

FCC Testing of the
Motorola Solutions Inc,
LTE B14 Portable Infrastructure.
Model: LXN 500
In accordance with FCC 47 CFR Parts 15 and 90
(Simultaneous Transmission)

Prepared for: Motorola Solutions Inc.
Israel Ltd
2 Hanegev St.
Airport City
Israel 70199

FCC ID: AZ492FT7102



Product Service

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Date: January 2018

Document Number: 75939219-05 | Issue: 01

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Project Management	Steven White	09 January 2018	
Authorised Signatory	Simon Bennett	09 January 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 Parts 15 and 90 (Simultaneous Transmission). The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Graeme Lawler	09 January 2018	

FCC Accreditation

90987 Octagon House, Fareham Test Laboratory

Designation Number: UK0010

EXECUTIVE SUMMARY

A sample of this product was tested and found to be compliant with FCC 47 CFR Parts 15 and 90 (Simultaneous Transmission)



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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	09 January 2018

Table 1

1.2 Introduction

Applicant	Motorola Solutions Inc
Manufacturer	Motorola Solutions Israel Ltd
Model Number(s)	LNx 500
Serial Number(s)	569REG0001
Hardware Version(s)	1.0.0
Software Version(s)	1.0.0
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Parts 15.247 and Part 90 (Simultaneous Transmission)
Order Number	17-14302
Date	25-May-2017
Date of Receipt of EUT	11-September-2017
Start of Test	13-December-2017
Finish of Test	13-December-2017
Name of Engineer(s)	Graeme Lawler



Product Service

1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Parts 15.247 and Part 90 for (Simultaneous Transmission) is shown below.

Section	Specification Clause	Test Description	Result	Comments/Base Standard
Configuration and Mode: Simultaneous transmission LTE Band 14 & 2.4 GHz WLAN				
2.1	15.247 (d) & 90.543(e)	Radiated Spurious Emissions (Simultaneous Transmission)	Pass	

Table 2

1.4 Application Form

EQUIPMENT DESCRIPTION	
Model Name/Number	LXN 500 B14
Part Number	SQM01SUM0309A
Hardware Version	1.0.0
Software Version	1.0.0
FCC ID (if applicable)	AZ492FT7102
Industry Canada ID (if applicable)	
Technical Description (Please provide a brief description of the intended use of the equipment)	The LXN 500 is an Ultra Deployable LTE System designed for on-demand coverage and public safety applications. The solution consists of a single portable unit that can be operated from a vehicle.

INTENTIONAL RADIATORS									
Technology	Frequency Band (MHz)	Conducted Declared Output Power (dBm)	Antenna Gain (dBi)	Supported Bandwidth (s) (MHz)	Modulation Scheme(s)	ITU Emission Designator	Test Channels (MHz)		
							Bottom	Middle	Top
LTE	758-768	30	6	5,10	64QAM	10M0G7D	760.5	763	765.5
Wi-Fi	2400-2500	15.33	10	5,20	OFDM	17M9GXW	2412	2442	2484

UN-INTENTIONAL RADIATOR	
Highest frequency generated or used in the device or on which the device operates or tunes	2484 MHz

Power Source			
AC	Single Phase	Three Phase	Nominal Voltage
	Yes		110/240
External DC	Nominal Voltage		Maximum Current
	9-33VDC		5A
Battery	Nominal Voltage		Battery Operating End Point Voltage
	12-16.8v		
Can EUT transmit whilst being charged?			Yes ☐ No ☒

EXTREME CONDITIONS			
Maximum temperature	60	°C	Minimum temperature
			-20 °C

Ancillaries
Please list all ancillaries which will be used with the device.



