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REPORT ON ELECTROMAGNETIC COMPATIBILITY TESTS

Performed at:
TWENTY PENCE TEST SITE

Twenty Pence Road,
Cottenham,
Cambridge
U.K.
CB24 8PS

on

Sepura PLC

SC2024 FCC part 22

dated

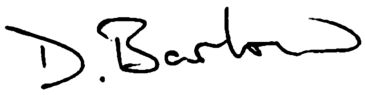
29th November 2016

Document History

Issue	Date	Affected page(s)	Description of modifications	Revised by	Approved by
1	21/12/16		Initial release		

Based on report template:
v090319

Equipment Under Test (EUT):	SC2024 FCC part 22
Test Commissioned by:	Sepura PLC 9000 Cambridge Research Park Beach Drive Waterbeach Cambridge CB25 9TL
Representative:	Steve Wood
Test Started:	12th October 2016
Test Completed:	12th October 2016
Test Engineer:	Stephen Browning
Date of Report:	29th November 2016

Written by:	Stephen Browning	Checked by:	Derek Barlow
Signature:		Signature:	
Date:	2nd December 2016	Date:	21st December 2016

dB Technology can only report on the specific unit(s) tested at its site. The responsibility for extrapolating this data to a product line lies solely with the manufacturer.

Test Standards Applied

CFR 47	*Code of Federal Regulations: Part 2 and Part 22*

Emissions Test Results Summary

CFR 47 **PASS**

Test	Port	Method	Limit	PASS/FAIL	*Notes*
Occupied Bandwidth.	antenna	Part 2.1049	20kHz	PASS	

specs_fccv100412

Note: this report only covers the occupied bandwidth test.

This Report shows that the EUT met the 20kHz occupied bandwidth measurement.

Contents

1 EUT Details

1.1 General

The EUT was a TETRA Voice + Data Hand Portable .

The device can transmit and receive over the following frequency band:

450MHz to 470MHz.

The nominal output power is 35dBm (3.1W).

The device can transmit in Trunked Mode Operation (TMO mode) or Direct Mode Operation (DMO mode)

The device has already been certified to FCC part 90 using the specific parts designed to accomodate Tetra devices. This allows a 22kHz occupied bandwidth.

The manufacturer is now seeking certification for other parts (e.g. Part 22) which specify 25kHz channel spacing but a bandwidth of 20kHz.

This unit tested under this report differs from the Part 90 approved product in that the software has been changed to support a new filter structure thus ensuring the product can meet the FCC requirements for 20kHz bandwidth. In all other aspects, the product remains unchanged.

This report is limited to measurements of occupied bandwidth with this new filter structure.

Measurements were made at the top, near middle and bottom of the appropriate frequency range:

Bottom: 450 MHz
Middle: 460 MHz
Top: 470 MHz

This Report shows that the EUT met the 20kHz occupied bandwidth measurement.

Details of the EUT and associated peripherals used during the tests are listed below. Figure 1 shows the interconnections between the EUT and peripherals.

Item	Manufacturer	Model	Description	Serial No:	Notes
1	Sepura	SC2024	TETRA Hand Portable	1PR001546GKV6YU	

1.2 Modifications to EUT and Peripherals

Details of any modifications that were required to achieve compliance are listed below. The modification numbers are referred to in the results sections as appropriate.

