

TEST REPORT

Product Name : CHAMPe Bingo Handset
Model Number : VK7B
FCC ID : 2AUX7-VK7B

Prepared for : Estone Technology LTD
Address : 2F, Building No.1, Jia'an Industrial Park, No.2 Long Chang Road, Bao'an, Shenzhen 518101, China.

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Report Number : ENS2311270028W00504R
Date(s) of Tests : November 28, 2023 to January 3, 2024
Date of issue : January 5, 2024

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Modified Information

Version	Report No.	Revision Date	Summary
Ver.1.0	ENS2311270028W00504R	/	Original Report

1 TEST RESULT CERTIFICATION

Applicant : Estone Technology LTD
Address : 2F, Building No.1, Jia'an Industrial Park, No.2 Long Chang Road, Bao'an, Shenzhen 518101, China.
Manufacturer : Estone Technology LTD
Address : 2F, Building No.1, Jia'an Industrial Park, No.2 Long Chang Road, Bao'an, Shenzhen 518101, China.
EUT : CHAMPe Bingo Handset
Model Name : VK7B
Trademark : 


Measurement Procedure Used:


APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 2, Subpart J FCC 47 CFR Part 15, Subpart E	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 above table standards requirement.

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

Date of Test : November 28, 2023 to January 3, 2024

Prepared by : 
Una Yu/Editor

Reviewer : 
Joe Xia/Supervisor

Approved & Authorized Signer : 
Lisa Wang/Manager

2 EUT TECHNICAL DESCRIPTION

Characteristics	Description
Product	CHAMPe Bingo Handset
Model Number	VK7B
Wifi Type	UNII-1: 5150MHz-5250MHz Band UNII-2A: with 5250MHz-5350MHz Band UNII-2C: with 5470MHz-5725MHz Band UNII-3: with 5725MHz-5850MHz Band
WLAN Supported	802.11a 802.11n(20MHz channel bandwidth) 802.11n(40MHz channel bandwidth) 802.11ac(20MHz channel bandwidth) 802.11ac(40MHz channel bandwidth) 802.11ac(80MHz channel bandwidth) 802.11ax(20MHz channel bandwidth) 802.11ax(40MHz channel bandwidth) 802.11ax(80MHz channel bandwidth)
Data Rate	802.11a:54/48/36/24/18/12/9/6Mbps 802.11n:up to 600 Mbps 802.11ac/ax:up to 1.733Gbps
Modulation	OFDM with BPSK/QPSK/16QAM/64QAM for 802.11a/n OFDM with BPSK/QPSK/16QAM/64QAM/256QAM/1024QAM for 802.11ac/ax
Frequency Range	5150MHz-5250MHz Band
	5180-5240MHz for 802.11a 5180-5240MHz for 802.11n(HT20) 5190-5230MHz for 802.11n(HT40) 5180-5240MHz for 802.11ac(HT20) 5190-5230MHz for 802.11ac(HT40) 5210MHz for 802.11ac(HT80) 5180-5240MHz for 802.11ax(HT20) 5190-5230MHz for 802.11ax(HT40) 5210MHz for 802.11ax(HT80)
	5250MHz-5350MHz Band
	5260-5320MHz for 802.11a 5260-5320MHz for 802.11n(HT20) 5270-5310MHz for 802.11n(HT40) 5260-5320MHz for 802.11ac(HT20) 5270-5310MHz for 802.11ac(HT40) 5290MHz for 802.11ac(HT80) 5260-5320MHz for 802.11ax(HT20) 5270-5310MHz for 802.11ax(HT40) 5290MHz for 802.11ax(HT80)
	5470MHz-5725MHz Band

	5500-5700MHz for 802.11a 5500-5700MHz for 802.11n(HT20) 5510-5670MHz for 802.11n(HT40) 5500-5700MHz for 802.11ac(HT20) 5510-5670MHz for 802.11ac(HT40) 5530-5610MHz for 802.11ac(HT80) 5500-5700MHz for 802.11ax(HT20) 5510-5670MHz for 802.11ax(HT40) 5530-5610MHz for 802.11ax(HT80)
	5725MHz-5850MHz Band
	5745-5825MHz for 802.11a 5745-5825MHz for 802.11n(HT20) 5755-5795MHz for 802.11n(HT40) 5745-5825MHz for 802.11ac(HT20) 5755-5795MHz for 802.11ac(HT40) 5775MHz for 802.11ac(HT80) 5745-5825MHz for 802.11ax(HT20) 5755-5795MHz for 802.11ax(HT40) 5775MHz for 802.11ax(HT80)
TPC Function	Applicable
Antenna Type	Integrated Antenna
Antenna Gain	Ant1: -0.35dBi, Ant2: -0.35dBi (Note: The antenna information is provided by the customers, which will have a certain impact on the test results.)
Power Supply	Rechargeable Li-ion polymer Battery 3.7V, 128000mAh, 47.36Wh AC 100-240V, 50/60Hz by adapter
Temperature Range	0°C ~ 45°C

Note: for more details, please refer to the user's manual of the EUT.

