FCC/IC Radio Test Report

FCC ID: A9AHF2012-RX
IC: 10101A-HF2012RX

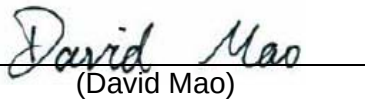
This report concerns (check one): ■ **Original Grant** □ **Class II Change**

Issued Date	:	Dec. 26, 2011
Project No.	:	1112C152
Equipment	:	VENGEANCE 2000
Model Name	:	HF2012-RX
Applicant	:	HT Precision Technologies, Inc.
Address	:	3F., No.13, Ln.120, Sec. 1, Neihu Rd., Neihu Dist., Taipei City 11493, Taiwan.

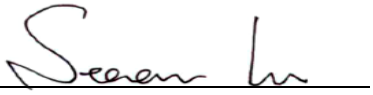
Tested by:
Neutron Engineering Inc. EMC Laboratory

Date of Receipt: Dec. 14, 2011

Date of Test:
Dec. 14, 2011 ~ Dec. 23, 2011

Testing Engineer : 
(David Mao)

Technical Manager : 
(Leo Hung)

Authorized Signatory : 
(Steven Lu)

Neutron Engineering Inc.

No.3,Jinshagang 1st Road, ShiXia, Dalang Town, Dong Guan, China.
TEL : (0769) 8318-3000 FAX : (0769) 8319-6000

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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1. CERTIFICATION

Equipment:	VENGEANCE 2000
Brand Name :	CORSAIR
Model Name. :	HF2012-RX
Applicant:	HT Precision Technologies, Inc.
Factory	HUI YANG DONGMEI AUDIO PRODUCTS CO. LTD
Address	Dong Feng District, Xinxi, Hui Yang Dist. HuiZhou, Guangdong. China
Date of Test:	Dec. 14, 2011 ~ Dec. 23, 2011
Test Item:	ENGINEERING SAMPLE
Standards:	FCC Part15, Subpart C(15.249)/ ANSI C63.4 : 2003 ; Canada RSS-210:2010

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-FICP-1-1112C152) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of NVLAP and TAF according to the ISO-17025 quality assessment standard and technical standard(s).

2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15, Subpart C (15.249) Canada RSS-210:2010				
StandardSection		Test Item	Judgment	Remark
FCC	RSS-210			
15.207		Conducted Emission	PASS	
15.209		Radiated Emission	PASS	
15.249	A2.9(a)	Radiated Spurious Emission	PASS	

NOTE:

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

(2) The EUT used rechargeable Li-ion battery.

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
Neutron's test firm number for IC 4428B-1

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. 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	30MHz ~ 200MHz	V	2.48	
		30MHz ~ 200MHz	H	2.16	
		200MHz ~ 1,000MHz	V	2.50	
		200MHz ~ 1,000MHz	H	2.66	

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

<table>
<tr><td>Equipment</td><td>VENGEANCE 2000</td></tr>
<tr><td>Brand Name</td><td>CORSAIR</td></tr>
<tr><td>Model Name.</td><td>HF2012-RX</td></tr>
<tr><td>OEM Brand/Model Name</td><td>N/A</td></tr>
<tr><td>Model Difference</td><td>N/A</td></tr>
<tr><td>Product Description</td><td>The EUT is a VENGEANCE 2000.
<table>
<tr><td>Product Type</td><td>Low Power Communication Device</td></tr>
<tr><td>Operation Frequency:</td><td>2405~2477 MHz</td></tr>
<tr><td>Modulation Type:</td><td>Pi/4 DQPSK</td></tr>
<tr><td>Date rate:</td><td>2Kbps</td></tr>
<tr><td>Number of Channel</td><td>37CH .Please see Note 2.</td></tr>
<tr><td>Antenna Designation:</td><td>Integral antenna</td></tr>
<tr><td>Antenna Gain(Peak)</td><td>0.002 dBi -ANT A
-0.205 dBi -ANT B</td></tr>
<tr><td>Output Power:</td><td>93.34 dBuV/m (AV Max.)</td></tr>
</table>
Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification. Please refer to the User's Manual.</td></tr>
<tr><td>Channel List</td><td>Please refer to the Note 2.</td></tr>
<tr><td>Power Source</td><td>#1 DC Voltage supplied from PC USB Port.
#2 DC Voltage supplied from Li-ion battery</td></tr>
<tr><td>Power Rating</td><td># 1 I/P AC 230V/50Hz, O/P DC 5V
2 DC 3.7V 2.52Wh</td></tr>
<tr><td>Connecting I/O Port(s)</td><td>Please refer to the User's Manual</td></tr>
</table>

Note:

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

2.

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	**2405MHz**	14	2431MHz	27	2457MHz
02	2407MHz	15	2433MHz	28	2459MHz
03	2409MHz	16	2435MHz	29	2461MHz
04	2411MHz	17	2437MHz	30	2463MHz
05	2413MHz	18	2439MHz	31	2465MHz
06	2415MHz	**19**	**2441MHz**	32	2467MHz
07	2417MHz	20	2443MHz	33	2469MHz
08	2419MHz	21	2445MHz	34	2471MHz
09	2421MHz	22	2447MHz	35	2473MHz
10	2423MHz	23	2449MHz	36	2475MHz
11	2425MHz	24	2451MHz	**37**	**2477MHz**
12	2427MHz	25	2453MHz		
13	2429MHz	26	2455MHz		

3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
A	N/A	N/A	Integral	N/A	0.002
B	N/A	N/A	Integral	N/A	-0.205

Note：(1) EUT function is Transceiver. EUT have two ANT port (L12,L16), can not transmiting synchronously.

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	Normal Link with Charging
Mode 2	CH Lower – 2405MHz
Mode 3	CH Middle – 2441MHz
Mode 4	CH Highest -2477MHz

The EUT system operated these modes (ANT A and ANT B) were found to be the worst case is ANT A

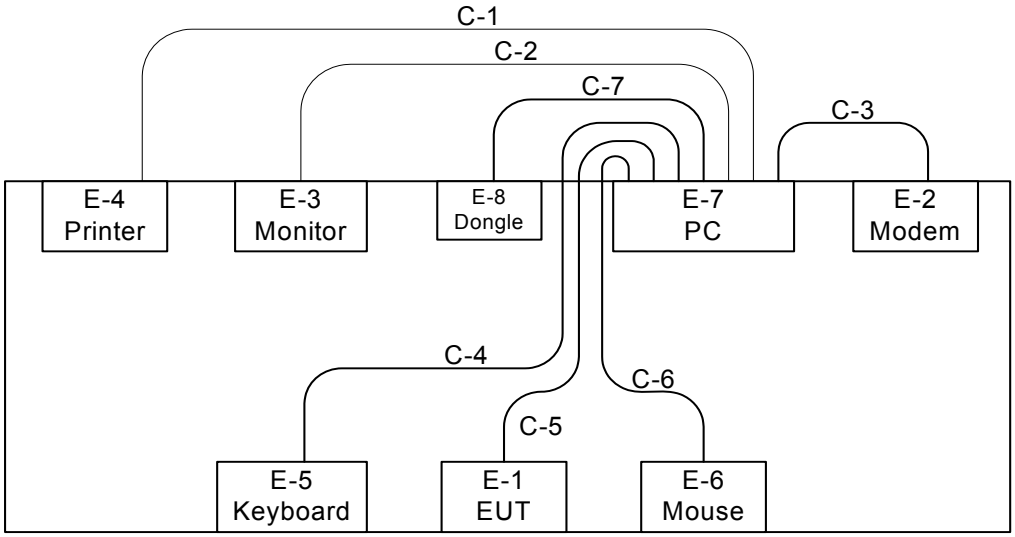
For Conducted Test	
Final Test Mode	Description
Mode 1	Normal Link with Charging

For Radiated Test	
Final Test Mode	Description
Mode 2	CH Lower – 2405MHz
Mode 3	CH Middle – 2441MHz
Mode 4	CH Highest -2477MHz

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

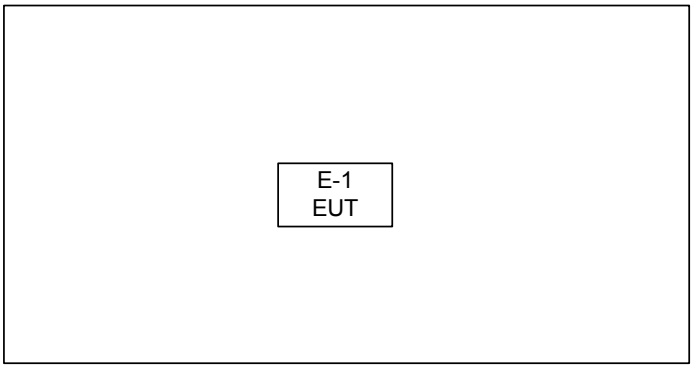
3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Conducted: Normal Link with Charging



C-1: Parallel Cable
C-2: D-Sub Cable
C-3: RS232 Cable
C-4: USB Cable
C-5: USB Cable
C-6: USB Cable
C-7: USB Cable

Radiated: TX/RX Mode



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 ID	Series No.	Note
E-1	VENGEANCE 2000	CORSAIR	HF2012	A9AHF2012-RX / 10101A-HF2012RX	N/A	EUT
E-2	Modem	ACEEX	DM-1414V	IFAXDm1414	0603002131	
E-3	LCD monitor	Dell	E177FPc	DOC	CNOFJ179-64180-6AG-1 WNS	
E-4	Printer	SII	DPU-414	DOC	3018507 B	
E-5	USB Keyboard	Dell	L100	DOC	CNORH6596589085C00U 7	
E-6	USB Mouse	Dell	MO56UOA	DOC	G01003HO	
E-7	PC	Dell 745	DCSM	DOC	G7K832X	
E-8	Wireless Gaming Headse	CORSAIR	HF2012-TX	A9AHF2012-TX	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
C-1	YES	NO	1.5M	
C-2	YES	YES	1.5M	
C-3	YES	NO	0.9M	
C-4	YES	YES	1.5M	
C-5	YES	NO	1.5M	
C-6	YES	NO	1.2M	
C-7	YES	NO	1.5M	

Note:

(1) The support equipment was authorized by Declaration of Confirmation.
(2) For detachable type I/O cable should be specified the length in cm in『Length』column.

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.

4.1.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	LISN	EMCO	3816/2	00052765	May.26.2012
2	LISN	R&S	ENV216	100087	May.26.2012
3	Test Cable	N/A	C_17	N/A	Mar.30.2012
4	EMI TEST RECEIVER	R&S	ESCS30	826547/022	May.26.2012
5	50Ω Terminator	SHX	TF2-3G-A	08122902	May.26.2012

Remark: ” N/A” denotes No Model Name. , Serial No. or No Calibration specified.

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

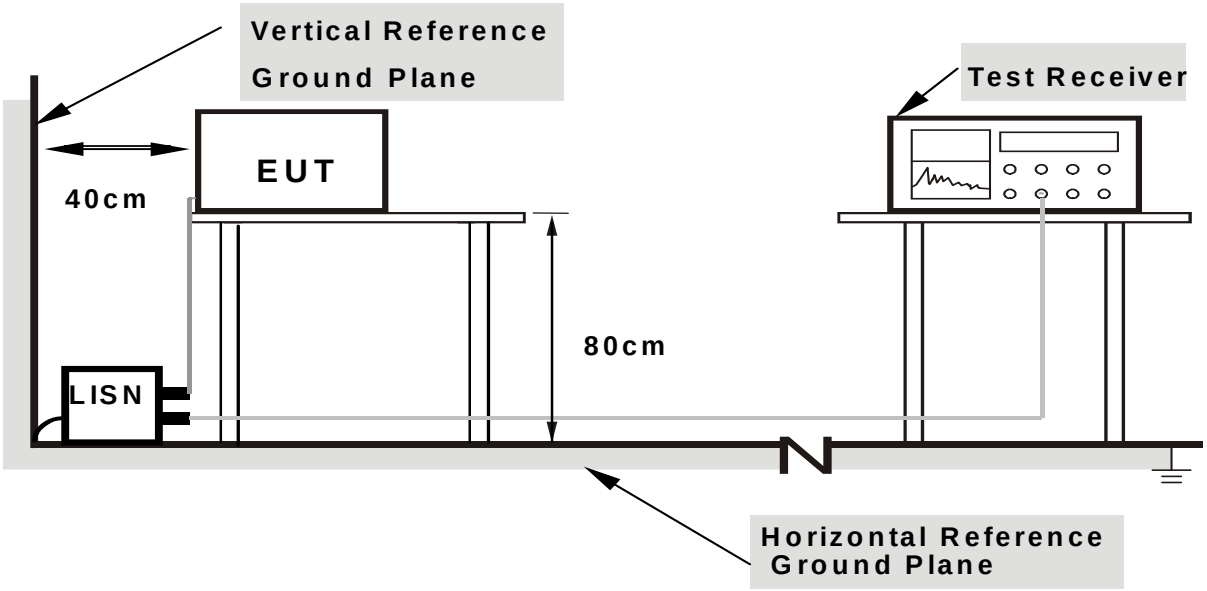
4.1.3 TEST PROCEDURE

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.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 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

4.1.6 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.

4.1.7 TEST RESULTS

EUT：	VENGEANCE 2000	Model Name. ：	HF2012-RX
Temperature：	21 ℃	Relative Humidity：	50 %
Pressure：	1009 hPa	Test Power ：	AC 120V/60Hz
Test Mode ：	Normal Link with Charging		

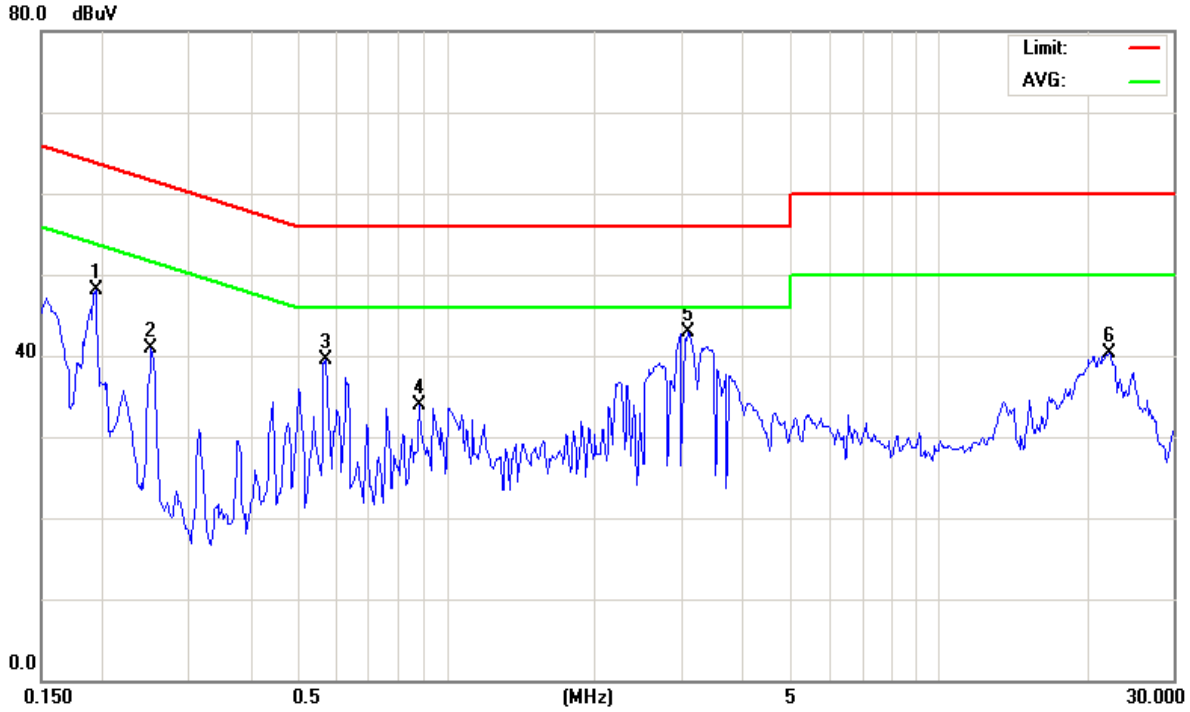
Freq. (MHz)	Terminal L/N	Measured(dBuV)		Limits(dBuV)		Margin (dB)	Note
		QP-Mode	AV-Mode	QP-Mode	AV-Mode		
0.19	Line	48.16	*	63.90	53.90	-15.74	(QP)
0.25	Line	40.83	*	61.71	51.71	-20.88	(QP)
0.57	Line	39.59	*	56.00	46.00	-16.41	(QP)
0.88	Line	34.00	*	56.00	46.00	-22.00	(QP)
3.09	Line	42.82	*	56.00	46.00	-13.18	(QP)
22.24	Line	40.27	*	60.00	50.00	-19.73	(QP)

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.



EUT：	VENGEANCE 2000	Model Name. ：	HF2012-RX
Temperature：	21 ℃	Relative Humidity：	50 %
Pressure：	1009 hPa	Test Power ：	AC 120V/60Hz
Test Mode ：	Normal Link with Charging		

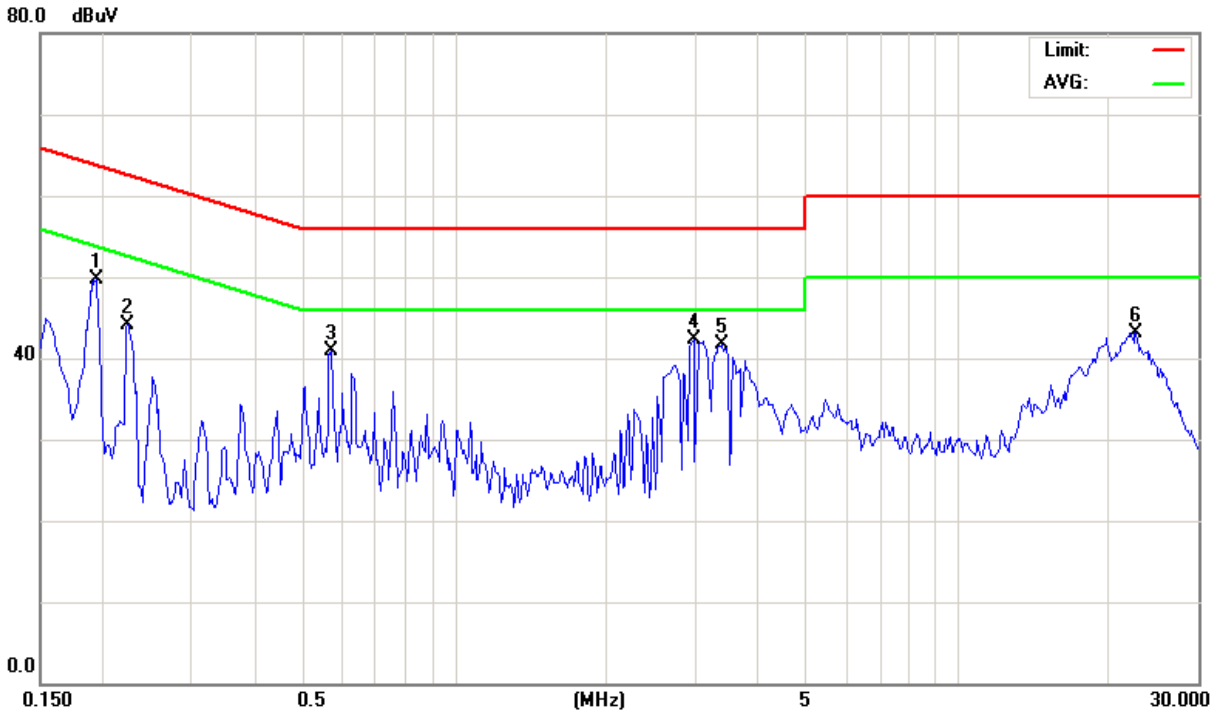
Freq. (MHz)	Terminal L/N	Measured(dBuV)		Limits(dBuV)		Margin (dB)	Note
		QP-Mode	AV-Mode	QP-Mode	AV-Mode		
0.19	Neutral	49.76	*	63.90	53.90	-14.14	(QP)
0.22	Neutral	44.14	*	62.66	52.66	-18.52	(QP)
0.57	Neutral	40.87	*	56.00	46.00	-15.13	(QP)
2.98	Neutral	42.39	*	56.00	46.00	-13.61	(QP)
3.40	Neutral	41.76	*	56.00	46.00	-14.24	(QP)
22.54	Neutral	43.19	*	60.00	50.00	-16.81	(QP)

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
Above 960	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

4.2.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	Schwarbeck	VULB9160	9160-3232	Jun .04.2012
2	Amplifier	HP	8447D	2944A09673	May.26.2012
3	Test Receiver	R&S	ESCI	100382	May.26.2012
4	Test Cable	N/A	C-01_CB03	N/A	Jul.01.2012
5	Antenna	EMCO	3142C	00066462	Jul.14.2012
6	Antenna	EMCO	3142C	00066464	Jul.14.2012
7	Amplifier	Agilent	8447D	2944A11203	Nov.25.2012
8	Amplifier	Agilent	8447D	2944A11204	Nov.25.2012
9	Spectrum Analyzer	Agilent	E4443A	MY48250370	Nov.25.2012
10	Active Loop Antenna	R&S	HFH2-Z2	830749/020	May.26.2012
11	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Oct.13.2012

Remark: ” N/A” denotes No Model Name. / Serial No. and No Calibration specified.

