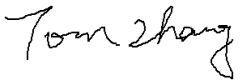
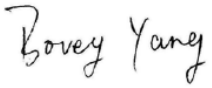
FCC RADIO TEST REPORT

Report Reference No. ..... :	NTEK-2012NT0111065E	
Compiled by (+ signature)	Tom Zhang	
Approved by (+ signature)	Bovey Yang	

Applicant's name ..... :	Great American Merchandise & Events
Address..... :	16043 N.82nd street scottsdale, AZ 85260-1800 USA
Manufacture's Name ..... :	Great American Merchandise & Events
Address..... :	16043 N.82nd street scottsdale, AZ 85260-1800 USA

Test specification:

Standard ..... :	FCC Part15.249
Test procedure ..... :	ANSI C63.4-2003

Test item description

Product name ..... :	ePOOL
FCC ID	**ALT4821**
Trademark ..... :	ePOOL
Model and/or type reference :	4821
Rating(s) ..... :	DC 6V(4*AA)by battery

Testing Laboratory information:

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

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.

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Testing ..... :	
Date of receipt of test item ..... :	01 Jan. 2012
Date (s) of performance of tests ..... :	01 Jan. 2012 ~10 Jan. 2012
Date of Issue..... :	10 Jan. 2012
Test Result..... :	**Pass**

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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15, Subpart C (15.249)			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	Pass	
15.203	Antenna Requirement	Pass	
15.249	Radiated Spurious Emission	Pass	
15.249	Occupied Bandwidth	Pass	

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 FRN Registration Nombre:238937; IC Registration Nombre:9270A-1

1.2 MEASUREMENT UNCERTAINTY

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

No.	Item	Uncertainty
1	Conducted Emission Test	±1.38dB
2	Radiated Emission Test	±3.17dB
3	RF power,conducted	±0.16dB
4	Spurious emissions,conducted	±0.21dB
5	All emissions,radiated(<1G)	±4.68dB
6	All emissions,radiated(>1G)	±4.89dB

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	ePOOL
Trade Name	ePOOL
Model Name	4821
OEM Brand/Model Name	N/A
Product Description	The EUT is a ePOOL Operation Frequency: 2405~2480 MHz Modulation Type: OQPSK (IEEE 802.15.4) Antenna Designation: rod antenna Antenna Gain(Peak) 0 dBi EIRP 98.51dbuv/m@3m
Channel List	Please refer to the Note 2.
Power Source	DC 6V(4*AA)by battery
Connecting I/O Port(s)	Please refer to the User's Manual
Products Covered	N/A
EUT Modification(s)	N/A

Note:

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

2.

Channel	Frequency (MHz)
01	2405
02	2410
03	2415
04	2420
05	2425
06	2430
07	2435
08	2440
09	2445
10	2450
11	2455
12	2460
13	2465
14	2470
15	2475
16	2480

3.

Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	N/A	N/A	rod antenna	NA	0	Antenna

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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	CH1
Mode 2	CH8
Mode 3	CH16

For Conducted Emission	
Final Test Mode	Description
-	“N/A” denotes test is not applicable in this Test Report

For Radiated Emission	
Final Test Mode	Description
Mode 1	CH1
Mode 2	CH8
Mode 3	CH16

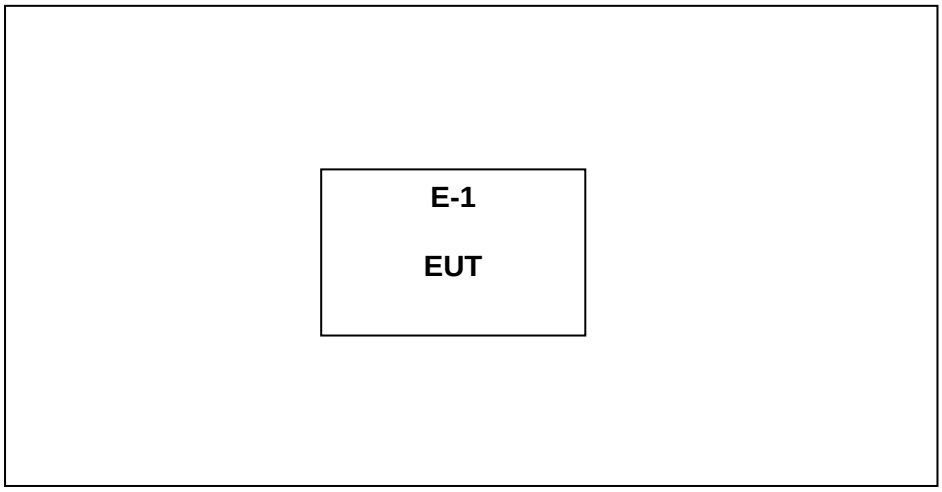
Note:

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

(2) The EUT use new battery.

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiated：



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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	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	ePOOL	ePOOL	4821	N/A	EUT

Item	Shielded Type	Ferrite Core	Length	Note

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.	Calibrated until
1	Spectrum Analyzer	Agilent	E4407B	160400005	Jul. 06. 2012
2	Test Receiver	R&S	ESPI	101318	Jul. 06. 2012
3	Bilog Antenna	TESEQ	CBL6111D	31216	Jul. 06. 2012
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264416	Jul. 06. 2012
5	Spectrum Analyzer	ADVANTEST	R3132	150900201	Jul. 06. 2012
6	Horn Antenna	EM	EM-AH-10180	2011071402	Jul. 06. 2012
7	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	Jul. 06. 2012
8	Amplifier	EM	EM-30180	060538	Jul. 06. 2012
9	Loop Antenna	ARA	PLA-1030/B	1029	Jul. 06. 2012
10	Power Meter	R&S	NRVS	100696	Jul. 06. 2012

Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Test Receiver	R&S	ESCI	101160	Jul. 06. 2012
2	LISN	R&S	ENV216	101313	Jul. 06. 2012
3	LISN	EMCO	3816/2	00042990	Jul. 06. 2012
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	Jul. 06. 2012
5	Passive Voltage Probe	R&S	ESH2-Z3	100196	Jul. 06. 2012
6	Absorbing clamp	R&S	MOS-21	100423	Jul. 06. 2012

3. TEST RESULT

3.1 ANTENNA REQUIREMENT

3.1.1 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.

3.1.2 EUT ANTENNA

The EUT antenna is integral Antenna. It comply with the standard requirement.

3.2 CONDUCTED EMISSION MEASUREMENT

3.2.1 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			66 - 56 *	56 - 46 *	CISPR
0.50 -5.0			56.00	46.00	CISPR
5.0 -30.0			60.00	50.00	CISPR

0.15 -0.5			66 - 56 *	56 - 46 *	LP002.
0.50 -5.0			56.00	46.00	LP002.
5.0 -30.0			60.00	50.00	LP002.

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

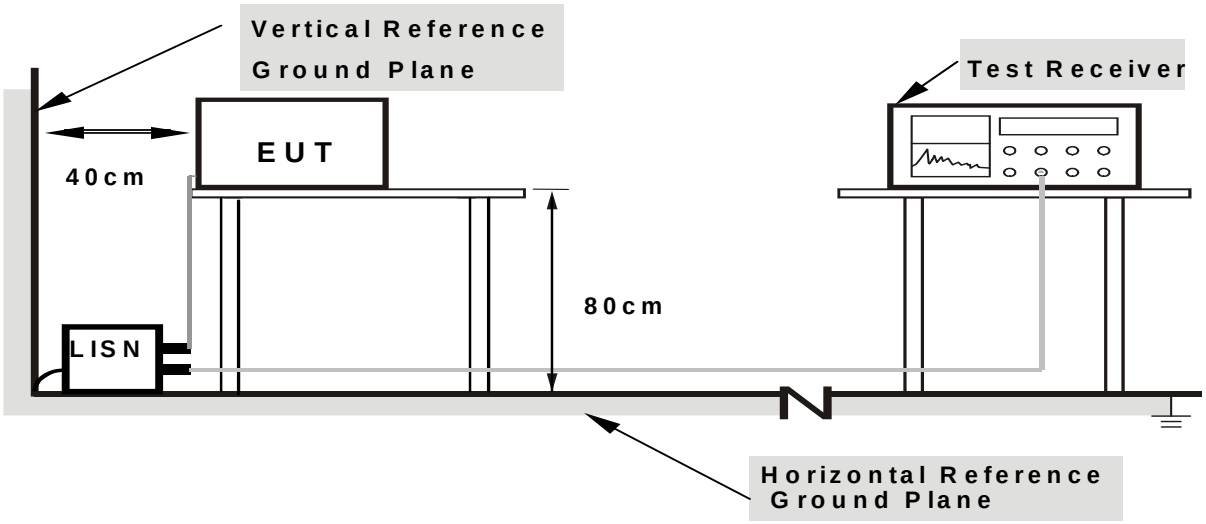
3.2.2 TEST PROCEDURE

a. The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.2.3 DEVIATION FROM TEST STANDARD

