

FCC Radio Test Report

FCC ID: H8GGK2324G

This report concerns (check one) : ☒ Original Grant ☐ Class I Change

Issued Date : Mar. 25, 2008
Project No. : R0803010
Equipment : 2.4G RF Keyboard
Model Name : GK-23; GKS-23
Applicant : A-FOUR TECH CO., LTD.
Address : 6F, No.108, Min-Chuan Rd., Hsin-Tien,
Taipei, Taiwan, R.O.C.

Tested by:

Neutron Engineering Inc. EMC Laboratory

Date of Test:

Mar. 18, 2008 ~ Mar. 24, 2008

Testing Engineer : Leo Hing Kao
(Rush Kao)
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Declaration

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

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Limitation

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

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1. CERTIFICATION

Equipment : 2.4G RF Keyboard
Brand Name : A4TECH
Model No. : GK-23; GKS-23
Applicant : A-FOUR TECH CO., LTD.
Data of Test : Mar. 18, 2008 ~ Mar. 24, 2008
Test Item : ENGINEERING SAMPLE
Standards : FCC Part15, Subpart C(15.249) / RSS-210: 2004/ ANCI C63.4 : 2003

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-R0803010) 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			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	N/A	
15.249	Radiated Spurious Emission	PASS	

NOTE:

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

2.1 TEST FACILITY

The test facilities used to collect the test data in this report is **OS01** at the location of No.132-1, Lane 329, Sec. 2, Palain Road, Shijr City, Taipei, Taiwan.

Neutron's test firm number is 95335

2.2 MEASUREMENT UNCERTAINTY

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

A. Conducted Measurement :

Test Site	Method	Measurement Frequency Range	U , (dB)	NOTE
C01	ANSI	150 KHz ~ 30MHz	1.94	

B. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	Ant. H / V	U , (dB)	NOTE
OS-01	ANSI	30MHz ~ 200MHz	V	3.82	
		30MHz ~ 200MHz	H	3.60	
		200MHz ~ 1,000MHz	V	3.86	
		200MHz ~ 1,000MHz	H	3.94	
OS-02	ANSI	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

Equipment	2.4G RF Keyboard	
Brand Name	A4TECH	
Model No.	GK-23; GKS-23	
OEM Brand/Model No.	N/A	
Model Difference	Model GKS-23 is identical to model GK-23 except the model designation.	
Product Description	The EUT is a 2.4G RF Keyboard.	
	Operation Frequency:	2402~2480MHz
	Modulation Type:	GFSK
	Number Of Channel	16CH
	Antenna Designation:	Integral Antenna(Printed)
	Antenna Gain(Peak)	-0.08 dBi
	Output Power:	89.53 dBuV/m (Max.)
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.		
Channel List	Please refer to the Note 2.	
Power Source	Battery supplied	
Power Rating	DC I/P 3V (AA Battery x 2)	
Connecting I/O Port(s)	Please refer to the User's Manual	
Products Covered	NA	

Note:

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

2.

Channel List							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2402	05	2425	09	2448	13	2471
02	2405	06	2428	10	2451	14	2474
03	2408	07	2431	11	2454	15	2477
04	2411	08	2434	12	2457	16	2480

3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	Integral Antenna(Printed)	N/A	-0.08

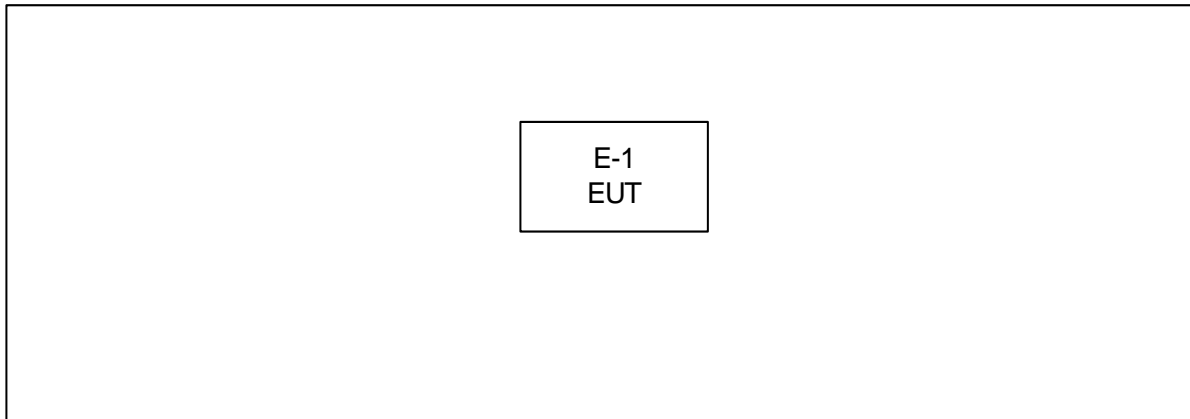
3.2 DESCRIPTION OF TEST MODES

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 Test Mode	Description
Mode 1	CH01
Mode 2	CH09
Mode 3	CH16

For Radiated Test	
Final Test Mode	Description
Mode 1	CH01
Mode 2	CH09
Mode 3	CH16

3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.	Note
E-1	2.4G RF Keyboard	A4TECH	GK-23	H8GGK2324G	N/A	EUT

Item	Shielded Type	Ferrite Core	Length	Note
	N/A	N/A	N/A	

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 RADIATED EMISSION MEASUREMENT

4.1.1 RADIATED EMISSION LIMITS (FCC 15.209)

requencies (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)	Class A (dBuV/m) (at 3m)		Class B (dBuV/m) (at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80	60	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15B.
- (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 μ V/m (94 dB μ V/m) @ 3 m	2400-2483.5
Field strength of harmonics 500 μ V/m (54 dB μ V/m) @ 3 m	Above 2483.5

4.1.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP_40	100129	Aug. 16, 2008
2	Horn Antenna	EMCO	3115	9120D-325	Aug. 19, 2008
3	Microwave Pre_amplifier	Agilent	8449B	3008A01714	May. 14, 2008
4	Microflex Cable	United Microwave	57793	1m	May. 13, 2008
5	Microflex Cable	United Microwave	A30A30-5006	10M	Jul. 24, 2008

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

4.1.3 TEST PROCEDURE

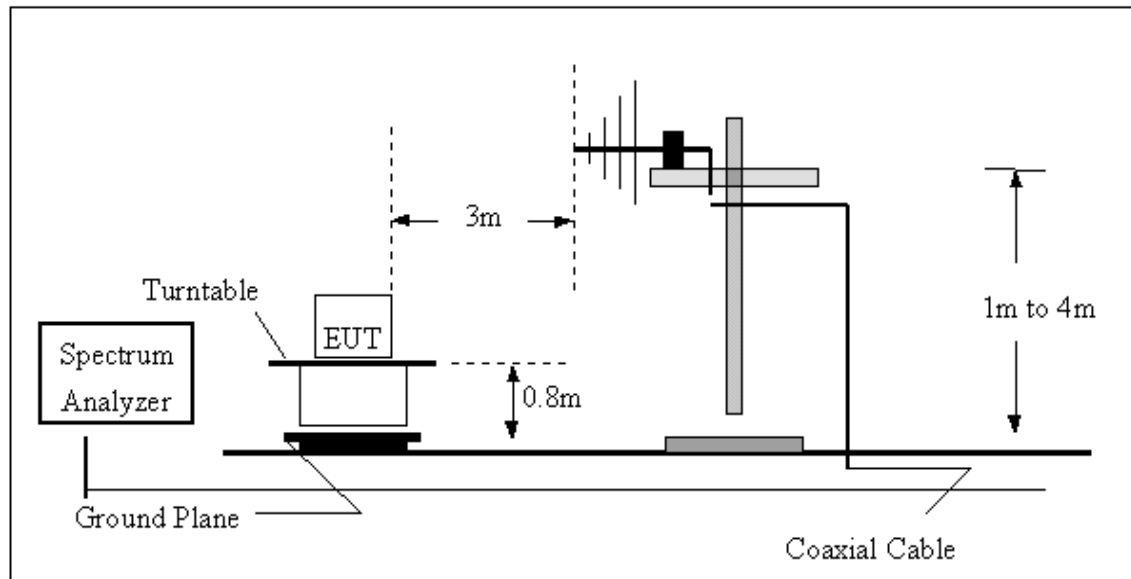
- The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3m meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- 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.
- 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.
- 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.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.1.4 DEVIATION FROM TEST STANDARD

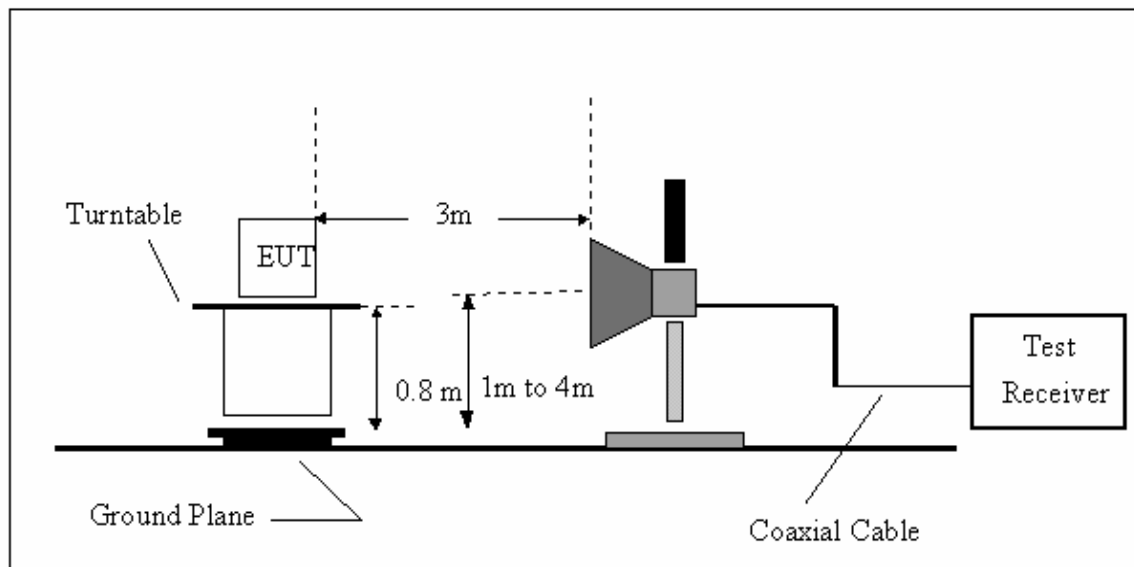
No deviation

4.1.5 TEST SETUP

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



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



4.1.6 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.

