



RADIO TEST REPORT

FCC ID: LNQSBWD960A

Product: ScreenBeam 960
Trade Name: Actiontec
Model No.: SBWD960A
Serial Model: N/A
Report No.: NTEK-2016NT06206619F1
Issue Date: 11 Aug. 2016

Prepared for

Actiontec Electronics Inc

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

Prepared by

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1 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

Measurement Procedure Used:

APPLICABLE STANDARDS	
APPLICABLE STANDARD/ TEST PROCEDURE	TEST RESULT
FCC 47 CFR Part 2, Subpart J:2015 FCC 47 CFR Part 15, Subpart C:2015 KDB 174176 D01 Line Conducted FAQ v01r01 ANSI C63.10-2013 FCC KDB 558074 D01 DTS Meas Guidance v03r05	Complied

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

This report shall not be reproduced except in full, without the written approval of NTEK Testing Technology Co., Ltd., this document may be altered or revised by NTEK Testing Technology Co., Ltd., personnel only, and shall be noted in the revision of the document.

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

Date of Test : 20 Jun. 2016 ~ 11 Aug. 2016

Testing Engineer : Eileen Liu.
(Eileen Liu)

Technical Manager : Jason Chen
(Jason Chen)

Authorized Signatory : Sam. Chen
(Sam Chen)

2 SUMMARY OF TEST RESULTS

FCC Part15 (15.247), Subpart C			
Standard Section	Test Item	Verdict	Remark
15.207	Conducted Emission	PASS	
15.247 (a)(2)	6dB Bandwidth	PASS	
15.247 (b)	Maximum Output Power	PASS	
15.247 (c)	Radiated Spurious Emission	PASS	
15.247 (d)	Power Spectral Density	PASS	
15.205	Emission not in Restricted Band	PASS	
15.203	Antenna Requirement	PASS	

Remark:

1. "N/A" denotes test is not applicable in this Test Report.
2. All test items were verified and recorded according to the standards and without any deviation during the test.
3. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

3 FACILITIES AND ACCREDITATIONS

3.1 FACILITIES

All measurement facilities used to collect the measurement data are located at 1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street, Bao'an District, Shenzhen P.R. China.

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

3.2 LABORATORY ACCREDITATIONS AND LISTINGS

Site Description

EMC Lab. : Accredited by CNAS, 2014.09.04
 The certificate is valid until 2017.09.03
 The Laboratory has been assessed and proved to be in compliance with CNAS-CL01:2006 (identical to ISO/IEC 17025:2005)
 The Certificate Registration Number is L5516.

Accredited by Industry Canada, August 29, 2012
 The Certificate Registration Number is 9270A-1.

Accredited by FCC, September 06, 2013
 The Certificate Registration Number is 238937.

Name of Firm : NTEK Testing Technology Co., Ltd
 Site Location : 1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street, Bao'an District, Shenzhen P.R. China.

3.3 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded 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	$\pm 1.38\text{dB}$
2	RF power, conducted	$\pm 0.16\text{dB}$
3	Spurious emissions, conducted	$\pm 0.21\text{dB}$
4	All emissions, radiated(<1G)	$\pm 4.68\text{dB}$
5	All emissions, radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^\circ\text{C}$
7	Humidity	$\pm 2\%$

4 GENERAL DESCRIPTION OF EUT

Product Feature and Specification	
Equipment	ScreenBeam 960
Trade Name	Actiontec
FCC ID	LNQSBWD960A
Model No.	SBWD960A
Serial Model	N/A
Model Difference	N/A
Operating Frequency	2412-2462MHz for 802.11b/g/11n(HT20); 2422-2452MHz for 802.11n(HT40);
Modulation	DSSS with DBPSK/DQPSK/CCK for 802.11b; OFDM with BPSK/QPSK/16QAM/64QAM for 802.11g/n;
Number of Channels	11 channels for 802.11b/g/11n(HT20); 7 channels for 802.11n(HT40);
Antenna	See Note 2
Power supply	<input type="checkbox"/> DC supply:
	<input checked="" type="checkbox"/> Adapter supply: 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
HW Version	N/A
SW Version	N/A

Note 1: Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.

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

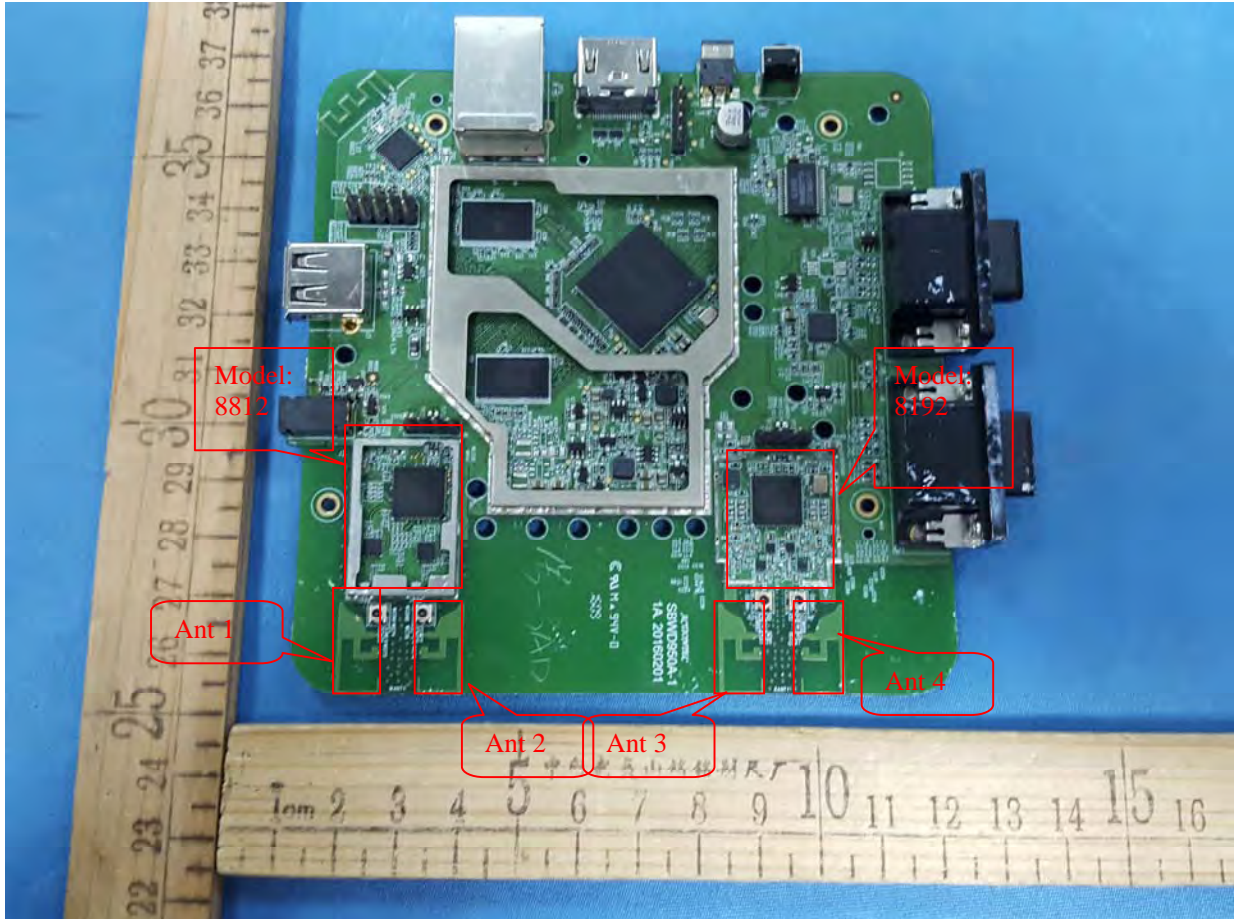


Figure A

Table for Filed Antenna for

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

Modules 8812 For 2.4G Band:

For IEEE 802.11b mode (1TX, 1RX) Only Chain 1 can be used as transmitting/receiving antenna.

For IEEE 802.11g 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 enable/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.

Modules 8192 For 2.4G Band:

For IEEE 802.11b mode (1TX, 1RX)

Only Chain 1 can be used as transmitting/receiving antenna. For IEEE 802.11g 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 enable/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.

*: Central management system.

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= $10\log(\text{antenna 1} + \text{antenna 2})$ dbi =5.86dbi in 2.4GHz
802.11 n 2.4GHz has MIMO mode.

Modules 8192 For MIMO mode: Directional gain= $10\log(\text{antenna 3} + \text{antenna 4})$ dbi =6.03dbi in 2.4GHz
802.11/n 2.4GHz has MIMO mode.

5 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.

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

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

Those data rates (802.11b: 1 Mbps; 802.11g: 6 Mbps; 802.11n (HT20): MCS0; 802.11n (HT40): MCS0) were used for all test.

The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement –X, Y, and Z-plane. The Y-plane results were found as the worst case and were shown in this report.

Frequency and Channel list for 802.11b/g/n (HT20):

Channel	Frequency(MHz)
1	2412
2	2417
...	...
5	2432
6	2437
...	...
10	2457
11	2462

Note: $f_c=2412\text{MHz}+k \times 5\text{MHz}$ $k=0$ to 10

Frequency and Channel list for 802.11n (HT40):

Channel	Frequency(MHz)
3	2422
4	2427
5	2432
6	2437
7	2442
8	2447
9	2452

Note: $f_c=2422\text{MHz}+k \times 5\text{MHz}$ $k=0$ to 6

Test Items	Mode	Data Rate	Channel	Ant
AC Power Line Conducted Emissions	Normal Link	-	-	-
Maximum Conducted Output Power	For beamforming mode			
	11n HT20	MCS0	1/6/11	1+2 3+4
	11n HT40	MCS0	3/6/9	1+2 3+4
	For non-beamforming mode			
	11b/CCK	1 Mbps	1/6/11	1/2 3/4
	11g/BPSK	6 Mbps	1/6/11	1/2 3/4
Power Spectral Density	For beamforming mode			
	11n HT20	MCS0	1/6/11	1+2 3+4
	11n HT40	MCS0	3/6/9	1+2 3+4
	For non-beamforming mode			
	11b/CCK	1 Mbps	1/6/11	1/2 3/4
	11g/BPSK	6 Mbps	1/6/11	1/2 3/4
6dB Spectrum Bandwidth	For beamforming mode			
	11n HT20	MCS0	1/6/11	1/2 3/4
	11n HT40	MCS0	3/6/9	1/2 3/4
	For non-beamforming mode			
	11b/CCK	1 Mbps	1/6/11	1/2 3/4
	11g/BPSK	6 Mbps	1/6/11	1/2 3/4
Radiated Emissions Below 1GHz	Normal Link	-	-	-
Radiated Emissions Above 1GHz	For beamforming mode			
	11n HT20	MCS0	1/6/11	1+2 3+4
	11n HT40	MCS0	3/6/9	1+2 3+4
	For non-beamforming mode			
	11b/CCK	1 Mbps	1/6/11	1/2 3/4
	11g/BPSK	6 Mbps	1/6/11	1/2 3/4

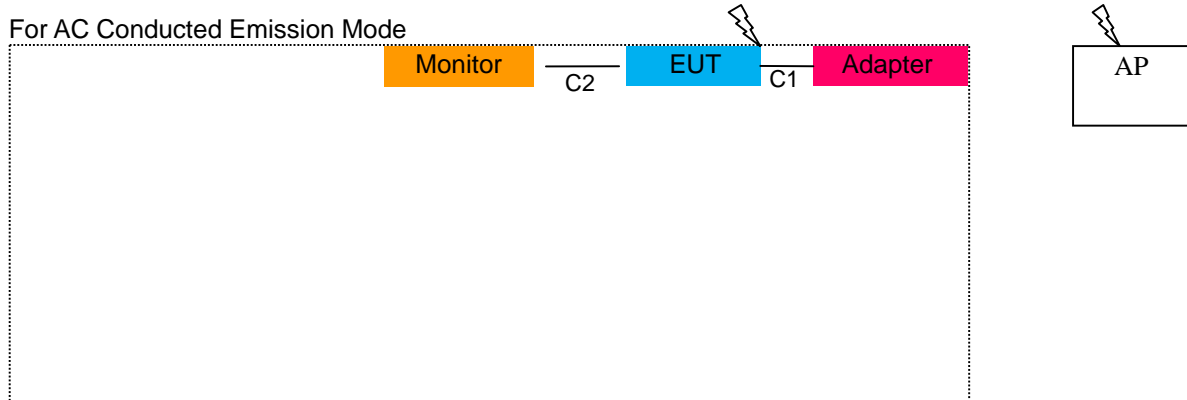
Band Edge Emissions	For beamforming mode			
	11n HT20	MCS0	1/11	1+2 3+4
	11n HT40	MCS0	3/9	1+2 3+4
	For non-beamforming			
	11b/CCK	1 Mbps	1/11	1/2 3/4
	11g/BPSK	6 Mbps	1/11	1/2 3/4

There are two modes of EUT, one is beamforming mode, and the other is non-beamforming mode for n/ac, after evaluating, beamforming mode has been evaluated to be the worst case, so it was selected to test and record in this test report.

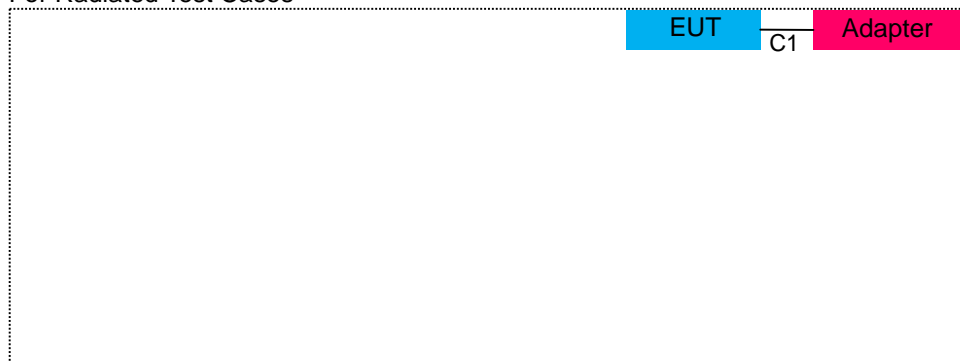
6 SETUP OF EQUIPMENT UNDER TEST

6.1 BLOCK DIAGRAM CONFIGURATION OF TEST SYSTEM

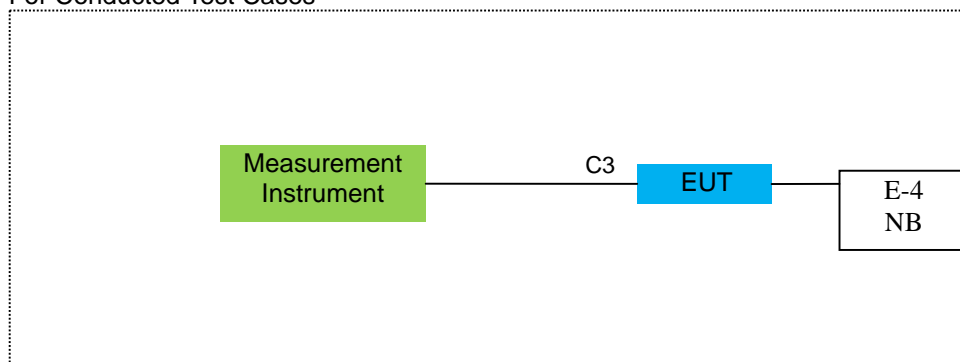
For AC Conducted Emission Mode



For Radiated Test Cases



For Conducted Test Cases



6.2 SUPPORT EQUIPMENT

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	Mfr/Brand	Model/Type No.	FCC ID	Note
E-1	ScreenBeam 960	Actiontec	SBWD960A	LNQSBWD960A	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

Notes:

- (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.
- (3) "YES" is means "shielded" "with core"; "NO" is means "unshielded" "without core".

6.3 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	2016.07.06	2017.07.05	1 year
2	Spectrum Analyzer	Agilent	N9020A	MY49100060	2016.07.06	2017.07.05	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	2016.07.06	2017.07.05	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	2016.07.06	2017.07.05	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-40G Hz)	N/A	R-03	N/A	2016.06.06	2017.06.05	1 year
18	High Test Cable(1G-40G Hz)	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	2016.06.08	2017.06.07	1 year
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Note: Each piece of equipment is scheduled for calibration once a year.

7 TEST REQUIREMENTS

7.1 CONDUCTED EMISSIONS TEST

7.1.1 Applicable Standard

According to FCC Part 15.207(a) and KDB 174176 D01 Line Conducted FAQ v01r01

7.1.2 Conformance Limit

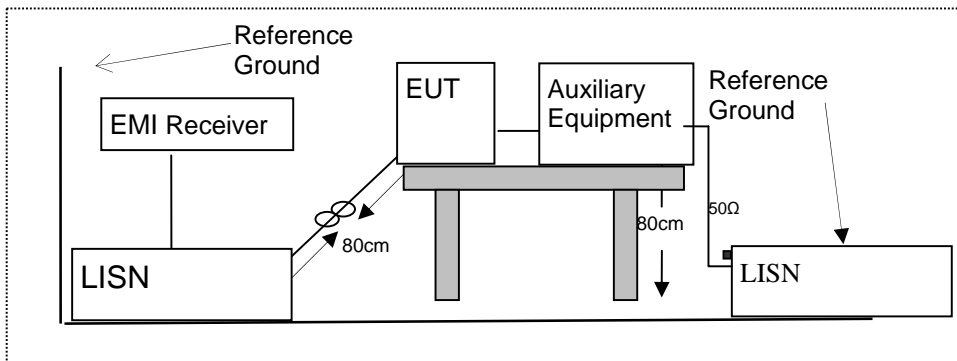
Frequency(MHz)	Conducted Emission Limit	
	Quasi-peak	Average
0.15-0.5	66-56*	56-46*
0.5-5.0	56	46
5.0-30.0	60	50

Note: 1. *Decreases with the logarithm of the frequency
 2. The lower limit shall apply at the transition frequencies
 3. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

7.1.3 Measuring Instruments

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

7.1.4 Test Configuration



7.1.5 Test Procedure

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

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room.
2. The EUT was placed on a table which is 0.8m above ground plane.
3. Connect EUT 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.
4. 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 40cm long.
5. 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.
6. LISN at least 80 cm from nearest part of EUT chassis.
7. The frequency range from 150KHz to 30MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth(IF bandwidth=9KHz) with Maximum Hold Mode
9. For the actual test configuration, please refer to the related Item –EUT Test Photos.

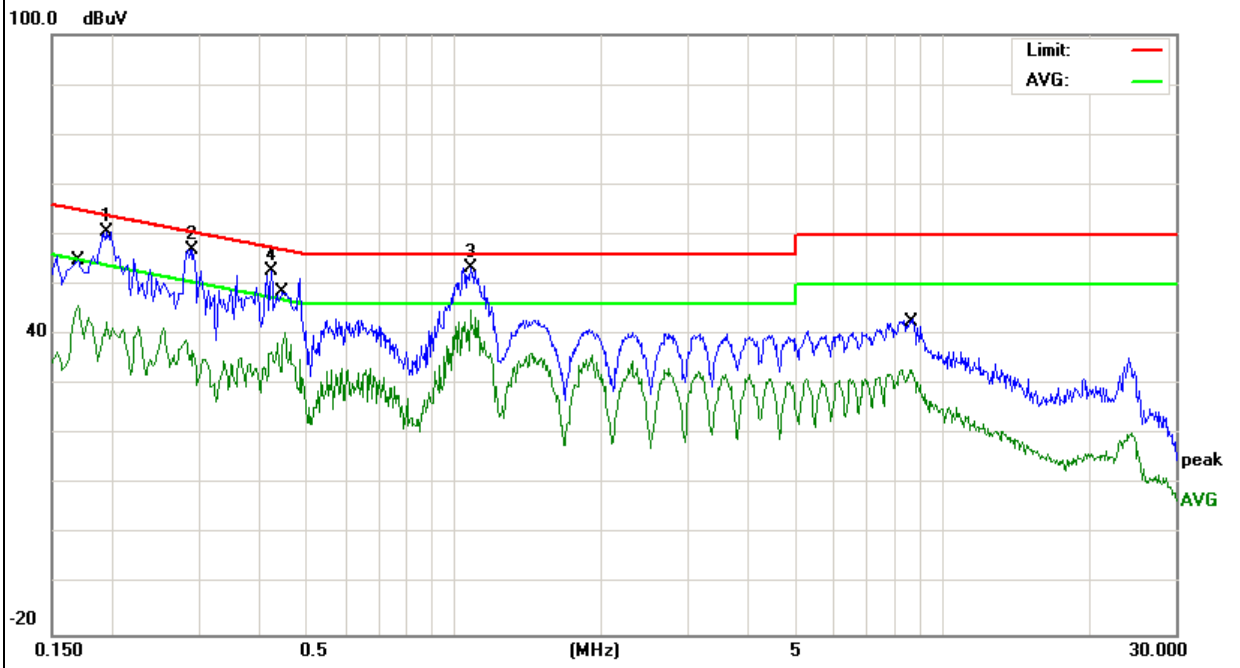
7.1.6 Test Results

EUT:	ScreenBeam 960	Model Name. :	SBWD960A
Temperature:	26 °C	Relative Humidity:	56%
Pressure:	1010hPa	Phase :	L
Test Voltage :	DC 5V From adapter AC120V/60Hz	Test Mode:	Mode 5(2.4G) -Adapter 1

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measure-ment (dBμV)	Limits (dBμV)	Margin (dB)	Remark
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.

