TEST REPORT

For

Mobile Phone

Model Number: CPH2711

FCC ID: R9C-OP24283

Test Laboratory	:	Shenzhen Academy of Metrology and Quality Inspection
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Revision History

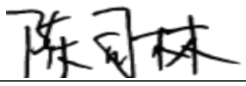
No	Date	Remark
V1.0	2024-12-9	Initial issue

TEST REPORT DECLARATION

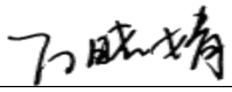
Applicant	:	Guangdong OPPO Mobile Telecommunications Corp., Ltd.
Address	:	NO.18 Haibin Road, Wusha Village, Chang'an Town, Dongguan City, Guangdong, China
Manufacturer	:	Guangdong OPPO Mobile Telecommunications Corp., Ltd.
Address	:	NO.18 Haibin Road, Wusha Village, Chang'an Town, Dongguan City, Guangdong, China
EUT Description	:	Mobile Phone
Model No.	:	CPH2711
Trade mark	:	OPPO
Serial Number	:	---
Date of EUT Receive	:	2024-11-4
Test Standards:	:	FCC Part 15 Subpart E

The EUT described above is tested by Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory to determine the maximum emissions from the EUT and ensure the EUT to be compliance with the immunity requirements of the EUT. Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory is assumed full responsibility for the accuracy of the test results, unless they depend on the manufacturer information.

The test report is valid for above tested sample only and shall not be reproduced in part without written approval of the laboratory.

Project Engineer:  Date: 2024-12-3

(陈司林 Chen SiLin)

Checked by:  Date: 2024-12-9

(万晓婧 Wan XiaoJing)

Approved by:  Date: 2024-12-9

(林斌 Lin Bin)

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1. TEST RESULTS SUMMARY

Table 1 Test Results Summary

Test Items	Test Results
6dB bandwidth	PASS
26dB Bandwidth	PASS
Maximum conducted output power and equivalent isotropically radiated power	PASS
Maximum power spectral density	PASS
Radiated emission	PASS
Conducted Emission	PASS
Dynamic Frequency Selection	PASS
Antenna Requirement	PASS

Remark: “N/A” means “Not applicable.”

2. GENERAL INFORMATION

2.1. Report information

This report is not a certificate of quality; it only applies to the sample of the specific product/equipment given at the time of its testing. The results are not used to indicate or imply that they are application to the similar items. In addition, such results must not be used to indicate or imply that SMQ approves recommends or endorses the manufacture, supplier or use of such product/equipment, or that SMQ in any way guarantees the later performance of the product/equipment.

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The lab will not be liable for any loss or damage resulting for false, inaccurate, inappropriate or incomplete product information provided by the applicant/manufacturer.

2.2. Laboratory Accreditation and Relationship to Customer

The testing report were performed by the Shenzhen Academy of Metrology and quality Inspection EMC Laboratory (Guangdong EMC compliance testing center), in their facilities located at NETC Building, No.4 Tongfa Rd., Xili, Nanshan, Shenzhen, China. At the time of testing, Laboratory is accredited by the following organizations:

China National Accreditation Service for Conformity Assessment (CNAS) accredits the Laboratory for conformance to FCC standards, EMC international standards and EN standards. The Registration Number is CNAS L0579.

The Laboratory is Accredited Testing Laboratory of FCC with Designation number CN1165 and Site registration number 582918.

The Laboratory is registered to perform emission tests with Innovation, Science and Economic Development (ISED), and the registration number is 11177A.

The Laboratory is registered to perform emission tests with VCCI, and the registration number are C-20048, G20076, R-20077, R-20078 and T-20047.

The Laboratory is Accredited Testing Laboratory of American Association for Laboratory Accreditation (A2LA) and certificate number is 3292.01.

