

Report on the FCC and IC Testing of:

PervasID

UHF RFID Distributed Antenna System,
Model: Space/Portal Ranger 9200

In accordance with FCC 47 CFR Part 15B,
ICES-003 and Industry Canada RSS-GEN

Prepared for: PervasID
St John's Innovation Centre
Cowley Road, Cambridge
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Product Service

Choose certainty.
Add value.

FCC ID: 2AQW9200

IC: 24482-9200

COMMERCIAL-IN-CONFIDENCE

Document Number: 75943122-01 | Issue: 01

SIGNATURE

NAME	JOB TITLE	RESPONSIBLE FOR	ISSUE DATE
Matthew Russell	RF Team Leader	Authorised Signatory	06 November 2018

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Product Service 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 15, ICES-003 and Industry Canada RSS-GEN. The sample tested was found to comply with the requirements defined in the applied rules.

SIGNATURE

NAME	JOB TITLE	RESPONSIBLE FOR	ISSUE DATE
Graeme Lawler	Test Engineer	Testing	06 November 2018

FCC Accreditation

90987 Octagon House, Fareham Test Laboratory

Industry Canada Accreditation

IC2932B-1 Octagon House, Fareham Test Laboratory

EXECUTIVE SUMMARY

A sample of this product was tested and found to be compliant with FCC 47 CFR Part 15B: 2017, ICES-003: 2016 and Industry Canada RSS-GEN Issue 05 (2018-04) 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	06 November 2018

Table 1

1.2 Introduction

Applicant	PervasID
Manufacturer	PervasID
Model Number(s)	Space/Portal Ranger 9200
Serial Number(s)	0280420101-0001
Hardware Version(s)	5.2 FCC
Software Version(s)	2.6.8
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 15B: 2017 ICES-003: 2016 Industry Canada RSS-GEN: Issue 05 (2018-04)
Order Number	PO-0028
Date	15-June-2018
Date of Receipt of EUT	31-July-2018
Start of Test	31-July-2018
Finish of Test	01-August-2018
Name of Engineer(s)	Graeme Lawler
Related Document(s)	ANSI C63.4: 2014



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1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15B, ICES-003 and Industry Canada RSS-GEN is shown below.

Section	Specification Clause			Test Description	Result	Comments/Base Standard
	Part 15B	ICES-003	RSS-GEN			
Configuration and Mode: Idle						
2.1	15.107	6.1	8.8	Conducted Disturbance at Mains Terminals	Pass	ANSI C63.4: 2014
2.2	15.109	6.2	7.3	Radiated Disturbance	Pass	ANSI C63.4: 2014

Table 2



1.4 Application Form

MAIN EUT			
MANUFACTURING DESCRIPTION	UHF RFID Distributed Antenna System		
MANUFACTURER	PervasID		
MODEL NAME/NUMBER	Space/Portal Ranger 9200		
PART NUMBER	RFID DAS 9200 R		
SERIAL NUMBER	0280420101-0001		
HARDWARE VERSION	v5.2 FCC		
SOFTWARE VERSION	2.6.8		
PSU VOLTAGE/FREQUENCY/CURRENT	24V DC 3A		
HIGHEST INTERNALLY GENERATED / USED FREQUENCY	928MHz		
FCC ID (if applicable)	2AQW9200		
INDUSTRY CANADA ID (if applicable)	24482-9200		
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	UHF RFID Distributed Antenna System - intended use detection and monitoring of UHF RFID tags		
COUNTRY OF ORIGIN	UK		
RF CHARACTERISTICS (if applicable)			
TRANSMITTER FREQUENCY OPERATING RANGE (MHz)	902-928 MHz		
RECEIVER FREQUENCY OPERATING RANGE (MHz)	902 - 928 MHz		
INTERMEDIATE FREQUENCIES	Direct conversion		
EMISSION DESIGNATOR(S): (i.e. G1D, GXW)			
MODULATION TYPES: (i.e. GMSK, QPSK)	PR-ASK		
OUTPUT POWER (W or dBm)	34dBm		
SEPARATE BATTERY/POWER SUPPLY (if applicable)			
MANUFACTURING DESCRIPTION	AC/DC Power Supply		
MANUFACTURER	XP Power		
TYPE	24V, 3A supply		
PART NUMBER	AEB70US24		
PSU VOLTAGE/FREQUENCY/CURRENT	90-264 VAC, 47-63Hz, 1.5A		
COUNTRY OF ORIGIN	China		
MODULES (if applicable)			
MANUFACTURING DESCRIPTION			
MANUFACTURER			
TYPE			
POWER			
FCC ID			
INDUSTRY CANADA ID			
EMISSION DESIGNATOR			
DHSS/FHSS/COMBINED OR OTHER			
COUNTRY OF ORIGIN			
ANCILLARIES (if applicable)			
MANUFACTURING DESCRIPTION			
MANUFACTURER			
TYPE			
PART NUMBER			
SERIAL NUMBER			
COUNTRY OF ORIGIN			

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

Name: Sabesan Sithamparanathan
Date: 25/06/2018

Position held: CEO



1.5 Product Information

1.5.1 Technical Description

UHF RFID Distributed Antenna System - intended use detection and monitoring of UHF RFID tags.

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
Serial Number: 0280420101-0001			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 3

1.8 Test Location

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

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: Idle		
Conducted Disturbance at Mains Terminals	Graeme Lawler	UKAS
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 Conducted Disturbance at Mains Terminals

2.1.1 Specification Reference

FCC 47 CFR Part 15B, Clause 15.107
ICES-003, Clause 6.1
Industry Canada RSS-GEN, Clause 8.8

2.1.2 Equipment Under Test and Modification State

Space/Portal Ranger 9200, S/N: 0280420101-0001 - Modification State 0

2.1.3 Date of Test

01-August-2018

2.1.4 Test Method

This test was performed in accordance with ANSI C63.4, clause 7.

The EUT was placed on a non-conductive table 0.8m above a reference ground plane and 0.4m away from a vertical coupling plane.

