



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

Report Reference No.: HK2401170358-6ER

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Date of issue: 2024/02/20

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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-HMI3020

Trade Mark: 

Product Model.....: ED-HMI3020-101C

Serial Model.....: ED-HMI3020-050C, ED-HMI3020-070C, ED-HMI3020-050R,
ED-HMI3020-070R, ED-HMI3020-101R

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. :	HK2401170358-6ER	2024/02/20
		Date of issue

Product Name : ED-HMI3020

Product Model : ED-HMI3020-101C

Serial Model : ED-HMI3020-050C, ED-HMI3020-070C, ED-HMI3020-050R,
ED-HMI3020-070R, ED-HMI3020-101R

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-HMI3020
Model/Type reference:	ED-HMI3020-101C
List Model:	ED-HMI3020-050C, ED-HMI3020-070C, ED-HMI3020-050R, ED-HMI3020-070R, ED-HMI3020-101R
Difference description	The main difference between different models is that the size of the LCD screen is not the same, and the maximum size is tested.
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 ^{Note 1}
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 ^{Note 2}

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	2026/02/18
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

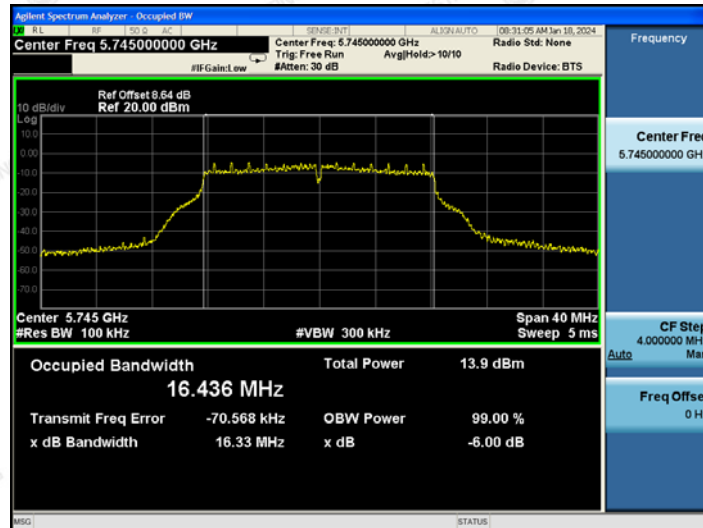


Test Results

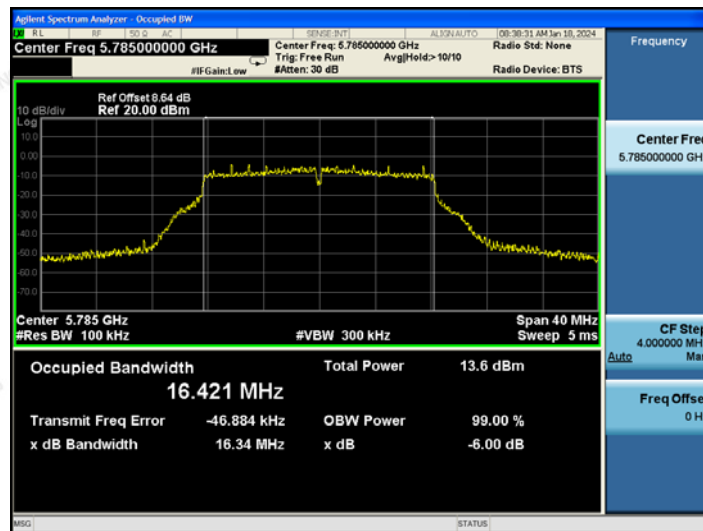
Type	Channel	6dB Bandwidth (MHz)	Limit (KHz)	Result
802.11a	149	16.44	N/A	N/A
	157	16.42		
	165	16.44		
802.11 n HT 20	149	17.65	N/A	N/A
	157	17.63		
	165	17.64		
802.11 n HT 40	151	36.22	N/A	N/A
	159	36.06		
802.11 ac HT 20	149	17.65	N/A	N/A
	157	17.63		
	165	17.64		
802.11 ac HT 40	151	36.13	N/A	N/A
	159	36.07		
802.11 ac HT 80	155	75.41	N/A	N/A



