

TEST REPORT

Product Name : Human Machine Interface
Model Number : VT-HMI04-RK3326S
FCC ID : 2BEA6HMI04

Prepared for : Vantron Technology, Inc.
Address : 48434 Milmont Drive Fremont, CA 94538-7324, USA

Prepared by : EMTEK (SHENZHEN) CO., LTD.
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Report Number : ENS2410310141W00204R
Date(s) of Tests : November 1, 2024 to February 26, 2025
Date of issue : March 1, 2025

1 TEST RESULT CERTIFICATION

Applicant : Vantron Technology, Inc.
Address : 48434 Milmont Drive Fremont, CA 94538-7324, USA
Manufacturer : Vantron Technology, Inc.
Address : 48434 Milmont Drive Fremont, CA 94538-7324, USA
EUT : Human Machine Interface
Model Name : VT-HMI04-RK3326S
Trademark : Vantron

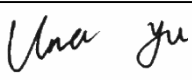
Measurement Procedure Used:


APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 2, Subpart J FCC 47 CFR Part 15, Subpart E	PASS
IC RSS-GEN, Issue 5(04-2018)+A1(03-2019)+A2(02-2021) IC RSS-247 Issue 2(02-2017)	PASS


The above equipment was tested by EMTEK (SHENZHEN) CO., LTD. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 2, Part 15.407, IC RSS-247 Issue 2 and IC RSS-GEN, Issue 5.

The test results of this report relate only to the tested sample identified in this report.

Date of Test : November 1, 2024 to February 26, 2025

Prepared by : 
Una Yu /Editor

Reviewer : 
Joe Xia /Supervisor

Approve & Authorized Signer : 
Lisa Wang/Manager



Modified History

Version	Report No.	Revision Date	Summary
Ver.1.0	ENS2410310141W00204R	/	Original Report



TABLE OF CONTENTS

1	TEST RESULT CERTIFICATION	2
2	EUT TECHNICAL DESCRIPTION	5
3	SUMMARY OF TEST RESULT	7
4	TEST METHODOLOGY	8
4.1	GENERAL DESCRIPTION OF APPLIED STANDARDS	8
4.2	MEASUREMENT EQUIPMENT USED	8
4.3	DESCRIPTION OF TEST MODES	8
5	FACILITIES AND ACCREDITATIONS	14
5.1	FACILITIES	14
5.2	EQUIPMENT	14
5.3	LABORATORY ACCREDITATIONS AND LISTINGS	14
6	TEST SYSTEM UNCERTAINTY	15
7	SETUP OF EQUIPMENT UNDER TEST	16
7.1	RADIO FREQUENCY TEST SETUP	16
7.2	RADIO FREQUENCY TEST SETUP	16
7.3	CONDUCTED EMISSION TEST SETUP	17
7.4	BLOCK DIAGRAM CONFIGURATION OF TEST SYSTEM	18
7.5	SUPPORT EQUIPMENT	19
8	TEST REQUIREMENTS	20
8.1	BANDWIDTH MEASUREMENT	20
8.2	MAXIMUM CONDUCTED OUTPUT POWER	84
8.3	MAXIMUM PEAK POWER DENSITY	89
8.4	UNDESIRABLE RADIATED SPURIOUS EMISSION	224
8.5	POWER LINE CONDUCTED EMISSIONS	253
8.6	ANTENNA APPLICATION	256

2 EUT TECHNICAL DESCRIPTION

Characteristics	Description
Product:	Human Machine Interface
Model Number:	VT-HMI04-RK3326S
Sample Number:	2#
Wifi Type:	Wifi 5G with 5150MHz-5250MHz Band Wifi 5G with 5250MHz-5350MHz Band Wifi 5G with 5470MHz-5725MHz Band Wifi 5G with 5725MHz-5850MHz Band
WLAN Supported:	802.11a/n/ac/ax
Data Rate :	802.11a: 54/48/36/24/18/12/9/6Mbps 802.11n: MCS0-MCS15 802.11ac: MCS0-MCS9 802.11ax: MCS0-MCS11
Modulation:	OFDM with BPSK/QPSK/16QAM/64QAM for 802.11a/n OFDM with BPSK/QPSK/16QAM/64QAM/256QAM for 802.11ac OFDMA with BPSK/QPSK/16QAM/64QAM/256QAM/1024QAM for 802.11ax
Frequency Range:	UNII-1: 5150MHz-5250MHz Band 5180-5240MHz for 802.11a/n(HT20)/ac(VHT20) /ax(HE20) 5190-5230MHz for 802.11n(HT40)/ac(VHT40) /ax(HE40) 5210MHz for 802.11ac(VHT80) /ax(HE80)
	UNII-2A: 5250MHz-5350MHz Band 5260-5320MHz for 802.11a/n(HT20)/ac(VHT20) /ax(HE20) 5270-5310MHz for 802.11n(HT40)/ac(VHT40) /ax(HE40) 5290MHz for 802.11ac(VHT80) /ax(HE80)
	UNII-2C: 5470MHz-5725MHz Band 5500-5700MHz for 802.11a/n(HT20)/ac(VHT20) /ax(HE20) 5510-5670MHz for 802.11n(HT40)/ac(VHT40) /ax(HE40) 5530MHz for 802.11ac(VHT80) /ax(HE80)
	UNII-3 with 5725MHz-5850MHz Band 5745-5825MHz for 802.11a/n(HT20)/ac(VHT20) /ax(HE20) 5755-5795MHz for 802.11n(HT40)/ac(VHT40) /ax(HE40) 5775MHz for 802.11ac(VHT80)/ax(HE80);
TPC Function:	Not Applicable
Antenna Port:	<input checked="" type="checkbox"/> Antenna port 1
Antenna Type:	FPC Antenna
Antenna Gain:	ANT 1: 2.45 dBi
Transmit Power:	UNII-1 Band: 13.73 dBm UNII-2A Band: 11.02 dBm UNII-2C Band: 13.52 dBm UNII-3 Band: 6.51 dBm

Power Supply:	DC 5V from adapter
Adapter:	MODEL:TEKA-UCA20US INPUT:AC 100-240V~50/60Hz 0.35A Max OUTPUT:5.0V, 2.0A
Test Voltage:	AC 120V/60Hz
Date of Received:	October 31, 2024
Temperature Range:	0° C ~ +45° C
Note: 1.For more details, please refer to the User's manual of the EUT.	



3 SUMMARY OF TEST RESULT

FCC Part Clause	IC Part Clause	Test Parameter	Verdict	Remark
15.407 (a) 15.407 (e) 2.1049	RSS-247, 6.2 RSS-Gen 6.7	99% , 6dB and 26dB Bandwidth	PASS	
15.407 (a)	RSS-247, 6.2	Maximum Conducted Output Power	PASS	
15.407 (a)	RSS-247, 6.2	PeakPower Spectral Density	PASS	
15.407 (b) 15.209 15.205	RSS-247, 6.2 RSS-Gen 8.9 RSS-Gen 8.10 RSS-Gen 6.13	RadiatedSpurious Emission	PASS	
15.207	RSS-Gen 8.8	Power Line Conducted Emission	PASS	
15.407(a) 15.203	RSS-Gen 6.8	Antenna Application	PASS	
NOTE1:N/A (Not Applicable) NOTE2:According to FCC OET KDB 789033, the report use radiated measurements in the restricted frequency bands. In addition, the radiated test is also performed to ensure the emissions emanating from the device cabinet also comply with the applicable limits.				