No deviation

3.2.4 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

3.2.5 TEST RESULT

N/A

3.3 RADIATED EMISSION MEASUREMENT

3.3.1 Radiated Emission Limits (FCC 15.209)

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

Note:

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

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

LIMITS OF RADIATED EMISSION MEASUREMENT (FCC 15.249)

Frequency of Emission (MHz)	Field Strength of fundamental ((millivolts /meter)	Field Strength of Harmonics (microvolts/meter)
2400 - 2483.5	50	500

Notes:

(1) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

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

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

3.3.2 TEST PROCEDURE

a. 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.
b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3m meter open area test site. 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; the height of the test antenna shall vary between 1 m to 4 m.
d. 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.
e. 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.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

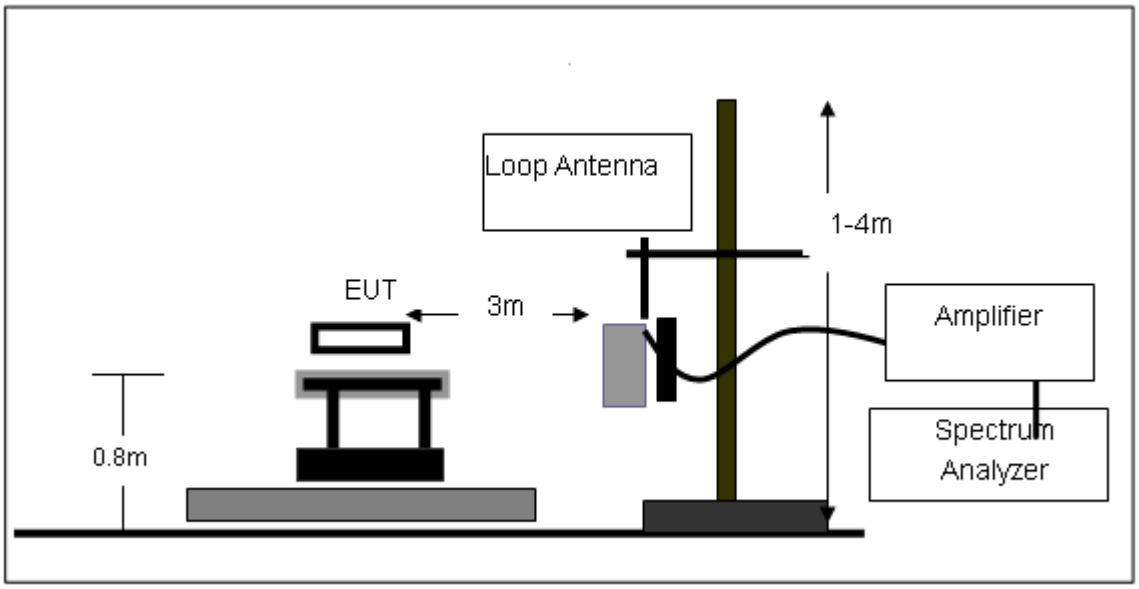
Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

3.3.3 DEVIATION FROM TEST STANDARD

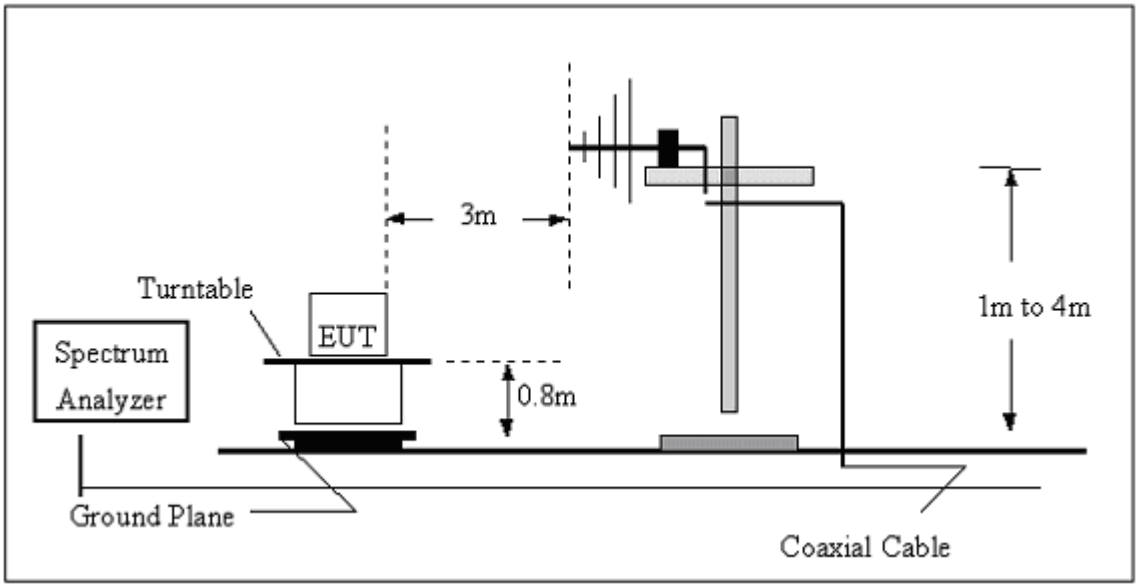
No deviation

3.3.4 TEST SETUP

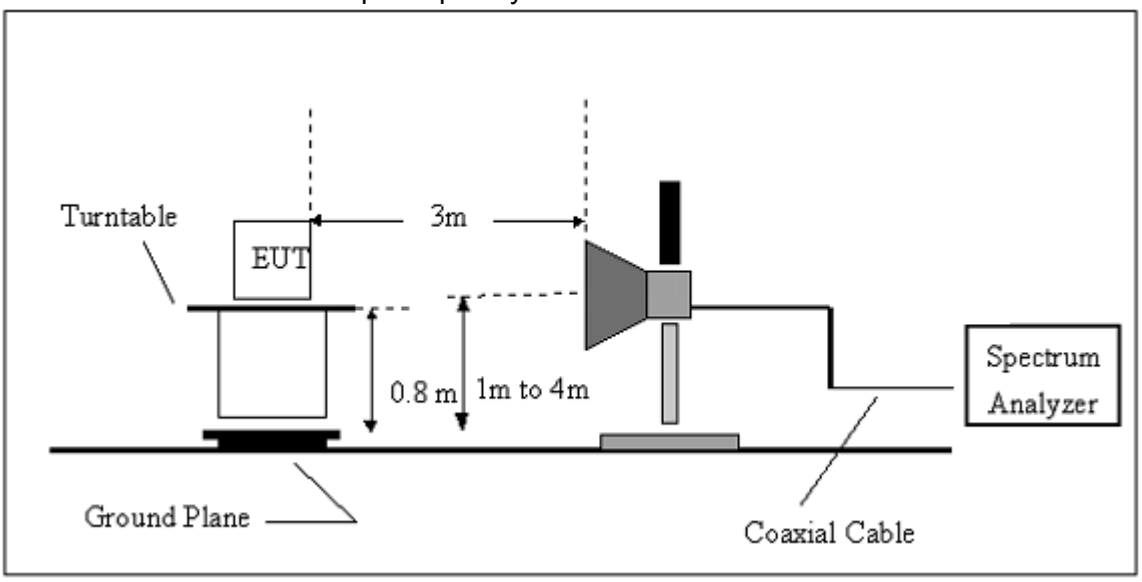
（A）Radiated Emission Test-Up Frequency Below 30MHz



