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### **TEST REPORT**

Test Result :	PASS *			
Date of Issue:	2023/05/19			
Date of Test:	2023/04/30 to 2023/05/02			
Date of Receipt:	2023/04/21			
Standards:	FCC 47 CFR Part 15, Subpart C 15.225			
FCC ID:	2AUCY-V2247			
Trade Mark:	vivo			
Model No.:	V2247			
EUT Description:	Mobile Phone			
Address of Manufacturer:	No.1, vivo Road, Chang'an, Dongguan,Guangdong,China			
Manufacturer:	vivo Mobile Communication Co., Ltd.			
Address of Applicant:	No.1, vivo Road, Chang'an, Dongguan,Guangdong,China			
Applicant:	vivo Mobile Communication Co., Ltd.			
Application No.:	XEWM2304000193RG			

\* In the configuration tested, the EUT detailed in this report complied with the standards specified above.

Authorized Signature:

Pore Tom

Peter Tan Regulatory Technical Manager



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#### 1 Version

Revision Record					
Version	Remark				
01		2023/05/19		Original	

Prepared By	Leah chen		
Checked By	Anely Yao		
-	(Andy Yao) /Reviewer		



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#### 2 Test Summary

Test Item	FCC Rules No.	FCC Rules No. Test Method		Result
Antenna Requirement	15.203		Clause 4.1	PASS
AC Power Line Conducted Emission	15.207	ANSI C63.10-2020 Section 6.2	Clause 4.2	PASS
20dB Spectrum Bandwidth	Spectrum Bandwidth 15.215(c) ANSI C63.10-2020 Section 6.9.2		Clause 4.3	PASS
Frequency Stability	15.225(e)	ANSI C63.10-2020 Section 6.8	Clause 4.4	PASS
Field Strength of Fundamental Emissions	15.225(a)(b)(c)	ANSI C63.10-2020 Section 6.4.7	Clause 4.5	PASS
Radiated Spurious Emissions	15.225(d)/15.209	ANSI C63.10-2020 Section 6.4/6.5	Clause 4.6	PASS



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#### **3** General Information

#### 3.1 Details of Client

Applicant:	vivo Mobile Communication Co., Ltd.	
Address of Applicant:	No.1, vivo Road, Chang'an, Dongguan, Guangdong, China	
Manufacturer:	vivo Mobile Communication Co., Ltd.	
Address of Manufacturer:	No.1, vivo Road, Chang'an, Dongguan, Guangdong, China	

#### 3.2 Test Location

Company:	SGS-CSTC Standards Technical Services (Xi'an) Co., Ltd.		
Address:	1/F, Unit D, Building 1, Kanghong Orange Science Park, No.137, Keyuan 3rd Road, Fengdong New Town, Xi' an, Shaanxi China		
Post code:	710086		
Test engineer:	Ken Liu		

#### 3.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

#### •A2LA (Certificate No. 4854.01)

SGS-CSTC Standards Technical Services (Xi'an) Co., Ltd. is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 4854.01.

#### Innovation, Science and Economic Development Canada

SGS-CSTC Standards Technical Services (Xi'an) Co., Ltd. has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0095.

IC#: 25613.

#### • FCC –Designation Number: CN1337

SGS-CSTC Standards Technical Services (Xi'an) Co., Ltd. has been recognized as an accredited testing laboratory.

Designation Number: CN1337.

Test Firm Registration Number: 917410



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#### 3.4 General Description of EUT

EUT Description:	Mobile Phone	
Model No.:	V2247	
Trade Mark:	vivo	
Hardware Version:	MP_0.1	
Software Version:	PD2280IF_EX_A_13.0.6.1.W30	
IMEI:	863548060194937	
Operation Frequency:	13.56MHz	
Modulation Type:	ASK	
Antenna Type:	Loop Antenna	
Remark:		
As above information is provided and confirmed by the applicant. SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.		



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#### 3.5 Test Environment

Environment Parameter	96~98 kPa Selected Values During Tests			
Relative Humidity	40-60 % RH Ambient			
Value	Temperature(°C) Voltage(V)			
NTNV 22~25 3.89				
Remark: The extreme Voltage and extreme Temperature are refer to the test data of Frequency Stability.				

### 3.6 Description of Support Units

The EUT has been tested as an independent unit.



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#### 4 Test results and Measurement Data

#### 4.1 Antenna Requirement

Standard requirement:	47 CFR Part 15C Section 15.203			
15.203 requirement:				
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.				
The antenna of the EUT are	permanently attached.			



