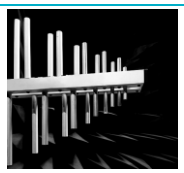
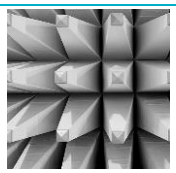

TEST REPORT

Test report no.: 1-1312-25-01-05_TR1-R03

Testing laboratory

cetecom advanced GmbH
Untertuerkheimer Strasse 6 – 10
66117 Saarbruecken / Germany
Phone: + 49 681 5 98 - 0
Fax: + 49 681 5 98 - 9075
Internet: https://cetecomadvanced.com
e-mail: mail@cetecomadvanced.com

Accredited Testing Laboratory:
The testing laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025 (2018-03) by the Deutsche Akkreditierungsstelle GmbH (DAkkS).
The accreditation is valid for the scope of testing procedures as stated in the accreditation certificate with the registration number:
D-PL-12047-01-00.
ISED Testing Laboratory Recognized Listing Number: DE0001
FCC designation number: DE0002

Applicant

DPA Microphones A/S
Kokkedal Industripark 10
2980 Kokkedal / DENMARK
Phone: +45 29 31 08 41
Contact: Niels Schou Frederiksen
e-mail: nsf@dpamicrophones.com

Manufacturer

Pasgao Electronics Co., Ltd.
V1 2nd District, Industrial Transfer Park
Enping City, Guangdon / CHINA

Test standard/s

FCC - Title 47 CFR Part 15	FCC - Title 47 of the Code of Federal Regulations; Chapter I; Part 15 - Radio frequency devices
RSS - 210 Issue 11	Spectrum Management and Telecommunications Radio Standards Specification - Licence-Exempt Radio Apparatus: Category I Equipment

For further applied test standards please refer to section 3 of this test report.

Test Item

Kind of test item:	**Bodypack Transmitter**
Model name:	**N-BP1**
FCC ID:	**2A3FT-NBP12**
ISED certification number:	**28129-NBP1**
Frequency:	614 MHz – 616 MHz | 657 MHz – 663 MHz
Technology tested:	proprietary
Antenna:	external antenna
Power supply:	2.4 V to 4.2 V DC, by AA battery
Temperature range:	-20°C to +55°C

This test report is electronically signed and valid without handwritten signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

Test report authorized:

cn=Christoph Schneider, o=cetecom advanced GmbH, ou=SND-230601, email=christoph.schneider@cetecomadvanced.com, c=DE
2026.03.19 10:59:24 +01'00'

Christoph Schneider
Lab Manager
Radio Labs

Test performed:

cn=Joachim Wolsdorfer, o=cetecom advanced GmbH, ou=WLD-230605, email=joachim.wolsdorfer@cetecomadvanced.com, c=DE
2026.03.19 11:03:30 +01'00'

Hans-Joachim Wolsdorfer
Lab Manager
Radio Labs

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2 General information

2.1 Notes and disclaimer

The test results of this test report relate exclusively to the test item specified in this test report. cetecom advanced GmbH does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item.
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In no case this test report can be considered as a Letter of Approval.

This test report is electronically signed and valid without handwritten signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

This test report replaces the test report with the number 1-1312-25-01-05_TR1-R03 and dated 2026-03-19.

2.2 Application details

Date of receipt of order:	2025-11-18
Date of receipt of test item:	2025-11-20
Start of test:*	2025-11-26
End of test:*	2026-03-16
Person(s) present during the test:	-/-

*Date of each measurement, if not shown in the plot, can be requested. Dates are stored in the measurement software.

2.3 Test laboratories sub-contracted

None

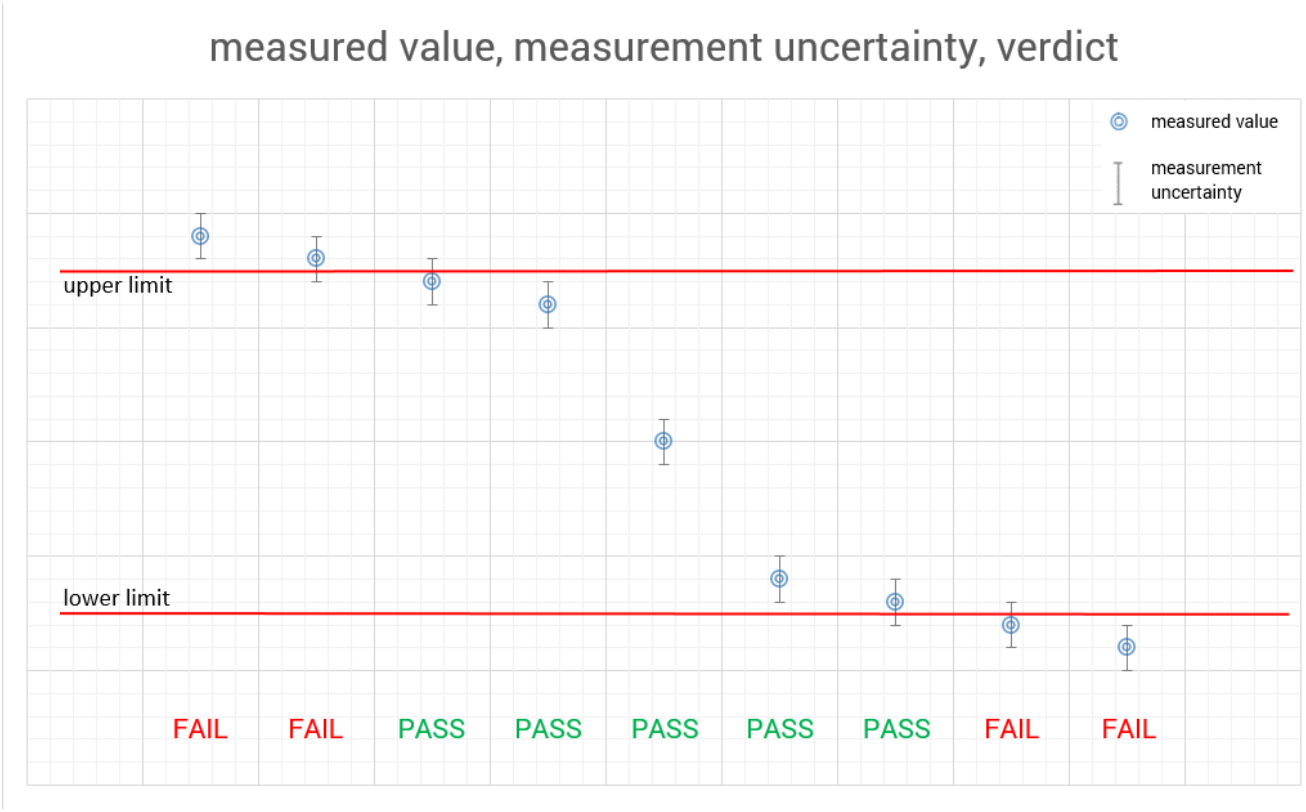
3 Test standard/s, references and accreditations

Test standard	Date	Description
FCC - Title 47 CFR Part 15		FCC - Title 47 of the Code of Federal Regulations; Chapter I; Part 15 - Radio frequency devices
RSS - 210 Issue 11	25.06.2024	Spectrum Management and Telecommunications Radio Standards Specification - Licence-Exempt Radio Apparatus: Category I Equipment
ETSI EN 300 422-1 V2.2.1	2021-11	Wireless Microphones; Audio PMSE up to 3 GHz; Part 1: Audio PMSE Equipment up to 3 GHz; Harmonised Standard for access to radio spectrum

Guidance	Version	Description
ANSI C63.4a-2017	-/-	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI C63.10-2020	-/-	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices Including - ANSI/USEMCSC C63.10-2020/Cor 1-2023 - ANSI/USEMCSC C63.10a-2024 - ANSI/USEMCSC C63.10a-2024 Amendment 1 / 2024-08-08 - ANSI/USEMCSC C63.10a-2024 Amendment 1 Errata / 2024-11-18

4 Reporting statements of conformity – decision rule

Only the measured values related to their corresponding limits will be used to decide whether the equipment under test meets the requirements of the test standards listed in chapter 3.
The measurement uncertainty is mentioned in this test report, see chapter 9, but is not taken into account - neither to the limits nor to the measurement results. Measurement results with a smaller margin to the corresponding limits than the measurement uncertainty have a potential risk of more than 5% that the decision might be wrong."



5 Test environment

Temperature	:	T_{nom} T_{max} T_{min}	+22 °C during room temperature tests +55 °C during high temperature tests -20 °C during low temperature tests
Relative humidity content	:		55 %
Barometric pressure	:		1021 hpa
Power supply	:	V_{nom} V_{max} V_{min}	3.0 V DC, by AA battery 4.2 V 2.4 V

6 Test item

6.1 General description

Kind of test item	:	Bodypack Transmitter
Model name	:	N-BP1
HMN	:	-/-
PMN	:	N-BP1
HVIN	:	N-BP1
FVIN	:	1.6
S/N serial number	:	CA000000
Hardware status	:	1
Software status	:	1.5 b 1362
Firmware status	:	1.6
Frequency band	:	614 MHz – 616 MHz | 657 MHz – 663 MHz
Type of radio transmission Use of frequency spectrum	: :	modulated carrier
Type of modulation	:	4FSK
Number of channels	:	20 (max.)
Antenna	:	external antenna
Power supply	:	2.4 V to 4.2 V DC, by AA battery
Temperature range	:	-20°C to +55°C

6.2 Additional information

The content of the following annexes is defined in the QA. It may be that not all of the listed annexes are necessary for this report, thus some values in between may be missing.

Test setup and EUT photos are included in test report: 1-1312-25-01-01_TR1-A101-R01
1-1312-25-01-01_TR1-A102-R01
1-1312-25-01-01_TR1-A103-R01

7 Description of the test setup

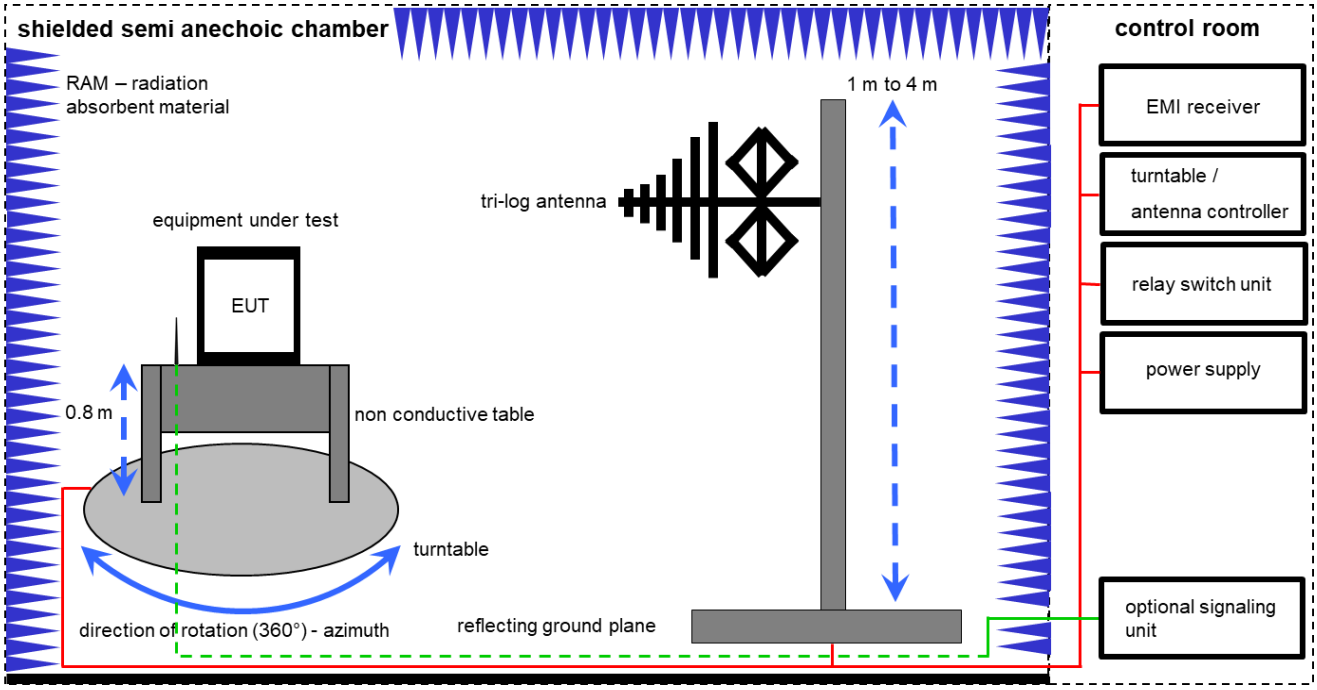
Typically, the calibrations of the test apparatus are commissioned to and performed by an accredited calibration laboratory. The calibration intervals are determined in accordance with the DIN EN ISO/IEC 17025. In addition to the external calibrations, the laboratory executes comparison measurements with other calibrated test systems or effective verifications. Weekly chamber inspections and range calibrations are performed. Where possible, RF generating and signaling equipment as well as measuring receivers and analyzers are connected to an external high-precision 10 MHz reference (GPS-based or rubidium frequency standard).

