



# FCC Radio Test Report

## FCC ID: SGPM618002

This report concerns (check one):  Original Grant  Class II Change

**Issued Date** : Feb. 28, 2014  
**Project No.** : 1207C053A  
**Equipment** : Wireless Mouse  
**Model Name** : M618GL  
**Applicant** : Shenzhen Delux Industry Co., Ltd.  
**Address** : Delux Industrial Park ,lan zhu road,ping shan street,long gang borough, Shenzhen

**Tested by:** Neutron Engineering Inc. EMC Laboratory

**Date of Receipt:** Feb. 17, 2014

**Date of Test:** Feb. 17, 2014~ Feb. 27, 2014

**Testing Engineer** : David Mao  
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### **Declaration**

**Neutron** represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with the standards traceable to National Measurement Laboratory (**NML**) of **R.O.C.**, or National Institute of Standards and Technology (**NIST**) of **U.S.A.**

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### **Limitation**

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.



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**REPORT ISSUED HISTORY**

Issued No.	Description	Issued Date
NEI-FCCP-1-1207C053A	Original Issue.	Feb. 28, 2014



## 1. CERTIFICATION

Equipment : Wireless Mouse  
Brand Name : DELUX  
Model Name : M618GL  
Applicant : Shenzhen Delux Industry Co., Ltd.  
Manufacturer : Shenzhen Delux Industry Co., Ltd.  
Address : Delux Industrial Park ,lan zhu road,ping shan street,long gang borough,  
Shenzhen  
Factory : Shenzhen Delux Industry Co., Ltd.  
Address : Delux Industrial Park ,lan zhu road,ping shan street,long gang borough,  
Shenzhen  
Date of Test : Feb. 17, 2014~ Feb. 27, 2014  
Test Sample : Engineering Sample  
Standard(s) : FCC Part15, Subpart C(15.249)/ ANSI C63.4-2009

The above equipment has been tested and found compliance with the requirement of the relative standards by Neutron Engineering Inc. EMC Laboratory.

The test data, data evaluation, and equipment configuration contained in our test report (Ref No. NEI-FCCP-1-1207C053A) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of TAF according to the ISO-17025 quality assessment standard and technical standard(s).



## 2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

FCC Part15, Subpart C (15.249)			
StandardSection	Test Item	Judgment	Remark
FCC			
15.207	Conducted Emission	N/A	Note (1)
15.209 15.249	Radiated Spurious Emission	PASS	

**NOTE:**

- (1) "N/A" denotes test is not applicable in this test report.
- (2) The EUT used new battery.



**2.1 TEST FACILITY**

The test facilities used to collect the test data in this report is **DG-CB03** at the location of No.3,Jinshagang 1st Road, ShiXia, Dalang Town,Dong Guan, China.523792  
 Neutron's test firm number for FCC: 319330

**2.2 MEASUREMENT UNCERTAINTY**

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

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 %.

A. Conducted Measurement :

Test Site	Method	Measurement Frequency Range	U,(dB)	NOTE
DG-C02	CISPR	150 KHz ~ 30MHz	1.94	

B. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	Ant. H / V	U,(dB)	NOTE
DG-CB03	CISPR	9KHz~30MHz	V	3.79	
		9KHz~30MHz	H	3.57	
		30MHz ~ 200MHz	V	3.82	
		30MHz ~ 200MHz	H	3.60	
		200MHz ~ 1,000MHz	V	3.86	
		200MHz ~ 1,000MHz	H	3.94	
		1GHz~18GHz	V	3.12	
		1GHz~18GHz	H	3.68	
		18GHz~40GHz	V	4.15	
		18GHz~40GHz	H	4.14	





**3. GENERAL INFORMATION**

**3.1 GENERAL DESCRIPTION OF EUT**

Equipment	Wireless Mouse		
Brand Name	DELUX		
Model Name	M618GL		
Model Difference	N/A		
Product Description	Operation Frequency	2403~2478 MHz	
	Modulation Technology	GFSK(1Mbps)	
	Data rate		
	Field Strength	77.98dBuV/m (AV Max.)	
Power Source	Supplied from 2*AAA battery.		
Power Rating	DC 3V		
Connecting I/O Port(s)	Please refer to the User's Manual		

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
- 2.

Frequency Channel							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
<b>01</b>	<b>2403</b>	06	2415	11	2445	16	2466
02	2404	07	2416	<b>12</b>	<b>2453</b>	17	2474
03	2405	08	2424	13	2456	18	2475
04	2406	09	2436	14	2464	19	2476
05	2413	10	2444	15	2465	<b>20</b>	<b>2478</b>

Hopping Channel List			
Group 1	Group 2	Group 3	Group 4
2403	2404	2405	2406
2478	2474	2475	2476
2453	2444	2445	2436
2413	2424	2415	2456
2466	2464	2465	2416



3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	Printed	N/A	3.96



**3.2 DESCRIPTION OF TEST MODES**

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based 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	Low – 2403MHz
Mode 2	Middle – 2453MHz
Mode 3	High -2478MHz

For Conducted Test	
Final Test Mode	Description
-	"N/A" denotes test is not applicable in this test report.

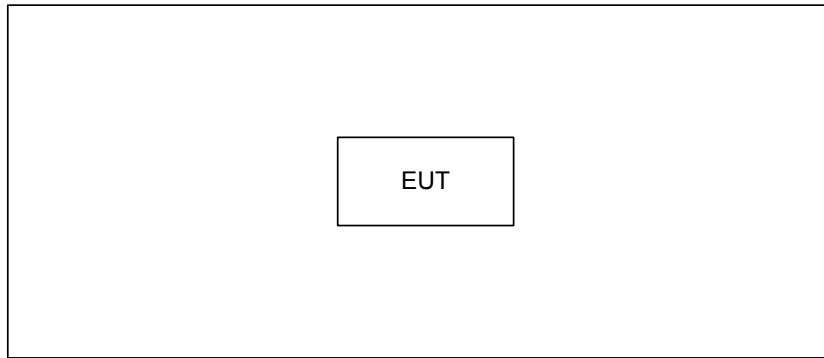
For Radiated Test	
Final Test Mode	Description
Mode 1	Low – 2403MHz
Mode 2	Middle – 2453MHz
Mode 3	High -2478MHz

Note:

(1) The measurements are performed at the high, middle, low available channels.



**3.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED**



**3.4 DESCRIPTION OF SUPPORT UNITS**

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/IC	Series No.	Note
-	-	-	-	-	-	

Item	Shielded Type	Ferrite Core	Length	Note
-	-	-	-	



**4. EMC EMISSION TEST**

**4.1 CONDUCTED EMISSION MEASUREMENT**

**4.1.1 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
0.50 -5.0	73.00	60.00	56.00	46.00	FCC
5.0 -30.0	73.00	60.00	60.00	50.00	FCC

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

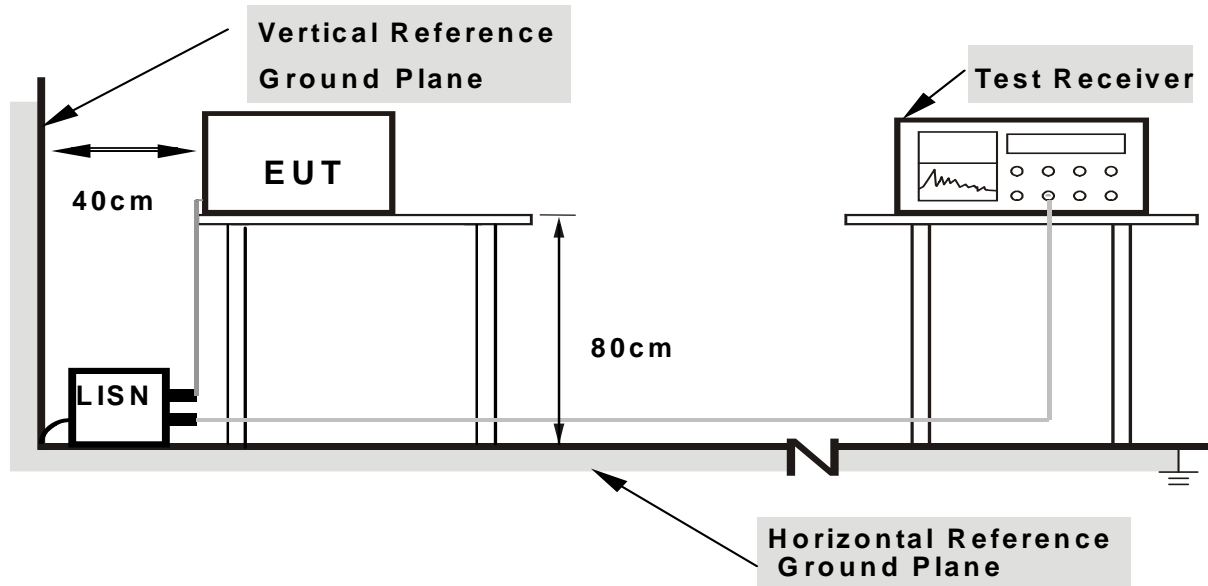
**4.1.2 TEST PROCEDURE**

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

**4.1.3 DEVIATION FROM TEST STANDARD**

No deviation

#### 4.1.4 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**

#### 4.1.5 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.

The EUT was programmed to be in continuously transmitting mode.

#### 4.1.6 EUT TEST CONDITIONS

Temperature: 25°C

Relative Humidity: 55%

Test Voltage: DC 3V

#### 4.1.7 TEST RESULTS

Remark:

- (1) All readings are QP Mode value unless otherwise stated AVG in column of "Note". If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform in this case, a "\*" marked in AVG Mode column of Interference Voltage Measured.
- (2) Measuring frequency range from 150KHz to 30MHz.
- (3) "N/A" denotes test is not applicable in this test report.

Test Mode:	N/A
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**4.2 RADIATED EMISSION MEASUREMENT**

**4.2.1 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
960~1000	500	3

Harmonic emissions limits comply with below 54 dBuV/m at 3m. Other 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 comply with the radiated emissions limits specified in section 15.209(a) limit in the table below has to be followed.

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 15.209 )**

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

Notes:

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

**LIMITS OF RADIATED EMISSION MEASUREMENT (FCC Part 15.249)**

FCC Part15 (15.249) , Subpart C	
Limit	Frequency Range (MHz)
Field strength of fundamental 50000 μV/m (94 dBμV/m) @ 3 m	2400-2483.5
Field strength of harmonics 500 μV/m (54 dBμV/m) @ 3 m	Above 2483.5



Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~90kHz for PK/AVG detector
Start ~ Stop Frequency	90kHz~110kHz for QP detector
Start ~ Stop Frequency	110kHz~490kHz for PK/AVG detector
Start ~ Stop Frequency	490kHz~30MHz for QP detector
Start ~ Stop Frequency	30MHz~1000MHz for QP detector

**4.2.2 TEST PROCEDURE**

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1GHz)
- 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. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- 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 AV 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.

