V	210.0	1.4
4982.880000	---	38.61	53.90	15.29	5000.0	1000.000	113.0	V	210.0	1.4
5150.000000	60.34	---	73.90	13.56	5000.0	1000.000	151.0	V	11.0	2.4
5150.000000	---	42.62	53.90	11.28	5000.0	1000.000	151.0	V	11.0	2.4

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.

Full Spectrum

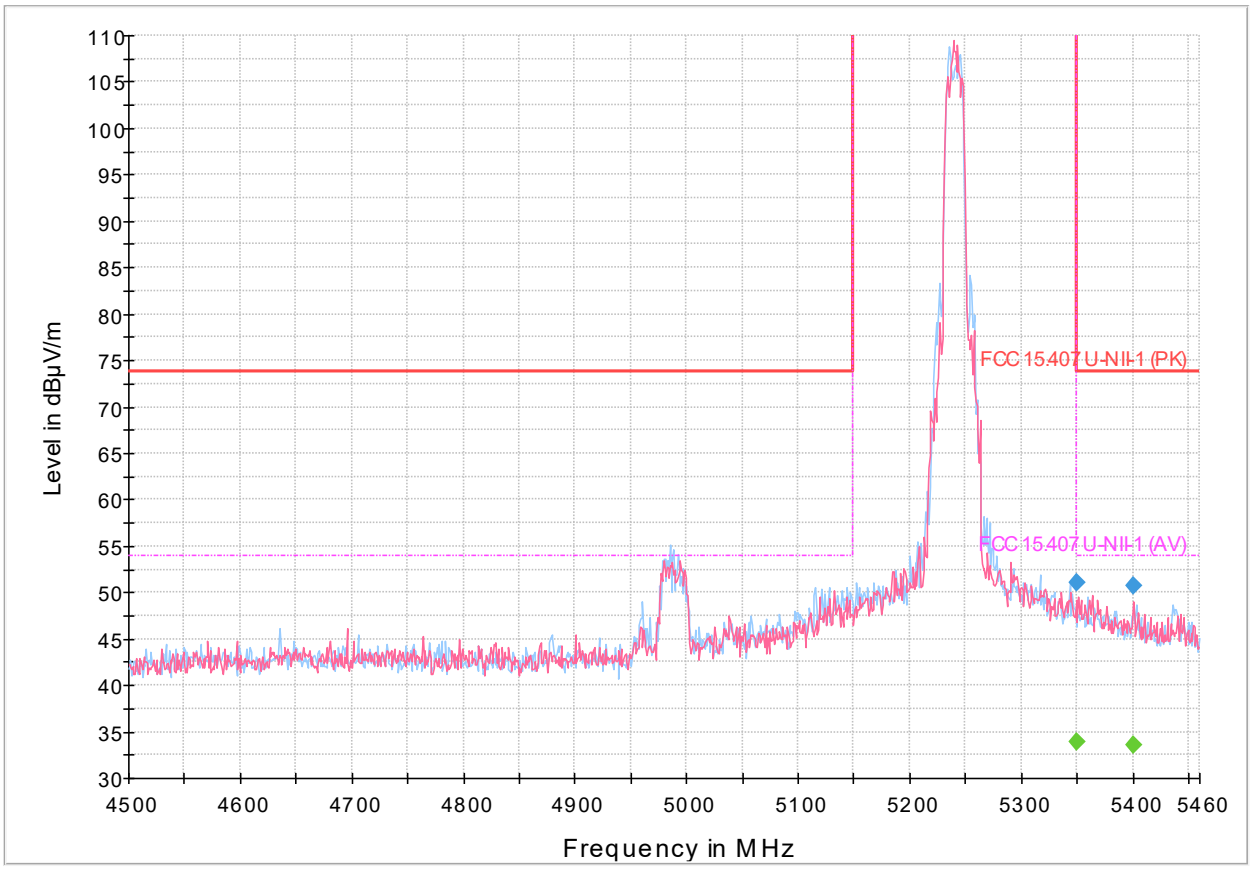

Figure 8.10-13: *Radiated emissions spectral plot (4.5 GHz - 5.46 GHz), 5240 MHz operation*

Table 8.10-13*: Radiated emissions results*

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)
5350.000000	---	33.82	53.90	20.08	5000.0	1000.000	137.0	V	0.0	2.9
5350.000000	51.07	---	73.90	22.83	5000.0	1000.000	137.0	V	0.0	2.9
5400.480000	---	33.58	53.90	20.32	5000.0	1000.000	188.0	V	0.0	2.9
5400.480000	50.72	---	73.90	23.18	5000.0	1000.000	188.0	V	0.0	2.9

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.

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Note: Spurious emissions limit of -27 dBm/MHz corresponds to field strength at 3m measurement distance of 68.23 dBµV/m. Emissions in restricted bands must meet the limits of FCC 15.209.

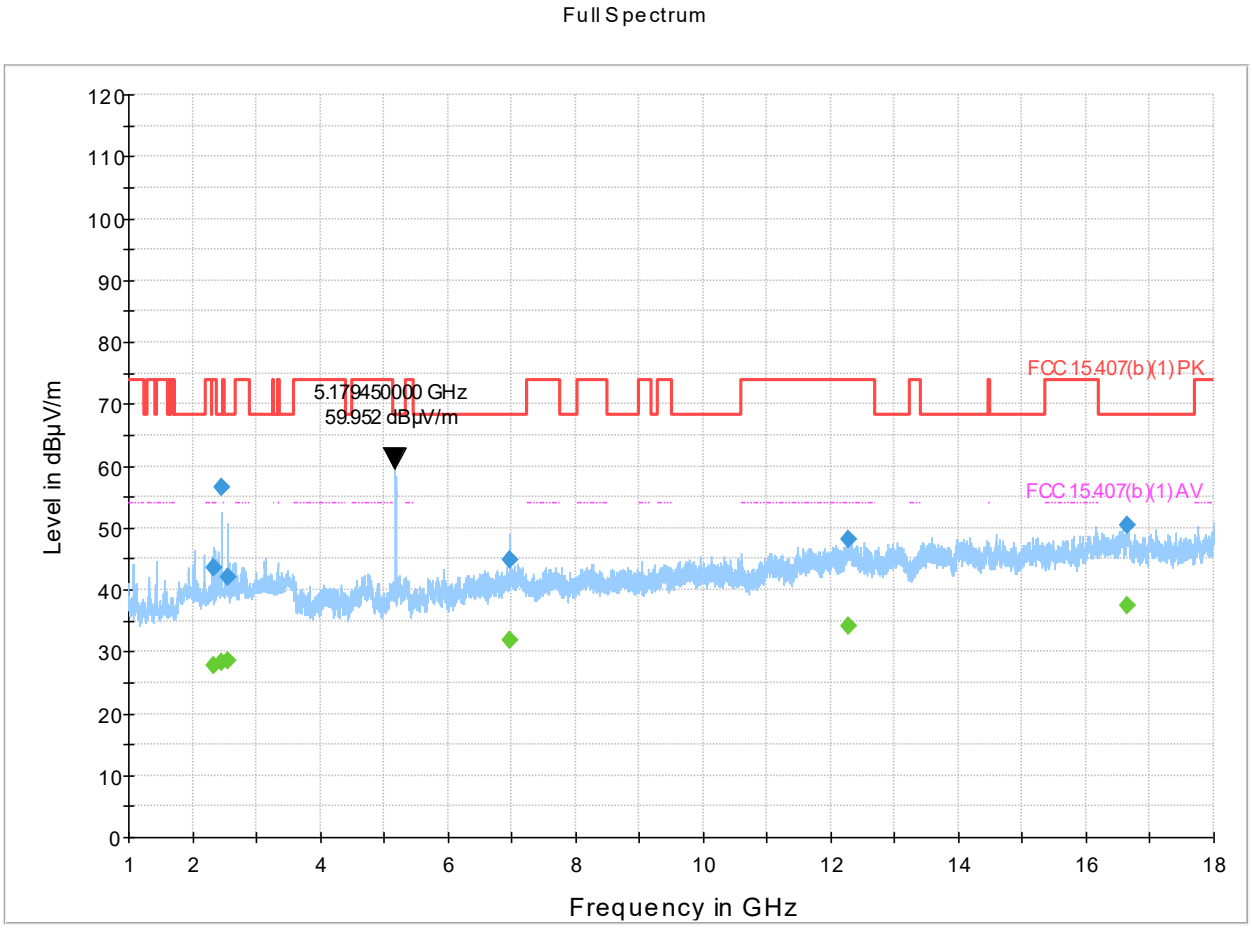

Figure 8.10-14: *Radiated emissions spectral plot (1 GHz - 18 GHz), 5180 MHz operation*

Table 8.10-14*: Radiated emissions results*

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)
2334.050000	43.55	---	73.98	30.43	5000.0	1000.000	176.0	H	152.0	-4.9
2334.050000	---	27.83	53.98	26.15	5000.0	1000.000	176.0	H	152.0	-4.9
2464.700000	---	28.30	---	---	5000.0	1000.000	339.0	V	156.0	-4.0
2464.700000	56.47	---	68.23	11.76	5000.0	1000.000	339.0	V	156.0	-4.0
2556.800000	42.03	---	68.23	26.20	5000.0	1000.000	310.0	V	219.0	-3.8
2556.800000	---	28.50	---	---	5000.0	1000.000	310.0	V	219.0	-3.8
6983.150000	---	31.88	---	---	5000.0	1000.000	257.0	V	46.0	5.0
6983.150000	44.82	---	68.23	23.41	5000.0	1000.000	257.0	V	46.0	5.0
12278.050000	48.04	---	73.98	25.94	5000.0	1000.000	113.0	V	51.0	15.3
12278.050000	---	34.20	53.98	19.78	5000.0	1000.000	113.0	V	51.0	15.3
16654.700000	50.38	---	68.23	17.85	5000.0	1000.000	293.0	H	349.0	23.3
16654.700000	---	37.33	---	---	5000.0	1000.000	293.0	H	349.0	23.3

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
A notch filter was used to suppress the fundamental emission to prevent overloading of measurement equipment.
Marked emission at 5179 MHz is the transmitter fundamental emission and is not evaluated against the limits.

Full Spectrum

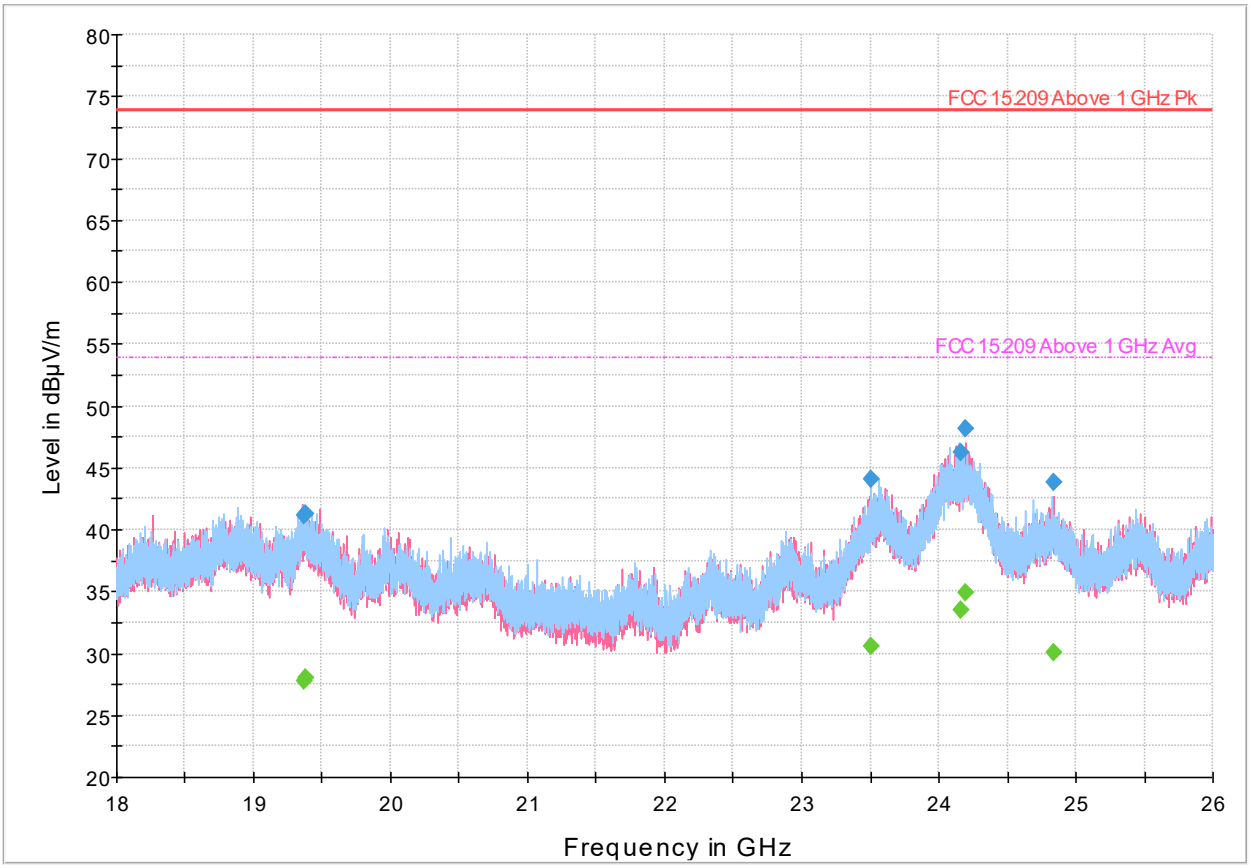

Figure 8.10-15: *Radiated emissions spectral plot (18 GHz - 26 GHz), 5180 MHz operation*

Table 8.10-15*: Radiated emissions results*

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)
19363.100000	41.12	---	73.90	32.78	5000.0	1000.000	178.0	V	20.0	16.7
19363.100000	---	27.82	53.90	26.08	5000.0	1000.000	178.0	V	20.0	16.7
19377.700000	---	28.05	53.90	25.85	5000.0	1000.000	162.0	V	183.0	16.6
19377.700000	41.26	---	73.90	32.64	5000.0	1000.000	162.0	V	183.0	16.6
23505.300000	44.04	---	73.90	29.86	5000.0	1000.000	368.0	H	179.0	23.2
23505.300000	---	30.61	53.90	23.29	5000.0	1000.000	368.0	H	179.0	23.2
24156.900000	46.30	---	73.90	27.60	5000.0	1000.000	172.0	H	283.0	27.2
24156.900000	---	33.47	53.90	20.43	5000.0	1000.000	172.0	H	283.0	27.2
24191.700000	---	34.87	53.90	19.03	5000.0	1000.000	224.0	V	21.0	27.1
24191.700000	48.17	---	73.90	25.73	5000.0	1000.000	224.0	V	21.0	27.1
24834.500000	43.80	---	73.90	30.10	5000.0	1000.000	319.0	V	154.0	22.3
24834.500000	---	30.02	53.90	23.88	5000.0	1000.000	319.0	V	154.0	22.3

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
Results show compliance with 68.23 dBµV/m (at 3m) limit (-27 dBm/MHz)

Full Spectrum

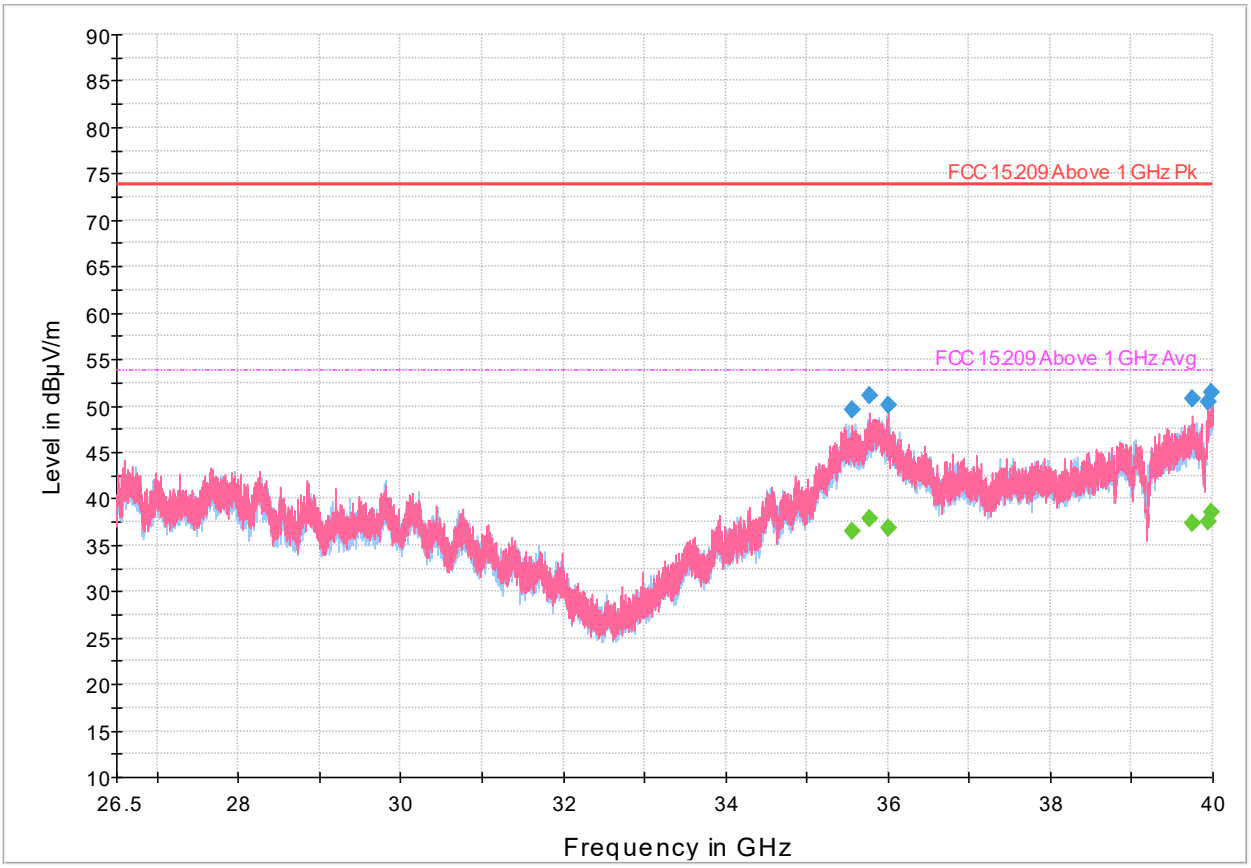

Figure 8.10-16: *Radiated emissions spectral plot (26.5 GHz - 40 GHz), 5180 MHz operation*

Table 8.10-16*: Radiated emissions results*

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)
35557.637500	49.53	---	73.90	24.37	5000.0	1000.000	132.0	V	324.0	19.7
35557.637500	---	36.42	53.90	17.48	5000.0	1000.000	132.0	V	324.0	19.7
35779.150000	51.08	---	73.90	22.82	5000.0	1000.000	174.0	V	5.0	20.5
35779.150000	---	37.81	53.90	16.09	5000.0	1000.000	174.0	V	5.0	20.5
36003.175000	50.14	---	73.90	23.76	5000.0	1000.000	165.0	V	77.0	21.0
36003.175000	---	36.85	53.90	17.05	5000.0	1000.000	165.0	V	77.0	21.0
39755.368750	50.73	---	73.90	23.17	5000.0	1000.000	137.0	V	143.0	18.5
39755.368750	---	37.32	53.90	16.58	5000.0	1000.000	137.0	V	143.0	18.5
39932.781250	---	37.48	53.90	16.42	5000.0	1000.000	116.0	H	166.0	20.1
39932.781250	50.50	---	73.90	23.40	5000.0	1000.000	116.0	H	166.0	20.1
39979.843750	---	38.62	53.90	15.28	5000.0	1000.000	161.0	H	21.0	20.8
39979.843750	51.50	---	73.90	22.40	5000.0	1000.000	161.0	H	21.0	20.8

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
Results show compliance with 68.23 dBµV/m (at 3m) limit (-27 dBm/MHz)

Full Spectrum

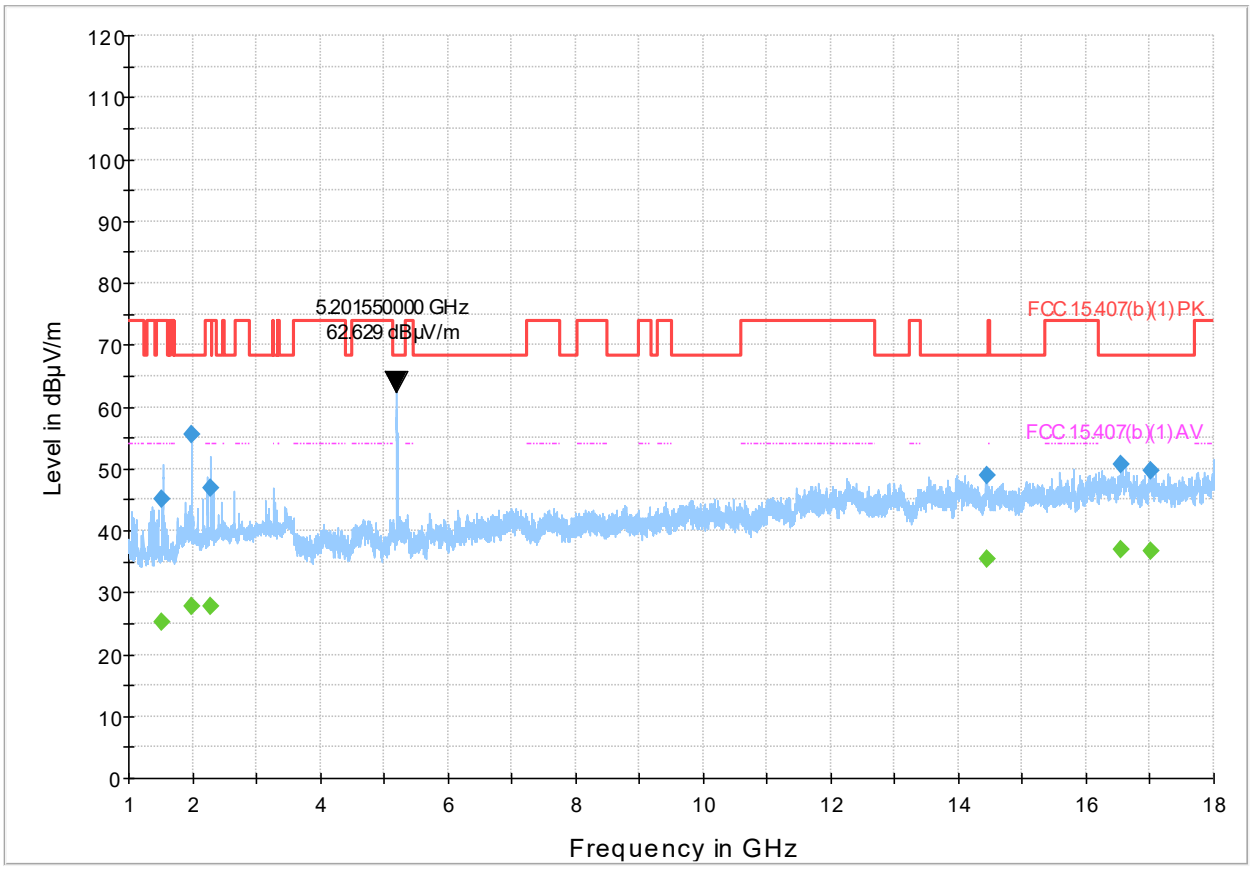

Figure 8.10-17: *Radiated emissions spectral plot (1 GHz - 18 GHz), 5200 MHz operation*

Table 8.10-17*: Radiated emissions results*

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)
1528.450000	45.08	---	73.98	28.90	5000.0	1000.000	200.0	V	304.0	-9.9
1528.450000	---	25.11	53.98	28.87	5000.0	1000.000	200.0	V	304.0	-9.9
1994.250000	---	27.80	---	---	5000.0	1000.000	346.0	H	0.0	-6.0
1994.250000	55.54	---	68.23	12.69	5000.0	1000.000	346.0	H	0.0	-6.0
2275.500000	---	27.88	53.98	26.10	5000.0	1000.000	218.0	V	0.0	-5.1
2275.500000	46.78	---	73.98	27.20	5000.0	1000.000	218.0	V	0.0	-5.1
14450.650000	---	35.52	---	---	5000.0	1000.000	147.0	V	186.0	17.4
14450.650000	49.03	---	68.23	19.20	5000.0	1000.000	147.0	V	186.0	17.4
16544.400000	50.63	---	68.23	17.60	5000.0	1000.000	400.0	H	209.0	22.3
16544.400000	---	37.06	---	---	5000.0	1000.000	400.0	H	209.0	22.3
17005.100000	49.81	---	68.23	18.42	5000.0	1000.000	356.0	V	129.0	19.5
17005.100000	---	36.76	---	---	5000.0	1000.000	356.0	V	129.0	19.5

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
A notch filter was used to suppress the fundamental emission to prevent overloading of measurement equipment.
Marked emission at 5202 MHz is the transmitter fundamental emission and is not evaluated against the limits.