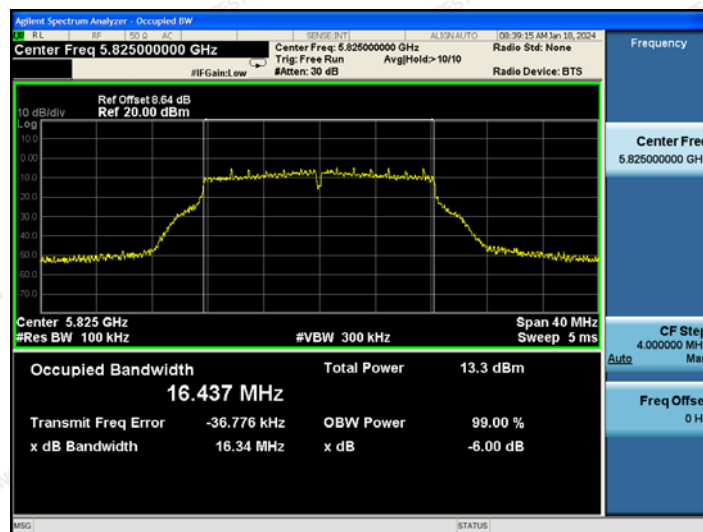
802.11a-5745



802.11a-5785

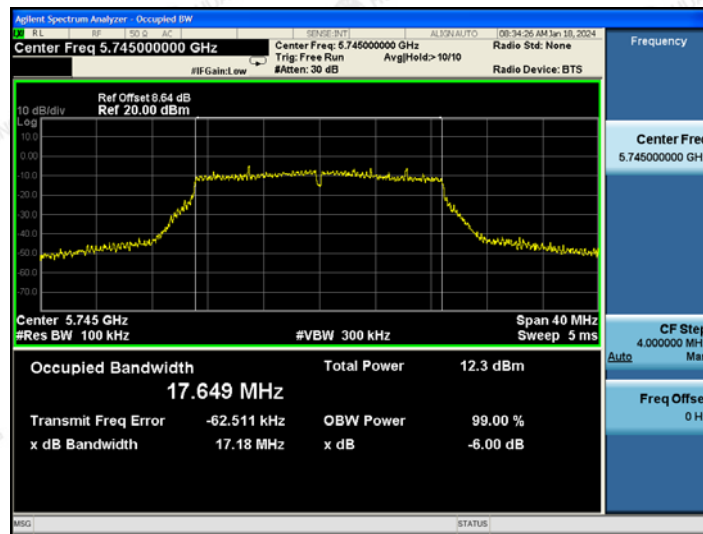


802.11a-5825

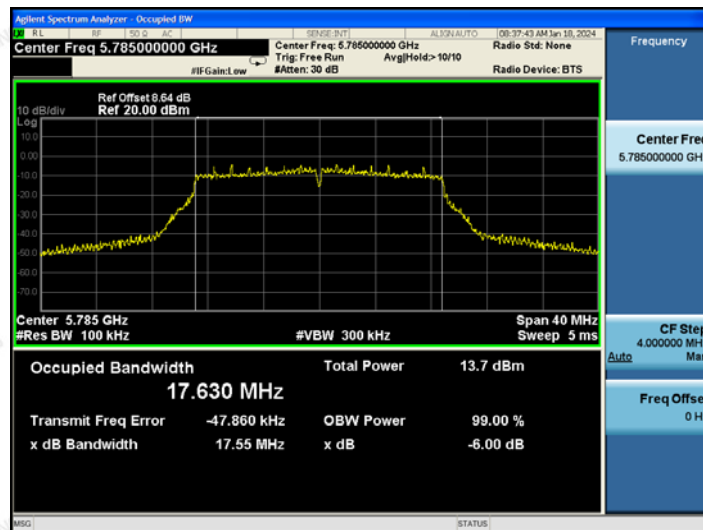




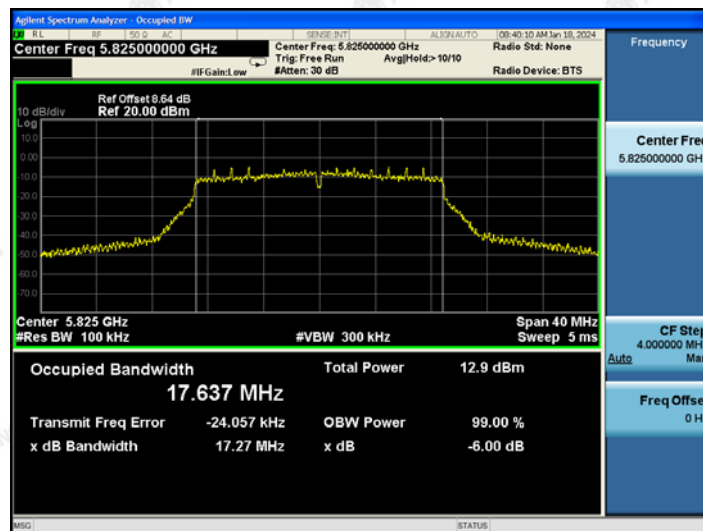
802.11n HT20-5745



802.11n HT20-5785

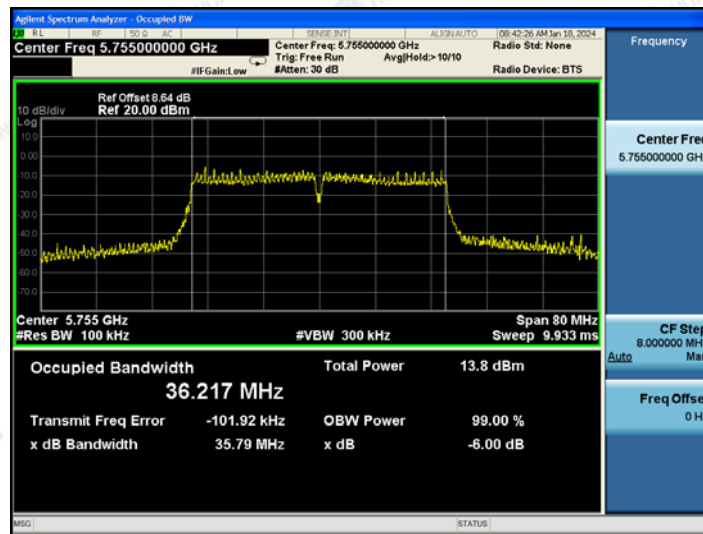


802.11n HT20-5825

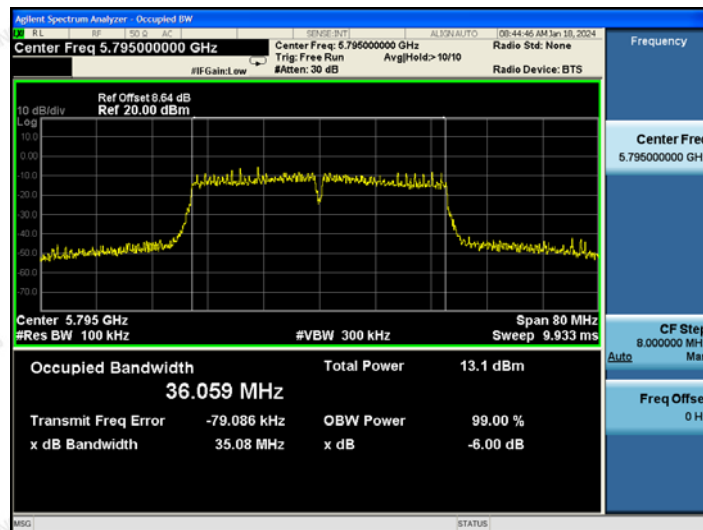




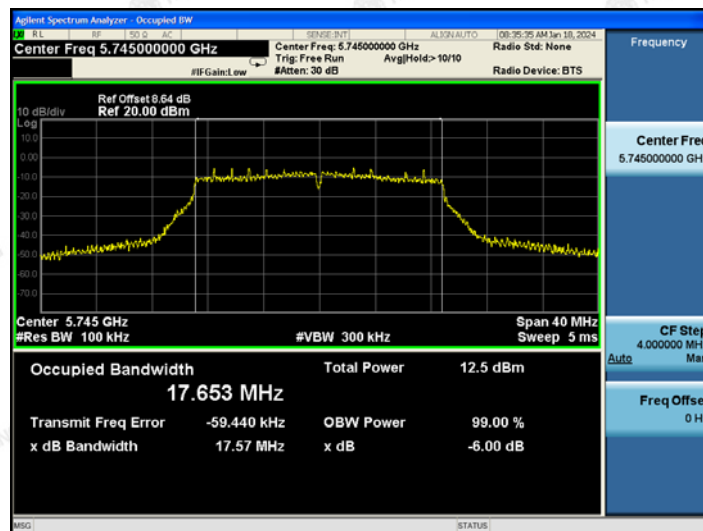
802.11n HT40-5755



802.11n HT40-5795

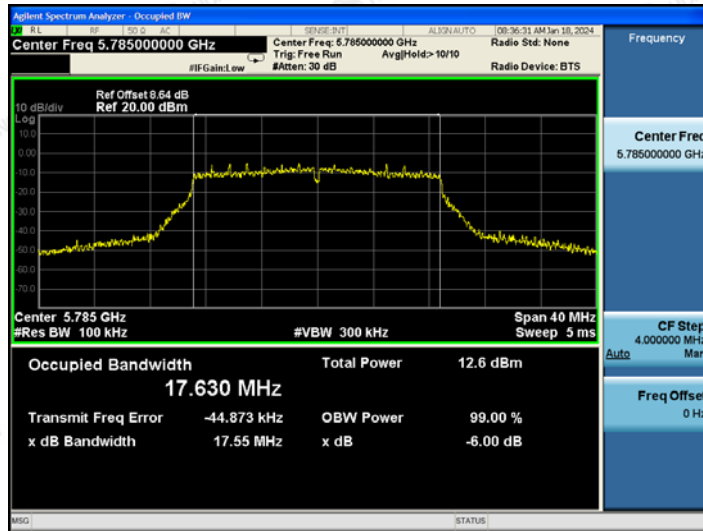


802.11ac HT20-5745

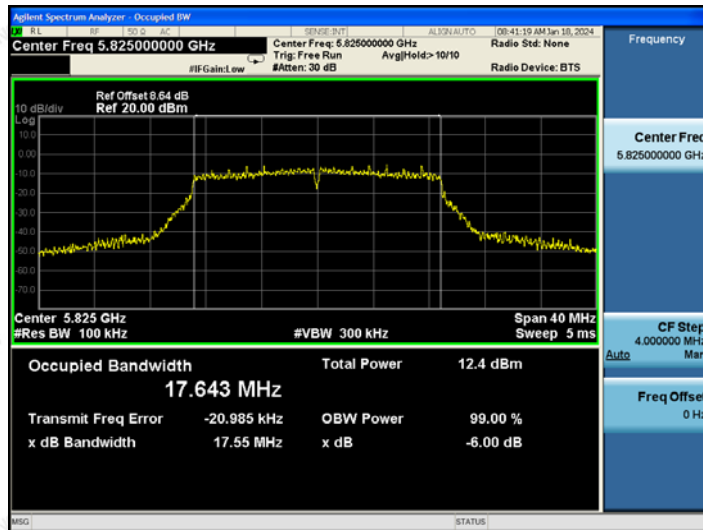




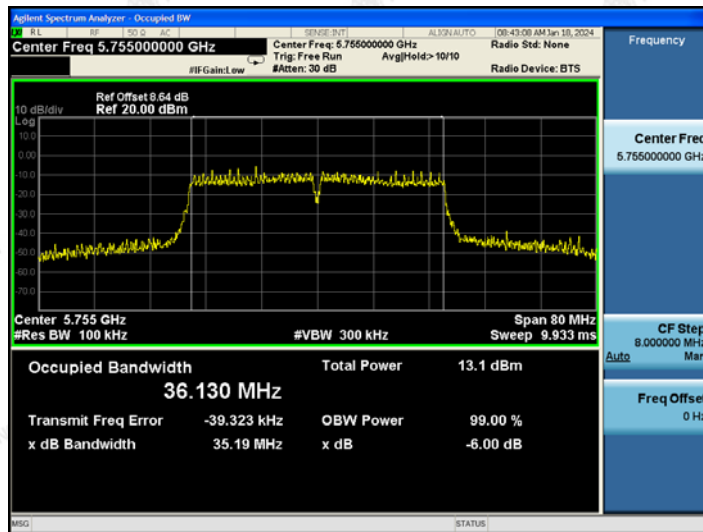
802.11ac HT20-5785



802.11ac HT20-5825

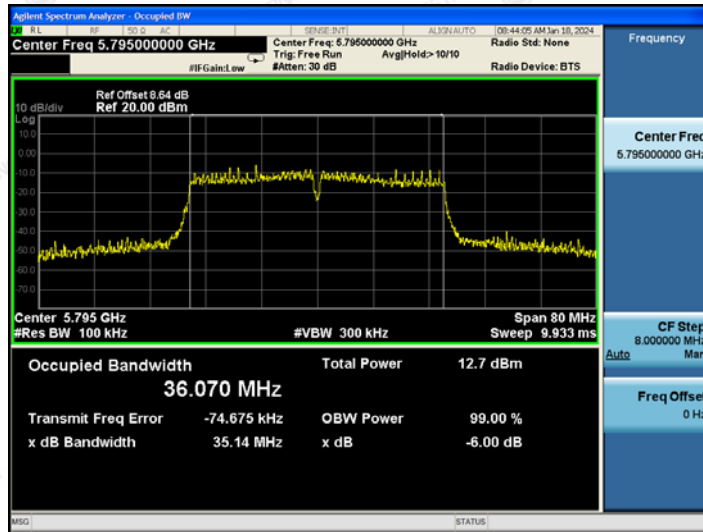


802.11ac HT40-5755

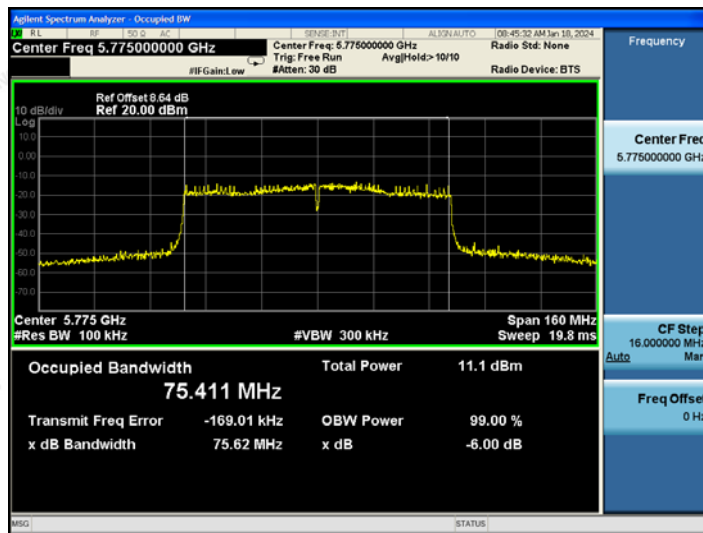




802.11ac HT40-5795



802.11ac HT80-5775





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

LIMIT

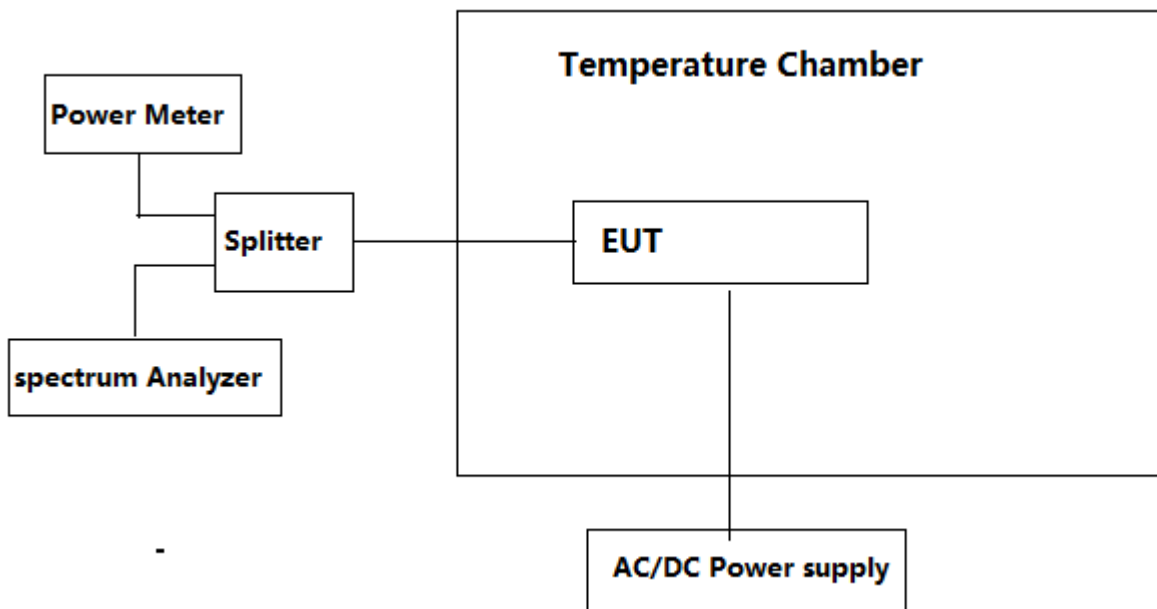
According to ETSI EN 300 440 clause 4.2.2.3.2

