EMC TEST REPORT

Applicant	Emerson White-Rodgers
FCC ID	2A4JN-ST76
Product	Sensi Touch 2
Brand	Sensi
Model	1F96U-42WFB; 1F96U-42WF; ST76; ST76W; ST76U; ST76WU; 1F96U-42WFBC; 1F96U-42WFC; ST76C; ST76WC
Report No.	R2112A1148-E1
Issue Date	March 3, 2022

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC Code CFR47 Part15B (2020)/ 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

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: December 20, 2022~ January 28, 2022 Date of Sample Received: December 17, 2021			
Note: All indications of Pass/Fail in this report are opinions expressed by 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.			

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 **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.

1.2 Test facility

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

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)

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

1.3 Testing Location

Company:	TA Technology (Shanghai) Co., Ltd.
Address:	No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China
City:	Shanghai
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2 General Description of Equipment under Test

2.1 Applicant and Manufacturer Information

Applicant	Emerson White-Rodgers
Applicant address	8100 West Florissant Ave St. Louis/United States of America
Manufacturer	Emerson White-Rodgers
Manufacturer address	8100 West Florissant Ave St. Louis/United States of America

2.2 General information

EUT Description			
Device Type	Movable Device		
Model	1F96U-42WFB; 1F96U-42WF; ST76; ST76W; ST76U; ST76WU; 1F96U-42WFBC; 1F96U-42WFC; ST76C; ST76WC		
Lab internal SN	R2112A1148/S01		
HW Version	0059-5337 REV.E		
SW Version	Wi-Fi/ Bluetooth	0170-1581v02_03	
	Model 900MHz	0170-1582v02_03	
Connecting I/O Port(s)	Please refer to the User's Manual.		
Antenna Type	PCB Antenna		
Frequency	Band	Tx (MHz)	Rx (MHz)
	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
	Model 900MHz	902.46 ~ 927.54	
Note: 1. The EUT is sent from the applicant to TA and the information of the EUT is declared by the applicant. 2. The main test model is ST76 in this report.			

Model Difference Table				
Model Number	**Description**	**Color**	**Channel**	**Instructions**
1F96U-42WFB	Sensi Touch 2	Black	Pro	English
1F96U-42WF	Sensi Touch 2	White	Pro	English
ST76	Sensi Touch 2	Black	Retail	English
ST76W	Sensi Touch 2	White	Retail	English
ST76U	Sensi Touch 2	Black	Utility	English

ST76WU	Sensi Touch 2	White	Utility	English
1F96U-42WFBC	Sensi Touch 2	Black	Pro	French / English
1F96U-42WFC	Sensi Touch 2	White	Pro	French / English
ST76C	Sensi Touch 2	Black	Retail	French / English
ST76WC	Sensi Touch 2	White	Retail	French / English
Note: The customer declares that the models have the same PCB assembly, the only difference is color, package and sale channels.				

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 (2020)
ANSI C63.4 (2014)

2.4 Test Mode

Test Mode	
Mode 1	External Power Supply + EUT + Receiver

3 Test Case Results

3.1 Radiated Emission

Ambient condition

Temperature	Relative humidity	Pressure
15°C~35°C	30%~60%	101.5kPa

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:

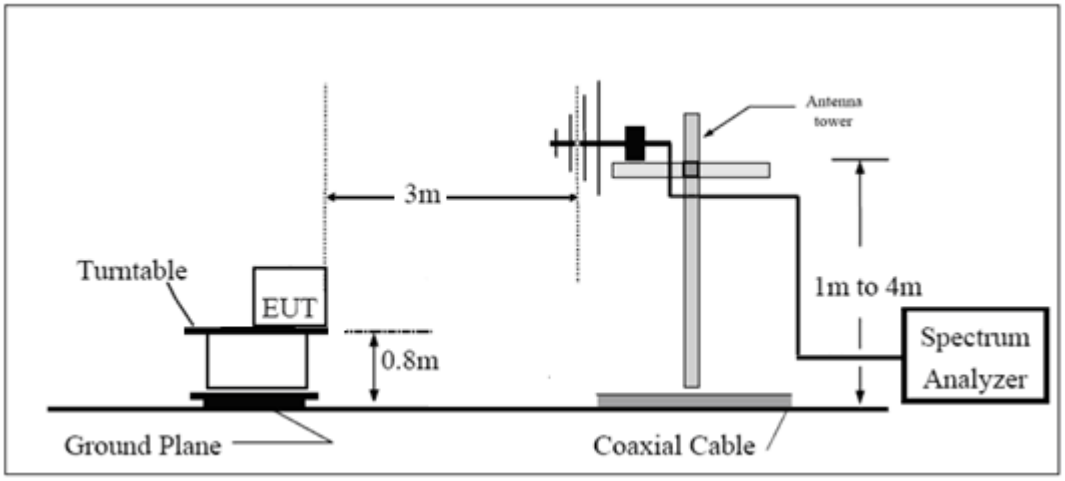
Below 1GHz:
RBW=100 kHz / VBW=300 kHz / Sweep=AUTO
Above 1GHz:

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

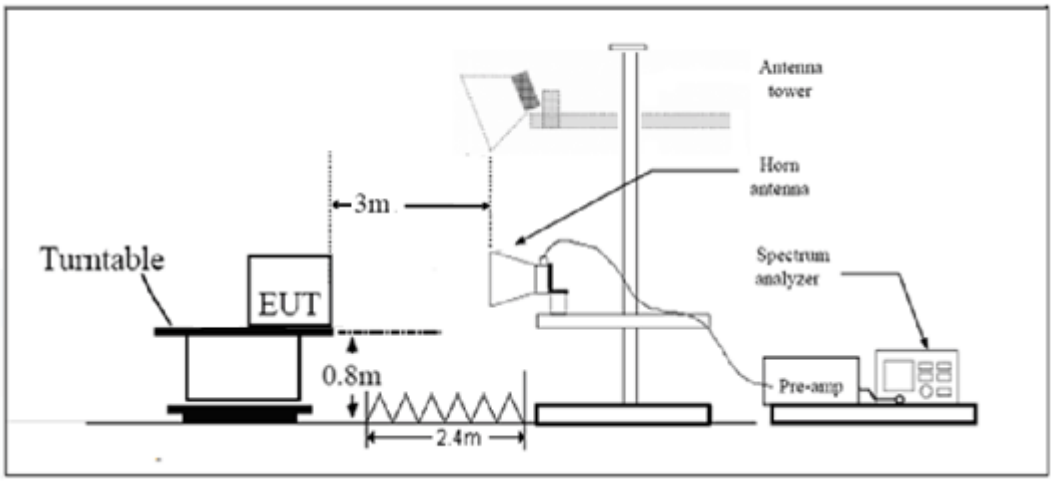
The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in lie-down position (X axis) and the worst case was recorded.

Test Setup

Below 1GHz



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
1000-5th harmonic of the highest frequency or 40GHz, which is lower	54 74	Average Peak

Measurement Uncertainty

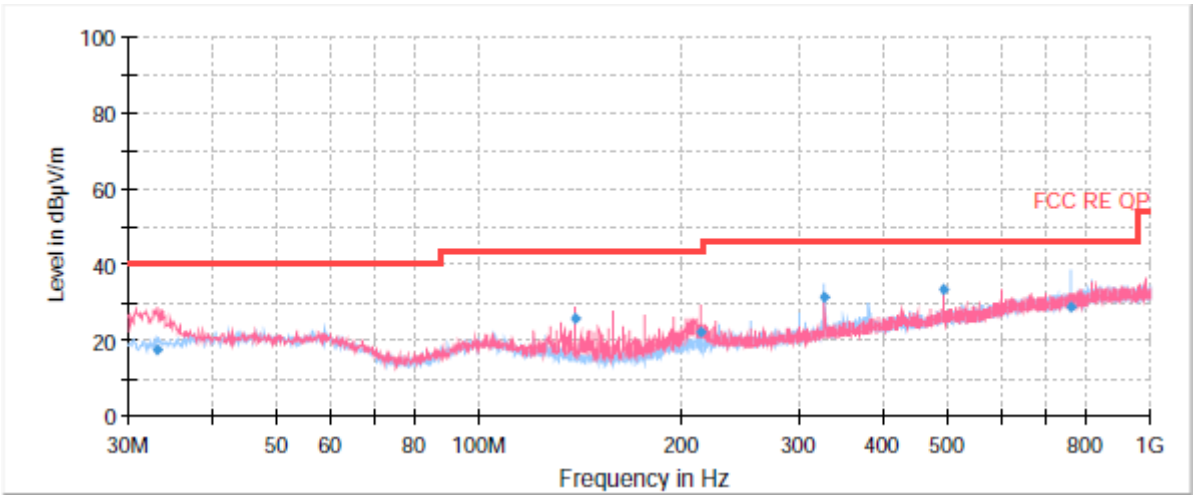
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 1.96.