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NP12/NP24 NAV PAC (UPS)
2 x USB flash drives and associated cables

ANTENNA CHARACTERISTICS				
☒	Antenna connector	State impedance	50	Ohm
☐	Temporary antenna connector	State impedance		Ohm
☐	Integral antenna	Type		
☒	External antenna	Type	VLQ69273	

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

Name: Darragh McShane
Position held: Project Manager Date: 07/06/2017

1.5 Product Information

1.5.1 Technical Description

The Equipment Under Test (EUT) –is a Motorola LTE Portable Infrastructure working in the public mobile service Band 14 which provides communication connections to Band 14 network and WLAN 802.11 b/g. The EUT can operate from a 120 V 60 Hz AC, 12 or 24 V DC supply.

The Equipment Under Test (EUT) is shown in the photograph below. A full technical description can be found in the Manufacturer's documentation.



Front View



Rear View

1.5.2 Antenna and ancillaries for use with the LXN 500

Vehicle 4 port antenna and cables:

AN000226A01	Laird Combo antenna VLQ69273 (4 ports)
CB000613A01	Laird Combo LTE antenna VLQ69273 (4 ports) cable
CB000548A01	Laird Combo WiFi antenna VLQ69273 (4 ports) cable
CB000133A01	Laird Combo GPS antenna VLQ69273 (4 ports) cable

Note: The 4-port antenna can also be used in buildings/fixed installations (providing there is a suitable ground plane/structure).

Vehicle 3 port antenna and cables:

AN000036A01	Laird combo antenna (3 ports) - Base
85013016001	Laird combo antenna (3 ports) - Whip
CB000613A01	Laird combo antenna (3 ports) LTE cable
CB000133A01	Laird combo antenna (3 ports) GPS cable
CB000548A01	Laird combo antenna (3 ports) WiFi cable

Vehicle power cable

CB000540A01	Vehicle power cable
-------------	---------------------

1.5.3 Details of antennas for use with LXN 500

APP	Type	LTE Freq (MHz)	Elec. length	Max Gain	cm	MOTOTOROLA p.n
Vehicle	3 port	LTE: 746 MHz -894MHz WiFi: 2400 MHz-2483 MHz	1/2 wave 1/4 wave	LTE:5 dBi Wifi:7 dBi	LTE mechanical length: 33cm WiFi radiated element : 60x50mm	AN000036A01+ 85013016001(Whip)
Vehicle/ In Building	4 port	LTE: 698-960 MHz , WiFi:2300-2700 MHz	1/4 wave 1/4 wave	LTE:6 dBi Wifi:10 dBi	LTE radiated element : 60x50mm WiFi radiated element : 25x45mm	AN000226A01*

*This Antenna was used during testing, it was selected because it has the highest peak gain and is therefore considered to be worst case.

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: 569REG0001			
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: Simultaneous transmission LTE Band 14 / 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

FCC Accreditation
90987 Octagon House, Fareham Test Laboratory

Designation Number: UK0010

2 Test Details

2.1 Radiated Spurious Emissions (Simultaneous Transmission)

2.1.1 Specification Reference

FCC 47 CFR Parts 15.247 and 90 (Simultaneous Transmission), Clause 15.247 (d) and 90.543(e)

2.1.2 Equipment Under Test and Modification State

LNx 500, S/N: 569REG0001

2.1.3 Date of Test

13-December-2017

2.1.4 Test Method

The test was performed in accordance with ANSI C63.26, clause 5.5. Pre-scans were performed using the direct field strength method. The specification limit was converted to a field strength limit using equation c) in clause 5.2.7. Any emissions found with 10dB of this limit were measured using the substitution method.

2.1.5 Environmental Conditions

Ambient Temperature 20.2 °C
Relative Humidity 40.0 %

2.1.6 Test Results

Simultaneous transmission LTE Band 14 & 2.4 GHz WLAN

The EUT was configured for simultaneous transmission in the following modes of operation, which had previously been identified as worst case with respect to output power.

