

EMC TEST REPORT

No. 2401454STO-101

Electromagnetic disturbances

EQUIPMENT UNDER TEST

Equipment: Radio Unit
Type/Model: Radio 4490HP 44B5 44B12A C*
Product number: KRC 161 981/3
Product configuration: WCDMA, NR, LTE, NB-IoT & ESS
Manufacturer: Ericsson AB
Tested by request of: Ericsson AB

*See opinions and interpretations clause 2.6

SUMMARY

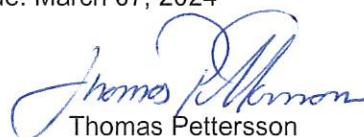
Referring to the emission limits, and the operating mode during the tests specified in this report, the equipment complies with the radiated spurious emission requirements according to the following standards:

47 CFR Part 2 Subpart J
47 CFR Part 22 Subpart H
47 CFR Part 27 Subpart C
RSS-GEN Issue 5
RSS-130 Issue 2
RSS-132 Issue 4

For details, see clause 2 – 4.

Date of issue: March 07, 2024

Issued by:


Thomas Pettersson

Approved by:


Per Larsson

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Revision History

Test report number	Date	Description	Changes
2401454STO-102	2024-03-01	First release	

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1. CLIENT INFORMATION

The EUT has been tested by request of

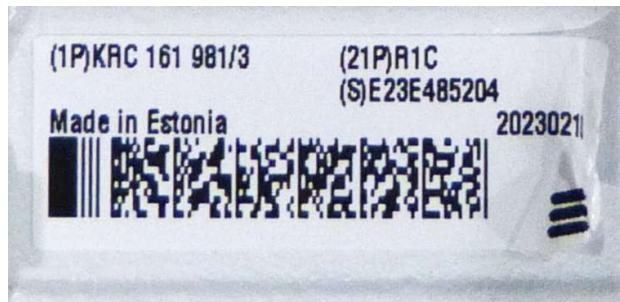
Company: Ericsson AB
164 80 Stockholm
Sweden

Name of contact: Lennart Blixt
BNEW DNEW RA RPSE1 IVC EMC
Phone +46 70 673 1973

Client observer: Per Sjöberg

2. EQUIPMENT UNDER TEST (EUT)**2.1 Identification of the EUT**

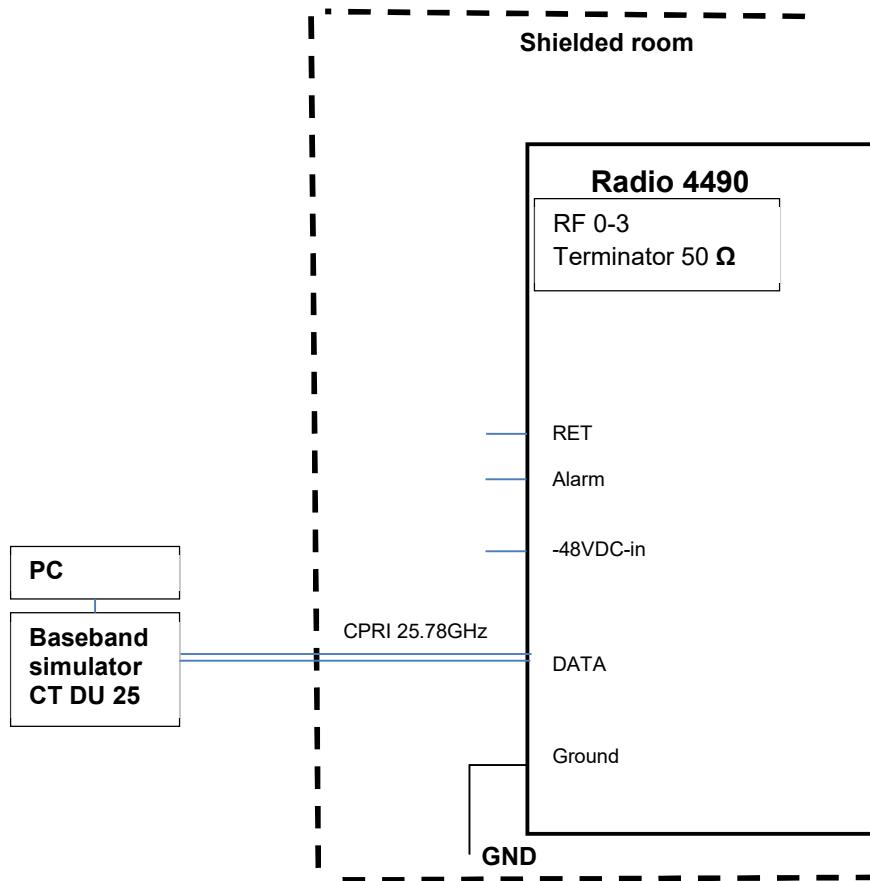
Equipment	Radio Unit
Type/Model	Radio 4490HP 44B5 44B12A C
Product number	KRC 161 981/3
Product configuration	WCDMA, NR, LTE, NB-IoT & ESS
Brand name	Ericsson
Manufacturer	Ericsson
Rating	-48VDC max: 36A
Class	III
Highest clock frequency	CPRI 25,78 GHz

**Photos of marking**

2.2 Description of the EUT

The test object is a Radio 4490 for a base station with WCDMA, NR, LTE, NB-IoT & ESS. It is designed to provide mobile users with a connection to a mobile network.

2.3 Test setup- block diagram



Block diagram of EUT during the tests

2.4 External cables connected to the EUT

Port	Type	Length [m]	Specifications
DC in	DC power	3.0	Two-core
Earth	Ground	3.0	Single wire, 35mm ²
External alarm	Signal cable	5.0	RPM 513 2350/1
RET	Control cable	3.0	1/TSR 48421/3000 R1B
Data 1 & Data 2	Optical fibre cable	20.0	RPM 253 1610/20M

2.5 Auxiliary equipment (AE)

Auxiliary equipment is equipment needed for correct operation of the EUT, but not included as part of the testing and evaluation of the EUT.

Equipment	Type / Model	Manufacturer	Serial no.
Computer	MacBook Pro	Apple	BAMS-1002122810
PSU	LP2 x 700W	PA Emilsson	BAMS-1017033682
Baseband simulator CT-DU25	LPC 102 500/1	Ericsson	T01G520910 BAMS-1017028179
RET	ATM200-A2	Andrew	CN10151085130
SFP module	RDH 102 75/3 R1A	Ericsson	CT72169581
SFP module	RDH 102 75/3 R1A	Ericsson	CU82116PGD
Power supply (for EUT)	SGA 60/250	Sorensen	BAMS-1000234866

2.6 Opinions and interpretations

The following types are also included as additional types in this test report:

The differences between the models are (according to the manufacturer):

Type/Model	Product numbers	Comment
Radio 4490HP 44B5 44B12A C	KRC 161 981/3 *	With un-security software
	KRC 161 981/31	With security software

* Tested model. The tests were performed on KRC 161 981/3 (Radio 4490HP 44B5 44B12A C with un-security software for testing purpose).

The hardware and software (except for the security software) are identical for all types above. The difference is considered not to imply different FCC part 2 Radio characteristics when compared to the tested type.

2.7 Decision rule

The statements of conformity are reported as:

Passed – When the measured values are within the specified limits.

Failed – When one or more measured values are outside the specified limits.

