



FCC PART 15E TEST REPORT No.23T04Z80629-028

for

BLU Products,Inc.

Smart phone

B160V

FCC ID: YHLBLUB160V

with

Hardware Version: V1.0

Software Version: BLU_B160V_V14.0.01.01.01.03_FSec

Issued Date: 2024-01-10

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

Test Laboratory:

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
23T04Z80629-028	Rev.0	1st edition	2024-01-10

Note: the latest revision of the test report supersedes all previous version.

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1. Test Laboratory

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2017 accredited test laboratory under American Association for Laboratory Accreditation (A2LA) with lab code 7049.01, and is also an FCC accredited test laboratory (CN1349), and ISED accredited test laboratory (CAB identifier:CN0066). The detail accreditation scope can be found on A2LA website.

1.2. Testing Location

Location 1:CTTL(Huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing,
P. R. China100191

Location 2:CTTL(Huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing,
100191, P. R. China

1.3. Testing Environment

Normal Temperature: 15-35°C

Relative Humidity: 20-75%

1.4. Project date

Testing Start Date: 2023-12-07

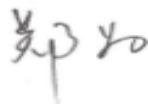
Testing End Date: 2024-01-10

1.5. Signature




Dong Jiaxuan

(Prepared this test report)



Zheng Wei

(Reviewed this test report)



Pang Shuai

(Approved this test report)



2. Client Information

2.1. Applicant Information

Company Name: BLU Products, Inc.
Address: 8600 NW 36th Street, Suite #300 | Miami, FL 33166
Contact: Zeng wei
Email: zwei@ctasiasz.com
Telephone: 305.715.7171
Fax: 305.436.8819

2.2. Manufacturer Information

Company Name: BLU Products, Inc.
Address: 8600 NW 36th Street, Suite #300 | Miami, FL 33166
Contact: Zeng wei
Email: zwei@ctasiasz.com
Telephone: 305.715.7171
Fax: 305.436.8819

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

3.1. About EUT

Description	Smart phone
Model name	B160V
FCC ID	YHLBLUB160V
WLAN Frequency Band	ISM Band: 5725MHz~5850MHz
Type of modulation	OFDM
Nominal Voltage	3.88/3.85V

3.2. Internal Identification of EUT used during the test

EUT ID*	IMEI	HW Version	SW Version	Date of receipt
UT59a	356197680004110	V1.0	BLU_B160V_ V14.0.01.01.01.03_FSec	2023-12-13
UT46a	356197680006255	V1.0	BLU_B160V_ V14.0.01.01.01.03_FSec	2023-12-13

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

UT46a is used for Conduction test, UT59a is used for Radiation test.

3.3. Internal Identification of AE used during the test

AE ID*	Description	Model	Manufacturer
AE1	Battery1	C846345400P	Huizhou Highpower Technology Co., Ltd.

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

3.4. General Description

Equipment Under Test (EUT) is a model of Smart phone with integrated antenna. It consists of normal options: Battery and Charger.

Manual and specifications of the EUT were provided to fulfil the test.

Samples undergoing test were selected by the Client.

4. Reference Documents

4.1. Documents supplied by applicant

EUT feature information is supplied by the applicant 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.

FCC Part15	FCC CFR 47, Part 15, Subpart C and E: 15.205 Restricted bands of operation; 15.209 Radiated emission limits, general requirements; 15.407 General technical requirements	2021
ANSI C63.10	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2013
UNII: KDB 789033 D02	General U-NII Test Procedures New Rules v02r01	2017-12

5. Laboratory Environment

Conducted RF performance testing is performed in shielding room.

EMC performance testing is performed in Semi-anechoic chamber.

6. Test Results

6.1. Summary of Test Results

SUMMARY OF MEASUREMENT RESULTS	Sub-clause of Part15E	Sub-clause of IC	Verdict
Maximum Peak Output Power	15.407 (a)	/	P
Peak Power Spectral Density	15.407 (a)	/	P
Occupied 6dB Bandwidth	15.407 (e)	/	P
Radiated Unwanted Emission	15.407, 15.205, 15.209	/	P
AC Powerline Conducted Emission	15.107, 15.207	/	P

Please refer to **ANNEX A** for detail.

Terms used in Verdict column

P	Pass, The EUT complies with the essential requirements in the standard.
NM	Not measured, The test was not measured by CTTL
NA	Not Applicable, The test was not applicable
F	Fail, The EUT does not comply with the essential requirements in the standard

6.2. Statements

CTTL has evaluated the test cases as listed in section 6.1 of this report for the EUT specified in section 3 according to the standards or reference documents listed in section 4.

This report only deals with the WLAN function among the features described in section 3.

6.3. Test Conditions

For this report, all the test cases are tested under normal temperature and normal voltage, and also under norm humidity, the specific condition is shown as follows:

Temperature	26°C
Voltage	3.88/3.85V
Humidity	44%

7. Test Facilities Utilized

Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	Vector Signal Analyzer	FSQ40	200089	Rohde & Schwarz	1 year	2024-07-04
2	Vector Signal Analyzer	FSW67	104051	Rohde & Schwarz	1 year	2024-03-06
3	LISN	ENV216	101200	Rohde & Schwarz	1 year	2024-06-05
4	Test Receiver	ESCI	100344	Rohde & Schwarz	1 year	2024-02-21
5	Attenuator	10dB/2W	/	Rosenberger	/	/
6	Shielding Room	S81	/	ETS-Lindgren	/	/

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	Test Receiver	ESW44	103023	R&S	13 months	2024-07-08
2	EMI Antenna	VULB 9163	01222	SCHWARZBE CK	13 months	2024-02-28
3	EMI Antenna	3115	6914	ETS-Lindgren	13 months	2024-06-07
4	EMI Antenna	3116	2661	ETS-Lindgren	13 months	2024-02-28
5	EMI Antenna	HF-H2-Z2	829304/007	R&S	13 months	2024-01-22

8. Measurement Uncertainty

8.1. Transmitter Output Power

Measurement Uncertainty: 0.387dB,k=1.96

8.2. Peak Power Spectral Density

Measurement Uncertainty: 0.705dB,k=1.96

8.3. 6dB Emission Bandwidth

Measurement Uncertainty: 60.80Hz,k=1.96

8.4. Band Edges Compliance

Measurement Uncertainty : 0.62dB,k=1.96

8.5. Radiated Unwanted Emission

Frequency Range	Uncertainty(dB)
9kHz-30MHz	4.92
$30\text{MHz} \leq f \leq 1\text{GHz}$	4.72
$1\text{GHz} \leq f \leq 18\text{GHz}$	4.84
$18\text{GHz} \leq f \leq 40\text{GHz}$	5.12

8.6. AC Power-line Conducted Emission

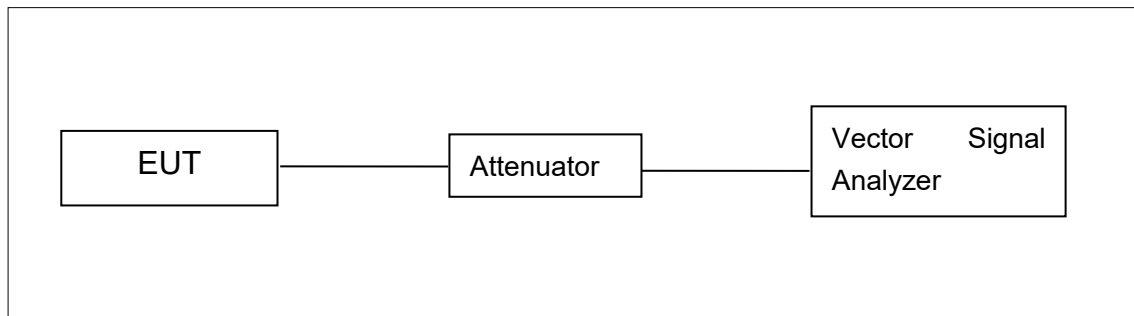
Measurement Uncertainty : 3.08dB,k=2

ANNEX A: MEASUREMENT RESULTS

A.1. Measurement Method

A.1.1. Conducted Measurements

- 1). Connect the EUT to the test system correctly.
- 2). Set the EUT to the required work mode.
- 3). Set the EUT to the required channel.
- 4). Set the spectrum analyzer to start measurement.
- 5). Record the values. Vector Signal Analyzer

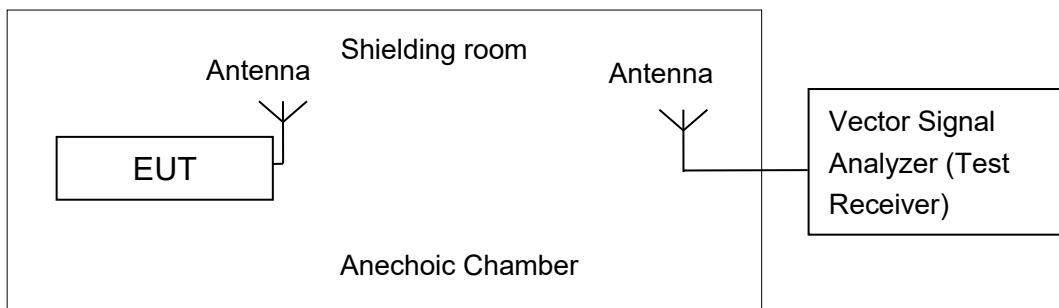


A.1.2. Radiated Emission Measurements

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 = 3MHz;



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.

A.2. Maximum Peak Output Power

Measurement Limit and Method:

Standard	Limit (dBm)
FCC CRF Part 15.407(a)	< 30

Set span to encompass the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.

Set RBW = 1 MHz.

Set VBW ≥ 3 MHz.

Number of points in sweep ≥ 2 × span / RBW.

Sweep time = auto.

Detector = power averaging (rms)

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 to ensure that the average accurately represents the true average over the on and off periods of the transmitter.

Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument's band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal. Add 10 log (1/x), where x is the duty cycle

A.2.1. Maximum Average Output Power-Conducted

EUT ID: UT46a

Measurement Results:

802.11a mode

Mode	Data Rate (Mbps)	Test Result (dBm)		
		5745MHz (Ch149)	5785MHz (Ch157)	5825MHz (Ch165)
802.11a	6	18.43	18.30	18.08
	9	/	/	/
	12	/	/	/
	18	/	/	/
	24	/	/	/
	36	/	/	/
	48	/	/	/
	54	/	/	/

The data rate 6Mbps is selected as worst condition, and the following cases are performed with this condition.

