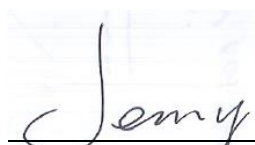


FCC RADIO TEST REPORT

Applicant..... : Robert Bosch GmbH
Address..... : Robert-Bosch-Platz 1, 70839 Gerlingen, Germany
Manufacturer..... : Robert Bosch GmbH
Address..... : Robert-Bosch-Platz 1, 70839 Gerlingen, Germany
Factory 1..... : Robert Bosch Malaysia
Address : Phase 1 – Free Industrial Zone, 11900 Bayan Lepas, Penang, Malaysia
Factory 2..... : Bosch Automotive Electronics India Pvt.Ltd.
Address : Hangar 703 Naganathapura, Electronic city PO, Bengaluru - 560100
Product Name..... : Multimedia device with Bluetooth and WLAN
Brand Name..... : BOSCH
Model No. : 71U0
FCC ID..... : 2AUXS-71U0
Measurement Standard.... : 47 CFR FCC PART 15 Subpart E (section 407)
Receipt Date of Samples.... : February 18, 2025
Date of Tested..... : February 18, 2025 to March 24, 2025
Date of Report..... : March 25, 2025

This report shows that above equipment is technically compliant with the requirements of the standards above. All test results in this report apply only to the tested sample(s). Without prior written approval of Dongguan Nore Testing Center Co., Ltd, this report shall not be reproduced except in full.



Prepared by

Jenny Liu / Project Engineer



Approved by

Iori Fan / Authorized Signatory

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Revision History

[illegible]

1. Summary of Test Result

FCC Rules	Description of Test	Result	Remarks
§15.207 (a)	AC Power Conducted Emission	N/A	See Note
§15.407(a)	Max. Conducted Output Power	PASS	---
§15.407(a)	26dB Spectrum Bandwidth and 99% Occupied Bandwidth	PASS	---
§15.407(e)	6dB Bandwidth	PASS	---
§15.407(a)	Power Spectral Density	PASS	---
§15.407(b) §15.205	Radiated Emissions	PASS	---
§15.407(b)	Band Edge Emissions	PASS	---
§15.407(g)	Frequency Stability	PASS	---
§15.203	Antenna Requirement	PASS	---
§15.407(h)	Dynamic Frequency Selection	N/A	See Note

Note 1: The device is designed for vehicle environment using and cannot connect to the public low-voltage network.

Note 2: This test only applies to the device support DFS band.

2. General Description of EUT

Product Information	
Product name:	Multimedia device with Bluetooth and WLAN
Main Model Name:	71U0
Additional Model Name:	N/A
Model Difference:	N/A
S/N:	4c8117b1 (conducted sample) / 60c50fde (radiated sample)
Brand Name	BOSCH
Hardware version:	DA3-002
Software version:	D3I_51.6(S3R-01-00 (2024-51-6))
Rating:	DC 10V to 16 V come from vehicle environment
Classification:	Class B
Typical arrangement:	Tabletop
I/O Port:	Refer to the user's manual
Accessories Information	
Adapter:	N/A
Cable:	N/A
Other:	N/A
Additional Information	
Note:	1. The device has six variant versions, and all the versions have the same schematic, construction, PCB Layout, Bluetooth & WIFI RF module; the differences are software version and components populated in accordance with the function feature. Details refer to following the variant version description. 2. According to the version differences and the manufacturer, all tests were performed on version GEX w/DAB, deviation test of Radiated Emission was performed on version IND.
Remark:	All the information above are provided by the manufacturer. More detailed feature of the EUT please refers to the user manual.

Technical Specification	
Frequency Range:	5190MHz for U-NII-1 5755MHz for U-NII-3
Modulation Technology:	OFDM
Modulation Type:	BPSK, QPSK, 16QAM, 64QAM, 256QAM
Number of Channel:	1 for U-NII-1 802.11n(HT40) / ac(VHT40) 1 for U-NII-3 802.11n(HT40) / ac(VHT40)
Antenna Type:	Chip Antenna
Number of Antenna	2 (BT & 5G WIFI x1, 2.4G & 5G WIFI x 1)
Antenna Gain:	ANT 1: 0.59 dBi maximum ANT 2: 2.96 dBi maximum
Beamforming Gain:	Not support
Transmission Mode:	SISO and MIMO
Note:	The information above declared by the manufacturer.
Remark:	This report only applies to 5GHz WLAN feature of the EUT.

Variant Version Description:

Function	Versions					
	IND	GEX w/DAB	GEX with no 5GHz AP support	GEX w/o DAB	EU w/DAB	EU w/o DAB
AM	Yes	Yes	Yes	Yes	Yes	Yes
FM	Yes	Yes	Yes	Yes	Yes	Yes
DAB	---	Yes	---	---	Yes	---
DRM	Yes	---	---	---	---	---
BT	Yes	Yes	Yes	Yes	Yes	Yes
BLE	Yes	Yes	Yes	Yes	Yes	Yes
Wifi Station (2.4 GHz)	Yes	Yes	Yes	Yes	Yes	Yes
GNSS	Yes	Yes	Yes	Yes	Yes	Yes
Wifi AP 2.4GHz	---	---	Yes	---	---	---
Wifi AP 5GHz	Yes	Yes	---	Yes	Yes	Yes
USB DCM	Yes	---	---	---	Yes	Yes
USB	Yes	Yes	Yes	Yes	Yes	Yes
QZSS	Yes	Yes	Yes	Yes	Yes	Yes
RVC	Yes	Yes	Yes	Yes	Yes	Yes
Int SVS	Yes	Yes	Yes	Yes	---	---
Ext SVS	---	---	---	---	---	---
Audio (8 CH)	Yes	Yes	Yes	Yes	---	---
Audio (4 CH)	---	---	---	---	Yes	Yes

Note: For wireless functions Bluetooth and WIFI, the hardware design is exactly the same. The WIFI bands and features are locked by the software at the factory and cannot be modified by the user.

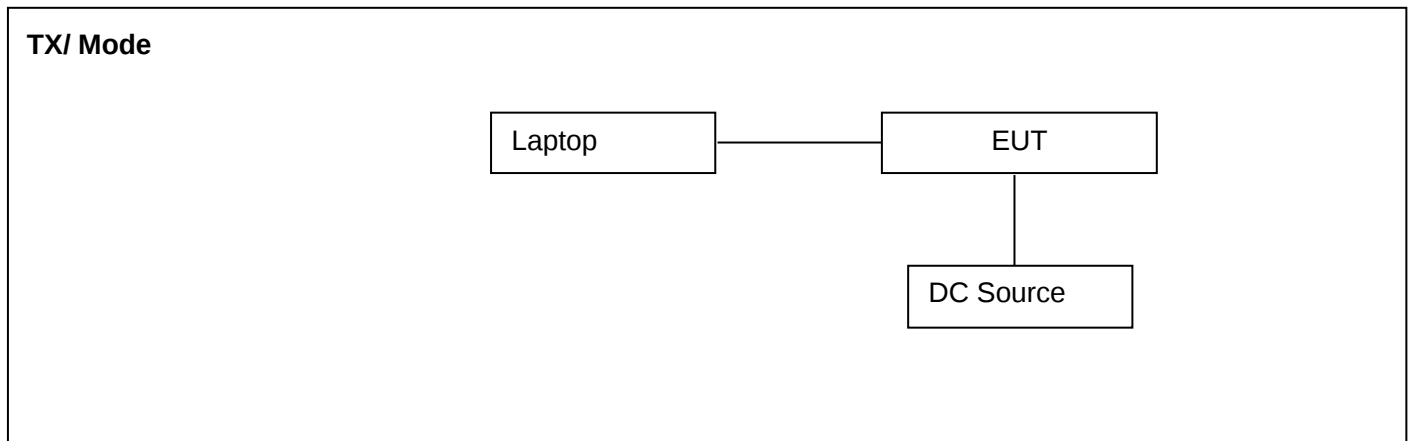
Channel List					
U-NII-1 Band 5180-5240MHz					
IEEE 802.11a/n(HT20)/ac(VHT20)/		IEEE 802.11n(HT40)/ac(VHT40)		IEEE 802.11 ac (VHT80))	
Channel	Frequency MHz	Channel	Frequency MHz	Channel	Frequency MHz
-	-	38	5190	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
U-NII-3 Band 5745~5825MHz					
-	-	151	5755	-	-
-	-	-	-	-	-
-	-	-	-		
-	-	-	-		
-	-	-	-		

3. Test Channels and Modes Detail

No.	Mode	Channel	Frequency (MHz)	Remark
1	TX	38	5190	IEEE 802.11n(HT40) /ac(VHT40)
		151	5755	IEEE 802.11n(HT40) /ac(VHT40)
2	WIFI (CH 38) + Bluetooth Link			Co-transmitting

Note: TX mode means that the EUT was programmed to be in continuously transmitting mode.

4. Configuration of EUT



5. Modification of EUT

No modifications are made to the EUT during all test items.

6. Description of Support Device

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Equipment	Brand	M/N	S/N	Cable Specification	Remarks
1.	Laptop	Lenovo	R720-151KBN	PF0Z35FH	---	Provided by the lab

Software	Power Setting				
ADB commands & MyFTM_GUI_v2.0.1m	Mode	Ant_1		Ant_2	
		U-NII-1	U-NII-3	U-NII-1	U-NII-3
	IEEE 802.11n(HT40)	10	13	13	10
	IEEE 802.11ac(VHT40)	10	14	13	10

7. Test Facility and Location

Test Site	:	Dongguan Nore Testing Center Co., Ltd. (Dongguan NTC Co., Ltd.)
Accreditations and Authorizations	:	The Laboratory has been assessed and proved to be in compliance with CNAS/CL01 Listed by CNAS, August 13, 2018 The Certificate Registration Number is L5795. The Certificate is valid until August 13, 2030 The Laboratory has been assessed and proved to be in compliance with ISO17025 Listed by A2LA, November 01, 2017 The Certificate Registration Number is 4429.01 The Certificate is valid until December 31, 2025 Listed by FCC, November 06, 2017 Test Firm Registration Number is 907417 Listed by Industry Canada, June 08, 2017 The Certificate Registration Number is 46405-9743A
Test Site Location	:	Building D, Gaosheng Science and Technology Park, Hongtu Road, Nancheng District, Dongguan City, Guangdong Province, China

8. Applicable Standards and References

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

Test Standards:

47 CFR Part 15, Subpart E, 15.407

ANSI C63.10-2013

References Test Guidance:

KDB 789033 D02 v02r01

KDB 905462 D03 v01r02

9. Deviations and Abnormalities from Standard Conditions

No additions, deviations and exclusions from the standard.

10. Test Conditions

No.	Test Item	Test Mode	Test Voltage	Tested by	Remarks
1.	AC Power Conducted Emission	---	---	---	---
2.	Max. Conducted Output Power	1	DC 13.5V	Sean	See note 1
3.	26dB Spectrum Bandwidth and 99% Occupied Bandwidth	1	DC 13.5V	Sean	See note 1
4.	6dB Bandwidth	1	DC 13.5V	Sean	See note 1
5.	Power Spectral Density	1	DC 13.5V	Sean	See note 1
6.	Radiated Emissions	1-2	DC 13.5V	Sean	See note 1,3
7.	Band Edge Emissions	1	DC 13.5V	Sean	See note 1
8.	Frequency Stability	1	DC 13.5V	Sean	See note 1
9.	Antenna Requirement	---	---	---	---
10.	Dynamic Frequency Selection	---	---	---	---

Note:

1. The testing climatic conditions for temperature, humidity, and atmospheric pressure are within: 15~35℃, 30~70%, 86~106kPa
2. DC 13.5V comes from the external DC source.
3. The device is designed for vehicle environment using and cannot connect to the public low-voltage network.

11. Measurement Uncertainty

No.	Test Item	Frequency	Uncertainty	Remarks
1.	Conducted Emission	150KHz ~ 30MHz	±2.52 dB	---
2.	Radiated Emission	9kHz ~ 30MHz	±5.60 dB	
		30MHz ~ 1GHz	±5.60 dB	---
		1GHz ~ 18GHz	±5.22 dB	---
		18GHz ~ 40GHz	±5.22 dB	
3.	RF Conducted	10Hz ~ 40GHz	±1.18 dB	---
4.	Occupied Channel Bandwidth	---	±1.05%	---

Note:

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The measurement uncertainty levels above are estimated and calculated according to CISPR 16-4-2.
3. The conformity assessment statement in this report is based solely on the test results, measurement uncertainty is excluded.