Technology	Frequency Band (MHz)	Channel Frequency (MHz)
802.11b	2400 MHz to 2483.5 MHz	2412
LTE	Band 14	760.5

Table 5 - Modes of Operation



Frequency (GHz)	Result (dBm)
	Peak
1.520994	-22.76
2.282205	-17.59

Table 6 - 1 GHz to 25 GHz Emissions Results

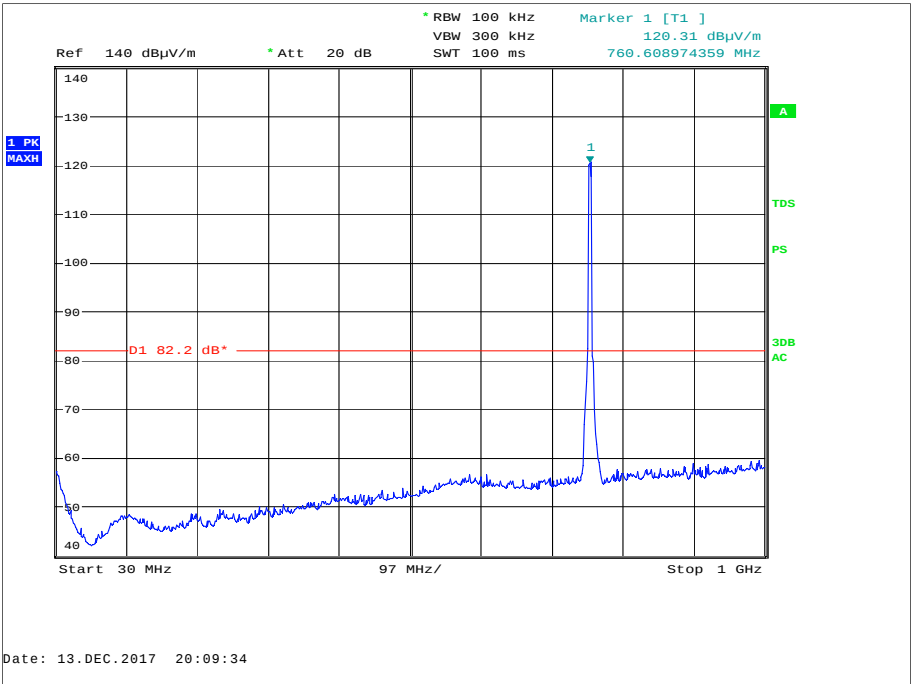