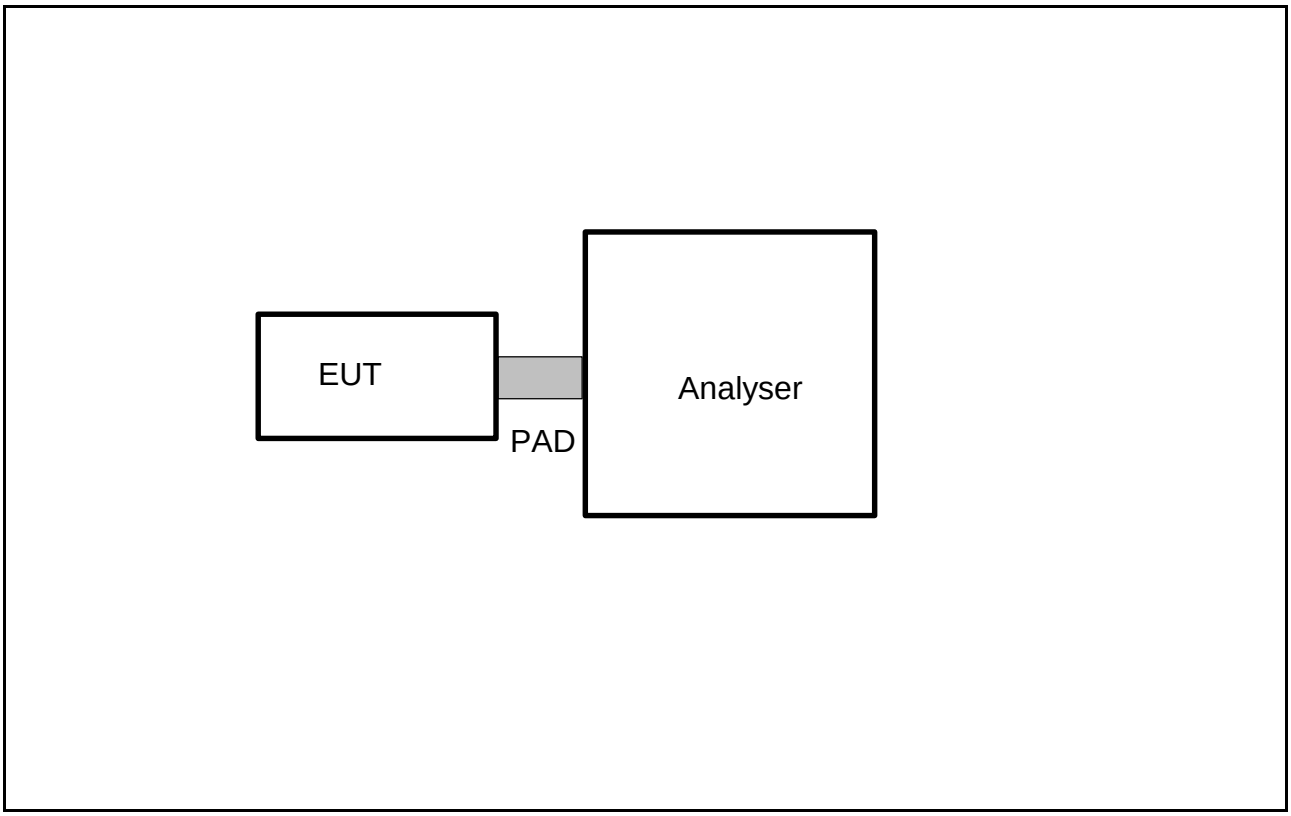
Mod No:	Details	Implemented for
0	As supplied for testing. No modifications were made. This sample was set to use the new filter structure to allow compliance with the 20kHz bandwidth requirement.	

1.3 EUT Operating Modes

The EUT was tested in the following operating mode or modes. Generally, operating modes are chosen that will exercise the functions of the EUT as fully as possible and in a manner likely to produce maximum emission levels or susceptibility. Individual test result sheets reference the operating mode of the EUT.

Operating Mode	Details
1	Transmitting on full power on the selected channel.

Figure 1 General Arrangement of EUT and Peripherals



Photograph 1 Arrangement of EUT and Peripherals

2 Test Equipment

The test equipment used during the tests was one or more of the items listed below. Individual test result sheets indicate which items were used.

Ref No:	Details	Serial Number
R8	Agilent E7405A Spectrum Analyser	MY44212494

3 Test Methods

3.1 Antenna Conducted Occupied Bandwidth

Measurements are made with the antenna output connected to a spectrum analyser via a suitable PAD. Sweeps are made with a 300Hz Resolution Bandwidth and a 1kHz Video Bandwidth. A peak detector is used. Markers are used to determine the 99% power bandwidth.

4 Test Results

The following sections contain tabulated test results. Plots of various scans are included at the back of this section.