Full Spectrum

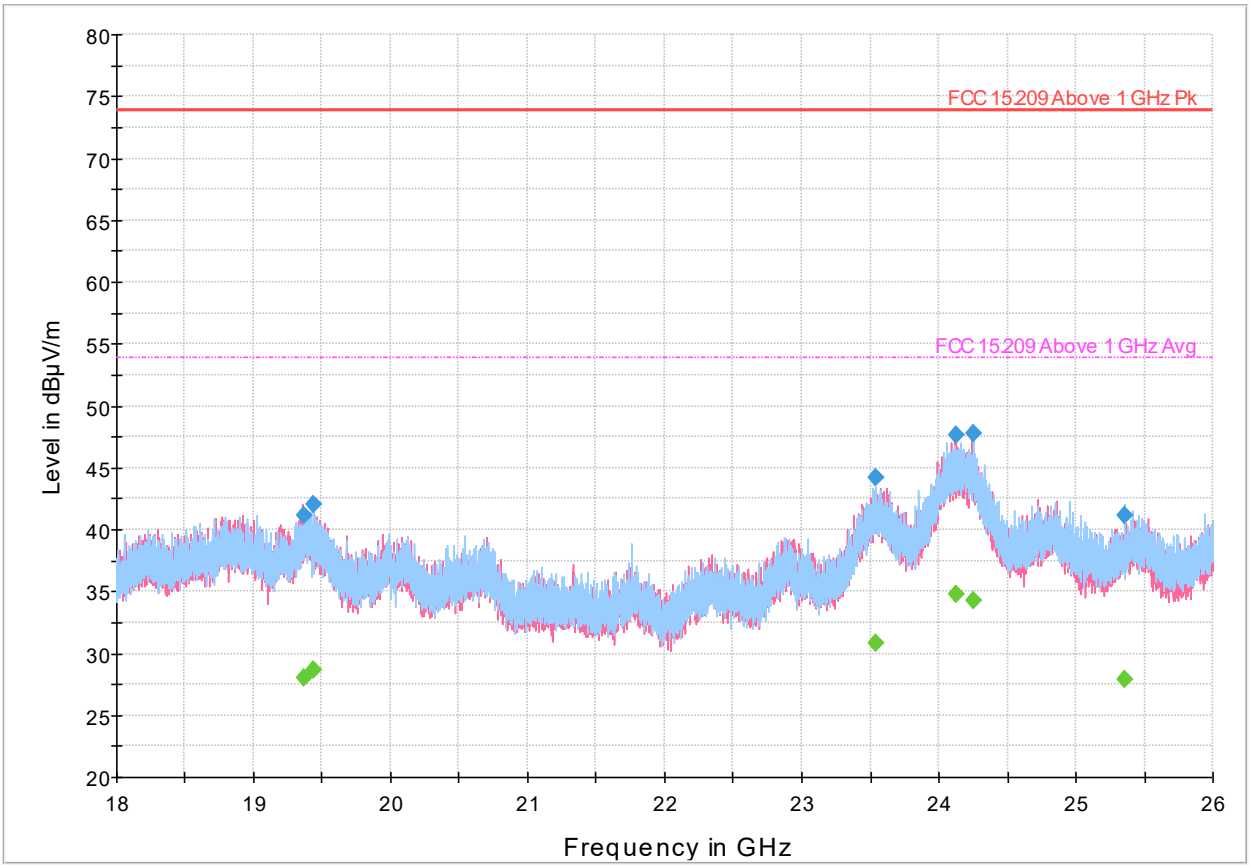

Figure 8.10-18: *Radiated emissions spectral plot (18 GHz - 26 GHz), 5200 MHz operation*

Table 8.10-18*: Radiated emissions results*

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)
19363.700000	---	28.02	53.90	25.88	5000.0	1000.000	129.0	V	326.0	16.7
19363.700000	41.14	---	73.90	32.77	5000.0	1000.000	129.0	V	326.0	16.7
19440.100000	---	28.68	53.90	25.22	5000.0	1000.000	331.0	H	11.0	16.5
19440.100000	42.02	---	73.90	31.88	5000.0	1000.000	331.0	H	11.0	16.5
23535.500000	44.21	---	73.90	29.69	5000.0	1000.000	301.0	H	356.0	23.5
23535.500000	---	30.86	53.90	23.04	5000.0	1000.000	301.0	H	356.0	23.5
24123.900000	47.70	---	73.90	26.20	5000.0	1000.000	382.0	V	342.0	27.3
24123.900000	---	34.78	53.90	19.12	5000.0	1000.000	382.0	V	342.0	27.3
24255.100000	47.82	---	73.90	26.08	5000.0	1000.000	288.0	H	0.0	26.9
24255.100000	---	34.30	53.90	19.60	5000.0	1000.000	288.0	H	0.0	26.9
25358.500000	41.20	---	73.90	32.70	5000.0	1000.000	191.0	H	52.0	21.4
25358.500000	---	27.96	53.90	25.94	5000.0	1000.000	191.0	H	52.0	21.4

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
Results show compliance with 68.23 dBµV/m (at 3m) limit (-27 dBm/MHz)

Full Spectrum

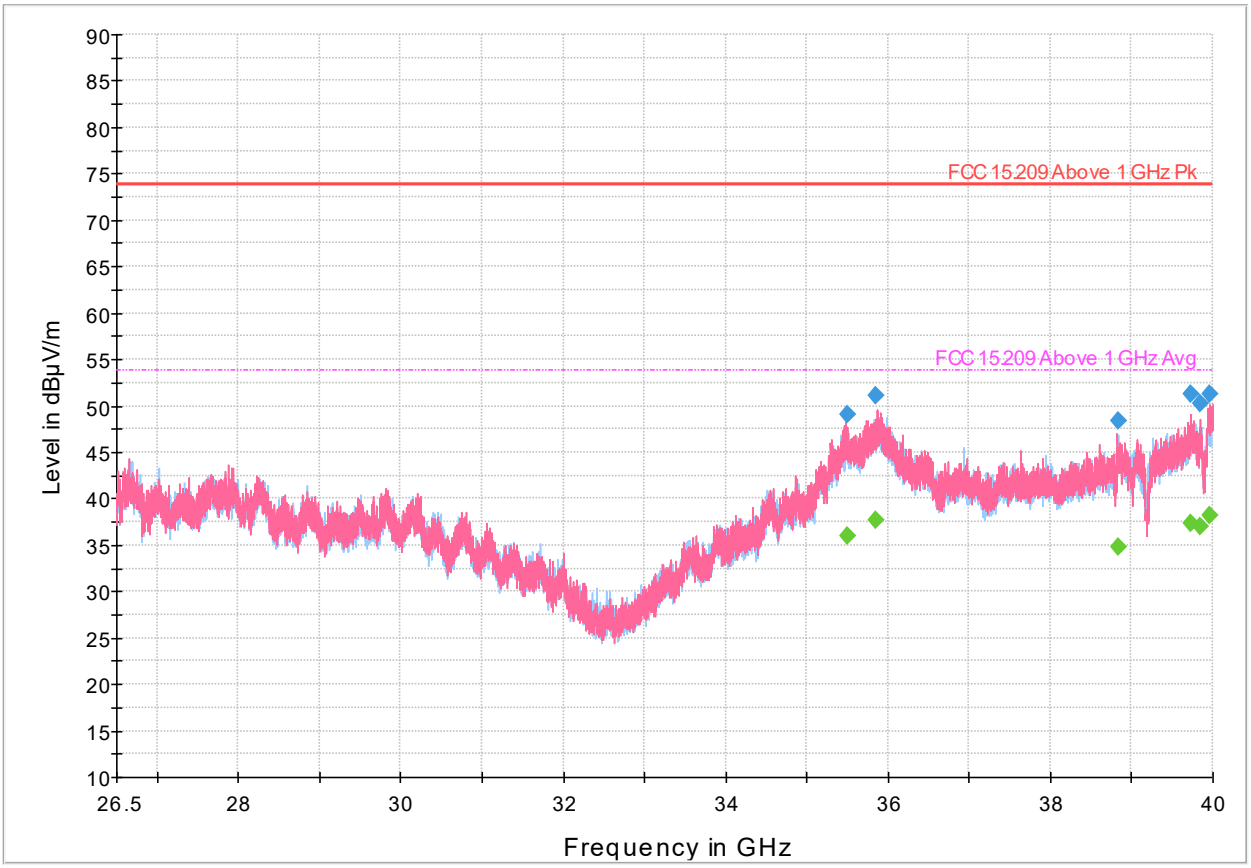

Figure 8.10-19: *Radiated emissions spectral plot (26.5 GHz - 40 GHz), 5200 MHz operation*

Table 8.10-19*: Radiated emissions results*

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)
35498.968750	49.06	---	73.90	24.84	5000.0	1000.000	107.0	V	359.0	19.5
35498.968750	---	35.98	53.90	17.92	5000.0	1000.000	107.0	V	359.0	19.5
35856.325000	---	37.72	53.90	16.18	5000.0	1000.000	157.0	V	11.0	20.7
35856.325000	51.14	---	73.90	22.76	5000.0	1000.000	157.0	V	11.0	20.7
38836.543750	48.34	---	73.90	25.56	5000.0	1000.000	201.0	V	240.0	16.6
38836.543750	---	34.83	53.90	19.07	5000.0	1000.000	201.0	V	240.0	16.6
39725.406250	---	37.37	53.90	16.53	5000.0	1000.000	137.0	V	214.0	18.2
39725.406250	51.24	---	73.90	22.66	5000.0	1000.000	137.0	V	214.0	18.2
39850.300000	---	37.01	53.90	16.89	5000.0	1000.000	133.0	V	332.0	19.3
39850.300000	50.18	---	73.90	23.72	5000.0	1000.000	133.0	V	332.0	19.3
39968.725000	---	38.19	53.90	15.71	5000.0	1000.000	211.0	H	52.0	20.7
39968.725000	51.31	---	73.90	22.59	5000.0	1000.000	211.0	H	52.0	20.7

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
Results show compliance with 68.23 dBµV/m (at 3m) limit (-27 dBm/MHz)

Full Spectrum

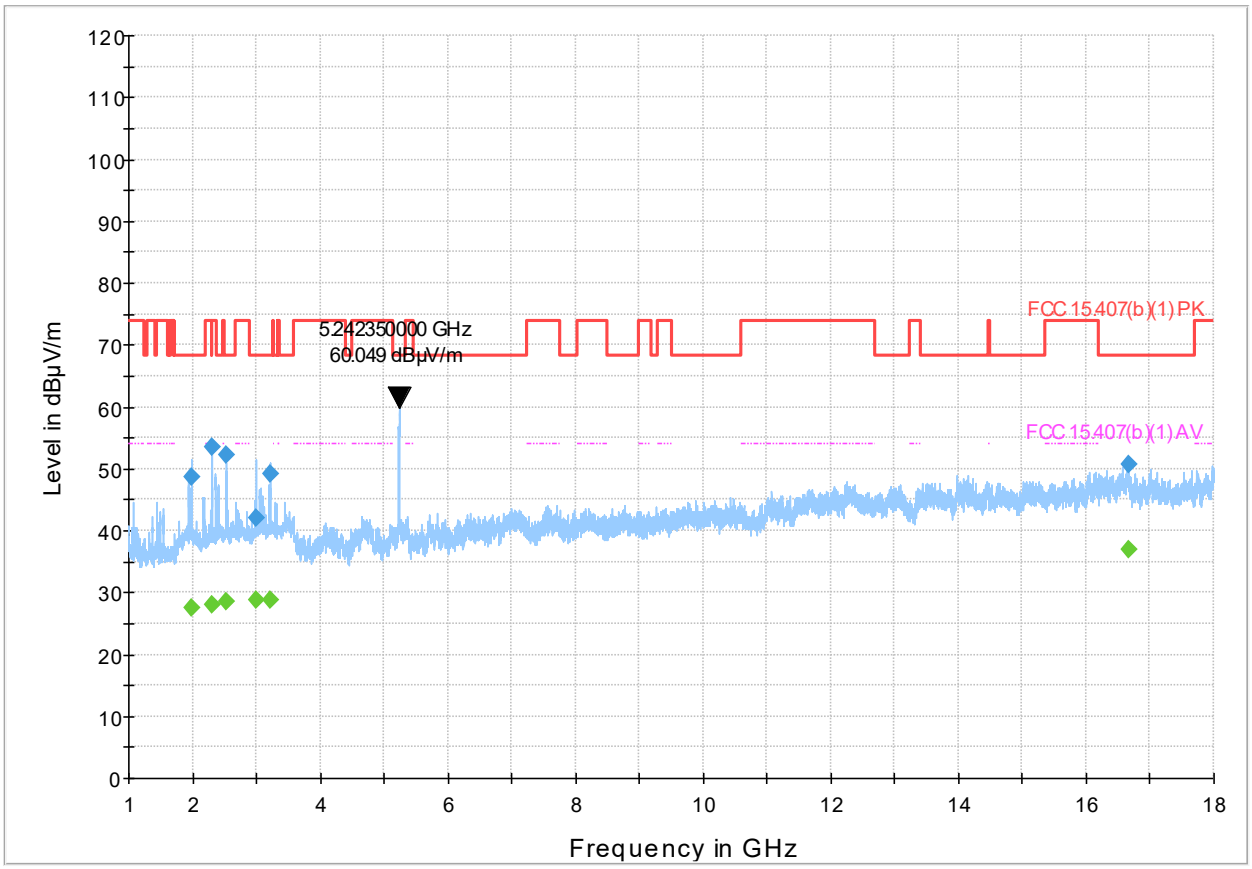

Figure 8.10-20: *Radiated emissions spectral plot (1 GHz - 18 GHz), 5240 MHz operation*

Table 8.10-20*: Radiated emissions results*

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)
1990.600000	48.64	---	68.23	19.59	5000.0	1000.000	303.0	H	328.0	-6.0
1990.600000	---	27.58	---	---	5000.0	1000.000	303.0	H	328.0	-6.0
2307.850000	---	27.99	---	---	5000.0	1000.000	179.0	H	190.0	-5.1
2307.850000	53.60	---	68.23	14.63	5000.0	1000.000	179.0	H	190.0	-5.1
2522.750000	52.22	---	68.23	16.01	5000.0	1000.000	116.0	V	31.0	-3.8
2522.750000	---	28.57	---	---	5000.0	1000.000	116.0	V	31.0	-3.8
2993.000000	41.93	---	68.23	26.30	5000.0	1000.000	220.0	V	31.0	-2.4
2993.000000	---	28.83	---	---	5000.0	1000.000	220.0	V	31.0	-2.4
3216.250000	49.27	---	68.23	18.96	5000.0	1000.000	122.0	V	0.0	-1.7
3216.250000	---	28.75	---	---	5000.0	1000.000	122.0	V	0.0	-1.7
16671.100000	---	36.92	---	---	5000.0	1000.000	181.0	H	31.0	22.5
16671.100000	50.77	---	68.23	17.46	5000.0	1000.000	181.0	H	31.0	22.5

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
A notch filter was used to suppress the fundamental emission to prevent overloading of measurement equipment.
Marked emission at 5242 MHz is the transmitter fundamental emission and is not evaluated against the limits.

Full Spectrum

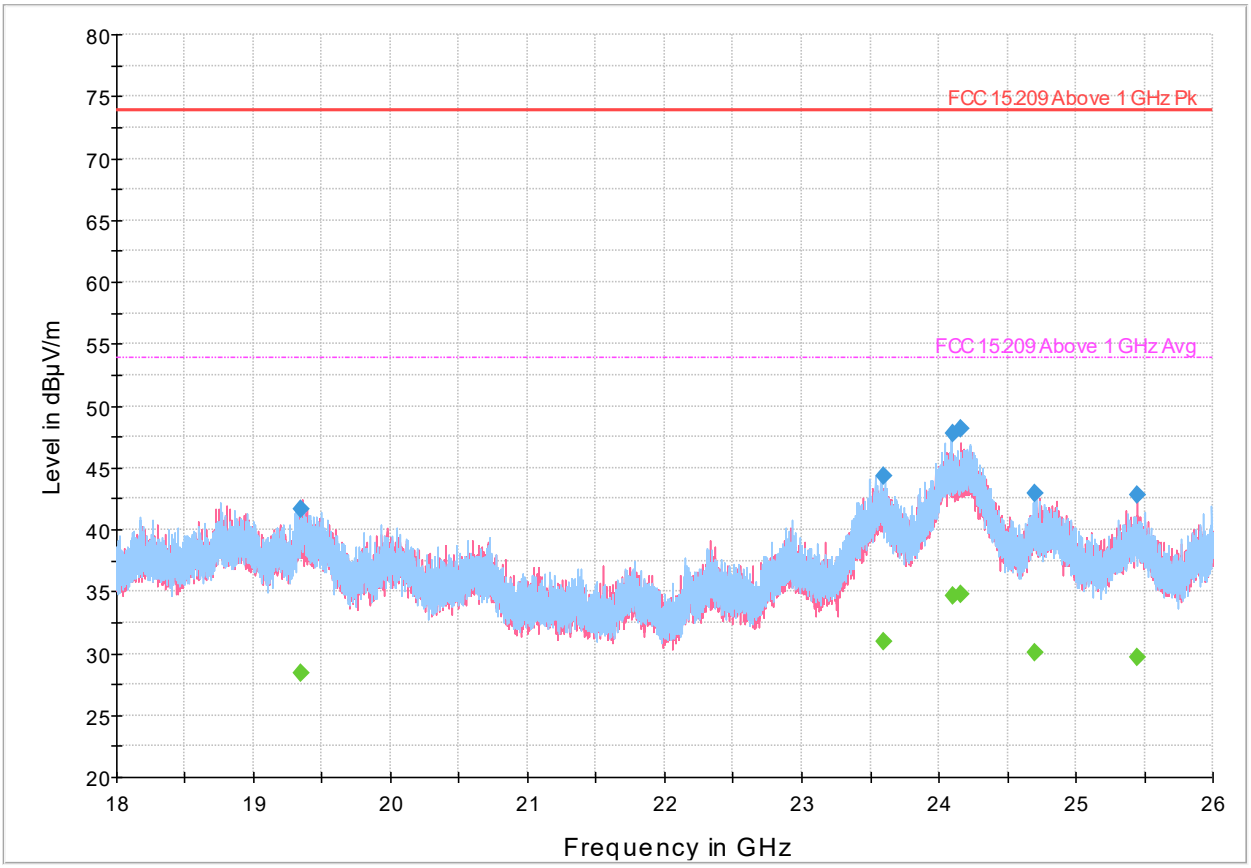

Figure 8.10-21: *Radiated emissions spectral plot (18 GHz - 26 GHz), 5240 MHz operation*

Table 8.10-21*: Radiated emissions results*

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)
19349.100000	---	28.45	53.90	25.45	5000.0	1000.000	212.0	V	148.0	16.7
19349.100000	41.64	---	73.90	32.26	5000.0	1000.000	212.0	V	148.0	16.7
23594.500000	44.31	---	73.90	29.59	5000.0	1000.000	373.0	H	283.0	23.8
23594.500000	---	30.97	53.90	22.93	5000.0	1000.000	373.0	H	283.0	23.8
24100.500000	---	34.61	53.90	19.29	5000.0	1000.000	281.0	H	113.0	27.4
24100.500000	47.79	---	73.90	26.11	5000.0	1000.000	281.0	H	113.0	27.4
24157.500000	---	34.76	53.90	19.14	5000.0	1000.000	352.0	V	240.0	27.2
24157.500000	48.19	---	73.90	25.71	5000.0	1000.000	352.0	V	240.0	27.2
24700.300000	---	30.06	53.90	23.84	5000.0	1000.000	117.0	H	170.0	22.4
24700.300000	42.88	---	73.90	31.02	5000.0	1000.000	117.0	H	170.0	22.4
25444.100000	42.78	---	73.90	31.12	5000.0	1000.000	136.0	V	262.0	21.7
25444.100000	---	29.64	53.90	24.26	5000.0	1000.000	136.0	V	262.0	21.7

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
Results show compliance with 68.23 dBµV/m (at 3m) limit (-27 dBm/MHz)

Full Spectrum

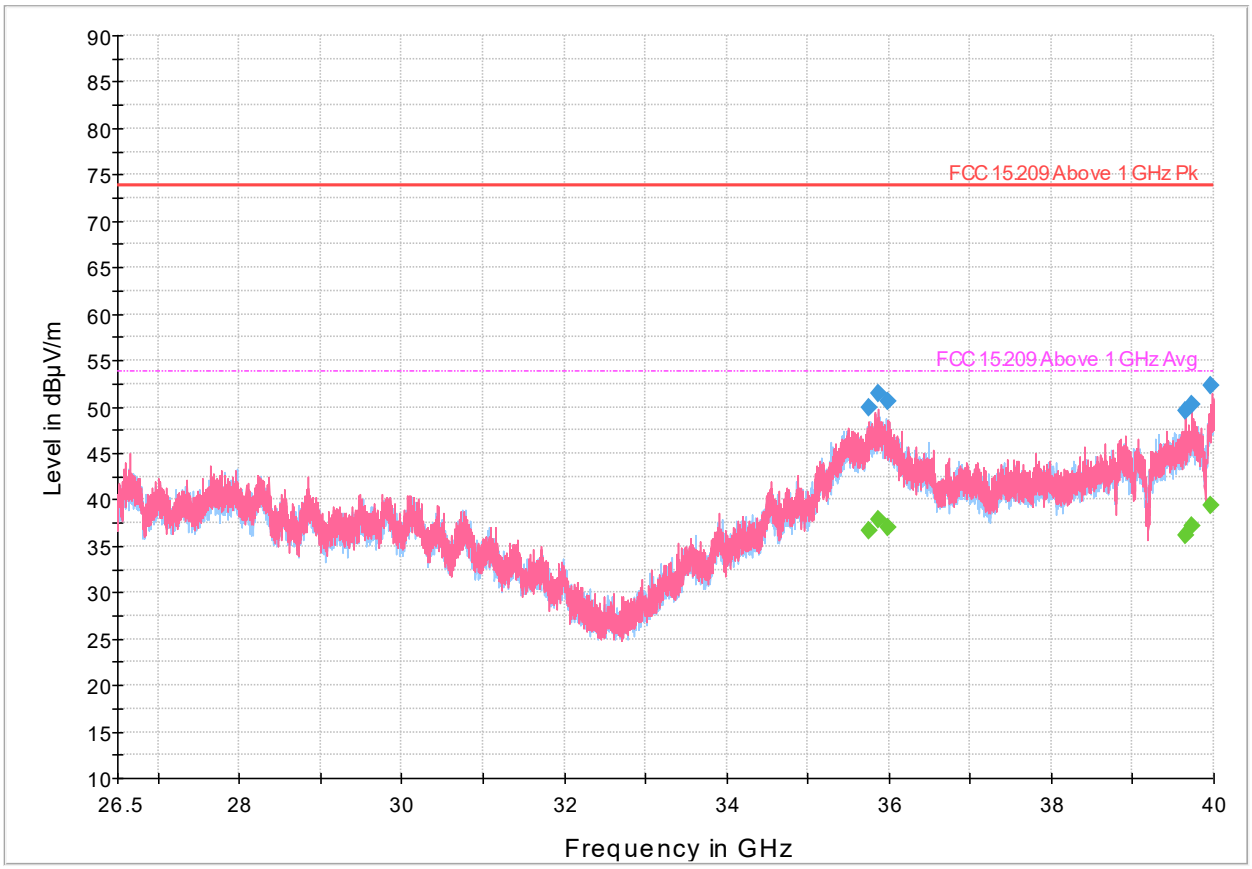

Figure 8.10-22: *Radiated emissions spectral plot (26.5 GHz - 40 GHz), 5240 MHz operation*

Table 8.10-22*: Radiated emissions results*

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)
35747.856250	---	36.64	53.90	17.26	5000.0	1000.000	104.0	H	18.0	20.4
35747.856250	49.84	---	73.90	24.06	5000.0	1000.000	104.0	H	18.0	20.4
35867.481250	51.39	---	73.90	22.51	5000.0	1000.000	150.0	V	52.0	20.7
35867.481250	---	37.80	53.90	16.10	5000.0	1000.000	150.0	V	52.0	20.7
35993.987500	50.57	---	73.90	23.33	5000.0	1000.000	175.0	V	197.0	21.0
35993.987500	---	36.97	53.90	16.93	5000.0	1000.000	175.0	V	197.0	21.0
39659.106250	49.55	---	73.90	24.35	5000.0	1000.000	191.0	V	328.0	17.7
39659.106250	---	36.16	53.90	17.74	5000.0	1000.000	191.0	V	328.0	17.7
39732.531250	---	37.26	53.90	16.64	5000.0	1000.000	146.0	V	-1.0	18.3
39732.531250	50.31	---	73.90	23.59	5000.0	1000.000	146.0	V	-1.0	18.3
39970.131250	52.37	---	73.90	21.53	5000.0	1000.000	152.0	V	172.0	20.7
39970.131250	---	39.30	53.90	14.60	5000.0	1000.000	152.0	V	172.0	20.7

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
Results show compliance with 68.23 dBµV/m (at 3m) limit (-27 dBm/MHz)

Full Spectrum

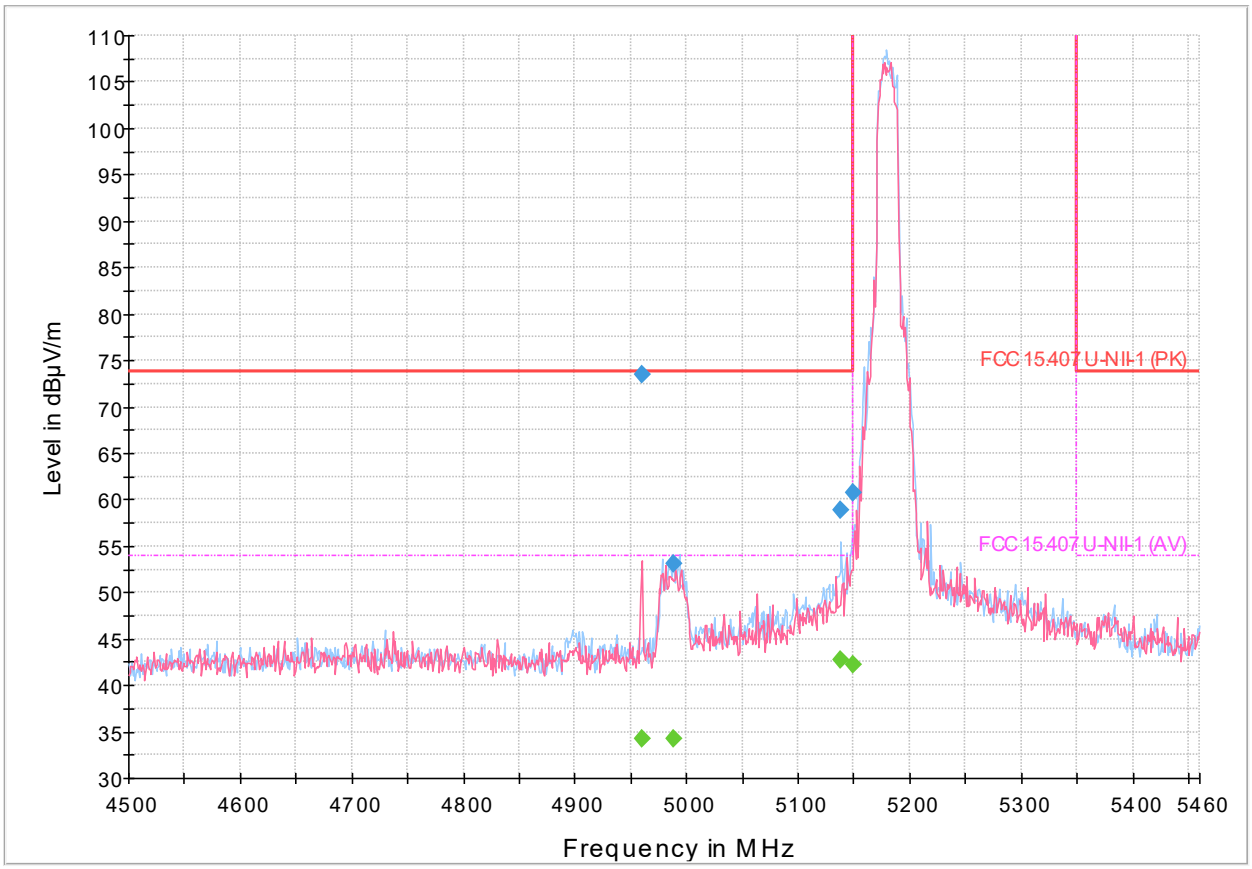

Figure 8.10-23: *Radiated emissions spectral plot (4.5 GHz - 5.46 GHz), 5180 MHz operation*

Table 8.10-23*: Radiated emissions results*

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)
4959.840000	---	34.31	53.90	19.59	5000.0	1000.000	330.0	H	40.0	1.3
4959.840000	73.40	---	73.90	0.50	5000.0	1000.000	330.0	H	40.0	1.3
4988.640000	---	34.32	53.90	19.58	5000.0	1000.000	276.0	H	11.0	1.4
4988.640000	53.07	---	73.90	20.83	5000.0	1000.000	276.0	H	11.0	1.4
5138.400000	---	42.81	53.90	11.09	5000.0	1000.000	204.0	V	10.0	2.3
5138.400000	58.94	---	73.90	14.96	5000.0	1000.000	204.0	V	10.0	2.3
5150.000000	---	42.27	53.90	11.63	5000.0	1000.000	143.0	V	10.0	2.4
5150.000000	60.74	---	73.90	13.16	5000.0	1000.000	143.0	V	10.0	2.4

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.

Full Spectrum

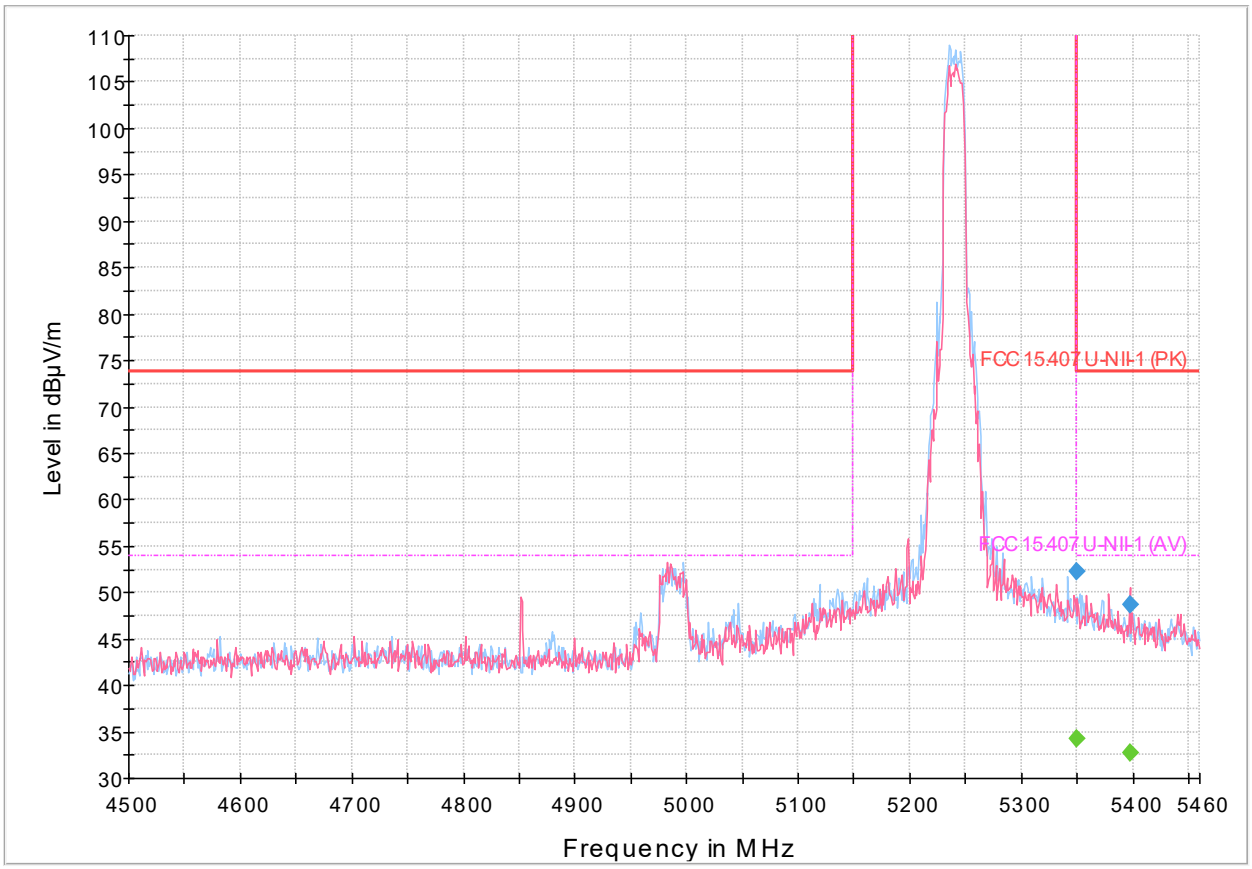

Figure 8.10-24: *Radiated emissions spectral plot (4.5 GHz - 5.46 GHz), 5240 MHz operation*

Table 8.10-24*: Radiated emissions results*

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)
5350.000000	---	34.17	53.90	19.73	5000.0	1000.000	190.0	V	40.0	2.9
5350.000000	52.31	---	73.90	21.59	5000.0	1000.000	190.0	V	40.0	2.9
5397.600000	---	32.65	53.90	21.25	5000.0	1000.000	240.0	V	0.0	2.9
5397.600000	48.61	---	73.90	25.29	5000.0	1000.000	240.0	V	0.0	2.9

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.

