FCC RADIO TEST REPORT
FCC ID:LNQSBWD960A

Product：	ScreenBeam 960
Trade Name：	Actiontec
Model Name：	SBWD960A
Serial Model：	N/A
Report No.：	NTEK-2016NT06206619F2

Prepared for

Actiontec Electronics Inc

760 North Mary Ave.,Sunnyvale, CA 94086,United States

Prepared by

Shenzhen NTEK Testing Technology Co., Ltd.

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TEST RESULT CERTIFICATION

Applicant's name ..... Actiontec Electronics Inc

Address ..... 760 North Mary Ave., Sunnyvale, California94086, United States

Manufacture's Name... Actiontec Electronics Inc

Address ..... 760 North Mary Ave., Sunnyvale, California94086, United States

Product description

Product name ..... ScreenBeam 960

Model and/or type reference SBWD960A

Serial Model ..... N/A

Standards ..... FCC Part15.407: 01 Oct. 2015

Test procedure ..... ANSI C63.10-2013 and KDB 789033 D02 General UNII Test Procedures New Rules v01r01
FCC KDB 662911 D01 Multiple Transmitter Output v01
FCC KDB 662911 D02 MIMO With Cross Polarized Antenna V01

This device described above has been tested by NTEK, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements/ the Industry Canada requirements.. And it is applicable only to the tested sample identified in the report.

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Date of Test .....

Date (s) of performance of tests ..... 20 Jun. 2016 ~11 Aug. 2016

Date of Issue ..... 11 Aug. 2016

Test Result ..... **Pass**

Testing Engineer : Eileen Liu.
(Eileen Liu)

Technical Manager : Jason chen
(Jason Chen)

Authorized Signatory : Sam . Chen
(Sam Chen)

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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.407) , Subpart E			
Standard Section	Test Item	Judgment	Remark
15.207	AC Power Line Conducted Emissions	PASS	
15.209(a), 15.407 (b)(1) 15.407 (b)(4) 15.407 (b)(6)	Spurious Radiated Emissions	PASS	
15.407 (a)(1) 15.407 (a)(3) 15.1049	26 dB and 99% Emission Bandwidth	PASS	
15.407(e)	Minimum 6 dB bandwidth	PASS	
15.407 (a)(1) 15.407 (a)(3)	Maximum Conducted Output Power	PASS	
2.1051, 15.407(b)(1) 15.407(b)(4)	Band Edges	PASS	
15.407 (a)(1) 15.407 (a)(3)	Power Spectral Density	PASS	
15.407(g)	Frequency Stability	PASS	
15.203	Antenna Requirement	PASS	

NOTE:

(1)” N/A” denotes test is not applicable in this Test Report

Revision History

Report No.	Version	Description	Issued Date
NTEK-2016NT06206619F2	Rev.01	Initial issue of report	Aug 11, 2016
NTEK-2016NT06206619F2	Rev.02	updata of report	Sep 05, 2016

1.1 TEST FACILITY

NTEK Testing Technology Co., Ltd
Add.:1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street, Bao'an District, Shenzhen P.R. China.
FCC Registration No.:238937; IC Registration No.:9270A-1
CNAS Registration No.:L5516

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y ± U**，where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**，providing a level of confidence of approximately **95** %。

No.	Item	Uncertainty
1	Conducted Emission Test	±1.38dB
2	RF power,conducted	±0.16dB
3	Spurious emissions,conducted	±0.21dB
4	All emissions,radiated(<1G)	±4.68dB
5	All emissions,radiated(>1G)	±4.89dB
6	Temperature	±0.5°C
7	Humidity	±2%

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	ScreenBeam 960	
Trade Name	Actiontec	
Model Name	SBWD960A	
Product Description	IEEE 802.11 WLAN Mode Supported	☒802.11a/AC(20MHz channel bandwidth) ☒802.11n/AC(20MHz channel bandwidth) ☒802.11n/AC(40MHz channel bandwidth) ☒802.11AC(80MHz channel bandwidth)
	Data Rate	802.11 a: 6,9,12,18,24,36,48,54Mbps; 802.11n(HT20):MCS0-MCS15; 802.11n(HT40):MCS0-MCS15; 802.11AC: NSS1,MCS0-MCS9,NSS2,MCS0-MCS9;
	Modulation	OFDM with BPSK/QPSK/16QAM/64QAM/256QAM for 802.11a/n/ac;
	Operating Frequency Range	☒5180-5240MHz for 802.11a/n(HT20)/AC20; 5190-5230MHz for 802.11n(HT40)/AC40; 5210MHz for 802.11 AC80; ☒5745-5825 MHz for 802.11a/n(HT20)/AC20; 5755-5795 MHz for 802.11a/n(HT40)/AC40; 5775MHz for 802.11 AC80;
	Number of Channels	☒4 channels for 802.11a/N20/AC20 in the 5180-5240MHz band ; 2 channels for 802.11 N40/AC40 in the 5190-5230MHz band ; 1 channels for 802.11 AC80 in the 5210MHz band ; ☒5 channels for 802.11a/N20/AC20 in the 5745-5825MHz band ; 2 channels for 802.11 N40/AC40 in the 5755-5795MHz band ; 1 channels for 802.11 AC80 in the 5775MHz band ;
	Antenna Type	PCB Antenna
	Smart system	☒SISO for 802.11a/n ☒MIMO for 802.11n/ac
	Antenna Gain	See Table for Filed Antenna
	Based on the application, features, or specification exhibited in User's Manual, More details of EUT technical specification, please refer to the User's Manual.	

Ratings	DC 5V
Adapter	Adapter 1: Mode: WA-10P05FU Input: 100-240V~, 50/60Hz, 0.3A Max Output: 5.0V⎓, 2.0A Adapter 2: Mode: WB-10E05FU Input: 100-240V~, 50/60Hz, 0.4A Max Output: 5.0V⎓, 2.0A Adapter 3: Mode: KSAS0120500200HU Input: 100-240V~, 50/60Hz, 0.4A Output: 5.0V⎓, 2.0A
Battery	N/A
Connecting I/O Port(s)	Please refer to the User's Manual

Note:

1. For a more detailed features description, please refer to the manufacturer’s specifications or the User's Manual.

2. Frequency and Channel list for 802.11a/n(20MHz) band I (5180-5240MHz):

802.11a/n/ac(20MHz) Carrier Frequency Channel							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	44	5220	-	-	-	-
40	5200	48	5240	-	-	-	-

Frequency and Channel list for 802.11n(40MHz) band I (5190-5230MHz):

802.11n /ac(40MHz) Carrier Frequency Channel							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
38	5190	-	-	-	-	-	-
46	5230	-	-	-	-	-	-

802.11ac (80MHz) Carrier Frequency Channel	
Channel	Frequency (MHz)
42	5210

Frequency and Channel list for 802.11a/n(20 MHz) band III (5745-5825MHz):

802.11a/n/ac(20 MHz) Carrier Frequency Channel							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	153	5765	157	5785	161	5805
165	5825	-	-	-	-	-	-

Frequency and Channel list for 802.11n(40MHz) band III (5755-5795MHz):

802.11n/ac 40MHz Carrier Frequency Channel					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
151	5755	159	5795	-	-

802.11ac 80MHz Carrier Frequency Channel	
Channel	Frequency (MHz)
155	5775

Note 2
The EUT has two modules, modules A (8812), module B (8192), four of the same type of antenna, as shown in Figure A shows

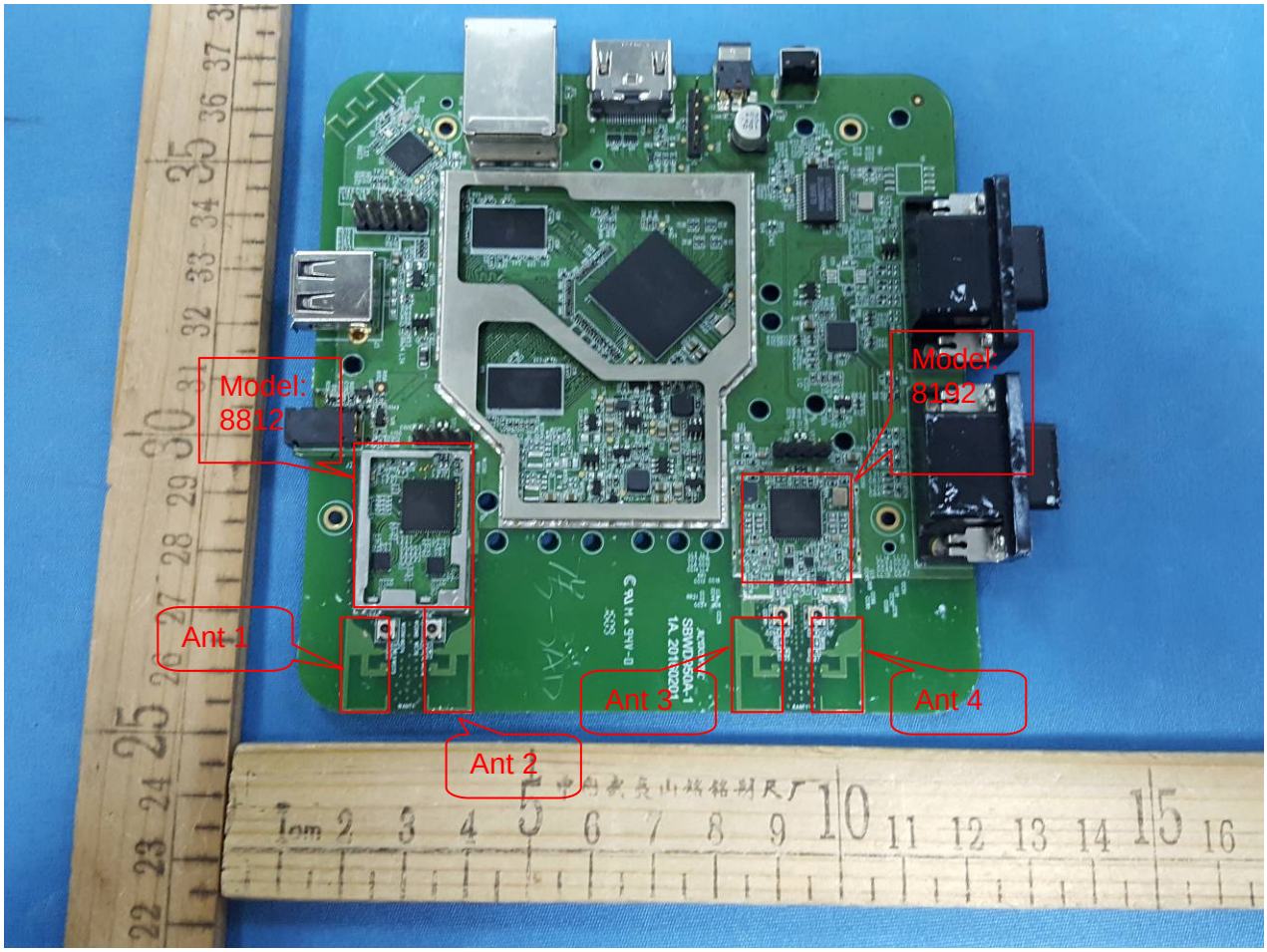


Figure A

Frequency	ANT1 max Gain(dBi)	ANT2 max Gain(dBi)	ANT3 max Gain(dBi)	ANT4 max Gain(dBi)
2400MHz-2500MHz	2.80	2.91	3.47	2.52
5150MHz-5250MHz	4.86	4.40	5.22	4.83
5725MHz-5850Mhz	3.36	4.30	5.11	4.93

Modules 8812 For 5G Band:

For IEEE 802.11a mode (1TX, 2RX): The EUT can support both 1TX and 2TX functions.
For 1TX Only Chain 1 can be used as transmitting antenna. Chain 1 and Chain 2 could receive simultaneously.
For IEEE 802.11n mode (1TX/2TX, 2RX): The EUT can support both 1TX and 2TX functions.
For 1TX Only Chain 1 can be used as transmitting antenna. When MCS 0~7 enable without TX-Beamforming/STBC. Chain 1 and Chain 2 could receive simultaneously.
For 2TX Both Chain 1 and Chain 2 can be used as transmitting/receiving antenna.
When TX-Beamforming/STBC enalbe/MCS 8~15 enable.
Chain 1 and Chain 2 could both transmit/receive simultaneously.
Only 2TX function was selected to test and record in the report, the 1TX test results were covered by 2TX Test results.
For IEEE 802.11ac mode (1TX/2TX, 2RX): The EUT can support both 1TX and 2TX functions.
For 1TX Only Chain 1 can be used as transmitting antenna. When 1SS MCS 0~9 enable without TX-Beamforming/STBC. Chain 1 and Chain 2 could receive simultaneously.
For 2TX Both Chain 1 and Chain 2 can be used as transmitting/receiving antenna.
When TX-Beamforming/STBC enalbe/2SS MCS 0~9 enable. Chain 1 and Chain 2 could both transmit/receive simultaneously. Only 2TX function was selected to test and record in the report, the 1TX test results were covered by 2TX Test results.

Modules 8192 For 5G Band:

For IEEE 802.11a mode (1TX, 2RX): The EUT can support both 1TX and 2TX functions.
For 1TX Only Chain 1 can be used as transmitting antenna.
Chain 1 and Chain 2 could receive simultaneously.
For IEEE 802.11n mode (1TX/2TX, 2RX): The EUT can support both 1TX and 2TX functions.
For 1TX Only Chain 1 can be used as transmitting antenna. When MCS 0~7 enable without TX-Beamforming/STBC. Chain 1 and Chain 2 could receive simultaneously.
For 2TX Both Chain 1 and Chain 2 can be used as transmitting/receiving antenna. When TX-Beamforming/STBC enalbe/MCS 8~15 enable.
Chain 1 and Chain 2 could both transmit/receive simultaneously.
Only 2TX function was selected to test and record in the report, the 1TX test results were covered by 2TX Test results.

Module 8812 and module 8192 are used for different purposes, where 8812 is responsible for Miracast and 8192 are responsible for wireless communication with CMS. When the 8812 is in a Miracast session, the CMS can still access the receiver's settings through the 8192 wireless adapter.

The Control software(tool_WIFI.exe) can control Modules 8812/8192 antenna 1, 2,3,4 ,
For 2.4GHz mode, antenna 1, 2, 3, 4, are transmitting, antenna 1 and 2 or antenna 3 and 4
May simultaneously transmit.
And the data is recorded for radiated emission and band edge.
Modules 8812 For MIMO mode: Directional gain
= 10log(antenna 1 + antenna 2) dbi =7.65dbi in 5.2GHz
= 10log(antenna 1 + antenna 2) dbi =8.04dbi in 5.8GHz
802.11 n/ac 5.0GHz has MIMO mode.
Modules 8192 For MIMO mode: Directional gain
=10log(antenna 3 + antenna 4) dbi =6.86dbi in 5.2GHz
= 10log(antenna 3 + antenna 4) dbi =8.03dbi in 5.8GHz
802.11n/ac 5.0GHz has MIMO mode.

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	Link Mode
Mode 2	802.11a / n/ ac 20 CH36/ CH40/ CH 48 802.11a /n/ ac 20 CH149/ CH157/ CH 165
Mode 3	802.11n/ ac40 CH38/ CH 46 802.11n/ ac40 CH 151 / CH 159
Mode 4	802.11 ac80 CH 155
For Radiated Emission	
Final Test Mode	Description
Mode 1	Link Mode
Mode 2	802.11a / n/ ac 20 CH36/ CH40/ CH 48 802.11a /n/ ac 20 CH149/ CH157/ CH 165
Mode 3	802.11n/ ac40 CH38/ CH 46 802.11n/ ac40 CH 151 / CH 159
Mode 4	802.11 ac80 CH 155

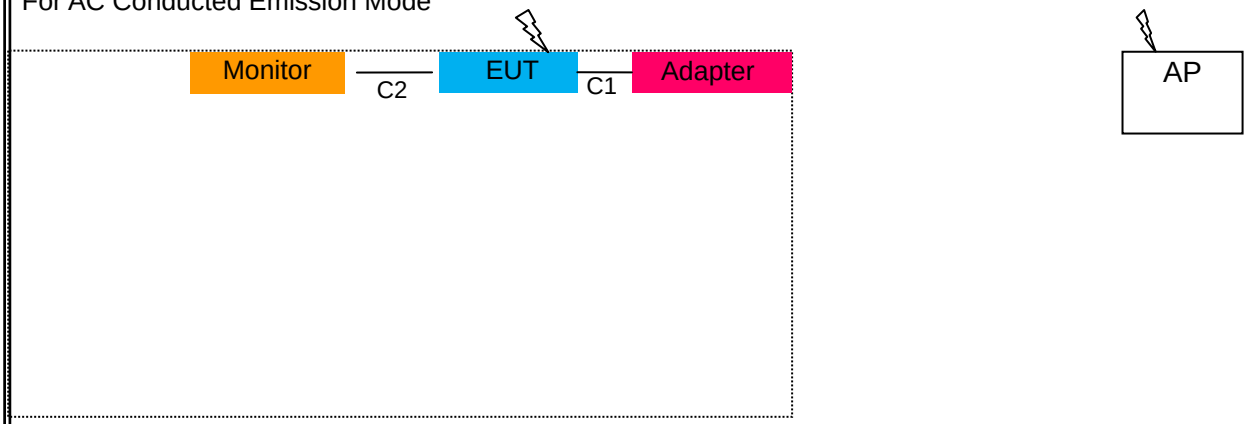
Note:

(1) The measurements are performed at the highest, middle, lowest available channels.

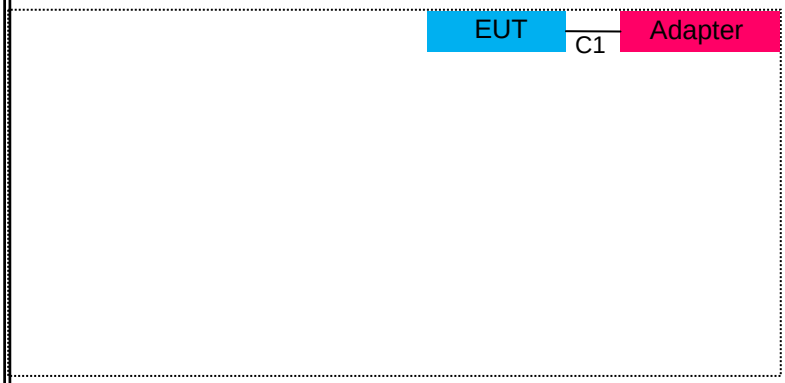
(2) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

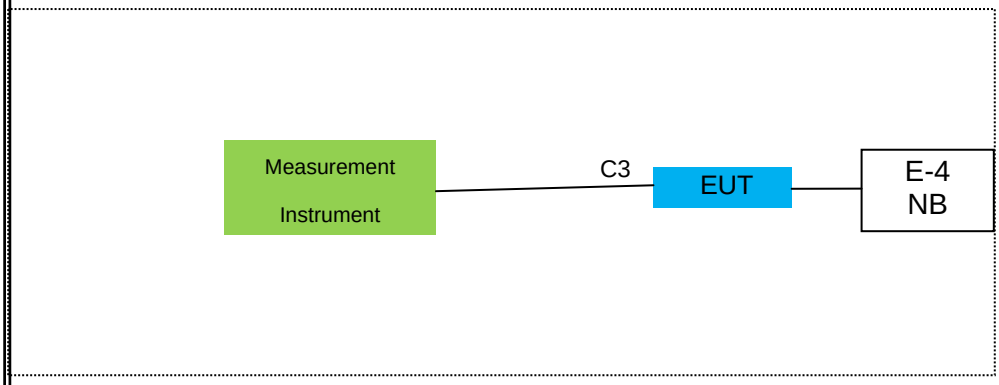
For AC Conducted Emission Mode



Radiated Spurious Emission Test



For Conducted Test Cases



2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

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

Item	Equipment	Brand	Model/Type No.	Series No.	Note
E-1	ScreenBeam 960	Actiontec	SBWD960A	N/A	EUT
E-2	Adapter 1	N/A	WA-10P05FU	N/A	Peripherals
E-2	Adapter 2	N/A	WB-10E05FU	N/A	Peripherals
E-2	Adapter 3	N/A	KSAS0120500200HU	N/A	Peripherals
E-3	Monitor	SONY	KDL-24EX520	N/A	Peripherals
E-4	Notebook PC	LENOVO	E450	N/A	

Item	Cable Type	Shielded Type	Ferrite Core	Length	Note
C-1	USB Cable	NO	NO	1.0m	
C-2	HDMI Cable	YES	YES	1.0m	
C-3	RF Cable	NO	NO	0.5m	Cable loss 0.1dBi

Note:

(1) The support equipment was authorized by Declaration of Confirmation.
(2) For detachable type I/O cable should be specified the length in cm in『Length』column.

2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Spectrum Analyzer	Agilent	E4407B	MY45108040	2015.07.06	2016.07.05	1 year
2	Spectrum Analyzer	Agilent	N9020A	MY49100060	2015.07.06	2016.07.05	1 year
3	EMI Test Receiver	Agilent	N9038A	MY53227146	2016.06.06	2017.06.05	1 year
4	Test Receiver	R&S	ESPI	101318	2016.06.06	2017.06.05	1 year
5	Bilog Antenna	TESEQ	CBL6111D	31216	2015.07.06	2016.07.05	1 year
6	50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2016.06.06	2017.06.05	1 year
7	Spectrum Analyzer	ADVANTEST	R3132	150900201	2016.06.06	2017.06.05	1 year
8	Horn Antenna	EM	EM-AH-10180	2011071402	2016.07.06	2017.07.05	1 year
9	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2016.07.06	2017.07.05	1 year
10	Amplifier	EM	EM-30180	060538	2015.12.22	2016.12.21	1 year
11	Amplifier	MITEQ	TTA1840-35-HG	177156	2016.06.06	2017.06.05	1 year
12	Loop Antenna	ARA	PLA-1030/B	1029	2016.06.06	2017.06.05	1 year
13	Power Meter	DARE	RPR3006W	100696	2016.07.06	2017.07.05	1 year
15	Test Cable (9KHz-30MHz)	N/A	R-01	N/A	2015.07.06	2016.07.05	1 year
16	Test Cable (30MHz-1GHz)	N/A	R-02	N/A	2016.07.06	2017.07.05	1 year
17	High Test Cable(1G-40GHz)	N/A	R-03	N/A	2016.06.06	2017.06.05	1 year
18	High Test Cable(1G-40GHz)	N/A	R-04	N/A	2016.06.06	2017.06.05	1 year

Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Test Receiver	R&S	ESCI	101160	2016.06.06	2017.06.05	1 year
2	LISN	R&S	ENV216	101313	2015.08.24	2016.08.23	1 year
3	LISN	EMCO	3816/2	00042990	2015.08.24	2016.08.23	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2016.06.07	2017.06.06	1 year
5	Passive Voltage Probe	R&S	ESH2-Z3	100196	2016.06.07	2017.06.06	1 year
6	Absorbing clamp	R&S	MOS-21	100423	2016.06.08	2017.06.07	1 year
7	Test Cable (9KHz-30MHz)	N/A	C01	N/A	2016.06.08	2017.06.07	1 year
8	Test Cable (9KHz-30MHz)	N/A	C02	N/A	2016.06.08	2017.06.07	1 year
9	Test Cable (9KHz-30MHz)	N/A	C03	N/A	2016.06.08	2017.06.07	1 year

1	Attenuation	MCE	24-10-34	BN9258	2016.06.06	2017.06.05	1 year

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)		Standard
	Quasi-peak	Average	Quasi-peak	Average	
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	CISPR
0.50 -5.0	73.00	60.00	56.00	46.00	CISPR
5.0 -30.0	73.00	60.00	60.00	50.00	CISPR

0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	FCC/ RSS-247
0.50 -5.0	73.00	60.00	56.00	46.00	FCC/ RSS-247
5.0 -30.0	73.00	60.00	60.00	50.00	FCC/ RSS-247