In order to simplify the identification of the equipment used at some special tests, some items of test equipment and ancillaries can be provided with an identifier or number in the equipment list below (Lab/Item).

Each block diagram listed can contain several test setup configurations. All devices belonging to a test setup are identified with the same letter syntax. For example: Column Setup and all devices with an A.

7.1 Shielded semi anechoic chamber

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 30 MHz to 1 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber. The receiving antennas are conform to specifications ANSI C63. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test setups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received. The wanted and unwanted emissions are received by spectrum analyzers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63.



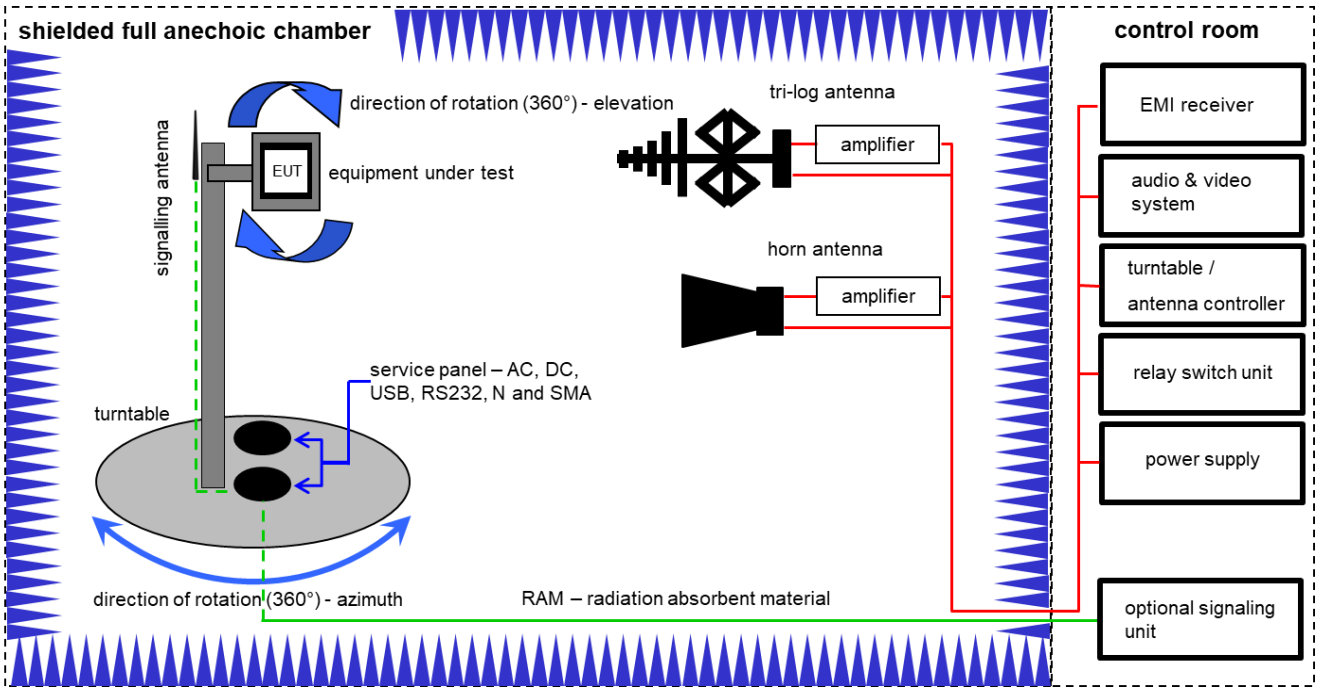
Measurement distance: tri-log antenna 10 meter
EMC32 software version: 10.59.00

FS = UR + CL + AF
(FS-field strength; UR-voltage at the receiver; CL-loss of the cable; AF-antenna factor)

Example calculation:
FS [dBµV/m] = 12.35 [dBµV] + 1.90 [dB] + 16.80 [dB/m] = 31.05 [dBµV/m] (35.69 µV/m) @ distance

No.	Setup	Equipment	Type	Manufacturer	Serial No.	INV. No.	Kind of Calibration	Last Calibration	Next Calibration
1	A	Switch-Unit	3488A	HP	2719A14505	300000368	ev	-/-	-/-
2	A	Semi anechoic chamber	3000023	MWB AG	-/-	300000551	ne	-/-	-/-
3	A	Antenna Tower	Model 2175	ETS-Lindgren	64762	300003745	izw	-/-	-/-
4	A	Positioning Controller	Model 2090	ETS-Lindgren	64672	300003746	izw	-/-	-/-
5	A	Turntable Interface-Box	Model 105637	ETS-Lindgren	44583	300003747	izw	-/-	-/-
6	A	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck Mess - Elektronik	318	300003696	vIKI!	31.01.2024	30.01.2026
7	A	Turntable	2089-4.0	EMCO	-/-	300004394	ne	-/-	-/-
8	A	PC	TecLine	F+W	-/-	300004388	ne	-/-	-/-
9	A	EMI Test Receiver	ESR3	Rohde & Schwarz	102587	300005771	k	06.12.2024	31.12.2025

7.2 Shielded fully anechoic chamber



Measurement distance: tri-log antenna and horn antenna 3 meter; loop antenna 3 meter

FS = UR + CA + AF
(FS-field strength; UR-voltage at the receiver; CA-loss of the signal path; AF-antenna factor)

Example calculation:
FS [dBµV/m] = 40.0 [dBµV] + (-35.8) [dB] + 32.9 [dB/m] = 37.1 [dBµV/m] (71.61 µV/m) @ distance

OP = AV + D - G + CA
(OP-radiated output power; AV-analyzer value; D-free field attenuation of measurement distance; G-antenna gain+amplifier gain; CA-loss signal path)

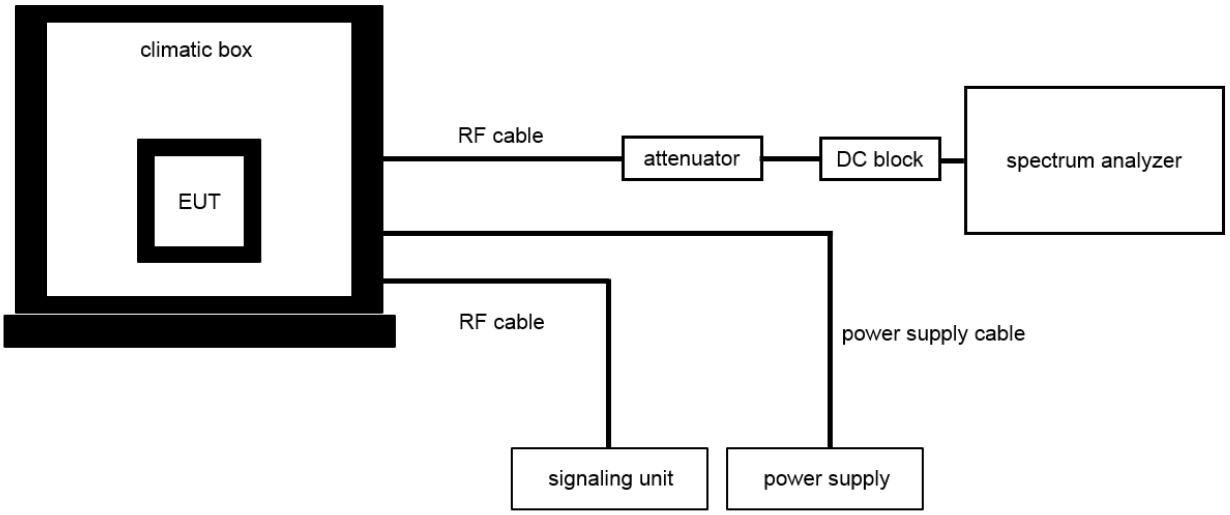
Example calculation:
OP [dBm] = -65.0 [dBm] + 50 [dB] - 20 [dBi] + 5 [dB] = -30 [dBm] (1 µW)

Equipment table:

No.	Setup	Equipment	Type	Manufacturer	Serial No.	INV. No.	Kind of Calibration	Last Calibration	Next Calibration
1	A, B	EMI Test Receiver 9kHz-26,5GHz	EMI Test Receiver 9kHz-26,5GHz ESR26	Rohde & Schwarz Messgerätebau GmbH / Memmingen	101376	40301	cal	08.12.2025	31.12.2026
2	B	Double-Ridged Waveguide Horn Antenna	Double-Ridged Waveguide Horn Antenna 3115	EMCO Elektronik GmbH / Gilching	8812-3089	300000307	cal	09.07.2024	09.07.2026
3	B	Highpass Filter	Highpass Filter WHK1.1/15G-10SS	Wainwright Instruments GmbH / Andechs	37	40362	cnn	-/-	-/-
4	B	Broadband Amplifier 0.5-18 GHz	Broadband Amplifier 0.5-18 GHz CBLU5184540	CERNEX	22050	40374	cpu	-/-	-/-
5	A, B	4U RF Switch Platform	4U RF Switch Platform L4491A	Agilent Technologies Deutschland GmbH / Böblingen	MY50000032	40376	cnn	-/-	-/-
6	A, B	NEXIO EMV-Software	NEXIO EMV-Software BAT EMC V2022.0.32.0	Nexio	-/-	40383	cnn	-/-	-/-
7	A, B	Anechoic chamber	Anechoic chamber	TDK	-/-	40385	cnn	-/-	-/-
8	A	TRILOG Broadband Antenna	TRILOG Broadband Antenna VULB9163	Schwarzbeck Mess-Elektronik OHG / Schönau	318	50284	cal	31.01.2024	31.01.2026

7.3 Conducted measurements normal and extreme conditions

Conducted measurements normal & extreme conditions



OP = AV + CA
(OP-output power; AV-analyzer value; CA-loss signal path)

Example calculation:
OP [dBm] = 6.0 [dBm] + 11.7 [dB] = 17.7 [dBm] (58.88 mW)

Equipment table:

No.	Setup	Equipment	Type	Manufacturer	Serial No.	INV. No.	Kind of Calibration	Last Calibration	Next Calibration
1	B	Signal analyzer	FSV30	Rohde & Schwarz	104365	300005923	k	04.12.2025	31.12.2026
2	A,B	Power Supply	HMP2020	Rohde & Schwarz	101961	300006102	k	04.12.2024	31.12.2026
3	B	Temperature Test Chamber	VT 4002	Heraeus Voetsch	521/83761	300002326	ev	18.09.2024	30.09.2026

8 Sequence of testing

8.1 Sequence of testing radiated spurious 30 MHz to 1 GHz

Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer.
- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- Measurement distance is 10 m or 3 m (see ANSI C 63.4) – see test details.
- EUT is set into operation.

Premeasurement

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height changes from 1 m to 3 m.
- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement

- The final measurement is performed for at least six highest peaks according to the requirements of the ANSI C63.4.
- Based on antenna and turntable positions at which the peak values are measured the software maximize the peaks by changing turntable position ± 45° and antenna height between 1 and 4 m.
- The final measurement is done with quasi-peak detector (as described in ANSI C 63.4).
- Final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit are recorded. A plot with the graph of the premeasurement with marked maximum final results and the limit is stored.

8.2 Sequence of testing radiated spurious 1 GHz to 12.75 GHz

Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer.
- If the EUT is a tabletop system, a 2-axis positioner with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed directly on the turn table.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- Measurement distance is 3 m (see ANSI C 63.4) – see test details.
- EUT is set into operation.

Premeasurement

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height is 1.5 m.
- At each turntable position and antenna polarization the analyzer sweeps with positive peak detector to find the maximum of all emissions.

Final measurement

- The final measurement is performed for at least six highest peaks according to the requirements of the ANSI C63.4.
- Based on antenna and turntable positions at which the peak values are measured the software maximizes the peaks by rotating the turntable from 0° to 360°. This measurement is repeated for different EUT-table positions (0° to 150° in 30°-steps) and for both antenna polarizations.
- The final measurement is done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and RMS detector (as described in ANSI C 63.4).
- Final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit are recorded. A plot with the graph of the premeasurement with marked maximum final results and the limit is stored.

9 Measurement uncertainty

Measurement uncertainty	
Test case	**Uncertainty**
Transmitter output power	± 3 dB
Occupied bandwidth	± 3 kHz to 10 kHz (depends on the used RBW)
Transmitter frequency stability	± 1 Hz to 1 kHz (depends on the used RBW)
Transmitter unwanted emissions (radiated or conducted)	Radiated: ± 3 dB Conducted: ± 0.5 dB
Modulation characteristics	-/-
Necessary bandwidth (BN) for analogue systems	± 1 kHz (depends on the used RBW)
Frequency modulation	± 3 kHz (depends on the used RBW)
Spurious emissions conducted below 30 MHz (AC conducted)	± 2.6 dB

10 Summary of measurement results

☒	No deviations from the technical specifications were ascertained
☐	There were deviations from the technical specifications ascertained
☐	This test report is only a partial test report. The content and verdict of the performed test cases are listed below.

