FCC Radio Test Report

FCC ID: PKNCM-163N

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

Project No.	:	1403C209
Equipment	:	Optical 2.4GHz Wireless Nano Mouse
Model Name	:	CM-163; MP2120RED; MP2120BLU; MP2120WHT; MP2120BLK
Applicant	:	Zhuoheng Electronics Co., Limited
Address	:	No.8.Lane 5.shangnan Road,The 5Th Industrial Area, Nance,Humen Town, DongGuan City, China.

Tested by: Neutron Engineering Inc. EMC Laboratory
Date of Receipt: Mar. 26, 2014
Date of Test: Mar. 26, 2014~ May. 19, 2014
Issued Date: May. 21, 2014

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Testing Laboratory
2640

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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Table of Contents **Page**

1 . CERTIFICATION 6

2 . SUMMARY OF TEST RESULTS 7

2.1 TEST FACILITY 8

2.2 MEASUREMENT UNCERTAINTY 8

3 . GENERAL INFORMATION 9

3.1 GENERAL DESCRIPTION OF EUT 9

3.2 DESCRIPTION OF TEST MODES 10

3.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED 11

3.4 DESCRIPTION OF SUPPORT UNITS 11

4 . EMC EMISSION TEST 12

4.1 CONDUCTED EMISSION MEASUREMENT 12

4.1.1 POWER LINE CONDUCTED EMISSION 12

4.1.2 TEST PROCEDURE 12

4.1.3 DEVIATION FROM TEST STANDARD 12

4.1.4 TEST SETUP 13

4.1.5 EUT OPERATING CONDITIONS 13

4.1.6 EUT TEST CONDITIONS 13

4.1.7 TEST RESULTS 13

4.2 RADIATED EMISSION MEASUREMENT 14

4.2.1 RADIATED EMISSION LIMITS 14

4.2.2 TEST PROCEDURE 15

4.2.3 DEVIATION FROM TEST STANDARD 15

4.2.4 TEST SETUP 16

4.2.5 EUT OPERATING CONDITIONS 17

4.2.6 EUT TEST CONDITIONS 17

4.2.7 TEST RESULTS (BELOW 30MHz) 17

4.2.8 TEST RESULTS (BETWEEN 30 – 1000 MHz) 17

4.2.9 TEST RESULTS (ABOVE 1000 MHz) 18

5 . BANDWIDTH TEST 19

5.1 TEST PROCEDURE 19

5.2 DEVIATION FROM STANDARD 19

5.3 TEST SETUP 19

5.4 EUT OPERATION CONDITIONS 19

5.5 EUT TEST CONDITIONS 19

5.6 TEST RESULTS 19

6 . ANTENNA CONDUCTED SPURIOUS EMISSION 20

6.1 APPLIED PROCEDURES / LIMIT 20

Table of Contents **Page**

6.2 TEST PROCEDURE 20
6.3 DEVIATION FROM STANDARD 20
6.4 TEST SETUP 20
6.5 EUT OPERATION CONDITIONS 21
6.6 EUT TEST CONDITIONS 21
6.7 TEST RESULTS 21

7 . MEASUREMENT INSTRUMENTS LIST AND SETTING 22

8 . EUT TEST PHOTO 23

ATTACHMENT A - CONDUCTED EMISSION 26

ATTACHMENT B - RADIATED EMISSION (9KHZ to 30MHZ) 27

ATTACHMENT C - RADIATED EMISSION (30MHZ TO 1000MHZ) 29

ATTACHMENT D - RADIATED EMISSION (ABOVE 1000MHZ) 36

ATTACHMENT E - BANDWIDTH 49

ATTACHMENT F - ANTENNA CONDUCTED SPURIOUS EMISSION 52

REPORT ISSUED HISTORY

Issued No.	Description	Issued Date
NEI-FCCP-1-1403C209	Original Issue.	May. 21, 2014

1. CERTIFICATION

Equipment	:	Optical 2.4GHz Wireless Nano Mouse
Brand Name	:	N/A
Model Name	:	CM-163; MP2120RED; MP2120BLU; MP2120WHT; MP2120BLK
Applicant	:	Zhuoheng Electronics Co., Limited.
Manufacturer	:	DongGuan YiBang Electronic Technology Co., Ltd
Address	:	No.8 ,Lane 5, ShangNan Road .The 5th Industrial Area,NanCe, HuMen Town ,DongGuan City,China.
Factory	:	DongGuan YiBang Electronic Technology Co., Ltd
Address	:	No.8 ,Lane 5, ShangNan Road .The 5th Industrial Area,NanCe, HuMen Town ,DongGuan City,China.
Date of Test	:	Mar. 26, 2014~ May. 19, 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-1-1403C209) 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 FCC	Test Item	Judgment	Remark
15.207	Conducted Emission	N/A	Note
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.

(3) Due to this EUT is powered by batteries only, this test item is not applicable.

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 ± 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. 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	Optical 2.4GHz Wireless Nano Mouse	
Brand Name	N/A	
Model Name	CM-163; MP2120RED; MP2120BLU; MP2120WHT; MP2120BLK	
Model Difference	Only differ in model name and enclosure color	
Product Description	Operation Frequency	2409~2476 MHz
	Modulation Technology	MSK(2Mbps)
	Data rate	
	Field Strength	86.28dBuV/m
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)
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

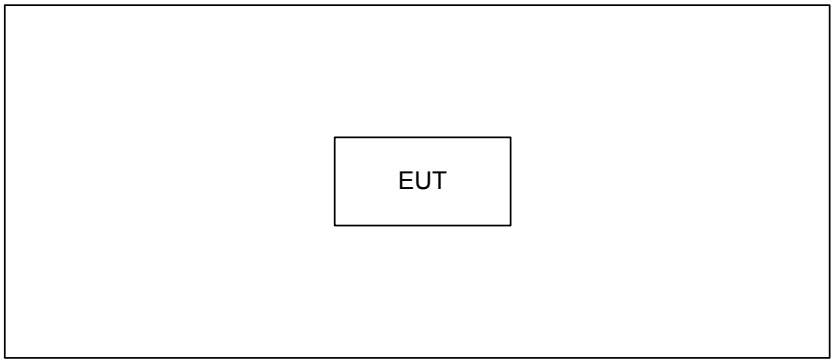
To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration 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/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 (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.

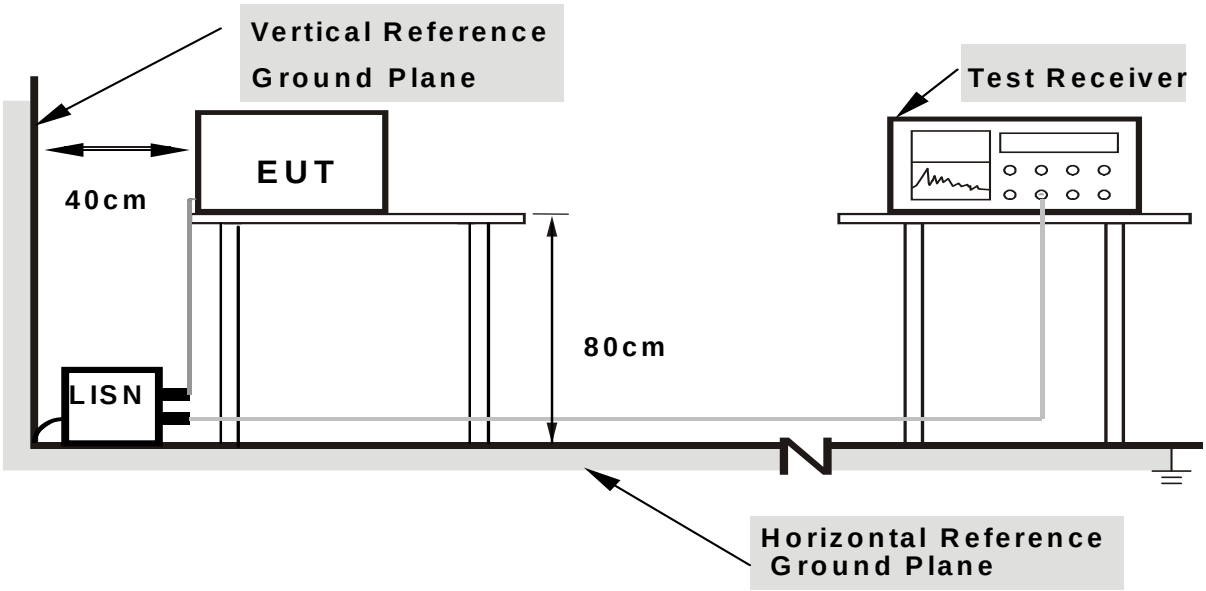
d. LISN at least 80 cm from nearest part of EUT chassis.

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 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

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

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

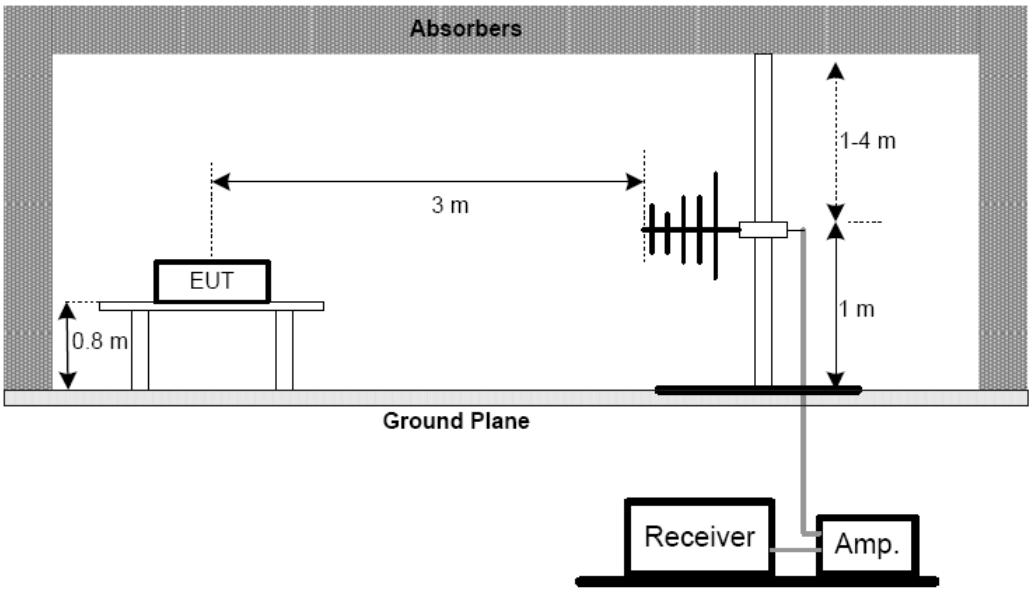
a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a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

