



TEST REPORT

No. I20D00114-SRD25

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

E-Mail: welcome@ecit.org.cn

Revision Version

Report Number	Revision	Date	Memo
I20D00114-SRD25	00	2020-08-20	Initial creation of test report
I20D00114-SRD25	01	2020-09-09	First modification of test report
I20D00114-SRD25	02	2020-09-11	Second modification of test report

CONTENTS

1. TEST LABORATORY	6
1.1. TESTING LOCATION	6
1.2. TESTING ENVIRONMENT	6
1.3. PROJECT DATA	6
1.4. SIGNATURE	6
2. CLIENT INFORMATION	7
2.1. APPLICANT INFORMATION	7
2.2. MANUFACTURER INFORMATION	7
3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE)	8
3.1. ABOUT EUT	8
3.2. INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST	8
3.3. INTERNAL IDENTIFICATION OF AE USED DURING THE TEST	8
4. REFERENCE DOCUMENTS	9
4.1. DOCUMENTS SUPPLIED BY APPLICANT	9
4.2. REFERENCE DOCUMENTS FOR TESTING	9
5. TEST RESULTS	10
5.1. SUMMARY OF TEST RESULTS	10
5.2. STATEMENTS	11
6. TEST EQUIPMENTS UTILIZED	12
6.1. RADIATED EMISSION TEST SYSTEM	12
6.2. AC CONDUCTED EMISSION TEST SYSTEM	12
7. MEASUREMENT UNCERTAINTY	13
8. TEST ENVIRONMENT	14
ANNEX A. DETAILED TEST RESULTS	15
ANNEX A.1. MEASUREMENT METHOD	15

ANNEX A.2. TRANSMITTER SPURIOUS EMISSION	16
ANNEX A.3. BAND EDGES COMPLIANCE	20
ANNEX A.4. AC POWERLINE CONDUCTED EMISSION.....	22
ANNEX B. ACCREDITATION CERTIFICATE	24

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°C-35°C
Relative Humidity	20%-75%

1.3. Project Data

Project Leader	Yu Anlu
Testing Start Date	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)

2. 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	/

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

3.1. About EUT

Production	4G Smart Phone
Model name	MobiWire Sora H5024,Smart E11 (H5024)
Occupied Channel Bandwidth	20 MHz: 802.11 a/n/ac 40 MHz: 802.11 n/ac 80 MHz: 802.11 ac
WLAN Frequency	UNII 3: 5725MHz-5850MHz
WLAN type of modulation	OFDM
Extreme Temperature	-10/+55℃
Nominal Voltage	3.80V
Extreme High Voltage	4.35V
Extreme Low Voltage	3.60V
Maximum of Antenna Gain	WiFi5.8GHz: -1dBi

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.

4. 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; Subpart E—Unlicensed National Information Infrastructure Devices	2018-10-01
ANSI 63.10	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2013
KDB 789033	Information Infrastructure (U-NII) Devices - Part 15, Subpart E	2017

5. Test Results

5.1. Summary of Test Results

Measurement Items	Sub-clause of Part15	Verdict
Band edge compliance	15.407	P
Transmitter Spurious Emission - Radiated	15.407	P
AC Powerline Conducted Emission	15.407	P

Note: Please refer to section 6 for detail; 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 JH5024,Smart E11 (H5024) is a variant model for testing.
ECIT only performed test cases which identified with P/NP/NA/F results in Annex A.

In this report, we only retest the radiation emission. And the conduct test results please refer to report No: I19D00035-SRD07-5.8GWLAN, which was prepared by East China Institute of Telecommunications.

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.

6. Test Equipments Utilized

6.1. Radiated Emission Test System

Item	Instrument Name	Type	Serial Number	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	Loop Antenna	AL-130R	121083	COM-POWER	2019-12-26	3 years

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.

7. 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	5100MHz-5850MHz	95%	$\pm 1.024\text{dB}$
Peak Power Spectral Density	5100MHz-5850MHz	95%	$\pm 1.024\text{dB}$
Occupied 6dB Bandwidth	5100MHz-5850MHz	95%	$\pm 62.04\text{Hz}$
Frequency Band Edges-Conducted	5100MHz-5850MHz	95%	$\pm 1.024\text{dB}$
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%	$\pm 3.66\text{ dB}$

