



# FCC Radio Test Report

**FCC ID: PKNREC-001**

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

**Project No.** : 1405C197  
**Equipment** : wireless mouse Receiver  
**Model Name** : REC-001;CM-163;CM-198;CM-190;  
MP2120RED; MP2120BLU;MP2120WHT;  
MP2120BLK; M4750;OM6750;OM4000W  
**Applicant** : ZHUOHENG ELECTRONICS CO.,  
LIMITED  
**Address** : No.8.Lane5.ShangNan Road, the 5<sup>th</sup>  
Industrial Area, NanCe, HuMen Town,  
DongGuan City, China.

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

**Date of Receipt:** May. 15, 2014

**Date of Test:** May. 15, 2014 ~ May. 27, 2014

**Issued Date:** May. 28, 2014

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Testing Laboratory  
2640



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**REPORT ISSUED HISTORY**

Issued No.	Description	Issued Date
NEI-FCCP-1-1405C197	Original Issue.	May. 28, 2014



## 1. CERTIFICATION

Equipment : wireless mouse Receiver  
Brand Name : N/A  
Model Name : REC-001;CM-163;CM-198;CM-190;MP2120RED; P2120BLU;MP2120WHT; MP2120BLK; M4750;OM6750;OM4000W  
Applicant : ZHUOHENG ELECTRONICS CO., LIMITED  
Manufacturer : Dongguan Yibang Electronic Technology Co., Ltd.  
Address : No.8.Lane5.ShangNan Road, the 5<sup>Th</sup> Industrial Area, NanCe, HuMen Town, DongGuan City, China.  
Factory : Dongguan Yibang Electronic Technology Co., Ltd.  
Address : No.8.Lane5.ShangNan Road, the 5<sup>Th</sup> Industrial Area, NanCe, HuMen Town, DongGuan City, China.  
Date of Test : May. 15, 2014 ~ May. 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-1-1405C197) 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	PASS	
15.209 15.249	Radiated Spurious Emission	PASS	

**NOTE:**

(1)"N/A" denotes test is not applicable in this test report.



## 2.1 TEST FACILITY

The test facilities used to collect the test data in this report is **DG-C02/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 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 %.

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 Receiver	
Brand Name	N/A	
Model Name	REC-001;CM-163;CM-198;CM-190;MP2120RED;P2120BLU;MP2120WHT;MP2120BLK; M4750;OM6750;OM4000W	
Model Difference	Only differ in model name and appearance color.	
Product Description	Operation Frequency	2409~2476 MHz
	Modulation Technology	MSK(2Mbps)
	Data rate	
	Field Strength	88.64dBuV/m(AV Max)
Power Source	Supplied from PC USB port.	
Power Rating	I/P: AC 120V/60Hz O/P: DC 5V	
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)
01	2409
02	2417
03	2426
04	2440
05	2445
06	2455
07	2460
08	2476

3. Table for Filed Antenna

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



## 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 – TX 2409MHz
Mode 2	Middle – TX 2440MHz
Mode 3	High -TX 2476MHz

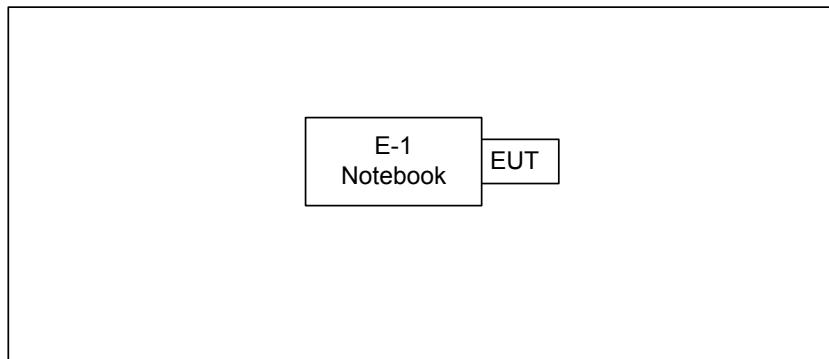
For Radiated Test	
Final Test Mode	Description
Mode 1	Low – TX 2409MHz
Mode 2	Middle – TX 2440MHz
Mode 3	High -TX 2476MHz

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	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 (FREQUENCY RANGE 150KHZ-30MHZ)

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

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

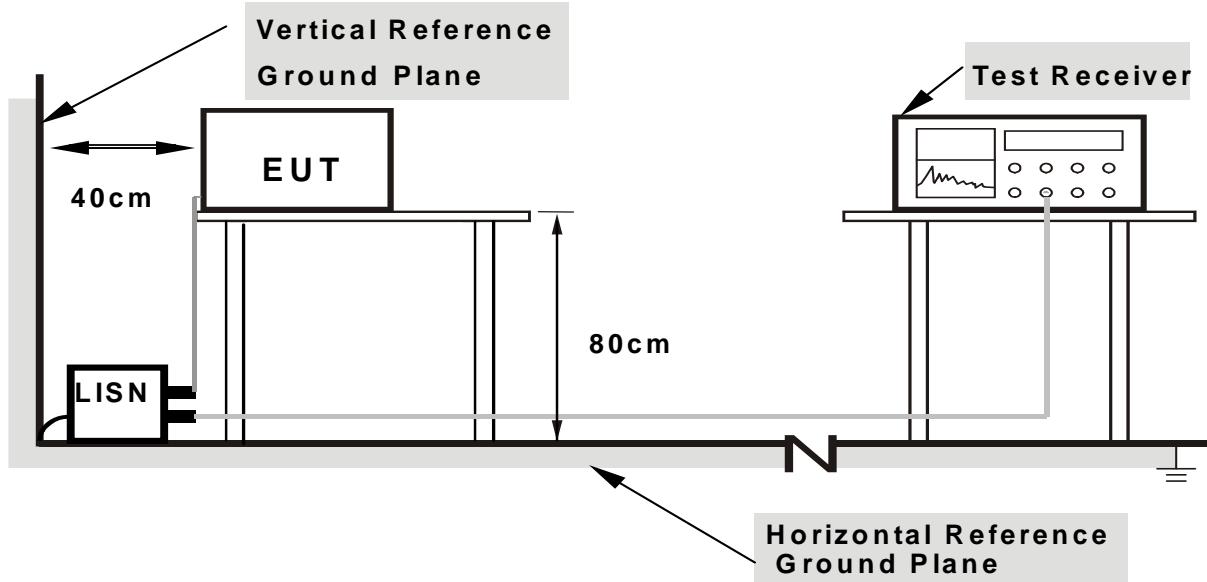
- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- 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 cm 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: AC 120V/60Hz

## 4.1.7 TEST RESULTS

Please refer to the Attachment A.

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.



## 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 $\mu$ V/m (94 dB $\mu$ V/m) @ 3 m	2400-2483.5
Field strength of harmonics 500 $\mu$ V/m (54 dB $\mu$ V/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

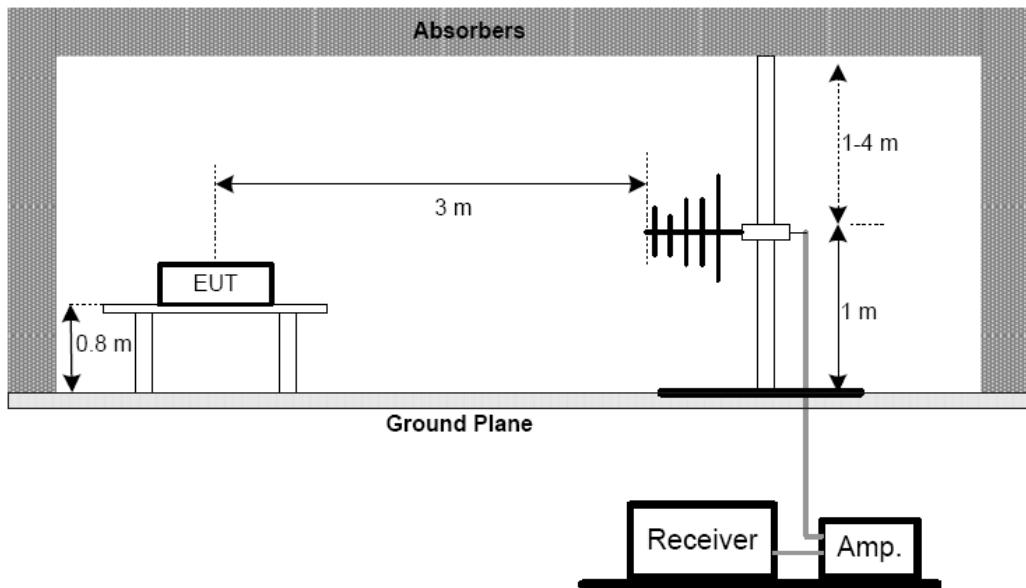
- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 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

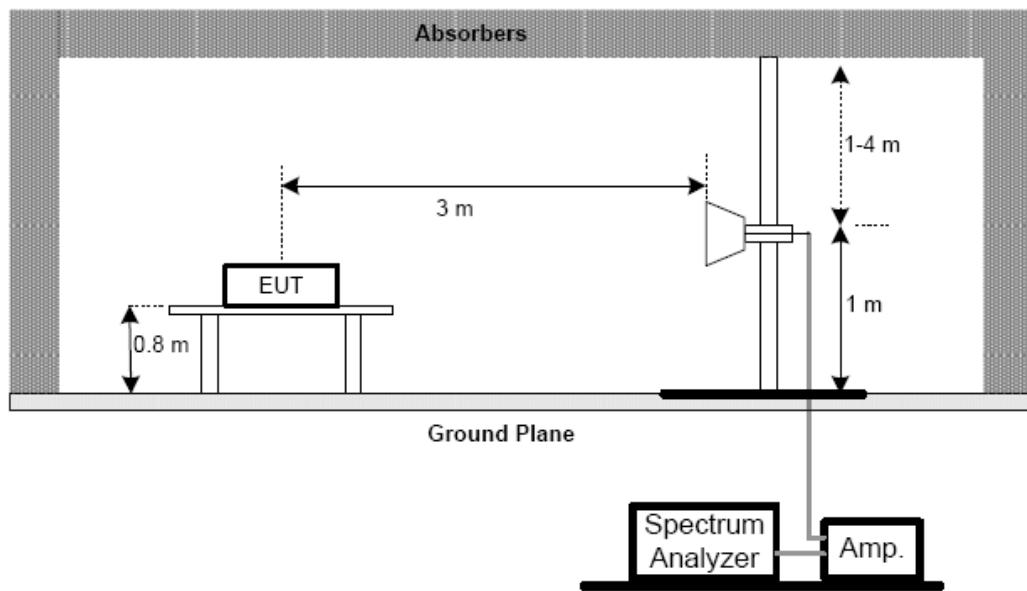
No deviation

#### 4.2.4 TEST SETUP

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

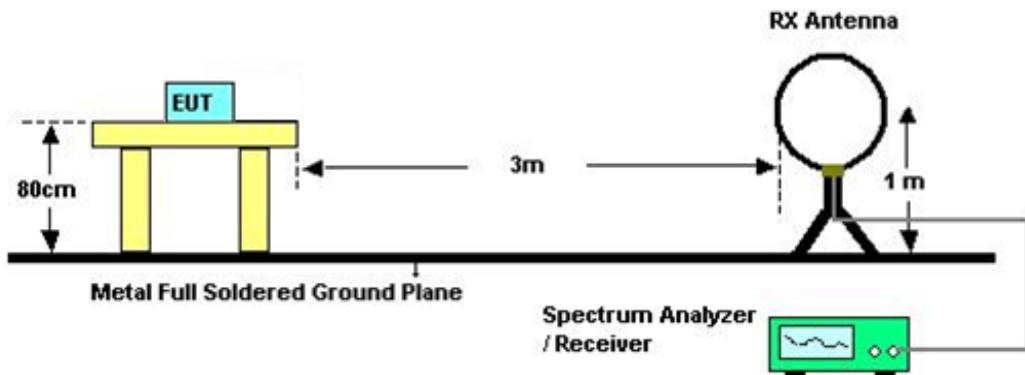


##### (B) Radiated Emission Test Set-Up Frequency Above 1 GHz





(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: AC 120V/60Hz

#### 4.2.7 TEST RESULTS (BELOW 30MHz)

Please refer to the Attachment B.

