TEST REPORT: FCC RF Test Report AWHHF

FCC ID: 2AD8UAWHHF01

Date:	Oulu 16. Jul 2024
Pages:	56
Appendices:	2

Equipment Under Test:	AirScale Base Transceiver Station Remote Radio Head 4T4R n41 80W 2,5GHz
Radio Access technology:	NR (TDD)
Type:	AWHHF
Manufacturer:	Nokia Solutions and Networks Oy
Address:	Kaapelitie 4, FI-90620, Oulu, Finland
Task:	Conformance test according to the specifications mentioned below
Test Specification(s):	FCC 47 CFR part 2 FCC 47 CFR part 27
Result:	The EUT complies with the requirements of the specification

The results relate only to the items tested as described in this test report.

Approved by:	**Date**	**Signature**
Jarkko Kenttälä Squad Group Lead, Type Approval Nokia Networks	16 Jul 2024	

Contents

1 Summary

The following tests were performed according to the FCC rules in order to verify the compliance of the EUT with the FCC requirements:

Test No.	Measurement	FCC Rule	Page Number of this Report	Result
1	RF Output power	§ 2.1046, § 27.50,	9	compliant
2	Modulation Characteristics	§ 2.1047,	14	compliant
3	Occupied Bandwidth	§ 2.1049, § 2.201, § 27.53,	15	compliant
4	Spurious Emissions at Antenna Terminals	§ 2.1051, § 2.1057 § 27.53	17	compliant
5	Field Strength of Spurious Radiation	§27.53 §15.109	20	compliant
6	Frequency Stability	§27.54 §2.1055	23	compliant

Table 1 Results – Summary

In accordance with the FCC Rule §15.3 (z) the equipment was tested with the limits that are valid for an *unintentional radiator*.

Measurements guidance: FCC OET laboratory KDB: 662911 D01 Multiple Transmitter Output v01r02, 971168 D03 IM Emission Repeater Amp v01 and FCC KDB 971168 D01 Power Meas License Digital Systems v03r01: ANSI C63.26-2015.

Test Laboratory:

Nokia Solutions and Networks Oy

Kaapelitie 4,

FI-90620, Oulu, Finland

Jarkko Kenttälä

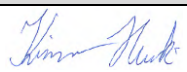
FCC Reg. No: 261413

Testing laboratory accreditation number: T297

1.1 Time Schedule

Test No.	1, 2, 3, 4, 6	5
Start of Test:	28 Jun 2024	15 Jul 2024
End of Test:	10 Jul 2024	16 Jul 2024

1.2 Participants

Name	Function	Signature
Kimmo Huuki	Tests no: 1,2,3,4 and 6 Setup of EUT	
Onyumbe Olamba N´Djeka	Test no 5 Setup of EUT	

2 Equipment Under Test

The EUT is a AirScale Base Transceiver Station Remote Radio Head

The BTS performs the full RAN function of NR system (New Radio).

2.1 Configuration of EUT

The used different EUT configurations are shown by the following table.

Module Type	**Airscale BTS RRH 4T4R, B41 20W per antenna 80W per radio**	
Radio Access Technology	NR	
Duplex mode	Time Division Duplex (TDD)	
Channel Bandwidth	NR Single slim carrier 49.5MHz (n41) (Config. A)	
Supply Voltage	48.0 V DC	
Single carrier		
Rated Output Power (Prat)	20W (43.0dBm) conducted / carrier	
Downlink/Uplink ratio	3:6	
	RX	**TX**
Number of Antenna Ports	4 (ANT1 to ANT4)	4 (ANT1 to ANT4)
MiMo	Yes	Yes

Table 2 Overview of EUT configuration

The tests were performed with one EUT at the antenna ports from ANT1 to ANT4.

The used different EUT configurations are shown by the following table.

Module Name	**Serial-No.**	**Module Type**	**Test No.**
AWHHF	AH211300441	RRH	1,2,3,4,5,6

Table 3 Configuration of EUT

For a functional description of the modules, please refer to the appropriate related parts and exhibit sections of this certification application.

2.2 Operating Conditions

The EUT supports QPSK, 16QAM, 64QAM and 256QAM modulation. If not stated otherwise, the following standard setup procedure for the EUT was used:

The transmitter was set up according to 3GPP TS 38.141 NR Test Models (TM) for all tests:

- TM 1.1: All QPSK modulation testing

- TM 3.1: All 64QAM modulation testing
- TM 3.1A All 256QAM modulation testing
- TM 3.2: All 16QAM modulation testing

During the measurements, one carrier channel was tested at a time. The carrier was set to the maximum power level to ensure the maximum emission amplitudes during all measurements.

During the tests, the AirScale BTS is transmitting a pseudo random bit pattern on the data channels. This ensures that the measurements of the emission characteristics of the transmitter are pursuant to § 2.1049.

Test models TM1.1, TM3.1, TM3.1A and TM3.2, have uplink/Downlink ratio 3:6.

3 Test Configuration

If not stated otherwise, the following measurement configuration was used to perform all measurements (see figure below).

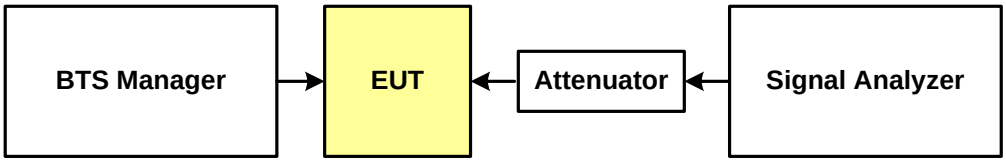


Figure 1 Test Configuration (single output)

The RF output of the transceiver (cell) under test is connected to a signal analyzer via a high-power attenuator to protect the input of the signal analyzer from high RF power levels. A description of the analyzer settings is given in each of the sections describing the measurements. The other transceivers are terminated.

A complete list of the measurement equipment is included on page 27 of this measurement report.

3.1 Calibration of the Test Equipment

All relevant test equipment has a valid calibration from an external calibration laboratory. Additionally, the signal analyzer has a built-in self-calibration procedure. This calibration procedure was activated prior to the measurements so that the analyzer is deemed accurate. High quality cables were used to connect the measurement equipment to the EUT. The actual loss of the attenuator and the cables was measured with a high precision network analyzer and taken into account for all measurements.

4 Test Results

4.1 Test No. 1: Transmitter Output Power (§ 2.1046, § 27.50)

4.1.1 Limits

The maximum output power of the equipment measured in terms of average values shall comply with the Total power limit:

EIRP limits are calculated and found in Appendix A.

BRS FCC EIRP limits: 33dBW + 10 log(X/Y) dBW + 10 log(360/beamwidth) dBW, where X is the channel width in MHz and Y is 5.5 or 6MHz. (§ 27.50(h)(ii)).

Peak to average power (PAPR) limit is 13dBm.

4.1.2 Test Procedure and Results

Detachable Antenna: The maximum output power at the antenna terminals was measured using a signal analyzer.

The RF power was measured with a frequency sweep across the carrier. The carrier power was calculated from the signal analyzer by integration over the result. The base station maximum output power was measured with signal analyzer with offset adjust in testcase. (Offset is measured connection loss of the test set up.)

For the MiMo output, RF power output was measured from each antenna port individually and the results summed mathematically in accordance with FCC KDB 662911 D01 and ANSI C63.26 -guidance.

All Tx ports were tested in Config A and one Tx port was selected for the remaining testing. The AWHHF antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in the results) and antenna port 2 was selected for the remaining testing based on ANSI C63.26-2015 clauses 5.2.5.3, 5.7.2i and 6.4.

Peak to average power (PAPR) was examined using CCDF method and 0.1% value recorded in dB to the tables below.

Average Power Spectral density was measured using FSW signal Analyzer.

The following table shows the measured output powers at the antenna connector.

Measured laboratory room temperature and humidity during the tests				
Date	Temperature Min-Max:		Humidity Min-Max:	
28.06.2024 – 02.07.2024	22.9 °C	25.1 °C	31.0 RH%	61.4 RH%

Config A:

	Channel Frequency (MHz)	Antenna Port1 Power (dBm)	Antenna Port2 Power (dBm)	Antenna Port3 Power (dBm)	Antenna Port 4 Power (dBm)	Total power/unit Power (W)
Test Model 1 Modulation QPSK	2592.99	42.07	42.07	42.03	42.04	64.17
Test Model 3.1 Modulation 64QAM	2592.99	42.06	42.08	42.03	42.02	64.09
Test Model 3.2 Modulation 16QAM	2592.99	41.92	41.96	41.92	41.90	62.31
Test Model 3.1A Modulation 256QAM	2592.99	42.06	42.05	42.03	42.03	64.02
Total power/antenna port (W)		63.80	**63.98**	63.43	63.36	

Table 4 RF Power Output (49.5 MHz BW NR Band 41)

Config A:

Test Model 1.1 Modulation QPSK		Test Model 3.1 Modulation 64QAM		Test Model 3.2 Modulation 16QAM		Test Model 3.1a Modulation 256QAM	
Channel Frequency 2520.75MHz		Channel Frequency 2520.75MHz		Channel Frequency 2520.75MHz		Channel Frequency 2520.75MHz	
Tx Port	(dBm)	Tx Port	(dBm)	Tx Port	(dBm)	Tx Port	(dBm)
2	42.05	2	42.04	2	41.92	2	42.05
Channel Frequency 2592.99MHz		Channel Frequency 2592.99MHz		Channel Frequency 2592.99MHz		Channel Frequency 2592.99MHz	
Tx Port	(dBm)	Tx Port	(dBm)	Tx Port	(dBm)	Tx Port	(dBm)
2	42.00	2	42.03	2	41.90	2	41.98
Channel Frequency 2665.26MHz		Channel Frequency 2665.26MHz		Channel Frequency 2665.26MHz		Channel Frequency 2665.26MHz	
Tx Port	(dBm)	Tx Port	(dBm)	Tx Port	(dBm)	Tx Port	(dBm)
2	41.98	2	41.99	2	41.89	2	41.98

Table 5 RF Power Output (Band 41 NR 49.5 MHz Channel BW)

The base station maximum output power was found to be compliant with the manufacturer's specifications and with all requirements of the FCC rules.

Config A:

Test Model 1.1 Modulation QPSK		Test Model 3.1 Modulation 64QAM		Test Model 3.2 Modulation 16QAM		Test Model 3.1a Modulation 256QAM	
Channel Frequency 2520.75MHz		Channel Frequency 2520.75MHz		Channel Frequency 2520.75MHz		Channel Frequency 2520.75MHz	
Tx Port	dBm/MHz	Tx Port	dBm/MHz	Tx Port	dBm/MHz	Tx Port	dBm/MHz
2	25.78	2	25.76	2	27.36	2	25.77
Channel Frequency 2592.99MHz		Channel Frequency 2592.99MHz		Channel Frequency 2592.99MHz		Channel Frequency 2592.99MHz	
Tx Port	dBm/MHz	Tx Port	dBm/MHz	Tx Port	dBm/MHz	Tx Port	dBm/MHz
2	25.61	2	25.74	2	27.16	2	25.67
Channel Frequency 2665.26MHz		Channel Frequency 2665.26MHz		Channel Frequency 2665.26MHz		Channel Frequency 2665.26MHz	
Tx Port	dBm/MHz	Tx Port	dBm/MHz	Tx Port	dBm/MHz	Tx Port	dBm/MHz
2	25.68	2	25.79	2	27.26	2	25.72

Table 6 Power Spectral Density (B41 NR 49.5 MHz Channel BW)

The base station power spectral density was found to be compliant with the manufacturer's specifications and with all requirements of the FCC rules.

Config A:

Test Model 1.1 Modulation QPSK Channel Frequency 2520.75MHz		Test Model 3.1 Modulation 64QAM Channel Frequency 2520.75MHz		Test Model 3.2 Modulation 16QAM Channel Frequency 2520.75MHz		Test Model 3.1a Modulation 256QAM Channel Frequency 2520.75MHz	
Tx Port	CCDF 0.1%	Tx Port	CCDF 0.1%	Tx Port	CCDF 0.1%	Tx Port	CCDF 0.1%
2	8.00	2	7.98	2	8.08	2	8.02
Channel Frequency 2592.99MHz		Channel Frequency 2592.99MHz		Channel Frequency 2592.99MHz		Channel Frequency 2592.99MHz	
Tx Port	CCDF 0.1%	Tx Port	CCDF 0.1%	Tx Port	CCDF 0.1%	Tx Port	CCDF 0.1%
2	7.92	2	7.92	2	8.04	2	7.94
Channel Frequency 2665.26MHz		Channel Frequency 2665.26MHz		Channel Frequency 2665.26MHz		Channel Frequency 2665.26MHz	
Tx Port	CCDF 0.1%	Tx Port	CCDF 0.1%	Tx Port	CCDF 0.1%	Tx Port	CCDF 0.1%
2	8.02	2	8.04	2	8.10	2	8.06

Table 7 Peak to Average Power (B41 NR 49.5 MHz BW)

The base station peak to average power was found to be compliant with the manufacturer's specifications and with all requirements of the FCC rules.

4.2 Test No. 2: Modulation Characteristics (§ 2.1047)

The occupied bandwidth was measured to be compliant with the manufacturer's specifications and with all requirements of the FCC rules, which represents the 99% power bandwidth (see the following section and screenshots on page 34).

No further testing is required under this section of the FCC rules. No measurements other than the occupied bandwidth are required. Sample of modulation screenshots are on page 31, in I/Q constellation diagrams and tables, showing QPSK, 16QAM, 64QAM and 256QAM –modulation generation.

4.3 Test No. 3: Occupied Bandwidth (§ 2.1049, § 2.201, § 27.53)

4.3.1 Limits

Para. No. 2.1049. The 99% occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to 0.5% of the emitted power.

FCC § 27.53(m)(6) for BRS: The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

4.3.2 Test Procedure and Results

The 99% occupied bandwidth of the carrier emission is measured using a signal analyzer with Resolution Bandwidth set to 1MHz (1-5% of bandwidth; see screenshots on page 34 for details). The following tables summarize the results:

The Relative measurement procedure of OBW is measured as the width of the spectral envelope of the modulated signal, at an amplitude level reduced from a reference value by a specified ratio (or in decibels, a specified number of dB down from the reference value). The typical ratio for transmitters is −26 dB, corresponding to the 26 dB BW. The Relative measurement procedure emission is measured using a signal analyzer with Resolution Bandwidth set to 1MHz (1-5% of bandwidth; see screenshots on page 36 for details).

