



TEST REPORT

No. I20D00114-SRD22

For

Client: MobiWire SAS

Production: 4G Smart Phone

Model Name: MobiWire Sora |H5024,Smart E11 (H5024)

Brand Name: MobiWire,Vodafone

FCC ID: QPN-SORA

Hardware Version: V01A

Software Version: SORA_V01_200520

Issued date: 2020-09-11

NOTE

1. The test results in this test report relate only to the devices specified in this report.
2. This report shall not be reproduced except in full without the written approval of East China Institute of Telecommunications.
3. For the test results, the uncertainty of measurement is not taken into account when judging the compliance with specification, and the results of measurement or the average value of measurement results are taken as the criterion of the compliance with specification directly.

Test Laboratory:

East China Institute of Telecommunications

Add: Block No.4, No.766, Jingang Road, Pudong District, Shanghai, P. R. China

Tel: +86 21 63843300

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Revision Version

Report Number	Revision	Date	Memo
I20D00114-SRD22	00	2020-08-20	Initial creation of test report
I20D00114-SRD22	01	2020-09-09	First modification of test report
I20D00114-SRD22	02	2020-09-11	Second modification of test report

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1. Test Laboratory

1.1. Testing Location

Company Name	East China Institute of Telecommunications
Address	Block No.4, No.766, Jingang Road, Pudong District, Shanghai, P. R. China
Postal Code	201206
Telephone	+86 21 63843300
FCC registration No	CN1177

1.2. Testing Environment

Normal Temperature	15℃-35℃
Relative Humidity	20%-75%

1.3. Project Data

Project Leader	Yu Anlu
2020-05-11	2020-08-03
Testing End Date	2020-09-09

1.4. Signature



Liu Yan
(Prepared this test report)



Fan Songyan
(Reviewed this test report)



Zheng Zhongbin
(Approved this test report)

1. Client Information

2.1.Applicant Information

Company Name	MobiWire SAS
Address	79 avenue Francois Arago, 92000 NANTERRE France
Telephone	+33668018722
Postcode	/

2.2.Manufacturer Information

Company Name	MobiWire SAS
Address	79 avenue Francois Arago, 92000 NANTERRE France
Telephone	+33668018722
Postcode	/

2. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Production	4G Smart Phone
Model name	MobiWire Sora H5024,Smart E11 (H5024)
BLE Frequency	2402MHz-2480MHz
BLE Channel	Ch0-39
BLE Modulation	GFSK
Extreme Temperature	-10/+55℃
Nominal Voltage	3.80V
Extreme High Voltage	4.35V
Extreme Low Voltage	3.60V
Maximum of Antenna Gain	Bluetooth: 0dBi

Note:

- Photographs of EUT are shown in ANNEX A of this test report.
- The value of the antenna gain is provided by the customer. For specific antenna information, please check the antenna specifications of the customer.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
N03	354128300000727	V01A	SORA_V01_200520	2020-07-24

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE used during the test

AE ID*	Description	Type	Manufacturer
AE1	RF cable	/	MobiWire SAS

*AE ID: is used to identify the test sample in the lab internally.

3. Reference Documents

4.1. Documents supplied by applicant

All technical documents are supplied by the client or manufacturer, which is the basis of testing.

4.2. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part15	FCC CFR 47, Part 15, Subpart C: 15.205 Restricted bands of operation; 15.209 Radiated emission limits, general requirements; 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz.	2018-10-01
ANSI C63.10	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices	2013
KDB558074	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247	v05r02

4. Test Results

5.1. Summary of Test Results

Measurement Items	Sub-clause of Part15C	Verdict
Transmitter Spurious Emission-Radiated	15.247	P
AC Powerline Conducted Emission	15.107,15.207	P

Note: please refer to Annex A in this test report for the detailed test results.

The following terms are used in the above table.

P	Pass, the EUT complies with the essential requirements in the standard.
NP	Not Perform, the test was not performed by ECIT.
NA	Not Applicable, the test was not applicable.
F	Fail, the EUT does not comply with the essential requirements in the standard.

Test Conditions

Tnom	Normal Temperature
Tmin	Low Temperature
Tmax	High Temperature
Vnom	Normal Voltage
Vmin	Low Voltage
Vmax	High Voltage
Hnom	Norm Humidity
Anom	Norm Air Pressure

For this report, all the test case listed above are tested under Normal Temperature and Normal Voltage, and also under norm humidity, the specific conditions as following:

Temperature	Tnom	25℃
Voltage	Vnom	3.80V
Humidity	Hnom	48%
Air Pressure	Anom	1010hPa

5.2.Statements

The MobiWire Sora |H5024,Smart E11 (H5024) is a variant model for testing.