12. Sample Calculations

Conducted Emission						
Freq. (MHz)	Reading Level (dBUV)	Correct Factor (dB)	Measurement (dBUV)	Limit (dBUV)	Over (dB)	Detector
0.1900	30.10	10.60	40.70	79.00	-38.30	QP
Where, Freq. = Emission frequency in MHz Reading Level = Spectrum Analyzer/Receiver Reading Corrector Factor = Insertion loss of LISN + Cable Loss + RF Switching Unit attenuation Measurement = Reading + Corrector Factor Limit = Limit stated in standard Margin = Measurement - Limit Detector = Reading for Quasi-Peak / Average / Peak						

Radiated Spurious Emissions and Restricted Bands						
Freq. (MHz)	Reading Level (dBUV)	Correct Factor (dB/m)	Measurement (dBUV/m)	Limit (dBUV/m)	Over (dB)	Detector
60.0700	45.88	-18.38	27.50	49.00	-21.50	QP
Where, Freq. = Emission frequency in MHz Reading Level = Spectrum Analyzer/Receiver Reading Corrector Factor = Antenna Factor + Cable Loss - Pre-amplifier Measurement = Reading + Corrector Factor Limit = Limit stated in standard Over = Margin, which calculated by Measurement - Limit Detector = Reading for Quasi-Peak / Average / Peak						

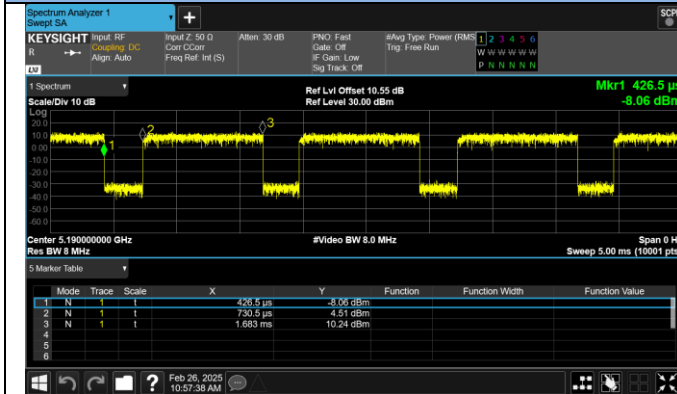
Note: For all conducted test items, the spectrum analyzer offset or transducer is derived from RF cable loss and attenuator factor. The offset or transducer is equal to the RF cable loss plus attenuator factor.

13. Duty cycle

Operation Band (MHz)	Mode	Ton (ms)	Ton+off (ms)	Duty Cycle (%)	1/T minimum VBW (kHz)	Duty Cycle Factor (dB)
U-NII-1	802.11n(HT40)	0.9525	1.2565	75.81%	1.05	1.20
	802.11ac(VHT40)	0.9485	1.2305	77.08%	1.05	1.13
U-NII-3	802.11n(HT40)	0.501	0.809	61.93%	2.00	2.08
	802.11ac(VHT40)	0.9485	1.2535	75.67%	1.05	1.21
Remark: Duty Cycle= (Ton/ Ton+off)*100% Duty Cycle factor=10*log(1/ Duty cycle)						

U-NII-1 Band

IEEE 802.11n(HT40)

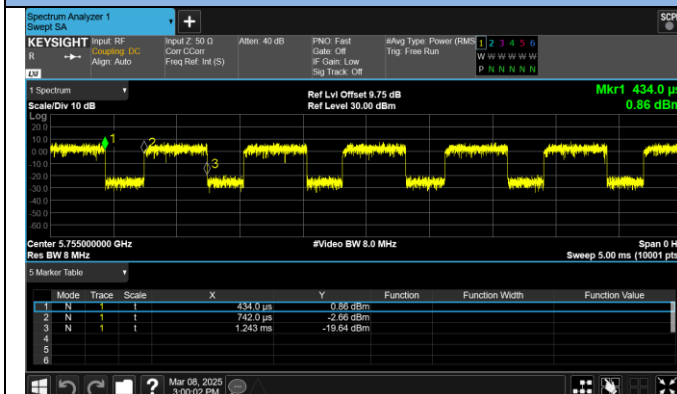


IEEE 802.11ac(VHT40)

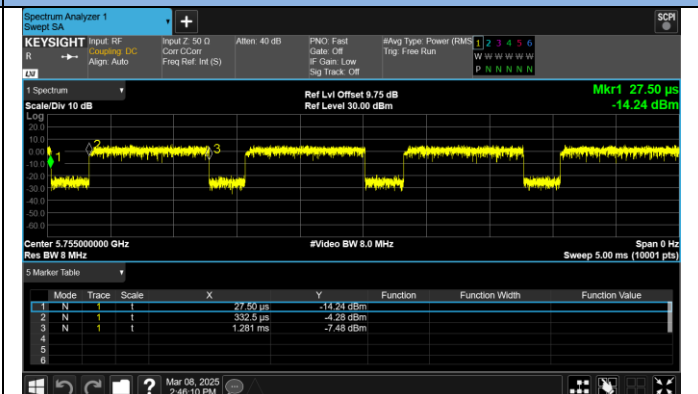


U-NII-3 Band

IEEE 802.11n(HT40)



IEEE 802.11ac(VHT40)



14. Test Items and Results

14.1 Conducted Emissions Measurement

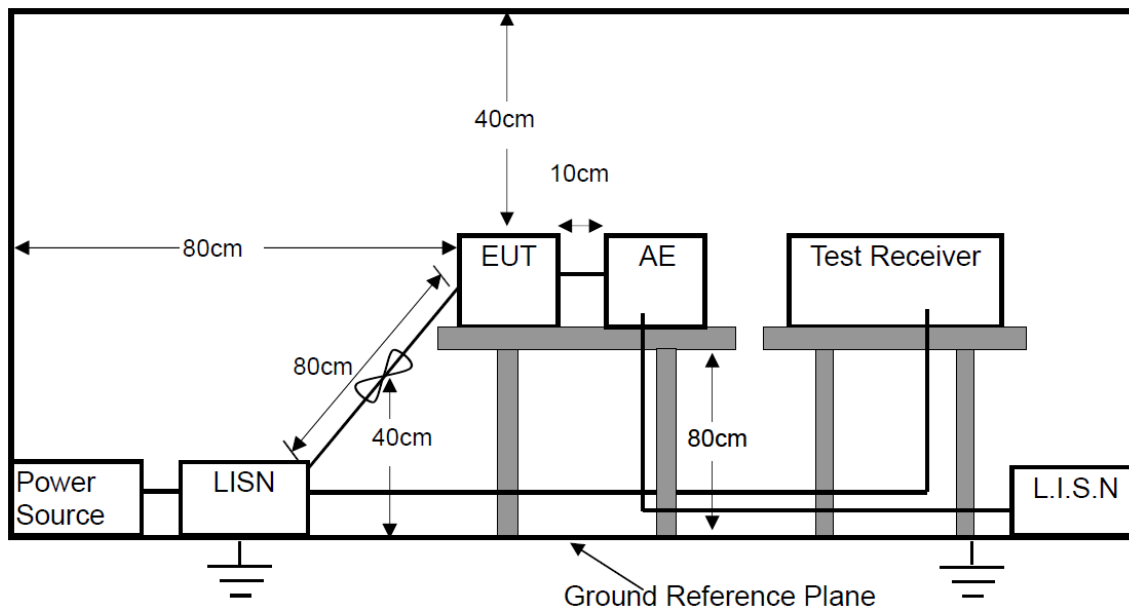
LIMITS

According to the requirements of FCC PART 15.207, the limits are as follows:

Frequency (MHz)	Quasi-peak	Average
0.15 to 0.5	66 to 56	56 to 46
0.5 to 5	56	46
5 to 30	60	50

Note: 1. If the limits for the average detector are met when using the quasi-peak detector, then the limits for the measurements with the average detector are considered to be met.
2. The lower limit shall apply at the transition frequencies.
3. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5MHz.

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

- a. The EUT was placed on a wooden table 0.8m height from the metal ground plan and 0.4m from the conducting wall of the shielding room and it was kept at 0.8m from any other grounded conducting surface.
- b. All I/O cables and support devices were positioned as per ANSI C63.10.
- c. Connect mains power port of the EUT to a line impedance stabilization network (LISN).
- d. Connect all support devices to the other LISN and AAN, if needed.
- e. Scan the frequency range from 150KHz to 30MHz at both sides of AC line for maximum conducted interference checking and record the test data.

TEST RESULTS

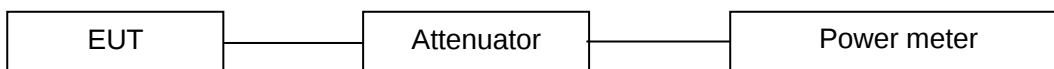
Not Applicable

14.2 Maximum Conducted Output Power Measurement

LIMITS

Operation Band	EUT category	Limit
☒ 5180~5240MHz	☐ Outdoor Access Point	1 Watt (30dBm) (Max. e.i.r.p $\leq$ 125mW(21dBm) at any elevation angle above 30 degrees as measured from the horizon)
	☐ Fixed point-to-point Access Point	1 Watt (30dBm)
	☒ Indoor Access Point	1 Watt (30dBm)
	☐ Mobile and Portable client device	250mW (24dBm)
☐ 5260~5320MHz	-	250mW (24dBm)
☐ 5500~5700MHz	-	250mW (24dBm)
☒ 5745~5825MHz	-	1 Watt (30dBm)

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

1. The transmitter output (antenna port) was connected to the power meter.
2. Test was performed in accordance with KDB789033 v02r01 for compliance testing of Unlicensed National Information Infrastructure (U-NII) Device -section (E) Maximum conducted output power.
3. Measurement using a power meter (PM) =b Method PM-G (Measurement using a gated RF average power meter).

TEST RESULTS

PASS

Please refer to the following table.

U-NII-1					
Frequency MHz	Data Rate Mbps	Average Output Power dBm			Limit dBm
IEEE 802.11n(HT40)					
Channel: 5190	MCS 8	ANT_1	ANT_2	Total	30.00
		8.962	4.833	10.38	
IEEE 802.11ac (VHT40)					
Channel: 5190	MCS 8	ANT_1	ANT_2	Total	30.00
		8.124	4.083	9.57	
Note: 1. As for IEEE 802.11n/ac mode, EUT working in MIMO mode. Directional Gain for MIMO. 2. Directional gain = $10 \log [(10^{0.59/20} + 10^{2.96/20})^2 / 2]$ = 4.87dBi < 6 dBi 3. Duty Cycle Factor has considered during the test.					

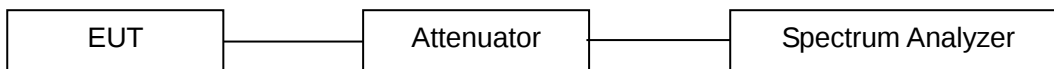
U-NII-3					
Frequency MHz	Data Rate Mbps	Average Output Power dBm			Limit dBm
IEEE 802.11n(HT40)					
Channel: 5755	MCS 8	ANT_1	ANT_2	Total	30.00
		8.177	3.379	9.42	
IEEE 802.11ac (VHT40)					
Channel: 5755	MCS 8	ANT_1	ANT_2	Total	30.00
		8.108	4.822	9.78	
Note: 1. As for IEEE 802.11n/ac mode, EUT working in MIMO mode. 3. Directional gain = 10 log [(10 ^{0.59/20} + 10 ^{2.96/20}) ² / 2]= 4.87dBi < 6 dBi 3. Duty Cycle Factor has considered during the test.					

14.3 6dB Bandwidth Measurement

LIMITS

The minimum 6dB bandwidth shall be at least 500 kHz

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer was set as below according to ANSI C63.10 clause 11.8.1:

- Set the RBW = 100KHz.
- Set the VBW $\geq 3 \times$ RBW
- Set the Detector = peak.
- Set the Sweep time = auto couple.
- Set the Trace mode = max hold.
- Allow trace to fully stabilize.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

TEST RESULTS

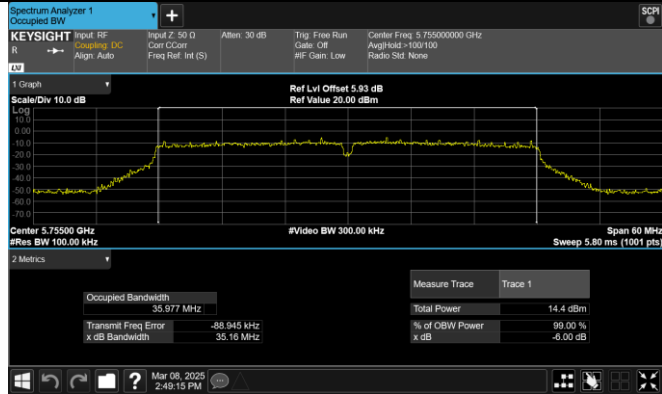
PASS

Please refer to the following tables.

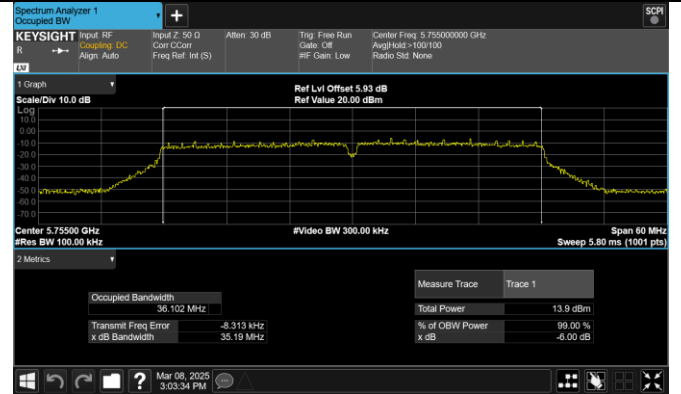
U-NII-3			
Frequency MHz	Data Rate Mbps	6dB Bandwidth MHz	Limit
IEEE 802.11n(HT40) Mode (OFDM)			
Channel: 5755	MCS0	35.16	>500KHz
IEEE 802.11ac (VHT40) Mode (OFDM)			
Channel: 5755	MCS0	35.19	>500KHz
Note: Both of antennas have considered during pre-test, but only the worst case (ANT_1) was recorded.			