TC Identifier	Description	Verdict	Date	Remark
RF-Testing	FCC Part 15 RSS - 210, Issue 11 RSS-Gen Issue 5	See table!	2026-03-19	-/-

Test specification clause	Test case	Temperature conditions	Voltage conditions	C	NC	NA	NP	Remark
FCC Part 15.236 (d)(2) FCC Part 2.1046) RSS-210 – G.2 RSS-Gen – 6.12	Transmitter output power	Nominal	Nominal	☒	☐	☐	☐	-/-
FCC Part 15.236 (f)(1) (ii) FCC Part 2.1049 RSS-210 – G.3 RSS-Gen – 6.6	Occupied bandwidth	Nominal	Nominal	☒	☐	☐	☐	-/-
FCC Part 15.236 (f)(1) (iii) FCC Part 2.1055 RSS-210 – G.4 RSS-Gen – 6.11	Transmitter frequency stability	Nominal	Nominal	☒	☐	☐	☐	-/-
		Extreme	Extreme	☒	☐	☐	☐	
FCC Part 15.236 (g) (2) RSS-210 – G.5 ETSI EN 300 422-1 V2.2.1(2021-11)	Transmitter unwanted emissions (radiated and conducted)	Nominal	Nominal	☒	☐	☐	☐	-/-
FCC Part 2.1047	Modulation characteristics	Nominal	Nominal	-/-				digital modulation
FCC Part 15.236 (g) (2) RSS-210 G.5 ETSI EN 300 422-1 V2.2.1(2021-11)	Transmitter Emission Mask in the out of band domain for digital systems	Nominal	Nominal	☒	☐	☐	☐	-/-
FCC Part 15.107(a) FCC Part 15.207	Conducted emissions < 30 MHz	Nominal	Nominal	☐	☐	☒	☐	battery powered

Note: C = Compliant; NC = Not compliant; NA = Not applicable; NP = Not performed

11 Additional comments

Reference documents: Customer_Questionnaire_Belt-pack_rev2

Special test descriptions: None

Configuration descriptions: power setting 5 mW

Test mode:

☒ No test mode available.
Test signal is applied to the transmitter.

☒ Special software is used.
EUT is transmitting pseudo random data by itself

Antennas and transmit operating modes:

☒ Operating mode 1 (single antenna)

- *Equipment with 1 antenna,*
- *Equipment with 2 diversity antennas operating in switched diversity mode by which at any moment in time only 1 antenna is used,*
- *Smart antenna system with 2 or more transmit/receive chains, but operating in a mode where only 1 transmit/receive chain is used)*

☐ Operating mode 2 (multiple antennas, no beamforming)

- *Equipment operating in this mode contains a smart antenna system using two or more transmit/receive chains simultaneously but without beamforming.*

☐ Operating mode 3 (multiple antennas, with beamforming)

- *Equipment operating in this mode contains a smart antenna system using two or more transmit/receive chains simultaneously with beamforming.*
  In addition to the antenna assembly gain (G), the beamforming gain (Y) may have to be taken into account when performing the measurements.

12 Measurement results

12.1 Transmitter output power

Measurement:

Measurement parameter	
Detector:	Peak (worst case) / Average (RMS)
Sweep time:	Auto / 20s
Resolution bandwidth:	> emission bandwidth
Video bandwidth:	> resolution bandwidth
Span:	> 2 times emissions bandwidth
Trace mode:	Max. hold
EUT configuration:	Peak: Unmodulated carrier RMS: Modulate the transmitter with a 2.5 kHz tone at a level 16 dB higher than that required to produce a frequency deviation of ± 75 kHz, or to produce 50% of the manufacturer's rated deviation, whichever is less.
Test setup:	See sub clause 7.2 A, 7.3 A
Measurement uncertainty:	See sub clause 9

Limits:

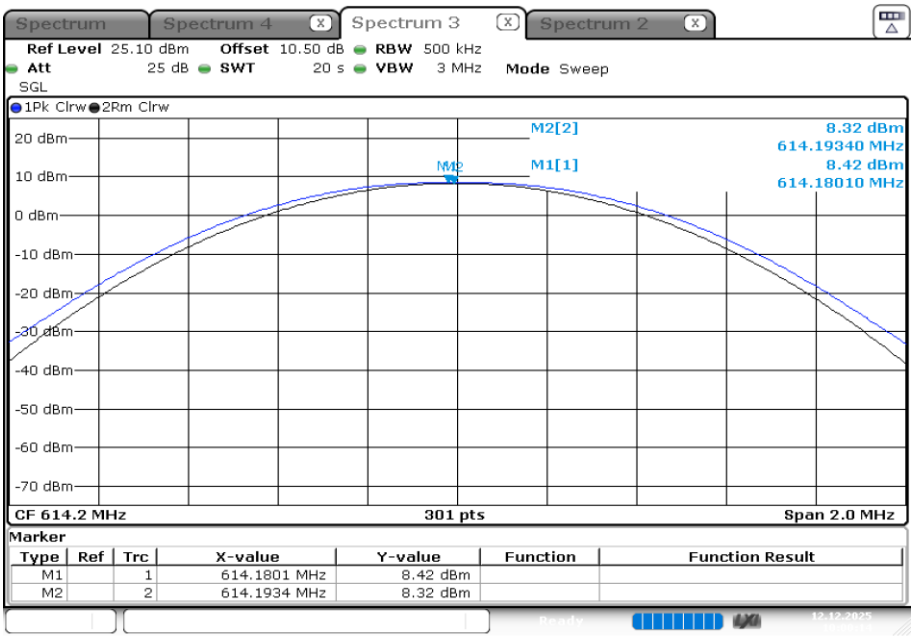
FCC	ISED
614 MHz – 616 MHz 657 MHz – 663 MHz	614 MHz – 616 MHz 653 MHz – 663 MHz
≤ 20 mW E.I.R.P. (13 dBm)	

Result(EUT power setting 5mW):

	Transmitter conducted output power		Transmitter radiated output power e.i.r.p.	
frequencies	**peak**	**average**	**peak**	**average**
614.2 MHz	8.42 dBm	8.32 dBm	9.54 dBm	9.44 dBm
615.8 MHz	8.36 dBm	8.26 dBm	9.77 dBm	9.67 dBm
657.2 MHz	7.24 dBm	7.16 dBm	6.86 dBm	6.78 dBm
662.8 MHz	7.11 dBm	7.03 dBm	5.54 dBm	5.46 dBm

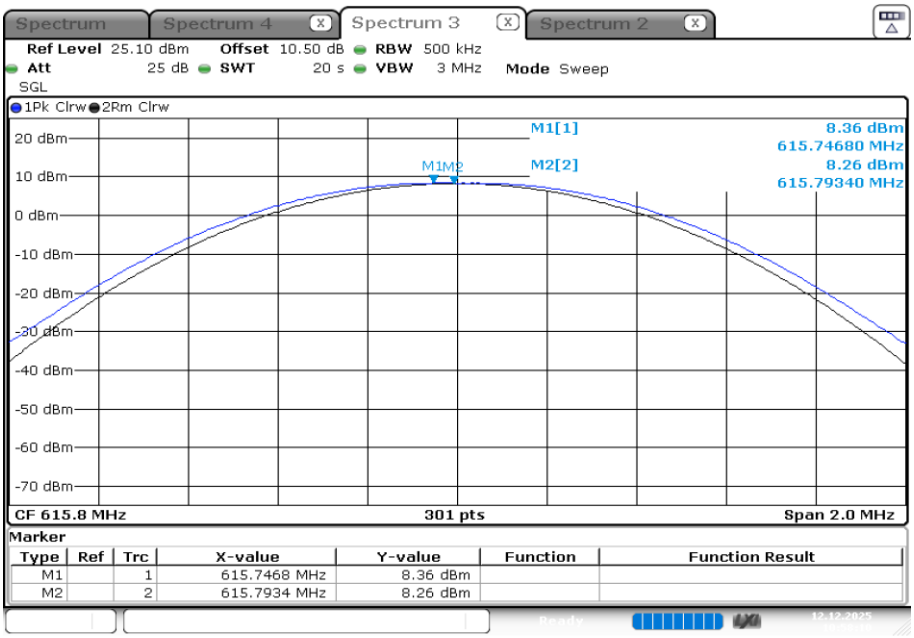
Plots:

Plot 1: 614.2 MHz



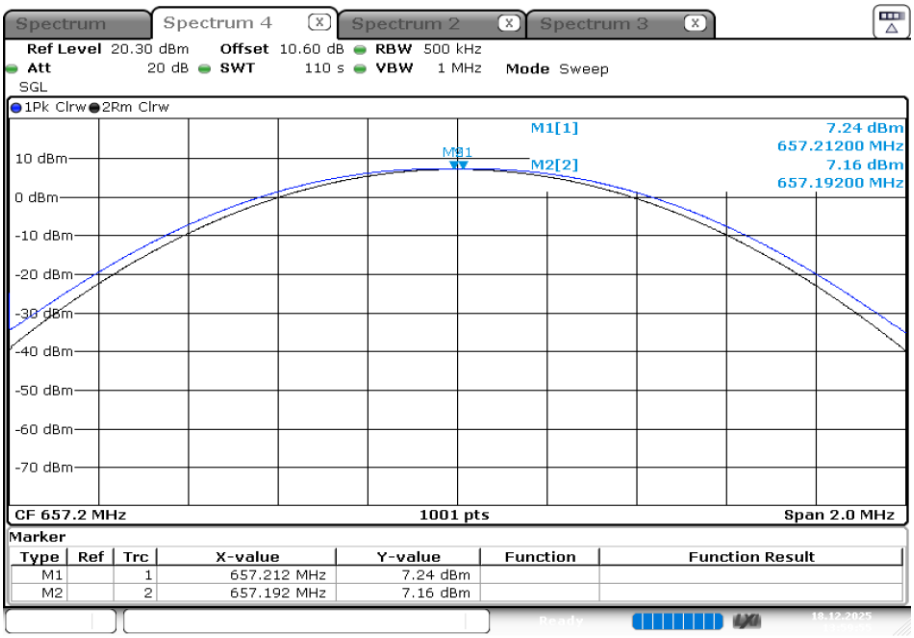
Date: 12.DEC.2025 10:00:15

Plot 2: 615.8 MHz

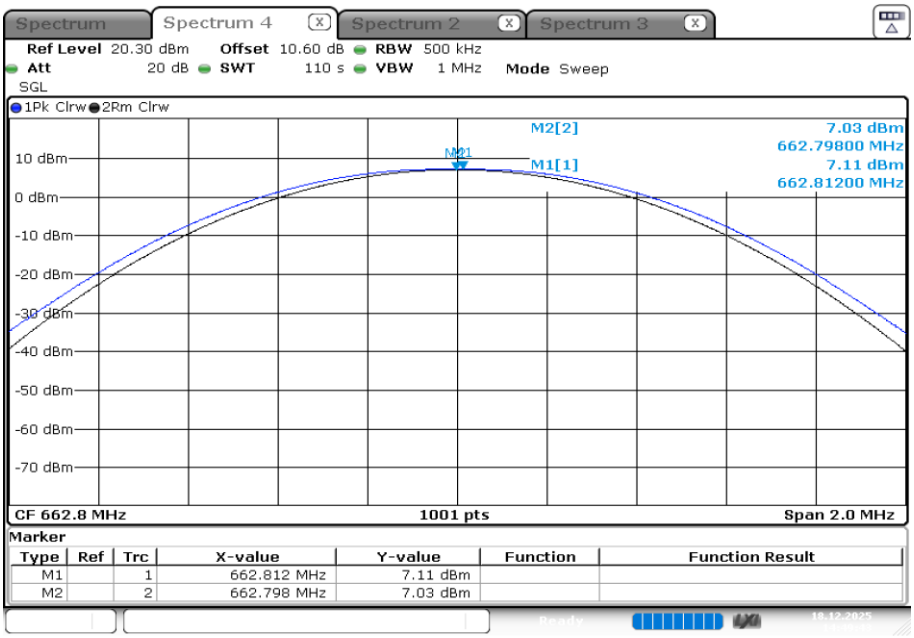


Date: 12.DEC.2025 10:58:11

Plot 3: 657.2 MHz



Plot 4: 662.8 MHz



12.2 Occupied bandwidth

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	1 % to 5 % of the occupied bandwidth
Video bandwidth:	3 x resolution bandwidth
Span:	2 x emission bandwidth
Trace mode:	Max. hold
Analyzer function:	99% power occupied bandwidth function
EUT:	Modulated signal with max. frequency deviation
Test setup:	See sub clause 7.3 A
Measurement uncertainty:	See sub clause 9