In this report, we only retest the radiation emission. And the conduct test results please refer to report No: I19D00035-SRD02-BLE, which was prepared by East China Institute of Telecommunications.

ECIT only performed test cases which identified with P/NP/NA/F results in Annex A.

ECIT has verified that the compliance of the tested device specified in section 3 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 4 of this test report.

5. Test Equipments Utilized

6.1. Radiated Emission Test System

Item	Instrument Name	Type	SN	Manufacturer	Cal. Date	Cal. interval
1	Universal Radio Communication Tester	CMU200	123123	R&S	2020-05-10	1 year
2	EMI Test Receiver	ESU40	100307	R&S	2020-05-10	1 year
3	TRILOG Broadband Antenna	VULB9163	VULB9163-515	Schwarzbeck	2020-02-28	2 years
4	Double- ridged Waveguide Antenna	ETS-3117	00135890	ETS	2020-02-28	2 years
5	2-Line V-Network	ENV216	101380	R&S	2020-05-10	1 year

6.2. AC Conducted Emission Test System

Item	Instrument Name	Type	SN	Manufacturer	Cal. Date	Cal. interval
1	Universal Radio Communication Tester	CMU200	123101	R&S	2020-05-10	1 year
2	Test Receiver	ESCI	101235	R&S	2020-05-10	1 year
3	2-Line V-Network	ENV216	101380	R&S	2020-05-10	1 year

Anechoic chamber

Fully anechoic chamber by ETS.

6. Measurement Uncertainty

Measurement uncertainty for all the testing in this report are within the limit specified in ECIT documents. The detailed measurement uncertainty is defined in ECIT documents.

Measurement Items	Range	Confidence Level	Calculated Uncertainty
Peak Output Power-Conducted	2402MHz-2480MHz	95%	$\pm 0.544\text{dB}$
Peak Power Spectral Density	2402MHz-2480MHz	95%	$\pm 0.544\text{dB}$
6dB Bandwidth	2402MHz-2480MHz	95%	$\pm 62.04\text{Hz}$
Frequency Band Edges-Conducted	2390MHz-2488.5MHz	95%	$\pm 0.544\text{dB}$
Conducted Emission	30MHz-2GHz	95%	$\pm 0.90\text{dB}$
Conducted Emission	2GHz-3.6GHz	95%	$\pm 0.88\text{dB}$
Conducted Emission	3.6GHz-8GHz	95%	$\pm 0.96\text{dB}$
Conducted Emission	8GHz-20GHz	95%	$\pm 0.94\text{dB}$
Conducted Emission	20GHz-22GHz	95%	$\pm 0.88\text{dB}$
Conducted Emission	22GHz-26GHz	95%	$\pm 0.86\text{dB}$
Transmitter Spurious Emission-Radiated	9KHz-30MHz	95%	$\pm 5.66\text{dB}$
Transmitter Spurious Emission-Radiated	30MHz-1000MHz	95%	$\pm 4.98\text{dB}$
Transmitter Spurious Emission-Radiated	1000MHz -18000MHz	95%	$\pm 5.06\text{dB}$
Transmitter Spurious Emission-Radiated	18000MHz -40000MHz	95%	$\pm 5.20\text{dB}$
AC Power line Conducted Emission	0.15MHz-30MHz	95%	$\pm 3.66\text{ db}$

7. Test Environment

Shielding Room1 (6.0 meters×3.0 meters×2.7 meters) did not exceed following limits along the conducted RF performance testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	> 100 dB
Ground system resistance	< 0.5 Ω

Control room did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω

Fully-anechoic chamber1 (6.9 meters×10.9 meters×5.4 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 25 %, Max. = 75 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω
VSWR	Between 0 and 6 dB, from 1GHz to 18GHz
Site Attenuation Deviation	Between -4 and 4 dB, 30MHz to 1GHz
Uniformity of field strength	Between 0 and 6 dB, from 80MHz to 3000 MHz

ANNEX A. Detailed Test Results

ANNEX A.1. Radiated Emission

A.6.1 Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247, 15.205, 15.209	20dB below peak output power

In addition, radiated emissions which fall in the restricted bands, as defined in 15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see 15.205(c)).

