Report on the Radio Testing

For

Draeger Safety UK Ltd

on

BTLE Radio in Gauge

Report no. TRA-051967-47-10A

2024-10-16

Report Number: TRA-051967-47-10A
Issue: A

REPORT ON THE RADIO TESTING OF A
Draeger Safety UK Ltd
BTLE Radio in Gauge
WITH RESPECT TO SELECTED PARTS OF SPECIFICATION(S)
FCC 47CFR 15.247 ISED RSS-247

TEST DATE: 2023-04-27 to 2023-04-28

Tested by:		Steven Garwell Radio Test Engineer
Written by:		Steven Garwell Radio Test Engineer
Approved by:	 Digitally signed by John Charters Date: 2024.10.16 10:40:39 +01'00'	John Charters Department Manager - Radio
Date:	2024-10-16	

1 Revision Record

Issue Number	*Issue Date*	*Revision History*
A	2024-10-16	Original

2 Summary

TEST REPORT NUMBER:	TRA-051967-47-10A
WORKS ORDER NUMBER:	TRA-051967-19
PURPOSE OF TEST:	Findings Report
TEST SPECIFICATION(S):	47CFR15.247 RSS-247
EQUIPMENT UNDER TEST (EUT):	BTLE Radio in Gauge
CONTAINS FCC IDENTIFIER:	RFRMS42
CONTAINS ISED IDENTIFIER:	4957A-MS42
EUT SERIAL NUMBER:	Test Sample S56
MANUFACTURER/AGENT:	Draeger Safety UK Ltd
ADDRESS:	Ullswater Close Blyth Riverside Business Park Blyth NE24 4RG United Kingdom
CLIENT CONTACT:	Eoghan Quigley ☎ 01670 352 891 ✉ eoghan.quigley@draeger.com
ORDER NUMBER:	4302888682
TEST DATE:	2023-04-27 to 2023-04-28
TESTED BY:	Steven Garwell Element

2.1 Test Summary

Test Method and Description		*Requirement Clause 47CFR15*	*Requirement Clause RSS*	*Applicable to this equipment*	*Result / Note*
Radiated spurious emissions (restricted bands of operation and cabinet radiation)		15.247 (d)	247, 3.3	☒	*PASS*
AC power line conducted emissions		15.207	Gen, 8.8	☐	*Note 1*
Occupied bandwidth		15.247 (a) (2)	247, 5.2 (a)	☐	*Note 2*
Conducted carrier power	Peak	15.247 (b) (3)	247, 5.4 (d)	☒	*PASS*
	Max.			☐	
Out of band emissions		15.247 (d)	247, 5.5	☐	*Note 2*
Power spectral density		15.247 (e)	247, 5.2 (b)	☐	*Note 2*
Calculation of duty correction		-	15.35 (c)	☐	*Note 2*

Specific Note:

1. The EUT is a battery powered device.
2. Testing limited to Radiated spurious emissions (restricted bands of operation and cabinet radiation) and Conducted carrier power as requested by the client.

General Notes:

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)

3 Contents

4 Introduction

This report TRA-051967-47-10A presents the results of the Radio testing on a Draeger Safety UK Ltd, BTLE Radio in Gauge to specification 47CFR15 Radio Frequency Devices. RSS-247 - Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices.

The testing was carried out for Draeger Safety UK Ltd by Element, at the address detailed below.

☒ Element Skelmersdale
Unit 1
Pendle Place
Skelmersdale
West Lancashire
WN8 9PN
UK

☐ Element Surrey Hills
Unit 15 B
Henley Business Park
Pirbright Road
Normandy
Guildford
GU3 2DX
UK

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 following US-UK MRA, Designation numbers.

Element Surrey Hills	UK2027
Element Skelmersdale	UK2020

ISED Registration Numbers:

Element Surrey Hills	30805
Element North West	3930B

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 Test Specifications

5.1 Normative References

- FCC 47 CFR Ch. I – Part 15 – Radio Frequency Devices.
- ISED RSS-247, Issue 2, February 2017 – Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices.
- ISED RSS-Gen, Issue 5, March 2019 – General Requirements for Compliance of Radio Apparatus.
- ANSI C63.10-2013 – American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.
- ANSI C63.4-2014 – American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

5.2 Deviations from Test Standards

There were no deviations from the test standard.

6 Glossary of Terms

§	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

7 Equipment under Test

7.1 EUT Identification

- Name: BTLE Radio in Gauge
- Serial Number: Test Sample S56
- Model Number: BTLE Radio In Gauge
- Software Revision: Not Stated
- Build Level / Revision Number: 1st prototype

7.2 Module Information

- Manufacturer: Telit
- Model: BlueMod+S42
- FCC ID: RFRMS42
- ISED ID: 4957A-MS42

7.3 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.

1. Laptop Computer – Dell Latitude E6410

7.4 EUT Mode of Operation

The EUT was transmitting on the frequencies as indicated, the frequencies where programmed using Hterm 0.8.5 software which was supplied on a test laptop.