U-NII-3

IEEE 802.11n(HT40)



IEEE 802.11ac(VHT40)

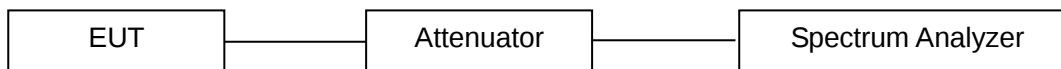


14.4 26dB Bandwidth & 99% Occupied Bandwidth

LIMITS

No restriction limits.

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

The antenna port of the EUT was connected to the input of a spectrum analyzer.

Analyzer was set as below according to FCC KDB789033(v02r01):

- a. For 26dB bandwidth, Set the RBW = Approximately 1% of the emission bandwidth
 - b. Set the VBW > RBW
 - c. Detector = peak.
 - d. Sweep time = auto couple.
 - e. Trace mode = max hold.
 - f. Allow trace to fully stabilize.
 - g. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 26 dB relative to the maximum level measured in the fundamental emission.
-
1. For 99% occupied bandwidth, Set the RBW = 1% to 5% of the OBW
 2. Set the VBW $\geq 3 \times$ RBW
 3. Detector = peak.
 4. Span = 1.5 times to 5.0 times the OBW
 5. Sweep time = auto couple.
 6. Trace mode = max hold. Allow trace to fully stabilize.
 7. Use the 99% power bandwidth function of the spectrum analyzer measure the occupied bandwidth.

TEST RESULTS

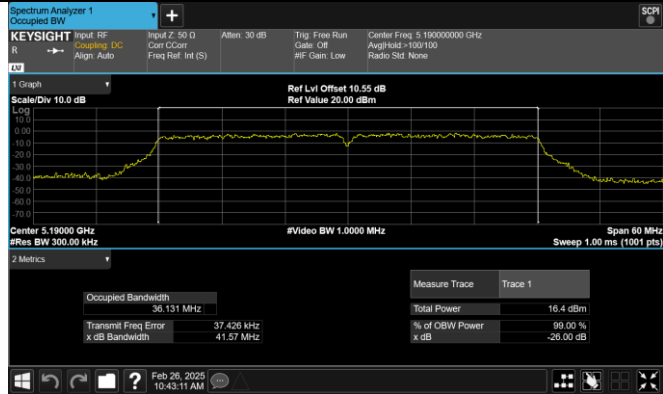
PASS

Please refer to the following table.

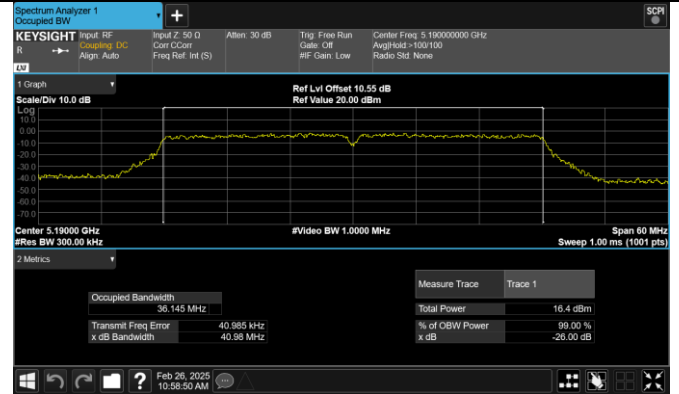
U-NII-1			
Frequency MHz	Data Rate Mbps	26dB Bandwidth MHz	99% Occupied Bandwidth MHz
IEEE 802.11n(HT40) Mode (OFDM)			
Channel: 5190	MCS0	41.57	---
IEEE 802.11ac (VHT40) Mode (OFDM)			
Channel: 5190	MCS0	40.98	---
Note: Both of antennas have considered during pre-test, but only the worst case (ANT_1) was recorded.			

U-NII-1 / 26dB Bandwidth

IEEE 802.11n(HT40)



IEEE 802.11ac(VHT40)

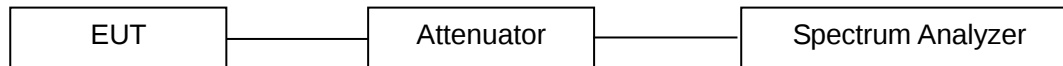


14.5 Power Spectral Density

LIMITS

Operation Band		Limit
☒ 5180~5240MHz	☐ Outdoor access point	17 dBm/MHz
	☒ Indoor access point	17 dBm/MHz
	☐ Fixed point-to-point access points	17 dBm/MHz
	☐ Client devices	11 dBm/MHz
☐ 5260~5320MHz	-	11 dBm/MHz
☐ 5500~5700MHz	-	11 dBm/MHz
☒ 5745~5825MHz	-	30 dBm/500kHz

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

The antenna port of the EUT was connected to the input of a spectrum analyzer.

Analyzer was set as below according to FCC KDB789033 (v02r01):

- Set analyzer center frequency to center frequency
- Set the RBW to: 1MHz
- Set the VBW to: 3MHz
- Detector = RMS
- Sweep time = auto couple
- Trace Average = 100 times
- If measured bandwidth of Maximum PSD is specified in 500kHz, add $10\log(500\text{kHz}/\text{RBW})$ to the measured result, whereas RBW (<500kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement. Allow trace to fully stabilize.

TEST RESULTS

PASS

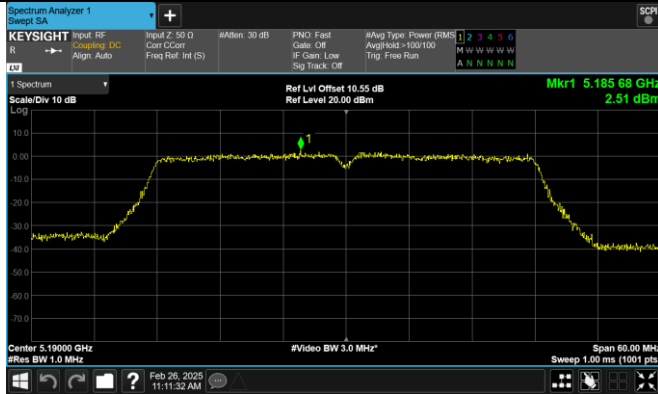
Please refer to the following test plots.

U-NII-1						
Frequency MHz	Data Rate Mbps	Duty Cycle Factor (dB)	PSD dBm/MHz		Total PSD with duty cycle factor	Limit dBm/ MHz
			ANT 1	ANT 2		
IEEE 802.11n(HT40)						
Channel: 5190	MCS 8	1.20	2.51	-2.37	4.93	17
IEEE 802.11ac(VHT40)						
Channel: 5190	MCS 8	1.13	3.42	-2.25	5.59	17
Note: 1. As for IEEE 802.11n/ac mode, EUT working in MIMO mode. 2. Please refer to section 13 for duty cycle factor 3. Directional gain = $10 \log [(10^{0.59/20} + 10^{2.96/20})^2 / 2]$ = 4.87dBi < 6 dBi						

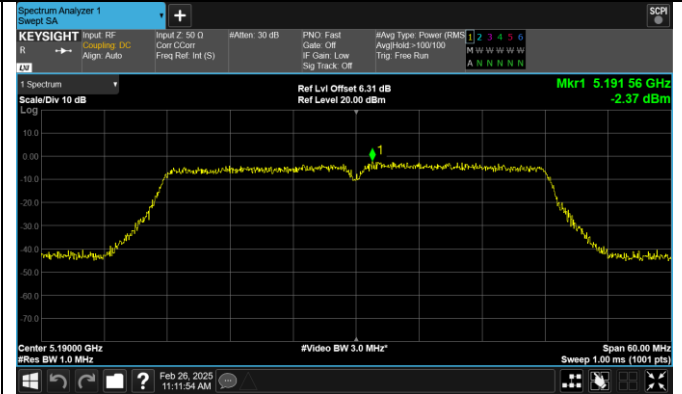
U-NII-3						
Frequency MHz	Data Rate Mbps	Duty Cycle Factor (dB)	PSD dBm/MHz		Total PSD with duty cycle factor	Limit dBm/ 500KHz
			ANT 1	ANT 2		
IEEE 802.11n(HT40)						
Channel: 5755	MCS 8	2.08	-1.97	-6.37	1.46	17
IEEE 802.11ac(VHT40)						
Channel: 5755	MCS 8	1.21	-2.63	-4.90	0.60	17
Note: 1. As for IEEE 802.11n/ac mode, EUT working in MIMO mode. 2. Please refer to section 13 for duty cycle factor 3. Directional gain = 10 log [(10 ^{0.59/20} + 10 ^{2.96/20}) ² / 2]= 4.87dBi < 6 dBi						