3 SUMMARY OF TEST RESULT

FCC Part Clause	Test Parameter	Verdict	Remark
15.407 (a) 15.407 (e)	99% , 6dB and 26dB Bandwidth	PASS	
15.407 (a)	Maximum Conducted Output Power	PASS	
15.407 (a)	Peak Power Spectral Density	PASS	
15.407 (b)	Radiated Spurious Emission	PASS	
15.407 (b)(6) 15.207	Power Line Conducted Emission	PASS	
15.407(a) 15.203	Antenna Application	PASS	

NOTE1: The results of this report do not take into account the uncertainty.

NOTE2: According to FCC OET KDB 789033 D2 General UNII Test Procedures New Rules v02r01, 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: 2AUX7-VK7B** filing to comply with the above table standards requirement.

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
 FCC KDB 789033 D2 General UNII Test Procedures New Rules v02r01

4.2 MEASUREMENT EQUIPMENT USED

For Conducted Emission Test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
EMI Test Receiver	Rohde & Schwarz	ESCI	101384	2023/5/13	1Year
AMN	Rohde & Schwarz	ENV216	101161	2023/5/13	1Year

For Spurious Emissions Test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Pre-Amplifier	Bonn	BLMA 011001N	2213967A	2023/10/23	1Year
EMI Test Receiver	Rohde & Schwarz	ESR7	102551	2023/10/23	1Year
Bilog Antenna	Schwarzbeck	VULB9163	9163142	2022/7/24	2Year
Horn antenna	Schwarzbeck	BBHA9120D	9120D-1198	2023/6/2	2Year
Pre-Amplifier	Bonn	BLMA 0118-5G	2213967B-01	2023/10/23	1Year
Spectrum Analyzer	Rohde & Schwarz	FSV3044	101290	2023/10/23	1Year
Horn antenna	Schwarzbeck	BBHA9170	9170-399	2023/5/12	2Year
Pre-Amplifier	Lunar EM	LNA18G26-40	J1012131010001	2023/5/10	1Year
Pre-Amplifier	Lunar EM	LNA26G40-40	J1013131028001	2023/5/10	1Year
Loop Antenna	Schwarzbeck	FMZB1519	1519-012	2023/5/12	2Year
Thermometer	Hegao	HTC-1	\	2023/5/16	1Year

For Other Test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Wideband Radio Communication Tester	R&S	CMW500	171168	2023/9/14	1Year
Frequency Extender	R&S	CMW-Z800A	100430	2023/11/1	1Year
Spectrum Analyzer	R&S	FSV3044	101289	2023/9/14	1Year
Analog Signal Generator	R&S	SMB100A	183237	2023/9/16	1Year
Vector Signal Generator	R&S	SMM100A	101808	2023/9/16	1Year
RF Control Unit(Power Meter)	Tonscend	JS0806-2	22C8060567	2023/9/14	1Year
Temperature&Humidity Chamber	ESPEC	EL-02KA	12107166	2023/5/10	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.

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 5150-5250MHz

Frequency and Channels list for 802.11a/n(20)/802.11ac(20)/802.11ax(20):

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

Frequency and Channels list for 802.11n (40)/802.11ac(40)/802.11ax(40):

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

Frequency and Channel list for 802.11ac(80)/802.11ax(80):

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

Test Frequency and Channels for 802.11a/n(20)/802.11ac(20)/802.11ax(20):

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

Test Frequency and channels for 802.11n (40)/802.11ac(40)/802.11ax(40):

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 channels for 802.11ac(80)/802.11ax(80):

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 5250-5350MHz

Frequency and Channels list for 802.11a/n(20)/802.11ac(20)/802.11ax(20):

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

Frequency and Channels list for 802.11n (40)/802.11ac(40)/802.11ax(40):

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

Frequency and Channels list for 802.11ac(80)/802.11ax(80):

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

Test Frequency and Channels for 802.11a/n(20)/802.11ac(20)/802.11ax(20):

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

Test Frequency and channels for 802.11n (40)/802.11ac(40)/802.11ax(40):

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 channels for 802.11ac(80)/802.11ax(80):

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

Wifi 5G with 5470-5725MHz

Frequency and Channels list for 802.11a/n(20)/802.11ac(20)/802.11ax(20):

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 Channels list for 802.11n (40)/802.11ac(40)/802.11ax(40):

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

Frequency and Channels list for 802.11ac(80)/802.11ax(80):

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

Test Frequency and Channels for 802.11a/n(20)/802.11ac(20)/802.11ax(20):

Lowest Frequency		Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
100	5500	116	5580	140	5700

Test Frequency and channels for 802.11n (40)/802.11ac(40)/802.11ax(40):

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

Test Frequency and channels for 802.11ac(80)/802.11ax(80):

Lowest Frequency		Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
106	5530	122	5610		

Wifi 5G with 5725MHz-5850MHz

Frequency and Channels list for 802.11a/n(20)/802.11ac(20)/802.11ax(20):

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

Frequency and Channels list for 802.11n (40)/802.11ac(40)/802.11ax(40):