Emission designator summary tables are found in Appendix B.

The following tables summarize the results:

Measured laboratory room temperature and humidity during the tests				
Date	Temperature Min-Max:		Humidity Min-Max:	
01.07.2024 – 02.07.2024	22.9 °C	24.0 °C	37.2 RH%	55.0 RH%

Config A:

Test Model 1.1 Modulation QPSK			Test Model 3.1 Modulation 64QAM			Test Model 3.2 Modulation 16QAM			Test Model 3.1a Modulation 256QAM		
Channel Frequency 2520.75MHz			Channel Frequency 2520.75MHz			Channel Frequency 2520.75MHz			Channel Frequency 2520.75MHz		
Tx Port	99% (MHz)	26dB (MHz)	Tx Port	Value 99% (MHz)	Value 26dB (MHz)	Tx Port	99% (MHz)	26dB (MHz)	Tx Port	99% (MHz)	26dB (MHz)
2	46.86	49.45	2	46.81	49.53	2	47.03	49.49	2	46.82	49.48
Channel Frequency 2592.99MHz			Channel Frequency 2592.99MHz			Channel Frequency 2592.99MHz			Channel Frequency 2592.99MHz		
Tx Port	99% (MHz)	26dB (MHz)	Tx Port	Value 99% (MHz)	Value 26dB (MHz)	Tx Port	99% (MHz)	26dB (MHz)	Tx Port	99% (MHz)	26dB (MHz)
2	46.90	49.45	2	46.85	49.56	2	47.07	49.44	2	46.88	49.49
Channel Frequency 2665.26MHz			Channel Frequency 2665.26MHz			Channel Frequency 2665.26MHz			Channel Frequency 2665.26MHz		
Tx Port	99% (MHz)	26dB (MHz)	Tx Port	Value 99% (MHz)	Value 26dB (MHz)	Tx Port	99% (MHz)	26dB (MHz)	Tx Port	99% (MHz)	26dB (MHz)
2	46.85	49.41	2	46.81	49.41	2	47.03	49.55	2	46.80	49.48

Table 8 Occupied Bandwidth (B41 NR 49.5 MHz BW)

The occupied bandwidth was found to be compliant with the manufacturer's specifications and with all requirements of the FCC rules.

4.4 Test No. 4 Spurious Emissions at Antenna Terminals (§ 2.1051, § 2.1057, § 27.53)

4.4.1 Limits

FCC §27.53(m)(2) for BRS. The power of any emissions outside the licensee's frequency bands of operation shall be attenuated below the transmitter power (P) measured in watts.

The attenuation shall be not less than 43 + 10 log (P) dB (P = transmitter power in Watts).

The compliance limit was calculated in the following way:

Maximum transmitter output power [W]: P

Maximum transmitter output power [dBm]: 30 + 10 log10 P (conversion from W to dBm)

Attenuation required by FCC: 43 + 10 log10 P

Compliance limit = Maximum transmitter output power - Required attenuation

= 30 + 10 log10 P - (43 + 10 log10 P) = -13 dBm

For MiMo output from 4 TX antenna connectors, one antenna connector was measured individually, and the individual limit lime was reduced by 10log(4). Limit line was calculated to show -19 dBm emission limit, according to FCC KDB 662911 D01 and ANSI C6326-2015 guidance.

The AWHHF antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in the results of Test No.1) and antenna port 2 was selected for the remaining testing based on ANSI C63.26-2015 clauses 5.2.5.3, 5.7.2i and 6.4.

4.4.2 Test Procedure and Results

The tests were carried out in accordance with § 27.53. For all frequency ranges except two (immediately below and above the carrier frequency block) a 1 MHz resolution bandwidth was used for the measurements.

In the 1 MHz frequency bands immediately outside and adjacent to the carrier frequency block the resolution bandwidth is lowered to 1% of the 99%/ 26 dB occupied bandwidth of the transmitted carrier.

According to § 2.1057, all emissions including the fundamental frequency from the lowest radio frequency generated in the equipment, without going below 9 kHz, up to the 10th harmonic were investigated.

The following tables summarize the worst case detected emission levels (see screenshots on page 38 for details). The external attenuation (cable loss of the set up) is already added in the results.

Measured laboratory room temperature and humidity during the tests				
Date	Temperature Min-Max:		Humidity Min-Max:	
01.07.2024 – 10.07 2024	22.9 °C	24.5 °C	30.5 RH%	60.5 RH%

Config A Lower band edge:

Carrier Frequency: 2520.75 MHz			
Frequency Range [MHz]	**Emission Frequency [MHz]**	**Maximum Emission Level [dBm]**	**Result**
QPSK-Modulation TX port 2			
	2496.00	-26.91	compliant
64QAM-Modulation TX port 2			
	2496.00	-26.63	compliant
16QAM-Modulation TX port 2			
	2496.00	-27.69	compliant
256QAM-Modulation TX port 2			
	2496.00	-27.10	compliant
Measurement Uncertainty:		f < 1.0GHz: ±1.1dB, 1.0GHz ≤ f <3.6GHz: ±1.2dB, 3.6GHz ≤ f <8.0GHz: ±1.6dB, 8.0GHz ≤ f: ±1.9dB	

Table 9 Spurious Emissions (Lower band edge) (B41 NR 49.5 MHz BW)

Config A Upper band edge:

Carrier Frequency: 2665.26 MHz			
Frequency Range [MHz]	**Emission Frequency [MHz]**	**Maximum Emission Level [dBm]**	**Result**
QPSK-Modulation TX port 2			
	2690.00	-27.46	compliant
64QAM-Modulation TX port 2			
	2690.00	-27.45	compliant
16QAM-Modulation TX port 2			
	2690.00	-28.05	compliant
256QAM-Modulation TX port 2			
	2690.00	-27.39	compliant
		f < 1.0GHz: ±1.1dB, 1.0GHz ≤ f <3.6GHz: ±1.2dB, Measurement Uncertainty:3.6GHz ≤ f <8.0GHz: ±1.6dB, 8.0GHz ≤ f: ±1.9dB	

Table 10 Spurious Emissions (Upper band edge) (B41 NR 49.5 MHz BW)

Config A Spurious emissions:

Carrier Frequency: 2592.99 MHz			
Frequency Range [MHz]	**Emission Frequency [MHz]**	**Maximum Emission Level [dBm]**	**Result**
QPSK-Modulation TX port 2			
0.009 – 27000	9231.56	-27.66	compliant
64QAM-Modulation TX port 2			
0.009 – 27000	9230.77	-27.69	compliant
16QAM-Modulation TX port 2			
0.009 – 27000	9232.35	-27.78	compliant
256QAM-Modulation TX port 2			
0.009 – 27000	9225.23	-27.63	compliant
Measurement Uncertainty:		f < 1.0GHz: ±1.1dB, 1.0GHz ≤ f <3.6GHz: ±1.2dB, 3.6GHz ≤ f <8.0GHz: ±1.6dB, 8.0GHz ≤ f: ±1.9dB	

Table 11 Spurious Emissions (B41 NR 49.5 MHz BW)

The measured conducted emission levels were found to be compliant with the manufacturer's specifications and with all requirements of the FCC rules.

4.5 Test No. 5 Field Strength of Spurious Radiation (§ 2.1053, § 27.53)

4.5.1 FCC Section 2.1053 Field Strength of Spurious Emissions

Field strength measurements of radiated spurious emissions were made in an FCC registered 3m Semi-Anechoic Chamber which is maintained by Nokia in Oulu, Finland. A complete description and full measurement data for the site is on file with the FCC (Site Registration Number: 261413).

The spectrum from 30 MHz to beyond the tenth harmonic of the carrier 2.69 GHz, (26.9 GHz), was searched for spurious radiation. Measurements were made using both horizontally and vertically polarized broadband antennas. Per FCC regulations, the comparison of out of band spurious emissions directly to the limit is appropriately made using the substitution method. However, when the emissions are more than 20 dB below the specification limit, the use of field strength measurements for compliance determination is acceptable and those emissions are considered not reportable (FCC Section 2.1053). For this case the evaluation of acceptable radiated field strength is as follows.

4.5.2 Field Strength of Spurious Emissions - Limits

FCC Sections 2.1053 and 27.53 contain the requirements for the levels of spurious radiation as a function of the level of the unmodulated carrier. The reference level for the unmodulated carrier is calculated as the field produced by an ideal dipole excited by the transmitter output power according to the following relation taken from Reference Data for Radio Engineers, page 676, 4th edition, IT&T Corp.

$$E = [(30*P)^{1/2}]/R$$

$$20 \log (E*10^{6}) - (43 + 10 \log P) = 82.23 \text{ dB}\mu\text{V/meter}$$

Where:

E = Field Intensity in Volts/meter P = Transmitted Power in Watts

R = Measurement distance in meters = 3 m

The Part 27 Limit is 82.23 dBµV/m at 3m and 85.75 dBuV/m at 2m

The calculated emission levels were found by:

Measured level (dBμV) + Cable Loss(dB)+Antenna Factor(dB) = Field Strength (dBμV/m)

4.5.3 FCC 15.109 Class B Radiated Emissions Limits:

Frequency (MHz)	Field Strengh at 3m (dBμV/m) FCC §15.109	Field Strengh at 3m (dBμV/m) ICES-003	RBW (KHz)	Detector
30 – 88	40.0	40.0	100	QP
88 – 216	43.5	43.5	100	QP
216 – 960	46.0	46.0	100	QP
960 – 1000	54.0	54.0	100	QP
1000 – 10th harmonic	54.0	54.0	1000	Average

Table 12 Radiated Emission Limits

4.5.4 RESULTS:

For compliance with 47CFR Part 2and 27, the field strength of any spurious radiation, measured at 3m, is required to be less than 82.23 dBµV/meter (82.23 @ 3m). Over the out of band spectrum investigated from 30 MHz to beyond the tenth harmonic of the carrier (up to 26.9 GHz), no reportable spurious emissions were detected.

Measured laboratory room temperature and humidity during the tests				
Date	Temperature Min-Max:		Humidity Min-Max:	
15.07.2024 – 16.07.2024	22.2 °C	24.6 °C	47.3 RH%	61.5 RH%

Frequency Range [MHz]	**Emission Frequency [MHz]**	**Maximum Emission Level [dBm]**	**Result**
30 - 26900	16577.333280	-33.81 dBm	compliant
Measurement Uncertainty:			±5.33 dB

Table 13 Field Strength of Spurious Radiation

The measured emission levels were found to be compliant with the manufacturer's specifications and with all requirements of the FCC.

4.6 Test No. 6: Frequency Stability (§27.54, §2.1055)

4.6.1 Purpose

Frequency stability measurements were performed to verify that the frequency deviation of the emission stays within the licensee's frequency block under extreme temperature.

4.6.2 Limits

Para. No. § 27.54. (-30 °C to +50 °C) and supply voltage conditions according to § 2.1055.

4.6.3 Test Configuration

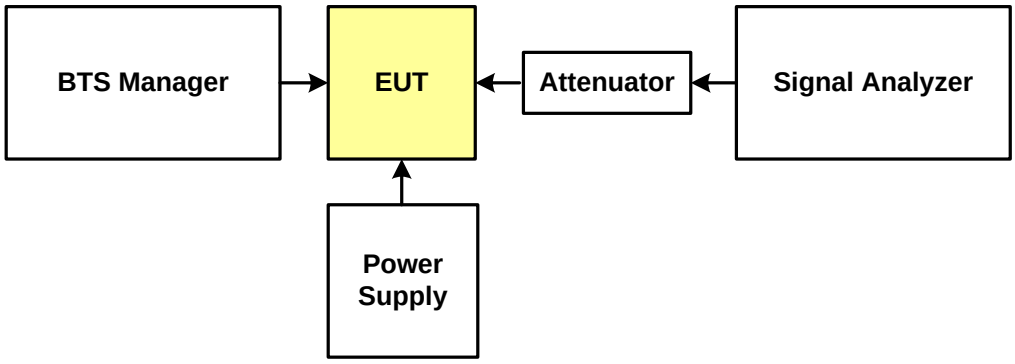


Figure 2 Test Configuration for frequency stability with voltage variation

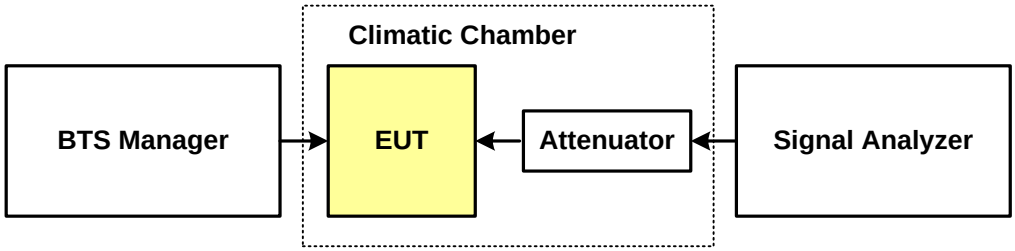


Figure 3 Test Configuration for frequency stability with temperature variation

A complete list of the measurement equipment is included on page 27 of this measurement report.

4.6.4 Test Procedure and Results

Measured laboratory room temperature and humidity during the tests				
Date	Temperature Min-Max:		Humidity Min-Max:	
02.07.2024 – 08.07 2024	22.8 °C	24.5 °C	36.2 RH%	60.5 RH%

Frequency Stability with Temperature Variation:

The supply voltage of the EUT was set to the nominal value and the temperature of the environmental chamber was varied in 10degree steps from -30 degrees Celsius to +50 degrees Celsius. The EUT was allowed to stabilize 60 min. at each temperature and the frequency error was measured.