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

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~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

4.2.3 TEST PROCEDURE

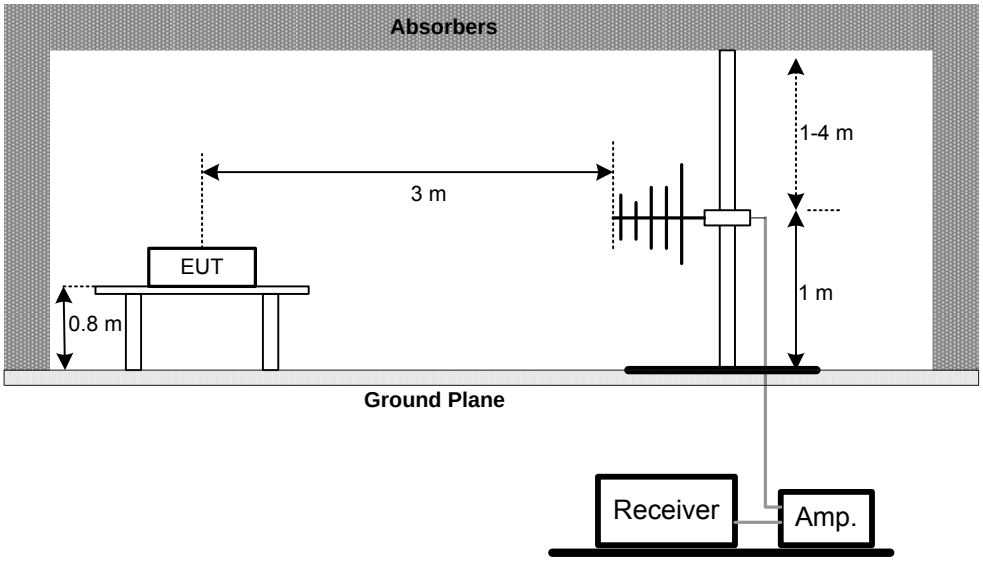
a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3m meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. 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 Quasi Peak detector mode re-measured.
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.2.4 DEVIATION FROM TEST STANDARD

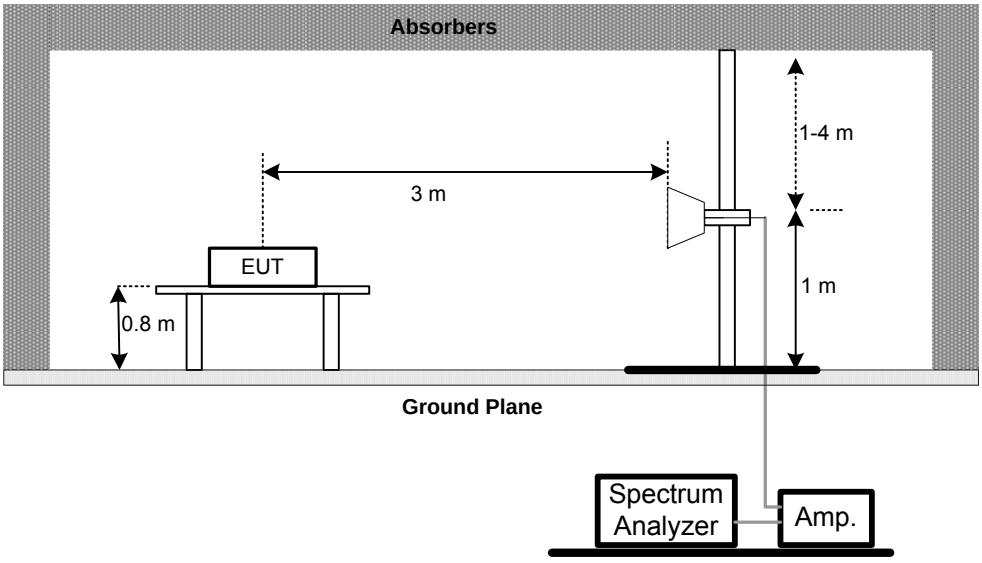
No deviation

4.2.5 TEST SETUP

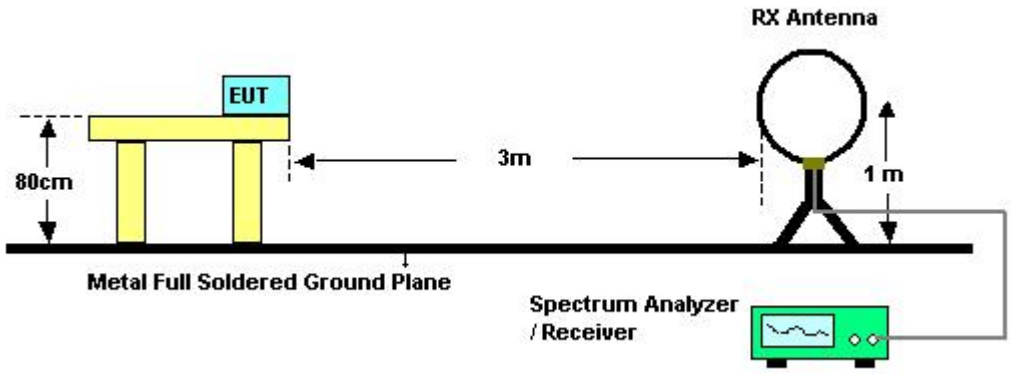
(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



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



(C) For radiated emissions below 30MHz



4.2.6 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.

4.2.7 TEST RESULTS (BELOW 30MHz)

EUT：	VENGEANCE 2000	Model Name. ：	HF2012-RX
Temperature：	25℃	Relative Humidity：	53 %
Pressure：	1009 hPa	Test Power ：	DC 3.7V
Test Mode ：	TX Mode		

Freq. (MHz)	Ant. 0°/90°	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
0.01	0°	28.47	24.30	52.77	128.05	-75.28	AV
0.01	0°	31.98	24.30	56.28	148.05	-91.77	PK
0.03	0°	23.78	23.95	47.73	119.48	-71.75	AV
0.03	0°	26.42	23.95	50.37	139.48	-89.11	PK
0.04	0°	20.04	23.10	43.14	115.79	-72.65	AV
0.04	0°	22.71	23.10	45.81	135.79	-89.98	PK
0.06	0°	18.06	22.17	40.23	111.80	-71.57	AV
0.06	0°	23.69	22.17	45.86	131.80	-85.94	PK
0.27	0°	21.89	20.36	42.25	99.13	-56.88	AV
0.27	0°	23.02	20.36	43.38	119.13	-75.75	PK
1.38	0°	27.35	19.56	46.91	64.84	-17.93	QP

Freq. (MHz)	Ant. 0°/90°	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
0.01	90°	17.33	24.30	41.63	127.73	-86.10	AV
0.01	90°	20.68	24.30	44.98	147.73	-102.75	PK
0.02	90°	13.04	24.17	37.21	120.74	-83.53	AV
0.02	90°	15.45	24.17	39.62	140.74	-101.12	PK
0.05	90°	20.14	22.62	42.76	114.25	-71.49	AV
0.05	90°	22.87	22.62	45.49	134.25	-88.76	PK
0.08	90°	21.44	21.85	43.29	109.83	-66.54	AV
0.08	90°	24.66	21.85	46.51	129.83	-83.32	PK
0.37	90°	21.07	20.12	41.19	96.29	-55.10	AV
0.37	90°	24.96	20.12	45.08	116.29	-71.21	PK
1.52	90°	23.15	19.55	42.70	63.94	-21.25	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)

EUT：	VENGEANCE 2000	Model Name. ：	HF2012-RX
Temperature：	23℃	Relative Humidity：	51 %
Pressure：	1009 hPa	Test Power ：	DC 3.7V
Test Mode ：	TX Mode 2405MHz		

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
63.95	V	48.79	-17.58	31.21	40.00	- 8.79	
143.98	V	46.32	-17.66	28.66	43.50	- 14.84	
216.73	V	45.69	-16.00	29.69	46.00	- 16.31	
432.55	V	41.84	-8.43	33.41	46.00	- 12.59	
505.30	V	43.01	-7.16	35.85	46.00	- 10.15	
648.38	V	36.24	-3.37	32.87	46.00	- 13.13	

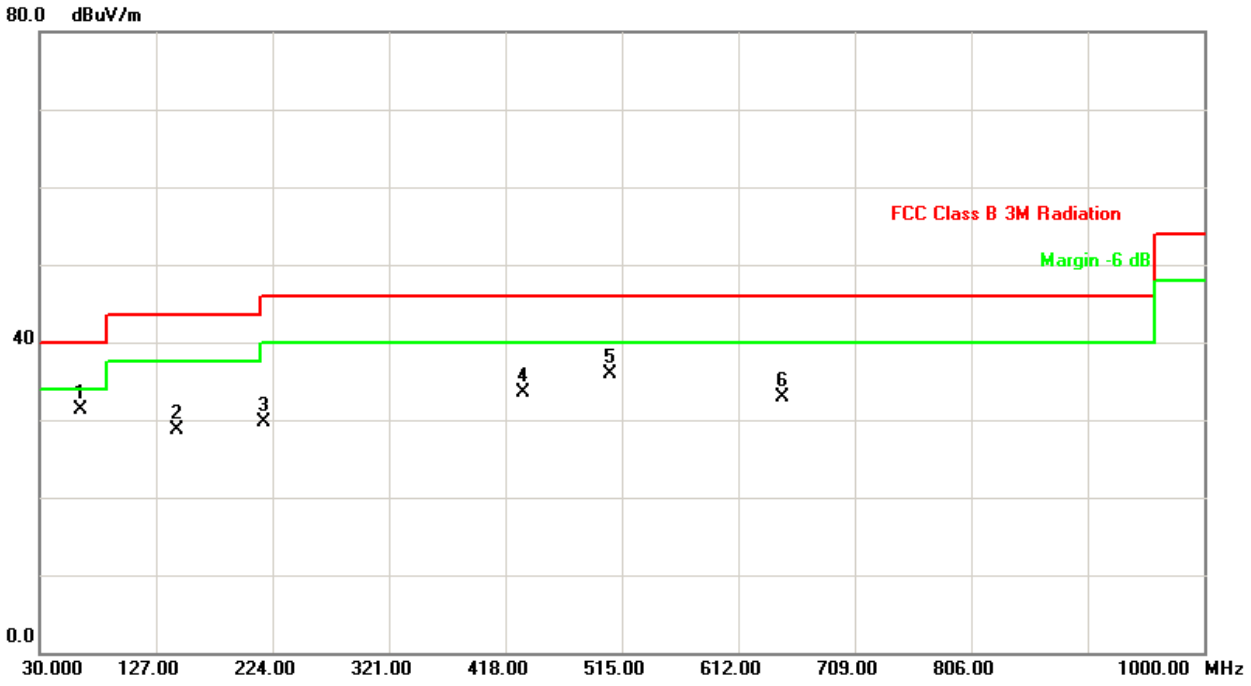
Remark：

(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.



EUT：	VENGEANCE 2000	Model Name. ：	HF2012-RX
Temperature：	23℃	Relative Humidity：	51 %
Pressure：	1009 hPa	Test Power ：	DC 3.7V
Test Mode ：	TX Mode 2405MHz		

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
42.13	H	47.04	-16.68	30.36	40.00	- 9.64	
119.73	H	47.36	-18.28	29.08	43.50	- 14.42	
296.75	H	42.84	-12.07	30.77	46.00	- 15.23	
432.55	H	43.70	-8.43	35.27	46.00	- 10.73	
551.38	H	41.18	-5.45	35.73	46.00	- 10.27	
721.13	H	35.60	-2.92	32.68	46.00	- 13.32	

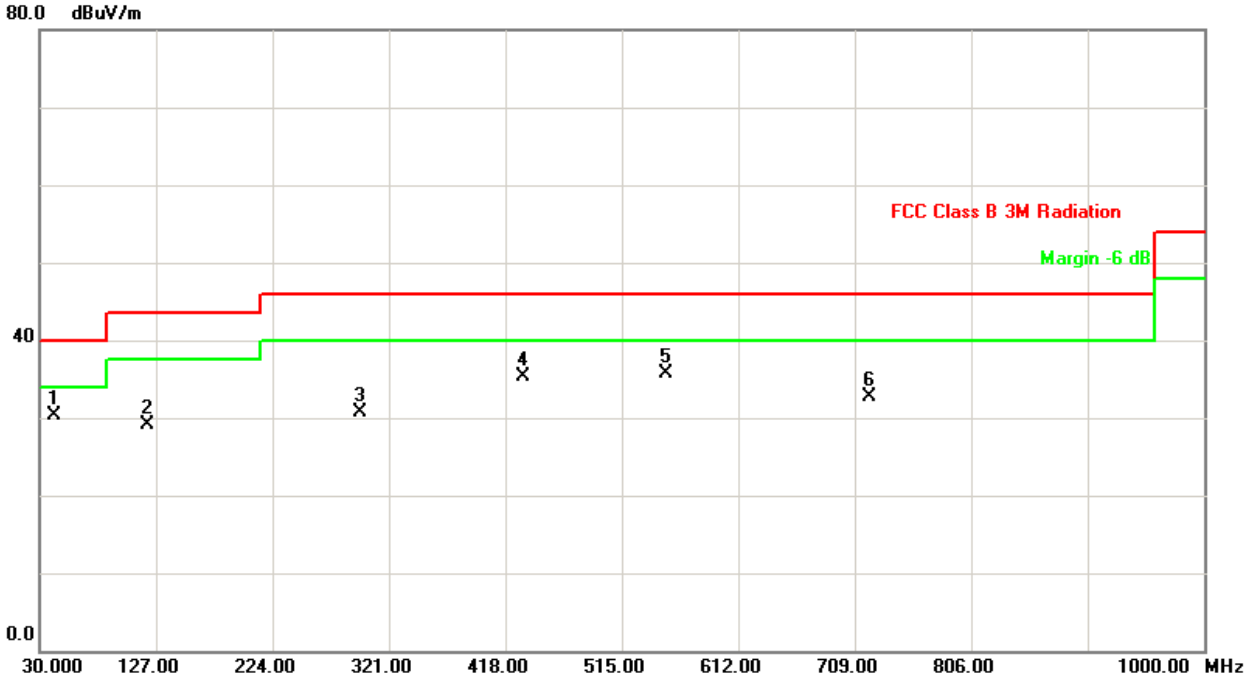
Remark：

(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.



EUT：	VENGEANCE 2000	Model Name. ：	HF2012-RX
Temperature：	23℃	Relative Humidity：	51 %
Pressure：	1009 hPa	Test Power ：	DC 3.7V
Test Mode ：	TX Mode 2441MHz		

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
34.85	V	48.60	-16.90	31.70	40.00	- 8.30	
63.95	V	47.79	-17.58	30.21	40.00	- 9.79	
253.10	V	44.17	-14.34	29.83	46.00	- 16.17	
420.43	V	44.50	-8.65	35.85	46.00	- 10.15	
505.30	V	43.51	-7.16	36.35	46.00	- 9.65	
587.75	V	38.39	-4.57	33.82	46.00	- 12.18	

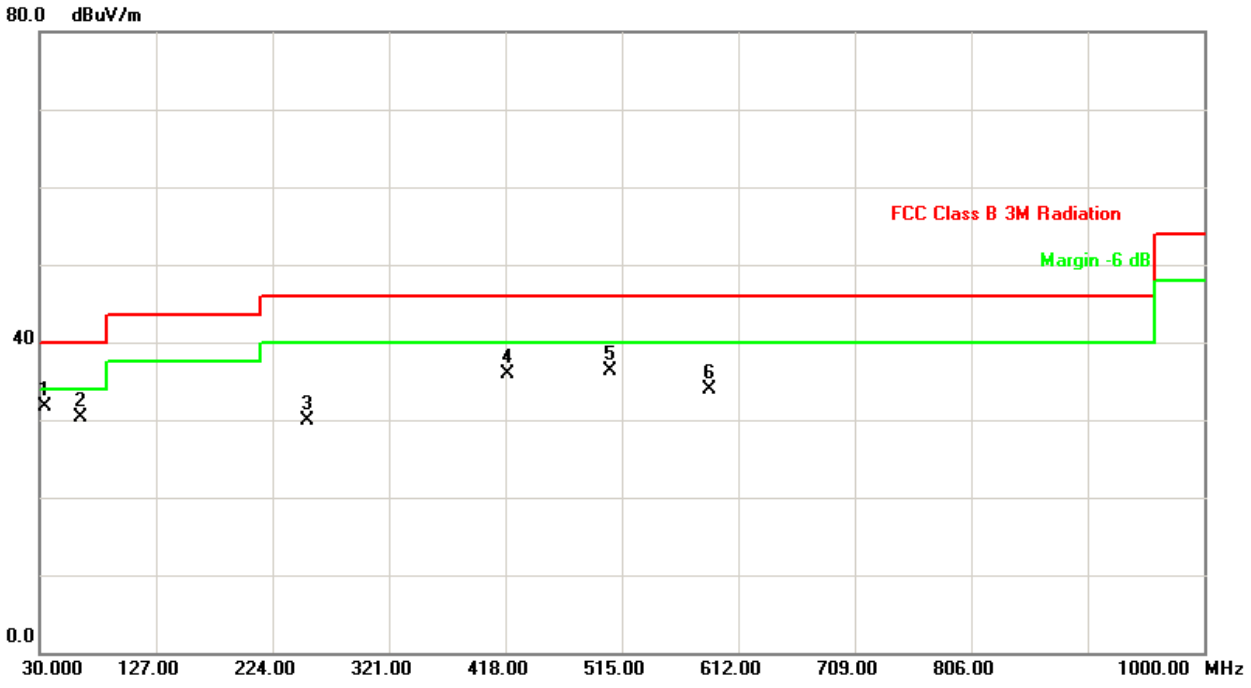
Remark：

(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.