3. TEST SPECIFICATIONS

3.1 Standards

Requirements:

FCC 47 CFR Part 2 Subpart J (2019)

FCC 47 CFR Part 22 Subpart H

FCC 47 CFR Part 27 Subpart C (2019) + amendment published on April 23, 2020

RSS-GEN Issue 5

RSS-130 Issue 2

RSS-132 Issue 4

Test methods:

KDB971168 D01 Power Meas License Digital Systems v03r01

ANSI C63.26: 2015: American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services

3.2 Additions, deviations and exclusions from standards and accreditation

The following deviation from standards and accreditation was made: only the radiated spurious emission performed according to manufacturer's request.

No other additions, deviations or exclusions have been made from standards and accreditation.

3.3 Test site

Measurements were performed at:

Intertek Semko AB.
Torshamnsgatan 43,
P.O. Box 1103
SE-164 22 Kista

Intertek Semko AB is a FCC listed test site with site registration number 90913

Intertek Semko AB is a FCC accredited conformity assessment body with designation number SE0002

Intertek Semko AB is an Industry Canada listed test facility with IC assigned code 2042G

Intertek Semko AB is an Innovation, Science and Economic Development Canada recognized wireless device testing laboratory with CAB identifier SE0003

Measurement chambers

Measurement Chamber	Type of chamber	IC Site filing #
5 m CHAMBER	Semi-anechoic 5 m	2042G-3

3.4 Mode of operation during the test

The EUT was tested with – 53 V DC, up to 24 A. Output Power: max 120W per port and max 480W per radio.

Transmission band

B5/n5: DL: 869 - 894 MHz, UL 824 -849 MHz
B12A/n12A DL: 729 - 745 MHz, UL 699 - 715MHz

Radio Configuration

LTE:

The test object was activated for maximum transmit power. E-TM1.1 as defined in ETSI TS 136 141/3GPP TS 36.141 was used in all cells.

NR:

The test object was transmitting test model FR1-TM3.2 as defined in ETSI TS 138 141/3GPP TS 38.141-1.

WCDMA:

The test object was activated for maximum transmit power. TM6 as defined in 3GPP TS 37.113 was used in all cells.

All the RF ports are activated for maximum transmit power. See table below for detailed radio configurations.

Radio configuration emission

Config . No.	Band	No. of Carriers	Channel BW (MHz)	Power carrier (W/dBm)	Total power per port (W/dBm)	Test Model	Carrier Frequency (DL)
							MHz
1	5	1	5 MHz	40/46	40/46	WCDMA -MIMO-1C 5.0 MHz	871,4
2	5	1	5 MHz	40/46	40/46	WCDMA -MIMO-1C 5.0 MHz	881,6
3	5	1	5 MHz	40/46	40/46	WCDMA -MIMO-1C 5.0 MHz	891,6
4	5	2	5 MHz	20/43	40/46	WCDMA -MIMO-2C 5.0 MHz	871,4 891,6
5	5	4	5 MHz	10/40	40/46	WCDMA -MIMO-4C 5.0 MHz	871,4 876,4 886,6 891,6
6	5	2	5 MHz	30/44,8	60/47,8	WCDMA + LTE- MIMO-2C (WCDMA 64QAM 5MHz) + (LTE QPSK 5MHz).	871,4 891,5
7	5	2	5 MHz 15 MHz	30/44,8	60/47,8	WCDMA + NR- MIMO-2C (WCDMA 64QAM 5MHz)+ (NR SCS 30kHz QPSK 15MHz)	871,4 886,5
8	5	3	5 MHz 15 MHz	20/43	60/47,8	WCDMA+ NR + LTE -MIMO-3C, (WCDMA 64QAM 5MHz)+ (NR SCS 30kHz QPSK 15MHz) + (LTE QPSK 5MHz).	871,4 881,5 891,5
9	5 12A	6	5 MHz 15 MHz	20/43	120/50,8	WCDMA(B5)+WCDMA(B5)+NR(B5) + LTE(12A)+ LTE(12A)+ LTE(12A) -MIMO- 6C,(WCDMA 64QAM 5MHz) + (NR SCS 30kHz QPSK 15MHz)+ (LTE 64QAM 5MHz).	731,5 737,0 742,5 871,4 876,4 886,5

3.5 Compliance

The EUT shall comply with the emission limits as listed below

Radiated spurious emissions

CFR47 §2.1051, §27.53(l)(1), §22.917, RSS-130.4.6, RSS-132.5.5

Radiated power of any emission outside the licensee's authorized bandwidth shall not exceed -13 dBm/MHz.

4. TEST SUMMARY

The results in this report apply only to sample tested:

Standard	Description	Result
Emission		
ANSI C63.26 5.5	Field strength of spurious radiation 30 – 1000 MHz The EUT complies with the limits. The margin to the limit was more than 20 dB to the limit. Config 1 – 9.	PASS
	Field strength of spurious radiation 1 – 18 GHz The EUT complies with the limits. The margin to the limit was more than 20 dB to the limit. Config 1 – 9.	PASS

5. RADIATED RF EMISSION IN THE FREQUENCY RANGE 30 MHZ– 18GHZ

Date of test	Temperature [°C]	Relative Humidity [%]
2024-02-23	22	33
2024-02-26	22	25
2024-02-27	21	27
2024-02-28	20	25
2024-02-29	21	26

5.1 Test set-up and test procedure

The test method is in accordance with ANSI C63.26.

The EUT was set up in order to emit maximum disturbances.

30 – 1000 MHz: The EUT was placed on a pole 0.8 m above the turntable which is part of the reference ground plane (RGP). The pole was insulated from RGP with 15 cm thick support.

> 1000 MHz: The EUT was placed on a pole 1.5 m above the turntable which is part of the reference ground plane (RGP). The pole was insulated from RGP with 15 cm thick support. Absorbers were placed on the floor between the EUT and measurement antenna.

Overview sweeps were performed with the measurement receiver in max-hold mode and the peak and average detectors activated in the frequency-range

The EUT is continuously rotated 360°

Test set-up:

30 MHz – 18 GHz

Test receiver set-up:

Preview test:

Peak RBW 1 MHz, VBW 3 MHz

Average RBW 1 MHz, VBW 3 MHz

Final test:

RMS RBW 1 MHz, VBW 3 MHz

Measuring distance:

3 m

Measuring angle:

0 – 359°

EUT height above ground plane:

0.8 m

1.5 m

Antenna

30 – 1000 MHz

1 – 18 GHz

Type:

Bilog

Horn

Antenna tilt:

Not Activated

Activated

Height above ground plane:

1 – 4 m

Polarisation:

Vertical and Horizontal

$E[\text{dB}\mu\text{V}/\text{m}] = \text{Analyser reading } [\text{dB}\mu\text{V}] + \text{Antenna factor } [1/\text{m}] - \text{Amplifier gain } [\text{dB}] + \text{Cable loss } [\text{dB}]$

