

FCC Test Report

Report No.: AGC04983200901FE06

FCC ID : VWZTA10V

APPLICATION PURPOSE : Original Equipment

PRODUCT DESIGNATION: Android POS

BRAND NAME : SPECTRA Technologies

MODEL NAME : APOLLO

APPLICANT: SPECTRA Technologies Holdings Co. Ltd.

DATE OF ISSUE : Oct. 13, 2020

STANDARD(S) FCC Part 15.407

REPORT VERSION : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd



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REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	1	Oct. 13, 2020	Valid	Initial Release

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1. VERIFICATION OF CONFORMITY

Amaliaant	CDECTD A Talabasian Haldings Co. 14d		
Applicant SPECTRA Technologies Holdings Co. Ltd.			
Address	Unit 1301-09, 19-20, Tower II, Grand Century Place, Kowloon, Hong Kong		
Manufacturer	SPECTRA Technologies Holdings Co. Ltd.		
Address	Unit 1301-09, 19-20, Tower II, Grand Century Place, Kowloon, Hong Kong		
Factory	FALCON (Dong Guan) Electronics Co., Ltd		
Address	No.19, Bei An First Road, Huang Jiang Town, Dong Guan City, Guang Dong Province, China		
Product Designation	Android POS		
Brand Name	SPECTRA Technologies		
Test Model	APOLLO		
Date of test	Sep. 07, 2020~Oct. 13, 2020		
Deviation	No any deviation from the test method		
Condition of Test Sample	Normal		
Test Result	Pass		
Report Template	AGCRT-US-BGN/RF		

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance (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 requirement of FCC Part 15 Rules requirement.

Prepared By	Jonjon Aucorg	
PGO 50	Donjon Huang (Project Engineer)	Oct. 13, 2020
Reviewed By	Max Zhang	NOC VO
	Max Zhang (Reviewer)	Oct. 13, 2020
Approved By	Formere	
	Forrest Lei (Authorized Officer)	Oct. 13, 2020

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2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

The EUT is designed as "Android POS". It is designed by way of utilizing the OFDM technology to achieve the system operation.

A major technical description of EUT is described as following

Operation Frequency 5150 MHz~5250MHz; 5260 MHz~5320MHz, 5500 MHz~5700MHz, 5725 MHz~5850MHz		
Output Power IEEE 802.11a20:9.57dBm; IEEE 802.11n(20):9.52dBm; IEEE802.11n(40):9.44dBm;		
Modulation	BPSK, QPSK, 16QAM, OFDM	
Number of channels	39	
Hardware Version	1.0	
Software Version	1.0024	
Antenna Designation	PIFA Antenna	
Number of transmit chain	1	
Antenna Gain	0.8dBi	
Power Supply	DC 5V by adapter or DC 7.2V by battery	

Note:

- 1. The EUT is designed as client without radar detection.
- 2. The device do not support TPC.

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2.2. TABLE OF CARRIER FREQUENCYS

Frequency Band	Channel Number	Frequency	Frequency Band	Channel Number	Frequency
	36	5180 MHz	⊗	112	5560 MHz
. C	38	5190 MHz	30 20	116	5580 MHz
	40	5200 MHz		118	5590 MHz
5150 MHz~ 5250MHz	42	5210 MHz	8	120	5600 MHz
0200W112	44	5220 MHz	- 60	122	5610 MHz
NG	46	5230 MHz	5500 MHz∼	124	5620 MHz
	48	5240 MHz	5700MHz	126	5630 MHz
, c,O	52	5260 MHz		128	5640 MHz
	54	5270 MHz		132	5660 MHz
0	56	5280 MHz		134	5670 MHz
5260 MHz~ 5320MHz	58	5290 MHz		136	5680 MHz
0020W112	60	5300 MHz		140	5700 MHz
G	62	5310 MHz		149	5745 MHz
- CO	64	5320 MHz		151	5755 MHz
	100	5500 MHz		153	5765 MHz
	102	5510 MHz	5725 MHz∼ 5850MHz	155	5775 MHz
5500 MHz∼	104	5520 MHz		157	5785 MHz
5700MHz	106	5530 MHz	0	159	5795 MHz
2.C	108	5540 MHz	30	165	5825MHz
	110	5550 MHz		a C	8

Note: For 20MHz bandwidth system use Channel

36,40,44,48,52,56,60,64,100,104,108,112,116,120,124,128,132,136,140,149,153,157,161,165; For 40MHZ bandwidth system use Channel 38,46,54,62,102,110,118,126,134,151,159; For 80MHZ bandwidth system use Channel 42,58,106,122,155

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2.3. RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: VWZTA10V** filing to comply with the FCC Part 15 requirements.