Figure 1 - 30 MHz to 1 GHz - Horizontal and Vertical

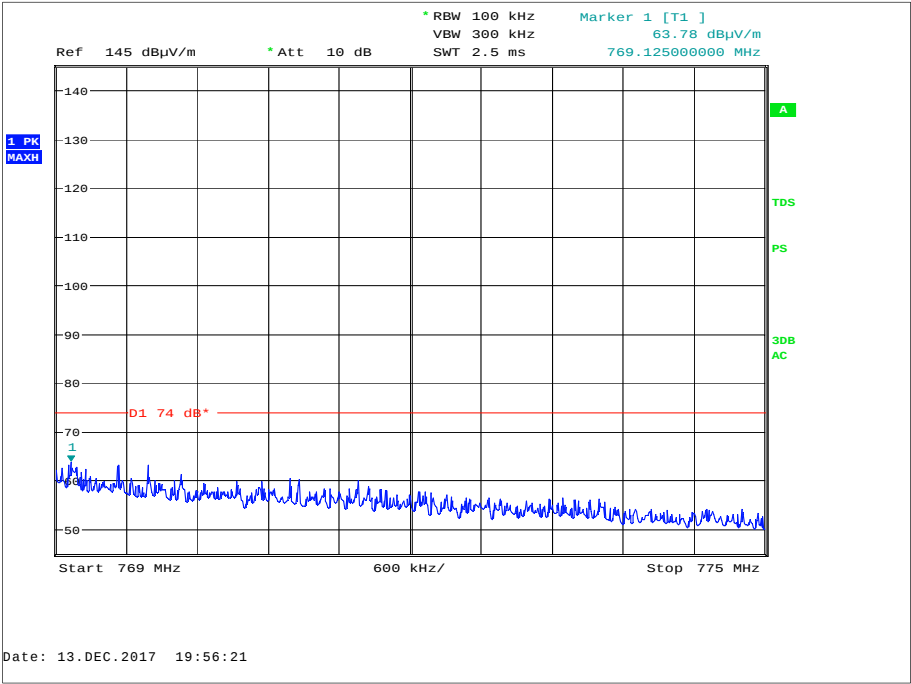


Figure 2 - 769 MHz to 775 MHz - Horizontal and Vertical

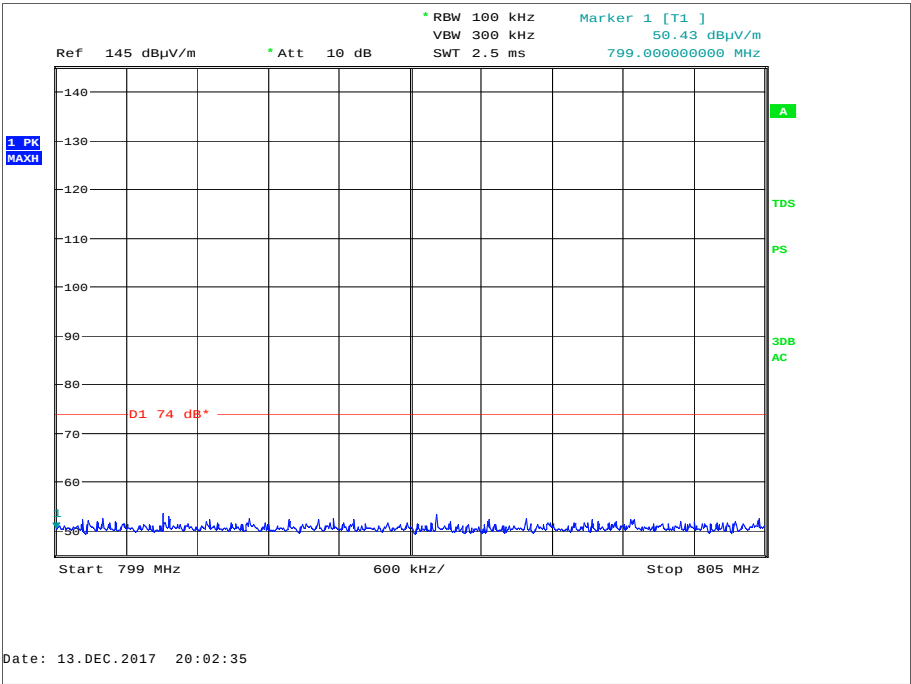


Figure 3 - 799 MHz to 805 MHz - Horizontal and Vertical

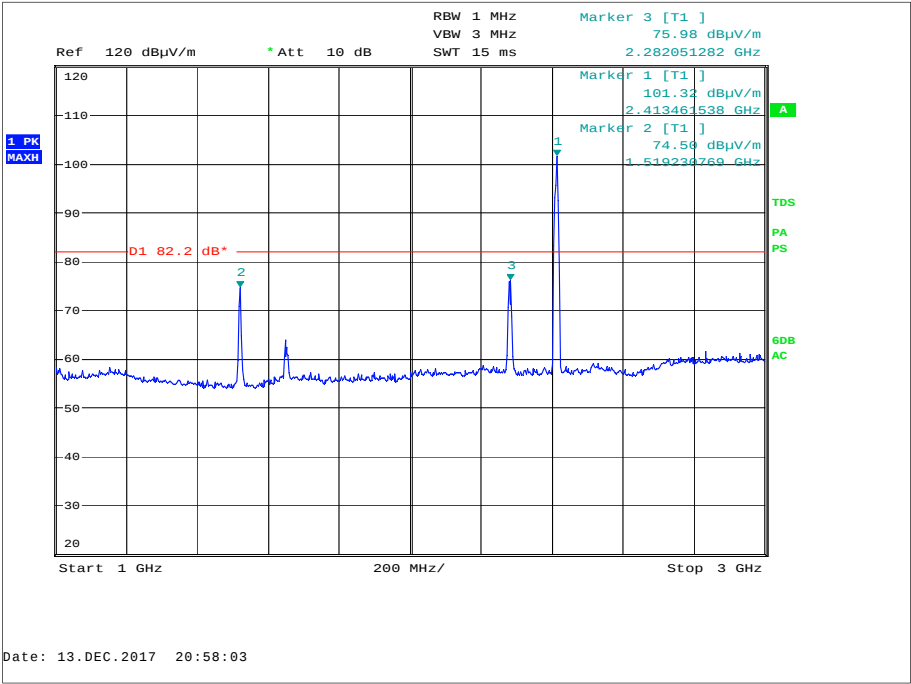