**4.2.3 DEVIATION FROM TEST STANDARD**

No deviation





# Neutron Engineering Inc.

Duty cycle: TX 2403MHz

$$\text{Duty cycle} = T_{\text{ON}} / (T_{\text{ON}} + T_{\text{OFF}})$$

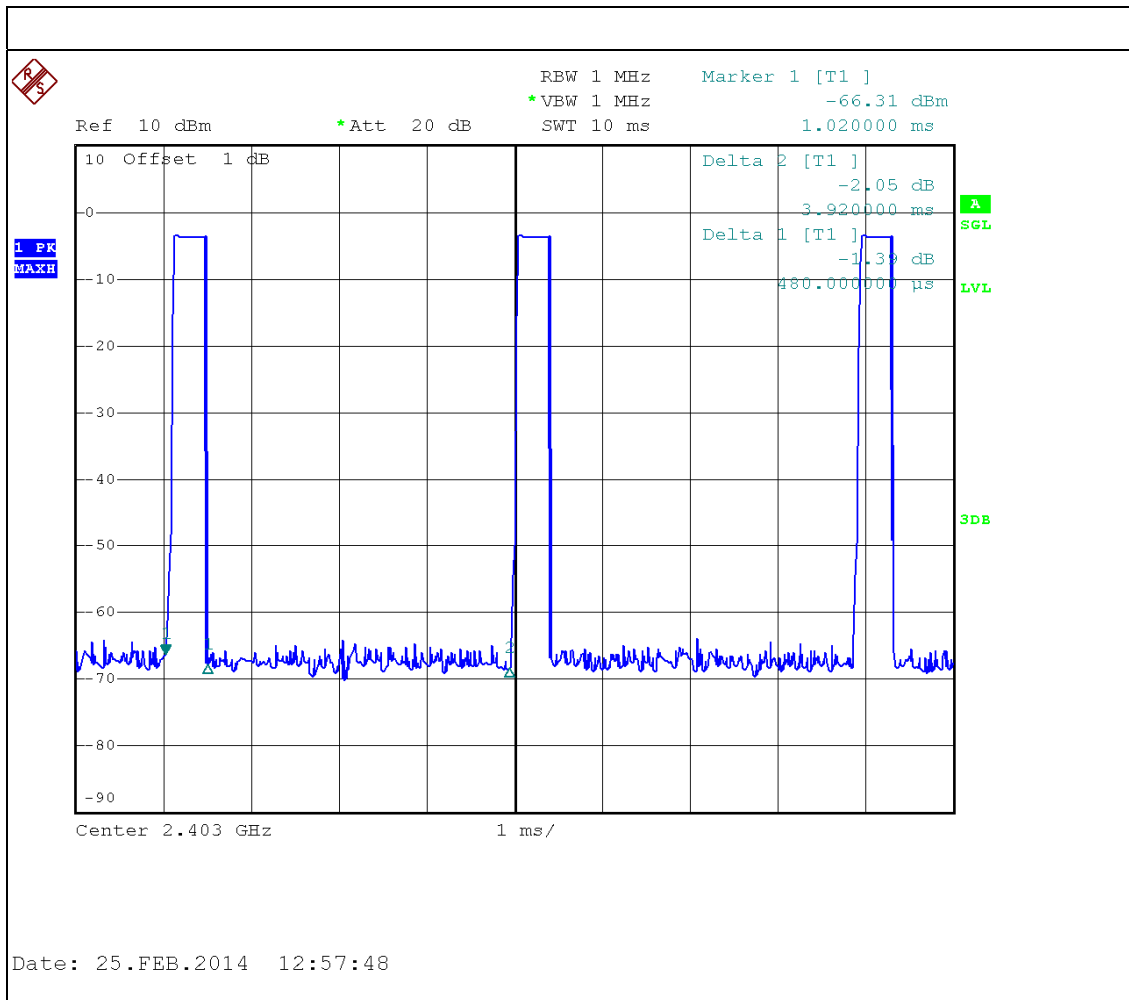
$T_{\text{ON}}$ : 0.48ms

$T_{\text{ON}} + T_{\text{OFF}}$ : (total time):3.92ms

Duty cycle: 12%

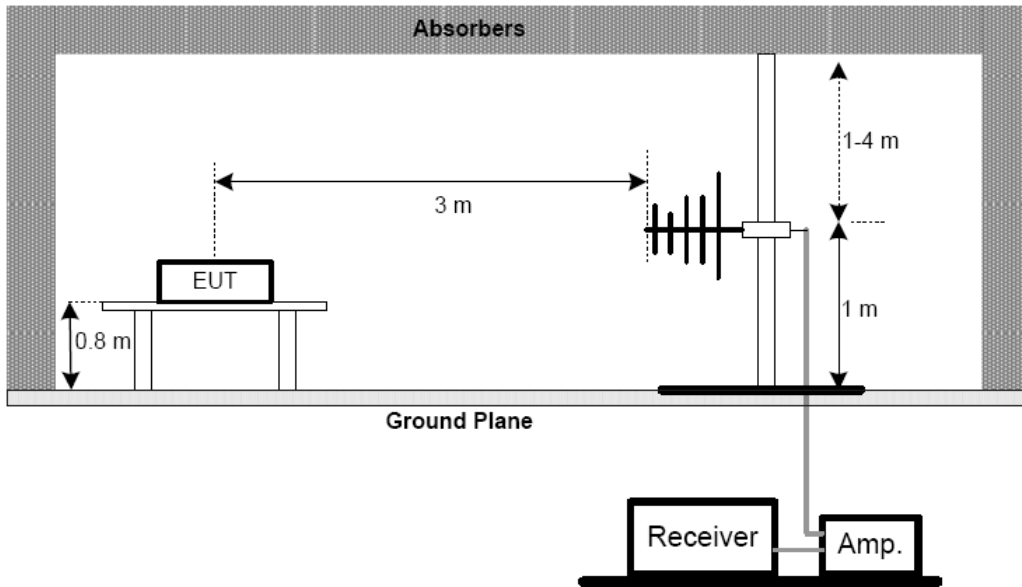
$$\text{AV} = \text{PK} + 20 \log(\text{Duty cycle})$$

$$\text{AV} = \text{PK} - 18.24$$

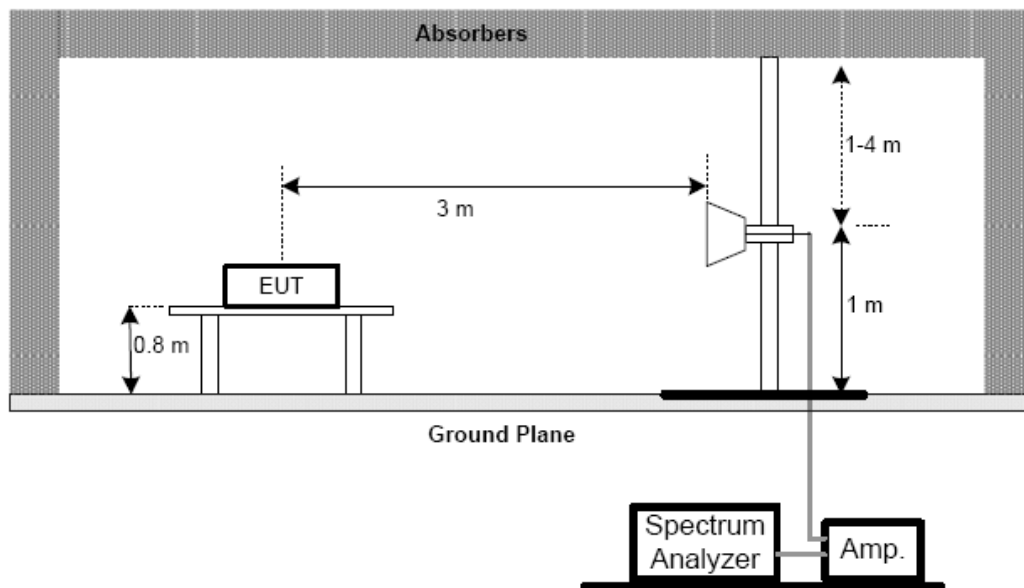


4.2.4 TEST SETUP

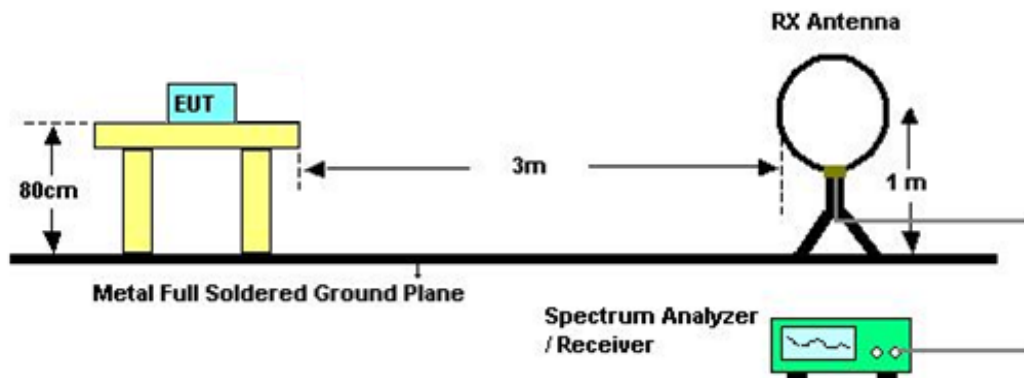
(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



(B) Radiated Emission Test Set-Up Frequency Above 1 GHz



(C) For radiated emissions below 30MHz



#### 4.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

#### 4.2.6 EUT TEST CONDITIONS

Temperature: 25°C

Relative Humidity: 55%

Test Voltage: DC 3V



4.2.7 TEST RESULTS (BELOW 30MHz)

Test Mode:	TX 2403MHz
------------	------------

Freq. (MHz)	Ant. 0°/90°	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
0.0094	0°	17.53	24.30	41.83	128.12	-86.29	AVG
0.0094	0°	19.72	24.30	44.02	148.12	-104.10	PK
0.0135	0°	18.15	24.30	42.45	125.00	-82.55	AVG
0.0137	0°	20.40	24.30	44.70	145.00	-100.30	PK
0.0245	0°	17.46	24.02	41.48	119.82	-78.35	AVG
0.0246	0°	20.08	24.02	44.10	139.82	-95.73	PK
0.0327	0°	18.13	23.50	41.63	117.31	-75.69	AVG
0.0328	0°	20.55	23.50	44.05	137.31	-93.27	PK
0.4250	0°	18.72	19.98	38.70	95.04	-56.34	AVG
0.4260	0°	21.15	19.98	41.13	115.04	-73.91	PK
1.5260	0°	18.95	19.55	38.50	63.93	-25.44	QP

Freq. (MHz)	Ant. 0°/90°	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
0.0094	90°	18.51	24.30	42.81	128.19	-85.38	AVG
0.0094	90°	20.23	24.30	44.53	148.19	-103.66	PK
0.0236	90°	17.55	24.07	41.62	120.15	-78.52	AVG
0.0237	90°	20.33	24.07	44.40	140.15	-95.74	PK
0.0316	90°	18.43	23.57	42.00	117.61	-75.62	AVG
0.0318	90°	20.67	23.57	44.24	137.61	-93.38	PK
0.0427	90°	17.85	22.86	40.71	115.00	-74.28	AVG
0.0429	90°	20.39	22.86	43.25	135.00	-91.74	PK
0.2370	90°	17.45	20.43	37.88	100.11	-62.23	AVG
0.2390	90°	20.72	20.43	41.15	120.11	-78.96	PK
1.6760	90°	18.63	19.53	38.16	63.12	-24.96	QP

Remark :

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



#### 4.2.8 TEST RESULTS (BETWEEN 30 – 1000 MHz)

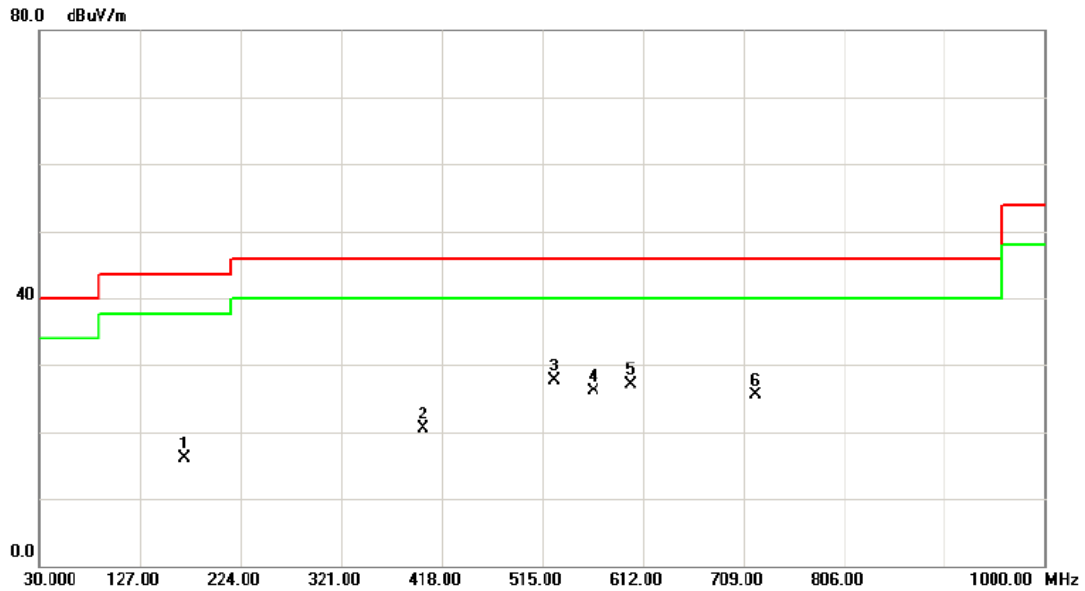
Remark :

- (1) All readings are Peak unless otherwise stated QP in column of 『Note』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform.
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency. "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
- (3) Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Peak detector mode or QP detector mode of the emission .
- (4) 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.



Test Mode: TX 2403MHz

Vertical

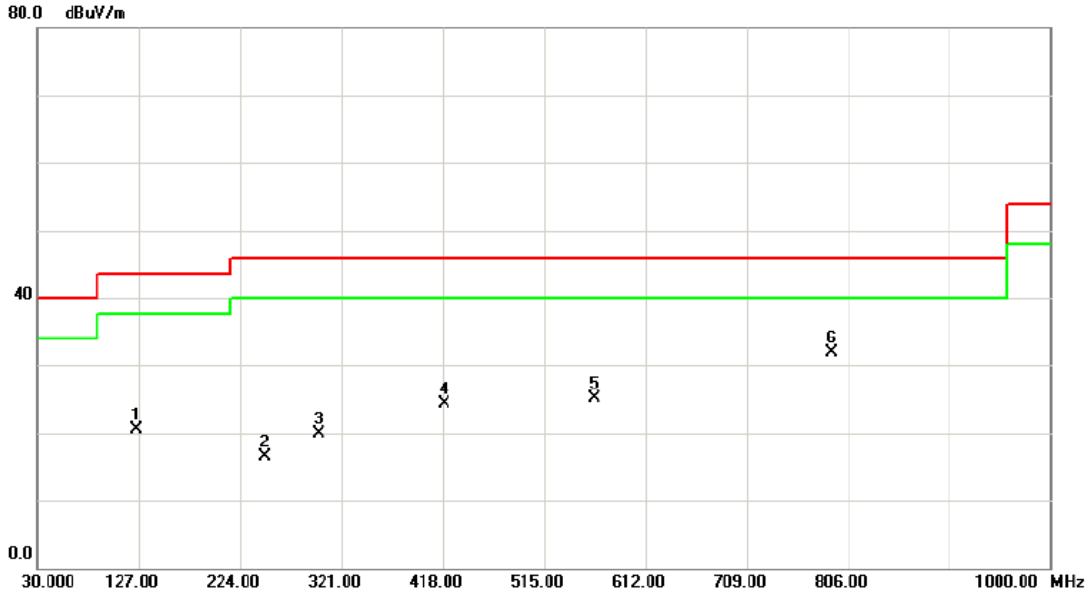


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		169.6800	28.95	-12.76	16.19	43.50	-27.31	peak	
2		400.5400	30.31	-9.87	20.44	46.00	-25.56	peak	
3	*	527.6100	36.49	-8.85	27.64	46.00	-18.36	peak	
4		564.4700	33.97	-7.78	26.19	46.00	-19.81	peak	
5		600.3600	35.20	-8.08	27.12	46.00	-18.88	peak	
6		721.6100	30.28	-4.86	25.42	46.00	-20.58	peak	