8. 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

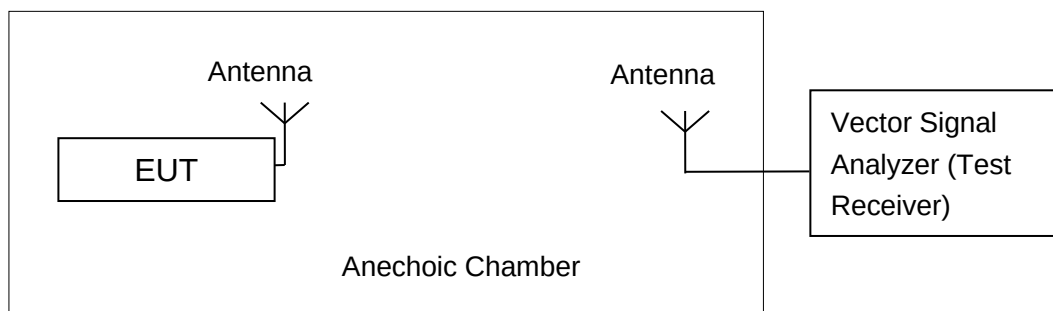
ANNEX A.1. Measurement Method

A.1.1. Radiated Emission Measurements

In the case of radiated emission, the used settings are as follows,

Sweep frequency from 30 MHz to 1GHz, RBW = 100 kHz, VBW = 300 kHz;

Sweep frequency from 1 GHz to 26GHz, RBW = 1MHz, VBW = 10Hz;



The measurement is made according to ANSI C63.10.

The radiated emission test is performed in semi-anechoic chamber. The distance from the EUT to the reference point of measurement antenna is 3m. The test is carried out on both vertical and horizontal polarization and only maximization result of both polarizations is kept. During the test, the turntable is rotated 360° and the measurement antenna is moved from 1m to 4m to get the maximization result.

ANNEX A.2. Transmitter Spurious Emission

Measurement Limit:

Standard	Frequency (MHz)	Limit (dBm/MHz)
FCC 47 CFR Part 15.407	5725MHz~5850MHz	< -27

The measurement is made according to ANSI C63.10.

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)).

Frequency of emission (MHz)	Field strength(uV/m)	Field strength(dBuV/m)
0.009-0.490	2400/F(kHz)	/
0.490-1.705	24000/F(kHz)	/
1.705-30	30	/
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

A.5.2 Transmitter Spurious Emission - Radiated

Modulation type and data rate tested (Only worst case result is given below):

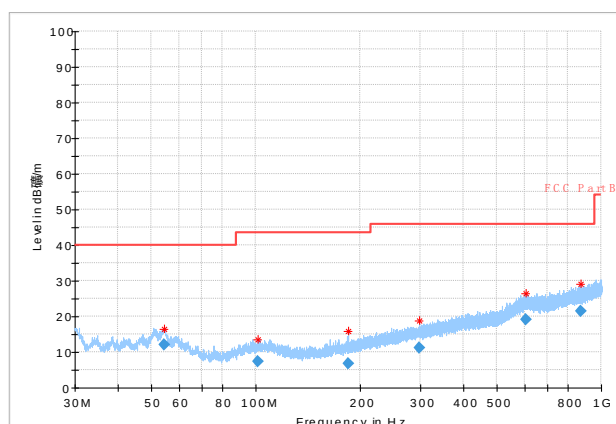
Mode	Data rate	Channel
802.11a	6Mbps	165(5825MHz)

Measurement Uncertainty:

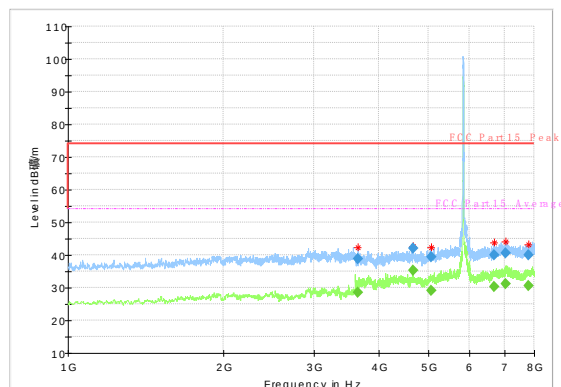
Frequency Range	Uncertainty(dB)
$f \leq 1\text{GHz}$	3.9
$f > 1\text{GHz}$	4.3

Measurement Results:

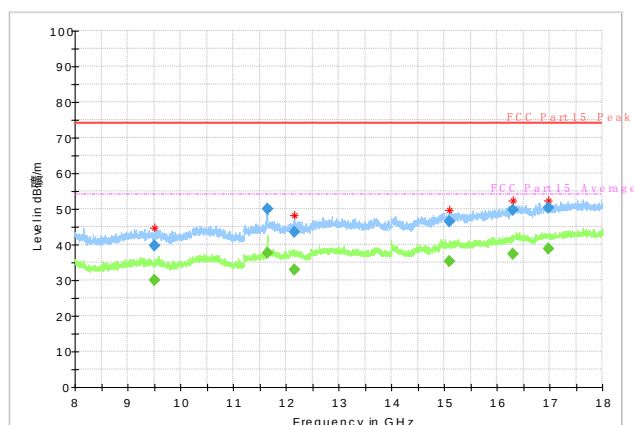
Radiated Spurious Emission
(802.11a, ch165, 30 MHz-1 GHz)



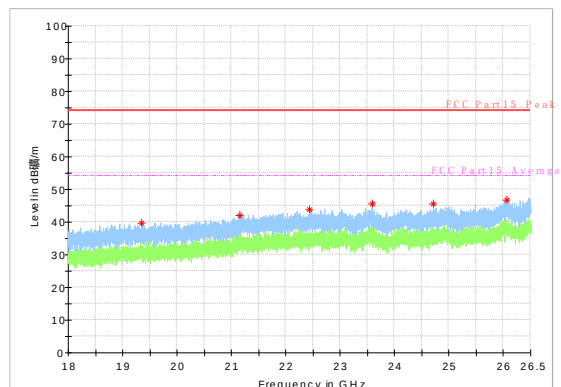
Radiated Spurious Emission
(802.11a, ch165, 1GHz-8GHz)



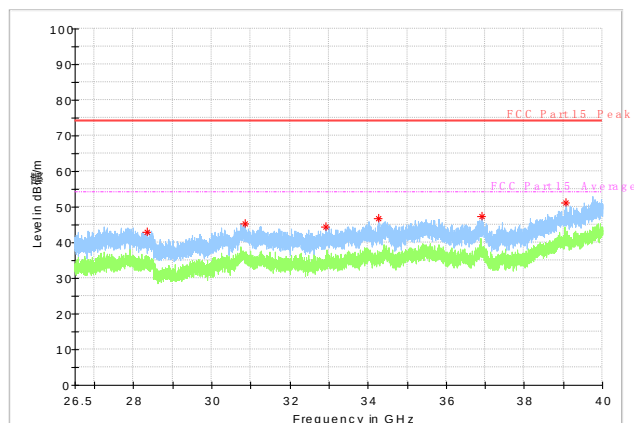
Radiated Spurious Emission
(802.11a, ch165, 8GHz-18GHz)



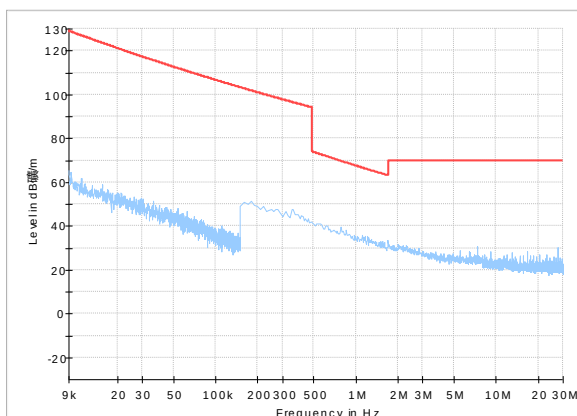
Radiated Spurious Emission
(802.11a, ch165, 18GHz-25.6GHz)



Radiated Spurious Emission
(802.11a, ch165, 25.6GHz-40GHz)



Radiated Spurious Emission (9kHz-30MHz)



Note:

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

P_{Mea} is the field strength recorded from the instrument.

RSE-11A-CH165-30M-1G-N03

Frequency (MHz)	Result (dB μ V/m)	ARpl (dB)	PMea (dB μ V/m)	Polarity
54.4	12.15	-15.4	27.55	V
101.7	7.32	-15.9	23.22	V
185.9	6.84	-15.7	22.54	V
298.6	11.25	-11.5	22.75	H
607.2	19.23	-2.9	22.13	V
874.9	21.48	-1.1	22.58	H

RSE-11A-CH165-1G-8G-N03

Frequency (MHz)	Result (dB μ V/m)	ARpl (dB)	PMea (dB μ V/m)	Polarity
3644.0	38.87	1.4	37.47	V
4660.0	42.07	2.2	39.87	V
5055.4	39.37	6.1	33.27	V
6681.2	40.06	4.5	35.56	H
7053.6	40.69	5	35.69	H
7791.6	40.13	4.8	35.33	V