802.11n-HT20 mode

Mode	Data Rate (Index)	Test Result (dBm)		
		5745MHz (Ch149)	5785MHz (Ch157)	5825MHz (Ch165)
802.11n (20MHz)	MCS0	17.90	17.74	17.73
	MCS1	/	/	/
	MCS2	/	/	/
	MCS3	/	/	/
	MCS4	/	/	/
	MCS5	/	/	/
	MCS6	/	/	/
	MCS7	/	/	/

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

802.11ac-HT20 mode

Mode	Data Rate (Index)	Test Result (dBm)		
		5745MHz (Ch149)	5785MHz (Ch157)	5825MHz (Ch165)
802.11ac (20MHz)	MCS0	17.99	17.66	17.48
	MCS1	/	/	/
	MCS2	/	/	/
	MCS3	/	/	/
	MCS4	/	/	/
	MCS5	/	/	/
	MCS6	/	/	/
	MCS7	/	/	/
	MCS8	/	/	/

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

802.11n-HT40 mode

Mode	Data Rate (Index)	Test Result (dBm)	
		5755MHz (Ch151)	5795MHz (Ch159)
802.11n (40MHz)	MCS0	17.72	17.33
	MCS1	/	/
	MCS2	/	/
	MCS3	/	/
	MCS4	/	/
	MCS5	/	/
	MCS6	/	/
	MCS7	/	/

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

802.11ac-HT40 mode

Mode	Data Rate (Index)	Test Result (dBm)	
		5755MHz (Ch151)	5795MHz (Ch159)
802.11ac (40MHz)	MCS0	17.70	17.54
	MCS1	/	/
	MCS2	/	/
	MCS3	/	/
	MCS4	/	/
	MCS5	/	/
	MCS6	/	/
	MCS7	/	/
	MCS8	/	/
	MCS9	/	/

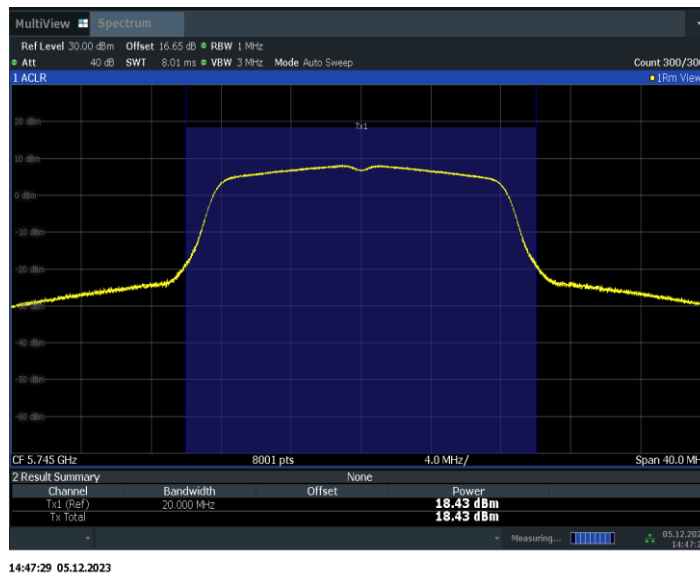
The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

802.11ac-HT80 mode

Mode	Data Rate (Index)	Test Result (dBm)
		5775MHz (Ch155)
802.11ac (80MHz)	MCS0	17.57
	MCS1	/
	MCS2	/
	MCS3	/
	MCS4	/
	MCS5	/
	MCS6	/
	MCS7	/
	MCS8	/
	MCS9	/

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

The duty cycle of all mode are 100%



Maximum output Power: 11a 5745

Conclusion: PASS

A.3. Peak Power Spectral Density

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.407(a)	< 30 dBm/500 kHz

Set span to encompass the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.

Set RBW = 500 kHz.

Set VBW \geq 3 MHz.

Number of points in sweep $\geq 2 \times$ span / RBW.

Sweep time = auto.

Detector = power averaging (rms)

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 to ensure that the average accurately represents the true average over the on and off periods of the transmitter. Use the peak search function on the instrument to find the peak of the spectrum and record its value. Add $10 \log(1/x)$, where x is the duty cycle.

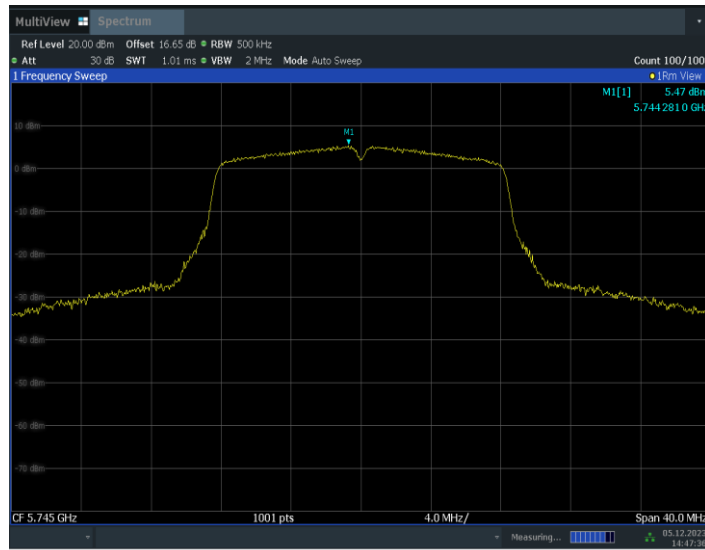
Measurement Uncertainty:

Measurement Uncertainty	0.75dB
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EUT ID: UT46a

Measurement Results:

TestMode	Antenna	Frequency[MHz]	Result [dBm/MHz]	Verdict
11A	Ant1	5745	5.47	PASS
		5785	5.31	PASS
		5825	5.15	PASS
11N40SISO	Ant1	5755	0.98	PASS
		5795	1.36	PASS
11AC20SISO	Ant1	5745	4.48	PASS
		5785	4.37	PASS
		5825	4.16	PASS
11AC80SISO	Ant1	5775	-2.51	PASS



Peak Power Spectral Density:11a 5745

Conclusion: PASS

A.4. 6dB Emission Bandwidth

Measurement Limit:

Standard	Limit (kHz)
FCC 47 CFR Part 15.407 (e)	≥ 500

Set RBW = 100 kHz.

Set the video bandwidth (VBW) ≥ 3 × RBW.

Detector = Peak.

Trace mode = max hold.

Sweep = auto couple.

Allow the trace to stabilize.

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.

Measurement Uncertainty:

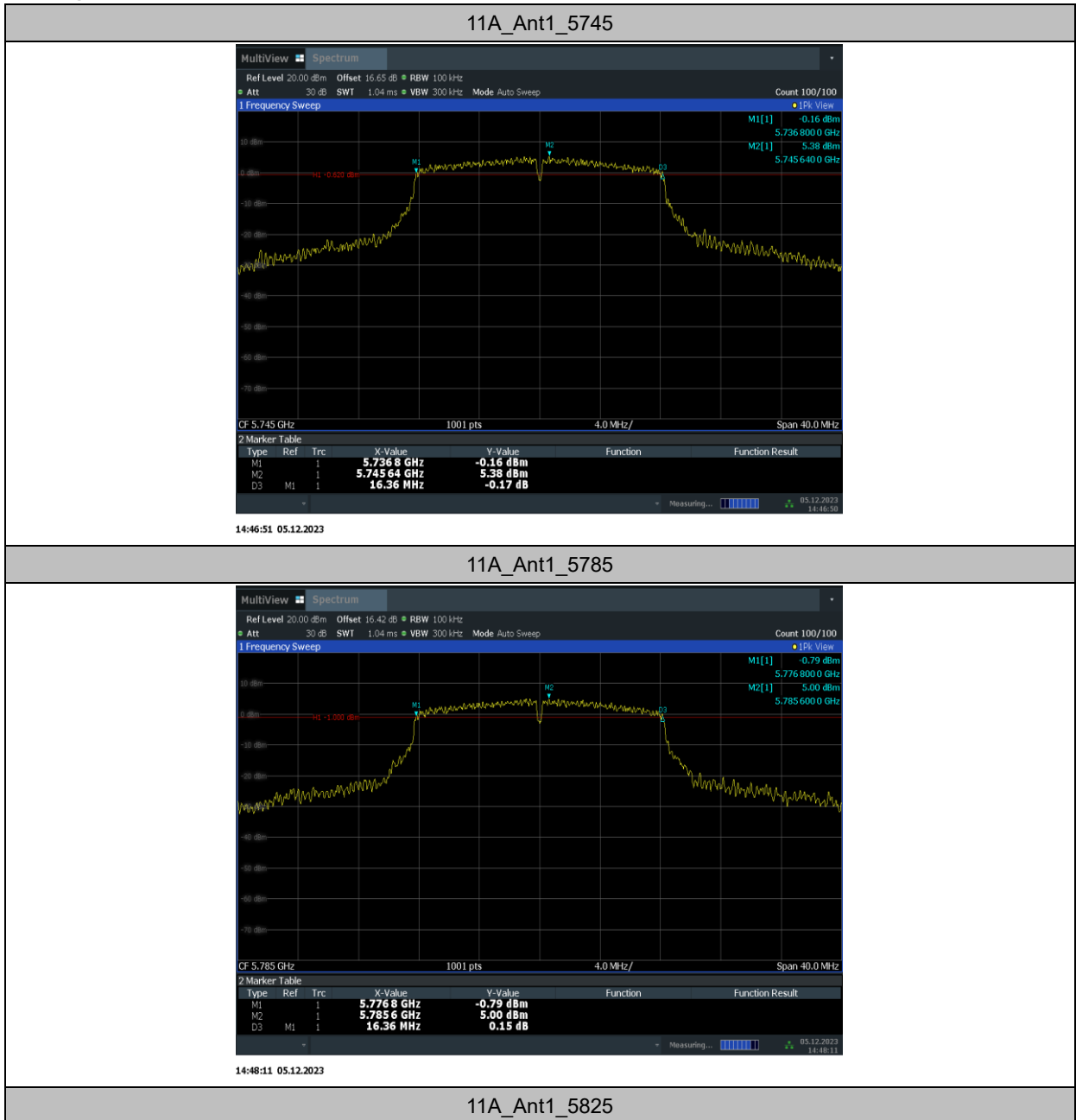
Measurement Uncertainty	60.80Hz
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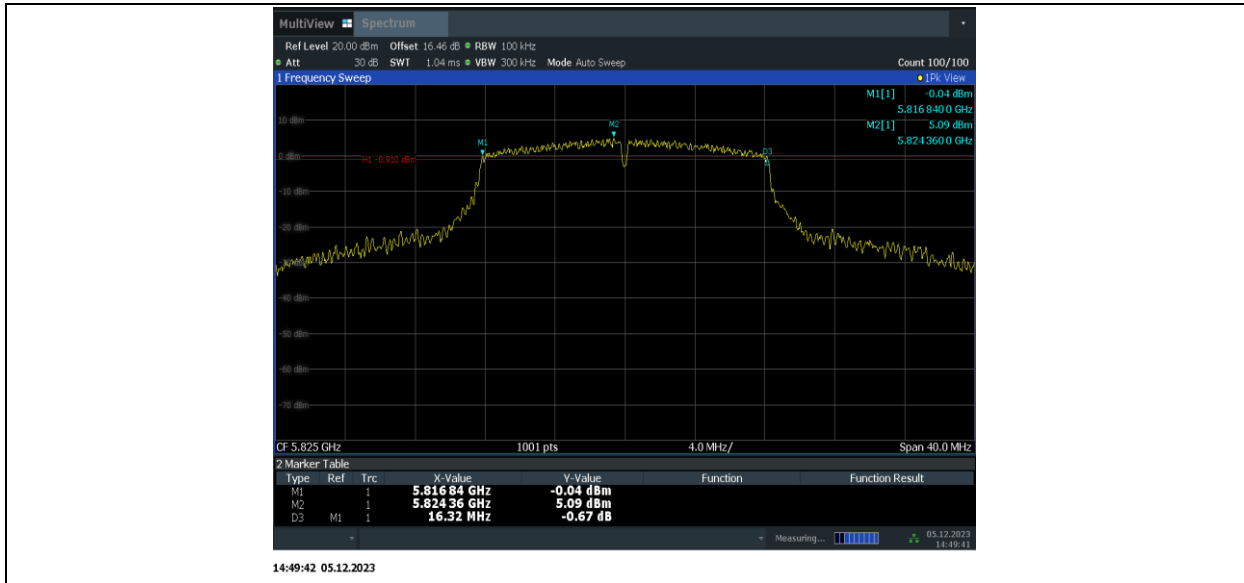
EUT ID: UT46a