7.5 EUT Radio Parameters

7.5.1 General

Frequencies of operation:	2402 MHz to 2480 MHz
Modulation type:	GFSK
Occupied channel bandwidth:	1 MHz
Channel spacing:	2 MHz
Declared output power:	≤ 4 dBm
Antenna Type and Gain:	Integral Chip Antenna; Gain 1.2 dBi
Nominal Supply Voltage:	7.5 V dc

7.6 EUT Description

The EUT is an Open circuit breathing apparatus with compressed air cylinder used for Fire Fighting.

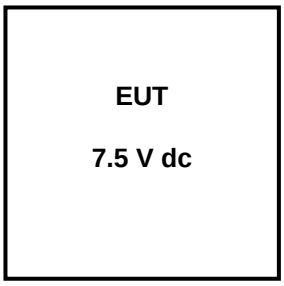
8 Modifications

No modifications were performed during this assessment.

9 EUT Test Setup

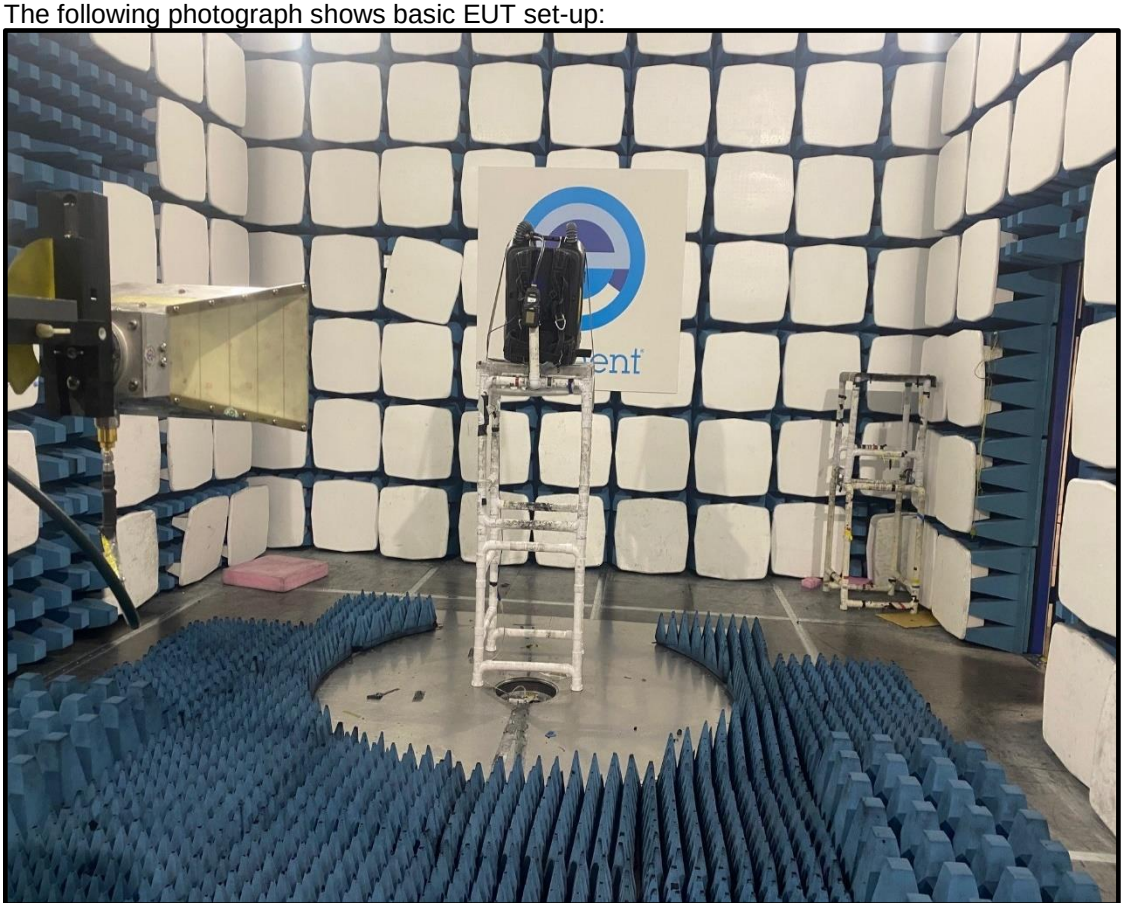
9.1 Block Diagram

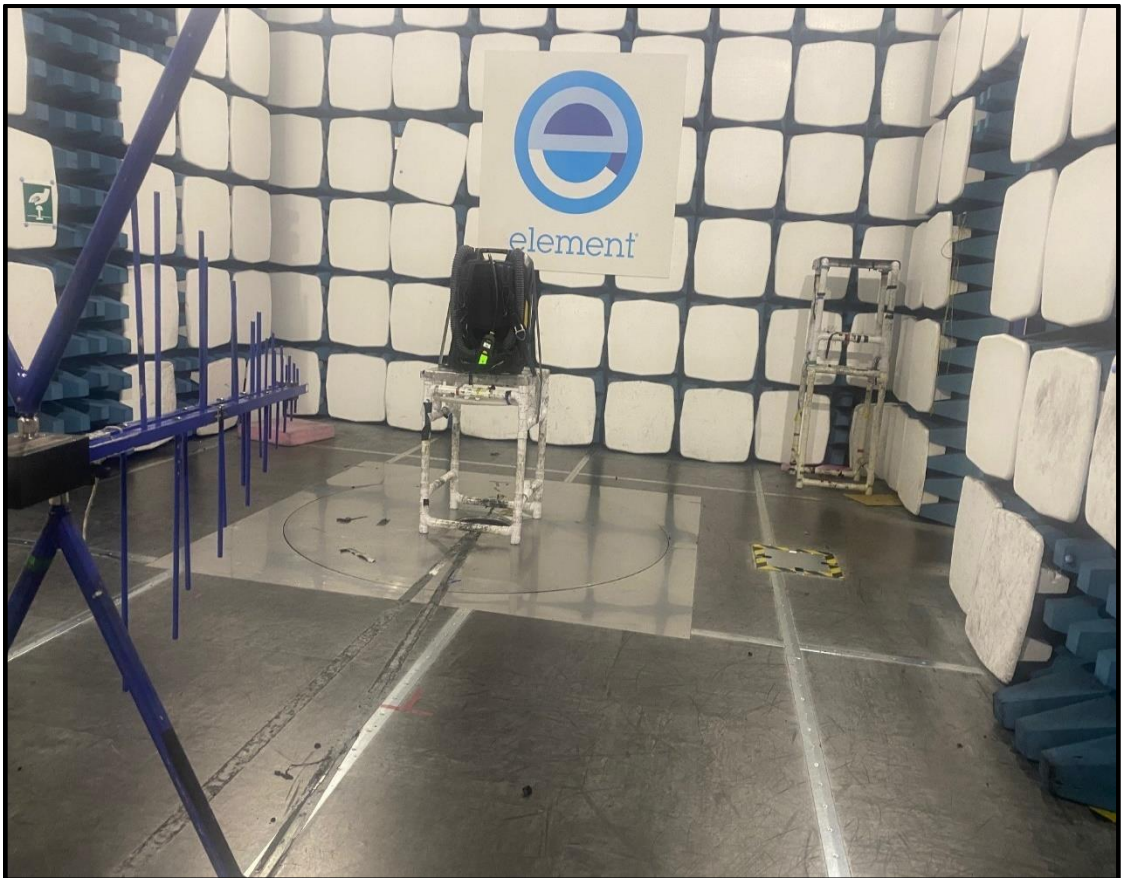
The following diagram shows basic EUT interconnections with cable type and cable lengths identified:



9.2 General Set-up Photograph

The following photograph shows basic EUT set-up:





9.3 Measurement software

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

Element Emissions R5
Element Transmitter Bench Test
ETS Lindgren EMPower V1.0.4.2

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 7.5 V dc from 5 x AA Alkaline battery cells.

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.

Restricted bands
A frequency band in which intentional radiators are permitted to radiate only spurious emissions but not fundamental signals.

11.2 Test Parameters

Test Location:	Element Skelmersdale
Test Chamber:	SK03 Radio Chamber
Test Standard and Clause:	ANSI C63.10-2013, Clause 6.5 and 6.6
EUT Frequencies Measured:	2402 MHz, 2442 MHz & 2480 MHz
Deviations from Standard:	None
Measurement BW:	30 MHz to 1 GHz: 120 kHz; Above 1 GHz: 1 MHz
Measurement Detector:	Up to 1 GHz: quasi-peak; Above 1 GHz: RMS average and Peak

Environmental Conditions (Normal Environment)

Temperature: +18 °C	+15 ºC to +35 ºC (as declared)
Humidity: 35 % RH	20 % RH to 75 % RH (as declared)