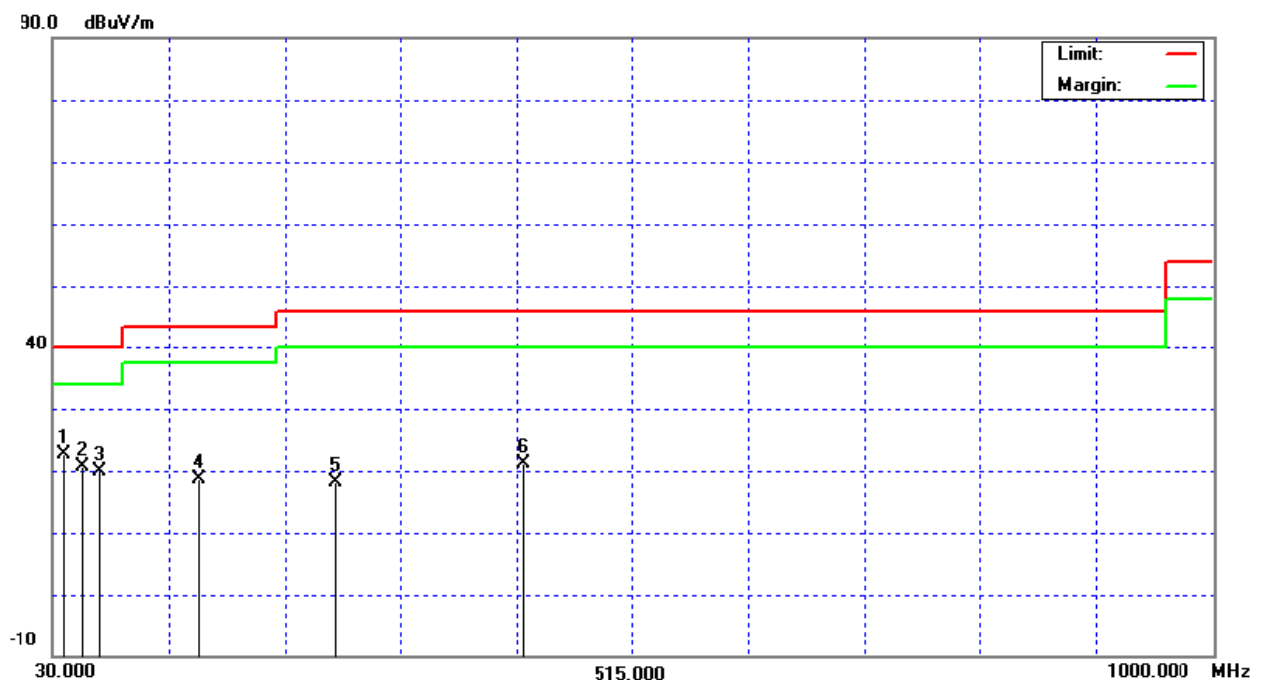
4.1.7 TEST RESULTS (Between 30 – 1000 MHz)

EUT :	2.4G RF Keyboard	Model No. :	GK-23
Temperature :	20 °C	Relative Humidity :	56 %
Pressure :	1016 hPa	Test Power :	DC 3V
Test Mode :	CH09		

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
39.70	V	27.37	-4.86	22.51	40.00	- 17.49	
55.22	V	24.98	-4.46	20.52	40.00	- 19.48	
68.80	V	26.07	-6.18	19.89	40.00	- 20.11	
152.22	V	20.57	-1.88	18.69	43.50	- 24.81	
266.68	V	20.36	-2.22	18.14	46.00	- 27.86	
423.82	V	16.66	4.37	21.03	46.00	- 24.97	

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.

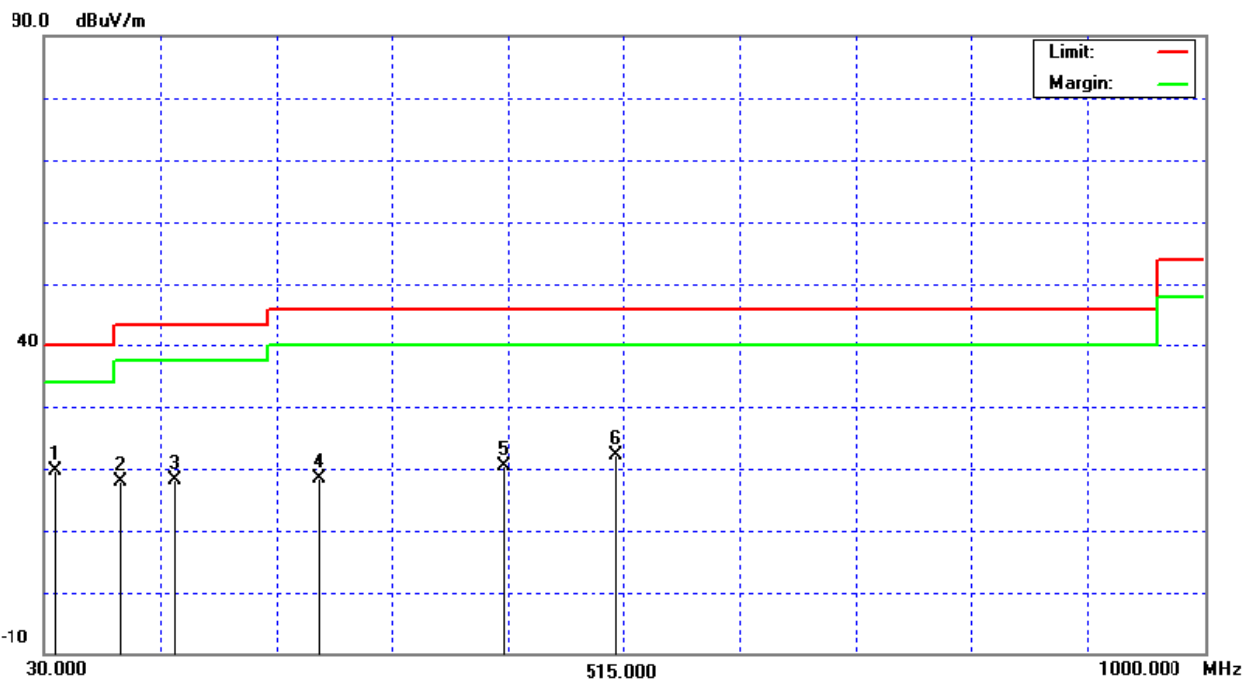


EUT :	2.4G RF Keyboard	Model No. :	GK-23
Temperature :	20 °C	Relative Humidity :	56 %
Pressure :	1016 hPa	Test Power :	DC 3V
Test Mode :	CH09		

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
39.70	H	24.50	-4.86	19.64	40.00	- 20.36	
94.02	H	26.30	-8.36	17.94	43.50	- 25.56	
138.64	H	20.96	-2.88	18.08	43.50	- 25.42	
260.86	H	20.81	-2.54	18.27	46.00	- 27.73	
414.12	H	15.88	4.58	20.46	46.00	- 25.54	
509.18	H	17.08	4.93	22.01	46.00	- 23.99	

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.