2.4. TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10 (2013). Radiated testing was performed at an antenna to EUT distance 3 meters.

Others testing (listed at item 5.3) was performed according to the procedures in FCC Part 15.407 rules KDB 789033 D02

2.5. SPECIAL ACCESSORIES

Refer to section 5.2.

2.6. EQUIPMENT MODIFICATIONS

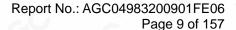
Not available for this EUT intended for grant.

2.7. ANTENNA REQUIREMENT

This intentional radiator is designed with a permanently attached antenna of an antenna to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

For more information of the antenna, please refer to the APPENDIX B: PHOTOGRAPHS OF EUT.

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3. MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in measurement" (GUM) published by CISPR and ANSI.

- Uncertainty of Conducted Emission, Uc = ±3.2 dB
- Uncertainty of Radiated Emission below 1GHz, Uc = ±3.9 dB
- Uncertainty of Radiated Emission above 1GHz, Uc = ±4.8 dB

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a/Inspection

The test results

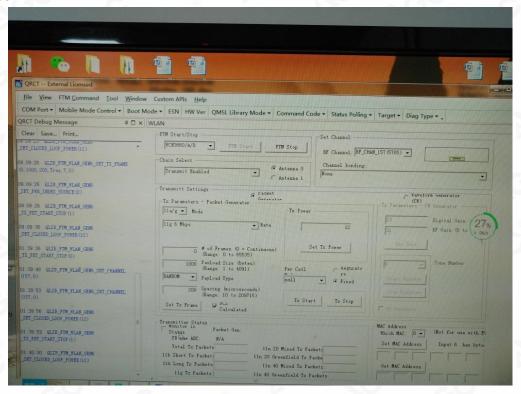


4. DESCRIPTION OF TEST MODES

Mode	Available channel	Tested channel	Modulation	Date rate(Mbps)
802.11a/n20	36, 40, 44, 48, 52, 56, 60, 64, 100, 104,	36, 40, 48, 52, 60, 64,	OFDM	6Mbps/MCS0
- GC	108, 112, 116, 120, 124, 128, 132, 136,	100, 120, 140, 149,	8	3
	140, 149, 153, 157, 161, 165	157, 165		9
802.11n40	38, 46, 54, 62, 102, 110, 118, 126, 134,	38, 46, 54, 62, 102,	OFDM	MCS0
C.O	151, 159;	118, 134, 151, 159	©	

Note:

- 1. The EUT has been set to operate continuously on tested channel individually, and the EUT is operating at its maximum duty cycle>or equal 98%
- 2. All modes under which configure applicable have been tested and the worst mode test data recording in the test report, if no other mode data.
- 3 The test software is the QDART_WIN_4_8_Installer_00057_1which can set the EUT into the individual test modes.



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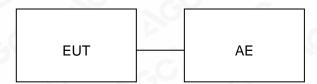


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5. SYSTEM TEST CONFIGURATION

5.1. CONFIGURATION OF EUT SYSTEM

Configure 1:



5.2. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	Android POS	APOLLO	VWZTA10V	EUT
2	Adapter	UWP-10W-0520S	N/A	AE
3	Battery	LARGE18650	N/A	AE
4	USB Cable	N/A	N/A	AE

5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.407	6dB Bandwidth	Compliant
§15.407	Emission Bandwidth	Compliant
§15.203	ANTENNA REQUIREMENT	Compliant
§15.407	§15.407 Maximum conducted output power	
§15.407	§15.407 Conducted Spurious Emission	
§15.407 Maximum Conducted Output Power Density		Compliant
§15.209 Radiated Emission		Compliant
§15.407 Band Edges		Compliant
§15.207 Line Conduction Emission		Compliant

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6. TEST FACILITY

Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd			
Location	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China			
Designation Number	CN1259			
FCC Test Firm Registration Number	975832			
A2LA Cert. No.	5054.02			
Description	Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by A2LA			