RELATED SUBMITTAL(S) / GRANT(S):

This submittal(s) (test report) is intended for **FCC ID:2BEA6HMI04** filing to comply with Section 15.407 of the FCC Part 15, Subpart C Rules.

4 TEST METHODOLOGY

4.1 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC 47 CFR Part 2, Subpart J

FCC 47 CFR Part 15, Subpart E

IC RSS-GEN, Issue 5(04-2018)+A1(03-2019)+A2(02-2021)

IC RSS-247 Issue 2(02-2017)

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

FCC KDB 789033 D2 General UNII Test Procedures New Rules v02r01

4.2 MEASUREMENT EQUIPMENT USED

Conducted Emission Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
EMI Test Receiver	Rohde & Schwarz	ESCI	101384	2024/5/11	1Year
AMN	Rohde & Schwarz	ENV216	101161	2024/5/10	1Year

For Spurious Emissions Test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Pre-Amplifier	Bonn	BLMA 011001N	2213967A	2024/10/18	1Year
EMI Test Receiver	Rohde & Schwarz	ESR7	102551	2024/10/18	1Year
Bilog Antenna	Schwarzbeck	VULB9163	9163142	2024/7/8	2Year
Horn antenna	Schwarzbeck	BBHA9120D	9120D-1198	2023/6/2	2Year
Pre-Amplifier	Bonn	BLMA 0118-5G	2213967B-01	2024/10/18	1Year
Spectrum Analyzer	Rohde & Schwarz	FSV3044	101290	2024/10/18	1Year
Horn antenna	Schwarzbeck	BBHA9170	9170-399	2023/5/12	2Year
Pre-Amplifier	Lunar EM	LNA18G26-40	J101213101000 1	2024/5/11	1Year
Pre-Amplifier	Lunar EM	LNA26G40-40	J101313102800 1	2024/5/11	1Year
Loop Antenna	Schwarzbeck	FMZB1519	1519-012	2023/5/12	2Year
Wideband Radio Communication Tester	R&S	CMW500	171168	2024/9/18	1Year
Coaxial Cable	TIMES	NmNm-7-C15702	N/A	2024/5/23	1Year
Coaxial Cable	TIMES	HF290-NMSM-6.5M	N/A	2024/5/23	1Year
Coaxial Cable	TIMES	LMR-240 N-N	N/A	2024/5/23	1Year

For other test items:

Equipment Type	Manufacturer	Model No.	Serial Number	Last Cal.	Cal. Interval
Wideband Radio Communication Tester	R&S	CMW500	171168	2024/9/18	1Year
Frequency Extender	R&S	CMW-Z800A	100430	2024/9/18	1Year
Spectrum Analyzer	R&S	FSV3044	101289	2024/12/17	1Year
Analog Signal Generator	R&S	SMB100A	183237	2024/9/18	1Year
Vector Signal Generator	R&S	SMM100A	101808	2024/9/18	1Year

RF Control Unit(Power Meter)	Tonscend	JS0806-2	22C8060567	2024/9/18	1Year
Temperature&Humidity Chamber	ESPEC	EL-02KA	12107166	2024/5/10	1 Year
DC Power Supply	KEYSIGHT	E3642A	MY53030016	2024/9/18	1 Year



4.3 DESCRIPTION OF TEST MODES

The EUT has been tested under its typical operating condition.

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

Test of channel included the lowest and middle and highest frequency to perform the test, then record on this report.

Those data rates (802.11a: 54 Mbps; 802.11n(HT20): MCS0; 802.11ac(VHT20): MCS0; 802.11n(HT40): MCS0; 802.11ac(VHT40): MCS0; 802.11ac(VHT80): MCS0;)were used for all test.

Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

☒ Wifi 5G with U-NII - 1

Frequency and Channel list for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax(HE20) :

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	44	5220		
40	5200	48	5240		

Frequency and Channel list for 802.11n (HT40), 802.11ac (VHT40), 802.11ax(HE40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
38	5190	46	5230		

Frequency and Channel list for 802.11ac (VHT80), 802.11ax(HE80):

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
42	5210				

Test Frequency and Channel for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax(HE20):

Lowest Frequency		Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	40	5200	48	5240

Test Frequency and channel for 802.11n (HT40), 802.11ac (VHT40), 802.11ax(HE40):

Lowest Frequency		Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
38	5190	N/A	N/A	46	5230

Test Frequency and channel for 802.11ac (VHT80), 802.11ax(HE80):

Lowest Frequency		Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
42	5210	N/A	N/A	N/A	N/A

☒ Wifi 5G with U-NII -2A

Frequency and Channel list 802.11a, 802.11n (HT20), 802.11ac (VHT20),802.11ax(HE20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
52	5260	60	5300		
56	5280	64	5320		

Frequency and Channel list for 802.11n (HT40), 802.11ac (VHT40), 802.11ax(HE40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
54	5270				
62	5310				

Frequency and Channel list for 802.11ac (VHT80),802.11ax(HE80):

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
58	5290				

Test Frequency and Channel for 802.11a, 802.11n (HT20), 802.11ac (VHT20),802.11ax(HE20):

Lowest Frequency		Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
52	5260	56	5280	64	5320

Test Frequency and channel for 802.11n (HT40), 802.11ac (VHT40),802.11ax(HE40):

Lowest Frequency		Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
54	5270	N/A	N/A	62	5310

Test Frequency and channel for 802.11ac (VHT80),802.11ax(HE80):

Lowest Frequency		Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
58	5290				

☒ Wifi 5G with U-NII -2C

Frequency and Channel list for 802.11a, 802.11n (HT20), 802.11ac (VHT20),802.11ax(HE20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
100	5500	116	5580	132	5660
104	5520	120	5600	136	5680
108	5540	124	5620	140	5700
112	5560	128	5640		

Frequency and Channel list for 802.11n (HT40), 802.11ac (VHT40), 802.11ax(HE40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
102	5510	118	5590	134	5670
110	5550	126	5630		

Frequency and Channel list for 802.11ac (VHT80),802.11ax(HE80):

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
106	5530	122	5610		

Test Frequency and Channel for 802.11a, 802.11n (HT20), 802.11ac (VHT20),802.11ax(HE20):

Lowest Frequency		Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
100	5500	120	5600	140	5700

Test Frequency and channel for 802.11n (HT40), 802.11ac (VHT40),802.11ax(HE40):

Lowest Frequency		Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
102	5510			134	5670

Test Frequency and channel for 802.11ac (VHT80), 802.11ax(HE80):