IEEE 802.11n/ac (V)HT40 (CDD) mode

Note: Spurious emissions limit of -27 dBm/MHz corresponds to field strength at 3m measurement distance of 68.23 dBµV/m. Emissions in restricted bands must meet the limits of FCC 15.209.

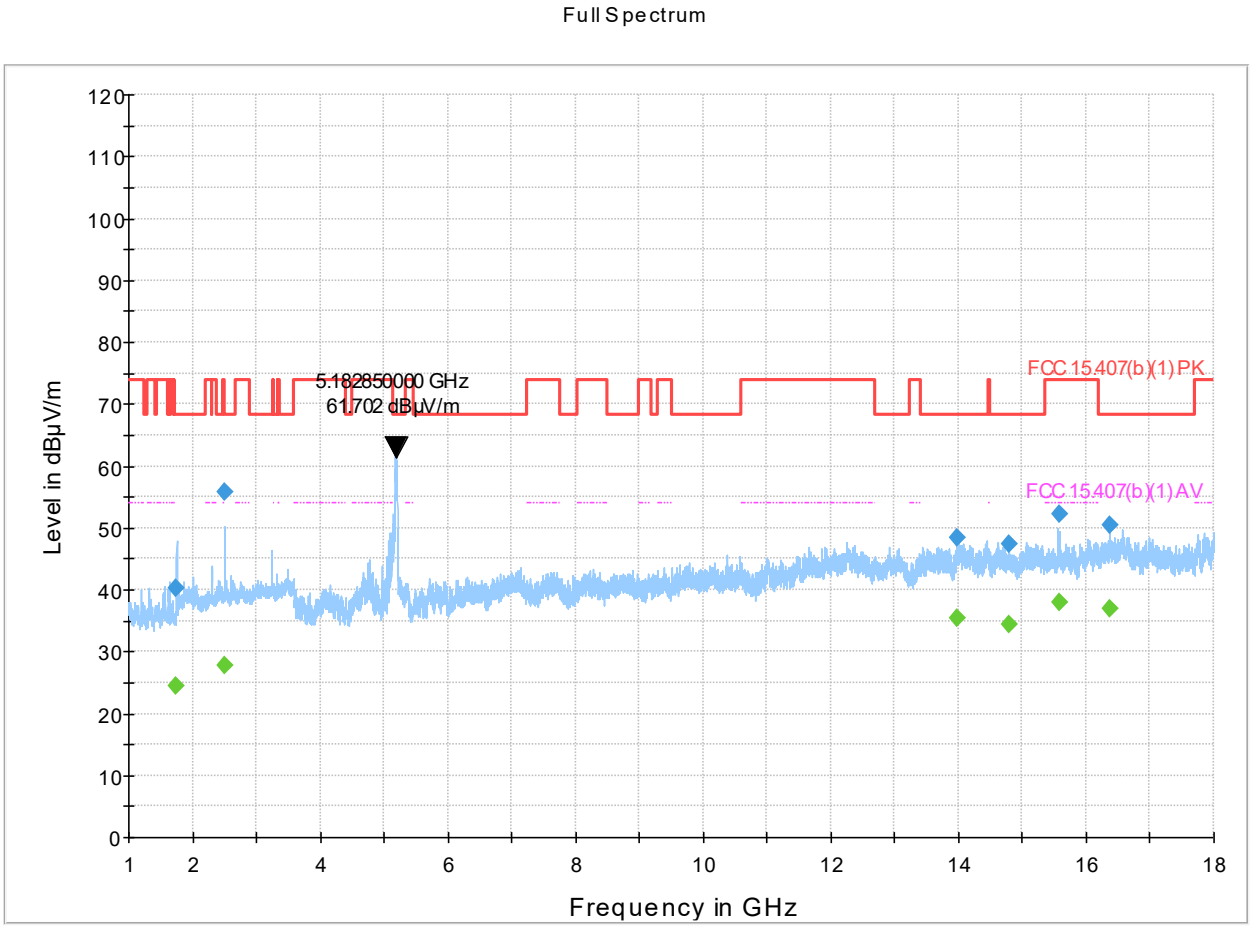

Figure 8.10-25: *Radiated emissions spectral plot (1 GHz - 18 GHz), 5190 MHz operation*

Table 8.10-25*: Radiated emissions results*

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)
1748.500000	40.25	---	68.23	27.98	5000.0	1000.000	340.0	H	193.0	-8.7
1748.500000	---	24.53	---	---	5000.0	1000.000	340.0	H	193.0	-8.7
2499.200000	55.86	---	73.98	18.12	5000.0	1000.000	380.0	V	11.0	-4.0
2499.200000	---	27.71	53.98	26.27	5000.0	1000.000	380.0	V	11.0	-4.0
13980.450000	48.31	---	68.23	19.92	5000.0	1000.000	253.0	V	11.0	17.5
13980.450000	---	35.49	---	---	5000.0	1000.000	253.0	V	11.0	17.5
14782.950000	---	34.32	---	---	5000.0	1000.000	194.0	V	0.0	16.6
14782.950000	47.40	---	68.23	20.83	5000.0	1000.000	194.0	V	0.0	16.6
15572.900000	52.13	---	73.98	21.85	5000.0	1000.000	142.0	H	349.0	19.5
15572.900000	---	38.01	53.98	15.97	5000.0	1000.000	142.0	H	349.0	19.5
16383.700000	---	36.86	---	---	5000.0	1000.000	380.0	H	152.0	22.4
16383.700000	50.49	---	68.23	17.74	5000.0	1000.000	380.0	H	152.0	22.4

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
A notch filter was used to suppress the fundamental emission to prevent overloading of measurement equipment.
Marked emission at 5183 MHz is the transmitter fundamental emission and is not evaluated against the limits.

Full Spectrum

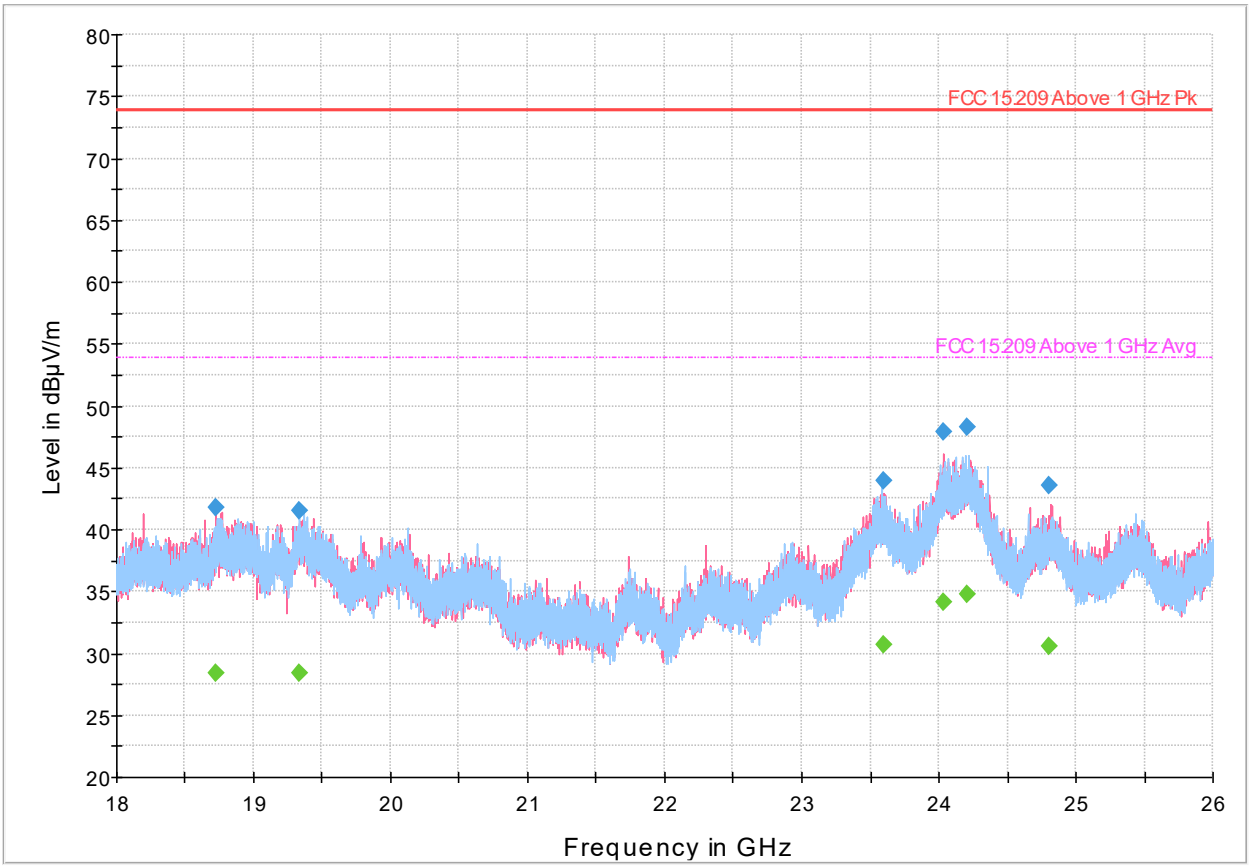

Figure 8.10-26: *Radiated emissions spectral plot (18 GHz - 26 GHz), 5190 MHz operation*

Table 8.10-26*: Radiated emissions results*

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)
18729.500000	---	28.42	53.90	25.48	5000.0	1000.000	334.0	V	20.0	15.9
18729.500000	41.72	---	73.90	32.18	5000.0	1000.000	334.0	V	20.0	15.9
19328.900000	---	28.38	53.90	25.52	5000.0	1000.000	352.0	H	0.0	16.7
19328.900000	41.51	---	73.90	32.39	5000.0	1000.000	352.0	H	0.0	16.7
23594.100000	43.94	---	73.90	29.96	5000.0	1000.000	343.0	H	55.0	23.8
23594.100000	---	30.71	53.90	23.19	5000.0	1000.000	343.0	H	55.0	23.8
24035.100000	---	34.17	53.90	19.73	5000.0	1000.000	343.0	V	178.0	27.6
24035.100000	47.90	---	73.90	26.00	5000.0	1000.000	343.0	V	178.0	27.6
24211.900000	48.32	---	73.90	25.58	5000.0	1000.000	400.0	H	124.0	27.1
24211.900000	---	34.82	53.90	19.08	5000.0	1000.000	400.0	H	124.0	27.1
24809.700000	---	30.59	53.90	23.31	5000.0	1000.000	367.0	V	242.0	22.3
24809.700000	43.63	---	73.90	30.27	5000.0	1000.000	367.0	V	242.0	22.3

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
Results show compliance with 68.23 dBµV/m (at 3m) limit (-27 dBm/MHz)

Full Spectrum

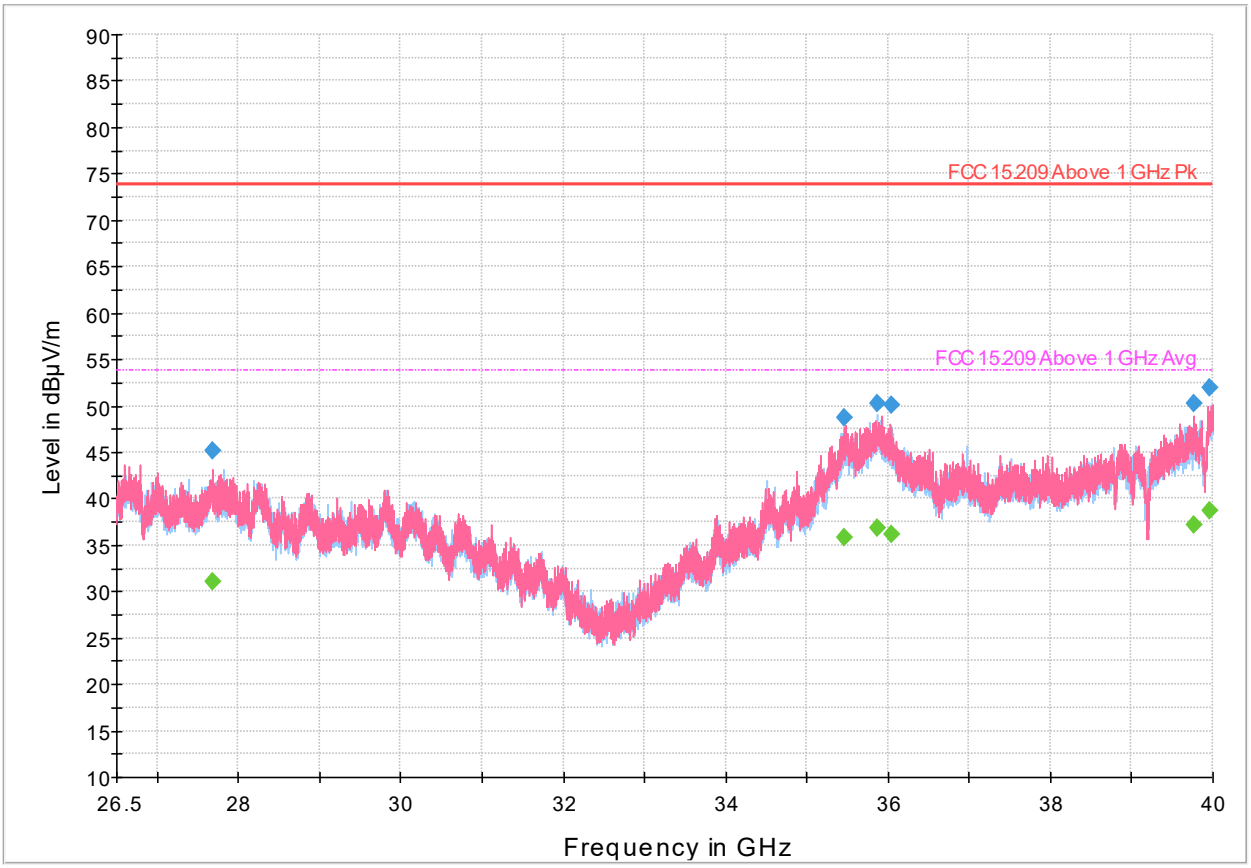

Figure 8.10-27: *Radiated emissions spectral plot (26.5 GHz - 40 GHz), 5190 MHz operation*

Table 8.10-27*: Radiated emissions results*

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)
27684.025000	45.17	---	73.90	28.73	5000.0	1000.000	136.0	V	135.0	9.6
27684.025000	---	31.06	53.90	22.84	5000.0	1000.000	136.0	V	135.0	9.6
35470.281250	48.79	---	73.90	25.11	5000.0	1000.000	148.0	V	205.0	19.2
35470.281250	---	35.88	53.90	18.02	5000.0	1000.000	148.0	V	205.0	19.2
35873.256250	50.26	---	73.90	23.64	5000.0	1000.000	102.0	H	275.0	20.7
35873.256250	---	36.88	53.90	17.02	5000.0	1000.000	102.0	H	275.0	20.7
36051.287500	50.03	---	73.90	23.87	5000.0	1000.000	136.0	H	17.0	20.5
36051.287500	---	36.09	53.90	17.81	5000.0	1000.000	136.0	H	17.0	20.5
39757.975000	---	37.21	53.90	16.69	5000.0	1000.000	138.0	V	294.0	18.5
39757.975000	50.18	---	73.90	23.72	5000.0	1000.000	138.0	V	294.0	18.5
39954.943750	---	38.68	53.90	15.22	5000.0	1000.000	191.0	V	353.0	20.5
39954.943750	52.04	---	73.90	21.86	5000.0	1000.000	191.0	V	353.0	20.5

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
Results show compliance with 68.23 dBµV/m (at 3m) limit (-27 dBm/MHz)

Full Spectrum

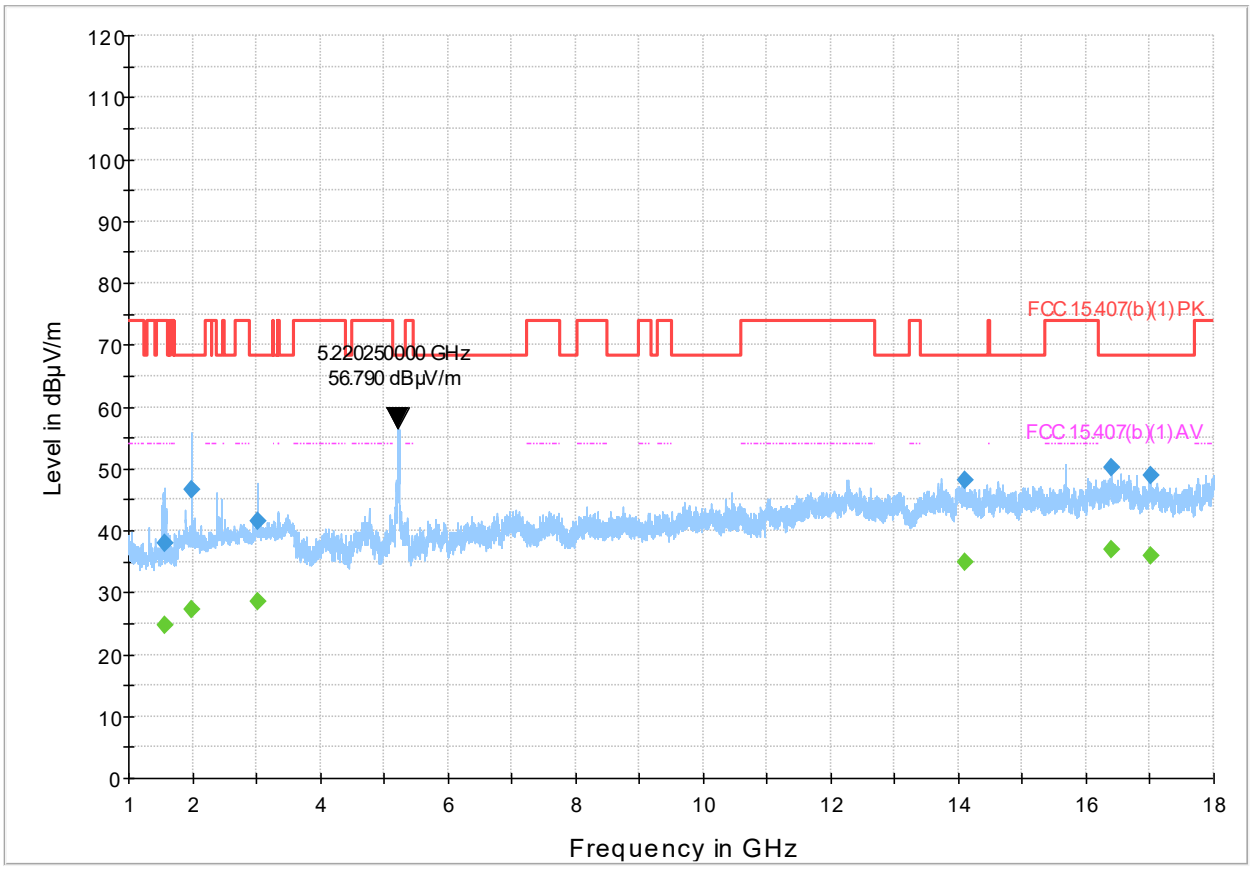

Figure 8.10-28: *Radiated emissions spectral plot (1 GHz - 18 GHz), 5230 MHz operation*

Table 8.10-28*: Radiated emissions results*

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)
1573.600000	38.08	---	73.98	35.90	5000.0	1000.000	219.0	V	149.0	-9.5
1573.600000	---	24.74	53.98	29.24	5000.0	1000.000	219.0	V	149.0	-9.5
1996.800000	46.51	---	68.23	21.72	5000.0	1000.000	378.0	V	209.0	-6.1
1996.800000	---	27.23	---	---	5000.0	1000.000	378.0	V	209.0	-6.1
3020.900000	41.62	---	68.23	26.61	5000.0	1000.000	400.0	V	77.0	-2.3
3020.900000	---	28.61	---	---	5000.0	1000.000	400.0	V	77.0	-2.3
14091.950000	---	35.02	---	---	5000.0	1000.000	388.0	V	0.0	17.1
14091.950000	48.06	---	68.23	20.17	5000.0	1000.000	388.0	V	0.0	17.1
16404.350000	50.18	---	68.23	18.05	5000.0	1000.000	210.0	H	11.0	22.7
16404.350000	---	37.00	---	---	5000.0	1000.000	210.0	H	11.0	22.7
17008.050000	---	35.99	---	---	5000.0	1000.000	378.0	H	161.0	19.4
17008.050000	48.79	---	68.23	19.44	5000.0	1000.000	378.0	H	161.0	19.4

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
A notch filter was used to suppress the fundamental emission to prevent overloading of measurement equipment.
Marked emission at 5220 MHz is the transmitter fundamental emission and is not evaluated against the limits.

Full Spectrum

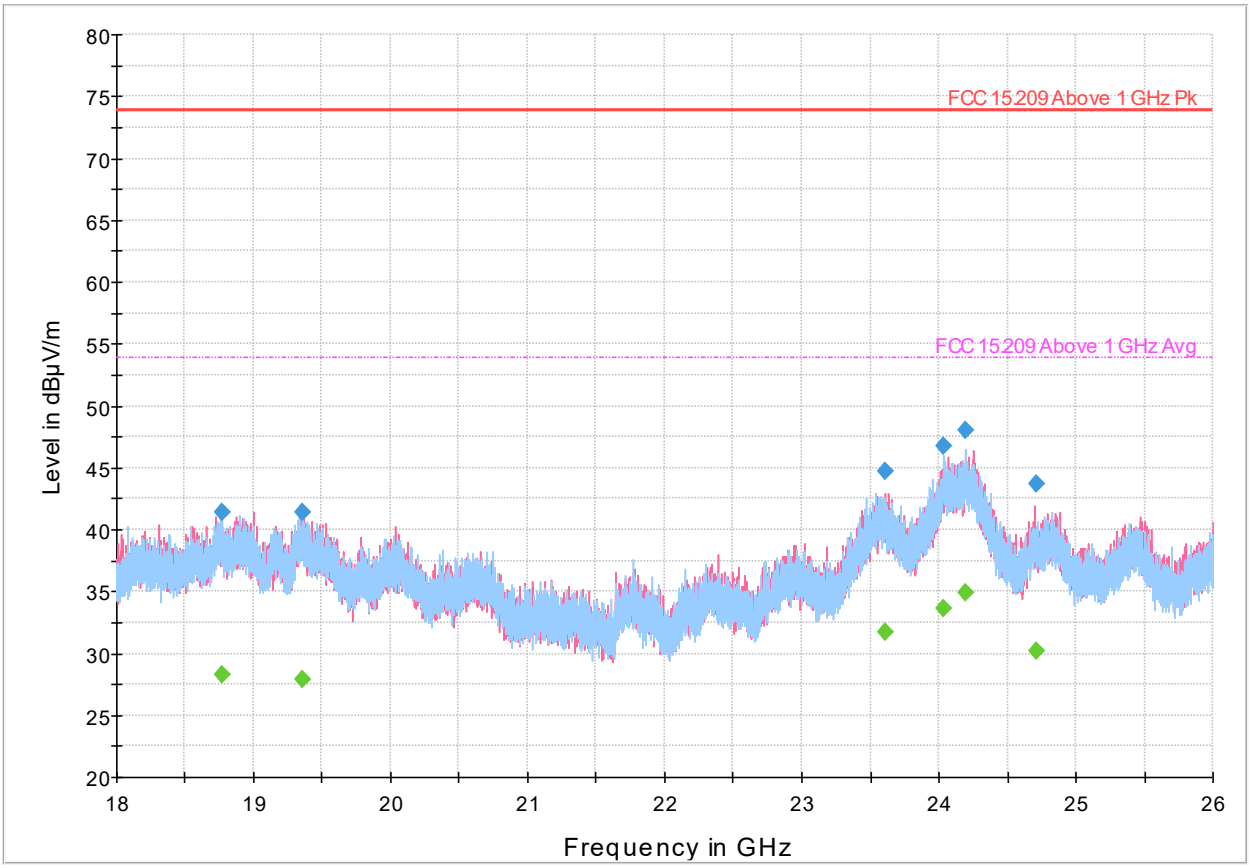

Figure 8.10-29: *Radiated emissions spectral plot (18 GHz - 26 GHz), 5230 MHz operation*

Table 8.10-29*: Radiated emissions results*

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)
18765.900000	41.42	---	73.90	32.48	5000.0	1000.000	235.0	H	136.0	15.9
18765.900000	---	28.31	53.90	25.59	5000.0	1000.000	235.0	H	136.0	15.9
19352.100000	41.36	---	73.90	32.54	5000.0	1000.000	306.0	H	194.0	16.7
19352.100000	---	27.86	53.90	26.04	5000.0	1000.000	306.0	H	194.0	16.7
23610.100000	44.72	---	73.90	29.18	5000.0	1000.000	375.0	V	0.0	23.8
23610.100000	---	31.70	53.90	22.20	5000.0	1000.000	375.0	V	0.0	23.8
24031.900000	46.78	---	73.90	27.12	5000.0	1000.000	114.0	H	0.0	27.6
24031.900000	---	33.67	53.90	20.23	5000.0	1000.000	114.0	H	0.0	27.6
24194.900000	48.06	---	73.90	25.84	5000.0	1000.000	316.0	H	341.0	27.1
24194.900000	---	34.94	53.90	18.96	5000.0	1000.000	316.0	H	341.0	27.1
24709.300000	43.72	---	73.90	30.18	5000.0	1000.000	346.0	V	78.0	22.4
24709.300000	---	30.25	53.90	23.65	5000.0	1000.000	346.0	V	78.0	22.4

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
Results show compliance with 68.23 dBµV/m (at 3m) limit (-27 dBm/MHz)

Full Spectrum

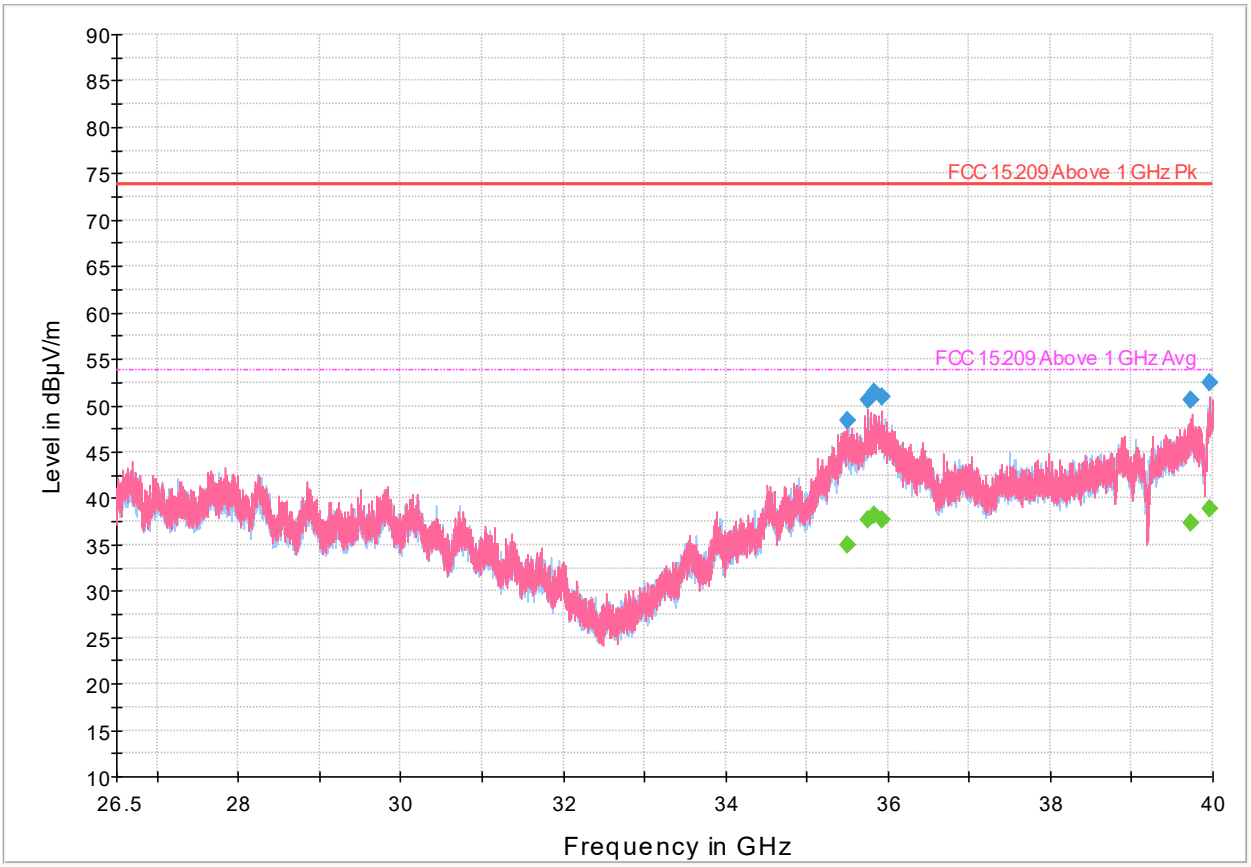

Figure 8.10-30: *Radiated emissions spectral plot (26.5 GHz - 40 GHz), 5230 MHz operation*