Frequency	Uncertainty
30MHz~200MHz	4.17 dB
200MHz~1000MHz	4.84 dB
1GHz~18GHz	4.35 dB
18GHz~26.5GHz	5.90 dB
26.5GHz~40GHz	5.92 dB

Test Results

Sweep the whole frequency band through the range from 30MHz to the 5th harmonic of the carrier. The Emissions in the frequency band 18GHz – 26.5GHz is more than 20dB below the limit are not reported.

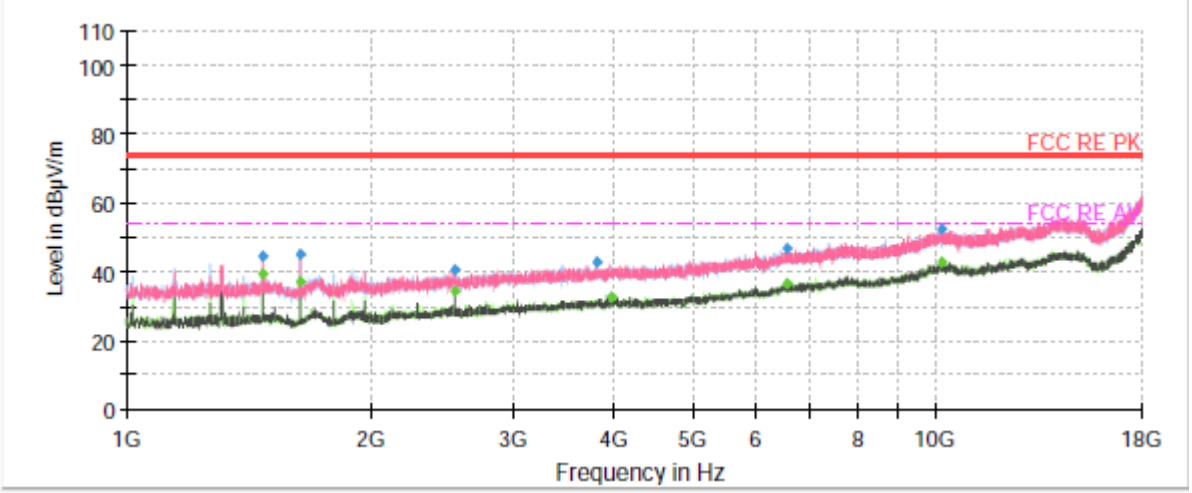
The following graphs display the maximum values of horizontal and vertical by software.
For above 1GHz, Blue trace uses the peak detection, Green trace uses the average detection.



Radiated Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)
33.27	17.55	40.00	22.45	1000.00	105.0	V	10.00	12
139.49	25.50	43.50	18.00	1000.00	100.0	V	323.00	9
213.82	21.90	43.50	21.60	1000.00	100.0	V	38.00	12
327.67	31.06	46.00	14.94	1000.00	100.0	H	237.00	16
491.60	33.53	46.00	12.47	1000.00	125.0	V	22.00	19
762.47	28.70	46.00	17.30	1000.00	113.0	H	190.00	24

Remark: 1. Correction Factor = Antenna factor + Insertion loss(cable loss+amplifier gain)
2. Margin = Limit – Quasi-Peak



Radiated Emission from 1GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)
1474.30	---	39.38	54.00	14.62	500.00	100.0	V	242.00	-17
1474.87	44.67	---	74.00	29.33	500.00	100.0	V	242.00	-17
1638.07	45.21	---	74.00	28.79	500.00	200.0	V	216.00	-16
1638.63	---	37.04	54.00	16.96	500.00	100.0	H	107.00	-16
2540.77	---	34.53	54.00	19.47	500.00	100.0	V	269.00	-14
2540.77	40.58	---	74.00	33.42	500.00	100.0	V	269.00	-14
3818.60	42.64	---	74.00	31.36	500.00	100.0	V	284.00	-12
3984.63	---	32.77	54.00	21.23	500.00	200.0	V	350.00	-11
6544.27	---	36.81	54.00	17.19	500.00	200.0	V	2.00	-4
6558.43	46.88	---	74.00	27.12	500.00	200.0	H	270.00	-4
10160.73	---	42.70	54.00	11.30	500.00	200.0	H	1.00	-1
10168.67	52.63	---	74.00	21.37	500.00	100.0	V	200.00	-1