All power was connected to the EUT through an Artificial Mains Network (AMN). Conducted disturbance voltage measurements on mains lines were made at the output of the AMN. The AMN was placed 0.8m from the boundary of the EUT and bonded to the reference ground plane.

2.1.5 Environmental Conditions

Ambient Temperature	20.1 °C
Relative Humidity	56.8 %



2.1.6 Test Results

Results for Configuration and Mode : Idle.

Performance assessment of the EUT made during this test: Pass.

Detailed results are shown below.

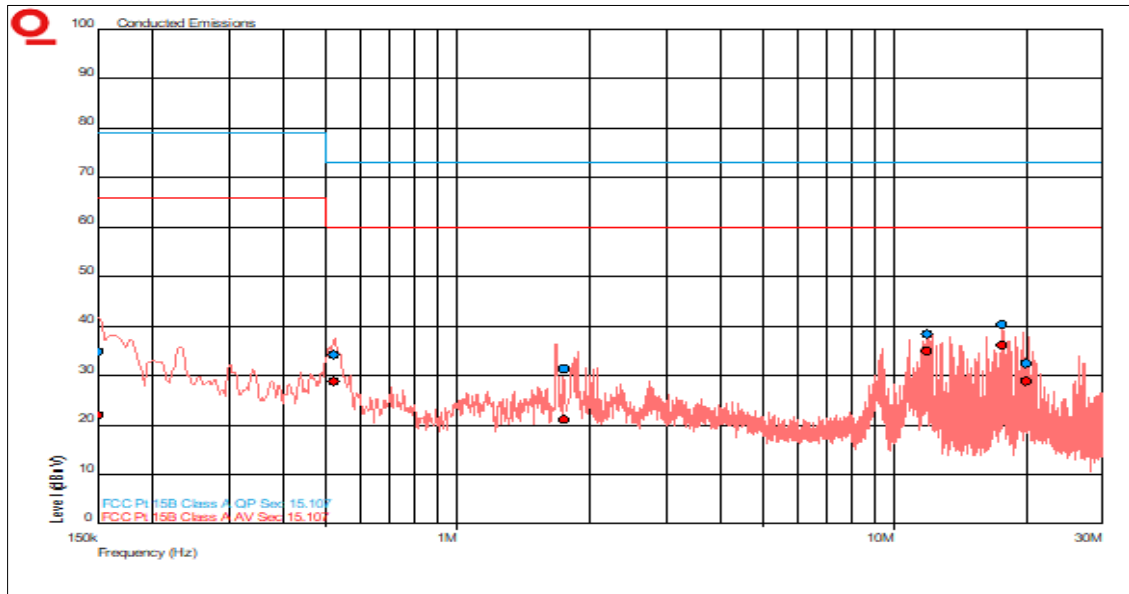


Figure 1 - Graphical Results - AC Mains Neutral

Frequency (MHz)	QP Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Level (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.150	34.8	79.0	-44.2	22.0	66.0	-44.0
0.521	34.3	73.0	-38.7	28.9	60.0	-31.1
1.755	31.5	73.0	-41.5	21.1	60.0	-38.9
11.894	38.4	73.0	-34.6	35.0	60.0	-25.0
17.695	40.4	73.0	-32.6	36.3	60.0	-23.7
20.014	32.5	73.0	-40.5	28.8	60.0	-31.2

Table 5



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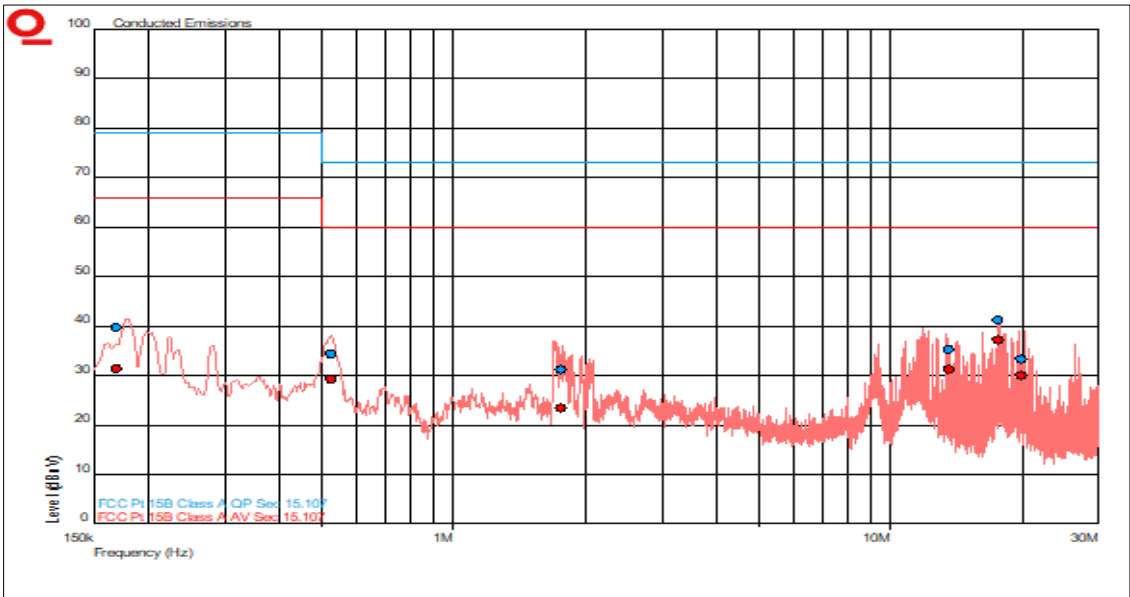


Figure 2 - Graphical Results - AC Mains Live

Frequency (MHz)	QP Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Level (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.169	39.7	79.0	-39.3	31.4	66.0	-34.6
0.525	34.4	73.0	-38.6	29.3	60.0	-30.7
1.761	31.3	73.0	-41.7	23.5	60.0	-36.5
13.604	35.3	73.0	-37.7	31.3	60.0	-28.7
17.694	41.3	73.0	-31.7	37.2	60.0	-22.8
19.894	33.3	73.0	-39.7	30.1	60.0	-29.9

