

Report on the Radio Testing
For
Inova Design Solutions Ltd (Bodytrak)
on
Bodytrak I
Report no. TRA-054222-47-09B
01 August 2022

Report Number: TRA-054222-47-09B
Issue: B

REPORT ON THE TESTING OF A
Inova Design Solutions Ltd (Bodytrak)
Bodytrak I
WITH RESPECT TO SPECIFICATION(S)
47CFR PARTS 22H, 24E, 27
TO SATISFY MODULAR INTEGRATION REQUIREMENTS OF
KDB 996369 D04 v01 / RSP-100

TEST DATE: 2022-01-06 to 2022-07-29

Written by:

Michael Else
Radio Test Engineer

Approved by:

John Charters
Laboratory Manager

Date: 1st August 2022

Disclaimers:

- [1] THIS DOCUMENT MAY BE REPRODUCED ONLY IN ITS ENTIRETY AND WITHOUT CHANGE
- [2] THE RESULTS CONTAINED IN THIS DOCUMENT RELATE ONLY TO THE ITEM(S) TESTED

1 Revision Record

<i>Issue Number</i>	<i>Issue Date</i>	<i>Revision History</i>
A	01 February 2022	Original (Test date: 2022-01-06 to 2022-01-10)
B	06 June 2022	Test set-up Photos deleted- due to short term confidentiality requirement, Model number updated, Test standard updated, Test method corrected. RSE for FDD5 channels 4132 and 4233 added. RSE for eFDD2 channels 18900 and 18625 added. (Test date: 2022-07-25 to 2022-07-29)

2 Summary

TEST REPORT NUMBER:	TRA-054222-47-09B
WORKS ORDER NUMBER:	TRA-054222-01
PURPOSE OF TEST:	Modular Integration
TEST SPECIFICATION(S):	47CFR Parts 22H, 24E, 27
EQUIPMENT UNDER TEST (EUT):	Bodytrak I
CONTAINS FCCID:	XPY1EIQ24NN
EUT SERIAL NUMBER:	BTCP1-B0045
MANUFACTURER/AGENT:	Inova Design Solutions Ltd. (Bodytrak)
ADDRESS:	Innovation Warehouse 1 ST Floor 1 East Poultry Avenue London EC2A 4NEFarrington Way Eastwood Nottingham Nottinghamshire NG16 3AG United Kingdom
CLIENT CONTACT:	Dmitry Iakovlev ☎ +44 (0)203 432 5439 ✉ Dmitry.iakovlev@bodytrak.co
TEST DATE:	2022-01-02 to 2022-07-29
TESTED BY:	Michael Else Element

2.1 Test Summary

Test Method and Description	Requirement Clause	Applicable to this equipment	Result / Note
	47CFR		
Spurious emissions	24.238, 24.232, 22.917 27.53, 2.1051	☒	Pass
Output power	24.232, 27.50	☒	Information only

Notes:

The client declares this is a modular radio with existing compliance evidence for FCC and has requested limited tests only for in order to support their claim that the module performance is comparable to the end product performance, and therefore the end product does not require further testing.

Limited testing was carried out to spurious emissions and output power only as requested by the client.

The results contained in this report relate only to the items tested, in the condition at time of test, and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

The apparatus was set up and exercised using the configurations, modes of operation and arrangements defined in this report only. Any modifications made are identified in Section 8 of this report.

Particular operating modes, apparatus monitoring methods and performance criteria required by the standards tested to have been performed except where identified in Section 5.2 of this test report (Deviations from Test Standards).

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4 Introduction

This report TRA-054222-47-09B presents the results of the Radio testing on a Inova Design Solutions Ltd. (Bodytrak), Bodytrak I to the selected parts of specifications FCC 47CFR FCC CFR 47 Parts 22H, 24E & 27.

The Bodytrak I contains a cellular module FCC ID: XPY1EIQ24NN

The testing was carried out for Inova Design Solutions Ltd by Element, at the address detailed below.

☐	Element Hull Unit E South Orbital Trading Park Hedon Road Hull HU9 1NJ UK	☒	Element Skelmersdale Unit 1 Pendle Place Skelmersdale West Lancashire WN8 9PN UK
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This report details the configuration of the equipment, the test methods used and any relevant modifications where appropriate.

All test and measurement equipment under the control of the laboratory and requiring calibration is subject to an established programme and procedures to control and maintain measurement standards. The quality management system meets the principles of ISO 9001, and has quality control procedures for monitoring the validity of tests undertaken. Records and sufficient detail are retained to establish an audit trail of calibration records relating to its test results for a defined period. Under control of the established calibration programme, key quantities or values of the test & measurement instrumentation are within specification and comply with the relevant traceable internationally recognised and appropriate standard specifications, which are UKAS calibrated as such where these properties have a significant effect on results. Participation in inter-laboratory comparisons and proficiency testing ensures satisfactory correlation of results conform to Elements own procedures, as well as statistical techniques for analysis of test data providing the appropriate confidence in measurements.

Throughout this report EUT denotes equipment under test.

FCC Site Listing:

The test laboratory is accredited for the above sites under the US-UK MRA,

Designation number(s):

Element Hull UK2007

Element Skelmersdale UK2020

The test site requirements of ANSI C63.4-2014 are met up to 1GHz.

The test site SVSWR requirements of CISPR 16-1-4:2010 are met over the frequency range 1 GHz to 18 GHz.

5 Glossary of Terms

S	denotes a section reference from the standard, not this document
AC	Alternating Current
ANSI	American National Standards Institute
BW	bandwidth
C	Celsius
CFR	Code of Federal Regulations
CW	Continuous Wave
dB	decibel
dBm	dB relative to 1 milliwatt
DC	Direct Current
DSSS	Direct Sequence Spread Spectrum
EIRP	Equivalent Isotropically Radiated Power
ERP	Effective Radiated Power
EUT	Equipment Under Test
FCC	Federal Communications Commission
FHSS	Frequency Hopping Spread Spectrum
Hz	hertz
IC	Industry Canada
ITU	International Telecommunication Union
LBT	Listen Before Talk
m	metre
max	maximum
MIMO	Multiple Input and Multiple Output
min	minimum
MRA	Mutual Recognition Agreement
N/A	Not Applicable
PCB	Printed Circuit Board
PDF	Portable Document Format
Pt-mpt	Point-to-multipoint
Pt-pt	Point-to-point
RF	Radio Frequency
RH	Relative Humidity
RMS	Root Mean Square
Rx	receiver
s	second
SVSWR	Site Voltage Standing Wave Ratio
Tx	transmitter
UKAS	United Kingdom Accreditation Service
V	volt
W	watt
Ω	ohm

6 Equipment Under Test

6.1 EUT Identification

- Name: Bodytrak I
- Serial Number: BTCP1-B0045
- Model Number: BCP1N
- Software Revision: 4315
- Build Level / Revision Number: Not Applicable

6.2 Pre-approved module identification

Module Details: LTE

- Manufacturer: uBlox
- Model: LARA-R202
- FCC ID: XPY1EIQ24NN

6.3 System Equipment

Equipment listed below forms part of the overall test setup and is required for equipment functionality and/or monitoring during testing. The compliance levels achieved in this report relate only to the EUT and not items given in the following list.

