





EMC TEST REPORT

Applicant Xiaomi Communications Co., Ltd.

FCC ID 2AFZZFRA65G

Product Mobile Phone

Brand Redmi

Model 2502FRA65G

Report No. R2410A1618-E1

Issue Date December 25, 2024

Eurofins TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC Code CFR47 Part15B (2023)/ ANSI C63.4-2014**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

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Summary of measurement results

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Number	Test Case	Clause in FCC Rules	Conclusion	
1	Radiated Emission	FCC Part15.109, ANSI C63.4-2014	PASS	
2	Conducted Emission	FCC Part15.107, ANSI C63.4-2014	PASS	

Date of Testing: September 23, 2023 ~ October 7, 2023

Date of Sample Received: September 20, 2023

Note: All indications of Pass/Fail in this report are opinions expressed by Eurofins TA Technology (Shanghai) Co., Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only.

2502FRA65G (Report No.: R2410A1618-E1) is a variant model of 23117RA68G (Report No.: R2309A0986-E1).

ID difference between 2502FRA65G and 23117RA68G: battery cover and Deco

The difference is derived from the ID set: Rear main camera bracket,

Motherboard bracket, flash shield, lens, Plastic & metal ring size changes.

Compared with the 23117RA68G, the 2502FRA65G adds a charging IC: SC6601A (Southchip)

Compared with N6, N6R adds NFC chip (THN31FGB1N), supplier: Beijing Tsingteng Microsystem Co., Ltd.

This report tests Radiated Emission, and did not worsen, so they were not recorded in the report.

Test values all duplicated from original report (Report No.: R2309A0986-R1).

The detailed product change description please refers to the Difference Declaration Letter.



1 Test Laboratory

1.1 Notes of the Test Report

This report shall not be reproduced in full or partial, without the written approval of **Eurofins TA Technology (Shanghai) Co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above.

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1.2 Test Facility

FCC (Designation number: CN1179, Test Firm Registration Number: 446626)

Eurofins TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform measurements.

A2LA (Certificate Number: 3857.01)

Eurofins TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform measurement.

1.3 Testing Location

Company: Eurofins TA Technology (Shanghai) Co., Ltd.

Address: Building 3, No.145, Jintang Rd, Pudong Shanghai, P.R.China

City: Shanghai

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2 General Description of Equipment Under Test

2.1 Applicant and Manufacturer Information

Applicant	Xiaomi Communications Co., Ltd.
Applicant address	#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085
Manufacturer	Xiaomi Communications Co., Ltd.
Manufacturer address	#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085

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2.2 General Information

EUT Description								
Device Type	Portable Device							
Model								
		Radiated Emission	IMEI 1: 863357060105648					
	Original	Radiated Emission	IMEI 2: 863357060105655					
I IMEI	Original	Conducted Emission	IMEI 1: 863357060104481					
INVICT		Conducted Emission	IMEI 2: 863357060106499					
	Variant	IMEI 1: 866213070041						
	Variant	IMEI 2: 866213070041	597					
HW Version	135100N6R							
SW Version	Xiaomi Hyper OS1.0							
Antonno Tuno	WWAN/ Wi-Fi/ Blueto	PIFA Antenna						
Antenna Type	NFC	coil Antenna						
	Band	Tx (MHz)	Rx (MHz)					
	GSM 850	824 ~ 849	869 ~ 894					
	GSM 1900	1850 ~ 1910	1930 ~ 1990					
	WCDMA Band II	1850 ~ 1910	1930 ~ 1990					
	WCDMA Band IV	1710 ~ 1755	2110 ~ 2155					
	WCDMA Band V	824 ~ 849	869 ~ 894					
Frequency	LTE Band 2 1850 ~ 1910		1930 ~ 1990					
	LTE Band 4	1710 ~ 1755	2110 ~ 2155					
	LTE Band 5	824 ~ 849	869 ~ 894					
	LTE Band 7	2500 ~ 2570	2620 ~ 2690					
	LTE Band 12	699 ~ 716	729 ~ 746					
	LTE Band 13 777 ~ 787		746 ~ 756					
	LTE Band 17	704 ~ 716	734 ~ 746					

