

FCC Test Report

Neology UK Ltd ANPR Camera, Model: IRIS P500

In accordance with FCC 47 CFR Part 15C,
FCC 47 CFR Part 15E, FCC 47 CFR Part 22 and
FCC 47 CFR Part 27

Prepared for: Neology UK Ltd
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FCC ID: 2AKNFP500FAW

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Document 75947696-02 Issue 01

SIGNATURE			
A handwritten signature in black ink, appearing to read "S. Marshall".			
NAME	JOB TITLE	RESPONSIBLE FOR	ISSUE DATE
Steve Marshall	Senior Engineer	Authorised Signatory	10 June 2020

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 15C, FCC 47 CFR Part 15E, FCC 47 CFR Part 22 and FCC 47 CFR Part 27. The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Graeme Lawler	10 June 2020	

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 15C: 2019, FCC 47 CFR Part 15E: 2019, FCC 47 CFR Part 22: 2019 and FCC 47 CFR Part 27: 2019 for the tests detailed in section 1.3.

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Contents

1	Report Summary	2
1.1	Report Modification Record.....	2
1.2	Introduction.....	2
1.3	Brief Summary of Results	3
1.4	Application Form	4
1.5	Product Information	7
1.6	Deviations from the Standard.....	7
1.7	EUT Modification Record	8
1.8	Test Location.....	8
2	Test Details	9
2.1	Radiated Spurious Emissions (Simultaneous Transmission)	9
3	Photographs	14
3.1	Test Setup Photographs	14
4	Measurement Uncertainty	18



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	10 June 2020

Table 1

1.2 Introduction

Applicant	Neology UK Ltd
Manufacturer	Neology UK Ltd
Model Number(s)	IRIS P500
Serial Number(s)	30181019
Hardware Version(s)	PoE COAD Rev 1
Software Version(s)	OS 1.10.245 App 5.1.3854
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 15C: 2019 FCC 47 CFR Part 15E: 2019 FCC 47 CFR Part 22: 2019 FCC 47 CFR Part 27: 2019
Order Number	1348-00
Date	10-December-2019
Date of Receipt of EUT	13-January-2020
Start of Test	15-January-2020
Finish of Test	15-January-2020
Name of Engineer(s)	Graeme Lawler
Related Document(s)	ANSI C63.26:2015



1.3 Brief Results

Summary of

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15C, FCC 47 CFR Part 15E, FCC 47 CFR Part 22 and FCC 47 CFR Part 27 is shown below.

Section	Specification Clause				Test Description	Result	Comments/Base Standard
	Part 15C	Part 15E	Part 22	Part 27			
Configuration and Mode: LTE FDD Band 4 and 5 GHz WLAN							
2.1	-	15.209 and 15.407 (b),	-	27.53 (h)	Radiated Spurious Emissions (Simultaneous Transmission)	Pass	
Configuration and Mode: LTE FDD Band 5 and 2.4 GHz WLAN							
2.1	15.247 (d) and 15.205	-	22.917 (a)	-	Radiated Spurious Emissions (Simultaneous Transmission)	Pass	

Table 2



1.4 Application Form

Equipment Description

Technical Description: <i>(Please provide a brief description of the intended use of the equipment)</i>	ANPR Camera with WiFi and LTE modems
Manufacturer:	Neology UK Ltd
Model:	IRIS P500
Part Number:	FC5742050112
Hardware Version:	PoE COAD Rev 1
Software Version:	OS 1.10.245 App 5.1.3854
FCC ID (if applicable)	2AKNFP500FAW
IC ID (if applicable)	Not Applicable