3.2 Conducted Emission

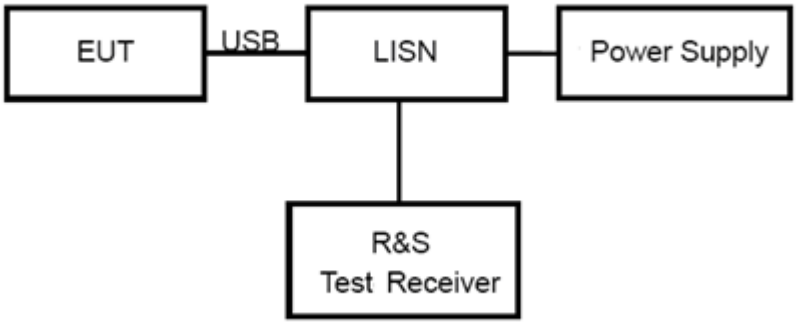
Ambient condition

Temperature	Relative humidity	Pressure
15°C~35°C	30%~60%	101.5kPa

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.

Test Setup



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

Limits

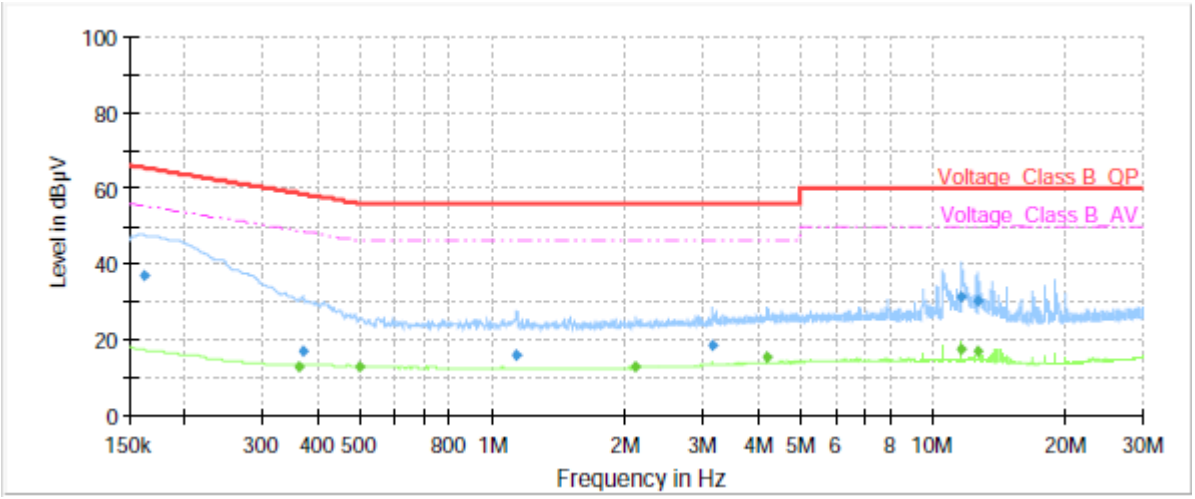
Frequency (MHz)	Conducted Limits(dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56 *	56 to 46*
0.5 - 5	56	46
5 - 30	60	50
*: Decreases with the logarithm of the frequency.		

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 1.96. U= 2.57 dB.