4.1.8 TEST RESULTS (Above 1000 MHz)

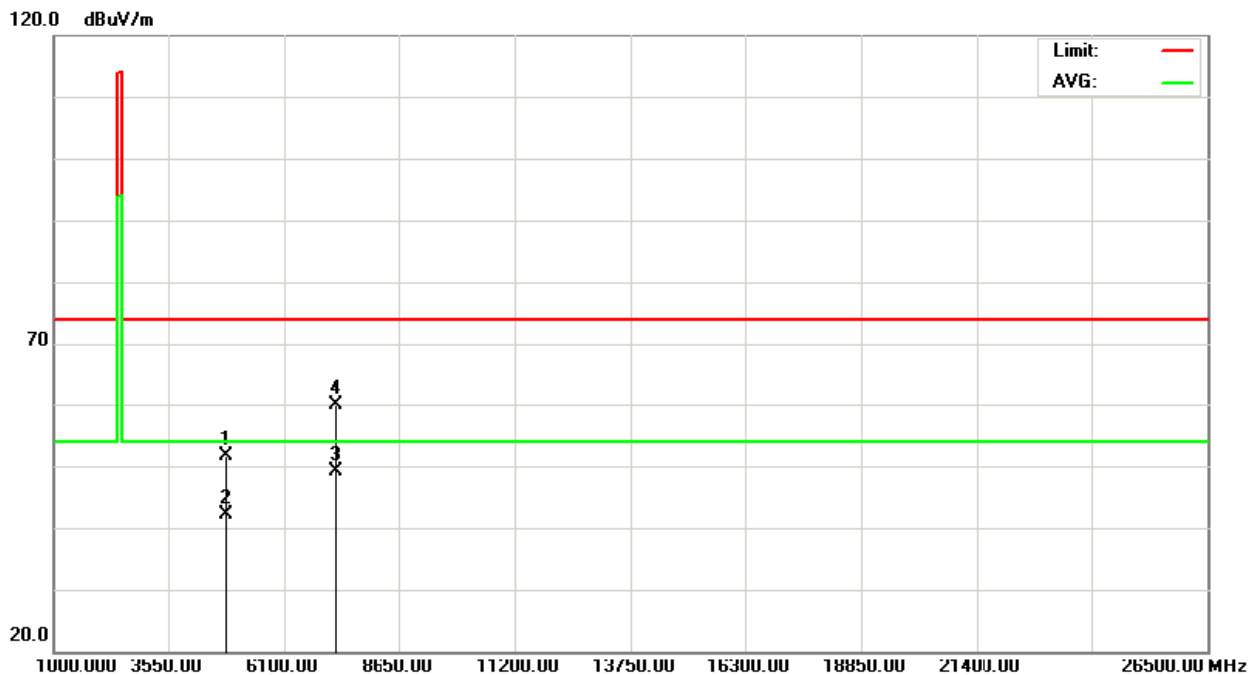
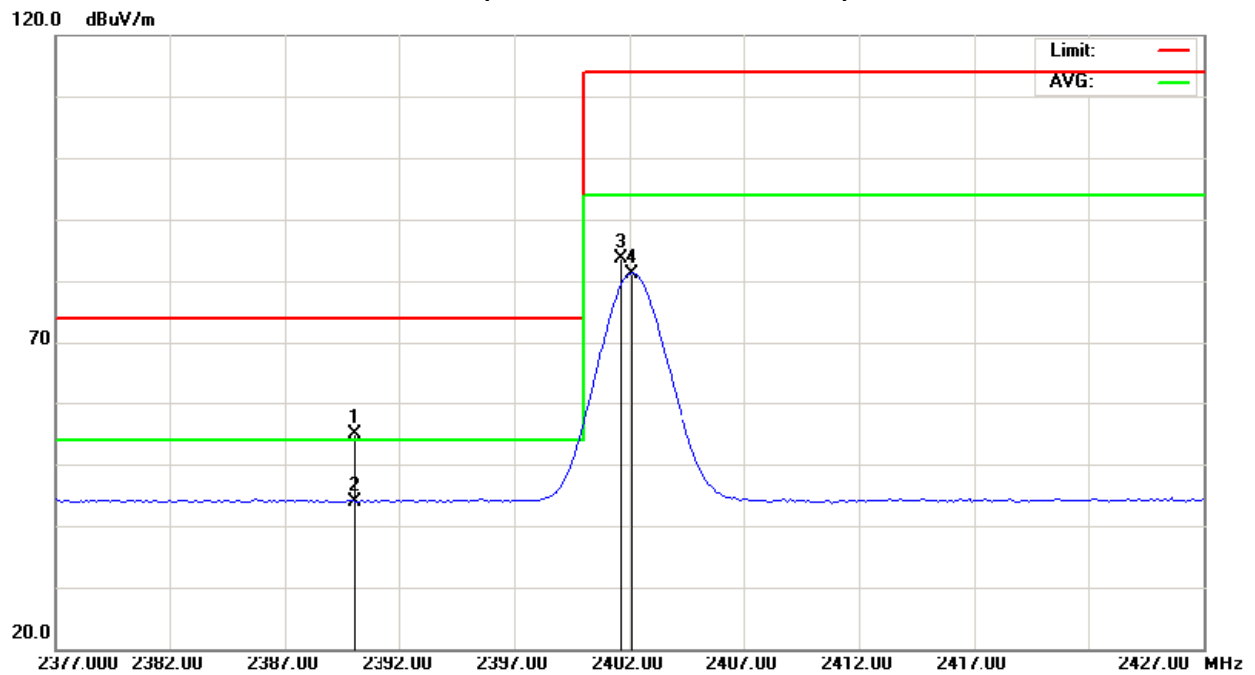
EUT :	2.4G RF Keyboard	Model No. :	GK-23
Temperature :	20 °C	Relative Humidity :	56 %
Pressure :	1012 hPa	Test Power :	DC 3V
Test Mode :	CH01		

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
2390.00	V	22.62	11.64	32.24	54.86	43.88	74.00	54.00	X/E
2402.10	V								X/F
4804.12	V	48.18	38.66	3.39	51.57	42.05	74.00	54.00	X/H
7206.50	V	50.96	40.18	8.92	59.88	49.10	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 Axes :
 "X" - denotes Laid on Table ; "Y" - denotes Vertical Stand ; "Z" - denotes Side Stand

Orthogonal Axes : X
CH01 (Above 1000 MHz, Vertical)



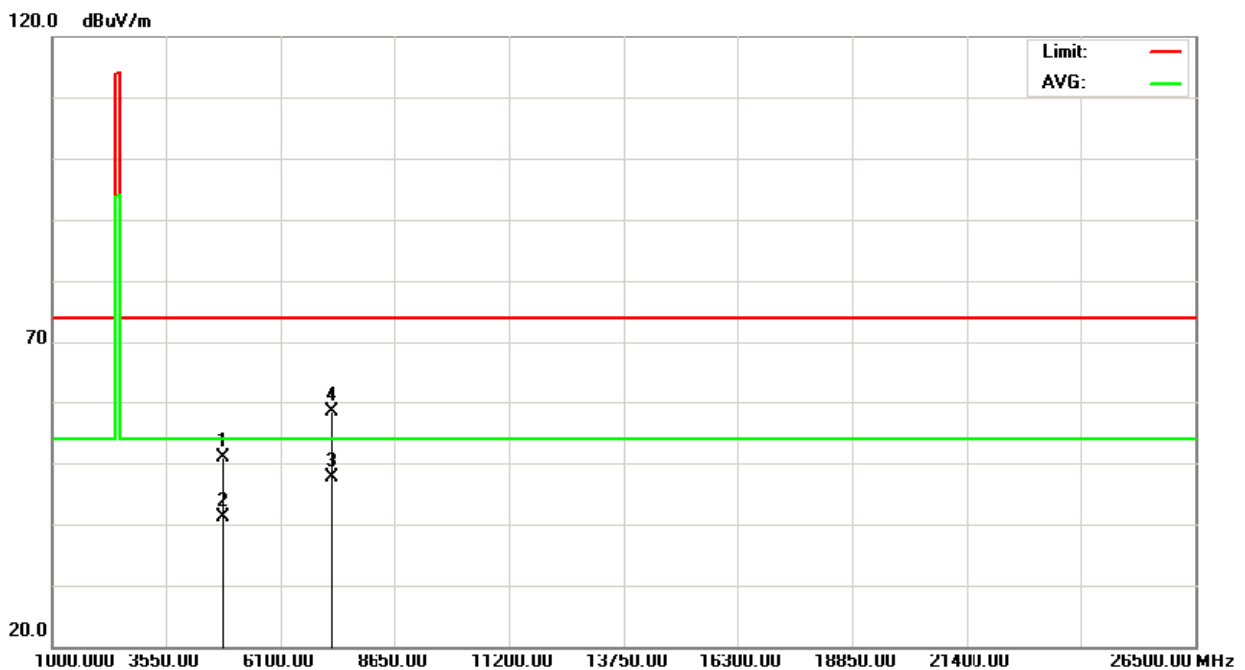
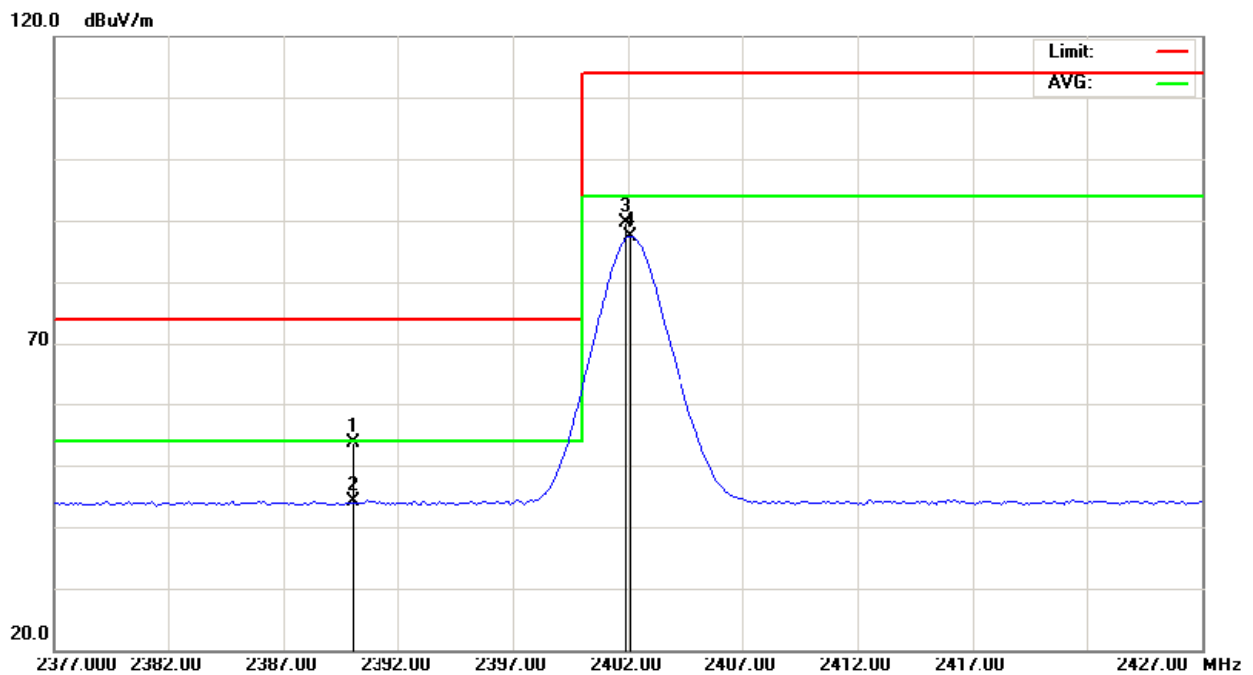
EUT :	2.4G RF Keyboard	Model No. :	GK-23
Temperature :	20 °C	Relative Humidity :	56 %
Pressure :	1012 hPa	Test Power :	DC 3V
Test Mode :	CH01		