2.3. Measurement Uncertainty

Conducted Emission
9 kHz~150 kHz U=3.7 dB k=2
150 kHz~30 MHz U=3.3 dB k=2

Radiated Emission
30 MHz~1000 MHz U=4.3 dB k=2
1 GHz~6 GHz U=4.6 dB k=2
6 GHz~40 GHz U=5.1 dB k=2

3. PRODUCT DESCRIPTION

3.1. EUT Description

Operate Frequency	:	U-NII 1(5180~5240 MHz) U-NII 2A(5260~5320 MHz) U-NII 2C(5500~5700 MHz) U-NII 3(5745~5825 MHz)
Antenna Designation	:	IFA U-NII 1(5180~5240 MHz): 1 dBi U-NII 2A(5260~5320 MHz): 1.5 dBi U-NII 2C(5500~5700 MHz): 1.5 dBi U-NII 3(5745~5825 MHz): 1.5 dBi
Modulation	:	OFDM (BPSK, QPSK, 16QAM, 64QAM) for 802.11a/n OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) for 802.11ac
Operating Voltage	:	DC 3.92 V (Li-ion, battery) AC 120 V/60 Hz (Adapter)
Software Version	:	ColorOS 15.0.0
Hardware Version	:	11

There are 4 adapters, only the worst data of VCB4JAUH (2#) shown in this report.

Frequency List:

Band 1

Ch.	Frequency (MHz)
36	5180
40	5200
44	5220
48	5240

Band 2A

Ch.	Frequency (MHz)
52	5260
56	5280
60	5300
64	5320

Band 2C

Ch.	Frequency (MHz)
100	5500
104	5520
108	5540
112	5560
116	5580
120	5600
124	5620
128	5640
132	5660
136	5680
140	5700

Band 3

Ch.	Frequency (MHz)
149	5745
153	5765
157	5785
161	5805
165	5825

Table 2 802.11a/802.11n/802.11ac Frequency /Channel operations

Band 1		Band 2A		Band 2C		Band 3	
Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)
38	5190	54	5270	102	5510	151	5755
46	5230	62	5310	110	5550	159	5795
				118	5590		
				126	5630		
				134	5670		

Table 3 802.11n/802.11ac (40MHz BW) Frequency /Channel operations

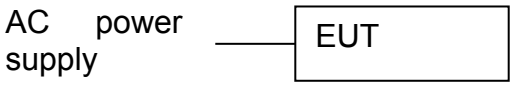
Band 1		Band 2A		Band 2C		Band 3	
Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)
42	5210	58	5290	106	5530	155	5775
				122	5610		

Table 4 802.11ac (80MHz BW) Frequency /Channel operations

3.2. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: **R9C-OP24283** filing to comply with Section 15.207,15.209, 15.407 of the FCC Part 15, Subpart E Rules.

3.3. Block Diagram of EUT Configuration



Setup of test

3.4. Operating Condition of EUT

The Radiated spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission (X plane).
Worst-case mode and channel used for 30-1000 MHz radiated and power line conducted emissions was the mode and channel with the highest output power.
Worst-case data rates as provided by the client were:
802.11a mode: 6 Mbps
802.11n HT20 mode: MCS0
802.11n HT40 mode: MCS0
802.11ac VHT20 mode: MCS0
802.11ac VHT40 mode: MCS0
802.11ac VHT80 mode: MCS0

3.5. Directional Antenna Gain

Not available for this EUT intended for grant.

3.6. Support Equipment List

Table 5 Support Equipment List

Name	Model No.	S/N	Manufacturer
Adapter 1# for EUT	VCB4JAUH	---	HUIZHOU GOLDEN LAKE INDUSTRIAL CO., LTD
Adapter 2# for EUT	VCB4JAUH	---	Jiangsu ChenYang Electronics Co,. Ltd.
Adapter 3# for EUT	VCB4HAUH	---	ShenZhen Huntkey Electronics Co.,Ltd.
Adapter 4# for EUT	VCB4HAUH	---	HUIZHOU GOLDEN LAKE INDUSTRIAL CO., LTD.

3.7. Special Accessories

Not available for this EUT intended for grant.

3.8. Equipment Modifications

Not available for this EUT intended for grant.

4. 6DB BANDWIDTH

4.1. Test Limit

The minimum 6 dB bandwidth shall be 500 kHz.