6.4 EUT Mode of Operation

6.4.1 Transmission

The mode of operation for transmitter tests was as follows:

The EUT set to transmit permanently, on selected channels and Bands as required.

6.5 EUT Description

The EUT is a personal wearable device is comprised of a miniature earpiece with integrated sensors connected to a torso-worn communication pack.

7 EUT Radio Parameters

7.1 General

Radio:	LTE				UMTS
Band(s) of operation:	2	4	5	12	5
Frequencies of operation:	1880 MHz & 1852.5 MHz	1732.4 MHz	826.4 MHz, 836.5 MHz & 846.6 MHz	707.5 MHz	826.4 MHz & 846.6 MHz
Modulation type(s):	OFDM	OFDM	OFDM	OFDM	QPSK
Channel bandwidth(s):	10 MHz / 5 MHz	10 MHz	10 MHz	10 MHz	5 MHz
Nominal Supply Voltage:	3.7 Vdc	3.7 Vdc	3.7 Vdc	3.7 Vdc	3.7 Vdc

7.2 Antennas

Manufacturer:	Bodytrak (High Band)
Bands covered:	2(LTE 1900) & 4(LTE 1700)
Type:	PCB trace
Gain:	2.4 dBi
Model number:	N/A

Manufacturer:	Bodytrak (Low Band)
Bands covered:	5 (LTE 850/UMTS) & 12 (LTE 700)
Type:	PCB trace and Flex PCB patch
Gain:	-0.9 dBi
Model number:	N/A

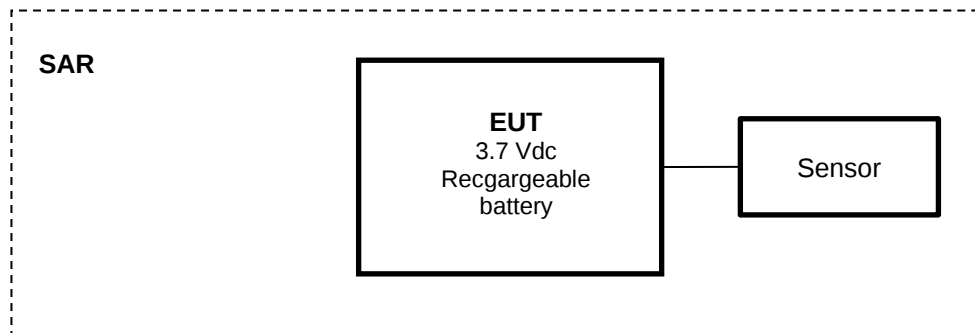
8 Modifications

No modifications were performed during this assessment.

9 EUT Test Setup

9.1 Block Diagram

The following diagram shows basic EUT interconnections:



9.2 General Set-up Photograph

The following photographs shows basic EUT set-up:

Photograph removed due to confidentiality requirement.

9.3 Measurement software

Where applicable, the following software was used to perform measurements contained within this report.

Element Emissions R5: Rev 5 – 2021.09.09.0
Element Transmitter Bench Test (See Note)
ETS Lindgren EMPower V1.0.4.2

Note:

The version of the Element software used is recorded in the results sheets contained within this report.

10 General Technical Parameters

10.1 Normal Conditions

The EUT was tested under the normal environmental conditions of the test laboratory, except where otherwise stated. The normal power source applied was 3.7 Vdc from internal Li-Po Rechargeable battery.

11 Radiated emissions

11.1 Definitions

Spurious emissions
Emissions on a frequency or frequencies, which are outside the necessary bandwidth and the level of which may be reduced without affecting the corresponding transmission of information. Spurious emissions include harmonic emissions, parasitic emissions, intermodulation products and frequency conversion products, but exclude out-of-band emissions.

Intermodulation products
Emissions of two or more electromagnetic waves transmitted simultaneously through a nonlinear electronic system.

11.2 Test Parameters

Test Location:	Element Skelmersdale
Test Chamber:	Chamber 01
Test Standard and Clause:	TIA 603-D, clause 2.2.12
EUT Operating Channels Tested:	Mid
Deviations From Standard:	N/A
Measurement BW:	30 MHz to 1 GHz: 120 kHz Above 1 GHz: 1 MHz
Measurement Detector:	Up to 1 GHz: Peak Above 1 GHz: Peak

Environmental Conditions (Normal Environment)

Temperature: 21 °C	+15 °C to +35 °C (as declared)
Humidity: 49 %RH	20%RH to 75%RH (as declared)
Supply: 3.7 Vdc	3.7 Vdc (as declared)

11.3 Test Limits

FCC 47CFR22

22.917(a) *Out of band emissions.* 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.

FCC 47CFR24

24.238(a) *Out of band emissions.* 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.

FCC 47CFR27

27.53(c) For operations in the 746–758 MHz band and the 776–788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

- (1) On any frequency outside the 746– 758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;
- (2) On any frequency outside the 776– 788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;
- (3) On all frequencies between 763–775 MHz and 793–805 MHz, by a factor not less than $76 + 10 \log (P)$ dB in a 6.25 kHz band segment, for base and fixed stations;
- (4) On all frequencies between 763–775 MHz and 793–805 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations;
- (5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;
- (6) Compliance with the provisions of paragraphs (c)(3) and (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

27.53(f) For operations in the 746–758 MHz, 775–788 MHz, and 805–806 MHz bands, emissions in the band 1559–1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

27.53(g) For operations in the 698–746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

27.53(h) *AWS emission limits—(1) General protection levels.* Except as otherwise specified below, for operations in the 1695–1710 MHz, 1710–1755 MHz, 1755–1780 MHz, 1915–1920 MHz, 1995–2000 MHz, 2000–2020 MHz, 2110–2155 MHz, 2155–2180 MHz, and 2180–2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10} (P)$ dB.