Measurement Result:

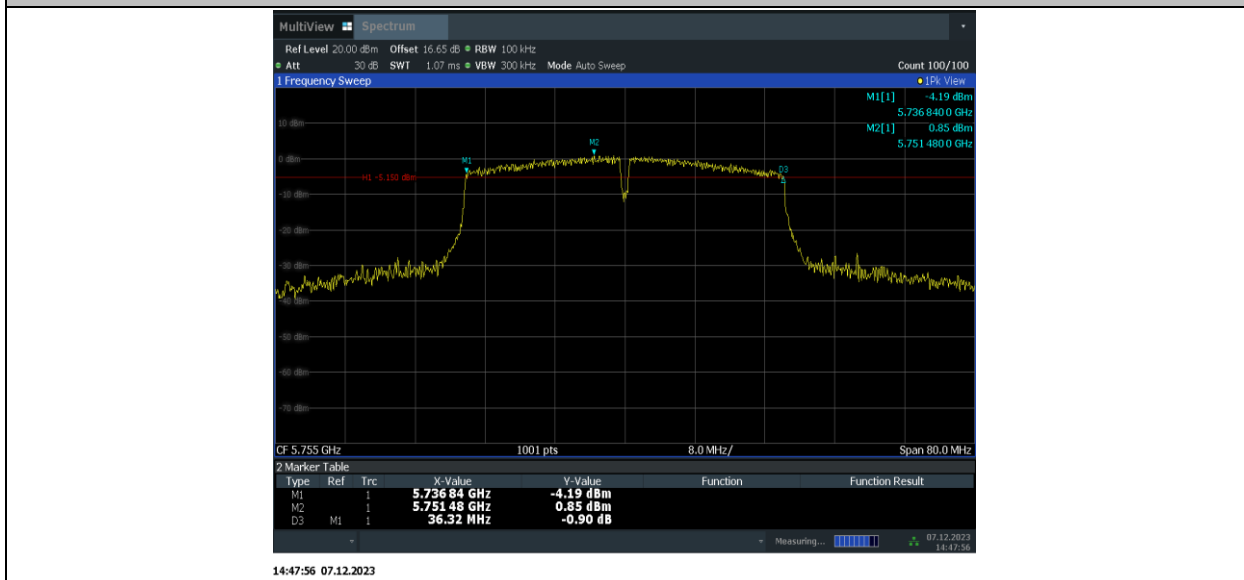
TestMode	Antenna	Frequency[MHz]	6db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5745	16.36	5736.80	5753.16	0.5	PASS
		5785	16.36	5776.80	5793.16	0.5	PASS
		5825	16.32	5816.84	5833.16	0.5	PASS
11N40SISO	Ant1	5755	36.32	5736.84	5773.16	0.5	PASS
		5795	36.08	5776.84	5812.92	0.5	PASS
11AC20SISO	Ant1	5745	17.60	5736.16	5753.76	0.5	PASS
		5785	17.56	5776.20	5793.76	0.5	PASS
		5825	17.56	5816.20	5833.76	0.5	PASS
11AC80SISO	Ant1	5775	76.32	5736.76	5813.08	0.5	PASS

Test graphs as below:

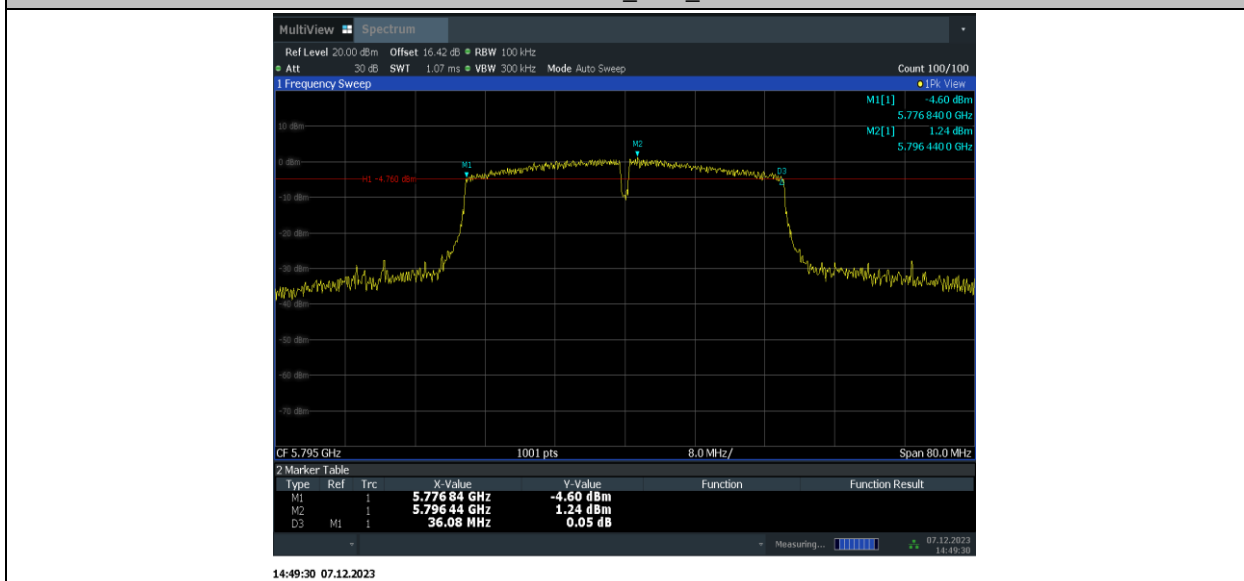




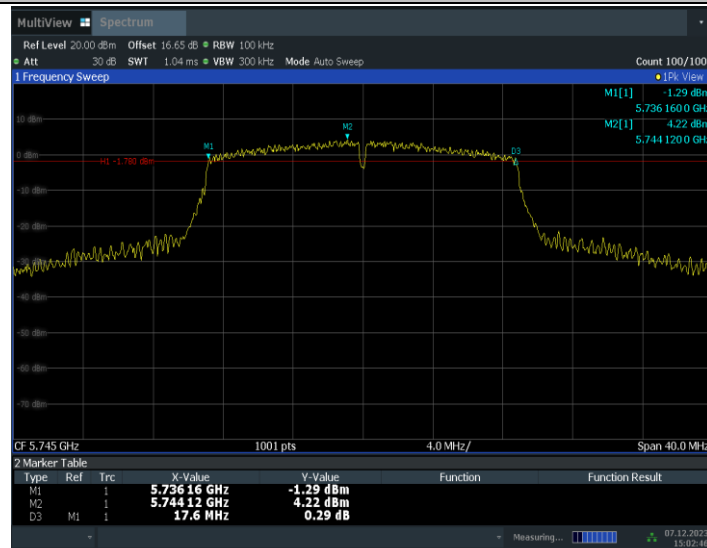
11N40SISO_Ant1_5755



11N40SISO_Ant1_5795

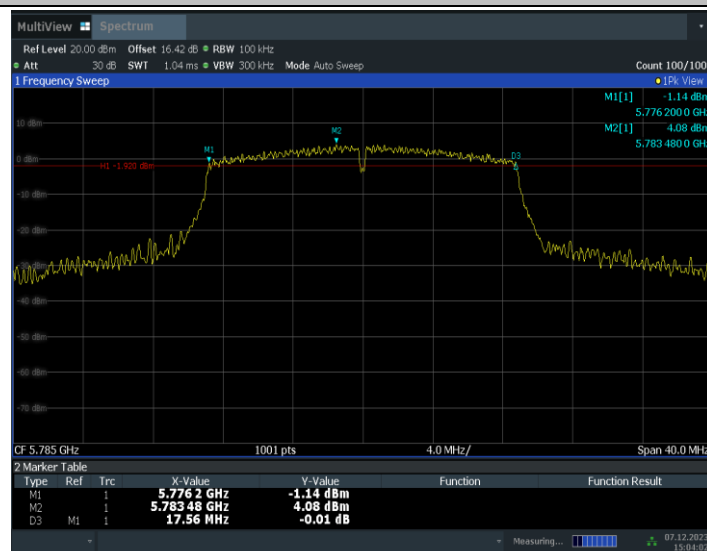


11AC20SISO_Ant1_5745



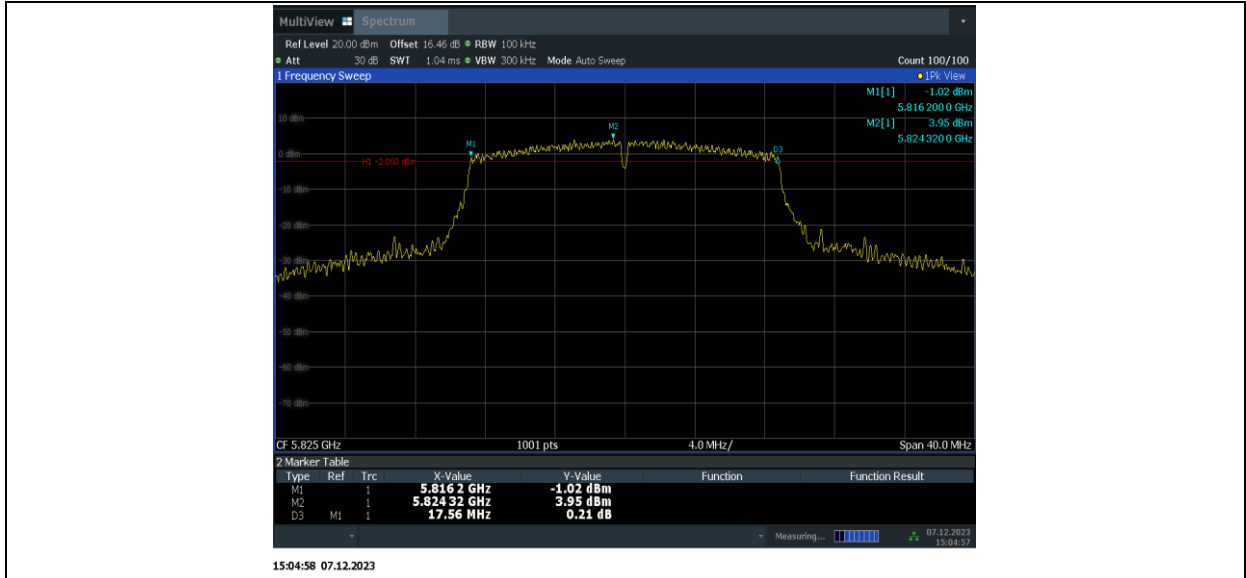
15:02:46 07.12.2023

11AC20SISO_Ant1_5785

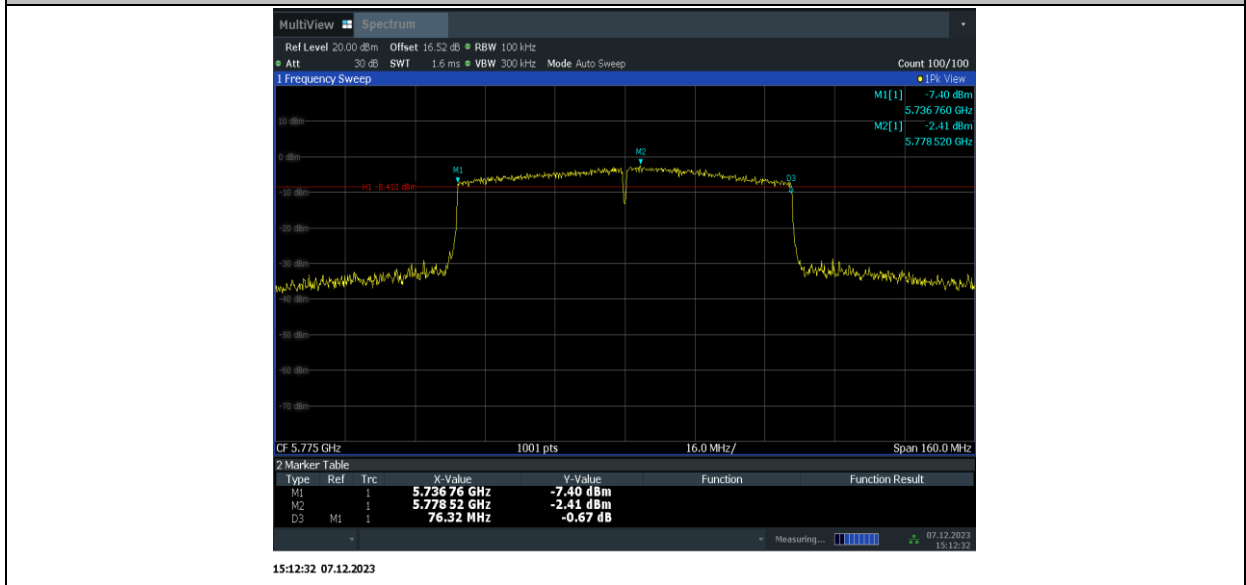


15:04:02 07.12.2023

11AC20SISO_Ant1_5825



11AC80SISO_Ant1_5775



Conclusion: PASS

A.5. Radiated Unwanted Emission

A.5.1 Limits

Unwanted Emissions in the unrestricted bands shall not exceed the limits that shown in 15.407:

Standard	Limit (dBm/MHz)	
FCC 47 CFR Part 15.407	at the band edge	27
	at 5 MHz above or below the band edge	15.6
	at 25 MHz above or below the band edge	10
	at 75 MHz or more above or below the band edge	-27
	Note: Increasing linearly from point to point.	

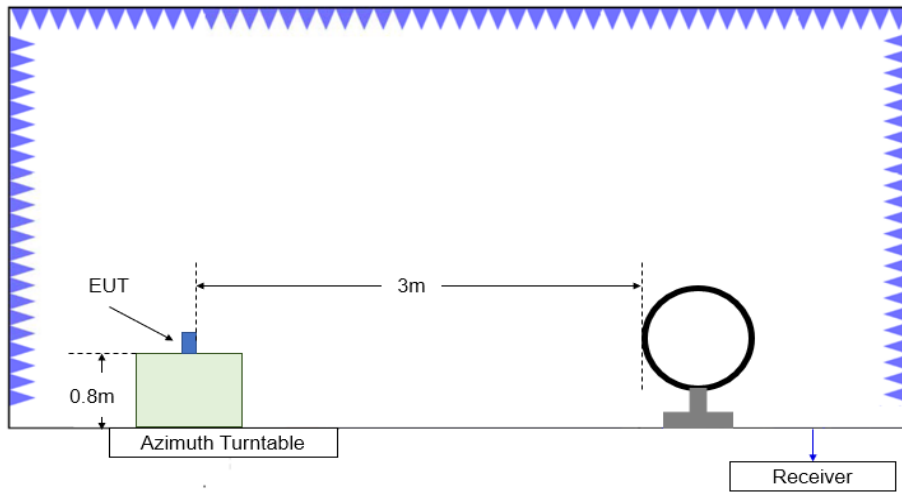
In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c))

Frequency (MHz)	Field strength(μ V/m)	Measurement distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30

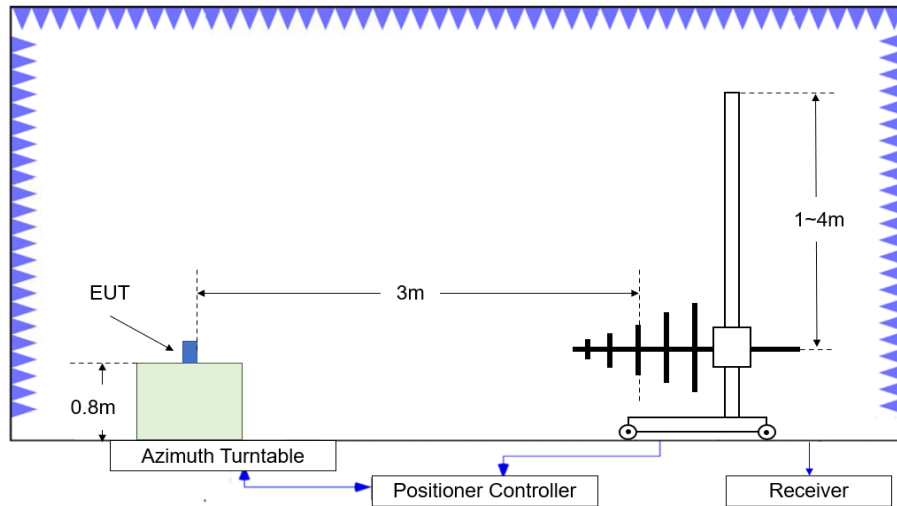
Frequency of emission (MHz)	Field strength (μ V/m)	Field strength (dBuV/m)	Measurement distance (m)
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Note: When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor (as defined in KDB 789033 II.G.2.d).

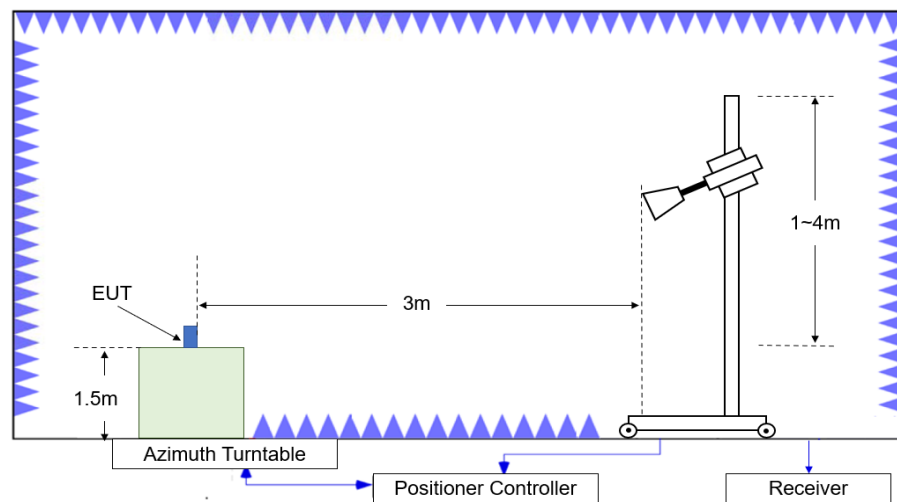
A.5.2 Test setup



Test Site Diagram (9kHz-30MHz)



Test Site Diagram (30MHz-1GHz)



Test Site Diagram (1GHz-40GHz)

A.5.3 Test Procedures

Radiated unwanted emissions from the EUT were measured according to ANSI C63.10 and KDB 789033 D02 v02r01.

Test setting

Frequency of emission (MHz)	RBW/VBW
30-1000	100kHz/300kHz
1000-4000	1MHz/3MHz
4000-18000	1MHz/3MHz
18000-26500	1MHz/3MHz
26500-40000	1MHz/3MHz

A.5.4 Calculation

1. The measurement results reported below is calculated by:

$$\text{Measurement Results (dB}\mu\text{V/m)} = P_{\text{measurement}} \text{ (dB}\mu\text{V)} + \text{Cable Loss (dB)} + \text{Antenna Factor (dB/m)}$$

Where: $P_{\text{measurement}}$ is the field strength recorded from the instrument

2. Convert the resultant EIRP level to an equivalent electric field strength using the following relationship:

$$E = \text{EIRP} - 20 \log(D) + 104.77$$

Where:

E is the field strength in dB μ V/m

D is the measurement distance in meters

EIRP is the equivalent isotropically radiated power in dBm

Test note

1. The EUT is operating at its maximum duty cycle and its maximum power control level.
2. Investigation has been done on all modes and modulations/data rates. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.
3. Spurious emissions for all channels were investigated and almost the same below 1GHz. According to FCC 47 CFR §15.31, emission levels are not report much lower than the limit by over 20dB
4. The test is carried out on both vertical and horizontal polarization and only maximization result of both polarizations is kept.
5. EUT in each of three orthogonal axis emissions had been tested out only the worst case (axis data) recorded in the report.
6. Measurement frequencies were performed from 9 kHz to the 10th harmonic of highest fundamental frequency or 40GHz, whichever is lower.
7. No spurious emissions were detected within 20dB of the limit below 30MHz. OFS and semi-chamber comparison testing had been performed and the result came out very similar. (KDB 414788)



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.