Table 8.10-30*: Radiated emissions results*

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)
35505.025000	---	34.96	53.90	18.94	5000.0	1000.000	209.0	H	5.0	18.94
35505.025000	48.44	---	73.90	25.46	5000.0	1000.000	209.0	H	5.0	25.46
35760.287500	50.62	---	73.90	23.28	5000.0	1000.000	163.0	V	139.0	23.28
35760.287500	---	37.71	53.90	16.19	5000.0	1000.000	163.0	V	139.0	16.19
35832.981250	---	38.25	53.90	15.65	5000.0	1000.000	175.0	V	52.0	15.65
35832.981250	51.38	---	73.90	22.52	5000.0	1000.000	175.0	V	52.0	22.52
35921.556250	50.97	---	73.90	22.93	5000.0	1000.000	167.0	V	173.0	22.93
35921.556250	---	37.62	53.90	16.28	5000.0	1000.000	167.0	V	173.0	16.28
39737.500000	50.58	---	73.90	23.32	5000.0	1000.000	142.0	V	240.0	23.32
39737.500000	---	37.35	53.90	16.55	5000.0	1000.000	142.0	V	240.0	16.55
39959.950000	52.46	---	73.90	21.44	5000.0	1000.000	114.0	V	306.0	21.44
39959.950000	---	38.96	53.90	14.94	5000.0	1000.000	114.0	V	306.0	14.94

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
Results show compliance with 68.23 dBµV/m (at 3m) limit (-27 dBm/MHz)

Full Spectrum

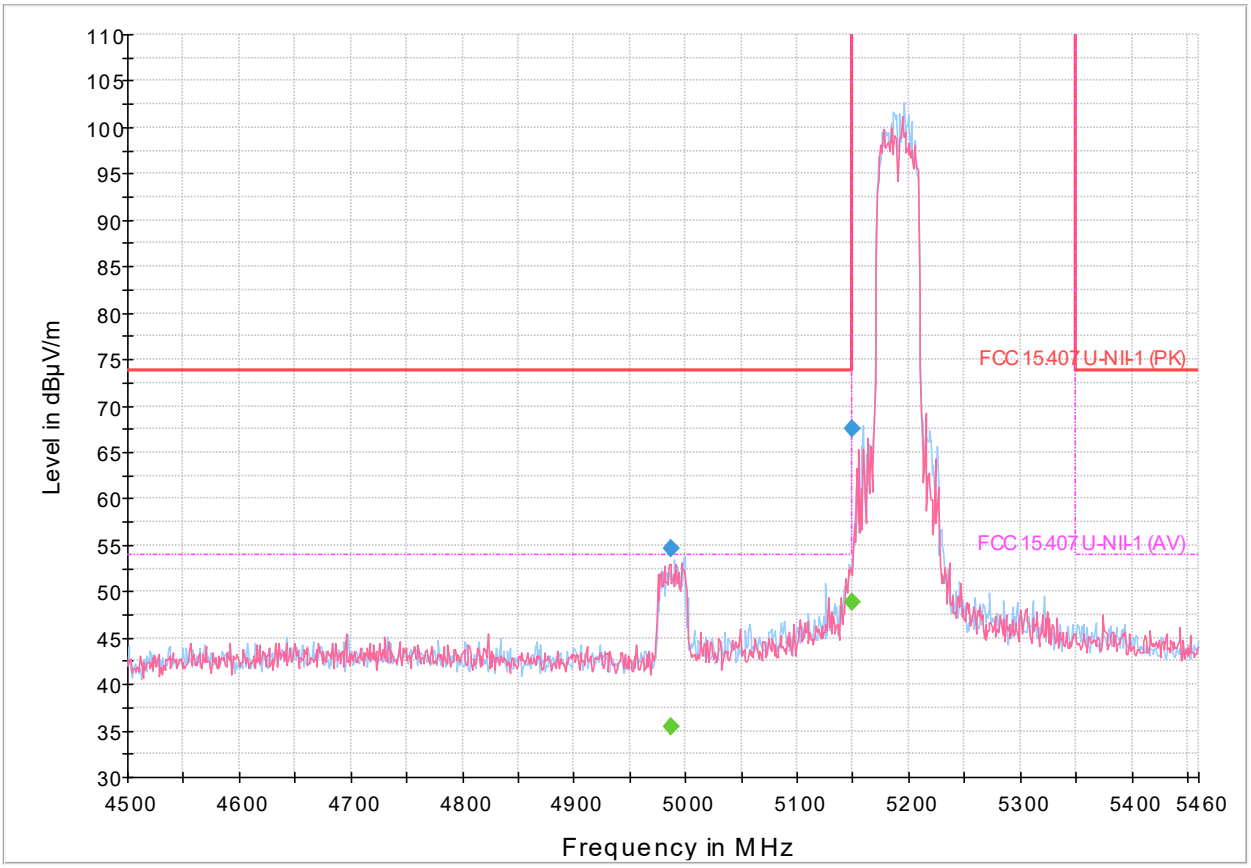

Figure 8.10-31: *Radiated emissions spectral plot (4.5 GHz - 5.46 GHz), 5190 MHz operation*

Table 8.10-31*: Radiated emissions results*

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)
4986.720000	---	35.39	53.90	18.51	5000.0	1000.000	100.0	V	76.0	1.4
4986.720000	54.55	---	73.90	19.35	5000.0	1000.000	100.0	V	76.0	1.4
5150.000000	---	48.90	53.90	5.00	5000.0	1000.000	181.0	V	11.0	2.4
5150.000000	67.52	---	73.90	6.38	5000.0	1000.000	181.0	V	11.0	2.4

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.

Full Spectrum

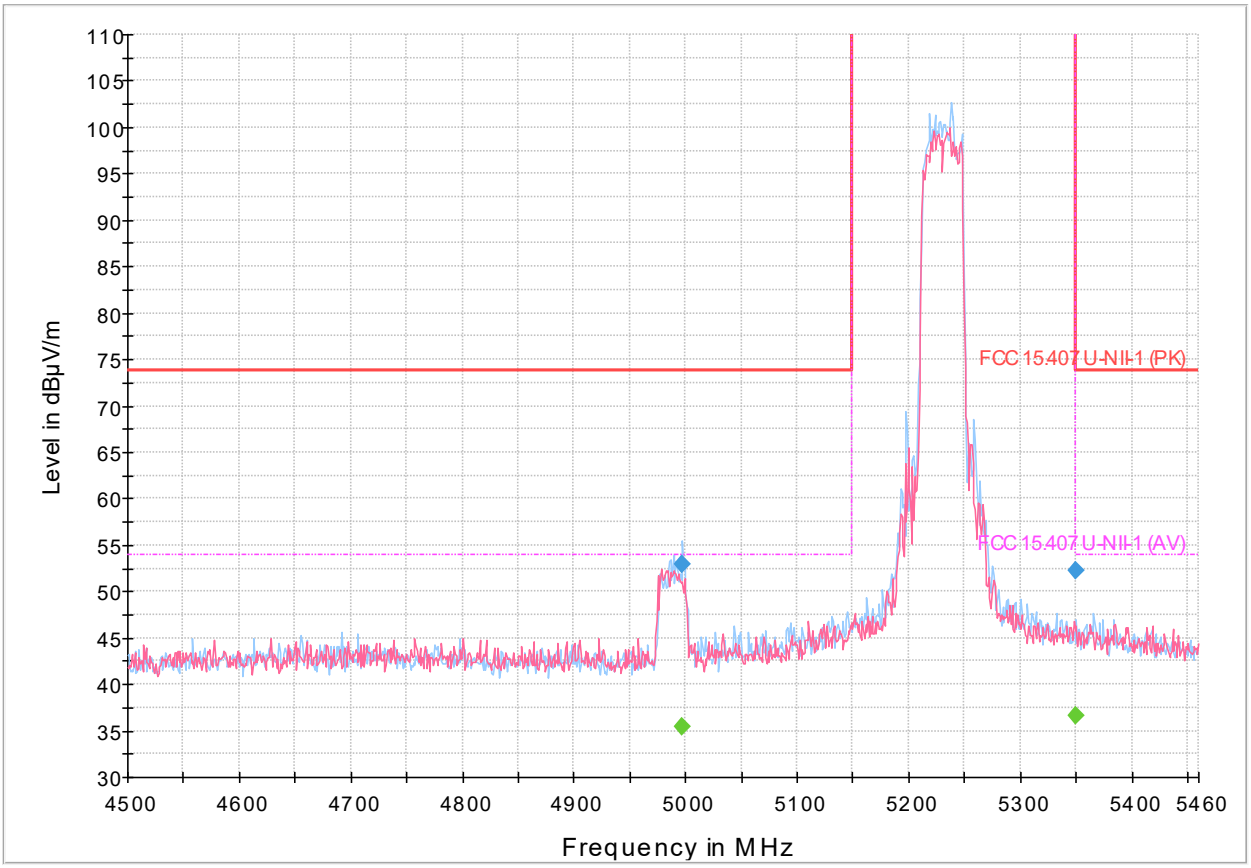

Figure 8.10-32: *Radiated emissions spectral plot (4.5 GHz - 5.46 GHz), 5230 MHz operation*

Table 8.10-32*: Radiated emissions results*

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)
4997.280000	52.97	---	73.90	20.93	5000.0	1000.000	113.0	V	348.0	1.5
4997.280000	---	35.52	53.90	18.38	5000.0	1000.000	113.0	V	348.0	1.5
5350.000000	---	36.55	53.90	17.35	5000.0	1000.000	275.0	H	354.0	2.9
5350.000000	52.30	---	73.90	21.60	5000.0	1000.000	275.0	H	354.0	2.9

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.

IEEE 802.11n/ac (V)HT80 (CDD) mode

Note: Spurious emissions limit of -27 dBm/MHz corresponds to field strength at 3m measurement distance of 68.23 dBµV/m. Emissions in restricted bands must meet the limits of FCC 15.209.

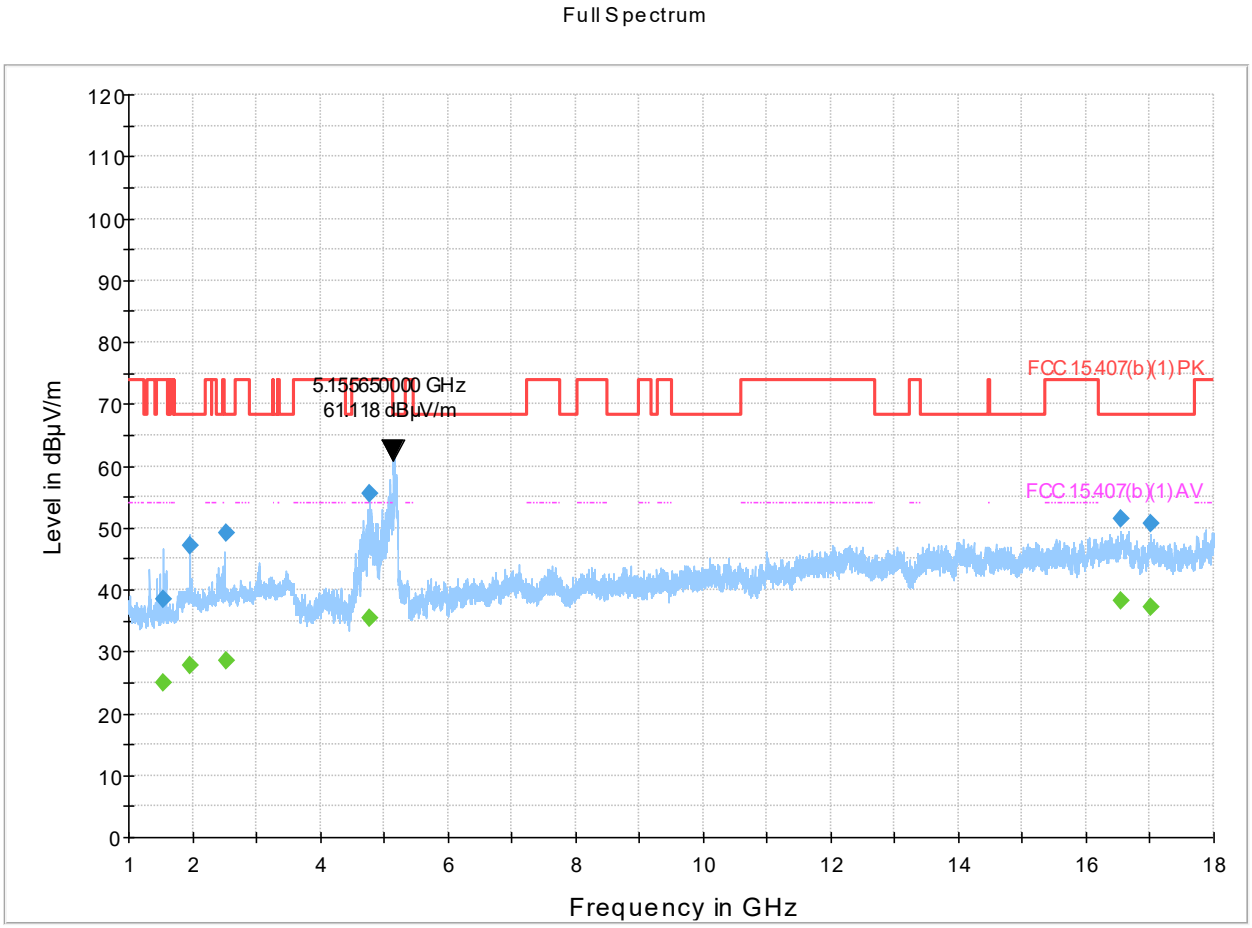

Figure 8.10-33: *Radiated emissions spectral plot (1 GHz - 18 GHz), 5210 MHz operation*

Table 8.10-33*: Radiated emissions results*

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)
1544.050000	38.58	---	73.98	35.40	5000.0	1000.000	150.0	V	165.0	-9.7
1544.050000	---	25.03	53.98	28.95	5000.0	1000.000	150.0	V	165.0	-9.7
1961.000000	47.10	---	68.23	21.13	5000.0	1000.000	189.0	V	130.0	-5.5
1961.000000	---	27.68	---	---	5000.0	1000.000	189.0	V	130.0	-5.5
2521.500000	49.10	---	68.23	19.13	5000.0	1000.000	346.0	V	85.0	-3.8
2521.500000	---	28.47	---	---	5000.0	1000.000	346.0	V	85.0	-3.8
4784.550000	---	35.51	53.98	18.47	5000.0	1000.000	187.0	H	322.0	2.0
4784.550000	55.51	---	73.98	18.47	5000.0	1000.000	187.0	H	322.0	2.0
16549.400000	---	38.17	---	---	5000.0	1000.000	328.0	H	20.0	22.3
16549.400000	51.48	---	68.23	16.75	5000.0	1000.000	328.0	H	20.0	22.3
17006.300000	50.67	---	68.23	17.56	5000.0	1000.000	196.0	H	135.0	19.5
17006.300000	---	37.32	---	---	5000.0	1000.000	196.0	H	135.0	19.5

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
A notch filter was used to suppress the fundamental emission to prevent overloading of measurement equipment.
Marked emission at 5220 MHz is the transmitter fundamental emission and is not evaluated against the limits.

Full Spectrum

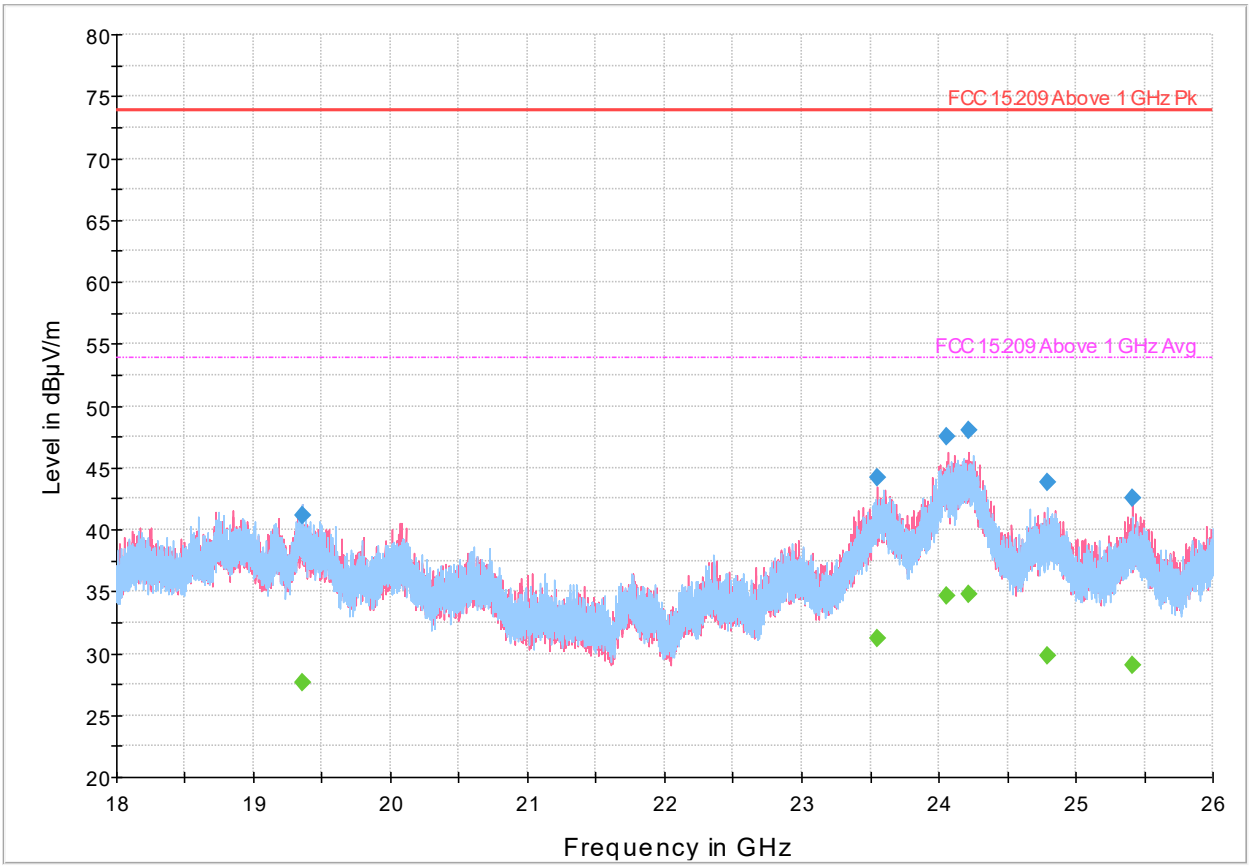

Figure 8.10-34: *Radiated emissions spectral plot (18 GHz - 26 GHz), 5210 MHz operation*

Table 8.10-34*: Radiated emissions results*

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)
19353.700000	---	27.70	53.90	26.20	5000.0	1000.000	258.0	H	0.0	16.7
19353.700000	41.09	---	73.90	32.81	5000.0	1000.000	258.0	H	0.0	16.7
23554.100000	44.25	---	73.90	29.65	5000.0	1000.000	154.0	V	10.0	23.7
23554.100000	---	31.15	53.90	22.75	5000.0	1000.000	154.0	V	10.0	23.7
24062.700000	47.55	---	73.90	26.35	5000.0	1000.000	343.0	V	312.0	27.5
24062.700000	---	34.71	53.90	19.19	5000.0	1000.000	343.0	V	312.0	27.5
24222.700000	48.08	---	73.90	25.82	5000.0	1000.000	104.0	V	254.0	27.0
24222.700000	---	34.74	53.90	19.16	5000.0	1000.000	104.0	V	254.0	27.0
24792.300000	43.79	---	73.90	30.11	5000.0	1000.000	242.0	H	21.0	22.3
24792.300000	---	29.86	53.90	24.04	5000.0	1000.000	242.0	H	21.0	22.3
25413.300000	---	29.07	53.90	24.83	5000.0	1000.000	231.0	V	0.0	21.6
25413.300000	42.57	---	73.90	31.33	5000.0	1000.000	231.0	V	0.0	21.6

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
Results show compliance with 68.23 dBµV/m (at 3m) limit (-27 dBm/MHz)

Full Spectrum

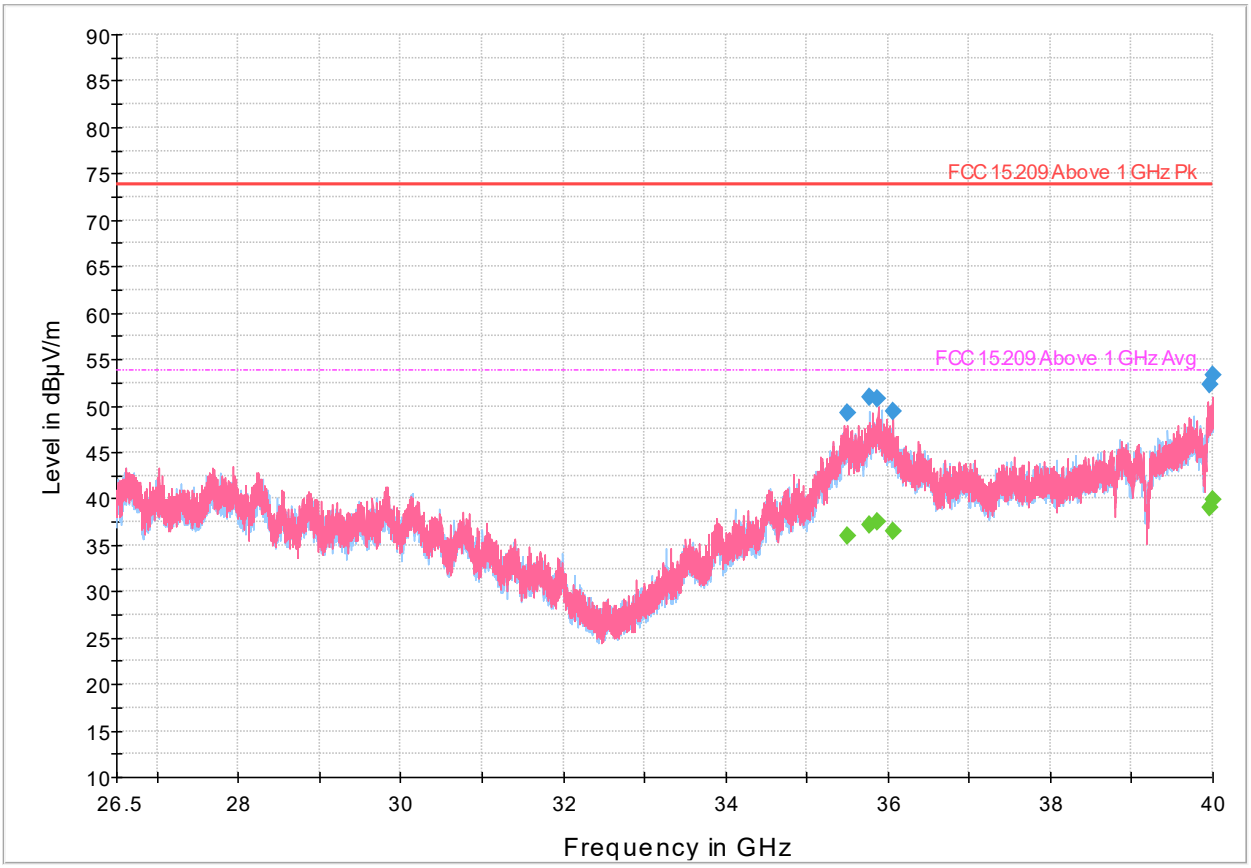

Figure 8.10-35: *Radiated emissions spectral plot (26.5 GHz - 40 GHz), 5210 MHz operation*

Table 8.10-35*: Radiated emissions results*

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)
35496.568750	49.24	---	73.90	24.66	5000.0	1000.000	122.0	V	326.0	19.4
35496.568750	---	36.06	53.90	17.84	5000.0	1000.000	122.0	V	326.0	19.4
35780.631250	50.98	---	73.90	22.92	5000.0	1000.000	127.0	H	358.0	20.5
35780.631250	---	37.20	53.90	16.70	5000.0	1000.000	127.0	H	358.0	20.5
35868.981250	50.76	---	73.90	23.14	5000.0	1000.000	199.0	V	10.0	20.7
35868.981250	---	37.55	53.90	16.35	5000.0	1000.000	199.0	V	10.0	20.7
36070.637500	---	36.43	53.90	17.47	5000.0	1000.000	131.0	V	5.0	20.3
36070.637500	49.45	---	73.90	24.45	5000.0	1000.000	131.0	V	5.0	20.3
39954.531250	---	39.04	53.90	14.86	5000.0	1000.000	127.0	V	121.0	20.5
39954.531250	52.21	---	73.90	21.69	5000.0	1000.000	127.0	V	121.0	20.5
39998.237500	53.39	---	73.90	20.51	5000.0	1000.000	175.0	V	4.0	21.1
39998.237500	---	39.84	53.90	14.06	5000.0	1000.000	175.0	V	4.0	21.1

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
Results show compliance with 68.23 dBµV/m (at 3m) limit (-27 dBm/MHz)

Full Spectrum

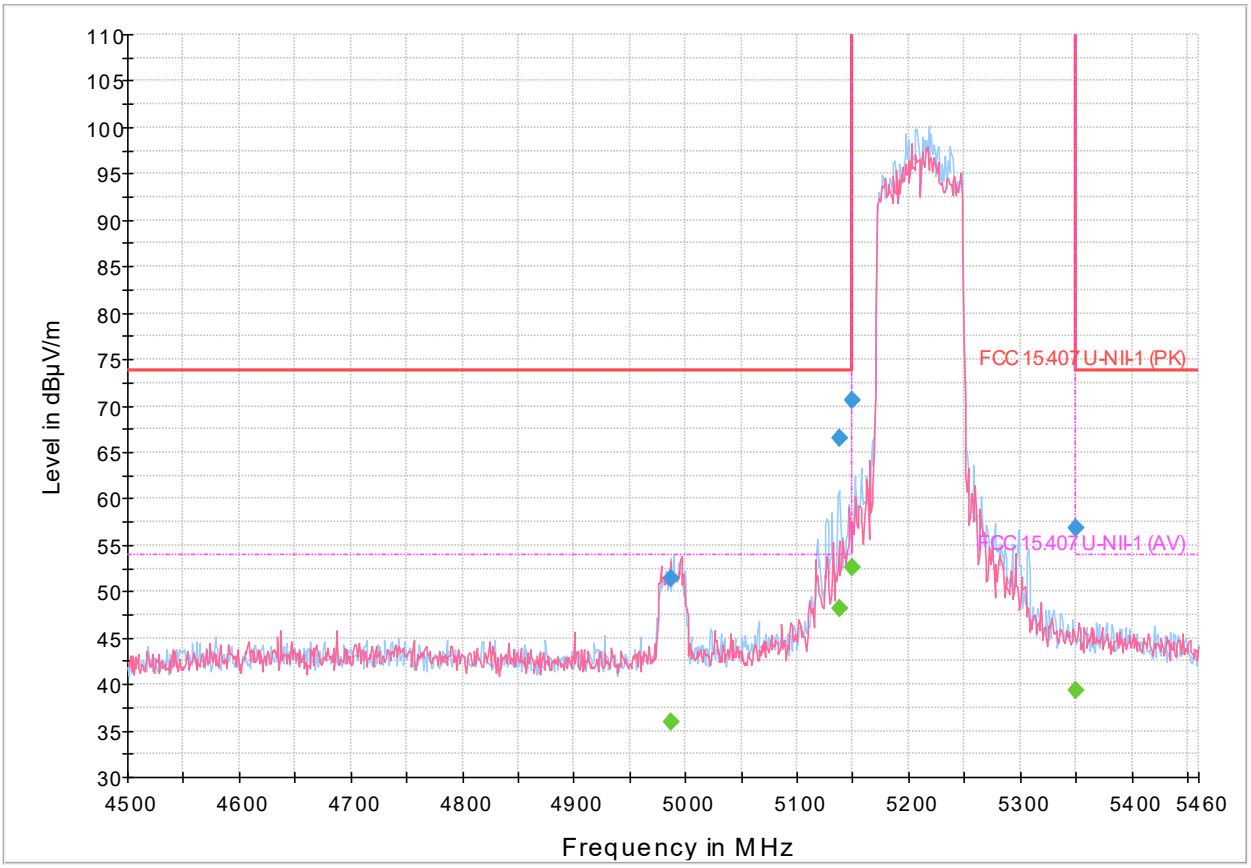

Figure 8.10-36: *Radiated emissions spectral plot (4.5 GHz - 5.46 GHz), 5210 MHz operation*

Table 8.10-36*: Radiated emissions results*

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)
4986.720000	51.48	---	73.90	22.42	5000.0	1000.000	120.0	V	250.0	1.4
4986.720000	---	35.90	53.90	18.00	5000.0	1000.000	120.0	V	250.0	1.4
5137.440000	66.44	---	73.90	7.46	5000.0	1000.000	188.0	V	20.0	2.3
5137.440000	---	48.25	53.90	5.65	5000.0	1000.000	188.0	V	20.0	2.3
5150.000000	70.53	---	73.90	3.37	5000.0	1000.000	196.0	V	0.0	2.4
5150.000000	---	52.63	53.90	1.27	5000.0	1000.000	196.0	V	0.0	2.4
5350.000000	56.86	---	73.90	17.04	5000.0	1000.000	235.0	H	11.0	2.9
5350.000000	---	39.40	53.90	14.50	5000.0	1000.000	235.0	H	11.0	2.9

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.