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

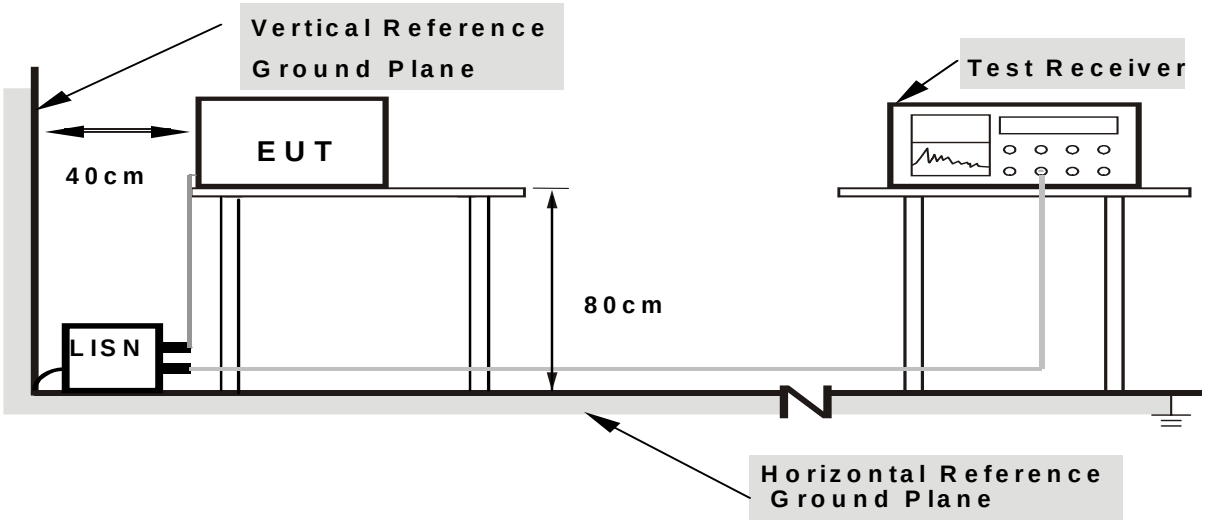
3.1.2 TEST PROCEDURE

a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

3.1.4 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

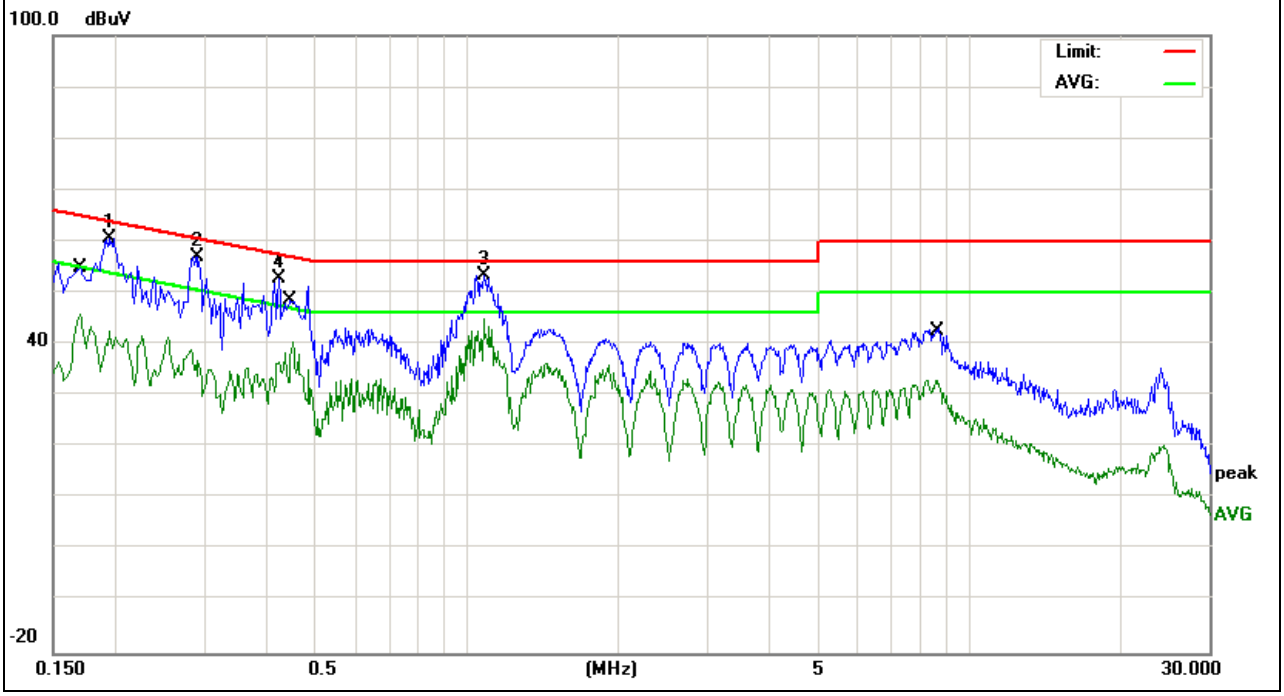
3.1.6 TEST RESULTS

EUT：	ScreenBeam 960	Model Name. ：	SBWD960A
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Phase：	L
Test Voltage ：	DC 5V From adapter AC120V/60Hz	Test Mode：	Mode 5-Adapter 1

Frequency	Reading Level	Correct Factor	Measure-ment	Limits	Margin	Remark
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.1940	50.37	10.13	60.50	63.86	-3.36	peak
0.2908	46.96	10.14	57.10	60.50	-3.40	peak
1.0780	43.47	9.84	53.31	56.00	-2.69	peak
0.4218	42.69	9.99	52.68	57.41	-4.73	peak
0.1700	35.83	10.12	45.95	54.96	-9.01	AVG
0.4500	30.62	9.92	40.54	46.87	-6.33	AVG
1.0780	35.07	9.84	44.91	46.00	-1.09	AVG
8.5899	23.22	9.78	33.00	50.00	-17.00	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

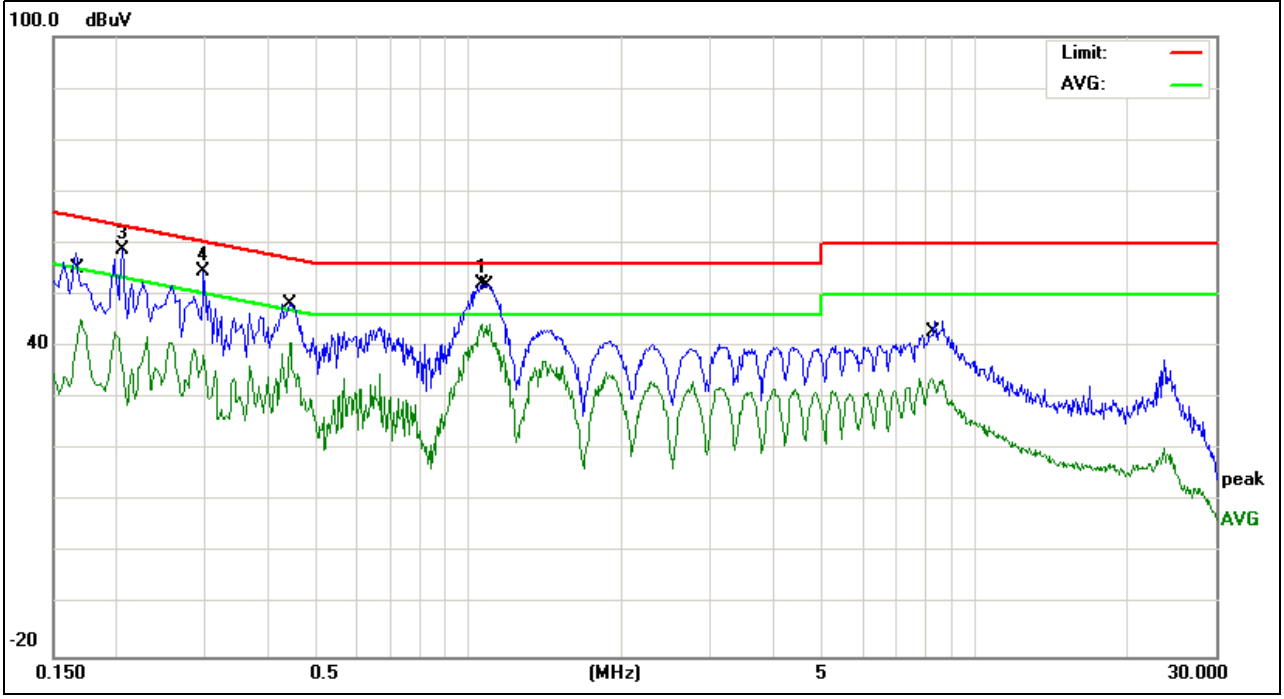


EUT：	ScreenBeam 960	Model Name. ：	SBWD960A
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Phase：	N
Test Voltage ：	DC 5V From adapter AC120V/60Hz	Test Mode：	Mode 5-Adapter 1

Frequency	Reading Level	Correct Factor	Measure-ment	Limits	Margin	Remark
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
1.0620	42.33	9.86	52.19	56.00	-3.81	peak
1.0980	31.74	9.86	41.60	46.00	-4.40	AVG
0.2059	48.64	10.03	58.67	63.37	-4.70	peak
0.2979	44.50	10.13	54.63	60.30	-5.67	peak
0.1700	35.08	10.06	45.14	54.96	-9.82	AVG
0.4420	30.85	9.95	40.80	47.02	-6.22	AVG
8.1979	24.11	9.75	33.86	50.00	-16.14	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

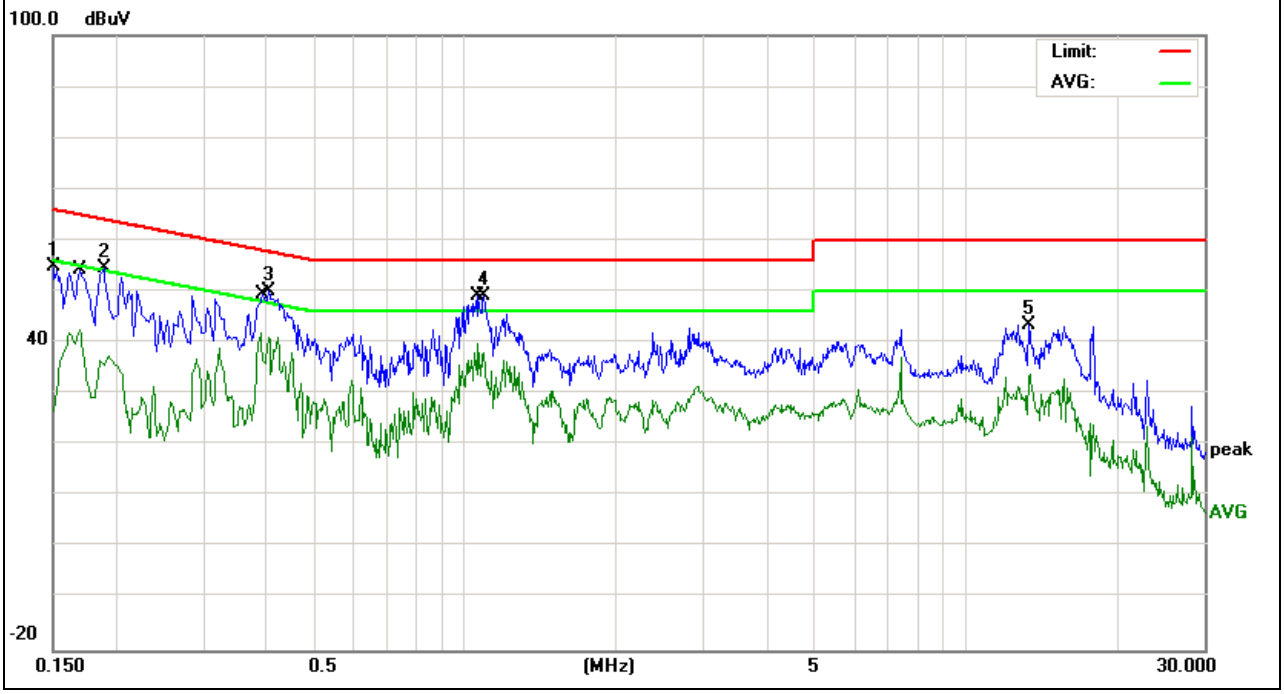


EUT：	ScreenBeam 960	Model Name. ：	SBWD960A
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Phase：	L
Test Voltage ：	DC 5V From adapter AC240V/60Hz	Test Mode：	Mode 5-Adapter 1

Frequency	Reading Level	Correct Factor	Measure-ment	Limits	Margin	Remark
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.1499	44.58	10.12	54.70	66.00	-11.30	peak
0.1900	44.40	10.13	54.53	64.03	-9.50	peak
0.4060	39.96	10.03	49.99	57.73	-7.74	peak
1.0900	39.36	9.84	49.20	56.00	-6.80	peak
13.3579	33.58	9.83	43.41	60.00	-16.59	peak
0.1700	32.51	10.12	42.63	54.96	-12.33	AVG
0.3900	31.82	10.05	41.87	48.06	-6.19	AVG
1.0620	29.94	9.84	39.78	46.00	-6.22	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

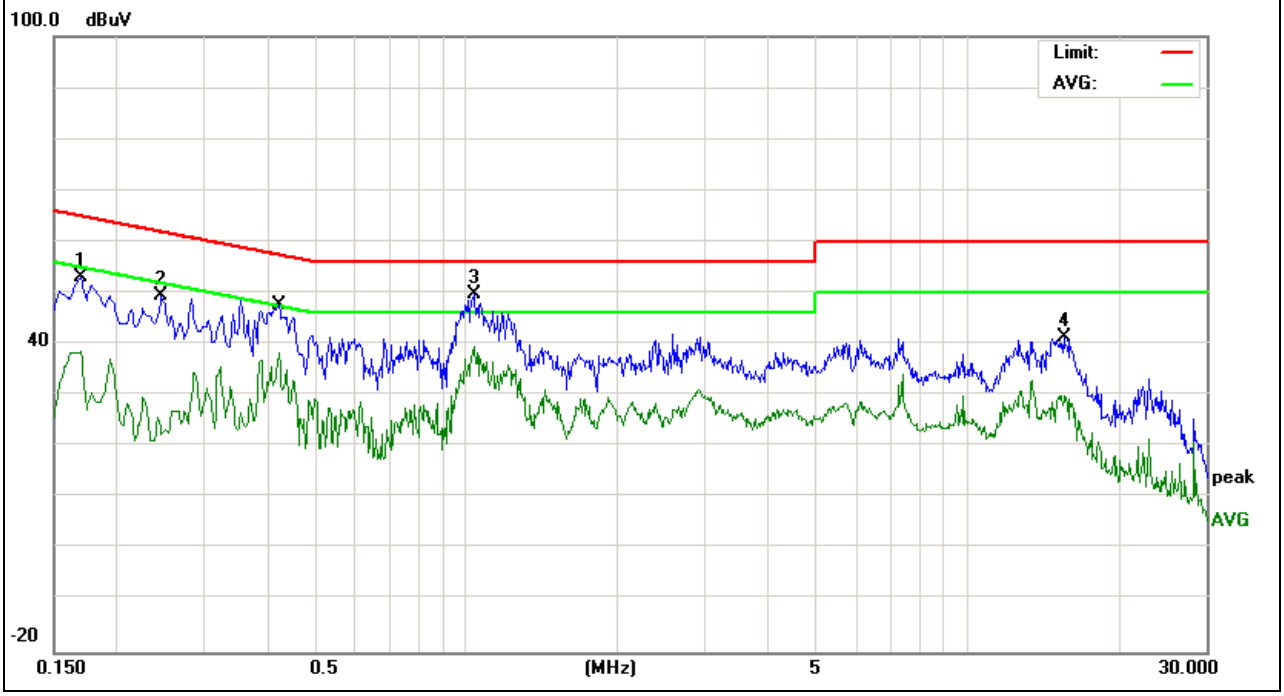


EUT：	ScreenBeam 960	Model Name. ：	SBWD960A
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Phase：	N
Test Voltage ：	DC 5V From adapter AC240V/60Hz	Test Mode：	Mode 5-Adapter 1

Frequency	Reading Level	Correct Factor	Measure-ment	Limits	Margin	Remark
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.1700	42.93	10.06	52.99	64.96	-11.97	peak
0.2459	39.28	10.07	49.35	61.89	-12.54	peak
1.0340	40.00	9.87	49.87	56.00	-6.13	peak
15.5699	31.53	9.81	41.34	60.00	-18.66	peak
0.1700	28.47	10.06	38.53	54.96	-16.43	AVG
0.4218	28.40	10.00	38.40	47.41	-9.01	AVG
1.0340	29.68	9.87	39.55	46.00	-6.45	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

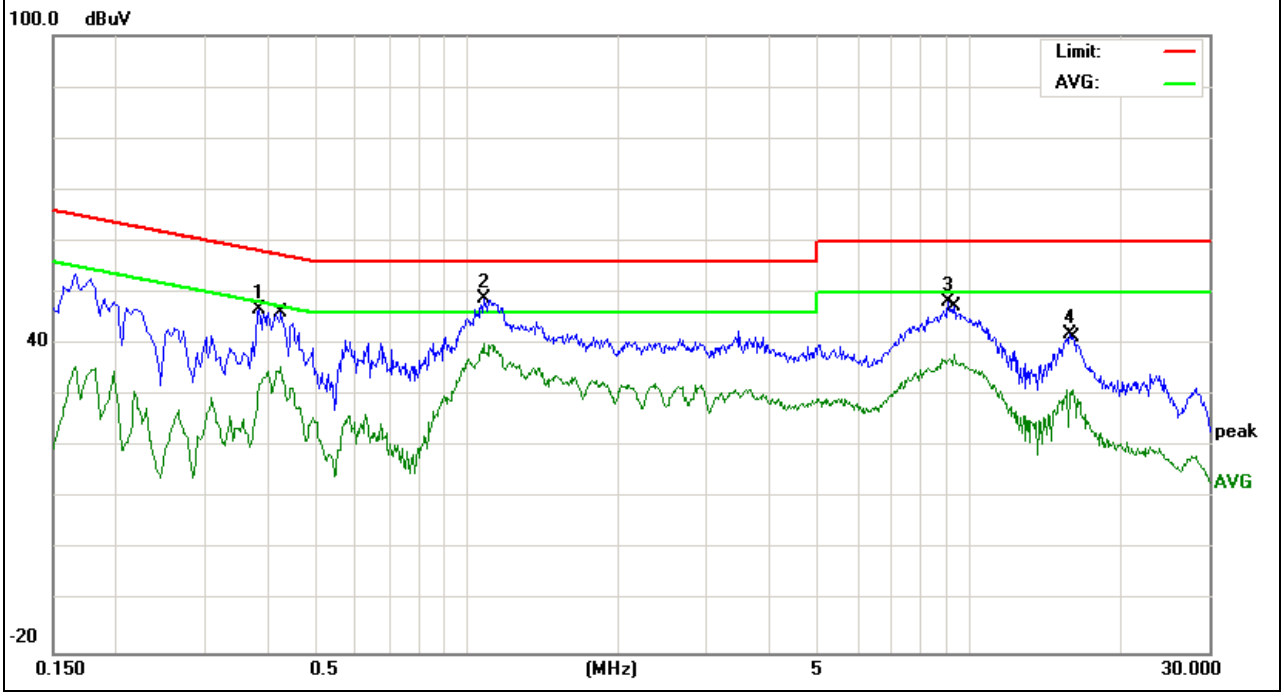


EUT：	ScreenBeam 960	Model Name. ：	SBWD960A
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Phase：	L
Test Voltage ：	DC 5V From adapter AC120V/60Hz	Test Mode：	Mode 5-Adapter 2

Frequency	Reading Level	Correct Factor	Measure-ment	Limits	Margin	Remark
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.3860	36.74	10.05	46.79	58.15	-11.36	peak
1.0820	38.98	9.84	48.82	56.00	-7.18	peak
9.0980	38.47	9.78	48.25	60.00	-11.75	peak
15.8060	32.11	9.87	41.98	60.00	-18.02	peak
0.4260	25.56	9.98	35.54	47.33	-11.79	AVG
1.0820	30.35	9.84	40.19	46.00	-5.81	AVG
9.3139	28.24	9.78	38.02	50.00	-11.98	AVG
16.1060	21.21	9.88	31.09	50.00	-18.91	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

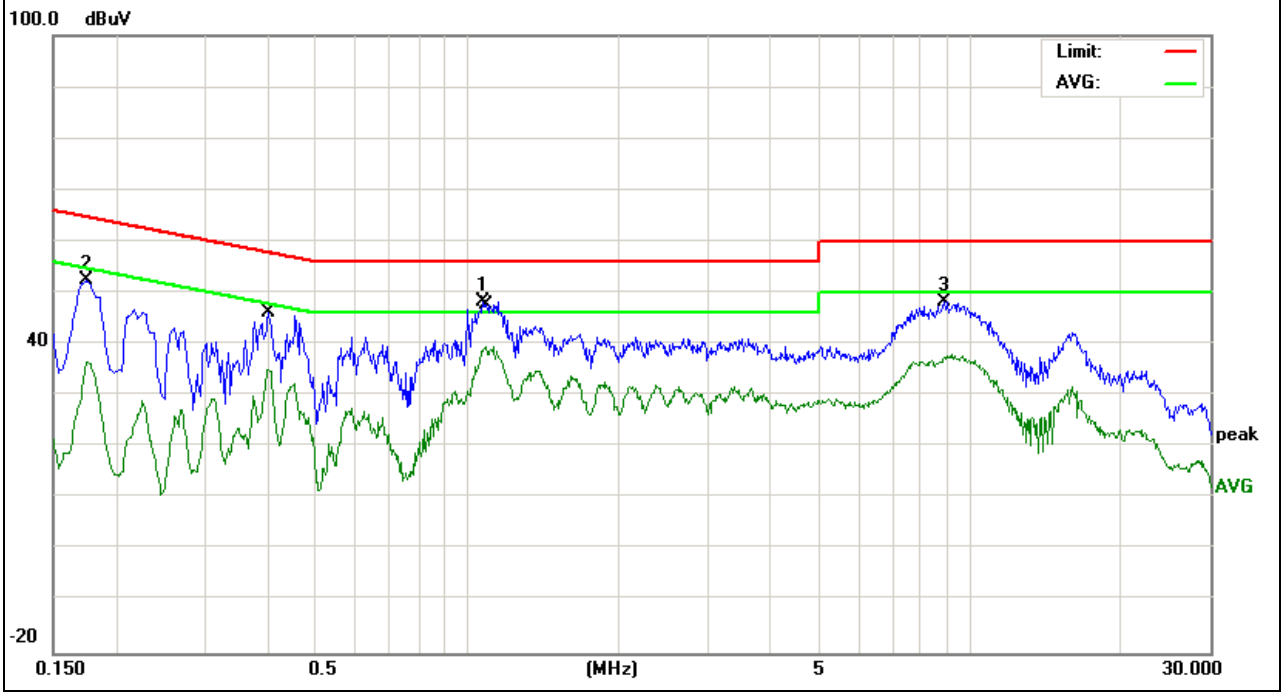


EUT：	ScreenBeam 960	Model Name. ：	SBWD960A
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Phase：	N
Test Voltage ：	DC 5V From adapter AC120V/60Hz	Test Mode：	Mode 5-Adapter 2

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measure-ment (dBμV)	Limits (dBμV)	Margin (dB)	Remark
1.0740	38.49	9.86	48.35	56.00	-7.65	peak
0.1740	42.38	10.05	52.43	64.76	-12.33	peak
8.9140	38.55	9.75	48.30	60.00	-11.70	peak
0.1740	26.47	10.05	36.52	54.76	-18.24	AVG
0.4020	25.07	10.05	35.12	47.81	-12.69	AVG
1.0900	29.78	9.86	39.64	46.00	-6.36	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

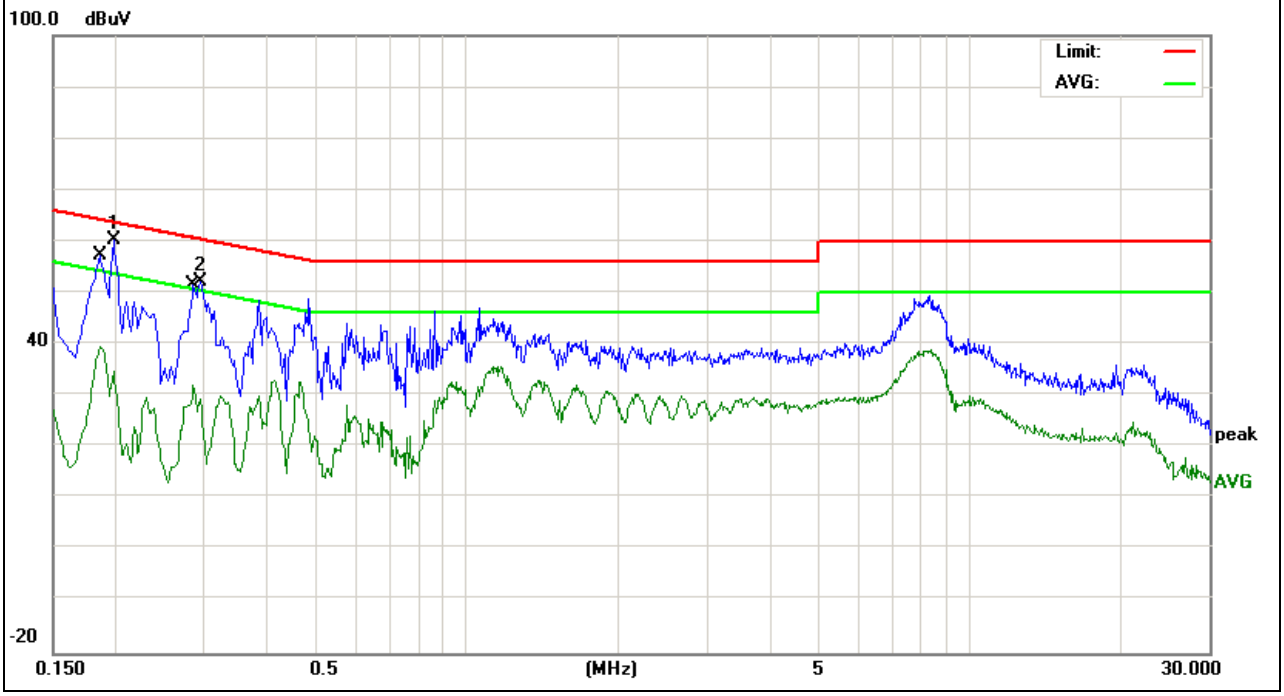


EUT：	ScreenBeam 960	Model Name. ：	SBWD960A
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Phase：	L
Test Voltage ：	DC 5V From adapter AC240V/60Hz	Test Mode：	Mode 5-Adapter 2

Frequency	Reading Level	Correct Factor	Measure-ment	Limits	Margin	Remark
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.1980	50.06	10.13	60.19	63.69	-3.50	peak
0.2940	42.09	10.14	52.23	60.41	-8.18	peak
0.1860	29.50	10.13	39.63	54.21	-14.58	AVG
0.2860	21.77	10.14	31.91	50.64	-18.73	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

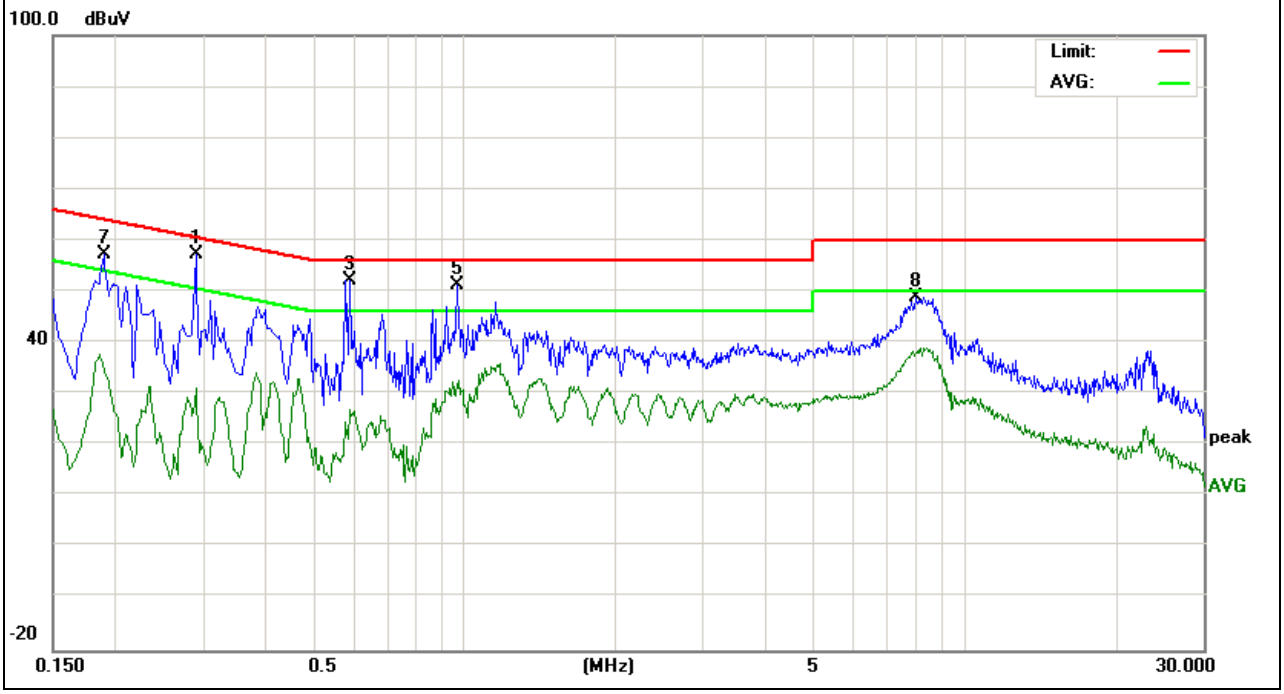


EUT：	ScreenBeam 960	Model Name. ：	SBWD960A
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Phase：	N
Test Voltage ：	DC 5V From adapter AC240V/60Hz	Test Mode：	Mode 5-Adapter 2