EUT：	VENGEANCE 2000	Model Name. ：	HF2012-RX
Temperature：	23℃	Relative Humidity：	51 %
Pressure：	1009 hPa	Test Power ：	DC 3.7V
Test Mode ：	TX Mode 2441MHz		

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
42.13	H	47.04	-16.68	30.36	40.00	- 9.64	
73.65	H	49.02	-18.69	30.33	40.00	- 9.67	
119.73	H	46.86	-18.28	28.58	43.50	- 14.92	
296.75	H	43.84	-12.07	31.77	46.00	- 14.23	
432.55	H	45.20	-8.43	36.77	46.00	- 9.23	
551.38	H	42.18	-5.45	36.73	46.00	- 9.27	

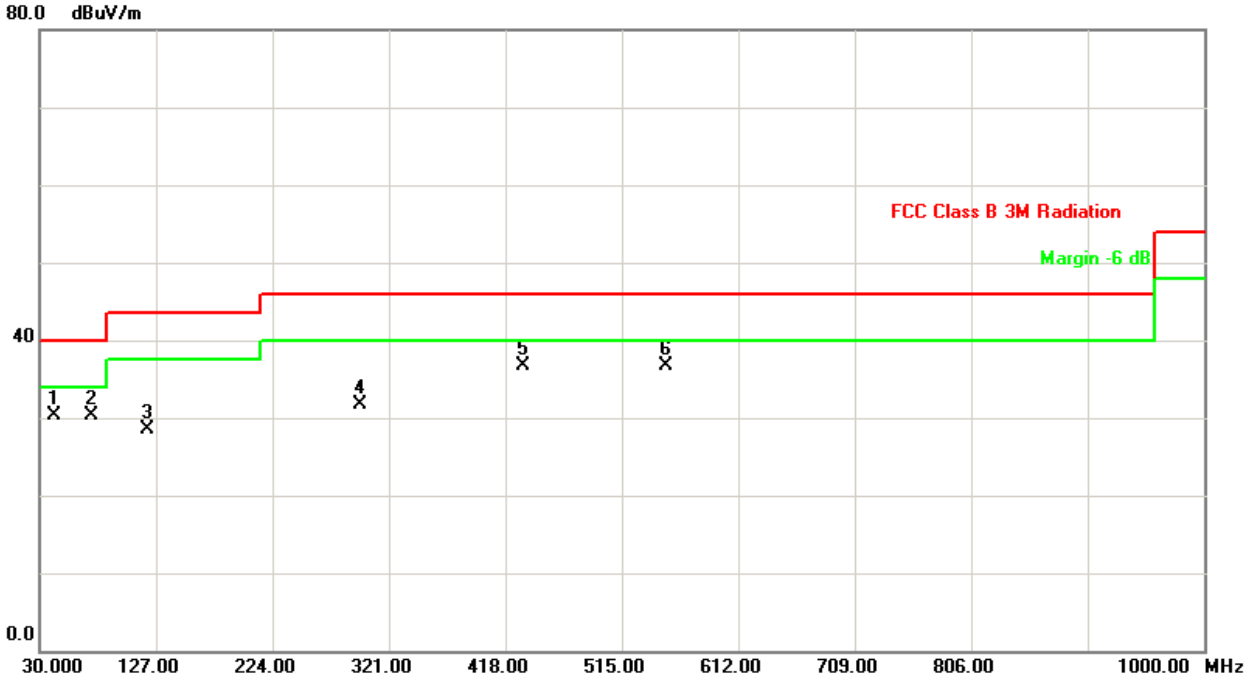
Remark：

(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.



EUT：	VENGEANCE 2000	Model Name. ：	HF2012-RX
Temperature：	23℃	Relative Humidity：	51 %
Pressure：	1009 hPa	Test Power ：	DC 3.7V
Test Mode ：	TX Mode 2477MHz		

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
49.40	V	50.07	-17.27	32.80	40.00	- 7.20	
143.98	V	47.32	-17.66	29.66	43.50	- 13.84	
216.73	V	46.69	-16.00	30.69	46.00	- 15.31	
444.68	V	43.94	-8.21	35.73	46.00	- 10.27	
541.68	V	42.19	-5.80	36.39	46.00	- 9.61	
721.13	V	35.59	-2.92	32.67	46.00	- 13.33	

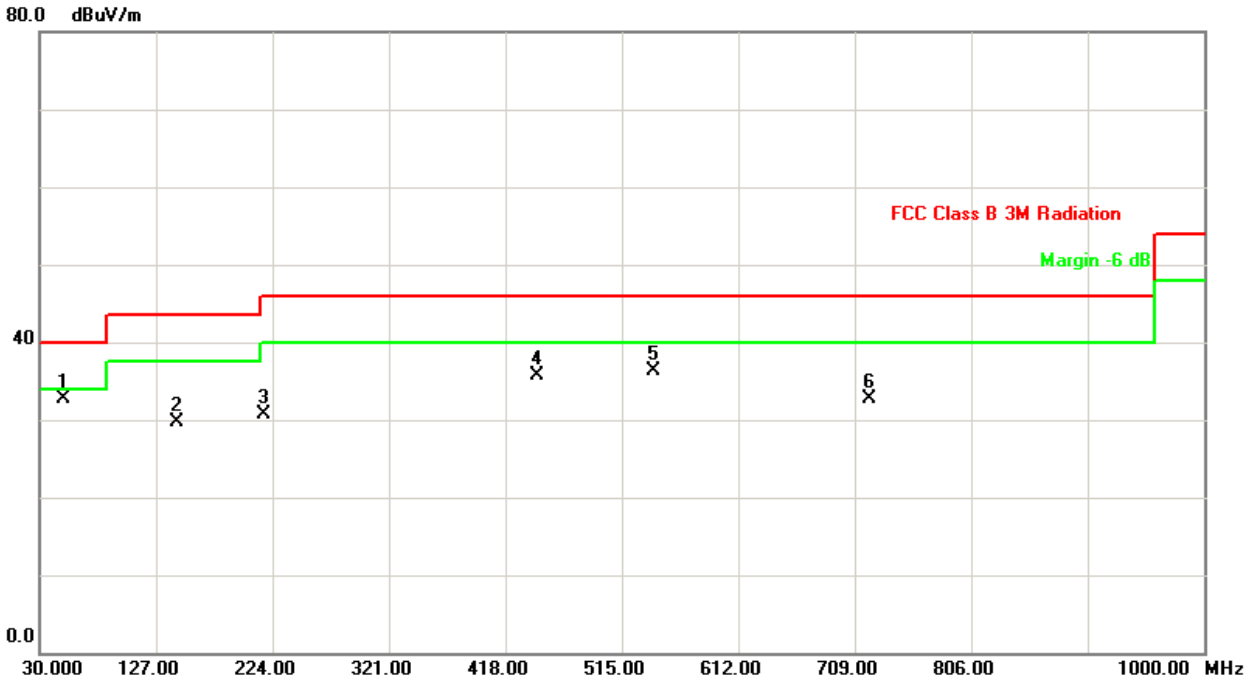
Remark：

(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.



EUT：	VENGEANCE 2000	Model Name. ：	HF2012-RX
Temperature：	23℃	Relative Humidity：	51 %
Pressure：	1009 hPa	Test Power ：	DC 3.7V
Test Mode ：	TX Mode 2477MHz		

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
42.13	H	48.04	-16.68	31.36	40.00	- 8.64	
119.73	H	48.36	-18.28	30.08	43.50	- 13.42	
296.75	H	45.84	-12.07	33.77	46.00	- 12.23	
432.55	H	44.70	-8.43	36.27	46.00	- 9.73	
493.18	H	42.62	-7.46	35.16	46.00	- 10.84	
575.63	H	40.74	-4.87	35.87	46.00	- 10.13	

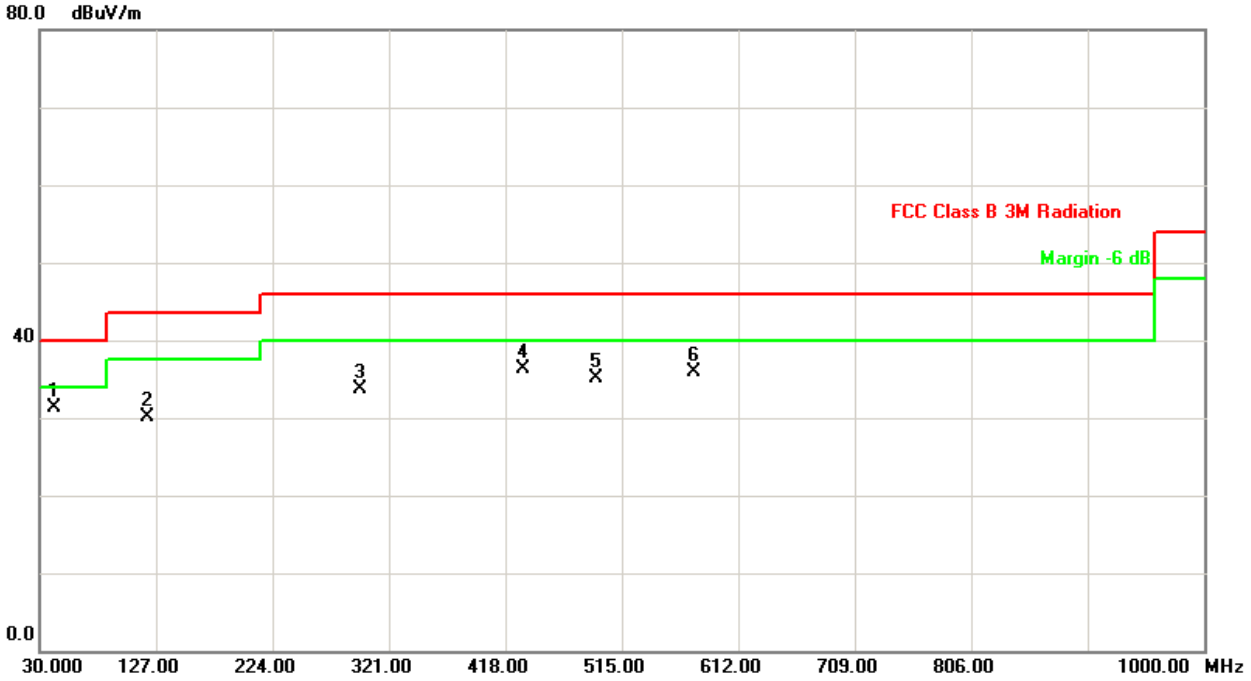
Remark：

(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.



EUT：	VENGEANCE 2000	Model Name. ：	HF2012-RX
Temperature：	23℃	Relative Humidity：	51 %
Pressure：	1009 hPa	Test Power ：	DC 3.7V
Test Mode ：	RX Mode 2405MHz		

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
34.85	V	49.60	-16.90	32.70	40.00	- 7.30	
49.40	V	49.07	-17.27	31.80	40.00	- 8.20	
143.98	V	47.32	-17.66	29.66	43.50	- 13.84	
216.73	V	47.19	-16.00	31.19	46.00	- 14.81	
444.68	V	40.94	-8.21	32.73	46.00	- 13.27	
648.38	V	38.74	-3.37	35.37	46.00	- 10.63	

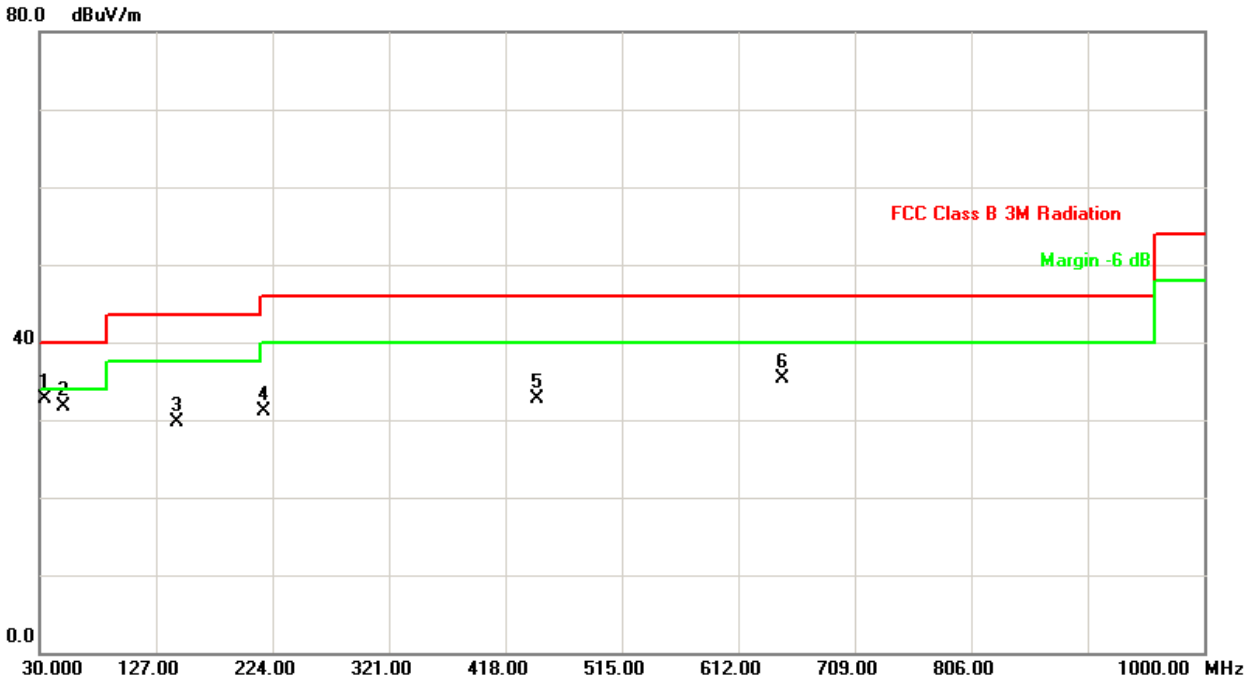
Remark：

(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.



EUT：	VENGEANCE 2000	Model Name. ：	HF2012-RX
Temperature：	23℃	Relative Humidity：	51 %
Pressure：	1009 hPa	Test Power ：	DC 3.7V
Test Mode ：	RX Mode 2405MHz		

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
42.13	H	48.04	-16.68	31.36	40.00	- 8.64	
73.65	H	49.02	-18.69	30.33	40.00	- 9.67	
119.73	H	47.36	-18.28	29.08	43.50	- 14.42	
296.75	H	44.84	-12.07	32.77	46.00	- 13.23	
420.43	H	44.09	-8.65	35.44	46.00	- 10.56	
624.15	H	38.32	-3.82	34.50	46.00	- 11.50	

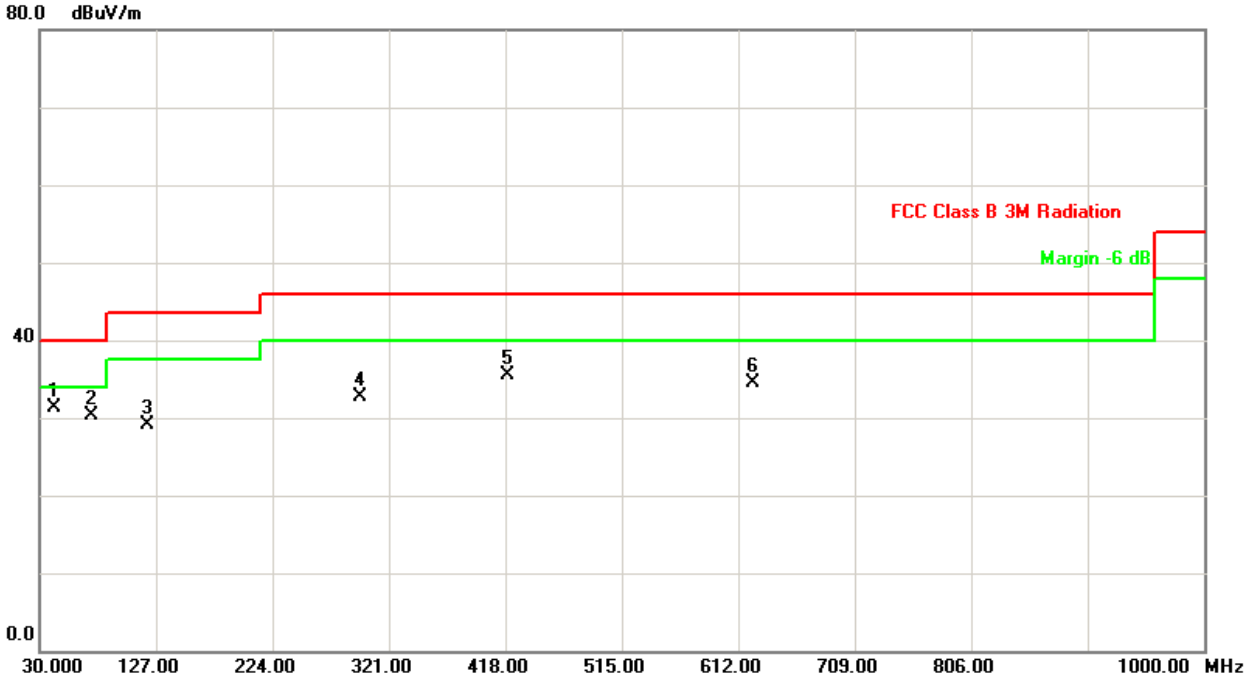
Remark：

(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.



