



**TEST REPORT**  
**ETSI EN 300 440 V2.2.1 (2018-07)**

**Report Reference No.**.....: **HK2401170360-6ER**

Compiled by

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Jason Zhou

Date of issue.....: 2024/02/20

Representative Laboratory Name.....: Shenzhen HUAKE Testing Technology Co., Ltd.

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China

**Applicant's name**.....: EDA Technology Shanghai Co., Ltd.

Address.....: Building 29, No.1661 Jialuo Road, Jiading District, Shanghai, PRC

**Test specification** .....

Standard .....

**ETSI EN 300 440 V2.2.1 (2018-07)**

TRF Originator .....

Shenzhen HUAKE Testing Technology Co., Ltd.

Master TRF .....

Dated 2017-12

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**Product Name** .....

ED-IPC3020

Trade Mark .....

EDA

Product Model.....

ED-IPC3020

Serial Model.....

N/A

Hardware version.....

V1.1

Software version .....

V1.1

Operation Frequency .....

From 5745MHz-5825MHz

Ratings.....

DC 5.1V From Adapter

Result.....

**PASS**



## TEST REPORT

Test Report No. :	HK2401170360-6ER	2024/02/20
		Date of issue

Product Name : ED-IPC3020

Product Model : ED-IPC3020

Serial Model : N/A

**Applicant** : EDA Technology Shanghai Co., Ltd.

Address : Building 29, No.1661 Jialuo Road, Jiading District, Shanghai, PRC

**Manufacturer** : EDA Technology Shanghai Co., Ltd.

Address : Building 29, No.1661 Jialuo Road, Jiading District, Shanghai, PRC

Test Result:	PASS
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The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.



**\*\* Modified History \*\***

Revision	Description	Issued Data	Remark
Revision 1.0	Initial Test Report Release	2024/02/20	Jason Zhou



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## 1. TEST STANDARDS

The tests were performed according to following standards:

[ETSI EN 300 440 V2.2.1 \(2018-07\)](#) : Short Range Devices (SRD); Radio equipment to be used in the 1 GHz to 40 GHz frequency range; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU



## 2. SUMMARY

### 2.1. General Remarks

Date of receipt of test sample	:	2024/01/17
Testing commenced on	:	2024/01/17
Testing concluded on	:	2024/02/20

### 2.2. Product Description

Product Name:	ED-IPC3020
Model/Type reference:	ED-IPC3020
List Model:	N/A
Difference description	N/A
Power supply:	DC 5.1V From Adapter
Adapter information:	Input: AC 100-240V, 50/60Hz, 0.8A Output: DC 5.1V/5.0A, DC 9.0V/3.0A, DC 12.0V/2.25A, DC 15.0V/1.8A Model: 27W USB-C Power Supply US
Antenna Type	Internal Antenna
Antenna Gain	3.5dBi
WLAN	Supported 802.11a/802.11n HT20/802.11n HT40/802.11ac HT20/802.11ac HT40/802.11ac HT80
Operation frequency	IEEE 802.11a/ IEEE 802.11n HT20/802.11ac HT20:5745MHz-5825MHz IEEE 802.11n HT40/ IEEE 802.11ac n HT40:5755-5795MHz IEEE 802.11ac HT80:5775MHz
Modulation Type	IEEE 802.11a: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20: OFDM (64QAM, 16QAM, QPSK,BPSK) IEEE 802.11n HT40: OFDM (64QAM, 16QAM, QPSK,BPSK) IEEE 802.11ac HT20: OFDM(256QAM, 64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ac HT40: OFDM (256QAM, 64QAM, 16QAM, QPSK,BPSK) IEEE 802.11ac HT80: OFDM (256QAM, 64QAM, 16QAM, QPSK,BPSK)
Receiver category	Receiver category 2
Remark: The products are identical in interior structure, electrical circuits and components, just model names are different.	

### 2.3. Equipment Under Test

#### Power supply system utilised

Power supply voltage	:	<input type="radio"/> 230V / 50 Hz	<input type="radio"/> 120V / 60Hz
		<input type="radio"/> 12 V DC	<input type="radio"/> 24 V DC
		<input checked="" type="radio"/> Other (specified in blank below)	

DC 5.1V From Adapter



## Description of the test mode

Channel	Frequency (MHz)
149	5745
151	5755
153	5765
157	5785
159	5795
161	5805
165	5825

## 2.4. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

○ - supplied by the lab

○ /	M/N: /
	Manufacturer: /

## 2.5. Test summary

ETSI EN 300 440 Requirements		
Equivalent isotropic radiated power(Radiated)	ETSI EN 300 440 Sub-clause 4.2.2	Pass
Permitted range of operating frequencies	ETSI EN 300 440 Sub-clause 4.2.3	Pass
Spurious emissions	ETSI EN 300 440 Sub-clause 4.2.4	Pass
Duty cycle	ETSI EN 300 440 Sub-clause 4.2.5	N/A
Additional requirements for FHSS equipment	ETSI EN 300 440 Sub-clause 4.2.6	N/A <sup>Note 1</sup>
Adjacent channel selectivity	ETSI EN 300 440 Sub-clause 4.3.3	Pass
Blocking or desensitization	ETSI EN 300 440 Sub-clause 4.3.4	Pass
Receiver Spurious emissions	ETSI EN 300 440 Sub-clause 4.3.5	Pass
Spectrum access techniques	ETSI EN 300 440 Sub-clause 4.4	Pass <sup>Note 2</sup>

Note 1: Which only applicable to FHSS system device.

Note 2: The manufacturer declares compliance with Section 4.4(Spectrum access techniques)

## 2.6. Modifications

No modifications were implemented to meet testing criteria.



### 3. TEST ENVIRONMENT

#### 3.1. Information of the Test Laboratory

Shenzhen HUAKE Testing Technology Co., Ltd.

1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Testing Laboratory Authorization:

A2LA Accreditation Code is 4781.01.

FCC Designation Number is CN1229.

Canada IC CAB identifier is CN0045.

CNAS Registration Number is L9589.

#### 3.2. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature: 25 °C

High Temperature: 40 °C

Low Temperature: -10 °C

Normal Voltage : DC 5.1V

High Voltage:DC 5.61V

Low Voltage:DC 4.59V

Relative Humidity: 55 %

Air Pressure: 989 hPa

#### 3.3. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics;Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics;Part 2 " and is documented in the Shenzhen Global Test Service Co.,Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen HUAKE laboratory is reported:

Test Items	Measurement Uncertainty	Notes
Conducted spurious emission	1.60 dB	(1)
Radiated spurious emission	2.20 dB	(1)

- (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.





### 3.4. Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
Broadband antenna	Schwarzbeck	VULB 9163	HKE-012	2024/02/19	2026/02/18
Horn antenna	Schwarzbeck	9120D	HKE-013	2024/02/19	2026/02/16
Receiver	R&S	ESR-7	HKE-010	2024/02/19	2025/02/18
Spectrum analyzer	Agilent	N9020A	HKE-048	2024/02/19	2025/02/18
Spectrum analyzer	R&S	FSP40	HKE-025	2024/02/19	2025/02/18
Preamplifier	Schwarzbeck	EMC051845S E	HKE-015	2024/02/19	2025/02/18
Preamplifier	Agilent	83051A	HKE-016	2024/02/19	2025/02/18
High pass filter unit	Tonscend	JS0806-F	HKE-055	2024/02/19	2025/02/18
Signal generator	Agilent	83630A	HKE-028	2024/02/19	2025/02/18
4 Ch. Simultaneous Sampling 14 Bits 2 MS/s	Agilent	U2531A	TW5406351 3	2024/02/19	2025/02/18
Power Sensor	Agilent	E9300A	HKE-086	2024/02/19	2025/02/18
RF automatic control unit	Tonscend	JS0806-2	HKE-060	2024/02/19	2025/02/18
Signal generator	Agilent	N5182A	HKE-029	2024/02/19	2025/02/18
Wireless Communication Test Set	R&S	CMW500	HKE-027	2024/02/19	2025/02/18

The calibration interval is 1 year.



## 4. TEST CONDITIONS AND RESULTS

### 4.1. 6dB Bandwidth

#### Limit

N/A

#### Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 KHz RBW and 300 KHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

#### Test Configuration

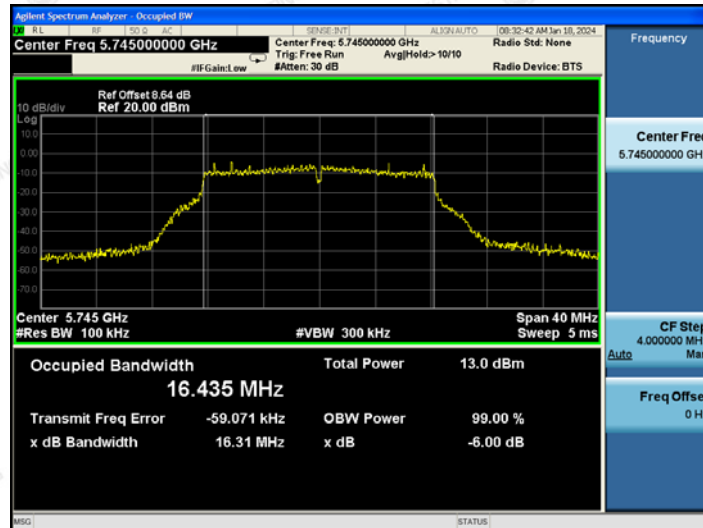


#### Test Results

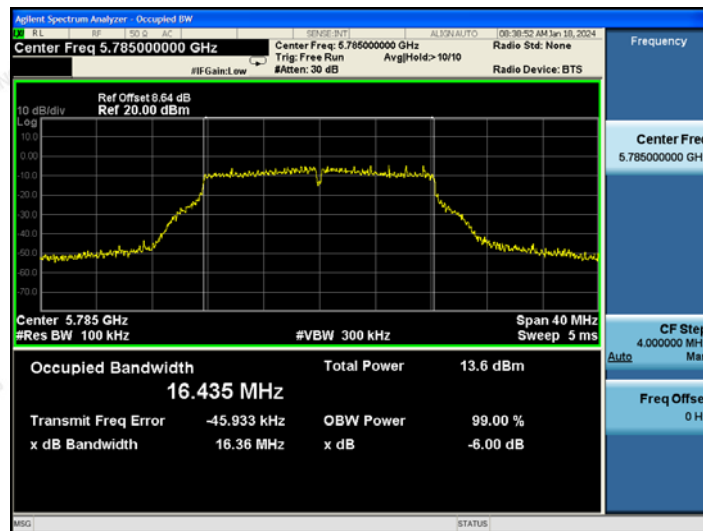
Type	Channel	6dB Bandwidth (MHz)	Limit (KHz)	Result
802.11a	149	16.44	N/A	N/A
	157	16.44		
	165	16.44		
802.11 n HT 20	149	17.64	N/A	N/A
	157	17.64		
	165	17.63		
802.11 n HT 40	151	36.12	N/A	N/A
	159	36.05		
802.11 ac HT 20	149	17.64	N/A	N/A
	157	17.63		
	165	17.65		
802.11 ac HT 40	151	36.14	N/A	N/A
	159	36.04		
802.11 ac HT 80	155	75.34	N/A	N/A



