

FCC Test Report

Ericsson AB (EAB) Antenna Integrated Radio Unit,
Product Name: AIR 6449 B77D

In accordance with FCC 47 CFR Part 27 and
FCC 47 Part 2 (NR)

Prepared for: Ericsson AB (EAB)
Isafjordsgatan 10
Kista
164 80
SWEDEN



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FCC ID: TA8AKRD901206

COMMERCIAL-IN-CONFIDENCE

Document 75950239-03 Issue 01

SIGNATURE

NAME	JOB TITLE	RESPONSIBLE FOR	ISSUE DATE
Matthew Russell	RF Team Leader	Authorised Signatory	18 January 2021

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD document control rules.

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC 47 CFR Part 27 and FCC 47 Part 2. The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Graeme Lawler	18 January 2021	

FCC Accreditation
90987 Octagon House, Fareham Test Laboratory

EXECUTIVE SUMMARY

A sample of this product was tested and found to be compliant with FCC 47 CFR Part 27: 2019 and FCC 47 Part 2: 2019 for the tests detailed in section 1.3.



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1 Report Summary

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
1	First Issue	18 January 2021

Table 1

1.2 Introduction

Applicant	Ericsson AB (EAB)
Manufacturer	Ericsson AB (EAB)
Product Name(s)	AIR 6449 B77D
Product Number(s)	KRD 901 206/2
Serial Number(s)	E23B987800
Hardware Version(s)	R1B
Software Version(s)	CXP 20300039/1 -R48A121
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 27: 2019 FCC 47 CFR Part 2: 2019
Non-Tested Variants	KRD 901 206/21 KRD 901 206/1 KRD 901 206/11
Test Plan/Issue/Date	2_12022-HRB 105 601-249 Uen AIR 6449 B77D FCC Test Plan V4.0
Order Number	9400786352
Date	14-October-2020
Date of Receipt of EUT	22-December-2020
Start of Test	11-January-2021
Finish of Test	12-January-2021
Name of Engineer(s)	Graeme Lawler
Related Document(s)	ANSI C63.26:2015 KDB 971168 D01 v03r01



1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 27 and FCC 47 Part 2 is shown below.

Section	Specification Clause		Test Description	Result	Comments/Base Standard
	Part 27	Part 2			
Configuration and Mode: DC Powered - NR 1 Carrier					
2.1	27.53	2.1053	Radiated Spurious Emissions	Pass	KDB 971168 D01 v03r01 ANSI C63.26:2015
Configuration and Mode: DC Powered - NR 2 Carriers					
2.1	27.53	2.1053	Radiated Spurious Emissions	Pass	KDB 971168 D01 v03r01 ANSI C63.26:2015

Table 2



1.4 Application Form

Equipment Description

Technical Description: <i>(Please provide a brief description of the intended use of the equipment)</i>	Antenna Integrated Radio Unit
Manufacturer:	Ericsson AB
Model:	AIR 6449 B77D
Part Number:	KRD 901 206/2* (with un-security software and RDNB board for testing purpose) KRD 901 206/21 (with security software and RDNB board for testing purpose) KRD 901 206/1 (with un-security software and antenna) KRD 901 206/11** (with security software and antenna) Note*: Tests have been performed on this unit. Note**: This will be the marketed, sold unit.
Hardware Version:	R1B
Software Version:	CXP 20300039/1 -R48A121
FCC ID (if applicable)	TA8AKRD901206
IC ID (if applicable)	N/A



Intentional Radiators

Technology	NR
Frequency Band (MHz)	3700 to 3980 MHz
Conducted Declared Output Power	Max output power: 320W Max output power limitation of 5,3W/MHz PSD
Antenna Gain (dBi)	26.1 dBi
Supported Bandwidth(s) (MHz)	20, 40, 60, 80, 100 MHz, SCS: 30 kHz
Modulation Scheme(s)	QPSK, 16QAM, 64QAM, 256QAM
ITU Emission Designator	(18M3W7D) (37M8W7D) (57M9W7D) (77M4W7D) (97M4W7D) (197MW7D) Max carrier aggregation of 2x100MHz
Bottom Frequency (MHz)	3700 MHz
Middle Frequency (MHz)	3840 MHz
Top Frequency (MHz)	3980 MHz
Duty Cycle	75%
Maximum number of NR carriers	2

Un-intentional Radiators

Highest frequency generated or used in the device or on which the device operates or tunes	CPRI 25,78 GHz
Lowest frequency generated or used in the device or on which the device operates or tunes	-
Class A Digital Device (Use in commercial, industrial or business environment) <input type="checkbox"/>	
Class B Digital Device (Use in residential environment only) <input checked="" type="checkbox"/>	



DC Power Source

Nominal voltage:	-48	V
Extreme upper voltage:	-58,5	V
Extreme lower voltage:	-36	V
Max current:	70	A

Temperature

Minimum temperature:	-40.0	°C
Maximum temperature:	+55.0	°C

Antenna Characteristics

Antenna connector <input type="checkbox"/>			State impedance		Ohm
Temporary antenna connector <input checked="" type="checkbox"/>			State impedance	50	Ohm
Integral antenna <input checked="" type="checkbox"/>	Type:	AAS (Advanced antenna system)	Gain	26.1 dBi	dBi
External antenna <input type="checkbox"/>	Type:		Gain		dBi
For external antenna only: Standard Antenna Jack <input type="checkbox"/> If yes, describe how user is prohibited from changing antenna (if not professional installed): Equipment is only ever professionally installed <input type="checkbox"/> Non-standard Antenna Jack <input type="checkbox"/>					

I hereby declare that the information supplied is correct and complete.

