TEST REPORT

Test Report No. : UL-RPT-RP14547111-116B

Manufacturer	:	Sound Devices LLC
Model No.	:	9295W with 11225.000 Antenna
FCC ID	:	2AKLX-9295W
Test Standard(s)	:	Antenna Gain Measurement (Derived from FCC Part 15.236(d)(2))

1. This test report shall not be reproduced except in full, without the written approval of UL International (UK) Ltd.
2. The results in this report apply only to the sample(s) tested.
3. The sample tested is in compliance with the above standard(s).
4. The test results in this report are traceable to the national or international standards.
5. Version 2.0 supersedes all previous versions.

Date of Issue: 02 November 2022

Checked by:

Ben Mercer
Lead Project Engineer, Radio Laboratory

Company Signatory:

Sarah Williams
RF Operations Leader, Radio Laboratory

ilac-MRA UKAS TESTING 5772

This laboratory is accredited by the United Kingdom Accreditation Service (UKAS). UKAS is one of the signatories to the International Laboratory Accreditation Co-operation (ILAC) Arrangement for the mutual recognition of test reports. The tests reported herein have been performed in accordance with its terms of accreditation.

UL International (UK) Ltd
Unit 1-3 Horizon, Kingsland Business Park, Wade Road, Basingstoke, Hampshire, RG24 8AH, UK
Telephone: +44 (0)1256 312000
Facsimile: +44 (0)1256 312001

Customer Information

Company Name:	Sound Devices LLC
Address:	PO Box 576, E7556 State Rd 23-33, Reedsburg, WI 53959, United States

Report Revision History

Version Number	Issue Date	Revision Details	Revised By
1.0	27/10/2022	Initial Version	Ben Mercer
2.0	02/11/2022	Implemented TCB feedback	Ben Mercer

Table of Contents

1. Attestation of Test Results

1.1. Description of EUT

The Equipment Under Test was a professional (body-worn) miniature microphone transmitter operating in the 614 MHz to 698 MHz frequency band including a ¼ wavelength whip antenna.

1.2. General Information

Specification Reference:	47CFR15.236
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) – Section 15.236
Site Registration:	685609
Lab. Designation No.:	UK2011
Location of Testing:	Unit 3 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, G24 8AH, United Kingdom
Test Date:	21 October 2022

1.3. Summary of Test Results

FCC Reference (47CFR)	Measurement
Part 15.236(d)(2) / ANSI C63.10 Annex G	Antenna Gain

Results:

Frequency (MHz)	Conducted Output Power (dBm)	Radiated Output Power (dBm)	Antenna Gain (dBd)	Antenna Gain (dBi)
615.000	22.24	22.75	0.51	2.66
657.100	22.53	20.22	-2.31	-0.16
660.000	22.03	20.34	-1.69	0.46
662.900	22.08	20.21	-1.87	0.28

Notes:

1. Antenna gain in dBd was calculated in accordance with ANSI C63.10 G.3:

$$ERP = P_T + G_T - L_C$$

Rearranged to: $G_T = ERP + L_C - P_T$

LC is ignored since there is no cable connected between transmitter and antenna.

2. Antenna gain in dBi was calculated in accordance with ANSI C63.10 G.4:

$$G_T(dBd) = G_T(dBi) – 2.15\ dB$$

Rearranged to: $G_T(dBi) = G_T(dBd) + 2.15\ dB$

1.4. Deviations from the Test Specification

For the measurements contained within this test report, there were no deviations from, additions to, or exclusions from the test specification identified above.

2. Summary of Testing

2.1. Facilities and Accreditation

The test site and measurement facilities used to collect data are located at Unit 3 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, RG24 8AH, United Kingdom. The following table identifies which facilities were utilised for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

Site 1	
Site 2	
Site 17	X

UL International (UK) Ltd is accredited by UKAS. The tests reported herein have been performed in accordance with its terms of accreditation.