4.1 Conducted Antenna Occupied Bandwidth

Factor Set 1: - - - -
Factor Set 2: - - - -
Factor Set 3: - - - -
Test Equipment: R8

Conducted Emissions (Signal)

Company:	Sepura PLC	*Product:*	SC2024 FCC part 22
Date:	12/10/2016	*Test Eng:*	Stephen Browning
Ports:	antenna		
Test:	Part 2.1049	using limits of	20kHz
Ports:			
Test:		using limits of	

Notes	Comments and Observations

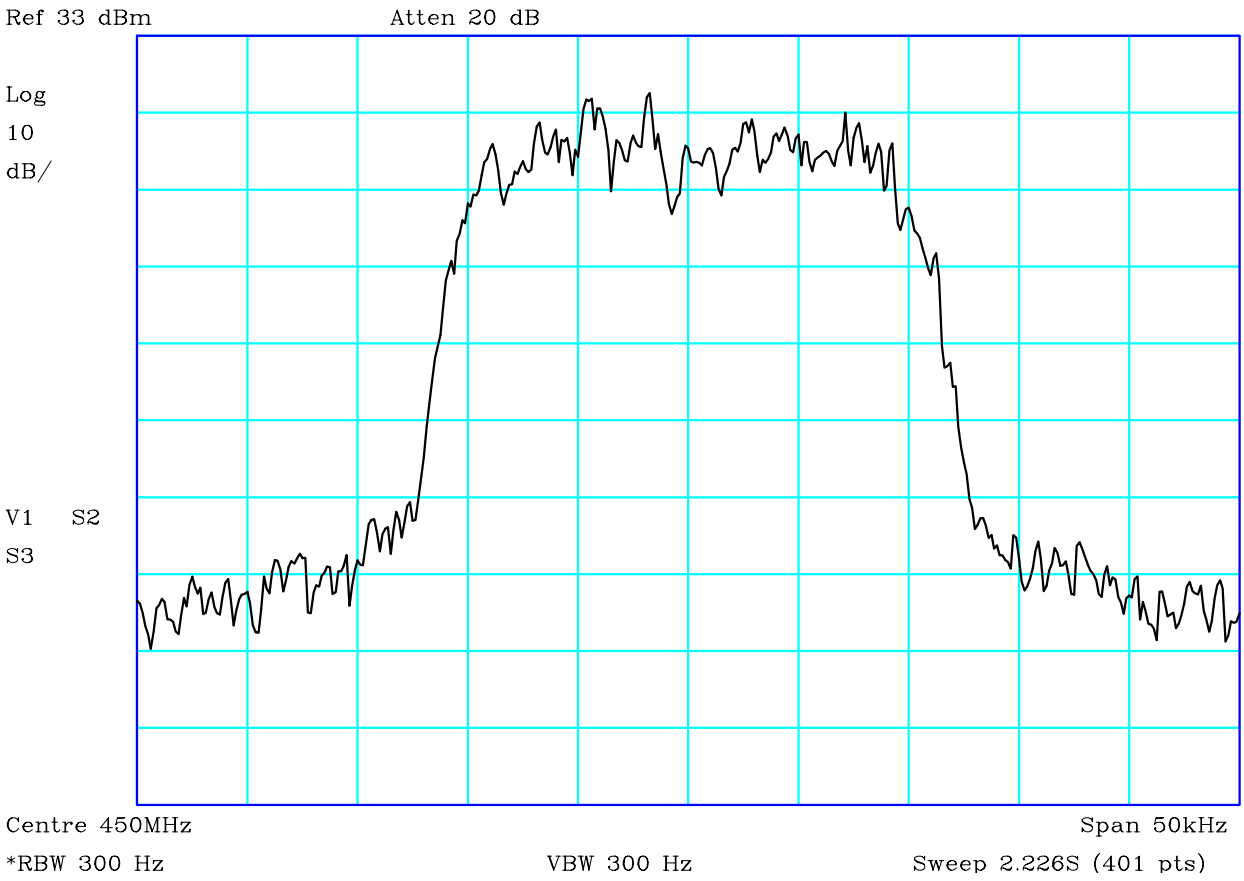
Measurements were made with continuous modulation applied.
Spectrum Analyser results are shown in plots 1 to 3.

Using the 'Bandwidth Power' function of the spectrum analyser, the following measurements were recorded.