$EIRP [\text{dBm}] = E[\text{dB}\mu\text{V}/\text{m}] + 20\log[3] - 104.8$

5.2 Measurement uncertainty

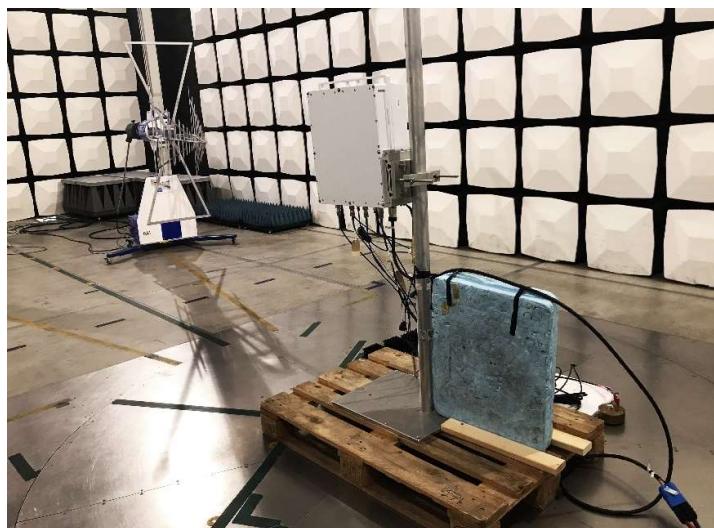
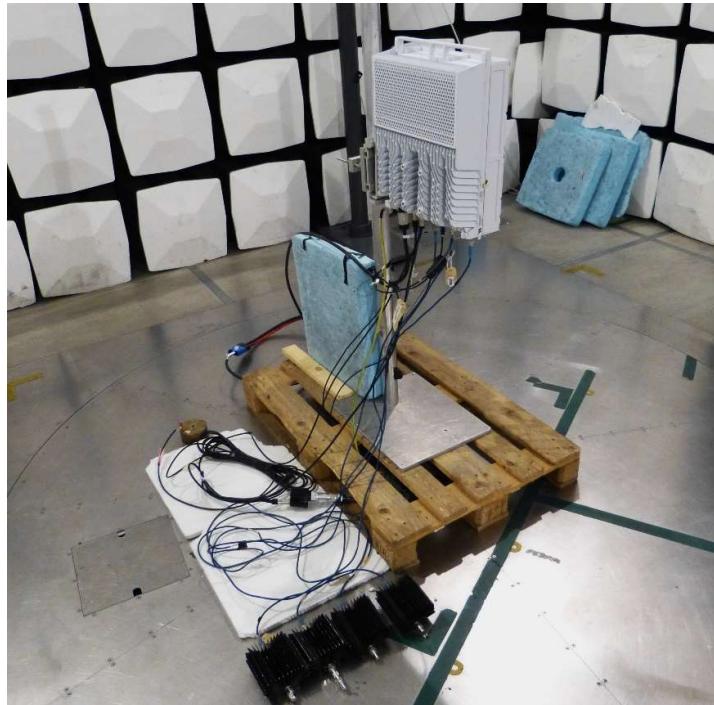
Measurement uncertainty for radiated disturbance

Uncertainty for the frequency range 30 to 1000 MHz at 3 m	± 5.1 dB
Uncertainty for the frequency range 30 to 1000 MHz at 10 m	± 5.0 dB
Uncertainty for the frequency range 1.0 to 18 GHz at 3 m	± 4.5 dB

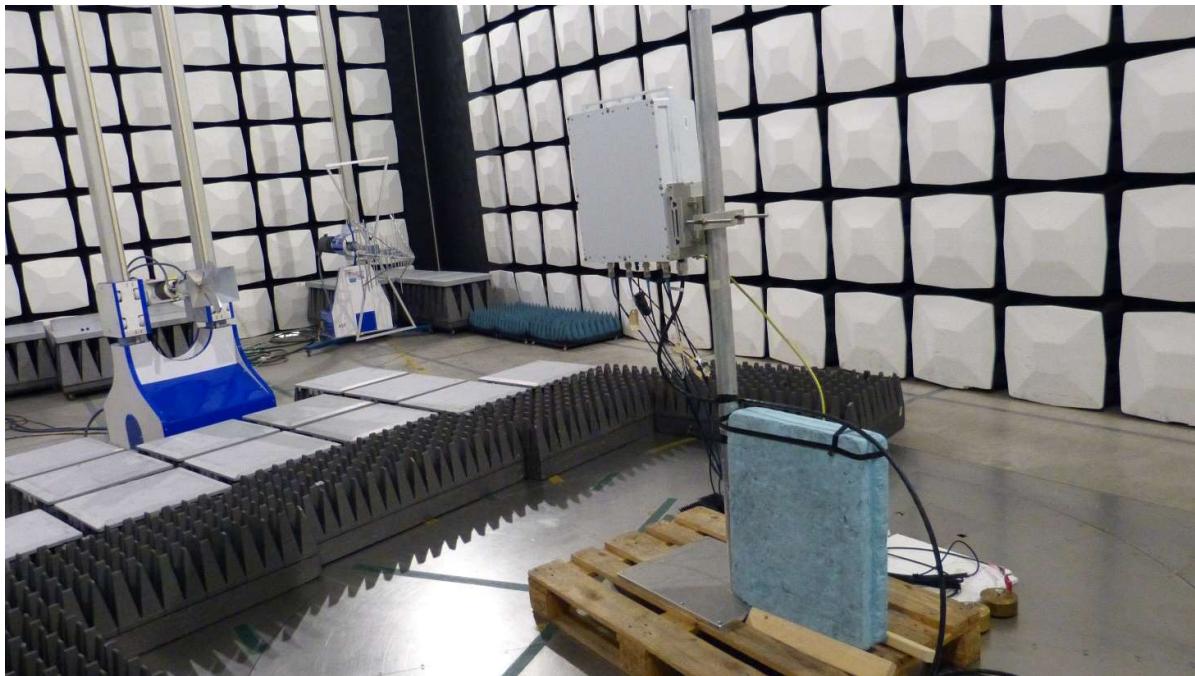
Measurement uncertainty is calculated in accordance with CISPR 16-4-2: 2011.

The measurement uncertainty is given with a confidence of 95 %.

