



FCC/ IC RADIO TEST REPORT-BLE
FCC ID:LNQSBWD950A
IC:2496A-SBWD950A

Product : ScreenBeam Pro Enterprise Edition

Trade Name : Actiontec

Model Name : SBWD950A

Serial Model : N/A

Report No. : NTEK-2015NT06182085F2

Prepared for

Actiontec Electronics, Inc.

760 North Mary Ave., Sunnyvale, California 94085 United States

Prepared by

Shenzhen NTEK Testing Technology Co., Ltd.

1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street
Bao'an District, Shenzhen P.R. China

Tel.: +86-0755-61156588 Fax.: +86-0755-61156599

Website:www.ntek.org.cn

TEST RESULT CERTIFICATION

Applicant's name Actiontec Electronics, Inc.

Address 760 North Mary Ave., Sunnyvale, California 94085 United States

Manufacturer's Name... Actiontec Electronics, Inc.

Address 760 North Mary Ave., Sunnyvale, California 94085 United States

Product description

Product name ScreenBeam Pro Enterprise Edition

Model and/or type SBWD950A
reference

Serial Model N/A

Standards FCC Part15.247: 01 Oct. 2014
IC RSS-247, Issue 1, May 28, 2015

Test procedure ANSI C63.10-2013 and KDB 558074: June 5, 2014
RSS GEN Issue 4

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.

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

Date of Test

Date (s) of performance of tests: 18 Jun. 2015 ~31 Jul. 2015

Date of Issue.....: 31 Jul. 2015

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

Testing Engineer : Jason Chen
(Jason Chen)

Technical Manager : Brown Lu
(Brown Lu)

Authorized Signatory : Sam. Chen
(Sam Chen)

Table of Contents

	Page
1 . SUMMARY OF TEST RESULTS	5
1.1 TEST FACILITY	6
1.2 MEASUREMENT UNCERTAINTY	6
2 . GENERAL INFORMATION	7
2.1 GENERAL DESCRIPTION OF EUT	7
2.2 DESCRIPTION OF TEST MODES	8
2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	9
2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)	10
2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS	11
3 . EMC EMISSION TEST	12
3.1 CONDUCTED EMISSION MEASUREMENT	12
3.1.1 POWER LINE CONDUCTED EMISSION LIMITS	12
3.1.2 TEST PROCEDURE	13
3.1.3 DEVIATION FROM TEST STANDARD	13
3.1.4 TEST SETUP	13
3.1.5 EUT OPERATING CONDITIONS	13
3.1.6 TEST RESULTS	14
3.2 RADIATED EMISSION MEASUREMENT	22
3.2.1 RADIATED EMISSION LIMITS	22
3.2.2 TEST PROCEDURE	23
3.2.3 DEVIATION FROM TEST STANDARD	23
3.2.4 TEST SETUP	23
3.2.5 EUT OPERATING CONDITIONS	24
3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)	25
3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)	26
3.2.8 TEST RESULTS (ABOVE 1000 MHZ)	28
4 . POWER SPECTRAL DENSITY TEST	29
4.1 APPLIED PROCEDURES / LIMIT	29
4.1.1 TEST PROCEDURE	29
4.1.2 DEVIATION FROM STANDARD	29
4.1.3 TEST SETUP	29
4.1.4 EUT OPERATION CONDITIONS	29
4.1.5 TEST RESULTS	30
5 . BANDWIDTH TEST	32
5.1 APPLIED PROCEDURES / LIMIT	32
5.1.1 TEST PROCEDURE	32

Table of Contents

	Page
TEST SETUP	32
5.1.2 EUT OPERATION CONDITIONS	32
5.1.3 TEST RESULTS	33
6 . PEAK OUTPUT POWER TEST	35
6.1 APPLIED PROCEDURES / LIMIT	35
6.1.1 TEST PROCEDURE	35
6.1.2 DEVIATION FROM STANDARD	35
6.1.3 TEST SETUP	35
6.1.4 EUT OPERATION CONDITIONS	35
6.1.5 TEST RESULTS	36
7 . 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE	37
7.1 DEVIATION FROM STANDARD	37
7.2 TEST SETUP	37
7.3 EUT OPERATION CONDITIONS	37
7.4 TEST RESULTS	38
8 . ANTENNA REQUIREMENT	40
8.1 STANDARD REQUIREMENT	40
8.2 EUT ANTENNA	40
9 . EUT TEST PHOTO	41
APPENDIX-PHOTOGRAPHS OF EUT CONSTRUCTIONAL DETAILS	

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.247) , Subpart C/ RSS-247 & RSS-Gen Rules			
Standard Section	Test Item	Judgment	Remark
15.207/ RSS-Gen §8.8/RSS-247 §6.2	Conducted Emission	PASS	
15.247 (a)(2)/ RSS-Gen§6.6&RSS-247§A5.2 (1)	99% Occupied Bandwidth & 6dB Bandwidth	PASS	
15.247 (b)/ RSS-247 §5.4 (4)	Peak Output Power	PASS	
15.247 (c)/ RSS-247 §A5.5	Radiated Spurious Emission	PASS	
15.247 (d)/ RSS-247 §A5.2 (2)	Power Spectral Density	PASS	
15.205/ RSS-247 §A5.5	Band Edge Emission	PASS	
15.203/ RSS-Gen §7.1.2	Antenna Requirement	PASS	

NOTE:

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

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 $y \pm U$, 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	$\pm 2\%$

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	ScreenBeam Pro Enterprise Edition	
Trade Name	Actiontec	
Model Name	SBWD950A	
Serial Model	N/A	
Model Difference	N/A	
Product Description	The EUT is a ScreenBeam Pro Enterprise Edition	
	Operation Frequency:	2402~2480MHz
	Modulation Type:	GFSK
	Number Of Channel	40CH
	Antenna Designation:	Please see Note 3.
	Antenna Gain (dBi)	1.0dBi
	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.	
Channel List	Please refer to the Note 2.	
Ratings	DC 5.0V, 2.0A	
Adapter	Adapter 1 Mode: WA-10P05FU Input: 100-240V~, 50/60Hz, 0.3A MAX Output: 5.0V $\overline{\text{---}}$, 2.0A	
	Adapter 2 Mode: KSAS0120500200HU Input: 100-240V~, 50/60Hz, 0.4A Output: 5.0V $\overline{\text{---}}$, 2.0A	
Battery	N/A	
Connecting I/O Port(s)	Please refer to the User's Manual	
Radio firmware Version	RTL8192DU:v4.0.0_756324.20150428 RTL8812AU-VS:v4.2.0-aei-20150409; BT: 1.0.0.0	
Radio software Version	Wifi: 9.2.4.102 ; BT: 1.0.0.0	
Test program power setting	44	
Product Hardware Version	2A	
Product Software Version	9.2.4.102	

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	CH00
Mode 2	CH19
Mode 3	CH39
Mode 4	Link Mode

For Conducted Emission	
Final Test Mode	Description
Mode 4	Link Mode

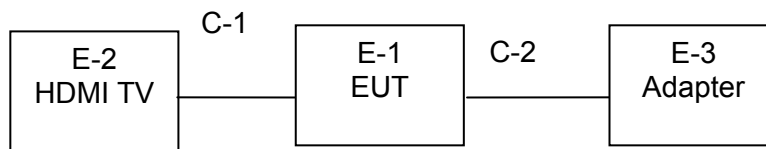
For Radiated Emission	
Final Test Mode	Description
Mode 1	CH00
Mode 2	CH19
Mode 3	CH39
Mode 4	Link Mode

Note:

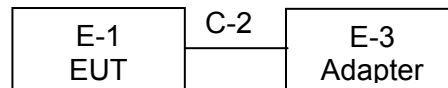
- (1) The measurements are performed at the highest, middle, lowest available channels.
- (2) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Conducted Emission Test



Radiated Emission Test



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 Pro Enterprise Edition	Actiontec	SBWD950A	N/A	EUT
E-2	TV	SONY	KDL-24EX520	N/A	
E-3	Adapter 1	Actiontec	WA-10P05FU	N/A	
E-3	Adapter 2	Actiontec	KSAS0120500200HU	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	100cm	
C-2	NO	NO	80cm	

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	Test Receiver	R&S	ESPI	101318	2015.06.07	2016.06.06	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2015.07.06	2016.07.05	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2015.06.07	2016.06.06	1 year
5	Spectrum Analyzer	ADVANTEST	R3132	150900201	2015.06.07	2016.06.06	1 year
6	Horn Antenna	EM	EM-AH-10180	2011071402	2015.07.06	2016.07.05	1 year
7	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2015.07.06	2016.07.05	1 year
8	Amplifier	EM	EM-30180	060538	2014.12.22	2015.12.21	1 year
9	Loop Antenna	ARA	PLA-1030/B	1029	2015.06.08	2016.06.07	1 year
10	Power Meter	R&S	NRVS	100696	2015.07.06	2016.07.05	1 year
11	Power Sensor	R&S	URV5-Z4	0395.1619.05	2015.07.06	2016.07.05	1 year

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Spectrum Analyzer	Agilent	E4407B	MY45108040	2014.07.06	2015.07.05	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2014.07.06	2015.07.05	1 year
6	Horn Antenna	EM	EM-AH-10180	2011071402	2014.07.06	2015.07.05	1 year
7	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2014.07.06	2015.07.05	1 year
10	Power Meter	R&S	NRVS	100696	2014.07.06	2015.07.05	1 year
11	Power Sensor	R&S	URV5-Z4	0395.1619.05	2014.07.06	2015.07.05	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	2015.06.06	2016.06.05	1 year
2	LISN	R&S	ENV216	101313	2014.08.24	2015.08.23	1 year
3	LISN	EMCO	3816/2	00042990	2014.08.24	2015.08.23	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2015.06.07	2016.06.06	1 year
5	Passive Voltage Probe	R&S	ESH2-Z3	100196	2015.06.07	2016.06.06	1 year
6	Absorbing clamp	R&S	MOS-21	100423	2015.06.08	2016.06.07	1 year

1	Attenuation	MCE	24-10-34	BN9258	2016.06.08	2016.06.07	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

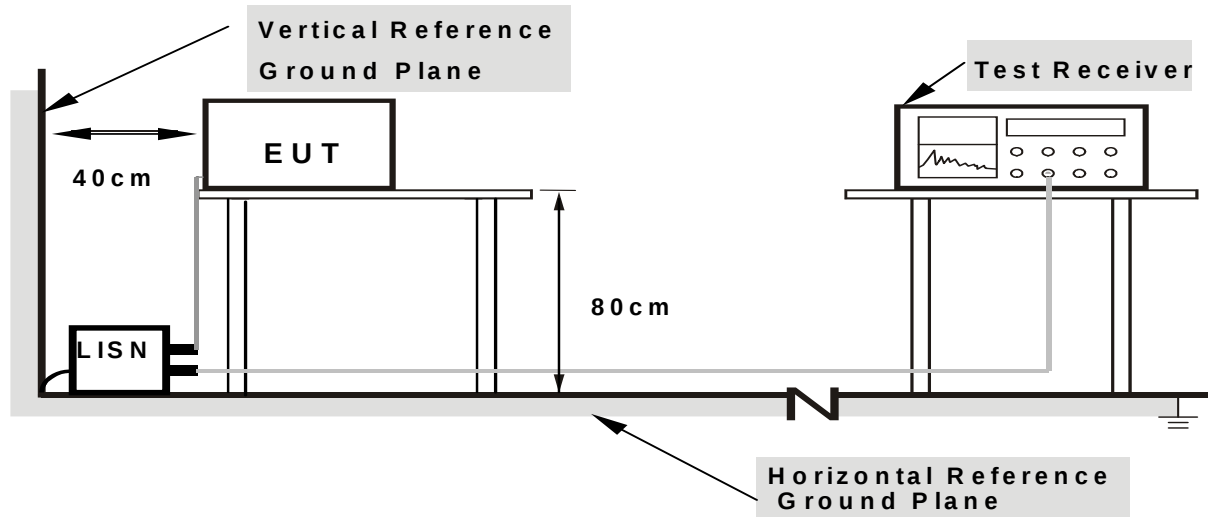
3.1.2 TEST PROCEDURE

- 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.
- 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.
- 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.
- LISN at least 80 cm from nearest part of EUT chassis.
- 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.