Limits:

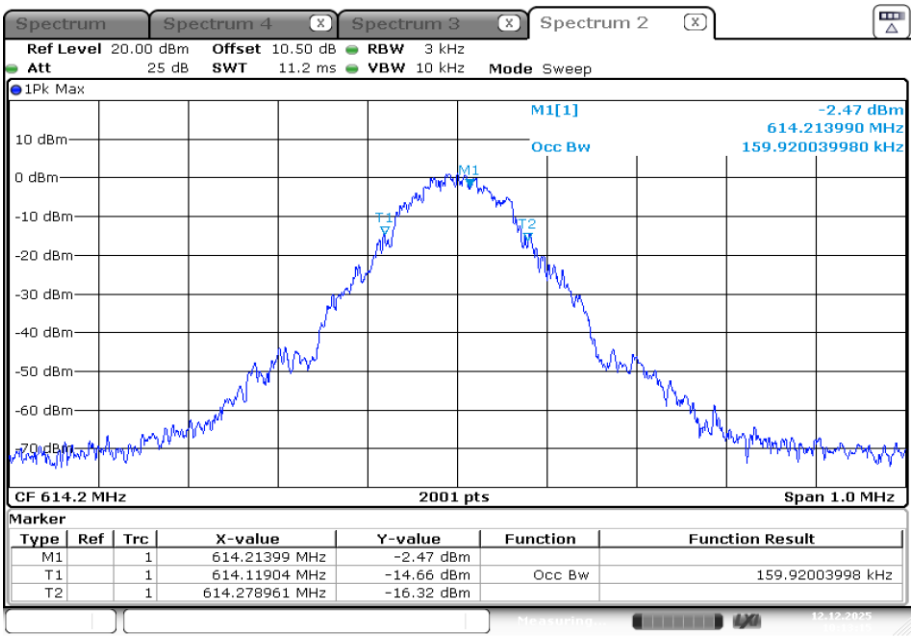
FCC	ISED
614 MHz – 616 MHz | 657 MHz – 663 MHz	614 MHz – 616 MHz | 653 MHz – 663 MHz
≤ 200 kHz	

Result:

Occupied bandwidth	
frequency	**OBW**
614.2 MHz	159.92 kHz
615.8 MHz	153.42 kHz
657.2 MHz	149.92 kHz
662.8 MHz	156.92 kHz

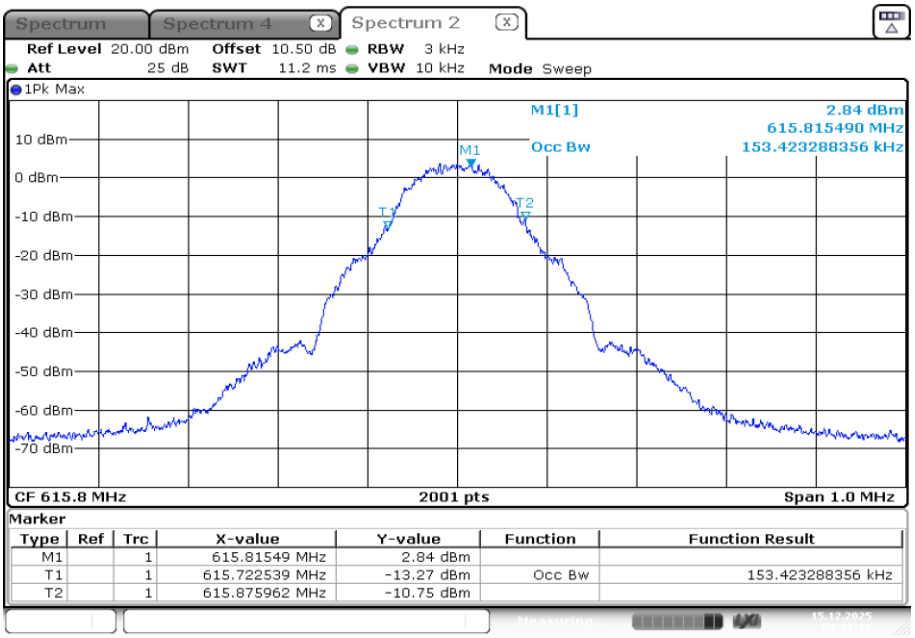
Plots:

Plot 1: 614.2 MHz



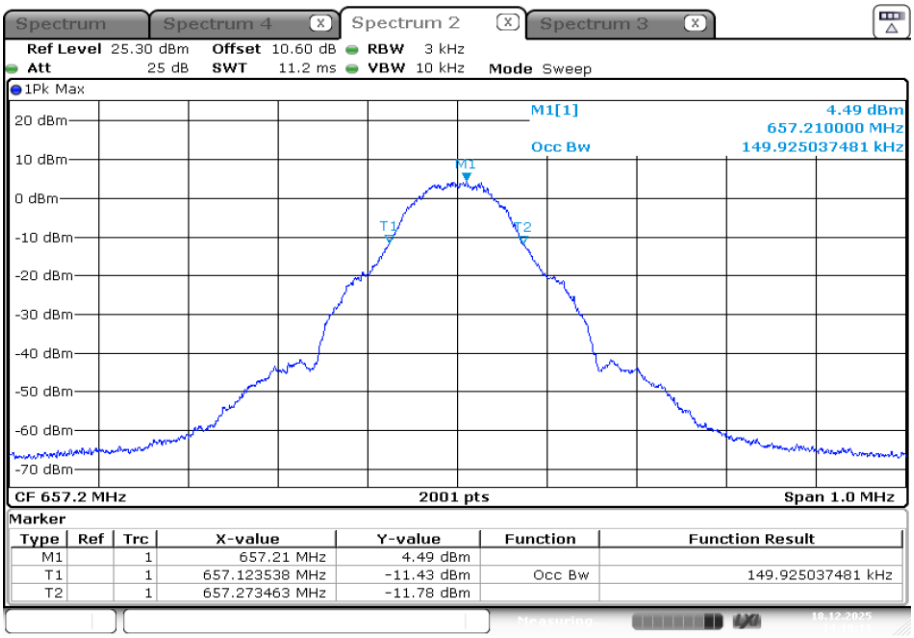
Date: 12.DEC.2025 10:13:16

Plot 2: 615.8 MHz



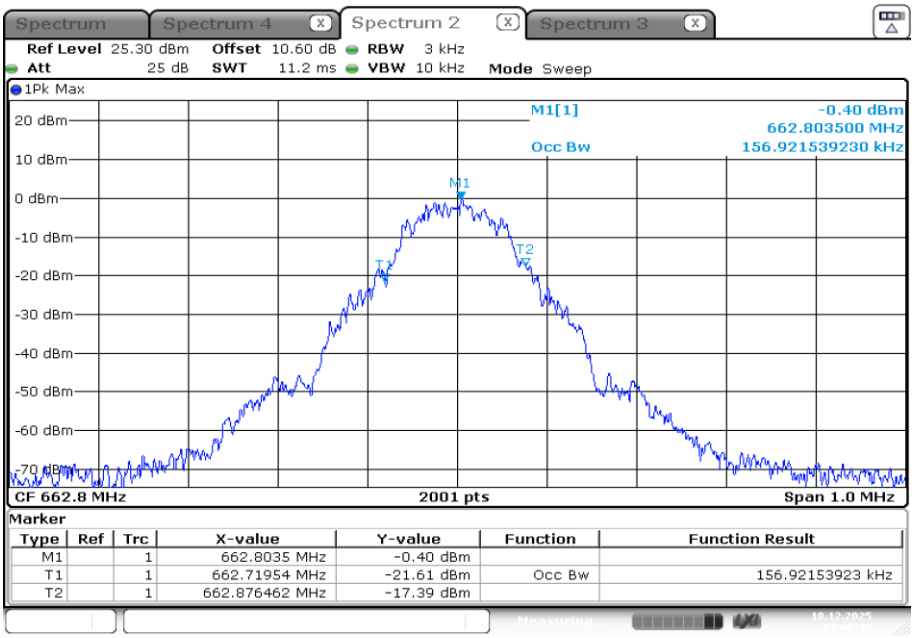
Date: 15.DEC.2025 08:21:19

Plot 3: 657.2 MHz



Date: 18.DEC.2025 14:19:12

Plot 4: 662.8 MHz



Date: 18.DEC.2025 14:46:44

12.3 Transmitter frequency stability

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	1 Hz / 10 Hz / 100 Hz
Video bandwidth:	3 x resolution bandwidth
Span:	wide enough to follow the frequency drift
Trace mode:	clear/write/view
EUT:	CW signal or MC with measurement method description
Test setup:	See sub clause 7.3 B
Measurement uncertainty:	See sub clause 9

Remark (RSS Gen):
"If the device contains both licence and licence-exempt transmitter modules, the device's frequency stability shall be measured under the most stringent condition specified in the applicable RSS of the transmitter module"

Limits:

FCC	ISED
614 MHz – 616 MHz | 657 MHz – 663 MHz	614 MHz – 616 MHz | 653 MHz – 663 MHz
≤ ± 50 ppm	

Results: 614.2 MHz

Temperature / Voltage	Frequency (MHz)	Deviation (kHz / ppm)
-30 °C / V_{nom}	614.199600	-0.400 / 0.65
-20 °C / V_{nom}	614.200200	0.200 / 0.33
-10 °C / V_{nom}	614.198801	-1.199 / 1.95
0 °C / V_{nom}	614.199001	-0.999 / 1.63
+10 °C / V_{nom}	614.198801	-1.199 / 1.95
+30 °C / V_{nom}	614.198601	-1.399 / 2.28
+40 °C / V_{nom}	614.199001	-0.999 / 1.63
+50 °C / V_{nom}	614.199201	-0.799 / 1.30
+20 °C / V_{nom} - 15%	614.199067	-0.933 / 1.52
+20 °C / V_{nom}	614.199067	-0.933 / 1.52
+20 °C / V_{nom} + 15%	614.198934	-1.066 / 1.74

Results: 615.8 MHz

Temperature / Voltage	Frequency (MHz)	Deviation (kHz / ppm)
-30 °C / V_{nom}	615.800200	0.200 / 0.32
-20 °C / V_{nom}	615.799001	-0.999 / 1.62
-10 °C / V_{nom}	615.799001	-0.999 / 1.62
0 °C / V_{nom}	615.798801	-1.199 / 1.95
+10 °C / V_{nom}	615.799001	-0.999 / 1.62
+30 °C / V_{nom}	615.799201	-0.799 / 1.30
+40 °C / V_{nom}	615.798801	-1.199 / 1.95
+50 °C / V_{nom}	615.798601	-1.399 / 2.27
+20 °C / V_{nom} - 15%	615.798867	-1.133 / 1.84
+20 °C / V_{nom}	615.798734	-1.266 / 2.06
+20 °C / V_{nom} + 15%	615.798934	-1.066 / 1.73

Results: 657.2 MHz

Temperature / Voltage	Frequency (MHz)	Deviation (kHz / ppm)
-30 °C / V_{nom}	657.199001	-0.999 / 1.52
-20 °C / V_{nom}	657.199001	-0.999 / 1.52
-10 °C / V_{nom}	657.198601	-1.399 / 2.12
0 °C / V_{nom}	657.198601	-1.399 / 2.12
+10 °C / V_{nom}	657.197802	-2.198 / 3.34
+30 °C / V_{nom}	657.199600	-0.400 / 0.60
+40 °C / V_{nom}	657.198402	-1.598 / 2.43
+50 °C / V_{nom}	657.198601	-1.399 / 2.12
+20 °C / V_{nom} - 15%	657.198734	-1.266 / 1.92
+20 °C / V_{nom}	657.199200	-0.800 / 1.21
+20 °C / V_{nom} + 15%	657.199000	-1.000 / 1.52

Results: 662.8 MHz

Temperature / Voltage	Frequency (MHz)	Deviation (kHz / ppm)
-30 °C / V_{nom}	662.799201	-0.799 / 1.21
-20 °C / V_{nom}	662.799001	-0.999 / 1.51
-10 °C / V_{nom}	662.798801	-1.199 / 1.81
0 °C / V_{nom}	662.799001	-0.999 / 1.51
+10 °C / V_{nom}	662.798402	-1.598 / 2.41
+30 °C / V_{nom}	662.799001	-0.999 / 1.51
+40 °C / V_{nom}	662.798202	-1.798 / 2.71
+50 °C / V_{nom}	662.798402	-1.598 / 2.41
+20 °C / V_{nom} - 15%	662.798934	-1.066 / 1.61
+20 °C / V_{nom}	662.799400	-0.600 / 0.90
+20 °C / V_{nom} + 15%	662.799467	-0.533 / 0.80

12.4 Transmitter unwanted emissions (radiated) 30 MHz -1 GHz

Measurement:

Measurement parameter	
Detector:	Peak (prescan) / RMS
Sweep time:	Auto
Resolution bandwidth:	See table below!
Video bandwidth:	See table below!
Span:	100 MHz steps!
Trace-Mode:	Max. hold
EUT:	MC with max frequency deviation
Used equipment:	See chapter 7.1 A
Measurement uncertainty:	See chapter 9

Frequency being measured	Measuring receiver bandwidth
25 MHz to 30 MHz	9 kHz to 10 kHz
30 MHz to 1 000 MHz	100 kHz
> 1 000 MHz	1 MHz

Limits:

FCC	ISED
FCC 47 CFR § 2.1053 47 CFR 74.861 (e)(6) On any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25 dB; On any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35 dB; On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least 43 + 10log10 (mean output power in watts) dB.	RSS 210 G.5
ETSI EN 300422 V2.2.1 (2021-11), section 4.2.4.1.2	

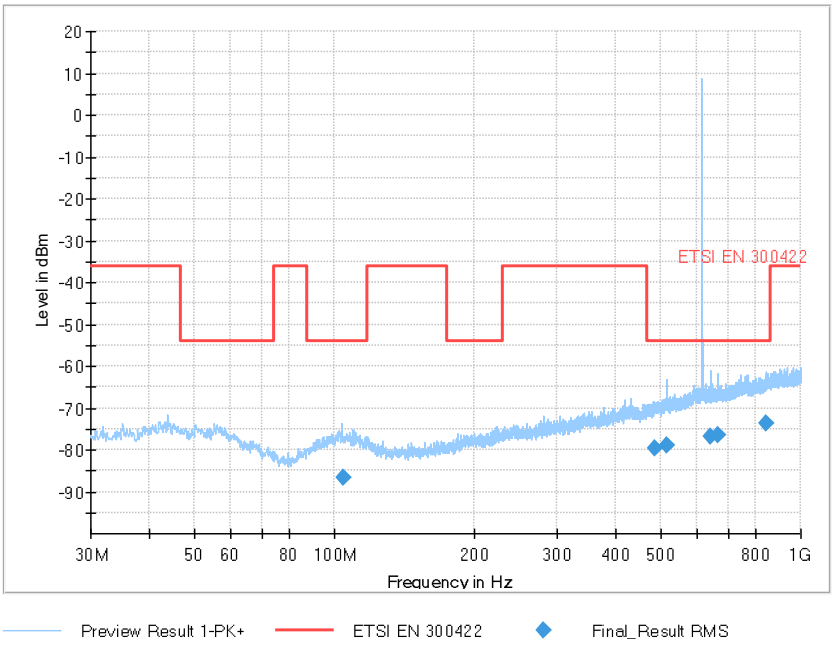
Limit: according to ETSI EN 300422 V2.2.1 section 4.2.4.1.2

Frequency range	Maximum power	RBW
9 kHz - 150 kHz	-36 dBm	1 kHz
150 kHz - 30 MHz	-36 dBm	10 kHz
30 MHz - 1 GHz	-36 dBm	$F_c + 2,5\ B \le f \le f_c + 4\ B$: 1 kHz $F_c + 4\ B < f \le f_c + 10\ B$: 10 kHz $f > f_c + 10\ B$: 100 kHz $f < f_c - 10\ B$: 100 kHz $f_c - 10\ B \le f < f_c - 4\ B$: 10 kHz $f_c - 4\ B \le f \le f_c - 2,5\ B$: 1 kHz
except:		
47 MHz - 74 MHz 87,5 MHz - 118 MHz	-54 dBm	100 kHz
174 MHz - 230 MHz 470 MHz - 862 MHz	-54 dBm	$F_c + 2,5\ B \le f \le f_c + 4\ B$: 1 kHz $F_c + 4\ B < f \le f_c + 10\ B$: 10 kHz $f > f_c + 10\ B$: 100 kHz $f < f_c - 10\ B$: 100 kHz $f_c - 10\ B \le f < f_c - 4\ B$: 10 kHz $f_c - 4\ B \le f \le f_c - 2,5\ B$: 1 kHz
1 GHz < $f \le F_{upper}$	-30 dBm	$F_c + 2,5\ B \le f \le f_c + 10\ B$: 30 kHz $F_c + 10\ B < f \le f_c + 12\ B$: 300 kHz $f > f_c + 12\ B$: 1 MHz $f < f_c - 12\ B$: 1 MHz $f_c - 12\ B \le f < f_c - 10\ B$: 300 kHz $f_c - 10\ B \le f \le f_c - 2,5\ B$: 30 kHz

Results:

see table below plots

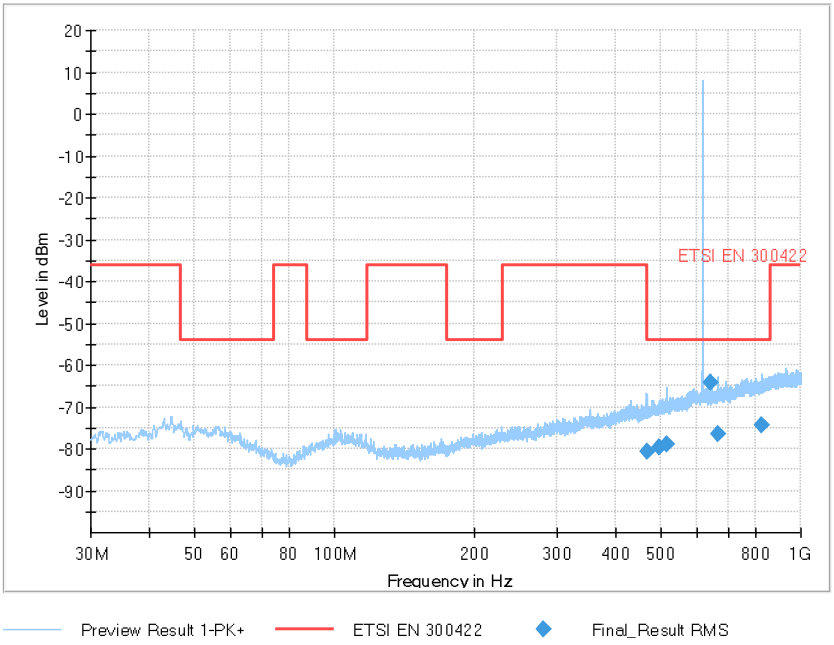
Plot 1: 614.2 MHz, spurious emissions, 30 MHz - 1 GHz



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
104.551	-86.57	-54.0	32.6	1000	100.0	159.0	V	265	-74
484.939	-79.60	-54.0	25.6	1000	100.0	115.0	V	-28	-68
516.491	-78.92	-54.0	24.9	1000	100.0	400.0	V	-29	-68
637.989	-76.76	-54.0	22.8	1000	100.0	400.0	V	-25	-66
664.439	-76.46	-54.0	22.5	1000	100.0	290.0	V	-9	-65
845.093	-73.71	-54.0	19.7	1000	100.0	200.0	H	300	-63

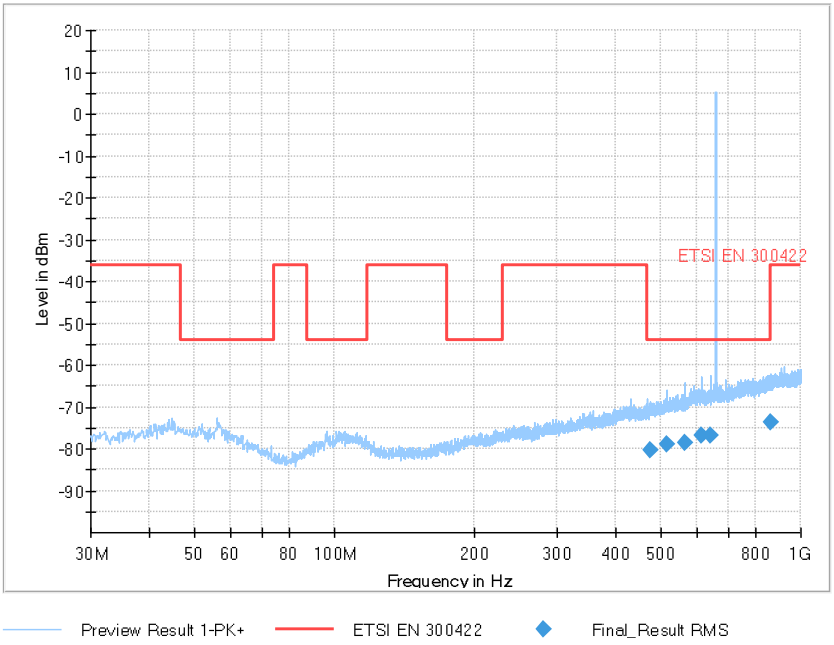
Plot 2: 615.8 MHz, spurious emissions, 30 MHz - 1 GHz



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
467.121	-80.54	-36.0	44.5	1000	100.0	291.0	V	168	-69
495.853	-79.52	-54.0	25.5	1000	100.0	200.0	V	30	-68
515.924	-79.00	-54.0	25.0	1000	100.0	400.0	V	152	-68
639.011	-64.12	-54.0	10.1	1000	100.0	249.0	V	10	-66
663.136	-76.54	-54.0	22.5	1000	100.0	400.0	V	-10	-65
822.759	-74.46	-54.0	20.5	1000	100.0	209.0	H	210	-63

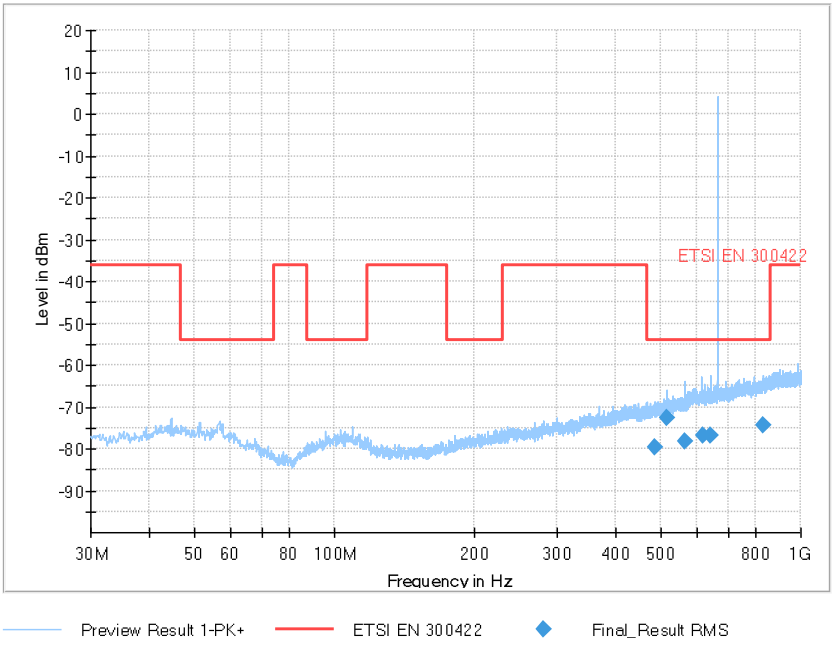
Plot 3: 657.2 MHz, spurious emissions, 30 MHz - 1 GHz



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
474.695	-80.18	-54.0	26.2	1000	100.0	400.0	V	210	-69
515.296	-79.05	-54.0	25.1	1000	100.0	400.0	V	171	-68
564.495	-78.42	-54.0	24.4	1000	100.0	400.0	V	4	-67
613.437	-76.69	-54.0	22.7	1000	100.0	327.0	V	21	-65
639.326	-76.91	-54.0	22.9	1000	100.0	388.0	V	30	-66
861.779	-73.63	-54.0	19.6	1000	100.0	400.0	H	76	-63

Plot 4: 662.8 MHz, spurious emissions, 30 MHz - 1 GHz



Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
486.801	-79.51	-54.0	25.5	1000	100.0	400.0	V	248	-68
516.134	-72.49	-54.0	18.5	1000	100.0	314.0	V	88	-68
564.760	-78.35	-54.0	24.4	1000	100.0	368.0	V	30	-67
615.008	-76.70	-54.0	22.7	1000	100.0	400.0	V	300	-65
639.487	-76.89	-54.0	22.9	1000	100.0	377.0	V	30	-66
829.569	-74.27	-54.0	20.3	1000	100.0	196.0	H	4	-63

12.5 Transmitter unwanted emissions (radiated) 1 GHz – 12.75 GHz

Measurement:

Measurement parameter	
Detector:	Peak (prescan) / RMS
Sweep time:	Auto
Resolution bandwidth:	See table below!
Video bandwidth:	See table below!
Span:	100 MHz steps!
Trace-Mode:	Max. hold
EUT:	MC with max frequency deviation
Used equipment:	See chapter 7.2 B
Measurement uncertainty:	See chapter 9

Frequency being measured	Measuring receiver bandwidth
25 MHz to 30 MHz	9 kHz to 10 kHz
30 MHz to 1 000 MHz	100 kHz
> 1 000 MHz	1 MHz