DocuSigned by:
Name: 
89D34784428E4F2...
Position held: Regulatory Engineer
Date:

14 januari 2021 | 13:20:55 CET



Ancillaries (if applicable)

Equipment	Type / Model	Manufacturer	Serial no.
Baseband 6648 3xSFP:	KDU1370015/1 R3A RDH10275/2 R1A	Ericsson	E23B849367 CT72195686 CT72175829 CT72197812
Test computer	Mac Mini	Apple	BAMS-1001997578
CT11	LPC 102 494/1	Ericsson	T01G487938
GPS 02 01	NCD90141/1 R2B	Ericsson	N/A
Gigabit Switch	N/A	Netgear	N/A
10W termination, 50Ohm	49-40-33	-	-
Power supply for BB	SM 52-30	Delta Elektronika	BAMS-1000635944
Power 6302	BML 901 367/1 R1A	Ericsson	BR84705513

1.5 Product Information

1.5.1 Technical Description

The Equipment under test (EUT) was an Ericsson AB AIR 6449 B77D Antenna Integrated Radio Unit working in the public mobile service from 3700-3980 MHz band which provides communication connections to the 3700-3980 MHz network.

1.5.2 Test Setup Diagram(s)

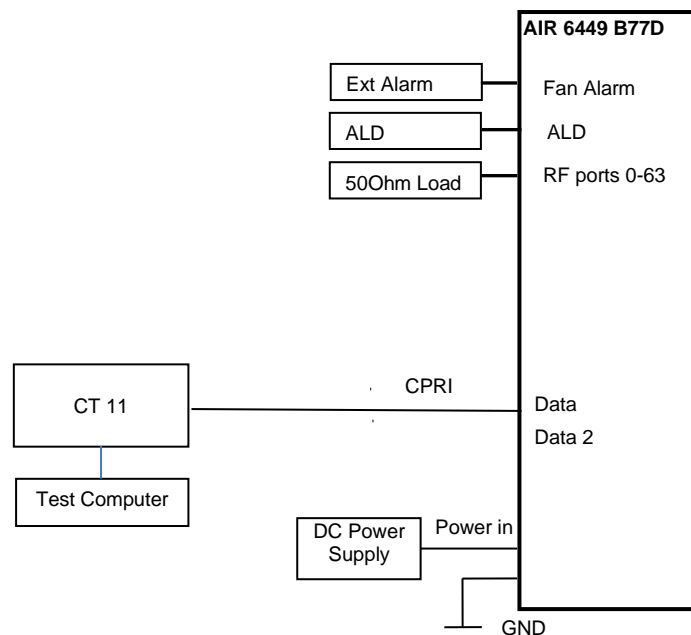


Figure 1

1.5.3 EUT Configuration and Rationale for Radiated Spurious Emissions

The EUT was mounted in a fixed position corresponding to its final installation position.

1.6 Deviations from the Standard

The testing has been carried out in accordance with FCC Part 27:2019, however this version of the Rule Parts does not cover 3700-3980 MHz (Band 77D) and therefore we referred to the current version of FCC Part 27, which is available on the e-CFR website, in which Clause 27.5 (m) refers to the Band 77 frequency band covered by this testing. All testing has been carried out in accordance with FCC Part 27:2019.

No other deviations from the applicable test standard were made during testing.



1.7 EUT Modification Record

The table below details modifications made to the EUT during the test programme.

The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
Model: AIR 6449, Serial Number: E23B987800			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 3

1.8 Test Location

TÜV SÜD conducted the following tests at our Fareham Test Laboratory.

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: DC Powered – NR – 1 carrier		
Radiated Disturbance	Graeme Lawler	UKAS
Configuration and Mode: DC Powered – NR – 2 carrier		
Radiated Disturbance	Graeme Lawler	UKAS

Table 4

Office Address:

Octagon House
Concorde Way
Segensworth North
Fareham
Hampshire
PO15 5RL
United Kingdom



2 Test Details

2.1 Radiated Spurious Emissions

2.1.1 Specification Reference

FCC 47 CFR Part 27, Clause 27.53(m)
FCC 47 Part 2, Clause 2.1053

2.1.2 Equipment Under Test and Modification State

AIR 6449, S/N: E23B987800 - Modification State 0

2.1.3 Date of Test

11-January-2021 to 12-January-2021

2.1.4 Test Method

The test was performed in accordance with ANSI C63.26 Clause 5. The EUT was configured as defined in ANSI C63.26, clause 5.5.2.3.2.

As a result of the conducted measurements that were performed on the EUT, it was established that NR 80 MHz were the bandwidth configurations which gave the highest output power and therefore deemed to be worst case operating modes. Testing was performed on the Top, Middle and Bottom channels for single carrier. Testing was performed on Middle channel only for multicarrier, as described in the Test Plan, the result was within 10dB of the single carrier result and therefore Middle and Top channel testing was not performed.