Conclusion: PASS

Average Results:
802.11a

Channel 149

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17976.167	41.90	-29.59	45.95	25.54	54.00	12.10	H
17947.200	41.76	-29.59	45.95	25.40	54.00	12.24	H
12306.767	38.85	-32.12	39.00	31.97	54.00	15.15	H
12331.333	38.84	-32.39	38.95	32.28	54.00	15.16	H
8499.300	34.55	-34.28	37.30	31.53	54.00	19.45	H
8469.233	34.30	-34.28	37.30	31.28	54.00	19.70	H

Channel 157

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17974.700	41.61	-29.59	45.95	25.25	54.00	12.39	H
17952.700	41.48	-29.59	45.95	25.12	54.00	12.52	V
12330.967	39.06	-32.39	38.95	32.50	54.00	14.94	V
12329.500	37.94	-32.39	38.95	31.38	54.00	16.06	H
8496.000	33.71	-34.28	37.30	30.69	54.00	20.29	H
8490.133	33.67	-34.28	37.30	30.65	54.00	20.33	H

Channel 165

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17971.033	41.53	-29.59	45.95	25.17	54.00	12.47	V
17979.467	41.38	-29.59	45.95	25.02	54.00	12.62	H
12330.967	38.64	-32.39	38.95	32.08	54.00	15.36	V
11653.367	38.55	-32.62	39.20	31.97	54.00	15.45	V
8493.433	34.11	-34.28	37.30	31.09	54.00	19.89	H
8486.100	33.55	-34.28	37.30	30.53	54.00	20.45	H

802.11n-HT20

Channel 149

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17942.800	41.46	-29.59	45.95	25.10	54.00	12.54	H
17937.300	41.41	-29.59	45.95	25.05	54.00	12.59	H
12332.067	38.21	-32.39	38.95	31.65	54.00	15.79	V
12329.867	38.19	-32.39	38.95	31.63	54.00	15.81	H
8495.267	33.85	-34.28	37.30	30.83	54.00	20.15	V
8492.700	33.78	-34.28	37.30	30.76	54.00	20.22	H

Channel 157

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17910.167	41.76	-29.59	45.95	25.40	54.00	12.24	H
17951.233	41.70	-29.59	45.95	25.34	54.00	12.30	V
12333.167	38.59	-32.39	38.95	32.03	54.00	15.41	V
12311.167	38.24	-32.12	39.00	31.36	54.00	15.76	H
8474.000	33.95	-34.28	37.30	30.93	54.00	20.05	H
8490.500	33.90	-34.28	37.30	30.88	54.00	20.10	H

Channel 165

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17975.067	41.15	-29.59	45.95	24.79	54.00	12.85	V
17978.000	41.07	-29.59	45.95	24.71	54.00	12.93	V
12309.333	37.99	-32.12	39.00	31.11	54.00	16.01	V
12330.233	37.79	-32.39	38.95	31.23	54.00	16.21	V
8488.300	33.27	-34.28	37.30	30.25	54.00	20.73	V
8278.200	33.26	-34.84	37.10	30.99	54.00	20.74	V

802.11n-HT40

Channel 151

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17950.500	41.80	-29.59	45.95	25.44	54.00	12.20	H
17975.067	41.40	-29.59	45.95	25.04	54.00	12.60	V
12331.333	37.79	-32.39	38.95	31.23	54.00	16.21	V
12332.067	37.69	-32.39	38.95	31.13	54.00	16.31	V
8493.800	33.75	-34.28	37.30	30.73	54.00	20.25	H
8490.867	33.52	-34.28	37.30	30.50	54.00	20.48	H

Channel 159

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17953.433	41.06	-29.59	45.95	24.70	54.00	12.94	V
17932.900	41.04	-29.59	45.95	24.68	54.00	12.96	H
12327.667	38.45	-32.39	38.95	31.89	54.00	15.55	H
12329.867	37.92	-32.39	38.95	31.36	54.00	16.08	V
8214.767	34.16	-34.94	36.90	32.20	54.00	19.84	H
8355.200	33.48	-34.93	37.20	31.21	54.00	20.52	V

802.11ac-HT20

Channel 149

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17950.500	42.16	-29.59	45.95	25.80	54.00	11.84	V
17908.700	41.48	-29.59	45.95	25.12	54.00	12.52	V
12332.800	38.83	-32.39	38.95	32.27	54.00	15.17	V
12328.767	38.57	-32.39	38.95	32.01	54.00	15.43	H
8489.400	34.16	-34.28	37.30	31.14	54.00	19.84	V
8485.733	33.91	-34.28	37.30	30.89	54.00	20.09	V

Channel 157

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17951.233	41.56	-29.59	45.95	25.20	54.00	12.44	H
17949.767	41.41	-29.59	45.95	25.05	54.00	12.59	V
12329.867	37.94	-32.39	38.95	31.38	54.00	16.06	H
12330.967	37.85	-32.39	38.95	31.29	54.00	16.15	H
8490.500	33.75	-34.28	37.30	30.73	54.00	20.25	V
9464.367	33.64	-34.40	37.70	30.34	54.00	20.36	V

Channel 165

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17932.167	41.28	-29.59	45.95	24.92	54.00	12.72	V
17939.867	41.28	-29.59	45.95	24.92	54.00	12.72	V
12328.767	38.12	-32.39	38.95	31.56	54.00	15.88	H
12332.800	38.08	-32.39	38.95	31.52	54.00	15.92	V
8494.167	33.52	-34.28	37.30	30.50	54.00	20.48	V
8374.267	33.48	-34.42	37.30	30.60	54.00	20.52	V

802.11ac-HT40

Channel 151

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17953.800	41.31	-29.59	45.95	24.95	54.00	12.69	V
17949.033	41.28	-29.59	45.95	24.92	54.00	12.72	V
12332.800	38.04	-32.39	38.95	31.48	54.00	15.96	V
12332.433	38.00	-32.39	38.95	31.44	54.00	16.00	V
8493.067	33.85	-34.28	37.30	30.83	54.00	20.15	V
8494.900	33.61	-34.28	37.30	30.59	54.00	20.39	V

Channel 159

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17946.100	41.45	-29.59	45.95	25.09	54.00	12.55	H
17939.500	41.24	-29.59	45.95	24.88	54.00	12.76	V
12265.700	37.95	-32.37	38.95	31.37	54.00	16.05	V
12328.400	37.94	-32.39	38.95	31.38	54.00	16.06	H
8493.433	34.03	-34.28	37.30	31.01	54.00	19.97	H
8374.267	33.70	-34.42	37.30	30.82	54.00	20.30	H

802.11ac-HT80

Channel 155

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17953.800	41.17	-29.59	45.95	24.81	54.00	12.83	V
17949.400	41.09	-29.59	45.95	24.73	54.00	12.91	H
12327.300	38.11	-32.39	38.95	31.55	54.00	15.89	V
12325.833	37.91	-32.12	39.00	31.03	54.00	16.09	H
8497.467	33.59	-34.28	37.30	30.57	54.00	20.41	V
8325.867	33.48	-34.93	37.20	31.21	54.00	20.52	H

Peak Results:
802.11a

Channel 149

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17232.933	52.92	-29.33	42.40	39.85	68.20	15.28	H
17229.267	52.54	-29.33	42.40	39.47	68.20	15.66	H
12329.867	46.81	-32.39	38.95	40.25	74.00	27.19	H
12310.067	46.61	-32.12	39.00	39.73	74.00	27.39	H
10242.433	43.79	-34.09	38.00	39.88	68.20	24.41	H
10166.533	43.76	-33.67	38.05	39.38	68.20	24.44	H

Channel 157

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17349.167	50.24	-28.74	43.40	35.58	68.20	17.96	H
17950.133	50.06	-29.59	45.95	33.70	74.00	23.94	V
12305.667	46.94	-32.12	39.00	40.06	74.00	27.06	H
12328.767	46.55	-32.39	38.95	39.99	74.00	27.45	H
10216.767	43.63	-34.09	38.00	39.72	68.20	24.57	H
10122.900	43.56	-34.28	38.10	39.74	68.20	24.64	H

Channel 165

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17926.667	49.78	-29.59	45.95	33.42	74.00	24.22	H
17868.367	49.69	-29.59	45.95	33.33	74.00	24.31	V
12311.167	46.44	-32.12	39.00	39.56	74.00	27.56	V
11644.933	46.41	-32.62	39.20	39.83	74.00	27.59	V
10139.767	43.21	-34.28	38.10	39.39	68.20	24.99	H
10148.200	42.91	-34.28	38.10	39.09	68.20	25.29	H

802.11n-HT20

Channel 149

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17231.100	52.27	-29.33	42.40	39.20	68.20	15.93	H
17230.367	51.39	-29.33	42.40	38.32	68.20	16.81	H
12331.700	46.41	-32.39	38.95	39.85	74.00	27.59	V
12292.833	45.91	-32.12	39.00	39.03	74.00	28.09	H
10148.933	43.72	-33.67	38.05	39.34	68.20	24.48	V
8548.433	43.10	-33.81	37.40	39.51	68.20	25.10	V

Channel 157

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17945.000	49.91	-29.59	45.95	33.55	74.00	24.09	V
17942.067	49.69	-29.59	45.95	33.33	74.00	24.31	H
12307.500	46.22	-32.12	39.00	39.34	74.00	27.78	H
12332.433	46.07	-32.39	38.95	39.51	74.00	27.93	H
10146.367	43.40	-34.28	38.10	39.58	68.20	24.80	H
10264.800	43.34	-33.82	38.00	39.16	68.20	24.86	H

Channel 165

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
16986.167	50.31	-29.38	40.85	38.84	68.20	17.89	V
16986.533	50.29	-29.38	40.85	38.82	68.20	17.91	V
12303.467	46.64	-32.12	39.00	39.76	74.00	27.36	V
11647.500	46.30	-32.62	39.20	39.72	74.00	27.70	H
10132.800	42.87	-34.28	38.10	39.05	68.20	25.33	V
10252.700	42.82	-33.82	38.00	38.64	68.20	25.38	V

802.11n-HT40

Channel 151

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17257.500	50.07	-29.33	42.40	37.00	68.20	18.13	V
17950.133	49.94	-29.59	45.95	33.58	74.00	24.06	H
12329.133	46.67	-32.39	38.95	40.11	74.00	27.33	H
12306.033	46.62	-32.12	39.00	39.74	74.00	27.38	V
10041.133	43.07	-34.07	38.00	39.14	68.20	25.13	V
10125.833	43.00	-34.28	38.10	39.18	68.20	25.20	V

Channel 159

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17806.033	49.66	-29.59	45.95	33.30	74.00	24.34	V
16956.100	49.45	-29.68	40.60	38.53	68.20	18.75	V
12331.333	46.28	-32.39	38.95	39.72	74.00	27.72	V
12303.100	45.86	-32.12	39.00	38.98	74.00	28.14	H
10244.267	43.59	-34.09	38.00	39.68	68.20	24.61	H
10073.767	43.40	-33.75	38.05	39.10	68.20	24.80	V