Supply: 7.5 V dc	7.5 V dc (as declared)

11.3 Test Limit

Unwanted emissions that fall within the restricted frequency bands shall comply with the limits specified:

General Field Strength Limits for License-Exempt Transmitters at Frequencies above 30 MHz

Frequency (MHz)	*Field Strength (µV/m at 3 m)*	*Field Strength (dBµV/m at 3 m)*
30 to 88	100	40.0
88 to 216	150	43.5
216 to 960	200	46.0
Above 960	500	54.0

On frequencies below or equal to 1000 MHz, the limits shown are based on measuring equipment employing a CISPR quasi-peak detector function. On frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit.

11.4 Test Method

With the EUT setup as per section 9 of this report and connected as per Figure i, the emissions from the EUT were measured on a spectrum analyzer / EMI receiver.

Radiated electromagnetic emissions from the EUT are checked first by preview scans. Preview scans for all spectrum and modulation characteristics are checked, using a peak detector and where applicable worst-case determined for function, operation, orientation, etc. for both vertical and horizontal polarisations. Pre-scan plots are shown with a peak detector and 100 kHz RBW.

If the EUT connects to auxiliary equipment and is table or floor standing, the configurations prescribed in ANSI C63.10 are followed. Alternatively, a layout closest to normal use (as declared by the provider) is employed, (see EUT setup photographs for more detail).

Emissions between 30 MHz and 1 GHz are measured using calibrated broadband antennas. Emissions above 1 GHz are characterized using standard gain horn antennas. Pre-amplifiers and filters are used where required. Care is taken to ensure that test receiver resolution bandwidth, video bandwidth and detector type(s) meet the regulatory requirements.