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	LTE Band 26	814 ~ 849	859 ~ 894			
	LTE Band 38	2570 ~ 2620	2570 ~ 2620			
	LTE Band 41	2496 ~ 2690	2496 ~ 2690			
	LTE Band 66	1710 ~ 1780	2110 ~ 2180			
	Bluetooth	2400 ~ 2483.5	2400 ~ 2483.5			
	Wi-Fi 2.4G	2400 ~ 2483.5	2400 ~ 2483.5			
	Wi-Fi 5G (U-NII-1)	5150 ~ 5250	5150 ~ 5250			
	Wi-Fi 5G (U-NII-2A)	5250 ~ 5350	5250 ~ 5350			
	Wi-Fi 5G (U-NII-2C)	5470 ~ 5725	5470 ~ 5725			
	Wi-Fi 5G (U-NII-3)	5725 ~ 5850	5725 ~ 5850			
	NFC	13.56	13.56			
	CA_2C, CA_7C, CA_38C, CA_41C;					
	CA_2A-2A, CA_4A-4A, CA_7A-7A, CA_41A-41A;					
	CA_2A-4A, CA_2A-5A, CA_2A-7A, CA_2A-66A;					
	CA_4A-5A, CA_4A-7A;					
CA Band (DL)	CA_5A-7A, CA_5A-66A; CA_7A-26A, CA_7A-66A;					
	CA_12A-66A;					
	CA_26A-41A;					
	CA_66A-66A, CA_660	C, CA_66B;				
	Auxiliary T	est Equipment				
	PC Manufacturer: Mic	rosoft Corporation				
PC	Model: 1724					
	SN: 032324771953					
Note:						

^{1.} The EUT is sent from the applicant to Eurofins TA and the information of the EUT is declared by the applicant.

2.3 Applied Standards

According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

Test standards FCC Code CFR47 Part15B (2023) ANSI C63.4-2014

2.4 Test Mode

Test Mode	
Mode 1	Adapter +USB cable+ earphone + Front camera On +GNSS Rx +
Wode 1	GSM/WCDMA/LTE/Bluetooth/WLAN receiver
Mode 2	Adapter +USB cable+ earphone + Rear camera On +GNSS Rx +
Wode 2	GSM/WCDMA/LTE/Bluetooth/WLAN receiver
Mode 3	Adapter + USB cable + earphone +PLAY COLORBAR (1KHz)
Mode 4	Adapter + USB cable + earphone + NFC
Mode 5	Adapter + USB cable + earphone + FM(98MHz)
Mode 6	Adapter + USB cable + earphone +GNSS Rx +
wode o	GSM/WCDMA/LTE/Bluetooth/WLAN receiver
Mode 7	USB Copy(PC with EUT) + USB cable + earphone
Mode 8	USB Copy(EUT with PC) + USB cable + earphone
Mode 9	USB Copy(SD card with PC) + USB cable + earphone
Mode 10	USB Copy(SD card with PC) + USB cable + earphone

Test Type	Test Mode	Worst Mode
Radiated Emission	Mode 1, 2, 3, 4, 5, 6, 7, 8, 9, 10	Mode 9
Conducted Emission	Mode 1, 2, 3, 4, 5, 6, 7, 8, 9, 10	Mode 7

During the test, the preliminary test was performed in all modes, the test data of the worst-case condition was recorded in this report.

3 Test Case Results

3.1 Radiated Emission

Ambient Condition

Temperature	Relative humidity		
15°C~35°C	30%~60%		

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Methods of Measurement

The EUT is placed on a non-metallic table 0.8m above the horizontal metal reference ground plane. The distance between EUT and receive antenna should be 3 meters. During the test, the EUT was operating in its typical mode. The test method is according to ANSI C63.4-2014. Sweep the whole frequency band through the range from 30MHz to the 5th harmonic of the carrier. During the test, the height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees for detecting the maximum of radiated signal level.

The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing. During the test, the EUT is worked at maximum output power.

