

Test report

443812-1TRFWL

Date of issue: June 28, 2021

Applicant:

Fujitsu Network Communications

Product:

Dual Band RU for North America

Model:

DB 5G RU

Model variant:

N/A

FCC ID:

CFD5GRUDB3

Specifications:

◆ **FCC 47 CFR Part 27**

Miscellaneous Wireless Communications Services

Lab and test locations

Company name	Nemko USA Inc.
Address	2210 Faraday Ave, Suite 150
City	Carlsbad
Province	California
Postal code	92008
Country	USA
Telephone	+1 760 444 3500
Website	www.nemko.com

Tested by	Martha Espinoza, Wireless Test Engineer
Reviewed by	Chip Fleury, Wireless & Certification Supervisor
Review date	June 29, 2021
Reviewer signature	

Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contain in this report are within Nemko USA's ISO/IEC 17025 accreditation.

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

Copyright notification

Nemko USA Inc. authorizes the applicant to reproduce this report provided it is reproduced in its entirety and for use by the company's employees only.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties.

Nemko USA Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

© Nemko USA Inc.

Table of contents

Table of contents	3
Section 1. Report summary	4
1.1 Applicant and manufacturer	4
1.2 Test specifications	4
1.3 Statement of compliance	4
1.4 Exclusions	4
1.5 Test report revision history	4
Section 2. Summary of test results	5
2.1 FCC Part 27 test results	5
Section 3. Equipment under test (EUT) details	6
3.1 Sample information	6
3.2 EUT information	6
3.3 Technical information	6
3.4 Product description and theory of operation	6
3.5 EUT exercise details	6
3.6 EUT setup diagram	7
Section 4. Engineering considerations	8
4.1 Modifications incorporated in the EUT	8
4.2 Technical judgment	8
4.3 Deviations from laboratory tests procedures	8
Section 5. Test conditions	9
5.1 Atmospheric conditions	9
5.2 Power supply range	9
Section 6. Measurement uncertainty	10
6.1 Uncertainty of measurement	10
Section 7. Test equipment	11
7.1 Test equipment list	11
Section 8. Testing data	12
8.1 FCC §2.1033(c)(4) Modulation type	12
8.2 FCC §2.1049(h) & 99% §27.5 (h)(j) Occupied Bandwidth and frequency ranges	13
8.3 FCC §27.53 (h)(3) 26 dB Occupied Bandwidth	17
8.4 FCC 27.50(d)(2)(ii) Output power	21
8.5 FCC 27.50(d)(5) Peak to Average Power Ratio	23
8.6 FCC 27.53(h) Emission Limits	27
8.7 FCC 27.55 Frequency stability	65
8.8 Radiated emissions set-up	67

Section 1. Report summary

1.1 Applicant and manufacturer

Company name	Fujitsu Networks Communications, Inc.
Address	2801 Telecom Parkway
City	Richardson
Province/State	TX
Postal/Zip code	75082
Country	United States of America

1.2 Test specifications

FCC 47 CFR Part 27	Miscellaneous Wireless Communications Services
--------------------	--

1.3 Statement of compliance

In the configuration tested, the EUT was found compliant.

Testing was completed 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.

1.4 Exclusions

None

1.5 Test report revision history

Revision #	Details of changes made to test report
443812-1TRFWL	Original report issued

Section 2. Summary of test results

2.1 FCC Part 27 test results

Part	Test description	Verdict
§2.1033(c)(4)	Modulation type	Pass
§2.1049(h)	99% Occupied bandwidth	Pass
§27.50(h)(j)	Frequency ranges	Pass
§27.50(d)(2)(ii)	Output power at RF antenna connector	Pass
§27.50(d)(5)	Peak to average power ratio	Pass
§27.53(h)(1)	Conducted spurious emissions	Pass
§27.53(h)(1)	Radiated spurious emissions	Pass
§27.53(h)(3)	26 dB Occupied bandwidth	Pass
§27.54	Frequency stability	Pass

Notes: None

Section 3. Equipment under test (EUT) details

3.1 Sample information

Receipt date	June 15, 2021
Nemko sample ID number	NEx: 443812

3.2 EUT information

Product name	Dual Band RU for North America
Model	DB 5G RU
Model variant	N/A
Serial number	10014 and 10018

3.3 Technical information

Frequency band	1995 - 2020 MHz (Band n70) and 2110 – 2200 MHz (Band n66)
Frequency Min (MHz)	1995 MHz
Frequency Max (MHz)	2200 MHz
RF power Min (W), Conducted/ERP/EIRP	67.142 Watts (Port D)
RF power Max (W), Conducted/ERP/EIRP	76.032 Watts (Port D)
Field strength, Units @ distance	71.28 dBuV/m @ 3m (17293.8 MHz)
Measured BW (kHz) (26 dB)	4.95047 MHz (5 MHz OBW Declared); 9.85969 MHz (10 MHz OBW Declared); 19.6856 MHz (20 MHz OBW Declared); 24.7211 MHz (25 MHz OBW Declared).
Type of modulation	QPSK; 16QAM; 64QAM; 256QAM
Transmitter spurious, Units @ distance	3 Meters
Power requirements	-48 VDC
Antenna information	The EUT is professionally installed.

3.4 Product description and theory of operation

The radio unit (RU) is one of the components to configure the 5G RAN mobile communication system. The RU has two band frequencies: band n66 and band n70. Four antenna ports are shared across the frequency bands.

3.5 EUT exercise details

A laptop computer was used to send test commands to EUT to force it to transmit the appropriate signal. Unit transmit the selected signal at full power: 60 Watts in band n66 and 40 Watts in band n70. The maximum power is only available in one band at the time due the maximum power supported by unit is 80 Watts. The unit was tested using a conducted port. The antenna installation shall be done by professionals, and they are not within the scope of the tests evaluated on this document.

3.6 EUT setup diagram

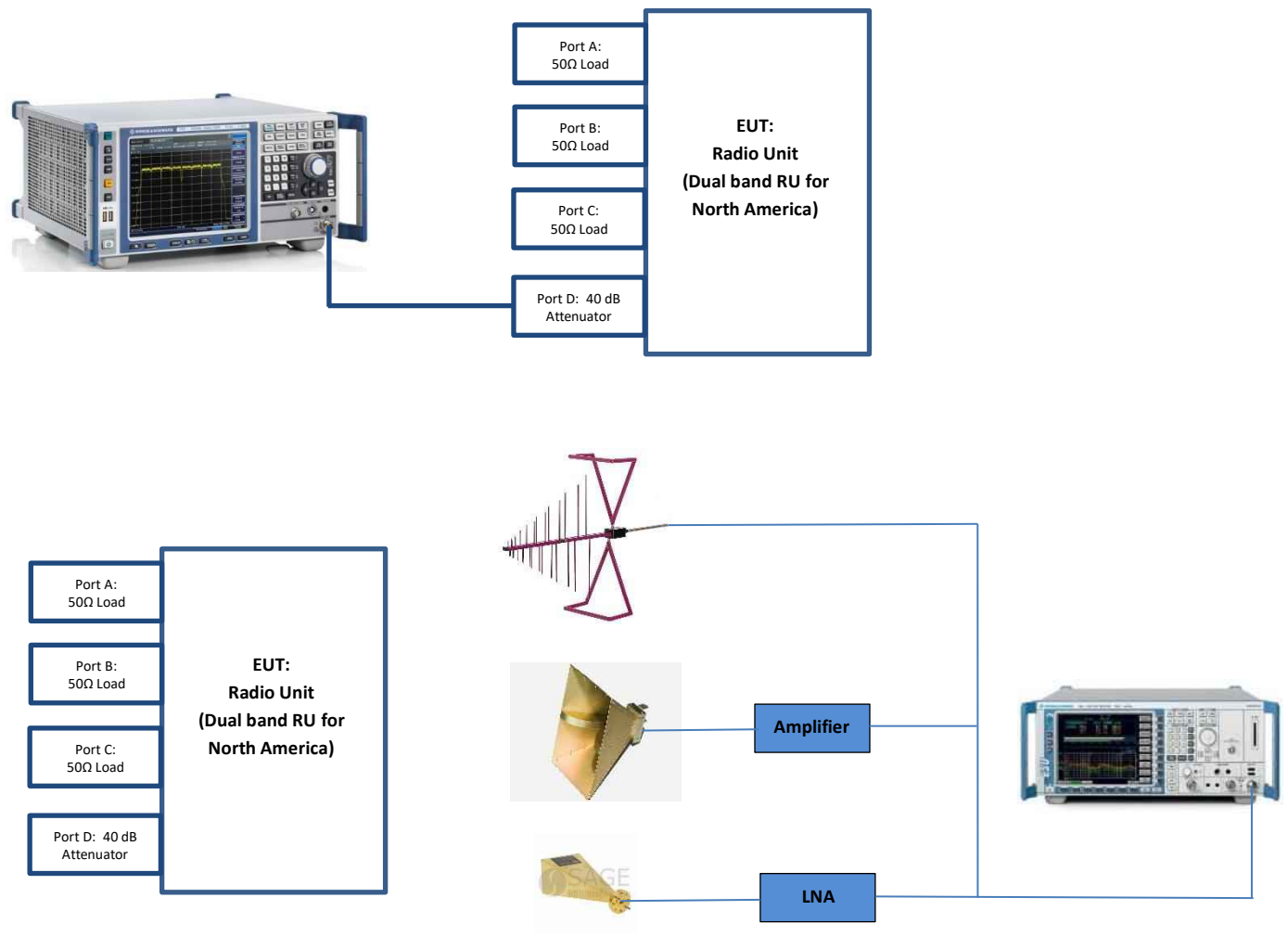


Figure 3.6-1: Setup diagram

Section 4. Engineering considerations

4.1 Modifications incorporated in the EUT

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

4.2 Technical judgment

None

4.3 Deviations from laboratory tests procedures

No deviations were made from laboratory procedures.

Section 5. Test conditions

5.1 Atmospheric conditions

Temperature	15–30 °C
Relative humidity	20–75 %
Air pressure	860–1060 mbar

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

Section 6. Measurement uncertainty

6.1 Uncertainty of measurement

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

Table 6.1-1: Measurement uncertainty.

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%

Section 7. Test equipment

7.1 Test equipment list

Table 7.1-1: Equipment list

Equipment	Manufacturer	Model no.	Asset no.	Cal cycle	Next cal.
EMC Test Receiver	Rohde & Schwarz	ESU 40	E1121	05-19-2021	05-19-2022
Signal Analyzer	Rohde & Schwarz	FSV 40	E1120	11-19-2019	11-19-2021
Antenna, Bilog	Schaffner-Chase	CBL6111C	1763	02-18-2020	02-18-2022
Antenna, Horn	ETS	3117-PA	E1160	12-02-2020	12-02-2021
Antenna, Horn	Sage Millimeter	SAR-2309-42-S2	E1143	11-13-2020	11-13-2022
Low Noise Amplifier	Sage Millimeter	SBL-1834034030-KFKF-SI	E1228	NCR	NCR
Temperature chamber	Cincinnati Sub-zero	ZPH-32-2-2-H/AC	S1179	08-03-2020	08-03-2021
Power sensor	ETS-Lindgren	7002-006	E1062	10-14-2020	10-14-2021

Note: NCR - no calibration required

Section 8. Testing data

8.1 FCC §2.1033(c)(4) Modulation type

8.1.1 Definitions and limits

(c) Applications for equipment other than that operating under parts 15, 11 and 18 of this chapter shall be accompanied by a technical report containing the following information:

(4) Type or types of emission

8.1.2 Test summary

Test date	June 15, 2021	Temperature	20 °C
Test engineer	Martha Espinoza	Air pressure	1005 mbar
Verdict	Pass	Relative humidity	55 %

8.1.3 Observations, settings and special notes

None

8.1.4 Test data

Band	Channel (MHz)	Bandwidth (MHz)	Emission type
n66	2112.5; 2155; 2197.5	5	QPSK; 16QAM; 64QAM; 256QAM
n66	2115; 2155; 2195	10	QPSK; 16QAM; 64QAM; 256QAM
n66	2120; 2155; 2190	20	QPSK; 16QAM; 64QAM; 256QAM
n70	2007.5	25	QPSK; 16QAM; 64QAM; 256QAM

Table 8.1-1: Types of emission

8.2 FCC §2.1049(h) & 99% §27.5 (h)(j) Occupied Bandwidth and frequency ranges

8.2.1 Definitions and limits

§2.1049 (h) Transmitters employing digital modulation techniques—when modulated by an input signal such that its amplitude and symbol rate represent the maximum rated conditions under which the equipment will be operated. The signal shall be applied through any filter networks, pseudo-random generators or other devices required in normal service. Additionally, the occupied bandwidth shall be shown for operation with any devices used for modifying the spectrum when such devices are optional at the discretion of the use.

§27 (h)(j)(k)

(h) 1710-1755 MHz, 2110-2155 MHz, 1695-1710 MHz, 1755-1780 MHz, and 2155-2180 MHz bands.

(j) 2000-2020 MHz and 2180-2200 MHz bands.

(k) 1915-1920 MHz and 1995-2000 MHz bands.

8.2.2 Test summary

Test date	June 16, 2021	Temperature	21 °C
Test engineer	Martha Espinoza	Air pressure	1003 mbar
Verdict	Pass	Relative humidity	58%

8.2.3 Observations, settings and special notes

Spectrum analyser settings:

Resolution bandwidth	1% - 5% OBW
Video bandwidth	3*RBW
Frequency span	2*OBW
Detector mode	Peak
Trace mode	Max Hold

8.2.3 Test data

Band	OBW Declared	Port	Channel (MHz)	99% OBW
n66	5 MHz	D	2112.5	4.537 MHz
n66	5 MHz	D	2155	4.539 MHz
n66	5 MHz	D	2197.5	4.544 MHz
n66	10 MHz	D	2115	9.294 MHz
n66	10 MHz	D	2155	9.294 MHz
n66	10 MHz	D	2195	9.295 MHz
n66	20 MHz	D	2120	18.886 MHz
n66	20 MHz	D	2155	18.896 MHz
n66	20 MHz	D	2190	18.890 MHz
n70	25 MHz	D	2007.5	23.708 MHz

Table 8.2-1: 99% Occupied bandwidth, QPSK Modulation.

Band	OBW Declared	Port	Channel (MHz)	99% OBW
n66	5 MHz	D	2112.5	4.567 MHz
n66	5 MHz	D	2155	4.572 MHz
n66	5 MHz	D	2197.5	4.564 MHz
n66	10 MHz	D	2115	9.248 MHz
n66	10 MHz	D	2155	9.250 MHz
n66	10 MHz	D	2195	9.244 MHz
n66	20 MHz	D	2120	18.938 MHz
n66	20 MHz	D	2155	18.936 MHz
n66	20 MHz	D	2190	18.938 MHz
n70	25 MHz	D	2007.5	23.788 MHz

Table 8.2-2: 99% Occupied bandwidth, 16QAM Modulation.

8.2.4 Test data, continued

Band	OBW Declared	Port	Channel (MHz)	99% OBW
n66	5 MHz	D	2112.5	4.540 MHz
n66	5 MHz	D	2155	4.540 MHz
n66	5 MHz	D	2197.5	4.542 MHz
n66	10 MHz	D	2115	9.305 MHz
n66	10 MHz	D	2155	9.307 MHz
n66	10 MHz	D	2195	9.306 MHz
n66	20 MHz	D	2120	18.898 MHz
n66	20 MHz	D	2155	18.901 MHz
n66	20 MHz	D	2190	18.895 MHz
n70	25 MHz	D	2007.5	23.697 MHz

Table 8.2-3: 99% Occupied bandwidth, 64QAM Modulation.

Band	OBW Declared	Port	Channel (MHz)	99% OBW
n66	5 MHz	D	2112.5	4.540 MHz
n66	5 MHz	D	2155	4.538 MHz
n66	5 MHz	D	2197.5	4.542 MHz
n66	10 MHz	D	2115	9.300 MHz
n66	10 MHz	D	2155	9.302 MHz
n66	10 MHz	D	2195	9.304 MHz
n66	20 MHz	D	2120	18.898 MHz
n66	20 MHz	D	2155	18.894 MHz
n66	20 MHz	D	2190	18.900 MHz
n70	25 MHz	D	2007.5	23.674 MHz

Table 8.2-4: 99% Occupied bandwidth, 256QAM Modulation.

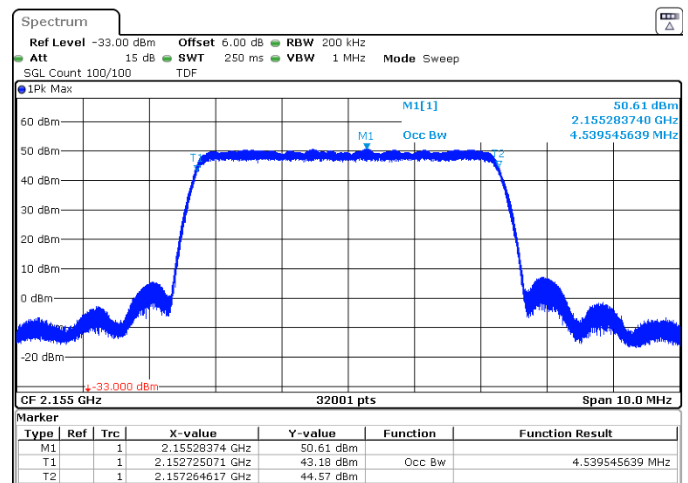
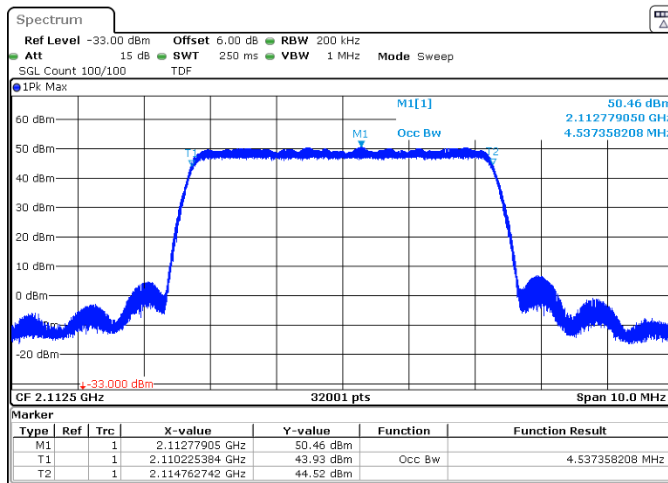


Figure 8.2-1: 99% Occupied bandwidth, QPSK Modulation, low and middle channel (5 MHz), respectively, band n66.

8.2.5 Test data, continued

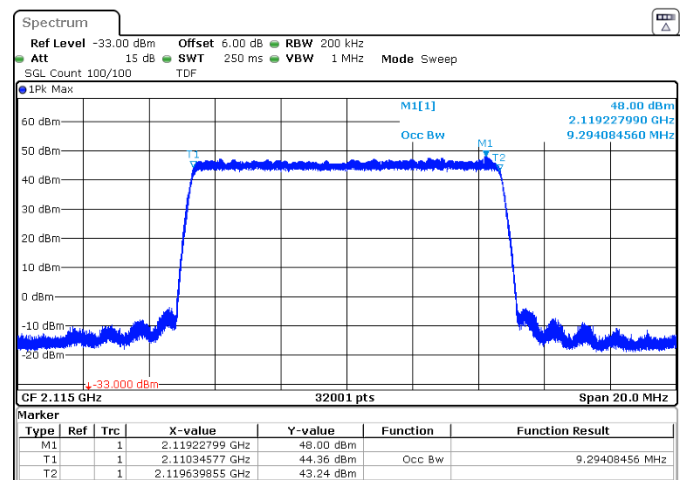
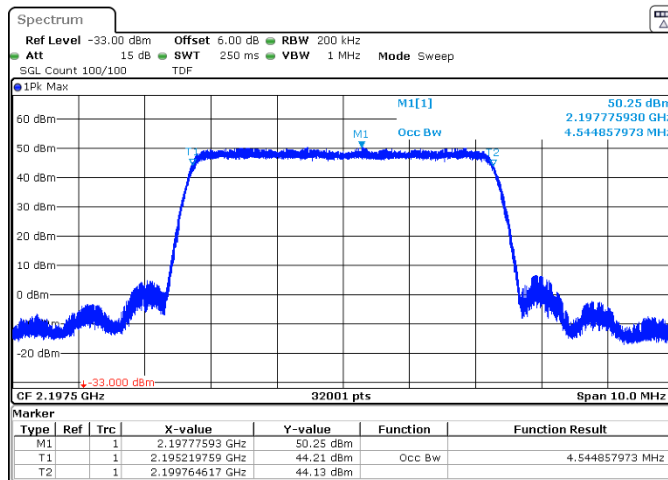


Figure 8.2-2: 99% Occupied bandwidth, QPSK Modulation, high channel (5 MHz) and low channel (10 MHz), respectively, band n66.

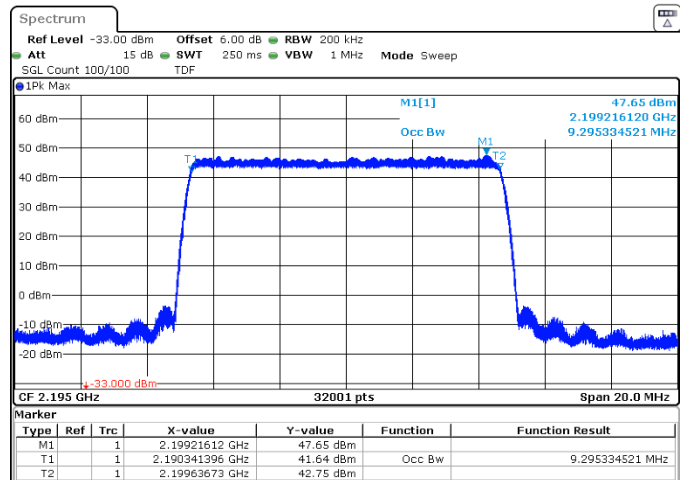
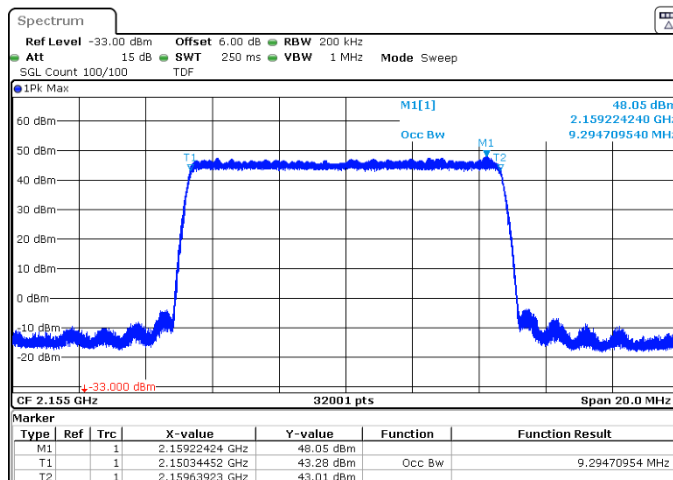


Figure 8.2-3: 99% Occupied bandwidth, QPSK Modulation, middle and high channel (10 MHz), respectively, band n66.

8.2.6 Test data, continued

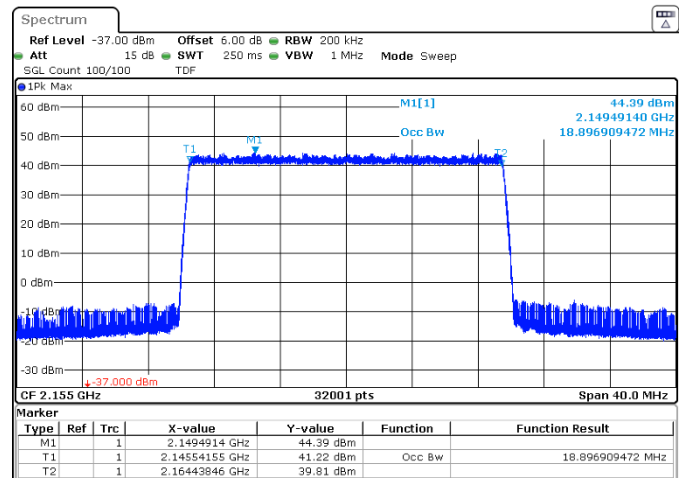
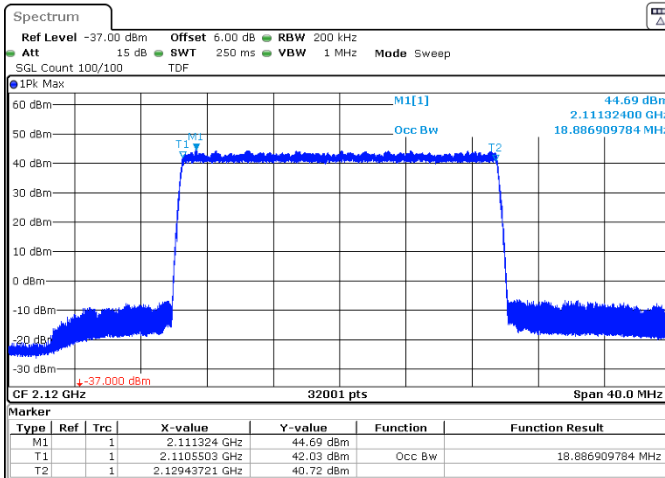


Figure 8.2-4: 99% Occupied bandwidth, QPSK Modulation, low and middle channel (20 MHz), respectively, band n66.

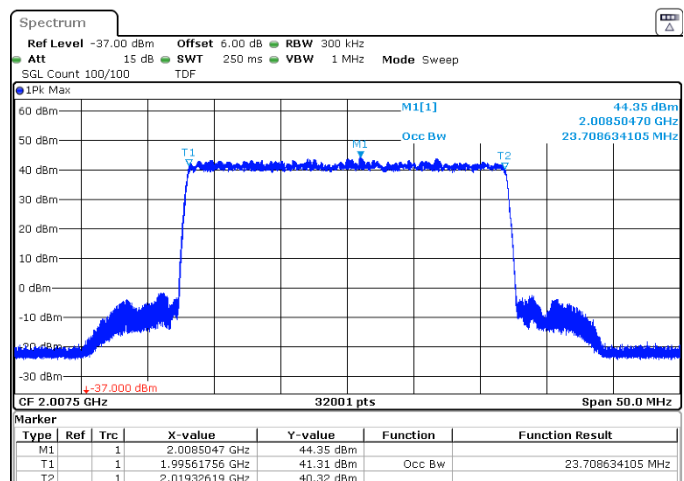
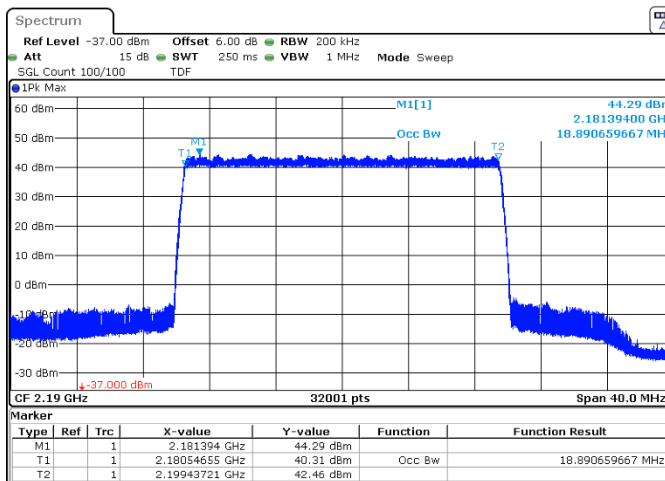


Figure 8.2-5: 99% Occupied bandwidth, QPSK Modulation, high channel (20 MHz), band n66 and 2007.5 MHz channel (25 MHz), band n70.