##### 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 =  $40 \log (\text{specific distance} / \text{test distance})$  (dB);.
- (3) Limit line = specific limits (dBuV) + distance extrapolation factor..

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

Please refer to the Attachment C

##### 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 .



## 4.2.9 TEST RESULTS (ABOVE 1000 MHz)

Please refer to the Attachment D

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) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission .
- (3) Data of measurement within this frequency range shown “ \* ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (5) EUT Orthogonal Axis :  
“X” - denotes Laid on Table ; “Y” - denotes Vertical Stand ; “Z” - denotes Side Stand
- (6) 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
- (7) The average value of fundamental frequency is:  
Average = Peak value + 20log(Duty cycle) ,Final AV=PK-19.49



## **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: AC 120V/60Hz

### **5.6 TEST RESULTS**

Please refer to the Attachment E



## **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.

### **6.2 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.

### **6.3 DEVIATION FROM STANDARD**

No deviation.

### **6.4 TEST SETUP**





## **6.5 EUT OPERATION CONDITIONS**

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

## **6.6 EUT TEST CONDITIONS**

Temperature: 25°C

Relative Humidity: 55%

Test Voltage: AC 120V/60Hz

## **6.7 TEST RESULTS**

Please refer to the Attachment F

**7. MEASUREMENT INSTRUMENTS LIST AND SETTING****Conducted Emission Measurement**

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	LISN	EMCO	3816/2	00052765	Mar. 29, 2015
2	LISN	R&S	ENV216	101447	Mar. 29, 2015
3	Test Cable	N/A	C_17	N/A	Mar. 14, 2015
4	EMI TEST RECEIVER	R&S	ESCS30	833364/017	Mar. 29, 2015
5	50Ω Terminator	SHX	TF2-3G-A	08122902	Mar. 29, 2015

**Radiated Emission Measurement**

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	Schwarbeck	VULB9160	9160-3232	Mar. 29, 2015
2	Amplifier	HP	8447D	2944A09673	Mar. 29, 2015
3	Test Receiver	R&S	ESCI	100382	Mar. 29, 2015
4	Test Cable	N/A	C-01_CB03	N/A	Jul. 02, 2014
5	Antenna	ETS	3115	00075789	Mar. 29, 2015
6	Amplifier	Agilent	8449B	3008A02274	Mar. 29, 2015
7	Spectrum	Agilent	E4408B	US39240143	Nov. 09, 2014
8	Test Cable	HUBER+SUHNER	C-45	N/A	Jan. 14, 2015
9	Controller	CT	SC100	N/A	N/A
10	Horn Antenna	EMCO	3115	9605-4803	Mar. 29, 2015
11	Active Loop Antenna	R&S	HFH2-Z2	830749/020	Mar. 29, 2015
12	Broad-Band Horn Antenna	Schwarbeck	BBHA 9170	9170319	Oct. 22, 2014

**Bandwidth**

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov. 11, 2014

**Antenna Conducted Spurious Emission**

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov. 11, 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**

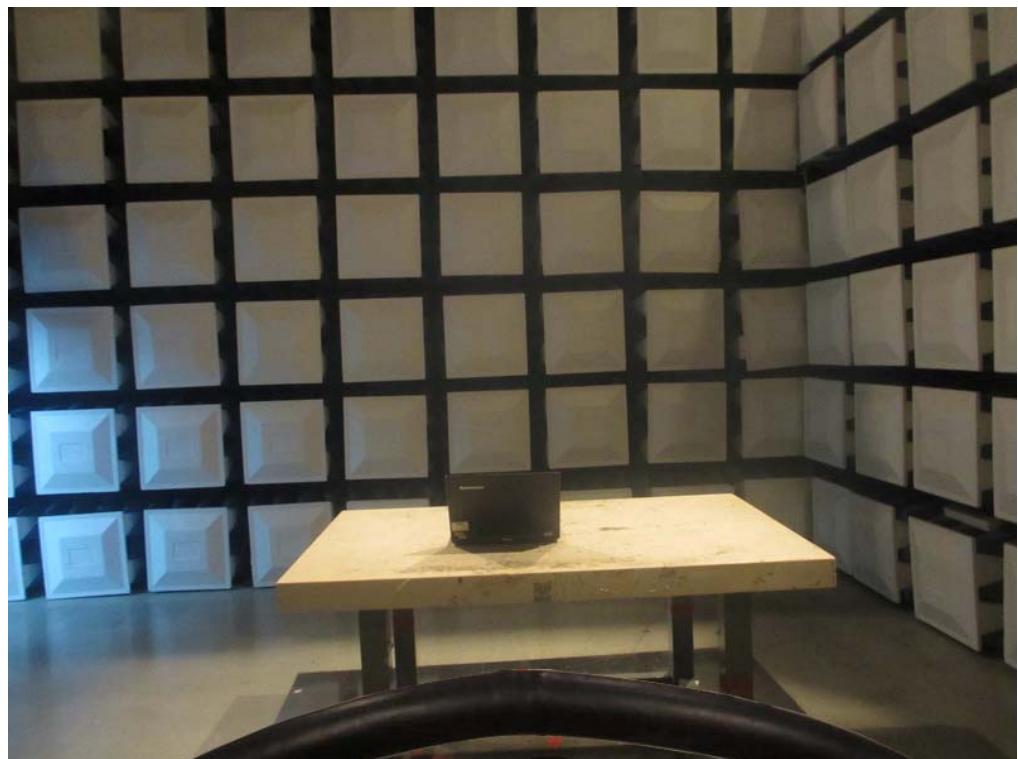
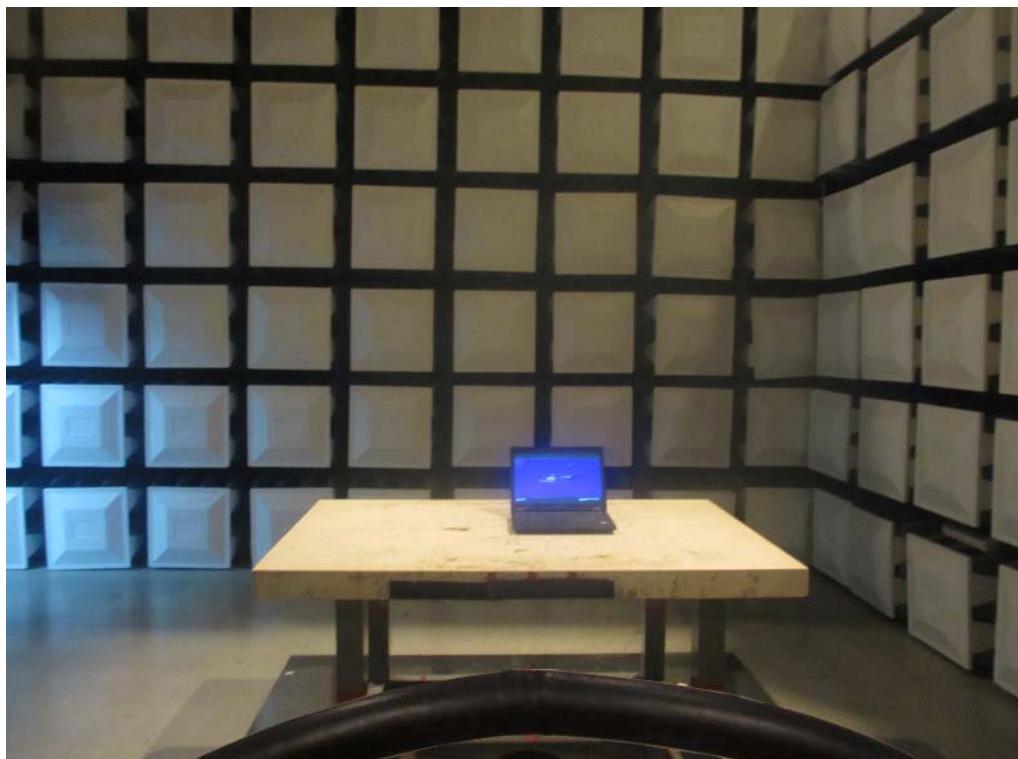
**Conducted Measurement Photos**





