

## RADIO TEST REPORT

For

Shenzhen Wesion Technology Co., Ltd.

VIM3

Test Model: VIM3 Pro

List Model No.: VIM3 Basic, VIM3L

Prepared for	:	Shenzhen Wesion Technology Co., Ltd.
Address	:	A#511, Mingyou Purchasing Center, Baoyuan Rd., Xixiang St., Bao'an Dis., Shenzhen, China.
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Date of receipt of test sample	:	Aug 15, 2019
Number of tested samples	:	1
Serial number	:	Prototype
Date of Test	:	Aug 15, 2019~ Aug 23, 2019
Date of Report	:	Aug 27, 2019



# **RADIO TEST REPORT**

## **ETSI EN 300 440 V2.1.1 (2017-03)**

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

**Report Reference No.** ..... : **LCS190814015AEG**

**Date of Issue** ..... : Aug ,27 2019

**Testing Laboratory Name** ..... : **Shenzhen LCS Compliance Testing Laboratory Ltd.**

**Address** ..... : 101, 601, Xingyuan Industrial Park, Gushu Community, Xixiang Street, Bao'an District, Shenzhen, Guangdong, China

**Testing Location/ Procedure** ..... : Full application of Harmonised standards ☒  
Partial application of Harmonised standards ☐  
Other standard testing method ☐

**Applicant's Name** ..... : **Shenzhen Wesion Technology Co., Ltd.**

**Address** ..... : A#511, Mingyou Purchasing Center, Baoyuan Rd., Xixiang St., Bao'an Dis., Shenzhen, China.

### **Test Specification**

**Standard** ..... : ETSI EN 300 440 V2.1.1 (2017-03)

**Test Report Form No.** ..... : LCSEMC-1.0

**TRF Originator** ..... : Shenzhen LCS Compliance Testing Laboratory Ltd.

**Master TRF** ..... : Dated 2017-06

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**Test Item Description** ..... : **VIM3**

**Trade Mark** ..... : Khadas

**Test Model** ..... : VIM3 Pro

**Ratings** ..... : Input:100-240V 0.7A  
Output:5V-3A 9V-2.67A 12V-2A

**Result** ..... : **Positive**

**Compiled by:**

*Jack Liu*

Jack Liu / Administrators

**Supervised by:**

*Aking Jin*

Aking Jin/ Administrators

**Approved by:**

*Gavin Liang*

Gavin Liang/ Manager

**RADIO -- TEST REPORT****Test Report No. : LCS190814015AEG**Aug.27 2019

Date of issue

Test Model..... : VIM3

EUT..... : VIM3 Pro

**Applicant..... : Shenzhen Wesion Technology Co., Ltd.**Address..... : A#511, Mingyou Purchasing Center, Baoyuan Rd., Xixiang St.,  
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Bao'an Dis., Shenzhen, China.

Telephone..... :

Fax..... :

**Factory..... : /**

Address..... : /

Telephone..... :

Fax..... :

**Test Result****Positive**

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.

## Revision History

Revision	Issue Date	Revisions	Revised By
000	Aug ,27 2019	Initial Issue	Gavin Liang

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# 1. GENERAL INFORMATION

## 1.1. Product Description for Equipment Under Test (EUT)

EUT	: VIM3
Model No.	: VIM3 Pro, VIM3 Basic, VIM3L
Model Declaration	: PCB board, structure and internal of these model(s) are the same, So no additional models were tested
Test Model	: VIM3 Pro
Power Supply	: Input:100-240V 0.7A Output:5V-3A 9V-2.67A 12V-2A
Hardware Version	: V12
Software Version	: Android 9.0
Bluetooth	:
Frequency Range	: 2.402-2.480GHz
Channel Number	: 79 channels for Bluetooth V5.0 (BDR/EDR) 40 channels for Bluetooth V5.0 (BT LE)
Channel Spacing	: 1MHz for Bluetooth V5.0 (BDR/EDR) 2MHz for Bluetooth V5.0 (BT LE)
Modulation Type	: GFSK, $\pi/4$ -DQPSK, 8-DPSK for Bluetooth V5.0 (BDR/EDR) GFSK for Bluetooth V5.0 (BT LE)
Bluetooth Version	: V5.0
Antenna Description	: PCB Antenna, 3.7dBi (Max.)
WIFI(2.4G Band)	:
Frequency Range	: 2412-2472MHz
Channel Spacing	: 5MHz
Channel Number	: 13 Channel for 20MHz bandwidth(2412~2472MHz)
Modulation Type	: 802.11b: DSSS; 802.11g/n: OFDM
Antenna Description	: PCB Antenna, 3.7dBi (Max.)
WIFI(5.2G Band)	:
Frequency Range	: 5180-5240MHz
Channel Number	: 4 Channels for 20MHz bandwidth(5180-5240MHz) 2 channels for 40MHz bandwidth(5190~5230MHz)
Modulation Type	: 802.11a/n: OFDM
Antenna Description	: PCB Antenna, 3.38dBi (Max.)
SRD(5.8G Band)	:
Frequency Range	: 5745-5825MHz
Channel Number	: 5 channels for 20MHz bandwidth(5745-5825MHz) 2 channels for 40MHz bandwidth(5755~5795MHz) 1 channels for 80MHz bandwidth(5775MHz)
Modulation Type	: IEEE 802.11a/n/ac: OFDM(64QAM, 16QAM, QPSK, BPSK)
Antenna Description	: PCB Antenna, 3.38dBi (Max.)

## 1.2. Objective

This Type approval report is prepared on behalf of **Shenzhen Wesion Technology Co., Ltd.** in accordance with ETSI EN 300 440 V2.1.1 (2017-03), 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.

The objective is to determine compliance with ETSI EN 300 440 V2.1.1 (2017-03).

## 1.3. Related Submittal(s)/Grant(s)

No Related Submittals.

## 1.4. Test Methodology

All measurements contained in this report were conducted with ETSI EN 300 440 V2.1.1 (2017-03).