450MHz	19.25	kHz
460MHz	19.37	kHz
470MHz	19.50	kHz

Limit : 20 kHz

PASS



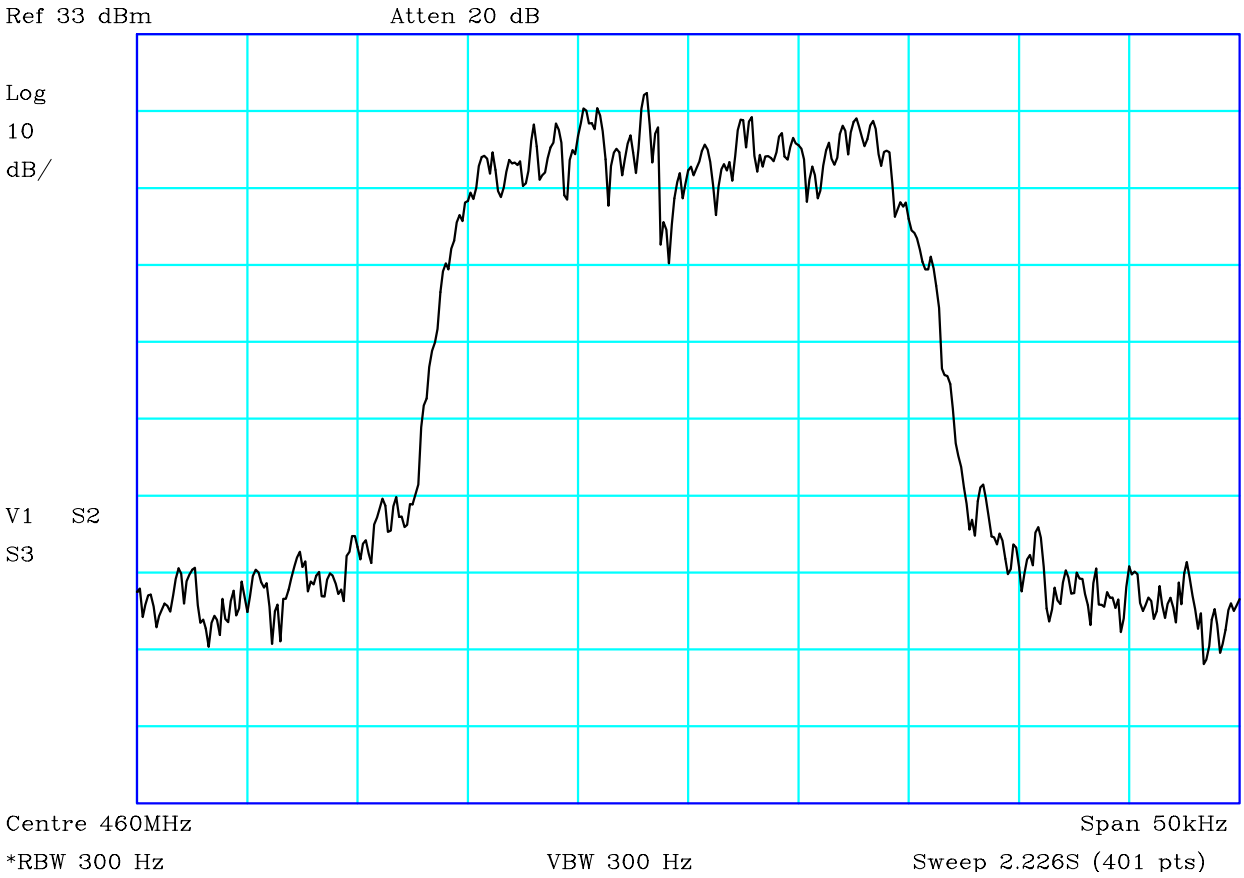
CF1:30dB_Pad

PLOT 1 Occupied Bandwidth - 450MHz

Company:	Sepura PLC	Product:	SC2024
Date:	12/10/2016	Test Eng:	Stephen Browning
Method:	FCC part 2.1049	Method:	
Limit1:		Limit2:	
Limit3:		Limit4:	

SC2024 serial number 1PR001546GKV6YU
99% Occupied Bandwidth = 19.25 kHz.

