



Shenzhen CTA Testing Technology Co., Ltd.

Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, China

TEST REPORT

Ordinance Article 2 paragraph 1 item (19)-3

Report Reference No.....: CTA26050600805

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Date of issue.....: Jun. 08, 2026

Testing Laboratory Name: Shenzhen CTA Testing Technology Co., Ltd.

Address.....: Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, China

Applicant's name.....: Shenzhen Hanyang Technology Co., Ltd.

Address: Building L, South China Digital Valley (Shenzhen International), Minxin Community, Minzhi Subdistrict, Longhua District, Shenzhen, China

Test specification

Standard: Ordinance Article 2 paragraph 1 item (19)-3

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Test item description: Yarbo Core

Trade Mark: Yarbo

Manufacturer: Shenzhen Hanyang Technology Co., Ltd.

Model/Type reference.....: Y40P JP

Listed Models: Y40X JP

Ratings: Input: 42V --- 2.2A

Battery: 36V 1382.4Wh 38.4Ah

Modulation: OFDM, OFDMA

Frequency.....: From 5500MHz to 5700MHz

Result.....: **PASS**

TEST REPORT

Equipment under Test : Yarbo Core

Model /Type : Y40P JP

Listed Models : Y40X JP

The PCB board, circuit, structure and internal of these models are the same, Only model number, colour, crawler track and appearance of the product are different for these models. So the tests were performed on model Y40P JP and the test results for the main test model can cover the listed models.

Applicant : Shenzhen Hanyang Technology Co., Ltd.

Address : Building L, South China Digital Valley (Shenzhen International), Minxin Community, Minzhi Subdistrict, Longhua District, Shenzhen, China

Manufacturer : Shenzhen Hanyang Technology Co., Ltd.

Address : Building L, South China Digital Valley (Shenzhen International), Minxin Community, Minzhi Subdistrict, Longhua District, Shenzhen, China

Test Result:**PASS**

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.

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1 SUMMARY

1.1 Test Standards

The tests were performed according to following standards:

[ARIB STD-T71](#): 5 GHz band low-power data communication system

[MIC Notice No.88 Appendix No.45](#): 5 GHz band wide-band low-power data communication system

1.2 Test Description

ARIB STD-T71		
Clause	Description of Test	Result
3.1.2 (2) & 3.1.2 (3) & 3.1.2 (5)	Tolerances Of Antenna Power & E.I.R.P	PASS
3.1.2 (4)	Tolerance Of Frequency	PASS
3.1.2 (7)	Transmission Burst Length	PASS
3.1.2 (8) & 3.1.2 (10)	Tolerance Of Unwanted Emission Intensity & Tolerance Of Out-Of-Band Leakage Power	PASS
3.1.2 (9)	Tolerance Of Adjacent Channel Leakage Power	PASS
3.1.2 (11)	Tolerance Of Occupied Bandwidth	PASS
3.1.3 (1)	Secondary Radiated Emissions	PASS
3.1.4.1	Interference prevention function	PASS
3.1.5	Carrier Sensing function	PASS
Note: (1) N/A is an abbreviation for Not Applicable. (2) N/T means this test item is not tested.		

Note: 1: "N/A" denotes test is not applicable in this Test Report

2: MIC Public Notice 88:2004, annex 45

3: MIC Ordinance Regulating Radio Equipment Section 4.17 of Article 49.20

4: Referenced in the standard ARIB STD-T71

5. This device has more than 1 sub-carrier in 1MHz.

1.3 TEST ENVIRONMENT

1.3.1 Address of the test laboratory

Shenzhen CTA Testing Technology Co., Ltd.

Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, China

1.3.2 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration No.: 517856 Designation Number: CN1318

Shenzhen CTA Testing Technology Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

A2LA-Lab Cert. No.: 6534.01

Shenzhen CTA Testing Technology Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10 and CISPR 16-1-4:2

1.4 Measurement Uncertainty

For the test methods, according to the present document, the measurement uncertainty figures shall be calculated in accordance with TR100028-1 [2] and shall correspond to an expansion factor (coverage factor) $K=1.96$ or $K=2$ (which provide confidence levels of respectively 95% and 95.5% in the case where the distributions characterizing the actual measurement uncertainties are normal).

Parameter	Uncertainty
Frequency error / 99%&90% bandwidth	$\pm 1.62 \times 10^{-6}$
Total RF power, conducted	$\pm 0.8\text{dB}$
Spurious emissions, conducted	$\pm 0.8\text{dB}$
DC and low frequency voltages	$\pm 0.05\%$
Humidity	$\pm 5\%$
Temperature	$\pm 1^\circ\text{C}$

2 GENERAL INFORMATION

2.1 General Remarks

Date of receipt of test sample	:	May 06, 2026
Testing commenced on	:	May 06, 2026
Testing concluded on	:	Jun. 08, 2026

2.2 Environmental conditions

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

Voltage	Normal Voltage	DC 36.0V
	High Voltage	DC 39.6V
	Low Voltage	DC 32.4V
Other	Normal Temperature	25°C
	Relative Humidity	55 %
	Air Pressure	989 hPa

Note: As the EUT was powered by DC 36V from battery, and with the voltage stabilizing circuit used, the chip voltage received floating not exceed $\pm 1\%$ of nominal condition when working on extreme voltage, so all test performed at nominal voltage only.

2.3 General Description of EUT

Product Name:	Yarbo Core
Model/Type reference:	Y40P JP
Power supply:	Input: 42V === 2.2A Battery: 36V 1382.4Wh 38.4Ah
Adapter information:	Model: GM95-420220-1FGN Input: AC 100-240V 50/60Hz 2.5A Output: DC 42.0V 2.2A 92.4W
Hardware version:	V1.0
Software version:	V1.0
Testing sample:	CTA260506008-1# (Engineer sample) CTA260506008-2# (Normal sample)
WIFI	
WLAN	Supported 802.11 a/n/ac
Modulation Type	IEEE 802.11a: OFDM IEEE 802.11n HT20: OFDM IEEE 802.11n HT40: OFDM IEEE 802.11ac VHT20: OFDM IEEE 802.11ac VHT40: OFDM IEEE 802.11ax HE20: OFDMA IEEE 802.11ax HE40: OFDMA
Operation frequency	IEEE 802.11a: 5500-5700MHz IEEE 802.11n HT20: 5500-5700MHz IEEE 802.11n HT40: 5510-5670MHz IEEE 802.11ac20: 5500-5700MHz IEEE 802.11ac40: 5510-5670MHz IEEE 802.11ax20: 5500-5700MHz IEEE 802.11ax40: 5510-5670MHz
Antenna type:	ANT1: Internal Antenna ANT2: Internal Antenna
Antenna Gain:	ANT1: 3.15 dBi ANT2: 3.15 dBi

Rated Power:	ANT1: IEEE 802.11a: 1.5mW/MHz IEEE 802.11n HT20: 1.5mW/MHz IEEE 802.11n HT40: 0.8mW/MHz IEEE 802.11ac VHT20: 1.5mW/MHz IEEE 802.11ac VHT40: 0.8mW/MHz IEEE 802.11ax HE20: 1.5mW/MHz IEEE 802.11ax HE40: 0.8mW/MHz ANT2: IEEE 802.11a: 1.5mW/MHz IEEE 802.11n HT20: 1.5mW/MHz IEEE 802.11n HT40: 0.8mW/MHz IEEE 802.11ac VHT20: 1.5mW/MHz IEEE 802.11ac VHT40: 0.8mW/MHz IEEE 802.11ax HE20: 1.5mW/MHz IEEE 802.11ax HE40: 0.8mW/MHz MIMO: IEEE 802.11n HT20: 3.0mW/MHz IEEE 802.11n HT40: 1.5mW/MHz IEEE 802.11ac VHT20: 3.0mW/MHz IEEE 802.11ac VHT40: 1.5mW/MHz IEEE 802.11ax HE20: 3.0mW/MHz IEEE 802.11ax HE40: 1.5mW/MHz
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Note: 1.For more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2. The EUT is a slave device without TPC functionality.