TEST EQUIPMENT OF CONDUCTED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESPI	101206	May 15, 2020	May 14, 2021
LISN	R&S	ESH2-Z5	100086	Jul. 03, 2020	Jul. 02, 2021
Test software	R&S	ES-K1 (Ver V1.71)	N/A	N/A	N/A

TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	May 15, 2020	May 14, 2021
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec. 12, 2019	Dec. 11, 2020
Power sensor	Aglient	U2021XA	MY54110007	Jun. 08, 2020	Jun. 07, 2021
5GHz Fliter	Micro-tronics	N/A	N/A	Mar. 23, 2020	Mar. 22, 2022
Attenuator	Weinachel Corp	58-30-33	N/A	Sep. 07, 2020	Sep. 06, 2022
Attenuator	ZHINAN	E-002	N/A	Sep. 03, 2020	Sep. 02 2022
Horn antenna	SCHWARZBECK	BBHA9170	768	Sep.21, 2019	Sep. 20, 2021
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	18051	May 22, 2020	May 21, 2022
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May. 17, 2019	May. 16, 2021
Broadband Preamplifier	ETS LINDGREN	3117PA	00225134	Sep. 03, 2020	Sep. 02, 2022
ANTENNA	SCHWARZBECK	VULB9168	D69250	Sep. 20, 2019	Sep. 19, 2021
Test software	FARA	EZ_EMC (Ver.RA-03A)	N/A	N/A	N/A

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7. MAXIMUM CONDUCTED OUTPUT POWER

7.1. MEASUREMENT PROCEDURE

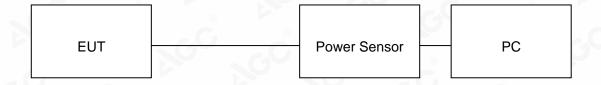
For average power test:

- 1. Connect EUT RF output port to power sensor through an RF attenuator.
- 2. Connect the power sensor to the PC.
- 3. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- 4. Record the maximum power from the software.

Note: The EUT was tested according to KDB 789033 for compliance to FCC 47CFR 15.407 requirements.

7.2. TEST SET-UP

AVERAGE POWER SETUP



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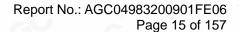


7.3. LIMITS AND MEASUREMENT RESULT

LIMITS AND MEASUREMENT RESULT FOR 802.11A20 MODULATION					
Frequency (MHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail		
5180	8.95	24	Pass		
5200	8.12	24	Pass		
5240	7.73	24	Pass		
5260	7.37	24	Pass		
5300	7.64	24	Pass		
5320	7.57	24	Pass		
5500	8.82	24	Pass		
5600	9.25	24	Pass		
5700	9.57	24	Pass		
5745	8.51	30	Pass		
5785	9.21	30	Pass		
5825	8.80	30	Pass		

LIMITS AND MEASUREMENT RESULT FOR 802.11N20 MODULATION				
Frequency (MHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail	
5180	9.52	24	Pass	
5200	8.12	24	Pass	
5240	8.61	24	Pass	
5260	8.09	24	Pass	
5300	7.65	24	Pass	
5320	8.15	24	Pass	
5500	8.26	24	Pass	
5600	9.49	24	Pass	
5700	9.26	24	Pass	
5745	8.71	30	Pass	
5785	8.89	30	Pass	
5825	9.06	30	Pass	

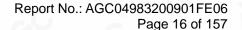
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Frequency (MHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail	
5190	8.12	24	Pass	
5230	7.96	24	Pass	
5270	7.86	24	Pass	
5310	7.40	24	Pass	
5510	8.42	24	Pass	
5590	9.14	24	Pass	
5670	9.44	24	Pass	
5755	8.47	24	Pass	
5795	8.32	24	Pass	

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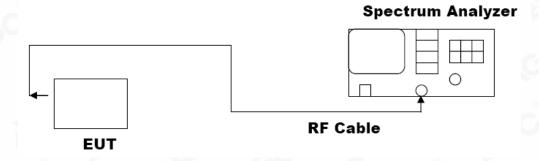
8. 6dB BANDWIDTH

8.1. MEASUREMENT PROCEDURE

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2. Set the EUT Work on operation frequency individually.
- 3. Set RBW = 100kHz.
- 4. Set the VBW ≥3*RBW. Detector = Peak. Trace mode = max hold.
- 5. Measure the maximum width of the emission that is 6 dB down from the peak of the emission.

