

FCC Radio Test Report

FCC ID: H8GRG20KM24G

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

Issued Date : Dec. 03, 2007
Project No. : R0711014
Equipment : 2.4G RF Dongle
Model Name : RG-20KM

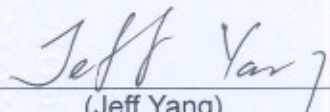
Applicant : A-FOUR TECH CO., LTD.
Address : 6F, No.108, Min-Chuan Rd., Hsin-Tien,
Taipei, Taiwan, R.O.C.

Tested by:
Neutron Engineering Inc. EMC Laboratory
Date of Test:
Nov. 26, 2007 ~ Nov. 29, 2007

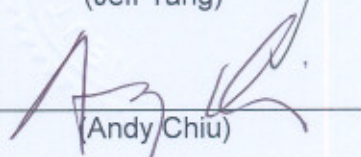
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Declaration

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 Dongle

Brand Name: A4TECH

Model Name: RG-20KM

Applicant: A-FOUR TECH CO., LTD.

Date of Test: Nov. 26, 2007 ~ Nov. 29, 2007

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-R0711014) 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	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	
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 **C01/OS01** at the location of No.132-1, Lane 329, Sec. 2, Palain Road, Shijr City, Taipei, Taiwan.

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 Dongle												
Brand Name	A4TECH												
Model Name	RG-20KM												
OEM Brand/Model Name	N/A												
Model Difference	N/A												
Product Description	<p>The EUT is a 2.4G RF Dongle.</p> <table border="1"> <tr> <td>A. Operation Frequency</td><td>2402~2480MHz</td></tr> <tr> <td>B. Modulation Type</td><td>GFSK</td></tr> <tr> <td>C. Number Of Channel</td><td>16</td></tr> <tr> <td>D. Antenna Designation</td><td>Integral Antenna(Printed)</td></tr> <tr> <td>E. Antenna Gain(Peak)</td><td>-4.1dBi</td></tr> <tr> <td>F. Output Power</td><td>93.53dBuV/m (Max.)</td></tr> </table> <p>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.</p>	A. Operation Frequency	2402~2480MHz	B. Modulation Type	GFSK	C. Number Of Channel	16	D. Antenna Designation	Integral Antenna(Printed)	E. Antenna Gain(Peak)	-4.1dBi	F. Output Power	93.53dBuV/m (Max.)
A. Operation Frequency	2402~2480MHz												
B. Modulation Type	GFSK												
C. Number Of Channel	16												
D. Antenna Designation	Integral Antenna(Printed)												
E. Antenna Gain(Peak)	-4.1dBi												
F. Output Power	93.53dBuV/m (Max.)												
Channel List	Please refer to the Note 2.												
Power Source	Supplied from PC USB port.												
Power Rating	DC I/P 5V, 500mA												
Connecting I/O Port(s)	Please refer to the User's Manual												
Products Covered	N/A												

Note:

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

- | 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 |

- Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	Integral Antenna(Printed)	N/A	-4.1

3.2 DESCRIPTION OF TEST MODES

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

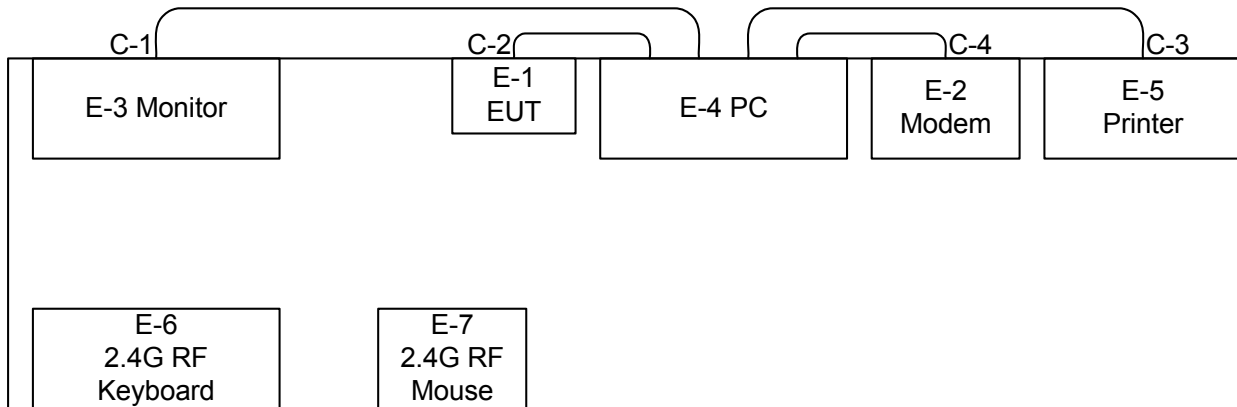
Pretest Test Mode	Description
Mode 1	Channel 01: 2402MHz
Mode 2	Channel 09: 2448MHz
Mode 3	Channel 16: 2480MHz

For Conducted Test	
Final Test Mode	Description
Mode 2	Channel 09: 2448MHz

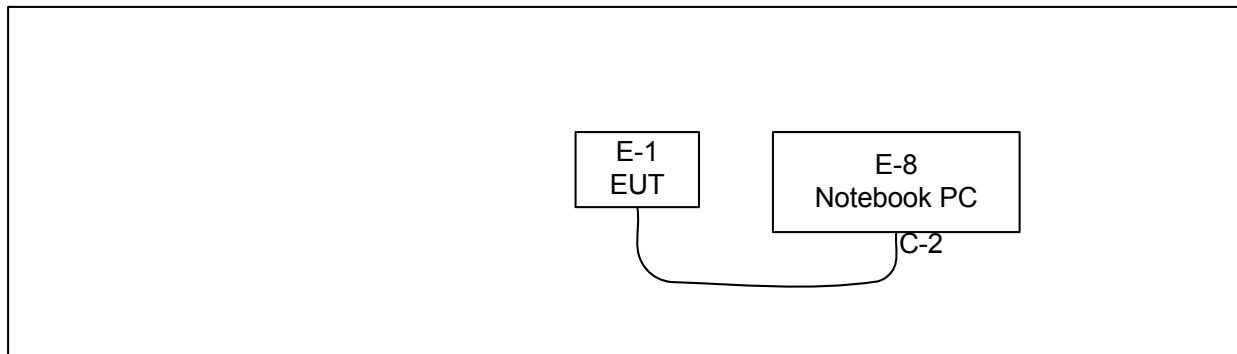
For Radiated Test	
Final Test Mode	Description
Mode 1	Channel 01: 2402MHz
Mode 2	Channel 09: 2448MHz
Mode 3	Channel 16: 2480MHz

3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Conducted Test



Radiated Test



C-1 D-SUB Cable
C-2 USB Cable
C-3 Parallel Cable
C-4 RS232 Cable

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 Dongle	A4TECH	RG-20KM	H8GRG20KM24G	N/A	EUT
E-2	Modem	ACEEX	DM-1414V	DOC	8041708	
E-3	19" LCD Monitor	Samsung	SyncMaster 193P	DOC	DI19H4JXC05517A	
E-4	PC	IBM	8175-I5V	DOC	99MYG14	
E-5	Printer	SII	DPU-414	DOC	1045105A	
E-6	2.4G RF K/B	A4TECH	GK-8	H8GGK824G	N/A	
E-7	2.4G RF MOUSE	A4TECH	G6-70D	H8GG670D24G	N/A	
E-8	Notebook PC	DELL	D600	DOC	7T390 A03	