2.4 Description of Test Modes

The EUT has been tested under typical operating condition. The Applicant provides communication tools software to control the EUT for staying in continuous transmitting and receiving mode for testing.

Operation Frequency List:

W56		W56		W56		W56	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
100	5500	102	5510				
104	5520	110	5550				
108	5540	118	5590				
112	5560	126	5630				
116	5580	134	5670				
120	5600						
124	5620						
128	5640						
132	5660						
136	5680						
140	5700						

Note: Test performed at the Low/Mid/High frequencies selected in the list above for EUT supported while working on specified mode.

2.5 Measurement Instruments List

Item	Test Equipment	Manufacturer	Model No.	Equipment No.	Cal. Institution	Calibration Date	Calibration Due Date
1	Spectrum Analyzer	Agilent	N9020A	CTA-301	LISAI	2025/07/30	2026/07/29
2	Vector Signal generator	Agilent	N5182A	CTA-305	LISAI	2025/07/30	2026/07/29
3	Spectrum analyzer	R&S	FSV40-N	CTA-344	LISAI	2025/05/17	2026/05/16

4	Spectrum analyzer	R&S	FSV40-N	CTA-344	LISAI	2026/05/16	2027/05/15
5	Power Meter	R&S	NRVS	CTA-354	LISAI	2025/07/30	2026/07/29
6	DC Power Supply	LongWei	LW-K3010D	CTA-033	LISAI	2025/07/30	2026/07/29
7	Oscilloscope	Tektronix	TDS3052	CTA-010	LISAI	2025/07/30	2026/07/29
8	Automatic control unit	Tonscend	JS0806-2	CTA-351	LISAI	2025/07/30	2026/07/29

Cal. Institution: LiSai-Guangzhou LiSai Calibration and Testing Co.,LTD.

Calibration by the calibration agencies listed in the table correspond to paragraph 4 (ii) (c) of Article 24-2 in the Radio Law".

☐ (a) Calibration conducted by the National Institute of Information and Communications Technology (NICT) or a designated calibration agency under Article 102-18-1 of the Radio Act.

☐ (b) Calibration conducted based on the regulations of Article 135 or 144 of the Measurement Act.

☒ (c) Calibration conducted in foreign countries, which is equivalent to calibration conducted by the NICT or a designated calibration agency under Article 102-18-1 of the Radio Act.

☐ (d) Calibration, etc. conducted by using measuring instruments and other facilities listed at the bottom of appended table 3 of the Radio Act, which is to have been calibrated as described in (a) through (c) above.

2.6 Table for Parameters of Test Software Setting

During testing, Channel & Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Power Parameters:

Tested mode, channel, and data rate information		
Mode	Final Test Data Rate (Mbps) (see Note)	Frequency (MHz)
IEEE 802.11a HT20	6 Mbps	5500
	6 Mbps	5580
	6 Mbps	5700
IEEE 802.11n HT20	MCS0	5500
	MCS0	5580
	MCS0	5700
IEEE 802.11ac VHT20	MCS0	5500
	MCS0	5580
	MCS0	5700
IEEE 802.11n HT40	MCS0	5510
	MCS0	5550
	MCS0	5670
IEEE 802.11ac VHT40	MCS0	5510
	MCS0	5550
	MCS0	5670
IEEE 802.11ax HE20	MCS0	5500
	MCS0	5580
	MCS0	5700
IEEE 802.11ax HE40	MCS0	5510
	MCS0	5550
	MCS0	5670

2.7 Test Voltage

POWER SUPPLY VOLTAGE FLUCTUATION TEST

Voltage Fluctuation Test	Normal Voltage	High Voltage +10% of Normal Voltage	Low Voltage -10% of Normal Voltage
Input To EUT	DC 36.0V	DC 39.6V	DC 32.4V
Output To RF Module	DC 3.30V	DC 3.30V	DC 3.30V
Voltage Variation (%)	--	--	--

Note:

Voltage Variation (%)

= (Output high or Low Voltage - Output Normal Voltage) / Output Normal Voltage * 100

During the input supply voltage to the EUT from the external power source is varied by +/- 10%, if output voltage had been confirmed that the fluctuation of power supply to the RF circuit of EUT (excluding power source) is equal to or less than +/-1%. Exempt extremely high and low supply voltage condition test, EUT only operated in normal voltage to test all regulations.

The sample power supply was confirmed that input voltage variation at the radio unit in the radio equipment to be tested is less than +1% against a variation of +10% at the input voltage from the external power supply to the radio equipment, and the radio equipment was designed so as to be operated in a specified voltage variation limit within +10%, Radio can only tested at rated voltage.

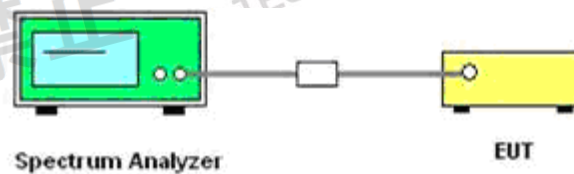
3 Test conditions and Results

3.1 Frequency Error

LIMIT

Tolerance of frequency shall be $\pm 20 \times 10^{-6}$.

TEST CONFIGURATION



TEST PROCEDURE

The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram as TEST CONFIGURATION shows.

EUT Condition: non-modulation

Spectrum Condition:

- Frequency: test frequency
- Span: 1 MHz
- RBW: 10 KHz
- VBW: 10 KHz
- Sweep time: Auto
- Detector mode: Positive peak
- Indication mode: max hold

TEST RESULTS

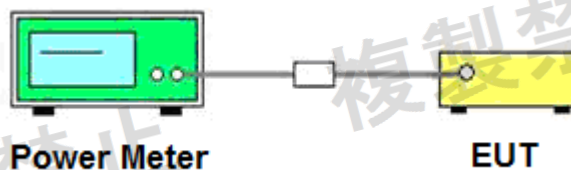
Please refer to the Appendix RF Test Data for 5G WIFI

3.2 Antenna Output Power and Output Power Tolerance

LIMIT

Operation Band	Item	20MHz system		40MHz system	80MHz system	160MHz system
W56	Antenna Power	DSSS, etc	OFDM	OFDM	OFDM	OFDM
		10mW/MHz	10mW/MHz	5mW/MHz	2.5mW/MHz	1.25mW/MHz
	Antenna power Tolerance	+50%, -50%				
	EIRP	50mW/MHz: with TPC 25mW/MHz: without TPC		25mW/MHz: with TPC 12.5mW/MHz: without TPC	12.5mW/MHz: with TPC 6.25mW/MHz: without TPC	6.25mW/MHz: with TPC 3.125mW/MHz: without TPC

TEST CONFIGURATION



TEST PROCEDURE

- EUT have transmitted continuous maximum power
- Antenna Power Error is definition that actual measure antenna power tolerance within +20% power range that base on manufacturer Marlare the conducted power density.