4.2.9 TEST RESULTS (ABOVE 1000 MHz)

EUT：	VENGEANCE 2000	Model Name. ：	HF2012-RX
Temperature：	23℃	Relative Humidity：	51%
Pressure：	1009 hPa	Test Power ：	DC 3.7V
Test Mode ：	TX 2405MHz		

Freq.	Ant.Pol.	Reading		Ant./CF	Act.		Limit		Note
		Peak	AV		Peak	AV	Peak	AV	
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2390.00	V	23.57	11.11	31.91	55.48	43.02	74.00	54.00	X/E
2405.13	**V**	**65.07**	**61.44**	**31.90**	**96.97**	**93.34**	**114.00**	**94.00**	**X/F**
4809.86	V	45.04	33.85	5.23	50.27	39.08	74.00	54.00	X/H

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 。

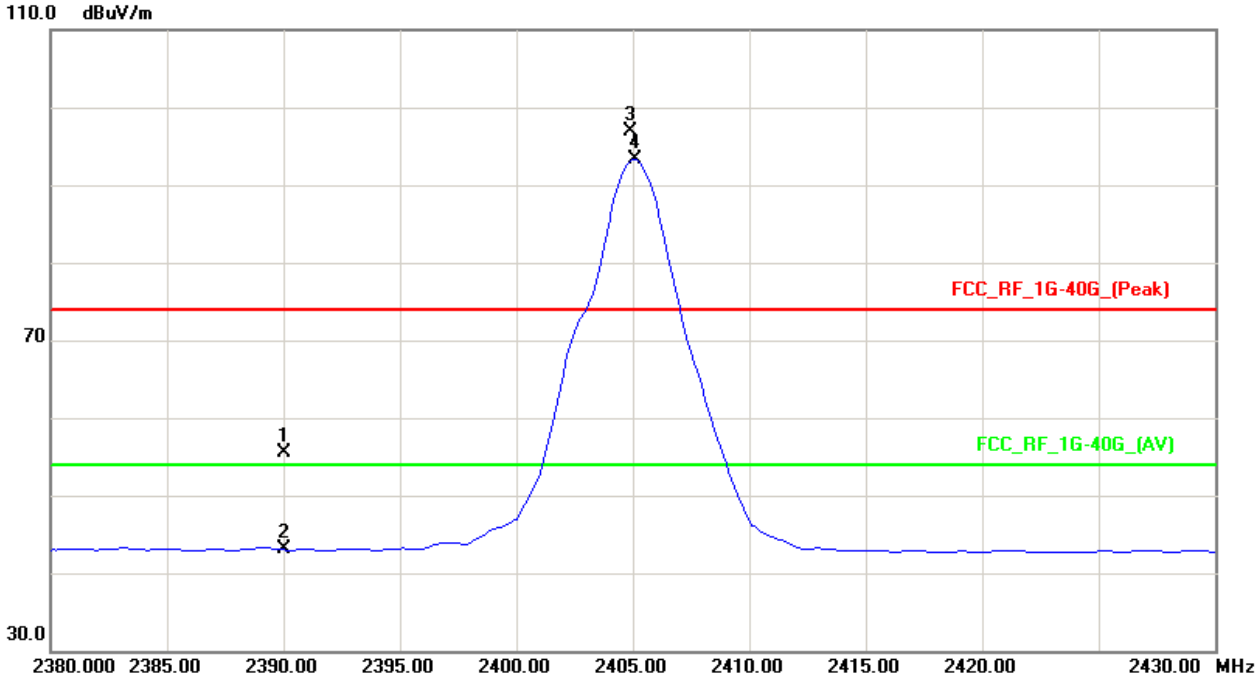
(4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

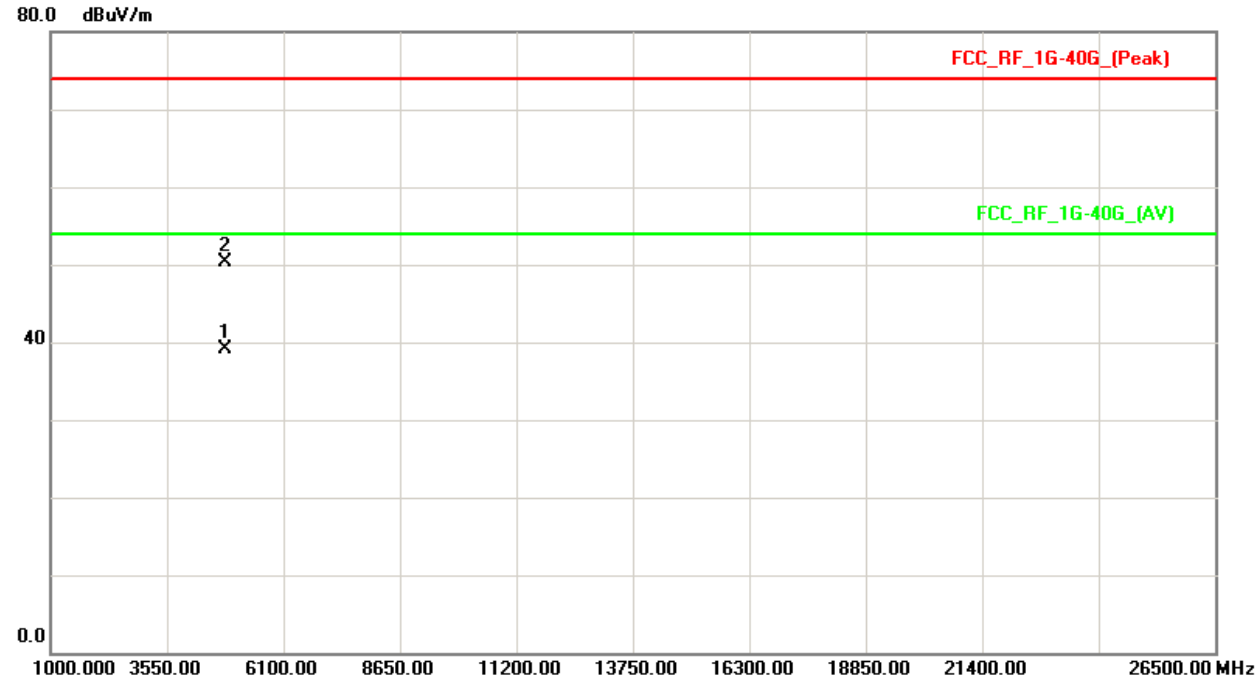
(5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

(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

Orthogonal Axis：X
TX 2405MHz (Above 1000 MHz, Vertical)





EUT：	VENGEANCE 2000	Model Name. ：	HF2012-RX
Temperature：	23℃	Relative Humidity：	51%
Pressure：	1009 hPa	Test Power ：	DC 3.7V
Test Mode ：	TX 2405MHz		

Freq.	Ant.Pol.	Reading		Ant./CF	Act.		Limit		Note
		Peak	AV		Peak	AV	Peak	AV	
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2390.00	H	23.36	11.06	31.91	55.27	42.97	74.00	54.00	X/E
2405.13	**H**	**64.00**	**60.76**	**31.90**	**95.90**	**92.66**	**114.00**	**94.00**	**X/F**
4809.66	H	44.28	33.62	5.23	49.51	38.85	74.00	54.00	X/H

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 。

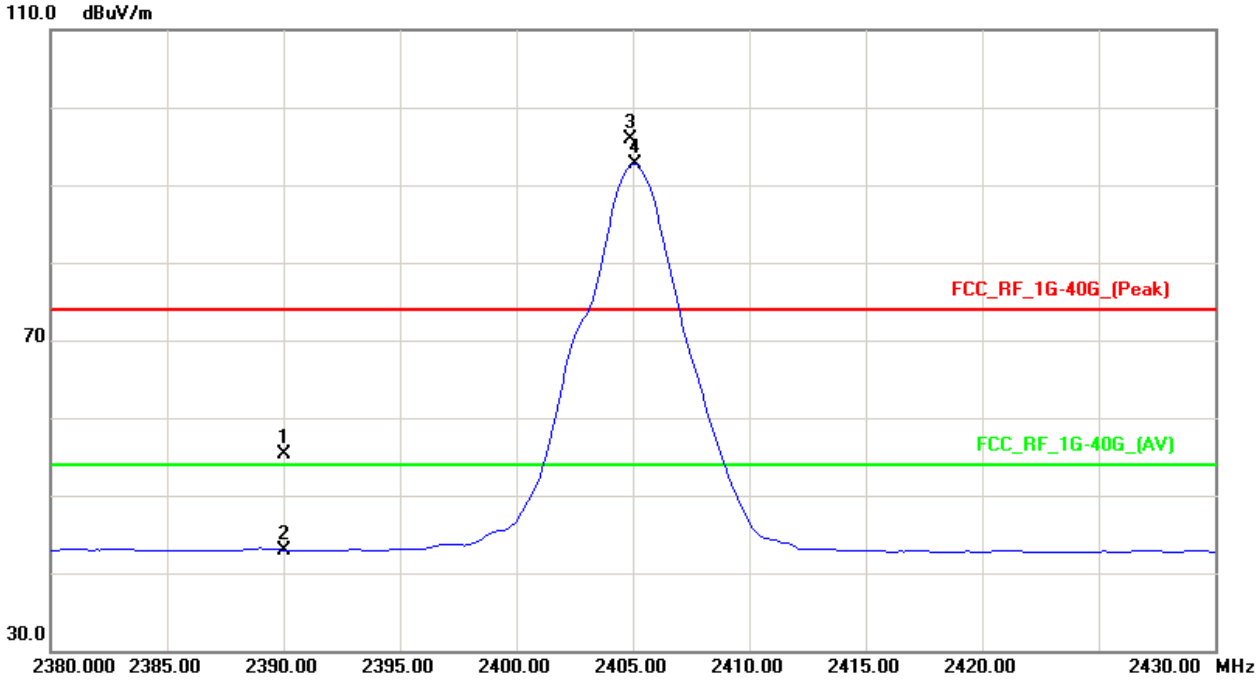
(4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

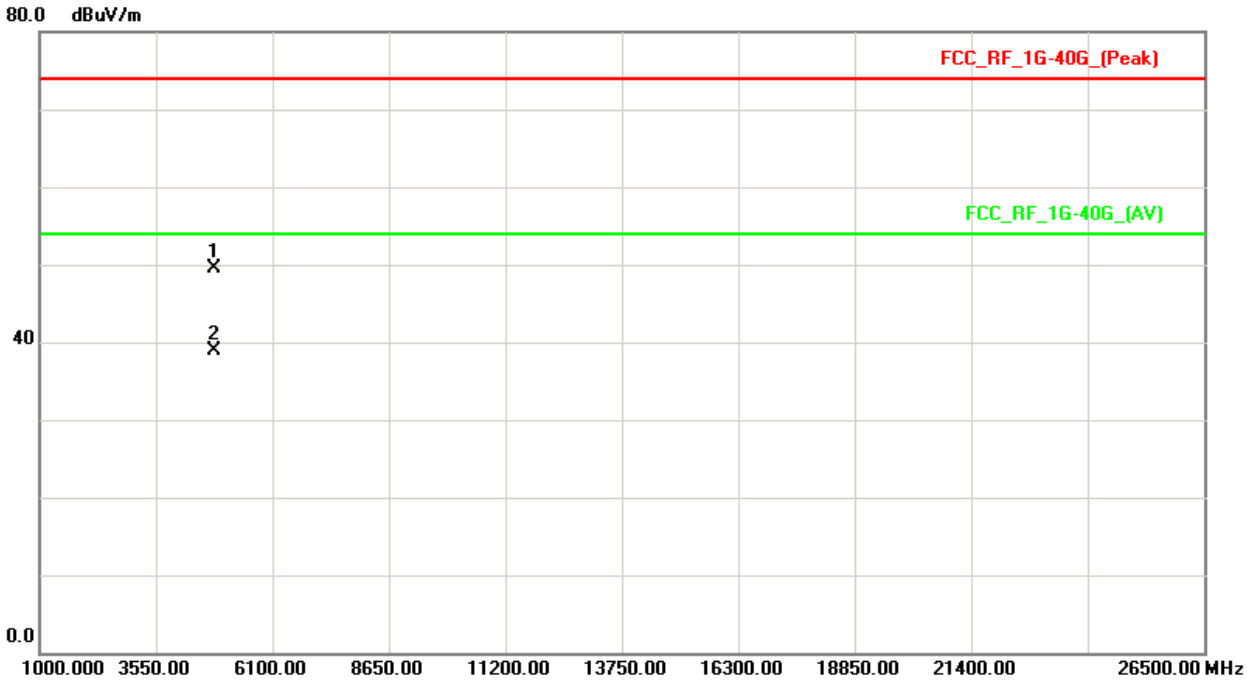
(5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

(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

Orthogonal Axis：X
TX 2405MHz (Above 1000 MHz, Horizontal)





EUT：	VENGEANCE 2000	Model Name. ：	HF2012-RX
Temperature：	23℃	Relative Humidity：	51%
Pressure：	1009 hPa	Test Power ：	DC 3.7V
Test Mode ：	TX 2441MHz		

Freq.	Ant.Pol.	Reading		Ant./CF	Act.		Limit		Note
		Peak	AV		Peak	AV	Peak	AV	
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2440.88	**V**	**65.65**	**60.98**	**31.85**	**97.50**	**92.83**	**114.00**	**94.00**	**X/F**
4880.53	V	46.75	35.99	5.49	52.24	41.48	74.00	54.00	X/H

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 。

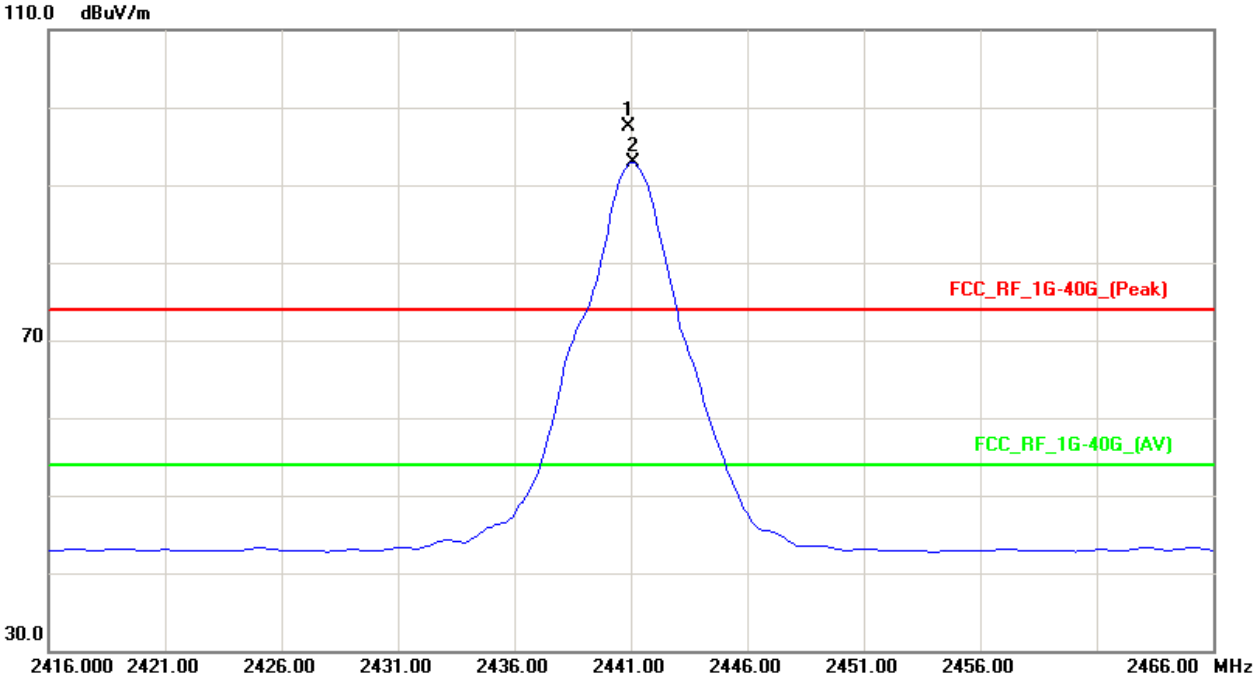
(4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

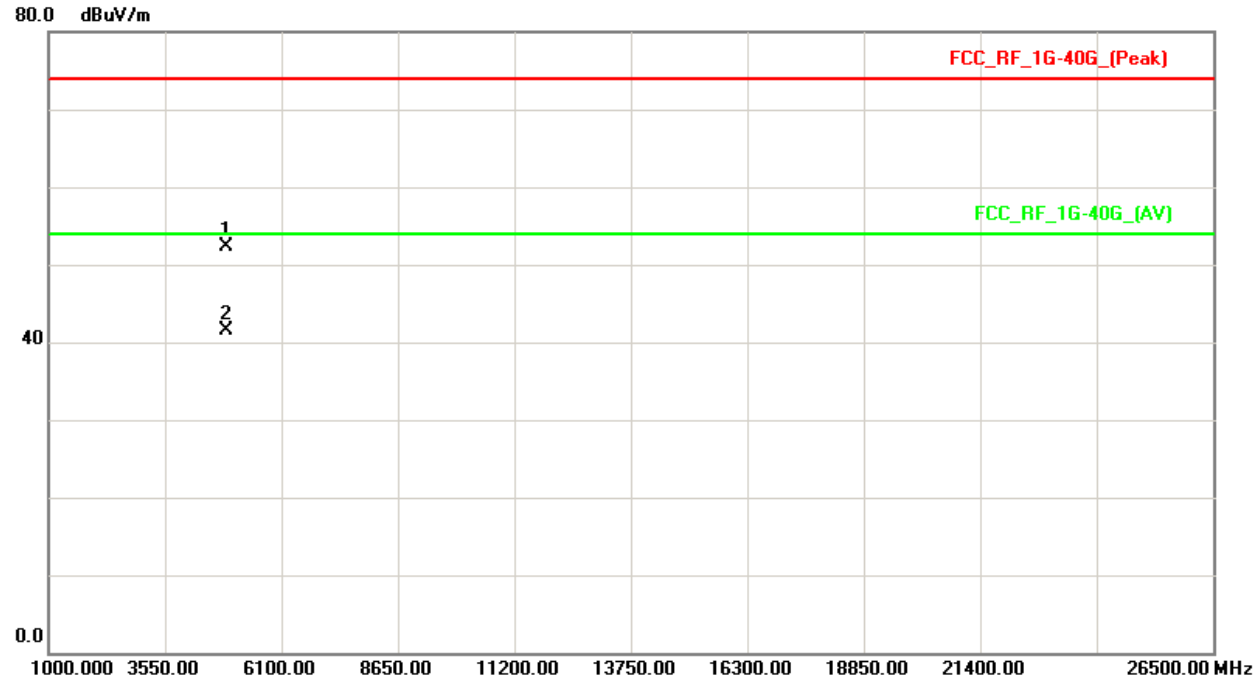
(5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

(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

Orthogonal Axis：X
TX 2441 MHz (Above 1000 MHz, Vertical)





EUT：	VENGEANCE 2000	Model Name. ：	HF2012-RX
Temperature：	23℃	Relative Humidity：	51%
Pressure：	1009 hPa	Test Power ：	DC 3.7V
Test Mode ：	TX 2441MHz		

Freq.	Ant.Pol.	Reading		Ant./CF	Act.		Limit		Note
		Peak	AV		Peak	AV	Peak	AV	
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2441.00	**H**	**62.84**	**59.64**	**31.85**	**94.69**	**91.49**	**114.00**	**94.00**	**X/F**
4881.16	H	44.87	32.64	5.49	50.36	38.13	74.00	54.00	X/H