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
2390.00	H	21.30	11.87	32.24	53.54	44.11	74.00	54.00	X/E
2402.00	H								X/F
4804.24	H	47.60	37.78	3.39	50.99	41.17	74.00	54.00	X/H
7206.40	H	49.53	38.60	8.92	58.45	47.52	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 Axes :
"X" - denotes Laid on Table ; "Y" - denotes Vertical Stand ; "Z" - denotes Side Stand

Orthogonal Axes : X
CH01 (Above 1000 MHz, Horizontal)



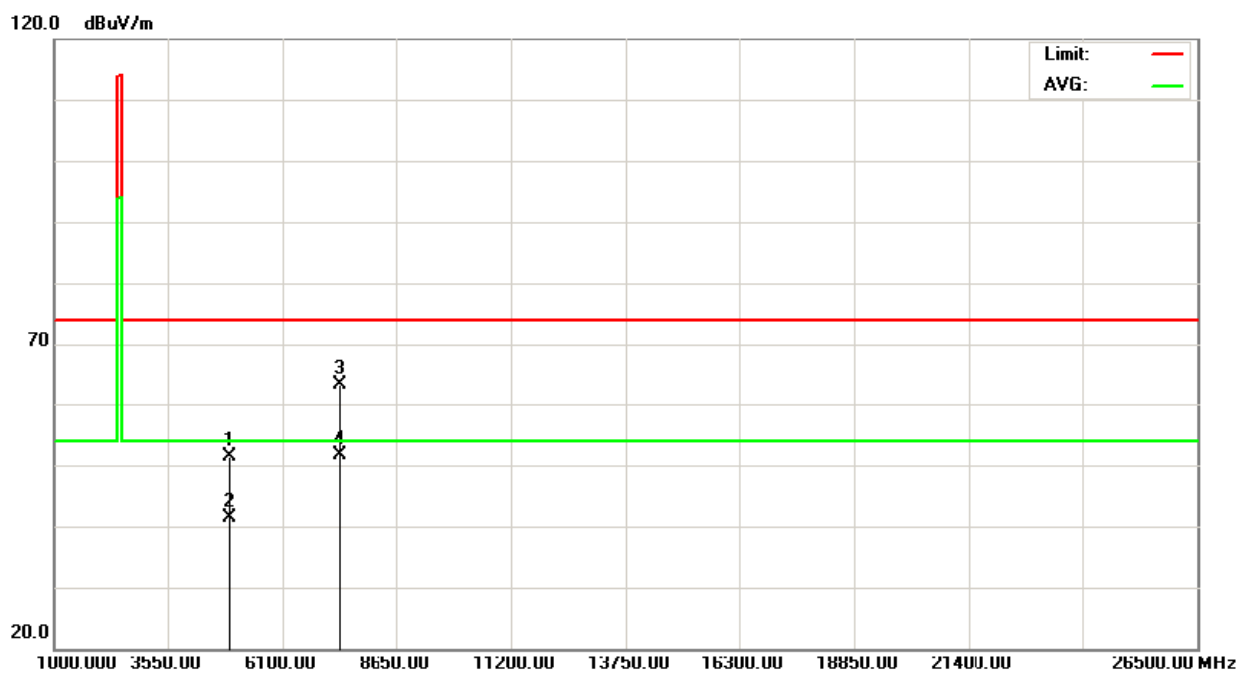
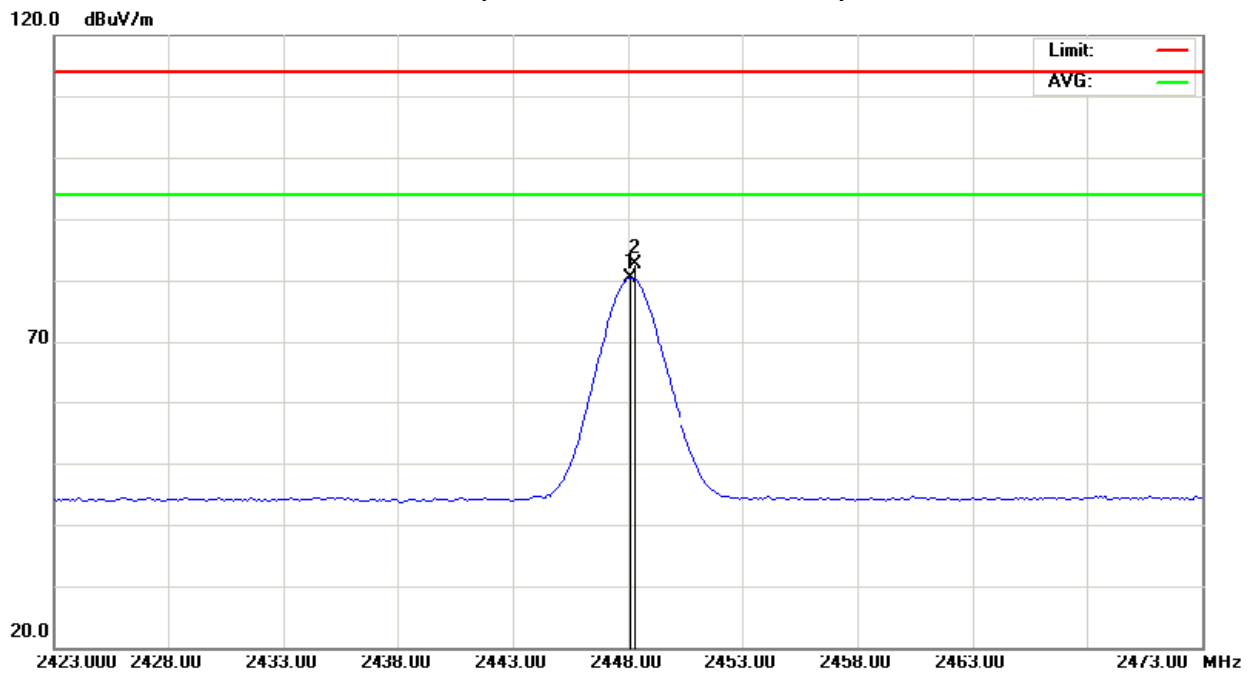
EUT :	2.4G RF Keyboard	Model No. :	GK-23
Temperature :	20 °C	Relative Humidity :	56 %
Pressure :	1012 hPa	Test Power :	DC 3V
Test Mode :	CH09		

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
2448.10	V								X/F
4896.52	V	47.58	37.74	3.76	51.34	41.50	74.00	54.00	X/H
7344.46	V	53.81	42.44	9.24	63.05	51.68	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 Axes :
 "X" - denotes Laid on Table ; "Y" - denotes Vertical Stand ; "Z" - denotes Side Stand

Orthogonal Axes : X
CH09 (Above 1000 MHz, Vertical)