Item	Shielded Type	Ferrite Core	Length	Note
C-1	YES	YES	1.8M	
C-2	YES	NO	1.5M	
C-3	YES	NO	1.8M	
C-4	YES	NO	1.5M	

Note:

- (1) The support equipment was authorized by Declaration of Conformity.
- (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 (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	Rolf Heine	NNB-2/16Z	98053	Dec. 27, 2007
2	LISN	EMCO	3816/2	00042990	Jan. 25, 2008
3	Pulse Limiter	Electro-Metrics	EM-7600	112644	Nov. 27, 2008
4	50Ω Terminator	N/A	N/A	N/A	May.13, 2009
5	Test Cable	N/A	C01	N/A	Oct. 10, 2008
6	EMI Test Receiver	R&S	ESCI	100082	Mar. 08, 2008

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

4.1.3 SETTING OF RECEIVER

Item	Receiver Parameters	Setting
1	Attenuation	10 dB
2	Start Frequency	0.15 MHz
3	Stop Frequency	30 MHz
4	IF Bandwidth	9 kHz

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

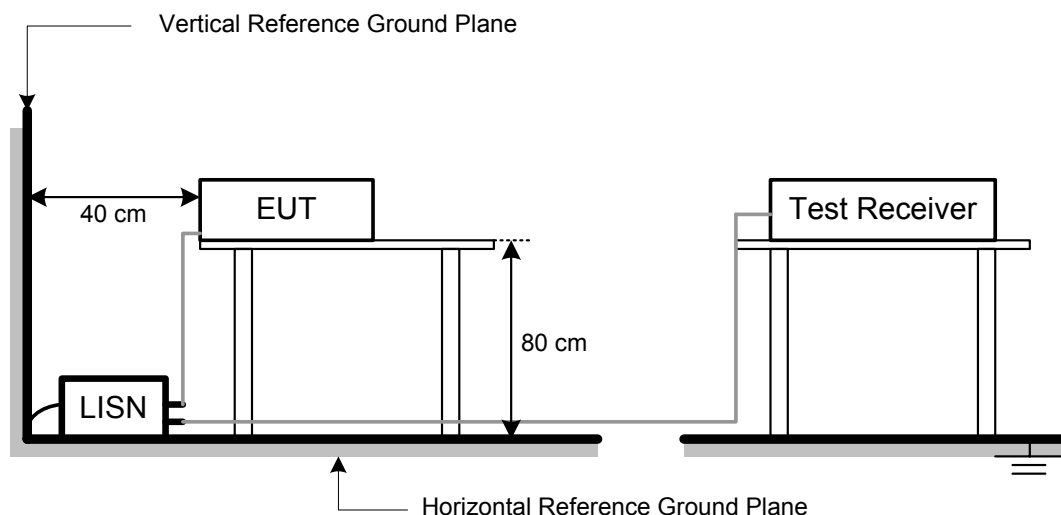
4.1.4 TEST PROCEDURE

- a. The EUT was placed 0.4 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.

4.1.5 DEVIATION FROM TEST STANDARD

No deviation

4.1.6 TEST SETUP



4.1.7 EUT OPERATING CONDITIONS

The EUT exercise program (EMC.exe) used during radiated and/or conducted emission measurement was designed to exercise the various system components in a manner similar to a typical use. The program contained on a PC hard disk and is auto-starting on power-up. Once loaded, the program sequentially exercises each system component in turn. The sequence used is:

1. Read (write) from (to) mass storage device (Disk).
2. Send "H" pattern to video port device (LCD Monitor).
3. Send " H " pattern to parallel port device (Printer).
4. Send " H " pattern to serial port device (Modem).
5. The RF Mouse & Keyboard (TX) send data to EUT (RX).
6. Repeated from 2 to 5 continuously.

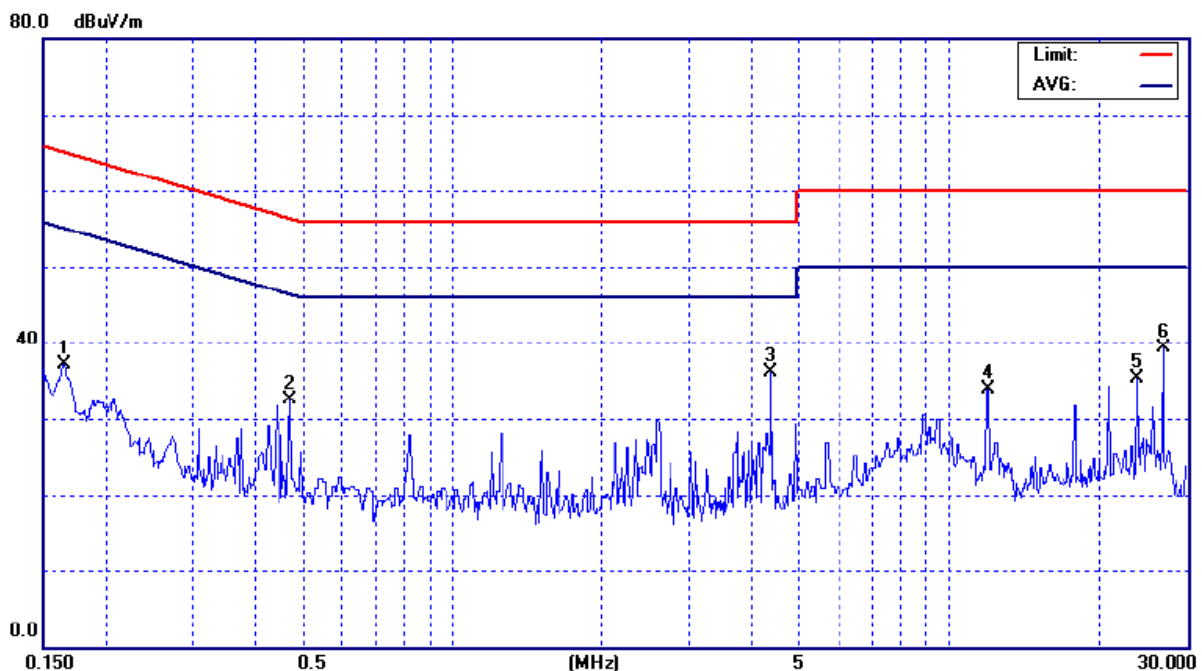
4.1.8 TEST RESULTS

E.U.T :	2.4G RF Dongle	Model Name :	RG-20KM
Temperature :	23 °C	Relative Humidity :	48%
Pressure :	1007 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	Channel 09: 2448MHz		

Freq. (MHz)	Terminal L/N	Measured(dBuV)		Limits(dBuV)		Margin (dB)	Note
		QP-Mode	AV-Mode	QP-Mode	AV-Mode		
0.17	Line	37.09	*	65.19	55.19	-28.10	(QP)
0.47	Line	32.51	*	56.49	46.49	-23.98	(QP)
4.38	Line	36.14	*	56.00	46.00	-19.86	(QP)
11.95	Line	34.00	*	60.00	50.00	-26.00	(QP)
23.95	Line	35.31	*	60.00	50.00	-24.69	(QP)
26.95	Line	39.36	*	60.00	50.00	-20.64	(QP)

