Test report

REP138950-1R1TRFWL

Date of issue: March 30, 2026

Applicant:

TrellisWare Technologies, Inc.

Product:

Handheld Radio

Model:

TW-750

Variant(s):

None

FCC ID:

2A6X2-750

Specifications:

- FCC 47 CFR Part 27, Miscellaneous Wireless Communications Services

Nemko USA Inc., a testing laboratory, is accredited by ANAB. The tests included in this report are within the scope of this accreditation.

Lab and test locations

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FCC Site Number	Test Firm Registration Number: 214630; Designation Number: US3165
ISED Test Site	2040B

Tested by	Lan Sayasane, Sr. EMC Test Engineer
Reviewed by	James Cunningham, EMC/WL Manager
Review date	March 30, 2026
Reviewer signature	James.Cunningham Digitally signed by James.Cunningham DN: cn=James.Cunningham, email=James.Cunningham@nemko.com Reason: I am approving this document Date: 2026.03.30 14:32:07 -07'00'

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.

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Section 1 Report summary

1.1 Test specifications

FCC 47 CFR Part 27	Miscellaneous Wireless Communications Services
ANSI C63.26: 2015	American National Standard of Procedures for Compliance Testing of Licensed Wireless Devices

1.2 Exclusions

None.

1.3 Statement of compliance

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

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

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

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

1.4 Test report revision history

Table 1.4-1: Test report revision history

Revision #	Issue Date	Details of changes made to test report
REP138950-1TRFWL	March 2, 2026	Original report issued
REP138950-1R1TRFWL	March 30, 2026	Update Section 3.4 Part Number form “N/A” with “ASY0750411” as requested by customer.

Section 2 Summary of test results

2.1 Sample information

Receipt date	15-Dec-25
Nemko sample ID number	PRJ0091632

2.2 Testing period

Test start date	16-Dec-25
Test end date	19-Feb-26

2.3 Test results

Table 2.3-1: FCC 47 CFR Part 27 results - 1390-1395 MHz and 1432-1435 MHz operation

Part	Test description	Verdict
§2.1033(c)(4)	Modulation type	Pass
§2.1049(h)	99% Occupied bandwidth	Pass
§27.50(e)	Output power	Pass
§27.53(j)	Spurious emissions at antenna terminals	Pass
§27.53(j)	Field strength of radiated spurious emissions	Pass
§27.54	Frequency stability	Pass

Notes: None

Table 2.3-2: FCC 47 CFR Part 27 results - 1695-1710 MHz operation

Part	Test description	Verdict
§2.1033(c)(4)	Modulation type	Pass
§2.1049(h)	99% Occupied bandwidth	Pass
§27.50(d)(4)	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 Disclaimer

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

3.2 Applicant

Company name	TrellisWare Technologies, Inc.
Address	10641 Scripps Summit Court, Ste. 100
City	San Diego
State	CA
Postal/Zip code	92121
Country	USA

3.3 Manufacturer

Company name	TrellisWare Technologies, Inc.
Address	10641 Scripps Summit Court, Ste. 100
City	San Diego
State	CA
Postal/Zip code	92121
Country	USA

3.4 EUT information

Product name	Handheld Radio
Model	TW-750
Variant(s)	None
Serial number	302299
Part number	ASY0750411
Power requirements	Battery: 3-4.2Vdc
Description/theory of operation	The TW-750 is a 2-Watt hand-held transceiver radio powered by Trellisware's TSM Mobile Ad-hoc Networking (MANET) Technology, a proprietary waveform which operates in the UHF/L/S bands for the purpose of secure voice communication, IP data networking and position location awareness.
Operational frequencies	1390-1395 MHz, 1432-1435 MHz and 1695-1710 MHz
Software details	Version: TSP-1.2.0 +ssh-b20
Modulation	CPM
Operational bandwidth(s)	1390-1395 MHz: 0.05, 1.2 and 3.6 MHz / 1432-1435 MHz: 0.05 and 1.2 MHz / 1695-1710 MHz: 0.05, 1.2 and 3.6 MHz
Antenna gain	2 dBi
Number of transmit antenna	1
Operating channels	1390-1395 MHz operation: • 0.05 MHz bandwidth operation: 1391 MHz, 1392.5 MHz, and 1394 MHz • 1.2 MHz bandwidth operation: 1392.5 MHz only • 3.6 MHz bandwidth operation: 1392.5 MHz only 1432-1435 MHz operation: • 0.05 MHz bandwidth operation: 1433 MHz, 1433.5 MHz, and 1434 MHz • 1.2 MHz bandwidth operation: 1433.5 MHz only 1695-1710 MHz operation: • 0.05 MHz bandwidth operation: 1696 MHz, 1705 MHz, and 1709 MHz • 1.2 MHz bandwidth operation: 1697 MHz, 1705 MHz, and 1708 MHz • 3.6 MHz bandwidth operation: 1699 MHz, 1705 MHz, and 1706 MHz

3.5 EUT exercise and monitoring details

EUT description of the methods used to exercise the EUT and all relevant ports:

- Use TW-750 preset via front screen or use the laptop to select frequency and its desire bandwidth (0.05, 1.2 or 3.6 MHz), then enable CW for each band before starting. All Tx is monitored through the ANT port.

EUT setup/configuration rationale:

- The EUT setup in a configuration that was expected to produce the highest amplitude emissions relative to the limit and that satisfy normal operation/installation practice by the end user.
- The type and construction of cables used in the measurement set-up were consistent with normal or typical use. Cables with mitigation features (for example, screening, tighter/more twists per length, ferrite beads) have been noted below:
  - None
- The EUT was setup in a manner that was consistent with its typical arrangement and use. The measurement arrangement of the EUT, local ancillary equipment and associated cabling was representative of normal practice. Any deviations from typical arrangements have been noted below:
  - None

3.6 EUT setup details

Table 3.6-1: EUT sub assemblies

Description	Brand name	Model/Part number	Serial number	Rev.
None	N/A	N/A	N/A	N/A

Table 3.6-2: EUT interface ports

Description	Qty.
USB	1
Antenna	1

Table 3.6-3: Support equipment

Description	Brand name	Model/Part number	Serial number	Rev.
Laptop	DELL	Latitude 7480	N/A	--
Multi-Function GNSS Simulator	Spectracom	GSG-5 Series/1212-0200-0600	201718	--

Table 3.6-4: Inter-connection cables

Cable description	From	To	Length (m)
USB (Use to set frequency, bandwidth and turn on Tx, then removed)	TW-750	Laptop	0.5

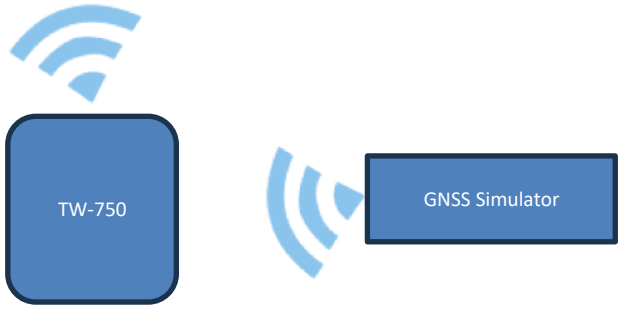

Figure 3.6-1: Test setup diagram

Section 4 Engineering considerations

4.1 Modifications incorporated in the EUT

None.

4.2 Technical judgement

None.

4.3 Deviations from laboratory test procedures

None.

Section 5 Test conditions

5.1 Atmospheric conditions

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

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

5.2 Power supply range

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

Section 6 Measurement uncertainty

6.1 Uncertainty of measurement

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: Uncertainty of measurement

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: Test equipment list

Equipment	Manufacturer	Model no.	Asset no.	Cal cycle	Next cal.
EMI Test Receiver	Rohde & Schwarz	ESU26.5	E1353	1 year	18-Dec-2026
System Controller	Sunol Sciences	SC104V	E1191	NCR	NCR
Antenna, Bilog	Schaffner	CBL 6111D	1763	2 years	16-Jul-2026
Antenna, DRG Horn	ETS-Lindgren	3117-PA	E1160	2 years	17-May-2026
EMI Test Receiver	Rohde & Schwarz	FSV3030	E1321	1 year	01-Jan-2026
Signal & Spectrum Analyzer	Rohde & Schwarz	FSW43	E1302	1 year	19-Mar-2026
Attenuator, 40dB	Centric RF	C18N100-40	N/A	NCR	NCR
Temperature Chamber	TestEquity	115A	E1162	1 year	25-Aug-2026

7.2 Test software list

Table 7.2-1: Test Software

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

Section 8 Testing data

8.1 Modulation type

8.1.1 References and limits

FCC §2.1033(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

Verdict	Pass		
Test date	December 16, 2025	Temperature	21 °C
Test engineer	Lan Sayasane, Sr. EMC Test Engineer	Air pressure	1009 mbar
Test location	☒ Wireless bench (conducted tests) ☐ 10 m semi-anechoic chamber (radiated tests) ☐ 3 m semi-anechoic chamber (radiated tests) ☐ Other:	Relative humidity	52 %

8.1.3 Observations, settings and special notes

None

8.1.4 Test data

Table 8.1-1: Modulation type

Frequency	Bandwidth (MHz)	Emission type
1391	0.05	CPM
1392.5	0.05	CPM
1394	0.05	CPM
1392.5	1.2	CPM
1392.5	3.6	CPM
1433	0.05	CPM
1433.5	0.05	CPM
1434	0.05	CPM
1433.5	1.2	CPM
1696	0.05	CPM
1705	0.05	CPM
1709	0.05	CPM
1697	1.2	CPM
1705	1.2	CPM
1708	1.2	CPM
1699	3.6	CPM
1705	3.6	CPM
1706	3.6	CPM

CPM: Continuous phase modulation

8.2 99% Occupied Bandwidth

8.2.1 References and limits

- FCC 47 CFR Part 2, §2.202 and §2.1049
- Test method: ANSI C63.26: 2015 §5.4.4

§2.202 and §2.1049
The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured.

8.2.2 Test summary

Verdict	Pass		
Test date	December 16, 2025 January 6, 2026	Temperature	21 °C
Test engineer	Lan Sayasane, Sr. EMC Test Engineer	Air pressure	1009 mbar
Test location	☒ Wireless bench (conducted tests) ☐ 10 m semi-anechoic chamber (radiated tests) ☐ 3 m semi-anechoic chamber (radiated tests) ☐ Other:	Relative humidity	52 %

8.2.3 Observations, settings and special notes

None

8.2.4 Setup details

EUT power input during test	Battery 3-4.2 Vdc
EUT setup configuration	☒ Table-top ☐ Floor standing ☐ Other:

Spectrum analyzer settings:

Resolution bandwidth	1 – 5% of OBW
Video bandwidth	> 3 x Resolution bandwidth
Detector mode	Peak
Trace mode	Max hold
Measurement time	Auto
Span	> 1.5 x OBW

8.2.5 Test data

Table 8.2-1: 99% Occupied Bandwidth test results

Frequency channel (MHz)	Modulation	Occupied Bandwidth Declared (MHz)	99% OBW (MHz)
1391	CPM	0.05	0.053
1392.5	CPM	0.05	0.052
1394	CPM	0.05	0.052
1392.5	CPM	1.2	1.199
1392.5	CPM	3.6	3.535
1433	CPM	0.05	0.053
1433.5	CPM	0.05	0.053
1434	CPM	0.05	0.052
1433.5	CPM	1.2	1.187
1696	CPM	0.05	0.053
1705	CPM	0.05	0.052
1709	CPM	0.05	0.052
1697	CPM	1.2	1.180
1705	CPM	1.2	1.187
1708	CPM	1.2	1.196
1699	CPM	3.6	3.591
1705	CPM	3.6	3.572
1706	CPM	3.6	3.556