Limit in restricted band:

Frequency of emission (MHz)	Field strength (uV/m)	Field strength (dBuV/m)
30~88	100	40
88~216	150	43.5
216~960	200	46
Above 960	500	54

A.6.2 Test Method

Portable, small, lightweight, or modular devices that may be handheld, worn on the body, or placed on a table during operation shall be positioned on a non-conducting platform, the top of which is 80 cm above the reference ground plane. The preferred area occupied by the EUT arrangement is 1 m by 1.5 m, but it may be larger or smaller to accommodate various sized EUTs. For testing purposes, ceiling- and wall-mounted devices also shall be positioned on a tabletop (see also ANSI C63.10-2013 section 6.3.4 and 6.3.5). In making any tests involving handheld, body-worn, or ceiling-mounted equipment, it is essential to recognize that the measured levels may be dependent on the orientation (attitude) of the three orthogonal axes of the EUT. Thus, exploratory tests as specified in 8.3.1 shall be carried out for various axes orientations to determine the attitude having maximum or near-maximum emission level. The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

Frequency of emission (MHz)	RBW/VBW	Sweep Time (s)
30~1000	100KHz/300KHz	5
1000~4000	1MHz/3MHz	15
4000~18000	1MHz/3MHz	40
18000~26500	1MHz/3MHz	20

A.6.3 Measurement Results:

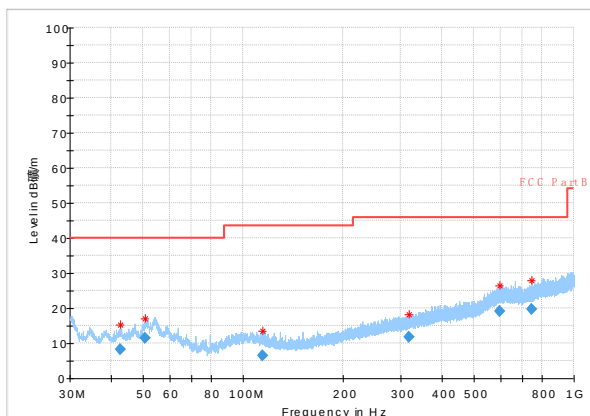
A “reference path loss” is established and A_{Rpi} is the attenuation of “reference path loss”, and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

The measurement results are obtained as described below:

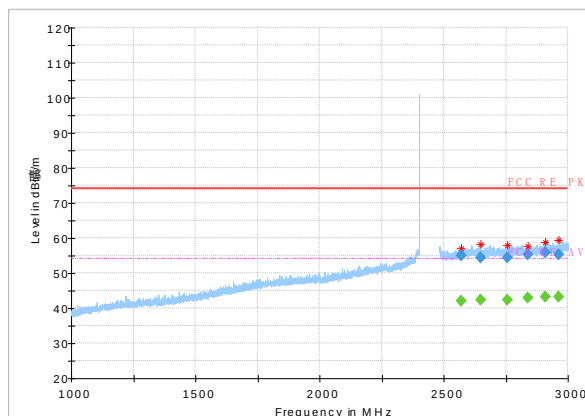
A_{Rpi} = Cable loss + Antenna Gain - Preamplifier gain