U-NII-1

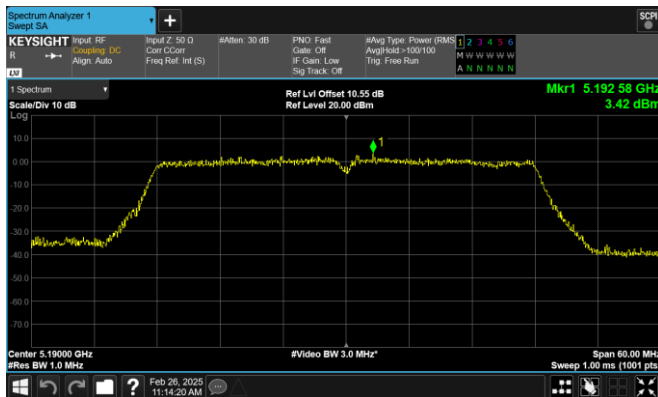
IEEE 802.11n(HT40) _ANT 1



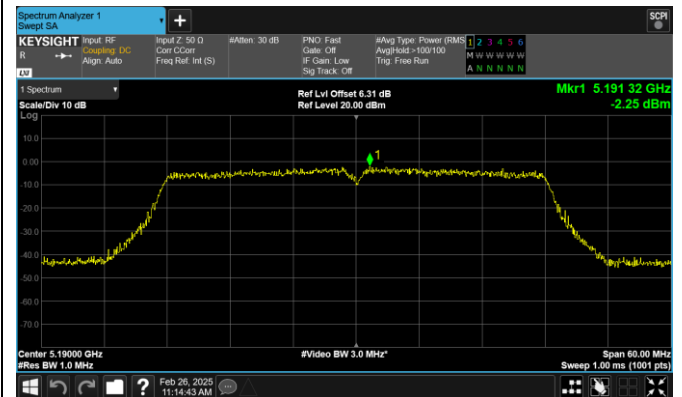
IEEE 802.11n(HT40) _ANT 2



IEEE 802.11ac(VHT40) _ANT 1

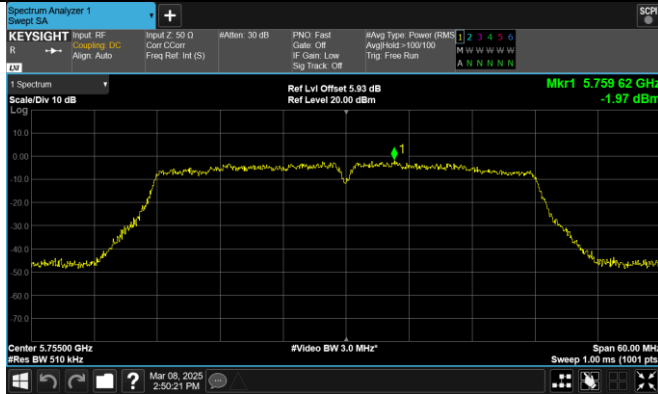


IEEE 802.11ac(VHT40) _ANT 2

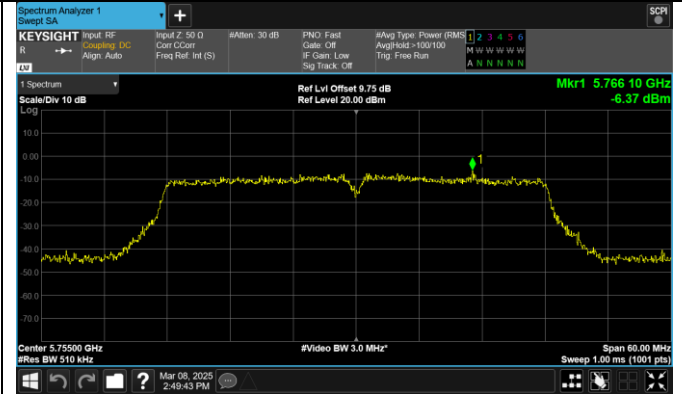


U-NII-3

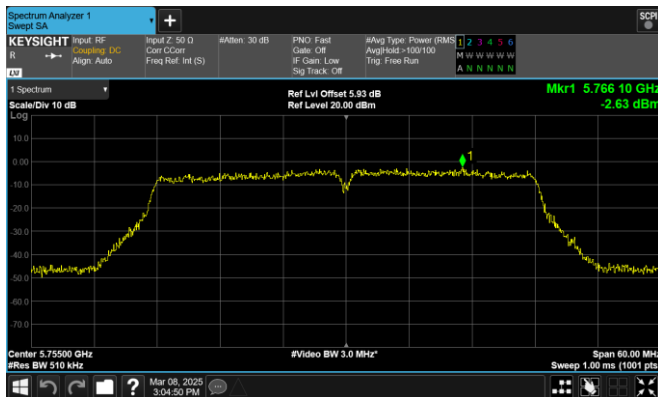
IEEE 802.11n(HT40)_ANT 1



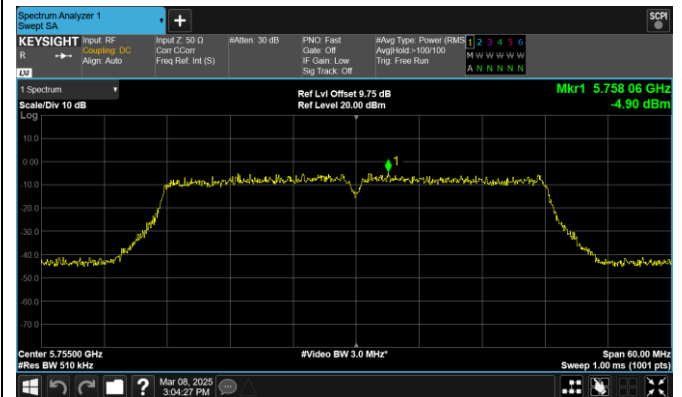
IEEE 802.11n(HT40)_ANT 2



IEEE 802.11ac(VHT40)_ANT 1



IEEE 802.11ac(VHT40)_ANT 2



14.6 Band Edge

LIMITS

For transmitters operating in the 5.15-5.25 GHz band:

All emissions outside of the 5.15-5.35GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.25-5.35 GHz band:

All emissions outside of the 5.15-5.35GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

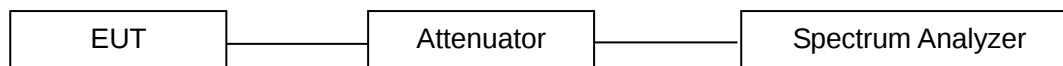
For transmitters operating in the 5.47-5.725 GHz band:

All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.725-5.85 GHz band:

All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27dBm/MHz at the band edge.

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

- Check the calibration of the measuring instrument using either an internal calibration or a known signal from an external generator.
- Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable, then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
- Set RBW to 1MHz and VBW to 3MHz of spectrum analyzer.
- Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
- Repeat above procedures until all measured frequencies were complete.

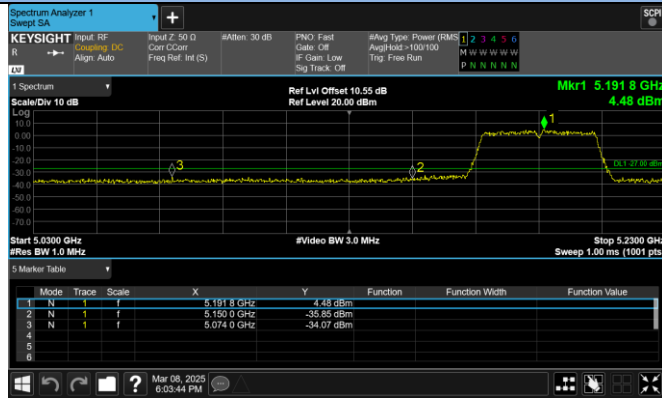
TEST RESULTS

PASS

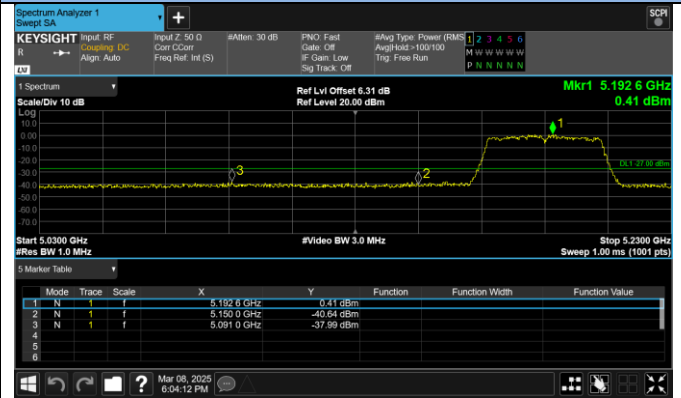
For 802.11a mode, both of ANT 1 & 2 has been tested, and only the worst case was recorded in the report. The EUT working at MIMO mode, and the worst case is about -31.24dBm.

U-NII-1

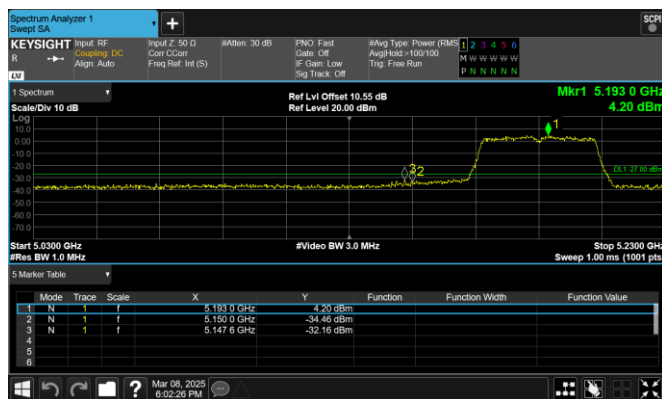
IEEE 802.11n(HT40) -ANT 1



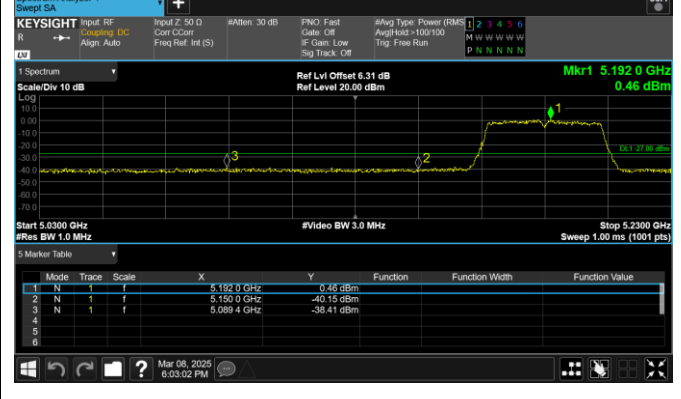
IEEE 802.11n(HT40) -ANT 2



IEEE 802.11ac(VHT40) -ANT 1

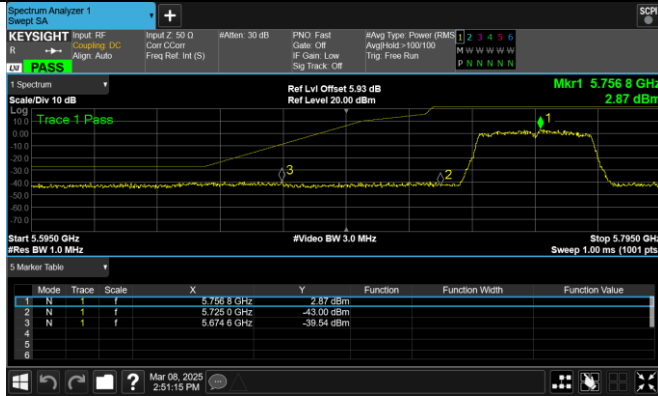


IEEE 802.11ac(VHT40) -ANT 2

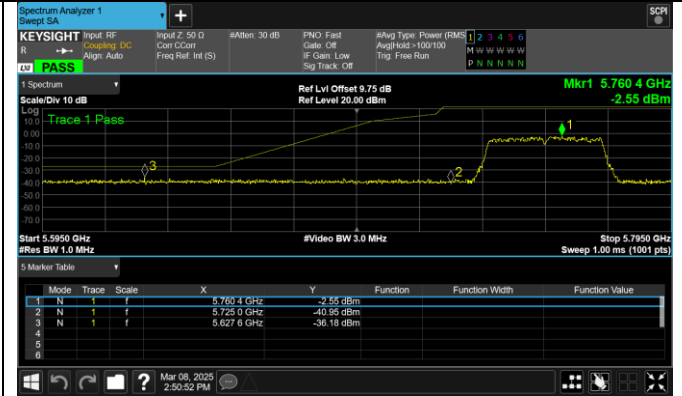


U-NII-3

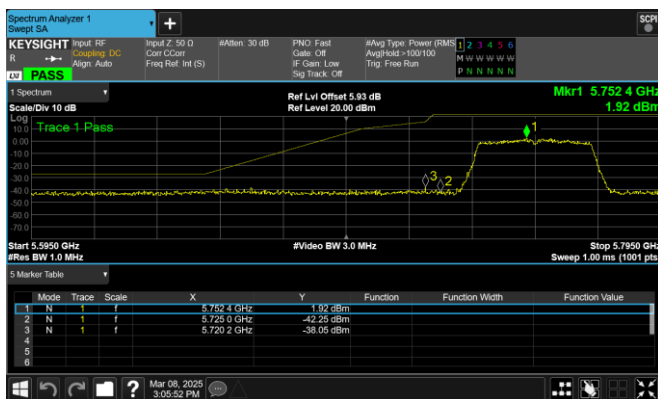
IEEE 802.11n(HT40) -ANT 1



IEEE 802.11n(HT40) -ANT 2



IEEE 802.11ac(VHT40) -ANT 1



IEEE 802.11ac(VHT40) -ANT 2

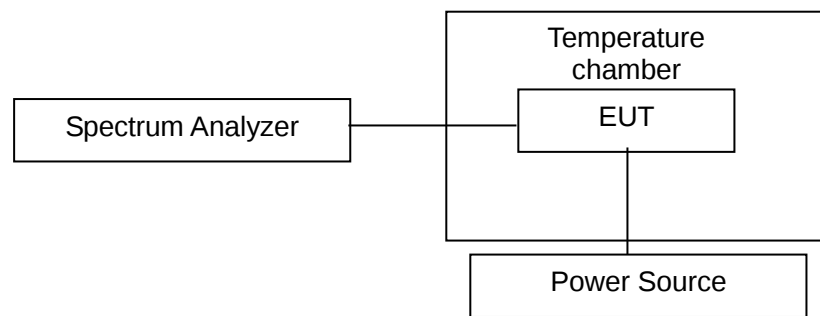


14.7 Frequency Stability

LIMITS

Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

- The EUT was placed inside the environmental test chamber and powered by Power source.
- Turn the EUT on and couple its output to a spectrum analyzer.
- Turn the EUT off and set the chamber to the highest temperature specified.
- Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes
- Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
- The chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

Note: The EUT set at un-modulation mode during frequency stability test.

TEST RESULTS

PASS

Please refer to the following pages of the worst case ANT_1.

U-NII-1						
5190MHz						
Temperature (°C)	Power Supplied (Vdc)	Measured Frequency (MHz)				Test Result
		0 Minute	2 Minute	5 Minute	10 Minute	
-40	13.5	5189.994	5189.991	5189.990	5189.991	Pass
-20		5189.989	5189.986	5189.990	5189.990	Pass
0		5189.991	5189.990	5189.992	5189.992	Pass
20		5189.994	5189.993	5189.996	5189.992	Pass
40		5189.983	5189.987	5189.988	5189.994	Pass
60		5189.989	5189.992	5189.989	5189.988	Pass
70		5189.992	5189.992	5189.990	5189.991	Pass
25	10.0	5189.995	5189.994	5189.992	5189.992	Pass
25	16.0	5189.991	5189.989	5189.994	5189.990	Pass

Note: EUT temperature working range is -40 to 70°C.

U-NII-3						
5755MHz						
Temperature (°C)	Power Supplied (Vdc)	Measured Frequency (MHz)				Test Result
		0 Minute	2 Minute	5 Minute	10 Minute	
-40	13.5	5754.982	5754.981	5754.984	5754.982	Pass
-20		5754.985	5754.983	5754.984	5754.982	Pass
0		5754.985	5754.982	5754.986	5754.984	Pass
20		5754.989	5754.986	5754.985	5754.986	Pass
40		5754.981	5754.982	5754.984	5754.988	Pass
60		5754.986	5754.985	5754.982	5754.982	Pass
70		5754.981	5754.982	5754.986	5754.982	Pass
25	10.0	5754.989	5754.990	5754.985	5754.986	Pass
25	16.0	5754.985	5754.986	5754.990	5754.984	Pass

Note: EUT temperature working range is -40 to 70°C.