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#### 4.2 AC Power Line Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.207			
Test Method:	ANSI C63.10-2020 Section 6.2			
Test Frequency Range:	150kHz to 30MHz			
Limit:		Limit (d	BuV)	
	Frequency range(MHZ)	Quasi-peak	Average	
	0.15-0.5	66 to 56*	56 to 46*	
	0.5-5	56	46	
	5-30	60	50	
	* Decreases with the log	arithm of the frequency.		
Test Procedure:	<ul> <li>5-30 60 50</li> <li>* Decreases with the logarithm of the frequency.</li> <li>1) The mains terminal disturbance voltage test was conducted in a shielded room.</li> <li>2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50µH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.</li> <li>3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.</li> <li>5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to</li> </ul>			



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Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission



2. Value =Reading[dBµV] + Factor(Lisn factor[dB] + cable loss[dB]).

3. Margin = Limit[ $dB\mu V$ ] – Value[ $dB\mu V$ ]



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1. The following Quasi-Peak and Average measurements were performed on the EUT:

2. Value =Reading[dBµV] + Factor(Lisn factor[dB] + cable loss[dB]).

3. Margin = Limit[dB $\mu$ V] – Value[dB $\mu$ V]



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#### Test Requirement: 47 CFR Part 15C Section 15.215(c) **Test Method:** ANSI C63.10-2020 Section Test Setup: SGS Test system 0 PC 0 ion 9 rol Unit 0 0 \_ E.U.T Analog Signal Gene DC Pov ī Ground Reference Plane Instruments Used: Refer to section 6 for details Limit: Intentional radiators must be designed to ensure that the 20dB in the specific band 13.553~13.567MHz. **Test Results:** Pass The detailed test data see: Appendix

#### 4.3 20dB Spectrum Bandwidth



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#### 4.4 Frequency Stability





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#### 4.5 Field Strength of Fundamental Emissions

Test Requirement:	47 CFR Part 15C Section 15.225				
Test Method:	ANSI C63.10-2020 Section 6.4.7				
Test Site:	Measurement Distance:	3m (Semi-Anecho	ic Chamber)		
Limit:	Frequency	Field Strength ( $\mu$ V/m) at 30m	Field Strength (dB $\mu$ V/m) at 30m	Field Strength (dB μ V/m) at 10m	Field Strength (dB μ V/m) at 3m
	1.705~13.110 MHz	30	29.5	48.58	69.5
	13.110-13.410 MHz	106	40.5	59.58	80.5
	13.410-13.553 MHz	334	50.5	69.58	90.5
	13.553-13.567 MHz	15,848	84.0	103.08	124.0
	13.567-13.710 MHz	334	50.5	69.58	90.5
	13.710-14.010 MHz	106	40.5	59.58	80.5
	14.010~30.000 MHz	30	29.5	48.58	69.5
Test Setup:	t Setup:				
rest Flocedule.	<ul> <li>at a 3 or 10 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>b. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li> <li>c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</li> <li>d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.</li> </ul>				



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	<ul> <li>e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>f. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the Y axis positioning which it is worse case.</li> <li>g. Repeat above procedures until all frequencies measured was complete.</li> <li>h. RBW set to 9kHz.</li> </ul>					
Exploratory Test Mode:	Transmitting with modulation. Charge + Transmitting mode.					
Final Test Mode:	<b>Transmitting with modulation.</b> Pretest the EUT at Charge + Transmitting mode.Only the worst case is recorded in the report.					
Instruments Used:	Refer to section 6 for details					
Test Results:	Pass					
The detailed test data	see: Appendix					



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#### 4.6 Radiated Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.225							
Test Method:	ANSI C63.10-2020 Section 6.4&6.5							
Test Site:	Measurement Distance:	3m (Semi-Anecho	ic Chamber)	)				
Limit:	Frequency Field strength Limit (microvolt/meter) (dBuV/m) Remark dis							
	0.009MHz-0.490MHz	2400/F(kHz)	-	-	300			
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30			
	1.705MHz-30MHz	30	-	-	30			
	30MHz-88MHz	100	40.0	Quasi-peak	3			
	88MHz-216MHz	150	43.5	Quasi-peak	3			
	216MHz-960MHz	200	46.0	Quasi-peak	3			
	Above 960MHz	500	54.0	Quasi-peak	3			
Remark: The emission limits shown in the above table are based on measurer employing a CISPR quasi-peak detector except for the frequency bands 9-90k 110-490kHz and above 1000 MHz. Radiated emission limits in these three bar based on measurements employing an average detector, the peak field streng any emission shall not exceed the maximum permitted average limits specified by more than 20 dB under any condition of modulation.								