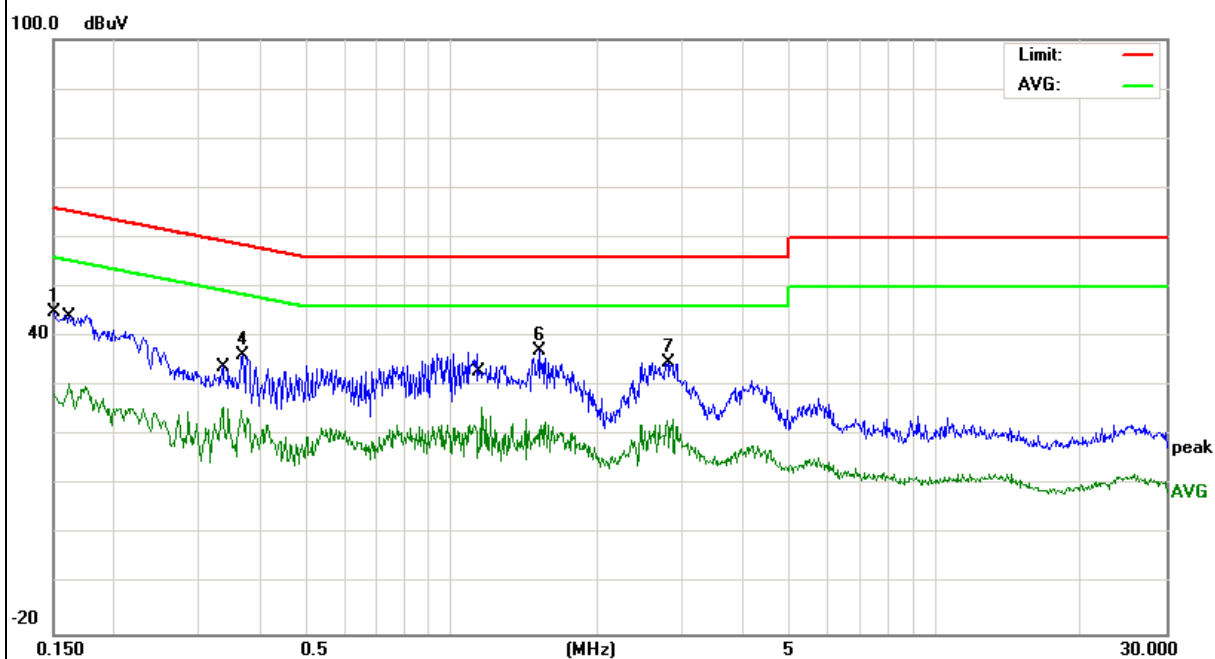
3.1.6 TEST RESULTS

EUT :	ScreenBeam Pro Enterprise Edition	Model Name. :	SBWD950A
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Phase :	L
Test Voltage :	DC 5V From adapter AC120V/60Hz	Test Mode :	Mode 4-Adapter 1

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measure-ment (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.1499	35.30	9.63	44.93	66.00	-21.07	QP
0.1620	20.82	9.60	30.42	55.36	-24.94	AVG
0.3356	16.23	9.50	25.73	49.31	-23.58	AVG
0.3699	26.84	9.50	36.34	58.50	-22.16	QP
1.1498	16.08	9.53	25.61	46.00	-20.39	AVG
1.5180	27.55	9.54	37.09	56.00	-18.91	QP
2.7980	25.33	9.57	34.90	56.00	-21.10	QP

Remark:

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

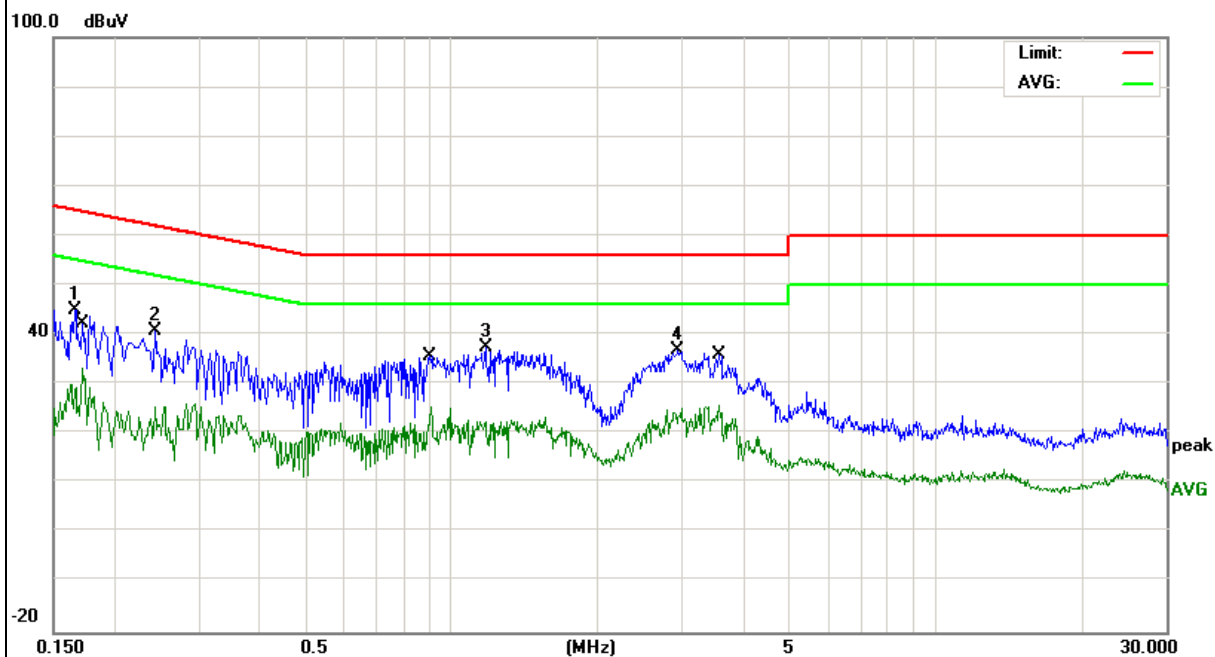


EUT :	ScreenBeam Pro Enterprise Edition	Model Name. :	SBWD950A
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Phase :	N
Test Voltage :	DC 5V From adapter AC120V/60Hz	Test Mode :	Mode 4-Adapter 1

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measure-ment (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.1660	35.44	9.61	45.05	65.15	-20.10	QP
0.2429	31.20	9.50	40.70	61.99	-21.29	QP
1.1778	28.03	9.55	37.58	56.00	-18.42	QP
2.9340	27.22	9.58	36.80	56.00	-19.20	QP
0.1720	23.54	9.59	33.13	54.86	-21.73	AVG
0.9060	15.92	9.55	25.47	46.00	-20.53	AVG
3.5779	16.27	9.59	25.86	46.00	-20.14	AVG

Remark:

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

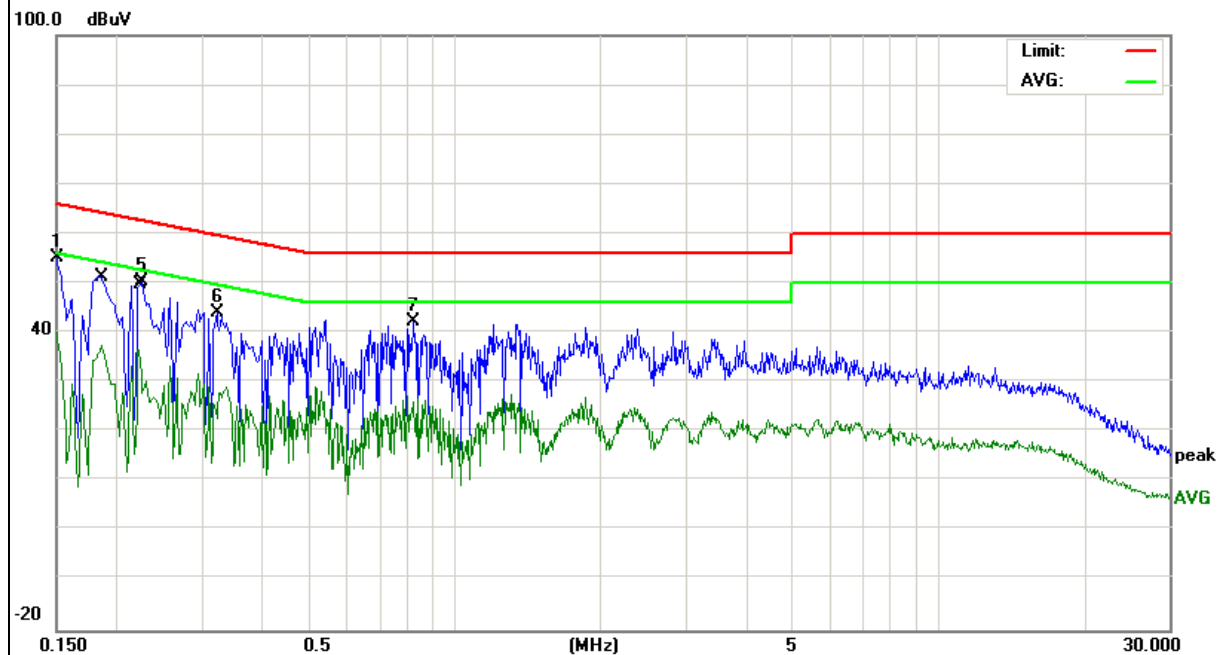


EUT :	ScreenBeam Pro Enterprise Edition	Model Name. :	SBWD950A
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Phase :	L
Test Voltage :	DC 5V From adapter AC240V/60Hz	Test Mode :	Mode 4-Adapter 1

Frequency	Reading Level	Correct Factor	Measure-ment	Limits	Margin	Remark
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.1499	45.62	9.63	55.25	66.00	-10.75	QP
0.1499	30.40	9.63	40.03	56.00	-15.97	AVG
0.1860	27.72	9.61	37.33	54.21	-16.88	AVG
0.2220	26.96	9.64	36.60	52.74	-16.14	AVG
0.2260	40.61	9.64	50.25	62.59	-12.34	QP
0.3220	34.47	9.66	44.13	59.65	-15.52	QP
0.8260	32.49	9.77	42.26	56.00	-13.74	QP