Note: The EUT was tested according to KDB 789033 for compliance to FCC 47CFR 15.407 requirements.

8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



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8.3. LIMITS AND MEASUREMENT RESULTS

LIN	IITS AND MEASUREMENT	RESULT FOR 802.11A20 MODUL	.ATION		
	Applicable Limits				
Applicable Limits	Te				
	Frequency (MHz)	-6dB Bandwidth	Criteria		
	5745MHz	16.42	PASS		
>500KHZ	5785MHz	16.41	PASS		
	5825MHz	16.39	PASS		

LIMITO	S AND MEASUREMENT S	PESULT FOR 902 11N20/40 MODI	II ATION	
LIMIT	S AND MEASUREMENT RESULT FOR 802.11N20/40 MODULATION Applicable Limits			
Applicable Limits	Te			
Applicable Lilling	Frequency (MHz)	-6dB Bandwidth	Criteria	
	5745MHz	17.58	PASS	
50 cc	5785MHz	17.60	PASS	
>500KHZ	5825MHz	17.61	PASS	
, GC	5755MHz	35.46	PASS	
	5795MHz	35.13	PASS	

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802.11a20 TEST RESULTTEST PLOT OF BANDWIDTH FOR 5745MHz



TEST PLOT OF BANDWIDTH FOR 5785MHz



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TEST PLOT OF BANDWIDTH FOR 5825MHz



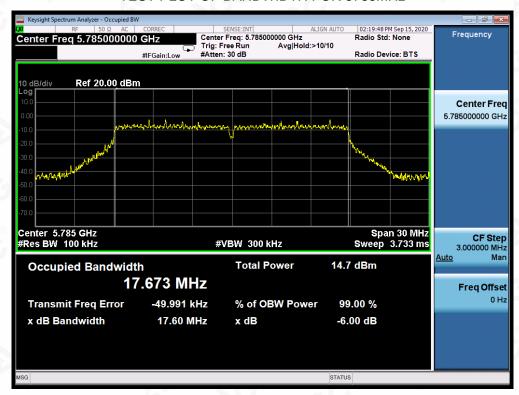
802.11n20 TEST RESULT TEST PLOT OF BANDWIDTH FOR 5745MHz



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TEST PLOT OF BANDWIDTH FOR 5785MHz



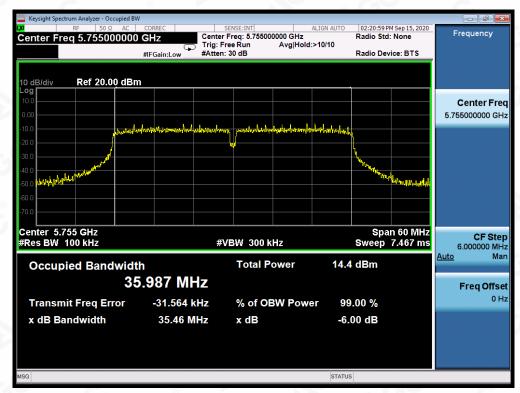
TEST PLOT OF BANDWIDTH FOR 5825MHz



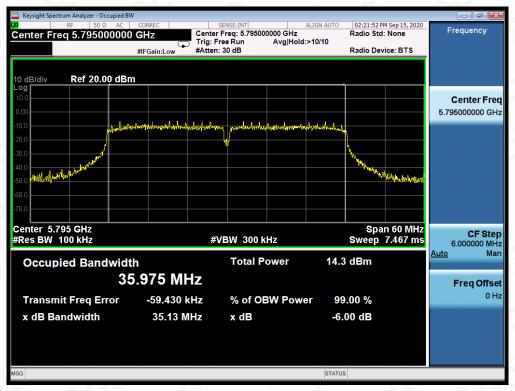
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802.11n40 TEST RESULTTEST PLOT OF BANDWIDTH FOR 5755MHz



TEST PLOT OF BANDWIDTH FOR 5795MHz



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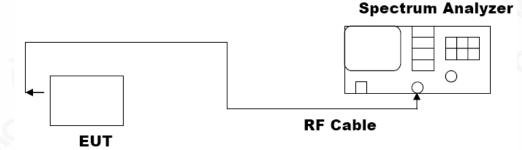
9. EMISSION BANDWIDTH

9.1. MEASUREMENT PROCEDURE

- a) Set RBW = approximately 1% of the emission bandwidth.
- b) Set the VBW > RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) 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%.

