

# Test report

**408216-9R1TRFWL**

Date of issue: February 12, 2021

Applicant:

**Garmin International, Inc.**

Product:

**Battery Cradle + Battery (ANT)**

Model:

**A04118**

Specifications:

- ◆ FCC 47 CFR Part 15, Subpart C – §15.249
- ◆ Industry Canada RSS-210, Issue 10

#### Lab and test locations

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

Tested by	Martha Espinoza, Wireless Test Engineer
Reviewed by	James Cunningham, Wireless Supervisor
Review date	February 12, 2021
Reviewer signature	

#### Limits of responsibility

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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.

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## Section 1 Report summary

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### 1.1 Applicant

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Company name	Garmin International, Inc.
Address	1200 E. 151 <sup>st</sup> street
City	Olathe
Province/State	KS
Postal/Zip code	66062
Country	USA

### 1.2 Manufacturer

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Company name	Garmin International, Inc.
Address	1200 E. 151 <sup>st</sup> street
City	Olathe
Province/State	KS
Postal/Zip code	66062
Country	USA

### 1.3 Test specifications

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FCC 47 CFR Part 15, Subpart C – §15.249 IC RSS-210, Issue 10	Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz, and 24.0-24.25 GHz Licence – Exempt radio apparatus: Category I Equipment
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### 1.4 Test methods

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ANSI C63.10-2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
Annex B – B.10 – RSS-210 and RSS-Gen	Bands: 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz and 24 -24.25 GHz

### 1.5 Exclusions

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None

### 1.6 Statement of compliance

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In the configuration tested, the EUT was found compliant.

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

See “Summary of test results” for full details.

### 1.7 Test report revision history

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**Table 1.7-1: Test report revision history**

Revision #	Details of changes made to test report
408216-9TRFWL	Original report issued
408216-9R1TRFWL	Revised product and support equipment names

Notes:

## Section 2 Summary of test results

### 2.1 FCC Part 15 Subpart C, general requirements

Part	Test description	Verdict
§15.207(a)	Conducted limits	Not applicable <sup>1</sup>
§15.31(e)	Variation of power source	Pass
§15.203	Antenna requirement	Pass <sup>2</sup>
§15.215(c)	20 dB occupied bandwidth	Pass

Notes: <sup>1</sup>EUT is battery power only

<sup>2</sup>EUT has an integrated antenna and it is not user accessible.

### 2.2 FCC Part 15.249

Part	Test description	Verdict
§15.249(a)	Radiated emissions not in restricted bands	Pass
§15.249(b)	Fixed point-to-point operation in the 24.0 – 24.25 GHz band	Not applicable
§15.249(c)	Spurious emissions (except harmonics)	Pass

Notes: None

### 2.3 IC RSS-210, Issue 10

Part	Test description	Verdict
Annex B.10(a)	Field strength: fundamental and harmonics	Pass
Annex B.10(b)	Radiated emissions except harmonic emissions	Pass

Notes: None

### 2.4 IC RSS-GEN, Issue 5

Part	Test description	Verdict
6.7	Occupied bandwidth (99%)	Pass
7.3	Receiver radiated emission limits	Not applicable <sup>1</sup>
7.4	Receiver conducted emission limits	Not applicable <sup>1</sup>
8.8	Power Line Conducted Emissions Limits for License-Exempt Radio Apparatus	Not applicable <sup>2</sup>

Notes: <sup>1</sup> EUT is neither a scanning receiver nor a stand-alone receiver

<sup>2</sup> EUT is battery powered only

## Section 3 Equipment under test (EUT) details

### 3.1 Sample information

Receipt date	November 9, 2020
Nemko sample ID number	NEx: 408216

### 3.2 EUT information

Product name	Battery Cradle + Battery
Model	A04118
Serial number	Conducted sample (50212): 3345709192 Radiated sample (30926): 3345709262
Part number	N/A

### 3.3 Technical information

Used IC test site(s) reg. number	N/A
RSS number and issue	RSS-210 Issue 10 (December 2019)
Frequency band	2400 – 2483.5 MHz
Minimum frequency (MHz)	2402
Maximum frequency (MHz)	2480
Minimum output power (dBm)	-59.01 dBm EIRP
Maximum output power (dBm)	-57.47 dBm EIRP
Measured 20 dB bandwidth	2402 MHz: 964.10 kHz 2441 MHz: 960.16 kHz 2480 MHz: 941.41 kHz
Type of modulation	GFSK
Emission classification	N/A
Power requirements	Battery package
Antenna information	3.8 dBi maximum antenna gain

### 3.4 EUT exercise and monitoring details

Conducted and radiated sample were configured through a tool named “RF State Setter” where different parameters can be configured such as, channel frequency, continuous wave signal, modulated signal, ANT, BLE, etc., depending on the test requirement.

### 3.5 EUT setup details

**Table 3.5-1: EUT sub assemblies**

Description	Brand name	Model/Part number	Serial number	Rev.
Battery cradle	Garmin	A04118	3345709192	---
Battery	Garmin	A04119	3345708884	---

**Table 3.5-2: EUT interface ports**

Description	Qty.
Field disturbance sensor port	1
Field disturbance sensor display port	1
Battery port	1

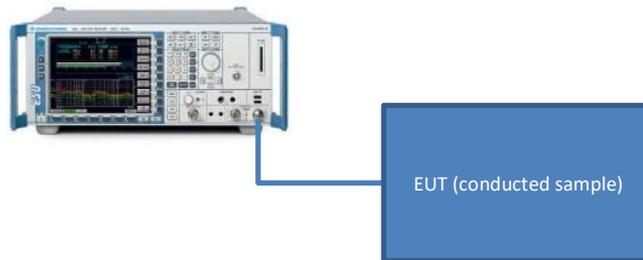
### 3.5 EUT setup details continued

**Table 3.5-1: Support equipment**

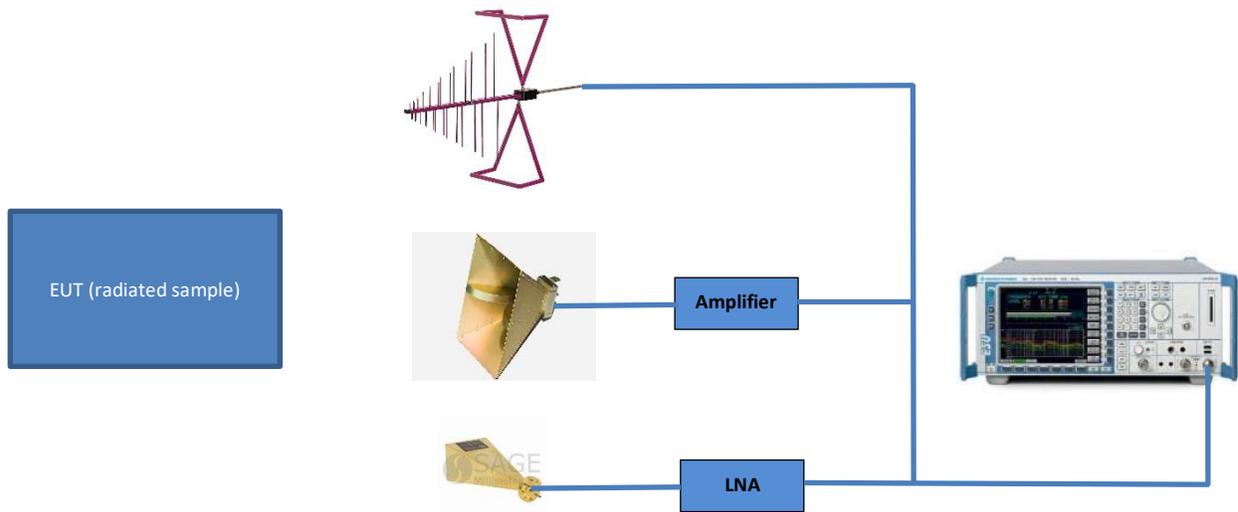
Description	Brand name	Model/Part number	Serial number	Rev.
Laptop	Dell	Latitude	N/A	---
ANT USB	Dynastream	ANTUSB-m	203-JN6016	---

**Table 3.5-2: Inter-connection cables**

Cable description	From	To	Length (ft)
N/A	N/A	N/A	N/A



**Figure 3.5-1: Test conducted setup.**



**Figure 3.5-2: Test radiated setup**

## Section 4 Engineering considerations

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### 4.1 Modifications incorporated in the EUT

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

### 4.2 Technical judgment

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None

### 4.3 Deviations from laboratory tests procedures

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No deviations were made from laboratory procedures

## Section 5 Test conditions

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### 5.1 Atmospheric conditions

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

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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

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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  $\pm 5\%$ , for which the equipment was designed.

## Section 6 Measurement uncertainty

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### 6.1 Uncertainty of measurement

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Measurement uncertainty budgets for the tests are detailed below. Measurement uncertainty calculations assume a coverage factor of  $K = 2$  with 95% certainty.