Remark:

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

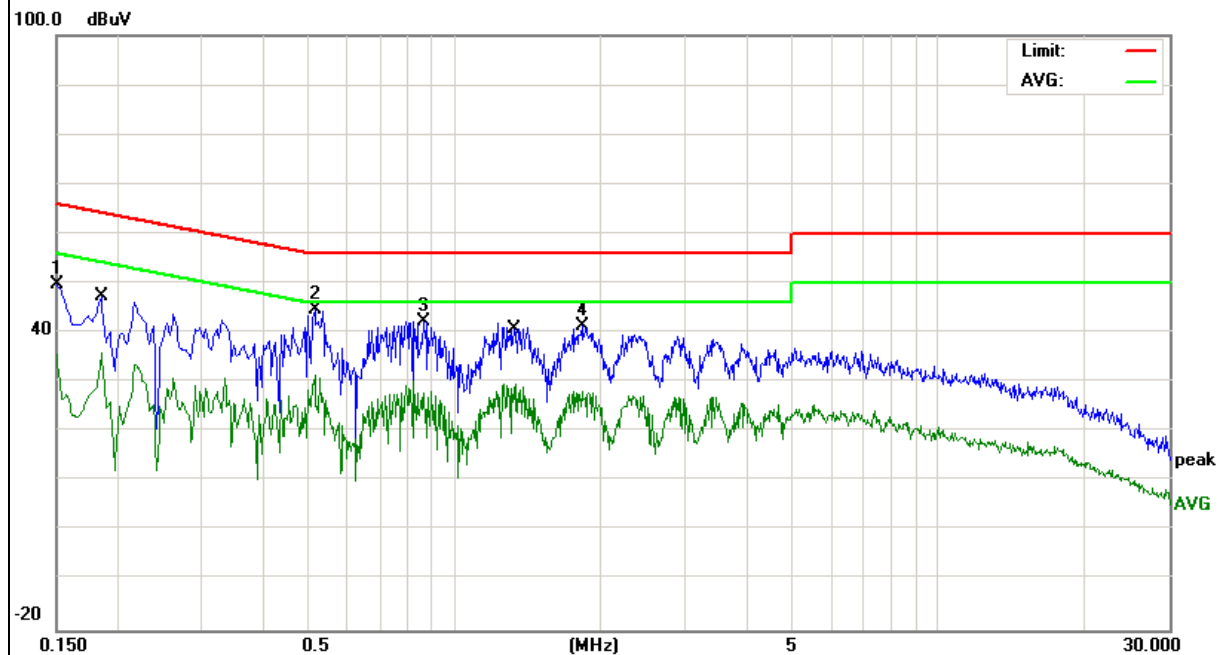


EUT :	ScreenBeam Pro Enterprise Edition	Model Name. :	SBWD950A
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Phase :	N
Test Voltage :	DC 5V From adapter AC240V/60Hz	Test Mode :	Mode 4-Adapter 1

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measure-ment (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.1499	40.14	9.60	49.74	66.00	-16.26	
0.5140	35.03	9.68	44.71	56.00	-11.29	QP
0.8660	32.75	9.63	42.38	56.00	-13.62	QP
1.8340	31.95	9.55	41.50	56.00	-14.50	QP
0.1860	26.26	9.61	35.87	54.21	-18.34	AVG
0.5140	21.65	9.68	31.33	46.00	-14.67	AVG
1.3380	20.15	9.59	29.74	46.00	-16.26	AVG

Remark:

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

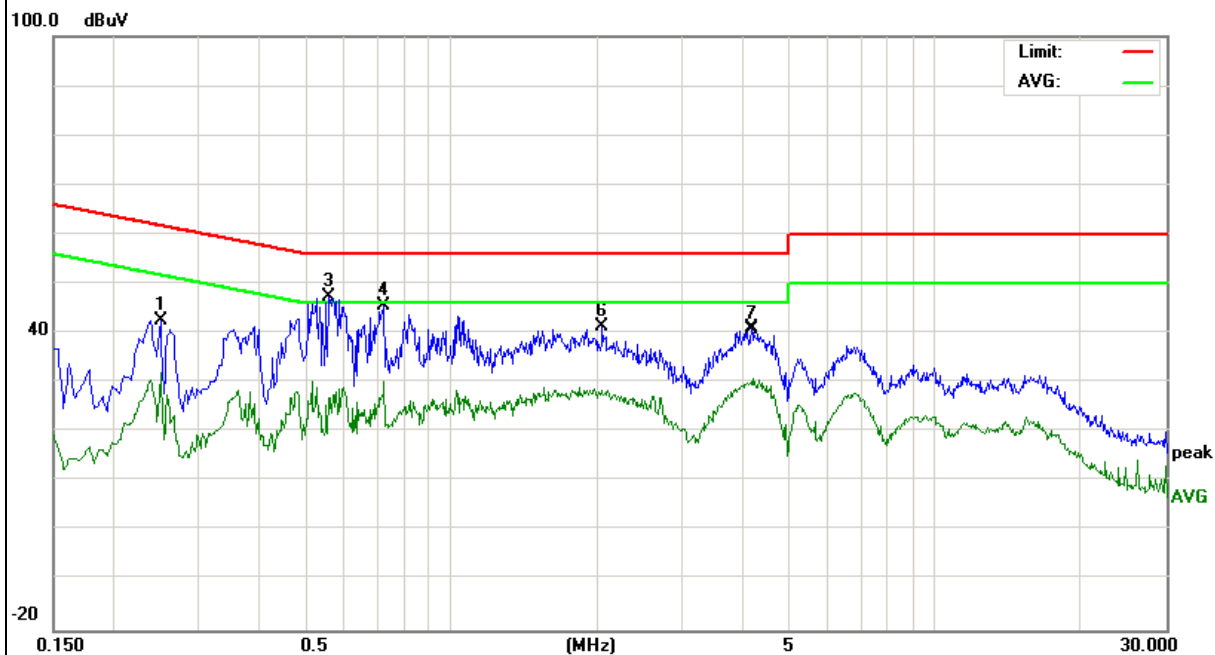


EUT :	ScreenBeam Pro Enterprise Edition	Model Name. :	SBWD950A
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Phase :	L
Test Voltage :	DC 5V From adapter AC120V/60Hz	Test Mode :	Mode 4-Adapter 2

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measure-ment (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.2500	33.02	9.67	42.69	61.75	-19.06	QP
0.2500	22.42	9.67	32.09	51.75	-19.66	AVG
0.5580	37.56	9.78	47.34	56.00	-8.66	QP
0.7260	35.76	9.77	45.53	56.00	-10.47	QP
0.7260	20.42	9.77	30.19	46.00	-15.81	AVG
2.0460	31.68	9.65	41.33	56.00	-14.67	QP
4.1579	31.20	9.70	40.90	56.00	-15.10	QP
4.1898	21.20	9.70	30.90	46.00	-15.10	AVG

Remark:

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

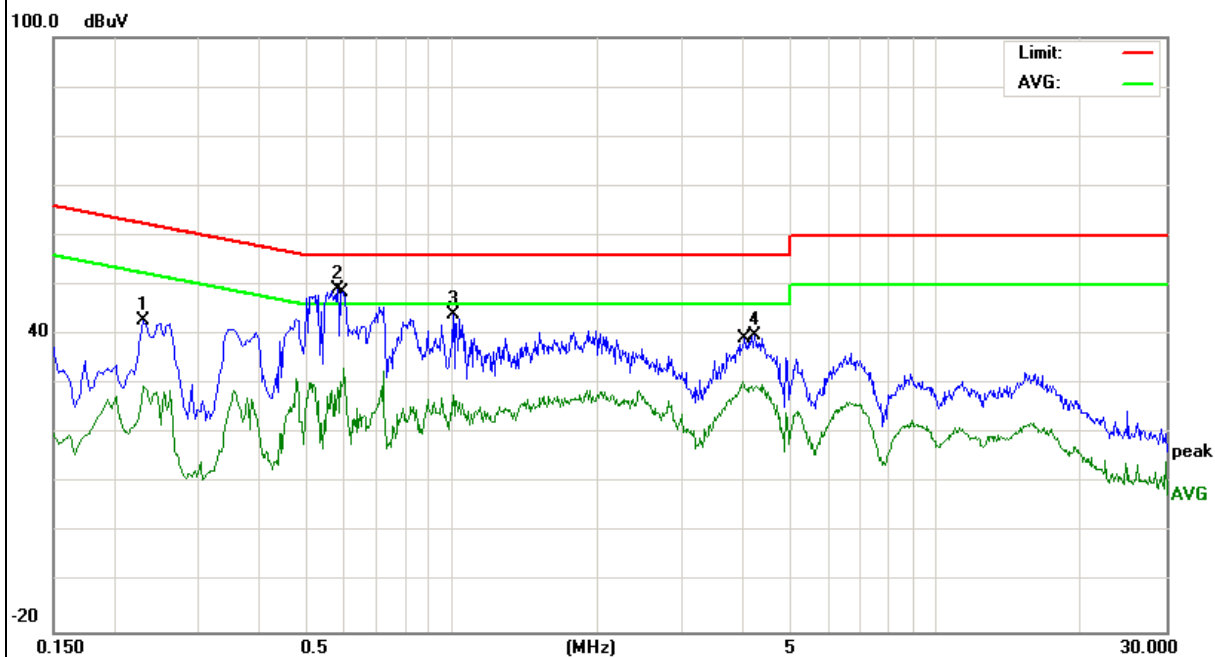


EUT :	ScreenBeam Pro Enterprise Edition	Model Name. :	SBWD950A
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Phase :	N
Test Voltage :	DC 5V From adapter AC120V/60Hz	Test Mode :	Mode 4-Adapter 2

Frequency	Reading Level	Correct Factor	Measure-ment	Limits	Margin	Remark
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.2300	33.12	9.61	42.73	62.45	-19.72	QP
0.5820	39.36	9.66	49.02	56.00	-6.98	QP
1.0100	34.58	9.61	44.19	56.00	-11.81	QP
4.2299	30.32	9.51	39.83	56.00	-16.17	QP
0.2300	19.92	9.61	29.53	52.45	-22.92	AVG
0.5980	23.60	9.66	33.26	46.00	-12.74	AVG
4.0060	20.96	9.51	30.47	46.00	-15.53	AVG

Remark:

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

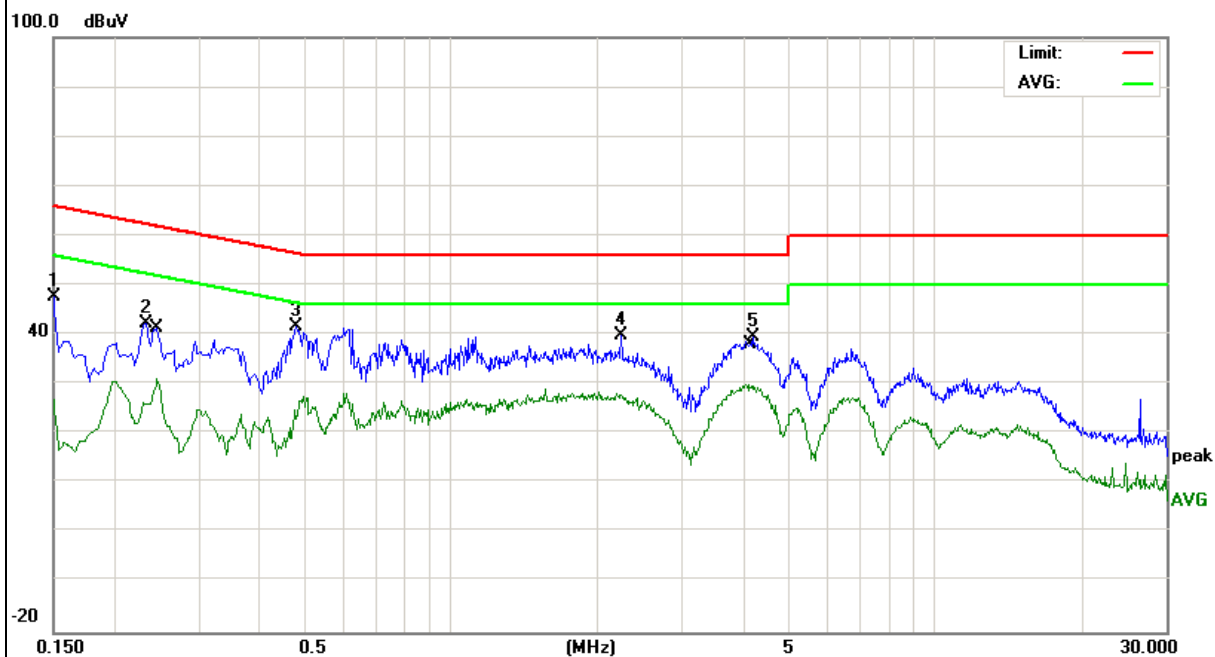


EUT :	ScreenBeam Pro Enterprise Edition	Model Name. :	SBWD950A
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Phase :	L
Test Voltage :	DC 5V From adapter AC240V/60Hz	Test Mode :	Mode 4-Adapter 2

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measure-ment (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.1499	38.10	9.63	47.73	66.00	-18.27	
0.2340	32.58	9.65	42.23	62.30	-20.07	QP
0.4780	31.83	9.68	41.51	56.37	-14.86	QP
2.2460	30.13	9.65	39.78	56.00	-16.22	QP
4.1859	29.90	9.70	39.60	56.00	-16.40	QP
0.2460	21.53	9.67	31.20	51.89	-20.69	AVG
4.1139	20.32	9.70	30.02	46.00	-15.98	AVG

Remark:

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

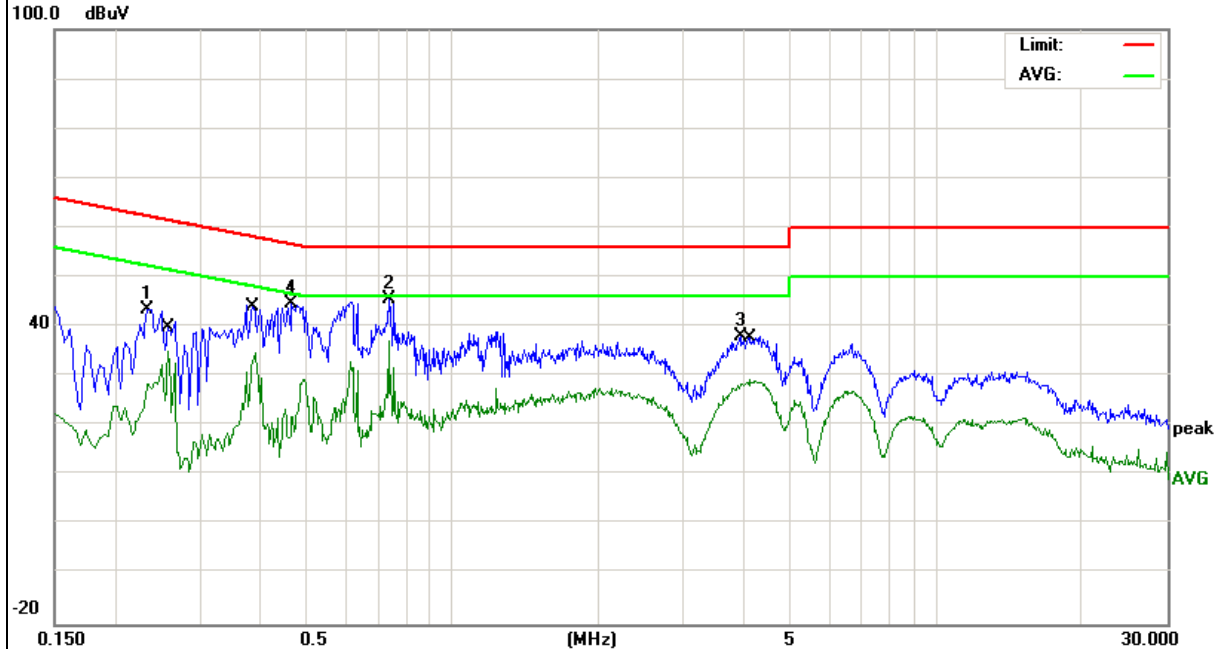


EUT :	ScreenBeam Pro Enterprise Edition	Model Name. :	SBWD950A
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Phase :	N
Test Voltage :	DC 5V From adapter AC240V/60Hz	Test Mode :	Mode 4-Adapter 2

Frequency	Reading Level	Correct Factor	Measure-ment	Limits	Margin	Remark
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.2340	33.90	9.61	43.51	62.30	-18.79	QP
0.7380	35.90	9.63	45.53	56.00	-10.47	QP
3.9300	28.68	9.51	38.19	56.00	-17.81	QP
0.4660	34.97	9.66	44.63	56.58	-11.95	QP
0.2580	25.55	9.62	35.17	51.49	-16.32	AVG
0.3899	25.24	9.64	34.88	48.06	-13.18	AVG
0.7380	27.58	9.63	37.21	46.00	-8.79	AVG
4.1179	19.79	9.51	29.30	46.00	-16.70	AVG

Remark:

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



3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

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)/ RSS-247 §5.5, then the 15.209(a)/ RSS-Gen limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

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

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C/ RSS-Gen.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

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

3.2.2 TEST PROCEDURE

- The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- 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 open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- 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.
- 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.
- 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.
- 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:

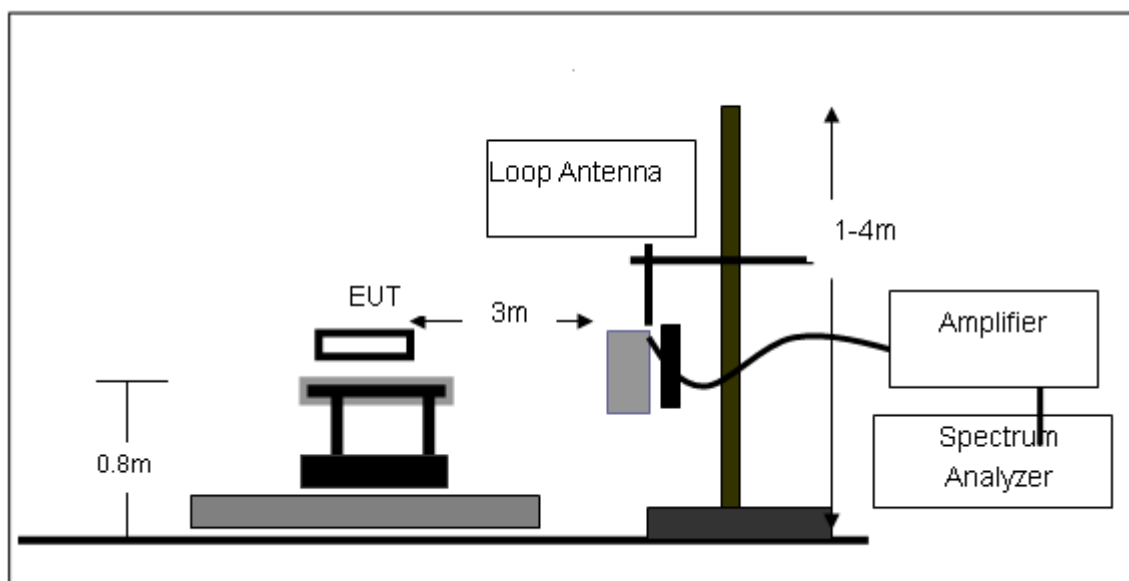
Frequency Band (MHz)	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	QP	120 kHz	300 kHz
Above 1000	Peak	1 MHz	1 MHz
	Peak	1 MHz	10 Hz

