

Report on the Radio Testing

For

GKD Technik Ltd

On

Base Station

Report no. TRA-051350-47-01A

3rd September to 4th September 2021

RF914 6.0



Report Number: TRA-051350-47-01A  
Issue: A

REPORT ON THE RADIO TESTING OF A  
GKD TECHNIK Ltd  
BASE STATION  
WITH RESPECT TO SPECIFICATION  
FCC 47CFR 15.209

TEST DATE: 3rd September to 4th September 2021

Written by:

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Approved by:

John Charters  
Laboratory Manager

Date: 8<sup>th</sup> October 2021

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><b>Issue Number</b></i>	<i><b>Issue Date</b></i>	<i><b>Revision History</b></i>
A	8 October 2021	Original

## 2 Summary

TEST REPORT NUMBER: TRA-051350-47-01A

WORKS ORDER NUMBER: TRA-051350-04

PURPOSE OF TEST: USA: Testing of radio frequency equipment per the relevant authorization procedure of chapter 47 of CFR (code of federal regulations) Part 2, subpart J.

TEST SPECIFICATION: FCC 47CFR 15.209



EQUIPMENT UNDER TEST (EUT): Base Station

FCC IDENTIFIER: 2A2IY-P200005

EUT SERIAL NUMBER: W11352

MANUFACTURER/AGENT: GKD Technik Ltd

ADDRESS: 17 Cobham Road  
Ferndowne Industrial Estate  
Wimbourne  
Dorset  
BH21 7PE  
United Kingdom

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ORDER NUMBER: 602220

TEST DATE: 3rd September to 4th September 2021

TESTED BY: Steven Garwell/Michael Else  
Element

## 2.1 Test Summary

<i>Test Method and Description</i>	<i>Requirement Clause, 47CFR15</i>	<i>Applicable to this equipment</i>	<i>Result / Note</i>
Radiated spurious emissions, below 30 MHz	15.209	<input checked="" type="checkbox"/>	Pass
Radiated spurious emissions	15.209	<input checked="" type="checkbox"/>	Pass
AC power line conducted emissions	15.207	<input type="checkbox"/>	Note 1
Occupied bandwidth	15.215(c)	<input checked="" type="checkbox"/>	Pass
Field strength of fundamental	15.209	<input checked="" type="checkbox"/>	Pass

**Note 1:** 12 Vdc -24 Vdc via the vehicle battery.

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 Standard)

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## 4 Introduction

This report TRA-051350-47-01A presents the results of the radio testing on a GKD Technik Ltd, Base Station to specification 47CFR15 Radio Frequency Devices.

The testing was carried out for GKD Technik Ltd by Element, at the address detailed below.

<input type="checkbox"/>	Element Hull Unit E South Orbital Trading Park Hedon Road Hull HU9 1NJ UK	<input checked="" type="checkbox"/>	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.

### FCC Site Listing:

Element is accredited for the above sites under the US-UK MRA, Designation number UK2020.

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

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.
- 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**

None

## 6 Glossary of Terms

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

## 7 Equipment Under Test

### 7.1 EUT Identification

- Name: Base Station
- Serial Number: W11352
- Model Number: P2100005
- Software Revision: GKD-1103-SW-001 v5.4.0 / GKD-1103-SW-003 v5.1.0 / GKD-1103-SW-002 v4.0.0 / GKD-1103-SW-002 v4.0.0
- Build Level / Revision Number: v2.1

### 7.2 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. *Not applicable – No support/monitoring equipment required whilst the equipment was under test*

### 7.3 EUT Mode of Operation

#### 7.3.1 Transmission

The mode of operation for transmitter tests was as follows:

The unit was tested in normal operation mode

### 7.4 EUT Radio Parameters

#### 7.4.1 General

<b>Frequency of operation:</b>	125 kHz
<b>Modulation type(s):</b>	On-off keying
<b>Nominal Supply Voltage:</b>	12-24 Vdc via the vehicle battery

### 7.5 EUT Description

**Error! Reference source not found.**

This test report covers the 125 kHz frequency only.