TEST RESULTS

Conducted

Ant1:

W56

Mode	Channel (MHz)	Output power (dBm/MHz)	Output power (mW/MHz)	Limit (mW/MHz)	Rated output power (mW/MHz)	Tolerance (%)	Limit	Result
IEEE 802.11a	5500	1.45	1.3964	10	1.5	-6.91%	50%~50%	Pass
	5580	1.62	1.4521	10	1.5	-3.19%		
	5700	1.33	1.3583	10	1.5	-9.45%		
IEEE 802.11n HT20	5500	1.50	1.4125	10	1.5	-5.83%	50%~50%	Pass
	5580	1.47	1.4028	10	1.5	-6.48%		
	5700	1.69	1.4757	10	1.5	-1.62%		
IEEE 802.11n HT40	5510	-2.72	0.5346	5	0.8	-33.18%	50%~50%	Pass
	5550	-1.80	0.6607	5	0.8	-17.41%		
	5670	-1.92	0.6427	5	0.8	-19.66%		
IEEE 802.11ac VHT20	5500	1.30	1.3490	10	1.5	-10.07%	50%~50%	Pass
	5580	1.60	1.4454	10	1.5	-3.64%		
	5700	0.01	1.0023	10	1.5	-33.18%		
IEEE 802.11ac VHT40	5510	-2.09	0.6180	5	0.8	-22.75%	50%~50%	Pass
	5550	-2.80	0.5248	5	0.8	-34.40%		
	5670	-2.32	0.5861	5	0.8	-26.74%		
IEEE 802.11ax HE20	5500	1.26	1.3366	10	1.5	-10.89%	50%~50%	Pass
	5580	0.71	1.1776	10	1.5	-21.49%		
	5700	-0.34	0.9247	10	1.5	-38.35%		
IEEE 802.11ax HE40	5510	-1.65	0.6839	5	0.8	-14.51%	50%~50%	Pass
	5550	-3.13	0.4864	5	0.8	-39.20%		
	5670	-2.53	0.5585	5	0.8	-30.19%		

Ant2:
W56

Mode	Channel (MHz)	Output power (dBm/MHz)	Output power (mW/MHz)	Limit (mW/MHz)	Rated output power (mW/MHz)	Tolerance (%)	Limit	Result
IEEE 802.11a	5500	1.60	1.4454	10	1.5	-3.64%	-	Pass
	5580	2.00	1.5849	10	1.5	5.66%	50%~50%	
	5700	1.97	1.5740	10	1.5	4.93%	50%~50%	
IEEE 802.11n HT20	5500	2.15	1.6406	10	1.5	9.37%	-	Pass
	5580	2.05	1.6032	10	1.5	6.88%	50%~50%	
	5700	1.76	1.4997	10	1.5	-0.02%	50%~50%	
IEEE 802.11n HT40	5510	-1.04	0.7870	5	0.8	-1.63%	-	Pass
	5550	-0.78	0.8356	5	0.8	4.45%	50%~50%	
	5670	-0.85	0.8222	5	0.8	2.78%	50%~50%	
IEEE 802.11ac VHT20	5500	0.70	1.1749	10	1.5	-21.67%	-	Pass
	5580	1.13	1.2972	10	1.5	-13.52%	50%~50%	
	5700	0.66	1.1641	10	1.5	-22.39%	50%~50%	
IEEE 802.11ac VHT40	5510	-1.45	0.7161	5	0.8	-10.49%	-	Pass
	5550	-1.33	0.7362	5	0.8	-7.98%	50%~50%	
	5670	-1.29	0.7430	5	0.8	-7.13%	50%~50%	
IEEE 802.11ax HE20	5500	1.74	1.4928	10	1.5	-0.48%	-	Pass
	5580	1.36	1.3677	10	1.5	-8.82%	50%~50%	
	5700	1.37	1.3709	10	1.5	-8.61%	50%~50%	
IEEE 802.11ax HE40	5510	-1.15	0.7674	5	0.8	-4.08%	-	Pass
	5550	-1.73	0.6714	5	0.8	-16.08%	50%~50%	
	5670	-1.79	0.6622	5	0.8	-17.23%	50%~50%	

MIMO

Mode	Channel (MHz)	Output power (mW/MHz)			Limit	Rated output power	Tolerance (%)	Limit	Result
		ANT1	ANT2	MIMO	(mW/MHz)	(mW/MHz)			
IEEE 802.11n HT20	5500	1.4125	1.6406	3.0531	10.00	3.0	1.77%	-80%-20%	Pass
	5580	1.4028	1.6032	3.006	10.00	3.0	0.20%	-80%-20%	Pass
	5700	1.4757	1.4997	2.9754	10.00	3.0	-0.82%	-80%-20%	Pass
IEEE 802.11n HT40	5510	0.5346	0.7870	1.3216	5.00	1.5	-11.89%	-80%-20%	Pass
	5550	0.6607	0.8356	1.4963	5.00	1.5	-0.25%	-80%-20%	Pass
	5670	0.6427	0.8222	1.4649	5.00	1.5	-2.34%	-80%-20%	Pass
IEEE 802.11ac VHT20	5500	1.3490	1.1749	2.5239	10.00	3.0	-15.87%	-80%-20%	Pass
	5580	1.4454	1.2972	2.7426	10.00	3.0	-8.58%	-80%-20%	Pass
	5700	1.0023	1.1641	2.1664	10.00	3.0	-27.79%	-80%-20%	Pass
IEEE 802.11ac VHT40	5510	0.6180	0.7161	1.3341	5.00	1.5	-11.06%	-80%-20%	Pass
	5550	0.5248	0.7362	1.261	5.00	1.5	-15.93%	-80%-20%	Pass
	5670	0.5861	0.7430	1.3291	5.00	1.5	-11.39%	-80%-20%	Pass
IEEE 802.11ax HE20	5500	1.3366	1.4928	2.8294	10.00	3.0	-5.69%	-80%-20%	Pass
	5580	1.1776	1.3677	2.5453	10.00	3.0	-15.16%	-80%-20%	Pass
	5700	0.9247	1.3709	2.2956	10.00	3.0	-23.48%	-80%-20%	Pass
IEEE 802.11ax HE40	5510	0.6839	0.7674	1.4513	5.00	1.5	-3.25%	-80%-20%	Pass
	5550	0.4864	0.6714	1.1578	5.00	1.5	-22.81%	-80%-20%	Pass
	5670	0.5585	0.6622	1.2207	5.00	1.5	-18.62%	-80%-20%	Pass

Note:

1). Test Result: Pass.

2). All test modes have been tested and we only record the worst result.

EIRP
ANT1

Mode	Channel (MHz)	Output power (dBm/MHz)	Antenna Gain (dBi)	EIRP (dBm/MHz)	EIRP (mW/MHz)	EIRP/MHz Limit (mW/MHz)	Result
IEEE 802.11a	5500	1.45	3.15	4.60	2.8840	25.00	Pass
	5580	1.62	3.15	4.77	2.9992	25.00	
	5700	1.33	3.15	4.48	2.8054	25.00	
IEEE 802.11n HT20	5500	1.50	3.15	4.65	2.9174	25.00	Pass
	5580	1.47	3.15	4.62	2.8973	25.00	
	5700	1.69	3.15	4.84	3.0479	25.00	
IEEE 802.11n HT40	5510	-2.72	3.15	0.43	1.1041	12.50	Pass
	5550	-1.80	3.15	1.35	1.3646	12.50	
	5670	-1.92	3.15	1.23	1.3274	12.50	
IEEE 802.11ac VHT20	5500	1.30	3.15	4.45	2.7861	25.00	Pass
	5580	1.60	3.15	4.75	2.9854	25.00	
	5700	0.01	3.15	3.16	2.0701	25.00	
IEEE 802.11ac VHT40	5510	-2.09	3.15	1.06	1.2764	12.50	Pass
	5550	-2.80	3.15	0.35	1.0839	12.50	
	5670	-2.32	3.15	0.83	1.2106	12.50	
IEEE 802.11ax HE20	5500	1.26	3.15	4.41	2.7606	25.00	Pass
	5580	0.71	3.15	3.86	2.4322	25.00	
	5700	-0.34	3.15	2.81	1.9099	25.00	
IEEE 802.11ax HE40	5510	-1.65	3.15	1.50	1.4125	12.50	Pass
	5550	-3.13	3.15	0.02	1.0046	12.50	
	5670	-2.53	3.15	0.62	1.1535	12.50	