Table 6



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
Screened Room (5)	Rainford	Rainford	1545	36	23-Jan-2021
Single Phase LISN	Rohde & Schwarz	ESH3-Z5	1674	12	04-Apr-2019
Transient Limiter	Hewlett Packard	11947A	2377	12	23-Feb-2019
Multimeter	Iso-tech	IDM101	2419	12	23-Nov-2018
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	22-Nov-2018
Cable (Rx, Nm-Nm, 7m)	Scott Cables	SLU18-NMNM-07.00M	4498	-	O/P Mon
Hygrometer	Rotronic	HP21	4989	12	26-Apr-2019

Table 7

O/P Mon – Output Monitored using calibrated equipment



2.2 Radiated Disturbance

2.2.1 Specification Reference

FCC 47 CFR Part 15B, Clause 15.109
ICES-003, Clause 6.2
Industry Canada RSS-GEN, Clause 7.3

2.2.2 Equipment Under Test and Modification State

Space/Portal Ranger 9200, S/N: 0280420101-0001 - Modification State 0

2.2.3 Date of Test

31-July-2018

2.2.4 Test Method

This test was performed in accordance with ANSI C63.4, clause 8.

The EUT was set up in a semi-anechoic chamber on a remotely controlled turntable and placed on a non-conductive table 0.8m above a reference ground plane.

A pre-scan of the EUT emissions profile was made while varying the antenna-to-EUT azimuth and antenna-to-EUT polarisation using a peak detector; measurements were taken at a 3m distance. Using the pre-scan list of the highest emissions detected, their bearing and associated antenna polarisation, the EUT was then formally measured using a Quasi-Peak, Peak, Average detector as appropriate. The readings were maximised by adjusting the antenna height, polarisation and turntable azimuth, in accordance with the specification.

In a typical installation the manufacturer declared that the EUT could either be installed two orientations (X and Y) therefore the EUT was tested in both of these orientations.

2.2.5 Environmental Conditions

Ambient Temperature	20.2 °C
Relative Humidity	56.8 %

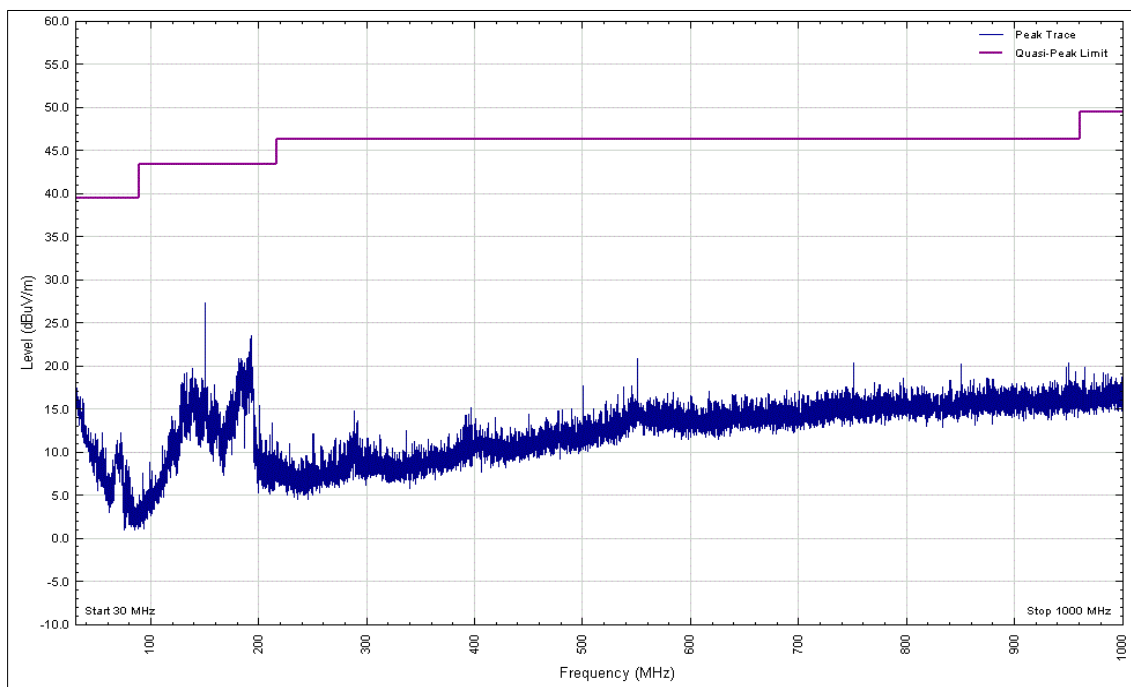
2.2.6 Test Results

Results for Configuration and Mode : Idle.

Performance assessment of the EUT made during this test: Pass.

Detailed results are shown below.

Highest frequency generated or used within the EUT: 928 MHz
Which necessitates an upper frequency test limit of: 5 GHz



