

**ETSI EN 301 893 V2.1.1 (2017-05)  
AS/NZS 4268:2017: AMD 1:2021**

**TEST REPORT  
For**

**WiFi+Bluetooth 5.2 System on Module**

**MODEL: PIXI-IW416**

Issued to:

**TechNexion Ltd.**

**16F-5, No. 736, Zhongzheng Road, ZhongHe District, 23511,  
New Taipei City, Taiwan**

Issued by

**Compliance Certification Services Inc.**

**Wugu Laboratory**

**No.11, Wugong 6th Rd., Wugu Dist.,**

**New Taipei City, Taiwan**

**Issued Date: July 31, 2023**

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**Revision History**

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	July 31, 2023	Initial Issue	ALL	Allison Chen

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Report No.: TMWK2305001494KR

## 1. TEST RESULT CERTIFICATION

**Applicant:** TechNexion Ltd.  
16F-5, No. 736, Zhongzheng Road, ZhongHe District, 23511,  
New Taipei City, Taiwan

**Manufacturer:** TechNexion Ltd.  
16F-5, No. 736, Zhongzheng Road, ZhongHe District, 23511,  
New Taipei City, Taiwan

**Equipment Under Test:** WiFi+Bluetooth 5.2 System on Module

**Brand Name:** TechNexion

**Model Number:** PIXI-IW416

**Date of Test:** May 22~June 20, 2023

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
ETSI EN 301 893 V2.1.1 (2017-05) AS/NZS 4268:2017: AMD 1:2021	Compliance
Statements of Conformity	
Determination of compliance is based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.	

Compliance Certification Services Inc. tested the above equipment for compliance with the requirements set forth in the ETSI EN 301 893. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

This test report can be used for CE and UKCA marking application which is based on equivalent requirements between UK and EU. It is appropriate using designated standards to provide presumption of conformity with GB law.

Approved by:




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Shawn Wu  
Supervisor

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## 2. EUT DESCRIPTION

<b>Product</b>	WiFi+Bluetooth 5.2 System on Module
<b>Trade Name</b>	TechNexion
<b>Model Number</b>	PIXI-IW416
<b>Model Discrepancy</b>	N/A
<b>Received Date</b>	May 16, 2023
<b>EUT Power Rating</b>	Power from host system. (DC 3.3V)
<b>Frequency Range</b>	IEEE 802.11a Mode: 5180 ~ 5240 MHz IEEE 802.11n HT20 Mode: 5180 ~ 5240 MHz IEEE 802.11n HT40 Mode: 5190 ~ 5230 MHz
<b>Modulation Technique</b>	IEEE 802.11a Mode: OFDM IEEE 802.11n HT20 Mode: OFDM IEEE 802.11n HT40 Mode: OFDM
<b>Number of Channels</b>	IEEE 802.11a Mode: 5180 ~ 5240 MHz: 4 Channels IEEE 802.11n HT20 Mode: 5180 ~ 5240MHz: 4 Channels IEEE 802.11n HT40 Mode: 5190 ~ 5230 MHz: 2 Channels
<b>Antenna Specification</b>	1. Type: PIFA Antenna Brand / Model: TechNexion / VM2450-25523-OOX-180 Gain: 3 dBi  2. Type: Dipole Antenna Brand / Model: TechNexion / VM2450-ASSY1005 Gain: 6 dBi (*worst case)
<b>Temperature Range</b>	-40°C ~ 85°C
<b>H.W: Version</b>	A1
<b>S.W Version</b>	1.0

**Remark:**

1. For more details, please refer to the User's manual of the EUT.
2. Disclaimer: Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.

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### 3. TEST METHODOLOGY

#### 3.1. GENERAL DESCRIPTION OF APPLIED STANDARDS

According to its specifications, the EUT must comply with the requirements of the following standards:

ETSI EN 301 893 V2.1.1 (2017-05) 5GHz RLAN; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU

#### 3.2. DESCRIPTION OF TEST MODES

The EUT (Model: PIXI-IW416) had been tested under operating and standby condition has 1 transmit antenna and 1 receive antenna.

Software used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Mode	Available Channel	Test Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11a	36 to 48	36	OFDM	BPSK	6Mb/s
802.11n HT20	36 to 48	36	OFDM	BPSK	MCS0
802.11n HT40	38 to 46	38	OFDM	BPSK	MCS0

### 3.2.1 The worst mode of measurement

Radiated Emission Measurement	
Test Condition	Emission for Unwanted and Fundamental
Power supply Mode	Mode 1: EUT Power by Host System (Dipole Antenna) Mode 2: EUT Power by Host System (PIFA Antenna)
Worst Mode	<input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4
Position	<input type="checkbox"/> Placed in fixed position. <input type="checkbox"/> Placed in fixed position at X-Plane (E2-Plane) <input type="checkbox"/> Placed in fixed position at Y-Plane (E1-Plane) <input checked="" type="checkbox"/> Placed in fixed position at Z-Plane (H-Plane)

**Remark:**

1. The worst mode was record in this test report.
2. The EUT pre-scanned in three axis ,X,Y, Z and two polarity, Horizontal and Vertical for radiated measurement. The worst case (Z-Plane) were recorded in this report.

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## 4. INSTRUMENT CALIBRATION

### 4.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

### 4.2 MEASUREMENT EQUIPMENT USED

#### Equipment Used for Emissions Measurement

RF Conducted Test Site					
Name of Equipment	Manufacturer	Model	Serial Number	Cal. Date	Cal. Due
Cable	Woken	WC12	CC001	2022-06-27	2023-06-26
EXA Signal Analyzer	Keysight	N9010B	MY60242460	2023-02-02	2024-02-01
Power Meter	Anritsu	ML2496A	2136002	2022-11-24	2023-11-23
Power Sensor	Anritsu	MA2411B	1911386	2022-08-08	2023-08-07
Power Sensor	Anritsu	MA2411B	1911387	2022-08-08	2023-08-07
Constant Temperature Humidity Chamber	TERCHY	MHG-150LF	930619	2022-10-25	2023-10-24
<b>Software</b>	ETSI Standard Test System-V3.160422 & Radio Test Software Ver. 21				

**Remark:**

1. Each piece of equipment is scheduled for calibration once a year.
2. N.C.R. = No Calibration Required.

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Wugu Fully Chamber B					
Name of Equipment	Manufacturer	Model	Serial Number	Cal. Date	Cal. Due
Coaxial Cable	EMCI	EMC101G-KM-K M-2700	211004	2022-12-19	2023-12-18
Thermo-Hygro Meter	WISEWIND	1206	D07	2022-12-19	2023-12-18
Horn Antenna	ETS LINDGREN	3116	00026370	2022-12-22	2023-12-21
Pre-Amplifier	MITEQ	AMF-6F-180040 00-37-8P	985646	2022-09-07	2023-09-06
K-Type Cable	Huber+Suhner	SUCOFLEX 102	29406/2	2022-11-29	2023-11-28
Bi-Log Antenna	Sunol Sciences	JB3	A030105	2022-08-03	2023-08-02
Signal Analyzer	R&S	FSV 40	101561	2022-08-05	2023-08-04
Signal Generator	Agilent	E8257C	US42340383	2022-06-29	2023-06-28
Pre-Amplifier	Anritsu	MH648A	M89145	2022-06-27	2023-06-26
Pre-Amplifier	EMEC	EM01G26G	060570	2022-06-27	2023-06-26
Bi-Log Antenna	Sunol Sciences	JB1	A052609	2023-02-09	2024-02-08
Antenna	SHWARZBECK	BBHA 9120 D	779	2023-02-03	2024-02-02
Cable	Huber+Suhner	104PEA	23452	2022-06-27	2023-06-26
Cable	Huber+Suhner	104PEA	33960	2022-06-27	2023-06-26
Horn Antenna	ETS LINDGREN	3117	00055165	2022-07-25	2023-07-24
High Pass Filters	MICRO TRONICS	HPM13195	003	2023-02-01	2024-01-31
Horn Antenna	SCHWARZBECK	BBHA9170	1047	2022-12-30	2023-12-29
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
<b>Software</b>	e3 V9-210616c				

**Remark:**

1. Each piece of equipment is scheduled for calibration once a year.
2. N.C.R. = No Calibration Required.

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Adaptivity for WIFI					
Name of Equipment	Manufacturer	Model	Serial Number	Cal. Date	Cal. Due
EXA Signal Analyzer	Keysight	N9010A	MY54200716	2022-10-13	2023-10-12
Vector Signal Generator	KEYSIGHT	N5138B	MY59100973	2022-08-10	2023-08-09
Vector Signal Generator	KEYSIGHT	N5182B/N5182BX07	MY61252828/ MY59362552	2023-02-01	2024-01-31
World Pallas	Adaptivity Box	AD3000	TW5451221	2022-09-16	2023-09-15
Attenuator	E-INSTRUMENT	EPA-600H	EC1400050	2023-06-13	2024-06-12
Directional Couplers	Agilent	87301D	MY44350252	2022-07-20	2023-07-19
Power Divider	Marvelous Microwave	MVE8586	16011206	2022-07-20	2023-07-19
Power Divider	Marvelous Microwave	MVE8586	16011205	2022-06-29	2023-06-28
Cable	Woken	SUMITOMO	13	2023-03-02	2024-03-01
Cable	Woken	SUMITOMO	12	2023-03-02	2024-03-01
Cable	Woken	SUMITOMO	11	2023-03-02	2024-03-01
Cable	Woken	SUMITOMO	10	2023-03-02	2024-03-01
Cable	Woken	SUMITOMO	9	2023-03-02	2024-03-01
Cable	Woken	SUMITOMO	7	2023-03-02	2024-03-01
<b>Software</b>	ETSI Standard Test System-V3.160422 & Radio Test Software Ver. 21				

Receiver Blocking for WIFI					
Name of Equipment	Manufacturer	Model	Serial Number	Cal. Date	Cal. Due
Power Divider	Marvelous Microwave	MVE8586	16011205	2022-06-29	2023-06-28
Cable	Woken	SUMITOMO	6	2023-03-02	2024-03-01
Cable	Woken	SUMITOMO	5	2023-03-02	2024-03-01
Cable	Woken	SUMITOMO	4	2023-03-02	2024-03-01
EXA Signal Analyzer	Keysight	N9010A	MY54200716	2022-10-13	2023-10-12
WLAN Test Set	Anritsu	MT-8860C	1211004	2023-01-06	2024-01-05
Power Divider	Marvelous Microwave	MVE8586	16011206	2022-07-20	2023-07-19
Directional Couplers	Agilent	87301D	MY44350252	2022-07-20	2023-07-19
Vector Signal Generator	KEYSIGHT	N5182B/N5182BX07	MY61252828/ MY59362552	2023-02-01	2024-01-31
<b>Software</b>	LANLook				

**Remark:**

1. Each piece of equipment is scheduled for calibration once a year.
2. N.C.R. = No Calibration Required.

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### 4.3 MEASUREMENT UNCERTAINTY

For the test methods to determine RF power levels, according to the present document, the measurement uncertainty figures shall be calculated in accordance with TR 100 028-1 [2] and TR 100 028-2 [3] and shall correspond to an expansion factor (coverage factor)  $k = 1,96$  or  $k = 2$  (which provide confidence levels of respectively 95 % and 95,45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)).

Table 7 is based on such expansion factors.

**Table 7: Maximum measurement uncertainty**

Parameter	Uncertainty
Humidity	$\pm 0.66\%$
Temperatrue	$\pm 0.11^{\circ}\text{C}$
Influence of Power Supply (DC Voltage)	$\pm 0.7\%$
Influence of Power Supply (AC Voltage)	$\pm 1.4\%$
Carrier Frequency and channelization	$\pm 0.03\text{ppm}$
RF Output power	$\pm 0.261 \text{ dB}$
Normal channel bandwidth and occupied channel bandwidth	$\pm 2.7\%$
Radiated Emission_9KHz-30MHz	$\pm 3.084 \text{ dB}$
Radiated Emission_30MHz-1GHz	$\pm 3.812 \text{ dB}$
Radiated Emission_1GHz-18GHz	$\pm 4.944 \text{ dB}$
Radiated Emission_18GHz-26GHz	$\pm 4.262 \text{ dB}$
Radiated Emission_26GHz-40GHz	$\pm 4.245 \text{ dB}$

## 5. TEST SUMMARY

ETSI EN 301 893 V2.1.1			
No	Test Item	Clause(s)	Result
1	Carrier frequencies	4.2.1	Compliance
2	Nominal, and occupied, channel bandwidth	4.2.2	Compliance
3	RF output power & Transmit Power Control (TPC) & Power Density	4.2.3	Compliance
4	Transmitter unwanted emissions outside the 5 GHz RLAN bands	4.2.4.1	Compliance
5	Transmitter unwanted emissions within the 5 GHz RLAN bands	4.2.4.2	Compliance
6	Receiver spurious emissions	4.2.5	Compliance
7	Dynamic frequency selection (DFS)	4.2.6.2	Not applicable
8	Adaptivity	4.2.7	Compliance
9	Receiver Blocking	4.3.8	Compliance
10	User Access Restrictions	4.2.9	Compliance <sup>1</sup>
11	Geo-location capability	4.2.10	Not applicable

Note:

Compliance<sup>1</sup>: Please refer to the product information declared by the manufacturer

Not applicable: The manufacture declared that the device without this function.

## **6. FACILITIES AND ACCREDITATIONS**

### **6.1. FACILITIES**

All measurement facilities used to collect the measurement data are located at

No.11, Wugong 6th Rd., Wugu Dist., New Taipei City, Taiwan

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## 7. SETUP OF EQUIPMENT UNDER TEST

### 7.1. SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix I for the actual connections between EUT and support equipment.