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

Frequency and Channels list for 802.11ac(80)/802.11ax(80):

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

Test Frequency and Channels for 802.11a/n(20)/802.11ac(20)/802.11ax(20):

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

Test Frequency and channels for 802.11n (40)/802.11ac(40)/802.11ax(40):

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

Test Frequency and channels for 802.11ac(80)/802.11ax(80):

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

Multi-antenna correlation:

<input checked="" type="checkbox"/>	Transmit Signals are Correlated
	Directional gain = $10 \log[(10^{G^1/20} + 10^{G^2/20} + \dots + 10^{G^N/20})^2 / N_{ANT}]$ dBi
<input type="checkbox"/>	All Transmit Signals are Completely Uncorrelated
	Directional gain = $10 \log[(10^{G^1/10} + 10^{G^2/10} + \dots + 10^{G^N/10}) / N_{ANT}]$ dBi

Ant1: -0.35dBi, Ant2: -0.35dBi

Directional gain = $10 \log [(10^{-0.35/20} + 10^{-0.35/20})^2 / 2]$ dBi=2.66 dBi

5 FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

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

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

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10 and CISPR Publication 22.

5.2 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:

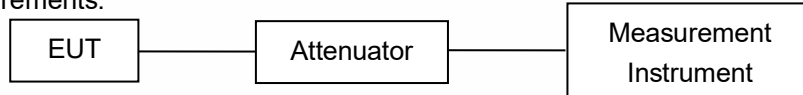
Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-5}$
Maximum Peak Output Power Test	$\pm 1.0\text{dB}$
Conducted Emissions Test	$\pm 2.0\text{dB}$
Radiated Emission Test	$\pm 2.0\text{dB}$
Power Density	$\pm 2.0\text{dB}$
Occupied Bandwidth Test	$\pm 1.0\text{dB}$
Band Edge Test	$\pm 3\text{dB}$
All emission, radiated	$\pm 3\text{dB}$
Antenna Port Emission	$\pm 3\text{dB}$
Temperature	$\pm 0.5^\circ\text{C}$
Humidity	$\pm 3\%$

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:

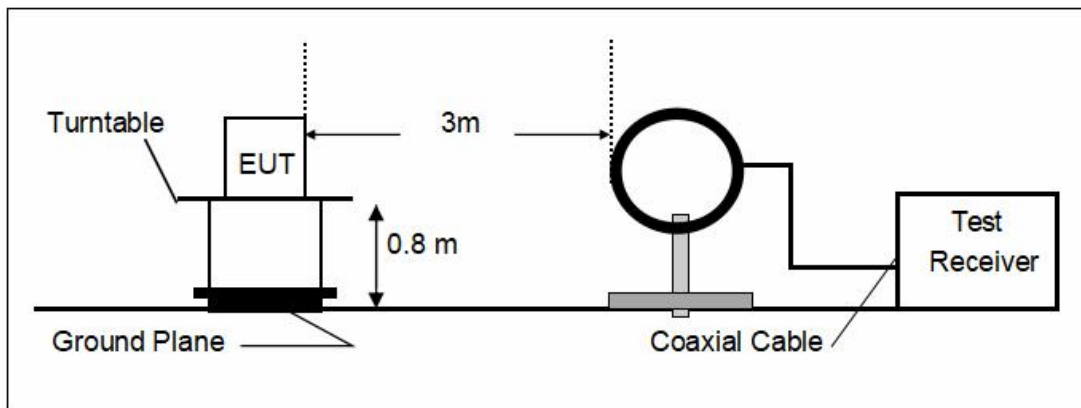
The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is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

Above 1GHz:

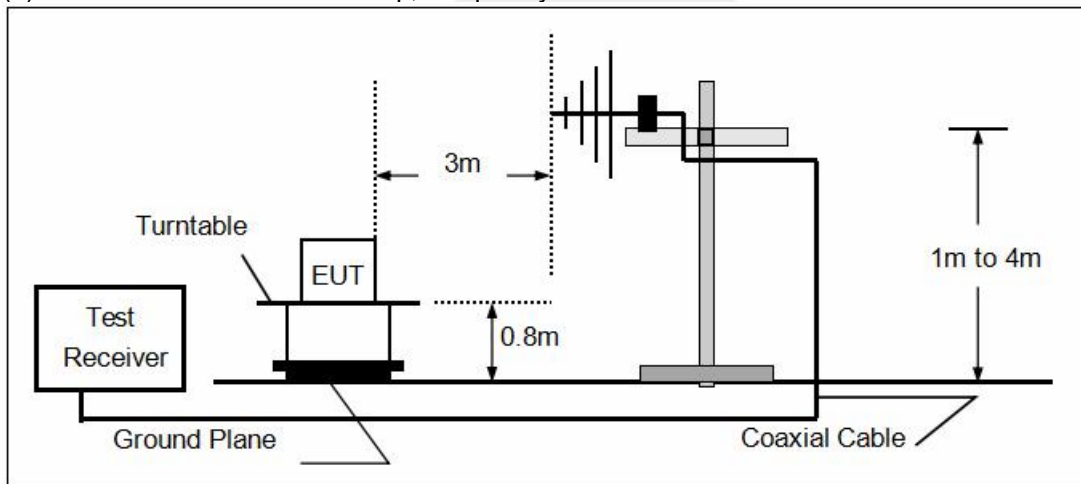
(Note: the FCC's permission to use 1.5m as an alternative per TCBC Conf call of Dec. 2, 2014.)