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



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



3.3.5 TEST RESULTS (BLOW 30MHz)

EUT：	ePOOL	Model Name. ：	4821
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC6.0V by battery
Test Mode ：	TX	Polarization :	--

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

NOTE:

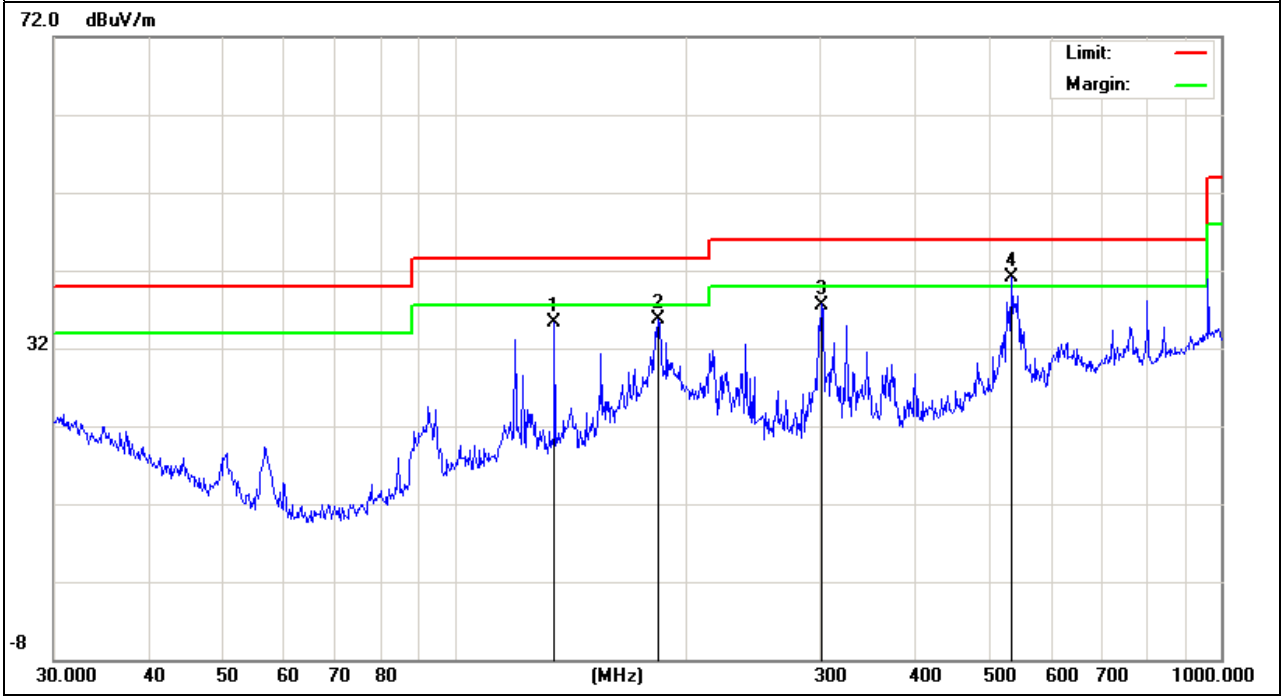
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
Distance extrapolation factor =20 log (specific distance/test distance)(dB);
Limit line = specific limits(dBuv) + distance extrapolation factor.

3.3.6 TEST RESULTS (BETWEEN 30 – 1000 MHZ)

EUT：	ePOOL	Model Name ：	4821
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date：	2012-1-8
Test Mode ：	TX	Polarization：	Horizontal
Test Power ：	DC 6.0V		

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
135.0319	23.23	11.99	35.22	43.5	-8.28	Quasi-Peak
184.4898	26.41	9.39	35.8	43.5	-7.7	Quasi-Peak
301.4223	23.02	14.58	37.6	46	-8.4	Quasi-Peak
533.8318	21.18	19.92	41.1	46	-4.9	Quasi-Peak

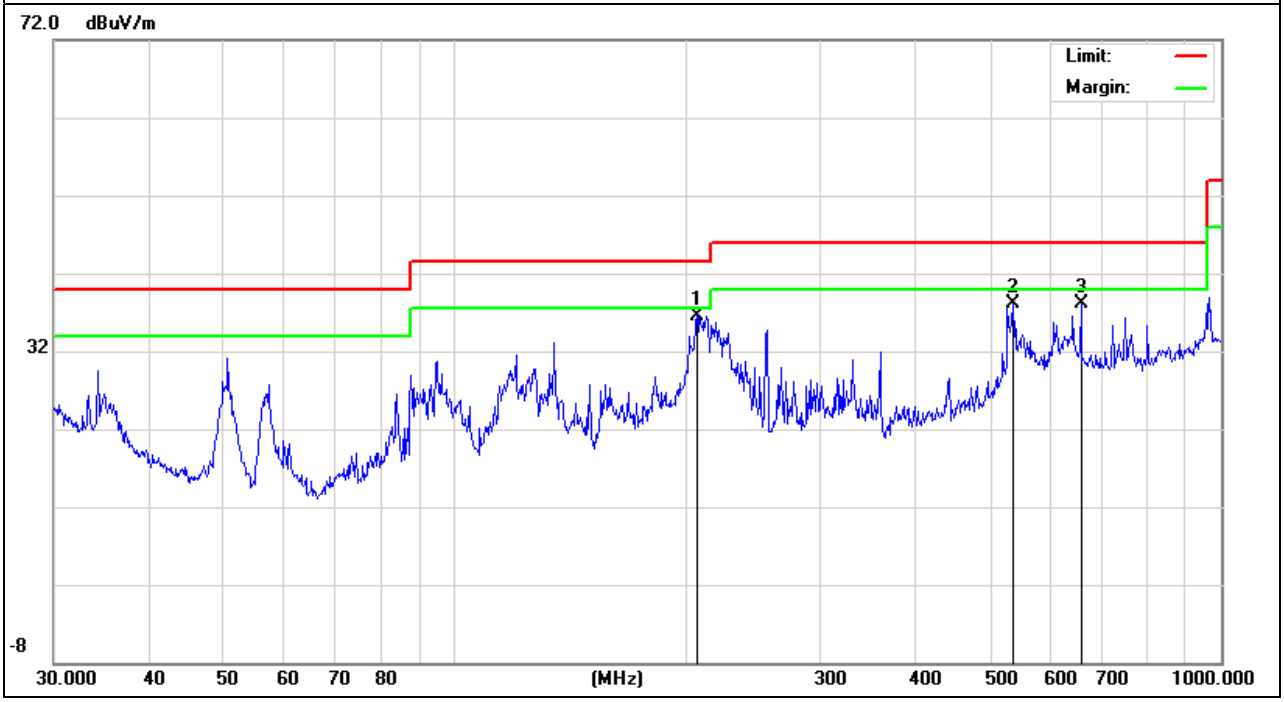
Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	ePOOL	Model Name ：	4821
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date：	2012-1-8
Test Mode ：	TX	Polarization：	Vertical
Test Power ：	DC 6.0V		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
207.1226	27.53	9.07	36.6	43.5	-6.9	Quasi-Peak
535.7073	18.01	20.09	38.1	46	-7.9	Quasi-Peak
656.5298	16.3	21.79	38.09	46	-7.91	Quasi-Peak

Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

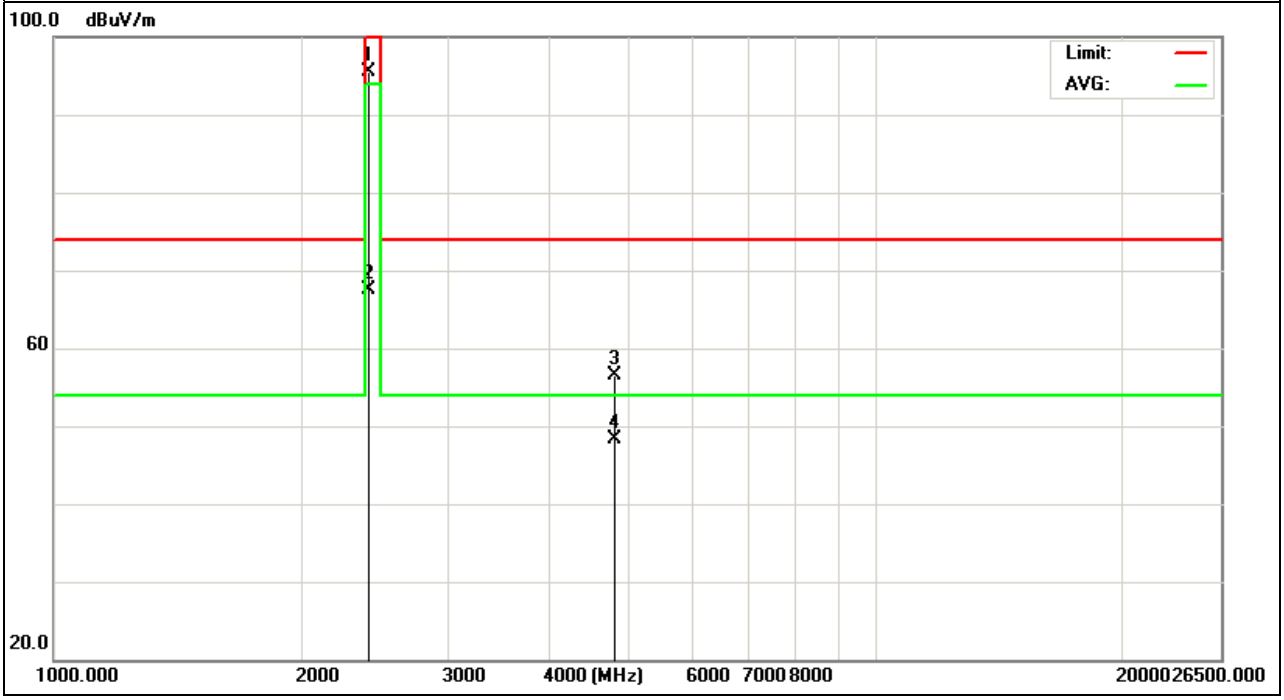


3.3.7 TEST RESULTS (ABOVE 1000 MHZ)

EUT：	ePOOL	Model Name ：	4821
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date：	2012-1-8
Test Mode ：	TX 2405MHz	Polarization：	Horizontal
Test Power ：	DC 6.0V		

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2405	109.97	-17.46	98.51	114.0 0	-15.49	peak
2405	84.91	-17.46	67.45	94	-26.55	AVG
4810	64.76	-8.16	56.6	74	-17.4	peak
4810	56.41	-8.16	48.25	54	-5.75	AVG

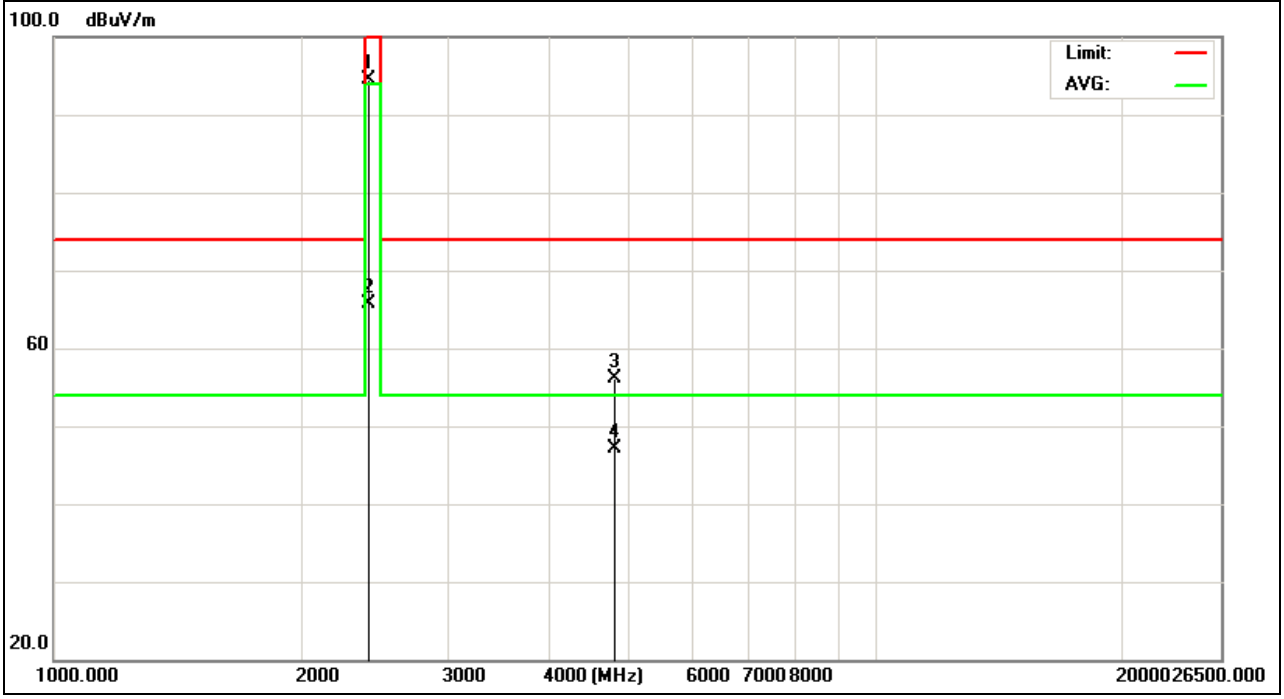
Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	ePOOL	Model Name ：	4821
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date：	2012-1-8
Test Mode ：	TX 2405MHz	Polarization：	Vertical
Test Power ：	DC 6.0V		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2405	111.91	-17.46	94.45	114.0 0	-19.55	peak
2405	83.12	-17.46	65.66	94	-28.34	AVG
4810	64.19	-8.16	56.03	74	-17.97	peak
4810	55.23	-8.16	47.07	54	-6.93	AVG

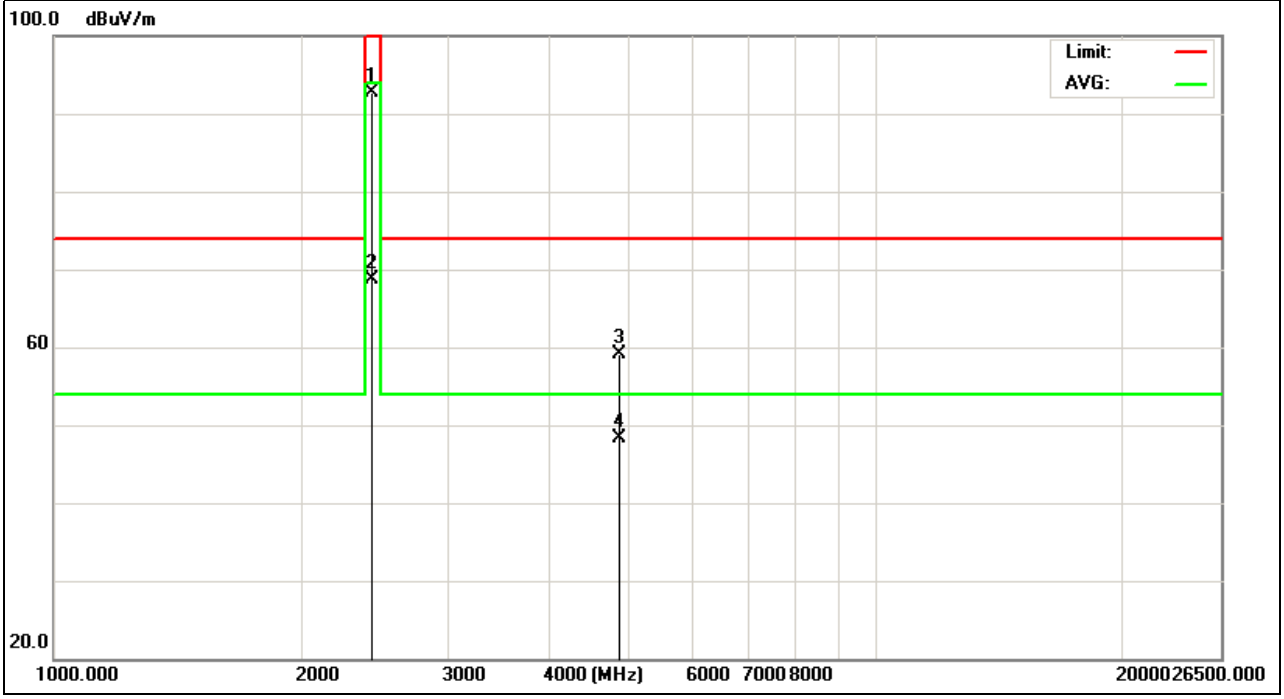
Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	ePOOL	Model Name ：	4821
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date：	2012-1-8
Test Mode ：	TX 2440MHz	Polarization：	Horizontal
Test Power ：	DC 6.0V		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2440	106.12	-17.45	96.67	114.0 0	-17.33	peak
2440	86.21	-17.45	68.76	94	-25.24	AVG
4880	67.21	-8.2	59.01	74	-14.99	peak
4880	56.41	-8.2	48.21	54	-5.79	AVG