### 7.2. SUPPORT EQUIPMENT

No.	Device Type	Brand	Model	Series No.	FCC ID
1	NB(G)	Lenovo	T460P	N/A	N/A
2	NB	Lenovo	TP00075A	N/A	N/A
3	AP	ASUS	RT-AX88U	N/A	MSQ-RTAXHP00

**Remark:**

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

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## 8. ETSI EN 301 893 REQUIREMENTS

### 8.1. CARRIER FREQUENCIES AND CHANNELIZATION

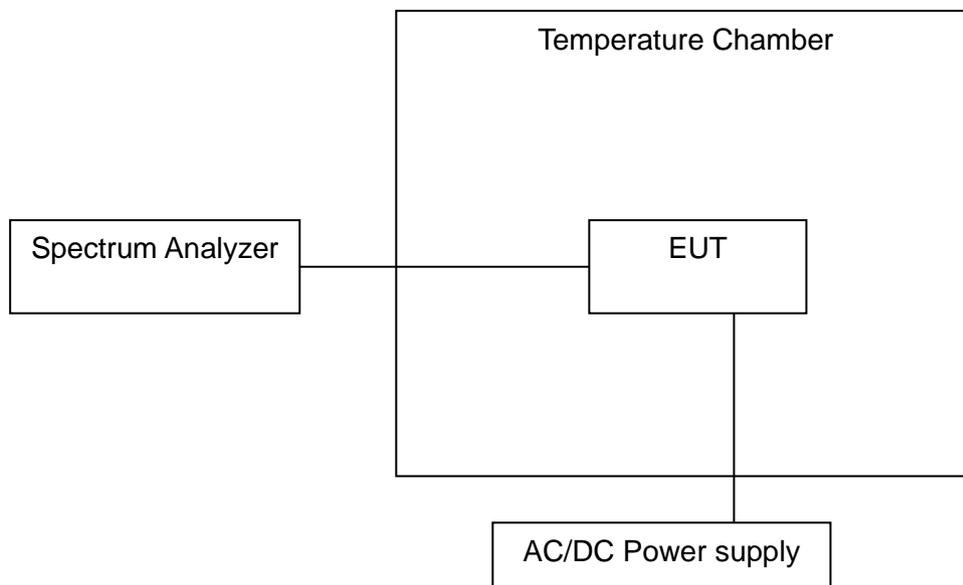
#### LIMIT

ETSI EN 301 893

The actual centre frequency for any given channel declared by the manufacturer shall be maintained within the range  $f_c \pm 20$  ppm over Normal and Extreme conditions.

#### TEST CONFIGURATION

Temperature and Voltage Measurement (under normal and extreme test conditions)



#### TEST PROCEDURE

1. Please refer to ETSI EN 301 893 V2.1.1 (2017-05).

#### TEST RESULTS

Compliance.

Report No.: TMWK2305001494KR

Temperature: 24.8~25.2°C

Test Date: May 22~23, 2023

Humidity: 52~60% RH

Tested By: David Li

11a Mode	Carrier Frequency				
	Channel Frequency	Measured Frequency	Deviation (ppm)	Limit ( ±ppm )	Result
	MHz	MHz			
NTNV	5180	5180.03	5.79	20	Pass
LTVN	5180	5180.04	7.72		Pass
HTNV	5180	5180.04	8.01		Pass

11n_HT40 Mode	Carrier Frequency				
	Channel Frequency	Measured Frequency	Deviation (ppm)	Limit ( ±ppm )	Result
	MHz	MHz			
NTNV	5190	5190.00	0.00	20	Pass
LTVN	5190	5190.01	0.96		Pass
HTNV	5190	5190.02	2.89		Pass

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## 8.2. RF OUTPUT POWER, TRANSMIT POWER CONTROL (TPC) AND POWER DENSITY

### LIMIT

ETSI EN 301 893

#### RF output power and power density at the highest power level

TPC is not required for channels whose nominal bandwidth falls completely within the band 5 150 MHz to 5 250 MHz.

For devices with TPC, the RF output power and the power density when configured to operate at the highest stated power level of the TPC range shall not exceed the levels given in table 1.

Devices are allowed to operate without TPC. See table 1 for the applicable limits in this case.

Table 1: Mean EIRP limits for RF output power and power density at the highest power level

Frequency band (MHz)	Mean e.i.r.p. limit (dBm)		Mean e.i.r.p. density limit (dBm/MHz)	
	with TPC	without TPC	with TPC	without TPC
5150 – 5350	23	20/23 (see note 1)	10	7/10 (see note 2)
5470 – 5725	30 (see note 3)	27 (see note 3)	17 (see note 3)	14 (see note 3)

NOTE 1: The applicable limit is 20 dBm, except for transmissions whose nominal bandwidth falls completely within the band 5 150 MHz to 5 250 MHz, in which case the applicable limit is 23 dBm.  
NOTE 2: The applicable limit is 7 dBm/MHz, except for transmissions whose nominal bandwidth falls completely within the band 5 150 MHz to 5 250 MHz, in which case the applicable limit is 10 dBm/MHz.  
NOTE 3: Slave devices without a Radar Interference Detection function shall comply with the limits for the band 5 250 MHz to 5 350 MHz.

#### RF output power at the lowest power level of the TPC range

For devices using TPC, the RF output power during a transmission burst when configured to operate at the lowest stated power level of the TPC range shall not exceed the levels given in table 2. For devices without TPC, the limits in table 2 do not apply.

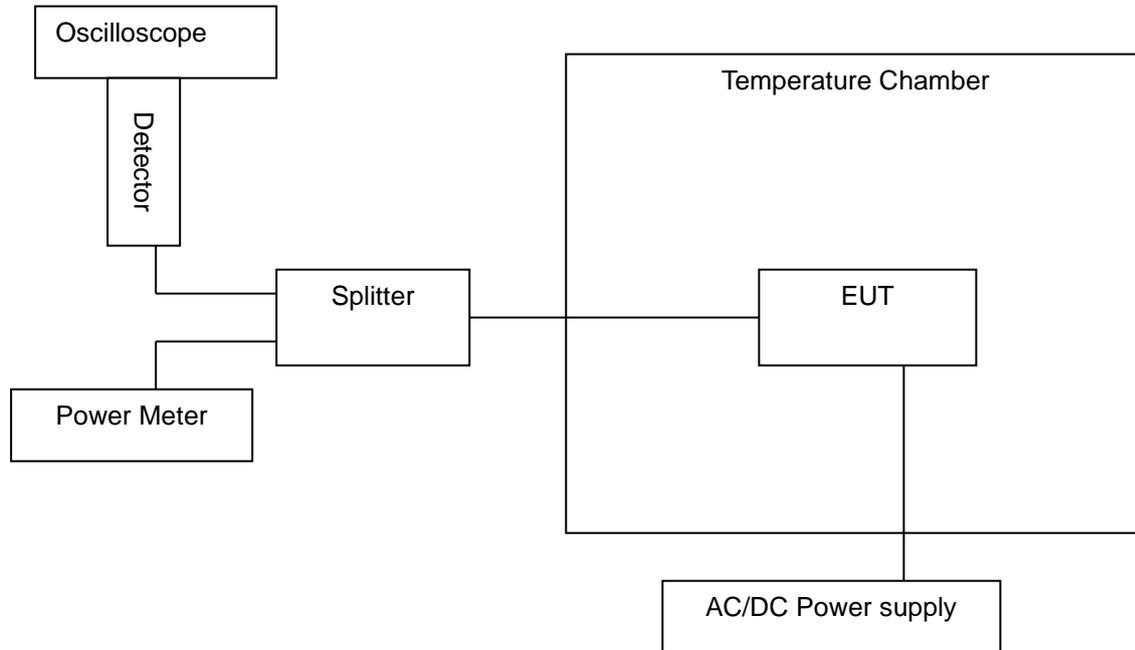
Table 2: Mean EIRP limits for RF output power at the lowest power level of the TPC range

Frequency band (MHz)	Mean EIRP (dBm)
5250 – 5350	17
5470 – 5725	24 (see note)

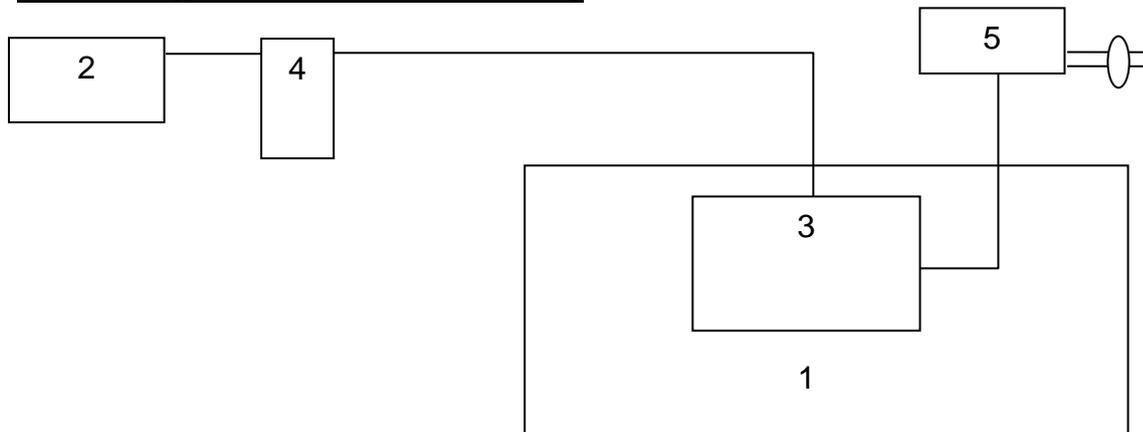
NOTE: Slave devices without a Radar Interference Detection function shall comply with the limits for the band 5 250 MHz to 5 350 MHz.

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**Test Configuration for RF Output Power and Transmit Power Control (TPC)**  
**Temperature and Voltage Measurement (under normal and extreme test conditions)**



**Test Configuration for Power Density**



**Legend**

- 1. Wooden table
- 2. Spectrum analyzer
- 3. EUT
- 4. DC block
- 5. Power supply

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## TEST PROCEDURE

1. Please refer to ETSI EN 301 893 V2.1.1 (2017-05). for the test conditions.
2. Please refer to ETSI EN 301 893 V2.1.1 (2017-05). for the measurement methods.

## TEST RESULTS

Compliance.

**Temperature:** 24.8~25.2°C      **Test Date:** May 22~23, 2023  
**Humidity:** 52~60% RH      **Tested By:** David Li

### **802.11a Mode HIGHEST POWER LEVEL**

Antenna Assembly Gain for 5.2G(5150MHz~5350MHz)				6	dBi	
Antenna Support				1	TX	
TEST CONDITIONS				TRANSMITTER POWER (dBm)		
Temp(°C)	Mode	Voltage(V)	Frequency(MHz)	Measured Power	EIRP	limit
25	Vnor	DC_3.3V	5180	14.25	20.25	23
85	Vnor	DC_3.3V	5180	14.03	20.03	23
-40	Vnor	DC_3.3V	5180	14.64	<b>20.64</b>	23

### **802.11n\_HT20 HIGHEST POWER LEVEL**

Antenna Assembly Gain for 5.2G(5150MHz~5350MHz)				6	dBi	
Antenna Support				1	TX	
TEST CONDITIONS				TRANSMITTER POWER (dBm)		
Temp(°C)	Mode	Voltage(V)	Frequency(MHz)	Measured Power	EIRP	limit
25	Vnor	DC_3.3V	5180	14.44	20.44	23
85	Vnor	DC_3.3V	5180	14.18	20.18	23
-40	Vnor	DC_3.3V	5180	14.83	<b>20.83</b>	23

### **802.11n\_HT40 HIGHEST POWER LEVEL**

Antenna Assembly Gain for 5.2G(5150MHz~5350MHz)				6	dBi	
Antenna Support				1	TX	
TEST CONDITIONS				TRANSMITTER POWER (dBm)		
Temp(°C)	Mode	Voltage(V)	Frequency(MHz)	Measured Power	EIRP	limit
25	Vnor	DC_3.3V	5190	14.16	20.16	23
85	Vnor	DC_3.3V	5190	13.93	19.93	23
-40	Vnor	DC_3.3V	5190	14.52	<b>20.52</b>	23

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## POWER DENSITY

**Temperature:** 24.8~25.2°C

**Test Date:** May 22~23, 2023

**Humidity:** 52~60% RH

**Tested By:** David Li

### **IEEE802.11a Mode:**

Duty Cycle measurement X: (Ton/Ton + Toff) =				0.94		
10 * log (1/x) =				0.27		dB
Antenna Assembly Gain for 5.2G(5150MHz~5350MHz)				6		dBi
TEST CONDITIONS				TRANSMITTER POWER(dBm/MHz)		
Temp(°C)	Mode	Voltage(V)	Frequency(MHz)	Measured Power	PSD EIRP	limit
25	Vnor	DC_3.3V	5180	2.74	9.00	10

### **IEEE 802.11n HT20 Mode:**

Duty Cycle measurement X: (Ton/Ton + Toff) =				0.94		
10 * log (1/x) =				0.27		dB
Antenna Assembly Gain for 5.2G(5150MHz~5350MHz)				6		dBi
TEST CONDITIONS				TRANSMITTER POWER (dBm/MHz)		
Temp(°C)	Mode	Voltage(V)	Frequency(MHz)	Measured Power	PSD EIRP	limit
25	Vnor	DC_3.3V	5180	2.45	8.72	10

Report No.: TMWK2305001494KR

### 8.3. TRANSMITTER UNWANTED EMISSIONS OUTSIDE THE 5GHZ RLAN BANDS

#### LIMIT

ETSI EN 301 893,

The level of transmitter unwanted emissions outside the 5 GHz RLAN bands shall not exceed the limits given in table 4.

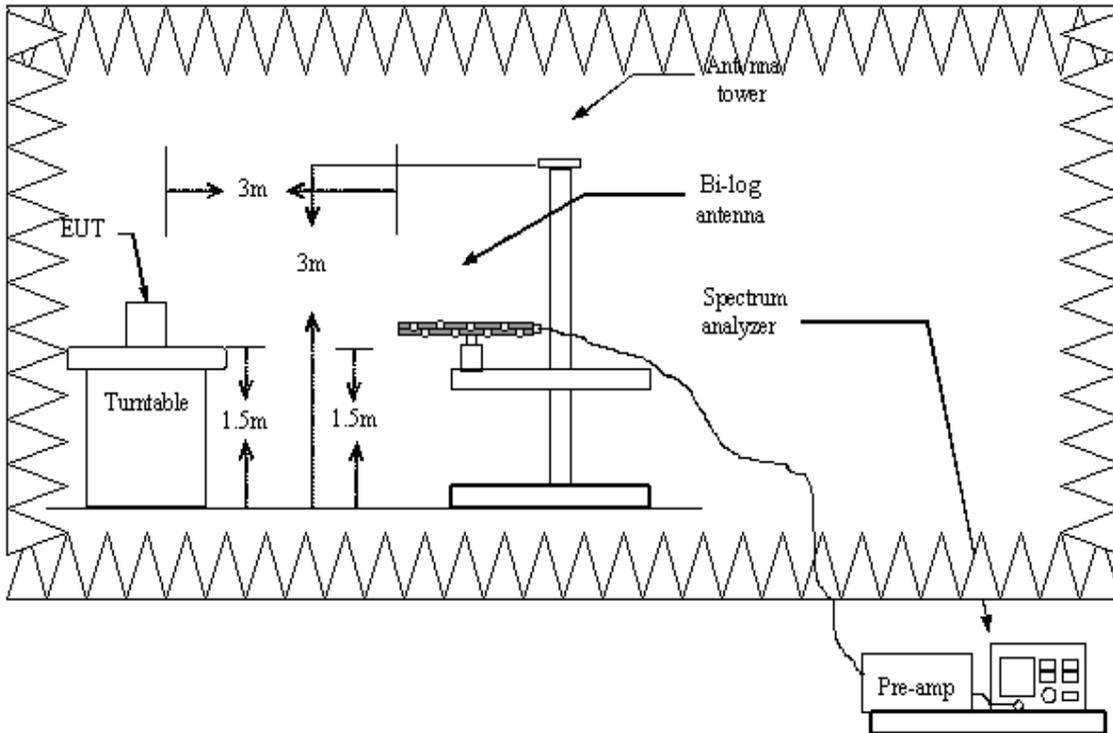
In case of equipment with antenna connectors, these limits apply to emissions at the antenna port (conducted). For emissions radiated by the cabinet or emissions radiated by integral antenna equipment (without antenna connectors), these limits are e.r.p. for emissions up to 1 GHz and e.i.r.p. for emissions above 1 GHz.