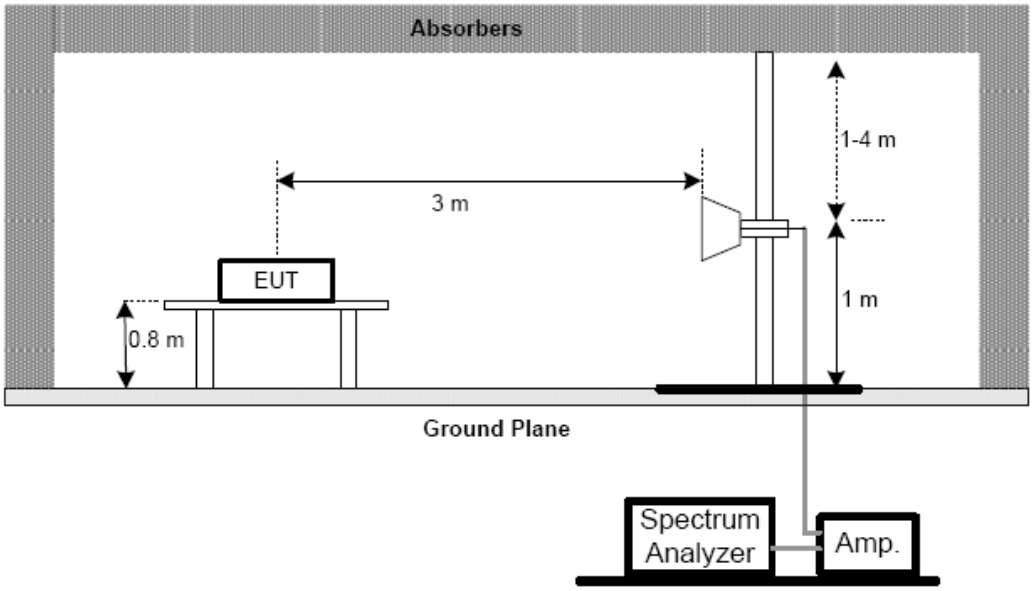
No deviation

4.2.4 TEST SETUP

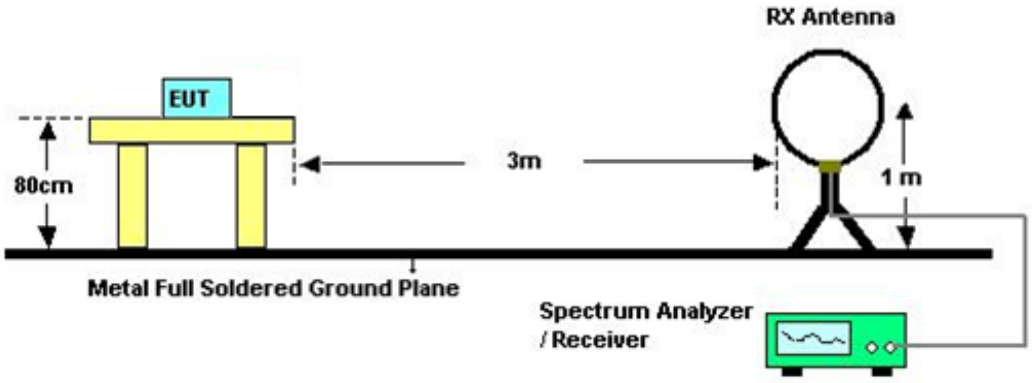
(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



(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)

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 (specific distance / 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: DC 3V

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.

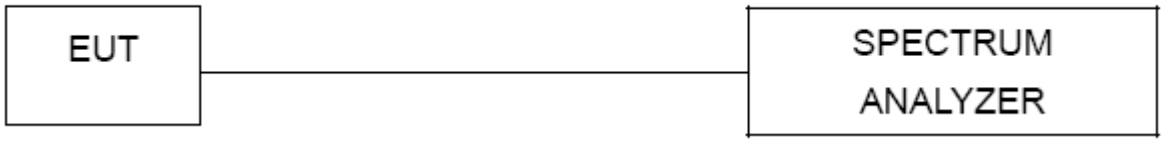
6.2 TEST PROCEDURE

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: DC 3V

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	Schwarzbeck	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

Radiated Measurement Photos

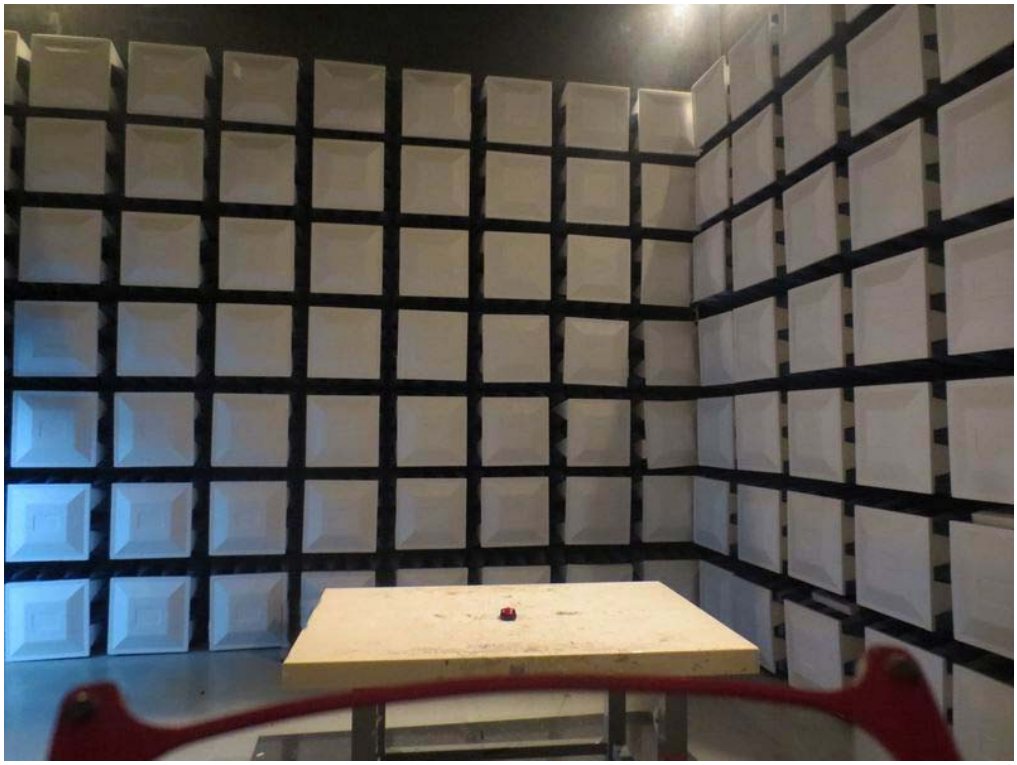
9K~30MHz

Radiated Measurement Photos

30~1000MHz

Radiated Measurement Photos

Above 1000MHz



ATTACHMENT A - CONDUCTED EMISSION

Test Mode: N/A

Note: "N/A" denotes test is not applicable in this test report.

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°	25.59	24.30	49.89	127.78	-77.89	AVG
0.0098	0°	29.57	24.30	53.87	147.78	-93.91	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	-17.57	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	-72.73	AVG
0.0462	90°	21.27	22.64	43.91	134.32	-90.41	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	-54.62	AVG
0.3758	90°	24.55	20.10	44.65	116.10	-71.45	PEAK
1.7162	90°	25.95	19.53	45.48	69.54	-24.06	QP

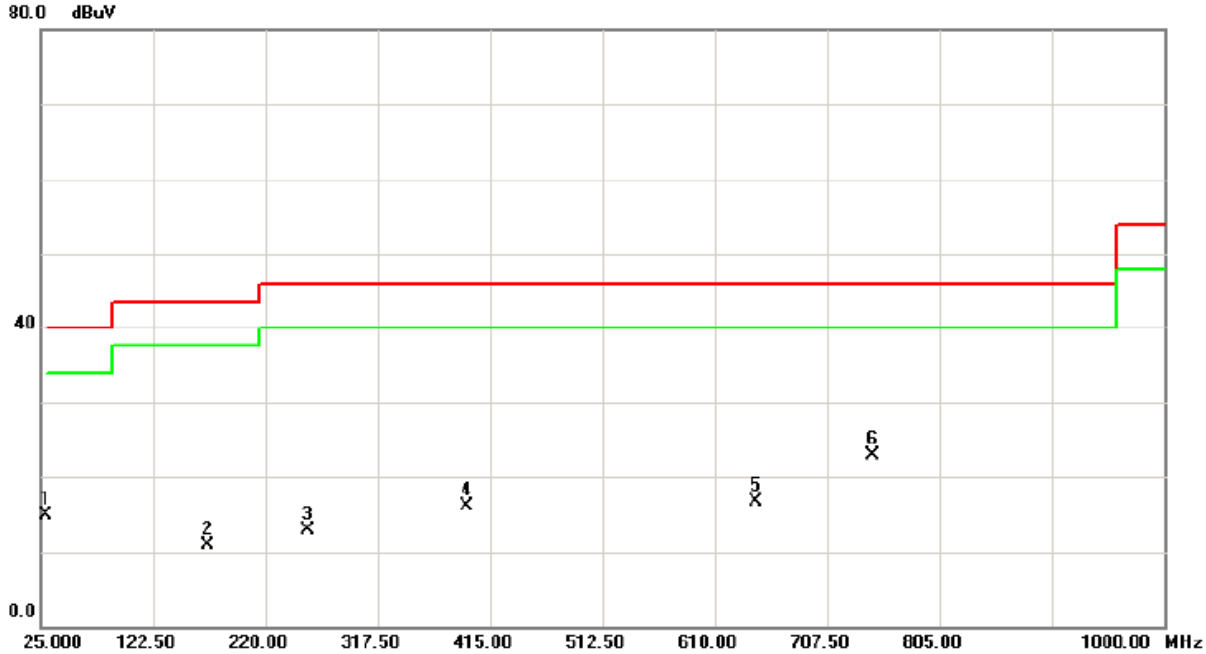
Remark:

(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 (specific distance / test distance) (dB);
(3) Limit line = specific limits (dBuV) + distance extrapolation factor.