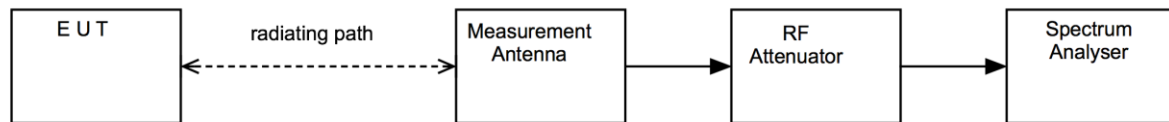
11.4 Test Method

With the EUT setup as per section 9 of this report and connected as per Figure viii the emissions from the EUT were measured on a spectrum analyzer / EMI receiver. The EUT was rotated in three orthogonal planes and the measurement antenna height scanned (below 1GHz, from 1 to 4 m; above 1GHz as necessary) in order to maximise emissions.

The measurements were performed with EUT set at its maximum gain. All modulation schemes, data rates and power settings were used to observe the worst-case configuration at each frequency.

Pre-scan plots are shown with a peak detector and 100kHz RBW.

Figure viii Test Setup



11.5 Test Equipment

Test date: 6th January 2022 to 10th January 2022

Equipment Description	Manufacturer	Equipment Type	Element No	Due For Calibration
Chamber 1	Rainford EMC	ATS	U387	2023-10-24
Radiated Test Software	Element	Emissions R5	REF9000	Cal not required
Spectrum Analyser	R&S	FSU46	REF910	2022-12-22
Pre Amp	AMETEK	LNA6901	U711	2022-02-03
High Pass Filter	Atlantic Microwave	AFH-07000	U558	2022-01-30
1-18GHz Horn	EMCO	3115	L139	2023-07-27
PreAmp	Watkins Johnson	6201-69	U372	2022-03-01
Pre Amp	Agilent	8449B	L572	2022-10-29
Bilog	Chase	CBL611/B	U573	2023-01-28
High Pass Filter	MiniCircuits	VHF-1500+	U519	2022-01-30
High Pass Filter	BSC	SH4141	REF977	2022-01-30
Horn 18-26GHz (&U330)	Flann	20240-20	L300	2022-04-23

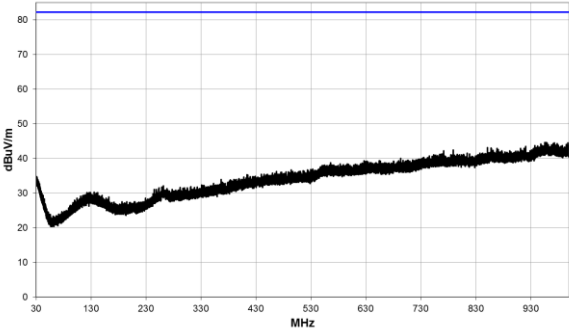
Following equipment was used during testing of eFDD2 (Channels 18625 / 18900) and FDD5 (Channels 4132 / 4233)

Testing Date: 25th July 2022 to 29th July 2022

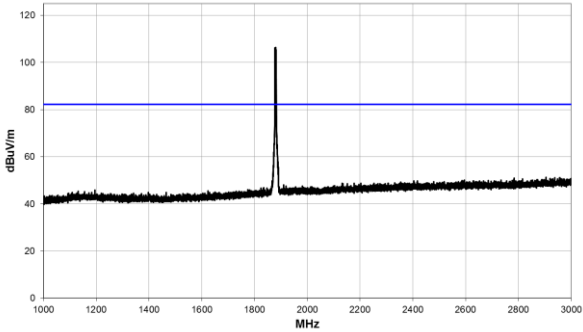
Equipment Description	Manufacturer	Equipment Type	Element No	Due For Calibration
Chamber 1	Rainford EMC	ATS	U387	2023-10-24
Radiated Test Software	Element	Emissions R5	REF9000	Cal not required
Pre Amp	Agilent	8449B	U457	2023-01-22
Pre Amp	Agilent	8449B	L572	2022-10-29
Pre Amp	AMETEK	LNA6901	U711	2023-03-14
High Pass Filter	BSC	SH4141	REF977	2023-02-04
1-18GHz Horn	EMCO	3115	U223	2023-12-13
EMI Receiver	R&S	ESR26	U489	2023-03-04
Bilog	Chase	CBL6112B	U093	2023-09-15
Bilog	Chase	CBL6112	U420	2023-01-28
Horn 18-26GHz (&U330)	Flann	20240-20	L263A	2024-06-23

11.7 Test Results

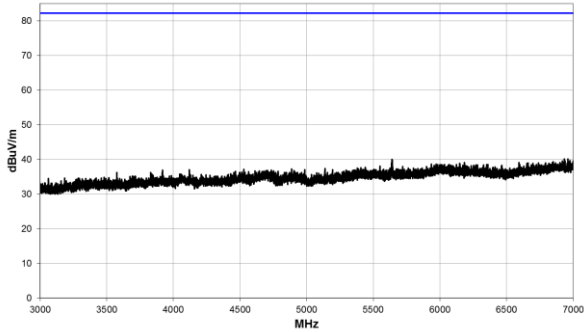
Radio 1: LTE Band 2; ARFCN: 18900; Frequency: 1880 MHz; Power Setting: High; Bandwidth: 10 MHz;					
Emission	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
No emissions were detected within 10 dB of the limit.					