**Table 4: Transmitter unwanted emission limits outside the 5 GHz RLAN bands**

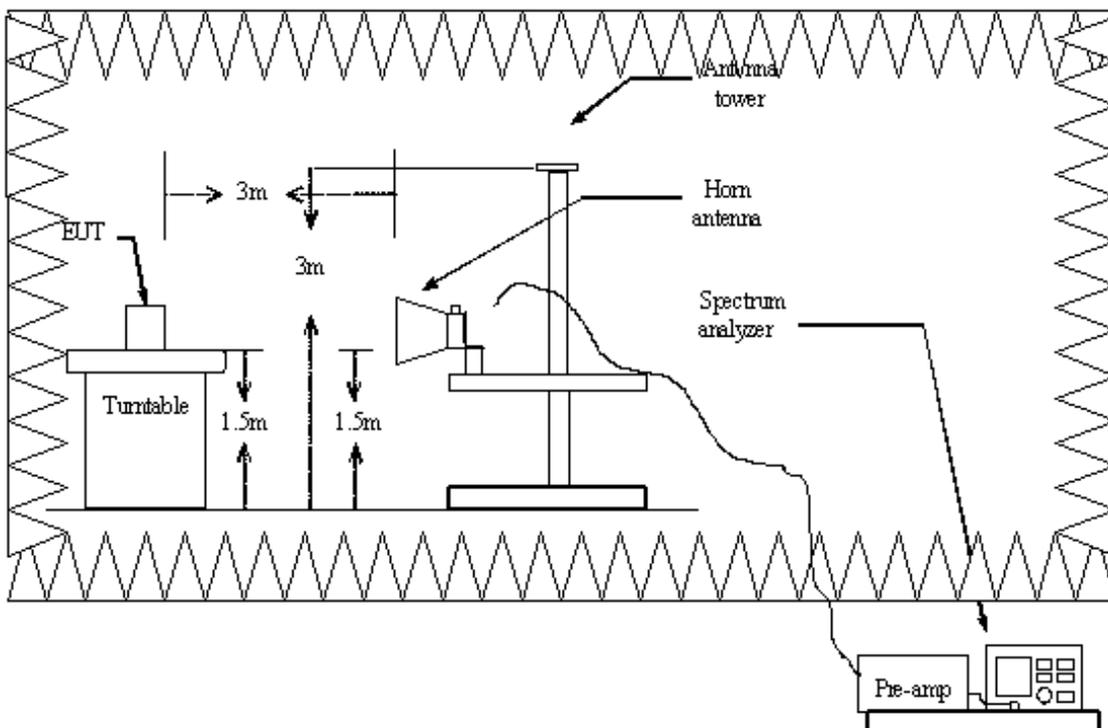
Frequency Range (MHz)	Maximum power (dBm)	Bandwidth
30 MHz to 47 MHz	-36 dBm	100 kHz
47 MHz to 74 MHz	-54 dBm	100 kHz
74 MHz to 87,5 MHz	-36 dBm	100 kHz
87,5 MHz to 118 MHz	-54 dBm	100 kHz
118 MHz to 174 MHz	-36 dBm	100 kHz
174 MHz to 230 MHz	-54 dBm	100 kHz
230 MHz to 470 MHz	-36 dBm	100 kHz
230 MHz to 470 MHz	-54 dBm	100 kHz
230 MHz to 470 MHz	-36 dBm	100 kHz
1 GHz to 5,15 GHz	-30 dBm	1 MHz
5,35 GHz to 5,47 GHz	-30 dBm	1 MHz
5,725 GHz to 26 GHz	-30 dBm	1 MHz

## Test Configuration:

### **Below 1GHz**

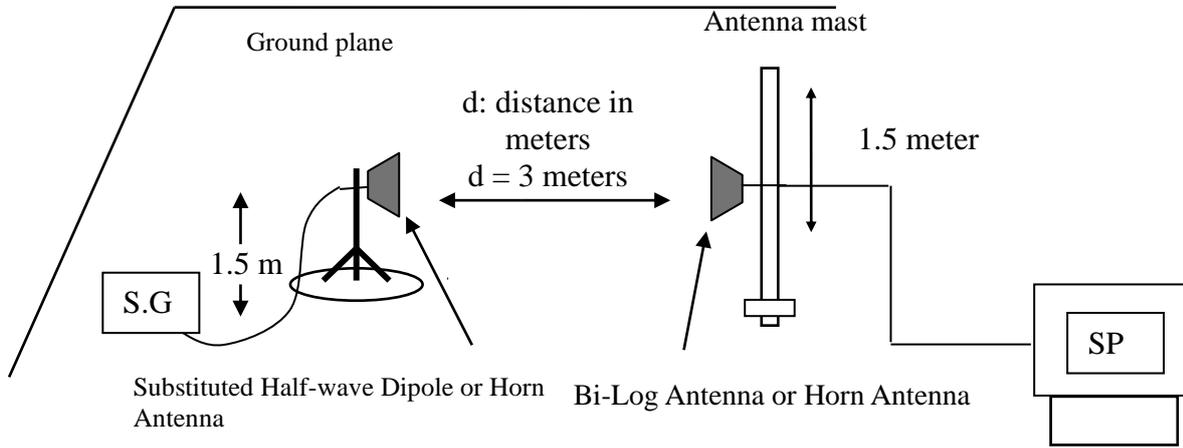


### **Above 1GHz**



Report No.: TMWK2305001494KR

## Substituted Method Test Set-up



## TEST PROCEDURE

1. Please refer to ETSI EN 301 893 V2.1.1 (2017-05). for the test conditions.
2. Please refer to ETSI EN 301 893 V2.1.1 (2017-05). for the measurement methods.

## TEST RESULTS

Compliance

Report No.: TMWK2305001494KR

**Mode 1: Dipole Antenna**

**Test Mode:** IEEE 802.11a mode / TX (5180 MHz)

**Tested by:** Ansel Wang

**Ambient temperature:** 24.2°C **Relative humidity:** 45%RH

**Date:** May 29, 2023

Freq. (MHz)	EIRP/ERP (dBm)	SG Output Level (dBm)	Antenna Gain (dBi/dBd)	Cable Loss (dB)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
68.40	-58.92	-51.66	-7.12	0.14	-54.00	-4.92	V
150.01	-70.55	-65.42	-4.92	0.21	-36.00	-34.55	V
250.01	-68.13	-68.36	0.52	0.29	-36.00	-32.13	V
350.02	-68.66	-68.94	0.64	0.36	-36.00	-32.66	V
449.97	-68.54	-68.44	0.32	0.42	-36.00	-32.54	V
591.48	-67.12	-67.81	1.19	0.50	-54.00	-13.12	V
10360.00	-44.84	-55.95	13.00	1.89	-30.00	-14.84	V
15540.00	-40.15	-51.62	13.72	2.25	-30.00	-10.15	V
150.01	-67.80	-62.67	-4.92	0.21	-36.00	-31.80	H
250.01	-59.43	-59.66	0.52	0.29	-36.00	-23.43	H
350.02	-66.66	-66.94	0.64	0.36	-36.00	-30.66	H
450.02	-64.58	-64.48	0.32	0.42	-36.00	-28.58	H
500.02	-65.45	-65.54	0.54	0.45	-54.00	-11.45	H
550.03	-60.48	-60.76	0.76	0.48	-54.00	-6.48	H
10360.00	-45.03	-56.14	13.00	1.89	-30.00	-15.03	H
15540.00	-40.85	-52.32	13.72	2.25	-30.00	-10.85	H

**Remark:**

1. The emission behaviour belongs to narrowband spurious emission.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Report No.: TMWK2305001494KR

**Test Mode:** IEEE 802.11n20 mode / TX (5180 MHz)

**Tested by:** Ansel Wang

**Ambient temperature:** 24.2°C **Relative humidity:** 45%RH

**Date:** May 29, 2023

Freq. (MHz)	EIRP/ERP (dBm)	SG Output Level (dBm)	Antenna Gain (dBi/dBd)	Cable Loss (dB)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
68.50	-62.58	-55.36	-7.08	0.14	-54.00	-8.58	V
150.01	-71.11	-65.98	-4.92	0.21	-36.00	-35.11	V
250.01	-69.38	-69.61	0.52	0.29	-36.00	-33.38	V
350.02	-69.17	-69.45	0.64	0.36	-36.00	-33.17	V
550.03	-66.45	-66.73	0.76	0.48	-54.00	-12.45	V
818.19	-63.38	-63.53	0.75	0.60	-54.00	-9.38	V
10360.00	-42.24	-53.35	13.00	1.89	-30.00	-12.24	V
15540.00	-40.88	-52.35	13.72	2.25	-30.00	-10.88	V
150.01	-67.75	-62.62	-4.92	0.21	-36.00	-31.75	H
250.01	-59.52	-59.75	0.52	0.29	-36.00	-23.52	H
350.02	-67.24	-67.52	0.64	0.36	-36.00	-31.24	H
450.02	-64.67	-64.57	0.32	0.42	-36.00	-28.67	H
500.02	-65.55	-65.64	0.54	0.45	-54.00	-11.55	H
550.03	-60.14	-60.42	0.76	0.48	-54.00	-6.14	H
10360.00	-45.67	-56.78	13.00	1.89	-30.00	-15.67	H
15540.00	-40.41	-51.88	13.72	2.25	-30.00	-10.41	H

**Remark:**

1. The emission behaviour belongs to narrowband spurious emission.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Report No.: TMWK2305001494KR

**Test Mode:** IEEE 802.11n40 mode / TX (5190 MHz)

**Tested by:** Ansel Wang

**Ambient temperature:** 24.2°C **Relative humidity:** 45%RH

**Date:** May 29, 2023

Freq. (MHz)	EIRP/ERP (dBm)	SG Output Level (dBm)	Antenna Gain (dBi/dBd)	Cable Loss (dB)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
85.35	-66.65	-61.95	-4.54	0.16	-36.00	-30.65	V
150.01	-71.76	-66.63	-4.92	0.21	-36.00	-35.76	V
250.01	-69.86	-70.09	0.52	0.29	-36.00	-33.86	V
350.02	-69.42	-69.70	0.64	0.36	-36.00	-33.42	V
525.03	-65.98	-66.28	0.76	0.46	-54.00	-11.98	V
621.33	-66.76	-66.93	0.68	0.51	-54.00	-12.76	V
10380.00	-44.21	-55.32	13.00	1.89	-30.00	-14.21	V
15570.00	-40.23	-51.78	13.81	2.26	-30.00	-10.23	V
150.01	-67.64	-62.51	-4.92	0.21	-36.00	-31.64	H
250.01	-59.34	-59.57	0.52	0.29	-36.00	-23.34	H
350.02	-67.20	-67.48	0.64	0.36	-36.00	-31.20	H
450.02	-63.64	-63.54	0.32	0.42	-36.00	-27.64	H
500.02	-65.66	-65.75	0.54	0.45	-54.00	-11.66	H
550.03	-61.11	-61.39	0.76	0.48	-54.00	-7.11	H
10380.00	-46.12	-57.23	13.00	1.89	-30.00	-16.12	H
15570.00	-40.31	-51.86	13.81	2.26	-30.00	-10.31	H

**Remark:**

1. The emission behaviour belongs to narrowband spurious emission.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Report No.: TMWK2305001494KR

**Mode 2: PIFA Antenna**

**Test Mode:** IEEE 802.11a mode / TX (5180 MHz)

**Tested by:** Ansel Wang

**Ambient temperature:** 24.2°C **Relative humidity:** 45%RH

**Date:** May 29, 2023

Freq. (MHz)	EIRP/ERP (dBm)	SG Output Level (dBm)	Antenna Gain (dBi/dBd)	Cable Loss (dB)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
68.50	-62.86	-55.64	-7.08	0.14	-54.00	-8.86	V
84.85	-67.56	-62.77	-4.64	0.15	-36.00	-31.56	V
250.01	-66.58	-66.81	0.52	0.29	-36.00	-30.58	V
350.02	-67.47	-67.75	0.64	0.36	-36.00	-31.47	V
450.02	-68.39	-68.29	0.32	0.42	-36.00	-32.39	V
550.03	-66.53	-66.81	0.76	0.48	-54.00	-12.53	V
10360.00	-44.92	-56.03	13.00	1.89	-30.00	-14.92	V
15540.00	-39.94	-51.41	13.72	2.25	-30.00	-9.94	V
47.20	-68.75	-57.30	-11.34	0.11	-54.00	-14.75	H
132.01	-72.32	-65.29	-6.83	0.20	-36.00	-36.32	H
250.01	-63.20	-63.43	0.52	0.29	-36.00	-27.20	H
350.02	-58.71	-58.99	0.64	0.36	-36.00	-22.71	H
450.02	-68.25	-68.15	0.32	0.42	-36.00	-32.25	H
550.03	-65.73	-66.01	0.76	0.48	-54.00	-11.73	H
10360.00	-44.20	-55.31	13.00	1.89	-30.00	-14.20	H
15540.00	-40.95	-52.42	13.72	2.25	-30.00	-10.95	H

**Remark:**

1. The emission behaviour belongs to narrowband spurious emission.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Report No.: TMWK2305001494KR

**Test Mode:** IEEE 802.11n20 mode / TX (5180 MHz)

**Tested by:** Ansel Wang

**Ambient temperature:** 24.2°C **Relative humidity:** 45%RH

**Date:** May 29, 2023

Freq. (MHz)	EIRP/ERP (dBm)	SG Output Level (dBm)	Antenna Gain (dBi/dBd)	Cable Loss (dB)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
68.50	-62.41	-55.19	-7.08	0.14	-54.00	-8.41	V
250.01	-66.07	-66.30	0.52	0.29	-36.00	-30.07	V
350.02	-68.34	-68.62	0.64	0.36	-36.00	-32.34	V
525.03	-64.63	-64.93	0.76	0.46	-54.00	-10.63	V
620.13	-64.86	-65.06	0.71	0.51	-54.00	-10.86	V
889.79	-62.89	-63.31	1.05	0.63	-36.00	-26.89	V
10360.00	-44.82	-55.93	13.00	1.89	-30.00	-14.82	V
15540.00	-41.23	-52.70	13.72	2.25	-30.00	-11.23	V
57.85	-70.22	-62.35	-7.74	0.13	-54.00	-16.22	H
139.06	-71.24	-64.98	-6.06	0.20	-36.00	-35.24	H
250.01	-63.65	-63.88	0.52	0.29	-36.00	-27.65	H
350.02	-59.00	-59.28	0.64	0.36	-36.00	-23.00	H
400.02	-67.65	-67.56	0.30	0.39	-36.00	-31.65	H
550.03	-65.23	-65.51	0.76	0.48	-54.00	-11.23	H
10360.00	-44.39	-55.50	13.00	1.89	-30.00	-14.39	H
15540.00	-40.90	-52.37	13.72	2.25	-30.00	-10.90	H