14.8 Radiated Spurious Emissions and Restricted Bands Measurement and Band Edge

LIMIT of Restricted bands

In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below:

Frequency range MHz	Distance Meters	Field Strengths Limit (15.209)
		$\mu\text{V/m}$
0.009 ~ 0.490	300	2400/F(kHz)
0.490 ~ 1.705	30	24000/F(kHz)
1.705 ~ 30	30	30
30 ~ 88	3	100
88 ~ 216	3	150
216 ~ 960	3	200
Above 960	3	500

Remark: (1) Emission level (dB) μV = 20 log Emission level $\mu\text{V/m}$

(2) The smaller limit shall apply at the cross point between two frequency bands.

(3) As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

(4) The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower.

(5) §15.407 specifies that emissions which fall in the restricted bands, as defined in §15.205 comply with radiated emission limits specified in §15.209.

LIMIT of Radiated Band Edges and non-restricted bands

For transmitters operating in the 5.15-5.25 GHz band:

All emissions outside of the 5.15-5.35GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.25-5.35 GHz band:

All emissions outside of the 5.15-5.35GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.47-5.725 GHz band:

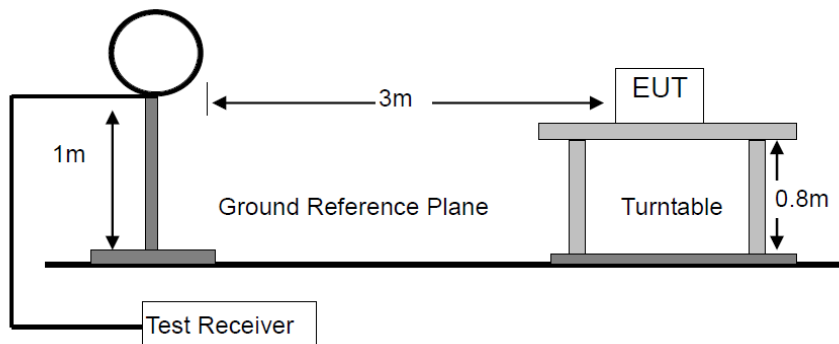
All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.725-5.85 GHz band:

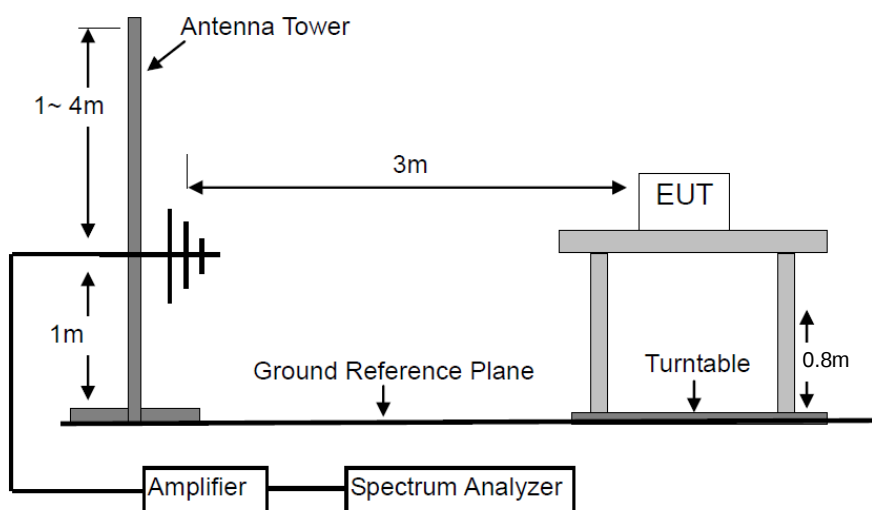
All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27dBm/MHz at the band edge.

BLOCK DIAGRAM OF TEST SETUP

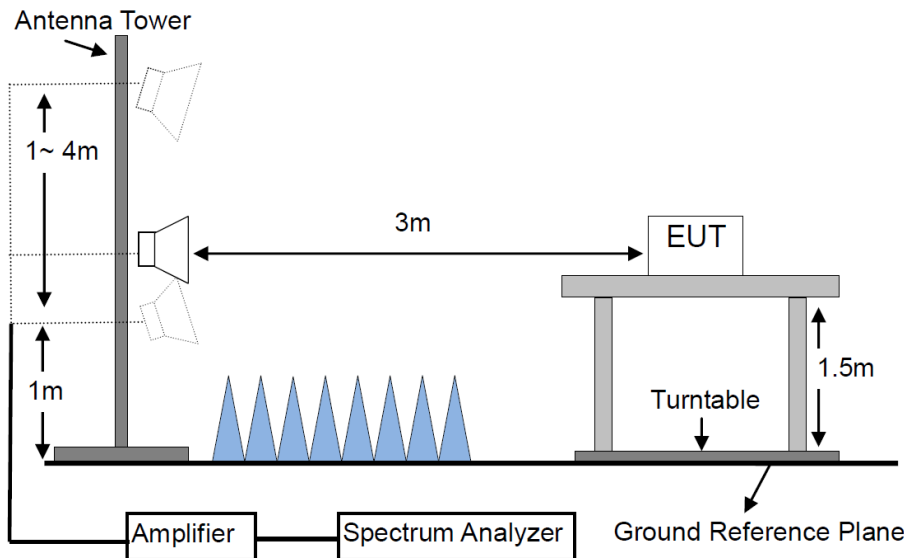
For Radiated Emission below 30MHz



For Radiated Emission 30-1000MHz



For Radiated Emission Above 1000MHz.



TEST PROCEDURES

- a. Below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi- anechoic chamber room.
- b. For the radiated emission test above 1GHz:

The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter full anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

- c. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. The test-receiver system was set to peak detect function and specified bandwidth with maximum hold mode.
- f. A Quasi-peak measurement was then made for that frequency point for below 1GHz test. PK and AV for above 1GHz emission test.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

Frequency Band (MHz)	Detector	Resolution Bandwidth	Video Bandwidth
0.009 to 0.090	AVG	300 Hz	1 KHz
0.091 to 0.109	QP	300 Hz	1 KHz
0.110 to 0.490	AVG	300 Hz / 10 KHz	1 KHz / 30 KHz
0.15 to 30	QP, AVG	10 KHz	30 KHz
30 to 1000	QP	120 kHz	300 kHz
Above 1000	Peak	1 MHz	3 MHz
	Average	1 MHz	10 Hz

TEST RESULTS

PASS

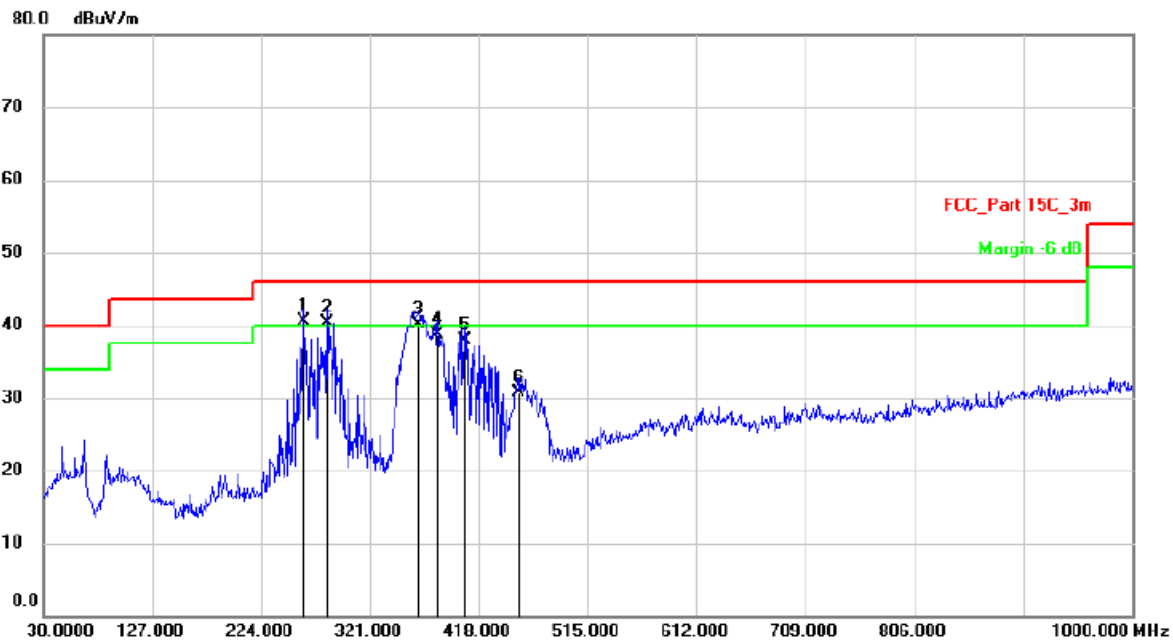
Please refer to the following pages of the worst case.

M/N: 71U0 (GEX w/DAB version)	Testing Voltage: DC 13.5V
Polarization: Horizontal	Detector: QP
Test Mode: 1 (802.11n40, CH 38)	Distance: 3m

Radiated Emission Measurement

Date: 2025/2/26

Time: 4:10:08



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	*	261.8299	46.55	-6.13	40.42	46.00	-5.58	QP	
2	!	282.2000	46.23	-5.84	40.39	46.00	-5.61	QP	
3	!	364.6500	44.11	-3.94	40.17	46.00	-5.83	QP	
4		381.1400	42.37	-3.73	38.64	46.00	-7.36	QP	
5		405.3900	41.11	-3.25	37.86	46.00	-8.14	QP	
6		453.8900	33.26	-2.49	30.77	46.00	-15.23	QP	

Note 1: Below 30MHz, the emissions are lower than 20dB below the allowable limit.

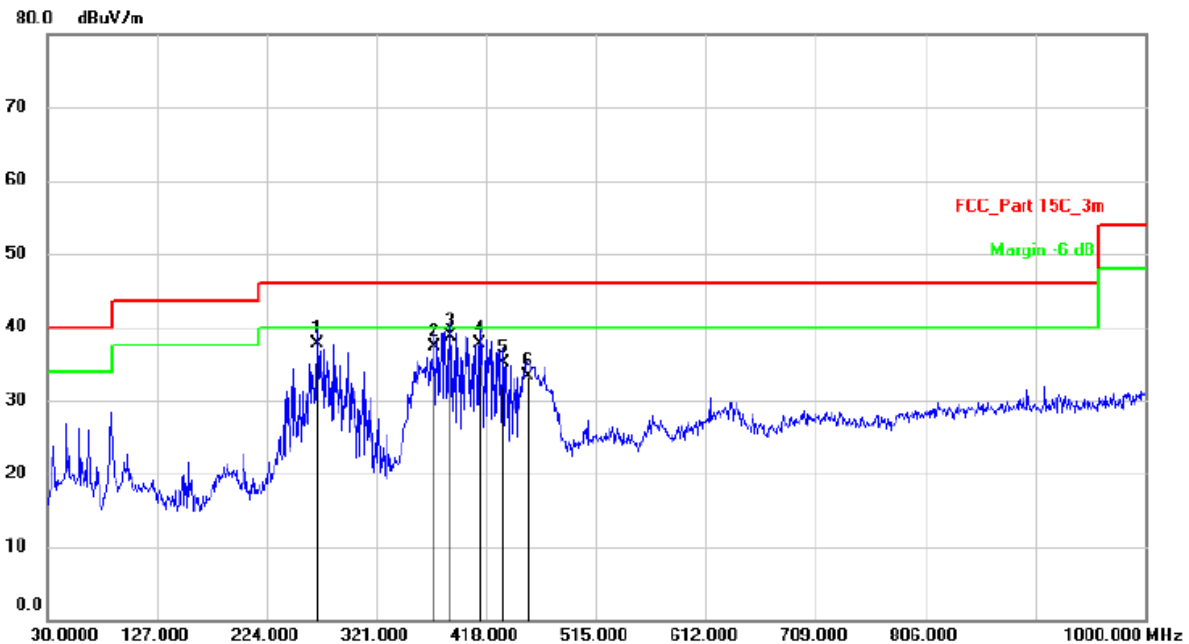
Note 2: *:Maximum data x:Over limit !:over margin

M/N: 71U0 (GEX w/DAB version)	Testing Voltage: DC 13.5V
Polarization: Vertical	Detector: QP
Test Mode: 1 (802.11n40, CH 38)	Distance: 3m

Radiated Emission Measurement

Date: 2025/2/26

Time: 4:17:37



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		268.6200	44.64	-7.03	37.61	46.00	-8.39	QP	
2		372.4100	42.20	-4.84	37.36	46.00	-8.64	QP	
3	*	385.9900	43.24	-4.62	38.62	46.00	-7.38	QP	
4		412.1800	41.85	-4.12	37.73	46.00	-8.27	QP	
5		432.5500	38.96	-3.83	35.13	46.00	-10.87	QP	
6		454.8600	36.81	-3.46	33.35	46.00	-12.65	QP	

Note 1: Below 30MHz, the emissions are lower than 20dB below the allowable limit.