Frequency	Reading Level	Correct Factor	Measure-ment	Limits	Margin	Remark
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.2900	47.20	10.14	57.34	60.52	-3.18	peak
0.2900	21.15	10.14	31.29	50.52	-19.23	AVG
0.5899	42.32	9.79	52.11	56.00	-3.89	peak
0.5899	17.11	9.79	26.90	46.00	-19.10	AVG
0.9660	41.30	9.84	51.14	56.00	-4.86	peak
0.9780	22.84	9.84	32.68	46.00	-13.32	AVG
0.1900	47.21	10.13	57.34	64.03	-6.69	peak
7.9939	39.10	9.77	48.87	60.00	-11.13	peak

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



3.2 RADIATED EMISSION MEASUREMENT

3.2.1 APPLICABLE STANDARD

According to FCC Part 15.407(d) and 15.209

3.2.2 CONFORMANCE LIMIT

According to FCC Part 15.407(b)(7): radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).
According to FCC Part15.205, Restricted bands

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
10.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(2)
13.36-13.41			

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Restricted Frequency(MHz)	Field Strength (μV/m)	Field Strength (dBμV/m)	Measurement Distance
0.009~0.490	2400/F(KHz)	20 log (uV/m)	300
0.490~1.705	2400/F(KHz)	20 log (uV/m)	30
1.705~30.0	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Limits of Radiated Emission Measurement(Above 1000MHz)

Frequency(MHz)	Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

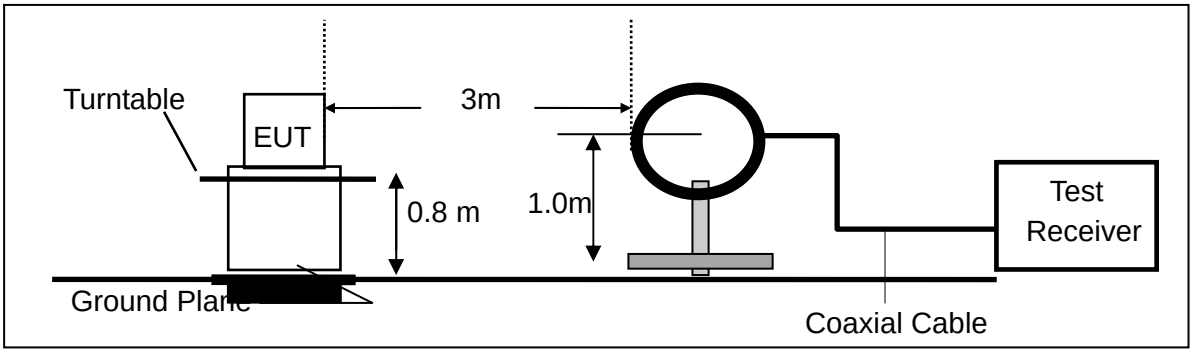
Remark :1. Emission level in dBuV/m=20 log (uV/m)
2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
3. Distance extrapolation factor =40log(Specific distance/ test distance)(dB);
Limit line=Specific limits(dBuV) + distance extrapolation factor.

3.2.3 MEASURING INSTRUMENTS

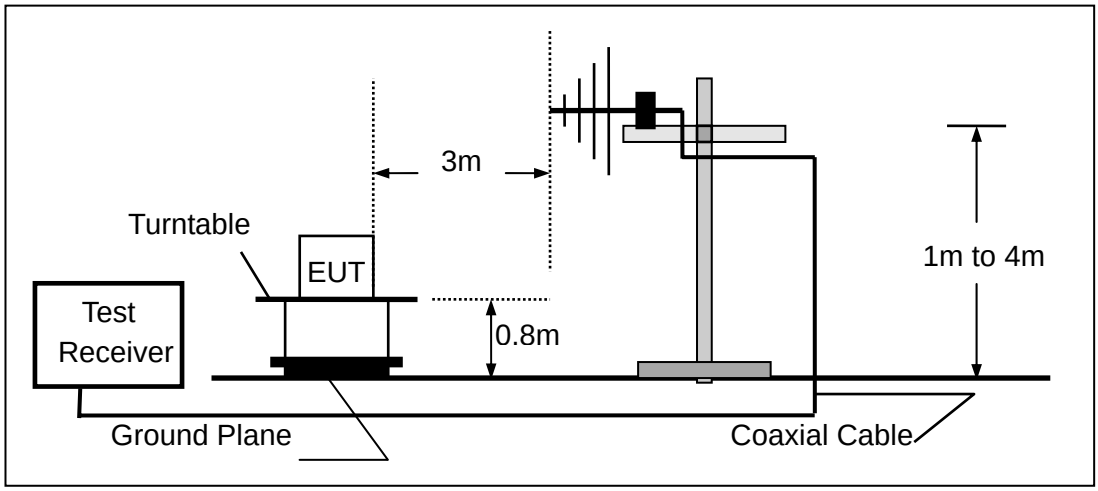
The Measuring equipment is listed in the section 6.3 of this test report.

3.2.4 TEST CONFIGURATION

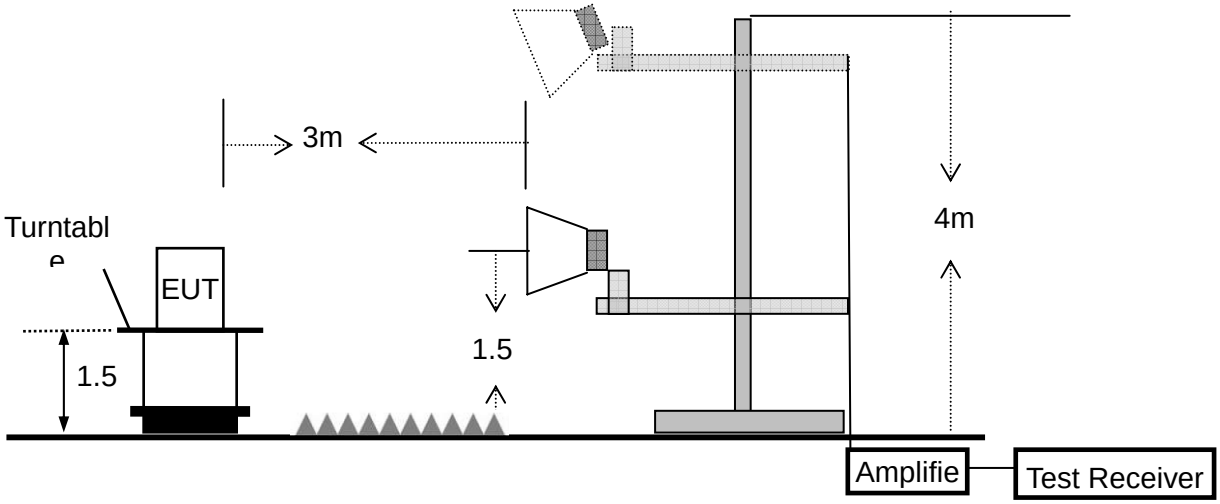
(a) For radiated emissions below 30MHz



(b) For radiated emissions from 30MHz to 1000MHz



(c) For radiated emissions above 1000MHz



3.2.5 TEST PROCEDURE

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.10-2013. 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.
This test is required for any spurious emission that falls in a Restricted Band, as defined in Section 15.205. It must be performed with the highest gain of each type of antenna proposed for use with the EUT.
Use the following spectrum analyzer settings:

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz and frequencies above 1GHz,
b. The EUT was placed on the top of a rotating table 0.8 m for below 1GHz and 1.5m for above 1GHz the ground at a 3 meter. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment or of the substitution antenna shall be 0.8 m for below 1GHz and 1.5m for above 1GHz; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For the radiated emission test above 1GHz:
Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
e. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
f. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
g For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

During the radiated emission test, the Spectrum Analyzer was set with the following configurations:

Frequency Band (MHz)	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	QP	120 kHz	300 kHz
Above 1000	Peak	1 MHz	1 MHz
	Average	1 MHz	10 Hz

Note: for the frequency ranges below 30 MHz, a narrower RBW is used for these ranges but the measured value should add a RBW correction factor (RBWCF) where RBWCF [dB] =10*lg(100 [kHz]/narrower RBW [kHz]). , the narrower RBW is 1 kHz and RBWCF is 20 dB for the frequency 9 kHz to 150 kHz, and the narrower RBW is 10 kHz and RBWCF is 10 dB for the frequency 150 kHz to 30 MHz.

3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)

EUT：	ScreenBeam 960	Model Name. ：	SBWD960A
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX	Polarization :	--

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	N/A
--	--	--	--	N/A

NOTE:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
Distance extrapolation factor =40 log (specific distance/test distance)(dB);
Limit line = specific limits(dBuv) + distance extrapolation factor.

3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)

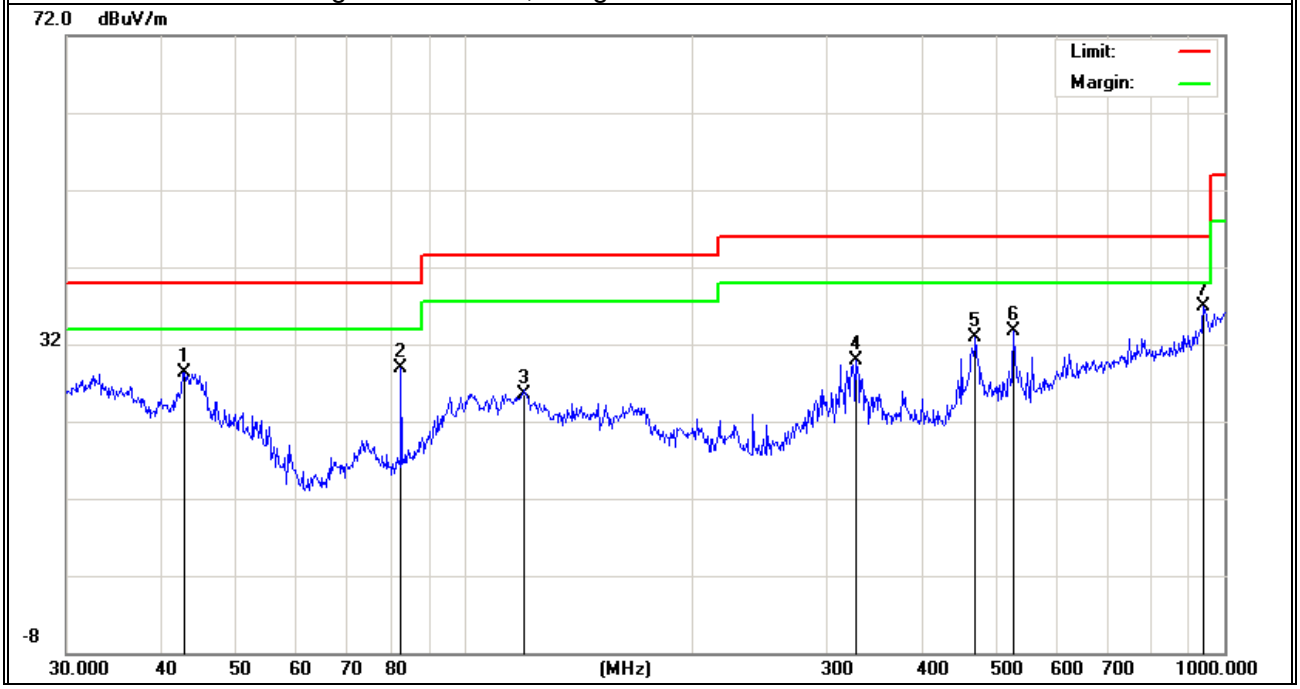
■ Spurious Emission below 1GHz (30MHz to 1GHz)

EUT：	ScreenBeam 960	Model Name ：	SBWD960A
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5V From adapter AC120V/60Hz
Test Mode ：	TX (802.11a-CH 36) -8812 module/8192 module-RX		

All the modulation modes have been tested, and the worst result was report as below:

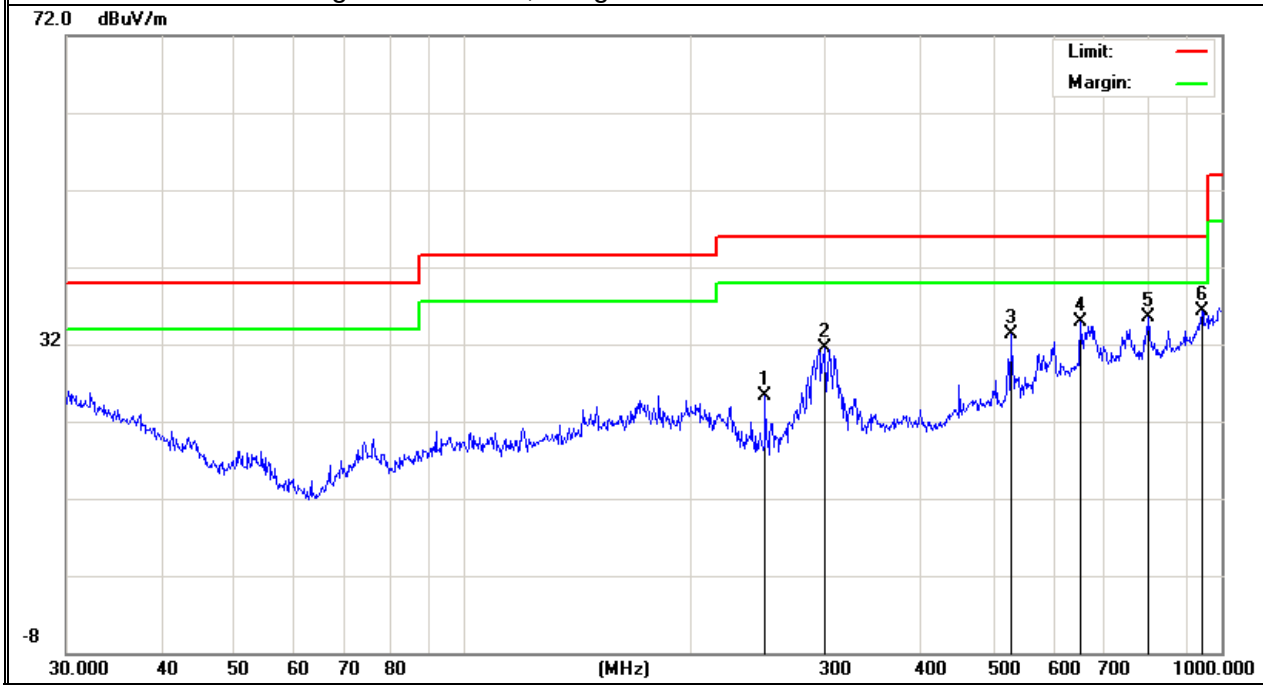
Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
V	42.8997	14.58	13.79	28.37	40.00	-11.63	QP
V	82.6482	18.74	10.08	28.82	40.00	-11.18	peak
V	119.4361	14.02	11.57	25.59	43.50	-17.91	QP
V	327.8873	14.99	14.83	29.82	46.00	-16.18	QP
V	470.5230	15.16	17.73	32.89	46.00	-13.11	QP
V	528.2458	14.83	18.86	33.69	46.00	-12.31	QP
V	938.8324	9.39	27.44	36.83	46.00	-9.17	QP

Remark:
Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level - Limit



Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
H	250.3010	13.11	12.12	25.23	46.00	-20.77	QP
H	299.3158	17.66	13.82	31.48	46.00	-14.52	QP
H	528.2458	14.48	18.86	33.34	46.00	-12.66	QP
H	651.9417	13.31	21.63	34.94	46.00	-11.06	QP
H	801.7862	11.38	24.04	35.42	46.00	-10.58	QP
H	942.1304	8.82	27.55	36.37	46.00	-9.63	QP

Remark:
Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level - Limit

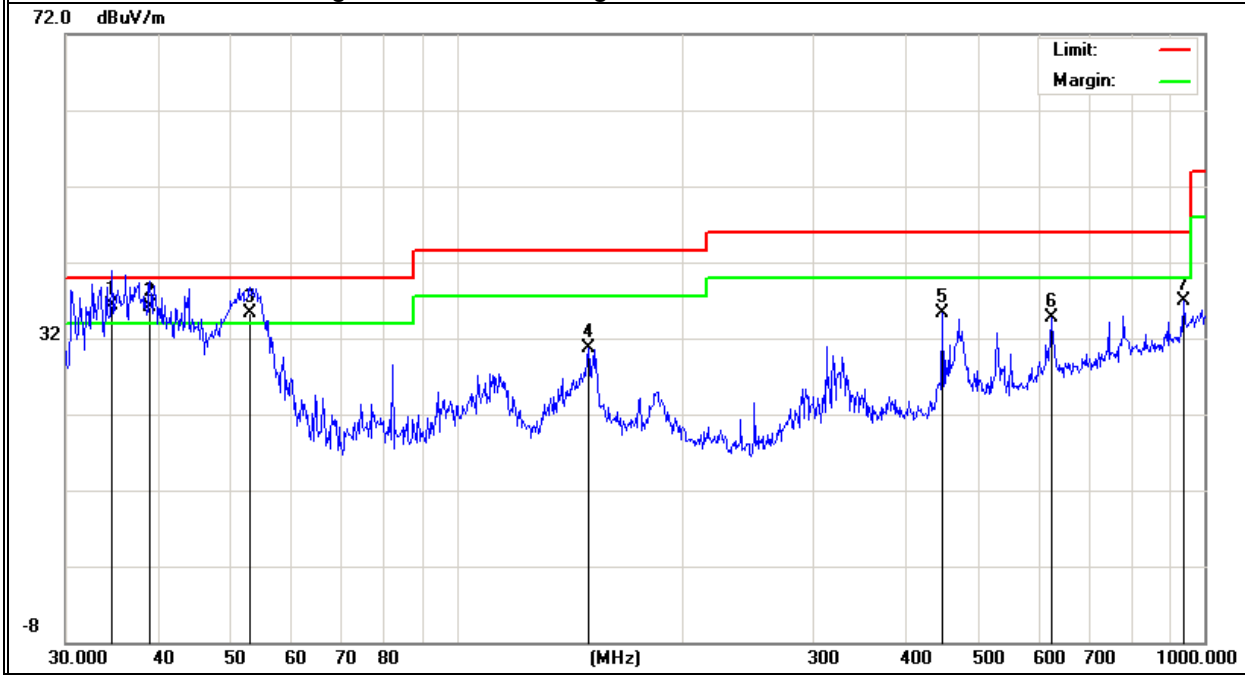


EUT：	ScreenBeam 960	Model Name ：	SBWD960A
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5V From adapter AC120V/60Hz
Test Mode ：	TX (802.11a-CH 149) -8812 module/8192 module-RX		

All the modulation modes have been tested, and the worst result was report as below:

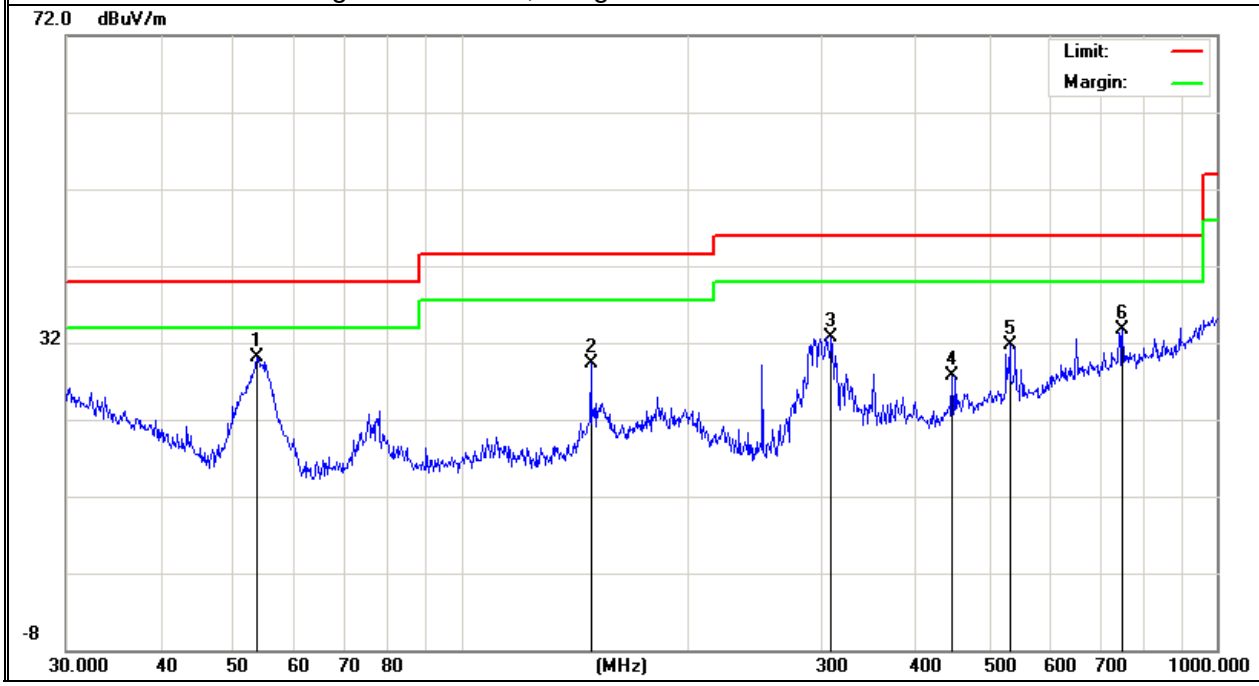
Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
V	34.6385	18.36	18.04	36.40	40.00	-3.60	QP
V	38.8878	20.35	15.85	36.20	40.00	-3.80	QP
V	52.9453	26.13	9.17	35.30	40.00	-4.70	QP
V	150.0107	17.78	12.83	30.61	43.50	-12.89	QP
V	446.4141	17.95	17.27	35.22	46.00	-10.78	QP
V	625.0778	13.64	21.13	34.77	46.00	-11.23	QP
V	938.8324	9.54	27.44	36.98	46.00	-9.02	QP

Remark:
Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level - Limit



Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
H	53.6932	21.25	8.85	30.10	40.00	-9.90	QP
H	148.4410	16.53	12.69	29.22	43.50	-14.28	QP
H	308.9126	18.55	14.22	32.77	46.00	-13.23	QP
H	446.4141	10.34	17.27	27.61	46.00	-18.39	QP
H	531.9633	12.64	18.97	31.61	46.00	-14.39	QP
H	750.1082	10.20	23.42	33.62	46.00	-12.38	QP

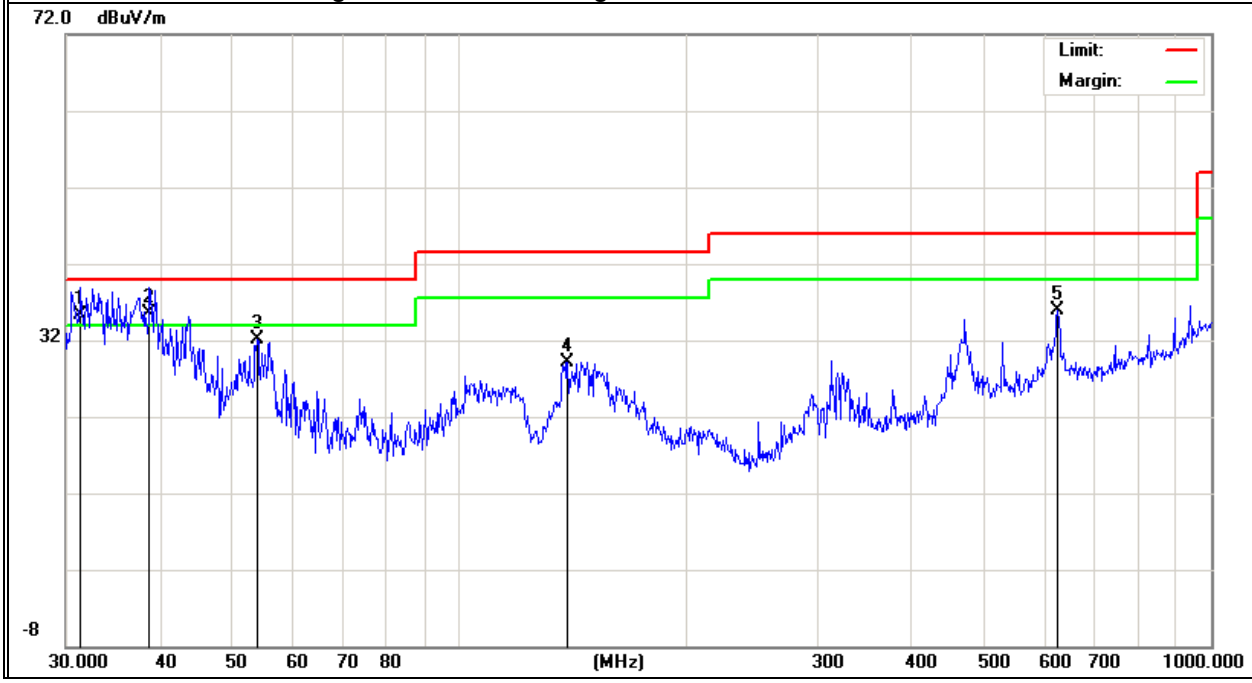
Remark:
Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level - Limit