For both horizontal and vertical polarizations, the EUT is then rotated through 360 degrees in azimuth until the highest emission is detected. At the previously determined azimuth the test antenna is raised and lowered from 1 to 4 m in height until a maximum emission level is detected, this maximum value is recorded.

Power values measured on the test receiver / analyzer are converted to field strength, FS, in dBµV/m at the regulatory distance, using:

$$FS = PR + CL + AF – PA + DC – CF$$

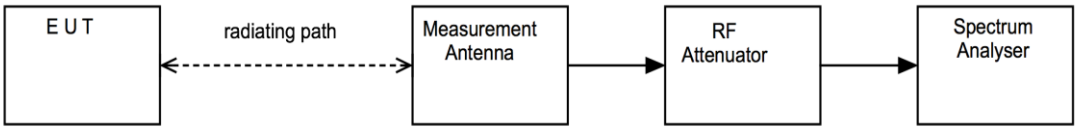
$$Factor = CL + AF - PA$$

Where,

PR is the power recorded on the receiver / spectrum analyzer in dBµV;
CL is the cable loss in dB;
AF is the test antenna factor in dB/m;
PA is the pre-amplifier gain in dB (where used);
DC is the duty correction factor in dB (where used, e.g. harmonics of pulsed fundamental);
CF is the distance factor in dB (where measurement distance different to limit distance);

This field strength value is then compared with the regulatory limit.

Figure i Test Setup

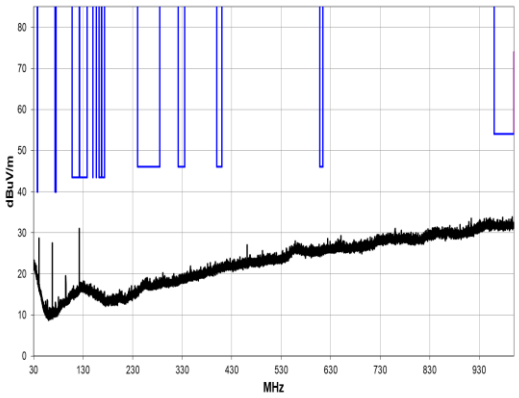


11.5 Test Equipment

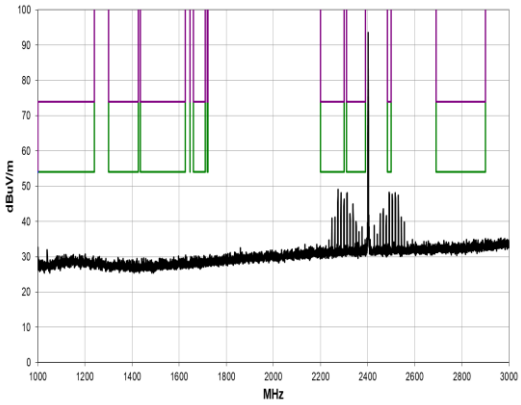
Equipment Type	*Manufacturer*	*Equipment Description*	*Element No*	*Due For Calibration*
Spectrum Analyser	R&S	FSU50	U544	2023-11-18
EMI Receiver	R&S	ESR26	U489	2023-09-30
1-18GHz Horn	EMCO	3115	L139	2024-07-01
Pre Amp	Agilent	8449B	U457	2024-01-24
Bilog	Chase	CBL611/A	U191	2025-02-22
PreAmp	Watkins Johnson	6201-69	U372	2024-03-07
2.4G Band Stop Filter	BSC	SN 4478	U543	2024-02-08
Radio Chamber - PP	Rainford EMC	ATS	REF940	2023-11-06
Radiated Test Software	Element	Emissions R5	REF9000	Cal not required

11.6 Test Results

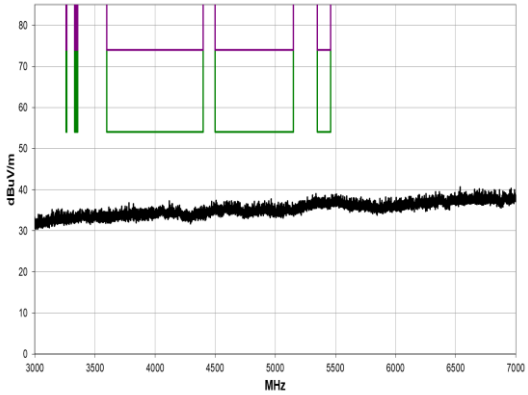
Frequency: 2402 MHz; Power Setting: 4 dBm



