

FCC PART 22 and 90 TEST REPORT

For

Sepura plc

Radio House, St. Andrews Road, Cambridge CB4 1GR UK

FCC ID: XX6SEP8010

Report Type: Class II permissive change	Product Type: DMR Two Way Radio
Test Engineer: <u>Dean Liu</u>	<i>Dean Liu</i>
Report Number: <u>RDG140821012-00A1</u>	
Report Date: <u>2015-01-23</u>	
Reviewed By: <u>Jerry Zhang EMC Manager</u>	<i>Jerry Zhang</i>
Test Laboratory: Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn	

Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Dongguan). This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

TABLE OF CONTENTS

GENERAL INFORMATION.....	3
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	3
OBJECTIVE	3
RELATED SUBMITTAL(S)/GRANT(S).....	3
TEST METHODOLOGY	3
TEST FACILITY	4
SYSTEM TEST CONFIGURATION.....	5
DESCRIPTION OF TEST CONFIGURATION	5
BLOCK DIAGRAM OF TEST SETUP	5
SUMMARY OF TEST RESULTS	6
FCC §1.1310 & §2.1093 - RF EXPOSURE.....	7
APPLICABLE STANDARD	7
TEST RESULT	7
FCC §2.1053 & §22.359 & §90.210 - RADIATED SPURIOUS EMISSIONS	8
APPLICABLE STANDARD	8
TEST EQUIPMENT LIST AND DETAILS.....	8
TEST PROCEDURE	8
TEST DATA	9

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The Sepura plc's product, model: SEP8310 (FCC ID: XX6SEP8010) (the "EUT") in this report is a DMR Two Way Radio, which was measured approximately: 14.9 cm (H) x 6.4 cm (W) x 3.7 cm (T), rated input voltage: DC 7.4V from lithium battery.

** All measurement and test data in this report was gathered from production sample serial number: 7PR101432GC0001. The EUT was received on 2014-08-25.*

Objective

This test report is prepared on behalf of Sepura plc in accordance with Part 2, Part 22 and Part 90 of the Federal Communications Commission rules.

This is the CIIPC application of the device. The differences between the original device and current one are :

- 1) The model number and appearance were changed.
- 2) The EUT lacked the screener and keyboard.

Please refer to the Permissive Change Declaration Letter.

For the changes made to the device, it will impact the RE test results, so the test data will be updated

Related Submittal(s)/Grant(s)

Original submission with FCC ID: XX6SEP8010.

Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of federal Regulations Title 47 Part 2, Sub-part J as well as the following individual parts:

Part 22 – Public Mobile Service

Part 90 – Private Land Mobile Radio Service

Applicable Standards: TIA 603-D and ANSI 63.4-2003.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Dongguan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 02, 2012. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

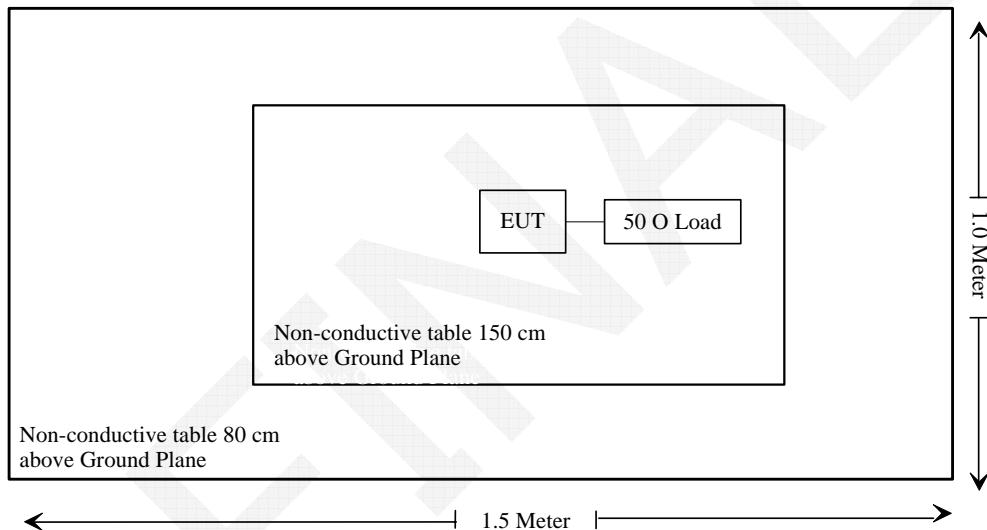
Description of Test Configuration

The system was configured for testing in a test mode.