802.11ac-HT20

Channel 149

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17232.200	52.04	-29.33	42.40	38.97	68.20	16.16	H
17232.933	51.85	-29.33	42.40	38.78	68.20	16.35	H
12304.567	46.79	-32.12	39.00	39.91	74.00	27.21	V
12330.600	46.49	-32.39	38.95	39.93	74.00	27.51	V
10151.867	43.86	-33.67	38.05	39.48	68.20	24.34	V
10242.433	43.85	-34.09	38.00	39.94	68.20	24.35	V

Channel 157

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17344.767	50.89	-28.74	43.40	36.23	68.20	17.31	V
17951.233	49.56	-29.59	45.95	33.20	74.00	24.44	H
12259.833	46.52	-32.37	38.95	39.94	74.00	27.48	H
12328.767	46.01	-32.39	38.95	39.45	74.00	27.99	V
10008.500	42.92	-34.07	38.00	38.99	68.20	25.28	V
10180.833	42.74	-33.67	38.05	38.36	68.20	25.46	V

Channel 165

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17967.000	49.22	-29.59	45.95	32.86	74.00	24.78	H
17797.600	49.21	-29.59	45.95	32.85	74.00	24.79	V
12290.267	46.61	-32.12	39.00	39.73	74.00	27.39	V
12321.067	46.17	-32.12	39.00	39.29	74.00	27.83	V
10247.933	42.89	-33.82	38.00	38.71	68.20	25.31	H
10105.667	42.66	-34.28	38.10	38.84	68.20	25.54	V

802.11ac-HT40

Channel 151

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17277.300	49.98	-29.54	42.90	36.62	68.20	18.22	H
17911.633	49.66	-29.59	45.95	33.30	74.00	24.34	V
12305.667	46.43	-32.12	39.00	39.55	74.00	27.57	V
12333.167	45.79	-32.39	38.95	39.23	74.00	28.21	H
10299.267	43.24	-33.88	38.00	39.12	68.20	24.96	H
10194.400	43.13	-33.67	38.05	38.75	68.20	25.07	V

Channel 159

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17377.033	50.82	-29.44	43.80	36.46	68.20	17.38	H
17380.333	50.06	-29.44	43.80	35.70	68.20	18.14	H
12332.800	46.05	-32.39	38.95	39.49	74.00	27.95	H
12308.233	45.93	-32.12	39.00	39.05	74.00	28.07	H
10106.033	43.64	-34.28	38.10	39.82	68.20	24.56	H
10083.667	43.25	-33.75	38.05	38.95	68.20	24.95	H

802.11ac-HT80

Channel 155

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17315.800	49.58	-29.54	42.90	36.22	68.20	18.62	V
17949.400	49.54	-29.59	45.95	33.18	74.00	24.46	H
12315.567	46.46	-32.12	39.00	39.58	74.00	27.54	V
12290.633	45.48	-32.12	39.00	38.60	74.00	28.52	V
8622.867	42.88	-33.66	37.50	39.04	68.20	25.32	V
10260.033	42.78	-33.82	38.00	38.60	68.20	25.42	V

Band edge compliance

Mode	Channel	Test Results	Conclusion
802.11a	5745 MHz	Fig.1	P
	5825 MHz	Fig.2	P
802.11n HT20	5745 MHz	Fig.3	P
	5825 MHz	Fig.4	P
802.11n HT40	5755 MHz	Fig.5	P
	5795 MHz	Fig.6	P
802.11ac HT20	5745 MHz	Fig.7	P
	5825 MHz	Fig.8	P
802.11ac HT40	5755 MHz	Fig.9	P
	5795 MHz	Fig.10	P
802.11ac HT80	5775 MHz	Fig.11 Fig.12	P

Conclusion: PASS

Test graphs as below:

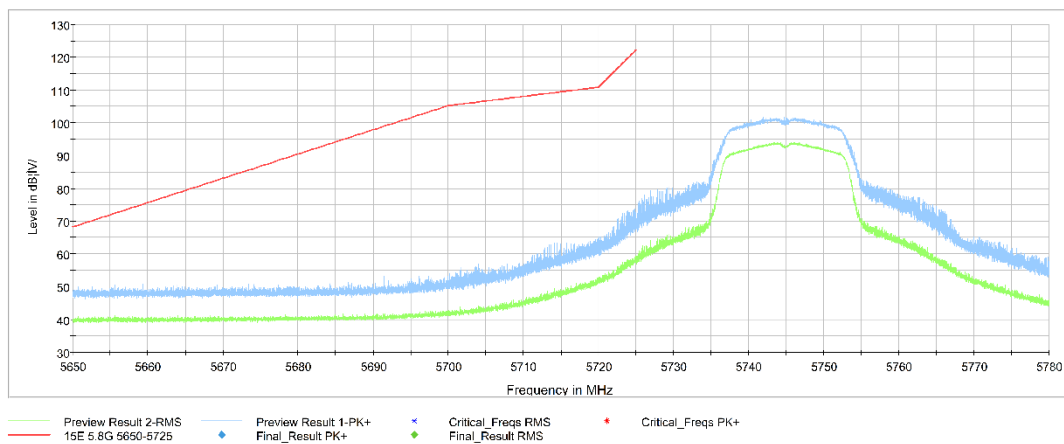


Fig. 1 Band Edges (802.11a Ch149,5745MHz)

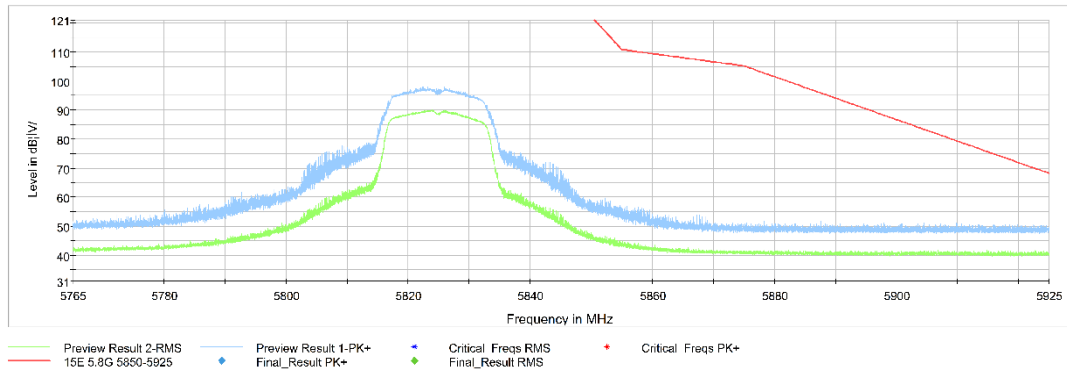


Fig. 2 Band Edges (802.11a Ch165, 5825MHz)

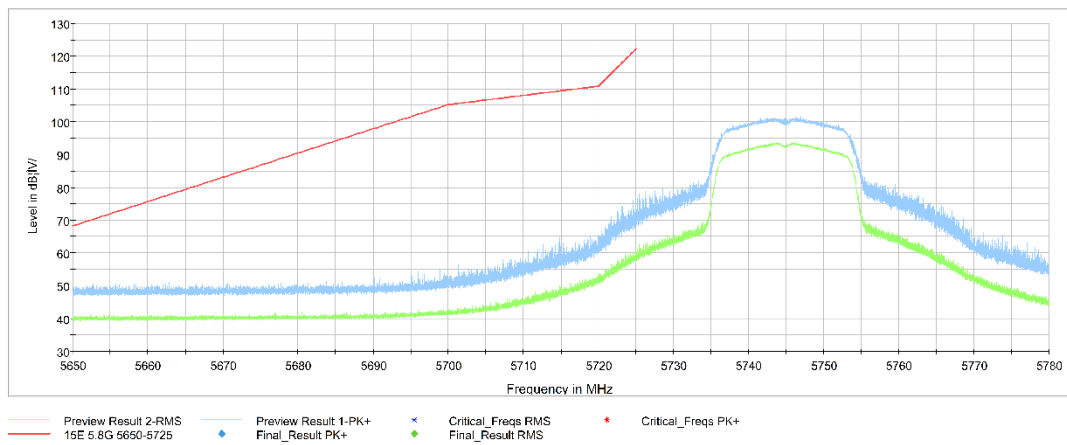


Fig. 3 Band Edges (802.11n-HT20 Ch149, 5745MHz)

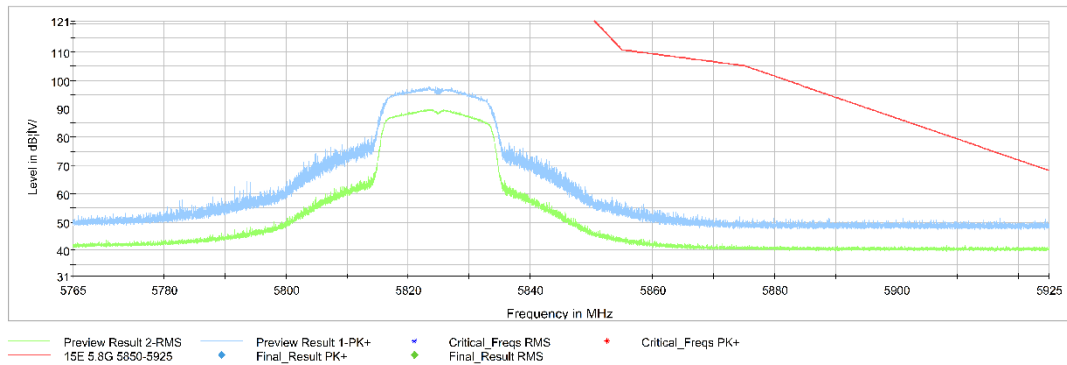


Fig. 4 Band Edges (802.11n-HT20 Ch165, 5825MHz)

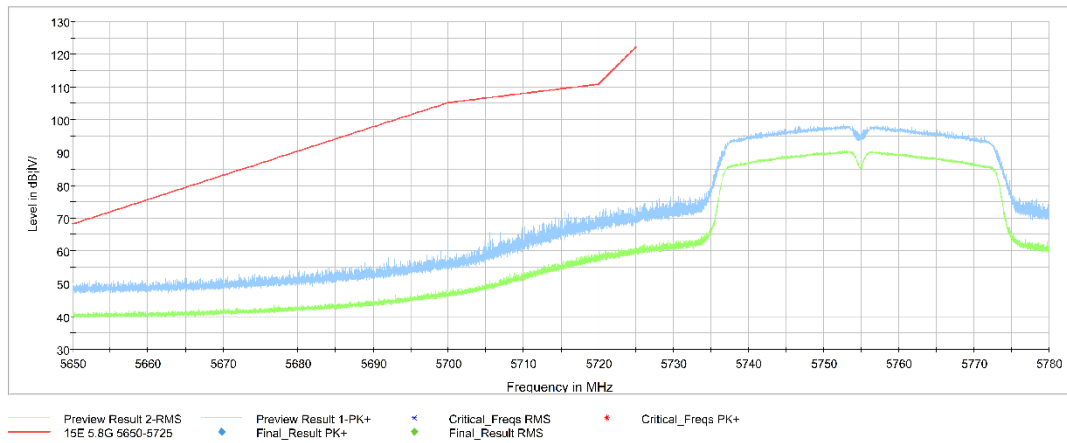


Fig. 5 Band Edges (802.11n-HT40 Ch151, 5755MHz)