2.2. Methods and Procedures

Reference:	ANSI C63.10-2013
Title:	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
Reference:	KDB 206256 D01 Wireless Microphone Certification v02r01, October 25, 2022
Title:	Basic Certification Requirements for Wireless Microphones

2.3. Measurement Uncertainty & Decision Rule

Overview

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

Decision Rule

The decision rule applied is based upon the accuracy method criteria. The measurement uncertainty is met and the result is considered in conformance with the requirement criteria if the observed value is within the prescribed limit.

Measurement Uncertainty

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor such that a confidence level of approximately 95% is maintained. For the purposes of this document “approximately” is interpreted as meaning “effectively” or “for most practical purposes”.

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
Maximum Peak Output Power (Conducted)	614 MHz to 698 MHz	95%	±1.13 dB
Maximum Peak Output Power (Radiated)	614 MHz to 698 MHz	95%	±3.3 dB

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty the published guidance of the appropriate accreditation body is followed.

2.4. Test and Measurement Equipment

Test Equipment Used for Conducted Tests

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2003	Thermohygrometer	Testo	608-H1	45046641	09 Dec 2022	12
M1874	Test Receiver	Rhode & Schwarz	ESU26	100553	09 May 2023	12
G217350	Vector Signal Generator	Rhode & Schwarz	SMM100A	101777	04 Apr 2025	36
A2946	Attenuator	AtlanTecRF	AN18W5-20	208146#1	Calibrated Before use	-

Test Equipment Used for Transmitter Radiated Emissions Tests

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
K0017	3m RSE Chamber	Rainford	N/A	N/A	26 Oct 2022	12
M2003	Thermohygrometer	Testo	608-H1	45046641	09 Dec 2022	12
M1874	Test Receiver	Rhode & Schwarz	ESU26	100553	09 May 2023	12
A3167	Pre Amplifier	Com Power	PAM-103	18020010	20 Oct 2022	12
A2916	Attenuator	AtlanTecRF	AN18W5-10	832827#2	26 Jan 2023	12
A3161	Antenna	Chase	CBL6111D	50859	03 May 2023	12

3. Equipment Under Test (EUT)

3.1. Identification of Equipment Under Test (EUT)

Brand Name:	A20-MINI
Model Name or Number:	9295W with 11225.000
Test Sample Serial Number:	GE9922164002
Hardware Version:	5
Firmware Version:	7.00.6158
FCC ID:	2AKLX-9295W

3.2. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.3. Additional Information Related to Testing

Tested Technology:	Short Range Device (Digital Transmission System)	
Power Supply Requirement:	Nominal	3.6 VDC
Type of Unit:	Transceiver	
Modulation:	COFDM	
Transmit Frequency Range:	614 MHz to 616 MHz	
Transmit Channels Tested:	**Channel ID**	**Channel Frequency (MHz)**
	Middle	615.0
Transmit Frequency Range:	657 MHz to 663 MHz	
Transmit Channels Tested:	**Channel ID**	**Channel Frequency (MHz)**
	Bottom	657.1
	Middle	660.0
	Top	662.9

3.4. Description of Available Antennas

The radio utilizes an external whip antenna with the maximum measured gain stated below. The measured conducted peak output power was subtracted from the measured peak ERP to obtain the antenna gain in dBd. The gain in dBi was calculated by adding 2.15 dB.

Antenna Type	Model Number	Frequency Range (MHz)	Antenna Gain (dBd)	Antenna Gain (dBi)
¼ Wavelength Whip	11225.000	615.000	0.51	2.66
		657.100	-2.31	-0.16
		660.000	-1.69	0.46
		662.900	-1.87	0.28

3.5. Description of Test Setup

Support Equipment

The following support equipment was used to exercise the EUT during testing:

Description:	Laptop PC
Brand Name:	HP
Model Name or Number:	Spectre Pro x360
Serial Number:	5CD6218MQ8

Description:	Laptop PC
Brand Name:	Dell
Model Name or Number:	Precision M6800
Serial Number:	86BSM12

Description:	Lavaliere Microphone
Brand Name:	Not marked or stated
Model Name or Number:	VT506WA-1934
Serial Number:	Not marked or stated

Description:	USB-TTL Interface Cable
Brand Name:	Not marked or stated
Model Name or Number:	Not marked or stated
Serial Number:	Not marked or stated

Operating Modes

The EUT was tested in the following operating mode(s):

- Continuously transmitting at maximum power with a modulated carrier on bottom, middle and top channels as required.