8.10.6.2 5725 – 5850 MHz operation

IEEE 802.11a (CDD) mode

Note: Spurious emissions limit of -27 dBm/MHz corresponds to field strength at 3m measurement distance of 68.23 dBµV/m. Emissions in restricted bands must meet the limits of FCC 15.209.

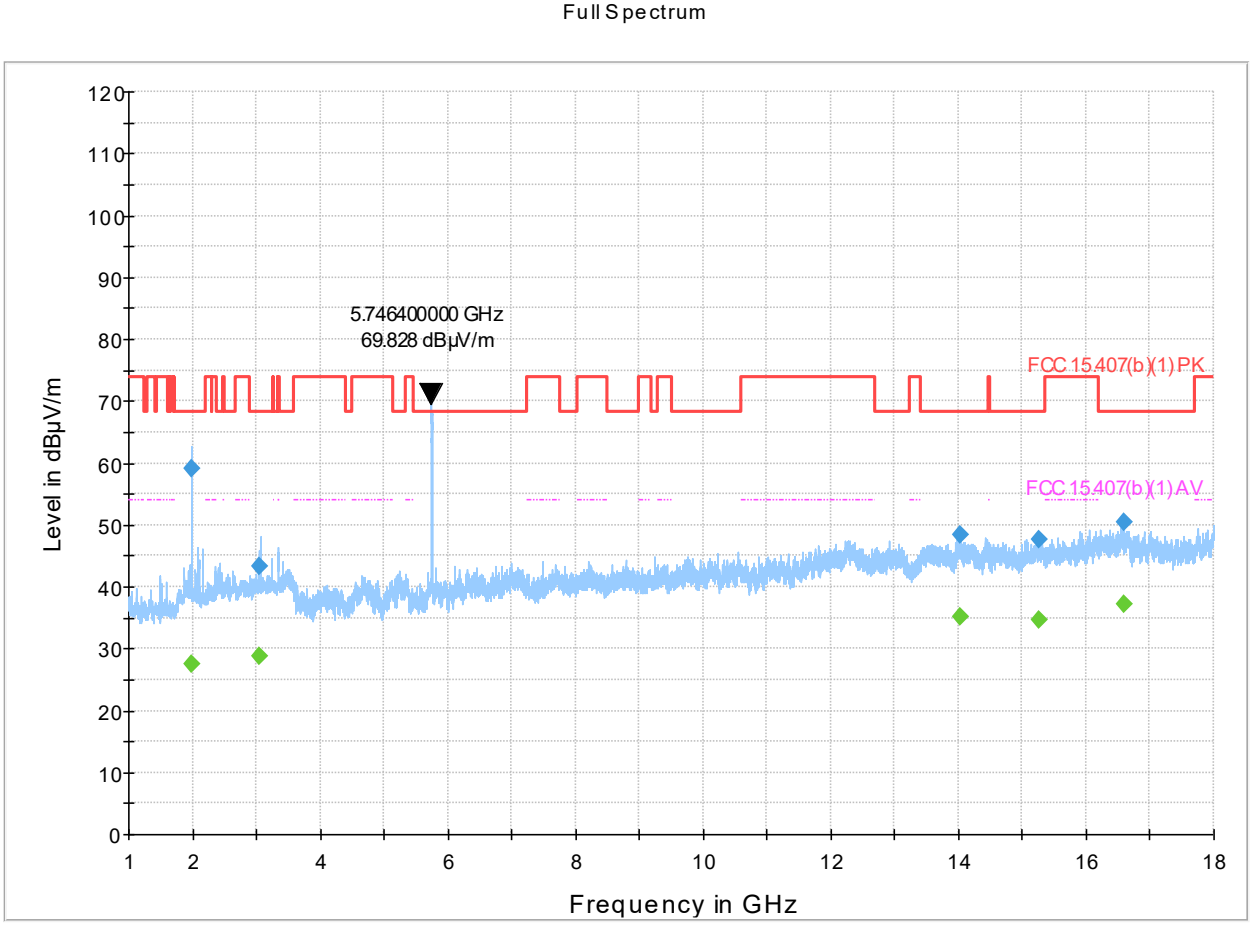

Figure 8.10-37: *Radiated emissions spectral plot (1 GHz - 18 GHz), 5745 MHz operation*

Table 8.10-37*: Radiated emissions results*

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)
1995.700000	59.03	---	68.23	9.20	5000.0	1000.000	138.0	V	30.0	-6.0
1995.700000	---	27.55	---	---	5000.0	1000.000	138.0	V	30.0	-6.0
3058.200000	---	28.71	---	---	5000.0	1000.000	252.0	H	108.0	-2.2
3058.200000	43.43	---	68.23	24.80	5000.0	1000.000	252.0	H	108.0	-2.2
14018.400000	48.38	---	68.23	19.85	5000.0	1000.000	106.0	V	30.0	17.2
14018.400000	---	35.13	---	---	5000.0	1000.000	106.0	V	30.0	17.2
15254.250000	47.68	---	68.23	20.55	5000.0	1000.000	141.0	H	97.0	18.1
15254.250000	---	34.74	---	---	5000.0	1000.000	141.0	H	97.0	18.1
16584.100000	50.50	---	68.23	17.73	5000.0	1000.000	371.0	V	268.0	22.2
16584.100000	---	37.08	---	---	5000.0	1000.000	371.0	V	268.0	22.2

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
A notch filter was used to suppress the fundamental emission to prevent overloading of measurement equipment.
Marked emission at 5746 MHz is the transmitter fundamental emission and is not evaluated against the limits.

Full Spectrum

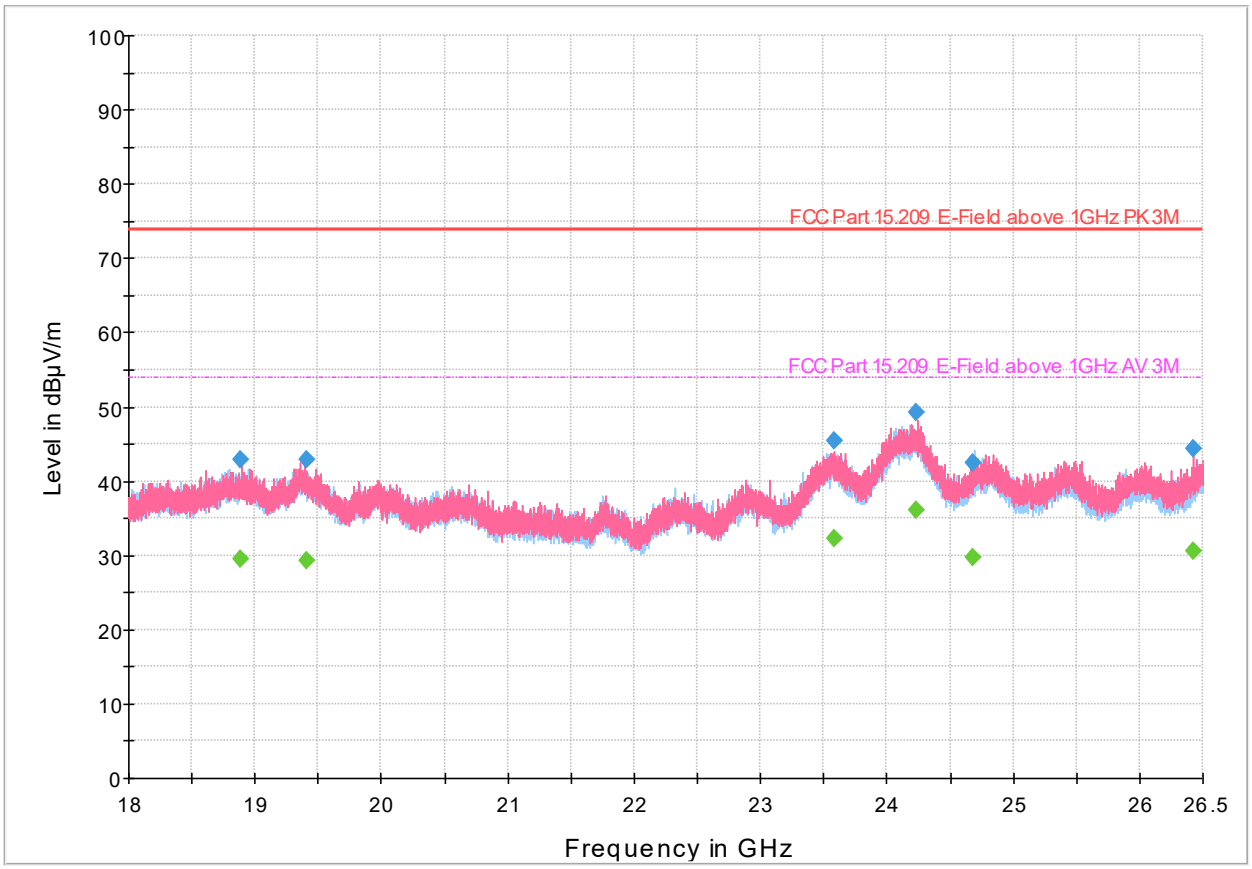

Figure 8.10-38: *Radiated emissions spectral plot (18 GHz - 26.5 GHz), 5745 MHz operation*

Table 8.10-38*: Radiated emissions results*

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)
18887.193750	42.83	---	73.90	31.07	5000.0	1000.000	226.0	V	289.0	15.9
18887.193750	---	29.48	53.90	24.42	5000.0	1000.000	226.0	V	289.0	15.9
19405.331250	42.94	---	73.90	30.96	5000.0	1000.000	306.0	V	316.0	16.6
19405.331250	---	29.38	53.90	24.52	5000.0	1000.000	306.0	V	316.0	16.6
23581.450000	45.51	---	73.90	28.39	5000.0	1000.000	400.0	V	0.0	23.9
23581.450000	---	32.31	53.90	21.59	5000.0	1000.000	400.0	V	0.0	23.9
24237.456250	49.31	---	73.90	24.59	5000.0	1000.000	400.0	V	314.0	27.0
24237.456250	---	36.07	53.90	17.83	5000.0	1000.000	400.0	V	314.0	27.0
24684.193750	42.53	---	73.90	31.37	5000.0	1000.000	365.0	H	283.0	22.4
24684.193750	---	29.70	53.90	24.20	5000.0	1000.000	365.0	H	283.0	22.4
26431.050000	44.28	---	73.90	29.62	5000.0	1000.000	400.0	V	0.0	23.1
26431.050000	---	30.65	53.90	23.25	5000.0	1000.000	400.0	V	0.0	23.1

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
Results show compliance with 68.23 dBµV/m (at 3m) limit (-27 dBm/MHz)

Full Spectrum

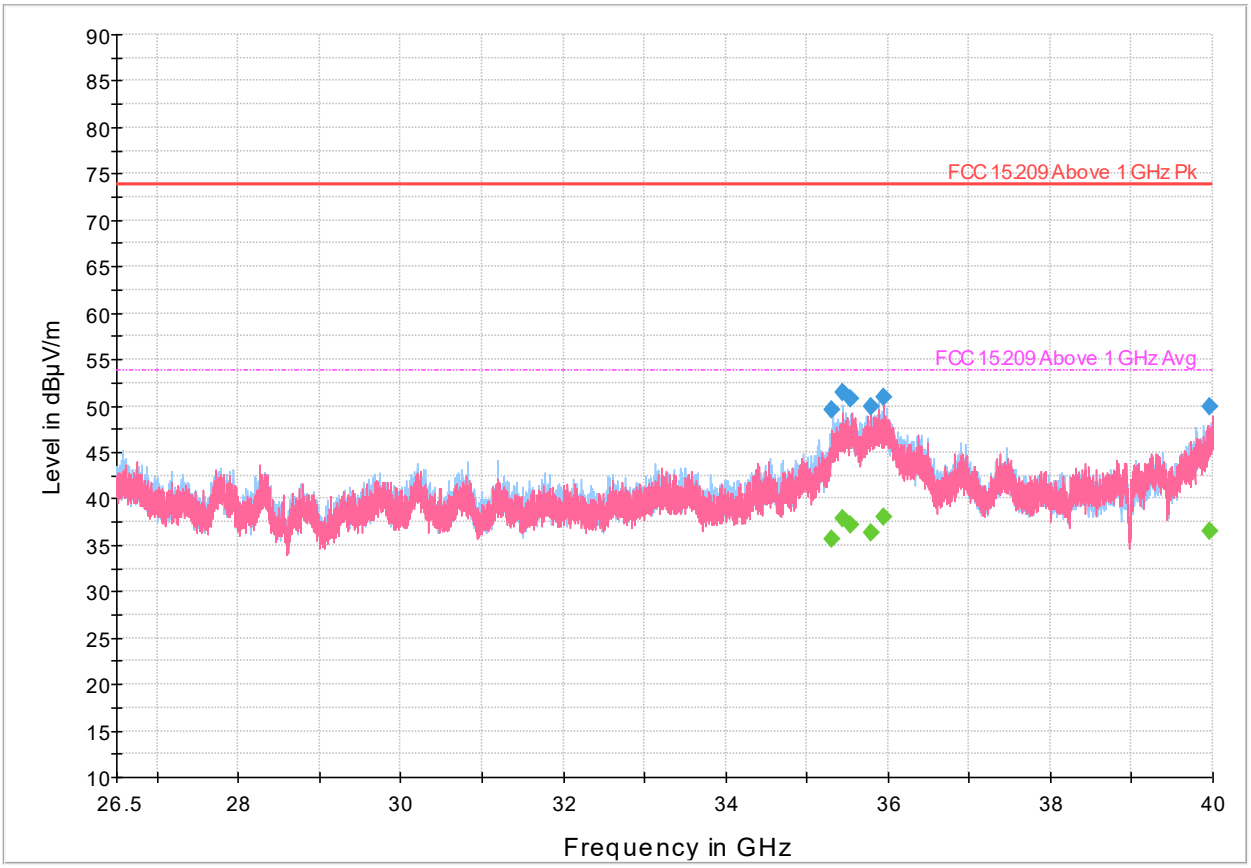

Figure 8.10-39: *Radiated emissions spectral plot (26.5 GHz - 40 GHz), 5745 MHz operation*

Table 8.10-39*: Radiated emissions results*

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)
35309.443750	---	35.65	53.90	18.25	5000.0	1000.000	114.0	H	112.0	17.6
35309.443750	49.53	---	73.90	24.37	5000.0	1000.000	114.0	H	112.0	17.6
35432.425000	---	37.92	53.90	15.98	5000.0	1000.000	183.0	V	5.0	18.8
35432.425000	51.49	---	73.90	22.41	5000.0	1000.000	183.0	V	5.0	18.8
35544.925000	50.70	---	73.90	23.20	5000.0	1000.000	225.0	H	3.0	19.6
35544.925000	---	37.25	53.90	16.65	5000.0	1000.000	225.0	H	3.0	19.6
35786.200000	49.90	---	73.90	24.00	5000.0	1000.000	111.0	V	328.0	20.5
35786.200000	---	36.29	53.90	17.61	5000.0	1000.000	111.0	V	328.0	20.5
35941.225000	50.87	---	73.90	23.03	5000.0	1000.000	109.0	V	5.0	20.9
35941.225000	---	37.94	53.90	15.96	5000.0	1000.000	109.0	V	5.0	20.9
39964.356250	49.86	---	73.90	24.04	5000.0	1000.000	225.0	H	10.0	20.6
39964.356250	---	36.52	53.90	17.38	5000.0	1000.000	225.0	H	10.0	20.6

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
Results show compliance with 68.23 dBµV/m (at 3m) limit (-27 dBm/MHz)

Full Spectrum

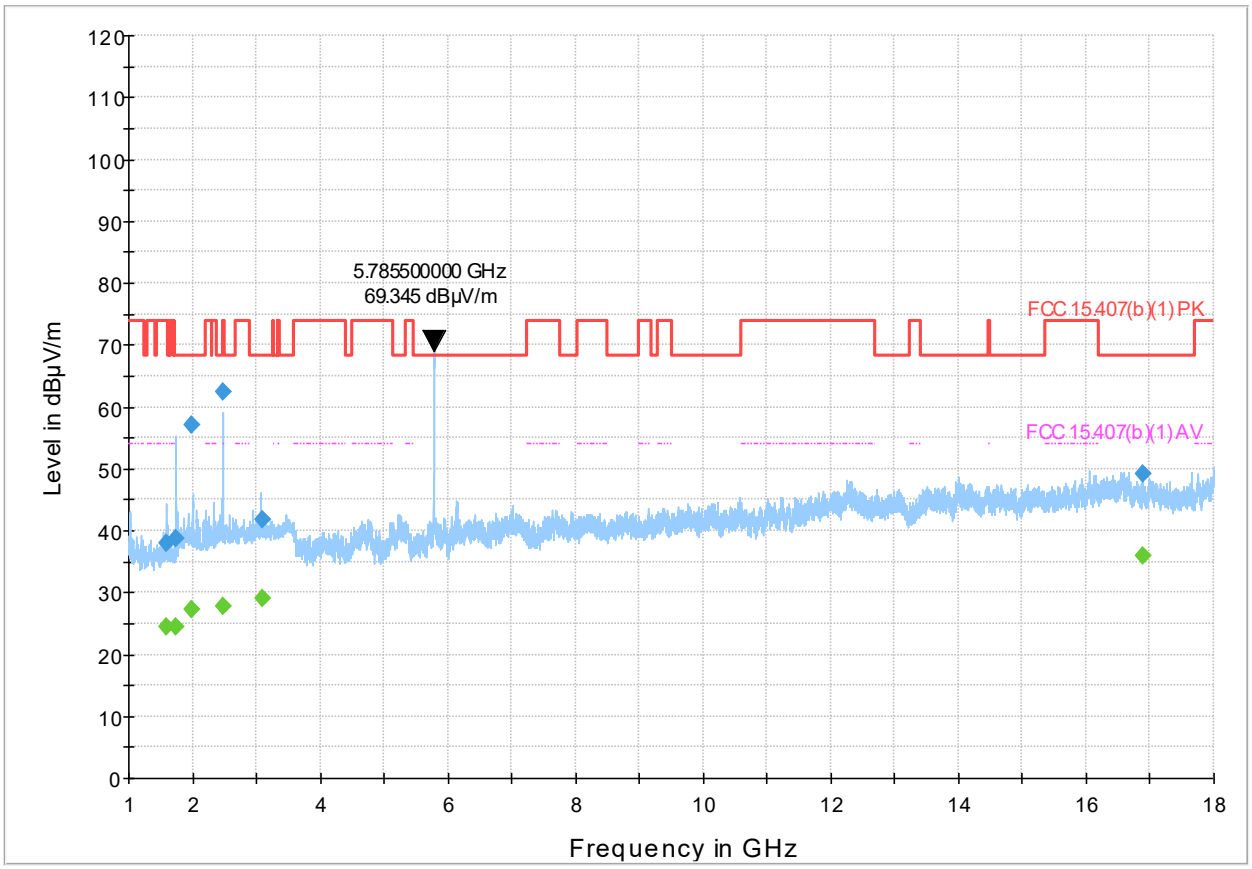

Figure 8.10-40: *Radiated emissions spectral plot (1 GHz - 18 GHz), 5785 MHz operation*

Table 8.10-40*: Radiated emissions results*

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)
1586.950000	37.99	---	73.98	35.99	5000.0	1000.000	373.0	V	140.0	-9.5
1586.950000	---	24.43	53.98	29.55	5000.0	1000.000	373.0	V	140.0	-9.5
1746.600000	38.69	---	68.23	29.54	5000.0	1000.000	217.0	H	240.0	-8.7
1746.600000	---	24.56	---	---	5000.0	1000.000	217.0	H	240.0	-8.7
1995.400000	56.98	---	68.23	11.25	5000.0	1000.000	319.0	H	296.0	-6.0
1995.400000	---	27.27	---	---	5000.0	1000.000	319.0	H	296.0	-6.0
2491.350000	---	27.69	53.98	26.29	5000.0	1000.000	261.0	H	212.0	-4.0
2491.350000	62.38	---	73.98	11.60	5000.0	1000.000	261.0	H	212.0	-4.0
3088.800000	---	28.95	---	---	5000.0	1000.000	114.0	H	0.0	-1.9
3088.800000	41.84	---	68.23	26.39	5000.0	1000.000	114.0	H	0.0	-1.9
16885.700000	49.09	---	68.23	19.14	5000.0	1000.000	274.0	V	10.0	20.3
16885.700000	---	35.97	---	---	5000.0	1000.000	274.0	V	10.0	20.3

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
A notch filter was used to suppress the fundamental emission to prevent overloading of measurement equipment.
Marked emission at 5785 MHz is the transmitter fundamental emission and is not evaluated against the limits.

Full Spectrum

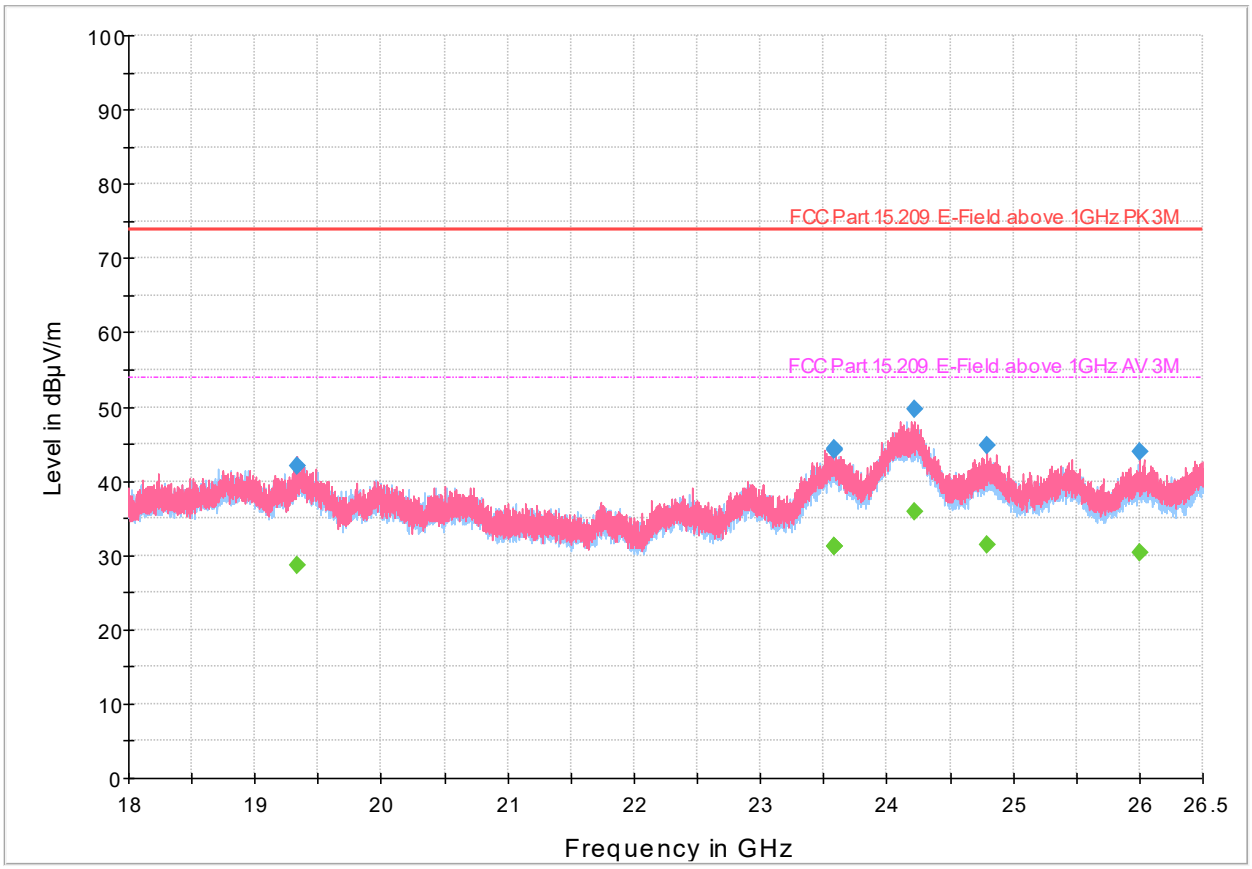

Figure 8.10-41: *Radiated emissions spectral plot (18 GHz - 26.5 GHz), 5785 MHz operation*

Table 8.10-41*: Radiated emissions results*

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)
19337.981250	---	28.73	53.90	25.17	5000.0	1000.000	138.0	V	355.0	16.7
19337.981250	41.98	---	73.90	31.92	5000.0	1000.000	138.0	V	355.0	16.7
23586.637500	---	31.14	53.90	22.76	5000.0	1000.000	322.0	V	11.0	23.9
23586.637500	44.21	---	73.90	29.69	5000.0	1000.000	322.0	V	11.0	23.9
23589.125000	44.48	---	73.90	29.42	5000.0	1000.000	388.0	V	258.0	23.9
23589.125000	---	31.18	53.90	22.72	5000.0	1000.000	388.0	V	258.0	23.9
24215.556250	---	35.91	53.90	17.99	5000.0	1000.000	171.0	V	249.0	27.1
24215.556250	49.67	---	73.90	24.23	5000.0	1000.000	171.0	V	249.0	27.1
24789.887500	---	31.51	53.90	22.39	5000.0	1000.000	306.0	V	0.0	22.3
24789.887500	44.73	---	73.90	29.17	5000.0	1000.000	306.0	V	0.0	22.3
25998.225000	43.87	---	73.90	30.03	5000.0	1000.000	110.0	V	53.0	21.8
25998.225000	---	30.41	53.90	23.49	5000.0	1000.000	110.0	V	53.0	21.8

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
Results show compliance with 68.23 dBµV/m (at 3m) limit (-27 dBm/MHz)