EIRP
ANT2

Mode	Channel (MHz)	Output power (dBm/MHz)	Antenna Gain (dBi)	EIRP (dBm/MHz)	EIRP (mW/MHz)	EIRP/MHz Limit (mW/MHz)	Result
IEEE 802.11a	5500	1.60	3.15	4.75	2.9854	25.00	Pass
	5580	2.00	3.15	5.15	3.2734	25.00	
	5700	1.97	3.15	5.12	3.2509	25.00	
IEEE 802.11n HT20	5500	2.15	3.15	5.30	3.3884	25.00	Pass
	5580	2.05	3.15	5.20	3.3113	25.00	
	5700	1.76	3.15	4.91	3.0974	25.00	
IEEE 802.11n HT40	5510	-1.04	3.15	2.11	1.6255	12.50	Pass
	5550	-0.78	3.15	2.37	1.7258	12.50	
	5670	-0.85	3.15	2.30	1.6982	12.50	
IEEE 802.11ac VHT20	5500	0.70	3.15	3.85	2.4266	25.00	Pass
	5580	1.13	3.15	4.28	2.6792	25.00	
	5700	0.66	3.15	3.81	2.4044	25.00	
IEEE 802.11ac VHT40	5510	-1.45	3.15	1.70	1.4791	12.50	Pass
	5550	-1.33	3.15	1.82	1.5205	12.50	
	5670	-1.29	3.15	1.86	1.5346	12.50	
IEEE 802.11ax HE20	5500	1.74	3.15	4.89	3.0832	25.00	Pass
	5580	1.36	3.15	4.51	2.8249	25.00	
	5700	1.37	3.15	4.52	2.8314	25.00	
IEEE 802.11ax HE40	5510	-1.15	3.15	2.00	1.5849	12.50	Pass
	5550	-1.73	3.15	1.42	1.3868	12.50	
	5670	-1.79	3.15	1.36	1.3677	12.50	

Note:

- 1). Test Result: Pass.
- 2). All test modes have been tested and we only record the worst result.

MIMO

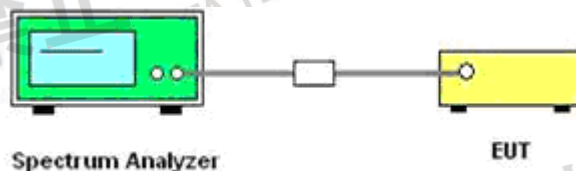
Mode	Channel (MHz)	EIRP(mW/MHz)			Limit (mW/MHz)	Result
		ANT1 (mW/MHz)	ANT2 (mW/MHz)	MIMO (mW/MHz)		
IEEE 802.11n HT20	5500	2.9174	3.3884	6.3058	25.00	Pass
	5580	2.8973	3.3113	6.2086	25.00	Pass
	5700	3.0479	3.0974	6.1453	25.00	Pass
IEEE 802.11n HT40	5510	1.1041	1.6255	2.7296	12.50	Pass
	5550	1.3646	1.7258	3.0904	12.50	Pass
	5670	1.3274	1.6982	3.0256	12.50	Pass
IEEE 802.11ac VHT20	5500	2.7861	2.4266	5.2127	25.00	Pass
	5580	2.9854	2.6792	5.6646	25.00	Pass
	5700	2.0701	2.4044	4.4745	25.00	Pass
IEEE 802.11ac VHT40	5510	1.2764	1.4791	2.7555	12.50	Pass
	5550	1.0839	1.5205	2.6044	12.50	Pass
	5670	1.2106	1.5346	2.7452	12.50	Pass
IEEE 802.11ax HE20	5500	2.7606	3.0832	5.8438	25.00	Pass
	5580	2.4322	2.8249	5.2571	25.00	Pass
	5700	1.9099	2.8314	4.7413	25.00	Pass
IEEE 802.11ax HE40	5510	1.4125	1.5849	2.9974	12.50	Pass
	5550	1.0046	1.3868	2.3914	12.50	Pass
	5670	1.1535	1.3677	2.5212	12.50	Pass

3.3 Occupied Bandwidth

LIMIT

Operation Band	20MHz system	40MHz system	80MHz system	160MHz system
W56	20MHz	40MHz	80MHz	160MHz

TEST CONFIGURATION



TEST PROCEDURE

The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram as TEST CONFIGURATION shows.

EUT Condition: modulation

Spectrum Condition:

1. Setting of SA is following as follow:
 - RBW: under 3% of OBW
 - VBW: = RBW
 - Sweep time: Auto
 - Sweep Mode: Continuous sweep
 - Detect mode: Positive peak
 - Trace mode: Max hold
2. EUT have transmitted the maximum modulation signal and fixed channelize.
3. SA set to 99% of occupied bandwidth to measure occupied bandwidth.

TEST RESULTS

Please refer to the Appendix RF Test Data for 5G WIFI

3.4 Adjacent Channel Power

LIMIT

For OFDM, $OBW \leq 20\text{MHz}$

-25dBc, fc $\pm 20\text{MHz} \pm 10\text{MHz}$

-40dBc, fc $\pm 40\text{MHz} \pm 10\text{MHz}$

For OFDM, $20\text{MHz} < OBW \leq 40\text{MHz}$

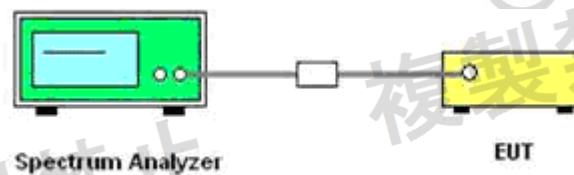
-25dBc, fc $\pm 40\text{MHz} \pm 20\text{MHz}$

-40dBc, fc $\pm 80\text{MHz} \pm 20\text{MHz}$

For OFDM, $40\text{MHz} < OBW \leq 80\text{MHz}$

-25dBc, fc $\pm 80\text{MHz} \pm 40\text{MHz}$

TEST CONFIGURATION



TEST PROCEDURE

The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram as TEST CONFIGURATION shows.

Use Spectrum's ACP measurement function and set spectrum analyzer as follow:

Spectrum Condition:

- Frequency: test frequency
- Span: >4 times integrate bandwidth
- RBW: 300 KHz
- VBW: 300 KHz
- Sweep time: Auto
- Sweep mode: Continuous
- Detector mode: Sample
- Indication mode: max hold

TEST RESULTS

Please refer to the Appendix RF Test Data for 5G WIFI

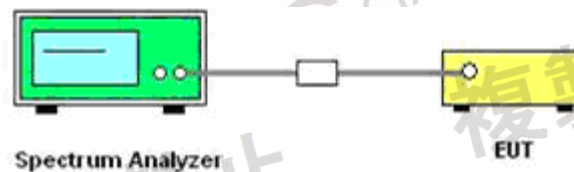
3.5 Unwanted Emission Strength and Out of Band Leakage Power

LIMIT

W56:

20MHz system	
DSSS, etc.	OFDM
5,470 MHz or less : 12.5 uW/MHz	5,460 MHz or less : 2.5 uW/MHz
	5,460 - 5,470 MHz : 12.5 uW/MHz
5,730 MHz or more : 12.5 uW/MHz	5,745 - 5,765 MHz : 12.5 uW/MHz
	Over 5,765 MHz : 2.5 uW/MHz
40MHz system	80MHz system
5,460 MHz or less : 12.5 uW/MHz	5,460 MHz or less : 12.5 uW/MHz
5,460 - 5,470 MHz : 50 uW/MHz	5,460 - 5,469.5 MHz : 50 uW/MHz
5,770 MHz or more : 12.5 uW/MHz	5,469.5 - 5,470 MHz : 51.2 uW/MHz
	5,770 MHz or more : 12.5 uW/MHz

TEST CONFIGURATION



TEST PROCEDURE

The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram as TEST CONFIGURATION shows.