Remark

- (1) Reading in which marked as QP means measurements by using are Quasi-Peak Mode with Detector BW=9KHz; SPA setting in RBW=10KHz, VBW =10KHz, Swp. Time = 0.3 sec./MHz ◦
Reading in which marked as AV means measurements by using are Average Mode with instrument setting in RBW=1MHz, VBW=10Hz, Swp. Time =0.3 sec./MHz ◦
- (2) 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 ◦
- (3) Measuring frequency range from 150KHz to 30MHz ◦

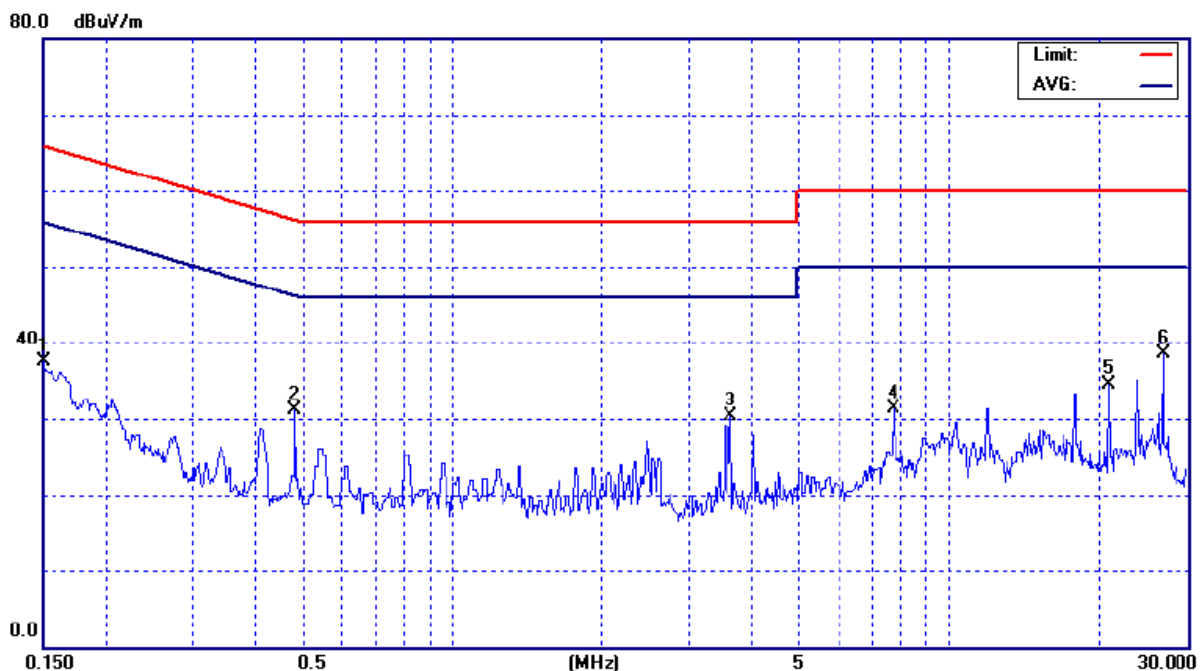


E.U.T :	2.4G RF Dongle	Model Name :	RG-20KM
Temperature :	23 °C	Relative Humidity :	48%
Pressure :	1007 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	Channel 09: 2448MHz		

Freq. (MHz)	Terminal L/N	Measured(dBuV)		Limits(dBuV)		Margin (dB)	Note
		QP-Mode	AV-Mode	QP-Mode	AV-Mode		
0.15	Neutral	37.53	*	66.00	56.00	-28.47	(QP)
0.48	Neutral	31.07	*	56.28	46.28	-25.21	(QP)
3.64	Neutral	30.22	*	56.00	46.00	-25.78	(QP)
7.75	Neutral	31.27	*	60.00	50.00	-28.73	(QP)
20.95	Neutral	34.50	*	60.00	50.00	-25.50	(QP)
26.95	Neutral	38.57	*	60.00	50.00	-21.43	(QP)

Remark

- (1) Reading in which marked as QP means measurements by using are Quasi-Peak Mode with Detector BW=9KHz; SPA setting in RBW=10KHz, VBW =10KHz, Swp. Time = 0.3 sec./MHz ◦ Reading in which marked as AV means measurements by using are Average Mode with instrument setting in RBW=1MHz, VBW=10Hz, Swp. Time =0.3 sec./MHz ◦
- (2) 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 ◦
- (3) Measuring frequency range from 150KHz to 30MHz ◦



4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT (FCC PART 15.209)

FREQUENCY (MHz)	Field Strength (micovolts/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.

Notes:

- (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 PART 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

4.2.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Test Cable	N/A	SR03_C	N/A	Aug. 20, 2008
2	Log-Bicon Antenna	Schwarzbeck	VULB 9161	4022	Jun. 13, 2008
3	Test Cable	N/A	10M_OS01	N/A	Oct. 10, 2008
4	Test Cable	N/A	OS01-1/-2	N/A	Oct. 10, 2008
5	Pre-Amplifier	Anritsu	MH648A(OS 01)	M09961	Oct. 10, 2008
6	Pre-Amplifier	Agilent	8449B	3008A01714	May,14, 2008
7	Spectrum Analyzer	ADVAN TEST	R3132	81700025	Mar. 22, 2008
8	Spectrum Analyzer	R&S	FSP_40	100129	Aug,16, 2008
9	Test Receiver	MEB	SMV41	130	Jun. 21, 2008
10	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-325	Dec. 13, 2007
11	Horn Antenna	Schwarzbeck	BBHA9170	9170-187	Dec. 11, 2007
12	Antenna Mast	Chance Most	CMTB-1.5	N/A	N/A
13	Turn Table	Chance Most	CMTB-1.5	N/A	N/A

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

4.2.3 TEST PROCEDURE

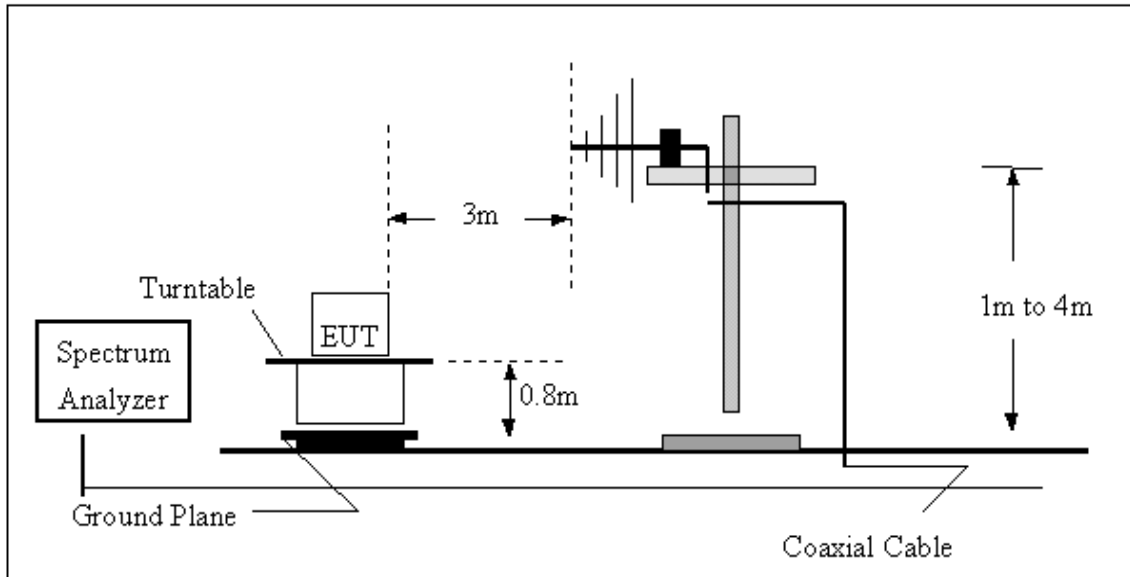
- The measuring distance of at 10 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3m or 10 meter open area test site. The table was rotated 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 radiated 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.