The EUT was set up on a support replicating typical installation conditions at a height of 1.5 m above the reference ground plane, (see setup photos) within a semi-anechoic chamber on a remotely controlled turntable.

Pre-scan and final measurements were made using a Field Strength method in accordance with ANSI C63.26 Clause 5.5.4. The readings were maximized by adjusting the antenna height, polarization and turntable azimuth, in accordance with the specification. Final results were then converted to eirp and are displayed in the plots below. The correction for field strength measurements to eirp at 3 m was 95.2 dB and at 1 m was 85.2 dB. An RBW of 1 MHz and VBW of 3 MHz was used for all measurements with a Peak detector and trace set to Max Hold. In all cases below where the limit line is exceeded – this is the intentional transmit frequency. A high pass filter in conjunction with a pre-amplifier was used for the measurement ranges of 8 – 27 GHz.

2.1.5 Environmental Conditions

Ambient Temperature 25.1°C
Relative Humidity 27.2%

2.1.6 Test Results

DC Powered - NR (80 MHz) – 1C – 3750 MHz (B)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Angle (°)	Height (cm)	Polarisation	Orientation
*							

Table 5 – 3750 MHz - 30 MHz to 40 GHz

* No emissions were detected within 6 dB of the limit.

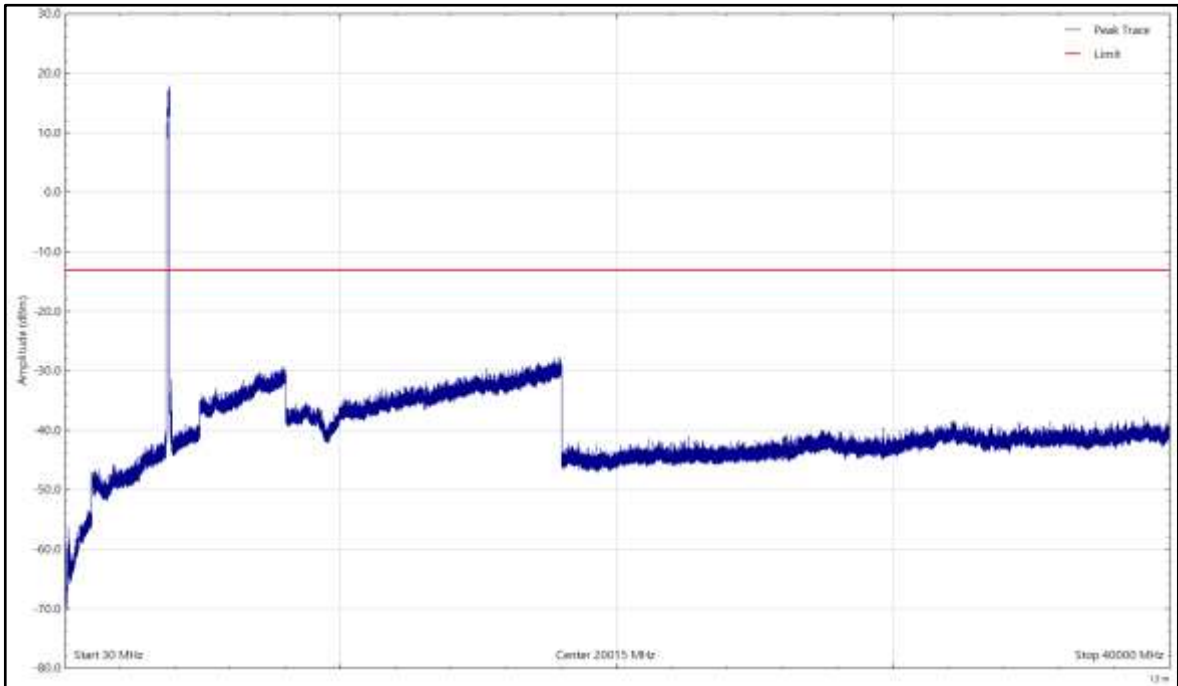


Figure 2 – 3750 MHz, 30 MHz to 40GHz, Horizontal

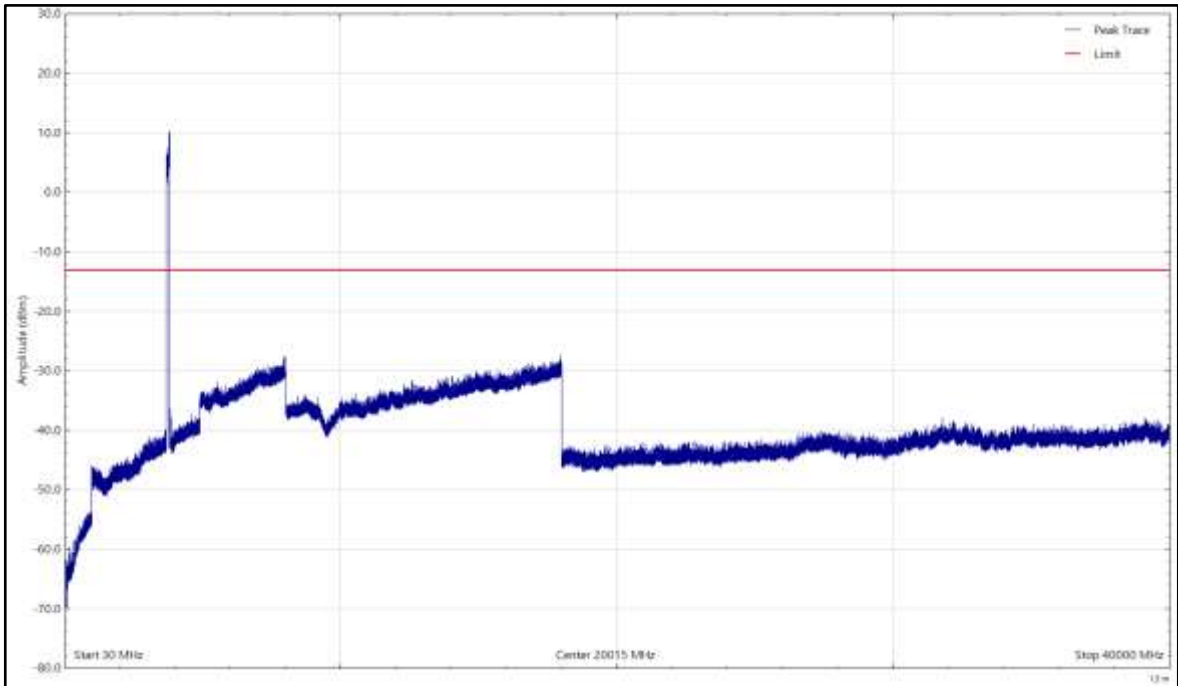


Figure 3 – 3750 MHz, 30 MHz to 40 GHz, Vertical



DC Powered - NR (80 MHz) – 1C – 3840 MHz (M)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Angle (°)	Height (cm)	Polarisation	Orientation
*							

Table 6 – 3840 MHz - 30 MHz to 40 GHz

* No emissions were detected within 6 dB of the limit.