3.2.3 DEVIATION FROM TEST STANDARD

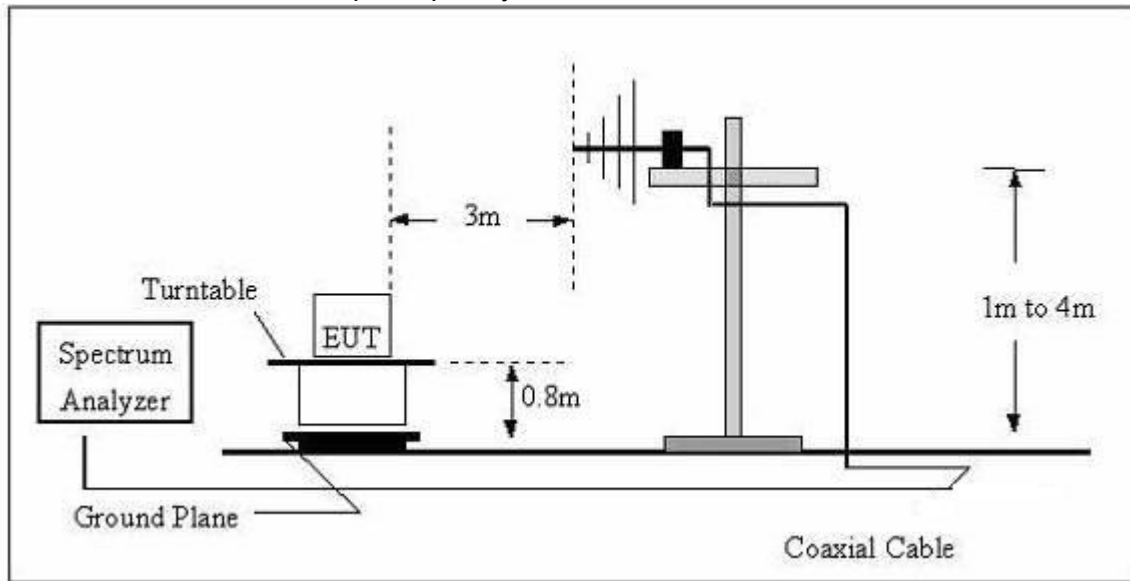
No deviation

3.2.4 TEST SETUP

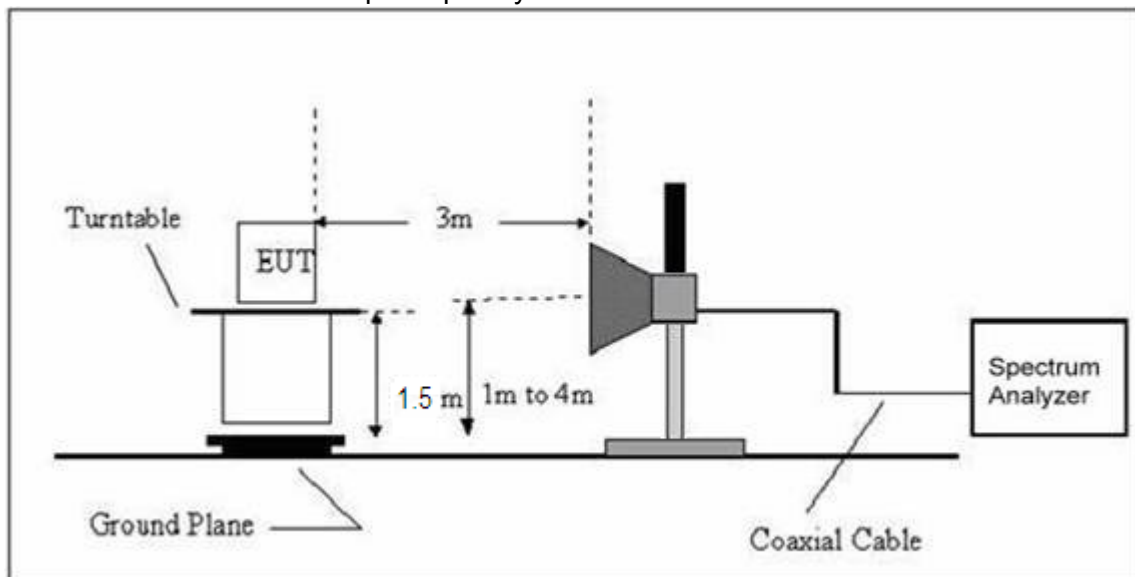
(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency Above 1GHz



3.2.5 EUT OPERATING 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.

3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)

EUT:	ScreenBeam Pro Enterprise Edition	Model Name. :	SBWD950A
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Voltage :	--
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 = $40 \log (\text{specific distance/test distance})(\text{dB})$;

Limit line = specific limits(dBuv) + distance extrapolation factor.

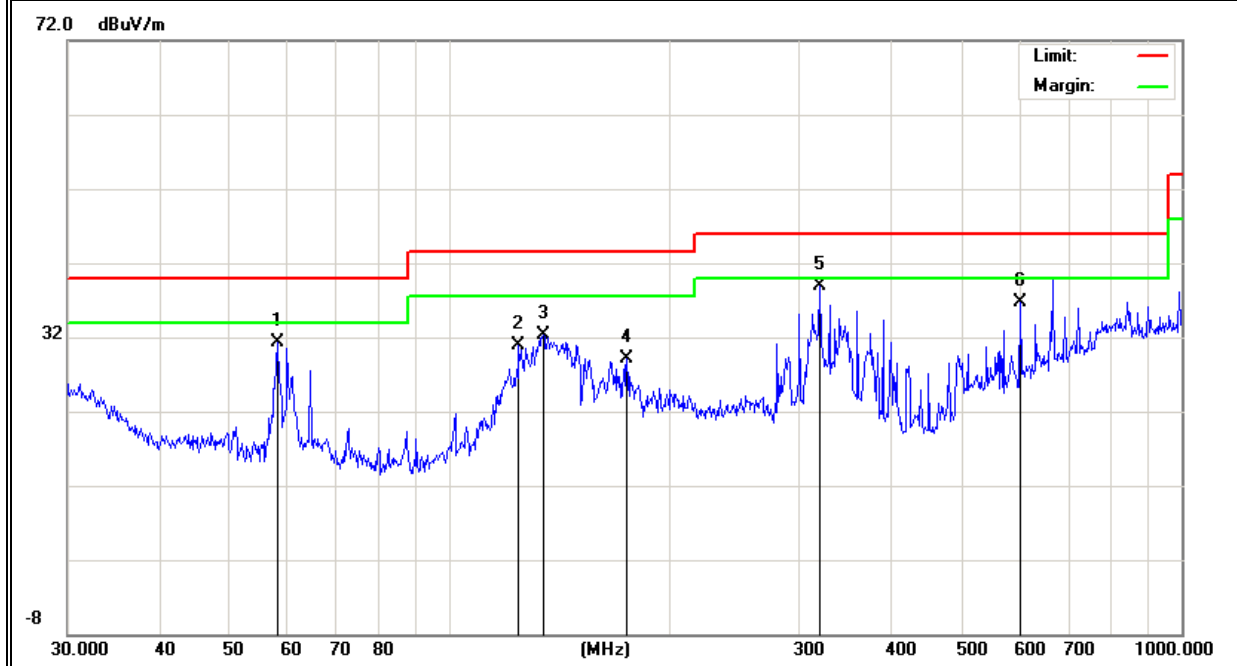
3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)

EUT :	ScreenBeam Pro Enterprise Edition	Model Name :	SBWD950A
Temperature :	20 °C	Relative Humidity :	48%
Pressure:	1010 hPa	Test Voltage :	DC 5V From adapter AC120V/60Hz
Test Mode :	TX		

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
V	57.9992	22.92	8.40	31.32	40.00	-8.68	QP
V	124.1329	18.80	12.02	30.82	43.50	-12.68	QP
V	134.0882	20.57	11.70	32.27	43.50	-11.23	QP
V	174.4241	18.45	10.58	29.03	43.50	-14.47	QP
V	319.9370	23.95	14.98	38.93	46.00	-7.07	QP
V	601.4265	14.31	22.44	36.75	46.00	-9.25	QP

Remark:

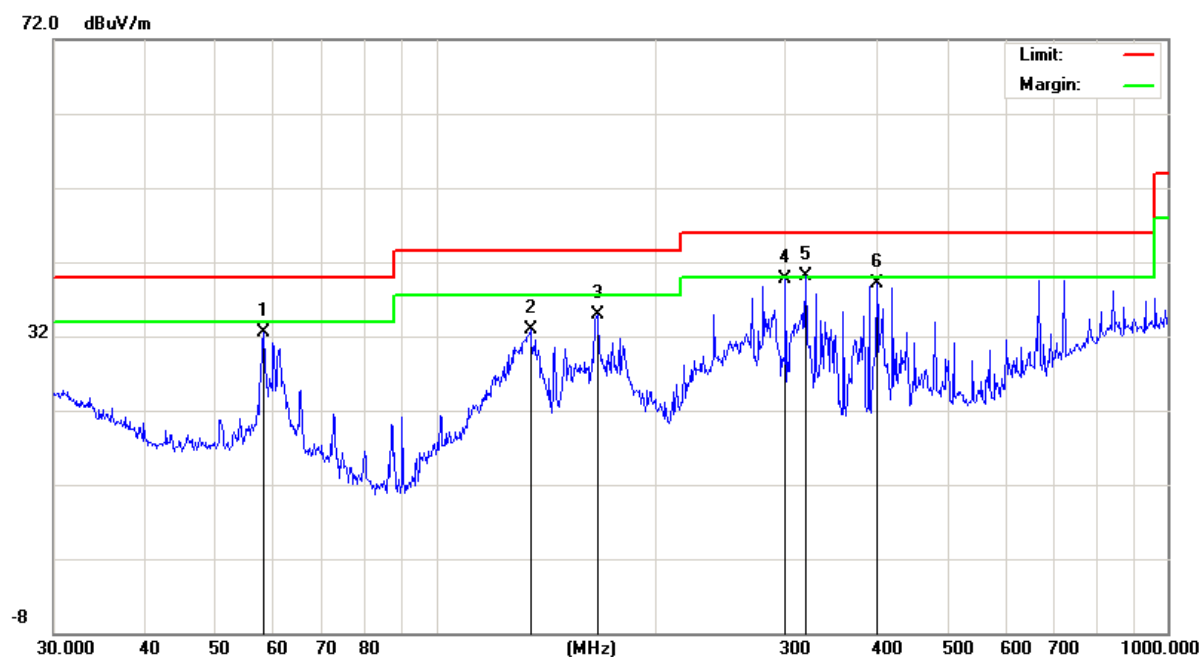
Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level - Limit



Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
H	57.9992	24.05	8.40	32.45	40.00	-7.55	QP
H	134.5592	21.31	11.67	32.98	43.50	-10.52	QP
H	166.068	24.36	10.53	34.89	43.50	-8.61	QP
H	300.3672	25.57	14.16	39.73	46.00	-6.27	QP
H	319.937	25.04	14.98	40.02	46.00	-5.98	QP
H	400.4318	20.81	18.32	39.13	46.00	-6.87	QP

Remark:

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



3.2.8 TEST RESULTS (ABOVE 1000 MHZ)

EUT :	ScreenBeam Pro Enterprise Edition	Model Name :	SBWD950A
Temperature :	20 °C	Relative Humidity :	48%
Pressure:	1010 hPa	Test Voltage :	DC 5V From adapter AC120V/60Hz
Test Mode :	TX		

Frequency (MHz)	Reading (dBμV)	Factor (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark	Polar (H/V)
Low Channel (2402 MHz)-Above 1G							
4800.552	58.63	-3.64	62.00	74.00	-12.00	Pk	Vertical
4800.552	40.94	-3.64	43.02	54.00	-10.98	AV	Vertical
7201.585	58.75	-0.95	60.25	74.00	-13.75	Pk	Vertical
7201.585	36.88	-0.95	39.25	54.00	-14.75	AV	Vertical
4802.695	58.98	-3.64	60.36	74.00	-13.64	Pk	Horizontal
4802.695	41.84	-3.64	44.23	54.00	-9.77	AV	Horizontal
7206.541	56.95	-0.95	56.81	74.00	-17.19	Pk	Horizontal
7206.541	36.77	-0.95	36.52	54.00	-17.48	AV	Horizontal
Mid Channel (2440 MHz)-Above 1G							
4882.362	59.35	-3.68	62.02	74.00	-11.98	Pk	Vertical
4882.362	41.38	-3.68	45.12	54.00	-8.88	AV	Vertical
7325.112	58.74	-0.82	58.36	74.00	-15.64	Pk	Vertical
7325.112	39.58	-0.82	41.02	54.00	-12.98	AV	Vertical
4888.252	61.25	-3.68	63.25	74.00	-10.75	Pk	Horizontal
4888.252	44.38	-3.68	47.05	54.00	-6.95	AV	Horizontal
7325.021	58.68	-0.82	58.48	74.00	-15.52	Pk	Horizontal
7325.021	38.85	-0.82	40.20	54.00	-13.80	AV	Horizontal
High Channel (2480MHz)- Above 1G							
4962.758	58.67	-3.59	61.06	74.00	-12.94	Pk	Vertical
4962.758	41.52	-3.59	44.69	54.00	-9.31	AV	Vertical
7441.025	57.14	-0.68	56.58	74.00	-17.42	Pk	Vertical
7441.025	41.44	-0.68	42.05	54.00	-11.95	AV	Vertical
4960.365	58.58	-3.59	61.77	74.00	-12.23	Pk	Horizontal
4960.365	41.68	-3.59	43.58	54.00	-10.42	AV	Horizontal
7441.256	60.06	-0.68	59.02	74.00	-14.98	Pk	Horizontal
7441.256	38.87	-0.68	40.20	54.00	-13.80	AV	Horizontal

Remark:

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

4. POWER SPECTRAL DENSITY TEST

4.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C/ RSS-210				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247/ RSS-247§5.2 (2)	Power Spectral Density	8 dBm (in any 3KHz)	2400-2483.5	PASS

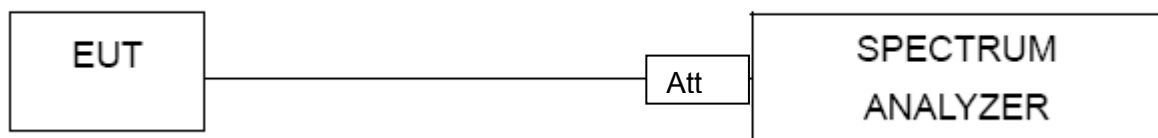
4.1.1 TEST PROCEDURE

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. 3 kHz ≤Set the RBW≤100 kHz.
4. Set the VBW ≥ 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

4.1.2 DEVIATION FROM STANDARD

No deviation.