Photos of the test set up

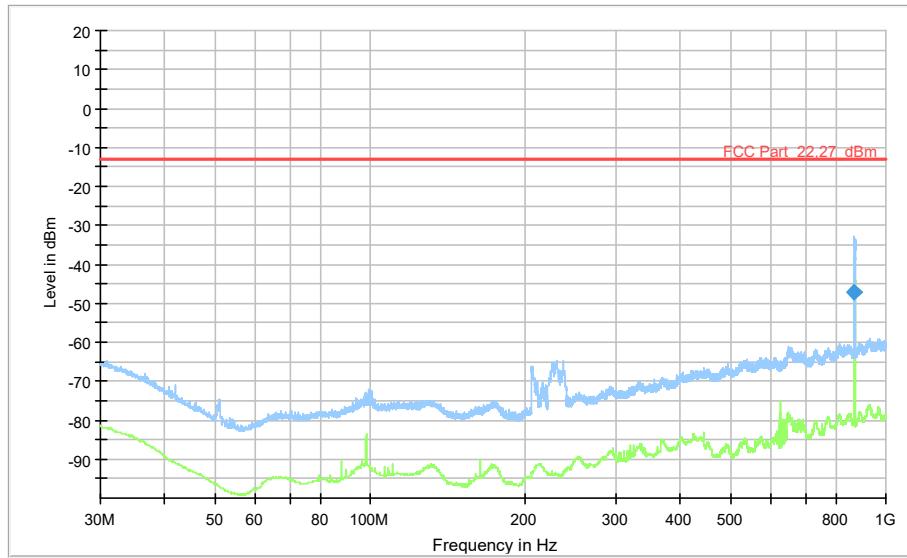


30 – 1000 MHz



1 – 18 GHz

5.3 Test results, 30 – 1000 MHz, configuration 1: Bottom channel B5

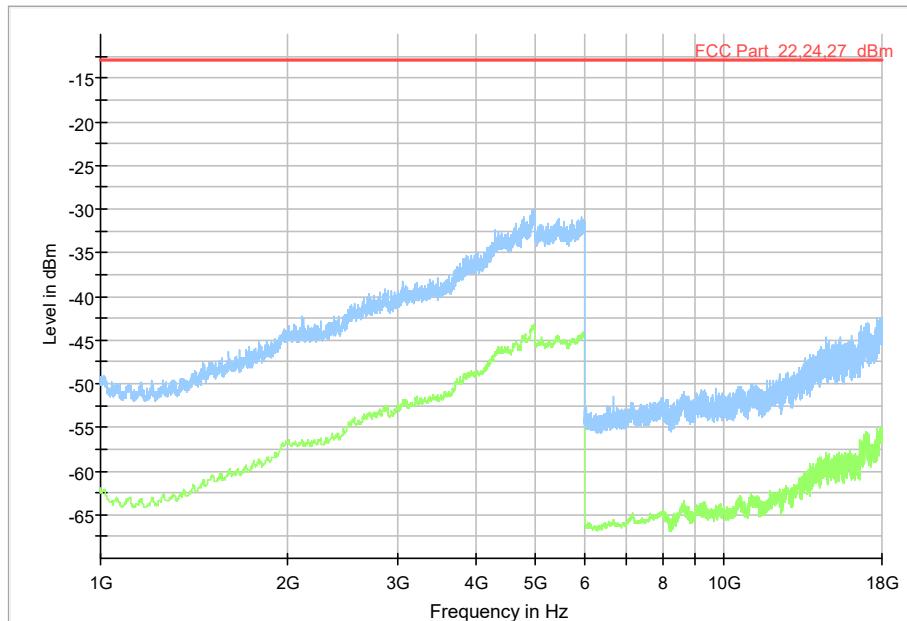


Diagram, Peak and average overview sweep, 30 – 1000 MHz at 3 m distance.

Measurement results, RMS

All measured disturbances have a margin of more than 20 dB to the limit.

5.4 Test results, 1-18 GHz, configuration 1: Bottom channel B5

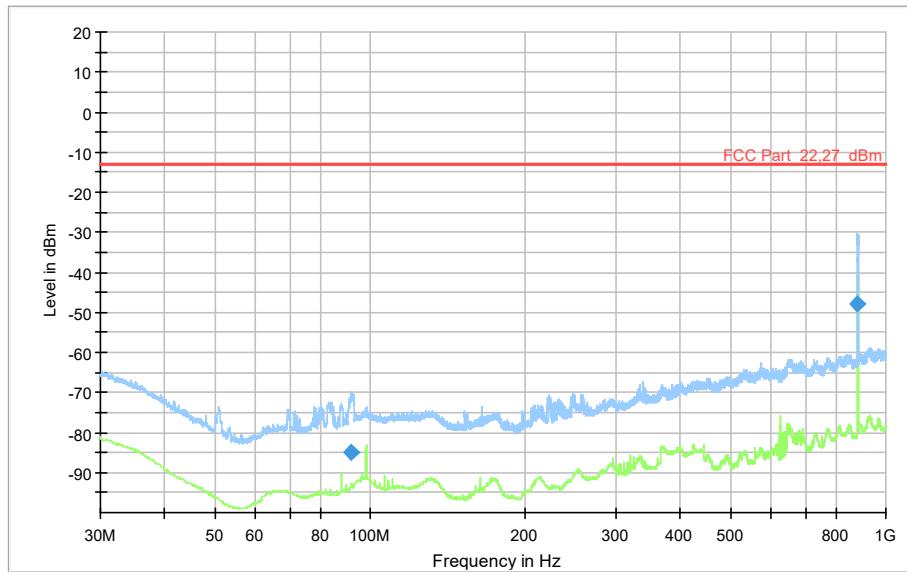


Diagram, Peak and average overview sweep, 1 – 18 GHz at 3 m distance.

Measurement results, RMS

All measured disturbances have a margin of more than 20 dB to the limit.

5.5 Test results, 30 – 1000 MHz, configuration 2: Mid. Channel B5

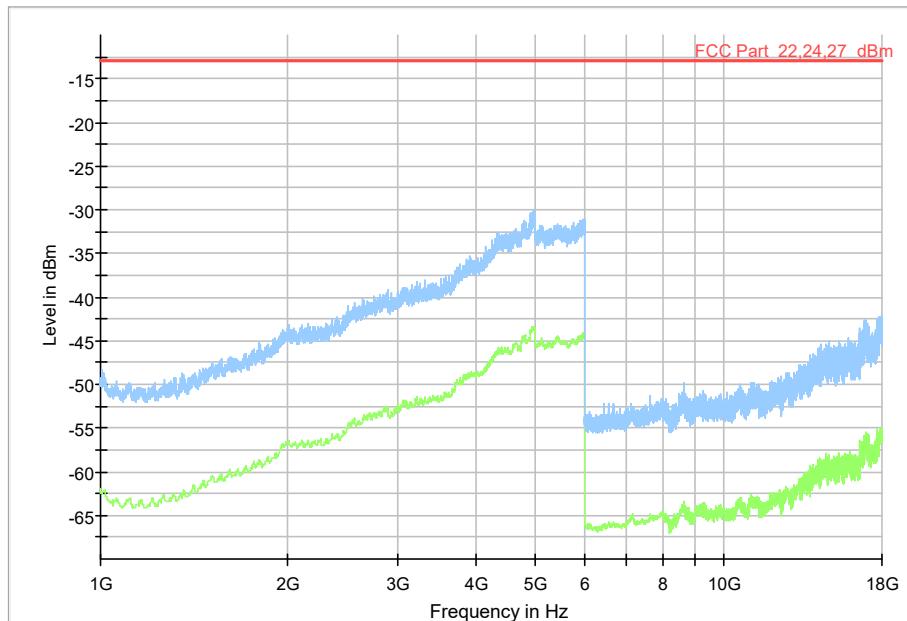


Diagram, Peak and average overview sweep, 30 – 1000 MHz at 3 m distance.

Measurement results, RMS

All measured disturbances have a margin of more than 20 dB to the limit.

5.6 Test results, 1-18 GHz, configuration 2: Mid channel B5

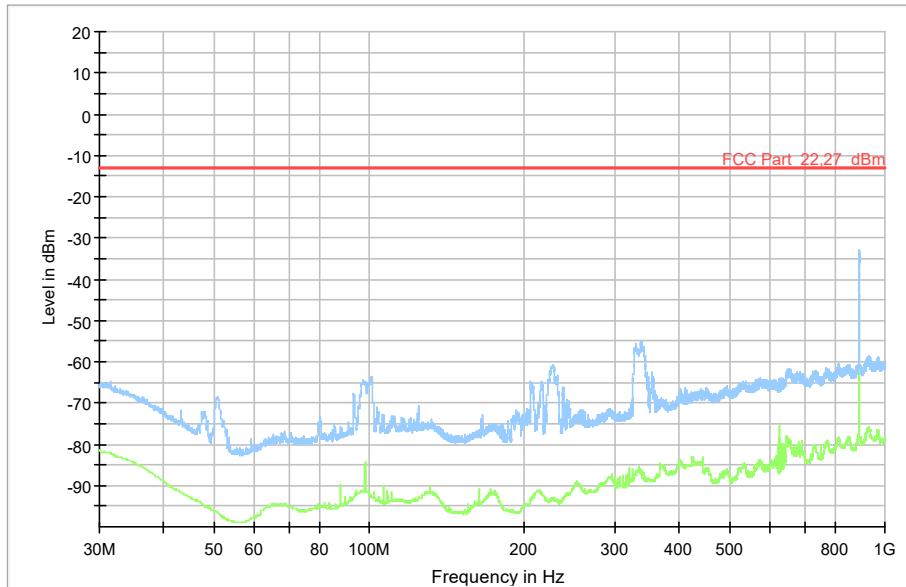


Diagram, Peak and average overview sweep, 1 – 18 GHz at 3 m distance.