Test name	Measurement uncertainty, dB
All antenna port measurements/ including OBW	0.55
Conducted spurious emissions	1.13
Radiated spurious emissions	3.78
AC power line conducted emissions	1.38
Supply Voltages	0.05%
Time	2.09%

**Table 6.1-1: Measurement uncertainty.**

*Important note: All testing in this document were done using the maximum radiation pattern from transmitter antenna for covering the worst case in all the measurements.*

## 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.
EMI Test Receiver	Rohde & Schwarz	ESU40	E1131	1 year	03 Dec 2021
EMI Test Receiver	Rohde & Schwarz	ESU40	E1121	1 year	01 Dec 2021
Spectrum analyzer	Rohde & Schwarz	FSW	E1302	1 year	18 Sep 2021
Spectrum analyzer	Rohde & Schwarz	FSV	E1120	1 year	19 Dec 2021
System controller	Sunol sciences	SC104V	E1191	NCR	NCR
Power sensor	ETS Lindgren	7002-006	E1062	1 year	29 Oct 2021
DRG Horn	ETS-Lindgren	3117-PA	E1139	2 years	21 March 2021
Bilog Antenna	Schaffner	CBL6111C	1763	2 years	18 Feb 2022
Antenna Horn	Sage	SAR-2309-42-S2	E1143	2 years	13 Nov 2022
Low Noise Amplifier	Sage	SBL-1834034030-KFKF	E1228	NCR	NCR

*Table 7.1-2: Test Software*

Manufacturer of Software	Details
Rohde & Schwarz	EMC 32 V10.60.15

## Section 8 Testing data

### 8.1 Occupied bandwidth: 20 dB and 99%

#### 8.1.1 Definition and limits

Title 47 → Chapter I → Subchapter A → Part 15 → Subpart C → §15.215(c)

- (c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80 % of the permitted band in order to minimize the possibility of out-of-band operation.

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 RSS.

#### 8.1.2 Test summary

Verdict	Pass		
Test date	November 25, 2020	Temperature	20 °C
	November 30, 2020		21 °C
Test engineer	Martha Espinoza	Air pressure	1000 mbar
			1001 mbar
Test location	Wireless bench	Relative humidity	46 %
			53 %

#### 8.1.3 Notes

Testing was performed in ANT mode and the EUT transmitting on a fixed channel at full power. Cable losses were calibrated using an offset of 1.5 dB.

#### 8.1.4 Setup details

EUT setup configuration	Tabletop
Test facility	Wireless bench
Measurement method	ANSI C63.10 §11.8.1 using built-in marker function of the spectrum analyzer

Receiver/spectrum analyzer settings:

Resolution bandwidth	30 kHz (1 – 5 % of OBW)
Video bandwidth	300 kHz
Detector mode	Peak
Trace mode	Max Hold
Measurement time	Long enough for trace to stabilize

#### 8.1.5 Test data

**Table 8.1-1: 20 dB and 99% occupied bandwidth test data**

Test Frequency (MHz)	20 dB Bandwidth (kHz)	99 % Bandwidth (kHz)
2402	964.10	917.777
2440	960.16	920.103
2480	941.41	920.936

Occupied bandwidth: 20 dB and 99%

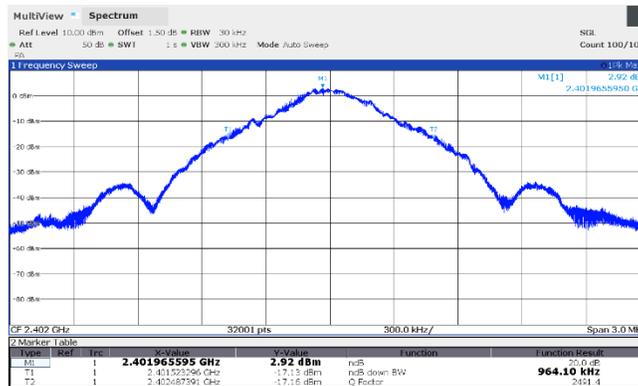


Figure 8.1-1: 20 dB occupied bandwidth, 2402 MHz

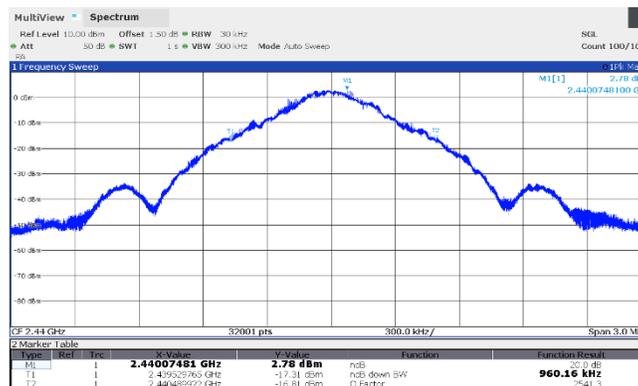


Figure 8.1-2: 20 dB occupied bandwidth, 2440 MHz

Occupied bandwidth: 20 dB and 99%



Figure 8.1-3: 20 dB occupied bandwidth, 2480 MHz

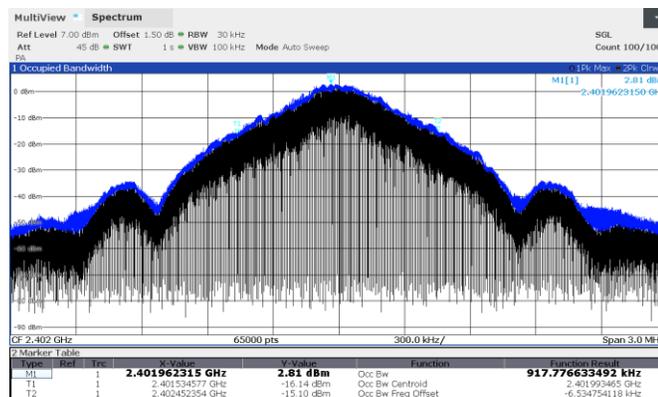


Figure 8.1-4: 99% occupied bandwidth, 2402 MHz

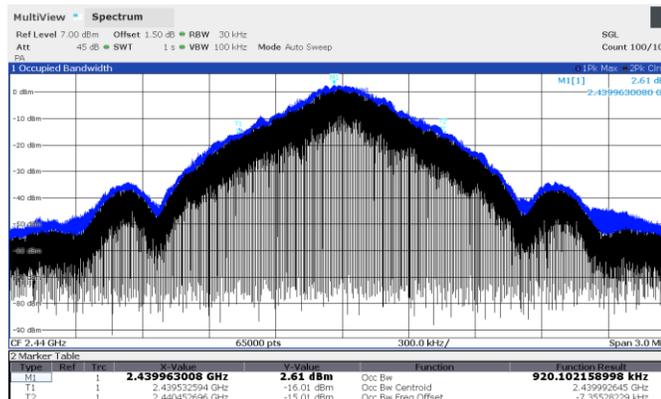


Figure 8.1-5: 99% occupied bandwidth, 2440 MHz

Occupied bandwidth: 20 dB and 99%

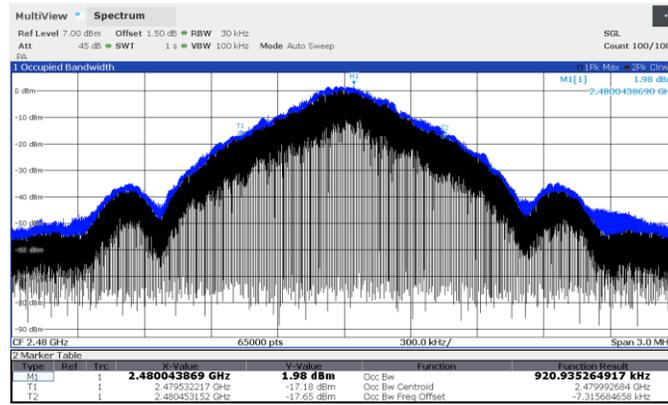


Figure 8.1-6: 99% occupied bandwidth, 2480 MHz

## 8.2 Field strength of fundamental, harmonic, and spurious emissions

### 8.2.1 Definition and limits

Title 47 → Chapter I → Subchapter A → Part 15 → Subpart C → §15.249(a)  
RSS-210 → Annex B.10(a)

- (a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

**Table 8.2-1: Field strength limits**

Fundamental frequency (MHz)	Field strength (mV/m)	Field strength (dB $\mu$ V/m)	Field strength of harmonics (mV/m)	Field strength of harmonics (dB $\mu$ V/m)
902 - 928	50	93.97	500	53.97
2400 – 2483.5	50	93.97	500	53.97
5725 - 5875	50	93.97	500	53.97
24000 - 24250	250	107.95	2500	67.95

- (c) Field strength limits are specified at a distance of 3 meters.  
(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation.