Note: The EUT was tested according to KDB 789033 for compliance to FCC 47CFR 15.407 requirements.

9.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



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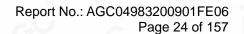
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9.3. LIMITS AND MEASUREMENT RESULTS

	Applicable Limits				
Applicable Limits	Test Data (MHz)				
	Frequency (MHz)	-26dB Bandwidth	99.00% Occupied Bandwidth	Criteria	
	5180MHz	22.08	16.720	PASS	
	5200MHz	21.36	16.707	PASS	
	5240MHz	21.37	16.708	PASS	
	5260MHz	21.56	16.707	PASS	
Within the Band	5300MHz	21.46	16.683	PASS	
	5320MHz	21.60	16.654	PASS	
	5500MHz	21.17	16.664	PASS	
	5600MHz	21.52	16.691	PASS	
	5700MHz	21.10	16.643	PASS	

LIMITS AND MEASUREMENT RESULT FOR 802.11N20 MODULATION					
	Applicable Limits				
Applicable Limits	Test Data (MHz)				
	Frequency (MHz)	-26dB Bandwidth	99.00% Occupied Bandwidth	Criteria	
	5180MHz	22.30	17.805	PASS	
	5200MHz	21.82	17.820	PASS	
	5240MHz	21.87	17.819	PASS	
	5260MHz	21.75	17.825	PASS	
Within the Band	5300MHz	21.80	17.785	PASS	
	5320MHz	21.56	17.828	PASS	
	5500MHz	21.54	17.803	PASS	
	5600MHz	21.39	17.800	PASS	
	5700MHz	22.32	17.810	PASS	

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g/Inspection The test results

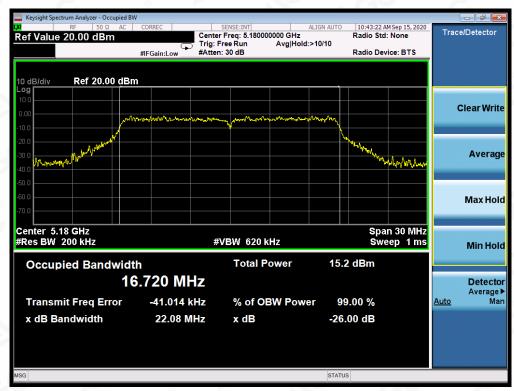


LIMITS AND MEASUREMENT RESULT FOR 802.11N40 MODULATION					
	Applicable Limits				
Applicable Limits	Test Data (MHz)				
- F F	Frequency (MHz)	-26dB Bandwidth	99.00% Occupied Bandwidth	Criteria	
	5190MHz	42.69	36.137	PASS	
	5230MHz	42.58	36.142	PASS	
	5270MHz	42.00	36.167	PASS	
Within the Band	5310MHz	43.79	36.123	PASS	
	5510MHz	41.67	36.095	PASS	
	5590MHz	41.85	36.077	PASS	
	5670MHz	42.90	36.159	PASS	

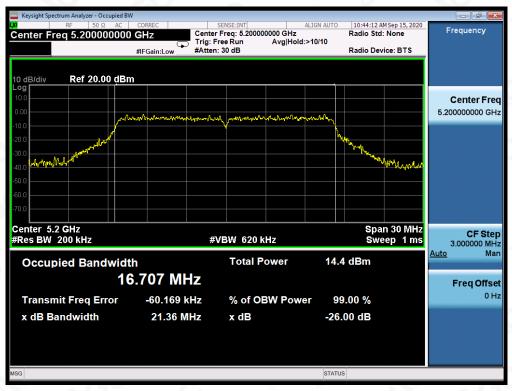
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802.11a20 TEST RESULTTEST PLOT OF BANDWIDTH FOR 5180MHz