Lowest Frequency		Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
106	5530				

☒ Wifi 5G with U-NII -3

Frequency and Channel list for 802.11a, 802.11n (HT20), 802.11ac (VHT20),802.11ax(HE20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	157	5785	165	5825
153	5765	161	5805		

Frequency and Channel list for 802.11n (HT40), 802.11ac (VHT40),802.11ax(HE40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
151	5755	159	5795		

Frequency and Channel list for 802.11ac (VHT80),802.11ax(HE80):

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
155	5775				

Test Frequency and Channel for 802.11a, 802.11n (HT20), 802.11ac (VHT20),802.11ax(HE20):

Lowest Frequency		Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	157	5785	165	5825

Test Frequency and channel for 802.11n (HT40), 802.11ac (VHT40),802.11ax(HE40):

Lowest Frequency		Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
151	5755	N/A	N/A	159	5795

Test Frequency and channel for 802.11ac (VHT80),802.11ax(HE80):

Lowest Frequency		Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
155	5775				

Multi-antenna correlation:

<input type="checkbox"/>	Transmit Signals are Correlated
	Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}]$ dBi
<input type="checkbox"/>	All Transmit Signals are Completely Uncorrelated
	Directional gain = $10 \log[(10^{G1/10} + 10^{G2/10} + \dots + 10^{GN/10}) / N_{ANT}]$ dBi

Directional gain

5 FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

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

EMTEK (Shenzhen) Co., Ltd.

Building 69, Majialong Industry Zone District, Nanshan District, Shenzhen, China

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with preselectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

5.3 LABORATORY ACCREDITATIONS AND LISTINGS

Site Description

EMC Lab.

: **Accredited by CNAS**

The Certificate Registration Number is L2291.

The Laboratory has been assessed and proved to be in compliance with CNAS-CL01 (identical to ISO/IEC 17025:2017)

Accredited by FCC

Designation Number: CN1204

Test Firm Registration Number: 882943

Accredited by A2LA

The Certificate Number is 4321.01.

Accredited by Industry Canada

The Conformity Assessment Body Identifier is CN0008

Name of Firm

: EMTEK (SHENZHEN) CO., LTD.

Site Location

: Building 69, Majialong Industry Zone,
Nanshan District, Shenzhen, Guangdong, China

6 TEST SYSTEM UNCERTAINTY

The following measurement uncertainty levels have been estimated for tests performed on the apparatus:

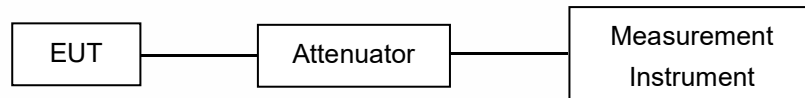
Test Parameter	Measurement Uncertainty
Frequency error	$\pm 20\text{Hz}$
Occupied Bandwidth	$\pm 0.5\text{KHz}$
Transmitter output power	$\pm 0.6\text{dB}$
Conducted spurious emissions	$\pm 3.2\text{dB}$
Radiated spurious emissions	$\pm 4.5\text{dB}$
Temperature	$\pm 1.2^{\circ}\text{C}$
Humidity	$\pm 3\%$
DC voltages	$\pm 0.25\text{V}$
Time	$\pm 1\%$

Measurement Uncertainty for a level of Confidence of 95%

7 SETUP OF EQUIPMENT UNDER TEST

7.1 RADIO FREQUENCY TEST SETUP

The WLAN component's antenna ports(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by PC/software to emit the specified signals for the purpose of measurements.



7.2 RADIO FREQUENCY TEST SETUP

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.10. The test distance is 3m. The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 and CAN/CSA-CEI/IEC CISPR 22.

Below 30MHz:

The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna (loop antenna). The Antenna should be positioned with its plane vertical at the specified distance from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. The center of the loop shall be 1 m above the ground. For certain applications, the loop antenna plane may also need to be positioned horizontally at the specified distance from the EUT.

Above 30MHz:

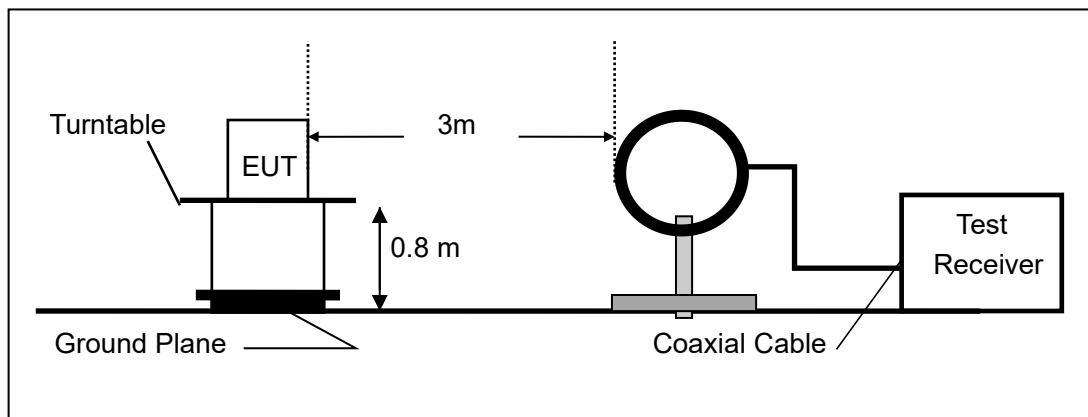
The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).

Above 1GHz:

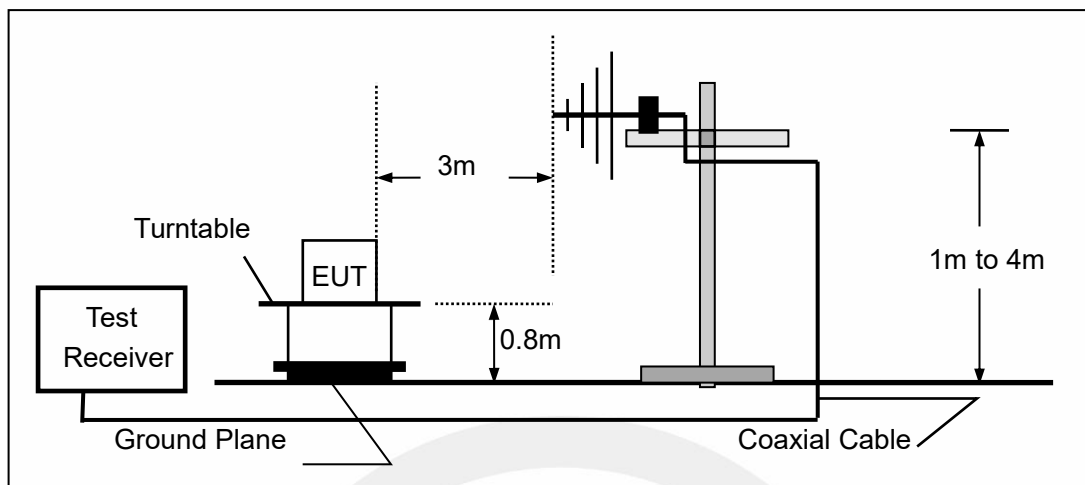
(Note: the FCC's permission to use 1.5m as an alternative per TCBC Conf call of Dec. 2, 2014.)