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).

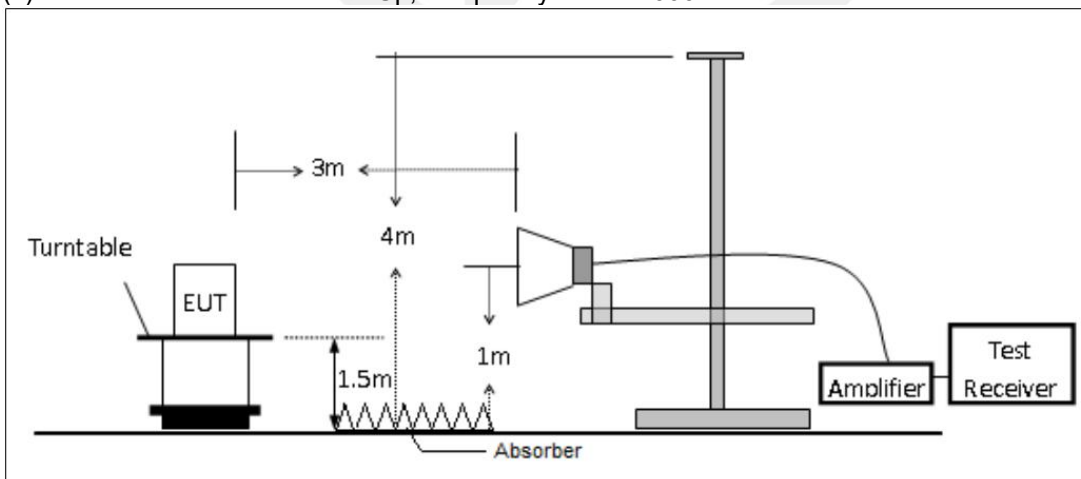
(a) Radiated Emission Test Set-Up, Frequency Below 30MHz



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



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

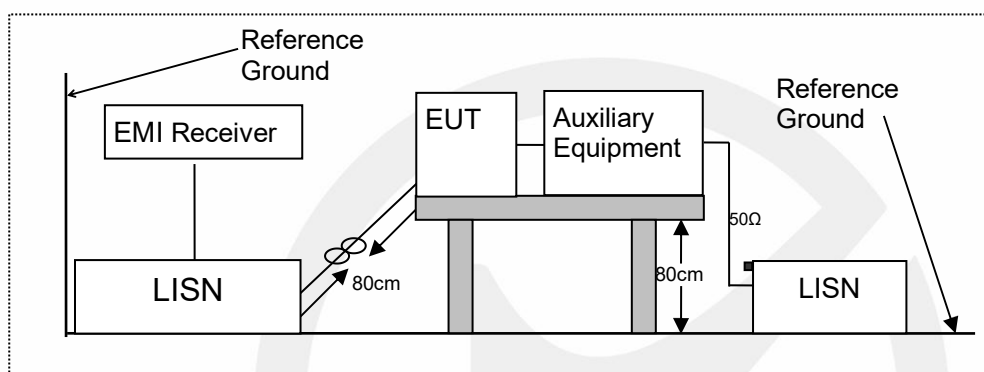


7.3 CONDUCTED EMISSION TEST SETUP

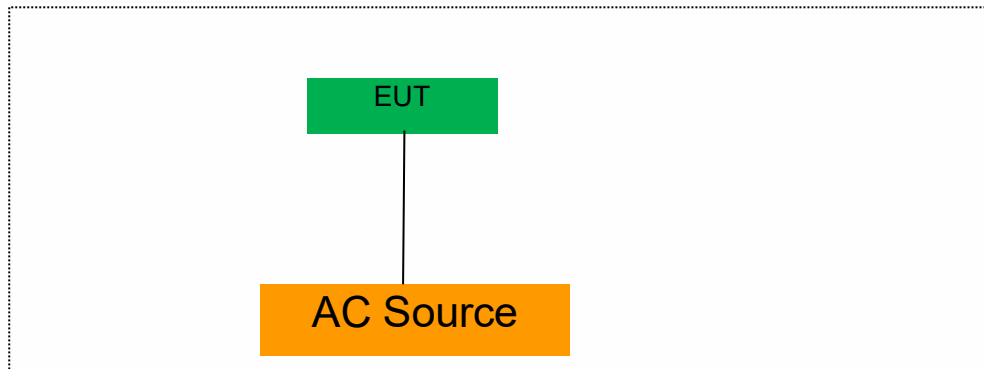
The mains cable of the EUT (maybe per AC/DC Adapter) must be connected to LISN. The LISN shall be placed 0.8 m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All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

Adapter : Model: MTP451BX-120300
Input: AC 100-240V, 50/60Hz, 1.5A
Output: DC 12V, 3A
CE, FCC

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.
3. Unless otherwise denoted as EUT in 『Remark』 column, device(s) used in tested system is a support equipment.