Measurement results, RMS

All measured disturbances have a margin of more than 20 dB to the limit.

5.7 Test results, 30 – 1000 MHz, configuration 3: Top channel B5

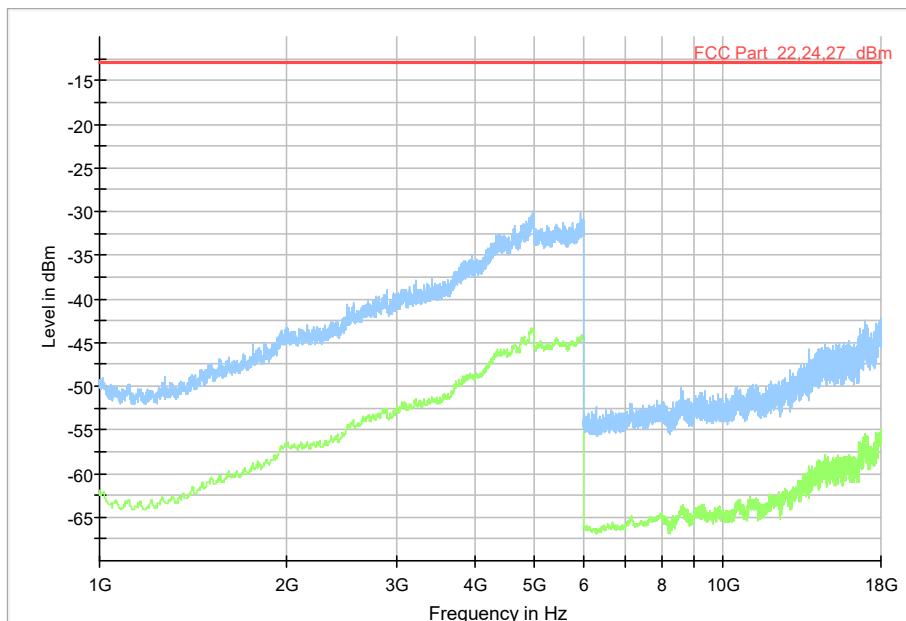


Diagram, Peak and average overview sweep, 30 – 1000 MHz at 3 m distance.

Measurement results, RMS

All measured disturbances have a margin of more than 20 dB to the limit.

5.8 Test results, 1-18 GHz, configuration 3: Top channel B5

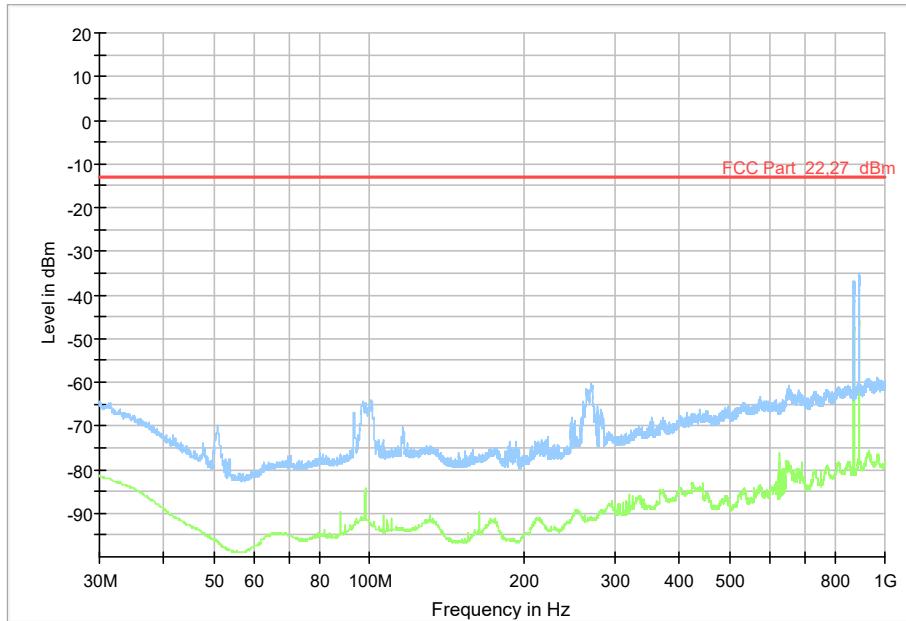


Diagram, Peak and average overview sweep, 1 – 18 GHz at 3 m distance.

Measurement results, RMS

All measured disturbances have a margin of more than 20 dB to the limit.

5.9 Test results, 30 – 1000 MHz, configuration 4: Mid B5 2 carrier

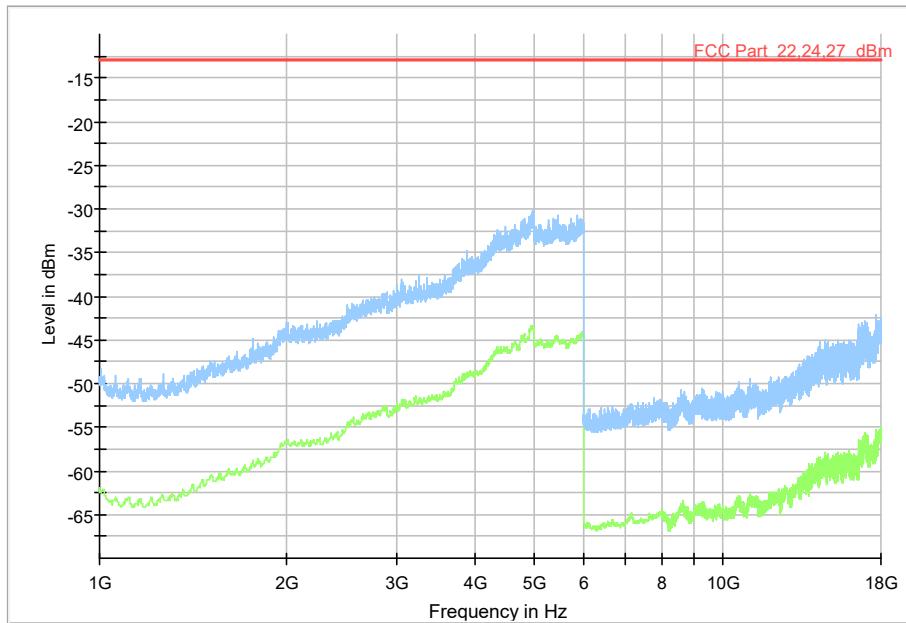


Diagram, Peak and average overview sweep, 30 – 1000 MHz at 3 m distance.