4.2. Test Procedure

ANSI C63.10-2013 Clause 11.8
The transmitter output was connected to the spectrum analyzer.
a) Set RBW = 100 kHz.
b) Set the VBW ≥ [3 × RBW].
c)Detector = Peak.
d)Trace mode = max hold.
e)Sweep = auto couple.
f)Allow the trace to stabilize.
g)Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

4.3. Test Setup

4.4. Test Equipment

No.	Equipment	Manufacturer	Model No.	LAST CALIB	Period
SB18161	Spectrum Analyzer	Rohde & Schwarz	FSV3030	2024-04-22	12 Months
SB9060	Signal Analyzer	Rohde & Schwarz	FSQ40	2024-04-22	12 Months

4.5. Test Condition

Date of test: Nov.14,2024-Nov.19,2024

Temperature: (25 ~ 26) ℃
Relative Humidity: (36 ~ 49) %RH
Atmospheric Pressure: (100.4 ~ 101.5) kPa

4.6. Test Data

Please refer to the Annex A.

5. 26DB BANDWIDTH

5.1. Test Limit

None; for reporting purposes only.

5.2. Test Procedure

a) Set RBW = approximately 1% of the emission bandwidth.
b) Set the VBW > RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

5.3. Test Setup

5.4. Test Equipment

No.	Equipment	Manufacturer	Model No.	LAST CALIB	Period
SB18161	Spectrum Analyzer	Rohde & Schwarz	FSV3030	2024-04-22	12 Months
SB9060	Signal Analyzer	Rohde & Schwarz	FSQ40	2024-04-22	12 Months

5.5. Test Condition

Date of test: Nov.14,2024-Nov.19,2024
Temperature: (23 ~ 26) ℃
Relative Humidity: (36 ~ 52) %RH
Atmospheric Pressure: (100.4 ~ 101.5) kPa

5.6. Test Data

Please refer to the Annex A.

6. MAXIMUM CONDUCTED OUTPUT POWER

6.1. Test Limit

CFR 47 (FCC) part 15.407 (a)
For the band 5.15–5.25 GHz.
For mobile and portable client devices in the 5.15–5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the max-imum antenna gain does not exceed 6 dBi.
For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz,the maximum antenna gain does not exceed 6 dBi.
For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

6.2. Test Procedure

ANSI C63.10-2013 Clause 11.9
a) Measure the duty cycle D of the transmitter output signal as described in 11.6.
b) Set span to at least 1.5 times the OBW.
c) Set RBW = 1% to 5% of the OBW, not to exceed 1 MHz.
d) Set VBW ≥ [3 × RBW].
e) Number of points in sweep ≥ [2 × span / RBW]. (This gives bin-to-bin spacing ≤ RBW / 2, so that narrowband signals are not lost between frequency bins.)
f) Sweep time = auto.
g) Detector = RMS (i.e., power averaging), if available. Otherwise, use the sample detector mode.
h) Do not use sweep triggering. Allow the sweep to “free run.”
i) Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed such that the average accurately represents the true average over the ON and OFF periods of the transmitter.
j) Compute power by integrating the spectrum across the OBW of the signal using the instrument’s band power measurement function with band limits set equal to the OBW band edges. If the instrument does not have a band power function, then sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.
k) Add [10 log (1 / D)], where D is the duty cycle, to the measured power to compute the average power during the actual transmission times (because the measurement represents an average over both the ON and OFF times of the transmission). For example, add [10 log (1/0.25)] = 6 dB if the duty cycle is 25%.

6.3. Test Setup

6.4. Test Equipment

No.	Equipment	Manufacturer	Model No.	LAST CALIB	Period
SB18161	Spectrum Analyzer	Rohde & Schwarz	FSV3030	2024-04-22	12 Months
SB9060	Signal Analyzer	Rohde & Schwarz	FSQ40	2024-04-22	12 Months

6.5. Test Condition

Date of test: Nov.14,2024-Nov.19,2024
Temperature: (23 ~ 26) ℃
Relative Humidity: (36 ~ 52) %RH
Atmospheric Pressure: (100.4 ~ 101.5) kPa

6.6. Test Data

Please refer to the Annex A.