EUT Specification:

Operating Frequency Band	136-174 MHz
Modulation Mode	FM/4FSK
Channel Separation	12.5 kHz
Rated Output Power	High power level: 5 W Low power level: 1 W

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§2.1093	RF Exposure	Compliance
§2.1046; § 22.727;§90.205	RF Output Power	Compliance*
§2.1047;§90.207	Modulation Characteristic	Compliance*
§2.1049;§22.357;§ 22.731;§90.209; §90.210	Occupied Bandwidth & Emission Mask	Compliance*
§2.1051; §22.359;§90.210	Spurious Emission at Antenna Terminal	Compliance*
§2.1053; §22.359;§90.210	Spurious Radiated Emissions	Compliance
§2.1055; § 22.355;§90.213	Frequency Stability	Compliance*
§90.214	Transient Frequency Behavior	Compliance*

Compliance*: Please refer to the report number RDG140811007-00, with FCC ID: XX6SEP8010.

FCC §1.1310 & §2.1093 - RF EXPOSURE

Applicable Standard

FCC§1.1310 and §2.1093.

Test Result

Compliance, please refer to the SAR report: RDG140821012-20AA1

FINAL

FCC §2.1053 & §22.359 & §90.210 - RADIATED SPURIOUS EMISSIONS

Applicable Standard

FCC §2.1053 and §22.359 and §90.210

Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Due Date
HP	Signal Generator	8648A	3426A00831	2014-11-06	2015-11-06
Sunol Sciences	Antenna	JB3	A060611-3	2014-07-28	2017-07-27
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
HP	Amplifier	8447E	2434A02181	2014-09-01	2015-09-01
R&S	EMI Test Receiver	ESCI	100224	2014-05-09	2015-05-09
Agilent	Signal Generator	E8247C	MY43321350	2014-10-16	2015-10-16
Mini-Circuit	Amplifier	ZVA-213-S+	054201245	2014-02-19	2015-02-19
TDK RF	Horn Antenna	HRN-0118	130 084	2012-09-06	2015-09-06
ETS LINDGREN	Horn Antenna	3115	000 527 35	2012-09-06	2015-09-06
R&S	Spectrum Analyzer	FSEM	DE31388	2014-05-09	2015-05-09

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load, which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

For part 90:

Spurious emissions in dB = $10 \log_{10}$ (TXpwr in Watts/0.001)-the absolute level

Spurious attenuation limit in dB = $50 + 10 \log_{10}$ (power out in Watts) for EUT with a 12.5 kHz channel bandwidth.

For part 22:

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.

Test Data**Environmental Conditions**

Temperature:	24.4 °C
Relative Humidity:	56 %
ATM Pressure:	101.2 kPa

The testing was performed by Dean Liu on 2014-11-05.

Test Mode: Transmitting (FM mode, high power level)