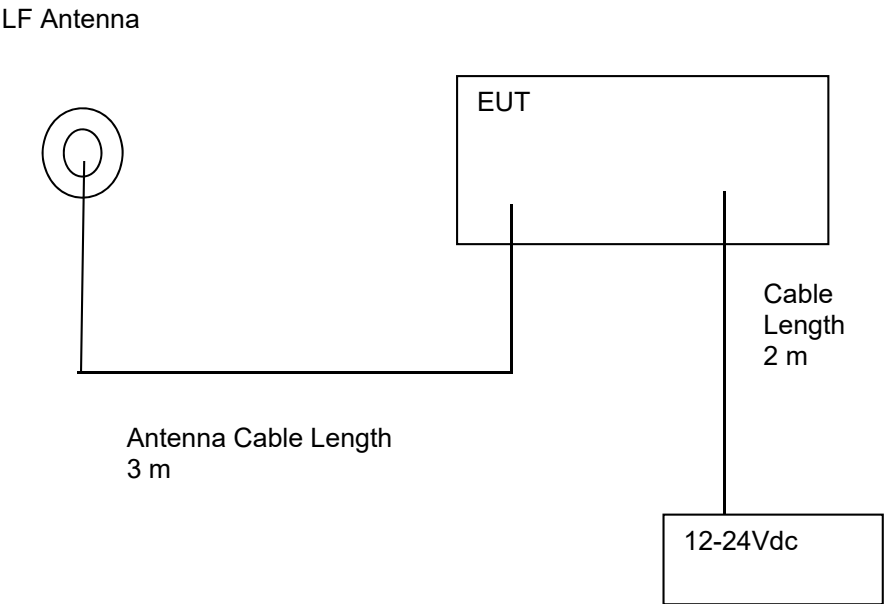
## **8 Modifications**

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 (See Note)

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 24 Vdc from a power supply.

### 10.2 Varying Test Conditions

Variation of supply voltage is required to ensure stability of the declared output power and frequency. During carrier power and frequency error testing the following variations were made:

	<b>Category</b>	<b>Nominal</b>	<b>Variation</b>
☒	Battery	12-24 Vdc	-

11 Radiated emissions below 30 MHz

11.1 Definitions

*Out-of-band emissions*

Emissions on a frequency or frequencies immediately outside the necessary bandwidth which result from the modulation process, but exclude spurious emissions.

*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 6.4
EUT Frequency Measured:	125 kHz
Deviations from Standard:	None
Measurement Distance and Site:	3 m
EUT Height:	1 m
Measurement Antenna and Height:	60 cm shielded loop; 1 m
Measurement BW:	9 kHz to 150 kHz: 200 Hz; 150 kHz to 30 MHz: 9 kHz
Measurement Detector:	9 kHz to 90 kHz and 110 kHz to 490 kHz: Average, RMS Other frequencies below 30 MHz: Quasi-peak.

Environmental Conditions (Normal Environment)

Temperature: 20 °C	+15 °C to +35 °C (as declared)
Humidity: 50 % RH	20 % RH to 75 % RH (as declared)
Supply: 12 Vdc-24 Vdc	

### 11.3 Test Limit

Emissions from license-exempt transmitters shall comply with the field strength limits shown in the table below. Additionally, the level of any transmitter emission shall not exceed the level of the transmitter's fundamental emission.

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

<i>Frequency, f (kHz)</i>	<i>Field Strength</i>	<i>Measurement Distance (m)</i>
9 to 490	2,400 / 377.f (μA/m) 2,400 / f (μV/m)	300
490 to 1,750	24,000 / 377.f (μA/m) 24,000 / f (μV/m)	30
1,750 to 30,000	30 (μV/m)	30

n.b. Devices operated pursuant to §15.225 / RSS-210 A2.6 are exempt from complying with the restricted band requirements for the 13.36–13.41 MHz band only.

### 11.4 Test Method

With the EUT setup as per section 9 of this report and connected as per Figure i, the EUT fundamental frequency was maximised by rotating the EUT through 360°, in three orthogonal planes, and adjusting the measurement antenna azimuth.

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 9 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 9 kHz and 30 MHz are measured using a calibrated 60cm active loop antenna. 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.

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

$$FS = 10 (PR - CF) / 20$$

Where,

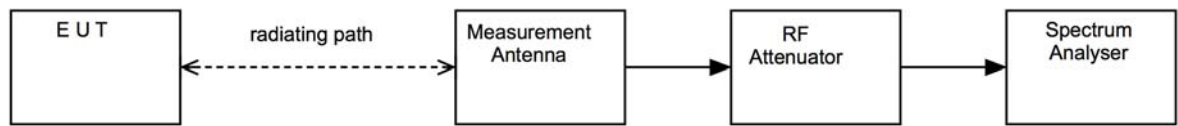
PR is the power recorded on the receiver / spectrum analyzer in dBμV and includes any cable loss, antenna factor and pre-amplifier gain;

CF is the distance extrapolation factor in dB (where measurement distance different to limit distance);

Per FCC 47CFR15.31(f)(2), an extrapolation factor of 40 dB per decade was used for extrapolation from 3 m to 300 m, and from 10 m to 300 m.