#### Test Setup:



determine the maximum value of the field strength. Both horizontal and vertical



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	polarizations of the antenna are set to make the measurement.					
	<ol> <li>For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters(for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.</li> </ol>					
m. The test-receiver system was set to Peak Detect Function and Specifi Bandwidth with Maximum Hold Mode.						
	<ul> <li>n. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the Y axis positioning which it is worse case.</li> </ul>					
	o. Repeat above procedures until all frequencies measured was complete.					
Exploratory Test	Transmitting with modulation.					
Mode:	Charge + Transmitting mode.					
Final Test Mode:	Transmitting with modulation.					
	Pretest the EUT at Charge + Transmitting mode.Only the worst case is recorded in the report.					
Instruments Used:	Refer to section 6 for details					
Test Results:	Pass					
The detailed test data	see: Appendix					



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### 5 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty		
1	Radio Frequency	± 7.25 x 10 <sup>-8</sup> GHz		
2	Occupied Bandwidth	± 0.2%		
3	Conduction Emission	± 3.0dB (150kHz to 30MHz)		
4	Dodicted Emission	± 4.6dB (9kHz to 30MHz)		
	Radiated Emission	± 4.9dB (30MHz to 1GHz)		

Remark:

The U<sub>lab</sub> (lab Uncertainty) is less than U<sub>cispr/ETSI</sub> (CISPR/ETSI Uncertainty), so the test results – compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit; – non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.



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### 6 Equipment List

RF Test System								
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy/mm/dd)	Cal.Due date (yyyy/mm/dd)			
MXA signal analyzer	Agilent	N9020A	XAW01-06-07	2023/02/16	2024/02/15			
MXG vector signal Generator	Agilent	N5182B	XAW01-07-16	2023/02/16	2024/02/15			
MXG vector signal Generator	Agilent	N5181A	XAW01-07-17	2022/09/14	2023/09/13			
Measurement Software	Tonscend	JS1120-3 (3.2.18)	XAW02-14-01	NCR	NCR			
RF control unit	Tonscend	JS0806-2	XAW03-37-01	NCR	NCR			
Power Meter	Anritsu	ML2495A	XAW01-25-03	2023/02/16	2024/02/15			
temperature chamber	Votsch	VT4002	XAW01-18-01	2023/02/16	2024/02/15			
Power Supply	Agilent	66311B	XAW01-17-01	2023/02/16	2024/02/15			
Radio communication analyzer	Rohde & Schwarz	CMW500	XAW01-03-01	2023/02/16	2024/02/15			
Temperature and humidity meter	MingGao	T809	XAW01-01-16	2022/09/18	2023/09/17			

CE Test System								
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy/mm/dd)	Cal.Due date (yyyy/mm/dd)			
Shielding Room	Brilliant-emc	N/A	XAW04-03-01	N/A	N/A			
Test receiver	ROHDE&SCHWARZ	ESR	XAW01-08-01	2022/09/08	2023/09/07			
Artificial network	ROHDE&SCHWARZ	ENV216	XAW01-04-01	2022/06/30	2023/06/29			
Temperature and humidity meter	MingGao	TH101B	XAW01-01-02	2022/09/18	2023/09/17			
Measurement Software	Tonscend	TS+ V4.0.0.0	XAW02-07-01	NCR	NCR			
Radio communication analyzer	ROHDE&SCHWARZ	CMW 500	XAW01-03-02	2023/02/16	2024/02/15			
Artificial network	ROHDE&SCHWARZ	ENV216	XAW01-04-02	2022/06/30	2023/06/29			



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RSE Test System							
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy/mm/d d)	Cal.Due date (yyyy/mm/d d)		
Semi-Anechoic Chamber	Brilliant-emc	N/A	XAW03-35-01	2021/09/09	2024/09/08		
MXA signal analyzer	Keysight	N9020A	XAW01-06-01	2023/02/16	2024/02/15		
Spectrum Analyzer	ROHDE &SCHWARZ	FSV3044	XAW01-13-05	2022/05/24	2023/05/23		
Test receiver	ROHDE &SCHWARZ	ESR	XAW01-08-01	2022/09/08	2023/09/07		
Receiving antenna (30MHz-3GHz)	Schwarzbeck	VULB 9163	XAW01-09-01	2022/07/28	2024/07/27		
Directional antenna rack controller	Max-Full	MF-7802BS	XAW03-03-01	NCR	NCR		
High-speed antenna rack controller	Max-Full	MF-7802	XAW03-04-01	NCR	NCR		
Filter bank	Tonscend	JS0806-F	XAW03-05-01	NCR	NCR		
Filter bank	Tonscend	JS0806s	XAW03-05-02	NCR	NCR		
Amplifier	Tonscend	TAP9K3G32	XAW01-41-01	2022/05/24	2023/05/23		
Temperature and humidity meter	MingGao	TH101B	XAW01-01-02	2022/09/18	2023/09/17		
Radio communication analyzer	ROHDE&SCH WARZ	CMW 500	XAW01-03-02	2023/02/16	2024/02/15		
Measurement Software	Tonscend	TS+ V4.0.0.0	XAW02-05-01	NCR	NCR		
Loop Antenna	Schwarzbeck	FMZB 1519B	XAW01-48-02	2022/05/26	2023/05/25		



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### 7 Photographs - Setup Photos

Refer to Appendix A.4 NFC Setup Photos.