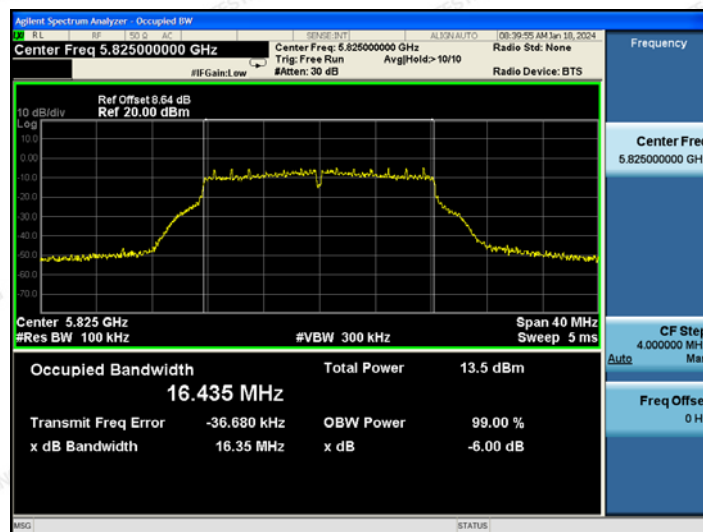
## 802.11a-5745



## 802.11a-5785



## 802.11a-5825





Agilent Spectrum Analyzer - Occupied BW

Center Freq: 5.745000000 GHz

Ref Offset: 8.64 dB

Ref: 20.00 dBm

Center Freq: 5.745000000 GHz

Span: 40 MHz

Res BW: 100 kHz

#BW: 300 kHz

Sweep: 5 ms

Occupied Bandwidth: 17.635 MHz

Total Power: 12.3 dBm

Transmit Freq Error: -60.832 kHz

OBW Power: 99.00 %

x dB Bandwidth: 17.21 MHz

x dB: -6.00 dB

Radio Device: BTS

10:35:03 AM Jan 10, 2024

Radio St: None

Trigger: Free Run

Avg: 10/10

Attenu: 30 dB

IF Gain: 1.00

Sense: INT1

ALX: AUTO

Agilent Spectrum Analyzer - Occupied BW

Center Freq 5.785000000 GHz

Ref Offset 8.64 dB  
Ref 20.00 dBm

Center Freq: 5.785000000 GHz  
Trig: Free Run  
Avg/Hold: 10/10  
Radio Device: BTS

Center 5.785 GHz  
#Res BW 100 kHz  
#VBW 300 kHz  
Span 40 MHz  
Sweep 5 ms

Occupied Bandwidth  
**17.639 MHz**

Total Power  
13.5 dBm

Transmit Freq Error  
-37.652 kHz

OBW Power  
99.00 %

x dB Bandwidth  
17.31 MHz

x dB  
-6.00 dB

Frequency  
Center Freq  
5.785000000 GHz

CF Step  
4.000000 MHz

Freq Offset  
0 Hz

Agilent Spectrum Analyzer - Occupied BW

Center Freq 5.825000000 GHz

Ref Offset 8.64 dB  
Ref 20.00 dBm

Center Freq: 5.825000000 GHz  
Trig: Free Run  
#Atten: 30 dB

109:40:36 AM Jan 18, 2024  
Radio Set: None  
Radio Device: BTS

Center Freq: 5.825 GHz  
#Res BW 100 kHz  
#VBW 300 kHz  
Span 40 MHz  
Sweep 5 ms

Occupied Bandwidth  
17.628 MHz

Total Power 12.8 dBm

Transmit Freq Error -25.568 kHz  
OBW Power 99.00 %  
x dB Bandwidth 16.90 MHz  
x dB -6.00 dB

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Agilent Spectrum Analyzer - Occupied BW

Center Freq 5.755000000 GHz

Ref Offset 8.64 dB  
Ref 20.00 dBm

Log

10 dB/div

0.00

-10.0

-20.0

-30.0

-40.0

-50.0

-60.0

-70.0

Center Freq: 5.755000000 GHz

Trig: Free Run

AvgHold: 10/10

GB: 42:47 AM Jan 18, 2024

Radio Std: None

Radio Device: BTS

#IF Gain: Low

#Att: 30 dB

Span 80 MHz

#Res BW 100 kHz

#VBW 300 kHz

Sweep 9.933 ms

Occupied Bandwidth

36.124 MHz

Total Power

14.1 dBm

Transmit Freq Error

-63.031 kHz

OBW Power

99.00 %

x dB Bandwidth

35.20 MHz

x dB

-6.00 dB

Agilent Spectrum Analyzer - Occupied BW

Center Freq 5.795000000 GHz

Ref Offset 8.64 dB  
Ref 20.00 dBm

Center Freq: 5.795000000 GHz  
Trig: Free Run  
Avg/Hold: >10/10  
Radio Device: BTS

Frequency

Center Freq  
5.795000000 GHz

CF Step  
8.000000 MHz

Auto

Freq Offset  
0 Hz

10 dB/div  
Log

Center 5.795 GHz  
#Res BW 100 kHz  
#BW 300 kHz  
Span 80 MHz  
Sweep 9.933 ms

Occupied Bandwidth  
36.045 MHz

Total Power  
12.7 dBm

Transmit Freq Error  
-86.259 kHz  
OBW Power  
99.00 %  
x dB Bandwidth  
35.13 MHz  
x dB  
-6.00 dB

MSG STATUS

Agilent Spectrum Analyzer - Occupied BW

Center Freq 5.745000000 GHz

Ref Offset 8.64 dB  
Ref 20.00 dBm

Center Freq: 5.745000000 GHz  
Trig: Free Run  
Avg/Hold: >10/10  
Radio Device: BTS

Center 5.745 GHz  
#Res BW 100 kHz  
#VBW 300 kHz  
Span 40 MHz  
Sweep 5 ms

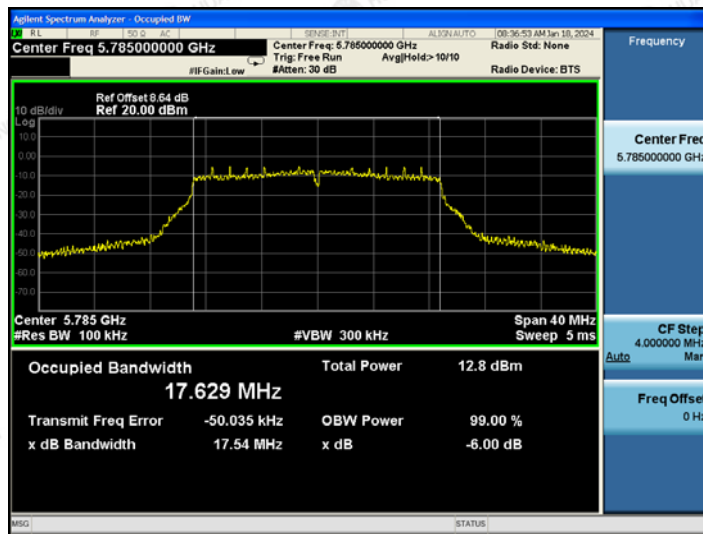
Occupied Bandwidth	Total Power	12.8 dBm
17.638 MHz		
Transmit Freq Error	-57.680 kHz	OBW Power
x dB Bandwidth	17.31 MHz	x dB
		99.00 %
		-6.00 dB

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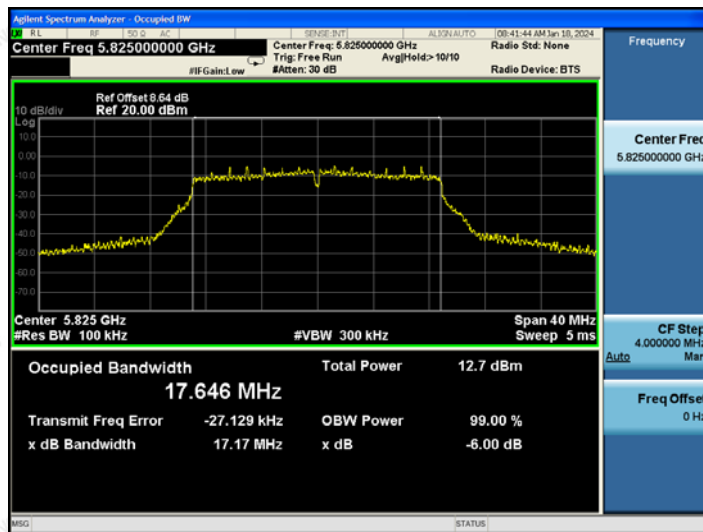
Add: 1-2F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China