Config A:

Carrier Frequency: 2592.99 MHz						
Supply Voltage (DC) [V]	**Ambient Temperature [°C]**	**Frequency Deviation**		**Manufacturer's Specification**		**Result**
		[Hz]	**[ppm]**	**[Hz]**	**[ppm]**	
QPSK Modulation TX port 2						
-48.0	-30.0	0.20894	0.000	124	0.05	compliant
-48.0	-20.0	0.06804	0.000	124	0.05	compliant
-48.0	-10.0	-0.42902	0.000	124	0.05	compliant
-48.0	0.0	0.19654	0.000	124	0.05	compliant
-48.0	10.0	0.21352	0.000	124	0.05	compliant
-48.0	30.0	-0.57287	0.000	124	0.05	compliant
-48.0	40.0	-0.06009	0.000	124	0.05	compliant
-48.0	50.0	0.20324	0.000	124	0.05	compliant
16QAM Modulation TX port 2						
-48.0	-30.0	0.26573	0.000	124	0.05	compliant
-48.0	-20.0	-0.09703	0.000	124	0.05	compliant
-48.0	-10.0	0.03560	0.000	124	0.05	compliant
-48.0	0.0	-0.63389	0.000	124	0.05	compliant
-48.0	10.0	-0.00780	0.000	124	0.05	compliant
-48.0	30.0	0.27237	0.000	124	0.05	compliant
-48.0	40.0	-0.10359	0.000	124	0.05	compliant
-48.0	50.0	0.61310	0.000	124	0.05	compliant
64QAM Modulation TX port 2						
-48.0	-30.0	-0.08870	0.000	124	0.05	compliant
-48.0	-20.0	-0.53768	0.000	124	0.05	compliant

-48.0	-10.0	0.12150	0.000	124	0.05	compliant
-48.0	0.0	0.01366	0.000	124	0.05	compliant
-48.0	10.0	-0.39037	0.000	124	0.05	compliant
-48.0	30.0	-0.01349	0.000	124	0.05	compliant
-48.0	40.0	0.31100	0.000	124	0.05	compliant
-48.0	50.0	0.01556	0.000	124	0.05	compliant
256QAM Modulation TX port 2						
-48.0	-30.0	0.01063	0.000	124	0.05	compliant
-48.0	-20.0	0.15206	0.000	124	0.05	compliant
-48.0	-10.0	0.19781	0.000	124	0.05	compliant
-48.0	0.0	0.07311	0.000	124	0.05	compliant
-48.0	10.0	0.63482	0.000	124	0.05	compliant
-48.0	30.0	-0.08210	0.000	124	0.05	compliant
-48.0	40.0	0.59676	0.000	124	0.05	compliant
-48.0	50.0	0.11643	0.000	124	0.05	compliant
Measurement Uncertainty:					±1.0 Hz	

Table 14 Frequency stability with temp. var. (B41 NR 49.5 MHz BW)

Frequency Stability with Voltage Variation:

The EUT was placed in a climatic chamber and allowed to stabilize at +20 degrees Celsius for at least 60 minutes. With the supply voltage of the EUT set to 85% of the nominal value, the frequency error was measure. This procedure was repeated at 100% and 115% of the nominal supply voltage value.

Config A:

Carrier Frequency: 2592.99 MHz						
Supply Voltage (DC) [V]	**Ambient Temperature [°C]**	**Frequency Deviation**		**Manufacturer's Specification**		**Result**
		[Hz]	**[ppm]**	**[Hz]**	**[ppm]**	
QPSK Modulation TX port 2						
-40.8	20.0	0.11555	0.000	124	0.05	compliant
-48.0	20.0	-0.25052	0.000	124	0.05	compliant
-55.2	20.0	0.17125	0.000	124	0.05	compliant
16QAM Modulation TX port 2						
-40.8	20.0	0.55307	0.000	124	0.05	compliant
-48.0	20.0	-0.20418	0.000	124	0.05	compliant
-55.2	20.0	-0.13830	0.000	124	0.05	compliant
64QAM Modulation TX port 2						
-40.8	20.0	-0.10165	0.000	124	0.05	compliant
-48.0	20.0	-0.59814	0.000	124	0.05	compliant
-55.2	20.0	-0.59814	0.000	124	0.05	compliant
256QAM Modulation TX port 2						
-40.8	20.0	-0.16568	0.000	124	0.05	compliant
-48.0	20.0	0.57394	0.000	124	0.05	compliant
-55.2	20.0	0.49513	0.000	124	0.05	compliant
Measurement Uncertainty:					±1.0 Hz	

Table 15 Frequency stability with voltage var. (B41 NR 49.5 MHz BW)

The measured frequency stability was found to be compliant with the manufacturer's specifications and with all requirements of the FCC rules.

5 Test Data and Screenshots

5.1 Part List of the RF Measurement Test Equipment

No.	Test Equipment	Manufacturer & Type	Serial Number	Calibration date	Calibration due	Test No.
1	Signal Analyzer	Rohde & Schwarz: FSW-43	104598	12/2023	12/2024	1, 2, 3, 4, 6
2	Vector Network Analyzer	Rohde & Schwarz: ZVA40	100146	12/2023	12/2024	1, 2, 3, 4, 6
3	Calibration Unit	Rohde & Schwarz: ZV-Z54	100125	11/2023	11/2024	1, 2, 3, 4, 6
4	Calibration Unit	Hewlett Packard 85032B	2919A04843	07/2023	07/2024	1, 2, 3, 4, 6
5	Frequency Standard	Datum 8040	002300628	07/2023	07/2024	1, 2, 3, 4, 6
6	Multimeter	Fluke 83	DM8750386	12/2023	12/2024	1, 2, 3, 4, 6
7	Humidity and Temperature probe	HMP110	S0840831	12/2023	12/2024	1, 2, 3, 4
8	Humidity and Temperature probe	HMP110	T1540333	12/2023	12/2024	6
9	DC Power Supply	Elektro-AutomatikGmbH & Co:PS 9080-510 3U19 3HE 15000W	1373610001	cnn	-	1, 2, 3, 4, 6
10	Attenuator	Weinschel 66-30-33	BN0228	cnn	-	1, 2, 3, 6
11	Attenuator	SHX DTS100G-20dB-24G	14111101	cnn	-	4
12	High Pass Filter	RF-Lambda RHPF23G06G40	21052000011	cnn	-	4
14	Temperature chamber	ATT DY 1000C 3ESS	TT01413	12/2023	12/2024	6
15	EMI Test Receiver	Rohde & Schwarz: ESW44	103055	12/2023	12/2024	5
16	Horn Antenna	ETS-Lindgren ETS3117	75823	12/2023	12/2024	5
17	Bilog Antenna	Schaffner Chase CBL6112B	2003	08/2023	08/2024	5
18	Horn Antenna	ETS-Lindgren 3116C-PA	150635	02/2024	02/2025	5
19	Amplifier	Miteq AFSX4	1829263	cnn	-	5
20	Band stop filter	Creowave Filters		cnn	-	5
21	High pass filter	Creowave Filters		cnn	-	5

22	Mast Controller	Maturo NCD/281	21250317	cnn	-	5
23	4-meter mast	Maturo TAM4.0-E	123/21250317	cnn	-	5
24	Anechoic chamber	Comtest Nokia 3m Chamber	Nokia 3m Chamber	10/2022	10/2025	5
25	Humidity and temperature meter	Vaisala HMP113	T0841033	12/2023	12/2024	5

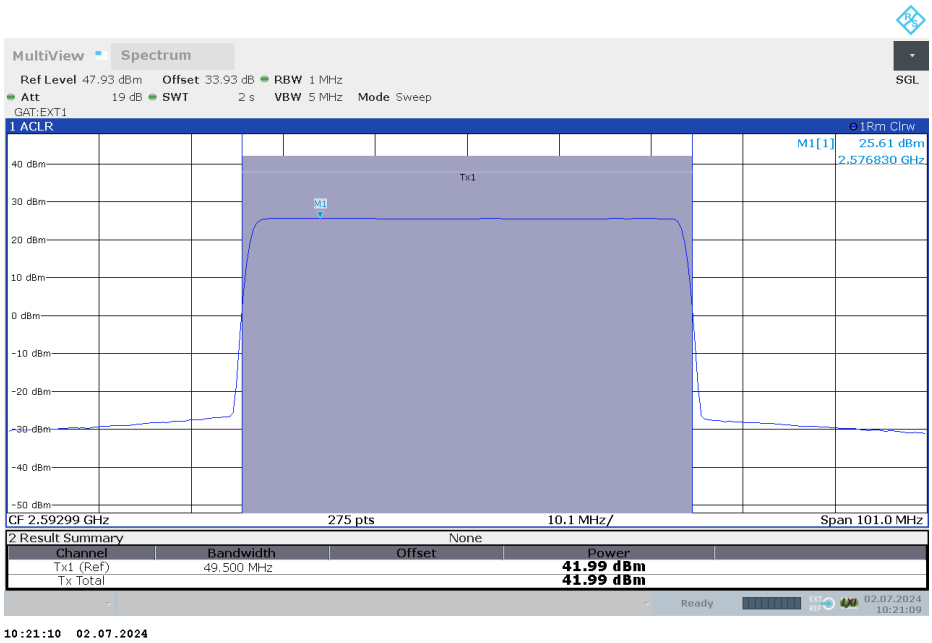
Table 16 Part List of the RF Measurement Test Equipment

5.2 Spectral Plots

NOTE: Only a sample of the spectral plots are used and visible in this report. All measured test results and data are saved in Oulu located server.