Configuration and Peripherals

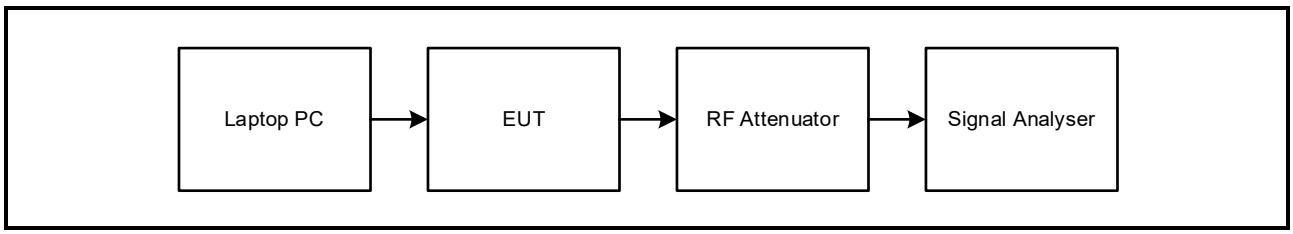
The EUT was tested in the following configuration(s):

- Controlled in test mode using a software application on the laptop PC supplied by the customer. The application was used to enable a continuous transmission and to select the test channels as required. The customer supplied a document containing the setup instructions ‘Set-Up_Instructions_v5.5.pdf. The laptop PC was connected to the EUT via USB-C cable.
- The power setting was set to 40 mW.
- Radiated peak output power tests were performed with the EUT in all 3 orientations. A lavaliere microphone was connected to the EUT.
- The EUT was powered from 3 x 1.5 V AAA alkaline batteries.
- The external whip antenna was removed to enable conducted measurements.

Test Setup Diagrams

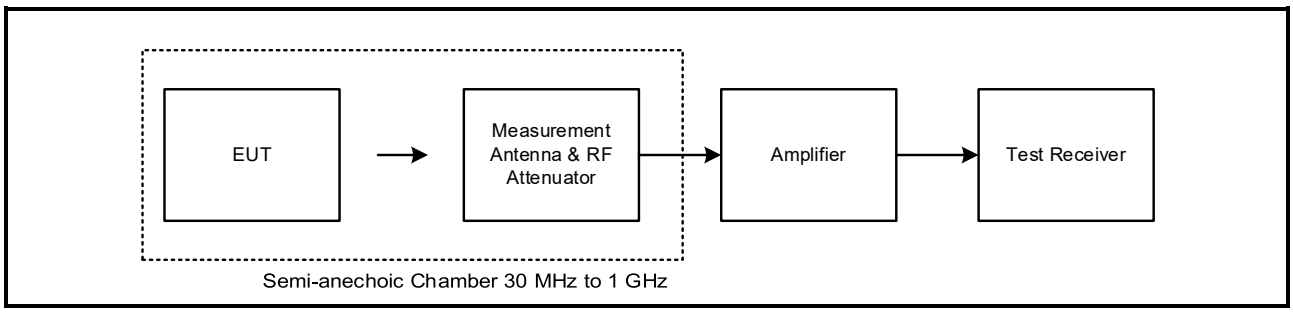
Conducted Tests:

Test Setup for Transmitter Conducted Peak Output Power



Radiated Tests:

Test Setup for Transmitter Radiated Peak Output Power



4. Test Results

4.1. Transmitter Maximum Peak Output Power (Conducted)

Test Summary:

Test Engineer:	Jose Bayona	**Test Date:**	21 October 2022
Test Sample Serial Number:	GE9922164002		

FCC Reference:	Part 15.236(d)(2)
Test Method Used:	FCC KDB 206256 Section IV(d) referencing ANSI C63.10 Section 6.5 & 11.9.1.1