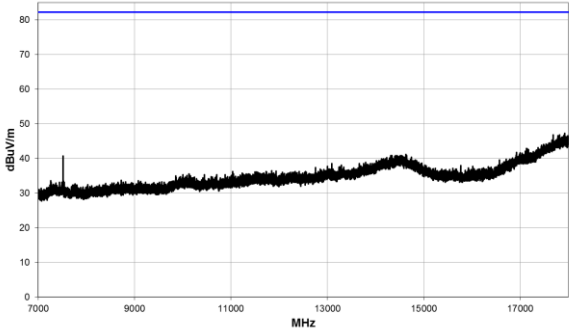
30 MHz to 1 GHz



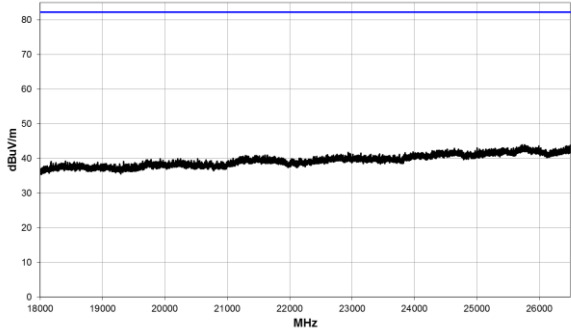
1 GHz to 3 GHz



3 GHz to 7 GHz

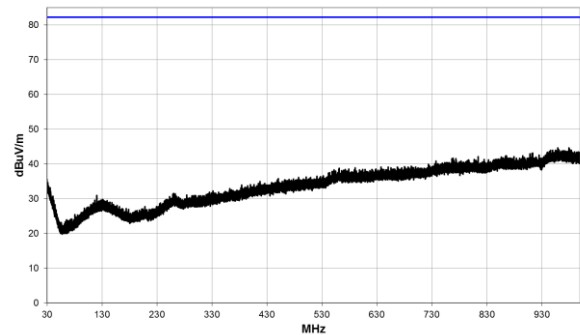


7 GHz to 18 GHz

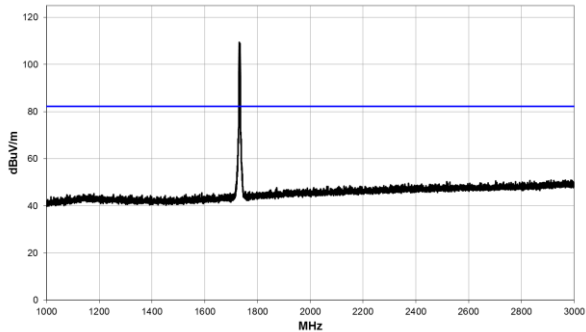


18 GHz to 26.5 GHz

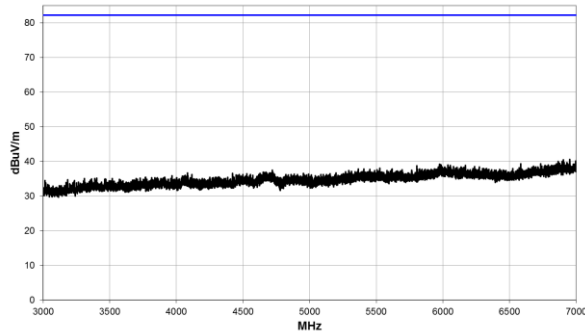
Radio 2: LTE Band 4; ARFCN: 20174; Frequency: 1732.4 MHz; Power Setting: High; Bandwidth: 10 MHz;					
Emission	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
No emissions were detected within 10 dB of the limit.					



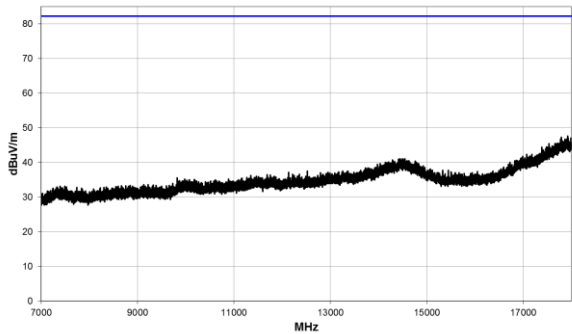
30 MHz to 1 GHz



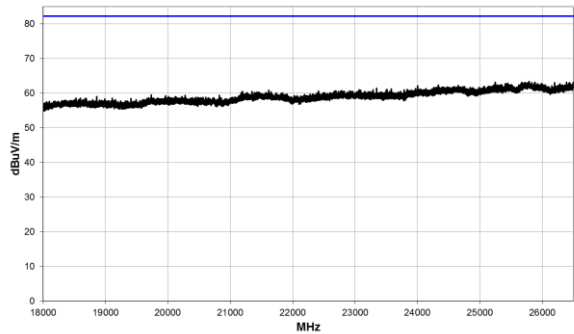
1 GHz to 3 GHz



3 GHz to 7 GHz

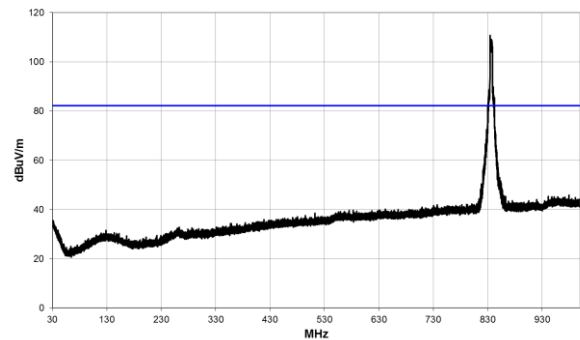


7 GHz to 18 GHz

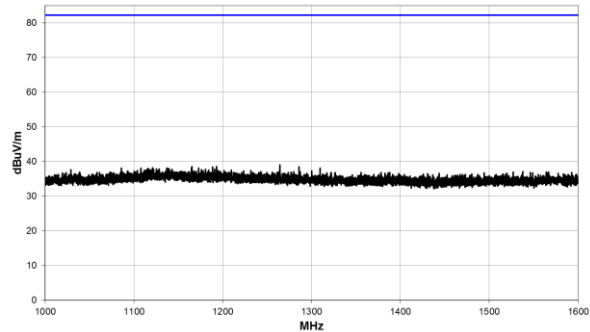


18 GHz to 26.5 GHz

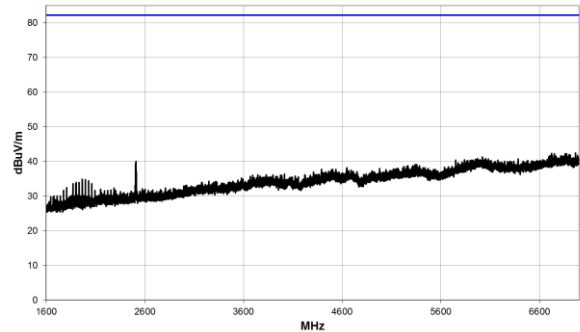
Radio 3: LTE Band 5; ARFCN: 20525; Frequency: 836.5 MHz; Power Setting: High; Bandwidth: 10 MHz;					
Emission	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
No emissions were detected within 10 dB of the limit.					