4.2.4 DEVIATION FROM TEST STANDARD

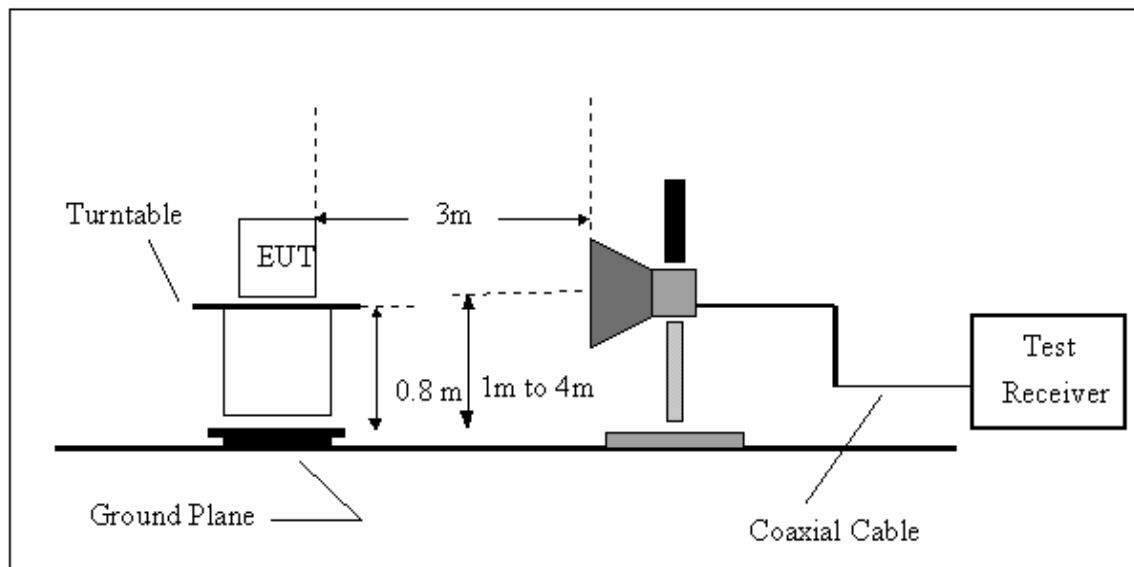
No deviation

4.2.5 TEST SETUP

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



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



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.

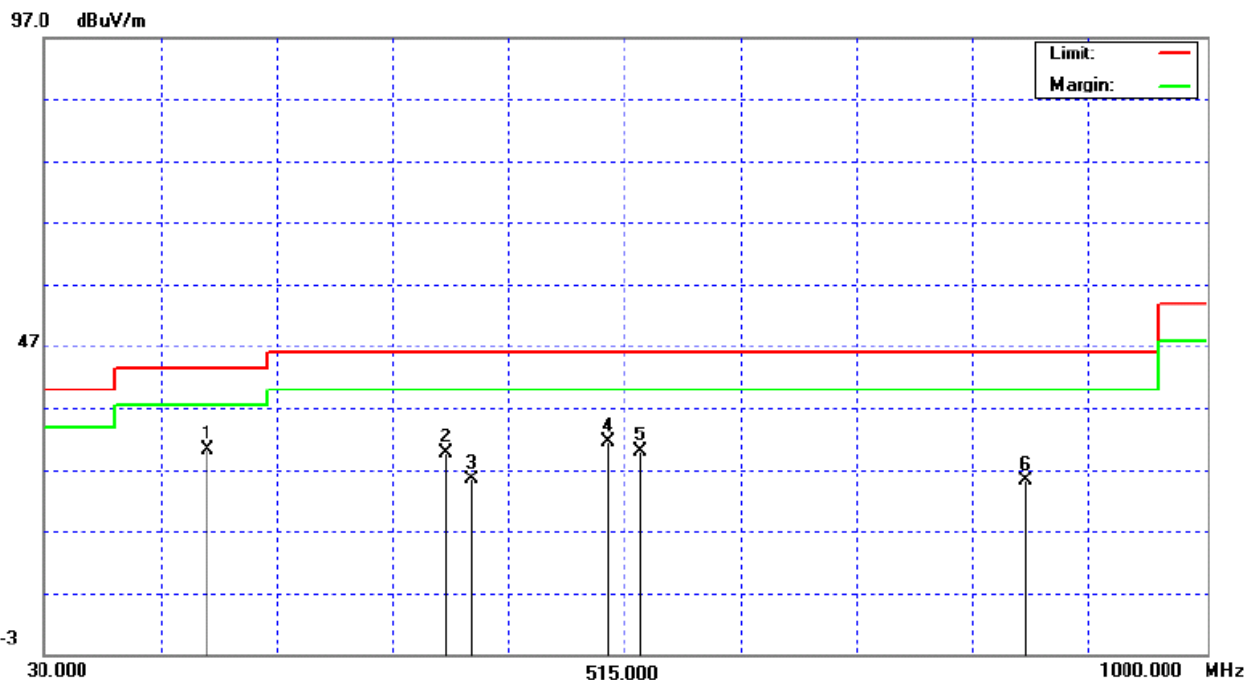
4.2.7 TEST RESULTS-BETWEEN 30MHZ AND 1000MHZ

E.U.T :	2.4G RF Dongle	Model Name :	RG-20KM
Temperature :	22 °C	Relative Humidity :	75%
Pressure :	1016 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	Channel 09: 2448MHz		

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
165.00	V	12.29	17.82	30.11	43.50	- 13.39	
365.00	V	8.18	21.39	29.57	46.00	- 16.43	
386.00	V	2.02	23.25	25.27	46.00	- 20.73	
500.00	V	7.16	24.26	31.42	46.00	- 14.58	
528.00	V	5.31	24.69	30.00	46.00	- 16.00	
850.00	V	-5.29	30.40	25.11	46.00	- 20.89	

Remark :

- (1) Reading in which marked as QP or Peak means measurements by using are Quasi-Peak Mode or Peak Mode with Detector BW=120KHz ; SPA setting in RBW=120KHz, VBW =120KHz, Swp. Time = 0.3 sec./MHz ◦
- (2) 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 ◦
- (3) Measuring frequency range from 30MHz to 1000MHz ◦
- (4) If the peak scan value lower limit more than 20dB, then this signal data does not how in table ◦