Test Mode: TX 2403MHz

Horizontal

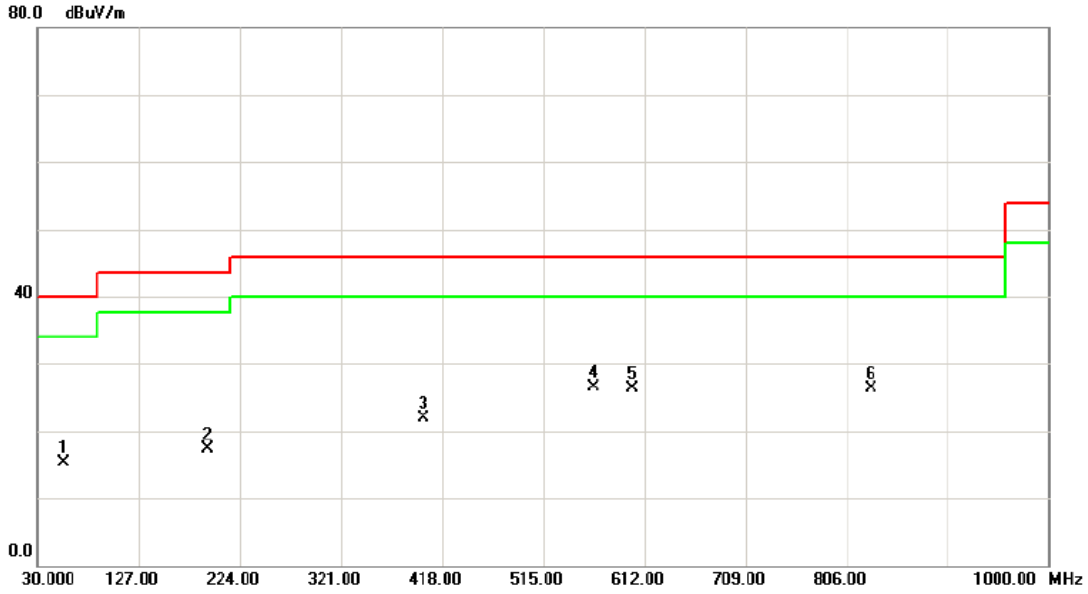


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		125.0600	34.02	-13.61	20.41	43.50	-23.09	peak	
2		247.2800	31.35	-14.94	16.41	46.00	-29.59	peak	
3		299.6600	31.23	-11.27	19.96	46.00	-26.04	peak	
4		419.9400	33.75	-9.49	24.26	46.00	-21.74	peak	
5		563.5000	32.78	-7.77	25.01	46.00	-20.99	peak	
6	*	790.4800	35.40	-3.44	31.96	46.00	-14.04	peak	



Test Mode: TX 2453MHz

Vertical



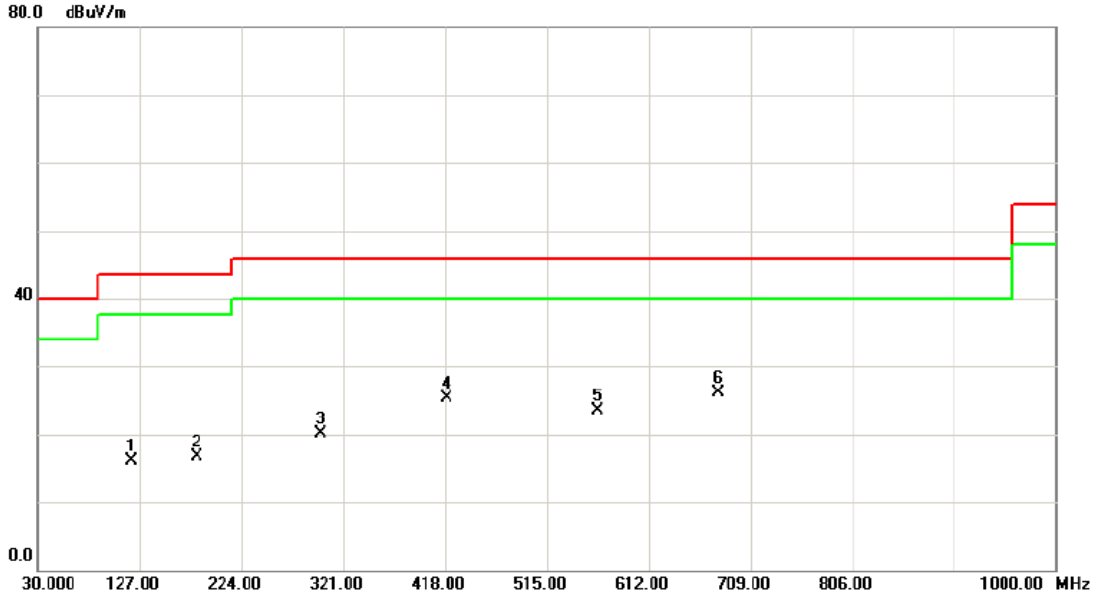
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		55.2200	30.10	-14.85	15.25	40.00	-24.75	peak	
2		193.9300	31.95	-14.66	17.29	43.50	-26.21	peak	
3		400.5400	31.84	-9.87	21.97	46.00	-24.03	peak	
4	*	563.5000	34.20	-7.77	26.43	46.00	-19.57	peak	
5		600.3600	34.42	-8.08	26.34	46.00	-19.66	peak	
6		830.2500	29.70	-3.44	26.26	46.00	-19.74	peak	





Test Mode: TX 2453MHz

Horizontal

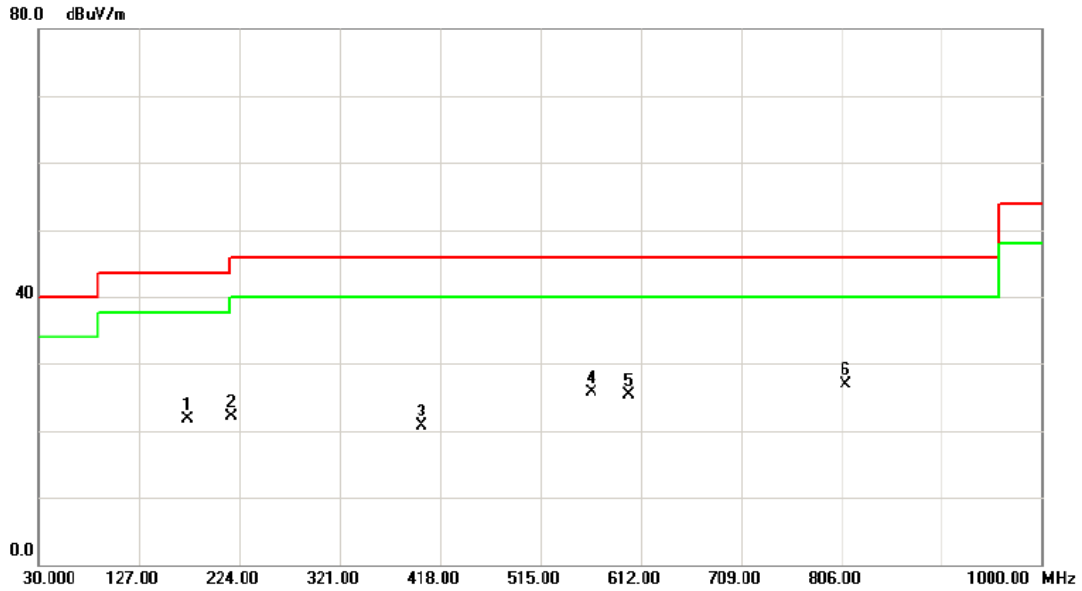


No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measurement dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	120.2100	29.89	-13.88	16.01	43.50	-27.49	peak	
2	181.3200	29.69	-13.04	16.65	43.50	-26.85	peak	
3	299.6600	31.39	-11.27	20.12	46.00	-25.88	peak	
4	419.9400	34.88	-9.49	25.39	46.00	-20.61	peak	
5	563.5000	31.33	-7.77	23.56	46.00	-22.44	peak	
6 *	677.9600	31.17	-5.15	26.02	46.00	-19.98	peak	



Test Mode: TX 2478MHz

Vertical

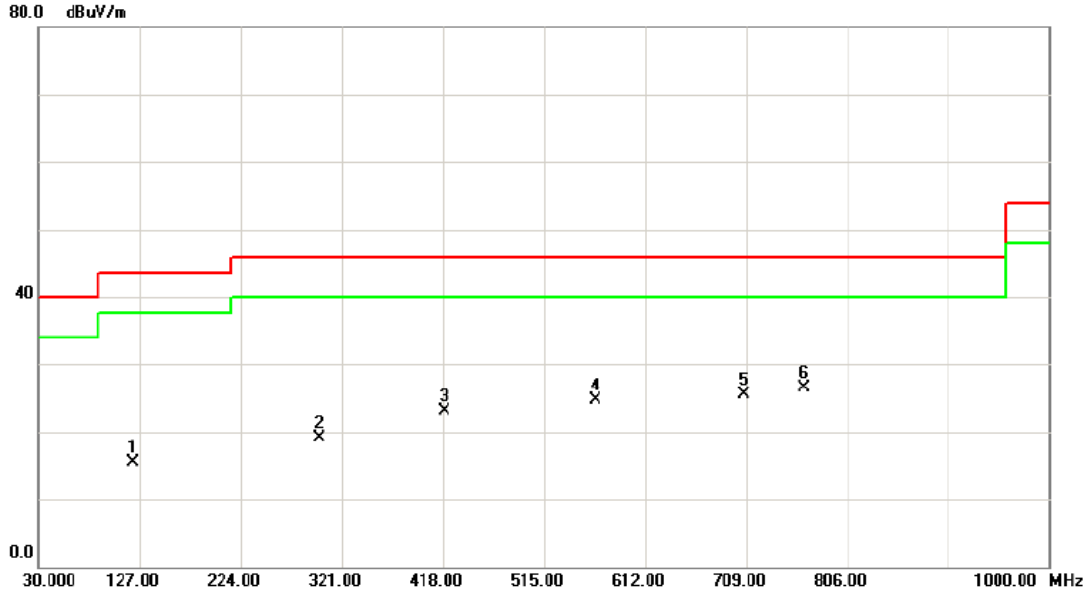


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		174.5300	34.57	-12.78	21.79	43.50	-21.71	peak	
2		217.2100	37.25	-15.09	22.16	46.00	-23.84	peak	
3		400.5400	30.64	-9.87	20.77	46.00	-25.23	peak	
4		564.4700	33.47	-7.78	25.69	46.00	-20.31	peak	
5		600.3600	33.39	-8.08	25.31	46.00	-20.69	peak	
6	*	810.8500	30.08	-3.24	26.84	46.00	-19.16	peak	



Test Mode: TX 2478MHz

Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		121.1800	29.27	-13.83	15.44	43.50	-28.06	peak	
2		299.6600	30.31	-11.27	19.04	46.00	-26.96	peak	
3		419.9400	32.52	-9.49	23.03	46.00	-22.97	peak	
4		564.4700	32.49	-7.78	24.71	46.00	-21.29	peak	
5		707.0600	30.25	-4.82	25.43	46.00	-20.57	peak	
6	*	765.2600	30.83	-4.36	26.47	46.00	-19.53	peak	



#### 4.2.9 TEST RESULTS (ABOVE 1000 MHz)

Remark :

- (1) All readings are Peak unless otherwise stated QP in column of 『Note 』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform.
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency. "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)
- (3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission .
- (4) 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.
- (5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (6) EUT Orthogonal Axis :  
"X" - denotes Laid on Table ; "Y" - denotes Vertical Stand ; "Z" - denotes Side Stand
- (7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna
- (8) The average value of fundamental frequency is:  
Average = Peak value + 20log(Duty cycle) ,Final AV=PK-18.24



# Neutron Engineering Inc.

Test Mode:	TX 2403MHz
------------	------------

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
2390.00	V	24.43	6.19	34.09	58.52	40.28	74.00	54.00	X/E
<b>2403.00</b>	<b>V</b>	<b>55.19</b>	<b>36.95</b>	<b>34.12</b>	<b>89.31</b>	<b>71.07</b>	<b>114.00</b>	<b>94.00</b>	<b>X/F</b>
4805.99	V	50.14	31.90	6.38	56.52	38.28	74.00	54.00	X/H

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
2390.00	H	24.39	6.15	34.09	58.48	40.24	74.00	54.00	X/E
<b>2402.95</b>	<b>H</b>	<b>62.01</b>	<b>43.86</b>	<b>34.12</b>	<b>96.13</b>	<b>77.98</b>	<b>114.00</b>	<b>94.00</b>	<b>X/F</b>
4805.67	H	44.97	26.73	6.38	51.35	33.11	74.00	54.00	X/H

Test Mode:	TX 2453MHz
------------	------------

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
<b>2452.75</b>	<b>V</b>	<b>56.29</b>	<b>38.05</b>	<b>34.27</b>	<b>90.56</b>	<b>72.32</b>	<b>114.00</b>	<b>94.00</b>	<b>X/F</b>
4906.04	V	51.03	32.79	6.67	57.70	39.46	74.00	54.00	X/H

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
<b>2452.80</b>	<b>H</b>	<b>61.20</b>	<b>42.96</b>	<b>34.27</b>	<b>95.47</b>	<b>77.23</b>	<b>114.00</b>	<b>94.00</b>	<b>X/F</b>
4905.86	H	46.21	27.97	6.67	52.88	34.64	74.00	54.00	X/H