**Radiated Measurement Photos**

**9K~30MHz**





**Radiated Measurement Photos**

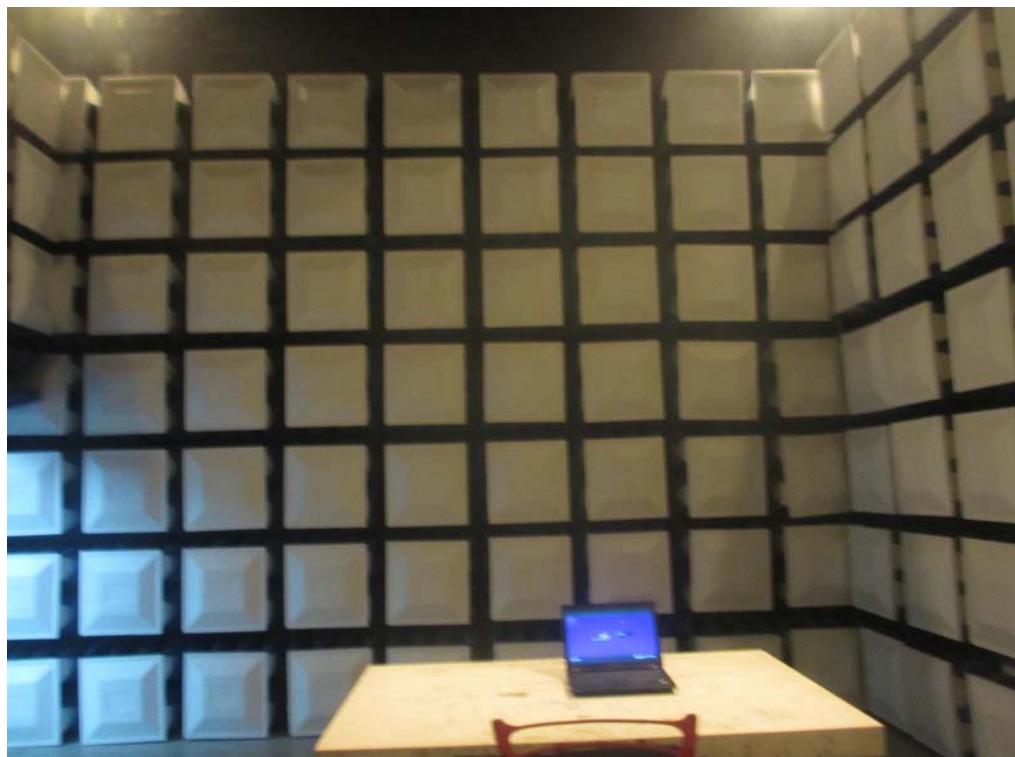
**30~1000MHz**





**Radiated Measurement Photos**

**Above 1GHz**





**Neutron Engineering Inc.**

## **ATTACHMENT A - CONDUCTED EMISSION**



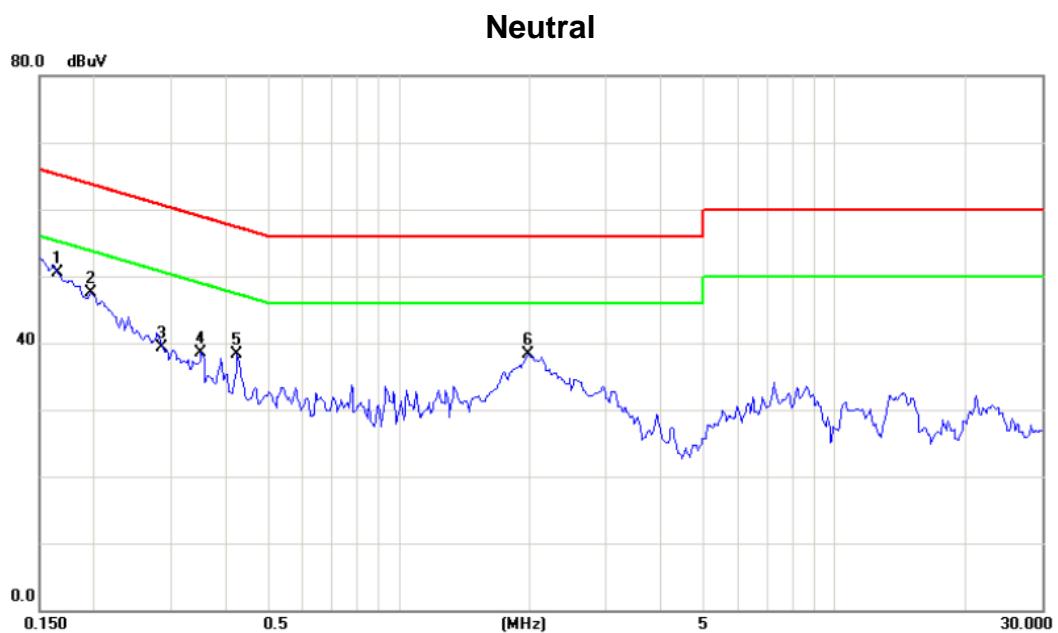
Test Mode : TX MODE



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV	dB			
1	*	0.1624	40.90	9.52	50.42	65.34	-14.92	peak	
2		0.2008	38.15	9.54	47.69	63.58	-15.89	peak	
3		0.3922	30.47	9.64	40.11	58.02	-17.91	peak	
4		0.4703	28.25	9.69	37.94	56.51	-18.57	peak	
5		0.8570	26.18	9.67	35.85	56.00	-20.15	peak	
6		2.0562	29.77	9.71	39.48	56.00	-16.52	peak	



Test Mode : TX MODE



No.	Mk.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
		Freq.	Level	Factor				
		MHz	dBuV	dB	dBuV	dB		
1	*	0.1655	40.84	9.62	50.46	65.18	-14.72	peak
2		0.1970	37.84	9.61	47.45	63.74	-16.29	peak
3		0.2878	29.66	9.62	39.28	60.59	-21.31	peak
4		0.3531	28.92	9.63	38.55	58.89	-20.34	peak
5		0.4273	28.61	9.63	38.24	57.31	-19.07	peak
6		1.9820	28.53	9.74	38.27	56.00	-17.73	peak



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## **ATTACHMENT B - RADIATED EMISSION (9KHZ to 30MHZ)**



Test Mode: TX Mode TX 2409MHz

Freq. (MHz)	Ant. 0°/90°	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
0.0098	0°	22.59	24.30	46.89	127.78	-80.89	AVG
0.0098	0°	25.57	24.30	49.87	147.78	-97.91	PEAK
0.0255	0°	21.64	23.95	45.59	119.46	-73.87	AVG
0.0255	0°	24.31	23.95	48.26	139.46	-91.20	PEAK
0.0388	0°	21.51	23.11	44.62	115.84	-71.22	AVG
0.0388	0°	24.38	23.11	47.49	135.84	-88.35	PEAK
0.0635	0°	18.73	22.13	40.86	111.55	-70.69	AVG
0.0635	0°	23.92	22.13	46.05	131.55	-85.50	PEAK
0.2672	0°	20.63	20.36	40.99	99.07	-58.08	AVG
0.2672	0°	22.88	20.36	43.24	119.07	-75.83	PEAK
1.4736	0°	27.12	19.55	46.67	64.24	-17.56	QP

Freq. (MHz)	Ant. 0°/90°	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
0.0097	90°	19.42	24.30	43.72	127.85	-84.13	AVG
0.0097	90°	20.28	24.30	44.58	147.85	-103.27	PEAK
0.0223	90°	15.54	24.15	39.69	120.63	-80.94	AVG
0.0223	90°	17.42	24.15	41.57	140.63	-99.06	PEAK
0.0462	90°	18.95	22.64	41.59	114.32	-72.72	AVG
0.0462	90°	21.27	22.64	43.91	134.32	-90.40	PEAK
0.0773	90°	21.11	21.85	42.96	109.84	-66.88	AVG
0.0773	90°	22.27	21.85	44.12	129.84	-85.72	PEAK
0.3758	90°	21.38	20.10	41.48	96.10	-54.63	AVG
0.3758	90°	24.55	20.10	44.65	116.10	-71.46	PEAK
1.7162	90°	25.95	19.53	45.48	69.54	-24.06	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 =  $40 \log (\text{specific distance} / \text{test distance})$  (dB);
- (3) Limit line = specific limits (dBuV) + distance extrapolation factor.

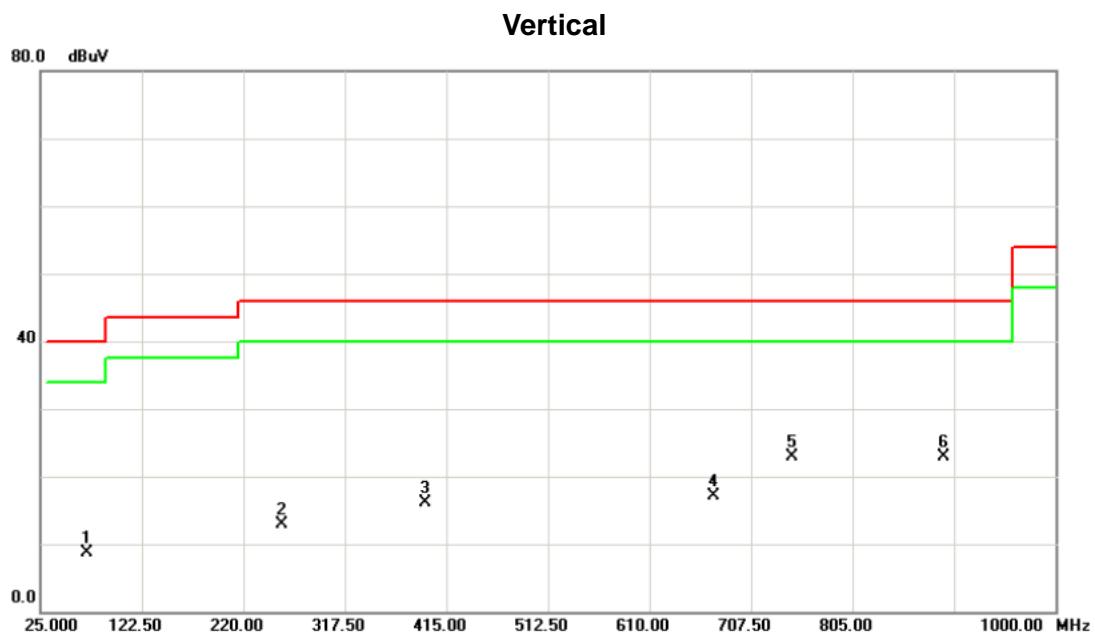


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## **ATTACHMENT C - RADIATED EMISSION (30MHZ TO 1000MHZ)**



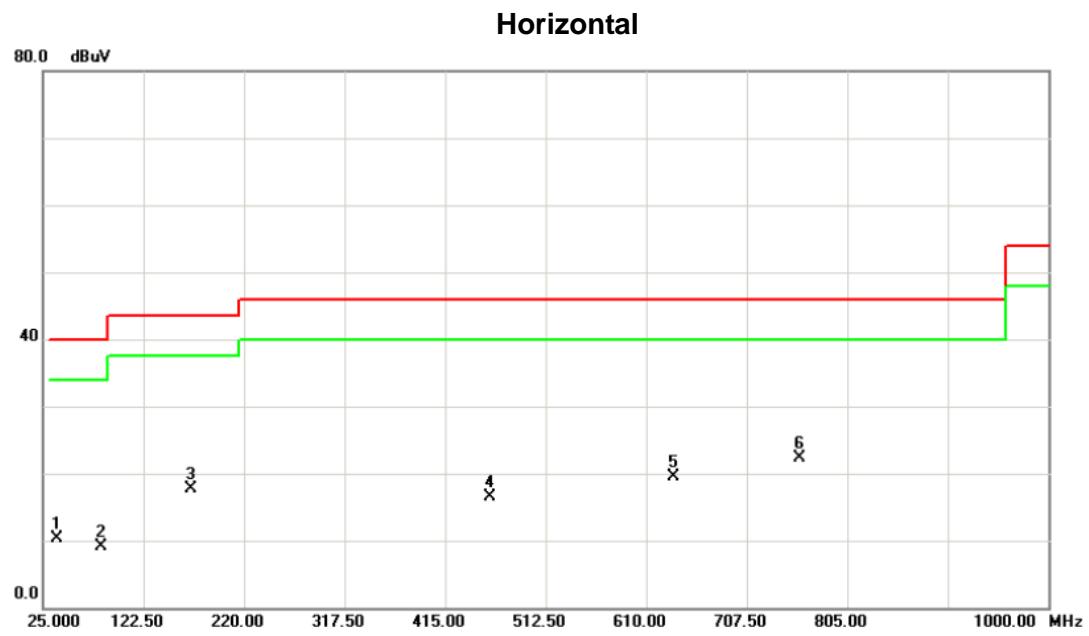
Test Mode: TX 2409MHz



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		69.8500	35.03	-26.28	8.75	40.00	-31.25	peak	
2		257.0500	28.67	-15.70	12.97	46.00	-33.03	peak	
3		394.5250	30.37	-14.32	16.05	46.00	-29.95	peak	
4		671.4250	30.17	-13.02	17.15	46.00	-28.85	peak	
5		746.5000	29.87	-6.91	22.96	46.00	-23.04	peak	
6	*	892.7500	31.84	-8.85	22.99	46.00	-23.01	peak	