RSE-11A-CH165-8G-18G-N03

Frequency (MHz)	Result (dB μ V/m)	ARpl (dB)	PMea (dB μ V/m)	Polarity
9514.4	39.65	6.1	33.55	H
11651.0	50	10.4	39.6	V
12159.0	43.51	11.1	32.41	V
15093.0	46.49	14.4	32.09	H
16311.4	49.71	17.3	32.41	V
16973.0	50.38	18.2	32.18	V

RSE-11A-CH165-18G-26.5G-N03

Frequency (MHz)	Result (dB μ V/m)	ARpl (dB)	PMea (dB μ V/m)	Polarity
19351.5	39.81	-5.7	45.51	H
21157.8	42.19	-4.1	46.29	V
22437.8	43.75	-3.3	47.05	V
23592.2	45.54	-2.8	48.34	V
24705.6	45.58	-2.3	47.88	H
26066.5	46.87	-2	48.87	V

RSE-11A-CH165-26.5G-40G-N03

Frequency (MHz)	Result (dB μ V/m)	ARpl (dB)	PMea (dB μ V/m)	Polarity
28342.8	42.88	-0.9	43.78	V
30841.6	45.22	0.3	44.92	H
32912.5	44.39	0.9	43.49	H
34272.0	46.68	1.7	44.98	H
36916.6	47.27	1.8	45.47	V
39076.6	51.17	4.3	46.87	V

Note: the EUT was displayed in several different direction, the worst cases were shown.

ANNEX A.3. Band Edges Compliance

Band Edges - Radiated

Measurement Limit:

- (1) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.
- (2) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (3) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (4) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (5) 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)).

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
10.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(2)
13.36-13.41			

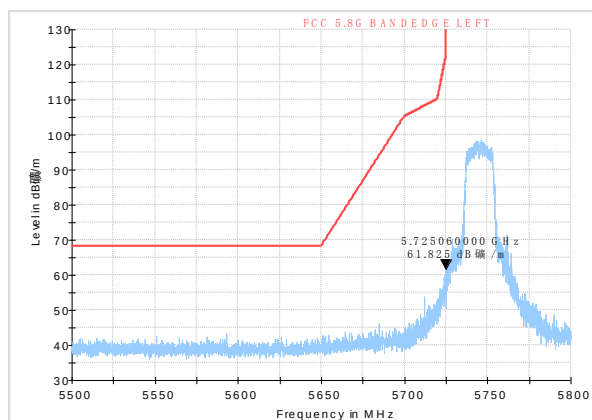
Set the spectrum analyzer in the following:

- (a) Sweep mode: SweepAnalyzer6db.
- (b) PEAK: RBW=1MHz / VBW=3MHz / Sweep=2.5ms, Sweep point;5001
- (c) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=2.5ms, Sweep point;5001

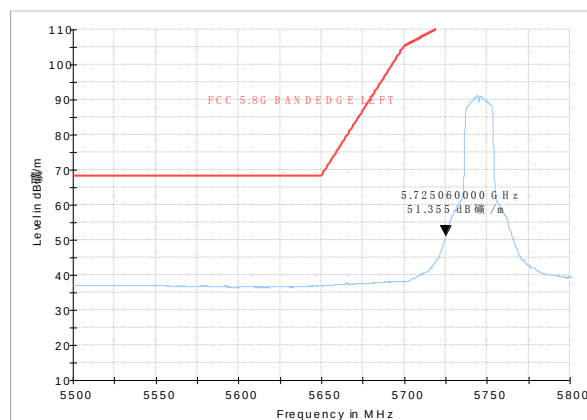
Measurement Result:

Band Edges (802.11a, 5745MHz)

