



EMC TEST REPORT

Applicant Doro AB
FCC ID WS5DFC0270
Product 4G Clamshell Smart Feature Phone
Brand Doro
Model DFC-0270
Report No. R1905A0242-E1
Issue Date July 17, 2019

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC Code CFR47 Part15B (2018)/ 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.

Wei Liu

Guangchang Fan

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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
Test Date: June 4, 2019 ~ June 17, 2019			

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

CNAS (accreditation number: L2264)

TA Technology (Shanghai) Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS).

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 electromagnetic emissions measurements.

IC (recognition number is 8510A)

TA Technology (Shanghai) Co., Ltd. has been listed by industry Canada to perform electromagnetic emission measurement.

VCCI (recognition number is C-4595, T-2154, R-4113, G-10766)

TA Technology (Shanghai) Co., Ltd. has been listed by industry Japan to perform electromagnetic emission measurement.

A2LA (Certificate Number: 3857.01)

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



1.3 Testing Location

Company: TA Technology (Shanghai) Co., Ltd.
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City: Shanghai
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2 General Description of Equipment under Test

2.1 Client Information

Applicant	Doro AB
Applicant address	Jörgen Kocksgatan 1B, SE 211 20 MALMÖ, SWEDENDoro AB
Manufacturer	Doro AB
Manufacturer address	Jörgen Kocksgatan 1B, SE 211 20 MALMÖ, SWEDENDoro AB

2.2 General information

EUT Description			
Device Type:	Portable Device		
Model:	DFC-0270		
IMEI:	IMEI 1:356755100011328 IMEI 2:356755100011336		
HW Version:	V01(HW code:4011, HW code:4021)		
SW Version:	DFC0270_VF292_N_S01A_V04_0_M190710_SMP		
Antenna Type:	Internal Antenna		
Frequency:	Band	Tx (MHz)	Rx (MHz)
	GSM 1900	1850 ~ 1910	1930 ~ 1990
	WCDMA Band II	1850 ~ 1910	1930 ~ 1990
	LTE Band 7	2500 ~ 2570	2620 ~ 2690
	Bluetooth:	2402 ~ 2480	2402 ~ 2480
	WIFI 2.4G:	2412 ~ 2462	2412 ~ 2462
Modulation:	GSM: GMSK GPRS: GMSK EGPRS: GMSK/8PSK WCDMA RMC: QPSK HSDPA: QPSK HSUPA: QPSK DC-HSDPA:64QAM LTE: QPSK / 16QAM Bluetooth: GFSK, $\pi/4$ -DQPSK, 8-DPSK Bluetooth v4.2 LE: GFSK WLAN 802.11b: DSSS WLAN 802.11g/n: OFDM		



EUT Accessory	
Adapter 1	Manufacturer: TEN PAO INDUSTRIAL CO.,LTD Model: S003ATB0500055
Adapter 2	Manufacturer: Dongguan Aohai Power Technology CO.,LTD Model: A31A-050055U-EU1(Halogen free)
Adapter 3	Manufacturer: Dongguan Aohai Power Technology CO.,LTD Model: A806A-050100U-UK1(Halogen free)
Adapter 4	Manufacturer: Dongguan Aohai Power Technology CO.,LTD Model: A2-501000(Halogen free)
Adapter 5	Manufacturer: Shenzhen BaiJunDa ELECTRONIC CO.,Ltd Model: UT-133E-5100
Charger base	Manufacturer: Mobewire Mobiles (Ningbo) Co.,Ltd Model: DFC-0240/0270 (Halogen free)
Battery	Manufacturer: NINGBO VEKEN BATTERY CO., LTD Model: DBX-1350A
Earphone 1	Manufacturer: Shenzhen Juwei Electronics Co.,Ltd Model: JWEP0944-M01R (Halogen free)
Earphone 2	Manufacturer: Shenzhen Juwei Electronics Co.,Ltd Model: JWEP0782-M01 (Halogen free)
USB Cable	Manufacturer: SHENZHEN FKY-QY HARDWARE ELECTRONIC CO.,LTD Model: M039B0800150 (Halogen free)
Note: The information of the EUT is declared by the manufacturer.	