Note 2: *:Maximum data x:Over limit !:over margin

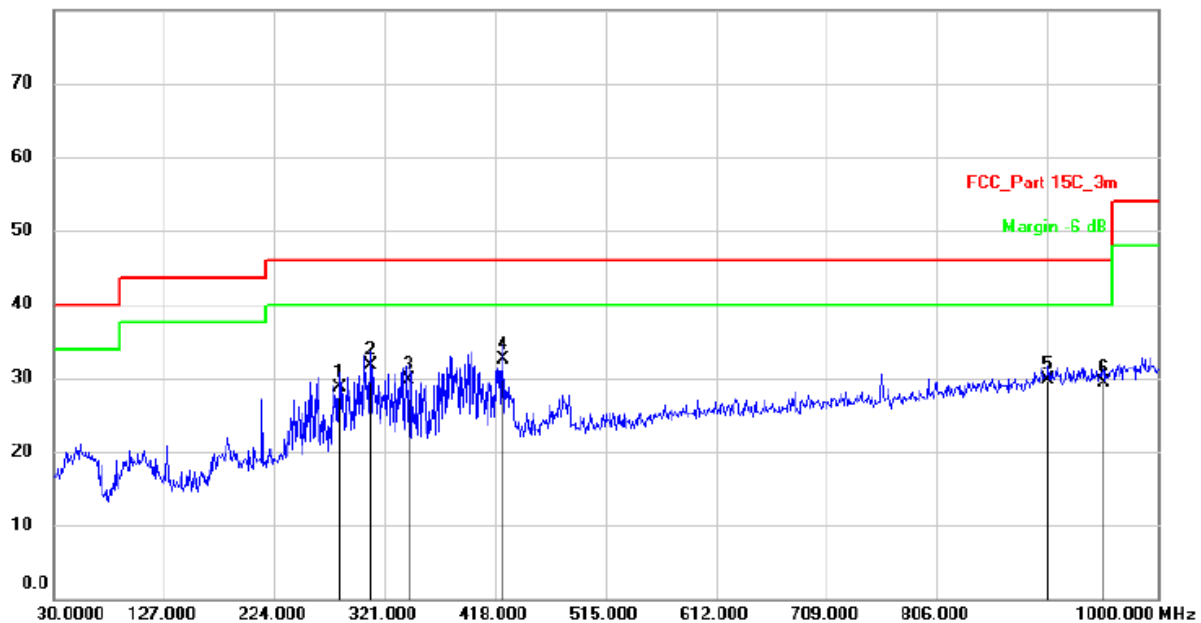
M/N: 71U0 (GEX w/DAB version)	Testing Voltage: DC 13.5V
Polarization: Horizontal	Detector: QP
Test Mode: 2	Distance: 3m

Radiated Emission Measurement

Date: 2025/3/22

Time: 16:21:23

80.0 dBuV/m



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		281.2300	34.56	-5.86	28.70	46.00	-17.30	QP	
2		308.3900	36.99	-5.29	31.70	46.00	-14.30	QP	
3		342.3400	34.09	-4.29	29.80	46.00	-16.20	QP	
4	*	424.7900	35.44	-2.94	32.50	46.00	-13.50	QP	
5		903.9700	23.50	6.20	29.70	46.00	-16.30	QP	
6		952.4700	23.02	6.28	29.30	46.00	-16.70	QP	

Note 1: Below 30MHz, the emissions are lower than 20dB below the allowable limit.

Note 2: *:Maximum data x:Over limit !:over margin

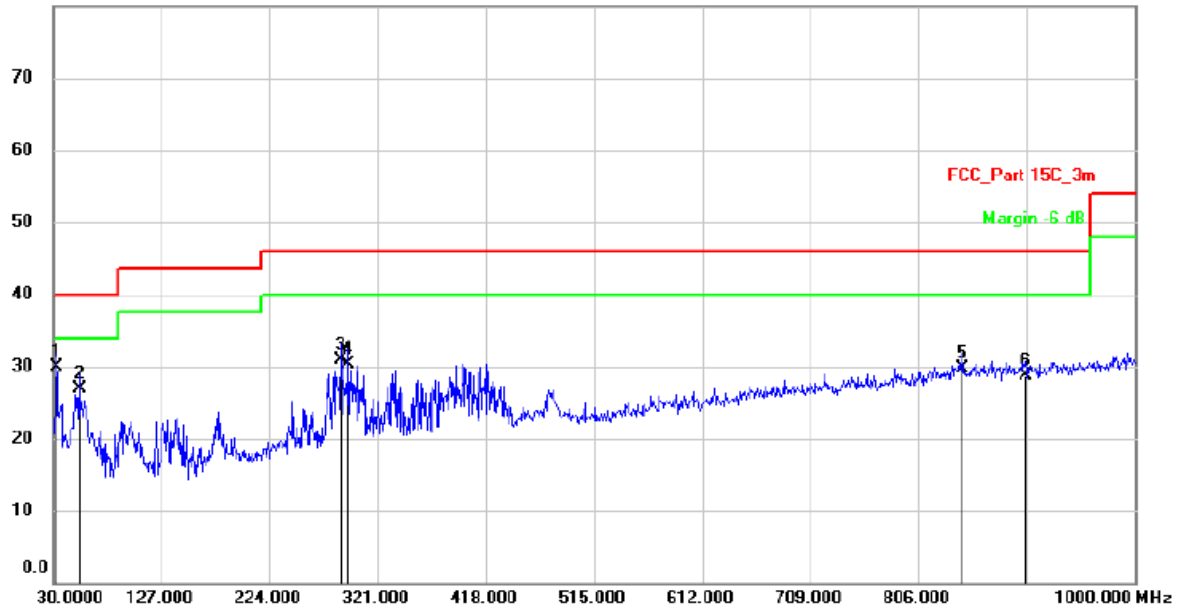
M/N: 71U0 (GEX w/DAB version)	Testing Voltage: DC 13.5V
Polarization: Vertical	Detector: QP
Test Mode: 2	Distance: 3m

Radiated Emission Measurement

Date: 2025/3/22

Time: 16:15:18

80.0 dBuV/m



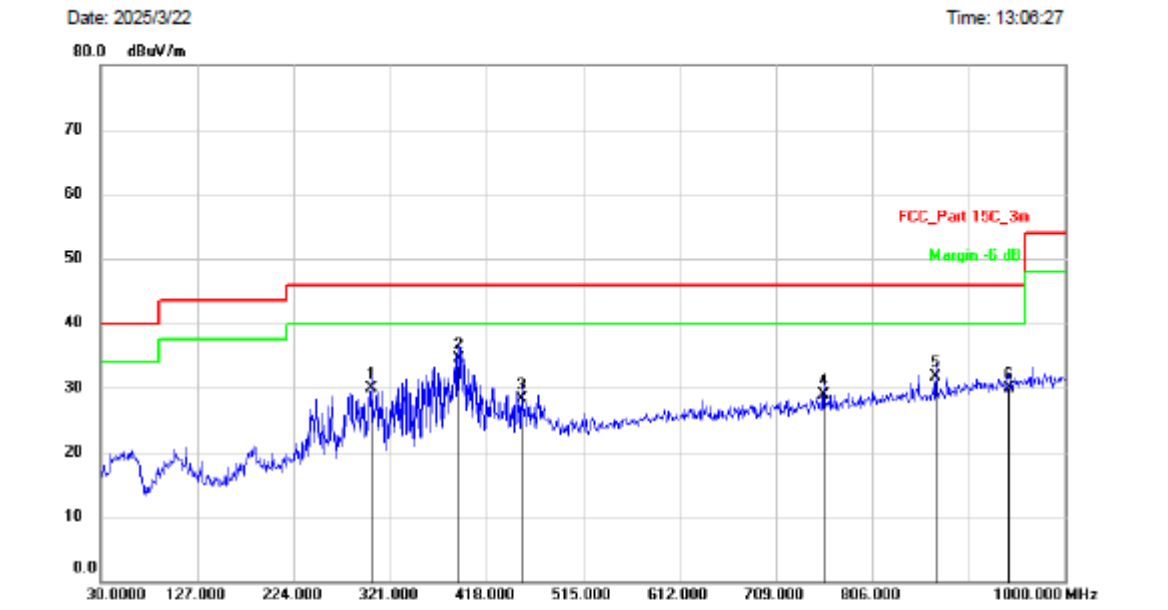
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	32.9100	39.39	-9.49	29.90	40.00	-10.10	QP	
2		53.2800	34.37	-7.47	26.90	40.00	-13.10	QP	
3		288.0200	37.76	-6.76	31.00	46.00	-15.00	QP	
4		294.8100	37.02	-6.62	30.40	46.00	-15.60	QP	
5		845.7700	25.08	4.72	29.80	46.00	-16.20	QP	
6		902.0300	23.74	4.96	28.70	46.00	-17.30	QP	

Note 1: Below 30MHz, the emissions are lower than 20dB below the allowable limit.

Note 2: *:Maximum data x:Over limit !:over margin

M/N: 71U0 (IND version)	Testing Voltage: DC 13.5V
Polarization: Horizontal	Detector: QP
Test Mode: 2	Distance: 3m

Radiated Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		302.5700	35.34	-5.44	29.90	46.00	-16.10	QP	
2	*	389.8700	38.14	-3.54	34.60	46.00	-11.40	QP	
3		452.9200	30.89	-2.49	28.40	46.00	-17.60	QP	
4		757.5000	25.73	3.17	28.90	46.00	-17.10	QP	
5		870.0200	26.79	4.91	31.70	46.00	-14.30	QP	
6		943.7400	23.74	6.26	30.00	46.00	-16.00	QP	

Note 1: Below 30MHz, the emissions are lower than 20dB below the allowable limit.

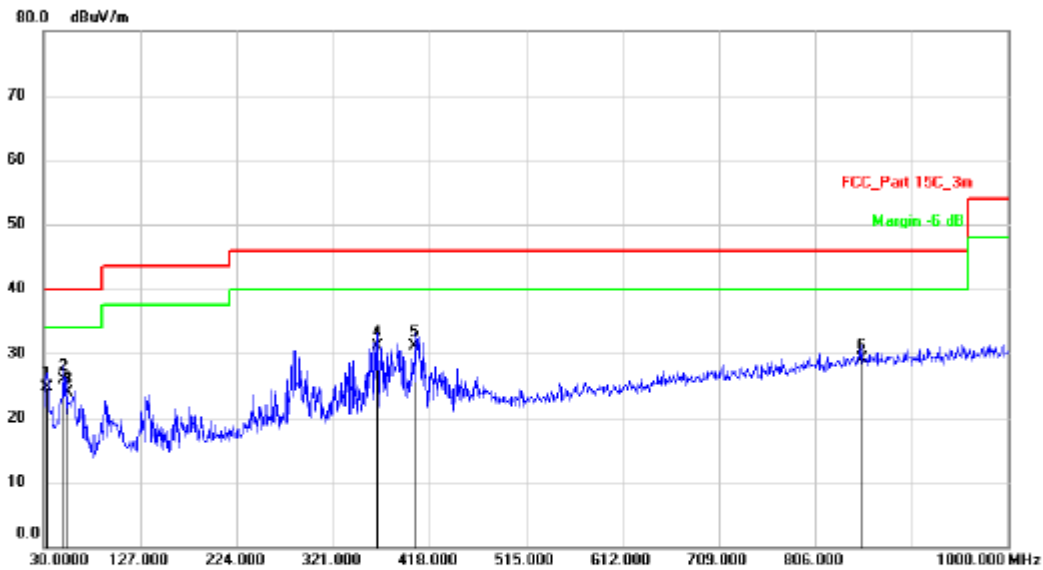
Note 2: *:Maximum data x:Over limit !:over margin

M/N: 71U0 (IND version)	Testing Voltage: DC 13.5V
Polarization: Vertical	Detector: QP
Test Mode: 2	Distance: 3m

Radiated Emission Measurement

Date: 2025/3/22

Time: 13:00:26



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		32.9100	34.29	-9.49	24.80	40.00	-15.20	QP	
2	*	49.4000	33.00	-7.00	26.00	40.00	-14.00	QP	
3		53.2800	31.47	-7.47	24.00	40.00	-16.00	QP	
4		365.6200	36.03	-4.93	31.10	46.00	-14.90	QP	
5		403.4500	35.38	-4.28	31.10	46.00	-14.90	QP	
6		852.5600	24.38	4.82	29.20	46.00	-16.80	QP	

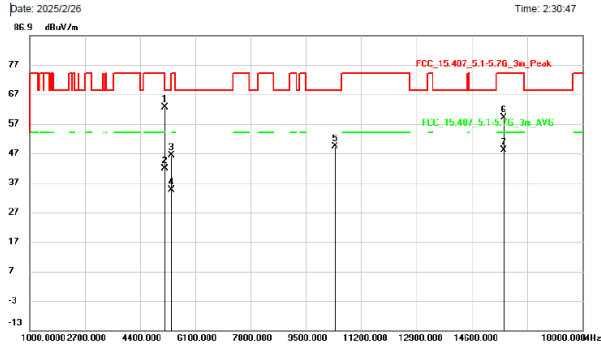
Note 1: Below 30MHz, the emissions are lower than 20dB below the allowable limit.