8.3 FCC §27.53 (h)(3) 26 dB Occupied Bandwidth

8.3.1 Definitions and limits

(3) Measurement procedure. (i) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

8.3.2 Test summary

Test date	June 16, 2021	Temperature	21 °C
Test engineer	Martha Espinoza	Air pressure	1003 mbar
Verdict	Pass	Relative humidity	58%

8.3.3 Observations, settings and special notes

Spectrum analyser settings:

Resolution bandwidth	1% - 5% OBW
Video bandwidth	3*RBW
Frequency span	2*OBW
Detector mode	Peak
Trace mode	Max Hold

8.3.4 Test data

Band	OBW Declared	Port	Channel (MHz)	26 dB OBW
n66	5 MHz	D	2112.5	4.944 MHz
n66	5 MHz	D	2155	4.948 MHz
n66	5 MHz	D	2197.5	4.934 MHz
n66	10 MHz	D	2115	9.840 MHz
n66	10 MHz	D	2155	9.845 MHz
n66	10 MHz	D	2195	9.844 MHz
n66	20 MHz	D	2120	19.675 MHz
n66	20 MHz	D	2155	19.666 MHz
n66	20 MHz	D	2190	19.645 MHz
n70	25 MHz	D	2007.5	24.711 MHz

Table 8.3-1: 26 dB Occupied bandwidth, QPSK Modulation.

Band	OBW Declared	Port	Channel (MHz)	26 dB OBW
n66	5 MHz	D	2112.5	4.947 MHz
n66	5 MHz	D	2155	4.942 MHz
n66	5 MHz	D	2197.5	4.939 MHz
n66	10 MHz	D	2115	9.791 MHz
n66	10 MHz	D	2155	9.775 MHz
n66	10 MHz	D	2195	9.790 MHz
n66	20 MHz	D	2120	19.601 MHz
n66	20 MHz	D	2155	19.596 MHz
n66	20 MHz	D	2190	19.615 MHz
n70	25 MHz	D	2007.5	24.657 MHz

Table 8.3-2: 26 dB Occupied bandwidth, 16QAM Modulation.

8.3.5 Test data, continued

Band	OBW Declared	Port	Channel (MHz)	26 dB OBW
n66	5 MHz	D	2112.5	4.950 MHz
n66	5 MHz	D	2155	4.937 MHz
n66	5 MHz	D	2197.5	4.937 MHz
n66	10 MHz	D	2115	9.835 MHz
n66	10 MHz	D	2155	9.859 MHz
n66	10 MHz	D	2195	9.825 MHz
n66	20 MHz	D	2120	19.655 MHz
n66	20 MHz	D	2155	19.590 MHz
n66	20 MHz	D	2190	19.685 MHz
n70	25 MHz	D	2007.5	24.721 MHz

Table 8.3-3: 26 dB Occupied bandwidth, 64QAM Modulation.

Band	OBW Declared	Port	Channel (MHz)	26 dB OBW
n66	5 MHz	D	2112.5	4.940 MHz
n66	5 MHz	D	2155	4.941 MHz
n66	5 MHz	D	2197.5	4.938 MHz
n66	10 MHz	D	2115	9.852 MHz
n66	10 MHz	D	2155	9.845 MHz
n66	10 MHz	D	2195	9.839 MHz
n66	20 MHz	D	2120	19.615 MHz
n66	20 MHz	D	2155	19.646 MHz
n66	20 MHz	D	2190	19.633 MHz
n70	25 MHz	D	2007.5	24.683 MHz

Table 8.3-4: 26 dB Occupied bandwidth, 256QAM Modulation.

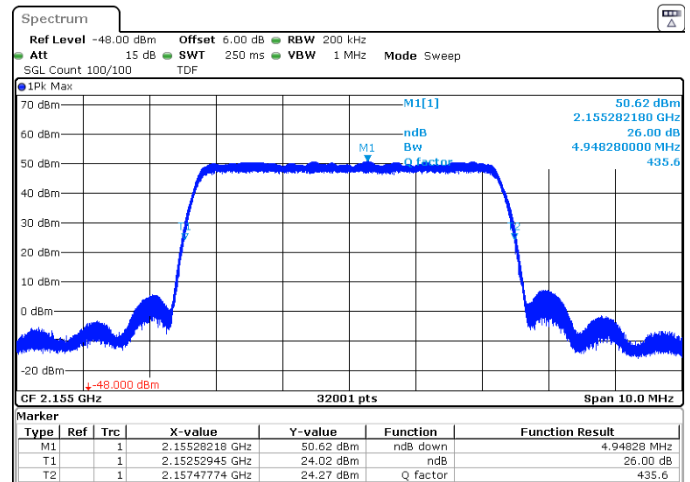
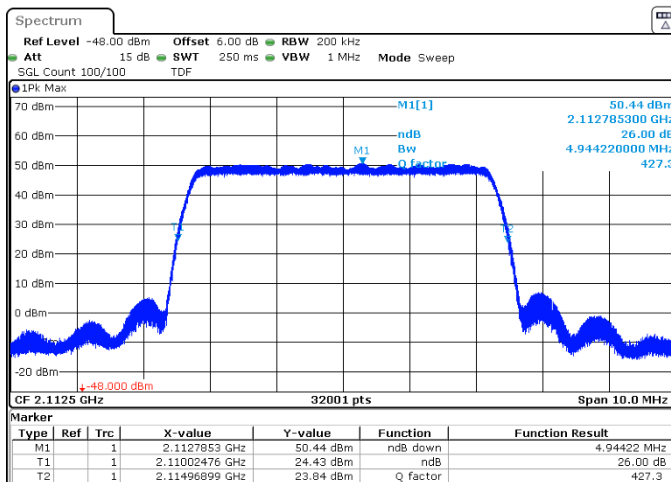


Figure 8.3-1: 26 dB Occupied bandwidth, QPSK Modulation, low and middle channel (5 MHz), respectively, band n66.

8.3.5 Test data, continued

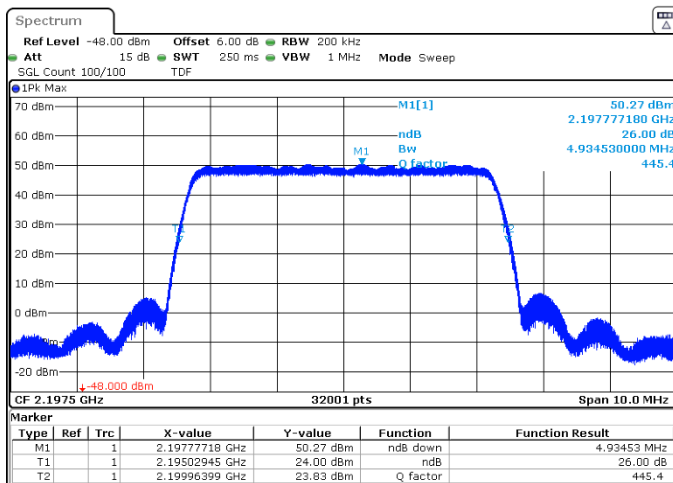


Figure 8.3-2: 26 dB Occupied bandwidth, QPSK Modulation, high channel (5 MHz) and low channel (10 MHz), respectively, band n66.

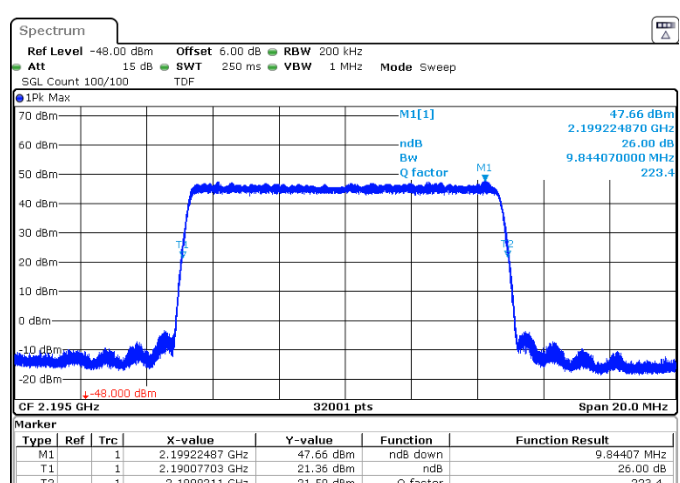
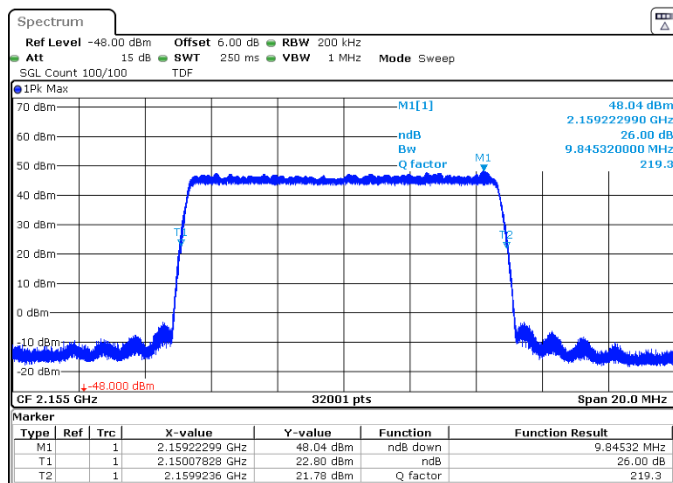
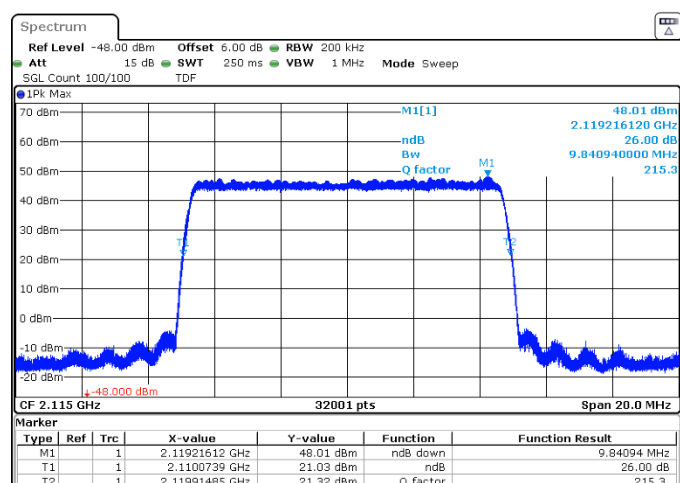


Figure 8.3-3: 26 dB Occupied bandwidth, QPSK Modulation, middle and high channel (10 MHz), respectively, band n66.

8.3.5 Test data, continued

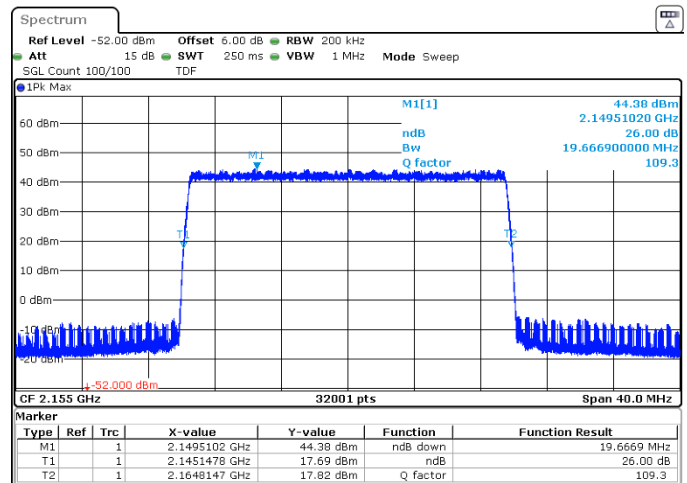
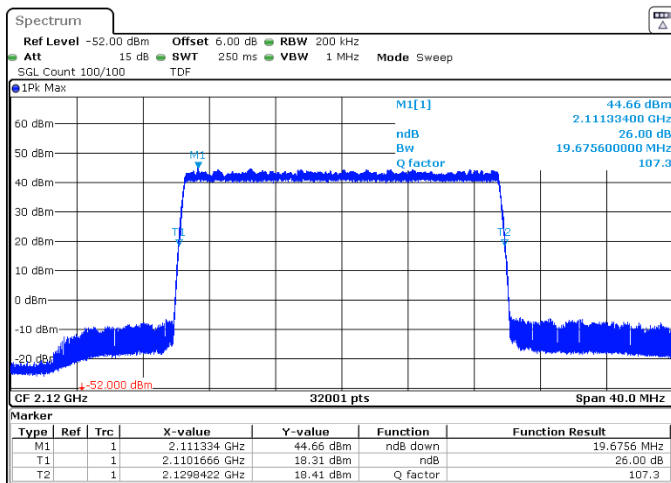


Figure 8.3-4: 26 dB Occupied bandwidth, QPSK Modulation, low and middle channel (20 MHz), respectively, band n66.

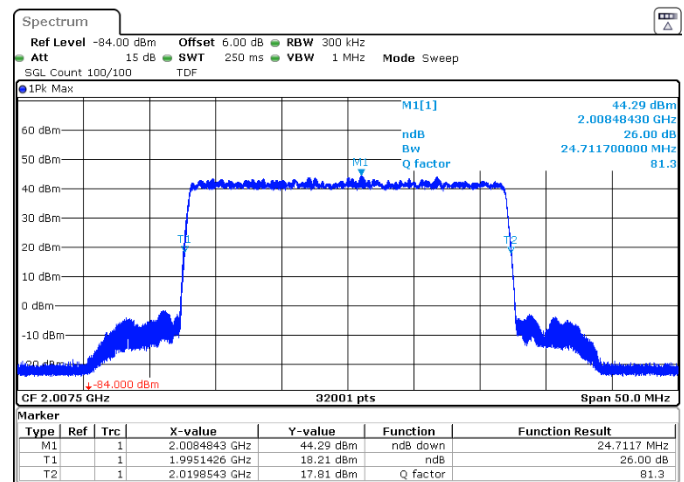
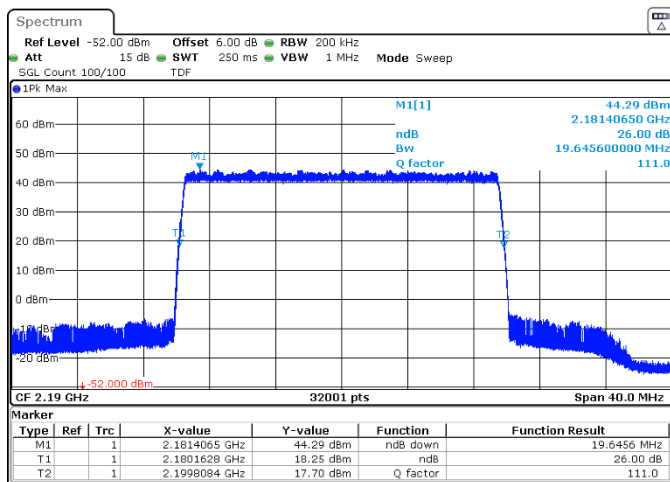


Figure 8.3-5: 26 dB Occupied bandwidth, QPSK Modulation, high channel (20 MHz), band n66 and 2007.5 MHz channel (25 MHz), band n70.

8.4 FCC 27.50(d)(2)(ii) Output power

8.4.1 Definitions and limits

(d) The following power and antenna height requirements apply to stations transmitting in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz and 2180-2200 MHz bands:

(2) The power of each fixed or base station transmitting in the 1995-2000 MHz, the 2110-2155 MHz 2155-2180 MHz band, or 2180-2200 MHz band and situated in any geographic location other than that described in paragraph (d)(1) of this section is limited to:

(i) An equivalent isotropically radiated power (EIRP) of 1640 watts when transmitting with an emission bandwidth of 1 MHz or less;

(ii) An EIRP of 1640 watts/MHz when transmitting with an emission bandwidth greater than 1 MHz.

8.4.2 Test summary

Test date	June 15, 2021	Temperature	20 °C
Test engineer	Martha Espinoza	Air pressure	1005 mbar
Verdict	Pass	Relative humidity	55 %

8.4.3 Observations, settings and special notes

Power sensor settings were:

Sample rate	5MS/s
Gap time	100 ms
Detector mode	RMS
Trigger level	-40 dBm

This test was made across the conducted port and using a sensor power. An offset of 41.3 dB was added to the measurement to compensate the losses from the cable and attenuator (40 dB) used. The signal transmitted continuously and with a 100% of duty cycle.

EUT has four ports which can transmit at the same time in a correlated way. This correlation permit to make the measurement in one port getting as a result the total power from the four ports adding a factor calculated from the next equation:

$$\text{Correlation factor} = 10\log(N)$$

Where N is the number of ports. In this specific case, $N = 4$,

$$\text{Correlation factor} = 10\log(4) = 6.0 \text{ dB}$$

To select the measurement port, a quick power test was done. The four ports are similar, however, the port with maximum power was chosen to make all the remaining tests. This pre-test was applied to both bands (n66 and n70):

Band	Modulation	OBW	Channel	Power Port A	Power Port B	Power Port C	Power Port D
n66	256QAM	5 MHz	2155 MHz	48.15 dBm	48.48 dBm	48.35 dBm	48.66 dBm
n70	QPSK	25 MHz	2007.5 MHz	46.67 dBm	46.69 dBm	46.63 dBm	46.78 dBm

Port D was selected for both bands, and it will be used to evaluate all the tests of this document.

EUT can transmit dual band: band n66 and band n70. The scope of this document for band n66 consist in three channels, four modulations, three bandwidths. For band n70, only one channel, four modulations and one bandwidth are under test. Unit transmit the selected signal at full power: 60 Watts in band n66 and 40 Watts in band n70. The maximum power is only available in one band at the time due the maximum power supported by unit is 80 Watts.

8.4.4 Test data

Band	Modulation	OBW (MHz)	Port	Channel (MHz)	Power (RMS) (dBm)	Correlation factor (dB)	Total power across all ports (dBm)
n66	QPSK	5	D	2112.5	48.45	6	54.45
n66	QPSK	5	D	2155	48.81	6	54.81
n66	QPSK	5	D	2197.5	48.58	6	54.58
n66	16QAM	5	D	2112.5	48.51	6	54.51
n66	16QAM	5	D	2155	48.47	6	54.47
n66	16QAM	5	D	2197.5	48.64	6	54.64
n66	64QAM	5	D	2112.5	48.47	6	54.47
n66	64QAM	5	D	2155	48.80	6	54.80
n66	64QAM	5	D	2197.5	48.63	6	54.63
n66	256QAM	5	D	2112.5	48.65	6	54.65
n66	256QAM	5	D	2155	48.66	6	54.66
n66	256QAM	5	D	2197.5	48.27	6	54.27

Table 8.4-1: Conducted output power, band n66, 5 MHz OBW

Band	Modulation	OBW (MHz)	Port	Channel (MHz)	Power (RMS) (dBm)	Correlation factor (dB)	Total power across all ports (dBm)
n66	QPSK	10	D	2115	48.75	6	54.75
n66	QPSK	10	D	2155	48.80	6	54.80
n66	QPSK	10	D	2195	48.71	6	54.71
n66	16QAM	10	D	2115	48.70	6	54.70
n66	16QAM	10	D	2155	48.77	6	54.77
n66	16QAM	10	D	2195	48.67	6	54.67
n66	64QAM	10	D	2115	48.68	6	54.68
n66	64QAM	10	D	2155	48.77	6	54.77
n66	64QAM	10	D	2195	48.67	6	54.67
n66	256QAM	10	D	2115	48.40	6	54.40
n66	256QAM	10	D	2155	48.42	6	54.42
n66	256QAM	10	D	2195	48.37	6	54.37

Table 8.4-2: Conducted output power, band n66, 10 MHz OBW

Band	Modulation	OBW (MHz)	Port	Channel (MHz)	Power (RMS) (dBm)	Correlation factor (dB)	Total power across all ports (dBm)
n66	QPSK	20	D	2120	48.68	6	54.68
n66	QPSK	20	D	2155	48.64	6	54.64
n66	QPSK	20	D	2190	48.35	6	54.35
n66	16QAM	20	D	2120	48.63	6	54.63
n66	16QAM	20	D	2155	48.51	6	54.51
n66	16QAM	20	D	2190	48.62	6	54.62
n66	64QAM	20	D	2120	48.64	6	54.64
n66	64QAM	20	D	2155	48.69	6	54.69
n66	64QAM	20	D	2190	48.61	6	54.61
n66	256QAM	20	D	2120	48.34	6	54.34
n66	256QAM	20	D	2155	48.47	6	54.47
n66	256QAM	20	D	2190	48.51	6	54.51

Table 8.4-3: Conducted output power, band n66, 20 MHz OBW

Band	Modulation	OBW (MHz)	Port	Channel (MHz)	Power (RMS) (dBm)	Correlation factor (dB)	Total power across all ports (dBm)
n70	QPSK	25	D	2007.5	46.78	6	52.78
n70	16QAM	25	D	2007.5	46.81	6	52.81
n70	64QAM	25	D	2007.5	46.80	6	52.80
n70	256QAM	25	D	2007.5	46.79	6	52.79

Table 8.4-4: Conducted output power, band n70, 25 MHz OBW

8.5 FCC 27.50(d)(5) Peak to Average Power Ratio

8.5.1 Definitions and limits

(d) The following power and antenna height requirements apply to stations transmitting in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz and 2180-2200 MHz bands:

(5) Equipment employed must be authorized in accordance with the provisions of §24.51. Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (d)(6) of this section. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

8.5.2 Test summary

Test date	June 16, 2021	Temperature	21 °C
Test engineer	Martha Espinoza	Air pressure	1003 mbar
Verdict	Pass	Relative humidity	58 %

8.5.3 Observations, settings and special notes

Spectrum analyser settings:

Resolution bandwidth	≥ OBW
Number of counts	The necessary number up to stabilizes the measured
Trace mode	Clear/Write

8.5.4 Test data

Band	OBW Declared	Port	Channel (MHz)	0.1%	0.1% Limit	Margin
n66	5 MHz	D	2112.5	7.59 dB	13 dB	5.41 dB
n66	5 MHz	D	2155	7.59 dB	13 dB	5.41 dB
n66	5 MHz	D	2197.5	7.59 dB	13 dB	5.41 dB
n66	10 MHz	D	2115	7.68 dB	13 dB	5.32 dB
n66	10 MHz	D	2155	7.68 dB	13 dB	5.32 dB
n66	10 MHz	D	2195	7.68 dB	13 dB	5.32 dB
n66	20 MHz	D	2120	7.71 dB	13 dB	5.29 dB
n66	20 MHz	D	2155	7.71 dB	13 dB	5.29 dB
n66	20 MHz	D	2190	7.71 dB	13 dB	5.29 dB
n70	25 MHz	D	2007.5	7.59 dB	13 dB	5.41 dB

Table 8.5-1: Peak to average power ratio, QPSK Modulation.

Band	OBW Declared	Port	Channel (MHz)	0.1%	0.1% Limit	Margin
n66	5 MHz	D	2112.5	7.59 dB	13 dB	5.41 dB
n66	5 MHz	D	2155	7.59 dB	13 dB	5.41 dB
n66	5 MHz	D	2197.5	7.59 dB	13 dB	5.41 dB
n66	10 MHz	D	2115	7.65 dB	13 dB	5.35 dB
n66	10 MHz	D	2155	7.65 dB	13 dB	5.35 dB
n66	10 MHz	D	2195	7.65 dB	13 dB	5.35 dB
n66	20 MHz	D	2120	7.74 dB	13 dB	5.26 dB
n66	20 MHz	D	2155	7.71 dB	13 dB	5.29 dB
n66	20 MHz	D	2190	7.71 dB	13 dB	5.29 dB
n70	25 MHz	D	2007.5	7.51 dB	13 dB	5.49 dB

Table 8.5-2: Peak to average power ratio, 16QAM Modulation.

8.5.5 Test data, continued

Band	OBW Declared	Port	Channel (MHz)	0.1%	0.1% Limit	Margin
n66	5 MHz	D	2112.5	7.59 dB	13 dB	5.41 dB
n66	5 MHz	D	2155	7.59 dB	13 dB	5.41 dB
n66	5 MHz	D	2197.5	7.59 dB	13 dB	5.41 dB
n66	10 MHz	D	2115	7.68 dB	13 dB	5.32 dB
n66	10 MHz	D	2155	7.68 dB	13 dB	5.32 dB
n66	10 MHz	D	2195	7.68 dB	13 dB	5.32 dB
n66	20 MHz	D	2120	7.71 dB	13 dB	5.29 dB
n66	20 MHz	D	2155	7.68 dB	13 dB	5.32 dB
n66	20 MHz	D	2190	7.71 dB	13 dB	5.29 dB
n70	25 MHz	D	2007.5	7.54 dB	13 dB	5.46 dB

Table 8.5-3: Peak to average power ratio, 64QAM Modulation.

Band	OBW Declared	Port	Channel (MHz)	0.1%	0.1% Limit	Margin
n66	5 MHz	D	2112.5	7.62 dB	13 dB	5.38 dB
n66	5 MHz	D	2155	7.62 dB	13 dB	5.38 dB
n66	5 MHz	D	2197.5	7.62 dB	13 dB	5.38 dB
n66	10 MHz	D	2115	7.65 dB	13 dB	5.35 dB
n66	10 MHz	D	2155	7.65 dB	13 dB	5.35 dB
n66	10 MHz	D	2195	7.65 dB	13 dB	5.35 dB
n66	20 MHz	D	2120	7.71 dB	13 dB	5.29 dB
n66	20 MHz	D	2155	7.68 dB	13 dB	5.32 dB
n66	20 MHz	D	2190	7.71 dB	13 dB	5.29 dB
n70	25 MHz	D	2007.5	7.54 dB	13 dB	5.46 dB

Table 8.5-4: Peak to average power ratio, 256QAM Modulation.



Figure 8.5-1: Peak to average power ratio, QPSK Modulation, low and middle channel (5 MHz), respectively, band n66.

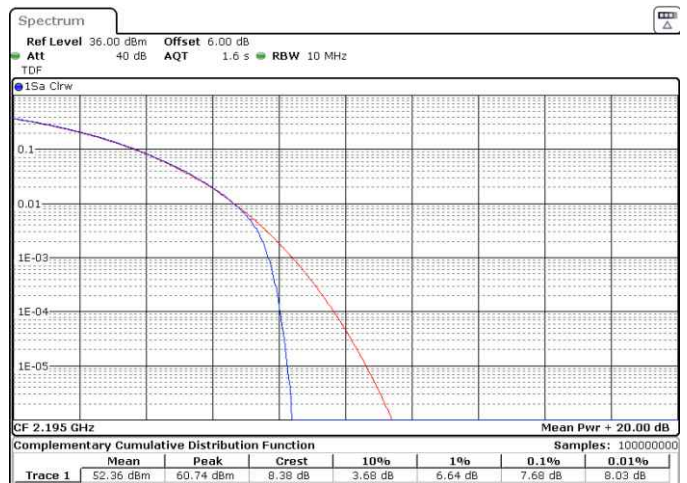
8.5.5 Test data, continued



Figure 8.5-2: Peak to average power ratio, QPSK Modulation, high channel (5 MHz) and low channel (10 MHz), respectively, band n66.



Figure 8.5-3: Peak to average power ratio, QPSK Modulation, middle and high channel (10 MHz), respectively, band n66.



8.5.5 Test data, continued



Figure 8.5-4: Peak to average power ratio, QPSK Modulation, low and middle channel (20 MHz), respectively, band n66.