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

Figure i Test Setup

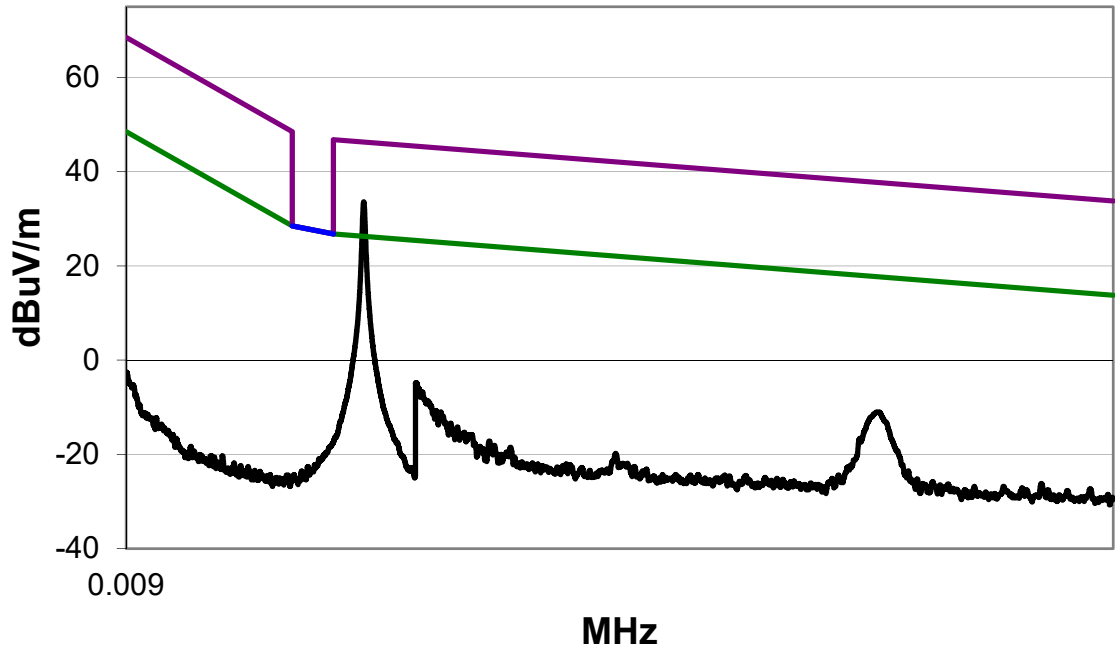


11.5 Test Equipment

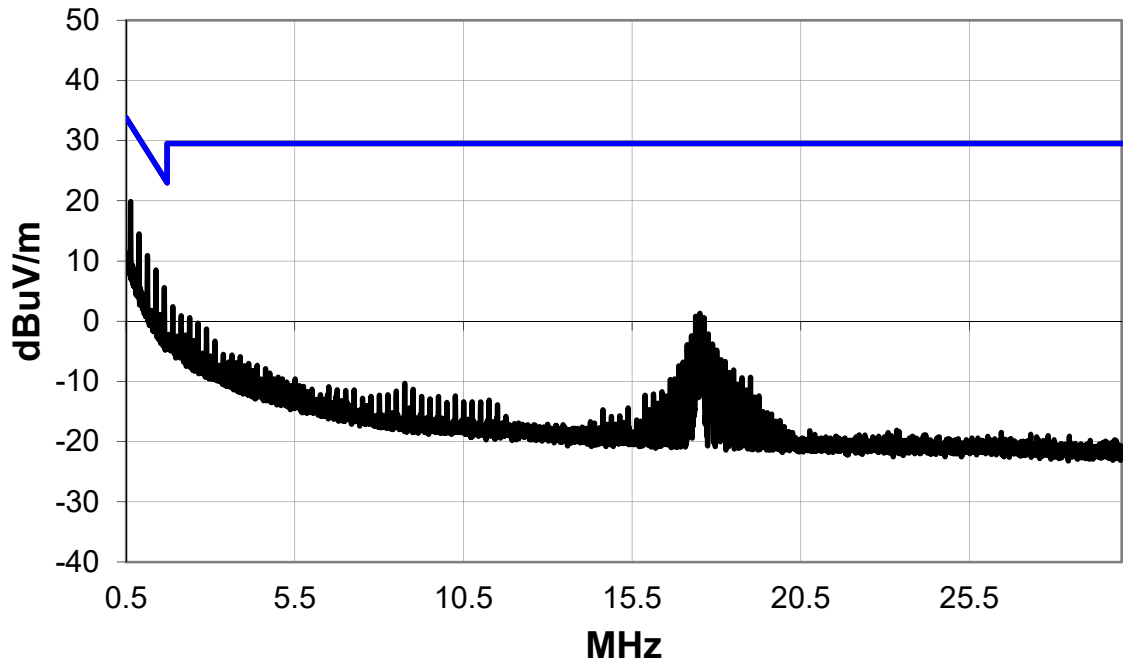
Equipment Type	Manufacturer	Equipment Description	Element No	Due For Calibration
Spectrum Analyser	R&S	FSU46	REF910	2021-11-18
Loop Antenna	The Elctro Mechanics Company	6502	R0079	2023-06-16
ATS	Rainford EMC	Radio Chamber - PP	REF940	2021-12-09