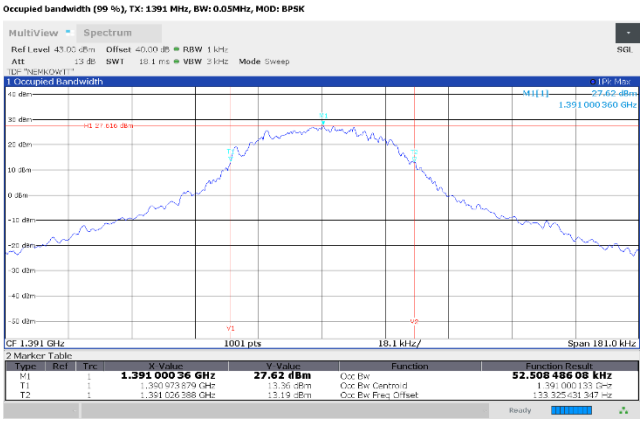

Figure 8.2-1: 99% Occupied Bandwidth, Low CH 1391 MHz, 0.05 MHz, CPM

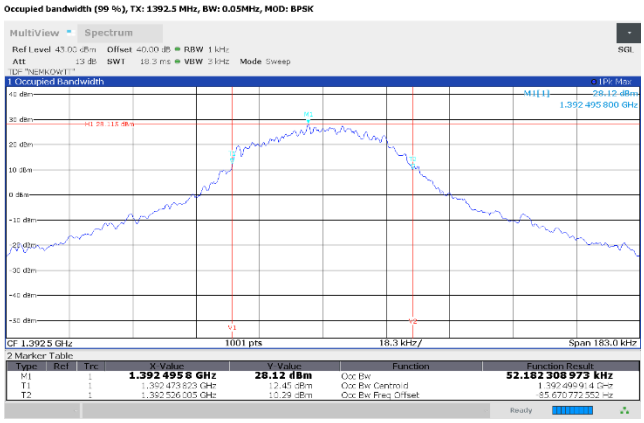

Figure 8.2-2: 99% Occupied Bandwidth, Mid CH 1392.5 MHz, 0.05 MHz, CPM

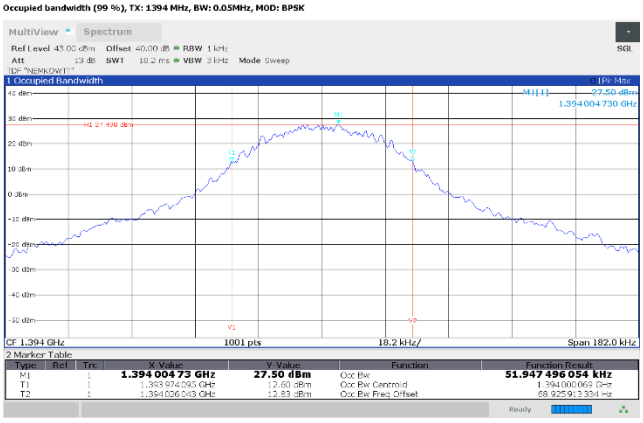

Figure 8.2-3: 99% Occupied Bandwidth, High CH 1394 MHz, 0.05 MHz, CPM

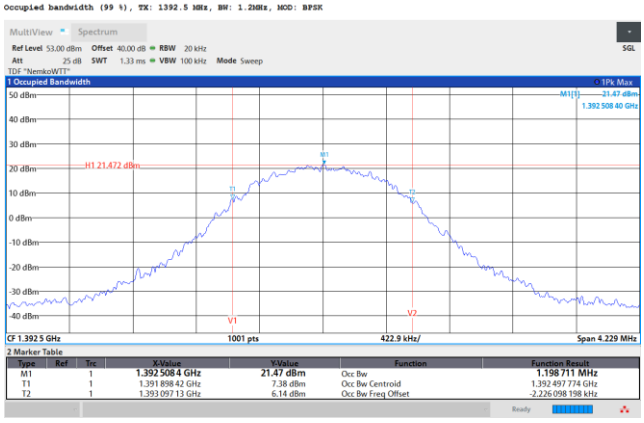

Figure 8.2-4: 99% Occupied Bandwidth, Mid CH 1392.5 MHz, 1.2 MHz, CPM

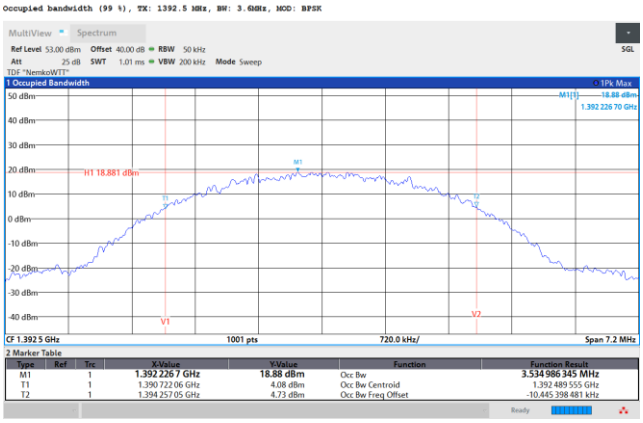

Figure 8.2-5: 99% Occupied Bandwidth, Mid CH 1392.5 MHz, 3.6 MHz, CPM

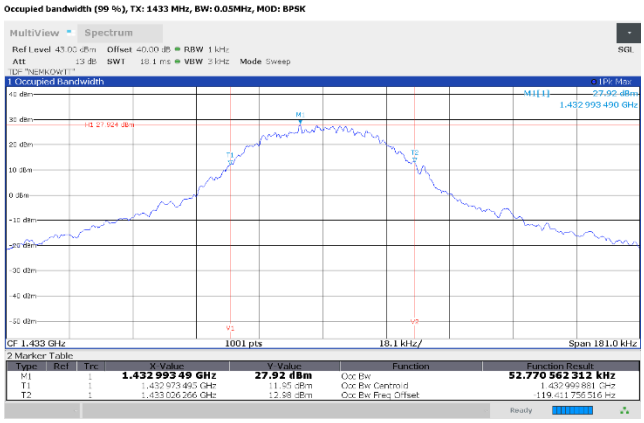

Figure 8.2-6: 99% Occupied Bandwidth, Low CH 1433 MHz, 0.05 MHz, CPM

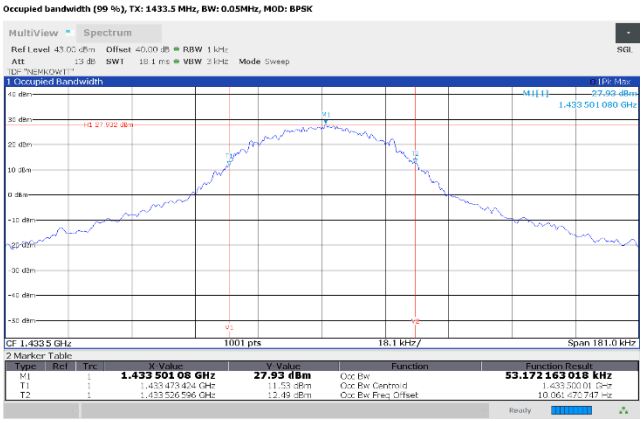

Figure 8.2-7: 99% Occupied Bandwidth, Mid CH 1433.5 MHz, 0.05 MHz, CPM

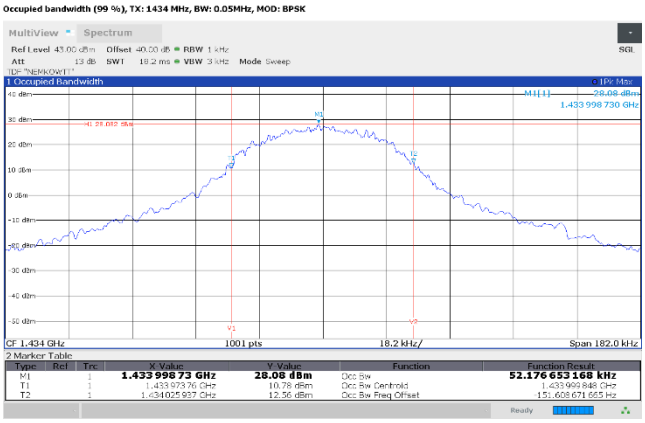

Figure 8.2-8: 99% Occupied Bandwidth, High CH 1434 MHz, 0.05 MHz, CPM

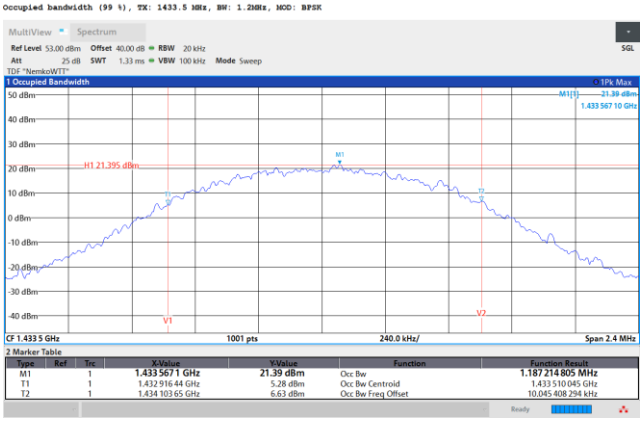

Figure 8.2-9: 99% Occupied Bandwidth, Mid CH 1433.5 MHz, 1.2 MHz, CPM

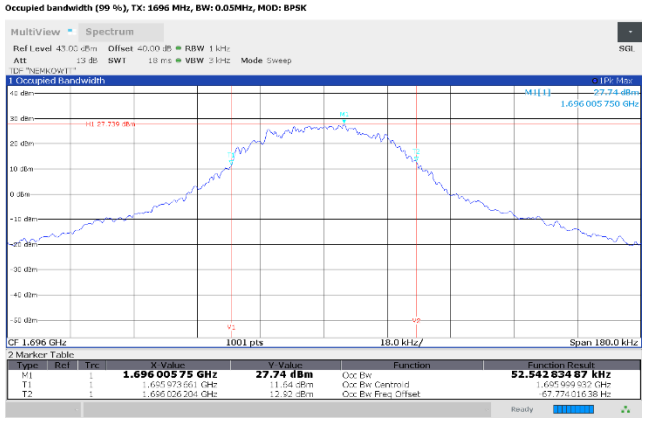

Figure 8.2-10: 99% Occupied Bandwidth, Low CH 1696 MHz, 0.05 MHz, CPM

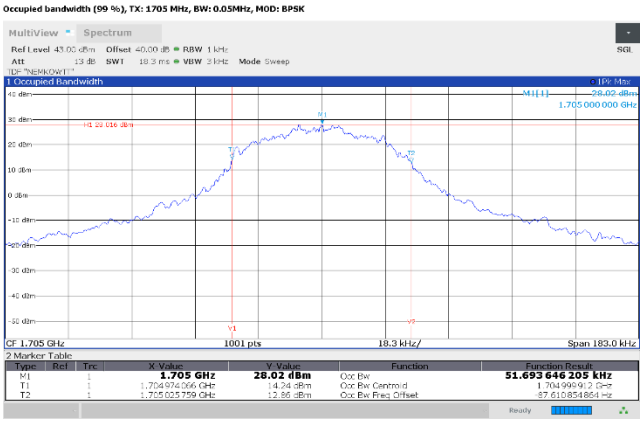

Figure 8.2-11: 99% Occupied Bandwidth, Mid CH 1705 MHz, 0.05 MHz, CPM

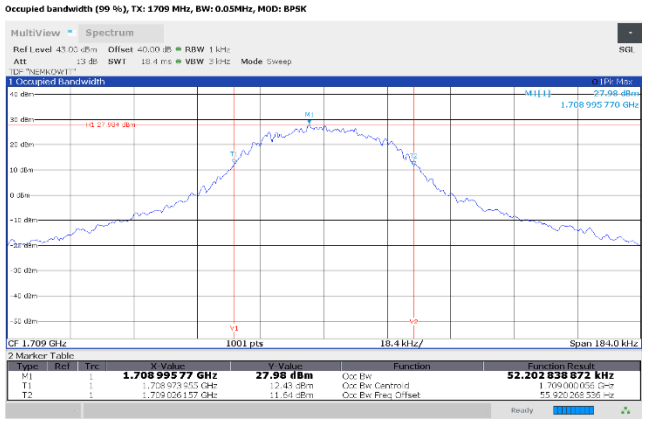

Figure 8.2-12: 99% Occupied Bandwidth, High CH 1709 MHz, 0.05 MHz, CPM

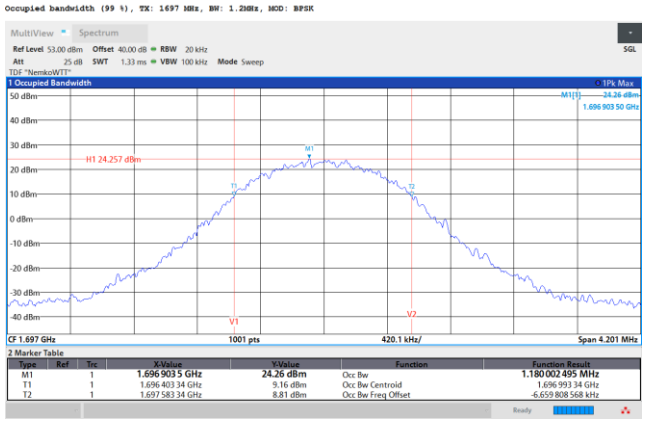

Figure 8.2-13: 99% Occupied Bandwidth, Low CH 1697 MHz, 1.2 MHz, CPM

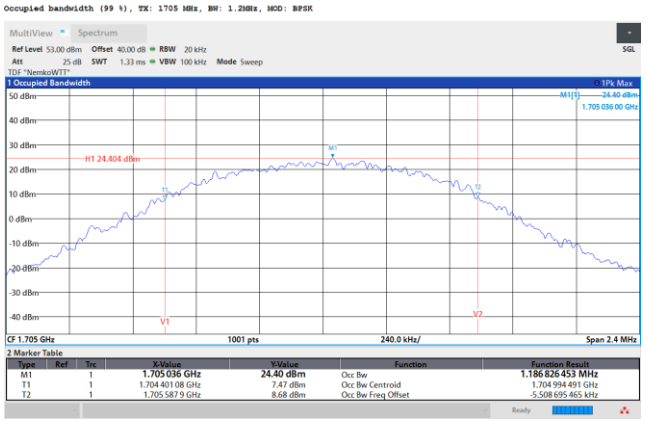

Figure 8.2-14: 99% Occupied Bandwidth, Mid CH 1705 MHz, 1.2 MHz, CPM

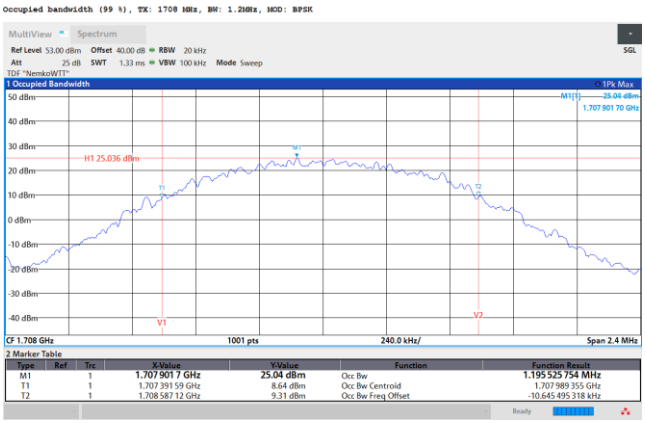

Figure 8.2-15: 99% Occupied Bandwidth, High CH 1708 MHz, 1.2 MHz, CPM

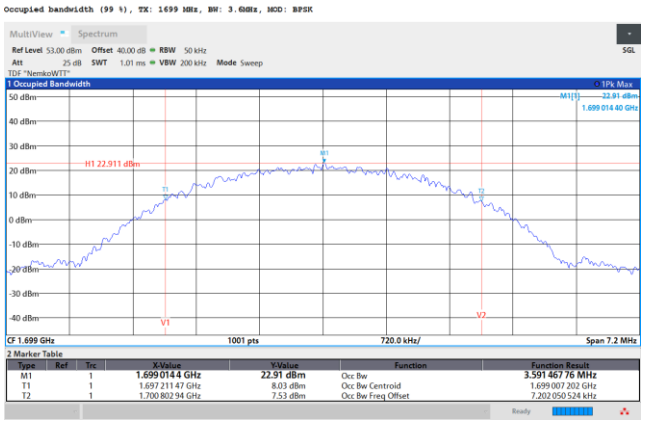

Figure 8.2-16: 99% Occupied Bandwidth, Low CH 1699 MHz, 3.6 MHz, CPM

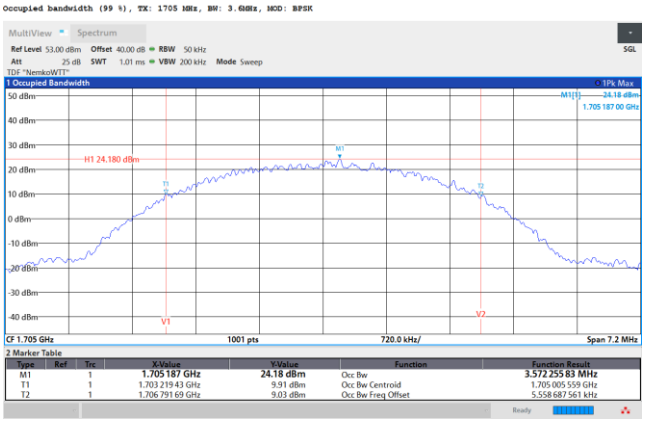

Figure 8.2-17: 99% Occupied Bandwidth, Mid CH 1705 MHz, 3.6 MHz, CPM

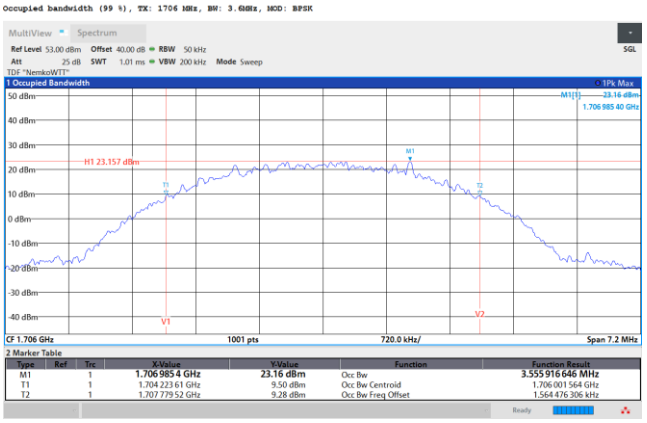

Figure 8.2-18: 99% Occupied Bandwidth, High CH 1706 MHz, 3.6 MHz, CPM

8.3 26 dB Occupied Bandwidth

8.3.1 Definitions and limits

For information only.
- Test method: ANSI C63.26: 2015 §5.4.3

8.3.2 Test summary

Verdict	Pass		
Test date	December 16, 2025 January 6, 2026	Temperature	21 °C
Test engineer	Lan Sayasane, Sr. EMC Test Engineer	Air pressure	1009 mbar
Test location	☒ Wireless bench (conducted tests) ☐ 10 m semi-anechoic chamber (radiated tests) ☐ 3 m semi-anechoic chamber (radiated tests) ☐ Other:	Relative humidity	52 %

8.3.3 Observations, settings and special notes

None

8.3.4 Test data

Table 8.3-1: 26 dB Occupied Bandwidth test results.

Frequency channel (MHz)	Modulation	Occupied Bandwidth Declared (MHz)	26 dB OBW (MHz)
1391	CPM	0.05	0.071
1392.5	CPM	0.05	0.068
1394	CPM	0.05	0.070
1392.5	CPM	1.2	1.505
1392.5	CPM	3.6	4.514
1433	CPM	0.05	0.070
1433.5	CPM	0.05	0.070
1434	CPM	0.05	0.071
1433.5	CPM	1.2	1.508
1696	CPM	0.05	0.065
1705	CPM	0.05	0.067
1709	CPM	0.05	0.068
1697	CPM	1.2	1.487
1705	CPM	1.2	1.588
1708	CPM	1.2	1.526
1699	CPM	3.6	4.644
1705	CPM	3.6	4.622
1706	CPM	3.6	4.558