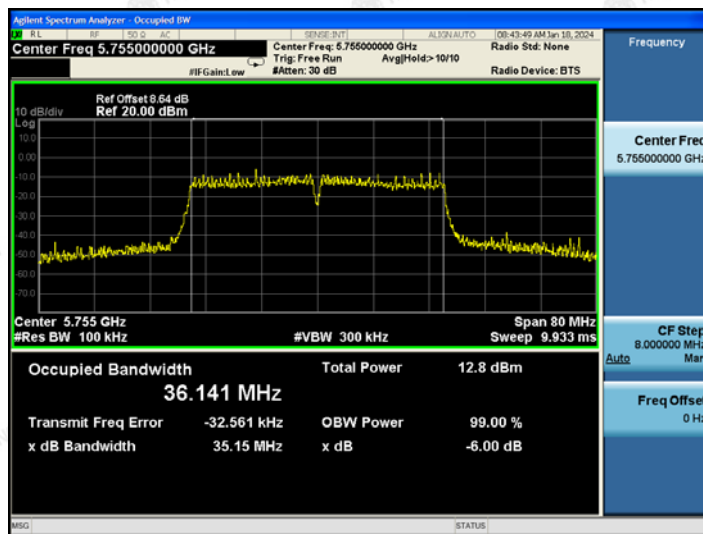
## 802.11ac HT20-5785



## 802.11ac HT20-5825

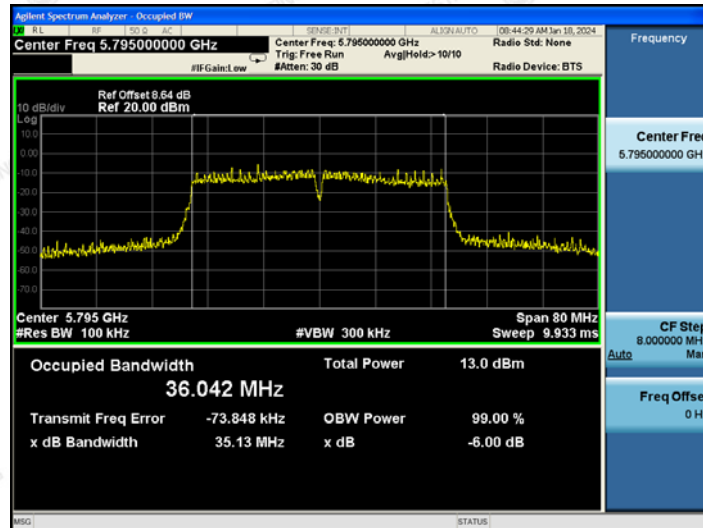


## 802.11ac HT40-5755

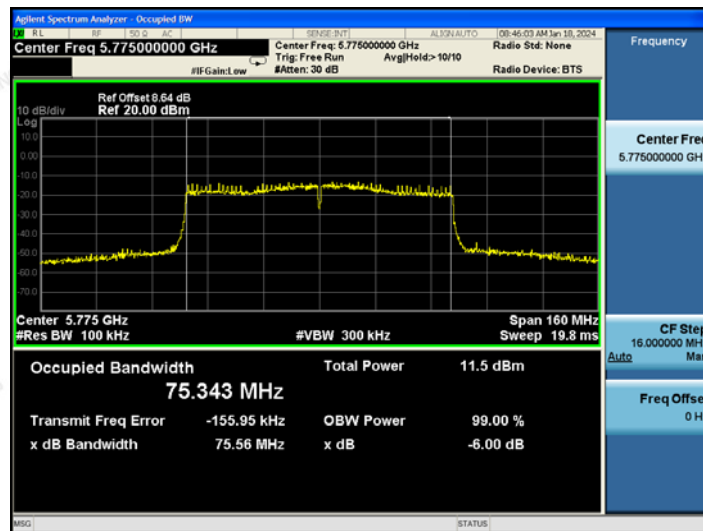




## 802.11ac HT40-5795



## 802.11ac HT80-5775





## 4.2. Equivalent Isotropically Radiated Power (e.i.r.p)

### LIMIT

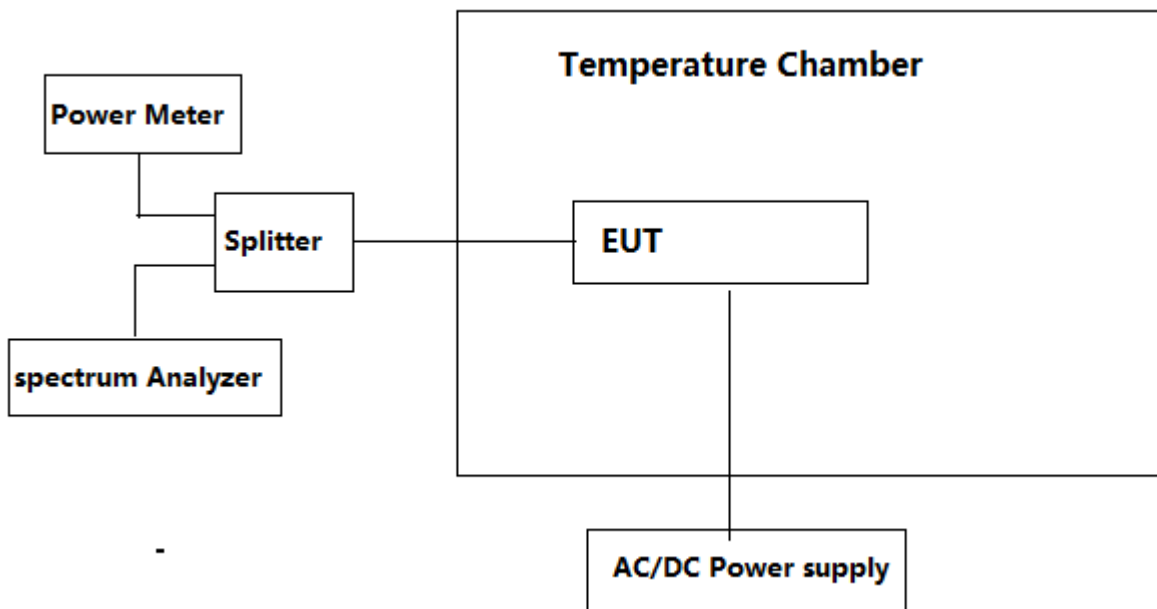
According to ETSI EN 300 440 clause 4.2.2.3.2

The transmitter maximum e.i.r.p. under normal and extreme test conditions shall not exceed the values given in table 2.

**Table 2: Maximum radiated peak power (e.i.r.p.)**

Frequency Bands	Power	Application	Notes
2 400 MHz to 2 483,5 MHz	10 mW e.i.r.p.	Non-specific short range devices	
2 400 MHz to 2 483,5 MHz	25 mW e.i.r.p.	Radio determination devices	
(a) 2 446 MHz to 2 454 MHz	500 mW e.i.r.p.	Radio Frequency Identification (RFID) devices	See also table 4 and annex D
(b) 2 446 MHz to 2 454 MHz	4 W e.i.r.p.	Radio Frequency Identification (RFID) devices	See also table 4 and annex D
5 725 MHz to 5 875 MHz	25 mW e.i.r.p.	Non-specific short range devices	
9 200 MHz to 9 500 MHz	25 mW e.i.r.p.	Radio determination devices	
9 500 MHz to 9 975 MHz	25 mW e.i.r.p.	Radio determination devices	
10,5 GHz to 10,6 GHz	500 mW e.i.r.p.	Radio determination devices	
13,4 GHz to 14,0 GHz	25 mW e.i.r.p.	Radio determination devices	
17,1 GHz to 17,3 GHz	400 mW e.i.r.p.	Radio determination devices	See annex F
24,00 GHz to 24,25 GHz	100 mW e.i.r.p.	Non-specific short range devices and Radio determination devices	

### TEST CONFIGURATION



### TEST PROCEDURE

1. Please refer to ETSI EN 300 440 clause 5 for the test conditions.
2. Please refer to ETSI EN 300 440 clause 4.2.2.3 for the measurement method.
3. According to the -6 dB channel bandwidth measurement result, the test procedure define in Sub-clause clause 4.2.2.3.2 is used for 802.11a HT20/802.11n HT20/802.11n HT40/802.11ac HT20/802.11ac HT40/802.11ac HT80 test.

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**TEST RESULTS**

802.11a							
Test conditions		Channel/ Frequency	Measured power (dBm)	Antenna Gain (dBi)	e.i.r.p (dBm)	Limit (dBm)	Result
Temperature (°C)	Voltage (V)						
+25°C	5.1V	149/5745	8.99	3.5	12.49	13.98	PASS
-10°C	5.61V		9.35	3.5	12.85		
	4.59V		8.59	3.5	12.09		
+40°C	5.61V		8.79	3.5	12.29		
	4.59V		9.39	3.5	12.89		
+25°C	5.1V	157/5785	9.07	3.5	12.57		
-10°C	5.61V		7.98	3.5	11.48		
	4.59V		9.29	3.5	12.79		
+40°C	5.61V		8.88	3.5	12.38		
	4.59V		8.35	3.5	11.85		
+25°C	5.1V	165/5825	8.89	3.5	12.39		
-10°C	5.61V		8.18	3.5	11.68		
	4.59V		8.57	3.5	12.07		
+40°C	5.61V		8.78	3.5	12.28		
	4.59V		8.67	3.5	12.17		

802.11n HT 20							
Test conditions		Channel/ Frequency	Measured power (dBm)	Antenna Gain (dBi)	e.i.r.p (dBm)	Limit (dBm)	Result
Temperature (°C)	Voltage (V)						
+25°C	5.1V	149/5745	8.97	3.5	12.47	13.98	PASS
-10°C	5.61V		8.72	3.5	12.22		
	4.59V		8.46	3.5	11.96		
+40°C	5.61V		7.87	3.5	11.37		
	4.59V		8.86	3.5	12.36		
+25°C	5.1V	157/5785	7.69	3.5	11.19		
-10°C	5.61V		8.19	3.5	11.69		
	4.59V		8.42	3.5	11.92		
+40°C	5.61V		8.26	3.5	11.76		
	4.59V		8.66	3.5	12.16		
+25°C	5.1V	165/5825	8.34	3.5	11.84		
-10°C	5.61V		9.15	3.5	12.65		
	4.59V		7.35	3.5	10.85		
+40°C	5.61V		8.97	3.5	12.47		
	4.59V		8.52	3.5	12.02		

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802.11n HT 40							
Test conditions		Channel/ Frequency	Measured power (dBm)	Antenna Gain (dBi)	e.i.r.p (dBm)	Limit (dBm)	Result
Temperature (°C)	Voltage (V)						
+25°C	5.1V	151/5755	5.82	3.5	9.32	13.98	PASS
-10°C	5.61V		6.57	3.5	10.07		
	4.59V		6.77	3.5	10.27		
+40°C	5.61V		5.35	3.5	8.85		
	4.59V		7.89	3.5	11.39		
+25°C	5.1V	159/5795	7.28	3.5	10.78		
-10°C	5.61V		8.28	3.5	11.78		
	4.59V		7.67	3.5	11.17		
+40°C	5.61V		7.52	3.5	11.02		
	4.59V		6.67	3.5	10.17		

802.11ac HT 20							
Test conditions		Channel/ Frequency	Measured power (dBm)	Antenna Gain (dBi)	e.i.r.p (dBm)	Limit (dBm)	Result
Temperature (°C)	Voltage (V)						
+25°C	5.1V	149/5745	6.46	3.5	9.96	13.98	PASS
-10°C	5.61V		6.28	3.5	9.78		
	4.59V		6.67	3.5	10.17		
+40°C	5.61V		6.76	3.5	10.26		
	4.59V		5.08	3.5	8.58		
+25°C	5.1V	157/5785	6.17	3.5	9.67		
-10°C	5.61V		6.49	3.5	9.99		
	4.59V		6.22	3.5	9.72		
+40°C	5.61V		6.99	3.5	10.49		
	4.59V		6.57	3.5	10.07		
+25°C	5.1V	165/5825	7.34	3.5	10.84		
-10°C	5.61V		6.22	3.5	9.72		
	4.59V		7.07	3.5	10.57		
+40°C	5.61V		7.13	3.5	10.63		
	4.59V		5.26	3.5	8.76		



802.11ac HT 40							
Test conditions		Channel/ Frequency	Measured power (dBm)	Antenna Gain (dBi)	e.i.r.p (dBm)	Limit (dBm)	Result
Temperature (°C)	Voltage (V)						
+25°C	5.1V	151/5755	5.37	3.5	8.87	13.98	PASS
-10°C	5.61V		5.38	3.5	8.88		
	4.59V		5.49	3.5	8.99		
+40°C	5.61V		5.47	3.5	8.97		
	4.59V		5.92	3.5	9.42		
+25°C	5.1V	159/5795	4.59	3.5	8.09		
-10°C	5.61V		5.62	3.5	9.12		
	4.59V		5.02	3.5	8.52		
+40°C	5.61V		5.77	3.5	9.27		
	4.59V		5.19	3.5	8.69		

802.11ac HT 80							
Test conditions		Channel/ Frequency	Measured power (dBm)	Antenna Gain (dBi)	e.i.r.p (dBm)	Limit (dBm)	Result
Temperature (°C)	Voltage (V)						
+25°C	5.1V	155/5775	5.32	3.5	8.82	13.98	PASS
-10°C	5.61V		6.18	3.5	9.68		
	4.59V		6.05	3.5	9.55		
+40°C	5.61V		6.42	3.5	9.92		
	4.59V		5.88	3.5	9.38		