**Remark:**

1. The emission behaviour belongs to narrowband spurious emission.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Report No.: TMWK2305001494KR

**Test Mode:** IEEE 802.11n40 mode / TX (5190 MHz)

**Tested by:** Ansel Wang

**Ambient temperature:** 24.2°C **Relative humidity:** 45%RH

**Date:** May 29, 2023

Freq. (MHz)	EIRP/ERP (dBm)	SG Output Level (dBm)	Antenna Gain (dBi/dBd)	Cable Loss (dB)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
68.40	-59.72	-52.46	-7.12	0.14	-54.00	-5.72	V
85.15	-67.86	-63.10	-4.60	0.16	-36.00	-31.86	V
250.01	-66.73	-66.96	0.52	0.29	-36.00	-30.73	V
301.46	-70.41	-70.30	0.21	0.32	-36.00	-34.41	V
350.02	-67.73	-68.01	0.64	0.36	-36.00	-31.73	V
549.98	-66.39	-66.68	0.76	0.47	-54.00	-12.39	V
10380.00	-45.49	-56.60	13.00	1.89	-30.00	-15.49	V
15570.00	-40.80	-52.35	13.81	2.26	-30.00	-10.80	V
57.90	-70.23	-62.39	-7.71	0.13	-54.00	-16.23	H
150.01	-70.99	-65.86	-4.92	0.21	-36.00	-34.99	H
175.01	-71.82	-69.21	-2.38	0.23	-54.00	-17.82	H
250.01	-63.51	-63.74	0.52	0.29	-36.00	-27.51	H
350.02	-59.29	-59.57	0.64	0.36	-36.00	-23.29	H
450.02	-68.20	-68.10	0.32	0.42	-36.00	-32.20	H
10380.00	-44.98	-56.09	13.00	1.89	-30.00	-14.98	H
15570.00	-40.05	-51.60	13.81	2.26	-30.00	-10.05	H

**Remark:**

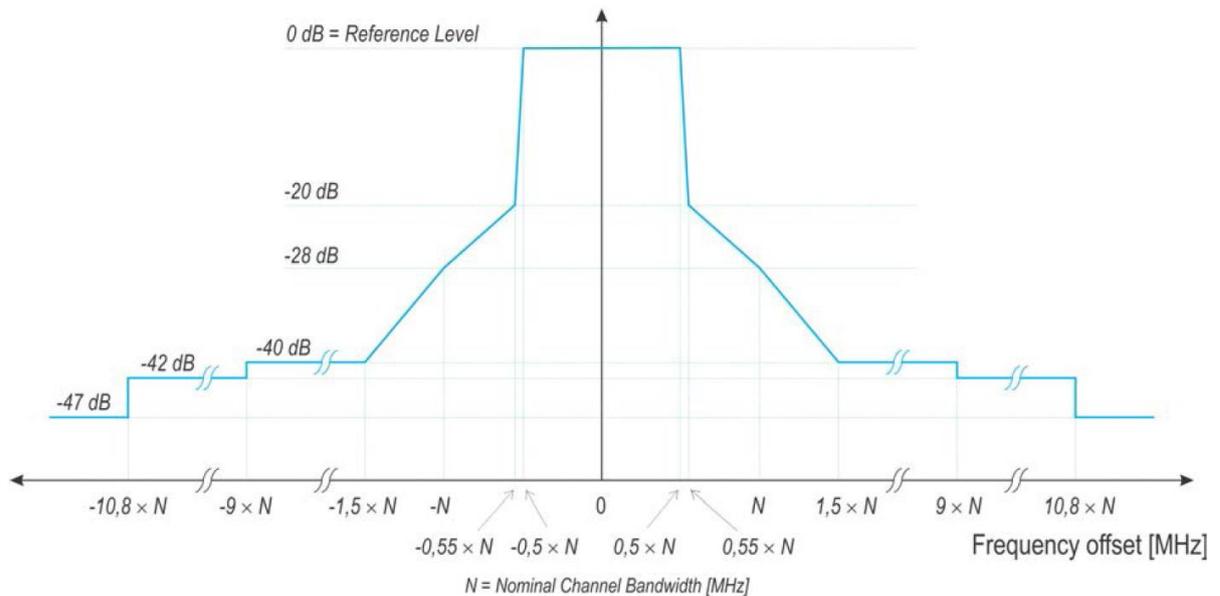
1. The emission behaviour belongs to narrowband spurious emission.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Report No.: TMWK2305001494KR

## 8.4. TRANSMITTER UNWANTED EMISSIONS WITHIN THE 5GHZ RLAN BANDS

### LIMIT

ETSI EN 301 893.



NOTE: dBc is the spectral density relative to the maximum spectral power density of the transmitted signal.

**Figure 1: Transmit spectral power mask**

### TEST PROCEDURE

1. Please refer to ETSI EN 301 893 V2.1.1 (2017-05). for the test conditions.
2. Please refer to ETSI EN 301 893 V2.1.1 (2017-05). for the measurement methods.

### TEST RESULTS

Compliance.

### WITHIN BAND

**Temperature:** 24.8~25.2°C

**Test Date:** May 22~23, 2023

**Humidity:** 52~60% RH

**Tested By:** David Li

Report No.: TMWK2305001494KR

**IEEE 802.11a Mode:**  
**Chain 0:**  
**CH36\_5150-5350MHz**



**CH36\_5470-5725MHz**



Report No.: TMWK2305001494KR

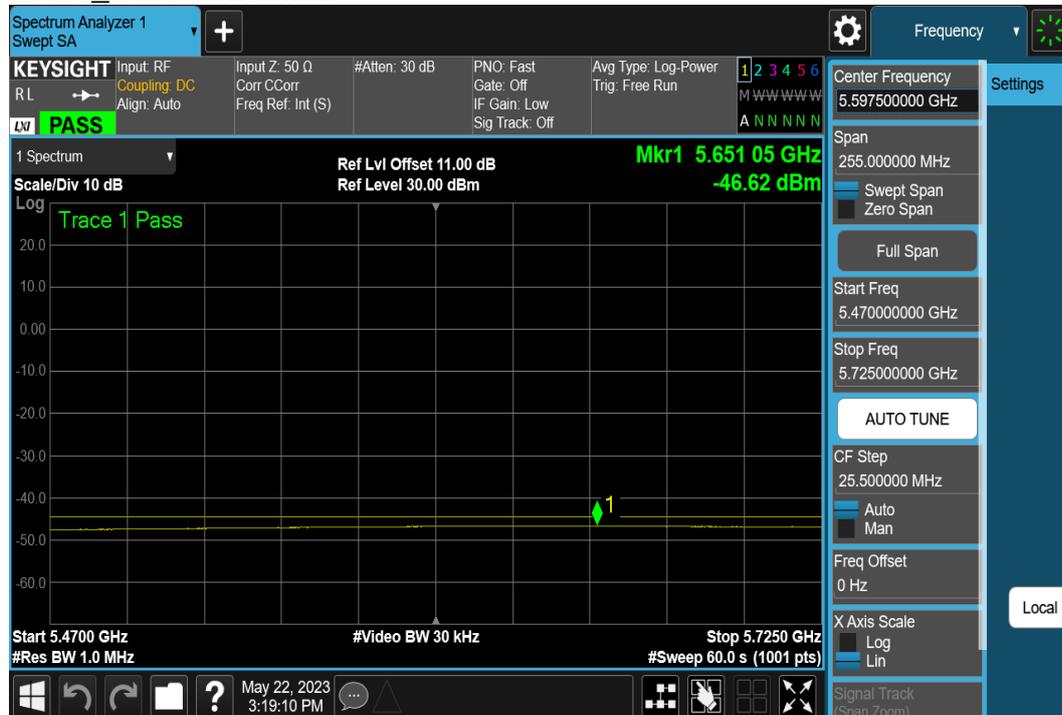
## IEEE 802.11n HT20 Mode:

Chain 0:

CH36\_5150-5350MHz



CH36\_5470-5725MHz



Report No.: TMWK2305001494KR

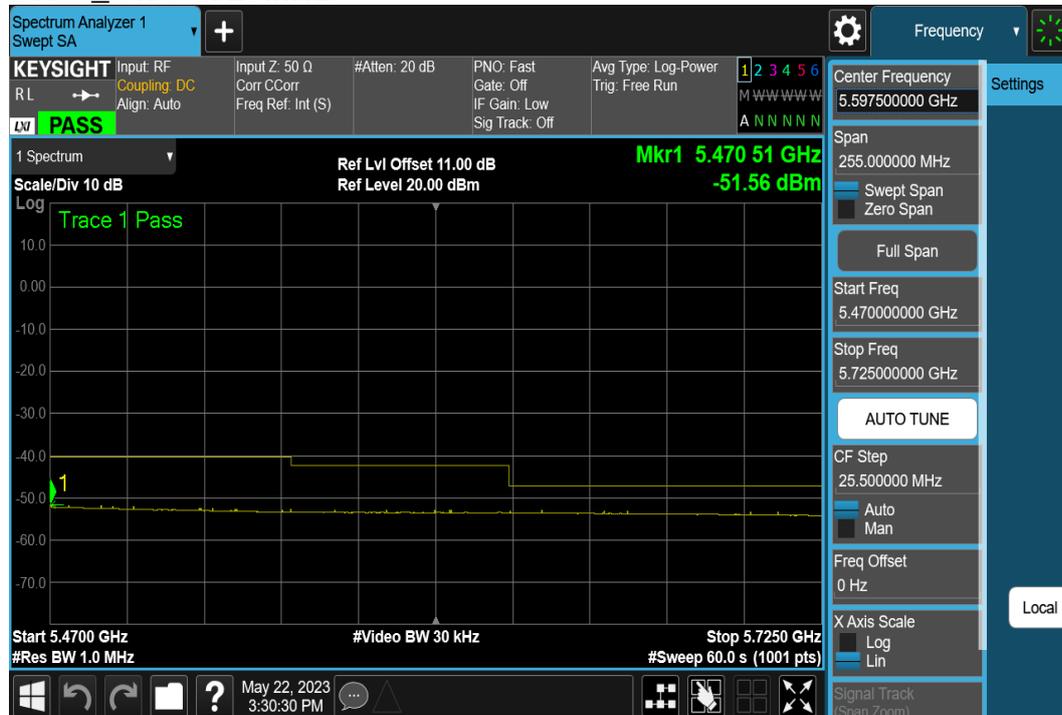
## IEEE 802.11n HT40 Mode

Chain 0:

### CH38\_5150-5350MHz



### CH38\_5470-5725MHz



Report No.: TMWK2305001494KR

## 8.5. RECEIVER SPURIOUS EMISSIONS

### LIMIT

ETSI EN 301 893

The spurious emissions of the receiver shall not exceed the limits given in table 5.

In case of equipment with antenna connectors, these limits apply to emissions at the antenna port (conducted). For emissions radiated by the cabinet or emissions radiated by integral antenna equipment (without antenna connectors), these limits are e.r.p. for emissions up to 1 GHz and e.i.r.p. for emissions above 1 GHz.

**Table 5: Spurious radiated emission limits**

Frequency band	Maximum power	Measurement Bandwidth
30 MHz to 1GHz	-57 dBm	100 kHz
1GHz to 26.5GHz	-47 dBm	1 MHz

### Test Configuration

#### **Conducted Spurious Emissions:**

(Same as the above section <Transmitter Conducted Spurious Emissions>)

#### **Radiated Spurious Emissions:**

(Same as the above section <Transmitter Radiated Spurious Emissions>)

Report No.: TMWK2305001494KR

## **TEST PROCEDURE**

Per the description of the ETSI EN 301 893, the setting up procedures are summarized as follows:

1. Two identical EUT's are used for this test. One is set to transmit and the other is set to receive.
2. The transmit EUT RF output is connected to the directional coupler. The coupler direct output arm is connected to the microwave detector. The coupled output arm is connected to the step attenuator.
3. The microwave detector is connected to an oscilloscope set up to generate the time gating pulse for the spectrum analyzer. The second oscilloscope is set up to simultaneously monitor the time gating pulse and the detected RF output.
4. The step attenuator is connected to the Receive EUT via the power splitter.
5. The Receive EUT RF input is connected to the input of the power splitter. One output arm of this splitter is connected to the spectrum analyzer to measure the spurious emissions. The other arm of this splitter is connected to the Transmit EUT RF output via the step attenuator.
6. Prior to the measurement, the spectrum analyzer is connected to the input of the power splitter, the remaining output arm of the power splitter is terminated, then the Transmit EUT power and the step attenuator are adjusted to produce the required reference sensitivity level that will be applied to the Receive EUT during the measurement.