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	8.06	3.5	11.56	13.98	PASS
-10°C	5.61V		8.42	3.5	11.92		
	4.59V		8.66	3.5	12.16		
+40°C	5.61V		7.86	3.5	11.36		
	4.59V		8.46	3.5	11.96		
+25°C	5.1V	157/5785	8.14	3.5	11.64		
-10°C	5.61V		7.05	3.5	10.55		
	4.59V		8.36	3.5	11.86		
+40°C	5.61V		7.95	3.5	11.45		
	4.59V		7.42	3.5	10.92		
+25°C	5.1V	165/5825	7.96	3.5	11.46		
-10°C	5.61V		7.25	3.5	10.75		
	4.59V		7.64	3.5	11.14		
+40°C	5.61V		7.85	3.5	11.35		
	4.59V		8.74	3.5	12.24		

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	8.04	3.5	11.54	13.98	PASS
-10°C	5.61V		7.79	3.5	11.29		
	4.59V		7.53	3.5	11.03		
+40°C	5.61V		6.94	3.5	10.44		
	4.59V		7.93	3.5	11.43		
+25°C	5.1V	157/5785	8.76	3.5	12.26		
-10°C	5.61V		7.26	3.5	10.76		
	4.59V		7.49	3.5	10.99		
+40°C	5.61V		7.33	3.5	10.83		
	4.59V		7.73	3.5	11.23		
+25°C	5.1V	165/5825	7.41	3.5	10.91		
-10°C	5.61V		8.22	3.5	11.72		
	4.59V		6.42	3.5	9.92		
+40°C	5.61V		8.04	3.5	11.54		
	4.59V		7.59	3.5	11.09		

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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	4.89	3.5	8.39	13.98	PASS
-10°C	5.61V		5.64	3.5	9.14		
	4.59V		5.84	3.5	9.34		
+40°C	5.61V		4.42	3.5	7.92		
	4.59V		6.96	3.5	10.46		
+25°C	5.1V	159/5795	6.35	3.5	9.85		
-10°C	5.61V		7.35	3.5	10.85		
	4.59V		6.74	3.5	10.24		
+40°C	5.61V		6.59	3.5	10.09		
	4.59V		5.74	3.5	9.24		

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	5.53	3.5	9.03	13.98	PASS
-10°C	5.61V		5.35	3.5	8.85		
	4.59V		5.74	3.5	9.24		
+40°C	5.61V		5.83	3.5	9.33		
	4.59V		4.15	3.5	7.65		
+25°C	5.1V	157/5785	5.24	3.5	8.74		
-10°C	5.61V		5.56	3.5	9.06		
	4.59V		5.29	3.5	8.79		
+40°C	5.61V		6.06	3.5	9.56		
	4.59V		5.64	3.5	9.14		
+25°C	5.1V	165/5825	6.41	3.5	9.91		
-10°C	5.61V		5.29	3.5	8.79		
	4.59V		6.14	3.5	9.64		
+40°C	5.61V		6.17	3.5	9.67		
	4.59V		4.33	3.5	7.83		



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	4.44	3.5	7.94	13.98	PASS
-10°C	5.61V		4.45	3.5	7.95		
	4.59V		4.56	3.5	8.06		
+40°C	5.61V		4.54	3.5	8.04		
	4.59V		4.99	3.5	8.49		
+25°C	5.1V	159/5795	3.66	3.5	7.16		
-10°C	5.61V		4.69	3.5	8.19		
	4.59V		4.09	3.5	7.59		
+40°C	5.61V		4.84	3.5	8.34		
	4.59V		4.26	3.5	7.76		

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	4.39	3.5	7.89	13.98	PASS
-10°C	5.61V		5.25	3.5	8.75		
	4.59V		5.12	3.5	8.62		
+40°C	5.61V		5.49	3.5	8.99		
	4.59V		4.95	3.5	8.45		



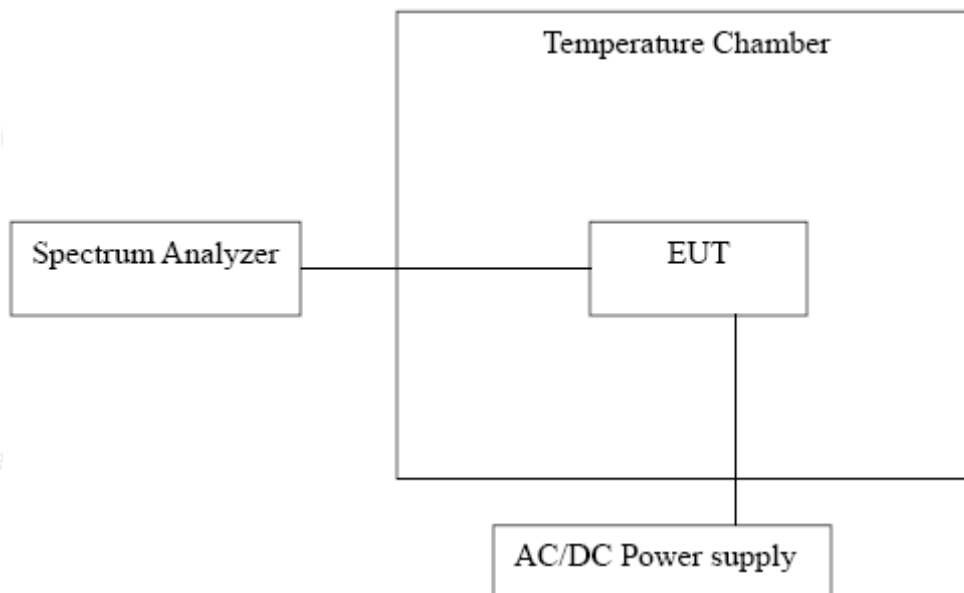
4.3. Permitted Range of Operating Frequencies

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 _L (MHz)	f _H (MHz)	Limit
Temperature (°C)	Voltage (V)			
+25°C	5.1	5735.88	5833.72	f _L ≥ 5725MHz and f _H ≤ 5875MHzGHz
-10°C	5.61	5735.54	5833.29	
	4.59	5735.38	5833.35	
+40°C	5.61	5735.49	5833.63	
	4.59	5735.37	5833.48	
				Pass

802.11n HT20				
Test Condition		f _L (MHz)	f _H (MHz)	Limit
Temperature (°C)	Voltage (V)			
+25°C	5.1	5735.40	5834.32	f _L ≥ 5725MHz and f _H ≤ 5875MHzGHz
-10°C	5.61	5735.54	5834.49	
	4.59	5735.66	5833.94	
+40°C	5.61	5735.74	5834.26	
	4.59	5735.7	5834.63	
				Pass

802.11n HT40				
Test Condition		f _L (MHz)	f _H (MHz)	Limit
Temperature (°C)	Voltage (V)			
+25°C	5.1	5736.12	5813.64	f _L ≥ 5725MHz and f _H ≤ 5875MHzGHz
-10°C	5.61	5736.37	5813.62	
	4.59	5736.65	5813.66	
+40°C	5.61	5736.47	5813.54	
	4.59	5736.34	5813.32	
				Pass

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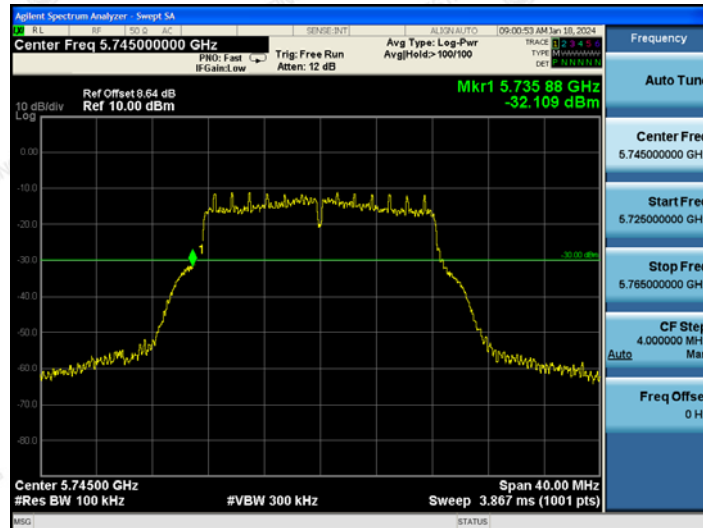
802.11ac HT20					
Test Condition		f_L (MHz)	f_H (MHz)	Limit	Result
Temperature (°C)	Voltage (V)				
+25°C	5.1	5735.48	5834.44	$f_L \geq 5725\text{MHz}$ and $f_H \leq 5875\text{MHzGHz}$	Pass
-10°C	5.61	5735.57	5834.36		
	4.59	5735.27	5834.28		
+40°C	5.61	5735.62	5834.17		
	4.59	5735.76	5834.19		