Test Mode:	TX 2478MHz
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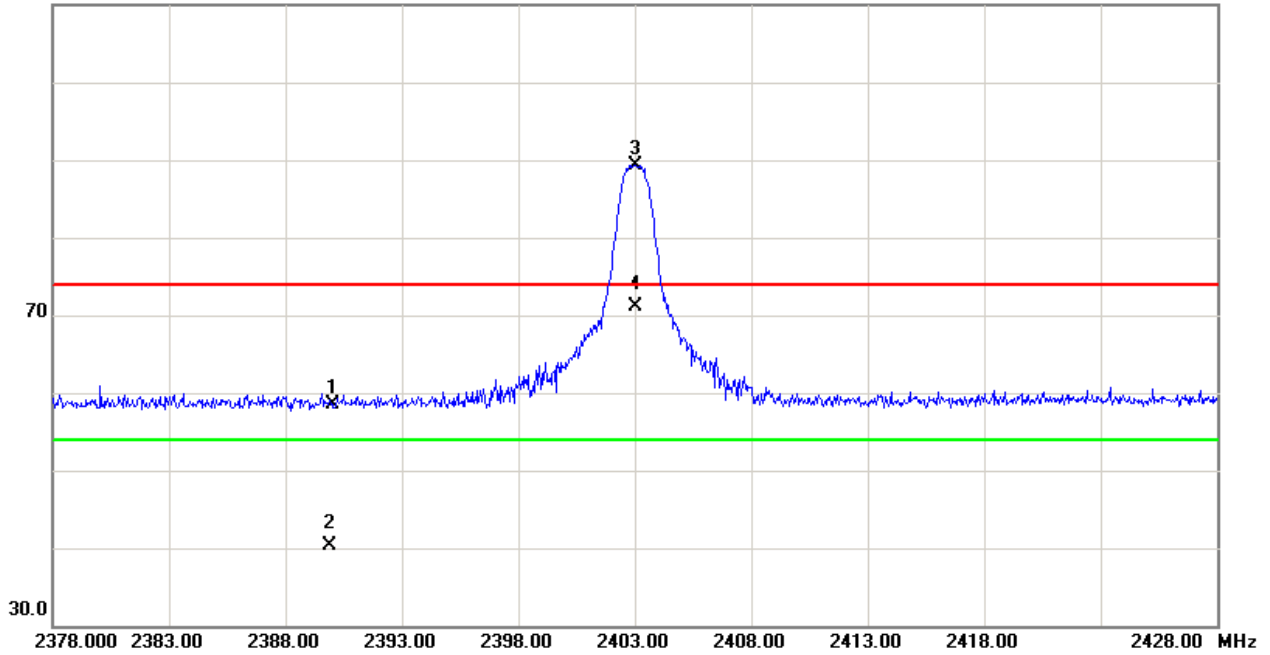
Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
<b>2477.70</b>	<b>V</b>	<b>54.15</b>	<b>35.91</b>	<b>34.35</b>	<b>88.50</b>	<b>70.26</b>	<b>114.00</b>	<b>94.00</b>	<b>X/F</b>
2483.50	V	24.91	6.67	34.37	59.28	41.04	74.00	54.00	X/E
4956.01	V	51.74	33.50	6.82	58.56	40.32	74.00	54.00	X/H

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
<b>2477.85</b>	<b>H</b>	<b>58.39</b>	<b>40.15</b>	<b>34.35</b>	<b>92.74</b>	<b>74.50</b>	<b>114.00</b>	<b>94.00</b>	<b>X/F</b>
2483.50	H	25.90	7.66	34.37	60.27	42.03	74.00	54.00	X/E
4955.95	H	47.00	28.76	6.82	53.82	35.58	74.00	54.00	X/H

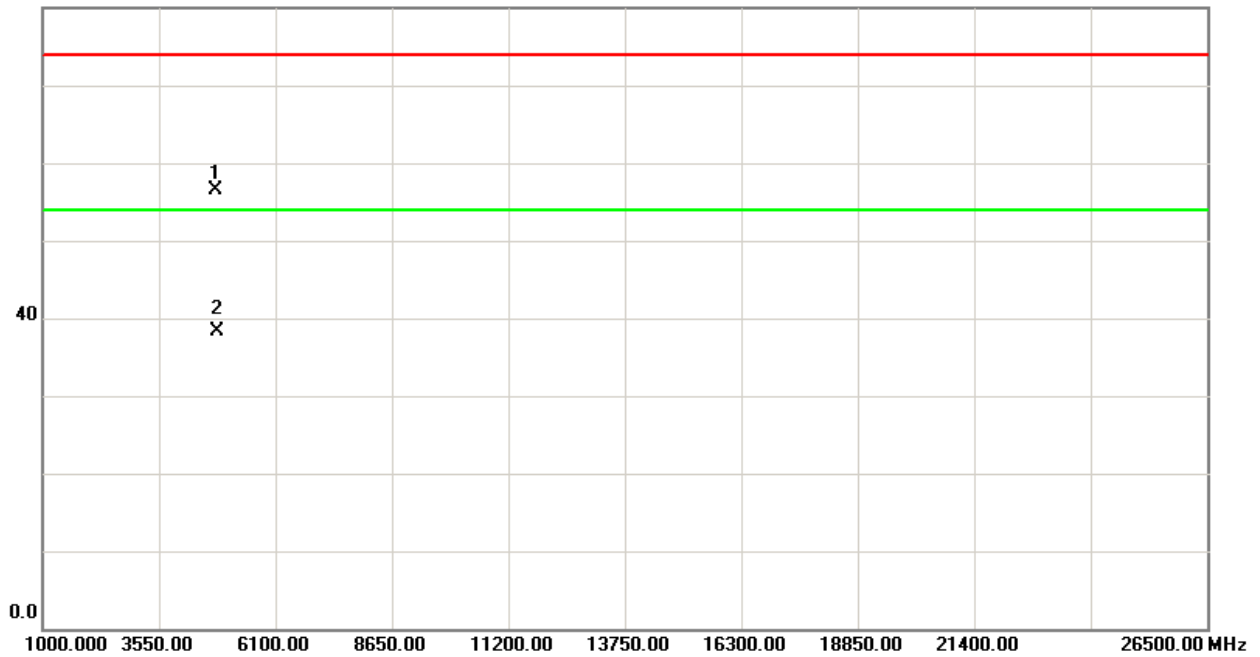


TX 2403MHz (Above 1000 MHz, Vertical)

110.0 dBuV/m

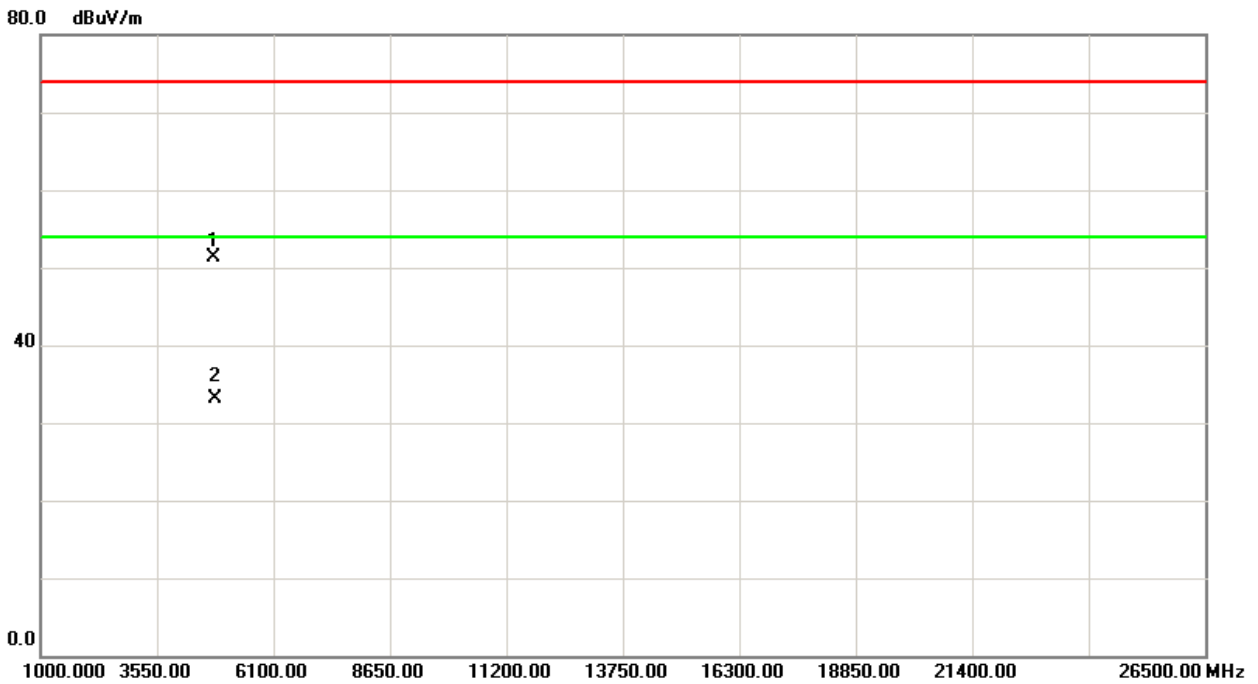
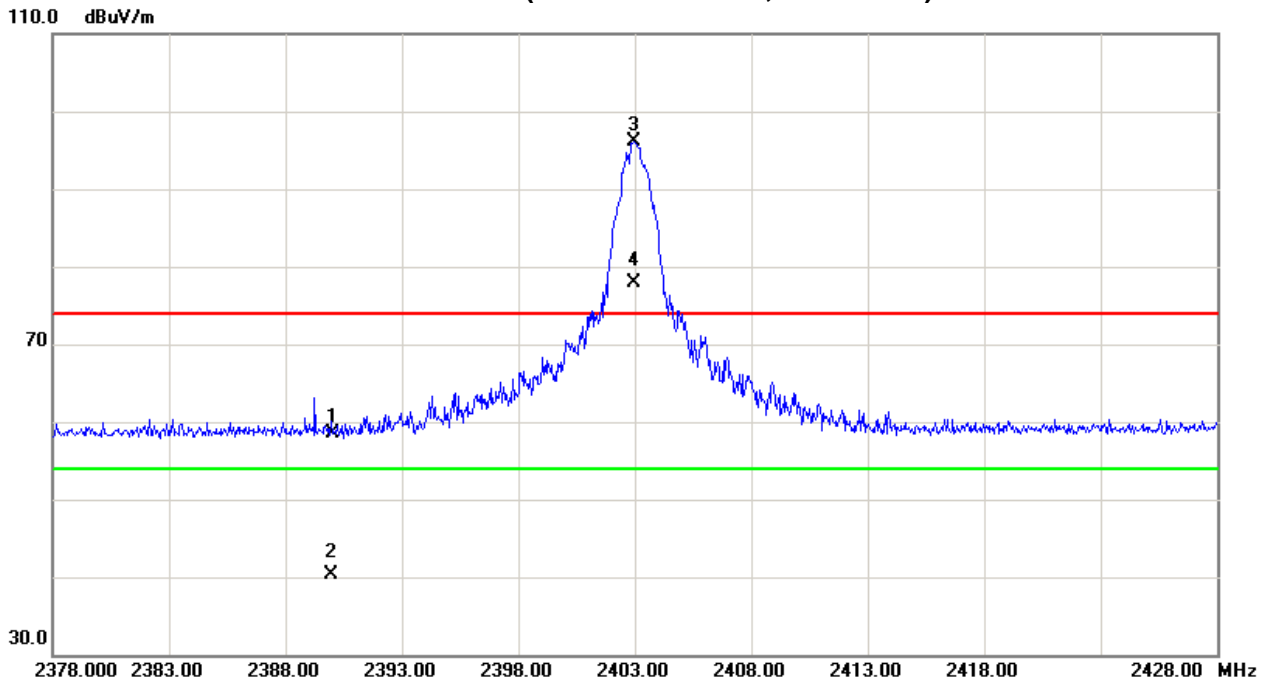