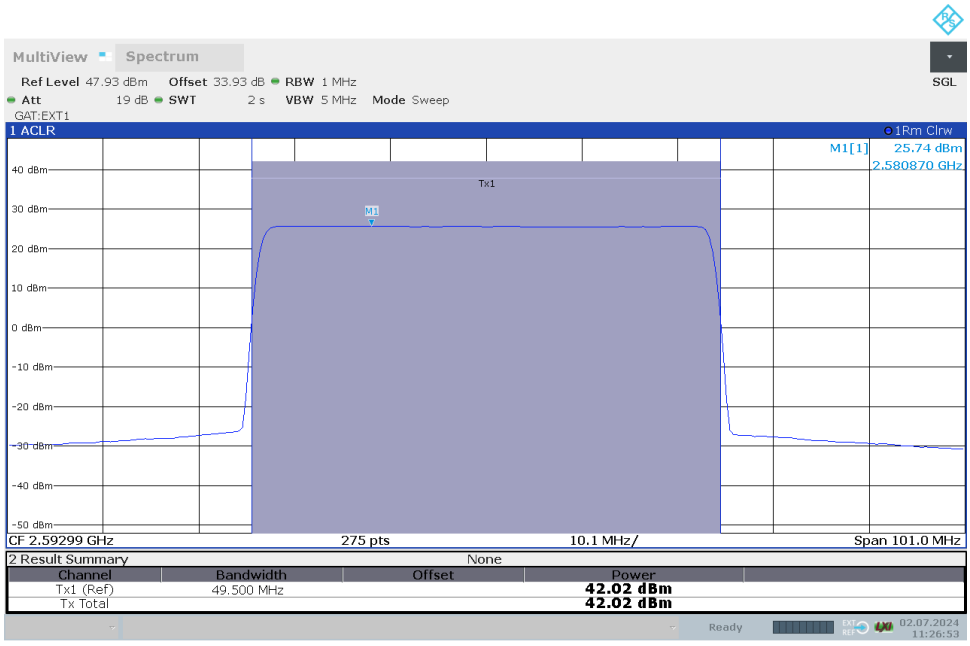
5.2.1 Test No. 1: RF Output Power

Power spectral density NR 49.5MHz BW



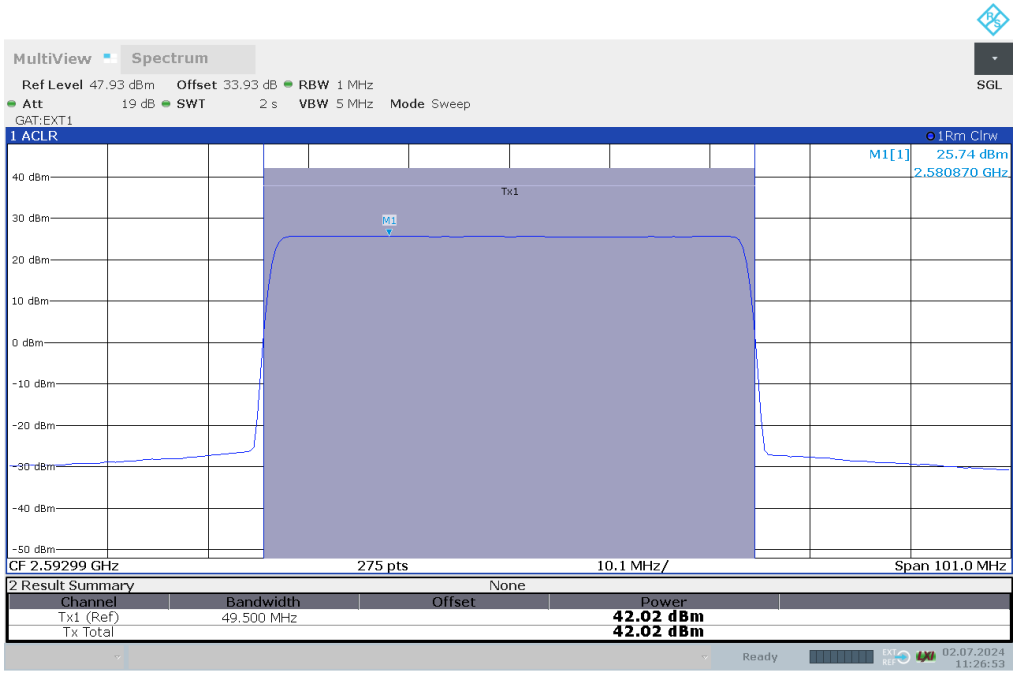
10:21:10 02.07.2024

Test Model 1.1, Modulation QPSK, Channel Frequency 2592.99MHz, TX port 2



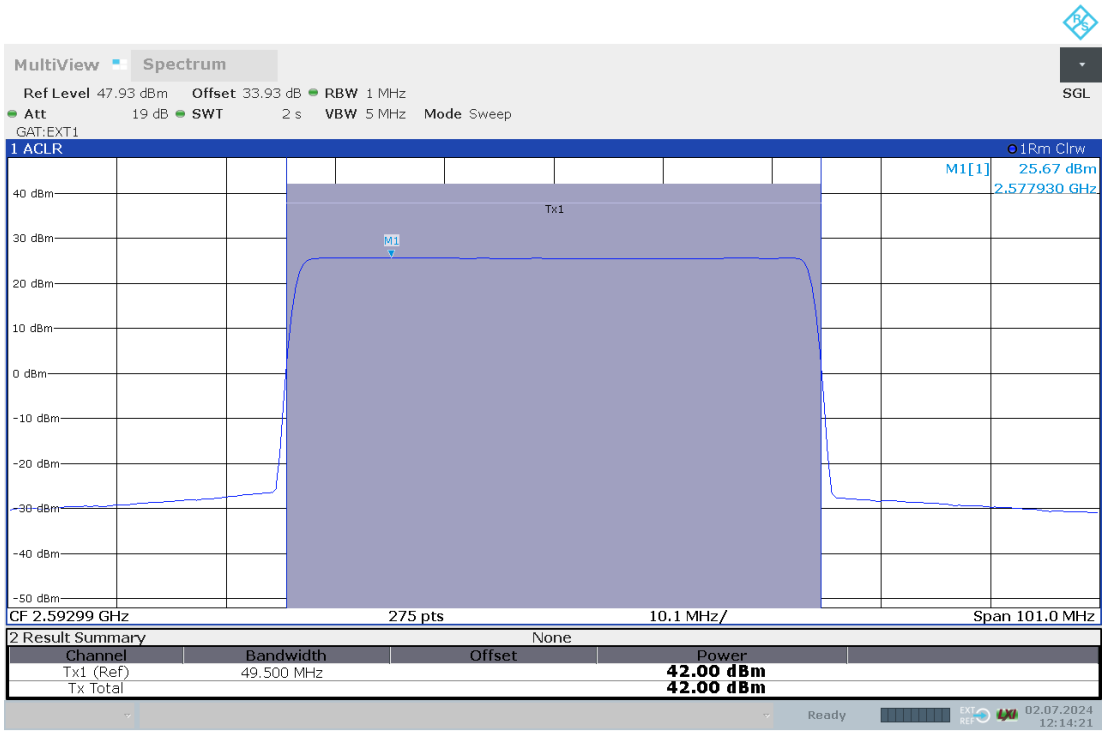
11:26:53 02.07.2024

Test Model 3.2, Modulation 16QAM, Channel Frequency 2592.99MHz, TX port 2



11:26:53 02.07.2024

Test Model 3.1, Modulation 64QAM, Channel Frequency 2592.99MHz, TX port 2



12:14:21 02.07.2024

Test Model 3.1a, Modulation 256QAM, Channel Frequency 2592.99MHz, TX port 2

Peak-to-Average Power Ratio (PAPR) NR 49.5MHz BW

Test Model 1.1, Modulation QPSK, Channel Frequency 2592.99MHz, Tx Port2

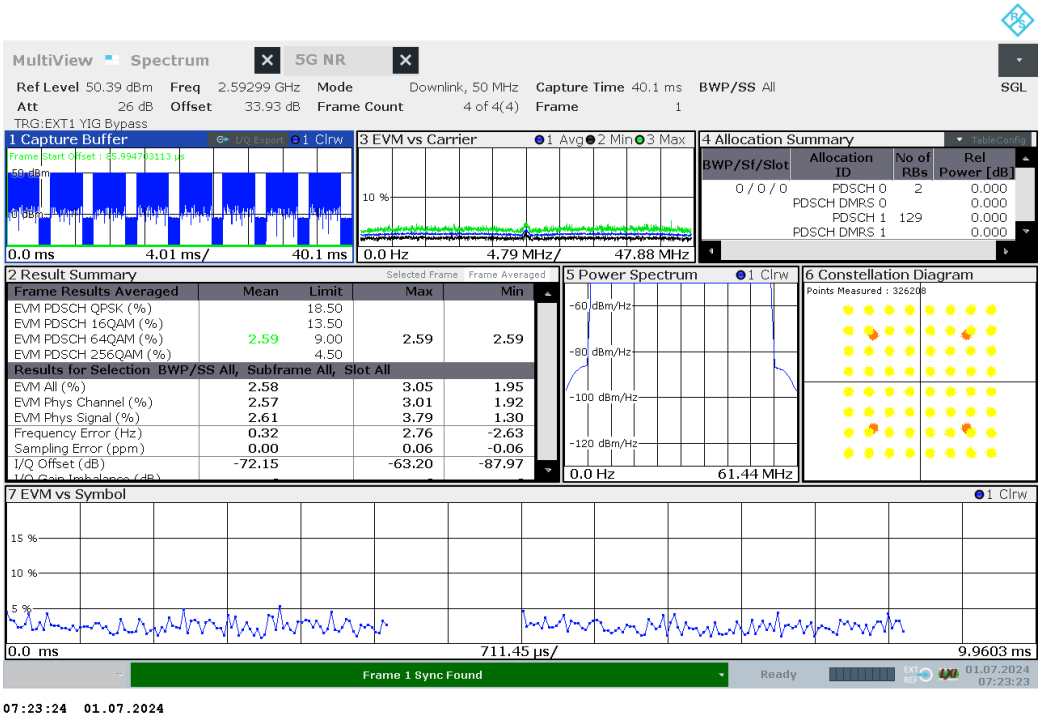
5.2.2 Test No. 2: Modulation Characteristics

No additional measurements are required for the modulation characteristics. Please refer to test no. 3, occupied bandwidth on page 15.

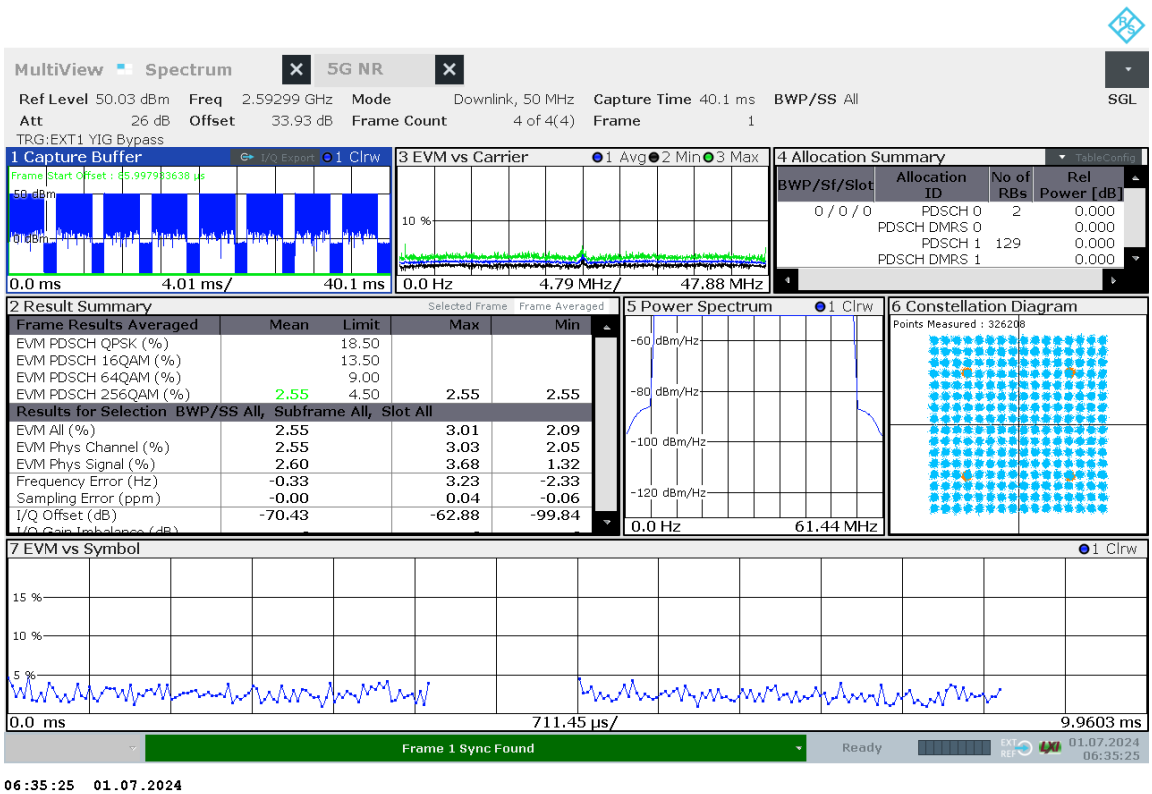
Screenshots below shows information about the modulations I/Q constellation form and modulation information table, displaying error to ideal modulation symbols.

I/Q constellation diagram with capture buffer – QPSK (2592.99MHz) (NR 49.5MHz Channel BW)

I/Q constellation diagram with capture buffer – 16QAM (2592.99 MHz) (NR 49.5MHz Channel BW)



I/Q constellation diagram with capture buffer – 64QAM (2592.99 MHz) (NR 49.5MHz Channel BW)

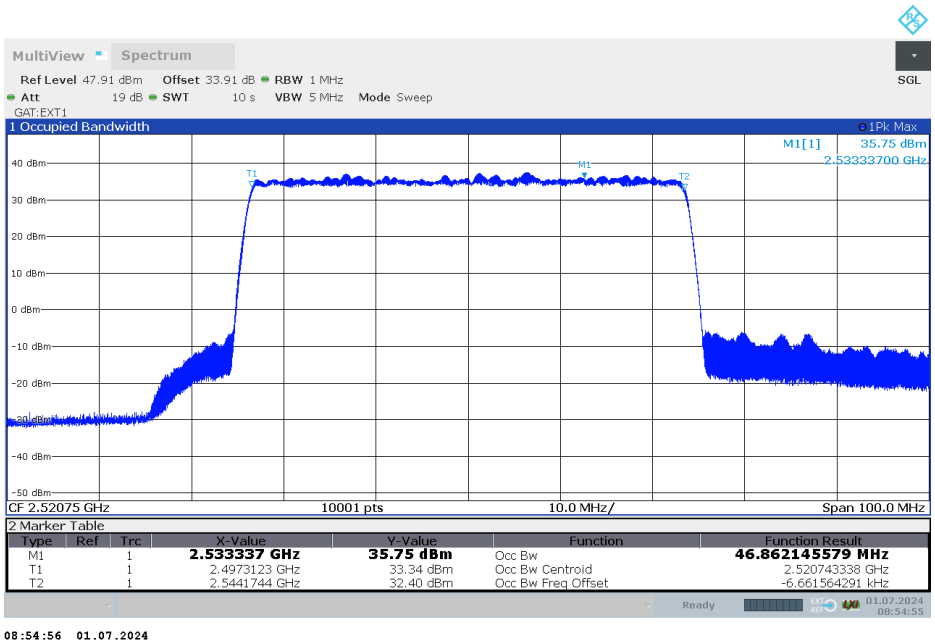


I/Q constellation table with I/Q error –256QAM (2592.99 MHz) (NR 49.5MHz Channel BW)