Limits:

FCC	ISED
FCC 47 CFR § 2.1053 47 CFR 74.861 (e)(6) On any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25 dB; On any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35 dB; On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least 43 + 10log10 (mean output power in watts) dB.	RSS 210 G.5
ETSI EN 300422 V2.2.1 (2021-11), section 4.2.4.1.2	

Limit: according to ETSI EN 300422 V2.2.1 section 4.2.4.1.2

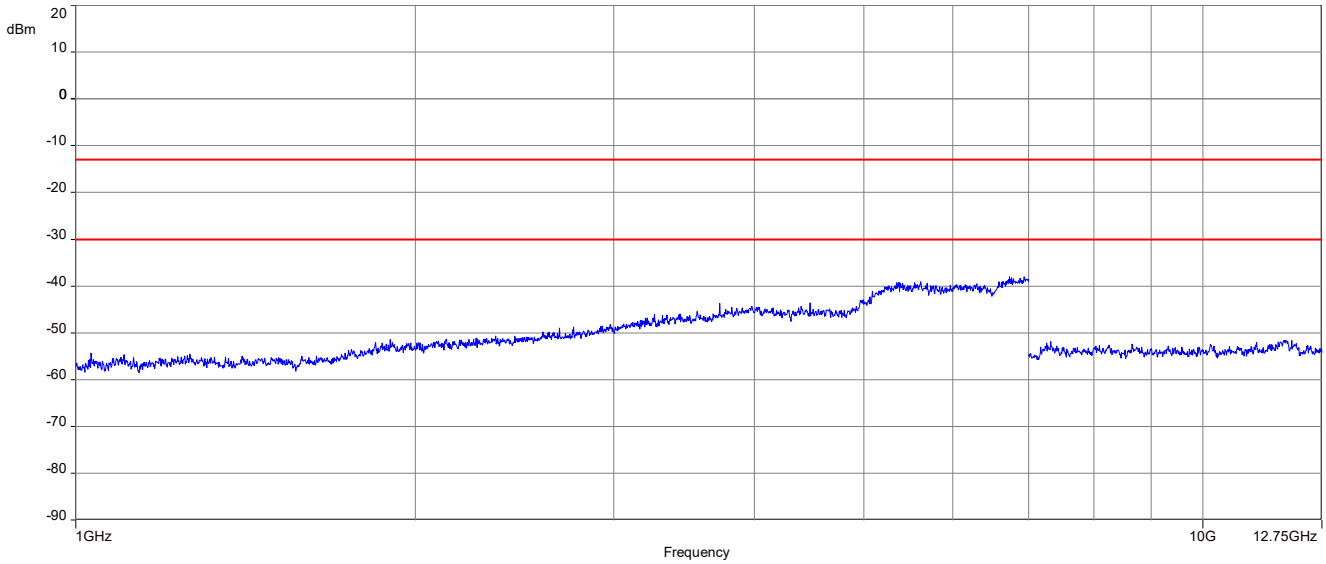
Frequency range	Maximum power	RBW
9 kHz - 150 kHz	-36 dBm	1 kHz
150 kHz - 30 MHz	-36 dBm	10 kHz
30 MHz - 1 GHz	-36 dBm	F_c + 2,5 B ≤ f ≤ f_c + 4 B: 1 kHz F_c + 4 B < f ≤ f_c + 10 B: 10 kHz f > f_c + 10 B: 100 kHz f < f_c - 10 B: 100 kHz f_c - 10 B ≤ f < f_c - 4 B: 10 kHz f_c - 4 B ≤ f ≤ f_c - 2,5 B: 1 kHz
except:		
47 MHz - 74 MHz 87,5 MHz - 118 MHz	-54 dBm	100 kHz
174 MHz - 230 MHz 470 MHz - 862 MHz	-54 dBm	F_c + 2,5 B ≤ f ≤ f_c + 4 B: 1 kHz F_c + 4 B < f ≤ f_c + 10 B: 10 kHz f > f_c + 10 B: 100 kHz f < f_c - 10 B: 100 kHz f_c - 10 B ≤ f < f_c - 4 B: 10 kHz f_c - 4 B ≤ f ≤ f_c - 2,5 B: 1 kHz
1 GHz < f ≤ F_{upper}	-30 dBm	F_c + 2,5 B ≤ f ≤ f_c + 10 B: 30 kHz F_c + 10 B < f ≤ f_c + 12 B: 300 kHz f > f_c + 12 B: 1 MHz f < f_c - 12 B: 1 MHz f_c - 12 B ≤ f < f_c - 10 B: 300 kHz f_c - 10 B ≤ f ≤ f_c - 2,5 B: 30 kHz

Results:

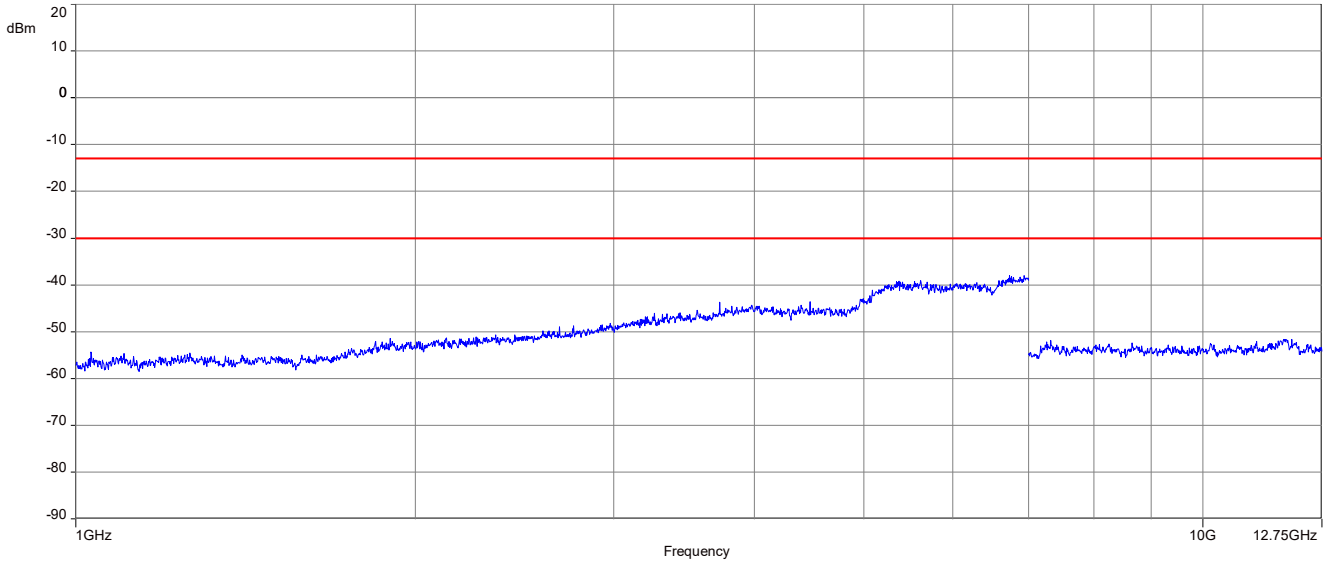
carrier frequency (MHz)	unwanted emission frequency (MHz)	Limit	level (dB) / (dBm) or remark
All detected emissions are more than 10 dB below the limit.			

Plots: radiated

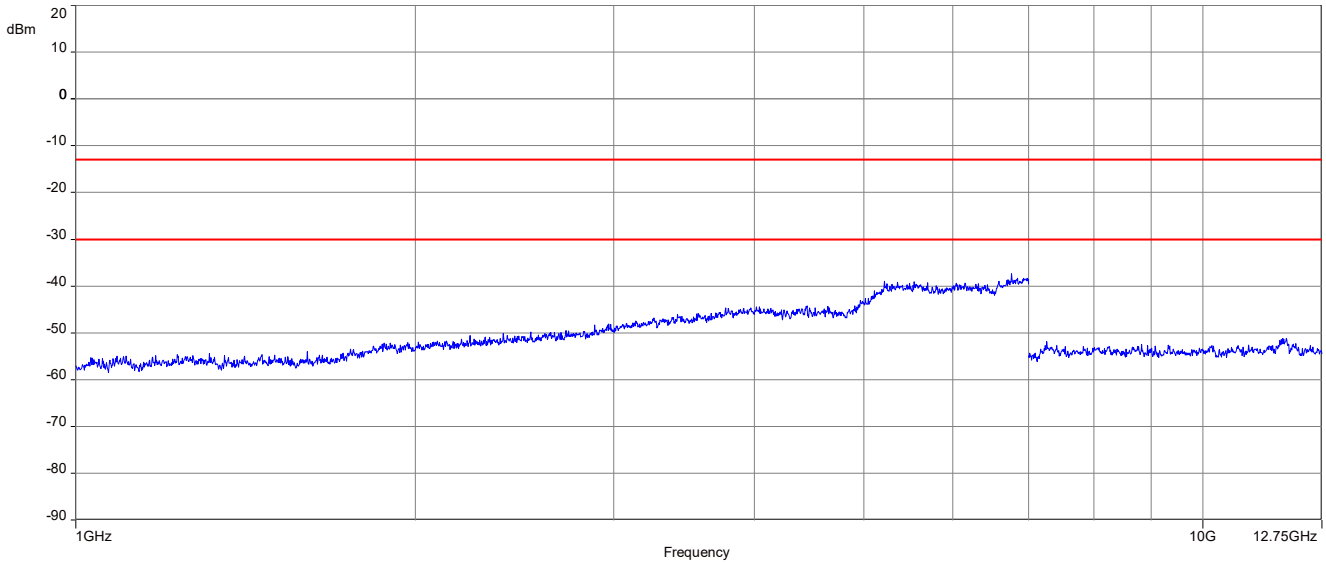
Plot 1: 614.2 MHz, spurious emissions, 1 GHz – 12.75 GHz



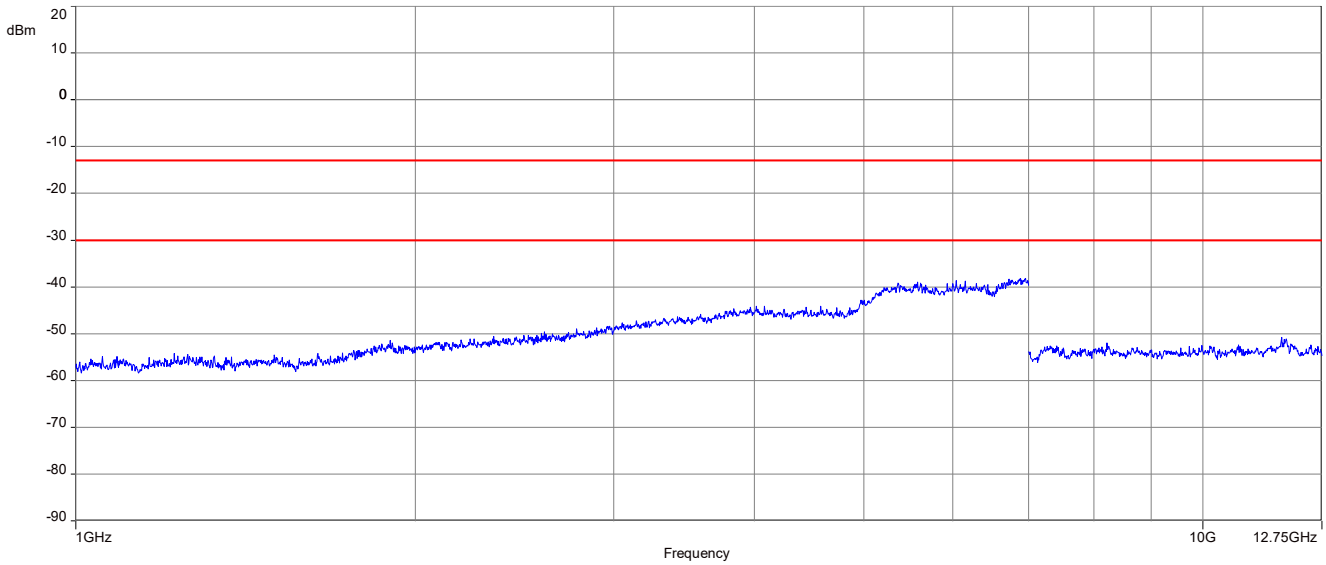
Plot 2: 615.8 MHz, spurious emissions, 1 GHz – 12.75 GHz



Plot 3: 657.2 MHz, spurious emissions, 1 GHz – 12.75 GHz



Plot 4: 662.8 MHz, spurious emissions, 1 GHz – 12.75 GHz



12.6 Transmitter unwanted emissions (conducted)

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	See plots
Resolution bandwidth:	30 MHz – 1 GHz: 100 kHz 1 GHz – 7 GHz: 1 MHz
Video bandwidth:	30 MHz – 1 GHz: 300 kHz 1 GHz – 7 GHz: 3 MHz
Span:	See plots
Trace-Mode:	Max. hold
Used equipment:	See chapter 7.3 A
Measurement uncertainty:	See chapter 9