EUT Condition: modulation

Spectrum Condition:

- Frequency: 30MHz-26GHz
- RBW: 1 MHz (30MHz-1GHz), 1 MHz (1GHz-26GHz)
- VBW: 1 MHz (30MHz-1GHz), 1 MHz (1GHz-26GHz)
- Sweep time: Auto
- Detector mode: Positive peak
- Indication mode: max hold

TEST RESULTS

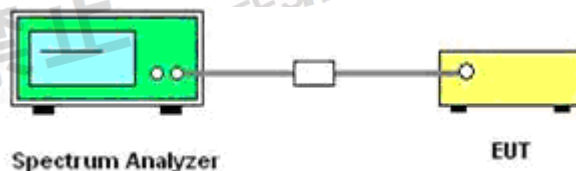
Please refer to the Appendix RF Test Data for 5G WIFI

3.6 Secondary Radiated Emission Strength

LIMIT

The limit on secondary emissions radiated from the receiving equipment within which the function of other radio equipment will not be impaired shall be, in terms of the power of a dummy antenna circuit that has the same electrical constant as the receiving antenna, 4nW or less at a frequency below 1 GHz and 20 nW or less at a frequency of 1 GHz or higher as measured using the circuit.

TEST CONFIGURATION



TEST PROCEDURE

The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram as TEST CONFIGURATION shows.

EUT Condition: modulation

Spectrum Condition:

- Frequency: 30MHz-26GHz
- RBW: 100 KHz (30MHz-1GHz), 1MHz (1GHz-26GHz)
- VBW: 100 KHz (30MHz-1GHz), 1MHz (1GHz-26GHz)
- Sweep time: Auto
- Detector mode: Positive peak
- Indication mode: max hold

TEST RESULTS

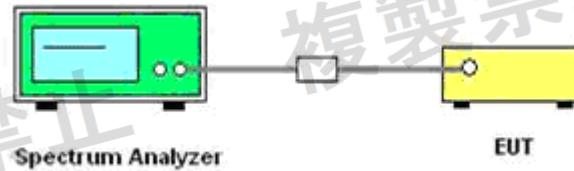
Please refer to the Appendix RF Test Data for 5G WIFI

3.7 Transmission Burst Length

LIMIT

Transmission Burst Length shall be 8ms or less.

TEST CONFIGURATION



TEST PROCEDURE

Enable EUT under transmission mode and connected it to the spectrum analyzer through antenna output port as the block diagram show in TEST CONFIGURATION

Use Spectrum's ACP measurement function and set spectrum analyzer as follow:

Spectrum Condition:

- Frequency: test frequency
- Span: 0Hz
- RBW: 10MHz
- VBW: =RBW
- Sweep time: Auto
- Sweep mode: single
- Detector mode: Peak
- Indication mode: max hold

TEST RESULTS

Please refer to the Appendix RF Test Data for 5G WIFI

3.8 Carrier Sense Capability

LIMIT

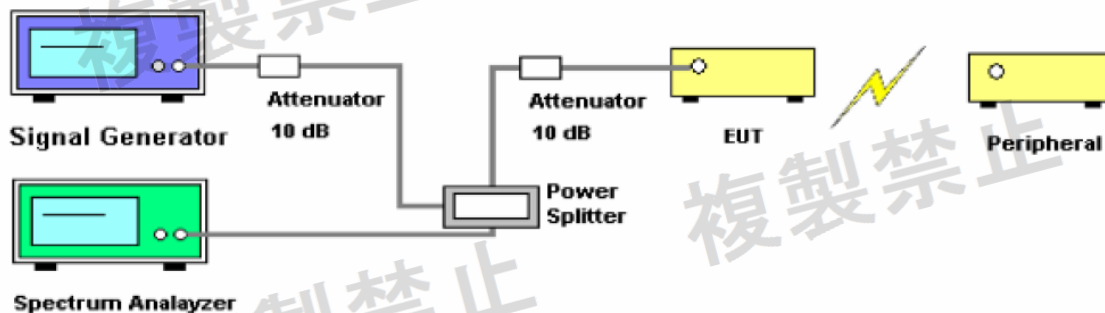
Item	Limits
Carrier Sense	Good - EUT stop RF transmission signal after carrier inject to EUT. (On $22.79 + Gr - 20 \cdot \log(f)$ [dBm] (Gr: dBi; f: MHz) or 100mV/m)

INSTRUMENTS SETTING

The following table is the setting of spectrum analyser and receiver.

Spectrum Parameter	Setting
Attenuation	Auto
RB / VB	1 MHz
Span	0 MHz
Sweep	Continuous
Detector	Peak
Trigger mode	Video

TEST CONFIGURATION



TEST PROCEDURE

1. Set The EUT state in "normal mode link with wireless router".
2. SG adjusted the frequency as same as the EUT transmitted signal and emitted the absence of modulation from SG and power level is $(on 22.79 + G - 20 \cdot \log(f) \text{ dBm})$ (G is the antenna gain is the test frequency).
3. Turn off the RF signal of the SG.
4. EUT have transmitted the maximum modulation signal and fixed channelize.
5. Setting the spectrum as follow :
RBW/VBW=1MHz/1MHz
Span=50MHz
Sweep time=auto
Sweep mode=continuous
Detect mode=positive peak
6. SG RF signal on.
7. EUT shall be stop the transmitted any signal and SG RF signal off, the EUT will be continuous transmitted signal.

TEST RESULTS

Remark: we test all modes, only worst cases were reported as below:

W56

Test mode	Test frequency (MHz)	Interference signal level (dBm)	Test result
IEEE 802.11ac VHT20	5500	-48.87	Good
IEEE 802.11ac VHT40	5510	-48.88	Good

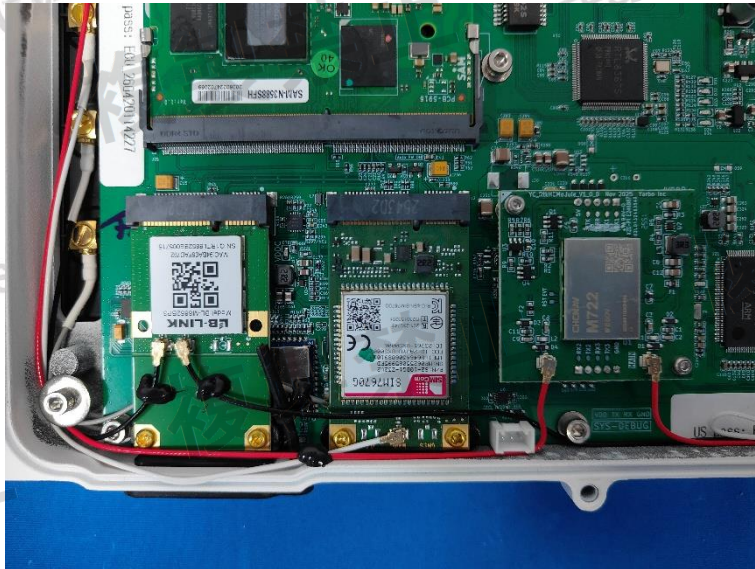
3.9 Construction protection method

REQUIREMENT

The high-frequency section and modulation section of the radio equipment except for the antenna system shall not be capable of being opened easily.

CONFIRMATION METHOD

all high-frequency section and modulation section was shield by metal shield.



3.10 Interference Prevention Function

REQUIREMENT

Clarify the one automatically to transmit and to receive identification code with the wireless equipment of the wireless station used in the same premises.

Item	Limits
Identification code	≥ 48 bits

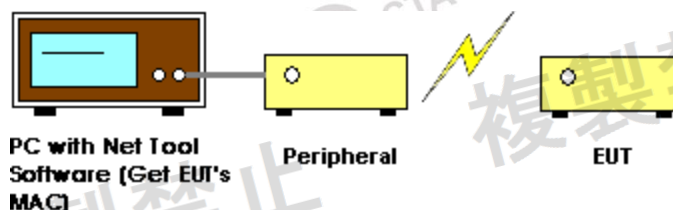
CONFIRMATION METHOD

A communication link was made where the ID code is correct (Identical).