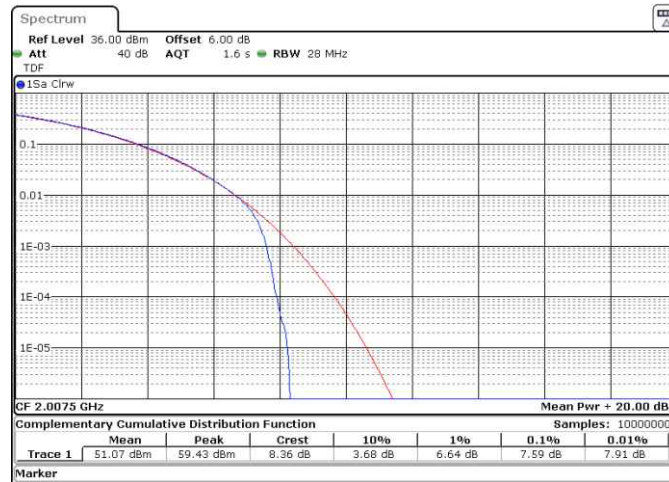
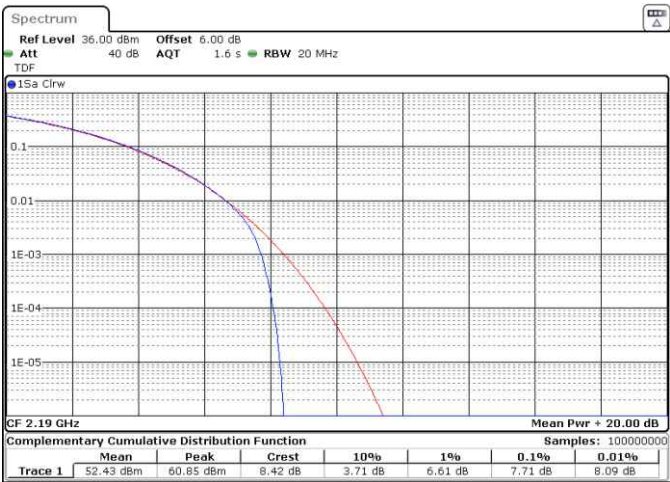


Figure 8.5-5: Peak to average power ratio, QPSK Modulation, high channel (10 MHz), band n66 and 2007.5 channel (25 MHz), band n70, respectively.

8.6 FCC 27.53(h) Emission Limits

8.6.1 Definitions and limits

(h) AWS emission limits—(1) General protection levels. Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB.

8.6.2 Test summary

Test date	June 17, 2021	Temperature	20 °C
	June 22, 2021		21 °C
	June 23, 2021		21 °C
	June 24, 2021		22 °C
Test engineer	Martha Espinoza	Air pressure	1005; 1005; 1004; 1008 mbar
Verdict	Pass	Relative humidity	57%; 62%; 67%; 61%

8.6.3 Observations, settings and special notes

EUT setup configuration	Table top
Test facility	3 m Semi anechoic chamber
Measuring distance	3m
Antenna height variation	1–4 m
Turn table position	0–360°
Measurement details	A preview measurement was generated with receiver in continuous scan or sweep mode while the EUT was rotated and antenna adjusted to maximize radiated emission. 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/spectrum analyzer settings for frequencies below 1 GHz:

Resolution bandwidth	120 kHz
Video bandwidth	300 kHz
Detector mode	– Peak (Preview measurement) – Quasi-peak (Final measurement)
Trace mode	Max Hold
Measurement time	– 100 ms (Peak preview measurement) – 5000 ms (Quasi-peak final measurement)

Receiver/spectrum analyzer settings for frequencies above 1 GHz:

Resolution bandwidth	1 MHz
Video bandwidth	3 MHz
Detector mode	Peak (Preview measurement) Peak and CAverage (Final measurement)
Trace mode	Max Hold
Measurement time	– 100 ms (Peak preview measurement) – 5000 ms (Peak and CAverage final measurement)

Spectrum analyser settings (conducted test):

Resolution bandwidth	1 MHz
Video bandwidth	3 MHz
Frequency span	The necessary to make an accuracy measurement
Detector mode	RMS
Trace mode	Max Hold

8.6.4 Observations, settings and special notes, continued

This test was realized in two parts: one with a conducted setup and another one with a radiated setup.

The conducted test was made in the port D (this port was selected based on test showed on section 8.4), transmitting at max power and with the other three ports loaded with 50 Ω loads. For capturing the signal with the equipment, it was divided in three ranges, using a transducer factor to compensate the losses caused by a cable and attenuator used to protect the test equipment. Additional to this number, a 6 dB correlation factor was added to evaluate the complete power across the four ports, considering the ranges where harmonic can be observed. The first range was measured from 30 MHz to 3 GHz where the fundamental signal is visible. The second range was selected from 3 GHz to 15 GHz, where a highpass filter was used to avoid saturation in the port. Both ranges used the 6 dB offset and a transducer factor (include the cable losses and attenuator). Last range was measured from 15 GHz to 26.5 GHz. This last scan only considered the transducer factor and not the 6 dB offset because after 15 GHz there were not traces of the fundamental signal. The evaluation was made using all the bandwidths and all the modulations for both bands.

In the other hand, the radiated test was made transmitting to max power too but loading the four ports with 50 Ω loads. The scans were made from 30 MHz to 26 GHz considering all the bandwidths but only the modulation with the highest power as was showed at section 8.4. For band n66, the modulation selected was QPSK and for band n70, the modulation was 16QAM.

Based on equation $43 + 10 \log_{10}(P)$ dB, the general emission limit is -13 dBm (conducted and radiated test) or the equivalent at 3m is 82.23 dBuV/m above 1 GHz and 84.38 dBuV/m below 1 GHz.

8.6.5 Test data

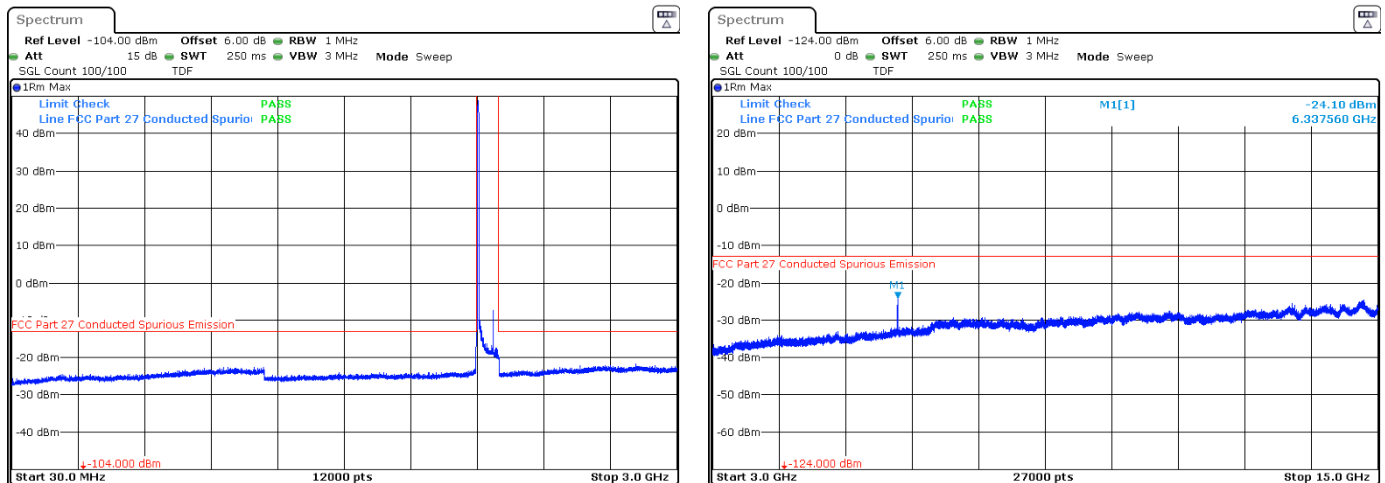


Figure 8.6-1: Conducted emission test, QPSK Modulation, low channel (5 MHz), band n66.

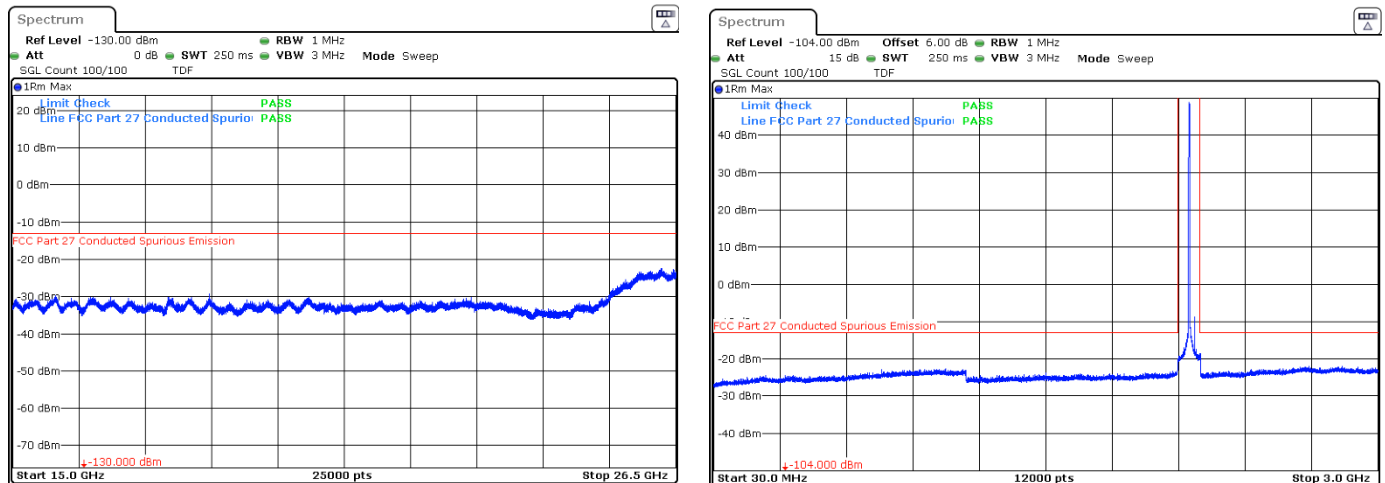


Figure 8.6-2: Conducted emission test, QPSK Modulation, low channel and middle channel (5 MHz), respectively, band n66.

8.6.5 Test data, continued

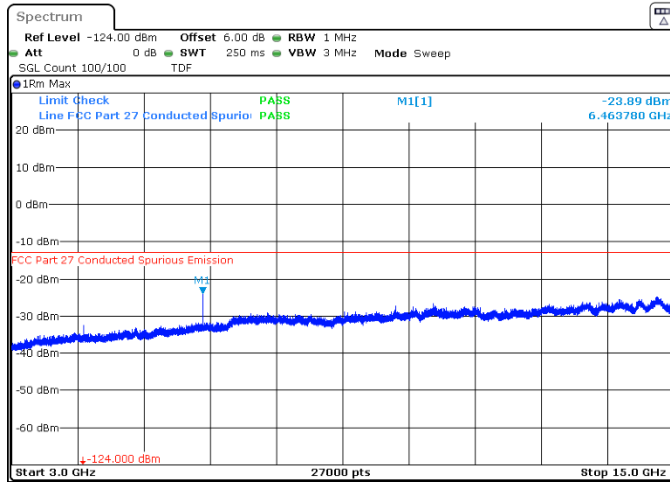


Figure 8.6-3: Conducted emission test, QPSK Modulation, middle channel (5 MHz), band n66.

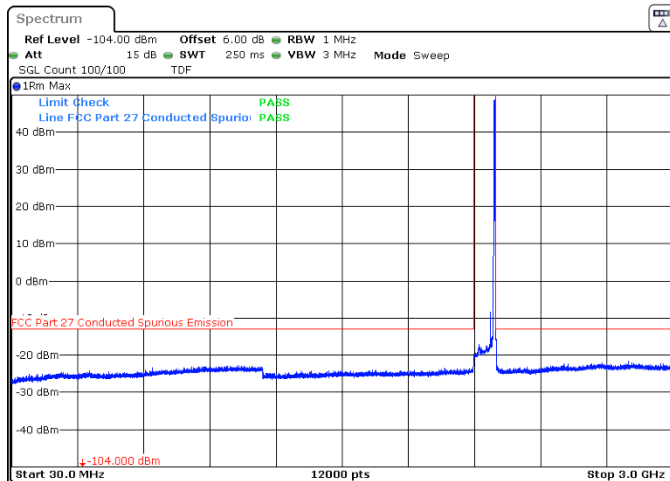
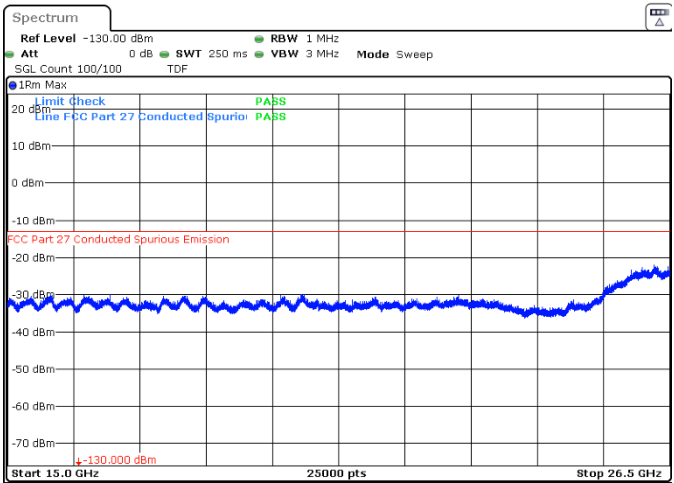


Figure 8.6-4: Conducted emission test, QPSK Modulation, high channel (5 MHz), respectively, band n66.

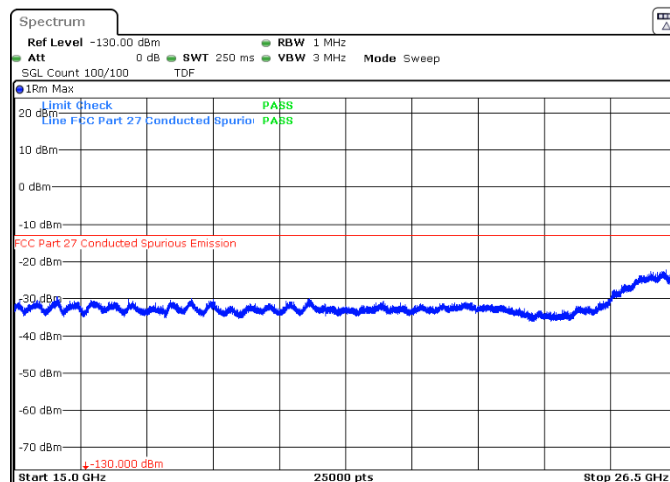
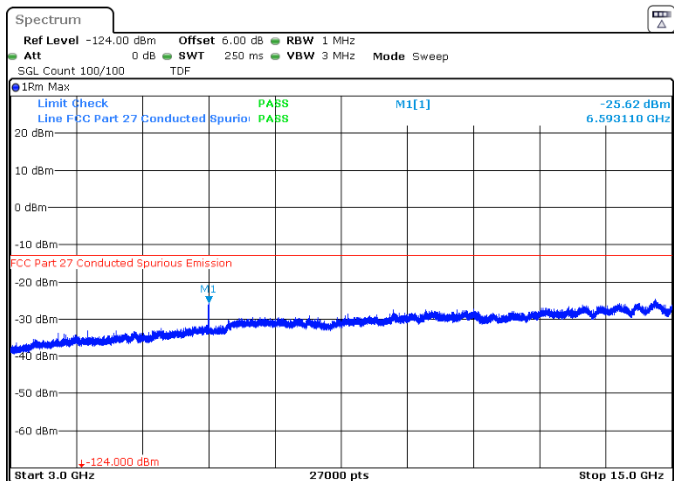


Figure 8.6-5: Conducted emission test, QPSK Modulation, high channel (5 MHz) and low channel (10 MHz), respectively, band n66.

8.6.5 Test data, continued

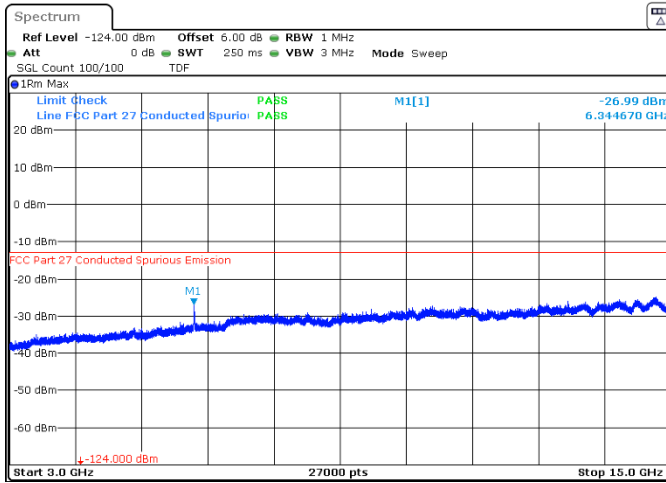


Figure 8.6-6: Conducted emission test, QPSK Modulation, low channel (10 MHz), band n66.

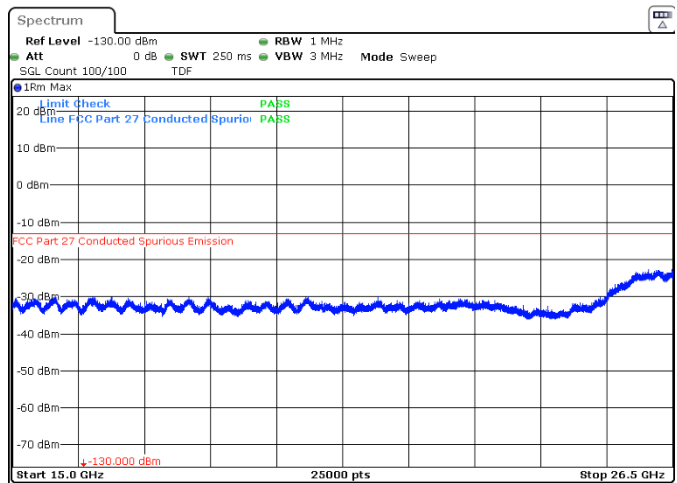


Figure 8.6-7: Conducted emission test, QPSK Modulation, middle channel (10 MHz), band n66.

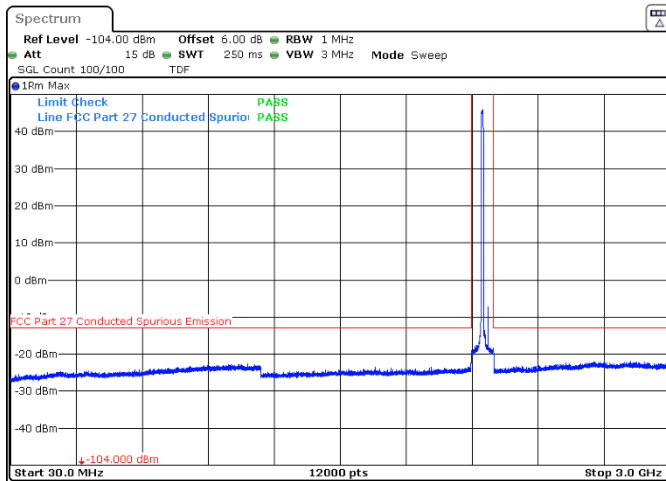


Figure 8.6-8: Conducted emission test, QPSK Modulation, middle and high channel (10 MHz), respectively, band n66.

8.6.5 Test data, continued

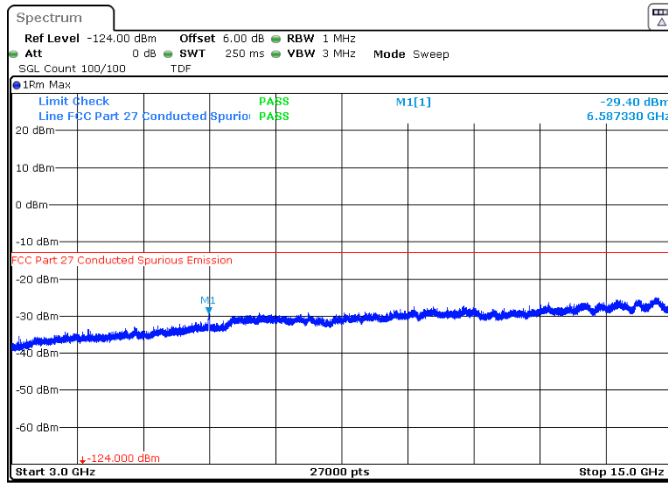


Figure 8.6-9: Conducted emission test, QPSK Modulation, high channel (10 MHz), band n66.

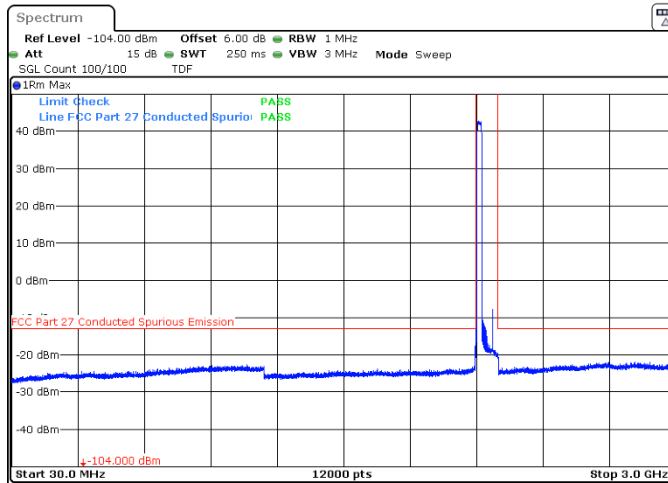
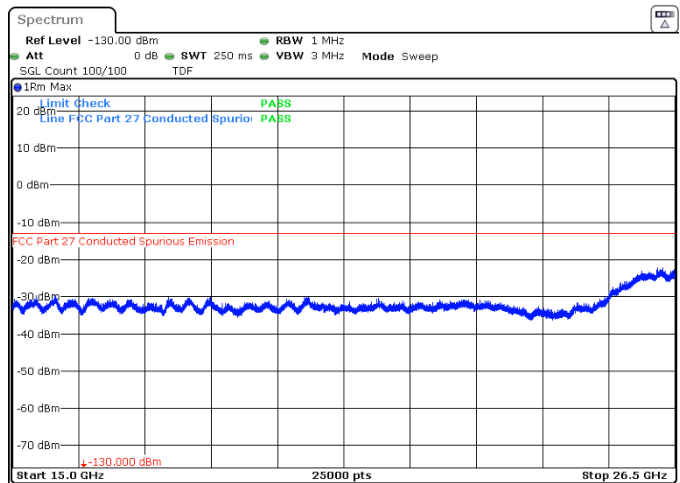


Figure 8.6-10: Conducted emission test, QPSK Modulation, low channel (20 MHz), band n66.

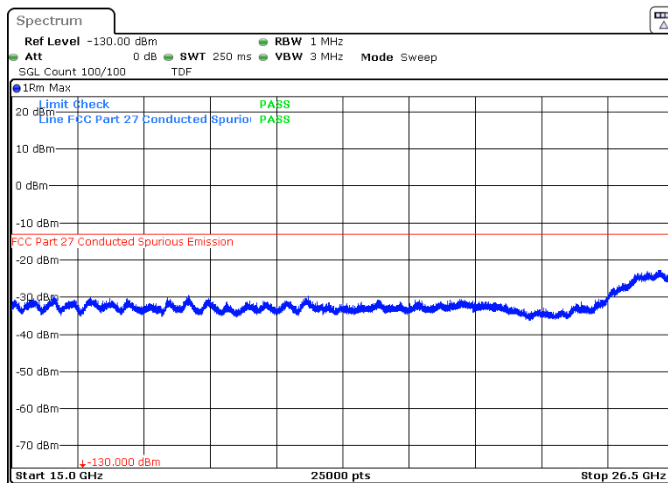
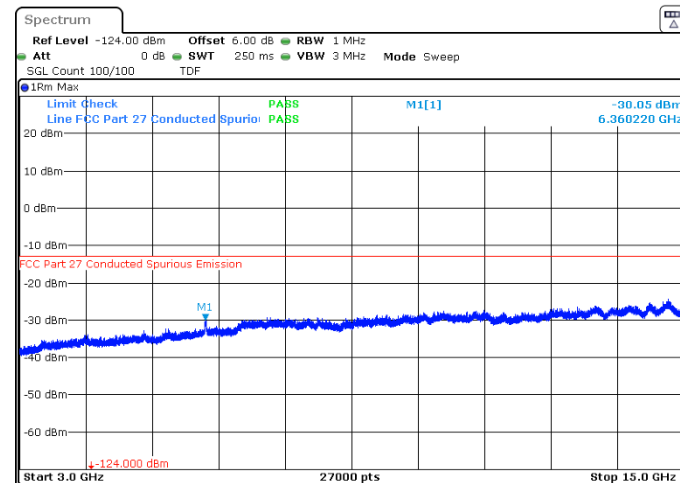


Figure 8.6-11: Conducted emission test, QPSK Modulation, low and middle channel (20 MHz), band n66.

8.6.5 Test data, continued

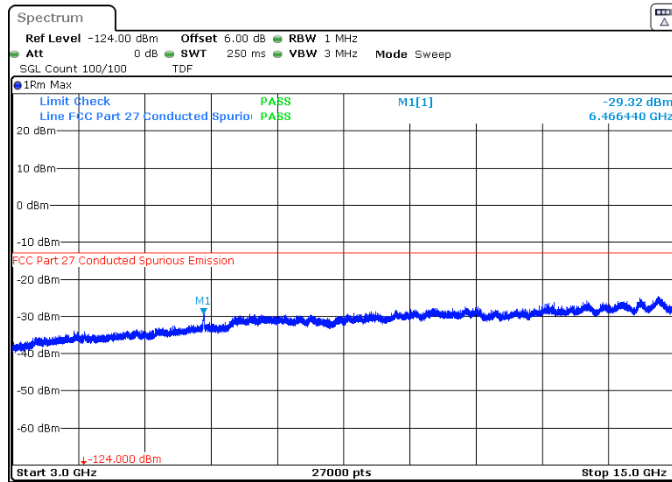


Figure 8.6-12: Conducted emission test, QPSK Modulation, middle channel (20 MHz), band n66.

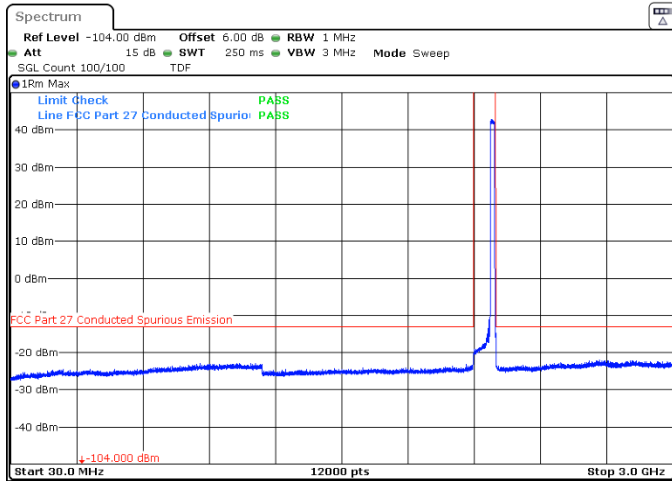
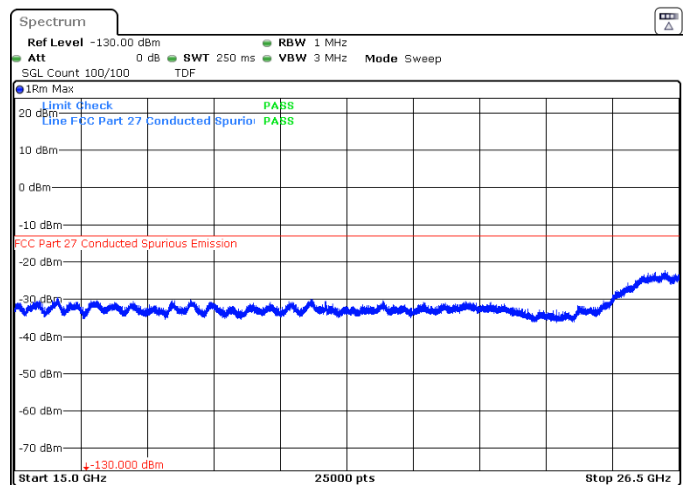


Figure 8.6-13: Conducted emission test, QPSK Modulation, high channel (20 MHz), band n66.