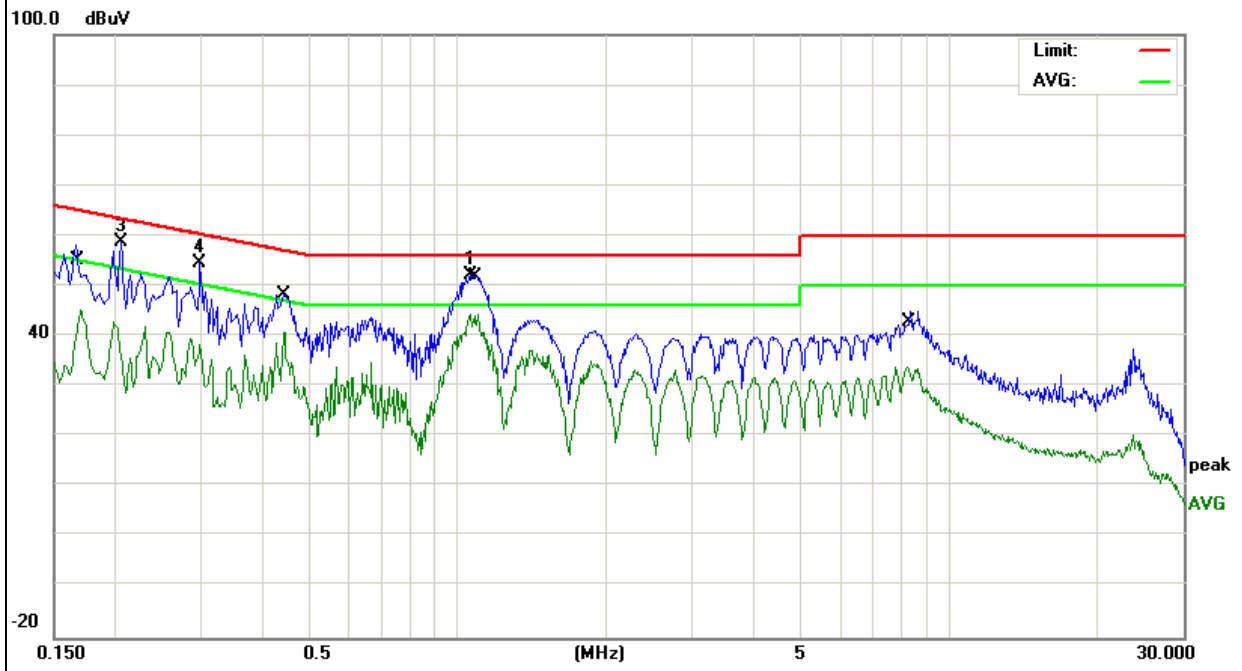


EUT:	ScreenBeam 960	Model Name. :	SBWD960A
Temperature:	26 °C	Relative Humidity:	56%
Pressure:	1010hPa	Phase :	N
Test Voltage :	DC 5V From adapter AC120V/60Hz	Test Mode:	Mode 5(2.4G) -Adapter 1

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measure-ment (dBμV)	Limits (dBμV)	Margin (dB)	Remark
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.

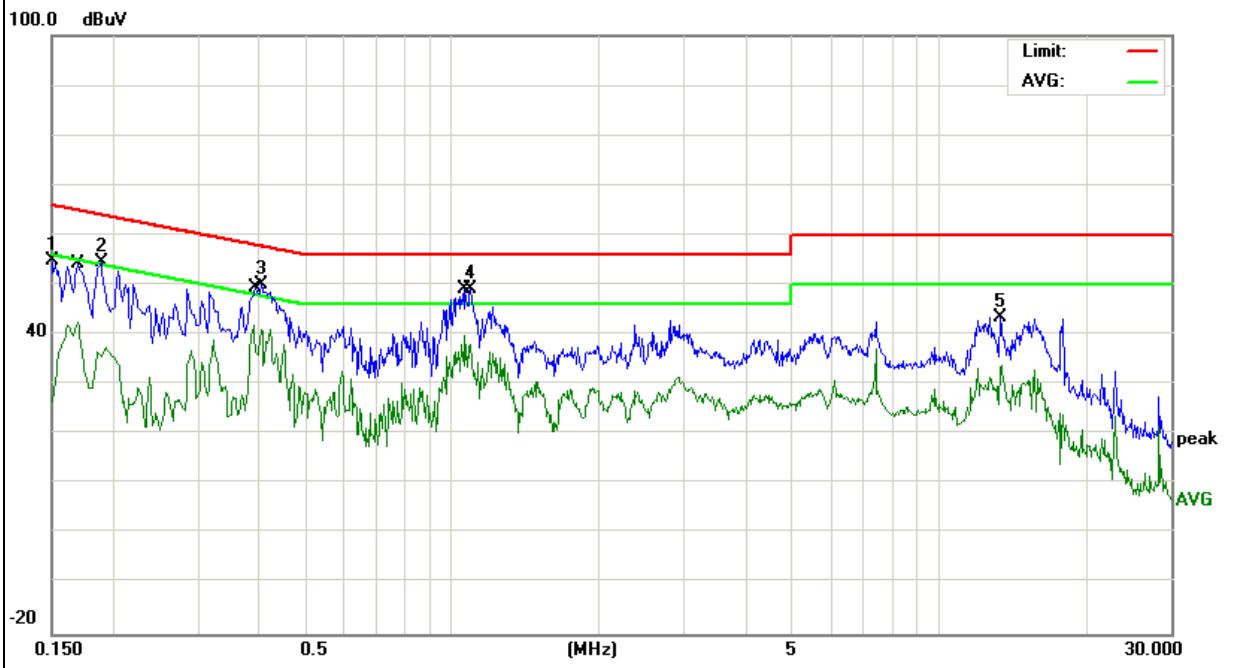


EUT:	ScreenBeam 960	Model Name. :	SBWD960A
Temperature:	26 °C	Relative Humidity:	56%
Pressure:	1010hPa	Phase :	L
Test Voltage :	DC 5V From adapter AC240V/60Hz	Test Mode:	Mode 5(2.4G) -Adapter 1

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measure-ment (dBμV)	Limits (dBμV)	Margin (dB)	Remark
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.

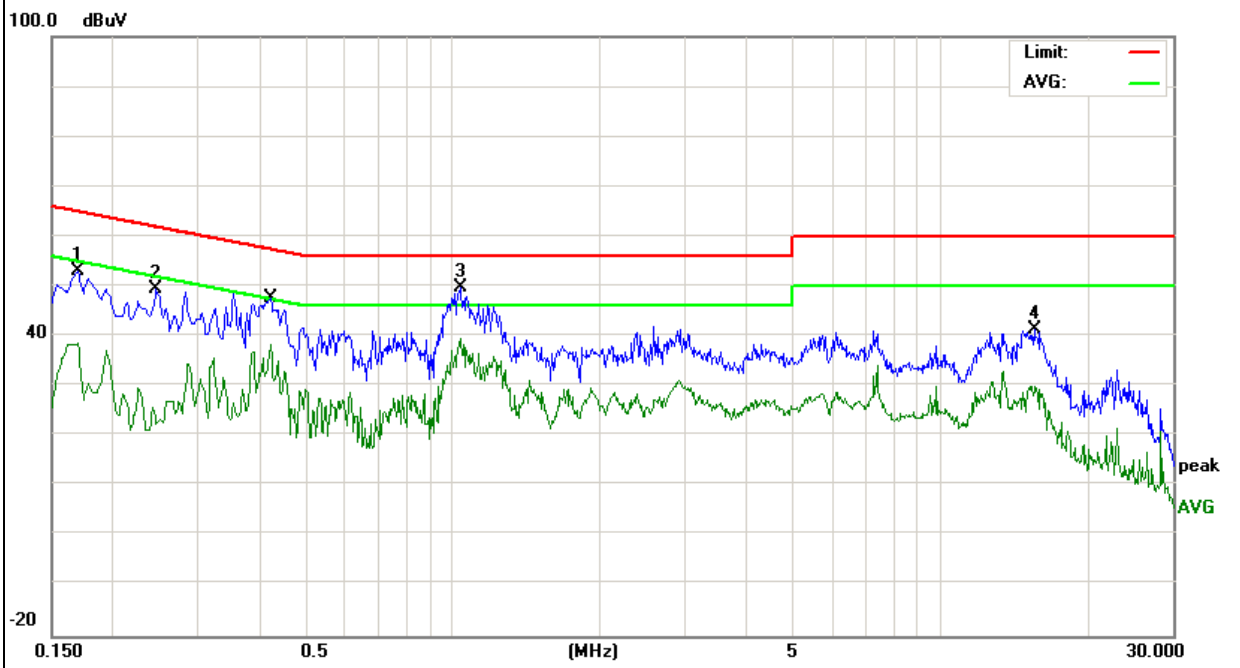


EUT:	ScreenBeam 960	Model Name. :	SBWD960A
Temperature:	26 °C	Relative Humidity:	56%
Pressure:	1010hPa	Phase :	N
Test Voltage :	DC 5V From adapter AC240V/60Hz	Test Mode:	Mode 5(2.4G) -Adapter 1

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measure-ment (dBμV)	Limits (dBμV)	Margin (dB)	Remark
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.

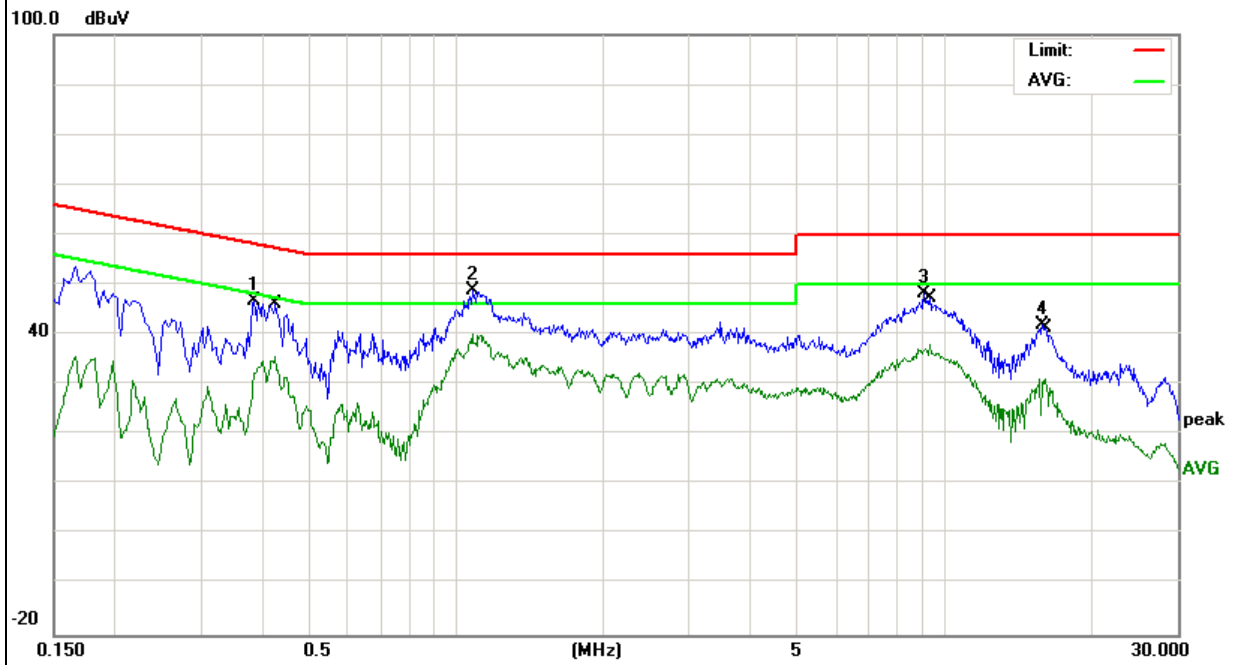


EUT:	ScreenBeam 960	Model Name. :	SBWD960A
Temperature:	26 °C	Relative Humidity:	56%
Pressure:	1010hPa	Phase :	L
Test Voltage :	DC 5V From adapter AC120V/60Hz	Test Mode:	Mode 5(2.4G)-Adapter 2

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measure-ment (dBμV)	Limits (dBμV)	Margin (dB)	Remark
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.

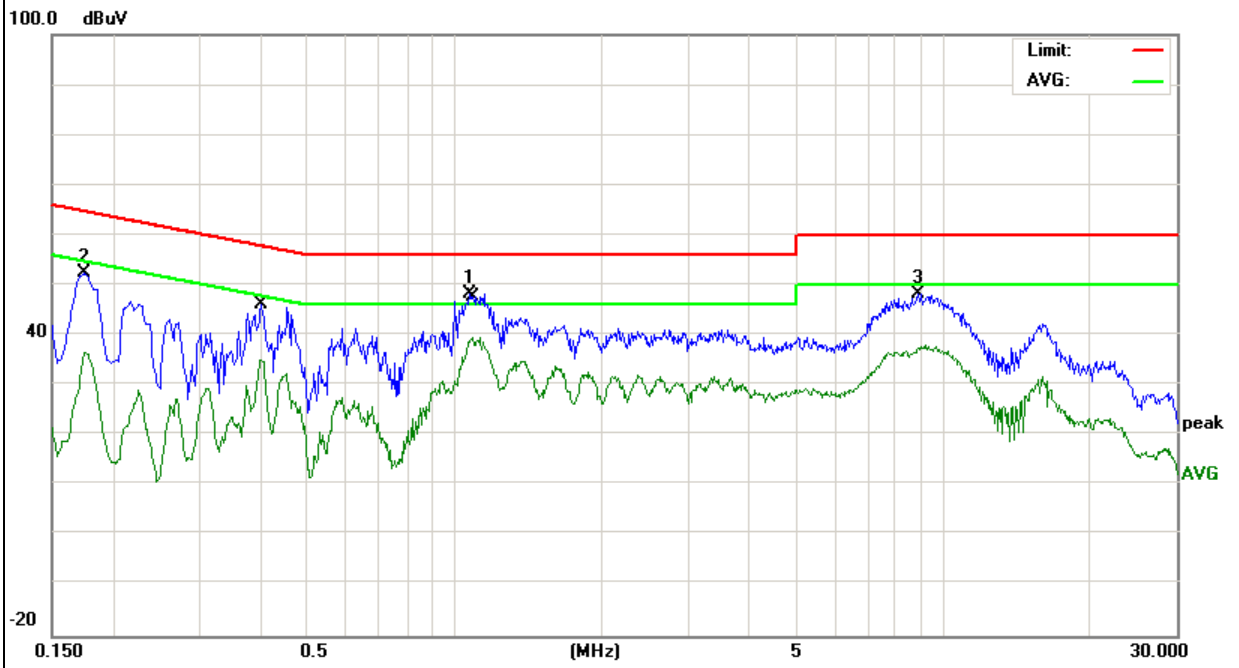


EUT:	ScreenBeam 960	Model Name. :	SBWD960A
Temperature:	26 °C	Relative Humidity:	56%
Pressure:	1010hPa	Phase :	N
Test Voltage :	DC 5V From adapter AC120V/60Hz	Test Mode:	Mode 5(2.4G)-Adapter 2

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.

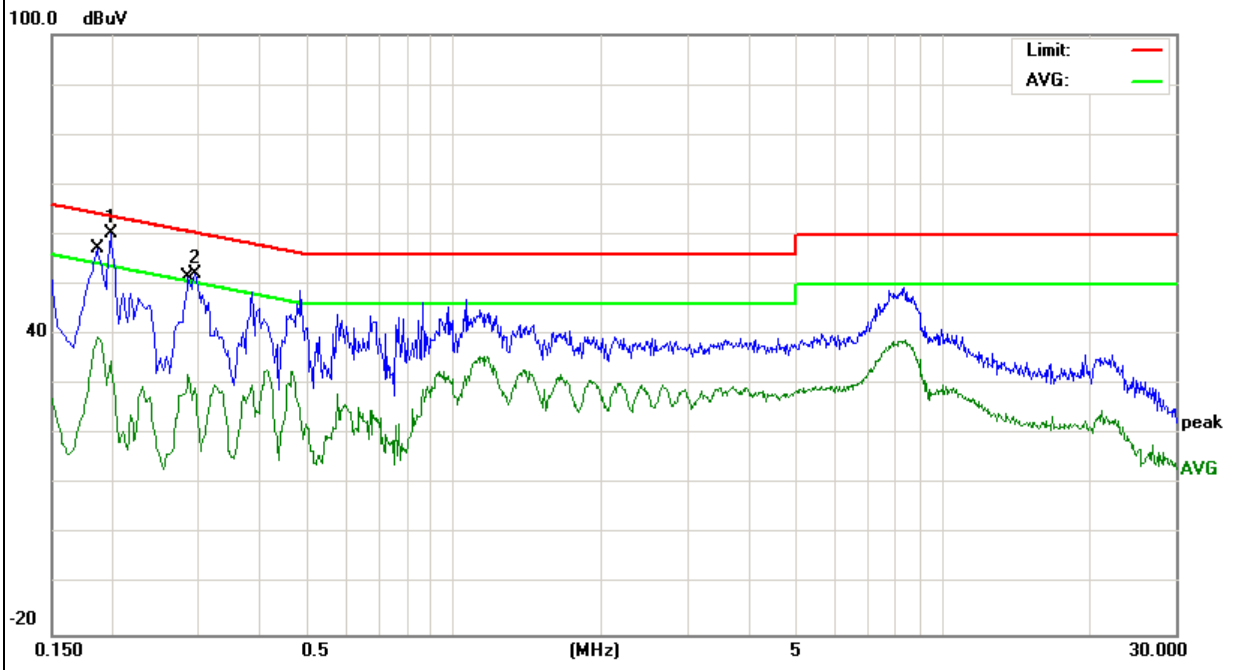


EUT:	ScreenBeam 960	Model Name. :	SBWD960A
Temperature:	26 °C	Relative Humidity:	56%
Pressure:	1010hPa	Phase :	L
Test Voltage :	DC 5V From adapter AC240V/60Hz	Test Mode:	Mode 5(2.4G)-Adapter 2

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measure-ment (dBμV)	Limits (dBμV)	Margin (dB)	Remark
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.