7. POWER SPECTRAL DENSITY

7.1. Test Limit

CFR 47 (FCC) part 15.247 (e) , For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

7.2. Test Procedure

ANSI C63.10-2013 Clause 11.10
The transmitter output was connected to the spectrum analyzer.
a)Set analyzer center frequency to DTS channel center frequency.
b) Set the span to 1.5 times the DTS bandwidth.
c) Set RBW to：3kHz≤RBW≤100 kHz.
d) Set VBW ≥ 3 x RBW.
e) Detector = peak.
f) Sweep time = auto couple.
g) Trace mode = max hold.
h)Allow trace to fully stabilize.
i)Use the peak marker function to determine the maximum amplitude level within the RBW.
j)If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

7.3. Test Setup

7.4. Test Equipment

No.	Equipment	Manufacturer	Model No.	LAST CALIB	Period
SB18161	Spectrum Analyzer	Rohde & Schwarz	FSV3030	2024-04-22	12 Months
SB9060	Signal Analyzer	Rohde & Schwarz	FSQ40	2024-04-22	12 Months

7.5.Test Condition

Date of test: Nov.14,2024-Nov.19,2024
Temperature: (23 ~ 26) ℃
Relative Humidity: (36 ~ 52) %RH
Atmospheric Pressure: (100.4 ~ 101.5) kPa

7.6.Test Data

Please refer to the Annex A.

8. RADIATED EMISSION

8.1. Test Limit

Table 6 Radiation Emission Test Limit

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

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permItted under other sections of this part, e.g., §§ 15.231 and 15.241.

Table 7 Restricted frequency bands

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
0.495 - 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	
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	
6.31175 - 6.31225	123 - 138	2200 - 2300	
8.291 - 8.294	149.9 - 150.05	2310 - 2390	
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	
12.29 - 12.293	167.72 - 173.2	3332 - 3339	
12.51975 - 12.52025	240 - 285	3345.8 - 3358	
12.57675 -	322 - 335.4	3600 - 4400	

12.57725 13.36 - 13.41			

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.
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.
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.
For transmitters operating in the 5.725-5.85 GHz band: 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.

8.2. Test Procedure

1. The testing follows the guidelines in ANSI C63.10-2013.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. For measurement below 1GHz, the EUT was placed on a turntable with 0.8meter, above ground. For measurement above 1 GHz, test at FAR, the EUT is placed on a non-conductive table, which is 1.5 meter above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. Use the following spectrum analyzer settings:
(1) Span shall wide enough to fully capture the emission being measured;
(2) Set RBW=100 kHz for f < 1 GHz; VBW >= RBW; Sweep = auto; Detector function = peak; Trace = max hold;
(3) Set RBW = 1 MHz, VBW= 3MHz for f > 1 GHz for peak measurement.
Set RBW = 1 MHz, and 1/T (on time) for average measurement.

8.3. Test Equipment

No.	Equipment	Manufacturer	Model No.	LAST CALIB	Period
SB15044/01	Test Receiver	ROHDE&SCHWARZ	ESW8	2024-03-15	12 Months
SB18844	Anechoic chamber	Albatross	3mSAC	2024-03-19	12 Months

SB18856	Broadband Antenna	SCHWARZBECK	VULB9163	2024-08-26	12 Months
SB3345	Loop antenna	SCHWARZBECK	FMZB1516	2024-01-12	12 Months
SB3435	Horn Antenna	ROHDE&SCHWARZ	HF906	2024-11-19	12 Months
SB8501/09	Test Receiver	ROHDE&SCHWARZ	ESU40	2024-01-17	12 Months
SB8501/11	Horn Antenna	ETS-Lindgren	3160-09	2023-02-22	36 Months
SB8501/12	Horn Antenna	ETS-Lindgren	3160-10	2023-02-22	36 Months
SB8501/16	Low Noise Amplifier	ROHDE&SCHWARZ	SCU-26	2024-01-16	12 Months
SB9054/08	Broadband Antenna	SCHWARZBECK	VULB 9163	2023-12-27	12 Months
SB9058/03	Low Noise Amplifier	ROHDE&SCHWARZ	SCU18	2024-01-16	12 Months
SB9059	Low Noise Amplifier	ROHDE&SCHWARZ	SCU-40	2024-08-19	12 Months
SB9555/02	Anechoic chamber	Albatross	/	2024-08-08	12 Months

8.4. Test Condition

Date of test: Nov.5,2024-Nov.22,2024
Temperature: (21 ~ 24) ℃
Relative Humidity: (46 ~ 56) %RH
Atmospheric Pressure: (100.4 ~ 101.5) kPa

8.5. Test Data

Please refer to the Annex A.

9. AC POWER-LINE CONDUCTION EMISSIONS

9.1. Test Standard and Limit

9.1.1. Test Standard

CFR 47 (FCC) part 15.207

9.1.2. Test Limit

Table 8 AC Power-line Conduction Emissions Test Limit

Frequency (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56[1]	56 to 46[1]
0.5 - 5	56	46
5 - 30	60	50
Note[1]: The level decreases linearly with the logarithm of the frequency.		