The EUT is placed on a turntable 1.5 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).

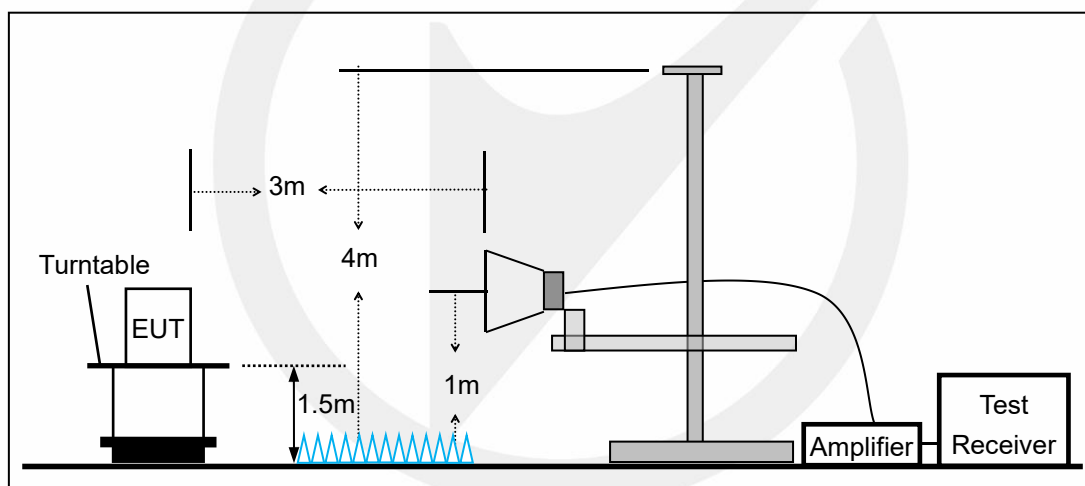
(a) Radiated Emission Test Set-Up, Frequency Below 30MHz



(b) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(c) Radiated Emission Test Set-Up, Frequency above 1000MHz

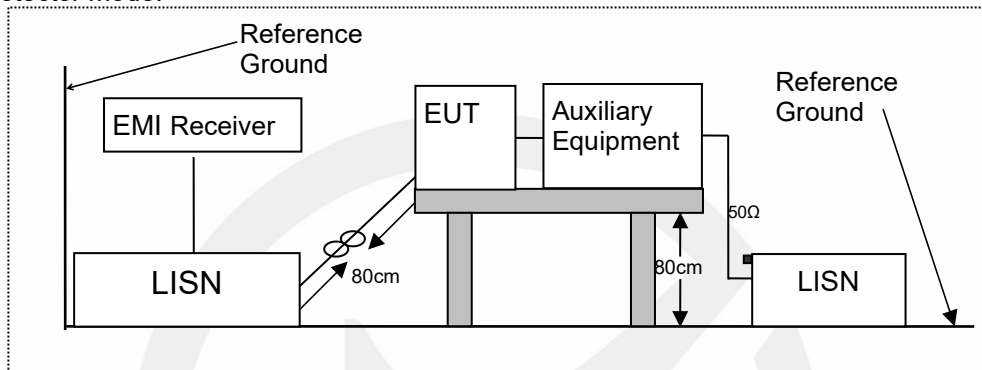


7.3 CONDUCTED EMISSION TEST SETUP

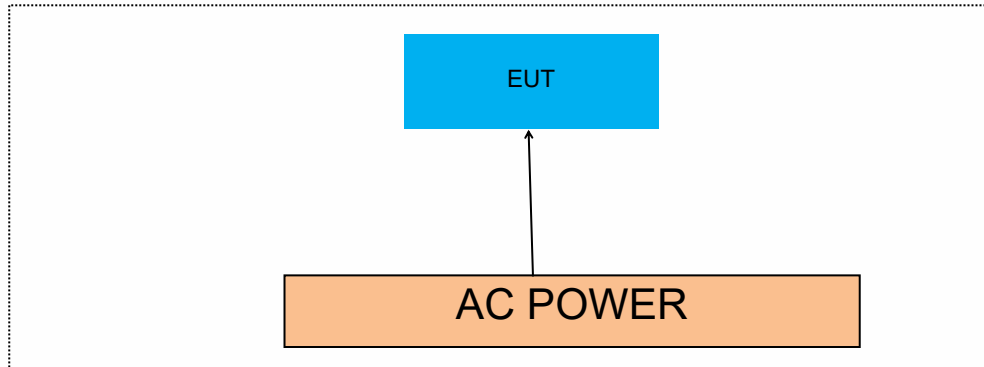
The mains cable of the EUT (maybe per AC/DC Adapter) must be connected to LISN. The LISN shall be placed 0.8 m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8m from the LISN.

Ground connections, where required for safety purposes, shall be connected to the reference ground point of the LISN and, where not otherwise provided or specified by the manufacturer, shall be of same length as the mains cable and run parallel to the mains connection at a separation distance of not more than 0.1 m.

According to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode.



7.4 BLOCK DIAGRAM CONFIGURATION OF TEST SYSTEM



7.5 SUPPORT EQUIPMENT

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Auxiliary Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
/	/	/	/

Notes:

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.

8 TEST REQUIREMENTS

8.1 BANDWIDTH MEASUREMENT

8.1.1 Applicable Standard

According to FCC Part 15.407(a)(1) for UNII Band I
According to FCC Part 15.407(a)(2) for UNII Band II-A and UNII Band II-C
According to FCC Part 15.407(a)(3) for UNII Band III
According to FCC Part 15.407(e) for UNII Band III
According to 789033 D02 Section II(C)
According to 789033 D02 Section II(D)
According to RSS-Gen6.6, RSS 247, 6.2

8.1.2 Conformance Limit

The 26dB bandwidth is used to determine the conducted power limits.
Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

8.1.3 Test Configuration

Test according to clause 7.1 radio frequency test setup

8.1.4 Test Procedure

According to 789033 D02 v02r01 section C&D, the following is the measurement procedure.

1. Emission Bandwidth (EBW)

- Set RBW = approximately 1% of the emission bandwidth.
- Set the VBW > RBW.
- Detector = Peak.
- Trace mode = max hold.
- Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

2. Minimum Emission Bandwidth for the band 5.725-5.85 GHz

Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.715-5.85 GHz. The following procedure shall be used for measuring this bandwidth:

- Set RBW = 100 kHz.
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Allow the trace to 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.

Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described above.