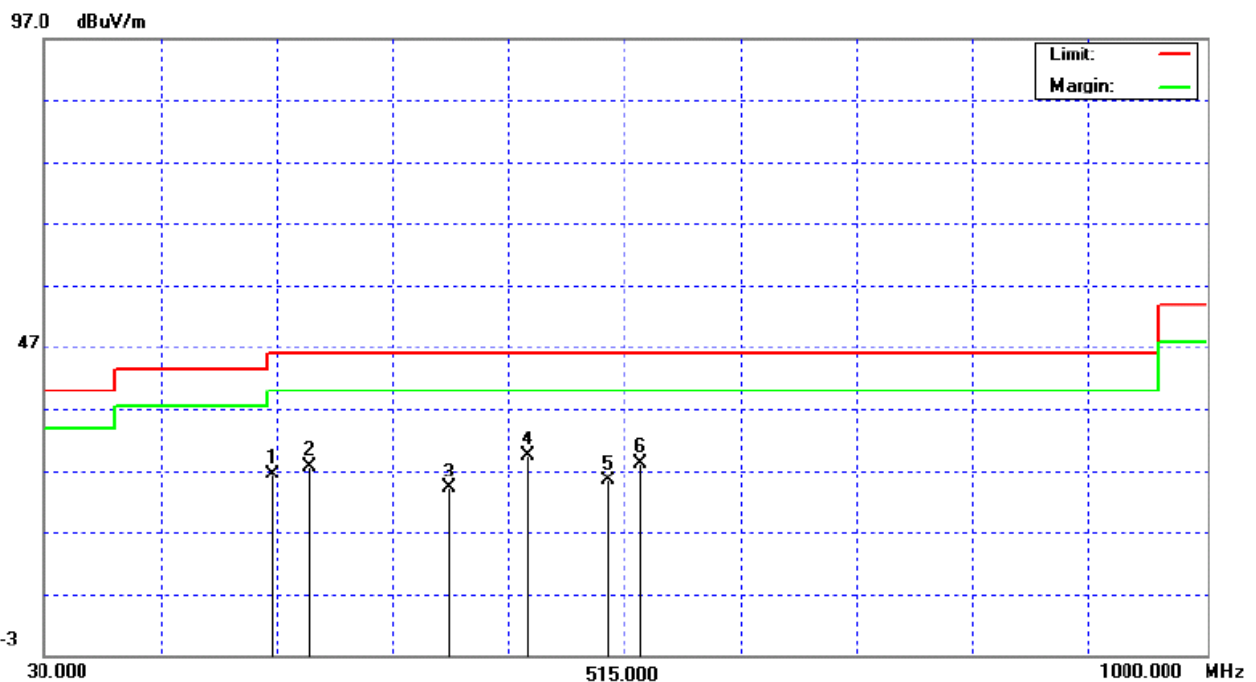


E.U.T :	2.4G RF Dongle	Model Name :	RG-20KM
Temperature :	22° C	Relative Humidity :	75%
Pressure :	1016 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	Channel 09: 2448MHz		

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
220.00	H	10.09	16.23	26.32	46.00	- 19.68	
250.00	H	10.54	17.04	27.58	46.00	- 18.42	
366.00	H	2.62	21.48	24.10	46.00	- 21.90	
432.00	H	5.72	23.78	29.50	46.00	- 16.50	
500.00	H	1.22	24.26	25.48	46.00	- 20.52	
528.00	H	3.44	24.69	28.13	46.00	- 17.87	

Remark :

- (1) Reading in which marked as QP or Peak means measurements by using are Quasi-Peak Mode or Peak Mode with Detector BW=120KHz ; SPA setting in RBW=120KHz, VBW =120KHz, Swp. Time = 0.3 sec./MHz ◦
- (2) 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 ◦
- (3) Measuring frequency range from 30MHz to 1000MHz ◦
- (4) If the peak scan value lower limit more than 20dB, then this signal data does not how in table ◦



4.2.8 TEST RESULTS-ABOVE 1000MHZ

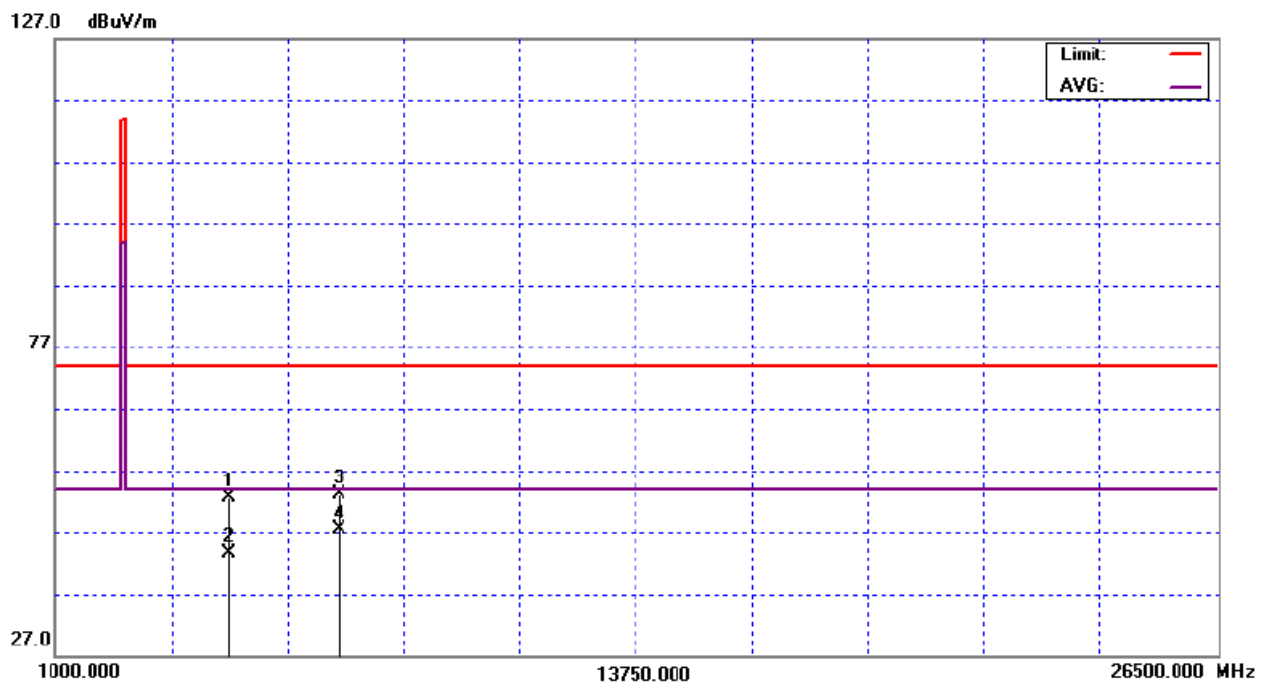
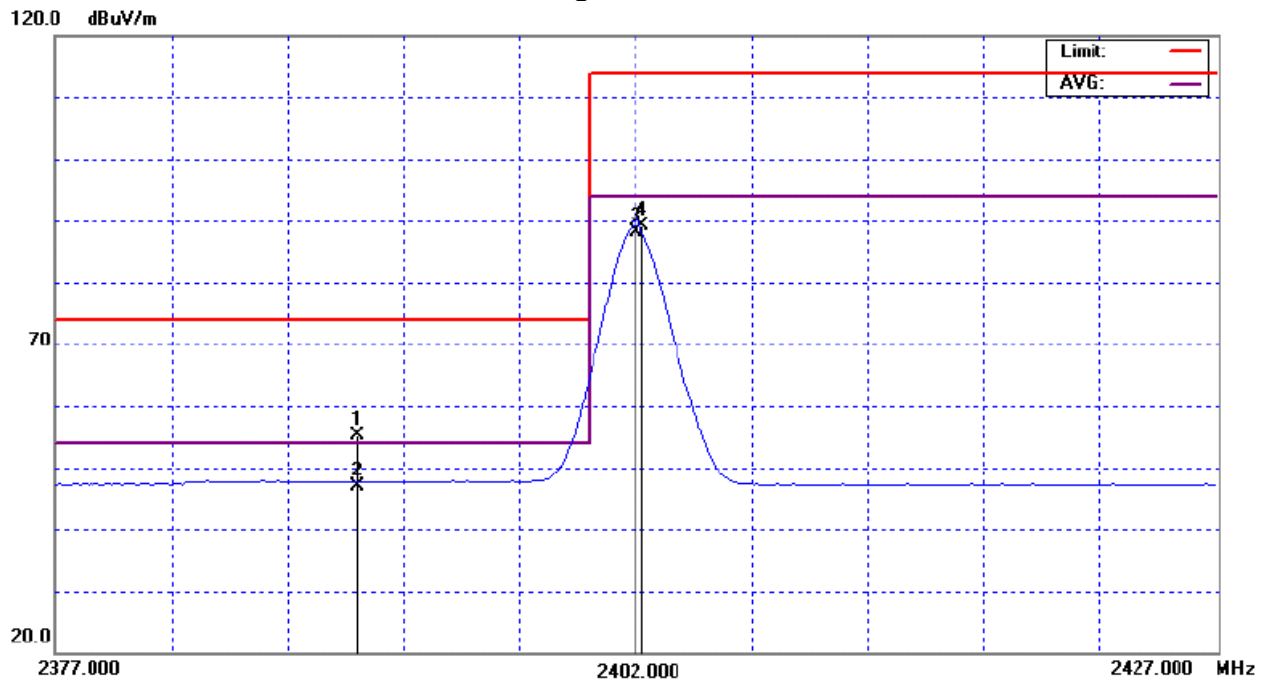
E.U.T :	2.4G RF Dongle	Model Name :	RG-20KM
Temperature :	22 °C	Relative Humidity :	75%
Pressure :	1016 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	Channel 01: 2402MHz		