11.6 Test Results

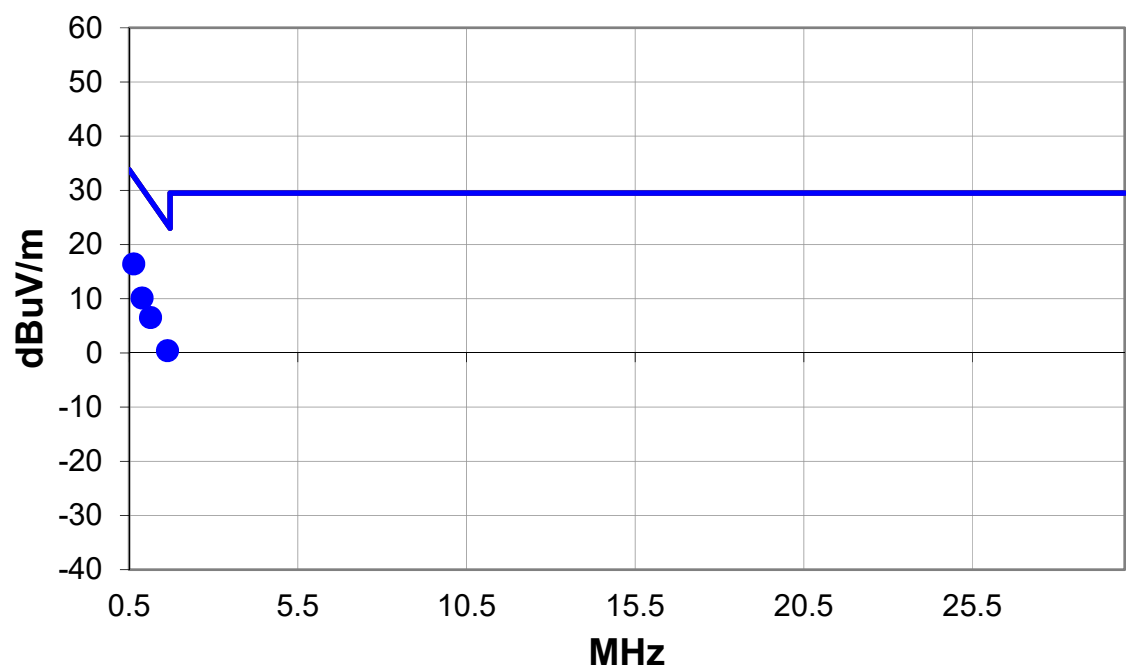
9 kHz-490 kHz



490 kHz-30 MHz



490 kHz-30 MHz Maximised



Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
0.627	45.9	10.5	1.0	163.2	3.0	Horz	QP	-40.0	16.4	31.7	-15.3
0.878	39.6	10.5	1.0	161.1	3.0	Horz	QP	-40.0	10.1	28.8	-18.7
1.128	36.0	10.5	1.0	151.2	3.0	Horz	QP	-40.0	6.5	26.6	-20.1
1.628	30.0	10.4	1.0	177.0	3.0	Horz	QP	-40.0	0.4	23.4	-23.0

## 12 Radiated emissions

### 12.1 Definitions

#### *Out-of-band emissions*

Emissions on a frequency or frequencies immediately outside the necessary bandwidth which result from the modulation process, but exclude spurious emissions.