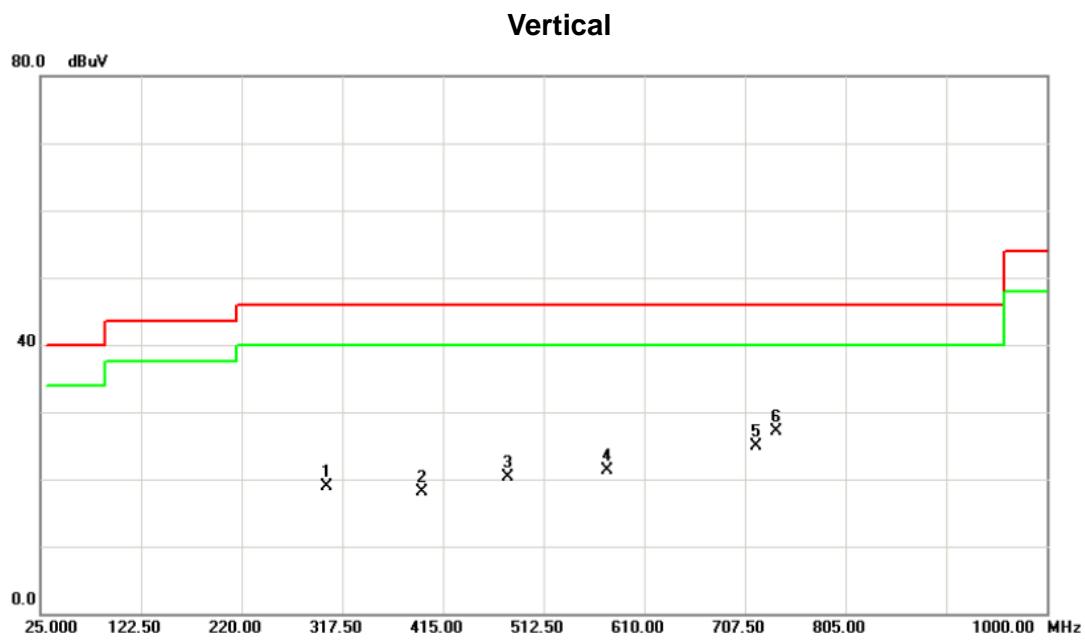
Test Mode: TX 2409MHz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dB	Detector	Comment
1		38.6500	31.44	-21.07	10.37	40.00	-29.63	peak
2		81.5500	36.40	-27.24	9.16	40.00	-30.84	peak
3		168.3250	38.96	-21.23	17.73	43.50	-25.77	peak
4		457.9000	29.84	-13.39	16.45	46.00	-29.55	peak
5		636.3250	29.91	-10.46	19.45	46.00	-26.55	peak
6	*	758.2000	30.36	-8.01	22.35	46.00	-23.65	peak



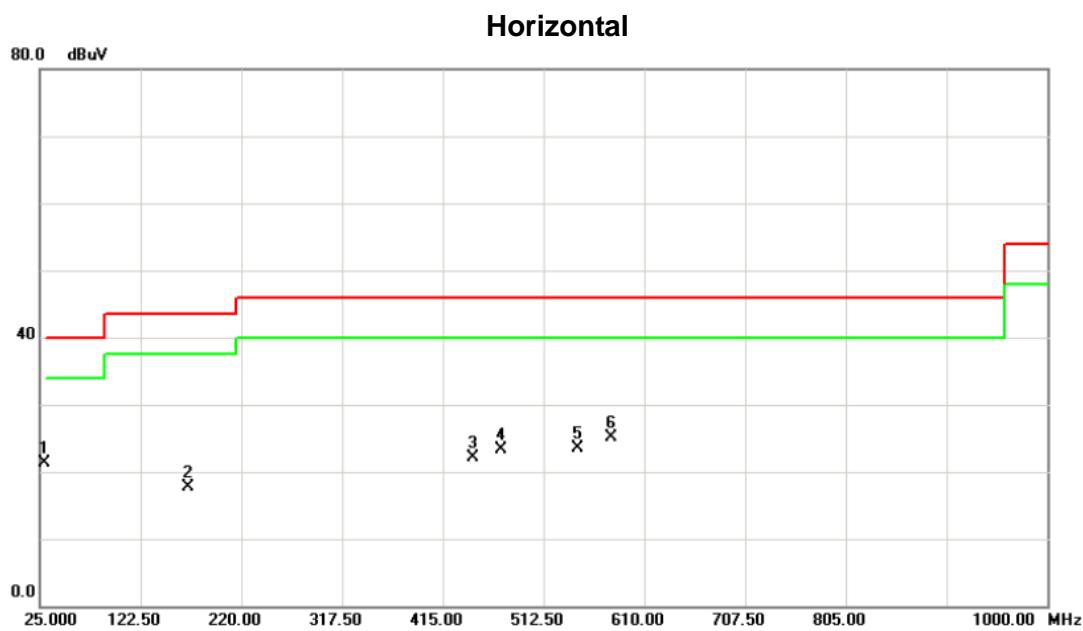
Test Mode: TX 2440MHz



No. Mk.	Freq. MHz	Reading	Correct	Measure-	Limit	Over	Detector	Comment
		Level dBuV	Factor dB	ment dBuV				
1	302.8750	38.11	-19.27	18.84	46.00	-27.16	peak	
2	394.5250	33.44	-15.24	18.20	46.00	-27.80	peak	
3	477.4000	34.46	-14.14	20.32	46.00	-25.68	peak	
4	573.9250	34.10	-12.84	21.26	46.00	-24.74	peak	
5	718.2250	34.26	-9.40	24.86	46.00	-21.14	peak	
6 *	737.7250	35.18	-8.08	27.10	46.00	-18.90	peak	



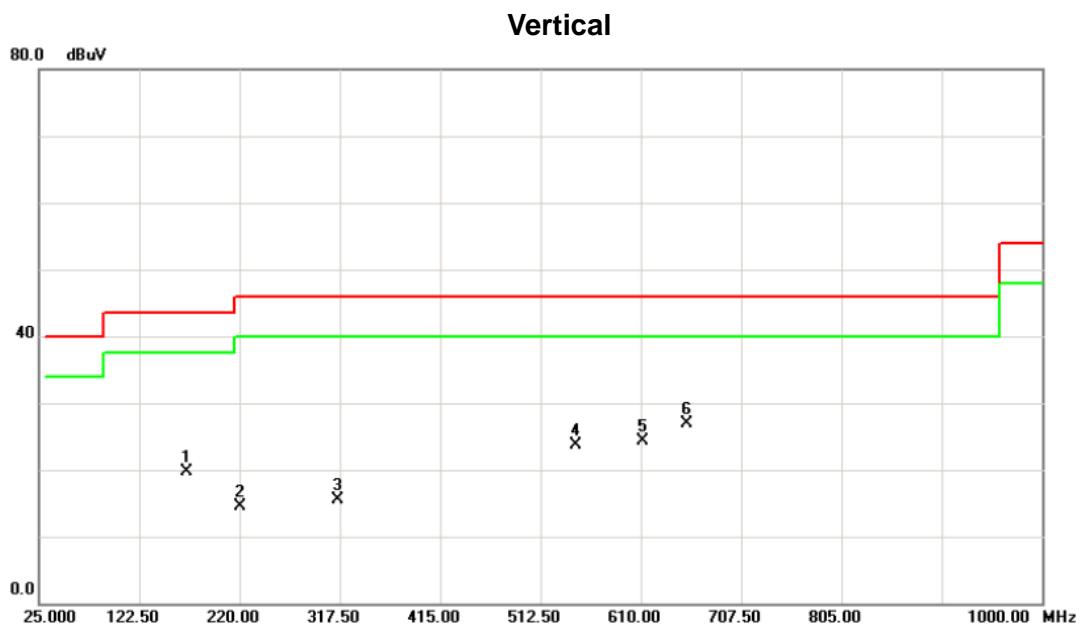
Test Mode: TX 2440MHz



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV	dBuV	dB		
1	*	29.8750	37.73	-16.40	21.33	40.00	-18.67	peak	
2		168.3250	38.96	-21.23	17.73	43.50	-25.77	peak	
3		444.2500	36.17	-13.97	22.20	46.00	-23.80	peak	
4		471.5500	37.12	-13.88	23.24	46.00	-22.76	peak	
5		545.6500	36.07	-12.52	23.55	46.00	-22.45	peak	
6		577.8250	38.09	-12.95	25.14	46.00	-20.86	peak	



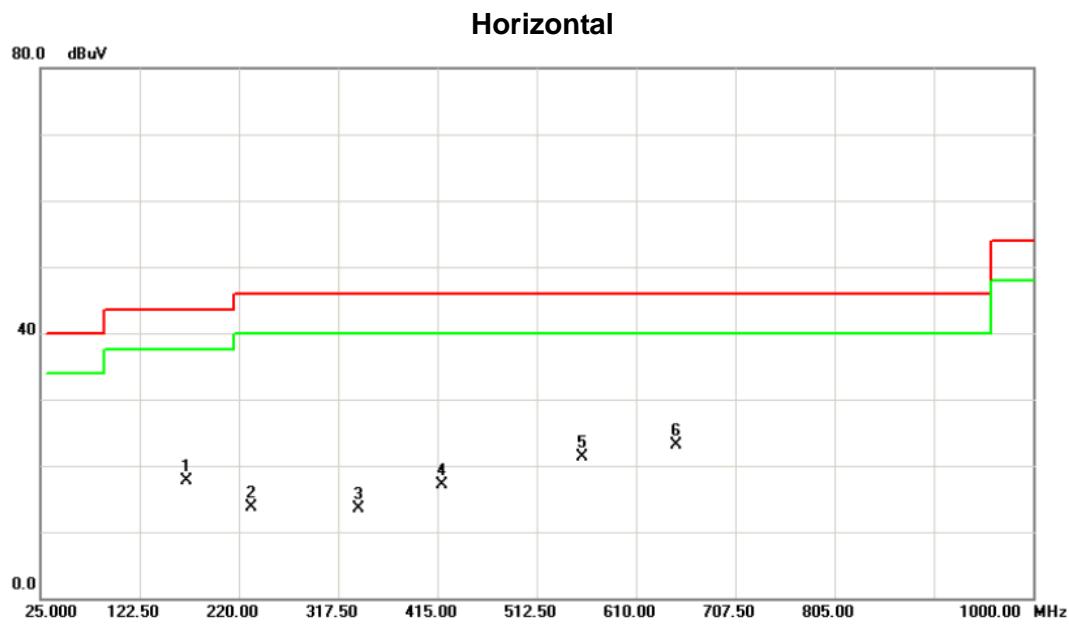
Test Mode: TX 2476MHz



No. Mk.	Freq. MHz	Reading Level	Correct Factor	Measure- ment	Limit	Over	Detector	Comment
		dBuV	dB	dBuV	dB	Over		
1	168.3250	40.96	-21.23	19.73	43.50	-23.77	peak	
2	220.9750	36.71	-22.12	14.59	46.00	-31.41	peak	
3	315.5500	34.89	-19.37	15.52	46.00	-30.48	peak	
4	546.6250	36.20	-12.47	23.73	46.00	-22.27	peak	
5	611.9500	36.50	-12.15	24.35	46.00	-21.65	peak	
6 *	654.8500	37.57	-10.59	26.98	46.00	-19.02	peak	



Test Mode: TX 2476MHz



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		168.3250	38.96	-21.23	17.73	43.50	-25.77	peak	
2		232.6750	35.69	-22.08	13.61	46.00	-32.39	peak	
3		337.9750	33.23	-19.75	13.48	46.00	-32.52	peak	
4		419.8750	31.65	-14.60	17.05	46.00	-28.95	peak	
5		557.3500	33.78	-12.40	21.38	46.00	-24.62	peak	
6	*	649.9750	33.35	-10.32	23.03	46.00	-22.97	peak	