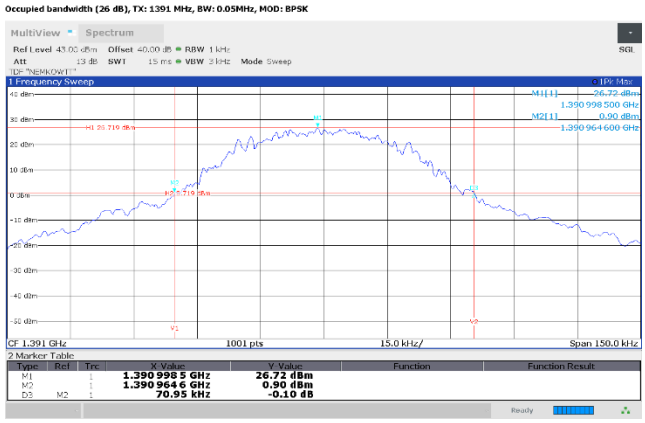

Figure 8.3-1: 26 dB Occupied Bandwidth, Low CH 1391 MHz, 0.05 MHz, CPM

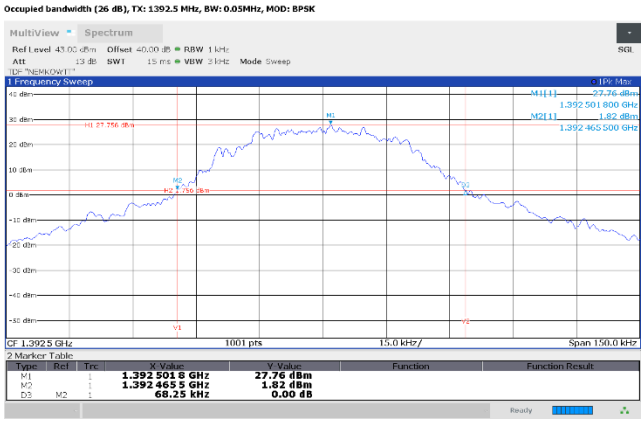

Figure 8.3-2: 26 dB Occupied Bandwidth, Mid CH 1392.5 MHz, 0.05 MHz, CPM

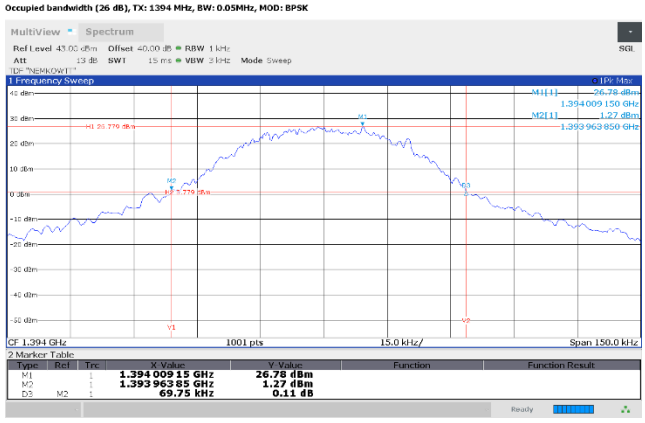

Figure 8.3-3: 26 dB Occupied Bandwidth, High CH 1394 MHz, 0.05 MHz, CPM

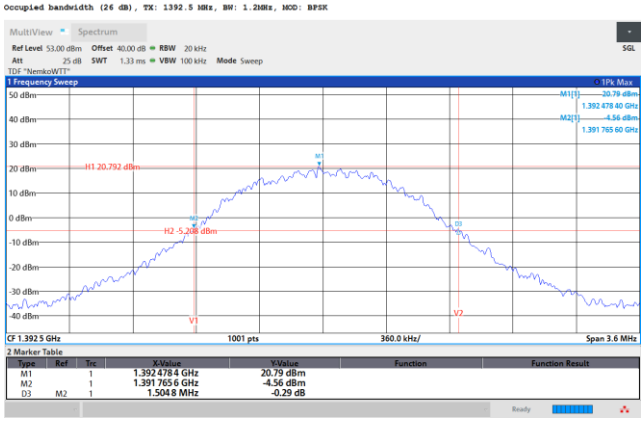

Figure 8.3-4: 26 dB Occupied Bandwidth, Mid CH 1392.5 MHz, 1.2 MHz, CPM

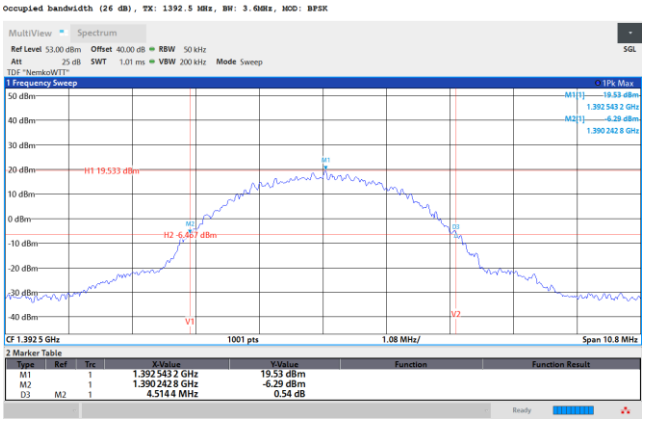

Figure 8.3-5: 26 dB Occupied Bandwidth, Mid CH 1392.5 MHz, 3.6 MHz, CPM

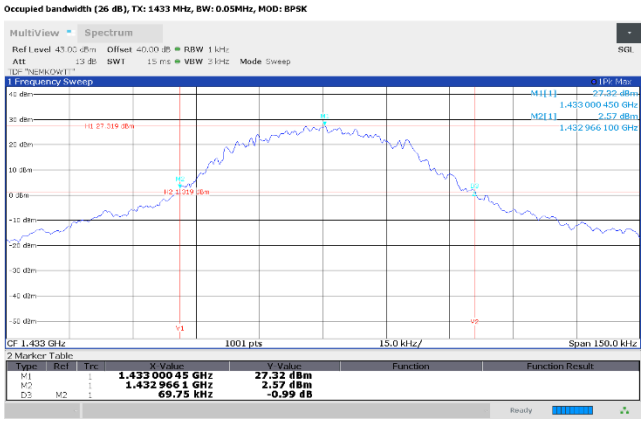

Figure 8.3-6: 26 dB Occupied Bandwidth, Low CH 1433 MHz, 0.05 MHz, CPM

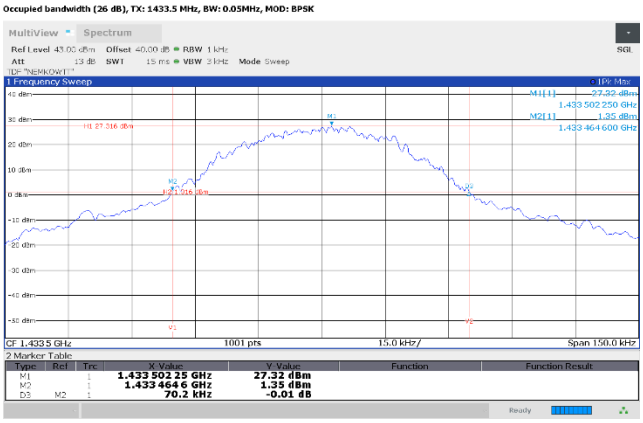

Figure 8.3-7: 26 dB Occupied Bandwidth, Mid CH 1433.5 MHz, 0.05 MHz, CPM

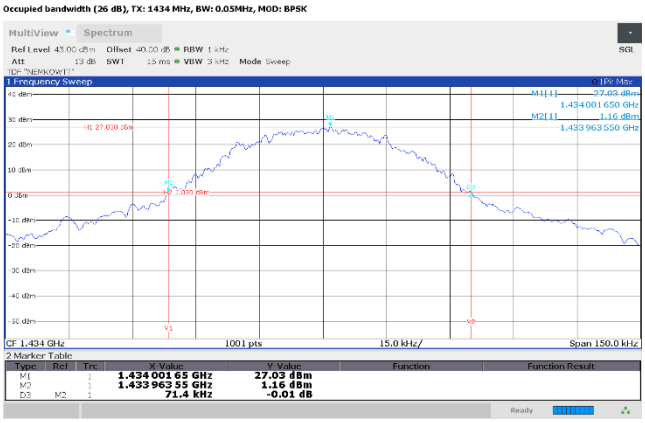

Figure 8.3-8: 26 dB Occupied Bandwidth, High CH 1434 MHz, 0.05 MHz, CPM

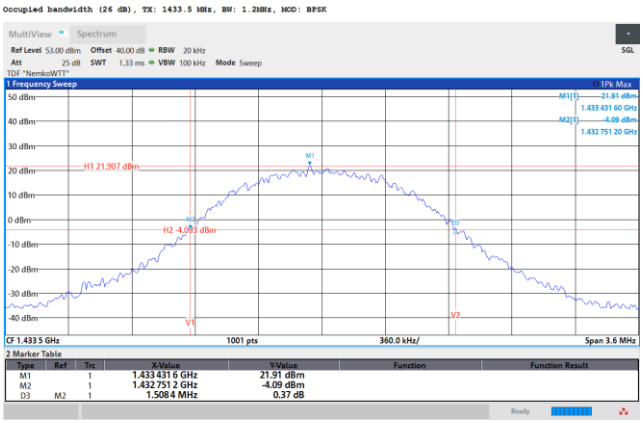

Figure 8.3-9: 26 dB Occupied Bandwidth, Mid CH 1433.5 MHz, 1.2 MHz, CPM

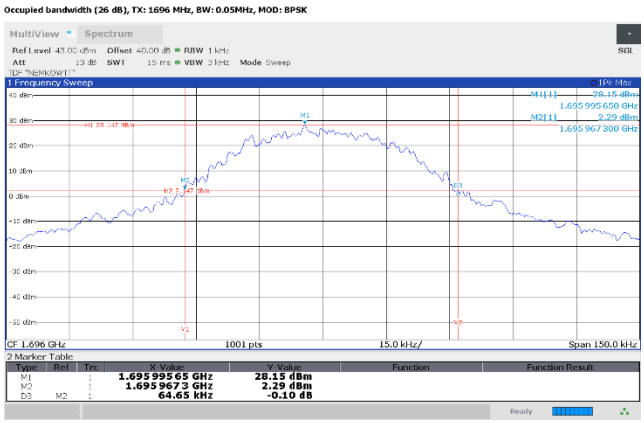

Figure 8.3-10: 26 dB Occupied Bandwidth, Low CH 1696 MHz, 0.05 MHz, CPM

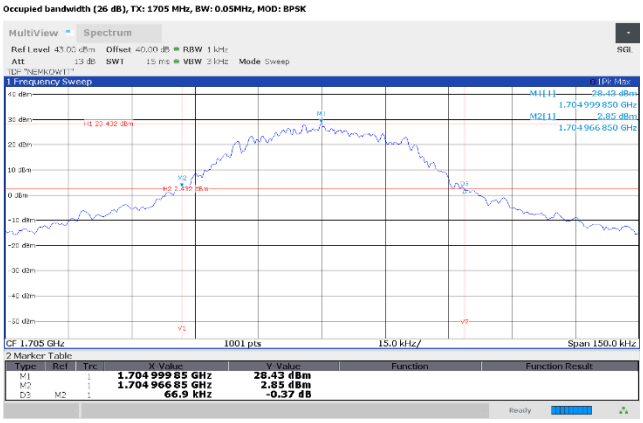

Figure 8.3-11: 26 dB Occupied Bandwidth, Mid CH 1705 MHz, 0.05 MHz, CPM

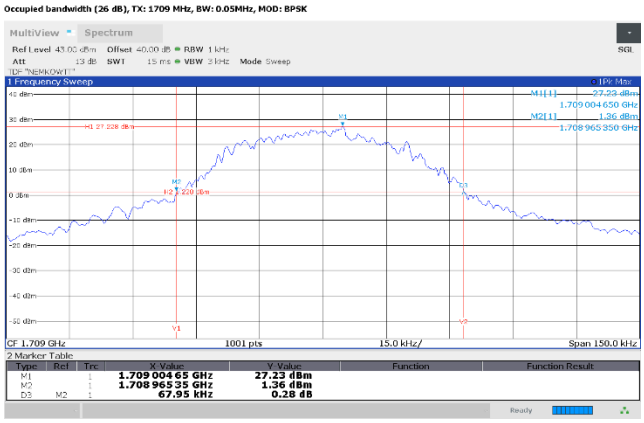

Figure 8.3-12: 26 dB Occupied Bandwidth, High CH 1709 MHz, 0.05 MHz, CPM

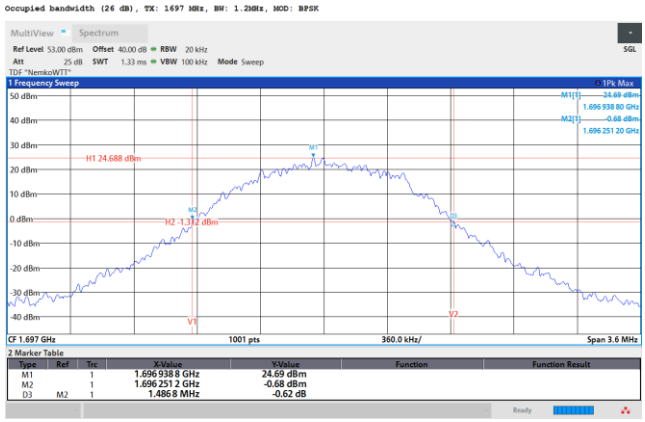

Figure 8.3-13: 26 dB Occupied Bandwidth, Low CH 1697 MHz, 1.2 MHz, CPM

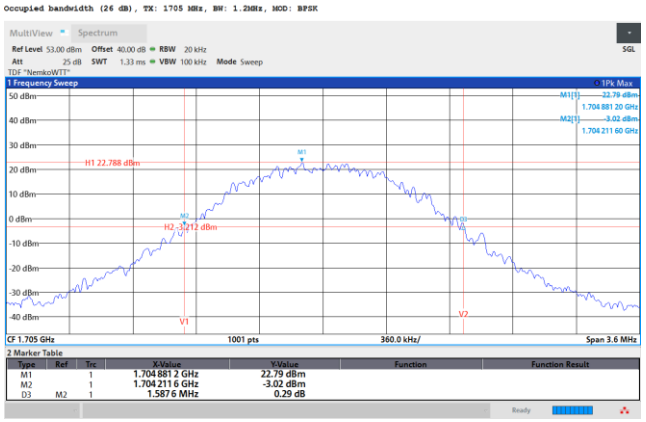

Figure 8.3-14: 26 dB Occupied Bandwidth, Mid CH 1705 MHz, 1.2 MHz, CPM

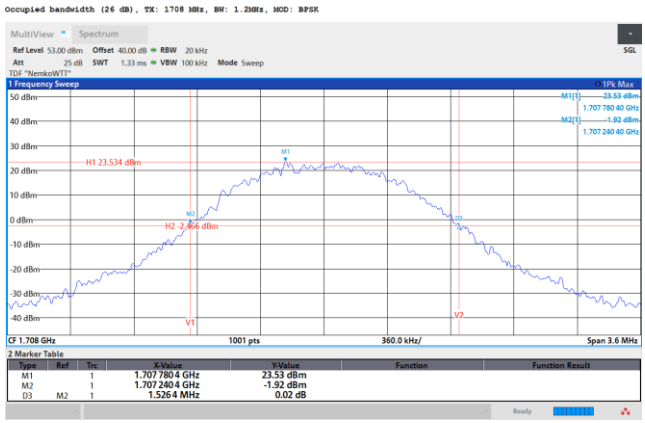

Figure 8.3-15: 26 dB Occupied Bandwidth, High CH 1708 MHz, 1.2 MHz, CPM

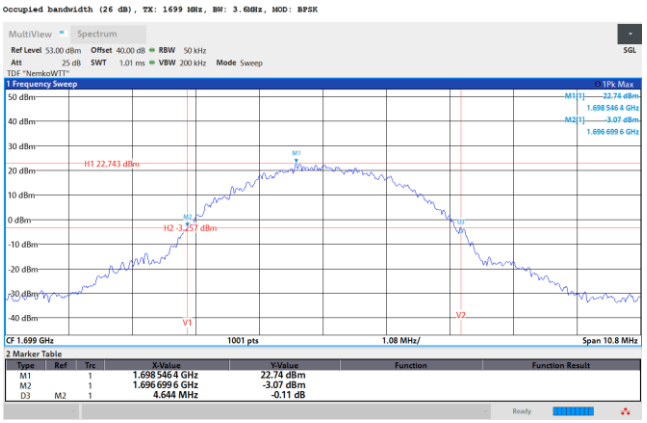

Figure 8.3-16: 26 dB Occupied Bandwidth, Low CH 1699 MHz, 3.6 MHz, CPM

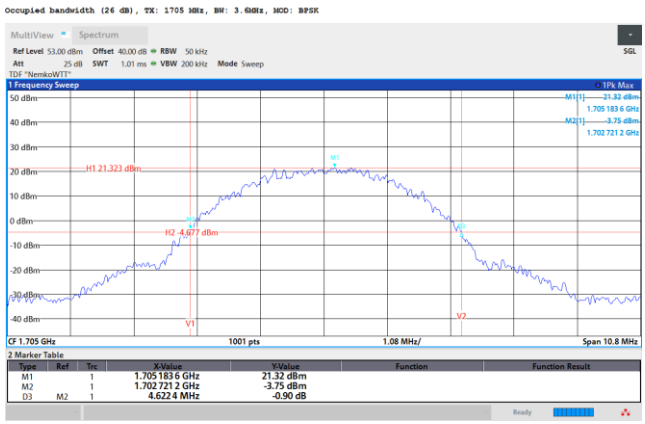

Figure 8.3-17: 26 dB Occupied Bandwidth, Mid CH 1705 MHz, 3.6 MHz, CPM

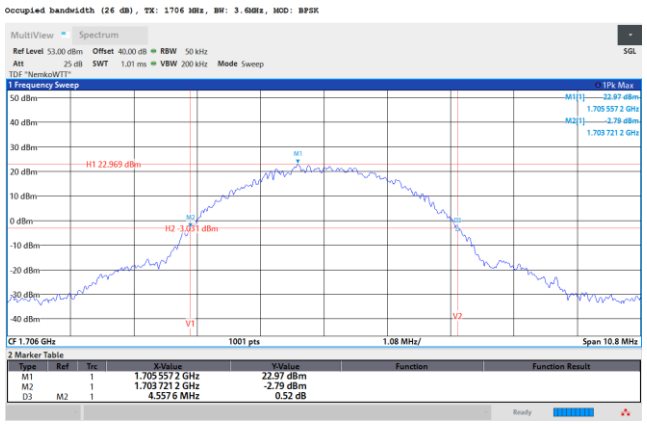

Figure 8.3-18: 26 dB Occupied Bandwidth, High CH 1706 MHz, 3.6 MHz, CPM

8.4 Output power

8.4.1 Definitions and limits

1392-1395 MHz and 1432-1435 MHz operation:

§27.50(e) The following power limits apply to the paired 1392-1395 MHz and 1432-1435 MHz bands as well as the unpaired 1390-1392 MHz band (1.4 GHz band):

(1) Fixed stations transmitting in the 1390-1392 MHz and 1432-1435 MHz bands are limited to 2000 watts EIRP peak power. Fixed stations transmitting in the 1392-1395 MHz band are limited to 100 watts EIRP peak power.

(2) Mobile stations transmitting in the 1390-1392 MHz and 1432-1435 MHz bands are limited to 4 watts EIRP peak power. Mobile stations transmitting in the1392-1395 MHz band are limited to 1 watt EIRP peak power.

1695-1710 MHz operation:

§27.50(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:

(4) Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP. Fixed stations operating in the 1710-1755 MHz band are limited to a maximum antenna height of 10 meters above ground. Mobile and portable stations operating in these bands must employ a means for limiting power to the minimum necessary for successful communications.

8.4.2 Test summary

Verdict	Pass		
Test date	December 16, 2025 January 6, 2026	Temperature	21 °C
Test engineer	Lan Sayasane, Sr. EMC Test Engineer	Air pressure	1009 mbar
Test location	☒ Wireless bench (conducted tests) ☐ 10 m semi-anechoic chamber (radiated tests) ☐ 3 m semi-anechoic chamber (radiated tests) ☐ Other:	Relative humidity	52 %

8.4.3 Observations, settings and special notes

An offset was added via transducer factor to compensate for the losses from the cable and attenuator (40 dB) used.

Conducted power measurements were performed according to ANSI C63.26 Clause 5.2.4.4 as a conducted antenna port measurement. Declared antenna gain was added to yield EIRP.

8.4.1 Test data

Table 8.4-1: Output power results.

Frequency (MHz)	Modulation	Channel Bandwidth (MHz)	Conducted power (dBm)	Antenna gain (dBi)	EIRP (dBm)	EIRP (Watts)	Limit (Watts)
1391	CPM	0.05	29.33	2	31.33	1.35	4.00
1392.5	CPM	0.05	26.25	2	28.25	0.67	1.00
1394	CPM	0.05	26.24	2	28.24	0.67	1.00
1392.5	CPM	1.2	27.87	2	29.87	0.97	1.00
1392.5	CPM	3.6	27.25	2	29.25	0.84	1.00
1433	CPM	0.05	29.42	2	31.42	1.39	4.00
1433.5	CPM	0.05	29.44	2	31.44	1.39	4.00
1434	CPM	0.05	29.46	2	31.46	1.40	4.00
1433.5	CPM	1.2	27.97	2	29.97	0.99	4.00
1696	CPM	0.05	26.57	2	28.57	0.72	1.00
1705	CPM	0.05	26.52	2	28.52	0.71	1.00
1709	CPM	0.05	26.56	2	28.56	0.72	1.00
1697	CPM	1.2	25.06	2	27.06	0.51	1.00
1705	CPM	1.2	25.16	2	27.16	0.52	1.00
1708	CPM	1.2	25.12	2	27.12	0.52	1.00
1699	CPM	3.6	25.24	2	27.24	0.53	1.00
1705	CPM	3.6	25.15	2	27.15	0.52	1.00
1706	CPM	3.6	25.33	2	27.33	0.54	1.00