EUT：	ScreenBeam 960	Model Name ：	SBWD960A
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5V From adapter AC120V/60Hz
Test Mode ：	TX (802.11a-CH 36) -8192 module/8812 module-RX		

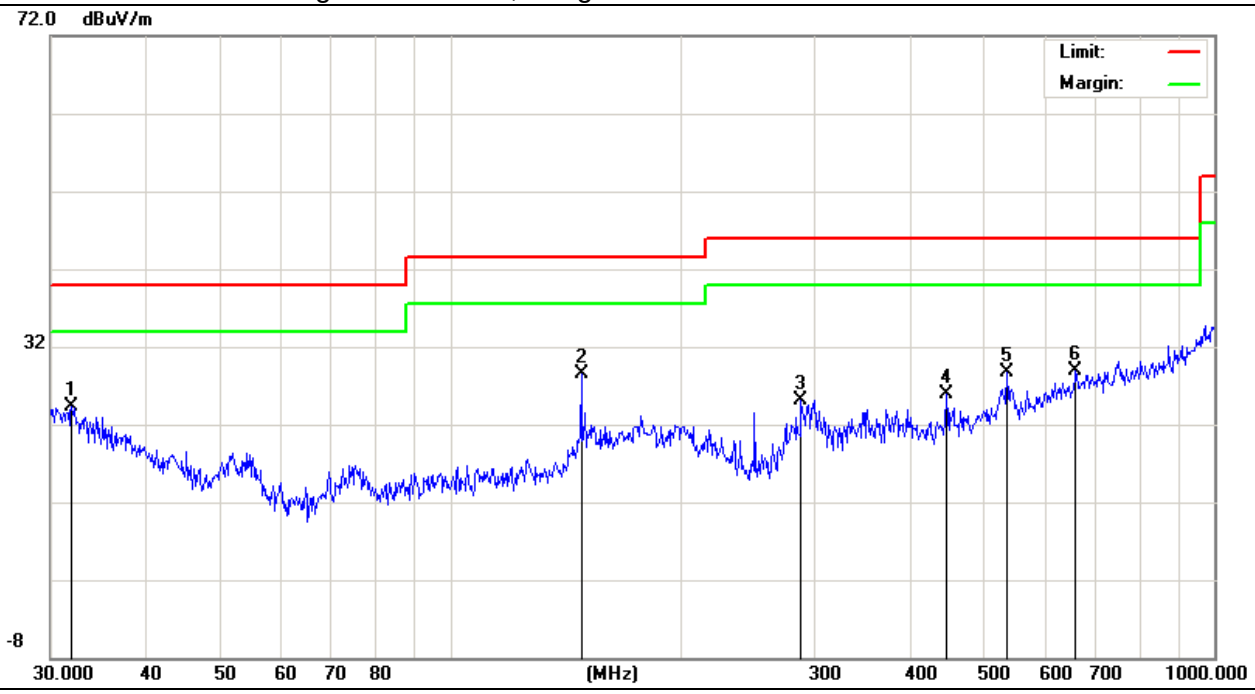
Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
V	31.3992	15.66	19.74	35.40	40.00	-4.60	QP
V	38.7518	19.67	15.93	35.60	40.00	-4.40	QP
V	53.8817	23.37	8.77	32.14	40.00	-7.86	QP
V	139.3613	17.01	12.09	29.10	43.50	-14.40	QP
V	625.0778	14.85	21.13	35.98	46.00	-10.02	QP

Remark:
Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level - Limit



Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
H	31.9542	4.82	19.55	24.37	40.00	-15.63	QP
H	148.4410	15.72	12.69	28.41	43.50	-15.09	QP
H	287.9904	11.83	13.35	25.18	46.00	-20.82	QP
H	446.4141	8.57	17.27	25.84	46.00	-20.16	QP
H	535.7073	9.65	19.05	28.70	46.00	-17.30	QP
H	658.8360	7.09	21.82	28.91	46.00	-17.09	QP

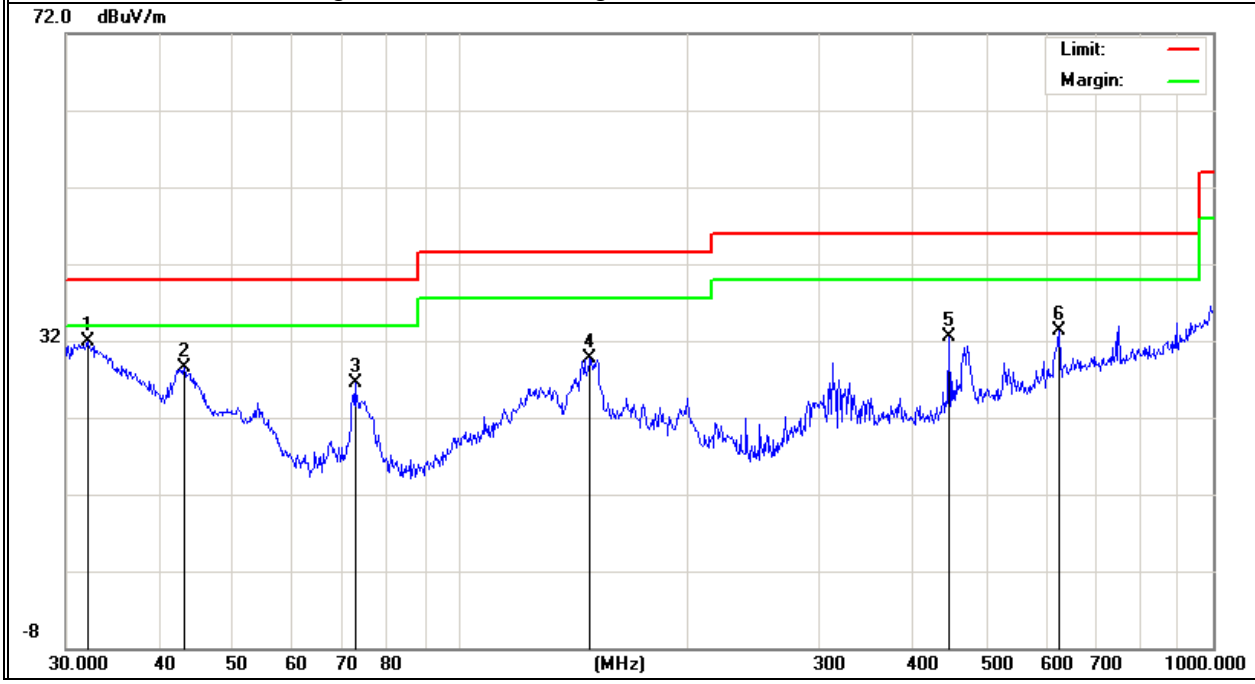
Remark:
Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level - Limit



EUT：	ScreenBeam 960	Model Name ：	SBWD960A
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5V From adapter AC120V/60Hz
Test Mode ：	TX (802.11a-CH 149) -8192 module/8812 module-RX		

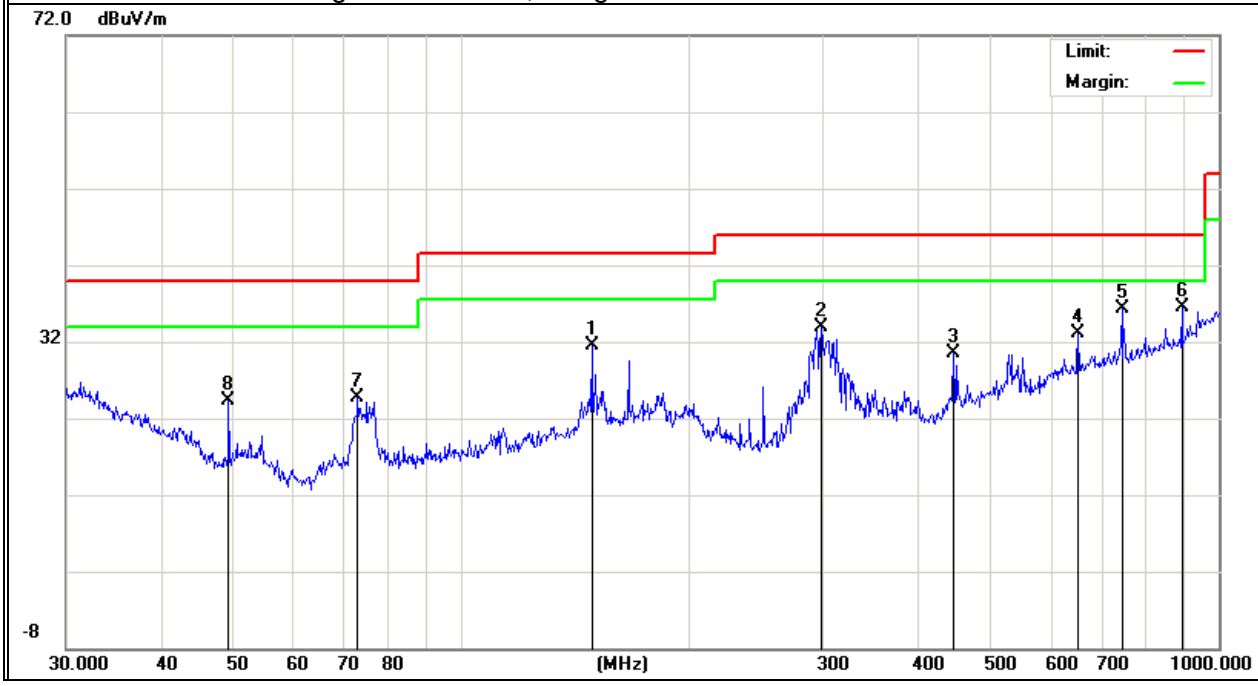
Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
V	32.0667	12.44	19.49	31.93	40.00	-8.07	QP
V	43.0504	14.68	13.73	28.41	40.00	-11.59	QP
V	72.5916	15.94	10.58	26.52	40.00	-13.48	QP
V	148.9625	16.91	12.73	29.64	43.50	-13.86	QP
V	446.4141	15.28	17.27	32.55	46.00	-13.45	QP
V	625.0778	12.11	21.13	33.24	46.00	-12.76	QP

Remark:
Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level - Limit



Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
H	148.4410	18.86	12.69	31.55	43.50	-11.95	QP
H	298.2681	20.19	13.79	33.98	46.00	-12.02	QP
H	446.4141	13.25	17.27	30.52	46.00	-15.48	QP
H	651.9415	11.53	21.63	33.16	46.00	-12.84	QP
H	744.8661	13.01	23.35	36.36	46.00	-9.64	QP
H	893.8567	11.11	25.43	36.54	46.00	-9.46	QP
H	72.8465	14.10	10.60	24.70	40.00	-15.30	peak
H	49.1865	14.01	10.37	24.38	40.00	-15.62	peak

Remark:
Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level - Limit



3.2.8 TEST RESULTS (1GHz-18GHz)

EUT：	ScreenBeam 960	Model Name ：	SBWD960A
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5V
Test Mode ：	Module 8812:TX (5.2G)-802.11a 5150-5250MHz		

All the modulation modes have been tested, and the worst result was report as below:

Polar	Frequency	Meter Reading	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(H/V)	(MHz)	(dBuV)	(dB)	dB/m	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel (5180 MHz)-Above 1G									
Vertical	2461.326	53.12	5.94	35.40	44.00	50.46	74.00	-23.54	Pk
Vertical	2461.265	46.65	5.94	35.40	44.00	43.99	54.00	-10.01	AV
Vertical	10360.286	61.36	8.46	39.75	44.50	65.07	74.00	-8.93	Pk
Vertical	10360.221	45.69	8.46	39.75	44.50	49.4	54.00	-4.6	AV
Vertical	15540.261	55.36	10.12	38.80	44.10	60.18	74.00	-13.82	Pk
Vertical	15540.128	41.09	10.12	38.80	42.70	47.31	54.00	-6.69	AV
Horizontal	2435.228	58.34	5.94	35.18	44.00	55.46	74.00	-18.54	Pk
Horizontal	2435.121	45.19	5.94	35.18	44.00	42.31	54.00	-11.69	AV
Horizontal	10360.665	61.09	8.46	38.71	44.50	63.76	74.00	-10.24	Pk
Horizontal	10360.605	45.18	8.46	38.71	44.50	47.85	54.00	-6.15	AV
Horizontal	15540.247	57.19	10.12	38.38	44.10	61.59	74.00	-12.41	Pk
Horizontal	15540.721	43.65	10.12	38.38	44.10	48.05	54.00	-5.95	AV
middle Channel (5200 MHz)-Above 1G									
Vertical	2315.655	57.13	6.48	36.35	44.05	55.91	74.00	-18.09	Pk
Vertical	2315.124	42.08	6.48	36.35	44.05	40.86	54.00	-13.14	AV
Vertical	10400.229	60.13	8.47	37.88	44.51	61.97	74.00	-12.03	Pk
Vertical	10400.215	44.07	8.47	37.88	44.51	45.91	54.00	-8.09	AV
Vertical	15560.151	58.07	10.12	38.8	44.10	62.89	74.00	-11.11	Pk
Vertical	15560.322	41.11	10.12	38.8	42.70	47.33	54.00	-6.67	AV
Horizontal	2441.128	57.6	6.48	36.37	44.05	56.4	74.00	-17.6	Pk
Horizontal	2441.11	42.16	6.48	36.37	44.05	40.96	54.00	-13.04	AV
Horizontal	10401.283	60.33	8.47	38.64	44.50	62.94	74.00	-11.06	Pk
Horizontal	10401.263	46.81	8.47	38.64	44.50	49.42	54.00	-4.58	AV
Horizontal	15561.258	56.25	10.12	38.38	44.10	60.65	74.00	-13.35	Pk
Horizontal	15561.035	42.03	10.12	38.38	44.10	46.43	54.00	-7.57	AV
High Channel (5240 MHz)-Above 1G									
Vertical	2418.262	57.64	7.10	37.24	43.50	58.48	74.00	-15.52	Pk
Vertical	2418.232	45.12	7.10	37.24	43.50	45.96	54.00	-8.04	AV
Vertical	10480.109	60.11	8.46	37.68	44.50	61.75	74.00	-12.25	Pk
Vertical	10480.117	43.51	8.46	37.68	44.50	45.15	54.00	-8.85	AV
Vertical	15720.061	58.03	10.12	38.8	44.10	62.85	74.00	-11.15	Pk
Vertical	15720.145	40.18	10.12	38.8	42.70	46.4	54.00	-7.6	AV
Horizontal	2413.165	59.34	7.10	37.24	43.50	60.18	74.00	-13.82	Pk
Horizontal	2413.266	41.51	7.10	37.24	43.50	42.35	54.00	-11.65	AV
Horizontal	10480.812	59.67	8.46	38.57	44.50	62.2	74.00	-11.8	Pk
Horizontal	10480.157	45.18	8.46	38.57	44.50	47.71	54.00	-6.29	AV
Horizontal	15720.134	57.06	10.12	38.38	44.10	61.46	74.00	-12.54	Pk
Horizontal	15720.115	41.57	10.12	38.38	44.10	45.97	54.00	-8.03	AV

Note:"802.11a (5G)" mode is the worst mode. PK value is lower than the Average value limit, So average didn't record.

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

EUT：	ScreenBeam 960	Model Name ：	SBWD960A
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5V
Test Mode ：	Module 8812:TX (5.8G)-802.11a 5745-5825MHz		

All the modulation modes have been tested, and the worst result was report as below:

Polar	Frequency	Meter Reading	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(H/V)	(MHz)	(dBuV)	(dB)	dB/m	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel (5745 MHz)-Above 1G									
Vertical	4679.234	52.13	5.94	35.40	44.00	49.47	74.00	-24.53	Pk
Vertical	4679.234	45.59	5.94	35.40	44.00	42.93	54.00	-11.07	AV
Vertical	11490.227	60.67	8.46	39.75	44.50	64.38	74.00	-9.62	Pk
Vertical	11490.227	44.15	8.46	39.75	44.50	47.86	54.00	-6.14	AV
Vertical	17235.265	56.84	10.12	38.80	44.10	61.66	74.00	-12.34	Pk
Vertical	17235.154	40.26	10.12	38.80	42.70	46.48	54.00	-7.52	AV
Horizontal	4679.639	57.51	5.94	35.18	44.00	54.63	74.00	-19.37	Pk
Horizontal	4679.639	44.18	5.94	35.18	44.00	41.3	54.00	-12.7	AV
Horizontal	11490.128	59.86	8.46	38.71	44.50	62.53	74.00	-11.47	Pk
Horizontal	10360.605	44.31	8.46	38.71	44.50	46.98	54.00	-7.02	AV
Horizontal	17235.111	58.16	10.12	38.38	44.10	62.56	74.00	-11.44	Pk
Horizontal	17235.109	42.86	10.12	38.38	44.10	47.26	54.00	-6.74	AV
middle Channel (5785 MHz)-Above 1G									
Vertical	4592.256	58.64	6.48	36.35	44.05	57.42	74.00	-16.58	Pk
Vertical	4592.256	43.18	6.48	36.35	44.05	41.96	54.00	-12.04	AV
Vertical	11570.199	59.85	8.47	37.88	44.51	61.69	74.00	-12.31	Pk
Vertical	11570.199	43.85	8.47	37.88	44.51	45.69	54.00	-8.31	AV
Vertical	17355.128	57.18	10.12	38.8	44.10	62	74.00	-12	Pk
Vertical	17355.128	40.16	10.12	38.8	42.70	46.38	54.00	-7.62	AV
Horizontal	4592.535	59.88	6.48	36.37	44.05	58.68	74.00	-15.32	Pk
Horizontal	4592.535	43.27	6.48	36.37	44.05	42.07	54.00	-11.93	AV
Horizontal	11570.271	60.56	8.47	38.64	44.50	63.17	74.00	-10.83	Pk
Horizontal	11570.271	46.26	8.47	38.64	44.50	48.87	54.00	-5.13	AV
Horizontal	17355.247	59.86	10.12	38.38	44.10	64.26	74.00	-9.74	Pk
Horizontal	17356.721	44.31	10.12	38.38	44.10	48.71	54.00	-5.29	AV
High Channel (5825 MHz)-Above 1G									
Vertical	6039.235	58.96	7.10	37.24	43.50	59.8	74.00	-14.2	Pk
Vertical	6039.235	46.62	7.10	37.24	43.50	47.46	54.00	-6.54	AV
Vertical	11652.838	55.53	8.46	37.68	44.50	57.17	74.00	-16.83	Pk
Vertical	11652.838	42.27	8.46	37.68	44.50	43.91	54.00	-10.09	AV
Vertical	17473.128	59.86	10.12	38.8	44.10	64.68	74.00	-9.32	Pk
Vertical	17473.107	39.97	10.12	38.8	42.70	46.19	54.00	-7.81	AV
Horizontal	6039.101	66.69	7.10	37.24	43.50	67.53	74.00	-6.47	Pk
Horizontal	6039.101	42.2	7.10	37.24	43.50	43.04	54.00	-10.96	AV
Horizontal	11652.283	56.63	8.46	38.57	44.50	59.16	74.00	-14.84	Pk
Horizontal	11652.283	43.77	8.46	38.57	44.50	46.3	54.00	-7.7	AV
Horizontal	17474.247	59.86	10.12	38.38	44.10	64.26	74.00	-9.74	Pk
Horizontal	17474.721	44.31	10.12	38.38	44.10	48.71	54.00	-5.29	AV

Note:"802.11a (5G)" mode is the worst mode. PK value is lower than the Average value limit, So average didn't record.

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

EUT：	ScreenBeam 960	Model Name ：	SBWD960A
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5V
Test Mode ：	Module 8192:TX (5.2G)-802.11a 5150-5250MHz		

All the modulation modes have been tested, and the worst result was report as below:

Polar	Frequency	Meter Reading	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(H/V)	(MHz)	(dBuV)	(dB)	dB/m	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel (5185 MHz)-Above 1G									
Vertical	2315.121	54.16	5.94	35.40	44.00	51.5	74.00	-22.5	Pk
Vertical	2315.145	43.27	5.94	35.40	44.00	40.61	54.00	-13.39	AV
Vertical	10373.214	61.04	8.46	39.75	44.50	64.75	74.00	-9.25	Pk
Vertical	10373.166	45.62	8.46	39.75	44.50	49.33	54.00	-4.67	AV
Vertical	15540.118	55.08	10.12	38.80	44.10	59.9	74.00	-14.1	Pk
Vertical	15540.118	41.67	10.12	38.80	42.70	47.89	54.00	-6.11	AV
Horizontal	4679.637	57.61	5.94	35.18	44.00	54.73	74.00	-19.27	Pk
Horizontal	4679.637	42.19	5.94	35.18	44.00	39.31	54.00	-14.69	AV
Horizontal	10371.221	60.34	8.46	38.71	44.50	63.01	74.00	-10.99	Pk
Horizontal	10731.265	46.26	8.46	38.71	44.50	48.93	54.00	-5.07	AV
Horizontal	15540.245	56.15	10.12	38.38	44.10	60.55	74.00	-13.45	Pk
Horizontal	15540.221	41.97	10.12	38.38	44.10	46.37	54.00	-7.63	AV
middle Channel (5200 MHz)-Above 1G									
Vertical	4592.232	56.33	6.48	36.35	44.05	55.11	74.00	-18.89	Pk
Vertical	4592.221	41.64	6.48	36.35	44.05	40.42	54.00	-13.58	AV
Vertical	10401.165	60.35	8.47	37.88	44.51	62.19	74.00	-11.81	Pk
Vertical	10401.215	45.15	8.47	37.88	44.51	46.99	54.00	-7.01	AV
Vertical	15540.117	56.21	10.12	38.8	44.10	61.03	74.00	-12.97	Pk
Vertical	15540.117	41.82	10.12	38.8	42.70	48.04	54.00	-5.96	AV
Horizontal	4592.523	58.61	6.48	36.37	44.05	57.41	74.00	-16.59	Pk
Horizontal	4592.523	41.21	6.48	36.37	44.05	40.01	54.00	-13.99	AV
Horizontal	10402.158	60.38	8.47	38.64	44.50	62.99	74.00	-11.01	Pk
Horizontal	10402.137	46.19	8.47	38.64	44.50	48.8	54.00	-5.2	AV
Horizontal	15540.232	57.32	10.12	38.38	44.10	61.72	74.00	-12.28	Pk
Horizontal	15540.183	41.82	10.12	38.38	44.10	46.22	54.00	-7.78	AV
High Channel (5240 MHz)-Above 1G									
Vertical	6039.235	58.13	7.10	37.24	43.50	58.97	74.00	-15.03	Pk
Vertical	6039.235	45.17	7.10	37.24	43.50	46.01	54.00	-7.99	AV
Vertical	10482.268	60.31	8.46	37.68	44.50	61.95	74.00	-12.05	Pk
Vertical	10482.716	45.18	8.46	37.68	44.50	46.82	54.00	-7.18	AV
Vertical	15540.128	57.04	10.12	38.8	44.10	61.86	74.00	-12.14	Pk
Vertical	15540.128	42.1	10.12	38.8	42.70	48.32	54.00	-5.68	AV
Horizontal	6039.101	58.61	7.10	37.24	43.50	59.45	74.00	-14.55	Pk
Horizontal	6039.101	43.11	7.10	37.24	43.50	43.95	54.00	-10.05	AV
Horizontal	10481.671	57.81	8.46	38.57	44.50	60.34	74.00	-13.66	Pk
Horizontal	10481.351	42.16	8.46	38.57	44.50	44.69	54.00	-9.31	AV
Horizontal	15540.247	56.24	10.12	38.38	44.10	60.64	74.00	-13.36	Pk
Horizontal	15540.721	41.08	10.12	38.38	44.10	45.48	54.00	-8.52	AV

Note:"802.11a (5G)" mode is the worst mode. PK value is lower than the Average value limit, So average didn't record.

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

EUT：	ScreenBeam 960	Model Name ：	SBWD960A
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5V
Test Mode ：	Module 8192:TX (5.8G)-802.11a 5745-5825MHz		

All the modulation modes have been tested, and the worst result was report as below:

Polar	Frequency	Meter Reading	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(H/V)	(MHz)	(dBuV)	(dB)	dB/m	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel (5745 MHz)-Above 1G									
Vertical	4679.316	53.26	5.94	35.40	44.00	50.6	74.00	-23.4	Pk
Vertical	4679.316	44.19	5.94	35.40	44.00	41.53	54.00	-12.47	AV
Vertical	11490.21	61.25	8.46	39.75	44.50	64.96	74.00	-9.04	Pk
Vertical	11490.21	45.26	8.46	39.75	44.50	48.97	54.00	-5.03	AV
Vertical	17235.12	55.86	10.12	38.80	44.10	60.68	74.00	-13.32	Pk
Vertical	17235.12	43.26	10.12	38.80	42.70	49.48	54.00	-4.52	AV
Horizontal	4679.637	58.16	5.94	35.18	44.00	55.28	74.00	-18.72	Pk
Horizontal	4679.637	46.29	5.94	35.18	44.00	43.41	54.00	-10.59	AV
Horizontal	11490.13	60.32	8.46	38.71	44.50	62.99	74.00	-11.01	Pk
Horizontal	11490.13	45.16	8.46	38.71	44.50	47.83	54.00	-6.17	AV
Horizontal	17235.25	57.18	10.12	38.38	44.10	61.58	74.00	-12.42	Pk
Horizontal	17235.22	43.09	10.12	38.38	44.10	47.49	54.00	-6.51	AV
middle Channel (5785 MHz)-Above 1G									
Vertical	4592.232	57.68	6.48	36.35	44.05	56.46	74.00	-17.54	Pk
Vertical	4592.221	42.19	6.48	36.35	44.05	40.97	54.00	-13.03	AV
Vertical	11570.14	59.64	8.47	37.88	44.51	61.48	74.00	-12.52	Pk
Vertical	11570.14	42.18	8.47	37.88	44.51	44.02	54.00	-9.98	AV
Vertical	17356.12	58.69	10.12	38.8	44.10	63.51	74.00	-10.49	Pk
Vertical	17356.12	42.09	10.12	38.8	42.70	48.31	54.00	-5.69	AV
Horizontal	4592.523	59.76	6.48	36.37	44.05	58.56	74.00	-15.44	Pk
Horizontal	4592.523	43.68	6.48	36.37	44.05	42.48	54.00	-11.52	AV
Horizontal	11570.21	61.52	8.47	38.64	44.50	64.13	74.00	-9.87	Pk
Horizontal	11570.21	47.26	8.47	38.64	44.50	49.87	54.00	-4.13	AV
Horizontal	17352.23	59.61	10.12	38.38	44.10	64.01	74.00	-9.99	Pk
Horizontal	17352.18	42.68	10.12	38.38	44.10	47.08	54.00	-6.92	AV
High Channel (5825 MHz)-Above 1G									
Vertical	6039.235	59.41	7.10	37.24	43.50	60.25	74.00	-13.75	Pk
Vertical	6039.235	46.28	7.10	37.24	43.50	47.12	54.00	-6.88	AV
Vertical	11652.84	58.62	8.46	37.68	44.50	60.26	74.00	-13.74	Pk
Vertical	11652.84	43.67	8.46	37.68	44.50	45.31	54.00	-8.69	AV
Vertical	17472.13	58.67	10.12	38.8	44.10	63.49	74.00	-10.51	Pk
Vertical	17472.13	41.09	10.12	38.8	42.70	47.31	54.00	-6.69	AV
Horizontal	6039.101	59.68	7.10	37.24	43.50	60.52	74.00	-13.48	Pk
Horizontal	6039.101	42.68	7.10	37.24	43.50	43.52	54.00	-10.48	AV
Horizontal	11652.28	59.06	8.46	38.57	44.50	61.59	74.00	-12.41	Pk
Horizontal	11652.28	43.95	8.46	38.57	44.50	46.48	54.00	-7.52	AV
Horizontal	17471.25	58.67	10.12	38.38	44.10	63.07	74.00	-10.93	Pk
Horizontal	17471.72	42.12	10.12	38.38	44.10	46.52	54.00	-7.48	AV

Note:"802.11a (5G)" mode is the worst mode. PK value is lower than the Average value limit, So average didn't record.