**Figure 3 - Graphical Results – 30 MHz to 1 GHz,
Vertical Polarity - EUT Orientation: X**

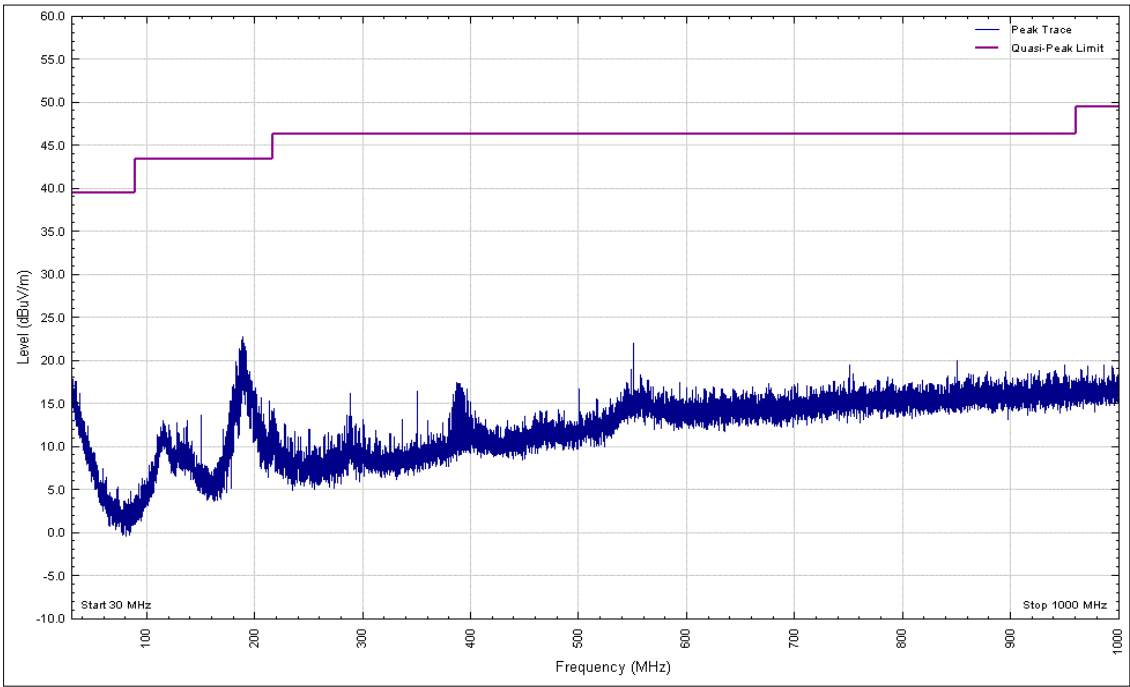


Figure 4 - Graphical Results – 30 MHz to 1 GHz,
Horizontal Polarity - EUT Orientation: X

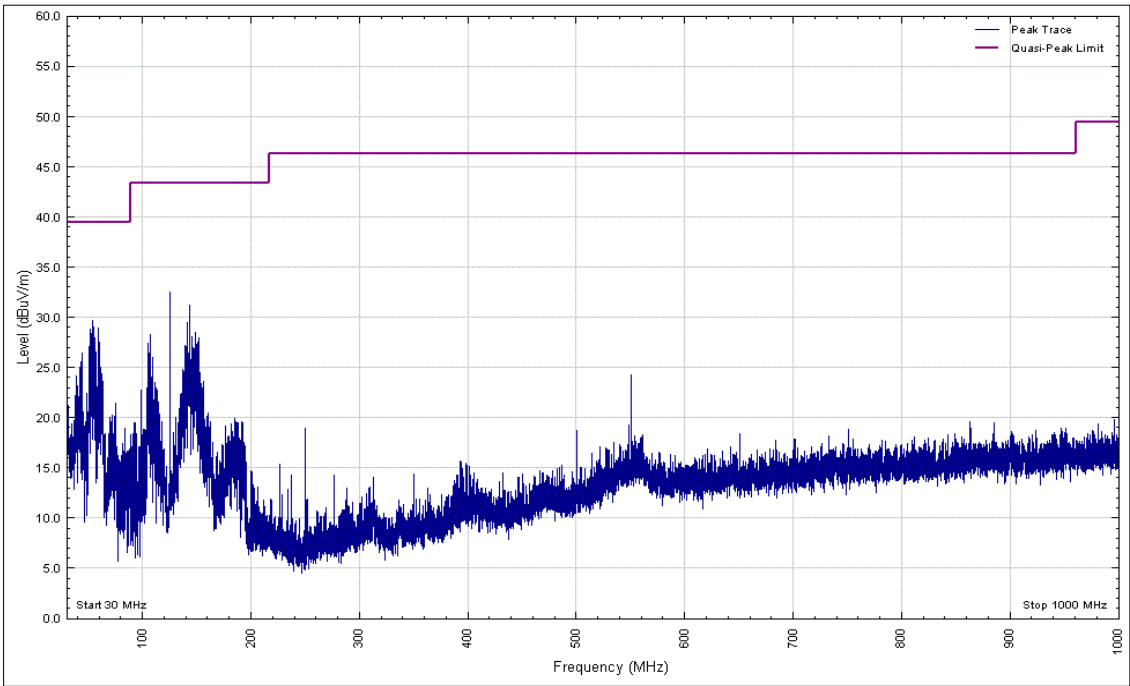


Figure 5 - Graphical Results – 30 MHz to 1 GHz,
Vertical Polarity - EUT Orientation: Y