Title 47 → Chapter I → Subchapter A → Part 15 → Subpart C → §15.209(a)

- (a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

**Table 8.2-2: Spurious emission limits**

Frequency (MHz)	Field strength (dB $\mu$ V/m)	Measurement distance (m)
30 - 88	40.00	3
88 - 216	43.52	3
216 - 960	46.02	3
Above 960	53.97	3

### 8.2.2 Test summary

Verdict	Pass		
Test date	November 12, 2020 December 16, 2020 December 17, 2020 December 19, 2020	Temperature	21°C 21°C 20°C 23°C
Test engineer	Martha Espinoza	Air pressure	1002 mbar 1005 mbar 1001 mbar 1000 mbar
Test location	3m semi anechoic chamber	Relative humidity	51 % 48 % 50 % 51 %

### 8.2.3 Notes

Testing was performed in ANT mode and the EUT transmitting on a fixed channel at full power. The EUT was configured to transmit continuously on the lowest, middle, and highest channels. The spectrum was searched from 30 MHz to 26 GHz (above the 10<sup>th</sup> harmonic of the highest transmit frequency). Radiated measurements were performed at a 3 m measurement distance.

### 8.2.4 Setup details

Receiver settings for radiated measurements below 1 GHz:

Resolution bandwidth	120 kHz
Video bandwidth	300 kHz
Detector mode	Peak (preview measurements) Quasi-Peak (final measurements)
Trace mode	Max Hold
Measurement time	5 s (final measurements)

Receiver settings for radiated measurements above 1 GHz:

Resolution bandwidth	1 MHz
Video bandwidth	3 MHz
Detector mode	Average and peak (final measurements)
Trace mode	Max Hold
Measurement time	5 s (final measurements)

### 8.2.5 Test data

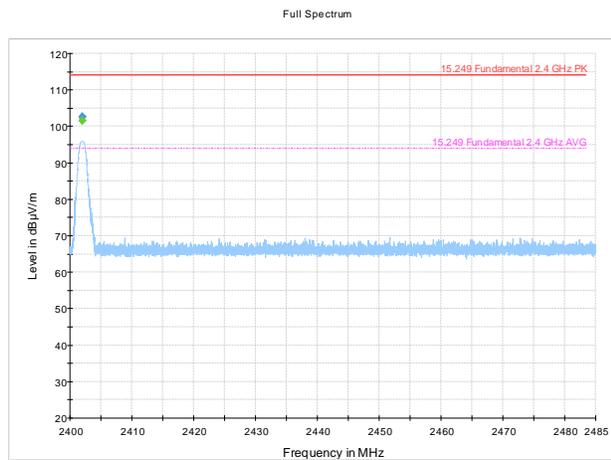


Figure 8.2-1: Field strength of fundamental, 2402 MHz

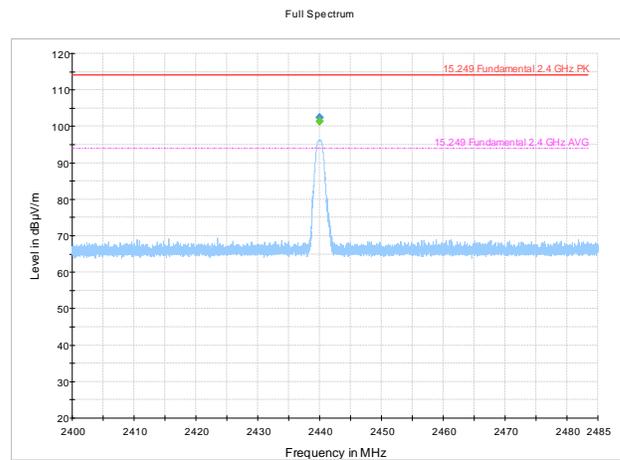


Figure 8.2-2: Field strength of fundamental, 2440 MHz

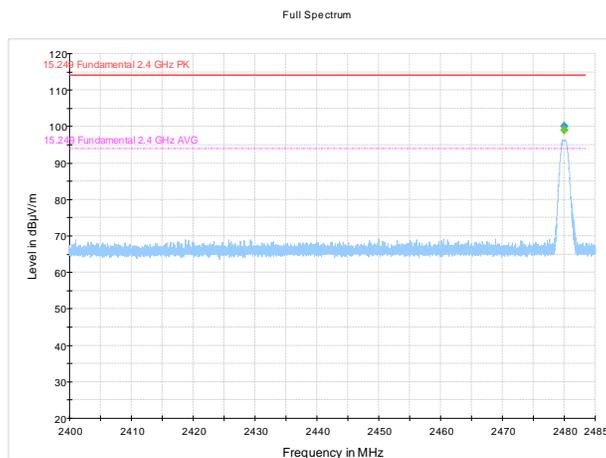


Figure 8.2-3: Field strength of fundamental, 2480 MHz

8.2.5 Test data, continued

Table 8.2-3: Field strength of fundamental

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2402.050000	---	38.734	93.97	5000.0	1000.000	110.4	V	25.0	19.8
2402.050000	102.61	---	113.97	5000.0	1000.000	110.4	V	25.0	19.8
2439.950000	---	38.584	93.97	5000.0	1000.000	109.3	V	25.0	20.1
2439.950000	102.46	---	113.97	5000.0	1000.000	109.3	V	25.0	20.1
2480.040000	---	36.214	93.97	5000.0	1000.000	110.4	V	35.0	20.2
2480.040000	100.09	---	113.97	5000.0	1000.000	110.4	V	35.0	20.2

Peak values were measured directly. Average values were calculated using a duty cycle correction factor. During normal operation, the transmitter has a duty cycle of less than 1%. To calculate the duty cycle correction, the duty cycle in normal operation was measured:

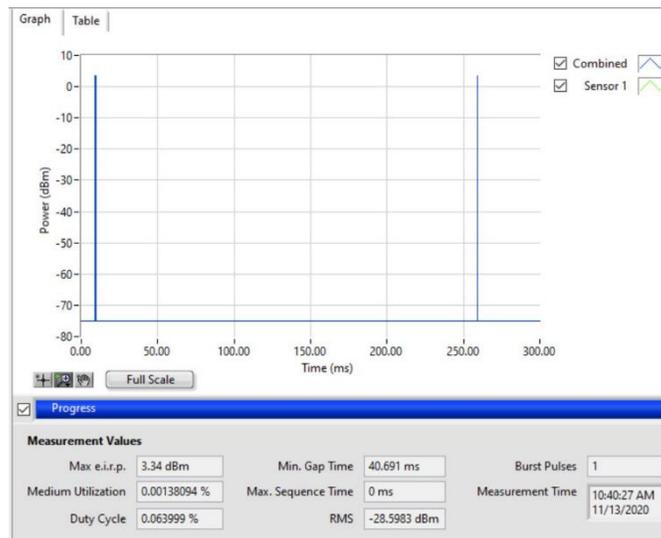


Figure 8.2-4: Normal operation duty cycle measurement with power sensor

Duty cycle correction factor calculated as:

$$\delta (dB) = 20 \text{ Log} (\text{duty cycle})$$

$$\delta (dB) = 20 \text{ Log} (0.00063999)$$

$$\delta (dB) = -63.876$$

Therefore, the average power of the fundamental reported in Table 8.2-3 above is calculated by adding the duty cycle correction factor (-63.876 dB) to the measured peak power.

8.2.5 Test data, continued

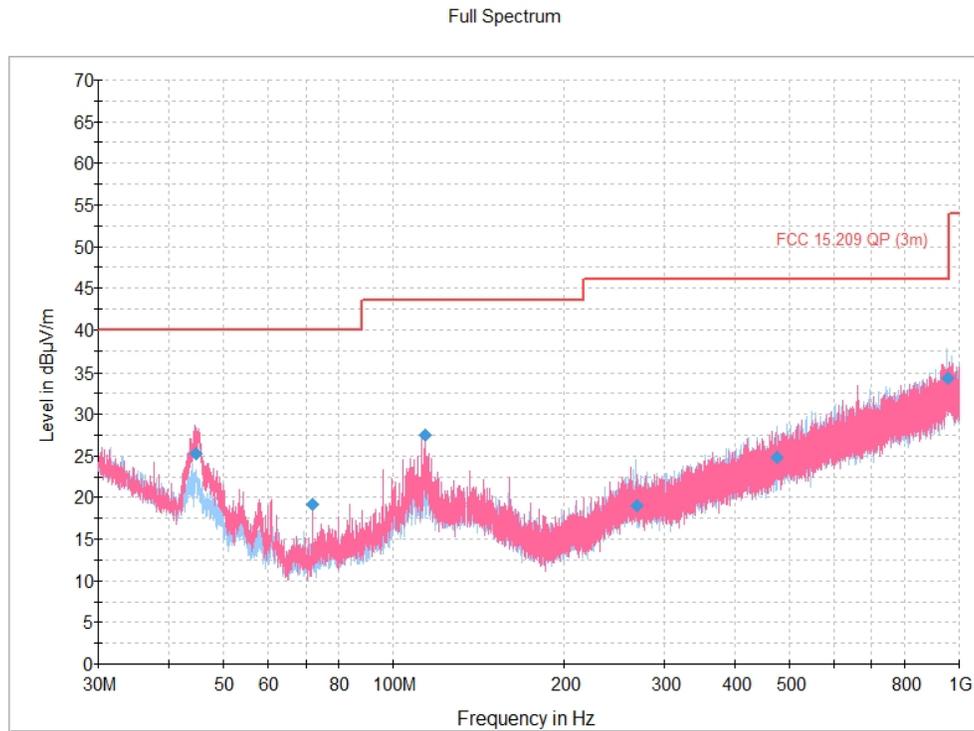


Figure 8.2-5: Radiated emissions, 2402 MHz, 30 – 1000 MHz

Table 8.2-4: Radiated emissions, 2402 MHz, 30 – 1000 MHz

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
44.622333	25.31	40.00	14.69	5000.0	120.000	105.0	V	224.0	18.6
72.001000	19.10	40.00	20.90	5000.0	120.000	401.0	V	224.0	13.9
113.646333	27.49	43.50	16.01	5000.0	120.000	395.0	V	188.0	19.1
268.548667	19.05	46.00	26.95	5000.0	120.000	182.0	H	11.0	21.4
475.920000	24.80	46.00	21.20	5000.0	120.000	213.0	H	280.0	26.7
953.156000	34.34	46.00	11.66	5000.0	120.000	245.0	H	256.0	34.7

Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)

Correction factors = antenna factor ACF (dB) + cable loss (dB)

Limits converted to dBµV/m and an inverse proportionality factor of 20 dB per decade has been used to normalize the specification limit to a measurement distance of 3 meters to determine compliance.

Notes:

8.2.5 Test data, continued

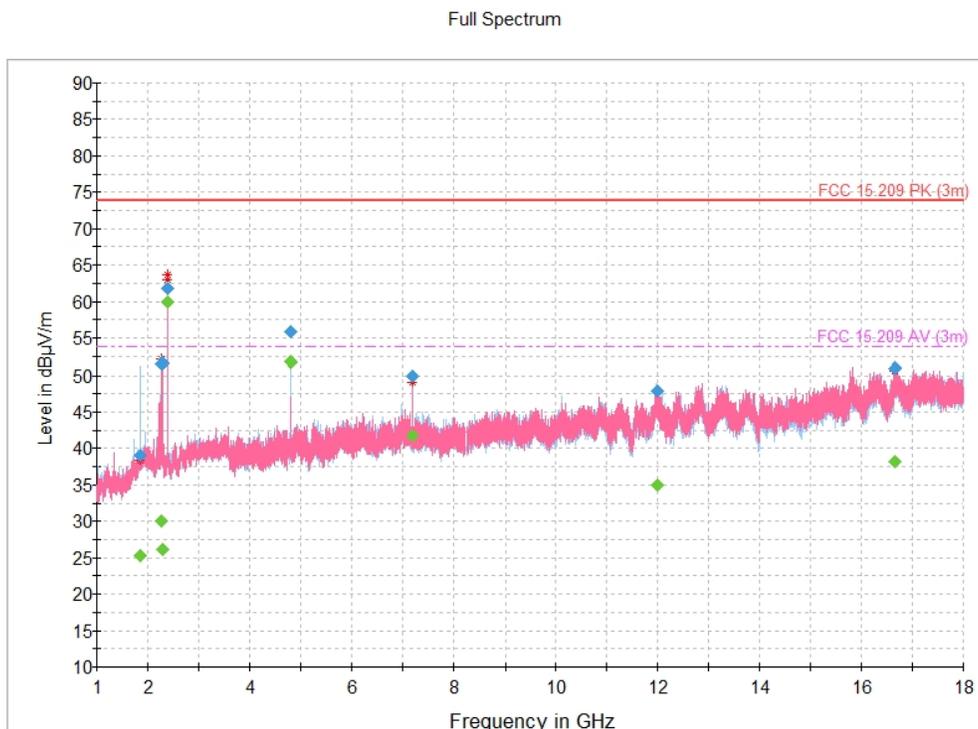


Figure 8.2-6: Radiated emissions, 2402 MHz, 1 – 18 GHz

Table 8.2-5: Radiated emissions, 2402 MHz, 1 – 18 GHz

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)
1863.666667	39.00	---	73.90	34.90	5000.0	1000.000	388.0	H	92.0	-11.2
1863.666667	---	25.32	53.90	28.58	5000.0	1000.000	388.0	H	92.0	-11.2
2273.866667	---	29.99	53.90	23.91	5000.0	1000.000	161.0	V	0.0	-10.4
2273.866667	51.56	---	73.90	22.34	5000.0	1000.000	161.0	V	0.0	-10.4
2290.133333	51.63	---	73.90	22.27	5000.0	1000.000	108.0	V	0.0	-10.5
2290.133333	---	26.11	53.90	27.79	5000.0	1000.000	108.0	V	0.0	-10.5
2402.166667	Low channel fundamental									
2402.166667	Low channel fundamental									
4804.200000	---	51.86	53.90	2.04	5000.0	1000.000	275.0	H	324.0	-1.7
4804.200000	55.81	---	73.90	18.09	5000.0	1000.000	275.0	H	324.0	-1.7
7205.733333	---	41.80	53.90	12.10	5000.0	1000.000	173.0	V	240.0	0.7
7205.733333	49.99	---	73.90	23.91	5000.0	1000.000	173.0	V	240.0	0.7
11984.833333	---	34.91	53.90	18.99	5000.0	1000.000	181.0	H	0.0	6.1
11984.833333	47.82	---	73.90	26.08	5000.0	1000.000	181.0	H	0.0	6.1
16654.400000	50.96	---	73.90	22.94	5000.0	1000.000	410.0	H	288.0	13.9
16654.400000	---	38.17	53.90	15.73	5000.0	1000.000	410.0	H	288.0	13.9

Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)

Correction factors = antenna factor ACF (dB) + cable loss (dB)

Notes: Limits converted to dBµV/m and an inverse proportionality factor of 20 dB per decade has been used to normalize the specification limit to a measurement distance of 3 meters to determine compliance.

A 2.4 GHz notch filter was used to prevent overloading.

8.2.5 Test data, continued

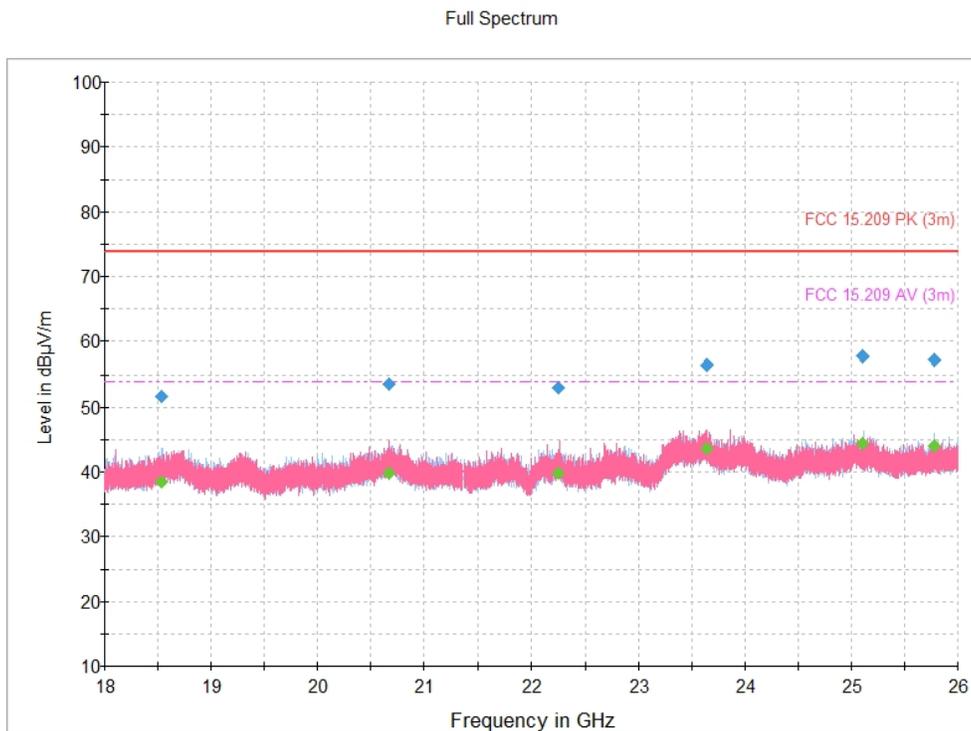


Figure 8.2-7: Radiated emissions, 2402 MHz, 18 – 26 GHz

Table 8.2-6: Radiated emissions, 2402 MHz, 18 – 26 GHz

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)
18535.666667	51.73	---	73.90	22.17	3000.0	1000.000	170.0	H	241.0	18.1
18535.666667	---	38.39	53.90	15.51	3000.0	1000.000	170.0	H	241.0	18.1
20665.800000	---	39.85	53.90	14.05	3000.0	1000.000	316.0	V	210.0	20.3
20665.800000	53.48	---	73.90	20.42	3000.0	1000.000	316.0	V	210.0	20.3
22251.266667	---	39.86	53.90	14.04	3000.0	1000.000	213.0	V	172.0	19.4
22251.266667	53.03	---	73.90	20.87	3000.0	1000.000	213.0	V	172.0	19.4
23642.066667	56.39	---	73.90	17.51	3000.0	1000.000	381.0	V	0.0	23.5
23642.066667	---	43.55	53.90	10.35	3000.0	1000.000	381.0	V	0.0	23.5
25109.933333	---	44.37	53.90	9.53	3000.0	1000.000	369.0	H	179.0	22.8
25109.933333	57.86	---	73.90	16.04	3000.0	1000.000	369.0	H	179.0	22.8
25784.733333	---	44.04	53.90	9.86	3000.0	1000.000	351.0	H	0.0	22.6
25784.733333	57.17	---	73.90	16.73	3000.0	1000.000	351.0	H	0.0	22.6

Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)

Correction factors = antenna factor ACF (dB) + cable loss (dB)

Limits converted to dBµV/m and an inverse proportionality factor of 20 dB per decade has been used to normalize the specification limit to a measurement distance of 3 meters to determine compliance.