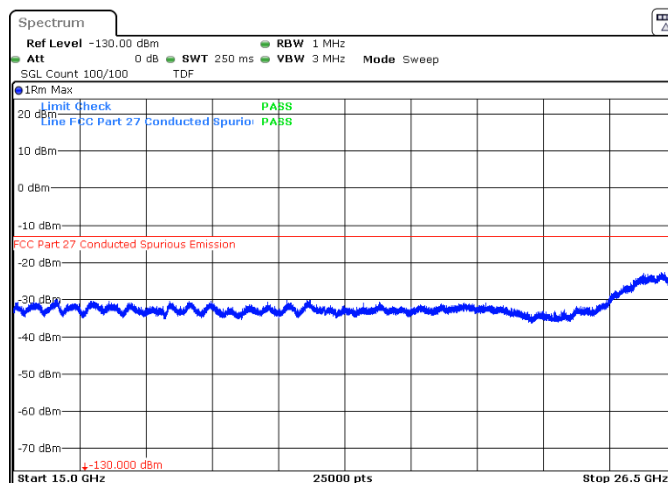


Figure 8.6-14: Conducted emission test, QPSK Modulation, high channel (20 MHz), band n66.

8.6.5 Test data, continued

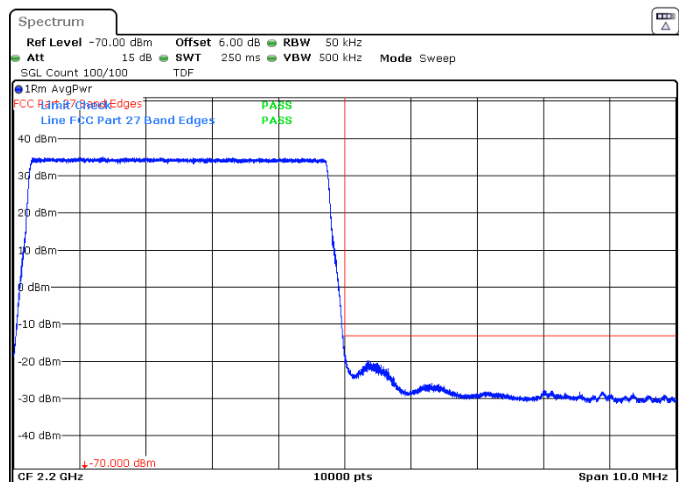
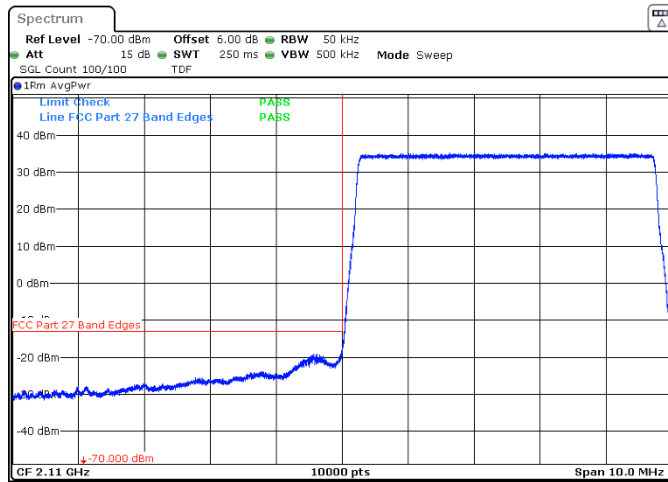


Figure 8.6-15: Conducted emission test, band edges, QPSK Modulation, low and high channel respectively (5 MHz), band n66.

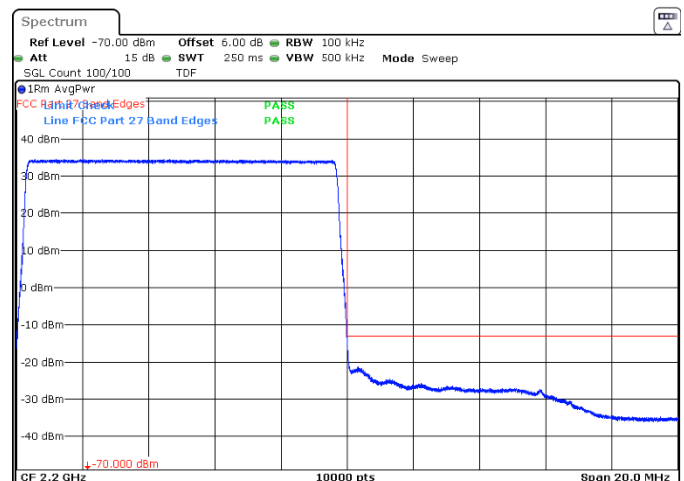
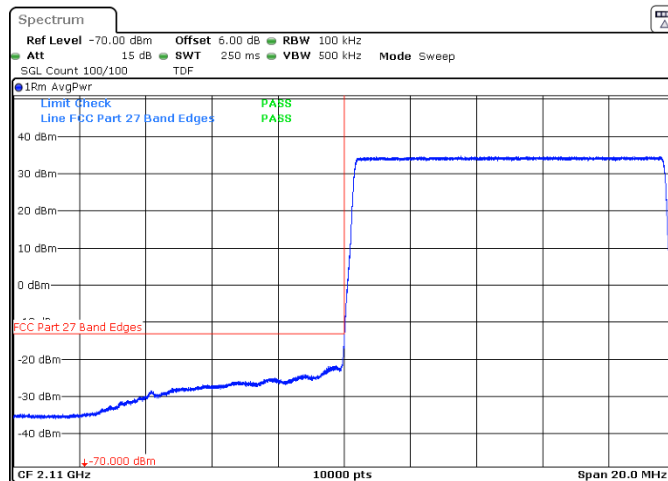


Figure 8.6-16: Conducted emission test, band edges, QPSK Modulation, low and high channel respectively (10 MHz), band n66.

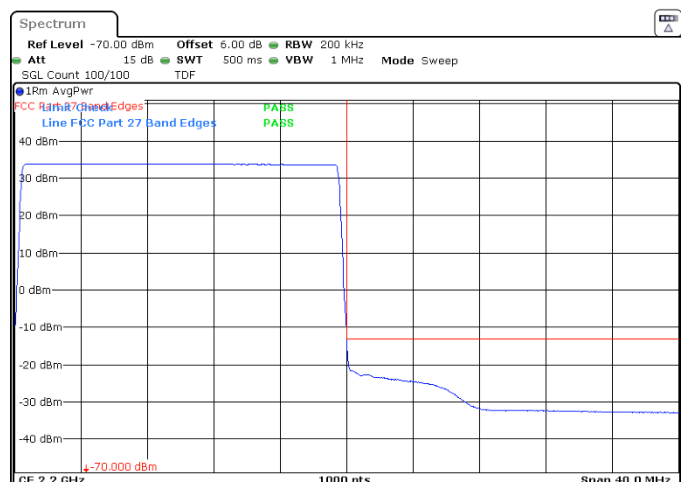
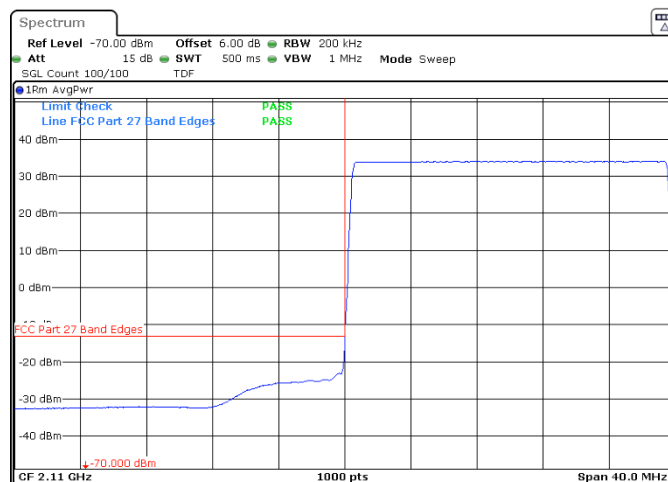
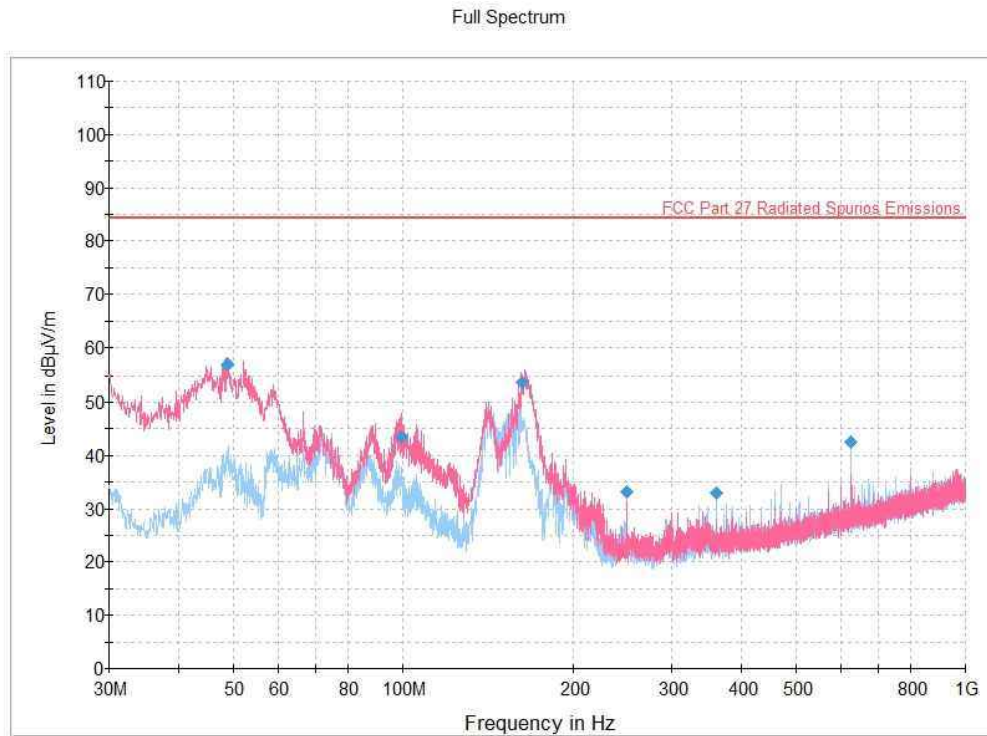


Figure 8.6-17: Conducted emission test, band edges, QPSK Modulation, low and high channel respectively (20 MHz), band n66.

8.6.5 Test data, continued



The spectral plot shows the vertical (red plot) and horizontal (blue plot) scans. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).

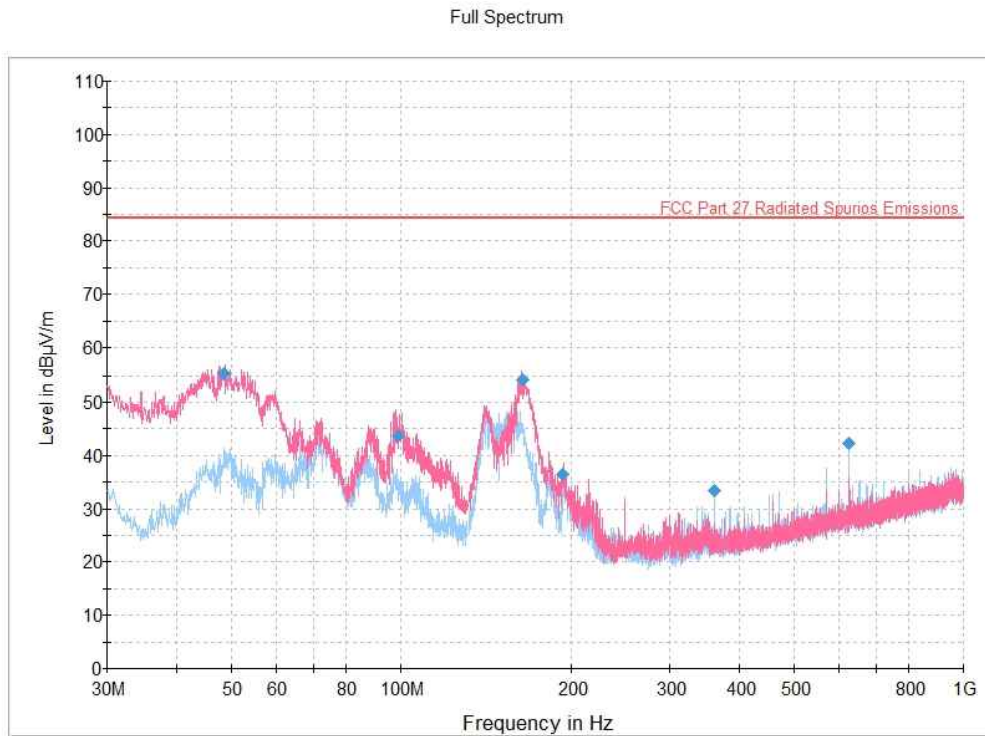
Figure 8.6-18: Emissions limit plot – Field strength measured from 0.030 to 1 GHz, QPSK Modulation, 5 MHz OBW, Low channel, band n66.

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
48.835833	56.93	84.38	27.45	5000.0	120.000	100.0	V	0.0	16.5
99.558333	43.37	84.38	41.01	5000.0	120.000	110.0	V	68.0	17.6
162.863333	53.67	84.38	30.71	5000.0	120.000	100.0	V	39.0	18.6
249.987500	33.16	84.38	51.22	5000.0	120.000	98.0	H	132.0	20.9
360.001667	32.88	84.38	51.50	5000.0	120.000	145.0	H	189.0	24.2
624.974167	42.39	84.38	41.99	5000.0	120.000	109.0	H	85.0	29.4

Table 8.6-1: Emissions limit results – Field strength measured from 0.030 to 1 GHz, QPSK Modulation, 5 MHz OBW, Low channel, band n66.

- 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 The maximum measured value observed over a period of 5 seconds was recorded.
 - ⁴ The spectral plot shows the vertical and horizontal scan separately.
 - ⁵ This measurement was done at 3m

8.6.5 Test data, continued



The spectral plot shows the vertical (red plot) and horizontal (blue plot) scans separately. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).

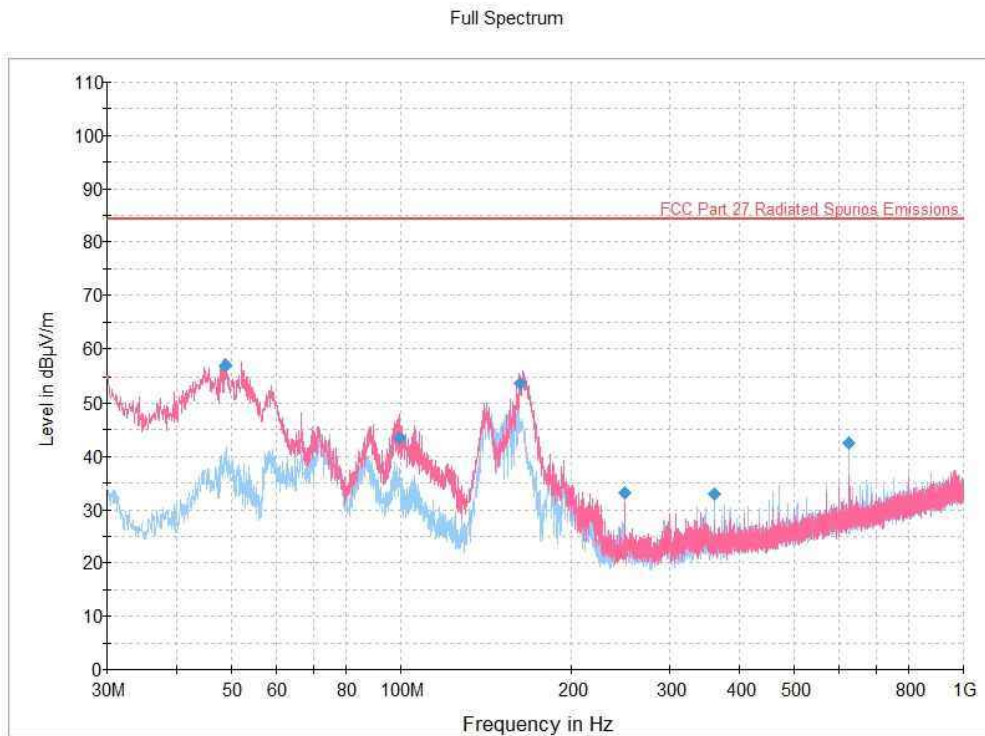
Figure 8.6-19: Emissions limit plot – Field strength measured from 0.030 to 1 GHz, QPSK Modulation, 5 MHz OBW, Middle channel, band n66.

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
48.553333	55.26	84.38	29.12	5000.0	120.000	100.0	V	349.0	16.6
99.181667	43.74	84.38	40.64	5000.0	120.000	110.0	V	82.0	17.6
163.855000	54.13	84.38	30.25	5000.0	120.000	100.0	V	54.0	18.5
193.135000	36.51	84.38	47.87	5000.0	120.000	100.0	V	327.0	17.4
360.001667	33.44	84.38	50.94	5000.0	120.000	147.0	H	192.0	24.2
625.014167	42.38	84.38	42.00	5000.0	120.000	127.0	H	84.0	29.4

Table 8.6-2: Emissions limit results – Field strength measured from 0.030 to 1 GHz, QPSK Modulation, 5 MHz OBW, Middle channel, band n66.

- 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 The maximum measured value observed over a period of 5 seconds was recorded.
 - ⁴ The spectral plot shows the vertical and horizontal scan separately.
 - ⁵ This measurement was done at 3m

8.6.5 Test data, continued



The spectral plot shows the vertical (red plot) and horizontal (blue plot) scans separately. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).

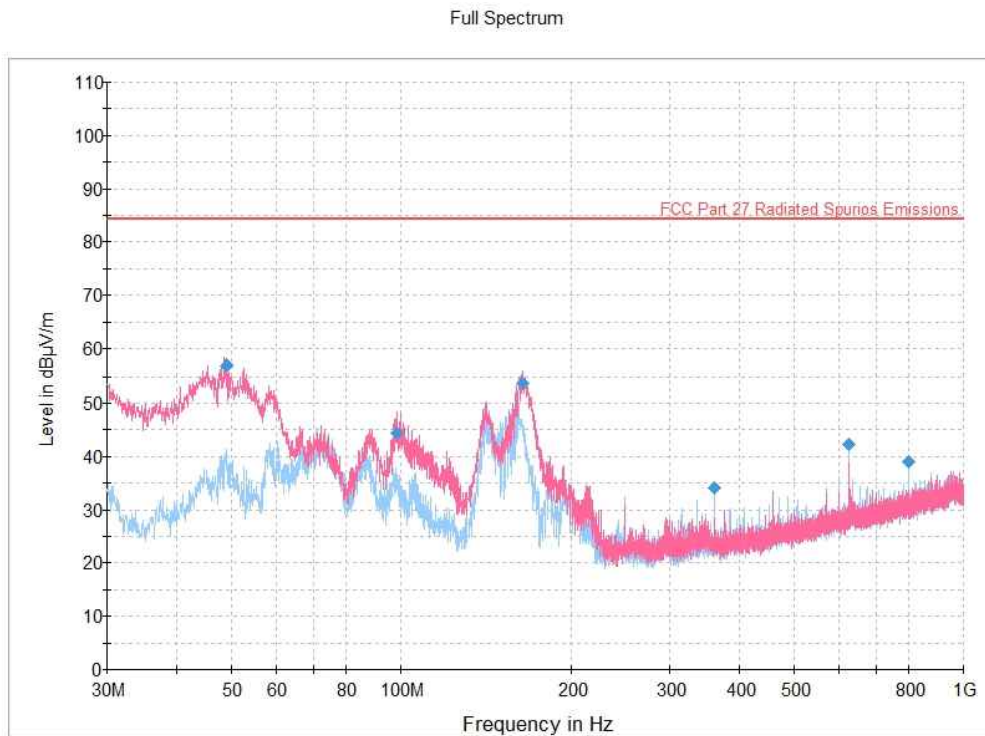
Figure 8.6-20: Emissions limit plot – Field strength measured from 0.030 to 1 GHz, QPSK Modulation, 5 MHz OBW, High channel, band n66.

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
48.835833	56.93	84.38	27.45	5000.0	120.000	100.0	V	0.0	16.5
99.558333	43.37	84.38	41.01	5000.0	120.000	110.0	V	68.0	17.6
162.863333	53.67	84.38	30.71	5000.0	120.000	100.0	V	39.0	18.6
249.987500	33.16	84.38	51.22	5000.0	120.000	98.0	H	132.0	20.9
360.001667	32.88	84.38	51.50	5000.0	120.000	145.0	H	189.0	24.2
624.974167	42.39	84.38	41.99	5000.0	120.000	109.0	H	85.0	29.4

Table 8.6-3: Emissions limit results – Field strength measured from 0.030 to 1 GHz, QPSK Modulation, 5 MHz OBW, High channel, band n66.

- 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 The maximum measured value observed over a period of 5 seconds was recorded.
 - ⁴ The spectral plot shows the vertical and horizontal scan separately.
 - ⁵ This measurement was done at 3m

8.6.5 Test data, continued



The spectral plot shows the vertical (red plot) and horizontal (blue plot) scans separately. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).

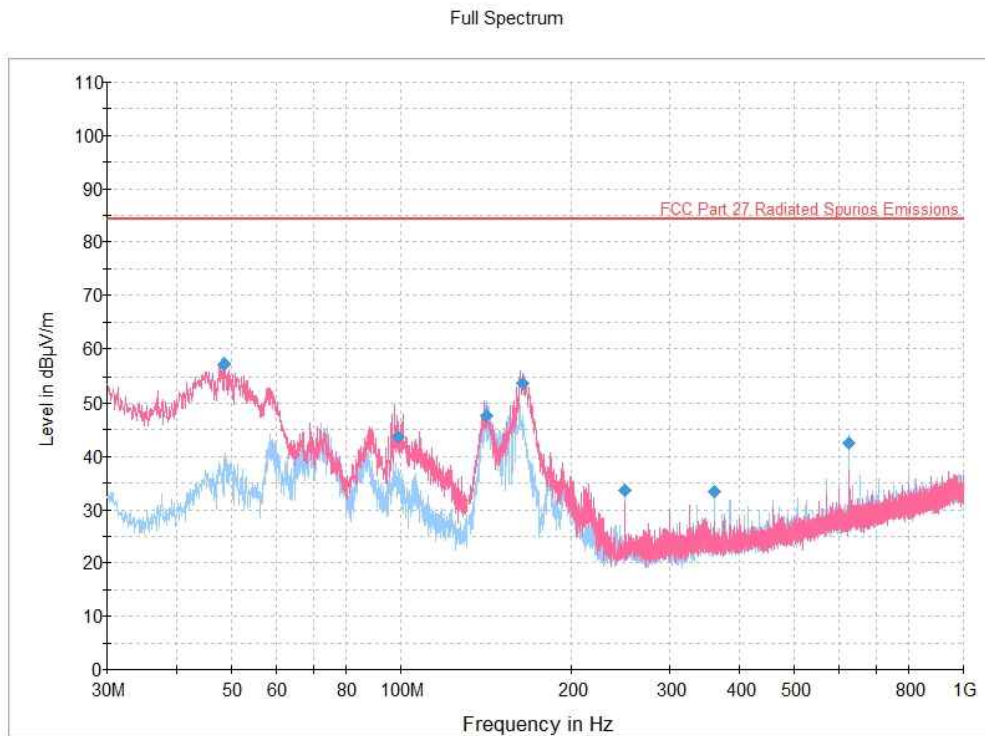
Figure 8.6-21: Emissions limit plot – Field strength measured from 0.030 to 1 GHz, QPSK Modulation, 10 MHz OBW, Low channel, band n66.

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
49.030000	57.10	84.38	27.28	5000.0	120.000	100.0	V	0.0	16.4
98.665833	44.41	84.38	39.97	5000.0	120.000	100.0	V	100.0	17.5
164.540000	53.73	84.38	30.65	5000.0	120.000	100.0	V	52.0	18.4
360.002500	33.98	84.38	50.40	5000.0	120.000	98.0	H	196.0	24.2
625.014167	42.32	84.38	42.06	5000.0	120.000	136.0	H	90.0	29.4
799.978333	38.94	84.38	45.44	5000.0	120.000	126.0	H	242.0	31.8

Table 8.6-4: Emissions limit results – Field strength measured from 0.030 to 1 GHz, QPSK Modulation, 10 MHz OBW, Low channel, band n66.

- 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 The maximum measured value observed over a period of 5 seconds was recorded.
 - ⁴ The spectral plot shows the vertical and horizontal scan separately.
 - ⁵ This measurement was done at 3m

8.6.5 Test data, continued



The spectral plot shows the vertical (red plot) and horizontal (blue plot) scans separately. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).

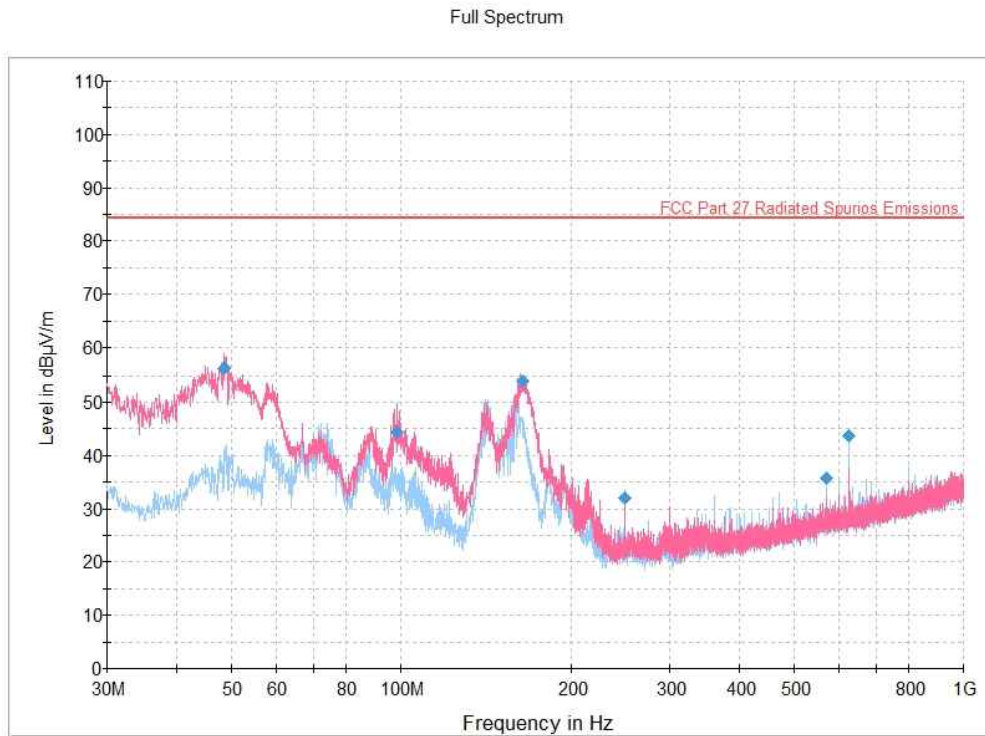
Figure 8.6-22: Emissions limit plot – Field strength measured from 0.030 to 1 GHz, QPSK Modulation, 10 MHz OBW, Middle channel, band n66.

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
48.510000	57.11	84.38	27.27	5000.0	120.000	100.0	V	11.0	16.6
99.175833	43.77	84.38	40.61	5000.0	120.000	100.0	V	87.0	17.6
141.432500	47.74	84.38	36.64	5000.0	120.000	237.0	H	194.0	19.6
164.246667	53.79	84.38	30.59	5000.0	120.000	100.0	V	38.0	18.4
249.987500	33.70	84.38	50.68	5000.0	120.000	108.0	H	148.0	20.9
360.002500	33.41	84.38	50.97	5000.0	120.000	145.0	H	194.0	24.2
625.014167	42.59	84.38	41.79	5000.0	120.000	119.0	H	84.0	29.4

Table 8.6-5: Emissions limit results – Field strength measured from 0.030 to 1 GHz, QPSK Modulation, 10 MHz OBW, Middle channel, band n66.

- 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 The maximum measured value observed over a period of 5 seconds was recorded.
 - ⁴ The spectral plot shows the vertical and horizontal scan separately.
 - ⁵ This measurement was done at 3m

8.6.5 Test data, continued



The spectral plot shows the vertical (red plot) and horizontal (blue plot) scans separately. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).