80.0 dBuV/m



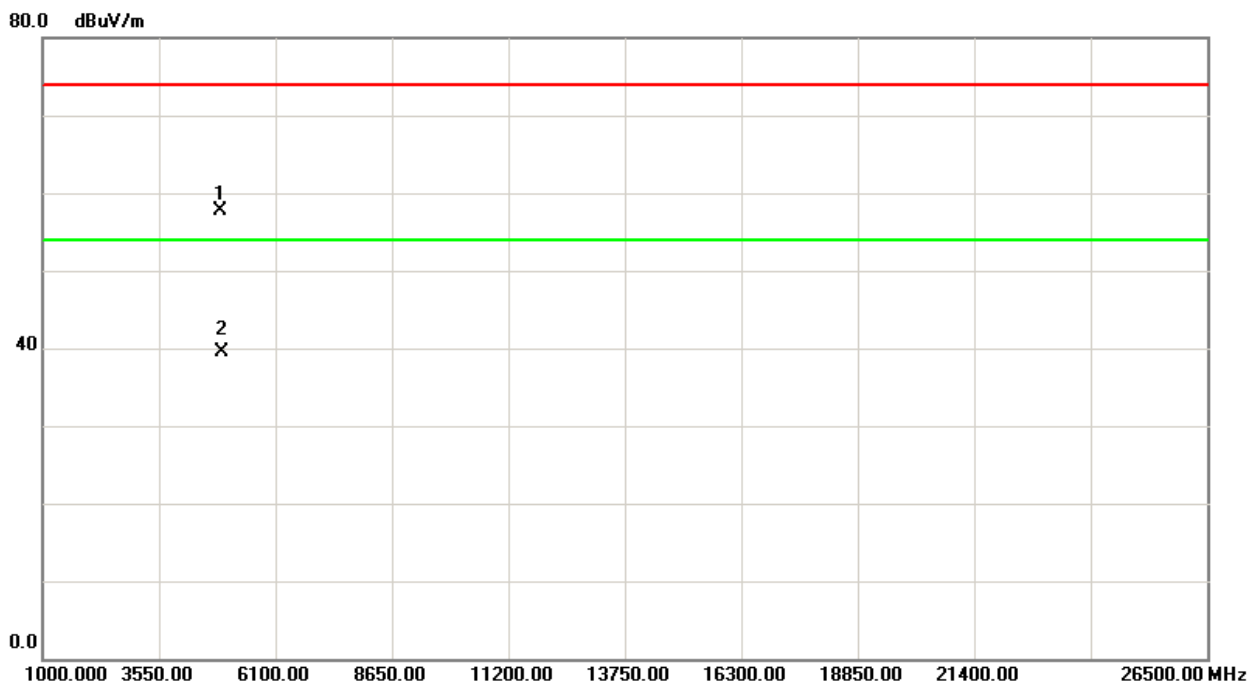
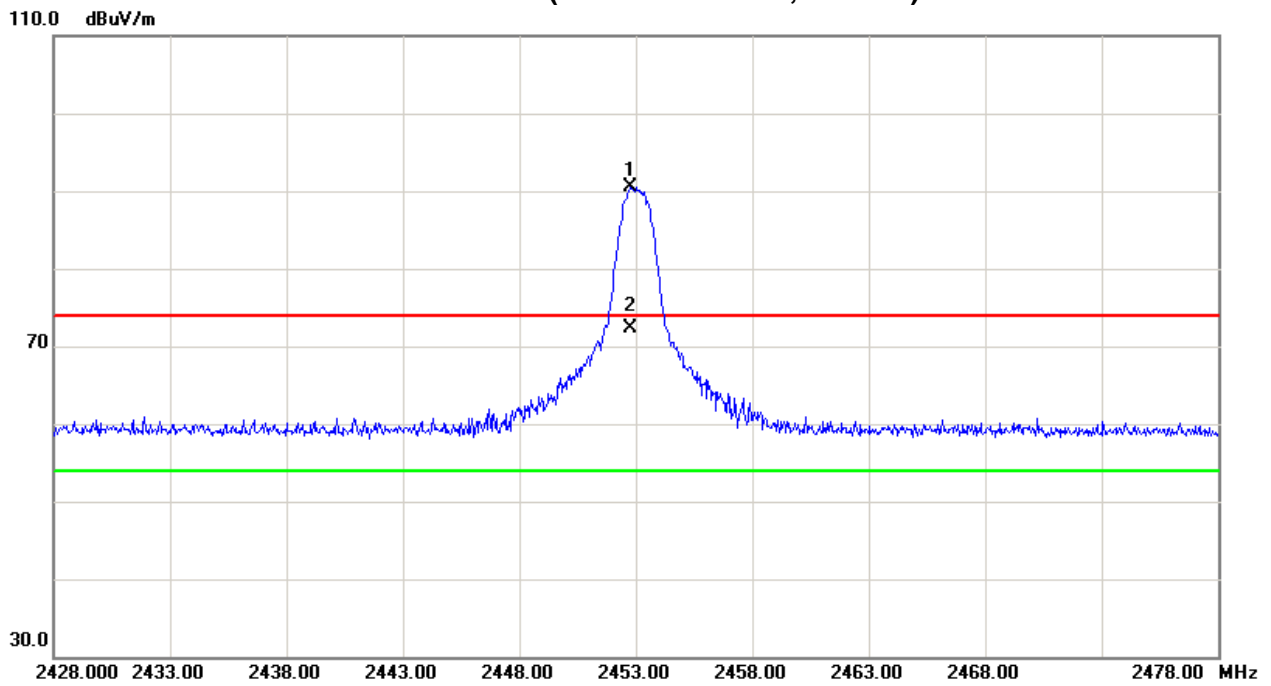


TX 2403MHz (Above 1000 MHz, Horizontal)





TX 2453 MHz (Above 1000 MHz, Vertical)

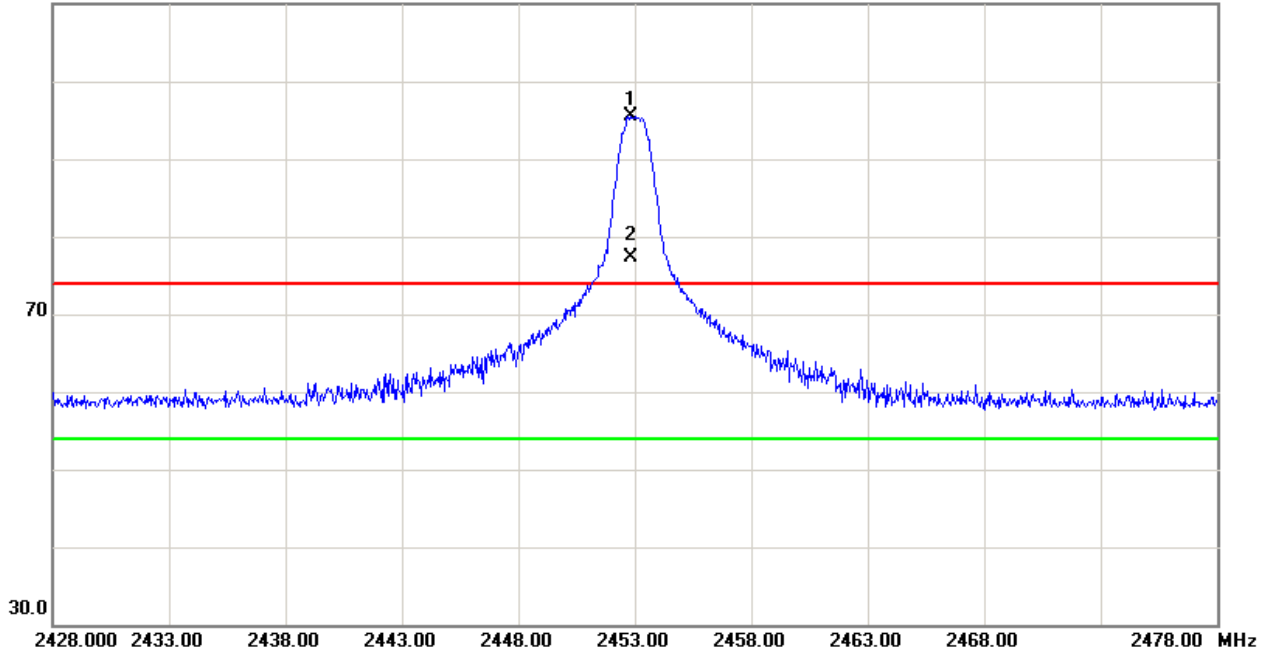




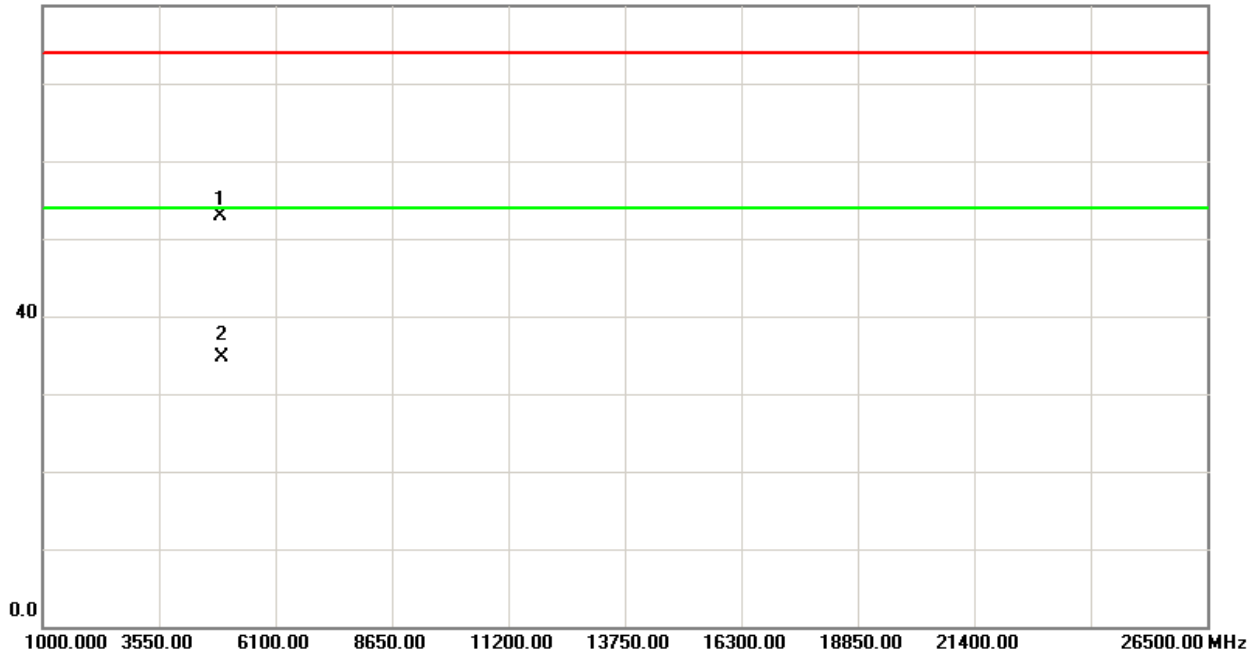


TX 2453MHz (Above 1000 MHz, Horizontal)

110.0 dBuV/m



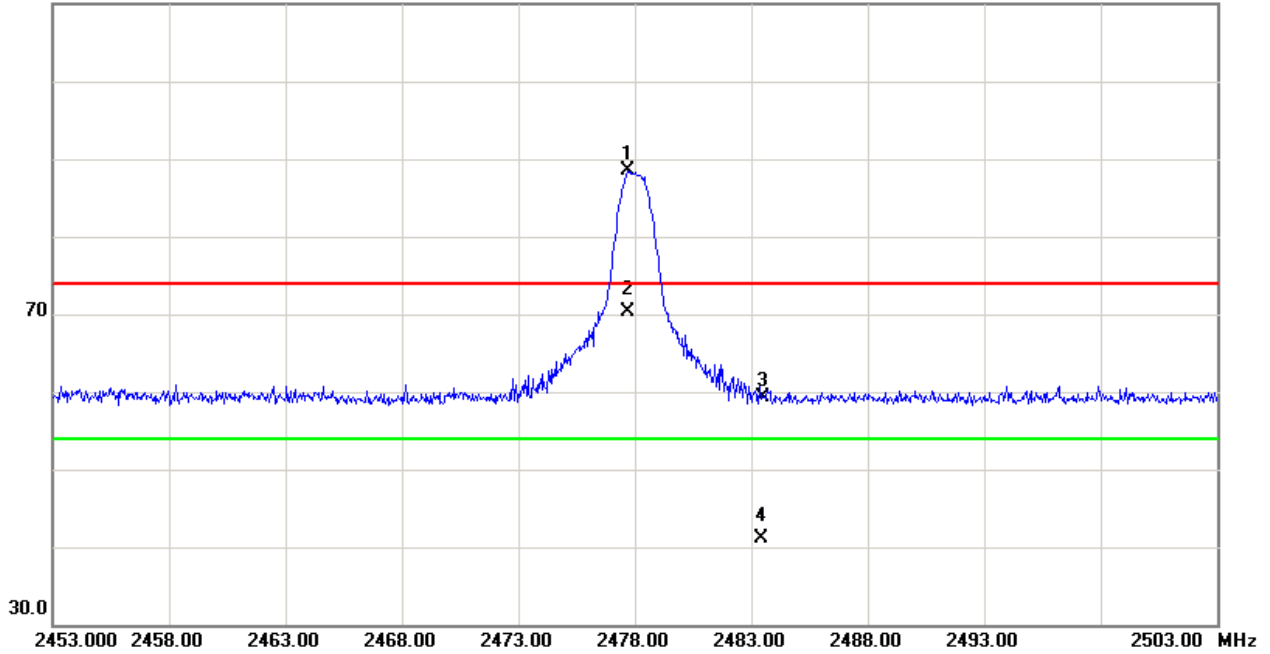
80.0 dBuV/m



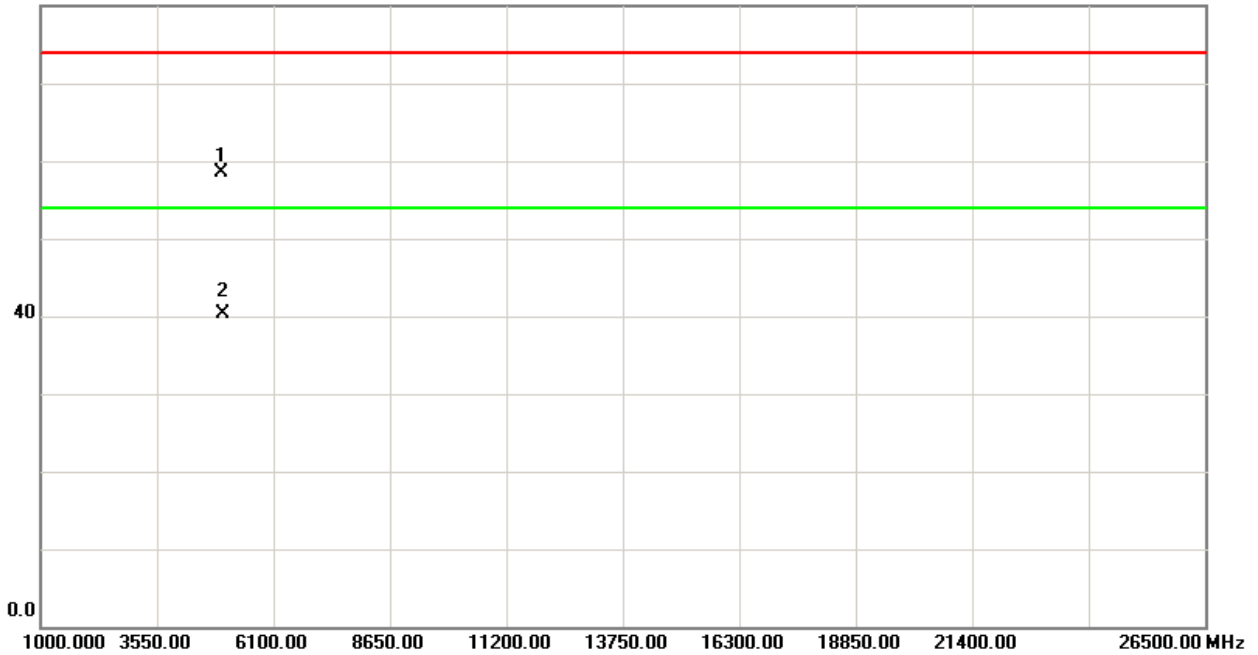


TX 2478MHz (Above 1000 MHz, Vertical)