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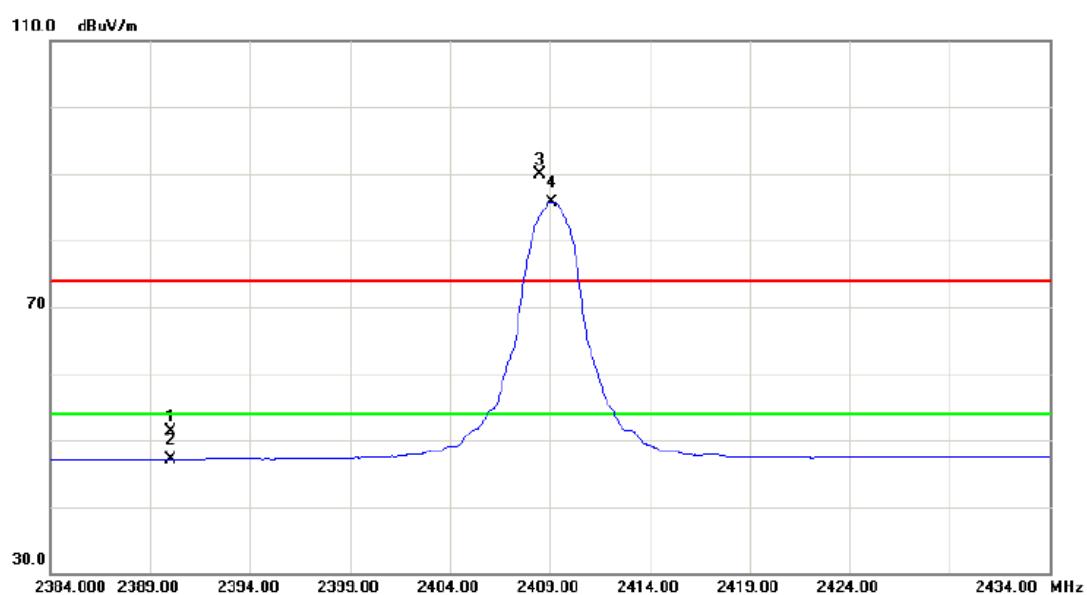
**ATTACHMENT D - RADIATED EMISSION (ABOVE 1000MHZ)**



Orthogonal Axis : X

Test Mode : TX 2409MHz

## Vertical

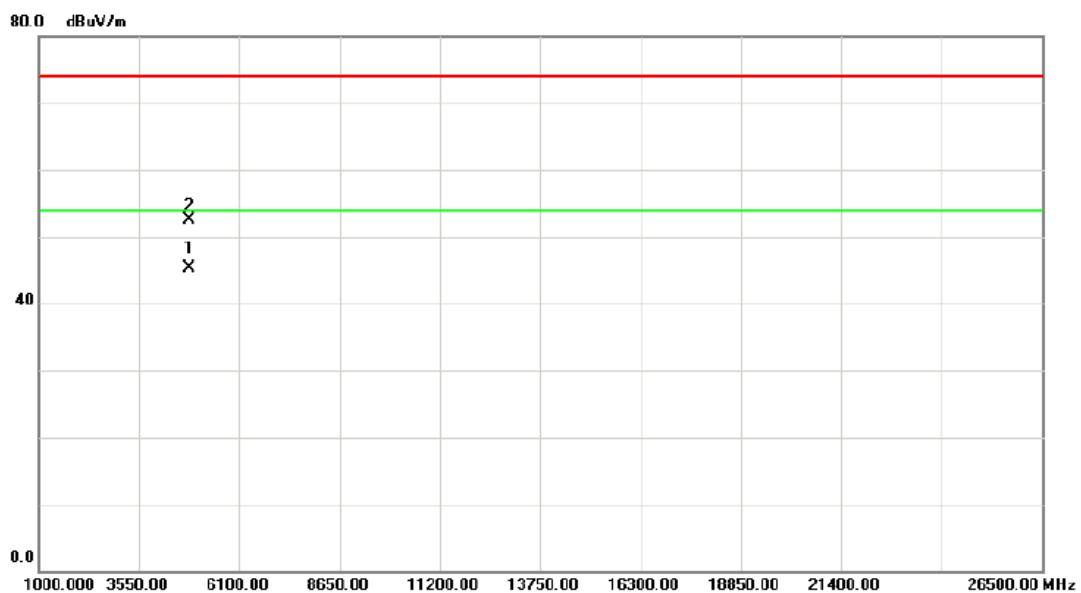


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2390.000	17.89	33.38	51.27	74.00	-22.73	peak	
2		2390.000	13.74	33.38	47.12	54.00	-6.88	AVG	
3	X	2408.500	56.41	33.43	89.84	74.00	15.84	peak	Fundamental frequency, no limit
4	*	2409.100	52.37	33.43	85.80	54.00	31.80	AVG	Fundamental frequency, no limit



Orthogonal Axis :	X
Test Mode :	TX 2409MHz

**Vertical**

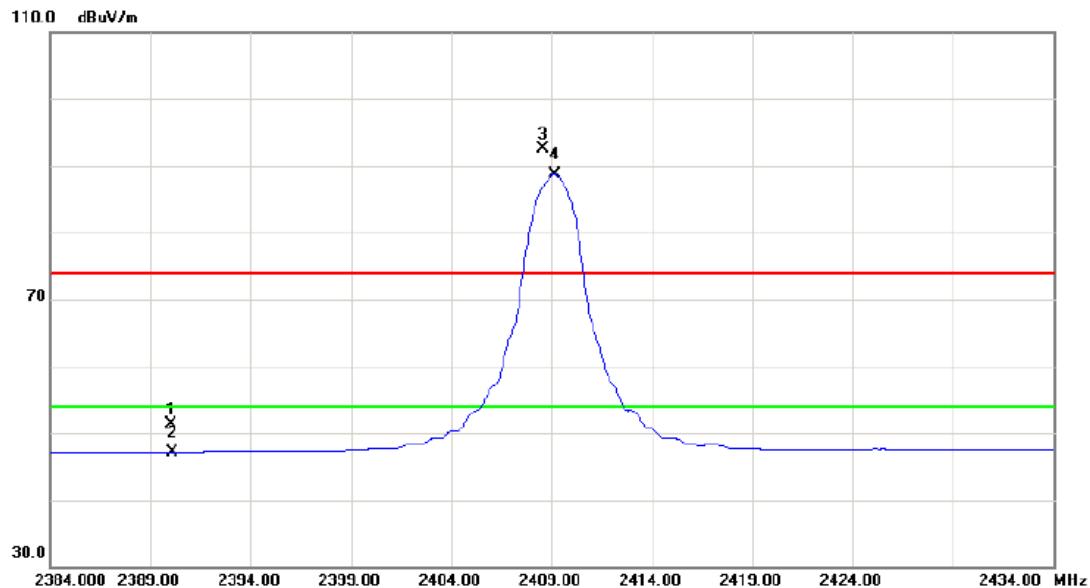


No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
1	*	4819.150	38.97	6.42	45.39	54.00	-8.61	AVG	
2		4819.150	46.13	6.42	52.55	74.00	-21.45	peak	



Orthogonal Axis :	X
Test Mode :	TX 2409MHz

## Horizontal

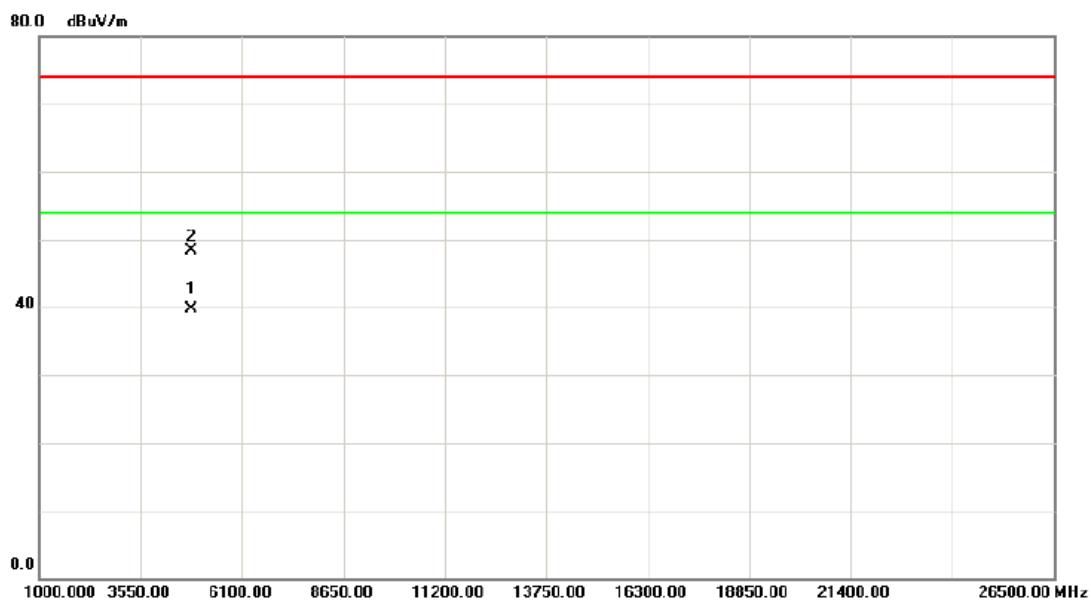


No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
1		2390.000	18.02	33.38	51.40	74.00	-22.60	peak	
2		2390.000	13.75	33.38	47.13	54.00	-6.87	AVG	
3	X	2408.550	59.16	33.43	92.59	74.00	18.59	peak	Fundamental frequency, no limit
4	*	2409.150	55.21	33.43	88.64	54.00	34.64	AVG	Fundamental frequency, no limit



Orthogonal Axis :	X
Test Mode :	TX 2409MHz

**Horizontal**



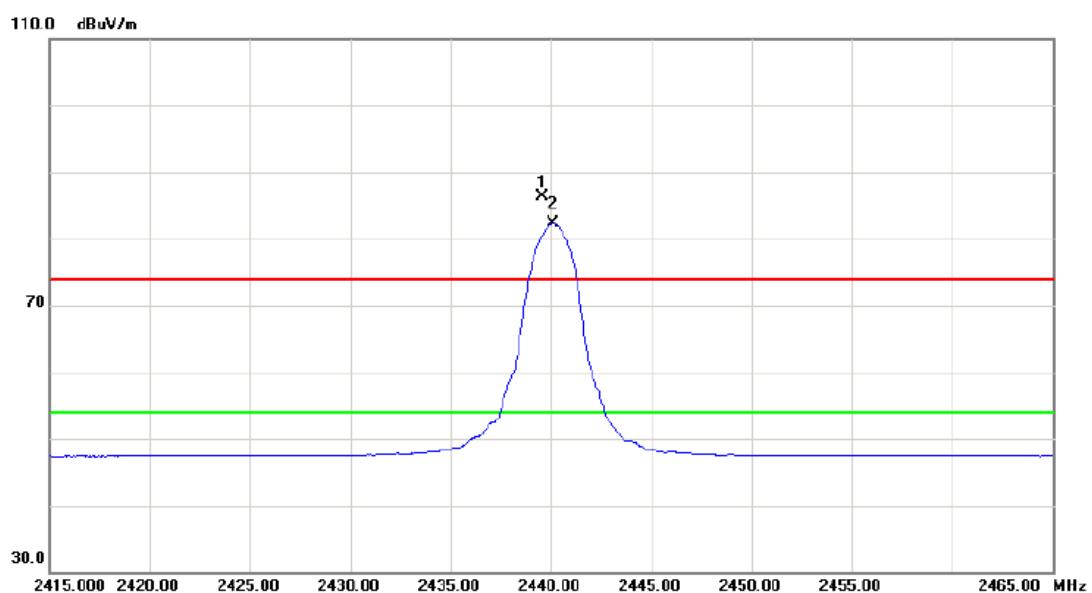
No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV/m	dB			
1	*	4819.150	33.31	6.42	39.73	54.00	-14.27	AVG	
2		4819.350	41.80	6.42	48.22	74.00	-25.78	peak	