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	43

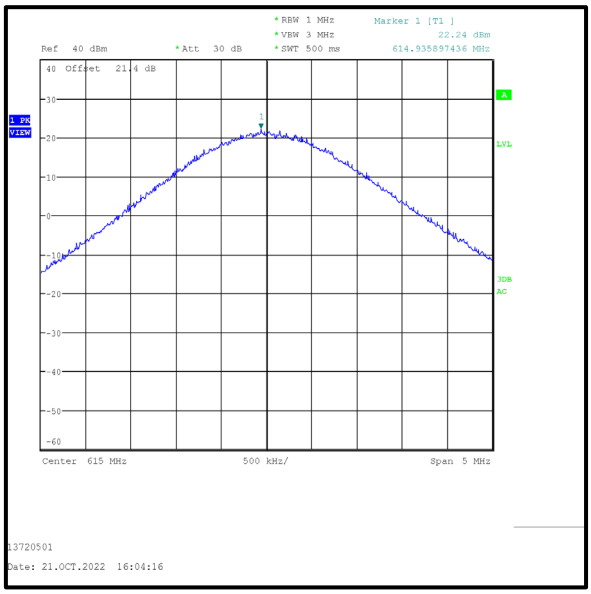
Note(s):

1. Conducted power tests were performed using a signal analyser in accordance with ANSI C63.10 Section 6.5 procedure.
2. The signal analyser resolution bandwidth was set to 1 MHz and video bandwidth of 3 MHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold. The span was set to 5 MHz. A marker was placed at the peak of the signal and the results recorded in the tables below.
3. The signal analyser was connected to the RF port on the EUT using suitable attenuation and RF cable. An RF level offset was entered on the signal analyser to compensate for the loss of the attenuator and RF cable.

Transmitter Maximum Peak Output Power (Conducted) (continued)

Results: 614 MHz to 616 MHz Band

Channel	Conducted Peak Power (dBm)
Middle	22.24

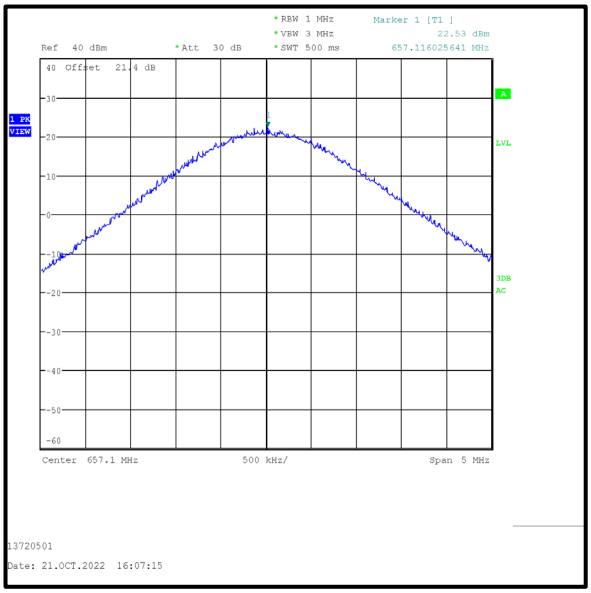


Middle Channel

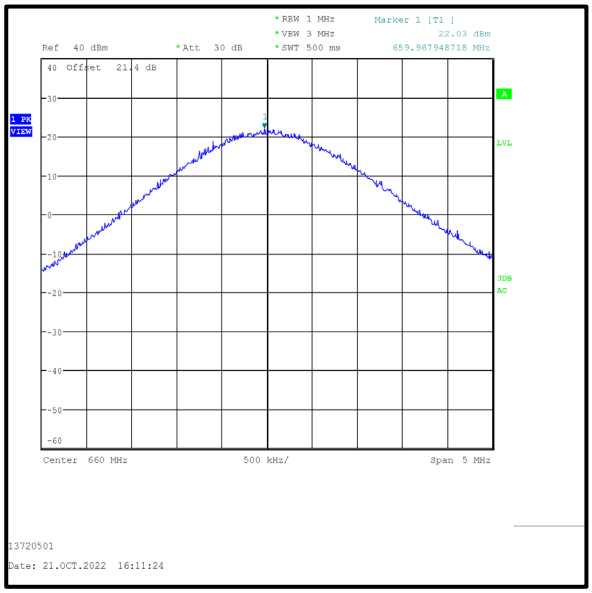
Transmitter Maximum Peak Output Power (Conducted) (continued)