Figure 4 - 1 GHz to 3 GHz - Horizontal and Vertical

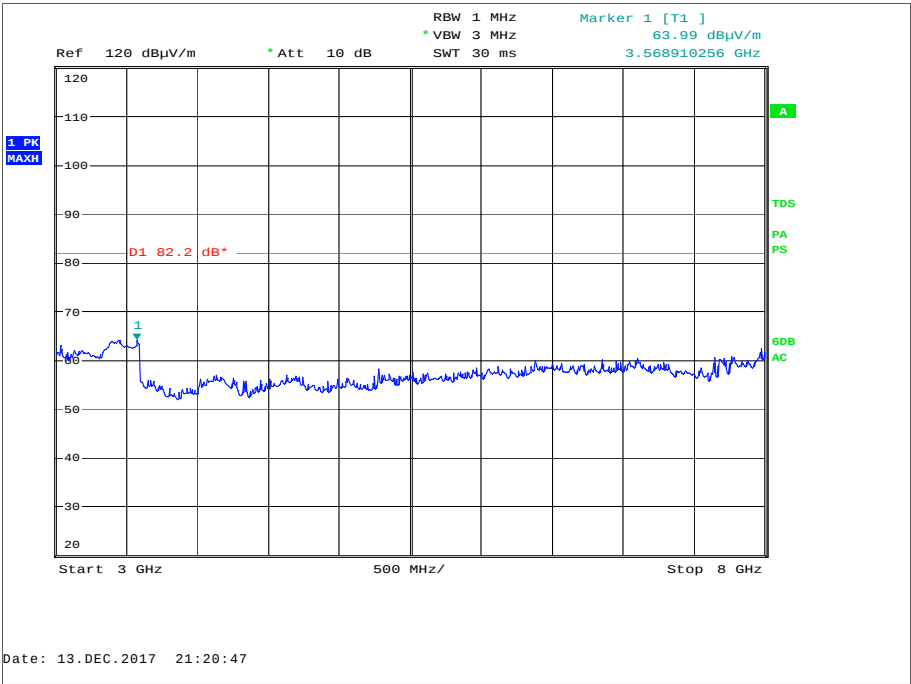


Figure 5 - 3 GHz to 8 GHz - Horizontal and Vertical

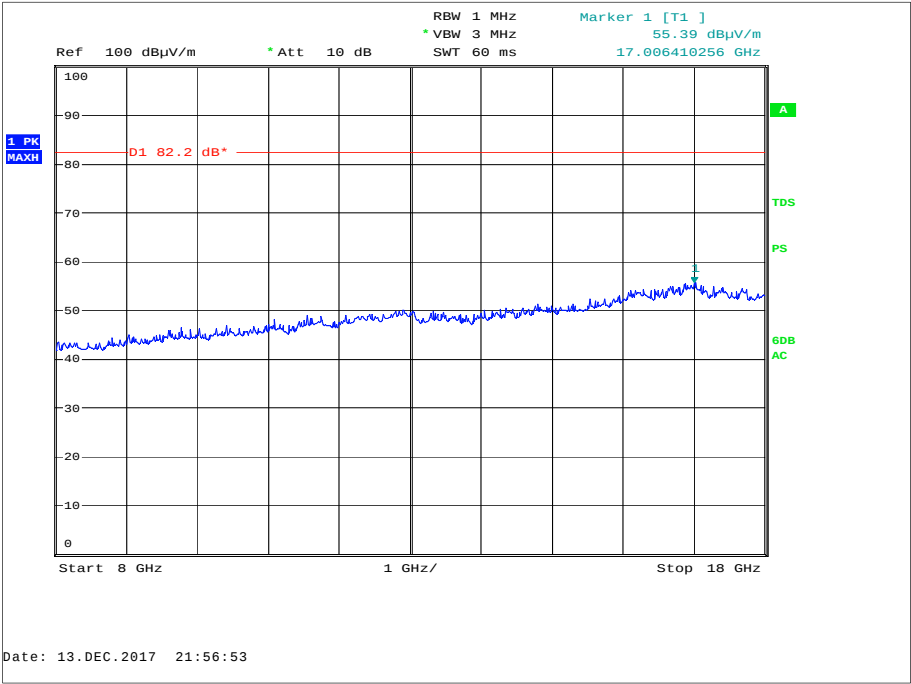


Figure 6 - 8 GHz to 18 GHz - Horizontal and Vertical

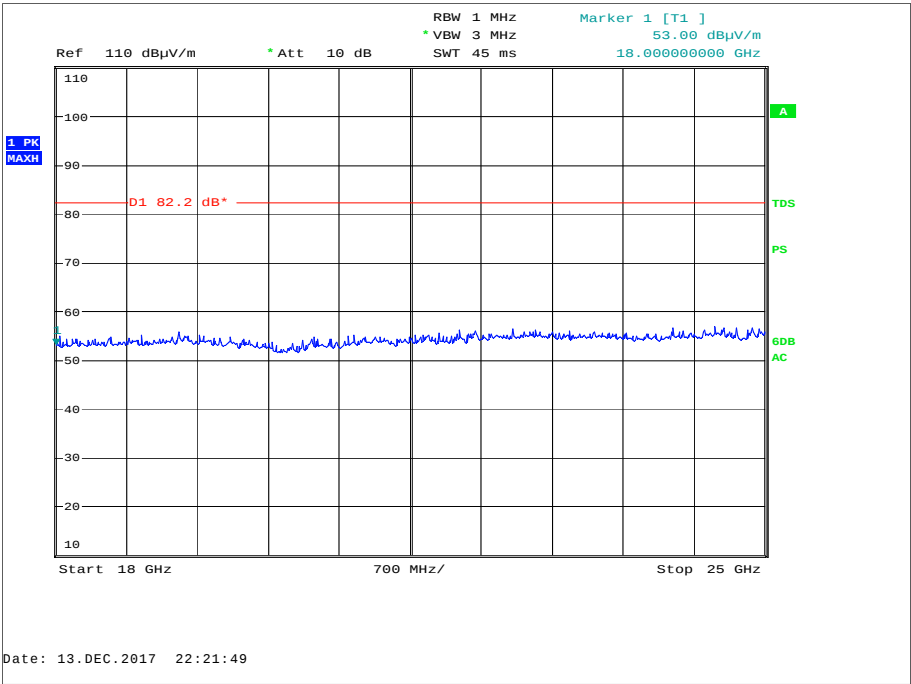


Figure 7 - 18 GHz to 25 GHz - Horizontal and Vertical

FCC 47 CFR Parts 15.247(d) and 90.543(e)

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
90.543(e)*	-13 dBm or -40 dBm (765 MHz to 775 MHz and 799 MHz to 805 MHz) and (1559 – 1610 MHz)
15.247 (d)	74 dBuV/m or -20dBc whichever is highest.