9.2. Test Procedure

The EUT is put on a table of non-conducting material that is 80cm high. The vertical conducting wall of shielding is located 40cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.). A EMI test receiver is used to test the emissions from both sides of AC line. According to the requirements in Section 7 and 13 of ANSI C63.4a-2017. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode.
The bandwidth of EMI test receiver is set at 9 kHz.

9.3. Test Arrangement

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application. The detailed information refers to test picture.

9.4. Test Equipment

No.	Equipment	Manufacturer	Model No.	LAST CALIB	Period
SB4357	AMN	ROHDE&SCHWARZ	ENV216	2024-05-21	12 Months
SB9058/05	Test Receiver	ROHDE&SCHWARZ	ESCI3	2024-09-03	12 Months
SB9549	Shielded Room	Albatross	SR	2024-08-28	12 Months

9.5. Test Condition

Date of test: Nov.5,2024
Temperature: 23 ℃
Relative Humidity: 49 %RH
Atmospheric Pressure: 101.4 kPa

9.6. Test Data

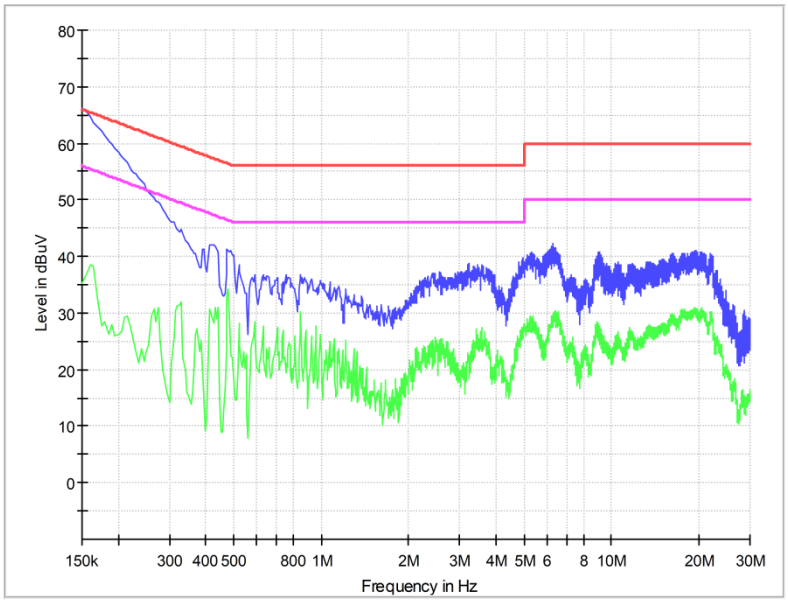
Note: Emissions not reported below are too low against the prescribed limits. “/” means the test data is too low against the limit.