Intentional Radiators

Technology	WiFi 2.4 GHz	WiFi 5 GHz	LTE-FDD B3	LTE-FDD B5
Frequency Band (MHz)	2400-2483.5	5150-5850	1710-1785	824-849
Conducted Declared Output Power (dBm)	17	17	23	23
Antenna Gain (dBi)	2	2	2.71	2.09
Supported Bandwidth(s) (MHz)	20 & 40	20 & 40	1.4,3,5,10, 15 and 20	1.4, 3, 5 and 10
Modulation Scheme(s)	BPSK, QPSK, 16QAM, 64QAM	BPSK, QPSK, 16QAM, 64QAM, 256QAM	QPSK, 16-QAM	QPSK, 16-QAM
ITU Emission Designator	20M0GXW 40M0GXW	20M0GXW 40M0GXW	1M40G7D 3M00G7D 5M00G7D 10M0G7D 15M0G7D 20M0G7D	1M40G7D 3M00G7D 5M00G7D 10M0G7D 15M0G7D 20M0G7D
Bottom Frequency (MHz)	2412	5180	1710.7	824.7
Middle Frequency (MHz)	2437	5500	1747.4	836.4
Top Frequency (MHz)	2462	5825	1784.3	848.3

Un-intentional Radiators

Highest frequency generated or used in the device or on which the device operates or tunes	200 MHz
Lowest frequency generated or used in the device or on which the device operates or tunes	32768 Hz
Class A Digital Device (Use in commercial, industrial or business environment) <input checked="" type="checkbox"/>	
Class B Digital Device (Use in residential environment only) <input type="checkbox"/>	



AC Power Source

AC supply frequency:		Hz
Voltage		V
Max current:		A
Single Phase <input type="checkbox"/> Three Phase <input type="checkbox"/>		

DC Power Source

Nominal voltage:	48	V
Extreme upper voltage:	60	V
Extreme lower voltage:	36	V
Max current:	1	A

Battery Power Source

Voltage:		V
End-point voltage:		V (Point at which the battery will terminate)
Alkaline <input type="checkbox"/> Leclanche <input type="checkbox"/> Lithium <input type="checkbox"/> Nickel Cadmium <input type="checkbox"/> Lead Acid* <input type="checkbox"/> * <i>(Vehicle regulated)</i>		
Other <input type="checkbox"/>	Please detail:	

Charging

Can the EUT transmit whilst being charged	Yes <input type="checkbox"/> No <input type="checkbox"/>
---	--

Temperature

Minimum temperature:	-40	°C
Maximum temperature:	+60	°C

Antenna Characteristics

Antenna connector <input checked="" type="checkbox"/>			State impedance	50	Ohm
Temporary antenna connector <input type="checkbox"/>			State impedance		Ohm
Integral antenna <input type="checkbox"/>	Type:		Gain		dBi
External antenna <input checked="" type="checkbox"/>	Type:	Dipole	Gain	4	dBi
For external antenna only: Standard Antenna Jack <input checked="" type="checkbox"/> If yes, describe how user is prohibited from changing antenna (if not professional installed): Equipment is only ever professionally installed <input checked="" type="checkbox"/> Non-standard Antenna Jack <input type="checkbox"/>					



Ancillaries (if applicable)

Manufacturer:		Part Number:	
Model:		Country of Origin:	

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

Name: Neill Arnell
Position held: Senior Hardware Engineer
Date: 17 March 2020

1.5 Product Information

1.5.1 Technical Description

The Equipment Under Test (EUT) was a Neology UK Ltd, ANPR Camera, Model: IRIS P500

The primary function of the EUT is an Automatic Number Plate Recognition (ANPR) Camera. The EUT has 4G, Bluetooth, GPS and WLAN capabilities.