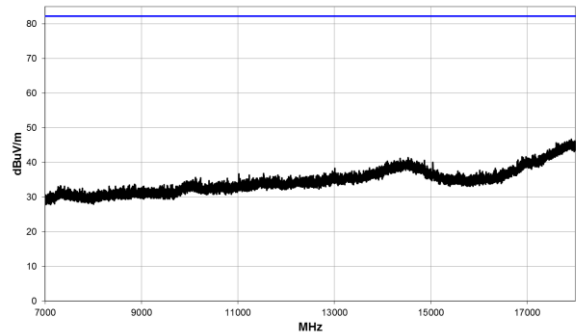
30 MHz to 1 GHz



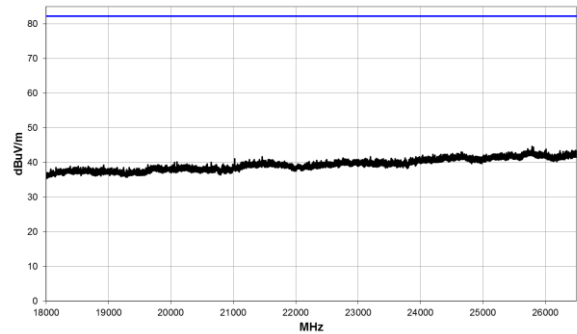
1 GHz to 1.6 GHz



1.6 GHz to 7 GHz

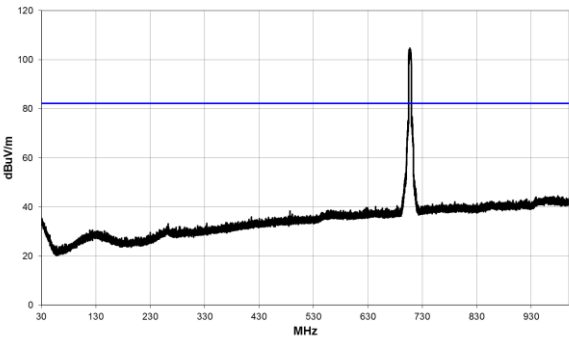


7 GHz to 18 GHz

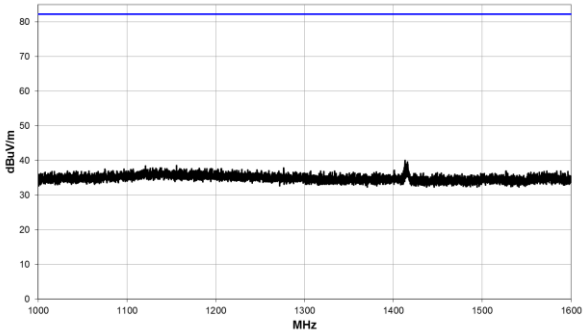


18 GHz to 26.5 GHz

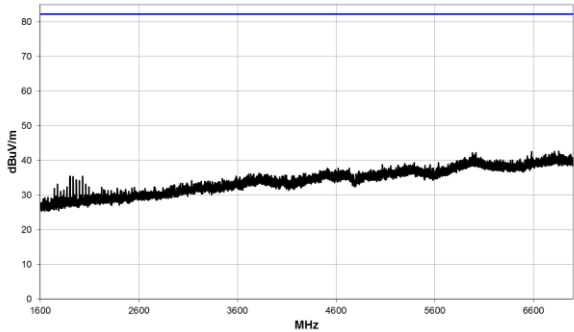
Radio 4:Band 12; ARFCN: 23095; Frequency: 707.5 MHz; Power Setting: High; Bandwidth: 10 MHz;					
Emission	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
No emissions were detected within 10 dB of the limit.					



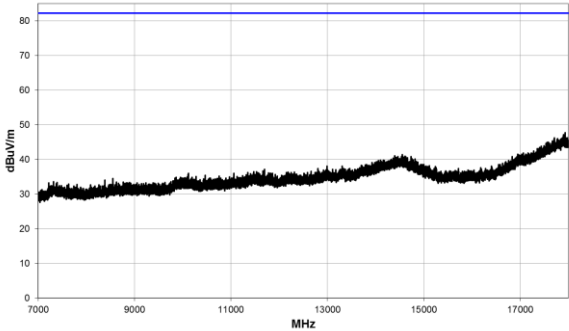
30 MHz to 1 GHz



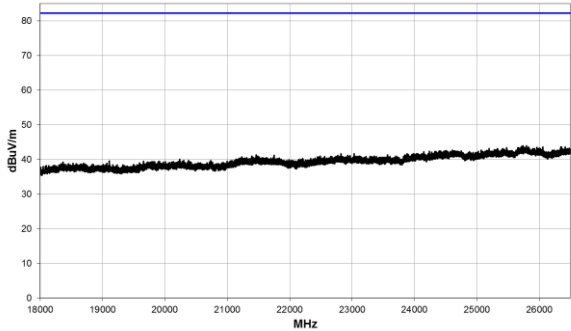
1 GHz to 1.6 GHz



1.6 GHz to 7 GHz

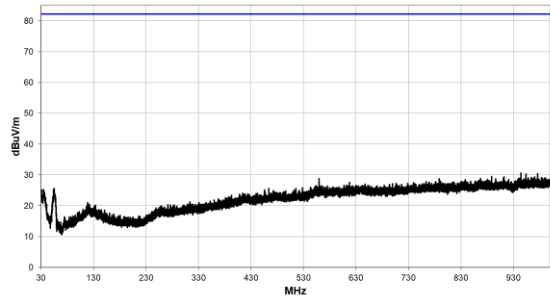


7 GHz to 18 GHz

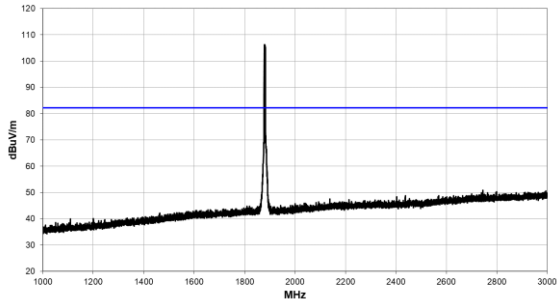


18 GHz to 26.5 GHz

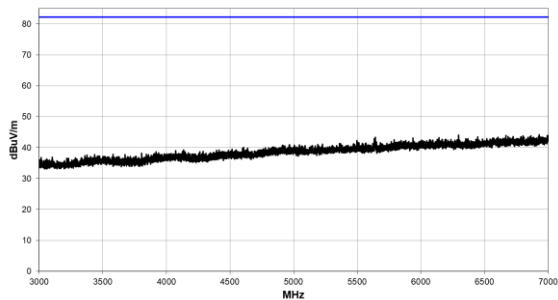
eFDD2, QPSK, Band 2; ARFCN: 18900; Frequency: 1880 MHz; Power Setting: High; Bandwidth: 5 MHz;					
Emission	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
No emissions were detected within 10 dB of the limit.					