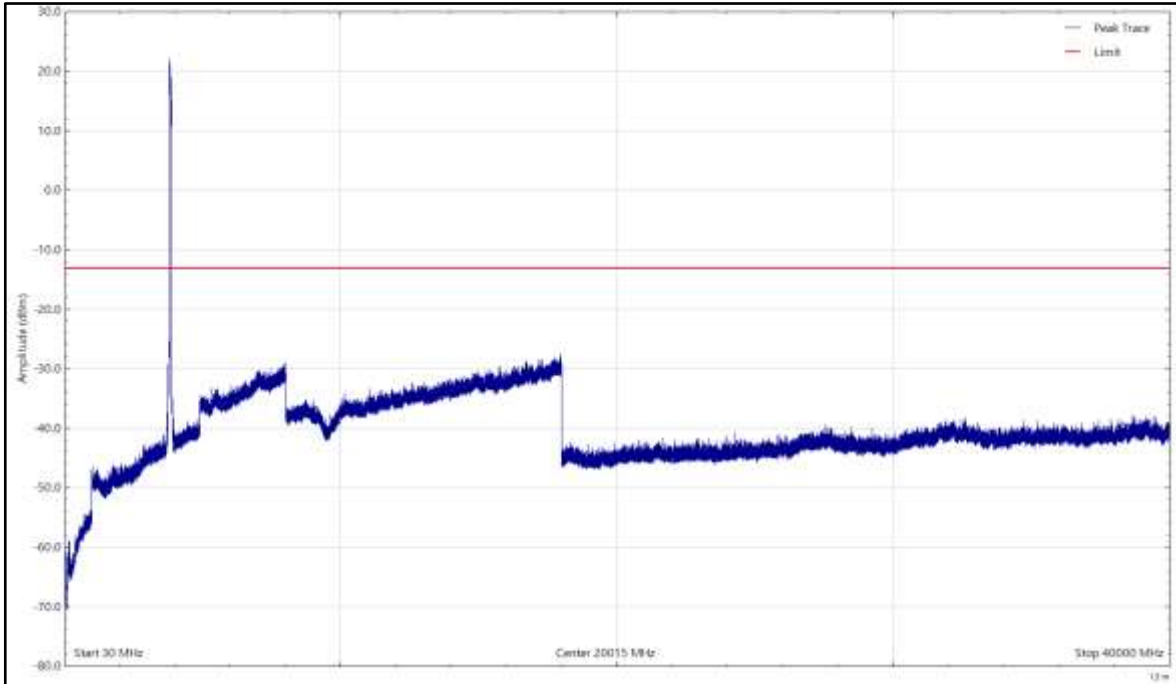


Figure 4 – 3840 MHz, 30 MHz to 40 GHz, Horizontal

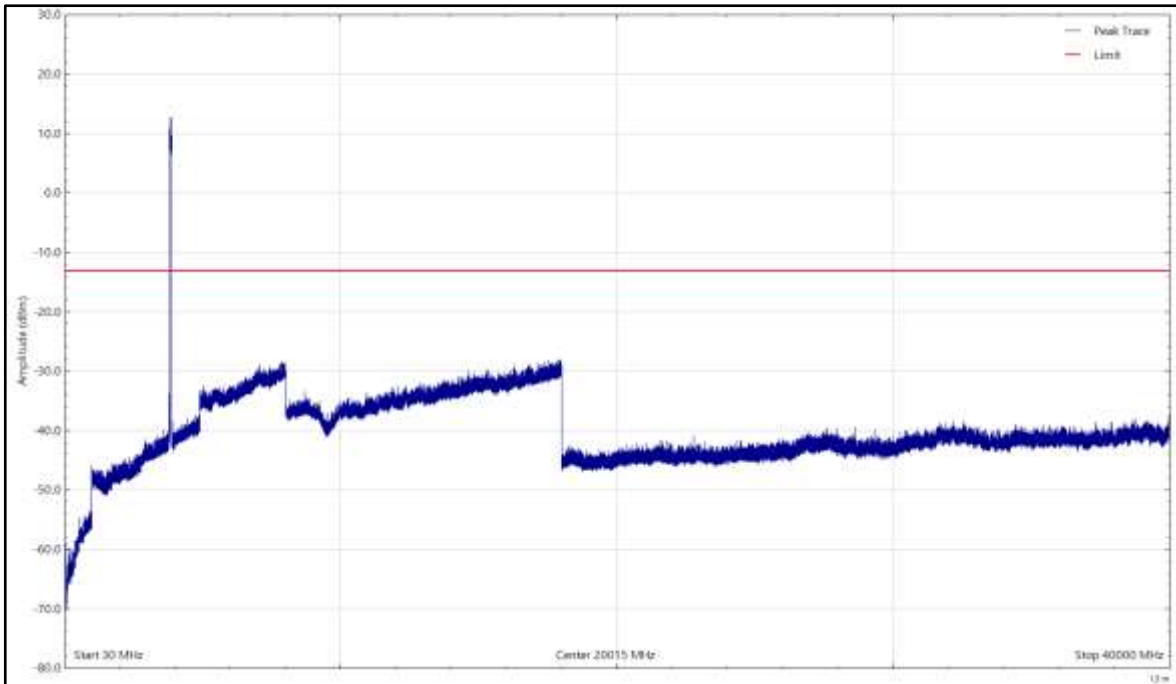


Figure 5 - 3840 MHz, 30 MHz to 40 GHz, Vertical



DC Powered - NR (80 MHz) – 1C – 3939.99 MHz (T)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Angle (°)	Height (cm)	Polarisation	Orientation
*							

Table 7 – 3939.99 MHz, 30 MHz to 40 GHz

* No emissions were detected within 6 dB of the limit.