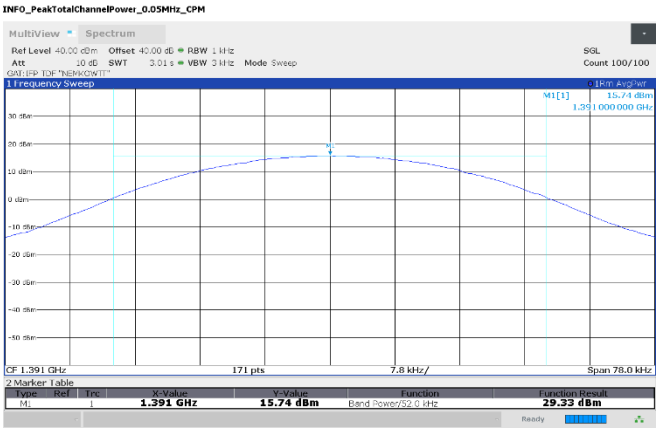

Figure 8.4-1: Output power, Low CH 1391 MHz, 0.05 MHz, CPM

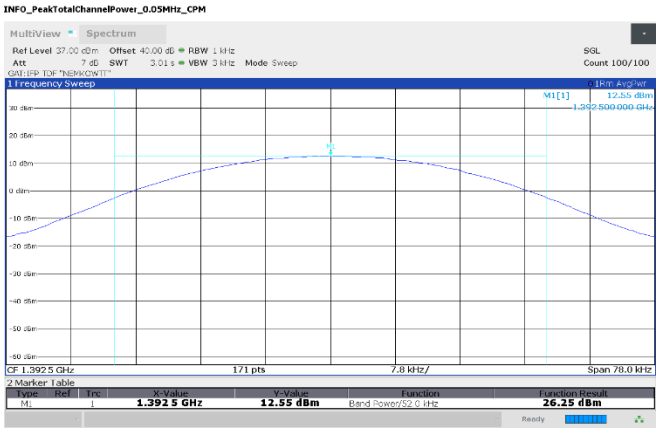

Figure 8.4-2: Output power, Mid CH 1392.5 MHz, 0.05 MHz, CPM

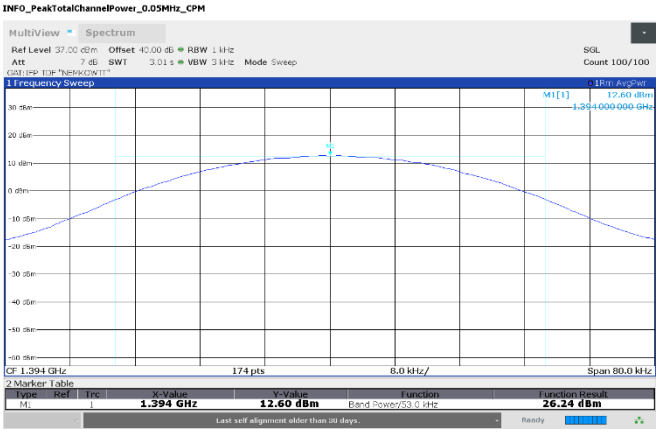

Figure 8.4-3: Output power, High CH 1394 MHz, 0.05 MHz, CPM

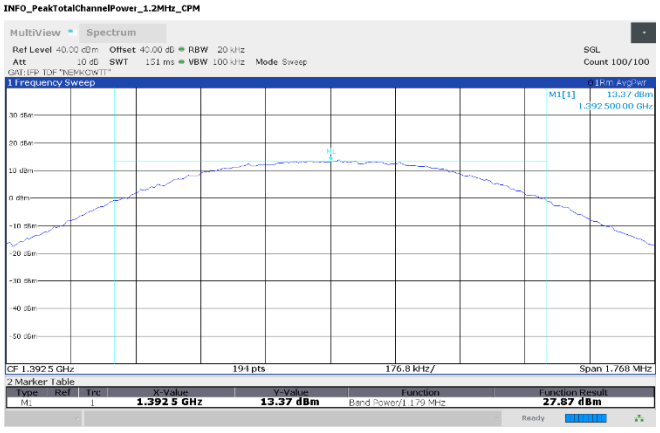

Figure 8.4-4: Output power, Mid CH 1392.5 MHz, 1.2 MHz, CPM

Figure 8.4-5: Output power, Mid CH 1392.5 MHz, 3.6 MHz, CPM

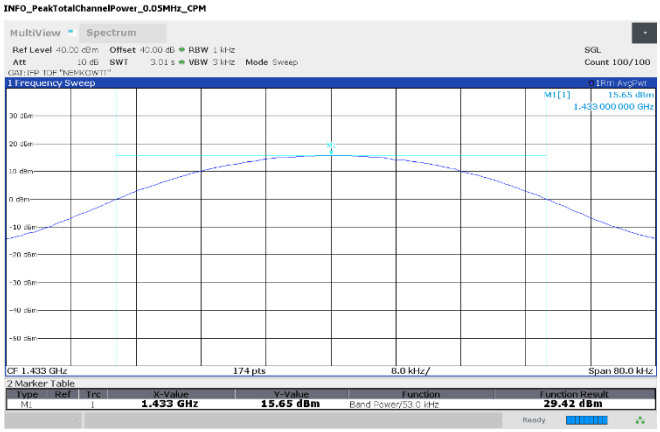

Figure 8.4-6: Output power, Low CH 1433 MHz, 0.05 MHz, CPM

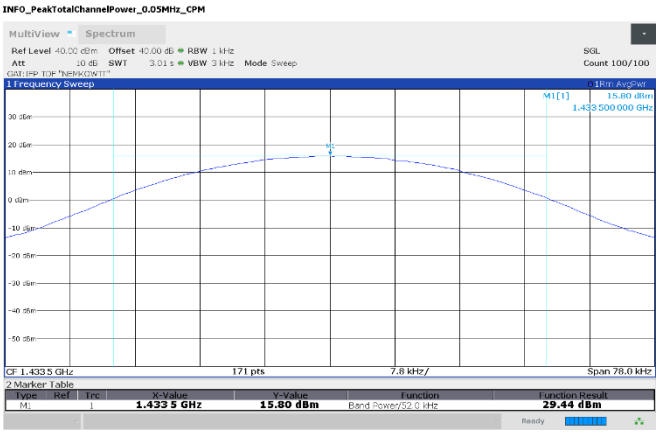

Figure 8.4-7: Output power, Mid CH 1433.5 MHz, 0.05 MHz, CPM

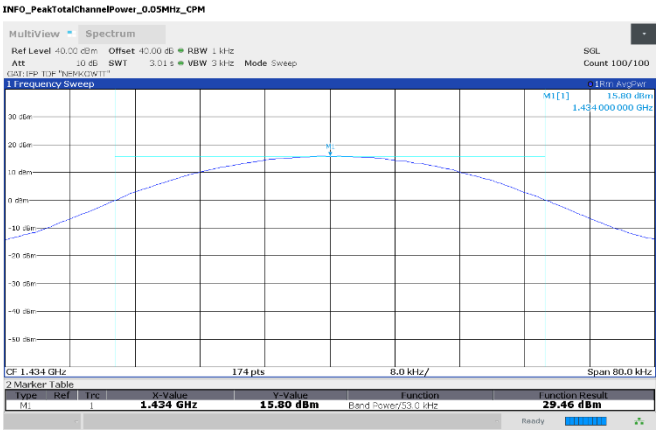

Figure 8.4-8: Output power, High CH 1434 MHz, 0.05 MHz, CPM

Figure 8.4-9: Output power, Mid CH 1433.5 MHz, 1.2 MHz, CPM

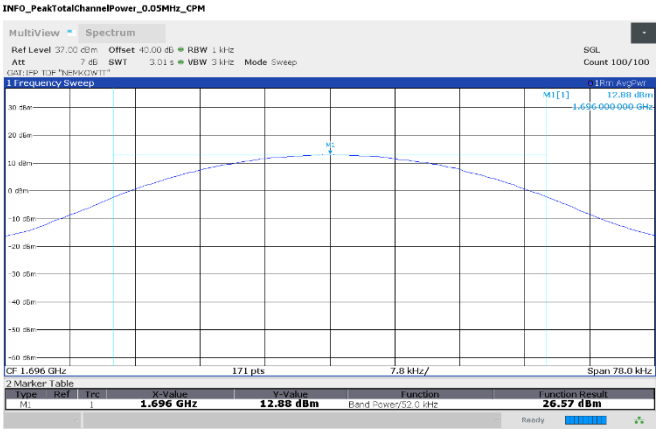

Figure 8.4-10: Output power, Low CH 1696 MHz, 0.05 MHz, CPM

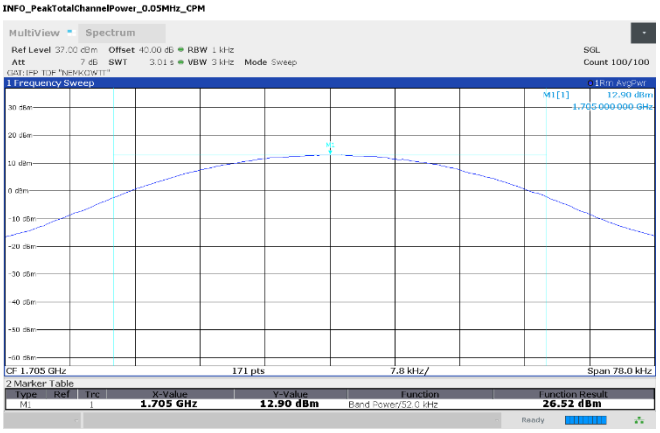

Figure 8.4-11: Output power, Mid CH 1705 MHz, 0.05 MHz, CPM

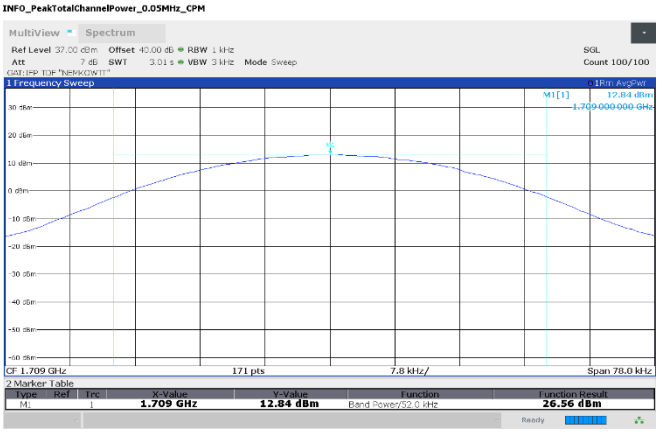

Figure 8.4-12: Output power, High CH 1709 MHz, 0.05 MHz, CPM

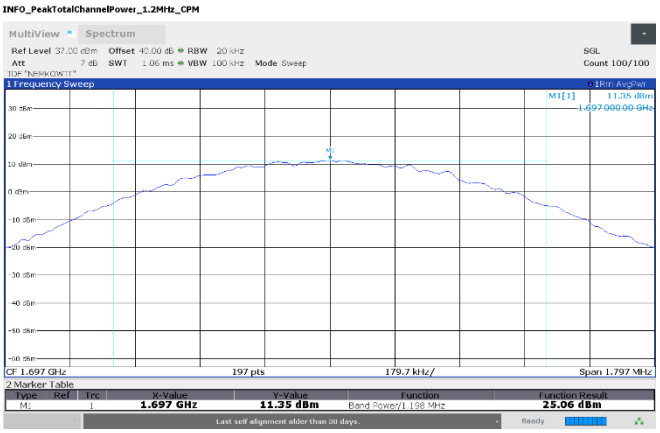

Figure 8.4-13: Output power, Low CH 1697 MHz, 1.2 MHz, CPM

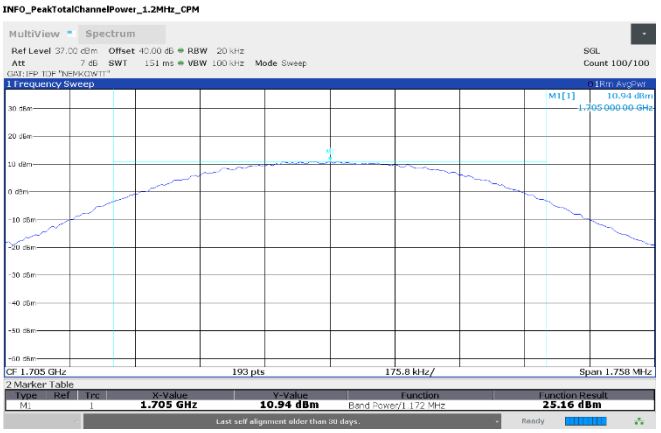

Figure 8.4-14: Output power, Mid CH 1705 MHz, 1.2 MHz, CPM

Figure 8.4-15: Output power, High CH 1708 MHz, 1.2 MHz, CPM

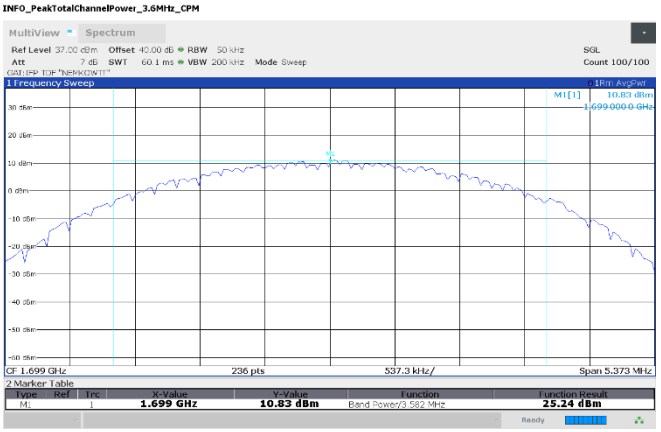

Figure 8.4-16: Output power, Low CH 1699 MHz, 3.6 MHz, CPM

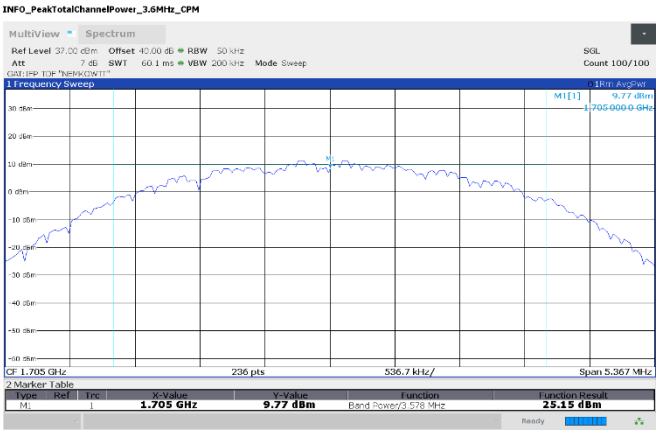

Figure 8.4-17: Output power, Mid CH 1705 MHz, 3.6 MHz, CPM

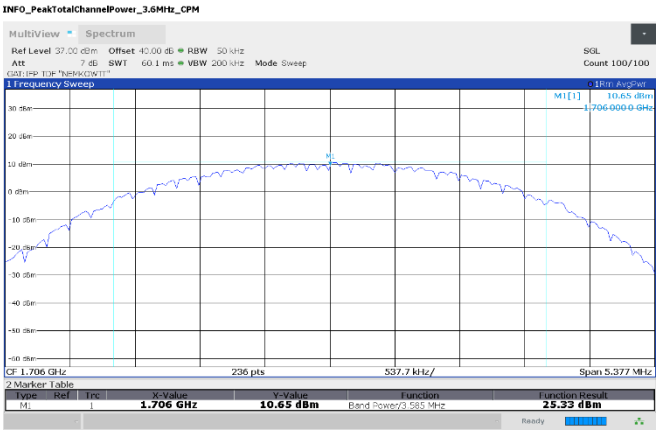

Figure 8.4-18: Output power, High CH 1706 MHz, 3.6 MHz, CPM

8.5 Peak to average power ratio

8.5.1 Definitions and limits

§ 27.50(d)(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.

Applicable to 1695 – 1710 MHz operation only.

8.5.2 Test summary

Verdict	Pass		
Test date	December 16, 2025 January 7, 2026	Temperature	21 °C
Test engineer	Lan Sayasane, Sr. EMC Test Engineer	Air pressure	1009 mbar
Test location	☒ Wireless bench (conducted tests) ☐ 10 m semi-anechoic chamber (radiated tests) ☐ 3 m semi-anechoic chamber (radiated tests) ☐ Other:	Relative humidity	52 %

8.5.3 Observations, settings and special notes

None

8.5.4 Test data

Table 8.5-1: Peak to average power ratio test results.

Frequency channel (MHz)	Modulation	Occupied Bandwidth Declared (MHz)	PAPR 0.1% (dB)	Limit (dB)
1705	CPM	0.05	0.68	13
1709	CPM	0.05	0.68	13
1697	CPM	1.2	2.00	13
1705	CPM	1.2	2.08	13
1708	CPM	1.2	2.06	13
1699	CPM	3.6	9.33	13
1705	CPM	3.6	9.13	13
1706	CPM	3.6	9.32	13

