

INQUIRY FCC SC2328

**< KDB 484596 DATA
REFERENCE >**



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VERSION CONTROL

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1 INTRODUCTION

The product under certification (variant device) is SC2328, with FCC ID: XX6SC2328X and ISED/IC ID 8739A-SC2328X. This is a device with TETRA transmitter.

SEPURA Limited has a very similar product, model SC2028 (REFERENCE device) certified under the FCC ID: XX6SC2028 and IC ID 8739A-SC2028 (exactly same main PCB but the model SC2028 integrate a module that supports BT/Wi-Fi. This module PCB is independent and it is plugged on the main board by a specific connector). The same hardware, same antennas, same frequency and software are used to generate the TETRA signal.

We, SEPURA LIMITED, take full responsibility for the fact that the test data as referenced represents valid data for demonstrating compliance for the variants listed in the application.

2 JUSTIFICATIONS

A tetra mobile radio (reference device) is certified for TETRA bands, Bluetooth 2.4GHz, Bluetooth Low energy and Wi-Fi 2.4GHz bands (Part 90, Part 15C).

The variant tetra mobile radio have identical components as the reference device, and only support TETRA technology (Part 90). The reduced band functionality for a variant is obtained by removing the BT and Wi-Fi module.

Both variants have the same main PCB, same hardware, same antennas, same frequency and same software is used to generate the TETRA signal.

For all these reasons, we consider that the variant device can leverage the test results (Part 90) from the reference device just performing the spot checking explained below.

3 SPOT CHECK TEST PLAN

3.1 RADIO FREQUENCY

TETRA

- Full testing on model SC2028 performing the following test cases:

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 90, FCC 47 CFR Part 2, Industry Canada RSS-119 and ISED RSS-GEN is shown below.

Section	Specification Clause				Test Description	Result	Comments/Base Standard
	Part 90	Part 2	RSS-119	RSS-GEN			
Configuration and Mode: TETRA 809 MHz to 824 MHz - Transmit High capacity battery							
2.1	90.205	2.1046	5.4	6.12	Maximum Conducted Output Power	Pass	
2.2	90.209	2.1049	5.5	6.7	Bandwidth Limitations	Pass	
2.3	90.210	2.1051	5.8	6.13	Spurious Emissions at Antenna Terminals	Pass	
2.4	90.210	2.1055	5.3	6.11	Frequency Stability	Pass	
2.5	90.221	-	-	-	Adjacent Channel Power	Pass	
2.6	90.207	2.1047	5.2	-	Types of Emissions	Pass	
2.7	90.210	2.1051	5.8	6.13	Radiated Spurious Emissions	Pass	
Configuration and Mode: TETRA 851 MHz to 869 MHz - Transmit High capacity battery							
2.1	90.205	2.1046	5.4	6.12	Maximum Conducted Output Power	Pass	
2.2	90.209	2.1049	5.5	6.7	Bandwidth Limitations	Pass	
2.3	90.210	2.1051	5.8	6.13	Spurious Emissions at Antenna Terminals	Pass	
2.4	90.210	2.1055	5.3	6.11	Frequency Stability	Pass	
2.5	90.221	-	-	-	Adjacent Channel Power	Pass	
2.6	90.207	2.1047	5.2	-	Types of Emissions	Pass	
2.7	90.210	2.1051	5.8	6.13	Radiated Spurious Emissions	Pass	

Table 2

- Partial testing on model SC2328 performing the following test cases:

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 2, FCC 47 CFR Part 90, ISED RSS-119 and ISED RSS-GEN is shown below.

Section	Specification Clause				Test Description	Result	Comments/Base Standard
	Part 2	Part 90	RSS-119	RSS-GEN			
Configuration and Mode: Tetra - 806-824 MHz							
2.1	2.1046	90.205	5.4	6.12	Maximum Conducted Output Power	Pass	ANSI C63.28: 2015
2.2	2.1053	90.210	5.8	6.13	Radiated Spurious Emissions	Pass	ANSI C63.28: 2015
2.3	2.1051	90.210	5.8	6.13	Spurious Emissions at Antenna Terminals	Pass	
Configuration and Mode: Tetra - 851-889 MHz							
2.1	2.1046	90.205	5.4	6.12	Maximum Conducted Output Power	Pass	ANSI C63.28: 2015
2.2	2.1053	90.210	5.8	6.13	Radiated Spurious Emissions	Pass	ANSI C63.28: 2015
2.3	2.1051	90.210	5.8	6.13	Spurious Emissions at Antenna Terminals	Pass	

Table 2

Comparing the test results in terms of power:

Tetra - 806-824 MHz

Parameter	806.025 MHz	815.000 MHz	823.975 MHz
Conducted Output Power (dBm)	34.25	34.25	34.28

Figure 1 SC2328 Maximum output power

TETRA 806 MHz to 824 MHz

Parameter	806.025 MHz	815.000 MHz	823.975 MHz
Conducted Output Power (dBm)	36.03	35.10	35.18

Figure 2 SC2028 Maximum output power

Difference= 0.90dBm

Tetra - 851-869 MHz

Parameter	851.025 MHz	860.000 MHz	868.975 MHz
Conducted Output Power (dBm)	34.13	34.05	33.95

Figure 3 SC2328 Maximum output power

TETRA 851 MHz to 869 MHz

Parameter	851.025 MHz	860.000 MHz	868.975 MHz
Conducted RMS Output Power (dBm)	34.91	34.84	34.75

Figure 4 SC2028 Maximum output power

Difference= 0.78dBm

, the difference is less than 3 dBm. So we are in compliance with the KDB criteria.