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)

8.1.2 Conformance Limit

(1) For the band 5.15-5.25 GHz.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(3) For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(e) 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 6.1 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:

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW) $\geq 3 \times \text{RBW}$.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to 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 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 $\geq 3 \times \text{RBW}$.
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 : 25℃
Humidity : 60 %

ATM Pressure: 1011 mbar
Test Engineer: XXH

Emission Bandwidth (26dB)

TestMode	Antenna	Frequency[MHz]	26db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	20.560	5169.760	5190.320	---	---
	Ant2	5180	21.200	5169.600	5190.800	---	---
	Ant1	5200	20.800	5189.440	5210.240	---	---
	Ant2	5200	21.000	5189.760	5210.760	---	---
	Ant1	5240	20.960	5229.400	5250.360	---	---
	Ant2	5240	21.040	5229.600	5250.640	---	---
	Ant1	5260	20.560	5249.760	5270.320	---	---
	Ant2	5260	20.640	5249.760	5270.400	---	---
	Ant1	5280	20.840	5269.440	5290.280	---	---
	Ant2	5280	20.400	5269.920	5290.320	---	---
	Ant1	5320	20.800	5309.440	5330.240	---	---
	Ant2	5320	20.800	5309.520	5330.320	---	---
	Ant1	5500	20.800	5489.760	5510.560	---	---
	Ant2	5500	20.920	5489.800	5510.720	---	---
	Ant1	5580	21.120	5569.560	5590.680	---	---
	Ant2	5580	20.760	5569.800	5590.560	---	---
	Ant1	5700	20.440	5689.840	5710.280	---	---
	Ant2	5700	20.640	5689.560	5710.200	---	---
	Ant1	5745	20.640	5734.520	5755.160	---	---
	Ant2	5745	20.640	5734.760	5755.400	---	---
	Ant1	5785	21.000	5774.600	5795.600	---	---
	Ant2	5785	21.280	5774.680	5795.960	---	---
	Ant1	5825	20.960	5814.600	5835.560	---	---
	Ant2	5825	21.040	5814.680	5835.720	---	---
11N20MIMO	Ant1	5180	21.040	5169.400	5190.440	---	---
	Ant2	5180	20.400	5169.800	5190.200	---	---
	Ant1	5200	20.760	5189.640	5210.400	---	---
	Ant2	5200	21.120	5189.480	5210.600	---	---
	Ant1	5240	20.720	5229.480	5250.200	---	---
	Ant2	5240	21.000	5229.600	5250.600	---	---
	Ant1	5260	20.920	5249.480	5270.400	---	---
	Ant2	5260	21.200	5249.520	5270.720	---	---
	Ant1	5280	21.040	5269.480	5290.520	---	---
	Ant2	5280	20.960	5269.560	5290.520	---	---
	Ant1	5320	20.960	5309.640	5330.600	---	---
	Ant2	5320	21.040	5309.560	5330.600	---	---
	Ant1	5500	20.840	5489.640	5510.480	---	---
	Ant2	5500	21.120	5489.320	5510.440	---	---
	Ant1	5580	20.760	5569.640	5590.400	---	---
	Ant2	5580	21.040	5569.560	5590.600	---	---
	Ant1	5700	20.760	5689.600	5710.360	---	---
	Ant2	5700	20.760	5689.640	5710.400	---	---
	Ant1	5745	20.880	5734.520	5755.400	---	---
	Ant2	5745	21.000	5734.640	5755.640	---	---
	Ant1	5785	21.120	5774.480	5795.600	---	---
	Ant2	5785	21.000	5774.720	5795.720	---	---