Test Results

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

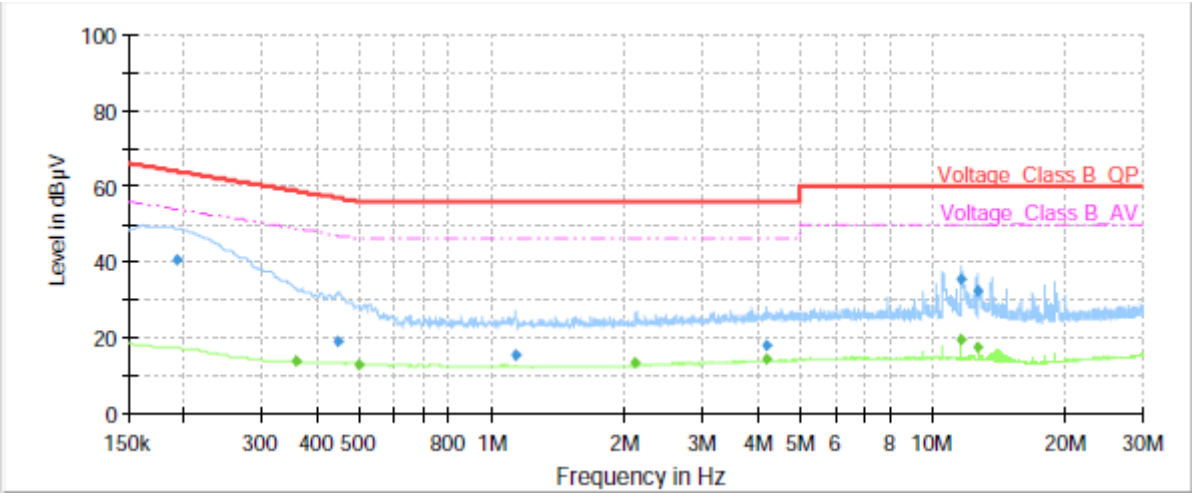


Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.16	36.70	---	65.40	28.70	70.0	9.000	L1	ON	21
0.36	---	13.01	48.69	35.68	70.0	9.000	L1	ON	21
0.37	16.83	---	58.49	41.66	70.0	9.000	L1	ON	21
0.50	---	12.64	46.00	33.36	70.0	9.000	L1	ON	20
1.13	15.81	---	56.00	40.19	70.0	9.000	L1	ON	20
2.11	---	12.87	46.00	33.13	70.0	9.000	L1	ON	20
3.16	18.68	---	56.00	37.32	70.0	9.000	L1	ON	19
4.22	---	15.21	46.00	30.79	70.0	9.000	L1	ON	19
11.59	31.42	---	60.00	28.58	70.0	9.000	L1	ON	20
11.59	---	17.29	50.00	32.71	70.0	9.000	L1	ON	20
12.64	---	16.81	50.00	33.19	70.0	9.000	L1	ON	20
12.64	30.02	---	60.00	29.98	70.0	9.000	L1	ON	20

Remark: Correct factor=cable loss + LISN factor

L line

Conducted Emission from 150 KHz to 30 MHz



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.19	40.37	---	63.92	23.55	70.0	9.000	N	ON	21
0.36	---	13.84	48.75	34.91	70.0	9.000	N	ON	21
0.45	19.03	---	56.89	37.86	70.0	9.000	N	ON	20
0.50	---	13.04	46.00	32.96	70.0	9.000	N	ON	20
1.13	15.23	---	56.00	40.77	70.0	9.000	N	ON	20
2.11	---	13.39	46.00	32.61	70.0	9.000	N	ON	20
4.22	17.85	---	56.00	38.15	70.0	9.000	N	ON	19
4.22	---	14.50	46.00	31.50	70.0	9.000	N	ON	19
11.60	35.52	---	60.00	24.48	70.0	9.000	N	ON	20
11.60	---	19.54	50.00	30.46	70.0	9.000	N	ON	20
12.65	---	17.59	50.00	32.41	70.0	9.000	N	ON	20
12.65	32.34	---	60.00	27.66	70.0	9.000	N	ON	20

Remark: Correct factor=cable loss + LISN factor

N line

Conducted Emission from 150 KHz to 30 MHz

4 Main Test Instruments

Name of Equipment	Manufacturer	Type/Model	Serial Number	Calibration Date	Expiration Time
Radiated Emission					
EMI Test Receiver	R&S	ESCI7	100936	2021-12-12	2022-12-11
Signal Analyzer	R&S	FSV40	100815	2021-05-15	2022-05-14
Loop Antenna	SCHWARZBECK	FMZB1519	1519-047	2020-04-02	2023-04-01
TRILOG Broadband Antenna	SCHWARZBECK	9163	391	2020-05-05	2023-05-04
Horn Antenna	R&S	HF907	102723	2021-07-26	2024-07-25
Horn Antenna	ETS-Lindgren	3160-09	00102643	2020-08-11	2023-08-10
Horn Antenna	STEATITE	QSH-SL-26-40-K-15	16779	2018-06-20	2023-06-19
Software	R&S	EMC32	9.26.01	/	/
Conducted Emission					
Artificial main network	R&S	ENV216	102191	2020-12-13	2022-12-12
EMI Test Receiver	R&S	ESR	101667	2021-05-15	2022-05-14
Software	R&S	EMC32	10.35.10	/	/

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

ANNEX A: The EUT Appearance

The EUT Appearance are submitted separately.

ANNEX B: Test Setup Photos

The Test Setup Photos are submitted separately.