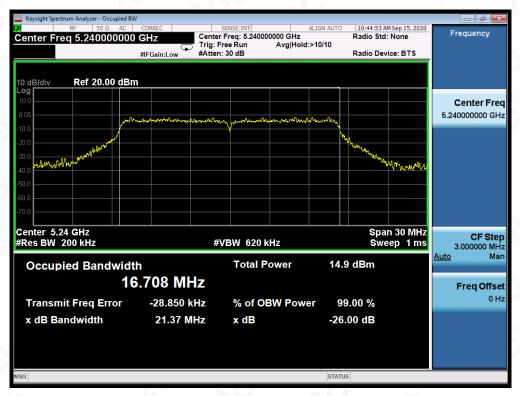
TEST PLOT OF BANDWIDTH FOR 5200MHz



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TEST PLOT OF BANDWIDTH FOR 5240MHz



TEST PLOT OF BANDWIDTH FOR 5260MHz



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TEST PLOT OF BANDWIDTH FOR 5300MHz



TEST PLOT OF BANDWIDTH FOR 5320MHz



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TEST PLOT OF BANDWIDTH FOR 5500MHz



TEST PLOT OF BANDWIDTH FOR 5600MHz



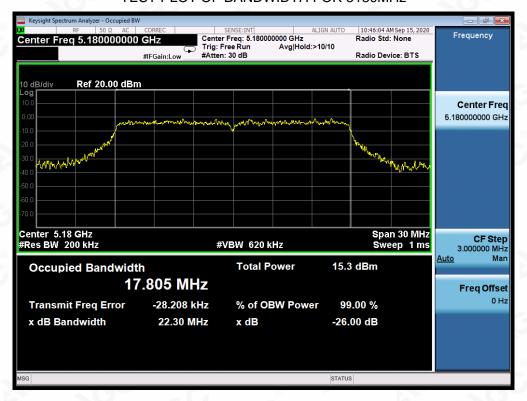
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TEST PLOT OF BANDWIDTH FOR 5700MHz



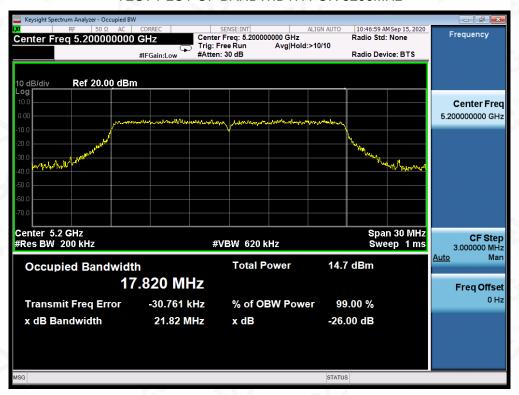
802.11n20 TEST RESULT TEST PLOT OF BANDWIDTH FOR 5180MHz



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TEST PLOT OF BANDWIDTH FOR 5200MHz



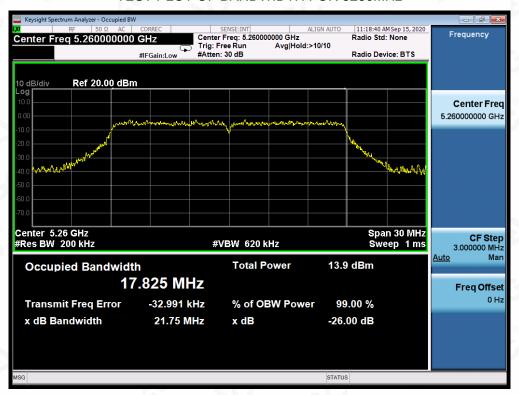
TEST PLOT OF BANDWIDTH FOR 5240MHz



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TEST PLOT OF BANDWIDTH FOR 5260MHz



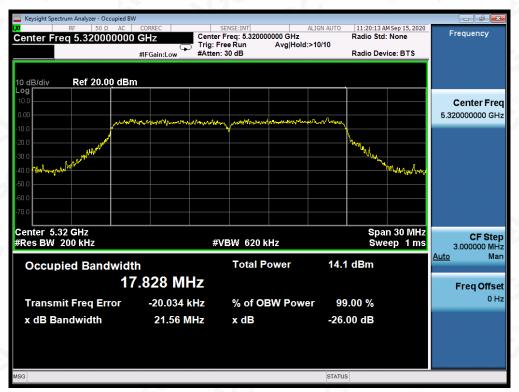
TEST PLOT OF BANDWIDTH FOR 5300MHz



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TEST PLOT OF BANDWIDTH FOR 5320MHz