## 1.5. Facilities

All measurement facilities used to collect the measurement data are located at 101, 601, Xingyuan Industrial Park, Gushu Community, Xixiang Street, Bao'an District, Shenzhen, Guangdong, China. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

## 1.6. Support Equipment List

Manufacturer	Description	Model	Serial Number	Certificate
--	--	--	--	--

## 1.7. External I/O Cable

I/O Port Description	Quantity	Cable
Micro USB	1	USB Cable: 0.8m, unshielded

## 1.8. Laboratory Accreditations and Listings

### Site Description

EMC Lab. : FCC Registration Number is 254912.  
Industry Canada Registration Number is 9642A-1.  
EMSD Registration Number is ARCB0108.  
UL Registration Number is 100571-492.  
TUV SUD Registration Number is SCN1081.  
TUV RH Registration Number is UA 50296516-001.  
NVLAP Accreditation Code is 600167-0.  
FCC Designation Number is CN5024.  
CAB identifier is CN0071.

## 1.9. Measurement Uncertainty

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	MXA Signal Analyzer	Agilent	N9020A	MY49100060	2018-11-15	2019-11-14
2	DC Power Supply	Agilent	E3642A	N/A	2018-11-15	2019-11-14
3	Temperature & Humidity Chamber	GUANGZHOU GOGN WEN	GDS-100	70932	2018-10-10	2019-10-09
4	EMI Test Software	AUDIX	E3	/	N/A	N/A
5	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	2019-06-12	2020-06-11
6	Positioning Controller	MF	MF-7082	/	2019-06-12	2020-06-11
7	Active Loop Antenna	SCHWARZBECK	FMZB 1519B	00005	2019-07-26	2019-07-25
8	By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2019-07-26	2019-07-25
9	Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1925	2019-07-02	2020-07-01
10	EMI Test Receiver	R&S	ESR 7	101181	2019-06-12	2020-06-11
11	RS SPECTRUM ANALYZER	R&S	FSP40	100503	2018-11-15	2019-11-14
12	Broadband Preamplifier	/	BP-01M18G	P190501	2019-07-01	2020-06-30
13	RF Cable-R03m	Jye Bao	RG142	CB021	2019-06-12	2020-06-11
14	RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	2019-06-12	2020-06-11
15	ESG Vector Signal Generator	Agilent	E4438C	MY42081396	2018-11-15	2019-11-14
16	ESG Vector Signal Generator	Agilent	E4438C	MY49072627	2019-06-11	2020-06-10

Note: All equipment is calibrated through GUANGZHOU LISAI CALIBRATION AND TEST CO.,LTD.



### 1.10. Measurement Uncertainty

Test Item		Uncertainty
Radio Frequency	:	$0.9 \times 10^{-4}$
Total RF Power, Conducted	:	1.0 dB
RF Power Density, Conducted	:	1.8 dB
Spurious Emissions, Conducted	:	1.8 dB
All Emissions, Radiated	:	3.1 dB
Temperature	:	0.5°C
Humidity	:	1 %
DC And Low Frequency Voltages	:	1 %

### 1.11. Description Of Test Modes

LCS has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Test Mode
Mode 1: Transmit by 802.11a
Mode 2: Transmit by 802.11n(20MHz)
Mode 3: Transmit by 802.11n(40MHz)
Mode 4: Transmit by 802.11ac(80MHz)
Mode 5: Receive by 802.11a
Mode 6: Receive by 802.11n(20MHz)
Mode 7: Receive by 802.11n(40MHz)
Mode 8: Receive by 802.11ac(80MHz)

Note:

- (1) For portable device, radiated spurious emission was verified over X, Y, Z Axis, and shown the worst case on this report.
- (2) Regard to the frequency band operation for systems using Wide Band modulation: the lowest, middle, highest frequency channel for conducted test, and the lowest, highest frequency channel for radiation spurious test.
- (3) The extreme test condition for voltage and temperature were declared by the manufacturer.

\*\*\*Note: The EUT was programmed to transmit continuously during testing (duty cycle = 100%).

## **2. SYSTEM TEST CONFIGURATION**

### **2.1. Justification**

The system was configured for testing in engineering mode.

### **2.2. EUT Exercise Software**

N/A.

### **2.3. Special Accessories**

N/A.

### **2.4. Block Diagram/Schematics**

Please refer to the related document.

### **2.5. Equipment Modifications**

Shenzhen LCS Compliance Testing Laboratory Ltd. has not done any modification on the EUT.

### **2.6. Configuration of Test Setup**

Please refer to the test setup photo.

### 3. SUMMARY OF TEST RESULTS

RULES ETSI EN 300 440 V2.1.1 (2017-03)	DESCRIPTION OF TEST	RESULT
§ 4.2.2	Equivalent isotropically radiated power (EIRP)	Compliant
§ 4.2.3	Permitted range of operating frequencies	Compliant
§ 4.2.4	Unwanted emissions in the spurious domain	Compliant
§ 4.2.5	Duty cycle	Compliant
§ 4.3.3	Adjacent channel selectivity	Compliant
§ 4.3.4	Blocking or desensitization	Compliant
§ 4.3.5	Spurious radiations	Compliant
§ 4.4	Spectrum access techniques	N/A

*Note: "N/A" means this test item is not applicable.*

## 4. EQUIVALENT ISOTROPICALLY RADIATED POWER (EIRP)

### 4.1. Definition and Limit

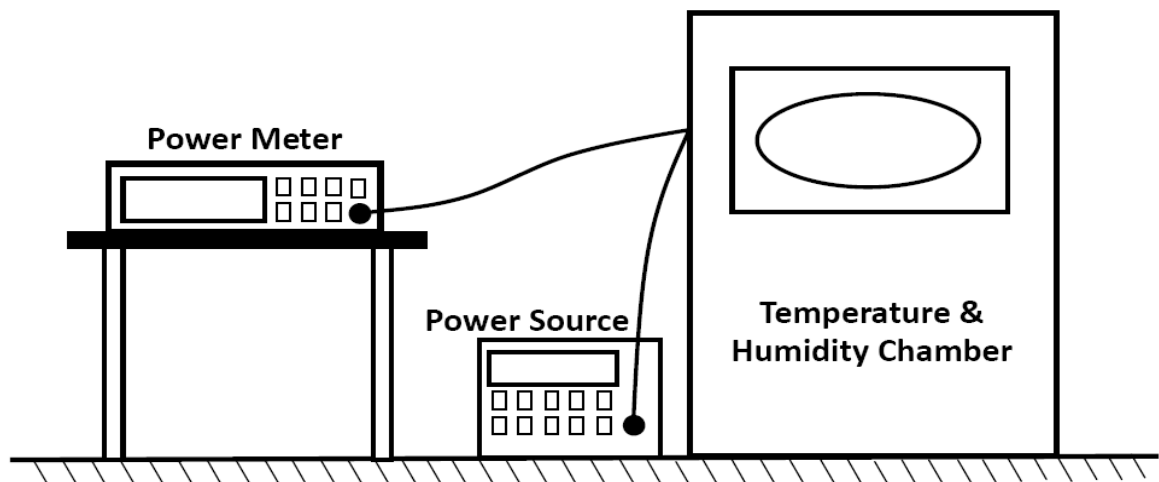
The e.i.r.p. is defined as the maximum radiated power of the transmitter and its antenna.