Notes:

8.2.5 Test data, continued

Full Spectrum

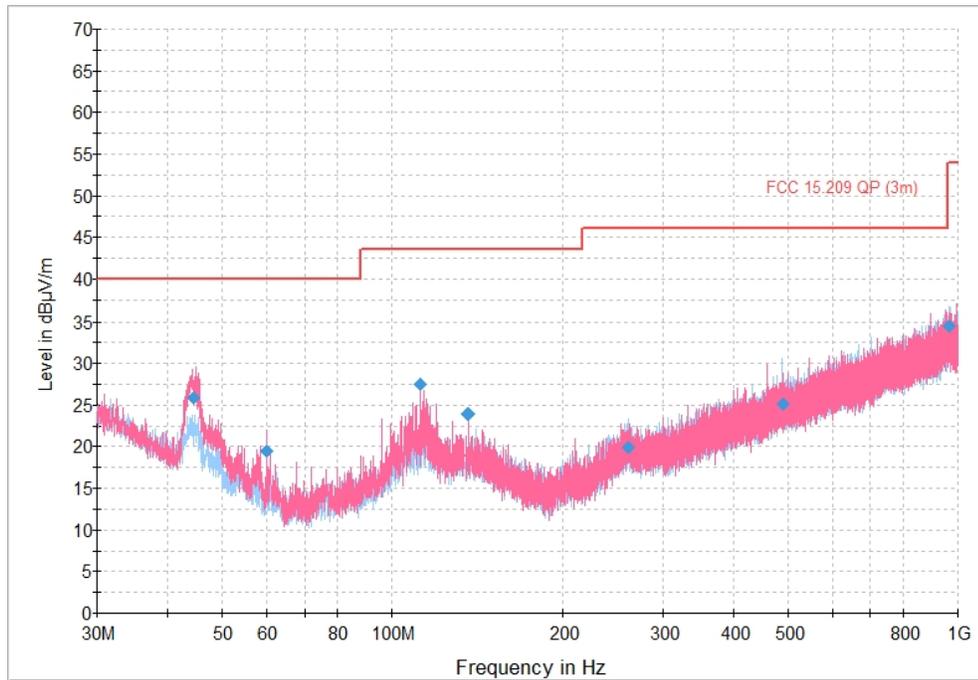


Figure 8.2-8: Radiated emissions, 2440 MHz, 30 – 1000 MHz

Table 8.2-7: Radiated emissions, 2440 MHz, 30 – 1000 MHz

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
44.601000	25.91	40.00	14.09	5000.0	120.000	98.0	V	312.0	18.6
60.005333	19.53	40.00	20.47	5000.0	120.000	135.0	V	107.0	12.7
112.029667	27.45	43.50	16.05	5000.0	120.000	389.0	V	91.0	18.9
136.021000	23.97	43.50	19.53	5000.0	120.000	383.0	V	92.0	19.7
260.880333	19.91	46.00	26.09	5000.0	120.000	263.0	H	90.0	22.1
489.490000	25.16	46.00	20.84	5000.0	120.000	292.0	H	136.0	26.9
964.917333	34.46	53.90	19.44	5000.0	120.000	241.0	H	160.0	34.7

Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)

Correction factors = antenna factor ACF (dB) + cable loss (dB)

Limits converted to dBµV/m and an inverse proportionality factor of 20 dB per decade has been used to normalize the specification limit to a measurement distance of 3 meters to determine compliance.

Notes:

8.2.5 Test data, continued

Full Spectrum

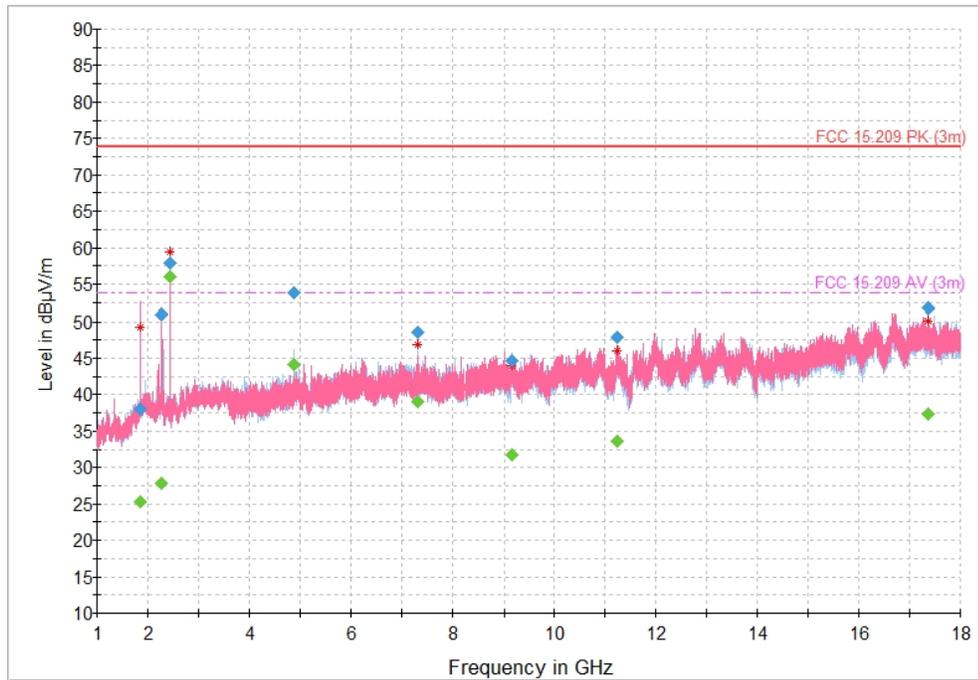


Figure 8.2-9: Radiated emissions, 2440 MHz, 1 – 18 GHz

Table 8.2-8: Radiated emissions, 2440 MHz, 1 – 18 GHz

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)
1853.900000	38.10	---	73.90	35.80	5000.0	1000.000	232.0	V	127.0	-11.3
1853.900000	---	25.30	53.90	28.60	5000.0	1000.000	232.0	V	127.0	-11.3
2279.933333	---	27.85	53.90	26.05	5000.0	1000.000	160.0	V	358.0	-10.4
2279.933333	50.92	---	73.90	22.98	5000.0	1000.000	160.0	V	358.0	-10.4
2439.900000	Middle channel fundamental									
2439.900000	Middle channel fundamental									
4880.133333	53.81	---	73.90	20.09	5000.0	1000.000	268.0	H	327.0	-2.0
4880.133333	---	44.14	53.90	9.76	5000.0	1000.000	268.0	H	327.0	-2.0
7319.866667	48.55	---	73.90	25.35	5000.0	1000.000	201.0	H	208.0	0.8
7319.866667	---	39.06	53.90	14.84	5000.0	1000.000	201.0	H	208.0	0.8
9149.866667	---	31.66	53.90	22.24	5000.0	1000.000	392.0	V	0.0	3.2
9149.866667	44.64	---	73.90	29.26	5000.0	1000.000	392.0	V	0.0	3.2
11241.733333	---	33.60	53.90	20.30	5000.0	1000.000	194.0	H	58.0	4.6
11241.733333	47.80	---	73.90	26.10	5000.0	1000.000	194.0	H	58.0	4.6
17363.800000	---	37.31	53.90	16.59	5000.0	1000.000	227.0	V	256.0	13.4
17363.800000	51.72	---	73.90	22.18	5000.0	1000.000	227.0	V	256.0	13.4

Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)

Correction factors = antenna factor ACF (dB) + cable loss (dB)

Notes: Limits converted to dBµV/m and an inverse proportionality factor of 20 dB per decade has been used to normalize the specification limit to a measurement distance of 3 meters to determine compliance.

A 2.4 GHz notch filter was used to prevent overloading.