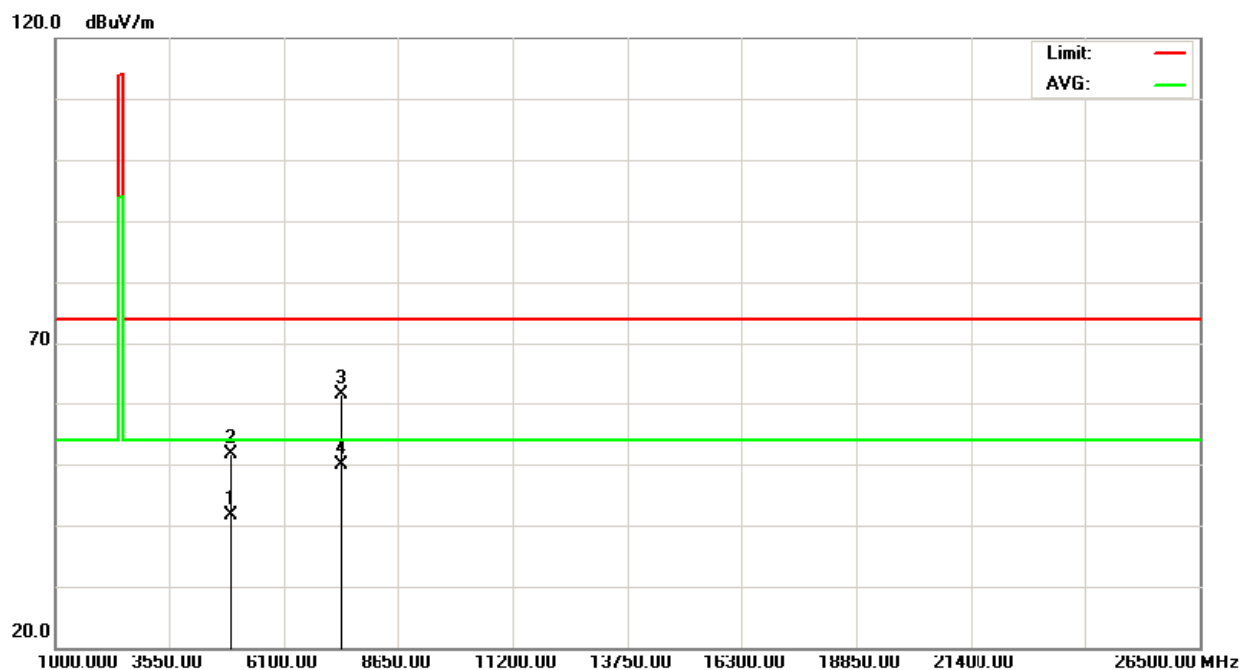
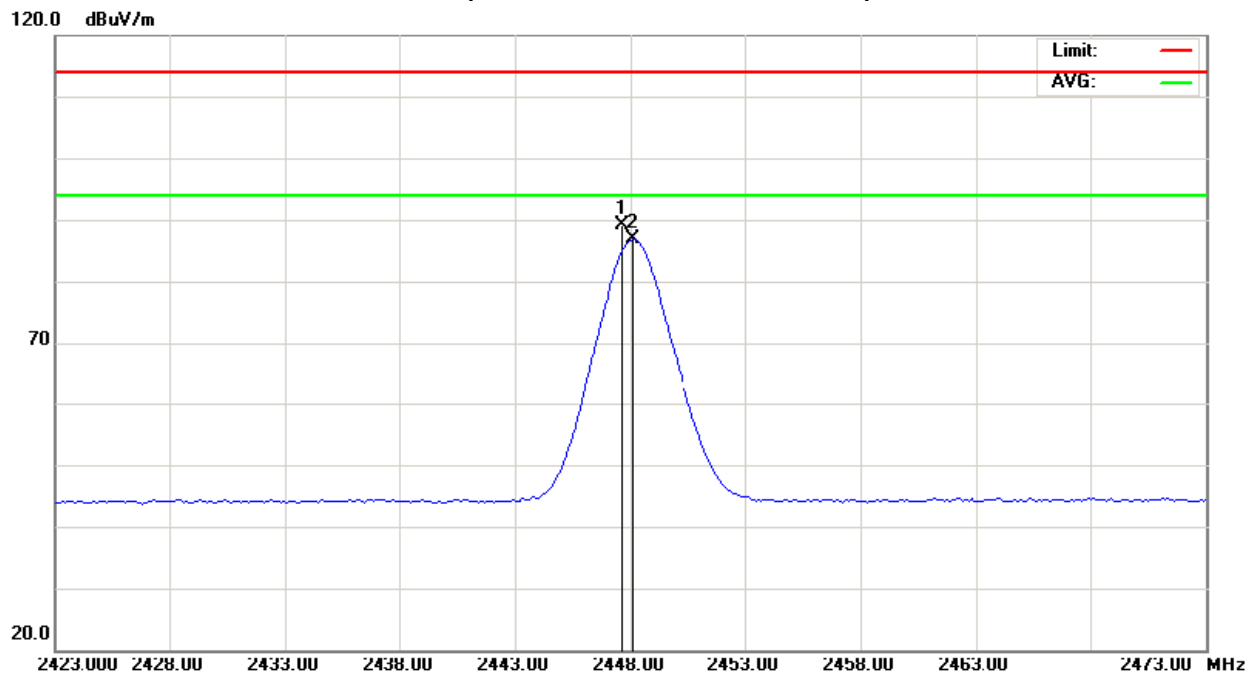
EUT :	2.4G RF Keyboard	Model No. :	GK-23
Temperature :	20 °C	Relative Humidity :	56 %
Pressure :	1012 hPa	Test Power :	DC 3V
Test Mode :	CH09		

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
2448.10	H								X/F
4896.20	H	47.82	37.85	3.75	51.57	41.60	74.00	54.00	X/H
7344.64	H	52.18	40.68	9.24	61.42	49.92	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 Axes :
"X" - denotes Laid on Table ; "Y" - denotes Vertical Stand ; "Z" - denotes Side Stand

Orthogonal Axes : X
CH09 (Above 1000 MHz, Horizontal)



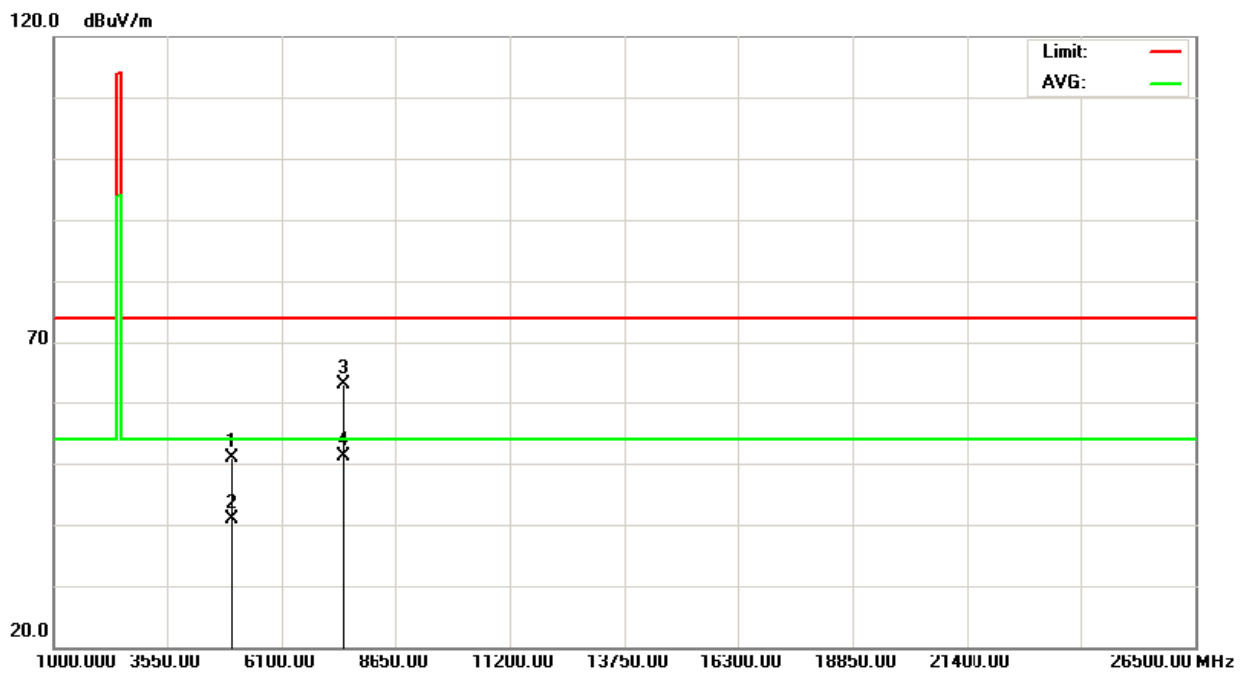
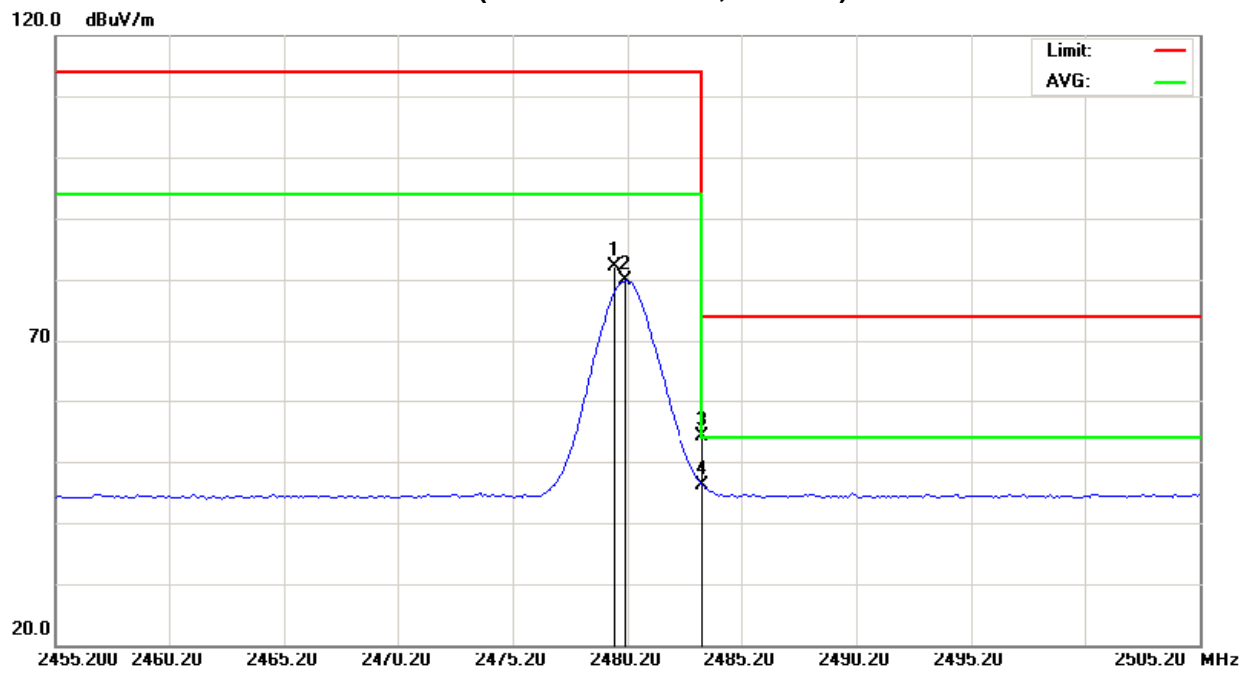
EUT :	2.4G RF Keyboard	Model No. :	GK-23
Temperature :	20 °C	Relative Humidity :	56 %
Pressure :	1012 hPa	Test Power :	DC 3V
Test Mode :	CH16		