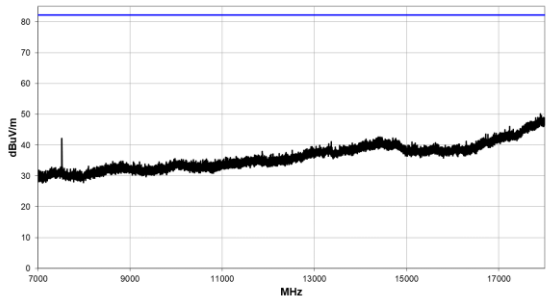
30 MHz to 1 GHz



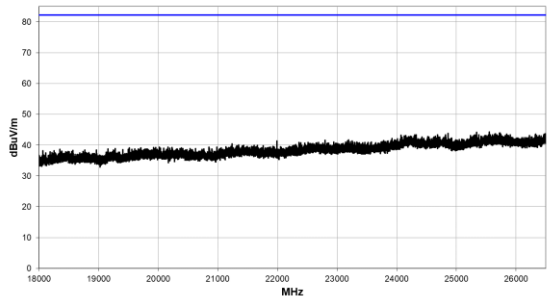
1 GHz to 3 GHz



3 GHz to 7 GHz

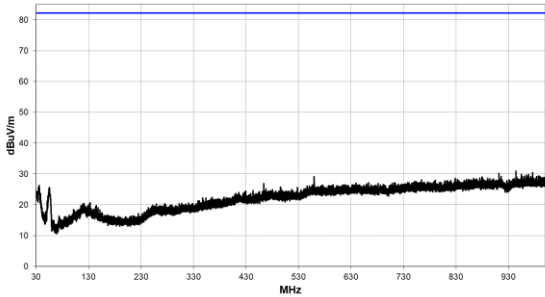


7 GHz to 18 GHz

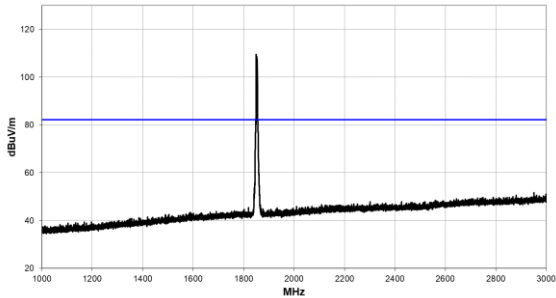


18 GHz to 26.5 GHz

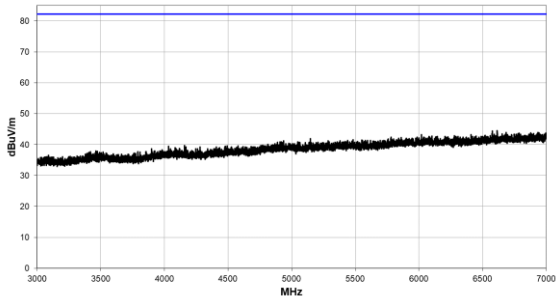
eFDD2, QPSK, Band 2; ARFCN: 18625; Frequency: 1852.5 MHz; Power Setting: High; Bandwidth: 5 MHz;					
Emission	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
No emissions were detected within 10 dB of the limit.					



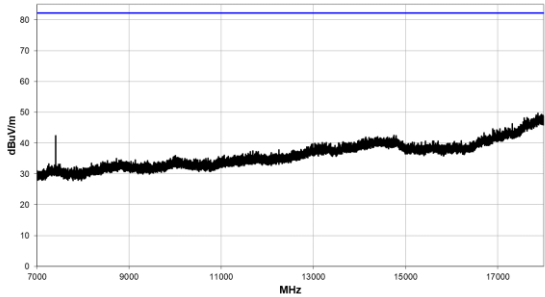
30 MHz to 1 GHz



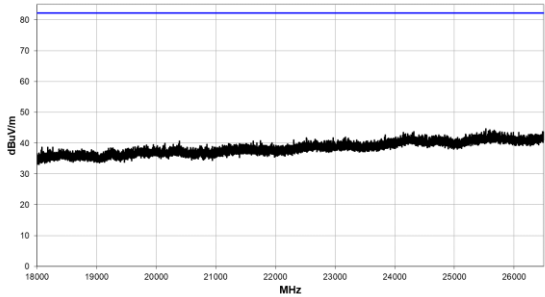
1 GHz to 3 GHz



3 GHz to 7 GHz

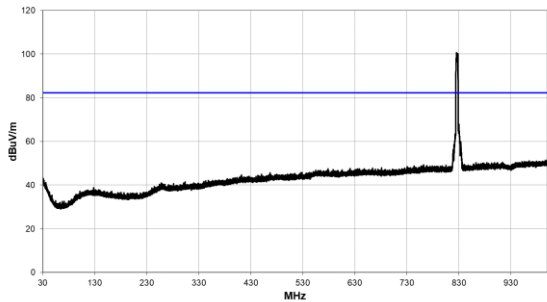


7 GHz to 18 GHz

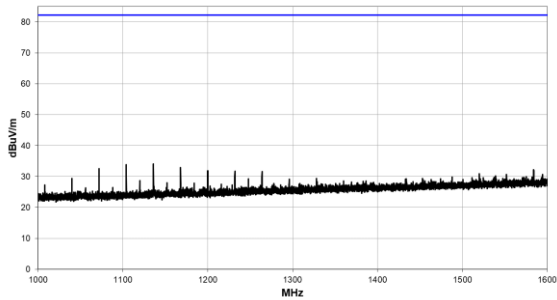


18 GHz to 26.5 GHz

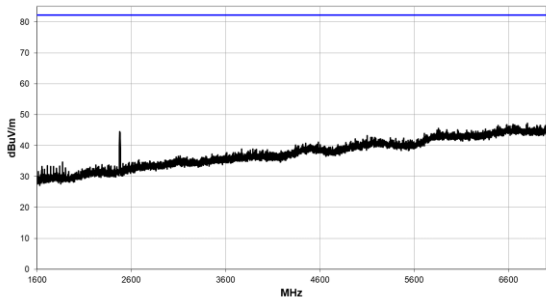
FDD5, HSDPA, Band 5; Channel: 4132; Frequency: 826.4 MHz; Power Setting: High; Bandwidth: 5 MHz;					
Emission	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
No emissions were detected within 10 dB of the limit.					