Results: 657 MHz to 663 MHz Band

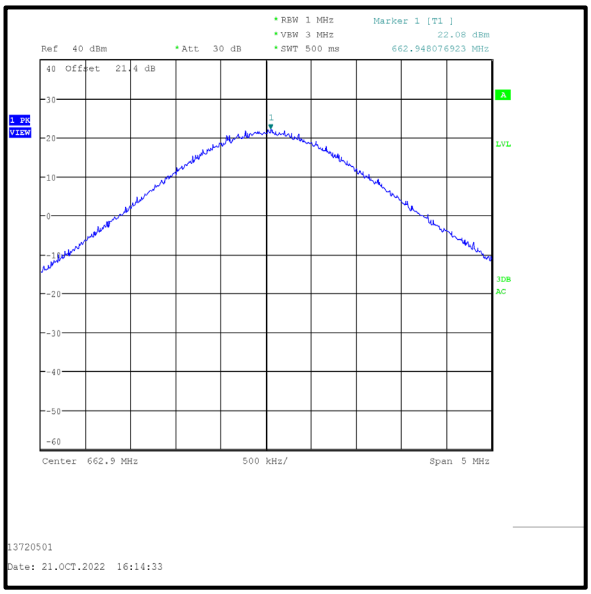
Channel	Conducted Peak Power (dBm)
Bottom	22.53
Middle	22.03
Top	22.08



Bottom Channel



Middle Channel



Top Channel

4.2. Transmitter Maximum ERP (Radiated)

Test Summary:

Test Engineer:	Jose Bayona	**Test Date:**	21 October 2022
Test Sample Serial Number:	GE9922164002		

FCC Reference:	Part 15.236(d)(2)
Test Method Used:	FCC KDB 206256 Section IV(d) referencing ANSI C63.10 Section 6.5

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	43

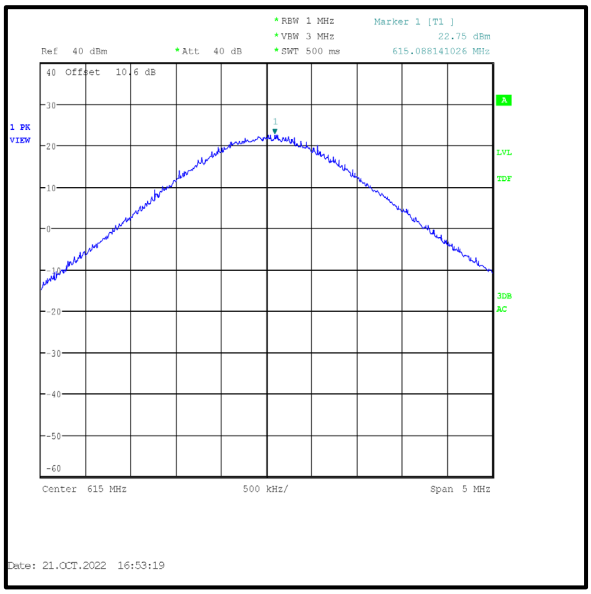
Note(s):

1. Radiated power tests were performed using a signal analyser in accordance with ANSI C63.10 Section 6.5.
2. The signal analyser resolution bandwidth was set to 1 MHz and video bandwidth of 3 MHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold. The span was set to 5 MHz. A marker was placed at the peak of the signal and the results recorded in the tables below.