1.5.2 Test Setup Diagram(s)

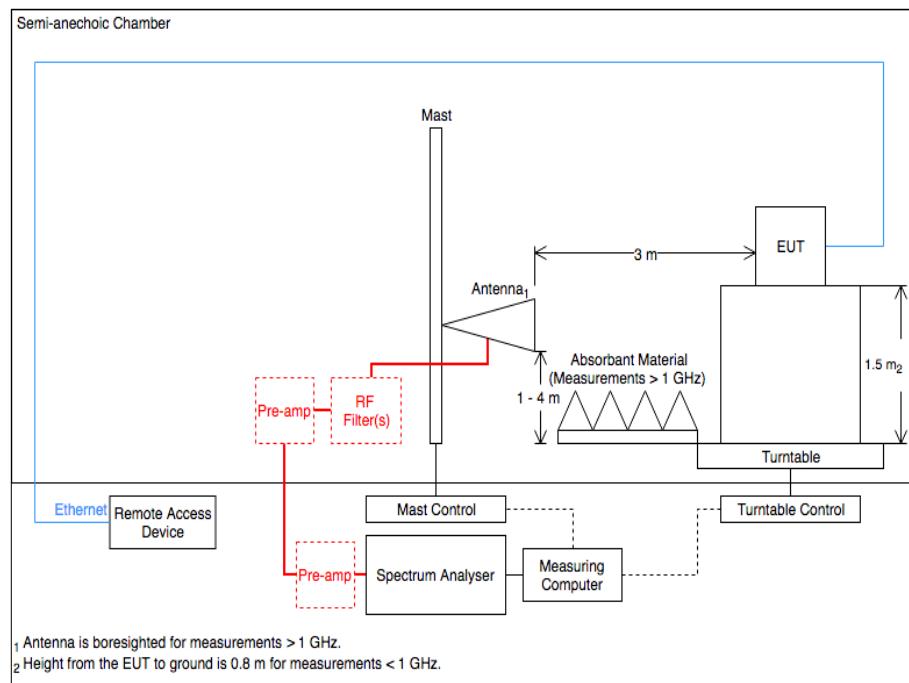


Figure 1 - Radiated Emissions

1.5.3 EUT Configuration and Rationale for Radiated Spurious Emissions

The EUT was placed on the non-conducting platform in a manner typical of a normal installation.

1.6 Deviations from the Standard

No 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: IRIS P500, Serial Number: 30181019			
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: LTE FDD Band 4 and 5 GHz WLAN		
Radiated Spurious Emissions (Simultaneous Transmission)	Graeme Lawler	UKAS
Configuration and Mode: LTE FDD Band 5 and 2.4 GHz WLAN		
Radiated Spurious Emissions (Simultaneous Transmission)	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 (Simultaneous Transmission)

2.1.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.209 and 15.247 (d)
FCC 47 CFR Part 15E, Clause 15.209 and 15.407 (b)
FCC 47 CFR Part 22, Clause 22.917 (a)
FCC 47 CFR Part 27, Clause 27.53 (h)

2.1.2 Equipment Under Test and Modification State

IRIS P500 ,S/N: 30181019 - Modification State 0

2.1.3 Date of Test

15-January-2020

2.1.4 Test Method

A preliminary profile of the Spurious Radiated Emissions was obtained up to the 10th harmonic by operating the EUT on a remotely controlled turntable within a semi-anechoic chamber.

Measurements of emissions from the EUT were obtained with the Measurement Antenna in both Horizontal and Vertical Polarisations. The profiling produced a list of the worst-case emissions together with the EUT azimuth and antenna polarisation.

Testing was performed in accordance with ANSI C63.26, clause 5.5.

Prescans and final measurements were performed using the direct field strength method. The Regulatory limit of -13dBm / MHz has been converted to a field strength limit in accordance with ANSI C63.26 clause 5.2.7 equation c)

This is the limit line shown on the plots.

Example calculation

$E (\text{dB}\mu\text{V/m}) = \text{EIRP} (\text{dBm}) - 20\log(d) + 104.8$ where (d) is the measurement distance.

$E (\text{dB}\mu\text{V/m}) = -13 - 20\log(3) + 104.8$

$E (\text{dB}\mu\text{V/m}) = 82.26$

2.1.5 Environmental Conditions

Ambient Temperature 18.5 °C

Relative Humidity 33.7 %

2.1.6 Test Results

LTE FDD Band 4 and 5 GHz WLAN

The EUT was configured for simultaneous transmission in the following mode of operation:

Technology	Frequency Band	Channel Frequency (MHz)
LTE	FDD Band 4	1732.5
5 GHz WLAN - 802.11a	U-NII 2c	5500.0

Table 5 - Modes of Operation

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

Table 6 - 30 MHz to 40 GHz

* No emissions were detected within 10 dB of the limit.