Full Spectrum

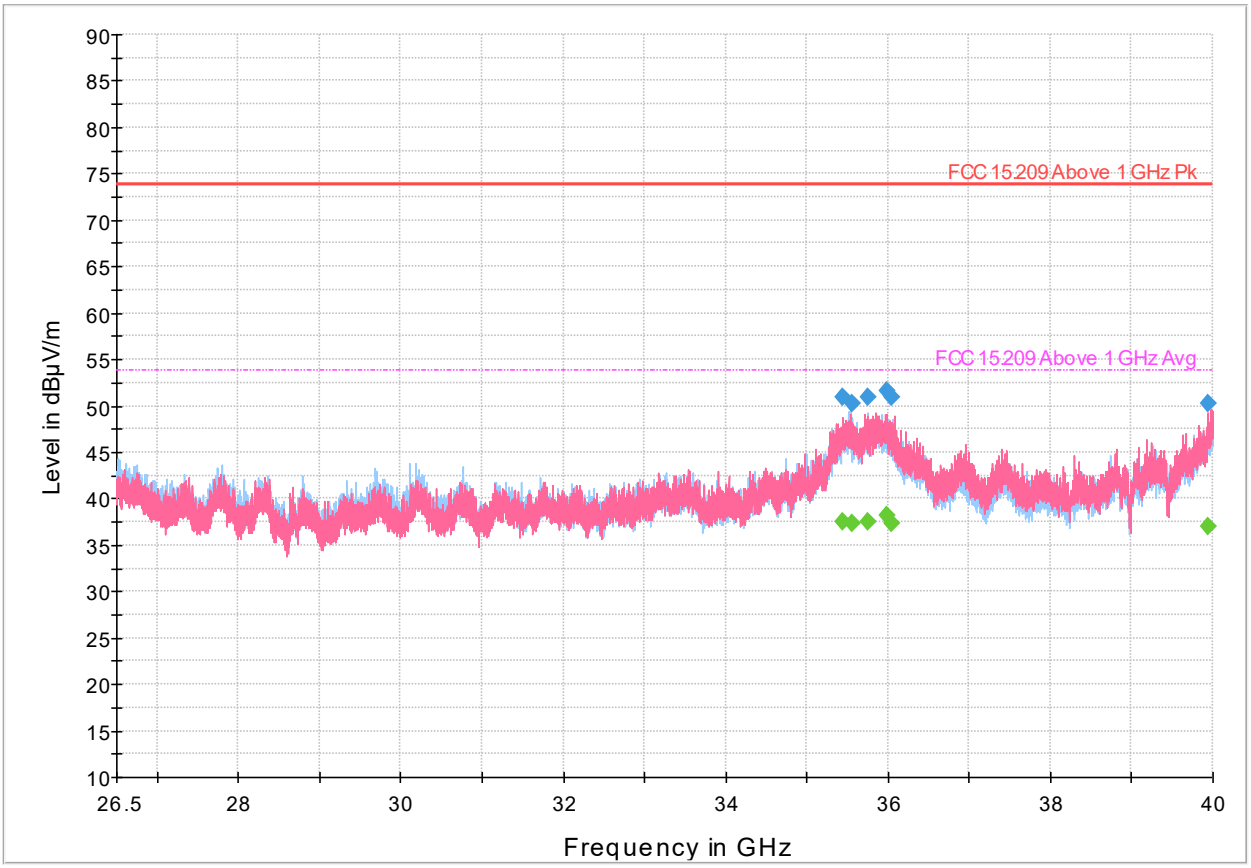

Figure 8.10-42: *Radiated emissions spectral plot (26.5 GHz - 40 GHz), 5785 MHz operation*

Table 8.10-42*: Radiated emissions results*

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)
35433.906250	50.91	---	73.90	22.99	5000.0	1000.000	148.0	V	297.0	18.8
35433.906250	---	37.53	53.90	16.37	5000.0	1000.000	148.0	V	297.0	18.8
35551.981250	---	37.27	53.90	16.63	5000.0	1000.000	214.0	H	10.0	19.7
35551.981250	50.20	---	73.90	23.70	5000.0	1000.000	214.0	H	10.0	19.7
35754.868750	---	37.55	53.90	16.35	5000.0	1000.000	169.0	H	52.0	20.5
35754.868750	50.90	---	73.90	23.00	5000.0	1000.000	169.0	H	52.0	20.5
35984.575000	---	38.17	53.90	15.73	5000.0	1000.000	134.0	V	358.0	21.0
35984.575000	51.57	---	73.90	22.33	5000.0	1000.000	134.0	V	358.0	21.0
36052.018750	51.01	---	73.90	22.89	5000.0	1000.000	199.0	H	109.0	20.5
36052.018750	---	37.36	53.90	16.54	5000.0	1000.000	199.0	H	109.0	20.5
39942.006250	---	36.95	53.90	16.95	5000.0	1000.000	190.0	V	3.0	20.3
39942.006250	50.24	---	73.90	23.66	5000.0	1000.000	190.0	V	3.0	20.3

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
Results show compliance with 68.23 dBµV/m (at 3m) limit (-27 dBm/MHz)

Full Spectrum

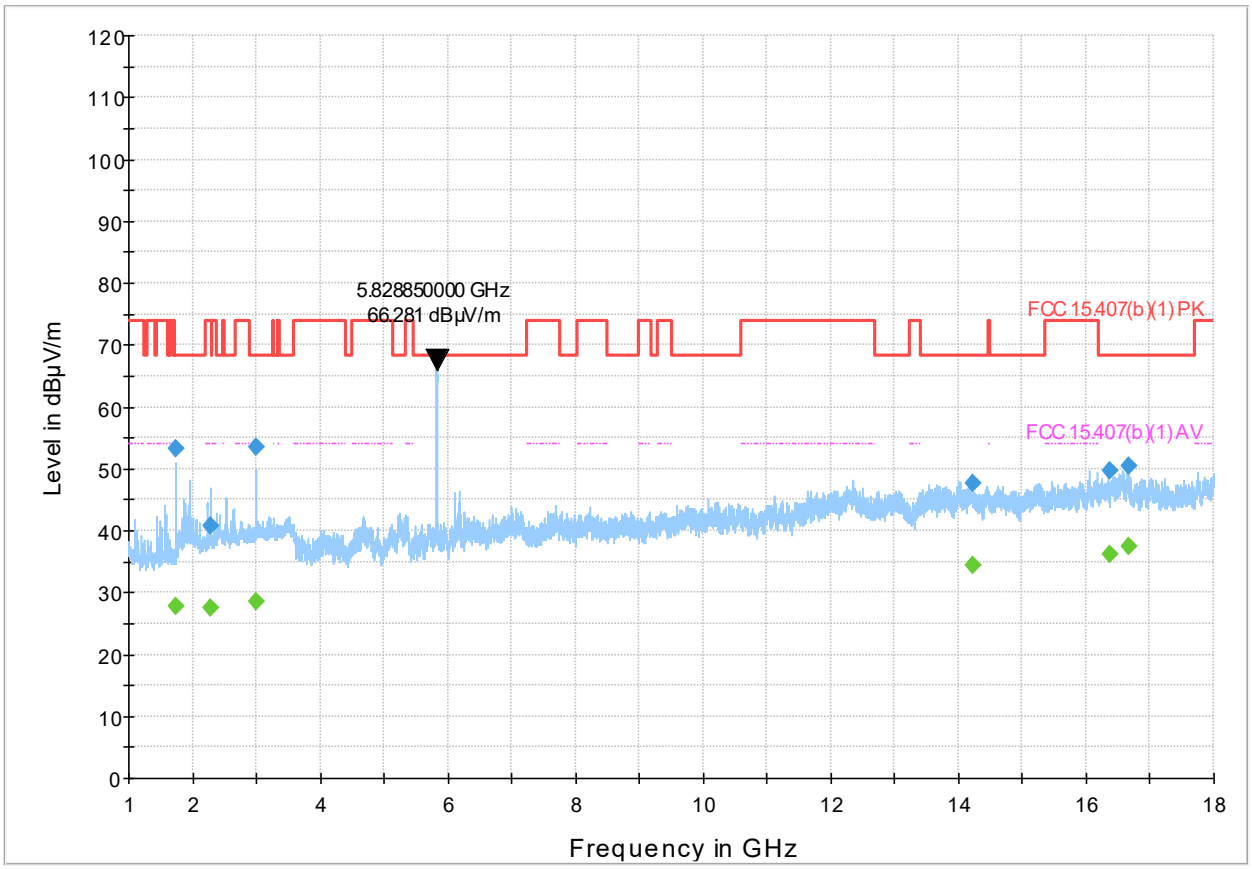

Figure 8.10-43: *Radiated emissions spectral plot (1 GHz - 18 GHz), 5825 MHz operation*

Table 8.10-43*: Radiated emissions results*

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)
1741.600000	53.33	---	68.23	14.90	5000.0	1000.000	359.0	H	136.0	-8.8
1741.600000	---	27.89	---	---	5000.0	1000.000	359.0	H	136.0	-8.8
2275.900000	---	27.44	53.98	26.54	5000.0	1000.000	142.0	V	224.0	-5.1
2275.900000	40.82	---	73.98	33.16	5000.0	1000.000	142.0	V	224.0	-5.1
2995.700000	53.58	---	68.23	14.65	5000.0	1000.000	119.0	V	97.0	-2.4
2995.700000	---	28.59	---	---	5000.0	1000.000	119.0	V	97.0	-2.4
14221.500000	---	34.37	---	---	5000.0	1000.000	375.0	V	130.0	16.2
14221.500000	47.62	---	68.23	20.61	5000.0	1000.000	375.0	V	130.0	16.2
16360.350000	49.57	---	68.23	18.66	5000.0	1000.000	366.0	H	54.0	21.5
16360.350000	---	36.15	---	---	5000.0	1000.000	366.0	H	54.0	21.5
16659.550000	50.49	---	68.23	17.74	5000.0	1000.000	255.0	V	218.0	23.0
16659.550000	---	37.35	---	---	5000.0	1000.000	255.0	V	218.0	23.0

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
A notch filter was used to suppress the fundamental emission to prevent overloading of measurement equipment.
Marked emission at 5829 MHz is the transmitter fundamental emission and is not evaluated against the limits.

Full Spectrum

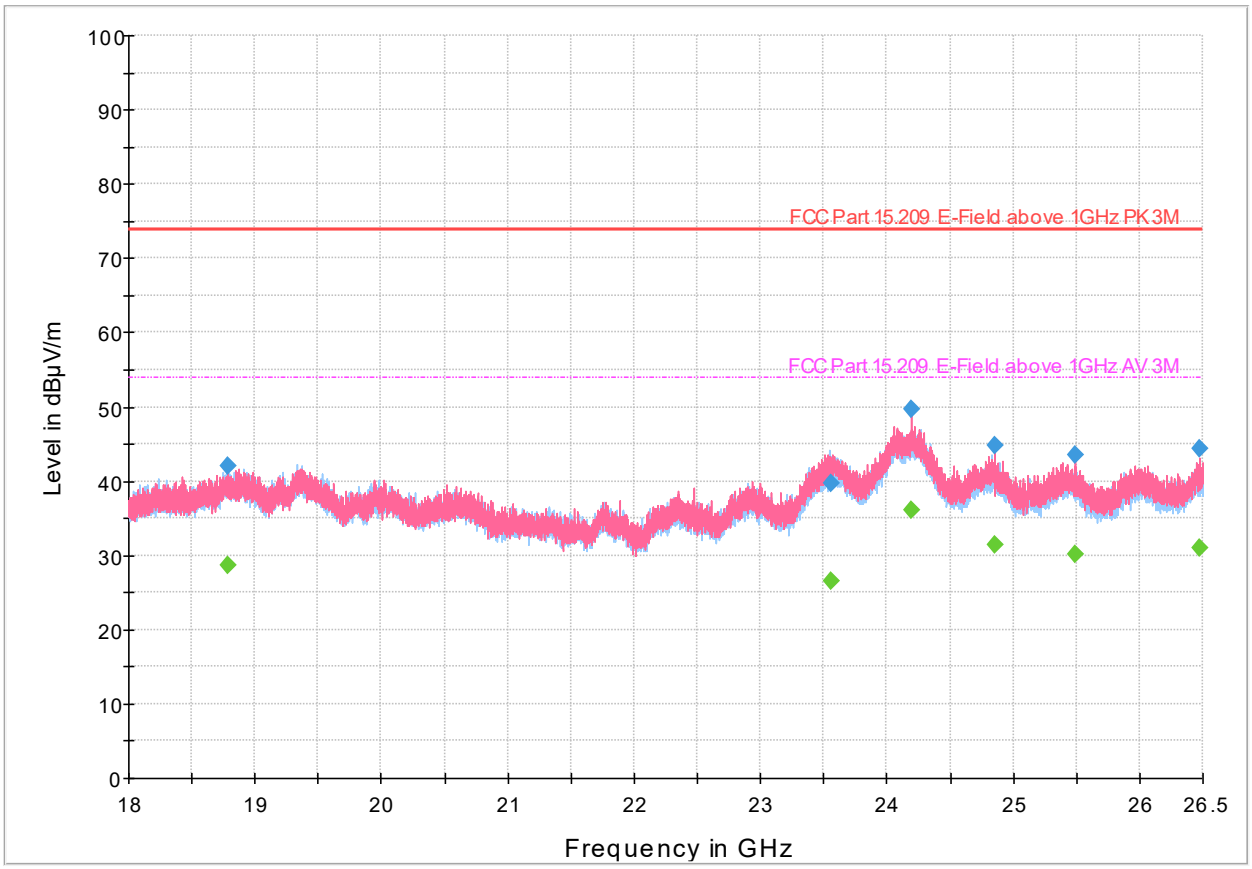

Figure 8.10-44: *Radiated emissions spectral plot (18 GHz - 26.5 GHz), 5825 MHz operation*

Table 8.10-44*: Radiated emissions results*

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)
18779.806250	42.13	---	73.90	31.77	5000.0	1000.000	346.0	V	312.0	15.9
18779.806250	---	28.68	53.90	25.22	5000.0	1000.000	346.0	V	312.0	15.9
23552.937500	---	26.53	53.90	27.37	5000.0	1000.000	123.0	H	356.0	23.7
23552.937500	39.64	---	73.90	34.26	5000.0	1000.000	123.0	H	356.0	23.7
24191.856250	---	36.01	53.90	17.89	5000.0	1000.000	106.0	V	270.0	27.1
24191.856250	49.77	---	73.90	24.13	5000.0	1000.000	106.0	V	270.0	27.1
24859.775000	---	31.48	53.90	22.42	5000.0	1000.000	356.0	V	347.0	22.3
24859.775000	44.85	---	73.90	29.05	5000.0	1000.000	356.0	V	347.0	22.3
25492.743750	43.56	---	73.90	30.34	5000.0	1000.000	316.0	V	0.0	21.9
25492.743750	---	30.15	53.90	23.75	5000.0	1000.000	316.0	V	0.0	21.9
26477.250000	---	31.00	53.90	22.90	5000.0	1000.000	398.0	V	0.0	23.3
26477.250000	44.31	---	73.90	29.59	5000.0	1000.000	398.0	V	0.0	23.3

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
Results show compliance with 68.23 dBµV/m (at 3m) limit (-27 dBm/MHz)

Full Spectrum

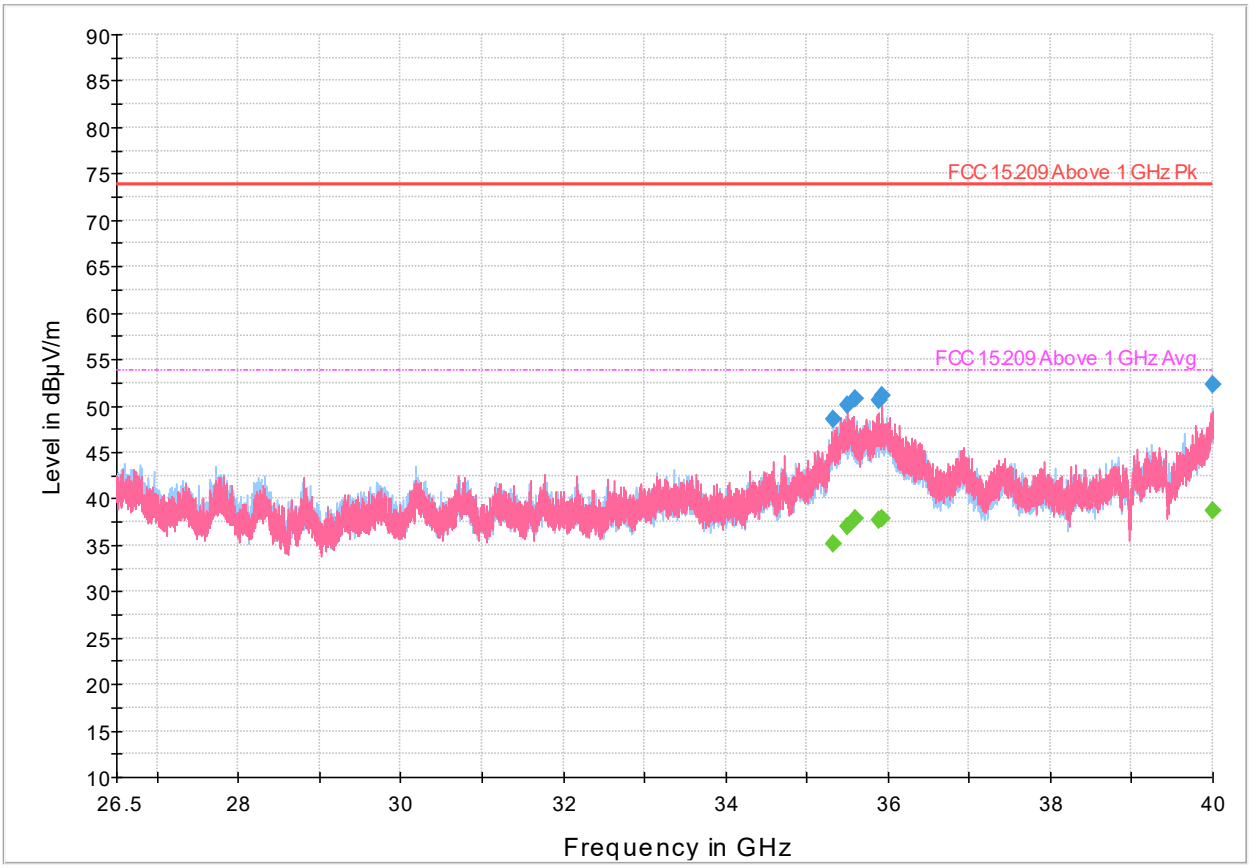

Figure 8.10-45: *Radiated emissions spectral plot (26.5 GHz - 40 GHz), 5825 MHz operation*

Table 8.10-45*: Radiated emissions results*

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)
35323.412500	48.50	---	73.90	25.40	5000.0	1000.000	114.0	H	58.0	17.8
35323.412500	---	35.12	53.90	18.78	5000.0	1000.000	114.0	H	58.0	17.8
35491.131250	---	36.98	53.90	16.92	5000.0	1000.000	225.0	V	161.0	19.4
35491.131250	50.09	---	73.90	23.81	5000.0	1000.000	225.0	V	161.0	19.4
35592.887500	50.81	---	73.90	23.09	5000.0	1000.000	154.0	V	6.0	19.8
35592.887500	---	37.85	53.90	16.05	5000.0	1000.000	154.0	V	6.0	19.8
35884.000000	---	37.65	53.90	16.25	5000.0	1000.000	192.0	V	348.0	20.7
35884.000000	50.61	---	73.90	23.29	5000.0	1000.000	192.0	V	348.0	20.7
35919.343750	51.15	---	73.90	22.75	5000.0	1000.000	128.0	V	-1.0	20.8
35919.343750	---	37.92	53.90	15.98	5000.0	1000.000	128.0	V	-1.0	20.8
39997.862500	52.25	---	73.90	21.65	5000.0	1000.000	118.0	H	10.0	21.1
39997.862500	---	38.71	53.90	15.19	5000.0	1000.000	118.0	H	10.0	21.1

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
Results show compliance with 68.23 dBµV/m (at 3m) limit (-27 dBm/MHz)

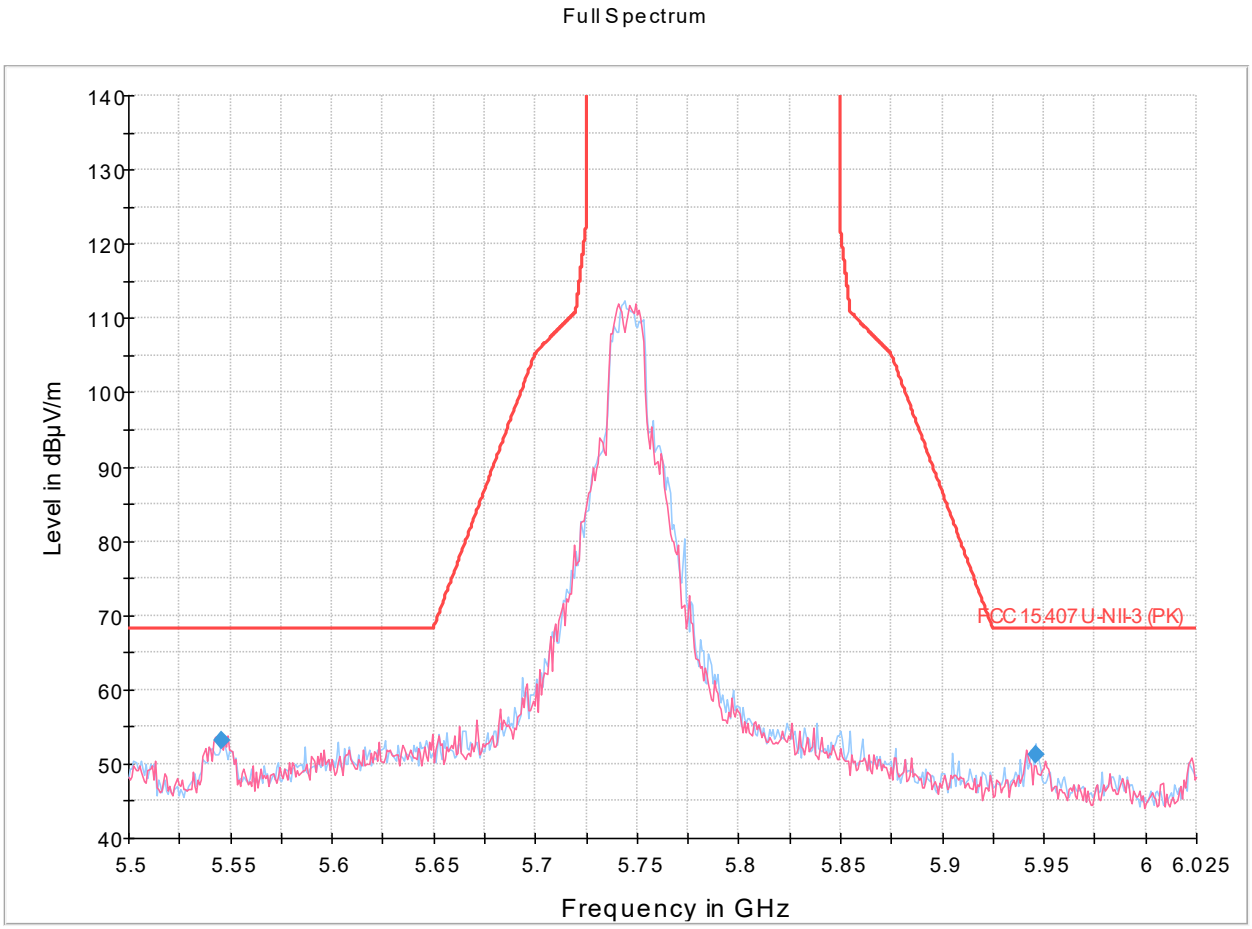

Figure 8.10-46: *Radiated emissions spectral plot (5.5 GHz - 6.025 GHz), 5745 MHz operation*

Table 8.10-46*: Radiated emissions results*

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
5545.500000	53.25	68.23	14.98	5000.0	1000.000	185.0	V	11.0	3.0
5946.250000	51.33	68.23	16.90	5000.0	1000.000	170.0	V	30.0	4.3

Notes:
[1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.

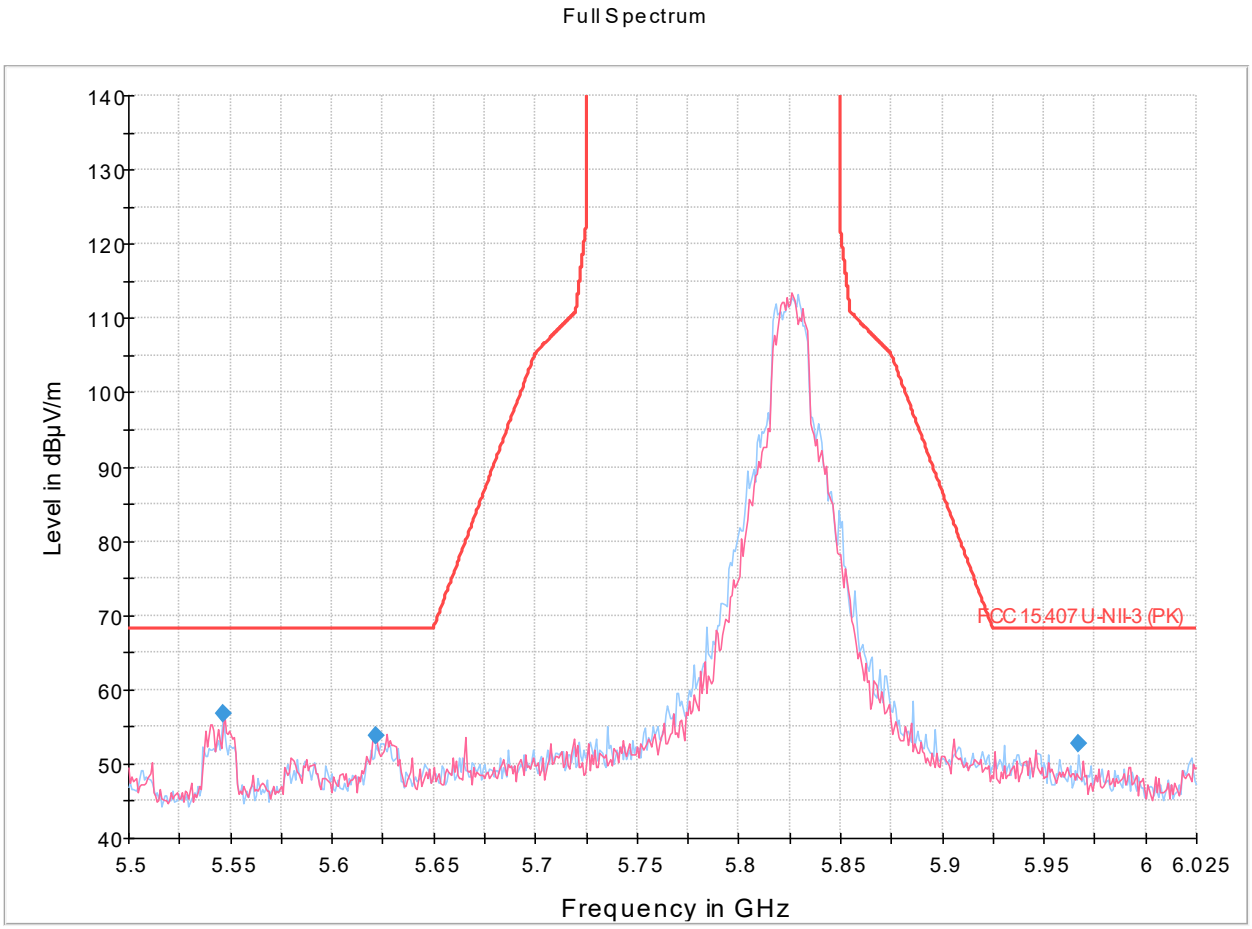

Figure 8.10-47: *Radiated emissions spectral plot (5.5 GHz - 6.025 GHz), 5825 MHz operation*

Table 8.10-47*: Radiated emissions results*

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
5546.375000	56.84	68.23	11.39	5000.0	1000.000	223.0	H	0.0	3.0
5621.625000	53.76	68.23	14.47	5000.0	1000.000	193.0	V	0.0	3.5
5967.250000	52.81	68.23	15.42	5000.0	1000.000	195.0	H	42.0	4.3

Notes:
[1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.

IEEE 802.11n/ac (V)HT20 (CDD) mode

Note: Spurious emissions limit of -27 dBm/MHz corresponds to field strength at 3m measurement distance of 68.23 dBµV/m. Emissions in restricted bands must meet the limits of FCC 15.209.