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 。

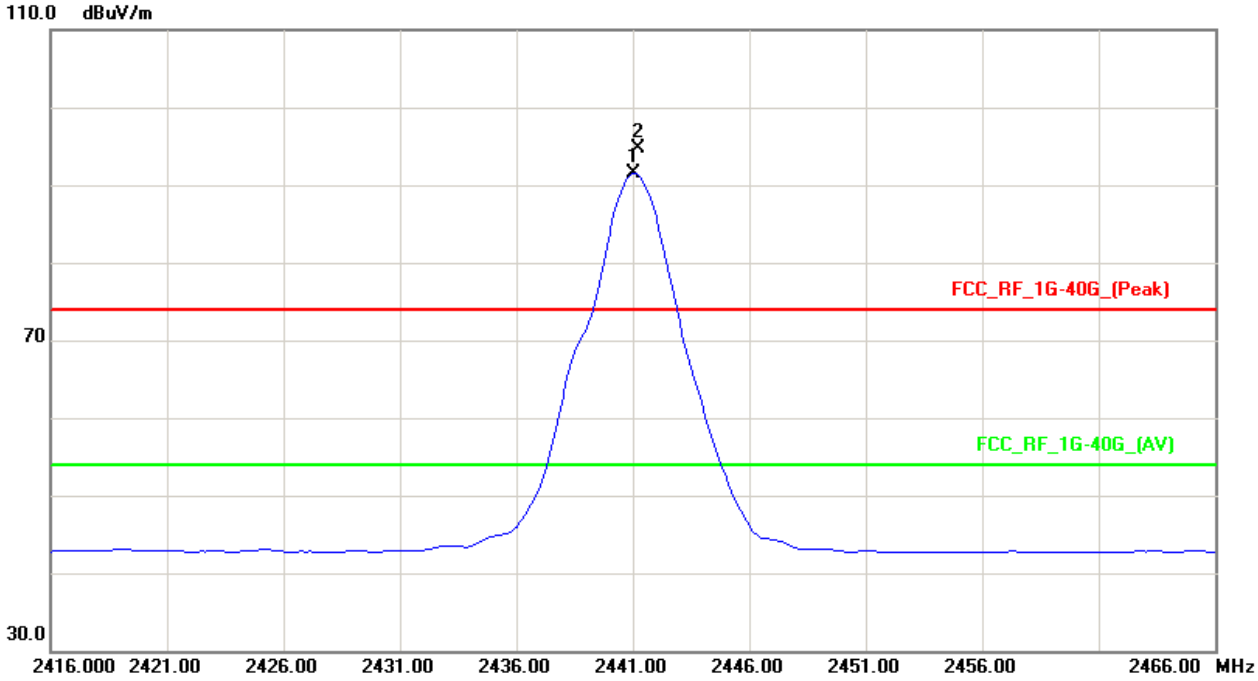
(4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

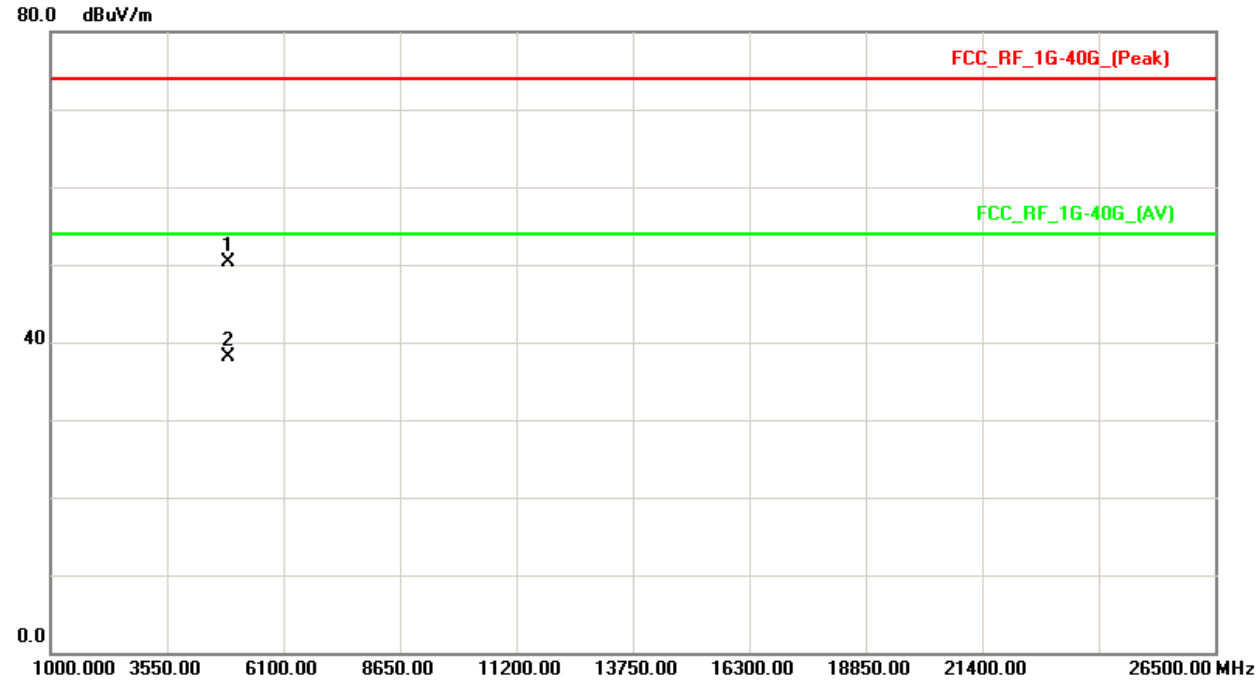
(5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

(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

Orthogonal Axis：X
TX 2441MHz (Above 1000 MHz, Horizontal)





EUT：	VENGEANCE 2000	Model Name. ：	HF2012-RX
Temperature：	23℃	Relative Humidity：	51%
Pressure：	1009 hPa	Test Power ：	DC 3.7V
Test Mode ：	TX 2477MHz		

Freq.	Ant.Pol.	Reading		Ant./CF	Act.		Limit		Note
		Peak	AV		Peak	AV	Peak	AV	
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2477.13	**V**	**65.95**	**61.15**	**31.81**	**97.76**	**92.96**	**114.00**	**94.00**	**X/F**
2483.50	V	23.77	12.21	31.80	55.57	44.01	74.00	54.00	X/E
4953.90	V	44.81	33.73	5.76	50.57	39.49	74.00	54.00	X/H

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 。

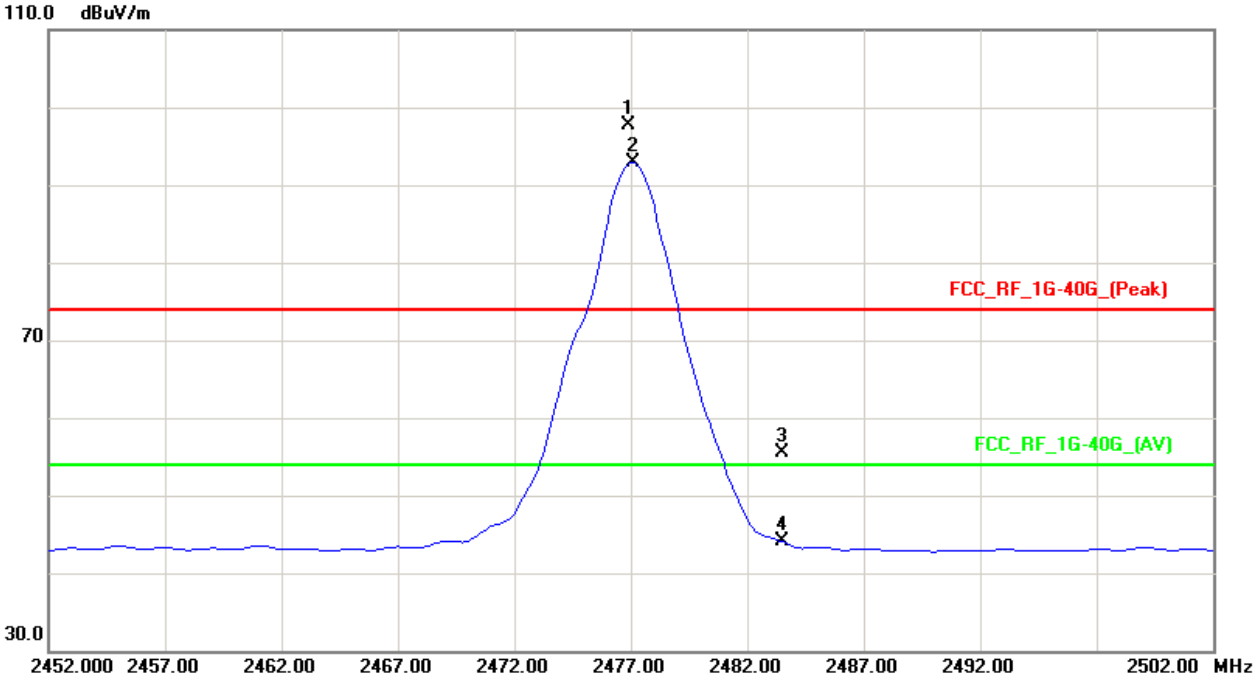
(4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

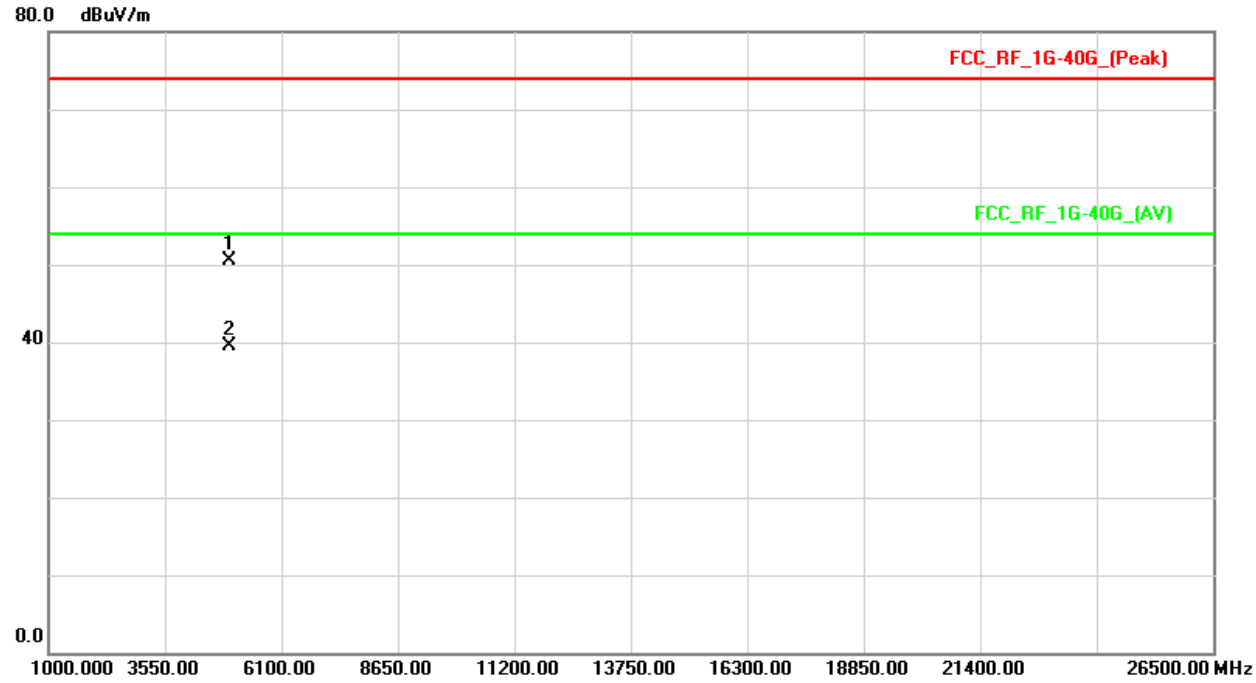
(5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

(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

Orthogonal Axis：X
TX 2477MHz (Above 1000 MHz, Vertical)





EUT：	VENGEANCE 2000	Model Name. ：	HF2012-RX
Temperature：	23℃	Relative Humidity：	51%
Pressure：	1009 hPa	Test Power ：	DC 3.7V
Test Mode ：	TX 2477MHz		

Freq.	Ant.Pol.	Reading		Ant./CF	Act.		Limit		Note
		Peak	AV		Peak	AV	Peak	AV	
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2477.00	**H**	**61.85**	**58.63**	**31.81**	**93.66**	**90.44**	**114.00**	**94.00**	**X/F**
2483.50	H	23.51	11.33	31.80	55.31	43.13	74.00	54.00	X/E
4953.10	H	43.43	31.73	5.76	49.19	37.49	74.00	54.00	X/H

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 。

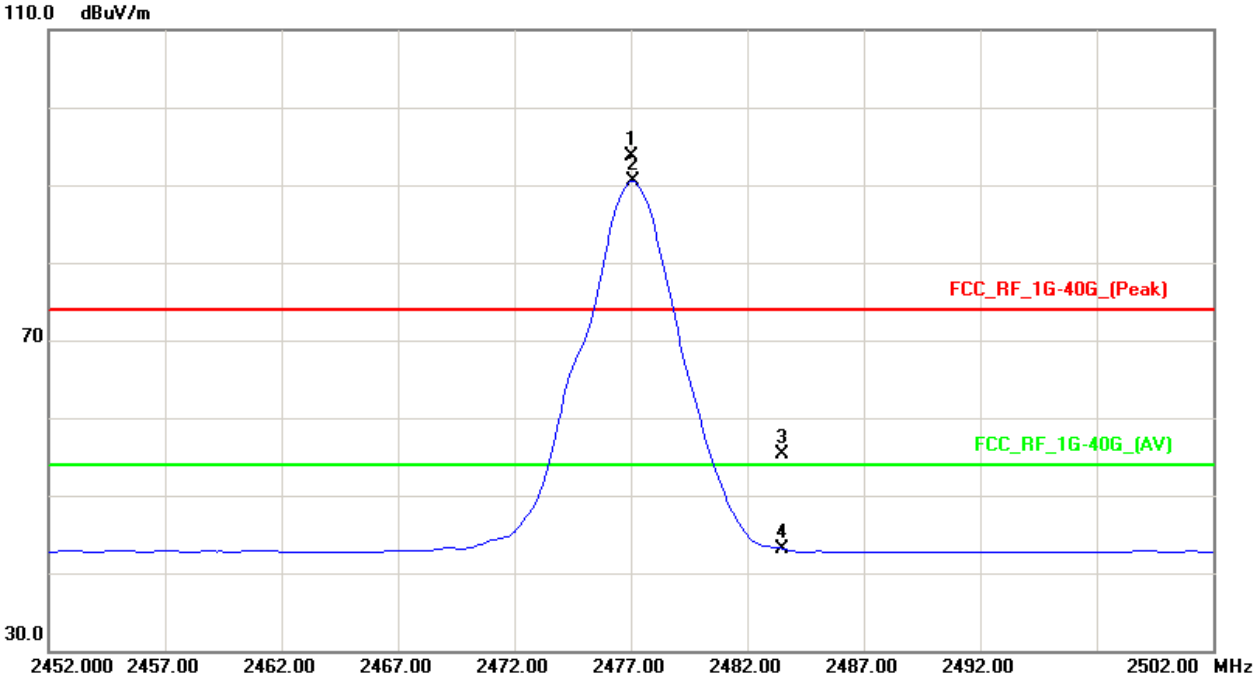
(4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

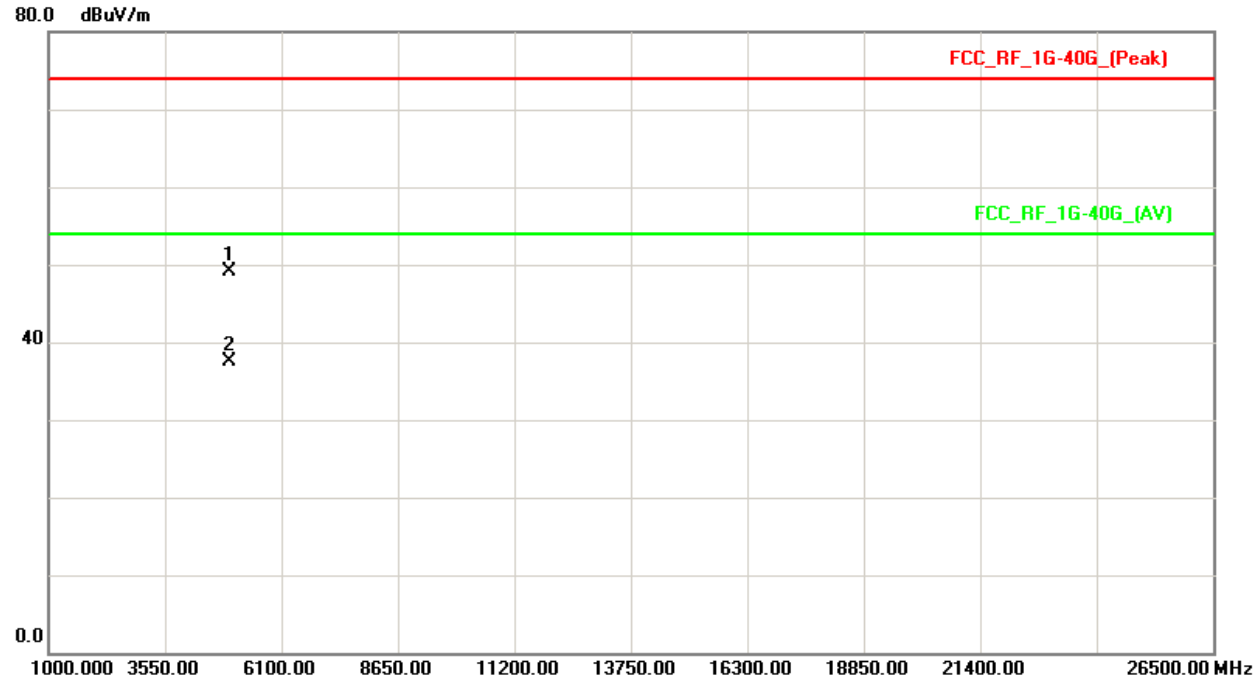
(5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

(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

Orthogonal Axis：X
TX 2477MHz (Above 1000 MHz, Horizontal)





EUT：	VENGEANCE 2000	Model Name. ：	HF2012-RX
Temperature：	23℃	Relative Humidity：	51%
Pressure：	1009 hPa	Test Power ：	DC 3.7V
Test Mode ：	RX Mode 2405MHz		

Freq.	Ant.Pol.	Reading		Ant./CF	Act.		Limit		Note
		Peak	AV		Peak	AV	Peak	AV	
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
1602.89	V	59.74	48.85	-5.30	54.44	43.55	74.00	54.00	X/E