**Remark:** The Nominal bit rate is 6Mbit/s, therefore the reference sensitivity is  $-85\text{dBm}$ .

## **TEST RESULTS**

Compliance

Report No.: TMWK2305001494KR

**Mode 1: Dipole Antenna**

**Test Mode:** IEEE 802.11a mode / RX (5180 MHz)

**Tested by:** Ansel Wang

**Ambient temperature:** 24.2°C **Relative humidity:** 45%RH

**Date:** May 29, 2023

Freq. (MHz)	EIRP/ERP (dBm)	SG Output Level (dBm)	Antenna Gain (dBi/dBd)	Cable Loss (dB)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
68.40	-63.35	-56.09	-7.12	0.14	-57.00	-6.35	V
149.96	-71.52	-66.40	-4.91	0.21	-57.00	-14.52	V
250.01	-68.98	-69.21	0.52	0.29	-57.00	-11.98	V
350.02	-68.14	-68.42	0.64	0.36	-57.00	-11.14	V
569.53	-66.93	-66.94	0.49	0.48	-57.00	-9.93	V
639.33	-66.50	-66.36	0.38	0.52	-57.00	-9.50	V
1597.53	-51.99	-57.47	6.30	0.82	-47.00	-4.99	V
4261.14	-50.90	-58.60	9.02	1.32	-47.00	-3.90	V
150.01	-67.13	-62.00	-4.92	0.21	-57.00	-10.13	H
350.02	-67.45	-67.73	0.64	0.36	-57.00	-10.45	H
450.02	-64.30	-64.20	0.32	0.42	-57.00	-7.30	H
500.02	-66.21	-66.30	0.54	0.45	-57.00	-9.21	H
550.03	-60.48	-60.76	0.76	0.48	-57.00	-3.48	H
663.83	-66.01	-66.22	0.74	0.53	-57.00	-9.01	H
1949.54	-51.50	-55.29	4.70	0.91	-47.00	-4.50	H
3000.09	-53.79	-59.17	6.50	1.12	-47.00	-6.79	H

**Remark:**

1. The emission behaviour belongs to narrowband spurious emission.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Report No.: TMWK2305001494KR

**Mode 2: PIFA Antenna**

**Test Mode:** IEEE 802.11a mode / RX (5180 MHz)

**Tested by:** Ansel Wang

**Ambient temperature:** 24.2°C **Relative humidity:** 45%RH

**Date:** May 29, 2023

Freq. (MHz)	EIRP/ERP (dBm)	SG Output Level (dBm)	Antenna Gain (dBi/dBd)	Cable Loss (dB)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
85.05	-68.43	-63.64	-4.63	0.16	-57.00	-11.43	V
249.96	-66.69	-66.93	0.52	0.28	-57.00	-9.69	V
350.02	-67.93	-68.21	0.64	0.36	-57.00	-10.93	V
435.22	-70.29	-70.11	0.23	0.41	-57.00	-13.29	V
550.03	-66.71	-66.99	0.76	0.48	-57.00	-9.71	V
657.03	-64.98	-65.15	0.69	0.52	-57.00	-7.98	V
1287.51	-50.06	-53.32	4.00	0.74	-47.00	-3.06	V
1677.03	-55.12	-59.92	5.64	0.84	-47.00	-8.12	V
46.75	-68.94	-57.16	-11.67	0.11	-57.00	-11.94	H
150.01	-70.98	-65.85	-4.92	0.21	-57.00	-13.98	H
250.01	-63.75	-63.98	0.52	0.29	-57.00	-6.75	H
450.02	-67.63	-67.53	0.32	0.42	-57.00	-10.63	H
550.03	-65.28	-65.56	0.76	0.48	-57.00	-8.28	H
937.60	-62.16	-62.22	0.70	0.64	-57.00	-5.16	H
1305.51	-52.45	-55.71	4.01	0.75	-47.00	-5.45	H
1731.53	-55.88	-60.58	5.56	0.86	-47.00	-8.88	H

**Remark:**

1. The emission behaviour belongs to narrowband spurious emission.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

## 8.6. ADAPTIVITY (CHANNEL ACCESS MECHANISM)

### PRODUCT INFORMATION

- Frame Based Equipment
  - The Frame Based Equipment operates as an Initiating Device
  - The Frame Based Equipment operates as an Responding Device
  - The Frame Based Equipment can operate as an Initiating Device and as a Responding Device
  
- Load Based Equipment
  - The Load Based Equipment operates as a Supervising Device
  - The Load Based Equipment operates as a Supervised Device
  - The Load Based Equipment can operate as a Supervising and as a Supervised Device

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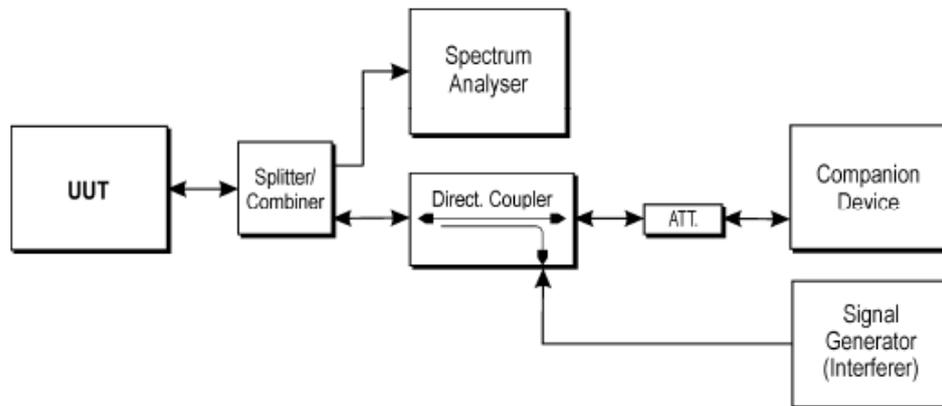
## LIMIT

<b>Adaptivity Limit</b>				
<input checked="" type="checkbox"/> Priority Class dependent Channel Access parameters for Supervised Devices:				
<b>Class #</b>	<b>P<sub>0</sub></b>	<b>CW<sub>min</sub></b>	<b>CW<sub>max</sub></b>	<b>Maximum Channel Occupancy Time (COT)</b>
4	2	3	7	2 ms
3	2	7	15	4 ms
2	3	15	1 023	6 ms (see note 1)
1	7	15	1 023	6 ms (see note 1)
NOTE 1: The maximum <i>Channel Occupancy Time</i> (COT) of 6 ms may be increased to 8 ms by inserting one or more pauses. The minimum duration of a pause shall be 100 $\mu$ s. The maximum duration (Channel Occupancy) before including any such pause shall be 6 ms. Pause duration is not included in the channel occupancy time.				
NOTE 2: The values for p <sub>0</sub> , CW <sub>min</sub> , CW <sub>max</sub> are minimum values. Greater values are allowed.				
<input type="checkbox"/> Priority Class dependent Channel Access parameters for Supervising Devices:				
<b>Class #</b>	<b>P<sub>0</sub></b>	<b>CW<sub>min</sub></b>	<b>CW<sub>max</sub></b>	<b>Maximum Channel Occupancy Time (COT)</b>
4	1	3	7	2 ms
3	1	7	15	4 ms
2	3	15	63	6 ms (see note 1 and note 2)
1	7	15	1 023	6 ms (see note 1)
NOTE 1: The maximum <i>Channel Occupancy Time</i> (COT) of 6 ms may be increased to 8 ms by inserting one or more pauses. The minimum duration of a pause shall be 100 $\mu$ s. The maximum duration (Channel Occupancy) before including any such pause shall be 6 ms. Pause duration is not included in the channel occupancy time.				
NOTE 2: The maximum Channel Occupancy Time (COT) of 6 ms may be increased to 10 ms by extending CW to CW × 2 + 1 when selecting the random number q for any backoff(s) that precede the Channel Occupancy that may exceed 6 ms or which follow the Channel Occupancy that exceeded 6 ms. The choice between preceding or following a Channel Occupancy shall remain unchanged during the operation time of the device.				
NOTE 3: The values for p <sub>0</sub> , CW <sub>min</sub> , CW <sub>max</sub> are minimum values. Greater values are allowed.				
Energy Detect Threshold (ED Threshold):				
<input checked="" type="checkbox"/> Option 1:				
For equipment that for its operation in the 5 GHz bands is conforming to IEEE 802.11™ac-2013 [10], clause 22, or to IEEE 802.11™-2012, clause 18 or clause 20, or any combination of these clauses, the Energy Detect Threshold (ED Threshold) is independent of the equipment's maximum transmit power (P <sub>H</sub> ). The Energy Detect Threshold (ED Threshold) shall be:				
TL = -75 dBm/MHz				
<input type="checkbox"/> Option 2:				
For equipment conforming to one or more of the clauses listed in Option 1, and to at least one other operating mode, and for equipment conforming to none of the clauses listed in Option 1, the Energy Detect Threshold (ED Threshold) shall be proportional to the equipment's maximum transmit power (P <sub>H</sub> ). Assuming a 0 dBi receive antenna the Energy Detect Threshold (ED Threshold) shall be:				
For P <sub>H</sub> ≤ 13 dBm: TL= -75 dBm/MHz				
For 13 dBm < P <sub>H</sub> < 23 dBm: TL= -85 dBm/MHz + (23 dBm - P <sub>H</sub> )				
For P <sub>H</sub> ≥ 23 dBm: TL= -85 dBm/MHz				

- Short Control Signalling Transmissions:
- Within an observation period of 50 ms, the number of Short Control Signalling Transmissions by the equipment shall be equal to or less than 50.
  - The total duration of the equipment's Short Control Signalling Transmissions shall be less than 2 500  $\mu$ s within said observation period.

## TEST CONFIGURATION

Figure 13 shows an example of the test set-up.



**Figure 13: Example Test Set-up for verifying the adaptivity of an equipment**

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## TEST PROCEDURE

1. Please refer to ETSI EN 301 893 V2.1.1 (2017-05).

## TEST RESULTS

Compliance.

**Temperature:** 24.5°C

**Test Date:** June 20, 2023

**Humidity:** 45% RH

**Tested By:** Jerry Chang

Detection Threshold Level		-75 dBm/MHz		
Mode	Frequency (MHz)	Signal duration after interfering (s)		
		AWGN	LTE	OFDM
802.11a 20	5180	PASS	PASS	PASS
802.11n 40	5190	PASS	N/A	N/A

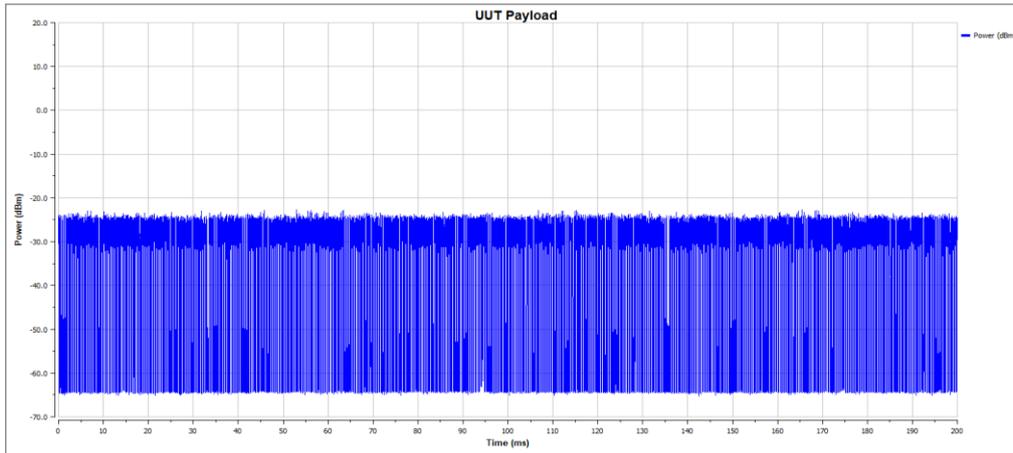
Short Control				
5180MHz	AWGN	OFDM	LTE	Limit
Transmissions Number	0	0	0	<50
Transmissions Time	0	0	0	<2.5ms
5190MHz	AWGN			Limit
Transmissions Number	0			<50
Transmissions Time	0			<2.5ms

802.11 a20 (Band 1&2):	
UUT Payload (%)	59.95
CCA Time (us)	140.93
Interference Start Time (ms)	15000.00
Transmission StopTime (ms)	15026.00
SCST TxOn / (TxOn + TxOff) (%)	0.00
Short Control Signalling Transmissions (us)	0.00
Test Status	Pass

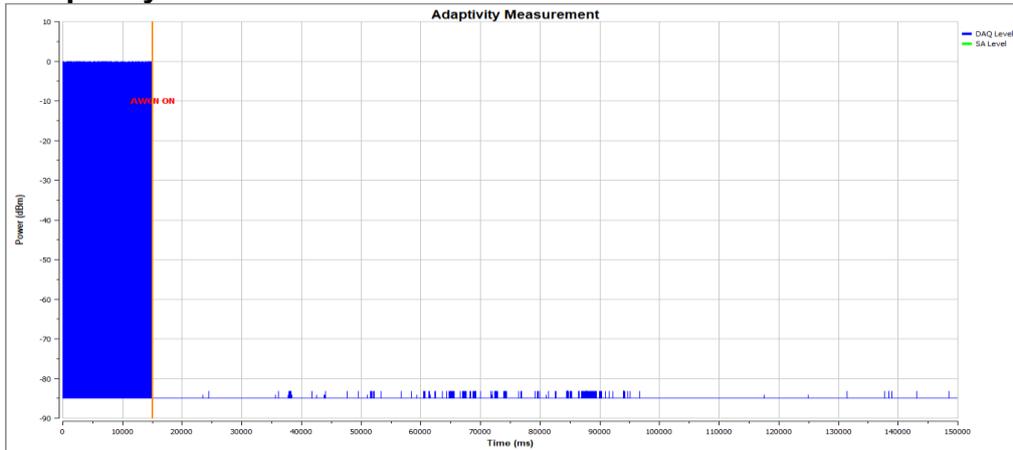
802.11 n40 (Band 1&2):	
UUT Payload (%)	56.92
CCA Time (us)	62.20
Interference Start Time (ms)	15000.00
Transmission StopTime (ms)	15026.00
SCST TxOn / (TxOn + TxOff) (%)	0.00
Short Control Signalling Transmissions (us)	0.00
Test Status	Pass

## Adaptive Test Results:

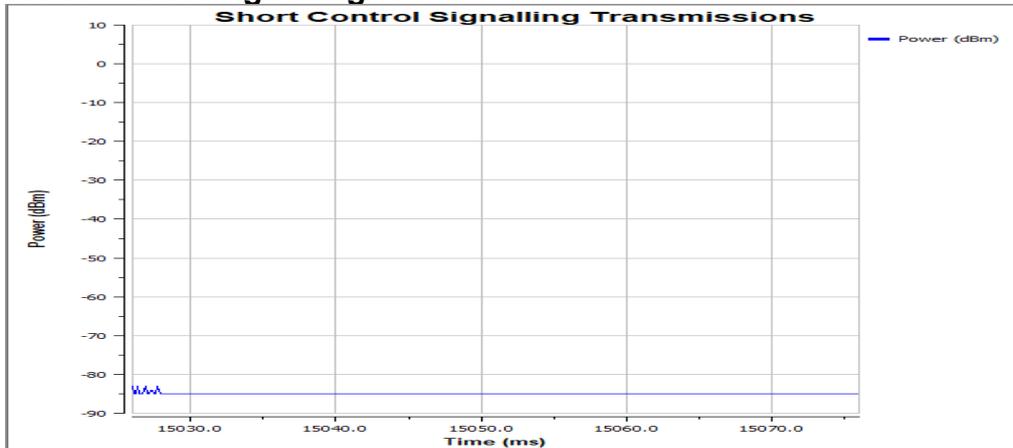
### 802.11 a20 (Band 1&2)\_AWGN Traffic Load Test