4.1.3 TEST SETUP



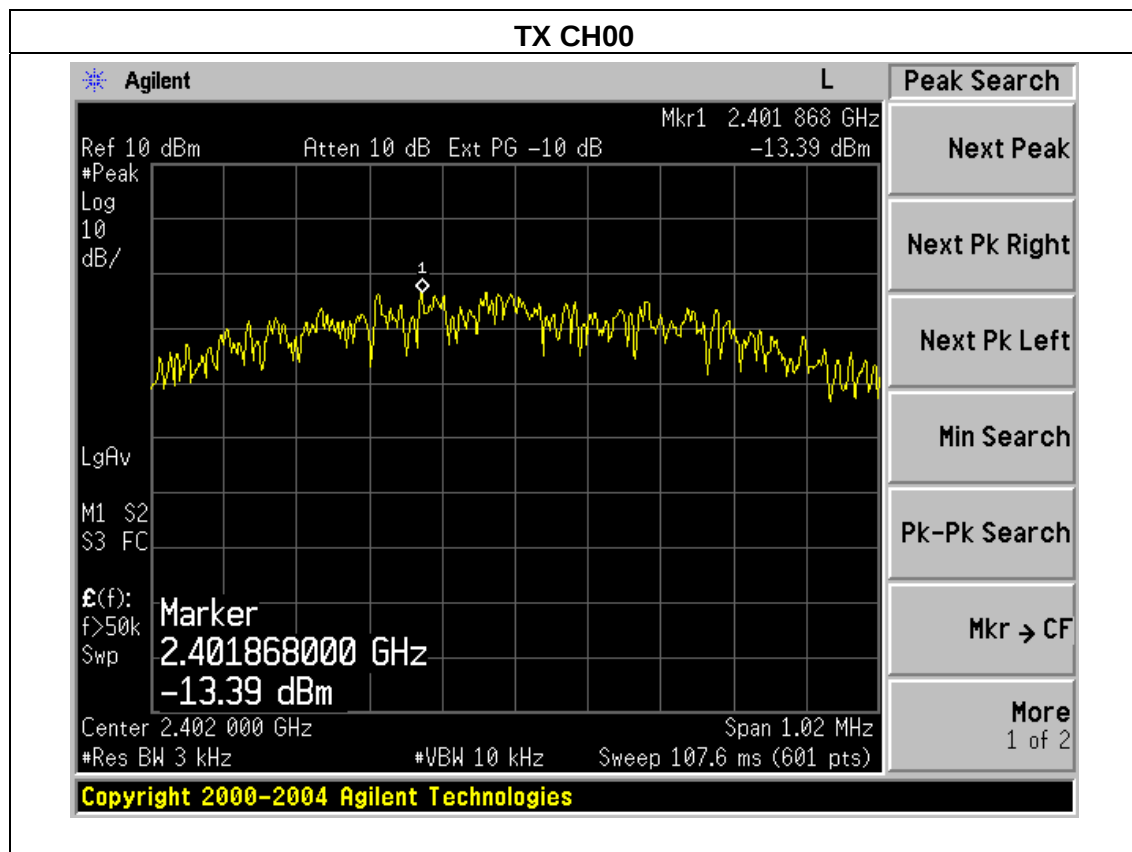
4.1.4 EUT OPERATION CONDITIONS

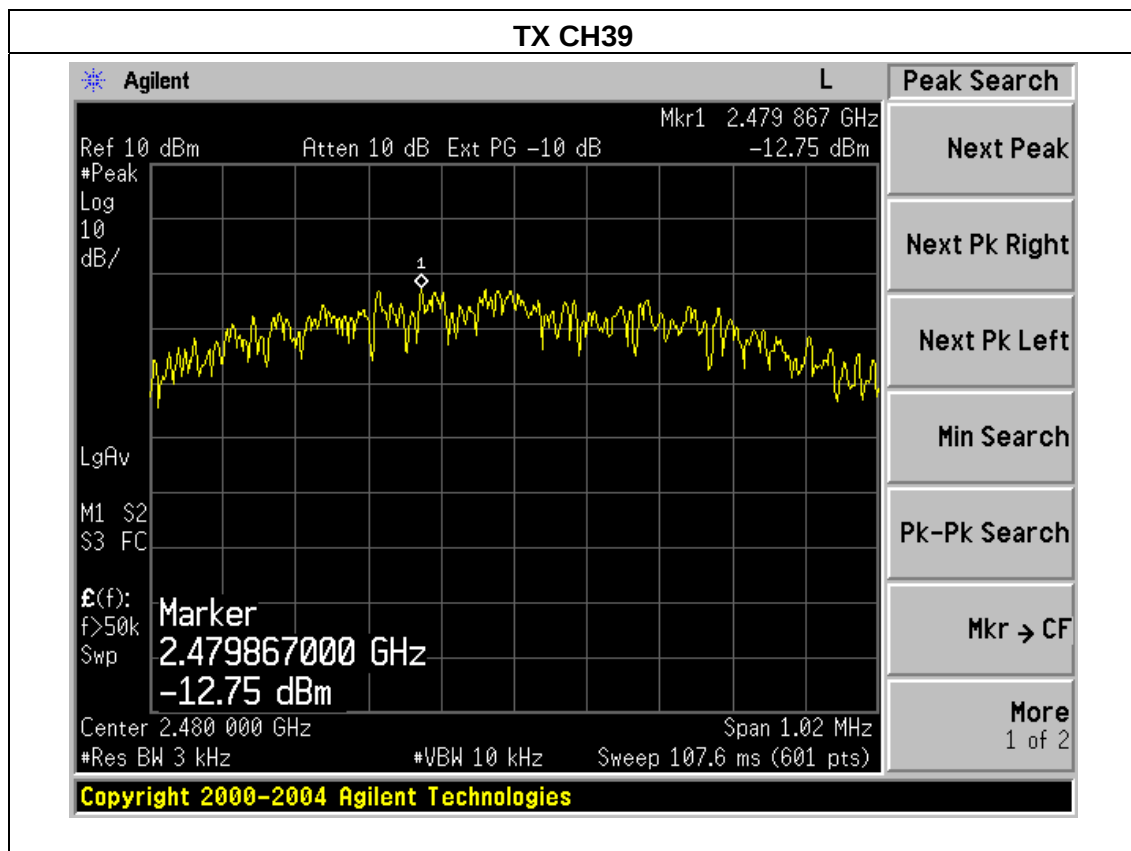
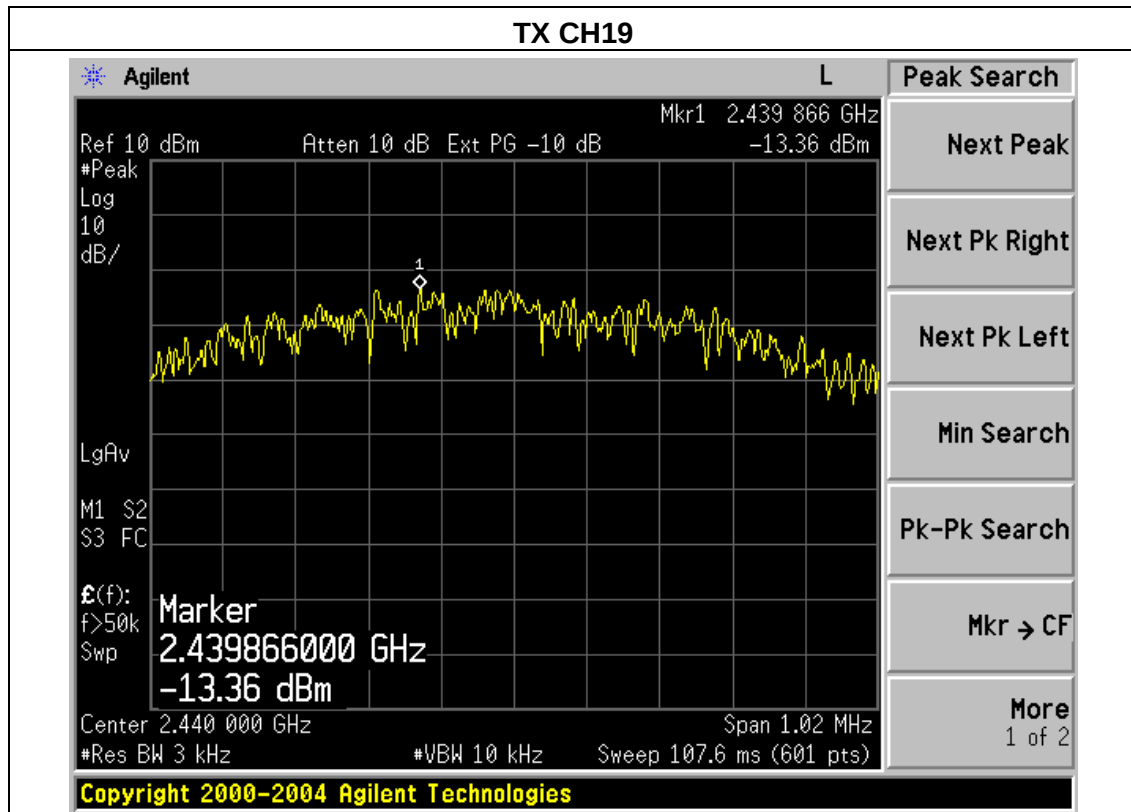
The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.