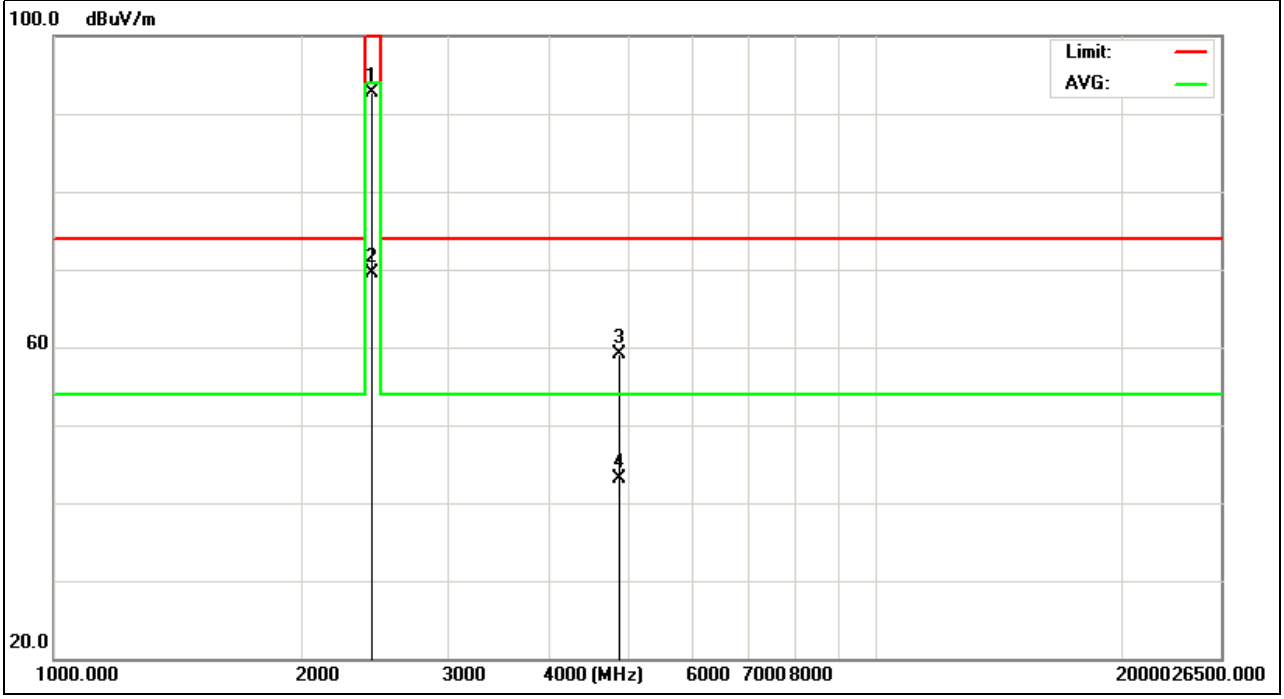
Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	ePOOL	Model Name ：	4821
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date：	2012-1-8
Test Mode ：	TX 2440MHz	Polarization：	Vertical
Test Power ：	DC 6.0V		

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2440	110.21	-17.45	92.76	114.0 0	-21.24	peak
2440	86.9	-17.45	69.45	94	-24.55	AVG
4880	67.33	-8.2	59.13	74	-14.87	peak
4880	51.23	-8.2	43.03	54	-10.97	AVG

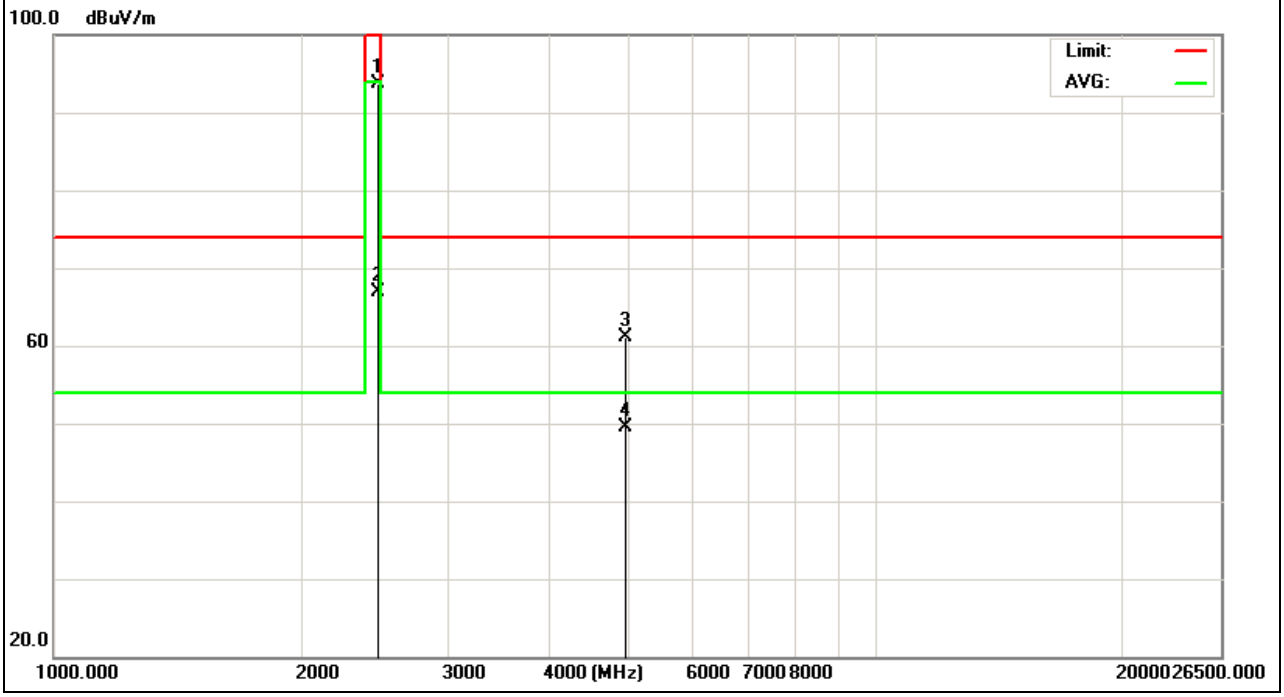
Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	ePOOL	Model Name ：	4821
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date：	2012-1-8
Test Mode ：	TX 2480MHz	Polarization：	Horizontal
Test Power ：	DC 6.0V		

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2480	107.09	-17.36	97.73	114	-16.27	peak
2480	84.23	-17.36	66.87	94	-27.13	AVG
4960	69.24	-8.13	61.11	74	-12.89	peak
4960	57.67	-8.13	49.54	54	-4.46	AVG