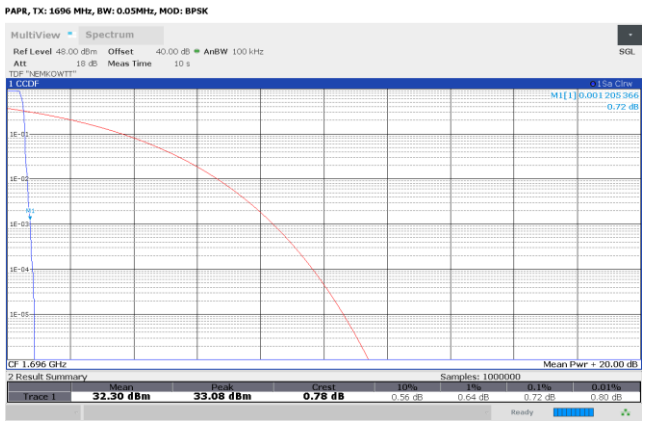

Figure 8.5-1: Peak to average power ratio, Low CH 1696 MHz, 0.05 MHz, CPM

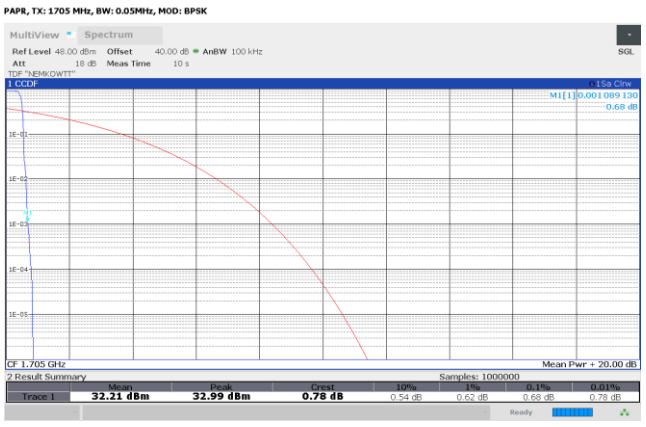

Figure 8.5-2: Peak to average power ratio, Mid CH 1705 MHz, 0.05 MHz, CPM

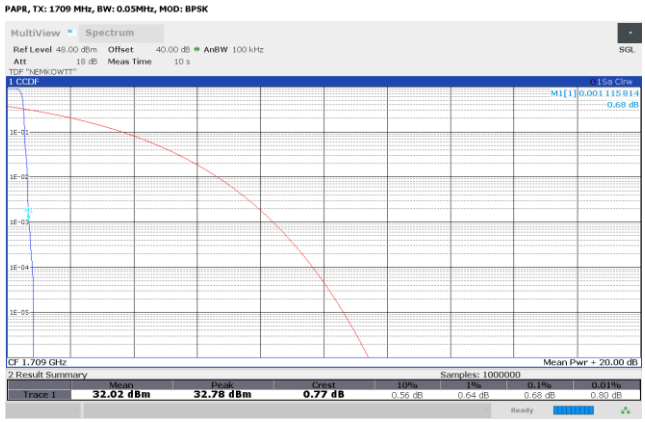

Figure 8.5-3: Peak to average power ratio, High CH 1709 MHz, 0.05 MHz, CPM

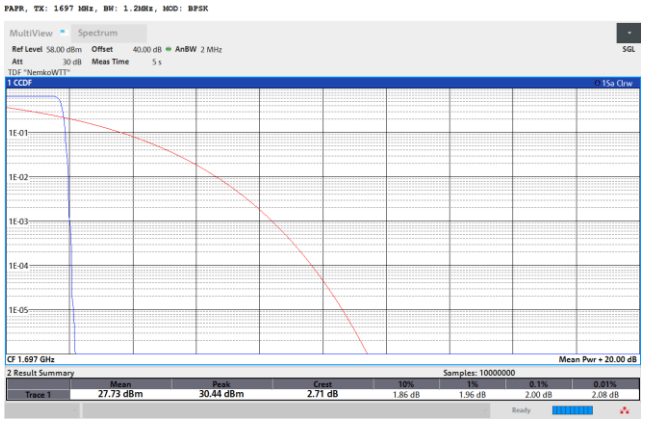

Figure 8.5-4: Peak to average power ratio, Low CH 1697 MHz, 1.2 MHz, CPM

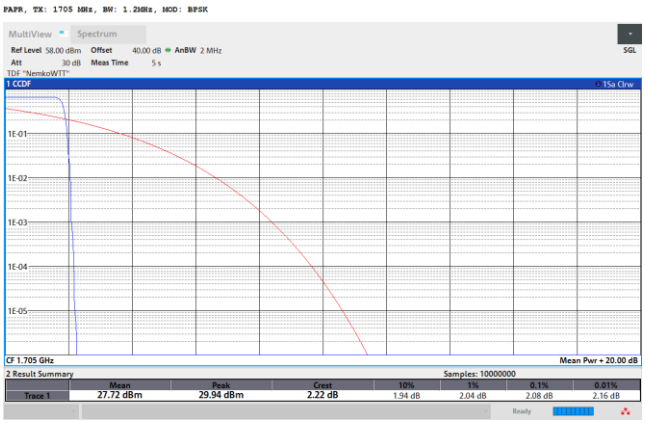

Figure 8.5-5: Peak to average power ratio, Mid CH 1705 MHz, 1.2 MHz, CPM

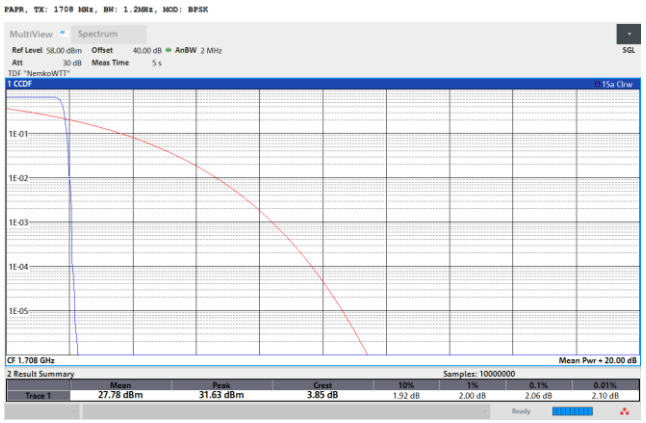

Figure 8.5-6: Peak to average power ratio, High CH 1708 MHz, 1.2 MHz, CPM

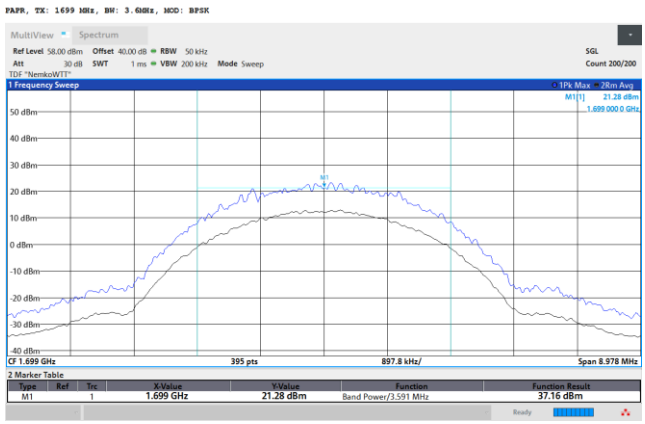

Figure 8.5-7: Peak to average power ratio, Low CH 1699 MHz, 3.6 MHz, CPM

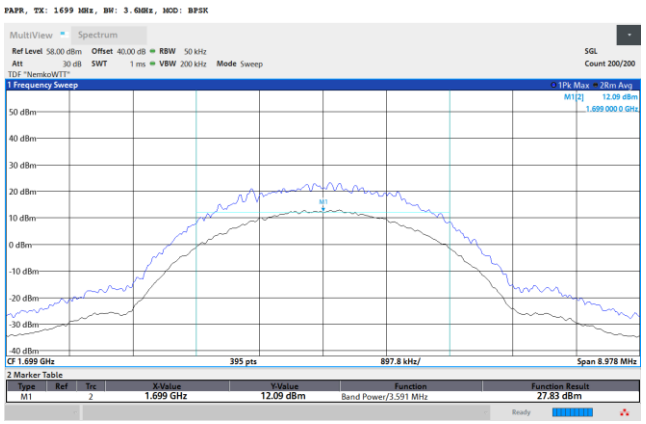

Figure 8.5-8: Peak to average power ratio, Low CH 1699 MHz, 3.6 MHz, CPM

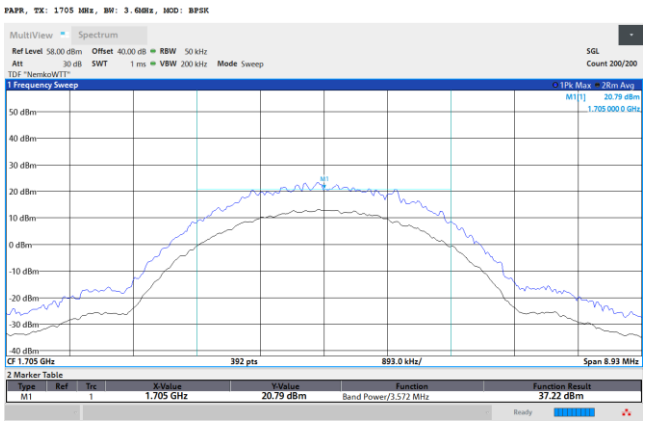

Figure 8.5-9: Peak to average power ratio, Mid CH 1705 MHz, 3.6 MHz, CPM

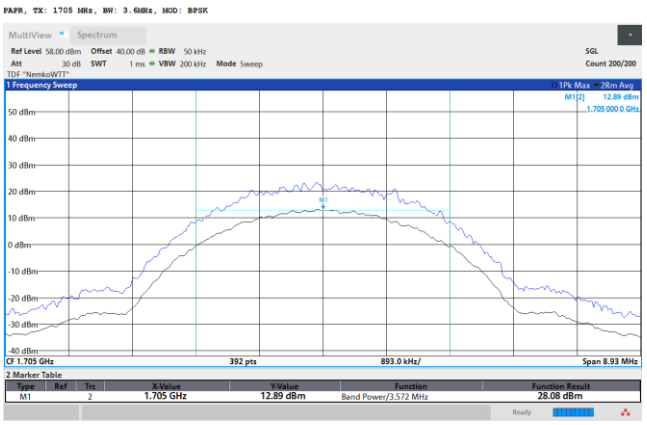

Figure 8.5-10: Peak to average power ratio, Mid CH 1705 MHz, 3.6 MHz, CPM

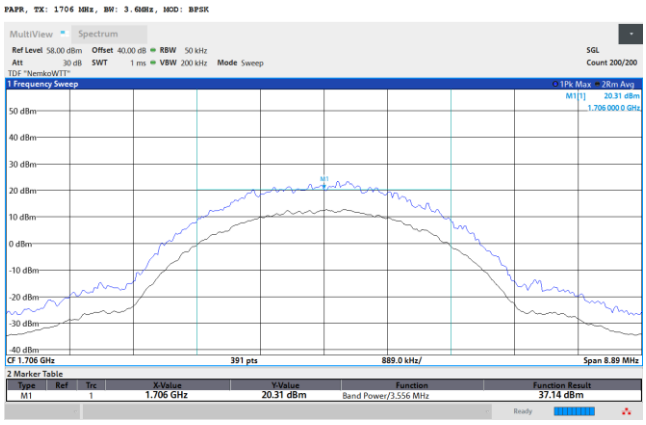

Figure 8.5-11: Peak to average power ratio, High CH 1706 MHz, 3.6 MHz, CPM

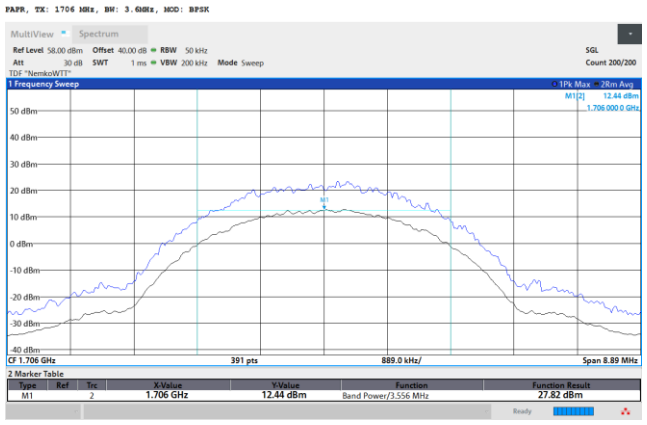

Figure 8.5-12: Peak to average power ratio, High CH 1706 MHz, 3.6 MHz, CPM

8.6 Spurious emissions at antenna terminals

8.6.1 References and limits

- FCC 47 CFR Part 27: §27.53(j): 1390 – 1395 MHz and 1432 – 1435 MHz operation
- FCC 47 CFR Part 27: §27.53(h): 1695 – 1710 MHz operation
- Test method: ANSI C63.26: 2015 §5.7

§27.53(j):

(1) For operations in the unpaired 1390-1392 MHz band and the paired 1392-1395 MHz and 1432-1435 MHz bands, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB. Compliance with these provisions is based on the procedures described in paragraph (a)(5) of this section.

(2) In the 1390-1395 MHz and 1432-1435 MHz bands, licensees are encouraged to take all reasonable steps to ensure that unwanted emission power does not exceed the following levels in the band 1400-1427 MHz:

(i) For stations of point-to-point systems in the fixed service: −45 dBW/27 MHz.

(ii) For stations in the mobile service: −60 dBW/27 MHz.

§27.53(h):

(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 log10(P) dB.

8.6.2 Test summary

Verdict	Pass		
Test date	December 17, 2025 January 13, 2026	Temperature	21 °C
Test engineer	Lan Sayasane, Sr. EMC Test Engineer	Air pressure	1007 mbar
Test location	☒ Wireless bench (conducted tests) ☐ 10 m semi-anechoic chamber (radiated tests) ☐ 3 m semi-anechoic chamber (radiated tests) ☐ Other:	Relative humidity	54 %

8.6.3 Observations, settings and special notes

None

8.6.4 Setup details

EUT power input during test	Battery 3-4.2 Vdc
EUT setup configuration	☒ Table-top ☐ Floor standing ☐ Other:

Spectrum analyzer:

Resolution bandwidth	1 MHz
Video bandwidth	3 MHz
Detector mode	RMS
Trace mode	Average, 100 sweeps
Measurement time	Auto

8.6.5 Test data – 1390-1395 MHz

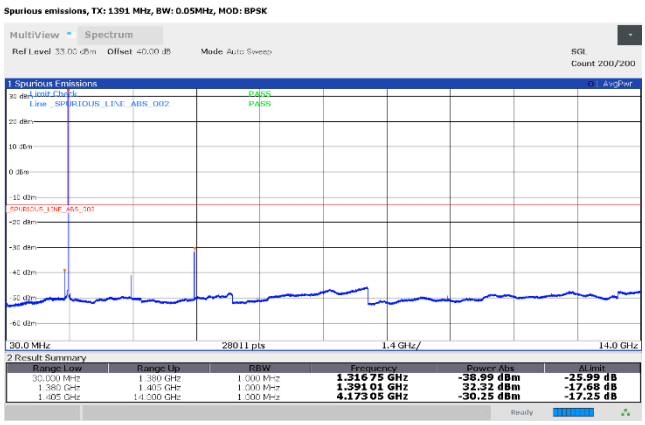

Figure 8.6-1: Spurious emissions at antenna terminals, Low CH 1391 MHz, 0.05 MHz, CPM

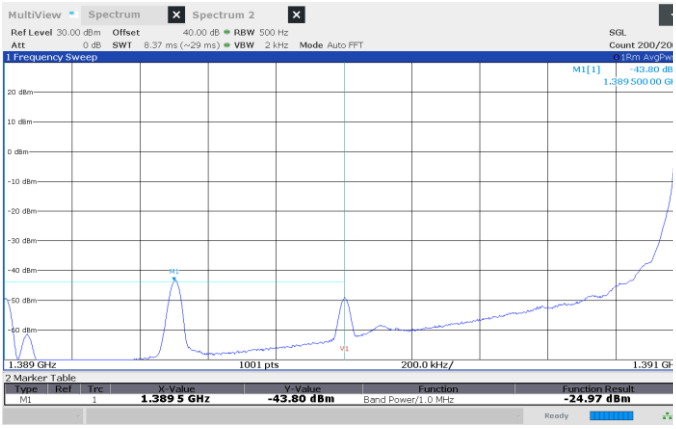

Figure 8.6-2: Spurious emissions at antenna terminals, Band Edge-1, Low CH 1391 MHz, 0.05 MHz, CPM

Figure 8.6-3: Spurious emissions at antenna terminals, Band Edge-2, Low CH 1391 MHz, 0.05 MHz, CPM

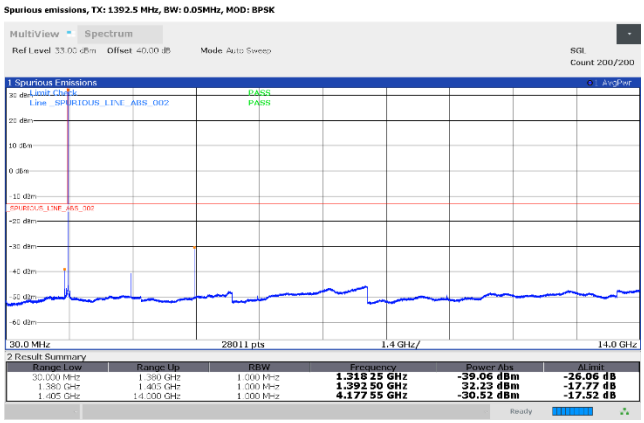

Figure 8.6-4: Spurious emissions at antenna terminals, Mid CH 1392.5 MHz, 0.05 MHz, CPM

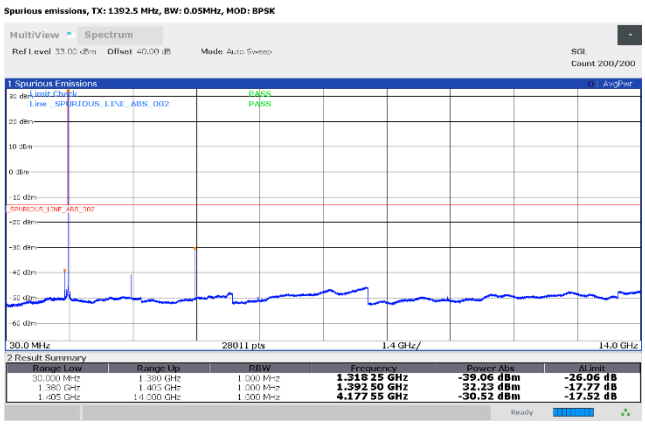

Figure 8.6-5: Spurious emissions at antenna terminals, High CH 1394 MHz, 0.05 MHz, CPM

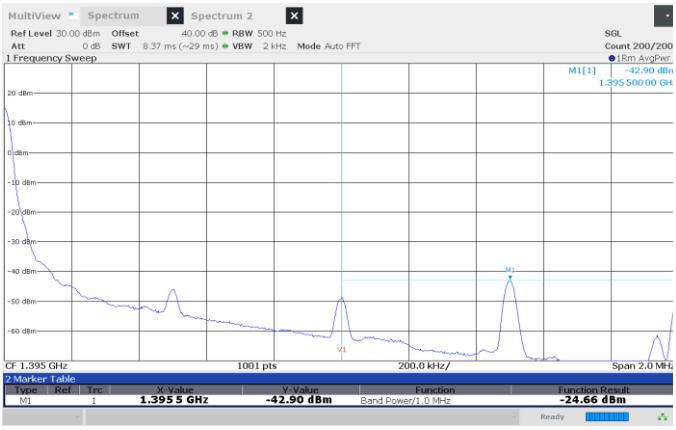

Figure 8.6-6: Spurious emissions at antenna terminals, Band Edge-1, High CH 1394 MHz, 0.05 MHz, CPM

Figure 8.6-7: Spurious emissions at antenna terminals, Band Edge-2, High CH 1394 MHz, 0.05 MHz, CPM

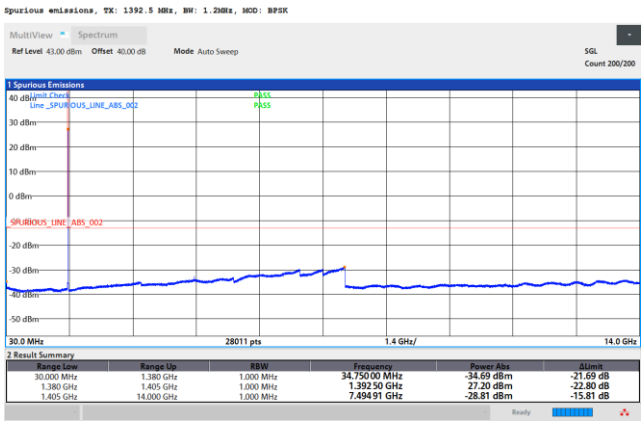

Figure 8.6-8: Spurious emissions at antenna terminals, Mid CH 1392.5 MHz, 1.2 MHz, CPM

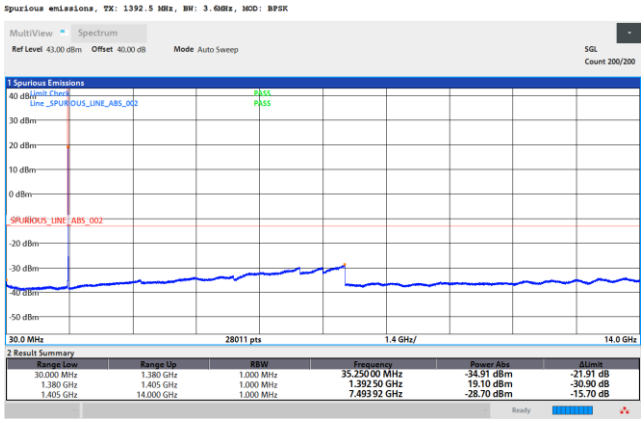

Figure 8.6-9: Spurious emissions at antenna terminals, Mid CH 1392.5 MHz, 3.6 MHz, CPM

8.6.6 Test data – 1432-1435 MHz

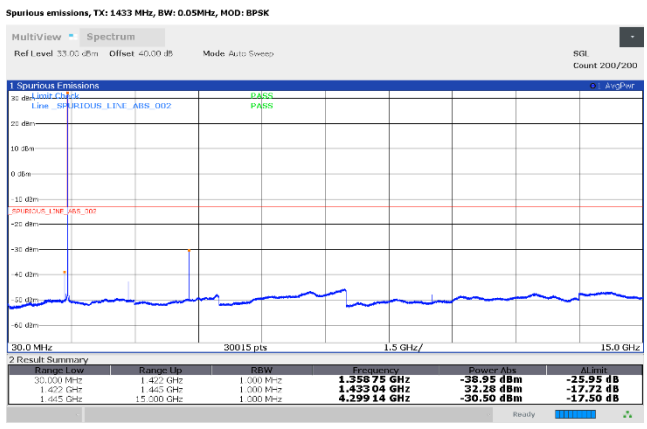

Figure 8.6-10: Spurious emissions at antenna terminals, Low CH 1433 MHz, 0.05 MHz, CPM

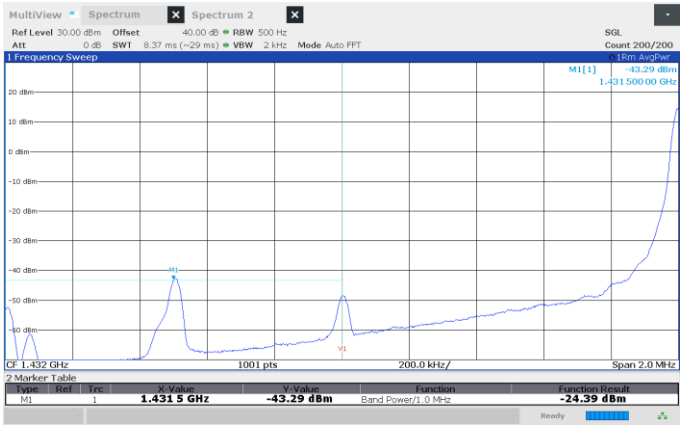

Figure 8.6-11: Spurious emissions at antenna terminals, Band Edge-1, Low CH 1433 MHz, 0.05 MHz, CPM

Figure 8.6-12: Spurious emissions at antenna terminals, Band Edge-2, Low CH 1433 MHz, 0.05 MHz, CPM

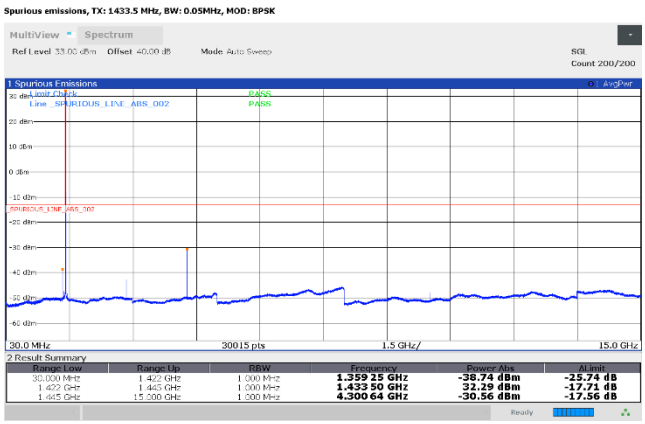

Figure 8.6-13: Spurious emissions at antenna terminals, Mid CH 1433.5 MHz, 0.05 MHz, CPM

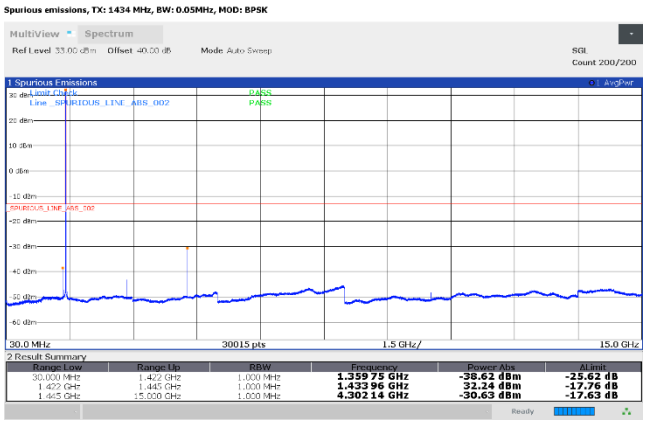

Figure 8.6-14: Spurious emissions at antenna terminals, High CH 1434 MHz, 0.05 MHz, CPM

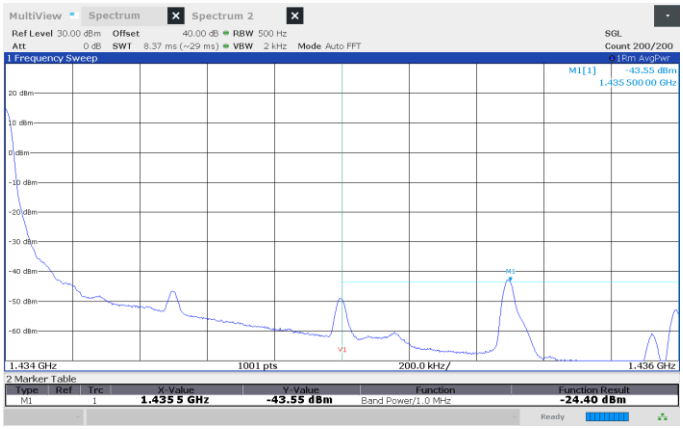

Figure 8.6-15: Spurious emissions at antenna terminals, Band Edge-1, High CH 1434 MHz, 0.05 MHz, CPM

Figure 8.6-16: Spurious emissions at antenna terminals, Band Edge-2, High CH 1434 MHz, 0.05 MHz, CPM