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	22.45	14.30	32.57	55.02	46.87	74.00	54.00	X/E
2402.30	V								X/F
4803.90	V	48.73	39.75	3.95	52.68	43.70	74.00	54.00	X/H
7206.00	V	41.64	35.84	11.58	53.22	47.42	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

Above 1000 MHz, Vertical
Channel 01: 2402MHz
Orthogonal Axes: X



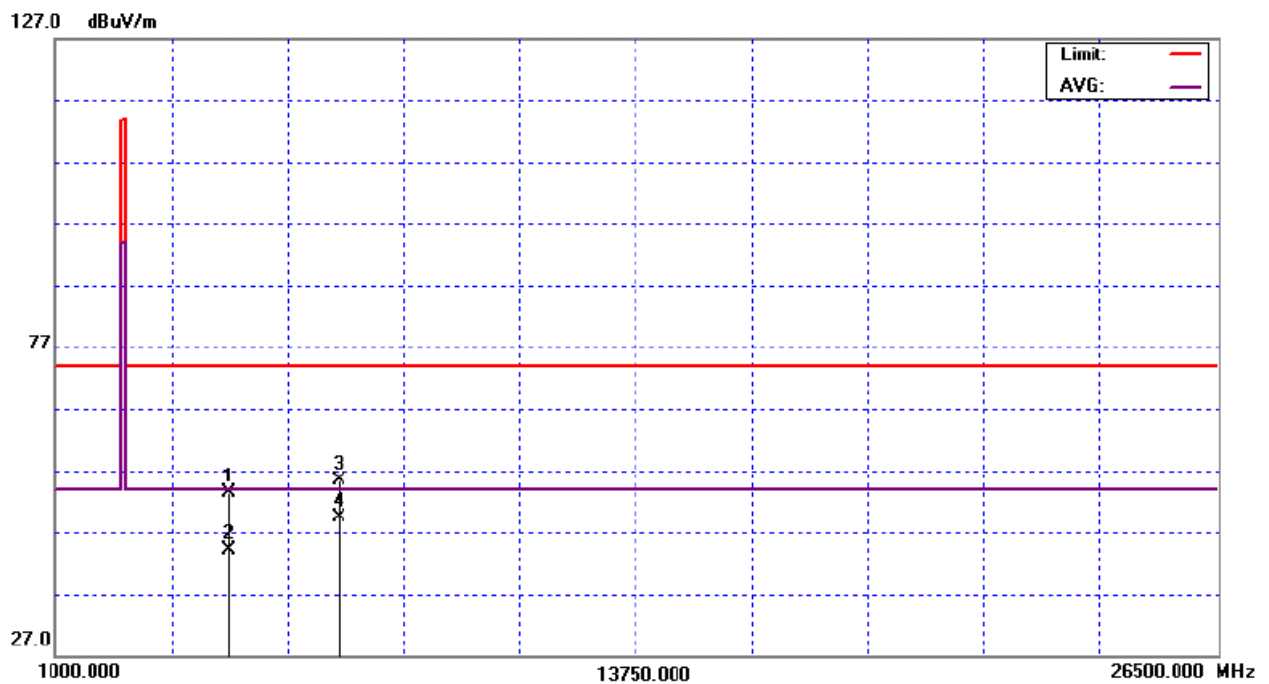
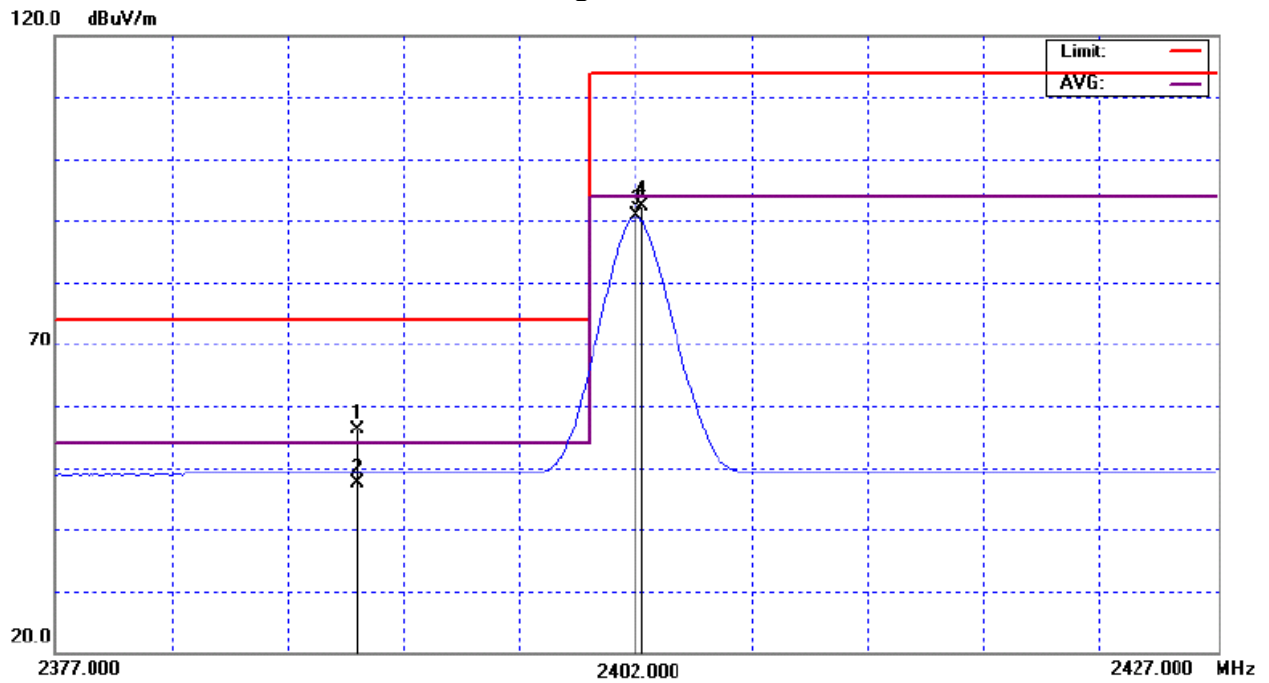
EUT :	2.4G RF Dongle	Model Name :	RG-20KM
Temperature :	22 ° C	Relative Humidity :	75%
Pressure :	1016 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	Channel 01: 2402MHz		