D. 99 Percent Occupied Bandwidth

The 99-percent occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5 % of the total mean power of the given emission. Measurement of the 99-percent occupied bandwidth is required only as a condition for using the optional band-edge measurement techniques described in section II.G.3.d). Measurements of 99-percent occupied bandwidth may also optionally be used in lieu of the EBW to 789033 D02 v01r02 General UNII Test Procedures New Rules v01 define the minimum frequency range over which the spectrum is integrated when measuring maximum conducted output power as described in section II.E.

However, the EBW must be measured to determine bandwidth dependent limits on maximum conducted output power in accordance with 15.407(a).

The following procedure shall be used for measuring (99 %) power bandwidth:

1. Set center frequency to the nominal EUT channel center frequency.
2. Set span = 1.5 times to 5.0 times the OBW.
3. Set RBW = 1 % to 5 % of the OBW
4. Set VBW $\geq 3 \cdot$ RBW
5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
6. Use the 99 % power bandwidth function of the instrument (if available).
7. If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.



8.1.5 Test Results

Temperature:	23.4°C
Relative Humidity:	46%
ATM Pressure:	1011 mbar

Note: N/A

Emission Bandwidth

TestMode	Antenna	Frequency[MHz]	26db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	22.840	5168.800	5191.640	---	---
		5200	23.640	5188.320	5211.960	---	---
		5240	24.520	5227.360	5251.880	---	---
		5260	23.800	5248.120	5271.920	---	---
		5280	22.760	5268.600	5291.360	---	---
		5320	24.720	5307.160	5331.880	---	---
		5500	23.920	5487.760	5511.680	---	---
		5580	24.840	5567.560	5592.400	---	---
		5700	24.560	5687.360	5711.920	---	---
		5745	24.640	5732.560	5757.200	---	---
		5785	24.760	5772.720	5797.480	---	---
		5825	25.120	5812.000	5837.120	---	---
11N20SISO	Ant1	5180	25.800	5167.920	5193.720	---	---
		5200	25.720	5187.160	5212.880	---	---
		5240	25.720	5227.520	5253.240	---	---
		5260	25.480	5246.840	5272.320	---	---
		5280	24.800	5268.160	5292.960	---	---
		5320	26.160	5306.880	5333.040	---	---
		5500	25.920	5486.760	5512.680	---	---
		5580	27.360	5565.760	5593.120	---	---
		5700	25.640	5686.680	5712.320	---	---
		5745	24.840	5732.560	5757.400	---	---
		5785	25.920	5772.000	5797.920	---	---
		5825	26.680	5810.960	5837.640	---	---
11N40SISO	Ant1	5190	45.040	5168.000	5213.040	---	---
		5230	45.360	5207.200	5252.560	---	---
		5270	44.960	5247.840	5292.800	---	---
		5310	45.120	5287.520	5332.640	---	---
		5510	51.200	5486.720	5537.920	---	---
		5550	48.320	5527.040	5575.360	---	---
		5670	45.760	5646.560	5692.320	---	---
		5755	45.920	5732.200	5778.120	---	---
		5795	47.600	5771.160	5818.760	---	---
11AC20SISO	Ant1	5180	25.240	5167.920	5193.160	---	---
		5200	25.520	5187.480	5213.000	---	---
		5240	25.680	5227.000	5252.680	---	---
		5260	24.640	5247.800	5272.440	---	---
		5280	25.840	5266.880	5292.720	---	---
		5320	24.440	5307.720	5332.160	---	---
		5500	25.840	5487.160	5513.000	---	---
		5580	26.200	5567.120	5593.320	---	---
		5700	25.480	5687.440	5712.920	---	---
		5745	27.000	5730.840	5757.840	---	---
		5785	25.600	5771.880	5797.480	---	---
		5825	26.400	5811.720	5838.120	---	---
11AC40SISO	Ant1	5190	45.120	5168.000	5213.120	---	---
		5230	46.160	5207.040	5253.200	---	---
		5270	45.440	5247.600	5293.040	---	---

		5310	45.040	5287.440	5332.480	---	---
		5510	46.160	5486.720	5532.880	---	---
		5550	47.600	5527.040	5574.640	---	---
		5670	47.200	5646.720	5693.920	---	---
		5755	47.360	5730.840	5778.200	---	---
		5795	46.800	5770.840	5817.640	---	---
11AC80SISO	Ant1	5210	87.040	5167.440	5254.480	---	---
		5290	85.120	5247.600	5332.720	---	---
		5530	96.960	5484.880	5581.840	---	---
		5610	88.800	5565.840	5654.640	---	---
		5775	90.880	5729.080	5819.960	---	---
11AX20SISO	Ant1	5180	24.800	5167.440	5192.240	---	---
		5200	24.400	5188.520	5212.920	---	---
		5240	24.240	5227.520	5251.760	---	---
		5260	23.240	5248.280	5271.520	---	---
		5280	23.920	5267.600	5291.520	---	---
		5320	25.120	5307.400	5332.520	---	---
		5500	24.360	5487.960	5512.320	---	---
		5580	25.920	5566.160	5592.080	---	---
		5700	25.440	5686.600	5712.040	---	---
		5745	27.800	5730.840	5758.640	---	---
11AX40SISO	Ant1	5785	24.600	5772.200	5796.800	---	---
		5825	25.040	5812.560	5837.600	---	---
		5190	44.720	5167.760	5212.480	---	---
		5230	43.040	5208.720	5251.760	---	---
		5270	43.840	5248.000	5291.840	---	---
		5310	43.280	5287.920	5331.200	---	---
		5510	44.720	5487.840	5532.560	---	---
		5550	46.240	5527.040	5573.280	---	---
		5670	44.240	5647.840	5692.080	---	---
		5755	45.200	5732.120	5777.320	---	---
11AX80SISO	Ant1	5795	45.920	5771.880	5817.800	---	---
		5210	87.200	5166.960	5254.160	---	---
		5290	84.960	5247.600	5332.560	---	---
		5530	84.960	5488.720	5573.680	---	---
		5610	87.520	5565.520	5653.040	---	---
		5775	87.520	5731.000	5818.520	---	---