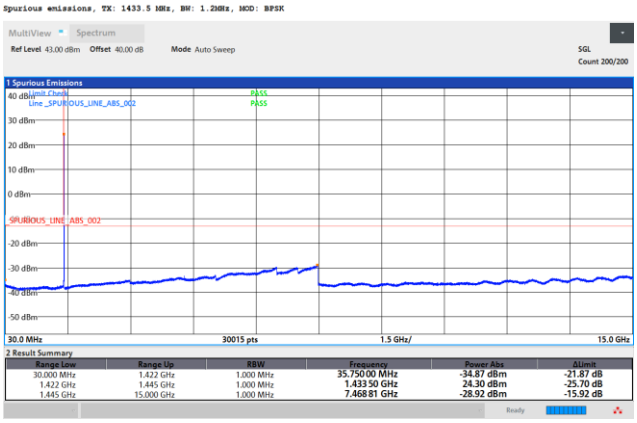

Figure 8.6-17: Spurious emissions at antenna terminals, Mid CH 1433.5 MHz, 1.2 MHz, CPM

8.6.7 Test data – 1695-1710 MHz

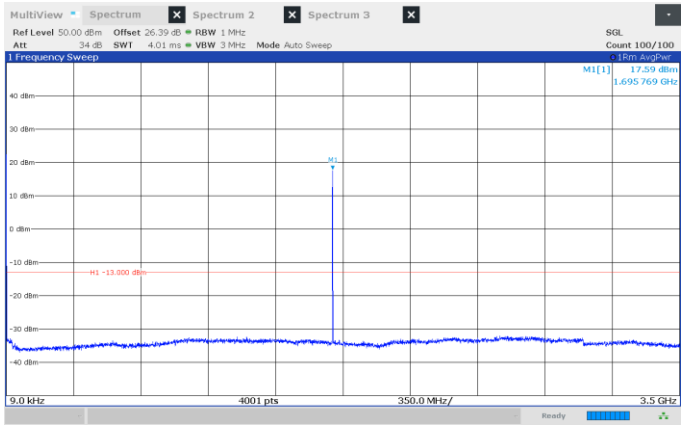

Figure 8.6-18: Spurious emissions at antenna terminals, Low CH 1696 MHz, 0.05 MHz, CPM, 9kHz-3.5GHz

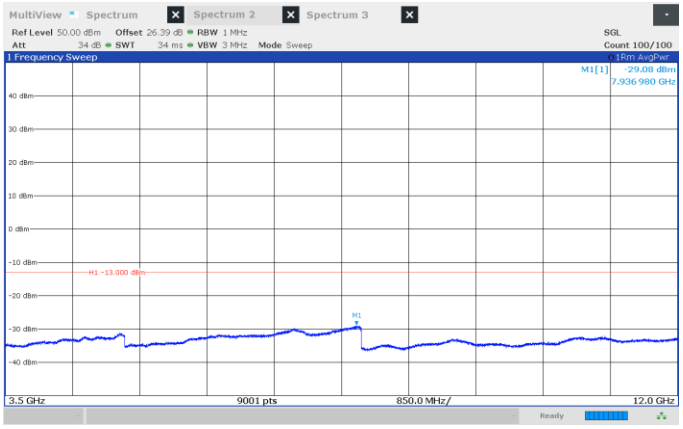

Figure 8.6-19: Spurious emissions at antenna terminals, Low CH 1696 MHz, 0.05 MHz, CPM, 3.5GHz-12GHz

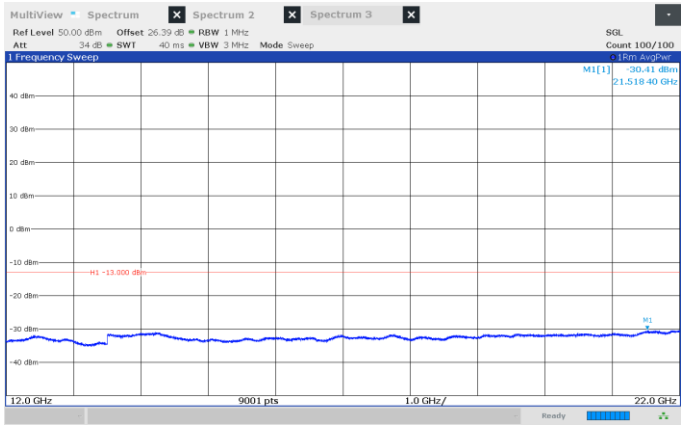

Figure 8.6-20: Spurious emissions at antenna terminals, Low CH 1696 MHz, 0.05 MHz, CPM, 12GHz-22GHz

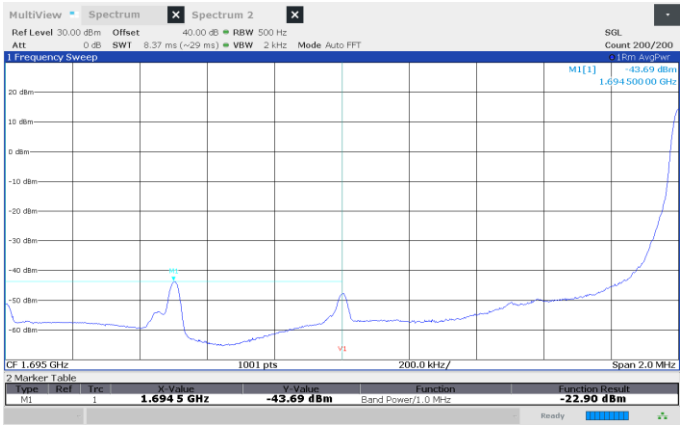

Figure 8.6-21: Spurious emissions at antenna terminals, Band Edge-1, Low CH 1696 MHz, 0.05 MHz, CPM

Figure 8.6-22: Spurious emissions at antenna terminals, Band Edge-2, Low CH 1696 MHz, 0.05 MHz, CPM

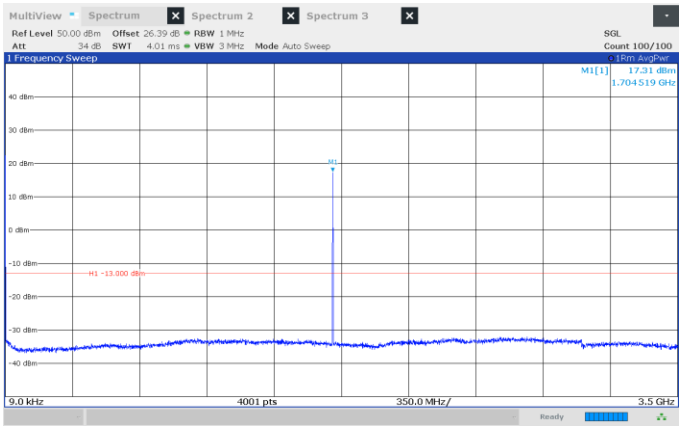

Figure 8.6-23: Spurious emissions at antenna terminals, Mid CH 1705 MHz, 0.05 MHz, CPM, 9kHz-3.5GHz

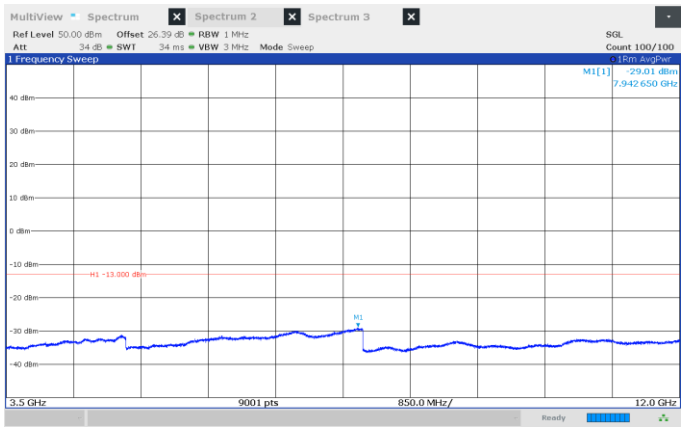

Figure 8.6-24: Spurious emissions at antenna terminals, Mid CH 1705 MHz, 0.05 MHz, CPM, 3.5GHz-12GHz

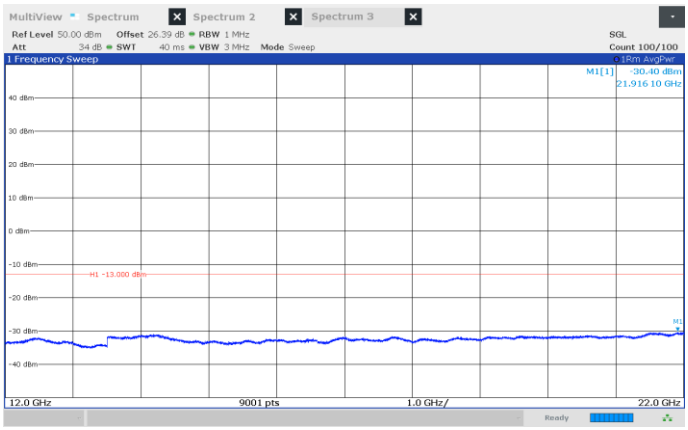

Figure 8.6-25: Spurious emissions at antenna terminals, Mid CH 1705 MHz, 0.05 MHz, CPM, 12GHz-22GHz

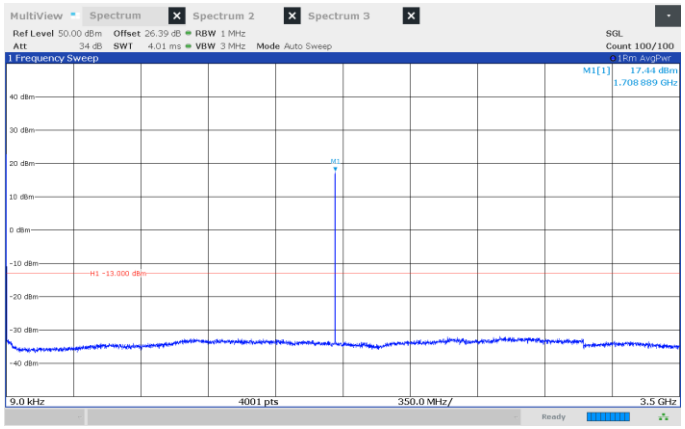

Figure 8.6-26: Spurious emissions at antenna terminals, High CH 1709 MHz, 0.05 MHz, CPM, 9kHz-3.5GHz

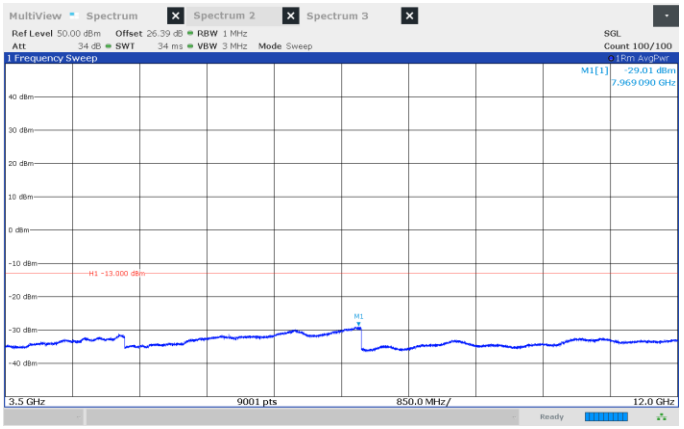

Figure 8.6-27: Spurious emissions at antenna terminals, High CH 1709 MHz, 0.05 MHz, CPM, 3.5GHz-12GHz

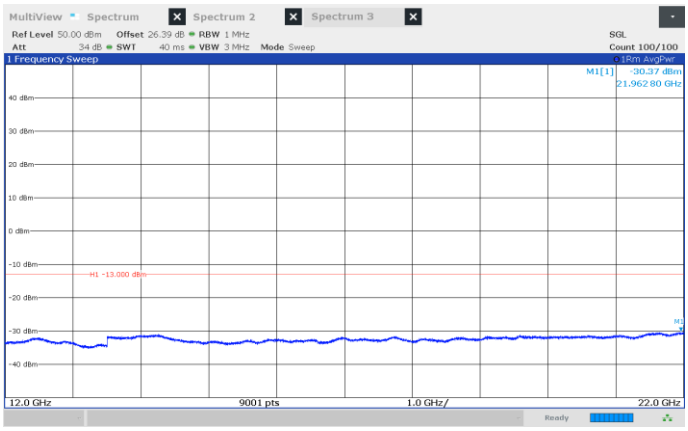

Figure 8.6-28: Spurious emissions at antenna terminals, High CH 1709 MHz, 0.05 MHz, CPM, 12GHz-22GHz

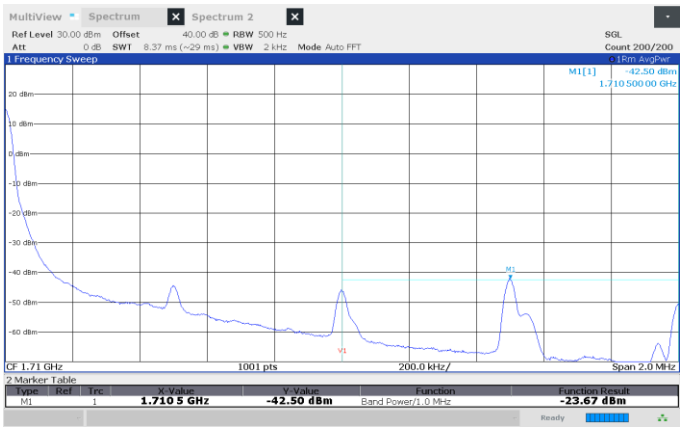

Figure 8.6-29: Spurious emissions at antenna terminals, Band Edge-1, High CH 1709 MHz, 0.05 MHz, CPM

Figure 8.6-30: Spurious emissions at antenna terminals, Band Edge-1, High CH 1709 MHz, 0.05 MHz, CPM

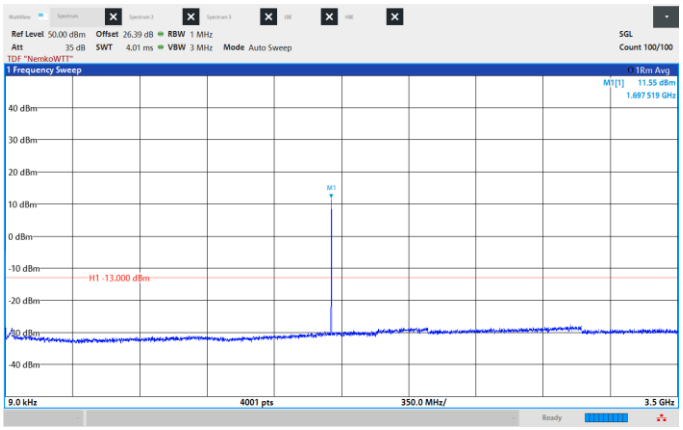

Figure 8.6-31: Spurious emissions at antenna terminals, Low CH 1697 MHz, 1.2 MHz, CPM, 9kHz-3.5GHz

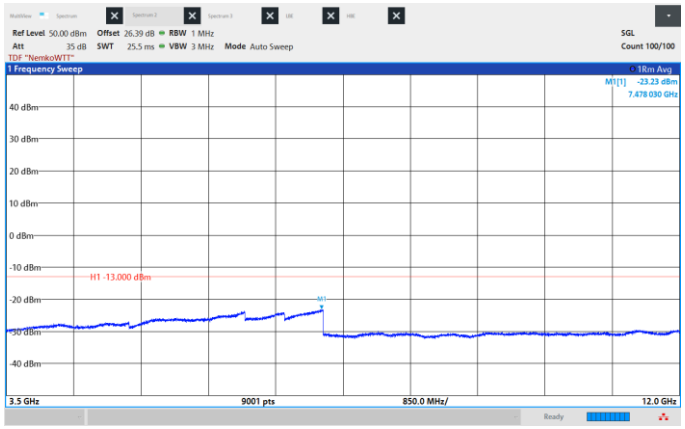

Figure 8.6-32: Spurious emissions at antenna terminals, Low CH 1697 MHz, 1.2 MHz, CPM, 3.5GHz-12GHz

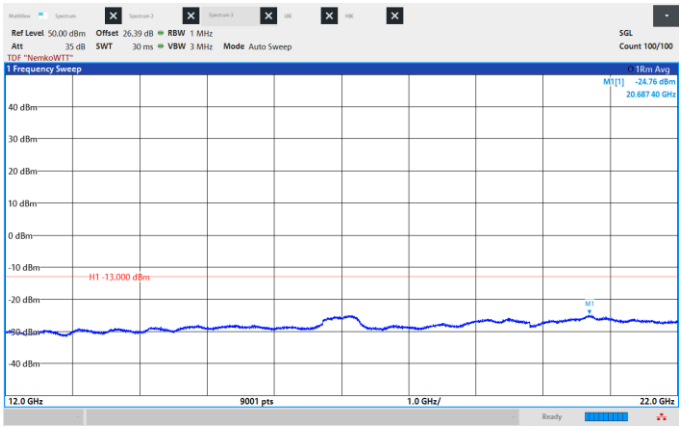

Figure 8.6-33: Spurious emissions at antenna terminals, Low CH 1697 MHz, 1.2 MHz, CPM, 12GHz-22GHz

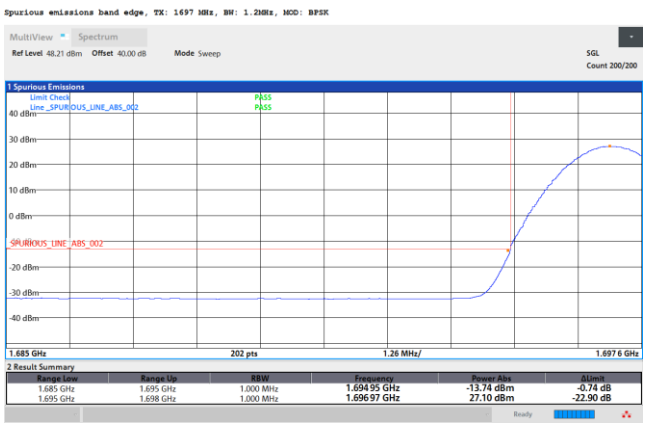

Figure 8.6-34: Spurious emissions at antenna terminals, Band Edge, Low CH 1697 MHz, 1.2 MHz, CPM

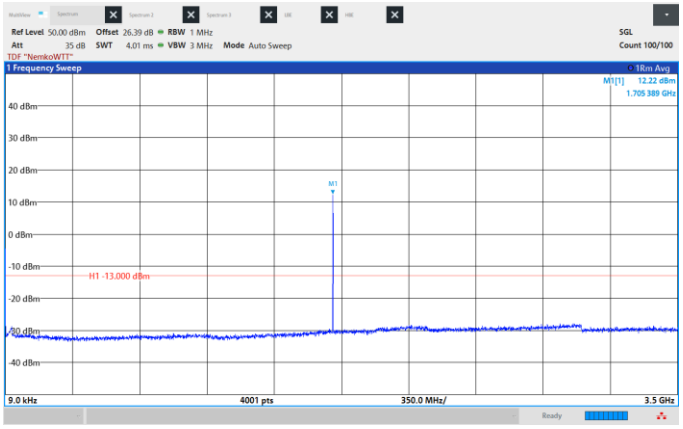

Figure 8.6-35: Spurious emissions at antenna terminals, Mid CH 1705 MHz, 1.2 MHz, CPM, 9kHz-3.5GHz

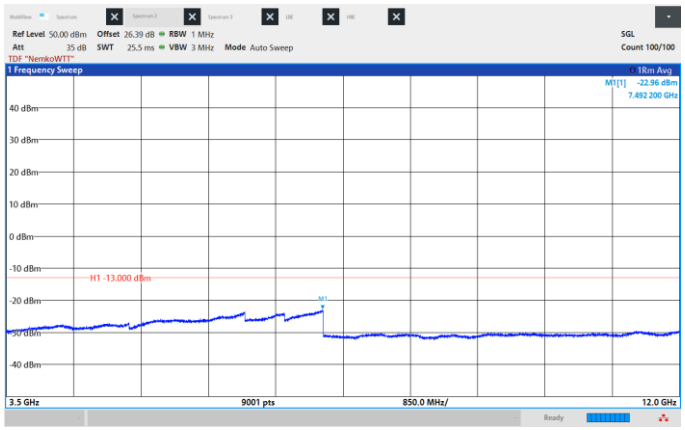

Figure 8.6-36: Spurious emissions at antenna terminals, Mid CH 1705 MHz, 1.2 MHz, CPM, 3.5GHz-12GHz