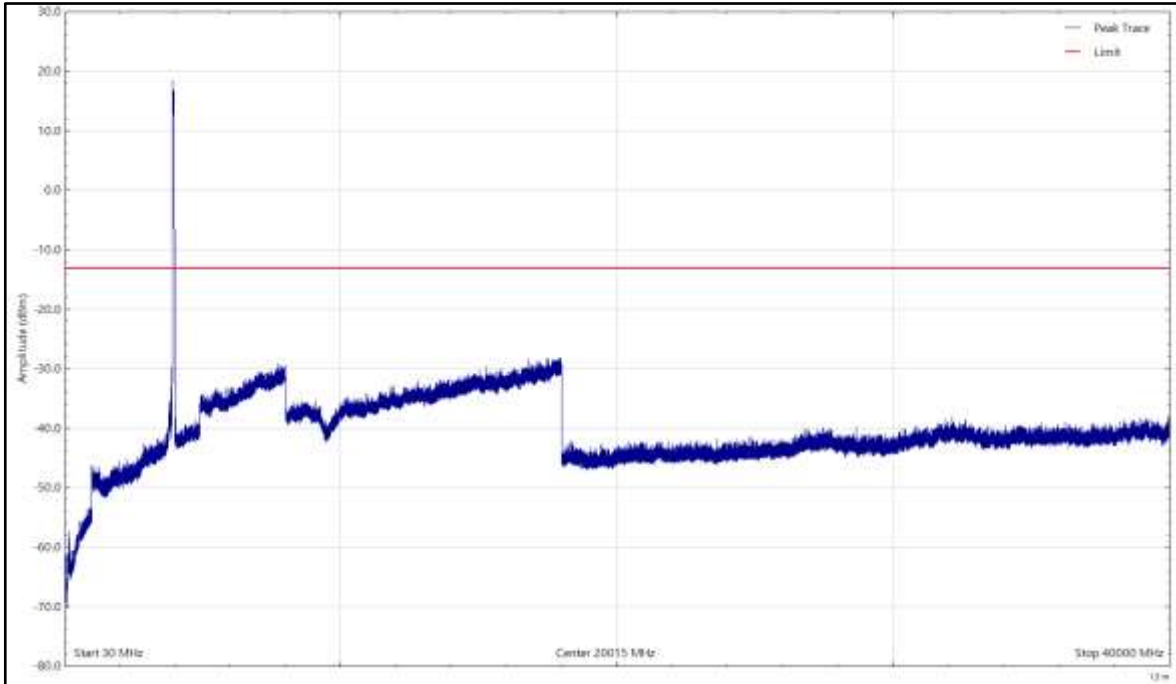


Figure 6 – 3939.99 MHz, 30 MHz to 40 GHz, Horizontal

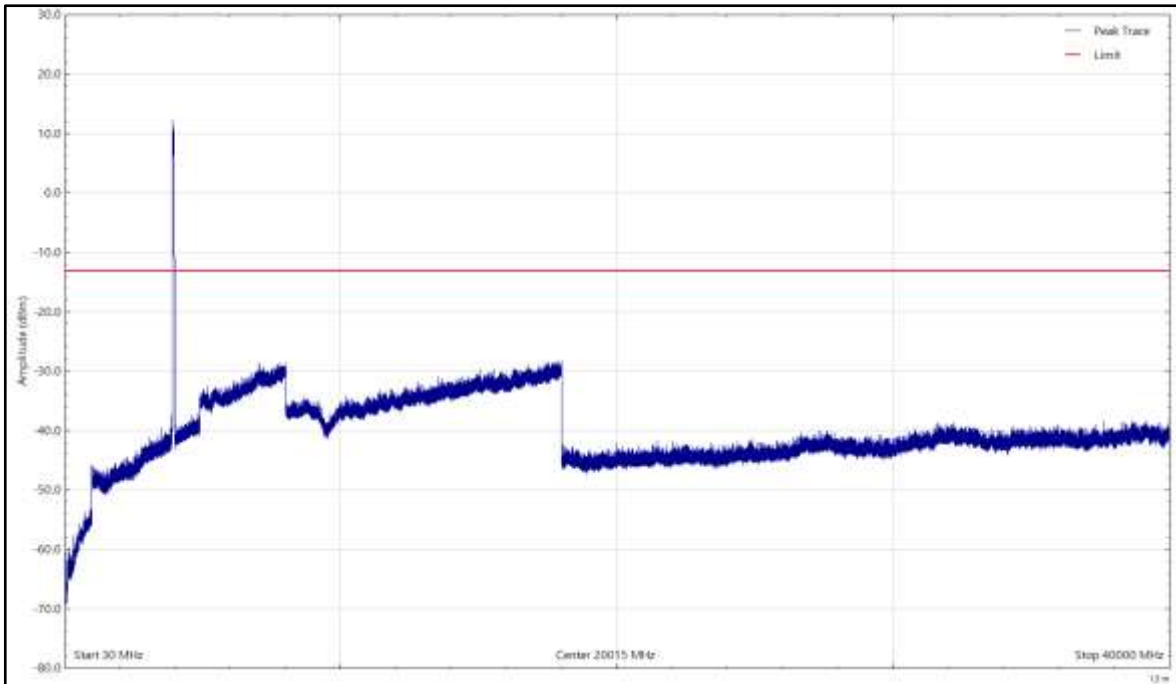


Figure 7 - 3939.99 MHz, 30 MHz to 40 GHz, Vertical



DC Powered – NR (80 MHz) – 2C – 3780 MHz (B) and 3900 MHz (M)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Angle (°)	Height (cm)	Polarisation	Orientation
*							

Table 8 – 3780 MHz and 3900 MHz, 30 MHz to 40 GHz

* No emissions were detected within 6 dB of the limit.