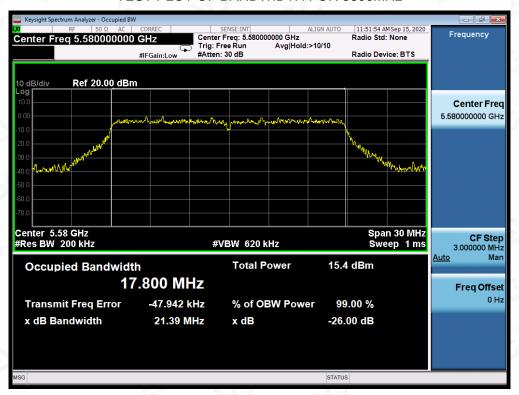
TEST PLOT OF BANDWIDTH FOR 5500MHz



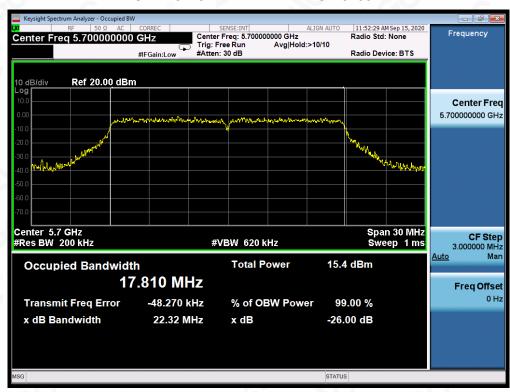
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TEST PLOT OF BANDWIDTH FOR 5600MHz



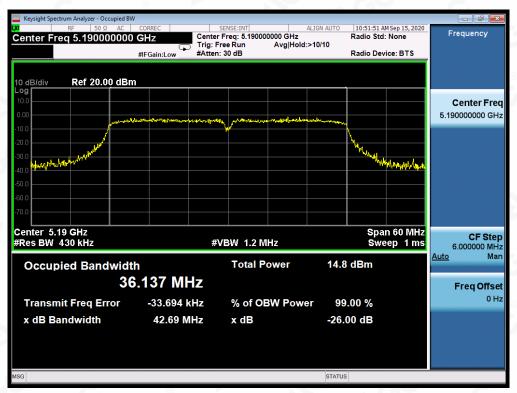
TEST PLOT OF BANDWIDTH FOR 5700MHz



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802.11n40 TEST RESULTTEST PLOT OF BANDWIDTH FOR 5190MHz



TEST PLOT OF BANDWIDTH FOR 5230MHz



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TEST PLOT OF BANDWIDTH FOR 5270MHz



TEST PLOT OF BANDWIDTH FOR 5310MHz



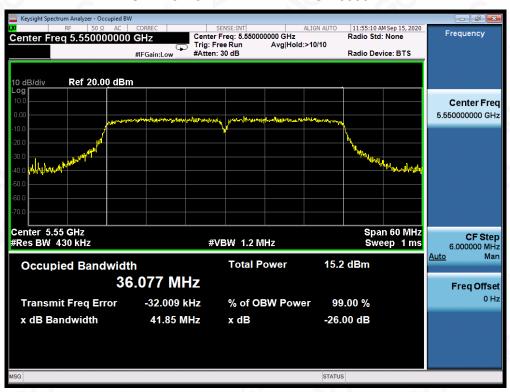
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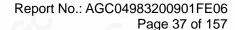
TEST PLOT OF BANDWIDTH FOR 5510MHz



TEST PLOT OF BANDWIDTH FOR 5590MHz



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TEST PLOT OF BANDWIDTH FOR 5670MHz





Report No.: AGC04983200901FE06

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10. MAXIMUM CONDUCTED OUTPUT POWER SPECTRAL DENSITY

10.1 MEASUREMENT PROCEDURE

Refer to KDB 789033 section F

10.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

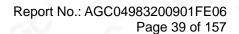
Refer To Section 8.2.

10.3 MEASUREMENT EQUIPMENT USED

Refer To Section 6.