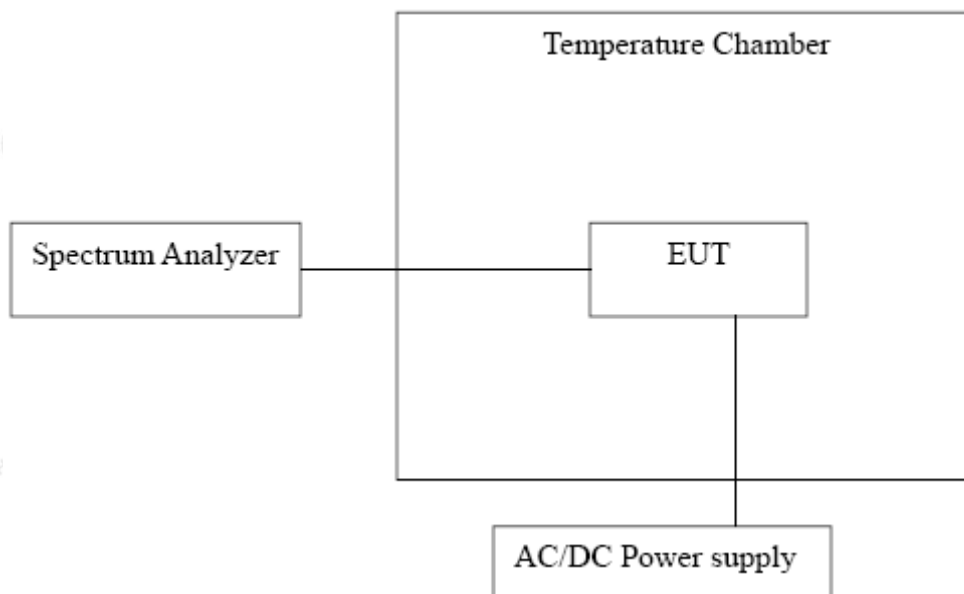
### 4.3. Permitted Range of Operating Frequencies

#### LIMIT

According to ETSI EN 300 440 clause 4.2.3.5

Frequency range Limit	
$F_{Low} > 5725G$	$F_{High} < 5875GHz$

#### TEST CONFIGURATION



#### TEST PROCEDURE

1. Please refer to ETSI EN 300 440 clause 5 for the test conditions.
2. Please refer to ETSI EN 300 440 clause 4.2.3.3 for the measurement method.



**TEST RESULTS**

802.11a				
Test Condition		f <sub>L</sub> (MHz)	f <sub>H</sub> (MHz)	Limit
Temperature (°C)	Voltage ( V )			
+25°C	5.1	5736.04	5833.60	f <sub>L</sub> ≥ 5725MHz and f <sub>H</sub> ≤ 5875MHzGHz
-10°C	5.61	5736.45	5833.15	
	4.59	5736.24	5833.21	
+40°C	5.61	5736.35	5833.49	
	4.59	5736.23	5833.34	
				Pass

802.11n HT20				
Test Condition		f <sub>L</sub> (MHz)	f <sub>H</sub> (MHz)	Limit
Temperature (°C)	Voltage ( V )			
+25°C	5.1	5735.48	5834.20	f <sub>L</sub> ≥ 5725MHz and f <sub>H</sub> ≤ 5875MHzGHz
-10°C	5.61	5735.45	5834.35	
	4.59	5735.52	5834.44	
+40°C	5.61	5735.67	5834.12	
	4.59	5735.56	5834.49	
				Pass

802.11n HT40				
Test Condition		f <sub>L</sub> (MHz)	f <sub>H</sub> (MHz)	Limit
Temperature (°C)	Voltage ( V )			
+25°C	5.1	5736.28	5813.64	f <sub>L</sub> ≥ 5725MHz and f <sub>H</sub> ≤ 5875MHzGHz
-10°C	5.61	5736.23	5813.48	
	4.59	5736.51	5813.52	
+40°C	5.61	5736.33	5813.44	
	4.59	5736.25	5813.18	
				Pass

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802.11ac HT20					
Test Condition		f <sub>L</sub> (MHz)	f <sub>H</sub> (MHz)	Limit	Result
Temperature (°C)	Voltage ( V )				
+25°C	5.1	5735.48	5834.24	f <sub>L</sub> ≥ 5725MHz and f <sub>H</sub> ≤ 5875MHzGHz	Pass
-10°C	5.61	5735.43	5834.22		
	4.59	5735.13	5834.14		
+40°C	5.61	5735.48	5834.63		
	4.59	5735.62	5834.45		

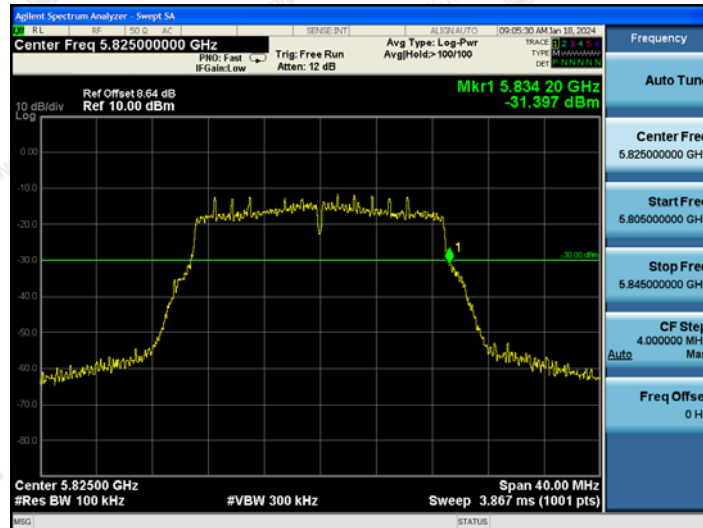
802.11ac HT40					
Test Condition		f <sub>L</sub> (MHz)	f <sub>H</sub> (MHz)	Limit	Result
Temperature (°C)	Voltage ( V )				
+25°C	5.1	5736.28	5813.56	f <sub>L</sub> ≥ 5725MHz and f <sub>H</sub> ≤ 5875MHzGHz	Pass
-10°C	5.61	5736.24	5813.48		
	4.59	5736.48	5813.43		
+40°C	5.61	5736.35	5813.32		
	4.59	5736.22	5813.34		

802.11ac HT80					
Test Condition		f <sub>L</sub> (MHz)	f <sub>H</sub> (MHz)	Limit	Result
Temperature (°C)	Voltage ( V )				
+25°C	5.1	5736.28	5813.56	f <sub>L</sub> ≥ 5725MHz and f <sub>H</sub> ≤ 5875MHzGHz	Pass
-10°C	5.61	5736.41	5813.43		
	4.59	5736.15	5813.75		
+40°C	5.61	5736.39	5813.22		
	4.59	5736.51	5813.15		