Peak detector

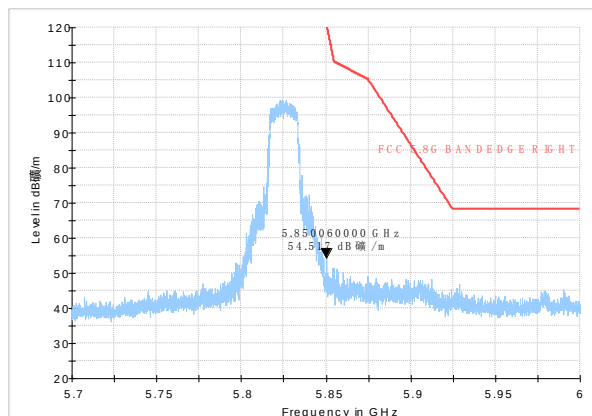


AV detector

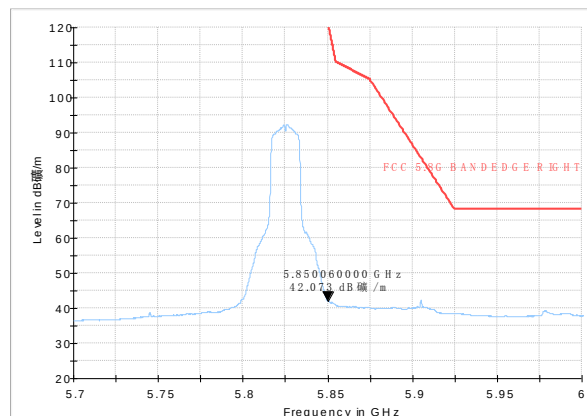


Band Edges (802.11a, 5825MHz)

Peak detector



AV detector



ANNEX A.4. AC Powerline Conducted Emission

Test Condition:

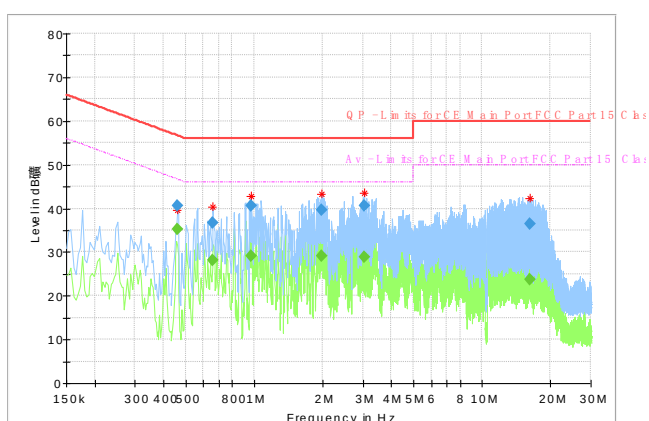
Voltage (V)	Frequency (Hz)
120	60

Measurement Result and limit:

WLAN (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Conclusion
0.15 to 0.5	66 to 56	P
0.5 to 5	56	
5 to 30	60	

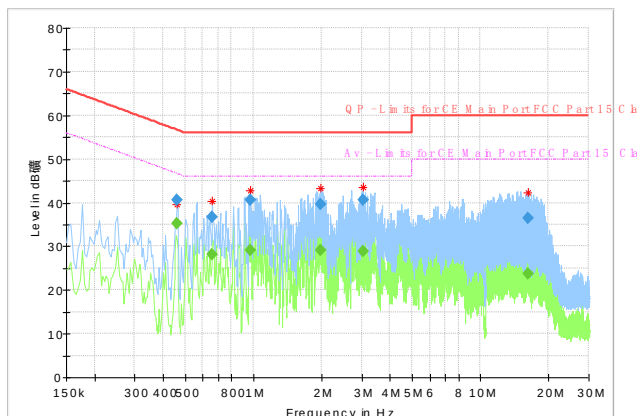
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5MHz.



WLAN (Average Limit)

Frequency range (MHz)	Average Limit (dBμV)	Conclusion
0.15 to 0.5	56 to 46	P
0.5 to 5	46	
5 to 30	50	

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



The measurement is made according to ANSI C63.10.

Measurement Result:

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.459694	40.63	---	56.70	16.07	15000.0	9.000	N	ON	9.8
0.459694	---	35.13	46.70	11.56	15000.0	9.000	N	ON	9.8
0.661181	36.66	---	56.00	19.34	15000.0	9.000	N	ON	9.8
0.970875	40.51	---	56.00	15.49	15000.0	9.000	N	ON	9.8
0.970875	---	29.20	46.00	16.80	15000.0	9.000	N	ON	9.8
1.967119	39.74	---	56.00	16.26	15000.0	9.000	N	ON	9.8
1.967119	---	29.11	46.00	16.89	15000.0	9.000	N	ON	9.8
3.056644	40.50	---	56.00	15.50	15000.0	9.000	N	ON	9.9
3.056644	---	28.91	46.00	17.09	15000.0	9.000	N	ON	9.9
16.291388	---	23.64	50.00	26.36	15000.0	9.000	L1	ON	10.1
16.291388	36.55	---	60.00	23.45	15000.0	9.000	L1	ON	10.1

ANNEX B. Accreditation Certificate



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