## Adaptivity Test

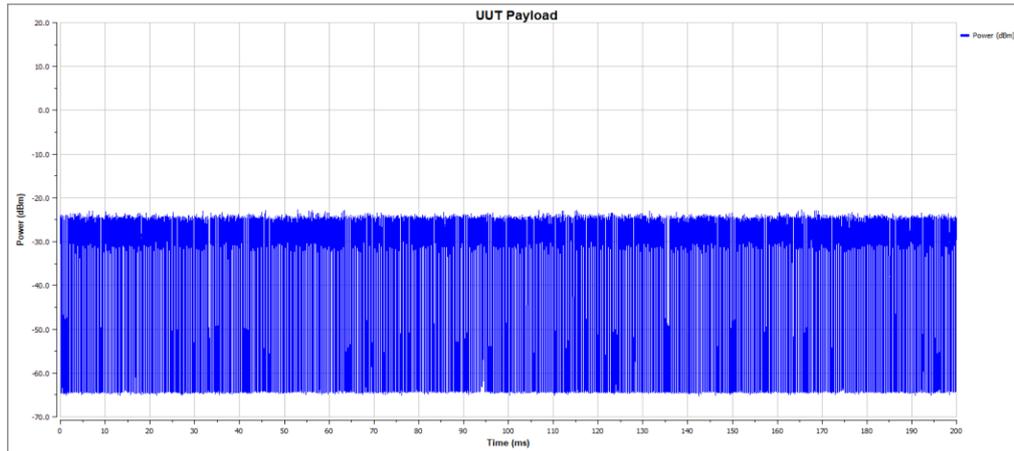


## Short control signalling check

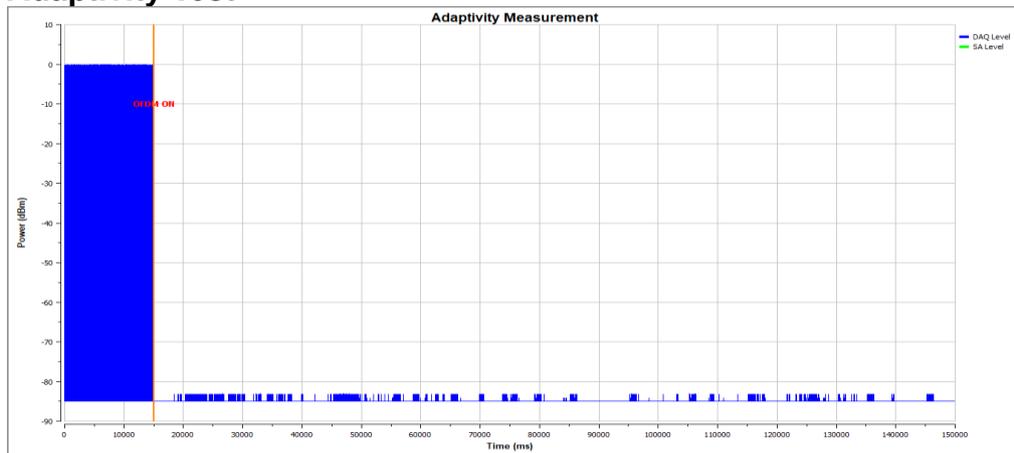


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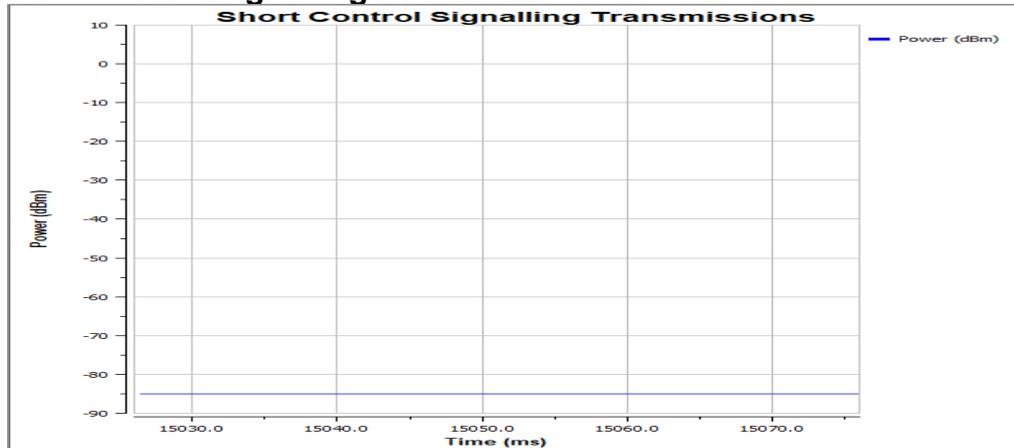
### 802.11 a20 (Band 1&2)\_OFDM Traffic Load Test



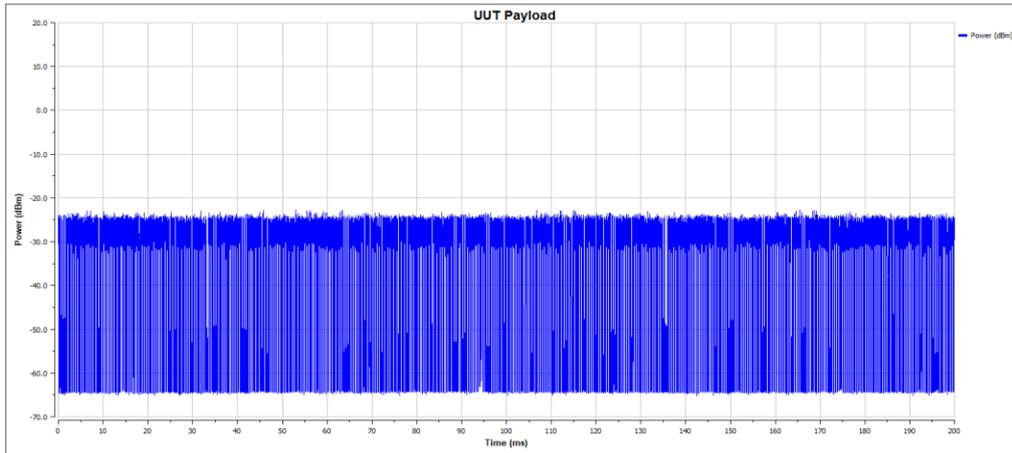
### Adaptivity Test



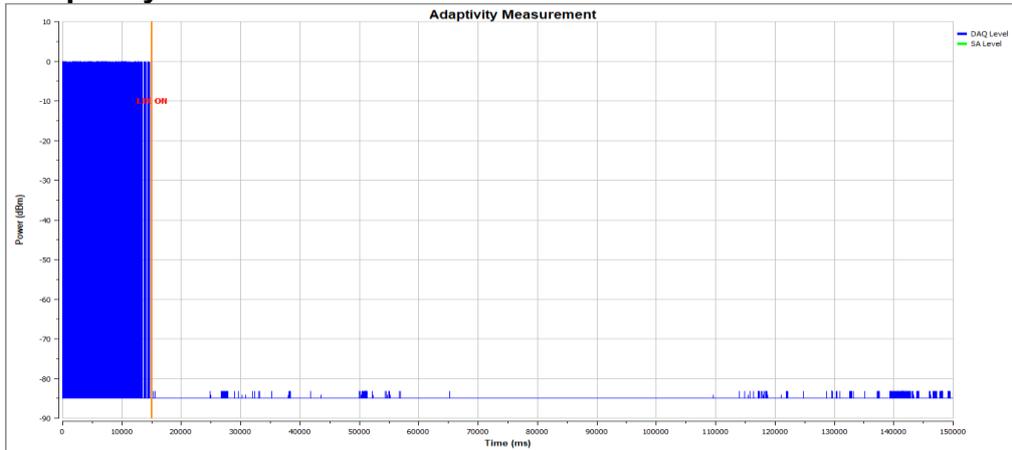
### Short control signalling check



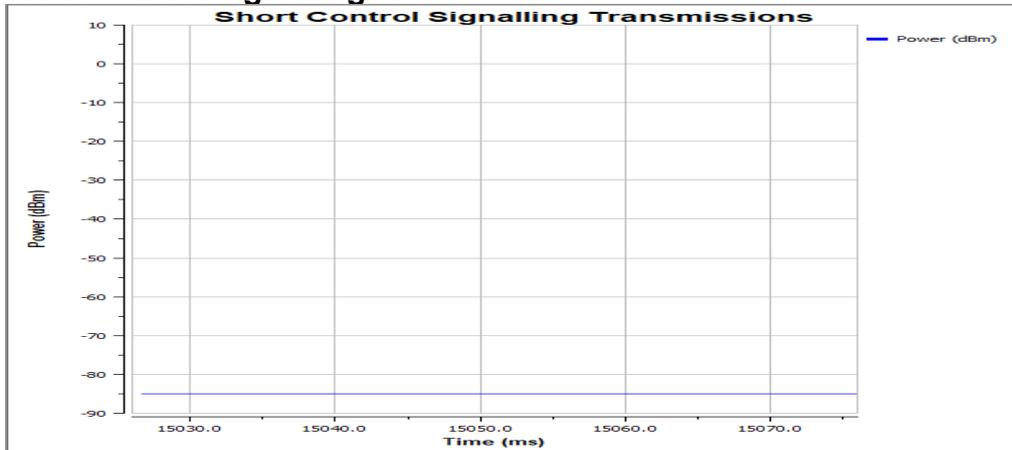
## 802.11 a20 (Band 1&2)\_LTE Traffic Load Test



## Adaptivity Test

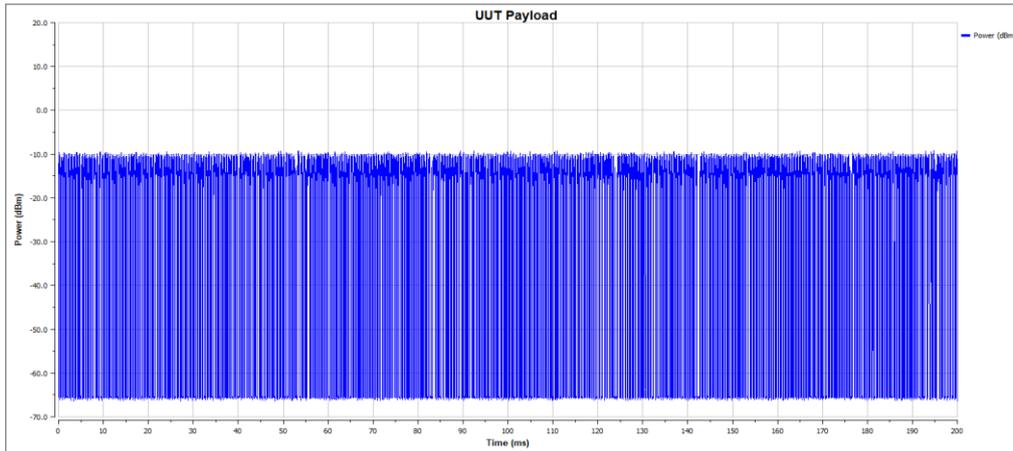


## Short control signalling check

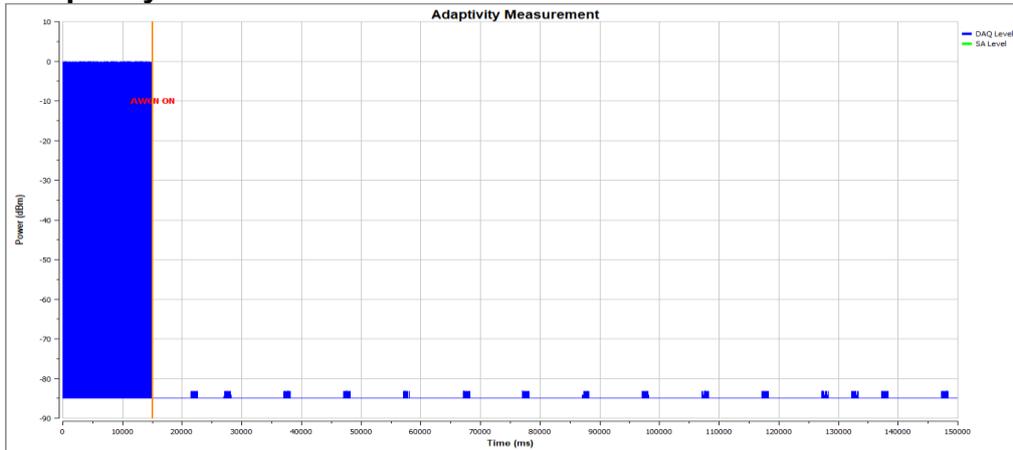


**Adaptivity Result on 5190MHz\_AWGN , spectrum shall monitor 5200MHz  
(Primary channel is 5180MHz and adjacent (non-primary) channel is 5200MHz)**

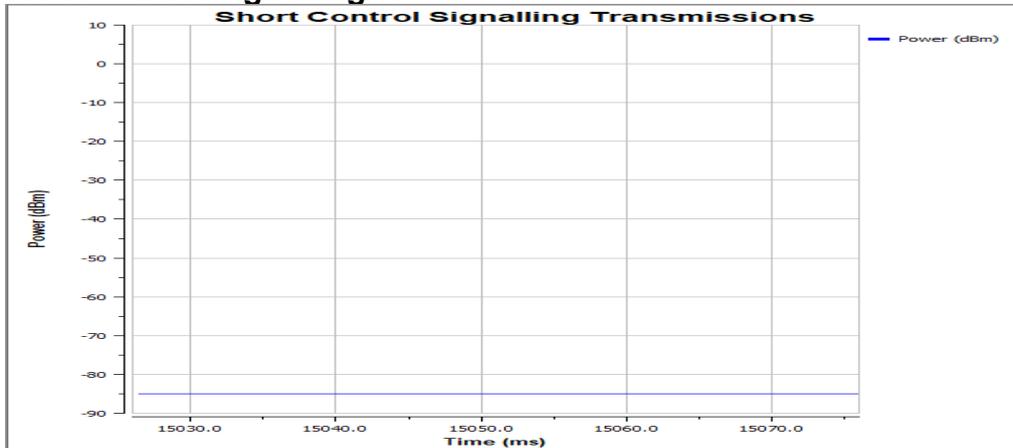
**802.11 n40 (Band 1&2)\_AWGN  
Traffic Load Test**



**Adaptivity Test**



**Short control signalling check**



Report No.: TMWK2305001494KR

**Medium Access Mechanism Test Results:**

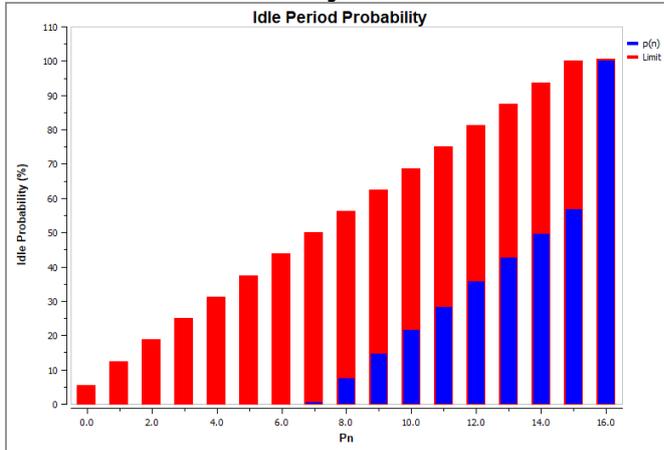
**1. IEEE 802.11a Mode (5180MHz)**

Modulation	Test Freq (MHz)	COT Number	Max COT (ms)	Priority Class
802.11 a20 (Band 1&2)	5180	10052	0.4098816	2