110.0 dBuV/m



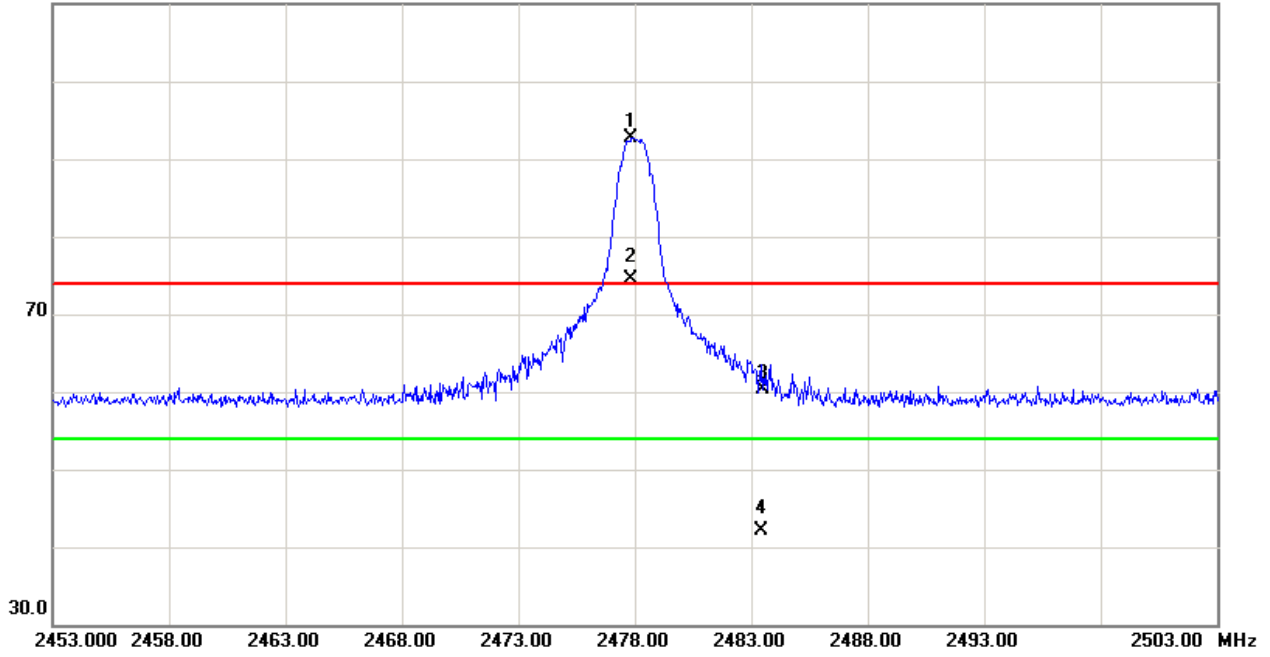
80.0 dBuV/m



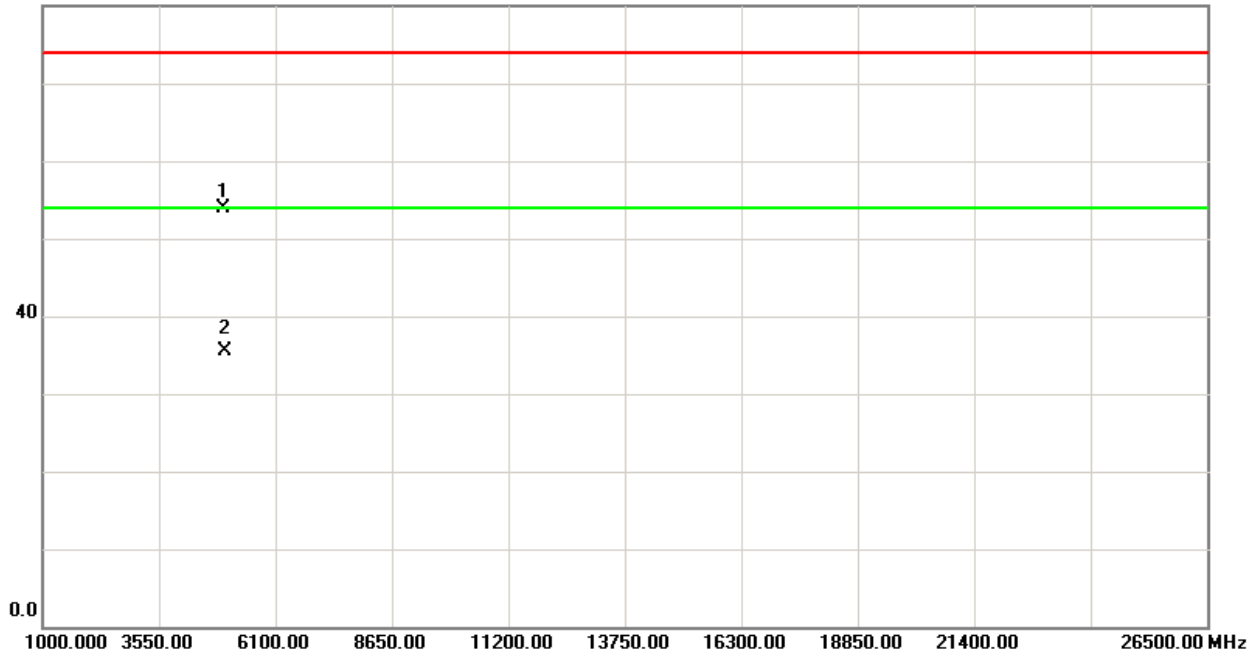


TX 2478MHz (Above 1000 MHz, Horizontal)

110.0 dBuV/m



80.0 dBuV/m





## **5. BANDWIDTH TEST**

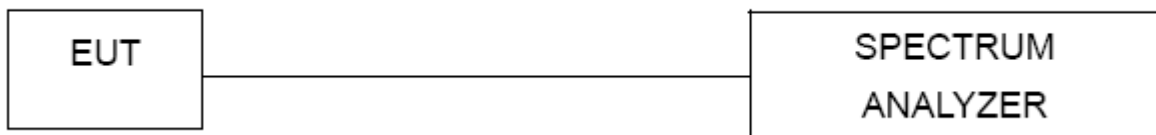
### **5.1 TEST PROCEDURE**

- 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=100KHz, Sweep time = Auto.

### **5.2 DEVIATION FROM STANDARD**

No deviation.

### **5.3 TEST SETUP**



### **5.4 EUT OPERATION CONDITIONS**

The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

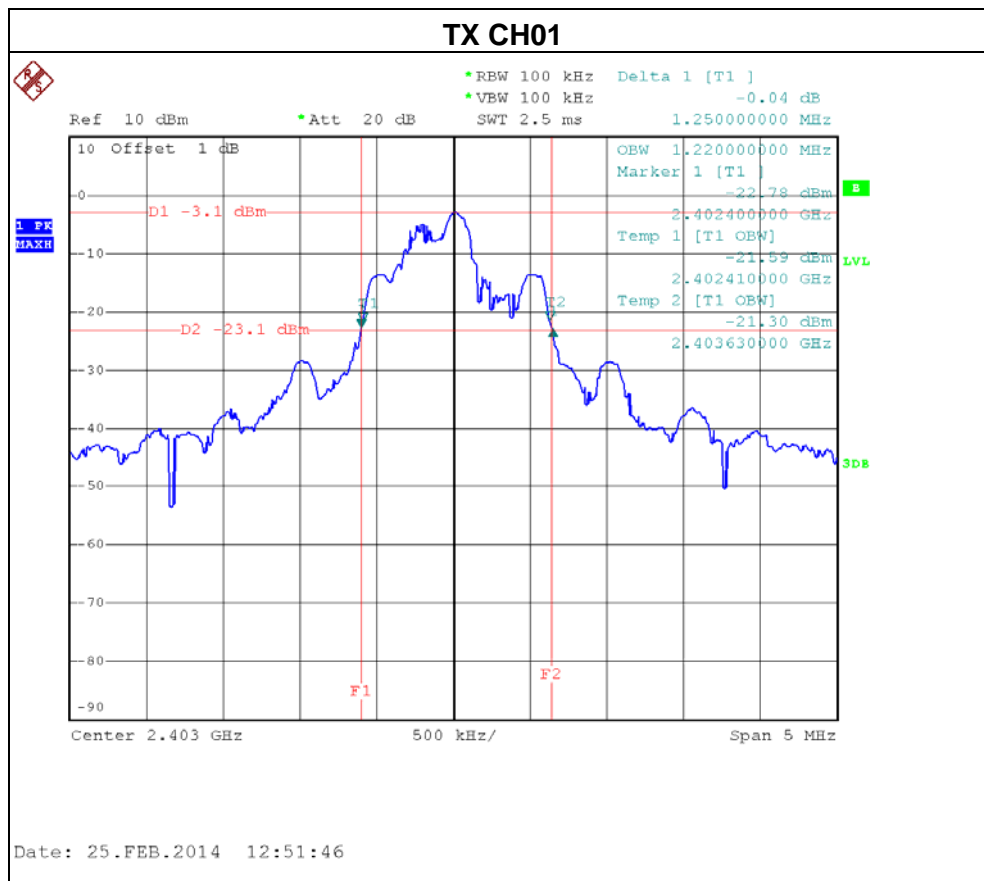
### **5.5 EUT TEST CONDITIONS**

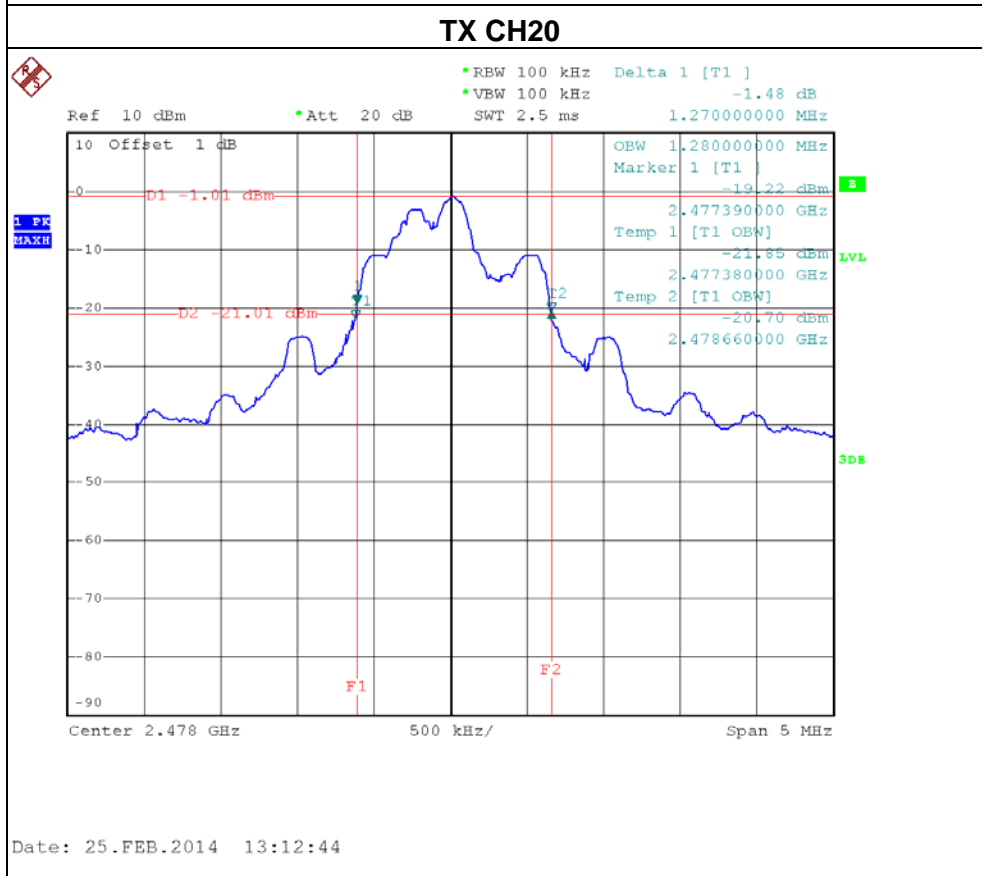
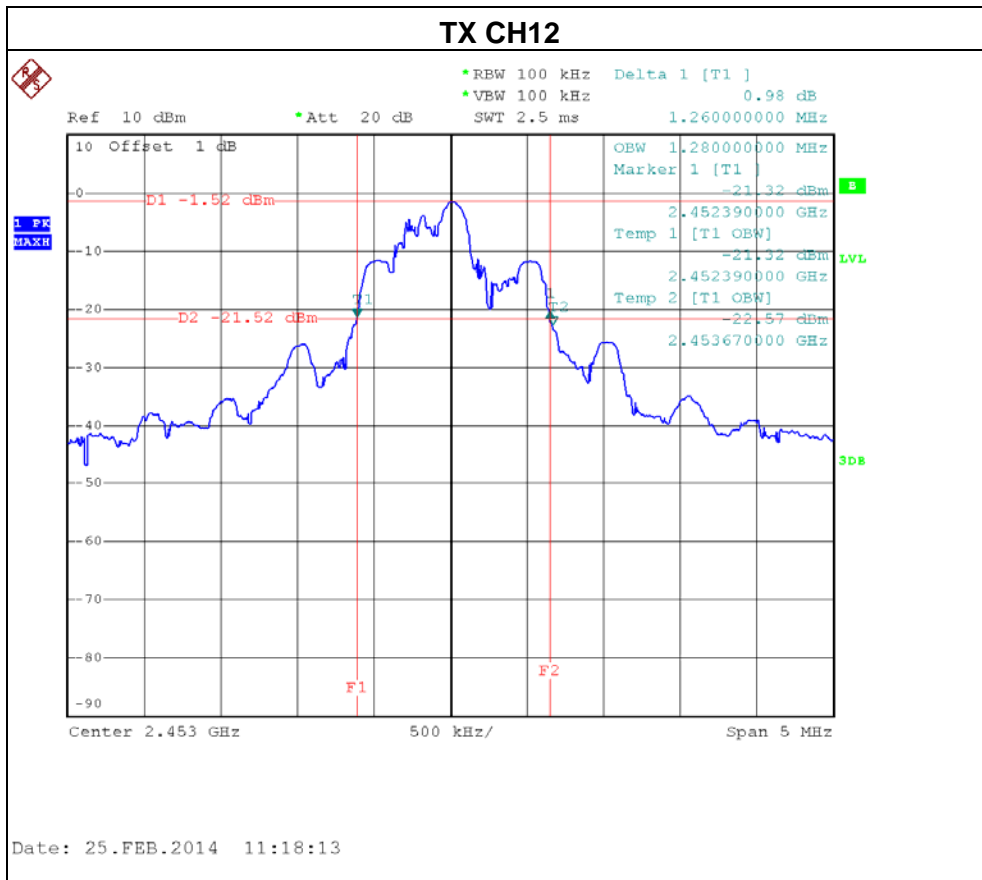
Temperature: 25°C  
Relative Humidity: 55%  
Test Voltage: DC 3V