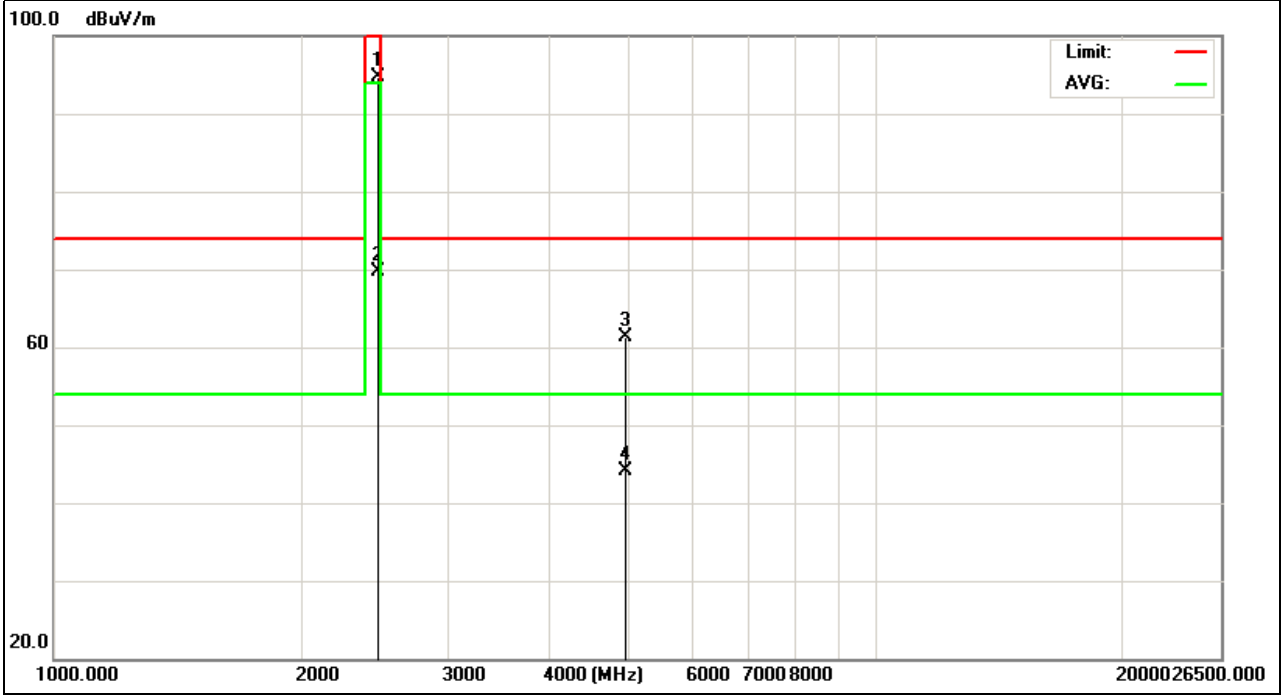
Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	ePOOL	Model Name ：	4821
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date：	2012-1-8
Test Mode ：	TX 2480MHz	Polarization：	Vertical
Test Power ：	DC 6.0V		

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2480	112.08	-17.36	94.72	114.0 0	-19.28	peak
2480	87.12	-17.36	69.76	94	-24.24	AVG
4960	69.45	-8.13	61.32	74	-12.68	peak
4960	52.21	-8.13	44.08	54	-9.92	AVG

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

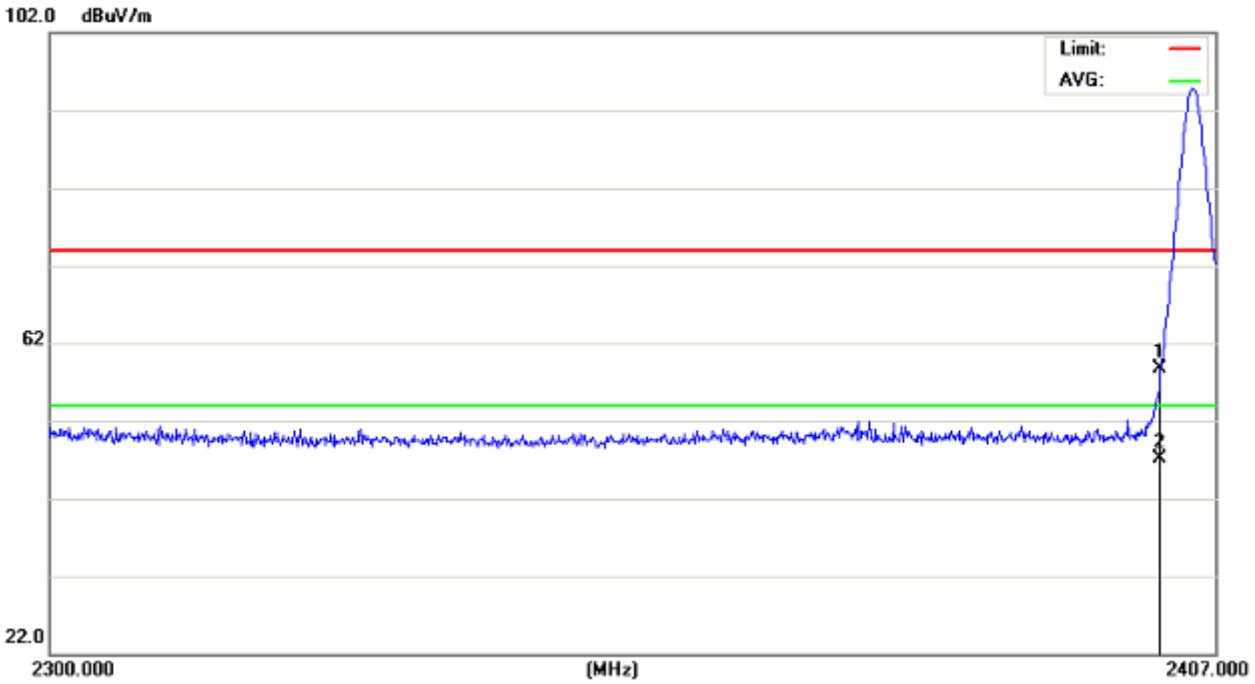


Band Edge Emission:

EUT：	ePOOL	Model Name ：	4821
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date：	2012-1-8
Test Mode ：	TX 2405MHz	Polarization：	Vertical
Test Power ：	DC 6.0V		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2400	23.7	35	58.7	74	-15.3	peak
2400	12.18	35	47.18	54	-6.82	AVG

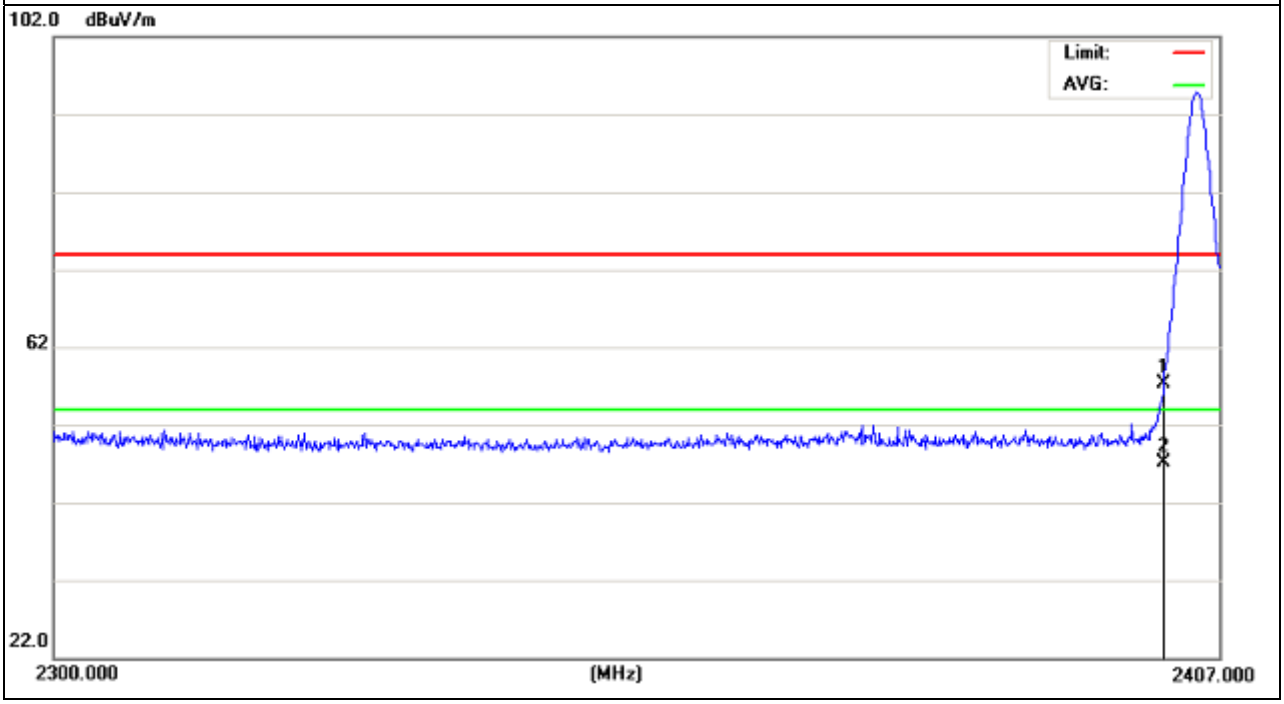
Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	ePOOL	Model Name ：	4821
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date：	2012-1-8
Test Mode ：	TX 2405MHz	Polarization：	Horizontal
Test Power ：	DC 6.0V		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2405	22.35	35	57.35	74	-16.65	peak
2405	12.09	35	47.09	54	-6.91	AVG