Table 9 AC Power-line Conduction Emissions Test Data

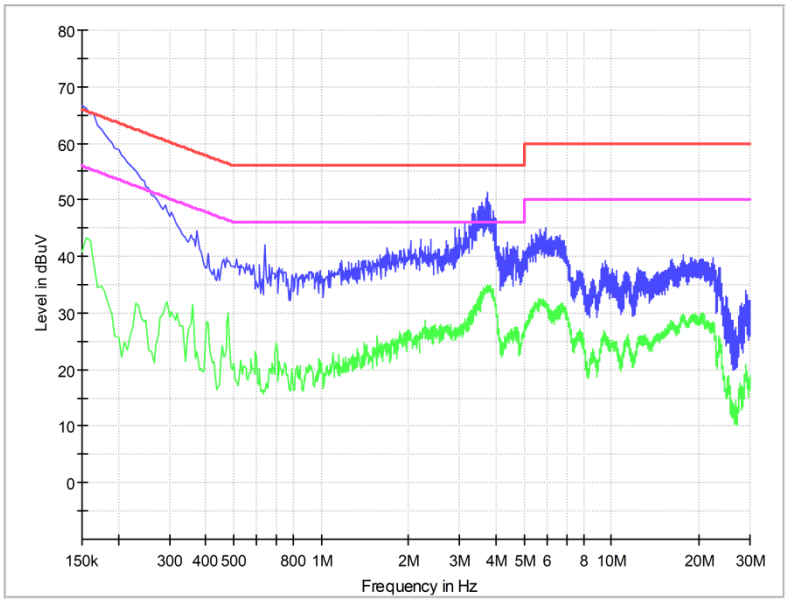
Test mode: Charging and Transmitting										
Port	Frequency (MHz)	Emission Level QP (dBuV/m)	Limit QP (dBuV/m)	Margin QP (dB)	Emission Level AV (dBuV/m)	Limit AV (dBuV/m)	Margin AV (dB)	Reading QP (dBuV/m)	Reading AV (dBuV/m)	Correction Factor (dB)
L	0.150	60.1	66.0	5.9	33.8	56.0	22.2	50.0	23.7	10.1
L	0.850	53.8	56.0	2.2	25.8	46.0	20.2	43.8	15.8	10.0
L	0.480	38.7	56.3	17.6	29.1	46.3	17.2	28.6	19.0	10.1
L	3.210	31.2	56.0	24.8	21.3	46.0	24.7	21.1	11.2	10.1
L	5.280	33.6	60.0	26.4	25.8	50.0	24.2	23.6	15.8	10.0
L	6.280	35.9	60.0	24.1	28.6	50.0	21.4	25.9	18.6	10.0
N	0.150	60.4	66.0	5.6	32.6	56.0	23.4	50.3	22.5	10.1
N	0.205	51.8	63.4	11.6	23.8	53.4	29.6	41.7	13.7	10.1
N	0.375	34.2	58.4	24.2	20.1	48.4	28.3	24.1	10.0	10.1
N	2.036	31.6	56.0	24.4	22.4	46.0	23.6	21.5	12.3	10.1
N	3.725	36.3	56.0	19.7	27.9	46.0	18.1	26.3	17.9	10.0
N	5.935	37.4	60.0	22.6	29.9	50.0	20.1	27.4	19.9	10.0

Test Mode: Charging and Transmitting

L:



N:



10. DYNAMIC FREQUENCY SELECTION

10.1. Test Limit

RSS-247 Issue 3 Clause 6.3 and kdb905462 D02

Table 10 Applicability of DFS Requirements Prior to Use of a Channel

Requirement	Operational Mode		
	Master	Client Without Radar Detection	Client With Radar Detection
Non-Occupancy Period	Yes	Not required	Yes
DFS Detection Threshold	Yes	Not required	Yes
Channel Availability Check Time	Yes	Not required	Not required
U-NII Detection Bandwidth	Yes	Not required	Yes

Table 11 Applicability of DFS requirements during normal operation

Requirement	Operational Mode	
	Master Device or Client with Radar Detection	Client Without Radar Detection
DFS Detection Threshold	Yes	Not required
Channel Closing Transmission Time	Yes	Yes
Channel Move Time	Yes	Yes
U-NII Detection Bandwidth	Yes	Not required

Additional requirements for devices with multiple bandwidth modes	Master Device or Client with Radar Detection	Client Without Radar Detection
U-NII Detection Bandwidth and Statistical Performance Check	All BW modes must be tested	Not required
Channel Move Time and Channel Closing Transmission Time	Test using widest BW mode available	Test using the widest BW mode available for the link
All other tests	Any single BW mode	Not required
Note: Frequencies selected for statistical performance check (Section 7.8.4) should include several frequencies within the radar detection bandwidth and		

frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in each of the bonded 20 MHz channels and the channel center frequency.

Table 12 Interference Threshold values, Master or Client incorporating In-Service Monitoring

Maximum Transmit Power	**Value (See Notes)**
Devices with an e.i.r.p. < 200 mW AND a Power Spectral Density < 10 dBm/MHz	-62 dBm
Devices with 200 mW ≤ e.i.r.p. ≤ 1 W	-64 dBm
Note: The detection threshold power is the received power, averaged over a 1-microsecond reference to a 0 dBi antenna.	

Table 13 DFS Response Requirement Values

Parameter	**Value**
Non-occupancy period	Minimum 30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds See Note 1.
Channel Closing Transmission Time	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2
U-NII Detection Bandwidth	Minimum 100% of the U-NII 99% transmission power bandwidth. See Note 3.
Note 1: Channel Move Time and the Channel Closing Transmission Time should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst. **Note 2:** The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate a Channel move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions. **Note 3:** During the U-NII Detection Bandwidth detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.	