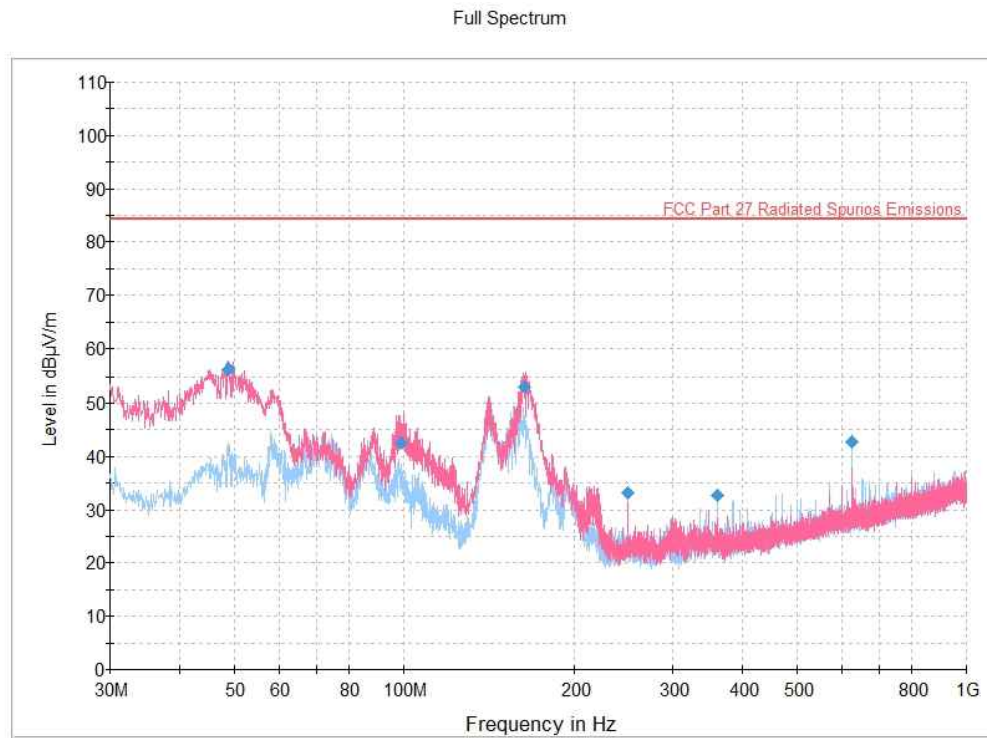
Figure 8.6-23: Emissions limit plot – Field strength measured from 0.030 to 1 GHz, QPSK Modulation, 10 MHz OBW, High channel, band n66.

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
48.510000	56.26	84.38	28.12	5000.0	120.000	100.0	V	0.0	16.6
98.465000	44.33	84.38	40.05	5000.0	120.000	100.0	V	88.0	17.5
163.781667	54.04	84.38	30.34	5000.0	120.000	100.0	V	53.0	18.5
249.987500	32.06	84.38	52.32	5000.0	120.000	138.0	H	150.0	20.9
571.461667	35.68	84.38	48.70	5000.0	120.000	110.0	H	100.0	28.6
625.014167	43.60	84.38	40.78	5000.0	120.000	110.0	H	89.0	29.4

Table 8.6-6: Emissions limit results – Field strength measured from 0.030 to 1 GHz, QPSK Modulation, 10 MHz OBW, High channel, band n66.

- 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 The maximum measured value observed over a period of 5 seconds was recorded.
 - ⁴ The spectral plot shows the vertical and horizontal scan separately.
 - ⁵ This measurement was done at 3m

8.6.5 Test data, continued



The spectral plot shows the vertical (red plot) and horizontal (blue plot) scans separately. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).

Figure 8.6-24: Emissions limit plot – Field strength measured from 0.030 to 1 GHz, QPSK Modulation, 20 MHz OBW, Low channel, band n66.

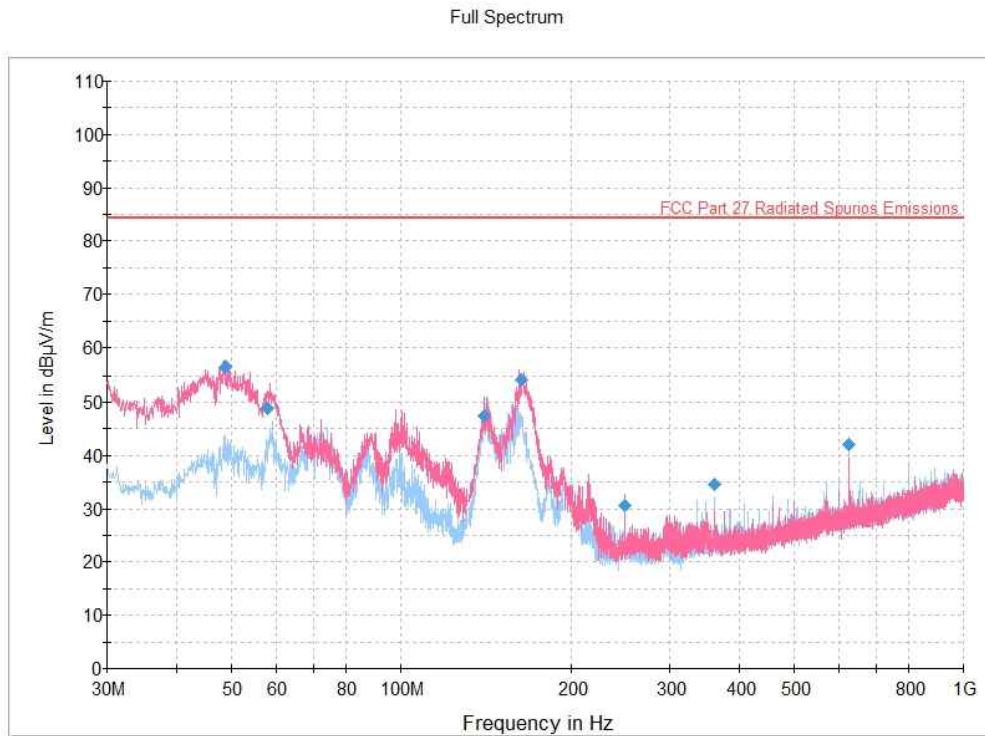
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
48.683333	56.37	84.38	28.01	5000.0	120.000	100.0	V	350.0	16.5
99.203333	42.39	84.38	41.99	5000.0	120.000	100.0	V	54.0	17.6
163.643333	53.10	84.38	31.28	5000.0	120.000	100.0	V	22.0	18.5
249.988333	33.13	84.38	51.25	5000.0	120.000	118.0	H	147.0	20.9
360.002500	32.76	84.38	51.62	5000.0	120.000	136.0	H	192.0	24.2
625.014167	42.64	84.38	41.74	5000.0	120.000	117.0	H	85.0	29.4

Table 8.6-7: Emissions limit results – Field strength measured from 0.030 to 1 GHz, QPSK Modulation, 20 MHz OBW, Low channel, band n66.

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 The maximum measured value observed over a period of 5 seconds was recorded.
- ⁴ The spectral plot shows the vertical and horizontal scan separately.
- ⁵ This measurement was done at 3m

8.6.5 Test data, continued



The spectral plot shows the vertical (red plot) and horizontal (blue plot) scans separately. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).

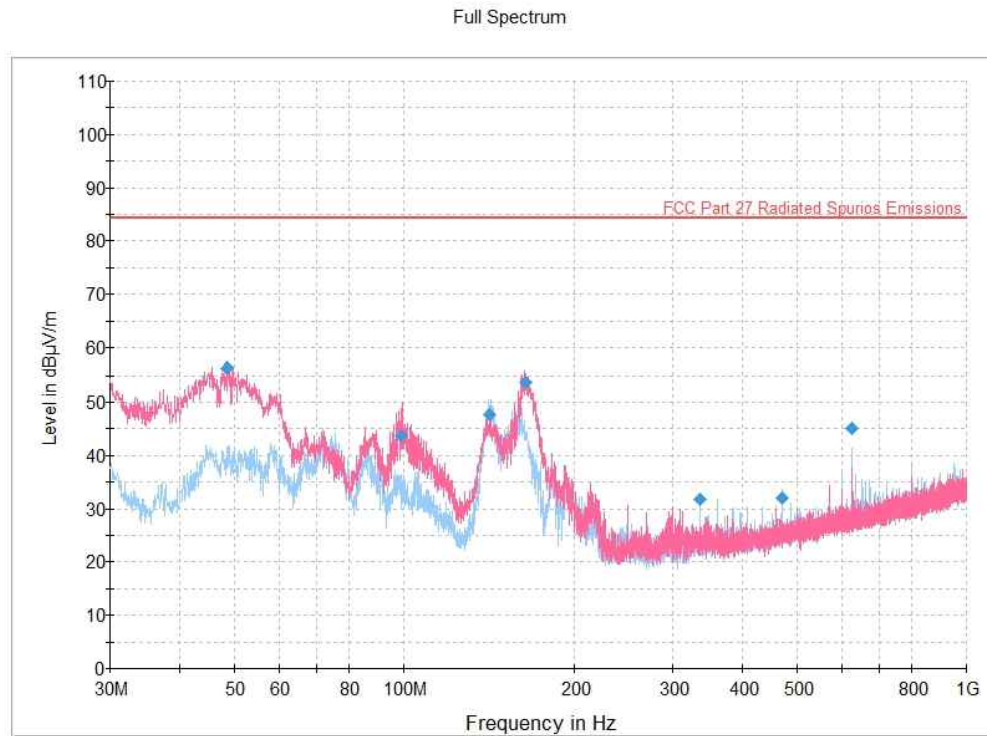
Figure 8.6-25: Emissions limit plot – Field strength measured from 0.030 to 1 GHz, QPSK Modulation, 20 MHz OBW, Middle channel, band n66.

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
48.710000	56.58	84.38	27.80	5000.0	120.000	98.0	V	11.0	16.5
58.015000	48.91	84.38	35.47	5000.0	120.000	108.0	V	23.0	13.0
140.096667	47.44	84.38	36.94	5000.0	120.000	100.0	V	142.0	19.6
163.079167	54.11	84.38	30.27	5000.0	120.000	98.0	V	54.0	18.5
249.987500	30.63	84.38	53.75	5000.0	120.000	100.0	V	320.0	20.9
360.001667	34.62	84.38	49.76	5000.0	120.000	100.0	H	208.0	24.2
625.014167	42.14	84.38	42.24	5000.0	120.000	128.0	H	85.0	29.4

Table 8.6-8: Emissions limit results – Field strength measured from 0.030 to 1 GHz, QPSK Modulation, 20 MHz OBW, Middle channel, band n66.

- 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 The maximum measured value observed over a period of 5 seconds was recorded.
 - ⁴ The spectral plot shows the vertical and horizontal scan separately.
 - ⁵ This measurement was done at 3m

8.6.5 Test data, continued



The spectral plot shows the vertical (red plot) and horizontal (blue plot) scans separately. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).

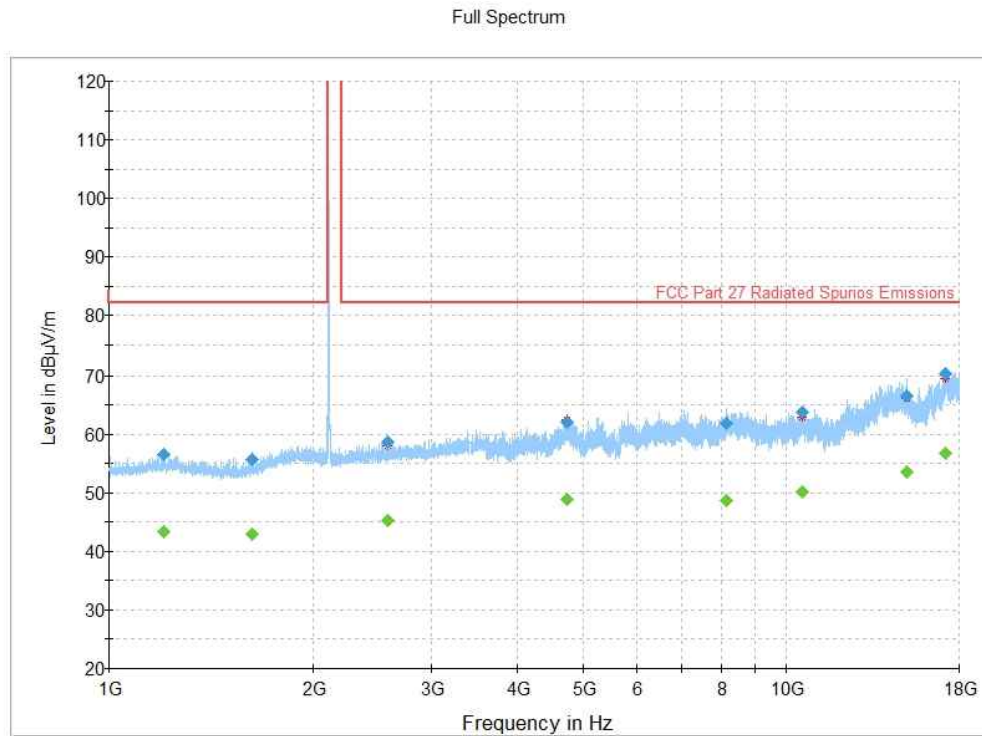
Figure 8.6-26: Emissions limit plot – Field strength measured from 0.030 to 1 GHz, QPSK Modulation, 20 MHz OBW, High channel, band n66.

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
48.510833	56.19	84.38	28.19	5000.0	120.000	100.0	V	0.0	16.6
98.835000	43.73	84.38	40.65	5000.0	120.000	100.0	V	70.0	17.5
141.596667	47.71	84.38	36.67	5000.0	120.000	193.0	H	185.0	19.6
163.896667	53.61	84.38	30.77	5000.0	120.000	100.0	V	35.0	18.5
335.995000	31.72	84.38	52.66	5000.0	120.000	173.0	H	229.0	23.2
469.410833	32.05	84.38	52.33	5000.0	120.000	100.0	H	222.0	26.5
625.014167	45.02	84.38	39.36	5000.0	120.000	110.0	H	96.0	29.4

Table 8.6-9: Emissions limit results – Field strength measured from 0.030 to 1 GHz, QPSK Modulation, 20 MHz OBW, High channel, band n66.

- 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 The maximum measured value observed over a period of 5 seconds was recorded.
 - ⁴ The spectral plot shows the vertical and horizontal scan separately.
 - ⁵ This measurement was done at 3m

8.6.5 Test data, continued



The spectral plot is a summation of a vertical and horizontal scan. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).

Figure 8.6-27: Emissions limit plot – Field strength measured from 1 to 18 GHz, QPSK Modulation, 5 MHz OBW, Low channel, band n66.

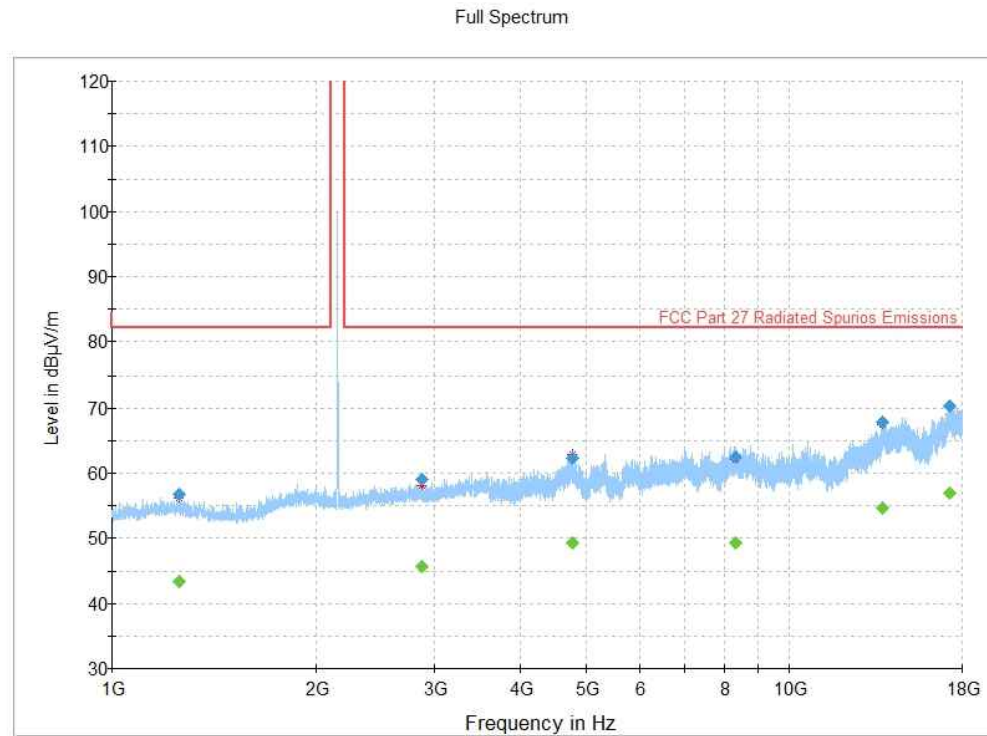
Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1202.833333	56.44	---	82.23	25.79	5000.0	1000.000	189.0	H	242.0	6.8
1202.833333	---	43.39	82.23	38.84	5000.0	1000.000	189.0	H	242.0	6.8
1630.700000	55.72	---	82.23	26.51	5000.0	1000.000	153.0	H	337.0	7.1
1630.700000	---	42.85	82.23	39.38	5000.0	1000.000	153.0	H	337.0	7.1
2580.400000	58.63	---	82.23	23.60	5000.0	1000.000	150.0	H	-11.0	11.5
2580.400000	---	45.32	82.23	36.91	5000.0	1000.000	150.0	H	-11.0	11.5
4731.333333	---	48.96	82.23	33.27	5000.0	1000.000	161.0	H	10.0	19.3
4731.333333	62.07	---	82.23	20.16	5000.0	1000.000	161.0	H	10.0	19.3
8154.133333	---	48.76	82.23	33.47	5000.0	1000.000	295.0	V	-11.0	22.9
8154.133333	61.83	---	82.23	20.40	5000.0	1000.000	295.0	V	-11.0	22.9
10532.266667	---	50.22	82.23	32.01	5000.0	1000.000	170.0	V	-1.0	25.7
10532.266667	63.74	---	82.23	18.49	5000.0	1000.000	170.0	V	-1.0	25.7
15078.133333	66.53	---	82.23	15.70	5000.0	1000.000	183.0	H	213.0	32.2
15078.133333	---	53.50	82.23	28.73	5000.0	1000.000	183.0	H	213.0	32.2
17208.400000	---	56.69	82.23	25.54	5000.0	1000.000	220.0	H	10.0	36.6
17208.400000	70.25	---	82.23	11.98	5000.0	1000.000	220.0	H	10.0	36.6

Table 8.6-10: Emissions limit results – Field strength measured from 1 to 18 GHz, QPSK Modulation, 5 MHz OBW, Low channel, band n66.

Notes:

- ¹ Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
- ² Correction factors = antenna factor ACF (dB) + cable loss (dB)+20 dB attenuator to protect the test equipment
- ³ The maximum measured value observed over a period of 5 seconds was recorded.
- ⁴ The spectral plot is a summation of a vertical and horizontal scan.
- ⁵ This measurement was done at 3m

8.6.5 Test data, continued



The spectral plot is a summation of a vertical and horizontal scan. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).

Figure 8.6-28: Emissions limit plot – Field strength measured from 1 to 18 GHz, QPSK Modulation, 5 MHz OBW, Middle channel, band n66.

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)
1259.100000	---	43.42	82.23	38.81	5000.0	1000.000	117.0	V	165.0	7.0
1259.100000	56.66	---	82.23	25.57	5000.0	1000.000	117.0	V	165.0	7.0
2874.666667	---	45.63	82.23	36.60	5000.0	1000.000	148.0	V	132.0	12.6
2874.666667	59.02	---	82.23	23.21	5000.0	1000.000	148.0	V	132.0	12.6
4778.733333	---	49.26	82.23	32.97	5000.0	1000.000	126.0	H	222.0	19.2
4778.733333	62.23	---	82.23	20.00	5000.0	1000.000	126.0	H	222.0	19.2
8334.800000	---	49.22	82.23	33.01	5000.0	1000.000	239.0	V	-1.0	23.5
8334.800000	62.54	---	82.23	19.69	5000.0	1000.000	239.0	V	-1.0	23.5
13727.466667	67.82	---	82.23	14.41	5000.0	1000.000	153.0	V	56.0	32.8
13727.466667	---	54.73	82.23	27.50	5000.0	1000.000	153.0	V	56.0	32.8
17245.433333	70.22	---	82.23	12.01	5000.0	1000.000	164.0	H	6.0	36.3
17245.433333	---	56.88	82.23	25.35	5000.0	1000.000	164.0	H	6.0	36.3

Table 8.6-11: Emissions limit results – Field strength measured from 1 to 18 GHz, QPSK Modulation, 5 MHz OBW, Middle channel, band n66.

Notes:

¹ Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)

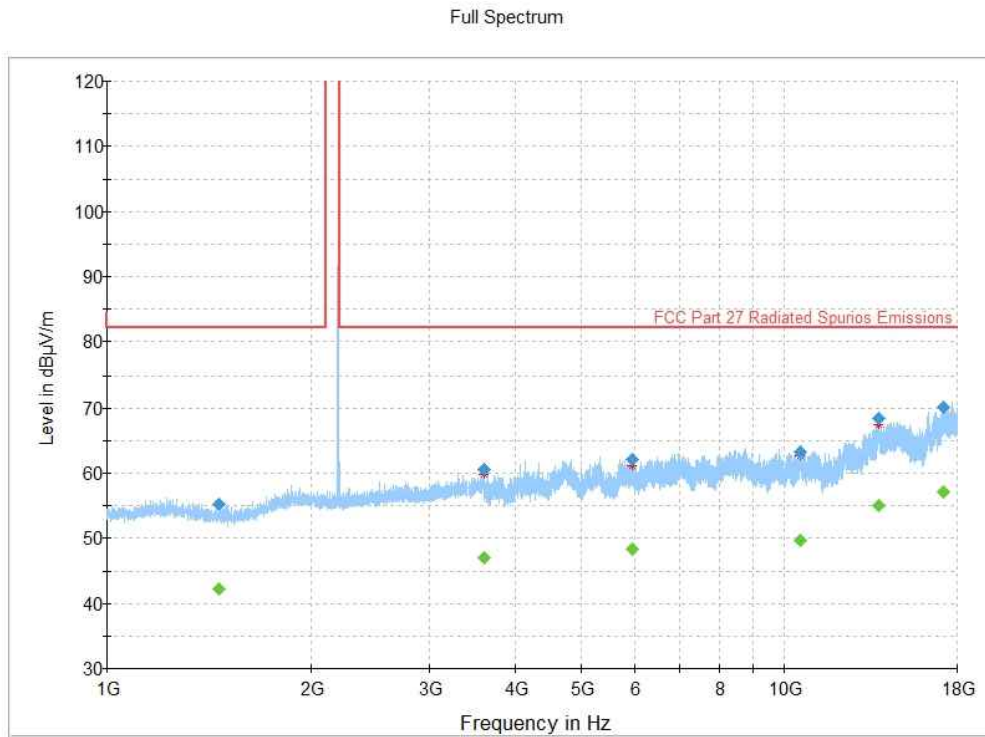
² Correction factors = antenna factor ACF (dB) + cable loss (dB)+20 dB attenuator to protect the test equipment

³ The maximum measured value observed over a period of 5 seconds was recorded.

⁴The spectral plot is a summation of a vertical and horizontal scan.

⁵This measurement was done at 3m

8.6.5 Test data, continued



The spectral plot is a summation of a vertical and horizontal scan. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).

Figure 8.6-29: Emissions limit plot – Field strength measured from 1 to 18 GHz, QPSK Modulation, 5 MHz OBW, High channel, band n66.

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)
1465.233333	55.30	---	82.23	26.93	5000.0	1000.000	119.0	V	10.0	6.3
1465.233333	---	42.31	82.23	39.92	5000.0	1000.000	119.0	V	10.0	6.3
3594.900000	60.65	---	82.23	21.58	5000.0	1000.000	138.0	V	102.0	15.3
3594.900000	---	47.06	82.23	35.17	5000.0	1000.000	138.0	V	102.0	15.3
5945.300000	---	48.39	82.23	33.84	5000.0	1000.000	200.0	H	301.0	20.4
5945.300000	62.11	---	82.23	20.12	5000.0	1000.000	200.0	H	301.0	20.4
10563.266667	63.22	---	82.23	19.01	5000.0	1000.000	266.0	V	296.0	25.7
10563.266667	---	49.77	82.23	32.46	5000.0	1000.000	266.0	V	296.0	25.7
13767.433333	---	54.98	82.23	27.25	5000.0	1000.000	113.0	H	202.0	33.0
13767.433333	68.33	---	82.23	13.90	5000.0	1000.000	113.0	H	202.0	33.0
17202.700000	70.21	---	82.23	12.02	5000.0	1000.000	189.0	V	227.0	36.6
17202.700000	---	57.05	82.23	25.18	5000.0	1000.000	189.0	V	227.0	36.6

Table 8.6-12: Emissions limit results – Field strength measured from 1 to 18 GHz, QPSK Modulation, 5 MHz OBW, High channel, band n66.

Notes:

¹ Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)

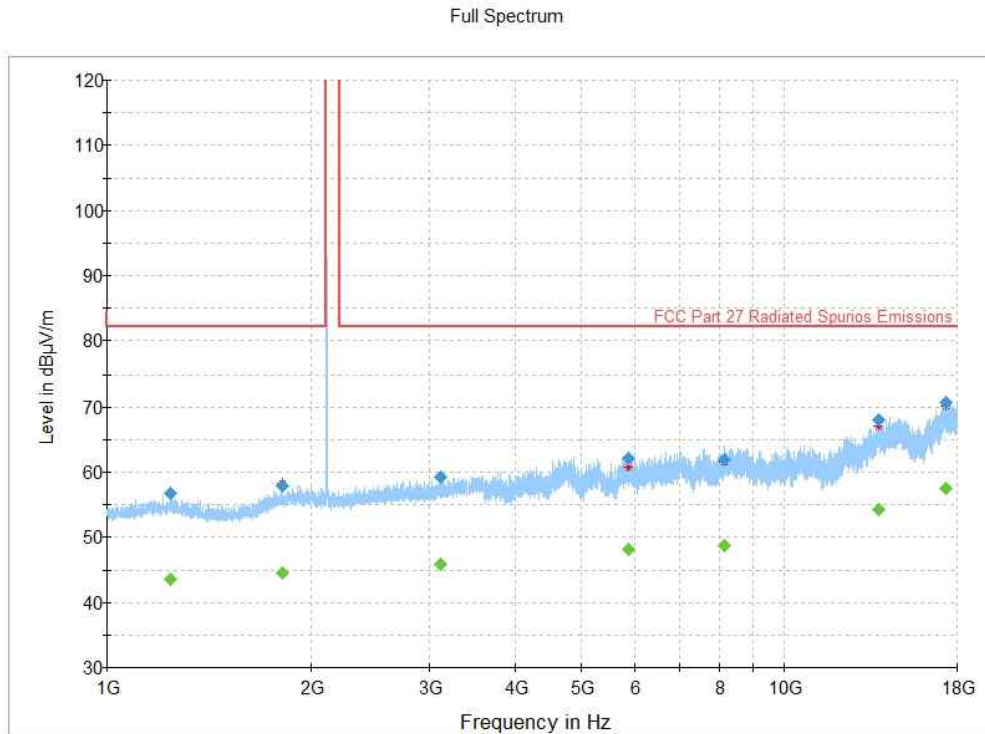
² Correction factors = antenna factor ACF (dB) + cable loss (dB)+20 dB attenuator to protect the test equipment

³ The maximum measured value observed over a period of 5 seconds was recorded.

⁴ The spectral plot is a summation of a vertical and horizontal scan.

⁵ This measurement was done at 3m

8.6.5 Test data, continued



The spectral plot is a summation of a vertical and horizontal scan. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).

Figure 8.6-30: Emissions limit plot – Field strength measured from 1 to 18 GHz, QPSK Modulation, 10 MHz OBW, Low channel, band n66.