Transmitter Maximum ERP (Radiated) (continued)

Results: 614 MHz to 616 MHz Band

Channel	Peak ERP (dBm)
Middle	22.75

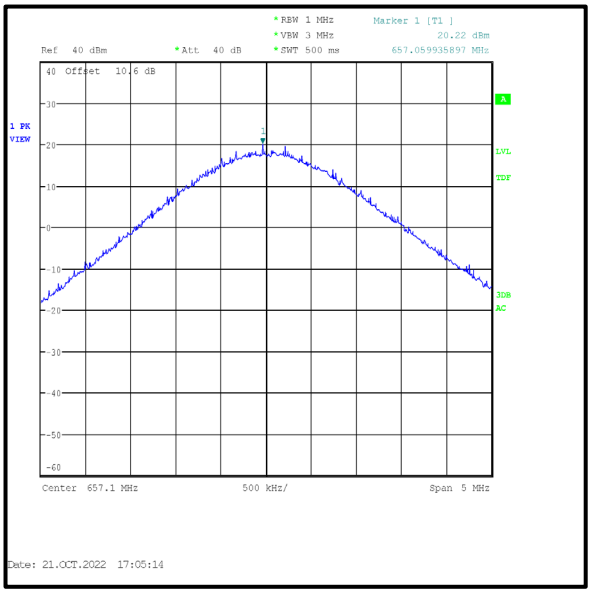


Middle Channel

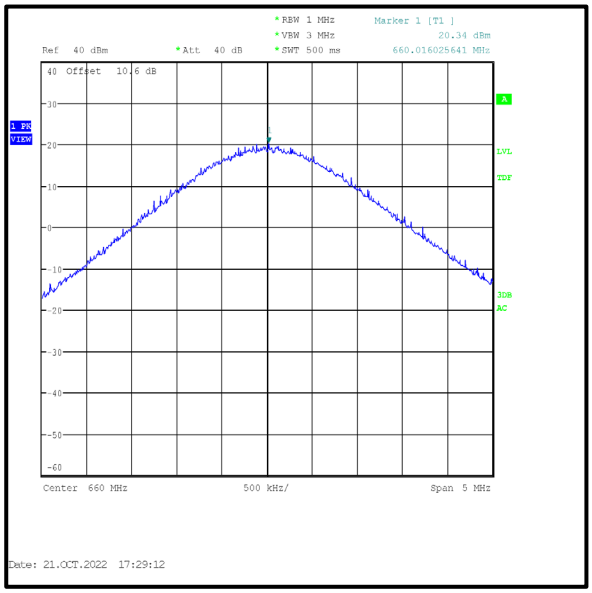
Transmitter Maximum ERP (Radiated) (continued)

Results: 657 MHz to 663 MHz Band

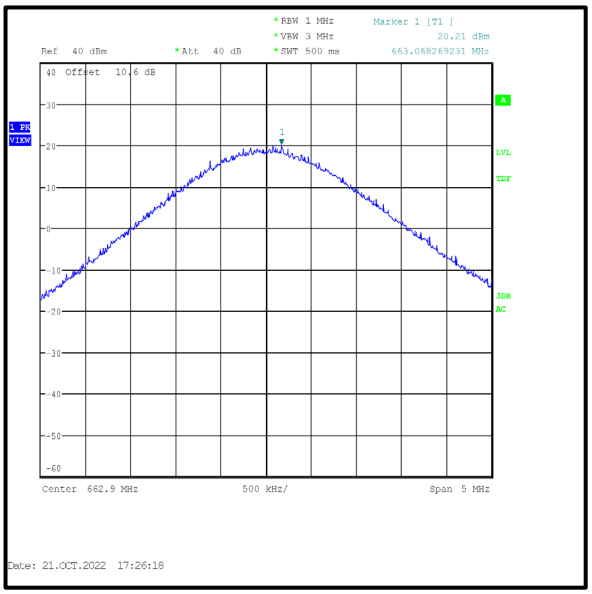
Channel	Peak ERP (dBm)
Bottom	20.22
Middle	20.34
Top	20.21



Bottom Channel



Middle Channel



Top Channel

--- END OF REPORT ---