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
2480.00	V								X/F
2483.50	V	21.62	13.54	32.59	54.21	46.13	74.00	54.00	X/E
4960.40	V	46.94	36.77	4.01	50.95	40.78	74.00	54.00	X/H
7440.56	V	53.30	41.59	9.46	62.76	51.05	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 Axes :
"X" - denotes Laid on Table ; "Y" - denotes Vertical Stand ; "Z" - denotes Side Stand

Orthogonal Axes : X
CH16 (Above 1000 MHz, Vertical)



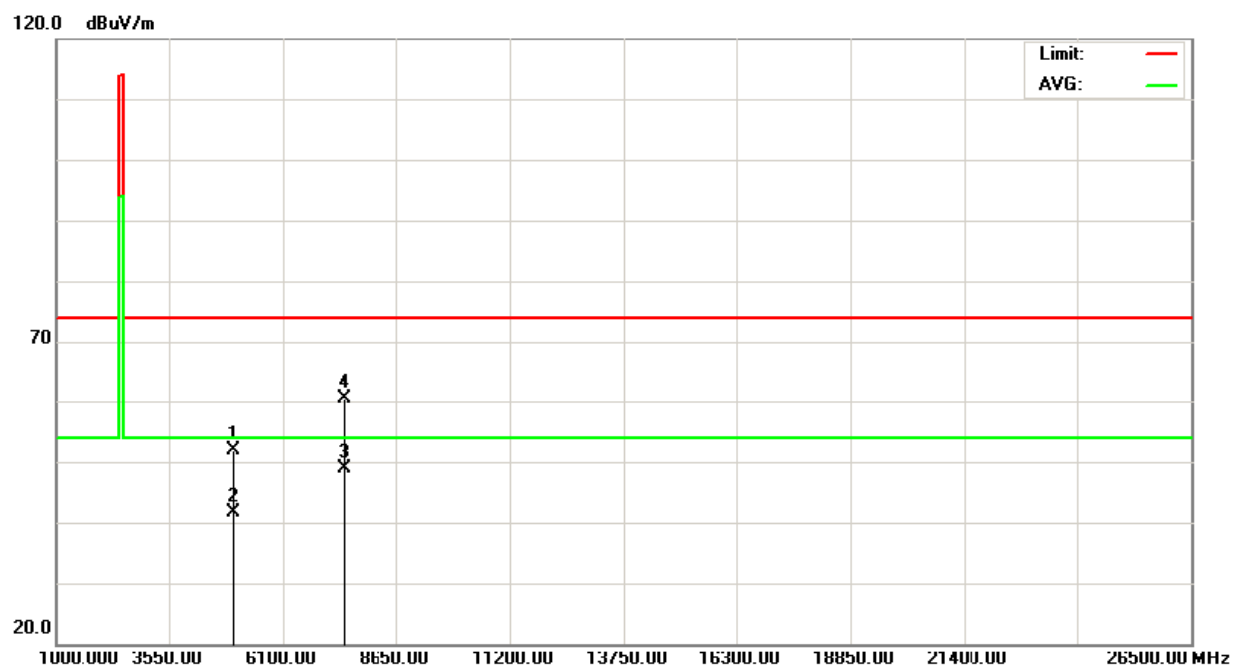
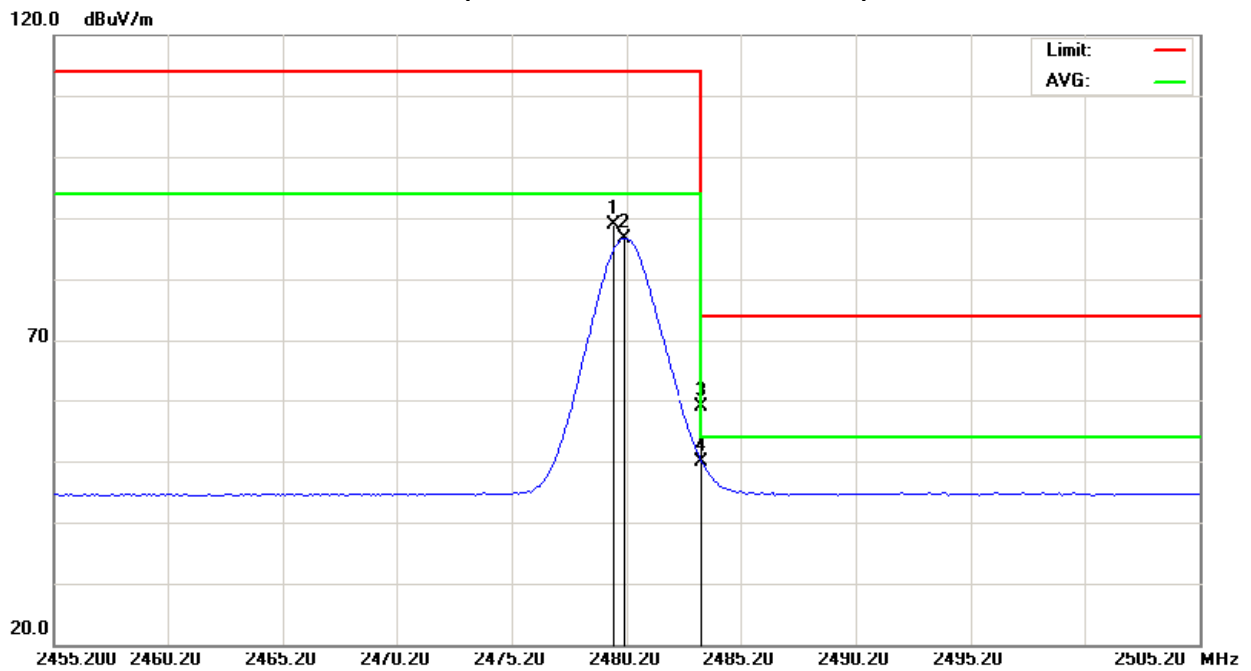
EUT :	2.4G RF Keyboard	Model No. :	GK-23
Temperature :	20 °C	Relative Humidity :	56 %
Pressure :	1012 hPa	Test Power :	DC 3V
Test Mode :	CH16		

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
2480.00	H								X/F
2483.50	H	26.41	17.40	32.59	59.00	49.99	74.00	54.00	X/E
4960.24	H	47.91	37.70	4.01	51.92	41.71	74.00	54.00	X/H
7440.50	H	51.01	39.41	9.46	60.47	48.87	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 Axes :
 "X" - denotes Laid on Table ; "Y" - denotes Vertical Stand ; "Z" - denotes Side Stand

Orthogonal Axes : X
CH16 (Above 1000 MHz, Horizontal)



4.1.9 TEST RESULTS (2400 – 2483.5 MHz)

EUT :	2.4G RF Keyboard	Model No. :	GK-23
Temperature :	20 °C	Relative Humidity :	56 %
Pressure :	1009 hPa	Test Power :	DC 3V
Test Mode :	TX CH 2402MHz/2448MHz/2480MHz		

Freq. (MHz)	Ant.Pol. (H/V)	Reading		Ant./CF CF(dB)	Actual FS		Limit3m		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
2402.00	V	51.23	48.97	32.28	83.51	81.25	114.00	94.00	CH01
2402.00	H	57.25	55.08	32.28	89.53	87.36	114.00	94.00	CH01
2448.00	V	50.27	47.94	32.46	82.73	80.40	114.00	94.00	CH09
2448.00	H	56.68	54.31	32.46	89.14	86.77	114.00	94.00	CH09
2480.00	V	49.63	47.22	32.58	82.21	79.80	114.00	94.00	CH16
2480.00	H	56.34	54.12	32.58	88.92	86.70	114.00	94.00	CH16