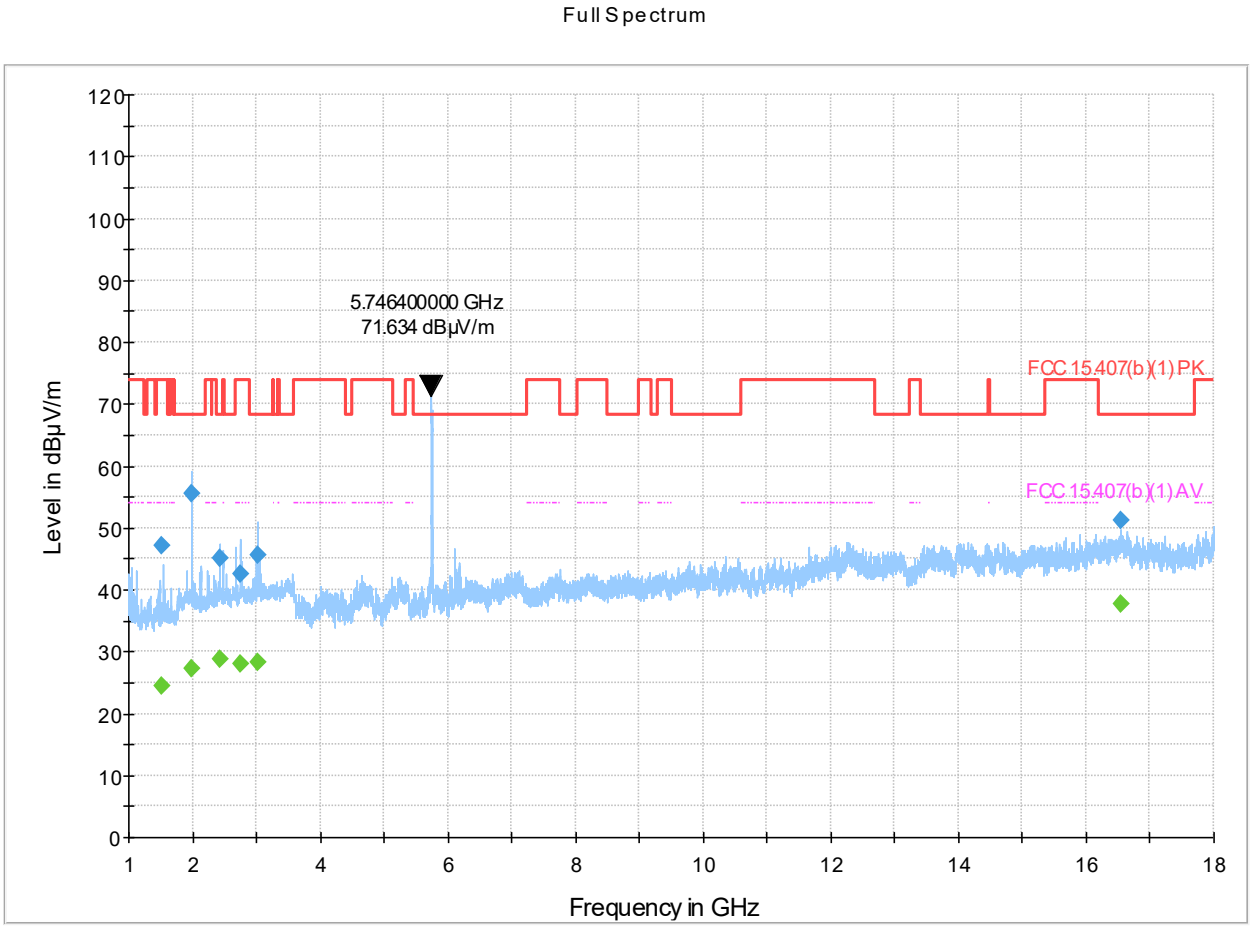

Figure 8.10-48: *Radiated emissions spectral plot (1 GHz - 18 GHz), 5745 MHz operation*

Table 8.10-48*: Radiated emissions results*

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)
1528.700000	47.06	---	73.98	26.92	5000.0	1000.000	172.0	H	11.0	-9.9
1528.700000	---	24.52	53.98	29.46	5000.0	1000.000	172.0	H	11.0	-9.9
1993.150000	55.59	---	68.23	12.64	5000.0	1000.000	400.0	H	94.0	-6.0
1993.150000	---	27.15	---	---	5000.0	1000.000	400.0	H	94.0	-6.0
2434.950000	---	28.79	---	---	5000.0	1000.000	327.0	V	0.0	-4.1
2434.950000	44.98	---	68.23	23.25	5000.0	1000.000	327.0	V	0.0	-4.1
2740.600000	42.63	---	73.98	31.35	5000.0	1000.000	159.0	H	65.0	-3.3
2740.600000	---	27.97	53.98	26.01	5000.0	1000.000	159.0	H	65.0	-3.3
3027.350000	---	28.35	---	---	5000.0	1000.000	145.0	H	131.0	-2.3
3027.350000	45.60	---	68.23	22.63	5000.0	1000.000	145.0	H	131.0	-2.3
16552.050000	51.26	---	68.23	16.97	5000.0	1000.000	216.0	V	0.0	22.3
16552.050000	---	37.66	---	---	5000.0	1000.000	216.0	V	0.0	22.3

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
A notch filter was used to suppress the fundamental emission to prevent overloading of measurement equipment.
Marked emission at 5746 MHz is the transmitter fundamental emission and is not evaluated against the limits.

Full Spectrum

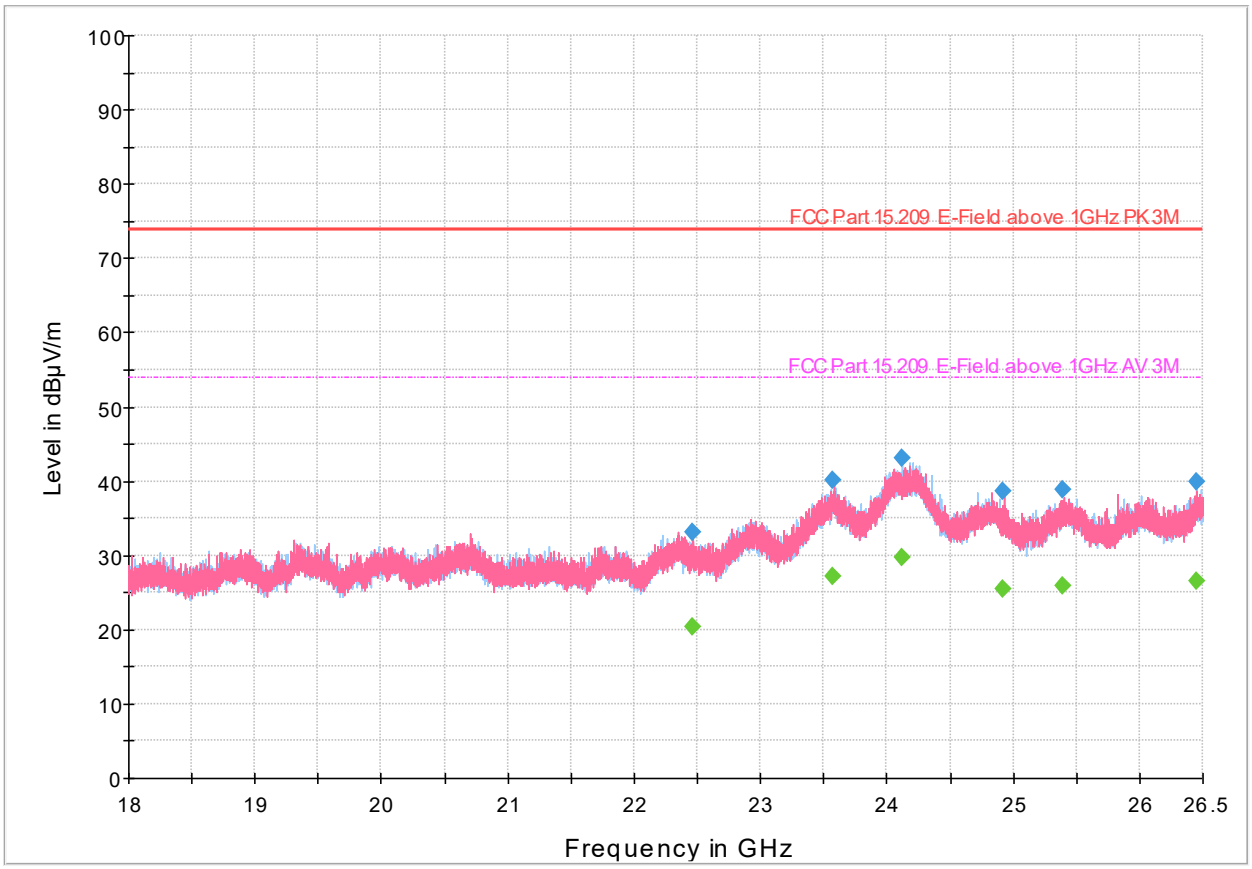

Figure 8.10-49: *Radiated emissions spectral plot (18 GHz - 26.5 GHz), 5745 MHz operation*

Table 8.10-49*: Radiated emissions results*

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)
22457.012500	33.14	---	73.90	40.76	5000.0	1000.000	323.0	V	117.0	17.4
22457.012500	---	20.31	53.90	33.59	5000.0	1000.000	323.0	V	117.0	17.4
23571.525000	40.18	---	73.90	33.72	5000.0	1000.000	260.0	V	86.0	23.9
23571.525000	---	27.17	53.90	26.73	5000.0	1000.000	260.0	V	86.0	23.9
24122.912500	---	29.77	53.90	24.13	5000.0	1000.000	350.0	H	162.0	27.3
24122.912500	43.04	---	73.90	30.86	5000.0	1000.000	350.0	H	162.0	27.3
24912.612500	38.60	---	73.90	35.30	5000.0	1000.000	293.0	V	160.0	22.4
24912.612500	---	25.49	53.90	28.42	5000.0	1000.000	293.0	V	160.0	22.4
25393.387500	38.87	---	73.90	35.03	5000.0	1000.000	316.0	V	84.0	21.5
25393.387500	---	25.87	53.90	28.03	5000.0	1000.000	316.0	V	84.0	21.5
26452.506250	---	26.63	53.90	27.27	5000.0	1000.000	240.0	H	306.0	23.2
26452.506250	39.99	---	73.90	33.91	5000.0	1000.000	240.0	H	306.0	23.2

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
Results show compliance with 68.23 dBµV/m (at 3m) limit (-27 dBm/MHz)

Full Spectrum

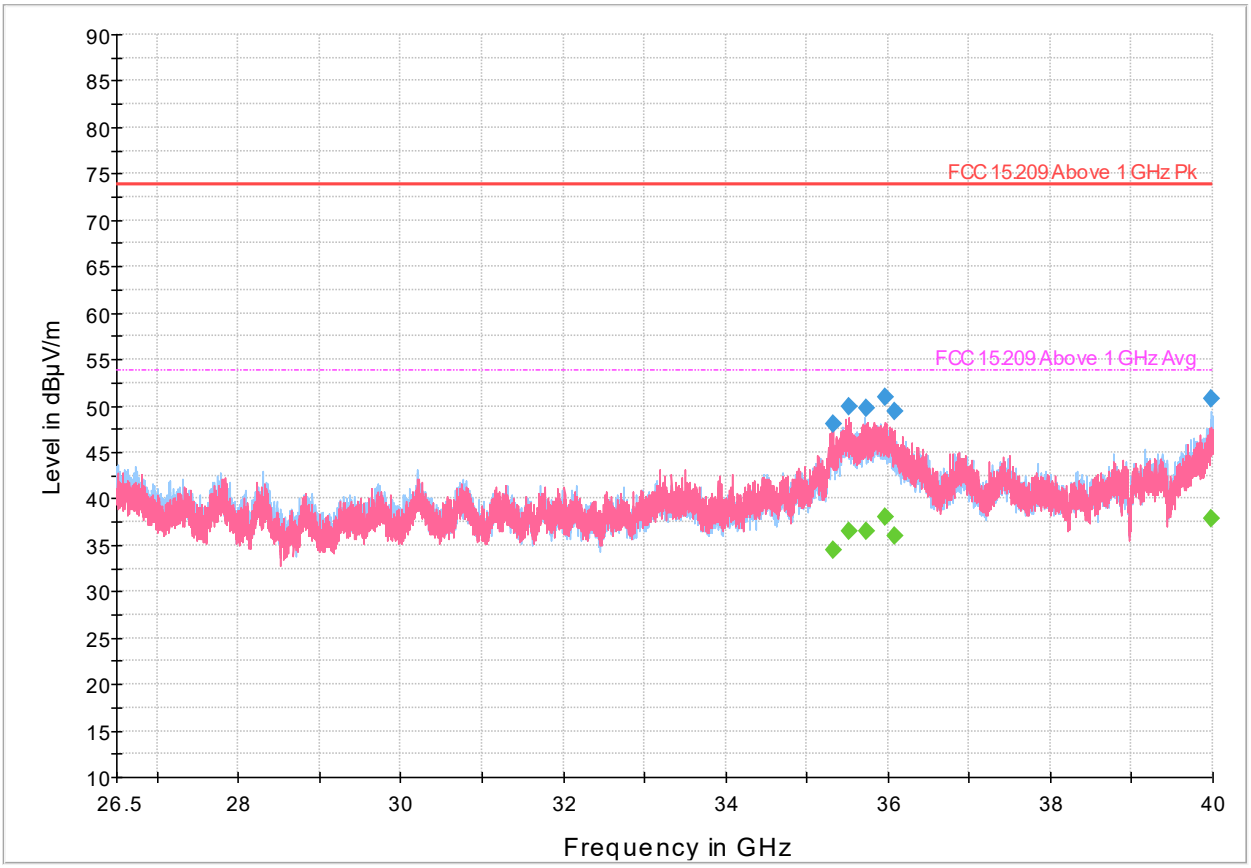

Figure 8.10-50: *Radiated emissions spectral plot (26.5 GHz - 40 GHz), 5745 MHz operation*

Table 8.10-50*: Radiated emissions results*

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)
35322.850000	48.03	---	73.90	25.87	5000.0	1000.000	125.0	V	10.0	17.8
35322.850000	---	34.49	53.90	19.41	5000.0	1000.000	125.0	V	10.0	17.8
35513.893750	49.96	---	73.90	23.94	5000.0	1000.000	121.0	V	347.0	19.5
35513.893750	---	36.51	53.90	17.39	5000.0	1000.000	121.0	V	347.0	19.5
35733.587500	49.78	---	73.90	24.12	5000.0	1000.000	148.0	H	82.0	20.4
35733.587500	---	36.54	53.90	17.36	5000.0	1000.000	148.0	H	82.0	20.4
35962.056250	---	38.03	53.90	15.87	5000.0	1000.000	218.0	V	229.0	20.9
35962.056250	50.95	---	73.90	22.95	5000.0	1000.000	218.0	V	229.0	20.9
36077.687500	49.37	---	73.90	24.53	5000.0	1000.000	116.0	V	21.0	20.3
36077.687500	---	35.92	53.90	17.98	5000.0	1000.000	116.0	V	21.0	20.3
39985.731250	---	37.87	53.90	16.03	5000.0	1000.000	130.0	H	-1.0	20.9
39985.731250	50.75	---	73.90	23.15	5000.0	1000.000	130.0	H	-1.0	20.9

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
Results show compliance with 68.23 dBµV/m (at 3m) limit (-27 dBm/MHz)

Full Spectrum

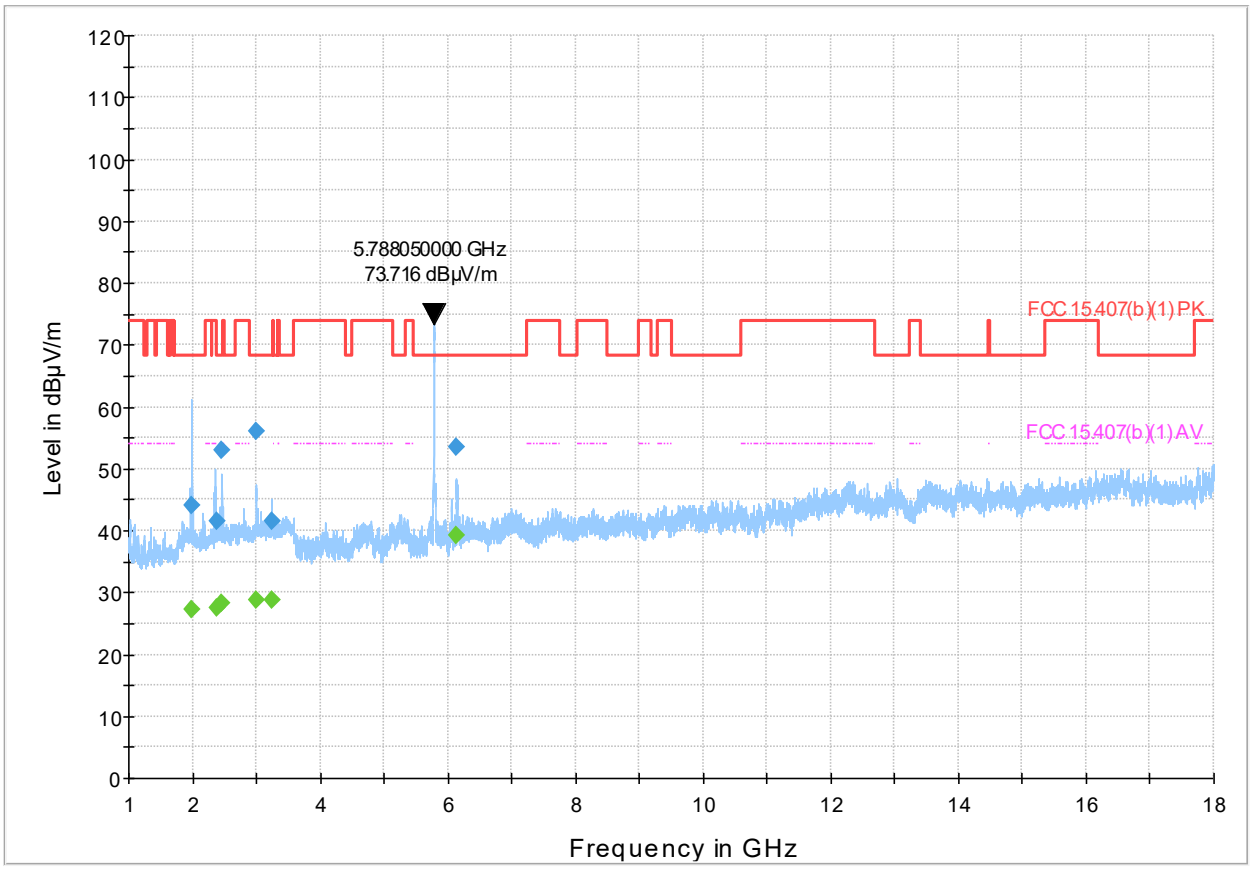

Figure 8.10-51: *Radiated emissions spectral plot (1 GHz - 18 GHz), 5785 MHz operation*

Table 8.10-51*: Radiated emissions results*

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)
1994.900000	43.96	---	68.23	24.27	5000.0	1000.000	150.0	H	64.0	-6.0
1994.900000	---	27.35	---	---	5000.0	1000.000	150.0	H	64.0	-6.0
2369.450000	---	27.64	53.98	26.34	5000.0	1000.000	379.0	V	144.0	-4.6
2369.450000	41.43	---	73.98	32.55	5000.0	1000.000	379.0	V	144.0	-4.6
2457.350000	52.87	---	68.23	15.36	5000.0	1000.000	300.0	H	10.0	-4.1
2457.350000	---	28.19	---	---	5000.0	1000.000	300.0	H	10.0	-4.1
2995.050000	---	28.86	---	---	5000.0	1000.000	133.0	H	133.0	-2.4
2995.050000	56.15	---	68.23	12.08	5000.0	1000.000	133.0	H	133.0	-2.4
3234.000000	41.59	---	68.23	26.64	5000.0	1000.000	340.0	V	0.0	-1.6
3234.000000	---	28.86	---	---	5000.0	1000.000	340.0	V	0.0	-1.6
6143.200000	53.53	---	68.23	14.70	5000.0	1000.000	225.0	H	11.0	4.2
6143.200000	---	39.23	---	---	5000.0	1000.000	225.0	H	11.0	4.2

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
A notch filter was used to suppress the fundamental emission to prevent overloading of measurement equipment.
Marked emission at 5788 MHz is the transmitter fundamental emission and is not evaluated against the limits.

Full Spectrum

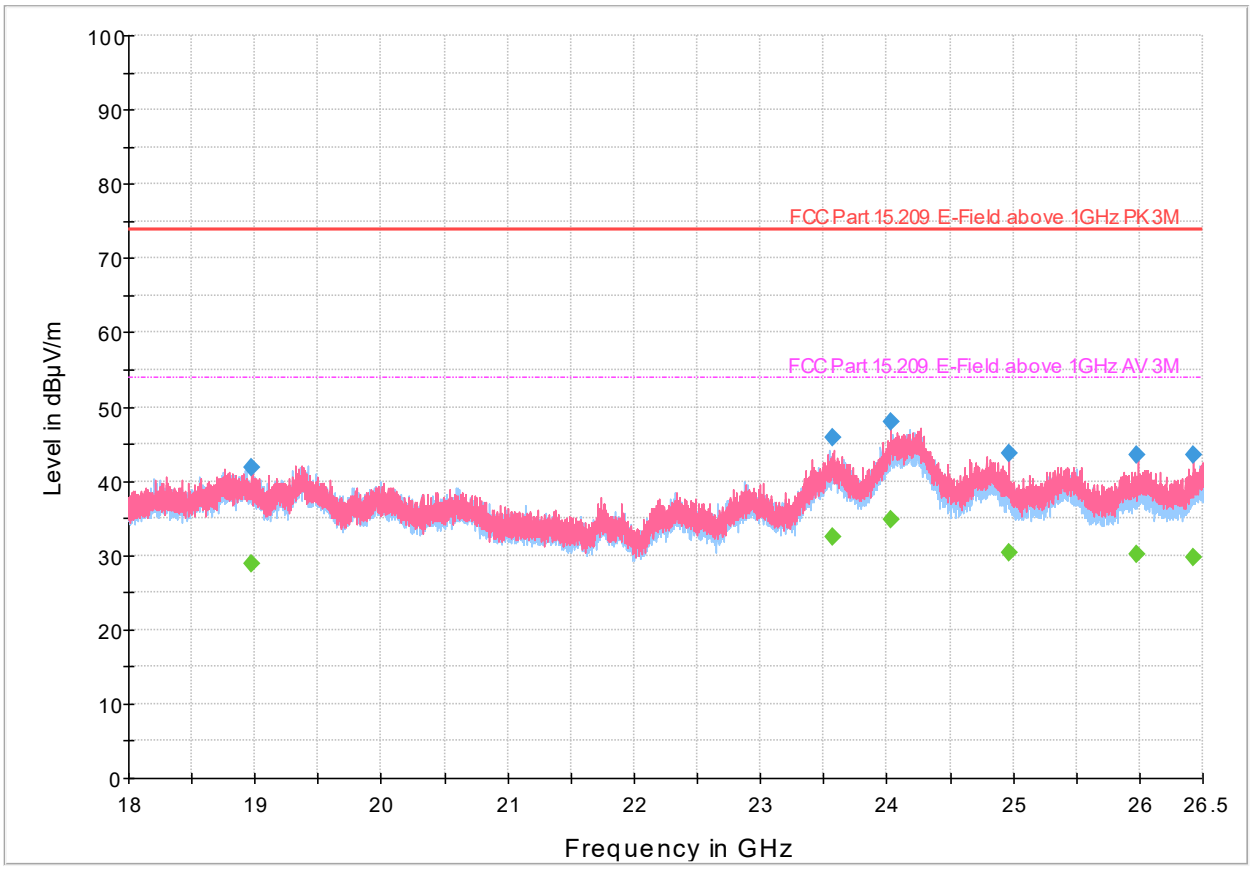

Figure 8.10-52: *Radiated emissions spectral plot (18 GHz - 26.5 GHz), 5785 MHz operation*

Table 8.10-52*: Radiated emissions results*

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)
18977.381250	41.78	---	73.90	32.12	5000.0	1000.000	231.0	V	0.0	16.0
18977.381250	---	28.81	53.90	25.09	5000.0	1000.000	231.0	V	0.0	16.0
23577.293750	---	32.40	53.90	21.50	5000.0	1000.000	350.0	V	227.0	23.9
23577.293750	45.80	---	73.90	28.10	5000.0	1000.000	350.0	V	227.0	23.9
24030.381250	---	34.74	53.90	19.16	5000.0	1000.000	344.0	V	164.0	27.6
24030.381250	48.03	---	73.90	25.87	5000.0	1000.000	344.0	V	164.0	27.6
24968.893750	---	30.35	53.90	23.55	5000.0	1000.000	398.0	V	299.0	22.4
24968.893750	43.66	---	73.90	30.24	5000.0	1000.000	398.0	V	299.0	22.4
25981.993750	43.49	---	73.90	30.41	5000.0	1000.000	357.0	V	117.0	21.7
25981.993750	---	30.09	53.90	23.81	5000.0	1000.000	357.0	V	117.0	21.7
26423.875000	---	29.77	53.90	24.13	5000.0	1000.000	161.0	V	316.0	23.0
26423.875000	43.55	---	73.90	30.35	5000.0	1000.000	161.0	V	316.0	23.0

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
Results show compliance with 68.23 dBµV/m (at 3m) limit (-27 dBm/MHz)

Full Spectrum

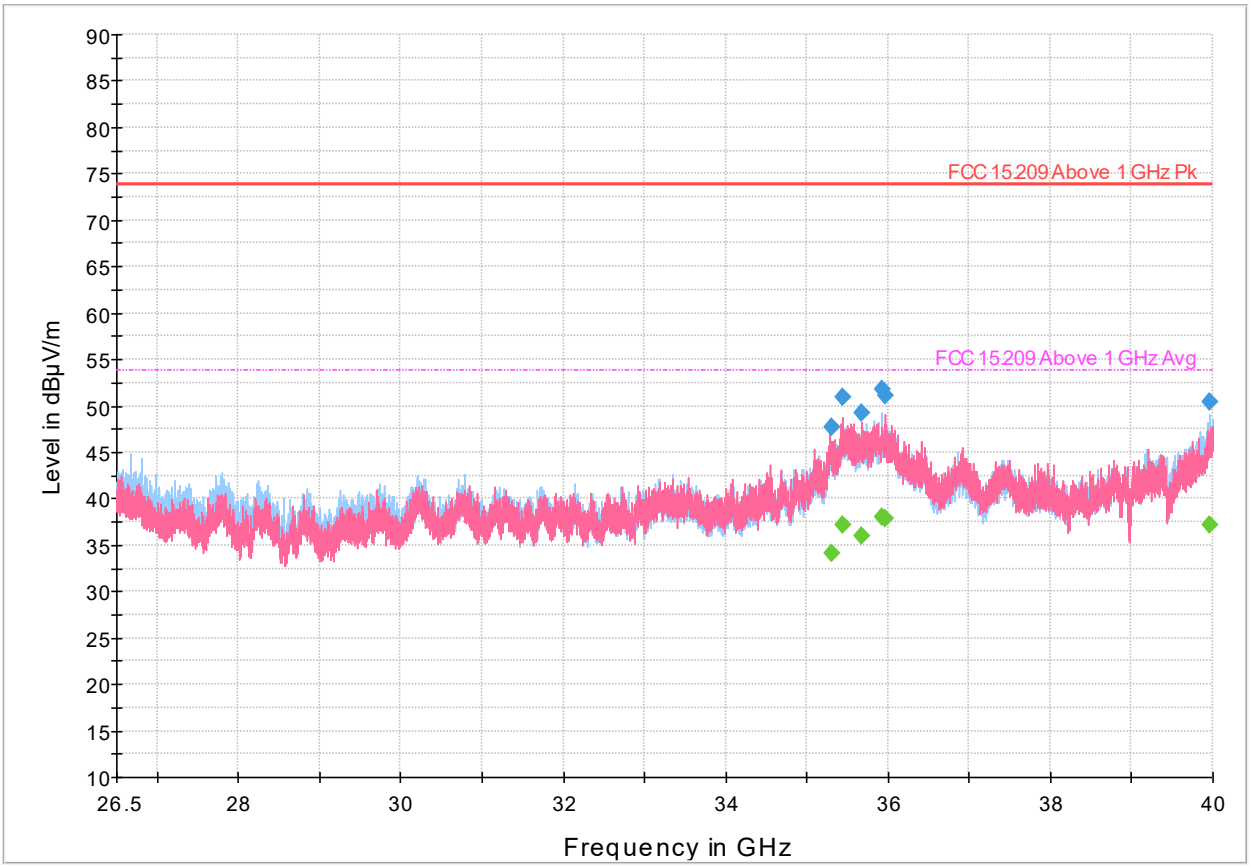

Figure 8.10-53: *Radiated emissions spectral plot (26.5 GHz - 40 GHz), 5785 MHz operation*

Table 8.10-53*: Radiated emissions results*

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)
35298.887500	---	34.12	53.90	19.78	5000.0	1000.000	137.0	V	263.0	17.5
35298.887500	47.65	---	73.90	26.25	5000.0	1000.000	137.0	V	263.0	17.5
35439.662500	---	37.17	53.90	16.73	5000.0	1000.000	217.0	V	216.0	18.9
35439.662500	50.93	---	73.90	22.97	5000.0	1000.000	217.0	V	216.0	18.9
35681.837500	49.21	---	73.90	24.69	5000.0	1000.000	211.0	V	276.0	20.2
35681.837500	---	35.98	53.90	17.92	5000.0	1000.000	211.0	V	276.0	20.2
35930.537500	51.82	---	73.90	22.08	5000.0	1000.000	192.0	H	177.0	20.8
35930.537500	---	38.08	53.90	15.82	5000.0	1000.000	192.0	H	177.0	20.8
35970.981250	51.17	---	73.90	22.73	5000.0	1000.000	142.0	V	11.0	20.9
35970.981250	---	37.89	53.90	16.01	5000.0	1000.000	142.0	V	11.0	20.9
39958.956250	50.51	---	73.90	23.39	5000.0	1000.000	116.0	H	-1.0	20.5
39958.956250	---	37.23	53.90	16.67	5000.0	1000.000	116.0	H	-1.0	20.5

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
Results show compliance with 68.23 dBµV/m (at 3m) limit (-27 dBm/MHz)