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。

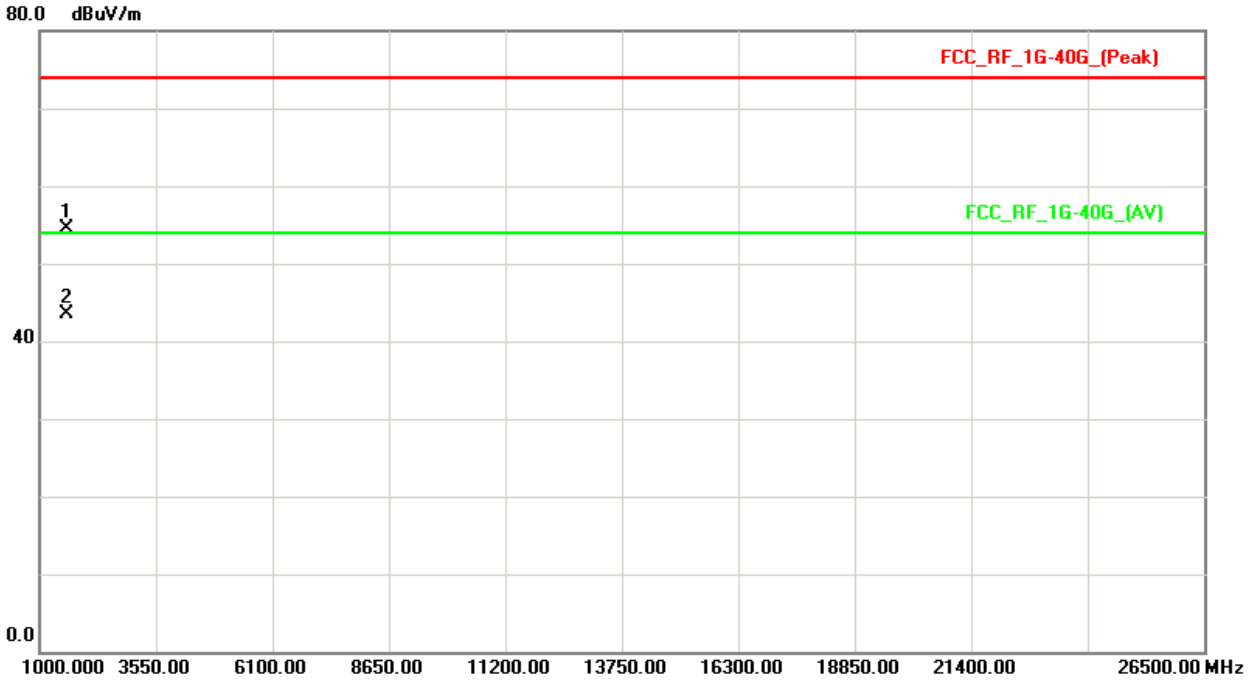
(2) Measuring frequency range from 1000MHz to 6000MHz or the 10th harmonic of highest fundamental frequency。"F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)

(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



EUT：	VENGEANCE 2000	Model Name. ：	HF2012-RX
Temperature：	23℃	Relative Humidity：	51%
Pressure：	1009 hPa	Test Power ：	DC 3.7V
Test Mode ：	RX Mode 2405MHz		

Freq.	Ant.Pol.	Reading		Ant./CF	Act.		Limit		Note
		Peak	AV		Peak	AV	Peak	AV	
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
1602.34	H	56.41	47.09	-5.30	51.11	41.79	74.00	54.00	X/E

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。

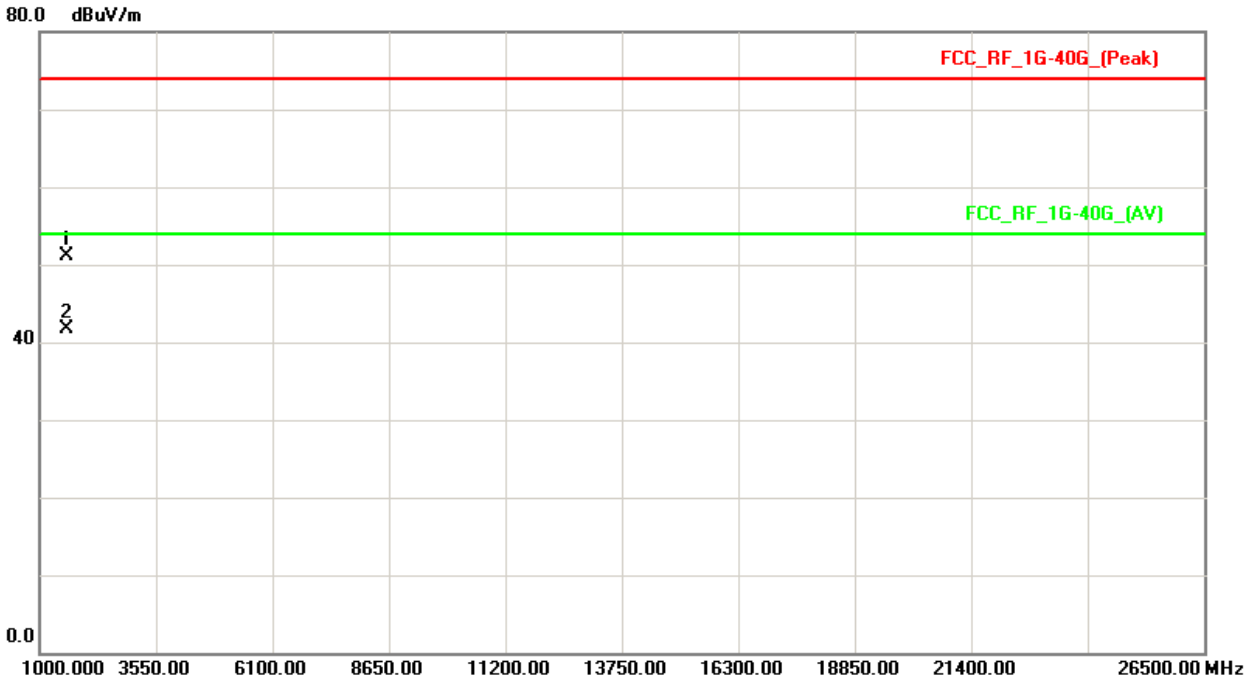
(2) Measuring frequency range from 1000MHz to 6000MHz or the 10th harmonic of highest fundamental frequency。"F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)

(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



EUT：	VENGEANCE 2000	Model Name. ：	HF2012-RX
Temperature：	23℃	Relative Humidity：	51%
Pressure：	1009 hPa	Test Power ：	DC 3.7V
Test Mode ：	RX Mode 2441MHz		

Freq.	Ant.Pol.	Reading		Ant./CF	Act.		Limit		Note
		Peak	AV		Peak	AV	Peak	AV	
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
1627.58	V	60.38	49.52	-5.01	55.37	44.51	74.00	54.00	X/E

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。

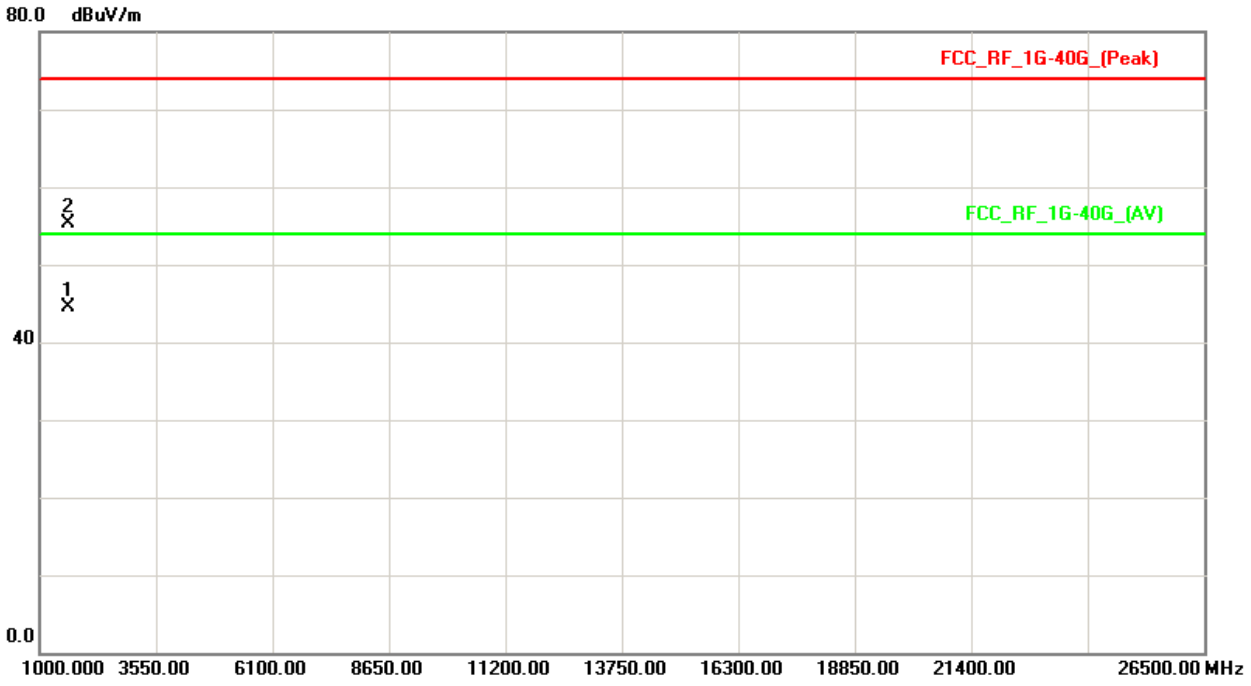
(2) Measuring frequency range from 1000MHz to 6000MHz or the 10th harmonic of highest fundamental frequency。"F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)

(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



EUT：	VENGEANCE 2000	Model Name. ：	HF2012-RX
Temperature：	23℃	Relative Humidity：	51%
Pressure：	1009 hPa	Test Power ：	DC 3.7V
Test Mode ：	RX Mode 2441MHz		

Freq.	Ant.Pol.	Reading		Ant./CF	Act.		Limit		Note
		Peak	AV		Peak	AV	Peak	AV	
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
1629.00	H	55.96	46.73	-5.00	50.96	41.73	74.00	54.00	X/E

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。

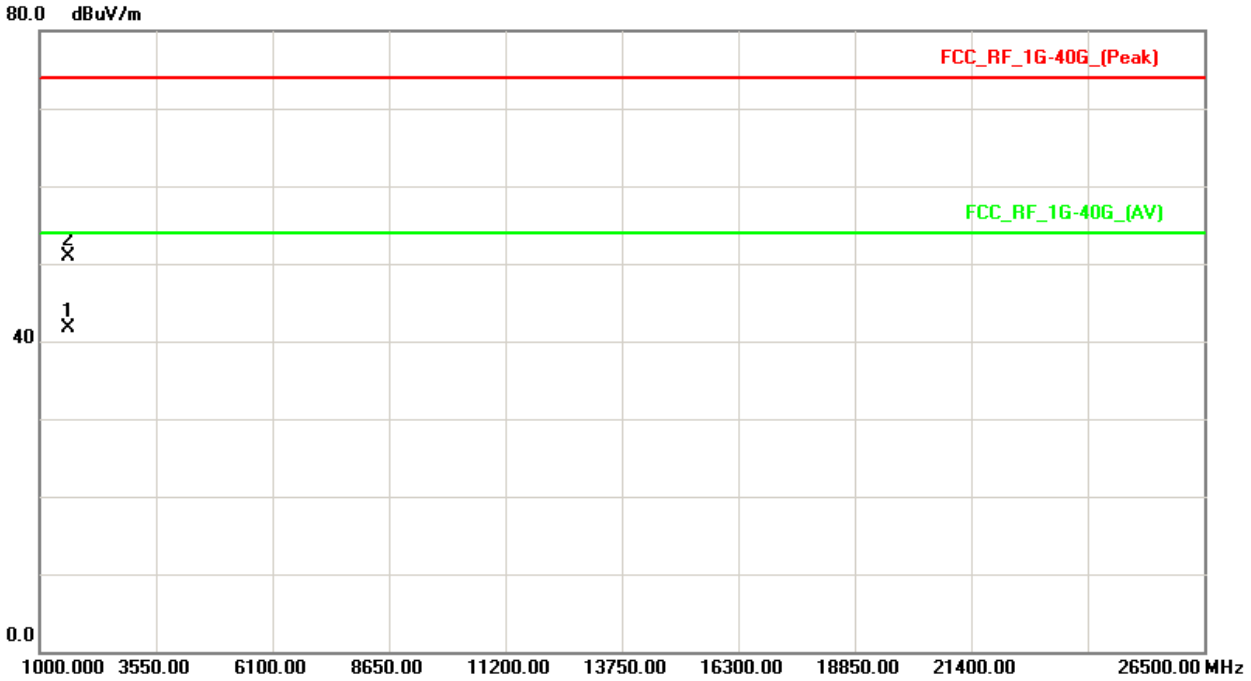
(2) Measuring frequency range from 1000MHz to 6000MHz or the 10th harmonic of highest fundamental frequency。"F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)

(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



EUT：	VENGEANCE 2000	Model Name. ：	HF2012-RX
Temperature：	23℃	Relative Humidity：	51%
Pressure：	1009 hPa	Test Power ：	DC 3.7V
Test Mode ：	RX Mode 2477MHz		

Freq.	Ant.Pol.	Reading		Ant./CF	Act.		Limit		Note
		Peak	AV		Peak	AV	Peak	AV	
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
1650.23	V	57.96	44.73	-4.76	53.20	39.97	74.00	54.00	X/E

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。

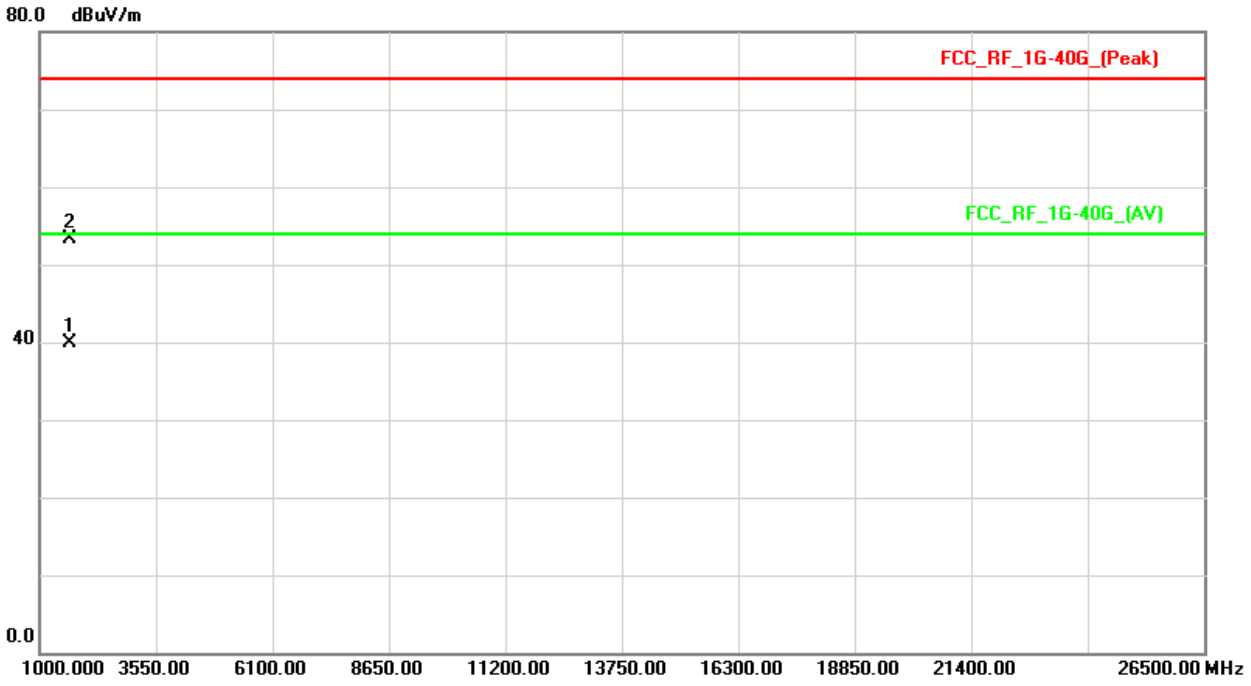
(2) Measuring frequency range from 1000MHz to 6000MHz or the 10th harmonic of highest fundamental frequency。"F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)

(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



EUT：	VENGEANCE 2000	Model Name. ：	HF2012-RX
Temperature：	23℃	Relative Humidity：	51%
Pressure：	1009 hPa	Test Power ：	DC 3.7V
Test Mode ：	RX Mode 2477MHz		

Freq.	Ant.Pol.	Reading		Ant./CF	Act.		Limit		Note
		Peak	AV		Peak	AV	Peak	AV	
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
1651.85	H	55.42	44.98	-4.74	50.68	40.24	74.00	54.00	X/E

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。

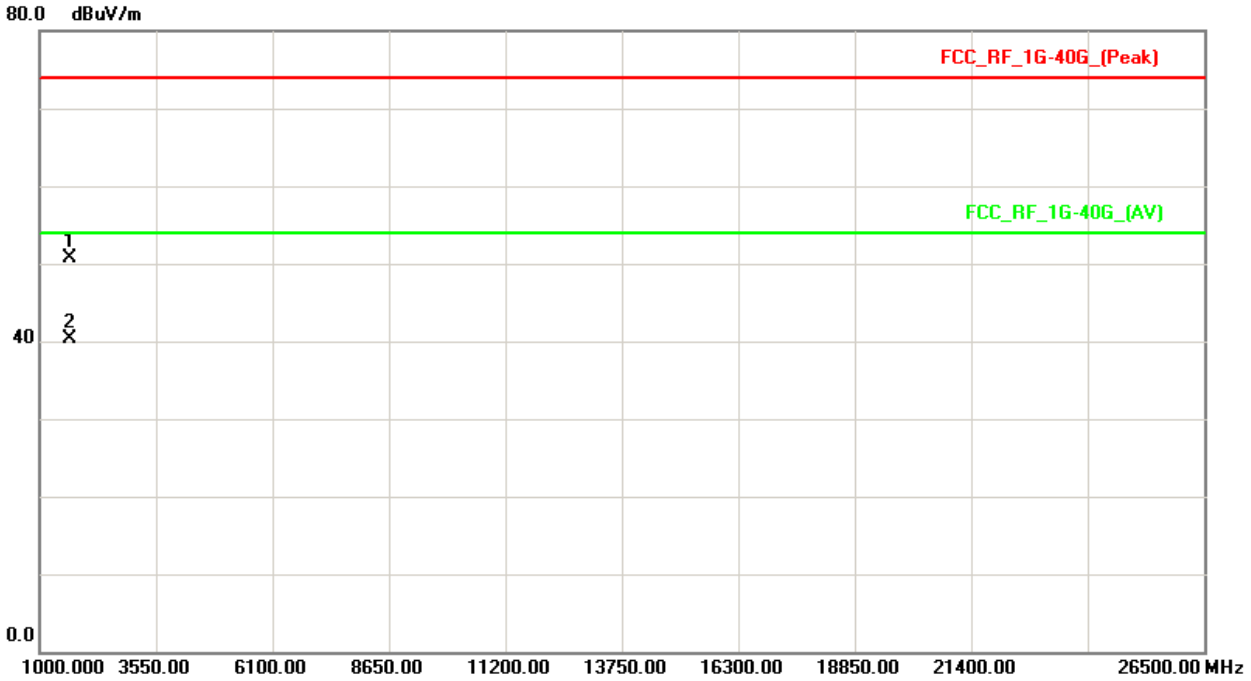
(2) Measuring frequency range from 1000MHz to 6000MHz or the 10th harmonic of highest fundamental frequency。"F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)

(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



4.2.10 TEST RESULTS (2400 – 2483.5 MHz)

EUT：	VENGEANCE 2000	Model Name. ：	HF2012-RX
Temperature：	20℃	Relative Humidity：	55 %
Pressure：	1009 hPa	Test Power ：	DC 3.7V
Test Mode ：	TX CH 2405MHz/2441MHz/2477MHz		

		Peak	AV		Peak	AV	Peak	AV	
Freq.	Ant.Pol.	Reading		Ant./CL/	Actual FS		Limit3m		
(MHz)	(H/V)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	NOTE
2404.88	V	65.07	61.44	31.90	96.97	93.34	114.00	94.00	CH01
2404.88	H	64.00	60.76	31.90	95.90	92.66	114.00	94.00	CH01
2440.88	V	65.65	60.98	31.85	97.50	92.83	114.00	94.00	CH19
2441.00	H	62.84	59.64	31.85	94.69	91.49	114.00	94.00	CH19
2476.88	V	65.95	61.15	31.81	97.76	92.96	114.00	94.00	CH37
2477.00	H	61.85	58.63	31.81	93.66	90.44	114.00	94.00	CH37

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) EUT Orthogonal Axis：
"X" - denotes Laid on Table；"Y" - denotes Vertical Stand；"Z" - denotes Side Stand

5. BANDWIDTH TEST

5.1 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov.25.2012

Remark: ” N/A” denotes No Model Name. , Serial No. or No Calibration specified.