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	23.58	14.76	32.57	56.15	47.33	74.00	54.00	X/E
2402.30	H								X/F
4803.90	H	49.31	40.28	3.95	53.26	44.23	74.00	54.00	X/H
7206.00	H	73.79	37.78	11.58	85.37	49.36	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

Above 1000 MHz, Horizontal
Channel 01: 2402MHz
Orthogonal Axes: X



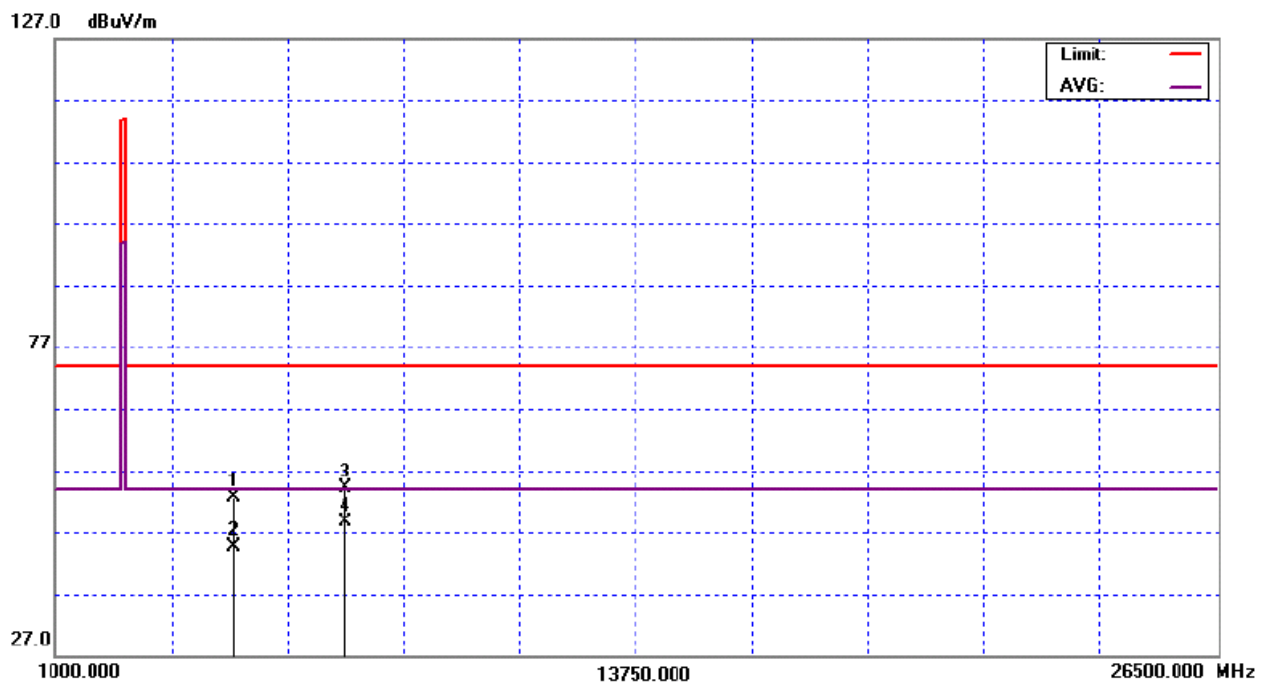
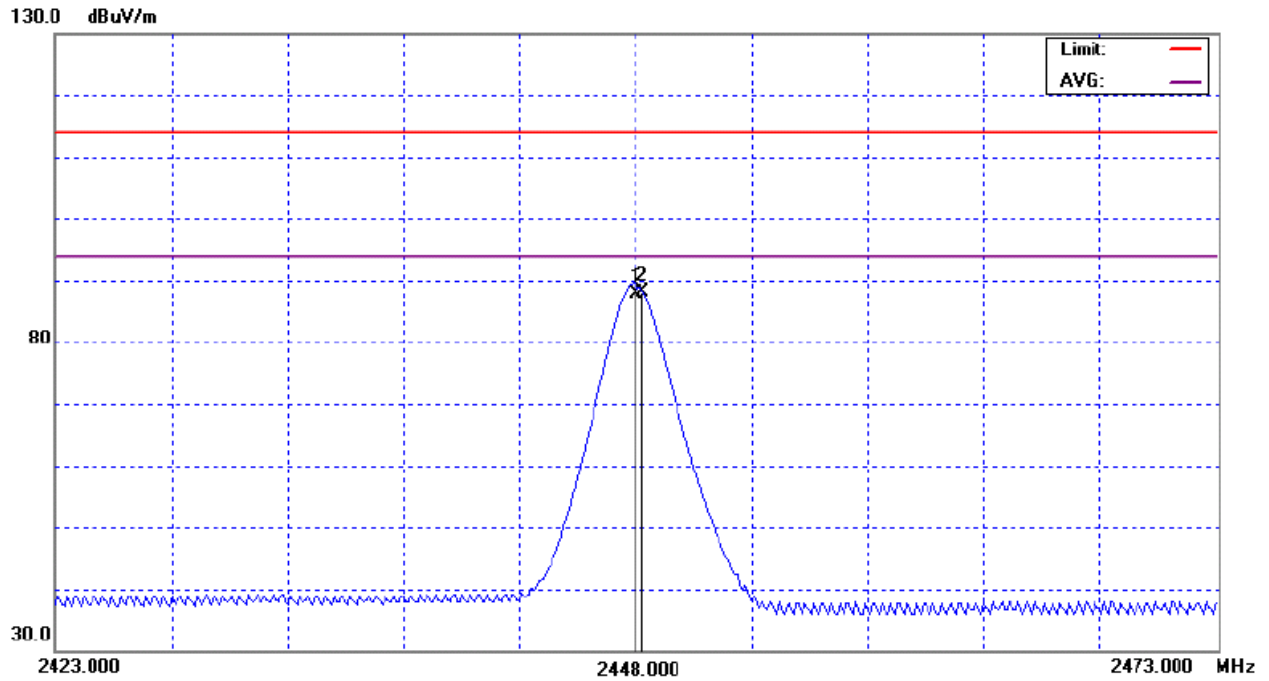
E.U.T :	2.4G RF Dongle	Model Name :	RG-20KM
Temperature :	22 °C	Relative Humidity :	75%
Pressure :	1016 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	Channel 09: 2448MHz		