Measurement results, RMS

All measured disturbances have a margin of more than 20 dB to the limit.

5.10 Test results, 1-18 GHz, configuration 4: Mid B5 2 carrier

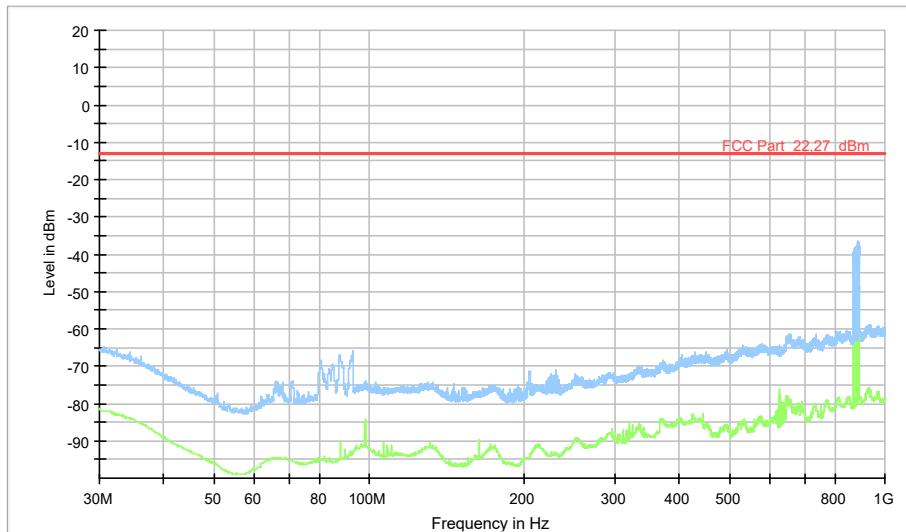


Diagram, Peak and average overview sweep, 1 – 18 GHz at 3 m distance.

Measurement results, RMS

All measured disturbances have a margin of more than 20 dB to the limit.

5.11 Test results, 30-1000 MHz, configuration 5: Mid B5 4 carrier WCDMA

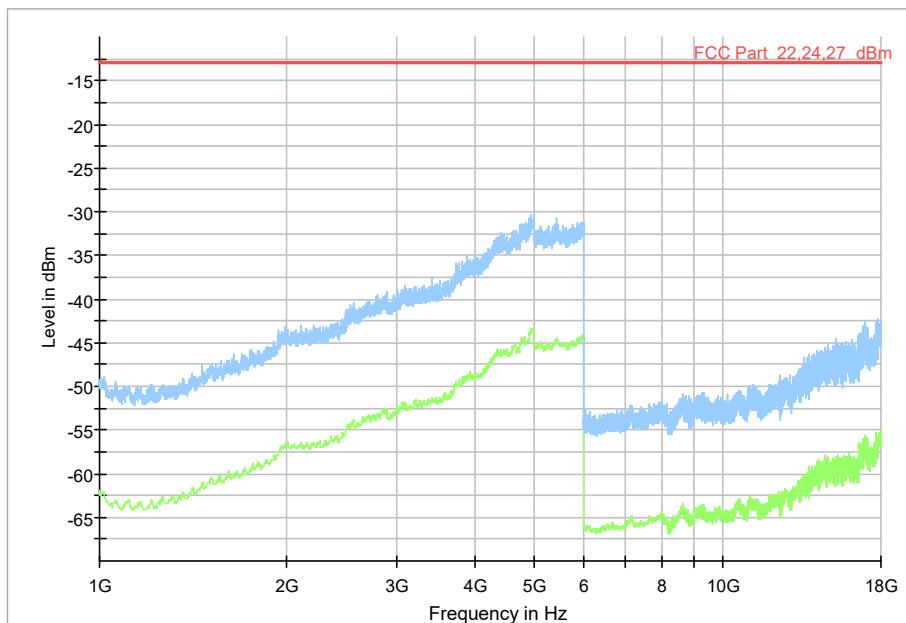


Diagram, Peak and average overview sweep, 30 – 1000 MHz at 3 m distance.

Measurement results, RMS

All measured disturbances have a margin of more than 20 dB to the limit.

5.12 Test results, 1-18 GHz, configuration 5: Mid B5 4 carrier WCDMA

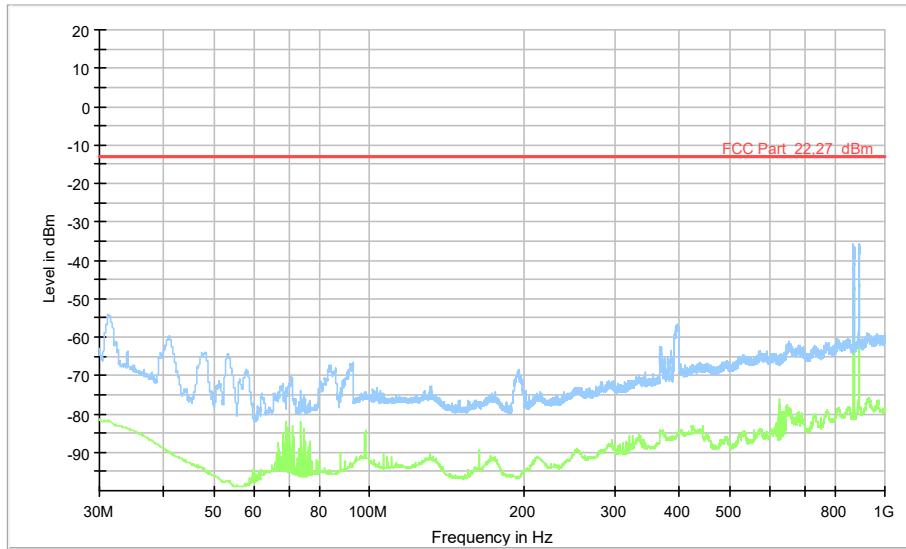


Diagram, Peak and average overview sweep, 1 – 18 GHz at 3 m distance.

Measurement results, RMS

All measured disturbances have a margin of more than 20 dB to the limit.

5.13 Test results, 30-1000 MHz, configuration 6: Mid B5 2 carrier WCDMA+LTE

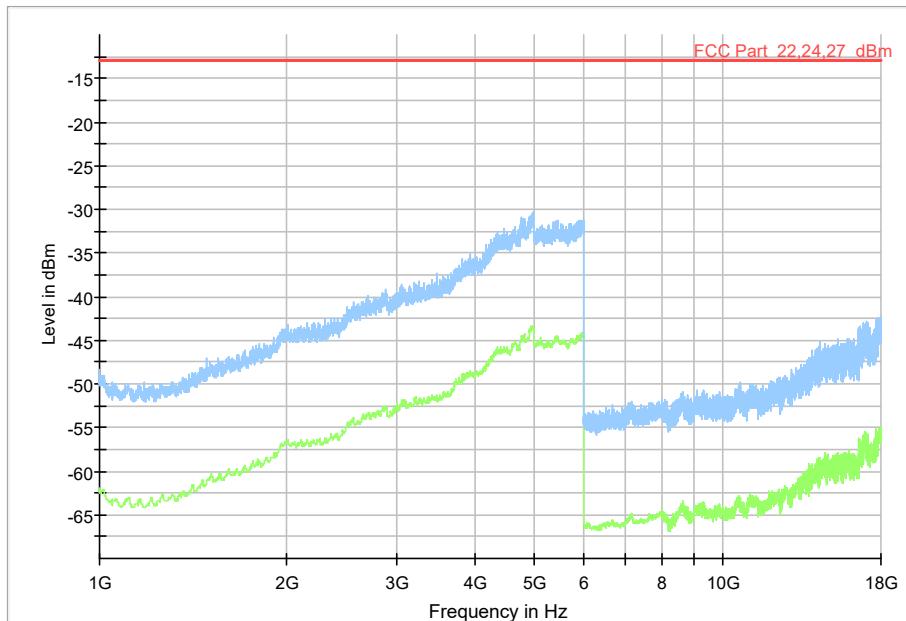


Diagram, Peak and average overview sweep, 30 – 1000 MHz at 3 m distance.