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

Test Mode:	TX 2409MHz

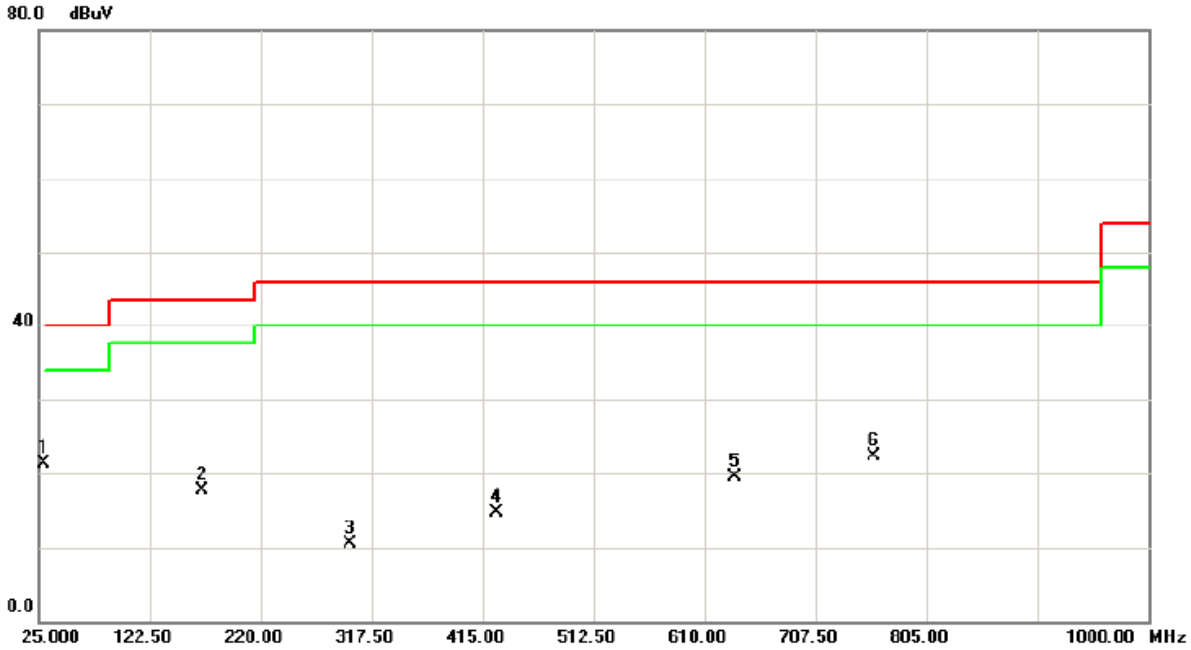
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		28.9000	31.29	-16.42	14.87	40.00	-25.13	peak	
2		169.3000	28.46	-17.54	10.92	43.50	-32.58	peak	
3		257.0500	28.67	-15.70	12.97	46.00	-33.03	peak	
4		394.5250	30.37	-14.32	16.05	46.00	-29.95	peak	
5		646.0750	30.42	-13.72	16.70	46.00	-29.30	peak	
6	*	746.5000	29.87	-6.91	22.96	46.00	-23.04	peak	

Test Mode:	TX 2409MHz

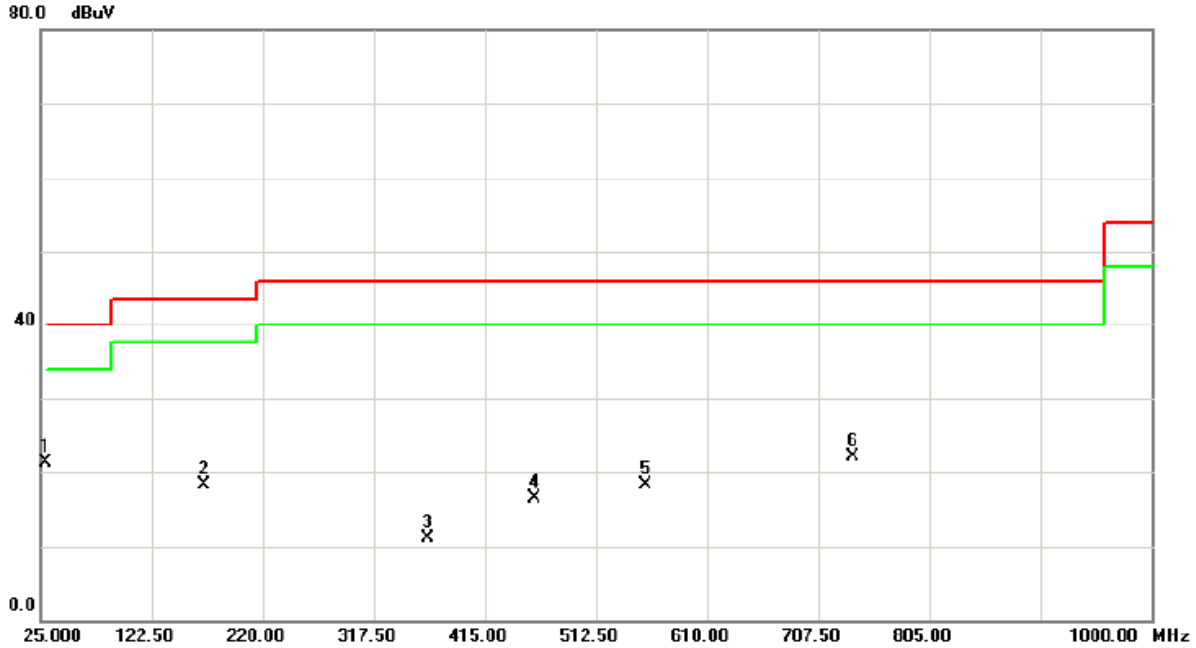
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
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		298.0000	29.64	-19.18	10.46	46.00	-35.54	peak	
4		427.6750	29.19	-14.49	14.70	46.00	-31.30	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

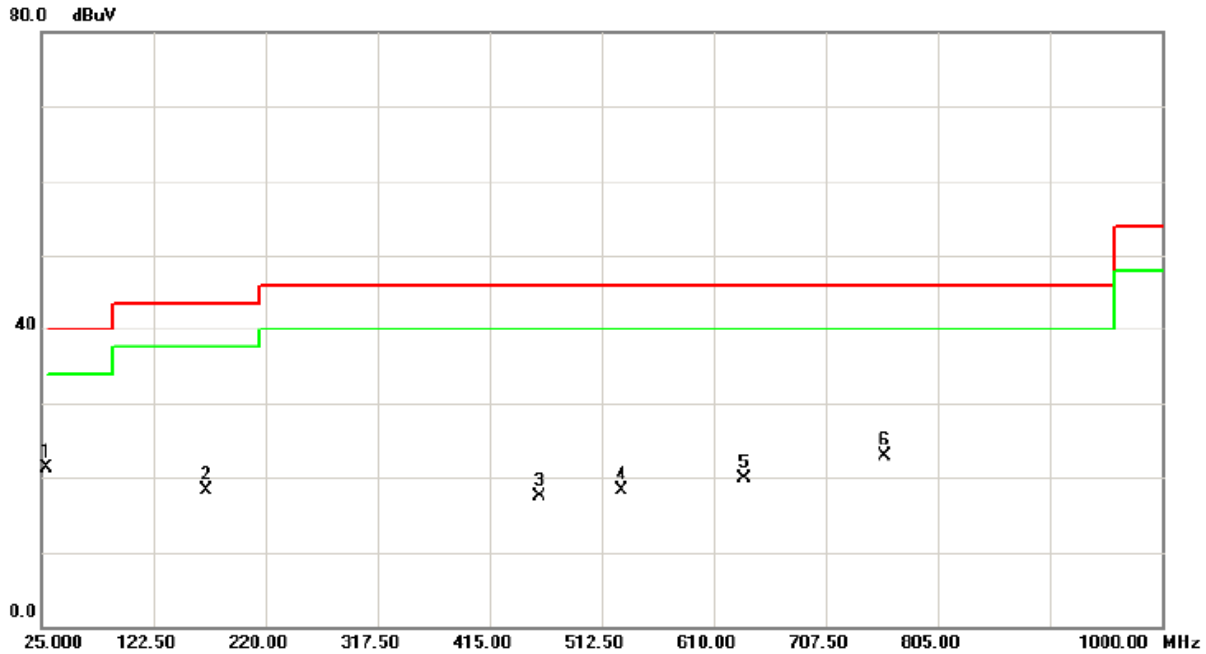
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	29.8750	37.73	-16.40	21.33	40.00	-18.67	peak	
2		168.3250	39.46	-21.23	18.23	43.50	-25.27	peak	
3		364.3000	29.72	-18.68	11.04	46.00	-34.96	peak	
4		457.9000	29.84	-13.39	16.45	46.00	-29.55	peak	
5		556.3750	30.74	-12.39	18.35	46.00	-27.65	peak	
6		737.7250	30.18	-8.08	22.10	46.00	-23.90	peak	

Test Mode:	TX 2440MHz

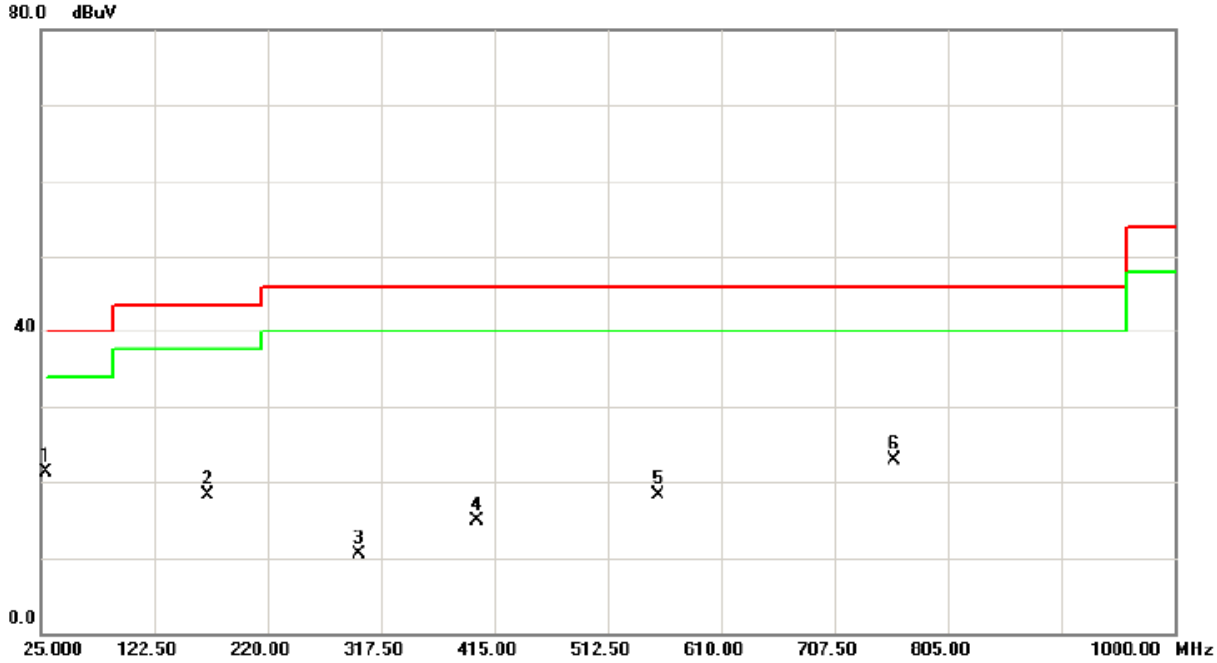
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	29.8750	37.73	-16.40	21.33	40.00	-18.67	peak	
2		168.3250	39.46	-21.23	18.23	43.50	-25.27	peak	
3		457.9000	30.84	-13.39	17.45	46.00	-28.55	peak	
4		530.0500	31.19	-12.88	18.31	46.00	-27.69	peak	
5		636.3250	30.41	-10.46	19.95	46.00	-26.05	peak	
6		758.2000	30.86	-8.01	22.85	46.00	-23.15	peak	