802.11ac HT40					
Test Condition		f_L (MHz)	f_H (MHz)	Limit	Result
Temperature (°C)	Voltage (V)				
+25°C	5.1	5736.12	5813.80	$f_L \geq 5725\text{MHz}$ and $f_H \leq 5875\text{MHzGHz}$	Pass
-10°C	5.61	5736.38	5813.62		
	4.59	5736.62	5813.57		
+40°C	5.61	5736.49	5813.46		
	4.59	5736.36	5813.48		

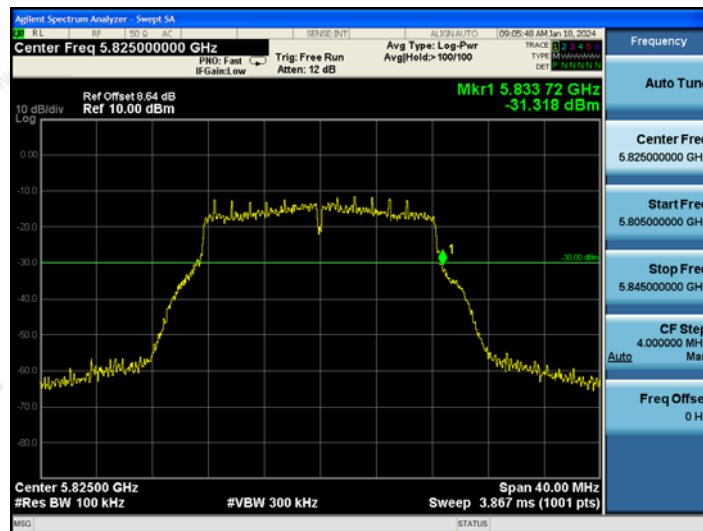
802.11ac HT80					
Test Condition		f_L (MHz)	f_H (MHz)	Limit	Result
Temperature (°C)	Voltage (V)				
+25°C	5.1	5736.12	5813.56	$f_L \geq 5725\text{MHz}$ and $f_H \leq 5875\text{MHzGHz}$	Pass
-10°C	5.61	5736.55	5813.57		
	4.59	5736.29	5813.64		
+40°C	5.61	5736.53	5813.36		
	4.59	5736.65	5813.29		