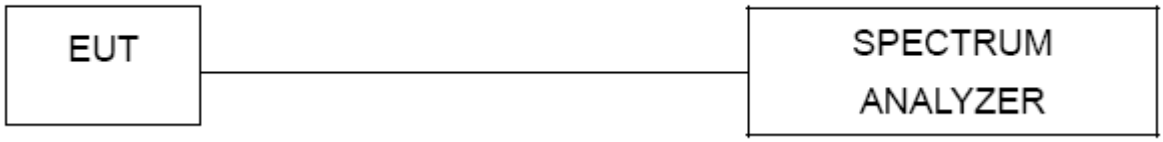
5.2 TEST PROCEDURE

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 = 2.5 ms.

5.3 DEVIATION FROM STANDARD

No deviation.

5.4 TEST SETUP



5.5 EUT OPERATION CONDITIONS

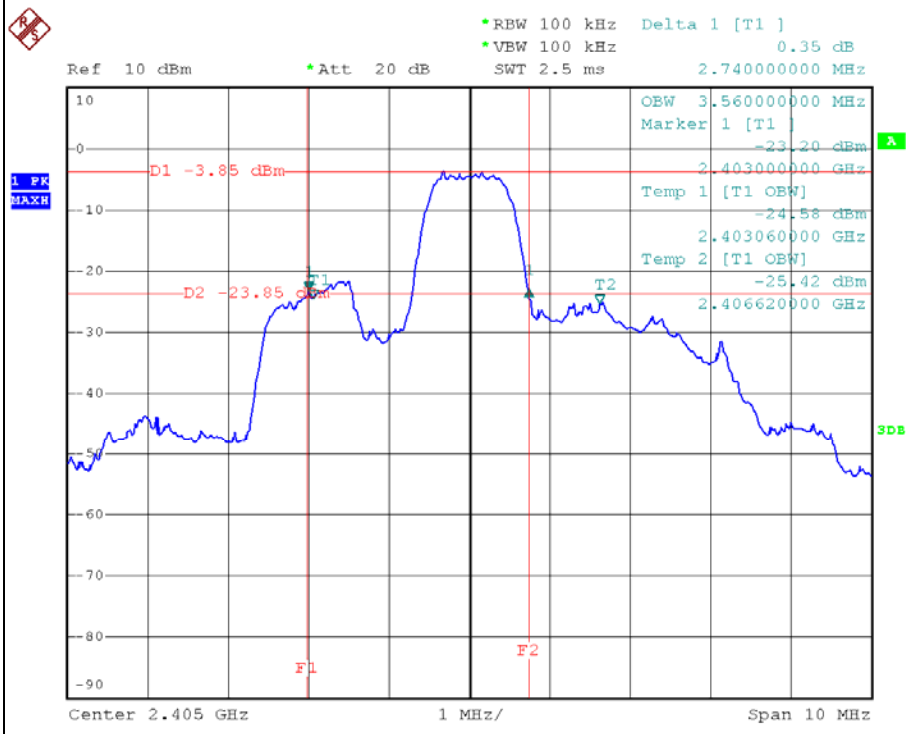
The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

5.6 TEST RESULTS

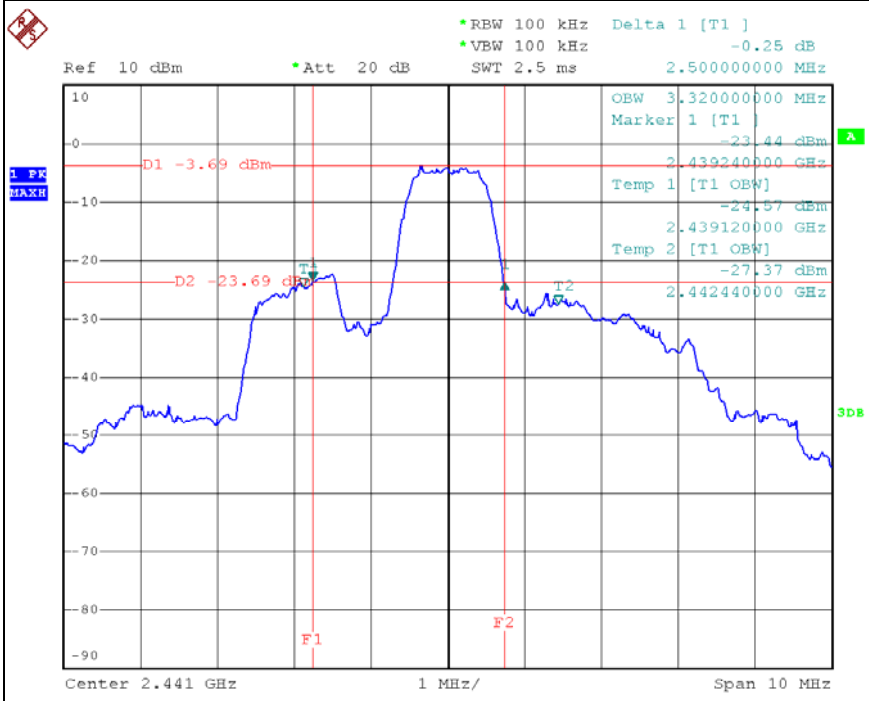
EUT：	VENGEANCE 2000	Model Name. ：	HF2012-RX
Temperature：	20℃	Relative Humidity：	55 %
Pressure：	1009 hPa	Test Power ：	DC 3.7V
Test Mode ：	TX CH 01/19/37		

Test Channel	Frequency (MHz)	20 dBc Bandwidth (MHz)	99% occupied Bandwidth(MHz)
CH01	2405	2.74	3.56
CH19	2441	2.50	3.32
CH37	2477	2.38	3.04

TX CH01

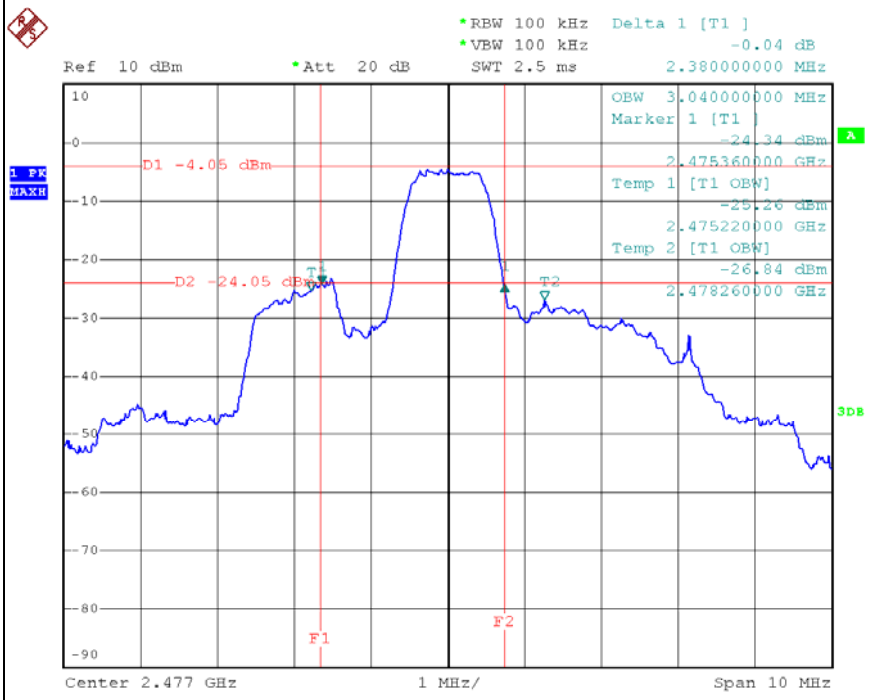


TX CH19



Date: 23.DEC.2011 09:25:05

TX CH 37



Date: 23.DEC.2011 09:32:40

6. ANTENNA CONDUCTED SPURIOUS EMISSION

6.1 APPLIED PROCEDURES / LIMIT

50dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

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

6.1.1 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov.25.2012

Remark: ” N/A” denotes No Model Name. , Serial No. or No Calibration specified.

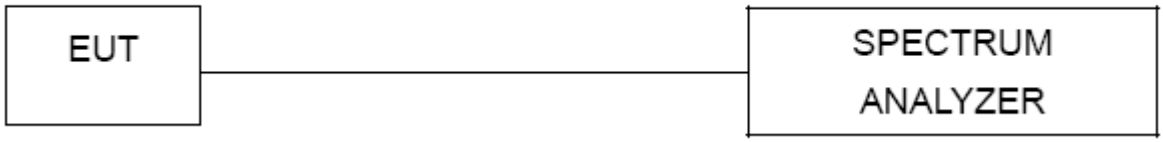
6.1.2 TEST PROCEDURE

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 = 200 ms.

6.1.3 DEVIATION FROM STANDARD

No deviation.

6.1.4 TEST SETUP



6.1.5 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.

6.1.6 TEST RESULTS

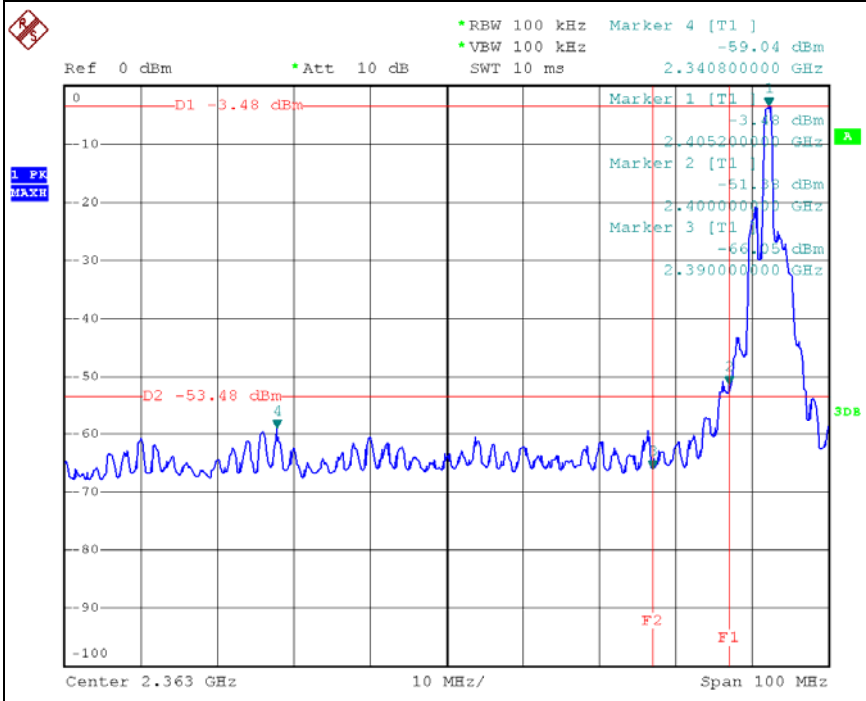
EUT：	VENGEANCE 2000	Model Name. ：	HF2012-RX
Temperature：	20℃	Relative Humidity：	55 %
Pressure：	1009 hPa	Test Power ：	DC 3.7V
Test Mode ：	TX CH01, CH19, CH37		

Channel of Worst Data: CH37			
The max. radio frequency power in any 100kHz bandwidth outside the frequency band		The max. radio frequency power in any 100 kHz bandwidth within the frequency band.	
FREQUENCY(MHz)	POWER(dBm)	FREQUENCY(MHz)	POWER(dBm)
2400.00	-51.33	2483.50	-57.65
Result			
In any 100kHz bandwidth outside the frequency band, the radio frequency power is at least 50dB below that in the 100kHz bandwidth within the band that contains the highest lever of the desired power.			

Band-edge test results –apply marker delta method

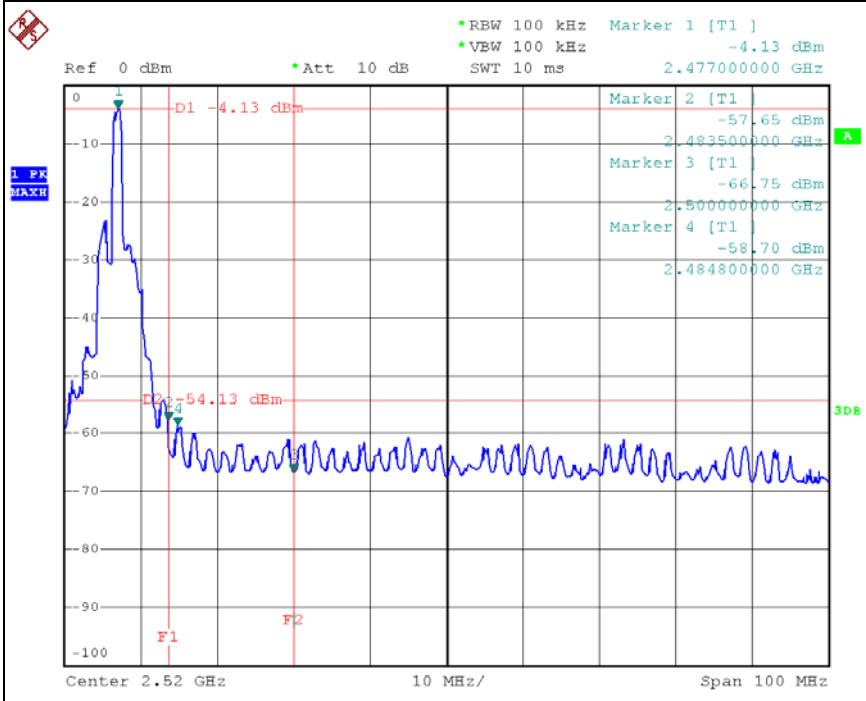
CH01	
Peak fundamental frequency measured	96.97dBuV/m
Delta	51.33dBm-3.48dBm=47.85dB
Peak field strength at 2400.0MHz	96.97dBuV/m-47.85dB=49.12dBuV/m
Result	PASS < Limits 74 dBuV/m

TX CH01



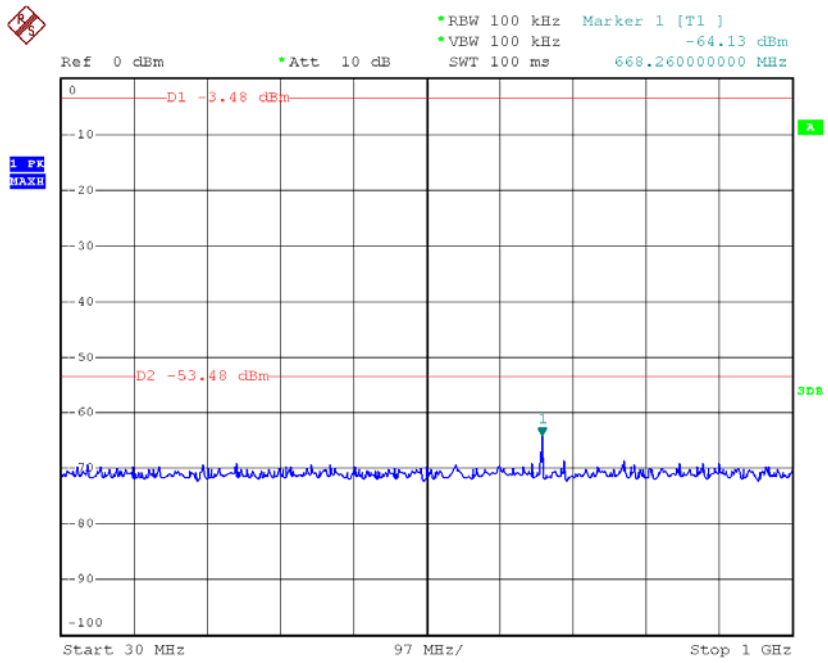
Date: 23.DEC.2011 09:51:39

TX CH37



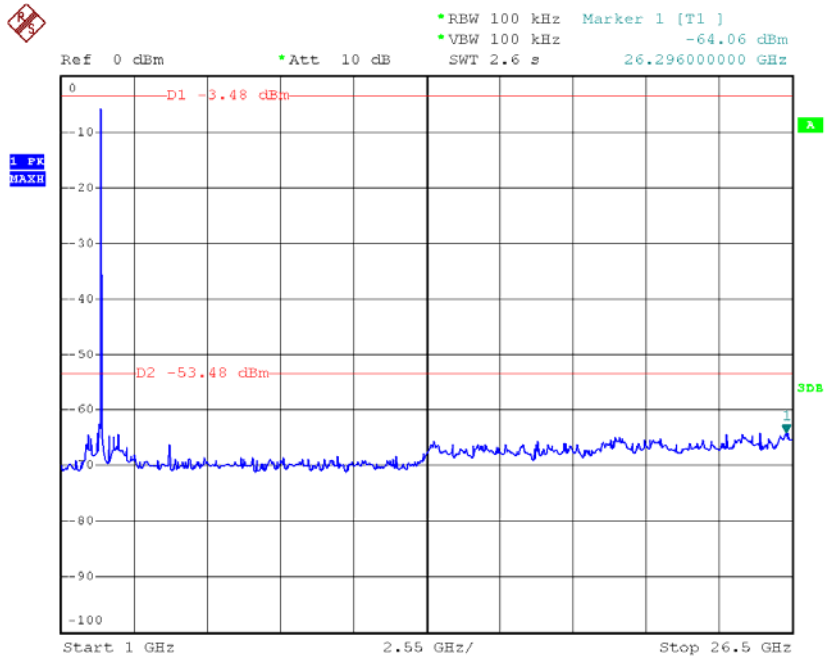
Date: 23.DEC.2011 09:48:06

TX CH 01 (30MHz~1GHz)