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

Frequency Bands	Power	Application
2 400 MHz to 2 483,5 MHz	10 mW e.i.r.p.	Generic use
2 400 MHz to 2 483,5 MHz	25 mW e.i.r.p.	Detection, movement and alert applications
(a) 2 446 MHz to 2 454 MHz	500 mW e.i.r.p.	RFID
(b) 2 446 MHz to 2 454 MHz	4 W e.i.r.p.	RFID
5 725 MHz to 5 875 MHz	25 mW e.i.r.p.	Generic use
9 200 MHz to 9 500 MHz	25 mW e.i.r.p.	Radiodetermination: radar, detection, movement and alert applications
9 500 MHz to 9 975 MHz	25 mW e.i.r.p.	Radiodetermination: Radar, detection, movement and alert applications
10,5 GHz to 10,6 GHz	500 mW e.i.r.p.	Radiodetermination: Radar, detection, movement and alert applications
13,4 GHz to 14,0 GHz	25 mW e.i.r.p.	Radiodetermination: Radar, detection, movement and alert applications
17,1 GHz to 17,3 GHz	400 mW e.i.r.p.	Radiodetermination: GBSAR detection, movement and alert applications
24,00 GHz to 24,25 GHz	100 mW e.i.r.p.	Generic use and Radiodetermination: radar, detection, movement and alert applications

## 4.2. Test Procedure

The equipment shall be able to operate in a continuous transmit mode for testing purposes.  
Please refer to ETSI EN 300 440 V2.1.1 (2017-03) clause 4.4.2.3 for the measurement method.



### 4.3. Test Result

#### Environmental Conditions

Temperature/ Humidity:	24.1° C/ 54.1%	ATM Pressure:	100.9 kPa
Operator:	Wang Chuang	Conclusion:	Pass

#### EIRP(802.11a)---Transmitter

Temperature (°C)	Power Supplied (V)	Test Result (EIRP, dBm)			Limit dBm
		Channel 149	Channel 157	Channel 165	
-20	DC 4.5V	9.62	9.22	9.72	14
	DC 5.0V	9.82	9.66	9.68	14
	DC 5.5V	9.46	9.06	9.60	14
25	DC 4.5V	9.61	9.68	9.33	14
	DC 5.0V	9.30	9.32	9.73	14
	DC 5.5V	9.18	9.24	9.62	14
45	DC 4.5V	9.22	9.80	9.46	14
	DC 5.0V	9.59	9.08	9.56	14
	DC 5.5V	9.75	9.05	9.23	14

#### EIRP(802.11n20)---Transmitter

Temperature (°C)	Power Supplied (V)	Test Result (EIRP, dBm)			Limit dBm
		Channel 149	Channel 157	Channel 165	
-20	DC 4.5V	9.29	9.50	9.06	14
	DC 5.0V	9.21	9.67	9.31	14
	DC 5.5V	9.49	9.52	9.04	14
25	DC 4.5V	9.55	9.00	9.01	14
	DC 5.0V	9.04	9.23	9.02	14
	DC 5.5V	9.24	9.52	9.63	14
45	DC 4.5V	9.56	9.68	9.50	14
	DC 5.0V	9.16	9.30	9.49	14
	DC 5.5V	9.58	9.95	9.49	14

#### EIRP(802.11n40)---Transmitter

Temperature (°C)	Power Supplied (V)	Test Result (EIRP, dBm)			Limit dBm
		Channel 151	Channel 159	/	
-20	DC 4.5V	8.25	8.07	/	14
	DC 5.0V	8.53	8.84	/	14
	DC 5.5V	8.19	8.64	/	14
25	DC 4.5V	8.42	8.75	/	14
	DC 5.0V	8.87	8.15	/	14
	DC 5.5V	8.47	8.34	/	14
45	DC 4.5V	8.29	8.05	/	14
	DC 5.0V	8.29	8.23	/	14
	DC 5.5V	8.85	8.01	/	14

EIRP(802.11ac80)---Transmitter			
Temperature (°C)	Power Supplied (V)	Test Result (EIRP, dBm)	Limit dBm
		Channel 155	
		MAIN	
-10	DC 4.5V	5.17	14
	DC 5.0V	5.83	14
	DC 5.5V	5.69	14
25	DC 4.5V	5.40	14
	DC 5.0V	5.63	14
	DC 5.5V	5.67	14
40	DC 4.5V	5.43	14
	DC 5.0V	5.66	14
	DC 5.5V	5.08	14

## 5. PERMITTED RANGE OF OPERATING FREQUENCIES

### 5.1. Definition and Limit

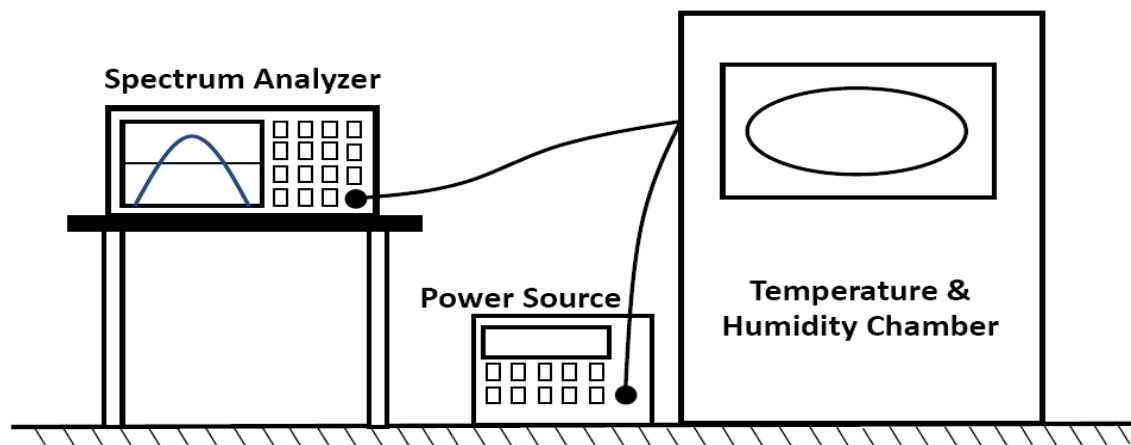
The permitted range of operating frequencies includes all frequencies on which the equipment may operate within an assigned frequency band. The operating frequency range shall be declared by the manufacturer.