Set the spectrum analyzer in the following:

Below 1GHz:

RBW=100 kHz / VBW=300 kHz / Sweep=AUTO

Above 1GHz:

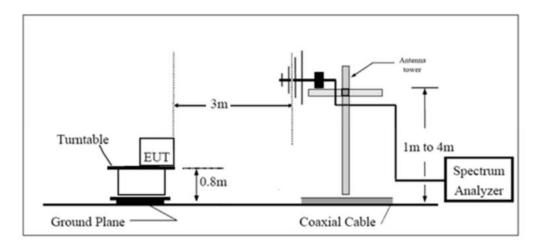
- (a) PEAK Detector: RBW=1MHz / VBW=3MHz/ Sweep=AUTO
- (b) AVERAGE Detector: RBW=1MHz / VBW=3MHz / Sweep=AUTO

The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in lie-down position (X axis) and the worst case was recorded.

During the test, EUT is connected to a laptop via a USB cable in the case of Transfer Data mode. The EUT is used as the peripheral equipment of the PC. The data is transferred from EUT to PC.

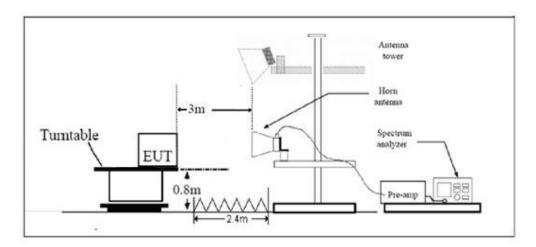
Test Setup

Below 1GHz



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Above 1GHz



Note: Area side: 2.4mX3.6m

Antenna Tower meets ANSI C63.4 requirements for measurements above 1 GHz by keeping the antenna aimed at the EUT during the antenna's ascent/ descent along the antenna mast.

Limits

Class B

Frequency (MHz)	Field Strength (dBµV/m)	Detector
30 -88	40.0	Quasi-peak
88-216	43.5	Quasi-peak
216 – 960	46.0	Quasi-peak
960-1000	54.0	Quasi-peak
1000-5 th harmonic of the highest	54	Average
frequency or 40GHz, which is lower	74	Peak

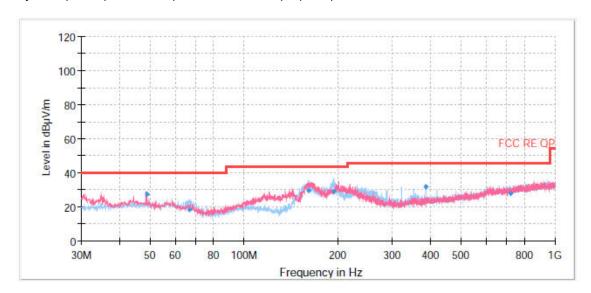
Frequency range of radiated measurements

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705-108	1000
108-500	2000
500-1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower.

Test Results

Sweep the whole frequency band through the range from 30MHz to the 5th harmonic of the carrier.

The following graphs display the maximum values of horizontal and vertical by software. For above 1GHz, Blue trace uses the peak detection, Green trace uses the average detection. A symbol (💆 $^{\text{W}}$) in the test plot below means (dBµV/m)

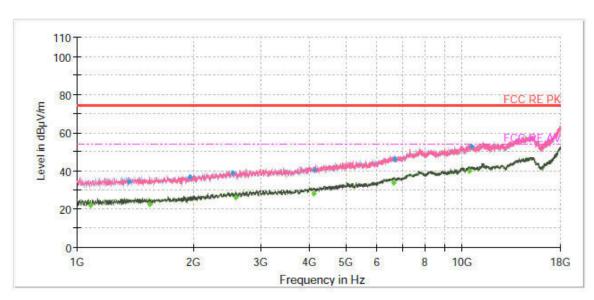


Radiated Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)
48.63	27.13	40.00	12.87	183.0	V	74.00	15
66.86	18.45	40.00	21.55	222.0	Н	28.00	12
161.23	29.45	43.50	14.05	203.0	Н	69.00	10
194.06	29.26	43.50	14.24	180.0	Н	242.00	13
384.01	31.57	46.00	14.43	104.0	Н	0.00	18
718.45	27.66	46.00	18.34	105.0	Н	82.00	23