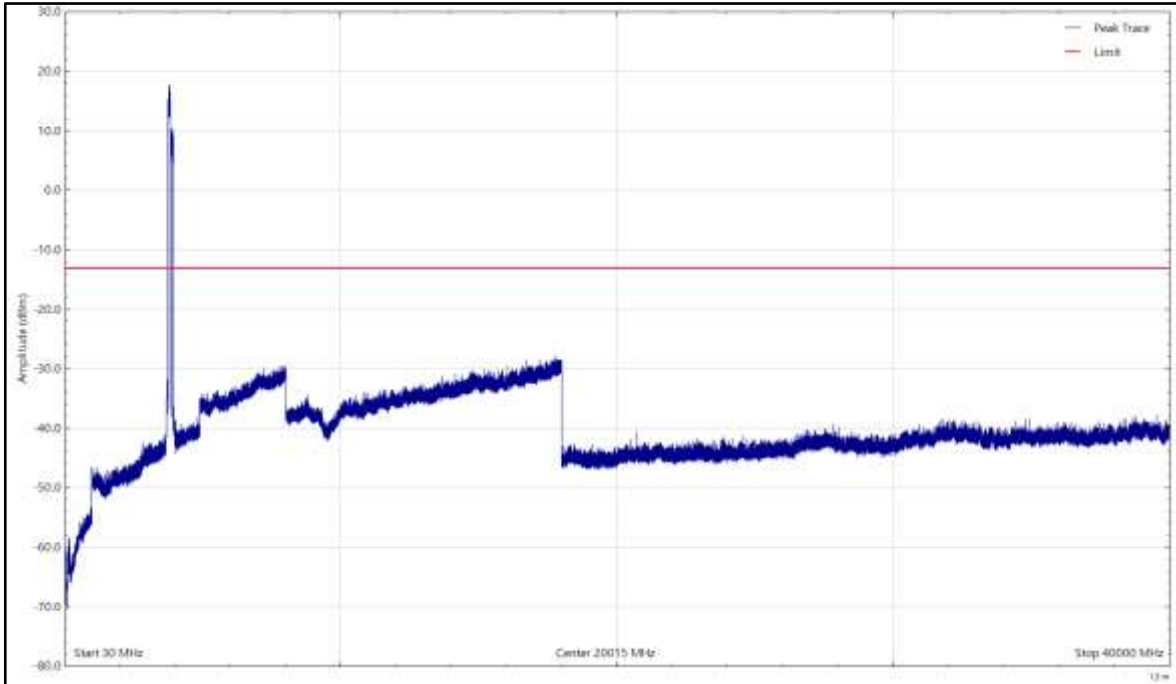


Figure 8 - 3780 MHz and 3900 MHz, 30 MHz to 40 GHz, Horizontal

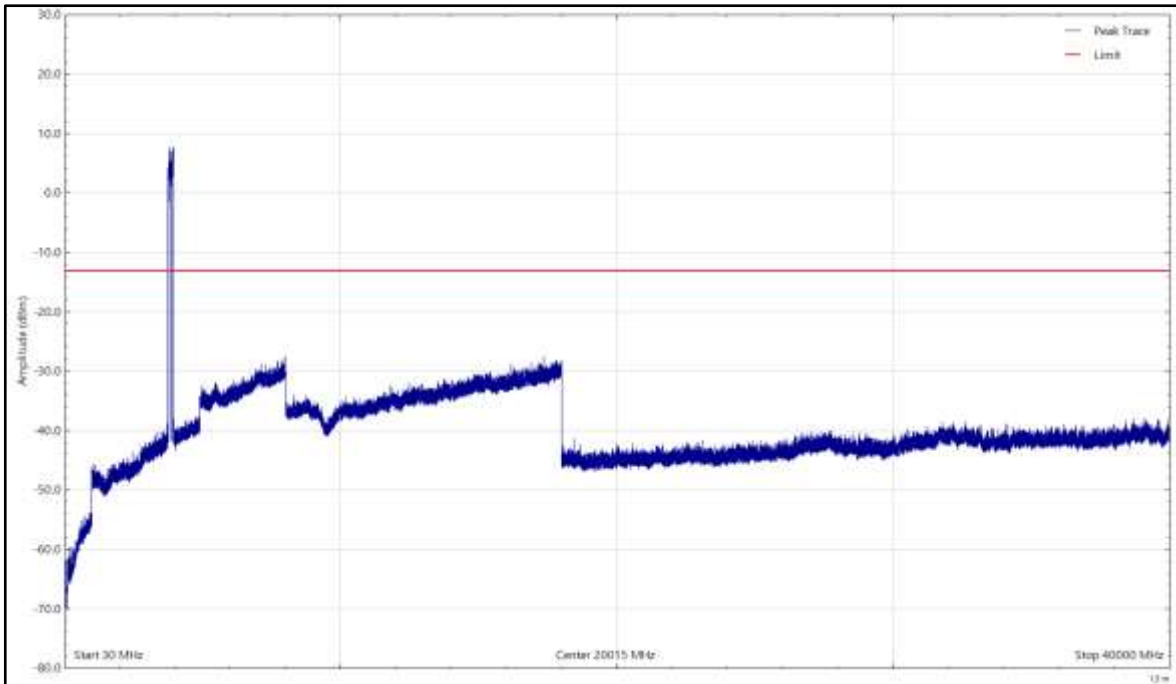


Figure 9 - 3780 MHz and 3900 MHz, 30 MHz to 40 GHz, Vertical



FCC 47 CFR Part 27, Limit Clause 27.53

The frequency band 3700-3980 MHz is not covered in the 27.53 limits for Emissions, therefore a standard limit for 27.53 has been applied.

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

2.1.7 Test Location and Test Equipment Used

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Antenna 18-40GHz (Double Ridge Guide)	Link Microtek Ltd	AM180HA-K-TU2	230	24	27-Jul-2022
Antenna with permanent attenuator (Bilog)	Schaffner	CBL6143	287	24	14-Oct-2022
Pre-Amplifier	Phase One	PS04-0086	1533	12	04-Feb-2021
18GHz - 40GHz Pre-Amplifier	Phase One	PSO4-0087	1534	12	18-Feb-2021
Comb Generator	Schaffner	RSG1000	3034	-	TU
EmX Emissions Software	TUV SUD	V2.0.1 V.V2.0.1	5125	-	Software