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 Axes :
 "X" - denotes Laid on Table ; "Y" - denotes Vertical Stand ; "Z" - denotes Side Stand

4.1.10 TEST RESULTS (Restricted Bands Requirements)

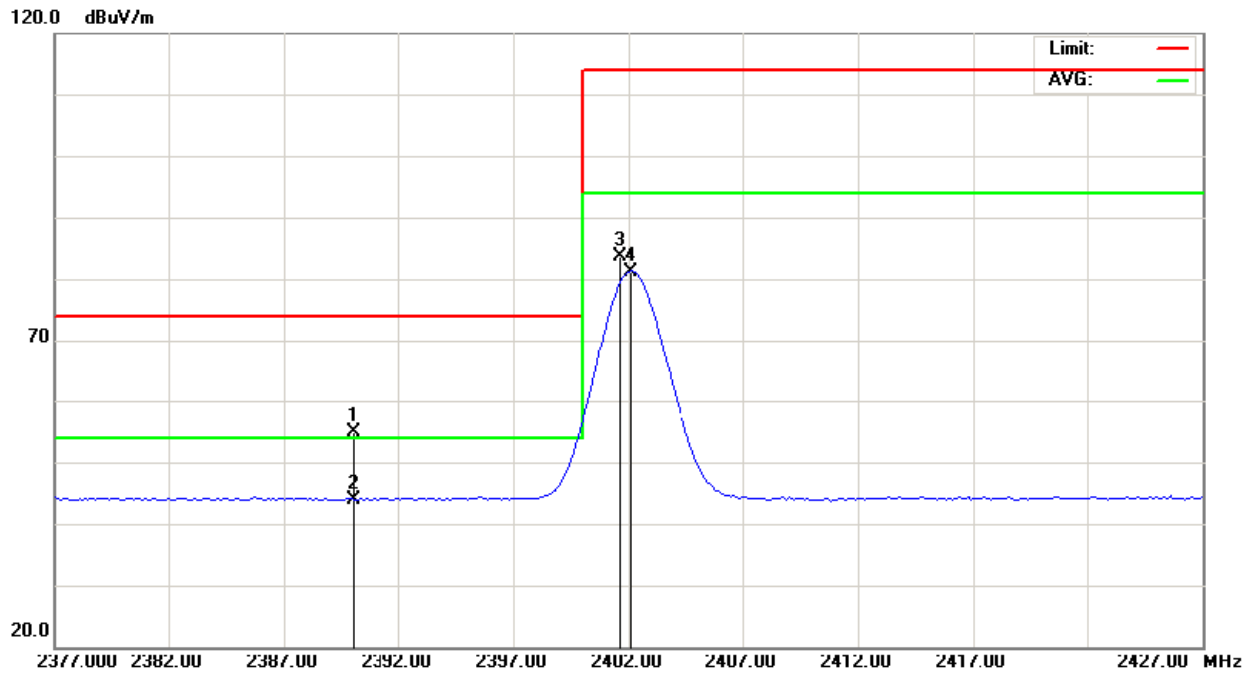
EUT :	2.4G RF Keyboard	Model No. :	GK-23
Temperature :	20 °C	Relative Humidity :	56 %
Pressure :	1009 hPa	Test Power :	DC 3V
Test Mode :	TX CH 2402MHz/2480MHz(Vertical)		
Note :	<p>The emission of the carrier radiated field strength is measured for (Peak and AV) as following:</p> <ol style="list-style-type: none"> 1. The transmitter was then configured with the worst case antenna and setup to transmit at the lowest channel (CH01). Then the field strength was measured at 2310-2390 MHz. 2. The transmitter was configured with the worst case antenna and setup to transmit at the highest channel (CH16). Then the field strength was measured at 2483.5-2500 MHz. 3. The band edge emission plot on the following page 34 shows 42.83dB delta between carrier maximum power and local maximum emission in 2400MHz. The emission of carrier strength list in the test result of channel 1 at the item 4.1. is 83.51dBuV/m(Peak) and 81.25dBuV/m(AV), so the maximum field strength in 2400MHz is 83.51-42.83=40.68dBuV/m which is under 74 dBuV/m limit, and 81.25-42.83=38.42dBuV/m which is under 54 dBuV/m limit 		

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
2390.00	V	22.62	11.64	32.24	54.86	43.88	74.00	54.00	CH01
2483.50	V	21.62	13.54	32.59	54.21	46.13	74.00	54.00	CH16

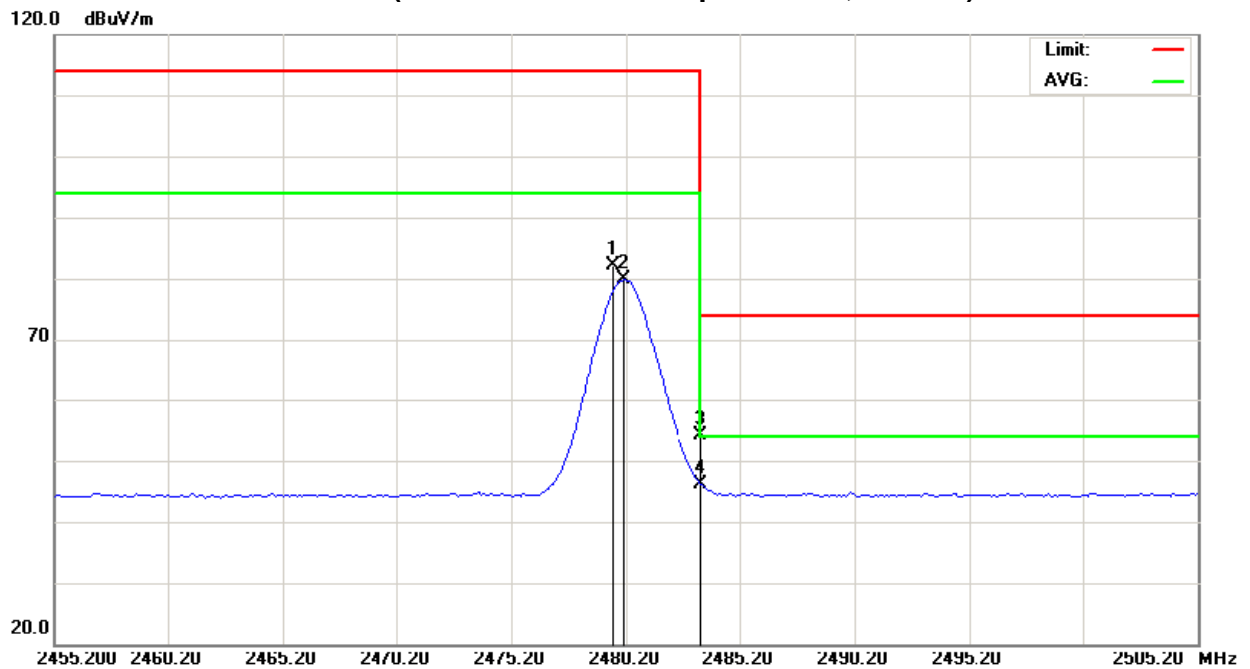
Remark :

- (1) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission .
- (2) EUT Orthogonal Axes :
 "X" - denotes Laid on Table ; "Y" - denotes Vertical Stand ; "Z" - denotes Side Stand

TX CH01 (Restricted Bands Requirements, Vertical)



TX CH16 (Restricted Bands Requirements, Vertical)