5.2.3 Test No. 3: Occupied Bandwidth

Occupied Bandwidth 99% plots

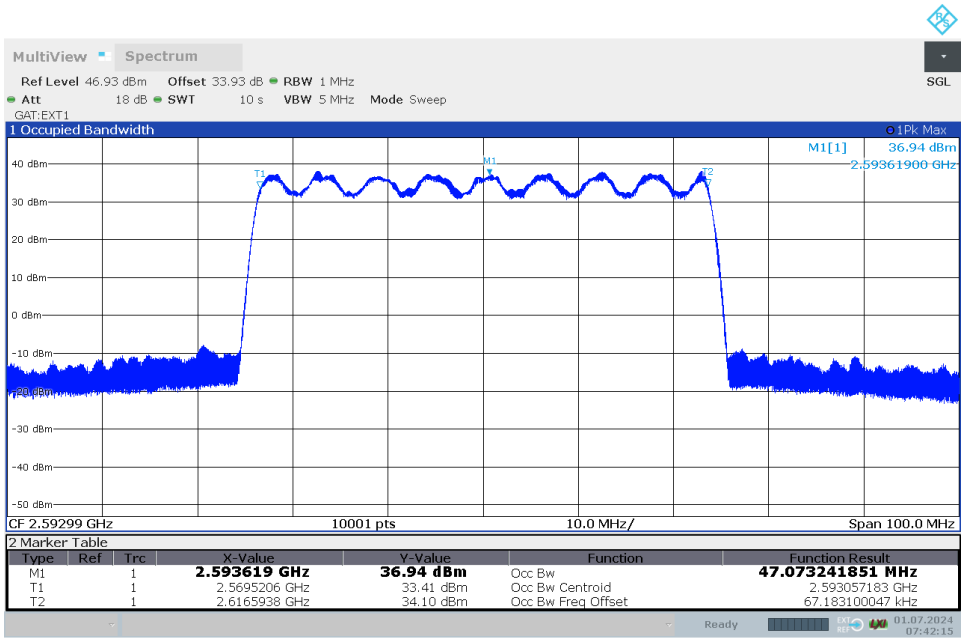
Occupied Bandwidth NR49.5MHz BW



08:54:56 01.07.2024

Test Model 1.1, Modulation QPSK, Channel Frequency 2520.75MHz, Tx Port 2

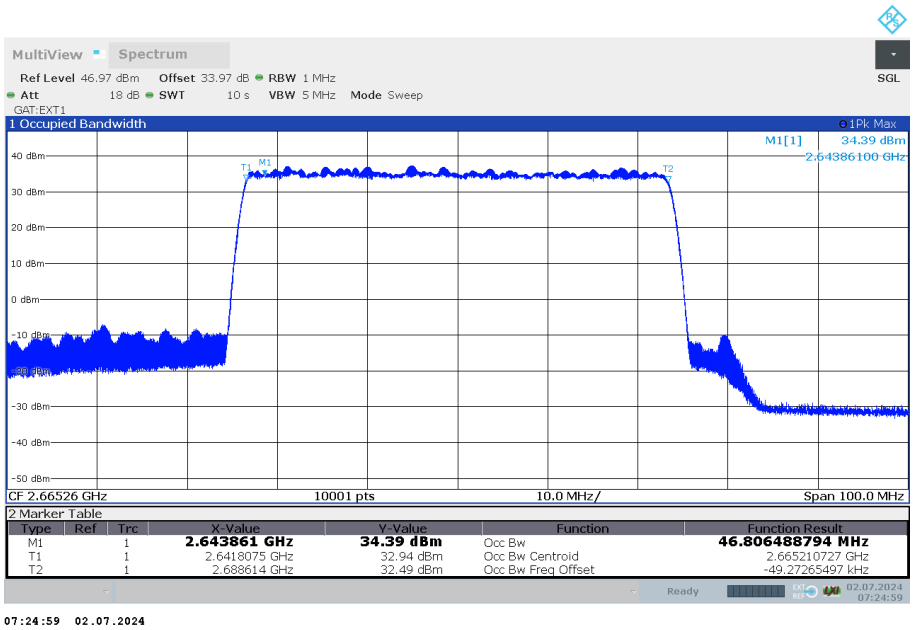
Occupied Bandwidth NR49.5MHz BW



07:42:16 01.07.2024

Test Model 3.2, Modulation 16QAM, Channel Frequency 2592.99MHz, Tx Port 2

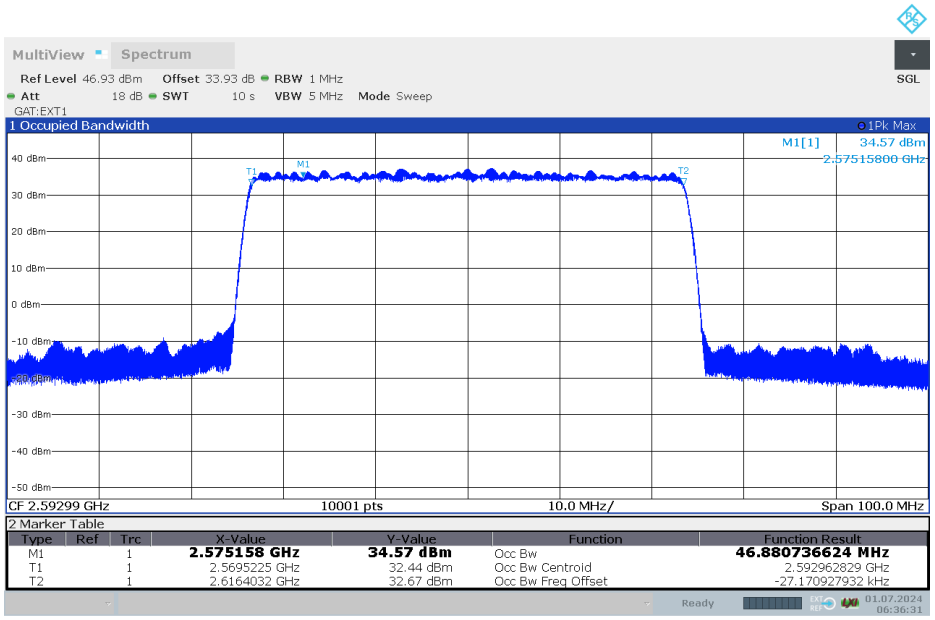
Occupied Bandwidth NR49.5MHz BW



07:24:59 02.07.2024

Test Model 3.1, Modulation 64QAM, Channel Frequency 2665.26MHz, Tx Port 2

Occupied Bandwidth NR49.5MHz BW

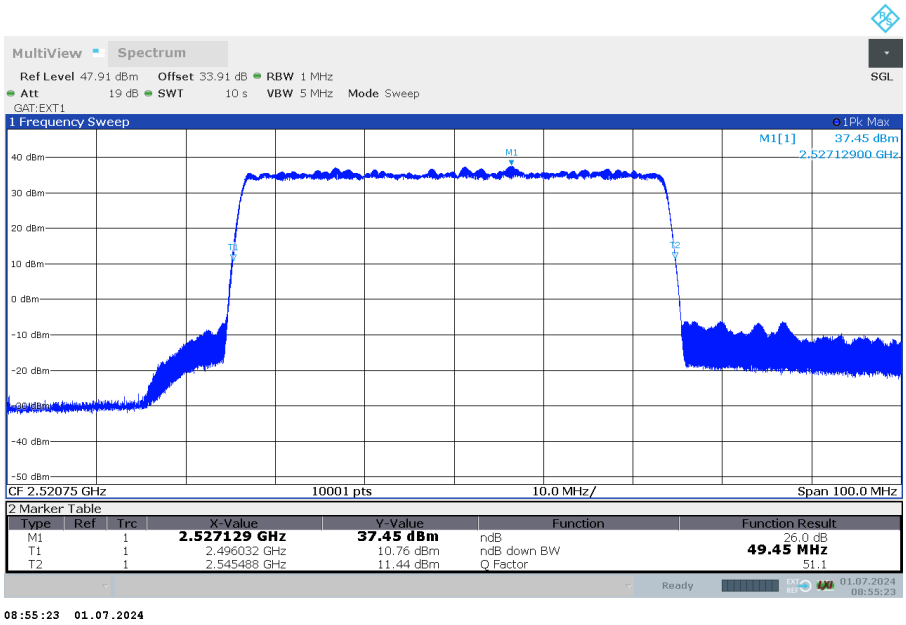


06:36:31 01.07.2024

Test Model 3.1a, Modulation 256QAM, Channel Frequency 2592.99MHz, Tx Port 2

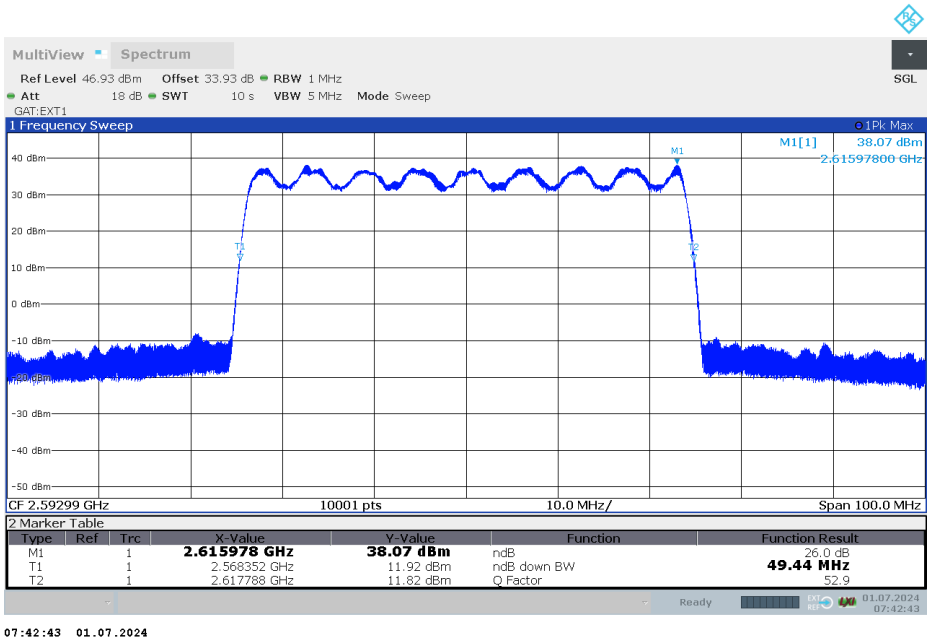
Occupied Bandwidth -26dB plots

Occupied Bandwidth NR 49.5MHz BW



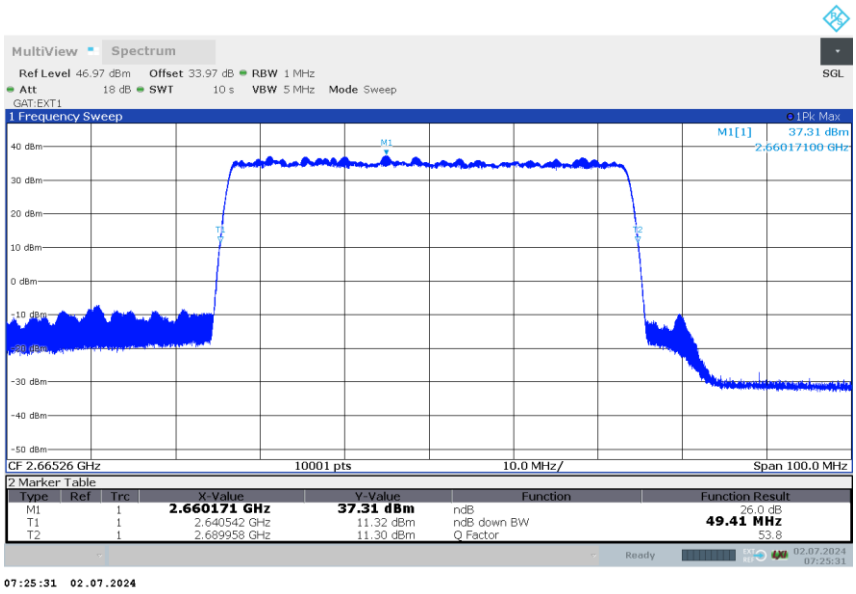
Test Model 1.1, Modulation QPSK, Channel Frequency 2520.75MHz, Tx Port 2

Occupied Bandwidth NR 49.5MHz BW



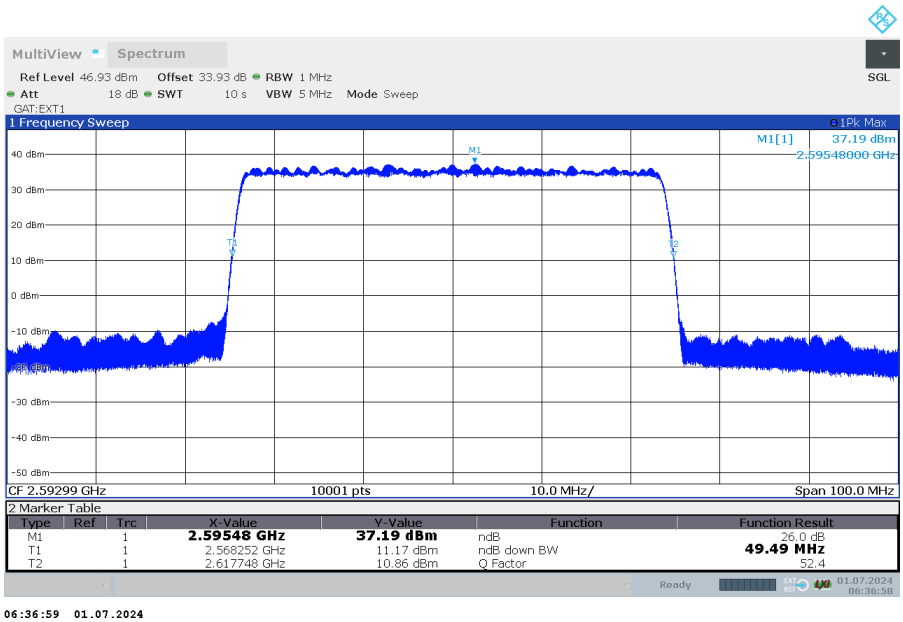
Test Model 3.2, Modulation 16QAM, Channel Frequency 2592.99MHz, Tx Port 2

Occupied Bandwidth NR 49.5MHz BW



Test Model 3.1, Modulation 64QAM, Channel Frequency 2665.26MHz, Tx Port 2

Occupied Bandwidth NR 49.5MHz BW



Test Model 3.1a, Modulation 256QAM, Channel Frequency 2592.99MHz, Tx Port 2

5.2.4 Test No. 4: Spurious Emissions at the Antenna Terminals

Config A TX port 2:

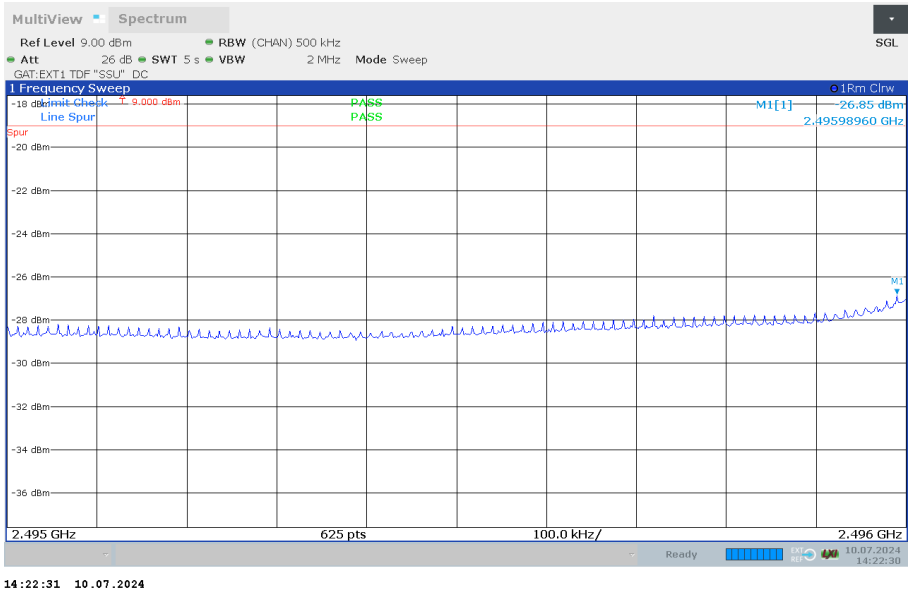


Figure 4 Spurious Emissions (Lower Band Edge) – QPSK (2520.75MHz) (49.5MHz Channel BW)

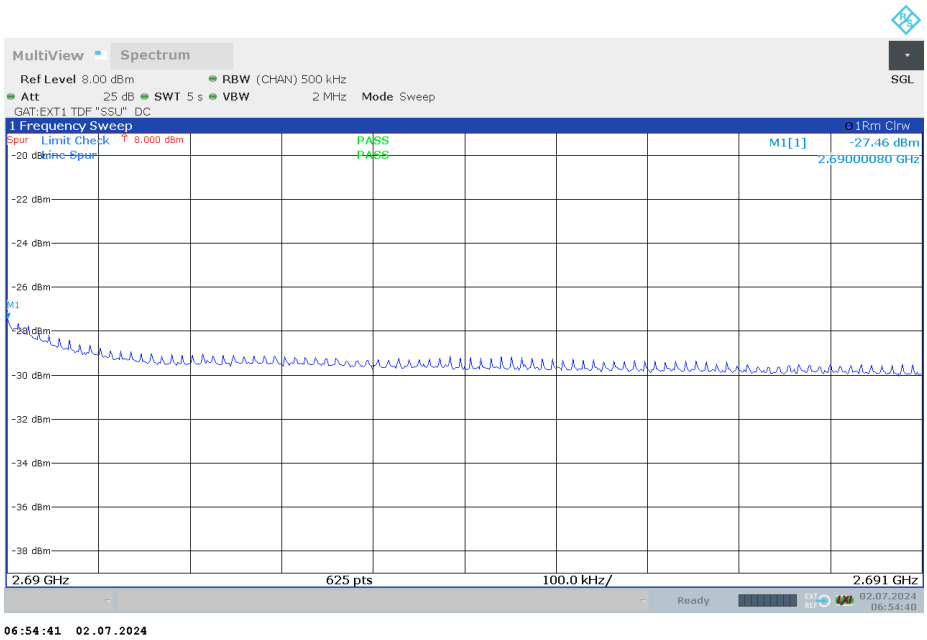


Figure 5 Spurious Emissions (Upper Band Edge) – QPSK (2685 MHz) (49.5MHz Channel BW)