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# Appendix



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#### 20dB Bandwidth



Note:

Because the measured signal is CW or CW-like adjusting the RBW per C63.10 would not be practical since measured bandwidth will always follow the RBW and the result will be approximately twice the RBW.



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#### **Frequency tolerance**

Declared Frequency (MHz)		13.56MHz				
			Startup			
Temperature (°C)	Voltage(VDC) F		leasurement equency(MHz)	Frequency Tolerance (%)	Limit (%)	Result
50			13.55997	0.00221		Pass
40			13.56000	0.00000		Pass
30	- 3.89		13.55998	0.00147	±0.01	Pass
20			13.55999	0.00074		Pass
10			13.55999	0.00074		Pass
0			13.55998	0.00147		Pass
-10			13.56003	-0.00021		Pass
-20			13.55998	0.00147		Pass
20	4.48		13.55999	0.00074		Pass
20	3.60		13.55998	0.00147		Pass

Declared Fre	equency (MHz)		13.56MHz			
			2mins			
Temperature (°C)	Voltage(VDC)	N Fre	/leasurement equency(MHz)	Frequency Tolerance (%)	Limit (%)	Result
50			13.55996	0.00295		Pass
40			13.55998	0.00147		Pass
30	3.89		13.55999	0.00074	+0.01	Pass
20			13.55997	0.00221		Pass
10			13.55999	0.00074		Pass
0			13.55998	0.00147	10.01	Pass
-10			13.55996	0.00295		Pass
-20			13.56003	-0.00221		Pass
20	4.48		13.55996	0.00295		Pass
20	3.60		13.55997	0.00221		Pass



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Declared Fre	Declared Frequency (MHz) 13.56MHz								
	5mins								
Temperature (°C)	Voltage(VDC)	N Fre	/leasurement equency(MHz)	Frequency Tolerance (%)	Limit (%)	Result			
50			13.55998	0.00147		Pass			
40			13.55999	0.00074		Pass			
30	3.89		13.55996	0.00295	±0.01	Pass			
20			13.55997	0.00221		Pass			
10			13.55999	0.00074		Pass			
0			13.55997	0.00221		Pass			
-10			13.55998	0.00147		Pass			
-20			13.55996	0.00295		Pass			
20	4.48		13.55996	0.00295		Pass			
	3.60		13.55997	0.00221		Pass			

Declared Frequency (MHz)			13.56MHz			
10mins						
Temperature (°C)	Voltage(VDC)	N Fre	leasurement equency(MHz)	Frequency Tolerance (%)	Limit (%)	Result
50	3.89		13.55999	0.00074	±0.01	Pass
40			13.55997	0.00221		Pass
30			13.55996	0.00295		Pass
20			13.55998	0.00147		Pass
10			13.55998	0.00147		Pass
0			13.55997	0.00221		Pass
-10			13.55996	0.00295		Pass
-20			13.56003	-0.00221		Pass
20	4.48		13.55998	0.00147	-	Pass
	3.60	3.60		0.00147		Pass



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### **Field Strength of Fundamental Emissions**

3. Factor=Cable loss.



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3. Factor=Cable loss.



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#### **Radiated Spurious Emissions**



52.36

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Remark:

4

1. The Quasi-Peak measurements were performed on the EUT.

0.05

32.21

2. Value = Reading + Antenna Factor + Factor.

20.10

3. Factor=Cable loss.

0.149



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104.14

51.78

100

358

Horizontal

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50.34

59.90

51.83

121.93

112.42

104.76

71.59

52.52

52.93

100

100

100

155

358

358

Vertical

Vertical

Vertical

4 0.1387 Remark:

1

2

1. The Quasi-Peak measurements were performed on the EUT.

0.03

0.04

0.05

30.52

39.91

31.62

2. Value = Reading + Antenna Factor + Factor.

19.79

19.95

20.16

3. Factor=Cable loss.

0.0192

0.0574

![](_page_29_Picture_7.jpeg)

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![](_page_30_Figure_2.jpeg)

#### NFC\_RE(Type 4)

2. Final Value Level = Reading + Antenna Factor + Factor.

3. Factor=Cable loss – Preamplifier Factor.

![](_page_30_Picture_6.jpeg)

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![](_page_31_Figure_2.jpeg)

2. Final Value Level = Reading + Antenna Factor + Factor.

3. Factor=Cable loss – Preamplifier Factor.

---End of Report---

![](_page_31_Picture_6.jpeg)

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