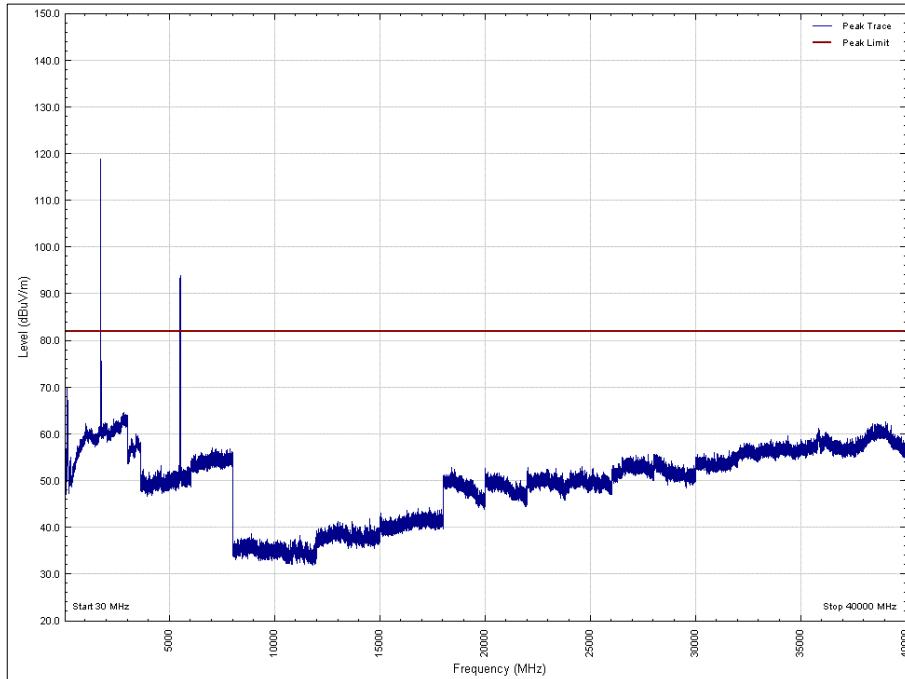


Figure 2 - 30 MHz to 40 GHz – Vertical

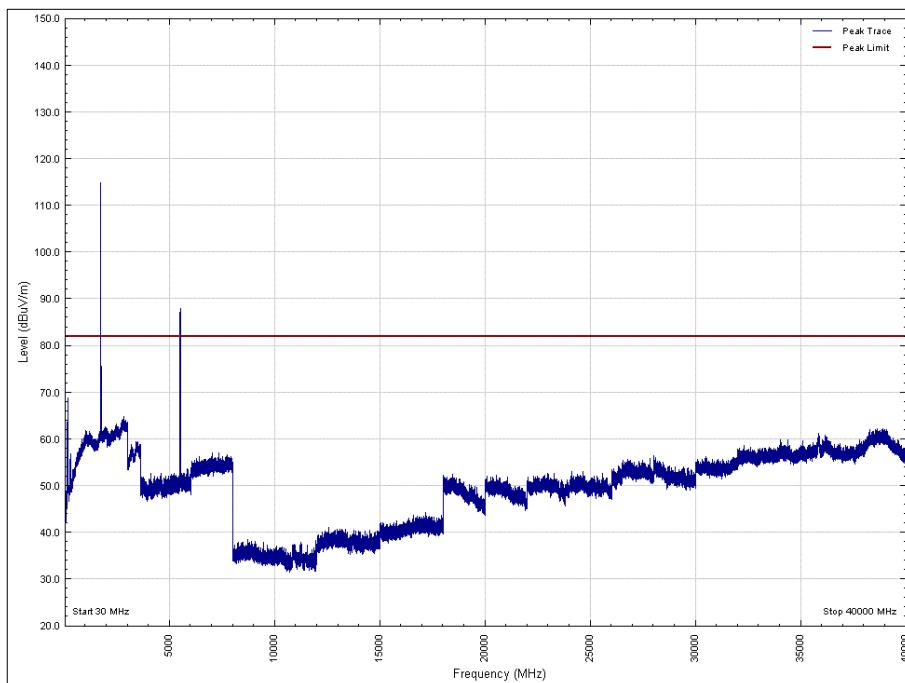


Figure 3 - 30 MHz to 40 GHz - Horizontal

LTE FDD Band 5 and 2.4 GHz WLAN

The EUT was configured for simultaneous transmission in the following mode of operation:

Technology	Frequency Band	Channel Frequency (MHz)
LTE	FDD Band 5	835.5
2.4 GHz WLAN - 802.11b	2400 MHz to 2483.5 MHz	2437.0

Table 7 - Modes of Operation

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

Table 8 - 30 MHz to 30 GHz

* No emissions were detected within 10 dB of the limit.