The width of the power envelope is  $f_H - f_L$  for a given operating frequency. In equipment that allows adjustment or selection of different operating frequencies, the power envelope takes up different positions in the allowed band. The frequency range is determined by lowest value of  $f_L$  and the highest value of  $f_H$  resulting from the adjustment of the equipment to the lowest and highest operating frequencies.

### 5.2. Test Procedure

The equipment shall be able to operate in a continuous transmit mode for testing purposes.

Please refer to ETSI EN 300 440 V2.1.1 (2017-03) clause 4.2.3.3 for the measurement method.



### 5.3. Test Result

#### Environmental Conditions

Temperature/ Humidity:	24.1° C/ 54.1%	ATM Pressure:	100.9 kPa
Operator:	Wang Chuang	Conclusion:	Pass

Please refer to the following page.



Test Mode: Tx, OFDM---Transmitter

**802.11a**

Test Conditions		Frequency (MHz) at -30dBm/30KHz	
Temperature	Voltage(V)	f <sub>L</sub> at Low Channel >5725MHz	f <sub>H</sub> at High Channel (<5875MHz)
T <sub>min</sub> = -20℃	DC 4.5V	5729.68	5743.45
	DC 5.0V	5729.16	5743.36
	DC 5.5V	5729.86	5743.17
T <sub>nor</sub> = 25℃	DC 4.5V	5729.15	5743.36
	DC 5.0V	5729.52	5743.15
	DC 5.5V	5729.36	5743.45
T <sub>max</sub> =45℃	DC 4.5V	5729.54	5743.25
	DC 5.0V	5729.26	5743.15
	DC 5.5V	5729.62	5743.63
Limit	f <sub>H</sub> (5875MHz) - f <sub>L</sub> (5725MHz) = 150MHz		

**802.11n20**

Test Conditions		Frequency (MHz) at -30dBm/30KHz	
Temperature	Voltage(V)	f <sub>L</sub> at Low Channel >5725MHz	f <sub>H</sub> at High Channel (<5875MHz)
T <sub>min</sub> = -20℃	DC 4.5V	5729.68	5743.47
	DC 5.0V	5729.78	5743.51
	DC 5.5V	5729.51	5743.26
T <sub>nor</sub> = 25℃	DC 4.5V	5729.48	5743.32
	DC 5.0V	5729.59	5743.48
	DC 5.5V	5729.25	5743.62
T <sub>max</sub> =45℃	DC 4.5V	5729.52	5743.21
	DC 5.0V	5729.15	5743.26
	DC 5.5V	5729.35	5743.65
Limit	f <sub>H</sub> (5875MHz) - f <sub>L</sub> (5725MHz) = 150MHz		

**802.11n40**

Test Conditions		Frequency (MHz) at -30dBm/30KHz	
Temperature	Voltage(V)	f <sub>L</sub> at Low Channel >5725MHz	f <sub>H</sub> at High Channel (<5875MHz)
T <sub>min</sub> = -20℃	DC 4.5V	5730.32	5828.25
	DC 5.0V	5729.16	5828.14
	DC 5.5V	5730.26	5828.15
T <sub>nor</sub> = 25℃	DC 4.5V	5729.51	5828.62
	DC 5.0V	5730.82	5829.41
	DC 5.5V	5729.31	5828.15
T <sub>max</sub> =45℃	DC 4.5V	5730.81	5829.35
	DC 5.0V	5729.21	5829.25
	DC 5.5V	5730.33	5829.15
Limit	f <sub>H</sub> (5875MHz) - f <sub>L</sub> (5725MHz) = 150MHz		

**802.11ac80**

Test Conditions		Frequency (MHz) at -30dBm/30KHz	
Temperature	Voltage(V)	f <sub>L</sub> at Low Channel >5725MHz	f <sub>H</sub> at High Channel (<5875MHz)
T <sub>min</sub> = -10°C	DC 4.5V	5737.26	5812.30
	DC 5.0V	5737.39	5812.27
	DC 5.5V	5737.20	5812.46
T <sub>nor</sub> = 25°C	DC 4.5V	5737.94	5812.32
	DC 5.0V	5737.86	5812.08
	DC 5.5V	5737.59	5812.34
T <sub>max</sub> =40°C	DC 4.5V	5737.21	5812.85
	DC 5.0V	5737.36	5812.78
	DC 5.5V	5737.10	5812.23
Limit	f <sub>H</sub> (5875MHz) - f <sub>L</sub> (5725MHz) = 150MHz		

## 6. DUTY CYCLE

### 6.1. Definition and Limit

For the purposes of the present document the duty cycle is defined as the ratio, expressed as a percentage, of the maximum transmitter "on" time monitored over one hour, relative to a one hour period. The device may be triggered either automatically or manually and depending on how the device is triggered will also depend on whether the duty cycle is fixed or random.

For automatic operated devices, either software controlled or pre-programmed devices, the provider shall declare the duty cycle for the equipment under test.

For manual operated or event dependant devices, with or without software controlled functions, the provider shall declare whether the device once triggered, follows a pre-programmed cycle, or whether the transmitter remains on until the trigger is released or the device is manually reset. The provider shall also give a description of the application for the device and include a typical usage pattern. The typical usage pattern as declared by the provider shall be used to determine the duty cycle and compare to the limit.

For manual operated or event dependant devices, with or without software controlled functions, the provider shall declare whether the device once triggered, follows a pre-programmed cycle, or whether the transmitter remains on until the trigger is released or the device is manually reset. The provider shall also give a description of the application for the device and include a typical usage pattern. The typical usage pattern as declared by the provider shall be used to determine the duty cycle and compare to the limit.