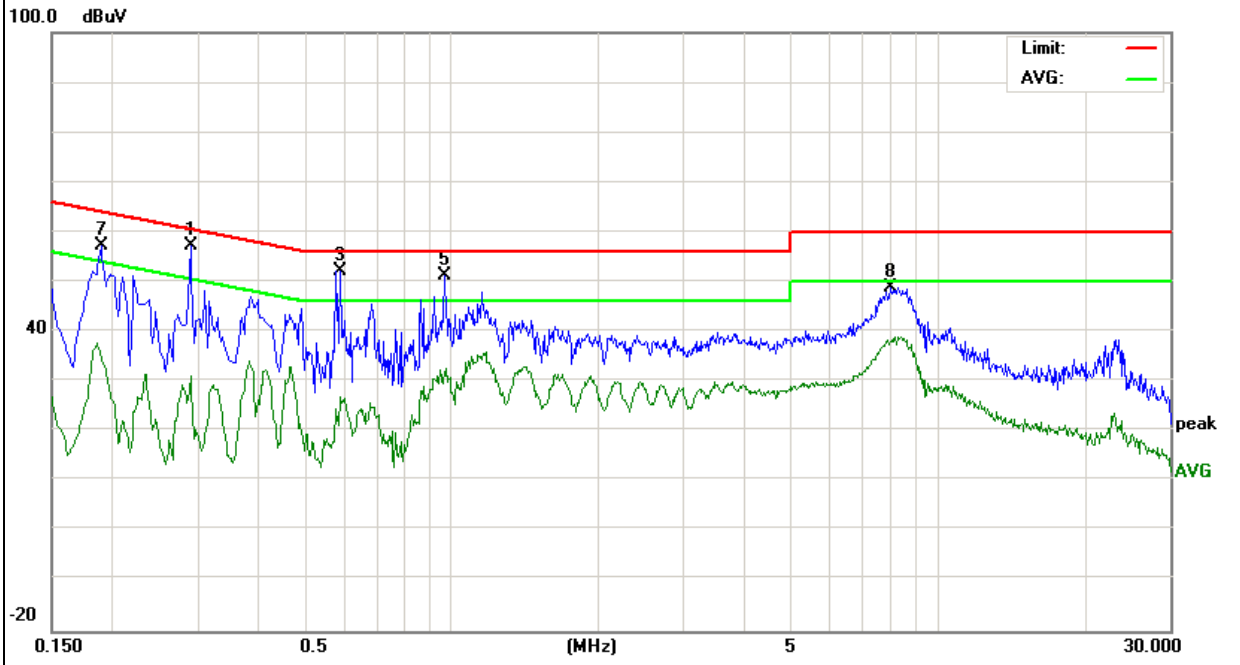


EUT:	ScreenBeam 960	Model Name. :	SBWD960A
Temperature:	26 °C	Relative Humidity:	56%
Pressure:	1010hPa	Phase :	N
Test Voltage :	DC 5V From adapter AC240V/60Hz	Test Mode:	Mode 5(2.4G)-Adapter 2

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measure-ment (dBμV)	Limits (dBμV)	Margin (dB)	Remark
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.



7.2 RADIATED SPURIOUS EMISSION

7.2.1 Applicable Standard

According to FCC Part 15.247(d) and 15.209 and ANSI C63.10-2013

7.2.2 Conformance Limit

According to FCC Part 15.247(d): 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 Part 15.205, 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

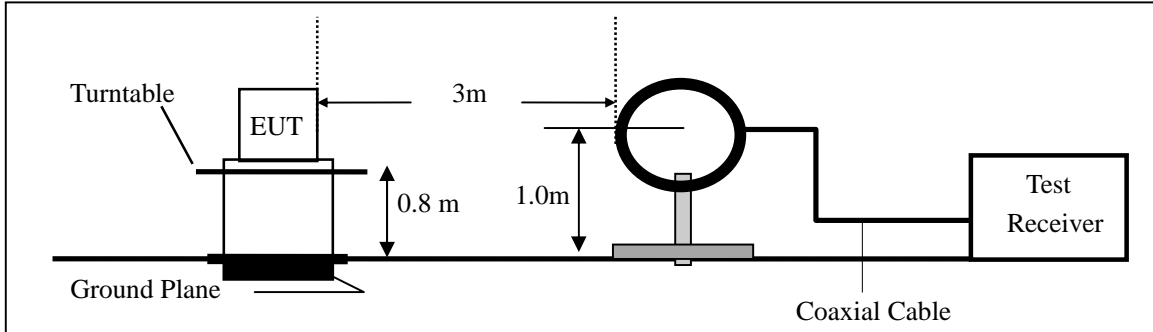
- Remark :1. Emission level in dBuV/m=20 log (uV/m)
 2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
 3. Distance extrapolation factor =40log(Specific distance/ test distance)(dB);
 Limit line=Specific limits(dBuV) + distance extrapolation factor.

7.2.3 Measuring Instruments

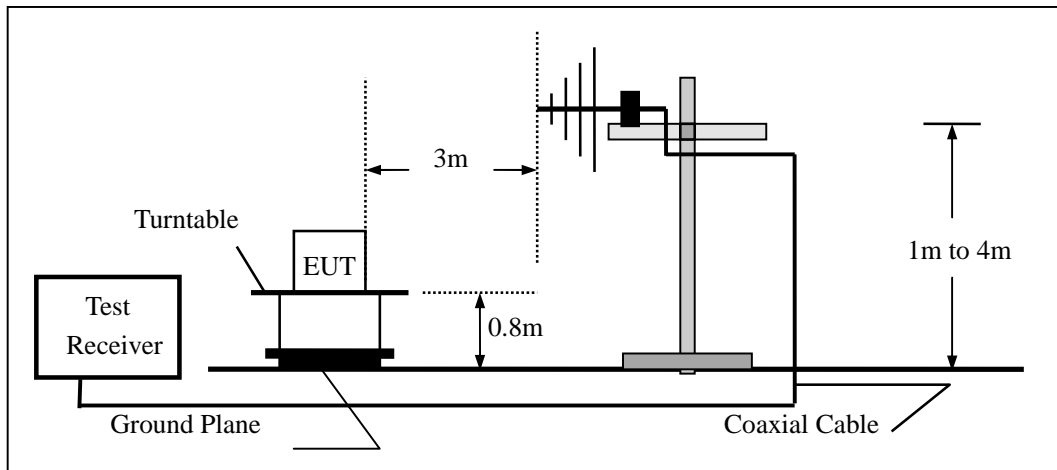
The Measuring equipment is listed in the section 6.3 of this test report.

7.2.4 Test Configuration

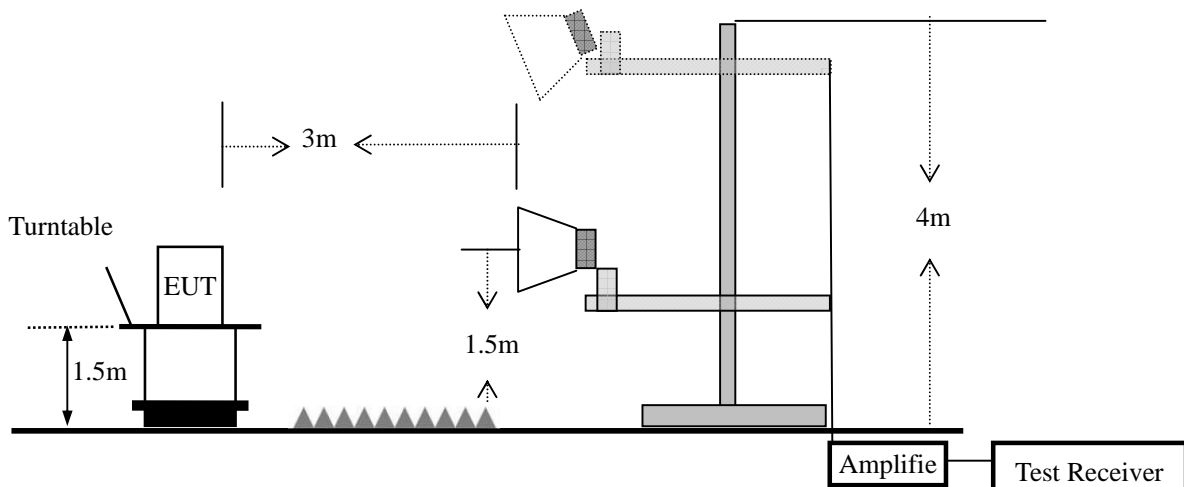
(a) For radiated emissions below 30MHz



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



(c) For radiated emissions above 1000MHz



7.2.5 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 $RBWCF [dB] = 10 \cdot \lg(100 [kHz] / \text{narrower RBW [kHz]})$. , 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.

7.2.6 Test Results

■ Spurious Emission below 30MHz (9KHz to 30MHz)

EUT:	ScreenBeam 960	Model No.:	SBWD960A
Temperature:	20 °C	Relative Humidity:	48%
Test Mode:	Mode1/Mode2/Mode3/Mode4	Test By:	Eileen Liu

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
--	--	--	--	--	--	--	--

Note: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

Distance extrapolation factor = $20 \log(\text{Specific distance} / \text{test distance})$ (dB);

Limit line = Specific limits(dBuV) + distance extrapolation factor

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

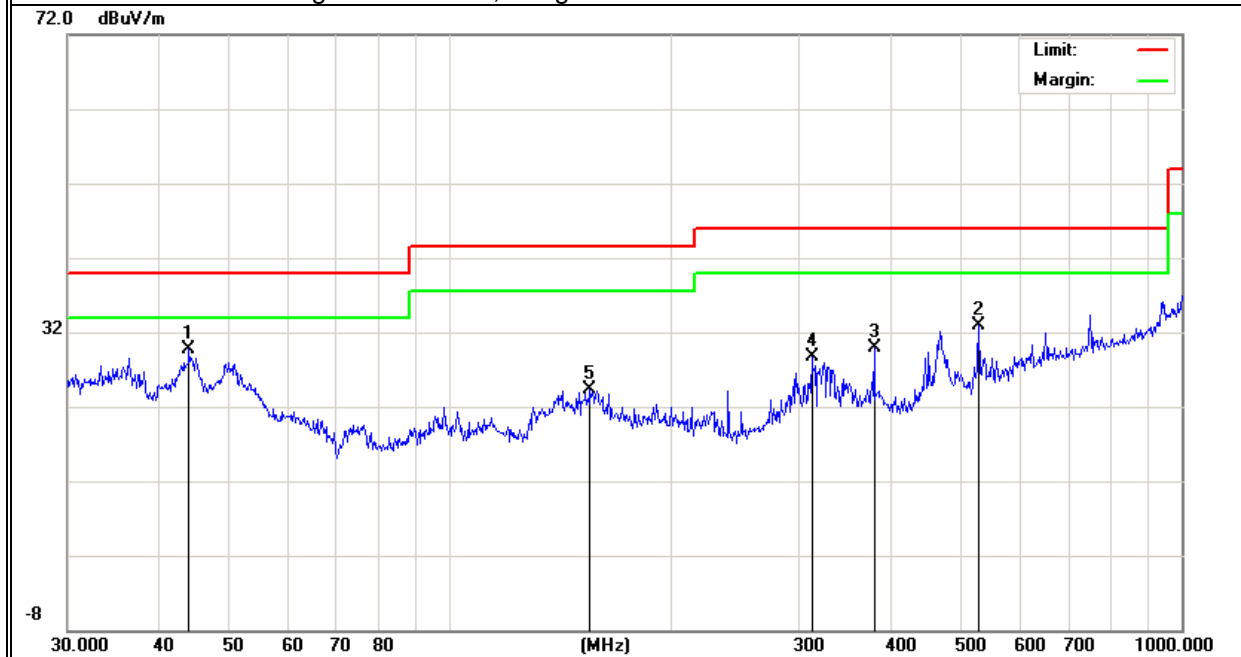
EUT:	ScreenBeam 960	Model Name :	SBWD960A
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Voltage :	DC 5V From adapter AC120V/60Hz
Test Mode :	TX (802.11B-CH 01) -8812 module		

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	43.9658	16.33	13.38	29.71	40.00	-10.29	peak
V	528.2458	13.95	18.86	32.81	46.00	-13.19	peak
V	379.9141	13.64	16.28	29.92	46.00	-16.08	peak
V	312.1793	14.44	14.31	28.75	46.00	-17.25	peak
V	155.3642	11.40	12.92	24.32	43.50	-19.18	peak

Remark:

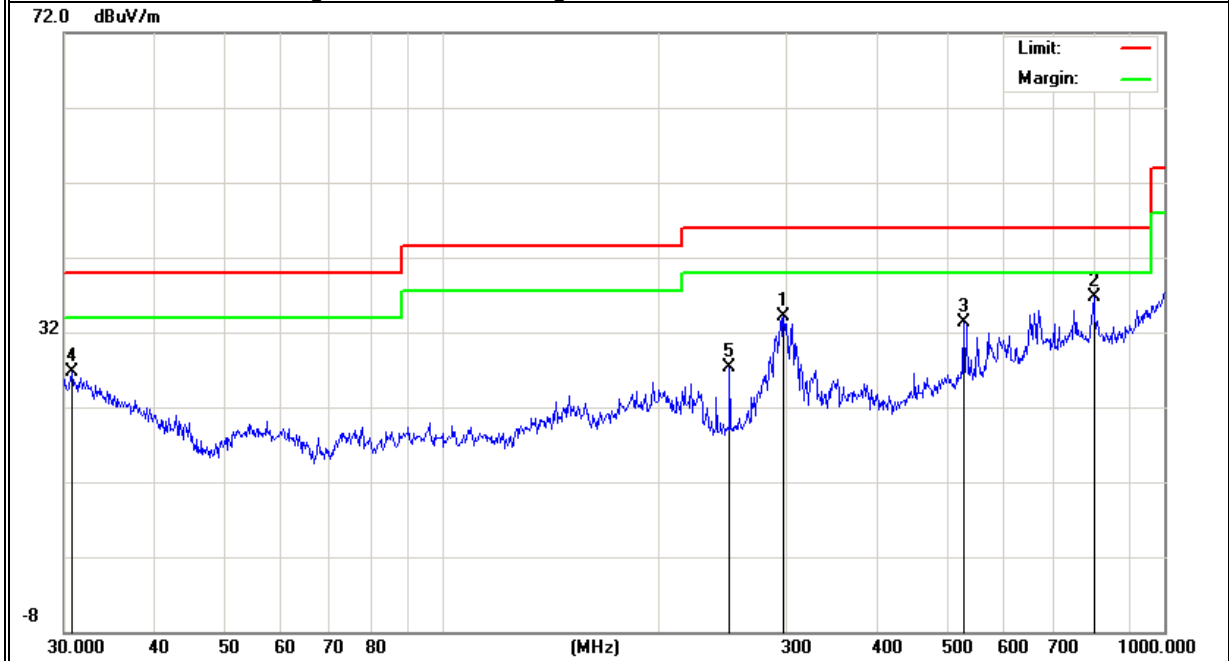
Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level - Limit



Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
H	297.2241	20.42	13.76	34.18	46.00	-11.82	peak
H	798.9796	12.73	24.01	36.74	46.00	-9.26	peak
H	528.2458	14.40	18.86	33.26	46.00	-12.74	peak
H	30.7454	6.66	19.98	26.64	40.00	-13.36	peak
H	250.3010	15.13	12.12	27.25	46.00	-18.75	peak

Remark:

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

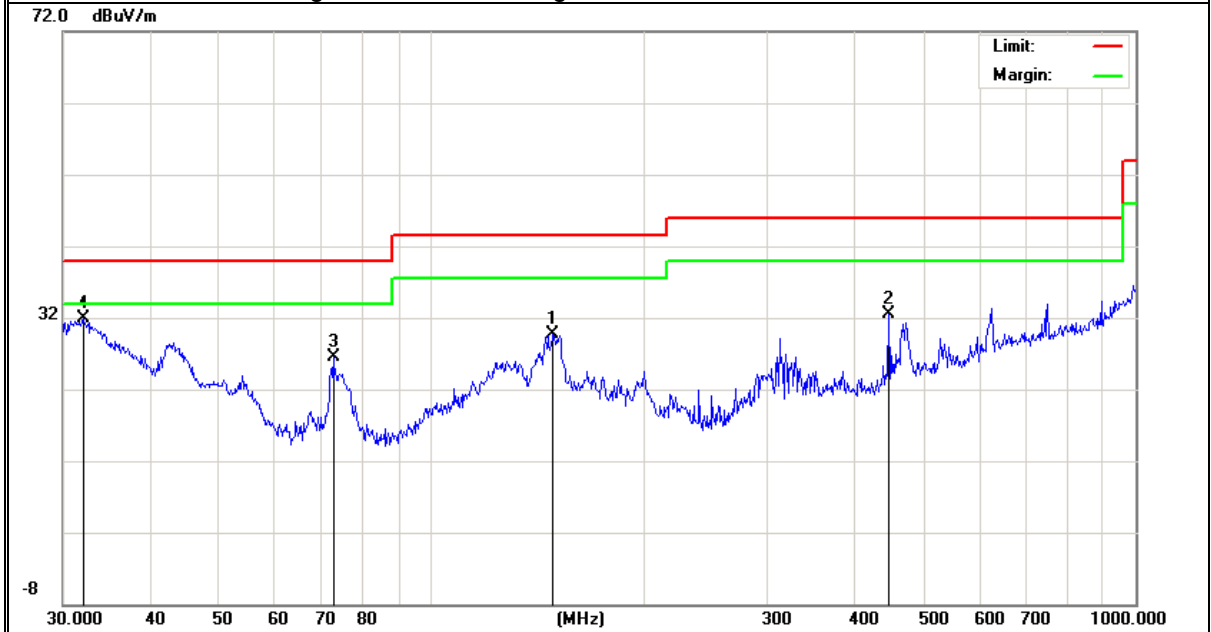


EUT:	ScreenBeam 960	Model Name :	SBWD960A
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Voltage :	DC 5V From adapter AC120V/60Hz
Test Mode :	TX (802.11B-CH 01) -8192 module		

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
V	148.9625	16.91	12.73	29.64	43.50	-13.86	peak
V	446.4141	15.28	17.27	32.55	46.00	-13.45	peak
V	72.5917	15.94	10.58	26.52	40.00	-13.48	peak
V	32.0668	12.44	19.49	31.93	40.00	-8.07	peak

Remark:

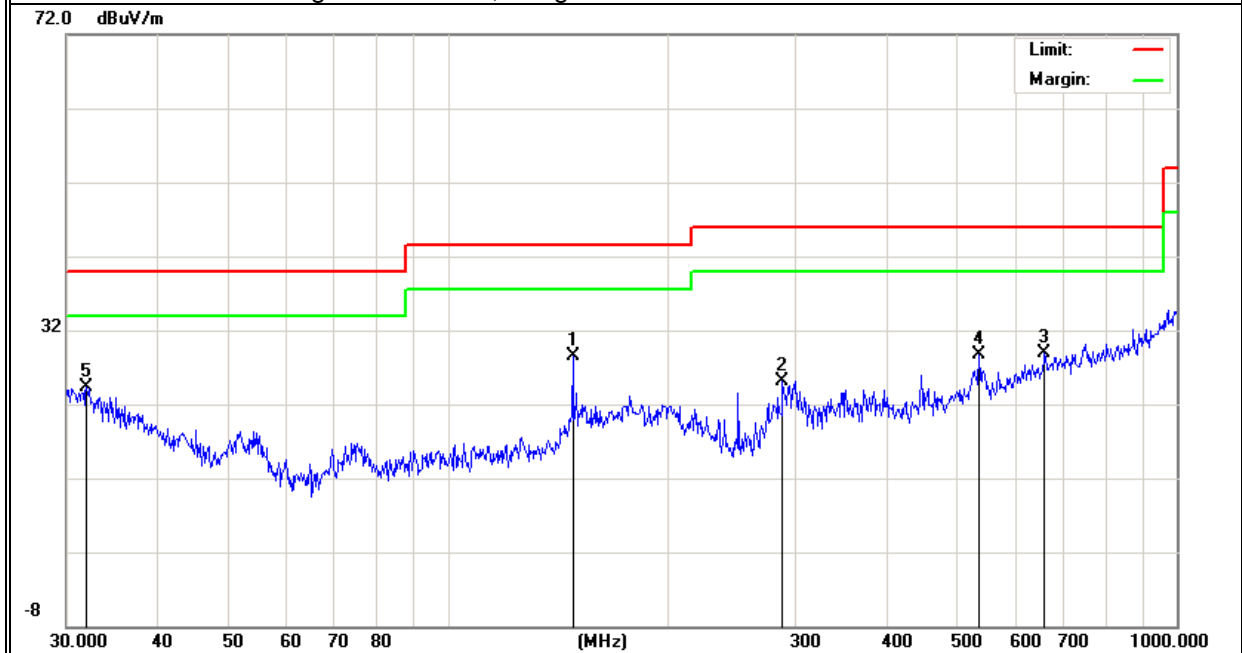
Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level - Limit



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

Remark:

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



■ Spurious Emission Above 1GHz (1GHz to 27GHz)

EUT:	ScreenBeam 960	Model No.:	SBWD960A
Temperature:	20 °C	Relative Humidity:	48%
Test Mode:	TX (802.11B) -8812 module	Test By:	Eileen Liu

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

Frequency (MHz)	Read Level (dBμV)	Cable loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
Low Channel (2412 MHz)-Above 1G								
4824.458	55.15	4.68	35.59	44.30	51.12	74.00	-22.88	Pk
4824.458	49.61	4.68	35.59	44.30	45.58	54.00	-8.42	AV
7236.206	48.29	7.10	36.22	44.60	47.01	74.00	-26.99	Pk
7236.206	42.19	7.10	36.22	44.60	40.91	54.00	-13.09	AV
4824.339	56.21	4.65	35.55	44.30	52.11	74.00	-21.89	Pk
4824.339	48.34	4.65	35.55	44.30	44.24	54.00	-9.76	AV
7236.102	47.33	7.11	36.24	44.52	46.16	74.00	-27.84	Pk
7236.102	41.19	7.11	36.24	44.52	40.02	54.00	-13.98	AV
Mid Channel (2437 MHz)-Above 1G								
4874.107	58.26	5.21	35.66	44.20	54.93	74.00	-19.07	Pk
4874.107	45.18	5.21	35.66	44.20	41.85	54.00	-12.15	AV
7311.089	48.36	7.10	36.50	44.43	47.53	74.00	-26.47	Pk
7311.089	42.06	7.10	36.50	44.43	41.23	54.00	-12.77	AV
4874.136	57.33	5.21	35.66	44.20	54.00	74.00	-20.00	Pk
4874.136	46.26	5.21	35.66	44.20	42.93	54.00	-11.07	AV
7311.335	47.29	7.10	36.50	44.43	46.46	74.00	-27.54	Pk
7311.335	41.38	7.10	36.50	44.43	40.55	54.00	-13.45	AV
High Channel (2462 MHz)- Above 1G								
4924.683	58.67	5.21	35.52	44.21	55.19	74.00	-18.81	Pk
4924.683	46.26	5.21	35.52	44.21	42.78	54.00	-11.22	AV
7386.248	47.18	7.10	36.53	44.60	46.21	74.00	-27.79	Pk
7386.248	41.07	7.10	36.53	44.60	40.10	54.00	-13.90	AV
4924.032	57.33	5.21	35.52	44.21	53.85	74.00	-20.15	Pk
4924.032	45.34	5.21	35.52	44.21	41.86	54.00	-12.14	AV
7386.169	48.16	7.10	36.53	44.60	47.19	74.00	-26.81	Pk
7386.169	43.07	7.10	36.53	44.60	42.10	54.00	-11.9	AV

- Note:
- (1) All Readings are Peak Value (VBW=3MHz) and Peak Value (VBW=10Hz).
 - (2) Emission Level= Antenna Factor + Cable Loss + Read Level - Preamp Factor
 - (3) Data of measurement within this frequency range shown "--" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
 - (4)"802.11b" mode is the worst mode. When PK value is lower than the Average value limit, average didn't record.