Note 2: *:Maximum data x:Over limit !:over margin

Modulation:U-NII-1(5190 MHz) TX (802.11n(HT40) the worst case)				Test Result: PASS			Test frequency range: 1-40GHz			
Freq. (MHz)	Ant. Pol. (H/V)	Reading Level(dBuV)		Factor (dB/m)	Emission Level (dBuV/m)		Limit 3m (dBuV/m)		Margin (dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
Operation Mode: TX Mode										
5150	H	55.65	34.84	6.91	62.56	41.75	68.20	54.00	-5.64	-12.25
5350	H	39.59	27.64	6.81	46.40	34.45	68.20	54.00	-21.80	-19.55
10380	H	35.14	---	14.08	49.22	---	68.20	---	-18.98	---
15570	H	38.07	27.15	20.96	59.03	48.11	74.00	54.00	-14.97	-5.89
20760	H	40.28	28.42	18.94	59.22	47.36	74.00	54.00	-14.78	-6.64
25950	H	36.61	---	23.23	59.84	---	68.20	---	-8.36	---
5150	V	57.80	38.58	6.91	64.71	45.49	68.20	54.00	-3.49	-8.51
5350	V	40.66	28.27	6.81	47.47	35.08	68.20	54.00	-20.73	-18.92
10380	V	35.95	---	14.08	50.03	---	68.20	---	-18.17	---
15570	V	38.20	27.15	20.96	59.10	48.05	74.00	54.00	-14.90	-5.95
20760	V	39.40	27.73	18.94	58.34	46.67	74.00	54.00	-15.66	-7.33
25950	V	36.09	---	23.23	59.32	--	68.20	---	-8.88	---
Remark: 1. Data of measurement within this frequency range shown “---” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits.										

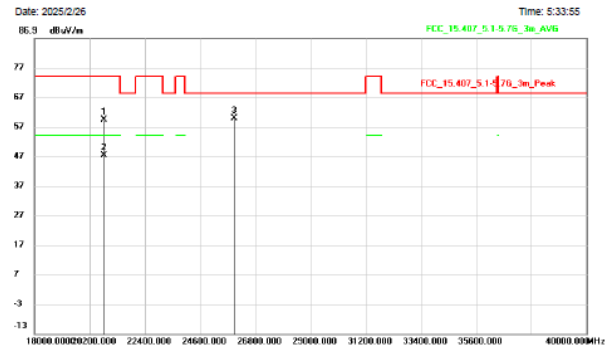
Horizontal

Radiated Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dBm	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	5150.000	55.65	6.91	62.56	68.20	-5.64	peak	
2		5150.000	34.84	6.91	41.75	54.00	-12.25	AVG	
3		5350.000	39.59	6.81	46.40	68.20	-21.80	peak	
4		5350.000	27.64	6.81	34.45	54.00	-19.55	AVG	
5		10380.000	35.14	14.08	49.22	68.20	-18.98	peak	
6		15570.000	38.07	20.96	59.03	74.00	-14.97	peak	
7		15570.000	27.15	20.96	48.11	54.00	-5.89	AVG	

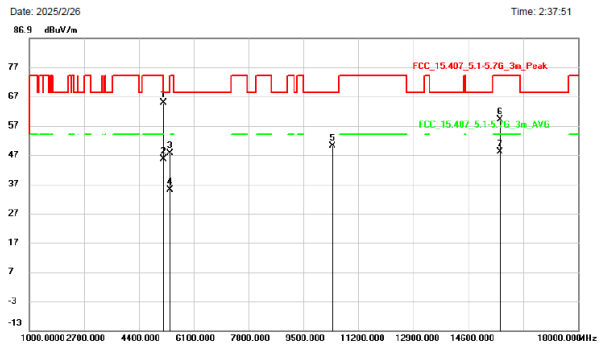
Radiated Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dBm	dBuV/m	dBuV/m	dB	Detector	Comment
1		20760.000	40.28	18.94	59.22	74.00	-14.78	peak	
2	*	20760.000	28.42	18.94	47.36	54.00	-6.64	AVG	
3		25950.000	36.61	23.23	59.84	68.20	-8.36	peak	

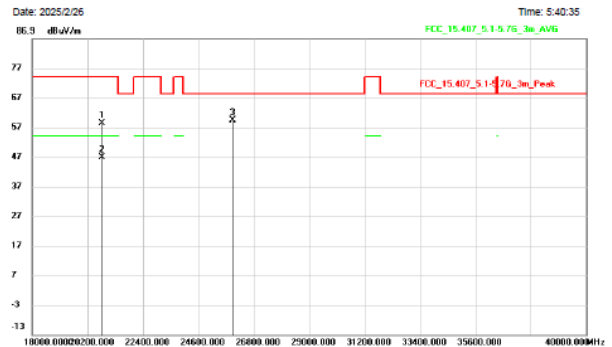
Vertical

Radiated Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dBm	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	5150.000	57.80	6.91	64.71	68.20	-3.49	peak	
2		5150.000	38.58	6.91	45.49	54.00	-8.51	AVG	
3		5350.000	40.66	6.81	47.47	68.20	-20.73	peak	
4		5350.000	28.27	6.81	35.08	54.00	-18.92	AVG	
5		10380.000	35.95	14.08	50.03	68.20	-18.17	peak	
6		15570.000	38.14	20.96	59.10	74.00	-14.90	peak	
7		15570.000	27.09	20.96	48.05	54.00	-5.95	AVG	

Radiated Emission Measurement

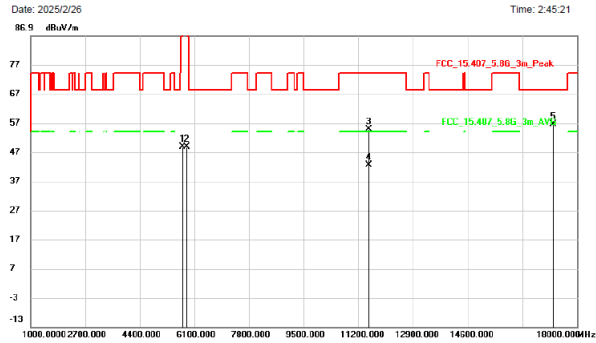


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dBm	dBuV/m	dBuV/m	dB	Detector	Comment
1		20760.000	39.40	18.94	58.34	74.00	-15.66	peak	
2	*	20760.000	27.73	18.94	46.67	54.00	-7.33	AVG	
3		25950.000	36.09	23.23	59.32	68.20	-8.88	peak	

Modulation: U-NII-3(5755 MHz) TX (802.11ac(VHT40) the worst case)				Test Result: PASS			Test frequency range: 1-40GHz			
Freq. (MHz)	Ant. Pol. (H/V)	Reading Level(dBuV)		Factor (dB/m)	Emission Level (dBuV/m)		Limit 3m (dBuV/m)		Margin (dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
Operation Mode: TX Mode										
5725	H	41.84	---	6.90	48.74	---	122.20	---	-73.46	---
5850	H	41.84	---	6.98	48.82	---	122.20	---	-73.38	---
11510	H	37.80	25.52	16.91	54.71	42.43	74.00	54.00	-19.29	-11.57
17265	H	34.28	---	22.31	56.59	---	68.20	---	-11.61	---
23020	H	39.89	27.32	19.72	59.61	47.04	74.00	54.00	-14.39	-6.96
28775	H	34.62	---	25.32	59.94	---	68.20	---	-8.26	---
5725	V	41.60	---	6.90	48.50	---	122.20	---	-73.70	---
5850	V	38.92	---	6.98	45.90	---	122.20	---	-76.30	---
11510	V	37.69	25.15	16.91	54.60	42.06	74.00	54.00	-19.40	-11.94
17265	V	34.31	---	22.31	56.62	---	68.20	---	-11.58	---
23020	V	38.34	27.00	19.72	58.06	46.72	74.00	54.00	-15.94	-7.28
28775	V	34.02	---	25.32	59.34	---	68.20	---	-8.86	---
Remark: 1. Data of measurement within this frequency range shown “---” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits.										

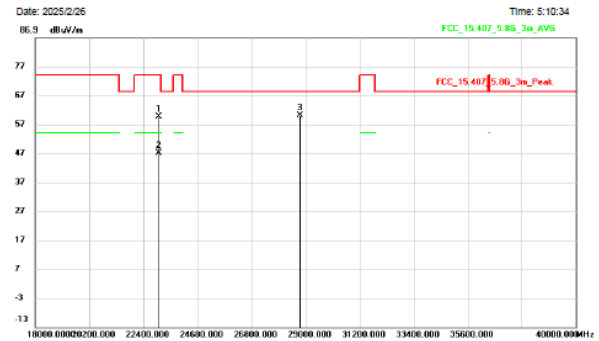
Horizontal

Radiated Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		5725.000	41.84	6.90	48.74	122.20	-73.46	peak	
2		5850.000	41.84	6.98	48.82	122.20	-73.38	peak	
3		11510.000	37.80	16.91	54.71	74.00	-19.29	peak	
4	*	11510.000	25.52	16.91	42.43	54.00	-11.57	AVG	
5		17265.000	34.28	22.31	56.59	68.20	-11.61	peak	

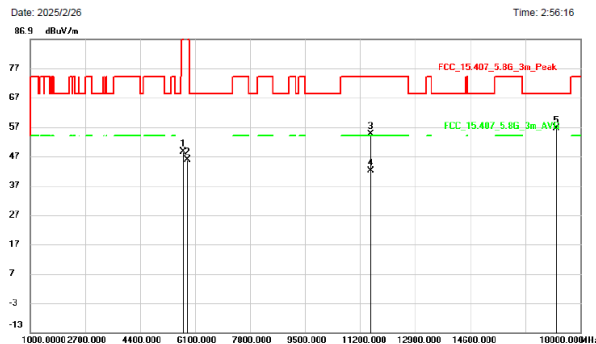
Radiated Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		23020.000	39.89	19.72	59.61	74.00	-14.39	peak	
2	*	23020.000	27.32	19.72	47.04	54.00	-8.96	AVG	
3		28775.000	34.82	25.32	59.94	68.20	-8.26	peak	

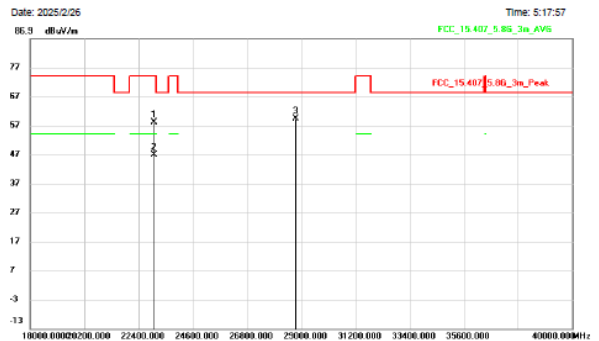
Vertical

Radiated Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		5725.000	41.60	6.90	48.50	122.20	-73.70	peak	
2		5850.000	38.92	6.98	45.90	122.20	-76.30	peak	
3		11510.000	37.69	16.91	54.60	74.00	-19.40	peak	
4		11510.000	25.15	16.91	42.06	54.00	-11.94	AVG	
5	*	17265.000	34.31	22.31	56.62	68.20	-11.58	peak	

Radiated Emission Measurement

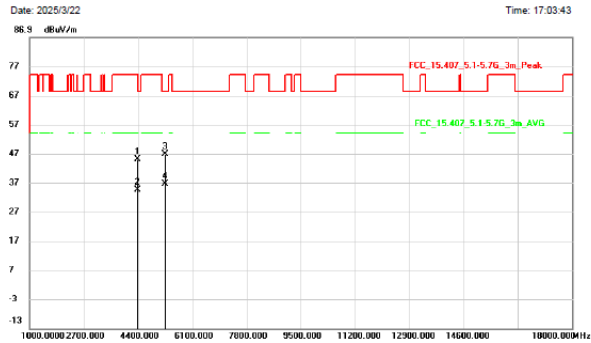


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		23020.000	38.34	19.72	58.06	74.00	-15.94	peak	
2	*	23020.000	27.00	19.72	46.72	54.00	-7.28	AVG	
3		28775.000	34.02	25.32	59.34	68.20	-8.86	peak	

Test Mode:2				Test Result: PASS			Test frequency range: 1-18GHz			
Freq. (MHz)	Ant. Pol. (H/V)	Reading Level(dBuV)		Factor (dB/m)	Emission Level (dBuV/m)		Limit 3m (dBuV/m)		Margin (dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
Operation Mode: Co-transmitting Mode										
4383	H	40.13	29.79	4.84	44.97	34.63	74.00	54.00	-29.03	-19.37
5250	H	39.97	---	6.82	46.79	---	68.20	---	-21.41	---
4689	V	41.74	30.29	5.87	47.61	36.16	74.00	54.00	-26.39	-17.84
5148	V	42.33	29.34	6.91	49.24	36.25	74.00	54.00	-24.76	-17.75
Remark: 1. Data of measurement within this frequency range shown “---” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits.										