Config A TX port 2:

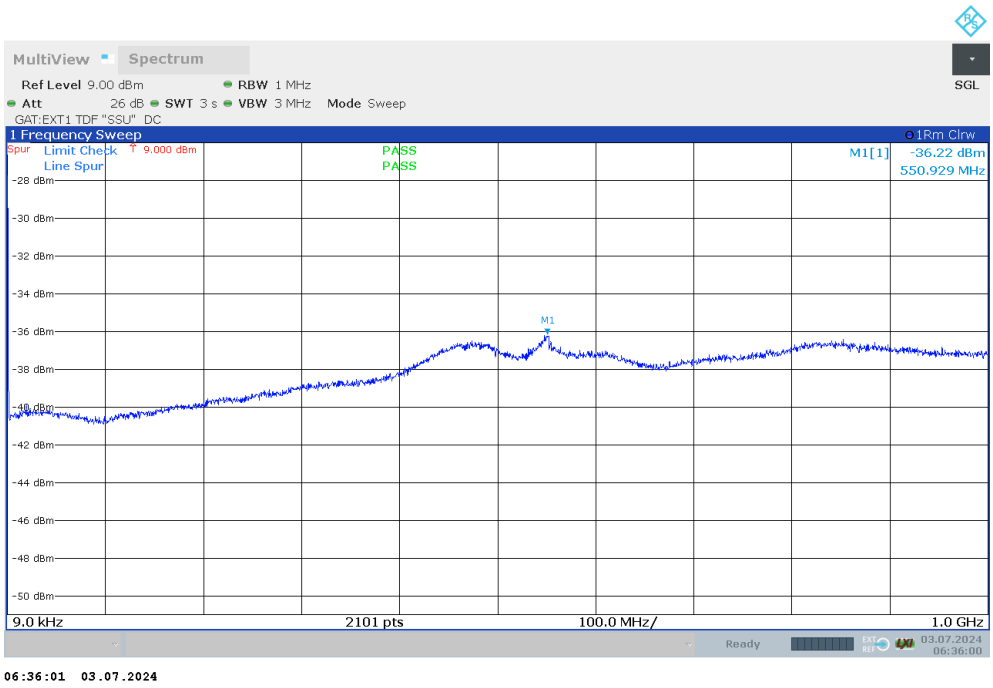


Figure 6 Spurious Emissions (9kHz – 1GHz) - QPSK (2592.99 MHz) (49.5MHz Channel BW)

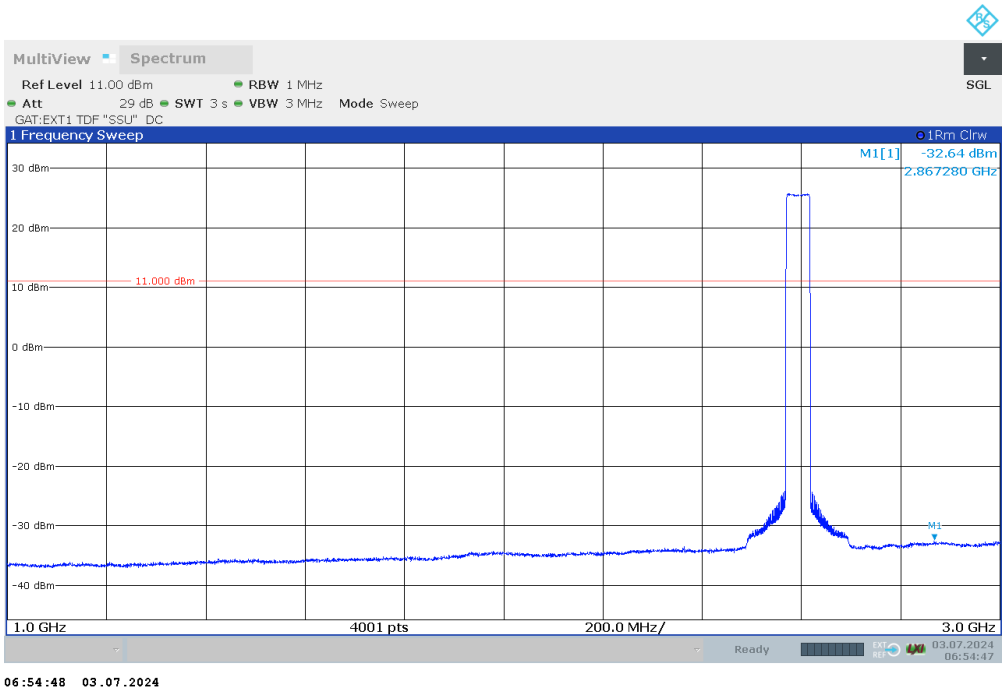


Figure 7 Spurious Emissions (1GHz – 3GHz) – QPSK (2592.99 MHz) (49.5MHz Channel BW)

Figure 8 Spurious Emissions (3GHz – 6GHz) – QPSK (2592.99 MHz) (49.5MHz Channel BW)

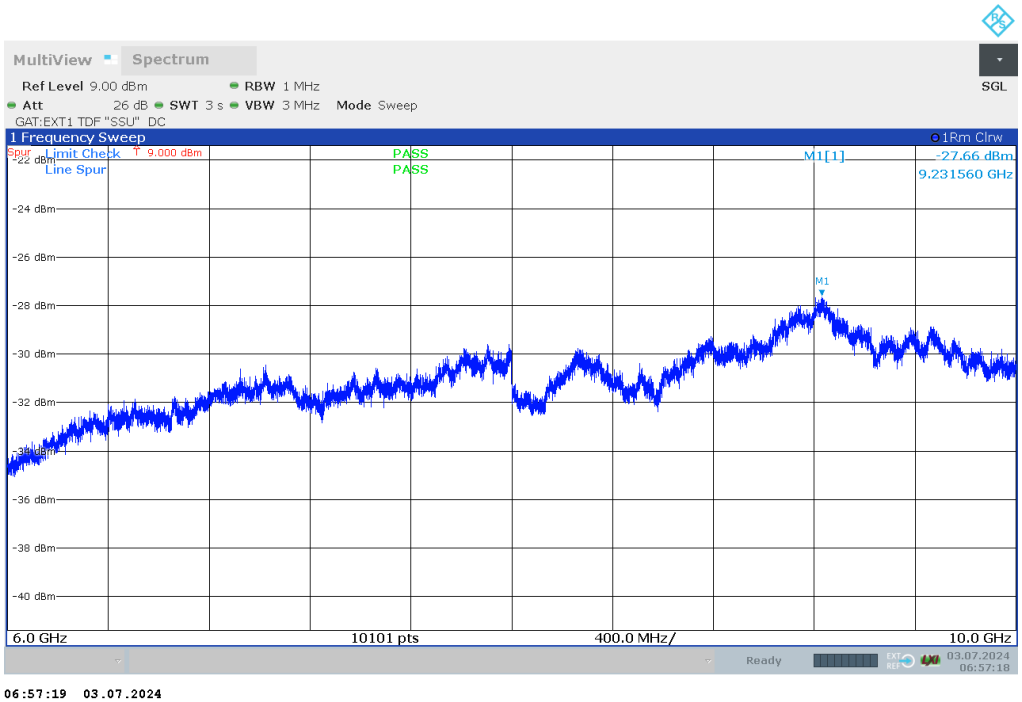


Figure 9 Spurious Emissions (6GHz – 10GHz) – QPSK (2592.99 MHz) (49.5MHz Channel BW)

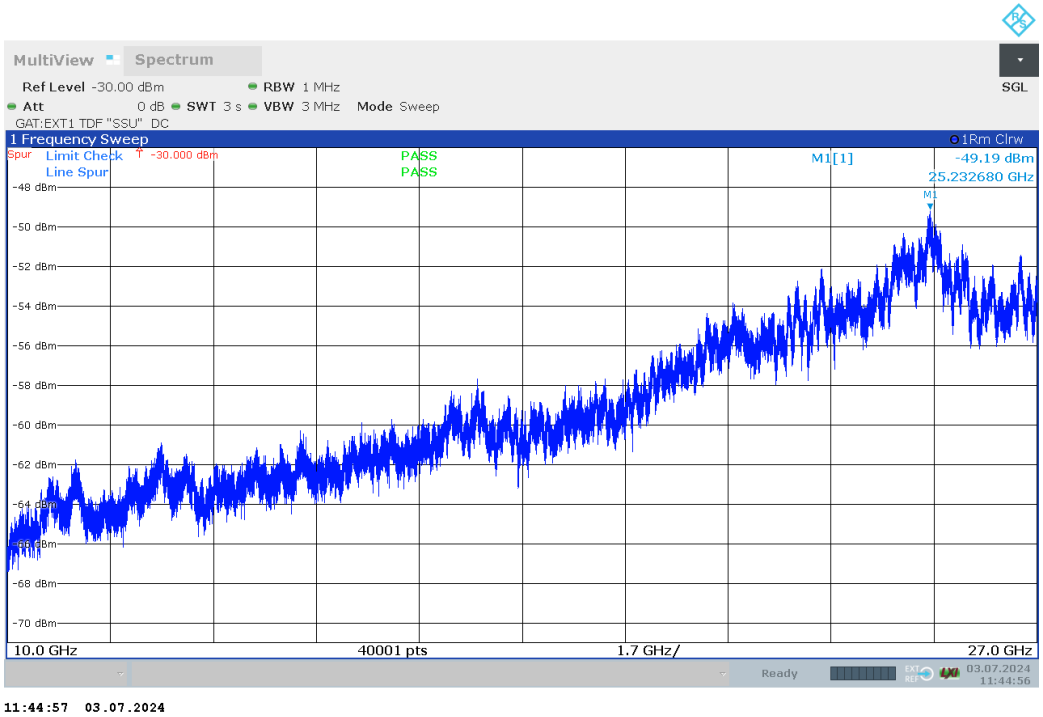


Figure 10 Spurious Emissions (10GHz – 27GHz) – QPSK (2592.99 MHz) (49.5MHz Channel BW)

5.2.5 Test No. 5 Field Strength of Spurious Radiation

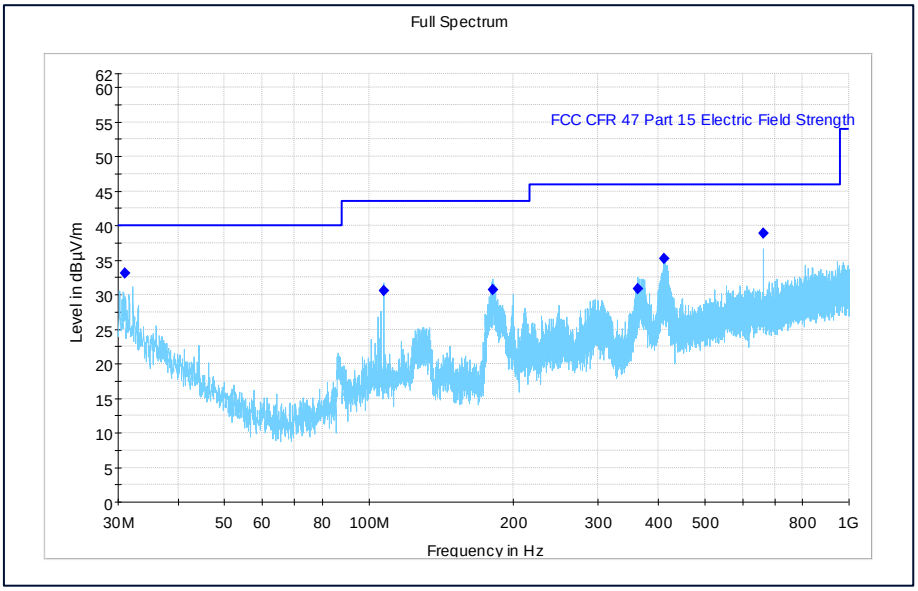


Figure 11 Field Strength of Spurious Radiation (30 MHz – 1 GHz) – QPSK (2520.75 MHz) (49.5 MHz Channel BW)

Final_Result

Frequency (MHz)	QuasiPeak Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Polarisation	Angle (°)
31.056333	33.09	40.00	6.91	100.0	V	145.0
107.341333	30.57	43.50	12.93	102.0	V	222.0
180.874667	30.72	43.50	12.78	197.0	H	224.0
363.172333	30.79	46.00	15.21	109.0	V	90.0
411.437000	35.18	46.00	10.82	214.0	H	52.0
663.541667	38.90	46.00	7.10	204.0	V	267.0