EUT:	ScreenBeam 960	Model No.:	SBWD960A
Temperature:	20 °C	Relative Humidity:	48%
Test Mode:	TX (802.11B) -8192 module	Test By:	Eileen Liu

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

Frequency (MHz)	Read Level (dBμV)	Cable loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
Low Channel (2412 MHz)-Above 1G								
4824.458	56.34	4.68	35.59	44.30	52.31	74.00	-21.69	Pk
4824.458	48.69	4.68	35.59	44.30	44.66	54.00	-9.34	AV
7236.206	49.03	7.10	36.22	44.60	47.75	74.00	-26.25	Pk
7236.206	43.17	7.10	36.22	44.60	41.89	54.00	-12.11	AV
4824.339	58.33	4.65	35.55	44.30	54.23	74.00	-19.77	Pk
4824.339	47.69	4.65	35.55	44.30	43.59	54.00	-10.41	AV
7236.102	48.19	7.11	36.24	44.52	47.02	74.00	-26.98	Pk
7236.102	42.03	7.11	36.24	44.52	40.86	54.00	-13.14	AV
Mid Channel (2437 MHz)-Above 1G								
4874.107	57.94	5.21	35.66	44.20	54.61	74.00	-19.39	Pk
4874.107	45.83	5.21	35.66	44.20	42.50	54.00	-11.50	AV
7311.089	49.18	7.10	36.50	44.43	48.35	74.00	-25.65	Pk
7311.089	42.57	7.10	36.50	44.43	41.74	54.00	-12.26	AV
4874.136	58.16	5.21	35.66	44.20	54.83	74.00	-19.17	Pk
4874.136	45.83	5.21	35.66	44.20	42.50	54.00	-11.50	AV
7311.335	46.38	7.10	36.50	44.43	45.55	74.00	-28.45	Pk
7311.335	40.15	7.10	36.50	44.43	39.32	54.00	-14.68	AV
High Channel (2462 MHz)- Above 1G								
4924.683	59.16	5.21	35.52	44.21	55.68	74.00	-18.32	Pk
4924.683	46.38	5.21	35.52	44.21	42.90	54.00	-11.10	AV
7386.248	48.61	7.10	36.53	44.60	47.64	74.00	-26.36	Pk
7386.248	41.08	7.10	36.53	44.60	40.11	54.00	-13.89	AV
4924.032	58.64	5.21	35.52	44.21	55.16	74.00	-18.84	Pk
4924.032	46.19	5.21	35.52	44.21	42.71	54.00	-11.29	AV
7386.169	48.67	7.10	36.53	44.60	47.70	74.00	-26.30	Pk
7386.169	42.61	7.10	36.53	44.60	41.64	54.00	-12.36	AV

- Note: (1) All Readings are Peak Value (VBW=3MHz) and Peak Value (VBW=10Hz).
 (2) Emission Level= Antenna Factor + Cable Loss + Read Level - Preamp Factor
 (3) Data of measurement within this frequency range shown "--" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
 (4)"802.11b" mode is the worst mode. When PK value is lower than the Average value limit, average didn't record.

- Spurious Emission in Restricted Band 2310MHz-18000MHz
the worst result was report as below:

Model 8812

Frequency	Reading Level	Cable Loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Detector	Comment
(MHz)	(dBμV)	(dB)	dB/m	(dB)	(dBμV/m)	(dBμV/m)	(dB)	Type	
802.11b									
2390	69.61	3.14	27.21	43.80	56.16	74	-17.84	Pk	Vertica
2390	60.62	3.14	27.21	43.80	47.17	54	-6.83	AV	Vertica
2483.5	71.34	3.58	27.70	44.00	58.62	74	-15.38	Pk	Horizo
2483.5	61.26	3.58	27.70	44.00	48.54	54	-5.46	AV	Horizo
802.11g									
2390	68.29	3.14	27.21	43.80	54.84	74	-19.16	Pk	Vertica
2390	59.34	3.14	27.21	43.80	45.89	54	-8.11	AV	Vertica
2483.5	70.12	3.58	27.70	44.00	57.4	74	-16.6	Pk	Horizo
2483.5	60.22	3.58	27.70	44.00	47.5	54	-6.5	AV	Horizo
802.11n(20)									
2390	68.69	3.14	27.21	43.80	55.24	74	-18.76	Pk	Vertica
2390	58.38	3.14	27.21	43.80	44.93	54	-9.07	AV	Vertica
2483.5	70.36	3.58	27.70	44.00	57.64	74	-16.36	Pk	Horizo
2483.5	60.05	3.58	27.70	44.00	47.33	54	-6.67	AV	Horizo
802.11n(40)									
2390	69.31	3.14	27.21	43.80	55.86	74	-18.14	Pk	Vertica
2390	59.66	3.14	27.21	43.80	46.21	54	-7.79	AV	Vertica
2483.5	69.37	3.58	27.70	44.00	56.65	74	-17.35	Pk	Horizo
2483.5	58.64	3.58	27.70	44.00	45.92	54	-8.08	AV	Horizo

(1) Emission Level= Antenna Factor + Cable Loss + Read Level - Preamp Factor

Model 8912

the worst result was report as below:

Frequency (MHz)	Reading Level (dBμV)	Cable Loss (dB)	Antenna (dB/m)	Preamp Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detect or Type	Comment
802.11b									
2390	70.35	3.14	27.21	43.80	56.9	74	-17.1	Pk	Vertical
2390	61.18	3.14	27.21	43.80	47.73	54	-6.27	AV	Vertical
2483.5	72.18	3.58	27.70	44.00	59.46	74	-14.54	Pk	Horizontal
2483.5	62.33	3.58	27.70	44.00	49.61	54	-4.39	AV	Horizontal
802.11g									
2390	70.25	3.14	27.21	43.80	56.8	74	-17.2	Pk	Vertical
2390	61.85	3.14	27.21	43.80	48.4	54	-5.6	AV	Vertical
2483.5	59.86	3.58	27.70	44.00	47.14	74	-26.86	Pk	Horizontal
2483.5	60.83	3.58	27.70	44.00	48.11	54	-5.89	AV	Horizontal
802.11n(20)									
2390	69.43	3.14	27.21	43.80	55.98	74	-18.02	Pk	Vertical
2390	59.68	3.14	27.21	43.80	46.23	54	-7.77	AV	Vertical
2483.5	71.23	3.58	27.70	44.00	58.51	74	-15.49	Pk	Horizontal
2483.5	61.03	3.58	27.70	44.00	48.31	54	-5.69	AV	Horizontal
802.11n(40)									
2390	70.16	3.14	27.21	43.80	56.71	74	-17.29	Pk	Vertical
2390	60.31	3.14	27.21	43.80	46.86	54	-7.14	AV	Vertical
2483.5	69.84	3.58	27.70	44.00	57.12	74	-16.88	Pk	Horizontal
2483.5	58.37	3.58	27.70	44.00	45.65	54	-8.35	AV	Horizontal

(1) Emission Level= Antenna Factor + Cable Loss + Read Level - Preamp Factor

Spurious Emission in Restricted Bands 3260MHz- 18000MHz

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

Frequency (MHz)	Reading Level (dBμV)	Cable Loss (dB)	Antenna (dB/m)	Preamp Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detect or Type	Comment
3260	60.04	4.04	29.57	44.70	48.95	74	-25.05	Pk	Vertical
3260	55.73	4.04	29.57	44.70	44.64	54	-9.36	AV	Vertical
3260	61.08	4.04	29.57	44.70	49.99	74	-24.01	Pk	Horizontal
3260	56.54	4.04	29.57	44.70	45.45	54	-8.55	AV	Horizontal
3332	64.18	4.26	29.87	44.40	53.91	74	-20.09	Pk	Vertical
3332	53.08	4.26	29.87	44.40	42.81	54	-11.19	AV	Vertical
3332	62.11	4.26	29.87	44.40	51.84	74	-22.16	Pk	Horizontal
3332	52.18	4.26	29.87	44.40	41.91	54	-12.09	AV	Horizontal
17797	35.18	10.99	43.95	43.50	46.62	74	-27.38	Pk	Vertical
17797	36.51	10.99	43.95	43.50	47.95	54	-6.05	AV	Vertical
17788	33.15	11.81	43.69	44.60	44.05	74	-29.95	Pk	Horizontal
17788	34.67	11.81	43.69	44.60	45.57	54	-8.43	AV	Horizontal

802.11b" mode is the worst mode. When PK value is lower than the Average value limit, average didn't record.

7.3 6DB BANDWIDTH

7.3.1 Applicable Standard

According to FCC Part 15.247(a)(2) and KDB 558074 DTS 01 Meas. Guidance v03r04

7.3.2 Conformance Limit

The minimum permissible 6dB bandwidth is 500 kHz.

7.3.3 Measuring Instruments

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

7.3.4 Test Setup

Please refer to Section 6.1 of this test report.

7.3.5 Test Procedure

The testing follows KDB 558074 DTS 01 Meas. Guidance v03r04

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.

The path loss was compensated to the results for each measurement.

Set to the maximum power setting and enable the EUT transmit continuously.

The EUT was operating in controlled its channel.

Use the following spectrum analyzer settings:

Span = the frequency band of operation

RBW = 100KHz

VBW \geq 3*RBW

Sweep = auto

Detector function = peak

Trace = max hold

7.3.6 Test Results

EUT:	ScreenBeam 960	Model No.:	SBWD960A
Temperature:	20 °C	Relative Humidity:	48%
Test Mode:	Mode1/Mode2/Mode3/Mode4	Test By:	Eileen Liu

802.11b Mode

RF Modules	Channel	Frequency (MHz)	6dB bandwidth (MHz)		Limit (kHz)	Result
			ANT A	ANT B		
8812	Low	2412	10.10	10.08	500	Pass
	Middle	2437	10.10	10.07	500	Pass
	High	2462	10.10	10.8	500	Pass
RF Modules	Channel	Frequency (MHz)	6dB bandwidth (MHz)		Limit (kHz)	Result
			ANT C	ANT D		
8192	Low	2412	10.13	10.12	500	Pass
	Middle	2437	10.14	10.11	500	Pass
	High	2462	10.13	10.13	500	Pass

802.11g Mode

RF Modules	Channel	Frequency (MHz)	6dB bandwidth (MHz)		Limit (kHz)	Result
			ANT A	ANT B		
8812	Low	2412	16.57	16.56	500	Pass
	Middle	2437	16.57	16.55	500	Pass
	High	2462	16.57	16.56	500	Pass
RF Modules	Channel	Frequency (MHz)	6dB bandwidth (MHz)		Limit (kHz)	Result
			ANT C	ANT D		
8192	Low	2412	16.57	16.56	500	Pass
	Middle	2437	16.58	16.57	500	Pass
	High	2462	16.58	16.56	500	Pass

802.11n20 Mode

RF Modules	Channel	Frequency (MHz)	6dB bandwidth (MHz)		Limit (kHz)	Result
			ANT A	ANT B		
8812	Low	2412	17.77	17.76	500	Pass
	Middle	2437	17.77	17.76	500	Pass
	High	2462	17.78	17.76	500	Pass
RF Modules	Channel	Frequency (MHz)	6dB bandwidth (MHz)		Limit (kHz)	Result
			ANT C	ANT D		
8192	Low	2412	17.70	17.70	500	Pass
	Middle	2437	17.74	17.73	500	Pass
	High	2462	17.70	17.70	500	Pass

802.11n40 Mode

RF Modules	Channel	Frequency (MHz)	6dB bandwidth (MHz)		Limit (kHz)	Result
			ANT A	ANT B		
8812	Low	2422	36.45	36.43	500	Pass
	Middle	2437	36.45	36.43	500	Pass
	High	2452	36.46	36.45	500	Pass
RF Modules	Channel	Frequency (MHz)	6dB bandwidth (MHz)		Limit (kHz)	Result
			ANT C	ANT D		
8192	Low	2422	36.51	36.48	500	Pass
	Middle	2437	36.51	36.48	500	Pass
	High	2452	36.51	36.49	500	Pass

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

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

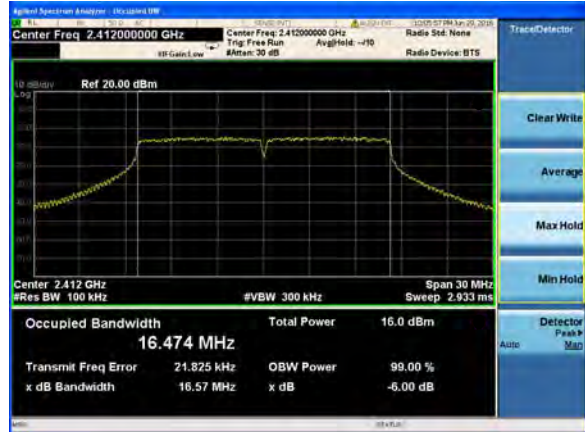
C(D) Represent the value of antenna 3 and 4,The worst data is Antenna 3 ,only shown Antenna 3 Plot.

RF Module 8812 Antenna 1

(802.11b) 6dB Bandwidth plot on channel 1



(802.11g) 6dB Bandwidth plot on channel 1



(802.11b) 6dB Bandwidth plot on channel 6



(802.11g) 6dB Bandwidth plot on channel 6



(802.11b) 6dB Bandwidth plot on channel 11

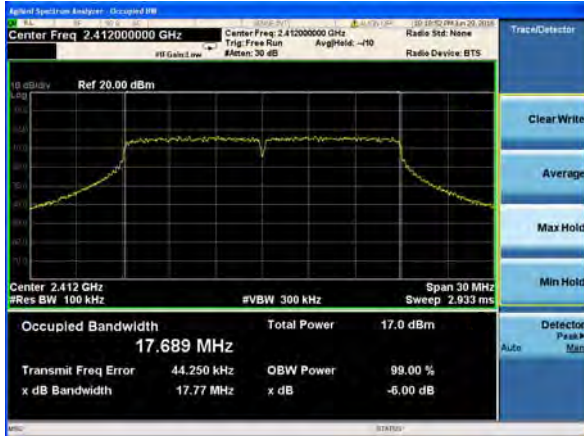


(802.11g) 6dB Bandwidth plot on channel 11



RF Module 8812 Antenna 1

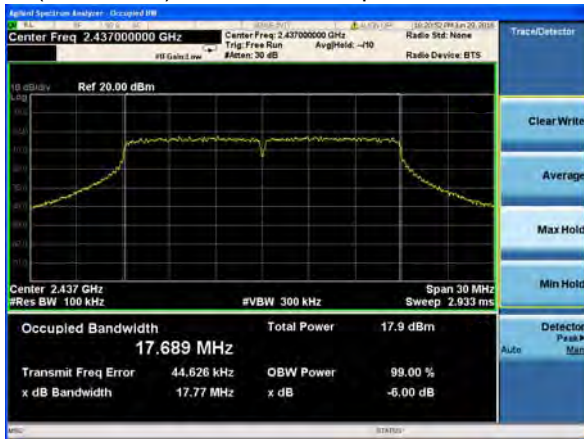
(802.11n20) 6dB Bandwidth plot on channel 1



(802.11n40) 6dB Bandwidth plot on channel 3



(802.11n20) 6dB Bandwidth plot on channel 6



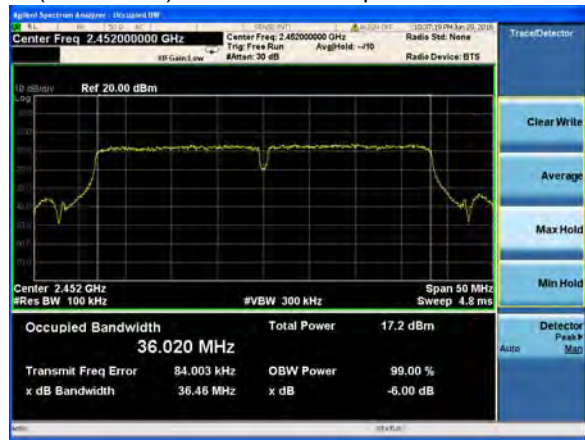
(802.11n40) 6dB Bandwidth plot on channel 6



(802.11n20) 6dB Bandwidth plot on channel 11



(802.11n40) 6dB Bandwidth plot on channel 9



RF Module 8192 Antenna 3

(802.11b) 6dB Bandwidth plot on channel 1



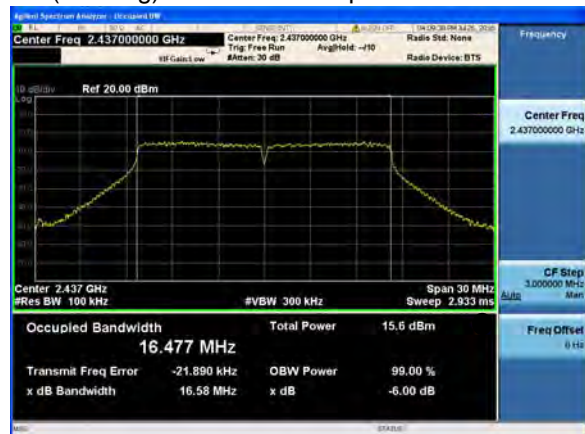
(802.11g) 6dB Bandwidth plot on channel 1



(802.11b) 6dB Bandwidth plot on channel 6



(802.11g) 6dB Bandwidth plot on channel 6



(802.11b) 6dB Bandwidth plot on channel 11

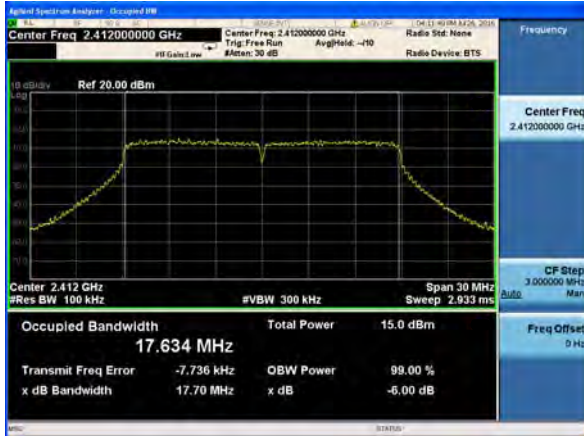


(802.11g) 6dB Bandwidth plot on channel 11



RF Module 8192 Antenna 3

(802.11n20) 6dB Bandwidth plot on channel 1



(802.11n40) 6dB Bandwidth plot on channel 3



(802.11n20) 6dB Bandwidth plot on channel 6



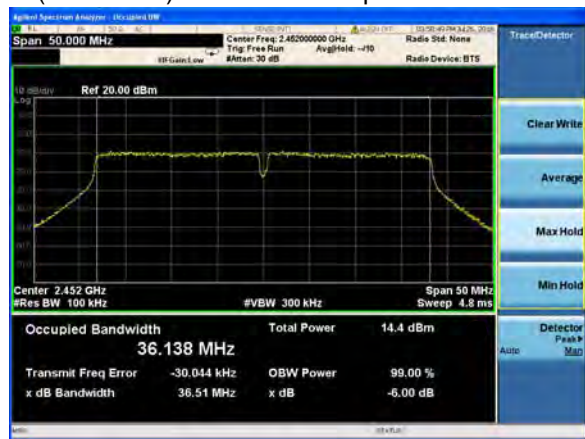
(802.11n40) 6dB Bandwidth plot on channel 6



(802.11n20) 6dB Bandwidth plot on channel 11



(802.11n40) 6dB Bandwidth plot on channel 9



7.4 20DB BANDWIDTH

7.4.1 Applicable Standard

According to FCC Part 15.247(a)(2) and KDB 558074 DTS 01 Meas. Guidance v03r05

7.4.2 Conformance Limit

The minimum permissible 6dB bandwidth is 500 kHz.