11A_Ant1_5180



11A_Ant1_5200



11A_Ant1_5240



11A_Ant1_5260



11A_Ant1_5280



11A_Ant1_5320



11A_Ant1_5500



11A_Ant1_5580



11A_Ant1_5700



11A_Ant1_5745



11A_Ant1_5785



11A_Ant1_5825



11N20SISO_Ant1_5180



11N20SISO_Ant1_5200



11N20SISO_Ant1_5240



11N20SISO_Ant1_5260



11N20SISO_Ant1_5280



11N20SISO_Ant1_5320



11N20SISO_Ant1_5500



11N20SISO_Ant1_5580



11N20SISO_Ant1_5700



11N20SISO_Ant1_5745



11N20SISO_Ant1_5785



11N20SISO_Ant1_5825



11N40SISO_Ant1_5190



11N40SISO_Ant1_5230



11N40SISO_Ant1_5270



11N40SISO_Ant1_5310



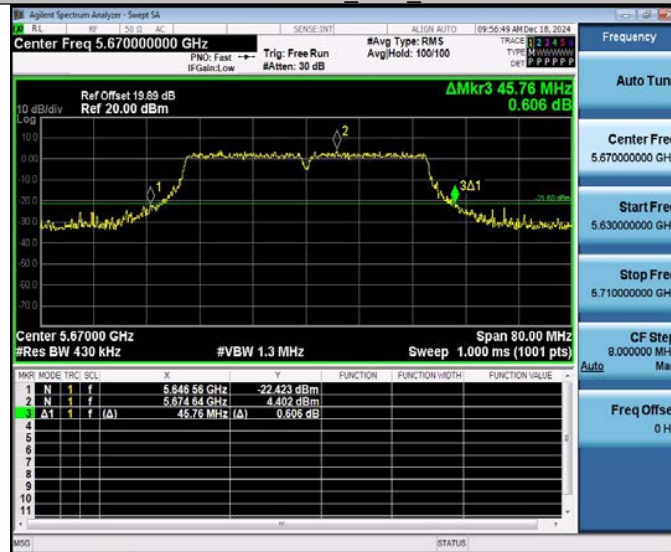
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11AC20SISO_Ant1_5180



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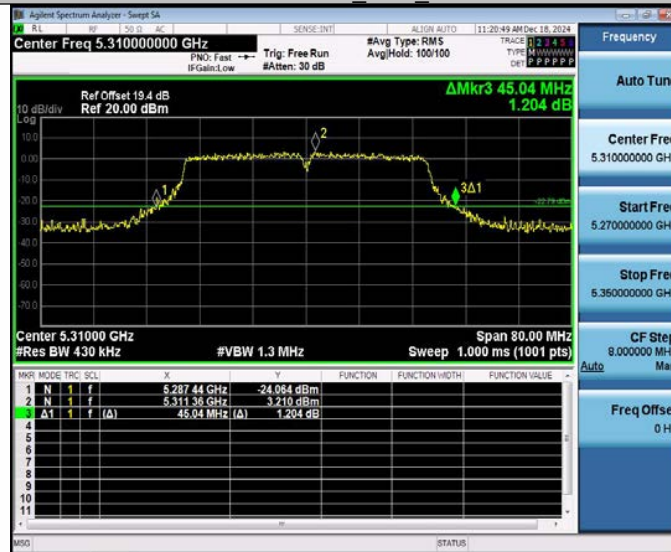
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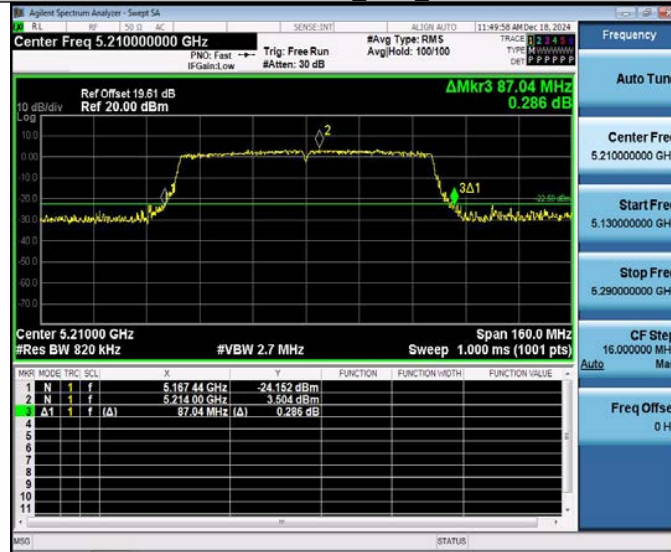
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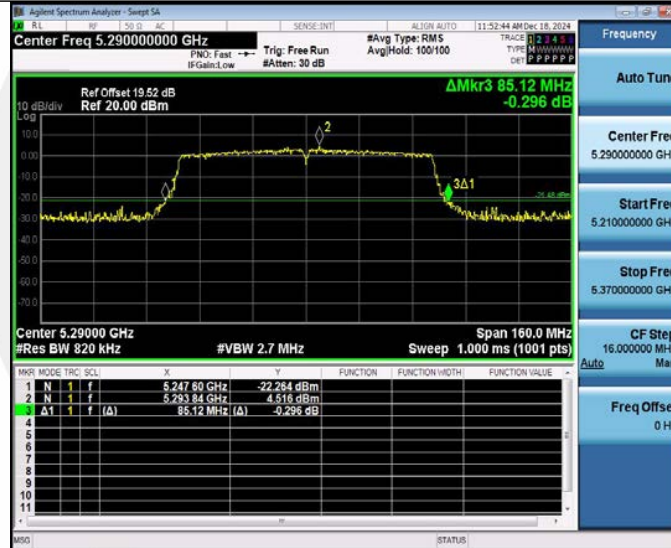
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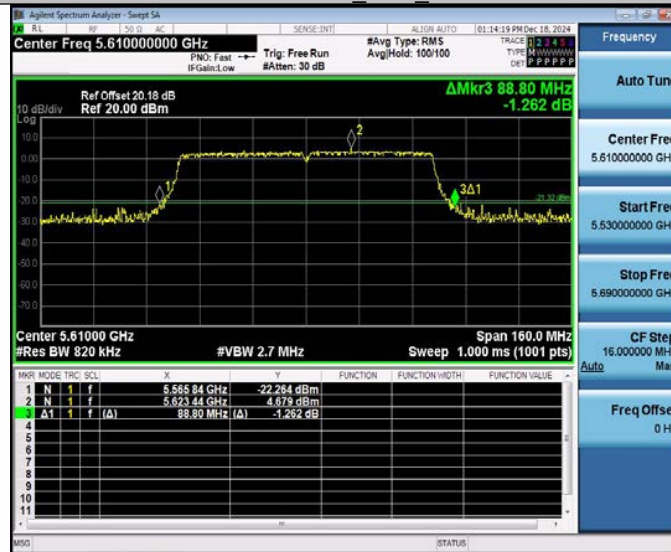
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11AC80SISO_Ant1_5530



11AC80SISO_Ant1_5610



11AC80SISO_Ant1_5775



11AX20SISO_Ant1_5180



11AX20SISO_Ant1_5200



11AX20SISO_Ant1_5240



11AX20SISO_Ant1_5260



11AX20SISO_Ant1_5280



11AX20SISO_Ant1_5320



11AX20SISO_Ant1_5500



11AX20SISO_Ant1_5580



11AX20SISO_Ant1_5700



11AX20SISO_Ant1_5745



11AX20SISO_Ant1_5785



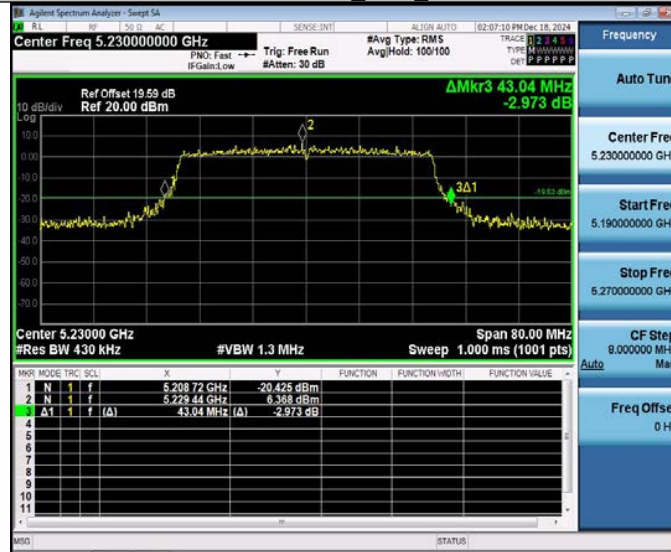
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11AX40SISO_Ant1_5230