5.6 TEST RESULTS

Test Channel	Frequency (MHz)	20 dBc Bandwidth (MHz)	99% occupied Bandwidth(MHz)
CH01	2403	1.25	1.22
CH12	2453	1.26	1.28
CH20	2478	1.27	1.28







## 6. ANTENNA CONDUCTED SPURIOUS EMISSION

### 6.1 APPLIED PROCEDURES / LIMIT

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 measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

#### 6.1.1 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=100KHz, Sweep time = 10 ms.

#### 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 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

#### 6.1.5 EUT TEST CONDITIONS

Temperature: 25°C

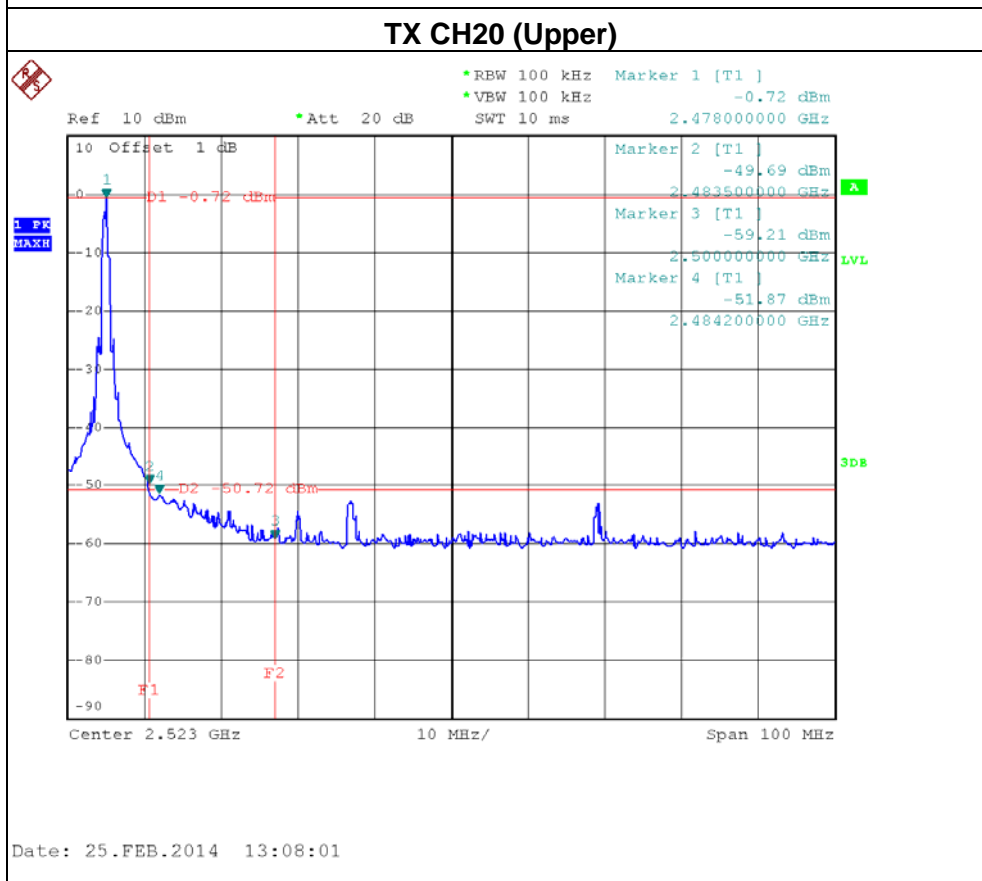
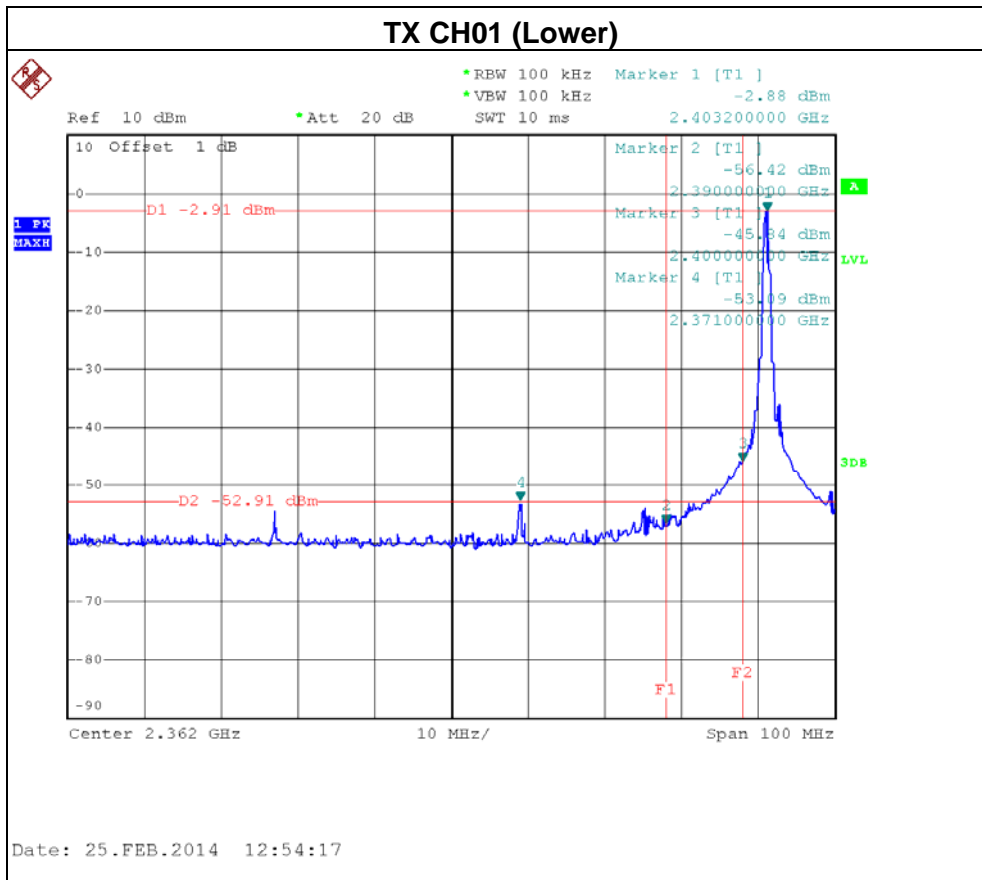
Relative Humidity: 55%

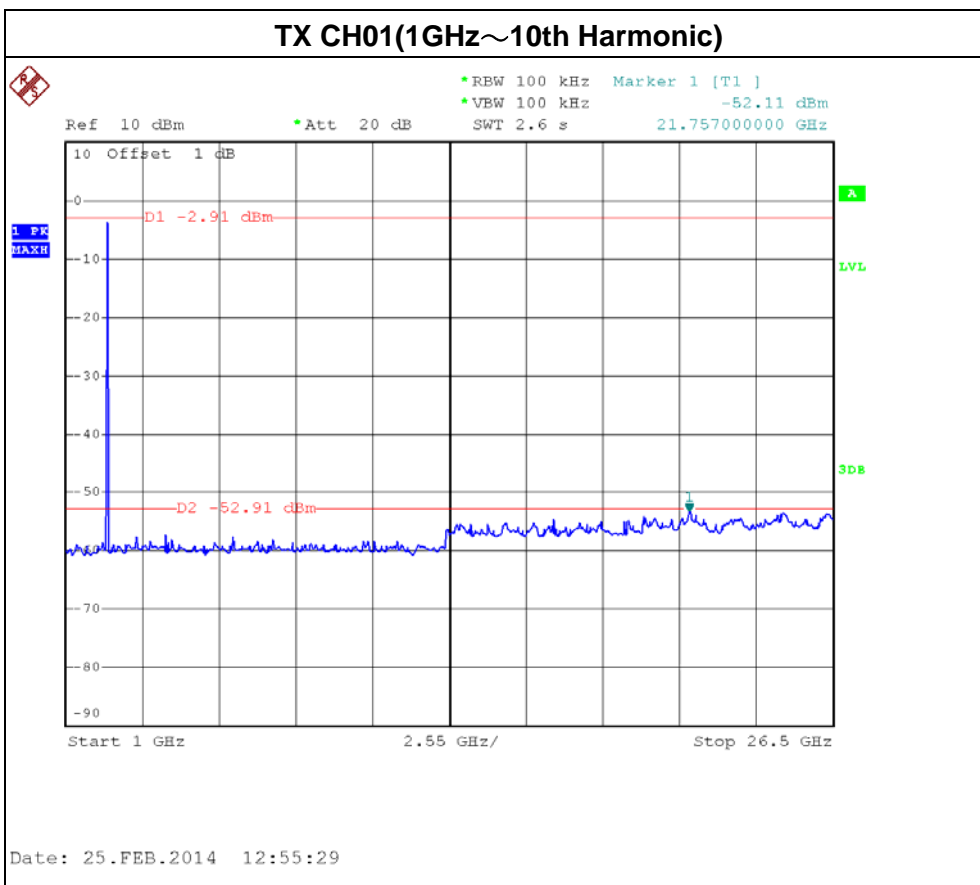
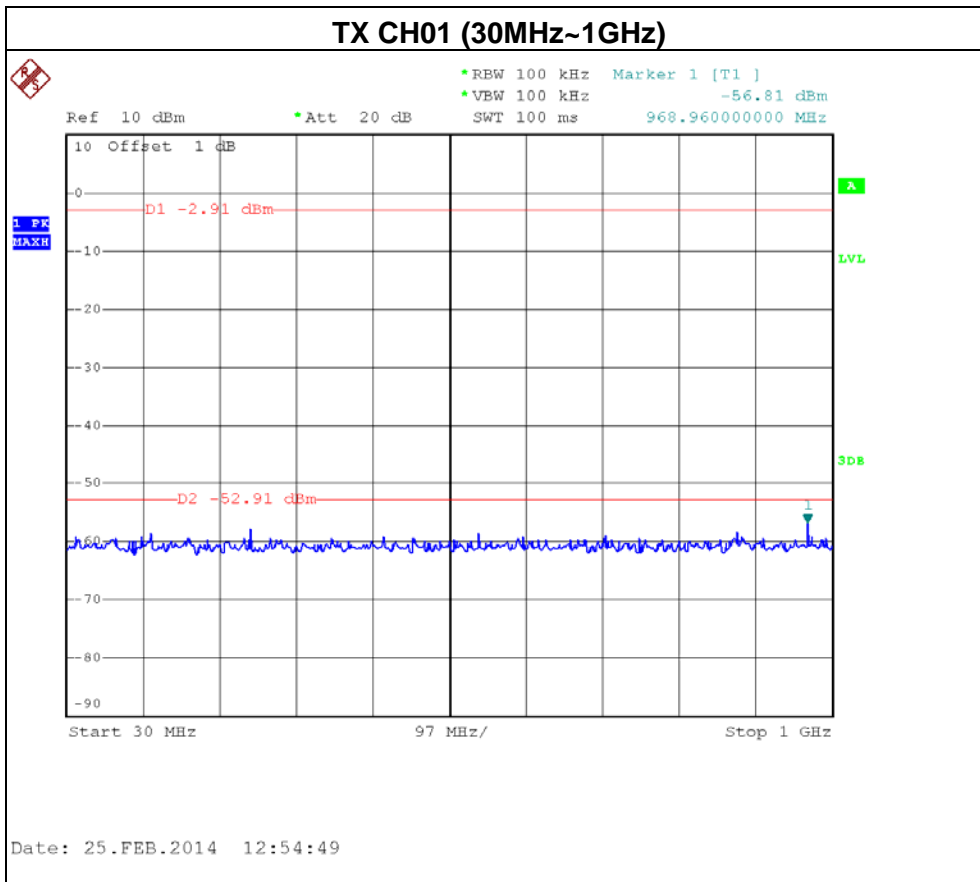
Test Voltage: DC 3V