Item	Configure 1	Configure 2
HW code	4011	4021
LCD	Sanlong 28LS124-06	Holitech QTB2D8096
Other	The same	The same
Note: Customer declaration, two configures is the same, except for LCD. There are more than one Configure, each one should be applied throughout the compliance test respectively, however, only the worst case (Configure 1) will be recorded in this report.		



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 (2018)

ANSI C63.4 (2014)



2.4 Test Mode

Test Mode	
Mode 1	Adapter + EUT + Earphone +Idle

3 Test Case Results

3.1 Radiated Emission

Ambient condition

Temperature	Relative humidity	Pressure
24°C~26°C	45%~50%	102.5kPa

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:

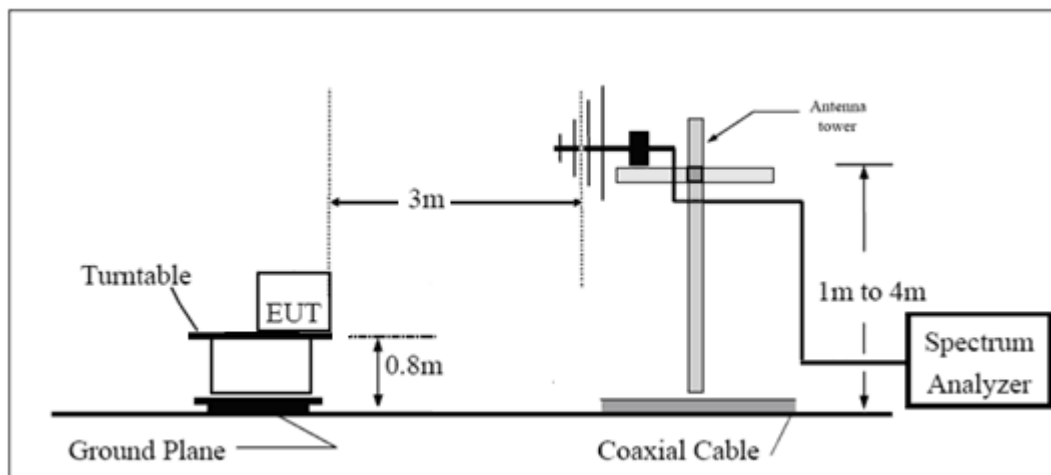
(a) PEAK: RBW=1MHz / VBW=3MHz/ Sweep=AUTO

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

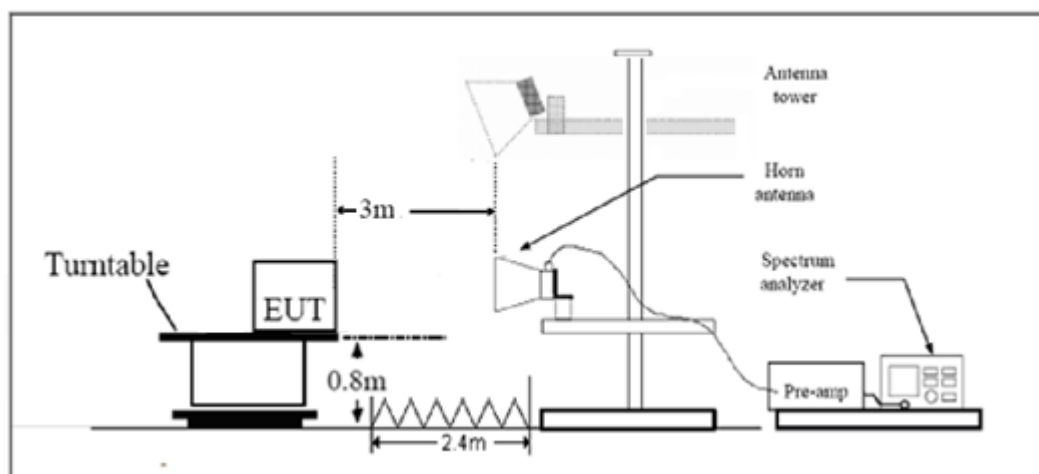
The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in lie-down position (X axis) and the worst case was recorded.