	Ant1	5825	20.760	5814.880	5835.640	---	---
	Ant2	5825	20.800	5814.640	5835.440	---	---
11N40MIMO	Ant1	5190	39.840	5170.080	5209.920	---	---
	Ant2	5190	39.600	5170.240	5209.840	---	---
	Ant1	5230	39.840	5210.080	5249.920	---	---
	Ant2	5230	39.760	5210.240	5250.000	---	---
	Ant1	5270	39.840	5250.160	5290.000	---	---
	Ant2	5270	40.000	5250.160	5290.160	---	---
	Ant1	5310	40.240	5290.000	5330.240	---	---
	Ant2	5310	40.240	5289.840	5330.080	---	---
	Ant1	5510	40.080	5490.080	5530.160	---	---
	Ant2	5510	40.000	5489.920	5529.920	---	---
	Ant1	5550	40.560	5529.600	5570.160	---	---
	Ant2	5550	40.000	5530.000	5570.000	---	---
	Ant1	5670	40.080	5650.000	5690.080	---	---
	Ant2	5670	39.920	5650.080	5690.000	---	---
	Ant1	5755	39.840	5735.080	5774.920	---	---
	Ant2	5755	39.600	5735.320	5774.920	---	---
	Ant1	5795	39.680	5775.160	5814.840	---	---
	Ant2	5795	39.920	5775.080	5815.000	---	---
11AC20MIMO	Ant1	5180	21.080	5169.520	5190.600	---	---
	Ant2	5180	21.360	5169.280	5190.640	---	---
	Ant1	5200	21.000	5189.480	5210.480	---	---
	Ant2	5200	21.080	5189.520	5210.600	---	---
	Ant1	5240	20.960	5229.520	5250.480	---	---
	Ant2	5240	20.960	5229.560	5250.520	---	---
	Ant1	5260	20.840	5249.680	5270.520	---	---
	Ant2	5260	20.840	5249.520	5270.360	---	---
	Ant1	5280	21.040	5269.600	5290.640	---	---
	Ant2	5280	21.080	5269.520	5290.600	---	---
	Ant1	5320	20.920	5309.520	5330.440	---	---
	Ant2	5320	21.000	5309.480	5330.480	---	---
	Ant1	5500	20.840	5489.560	5510.400	---	---
	Ant2	5500	20.960	5489.440	5510.400	---	---
	Ant1	5580	21.160	5569.480	5590.640	---	---
	Ant2	5580	20.920	5569.440	5590.360	---	---
	Ant1	5700	20.920	5689.520	5710.440	---	---
	Ant2	5700	20.880	5689.440	5710.320	---	---
	Ant1	5745	21.160	5734.520	5755.680	---	---
	Ant2	5745	20.880	5734.720	5755.600	---	---
	Ant1	5785	20.920	5774.640	5795.560	---	---
	Ant2	5785	20.440	5774.880	5795.320	---	---
	Ant1	5825	20.920	5814.600	5835.520	---	---
	Ant2	5825	21.440	5814.200	5835.640	---	---
11AC40MIMO	Ant1	5190	39.920	5170.080	5210.000	---	---
	Ant2	5190	39.680	5170.160	5209.840	---	---
	Ant1	5230	39.840	5210.080	5249.920	---	---
	Ant2	5230	39.840	5210.080	5249.920	---	---
	Ant1	5270	40.080	5249.920	5290.000	---	---
	Ant2	5270	39.840	5250.080	5289.920	---	---
	Ant1	5310	40.000	5289.920	5329.920	---	---
	Ant2	5310	40.080	5290.000	5330.080	---	---
	Ant1	5510	40.000	5490.080	5530.080	---	---
	Ant2	5510	39.760	5490.160	5529.920	---	---
	Ant1	5550	40.480	5529.840	5570.320	---	---

	Ant2	5550	39.840	5530.160	5570.000	---	---
	Ant1	5670	40.320	5649.600	5689.920	---	---
	Ant2	5670	40.160	5650.080	5690.240	---	---
	Ant1	5755	40.320	5734.680	5775.000	---	---
	Ant2	5755	40.320	5735.000	5775.320	---	---
	Ant1	5795	39.600	5775.080	5814.680	---	---
	Ant2	5795	40.000	5774.840	5814.840	---	---
11AC80MIMO	Ant1	5210	82.080	5169.200	5251.280	---	---
	Ant2	5210	81.760	5169.360	5251.120	---	---
	Ant1	5290	81.440	5249.360	5330.800	---	---
	Ant2	5290	81.920	5249.360	5331.280	---	---
	Ant1	5530	82.080	5488.880	5570.960	---	---
	Ant2	5530	81.920	5489.200	5571.120	---	---
	Ant1	5610	81.760	5569.200	5650.960	---	---
	Ant2	5610	81.920	5569.040	5650.960	---	---
	Ant1	5775	81.760	5734.040	5815.800	---	---
	Ant2	5775	82.080	5734.040	5816.120	---	---
11AX20MIMO	Ant1	5180	21.240	5169.440	5190.680	---	---
	Ant2	5180	22.200	5169.360	5191.560	---	---
	Ant1	5200	21.280	5189.440	5210.720	---	---
	Ant2	5200	21.040	5189.600	5210.640	---	---
	Ant1	5240	21.400	5229.320	5250.720	---	---
	Ant2	5240	22.240	5229.360	5251.600	---	---
	Ant1	5260	21.360	5249.240	5270.600	---	---
	Ant2	5260	21.240	5249.400	5270.640	---	---
	Ant1	5280	20.800	5269.640	5290.440	---	---
	Ant2	5280	21.440	5269.360	5290.800	---	---
	Ant1	5320	23.160	5309.320	5332.480	---	---
	Ant2	5320	21.520	5309.320	5330.840	---	---
	Ant1	5500	20.800	5489.560	5510.360	---	---
	Ant2	5500	20.800	5489.560	5510.360	---	---
	Ant1	5580	20.760	5569.600	5590.360	---	---
	Ant2	5580	21.080	5569.480	5590.560	---	---
	Ant1	5700	21.400	5689.440	5710.840	---	---
	Ant2	5700	20.960	5689.520	5710.480	---	---
	Ant1	5745	23.040	5734.680	5757.720	---	---
	Ant2	5745	23.520	5734.560	5758.080	---	---
	Ant1	5785	22.080	5774.400	5796.480	---	---
	Ant2	5785	24.200	5774.240	5798.440	---	---
	Ant1	5825	21.200	5814.560	5835.760	---	---
	Ant2	5825	20.920	5814.600	5835.520	---	---
11AX40MIMO	Ant1	5190	39.920	5170.080	5210.000	---	---
	Ant2	5190	39.760	5170.160	5209.920	---	---
	Ant1	5230	40.000	5210.000	5250.000	---	---
	Ant2	5230	40.000	5210.160	5250.160	---	---
	Ant1	5270	39.920	5250.160	5290.080	---	---
	Ant2	5270	39.760	5250.160	5289.920	---	---
	Ant1	5310	40.240	5290.000	5330.240	---	---
	Ant2	5310	39.600	5290.240	5329.840	---	---
	Ant1	5510	40.000	5490.160	5530.160	---	---
	Ant2	5510	40.000	5490.000	5530.000	---	---
	Ant1	5550	39.840	5530.160	5570.000	---	---
	Ant2	5550	39.920	5530.080	5570.000	---	---
	Ant1	5670	40.240	5650.000	5690.240	---	---
	Ant2	5670	39.760	5650.240	5690.000	---	---