11AX40SISO_Ant1_5270



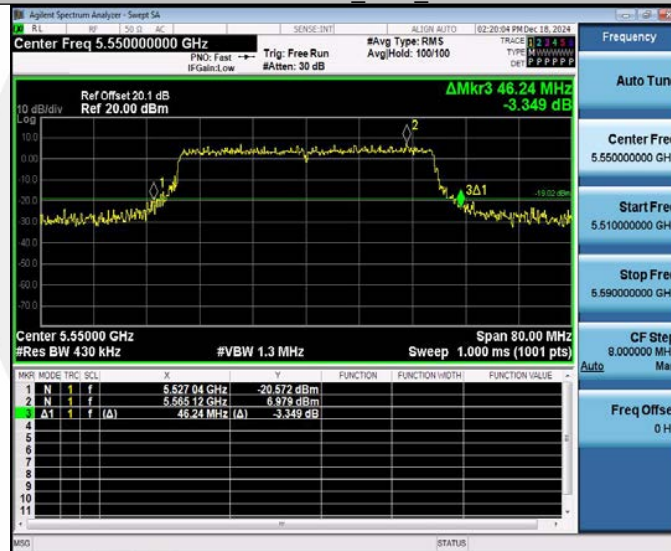
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11AX40SISO_Ant1_5550



11AX40SISO_Ant1_5670



11AX40SISO_Ant1_5755



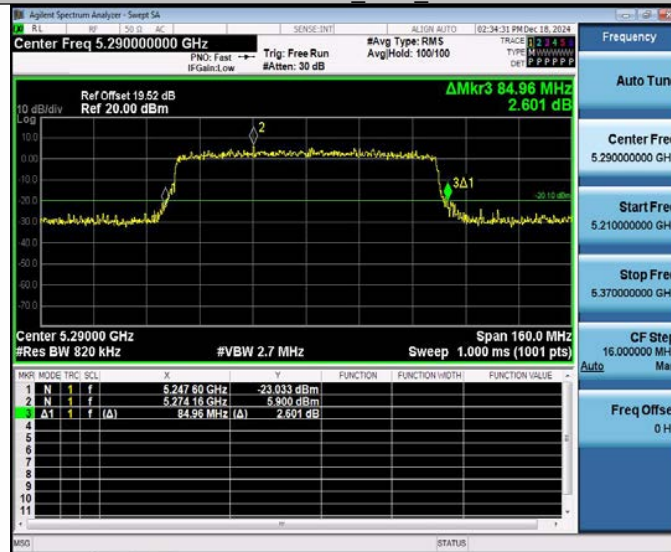
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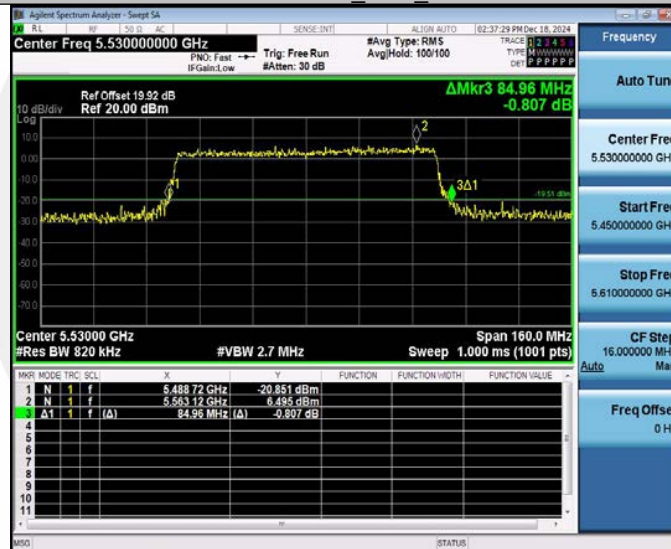
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11AX80SISO_Ant1_5290