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

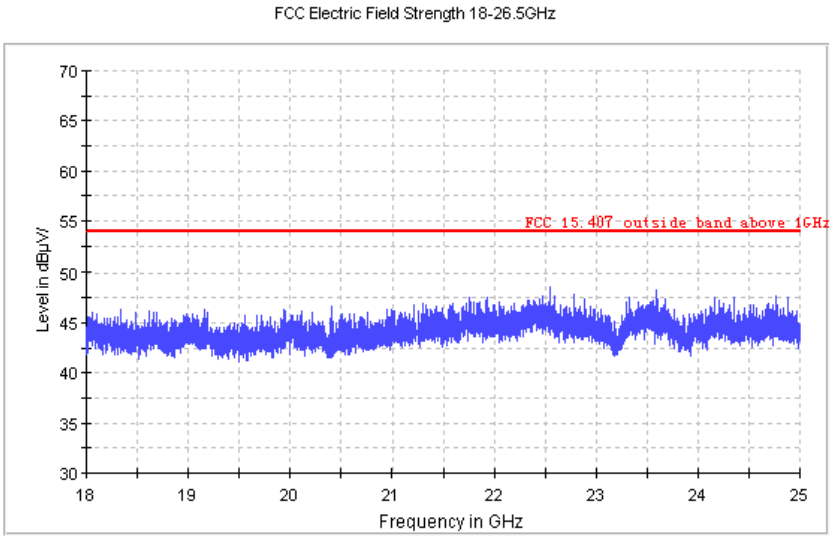
TEST RESULTS (18GHz-40GHz)

EUT：	ScreenBeam 960	Model Name ：	SBWD960A
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX (5.2G)-802.11N(20) 5180MHz~5240MHz , TX (5.8G) -802.11N(20) 5745MHz~5825MHz		

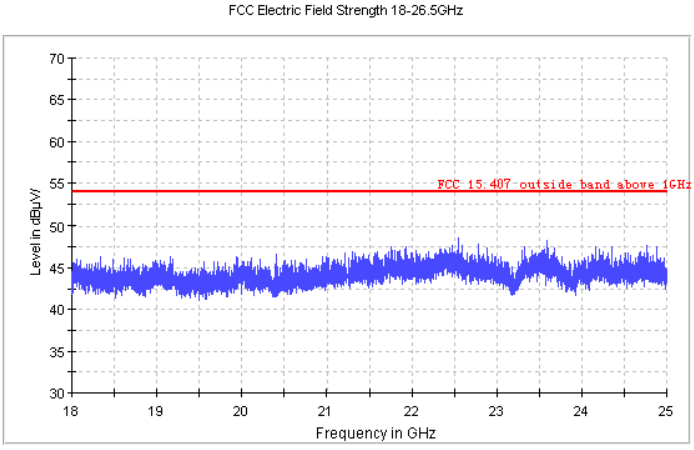
All the modulation modes have been tested, and the worst result was report as below:

Low Channel (802.11N(20) 5180 MHz)-Above 1G

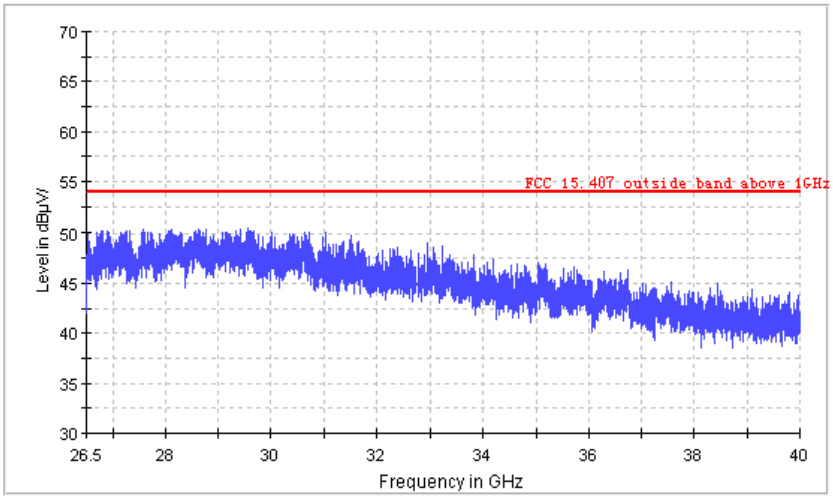
Horizontal



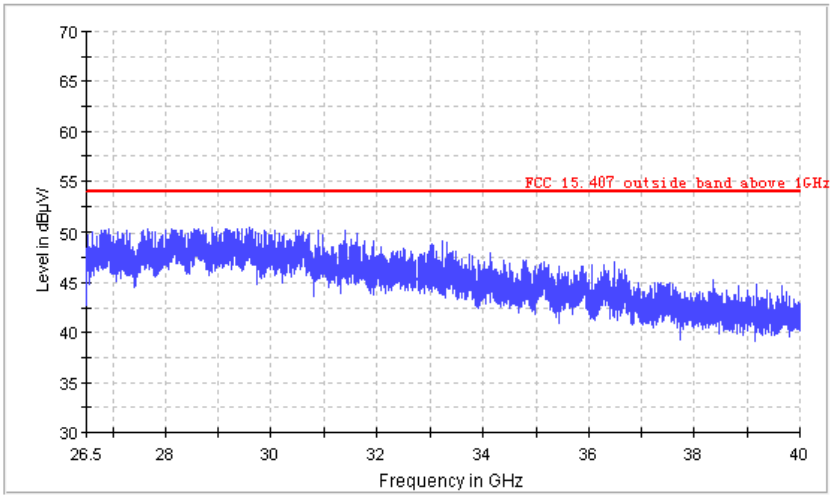
Vertical



Horizontal



Vertical



4. POWER SPECTRAL DENSITY TEST

4.1 APPLIED PROCEDURES / LIMIT

According to FCC §15.407(a)(3)

For the band 5.15-5.25 GHz,

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 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. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).
(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 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.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. 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.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, 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.

For the band 5.725-5.85 GHz

(3)For the band 5.725-5.85 GHz, 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.

,

4.2 TEST PROCEDURE

For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 KHz bandwidth, the following adjustments to the procedures apply:

a) Set RBW ≥ 1/T, where T is defined in section II.B.l.a).

b) Set VBW ≥ 3 RBW.

c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10log(500kHz/RBW) to the measured result, whereas RBW (< 500 KHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.

d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add 10log(1MHz/RBW) to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.

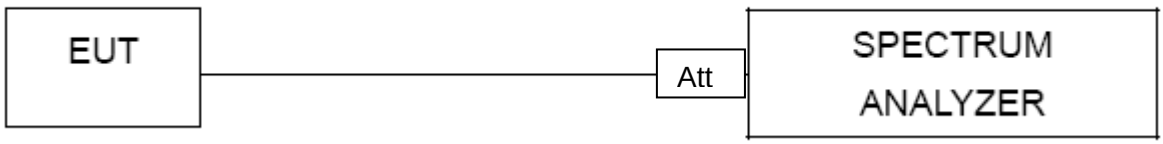
e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

Note: As a practical matter, it is recommended to use reduced RBW of 100 KHz for the sections 5.c) and 5.d) above, since RBW=100 KHZ is available on nearly all spectrum analyzers.

4.3 DEVIATION FROM STANDARD

No deviation.

4.4 TEST SETUP



4.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.

4.6 TEST RESULTS

EUT：	ScreenBeam 960	Model Name ：	SBWD960A
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1015 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX Frequency Band I (5150-5250MHz)		

NOTE: Model 1/2 (3/4) represent two different modules，

1(2) Represent the value of antenna 1 and 2,The worst data is Antenna 1 ,only shown Antenna 1 Plot.

3(4) Represent the value of antenna 3 and 4,The worst data is Antenna 3 ,only shown Antenna 3 Plot.

EUT has two antennas, and different modes support different transmit mode what describe as Following form:

Mode	Tx/Rx
802.11a	1Tx, 1Rx
802.11n/ac	2Tx, 2Rx

RF Module 8812

Mode	Frequency	Measured Power Density (dBm)		Total power density (dBm)	Calculate power density (dBm)(Note 1)		Limit (dBm)	Result
		ANT 1	ANT 2		ANT 1	ANT 2		
802.11 a	5185	1.532	1.162	-	1.532	1.162	11	PASS
	5200	1.5	1.215	-	1.5	1.215	11	PASS
	5240	1.935	1.6215	-	1.935	1.6215	11	PASS
802.11 n20	5185	1.253	1.034	4.155	4.155		9.35	PASS
	5200	1.178	1.151	4.175	4.175		9.35	PASS
	5240	1.778	1.268	4.541	4.541		9.35	PASS
802.11 n40	5190	-2.749	-2.834	0.219	0.219		9.35	PASS
	5230	-4.17	-3.061	-0.570	-0.57		9.35	PASS
802.11 AC20	5185	1.13	1.11	4.130	4.130		9.35	PASS
	5200	1.29	1.2	4.256	4.256		9.35	PASS
	5240	1.912	1.266	4.611	4.611		9.35	PASS
802.11 AC40	5190	-2.872	-3.065	0.043	0.043		9.35	PASS
	5230	-2.62	-3.11	0.152	0.152		9.35	PASS
802.11 AC80	5210 MHz	-1.785	-1.855	1.190	1.190		9.35	PASS

Modules 8812 For MIMO mode: Directional gain
= 10log(antenna 1 + antenna 2) dbi =7.65dbi in 5.2GHz
= 10log(antenna 1 + antenna 2) dbi =8.04dbi in 5.8GHz
802.11 n/ac 5.0GHz has MIMO mode.

7.65dbi>6.0 dbi so power limit= 11-(7.65-6.0)=9.35

Factor =10log(1MHz/RBW)

RBW=1MHz

RF Module 8192

Mode	Frequency	Measured Power Density (dBm)		Total power density (dBm)	Calculate power density (dBm)(Note 1)		Limit (dBm)	Result
		ANT A	ANT B		ANT A	ANT B		
802.11 a	5185	1.799	1.684	-	1.799	1.684	11	PASS
	5200	1.192	1.569	-	1.192	1.569	11	PASS
	5240	1.893	1.664	-	1.893	1.664	11	PASS
802.11 n20	5185	1.411	1.364	4.398	4.398		10.14	PASS
	5200	1.155	1.121	4.148	4.148		10.14	PASS
	5240	1.609	1.426	4.529	4.529		10.14	PASS
802.11 n40	5190	-2.171	-2.316	0.767	0.767		10.14	PASS
	5230	-2.099	-2.116	0.903	0.90		10.14	PASS

Modules 8192 For MIMO mode: Directional gain
=10log(antenna 3 + antenna 4) dbi =6.86dbi in 5.2GHz
= 10log(antenna 3 + antenna 4) dbi =8.03dbi in 5.8GHz
802.11n/ac 5.0GHz has MIMO mode.

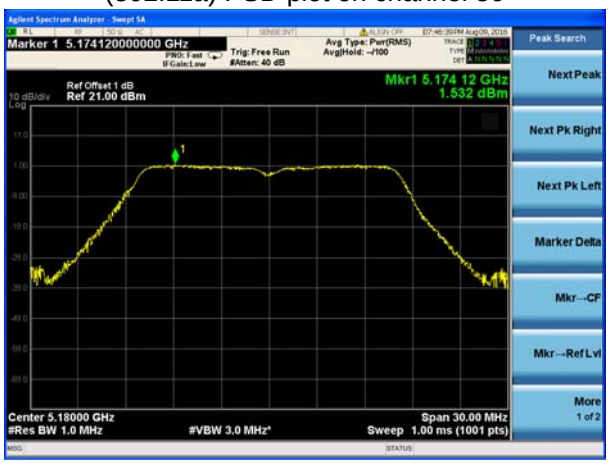
6.86dbi>6.0 dbi so power limit= 11-(6.86-6.0)=10.14

Factor =10log(1MHz/RBW)

RBW=1MHz

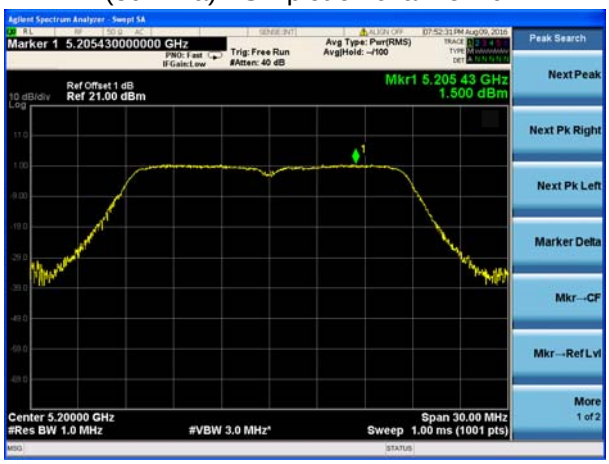
RF Module 8812 Antenna 1

(802.11a) PSD plot on channel 36

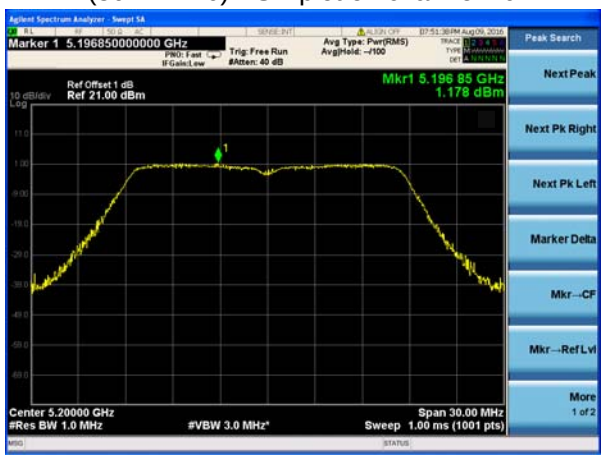


(802.11n20) PSD plot on channel 36

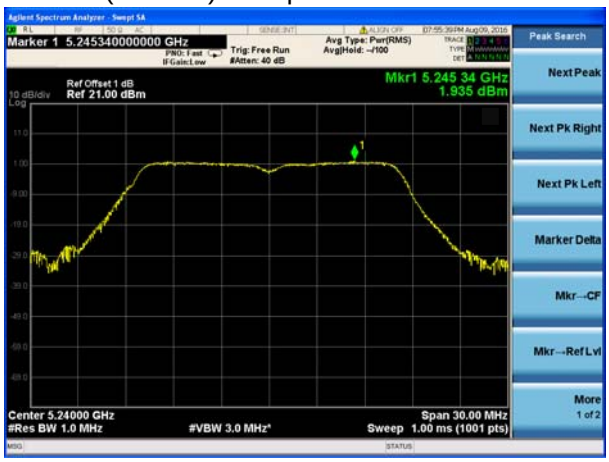
(802.11a) PSD plot on channel 40



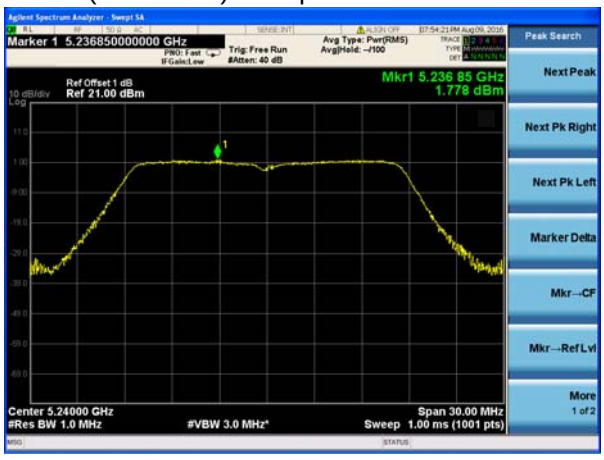
(802.11n20) PSD plot on channel 40



(802.11a) PSD plot on channel 48



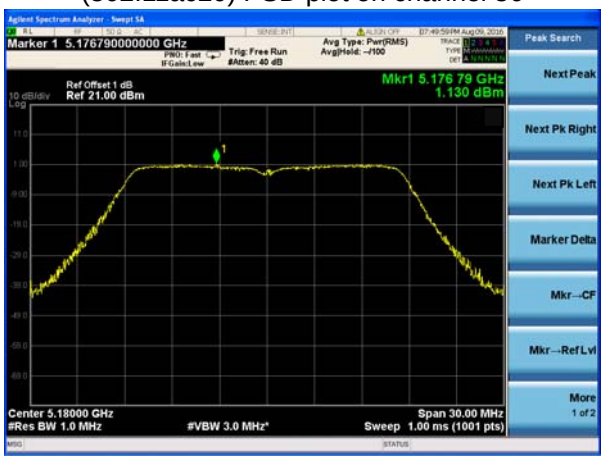
(802.11n20) PSD plot on channel 48



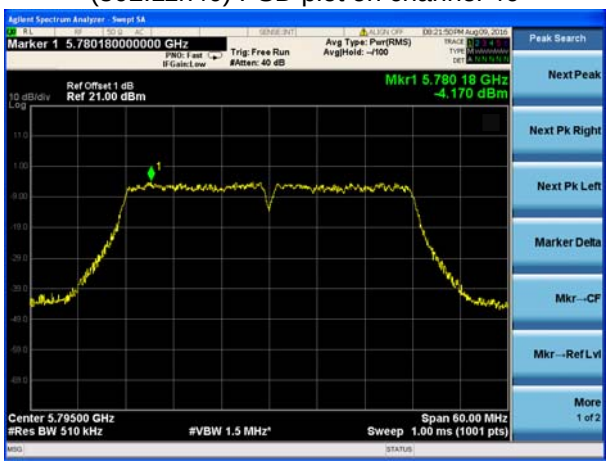
RF Module 8812 Antenna 1

(802.11n40) PSD plot on channel 38

(802.11ac20) PSD plot on channel 36

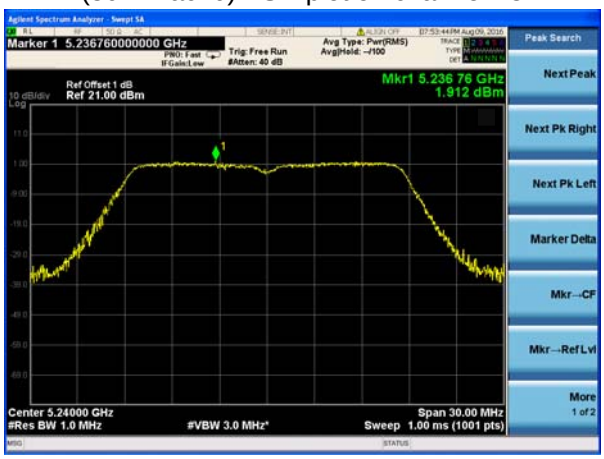


(802.11n40) PSD plot on channel 46



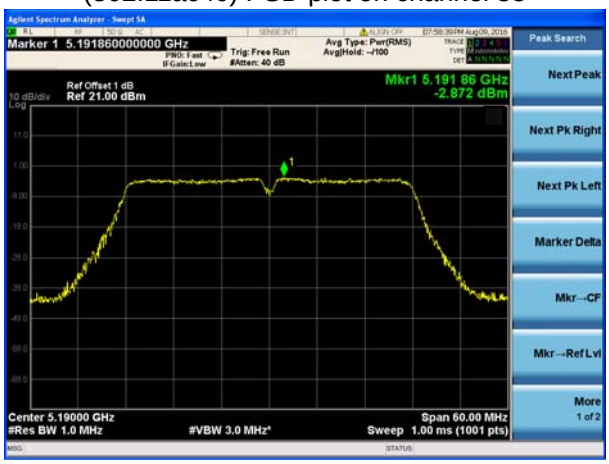
(802.11ac20) PSD plot on channel 40

(802.11ac20) PSD plot on channel 48

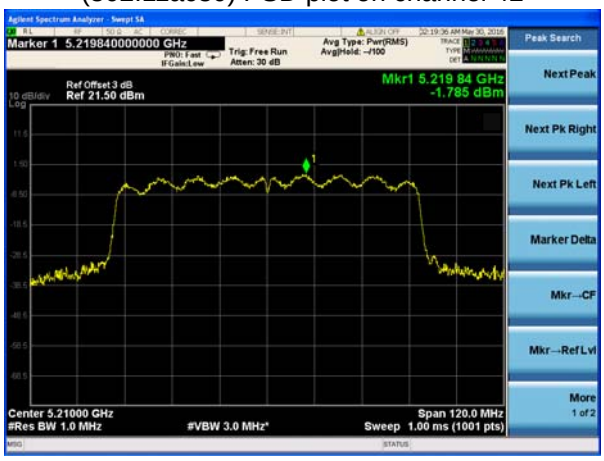


RF Module 8812 Antenna 1

(802.11ac40) PSD plot on channel 38



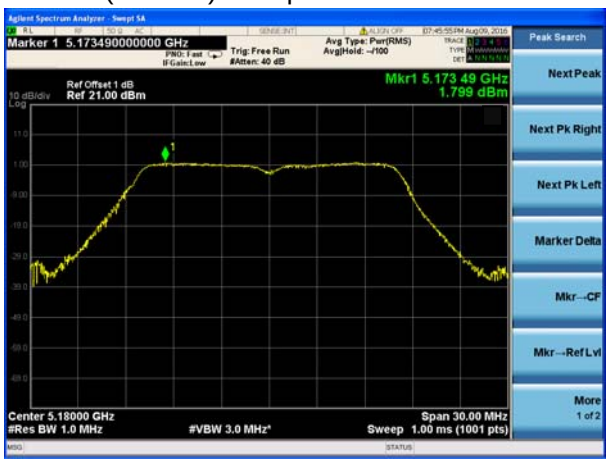
(802.11ac80) PSD plot on channel 42



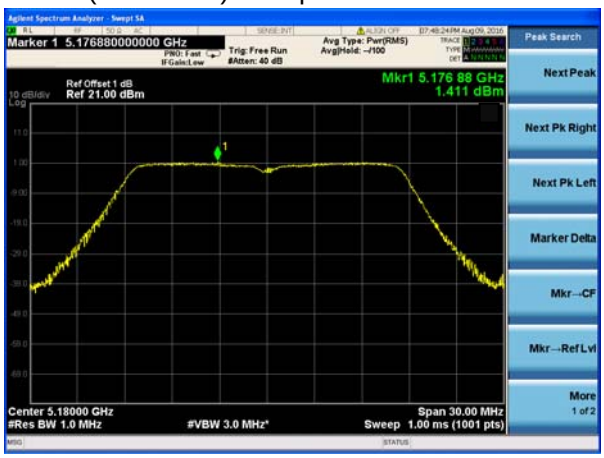
(802.11ac40) PSD plot on channel 46

RF Module 8192 Antenna 3

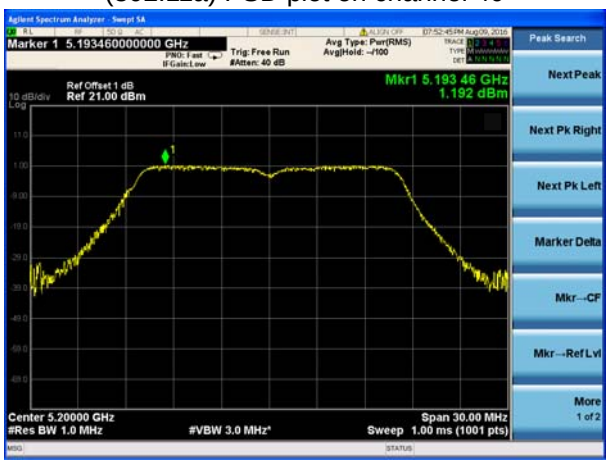
(802.11a) PSD plot on channel 36



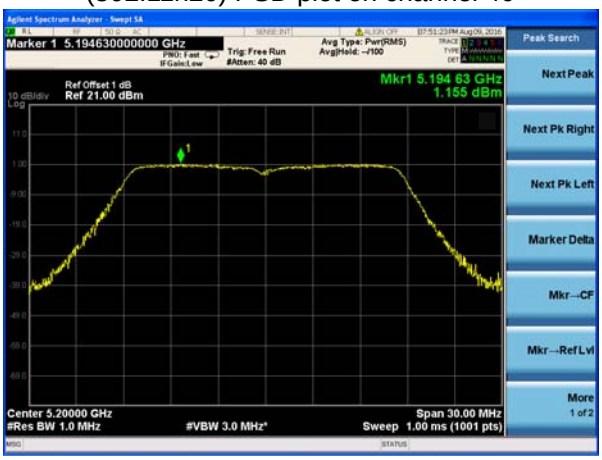
(802.11n20) PSD plot on channel 36



(802.11a) PSD plot on channel 40

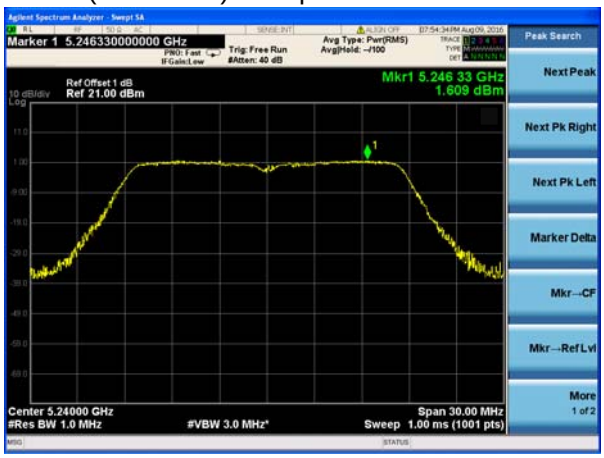


(802.11n20) PSD plot on channel 40



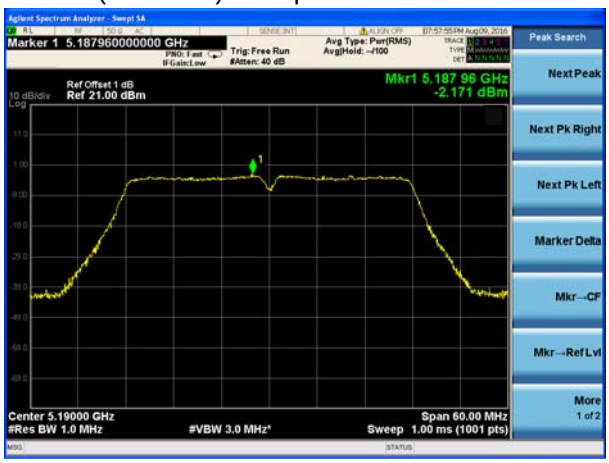
(802.11a) PSD plot on channel 48

(802.11n20) PSD plot on channel 48



RF Module 8192 Antenna 3

(802.1140) PSD plot on channel 38



(802.11n40) PSD plot on channel 46

Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1015 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX Frequency Band III (5725-5825MHz)		

NOTE: Model 1/2 (3/4) represent two different modules，
1(2) Represent the value of antenna 1 and 2,The worst data is Antenna 1 ,only shown Antenna 1 Plot.
3(4) Represent the value of antenna 3 and 4,The worst data is Antenna 3 ,only shown Antenna 3 Plot.