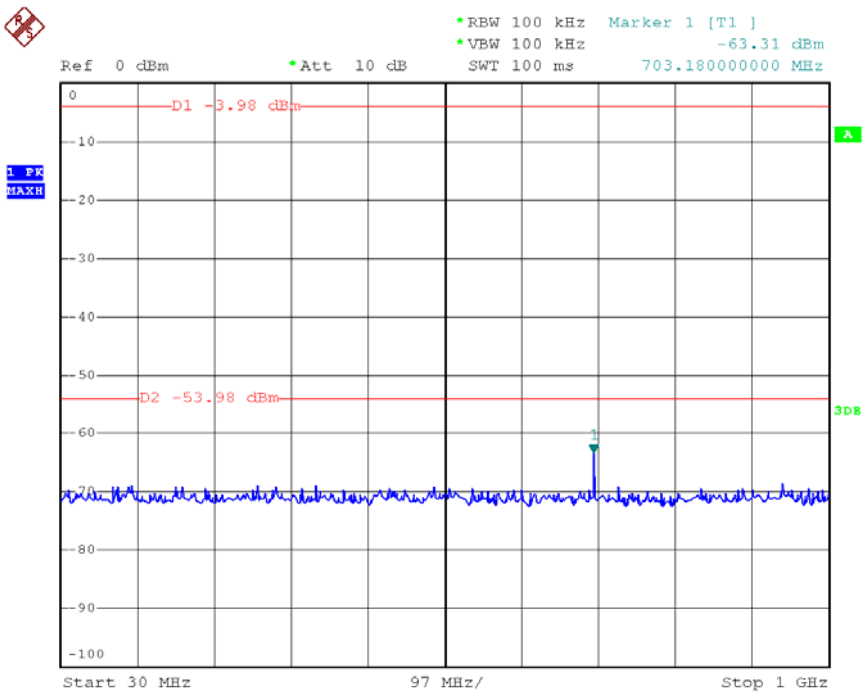
Date: 23.DEC.2011 09:52:48

TX CH 01(1GHz～10th Harmonic)



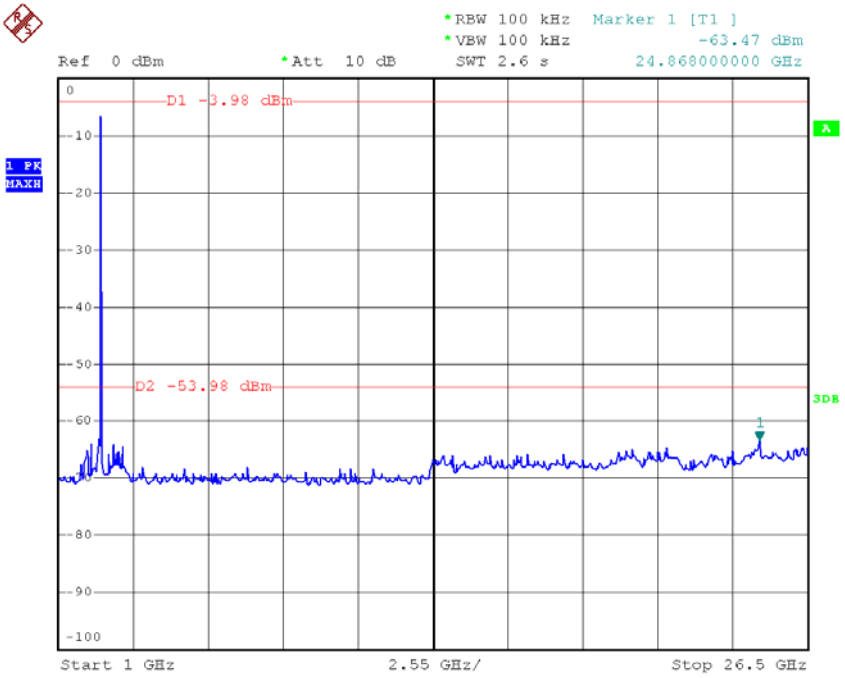
Date: 23.DEC.2011 09:53:12

TX CH19 (30MHz~1GHz)



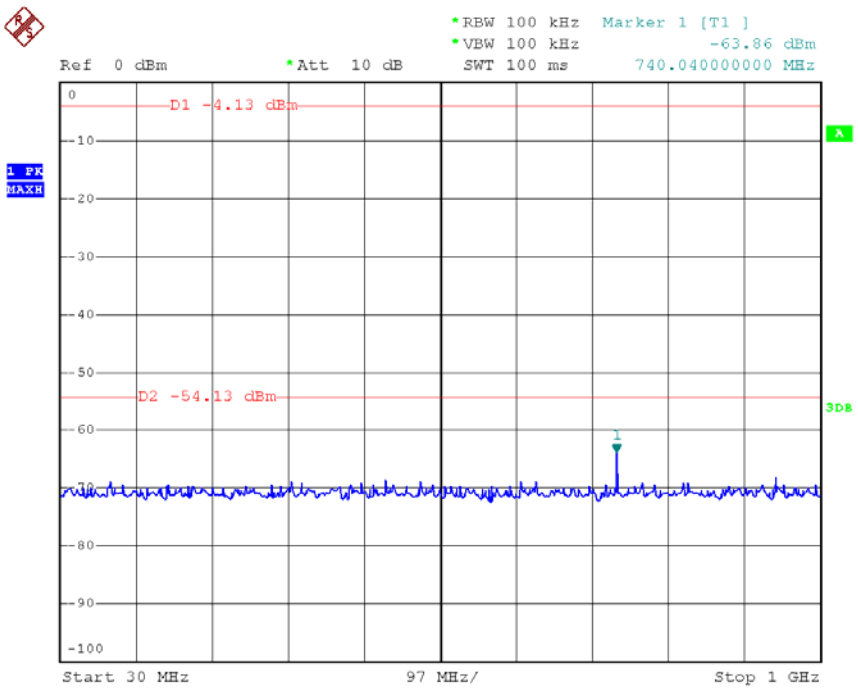
Date: 23.DEC.2011 09:44:21

TX CH19 (1GHz～10th Harmonic)



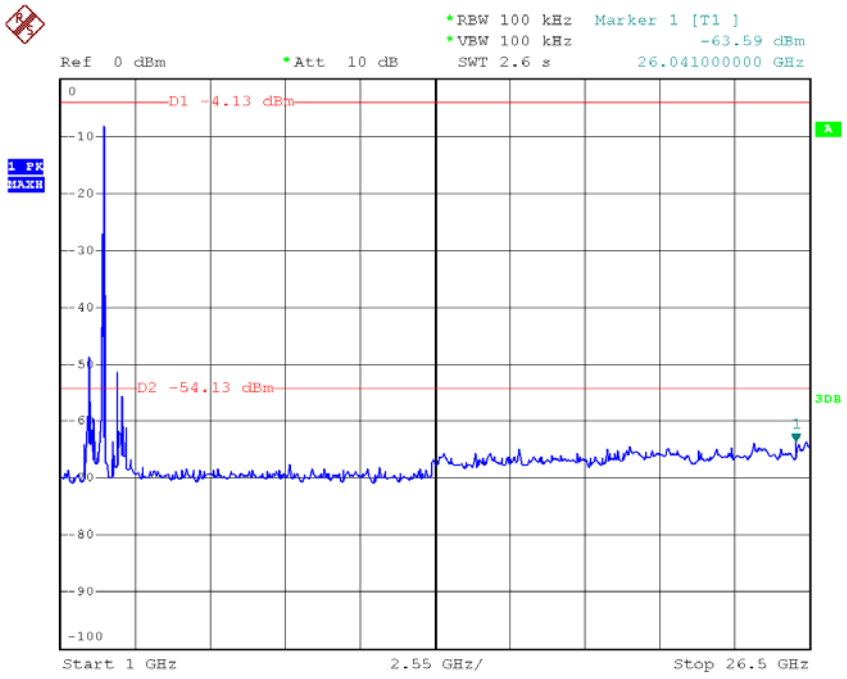
Date: 23.DEC.2011 09:44:41

TX CH37 (30MHz~1GHz)



Date: 23.DEC.2011 09:48:32

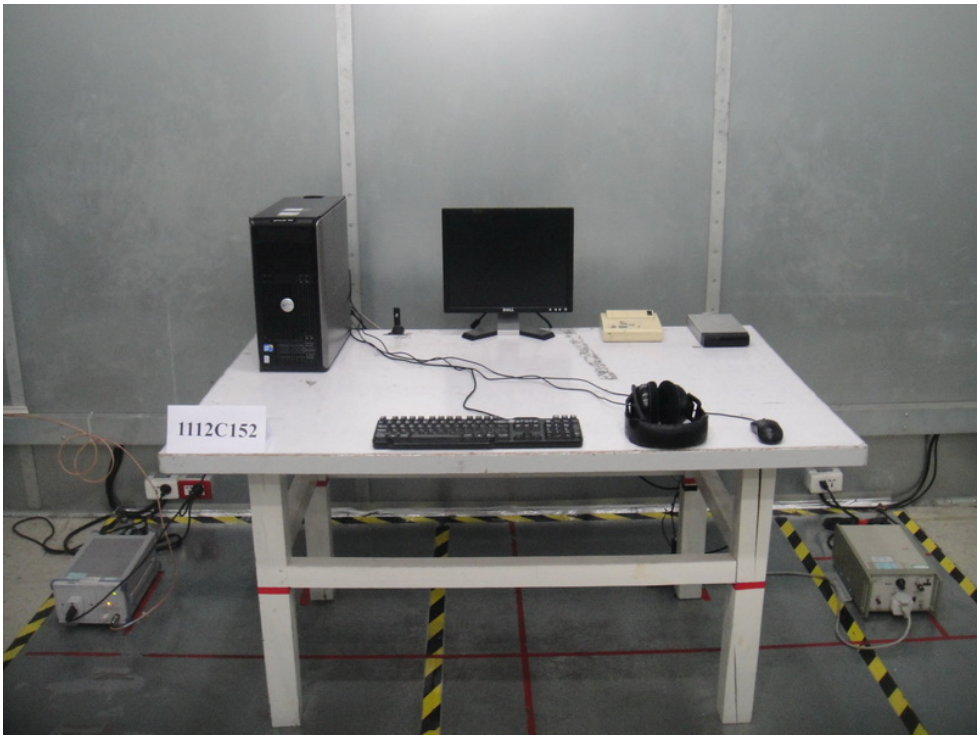
TX CH37 (1GHz～10th Harmonic)



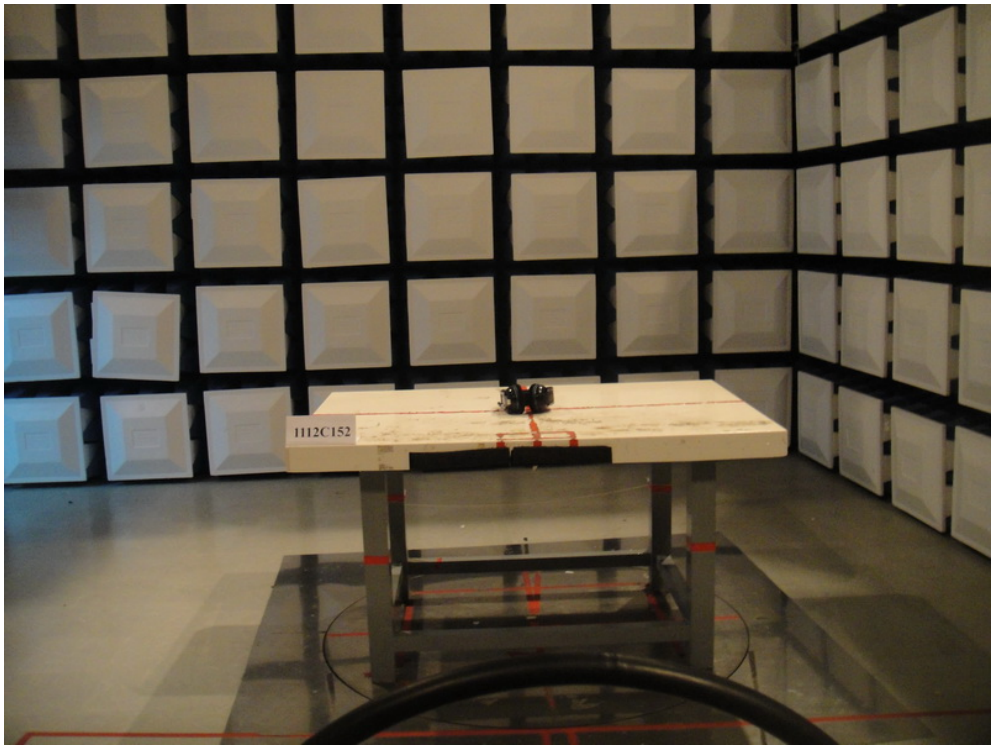
Date: 23.DEC.2011 09:49:13

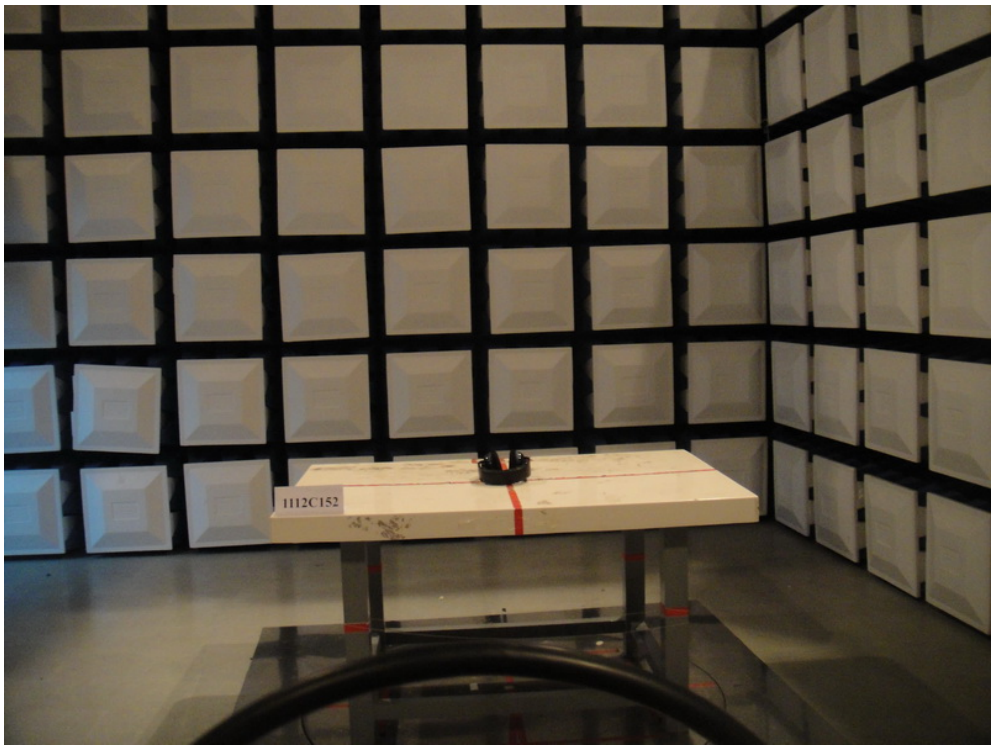
7. EUT TEST PHOTO

Conducted Measurement Photos
Normal Link with Charging

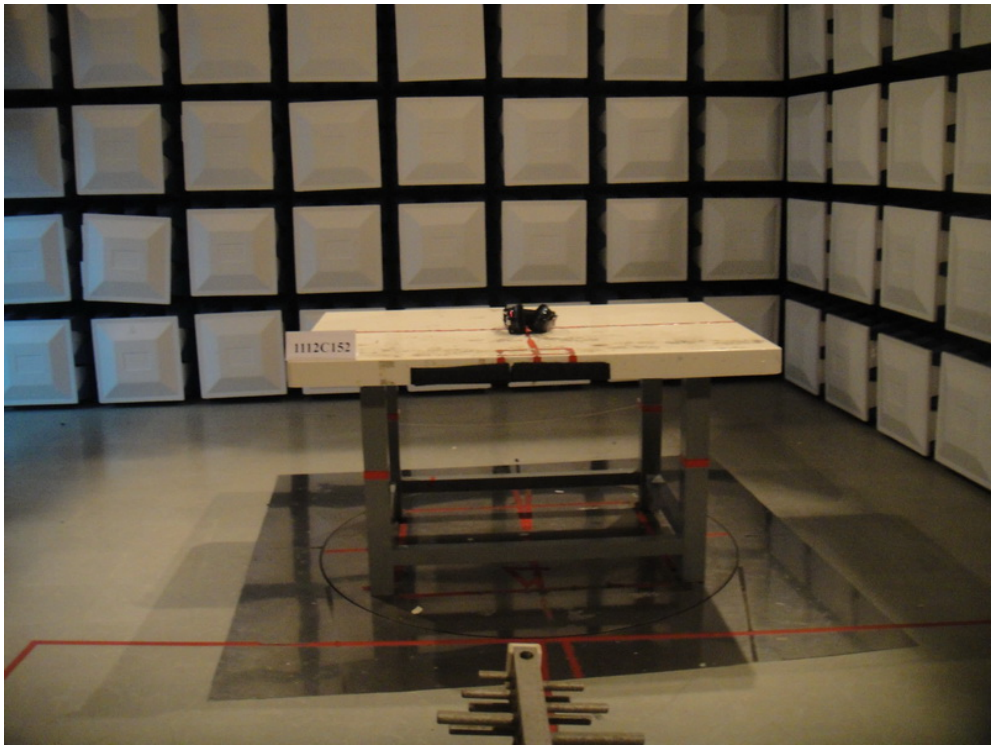


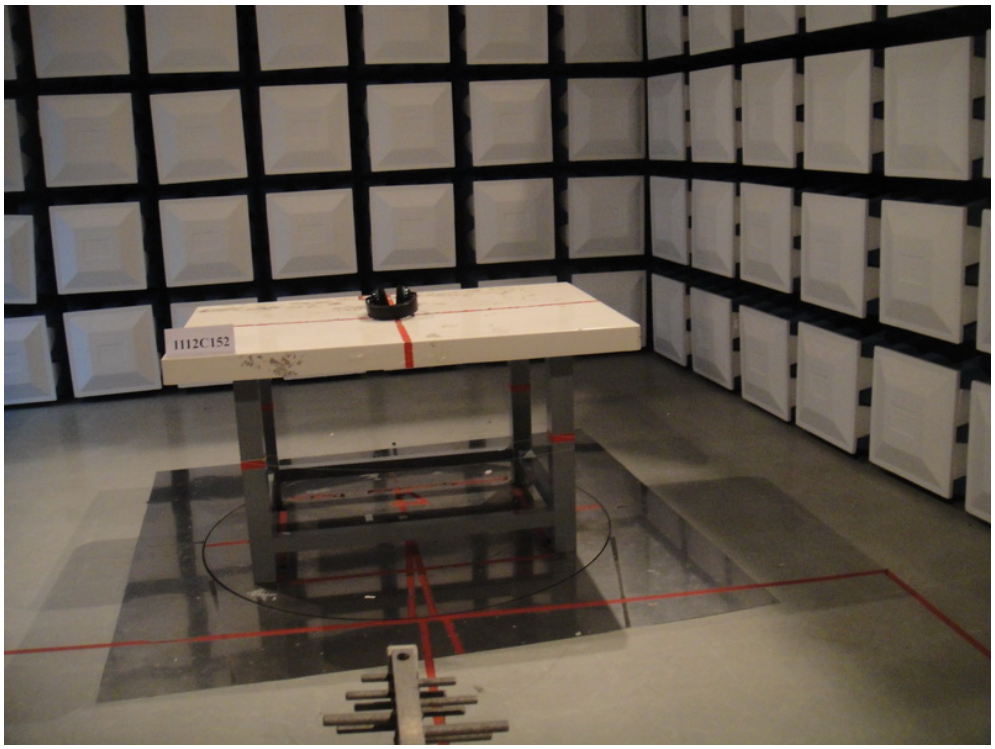
Radiated Measurement Photos
9K~30MHz





Radiated Measurement Photos
30M~1000MHz





Radiated Measurement Photos
Above 1000MHz