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

Frequency (MHz)	Field Strength (dB μ V/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 frequency or 40GHz, which is lower	54 74	Average Peak

Measurement Uncertainty

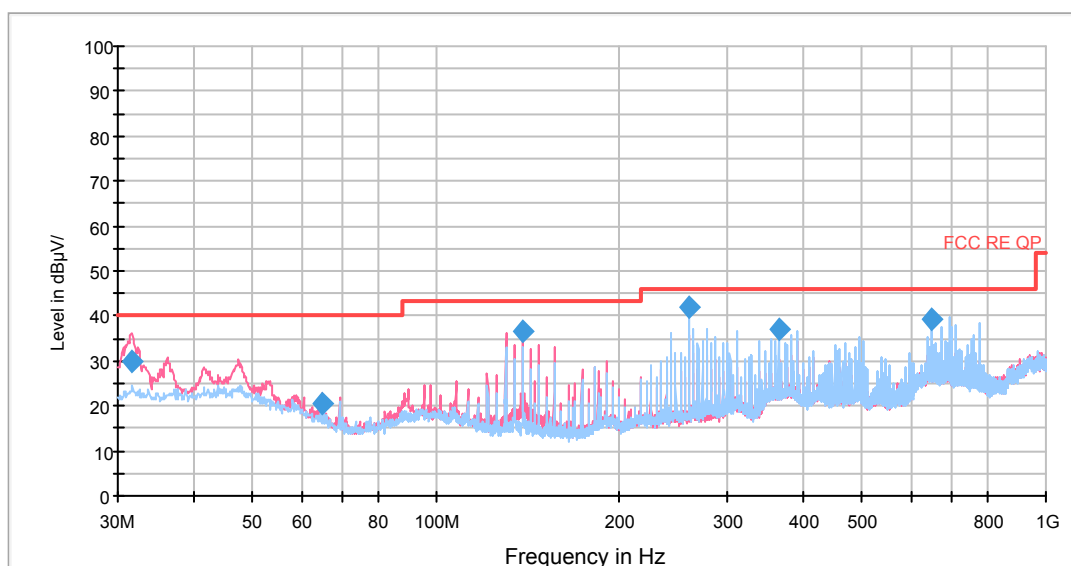
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$.

Frequency	Uncertainty
30MHz~200MHz	4.02 dB
200MHz~1000MHz	3.28 dB
1GHz~18GHz	3.70 dB
18GHz~26.5GHz	5.78 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.



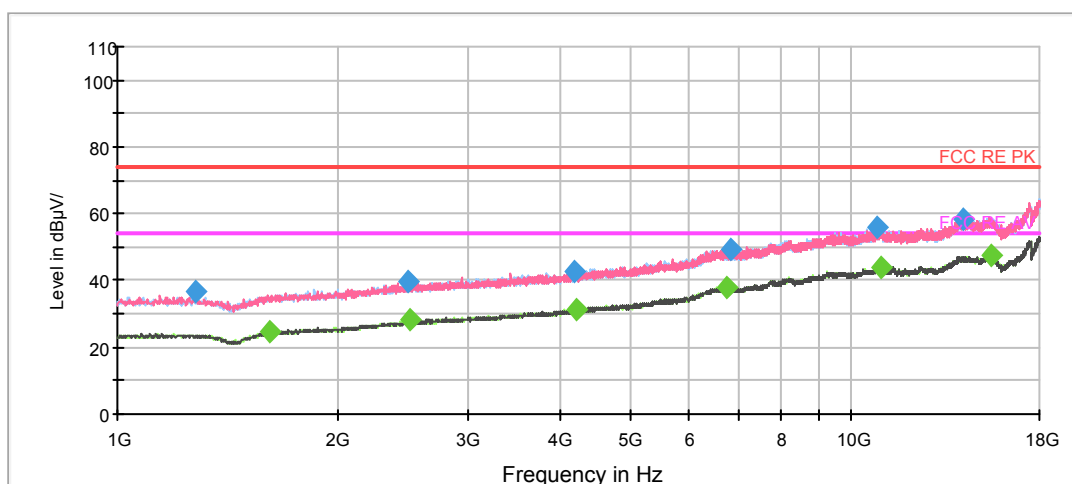
Radiated Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
31.617310	30.1	100.0	V	71.0	-3.1	9.9	40.0
64.998647	20.4	200.0	V	226.0	-11.4	19.6	40.0
138.653400	36.6	100.0	V	195.0	-14.2	6.9	43.5
260.001250	41.8	100.0	H	106.0	-10.9	4.2	46.0
364.013750	36.9	100.0	H	93.0	-5.5	9.1	46.0
650.007500	39.2	120.0	H	100.0	-1.6	6.8	46.0