Result = $P_{Mea} + A_{Rpi}$

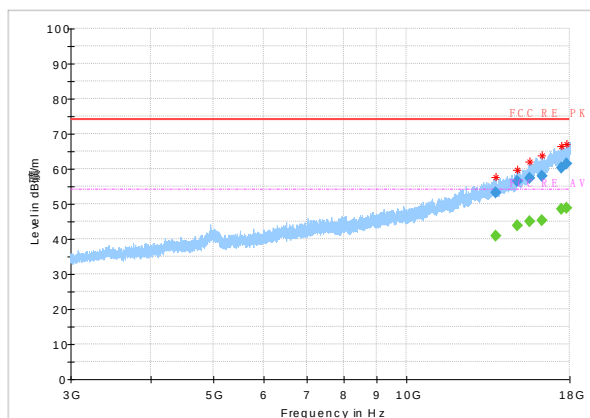
Radiated emission: Ch0, 30MHz~1GHz



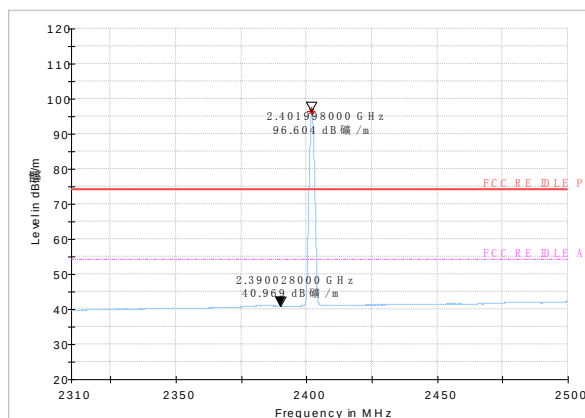
Radiated emission: Ch0, 1GHz~3GHz



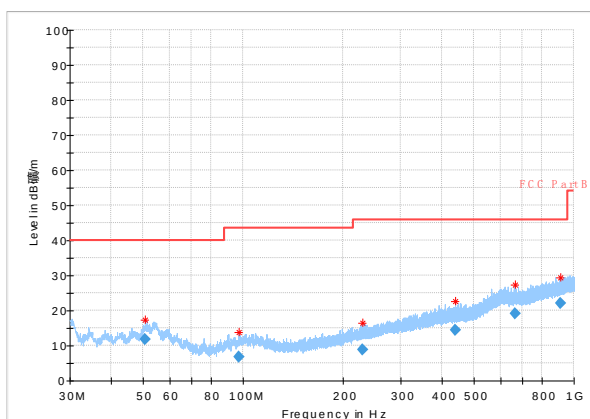
Radiated emission: Ch0, 3GHz~18GHz



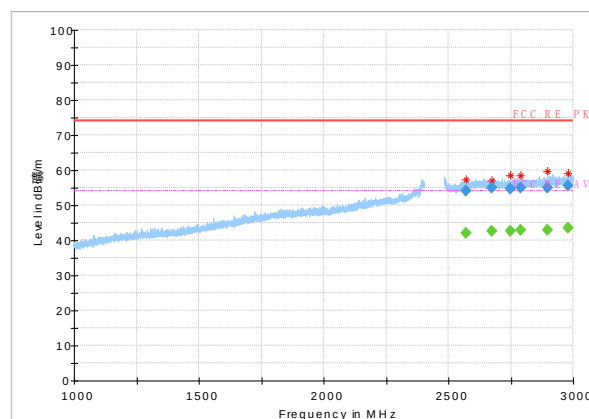
Bandedge: Ch0



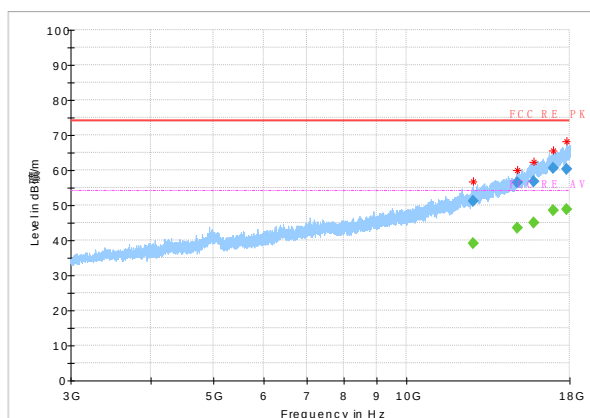
Radiated emission:Ch39, 30MHz~1GHz



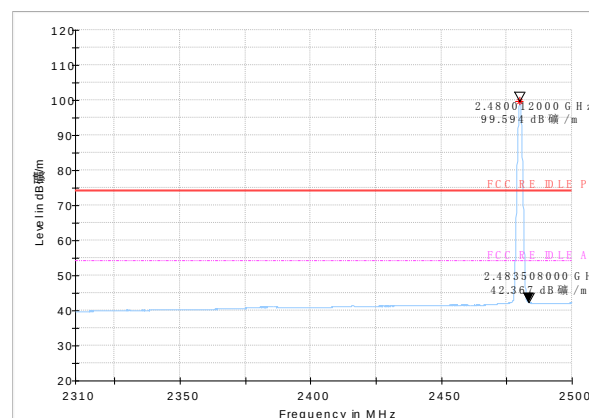
Radiated emission: Ch39, 1GHz~3GHz



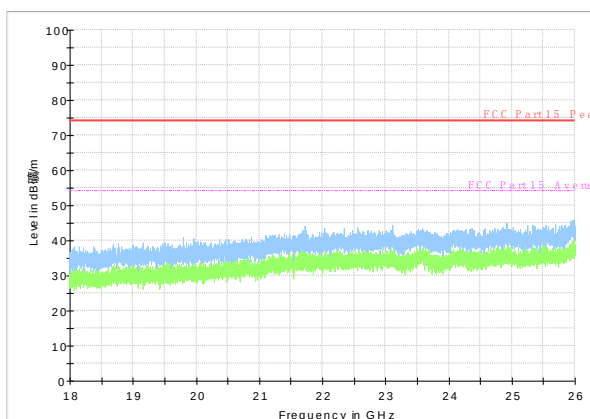
Radiated emission: Ch39, 3GHz~18GHz



Bandedge:Ch39



ALL Channel 18GHz~26GHz



/

/

Ch0 30MHz-1GHz (Peak)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
42.7	8.29	-15.9	24.19	H
50.8	11.37	-15.5	26.87	V
114.9	6.45	-16.1	22.55	H
317.5	11.72	-10.7	22.42	V
598.3	19.16	-3.1	22.26	V
744.7	19.77	-2.7	22.47	V

Ch0 1GHz-3GHz (Peak)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2570.7	54.93	17.3	37.63	V
2647.0	54.41	17.8	36.61	V
2757.1	54.5	18	36.5	H
2837.9	55.36	18.3	37.06	H
2909.8	55.96	18.7	37.26	H
2961.9	55.38	19	36.38	H

Ch0 1GHz-3GHz (Average)

Frequency(MHz)	Result(dBuV/m)	ARpl(dB)	PMea(dBuV/m)	Polarity
2570.7	42.14	17.3	24.84	V
2647.0	42.4	17.8	24.6	V
2757.1	42.45	18	24.45	H
2837.9	42.93	18.3	24.63	H
2909.8	43.37	18.7	24.67	H

Ch0 3GHz-18GHz (Peak)

Frequency(MHz)	Result(dBuV/m)	ARpl(dB)	PMea(dBuV/m)	Polarity
13797.9	53.26	18.3	34.96	H
14891.0	56.34	22.2	34.14	V
15590.6	57.49	24.5	32.99	H
16267.0	57.84	24.9	32.94	H