EUT has two antennas, and different modes support different transmit mode what describe as Following form:

Mode	Tx/Rx
802.11a	1Tx, 1Rx
802.11n/ac	2Tx, 2Rx

RF Module 8812

Mode	Frequency	Measured Power Density (dBm)		Total power density (dBm)	Calculate power density (dBm)(Note 1)		Limit (dBm)	Result
		ANT A	ANT B		ANT A	ANT B		
802.11 a	5745 MHz	1.662	1.562	-	1.662	1.562	30	PASS
	5785 MHz	0.727	1.25	-	0.727	1.25	30	PASS
	5825 MHz	-0.121	-0.226	-	-0.121	-0.226	30	PASS
802.11 n20	5745 MHz	1.568	1.316	4.454	4.454		27.96	PASS
	5785 MHz	1.029	1.006	4.028	4.028		27.96	PASS
	5825 MHz	0.071	1.032	3.588	3.588		27.96	PASS
802.11 n40	5755 MHz	-3.637	-3.667	-0.64	-0.64		27.96	PASS
	5795 MHz	-4.17	-4.22	-1.185	-1.18		27.96	PASS
802.11 AC20	5745 MHz	1.007	1.06	4.044	4.044		27.96	PASS
	5785 MHz	1.205	1.156	4.191	4.191		27.96	PASS
	5825 MHz	0.515	0.365	3.451	3.451		27.96	PASS
802.11 AC40	5755 MHz	-3.365	-3.662	-0.50	-0.50		27.96	PASS
	5795 MHz	-4.136	-4.165	-1.14	-1.14		27.96	PASS
802.11 AC80	5775 MHz	-3.703	-3.921	-0.80	-0.80		27.96	PASS

Note:

(1) Calculate power density= Measured Power Density+10log(1MHz/RBW)
RBW=0.51MHz

(Modules 8812 For MIMO mode: Directional gain
= 10log(antenna 1 + antenna 2) dbi =7.65dbi in 5.2GHz
= 10log(antenna 1 + antenna 2) dbi =8.04dbi in 5.8GHz
802.11 n/ac 5.0GHz has MIMO mode.
8.04dbi>6.0 dbi so power limit= 30-(8.04-6.0)=8.96

RF Module 8912

Mode	Frequency	Measured Power Density (dBm)		Total power density (dBm)	Calculate power density (dBm)(Note 1)		Limit (dBm)	Result
		ANT A	ANT B		ANT A	ANT B		
802.11 a	5745	1.733	1.689	-	1.733	1.689	30	PASS
	5785	1.408	1.364	-	1.408	1.364	30	PASS
	5825	0.242	0.165	-	0.242	0.165	30	PASS
802.11 n20	5745	1.783	1.619	4.712	4.712		29.97	PASS
	5785	0.972	0.894	3.943	3.943		29.97	PASS
	5825	-0.357	0.226	2.955	2.955		29.97	PASS
802.11 n40	5755	-3.223	-3.338	-0.27	-0.27		29.97	PASS
	5795	-4.132	-4.365	-1.237	-1.24		29.97	PASS

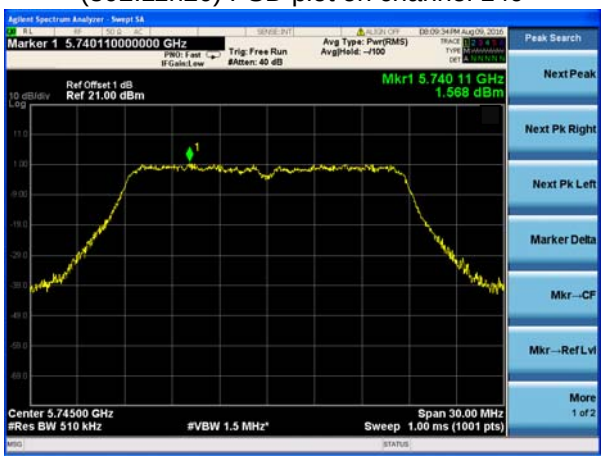
Modules 8192 For MIMO mode: Directional gain
=10log(antenna 3 + antenna 4) dbi =6.86dbi in 5.2GHz
= 10log(antenna 3 + antenna 4) dbi =8.03dbi in 5.8GHz
802.11n/ac 5.0GHz has MIMO mode.

8.03dbi>6.0 dbi so power limit= 30-(8.03-6.0)=8.97

RF Module 8812 Antenna 1

(802.11a) PSD plot on channel 149

(802.11n20) PSD plot on channel 149

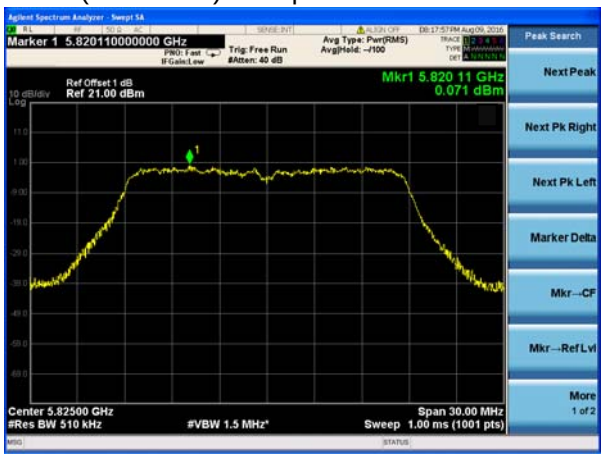


(802.11a) PSD plot on channel 157

(802.11n20) PSD plot on channel 157

(802.11a) PSD plot on channel 165

(802.11n20) PSD plot on channel 165

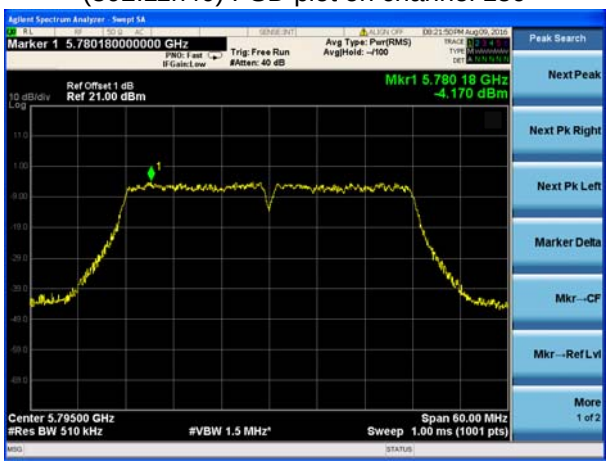


RF Module 8812 Antenna 1

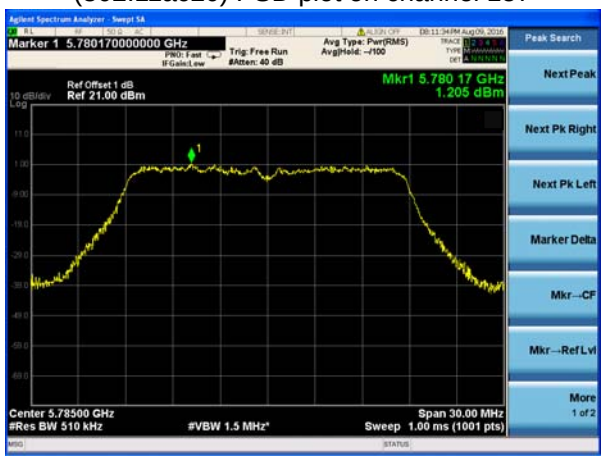
(802.11n40) PSD plot on channel 151

(802.11ac20) PSD plot on channel 149

(802.11n40) PSD plot on channel 159



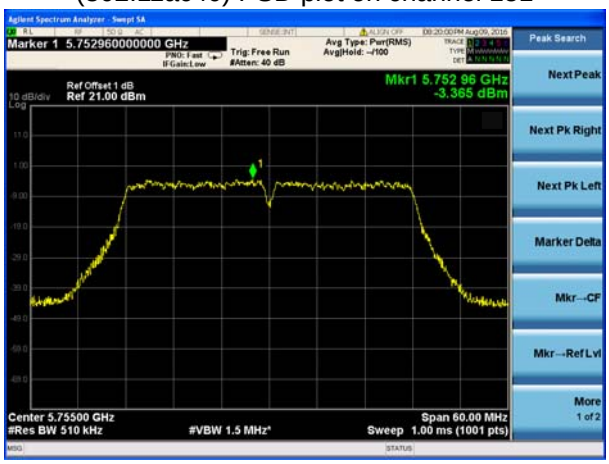
(802.11ac20) PSD plot on channel 157



(802.11ac20) PSD plot on channel 165

RF Module 8812 Antenna 1

(802.11ac40) PSD plot on channel 151



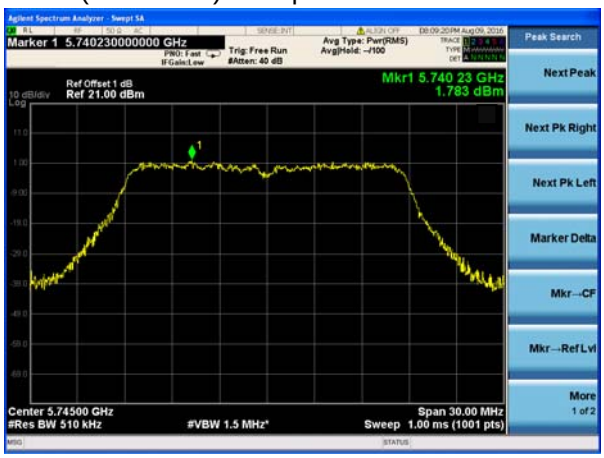
(802.11ac80) PSD plot on channel 155

(802.11ac40) PSD plot on channel 159

RF Module 8192 Antenna 3

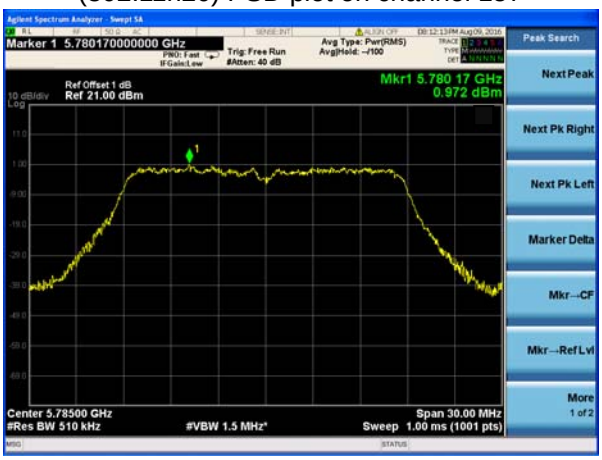
(802.11a) PSD plot on channel 149

(802.11n20) PSD plot on channel 149



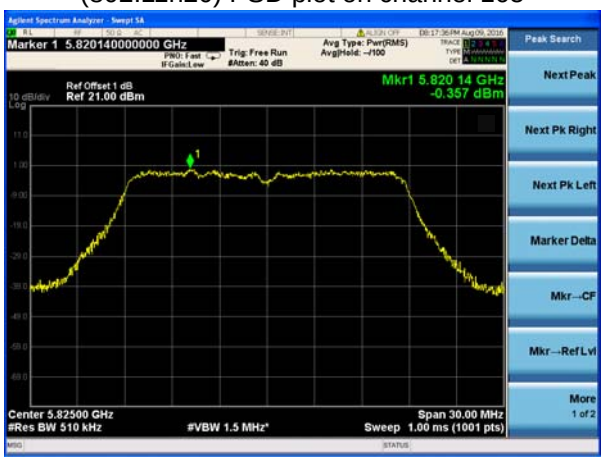
(802.11a) PSD plot on channel 157

(802.11n20) PSD plot on channel 157



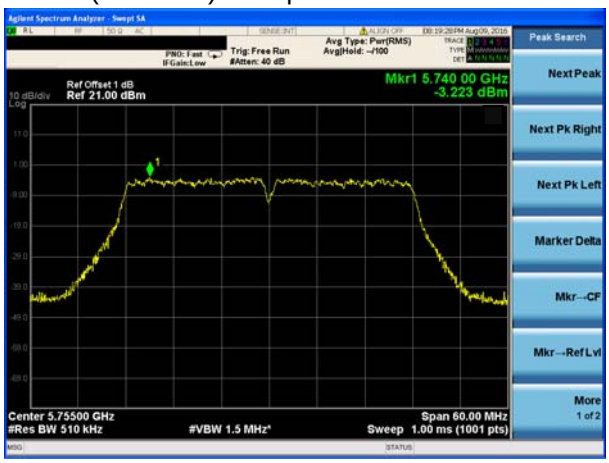
(802.11a) PSD plot on channel 165

(802.11n20) PSD plot on channel 165



RF Module 8192 Antenna 3

(802.1140) PSD plot on channel 151



(802.11n40) PSD plot on channel 159

5. 26 DB & 99% EMISSION BANDWIDTH

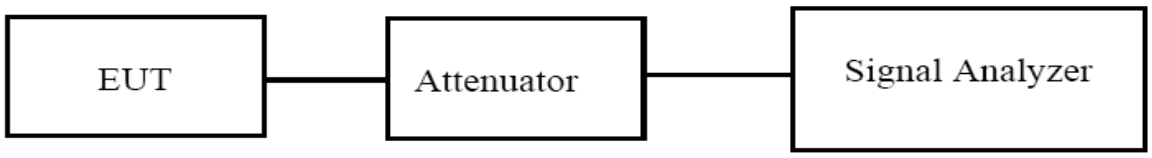
5.1 APPLIED PROCEDURES / LIMIT

The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

5.2 TEST 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%.
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 ≥ 3 · 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.



5.3 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

5.4 TEST RESULTS

EUT：	ScreenBeam 960	Model Name ：	SBWD960A
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1012 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX Frequency Band I (5150-5250MHz)		

NOTE: Model 1/2 (3/4) represent two different modules，
1(2) Represent the value of antenna 1 and 2,The worst data is Antenna 1 ,only shown Antenna 1 Plot.
3(4) Represent the value of antenna 3 and 4,The worst data is Antenna 3 ,only shown Antenna 3 Plot.

EUT has two antennas, and different modes support different transmit mode what describe as Following form:

Mode	Tx/Rx
802.11a	1Tx, 1Rx
802.11n/ac	2Tx, 2Rx

RF Module 8812

Mode	Channel	Frequency (MHz)	99% bandwidth(MHz)		26dB bandwidth (MHz)		Result
			ANT 1	ANT 2	ANT 1	ANT 2	
802.11a	CH36	5180	16.789	16.648	21.11	21.06	Pass
	CH40	5200	16.774	16.569	21.00	21.00	Pass
	CH48	5240	16.754	16.699	20.95	20.86	Pass
802.11 n20	CH36	5180	17.840	17.674	21.79	21.74	Pass
	CH40	5200	17.829	17.784	21.82	21.81	Pass
	CH48	5240	17.824	17.816	21.73	21.75	Pass
802.11 n40	CH 38	5190	36.220	36.216	42.58	42.56	Pass
	CH 46	5230	36.208	36.207	42.32	42.33	Pass
802.11 AC20	CH36	5180	17.831	17.831	21.56	21.52	Pass
	CH40	5200	17.831	17.826	21.88	21.78	Pass
	CH48	5240	17.834	17.832	21.65	21.63	Pass
802.11 AC40	CH 38	5190	36.221	36.212	42.46	42.41	Pass
	CH 46	5230	36.205	36.201	42.37	42.33	Pass
802.11 AC80	CH 42	5210	75.182	75.164	80.73	80.71	Pass

RF Module 8192

Mode	Channel	Frequency (MHz)	99% bandwidth(MHz)		26dB bandwidth (MHz)		Result
			ANT 3	ANT 4	ANT 3	ANT 4	
802.11a	CH36	5180	16.783	16.775	21.08	21.03	Pass
	CH40	5200	16.777	16.766	21.09	21.05	Pass
	CH48	5240	16.756	16.754	20.96	20.94	Pass
802.11 n20	CH36	5180	17.840	17.832	21.79	21.78	Pass
	CH40	5200	17.829	17.822	21.82	21.80	Pass
	CH48	5240	17.824	17.819	21.73	21.70	Pass
802.11 n40	CH 38	5190	36.214	36.211	42.45	42.44	Pass
	CH 46	5230	36.223	36.216	42.27	42.21	Pass

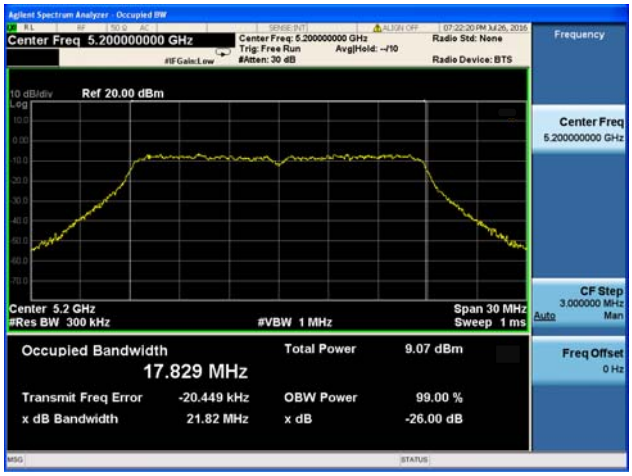
RF Module 8812 Antenna 1

(802.11a) -26dB&99% Bandwidth plot on channel 36

(802.11n20) -26dB&99% Bandwidth plot on channel 36

(802.11a) -26dB&99% Bandwidth plot on channel 40

(802.11n20) -26dB&99% Bandwidth plot on channel 40



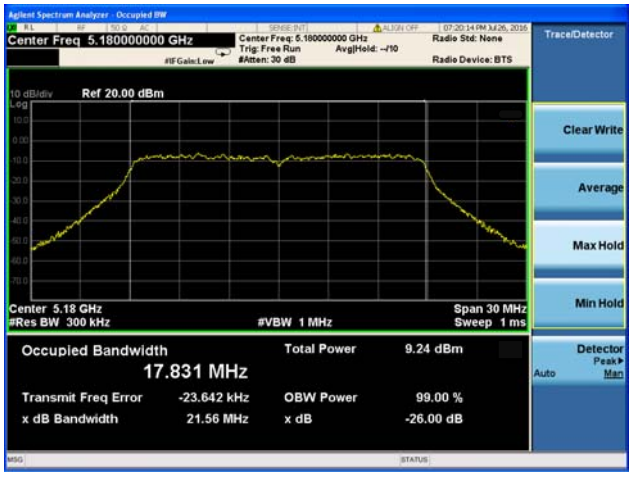
(802.11a) -26dB&99% Bandwidth plot on channel 48

(802.11n20) -26dB&99% Bandwidth plot on channel 48

RF Module 8812 Antenna 1

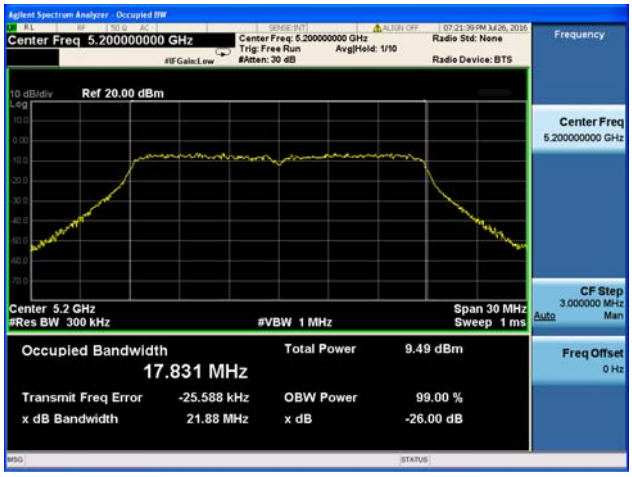
(802.11n40) -26dB&99% Bandwidth plot on channel 38

(802.11ac20) -26dB&99% Bandwidth plot on channel 36



(802.11n40) -26dB&99% Bandwidth plot on channel 46

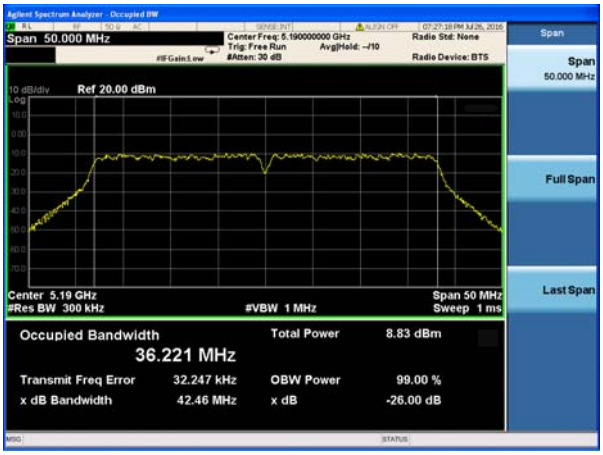
(802.11ac20) -26dB&99% Bandwidth plot on channel 40



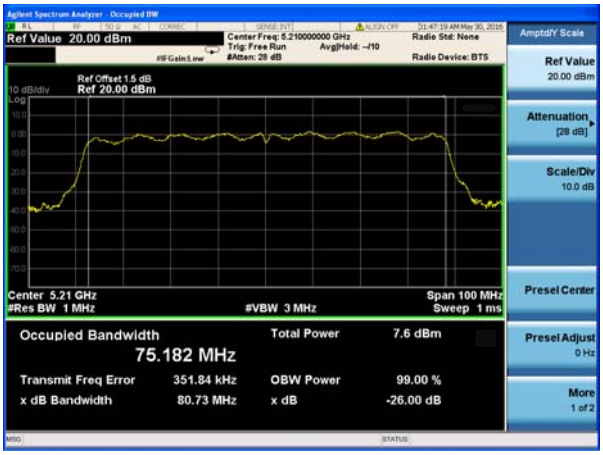
(802.11ac20) -26dB&99% Bandwidth plot on channel 48

RF Module 8812 Antenna 1

(802.11ac40) -26dB&99% Bandwidth plot on channel 38



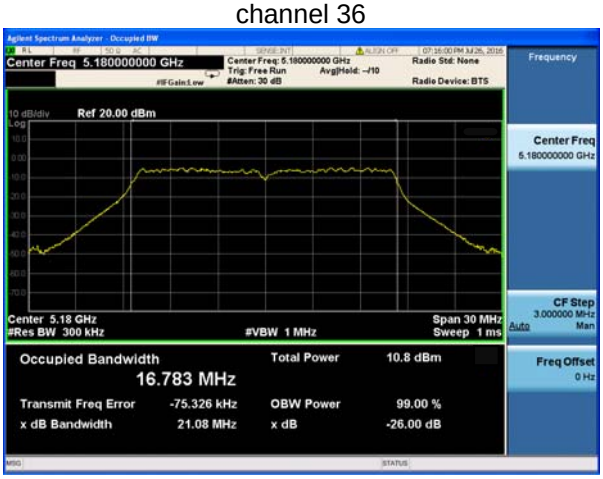
(802.11ac80) -26dB&99% Bandwidth plot on channel 42



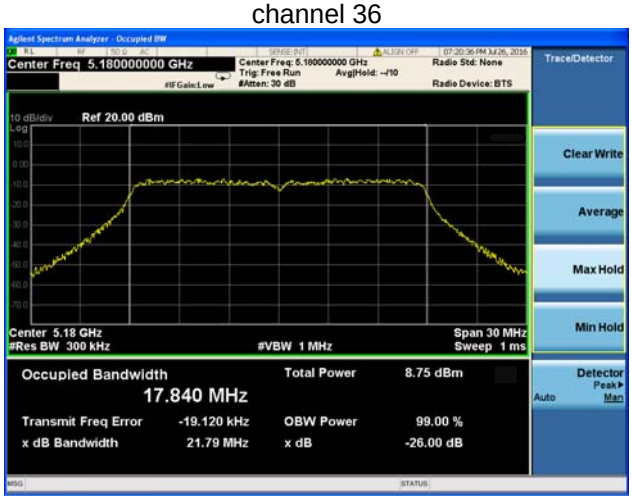
(802.11ac40) -26dB&99% Bandwidth plot on channel 46

RF Module 8192 Antenna 3

(802.11a) -26dB&99% Bandwidth plot on channel 36

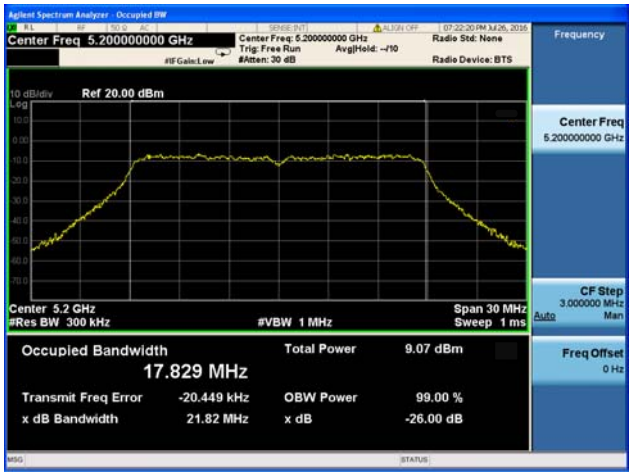


(802.11n20) -26dB&99% Bandwidth plot on channel 36



(802.11a) -26dB&99% Bandwidth plot on channel 40

(802.11n20) -26dB&99% Bandwidth plot on channel 40

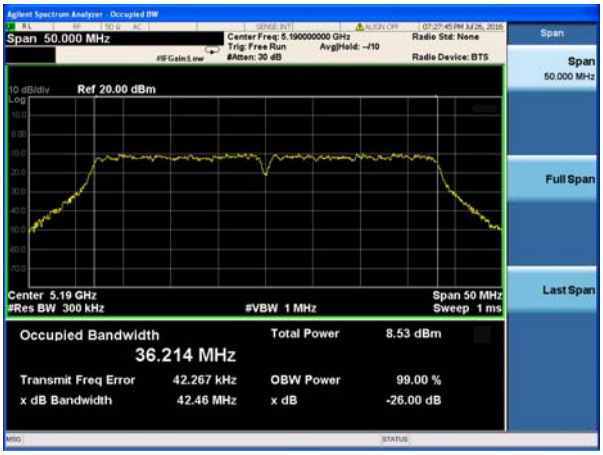


(802.11a) -26dB&99% Bandwidth plot on channel 48

(802.11n20) -26dB&99% Bandwidth plot on channel 48

RF Module 8192 Antenna 1

(802.11n40) -26dB&99% Bandwidth plot on channel 38



(802.11n40) -26dB&99% Bandwidth plot on channel 46

EUT：	ScreenBeam 960	Model Name ：	SBWD960A
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1012 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX Frequency Band III (5745-5850MHz)		

NOTE: Model 1/2 (3/4) represent two different modules，
1(2) Represent the value of antenna 1 and 2,The worst data is Antenna 1 ,only shown Antenna 1 Plot.
3(4) Represent the value of antenna 3 and 4,The worst data is Antenna 3 ,only shown Antenna 3 Plot.