Preamplifier (30dB 1GHz to 18GHz)	Schwarzbeck	BBV 9718 C	5350	12	21-Sep-2021
Test Receiver	Rohde & Schwarz	ESW 44	5379	12	15-Dec-2021
3.5 mm 2m Cable	Junkosha	MWX221-02000DMS	5428	12	15-Oct-2021
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB-40	5481	12	18-Mar-2021
1m K-Type Cable	Junkosha	MWX241-01000KMSKMS/A	5511	12	03-Apr-2021
1m -SMA Cable	Junkosha	MWX221-01000AMSAMS/A	5515	12	01-Apr-2021
8m N Type Cable	Junkosha	MWX221-08000NMSNMS/B	5519	12	24-Mar-2021
2 m K Type Cable	Junkosha	MWX241-02000KMSKMS/A	5523	12	03-Apr-2021
DRG Horn Antenna (7.5-18GHz)	Schwarzbeck	HWRD750	5610	12	22-Sep-2021
Broadband Horn Antenna (1-10 GHz)	Schwarzbeck	BBHA 9120 B	5611	12	22-Sep-2021
Turntable & Mast Controller	Maturo Gmbh	NCD/498/2799.01	5612	-	TU
Tilt Antenna Mast TAM 4.0-P	Maturo Gmbh	TAM 4.0-P	5613	-	TU
Tilt Antenna Mast TAM 4.0-P	Maturo Gmbh	Turntable 1.5 SI-2t	5614	-	TU
3m Semi Anechoic Chamber	MVG	EMC-3	5621	36	11-Aug-2023