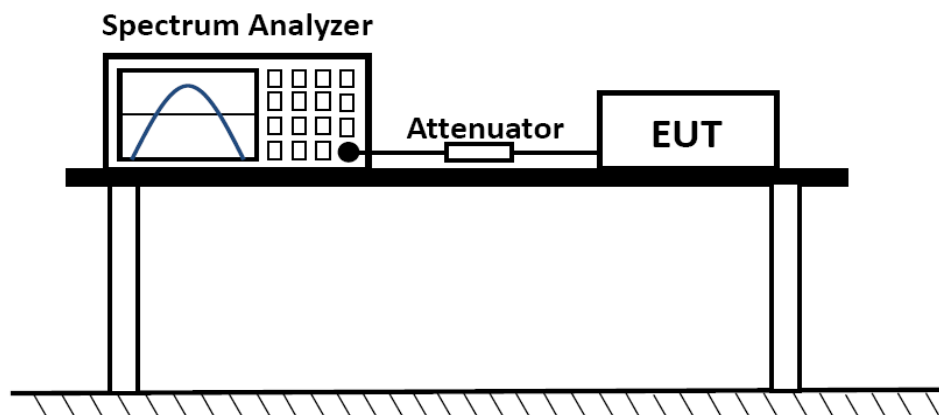
For devices with a 100 % duty cycle transmitting an unmodulated carrier most of the time, a time-out shut-off facility shall be implemented in order to improve the efficient use of spectrum. The method of implementation shall be declared by the provider.

**Table Duty Cycle Limits**

Frequency Band	Duty cycle	Application
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
(b) 2 446 MHz to 2 454 MHz	≤ 15 %	RFID
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
24,00 GHz to 24,25 GHz	No Restriction	Generic use and for Radiodetermination: radar, detection, movement and alert applications

## 6.2. Test Procedure

Please refer to ETSI EN 300 440 V2.1.1 (2017-03) clause 4.2.5.3 for the measurement method.



## 6.3. Test Result

The EUT was programmed to transmit continuously during testing (duty cycle = 100%).

## 7. UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN

### 7.1. Definition and Limit

Unwanted emissions in the spurious domain (spurious emissions) are those at frequencies beyond the limit of 250 % of the necessary bandwidth above and below the centre frequency of the emission.

The spurious emissions of the transmitter shall not exceed the values in following tables:

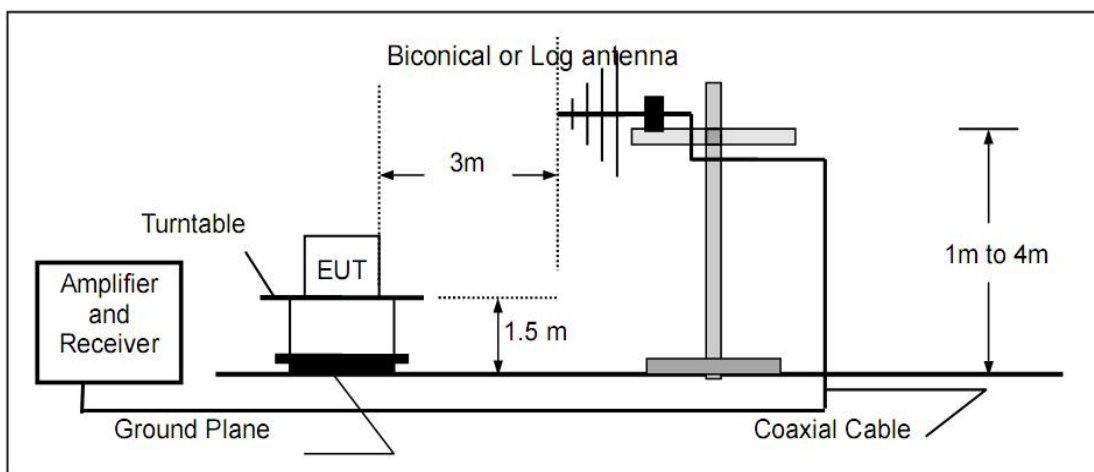
**Table:** spurious emissions

Frequency ranges	47 MHz to 74 MHz 87,5 MHz to 108 MHz 174 MHz to 230 MHz 470 MHz to 862 MHz	Other frequencies $\leq 1\,000$ MHz	Frequencies $> 1\,000$ MHz
State			
Operating	4 nW	250 nW	1 $\mu$ W
Standby	2 nW	2 nW	20 nW

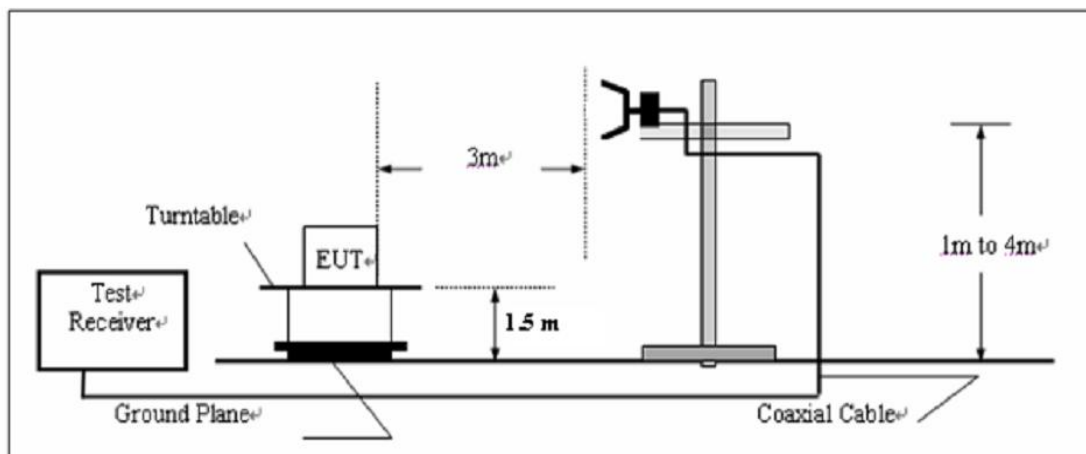
### 7.2. Test Procedure

Please refer to ETSI EN 300 440 V2.1.1 (2017-03) clause 4.2.4.3 for the measurement method.