8.2.5 Test data, continued

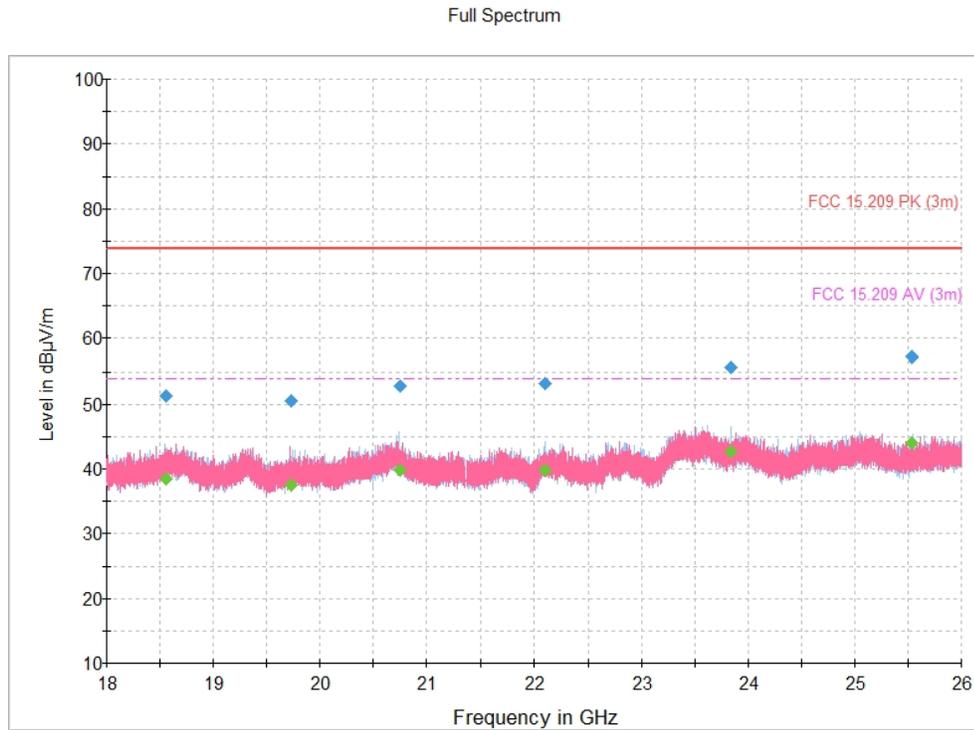


Figure 8.2-10: Radiated emissions, 2440 MHz, 18 – 26 GHz

Table 8.2-9: Radiated emissions, 2440 MHz, 18 – 26 GHz

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)
18554.733333	---	38.39	53.90	15.51	3000.0	1000.000	402.0	H	301.0	18.2
18554.733333	51.27	---	73.90	22.63	3000.0	1000.000	402.0	H	301.0	18.2
19727.533333	50.57	---	73.90	23.33	3000.0	1000.000	306.0	V	136.0	17.8
19727.533333	---	37.50	53.90	16.40	3000.0	1000.000	306.0	V	136.0	17.8
20747.933333	52.79	---	73.90	21.11	3000.0	1000.000	369.0	H	222.0	20.3
20747.933333	---	39.84	53.90	14.06	3000.0	1000.000	369.0	H	222.0	20.3
22098.866667	53.13	---	73.90	20.77	3000.0	1000.000	322.0	H	138.0	19.2
22098.866667	---	39.89	53.90	14.01	3000.0	1000.000	322.0	H	138.0	19.2
23845.800000	55.73	---	73.90	18.17	3000.0	1000.000	137.0	H	121.0	22.5
23845.800000	---	42.77	53.90	11.13	3000.0	1000.000	137.0	H	121.0	22.5
25536.600000	---	44.04	53.90	9.86	3000.0	1000.000	259.0	H	54.0	22.7
25536.600000	57.23	---	73.90	16.67	3000.0	1000.000	259.0	H	54.0	22.7

Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)

Correction factors = antenna factor ACF (dB) + cable loss (dB)

Limits converted to dBµV/m and an inverse proportionality factor of 20 dB per decade has been used to normalize the specification limit to a measurement distance of 3 meters to determine compliance.

Notes:

8.2.5 Test data, continued

Full Spectrum

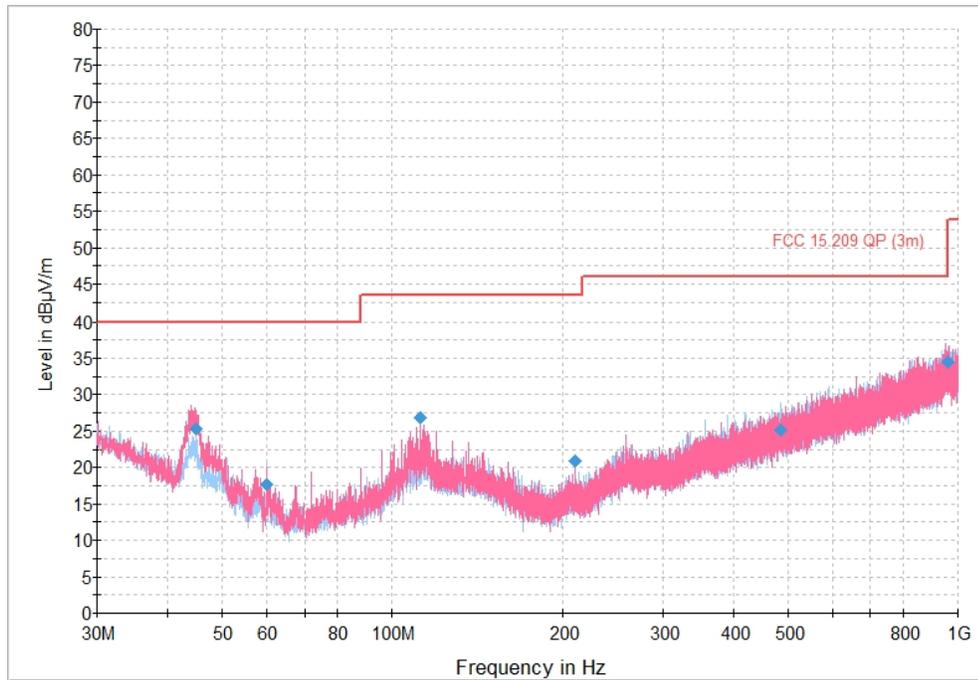


Figure 8.2-11: Radiated emissions, 2480 MHz, 30 – 1000 MHz

Table 8.2-10: Radiated emissions, 2480 MHz, 30 – 1000 MHz

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
45.048000	25.36	40.00	14.64	5000.0	120.000	98.0	V	12.0	18.4
60.013000	17.62	40.00	22.38	5000.0	120.000	171.0	H	23.0	12.7
112.062000	26.80	43.50	16.70	5000.0	120.000	402.0	V	270.0	18.9
209.999667	20.83	43.50	22.67	5000.0	120.000	200.0	V	56.0	18.2
485.795333	25.16	46.00	20.84	5000.0	120.000	240.0	H	272.0	26.9
960.516000	34.42	53.90	19.48	5000.0	120.000	171.0	H	129.0	34.7

Notes:  
 Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)  
 Correction factors = antenna factor ACF (dB) + cable loss (dB)  
 Limits converted to dBµV/m and an inverse proportionality factor of 20 dB per decade has been used to normalize the specification limit to a measurement distance of 3 meters to determine compliance.