#### *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.

### 12.2 Test Parameters

Test Location:	Element Skelmersdale
Test Chamber:	SK03 radio chamber
Test Standard and Clause:	ANSI C63.10-2013, Clause 6.5
EUT Frequency Measured:	125 kHz
Deviations from Standard:	None
Measurement BW:	30 MHz to 1GHz: 120 kHz
Measurement Detector:	Quasi-peak

### Environmental Conditions (Normal Environment)

Temperature: 22 °C	+15 °C to +35 °C (as declared)
Humidity: 40 % RH	20 % RH to 75 % RH (as declared)
Supply: 12 Vdc-24 Vdc	

### 12.3 Test Limit

Emissions from license-exempt transmitters shall comply with the field strength limits shown in the table below. Additionally, the level of any transmitter emission shall not exceed the level of the transmitter's fundamental emission.

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

<b>Frequency (MHz)</b>	<b>Field Strength (<math>\mu\text{V/m}</math> at 3 m)</b>
30 to 88	100
88 to 216	150
216 to 960	200
Above 960	500

## 12.4 Test Method

With the EUT setup as per section 9 of this report and connected as per Figure ii, 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:

$$FS = PR + CL + AF - PA + DC - CF$$

$$\text{Factor} = CL + AF - PA$$

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;

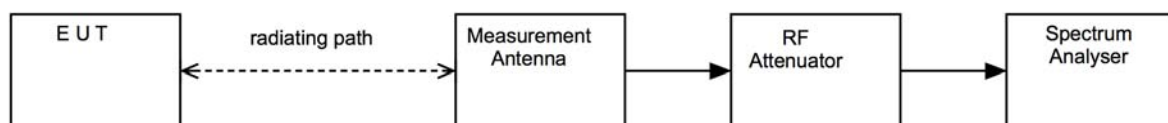
PA is the pre-amplifier gain in dB (where used);

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 is different to limit distance);

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

**Figure ii Test Setup**



### 12.5 Test Set-up Photograph

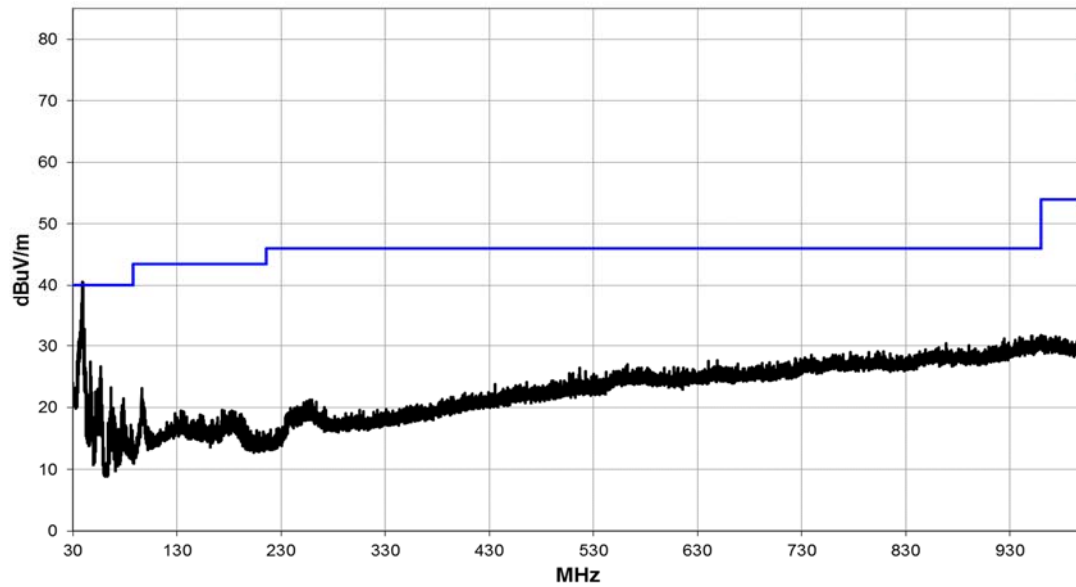


### 12.6 Test Equipment

<i>Equipment Type</i>	<i>Manufacturer</i>	<i>Equipment Description</i>	<i>Element No</i>	<i>Due For Calibration</i>
Spectrum Analyser	R&S	FSU46	REF910	2021-11-18
Bilog	Chase	CBL611/A	U573	2023-01-28
PreAmp	Watkins Johnson	6201-69	U372	2022-03-01
Radio Chamber - PP	Rainford EMC	ATS	REF940	2021-12-09