4.1.5 TEST RESULTS

EUT :	ScreenBeam Pro Enterprise Edition	Model Name :	SBWD950A
Temperature :	25 °C	Relative Humidity :	56%
Pressure :	1015 hPa	Test Voltage :	DC 5V From adapter AC120V/60Hz
Test Mode :	TX Mode /CH00, CH19, CH39		

Frequency	Power Density (dBm)	Limit (dBm)	Result
2402 MHz	-13.39	8	PASS
2440 MHz	-13.36	8	PASS
2480 MHz	-12.75	8	PASS





5. BANDWIDTH TEST

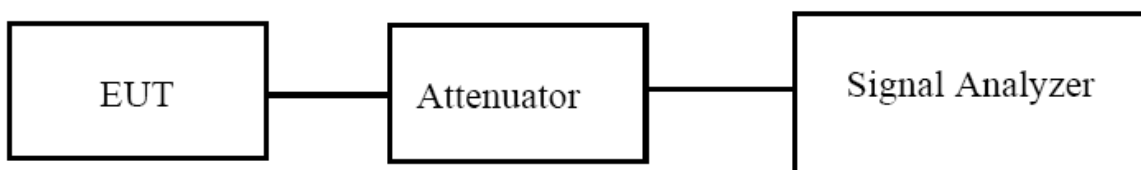
5.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C/ RSS-210				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(2)/ RSS-Gen§6.6 .1&RSS-247§ 5.2 (1)	Bandwidth	$\geq 500\text{KHz}$ (6dB bandwidth)	2400-2483.5	PASS

5.1.1 TEST PROCEDURE

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

TEST SETUP



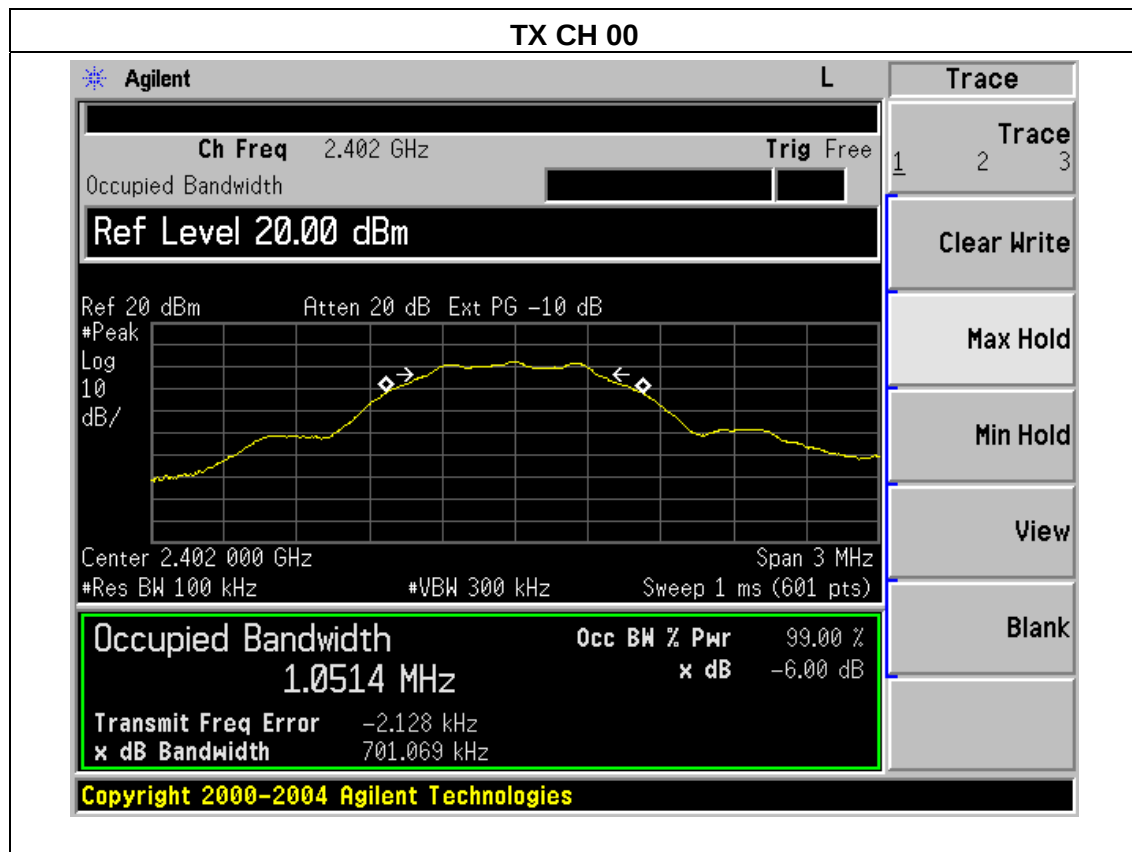
5.1.2 EUT OPERATION CONDITIONS

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.

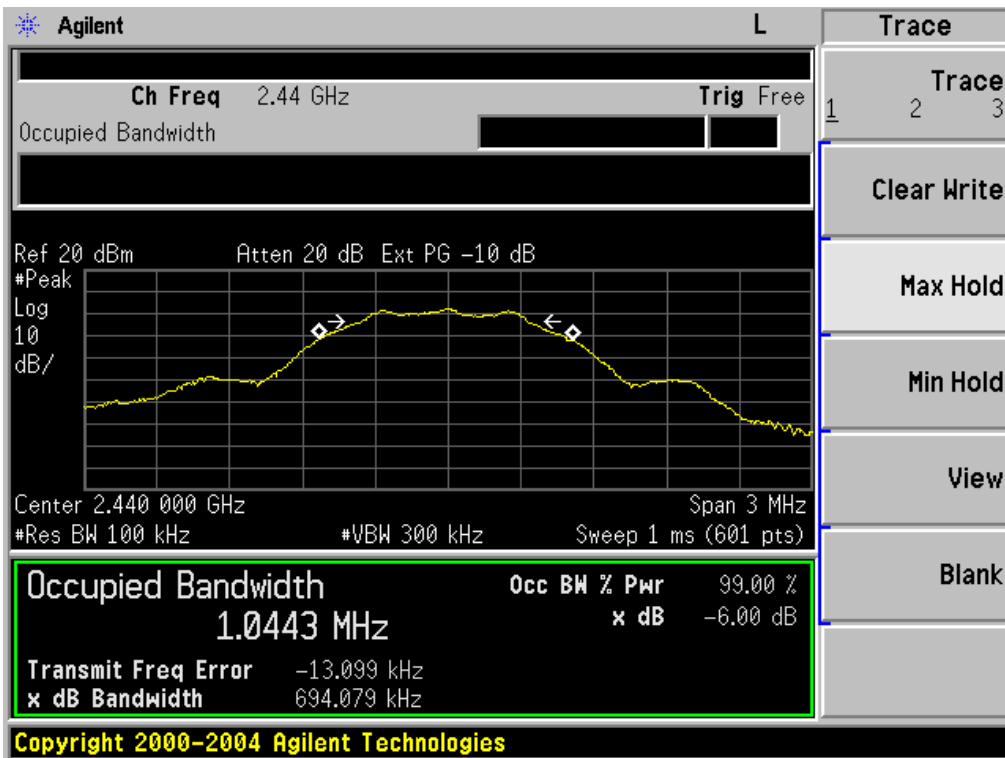
5.1.3 TEST RESULTS

EUT :	ScreenBeam Pro Enterprise Edition	Model Name :	SBWD950A
Temperature :	25 °C	Relative Humidity :	56%
Pressure :	1012 hPa	Test Voltage :	DC 5V From adapter AC120V/60Hz
Test Mode :	TX Mode /CH00, CH19, CH39		

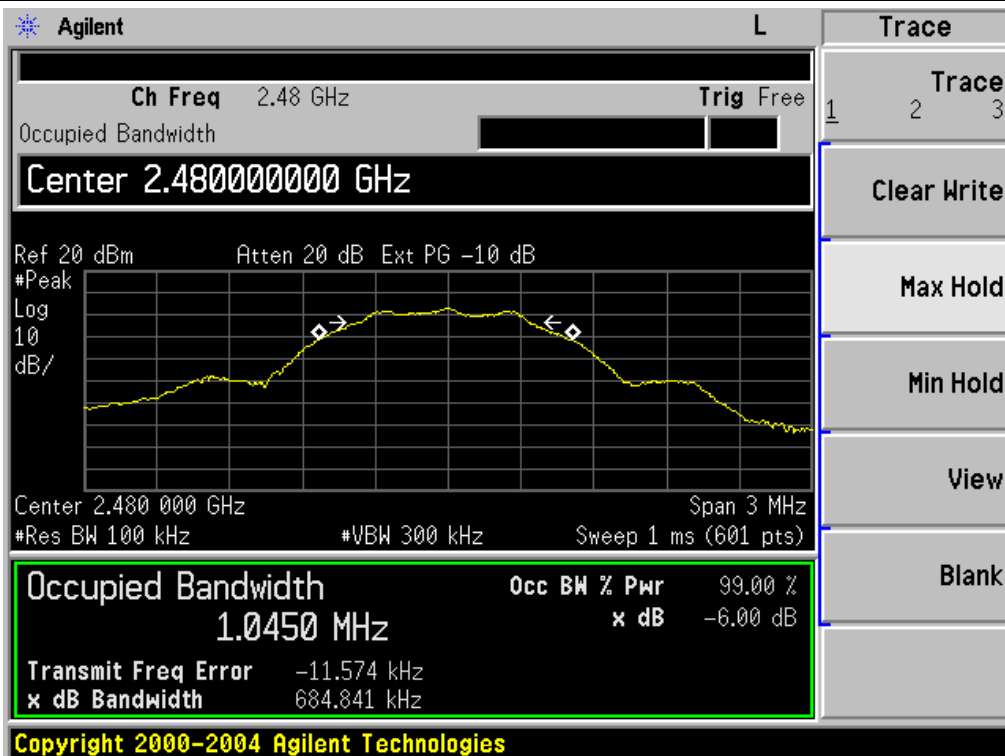
Channel	Frequency (MHz)	99% Bandwidth (MHz)	6dB bandwidth (kHz)	Limit (kHz)	Result
Low	2402	1.051	701.069	500	Pass
Middle	2440	1.044	694.079	500	Pass
High	2480	1.045	684.841	500	Pass



TX CH 19



TX CH 39



6. PEAK OUTPUT POWER TEST

6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C/ RSS-210				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3)/ RSS-247 §5.4	Peak Output Power	1 watt or 30dBm	2400-2483.5	PASS

6.1.1 TEST PROCEDURE

- a. The EUT was directly connected to the Power meter

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP



6.1.4 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.

6.1.5 TEST RESULTS

EUT :	ScreenBeam Pro Enterprise Edition	Model Name :	SBWD950A
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 5V From adapter AC120V/60Hz
Test Mode :	TX Mode		

Test Channe	Frequency	Maximum Conducted Output Power (PK)	LIMIT
	(MHz)	(dBm)	dBm
CH00	2402	2.43	30
CH19	2440	2.38	30
CH39	2480	2.90	30

7. 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE

APPLICABLE STANDARD

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, 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)).

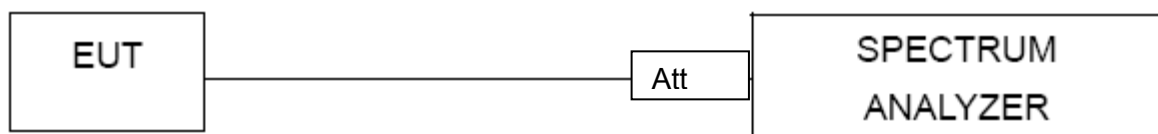
TEST PROCEDURE

- a) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b) 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.
- c) Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
- d) 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.
- e) Repeat above procedures until all measured frequencies were complete.