	Ant1	5755	39.760	5735.000	5774.760	---	---
	Ant2	5755	40.000	5735.080	5775.080	---	---
	Ant1	5795	40.000	5775.000	5815.000	---	---
	Ant2	5795	39.760	5775.080	5814.840	---	---
11AX80MIMO	Ant1	5210	81.440	5169.200	5250.640	---	---
	Ant2	5210	80.480	5170.000	5250.480	---	---
	Ant1	5290	81.440	5249.360	5330.800	---	---
	Ant2	5290	81.600	5249.520	5331.120	---	---
	Ant1	5530	80.960	5489.520	5570.480	---	---
	Ant2	5530	80.640	5489.680	5570.320	---	---
	Ant1	5610	80.960	5569.520	5650.480	---	---
	Ant2	5610	81.120	5569.680	5650.800	---	---
	Ant1	5775	81.120	5734.520	5815.640	---	---
	Ant2	5775	80.960	5734.360	5815.320	---	---



11A_Ant1_5180



11A_Ant2_5180



11A_Ant1_5200



11A_Ant1_5260



11A_Ant2_5260



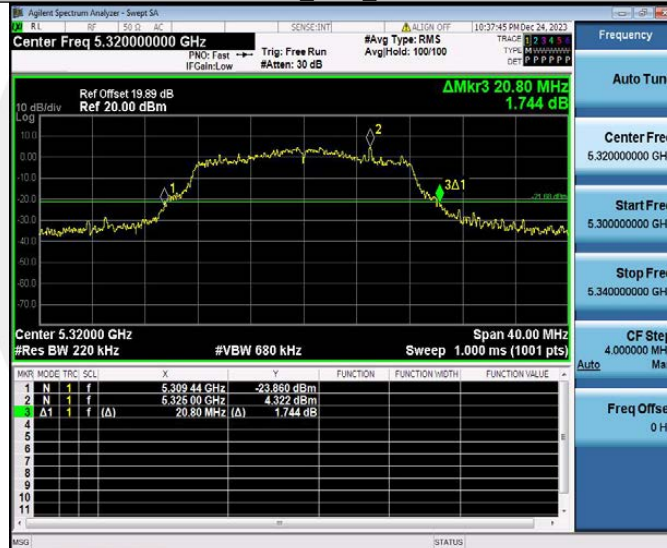
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11A_Ant1_5580