7.4.3 Measuring Instruments

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

7.4.4 Test Setup

Please refer to Section 6.1 of this test report.

7.4.5 Test Procedure

The testing follows KDB 558074 DTS 01 Meas. Guidance v03r05

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.

The path loss was compensated to the results for each measurement.

Set to the maximum power setting and enable the EUT transmit continuously.

The EUT was operating in controlled its channel.

Use the following spectrum analyzer settings:

Span = the frequency band of operation

RBW = 100KHz

VBW \geq 3*RBW

Sweep = auto

Detector function = peak

Trace = max hold

7.4.6 Test Results

EUT:	ScreenBeam 960	Model No.:	SBWD960A
Temperature:	20 °C	Relative Humidity:	48%
Test Mode:	Mode1/Mode2/Mode3/Mode4	Test By:	Eileen Liu

802.11b Mode

RF Modules	Channel	Frequency (MHz)	-20dB bandwidth (MHz)		Limit (kHz)	Result
			ANT A	ANT B		
8812	Low	2412	17.12	17.11	500	Pass
	Middle	2437	17.12	17.10	500	Pass
	High	2462	17.12	17.11	500	Pass
RF Modules	Channel	Frequency (MHz)	-20dB bandwidth (MHz)		Limit (kHz)	Result
			ANT C	ANT D		
8192	Low	2412	17.12	17.10	500	Pass
	Middle	2437	17.13	17.10	500	Pass
	High	2462	17.12	17.11	500	Pass

802.11g Mode

RF Modules	Channel	Frequency (MHz)	-20dB bandwidth (MHz)		Limit (kHz)	Result
			ANT A	ANT B		
8812	Low	2412	18.60	18.60	500	Pass
	Middle	2437	18.58	18.57	500	Pass
	High	2462	18.60	18.60	500	Pass
RF Modules	Channel	Frequency (MHz)	-20dB bandwidth (MHz)		Limit (kHz)	Result
			ANT C	ANT D		
8192	Low	2412	18.61	18.60	500	Pass
	Middle	2437	18.61	18.60	500	Pass
	High	2462	18.58	18.59	500	Pass

802.11n20 Mode

RF Modules	Channel	Frequency (MHz)	-20dB bandwidth (MHz)		Limit (kHz)	Result
			ANT A	ANT B		
8812	Low	2412	19.41	19.40	500	Pass
	Middle	2437	19.41	19.41	500	Pass
	High	2462	19.60	19.58	500	Pass
RF Modules	Channel	Frequency (MHz)	-20dB bandwidth (MHz)		Limit (kHz)	Result
			ANT C	ANT D		
8192	Low	2412	19.42	19.41	500	Pass
	Middle	2437	19.40	19.40	500	Pass
	High	2462	19.41	19.40	500	Pass

802.11n40 Mode

RF Modules	Channel	Frequency (MHz)	-20dB bandwidth (MHz)		Limit (kHz)	Result
			ANT A	ANT B		
8812	Low	2422	37.80	37.80	500	Pass
	Middle	2437	37.77	37.75	500	Pass
	High	2452	37.75	37.74	500	Pass
RF Modules	Channel	Frequency (MHz)	-20dB bandwidth (MHz)		Limit (kHz)	Result
			ANT C	ANT D		
8192	Low	2422	37.76	37.75	500	Pass
	Middle	2437	37.80	37.80	500	Pass
	High	2452	37.81	37.80	500	Pass

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.

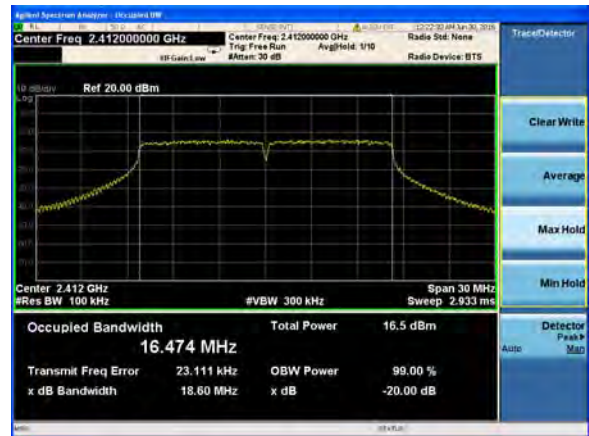
3(4) Represent the value of antenna 3 and 4,The worst data is Antenna 3 ,only shown Antenna 3 Plot.

RF Module 8812 Antenna 1

(802.11b) -20dB Bandwidth plot on channel 1



(802.11g) -20dB Bandwidth plot on channel 1



(802.11b) -20dB Bandwidth plot on channel 6



(802.11g) -20dB Bandwidth plot on channel 6



(802.11b) -20dB Bandwidth plot on channel 11

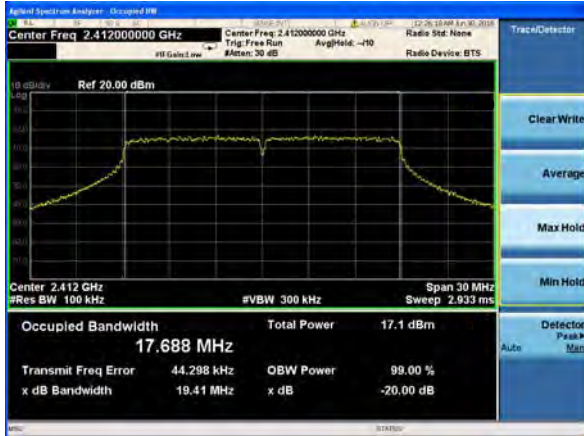


(802.11g) -20dB Bandwidth plot on channel 11

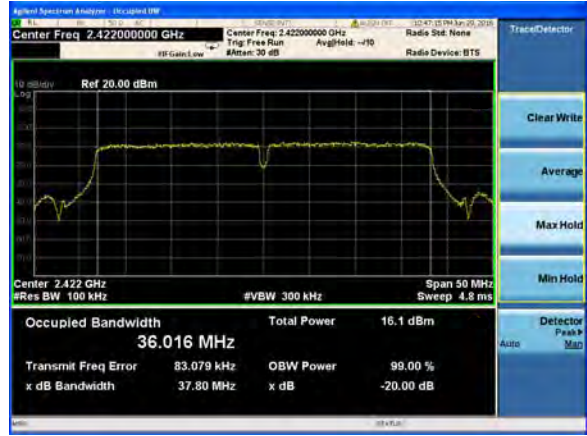


RF Module 8812 Antenna 1

(802.11n20) -20dB Bandwidth plot on channel 1



(802.11n40) -20dB Bandwidth plot on channel 3



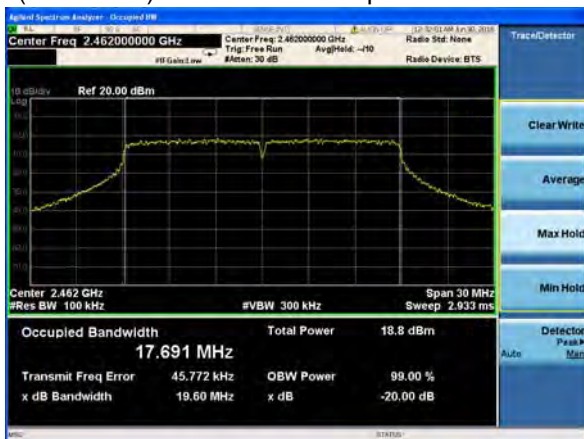
(802.11n20) -20dB Bandwidth plot on channel 6



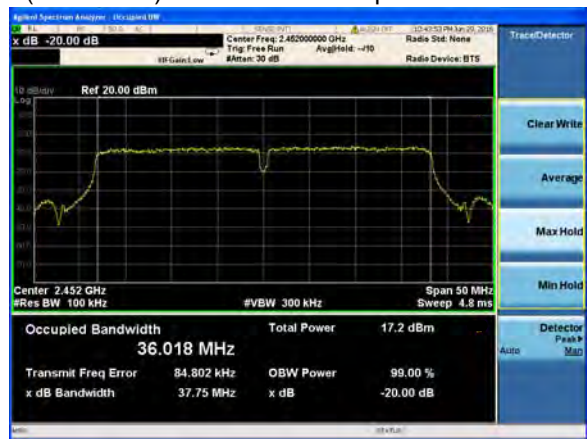
(802.11n40) -20dB Bandwidth plot on channel 6



(802.11n20) -20dB Bandwidth plot on channel 11



(802.11n40) -20dB Bandwidth plot on channel 9

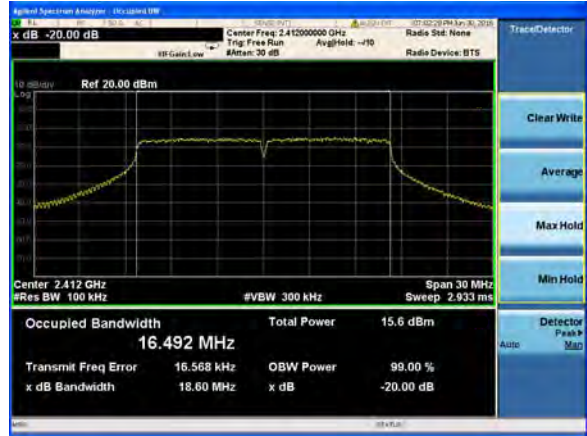


RF Module 8192 Antenna 3

(802.11b) -20dB Bandwidth plot on channel 1



(802.11g) -20dB Bandwidth plot on channel 1



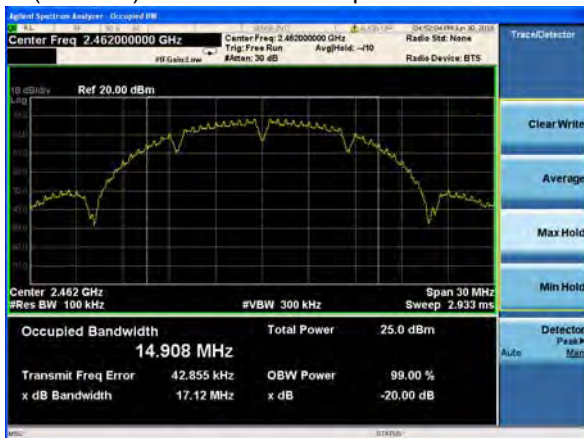
(802.11b) -20dB Bandwidth plot on channel 6



(802.11g) -20dB Bandwidth plot on channel 6



(802.11b) -20dB Bandwidth plot on channel 11



(802.11g) -20dB Bandwidth plot on channel 11

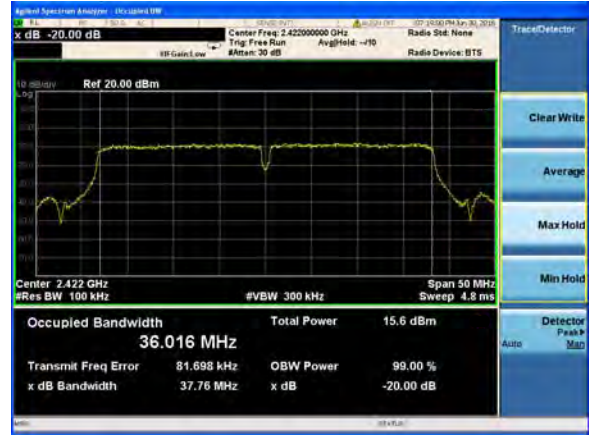


RF Module 8192 Antenna 3

(802.11n20) -20dB Bandwidth plot on channel 1



(802.11n40) -20dB Bandwidth plot on channel 3



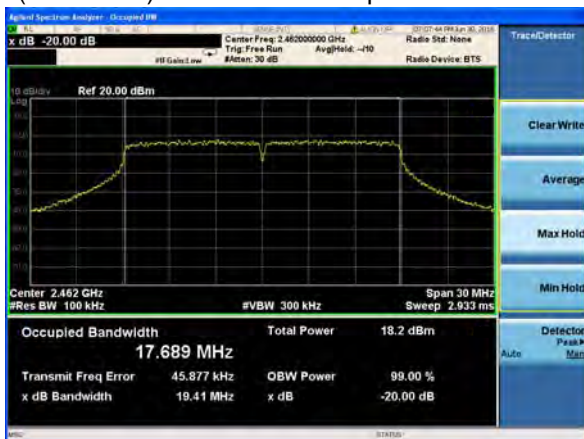
(802.11n20) -20dB Bandwidth plot on channel 6



(802.11n40) -20dB Bandwidth plot on channel 6



(802.11n20) -20dB Bandwidth plot on channel 11



(802.11n40) -20dB Bandwidth plot on channel 9



7.5 DUTY CYCLE

7.5.1 Applicable Standard

According to KDB 558074)6)b), issued 06/09/2015

7.5.2 Conformance Limit

No limit requirement.

7.5.3 Measuring Instruments

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

7.5.4 Test Setup

Please refer to Section 6.1 of this test report.

7.5.5 Test Procedure

The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set $RBW \geq OBW$ if possible; otherwise, set RBW to the largest available value. Set $VBW \geq RBW$. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are $> 50/T$ and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if $T \leq 16.7$ microseconds.)

The transmitter output is connected to the Spectrum Analyzer. We tested according to the zero-span measurement method, 6.0)b) in KDB 558074(issued 06/09/2015)

The largest available value of RBW is 8 MHz and VBW is 50 MHz. The zero-span method of measuring duty cycle shall not be used if $T \leq 6.25$ microseconds. ($50/6.25 = 8$)

The zero-span method was used because all measured T data are > 6.25 microseconds and both RBW and VBW are $> 50/T$.

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.

The path loss was compensated to the results for each measurement.

Set to the maximum power setting and enable the EUT transmit continuously.

The EUT was operating in controlled its channel.

Use the following spectrum analyzer settings:

Span = Zero Span

RBW = 8MHz(the largest available value)

VBW = 8MHz (\geq RBW)

Number of points in Sweep > 100

Detector function = peak

Trace = Clear write

Measure T_{total} and T_{on}

Calculate Duty Cycle = T_{on} / T_{total} and Duty Cycle Factor = $10 \cdot \log(1/\text{Duty Cycle})$

7.5.6 Test Results

EUT:	ScreenBeam 960	Model No.:	SBWD960A
Temperature:	20 °C	Relative Humidity:	48%
Test Mode:	Mode1/Mode2/Mode3/Mode4	Test By:	Eileen Liu

Note: Model 1(3) represent two different modules,

**RF Module 8812
Antenna 1**

Mode	Data rate	Channel	T _{on}	T _{total}	Duty Cycle %	Duty Cycle Factor (dB)	1/T Minimum VBW (kHz)
802.11b	1Mbps	6	10	10	100	0.00	0.01
802.11g	6Mbps	6	10	10	100	0.00	0.01
802.11n HT20	MCS0	6	10	10	100	0.00	0.01
802.11n HT40	MCS0	6	10	10	100	0.00	0.01

**RF Module 8192
Antenna 3**

Mode	Data rate	Channel	T _{on}	T _{total}	Duty Cycle %	Duty Cycle Factor (dB)	1/T Minimum VBW (kHz)
802.11b	1Mbps	6	10	10	100	0.00	0.01
802.11g	6Mbps	6	10	10	100	0.00	0.01
802.11n HT20	MCS0	6	10	10	100	0.00	0.01
802.11n HT40	MCS0	6	10	10	100	0.00	0.01

Note: All the modulation modes were tested, the data of the worst mode are described in the following table.

7.6 MAXIMUM OUTPUT POWER

7.6.1 Applicable Standard

According to FCC Part 15.247(b)(3) and KDB 558074 DTS 01 Meas. Guidance v03r05

7.6.2 Conformance Limit

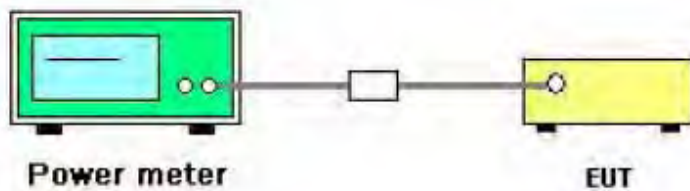
The maximum peak conducted output power of the intentional radiator for systems using digital modulation in the 2400 - 2483.5 MHz bands shall not exceed: 1 Watt (30dBm). If transmitting antenna of directional gain greater than 6dBi is used, the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

7.6.3 Measuring Instruments

The following table is the setting of the power meter.

Power Meter Parameter	Setting
Detector	Average

7.6.4 Test Setup



7.6.5 Test Procedure

1. Test procedures refer KDB 558074 D01 v03r05 section 9.2.3.2 Measurement using a power meter (PM).
2. Alternatively, measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since this measurement is made only during the ON time of the transmitter, no duty cycle correction is required.
3. Multiple antenna system was performed in accordance with KDB 662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.

7.6.6 EUT operation during Test

The EUT was programmed to be in continuously transmitting mode.

7.6.7 Test Results

EUT:	ScreenBeam 960	Model No.:	SBWD960A
Temperature:	20 °C	Relative Humidity:	48%
Test Mode:	Mode1/Mode2/Mode3/Mode4	Test By:	Eileen Liu

RF Module 8812

Test Channel	Frequenc (MHz)	Conducted Output Power(dBm)		Total Power (dBm)		LIMIT (dBm)	Verdict
		ANT 1	ANT 2	ANT 1	ANT 2		
		802.11b					
1	2412	17.24	17.15	-	-	30	PASS
6	2437	17.16	17.03	-	-	30	PASS
11	2462	17.21	17.07	-	-	30	PASS
802.11g							
1	2412	17.29	17.01	-	-	30	PASS
6	2437	17.15	17.33	-	-	30	PASS
11	2462	17.22	17.22	-	-	30	PASS
802.11n HT20							
1	2412	17.16	17.11	20.15		29.97	PASS
6	2437	17.23	17.08	20.17		29.97	PASS
11	2462	17.18	17.24	20.22		29.97	PASS
802.11n HT40							
3	2422	17.36	17.15	20.27		29.97	PASS
6	2437	17.29	17.24	20.28		29.97	PASS
9	2452	17.58	17.36	20.48		29.97	PASS

Note: Model 8812 For MIMO mode: Directional gain
 $= 10\log(\text{antenna 1} + \text{antenna 2}) \text{ dbi} = 5.86\text{dbi}$ in 2.4GHz
 802.11 n 2.4GHz has MIMO mode.
 Model 8192 For MIMO mode: Directional gain
 $= 10\log(\text{antenna 1} + \text{antenna 2}) \text{ dbi} = 6.03\text{dbi}$ in 2.4GHz
 802.11/n 2.4GHz has MIMO mode.
 $6.03\text{dbi} > 6.0 \text{ dbi}$ so power limit= $30 - (6.03 - 6.0) = 29.97$

RF Module 8192

Test Channel	Frequenc (MHz)	Conducted Output Power(dBm)		Total Power (dBm)		LIMIT (dBm)	Verdict
		ANT 3	ANT 4	ANT 3	ANT 4		
	802.11b						
1	2412	17.14	17.11	-	-	30	PASS
6	2437	17.18	17.04	-	-	30	PASS
11	2462	17.01	17.13	-	-	30	PASS
802.11g							
1	2412	17.16	17.64	-	-	30	PASS
6	2437	17.29	17.28	-	-	30	PASS
11	2462	17.29	17.43	-	-	30	PASS
802.11n HT20							
1	2412	17.31	17.24	20.29		29.97	PASS
6	2437	17.28	17.15	20.23		29.97	PASS
11	2462	17.29	17.09	20.20		29.97	PASS
802.11n HT40							
3	2422	17.19	17.05	20.13		29.97	PASS
6	2437	17.27	17.11	20.20		29.97	PASS
9	2452	17.22	17.13	20.19		29.97	PASS

Note: Model 8812 For MIMO mode: Directional gain
 = $10\log(\text{antenna 1} + \text{antenna 2}) \text{ dBi} = 5.86\text{dBi}$ in 2.4GHz
 802.11 n 2.4GHz has MIMO mode.
 Model 8192 For MIMO mode: Directional gain
 = $10\log(\text{antenna 3} + \text{antenna 4}) \text{ dBi} = 6.03\text{dBi}$ in 2.4GHz
 802.11/n 2.4GHz has MIMO mode.
 $6.03\text{dBi} > 6.0 \text{ dBi}$ so power limit = $30 - (6.03 - 6.0) = 29.97$

7.7 POWER SPECTRAL DENSITY

7.7.1 Applicable Standard

According to FCC Part 15.247(e) and KDB 558074 DTS 01 Meas. Guidance v03r05

7.7.2 Conformance Limit

The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

7.7.3 Measuring Instruments

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

7.7.4 Test Setup

Please refer to Section 6.1 of this test report.