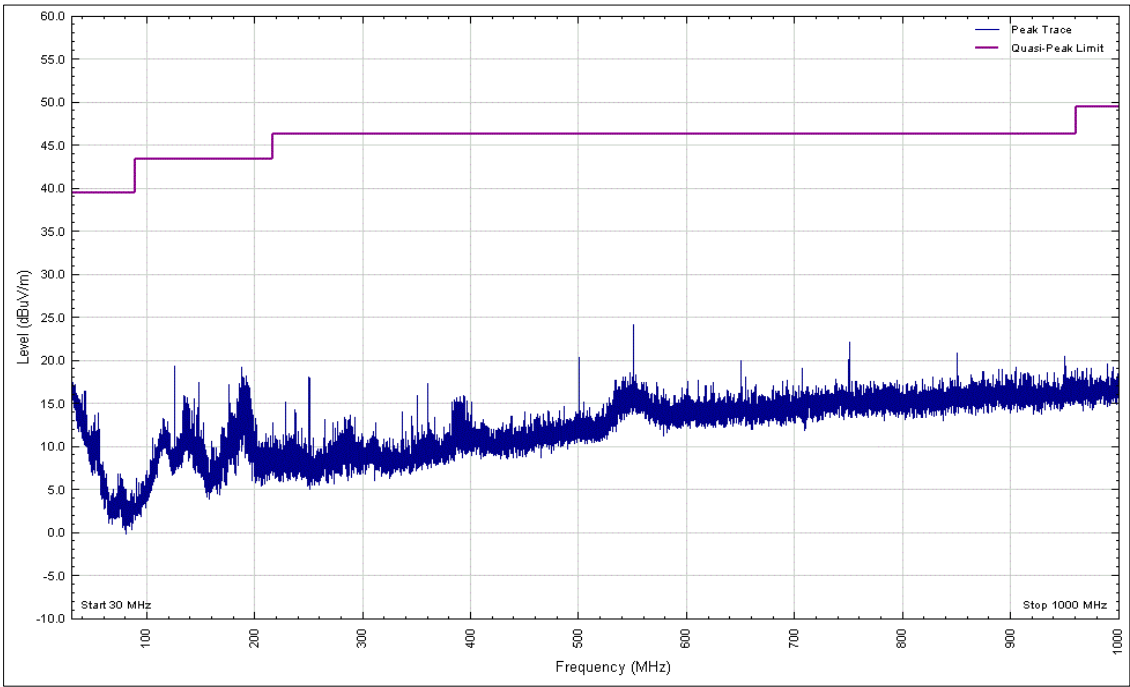


Figure 6 - Graphical Results – 30 MHz to 1 GHz,
Horizontal Polarity - EUT Orientation: Y - Peak

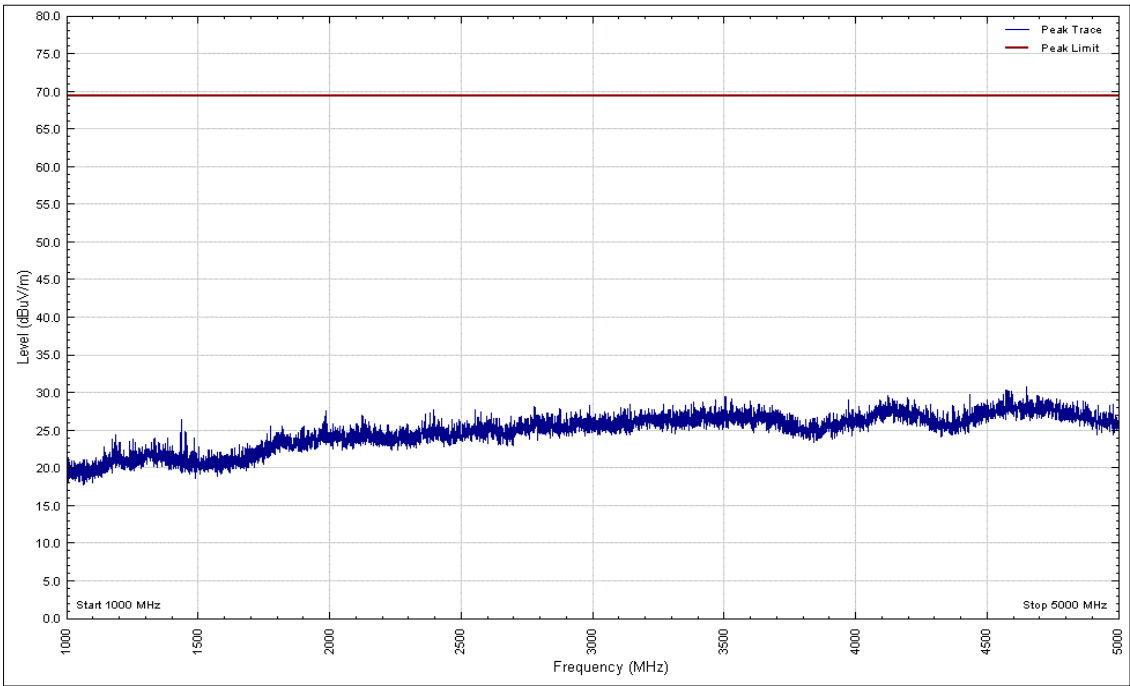


Figure 7 - Graphical Results - 1 GHz to 5 GHz
Vertical Polarity - EUT Orientation: X - Peak

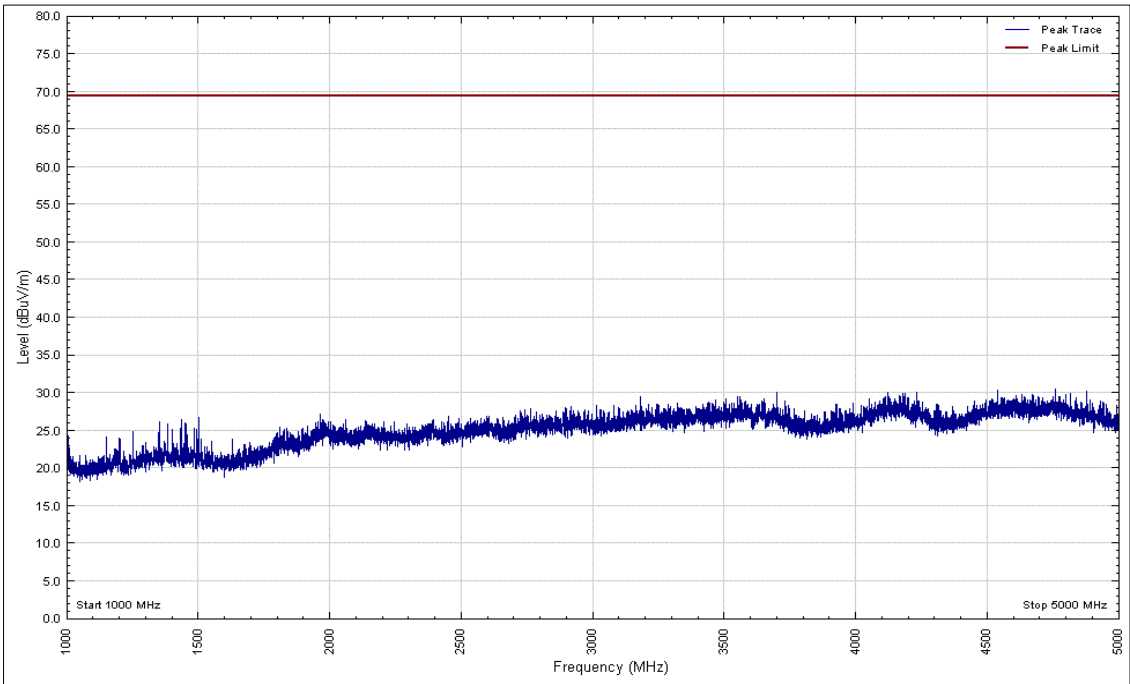


Figure 8 - Graphical Results - 1 GHz to 5 GHz
Horizontal Polarity - EUT Orientation: X - Peak