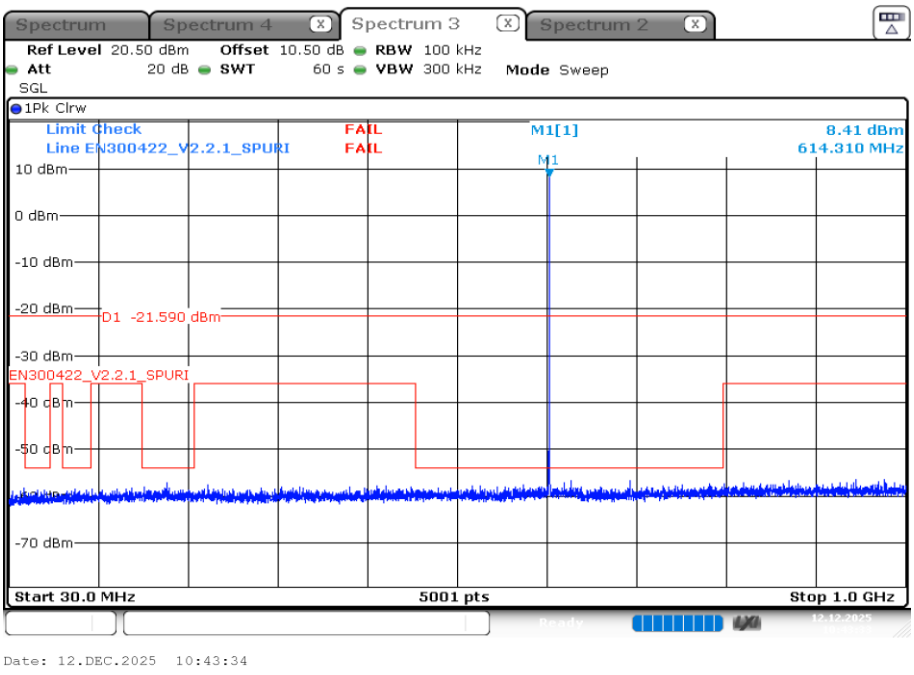
Limits:

FCC	IC
FCC 47 CFR § 2.1051 47 CFR 74.861 (e)(6) On any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25 dB; On any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35 dB; On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least 43 + 10log10 (mean output power in watts) dB.	RSS 210 G.5
ETSI EN 300422 V2.2.1 (2021-11), section 4.2.4.1.2	

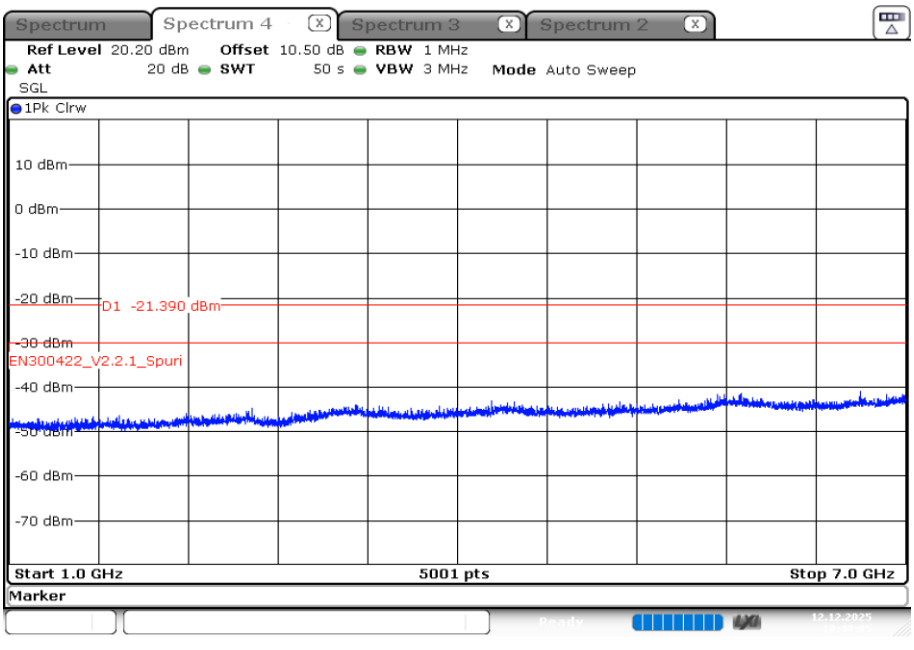
Results: see plots

Plots:

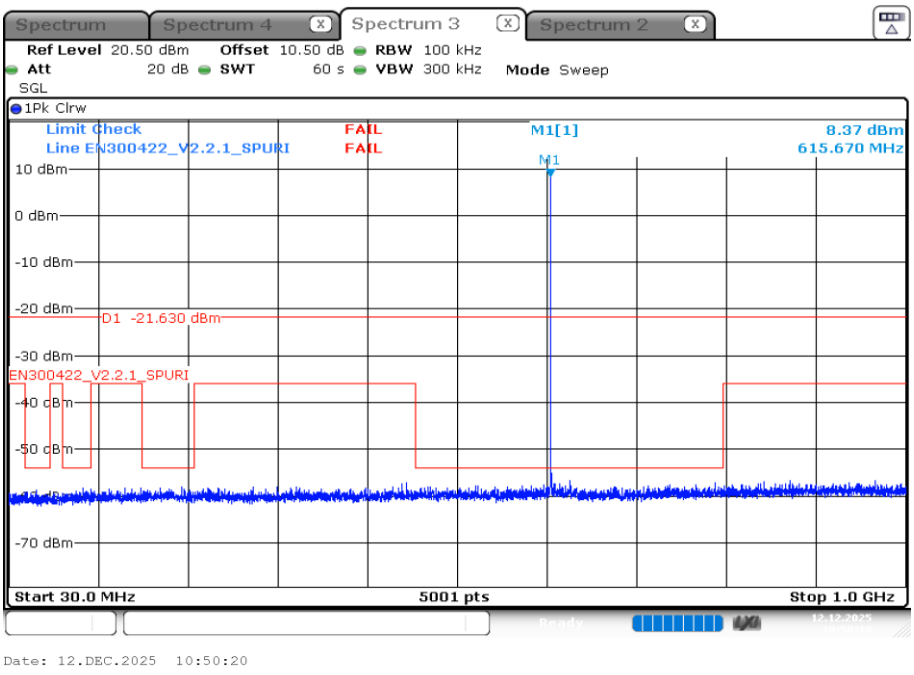
Plot 1: 614.2 MHz, 30MHz – 1GHz



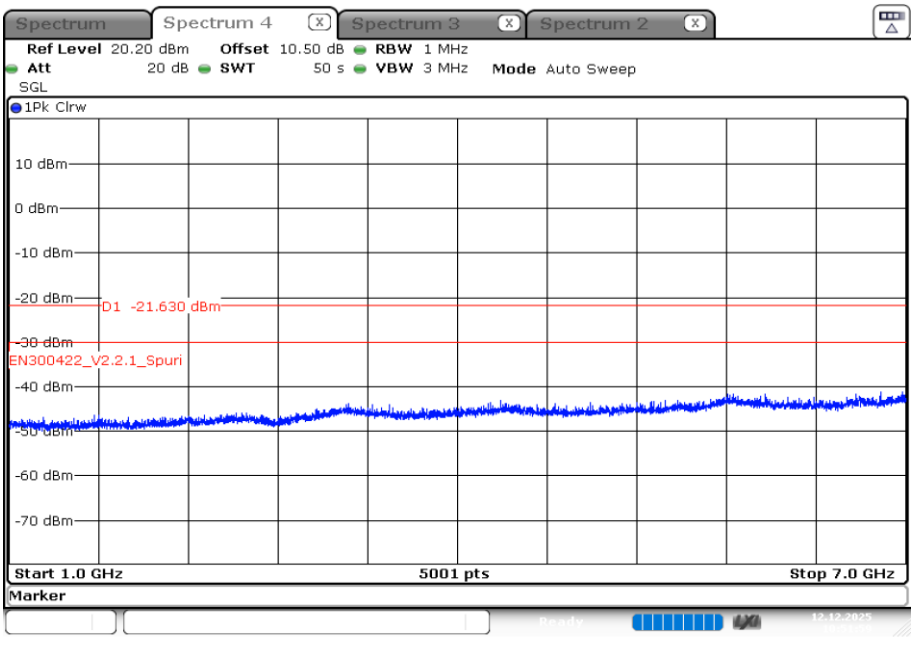
Plot 2: 614.2 MHz, 1GHz – 7 GHz



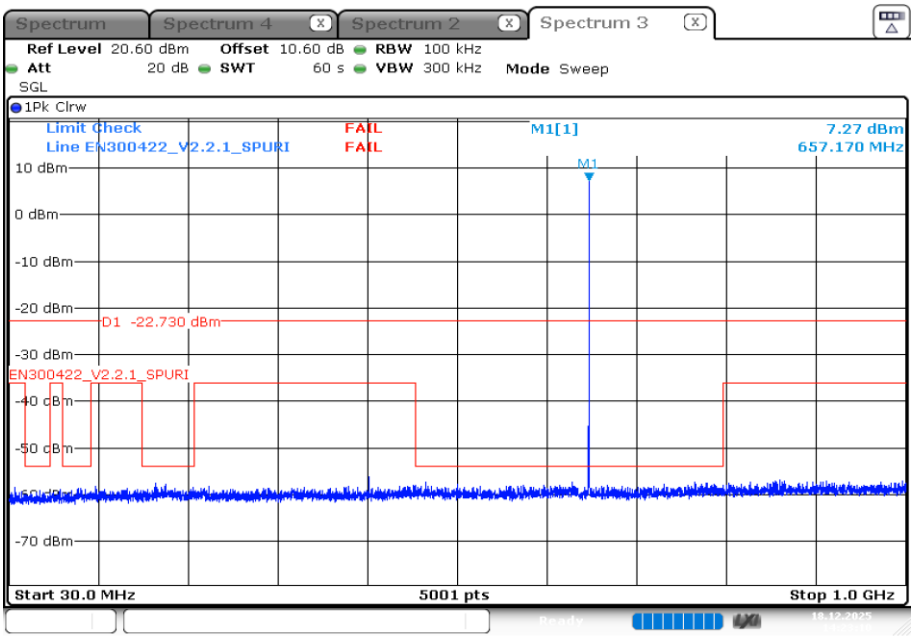
Plot 3: 615.8 MHz, 30 MHz – 1GHz



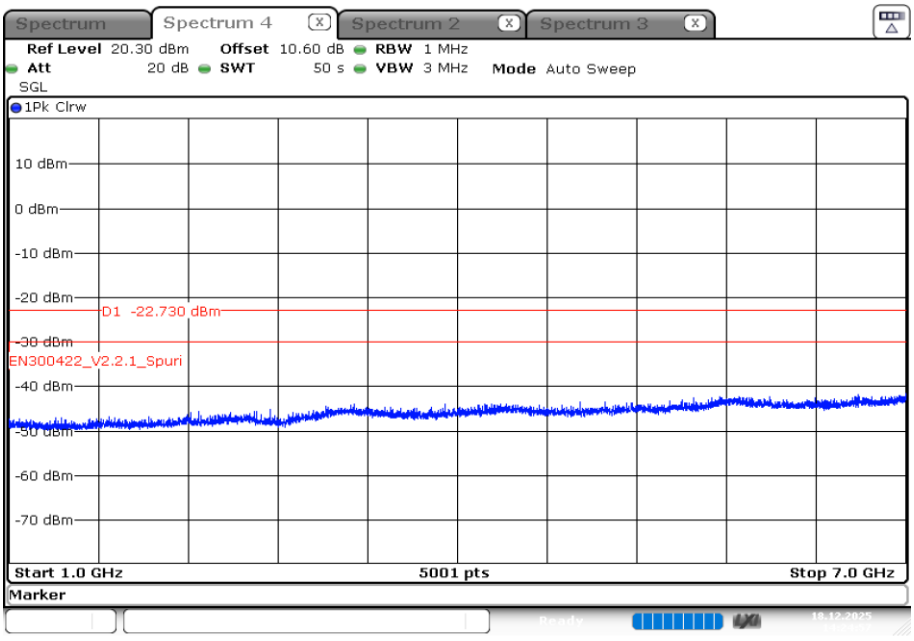
Plot 4: 615.8 MHz, 1GHz – 7GHz



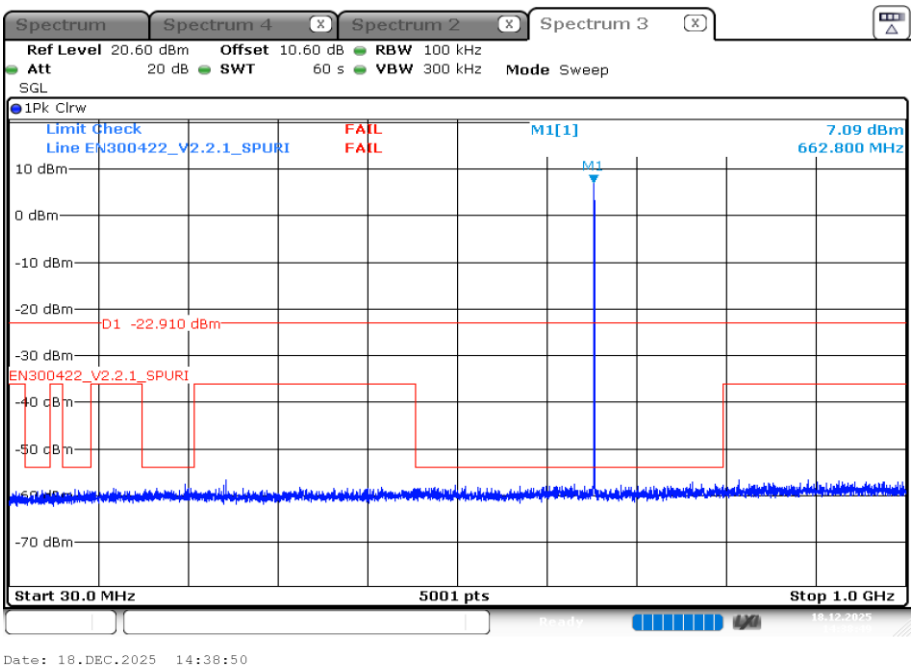
Plot 5: 657.2 MHz, 30 MHz – 1 GHz



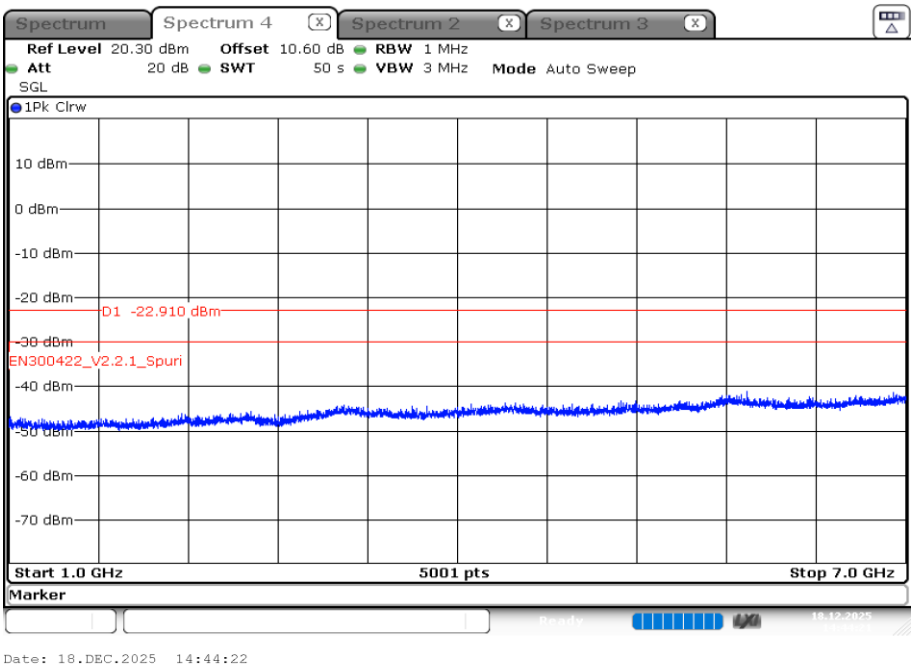
Plot 6: 657.2 MHz, 1 GHz – 7 GHz



Plot 7: 662.8 MHz, 30 MHz – 1 GHz



Plot 8: 662.8 MHz, 1 GHz – 7 GHz



12.7 Transmitter Emission Mask in the out of band domain for digital systems

Measurement:

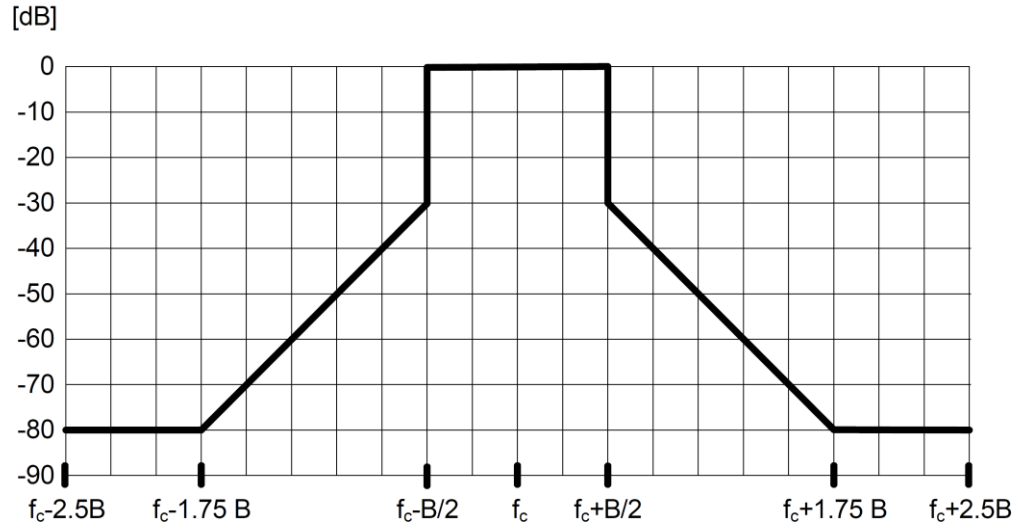
Measurement parameter	
Detector:	Peak / Average (-90 dBc point only)
Sweep time:	Auto
Resolution bandwidth:	1 kHz
Video bandwidth:	1 kHz
Span:	fc - 1 MHz to fc + 1 MHz (2 MHz)
Trace mode:	Max hold/view
EUT:	MC
Test setup:	See sub clause 7.3 A
Measurement uncertainty:	See sub clause 9

channel bandwidth (customer declaration): 200 kHz

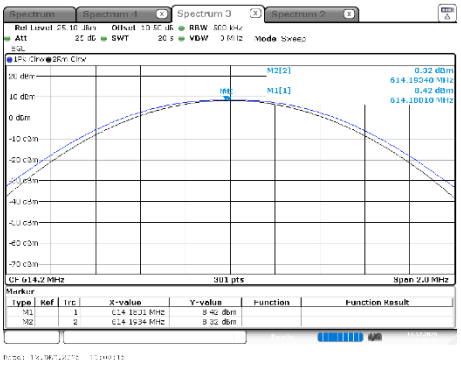
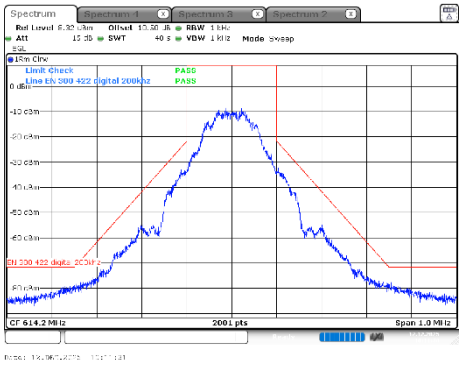
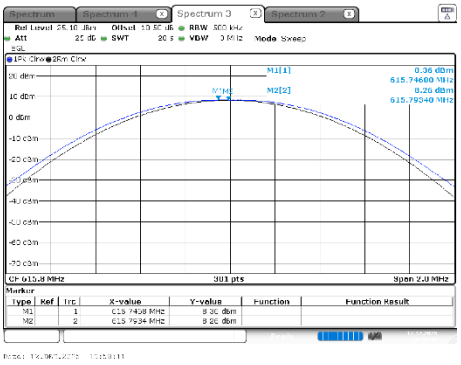
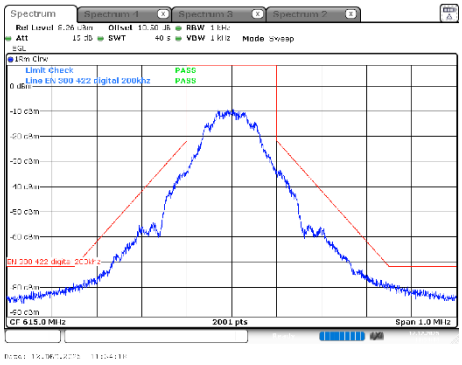
Limits:

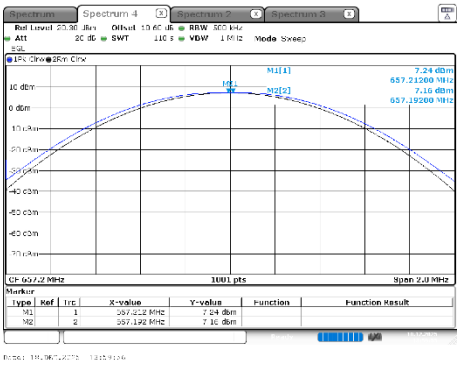
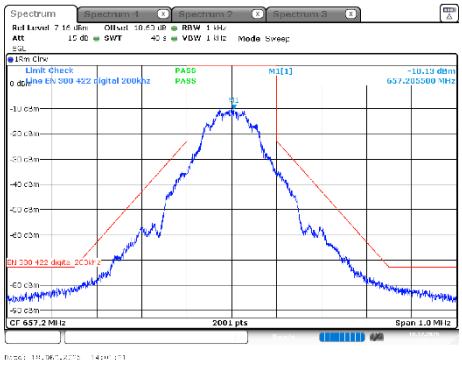
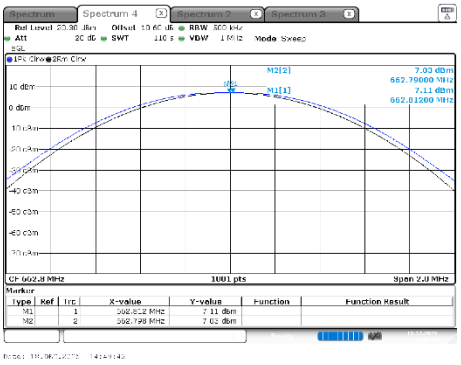
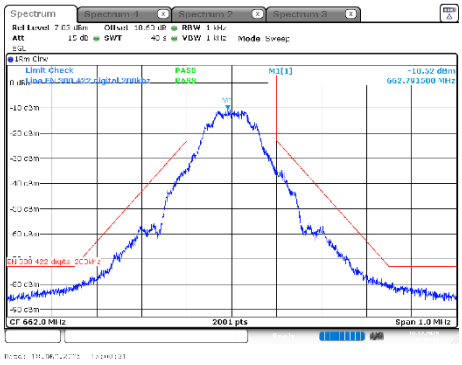
FCC	ISED
47 CFR 15.236 (g)(2)	RSS 210 G.5
ETSI EN 300 422-1 V 2.2.1, section 4.2.4.2.2	

Limits: according to ETSI EN 300 422-1 V2.2.1

FCC & ISED
Signal within the spectrum mask: 

Plots:

Frequency	Carrier power	Modulated carrier
614.2 MHz		
615.8 MHz		

Frequency	Carrier power	Modulated carrier
657.2 MHz		
662.8 MHz		

13 Glossary

AVG	Average
C	Compliant
C/N_0	Carrier to noise-density ratio, expressed in dB-Hz
CAC	Channel availability check
CW	Clean wave
DC	Duty cycle
DFS	Dynamic frequency selection
DSSS	Dynamic sequence spread spectrum
DUT	Device under test
EN	European Standard
ETSI	European Telecommunications Standards Institute
EMC	Electromagnetic Compatibility
EUT	Equipment under test
FCC	Federal Communications Commission
FCC ID	Combination of Grantee Code and Equipment Product Code
FHSS	Frequency hopping spread spectrum
FVIN	Firmware version identification number
GNSS	Global Navigation Satellite System
GUE	GNSS User Equipment
HMN	Host marketing name
HVIN	Hardware version identification number
HW	Hardware
ISED	Innovation, Science and Economic Development Canada
Inv. No.	Inventory number
MC	Modulated carrier
NA	Not applicable
NC	Not compliant
NOP	Non occupancy period
NP	Not performed
OBW	Occupied bandwidth
OC	Operating channel
OCW	Operating channel bandwidth
OFDM	Orthogonal frequency division multiplexing
OOB	Out of band
OP	Occupancy period
PER	Packet error rate
PMN	Product marketing name
PP	Positive peak
QP	Quasi peak
RLAN	Radio local area network
S/N or SN	Serial number
SW	Software
UUT	Unit under test
WLAN	Wireless local area network

14 Document history

Version	Applied changes	Date of release
R01	Initial release	2026-01-14
R02	editorial changes	2026-03-19
R03	Applicant / Manufacturer information changed	2026-03-19

################################## END OF TEST REPORT ##################################