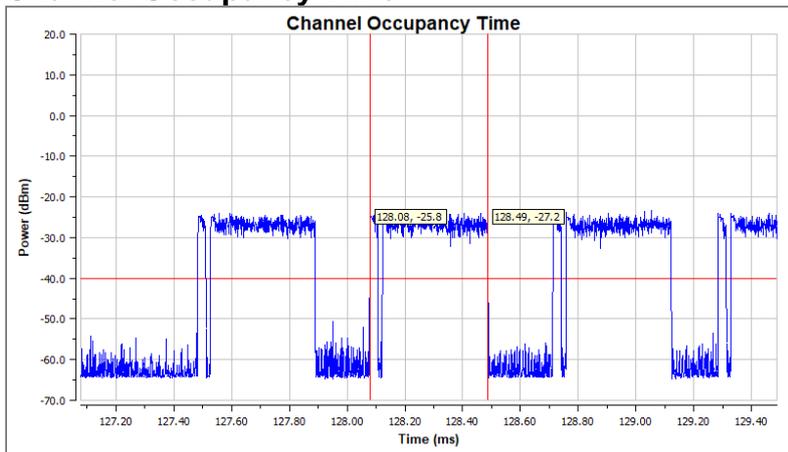
Pn	Result	Limit	Status
0	0	5	Pass
1	0	12	Pass
2	0	18.25	Pass
3	0	24.5	Pass
4	0	30.75	Pass
5	0	37	Pass
6	0	43.25	Pass
7	0.59	49.5	Pass
8	7.47	55.75	Pass
9	14.57	62	Pass
10	21.57	68.25	Pass
11	28.22	74.5	Pass
12	35.73	80.75	Pass
13	42.72	87	Pass
14	49.58	93.25	Pass
15	56.68	99.5	Pass
16	100	100	Pass

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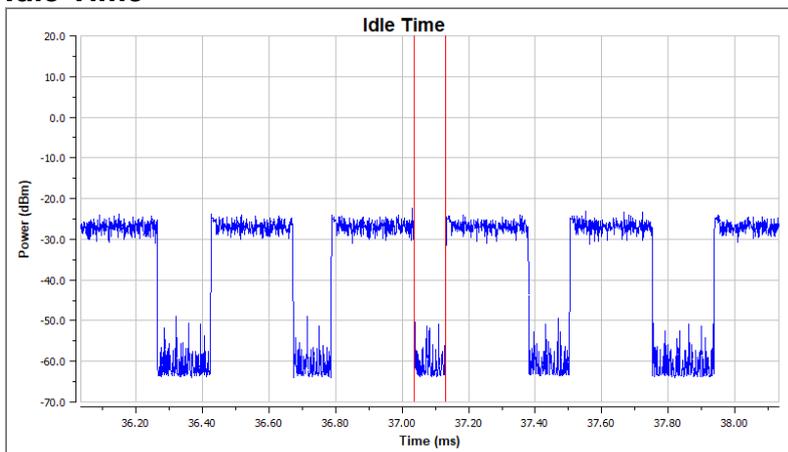
## Idle Period Probability



## Channel Occupancy Time



## Idle Time



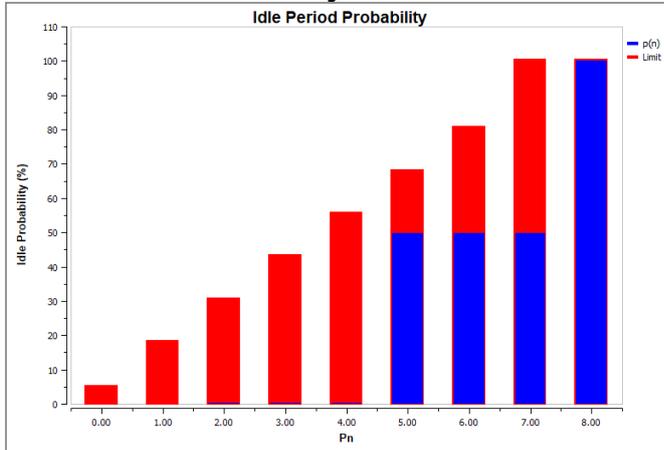
## 2. IEEE 802.11n HT40 Mode (5190MHz)

Modulation	Test Freq (MHz)	COT Number	Max COT (ms)	Priority Class
802.11 n40 (Band 1&2)	5190	10272	2.609344	3

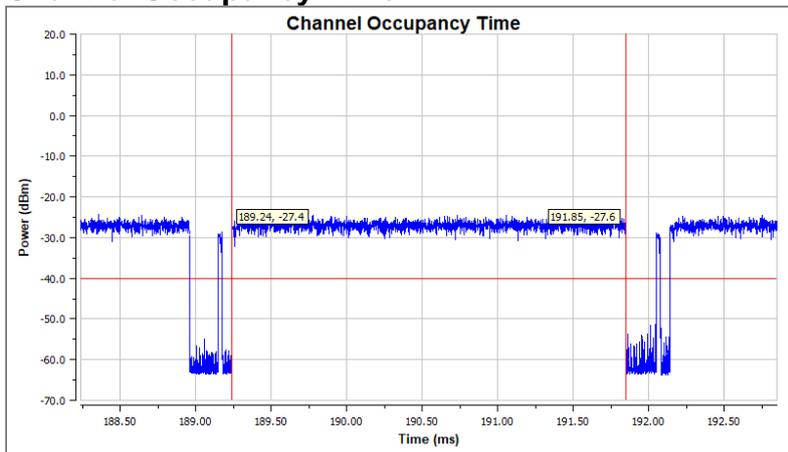
Pn	Result	Limit	Status
0	0	5	Pass
1	0.1	18	Pass
2	0.23	30.5	Pass
3	0.24	43	Pass
4	0.25	55.5	Pass
5	49.84	68	Pass
6	49.86	80.5	Pass
7	49.89	100	Pass
8	100	100	Pass

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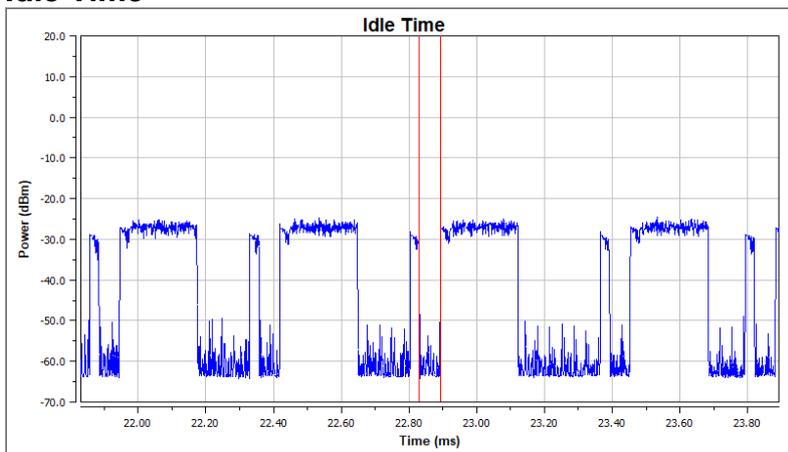
## Idle Period Probability



## Channel Occupancy Time



## Idle Time



Report No.: TMWK2305001494KR

## 8.7. RECEIVER BLOCKING

### LIMIT

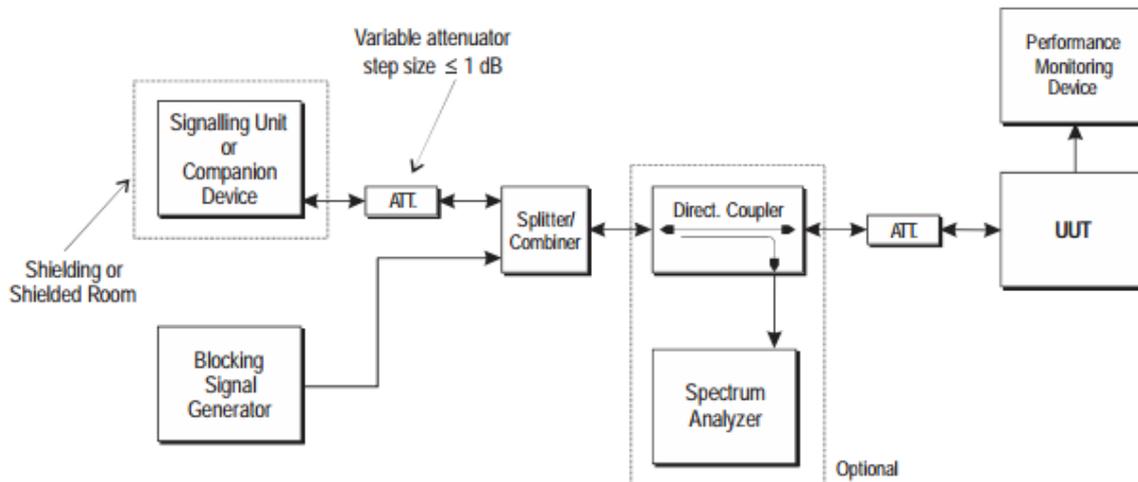
The minimum performance criterion shall be a PER of less than or equal to 10 %.

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 2)		Type of blocking signal
		Master or Slave with radar detection (see table D.2, note 2)	Slave without radar detection (see table D.2, note 2)	
P <sub>min</sub> + 6 dB	5 100	-53	-59	Continuous Wave
P <sub>min</sub> + 6 dB	4 900 5 000 5 975	-47	-53	Continuous Wave

NOTE 1: P<sub>min</sub> is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined clause 4.2.8.3 in the absence of any blocking signal.

NOTE 2: The levels specified are levels in front of the UUT antenna. In case of conducted measurements, the same levels should be used at the antenna connector irrespective of antenna gain.

### TEST CONFIGURATION



### TEST PROCEDURE

1. Please refer to ETSI EN 301 893 V2.1.1 (2017-05).

Report No.: TMWK2305001494KR

## TEST RESULTS

**Temperature:** 24.5°C

**Test Date:** June 20, 2023

**Humidity:** 45% RH

**Tested By:** Jerry Chang

Receiver Blocking Result_Slave								
Configuration	Pmin (dBm)	Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	Blocking signal highest level which the performance criteria (dBm)	Packet Error Rate (%)	Limit	Result
802.11a CH 36	-89.2	-83.2	5100	-59	-26.30	0.1	≤ 10%	PASS
			4900		-18.82	0.2		
			5000	-53	-21.75	0.2		
			5975		-9.33	0.2		

Report No.: TMWK2305001494KR

## 8.8. NOMINAL CHANNEL BANDWIDTH AND OCCUPIED CHANNEL BANDWIDTH

### LIMIT

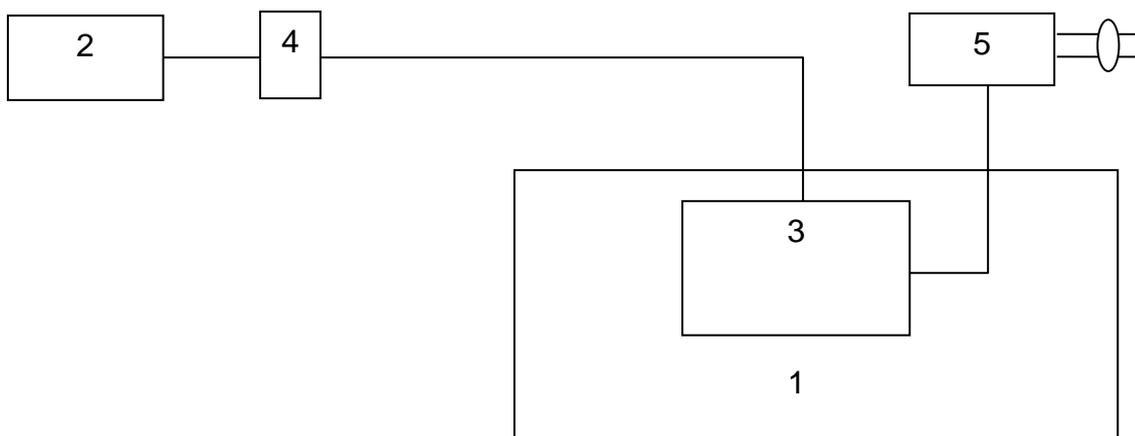
#### ETSI EN 301 893

The Nominal Channel Bandwidth shall be at least 5 MHz at all times.

The Occupied Channel Bandwidth shall be between 80 % and 100 % of the declared Nominal Channel Bandwidth. In case of smart antenna systems (devices with multiple transmit chains) each of the transmit chains shall meet this requirement.

During an established communication, the device is allowed to operate temporarily with an Occupied Channel Bandwidth below 80 % of its Nominal Channel Bandwidth with a minimum of 4 MHz.

### Test Configuration



### **Legend**

1. Wooden table
2. Spectrum analyzer
3. EUT
4. DC block
5. Power supply

### **TEST PROCEDURE**

1. Please refer to ETSI EN 301 893 (V2.1.1) for the test conditions.
2. Please refer to ETSI EN 301 893 (V2.1.1) for the measurement method.

### **TEST RESULTS**

Compliance.