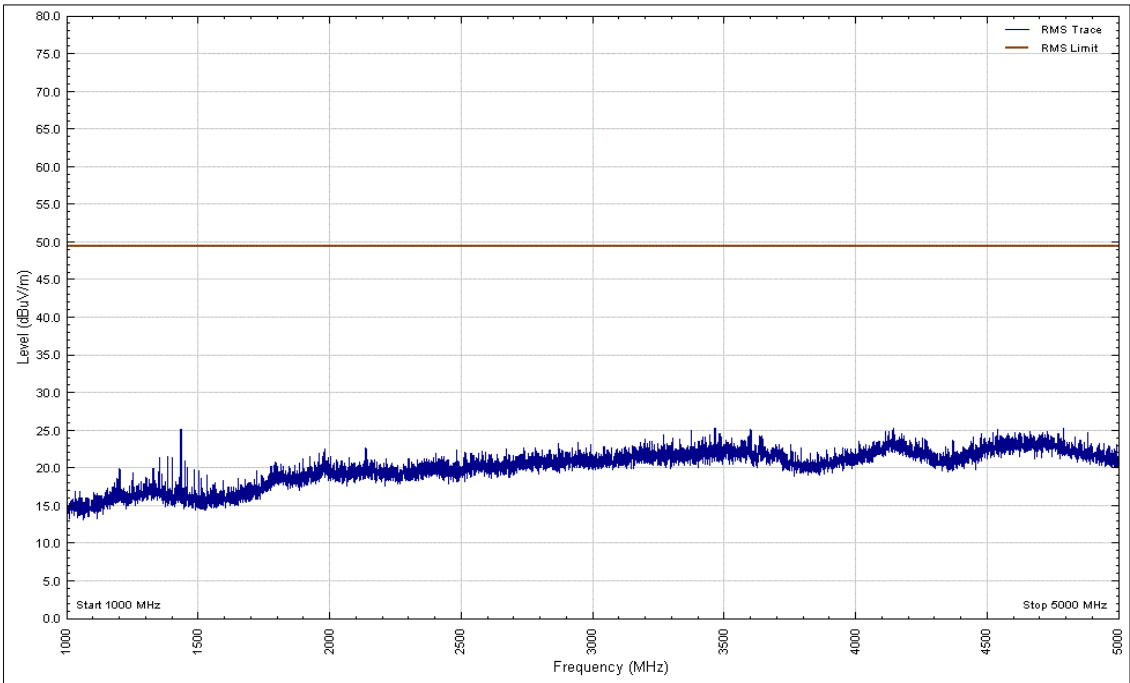


Figure 9 - Graphical Results - 1 GHz to 5 GHz
Vertical Polarity - EUT Orientation: X - Average

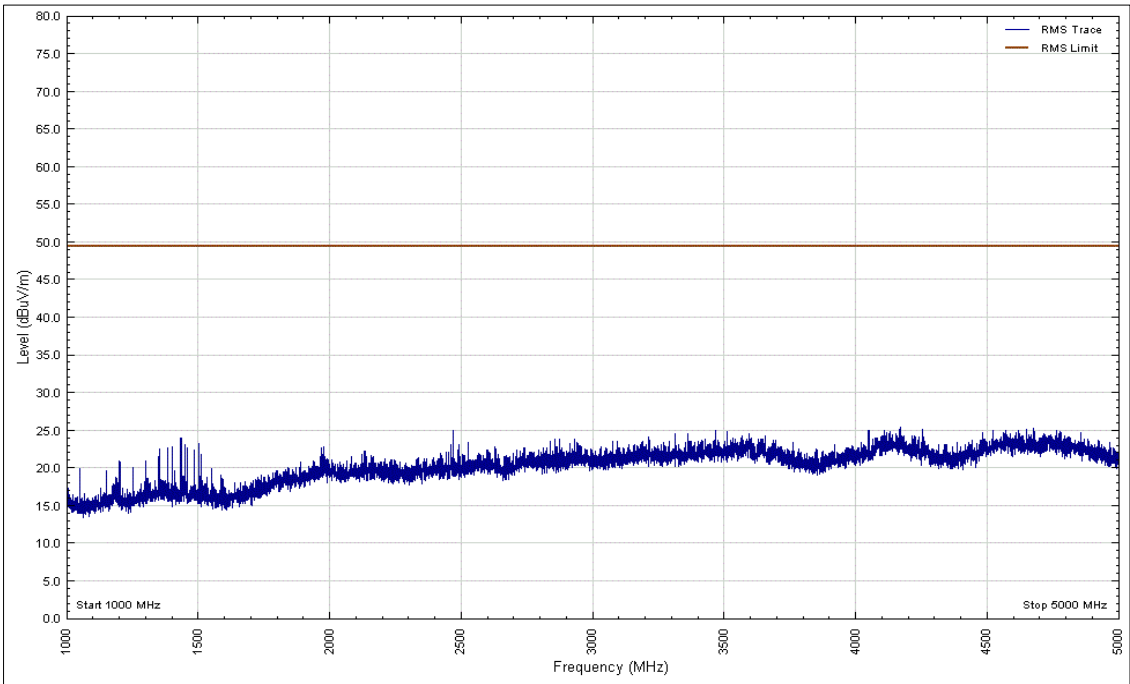


Figure 10 - Graphical Results - 1 GHz to 5 GHz
Horizontal Polarity - EUT Orientation: X - Average