7.7.5 Test Procedure

The testing follows Measurement Procedure 10.3 Method AVGPSD of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r05

This procedure may be used when the maximum (average) conducted output power was used to demonstrate compliance to the output power limit. This is the baseline method for determining the maximum (average) conducted PSD level. If the instrument has an RMS power averaging detector, it must be used; otherwise, use the sample detector. The EUT must be configured to transmit continuously (duty cycle $\geq 98\%$); otherwise sweep triggering/signal gating must be implemented to ensure that measurements are made only when the EUT is transmitting at its maximum power control level (no transmitter off time is to be considered).

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.

The path loss was compensated to the results for each measurement.

Set to the maximum power setting and enable the EUT transmit continuously.

The EUT was operating in controlled its channel.

a) Set instrument center frequency to DTS channel center frequency.

b) Set span to at least 1.5 times the OBW.

c) Set RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.

d) Set VBW $\geq 3 \times \text{RBW}$.

e) Detector = power averaging (RMS) or sample detector (when RMS not available).

f) Ensure that the number of measurement points in the sweep $\geq 2 \times \text{span}/\text{RBW}$.

g) Sweep time = auto couple.

h) Employ trace averaging (RMS) mode over a minimum of 100 traces.

i) Use the peak marker function to determine the maximum amplitude level.

j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reduc

7.7.6 Test Results

EUT:	ScreenBeam 960	Model No.:	SBWD960A
Temperature:	20 °C	Relative Humidity:	48%
Test Mode:	Mode1/Mode2/Mode3/Mode4	Test By:	Eileen Liu

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
11b, 11g, 11n(HT20, HT40)	1Tx, 1Rx
11n(HT20, HT40)	2Tx, 2Rx

RF Module 8812

Test Channel	Frequency (MHz)	Power Density (dBm/3KHz)		Total Power Density (dBm/3KHz)		LIMIT (dBm/3KH)	Verdict
		ANT 1	ANT 2	ANT 1	ANT 2		
		802.11b					
1	2412	-17.264	-17.616	-	-	8	PASS
6	2437	-16.649	-17.064	-	-	8	PASS
11	2462	-15.751	-16.648	-	-	8	PASS
802.11g							
1	2412	-24.775	-24.651	-	-	8	PASS
6	2437	-24.128	-24.137	-	-	8	PASS
11	2462	-22.963	-24.158	-	-	8	PASS
802.11n HT20							
1	2412	-24.114	-24.154	-21.12		8	PASS
6	2437	-22.95	-22.991	-19.96		8	PASS
11	2462	-22.464	-23.26	-19.83		8	PASS
802.11n HT40							
3	2422	-28.429	-28.516	-25.46		8	PASS
6	2437	-27.643	-27.661	-24.64		8	PASS
9	2452	-26.24	-26.351	-23.28		8	PASS

Note: Model 8812 For MIMO mode: Directional gain = 10log(antenna 1 + antenna 2) dbi =5.86dbi in 2.4GHz
802.11 n 2.4GHz has MIMO mode.

RF Module 8192

Test Channel	Frequency (MHz)	Power Density (dBm/3KHz)		Total Power Density (dBm/3KHz)		LIMIT (dBm/3KH)	Verdict
		ANT 3	ANT 4	ANT 3	ANT 4		
	802.11b						
1	2412	-17.586	-17.665	-	-	8	PASS
6	2437	-16.931	-17.564	-	-	8	PASS
11	2462	-16.017	-17.816	-	-	8	PASS
802.11g							
1	2412	-25.205	-25.128	-	-	8	PASS
6	2437	-24.759	-25.168	-	-	8	PASS
11	2462	-23.743	-25.166	-	-	8	PASS
802.11n HT20							
1	2412	-24.541	-24.168	-21.34		7.97	PASS
6	2437	-23.419	-24.119	-20.74		7.97	PASS
11	2462	-22.907	-23.108	-20.00		7.97	PASS
802.11n HT40							
3	2422	-28.429	-28.522	-25.46		7.97	PASS
6	2437	-28.616	-28.665	-25.63		7.97	PASS
9	2452	-28.909	-28.667	-25.78		7.97	PASS

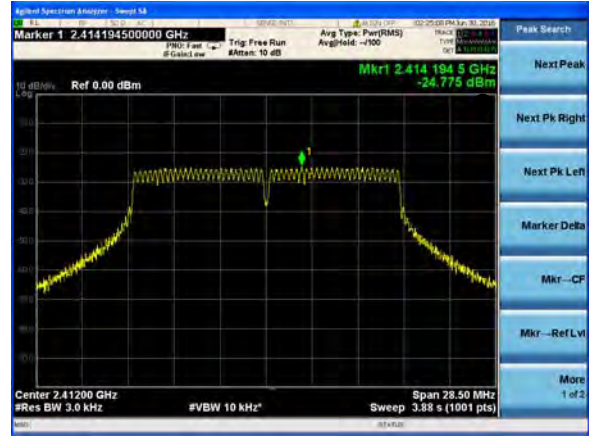
Note: Model 8192 For MIMO mode: Directional gain
 $=10\log(\text{antenna 1} + \text{antenna 2}) \text{ dbi} = 6.03\text{dbi}$ in 2.4GHz
 802.11/n 2.4GHz has MIMO mode.
 $6.03\text{dbi} > 6.0 \text{ dbi}$ so power limit= $8 - (6.03 - 6.0) = 7.97$

RF Module 8812 Antenna 1

(802.11b) PSD plot on channel 1



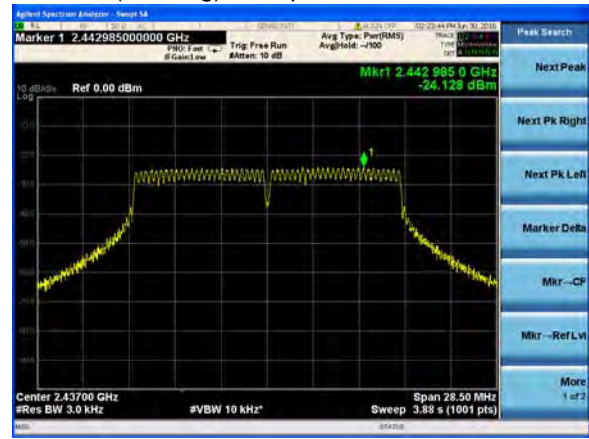
(802.11g) PSD plot on channel 1



(802.11b) PSD plot on channel 6



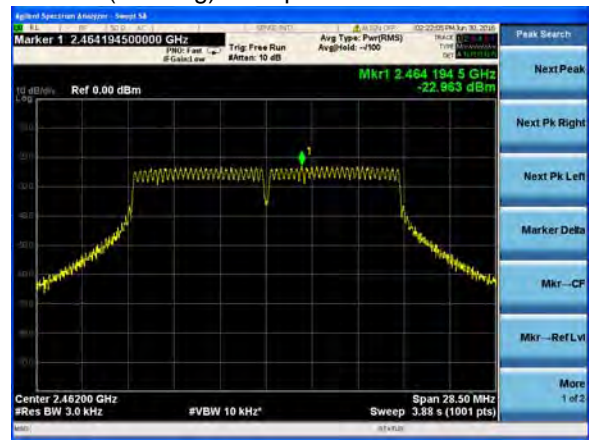
(802.11g) PSD plot on channel 6



(802.11b) PSD plot on channel 11

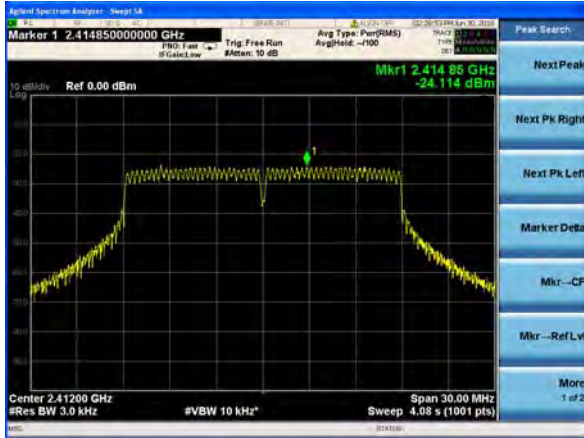


(802.11g) PSD plot on channel 11



RF Module 8812 Antenna 1

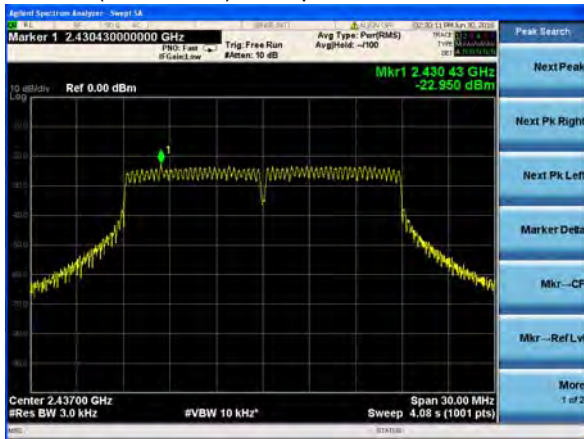
(802.11n20) PSD plot on channel 1



(802.11n40) PSD plot on channel 3



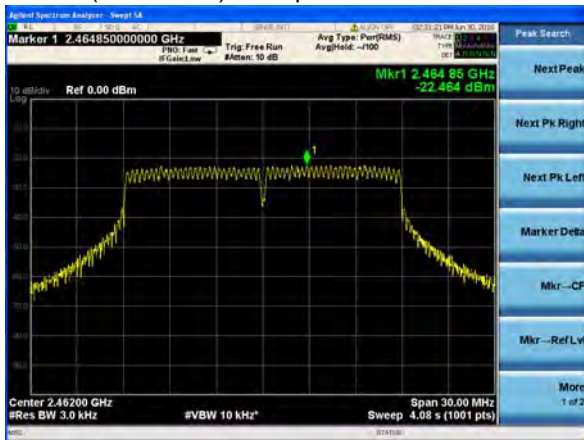
(802.11n20) PSD plot on channel 6



(802.11n40) PSD plot on channel 6



(802.11n20) PSD plot on channel 11



(802.11n40) PSD plot on channel 9

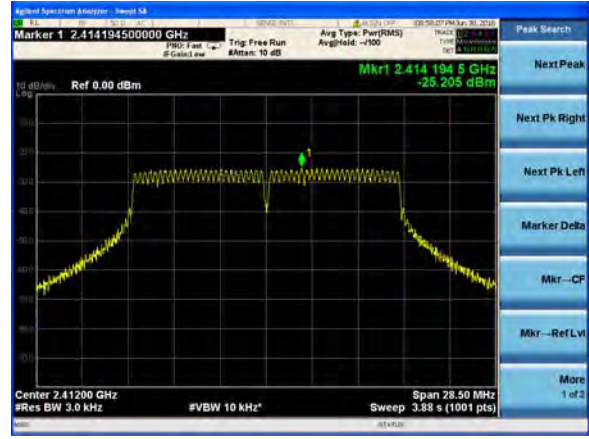


RF Module 8192 Antenna 3

(802.11b) PSD plot on channel 1



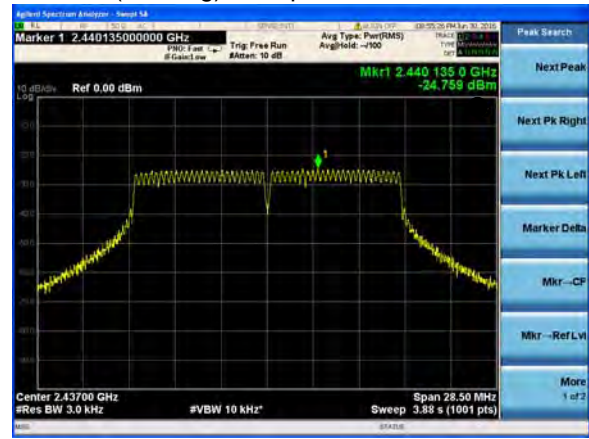
(802.11g) PSD plot on channel 1



(802.11b) PSD plot on channel 6



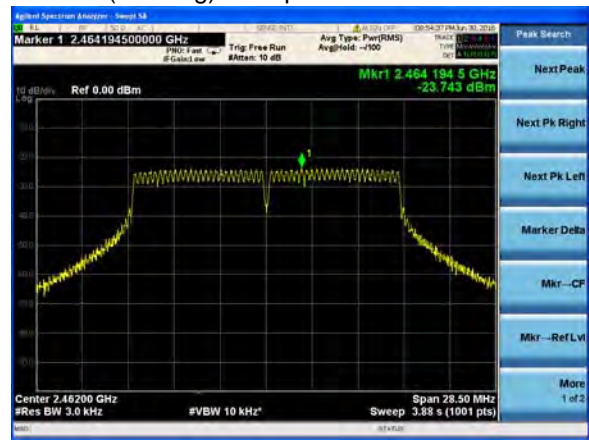
(802.11g) PSD plot on channel 6



(802.11b) PSD plot on channel 11

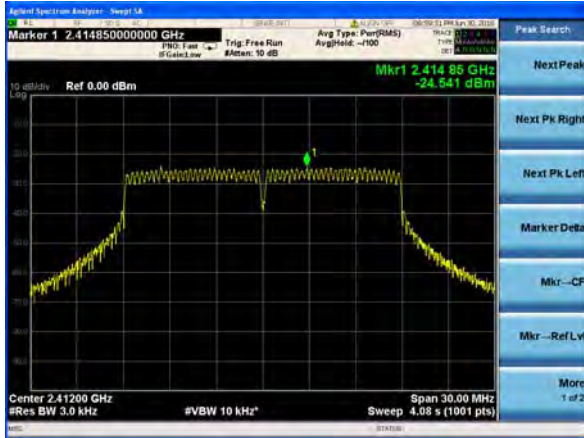


(802.11g) PSD plot on channel 11



RF Module 8192 Antenna C

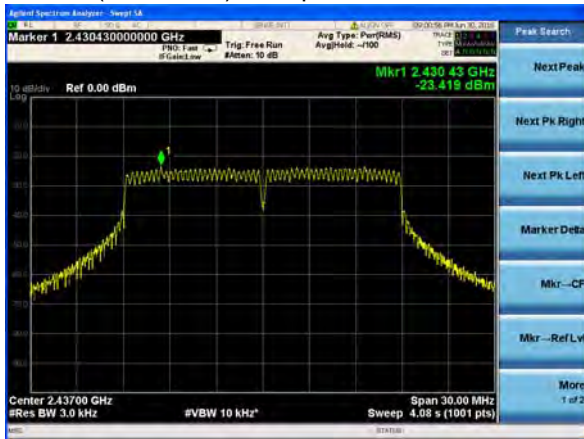
(802.11n20) PSD plot on channel 1



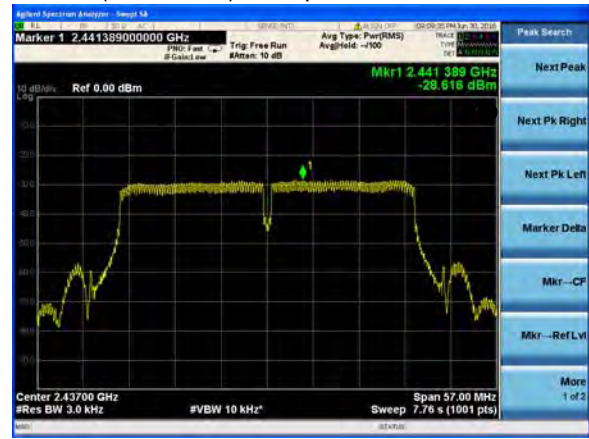
(802.11n40) PSD plot on channel 3



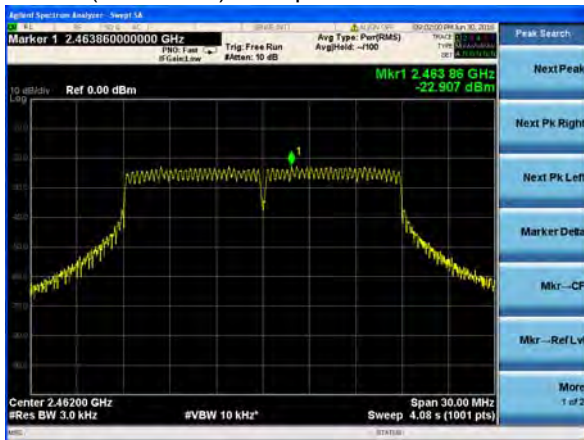
(802.11n20) PSD plot on channel 6



(802.11n40) PSD plot on channel 6



(802.11n20) PSD plot on channel 11



(802.11n40) PSD plot on channel 9



7.8 Emission not in Restricted Band

7.8.1 Applicable Standard

According to FCC Part 15.247(d) and KDB 558074 DTS 01 Meas. Guidance v03r05

The DTS rules specify that in any 100 kHz bandwidth outside of the authorized frequency band, the power shall be attenuated according to the following conditions:

a) If the maximum peak conducted output power procedure was used to demonstrate compliance as described in 9.1, then the peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 20 dBc).

b) If maximum conducted (average) output power was used to demonstrate compliance as described in 9.2, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 30 dBc).

c) In either case, attenuation to levels below the 15.209 general radiated emissions limits is not required.⁸ The following procedures shall be used to demonstrate compliance to these limits. Note that these procedures can be used in either an antenna-port conducted or radiated test set-up. Radiated tests must conform to the test site requirements and utilize maximization procedures defined herein.

7.8.2 Measuring Instruments

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

7.8.3 Test Setup

Reference level measurement

Establish a reference level by using the following procedure:

- a) Set instrument center frequency to DTS channel center frequency.
- b) Set the span to ≥ 1.5 times the DTS bandwidth.
- c) Set the RBW = 100 kHz.
- d) Set the VBW $\geq 3 \times$ RBW.
- e) Detector = peak.
- f) Sweep time = auto couple.
- g) Trace mode = max hold.
- h) Allow trace to fully stabilize.
- i) Use the peak marker function to determine the maximum PSD level.

Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

Emission level measurement

- a) Set the center frequency and span to encompass frequency range to be measured.
- b) Set the RBW = 100 kHz.
- c) Set the VBW $\geq 3 \times$ RBW.
- d) Detector = peak.
- e) Sweep time = auto couple.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use the peak marker function to determine the maximum amplitude level.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements specified in 11.1 a) or 11.1 b). Report the three highest emissions relative to the limit.