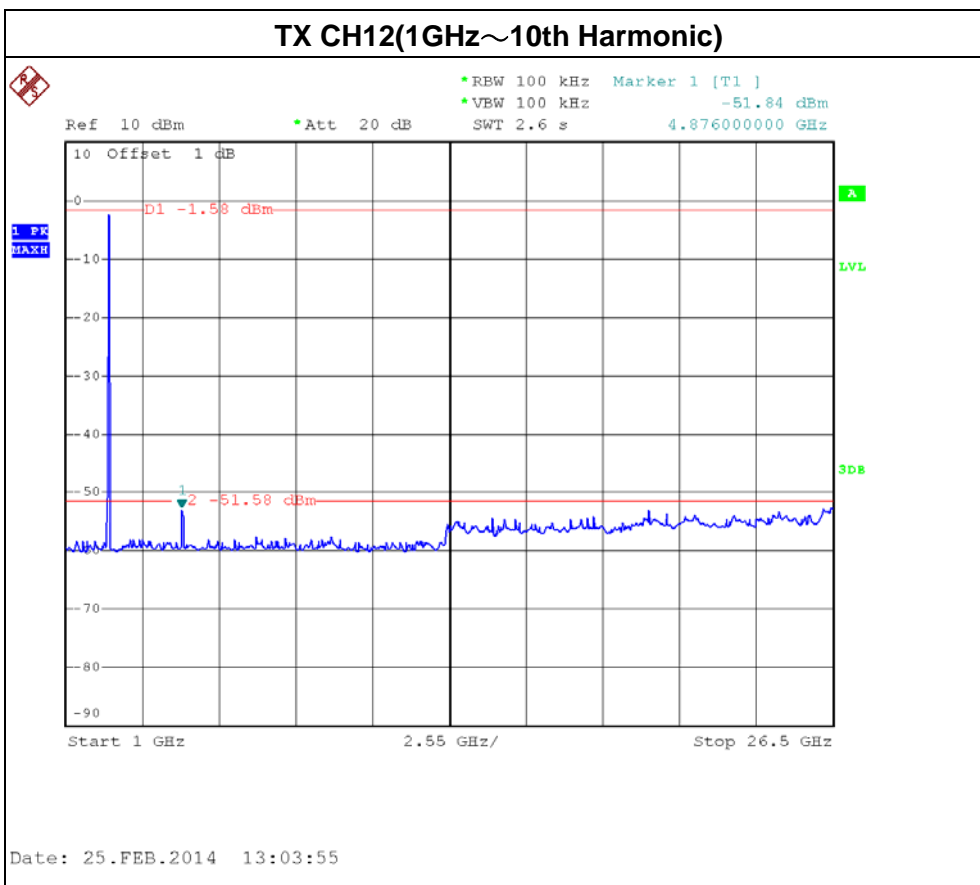
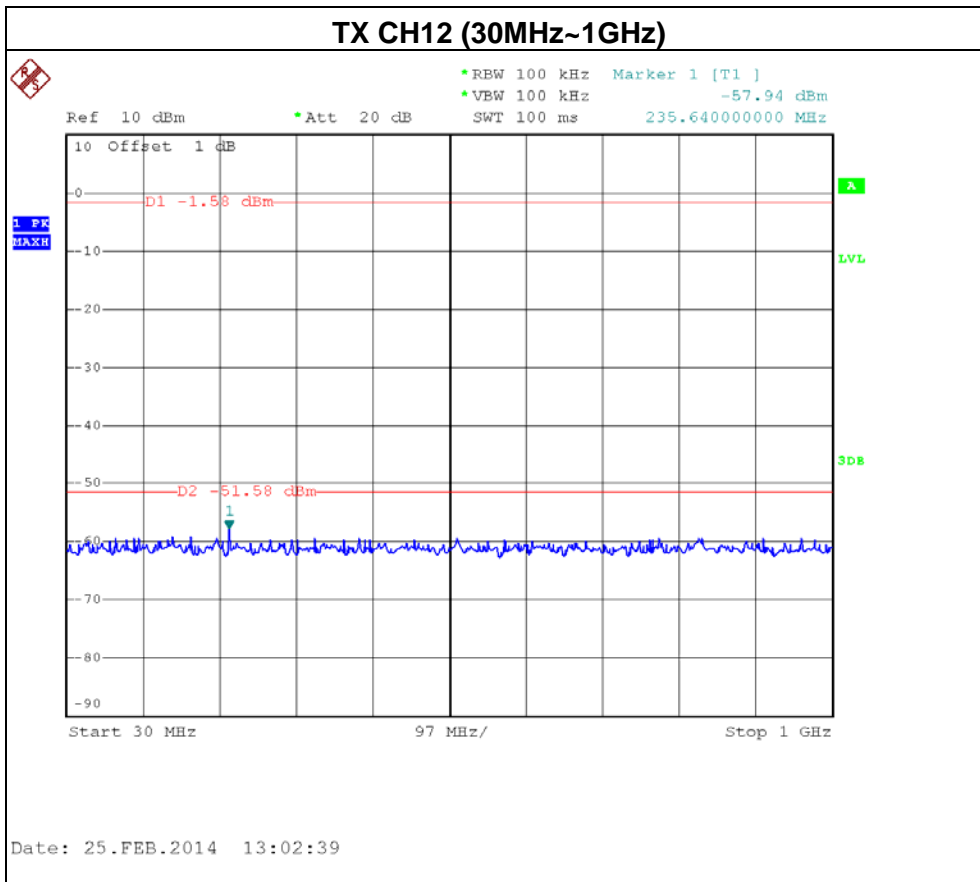


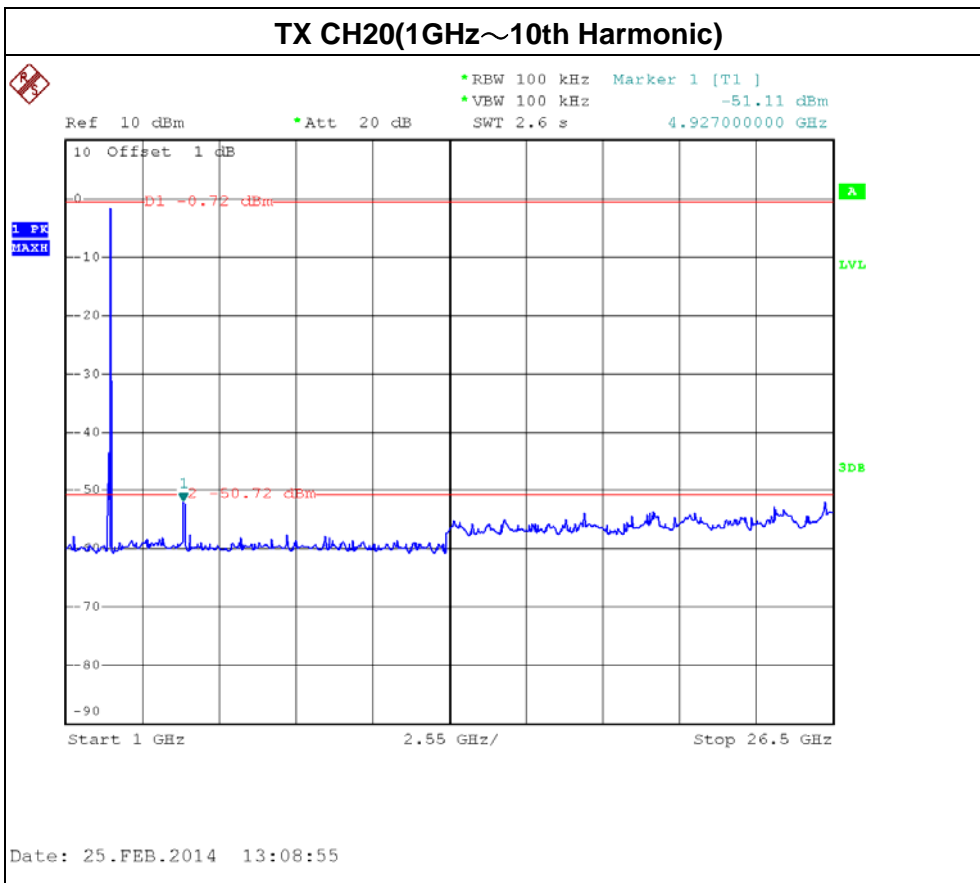
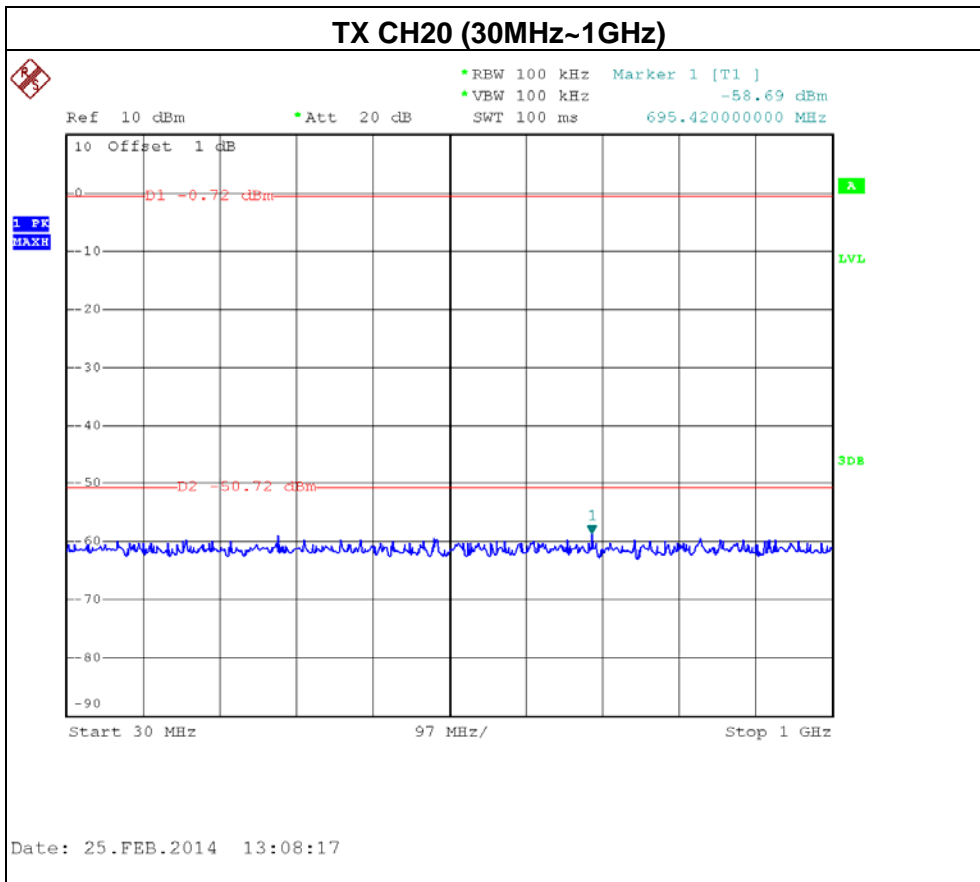


6.1.6 TEST RESULTS











**7. MEASUREMENT INSTRUMENTS LIST AND SETTING**

<b>Conducted Emission Measurement</b>					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	LISN	EMCO	3816/2	00052765	Apr. 25, 2014
2	LISN	R&S	ENV216	100087	Nov.09, 2014
3	Test Cable	N/A	C_17	N/A	Mar.15, 2014
4	EMI TEST RECEIVER	R&S	ESCS30	826547/022	Apr. 25, 2014
5	50Ω Terminator	SHX	TF2-3G-A	08122902	Apr. 25, 2014

<b>Radiated Emission Measurement</b>					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	Schwarbeck	VULB9160	9160-3232	Apr. 25, 2014
2	Amplifier	HP	8447D	2944A09673	Apr. 25, 2014
3	Test Receiver	R&S	ESCI	100382	Apr. 25, 2014
4	Test Cable	N/A	C-01_CB03	N/A	Jul. 02, 2014
5	Antenna	ETS	3115	00075789	Apr. 25, 2014
6	Amplifier	Agilent	8449B	3008A02274	Apr. 25, 2014
7	Spectrum	Agilent	E4408B	US39240143	Nov. 09, 2014
8	Test Cable	HUBER+SUHNER	C-45	N/A	Apr. 30, 2014
9	Controller	CT	SC100	N/A	N/A
10	Horn Antenna	EMCO	3115	9605-4803	Apr. 25, 2014
11	Active Loop Antenna	R&S	HFH2-Z2	830749/020	Apr. 25, 2014
12	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Oct. 22, 2014

<b>Bandwidth</b>					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov. 09, 2014

<b>Antenna Conducted Spurious Emission</b>					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov. 09, 2014

Remark: "N/A" denotes no model name, serial no. or calibration specified.  
All calibration period of equipment list is one year.



**8. EUT TEST PHOTO**

**Radiated Measurement Photos  
9K~30MHz**





**Radiated Measurement Photos  
30~1000MHz**





**Radiated Measurement Photos  
Above 1000MHz**