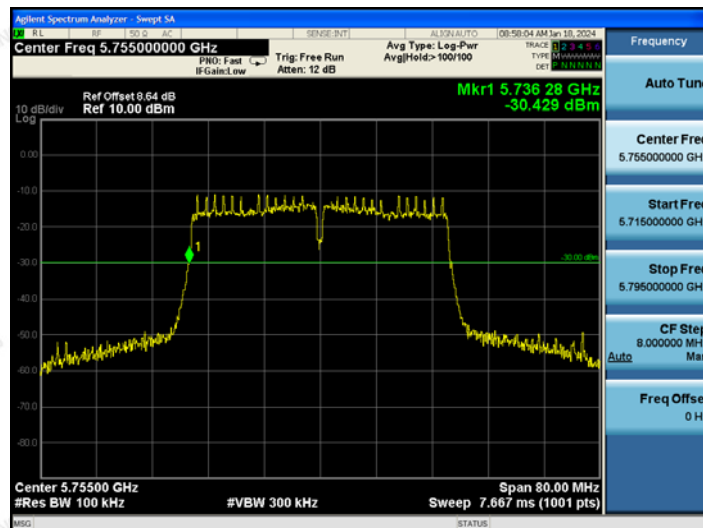




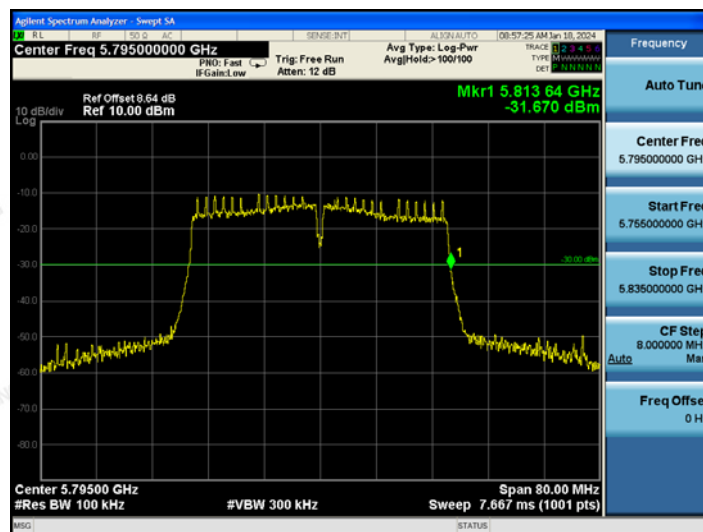
802.11n HT20 5825



802.11n HT40 5755



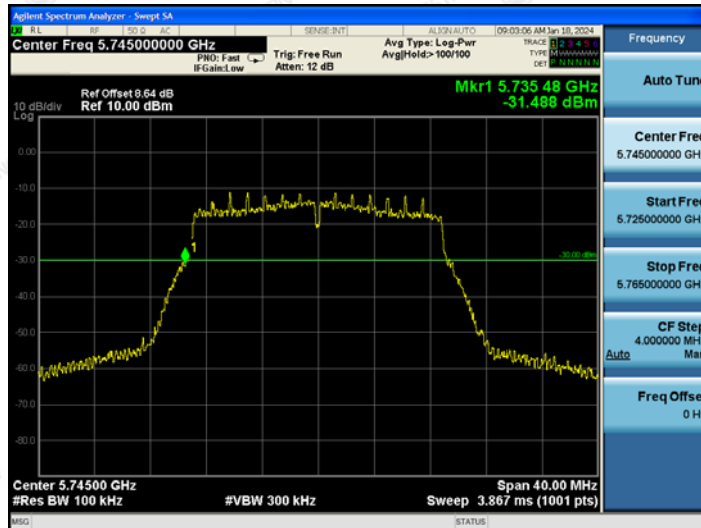
802.11n HT40 5795



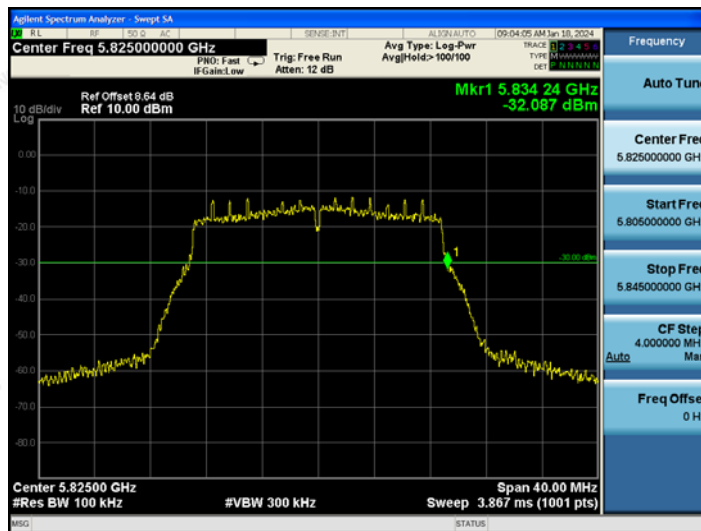




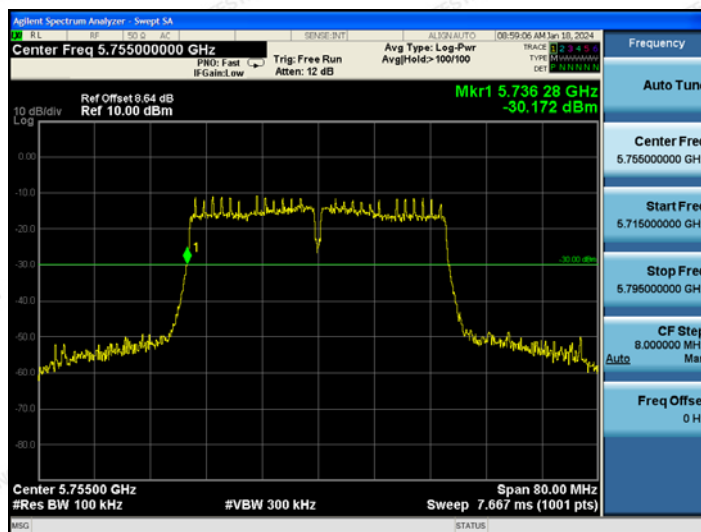
## 802.11ac HT20 5745



## 802.11ac HT20 5825

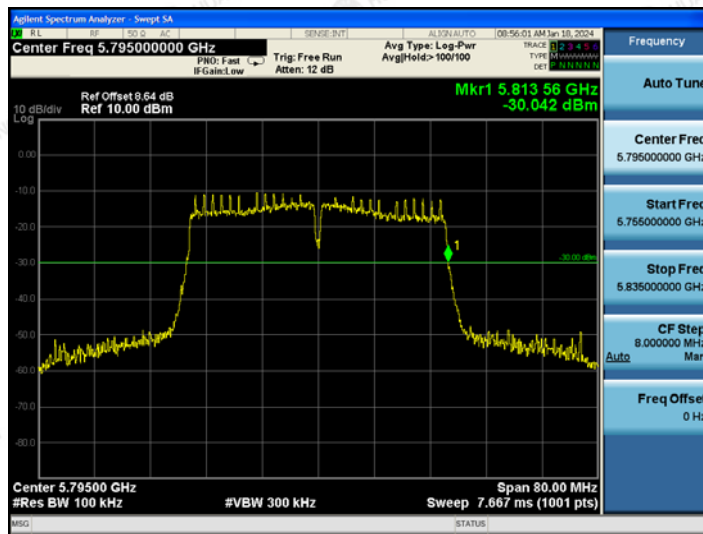


## 802.11ac HT40 5755

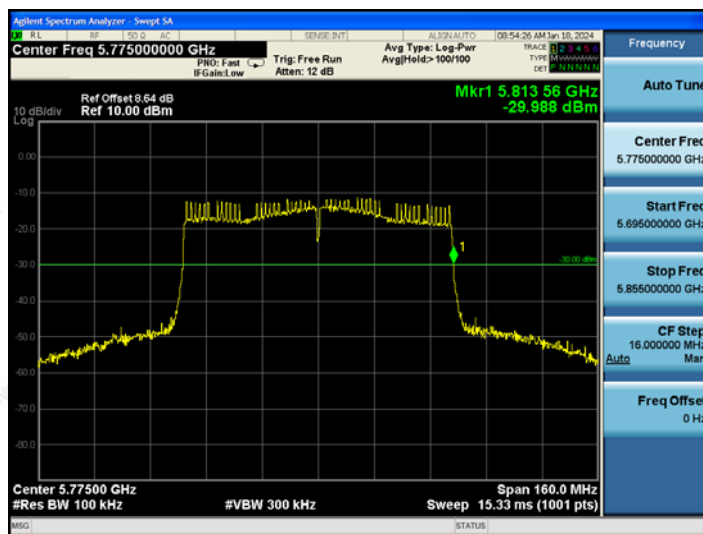
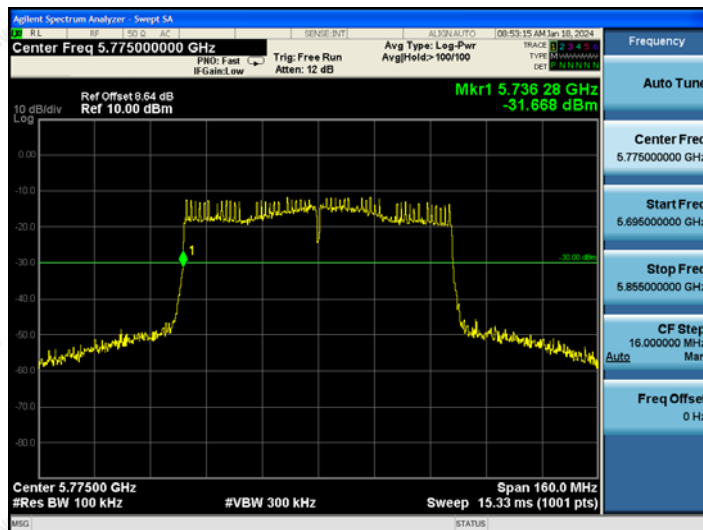




802.11ac HT40 5795



802.11ac HT80 5775



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#### 4.4. Spurious emissions and cabinet

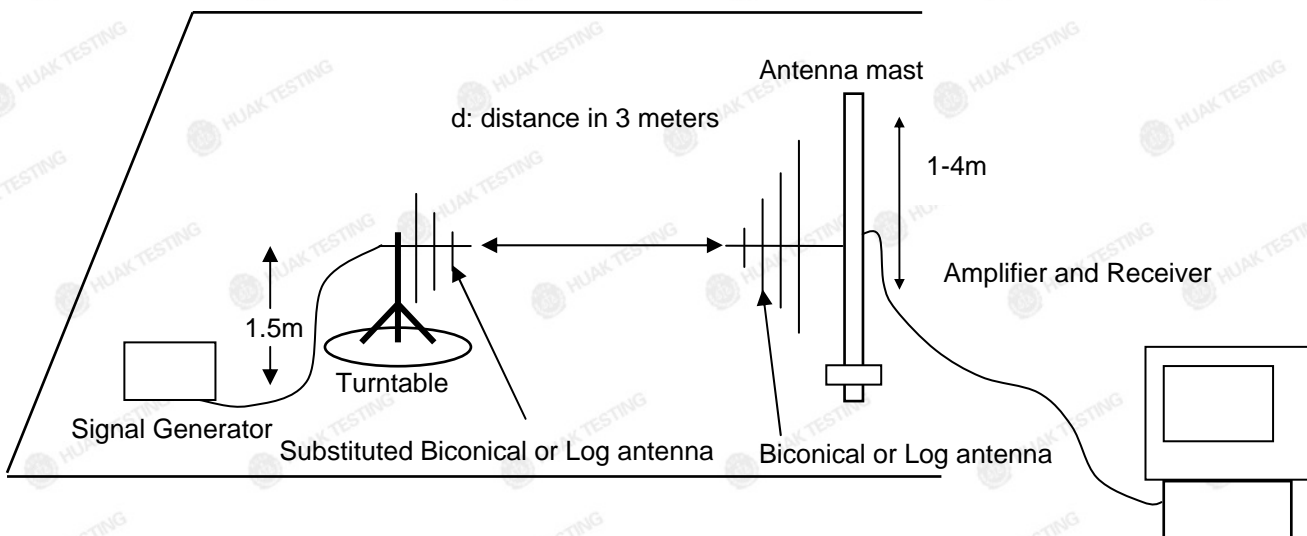
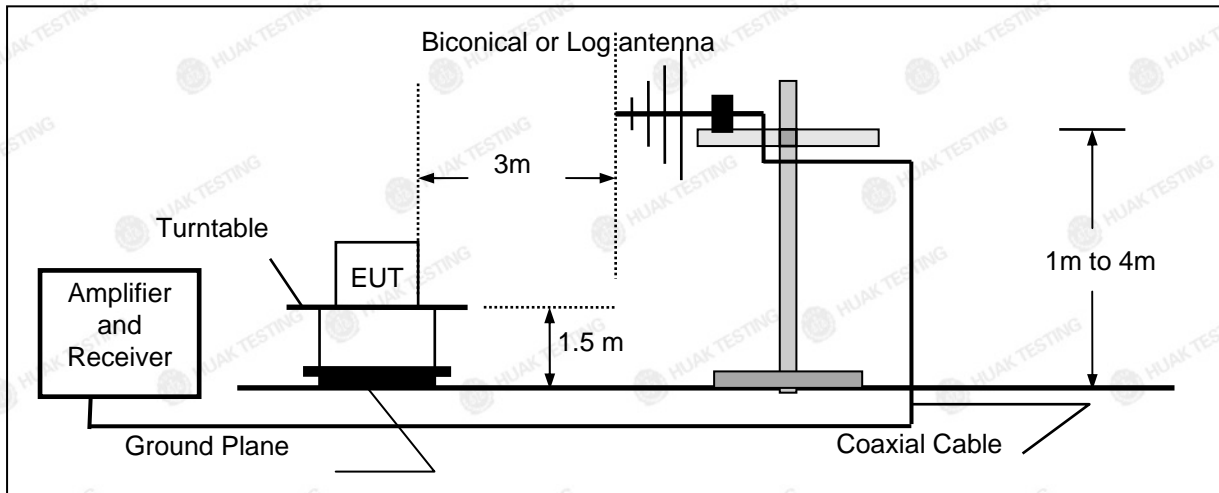
##### LIMIT

The power of the spurious emissions shall not exceed the limits of table

State	47 MHz to 74 MHz 87.5 MHz to 118 MHz 174 MHz to 230 MHz 470 MHz to 862 MHz	Other frequencies ≤1 000 MHz	Frequencies > 1 000 MHz
Operating	4 nW /-54dBm	250 nW/-36dBm	1 μW /-30dBm
Standby	2 nW /-57dBm	2 nW /-57dBm	20 nW /-47dBm