7.8.4 Test Results

EUT:	ScreenBeam 960	Model No.:	SBWD960A
Temperature:	20 °C	Relative Humidity:	48%
Test Mode:	Mode1/Mode2/Mode3/Mode4	Test By:	Eileen Liu

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:

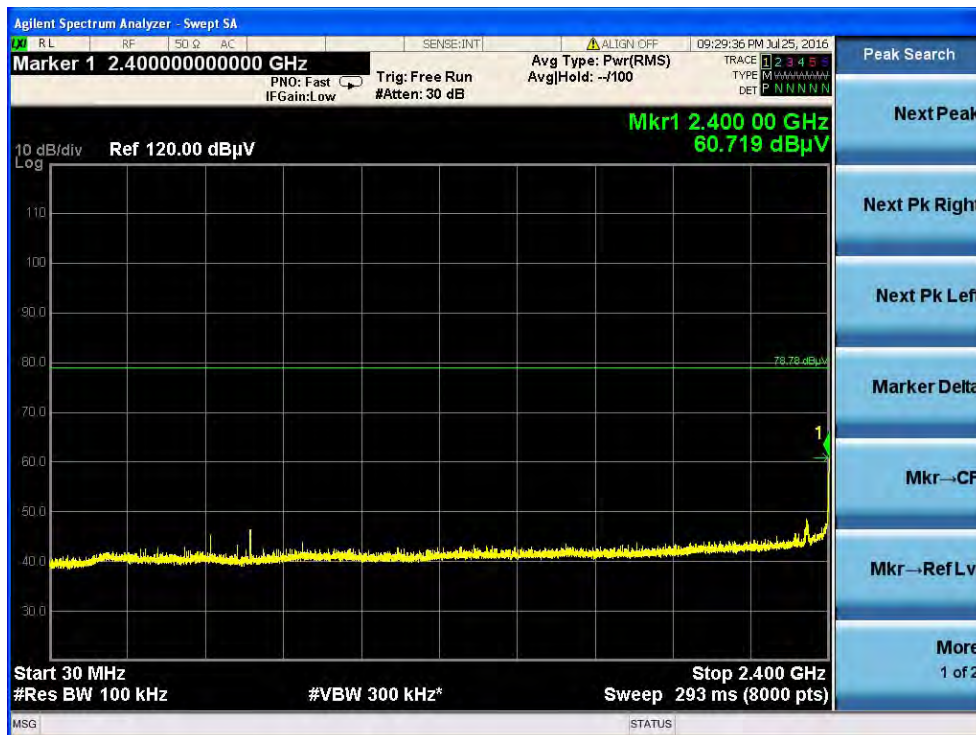
Mode	Tx/Rx
11b, 11g, 11n(HT20, HT40)	1Tx, 1Rx
11n(HT20, HT40)	2Tx, 2Rx

RF Module 8812 Antenna 1

(802.11b) Emission not in Restricted Band plot on channel 1
Reference Level



Configuration IEEE 802.11b / CH 1 / 30MHz~2400MHz (down 30dBc)



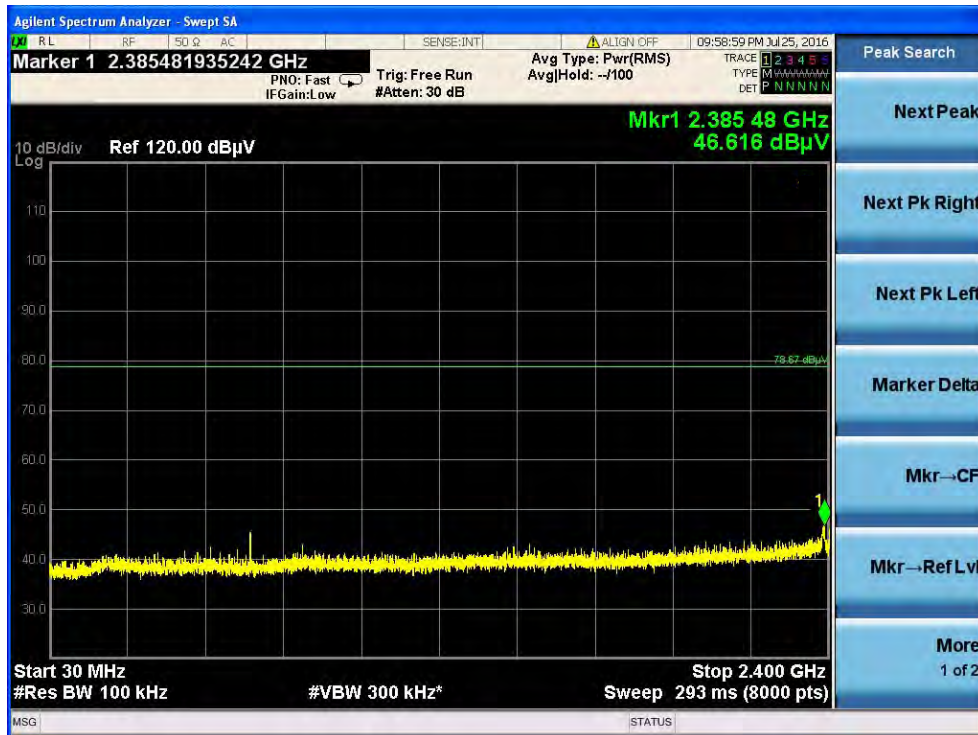
Configuration IEEE 802.11b / CH 1 / 2500MHz~26500MHz (down 30dBc)



(802.11b) Emission not in Restricted Band plot on channel 11 Reference Level



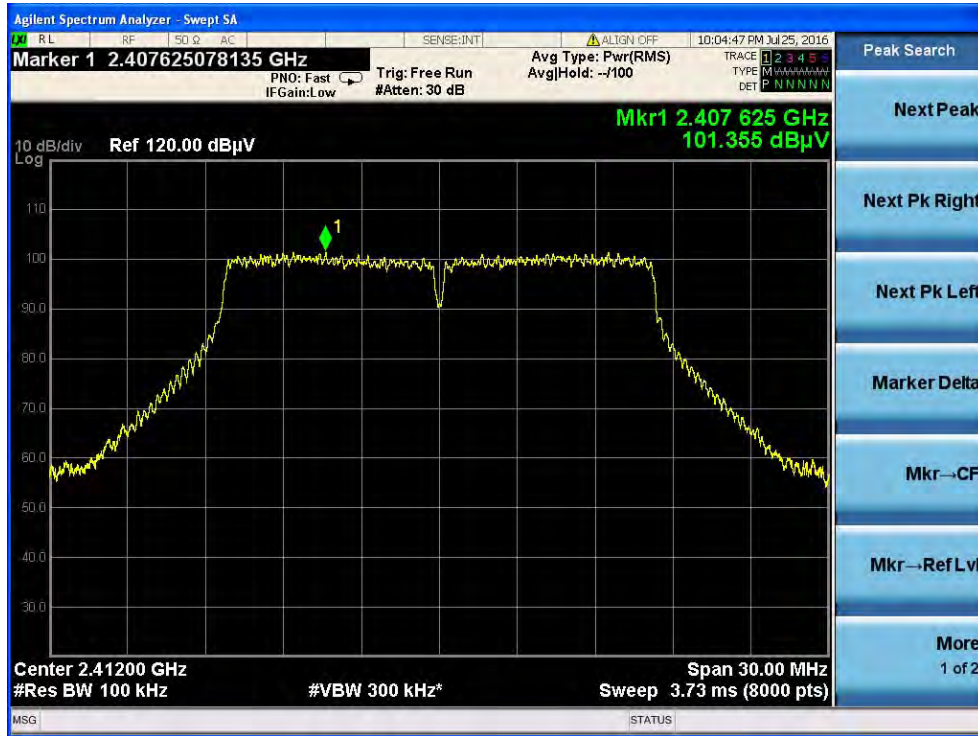
Configuration IEEE 802.11b / CH 11 / 30MHz~2400MHz (down 30dBc)



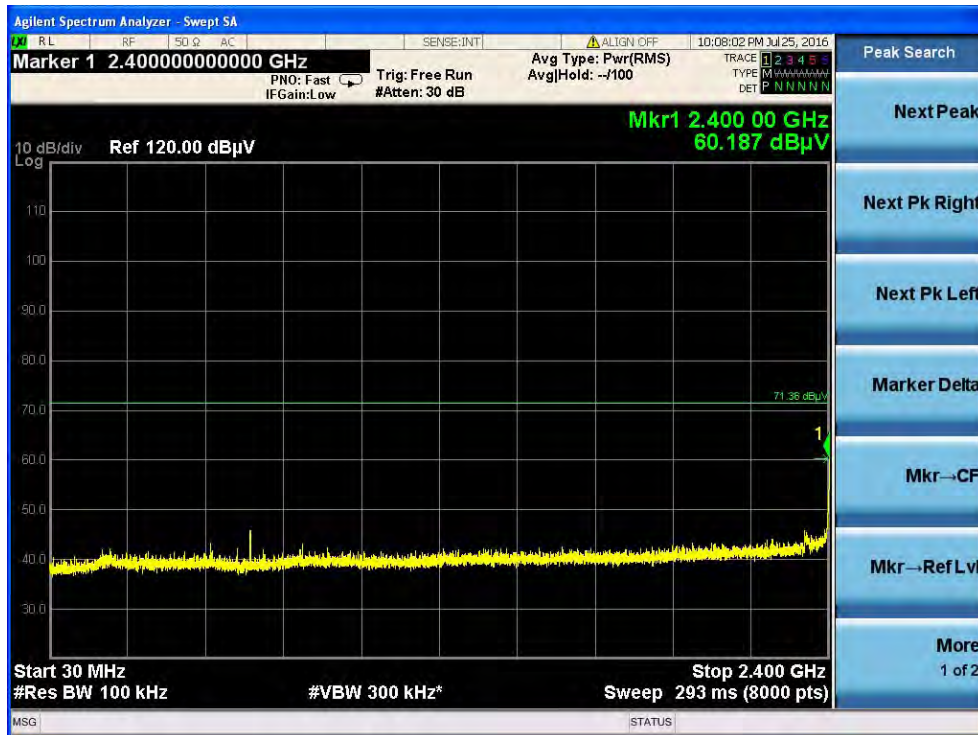
Configuration IEEE 802.11b / CH 11 / 2500MHz~26500MHz (down 30dBc)



Configuration IEEE 802.11g Emission not in Restricted Band plot on channel 1
Reference Level



Configuration IEEE 802.11g / CH 1 / 30MHz~2400MHz (down 30dBc)



Configuration IEEE 802.11g / CH 1 / 2500MHz~26500MHz (down 30dBc)



Configuration IEEE 802.11g Emission not in Restricted Band plot on channel 11 Reference Level



Configuration IEEE 802.11g / CH 11 / 30MHz~2400MHz (down 30dBc)



Configuration IEEE 802.11g / CH 11 / 2500MHz~26500MHz (down 30dBc)



Configuration IEEE 802.11n20 Emission not in Restricted Band plot on channel 1
Reference Level



Configuration IEEE 802.11n20 / CH 1 / 30MHz~2400MHz (down 30dBc)



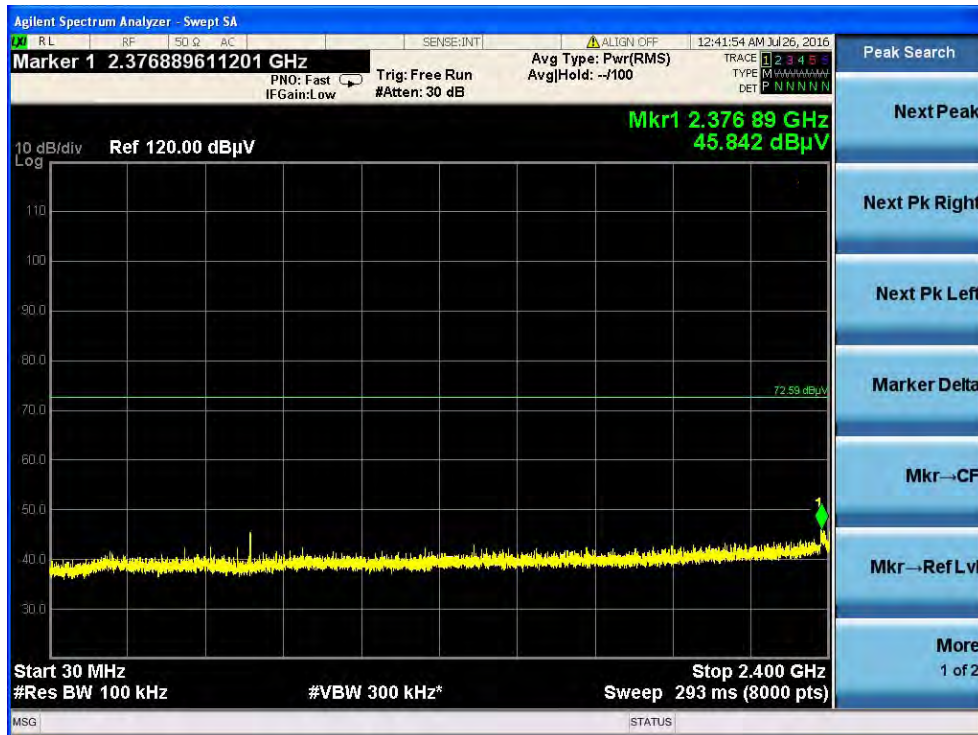
Configuration IEEE 802.11n20 / CH 1 / 2500MHz~26500MHz (down 30dBc)



Configuration IEEE 802.11n20 Emission not in Restricted Band plot on channel 11 Reference Level



Configuration IEEE 802.11n20 / CH 11 / 30MHz~2400MHz (down 30dBc)



Configuration IEEE 802.11n20 / CH 11 / 2500MHz~26500MHz (down 30dBc)



Configuration IEEE 802.11n40 Emission not in Restricted Band plot on channel 3
Reference Level



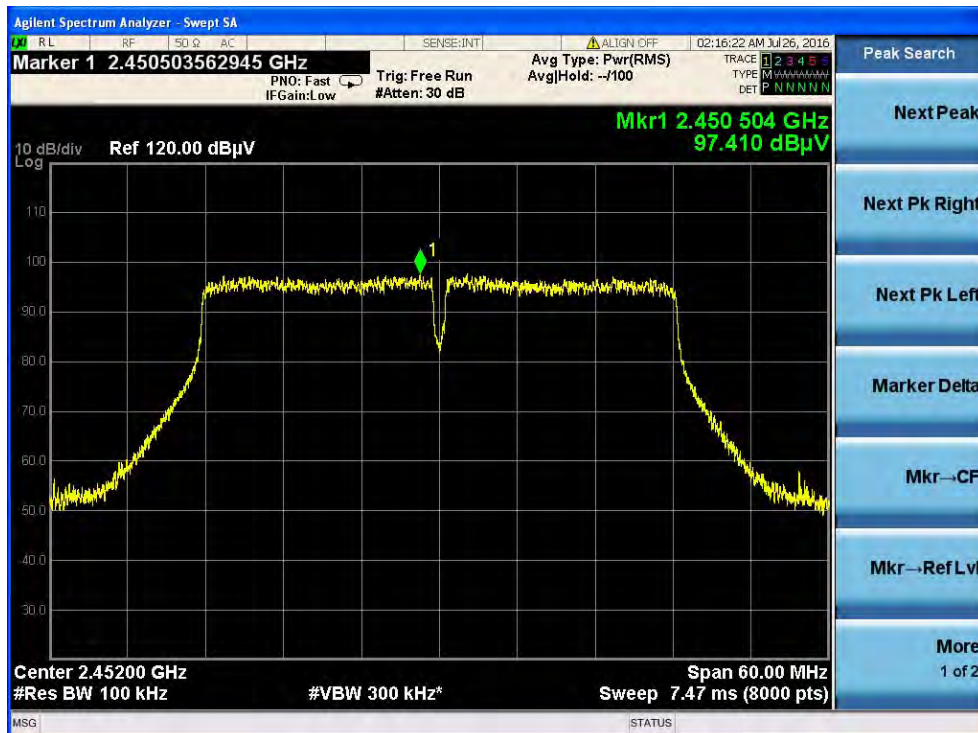
Configuration IEEE 802.11n40 / CH 3 / 30MHz~2400MHz (down 30dBc)



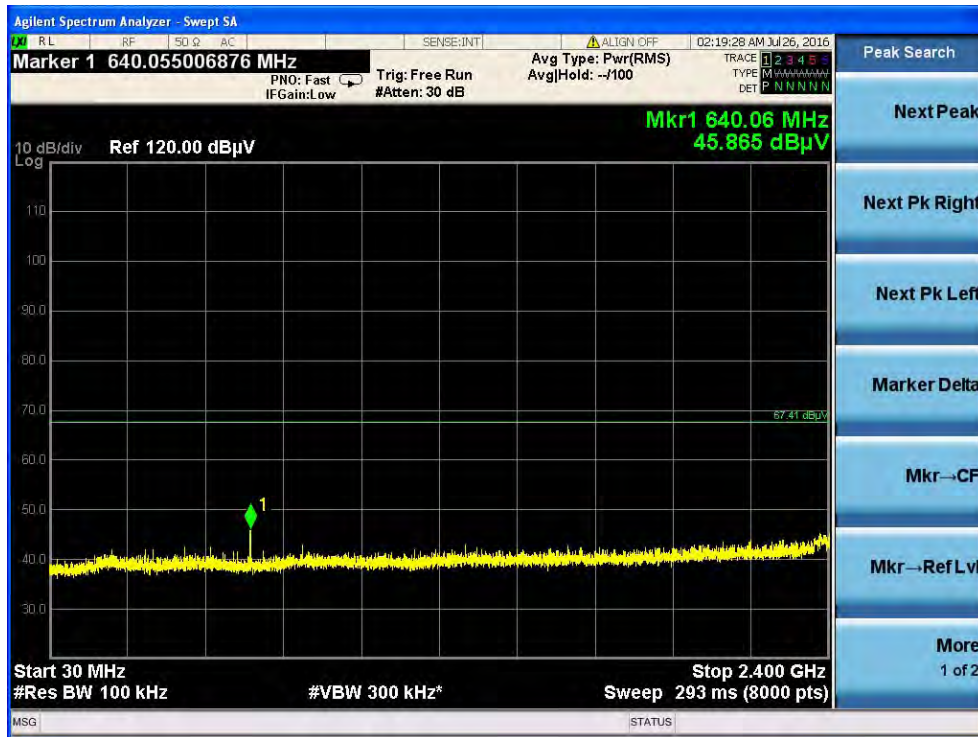
Configuration IEEE 802.11n40 / CH 3 / 2500MHz~26500MHz (down 30dBc)



Configuration IEEE 802.11n40 Emission not in Restricted Band plot on channel 9 Reference Level



Configuration IEEE 802.11n40 / CH 9 / 30MHz~2400MHz (down 30dBc)



Configuration IEEE 802.11n40 / CH 9 / 2500MHz~26500MHz (down 30dBc)



Configuration IEEE 802.11b / CH 1 / 2500MHz~26500MHz (down 30dBc)



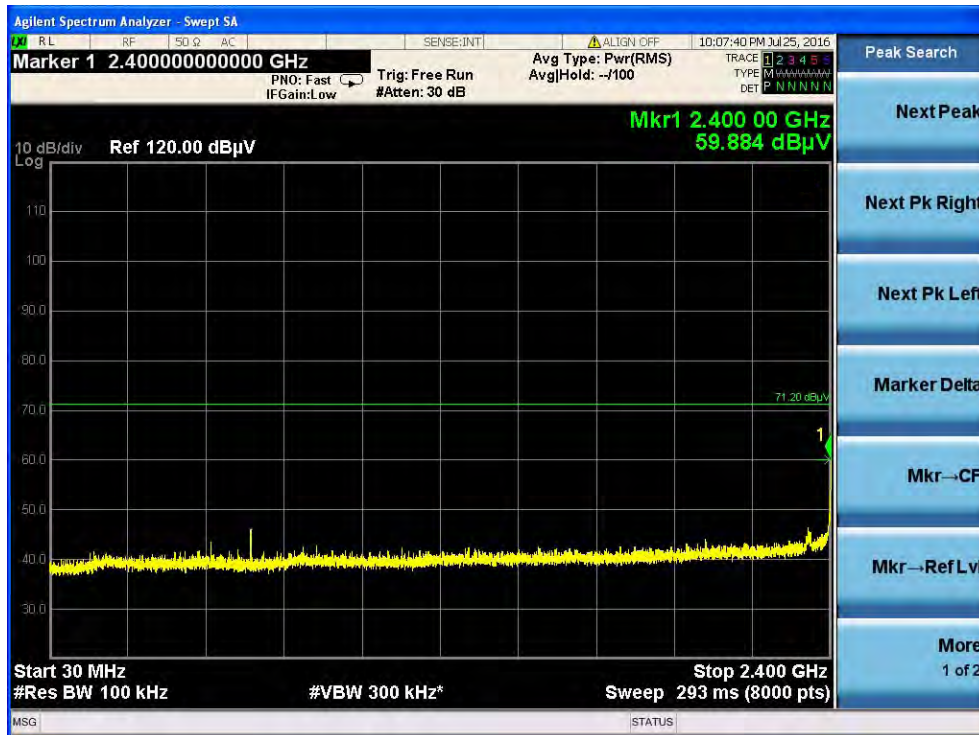
(802.11b) Emission not in Restricted Band plot on channel 11 Reference Level