Frequency	Polar	S.A. Reading	S.G. Level	Antenna Gain	Cable Loss	Absolute Level	Limit	Margin
MHz	H/V	dBμV	dBm	dBd/dBi	dB	dBm	dBm	dB
Frequency: 155 MHz, for FCC PART 90								
310	H	54.91	-49.2	0.0	0.5	-49.7	-20.0	29.7
310	V	52.61	-53	0.0	0.5	-53.5	-20.0	33.5
465	H	45.1	-54.6	0.0	0.7	-55.3	-20.0	35.3
465	V	39.86	-63	0.0	0.7	-63.7	-20.0	43.7
1085	H	39.34	-60.7	7.5	1.1	-54.3	-20.0	34.3
1085	V	39.54	-60.8	7.5	1.1	-54.4	-20.0	34.4
Frequency: 173.975 MHz, for FCC PART 90								
347.95	H	51.27	-51.2	0.0	0.6	-51.8	-20.0	31.8
347.95	V	52.06	-52.7	0.0	0.6	-53.3	-20.0	33.3
521.925	H	42.86	-56.1	0.0	0.7	-56.8	-20.0	36.8
521.925	V	43.93	-58.1	0.0	0.7	-58.8	-20.0	38.8
1217.825	H	38.29	-62.2	7.5	1	-55.7	-20.0	35.7
1217.825	V	41.55	-58.8	7.5	1	-52.3	-20.0	32.3
Frequency: 161.650 MHz, for FCC PART 22								
323.3	H	52.96	-50.6	0.0	0.5	-51.1	-13.0	38.1
323.3	V	51.03	-54.3	0.0	0.5	-54.8	-13.0	41.8
484.95	H	46.81	-52.7	0.0	0.7	-53.4	-13.0	40.4
484.95	V	42.23	-60.4	0.0	0.7	-61.1	-13.0	48.1
1131.55	H	39.48	-60.6	7.4	1.1	-54.3	-13.0	41.3
1131.55	V	42.13	-58.2	7.4	1.1	-51.9	-13.0	38.9

Test Mode: Transmitting (4FSK mode, high power level)

Frequency	Polar	S.A. Reading	S.G. Level	Antenna Gain	Cable Loss	Absolute Level	Limit	Margin
MHz	H/V	dBuV	dBm	dBd/dBi	dB	dBm	dBm	dB
Frequency: 155 MHz, for FCC PART 90								
310	H	55.6	-48.5	0.0	0.5	-49.0	-20.0	29.0
310	V	52.5	-53.1	0.0	0.5	-53.6	-20.0	33.6
465	H	45.03	-54.7	0.0	0.7	-55.4	-20.0	35.4
465	V	40.31	-62.5	0.0	0.7	-63.2	-20.0	43.2
1085	H	38.84	-61.2	7.5	1.1	-54.8	-20.0	34.8
1085	V	39.32	-61	7.5	1.1	-54.6	-20.0	34.6
Frequency: 173.975 MHz, for FCC PART 90								
347.95	H	51.2	-51.3	0.0	0.6	-51.9	-20.0	31.9
347.95	V	51.74	-53	0.0	0.6	-53.6	-20.0	33.6
521.925	H	42.19	-56.7	0.0	0.7	-57.4	-20.0	37.4
521.925	V	44.36	-57.6	0.0	0.7	-58.3	-20.0	38.3
1217.825	H	38.88	-61.6	7.5	1	-55.1	-20.0	35.1
1217.825	V	40.98	-59.4	7.5	1	-52.9	-20.0	32.9
Frequency: 161.650 MHz, for FCC PART 22								
323.3	H	53.14	-50.4	0.0	0.5	-50.9	-13.0	37.9
323.3	V	51.14	-54.2	0.0	0.5	-54.7	-13.0	41.7
484.95	H	45.77	-53.8	0.0	0.7	-54.5	-13.0	41.5
484.95	V	42.05	-60.6	0.0	0.7	-61.3	-13.0	48.3
1131.55	H	39.63	-60.5	7.4	1.1	-54.2	-13.0	41.2
1131.55	V	42.35	-58	7.4	1.1	-51.7	-13.0	38.7

Note1: Fr radiated spurious emissions were tested at high rated power, which was the worst case.

Note2: The unit of Antenna Gain is dBd for frequency below 1GHz, and the unit of Antenna Gain is dBi for frequency above 1GHz.

Note3: Absolute Level = SG Level - Cable loss + Antenna Gain
Margin = Limit-Absolute Level

***** END OF REPORT *****