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)
1241.766667	56.72	---	82.23	25.51	5000.0	1000.000	240.0	H	10.0	7.1
1241.766667	---	43.50	82.23	38.73	5000.0	1000.000	240.0	H	10.0	7.1
1821.500000	---	44.57	82.23	37.66	5000.0	1000.000	225.0	V	109.0	9.3
1821.500000	57.89	---	82.23	24.34	5000.0	1000.000	225.0	V	109.0	9.3
3117.433333	59.28	---	82.23	22.95	5000.0	1000.000	149.0	H	-11.0	13.4
3117.433333	---	45.95	82.23	36.28	5000.0	1000.000	149.0	H	-11.0	13.4
5889.733333	62.06	---	82.23	20.17	5000.0	1000.000	136.0	H	10.0	20.3
5889.733333	---	48.10	82.23	34.13	5000.0	1000.000	136.0	H	10.0	20.3
8160.233333	61.83	---	82.23	20.40	5000.0	1000.000	176.0	V	10.0	22.9
8160.233333	---	48.80	82.23	33.43	5000.0	1000.000	176.0	V	10.0	22.9
13763.433333	---	54.35	82.23	27.88	5000.0	1000.000	115.0	H	301.0	33.0
13763.433333	67.97	---	82.23	14.26	5000.0	1000.000	115.0	H	301.0	33.0
17309.233333	---	57.47	82.23	24.76	5000.0	1000.000	225.0	H	301.0	36.8
17309.233333	70.77	---	82.23	11.46	5000.0	1000.000	225.0	H	301.0	36.8

Table 8.6-13: Emissions limit results – Field strength measured from 1 to 18 GHz, QPSK Modulation, 10 MHz OBW, Low channel, band n66.

Notes:

¹ Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)

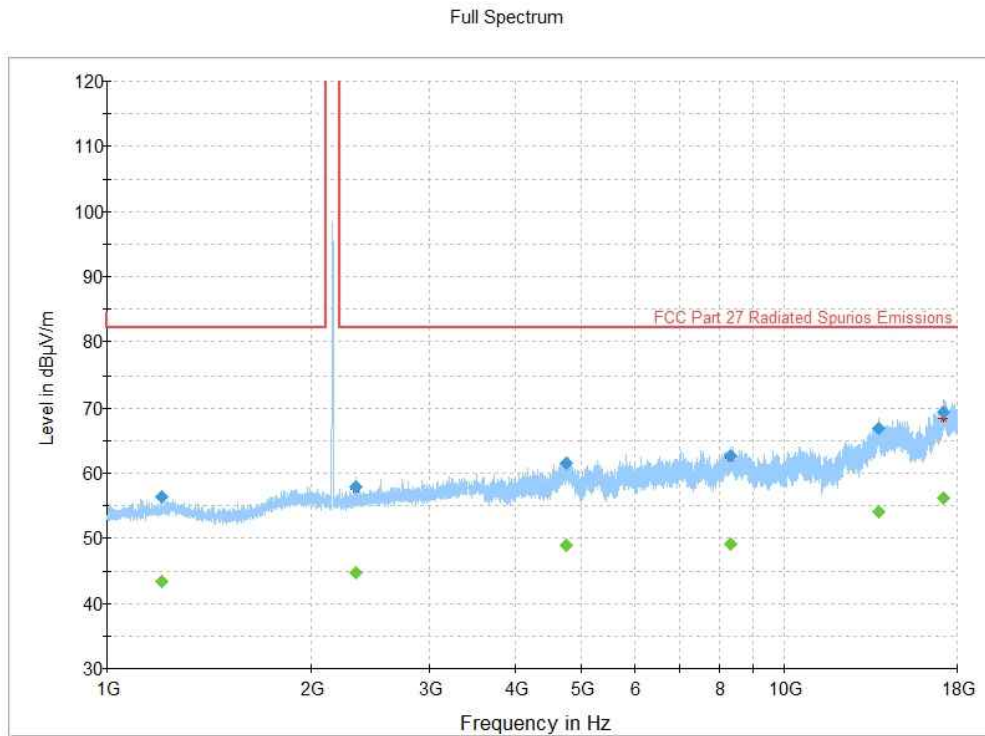
² Correction factors = antenna factor ACF (dB) + cable loss (dB)+20 dB attenuator to protect the test equipment

³ The maximum measured value observed over a period of 5 seconds was recorded.

⁴ The spectral plot is a summation of a vertical and horizontal scan.

⁵ This measurement was done at 3m

8.6.5 Test data, continued



The spectral plot is a summation of a vertical and horizontal scan. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).

Figure 8.6-31: Emissions limit plot – Field strength measured from 1 to 18 GHz, QPSK Modulation, 10 MHz OBW, Middle channel, band n66.

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)
1205.266667	---	43.30	82.23	38.93	5000.0	1000.000	150.0	V	68.0	6.8
1205.266667	56.31	---	82.23	25.92	5000.0	1000.000	150.0	V	68.0	6.8
2338.666667	57.99	---	82.23	24.24	5000.0	1000.000	172.0	H	41.0	10.8
2338.666667	---	44.78	82.23	37.45	5000.0	1000.000	172.0	H	41.0	10.8
4754.766667	---	48.82	82.23	33.41	5000.0	1000.000	116.0	V	7.0	19.3
4754.766667	61.62	---	82.23	20.61	5000.0	1000.000	116.0	V	7.0	19.3
8338.300000	62.62	---	82.23	19.61	5000.0	1000.000	140.0	V	147.0	23.5
8338.300000	---	49.14	82.23	33.09	5000.0	1000.000	140.0	V	147.0	23.5
13771.333333	---	54.09	82.23	28.14	5000.0	1000.000	192.0	V	10.0	33.0
13771.333333	66.84	---	82.23	15.39	5000.0	1000.000	192.0	V	10.0	33.0
17160.433333	---	56.10	82.23	26.13	5000.0	1000.000	231.0	H	10.0	35.8
17160.433333	69.28	---	82.23	12.95	5000.0	1000.000	231.0	H	10.0	35.8

Table 8.6-14: Emissions limit results – Field strength measured from 1 to 18 GHz, QPSK Modulation, 10 MHz OBW, Middle channel, band n66.

Notes:

¹ Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)

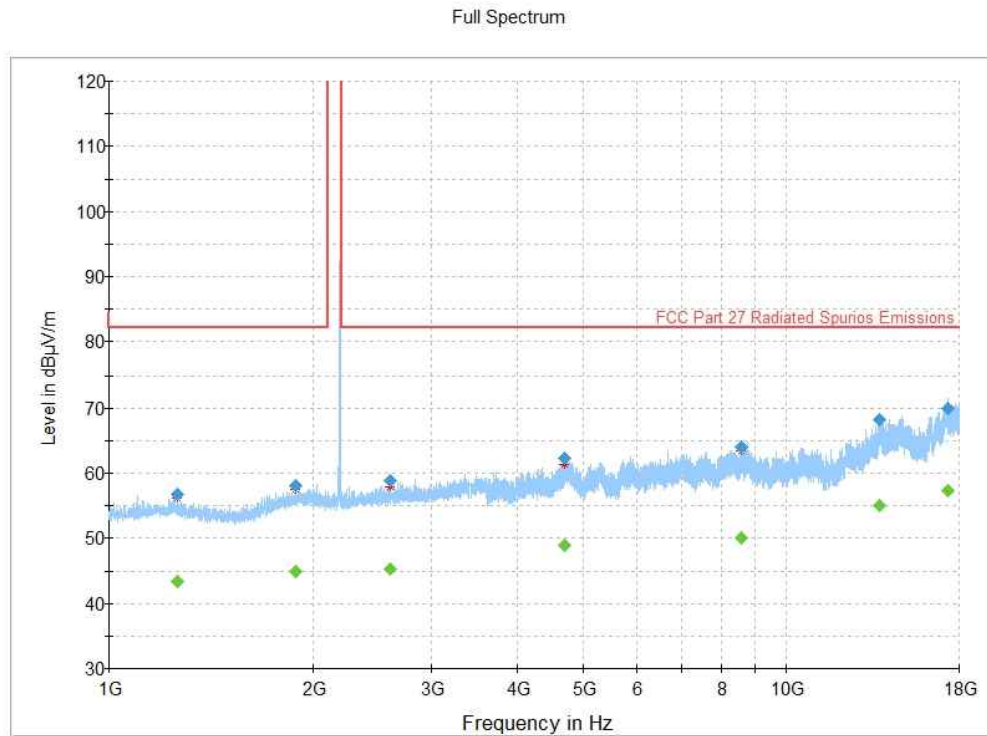
² Correction factors = antenna factor ACF (dB) + cable loss (dB)+20 dB attenuator to protect the test equipment

³ The maximum measured value observed over a period of 5 seconds was recorded.

⁴ The spectral plot is a summation of a vertical and horizontal scan.

⁵ This measurement was done at 3m

8.6.5 Test data, continued



The spectral plot is a summation of a vertical and horizontal scan. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).

Figure 8.6-32: Emissions limit plot – Field strength measured from 1 to 18 GHz, QPSK Modulation, 10 MHz OBW, High channel, band n66.

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)
1260.866667	56.68	---	82.23	25.55	5000.0	1000.000	194.0	V	6.0	7.0
1260.866667	---	43.39	82.23	38.84	5000.0	1000.000	194.0	V	6.0	7.0
1888.900000	58.17	---	82.23	24.06	5000.0	1000.000	164.0	V	6.0	10.0
1888.900000	---	44.91	82.23	37.32	5000.0	1000.000	164.0	V	6.0	10.0
2605.733333	---	45.30	82.23	36.93	5000.0	1000.000	120.0	H	7.0	11.6
2605.733333	58.92	---	82.23	23.31	5000.0	1000.000	120.0	H	7.0	11.6
4692.600000	62.30	---	82.23	19.93	5000.0	1000.000	174.0	V	-11.0	19.3
4692.600000	---	48.88	82.23	33.35	5000.0	1000.000	174.0	V	-11.0	19.3
8581.800000	---	50.13	82.23	32.10	5000.0	1000.000	265.0	H	6.0	23.6
8581.800000	63.96	---	82.23	18.27	5000.0	1000.000	265.0	H	6.0	23.6
13700.133333	68.12	---	82.23	14.11	5000.0	1000.000	178.0	H	119.0	32.7
13700.133333	---	54.96	82.23	27.27	5000.0	1000.000	178.0	H	119.0	32.7
17312.433333	---	57.25	82.23	24.98	5000.0	1000.000	222.0	V	71.0	36.7
17312.433333	69.99	---	82.23	12.24	5000.0	1000.000	222.0	V	71.0	36.7

Table 8.6-15: Emissions limit results – Field strength measured from 1 to 18 GHz, QPSK Modulation, 10 MHz OBW, High channel, band n66.

Notes:

¹ Field strength (dBμV/m) = receiver/spectrum analyzer value (dBμV) + correction factor (dB)

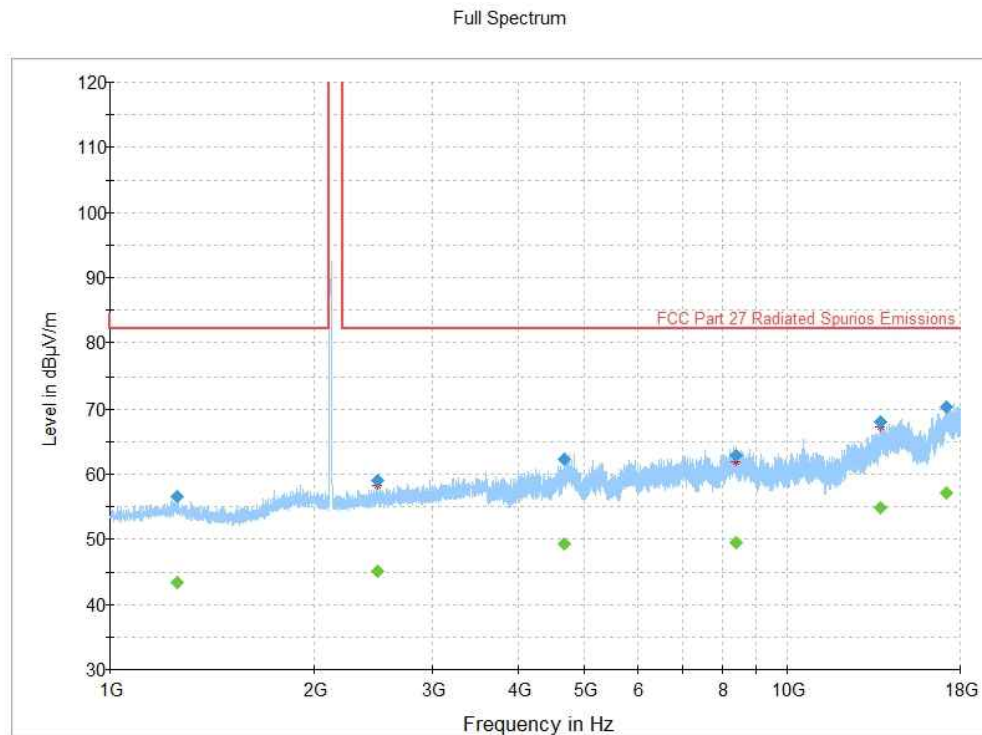
² Correction factors = antenna factor ACF (dB) + cable loss (dB)+20 dB attenuator to protect the test equipment

³ The maximum measured value observed over a period of 5 seconds was recorded.

⁴The spectral plot is a summation of a vertical and horizontal scan.

⁵This measurement was done at 3m

8.6.5 Test data, continued



The spectral plot is a summation of a vertical and horizontal scan. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).

Figure 8.6-33: Emissions limit plot – Field strength measured from 1 to 18 GHz, QPSK Modulation, 20 MHz OBW, Low channel, band n66.

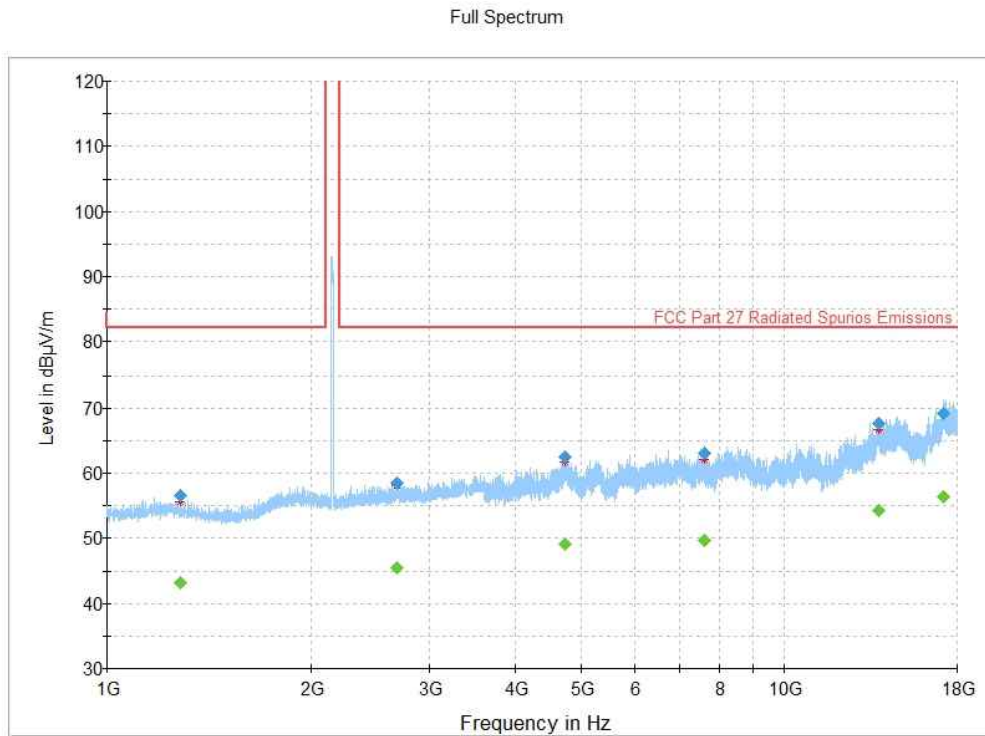
Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1258.600000	---	43.40	82.23	38.83	5000.0	1000.000	127.0	H	34.0	7.0
1258.600000	56.49	---	82.23	25.74	5000.0	1000.000	127.0	H	34.0	7.0
2482.633333	58.96	---	82.23	23.27	5000.0	1000.000	127.0	V	117.0	11.3
2482.633333	---	45.01	82.23	37.22	5000.0	1000.000	127.0	V	117.0	11.3
4686.300000	62.26	---	82.23	19.97	5000.0	1000.000	145.0	V	6.0	19.3
4686.300000	---	49.28	82.23	32.95	5000.0	1000.000	145.0	V	6.0	19.3
8379.833333	---	49.51	82.23	32.72	5000.0	1000.000	134.0	V	6.0	23.5
8379.833333	62.85	---	82.23	19.38	5000.0	1000.000	134.0	V	6.0	23.5
13741.466667	67.99	---	82.23	14.24	5000.0	1000.000	132.0	H	291.0	32.8
13741.466667	---	54.75	82.23	27.48	5000.0	1000.000	132.0	H	291.0	32.8
17197.000000	70.36	---	82.23	11.87	5000.0	1000.000	279.0	H	176.0	36.6
17197.000000	---	57.10	82.23	25.13	5000.0	1000.000	279.0	H	176.0	36.6

Table 8.6-16: Emissions limit results – Field strength measured from 1 to 18 GHz, QPSK Modulation, 20 MHz OBW, Low channel, band n66.

Notes:

- ¹ Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
- ² Correction factors = antenna factor ACF (dB) + cable loss (dB)+20 dB attenuator to protect the test equipment
- ³ The maximum measured value observed over a period of 5 seconds was recorded.
- ⁴ The spectral plot is a summation of a vertical and horizontal scan.
- ⁵ This measurement was done at 3m

8.6.5 Test data, continued



The spectral plot is a summation of a vertical and horizontal scan. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).

Figure 8.6-34: Emissions limit plot – Field strength measured from 1 to 18 GHz, QPSK Modulation, 20 MHz OBW, Middle channel, band n66.

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)
1283.533333	56.59	---	82.23	25.64	5000.0	1000.000	192.0	V	9.0	6.8
1283.533333	---	43.16	82.23	39.07	5000.0	1000.000	192.0	V	9.0	6.8
2680.366667	---	45.39	82.23	36.84	5000.0	1000.000	181.0	V	124.0	12.1
2680.366667	58.41	---	82.23	23.82	5000.0	1000.000	181.0	V	124.0	12.1
4733.566667	62.40	---	82.23	19.83	5000.0	1000.000	126.0	V	214.0	19.3
4733.566667	---	49.14	82.23	33.09	5000.0	1000.000	126.0	V	214.0	19.3
7617.533333	62.99	---	82.23	19.24	5000.0	1000.000	165.0	V	109.0	22.3
7617.533333	---	49.64	82.23	32.59	5000.0	1000.000	165.0	V	109.0	22.3
13769.466667	---	54.29	82.23	27.94	5000.0	1000.000	250.0	V	128.0	33.0
13769.466667	67.66	---	82.23	14.57	5000.0	1000.000	250.0	V	128.0	33.0
17167.600000	69.15	---	82.23	13.08	5000.0	1000.000	129.0	H	10.0	36.0
17167.600000	---	56.30	82.23	25.93	5000.0	1000.000	129.0	H	10.0	36.0

Table 8.6-17: Emissions limit results – Field strength measured from 1 to 18 GHz, QPSK Modulation, 20 MHz OBW, Middle channel, band n66.

Notes:

¹ Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)

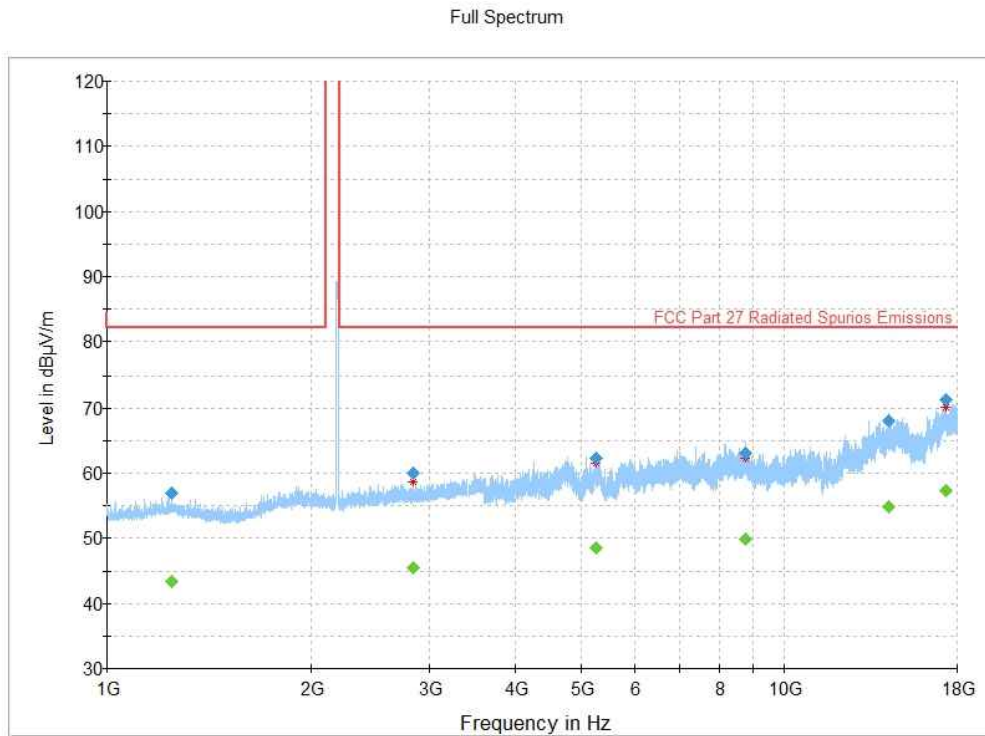
² Correction factors = antenna factor ACF (dB) + cable loss (dB)+20 dB attenuator to protect the test equipment

³ The maximum measured value observed over a period of 5 seconds was recorded.

⁴The spectral plot is a summation of a vertical and horizontal scan.

⁵This measurement was done at 3m

8.6.5 Test data, continued



The spectral plot is a summation of a vertical and horizontal scan. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).

Figure 8.6-35: Emissions limit plot – Field strength measured from 1 to 18 GHz, QPSK Modulation, 20 MHz OBW, High channel, band n66.

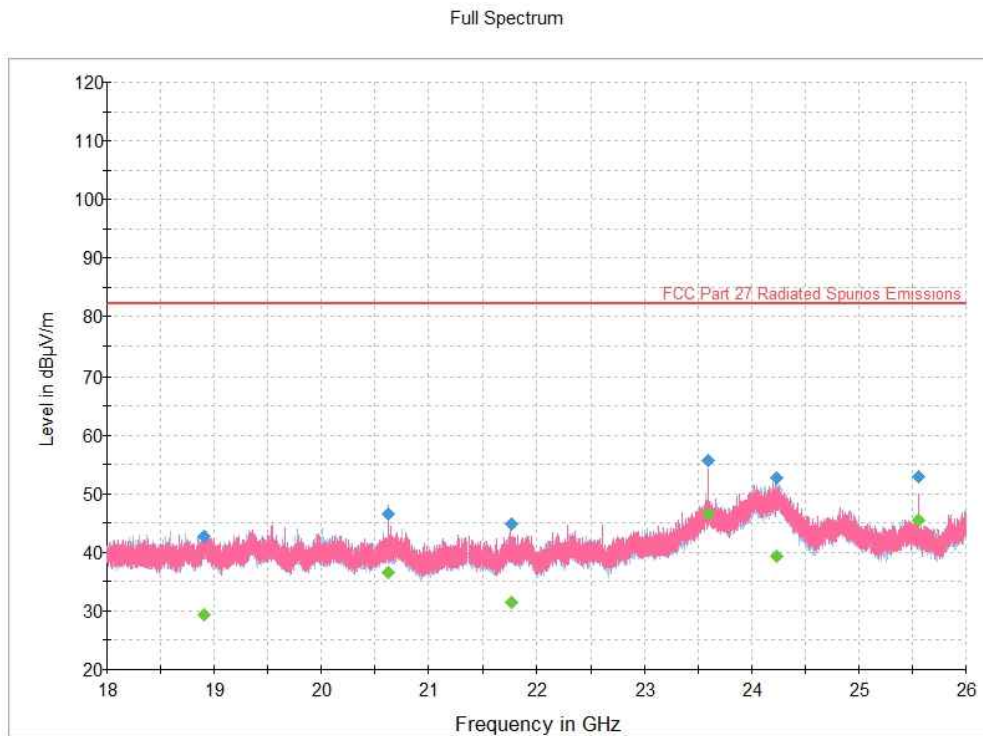
Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1245.900000	56.99	---	82.23	25.24	5000.0	1000.000	187.0	V	337.0	7.1
1245.900000	---	43.41	82.23	38.82	5000.0	1000.000	187.0	V	337.0	7.1
2835.066667	59.92	---	82.23	22.31	5000.0	1000.000	152.0	H	6.0	12.5
2835.066667	---	45.55	82.23	36.68	5000.0	1000.000	152.0	H	6.0	12.5
5259.766667	62.28	---	82.23	19.95	5000.0	1000.000	144.0	H	265.0	19.1
5259.766667	---	48.55	82.23	33.68	5000.0	1000.000	144.0	H	265.0	19.1
8773.000000	---	49.89	82.23	32.34	5000.0	1000.000	141.0	V	159.0	24.0
8773.000000	63.07	---	82.23	19.16	5000.0	1000.000	141.0	V	159.0	24.0
14269.633333	---	54.76	82.23	27.47	5000.0	1000.000	165.0	H	245.0	32.1
14269.633333	68.01	---	82.23	14.22	5000.0	1000.000	165.0	H	245.0	32.1
17293.800000	71.28	---	82.23	10.95	5000.0	1000.000	135.0	V	219.0	36.9
17293.800000	---	57.41	82.23	24.82	5000.0	1000.000	135.0	V	219.0	36.9

Table 8.6-18: Emissions limit results – Field strength measured from 1 to 18 GHz, QPSK Modulation, 20 MHz OBW, High channel, band n66.

Notes:

- ¹ Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
- ² Correction factors = antenna factor ACF (dB) + cable loss (dB)+20 dB attenuator to protect the test equipment
- ³ The maximum measured value observed over a period of 5 seconds was recorded.
- ⁴ The spectral plot is a summation of a vertical and horizontal scan.
- ⁵ This measurement was done at 3m

8.6.5 Test data, continued



The spectral plot shows the vertical (red plot) and horizontal (blue plot) scans separately. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).

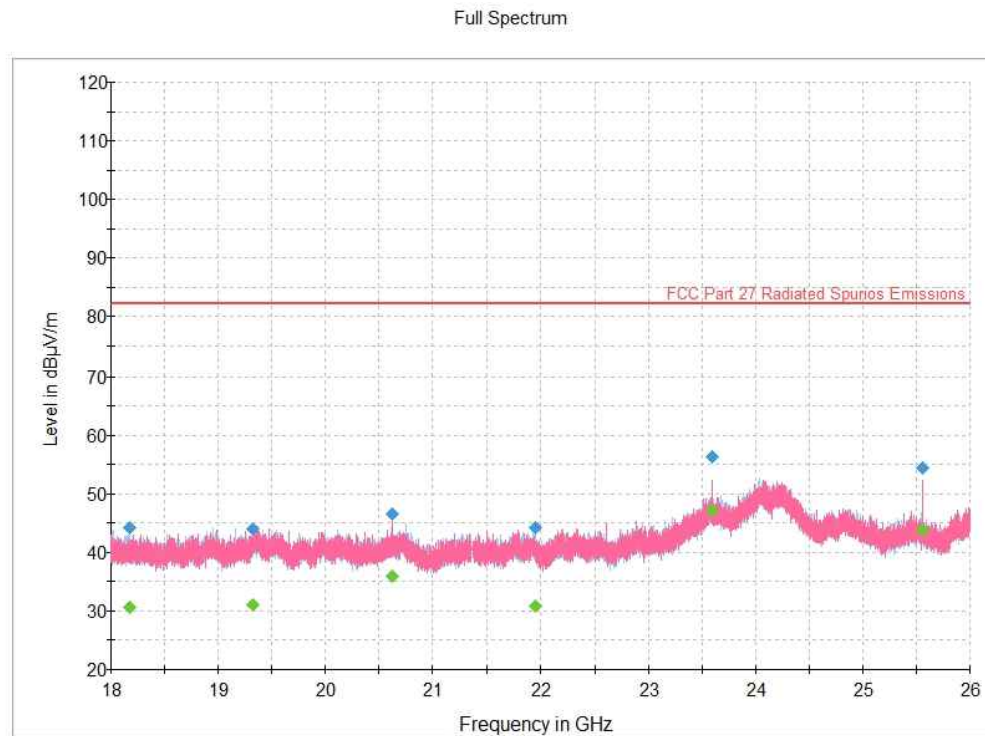
Figure 8.6-36: Emissions limit plot – Field strength measured from 18 to 26 GHz, QPSK Modulation, 5 MHz OBW, Low channel, band n66.