Measurement results, RMS

All measured disturbances have a margin of more than 20 dB to the limit.

5.14 Test results, 1-18 GHz, configuration 6: Mid B5 2 carrier WCDMA+LTE

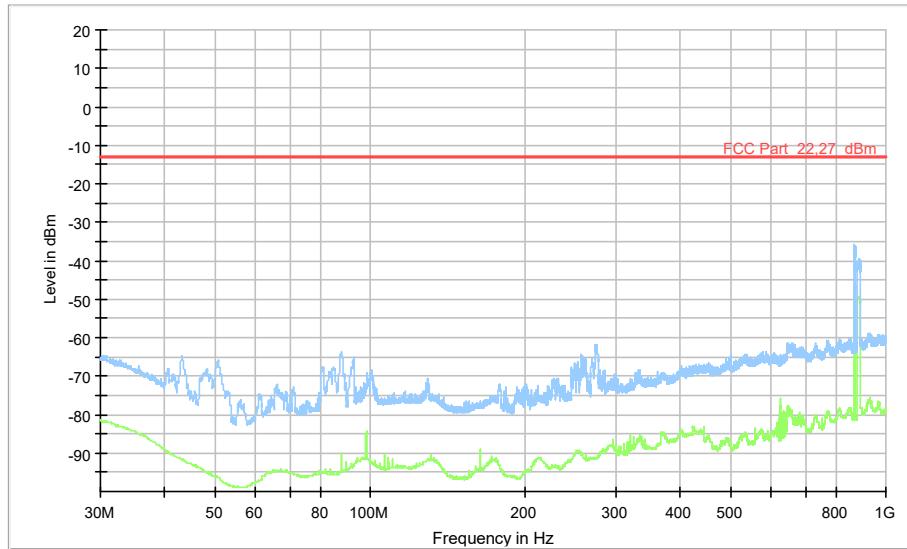


Diagram, Peak and average overview sweep, 1 – 18 GHz at 3 m distance.

Measurement results, RMS

All measured disturbances have a margin of more than 20 dB to the limit.

5.15 Test results, 30-1000 MHz, configuration 7: Mid B5 2 carrier WCDMA+NR

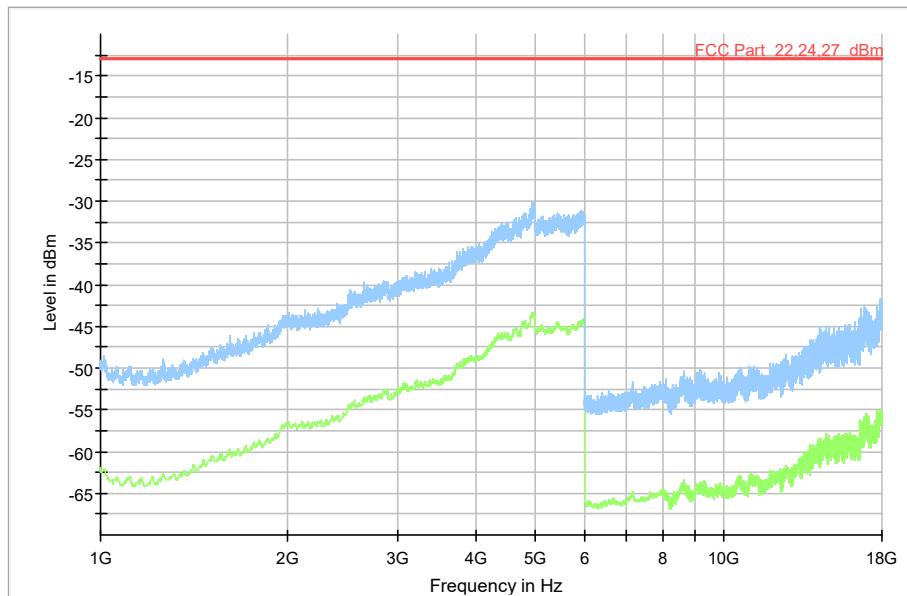


Diagram, Peak and average overview sweep, 1 – 18 GHz at 3 m distance.

Measurement results, RMS

All measured disturbances have a margin of more than 20 dB to the limit.

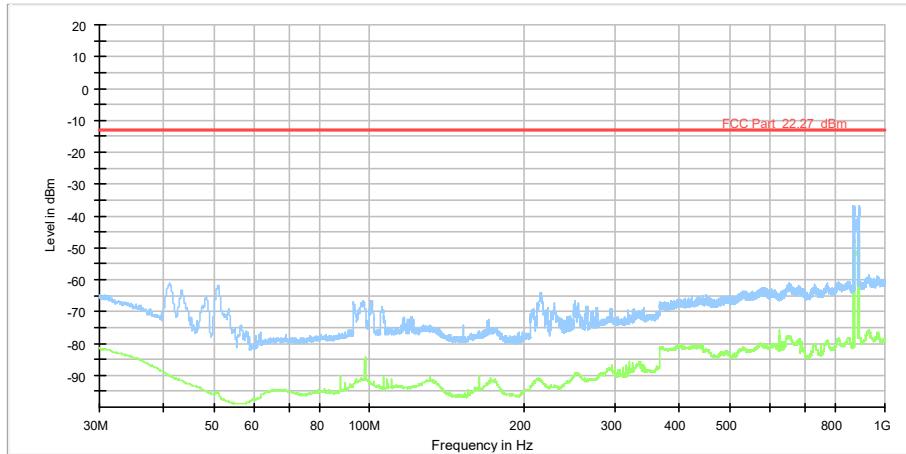
5.16 Test results, 1-18 GHz, configuration 7: Mid B5 2 carrier WCDMA+NR



Diagram, Peak and average overview sweep, 1 – 18 GHz at 3 m distance.