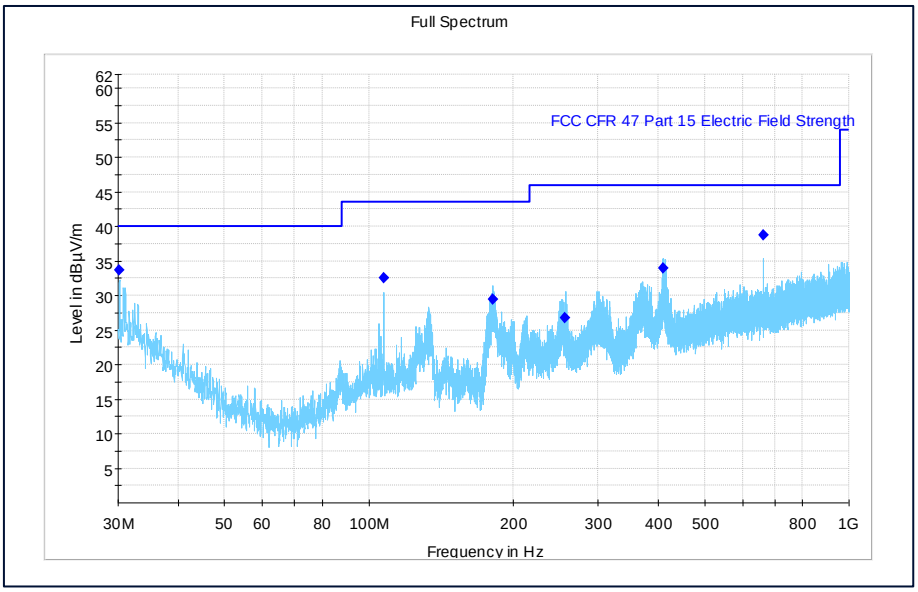


Figure 12 Field Strength of Spurious Radiation (30 MHz – 1 GHz) – QPSK (2592.99 MHz) (49.5 MHz Channel BW)

Final_Result

Frequency (MHz)	QuasiPeak Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Polarisation	Angle (°)
30.210000	33.69	40.00	6.31	117.0	V	22.0
107.371333	32.51	43.50	10.99	109.0	V	294.0
180.662000	29.48	43.50	14.02	191.0	H	222.0
255.664333	26.80	46.00	19.20	119.0	H	92.0
410.845000	34.01	46.00	12.00	209.0	H	53.0
663.541667	38.71	46.00	7.29	197.0	V	270.0

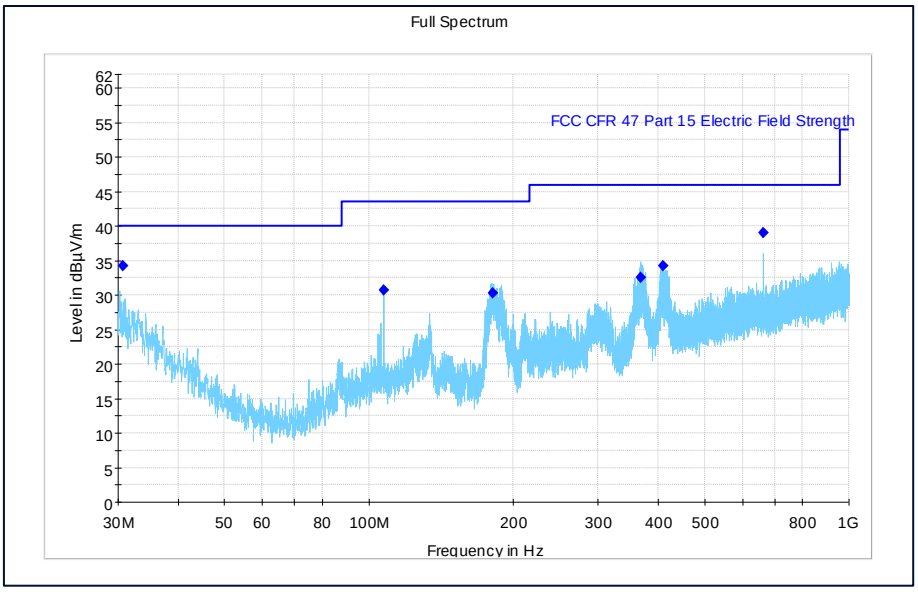


Figure 13 Field Strength of Spurious Radiation (30 MHz – 1 GHz) – QPSK (2665.26 MHz) (49.5 MHz Channel BW)

Final_Result

Frequency (MHz)	QuasiPeak Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Polarisation	Angle (°)
30.780000	34.22	40.00	5.78	102.0	V	93.0
107.403667	30.69	43.50	12.81	100.0	V	92.0
180.797333	30.34	43.50	13.16	200.0	H	224.0
367.646000	32.54	46.00	13.46	100.0	H	257.0
410.348000	34.31	46.00	11.69	208.0	H	56.0
663.541667	39.07	46.00	6.93	201.0	V	267.0

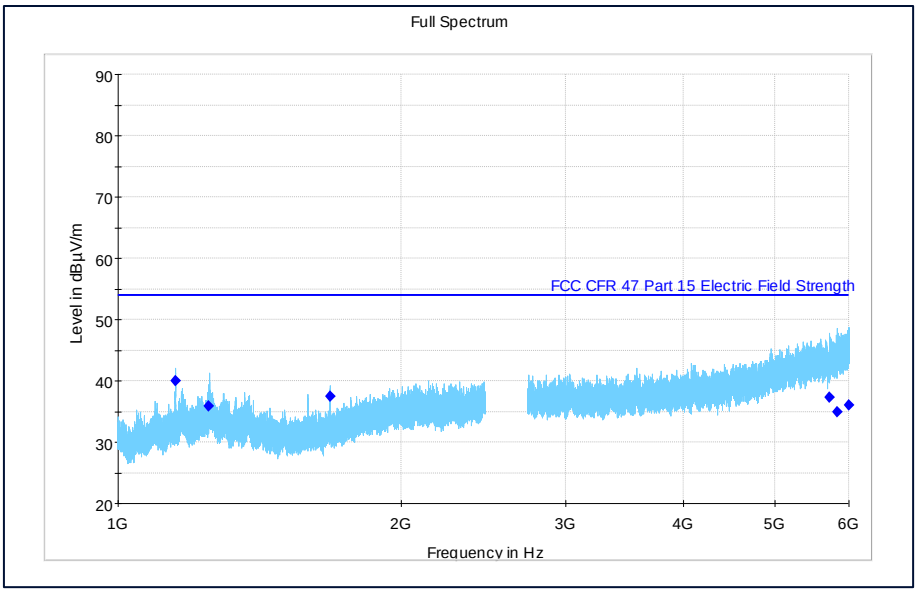


Figure 14 Field Strength of Spurious Radiation (1 GHz – 6 GHz) – QPSK (2520.75 MHz) (49.5 MHz Channel BW)

Final_Result

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Polarisation	Angle (°)
1150.167500	39.96	54.00	14.04	117.0	V	334.0
1249.877033	35.86	54.00	18.14	102.0	H	301.0
1680.953600	37.39	54.00	16.61	256.0	H	6.0
5722.819333	37.25	54.00	16.75	337.0	V	182.0
5833.276833	34.87	54.00	19.13	183.0	H	153.0
6000.000000	36.07	54.00	17.93	100.0	V	90.0

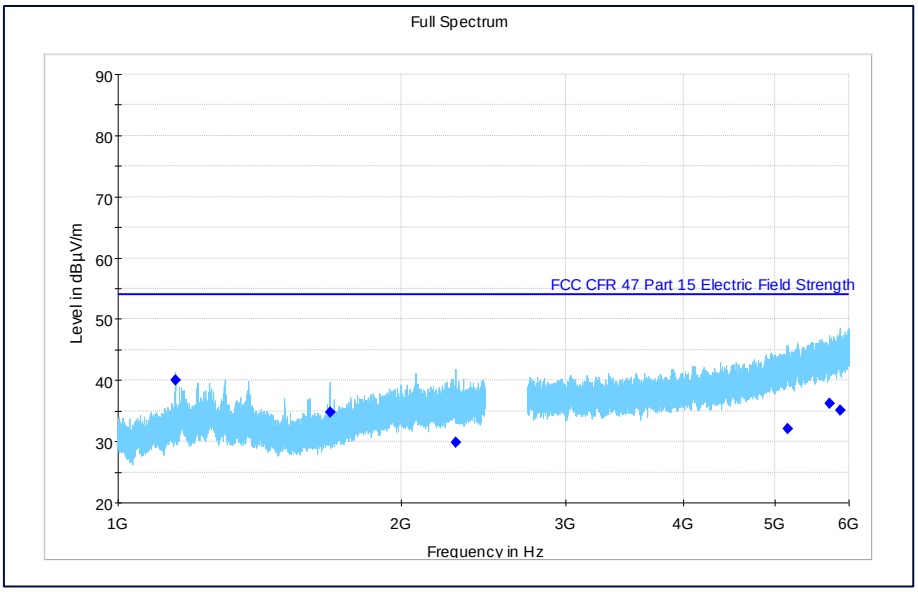


Figure 15 Field Strength of Spurious Radiation (1 GHz – 6 GHz) – QPSK (2592.99 MHz) (49.5 MHz Channel BW)

Final_Result

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Polarisation	Angle (°)
1150.151600	40.11	54.00	13.89	121.0	V	335.0
1680.983300	34.76	54.00	19.24	142.0	H	300.0
2286.088400	29.93	54.00	24.07	121.0	V	179.0
5158.314500	32.04	54.00	21.96	325.0	V	116.0
5721.544000	36.19	54.00	17.81	110.0	V	180.0
5869.138167	35.16	54.00	18.84	229.0	H	210.0

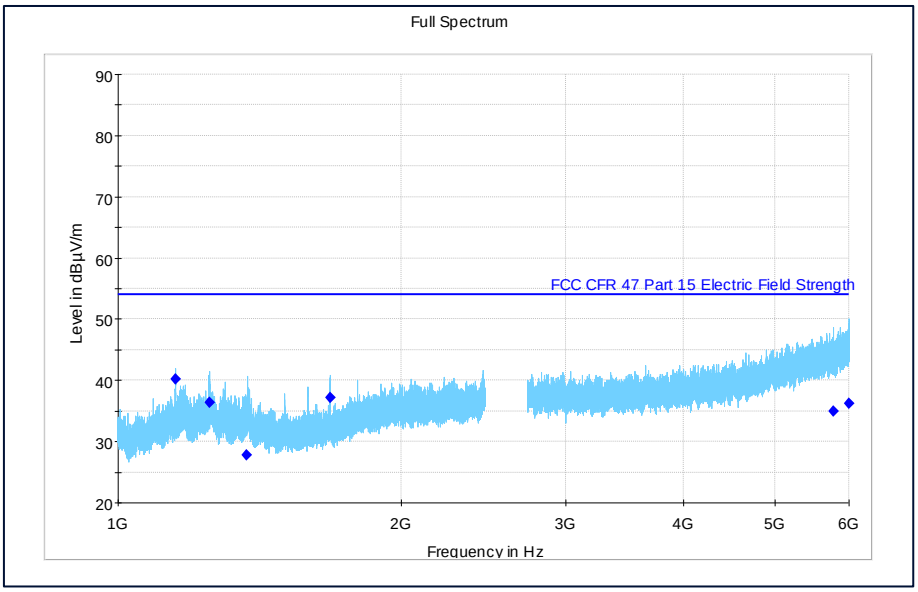


Figure 16 Field Strength of Spurious Radiation (1 GHz – 6 GHz) – QPSK (2665.26 MHz) (49.5 MHz Channel BW)

Final_Result

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Polarisation	Angle (°)
1150.148233	40.19	54.00	13.81	117.0	V	334.0
1250.104933	36.40	54.00	17.60	104.0	H	301.0
1370.318900	27.75	54.00	26.25	197.0	H	30.0
1680.929667	37.17	54.00	16.83	258.0	H	5.0
5776.498500	34.98	54.00	19.02	108.0	V	182.0
5996.915209	36.24	54.00	17.76	194.0	H	213.0

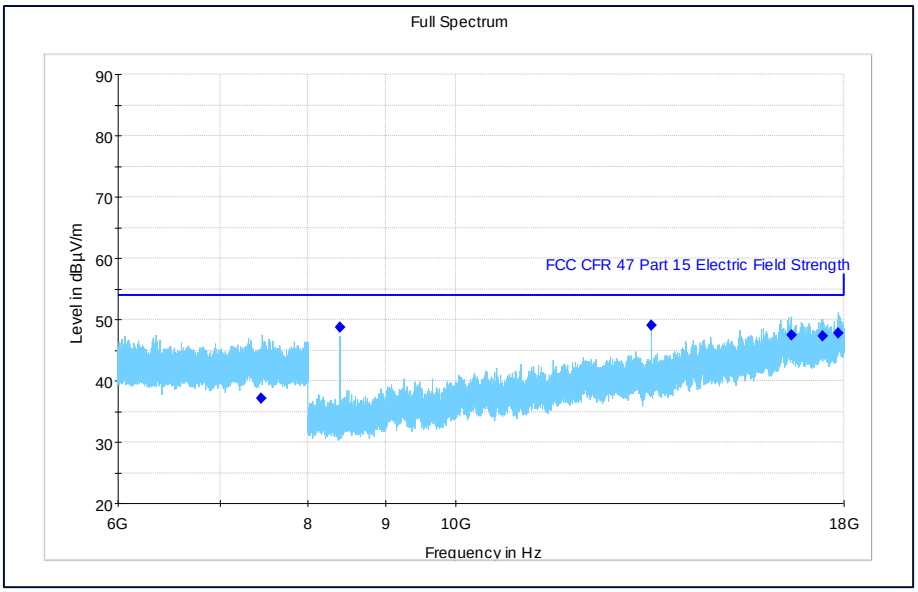


Figure 17 Field Strength of Spurious Radiation (6 GHz – 18 GHz) – QPSK (2520.75 MHz) (49.5 MHz Channel BW)

Final_Result

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Polarisation	Angle (°)
7454.793166	37.08	54.00	16.92	151.0	V	300.0
8399.990880	48.73	54.00	5.27	141.0	H	135.0
13452.498560	49.01	54.00	4.99	264.0	V	38.0
16611.928292	47.48	54.00	6.52	107.0	V	36.0
17424.759880	47.23	54.00	6.77	242.0	V	147.0
17835.090308	47.80	54.00	6.20	107.0	V	195.0