Remark: 1. Correction Factor = Antenna factor + Insertion loss(cable loss+amplifier gain)

2. Margin = Limit - Quasi-Peak



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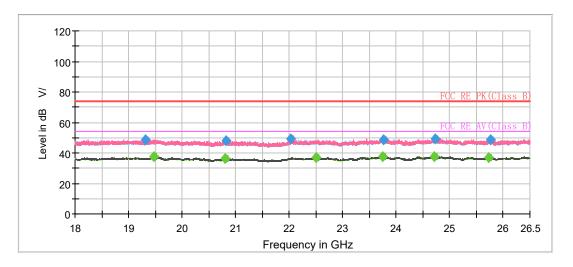
Radiated Emission from 1GHz to 18GHz

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dB µ V/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1082.88		21.75	54.00	32.25	1000.00	194.0	Н	132.00	-21
1363.38	34.53		74.00	39.47	1000.00	194.0	V	299.00	-20
1548.25		22.54	54.00	31.46	1000.00	100.0	Н	49.00	-19
1966.88	36.92		74.00	37.08	1000.00	110.0	V	127.00	-18
2532.13	38.99		74.00	35.01	1000.00	110.0	Н	224.00	-16
2581.00		26.13	54.00	27.87	1000.00	110.0	Н	105.00	-16
4111.00		28.23	54.00	25.77	1000.00	190.0	Н	270.00	-11
4149.25	40.66		74.00	33.34	1000.00	100.0	Н	83.00	-11
6641.88		33.52	54.00	20.48	1000.00	210.0	Н	352.00	-3
6671.63	46.29		74.00	27.71	1000.00	210.0	Н	10.00	-3
10420.13		39.83	54.00	14.17	1000.00	110.0	V	256.00	1
10581.63	52.54		74.00	21.46	1000.00	199.0	Н	0.00	2

Remark: 1. Correction Factor = Antenna factor + Insertion loss (cable loss + amplifier gain)

2. Peak Margin = Limit -MAX Peak/ Average



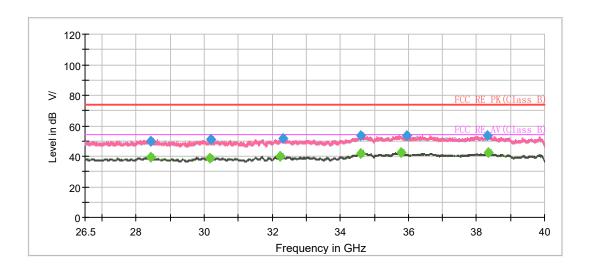


Radiated Emission from 18GHz to 26.5GHz

Frequency (MHz)	MaxPeak (dB μ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
19306.875000	48.88		74.00	25.12	500.0	200.0	Н	86.0	-5.5
19465.187500		37.51	54.00	16.49	500.0	100.0	V	192.0	-5.3
20808.187500		36.31	54.00	17.69	500.0	200.0	Н	11.0	-5.1
20816.687500	48.25		74.00	25.75	500.0	100.0	Н	264.0	-5.1
22036.437500	49.11		74.00	24.89	500.0	200.0	V	219.0	-4.2
22499.687500		36.99	54.00	17.01	500.0	200.0	V	186.0	-3.9
23749.187500		37.56	54.00	16.44	500.0	200.0	V	292.0	-2.3
23768.312500	48.71		74.00	25.29	500.0	200.0	Н	77.0	-2.4
24704.375000		37.57	54.00	16.43	500.0	100.0	V	292.0	-2.1
24722.437500	49.12		74.00	24.88	500.0	200.0	V	320.0	-2.1
25726.500000		36.78	54.00	17.22	500.0	200.0	Н	72.0	-2.6
25764.750000	48.40		74.00	25.60	500.0	200.0	Н	106.0	-2.6

Remark: 1. Correction Factor = Antenna factor + Insertion loss (cable loss + amplifier gain)