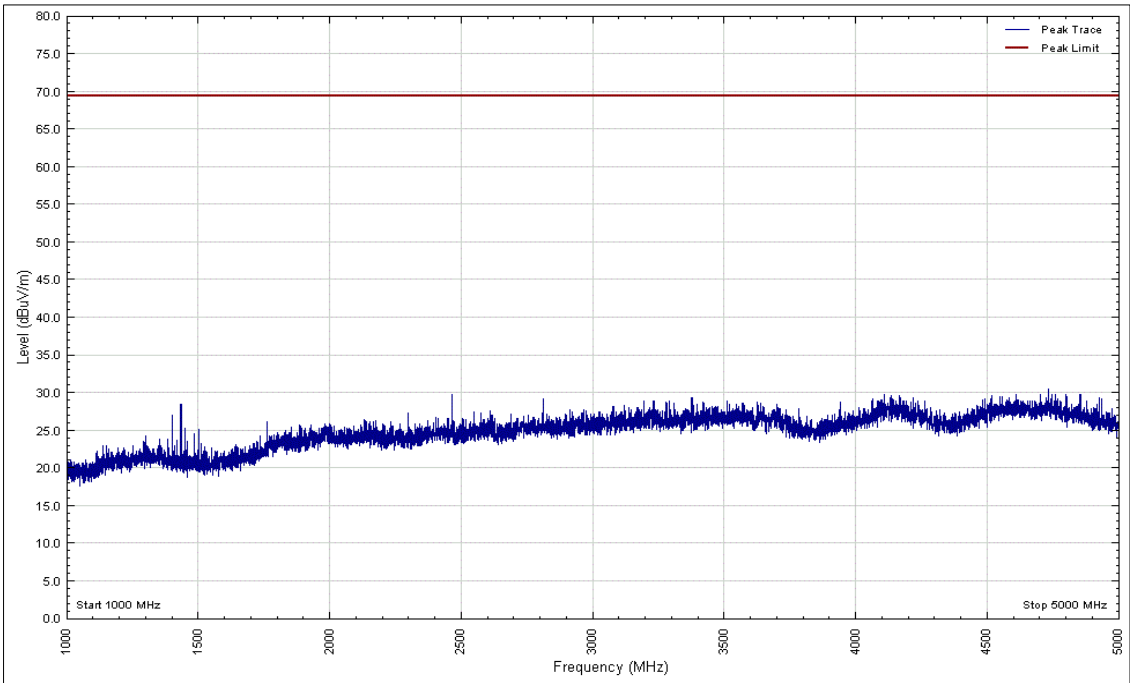


Figure 11 - Graphical Results - 1 GHz to 5 GHz
Vertical Polarity - EUT Orientation: Y - Peak

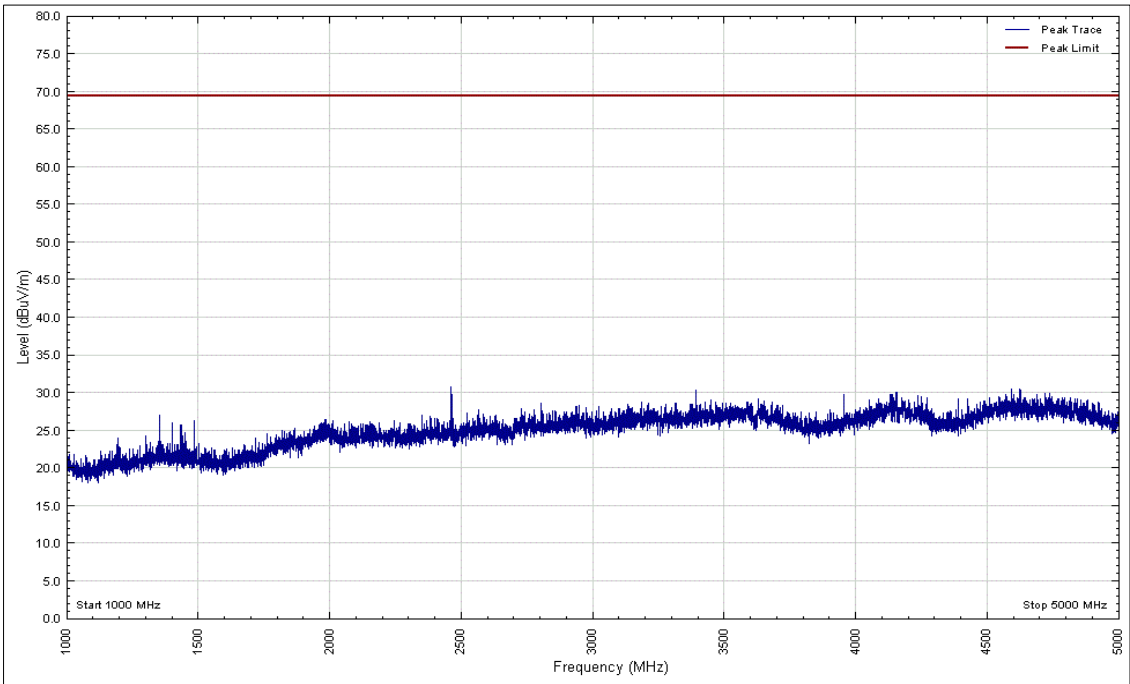


Figure 12 - Graphical Results - 1 GHz to 5 GHz
Horizontal Polarity - EUT Orientation: Y - Peak