8.2.5 Test data, continued

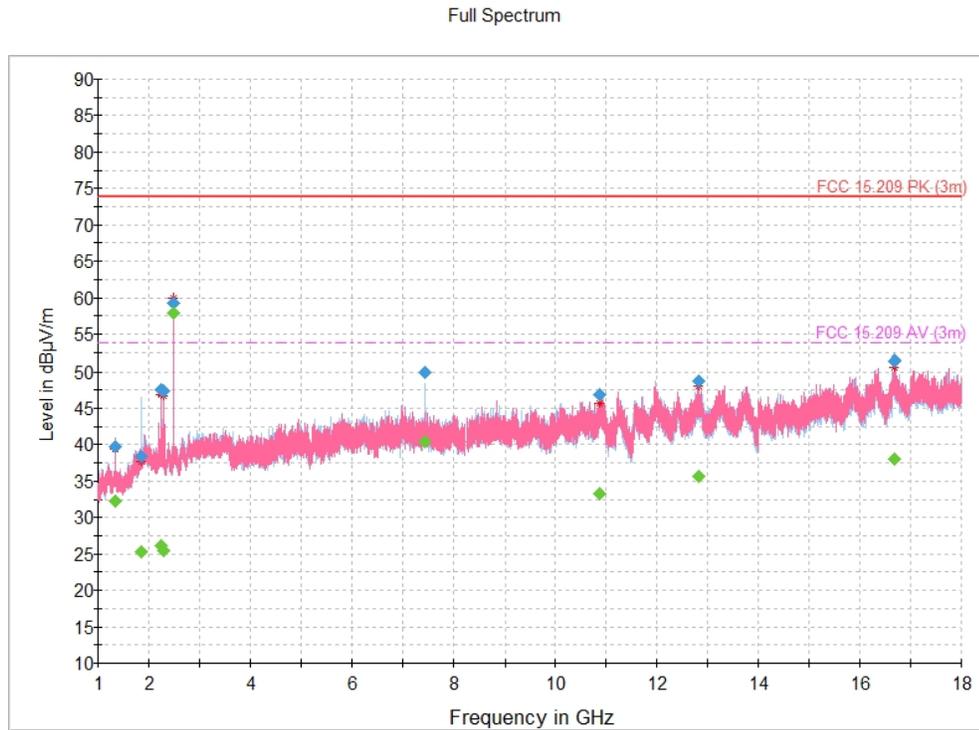


Figure 8.2-12: Radiated emissions, 2480 MHz, 1 – 18 GHz

Table 8.2-11: Radiated emissions, 2480 MHz, 1 – 18 GHz

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)
1350.033333	39.78	---	73.90	34.12	5000.0	1000.000	190.0	V	0.0	-14.4
1350.033333	---	32.23	53.90	21.67	5000.0	1000.000	190.0	V	0.0	-14.4
1854.533333	38.29	---	73.90	35.61	5000.0	1000.000	325.0	H	58.0	-11.3
1854.533333	---	25.25	53.90	28.65	5000.0	1000.000	325.0	H	58.0	-11.3
2256.133333	---	26.10	53.90	27.80	5000.0	1000.000	138.0	V	354.0	-10.5
2256.133333	47.53	---	73.90	26.37	5000.0	1000.000	138.0	V	354.0	-10.5
2303.900000	47.33	---	73.90	26.57	5000.0	1000.000	128.0	V	0.0	-10.5
2303.900000	---	25.47	53.90	28.43	5000.0	1000.000	128.0	V	0.0	-10.5
2479.966667	High channel fundamental									
2479.966667	High channel fundamental									
7439.600000	---	40.46	53.90	13.44	5000.0	1000.000	205.0	H	242.0	1.3
7439.600000	49.85	---	73.90	24.05	5000.0	1000.000	205.0	H	242.0	1.3
10864.400000	46.90	---	73.90	27.00	5000.0	1000.000	410.0	H	260.0	4.3
10864.400000	---	33.19	53.90	20.71	5000.0	1000.000	410.0	H	260.0	4.3
12818.266667	---	35.64	53.90	18.26	5000.0	1000.000	245.0	V	224.0	8.9
12818.266667	48.80	---	73.90	25.10	5000.0	1000.000	245.0	V	224.0	8.9
16693.133333	---	38.01	53.90	15.89	5000.0	1000.000	282.0	V	301.0	14.3
16693.133333	51.39	---	73.90	22.51	5000.0	1000.000	282.0	V	301.0	14.3

Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)

Correction factors = antenna factor ACF (dB) + cable loss (dB)

Notes:

Limits converted to dBµV/m and an inverse proportionality factor of 20 dB per decade has been used to normalize the specification limit to a measurement distance of 3 meters to determine compliance.

A 2.4 GHz notch filter was used to prevent overloading.

8.2.5 Test data, continued

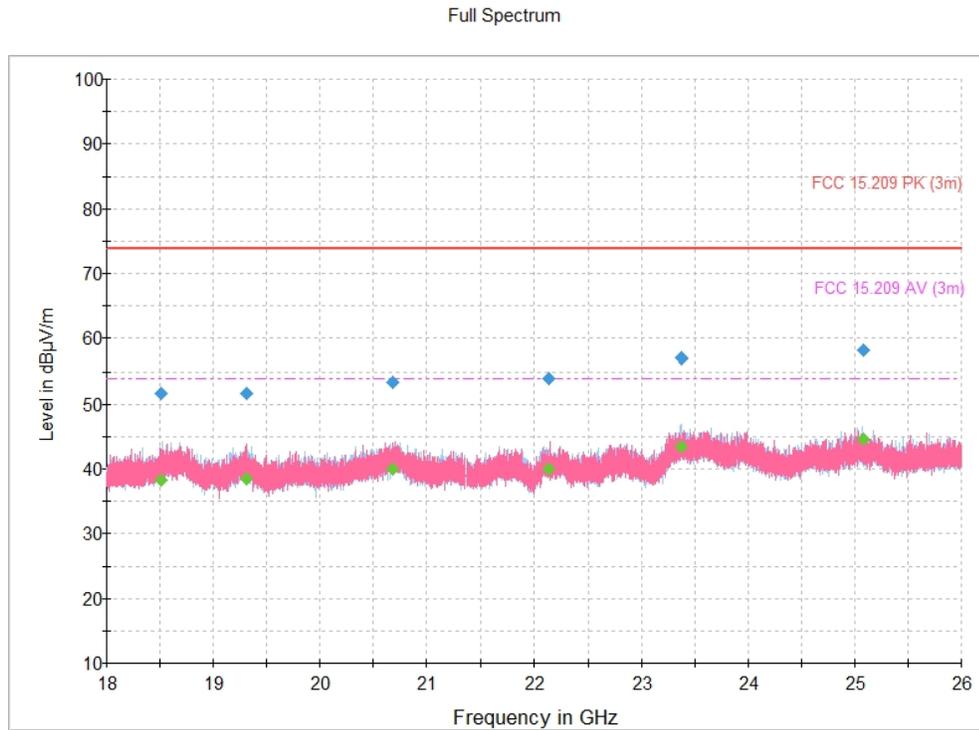


Figure 8.2-13: Radiated emissions, 2480 MHz, 18 – 26 GHz

Table 8.2-12: Radiated emissions, 2480 MHz, 18 – 26 GHz

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)
18515.000000	---	38.22	53.90	15.68	3000.0	1000.000	410.0	H	333.0	18.0
18515.000000	51.57	---	73.90	22.33	3000.0	1000.000	410.0	H	333.0	18.0
19306.866667	51.67	---	73.90	22.23	3000.0	1000.000	284.0	V	152.0	18.6
19306.866667	---	38.55	53.90	15.35	3000.0	1000.000	284.0	V	152.0	18.6
20687.133333	---	39.98	53.90	13.92	3000.0	1000.000	272.0	V	138.0	20.5
20687.133333	53.46	---	73.90	20.44	3000.0	1000.000	272.0	V	138.0	20.5
22137.533333	53.90	---	73.90	20.00	3000.0	1000.000	180.0	V	0.0	19.3
22137.533333	---	40.00	53.90	13.90	3000.0	1000.000	180.0	V	0.0	19.3
23370.866667	---	43.42	53.90	10.48	3000.0	1000.000	320.0	H	0.0	23.0
23370.866667	56.99	---	73.90	16.91	3000.0	1000.000	320.0	H	0.0	23.0
25078.066667	---	44.65	53.90	9.25	3000.0	1000.000	340.0	H	106.0	22.9
25078.066667	58.10	---	73.90	15.80	3000.0	1000.000	340.0	H	106.0	22.9

Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)

Correction factors = antenna factor ACF (dB) + cable loss (dB)

Limits converted to dBµV/m and an inverse proportionality factor of 20 dB per decade has been used to normalize the specification limit to a measurement distance of 3 meters to determine compliance.

Notes:

8.2.5 Test data, continued

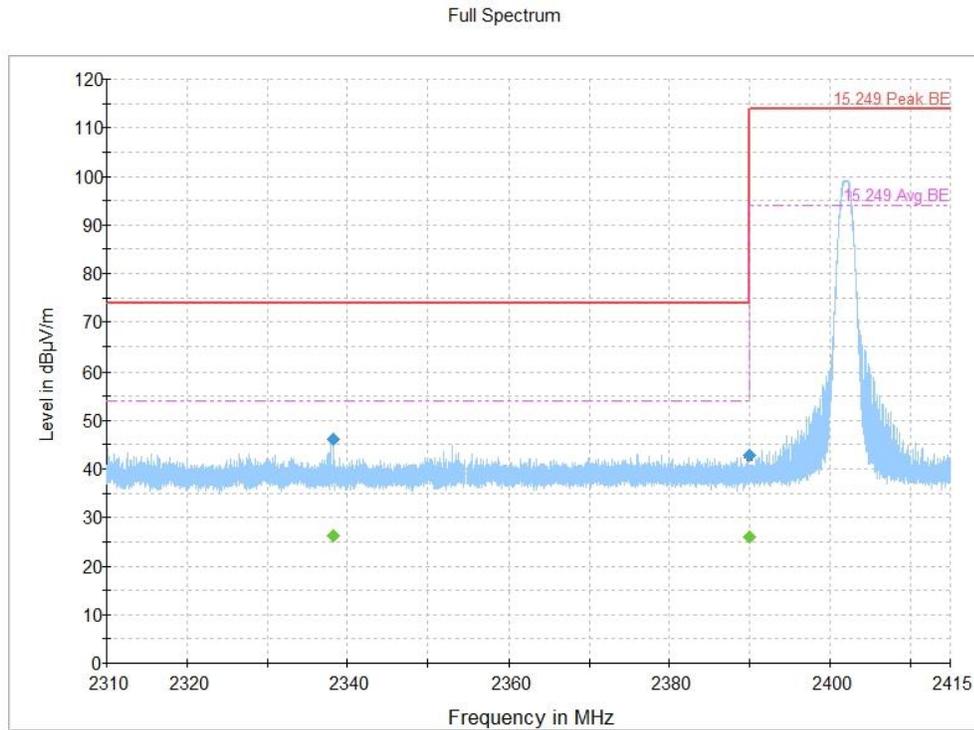


Figure 8.2-14: Radiated emissions, restricted band edge, low

Table 8.2-13: Radiated emissions, restricted band edge, low

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)
2338.252000	---	26.28	53.90	27.62	5000.0	1000.000	100.0	V	355.0	-10.4
2338.252000	46.24	---	73.90	27.66	5000.0	1000.000	100.0	V	355.0	-10.4
2390.000000	---	26.05	53.90	27.85	5000.0	1000.000	107.0	V	339.0	-10.1
2390.000000	42.76	---	73.90	31.14	5000.0	1000.000	107.0	V	339.0	-10.1

Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)

Correction factors = antenna factor ACF (dB) + cable loss (dB)

Notes:

Limits converted to dBµV/m and an inverse proportionality factor of 20 dB per decade has been used to normalize the specification limit to a measurement distance of 3 meters to determine compliance.