EUT has two antennas, and different modes support different transmit mode what describe as Following form:

Mode	Tx/Rx
802.11a	1Tx, 1Rx
802.11n/ac	2Tx, 2Rx

RF Module 8812

Mode	Channel	Frequency (MHz)	99% bandwidth(MHz)		26dB bandwidth (MHz)		Result
			ANT 1	ANT 2	ANT 1	ANT 2	
802.11a	CH149	5745	16.775	16.755	21.22	21.19	Pass
	CH157	5785	16.776	16.762	21.10	21.04	Pass
	CH165	5825	16.758	16.746	21.03	21.00	Pass
802.11 n20	CH149	5745	17.808	17.798	21.69	21.59	Pass
	CH157	5785	17.810	17.803	21.60	21.75	Pass
	CH165	5825	17.820	17.816	21.81	21.72	Pass
802.11 n40	CH 151	5755	36.207	36.198	42.21	42.16	Pass
	CH 159	5795	36.199	36.186	42.42	42.35	Pass
802.11 AC20	CH149	5745	17.821	17.816	21.74	21.65	Pass
	CH157	5785	17.820	17.819	21.56	21.27	Pass
	CH165	5825	17.820	17.815	21.81	21.59	Pass
802.11 AC40	CH 151	5755	36.207	36.200	42.21	42.11	Pass
	CH 159	5795	36.226	36.219	42.49	42.37	Pass
802.11 AC80	CH 155	5775	75.203	75.178	81.05	81.00	Pass

RF Module 8192

Mode	Channel	Frequency (MHz)	99% bandwidth(MHz)		26dB bandwidth (MHz)		Result
			ANT 3	ANT 4	ANT 3	ANT 4	
802.11a	CH149	5745	16.773	16.724	21.18	21.11	Pass
	CH157	5785	16.775	16.754	21.19	21.06	Pass
	CH165	5825	16.758	16.738	21.11	21.14	Pass
802.11 n20	CH149	5745	17.825	17.734	21.73	21.64	Pass
	CH157	5785	17.811	17.803	21.67	21.53	Pass
	CH165	5825	17.818	17.761	21.64	21.55	Pass
802.11 n40	CH151	5755	36.198	36.136	41.86	41.86	Pass
	CH159	5795	36.211	36.128	42.51	42.21	Pass

RF Module 8812 Antenna 1

(802.11a) -26dB&99% Bandwidth plot on channel 149

(802.11n20) -26dB&99% Bandwidth plot on channel 149

(802.11a) -26dB&99% Bandwidth plot on channel 157

(802.11n20) -26dB&99% Bandwidth plot on channel 157

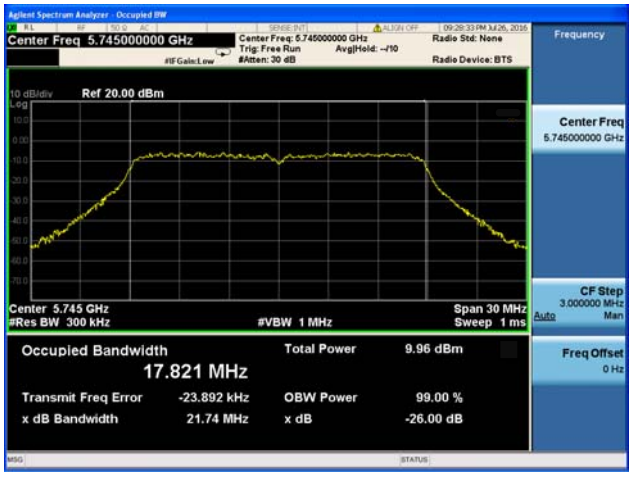
(802.11a) -26dB&99% Bandwidth plot on channel 165

(802.11n20) -26dB&99% Bandwidth plot on channel 165

RF Module 8812 Antenna 1

(802.11n40) -26dB&99% Bandwidth plot on channel 151

(802.11ac20) -26dB&99% Bandwidth plot on channel 149



(802.11n40) -26dB&99% Bandwidth plot on channel 159

(802.11ac20) -26dB&99% Bandwidth plot on channel 157

(802.11ac20) -26dB&99% Bandwidth plot on channel 165

RF Module 8812 Antenna 1

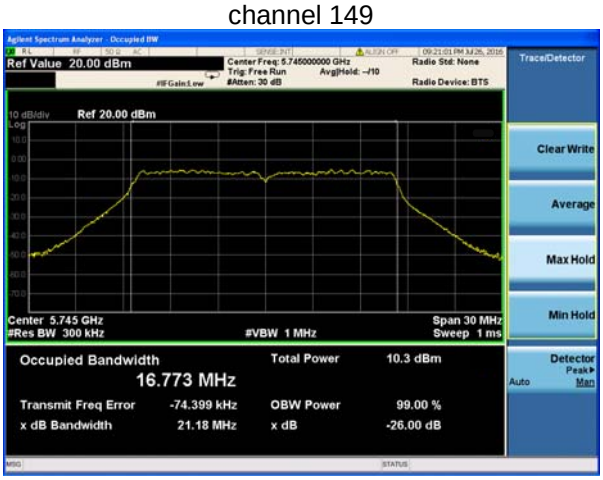
(802.11ac40) -26dB&99% Bandwidth plot on channel 151

(802.11ac80) -26dB&99% Bandwidth plot on channel 155

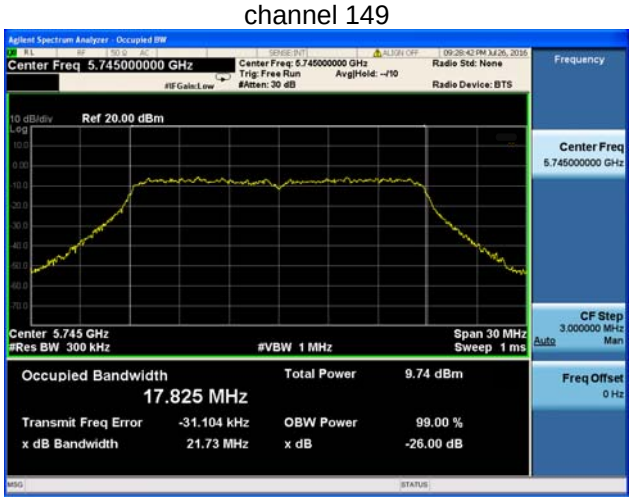
(802.11ac40) -26dB&99% Bandwidth plot on channel 159

RF Module 8192 Antenna 3

(802.11a) -26dB&99% Bandwidth plot on channel 149



(802.11n20) -26dB&99% Bandwidth plot on channel 149



(802.11a) -26dB&99% Bandwidth plot on channel 157

(802.11n20) -26dB&99% Bandwidth plot on channel 157

(802.11a) -26dB&99% Bandwidth plot on channel 165

(802.11n20) -26dB&99% Bandwidth plot on channel 165

RF Module 8192 Antenna 3

(802.11n40) -26dB&99% Bandwidth plot on channel 151

(802.11n40) -26dB&99% Bandwidth plot on channel 159

6. MINIMUM 6 DB BANDWIDTH

6.1 APPLIED PROCEDURES / LIMIT

According to FCC §15.407(e)
(e) Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

6.2 TEST PROCEDURE

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) ≥ 3 × RBW.

c) Detector = Peak.

d) Trace mode = max hold.

e) Sweep = auto couple.

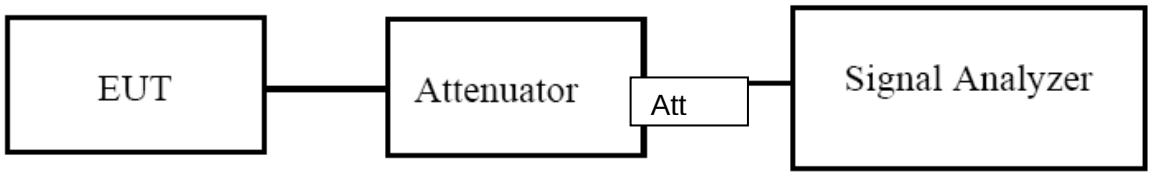
f) Allow the trace to stabilize.

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.

6.3 DEVIATION FROM STANDARD

No deviation.

6.4 TEST SETUP



6.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

6.6 TEST RESULTS

EUT：	ScreenBeam 960	Model Name ：	SBWD960A
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX (5G) Mode Frequency Band III (5725-5825MHz)		

NOTE: Model 1/2 (3/4) represent two different modules，
1(2) Represent the value of antenna 1 and 2,The worst data is Antenna 1 ,only shown Antenna 1 Plot.
3(4) Represent the value of antenna 3 and 4,The worst data is Antenna 3 ,only shown Antenna 3 Plot.

EUT has two antennas, and different modes support different transmit mode what describe as Following form:

Mode	Tx/Rx
802.11a	1Tx, 1Rx
802.11n/ac	2Tx, 2Rx

RF Module 8812

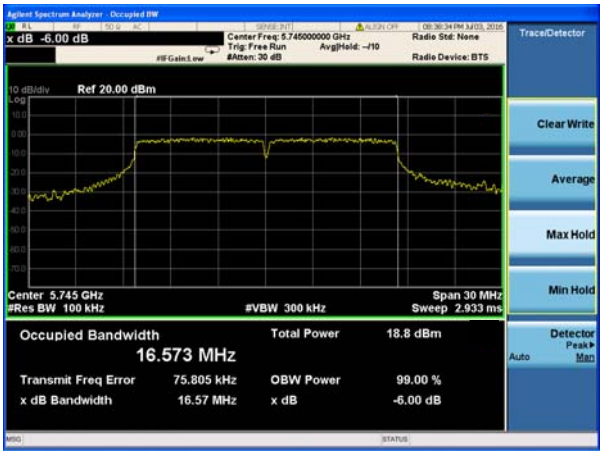
Mode	Channel	Frequency (MHz)	-6dB bandwidth (MHz)		Limit (KHz)	Result
			ANT A	ANT B		
802.11a	149	5745	16.57	16.53	500	Pass
	157	5785	16.57	16.55	500	Pass
	165	5825	16.57	16.51	500	Pass
802.11 n20	149	5745	17.78	17.73	500	Pass
	157	5785	17.76	17.74	500	Pass
	165	5825	17.80	17.77	500	Pass
802.11 n40	151	5755	36.47	36.54	500	Pass
	159	5795	36.48	36.42	500	Pass
802.11 AC20	149	5745	17.71	17.61	500	Pass
	157	5785	17.72	17.59	500	Pass
	165	5825	17.73	17.64	500	Pass
802.11 AC40	149	5745	36.53	36.42	500	Pass
	157	5785	36.53	36.53	500	Pass
802.11 AC80	155	5775	75.43	75.42	500	Pass

RF Module 8192

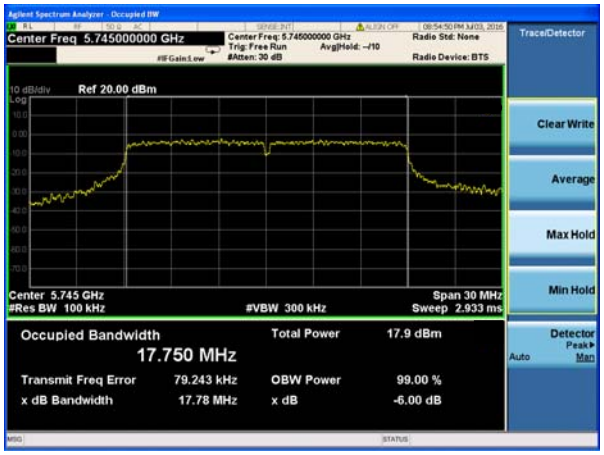
Mode	Channel	Frequency (MHz)	-6dB bandwidth (MHz)		Limit (KHz)	Result
			ANT A	ANT B		
802.11a	149	5745	16.58	16.56	500	Pass
	157	5785	16.55	16.43	500	Pass
	165	5825	16.56	16.52	500	Pass
802.11 n20	149	5745	17.81	17.79	500	Pass
	157	5785	17.76	17.75	500	Pass
	165	5825	17.79	17.72	500	Pass
802.11 n40	151	5755	36.47	36.24	500	Pass
	159	5795	36.46	36.28	500	Pass

RF Module 8812 Antenna 1

(802.11a) -6dB Bandwidth plot on channel 149



(802.11n20) -6dB Bandwidth plot on channel 149

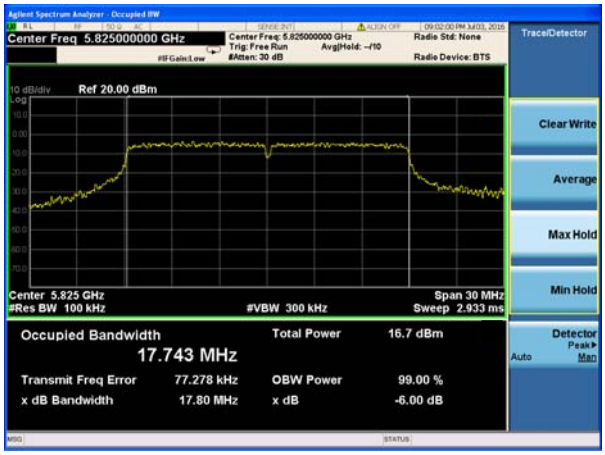


(802.11a) -6dB Bandwidth plot on channel 157

(802.11n20) -6dB Bandwidth plot on channel 157

(802.11a) -6dB Bandwidth plot on channel 165

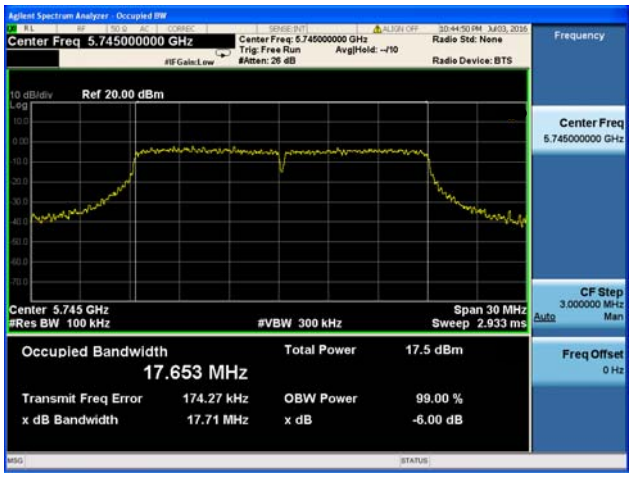
(802.11n20) -6dB Bandwidth plot on channel 165



RF Module 8812 Antenna 1

(802.11n40) -6dB Bandwidth plot on channel 151

(802.11ac20) -6dB Bandwidth plot on channel 149



(802.11n40) -6dB Bandwidth plot on channel 159

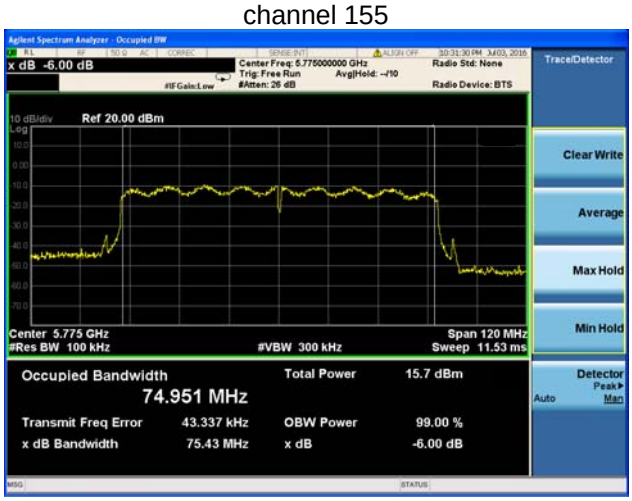
(802.11ac20) -6dB Bandwidth plot on channel 157

(802.11ac20) -6dB Bandwidth plot on channel 165

RF Module 8812 Antenna 1

(802.11ac40) -6dB Bandwidth plot on channel 151

(802.11ac80) -6dB Bandwidth plot on channel 155

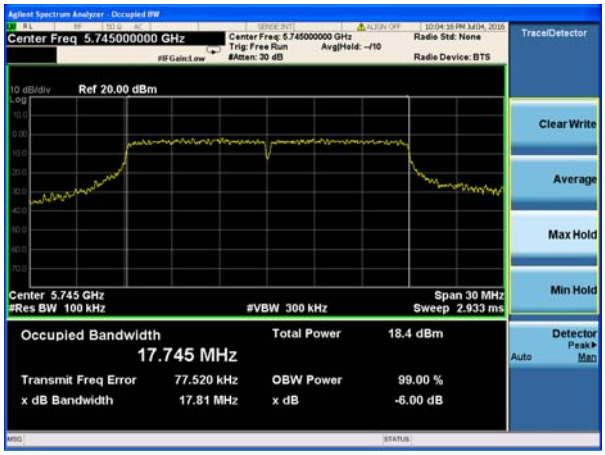


(802.11ac40) -6dB Bandwidth plot on channel 159

RF Module 8192 Antenna 3

(802.11a) -6dB Bandwidth plot on channel 149

(802.11n20) -6dB Bandwidth plot on channel 149

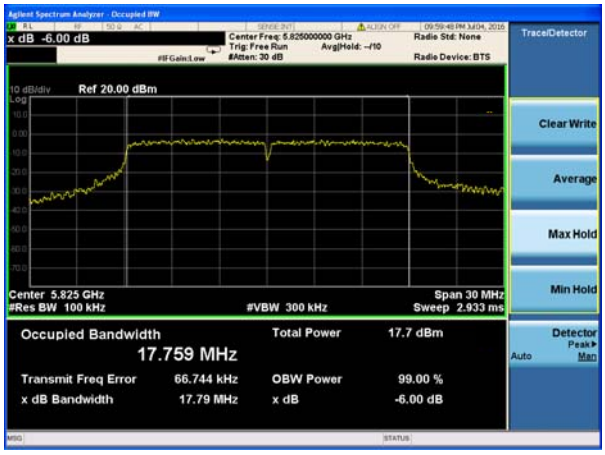


(802.11a) -6dB Bandwidth plot on channel 157

(802.11n20) -6dB Bandwidth plot on channel 157

(802.11a) -6dB Bandwidth plot on channel 165

(802.11n20) -6dB Bandwidth plot on channel 165



RF Module 8192 Antenna 3

(802.11n40) -6dB Bandwidth plot on channel 151

(802.11n40) -6dB Bandwidth plot on channel 159

7. MAXIMUM CONDUCTED OUTPUT POWER

7.1 PPLIED PROCEDURES / LIMIT

According to FCC §15.407

The maximum conduced output power should not exceed:

Frequency Band		Limit
5.15~5.25 GHz		
operating Mode		
	outdoor access point	maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).
	indoor access point	maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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.
	fixed point-to-point access points	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 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. 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.
X	client devices	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.
5.725-5.85 GHz		
X	client devices	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.

7.2 TEST PROCEDURE

1.The transmitter output (antenna port) was connected to the power meter.

2. Test was performed in accordance with KDB789033 D02 v01r02 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (E) Maximum conducted output power =>3. Measurement using a Power Meter (PM) =>b) Method PM-G (Measurement using a gated RF average power meter).

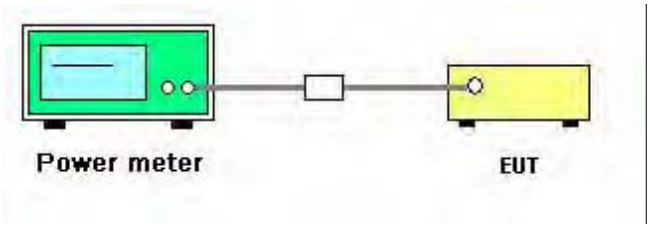
3. Multiple antenna systems was performed in accordance with KDB662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.

4. When measuring maximum conducted output power with multiple antenna systems,add every result of the values by mathematic formula.

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP



7.5 EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

7.6 TEST RESULTS

EUT：	ScreenBeam 960	Model Name ：	SBWD960A
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX (5G) Mode Frequency Band I (5150-5250MHz)		

EUT has two antennas, and different modes support different transmit mode what describe as Following form:

Mode	Tx/Rx
802.11a	1Tx, 1Rx
802.11n/ac	2Tx, 2Rx

RF Module 8812

Test Channel	Frequency	Maximum output power. (AV) (dBm)		Total Power (AV)	LIMIT	Result
	(MHz)	ANT 1	ANT 2	dBm	dBm	
TX 802.11a Mode						
CH36	5180	15.72	15.27	-	23.97	Pass
CH40	5200	15.69	15.12	-	23.97	Pass
CH48	5240	15.35	15.18	-	23.97	Pass
TX 802.11 n20M Mode						
CH36	5180	14.570	14.280	17.438	22.35	Pass
CH40	5200	14.760	14.170	17.485	22.35	Pass
CH48	5240	14.080	14.070	17.085	22.35	Pass
TX 802.11 n40M Mode						
CH38	5190	14.870	14.150	17.535	22.35	Pass
CH46	5230	14.570	14.070	17.337	22.35	Pass
TX 802.11 AC20M Mode						
CH36	5180	14.840	14.270	17.575	22.35	Pass
CH40	5200	14.540	14.060	17.317	22.35	Pass
CH48	5240	14.250	14.110	17.191	22.35	Pass
TX 802.11 AC40M Mode						
CH38	5190	14.140	14.010	17.086	22.35	Pass
CH46	5230	14.110	14.100	17.115	22.35	Pass
TX 802.11 AC80M Mode						
CH42	5210	14.530	14.420	17.486	22.35	Pass

Modules 8812 For MIMO mode: Directional gain
= 10log(antenna 1 + antenna 2) dbi =7.65dbi in 5.2GHz
= 10log(antenna 1 + antenna 2) dbi =8.04dbi in 5.8GHz
802.11 n/ac 5.0GHz has MIMO mode.

7.65dbi>6.0 dbi so power limit=23.97-(7.65-6.0)=22.35

RF Module 8192

Test Channel	Frequency	Maximum output power. (AV) (dBm)		Total Power (AV)	LIMIT	Result
	(MHz)	ANT 3	ANT 4	dBm	dBm	
TX 802.11a Mode						
CH36	5180	15.680	15.210	-	23.97	Pass
CH40	5200	15.660	15.080	-	23.97	Pass
CH48	5240	15.530	15.120	-	23.97	Pass
TX 802.11 n20M Mode						
CH36	5180	14.490	14.250	17.382	23.12	Pass
CH40	5200	14.260	14.170	17.226	23.12	Pass
CH48	5240	14.540	14.140	17.355	23.12	Pass
TX 802.11 n40M Mode						
CH38	5190	14.480	14.160	17.333	23.12	Pass
CH46	5230	14.640	14.110	17.393	23.12	Pass

Modules 8192 For MIMO mode: Directional gain
=10log(antenna 3 + antenna 4) dbi =6.86dbi in 5.2GHz
= 10log(antenna 3 + antenna 4) dbi =8.03dbi in 5.8GHz
802.11n/ac 5.0GHz has MIMO mode.
6.86dbi>6.0 dbi so power limit= 23.97-(6.86-6.0)=23.12

EUT：	ScreenBeam 960	Model Name ：	SBWD960A
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX (5G) Mode Frequency Band III (5725-5825MHz)		

EUT has two antennas, and different modes support different transmit mode what describe as Following form:

Mode	Tx/Rx
802.11a	1Tx, 1Rx
802.11n/ac	2Tx, 2Rx

RF Module 8812

Test Channel	Frequency	Maximum output power. (AV) (dBm)		Total (AV)	LIMIT
	(MHz)	ANT 1	ANT 2	dBm	dBm
TX 802.11a Mode					
CH 149	5745	17.15	17.36	–	30
CH 157	5785	17.29	17.11	–	30
CH 165	5825	17.38	17.37	–	30
TX 802.11 n20M Mode					
CH 149	5745	17.31	17.13	20.231	27.96
CH 157	5785	17.37	17.23	20.311	27.96
CH 165	5825	17.22	17.44	20.342	27.96
TX 802.11 n40M Mode					
CH 151	5755	17.28	17.14	20.221	27.96
CH 159	5795	17.16	17.03	20.106	27.96
TX 802.11 AC20M Mode					
CH 149	5745	17.14	17.05	20.106	27.96
CH 157	5785	17.21	17.09	20.161	27.96
CH 165	5825	17.22	17.15	20.195	27.96
TX 802.11 AC40M Mode					
CH 151	5755	17.58	17.25	20.428	27.96
CH 159	5795	17.34	17.28	20.320	27.96
TX 802.11 AC80M Mode					
CH 155	5775	17.02	17.1	20.070	27.96

Modules 8812 For MIMO mode: Directional gain
= 10log(antenna 1 + antenna 2) dbi =7.65dbi in 5.2GHz
= 10log(antenna 1 + antenna 2) dbi =8.04dbi in 5.8GHz
802.11 n/ac 5.0GHz has MIMO mode.