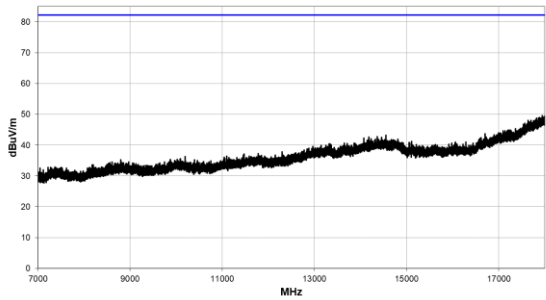
30 MHz to 1 GHz



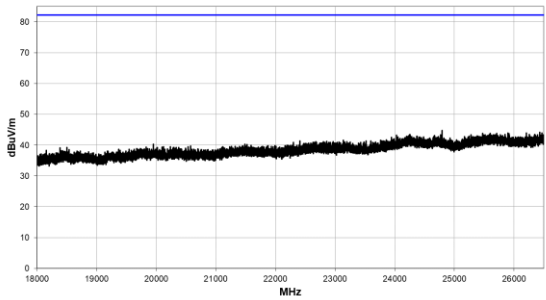
1 GHz to 1.6 GHz



1.6 GHz to 7 GHz

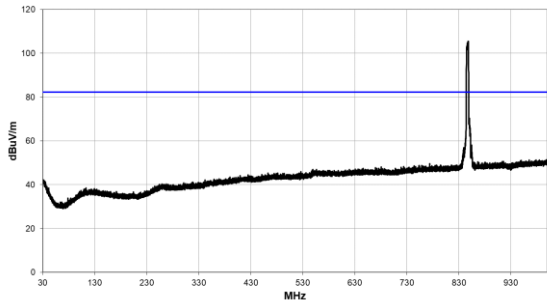


7 GHz to 18 GHz

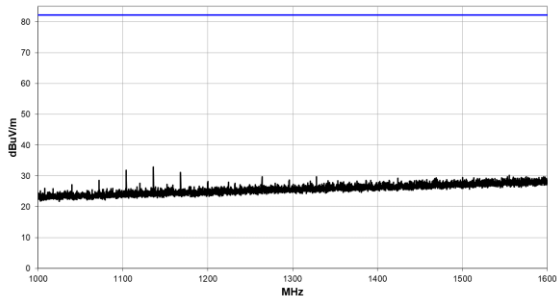


18 GHz to 26.5 GHz

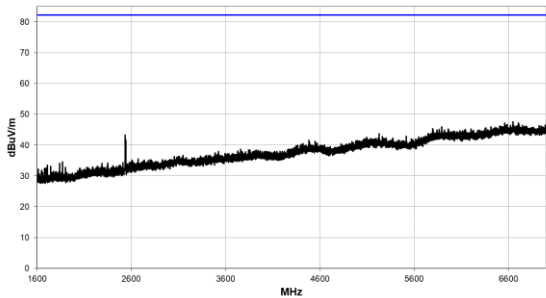
FDD5, HSDPA, Band 5; Channel: 4233; Frequency: 846.6 MHz; Power Setting: High; Bandwidth: 5 MHz;					
Emission	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
No emissions were detected within 10 dB of the limit.					



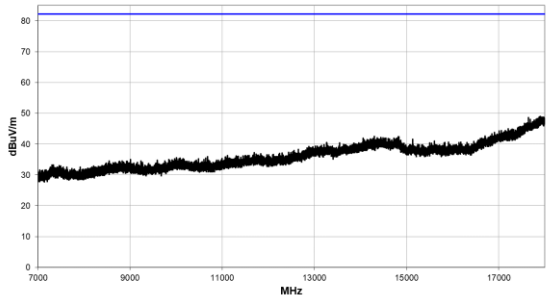
30 MHz to 1 GHz



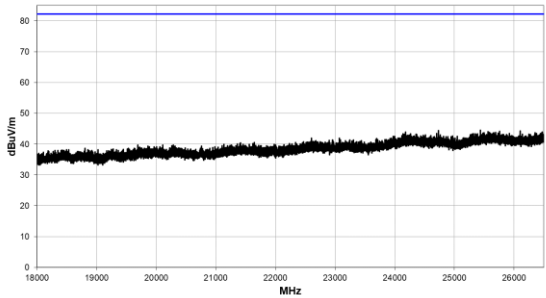
1 GHz to 1.6 GHz



1.6 GHz to 7 GHz



7 GHz to 18 GHz



18 GHz to 26.5 GHz

12 Maximum peak conducted output power

12.1 Definition

The maximum peak conducted output power is defined as the maximum power level measured with a peak detector using a filter with width and shape of which is sufficient to accept the signal bandwidth.

The maximum conducted output power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level.

12.2 Test Parameters

Test Location:	Element Skelmersdale
Test Chamber:	Chamber 01
Test Standard:	ANSI C63.26-2015
EUT Channels Measured:	Mid
Deviations From Standard:	None
Measurement BW:	20 MHz
Measurement Detector:	Peak

Environmental Conditions (Normal Environment)

Temperature: 21 °C	+15 °C to +35 °C (as declared)
Humidity: 50 % RH	20 % RH to 75 % RH (as declared)

12.3 Test Limit

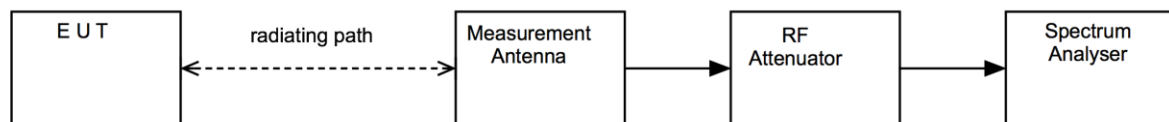
No Limits, information only.

12.4 Test Method

With the EUT setup as per section 9 of this report and connected as per Figure iv, the resolution bandwidth of the spectrum analyser was increased above the EUT occupied bandwidth and the peak emission data noted.