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)
18907.000000	---	29.45	82.23	52.78	5000.0	1000.000	256.0	H	55.0	17.5
18907.000000	42.61	---	82.23	39.62	5000.0	1000.000	256.0	H	55.0	17.5
20624.866667	46.62	---	82.23	35.61	5000.0	1000.000	157.0	V	242.0	19.5
20624.866667	---	36.49	82.23	45.74	5000.0	1000.000	157.0	V	242.0	19.5
21760.733333	44.87	---	82.23	37.36	5000.0	1000.000	138.0	V	0.0	19.5
21760.733333	---	31.36	82.23	50.87	5000.0	1000.000	138.0	V	0.0	19.5
23592.866667	55.74	---	82.23	26.49	5000.0	1000.000	100.0	V	258.0	25.9
23592.866667	---	46.64	82.23	35.59	5000.0	1000.000	100.0	V	258.0	25.9
24238.866667	---	39.42	82.23	42.81	5000.0	1000.000	410.0	H	70.0	29.0
24238.866667	52.73	---	82.23	29.50	5000.0	1000.000	410.0	H	70.0	29.0
25559.000000	52.86	---	82.23	29.37	5000.0	1000.000	128.0	V	273.0	24.3
25559.000000	---	45.52	82.23	36.71	5000.0	1000.000	128.0	V	273.0	24.3

Table 8.6-19: Emissions limit results – Field strength measured from 18 to 26 GHz, QPSK Modulation, 5 MHz OBW, Low channel, band n66.

- 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 The maximum measured value observed over a period of 5 seconds was recorded.
 - ⁴ The spectral plot shows the vertical and horizontal scan separately.
 - ⁵ This measurement was done at 3m

8.6.5 Test data, continued



The spectral plot shows the vertical (red plot) and horizontal (blue plot) scans separately. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).

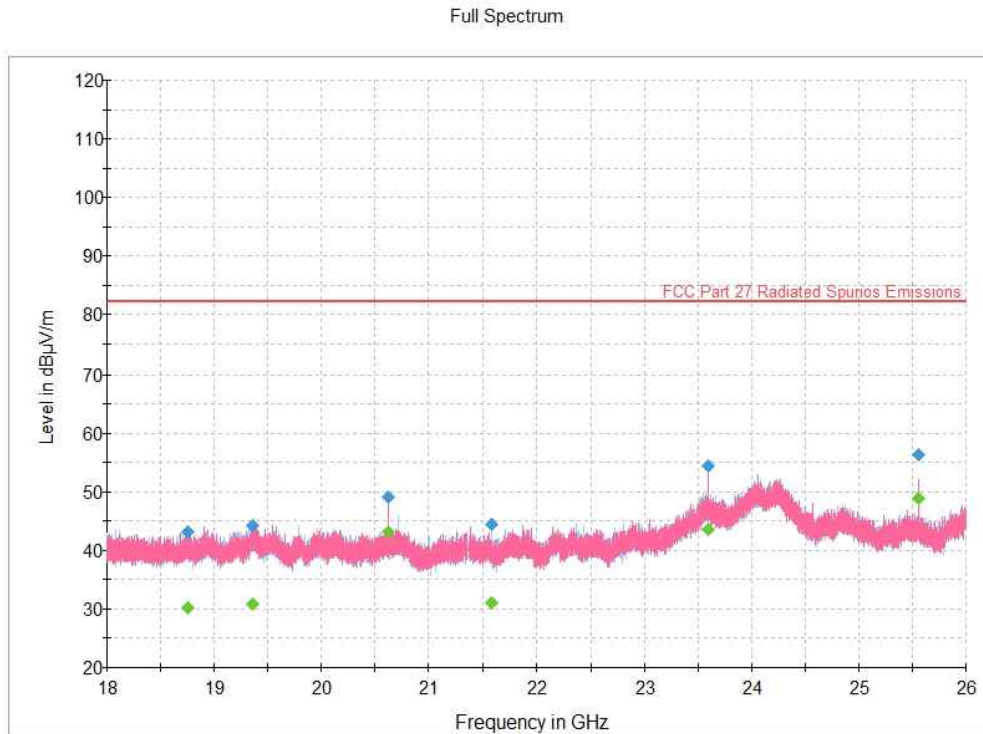
Figure 8.6-37: Emissions limit plot – Field strength measured from 18 to 26 GHz, QPSK Modulation, 5 MHz OBW, Middle channel, band n66.

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)
18169.666667	44.17	---	82.23	38.06	5000.0	1000.000	410.0	H	0.0	17.3
18169.666667	---	30.55	82.23	51.68	5000.0	1000.000	410.0	H	0.0	17.3
19321.000000	---	31.04	82.23	51.19	5000.0	1000.000	279.0	H	321.0	18.5
19321.000000	43.92	---	82.23	38.31	5000.0	1000.000	279.0	H	321.0	18.5
20625.000000	---	35.85	82.23	46.38	5000.0	1000.000	154.0	V	245.0	19.5
20625.000000	46.57	---	82.23	35.66	5000.0	1000.000	154.0	V	245.0	19.5
21945.533333	---	30.72	82.23	51.51	5000.0	1000.000	182.0	H	351.0	19.1
21945.533333	44.21	---	82.23	38.02	5000.0	1000.000	182.0	H	351.0	19.1
23593.000000	---	47.14	82.23	35.09	5000.0	1000.000	100.0	V	258.0	25.9
23593.000000	56.30	---	82.23	25.93	5000.0	1000.000	100.0	V	258.0	25.9
25559.000000	54.32	---	82.23	27.91	5000.0	1000.000	118.0	V	262.0	24.3
25559.000000	---	43.88	82.23	38.35	5000.0	1000.000	118.0	V	262.0	24.3

Table 8.6-20: Emissions limit results – Field strength measured from 18 to 26 GHz, QPSK Modulation, 5 MHz OBW, Middle channel, band n66.

- 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 The maximum measured value observed over a period of 5 seconds was recorded.
 - ⁴ The spectral plot shows the vertical and horizontal scan separately.
 - ⁵ This measurement was done at 3m

8.6.5 Test data, continued



The spectral plot shows the vertical (red plot) and horizontal (blue plot) scans separately. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).

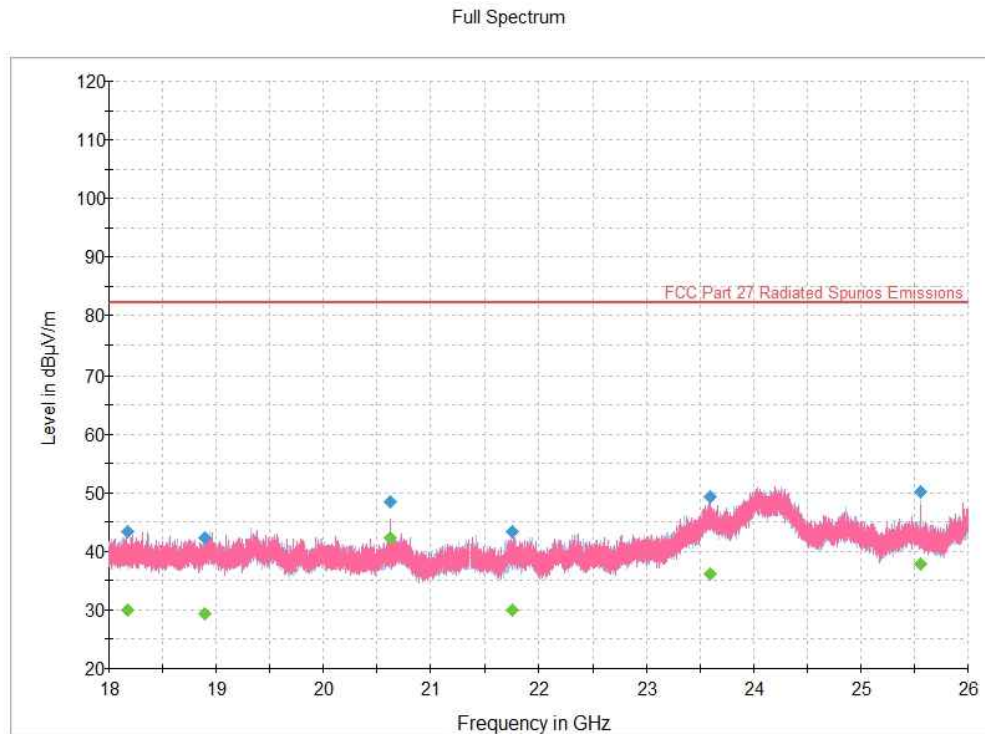
Figure 8.6-38: Emissions limit plot – Field strength measured from 18 to 26 GHz, QPSK Modulation, 5 MHz OBW, High channel, band n66.

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)
18752.866667	43.08	---	82.23	39.15	5000.0	1000.000	294.0	H	105.0	17.6
18752.866667	---	30.25	82.23	51.98	5000.0	1000.000	294.0	H	105.0	17.6
19359.800000	---	30.79	82.23	51.44	5000.0	1000.000	332.0	V	87.0	18.5
19359.800000	44.21	---	82.23	38.02	5000.0	1000.000	332.0	V	87.0	18.5
20625.000000	---	43.13	82.23	39.10	5000.0	1000.000	148.0	H	146.0	19.5
20625.000000	49.03	---	82.23	33.20	5000.0	1000.000	148.0	H	146.0	19.5
21574.600000	44.40	---	82.23	37.83	5000.0	1000.000	274.0	H	242.0	18.8
21574.600000	---	31.12	82.23	51.11	5000.0	1000.000	274.0	H	242.0	18.8
23592.866667	54.32	---	82.23	27.91	5000.0	1000.000	100.0	V	248.0	25.9
23592.866667	---	43.50	82.23	38.73	5000.0	1000.000	100.0	V	248.0	25.9
25559.000000	56.30	---	82.23	25.93	5000.0	1000.000	100.0	V	272.0	24.3
25559.000000	---	48.96	82.23	33.27	5000.0	1000.000	100.0	V	272.0	24.3

Table 8.6-21: Emissions limit results – Field strength measured from 18 to 26 GHz, QPSK Modulation, 5 MHz OBW, High channel, band n66.

- 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 The maximum measured value observed over a period of 5 seconds was recorded.
 - ⁴ The spectral plot shows the vertical and horizontal scan separately.
 - ⁵ This measurement was done at 3m

8.6.5 Test data, continued



The spectral plot shows the vertical (red plot) and horizontal (blue plot) scans separately. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).

Figure 8.6-39: Emissions limit plot – Field strength measured from 18 to 26 GHz, QPSK Modulation, 10 MHz OBW, Low channel, band n66.

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)
18169.666667	---	29.94	82.23	52.29	5000.0	1000.000	402.0	V	86.0	17.3
18169.666667	43.27	---	82.23	38.96	5000.0	1000.000	402.0	V	86.0	17.3
18895.400000	---	29.42	82.23	52.81	5000.0	1000.000	256.0	H	70.0	17.5
18895.400000	42.40	---	82.23	39.83	5000.0	1000.000	256.0	H	70.0	17.5
20625.000000	48.45	---	82.23	33.78	5000.0	1000.000	108.0	V	132.0	19.5
20625.000000	---	42.32	82.23	39.91	5000.0	1000.000	108.0	V	132.0	19.5
21755.933333	---	29.91	82.23	52.32	5000.0	1000.000	255.0	V	11.0	19.4
21755.933333	43.40	---	82.23	38.83	5000.0	1000.000	255.0	V	11.0	19.4
23592.866667	---	36.18	82.23	46.05	5000.0	1000.000	158.0	H	116.0	25.9
23592.866667	49.37	---	82.23	32.86	5000.0	1000.000	158.0	H	116.0	25.9
25559.000000	50.12	---	82.23	32.11	5000.0	1000.000	100.0	H	118.0	24.3
25559.000000	---	37.91	82.23	44.32	5000.0	1000.000	100.0	H	118.0	24.3

Table 8.6-22: Emissions limit results – Field strength measured from 18 to 26 GHz, QPSK Modulation, 10 MHz OBW, Low channel, band n66.

Notes:

¹ Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)

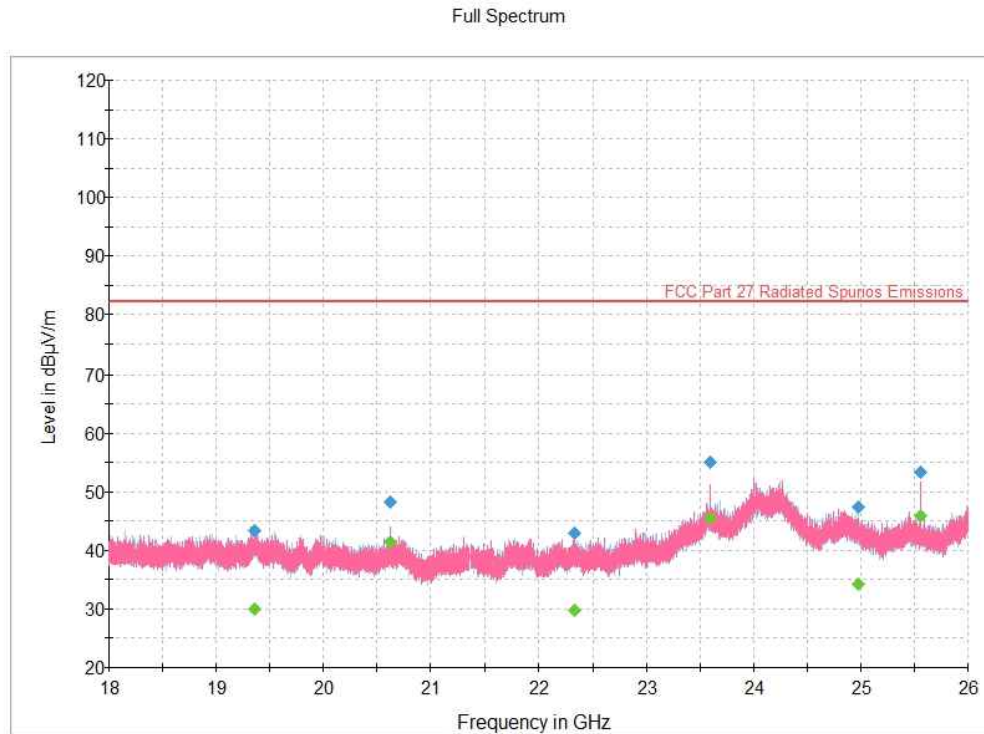
² Correction factors = antenna factor ACF (dB) + cable loss (dB)

³ The maximum measured value observed over a period of 5 seconds was recorded.

⁴ The spectral plot shows the vertical and horizontal scan separately.

⁵ This measurement was done at 3m

8.6.5 Test data, continued



The spectral plot shows the vertical (red plot) and horizontal (blue plot) scans separately. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).

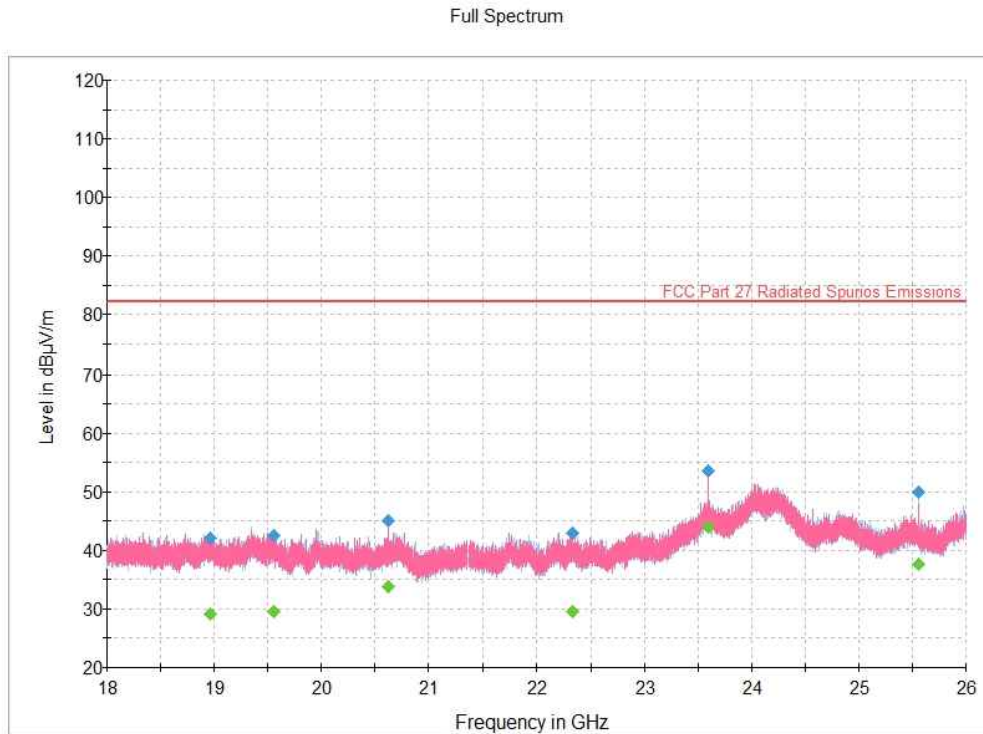
Figure 8.6-40: Emissions limit plot – Field strength measured from 18 to 26 GHz, QPSK Modulation, 10 MHz OBW, Middle channel, band n66.

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)
19354.333333	43.35	---	82.23	38.88	5000.0	1000.000	335.0	H	357.0	18.5
19354.333333	---	30.07	82.23	52.16	5000.0	1000.000	335.0	H	357.0	18.5
20624.866667	---	41.49	82.23	40.74	5000.0	1000.000	98.0	V	131.0	19.5
20624.866667	48.27	---	82.23	33.96	5000.0	1000.000	98.0	V	131.0	19.5
22333.666667	42.90	---	82.23	39.33	5000.0	1000.000	147.0	V	0.0	19.5
22333.666667	---	29.72	82.23	52.51	5000.0	1000.000	147.0	V	0.0	19.5
23592.866667	54.93	---	82.23	27.30	5000.0	1000.000	98.0	V	258.0	25.9
23592.866667	---	45.43	82.23	36.80	5000.0	1000.000	98.0	V	258.0	25.9
24975.533333	---	34.14	82.23	48.09	5000.0	1000.000	377.0	H	153.0	24.7
24975.533333	47.44	---	82.23	34.79	5000.0	1000.000	377.0	H	153.0	24.7
25559.000000	53.26	---	82.23	28.97	5000.0	1000.000	100.0	V	118.0	24.3
25559.000000	---	45.93	82.23	36.30	5000.0	1000.000	100.0	V	118.0	24.3

Table 8.6-23: Emissions limit results – Field strength measured from 18 to 26 GHz, QPSK Modulation, 10 MHz OBW, Middle channel, band n66.

- 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 The maximum measured value observed over a period of 5 seconds was recorded.
 - ⁴ The spectral plot shows the vertical and horizontal scan separately.
 - ⁵ This measurement was done at 3m

8.6.5 Test data, continued



The spectral plot shows the vertical (red plot) and horizontal (blue plot) scans separately. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).

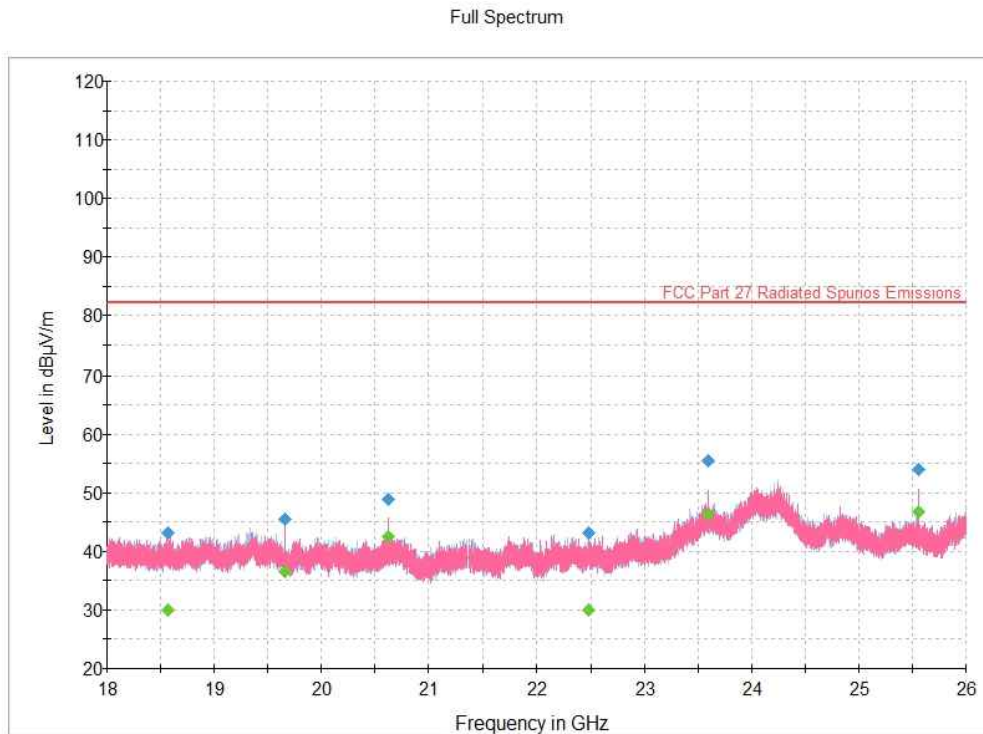
Figure 8.6-41: Emissions limit plot – Field strength measured from 18 to 26 GHz, QPSK Modulation, 10 MHz OBW, High channel, band n66.

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)
18964.733333	---	29.12	82.23	53.11	5000.0	1000.000	297.0	H	105.0	17.6
18964.733333	42.01	---	82.23	40.22	5000.0	1000.000	297.0	H	105.0	17.6
19553.133333	---	29.64	82.23	52.59	5000.0	1000.000	278.0	V	178.0	18.1
19553.133333	42.55	---	82.23	39.68	5000.0	1000.000	278.0	V	178.0	18.1
20625.000000	45.16	---	82.23	37.07	5000.0	1000.000	119.0	H	131.0	19.5
20625.000000	---	33.90	82.23	48.33	5000.0	1000.000	119.0	H	131.0	19.5
22331.533333	42.89	---	82.23	39.34	5000.0	1000.000	401.0	V	54.0	19.5
22331.533333	---	29.61	82.23	52.62	5000.0	1000.000	401.0	V	54.0	19.5
23592.866667	53.44	---	82.23	28.79	5000.0	1000.000	140.0	V	238.0	25.9
23592.866667	---	43.97	82.23	38.26	5000.0	1000.000	140.0	V	238.0	25.9
25559.133333	49.87	---	82.23	32.36	5000.0	1000.000	100.0	H	118.0	24.3
25559.133333	---	37.61	82.23	44.62	5000.0	1000.000	100.0	H	118.0	24.3

Table 8.6-24: Emissions limit results – Field strength measured from 18 to 26 GHz, QPSK Modulation, 10 MHz OBW, High channel, band n66.

- 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 The maximum measured value observed over a period of 5 seconds was recorded.
 - ⁴ The spectral plot shows the vertical and horizontal scan separately.
 - ⁵ This measurement was done at 3m

8.6.5 Test data, continued



The spectral plot shows the vertical (red plot) and horizontal (blue plot) scans separately. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).

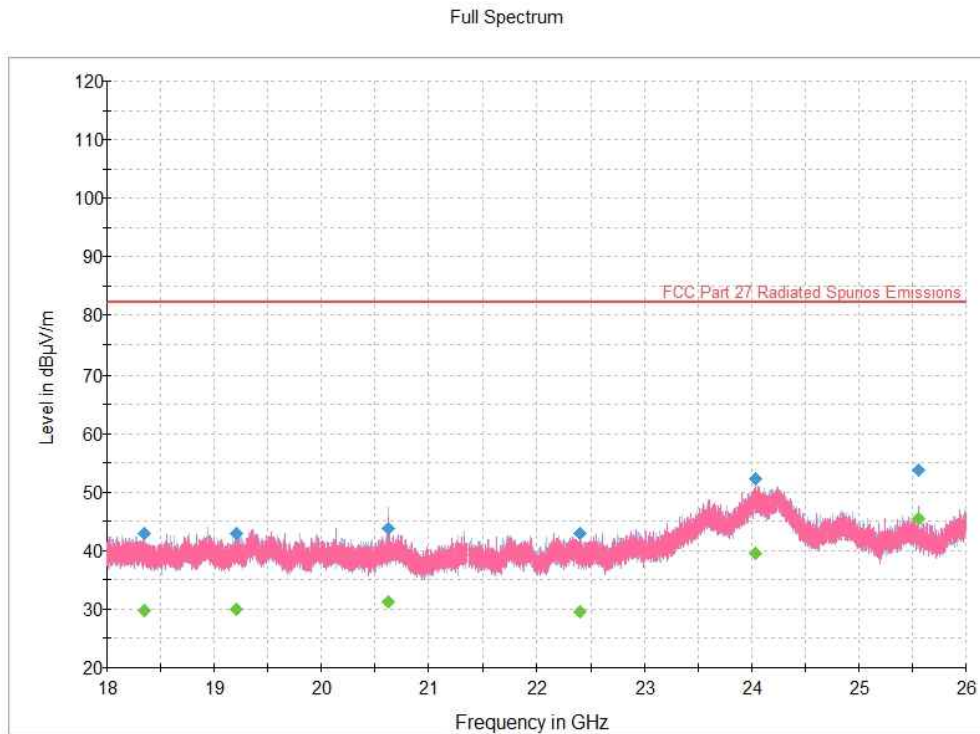
Figure 8.6-42: Emissions limit plot – Field strength measured from 18 to 26 GHz, QPSK Modulation, 20 MHz OBW, Low channel, band n66.

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)
18567.933333	---	30.00	82.23	52.23	5000.0	1000.000	177.0	H	196.0	18.0
18567.933333	43.13	---	82.23	39.10	5000.0	1000.000	177.0	H	196.0	18.0
19660.733333	45.54	---	82.23	36.69	5000.0	1000.000	129.0	V	130.0	18.0
19660.733333	---	36.64	82.23	45.59	5000.0	1000.000	129.0	V	130.0	18.0
20624.866667	---	42.45	82.23	39.78	5000.0	1000.000	116.0	V	133.0	19.5
20624.866667	48.77	---	82.23	33.46	5000.0	1000.000	116.0	V	133.0	19.5
22478.733333	---	29.88	82.23	52.35	5000.0	1000.000	347.0	H	133.0	19.4
22478.733333	43.15	---	82.23	39.08	5000.0	1000.000	347.0	H	133.0	19.4
23593.000000	---	46.41	82.23	35.82	5000.0	1000.000	98.0	V	256.0	25.9
23593.000000	55.41	---	82.23	26.82	5000.0	1000.000	98.0	V	256.0	25.9
25559.000000	54.04	---	82.23	28.19	5000.0	1000.000	129.0	V	272.0	24.3
25559.000000	---	46.68	82.23	35.55	5000.0	1000.000	129.0	V	272.0	24.3

Table 8.6-25: Emissions limit results – Field strength measured from 18 to 26 GHz, QPSK Modulation, 20 MHz OBW, Low channel, band n66.