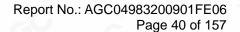
10.4 LIMITS AND MEASUREMENT RESULT

LIMITS AND MEASUREMENT RESULT FOR 802.11A20 MODULATION					
Frequency (MHz)	Power density (dBm/MHz)	Applicable Limits (dBm)	Pass or Fail		
5180	-2.358	11	Pass		
5200	-3.078	11	Pass		
5240	-2.852	11	Pass		
5260	-3.833	11	Pass		
5300	-3.328	11	Pass		
5320	-3.403	0 11	Pass		
5500	-2.382	11	Pass		
5600	-1.769	11	Pass		
5700	-1.917	11 ⊚	Pass		
Frequency (MHz)	Power density (dBm/MHz)	Applicable Limits (dBm)	Pass or Fai		
5745	-5.649	30	Pass		
5785	-5.511	30	Pass		
5825	-5.584	30	Pass		





LIMITS AND MEASUREMENT RESULT FOR 802.11N20 MODULATION					
Frequency (MHz)	Power density (dBm/MHz)	Applicable Limits (dBm)	Pass or Fail		
5180	-2.383	11	Pass		
5200	-2.934	11	Pass		
5240	-3.167	11	Pass		
5260	-3.736	11	Pass		
5300	-3.755	11	Pass		
5320	-3.530	11	Pass		
5500	-2.675	11	Pass		
5600	-2.033	11	Pass		
5700	-2.389	C11 C	Pass		
Frequency (MHz)	Power density (dBm/MHz)	Applicable Limits (dBm)	Pass or Fai		
5745	-5.822	30	Pass		
5785	-5.379	30	Pass		
5825	-5.376	30	Pass		





LIMITS AND MEASUREMENT RESULT FOR 802.11N40 MODULATION

Frequency (MHz)	Power density (dBm/MHz)	Applicable Limits (dBm)	Pass or Fail
5190	-6.361	11	Pass
5230	-6.208	_® 11	Pass
5270	-6.843	GC 11	Pass
5310	-6.612	11	Pass
5510	-5.992	11	Pass
5590	-4.855	11	Pass
5670	-5.296	11	Pass
Frequency (MHz)	Power density (dBm/MHz)	Applicable Limits (dBm)	Pass or Fail
5755	-8.535	30	Pass
5795	-8.786	30	Pass



802.11a20 TEST RESULTTEST PLOT OF SPECTRAL DENSITY FOR 5180MHz



TEST PLOT OF SPECTRAL DENSITY FOR 5200MHz





TEST PLOT OF SPECTRAL DENSITY FOR 5240MHz



TEST PLOT OF SPECTRAL DENSITY FOR 5260MHz



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TEST PLOT OF SPECTRAL DENSITY FOR 5300MHz



TEST PLOT OF SPECTRAL DENSITY FOR 5320MHz





TEST PLOT OF SPECTRAL DENSITY FOR 5500MHz



TEST PLOT OF SPECTRAL DENSITY FOR 5600MHz





TEST PLOT OF SPECTRAL DENSITY FOR 5700MH



TEST PLOT OF SPECTRAL DENSITY FOR 5745MHz





TEST PLOT OF SPECTRAL DENSITY FOR 5785MHz

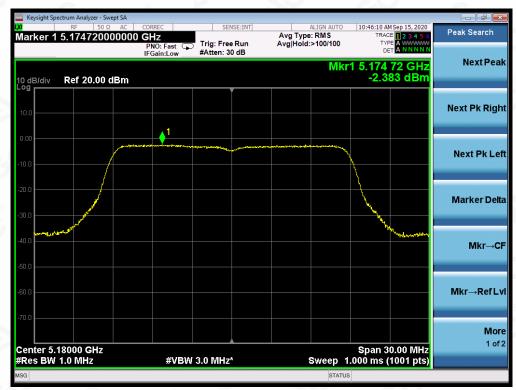


TEST PLOT OF SPECTRAL DENSITY FOR 5825MHz





802.11n20 TEST RESULTTEST PLOT OF SPECTRAL DENSITY FOR 5180MHz



TEST PLOT OF SPECTRAL DENSITY FOR 5200MHz





TEST PLOT OF SPECTRAL DENSITY FOR 5240MHz



TEST PLOT OF SPECTRAL DENSITY FOR 5260MHz