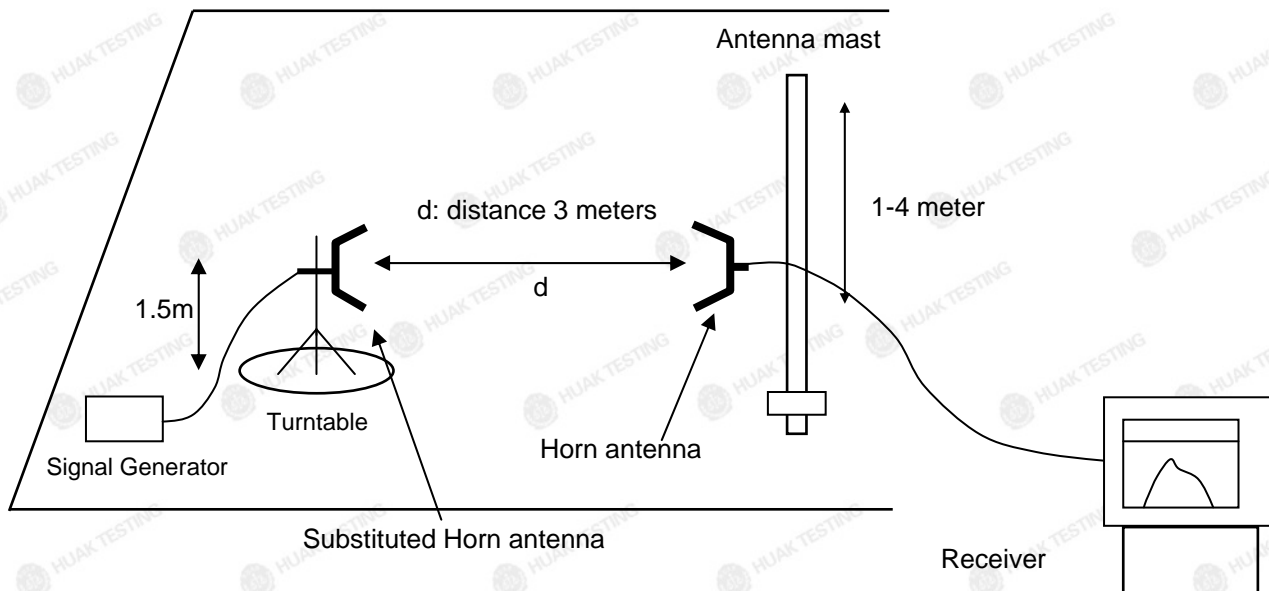
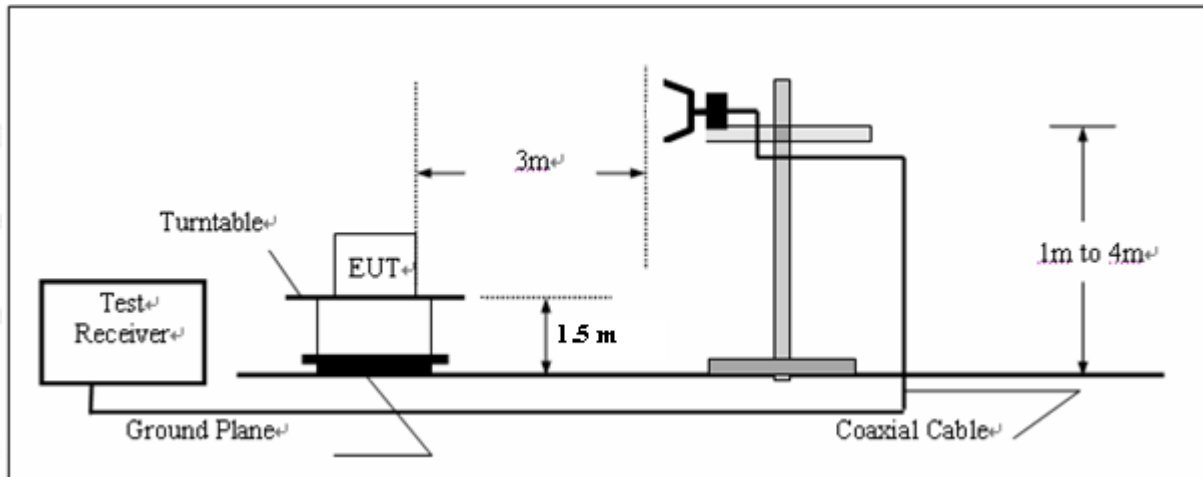
##### TEST CONFIGURATION

###### Below 1GHz





Above 1GHz



**TEST PROCEDURE**

1. Please refer to ETSI EN 300 440 clause 5 for the test conditions.
2. Please refer to ETSI EN 300 440 clause 4.2.4.3 for the measurement method.



**TEST RESULTS**

Note: We tested at 802.11a/802.11n HT20/802.11n HT40/802.11ac HT20/802.11ac HT40/802.11ac HT80 mode at the antenna single transmitting mode and the Mimo mode, and recorded the worst case 802.11n HT 20 mode at the Mimo mode. The measurement frequency range is from 25MHz to the 10<sup>th</sup> harmonic of the fundamental frequency, not exceeding 40GHz. 18GHz-40GHz not recorded for no spurious point have a margin of less than 6 dB with respect to the limits.

**802.11n HT 20, CH 149, Horizontal/Vertical**

Below 1G

Fre. (MHz)	ANT. Pol.	Result (dBm)	Limit	Margin	Conclusion
<b>Below 1GHz:</b>					
138.86	V	-75.94	-36	-39.94	PASS
209.71	V	-75.81	-54	-21.81	PASS
281.45	V	-77.71	-36	-41.71	PASS
368.41	V	-77.54	-36	-41.54	PASS
469.01	V	-73.62	-54	-19.62	PASS
796.71	V	-77.31	-54	-23.31	PASS
183.15	H	-71.71	-54	-17.71	PASS
229.96	H	-78.66	-36	-42.66	PASS
327.11	H	-72.54	-36	-36.54	PASS
393.32	H	-73.79	-36	-37.79	PASS
588.37	H	-80.02	-54	-26.02	PASS
833.03	H	-83.09	-54	-29.09	PASS
Note: 1. Cable loss and antenna gain was combined in the calculated result. 2. Other point of the measurements are below 20dB from the limit.					



Fre. (MHz)	ANT. Pol.	Result (dBm)	Limit	Margin	Conclusion
<b>Above 1GHz:</b>					
2130.27	V	-58.12	-30	-28.12	PASS
2426.44	V	-56.63	-30	-26.63	PASS
3451.47	V	-55.19	-30	-25.19	PASS
4287.59	V	-56.71	-30	-26.71	PASS
5517.94	V	-51.79	-30	-21.79	PASS
5891.54	V	-50.95	-30	-20.95	PASS
2129.04	H	-49.61	-30	-19.61	PASS
2371.98	H	-57.72	-30	-27.72	PASS
3072.04	H	-53.99	-30	-23.99	PASS
3545.38	H	-57.71	-30	-27.71	PASS
4863.34	H	-52.54	-30	-22.54	PASS
6705.99	H	-53.42	-30	-23.42	PASS
<b>Note:</b> 1.Cable loss and antenna gain was combined in the calculated result. 2. Other point of the measurements are below 20dB from the limit.					

**802.11n HT 20, CH 165, Horizontal/Vertical**

Below 1G

Fre. (MHz)	ANT. Pol.	Result (dBm)	Limit	Margin	Conclusion
<b>Below 1GHz:</b>					
187.26	V	-77.73	-36	-41.73	PASS
238.48	V	-75.49	-54	-21.49	PASS
284.12	V	-79.11	-36	-43.11	PASS
386.56	V	-79.64	-36	-43.64	PASS
454.66	V	-74.62	-54	-20.62	PASS
793.95	V	-79.55	-54	-25.55	PASS
184.84	H	-72.72	-54	-18.72	PASS
234.26	H	-75.26	-36	-39.26	PASS
307.74	H	-81.41	-36	-45.41	PASS
404.53	H	-75.01	-36	-39.01	PASS
572.56	H	-78.02	-54	-24.02	PASS
830.72	H	-80.52	-54	-26.52	PASS
Note: 1.Cable loss and antenna gain was combined in the calculated result. 2. Other point of the measurements are below 20dB from the limit.					



Fre. (MHz)	ANT. Pol.	Result (dBm)	Limit	Margin	Conclusion
<b>Above 1GHz:</b>					
2080.68	V	-54.32	-30	-24.32	PASS
2575.31	V	-54.54	-30	-24.54	PASS
3679.29	V	-58.22	-30	-28.22	PASS
4438.19	V	-54.29	-30	-24.29	PASS
5445.92	V	-54.21	-30	-24.21	PASS
5995.41	V	-57.61	-30	-27.61	PASS
2381.07	H	-53.12	-30	-23.12	PASS
2313.57	H	-57.34	-30	-27.34	PASS
3073.24	H	-55.29	-30	-25.29	PASS
3876.44	H	-57.59	-30	-27.59	PASS
5065.89	H	-50.01	-30	-20.01	PASS
6686.88	H	-45.39	-30	-15.39	PASS
<b>Note:</b> 1.Cable loss and antenna gain was combined in the calculated result. 2. Other point of the measurements are below 20dB from the limit.					





#### 4.5. Duty cycle

According to ETSI EN 300 440 clause 4.2.5.4

Table 4 defines the maximum duty cycle within a 1 hour period.

**Table 4: Duty cycle limits**

Frequency Band	Duty cycle	Application	Notes
2 400 MHz to 2 483,5 MHz	No Restriction	Generic use	
2 400 MHz to 2 483,5 MHz	No Restriction	Detection, movement and alert applications	
(a) 2 446 MHz to 2 454 MHz	No Restriction	RFID	Limits shown in annex D shall apply
(b) 2 446 MHz to 2 454 MHz	≤ 15 %	RFID	Limits shown in annex D shall apply
5 725 MHz to 5 875 MHz	No Restriction	Generic use	
9 200 MHz to 9 500 MHz	No Restriction	Radiodetermination: radar, detection, movement and alert applications	
9 500 MHz to 9 975 MHz	No Restriction	Radiodetermination: radar, detection, movement and alert applications	
10,5 GHz to 10,6 GHz	No Restriction	Radiodetermination: radar, detection, movement and alert applications	
13,4 GHz to 14,0 GHz	No Restriction	Radiodetermination: radar, detection, movement and alert applications	
17,1 GHz to 17,3 GHz	DAA or equivalent techniques	Radiodetermination: GBSAR detecting and movement and alert applications	Limits shown in annex F shall apply
24,00 GHz to 24,25 GHz	No Restriction	Generic use and for Radiodetermination: radar, detection, movement and alert applications	

#### **TEST RESULTS**

For device working in frequency band 5725MHz to 5875MHz, no duty cycle restricted.



#### 4.6. Adjacent channel selectivity

##### LIMIT

Receiver category	Limit
1	-30dBm+k
2	No limit
3	No limit

The correction factor, k, is as follows:

$$K=-20\log f-10\log BW$$

Where:

-f is the frequency in GHz;

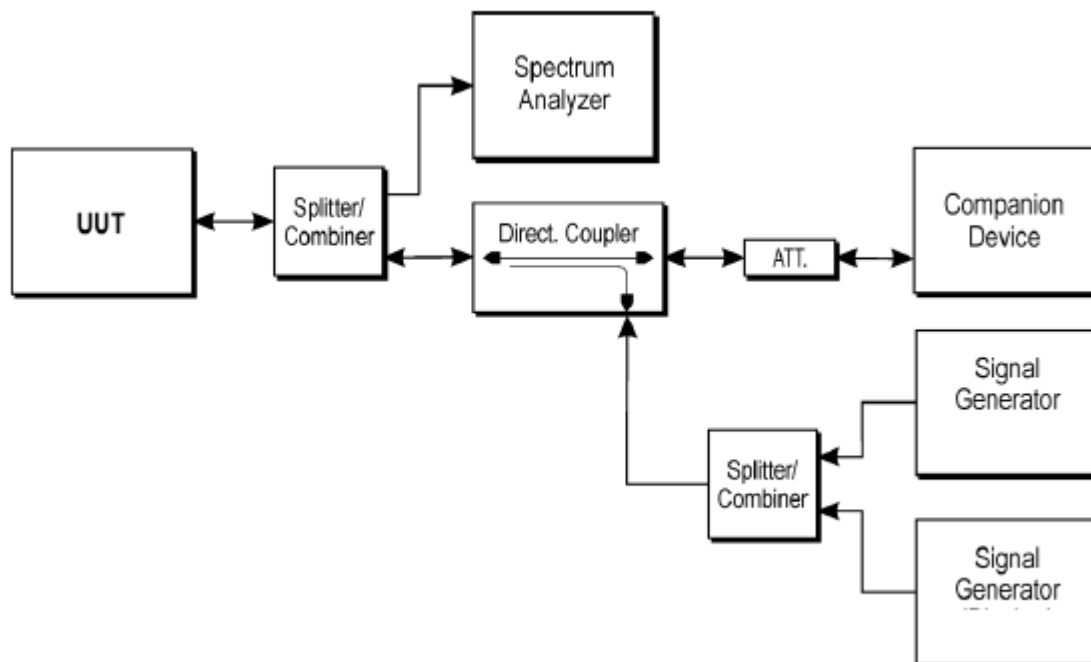
-BW is the channel bandwidth in MHz.