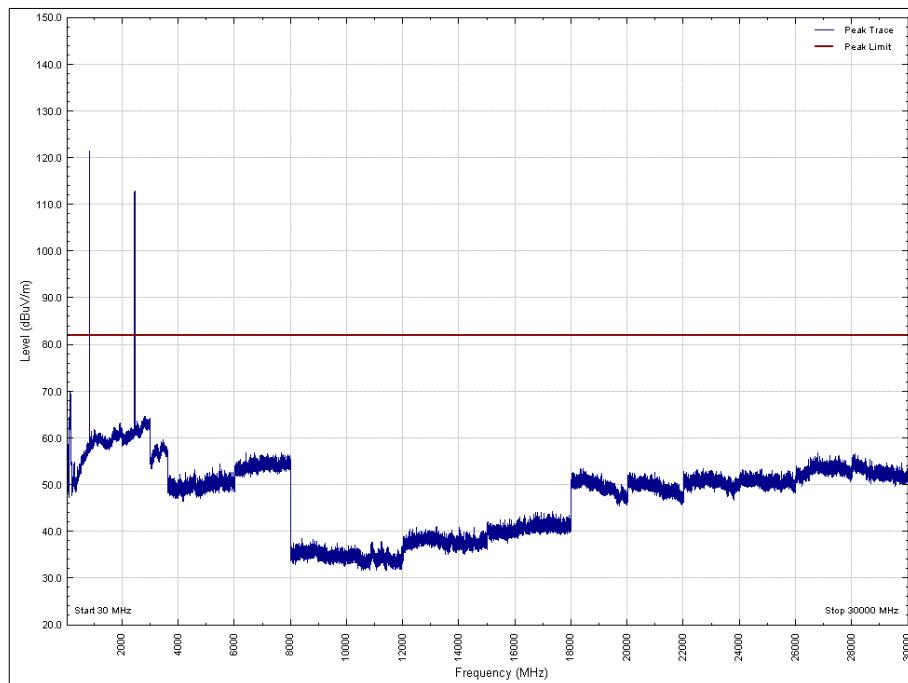


Figure 4 - 30 MHz to 30 GHz – Vertical

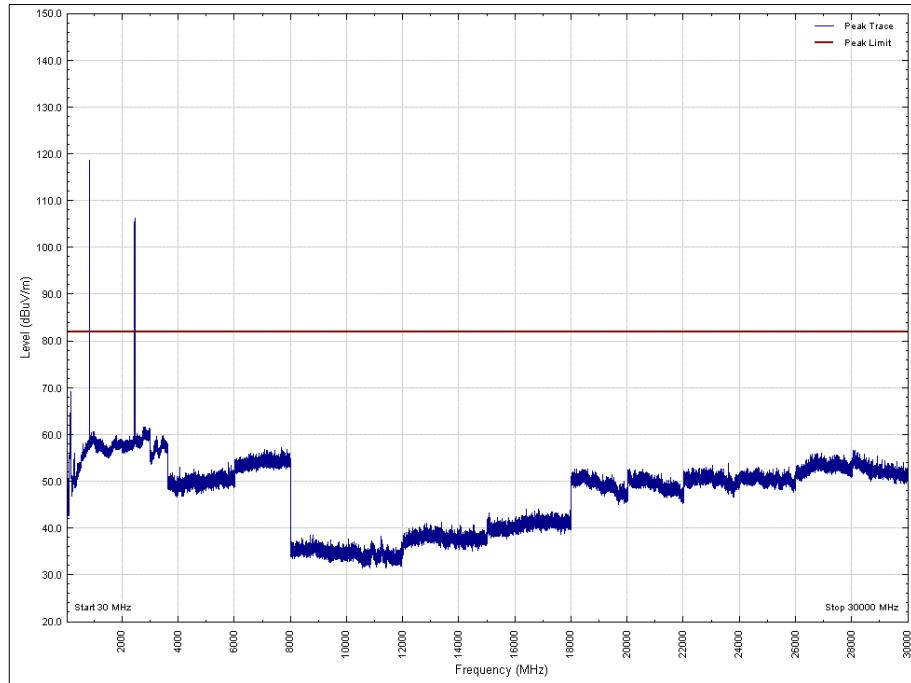


Figure 5 - 30 MHz to 30 GHz - Horizontal

Limit Clause

The least stringent limit from the applicable rule parts was used to determine compliance for Radiated Emissions testing of multiple transmission sources.

The least stringent applicable limit was:

Rule Part	Limit
Part 22.917 (a) and Part 27.53 (h)	-13 dBm (EIRP) / 82 dB μ V/m at 3m.

Table 9 - Limit Table



2.1.7 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 5.

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	02-May-2020
Filter (High Pass)	Lorch	SHP7-7000-SR	566	12	06-Jun-2020
Pre-Amplifier	Phase One	PS04-0086	1533	12	08-Feb-2020
18GHz - 40GHz Pre-Amplifier	Phase One	PSO4-0087	1534	12	05-Feb-2020
Screened Room (5)	Rainford	Rainford	1545	36	23-Jan-2021
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
DC Power Supply	Hewlett Packard	6269B	1909	-	O/P Mon
Multimeter	Iso-tech	IDM101	2417	12	11-Nov-2020
Antenna with permanent attenuator (Bilog)	Chase	CBL6143	2904	24	30-Sep-2021
Comb Generator	Schaffner	RSG1000	3034	-	TU