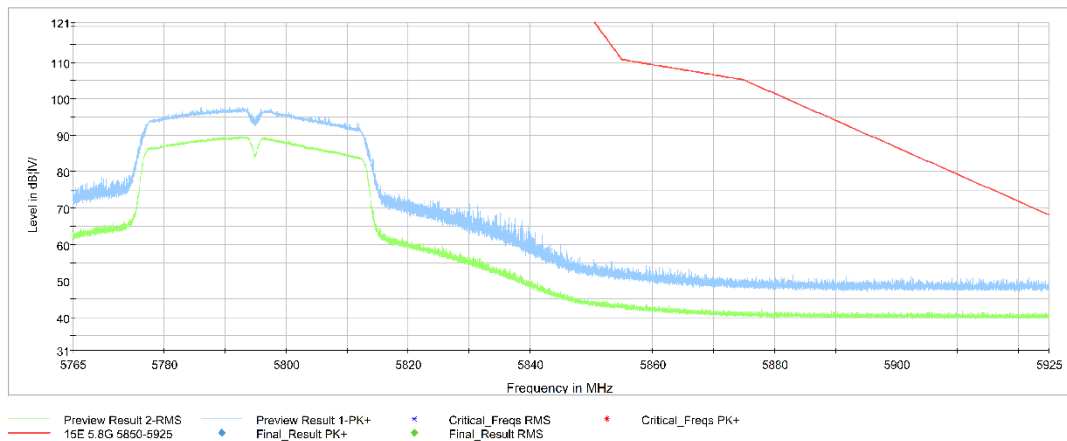


Fig. 6 Band Edges (802.11n-HT40 Ch159, 5795MHz)

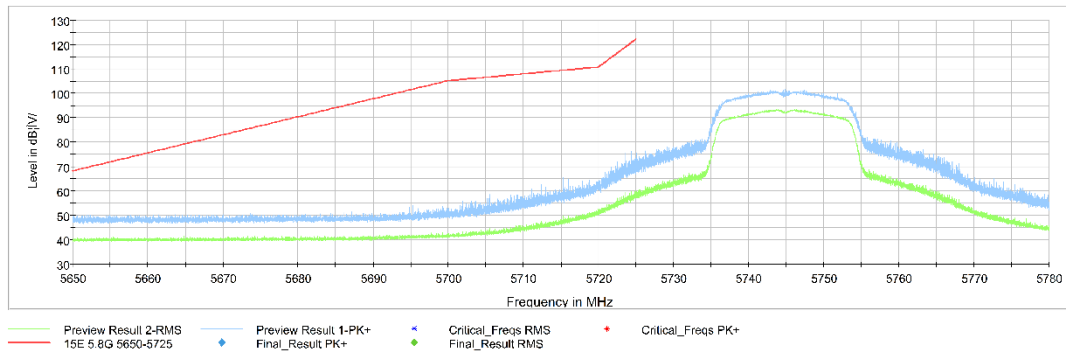


Fig. 7 Band Edges (802.11ac-HT20 Ch149, 5745MHz)

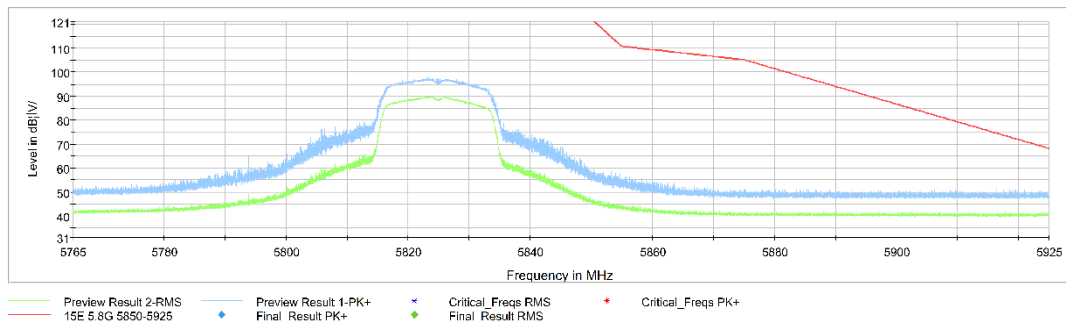


Fig. 8 Band Edges (802.11ac-HT20 Ch165, 5825MHz)

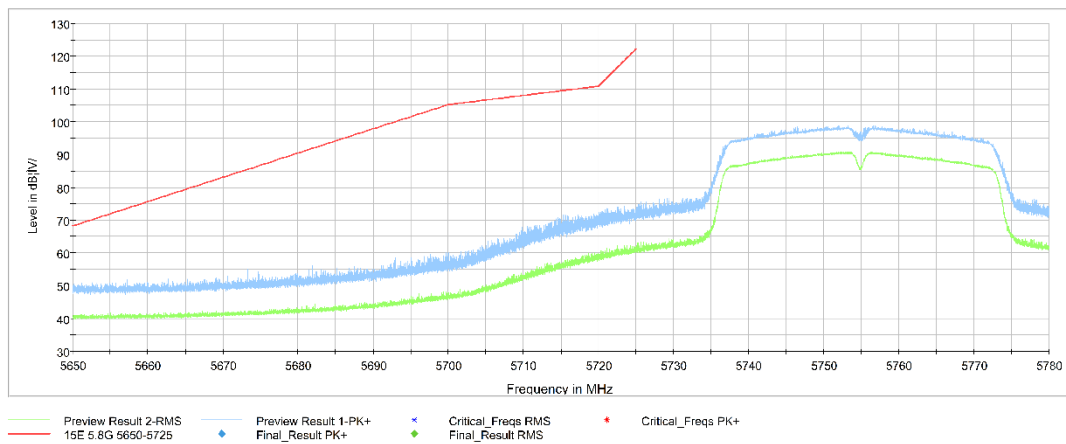


Fig. 9 Band Edges (802.11ac-HT40 Ch151, 5755MHz)

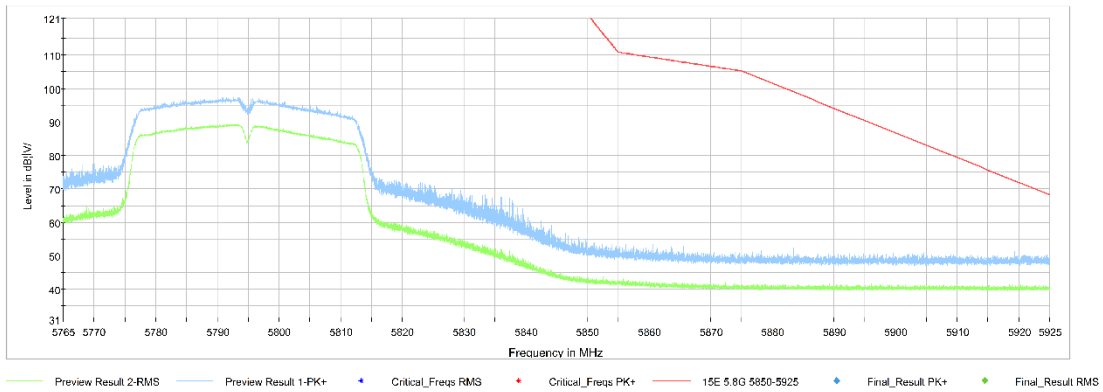


Fig. 10 Band Edges (802.11ac-HT40 Ch159, 5795MHz)

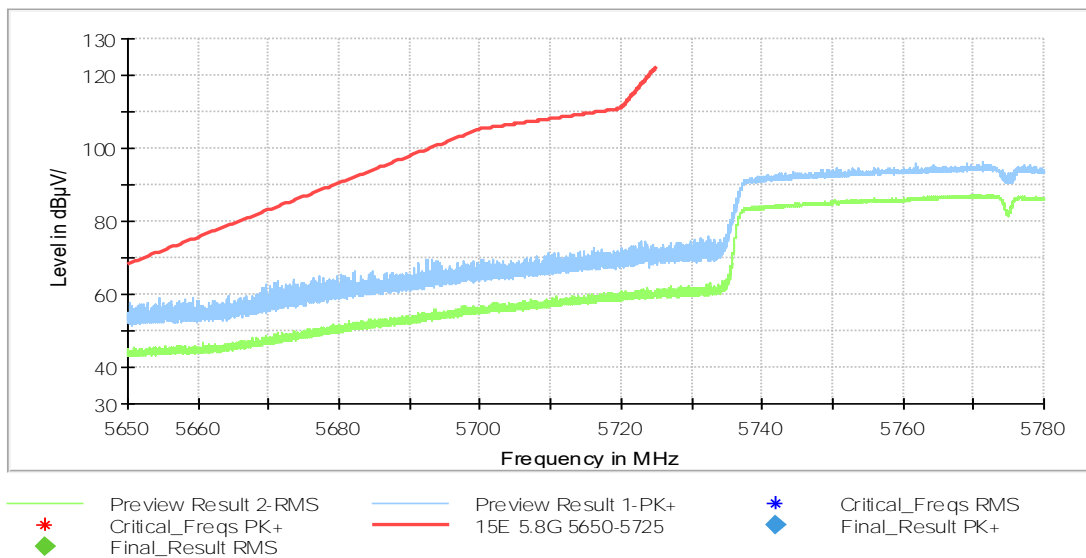


Fig. 11 Band Edges (802.11ac-HT80 Ch155, 5775MHz)

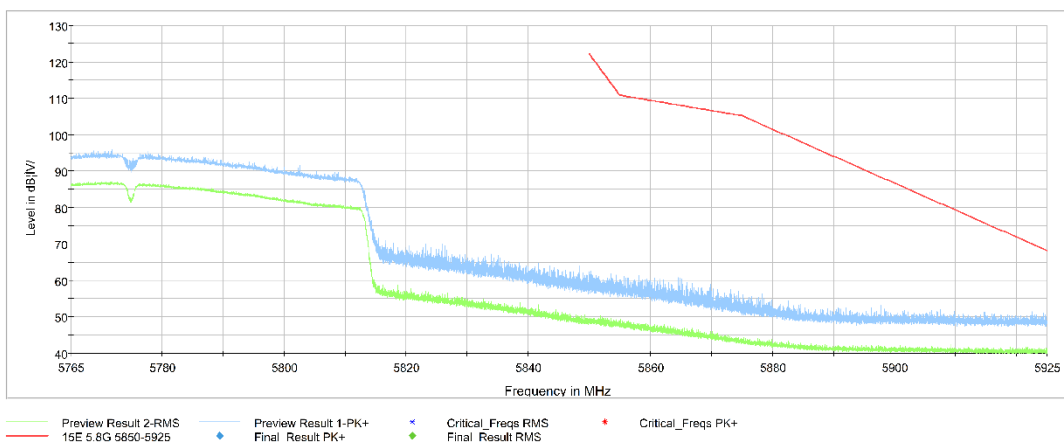


Fig. 12 Band Edges (802.11ac-HT80, 5775MHz)

A.6. AC Powerline Conducted Emission

A.6.1 Summary

All AC line conducted spurious emissions are measured with a receiver connected to a grounded LISN while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates and modes were investigated for conducted spurious emissions. Only the conducted emissions of the configuration that produced the worst case emissions are reported in this section

A.6.2 Method of Measurement

See Clause 6.2 of ANSI C63.10 specifically.