The factor k is limited within the following:

$$-40\text{ dB} < k < 0\text{ dB}$$

The manufacturer declare the BW is 20MHz,  $K=-20\log f(\text{Unwanted Signal Frequency})-13.01$ .

##### TEST PROCEDURE



##### TEST CONFIGURATION

- 1.Please refer to ETSI EN 300 440 clause 5 for the test conditions.
- 2.Please refer to ETSI EN 300 440 clause 4.3.3.3 for the measurement method.

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**TEST RESULTS**

802.11a

Test Channel	BW(MHz)	Unwanted Signal Frequency(MHz)	Adjacent Frequency Signal Power Level (dBm)	Limit (dBm)	Result
153	20	5745	-41.32	-58.20	PASS
	20	5785	-46.43	-58.26	PASS
161	20	5785	-41.94	-58.26	PASS
	20	5825	-39.96	-58.32	PASS

802.11 n HT 20

Test Channel	BW(MHz)	Unwanted Signal Frequency(MHz)	Adjacent Frequency Signal Power Level (dBm)	Limit (dBm)	Result
153	20	5745	-45.02	-58.20	PASS
	20	5785	-39.45	-58.26	PASS
161	20	5785	-39.82	-58.26	PASS
	20	5825	-47.03	-58.32	PASS

802.11 n HT 40

Test Channel	BW(MHz)	Unwanted Signal Frequency(MHz)	Adjacent Frequency Signal Power Level (dBm)	Limit (dBm)	Result
155	40	5755	-45.62	-61.22	PASS
	40	5795	-42.59	-61.28	PASS

802.11 ac HT 20

Test Channel	BW(MHz)	Unwanted Signal Frequency(MHz)	Adjacent Frequency Signal Power Level (dBm)	Limit (dBm)	Result
153	20	5745	-45.36	-58.20	PASS
	20	5785	-45.22	-58.26	PASS
161	20	5785	-47.43	-58.26	PASS
	20	5825	-45.53	-58.32	PASS



## 802.11 ac HT 40

Test Channel	BW(MHz)	Unwanted Signal Frequency(MHz)	Adjacent Frequency Signal Power Level (dBm)	Limit (dBm)	Result
155	40	5755	-48.52	-61.22	PASS
	40	5795	-46.69	-61.28	PASS

## 802.11 ac HT 80

Test Channel	BW(MHz)	Unwanted Signal Frequency(MHz)	Adjacent Frequency Signal Power Level (dBm)	Limit (dBm)	Result
155	80	5775	-47.44	-64.26	PASS





#### 4.7. Blocking or desensitization

##### LIMIT

Receiver category	Limit
1	-30dBm+k
2	-45dBm+k
3	-60dBm+k

The correction factor, k, is as follows:

$$K=-20\log f-10\log BW$$

Where:

-f is the frequency in GHz;

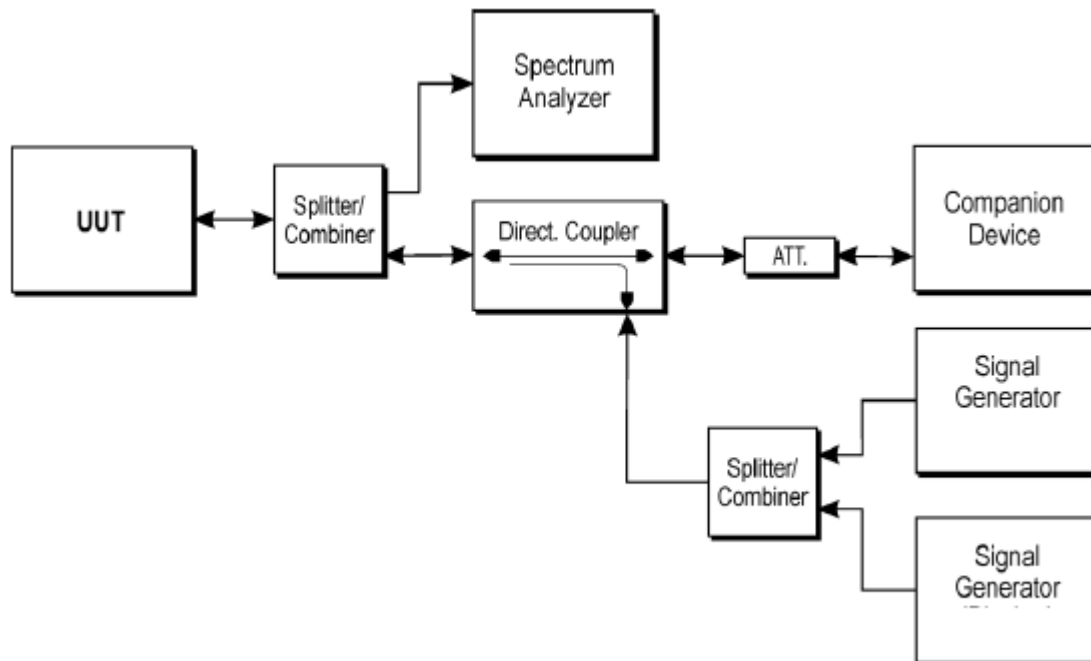
-BW is the channel bandwidth in MHz.

The factor k is limited within the following:

$$-40\text{ dB} < k < 0\text{ dB}$$

The manufacturer declare the BW is 20MHz,  $K=-20\log(\text{Blocking Signal Frequency})-13.01$ .

##### TEST PROCEDURE



##### TEST CONFIGURATION

1. Please refer to ETSI EN 300 440 clause 5 for the test conditions.
2. Please refer to ETSI EN 300 440 clause 4.3.4.3 for the measurement method.

**TEST RESULTS**

802.11a

Test Channel	BW(MHz)	Blocking Signal Frequency(MHz)	Blocking Signal Power Level (dBm)	Limit (dBm)	Result
149	20	5545(10 time channel bandwidth frequency offset)	-51.02	-72.88	PASS
		5345(20 time channel bandwidth frequency offset)	-47.66	-72.56	PASS
		4745(50 time channel bandwidth frequency offset)	-43.01	-71.53	PASS
165	20	6025(10 time channel bandwidth frequency offset)	-50.61	-73.60	PASS
		6225(20 time channel bandwidth frequency offset)	-50.14	-73.89	PASS
		6825(50 time channel bandwidth frequency offset)	-47.94	-74.69	PASS

802.11 n HT 20

Test Channel	BW(MHz)	Blocking Signal Frequency(MHz)	Blocking Signal Power Level (dBm)	Limit (dBm)	Result
149	20	5545(10 time channel bandwidth frequency offset)	-53.76	-72.88	PASS
		5345(20 time channel bandwidth frequency offset)	-46.54	-72.56	PASS
		4745(50 time channel bandwidth frequency offset)	-48.63	-71.53	PASS
165	20	6025(10 time channel bandwidth frequency offset)	-49.96	-73.60	PASS
		6225(20 time channel bandwidth frequency offset)	-49.36	-73.89	PASS
		6825(50 time channel bandwidth frequency offset)	-45.83	-74.69	PASS



## 802.11 n HT 40

Test Channel	BW(MHz)	Blocking Signal Frequency(MHz)	Blocking Signal Power Level (dBm)	Limit (dBm)	Result
151	40	5355(10 time channel bandwidth frequency offset)	-51.16	-75.59	PASS
		4955(20 time channel bandwidth frequency offset)	-50.81	-74.92	PASS
		3755(50 time channel bandwidth frequency offset)	-50.32	-73.51	PASS
159	40	6195(10 time channel bandwidth frequency offset)	-49.13	-76.86	PASS
		6595(20 time channel bandwidth frequency offset)	-48.96	-77.40	PASS
		7795(50 time channel bandwidth frequency offset)	-50.42	-77.66	PASS

## 802.11 ac HT 20

Test Channel	BW(MHz)	Blocking Signal Frequency(MHz)	Blocking Signal Power Level (dBm)	Limit (dBm)	Result
149	20	5545(10 time channel bandwidth frequency offset)	-50.32	-72.88	PASS
		5345(20 time channel bandwidth frequency offset)	-51.63	-72.56	PASS
		4745(50 time channel bandwidth frequency offset)	-54.42	-71.53	PASS
165	20	6025(10 time channel bandwidth frequency offset)	-50.84	-73.60	PASS
		6225(20 time channel bandwidth frequency offset)	-50.14	-73.89	PASS
		6825(50 time channel bandwidth frequency offset)	-49.31	-74.69	PASS



## 802.11 ac HT 40

Test Channel	BW(MHz)	Blocking Signal Frequency(MHz)	Blocking Signal Power Level (dBm)	Limit (dBm)	Result
151	40	5355(10 time channel bandwidth frequency offset)	-48.33	-75.59	PASS
		4955(20 time channel bandwidth frequency offset)	-52.23	-74.92	PASS
		3755(50 time channel bandwidth frequency offset)	-49.52	-72.51	PASS
159	40	6195(10 time channel bandwidth frequency offset)	-46.26	-76.86	PASS
		6595(20 time channel bandwidth frequency offset)	-47.04	-77.40	PASS
		7795(50 time channel bandwidth frequency offset)	-49.72	-77.66	PASS

## 802.11 ac HT 80

Test Channel	BW(MHz)	Blocking Signal Frequency(MHz)	Blocking Signal Power Level (dBm)	Limit (dBm)	Result
155	80	4975(10 time channel bandwidth frequency offset)	-53.72	-72.88	PASS
		3175(20 time channel bandwidth frequency offset)	-50.82	-72.56	PASS
		1775(50 time channel bandwidth frequency offset)	-46.43	-71.53	PASS
		6575(10 time channel bandwidth frequency offset)	-56.01	-73.60	PASS
		7375(20 time channel bandwidth frequency offset)	-49.56	-73.89	PASS
		9775(50 time channel bandwidth frequency offset)	-47.02	-74.69	PASS





#### **4.8. Receiver Emissions**

##### **LIMIT**

The power of any spurious emission shall not exceed 2 nW in the range 25 MHz to 1 GHz and shall not exceed 20 nW on frequencies above 1 GHz.

##### **TEST CONFIGURATION**

The same as described in section 4.4

##### **TEST PROCEDURE**

1. Please refer to ETSI EN 300 440 Sub-clause 5 for the test conditions.
2. Please refer to ETSI EN 300 440 Sub-clause 4.3.5.4 for the measurement method.