11A_Ant2_5580



11A_Ant1_5700



11A_Ant2_5700



11A_Ant1_5745



11A_Ant2_5745



11A_Ant1_5785



11A_Ant2_5785



11A_Ant1_5825



11A_Ant2_5825



11N20MIMO Ant1 5180



11N20MIMO Ant2 5180



11N20MIMO Ant1 5200



11N20MIMO_Ant2_5200



11N20MIMO_Ant1_5240



11N20MIMO_Ant2_5240



11N20MIMO Ant1 5260



11N20MIMO Ant2 5260



11N20MIMO Ant1 5280



11N20MIMO_Ant2_5280



11N20MIMO_Ant1_5320



11N20MIMO_Ant2_5320



11N20MIMO Ant1 5500



11N20MIMO Ant2 5500



11N20MIMO Ant1 5580



11N20MIMO_Ant2_5580



11N20MIMO_Ant1_5700



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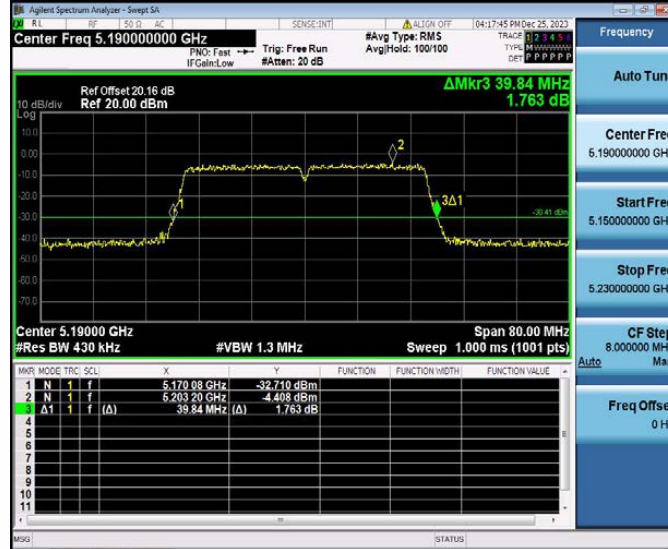
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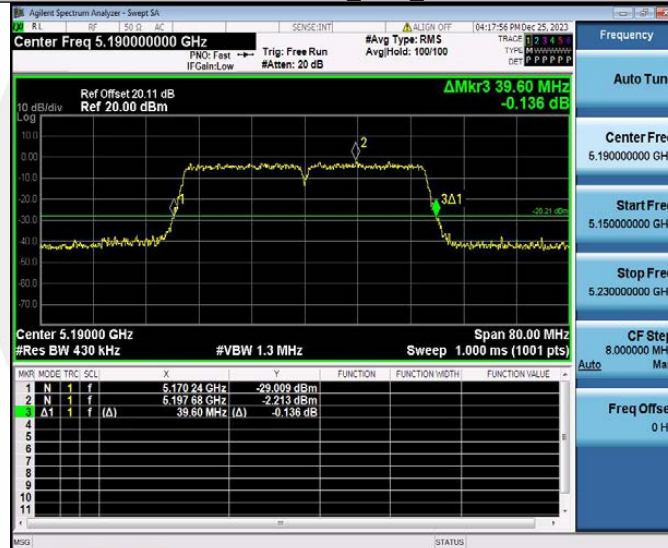
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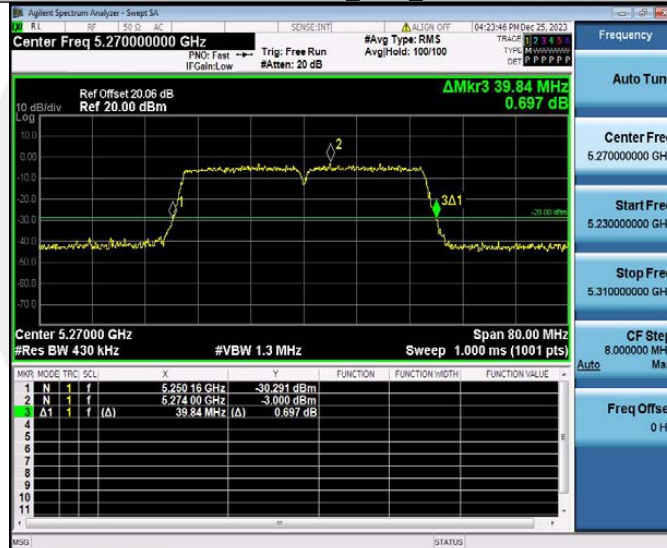
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11N40MIMO Ant1 5310



11N40MIMO Ant2 5310



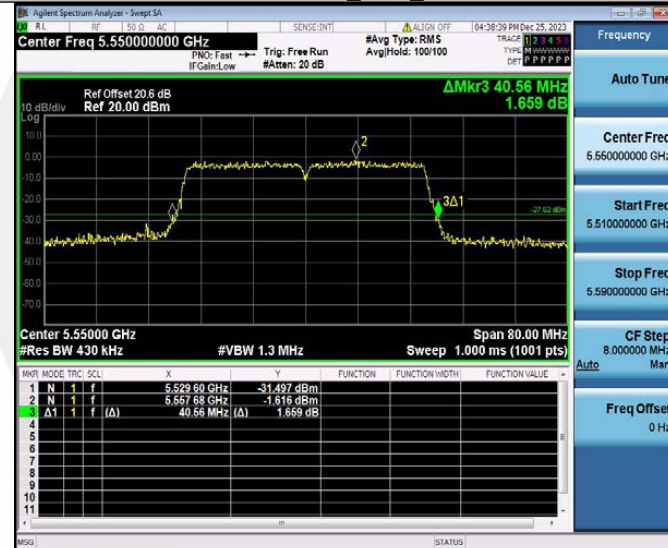
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11N40MIMO_Ant2_5550



11N40MIMO_Ant1_5670



11N40MIMO_Ant2_5670



11N40MIMO_Ant1_5755



11N40MIMO_Ant2_5755



11N40MIMO_Ant1_5795



11N40MIMO_Ant2_5795



11AC20MIMO_Ant1_5180



11AC20MIMO_Ant2_5180



11AC20MIMO_Ant1_5200



11AC20MIMO_Ant2_5200



11AC20MIMO_Ant1_5240



11AC20MIMO_Ant2_5240