Configuration IEEE 802.11g Emission not in Restricted Band plot on channel 1
Reference Level



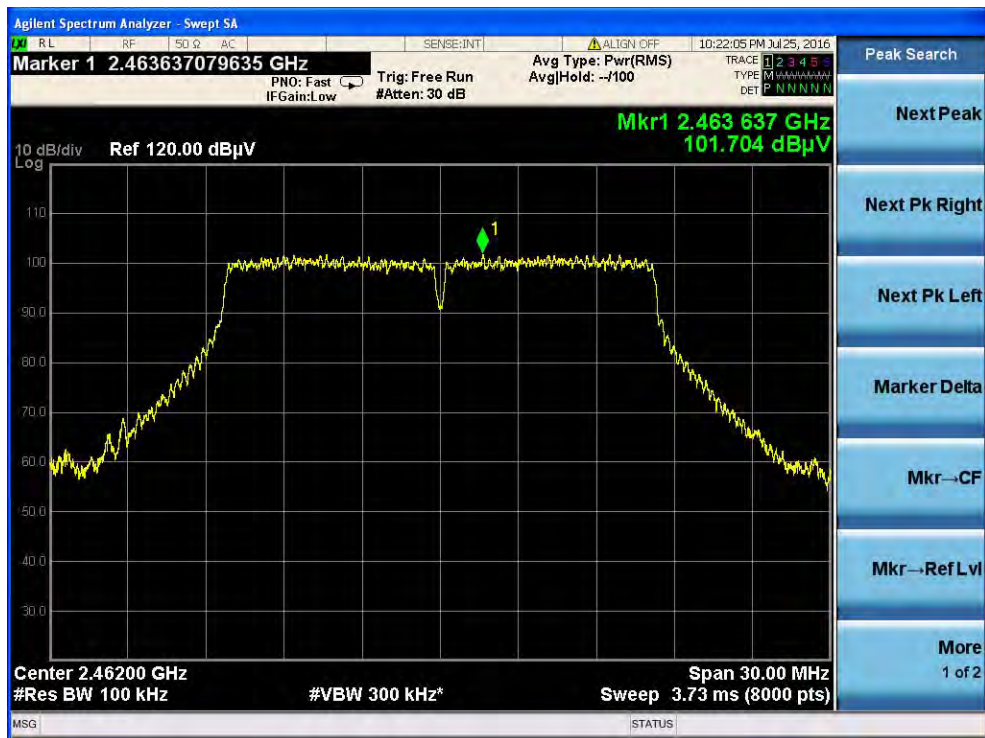
Configuration IEEE 802.11g / CH 1 / 30MHz~2400MHz (down 30dBc)



Configuration IEEE 802.11g / CH 1 / 2500MHz~26500MHz (down 30dBc)



Configuration IEEE 802.11g Emission not in Restricted Band plot on channel 11 Reference Level



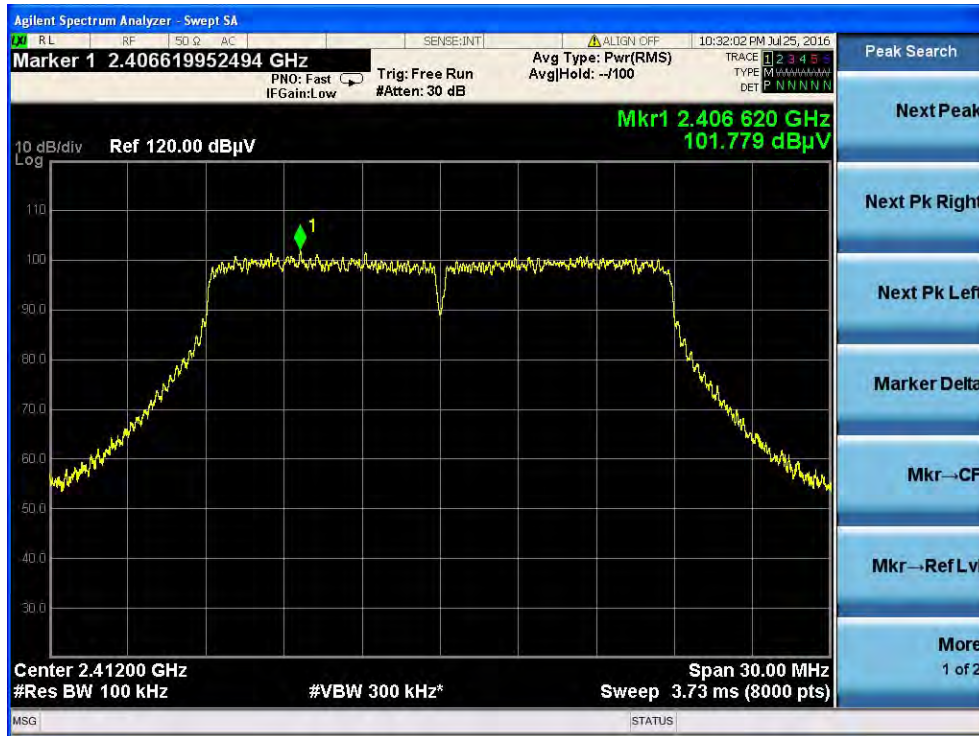
Configuration IEEE 802.11g / CH 11 / 30MHz~2400MHz (down 30dBc)



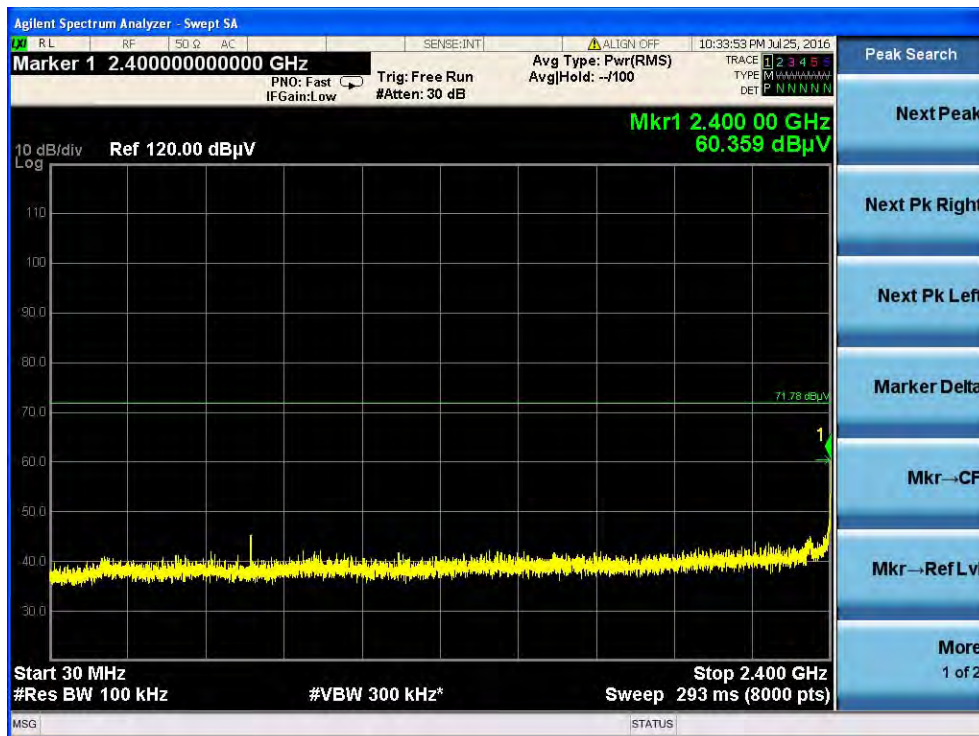
Configuration IEEE 802.11g / CH 11 / 2500MHz~26500MHz (down 30dBc)



Configuration IEEE 802.11n20 Emission not in Restricted Band plot on channel 1
Reference Level



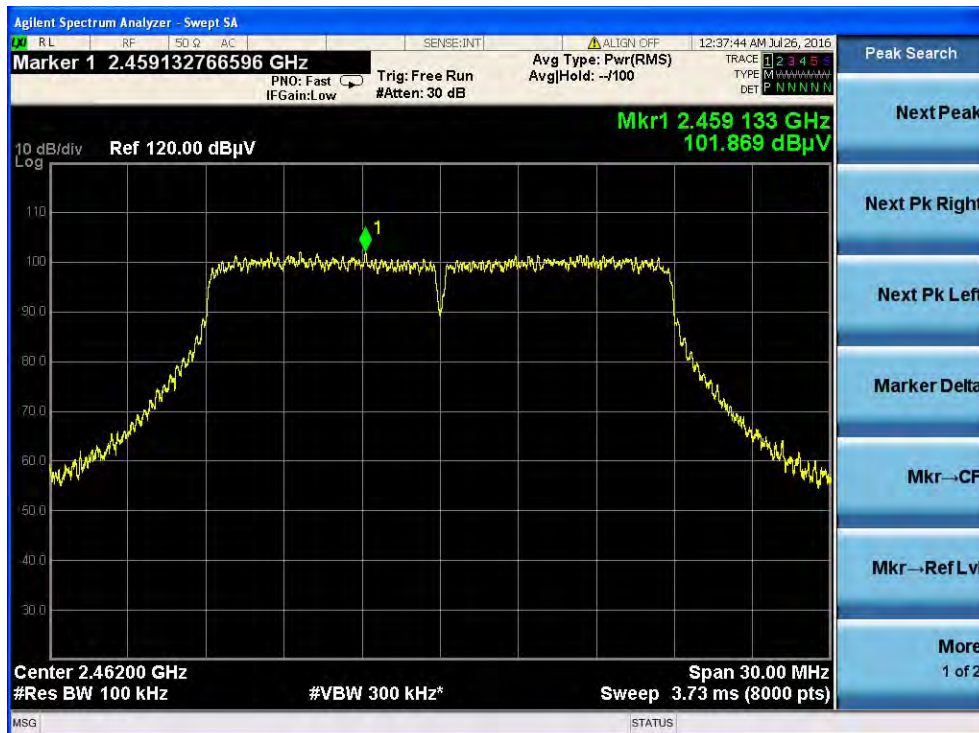
Configuration IEEE 802.11n20 / CH 1 / 30MHz~2400MHz (down 30dBc)



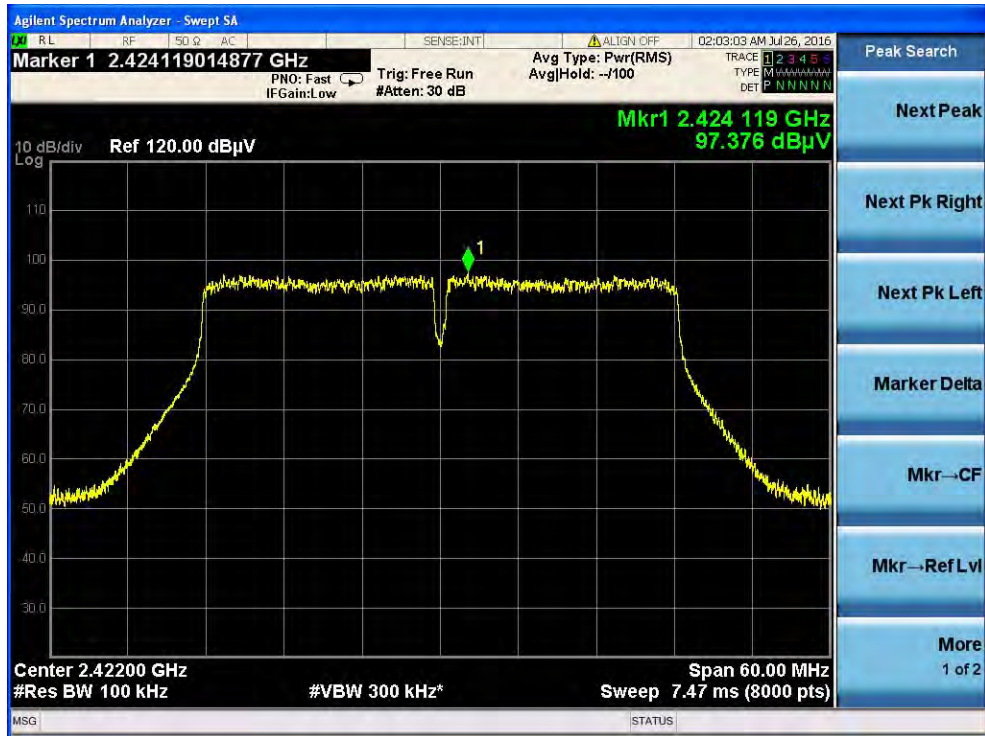
Configuration IEEE 802.11n20 / CH 1 / 2500MHz~26500MHz (down 30dBc)



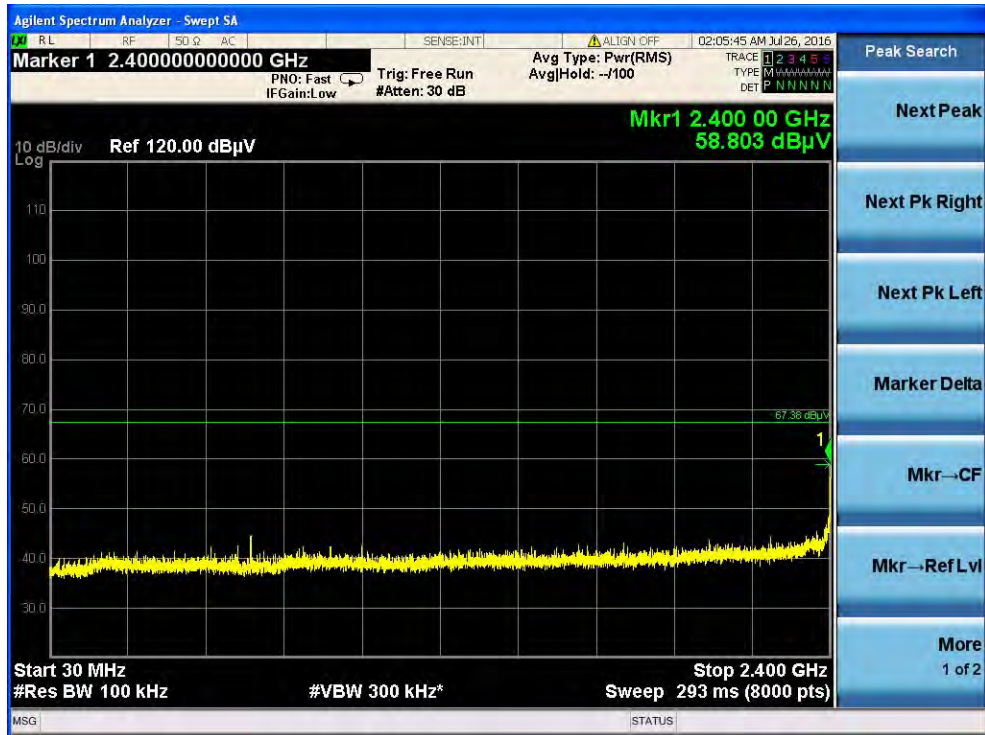
Configuration IEEE 802.11n20 Emission not in Restricted Band plot on channel 11 Reference Level



Configuration IEEE 802.11n40 Emission not in Restricted Band plot on channel 3
Reference Level



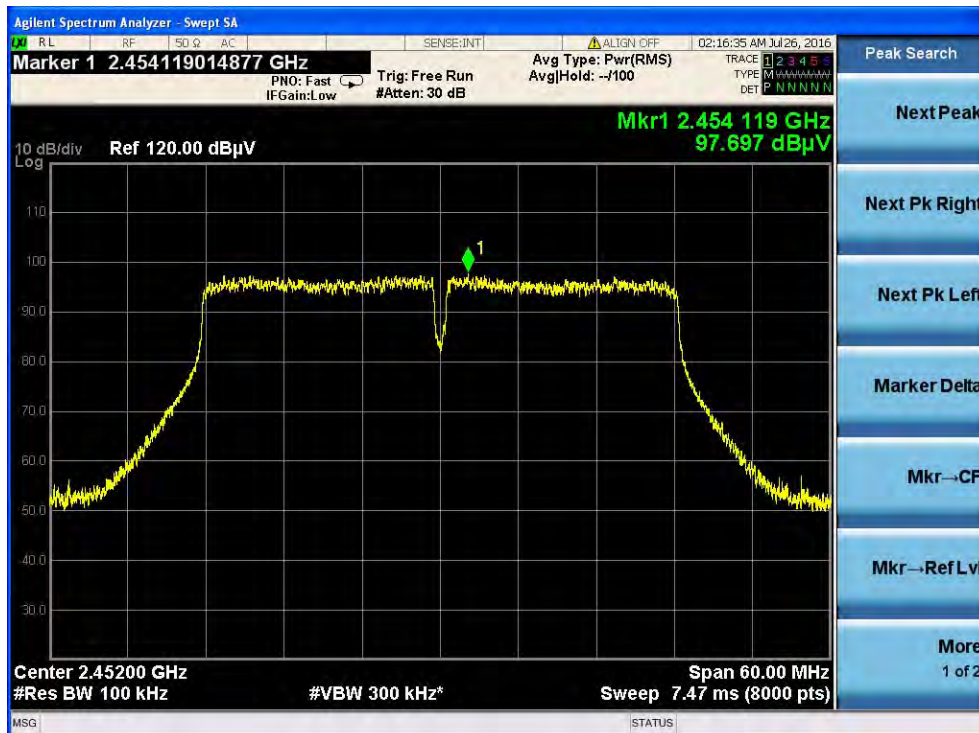
Configuration IEEE 802.11n40 / CH 3 / 30MHz~2400MHz (down 30dBc)



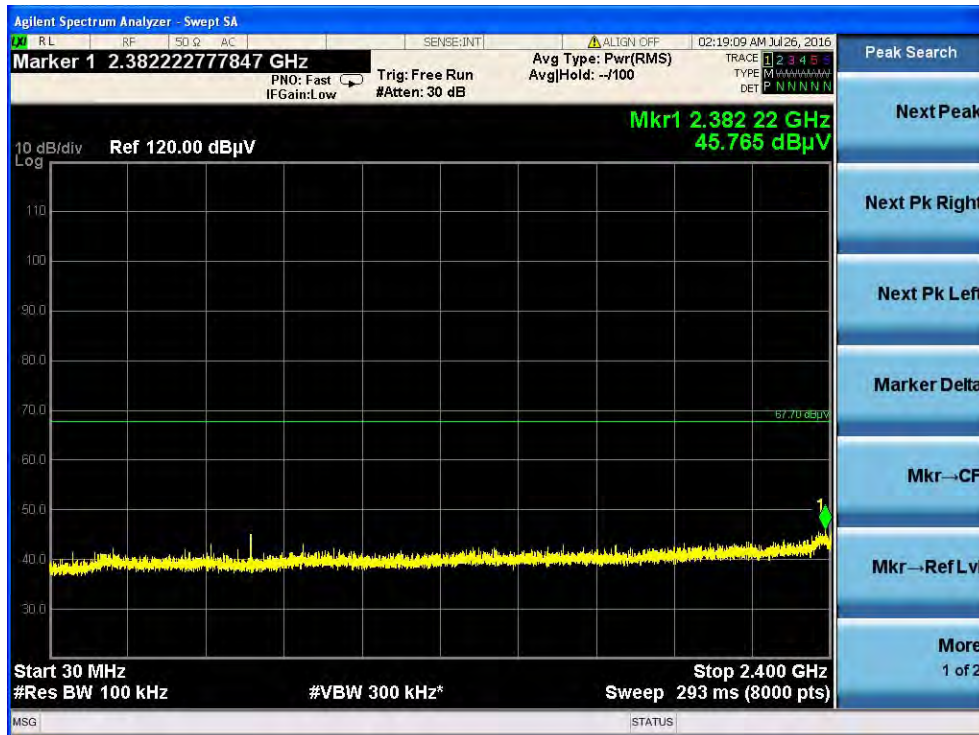
Configuration IEEE 802.11n40 / CH 3 / 2500MHz~26500MHz (down 30dBc)



Configuration IEEE 802.11n40 Emission not in Restricted Band plot on channel 9 Reference Level



Configuration IEEE 802.11n40 / CH 9 / 30MHz~2400MHz (down 30dBc)



Configuration IEEE 802.11n40 / CH 9 / 2500MHz~26500MHz (down 30dBc)



7.9 ANTENNA APPLICATION

7.9.1 Antenna 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.

7.9.2 Result

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

END OF REPORT