SAR

For SAR, test report is issued against FCC 47 CFR Part 2.1093 - "Radiofrequency radiation exposure evaluation: portable devices". and the following FCC Published RF exposure KDB procedures:

- FCC OET KDB 447498 D01 General RF Exposure Guidance v06 (October 2015).
- FCC OET KDB 865664 D01 - SAR Measurement Requirements for 100 MHz to 6 GHz v01r04 (August 2015).
- FCC OET KDB 643646 D01: SAR test for PTT Radios v01r03
- FCC OET KDB 178919 D01 178919 D01 Permissive Change Policy v06
- FCC KDB 484596 D01 Referencing Test Data v02r03.

We have performed partial testing on model SC2328 where we got the following results:

5. MEASUREMENT RESULTS FOR SAR (SPECIFIC ABSORPTION RATE)

5.1. TETRA SPOT CHECKING

Antenna	Exposure Conditions	Position	Dist (mm)	Frequency (MHz)	Estimated SAR 10-g (W/kg)	SAR 10-g (W/kg)	Power Drift (%)	Plot No.
300-00498	Head	Left Tilt – Battery model 300-01852	0	868.98	2.47	2.60	-0.16	1
300-00498	Front of Face	Front of face – Battery model 300-01853	25	868.98	0.60	0.63	-0.09	2
300-00498	Body	Back face – Battery model 300-01852	5	860.00	1.68	1.76	0.03	3

The SAR measurements for the SC2328 model, using the worst-case SAR measurement on the SC2028, are lower than those for the SC2028, and are in the uncertainty range of the laboratory, as shown in the following table:

Exposure Conditions	Position	Dist (mm)	Frequency (MHz)	SC2328 SAR 1-g (W/kg)	SC2028 SAR 1-g (W/kg)	Δ SAR SC2328 and SC2028 (W/kg)	SC2328 Plot No.
Head	Left Tilt – Battery model 300-01852	0	868.98	2.600	2.840	-0.240	1
Front of face	Front of face – Battery model 300-01853	25	868.98	0.627	0.645	-0.018	2
Body	Back face – Battery model 300-01852	5	860.00	1.760	1.880	-0.120	3

Again we got a difference smaller than 3 dB. In this case, 0.24 W/kg is the maximum difference. **So we are in compliance with the KDB criteria.**

RF EXPOSURE

And finally, we have leveraged the RF exposure assessment. As I said before, the same hardware, same antennas, same frequency and software are used to generate the TETRA signal. So, in the RF assessment nothing would change between SC2028 and SC2328.

3.2 EMC

Full testing has been done for model SC2328 against FCC Rules and Regulations CFR 47, Part 15, Subpart B (10-1-21 Edition). So we don't need to leverage any test result from other device.

ANNEX 1: CROSS REFERENCE TABLE

Reference device	Variant device	Key Differences
FCC ID XX6SC2028	FCC ID XX6SC2328X	Both variants share the same main PCB. The Bluetooth / WLAN module is a separate module that plugs into the main PCB. The SC2328 without Bluetooth/WLAN module is a subset of the SC2028 with Bluetooth/WLAN module, with the Bluetooth / WLAN module removed and a reduced key mat and associated bezel. The same hardware, same antennas, same frequency and software are used to generate the TETRA signal.

Rule Part	Test item	Data Reference	Comments
TNB			
FCC 90.205	Maximum Conducted Output Power	N	Full testing for model SC2028 and spot checking for model SC2328
FCC 90.209	Bandwidth Limitations	Y	Full testing for model SC2028 and data reference for model SC2328
FCC 90.210	Spurious Emissions at Antenna Terminals	N	Full testing for model SC2028 and spot checking for model SC2328
FCC 90.210	Frequency stability	Y	Full testing for model SC2028 and data reference for model SC2328
FCC 90.214	Transient Frequency Behaviour	Y	Full testing for model SC2028 and data reference for model SC2328

FCC 90.221	Adjacent Channel Power	Y	Full testing for model SC2028 and data reference for model SC2328
FCC 90.207	Types of Emissions	Y	Full testing for model SC2028 and data reference for model SC2328
FCC 90.210	Radiated Spurious Emissions	N	Full testing for model SC2028 and spot checking for model SC2328

Rule Part	Test item	Data Reference	Comments
FCC 2.1091 FCC 2.1093 FCC 1.1310 FCC 1.1307	RF Exposure Exemption evaluation	Y	Full testing for model SC2028 and data reference for model SC2328 <i>Note: the same hardware, same antennas, same frequency and software are used to generate the TETRA signal. So, in the RF assessment nothing would change between SC2028 and SC2328.</i>
FCC 2.1093	MEASUREMENT RESULTS FOR SAR (SPECIFIC ABSORPTION RATE)	N	Full testing for model SC2028 and spot checking for model SC2328

Unintentional radiator (EMC) is out of the certification scope.

Rule Part	Test item	Data Reference	Comments
JAB			

FCC 15.107	CE Continuous Conducted emission	N/A	According to the standard, this test is not applicable because EUT is powered in DC (internal battery)
FCC 15.109	RE Radiated emission. Electromagnetic field measure	N	Full testing for model SC2028 and for model SC2328

Acceptance Criteria for all test cases**FCC Part 90 (TNB)**

For the same conditions, we have compared the maximum conducted output power measured in both models. And we have verified that the difference is <3 dB.