Antenna (Log Periodic)	Schaffner	UPA6108	3108	12	28-Jul-2020
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	03-Jan-2021
'2.92mm' - '2.92mm' RF Cable (2m)	Rhophase	KPS-1503-2000-KPS	3695	12	11-Jun-2020
Cable 1503 2M 2.92(P)m 2.92(P)m	Rhophase	KPS-1503A-2000-KPS	4293	12	08-Nov-2020
Wideband Radio Test Set	Rohde & Schwarz	CMW500	4546	12	04-Jun-2020
Mast Controller	Maturo GmbH	NCD	4810	-	TU
Tilt Antenna Mast	Maturo GmbH	TAM 4.0-P	4811	-	TU
Double Ridge Broadband Horn Antenna	Schwarzbeck	BBHA 9120 B	4848	12	11-Mar-2020
4dB Attenuator	Pasternack	PE7047-4	4935	24	30-Sep-2021
Hygrometer	Rotronic	HP21	4989	12	02-May-2020
Cable (18 GHz)	Rosenberger	LU7-071-1000	5099	12	06-Oct-2020
EmX Emissions Software	TÜV SUD	EmX	5125	-	Software
1.5m 40GHz RF Cable	Scott Cables	KPS-1501-2000-KPS	5127	6	20-Jan-2020
8 Meter Cable	Teledyne	PR90-088-8MTR	5212	12	30-Aug-2020
3 GHz High pass filter	Wainwright	WHKX12-2580-3000-18000-80SS	5220	12	15-Feb-2020
Antenna (DRG Horn 7.5-18GHz)	Schwarzbeck	HWRD750	5348	12	04-Sep-2020

Table 10

TU - Traceability Unscheduled
 O/P Mon – Output Monitored using calibrated equipment.