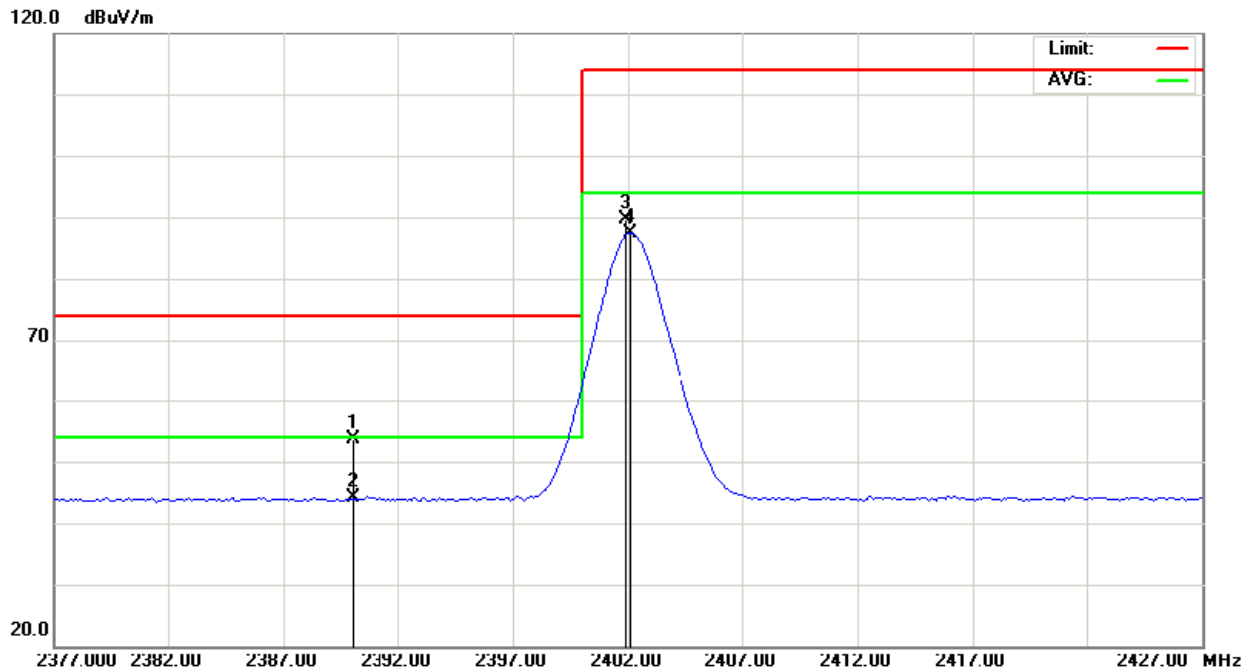
EUT :	2.4G RF Keyboard	Model No. :	GK-23
Temperature :	20 °C	Relative Humidity :	56 %
Pressure :	1009 hPa	Test Power :	DC 3V
Test Mode :	TX CH 2402MHz/2480MHz (Horizontal)		
Note :	<p>The emission of the carrier radiated field strength is measured for (Peak and AV) as following:</p> <ol style="list-style-type: none"> 1. The transmitter was then configured with the worst case antenna and setup to transmit at the lowest channel (CH01). Then the field strength was measured at 2310-2390 MHz. 2. The transmitter was configured with the worst case antenna and setup to transmit at the highest channel (CH16). Then the field strength was measured at 2483.5-2500 MHz. 3. The band edge emission plot on the following page 34 shows 42.83dB delta between carrier maximum power and local maximum emission in 2400MHz. The emission of carrier strength list in the test result of channel 1 at the item 4.1. is 89.53dBuV/m(Peak) and 87.36dBuV/m(AV), so the maximum field strength in 2400MHz is 89.53-42.83=46.7dBuV/m which is under 74 dBuV/m limit, and 87.36-42.83=44.53dBuV/m which is under 54 dBuV/m limit 		

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
2390.00	H	21.30	11.87	32.24	53.54	44.11	74.00	54.00	CH01
2483.50	H	26.41	17.40	32.59	59.00	49.99	74.00	54.00	CH16

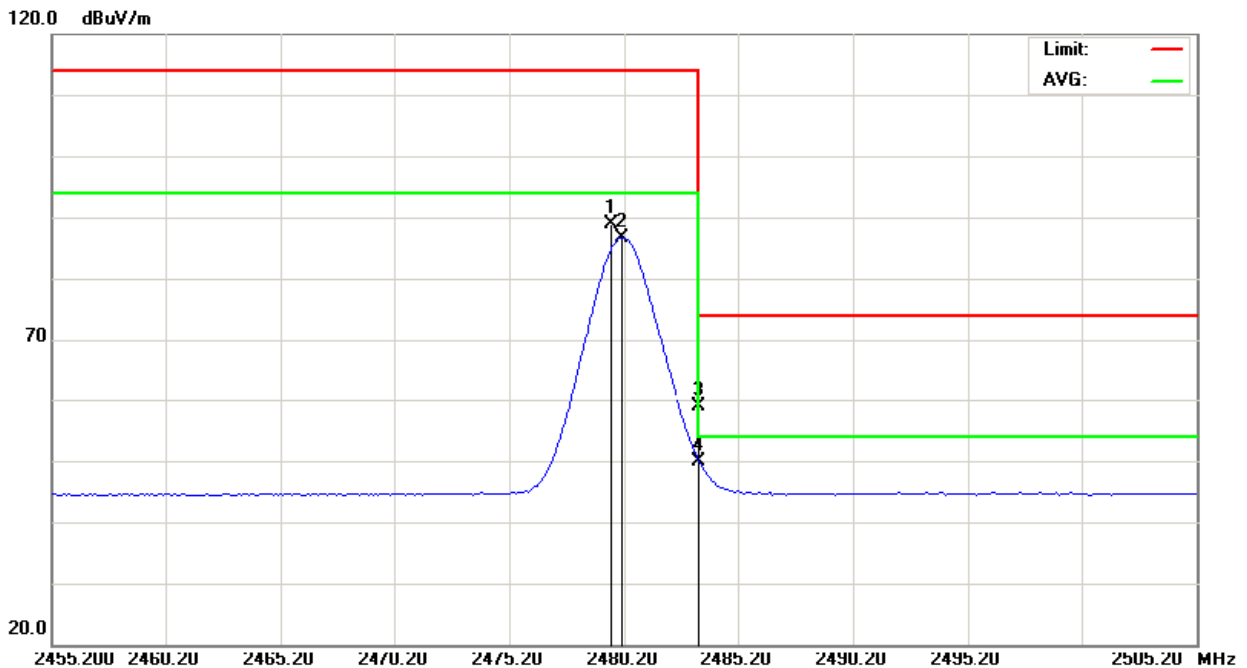
Remark :

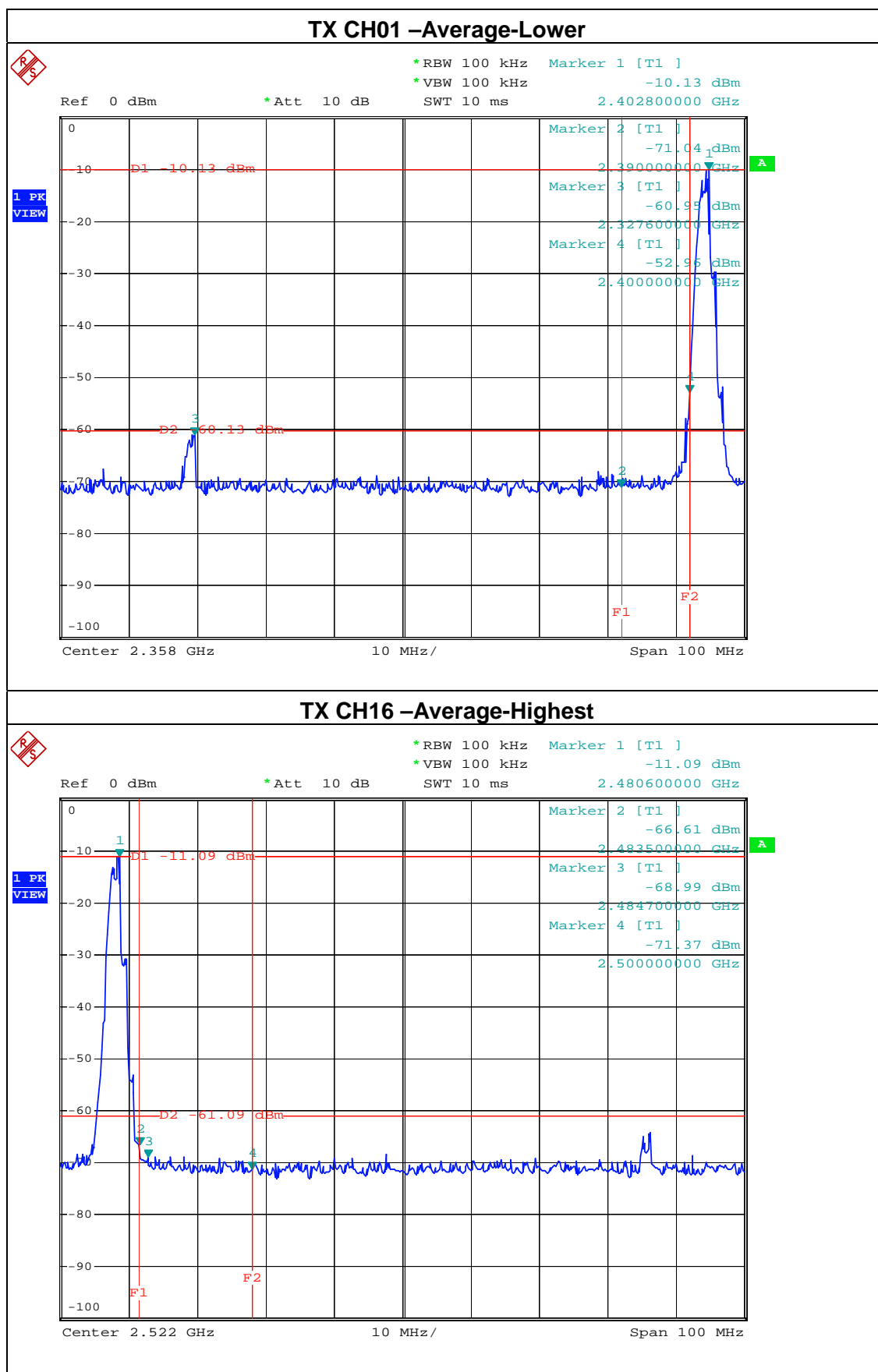
- (1) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission °
- (2) EUT Orthogonal Axes :
 "X" - denotes Laid on Table ; "Y" - denotes Vertical Stand ; "Z" - denotes Side Stand

TX CH01 (Restricted Bands Requirements, Horizontal)



TX CH16 (Restricted Bands Requirements, Horizontal)





5. EUT TEST PHOTO

Radiated Measurement Photos