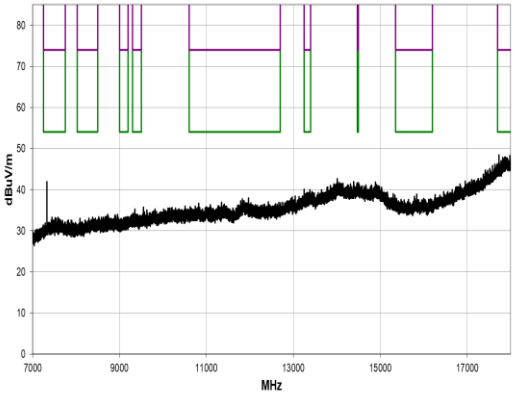
30 MHz to 1 GHz



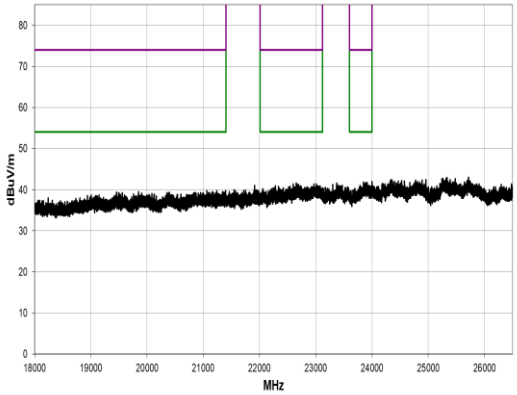
1 GHz to 3 GHz



3 GHz to 7 GHz



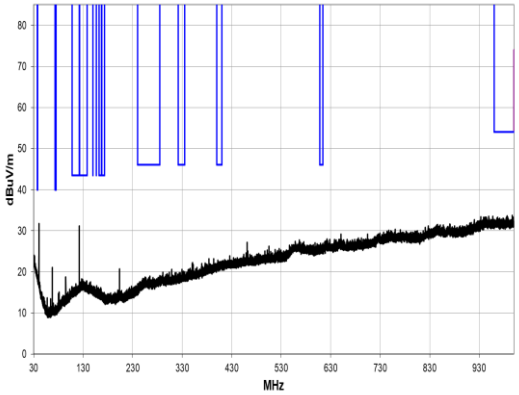
7 GHz to 18 GHz



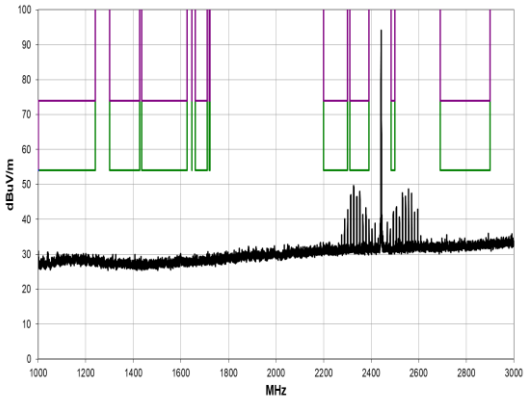
18 GHz to 26.5 GHz

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
2274.225	51.4	-3.9	1.73	230.9	3.0	0.0	Vert	AV	0.0	47.5	54.0	-6.5
2491.842	50.6	-3.4	1.47	335.0	3.0	0.0	Horz	AV	0.0	47.2	54.0	-6.8
2312.708	50.4	-3.7	1.77	226.9	3.0	0.0	Vert	AV	0.0	46.7	54.0	-7.3
2491.358	49.4	-3.4	1.76	64.9	3.0	0.0	Vert	AV	0.0	46.0	54.0	-8.0
2274.258	48.7	-3.9	1.7	25.0	3.0	0.0	Horz	AV	0.0	44.8	54.0	-9.2
2312.192	56.5	-3.7	1.77	226.9	3.0	0.0	Vert	PK	0.0	52.8	74.0	-21.2
2273.733	56.3	-3.9	1.73	230.9	3.0	0.0	Vert	PK	0.0	52.4	74.0	-21.6
2491.833	55.8	-3.4	1.47	335.0	3.0	0.0	Horz	PK	0.0	52.4	74.0	-21.6
2312.167	55.9	-3.7	3.49	360.1	3.0	0.0	Horz	PK	0.0	52.2	74.0	-21.8
2491.458	54.8	-3.4	1.76	64.9	3.0	0.0	Vert	PK	0.0	51.4	74.0	-22.6
2274.142	54.6	-3.9	1.7	25.0	3.0	0.0	Horz	PK	0.0	50.7	74.0	-23.3

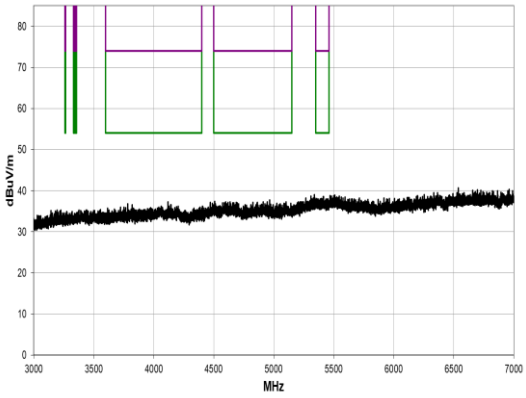
Frequency: 2442 MHz; Power Setting: 4 dBm