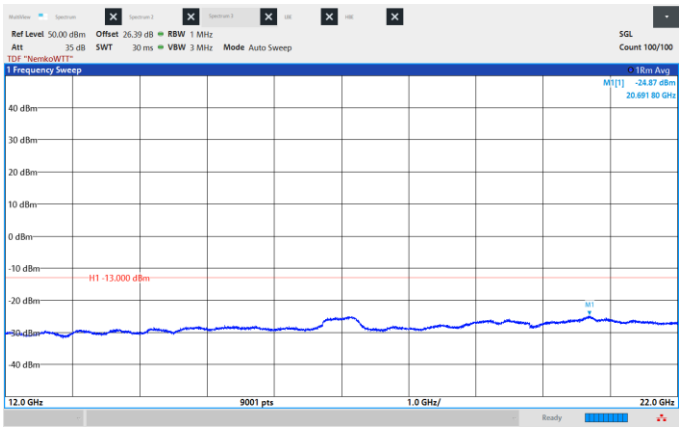

Figure 8.6-37: Spurious emissions at antenna terminals, Mid CH 1705 MHz, 1.2 MHz, CPM, 12GHz-22GHz

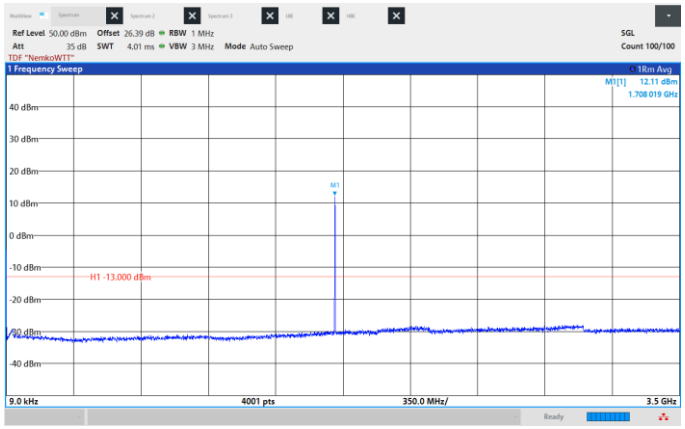

Figure 8.6-38: Spurious emissions at antenna terminals, High CH 1708 MHz, 1.2 MHz, CPM, 9kHz-3.5GHz

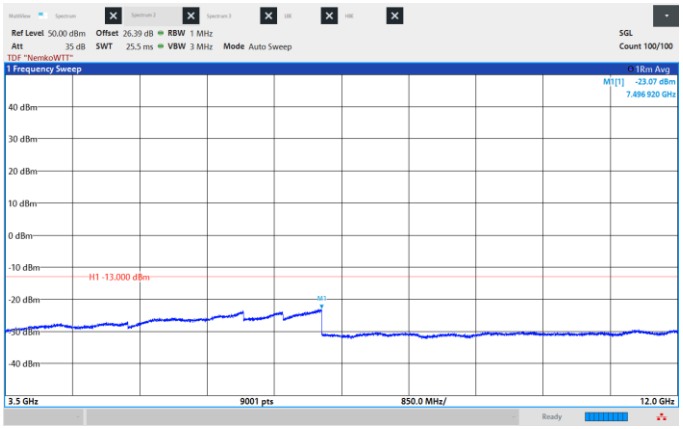

Figure 8.6-39: Spurious emissions at antenna terminals, High CH 1708 MHz, 1.2 MHz, CPM, 3.5GHz-12GHz

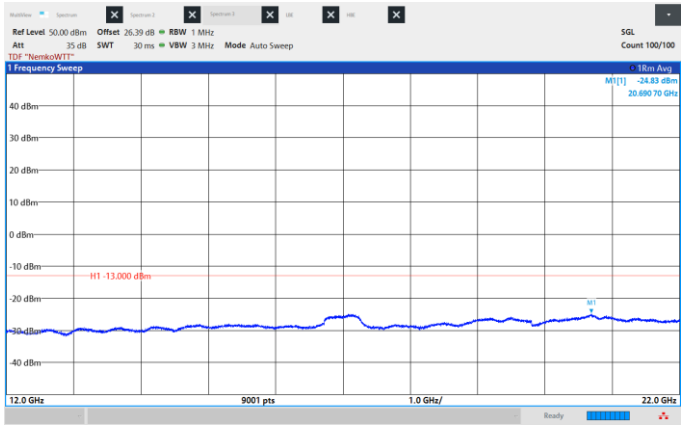

Figure 8.6-40: Spurious emissions at antenna terminals, High CH 1708 MHz, 1.2 MHz, CPM, 12GHz-22GHz

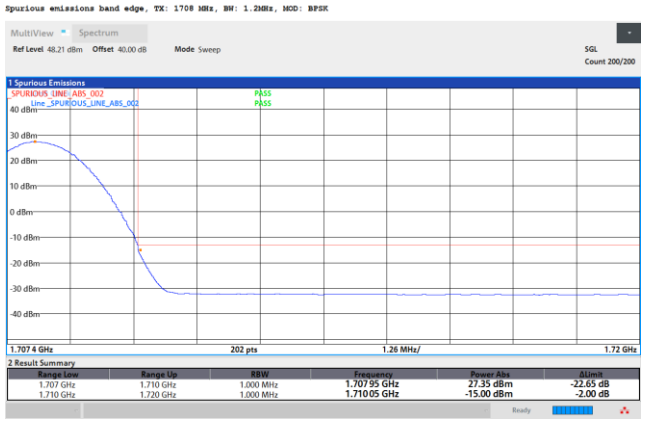

Figure 8.6-41: Spurious emissions at antenna terminals, Band Edge CH 1708 MHz, 1.2 MHz, CPM

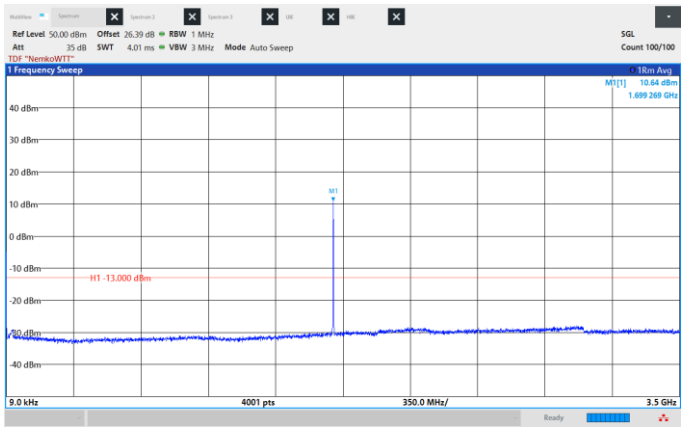

Figure 8.6-42: Spurious emissions at antenna terminals, Low CH 1699 MHz, 3.6 MHz, CPM, 9kHz-3.5GHz

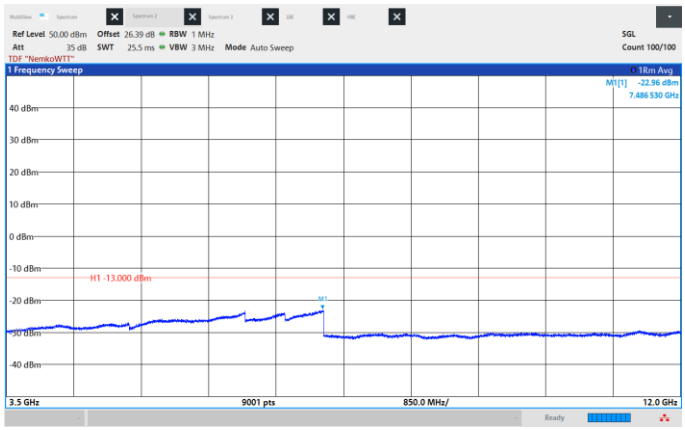

Figure 8.6-43: Spurious emissions at antenna terminals, Low CH 1699 MHz, 3.6 MHz, CPM, 3.5GHz-12GHz

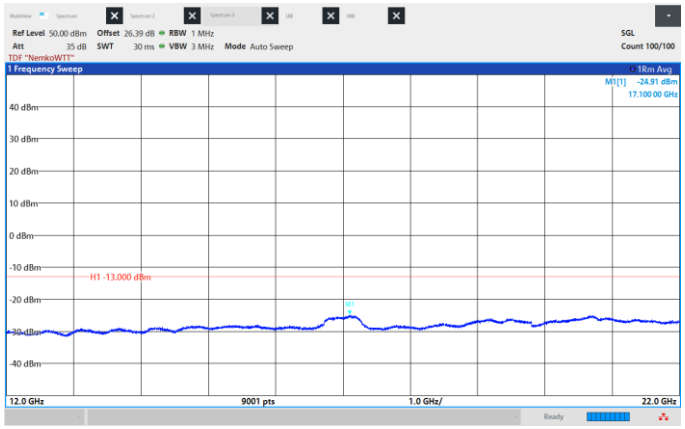

Figure 8.6-44: Spurious emissions at antenna terminals, Low CH 1699 MHz, 3.6 MHz, CPM, 12GHz-22GHz

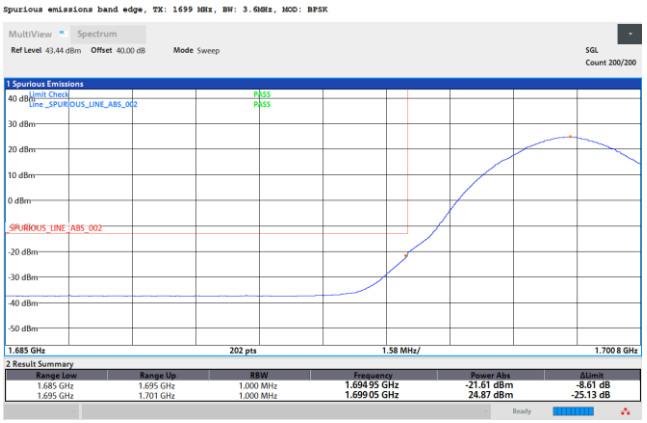

Figure 8.6-45: Spurious emissions at antenna terminals, Band Edge, Low CH 1699 MHz, 3.6 MHz, CPM

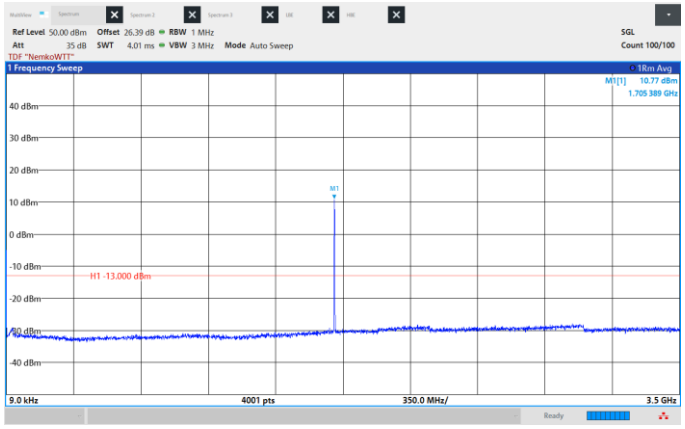

Figure 8.6-46: Spurious emissions at antenna terminals, Mid CH 1705 MHz, 3.6 MHz, CPM, 9kHz-3.5GHz

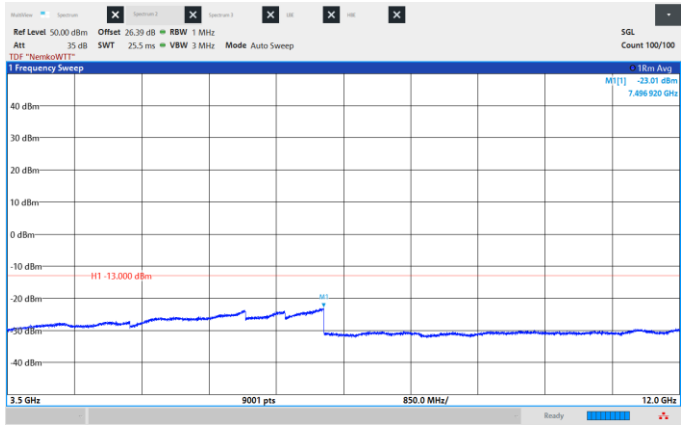

Figure 8.6-47: Spurious emissions at antenna terminals, Mid CH 1705 MHz, 3.6 MHz, CPM, 3.5GHz-12GHz

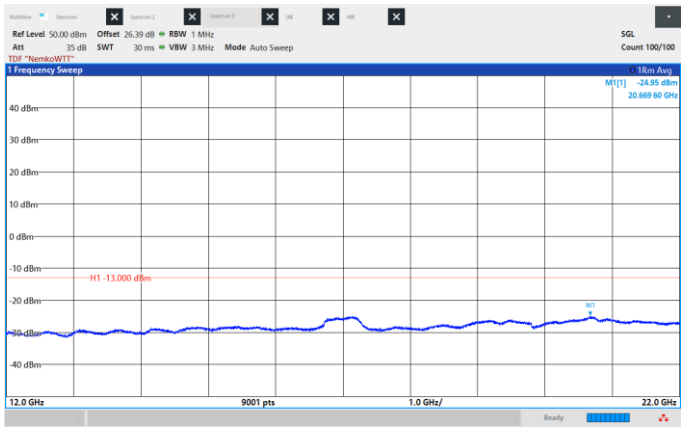

Figure 8.6-48: Spurious emissions at antenna terminals, Mid CH 1705 MHz, 3.6 MHz, CPM, 12GHz-22GHz

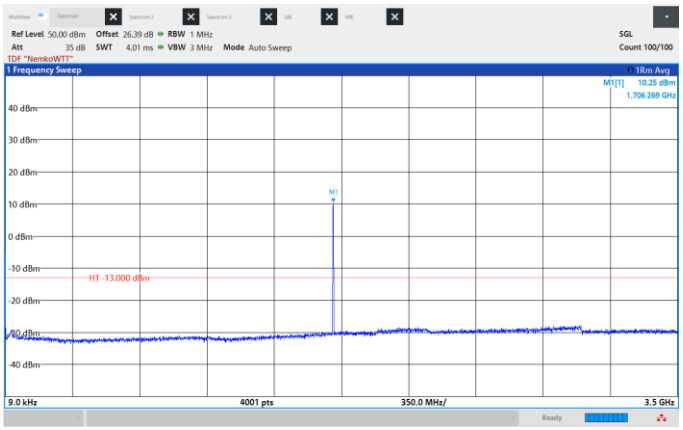

Figure 8.6-49: Spurious emissions at antenna terminals, High CH 1706 MHz, 3.6 MHz, CPM, 9kHz-3.5GHz

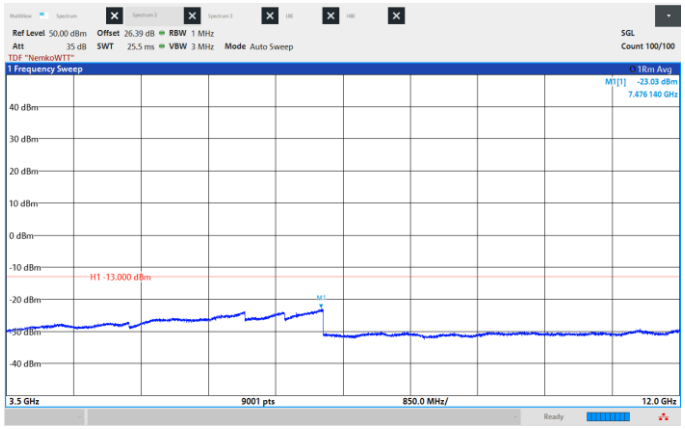

Figure 8.6-50: Spurious emissions at antenna terminals, High CH 1706 MHz, 3.6 MHz, CPM, 3.5GHz-12GHz

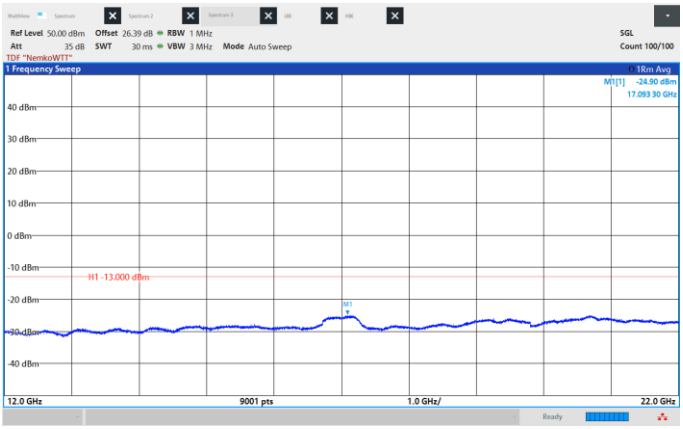

Figure 8.6-51: Spurious emissions at antenna terminals, High CH 1706 MHz, 3.6 MHz, CPM, 12GHz-22GHz

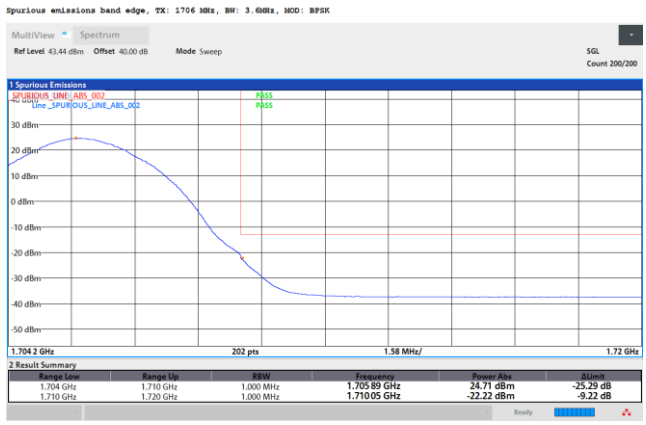

Figure 8.6-52: Spurious emissions at antenna terminals, Band Edge, High CH 1706 MHz, 3.6 MHz, CPM

8.7 Field strength of radiated spurious emissions

8.7.1 References and limits

- FCC 47 CFR Part 27: §27.53(j): 1390 – 1395 MHz and 1432 – 1435 MHz operation
- FCC 47 CFR Part 27: §27.53(h): 1695 – 1710 MHz operation
- Test method: ANSI C63.26: 2015 §5.7

§27.53(j):

(1) For operations in the unpaired 1390-1392 MHz band and the paired 1392-1395 MHz and 1432-1435 MHz bands, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB. Compliance with these provisions is based on the procedures described in paragraph (a)(5) of this section.

(2) In the 1390-1395 MHz and 1432-1435 MHz bands, licensees are encouraged to take all reasonable steps to ensure that unwanted emission power does not exceed the following levels in the band 1400-1427 MHz:

(i) For stations of point-to-point systems in the fixed service: −45 dBW/27 MHz.

(ii) For stations in the mobile service: −60 dBW/27 MHz.

§27.53(h):

(2) 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 log10(P) dB.