Test Mode:	TX 2476MHz

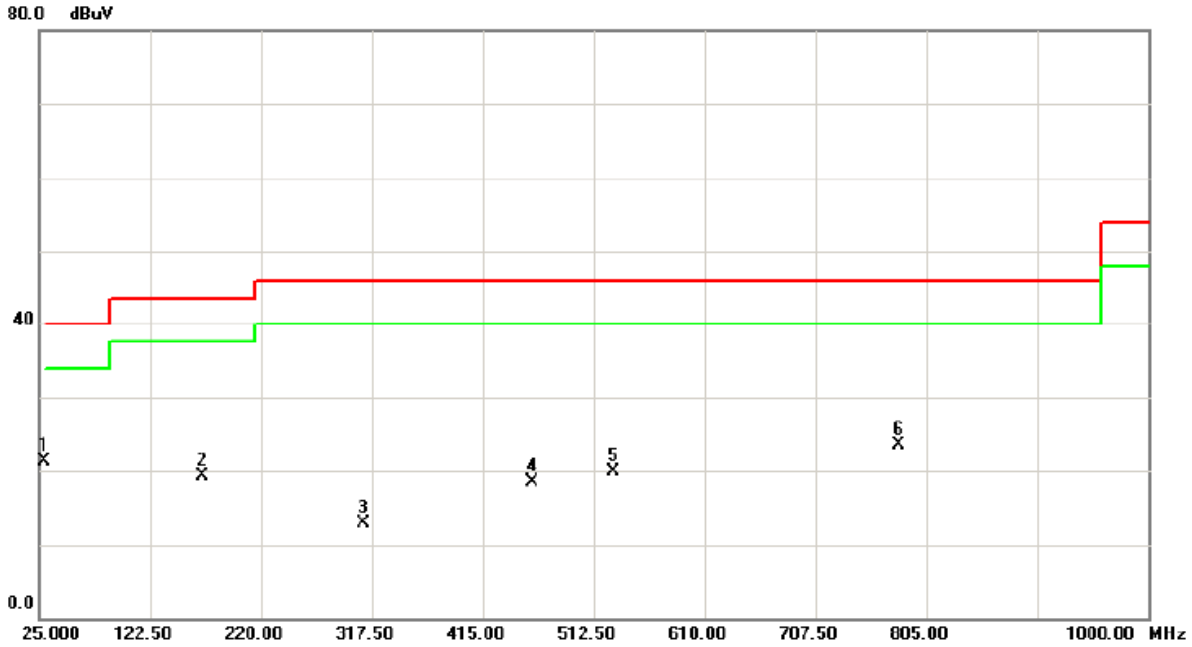
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	29.8750	37.73	-16.40	21.33	40.00	-18.67	peak	
2		168.3250	39.46	-21.23	18.23	43.50	-25.27	peak	
3		298.0000	29.64	-19.18	10.46	46.00	-35.54	peak	
4		400.3750	29.45	-14.63	14.82	46.00	-31.18	peak	
5		556.3750	30.74	-12.39	18.35	46.00	-27.65	peak	
6		758.2000	30.86	-8.01	22.85	46.00	-23.15	peak	

Test Mode:	TX 2476MHz

Horizontal

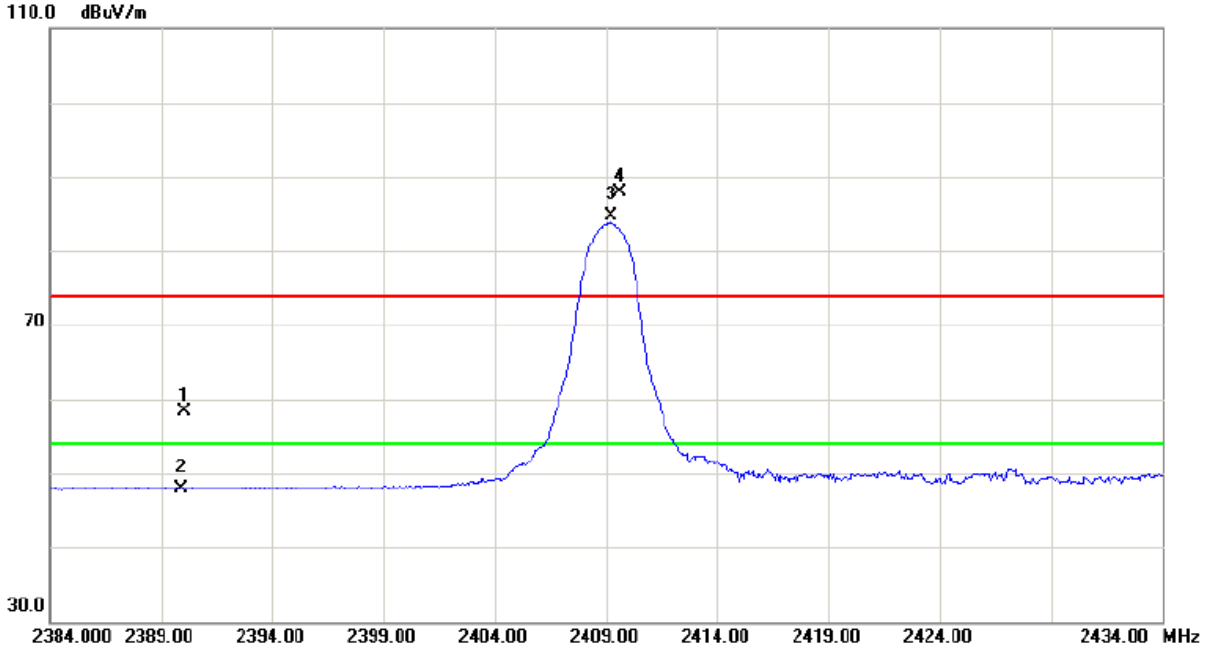


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	29.8750	37.73	-16.40	21.33	40.00	-18.67	peak	
2		168.3250	40.46	-21.23	19.23	43.50	-24.27	peak	
3		310.6750	32.29	-19.33	12.96	46.00	-33.04	peak	
4		457.9000	31.84	-13.39	18.45	46.00	-27.55	peak	
5		530.0500	32.69	-12.88	19.81	46.00	-26.19	peak	
6		780.6250	31.92	-8.51	23.41	46.00	-22.59	peak	

ATTACHMENT D - RADIATED EMISSION (ABOVE 1000MHZ)

Orthogonal Axis :	X
Test Mode :	TX 2409MHz

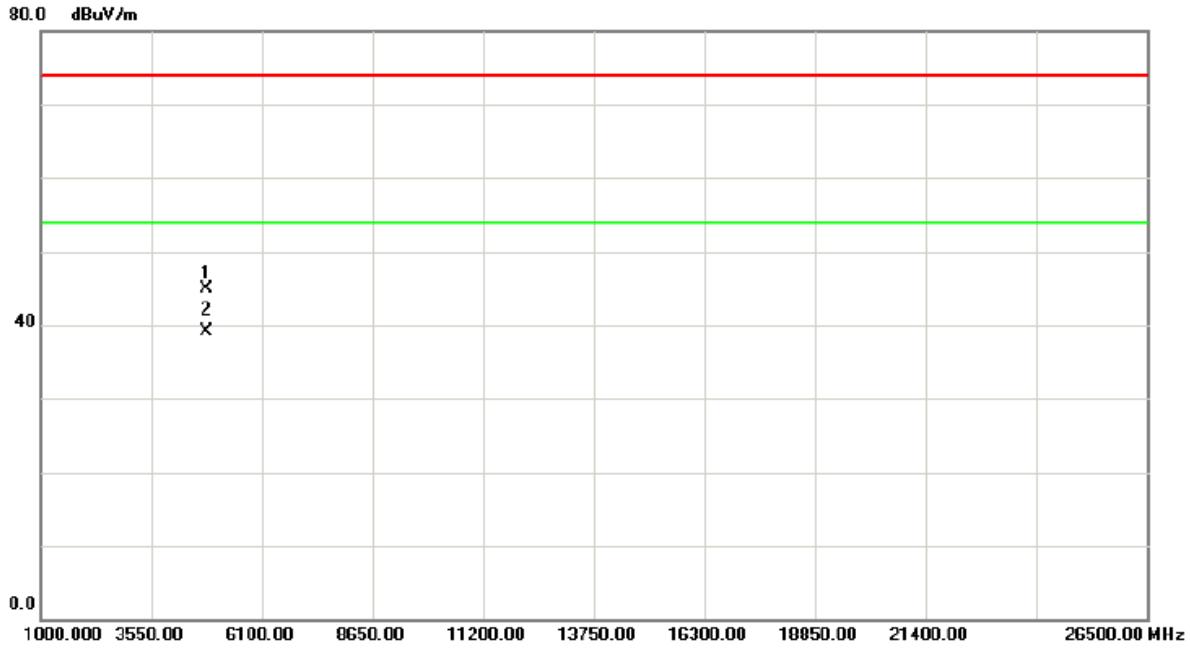
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2390.000	25.02	33.38	58.40	74.00	-15.60	peak	
2		2390.000	14.48	33.38	47.86	54.00	-6.14	AVG	
3	*	2409.300	51.23	33.43	84.66	54.00	30.66	AVG	Fundamental frequency, no limit
4	X	2409.600	54.50	33.43	87.93	74.00	13.93	peak	Fundamental frequency, no limit

Orthogonal Axis :	X
Test Mode :	TX 2409MHz

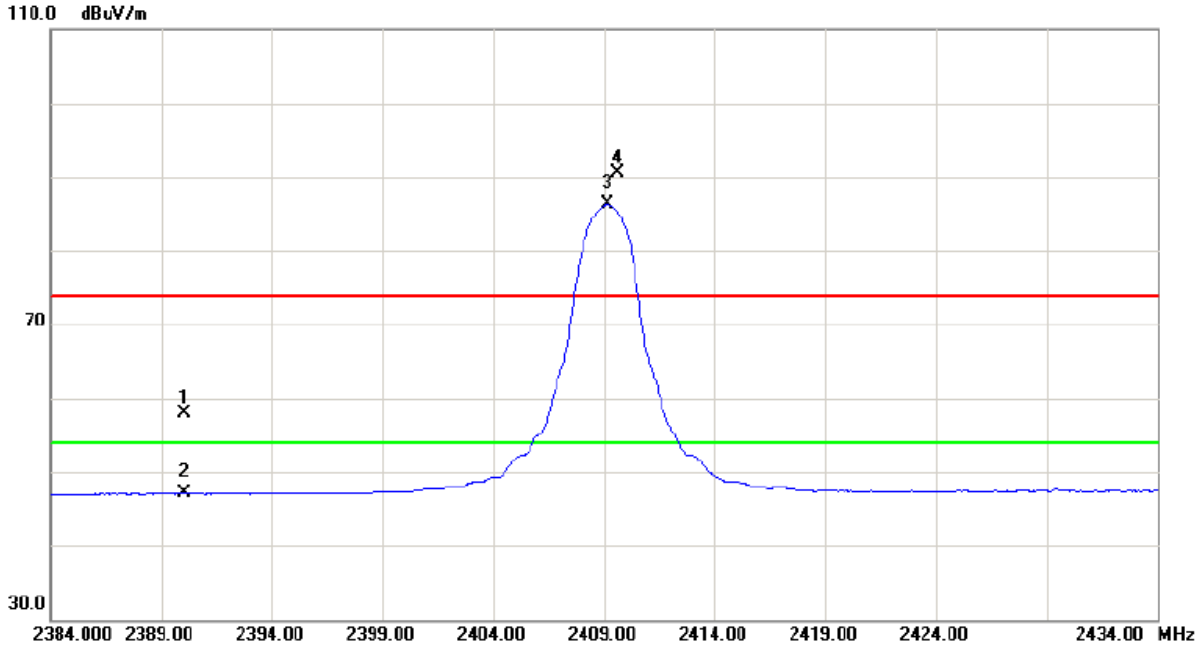
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4818.400	38.49	6.42	44.91	74.00	-29.09	peak	
2	*	4818.400	32.63	6.42	39.05	54.00	-14.95	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2409MHz