17505.5	60.35	28.8	31.55	H
17779.8	61.46	29.5	31.96	V

Ch0 3GHz-18GHz (Average)

Frequency(MHz)	Result(dBuV/m)	ARpl(dB)	PMea(dBuV/m)	Polarity
14891.0	43.71	22.2	21.51	V
15590.6	45.03	24.5	20.53	H
16267.0	45.16	24.9	20.26	H
17505.5	48.45	28.8	19.65	H
17779.8	48.94	29.5	19.44	V

Ch39 30MHz-1GHz (Peak)

Frequency(MHz)	Result(dBuV/m)	ARpl(dB)	PMea(dBuV/m)	Polarity
50.7	11.77	-15.5	27.27	V
97.1	6.8	-16.3	23.1	V
230.2	8.96	-13.5	22.46	H
439.1	14.47	-8.5	22.97	V
665.9	19.12	-3.1	22.22	V
911.0	21.92	-0.3	22.22	V

Ch39 1GHz-3GHz (Peak)

Frequency(MHz)	Result(dBuV/m)	ARpl(dB)	PMea(dBuV/m)	Polarity
2571.5	54.02	17.3	36.72	V
2674.8	54.99	17.8	37.19	V
2746.7	54.71	18	36.71	H
2787.8	54.91	18.2	36.71	V
2895.1	54.96	18.7	36.26	H
2978.5	55.69	19.2	36.49	V

Ch39 1GHz-3GHz (Average)

Frequency(MHz)	Result(dBuV/m)	ARpl(dB)	PMea(dBuV/m)	Polarity
2571.5	42.2	17.3	24.9	V
2674.8	42.61	17.8	24.81	V
2746.7	42.76	18	24.76	H
2787.8	42.93	18.2	24.73	V
2895.1	43.06	18.7	24.36	H
2978.5	43.57	19.2	24.37	V

Ch39 3GHz-18GHz (Peak)

Frequency(MHz)	Result(dBuV/m)	ARpl(dB)	PMea(dBuV/m)	Polarity
12714.4	51.11	17.2	33.91	V
14892.8	56.43	22.2	34.23	H
15828.8	56.89	24.4	32.49	H
16963.4	60.62	28	32.62	V
17770.5	60.38	29.3	31.08	V

Ch39 3GHz-18GHz (Average)

Frequency(MHz)	Result(dBuV/m)	ARpl(dB)	PMea(dBuV/m)	Polarity
14892.8	43.51	22.2	21.31	H
15828.8	44.94	24.4	20.54	H
16963.4	48.49	28	20.49	V
17770.5	48.96	29.3	19.66	V

Note: Only the worst case is written in the report.