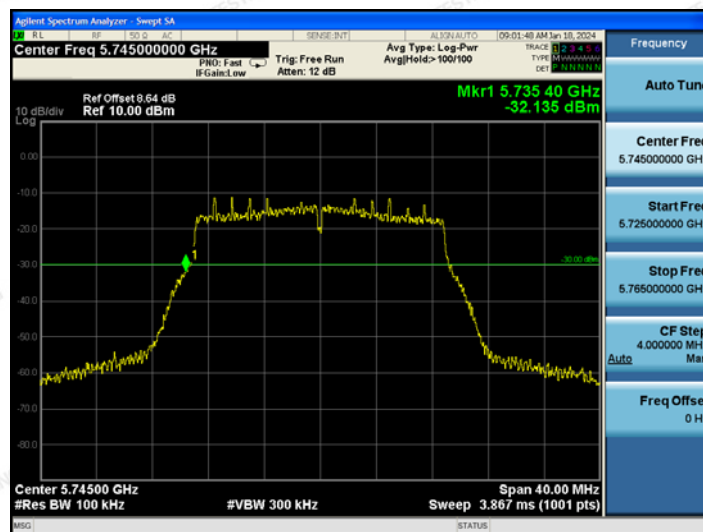
802.11a 5745



802.11a 5825

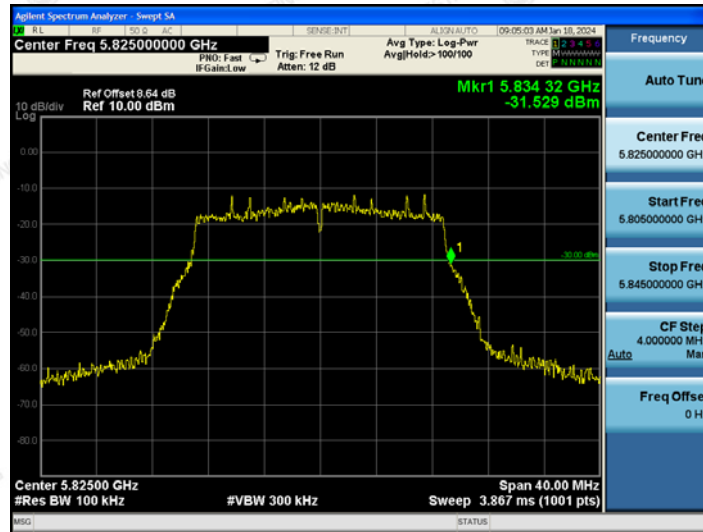


802.11n HT20 5745

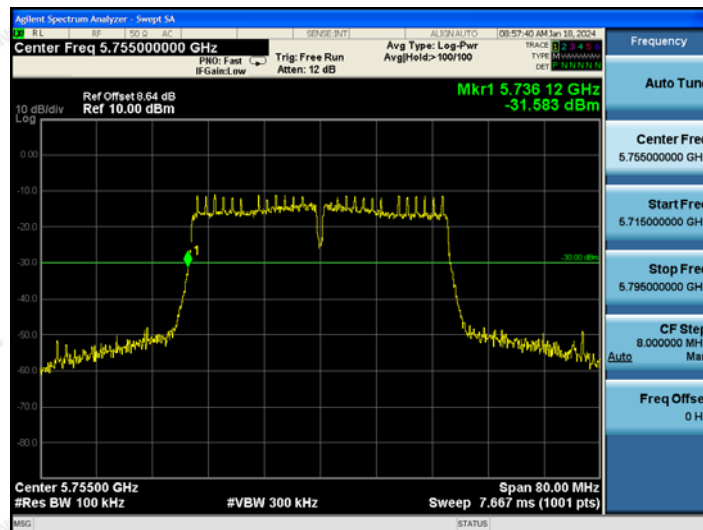




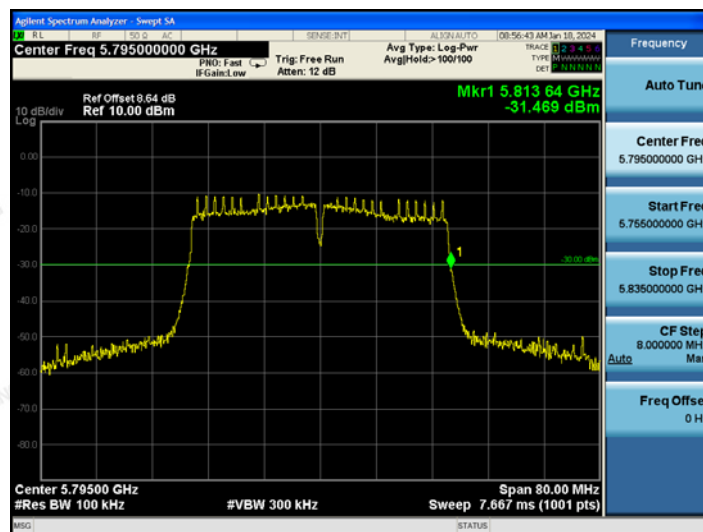
802.11n HT20 5825



802.11n HT40 5755

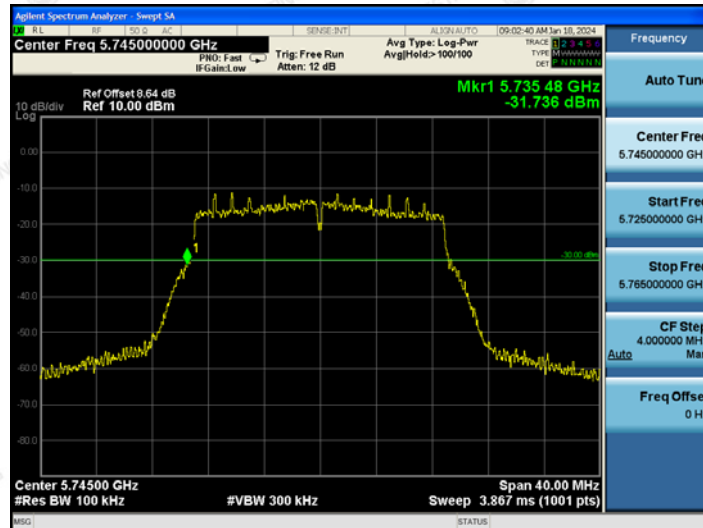


802.11n HT40 5795

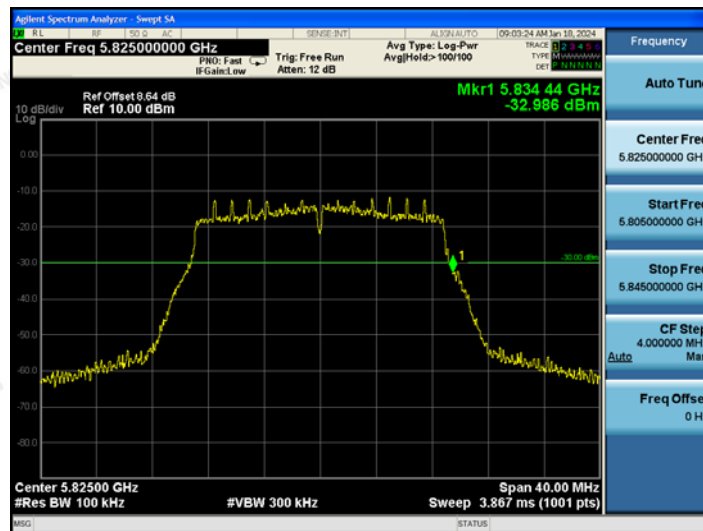




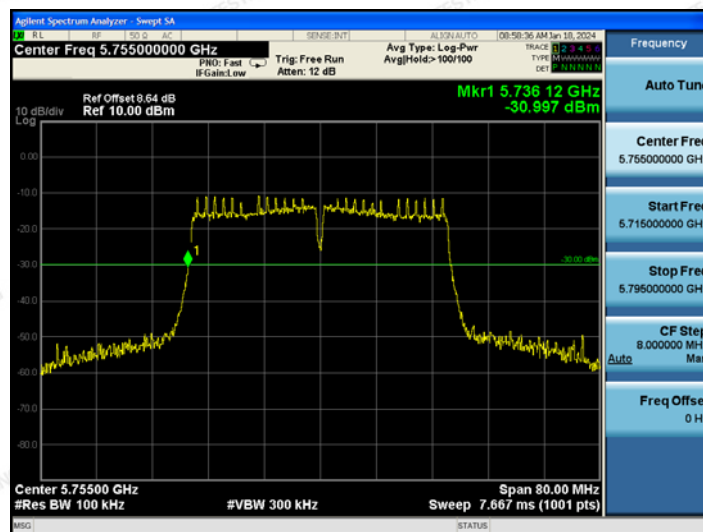
802.11ac HT20 5745



802.11ac HT20 5825

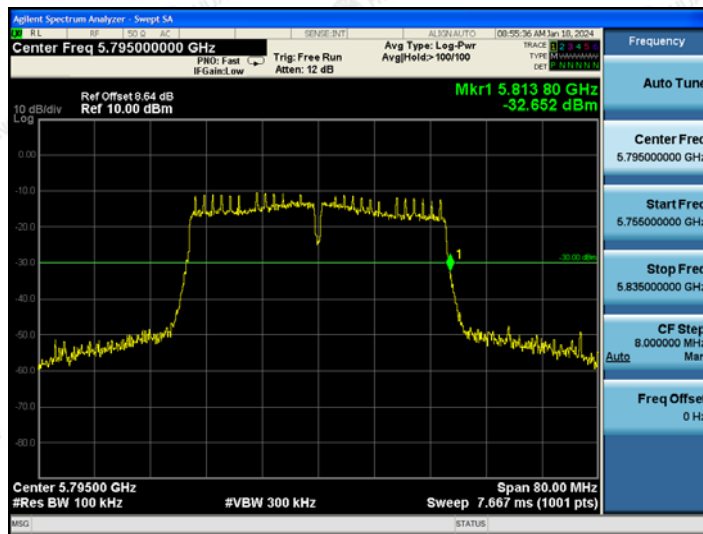


802.11ac HT40 5755

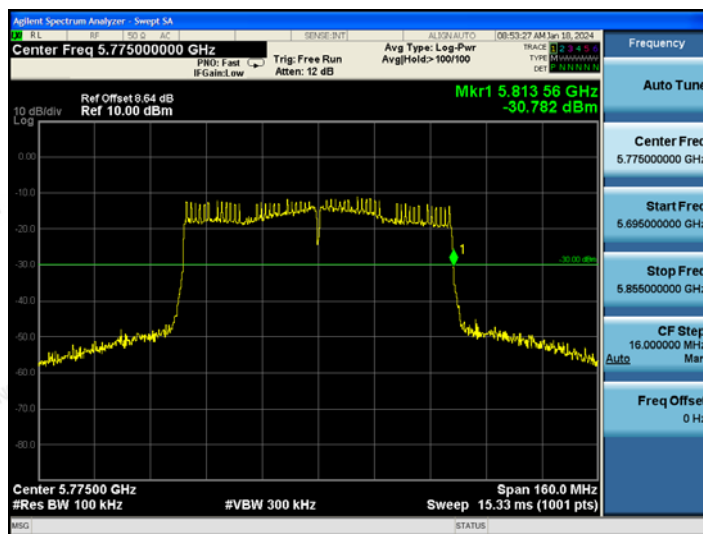
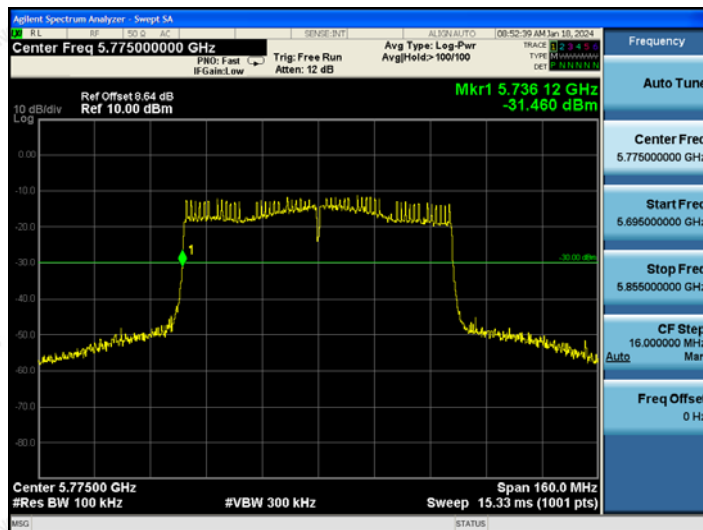




802.11ac HT40 5795



802.11ac HT80 5775



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4.4. Spurious emissions and cabinet

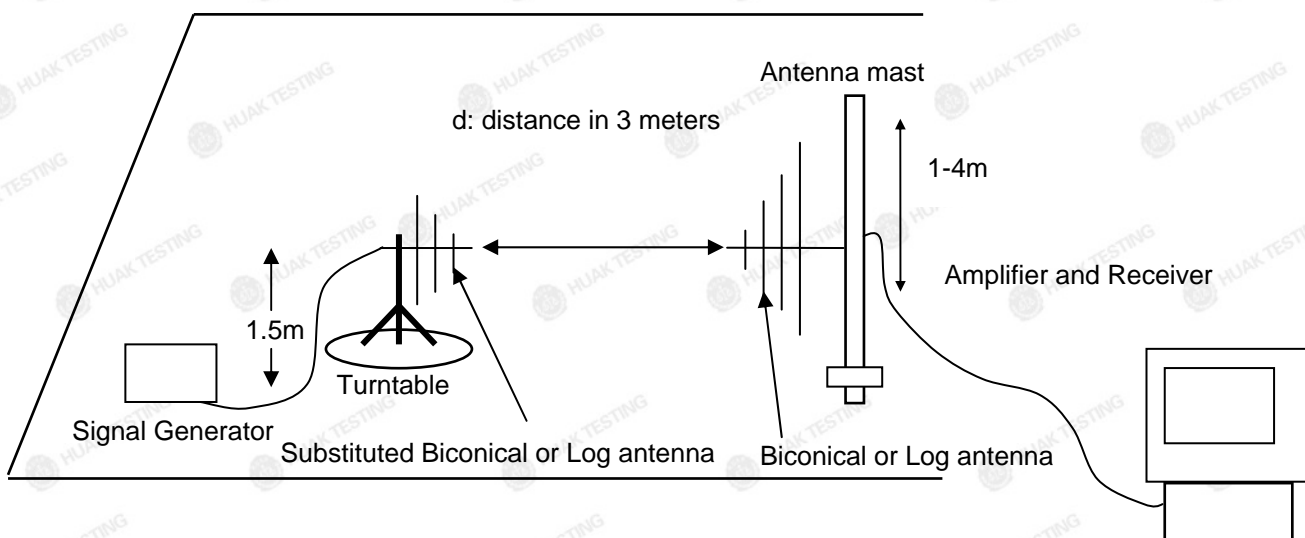
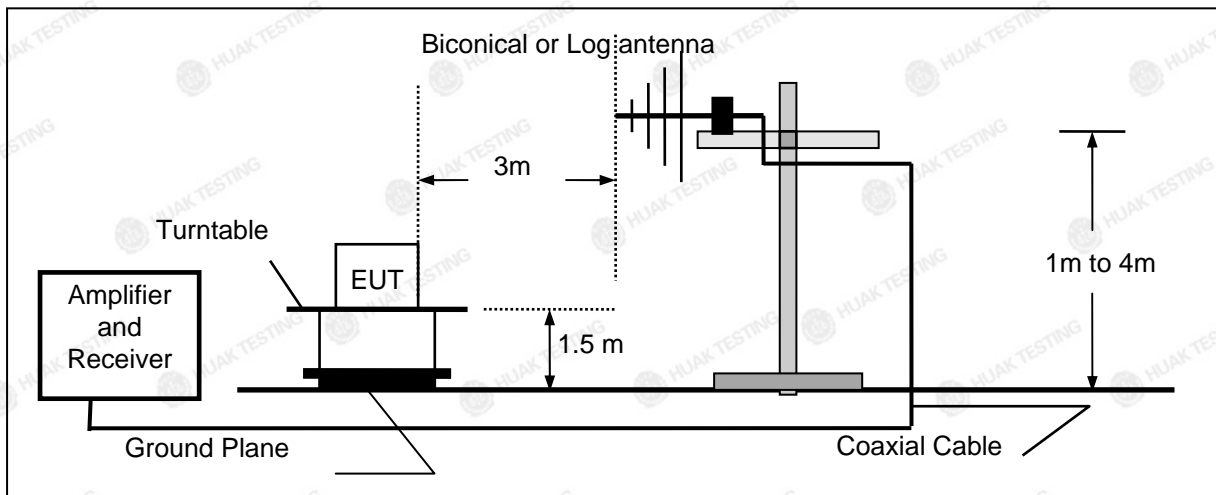
LIMIT