##### **TEST RESULTS**

Remark: We tested at 802.11a/802.11n HT20/802.11n HT40/802.11ac HT20/802.11ac HT40/802.11ac HT80 mode at the antenna single receiver mode and the Mimo mode, and recorded the worst case 802.11n HT 20 mode at the Mimo mode. The measurement frequency range is from 25MHz to the 10<sup>th</sup> harmonic of the fundamental frequency, not exceeding 40GHz. 18GHz-40GHz not recorded for no spurious point have a margin of less than 6 dB with respect to the limits.

**802.11n HT 20, CH 149, Horizontal/Vertical**

Below 1G

NO.	Freq. [MHz]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Path [dB]	Ant. Pol.
1	159.11	-78.34	-57	-21.34	4.71	0.00	Vertical
2	334.89	-79.79	-57	-22.79	3.29	0.00	Vertical
3	408.01	-76.11	-57	-19.11	3.18	0.00	Vertical
4	439.15	-74.87	-57	-17.87	3.15	0.00	Vertical
5	597.38	-81.24	-57	-24.24	3.72	0.00	Vertical
6	730.03	-76.09	-57	-19.09	4.03	0.00	Vertical
7	200.27	-77.11	-57	-20.11	3.42	0.00	Horizontal
8	251.04	-77.92	-57	-20.92	4.06	0.00	Horizontal
9	344.64	-77.62	-57	-20.62	3.81	0.00	Horizontal
10	433.46	-73.59	-57	-16.59	3.79	0.00	Horizontal
11	513.58	-75.81	-57	-18.81	3.55	0.00	Horizontal
12	720.46	-76.42	-57	-19.42	3.18	0.00	Horizontal

NOTE: Other point of the measurements are below 20dB from the limit.



Above 1G

NO.	Freq. [MHz]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Path [dB]	Ant. Pol.
1	1744.38	-76.91	-47	-29.91	7.95	0.00	Vertical
2	1801.18	-82.64	-47	-35.64	8.13	0.00	Vertical
3	2880.46	-77.51	-47	-30.51	5.65	0.00	Vertical
4	3618.32	-77.21	-47	-30.21	6.73	0.00	Vertical
5	4047.57	-82.79	-47	-35.79	7.27	0.00	Vertical
6	4470.91	-75.42	-47	-28.42	6.44	0.00	Vertical
7	1814.18	-79.92	-47	-32.92	7.51	0.00	Horizontal
8	3095.64	-82.62	-47	-35.62	6.98	0.00	Horizontal
9	3308.54	-77.32	-47	-30.32	5.47	0.00	Horizontal
10	3946.64	-76.69	-47	-29.69	6.73	0.00	Horizontal
11	4908.31	-79.22	-47	-32.22	7.54	0.00	Horizontal
12	5306.73	-78.71	-47	-31.71	8.12	0.00	Horizontal

NOTE: Other point of the measurements are below 20dB from the limit.

**802.11n HT 20, CH 165, Horizontal/Vertical**

Below 1G

NO.	Freq. [MHz]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Path [dB]	Ant. Pol.
1	193.51	-77.64	-57	-20.64	4.71	0.00	Vertical
2	332.95	-81.31	-57	-24.31	3.29	0.00	Vertical
3	402.77	-74.75	-57	-17.75	3.18	0.00	Vertical
4	419.14	-78.01	-57	-21.01	3.15	0.00	Vertical
5	598.45	-81.39	-57	-24.39	3.72	0.00	Vertical
6	763.81	-76.72	-57	-19.72	4.03	0.00	Vertical
7	186.05	-79.83	-57	-22.83	3.42	0.00	Horizontal
8	258.33	-84.45	-57	-27.45	4.06	0.00	Horizontal
9	340.77	-77.63	-57	-20.63	3.81	0.00	Horizontal
10	435.81	-77.2	-57	-20.2	3.79	0.00	Horizontal
11	497.31	-77.59	-57	-20.59	3.55	0.00	Horizontal
12	753.35	-74.83	-57	-17.83	3.18	0.00	Horizontal

NOTE: Other point of the measurements are below 20dB from the limit.





Above 1G

NO.	Freq. [MHz]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Path [dB]	Ant. Pol.
1	1595.54	-81.41	-47	-34.41	7.95	0.00	Vertical
2	2081.14	-77.56	-47	-30.56	8.13	0.00	Vertical
3	2937.54	-78.62	-47	-31.62	5.65	0.00	Vertical
4	3591.57	-77.51	-47	-30.51	6.73	0.00	Vertical
5	3790.32	-82.74	-47	-35.74	7.27	0.00	Vertical
6	4498.54	-74.11	-47	-27.11	6.44	0.00	Vertical
7	1634.14	-79.49	-47	-32.49	7.51	0.00	Horizontal
8	2943.63	-80.74	-47	-33.74	6.98	0.00	Horizontal
9	3410.33	-77.52	-47	-30.52	5.47	0.00	Horizontal
10	4031.54	-77.31	-47	-30.31	6.73	0.00	Horizontal
11	4778.07	-75.69	-47	-28.69	7.54	0.00	Horizontal
12	5425.54	-78.44	-47	-31.44	8.12	0.00	Horizontal

NOTE: Other point of the measurements are below 20dB from the limit.



## 5. Test Setup Photos of the EUT



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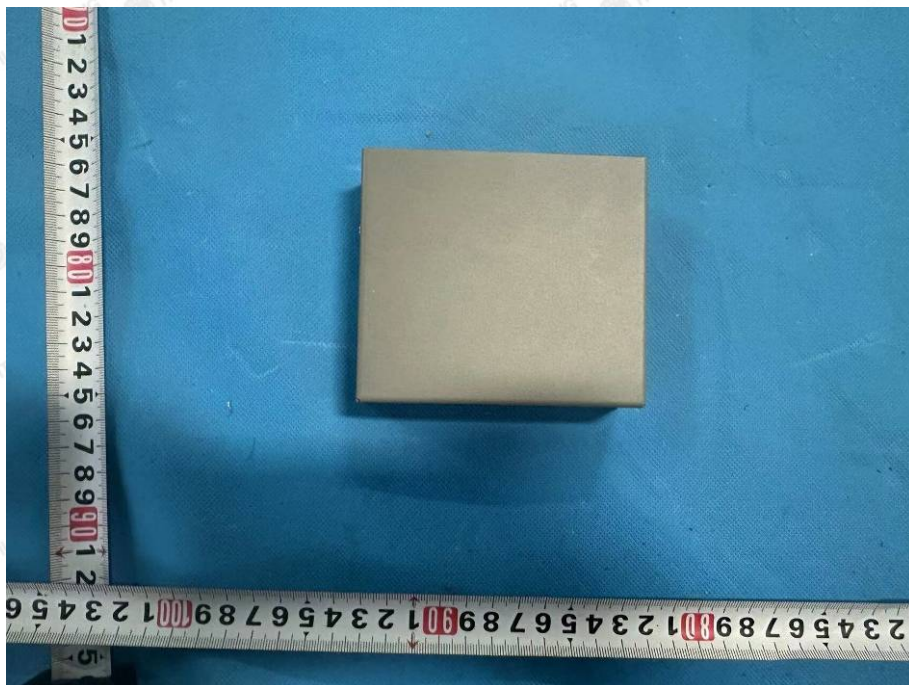
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## 6. External and Internal Photos of the EUT



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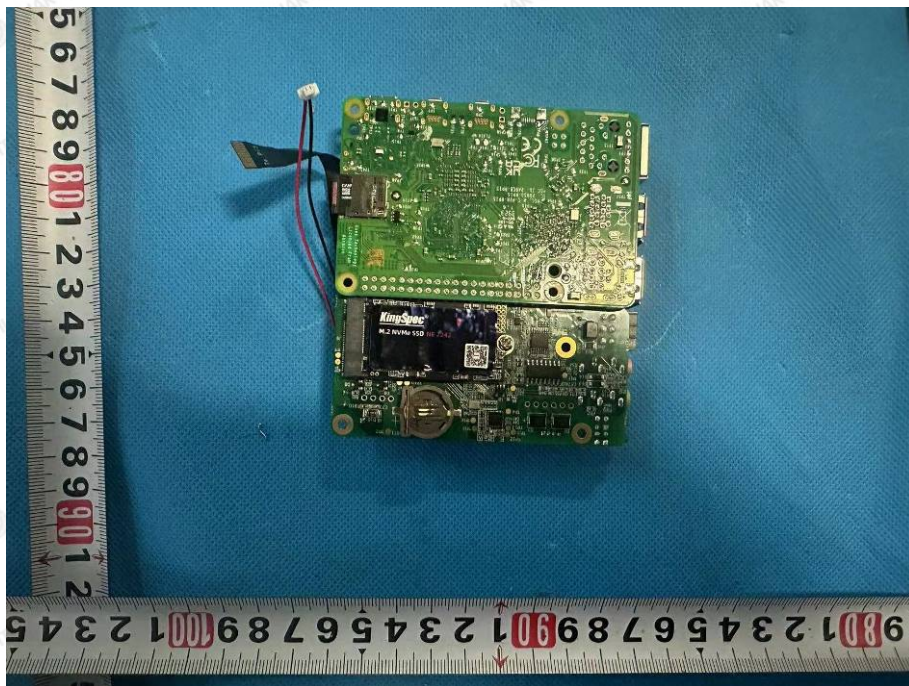
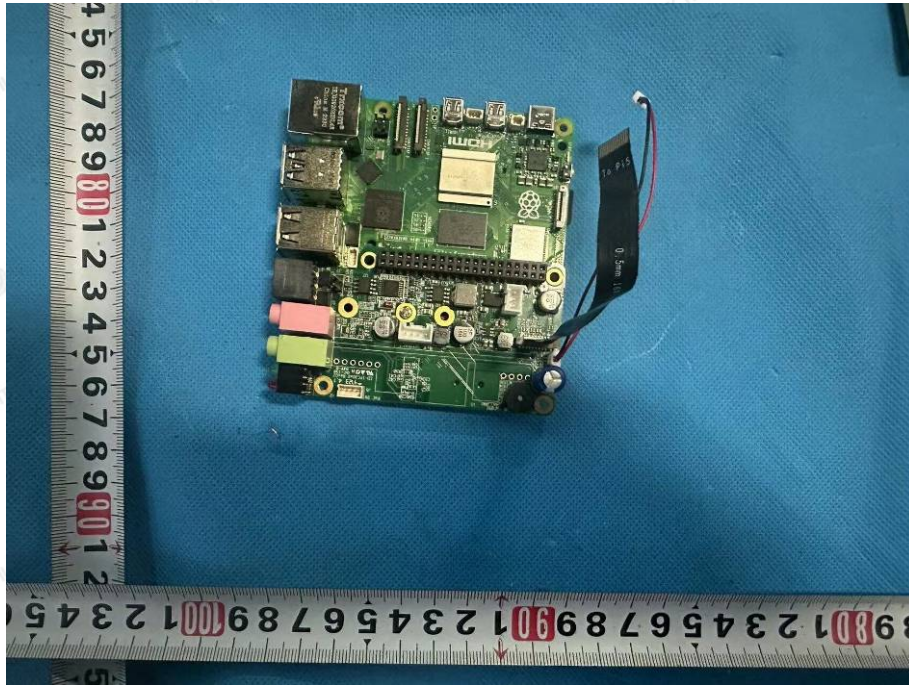












.....End of Report.....