Orthogonal Axis : X

Test Mode : TX 2440MHz

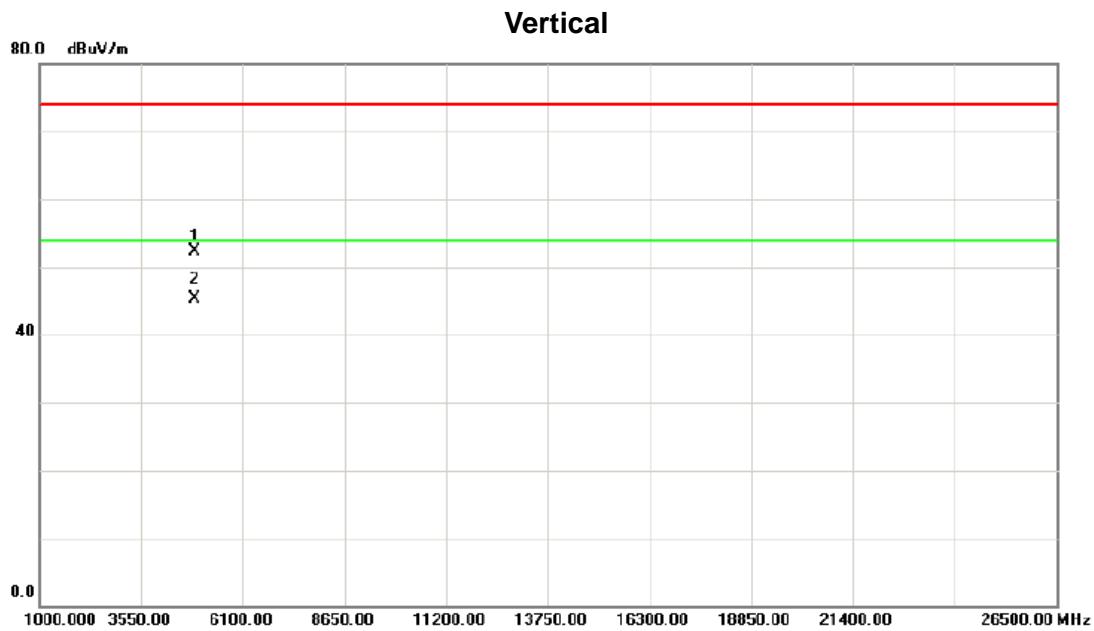
**Vertical**



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	X	2439.550	52.80	33.51	86.31	74.00	12.31	peak	Fundamental frequency, no limit
2	*	2440.100	48.75	33.51	82.26	54.00	28.26	AVG	Fundamental frequency, no limit



Orthogonal Axis :	X
Test Mode :	TX 2440MHz

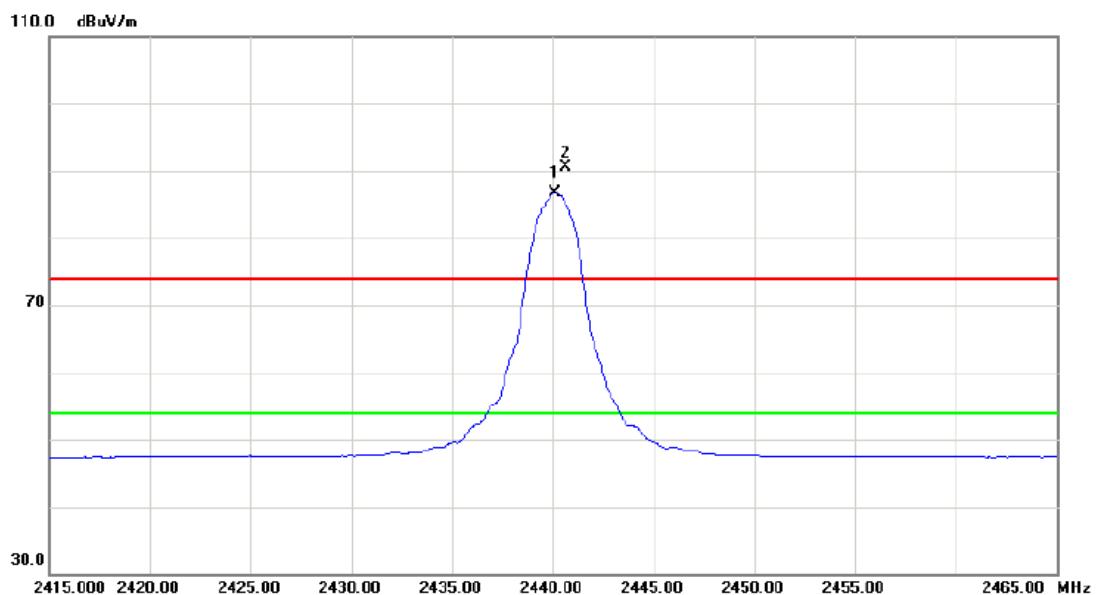


No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1		4878.950	45.76	6.57	52.33	74.00	-21.67	peak	
2	*	4881.150	38.82	6.57	45.39	54.00	-8.61	AVG	



Orthogonal Axis :	X
Test Mode :	TX 2440MHz

**Horizontal**

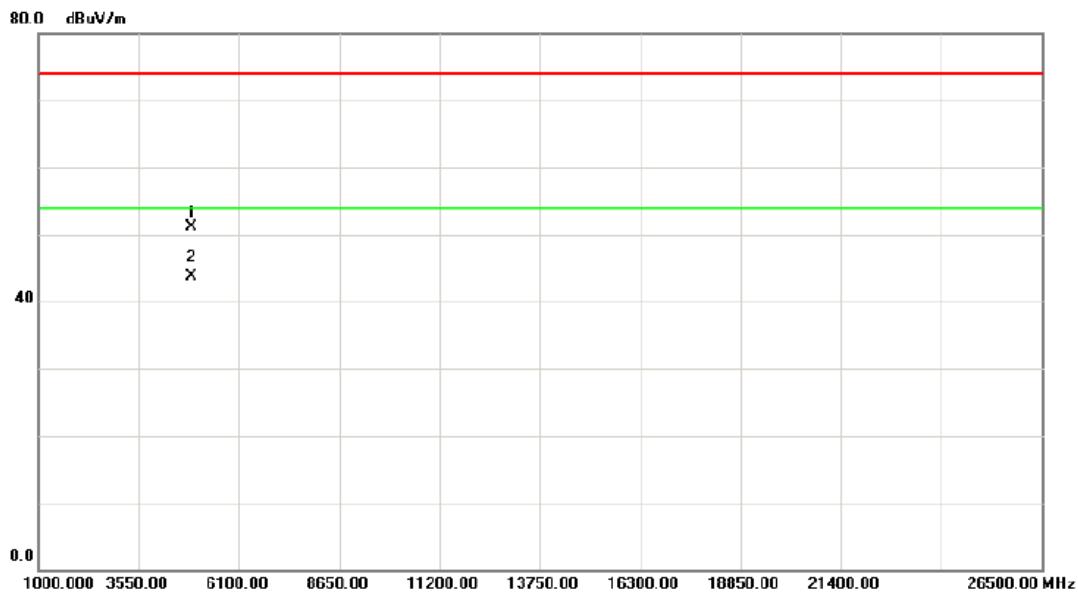


No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV/m	dB			
1	*	2440.100	53.20	33.51	86.71	54.00	32.71	AVG	Fundamental frequency, no limit
2	X	2440.600	57.07	33.51	90.58	74.00	16.58	peak	Fundamental frequency, no limit



Orthogonal Axis :	X
Test Mode :	TX 2440MHz

**Horizontal**

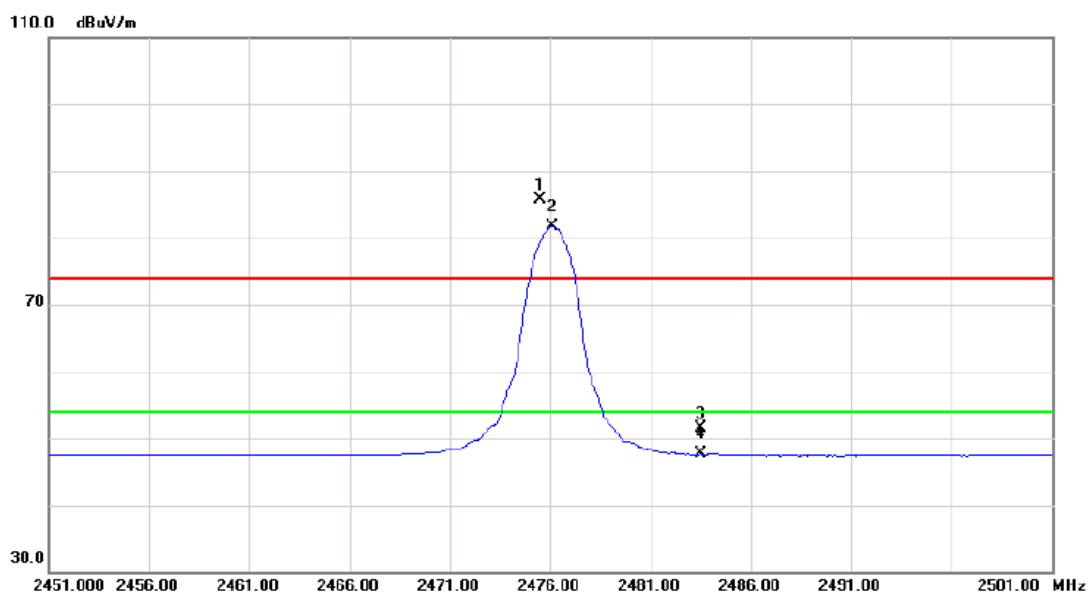


No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over
			Level	Factor	ment		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1		4881.150	44.58	6.57	51.15	74.00	-22.85
2	*	4881.150	37.08	6.57	43.65	54.00	-10.35
							AVG



Orthogonal Axis :	X
Test Mode :	TX 2476MHz

## Vertical

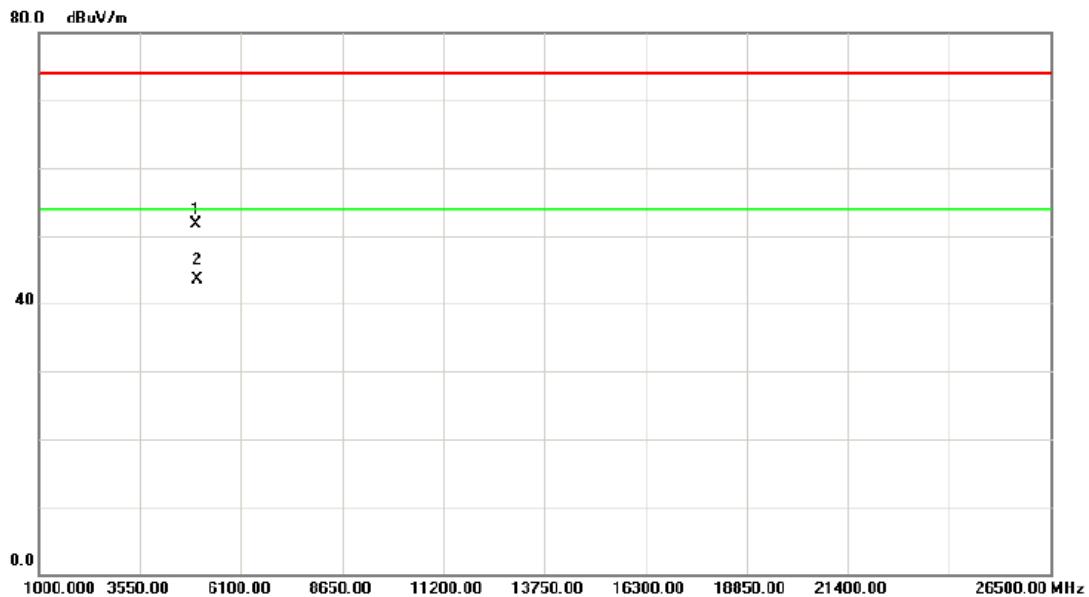


No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	X	2475.500	52.01	33.60	85.61	74.00	11.61	peak	Fundamental frequency, no limit
2	*	2476.100	48.16	33.60	81.76	54.00	27.76	AVG	Fundamental frequency, no limit
3		2483.500	17.89	33.62	51.51	74.00	-22.49	peak	
4		2483.500	13.99	33.62	47.61	54.00	-6.39	AVG	