Table 7 - Limit Table

Note: Limits specified in dBm, were converted to a field strength limit using equation c) in clause 5.2.7. of ANSI C63.26. $(E \text{ (dB}\mu\text{V/m)}) = \text{EIRP (dBm)} - 20\log(D) + 104.8$; where D is the measurement distance (in the far field region) in m.

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 (Bilog)	Schaffner	CBL6143	287	24	18-Apr-2018
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	1002	12	20-Oct-2018
Antenna 18-40GHz (Double Ridge Guide)	Q-Par Angus Ltd	QSH 180K	1511	24	07-Dec-2018
Pre-Amplifier	Phase One	PS04-0086	1533	12	31-Jul-2018
18GHz - 40GHz Pre-Amplifier	Phase One	PSO4-0087	1534	12	23-Jan-2018
Screened Room (5)	Rainford	Rainford	1545	36	20-Dec-2017
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Hygrometer	Rotronic	HYGROPALM 1	2338	12	24-Oct-2018
Digital Multimeter	Iso-tech	IDM-101	2895	12	20-Jul-2018
Antenna (DRG Horn)	ETS-Lindgren	3115	3125	12	21-Jul-2018
Cable (N-N, 8m)	Rhophase	NPS-2302-8000-NPS	3248	12	02-May-2018
Tilt Antenna Mast	matur GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	matur GmbH	NCD	3917	-	TU
Cable 1503 2M 2.92(P)m 2.92(P)m	Rhophase	KPS-1503A-2000-KPS	4293	12	23-Jan-2018
Suspended Substrate Highpass Filter	Advance Power Components	11SH10-3000/X18000-O/O	4412	12	03-Apr-2018
Cable (Rx, Km-Km 2m)	Scott Cables	KPS-1501-2000-KPS	4526	6	22-May-2018
Cable (Rx, SMAm-SMAm 0.5m)	Scott Cables	SLSLL18-SMSM-00.50M	4528	6	O/P Mon
Double Ridged Waveguide Horn Antenna	ETS-Lindgren	3117	4722	12	17-Feb-2018
Double Ridge Broadband Horn Antenna	Schwarzbeck	BBHA 9120 B	4848	12	17-Feb-2018

Table 8

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



3 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

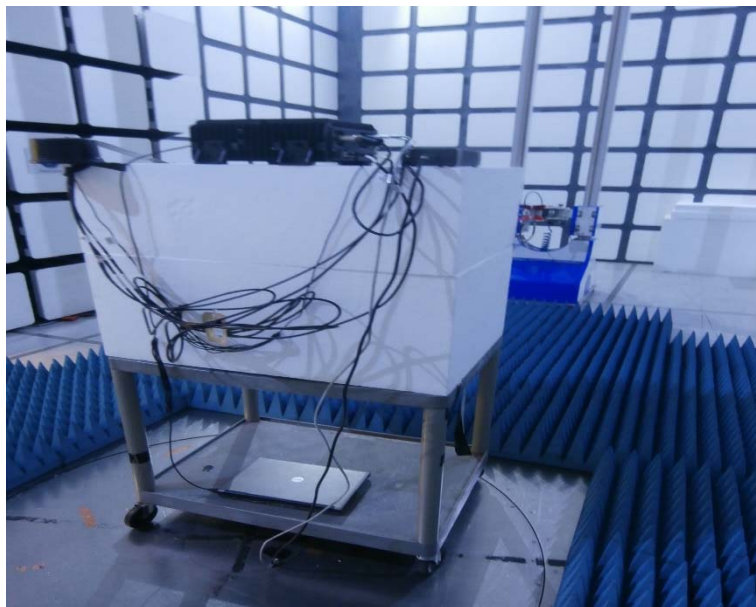
Table 9

4 Appendix A (Set-Up Photos)

Radiated Emissions 30 MHz to 1 GHz



Radiated Emissions 1 GHz to 18 GHz





Product Service

Radiated Emissions 18 GHz to 25 GHz