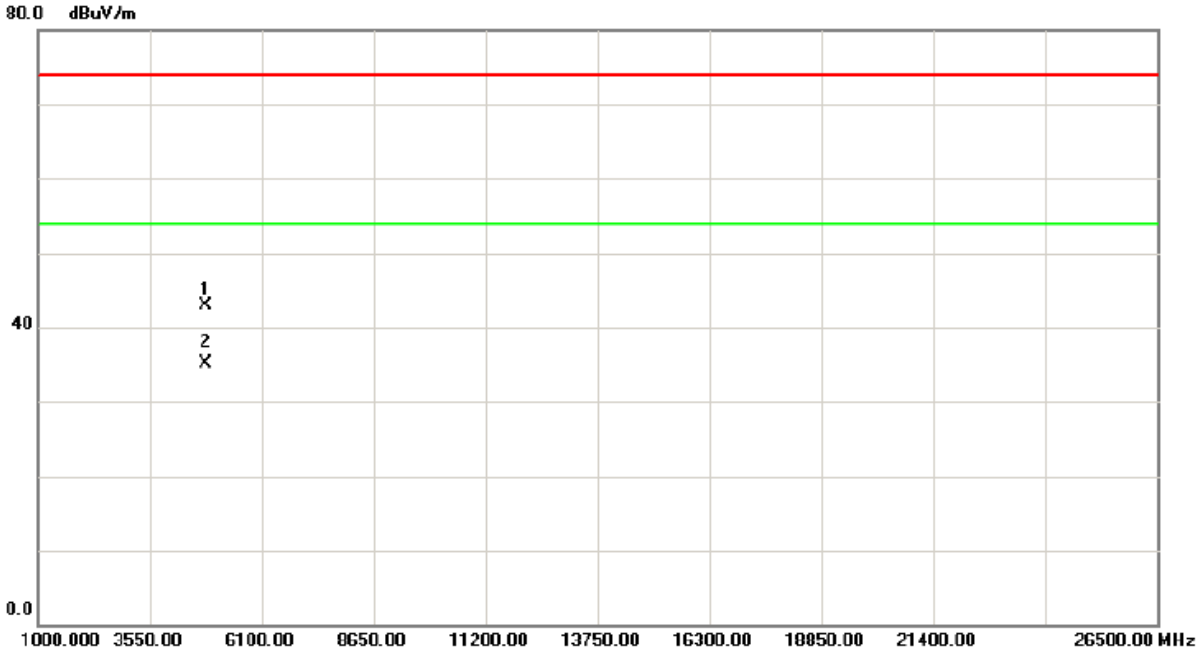
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2390.000	24.47	33.38	57.85	74.00	-16.15	peak	
2		2390.000	13.65	33.38	47.03	54.00	-6.97	AVG	
3	*	2409.150	52.85	33.43	86.28	54.00	32.28	AVG	Fundamental frequency, no limit
4	X	2409.600	57.10	33.43	90.53	74.00	16.53	peak	Fundamental frequency, no limit

Orthogonal Axis :	X
Test Mode :	TX 2409MHz

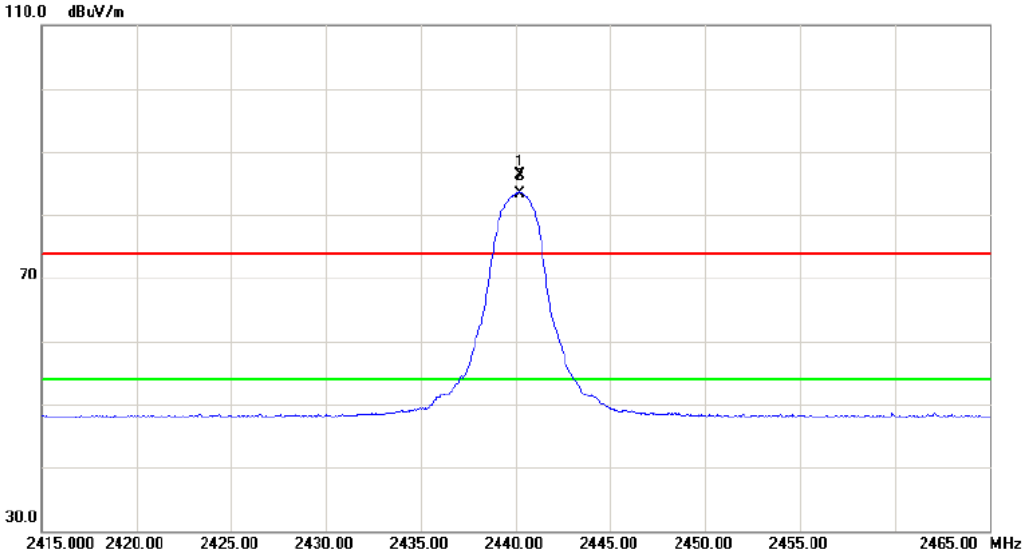
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4818.400	36.43	6.42	42.85	74.00	-31.15	peak	
2	*	4818.400	28.65	6.42	35.07	54.00	-18.93	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2440MHz

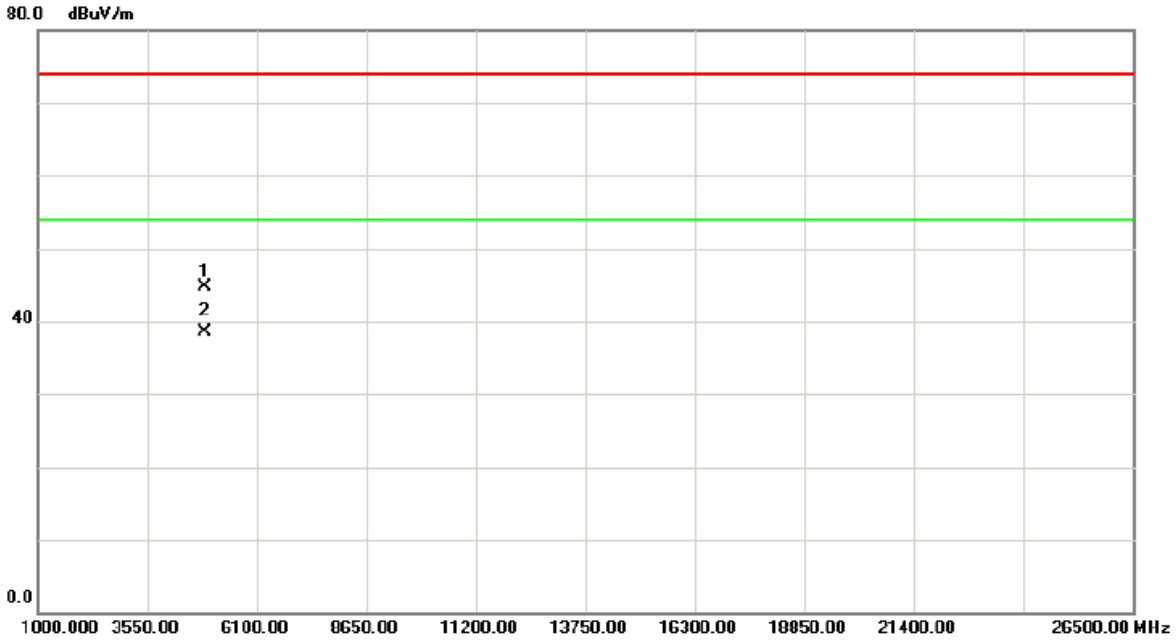
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2440.250	52.79	33.51	86.30	74.00	12.30	peak	Fundamental frequency, no limit
2	*	2440.250	49.72	33.51	83.23	54.00	29.23	AVG	Fundamental frequency, no limit

Orthogonal Axis :	X
Test Mode :	TX 2440MHz

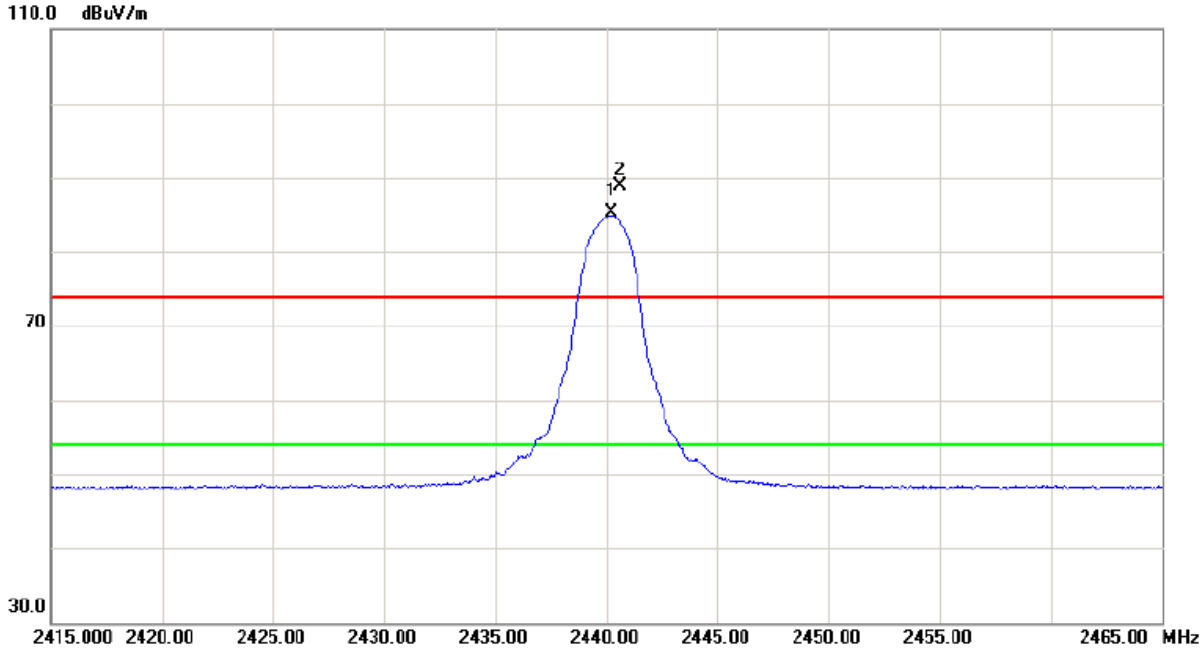
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4879.200	38.12	6.60	44.72	74.00	-29.28	peak	
2	*	4879.200	31.87	6.60	38.47	54.00	-15.53	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2440MHz