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

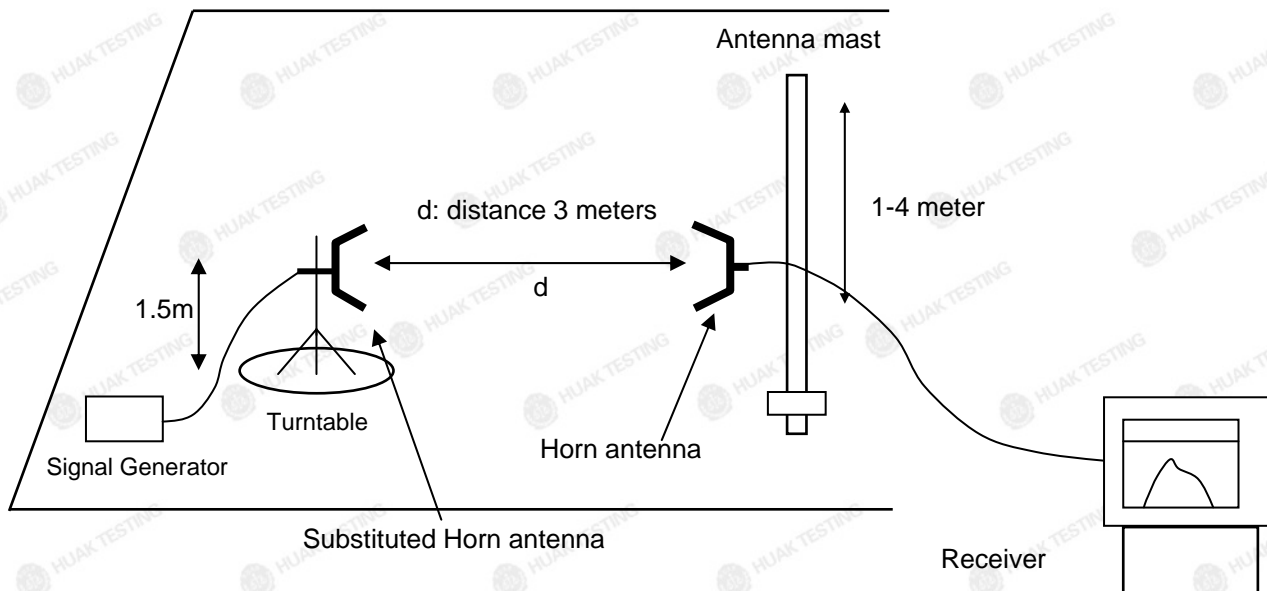
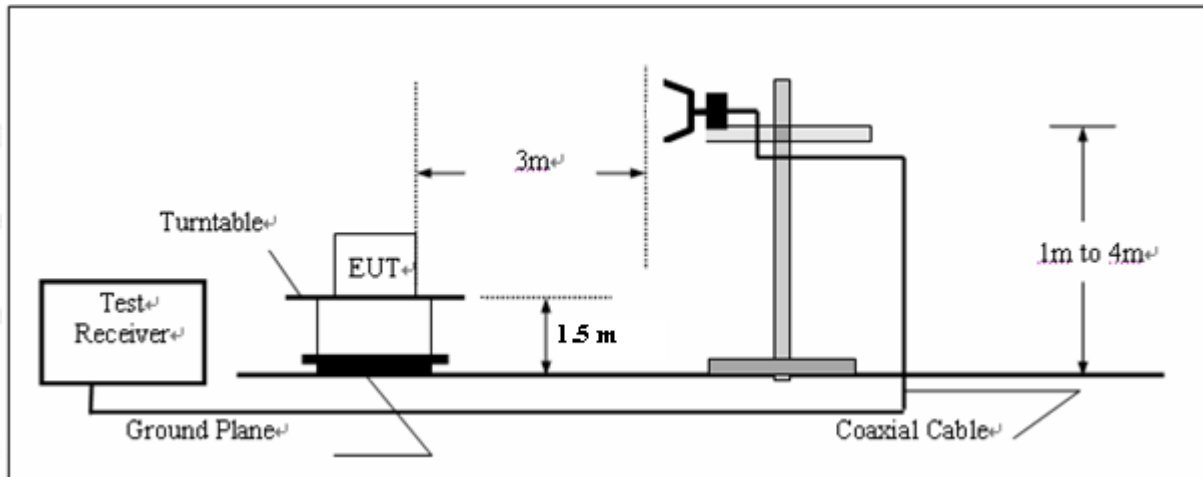
TEST CONFIGURATION

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 10th 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
Below 1GHz:					
137.98	V	-76.03	-36	-40.03	PASS
208.83	V	-75.94	-54	-21.94	PASS
280.57	V	-77.84	-36	-41.84	PASS
367.53	V	-77.67	-36	-41.67	PASS
468.13	V	-73.75	-54	-19.75	PASS
795.83	V	-77.44	-54	-23.44	PASS
182.27	H	-71.84	-54	-17.84	PASS
229.08	H	-78.79	-36	-42.79	PASS
326.23	H	-72.67	-36	-36.67	PASS
392.12	H	-73.92	-36	-37.92	PASS
587.42	H	-80.15	-54	-26.15	PASS
832.15	H	-83.22	-54	-29.22	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
Above 1GHz:					
2139.81	V	-58.25	-30	-28.25	PASS
2435.98	V	-56.73	-30	-26.73	PASS
3460.94	V	-55.32	-30	-25.32	PASS
4297.13	V	-56.84	-30	-26.84	PASS
5527.48	V	-51.92	-30	-21.92	PASS
5901.08	V	-51.03	-30	-21.03	PASS
2138.58	H	-49.74	-30	-19.74	PASS
2381.52	H	-57.85	-30	-27.85	PASS
3081.58	H	-54.12	-30	-24.12	PASS
3554.92	H	-57.84	-30	-27.84	PASS
4872.88	H	-52.63	-30	-22.63	PASS
6715.53	H	-53.53	-30	-23.53	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.					

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

Below 1G

Fre. (MHz)	ANT. Pol.	Result (dBm)	Limit	Margin	Conclusion
Below 1GHz:					
186.38	V	-77.86	-36	-41.86	PASS
237.52	V	-75.62	-54	-21.62	PASS
283.24	V	-79.24	-36	-43.24	PASS
385.62	V	-79.73	-36	-43.73	PASS
453.78	V	-74.75	-54	-20.75	PASS
793.07	V	-79.63	-54	-25.63	PASS
183.96	H	-72.85	-54	-18.85	PASS
233.38	H	-75.39	-36	-39.39	PASS
306.82	H	-81.54	-36	-45.54	PASS
403.65	H	-75.14	-36	-39.14	PASS
571.68	H	-78.15	-54	-24.15	PASS
829.82	H	-80.65	-54	-26.65	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
Above 1GHz:					
2090.22	V	-54.45	-30	-24.45	PASS
2584.54	V	-54.67	-30	-24.67	PASS
3688.83	V	-58.35	-30	-28.35	PASS
4447.73	V	-54.42	-30	-24.42	PASS
5455.46	V	-54.34	-30	-24.34	PASS
6004.95	V	-57.74	-30	-27.74	PASS
2390.61	H	-53.25	-30	-23.25	PASS
2323.11	H	-57.43	-30	-27.43	PASS
3082.78	H	-55.42	-30	-25.42	PASS
3885.98	H	-57.72	-30	-27.72	PASS
5075.43	H	-50.14	-30	-20.14	PASS
6696.42	H	-45.52	-30	-15.52	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.					



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;

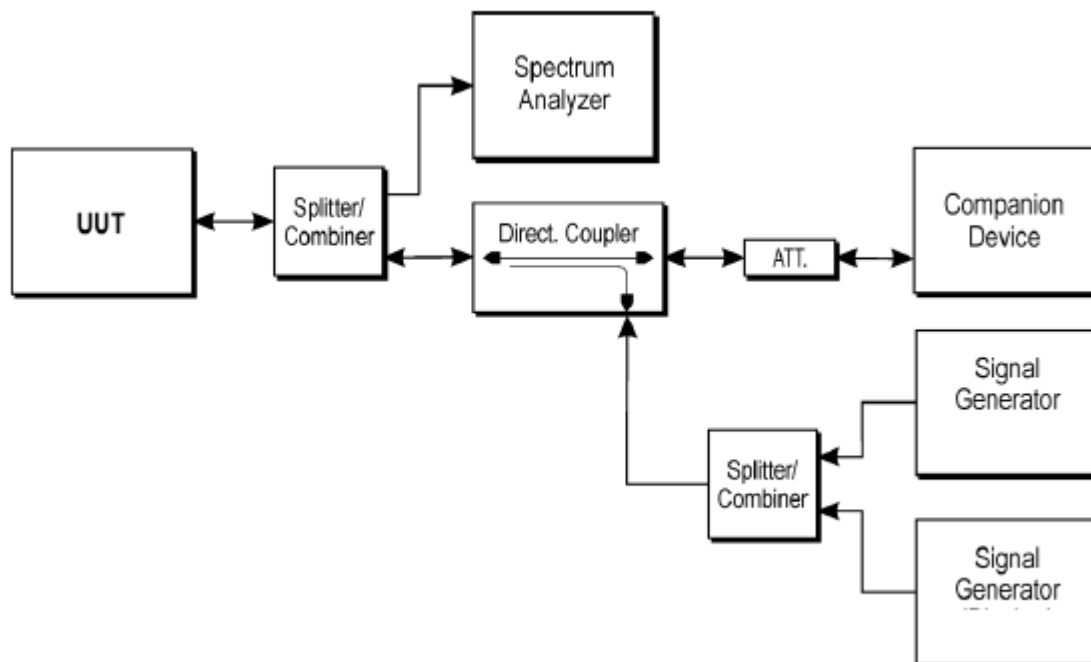
-BW is the channel bandwidth in MHz.

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	-41.45	-58.20	PASS
	20	5785	-46.56	-58.26	PASS
161	20	5785	-42.03	-58.26	PASS
	20	5825	-40.09	-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	-45.15	-58.20	PASS
	20	5785	-39.58	-58.26	PASS
161	20	5785	-39.93	-58.26	PASS
	20	5825	-47.16	-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	-45.42	-61.22	PASS
	40	5795	-42.69	-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	-45.49	-58.20	PASS
	20	5785	-45.35	-58.26	PASS
161	20	5785	-47.53	-58.26	PASS
	20	5825	-45.66	-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	-48.21	-61.22	PASS
	40	5795	-46.59	-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	-47.42	-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;

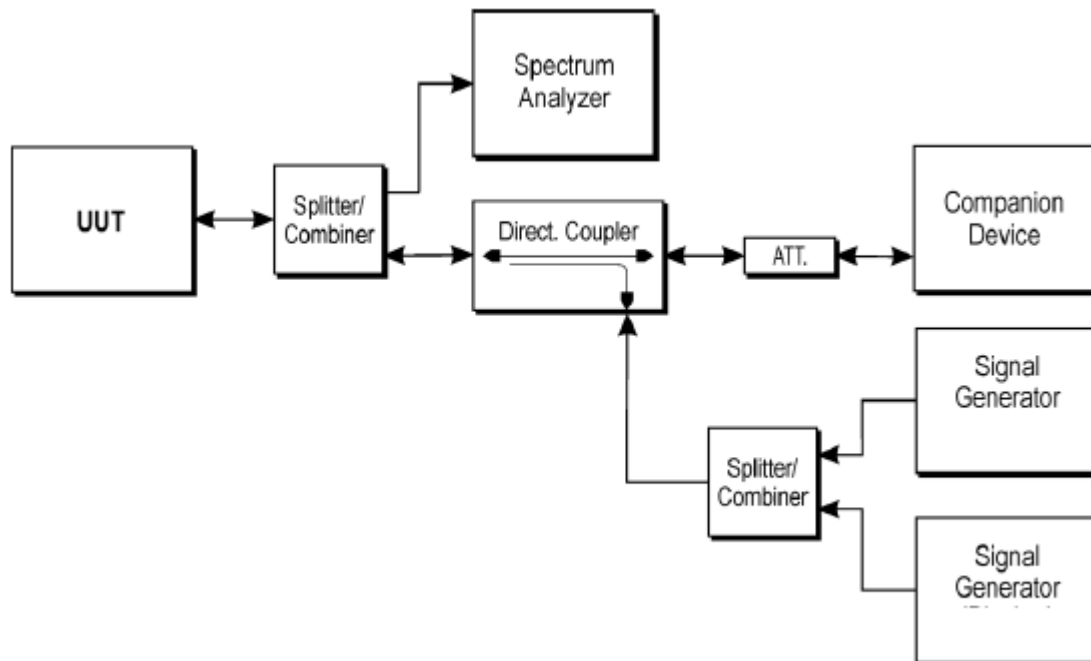
-BW is the channel bandwidth in MHz.