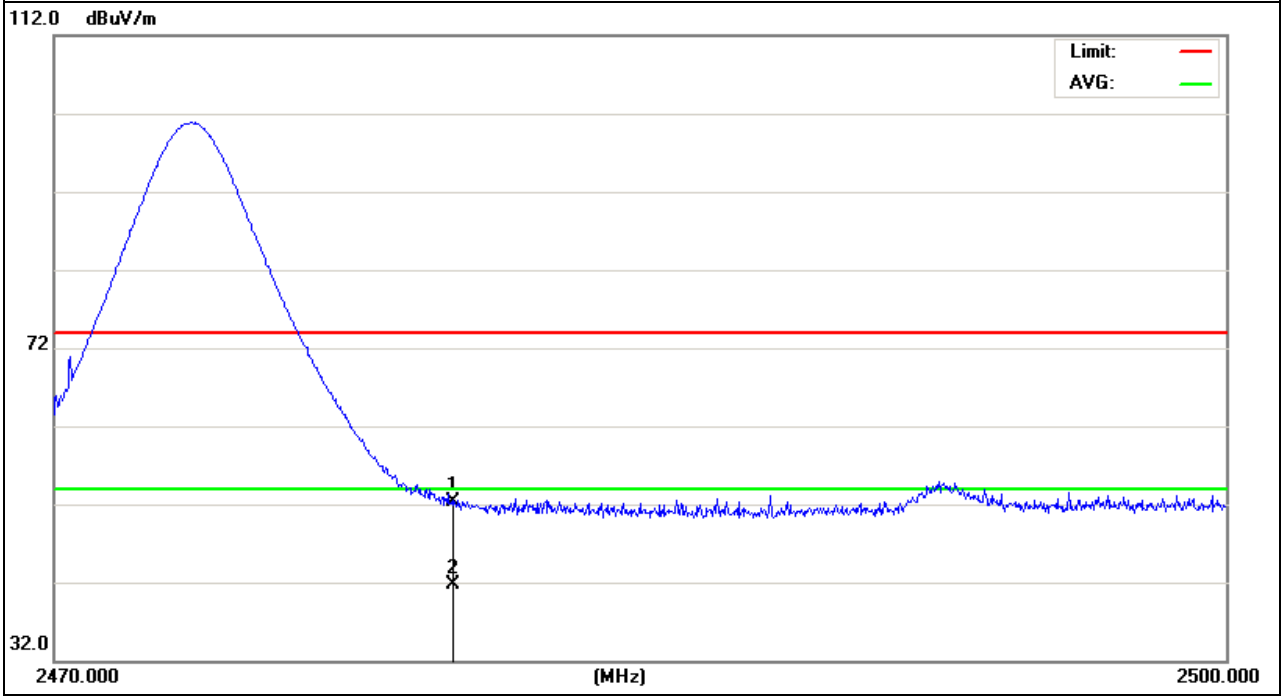
Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	ePOOL	Model Name ：	4821
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date：	2012-1-8
Test Mode ：	TX 2480MHz	Polarization：	Vertical
Test Power ：	DC 6.0V		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.5	17.09	35.25	52.34	74	-21.66	peak
2483.5	6.48	35.25	41.73	54	-12.27	AVG

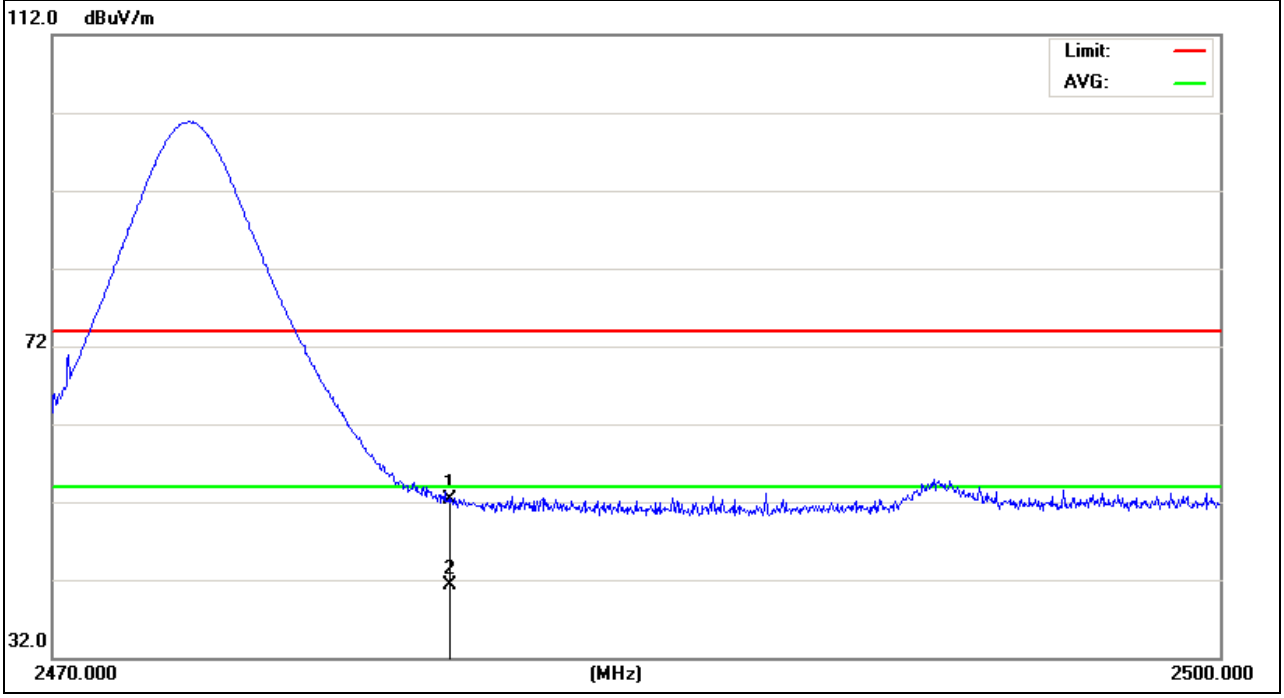
Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	ePOOL	Model Name ：	4821
Temperature：	24 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date：	2012-1-8
Test Mode ：	TX 2480MHz	Polarization：	Horizontal
Test Power ：	DC 6.0V		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.5	17.15	35.25	52.4	74	-21.6	peak
2483.5	5.98	35.25	41.23	54	-12.77	AVG

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.