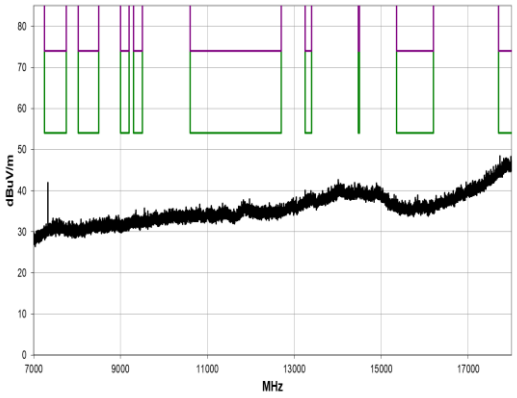
30 MHz to 1 GHz



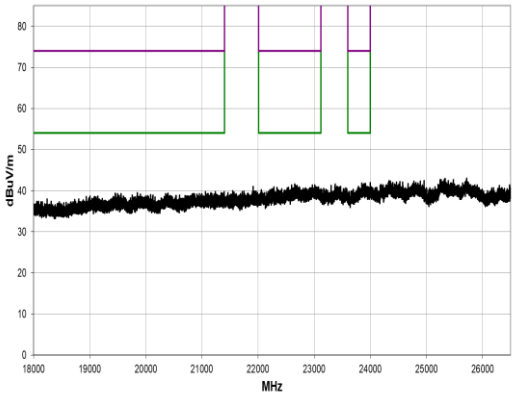
1 GHz to 3 GHz



3 GHz to 7 GHz



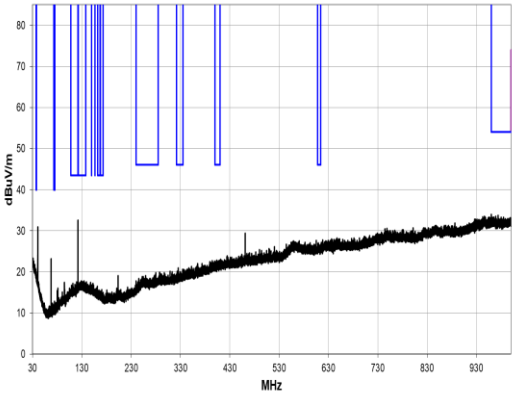
7 GHz to 18 GHz



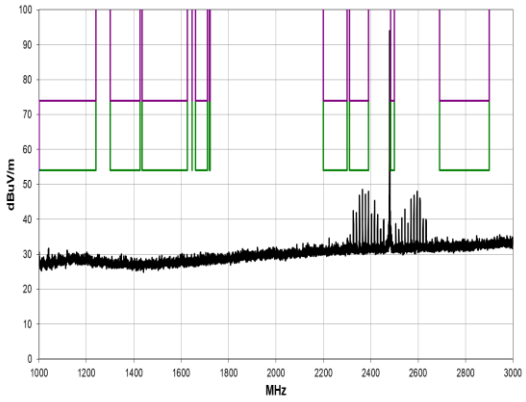
18 GHz to 26.5 GHz

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
2326.583	52.4	-3.7	1.91	234.0	3.0	0.0	Vert	AV	0.0	48.7	54.0	-5.3
2326.983	51.6	-3.7	3.48	4.9	3.0	0.0	Horz	AV	0.0	47.9	54.0	-6.1
2352.125	51.0	-3.6	1.91	232.1	3.0	0.0	Vert	AV	0.0	47.4	54.0	-6.6
2352.183	50.7	-3.6	2.02	9.0	3.0	0.0	Horz	AV	0.0	47.1	54.0	-6.9
2377.800	47.9	-3.6	2.3	235.9	3.0	0.0	Vert	AV	0.0	44.3	54.0	-9.7
2377.683	46.8	-3.6	3.61	2.9	3.0	0.0	Horz	AV	0.0	43.2	54.0	-10.8
2326.825	56.9	-3.7	1.91	234.0	3.0	0.0	Vert	PK	0.0	53.2	74.0	-20.8
2352.592	56.4	-3.6	1.91	232.1	3.0	0.0	Vert	PK	0.0	52.8	74.0	-21.2
2326.942	56.5	-3.7	3.48	4.9	3.0	0.0	Horz	PK	0.0	52.8	74.0	-21.2
2352.700	55.4	-3.6	2.02	9.0	3.0	0.0	Horz	PK	0.0	51.8	74.0	-22.2
2377.808	53.7	-3.6	3.61	2.9	3.0	0.0	Horz	PK	0.0	50.1	74.0	-23.9
2378.092	53.4	-3.6	2.3	235.9	3.0	0.0	Vert	PK	0.0	49.8	74.0	-24.2
7326.733	42.1	8.4	1.53	230.9	1.0	0.0	Vert	AV	-9.5	41.0	54.0	-13.0
7325.242	40.1	8.4	1.48	123.0	1.0	0.0	Horz	AV	-9.5	39.0	54.0	-15.0
7325.192	51.6	8.4	1.53	230.9	1.0	0.0	Vert	PK	-9.5	50.5	74.0	-23.5
7325.192	50.4	8.4	1.48	123.0	1.0	0.0	Horz	PK	-9.5	49.3	74.0	-24.7

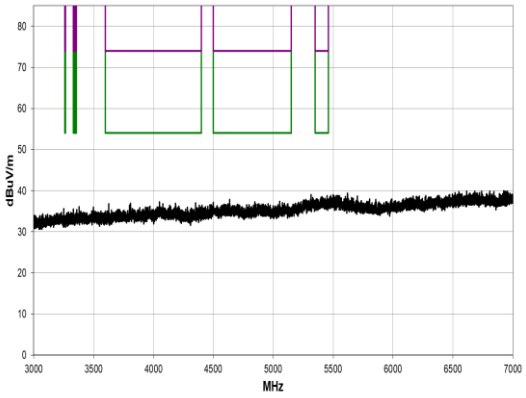
Frequency: 2480 MHz; Power Setting: 4 dBm