8.04dbi>6.0 dbi so power limit=23.97-(8.04-6.0)=27.96

RF Module 8192

Test Channel	Frequency	Maximum output power. (AV) (dBm)		Total (AV)	LIMIT
	(MHz)	ANT 3	ANT 4	dBm	dBm
TX 802.11a Mode					
CH 149	5745	17.08	17.14	–	30
CH 157	5785	17.46	17.25	–	30
CH 165	5825	17.34	17.07	–	30
TX 802.11 n20M Mode					
CH 149	5745	17.25	17.11	20.191	27.97
CH 157	5785	17.15	17.07	20.120	27.97
CH 165	5825	17.08	17.16	20.130	27.97
TX 802.11 n40M Mode					
CH 151	5755	17.27	17.09	20.191	27.97
CH 159	5795	17.26	17.00	20.142	27.97

Modules 8192 For MIMO mode: Directional gain
=10log(antenna 3 + antenna 4) dbi =6.86dbi in 5.2GHz
= 10log(antenna 3 + antenna 4) dbi =8.03dbi in 5.8GHz
802.11n/ac 5.0GHz has MIMO mode.

8.03dbi>6.0 dbi so power limit= 30-(8.03-6.0)=27.97

8. OUT OF BAND EMISSIONS

8.1 APPLICABLE STANDARD

According to FCC §15.407(b)

Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(2) For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

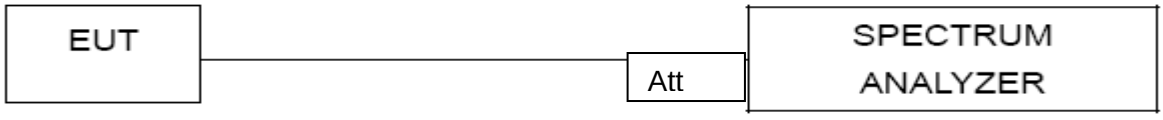
8.2 TEST PROCEDURE

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

8.3 DEVIATION FROM STANDARD

No deviation.

8.4 TEST SETUP



8.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

8.6 TEST RESULTS

EUT：	ScreenBeam 960	Model Name ：	SBWD960A
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1012 hPa	Test Voltage ：	DC 5V

NOTE: Model 1/2 (3/4) represent two different modules，
1(2) Represent the value of antenna 1 and 2,The worst data is Antenna 1 ,only shown Antenna 1 Plot.
3(4) Represent the value of antenna 3 and 4,The worst data is Antenna 3 ,only shown Antenna 3 Plot.

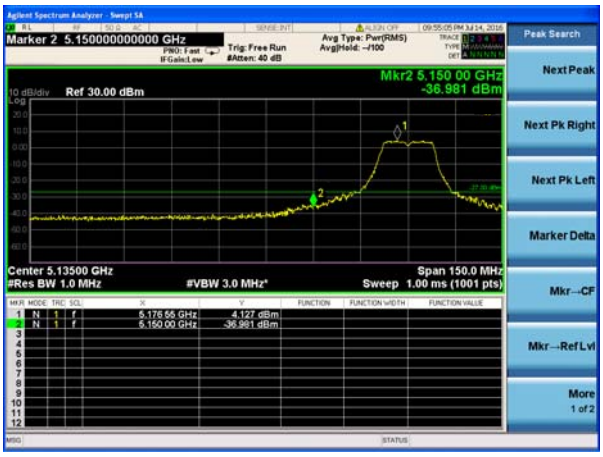
EUT has two antennas, and different modes support different transmit mode what describe as Following form:

Mode	Tx/Rx
802.11a	1Tx, 1Rx
802.11n/ac	2Tx, 2Rx

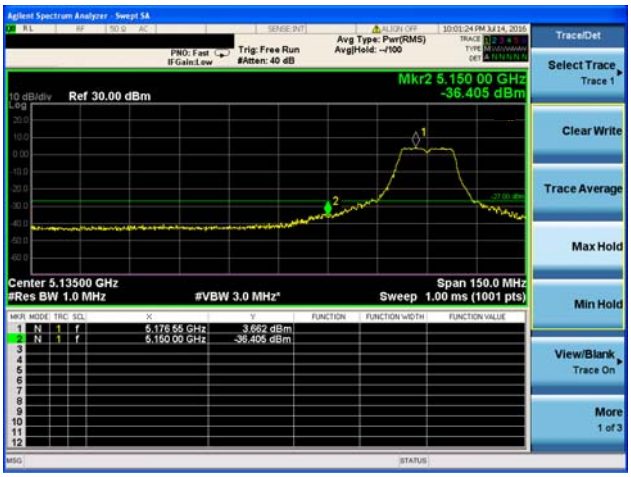
RF Module 8812 Antenna 1

5.15~5.25 GHz

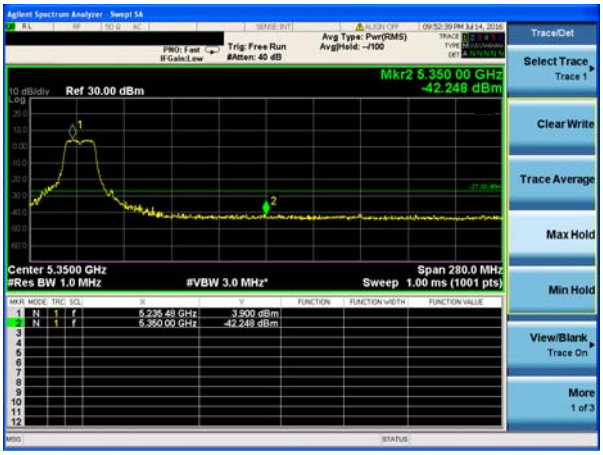
(802.11a) Band Edge, Left Side



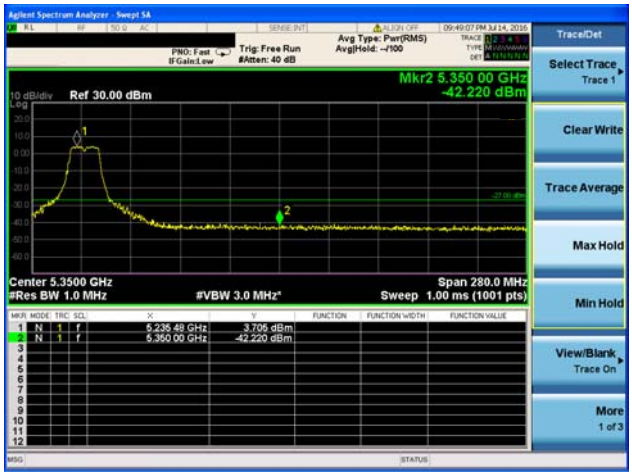
(802.11n20) Band Edge, Left Side



(802.11a) Band Edge, Right Side



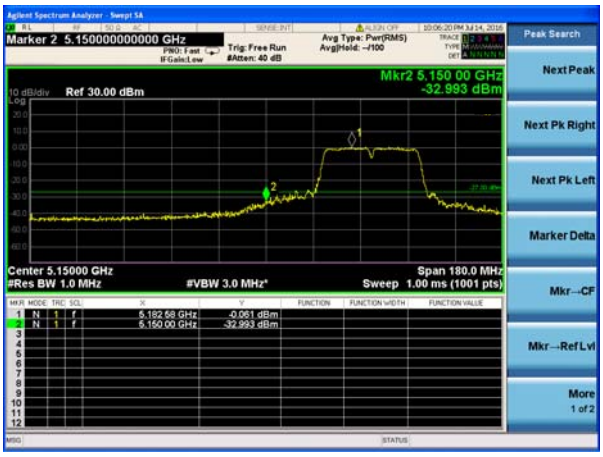
(802.11n20) Band Edge, Right Side



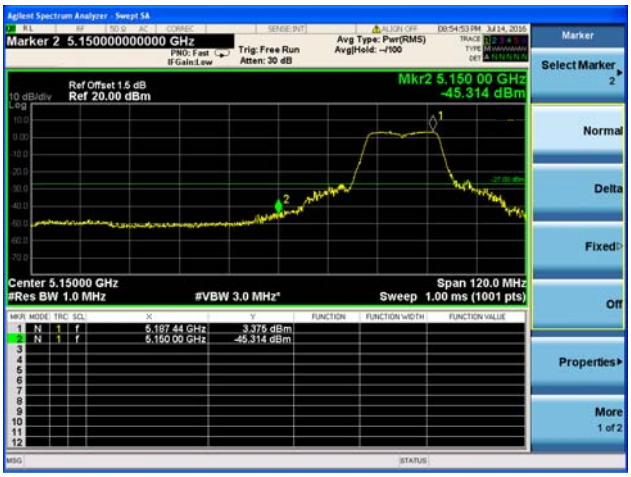
RF Module 8812 Antenna 1

5.15~5.25 GHz

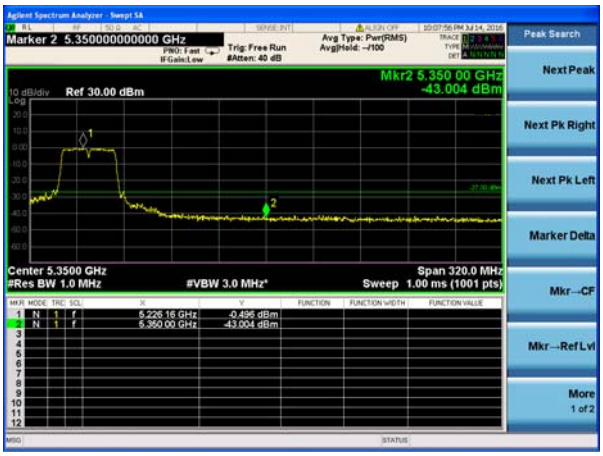
(802.11n40) Band Edge, Left Side



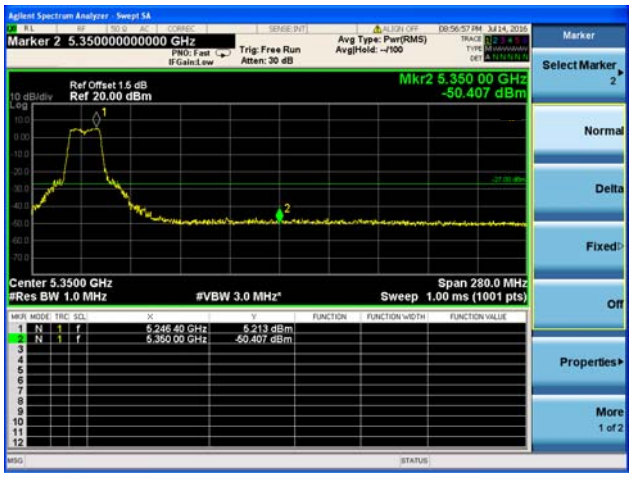
(802.11ac20) Band Edge, Left Side



(802.11n40) Band Edge, Right Side



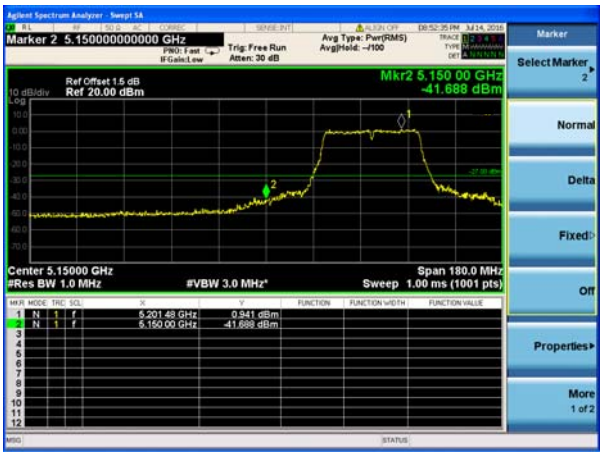
(802.11ac20) Band Edge, Right Side



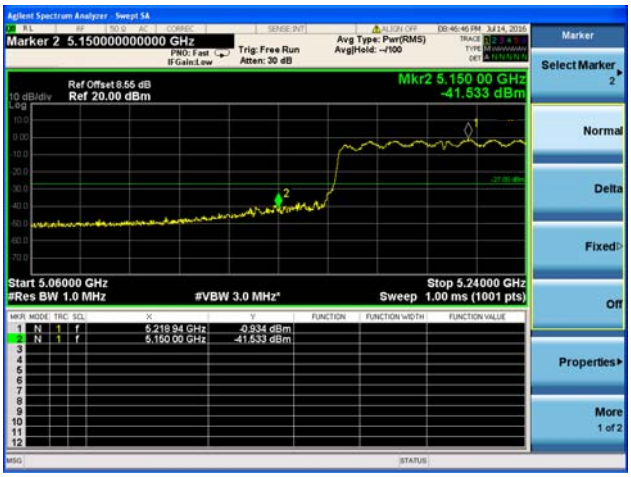
RF Module 8812 Antenna 1

5.15~5.25 GHz

(802.11ac40) Band Edge, Left Side

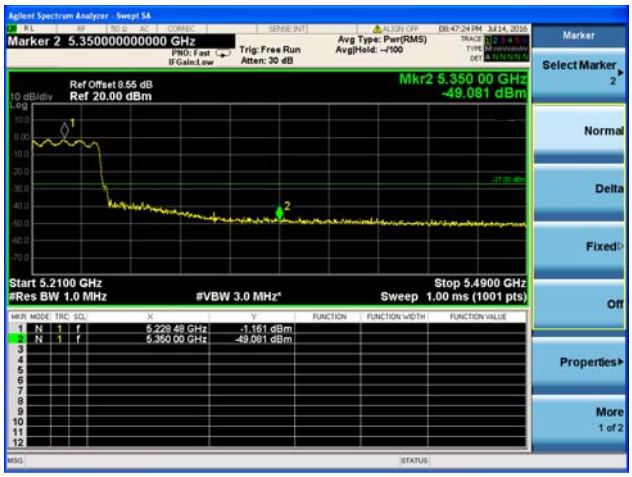


(802.11ac80) Band Edge, Left Side



(802.11ac40) Band Edge, Right Side

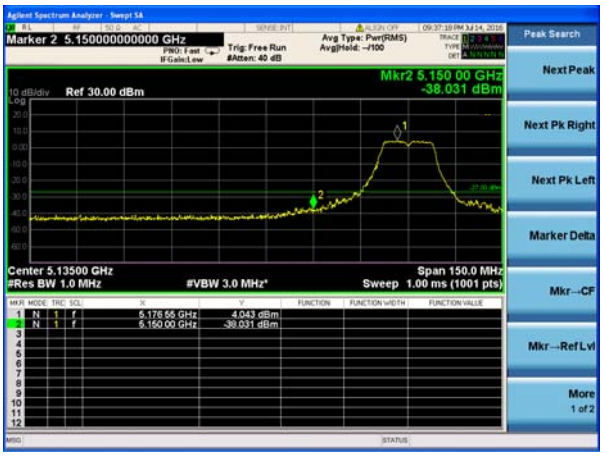
(802.11ac80) Band Edge, Right Side



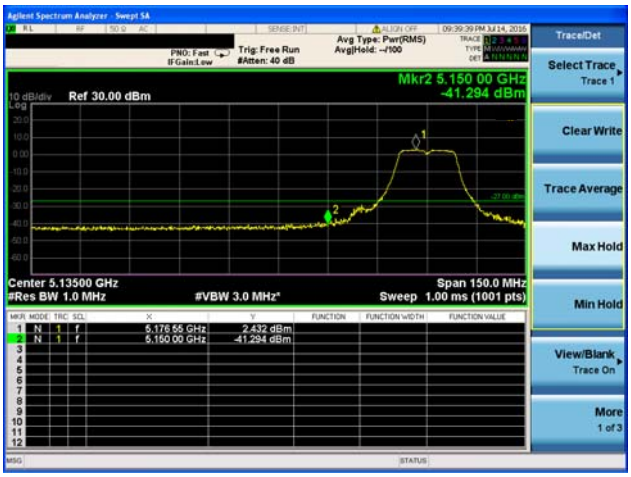
RF Module 8192 Antenna 3

5.15~5.25 GHz

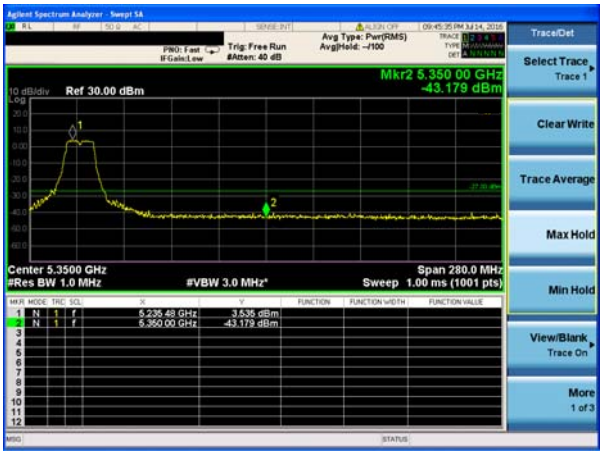
(802.11a) Band Edge, Left Side



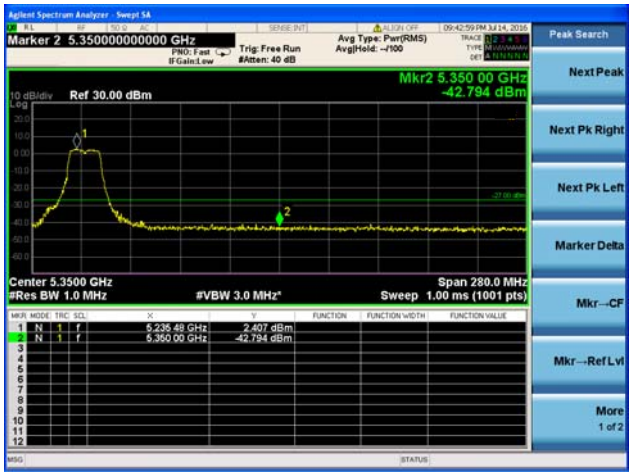
(802.11n20) Band Edge, Left Side



(802.11a) Band Edge, Right Side



(802.11n20) Band Edge, Right Side

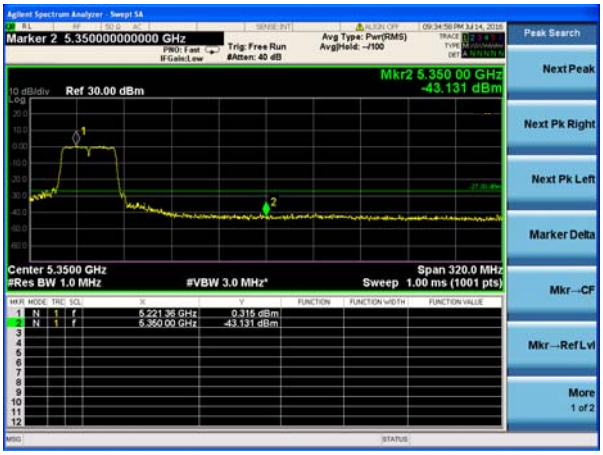


RF Module 8192 Antenna 3

5.15~5.25 GHz

(802.11n40) Band Edge, Left Side

(802.1140) Band Edge, Right Side



RF Module 8812 Antenna 1

5.725-5.85 GHz

(802.11a) Band Edge, Left Side

(802.11n20) Band Edge, Left Side

(802.11a) Band Edge, Right Side

(802.11n20) Band Edge, Right Side

RF Module 8812 Antenna 1

5.725-5.85 GHz

(802.11n40) Band Edge, Left Side

(802.11ac20) Band Edge, Left Side

(802.11n40) Band Edge, Right Side

(802.11ac20) Band Edge, Right Side

RF Module 8812 Antenna 1

5.725-5.85 GHz

(802.11ac40) Band Edge, Left Side

(802.11ac80) Band Edge, Left Side

(802.11ac40) Band Edge, Right Side

(802.11ac80) Band Edge, Right Side

RF Module 8192 Antenna 1

5.725-5.85 GHz

(802.11a) Band Edge, Left Side

(802.11n20) Band Edge, Left Side

(802.11a) Band Edge, Right Side

(802.11n20) Band Edge, Right Side

RF Module 8192 Antenna 1

5.725-5.85 GHz

(802.11n40) Band Edge, Left Side

(802.11n40) Band Edge, Right Side

9. Frequency Stability Measurement

9.1 LIMIT

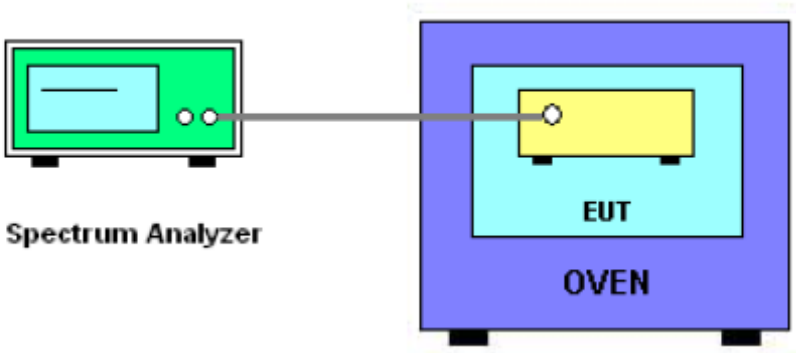
Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

The transmitter center frequency tolerance shall be ± 20 ppm maximum for the 5 GHz band (IEEE 802.11n specification).

9.2 TEST PROCEDURES

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5. fc is declaring of channel frequency. Then the frequency error formula is (fc-f)/fc × 10_6 ppm and the limit is less than ±20ppm (IEEE 802.11nspecification).
6. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
7. Extreme temperature is -20°C~70°C.

9.3 TEST SETUP LAYOUT



9.4 EUT OPERATION DURING TEST

The EUT was programmed to be in continuously un-modulation transmitting mode.

9.5 TEST RESULTS

EUT：	ScreenBeam 960	Model Name ：	SBWD960A
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1015 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX Frequency Band I (5150-5250MHz)		

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	5.00	5180.01165	5180	0.01165	-2.2490
		V max (V)	5.75	5180.00981	5180	0.00981	-1.8938
		V min (V)	4.25	5180.01171	5180	0.01171	-2.2606
Limits				± 20 ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	5	T (°C)	-20	5180.00268	5180	0.00268	-0.5174
		T (°C)	-10	5180.00165	5180	0.00165	-0.3185
		T (°C)	0	5180.01682	5180	0.01682	-3.2471
		T (°C)	10	5180.01195	5180	0.01195	-2.3069
		T (°C)	20	5180.01172	5180	0.01172	-2.2625
		T (°C)	30	5180.01271	5180	0.01271	-2.4537
		T (°C)	40	5180.01216	5180	0.01216	-2.3475
		T (°C)	50	5180.01224	5180	0.01224	-2.3629
		T (°C)	60	5180.01319	5180	0.01319	-2.5463
		T (°C)	70	5180.01481	5180	0.01481	-2.8591
Limits				± 20 ppm			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5200MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	5.00	5200.02264	5200	0.02264	-4.3538
		V max (V)	5.75	5200.02165	5200	0.02165	-4.1635
		V min (V)	4.25	5200.02259	5200	0.02259	-4.3442
Limits				± 20 ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5200MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	5	T (°C)	-20	5200.00218	5200	0.00218	-0.4192
		T (°C)	-10	5200.00619	5200	0.00619	-1.1904
		T (°C)	0	5200.01658	5200	0.01658	-3.1885
		T (°C)	10	5200.01195	5200	0.01195	-2.2981
		T (°C)	20	5200.01752	5200	0.01752	-3.3692
		T (°C)	30	5200.02116	5200	0.02116	-4.0692
		T (°C)	40	5200.02058	5200	0.02058	-3.9577
		T (°C)	50	5200.02568	5200	0.02568	-4.9385
		T (°C)	60	5200.02273	5200	0.02273	-4.3712
		T (°C)	70	5200.02259	5200	0.02259	-4.3442
Limits				± 20 ppm			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	5.00	5240.00165	5240	0.00165	-0.3149
		V max (V)	5.75	5240.00118	5240	0.00118	-0.2252
		V min (V)	4.25	5240.00681	5240	0.00681	-1.2996
Limits				± 20 ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	5	T (°C)	-20	5240.01182	5240	0.01182	-2.2557
		T (°C)	-10	5240.00367	5240	0.00367	-0.7004
		T (°C)	0	5240.01182	5240	0.01182	-2.2557
		T (°C)	10	5240.01219	5240	0.01219	-2.3263
		T (°C)	20	5240.01167	5240	0.01167	-2.2271
		T (°C)	30	5240.01362	5240	0.01362	-2.5992
		T (°C)	40	5240.01229	5240	0.01229	-2.3454
		T (°C)	50	5240.01215	5240	0.01215	-2.3187
		T (°C)	60	5240.00336	5240	0.00336	-0.6412
		T (°C)	70	5240.01216	5240	0.01216	-2.3206
Limits				± 20 ppm			

10. ANTENNA REQUIREMENT

10.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

10.2 EUT ANTENNA

The EUT antenna is permanent attached antenna. It comply with the standard requirement.

END OF REPORT