7.1 DEVIATION FROM STANDARD

No deviation.

7.2 TEST SETUP



7.3 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.

7.4 TEST RESULTS

EUT :	ScreenBeam Pro Enterprise Edition	Model Name :	SBWD950A
Temperature :	25 °C	Relative Humidity :	56%
Pressure :	1012 hPa	Test Voltage :	DC 5V From adapter AC120V/60Hz

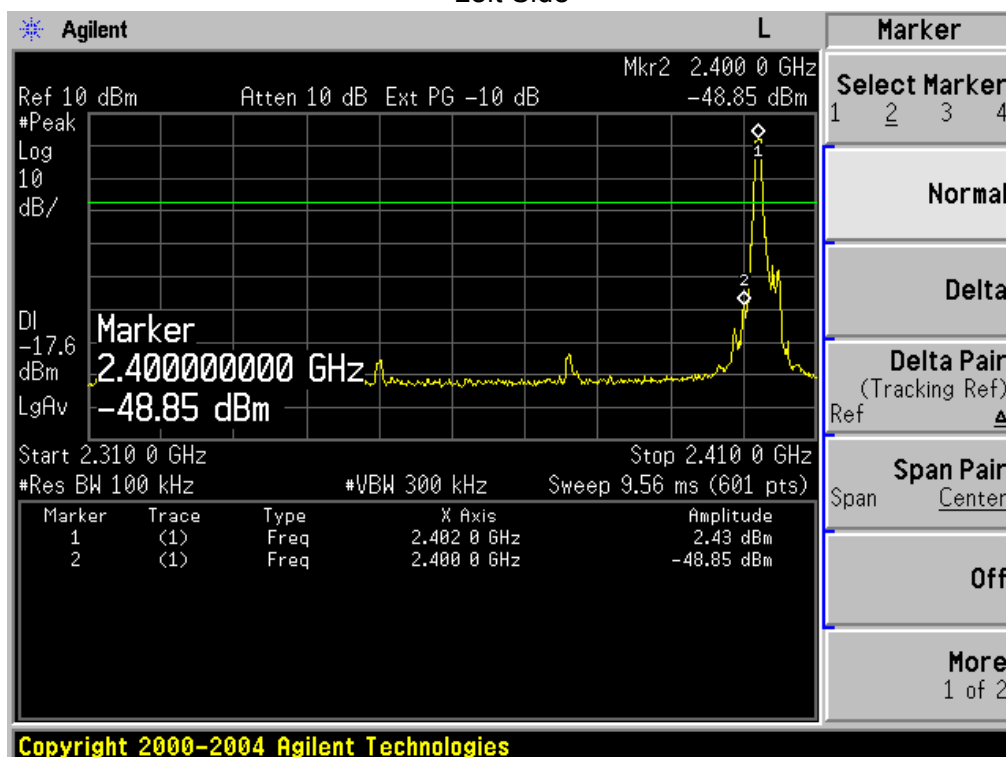
Frequency Band	Delta Peak to band emission (dBc)	> Limit (dBc)	Result
Left-band	51.28	20	Pass
Right-band	63.21	20	Pass

Radiated band edge:

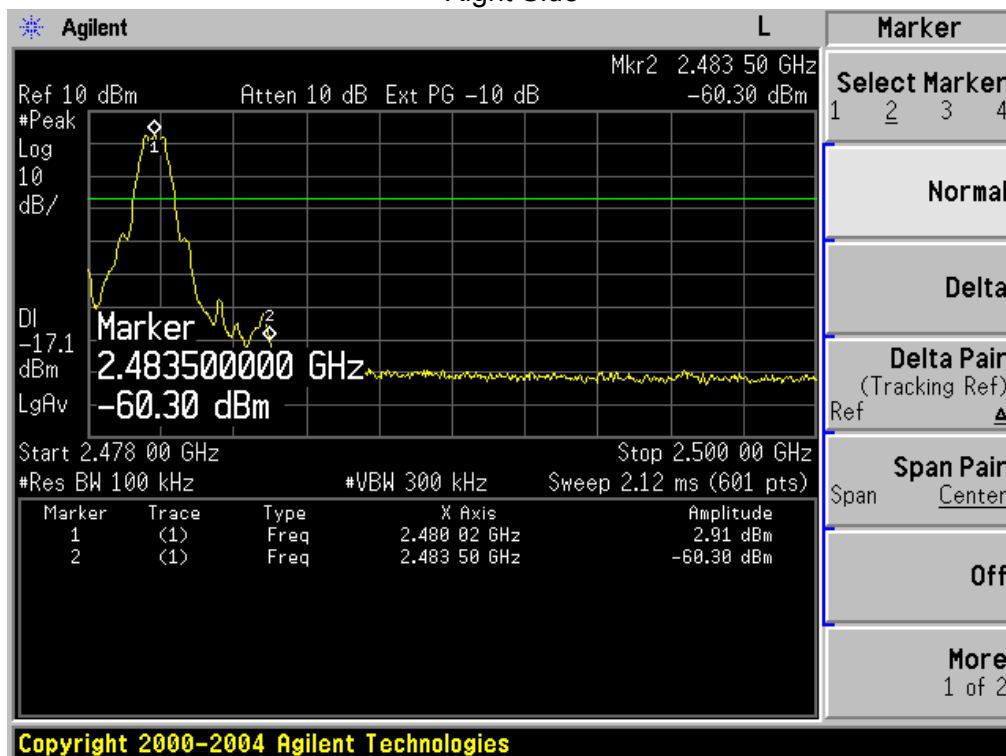
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type	Comment
2390	54.23	-13.06	41.17	74	-32.83	peak	Vertical
2390	55.17	-13.06	42.11	74	-31.89	peak	Horizontal
2483.5	57.06	-12.78	44.28	74	-29.72	peak	Vertical
2483.5	57.18	-12.78	44.4	74	-29.60	peak	Horizontal

Note: Test method to see chapter 3.2 . When PK value is lower than the Average value limit, average not record.

Left Side



Right Side



8. ANTENNA REQUIREMENT

8.1 STANDARD REQUIREMENT

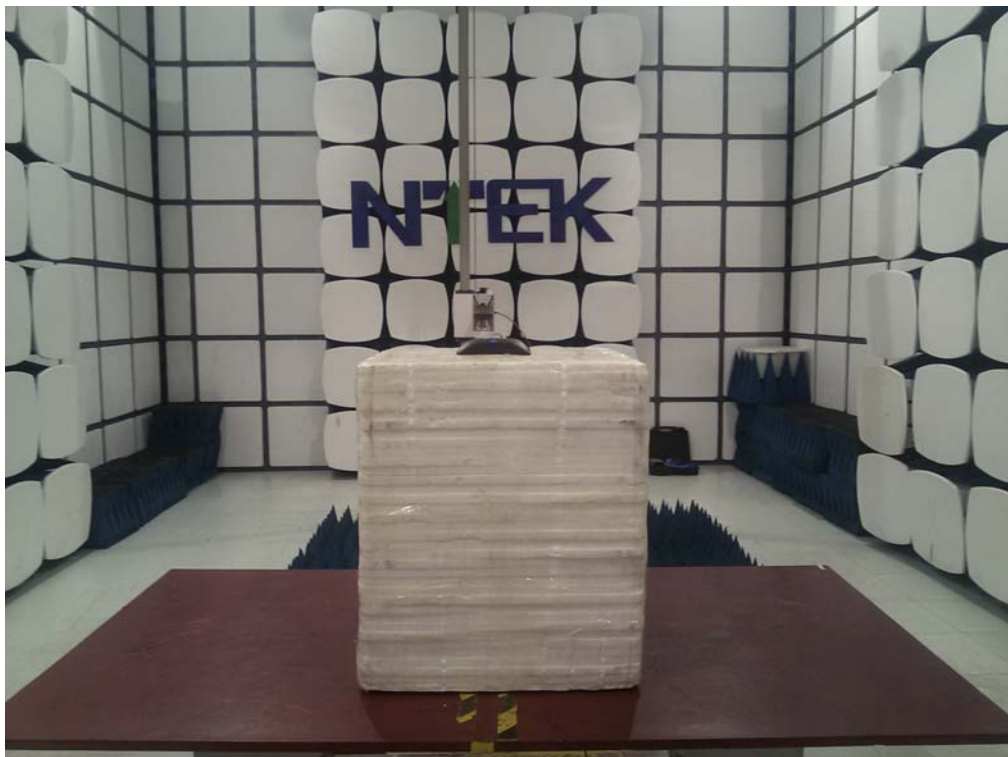
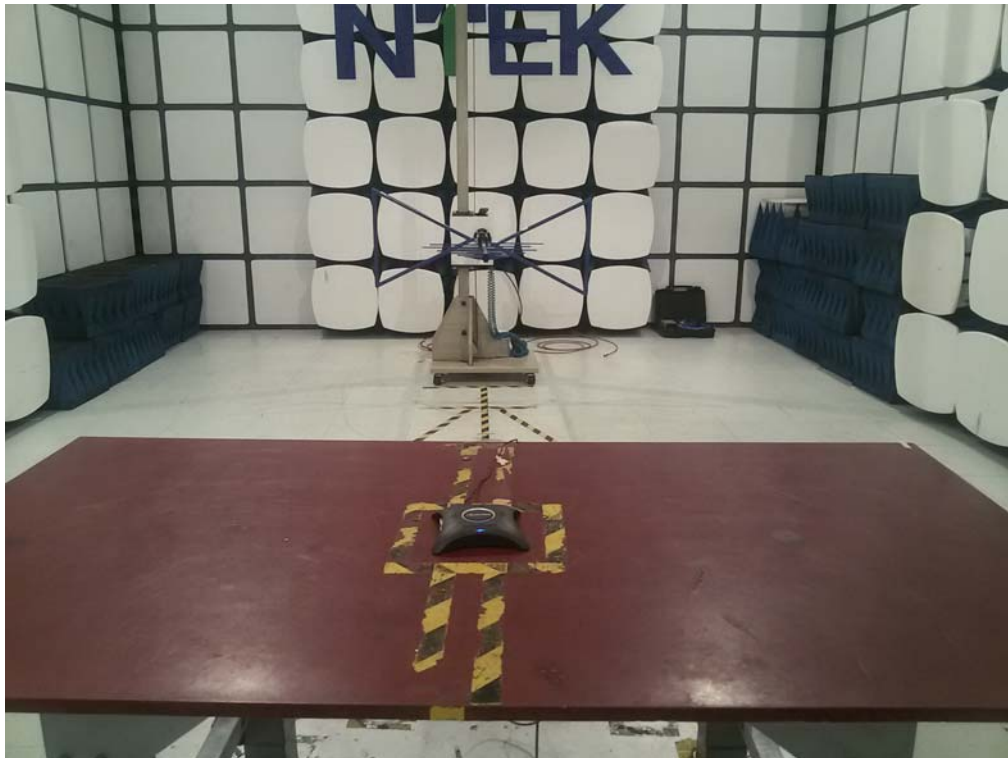
15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

8.2 EUT ANTENNA

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

9. EUT TEST PHOTO

Radiated Measurement Photos



Conducted Measurement Photos