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

2. Margin = Limit – Quasi-Peak

FCC RE 1G-18GHz PK+AV Class B



Radiated Emission from 1GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1280.500000	36.5	100.0	V	0.0	-11.0	37.5	74.0
2485.375000	39.8	100.0	H	0.0	-6.4	34.2	74.0
4202.375000	42.4	200.0	H	9.0	-2.2	31.6	74.0
6831.000000	49.5	100.0	H	358.0	5.1	24.5	74.0
10798.375000	55.7	100.0	H	355.0	13.4	18.3	74.0
14211.125000	58.5	100.0	V	289.0	17.0	15.5	74.0

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1607.750000	24.5	200.0	H	0.0	-10.0	29.5	54.0
2496.000000	28.0	100.0	V	28.0	-6.4	26.0	54.0
4213.000000	31.1	200.0	H	0.0	-2.1	22.9	54.0
6739.625000	37.9	200.0	V	56.0	5.0	16.1	54.0
10957.750000	43.8	100.0	V	250.0	13.5	10.2	54.0
15445.750000	47.3	200.0	H	136.0	17.4	6.7	54.0

3.2 Conducted Emission

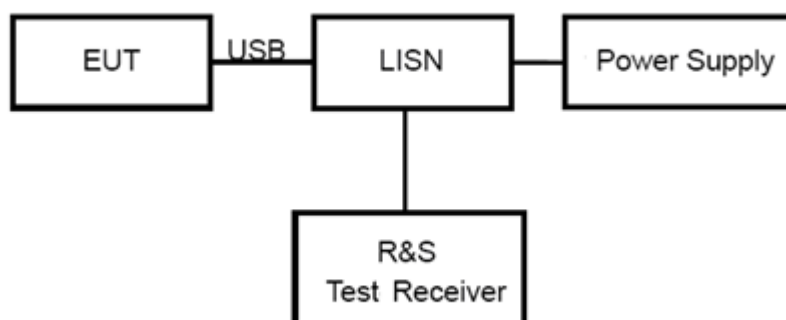
Ambient condition

Temperature	Relative humidity	Pressure
24°C ~26°C	50%~55%	102.5kPa

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

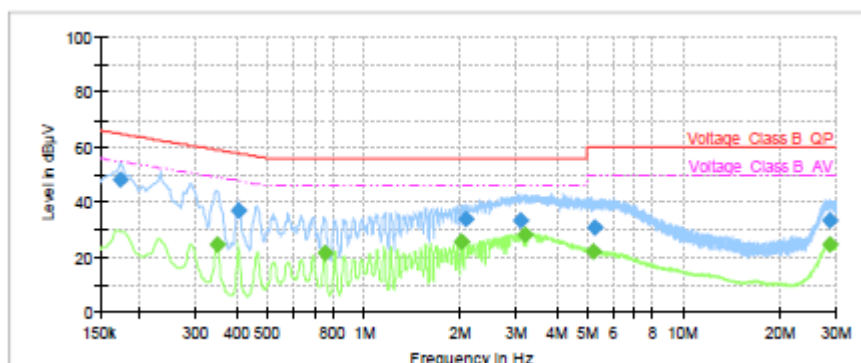
Frequency (MHz)	Conducted Limits(dB μ V)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56 *	56 to 46 *
0.5 - 5	56	46
5 - 30	60	50
*: Decreases with the logarithm of the frequency.		

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.