## 12.7 Test Results

30 MHz to 1 GHz



Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	Polarity/ Transducer Type	Detector	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
39.644	43.0	-9.3	1.0	62.9	3.0	Vert	QP	33.7	40.0	-6.3
39.136	41.8	-9.1	1.0	214.9	3.0	Vert	QP	32.7	40.0	-7.3
38.890	40.6	-8.9	1.0	114.2	3.0	Vert	QP	31.7	40.0	-8.3
36.391	35.7	-7.4	1.0	144.1	3.0	Vert	QP	28.3	40.0	-11.7
36.143	34.1	-7.3	1.0	97.1	3.0	Vert	QP	26.8	40.0	-13.2
40.422	36.3	-9.6	1.0	12.1	3.0	Vert	QP	26.7	40.0	-13.3
35.651	31.4	-7.0	1.0	127.2	3.0	Vert	QP	24.4	40.0	-15.6
34.642	26.2	-6.5	1.0	90.0	3.0	Vert	QP	19.7	40.0	-20.3

## 13 Occupied Bandwidth

### 13.1 Definition

#### 20 dB bandwidth

The emission bandwidth (x dB) is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated x dB below the maximum in-band spectral density of the modulated signal.

### 13.2 Test Parameters

Test Location:	Element Skelmersdale
Test Chamber:	Radio Laboratory
Test Standard and Clause:	ANSI C63.10-2013, Clause 6.9
EUT Frequency Measured:	125 kHz
EUT Test Modulations:	On-off keying
Deviations from Standard:	None
Measurement BW:	50 Hz
Spectrum Analyzer Video BW:	300 Hz
Measurement Span: (requirement 2 to 5 times OBW)	7 kHz
Measurement Detector:	Peak

### Environmental Conditions (Normal Environment)

Temperature: 22 °C	+15 °C to +35 °C (as declared)
Humidity: 40 % RH	20 % RH to 75 % RH (as declared)
Supply: 12-24 Vdc	

### 13.3 Test Limit

Federal Communications Commission:

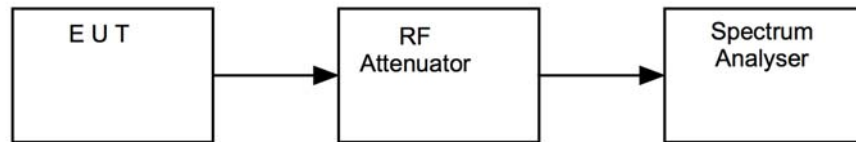
Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

### 13.4 Test Method

With the EUT setup as per section 9 of this report and connected as per Figure iv, the bandwidth of the EUT was measured on a spectrum analyser.