Table 9

TU – Traceability Unscheduled

3 Photographs

3.1 Test Setup Photographs



Figure 10 – 30 MHz to 1 GHz

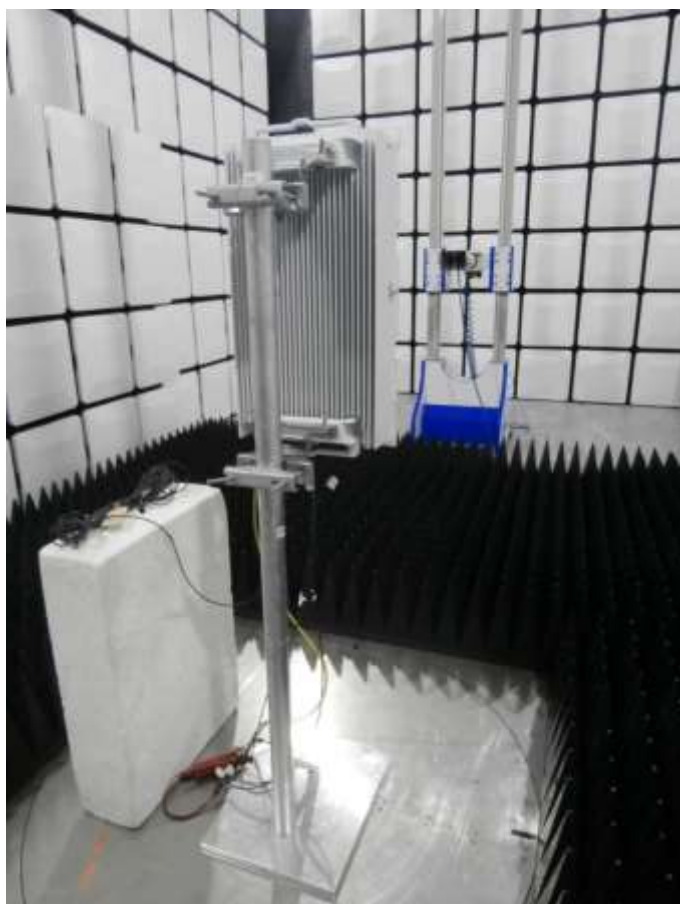


Figure 11 – 1 GHz to 18 GHz

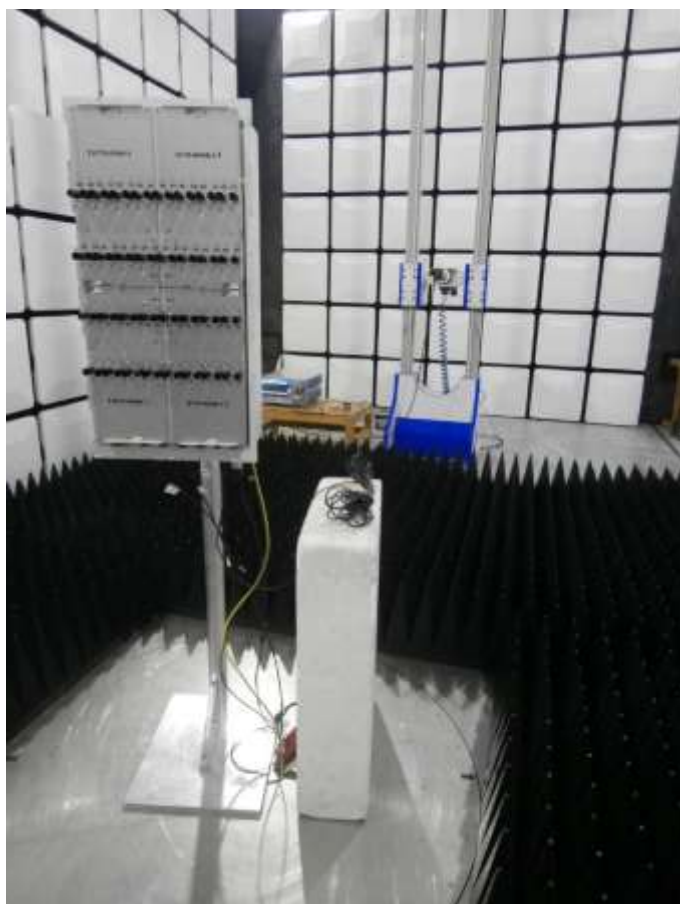


Figure 12 – 18 GHz to 40 GHz



4 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

Test Name	Measurement Uncertainty
Radiated Spurious Emissions	30 MHz to 1 GHz: ± 5.2 dB 1 GHz to 40 GHz: ± 6.3 dB

Table 10

Measurement Uncertainty Decision Rule

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115: 2007, clause 4.4.3 and 4.5.1.