TEST PROCEDURE

- In the case that the EUT has the function of automatically transmitting the identification code: a. Transmit the predetermined identification codes from EUT. b. Check the transmitted identification codes with the demodulator.
- In the case of receiving the identification code: a. Transmit the predetermined identification codes from the counterpart. b. Check if communication is normal. c. Transmit the other signals than predetermined ID codes from the counterpart. d. check if the EUT stops the transmission, or if it displays that identification codes are different from the predetermined ones.

TEST CONFIGURATION



TEST RESULTS

PASS

MAC: A5: 2E: 2C: B1: D3: DA

3.11 Dynamic Frequency Selection

Requirements

the following are the requirements for Client Devices:

- 1) A Client Device will not transmit before having received appropriate control signals from a Master Device.
 - 2) A Client Device will stop all its transmissions whenever instructed by a Master Device to which it is associated and will meet the Channel Move Time and Channel Closing Transmission Time requirements.
- The Client Device will not resume any transmissions until it has again received control signals from a Master Device.
- 3) If a Client Device is performing In-Service Monitoring and detects a Radar Waveform above the DFS Detection Threshold, it will inform the Master Device. This is equivalent to the Master Device detecting the Radar Waveform and d) through f) of section 5.1.1(KDB905462 D02 v02) apply.
 - 4) Irrespective of Client Device or Master Device detection the Channel Move Time and Channel Closing Transmission Time requirements remain the same.

Limit

Parameter	Value
Non-occupancy period	Minimum 30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds See Note 1.
Channel Closing Transmission Time	200 milliseconds + an Aggregate of 60 milliseconds over Remaining 10 second period. See Notes 1 and 2.
U-NII Detection Bandwidth	Minimum 100 % of the U-NII 99 % transmission power bandwidth. See Note 3.

Note 1: Channel Move Time and the Channel Closing Transmission Time should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.

Note 2: The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate a Channel move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.

Note 3: During the U-NII Detection Bandwidth detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.

DFS detection threshold values

The DFS detection thresholds are defined for Master devices and Client Devices with In-service monitoring. These detection thresholds are listed in the following table.

Maximum Transmit Power	Value (See Notes 1 and 2)
EIRP $\geq$ 200 milliwatt	-64 dBm
EIRP $<$ 200 milliwatt and Power spectral $<$ 10 dBm/MHz	-62 dBm
EIRP $<$ 200 milliwatt that do not meet the power spectral density requirement	-64 dBm

Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna.

Calibration:

The EUT is slave equipment with a max gain is 3.15dBi;

For a detection threshold level of -62dBm and the master, Model: GR140IG,

FCC ID: 2AW68-GR140IG) antenna gain is 5.89 dBi, required detection threshold is -64 dBm.

Maximum transmit power is less than 200 milliwatt in this report, so detection threshold level is -62dBm.

Note 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.

Note 3: EIRP is based on the highest antenna. For MIMO devices refer to KDB Publication 662911 D01.

DFS test signals

As the EUT is a Client Device with no Radar Detection only one type radar pulse is required for the testing. Radar Pulse type 0 was used in the evaluation of the Client device for the purpose of measuring the Channel Move Time and the Channel Closing Transmission Time.

Table 5 – Short Pulse Radar Test Waveforms

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

A minimum of 30 unique waveforms are required for each of the Short Pulse Radar Types 2 through 4. If more than 30 waveforms are used for Short Pulse Radar Types 2 through 4, then each additional waveform must also be unique and not repeated from the previous waveforms. If more than 30 waveforms are used for Short Pulse Radar Type 1, then each additional waveform is generated with Test B and must also be unique and not repeated from the previous waveforms in Tests A or B.

Table 6 – Long Pulse Radar Test Waveform

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

The parameters for this waveform are randomly chosen. Thirty unique waveforms are required for the Long Pulse Radar Type waveforms. If more than 30 waveforms are used for the Long Pulse Radar Type waveforms, then each additional waveform must also be unique and not repeated from the previous waveforms.

Table 7 – Frequency Hopping Radar Test Waveform

Radar Type	Pulse Width (μsec)	PRI (μsec)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)	Minimum Percentage of Successful Detection	Minimum Number of Trials
6	1	333	9	0.333	300	70%	30

Table 5a - Pulse Repetition Intervals Values for Test A

Pulse Repetition Frequency Number	Pulse Repetition Frequency (Pulses Per Second)	Pulse Repetition Interval (Microseconds)
1	1930.5	518
2	1858.7	538
3	1792.1	558
4	1730.1	578
5	1672.2	598
6	1618.1	618
7	1567.4	638
8	1519.8	658
9	1474.9	678
10	1432.7	698
11	1392.8	718
12	1355	738
13	1319.3	758
14	1285.3	778
15	1253.1	798
16	1222.5	818
17	1193.3	838
18	1165.6	858
19	1139	878
20	1113.6	898
21	1089.3	918
22	1066.1	938
23	326.2	3066

Manufacturer's Statement Regarding Uniform Channel Spreading

The end product implements an automatic channel selection feature at startup such that operation commences on channels distributed across the entire set of allowed 5GHz channels. This feature will ensure uniform spreading is achieved while avoiding non-allowed channels due to prior radar events.

TEST AND MEASUREMENT SYSTEM

System Overview

The measurement system is based on a conducted test method.

The short pulse and long pulse signal generating system utilizes the NTIA software and the same manufacturer / model Vector Signal Generator as the NTIA. The hopping signal generating system utilizes the simulated hopping method.

The software selects waveform parameters from within the bounds of the signal type on a random basis using uniform distribution. The short pulse types 2, 3 and 4, and the long pulse type 5 parameters are randomized at run-time. The hopping type 6 pulse parameters are fixed while the hopping sequence is based on the August 2005 NTIA Hopping Frequency List, with the initial starting point randomized at run-time.

The signal monitoring equipment consists of a spectrum analyzer with the capacity to display 8192 bins on the horizontal axis. A time-domain resolution of 2 msec / bin is achievable with a 16 second sweep time, meeting the 10 second short pulse reporting criteria. The aggregate ON time is calculated by

multiplying the number of bins above a threshold during a particular observation period by the dwell time per bin, with the analyzer set to peak detection and max hold. A time-domain resolution of 3 msec / bin is achievable with a 24 second sweep time, meeting the 22 second long pulse reporting criteria and allowing a minimum of 10 seconds after the end of the long pulse waveform.

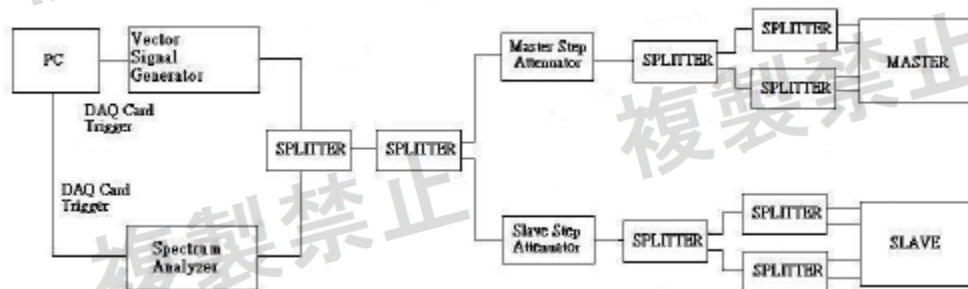
Frequency Hopping Signal Generation

The hopping burst generator is a High Speed Digital I/O card plugged into the control computer. This card utilizes an independent hardware clock reference therefore the output pulse timing is unaffected by host computer operating system latency times.