Table 14 Short Pulse Radar Test Waveforms

Radar Type	**Pulse Width (µsec)**	**PRI (µsec)**	**Number of Pulses**	**Minimum Percentage of Successful Detection**	**Minimum Number of Trials**

0	1	1428	18	See Note 1	See Note 1
1	1	Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a□ □ □	Roundup:□ □ □ □ □ {(1/360)×（19×10^{6}PRI$_u$ sec）}	60%	30
		Test B: 15 unique PRI values randomly selected within the range of 518-3066 μsec, with a minimum increment of 1 μsec, excluding PRI values Selected in Test A			
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120
Note 1: Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.					

Table 15 Long Pulse Radar Test Waveform

Radar Type	Pulse Width (μsec)	Chirp Width (MHz)	PRI (μsec)	Number of Pulses per Burst	Number of Bursts	Minimum Percentage of Successful Detection	Minimum Number of Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

Table 16 Frequency Hopping Radar Test Waveform

Radar Type	Pulse Width (μsec)	PRI (μsec)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length	Minimum Percentage of	Minimum Number of

					(msec)	Successful Detection	Trials
6	1	333	9	0.333	300	70%	30

10.2. Test Procedure

The EUT Operates over the 5250-5350MHz and 5470-5725 MHz range and it is a Client Device without Radar Detection.

The radar detection threshold, lower antenna gain is the parameter of interfernce radar DFS detection threshold, the required conducted threshold at the antenna port is the -62dBm+0dBi+1dB=-61dBm.

The R&S SMBV100A vector signal generator with option K350 is used to generate the pulse during test.

The Client device is connected to the Master device on the Channel selected to test. The program iPerf is used to set up a connection between the Client and the Master Device with proper duty cycle.

The Spectrum analyzer is used to monitor the DFS radar pulse and the EUT transmission with zero span function at the selected Channel. The spectrum analyzer is set to peak detection, and max hold.

WLAN traffic load is verified before the pulse is injected.

Channel Move time
The test software controls the spectrum analyzer to start monitoring the EUT transmission, and at T0=2sec, the pulse is injected. The time the pulse stop is marked as T1, The time when no transmission is detected is marked as T3. T3-T1 is calculated as Channel move time.

Non-Occupancy Period
The test software controls the spectrum analyzer to start monitoring the EUT transmission, and at T0=10sec, the pulse is injected. T2 is the channel move time stop moment; the software controls the spectrum to monitor for 1800 seconds. The plot is recorded in report.

10.3. Test Setup

Setup for Master with injection at the Master

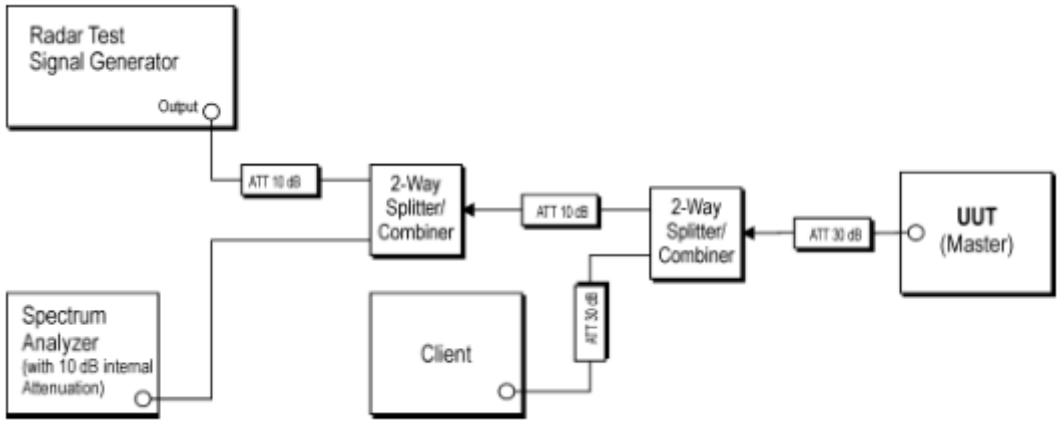


Figure 1 Example Conducted Setup where UUT is a Master and Radar Test Waveforms are injected into the Master