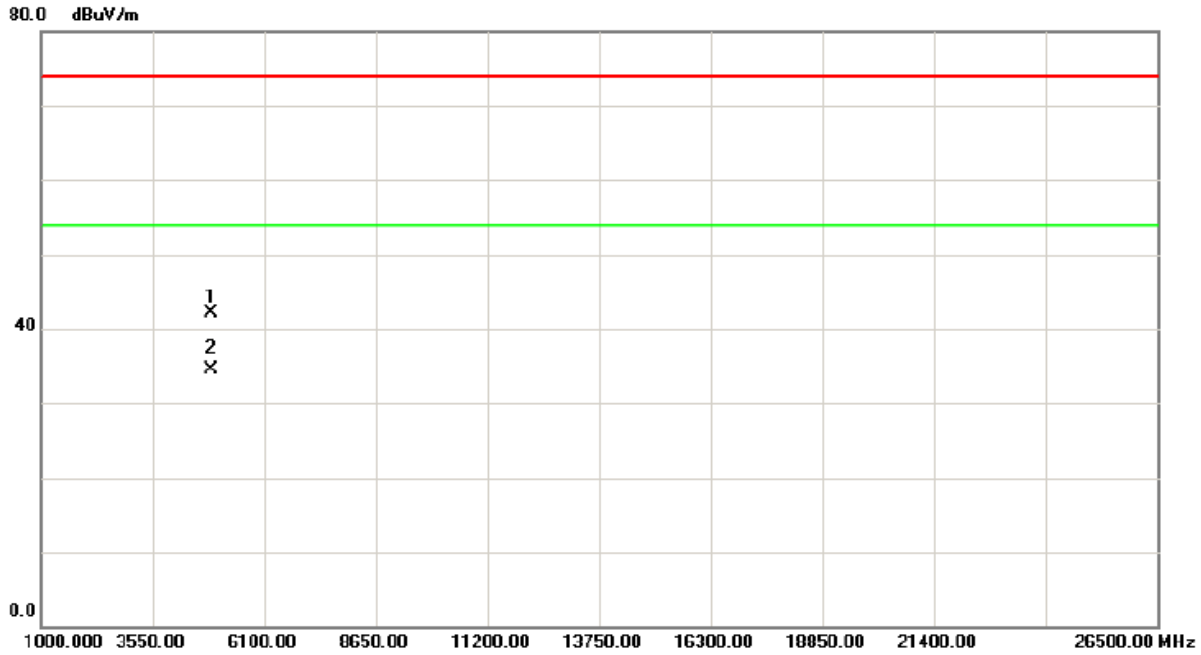
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	2440.250	51.77	33.51	85.28	54.00	31.28	AVG	Fundamental frequency, no limit
2	X	2440.650	55.44	33.51	88.95	74.00	14.95	peak	Fundamental frequency, no limit

Orthogonal Axis :	X
Test Mode :	TX 2440MHz

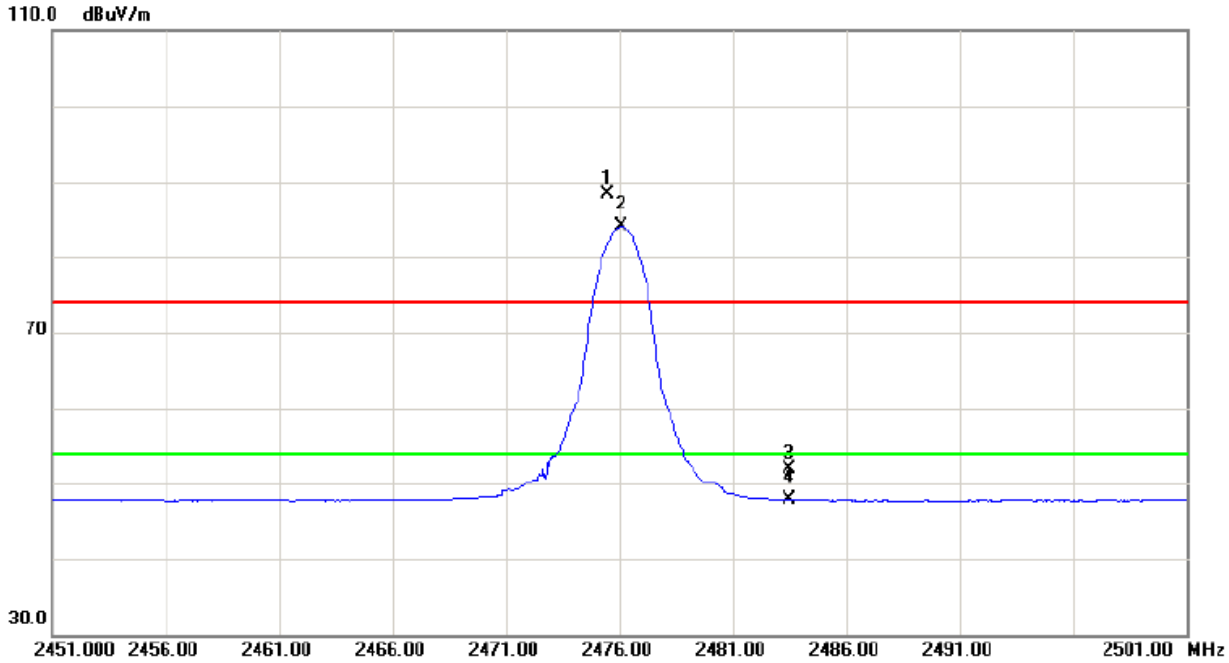
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4879.200	35.52	6.60	42.12	74.00	-31.88	peak	
2	*	4879.200	27.97	6.60	34.57	54.00	-19.43	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2476MHz

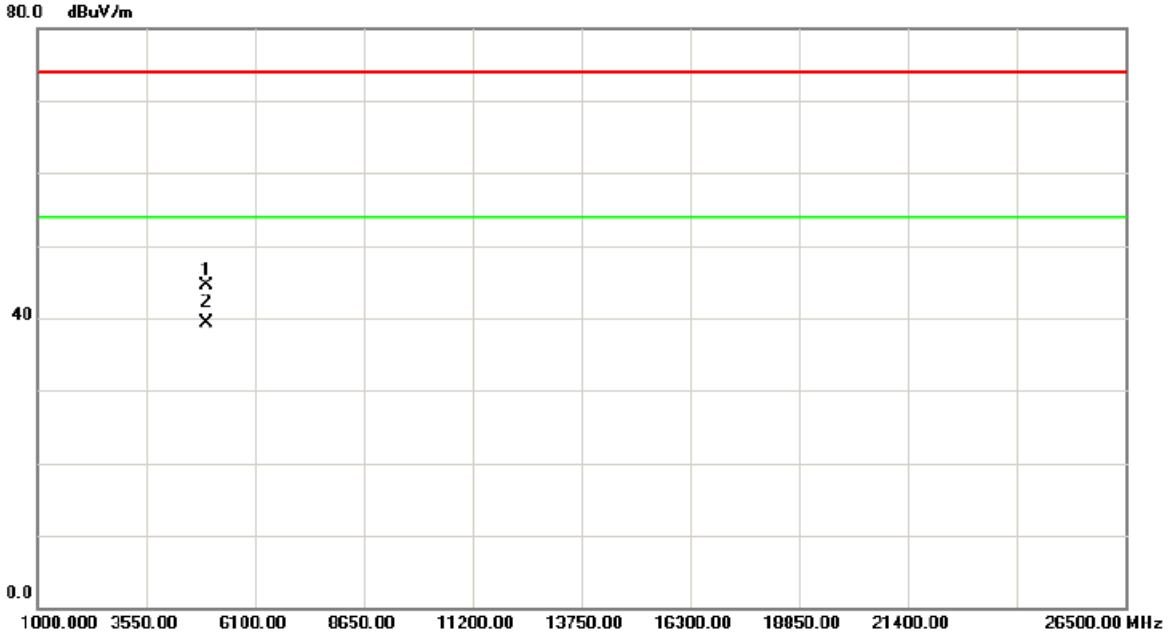
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2475.500	54.68	33.60	88.28	74.00	14.28	peak	Fundamental frequency, no limit
2	*	2476.100	50.52	33.60	84.12	54.00	30.12	AVG	Fundamental frequency, no limit
3		2483.500	18.25	33.62	51.87	74.00	-22.13	peak	
4		2483.500	14.35	33.62	47.97	54.00	-6.03	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2476MHz

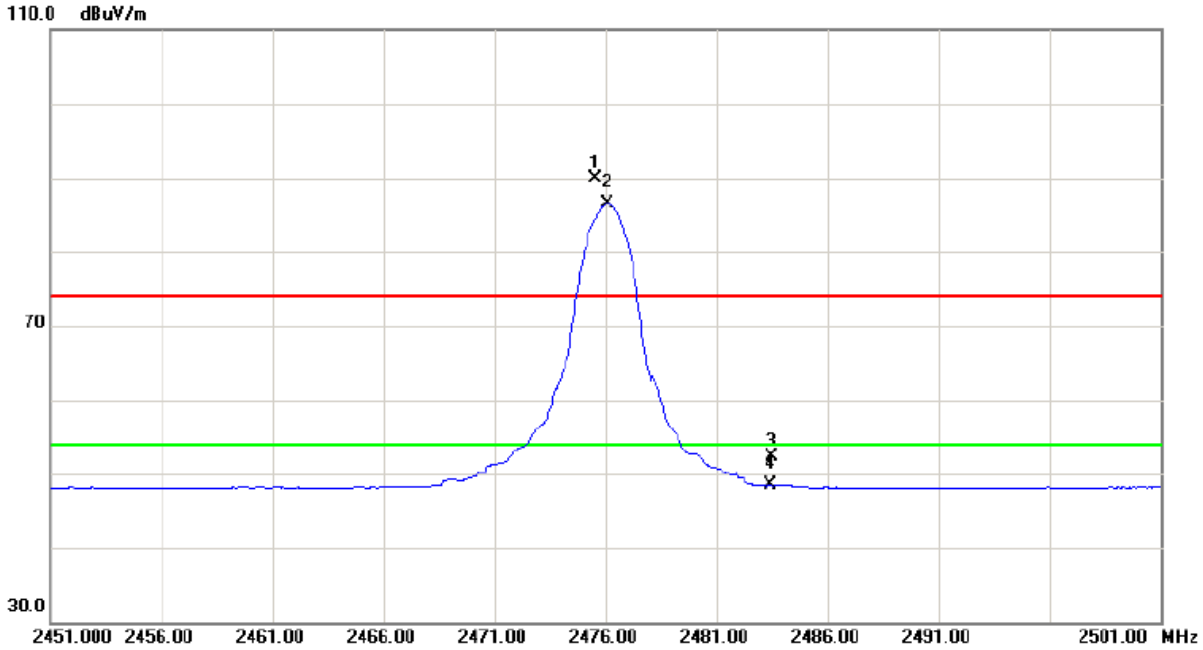
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4952.250	37.74	6.81	44.55	74.00	-29.45	peak	
2	*	4952.250	32.58	6.81	39.39	54.00	-14.61	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2476MHz