See Clause 4 and Clause 5 of ANSI C63.10 generally.

The conducted emissions from the AC port of the EUT are measured in a shielding room. The EUT is connected to a Line Impedance Stabilization Network (LISN). An overview sweep with peak detection was performed. The measurements were performed with a quasi-peak detector and if required, an average detector.

The conducted emission measurements were made with the following detector of the test receiver: Quasi-Peak / Average Detector.

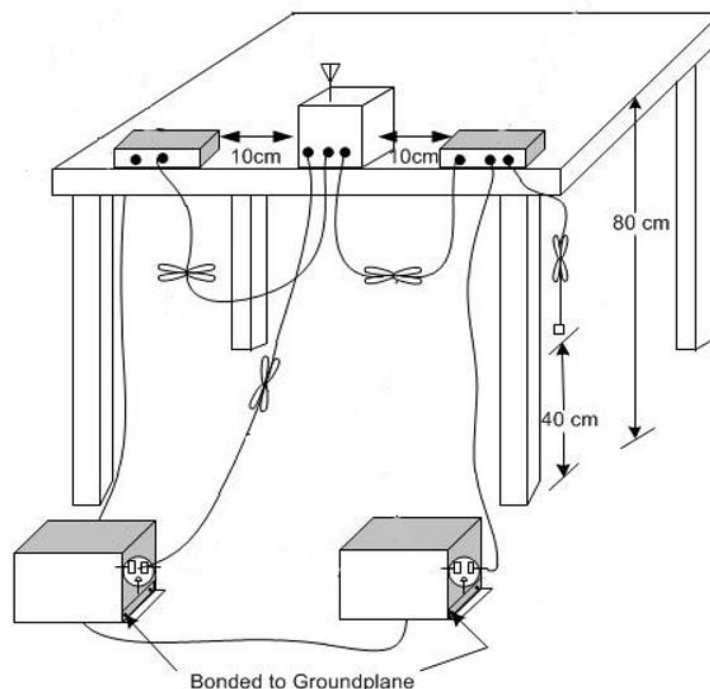
The measurement bandwidth is:

Frequency of Emission (MHz)	RBW/IF bandwidth
0.15-30	9kHz

A.6.3 Test Condition

Voltage (V)	Frequency (Hz)
120	60

A.6.4 Test setup



A.6.5 Measurement Result and limit

Wi-Fi (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ V)		Conclusion
		With charger		
		Wi-Fi	Idle	
0.15 to 0.5	66 to 56	Fig.A.6.1	Fig. A.6.2	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 0.5 MHz.

Wi-Fi (Average Limit)

Frequency range (MHz)	Average Limit (dB μ V)	Result (dB μ V)		Conclusion
		With charger		
		Wi-Fi	Idle	
0.15 to 0.5	56 to 46	Fig.A.6.1	Fig. A.6.2	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 0.5 MHz.

Conclusion: Pass

Test graphs as below:

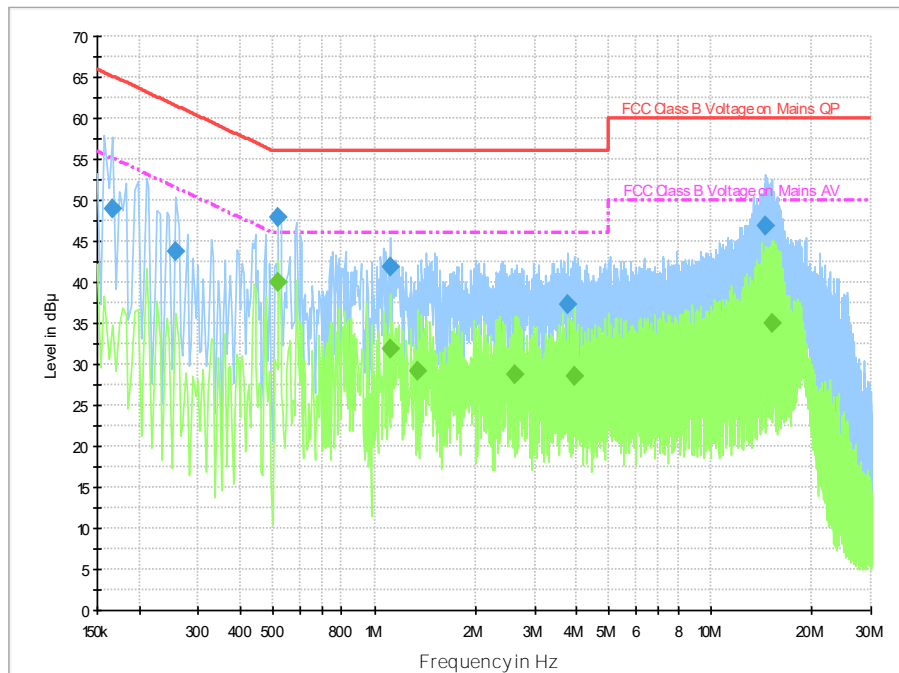


Fig.A.6.1. AC Powerline Conducted Emission-11a CH149

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.166000	49.0	2000.0	9.000	On	N	19.7	16.1	65.2
0.258000	43.8	2000.0	9.000	On	L1	19.7	17.7	61.5
0.518000	48.0	2000.0	9.000	On	L1	19.7	8.0	56.0
1.114000	41.9	2000.0	9.000	On	L1	19.6	14.1	56.0
3.750000	37.4	2000.0	9.000	On	L1	19.6	18.6	56.0
14.578000	46.8	2000.0	9.000	On	L1	19.7	13.2	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.518000	39.9	2000.0	9.000	On	L1	19.7	6.1	46.0
1.114000	31.8	2000.0	9.000	On	L1	19.6	14.2	46.0
1.346000	29.2	2000.0	9.000	On	L1	19.6	16.8	46.0
2.622000	28.7	2000.0	9.000	On	L1	19.6	17.3	46.0
3.954000	28.5	2000.0	9.000	On	L1	19.6	17.5	46.0
15.282000	35.0	2000.0	9.000	On	L1	19.7	15.0	50.0

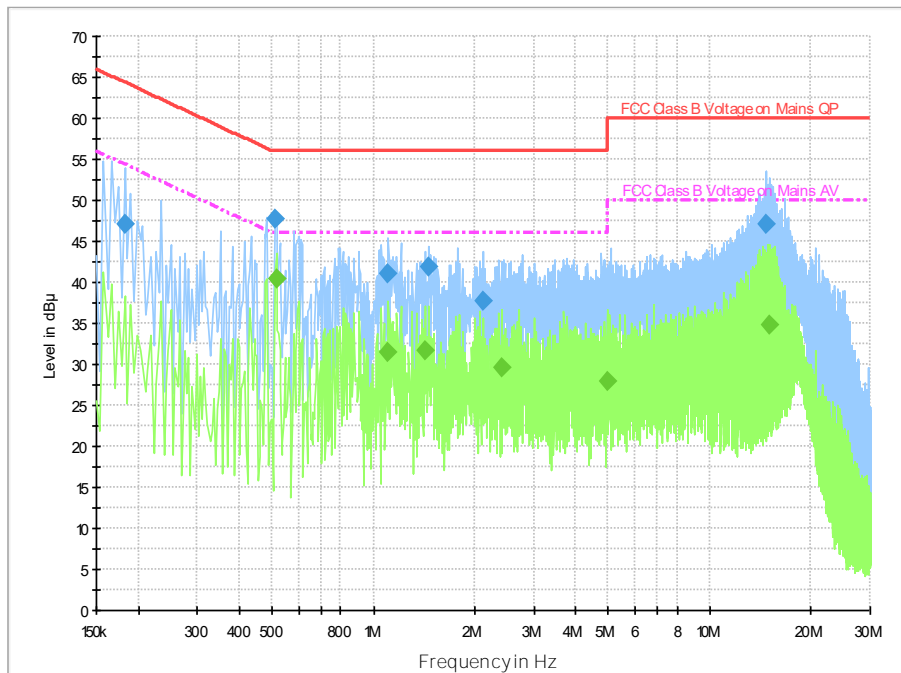


Fig.A.6.2. AC Powerline Conducted Emission-Idle

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.182000	47.1	2000.0	9.000	On	L1	19.7	17.3	64.4
0.510000	47.7	2000.0	9.000	On	L1	19.7	8.3	56.0
1.106000	41.0	2000.0	9.000	On	L1	19.6	15.0	56.0
1.462000	41.9	2000.0	9.000	On	L1	19.7	14.1	56.0
2.122000	37.8	2000.0	9.000	On	L1	19.6	18.2	56.0
14.758000	47.1	2000.0	9.000	On	L1	19.7	12.9	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.514000	40.5	2000.0	9.000	On	L1	19.7	5.5	46.0
1.106000	31.6	2000.0	9.000	On	L1	19.6	14.4	46.0
1.426000	31.6	2000.0	9.000	On	L1	19.7	14.4	46.0
2.414000	29.5	2000.0	9.000	On	L1	19.6	16.5	46.0
4.946000	28.0	2000.0	9.000	On	L1	19.6	18.0	46.0
15.034000	34.8	2000.0	9.000	On	L1	19.7	15.2	50.0

ANNEX B: EUT parameters

Disclaimer: The antenna gain and worse case provided by the client may affect the validity of the measurement results in this report, and the client shall bear the impact and consequences arising therefrom.

ANNEX C: Accreditation Certificate



Accredited Laboratory

A2LA has accredited

TELECOMMUNICATION TECHNOLOGY LABS, CAICT
Beijing, People's Republic of China

for technical competence in the field of
Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).



Presented this 26th day of June 2023.



Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 7049.01
Valid to July 31, 2024

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

*** END OF REPORT BODY ***