Setup for Client with injection at the Master

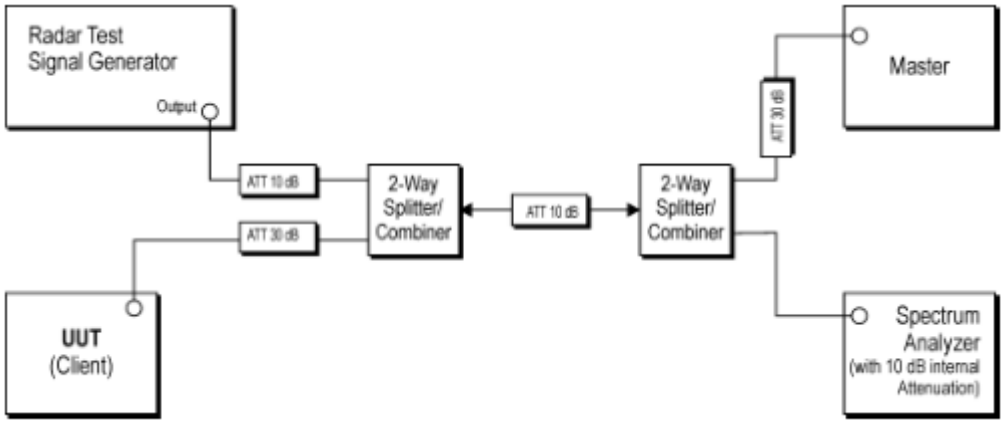


Figure 2 Example Conducted Setup where UUT is a Client and Radar Test Waveforms are injected into the Master

Setup for Client with injection at the Client

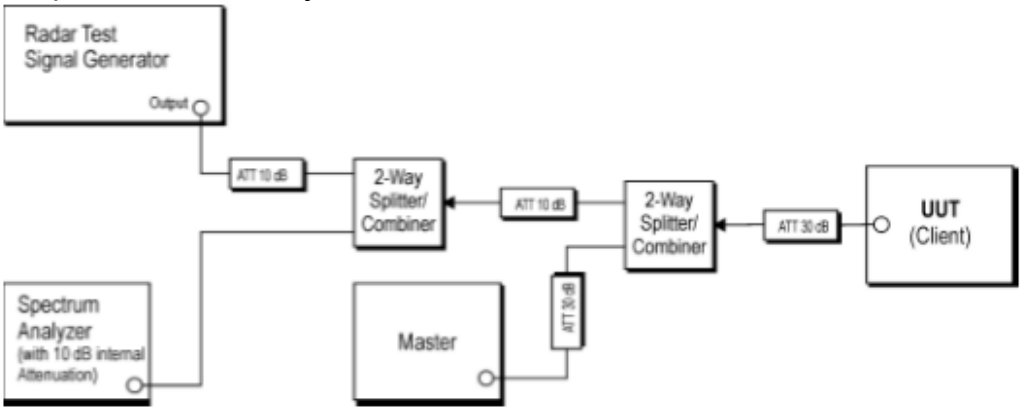


Figure 3 Example Conducted Setup where UUT is a Client and Radar Test Waveforms are injected into the Client

10.4. Test Equipment

No.	Equipment	Manufacturer	Model No.	LAST CALIB	Period
SB11873/01	Power sensor, Power Meter	Rohde & Schwarz	OSP120+OSP-B157	2024-04-22	12 Months
SB11873/02	Vector Signal Generator	Rohde & Schwarz	SMBV100A	2024-04-22	12 Months
SB11895	Step Attenuator	Agilent	8496B-002	2024-02-27	12 Months
SB9060	Signal Analyzer	Rohde & Schwarz	FSQ40	2024-04-22	12 Months

10.5. Test Condition

Date of test: Dec.2,2024
Temperature: 23 ℃
Relative Humidity: 40 %RH
Atmospheric Pressure: 100.8 kPa

10.6. Test Data

Please refer to the Annex B.

DFS Operational mode	Master	Client Without Radar Detection	Client With Radar Detection
	☐	☒	☐

11. ANTENNA REQUIREMENTS

11.1. Test Limit

15.203 requirements:
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

11.2. Antenna Connector

Antenna Connector is on the PCB within enclosure and not accessible to user.
----------End of Report----------