The measurements were performed with EUT set at its maximum duty. All modulation schemes, data rates and power settings were used to observe the worst-case configuration in each bandwidth.

Figure iv Test Setup



12.5 Test Equipment

Equipment Description	Manufacturer	Equipment Type	Element No	Due For Calibration
Chamber 1	Rainford EMC	ATS	U387	2023-10-24
Radiated Test Software	Element	Emissions R5	REF9000	Cal not required
Spectrum Analyser	R&S	FSU46	REF910	2022-12-22
Pre Amp	AMETEK	LNA6901	U711	2022-02-03
1-18GHz Horn	EMCO	3115	L139	2023-07-27
Pre Amp	Agilent	8449B	L572	2022-10-29

12.6 Test Results

The following formula may be used to convert field strength (FS) in volts/metre to transmitter output power (TP) in watts:

$$TP = (FS \times D)^2 / 30$$

For Operation below 1 GHz correction factor of -2.15 dB is taken into account to convert from eirp to erp

LTE; BAND: 2; UL ARFCN: 18900; FREQUENCY: 1880 MHz				
Channel Frequency (MHz)	Peak Field Strength (dBµV/m)	Distance (m)	Max. Power (W)	Result
1880	121.20	3	0.395	Pass

LTE; BAND: 4; UL ARFCN: 20175; FREQUENCY: 1732.5 MHz				
Channel Frequency (MHz)	Peak Field Strength (dBµV/m)	Distance (m)	Max. Power (W)	Result
1732.5	123.8	3	0.719	Pass

LTE; BAND: 5; UL ARFCN: 120525; FREQUENCY: 836.5 MHz				
Channel Frequency (MHz)	Peak Field Strength (dBµV/m)	Distance (m)	Max. Power (W)	Result
836.5	120.6	3	0.210	Pass

LTE; BAND: 12; UL ARFCN: 123095; FREQUENCY: 707.5 MHz				
Channel Frequency (MHz)	Peak Field Strength (dBµV/m)	Distance (m)	Max. Power (W)	Result
707.5	118.2	3	0.121	Pass

13 Measurement Uncertainty

Radio Testing – General Uncertainty Schedule

All statements of uncertainty are expanded standard uncertainty using a coverage factor of 1.96 to give a 95 % confidence where no required test level exists.

Test/Measurement	Budget Number	MU
Conducted RF Power, Power Spectral Density, Adjacent Channel Power and Spurious emissions		
Absolute RF power (via antenna connector) Dare RPR3006W Power Head	MU4001	0.9 dB
Carrier Power and PSD - Spectrum Analysers	MU4004	0.9 dB
Adjacent Channel Power	MU4002	1.9 dB
Transmitter conducted spurious emissions	MU4041	0.9 dB
Conducted power and spurious emissions 40 GHz to 50 GHz	MU4042	2.4 dB
Conducted power and spurious emissions 50 GHz to 75 GHz	MU4043	2.5 dB
Conducted power and spurious emissions 75 GHz to 110 GHz	MU4044	2.4 dB
Radiated RF Power and Spurious emissions ERP and EIRP		
Effective Radiated Power Reverb Chamber	MU4020	3.7 dB
Effective Radiated Power	MU4021	4.7 dB
TRP Emissions 30 MHz to 1 GHz using CBL6111 or CBL6112 Bilog Antenna	MU4046	5.3 dB
TRP Emissions 1 GHz to 18 GHz using HL050 Log Periodic Antenna	MU4047	5.1 dB
TRP Emissions 18 GHz to 26.5 GHz using Standard Gain Horn	MU4048	2.7 dB
TRP Emissions 26.5 GHz to 40 GHz using Standard Gain Horn	MU4049	2.7 dB
Spurious Emissions Electric and Magnetic Field		
Radiated Spurious Emissions 30 MHz to 1 GHz	MU4037	4.7 dB
Radiated Spurious Emissions 1-18 GHz	MU4032	4.5 dB
E Field Emissions 18GHz to 26 GHz	MU4024	3.2 dB
E Field Emissions 26GHz to 40 GHz	MU4025	3.3 dB
E Field Emissions 40GHz to 50 GHz	MU4026	3.5 dB
E Field Emissions 50GHz to 75 GHz	MU4027	3.6 dB
E Field Emissions 75GHz to 110 GHz	MU4028	3.6 dB
Radiated Magnetic Field Emissions	MU4031	2.3 dB
Frequency Measurements		
Frequency Deviation	MU4022	0.316 kHz
Frequency error using CMTA test set	MU4023	113.441 Hz
Frequency error using GPS locked frequency source	MU4045	0.0413 ppm
Bandwidth/Spectral Mask Measurements		
Channel Bandwidth	MU4005	3.87 %
Transmitter Mask Amplitude	MU4039	1.3 dB
Transmitter Mask Frequency	MU4040	2.59 %
Time Domain Measurements		
Transmission Time	MU4038	4.40 %
Dynamic Frequency Selection (DFS) Parameters)		
DFS Analyser - Measurement Time	MU4006	679 μ s
DFS Generator - Frequency Error	MU4007	92 Hz
DFS Threshold Conducted	MU4008	1.3 dB
DFS Threshold Radiated	MU4009	3.2 dB

Test/Measurement	Budget Number	MU
Receiver Parameters		
EN300328 Receiver Blocking	MU4010	1.1 dB
EN301893 Receiver Blocking	MU4011	1.1 dB
EN303340 Adjacent Channel Selectivity	MU4012	1.1 dB
EN303340 Overloading	MU4013	1.1 dB
EN303340 Receiver Blocking	MU4014	1.1 dB
EN303340 Receiver Sensitivity	MU4015	0.9 dB
EN303372-1 Image Rejection	MU4016	1.4 dB
EN303372-1 Receiver Blocking	MU4017	1.1 dB
EN303372-2 Adjacent Channel Selectivity	MU4018	1.1 dB
EN303372-2 Dynamic Range	MU4019	0.9 dB
Receiver Blocking Talk Mode Conducted	MU4033	1.2 dB
Receiver Blocking Talk Mode- radiated	MU4034	3.4 dB
Rx Blocking, listen mode, blocking level	MU4035	3.2 dB
Rx Blocking, listen mode, radiated Threshold Measurement	MU4036	3.4 dB
Adjacent Sub Band Selectivity	MU4003	4.2 dB