Measurement results, RMS

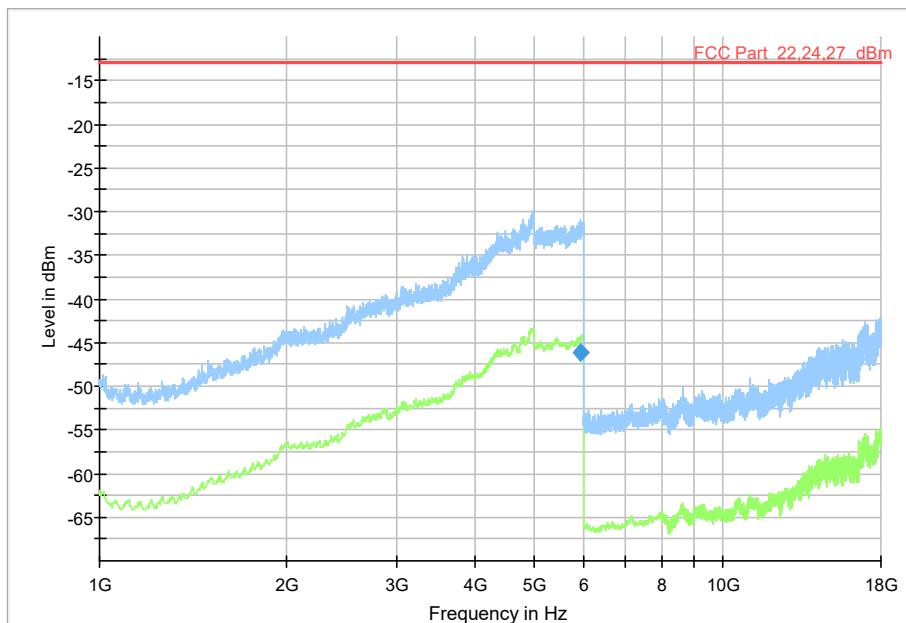
All measured disturbances have a margin of more than 20 dB to the limit.

5.17 Test results, 30-1000 MHz, configuration 8: Mid B5 3 carrier WCDMA+LTE+NR

Diagram, Peak and average overview sweep, 30 – 1000 MHz at 3 m distance.

Measurement results, RMS

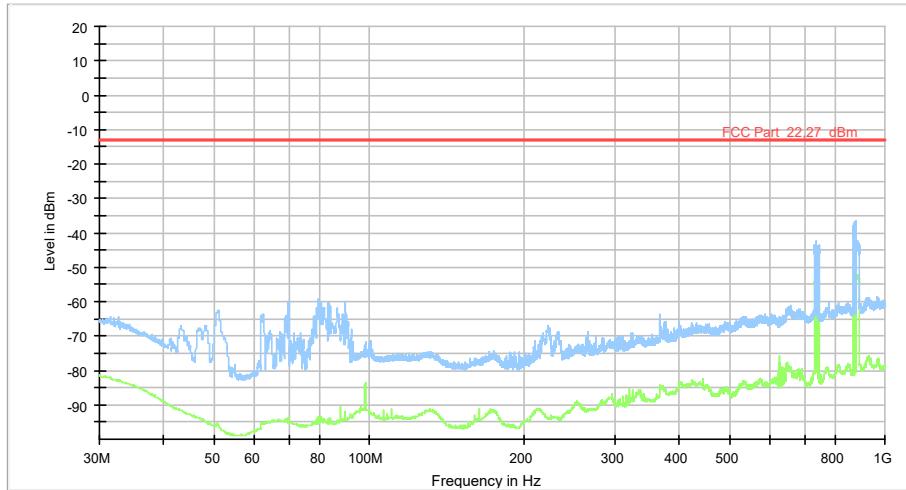
All measured disturbances have a margin of more than 20 dB to the limit.

5.18 Test results, 1-18 GHz, configuration 8: Mid B5 3 carrier WCDMA+LTE+NR

Diagram, Peak and average overview sweep, 1 – 18 GHz at 3 m distance.

Measurement results, RMS

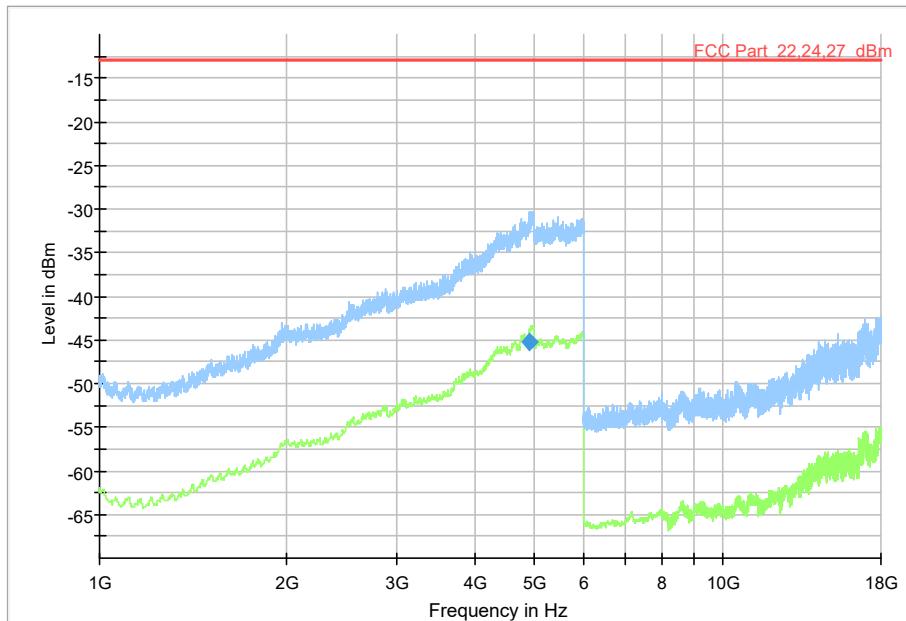
All measured disturbances have a margin of more than 20 dB to the limit.

5.19 Test results, 30-1000 MHz, configuration 9: Mid B5 6 carrier Max carrier (6)

Diagram, Peak and average overview sweep, 30 – 1000 MHz at 3 m distance.

Measurement results, RMS

All measured disturbances have a margin of more than 20 dB to the limit.

5.20 Test results, 1-18 GHz, configuration 9: Mid B5 6 carrier Max carrier (6)

Diagram, Peak and average overview sweep, 1 – 18 GHz at 3 m distance.

Measurement results, RMS

All measured disturbances have a margin of more than 20 dB to the limit.

5.21 Test equipment

Equipment type	Manufacturer	Model	Inv. No.	Last Cal. date	Next Cal. date
Measurement software	Rohde & Schwarz	EMC32 -			
11.60.00	--	--	--		
Measurement Receiver	Rohde & Schwarz	ESW44	33950	July 5, 2023	1 year
Open switch and control platform	Rohde & Schwarz	OSP130	32298	December 13, 2023	1 year
Open switch and control platform	Rohde & Schwarz	OSP-F7-B	32299	December 23, 2023	1 year
Antenna	Rohde & Schwarz	HL562	32310	June 13, 2022	3 years
Rotary joint	Spinner	BN835027	31807	October 20, 2023	1 year
Coaxial cable	Schuner	SUCOFLEX 104	39150	December 31, 2023	1 year
Coaxial cable	Rosenberger	UFB311A	39053	August 16, 2023	1 year
Coaxial cable	Rosenberger	JFB293C	39141	June 14, 2023	1 year
Coaxial cable	Rosenberger	JFB293C	39142	June 14, 2023	1 year
Horn antenna	Rohde & Schwarz	HF907	32296	April 12, 2022	3 years
Temp & RH meter	Vaisala	HMI41	32403	December 11, 2024	1 year
Preamplifier Signal path	Rohde & Schwarz	TS-PRE1 EMI	32297	July 11, 2023	1 year

6. EUT SOFTWARE

Software Radio: CXP2021113/1_R20A103

7. EUT HARDWARE LIST

Product	Product No,	R-State	Serial Number
Radio 4490 B5 B12A	KRC 161 981/3	R1C	E23E485204
SFP module Ericsson	RDH 102 75/3	R1A	EA61XL085F
SFP module Ericsson	RDH 102 75/3	R1A	EA61XL099A