8.2.5 Test data, continued

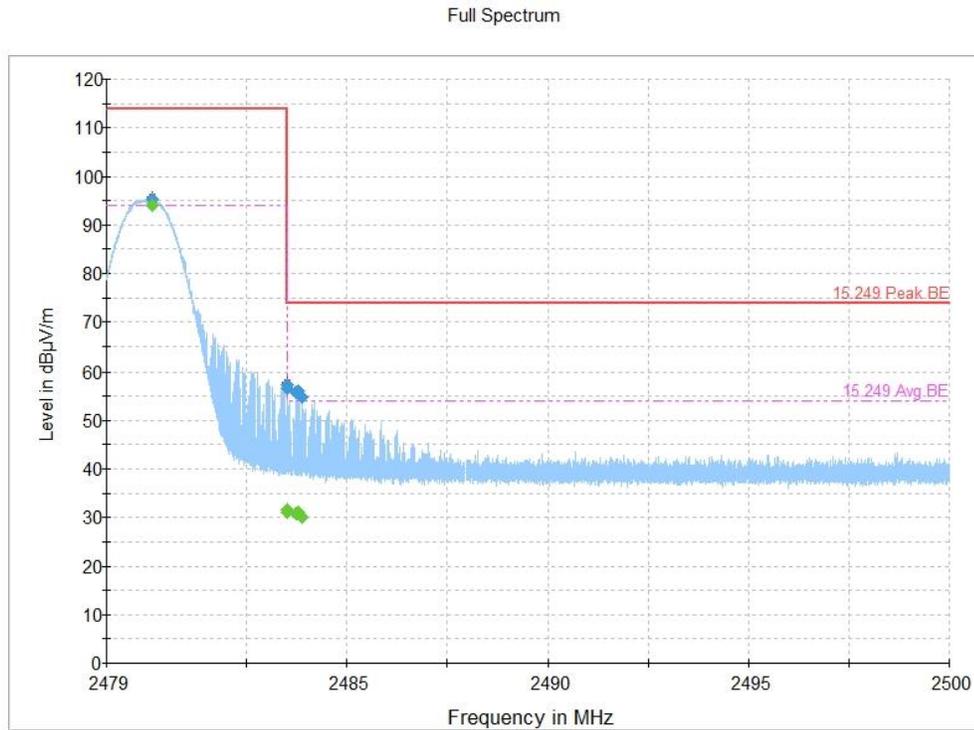


Figure 8.2-15: Radiated emissions, restricted band edge, high

Table 8.2-14: Radiated emissions, restricted band edge, high

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)
2480.155000	---	94.10	94.00	-0.10	5000.0	1000.000	127.0	V	339.0	-9.5
2480.155000	95.39	---	114.00	18.61	5000.0	1000.000	127.0	V	339.0	-9.5
2483.500000	---	31.53	53.90	22.37	5000.0	1000.000	98.0	V	322.0	-9.5
2483.500000	57.35	---	73.90	16.55	5000.0	1000.000	98.0	V	322.0	-9.5
2483.508700	---	31.11	53.90	22.79	5000.0	1000.000	162.0	V	348.0	-9.5
2483.508700	56.55	---	73.90	17.35	5000.0	1000.000	162.0	V	348.0	-9.5
2483.740400	---	30.70	53.90	23.20	5000.0	1000.000	162.0	V	0.0	-9.5
2483.740400	55.86	---	73.90	18.04	5000.0	1000.000	162.0	V	0.0	-9.5
2483.765600	---	30.83	53.90	23.07	5000.0	1000.000	166.0	V	0.0	-9.5
2483.765600	55.83	---	73.90	18.07	5000.0	1000.000	166.0	V	0.0	-9.5
2483.800600	---	30.96	53.90	22.94	5000.0	1000.000	98.0	V	330.0	-9.5
2483.800600	55.95	---	73.90	17.95	5000.0	1000.000	98.0	V	330.0	-9.5
2483.885300	---	30.17	53.90	23.73	5000.0	1000.000	162.0	V	342.0	-9.5
2483.885300	54.77	---	73.90	19.13	5000.0	1000.000	162.0	V	342.0	-9.5

Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)

Correction factors = antenna factor ACF (dB) + cable loss (dB)

Limits converted to dBµV/m and an inverse proportionality factor of 20 dB per decade has been used to normalize the specification limit to a measurement distance of 3 meters to determine compliance.

Notes:

## Section 9 Block diagrams of test set-ups

### 9.1 Radiated emissions set-up

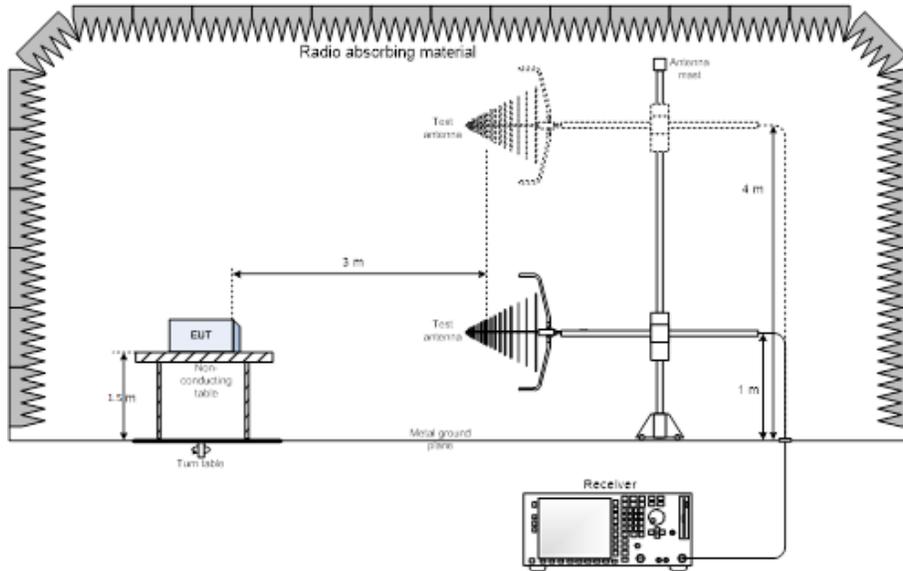


Figure 9.1-1 30 MHz - 1000 MHz Setup

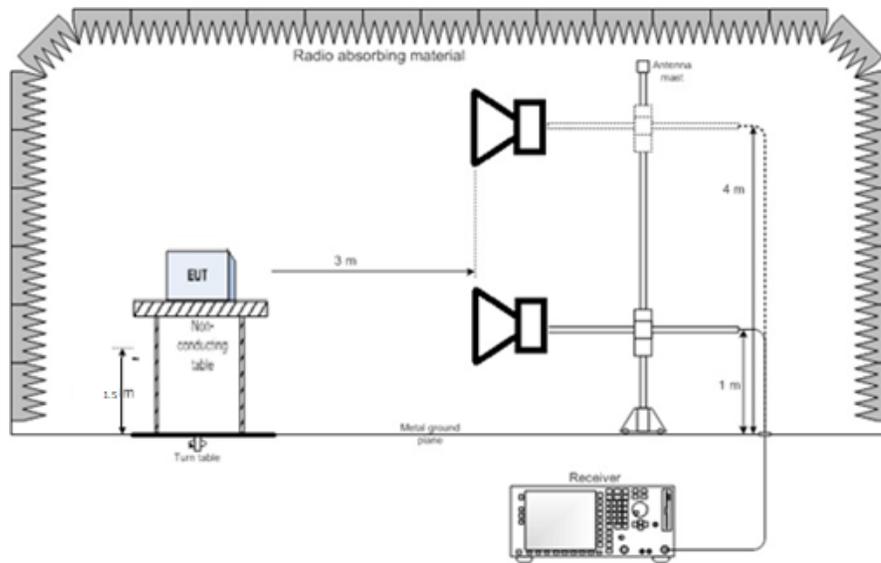


Figure 9.1-2 1 GHz - 26 GHz Setup

Thank you for choosing