Full Spectrum

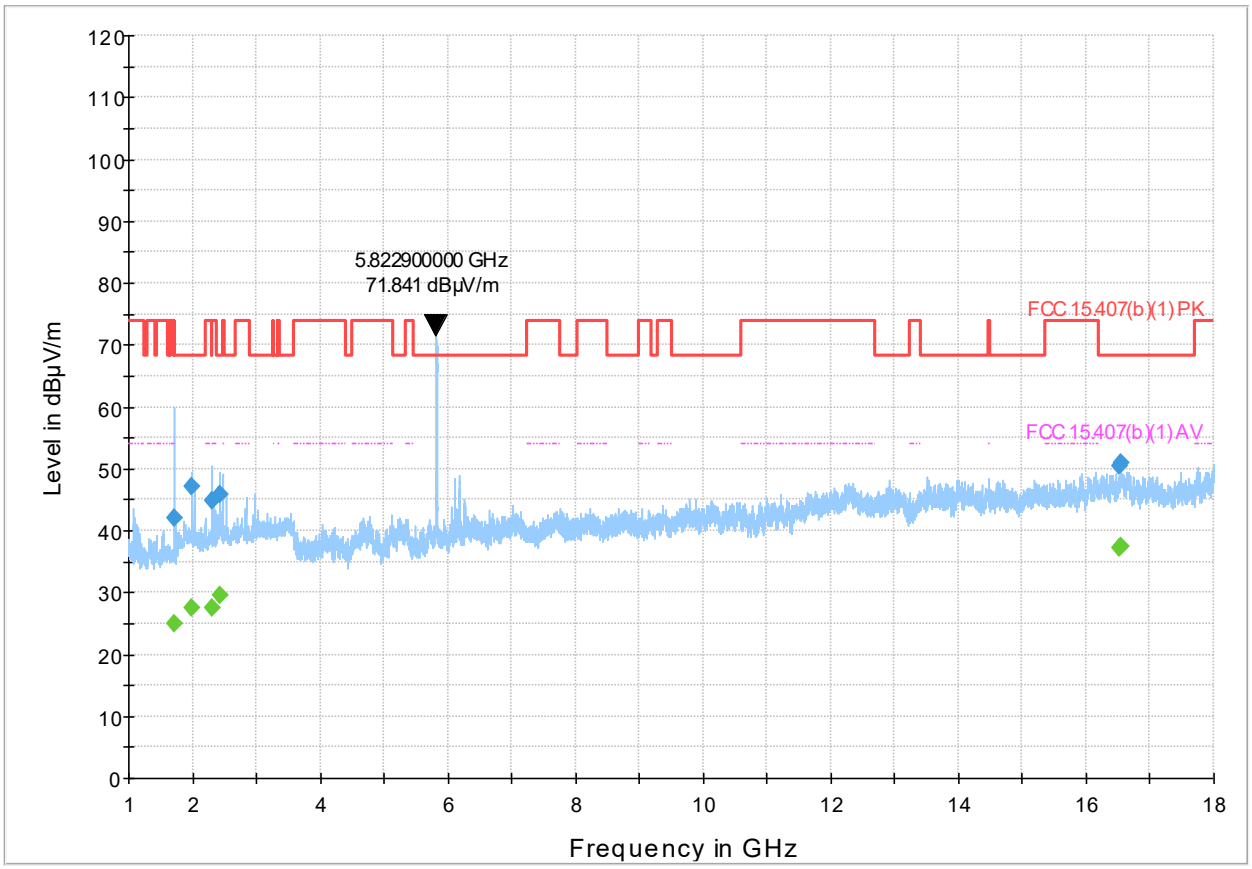

Figure 8.10-54: *Radiated emissions spectral plot (1 GHz - 18 GHz), 5825 MHz operation*

Table 8.10-54*: Radiated emissions results*

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)
1718.050000	41.99	---	68.59	26.60	5000.0	1000.000	400.0	H	264.0	-9.2
1718.050000	---	24.98	---	---	5000.0	1000.000	400.0	H	264.0	-9.2
1991.950000	47.18	---	68.23	21.05	5000.0	1000.000	252.0	H	174.0	-6.0
1991.950000	---	27.40	---	---	5000.0	1000.000	252.0	H	174.0	-6.0
2305.000000	44.93	---	68.23	23.30	5000.0	1000.000	384.0	V	160.0	-5.1
2305.000000	---	27.51	---	---	5000.0	1000.000	384.0	V	160.0	-5.1
2430.300000	45.80	---	68.23	22.43	5000.0	1000.000	216.0	H	220.0	-4.1
2430.300000	---	29.60	---	---	5000.0	1000.000	216.0	H	220.0	-4.1
16524.400000	---	37.10	---	---	5000.0	1000.000	384.0	H	266.0	22.4
16524.400000	50.37	---	68.23	17.86	5000.0	1000.000	384.0	H	266.0	22.4
16540.400000	---	37.56	---	---	5000.0	1000.000	110.0	H	226.0	22.3
16540.400000	50.87	---	68.23	17.36	5000.0	1000.000	110.0	H	226.0	22.3

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
A notch filter was used to suppress the fundamental emission to prevent overloading of measurement equipment.
Marked emission at 5823 MHz is the transmitter fundamental emission and is not evaluated against the limits.

Full Spectrum

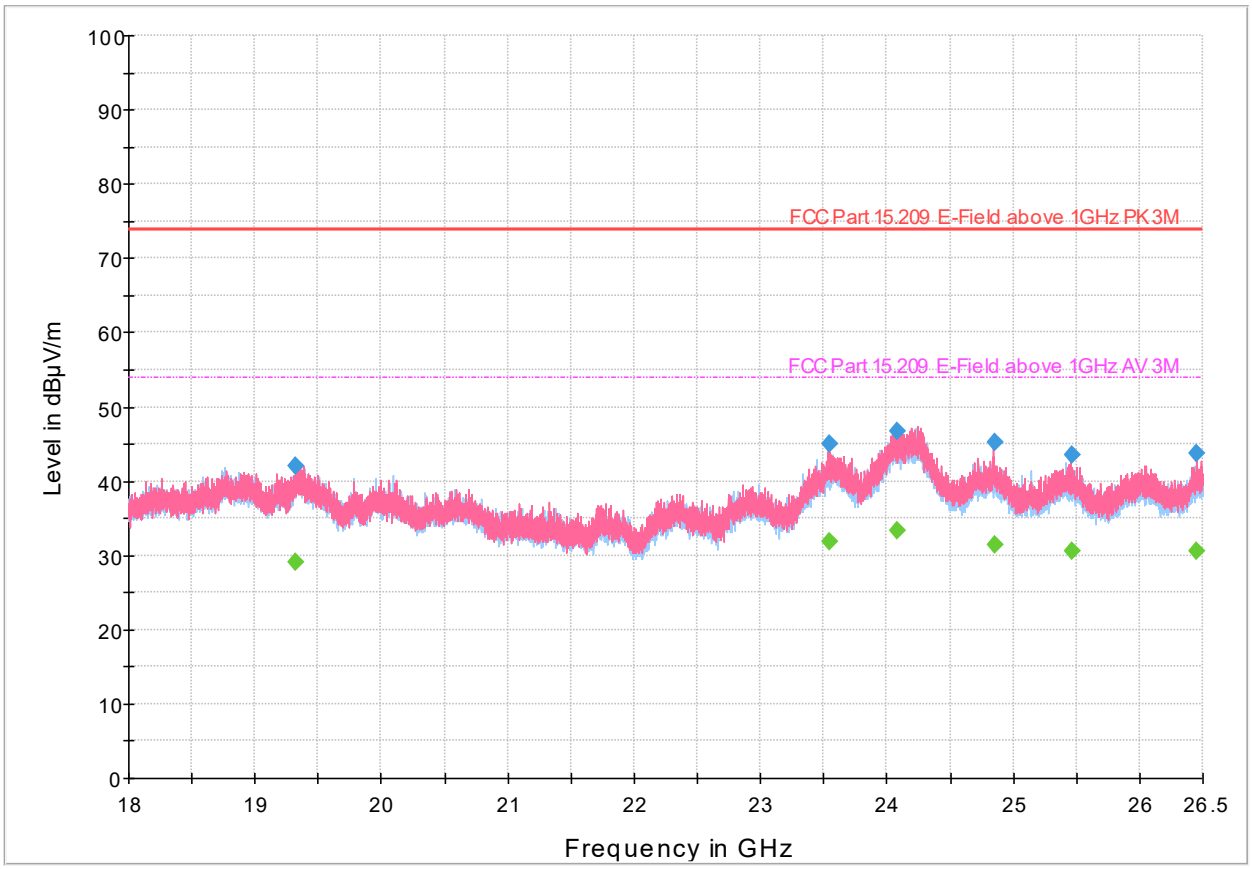

Figure 8.10-55: *Radiated emissions spectral plot (18 GHz - 26.5 GHz), 5825 MHz operation*

Table 8.10-55*: Radiated emissions results*

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)
19322.012500	---	29.07	53.90	24.83	5000.0	1000.000	388.0	V	347.0	16.8
19322.012500	42.11	---	73.90	31.79	5000.0	1000.000	388.0	V	347.0	16.8
23548.231250	---	31.84	53.90	22.06	5000.0	1000.000	291.0	V	59.0	23.6
23548.231250	45.08	---	73.90	28.82	5000.0	1000.000	291.0	V	59.0	23.6
24079.537500	46.71	---	73.90	27.19	5000.0	1000.000	231.0	H	354.0	27.5
24079.537500	---	33.42	53.90	20.48	5000.0	1000.000	231.0	H	354.0	27.5
24858.312500	---	31.48	53.90	22.42	5000.0	1000.000	144.0	V	146.0	22.3
24858.312500	45.23	---	73.90	28.67	5000.0	1000.000	144.0	V	146.0	22.3
25470.681250	---	30.55	53.90	23.35	5000.0	1000.000	345.0	V	131.0	21.8
25470.681250	43.62	---	73.90	30.28	5000.0	1000.000	345.0	V	131.0	21.8
26452.325000	43.73	---	73.90	30.17	5000.0	1000.000	186.0	V	235.0	23.2
26452.325000	---	30.58	53.90	23.32	5000.0	1000.000	186.0	V	235.0	23.2

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
Results show compliance with 68.23 dBµV/m (at 3m) limit (-27 dBm/MHz)

Full Spectrum

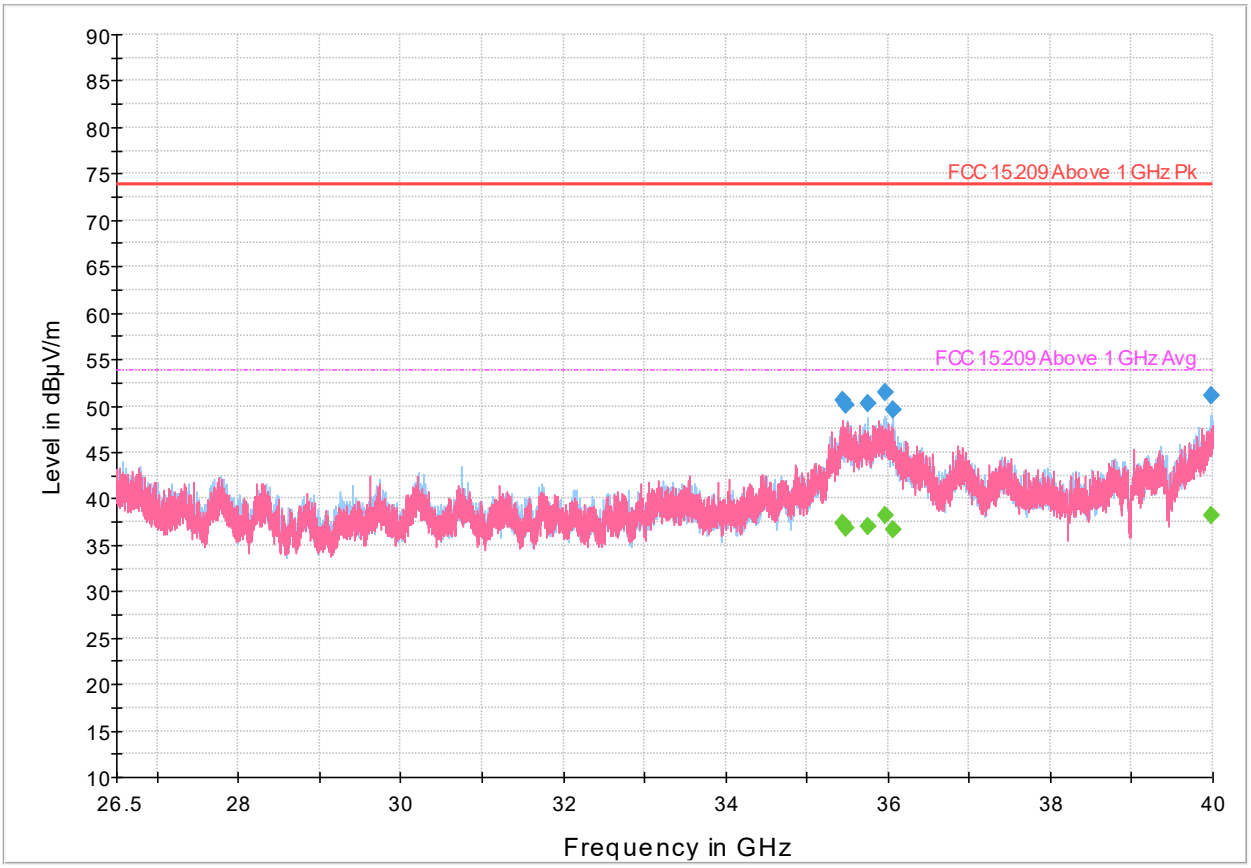

Figure 8.10-56: *Radiated emissions spectral plot (26.5 GHz - 40 GHz), 5825 MHz operation*

Table 8.10-56*: Radiated emissions results*

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)
35436.212500	50.58	---	73.90	23.32	5000.0	1000.000	137.0	H	23.0	18.9
35436.212500	---	37.29	53.90	16.61	5000.0	1000.000	137.0	H	23.0	18.9
35486.818750	---	36.80	53.90	17.10	5000.0	1000.000	118.0	H	138.0	19.3
35486.818750	50.00	---	73.90	23.90	5000.0	1000.000	118.0	H	138.0	19.3
35760.737500	50.17	---	73.90	23.73	5000.0	1000.000	177.0	H	269.0	20.5
35760.737500	---	37.02	53.90	16.88	5000.0	1000.000	177.0	H	269.0	20.5
35971.825000	51.40	---	73.90	22.50	5000.0	1000.000	184.0	H	171.0	20.9
35971.825000	---	38.16	53.90	15.74	5000.0	1000.000	184.0	H	171.0	20.9
36054.943750	---	36.70	53.90	17.20	5000.0	1000.000	224.0	H	10.0	20.5
36054.943750	49.51	---	73.90	24.39	5000.0	1000.000	224.0	H	10.0	20.5
39988.431250	51.10	---	73.90	22.80	5000.0	1000.000	127.0	H	10.0	21.0
39988.431250	---	38.19	53.90	15.71	5000.0	1000.000	127.0	H	10.0	21.0

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
Results show compliance with 68.23 dBµV/m (at 3m) limit (-27 dBm/MHz)

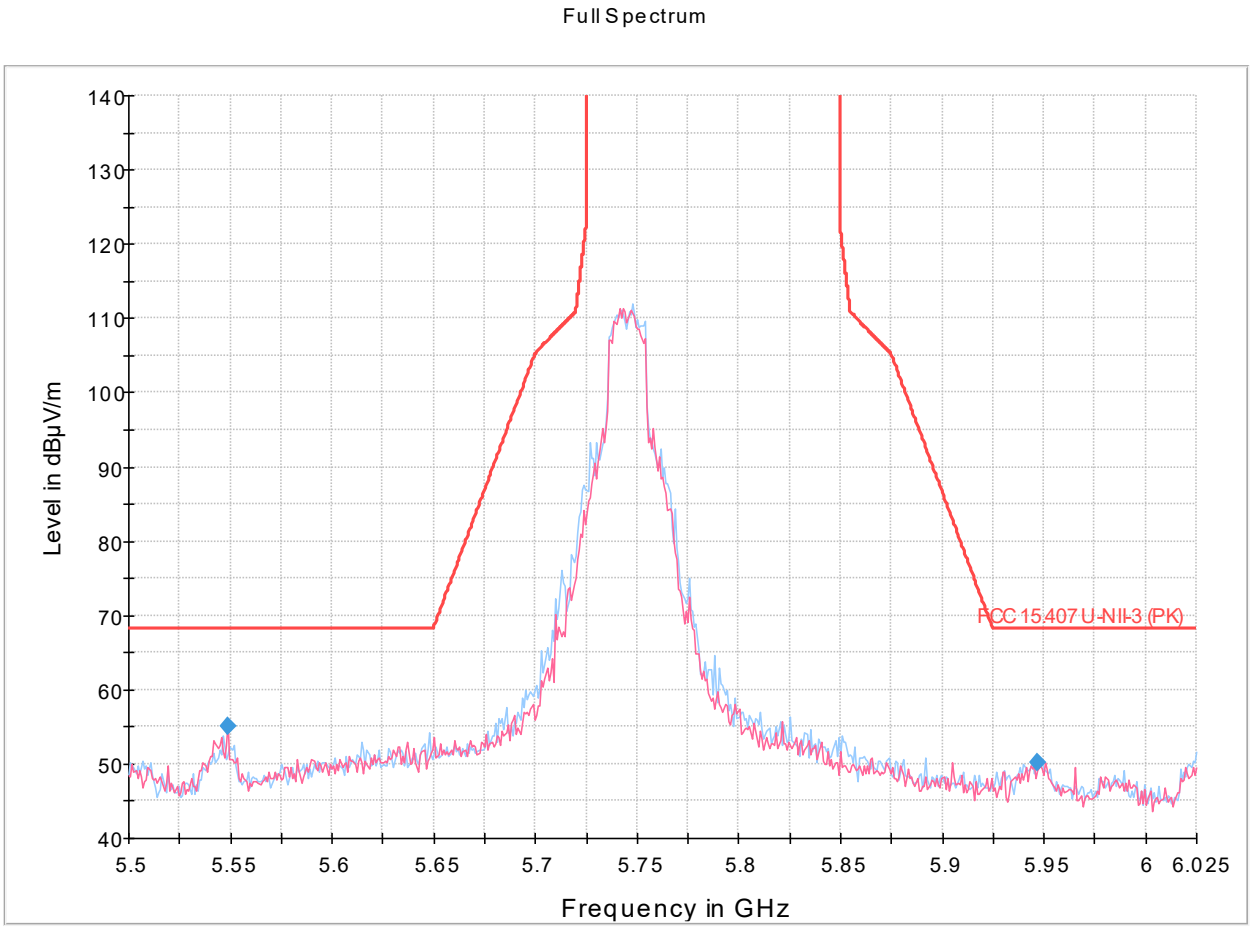

Figure 8.10-57: *Radiated emissions spectral plot (5.5 GHz - 6.025 GHz), 5745 MHz operation*

Table 8.10-57*: Radiated emissions results*

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
5549.000000	55.04	68.23	13.19	5000.0	1000.000	242.0	H	11.0	3.0
5947.125000	50.28	68.23	17.95	5000.0	1000.000	224.0	H	19.0	4.4

Notes:
[1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.

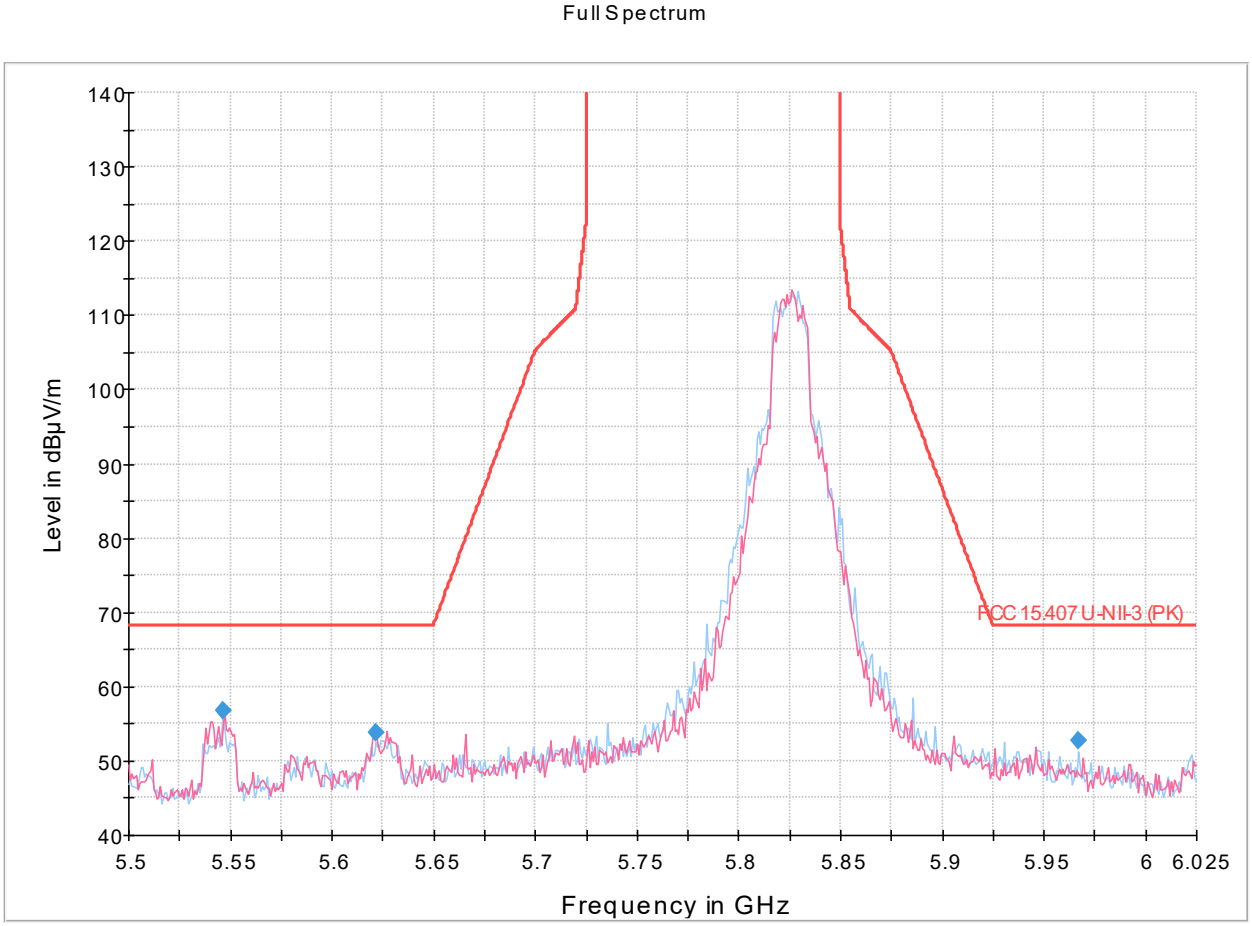

Figure 8.10-58: *Radiated emissions spectral plot (5.5 GHz - 6.025 GHz), 5835 MHz operation*

Table 8.10-58*: Radiated emissions results*

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
5546.375000	56.84	68.23	11.39	5000.0	1000.000	223.0	H	0.0	3.0
5621.625000	53.76	68.23	14.47	5000.0	1000.000	193.0	V	0.0	3.5
5967.250000	52.81	68.23	15.42	5000.0	1000.000	195.0	H	42.0	4.3

Notes:
[1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.

IEEE 802.11n/ac (V)HT40 (CDD) mode

Note: Spurious emissions limit of -27 dBm/MHz corresponds to field strength at 3m measurement distance of 68.23 dBµV/m. Emissions in restricted bands must meet the limits of FCC 15.209.

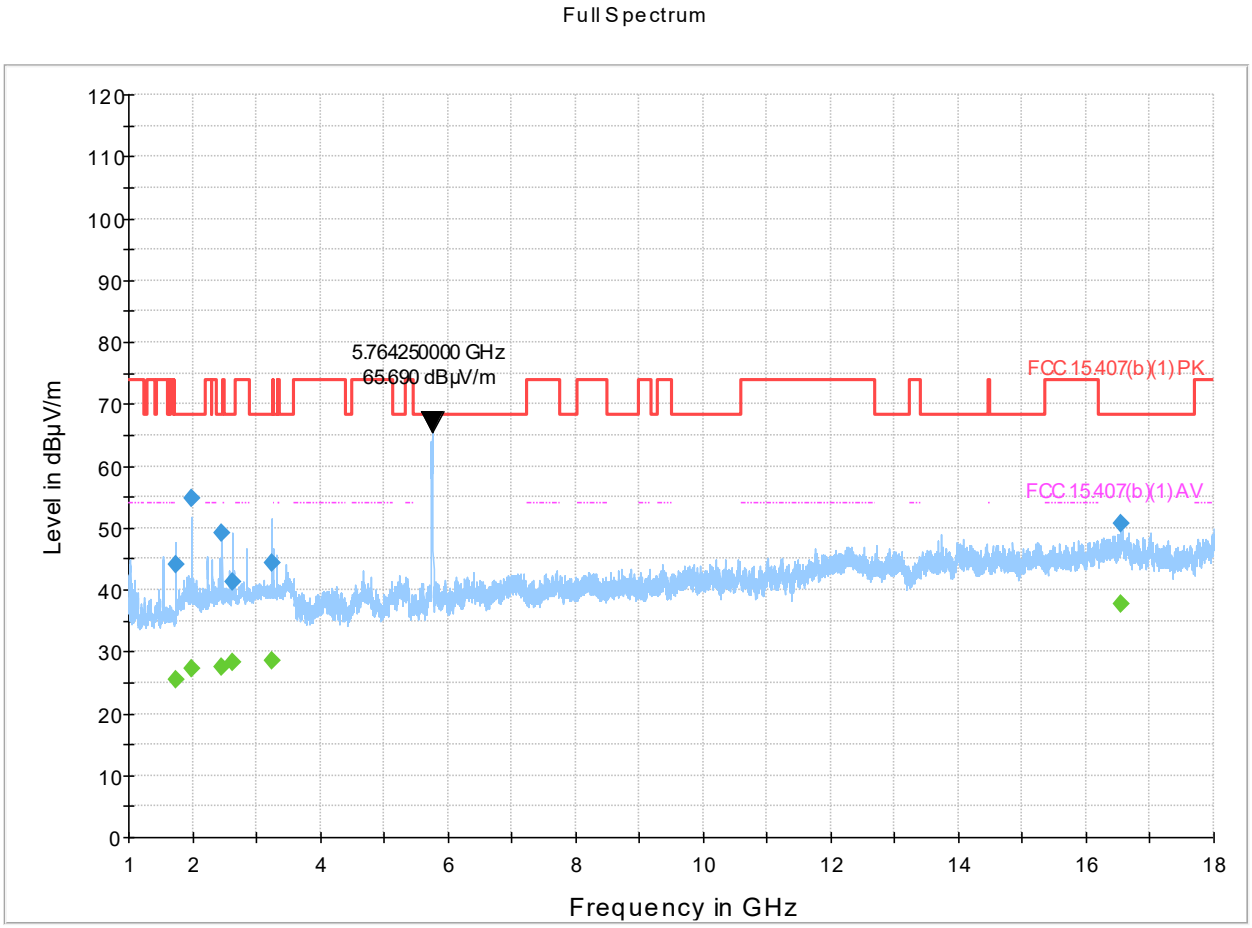

Figure 8.10-59: *Radiated emissions spectral plot (1 GHz - 18 GHz), 5755 MHz operation*

Table 8.10-59*: Radiated emissions results*

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)
1748.600000	---	25.50	---	---	5000.0	1000.000	116.0	H	99.0	-8.7
1748.600000	43.98	---	68.23	24.25	5000.0	1000.000	116.0	H	99.0	-8.7
1994.500000	---	27.15	---	---	5000.0	1000.000	122.0	H	297.0	-6.0
1994.500000	54.75	---	68.23	13.48	5000.0	1000.000	122.0	H	297.0	-6.0
2460.400000	49.13	---	68.23	19.10	5000.0	1000.000	191.0	V	11.0	-4.0
2460.400000	---	27.64	---	---	5000.0	1000.000	191.0	V	11.0	-4.0
2622.500000	41.34	---	68.23	26.89	5000.0	1000.000	231.0	H	191.0	-3.5
2622.500000	---	28.16	---	---	5000.0	1000.000	231.0	H	191.0	-3.5
3240.500000	---	28.56	---	---	5000.0	1000.000	358.0	V	53.0	-1.6
3240.500000	44.24	---	68.23	23.99	5000.0	1000.000	358.0	V	53.0	-1.6
16547.250000	---	37.65	---	---	5000.0	1000.000	231.0	H	0.0	22.3
16547.250000	50.68	---	68.23	17.55	5000.0	1000.000	231.0	H	0.0	22.3

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.
A notch filter was used to suppress the fundamental emission to prevent overloading of measurement equipment.
Marked emission at 5764 MHz is the transmitter fundamental emission and is not evaluated against the limits.