ANNEX A.2. AC Powerline Conducted Emission

Method of Measurement: ANSI C63.10-2013-clause 6.2

- 1 The one EUT cable configuration and arrangement and mode of operation that produced the emission with the highest amplitude relative to the limit is selected for the final measurement, while applying the appropriate modulating signal to the EUT.
- 2 If the EUT is relocated from an exploratory test site to a final test site, the highest emissions shall be remaximized at the final test location before final ac power-line conducted emission measurements are performed.
- 3 The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment in the system) is then performed for the full frequency range for which the EUT is being tested for compliance without further variation of the EUT arrangement, cable positions, or EUT mode of operation.
- 4 If the EUT is comprised of equipment units that have their own separate ac power connections, e.g., floor-standing equipment with independent power cords for each shelf that are able to connect directly to the ac power network, each current-carrying conductor of one unit is measured while the other units are connected to a second (or more) LISN(s). All units shall be separately measured. If a power strip is provided by the manufacturer, to supply all of the units making up the EUT, only the conductors in the power cord of the power strip shall be measured.

If the EUT uses a detachable antenna, these measurements shall be made with a suitable dummy load connected to the antenna output terminals; otherwise, the tests shall be made with the antenna connected and, if adjustable, fully extended. When measuring the ac conducted emissions from a device that operates between 150 kHz and 30 MHz a non-detachable antenna may be replaced with a dummy load for the measurements within the fundamental emission band of the transmitter, but only for those measurements.³⁶ Record the six highest EUT emissions relative to the limit of each of the current-carrying conductors of the power cords of the equipment that comprises the EUT over the frequency range specified by the procuring or regulatory agency. Diagram or photograph the test setup that was used. See Clause 8 for full reporting requirements.

Test Condition:

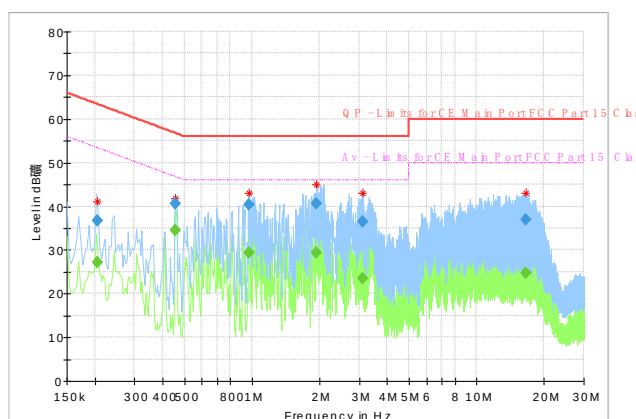
Voltage (V)	Frequency (Hz)
120	60

Measurement Result and limit:

(Quasi-peak-average Limit)

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Average Limit (dBμV)	Conclusion
0.15 to 0.5	66 to 56	56 to 46	P
0.5 to 5	56	46	
5 to 30	60	50	

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.



Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.205969	---	27.25	53.37	26.12	15000.	9.000	N	ON	9.7
0.205969	36.76	---	63.37	26.60	15000.	9.000	N	ON	9.7
0.455963	---	34.49	46.77	12.27	15000.	9.000	N	ON	9.8
0.455963	40.54	---	56.77	16.22	15000.	9.000	N	ON	9.8
0.970875	---	29.34	46.00	16.66	15000.	9.000	N	ON	9.8
0.970875	40.25	---	56.00	15.75	15000.	9.000	N	ON	9.8
1.944731	---	29.42	46.00	16.58	15000.	9.000	N	ON	9.8
1.944731	40.51	---	56.00	15.49	15000.	9.000	N	ON	9.8
3.127538	---	23.59	46.00	22.41	15000.	9.000	N	ON	9.9
3.127538	36.51	---	56.00	19.49	15000.	9.000	N	ON	9.9
16.627200	---	24.67	50.00	25.33	15000.	9.000	N	ON	9.9
16.627200	36.92	---	60.00	23.08	15000.	9.000	N	ON	9.9

ANNEX B. Accreditation Certificate



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