The software selects the hopping sequence as a 100-length segment of the August 2005 NTIA hopping frequency list. This list contains 274 unique pseudorandom sequences. Each such sequence contains 475 frequencies ordered on a random without replacement basis. Each successive trial uses a contiguous 100-length segment from within each successive 475-length sequence in the list. The initial starting point within the list is randomized at run-time such that the first 100-length segment is entirely contained within the first 475-length sequence. The starting point of each successive trial is incremented by 475.

Each frequency in the 100-length segment is compared to the boundaries of the EUT Detection Bandwidth and the software creates a hopping burst pattern in accordance with Section 7.4.1.3 Method #2 Simulated Frequency Hopping Radar Waveform Generating Subsystem of FCC 06-96 APPENDIX. The frequency of the signal generator is incremented in 1 MHz steps from FL to FH for each successive trial. This incremental sequence is repeated as required to generate a minimum of 30 total trials and to maintain a uniform frequency distribution over the entire Detection Bandwidth.

Conducted Method System Block Diagram



Measurement System Frequency Reference

Lock the signal generator and the spectrum analyzer to the same reference source as follows: Connect the 10 MHz OUT (SWITCHED) on the spectrum analyzer to the 10 MHz IN on the signal generator and set the spectrum analyzer 10 MHz Out to On.

System Calibration

Connect the spectrum analyzer to the test system in place of the master device. Set the signal generator to CW mode. Adjust the amplitude of the signal generator to yield a measured level of -62 dBm on the spectrum analyzer.

Without changing any of the instrument settings, reconnect the spectrum analyzer to the Common port of the Spectrum Analyzer Combiner/Divider and connect a 50 ohm load to the Master Device port of the test system.

Measure the amplitude and calculate the difference from -62 dBm. Adjust the Reference Level Offset of the spectrum analyzer to this difference. Confirm that the signal is displayed at -62 dBm. Readjust the RBW and VBW to 3 MHz, set the span to 10 MHz, and confirm that the signal is still displayed at -62 dBm.

The spectrum analyzer displays the level of the signal generator as received at the antenna ports of the Master Device. The interference detection threshold may be varied from the calibrated value of -62 dBm and the spectrum analyzer will still indicate the level as received by the Master Device.

Set the signal generator to produce a radar waveform, trigger a burst manually and measure the level on the spectrum analyzer. Readjust the amplitude of the signal generator as required so that the peak level of the waveform is at a displayed level equal to the required or desired interference detection threshold. Separate signal generator amplitude settings are determined as required for each radar type.

Interference Detection Threshold Adjustment

Download the applicable radar waveforms to the signal generator. Select the radar waveform, trigger a burst manually and measure the amplitude on the spectrum analyzer. Readjust the amplitude of the

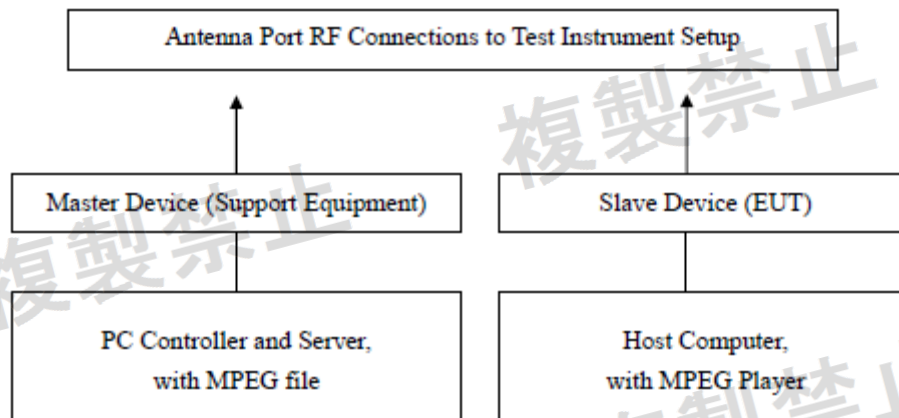
signal generator as required so that the peak level of the waveform is at a displayed level equal to the required or desired interference detection threshold. Separate signal generator amplitude settings are determined as required for each radar type.

Adjustment Of Displayed Traffic Level

Establish a link between the Master and Slave, adjusting the Link Step Attenuator as needed to provide a suitable received level at the Master and Slave devices. Stream the video test file to generate WLAN traffic. Confirm that the WLAN traffic level, as displayed on the spectrum analyzer, is at lower amplitude than the radar detection threshold. Confirm that the displayed traffic is from the Master Device. For Master Device testing confirm that the displayed traffic does not include Slave Device traffic. For Slave Device testing confirm that the displayed traffic does not include Master Device traffic.

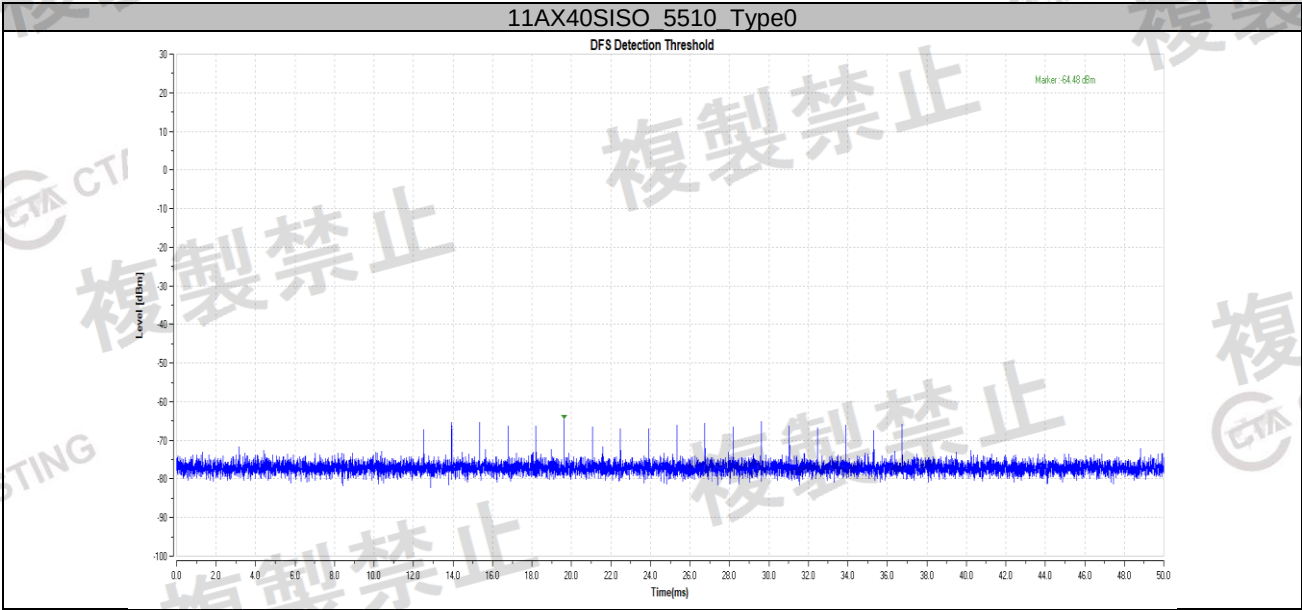
If a different setting of the Master Step Attenuator is required to meet the above conditions, perform a new System Calibration for the new Master Step Attenuator setting.