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**

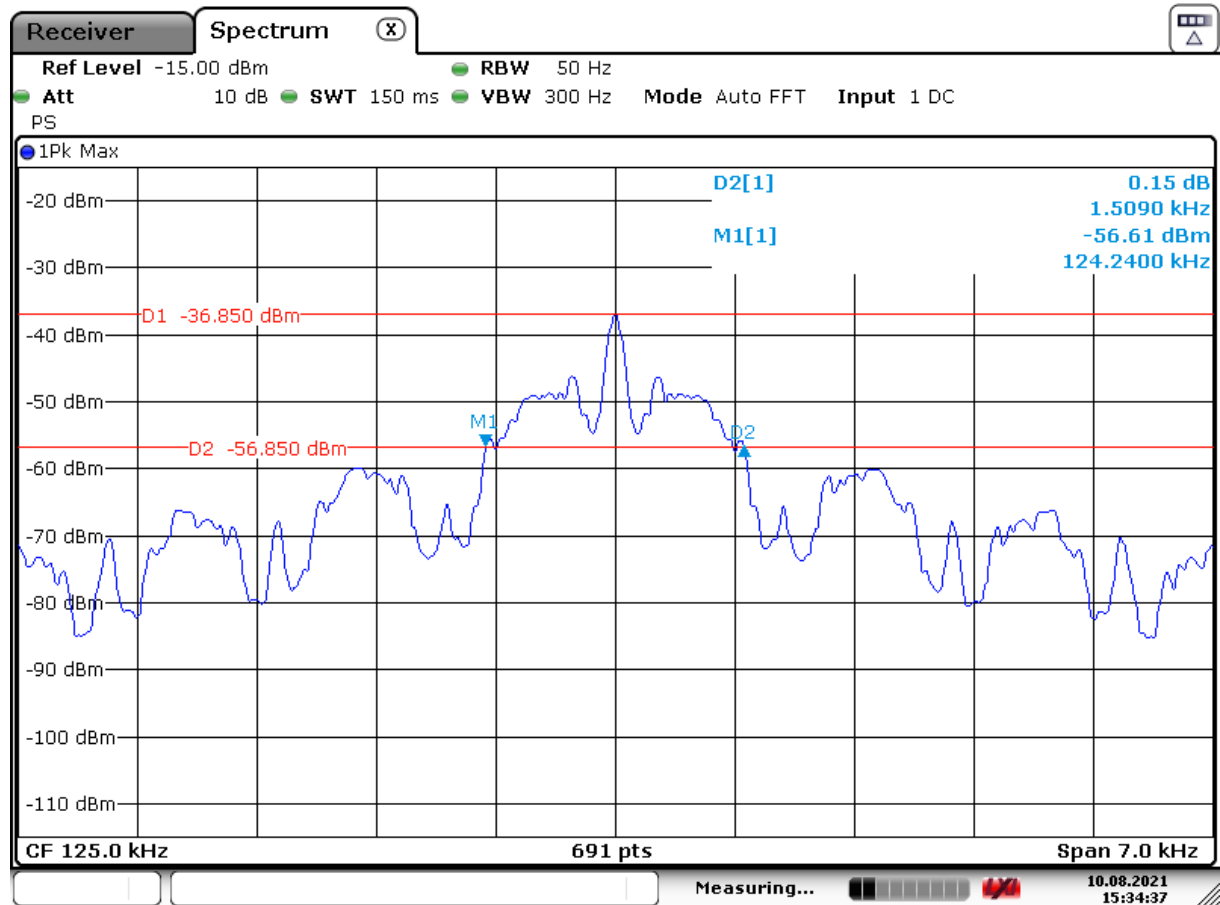


### 13.5 Test Equipment

<i>Equipment Type</i>	<i>Manufacturer</i>	<i>Equipment Description</i>	<i>Element No</i>	<i>Due For Calibration</i>
EMI Receiver	R&S	ESR26	U489	2022-03-04

### 13.6 Test Results

15.225. Frequency 125 kHz			
Channel Frequency (kHz)	$F_L$ (kHz)	$F_H$ (kHz)	20 dB Bandwidth (kHz)
125.00	124.240	125.749	1.5090



Date: 10.AUG.2021 15:34:37

## 14 Transmitter output power (fundamental radiated emission)

### 14.1 Definition

The RF power dissipated in the standard output termination when operating under the rated duty cycle selected by the applicant for approval.

### 14.2 Test Parameters

Test Location:	Element Skelmersdale
Test Chamber:	Radio Laboratory
Test Antenna:	Active 60cm loop
Test Standard and Clause:	ANSI C63.10-2013, Clause 6.3 / 6.4
Frequency Measured:	125 kHz
Deviations from Standard:	None
Measurement BW:	200 Hz
Spectrum Analyzer Video BW: (requirement at least 3x RBW)	1 KHz
Measurement Detector:	Average

### Environmental Conditions (Normal Environment)

Temperature: 24 °C	+15 °C to +35 °C (as declared)
Humidity: 40 % RH	20 % RH to 75 % RH (as declared)

### 14.3 Test Limit

Emissions from license-exempt transmitters shall comply with the field strength limits shown in the table below. Additionally, the level of any transmitter emission shall not exceed the level of the transmitter's fundamental emission.

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

<i>Frequency, f (kHz)</i>	<i>Field Strength</i>	<i>Measurement Distance (m)</i>
9 to 490	$2,400 / 377.f$ (μA/m) $2,400 / f$ (μV/m)	300
490 to 1,750	$24,000 / 377.f$ (μA/m) $24,000 / f$ (μV/m)	30
1,750 to 30,000	30 (μV/m)	30

n.b. Devices operated pursuant to §15.225 / RSS-210 A2.6 are exempt from complying with the restricted band requirements for the 13.36–13.41 MHz band only.

#### 14.4 Test Method

With the EUT setup as per section 9 of this report and connected as per Figure v, 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.