2. Peak Margin = Limit -MAX Peak/ Average



Radiated Emission from 26.5GHz to 40GHz

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB μ V/m)	Limit (dB µ V/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
28423.750000	50.11		74.00	23.89	500.0	200.0	V	325.0	0.1
28427.125000		39.22	54.00	14.78	500.0	200.0	Н	8.0	0.1
30172.000000		38.84	54.00	15.16	500.0	200.0	Н	68.0	-0.3
30178.750000	51.14		74.00	22.86	500.0	100.0	Н	299.0	-0.3
32240.875000		39.88	54.00	14.12	500.0	200.0	V	314.0	-1.2
32323.562500	51.99		74.00	22.01	500.0	200.0	V	304.0	-1.2
34593.250000	53.28		74.00	20.72	500.0	100.0	V	88.0	2.8
34608.437500		42.04	54.00	11.96	500.0	200.0	V	244.0	2.9
35777.875000		42.54	54.00	11.46	500.0	200.0	V	340.0	3.2
35960.125000	53.57		74.00	20.43	500.0	200.0	Н	23.0	3.4
38314.187500	53.34		74.00	20.66	500.0	200.0	V	284.0	3.7
38334.437500		42.41	54.00	11.59	500.0	200.0	V	0.0	3.7

Remark: 1. Correction Factor = Antenna factor + Insertion loss (cable loss + amplifier gain)

2. Peak Margin = Limit -MAX Peak/ Average



3.2 Conducted Emission

Ambient Condition

Temperature	Relative humidity
15°C~35°C	30%~60%

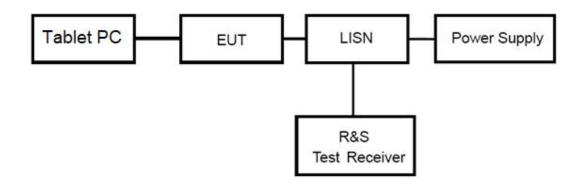
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Methods of Measurement

The EUT is placed on a non-metallic table of 80cm height above the horizontal metal reference ground plane. During the test, the EUT was operating in its typical mode. The test method is according to ANSI C63.4-2014. Connect the AC power line of the EUT to the L.I.S.N. Use EMI receiver to detect the average and Quasi-peak value. RBW is set to 9 kHz, VBW is set to 30kHz. The measurement result should include both L line and N line.

During the test, EUT is connected to a laptop via a USB cable in the case of Transfer Data mode. The EUT is used as the peripheral equipment of the PC. The data is transferred from EUT to PC

Test Setup



Note: Power Supply is AC Power source and it is used to change the voltage 120V/60Hz.

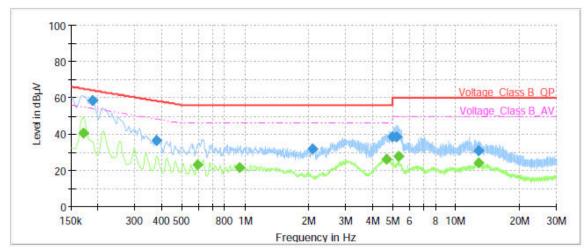
Limits

Frequency	Class A	(dBμV)	Class B (dBμV)			
(MHz)	Quasi-peak	Average	Quasi-peak	Average		
0.15 - 0.5	79	66	66 to 56 *	56 to 46*		
0.5 - 5	73	60	56	46		
5 - 30	73	60	60	50		
* Decreases with the logarithm of the frequency.						

Note: The EUT should meet CLASS B limit.

Test Results

Following plots, Blue trace uses the peak detection; Green trace uses the average detection.