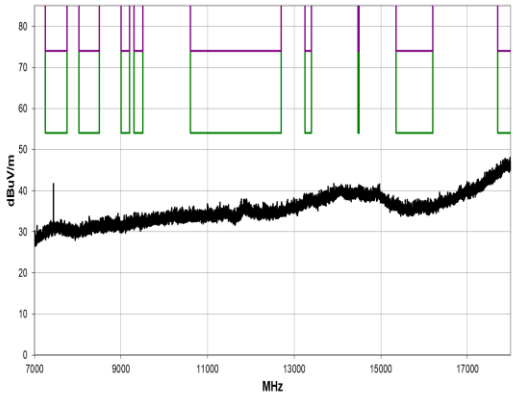
30 MHz to 1 GHz



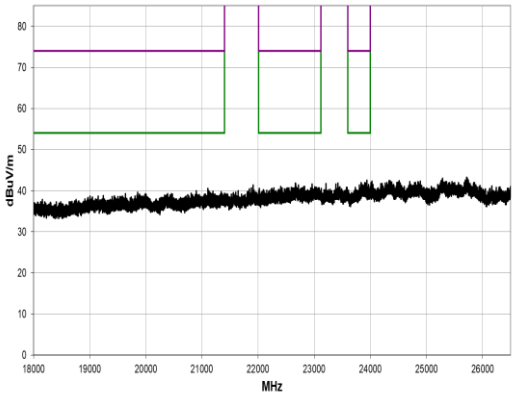
1 GHz to 3 GHz



3 GHz to 7 GHz



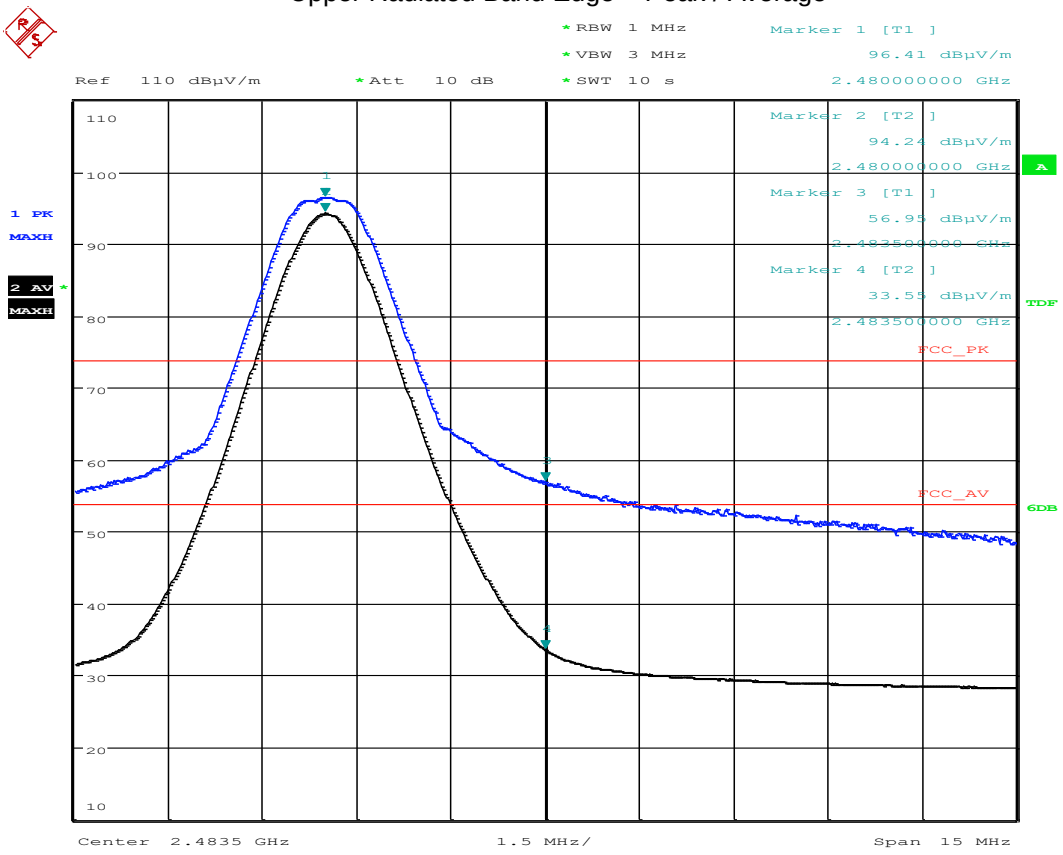
7 GHz to 18 GHz



18 GHz to 26.5 GHz

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
2364.508	51.3	-3.6	1.83	238.0	3.0	0.0	Vert	AV	0.0	47.7	54.0	-6.3
2365.092	51.2	-3.6	2.06	7.9	3.0	0.0	Horz	AV	0.0	47.6	54.0	-6.4
2326.633	45.0	-3.7	1.97	233.0	3.0	0.0	Vert	AV	0.0	41.3	54.0	-12.7
2365.083	57.2	-3.6	1.83	238.0	3.0	0.0	Vert	PK	0.0	53.6	74.0	-20.4
2364.700	57.0	-3.6	2.06	7.9	3.0	0.0	Horz	PK	0.0	53.4	74.0	-20.6
2326.092	52.1	-3.7	1.97	233.0	3.0	0.0	Vert	PK	0.0	48.4	74.0	-25.6
7439.200	41.8	8.4	1.94	242.9	1.0	0.0	Horz	AV	-9.5	40.7	54.0	-13.3
7439.233	41.5	8.4	1.69	232.1	1.0	0.0	Vert	AV	-9.5	40.4	54.0	-13.6
7439.092	51.9	8.4	1.94	242.9	1.0	0.0	Horz	PK	-9.5	50.8	74.0	-23.2
7439.267	51.7	8.4	1.69	232.1	1.0	0.0	Vert	PK	-9.5	50.6	74.0	-23.4

Upper Radiated Band Edge – Peak / Average



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12 Maximum peak conducted output power

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 effective isotropic radiated power (EIRP) is defined as the product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna.

12.1 Test Parameters

Test Location:	Element Skelmersdale
Test Chamber:	SK03 Radio Chamber
Test Standard and Clause:	ANSI C63.10-2013, Clause 11.9.1
EUT Frequencies Measured:	2402 MHz, 2440 MHz & 2480 MHz
EUT Channel Bandwidths:	1 MHz
Deviations From Standard:	None
Measurement BW:	2 MHz
Spectrum Analyzer Video BW: (requirement at least 3x RBW)	10 MHz
Measurement Detector:	Peak
Voltage Extreme Environment Test Range:	Mains Power = 85 % and 115 % of Nominal (FCC only requirement); Battery Power = new battery.

Environmental Conditions (Normal Environment)

Temperature: +18 °C	+15 ºC to +35 ºC (as declared)
Humidity: 35 % RH	20 % RH to 75 % RH (as declared)

12.2 Test Limit

FCC:

For systems employing digital modulation techniques operating in the bands 902 to 928 MHz, 2400 to 2483.5 MHz and 5725 to 5850 MHz, the maximum peak conducted output power shall not exceed 1 W.