Radiated Below 1GHz

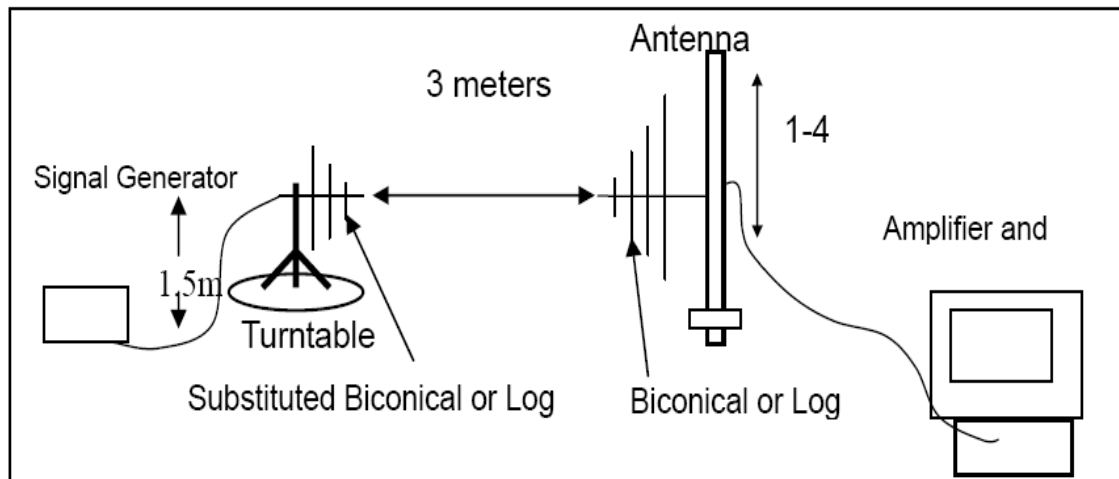


Radiated Above 1GHz

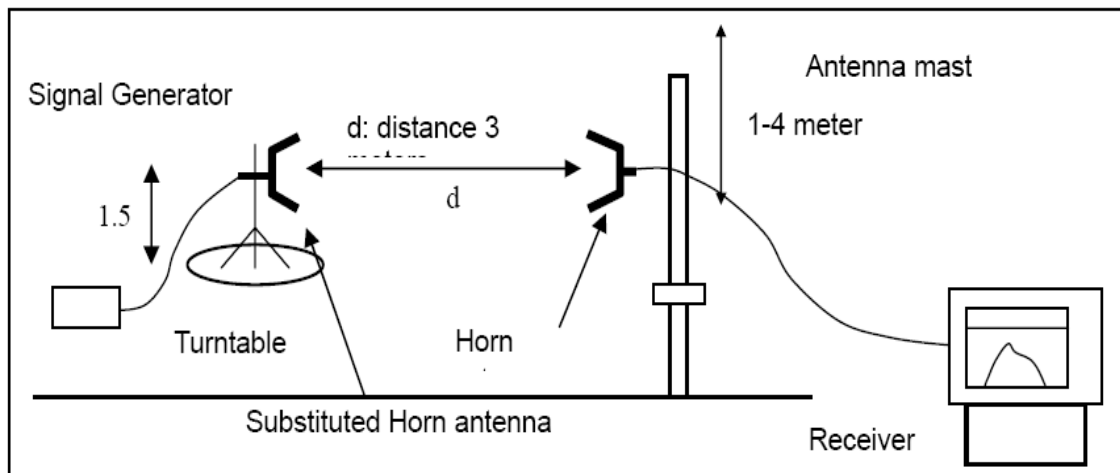


**Substitution Method: (Radiated Emissions)**

Radiated Below 1GHz



Radiated Above 1 GHz



### 7.3. Test Result

#### Environmental Conditions

Temperature/ Humidity:	24.1° C/ 54.1%	ATM Pressure:	100.9 kPa
Operator:	Wang Chuang	Conclusion:	Pass

Test Result of Unwanted Emissions In The Spurious Domain (802.11a)				
Frequency (MHz)	Test Data		Limit (dBm)	Conclusion
	Polarization	Level (dBm)		
Lowest Channel				
93.01	Vertical	-66.64	-54.00	Pass
745.09	V	-63.40	-36.00	
11490.00	V	-62.85	-30.00	
17235.00	V	-58.38	-30.00	
76.88	Horizontal	-67.64	-36.00	
154.32	H	-63.21	-54.00	
11490.00	H	-61.52	-30.00	
17235.00	H	-58.17	-30.00	
Middle Channel				
131.88	Vertical	-67.92	-36.00	Pass
564.29	V	-65.51	-36.00	
11570.00	V	-62.06	-30.00	
17355.00	V	-61.17	-30.00	
145.70	Horizontal	-69.58	-36.00	
605.66	H	-62.33	-54.00	
11570.00	H	-60.69	-30.00	
17355.00	H	-60.63	-30.00	
Highest Channel				
224.42	Vertical	-70.09	-36.00	Pass
786.21	V	-64.28	-36.00	
11650.00	V	-61.32	-30.00	
17475.00	V	-59.21	-30.00	
83.19	Horizontal	-67.81	-36.00	
466.37	H	-64.74	-54.00	
11650.00	H	-61.40	-30.00	
17475.00	H	-59.25	-30.00	

Test Result of Unwanted Emissions In The Spurious Domain (802.11n20)				
Frequency (MHz)	Test Data		Limit (dBm)	Conclusion
	Polarization	Level (dBm)		
Lowest Channel				
96.73	Vertical	-68.69	-54.00	Pass
746.04	V	-63.54	-36.00	
11490.00	V	-62.54	-30.00	
17235.00	V	-57.75	-30.00	
76.49	Horizontal	-67.73	-36.00	
157.74	H	-64.64	-54.00	
11490.00	H	-61.44	-30.00	
17235.00	H	-59.87	-30.00	
Middle Channel				
130.86	Vertical	-68.84	-36.00	Pass
563.12	V	-63.79	-36.00	
11570.00	V	-61.62	-30.00	
17355.00	V	-58.79	-30.00	
147.23	Horizontal	-69.03	-36.00	
605.26	H	-62.24	-54.00	
11570.00	H	-61.64	-30.00	
17355.00	H	-60.35	-30.00	
Highest Channel				
228.43	Vertical	-69.34	-36.00	Pass
787.38	V	-63.23	-36.00	
11650.00	V	-63.28	-30.00	
17475.00	V	-60.94	-30.00	
81.29	Horizontal	-68.28	-36.00	
464.78	H	-64.39	-54.00	
11650.00	H	-62.17	-30.00	
17475.00	H	-59.00	-30.00	