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)	-51.15	-72.88	PASS
		5345(20 time channel bandwidth frequency offset)	-47.79	-72.56	PASS
		4745(50 time channel bandwidth frequency offset)	-43.14	-71.53	PASS
165	20	6025(10 time channel bandwidth frequency offset)	-50.74	-73.60	PASS
		6225(20 time channel bandwidth frequency offset)	-50.27	-73.89	PASS
		6825(50 time channel bandwidth frequency offset)	-48.03	-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)	-53.89	-72.88	PASS
		5345(20 time channel bandwidth frequency offset)	-46.67	-72.56	PASS
		4745(50 time channel bandwidth frequency offset)	-48.76	-71.53	PASS
165	20	6025(10 time channel bandwidth frequency offset)	-50.09	-73.60	PASS
		6225(20 time channel bandwidth frequency offset)	-49.49	-73.89	PASS
		6825(50 time channel bandwidth frequency offset)	-45.96	-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)	-51.29	-75.59	PASS
		4955(20 time channel bandwidth frequency offset)	-50.94	-74.92	PASS
		3755(50 time channel bandwidth frequency offset)	-50.45	-73.51	PASS
159	40	6195(10 time channel bandwidth frequency offset)	-49.23	-76.86	PASS
		6595(20 time channel bandwidth frequency offset)	-49.03	-77.40	PASS
		7795(50 time channel bandwidth frequency offset)	-50.55	-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)	-50.43	-72.88	PASS
		5345(20 time channel bandwidth frequency offset)	-51.76	-72.56	PASS
		4745(50 time channel bandwidth frequency offset)	-54.55	-71.53	PASS
165	20	6025(10 time channel bandwidth frequency offset)	-50.93	-73.60	PASS
		6225(20 time channel bandwidth frequency offset)	-50.27	-73.89	PASS
		6825(50 time channel bandwidth frequency offset)	-49.44	-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)	-48.43	-75.59	PASS
		4955(20 time channel bandwidth frequency offset)	-52.36	-74.92	PASS
		3755(50 time channel bandwidth frequency offset)	-49.65	-72.51	PASS
159	40	6195(10 time channel bandwidth frequency offset)	-46.39	-76.86	PASS
		6595(20 time channel bandwidth frequency offset)	-47.17	-77.40	PASS
		7795(50 time channel bandwidth frequency offset)	-49.85	-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)	-53.85	-72.88	PASS
		3175(20 time channel bandwidth frequency offset)	-50.95	-72.56	PASS
		1775(50 time channel bandwidth frequency offset)	-46.56	-71.53	PASS
		6575(10 time channel bandwidth frequency offset)	-56.14	-73.60	PASS
		7375(20 time channel bandwidth frequency offset)	-49.69	-73.89	PASS
		9775(50 time channel bandwidth frequency offset)	-47.15	-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 10th 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	158.23	-78.43	-57	-21.43	4.71	0.00	Vertical
2	333.92	-79.92	-57	-22.92	3.29	0.00	Vertical
3	407.13	-76.24	-57	-19.24	3.18	0.00	Vertical
4	438.22	-74.93	-57	-17.93	3.15	0.00	Vertical
5	596.42	-81.37	-57	-24.37	3.72	0.00	Vertical
6	729.15	-76.22	-57	-19.22	4.03	0.00	Vertical
7	199.32	-77.24	-57	-20.24	3.42	0.00	Horizontal
8	250.16	-78.05	-57	-21.05	4.06	0.00	Horizontal
9	343.72	-77.75	-57	-20.75	3.81	0.00	Horizontal
10	432.58	-73.72	-57	-16.72	3.79	0.00	Horizontal
11	512.62	-75.94	-57	-18.94	3.55	0.00	Horizontal
12	719.52	-76.55	-57	-19.55	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	1753.92	-77.04	-47	-30.04	7.95	0.00	Vertical
2	1810.72	-82.77	-47	-35.77	8.13	0.00	Vertical
3	2889.94	-77.64	-47	-30.64	5.65	0.00	Vertical
4	3627.86	-77.34	-47	-30.34	6.73	0.00	Vertical
5	4057.11	-82.92	-47	-35.92	7.27	0.00	Vertical
6	4480.45	-75.55	-47	-28.55	6.44	0.00	Vertical
7	1823.72	-80.05	-47	-33.05	7.51	0.00	Horizontal
8	3105.18	-82.75	-47	-35.75	6.98	0.00	Horizontal
9	3318.04	-77.13	-47	-30.13	5.47	0.00	Horizontal
10	3956.18	-76.82	-47	-29.82	6.73	0.00	Horizontal
11	4917.85	-79.35	-47	-32.35	7.54	0.00	Horizontal
12	5316.27	-78.84	-47	-31.84	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	192.63	-77.73	-57	-20.73	4.71	0.00	Vertical
2	332.07	-81.13	-57	-24.13	3.29	0.00	Vertical
3	401.89	-74.83	-57	-17.83	3.18	0.00	Vertical
4	418.22	-78.14	-57	-21.14	3.15	0.00	Vertical
5	597.57	-81.52	-57	-24.52	3.72	0.00	Vertical
6	762.93	-76.85	-57	-19.85	4.03	0.00	Vertical
7	185.17	-79.96	-57	-22.96	3.42	0.00	Horizontal
8	257.45	-84.58	-57	-27.58	4.06	0.00	Horizontal
9	339.82	-77.76	-57	-20.76	3.81	0.00	Horizontal
10	434.93	-77.33	-57	-20.33	3.79	0.00	Horizontal
11	496.43	-77.72	-57	-20.72	3.55	0.00	Horizontal
12	752.47	-74.96	-57	-17.96	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	1605.04	-81.54	-47	-34.54	7.95	0.00	Vertical
2	2090.68	-77.63	-47	-30.63	8.13	0.00	Vertical
3	2947.08	-78.75	-47	-31.75	5.65	0.00	Vertical
4	3601.11	-77.64	-47	-30.64	6.73	0.00	Vertical
5	3799.84	-82.87	-47	-35.87	7.27	0.00	Vertical
6	4508.08	-74.24	-47	-27.24	6.44	0.00	Vertical
7	1643.68	-79.62	-47	-32.62	7.51	0.00	Horizontal
8	2953.14	-80.87	-47	-33.87	6.98	0.00	Horizontal
9	3419.87	-77.65	-47	-30.65	5.47	0.00	Horizontal
10	4041.08	-77.44	-47	-30.44	6.73	0.00	Horizontal
11	4787.61	-75.82	-47	-28.82	7.54	0.00	Horizontal
12	5435.08	-78.57	-47	-31.57	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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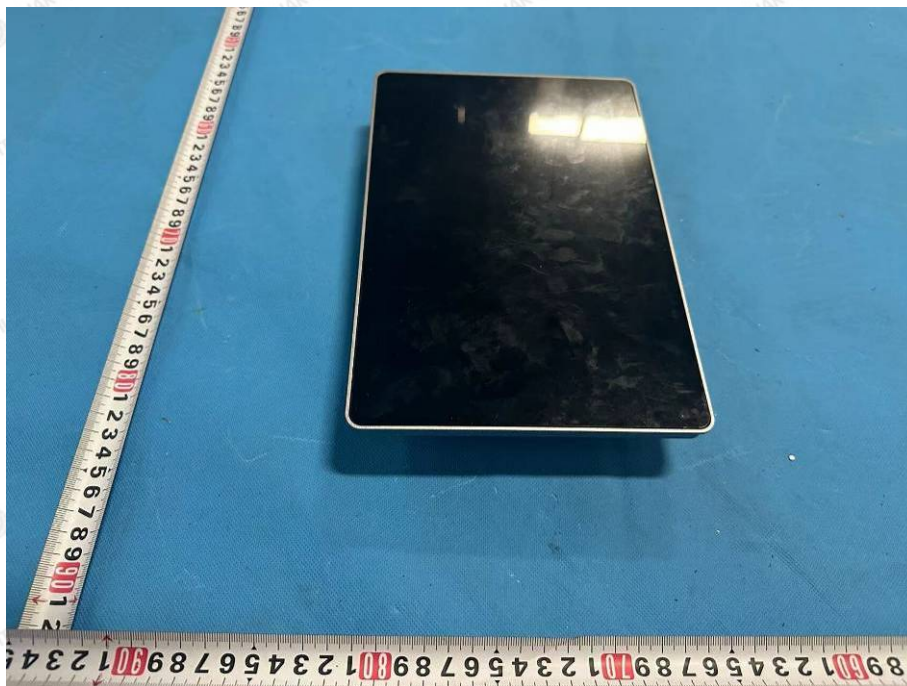
6. External and Internal Photos of the EUT