Orthogonal Axis :	X
Test Mode :	TX 2476MHz

**Vertical**

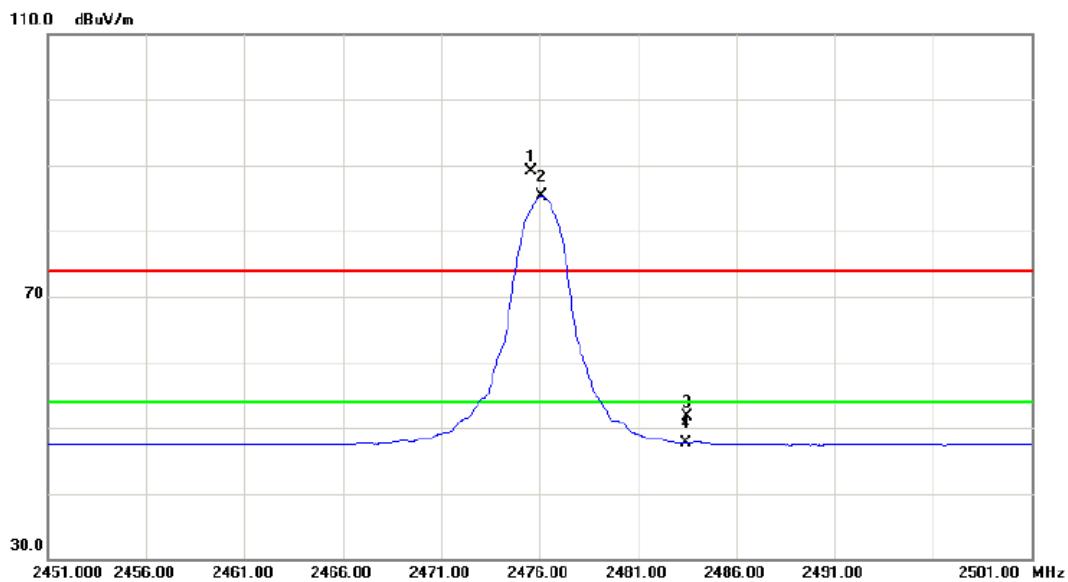


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector Comment
1		4953.150	45.00	6.73	51.73	74.00	-22.27	peak
2	*	4953.150	36.73	6.73	43.46	54.00	-10.54	AVG



Orthogonal Axis :	X
Test Mode :	TX 2476MHz

## Horizontal

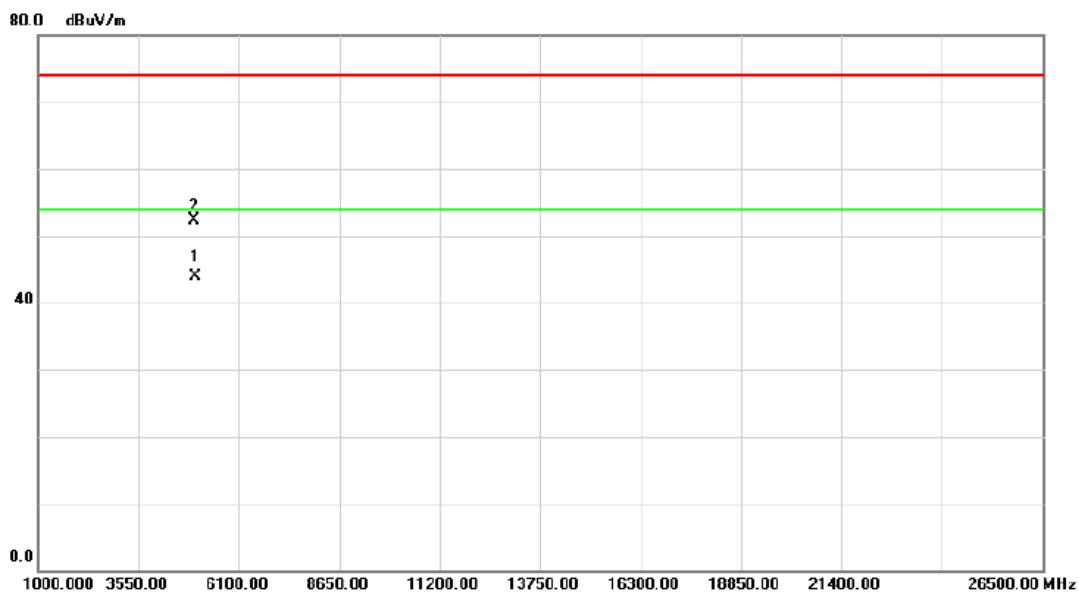


No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
1	X	2475.550	55.59	33.60	89.19	74.00	15.19	peak	Fundamental frequency, no limit
2	*	2476.100	51.72	33.60	85.32	54.00	31.32	AVG	Fundamental frequency, no limit
3		2483.500	18.03	33.62	51.65	74.00	-22.35	peak	
4		2483.500	14.10	33.62	47.72	54.00	-6.28	AVG	



Orthogonal Axis :	X
Test Mode :	TX 2476MHz

**Horizontal**



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over		
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	4953.100	37.09	6.72	43.81	54.00	-10.19	AVG	
	2	4953.150	45.52	6.73	52.25	74.00	-21.75	peak	