Facility:	GTEM_1			Mode:	1
				Modification State:	0
		File:	H69126D7	Analyser:	R8



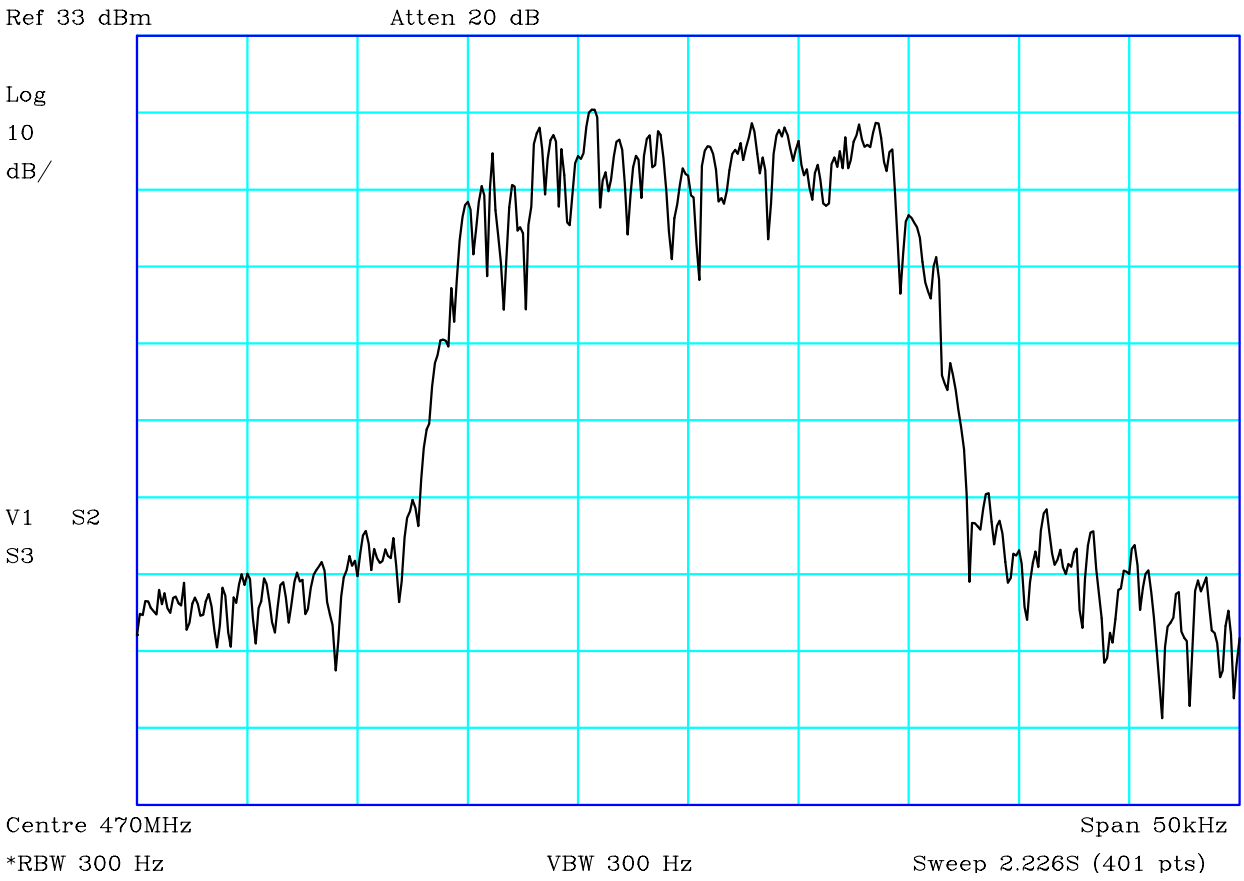
CF1:30dB_Pad

PLOT 2 Occupied Bandwidth - 460MHz

Company:	Sepura PLC	Product:	SC2024
Date:	12/10/2016	Test Eng:	Stephen Browning
Method:	FCC part 2.1049	Method:	
Limit1:		Limit2:	
Limit3:		Limit4:	

SC2024 serial number 1PR001546GKV6YU
99% Occupied Bandwidth = 19.375 kHz.

Facility:	GTEM_1			Mode:	1
				Modification State:	0
		File:	H6912707	Analyser:	R8



CF1:30dB_Pad

PLOT 3 Occupied Bandwidth - 470MHz

Company:	Sepura PLC	Product:	SC2024
Date:	12/10/2016	Test Eng:	Stephen Browning
Method:	FCC part 2.1049	Method:	
Limit1:		Limit2:	
Limit3:		Limit4:	

SC2024 serial number 1PR001546GKV6YU
99% Occupied Bandwidth = 19.5 kHz

Facility:	GTEM_1			Mode:	1
				Modification State:	0
		File:	H6912721	Analyser:	R8