Test Result of Unwanted Emissions In The Spurious Domain (802.11n40)				
Frequency (MHz)	Test Data		Limit (dBm)	Conclusion
	Polarization	Level (dBm)		
Lowest Channel				
91.26	Vertical	-67.14	-56.00	Pass
746.36	V	-62.82	-36.00	
11510.00	V	-61.40	-30.00	
17265.00	V	-60.61	-30.00	
76.27	Horizontal	-69.76	-36.00	
154.77	H	-63.54	-36.00	
11510.00	H	-60.30	-30.00	
17265.00	H	-59.02	-30.00	
Highest Channel				
226.60	Vertical	-68.78	-36.00	Pass
785.25	V	-65.97	-36.00	
11590.00	V	-60.60	-30.00	
17385.00	V	-60.98	-30.00	
81.82	Horizontal	-67.94	-36.00	
464.05	H	-64.71	-36.00	
11590.00	H	-61.02	-30.00	
17385.00	H	-61.43	-30.00	

Test Result of Unwanted Emissions In The Spurious Domain (802.11n40)				
Frequency (MHz)	Test Data		Limit (dBm)	Conclusion
	Polarization	Level (dBm)		
Lowest Channel				
91.26	Vertical	-67.14	-54.00	Pass
746.36	V	-62.82	-36.00	
11510.00	V	-61.40	-30.00	
17265.00	V	-60.61	-30.00	
76.27	Horizontal	-69.76	-36.00	
154.77	H	-63.54	-36.00	
11510.00	H	-60.30	-30.00	
17265.00	H	-59.02	-30.00	
Highest Channel				
226.60	Vertical	-68.78	-36.00	Pass
785.25	V	-65.97	-36.00	
11590.00	V	-60.60	-30.00	
17385.00	V	-60.98	-30.00	
81.82	Horizontal	-67.94	-36.00	
464.05	H	-64.71	-36.00	
11590.00	H	-61.02	-30.00	
17385.00	H	-61.43	-30.00	

Test Result of Unwanted Emissions In The Spurious Domain (802.11ac80)				
Frequency (MHz)	Test Data		Limit (dBm)	Conclusion
	Polarization	Level (dBm)		
95.73	Vertical	-64.97	-54.00	Pass
284.41	V	-69.31	-36.00	
11549.26	V	-53.11	-30.00	
17325.49	V	-48.42	-30.00	
175.04	Horizontal	-66.62	-54.00	
561.93	H	-64.43	-54.00	
11551.08	H	-52.13	-30.00	
17325.36	H	-51.30	-30.00	

## 8. ADJACENT CHANNEL SELECTIVITY

### 8.1. Definition and Limit

The adjacent channel selectivity is a measure of the capability of the receiver to operate satisfactorily in the presence of an unwanted signal that differs in frequency from the wanted signal by an amount equal to the adjacent channel. The adjacent channel selectivity of the equipment under specified conditions shall not be less than the levels of the unwanted signal as stated in table 6.

**Table 6: Limit for adjacent channel selectivity**

Receiver category	Limit
1	-30 dBm + 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:

- $-40 < k < 0$  dB.

### 8.2. Test Procedure

Please refer to ETSI EN 300 440 clause 4.3.3.3 for the measurement method.

### 8.3. Test Result

#### Environmental Conditions

Temperature/ Humidity:	24.1° C/ 54.1%	ATM Pressure:	100.9 kPa
Operator:	Wang Chuang	Conclusion:	Pass

Receiver category: 1								
Test Channel (Worst Case)		The signal of adjacent channel(signal generator B)						
		Adjacent channel		BW (MHz)	K (dB)	Test Value (dBm)	Limit (dBm)	Verdict
157	5785MHz	153	5765MHz(lower)	20	-28.35	-47.13	$\geq -58.26$	Pass
		161	5805MHz(upper)	20	-28.35	-49.27	$\geq -58.26$	Pass
151	5755MHz	/	5715MHz(lower)	40	-31.17	-58.71	$\geq -61.22$	Pass
		159	5805MHz(upper)	40	-31.17	-60.25	$\geq -61.22$	Pass
155	5775MHz	/	5715MHz(lower)	80	-34.25	-60.36	$\geq -64.26$	Pass
		/	5805MHz(upper)	80	-34.25	-62.41	$\geq -64.26$	Pass

Note: The BW(channel bandwidth) is declared by the manufacturer of the equipment.

## 9. BLOCKING OR DESENSITIZATION

### 9.1. Definition and Limit

Blocking is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted input signal at any frequencies other than those of the spurious responses or the adjacent channels or bands, see clauses 4.3.3 and 4.3.4.

The blocking level, for any frequency within the specified ranges, shall not be less than the values given in table 7, except at frequencies on which spurious responses are found.

**Table 7: Limits for blocking or desensitization**

Receiver category	Limit
1	-30 dBm + k
2	-45 dBm + k
3	No limit

The correction factor, k, is as follows:

Where:

- f is the frequency in GHz;
- BW is the channel bandwidth in MHz.

The factor k is limited within the following:

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

### 9.2. Test Procedure

Please refer to ETSI EN 300 440 clause 4.3.4.3 for the measurement method.