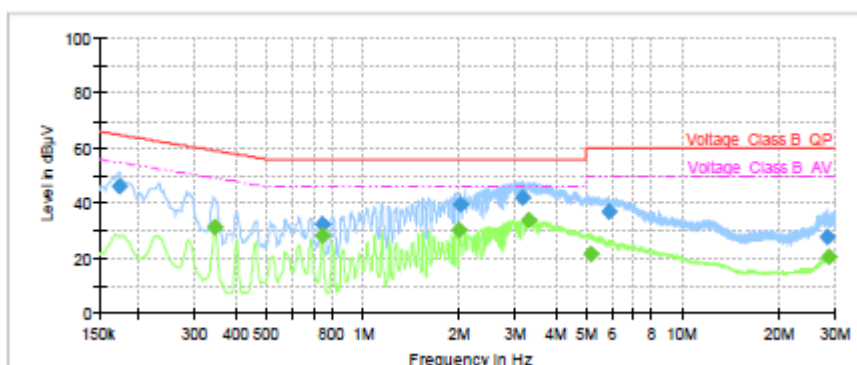


Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.17	48.43	---	64.84	16.41	1000.0	9.000	L1	ON	19.15
0.35	---	24.86	49.01	24.15	1000.0	9.000	L1	ON	19.17
0.40	36.77	---	57.77	21.00	1000.0	9.000	L1	ON	19.23
0.75	---	21.64	46.00	24.36	1000.0	9.000	L1	ON	19.25
2.02	---	25.49	46.00	20.51	1000.0	9.000	L1	ON	19.12
2.09	33.80	---	56.00	22.20	1000.0	9.000	L1	ON	19.09
3.09	33.46	---	56.00	22.54	1000.0	9.000	L1	ON	19.09
3.19	---	28.26	46.00	17.74	1000.0	9.000	L1	ON	19.08
5.25	---	22.27	50.00	27.73	1000.0	9.000	L1	ON	19.09
5.30	30.76	---	60.00	29.24	1000.0	9.000	L1	ON	19.09
28.75	33.13	---	60.00	26.87	1000.0	9.000	L1	ON	19.83
28.76	---	24.71	50.00	25.29	1000.0	9.000	L1	ON	19.83

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)
0.17	46.22	---	64.84	18.62	1000.0	9.000	N	ON	19.16
0.34	---	31.40	49.12	17.72	1000.0	9.000	N	ON	19.18
0.75	---	28.23	46.00	17.77	1000.0	9.000	N	ON	19.24
0.75	32.22	---	56.00	23.78	1000.0	9.000	N	ON	19.24
2.00	---	30.06	46.00	15.94	1000.0	9.000	N	ON	19.13
2.02	39.52	---	56.00	16.48	1000.0	9.000	N	ON	19.13
3.15	41.98	---	56.00	14.02	1000.0	9.000	N	ON	19.08
3.32	---	33.89	46.00	12.11	1000.0	9.000	N	ON	19.06
5.15	---	21.31	50.00	28.69	1000.0	9.000	N	ON	19.09
5.88	36.95	---	60.00	23.05	1000.0	9.000	N	ON	19.10
28.26	27.71	---	60.00	32.29	1000.0	9.000	N	ON	19.69
28.65	---	20.66	50.00	29.34	1000.0	9.000	N	ON	19.69

Remark: Correct factor=cable loss + LISN factor

N line

Conducted Emission from 150 KHz to 30 MHz

4 Main Test Instrument

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Time
Spectrum Analyzer	R&S	FSV40	15195-01-00	2019-05-19	2020-05-18
EMI Test Receiver	R&S	ESCI	100948	2019-05-19	2020-05-18
Trilog Antenna	SCHWARZBECK	VULB 9163	9163-201	2017-11-18	2019-11-17
Horn Antenna	R&S	HF907	100126	2018-07-07	2020-07-06
Standard Gain Horn	ETS-Lindgren	3160-09	00102643	2018-06-20	2020-06-19
EMI Test Receiver	R&S	ESR	101667	2019-05-19	2020-05-18
LISN	R&S	ENV216	101171	2016-12-16	2019-12-15
Bore Sight Antenna mast	ETS	2171B	00058752	/	/
Test software	EMC32	R&S	9.26.0	/	/

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

ANNEX A: The EUT Appearance and Test Configuration

A.1 EUT Appearance



Front Side close



Back Side close



open
a: EUT



Adapter 1



Adapter 2



Adapter 3



Adapter 4



Adapter 5

b: Adapter



c: Charger base



d: USB Cable



Earphone 1



Earphone 2

e: Earphone

Picture 1 EUT and Accessory

A.2 Test Setup



Below 1GHz



Above 1GHz

Picture 2 Radiated Emission Test Setup



Picture 3 Conducted Emission Test Setup