Power values measured on the test receiver / analyzer are converted to field strength, FS, in  $\mu\text{V/m}$  at the regulatory distance, using:

$$FS = 10 (PR - CF) / 20$$

Where,

PR is the power recorded on the receiver / spectrum analyzer in  $\text{dB}\mu\text{V}$  and includes any cable loss, antenna factor and pre-amplifier gain;

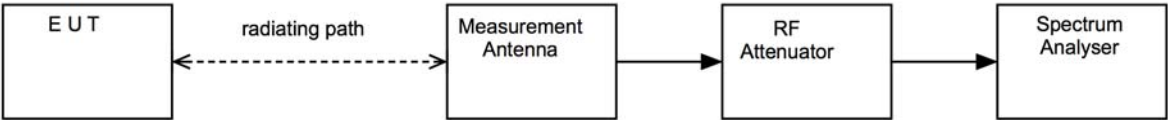
CF is the distance extrapolation factor in dB (where measurement distance different to limit distance);

Per FCC 47CFR15.31(f)(2) / RSS-Gen 6.4, an extrapolation factor of 40 dB per decade was used for extrapolation from 3 m to 300 m.

Per FCC 47CFR15.31(f)(2) / RSS-Gen 6.4, an extrapolation factor from 1 m to 3 m of 21.69 dB was determined from measurements at 1 and 3 metres.

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

Figure v Test Setup



The following photograph shows basic EUT set-up:



14.5 Test Equipment

Equipment Type	Manufacturer	Equipment Description	Element No	Due For Calibration
Receiver	R&S	ESHS10	U003	2021-12-11
Loop Antenna	The Elctro Mechanics Company	6502	R0079	2023-06-16

**14.6 Test Results**

<i>Frequency 125 kHz</i>							
<i>Channel Frequency (kHz)</i>	<i>Receiver Level (dBμV/m)</i>	<i>Measurement Distance (m)</i>	<i>Limit Distance (m)</i>	<i>Extrapolation Factor (dB)</i>	<i>Field Strength (μV/m)</i>	<i>Field Strength Limit (μV/m)</i>	<i>Result</i>
125	107.80	3	300	87.68	10.133	19.2	Pass
125	79.20	10	300	59.08	10.133	19.2	Pass

## 15 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

Reference Number	Parameter	Description	Value	Unit
1	Adjacent Channel Power	Uncertainty in test result	1.9	dB
2	Carrier Power	Uncertainty in test result (power meter) upto 40 GHz	0.9	dB
		Uncertainty in test result (Spectrum Analyser) upto 40 GHz	1.7	
		40 to 50 GHz	2.4	
		50 to 75 GHz	2.5	
		75 GHz to 110 GHz	2.4	
3	Effective Radiated Power	Uncertainty in test result	4.71	dB
4	Radiated Spurious Emissions	Uncertainty in test result 30 MHz – 1 GHz	4.75	dB
		Uncertainty in test result 1 MHz – 18 GHz	4.46	dB
5	Maximum Frequency Error	Uncertainty in test result (CMTA)	113.441	Hz
		Uncertainty in test result (Spectrum Analyser) Using GPS locked frequency Source	0.0413	ppm
6	Radiated spurious emissions Field Strength, OAT'S 9 kHz -110 GHz	Uncertainty in test result (9 kHz-30 MHz)	2.3	dB
		Uncertainty in test result (30 MHz-1GHz)	4.75	dB
		Uncertainty in test result (1 GHz-18 GHz)	4.46	dB
		Uncertainty in test result (18 GHz-26 GHz)	3.2	dB
		Uncertainty in test result (26 GHz-40 GHz)	3.3	dB
		Uncertainty in test result (40 GHz-50 GHz)	3.5	dB
		Uncertainty in test result (50 GHz-75 GHz)	3.6	dB
		Uncertainty in test result (75 GHz-110 GHz)	3.6	dB
7	Frequency Deviation	Uncertainty in test result	3.7	%
	Magnetic Field Emissions	Uncertainty in test result	2.3	dB
9	Conducted Spurious Emissions	Uncertainty in test result Upto 40 GHz	0.921	dB
		Uncertainty in test result 40 GHz-50 GHz	2.4	dB
		Uncertainty in test result 50 GHz-75 GHz	2.5	dB
		Uncertainty in test result 75 GHz-110 GHz	2.4	dB
10	Channel Bandwidth	Uncertainty in test result	7.75	%
11	Spectrum Mask Measurements	Uncertainty in test result (Frequency)	2.59	%
		Uncertainty in test result (Amplitude)	1.32	dB
12	Adjacent Sub Band Selectivity	Uncertainty in test result	1.24	dB
13	Receiver Blocking-Listen Mode, Radiated	Uncertainty in test result	3.23	dB
14	Receiver Blocking-Talk Mode, Radiated	Uncertainty in test result	3.36	dB