### 9.3. Test Result

#### Environmental Conditions

Temperature/ Humidity:	24.1° C/ 54.1%	ATM Pressure:	100.9 kPa
Operator:	Wang Chuang	Conclusion:	Pass

Receiver category: 1									
Test Channel (Worst Case)		Lower or upper	Spacing	Frequency (MHz)	BW (MHz)	K (dB)	Test Value (dBm)	Limit (dBm)	Verdict
157	5785MHz	Lower	10*BW	5575	20	-28.26	-17.76	≥-58.26	Pass
			20*BW	5375	20	-28.26	-9.85	≥-58.26	Pass
			50*BW	4775	20	-28.26	-6.89	≥-58.26	Pass
		Upper	10*BW	5995	20	-28.26	-13.36	≥-58.26	Pass
			20*BW	6195	20	-28.26	-7.89	≥-58.26	Pass
			50*BW	6795	20	-28.26	-6.18	≥-58.26	Pass
151	5755MHz	Lower	10*BW	5325	40	-31.22	-5.67	≥-61.22	Pass
			20*BW	4925	40	-31.22	1.22	≥-61.22	Pass
			50*BW	3725	40	-31.22	6.17	≥-61.22	Pass
		Upper	10*BW	6175	40	-31.22	-1.41	≥-61.22	Pass
			20*BW	6575	40	-31.22	5.24	≥-61.22	Pass
			50*BW	7775	40	-31.22	6.25	≥-61.22	Pass
155	5775MHz	Lower	10*BW	4935	80	-34.26	1.87	≥-64.26	Pass
			20*BW	4135	80	-34.26	8.68	≥-64.26	Pass
			50*BW	1735	80	-34.26	13.62	≥-64.26	Pass
		Upper	10*BW	6615	80	-34.26	5.91	≥-64.26	Pass
			20*BW	7415	80	-34.26	12.75	≥-64.26	Pass
			50*BW	9815	80	-34.26	13.57	≥-64.26	Pass

Note: The BW(channel bandwidth) is declared by the manufacturer of the equipment.

## 10. SPURIOUS RADIATIONS

### 10.1. Definition and Limit

Spurious radiations from the receiver are components at any frequency, radiated by the equipment and antenna.

These requirements do not apply to receivers used in combination with permanently co-located transmitters continuously transmitting. Co-located is defined as < 3 m. In these cases the receivers will be tested together with the transmitter in operating mode.

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.

### 10.2. Test Procedure

Please refer to ETSI EN 300 440 V2.1.1 (2017-03) clause 4.3.5.3 for the measurement method.

### 10.3. Test Result

#### Environmental Conditions

Temperature/ Humidity:	24.1° C/ 54.1%	ATM Pressure:	100.9 kPa
Operator:	Wang Chuang	Conclusion:	Pass

Test Result of Spurious Radiations (802.11a)				
Frequency (MHz)	Test Data		Limit (dBm)	Conclusion
	Polarization	Level (dBm)		
Lowest Channel				
96.23	Vertical	-71.10	-57.00	Pass
743.35	V	-65.04	-57.00	
11490.00	V	-62.39	-47.00	
17235.00	V	-60.72	-47.00	
73.56	Horizontal	-67.46	-57.00	
152.83	H	-65.36	-57.00	
11490.00	H	-62.31	-47.00	
17235.00	H	-62.31	-47.00	
Middle Channel				
133.80	Vertical	-70.08	-57.00	Pass
561.74	V	-65.55	-57.00	
11570.00	V	-60.25	-47.00	
17355.00	V	-56.95	-47.00	
148.10	Horizontal	-69.30	-57.00	
605.82	H	-61.21	-57.00	
11570.00	H	-62.09	-47.00	
17355.00	H	-61.38	-47.00	
Highest Channel				
224.41	Vertical	-69.14	-57.00	Pass
786.49	V	-61.94	-57.00	
11650.00	V	-61.22	-47.00	
17475.00	V	-58.91	-47.00	
82.83	Horizontal	-67.96	-57.00	
467.27	H	-66.87	-57.00	
11650.00	H	-61.35	-47.00	
17475.00	H	-58.79	-47.00	

Test Result of Spurious Radiations (802.11n20)				
Frequency (MHz)	Test Data		Limit (dBm)	Conclusion
	Polarization	Level (dBm)		
Lowest Channel				
91.36	Vertical	-67.46	-57.00	Pass
741.44	V	-66.90	-57.00	
11490.00	V	-60.59	-47.00	
17235.00	V	-59.29	-47.00	
75.55	Horizontal	-67.38	-57.00	
153.31	H	-60.51	-57.00	
11490.00	H	-59.38	-47.00	
17235.00	H	-58.88	-47.00	
Middle Channel				
129.29	Vertical	-67.88	-57.00	Pass
566.31	V	-66.09	-57.00	
11570.00	V	-59.37	-47.00	
17355.00	V	-61.02	-47.00	
148.83	Horizontal	-69.55	-57.00	
609.58	H	-63.10	-57.00	
11570.00	H	-60.81	-47.00	
17355.00	H	-61.46	-47.00	
Highest Channel				
224.66	Vertical	-66.27	-57.00	Pass
786.96	V	-65.84	-57.00	
11650.00	V	-63.09	-47.00	
17475.00	V	-59.59	-47.00	
84.48	Horizontal	-64.02	-57.00	
469.42	H	-68.12	-57.00	
11650.00	H	-59.61	-47.00	
17475.00	H	-59.65	-47.00	



Test Result of Spurious Radiations (802.11n40)				
Frequency (MHz)	Test Data		Limit (dBm)	Conclusion
	Polarization	Level (dBm)		
Lowest Channel				
62.79	Vertical	-66.54	-57.00	Pass
919.50	V	-74.04	-57.00	
1472.31	V	-65.45	-47.00	
1952.30	V	-65.67	-47.00	
393.96	Horizontal	-68.12	-57.00	
422.13	H	-74.07	-57.00	
1538.53	H	-63.03	-47.00	
2150.76	H	-63.57	-47.00	
Highest Channel				
62.79	Vertical	-74.26	-57.00	Pass
919.50	V	-77.50	-57.00	
1559.04	V	-55.91	-47.00	
2246.38	V	-64.60	-47.00	
310.62	Horizontal	-66.55	-57.00	
571.56	H	-75.79	-57.00	
1503.72	H	-60.30	-47.00	
1923.35	H	-64.20	-47.00	

Test Result of Spurious Radiations (802.11ac80)				
Frequency (MHz)	Test Data		Limit (dBm)	Conclusion
	Polarization	Level (dBm)		
223.20	Vertical	-66.29	-57.00	Pass
784.45	V	-65.48	-57.00	
11591.46	V	-63.07	-47.00	
17385.17	V	-60.44	-47.00	
85.84	Horizontal	-70.74	-57.00	
465.16	H	-61.65	-57.00	
11588.95	H	-62.39	-47.00	
17383.35	H	-62.25	-47.00	

## 11. PHOTOGRAPHS OF TEST SETUP



Spurious Emission below 1GHz



Spurious Emission above 1GHz

-----THE END OF REPORT-----