3 Photographs

3.1 Test Setup Photographs



Figure 6 - Test Setup - 30 MHz to 1 GHz

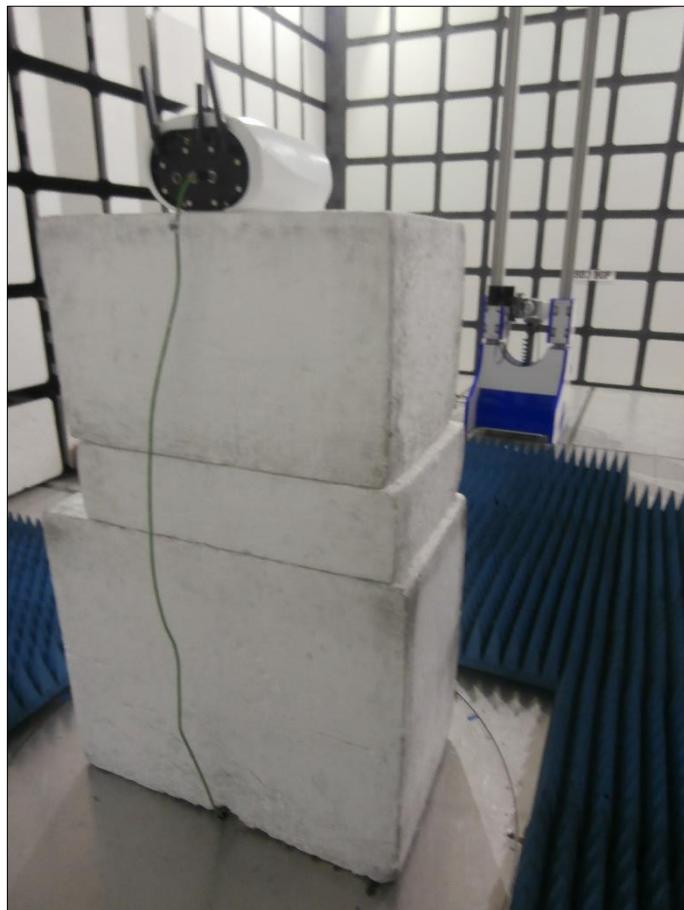


Figure 7 - Test Setup - 1 GHz to 8 GHz



Figure 8 - Test Setup - 8 GHz to 18 GHz

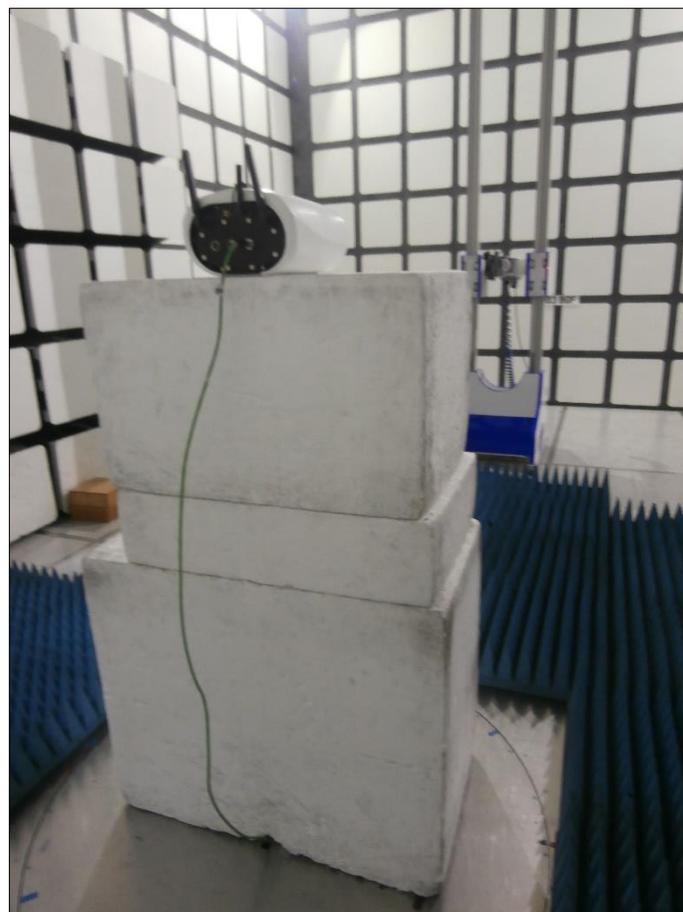


Figure 9 - Test Setup - 18 GHz to 40 GHz

4 Measurement Uncertainty

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

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

Table 11

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.