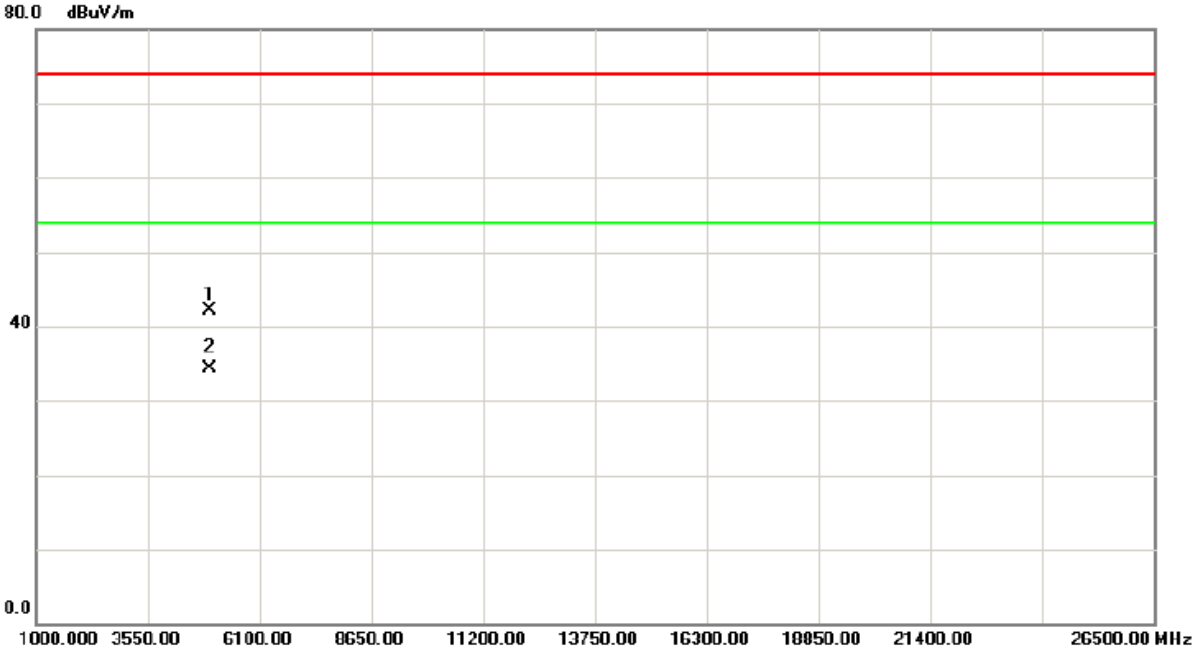
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2475.550	56.29	33.60	89.89	74.00	15.89	peak	Fundamental frequency, no limit
2	*	2476.100	52.91	33.60	86.51	54.00	32.51	AVG	Fundamental frequency, no limit
3		2483.500	18.72	33.62	52.34	74.00	-21.66	peak	
4		2483.500	14.79	33.62	48.41	54.00	-5.59	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2476MHz

Horizontal

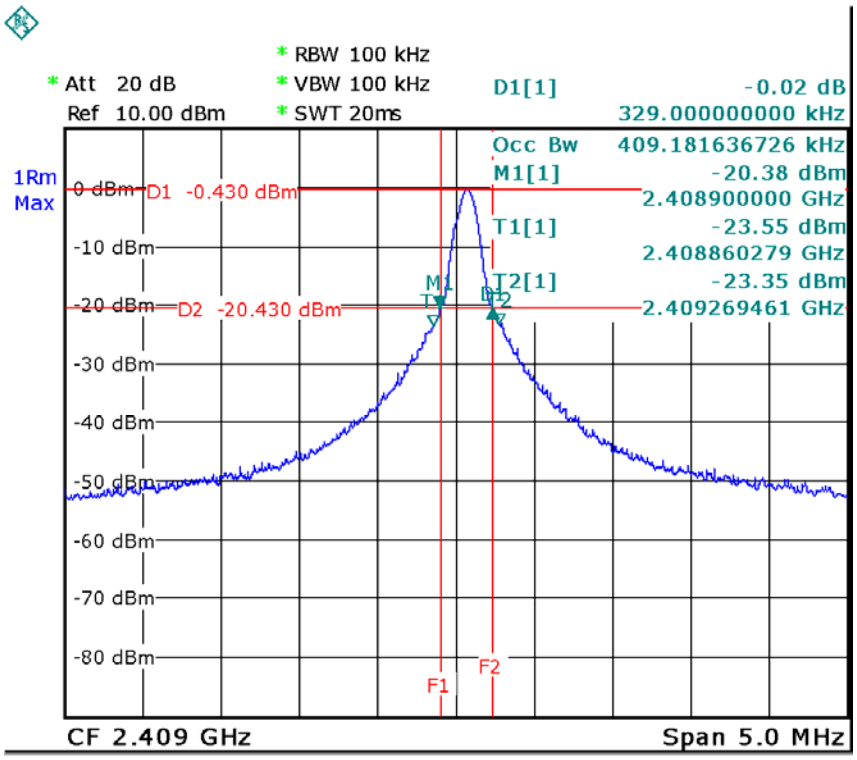


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4952.250	35.26	6.81	42.07	74.00	-31.93	peak	
2	*	4952.250	27.50	6.81	34.31	54.00	-19.69	AVG	