Report No.: TMWK2305001494KR

Temperature: 24.8~25.2°C

Test Date: May 22~23, 2023

Humidity: 52~60% RH

Tested By: David Li

**IEEE802.11a Mode: (Chain 0)**

Channel Frequency (MHz)	Occupied Bandwidth (MHz)	Nominal Bandwidth (MHz)	LIMIT	Result
5180	16.438	20	>16MHz	Pass

**IEEE 802.11n HT20 Mode: (Chain 0)**

Channel Frequency (MHz)	Occupied Bandwidth (MHz)	Nominal Bandwidth (MHz)	LIMIT	Result
5180	17.615	20	>16MHz	Pass

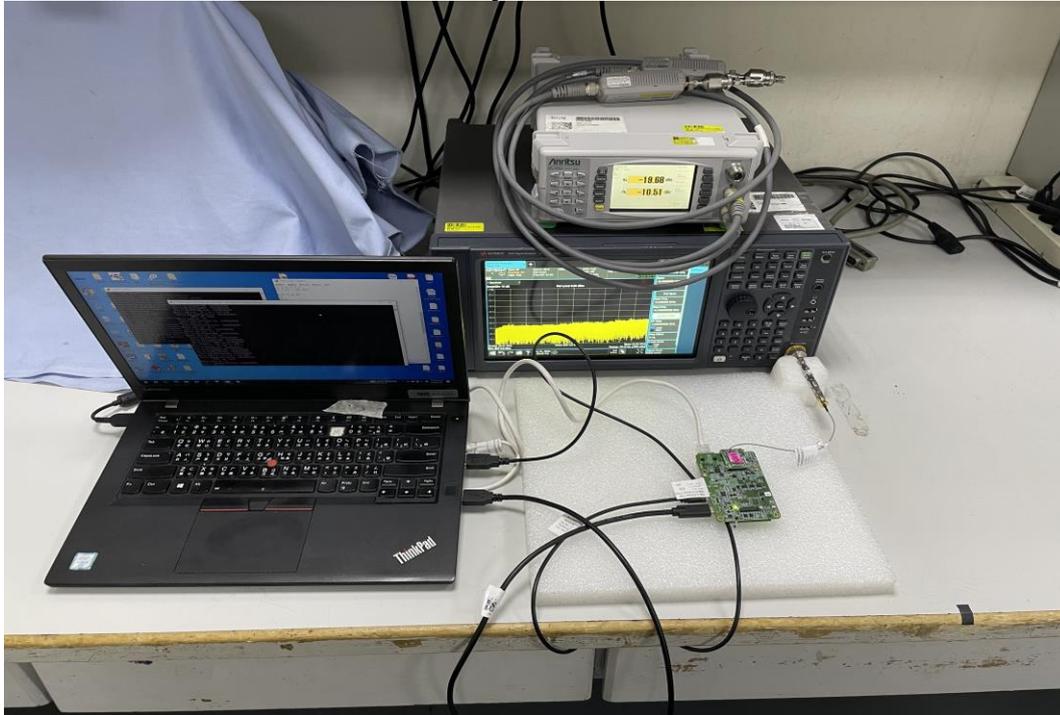
**IEEE 802.11n HT40 Mode: (Chain 0)**

Channel Frequency (MHz)	Occupied Bandwidth (MHz)	Nominal Bandwidth (MHz)	LIMIT	Result
5190	36.154	40	>32MHz	Pass

-- End of Test Report --

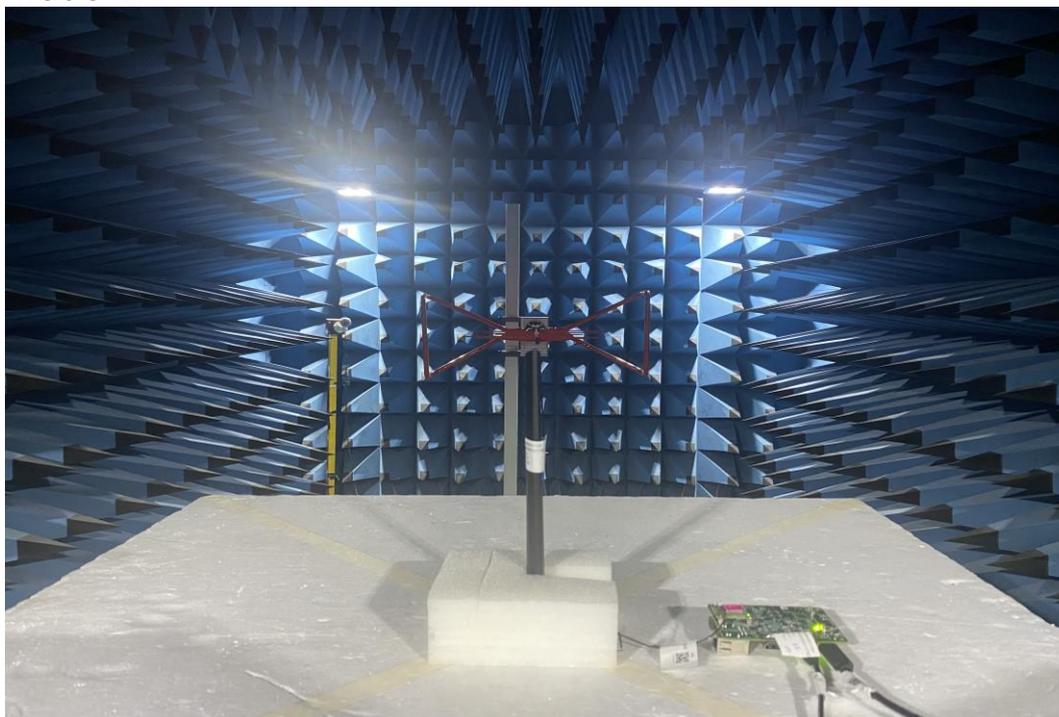
Report No.: TMWK2305001494KR

## APPENDIX A PHOTOGRAPHS OF TEST SETUP Conducted Emissions Setup Photos

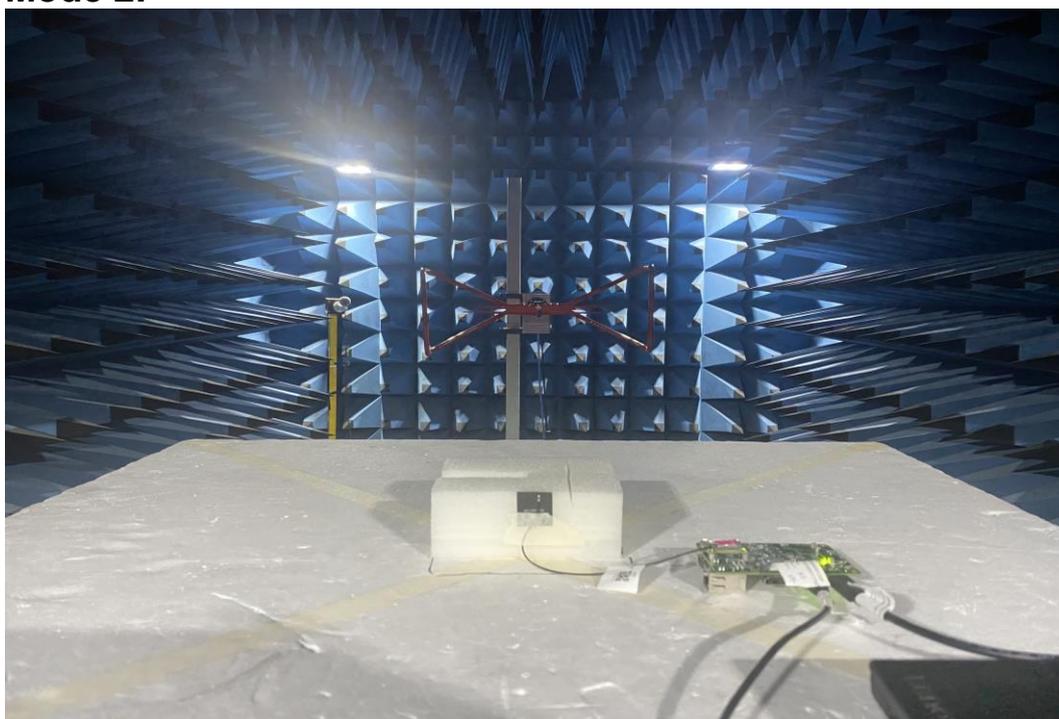


Report No.: TMWK2305001494KR

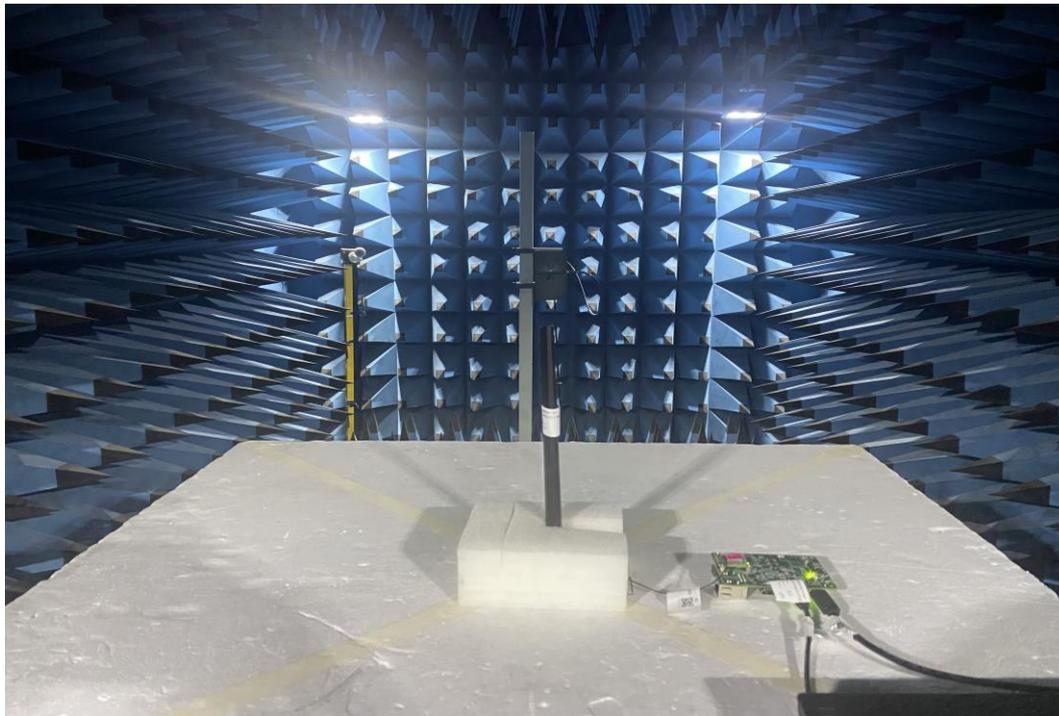
## Radiated Emissions Setup Photos Below 1GHz Mode 1:



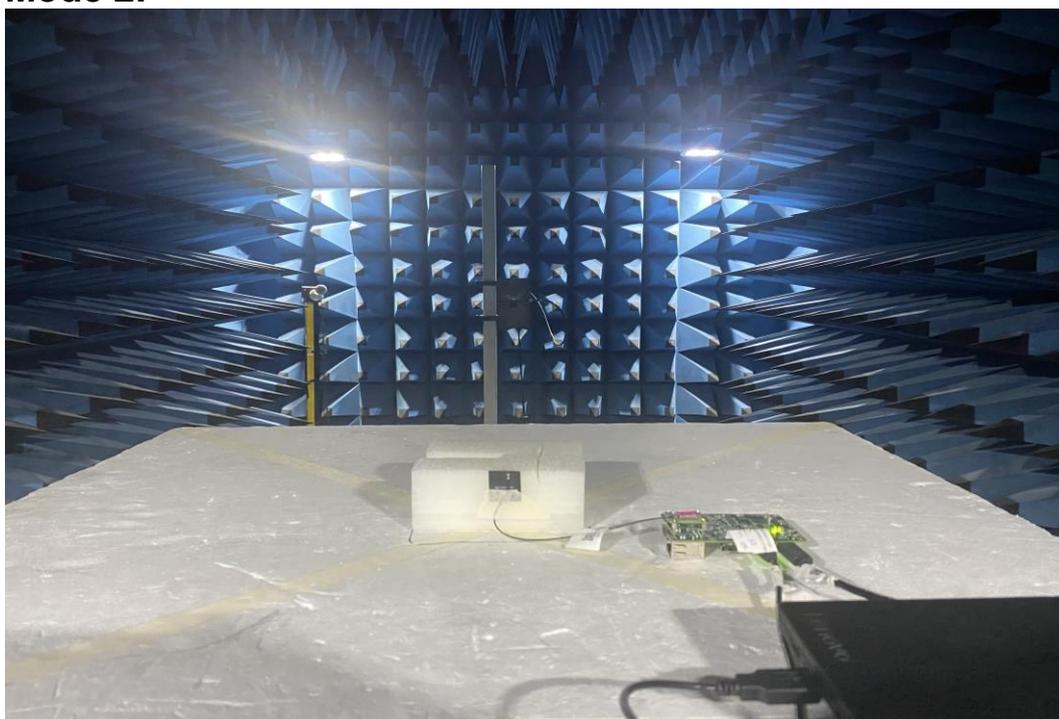
## Mode 2:



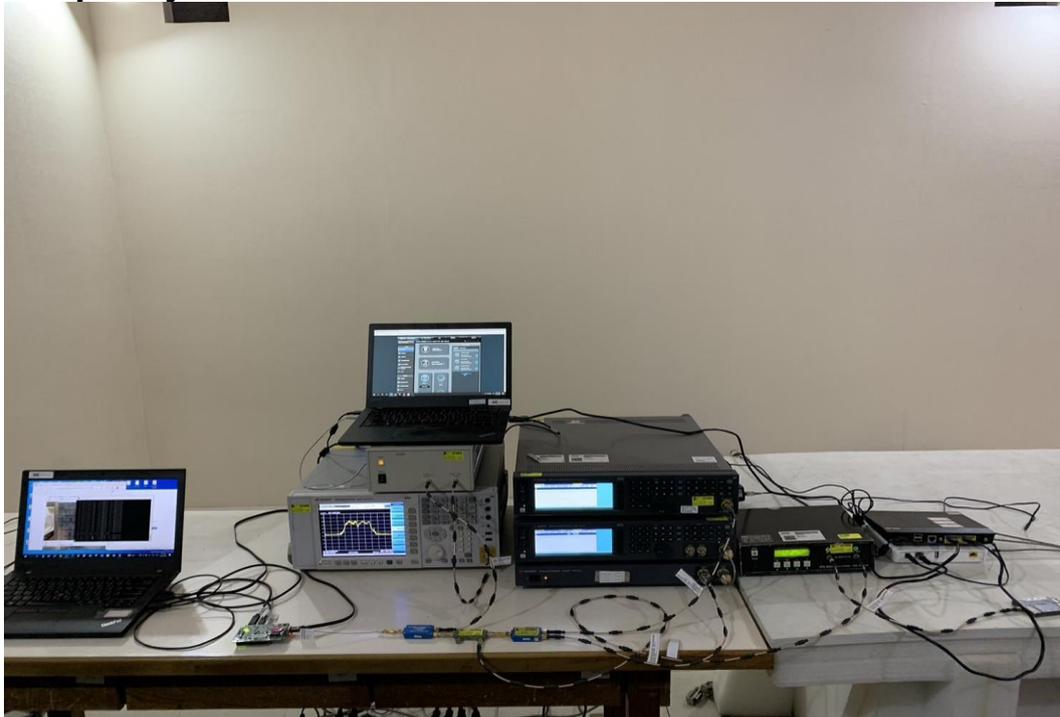
## Above 1GHz Mode 1:



## Mode 2:



## Dynamic Frequency Selection and Adaptive Set Up Photo Adaptivity & MAM



## Receiver Blocking