Horizontal

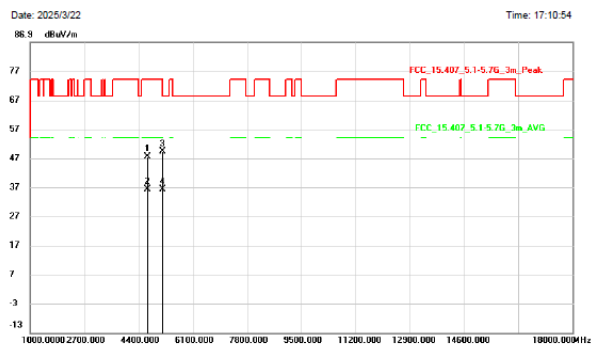
Radiated Emission Measurement



No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1	4383.000	40.13	4.84	44.97	74.00	-29.03	peak	
2 *	4383.000	29.79	4.84	34.63	54.00	-19.37	AVG	
3	5250.000	39.97	6.82	46.79	68.20	-21.41	peak	
4	5250.000	29.66	6.82	36.48	68.20	-31.72	AVG	

Vertical

Radiated Emission Measurement



No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1	4689.000	41.74	5.87	47.61	74.00	-26.39	peak	
2	4689.000	30.29	5.87	36.16	54.00	-17.84	AVG	
3	5148.000	42.33	6.91	49.24	74.00	-24.76	peak	
4 *	5148.000	29.34	6.91	36.25	54.00	-17.75	AVG	

14.9 Dynamic Frequency Selection

List of Measurement and Examinations

EUT Operational mode:

DFS Operational mode	Operating Frequency Range	
	U-NII-2A	U-NII-2C
Slave without radar Interference detection function	√	√

Devices with radar detection

Maximum Transmit Power	Value (See Note 1 and 2)
≥200 mw	-64 dBm
EIRP < 200 mw and power spectral density < 10 dBm/MHz	-62 dBm
EIRP < 200 mw 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. 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. 3. EIRP is based on the highest antenna gain. For MIMO device refer to KDB Publication 662911 D01.	

Applicability of DFS requirements prior to use of a channel

Requirement Radar	Operational Mode		
	Master	Client without Radar Detection	Client with Radar Detection
Non-Occupancy Period	√	Not required	Yes
DFS Detection Threshold	√	Not required	Yes
Channel Availability Check Time	√	Not required	Not Required
U-NII Detection Bandwidth	√	Not required	Yes
Note: Regarding KDB 905462 D03 Client Without DFS New Rules section (b)(5/6), If the client moves with the master, the device is considered compliant if nothing appears in the client non- occupancy period test. For devices that shut down (rather than moving channels), no beacons should appear. An analyzer plot that contains a single 30-minute sweep on the original channel.			

Applicability of DFS requirements during normal operation

Requirement Radar	Operational Mode		
	Master	Client without Radar Detection	Client with Radar Detection
DFS Detection Threshold	√	Not required	Yes
Channel Closing Transmission Time	√	Yes	Yes
Channel Move Time	√	Yes	Yes
U-NII Detection Bandwidth	√	Not required	Yes
Note: Regarding KDB 905462 D03 Client Without DFS New Rules section (b)(5/6), If the client moves with the master, the device is considered compliant if nothing appears in the client non- occupancy period test. For devices that shut down (rather than moving channels), no beacons should appear. An analyzer plot that contains a single 30-minute sweep on the original channel.			
Additional requirements for devices with multiple bandwidth modes	Master or Client with radar detection	Client without radar detection	
U-NII Detection Bandwidth and Statistical Performance Check	All BW modes must be tested	Not required	
Channel Move Time and Channel Closing Channel Move Time and Channel Closing Transmission Time	Test using widest BW mode available	Test using the widest Test using the widest BW mode available for the link	
All other	Any single BW mode	Not required	
Note: Frequencies selected for statistical performance check (Section 7.8.4) should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in each of the bonded 20 MHz channels and the channel center frequency.			

DFS Radar Signal Parameter Values:

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 60ms 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.
 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.
 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 Radar Signal Parameter:

Radar 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 1: Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (μsec)	PRI (μsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Trials
0	1	1428	18	See Note 1	See Note 1
1	1	Test A, Test B	$\text{Roundup} \left\{ \left(\frac{1}{\left(\frac{360}{19 \cdot 10^6} \right) \cdot \text{PRI}_{\mu\text{sec}}} \right) \right\}$	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: Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.					
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.					
Remark1: 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.					
Remark2: 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.					
Remark3: The aggregate is the average of the percentage of successful detections of short pulse radar types 1-4.					

Table 2: 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 Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

Table 3: 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 Trials
6	1	333	9	0.333	300	70%	30

In-Service Monitoring: Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period

Limit of In-Service Monitoring

Reference to DFS Radar Signal Parameter Values.

Test Procedures

One frequency will be chosen from the Operating Channels of the EUT within the 5250-5350 MHz or 5470-5725 MHz bands. For 802.11 devices, the test frequency must contain control signals. This can be verified by disabling channel loading and monitoring the spectrum analyzer. If no control signals are detected, another frequency must be selected within the emission bandwidth where control signals are detected.

In case the EUT is a Master Device, a U-NII device operating as a Client Device will be used and it is assumed that the Client will associate with the EUT (Master). For radiated tests, the emissions of the Radar Waveform generator will be directed towards the Master Device. If the Master Device has antenna gain, the main beam of the antenna will be directed toward the radar emitter. Vertical polarization is used for testing.

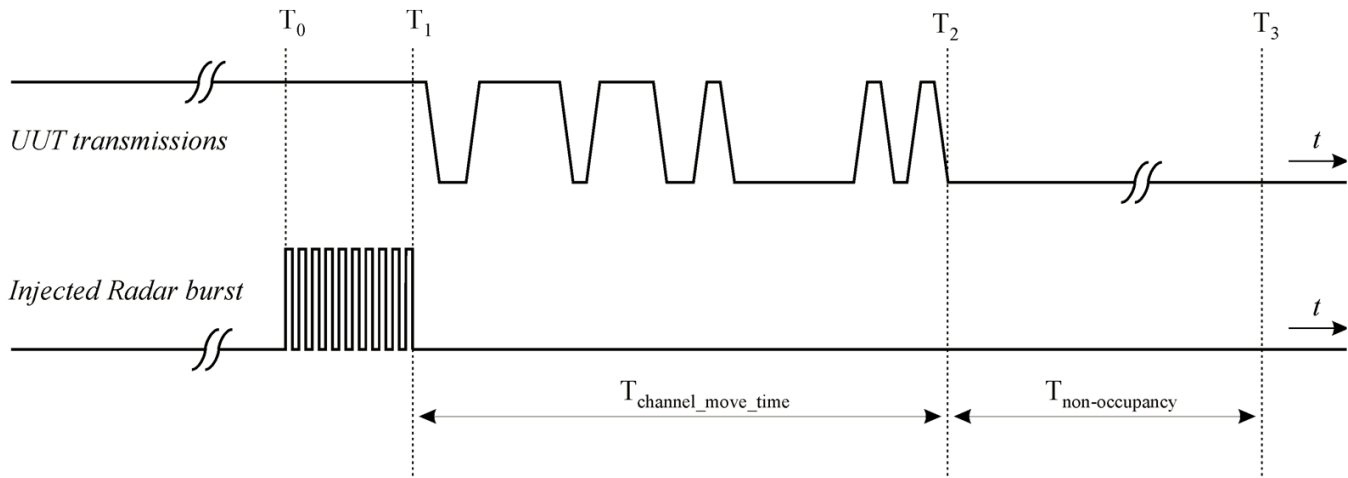
The TCP protocol unicast data stream was generated by the iperf software command line with at least 17% activity ratio over any 100ms period.

Timing plots are reported with calculations demonstrating a minimum channel loading of approximately 17% or greater. For example, channel loading can be estimated by setting the spectrum analyzer for zero span and approximate the Time On/ (Time On + Off Time).

At time T0 the Radar Waveform generator sends a Burst of pulses for one of the Short Pulse Radar Types 1-4 at DFS Detection Threshold levels on the Operating Channel. An additional 1dB is added to the radar test signal to ensure it is at or above the DFS Detection Threshold, accounting for equipment variations/errors.

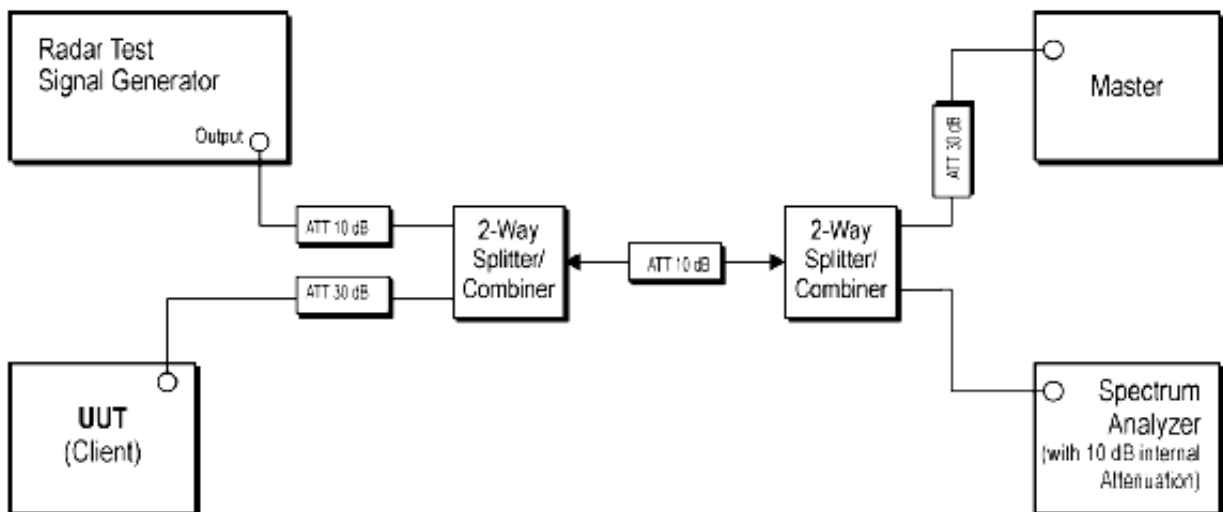
Observe the transmissions of the EUT at the end of the radar Burst on the Operating Channel for duration greater than 10 seconds. Measure and record the transmissions from the EUT during the observation time (Channel Move Time). Measure and record the Channel Move Time and Channel Closing Transmission Time if radar detection occurs.

When operating as a Master Device, monitor the EUT for more than 30 minutes following instant T2 to verify that the EUT does not resume any transmissions on this Channel. Perform this test once and record the measurement result.



Channel Closing Transmission Time, Channel Move Time and Non-Occupancy Period

Test Set-Up



Setup for Client with injection at the Master

Measurement Results

Not Applicable

14.10 Antenna Requirement

STANDARD APPLICABLE

According to of FCC part 15C section 15.203:

furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section 15.203 of the rules.

And according to 47 CFR section 15.407(a), if the transmitting antennas of directional gain greater than 6dBi are used, the transmit power and power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

ANTENNA CONNECTED CONSTRUCTION

The antenna is chip antenna that no antenna other than furnished by the responsible party shall be used with the device, and the best case gain of the antenna is 2.96 dBi, therefore, the antenna is considered to meet the requirement.

15. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI7	100837	Mar. 12, 2025	1 Year
2.	Antenna	Schwarzbeck	VULB9162	9162-010	Mar. 23, 2024	2 Year
3.	Spectrum Analyzer	Keysight	N9010B	MY62170254	Aug. 14, 2024	1 Year
4.	Spectrum Analyzer	Keysight	N9020A	MY54200831	Mar. 12, 2025	1 Year
5.	Horn Antenna+Amplifier	COM-Power	AHA-840	10100020	Mar. 23, 2024	2 Year
6.	Horn Antenna	COM-Power	AH-118	071078	Mar. 23, 2024	2 Year
7.	Pre-Amplifier	HP	HP 8449B	3008A00964	Mar. 12, 2025	1 Year
8.	Pre-Amplifier	HP	HP 8447D	1145A00203	Mar. 12, 2025	1 Year
9.	Power Meter	Agilent	N1912A	MY41497159	Aug.14, 2024	1 Year
10.	Power Sensor	Agilent	N1921A	MY48251036	Aug.14, 2024	1 Year
11.	Loop Antenna	Schwarzbeck	FMZB 1513	1513-272	Mar. 23, 2024	2 Year
12.	Test Receiver	Rohde & Schwarz	ESCI	101152	Mar. 12, 2025	1 Year
13.	L.I.S.N	Rohde & Schwarz	ENV 216	101317	Mar. 12, 2025	1 Year
14.	L.I.S.N	Rohde & Schwarz	ESH2-Z5	893606/014	Mar. 12, 2025	1 Year
15.	RF Switching Unit	Compliance Direction Systems Inc.	RSU-M2	38311	Mar. 12, 2025	1 Year
16.	Temperature & Humidity Chamber	REMAFEE	SYHR225L	N/A	Mar. 12, 2025	1 Year
17.	DC Source	Maynuo	MY8811	N/A	Mar. 12, 2025	1 Year
18.	Temporary antenna connector	TESCOM	SS402	N/A	N/A	N/A
19.	Chamber	SAEMC	9*7*7m	N/A	Apr. 21, 2023	2 Year
20.	Test Software	EZ	EZ_EMG	N/A	N/A	N/A

Note: For photographs of EUT and measurement, please refer to appendix in separate documents.

---End---