Test Setup



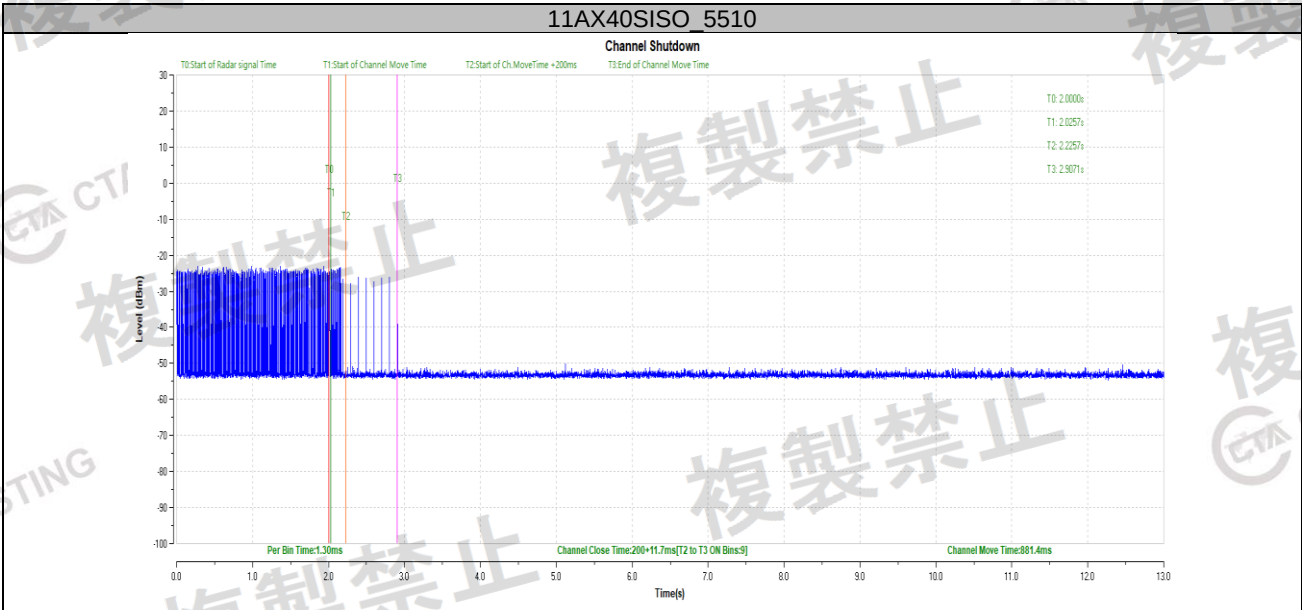
TEST RESULT

TestMode	Frequency[dbm]	Radar Type	Result	Limit[dbm]	Verdict
11AX40SISO	5510	Type0	-64.48	-64.00	PASS



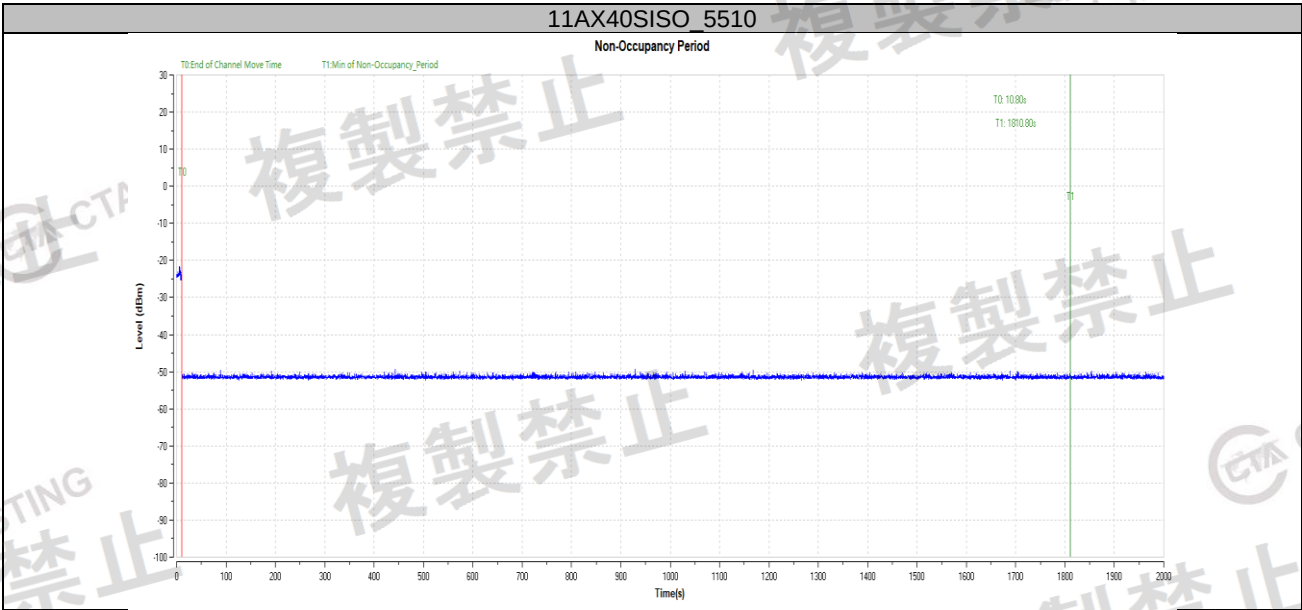
Channel Move Time & Channel Closing Transmission Time

TestMode	Frequency[MHz]	CCTT[ms]	Limit[ms]	CMT[ms]	Limit[ms]	Verdict
11AX40SISO	5510	200+11.7	200+60	881.4	10000	PASS

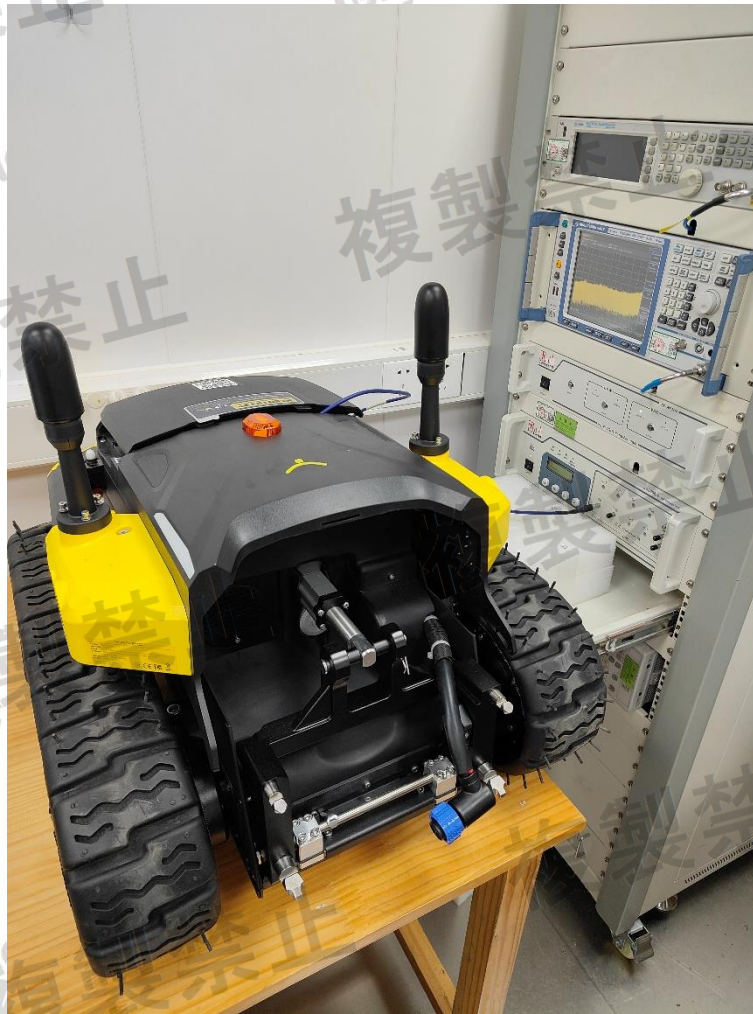


Non-Occupancy Period

TestMode	Frequency[MHz]	Result	Limit[s]	Verdict
11AX40SISO	5510	see test graph	≥1800	PASS



4 Test Setup Photos of the EUT



5 Photos of the EUT

Reference to the test report No. CTA26050600801

***** End of Report *****