ATTACHMENT E - BANDWIDTH

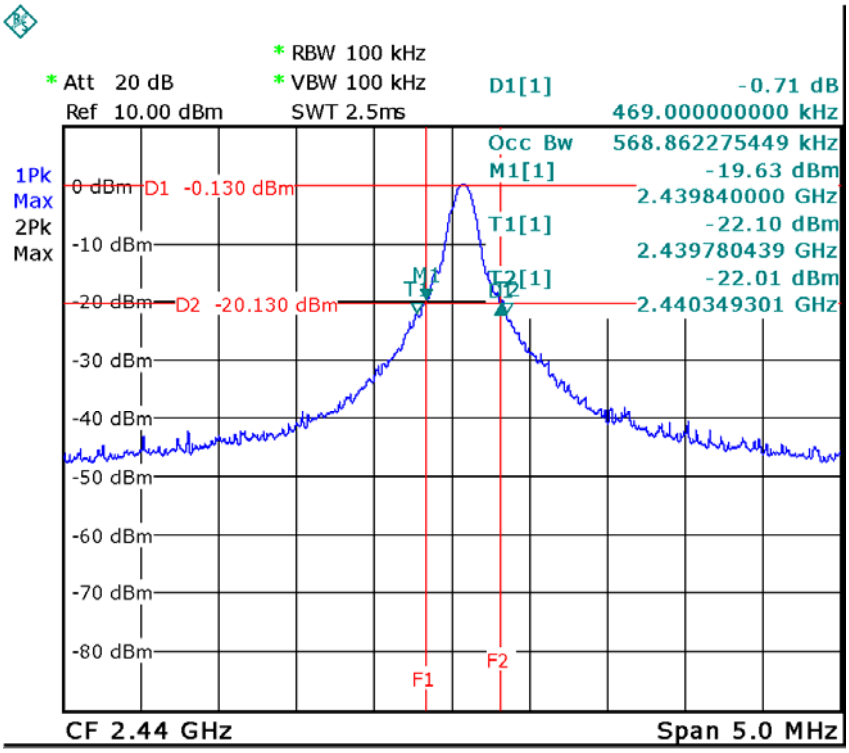
Test Mode : TX

2409MHz



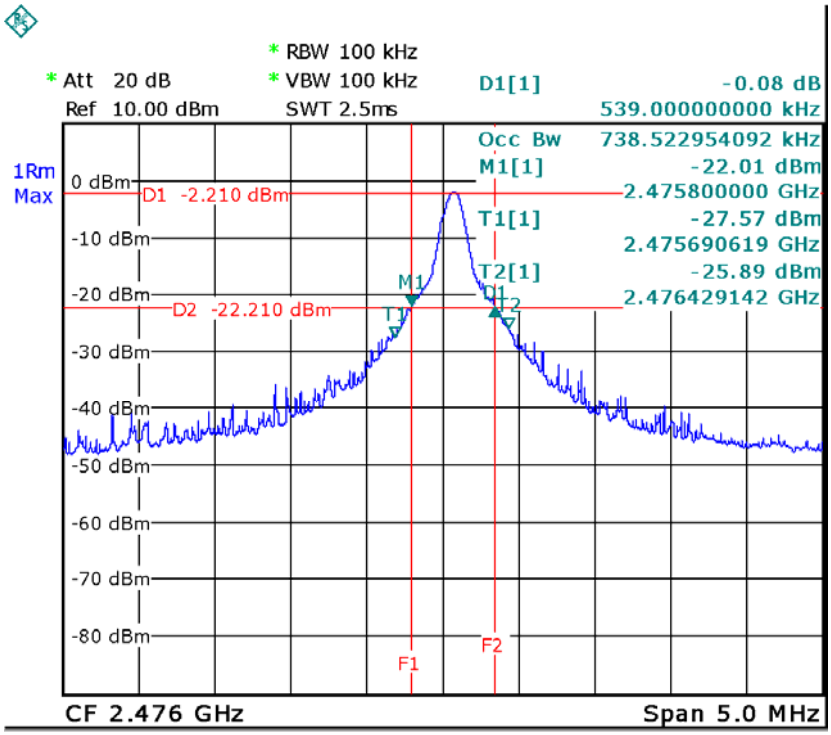
Date: 15.MAY.2014 17:36:22

2440MHz



Date: 15.MAY.2014 17:50:46

2476MHz

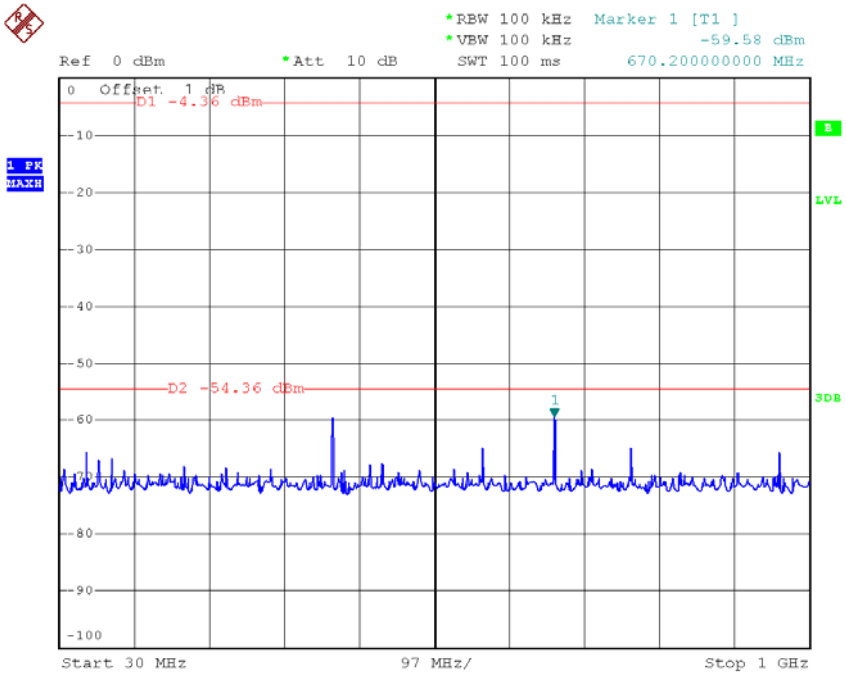


Date: 15.MAY.2014 13:02:54

ATTACHMENT F - ANTENNA CONDUCTED SPURIOUS EMISSION

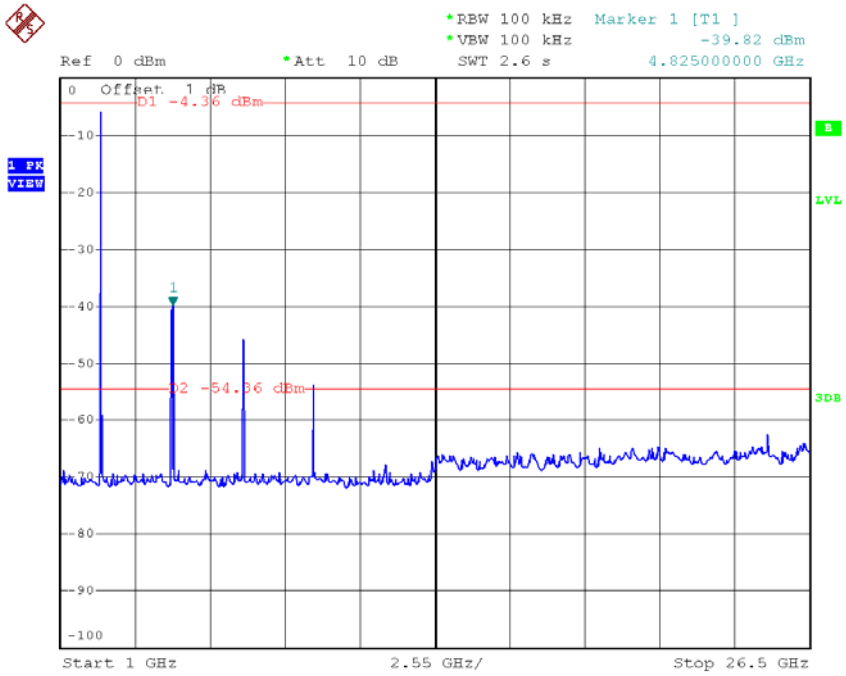
Test Mode :	**TX**

2409MHz (30MHz to 1000MHz)



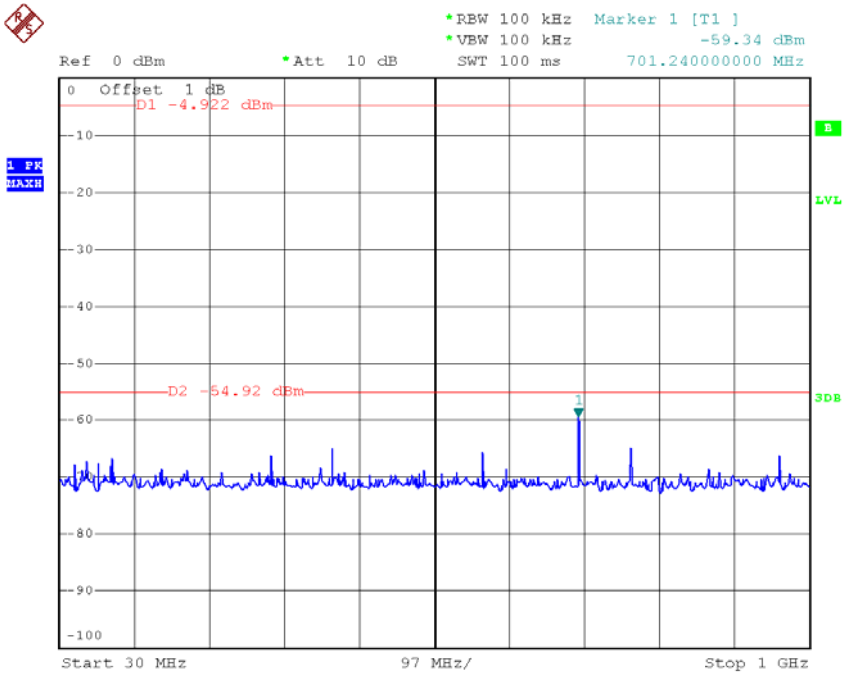
Date: 20.MAY.2014 11:46:34

2409MHz (1000MHz to 10th Harmonic)



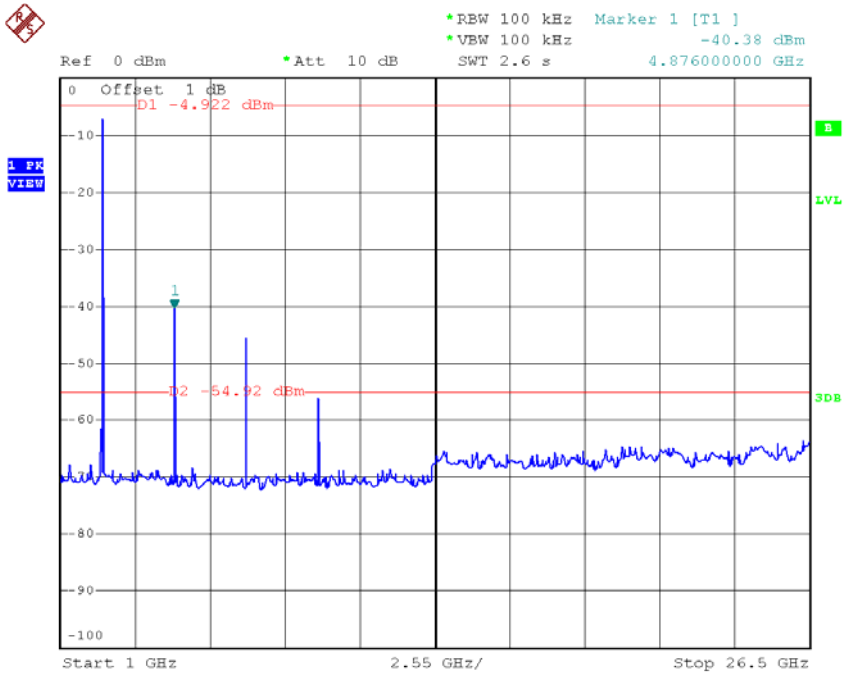
Date: 20.MAY.2014 11:47:14

2440MHz (30MHz to 1000MHz)



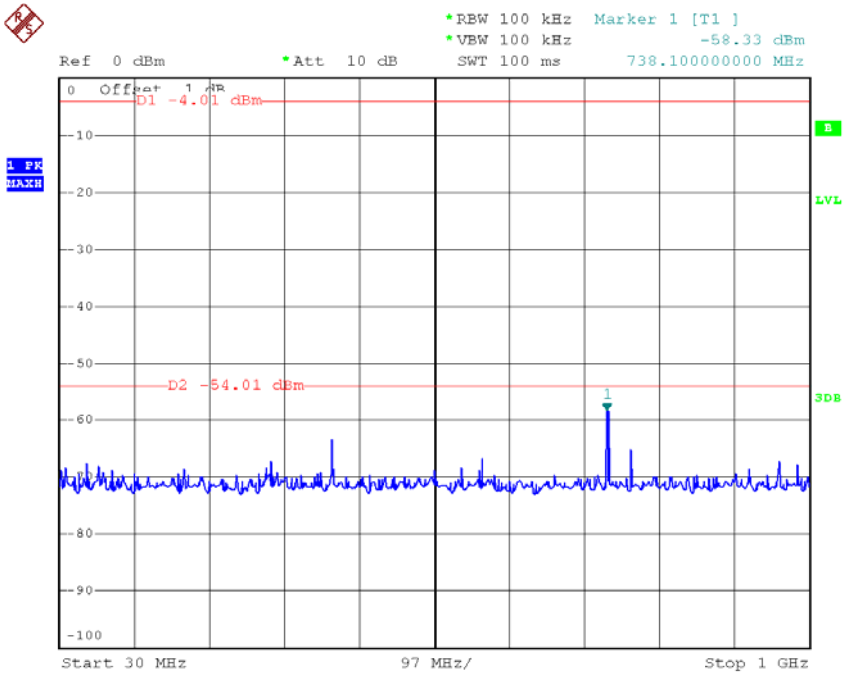
Date: 20.MAY.2014 11:48:45

2440MHz (1000MHz to 10th Harmonic)



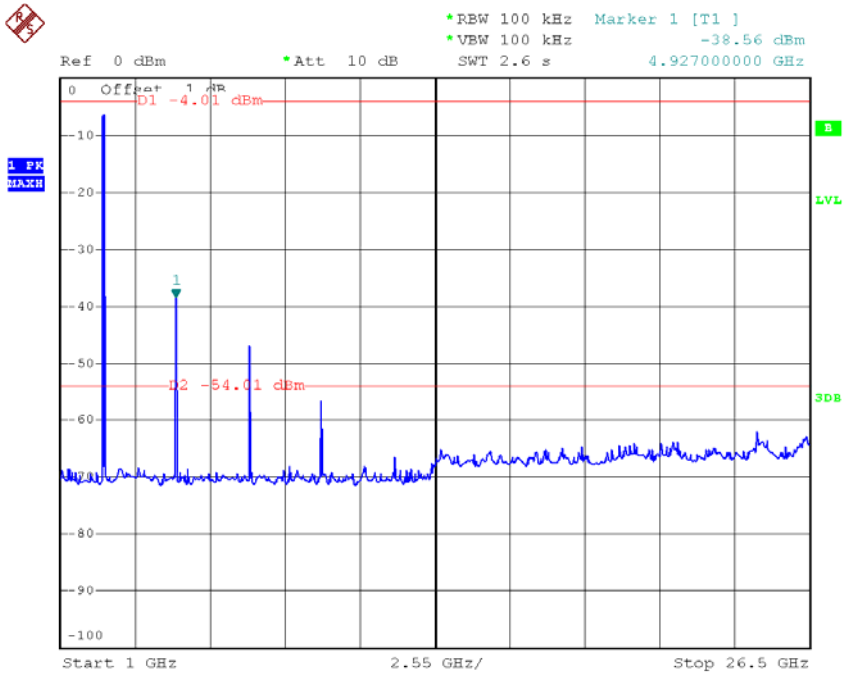
Date: 20.MAY.2014 11:49:08

2476MHz (30MHz to 1000MHz)



Date: 20.MAY.2014 11:51:43

2476MHz (1000MHz to 10th Harmonic)



Date: 20.MAY.2014 11:51:59