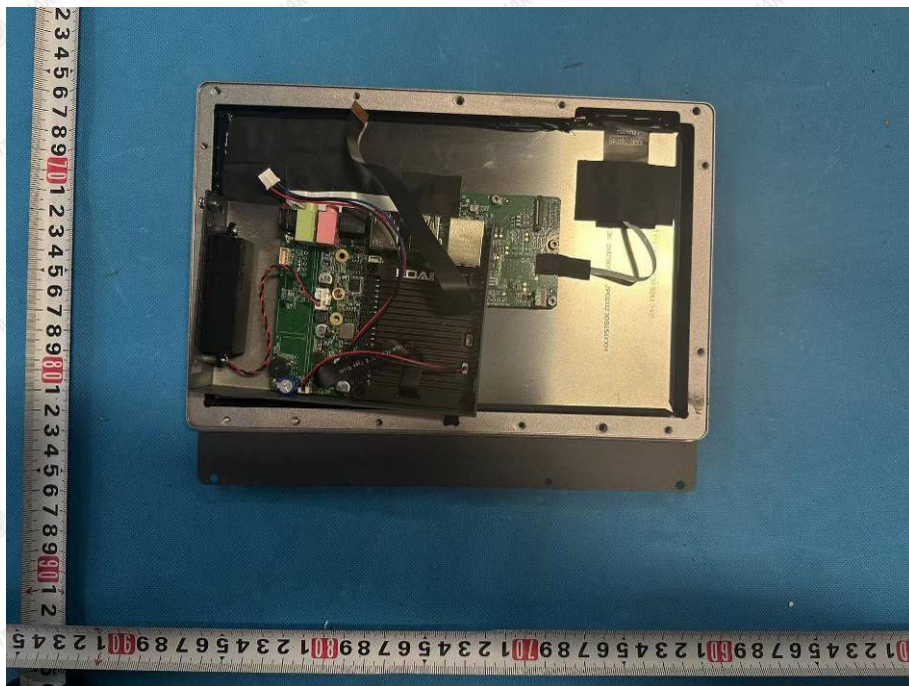
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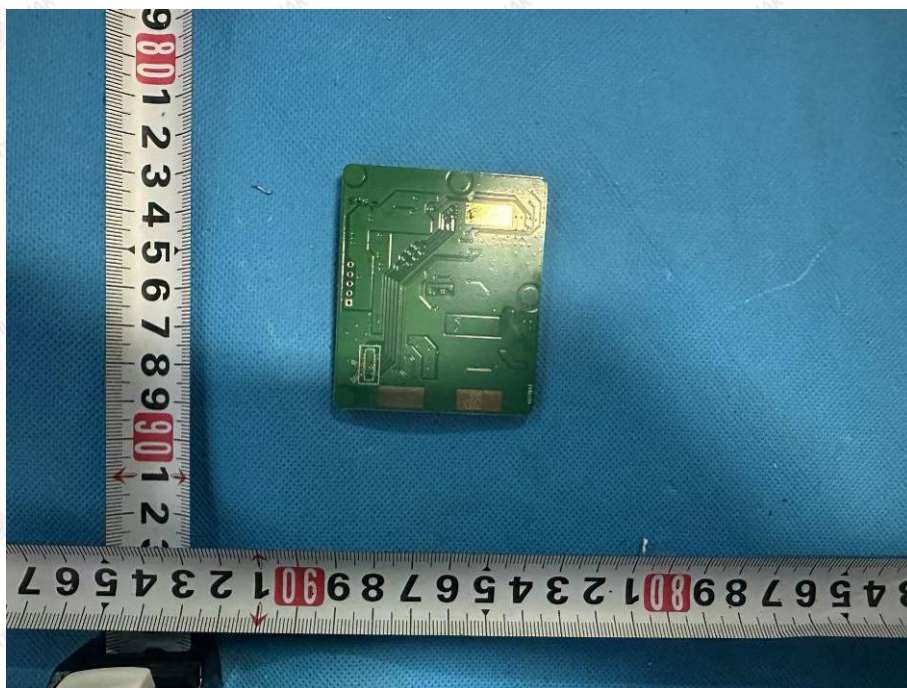
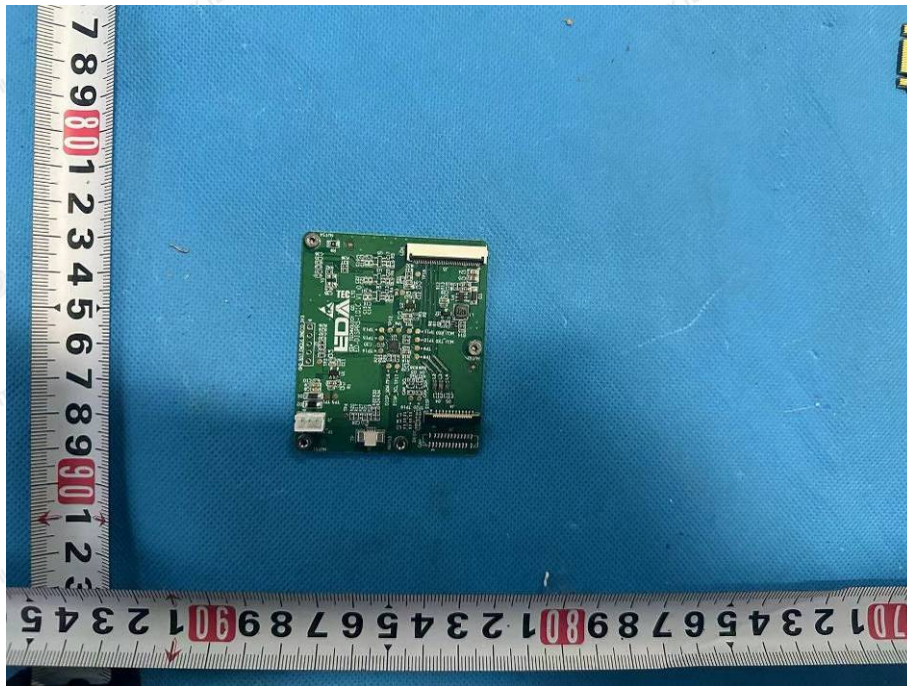
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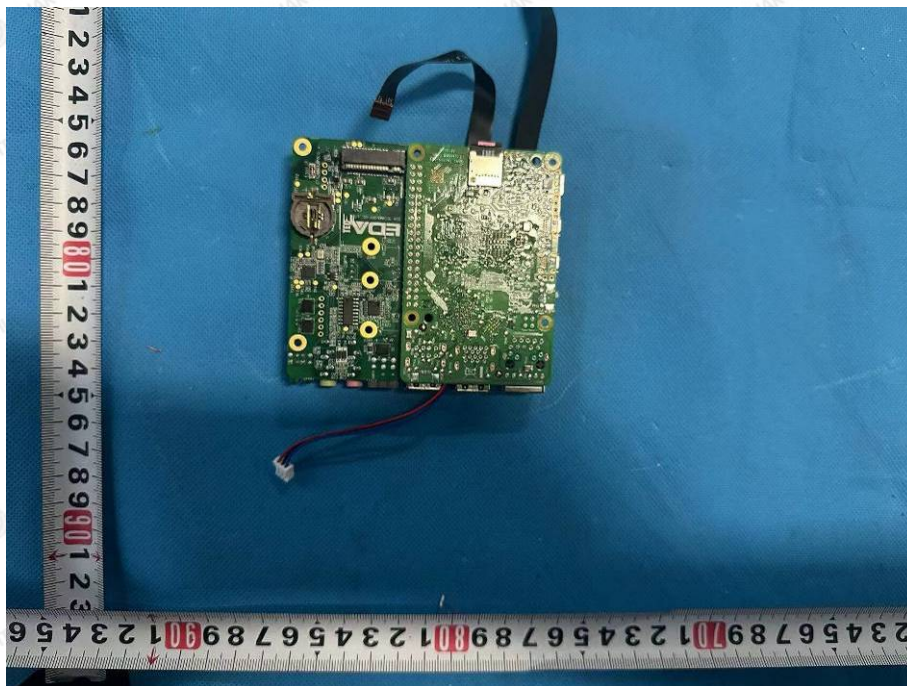
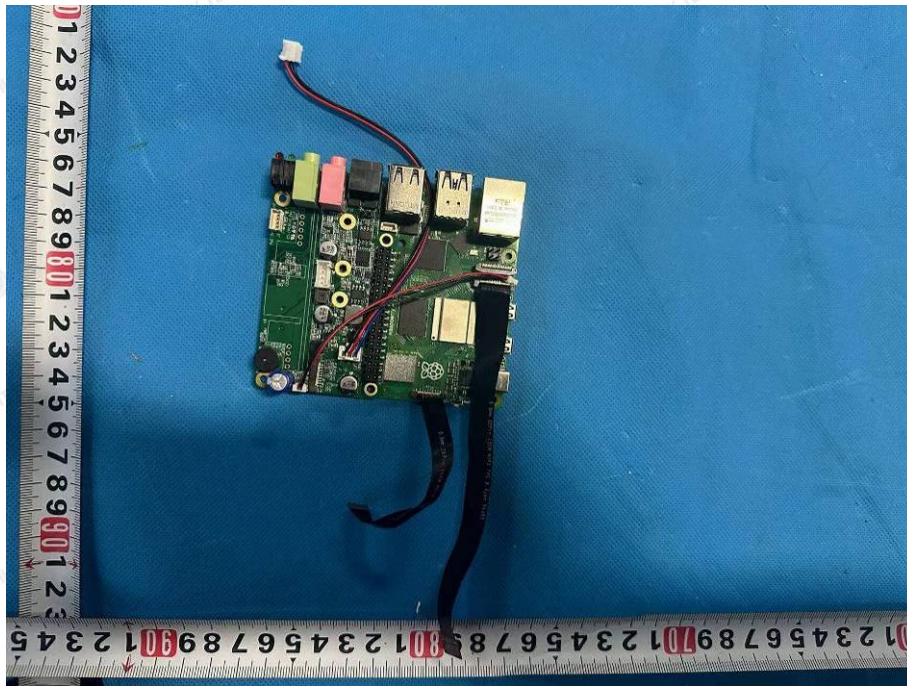
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.....End of Report.....