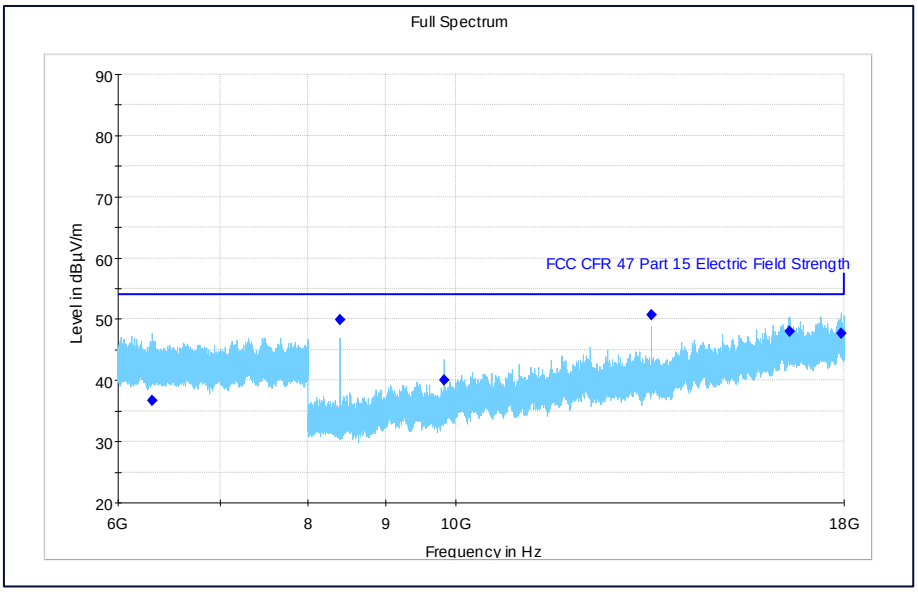


Figure 18 Field Strength of Spurious Radiation (6 GHz – 18 GHz) – QPSK (2592.99 MHz) (49.5 MHz Channel BW)

Final_Result

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Polarisation	Angle (°)
6317.612000	36.67	54.00	17.33	200.0	V	32.0
8399.998800	49.98	54.00	4.02	144.0	H	124.0
9830.406960	40.00	54.00	14.00	198.0	H	204.0
13452.505412	50.78	54.00	3.22	262.0	V	38.0
16577.333280	47.93	54.00	6.07	200.0	H	1.0
17932.476732	47.63	54.00	6.37	175.0	V	114.0

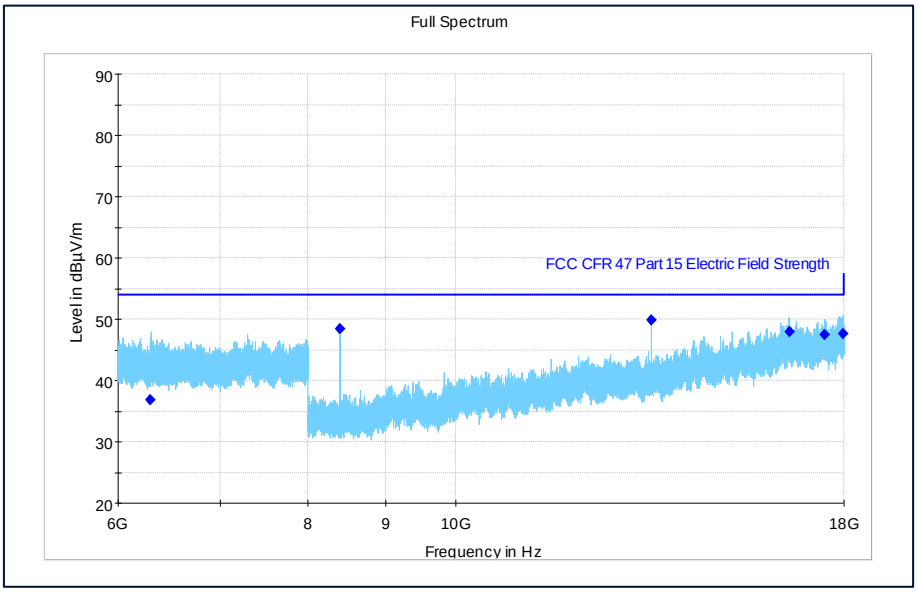


Figure 19 Field Strength of Spurious Radiation (6 GHz – 18 GHz) – QPSK (2665.26 MHz) (49.5 MHz Channel BW)

Final_Result

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Polarisation	Angle (°)
6302.332500	36.78	54.00	17.22	103.0	V	184.0
8399.995320	48.42	54.00	5.58	191.0	H	180.0
13452.491000	49.87	54.00	4.13	187.0	V	25.0
16573.168160	47.95	54.00	6.05	131.0	V	86.0
17485.157360	47.48	54.00	6.52	117.0	V	335.0
17969.457588	47.62	54.00	6.38	138.0	V	40.0

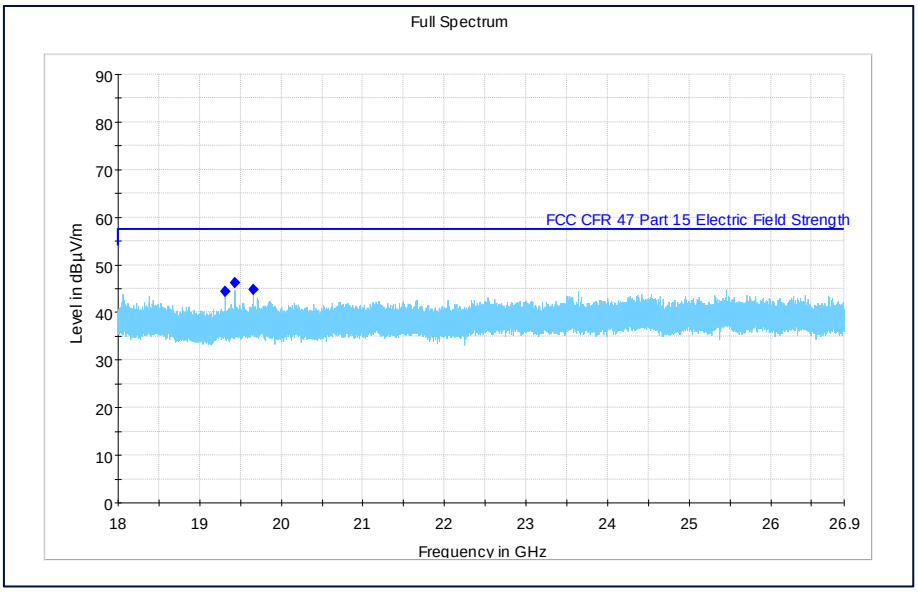


Figure 20 Field Strength of Spurious Radiation (18 GHz – 26.9 GHz) – QPSK (2520.75 MHz) (49.5 MHz Channel BW)

Final_Result

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Polarisation	Angle (°)
19312.310800	44.41	57.50	13.09	100.0	H	147.0
19437.299748	46.27	57.50	11.23	100.0	H	148.0
19660.630852	44.88	57.50	12.62	192.0	V	152.0

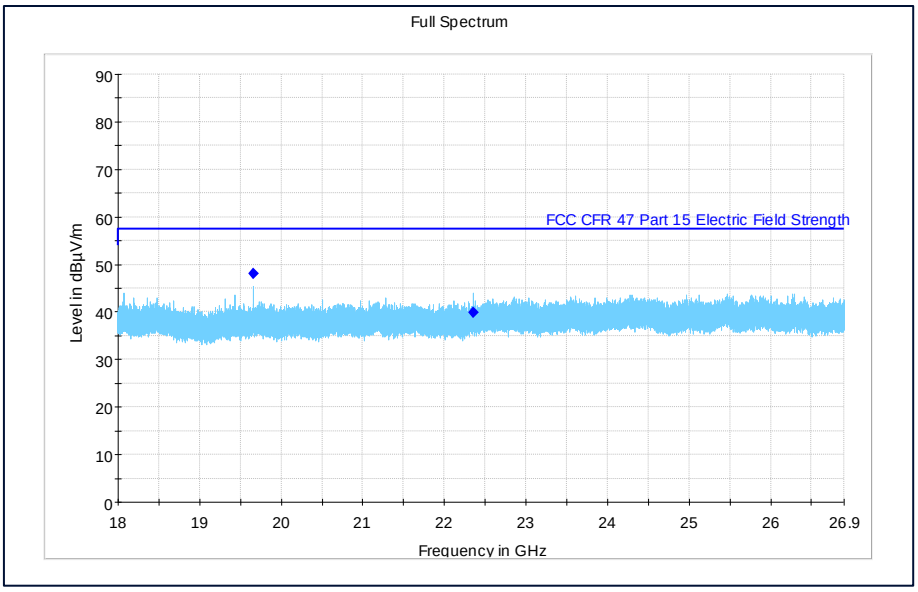


Figure 21 Field Strength of Spurious Radiation (18 GHz – 26.9 GHz) – QPSK (2592.99 MHz) (49.5 MHz Channel BW)

Final_Result

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Polarisation	Angle (°)
19660.629652	48.12	57.50	9.38	194.0	V	165.0
22353.250120	39.87	57.50	17.63	343.0	H	272.0

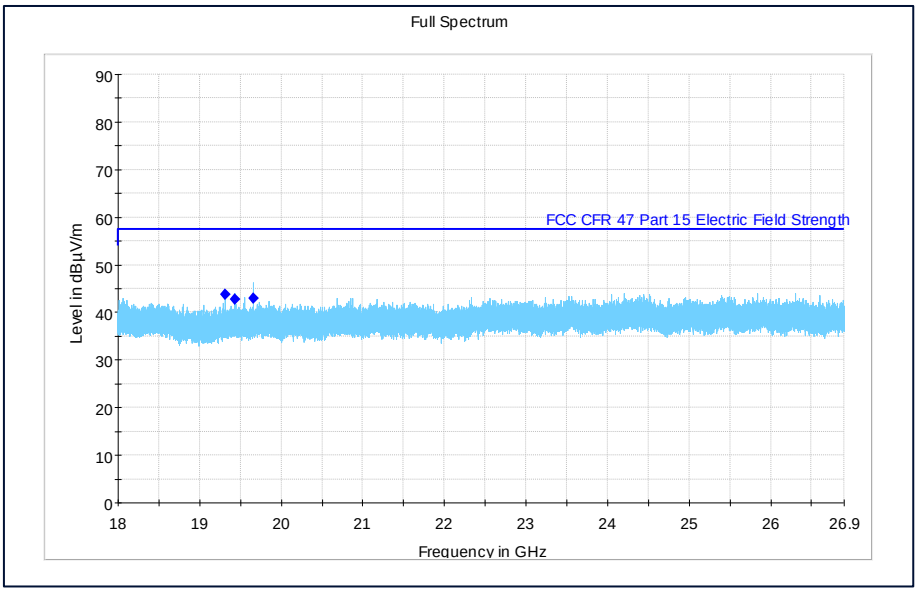


Figure 22 Field Strength of Spurious Radiation (18 GHz – 26.9 GHz) – QPSK (2665.26 MHz) (49.5 MHz Channel BW)

Final_Result

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Polarisation	Angle (°)
19312.305640	43.83	57.50	13.67	100.0	H	147.0
19437.300108	42.73	57.50	14.77	195.0	H	303.0
19660.624132	43.02	57.50	14.48	264.0	V	32.0

Appendix A: AWHHF EIRP calculations

EIRP Calculations for Four Port MIMO Operations for Band 41 Single Carriers

EIRP calculations are needed at each transmitter location to optimize base station operational performance while meeting regulatory requirements. Each cell site installation needs to consider the power measurements in the radio certification report as well as site specific regulatory requirements (such as antenna height, population density, etc.), site installation parameters (line loss between antenna and radio, antenna parameters, etc.) and base station operational parameters (MIMO operational setup, carrier power level, channel bandwidth, modulation type, etc.) to optimize performance. Transmitter output power may be reduced (from maximum) by base station setup parameters. Base station antennas are selected by the customer.

The base station antenna is selected by the customer. This EIRP calculation is based upon Nokia antenna assembly model "AAHM". The maximum Band 41 gain (12.0dBi) for this antenna was used for the EIRP calculation. This antenna assembly has a pair of ±45° cross-polarized radiators used for Band 41. Four AWHHF transmitter outputs are connected to the antenna assembly RF inputs.

Equivalent Isotropically Radiated Power (EIRP) is calculated (as specified in ANSI C63.26-2015 section 6.4 for uncorrelated output signals) from the results of power measurements (highest measured power for each channel bandwidth type). The maximum antenna gain was used for this calculation. The cable loss between the antenna and transmitter is site dependent. The cable loss 0 dB was used in this calculation since AAHM can be installed directly into the AWHHF. Calculations of worst-case EIRP for four port MIMO are as follows:

Parameter	NR 49.5 MHz Ch BW
Worst Case Power Output per Antenna Port	42.08 dBm
Number of Ant Ports per Polarization	2
Total Power per Polarization **10Log 2 = + 3dB**	45.08 dBm
Cable Loss (site dependent) **= 0.0dB**	45.08 dBm
Dir Gain = Max Ant Gain (G_{Ant}) **See Note 1**	12.0 dBi
EIRP per Polarization	57.08 dBm
Number of Polarizations	2
EIRP Total = **Y1 ±45°and Y2 ±45°** **See Note 2**	57.08 dBm
Passing FCC EIRP Limit **See Note 3**	79.60 dBm

Note 1: The directional gain is equal to antenna gain since the transmit signals are completely uncorrelated. See ANSI C63.26 sections 6.4.5.2.3b) and 6.4.5.3.1b) for guidance.
Note 2: The EIRP per antenna polarity is required to be below the regulatory limit as described in ANSI C63.26-2015 section 6.4.6.3 b)2) and KDB 662911 D02v01 page 3 example (2) since the two transmitter outputs to each antenna are 90 degree-phase shifted relative to each other (cross-polarized radiators).
Note 3: The EIRP limit is defined by FCC part 27.50(h)(ii) as 33dBW+ 10Log(X/Y) dBW + 10 log(360/beamwidth) dBW where X is the channel width in MHz and Y is 5.5 or 6MHz. The Nokia AAHM antenna has a horizontal beamwidth of 65 degrees for the 2490 to 2690MHz frequency range. Y was selected to be 6MHz.

EIRP Calculation Summary

The worst case AWHHF Band 41 four port MIMO EIRP levels using antenna assembly model “AAHM” are less than the FCC EIRP Regulatory Limits.

Appendix B: AWHHF Emission Designators

FCC Emission Designators for Band 41/n41 (2496MHz to 2690MHz) Single Carrier	
Ch BW	5G-NR
	FCC
49.5MHz	49M56G7W
Note: FCC emission designators are based on 26dB emission bandwidth.	