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.17		40.40	54.95	14.55	1000.0	9.000	L1	ON	21.0
0.19	58.68		64.11	5.44	1000.0	9.000	L1	ON	21.1
0.38	36.63		58.29	21.66	1000.0	9.000	L1	ON	21.0
0.60		23.17	46.00	22.83	1000.0	9.000	L1	ON	20.8
0.94		21.56	46.00	24.44	1000.0	9.000	L1	ON	20.3
2.09	31.63		56.00	24.37	1000.0	9.000	L1	ON	19.7
4.67		26.38	46.00	19.62	1000.0	9.000	L1	ON	19.5
4.98	38.61		56.00	17.39	1000.0	9.000	L1	ON	19.5
5.23	38.62		60.00	21.38	1000.0	9.000	L1	ON	19.5
5.33		27.55	50.00	22.45	1000.0	9.000	L1	ON	19.5
12.77	30.53		60.00	29.47	1000.0	9.000	L1	ON	19.6
12.78		24.19	50.00	25.81	1000.0	9.000	L1	ON	19.6

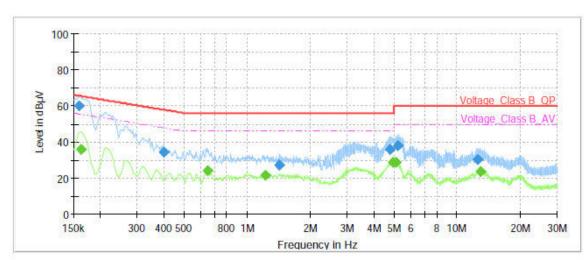
Remark: Correct factor=cable loss + LISN factor

L line

Conducted Emission from 150 kHz to 30 MHz

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Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.16	59.89		65.52	5.63	1000.0	9.000	Ν	ON	21.0
0.16		35.71	55.40	19.69	1000.0	9.000	N	ON	21.0
0.40	34.31		57.86	23.54	1000.0	9.000	N	ON	21.0
0.65		24.21	46.00	21.79	1000.0	9.000	N	ON	20.7
1.23		21.40	46.00	24.60	1000.0	9.000	N	ON	20.1
1.43	27.25		56.00	28.75	1000.0	9.000	N	ON	19.9
4.80	35.79		56.00	20.21	1000.0	9.000	N	ON	19.5
4.96		28.59	46.00	17.41	1000.0	9.000	N	ON	19.5
5.14		28.75	50.00	21.25	1000.0	9.000	N	ON	19.5
5.23	37.83		60.00	22.17	1000.0	9.000	N	ON	19.5
12.55	30.45		60.00	29.55	1000.0	9.000	N	ON	19.6
12.87		23.67	50.00	26.33	1000.0	9.000	N	ON	19.6

Remark: Correct factor=cable loss + LISN factor

N line

Conducted Emission from 150 kHz to 30 MHz

4 Uncertainty Measurement

Case	Uncertainty	Factor k
Radiated Emission 30MHz – 200MHz	4.17 dB	1.96
Radiated Emission 200MHz – 1GHz	4.84 dB	1.96
Radiated Emission 1GHz – 18GHz	4.35 dB	1.96
Radiated Emission 18GHz – 26.5GHz	5.90 dB	1.96
Radiated Emission 26.5GHz – 40GHz	5.92 dB	1.96
Conducted Emission	2.57 dB	2



5 Main Test Instruments

Name of Equipment	Manufacturer	Type/Model	Serial Number	Calibration Date	Expiration Time					
	Radiated Emission									
EMI Test Receiver	R&S	ESCI3	100948	2023-05-12	2024-05-11					
Signal Analyzer	R&S	FSV40	101298	2023-05-12	2024-05-11					
TRILOG Broadband Antenna	SCHWARZBECK	VULB 9163	01111	2022-10-25	2025-10-24					
Horn Antenna	R&S	HF907	102723	2021-07-24	2024-07-23					
Horn Antenna	ETS-Lindgren	3160-09	00102643	2021-10-10	2024-10-09					
Horn Antenna	STEATITE	QSH-SL-26-40- K-15	16779	2023-01-17	2026-01-16					
Software	R&S	EMC32	9.26.01	1	1					
	Cond	ducted Emission								
Artificial main network	R&S	ENV216	102191	2022-12-13	2024-12-09					
EMI Test Receiver	R&S	ESR	101667	2023-05-12	2024-05-11					
Software	R&S	EMC32	10.35.10	1	1					



ANNEX A: The EUT Appearance

The EUT Appearance are submitted separately.

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ANNEX B: Test Setup Photos

The Test Setup Photos are submitted separately.

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ANNEX C: Product Change Description

The Product Change Description are submitted separately.

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

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