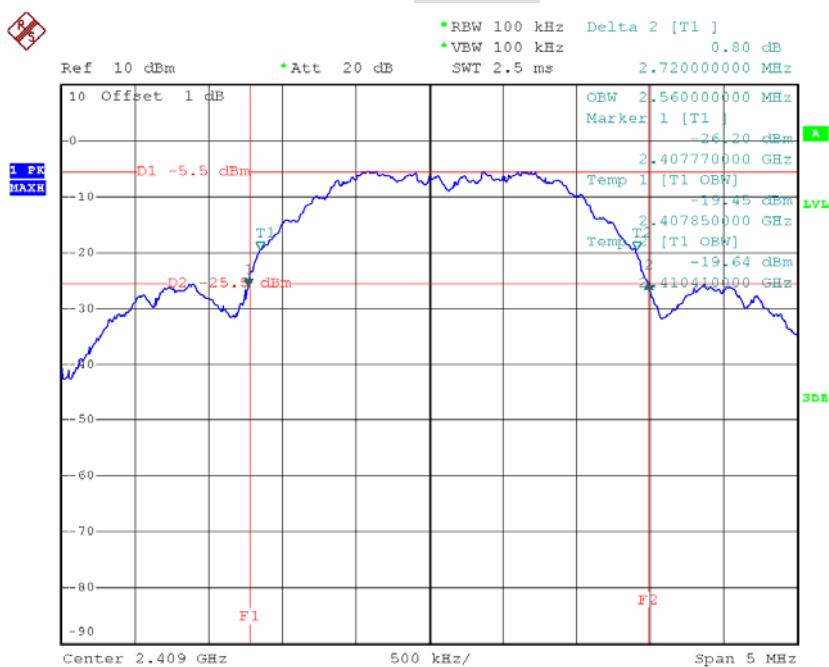


## **ATTACHMENT E - BANDWIDTH**



Test Mode : TX

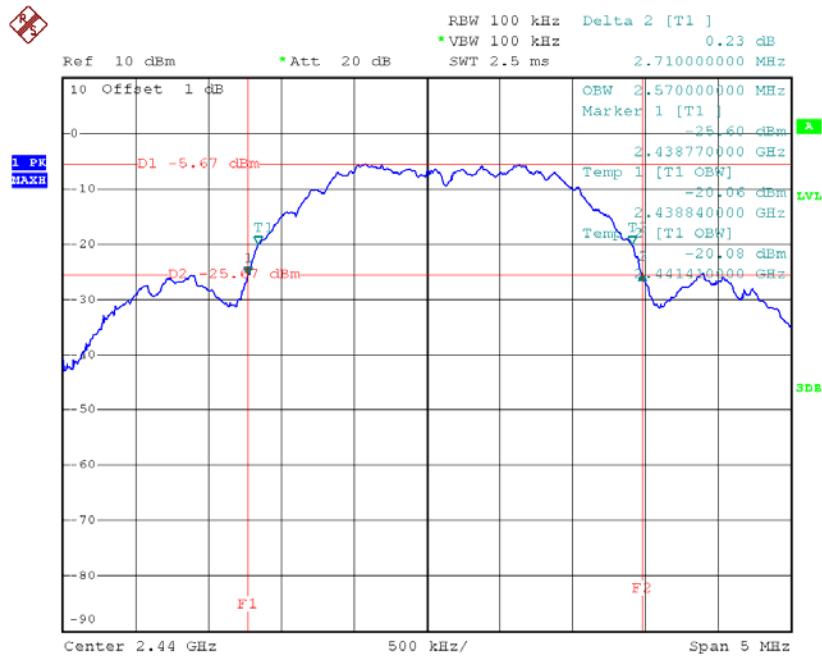
2409MHz



Date: 22.MAY.2014 05:40:49

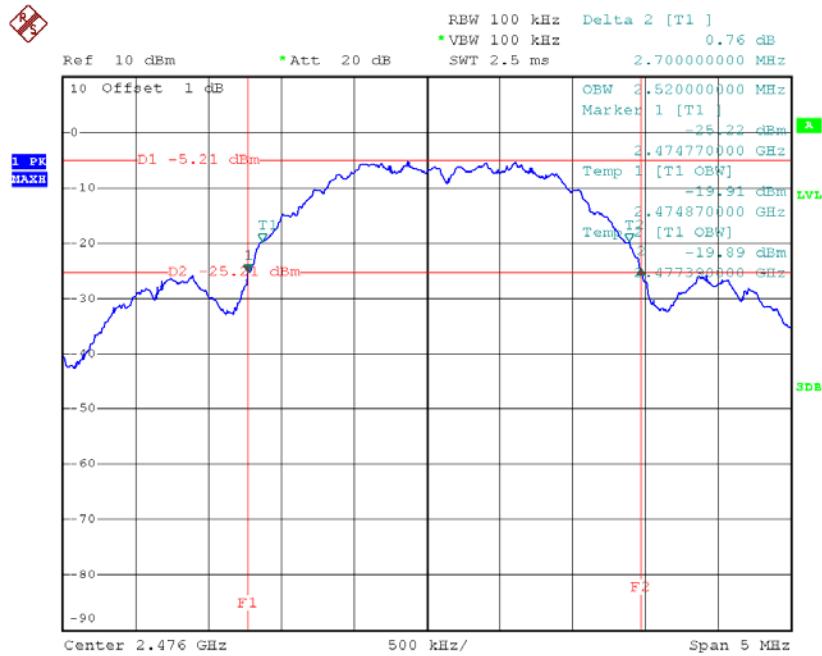


## 2440MHz



Date: 22.MAY.2014 05:46:40

## 2476MHz



Date: 22.MAY.2014 05:48:13



**ATTACHMENT F - ANTENNA CONDUCTED SPURIOUS  
EMISSION**

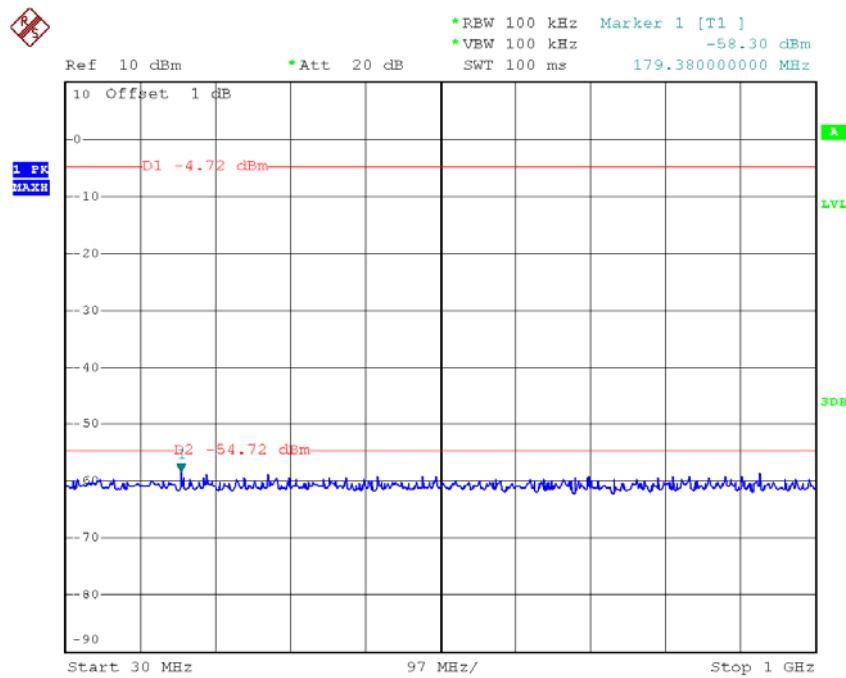


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<b>Test Mode :</b>	TX
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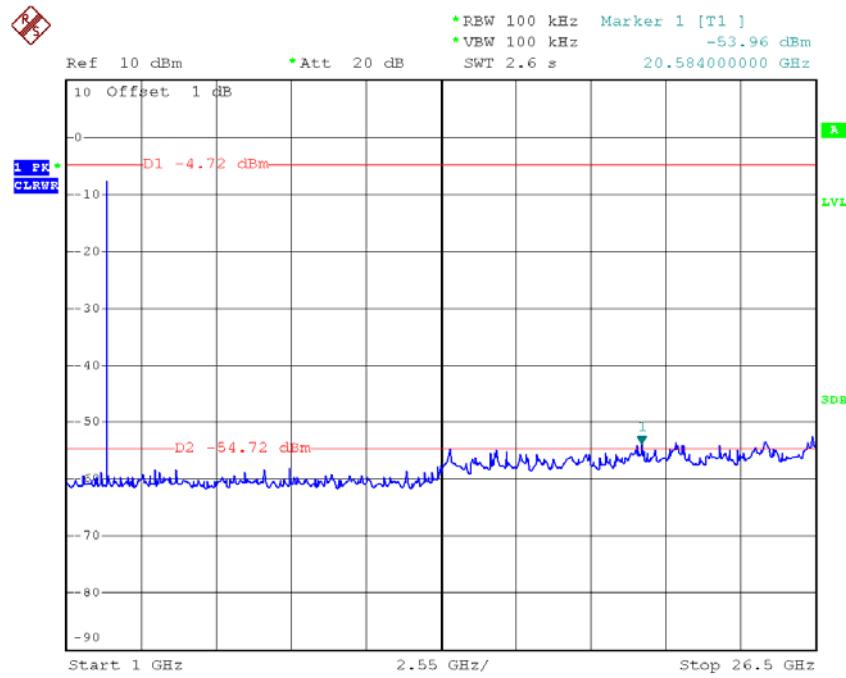


## 2409MHz (30MHz to 1000MHz)



Date: 23.MAY.2014 21:50:39

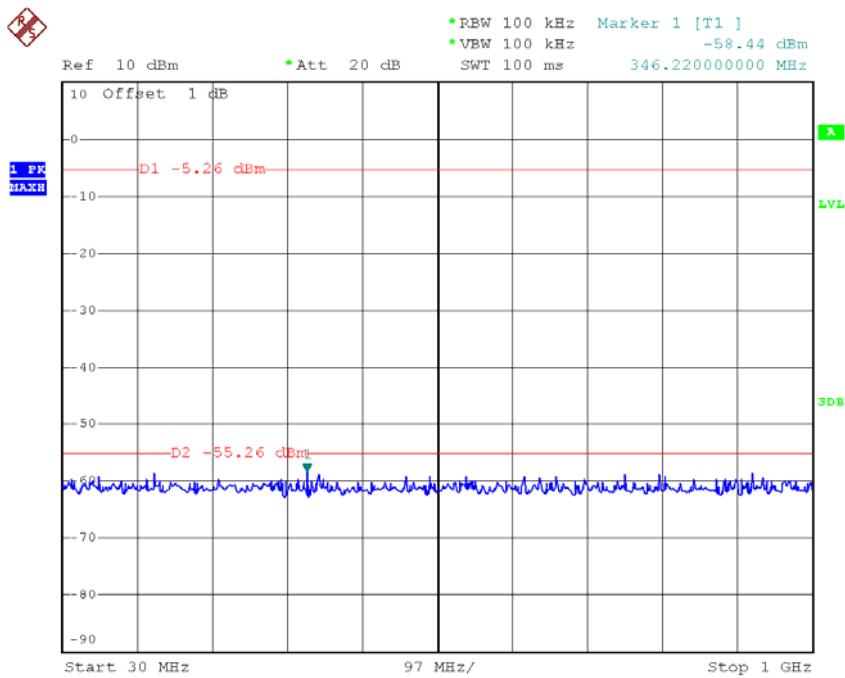
## 2409MHz (1000MHz to 10<sup>th</sup> Harmonic)



Date: 23.MAY.2014 21:54:08

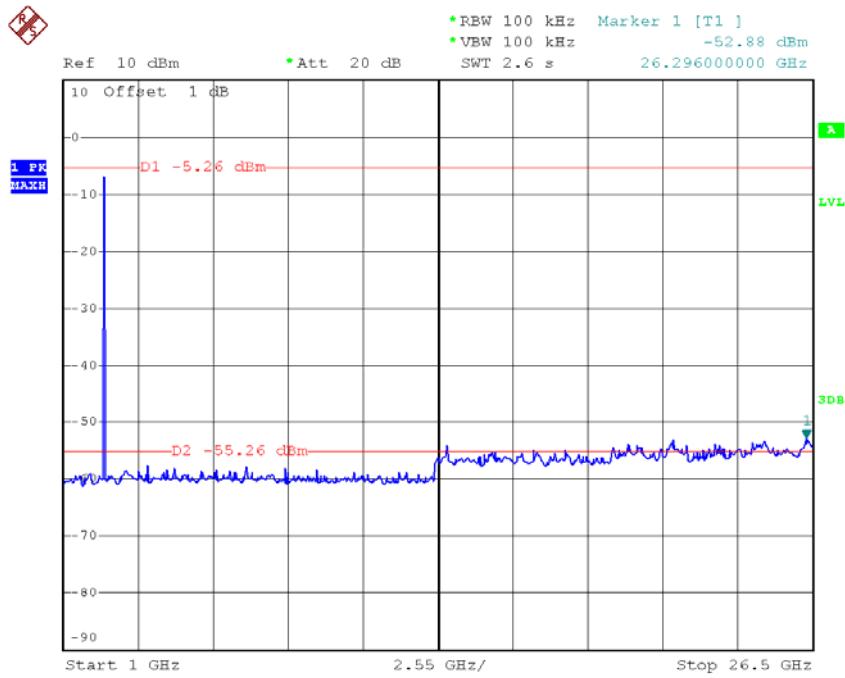


## 2440MHz (30MHz to 1000MHz)



Date: 23.MAY.2014 21:56:56

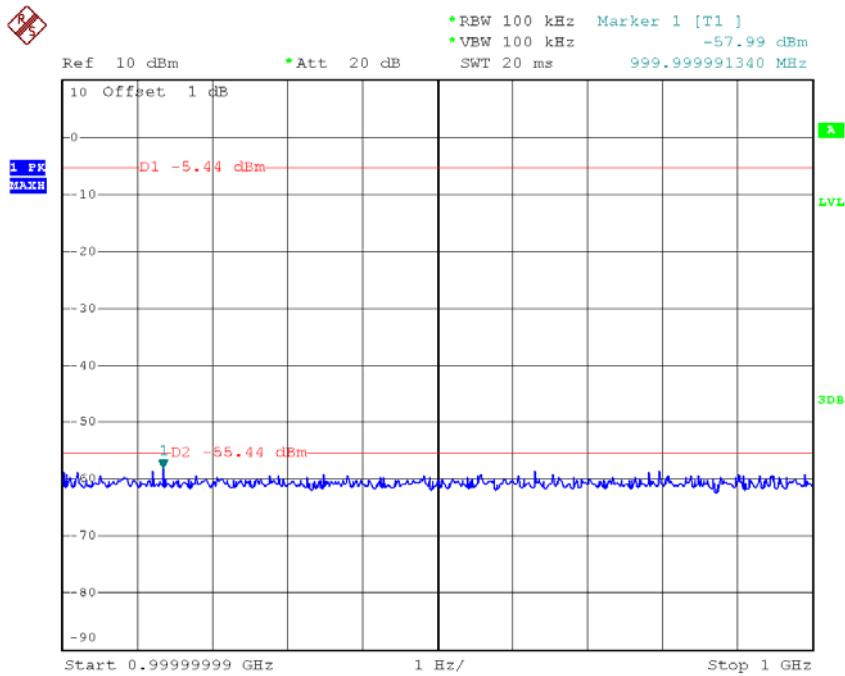
## 2440MHz (1000MHz to 10<sup>th</sup> Harmonic)



Date: 23.MAY.2014 21:57:23

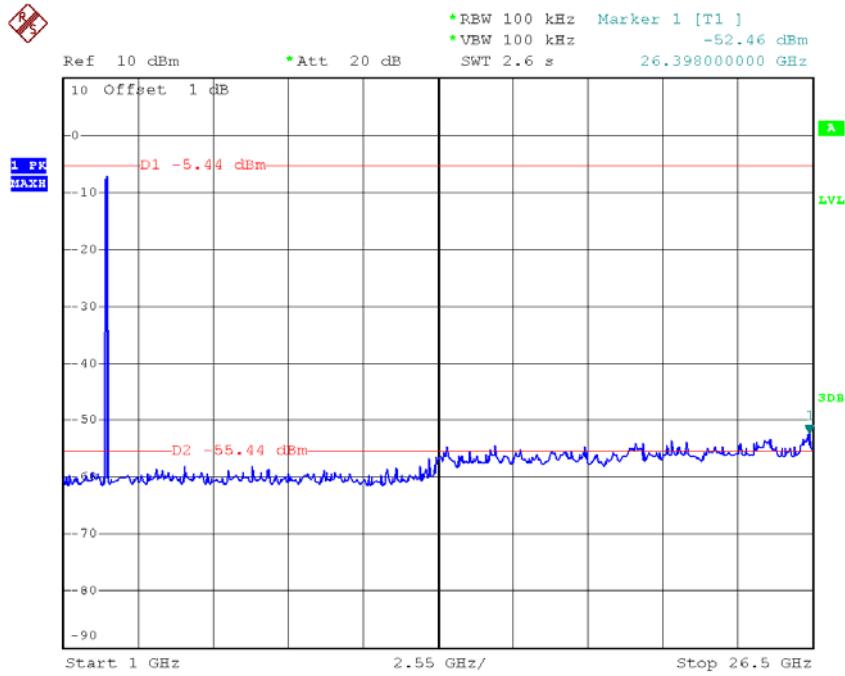


### 2476MHz (30MHz to 1000MHz)



Date: 23.MAY.2014 22:01:12

## 2476MHz (1000MHz to 10<sup>th</sup> Harmonic)



Date: 23.MAY.2014 22:01:35