ISED:

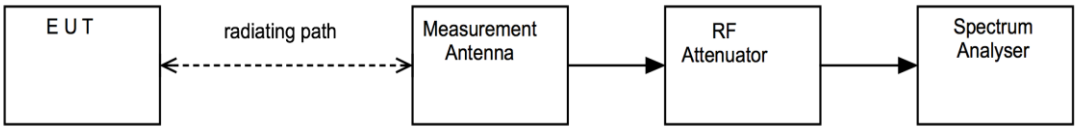
For systems employing digital modulation techniques operating in the bands 902 to 928 MHz, 2400 to 2483.5 MHz and 5725 to 5850 MHz, the maximum peak conducted output power shall not exceed 1 W. The EIRP shall not exceed 4 W.

12.3 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



12.4 Test Equipment

Equipment Type	*Manufacturer*	*Equipment Description*	*Element No*	*Due For Calibration*
Spectrum Analyser	R&S	FSU50	U544	2023-11-18
1-18GHz Horn	EMCO	3115	L139	2024-07-01
Pre Amp	Agilent	8449B	U457	2024-01-24
Radio Chamber - PP	Rainford EMC	ATS	REF940	2023-11-06
Radiated Test Software	Element	Emissions R5	REF9000	Cal not required

12.5 Test Results

12.6 FCC:

The following formula was used to convert field strength (*E*) in volts/metre to conducted output power in watts:

$$\text{Conducted Output Power} = (E \times d)^2 / (30 \times G)$$

Where,
E is the electric field strength in V/m
d is the measurement distance in meters (m)
G is the antenna numerical gain referenced to isotropic gain

Modulation: GFSK; Data rate: 1 Mbps; Power setting: 4 dBm						
Frequency (MHz)	***Peak Field Strength (dBµV/m)***	***Peak Field Strength (V/m)***	***Distance (m)***	***Numeric Gain***	***Maximum peak conducted output power (W)***	***Result***
2402	97.2	0.07244	3	1.32	0.00119	PASS
2442	97.0	0.07079	3	1.32	0.00114	PASS
2480	97.3	0.07328	3	1.32	0.00122	PASS

12.7 ISED

The following formula was used to convert field strength (*E*) in volts/metre to EIRP in watts:

$$\text{EIRP} = (E \times d)^2 / 30$$

Where,
E is the electric field strength in V/m
d is the measurement distance in meters (m)

Modulation: GFSK; Data rate: 1 Mbps; Power setting: 4 dBm					
Frequency (MHz)	***Peak Field Strength (dBµV/m)***	***Peak Field Strength (V/m)***	***Distance (m)***	***EIRP (W)***	***Result***
2402	97.2	0.07244	3	0.00157	PASS
2442	97.0	0.07079	3	0.00150	PASS
2480	97.3	0.07328	3	0.00161	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 connecter) 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 µs**
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**