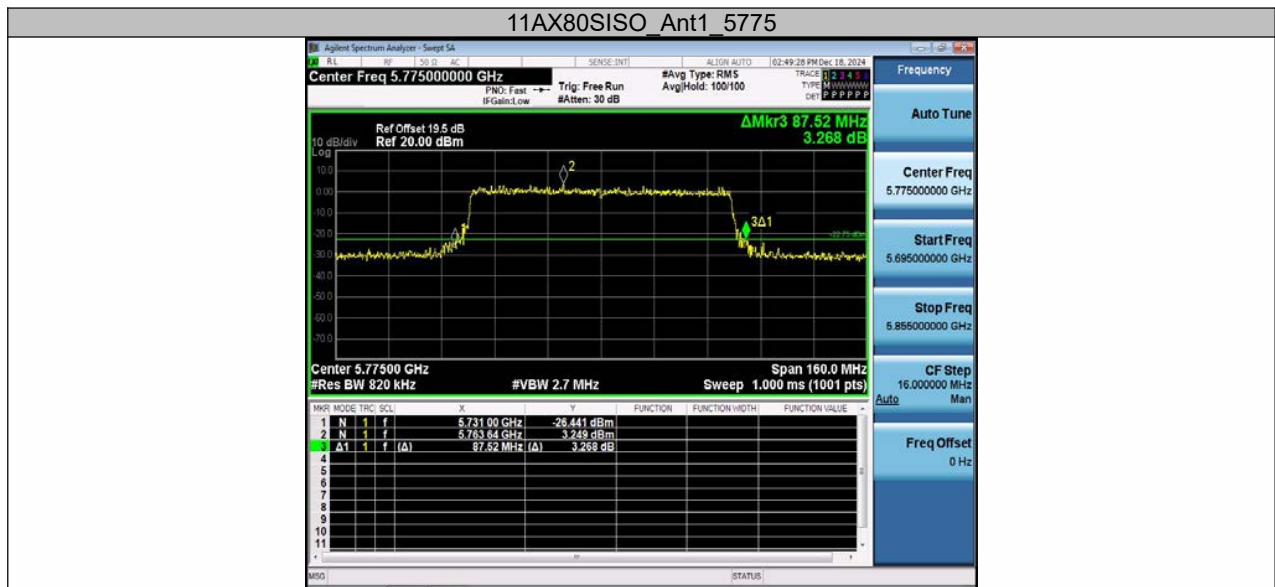


11AX80SISO_Ant1_5530



11AX80SISO_Ant1_5610





Occupied channel bandwidth

TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	17.593	5171.2062	5188.7992	---	---
		5200	17.673	5191.1599	5208.8329	---	---
		5240	17.566	5231.2205	5248.7865	---	---
		5260	17.610	5251.1898	5268.7998	---	---
		5280	17.574	5271.1701	5288.7441	---	---
		5320	17.570	5311.1888	5328.7588	---	---
		5500	17.773	5491.0898	5508.8628	---	---
		5580	17.851	5571.1275	5588.9785	---	---
		5700	17.896	5690.9580	5708.8540	---	---
		5745	17.779	5736.0318	5753.8108	---	---
		5785	17.757	5776.0447	5793.8017	---	---
11N20SISO	Ant1	5825	17.856	5816.0285	5833.8845	---	---
		5180	18.781	5170.6767	5189.4577	---	---
		5200	18.776	5190.6370	5209.4130	---	---
		5240	18.717	5230.6910	5249.4080	---	---
		5260	18.820	5250.6343	5269.4543	---	---
		5280	18.805	5270.5865	5289.3915	---	---
		5320	18.783	5310.5876	5329.3706	---	---
		5500	19.009	5490.5115	5509.5205	---	---
		5580	19.042	5570.5772	5589.6192	---	---
		5700	19.007	5690.4511	5709.4581	---	---
		5745	19.029	5735.4367	5754.4657	---	---
11N40SISO	Ant1	5785	19.137	5775.3801	5794.5171	---	---
		5825	19.061	5815.4229	5834.4839	---	---
		5190	37.199	5171.4786	5208.6776	---	---
		5230	37.299	5211.4310	5248.7300	---	---
		5270	37.181	5251.4722	5288.6532	---	---
		5310	37.378	5291.3656	5328.7436	---	---
		5510	37.810	5491.2076	5529.0176	---	---
		5550	37.775	5531.3443	5569.1193	---	---
11AC20SISO	Ant1	5670	37.503	5651.2761	5688.7791	---	---
		5755	37.546	5736.1820	5773.7280	---	---
		5795	37.653	5776.1382	5813.7912	---	---
		5180	18.797	5170.6465	5189.4435	---	---
		5200	18.777	5190.6443	5209.4213	---	---
		5240	18.747	5230.6408	5249.3878	---	---
		5260	18.747	5250.6842	5269.4312	---	---
		5280	18.719	5270.6805	5289.3995	---	---
		5320	18.697	5310.6431	5329.3401	---	---
		5500	19.073	5490.4872	5509.5602	---	---
		5580	19.004	5570.5709	5589.5749	---	---
11AC40SISO	Ant1	5700	19.166	5690.3993	5709.5653	---	---
		5745	19.129	5735.3910	5754.5200	---	---
		5785	19.047	5775.4439	5794.4909	---	---
		5825	19.063	5815.4622	5834.5252	---	---
		5190	37.316	5171.4375	5208.7535	---	---
		5230	37.168	5211.4769	5248.6449	---	---
		5270	37.257	5251.4319	5288.6889	---	---
		5310	37.369	5291.3212	5328.6902	---	---
11AC80SISO	Ant1	5510	37.765	5491.1947	5528.9597	---	---
		5550	37.706	5531.3257	5569.0317	---	---
		5670	37.752	5651.1320	5688.8840	---	---
		5755	37.719	5736.0819	5773.8009	---	---
	Ant1	5795	37.651	5776.1267	5813.7777	---	---
		5210	76.510	5171.9103	5248.4203	---	---
		5290	76.377	5251.8624	5328.2394	---	---
		5530	77.116	5491.7075	5568.8235	---	---
	Ant1	5610	76.830	5571.7634	5648.5934	---	---

		5775	77.002	5736.3345	5813.3365	---	---
11AX20SISO	Ant1	5180	19.386	5170.3439	5189.7299	---	---
		5200	19.424	5190.2718	5209.6958	---	---
		5240	19.421	5230.3240	5249.7450	---	---
		5260	19.453	5250.2685	5269.7215	---	---
		5280	19.382	5270.3269	5289.7089	---	---
		5320	19.430	5310.2729	5329.7029	---	---
		5500	19.649	5490.1686	5509.8176	---	---
		5580	19.587	5570.2313	5589.8183	---	---
		5700	19.588	5690.2073	5709.7953	---	---
		5745	19.636	5735.1698	5754.8058	---	---
		5785	19.531	5775.2461	5794.7771	---	---
		5825	19.611	5815.1945	5834.8055	---	---
11AX40SISO	Ant1	5190	38.230	5170.9626	5209.1926	---	---
		5230	38.298	5210.8834	5249.1814	---	---
		5270	38.267	5250.9201	5289.1871	---	---
		5310	38.412	5290.8038	5329.2158	---	---
		5510	38.554	5490.8034	5529.3574	---	---
		5550	38.575	5530.8657	5569.4407	---	---
		5670	38.538	5650.8023	5689.3403	---	---
		5755	38.558	5735.6976	5774.2556	---	---
11AX80SISO	Ant1	5795	38.519	5775.6773	5814.1963	---	---
		5210	77.968	5171.2103	5249.1783	---	---
		5290	77.782	5251.2150	5328.9970	---	---
		5530	78.405	5491.0257	5569.4307	---	---
		5610	78.181	5570.9906	5649.1716	---	---
		5775	78.403	5735.6657	5814.0687	---	---

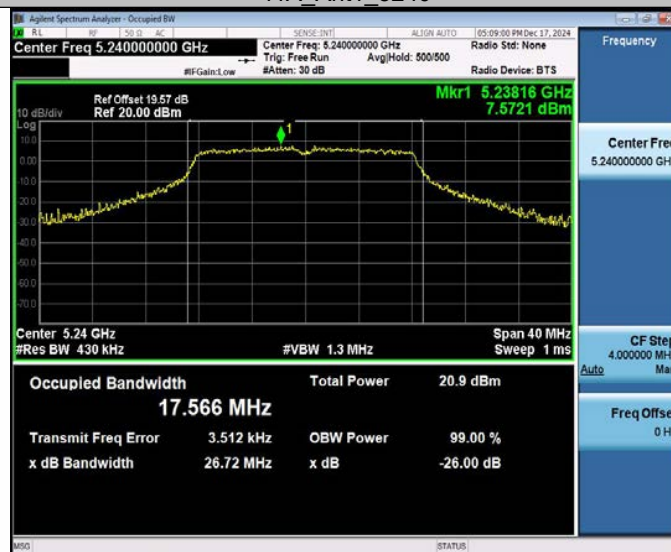
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11A_Ant1_5200



11A_Ant1_5240



11A_Ant1_5260



11A_Ant1_5280



11A_Ant1_5320



11A_Ant1_5500



11A_Ant1_5580



11A_Ant1_5700