- 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 The maximum measured value observed over a period of 5 seconds was recorded.
 - ⁴ The spectral plot shows the vertical and horizontal scan separately.
 - ⁵ This measurement was done at 3m

8.6.5 Test data, continued



The spectral plot shows the vertical (red plot) and horizontal (blue plot) scans separately. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).

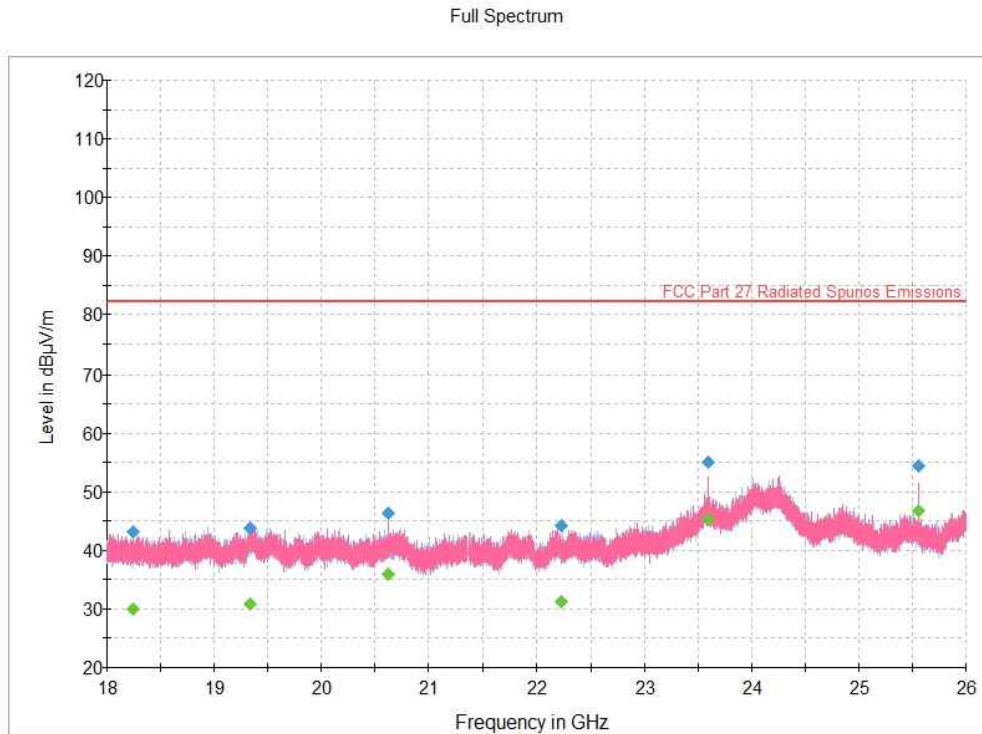
Figure 8.6-43: Emissions limit plot – Field strength measured from 18 to 26 GHz, QPSK Modulation, 20 MHz OBW, Middle channel, band n66.

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)
18348.200000	42.89	---	82.23	39.34	5000.0	1000.000	215.0	H	325.0	17.2
18348.200000	---	29.71	82.23	52.52	5000.0	1000.000	215.0	H	325.0	17.2
19211.533333	42.84	---	82.23	39.39	5000.0	1000.000	290.0	V	39.0	18.1
19211.533333	---	29.96	82.23	52.27	5000.0	1000.000	290.0	V	39.0	18.1
20624.866667	43.79	---	82.23	38.44	5000.0	1000.000	138.0	H	130.0	19.5
20624.866667	---	31.18	82.23	51.05	5000.0	1000.000	138.0	H	130.0	19.5
22401.533333	---	29.64	82.23	52.59	5000.0	1000.000	155.0	H	259.0	19.2
22401.533333	42.99	---	82.23	39.24	5000.0	1000.000	155.0	H	259.0	19.2
24043.133333	---	39.43	82.23	42.80	5000.0	1000.000	127.0	V	87.0	29.7
24043.133333	52.25	---	82.23	29.98	5000.0	1000.000	127.0	V	87.0	29.7
25559.000000	53.69	---	82.23	28.54	5000.0	1000.000	100.0	V	118.0	24.3
25559.000000	---	45.56	82.23	36.67	5000.0	1000.000	100.0	V	118.0	24.3

Table 8.6-26: Emissions limit results – Field strength measured from 18 to 26 GHz, QPSK Modulation, 20 MHz OBW, Middle channel, band n66.

- 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 The maximum measured value observed over a period of 5 seconds was recorded.
 - ⁴ The spectral plot shows the vertical and horizontal scan separately.
 - ⁵ This measurement was done at 3m

8.6.5 Test data, continued



The spectral plot shows the vertical (red plot) and horizontal (blue plot) scans separately. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).

Figure 8.6-44: Emissions limit plot – Field strength measured from 18 to 26 GHz, QPSK Modulation, 20 MHz OBW, High channel, band n66.

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)
18348.200000	42.89	---	82.23	39.34	5000.0	1000.000	215.0	H	325.0	17.2
18348.200000	---	29.71	82.23	52.52	5000.0	1000.000	215.0	H	325.0	17.2
19211.533333	42.84	---	82.23	39.39	5000.0	1000.000	290.0	V	39.0	18.1
19211.533333	---	29.96	82.23	52.27	5000.0	1000.000	290.0	V	39.0	18.1
20624.866667	43.79	---	82.23	38.44	5000.0	1000.000	138.0	H	130.0	19.5
20624.866667	---	31.18	82.23	51.05	5000.0	1000.000	138.0	H	130.0	19.5
22401.533333	---	29.64	82.23	52.59	5000.0	1000.000	155.0	H	259.0	19.2
22401.533333	42.99	---	82.23	39.24	5000.0	1000.000	155.0	H	259.0	19.2
24043.133333	---	39.43	82.23	42.80	5000.0	1000.000	127.0	V	87.0	29.7
24043.133333	52.25	---	82.23	29.98	5000.0	1000.000	127.0	V	87.0	29.7
25559.000000	53.69	---	82.23	28.54	5000.0	1000.000	100.0	V	118.0	24.3
25559.000000	---	45.56	82.23	36.67	5000.0	1000.000	100.0	V	118.0	24.3

Table 8.6-27: Emissions limit results – Field strength measured from 18 to 26 GHz, QPSK Modulation, 20 MHz OBW, High channel, band n66.

- 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 The maximum measured value observed over a period of 5 seconds was recorded.
 - ⁴ The spectral plot shows the vertical and horizontal scan separately.
 - ⁵ This measurement was done at 3m

8.6.5 Test data, continued

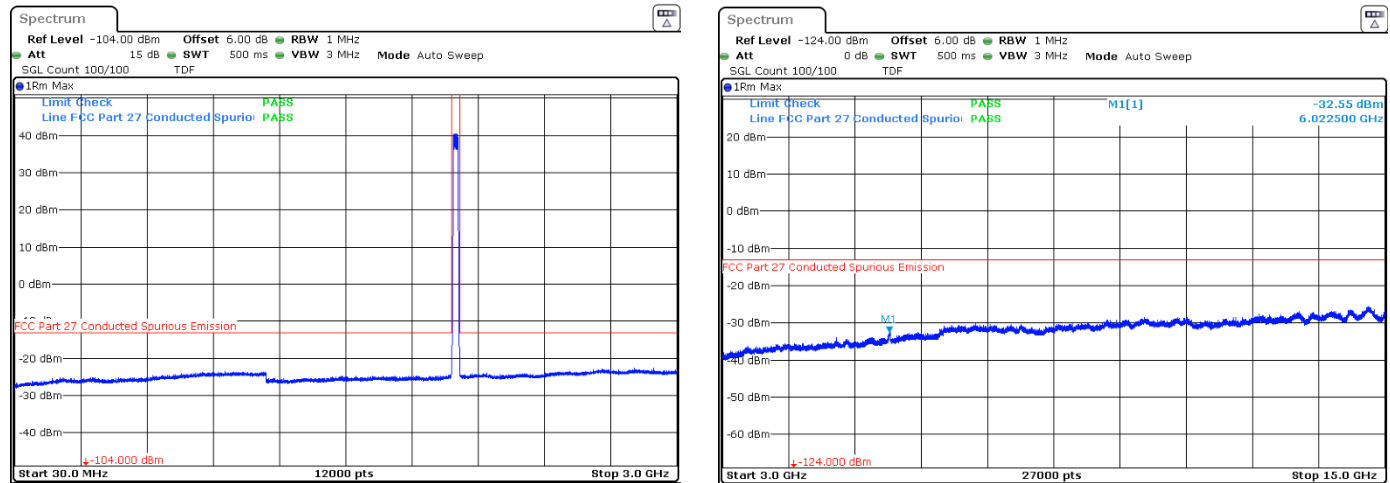


Figure 8.6-45: Conducted emission test, 16QAM Modulation, 2007.5 channel (25 MHz), band n70.

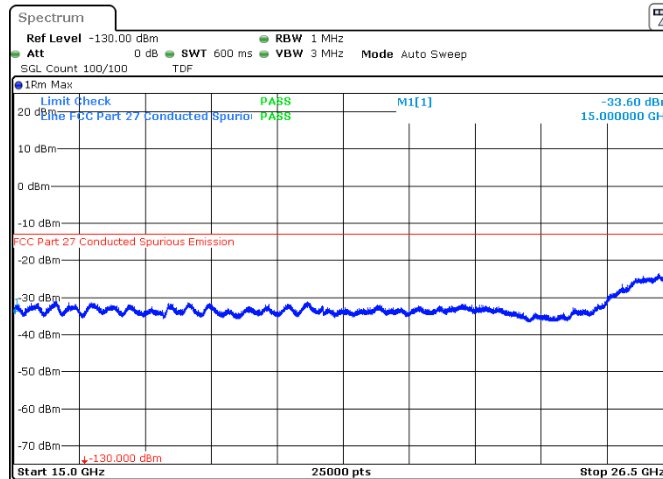
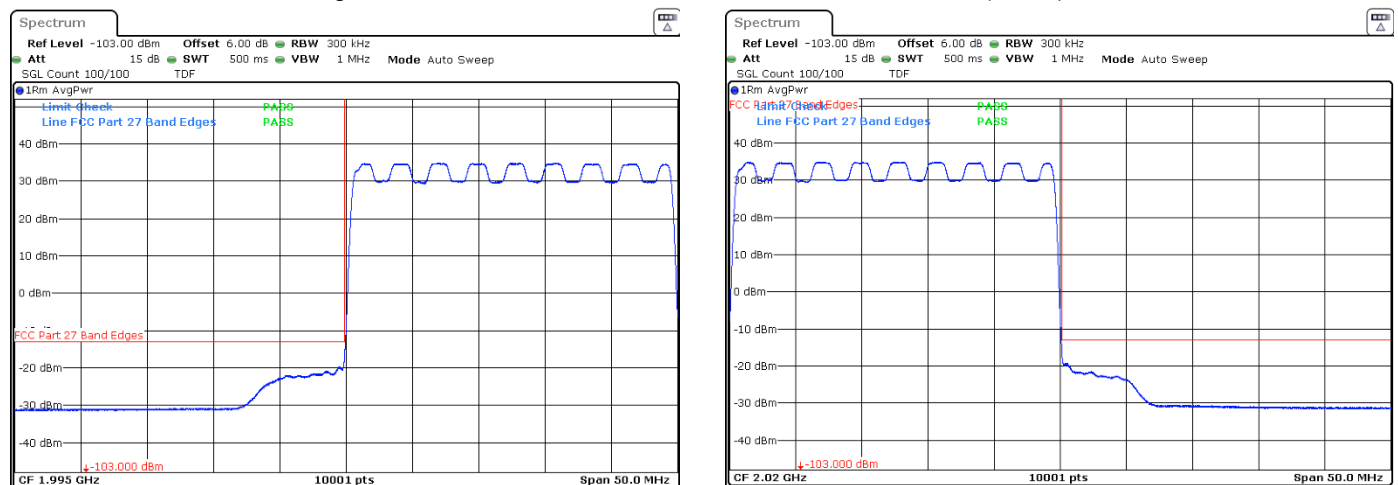


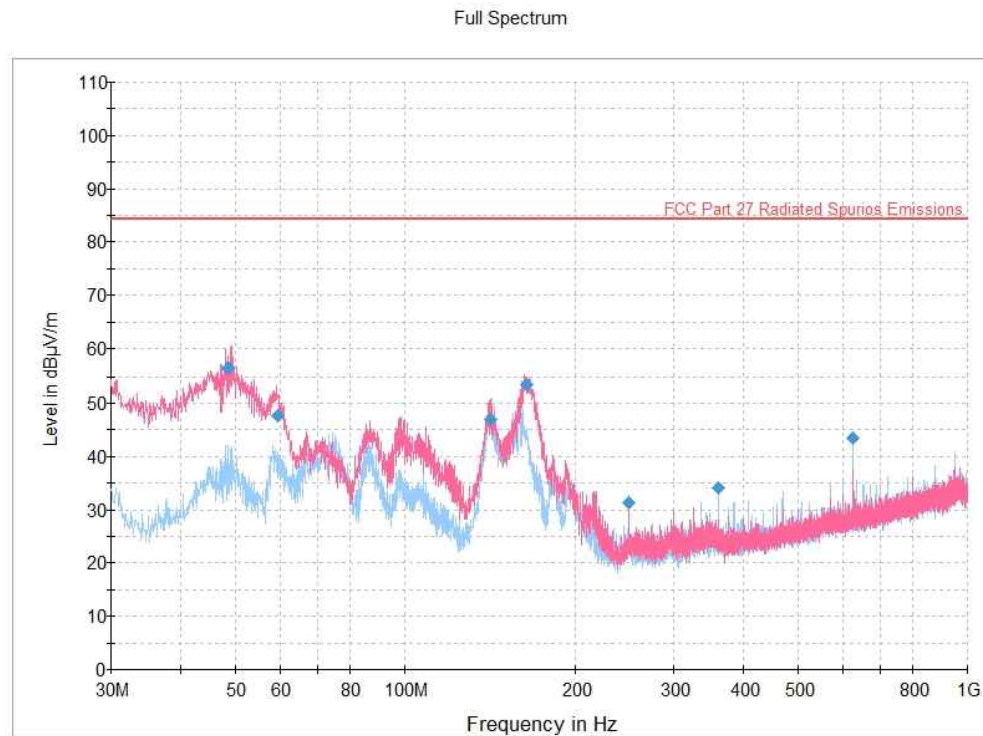
Figure 8.6-46: Conducted emission test, 16QAM Modulation, 2007.5 channel (25 MHz), band n70.



* Figure 8.6-47: Conducted emission test, band edges, 16QAM Modulation, 2007.5 channel (25 MHz), band n70.

***Note:** For this specific test the frequency limit has a frequency offset equivalent at $RBW/2$ (± 150 kHz from the low and high edge of the band), in order to compliance with the test. This offset was taken according to ANSI C63.26 Clause 5.7.2 (g) rules.

8.6.5 Test data, continued



The spectral plot shows the vertical (red plot) and horizontal (blue plot) scans separately. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).

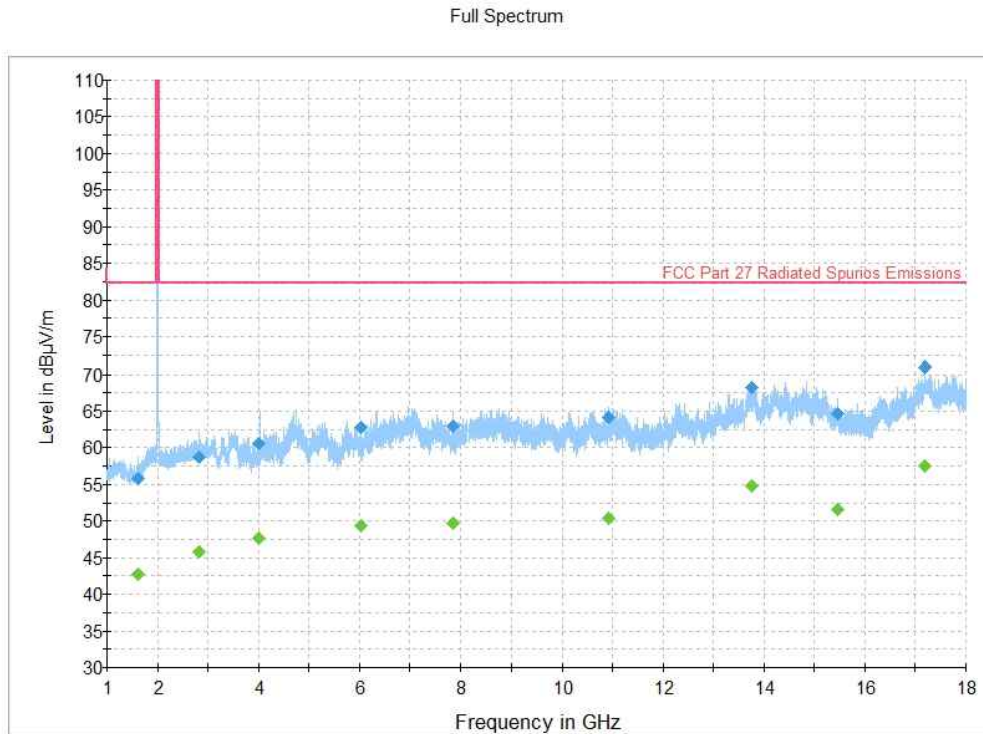
Figure 8.6-48: Emissions limit plot – Field strength measured from 0.030 to 1 GHz, 16QAM Modulation, 25 MHz OBW, 2007.5 MHz channel, band n70.

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
48.397500	56.45	84.38	27.93	5000.0	120.000	100.0	V	-1.0	16.7
59.419167	47.53	84.38	36.85	5000.0	120.000	100.0	V	44.0	12.7
141.479167	47.03	84.38	37.35	5000.0	120.000	258.0	H	176.0	19.6
163.767500	53.55	84.38	30.83	5000.0	120.000	100.0	V	39.0	18.5
249.988333	31.41	84.38	52.97	5000.0	120.000	156.0	H	149.0	20.9
360.002500	34.08	84.38	50.30	5000.0	120.000	117.0	H	195.0	24.2
625.014167	43.37	84.38	41.01	5000.0	120.000	118.0	H	87.0	29.4

Table 8.6-28: Emissions limit results – Field strength measured from 0.030 to 1 GHz, 16QAM Modulation, 25 MHz OBW, 2007.5 MHz channel, band n70.

- 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 The maximum measured value observed over a period of 5 seconds was recorded.
 - ⁴ The spectral plot shows the vertical and horizontal scan separately.
 - ⁵ This measurement was done at 3m

8.6.5 Test data, continued



The spectral plot is a summation of a vertical and horizontal scan. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).

Figure 8.6-49: Emissions limit plot – Field strength measured from 1 to 18 GHz, 16QAM Modulation, 25 MHz OBW, 2007.5 MHz channel, band n70.

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)
1610.450000	55.87	---	82.23	26.36	5000.0	1000.000	144.0	V	0.0	6.9
1610.450000	---	42.73	82.23	39.50	5000.0	1000.000	144.0	V	0.0	6.9
2826.500000	---	45.79	82.23	36.44	5000.0	1000.000	159.0	V	168.0	12.4
2826.500000	58.72	---	82.23	23.51	5000.0	1000.000	159.0	V	168.0	12.4
4014.200000	---	47.74	82.23	34.49	5000.0	1000.000	171.0	V	10.0	17.1
4014.200000	60.62	---	82.23	21.61	5000.0	1000.000	171.0	V	10.0	17.1
6026.800000	62.77	---	82.23	19.46	5000.0	1000.000	326.0	V	54.0	20.5
6026.800000	---	49.34	82.23	32.89	5000.0	1000.000	326.0	V	54.0	20.5
7859.600000	62.96	---	82.23	19.27	5000.0	1000.000	349.0	V	77.0	22.6
7859.600000	---	49.76	82.23	32.47	5000.0	1000.000	349.0	V	77.0	22.6
10926.650000	---	50.46	82.23	31.77	5000.0	1000.000	268.0	V	286.0	25.3
10926.650000	64.16	---	82.23	18.07	5000.0	1000.000	268.0	V	286.0	25.3
13744.850000	---	54.79	82.23	27.44	5000.0	1000.000	190.0	V	124.0	32.8
13744.850000	68.25	---	82.23	13.98	5000.0	1000.000	190.0	V	124.0	32.8
15454.700000	64.71	---	82.23	17.52	5000.0	1000.000	356.0	H	0.0	32.2
15454.700000	---	51.64	82.23	30.59	5000.0	1000.000	356.0	H	0.0	32.2
17180.650000	---	57.46	82.23	24.77	5000.0	1000.000	181.0	H	190.0	36.2
17180.650000	70.95	---	82.23	11.28	5000.0	1000.000	181.0	H	190.0	36.2

Table 8.6-29: Emissions limit results – Field strength measured from 1 to 18 GHz, 16QAM Modulation, 25 MHz OBW, 2007.5 MHz channel, band n70.

Notes:

¹ Field strength (dBμV/m) = receiver/spectrum analyzer value (dBμV) + correction factor (dB)

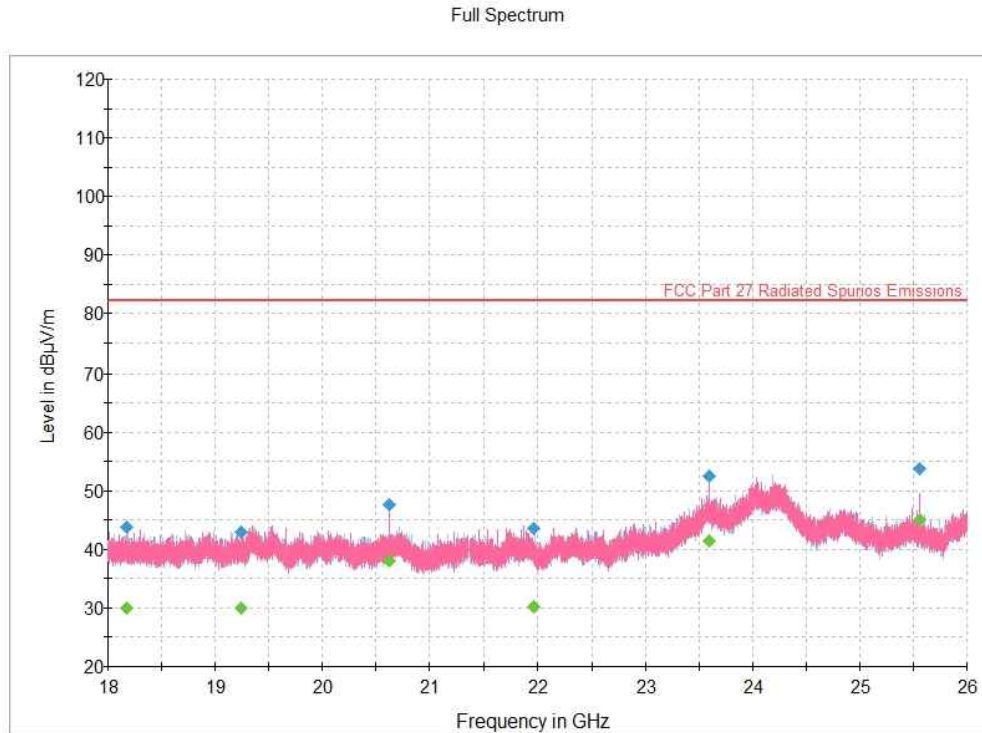
² Correction factors = antenna factor ACF (dB) + cable loss (dB)+20 dB attenuator to protect the test equipment

³ The maximum measured value observed over a period of 5 seconds was recorded.

⁴ The spectral plot is a summation of a vertical and horizontal scan.

⁵ This measurement was done at 3m

8.6.5 Test data, continued



The spectral plot shows the vertical (red plot) and horizontal (blue plot) scans separately. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).

Figure 8.6-50: Emissions limit plot – Field strength measured from 18 to 26 GHz, 16QAM Modulation, 25 MHz OBW, 2007.5 MHz channel, band n70.

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)
18174.333333	43.72	---	82.23	38.51	5000.0	1000.000	165.0	H	40.0	17.3
18174.333333	---	29.98	82.23	52.25	5000.0	1000.000	165.0	H	40.0	17.3
19237.400000	---	30.07	82.23	52.16	5000.0	1000.000	315.0	H	86.0	18.2
19237.400000	42.98	---	82.23	39.25	5000.0	1000.000	315.0	H	86.0	18.2
20625.266667	---	38.11	82.23	44.12	5000.0	1000.000	147.0	V	254.0	19.5
20625.266667	47.63	---	82.23	34.60	5000.0	1000.000	147.0	V	254.0	19.5
21958.866667	---	30.14	82.23	52.09	5000.0	1000.000	139.0	H	332.0	19.1
21958.866667	43.59	---	82.23	38.64	5000.0	1000.000	139.0	H	332.0	19.1
23592.866667	---	41.44	82.23	40.79	5000.0	1000.000	139.0	V	248.0	25.9
23592.866667	52.55	---	82.23	29.68	5000.0	1000.000	139.0	V	248.0	25.9
25559.000000	53.80	---	82.23	28.43	5000.0	1000.000	100.0	V	132.0	24.3
25559.000000	---	45.02	82.23	37.21	5000.0	1000.000	100.0	V	132.0	24.3

Table 8.6-30: Emissions limit results – Field strength measured from 18 to 26 GHz, 16QAM Modulation, 25 MHz OBW, 2007.5 MHz channel, band n70.

- 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 The maximum measured value observed over a period of 5 seconds was recorded.
 - ⁴ The spectral plot shows the vertical and horizontal scan separately.
 - ⁵ This measurement was done at 3m

8.7 FCC 27.55 Frequency stability

8.7.1 Definitions and limits

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

8.7.2 Test summary

Test date	June 18, 2021 June 21, 2021	Temperature	21 °C 20 °C
Test engineer	Martha Espinoza	Air pressure	1003; 1008 mbar
Verdict	Pass	Relative humidity	52 %; 58 %

8.7.3 Observations, settings and special notes

99% Occupied bandwidth function was used for calculating the center frequency in each case. An unmodulated signal was used in each band, selecting the middle channel in both cases. The ppm was calculated only for reference. None requirement was specified by FCC Part 27, except stays on the band.

8.7.4 Test data

Table 8.7-1: Frequency tolerance measurements, band n66

Test conditions	Frequency, MHz	ppm
+55 °C, Nominal	2154.996407	-0.58
+50 °C, Nominal	2154.996250	-0.51
+40 °C, Nominal	2154.996250	-0.51
+30 °C, Nominal	2154.995782	-0.29
+20 °C, 58 VDC	2154.995938	-0.36
+20 °C, 55.20 VDC (+15 %)	2154.995938	-0.36
+20 °C, Nominal	2154.995157	Reference
+20 °C, 40.80 VDC (-15 %)	2154.995938	-0.36
+20 °C, 36 VDC	2154.995938	-0.36
+10 °C, Nominal	2154.995782	-0.29
0 °C, Nominal	2154.995782	-0.29
-10 °C, Nominal	2154.995938	-0.36
-20 °C, Nominal	2154.995938	-0.36
-30 °C, Nominal	2154.995938	-0.36
-40 °C, Nominal	2154.995938	-0.36

8.7.4 Test data, continued

Table 8.7-2: Frequency tolerance measurements, band n70

Test conditions	Frequency, MHz	ppm
+55 °C, Nominal	2007.499844	-0.08
+50 °C, Nominal	2007.500000	-0.16
+40 °C, Nominal	2007.500000	-0.16
+30 °C, Nominal	2007.499844	-0.08
+20 °C, 58 VDC	2007.499844	-0.08
+20 °C, 55.20 VDC (+15 %)	2007.499844	-0.08
+20 °C, Nominal	2007.499688	Reference
+20 °C, 40.80 VDC (-15 %)	2007.499688	0.00
+20 °C, 36 VDC	2007.499688	0.00
+10 °C, Nominal	2007.499844	-0.08
0 °C, Nominal	2007.499844	-0.08
-10 °C, Nominal	2007.499844	-0.08
-20 °C, Nominal	2007.499844	-0.08
-30 °C, Nominal	2007.499844	-0.08
-40 °C, Nominal	2007.499844	-0.08

Block diagrams of test set-ups

8.8 Radiated emissions set-up