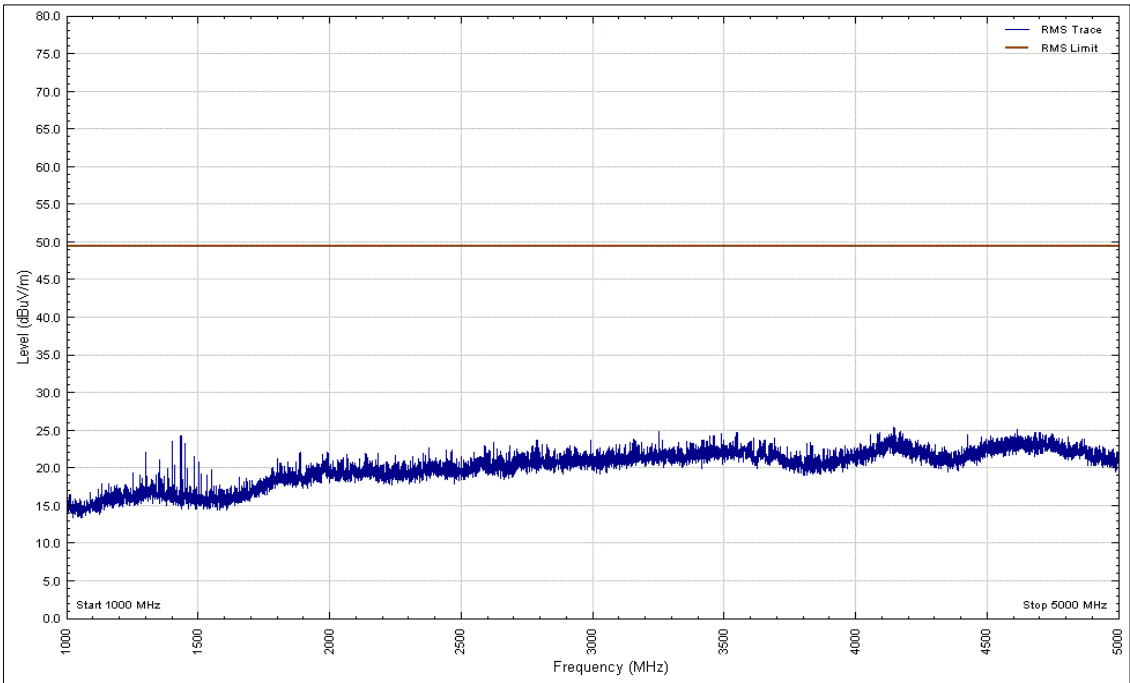
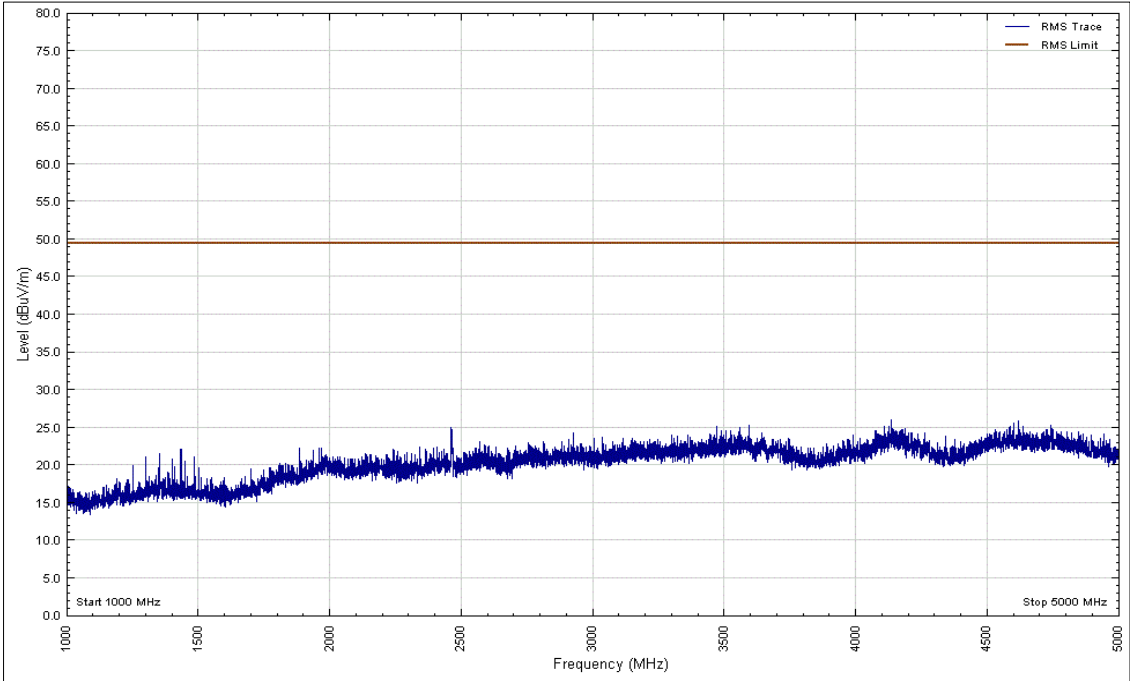


Figure 13 - Graphical Results - 1 GHz to 5 GHz
Vertical Polarity - EUT Orientation: Y - Average



**Figure 14 - Graphical Results - 1 GHz to 5 GHz
Horizontal Polarity - EUT Orientation: Y - Average**

No emissions were detected within 10 dB of the limit.



2.2.7 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
Screened Room (5)	Rainford	Rainford	1545	36	23-Jan-2021
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Multimeter	Iso-tech	IDM101	2419	12	23-Nov-2018
Antenna (Bilog)	Chase	CBL6143	2904	24	08-Aug-2019
Comb Generator	Schaffner	RSG1000	3034	-	TU
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	22-Nov-2018
1GHz to 8GHz Low Noise Amplifier	Wright Technologies	APS04-0085	4365	12	18-Oct-2018
Cable (Rx, Km-Km 2m)	Scott Cables	KPS-1501-2000-KPS	4526	6	31-Aug-2018
Cable (Rx, SMAM-SMAM 0.5m)	Scott Cables	SLSLL18-SMSM-00.50M	4528	6	15-Aug-2018
Double Ridged Waveguide Horn Antenna	ETS-Lindgren	3117	4722	12	01-Mar-2019
Mast Controller	Maturo GmbH	NCD	4810	-	TU
Tilt Antenna Mast	Maturo GmbH	TAM 4.0-P	4811	-	TU
9m N type RF cable	Rosenberger	2303-0 9.0m PNm PNm	4827	6	04-Jan-2019
4dB Attenuator	Pasternack	PE7047-4	4935	12	28-Nov-2018

Table 8

TU – Traceability Unscheduled



3 Measurement Uncertainty

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

Test Name	Measurement Uncertainty
Conducted Disturbance at Mains Terminals	150 kHz to 30 MHz, LISN, ± 3.7 dB
Radiated Disturbance	30 MHz to 1 GHz, Bilog Antenna, ± 5.2 dB 1 GHz to 40 GHz, Horn Antenna, ± 6.3 dB

Table 9