8.7.2 Test summary

Verdict	Pass		
Test date	December 18, 2025 December 22, 2025 January 15, 2026	Temperature	21 °C
Test engineer	Lan Sayasane, Sr. EMC Test Engineer	Air pressure	1004 mbar
Test location	☐ Wireless bench (conducted tests) ☐ 10 m semi-anechoic chamber (radiated tests) ☒ 3 m semi-anechoic chamber (radiated tests) ☐ Other:	Relative humidity	56 %

8.7.3 Notes

None

8.7.4 Setup details

EUT power input during test	Battery 3-4.2 Vdc
EUT setup configuration	☒ Table-top ☐ Floor standing ☐ Other:

Receiver settings for frequencies from 30 – 1000 MHz:

Resolution bandwidth	120 kHz (Pre-scan) 5 kHz (Final measurement)
Video bandwidth	300 kHz
Detector mode	– Peak (Preview measurement) – RMS (Final measurement)
Trace mode	Max Hold
Measurement time	1000 ms (RMS final measurement)

Receiver settings for frequencies from 1 – 40 GHz:

Resolution bandwidth	1 MHz (Pre-scan) 5 kHz (Final measurement)
Video bandwidth	3 MHz (Pre-scan)
Detector mode	– Peak (Preview measurement) – RMS (Final measurement)
Trace mode	Max Hold
Measurement time	1000 ms (RMS final measurement)

8.7.5 Test data – 1390-1395 MHz

Radiated spurious emissions:

Figure 8.7-1: Radiated emissions spectral plot (30 MHz - 1 GHz) - Low_1391MHz, 0.05MHz BW

Table 8.7-1: Radiated emissions results

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
32.000000	31.34	84.38	53.04	5000.0	100.000	119.0	V	313.0	25.5
112.025833	29.39	84.38	54.99	5000.0	100.000	385.0	V	150.0	19.0
113.641667	29.87	84.38	54.51	5000.0	100.000	382.0	V	200.0	19.2
494.539167	30.67	84.38	53.71	5000.0	100.000	287.0	H	202.0	27.2
675.070000	34.85	84.38	49.53	5000.0	100.000	201.0	H	0.0	30.1
948.360000	39.78	84.38	44.60	5000.0	100.000	401.0	H	227.0	34.9

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

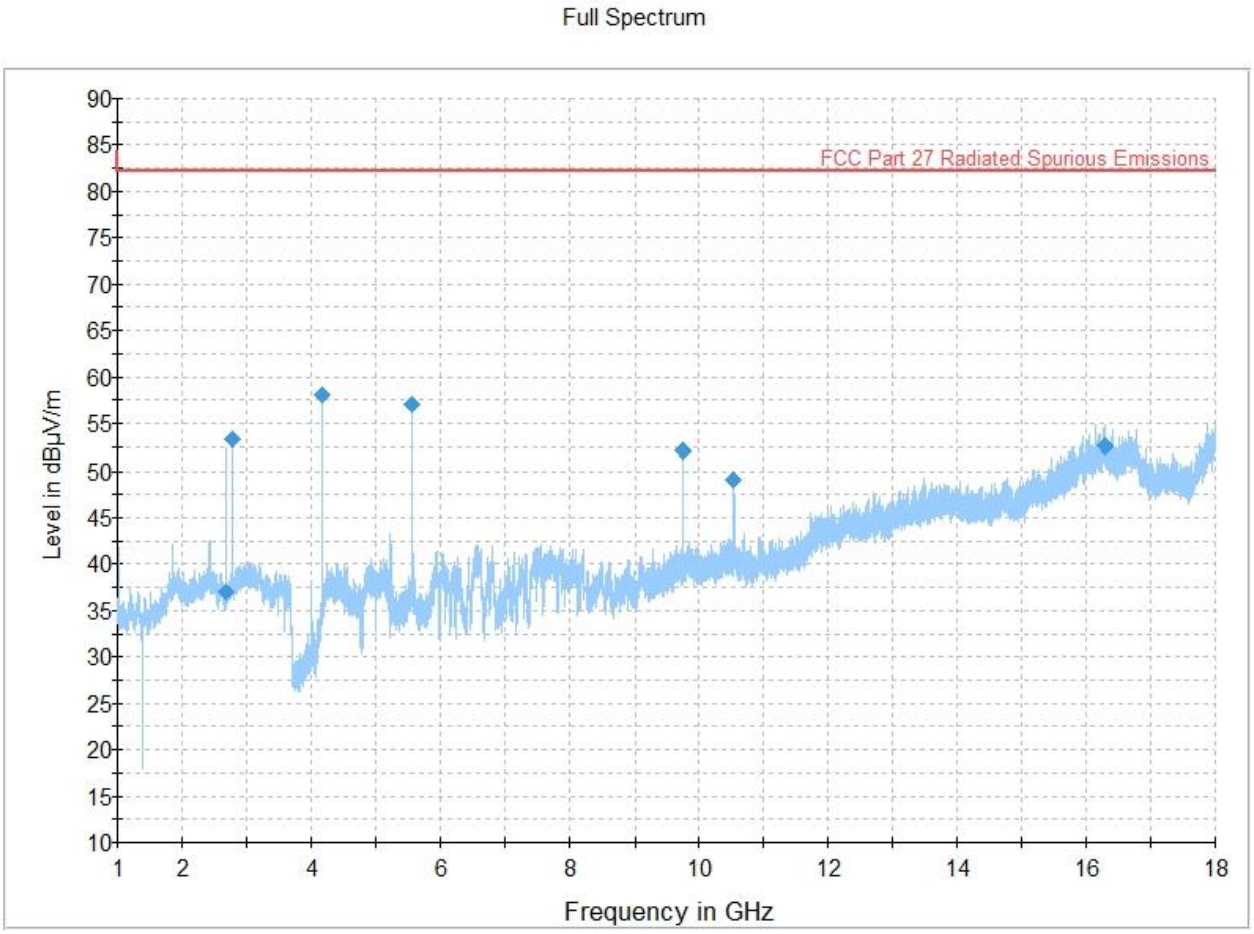

Figure 8.7-2: Radiated emissions spectral plot (1 GHz - 18 GHz) - Low_1391MHz, 0.05MHz BW

Table 8.7-2: Radiated emissions results

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)

2683.766667	37.04	82.23	45.19	100.0	1000.000	308.0	V	82.0	-3.2
2782.000000	53.30	82.23	28.93	100.0	1000.000	260.0	V	150.0	-2.8
4173.166667	58.13	82.23	24.10	100.0	1000.000	190.0	V	134.0	1.0
5563.933333	57.04	82.23	25.19	100.0	1000.000	205.0	V	136.0	3.6
9736.866667	52.13	82.23	30.10	100.0	1000.000	231.0	V	356.0	10.7
10534.733333	49.03	82.23	33.20	100.0	1000.000	110.0	V	234.0	11.4
16279.866667	52.69	82.23	29.54	100.0	1000.000	351.0	H	35.0	23.6

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

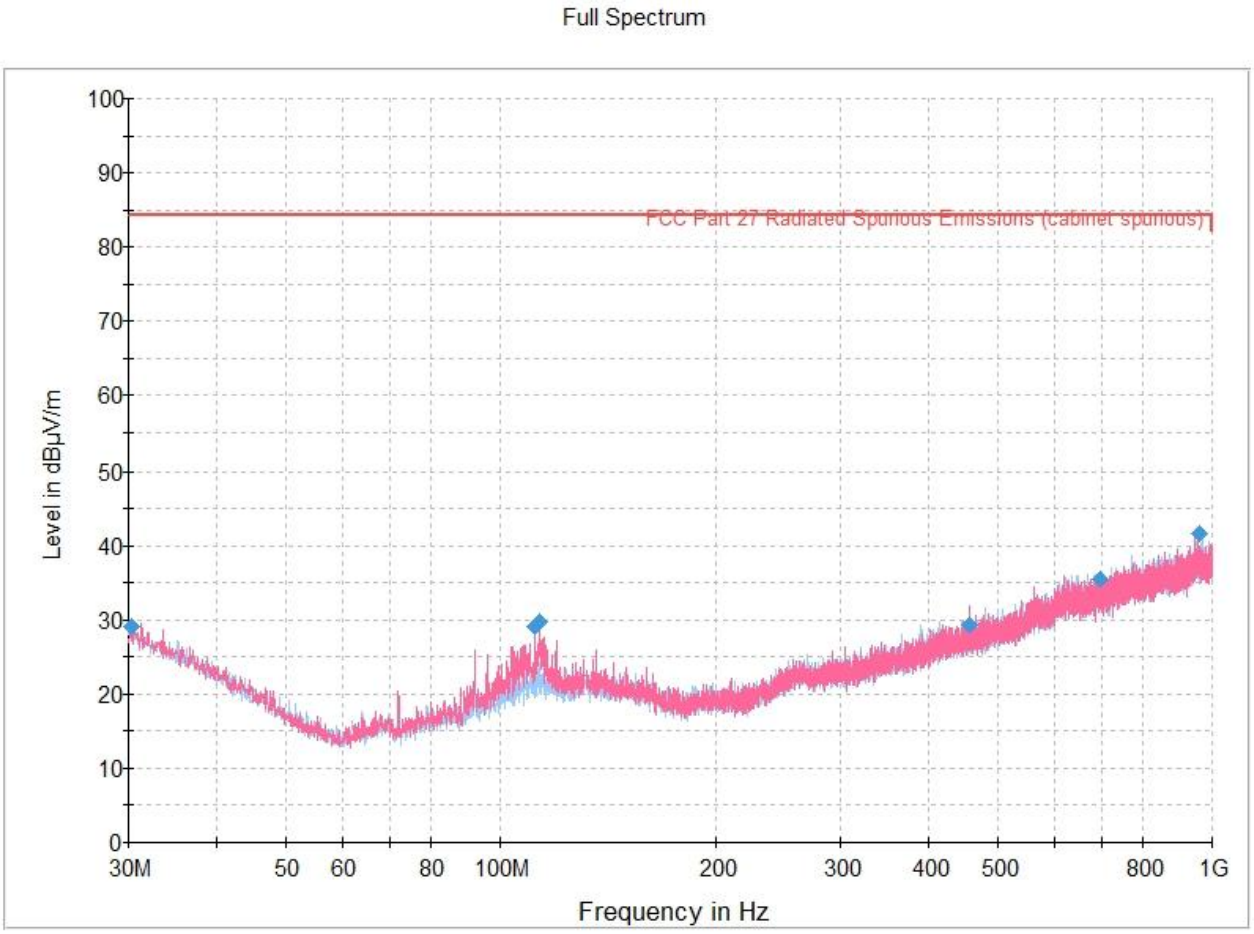

Figure 8.7-3: Radiated emissions spectral plot (30 MHz - 1 GHz) - Mid_1392.5MHz, 0.05MHz BW

Table 8.7-3: Radiated emissions results

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
30.240000	29.02	84.38	55.36	5000.0	100.000	300.0	H	301.0	26.5
112.025000	29.06	84.38	55.32	5000.0	100.000	399.0	V	34.0	19.0
113.641667	29.78	84.38	54.60	5000.0	100.000	389.0	V	84.0	19.2
455.325833	29.26	84.38	55.12	5000.0	100.000	120.0	V	216.0	26.3
695.923333	35.46	84.38	48.92	5000.0	100.000	144.0	V	63.0	30.5
958.780833	41.56	84.38	42.82	5000.0	100.000	262.0	V	254.0	34.8

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

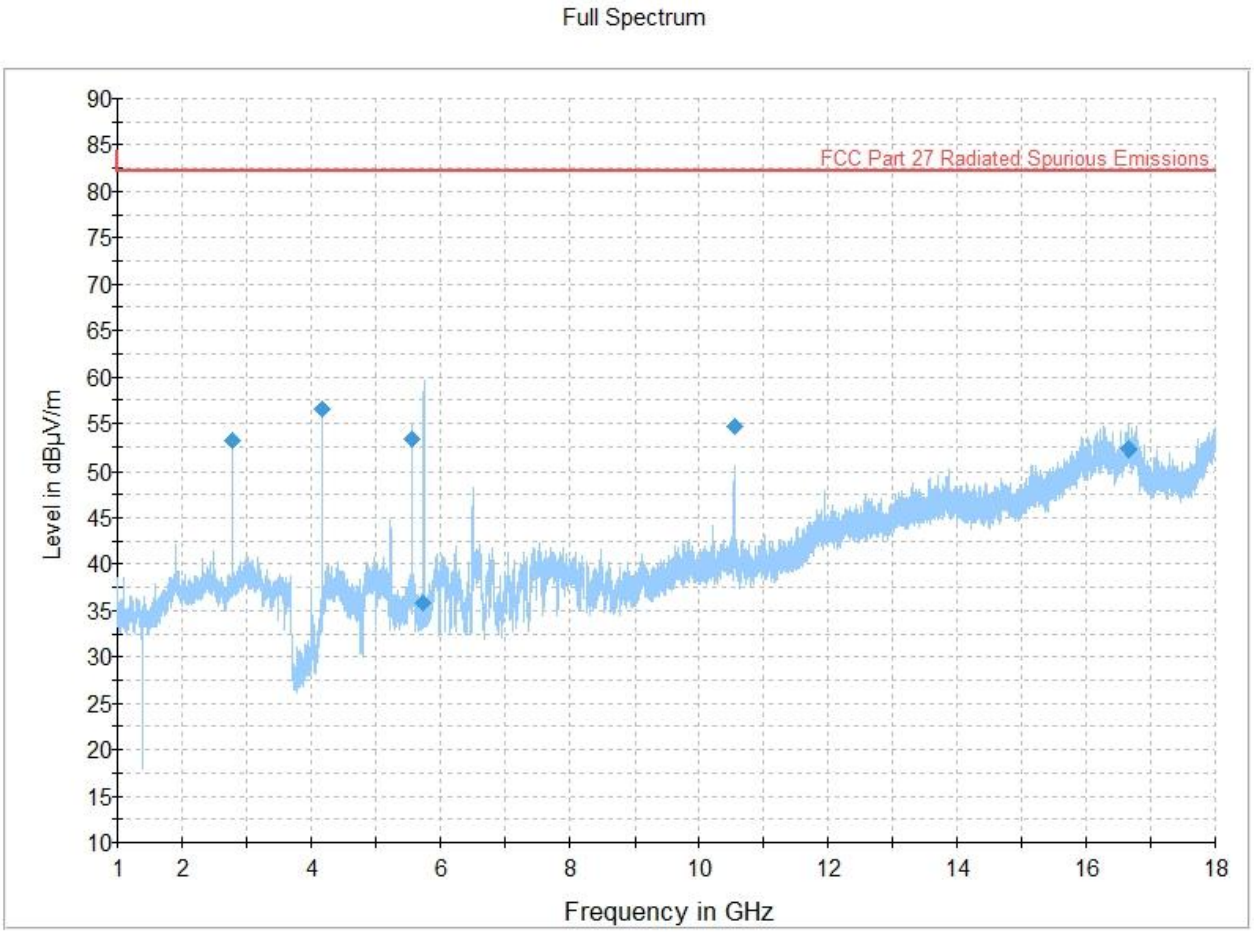

Figure 8.7-4: Radiated emissions spectral plot (1 GHz - 18 GHz) - Mid_1392.5MHz, 0.05MHz BW

Table 8.7-4: Radiated emissions results

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2785.000000	53.09	82.23	29.14	100.0	1000.000	223.0	V	174.0	-2.8
4177.700000	56.50	82.23	25.73	100.0	1000.000	146.0	V	133.0	1.0
5570.000000	53.29	82.23	28.94	100.0	1000.000	185.0	V	148.0	3.6
5748.933333	35.87	82.23	46.36	100.0	1000.000	156.0	V	97.0	4.1
10540.166667	54.66	82.23	27.57	100.0	1000.000	186.0	H	72.0	11.5
16656.266667	52.29	82.23	29.94	100.0	1000.000	197.0	V	70.0	23.5

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

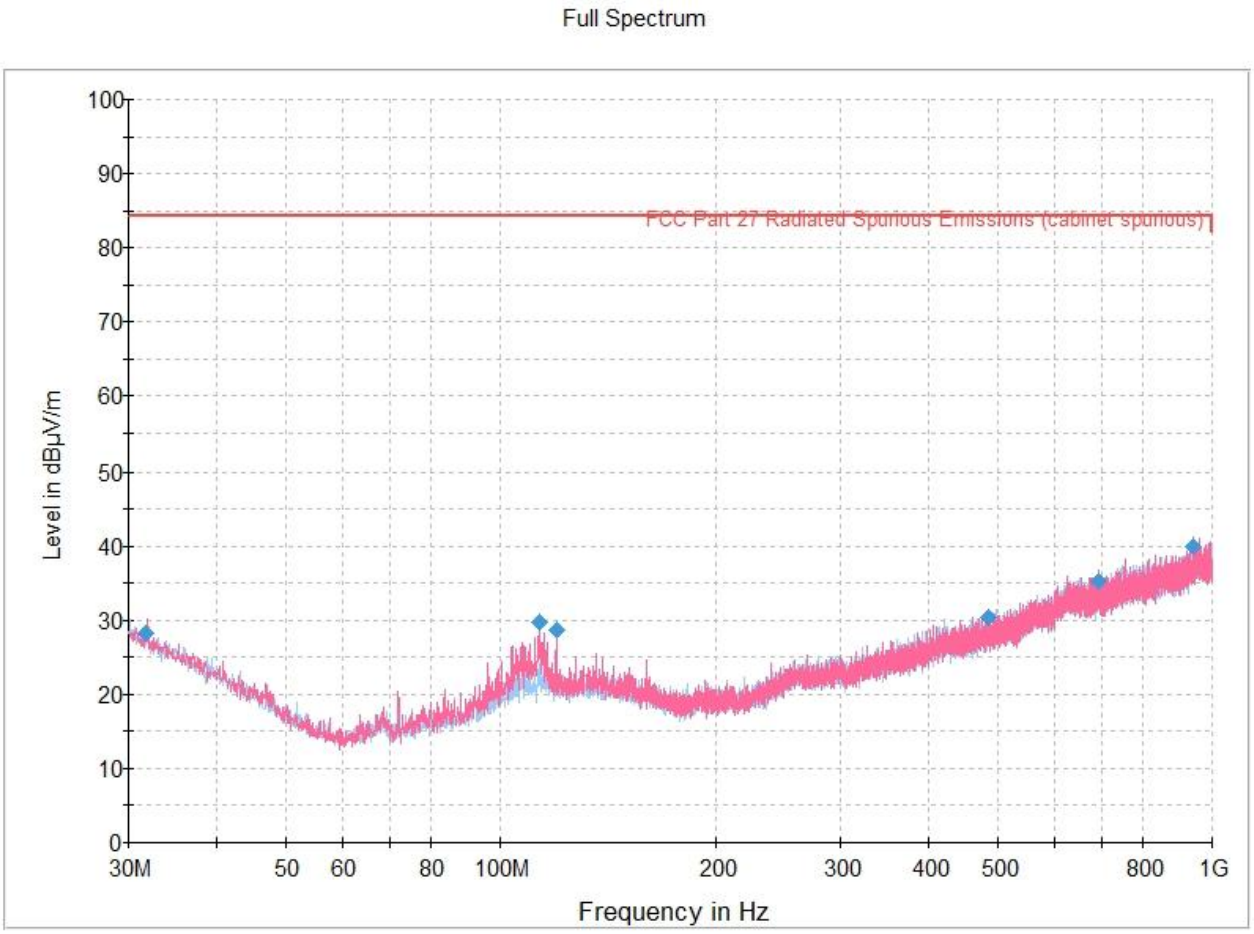

Figure 8.7-5: Radiated emissions spectral plot (30 MHz - 1 GHz) - High_1394MHz, 0.05MHz BW

Table 8.7-5: Radiated emissions results

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
31.760000	28.19	84.38	56.19	5000.0	100.000	102.0	V	60.0	25.6
113.642500	29.78	84.38	54.60	5000.0	100.000	401.0	V	0.0	19.2
120.027500	28.59	84.38	55.79	5000.0	100.000	379.0	V	48.0	19.6
484.830000	30.39	84.38	53.99	5000.0	100.000	103.0	V	59.0	27.0
691.089167	35.33	84.38	49.05	5000.0	100.000	370.0	V	331.0	30.5
941.934167	39.92	84.38	44.46	5000.0	100.000	118.0	V	349.0	34.5

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