4. BANDWIDTH TEST

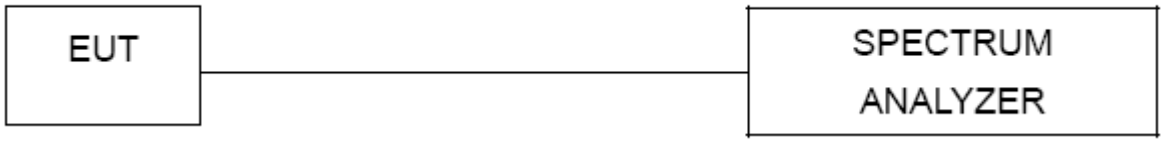
4.1 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
b. Spectrum Setting : RBW= 100KHz, VBW≧RBW, Sweep time = Auto.

4.2 DEVIATION FROM STANDARD

No deviation.

4.3 TEST SETUP

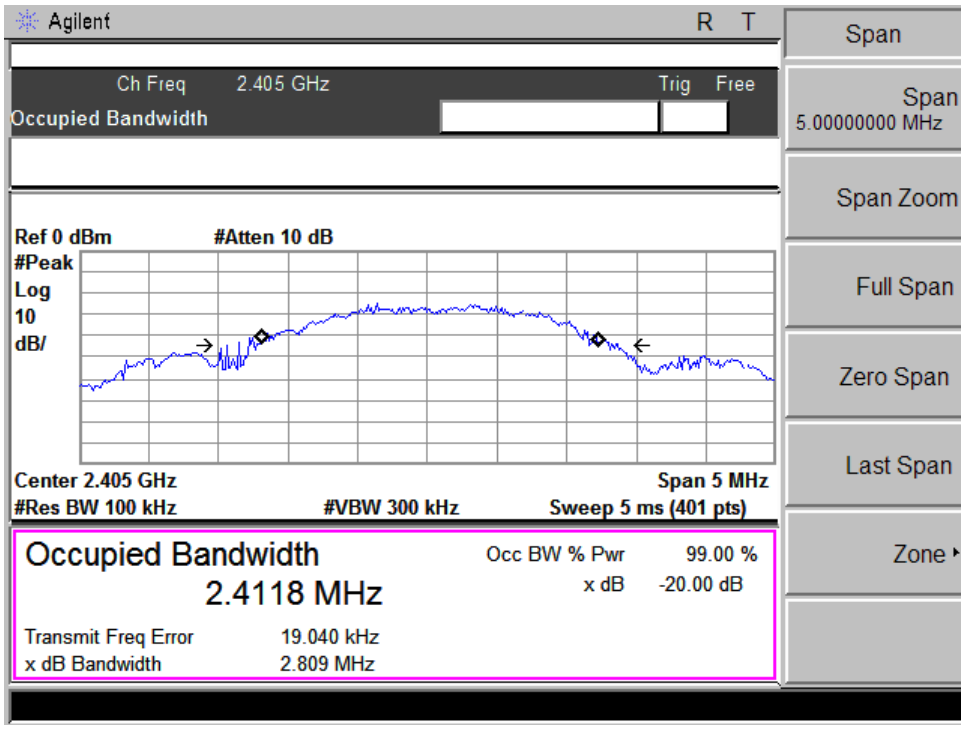


4.4 TEST RESULTS

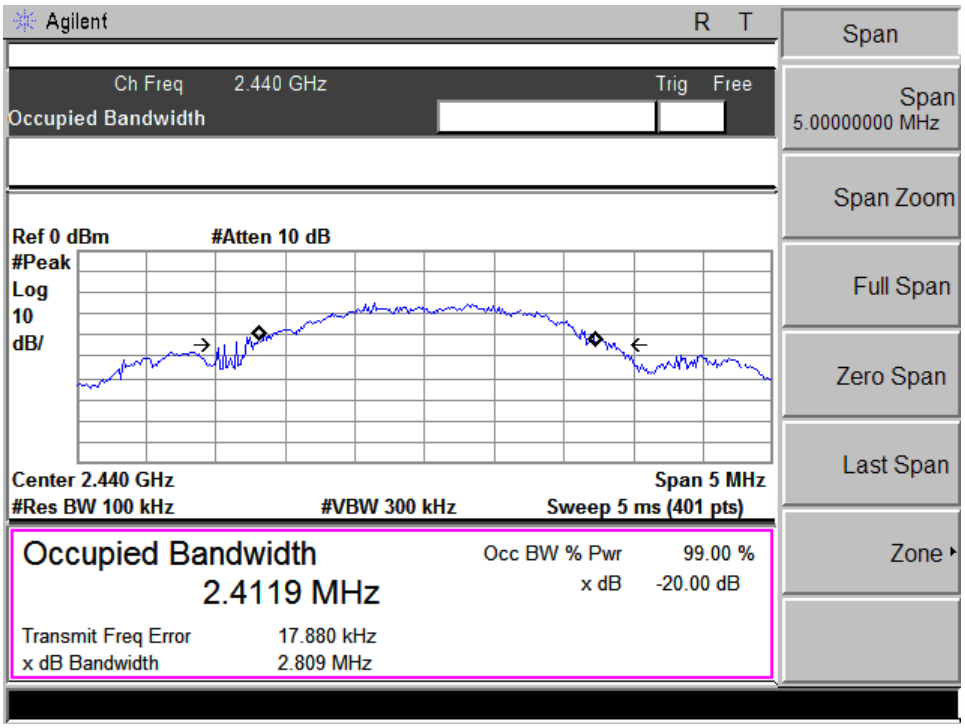
EUT：	ePOOL	Model Name ：	4821
Temperature：	26 ℃	Relative Humidity：	53%
Pressure：	1020 hPa	Test Power ：	DC 6.0V
Test Mode ：	TX CH 1/8/16		

Test Channel	Frequency (MHz)	20 dBc Bandwidth (MHz)	99% Bandwidth (MHz)
CH01	2405	2.80	2.41
CH08	2440	2.80	2.41
CH16	2480	2.80	2.41

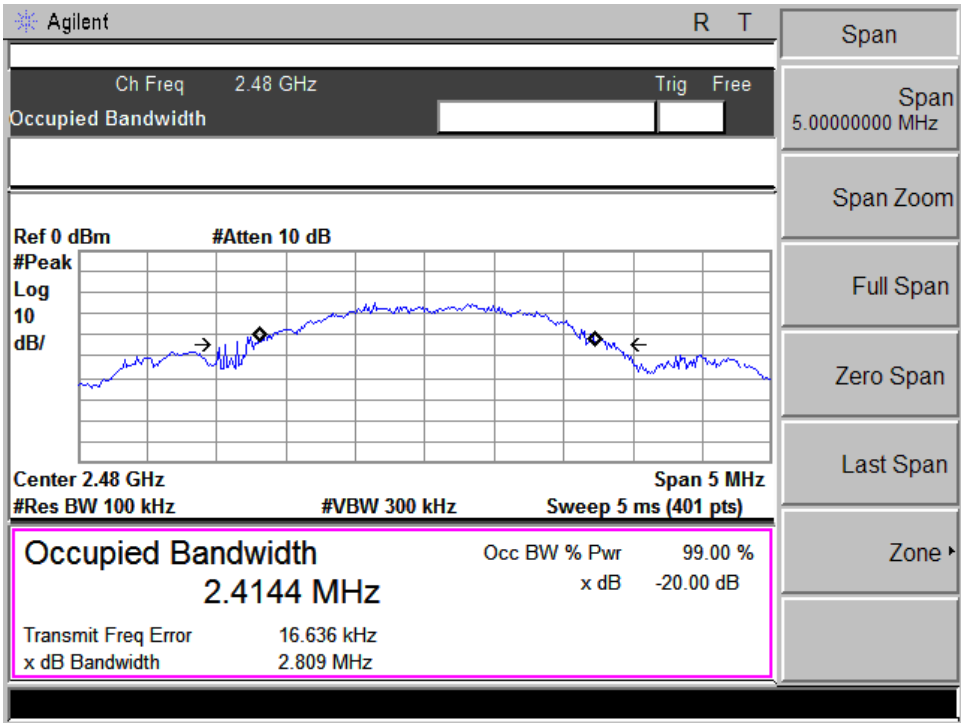
The Lowest Channel:2405MHz



The Middle Channel: 2440GHz



The High Channel:2480MHz



5. EUT TEST PHOTO

Radiated Measurement Photos