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)	
2448.30	V								X/F
4896.00	V	48.25	40.33	4.40	52.65	44.73	74.00	54.00	X/H
7344.00	V	42.19	36.70	11.94	54.13	48.64	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

Above 1000 MHz, Vertical
Channel 09: 2448MHz
Orthogonal Axes: X



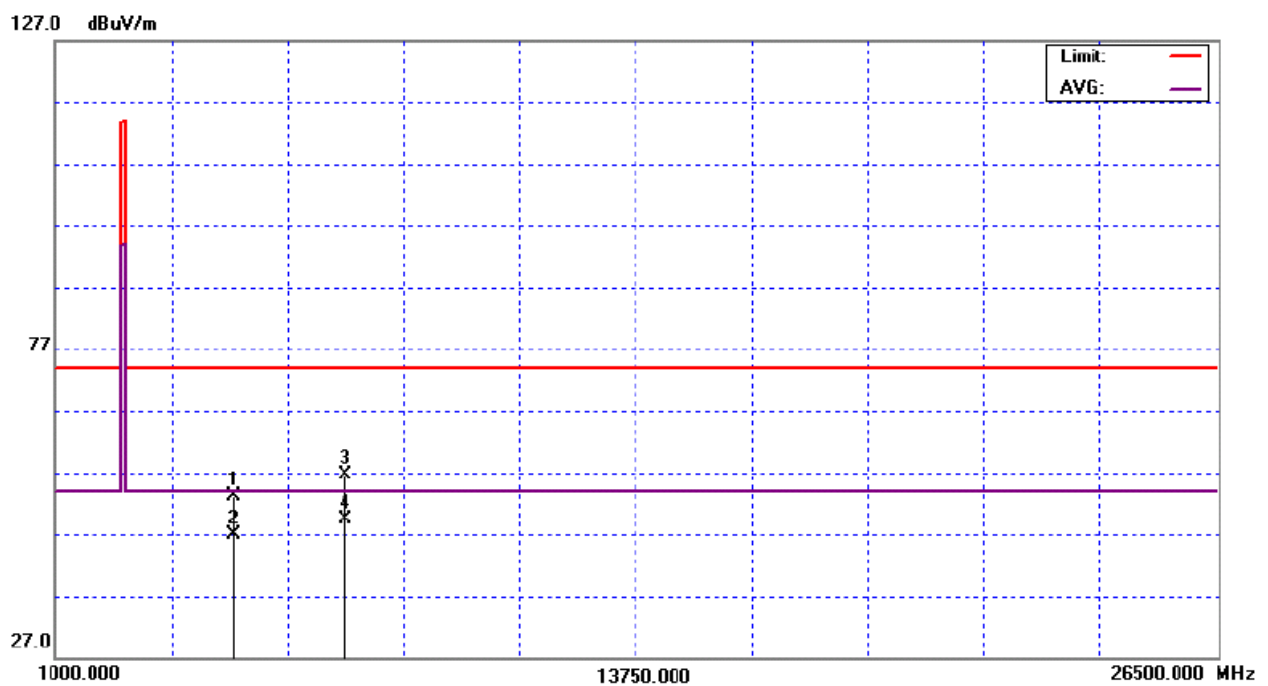
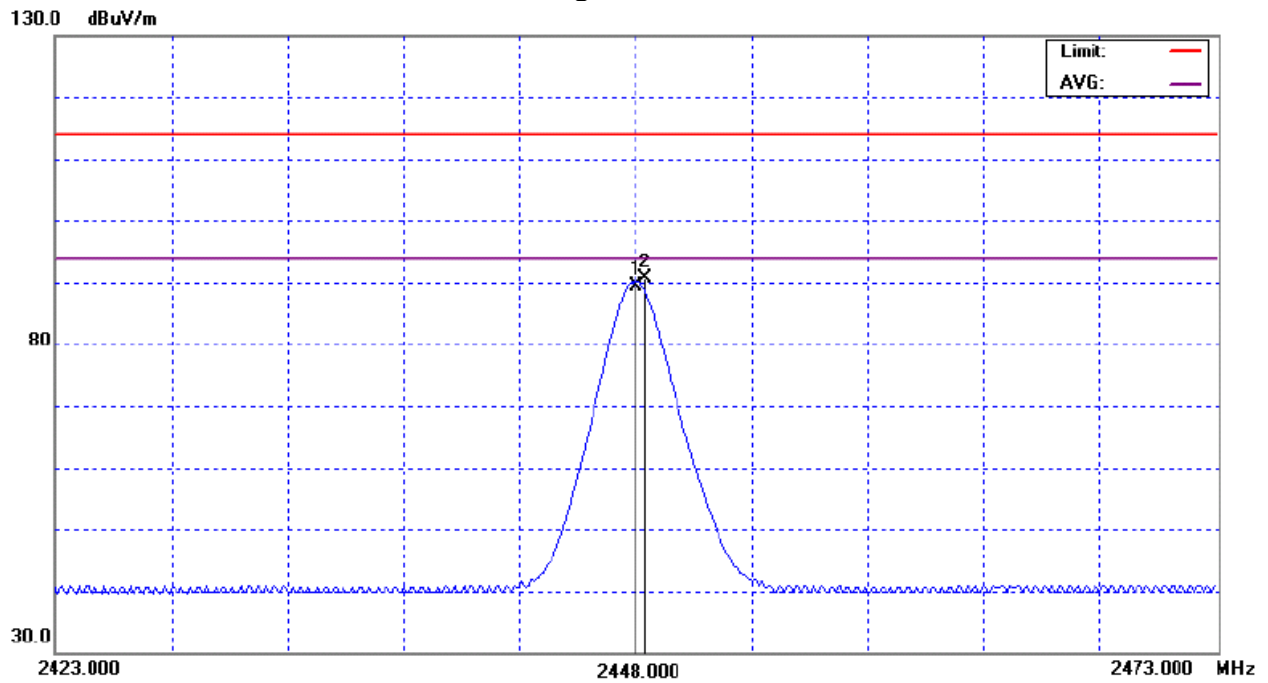
EUT :	2.4G RF Dongle	Model Name :	RG-20KM
Temperature :	22 ° C	Relative Humidity :	75%
Pressure :	1016 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	Channel 09: 2448MHz		

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)	
2448.40	H								X/F
4896.00	H	48072.00	42.43	4.40	48076.40	46.83	74.00	54.00	X/H
7344.00	H	44.66	37.33	11.94	56.60	49.27	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

Above 1000 MHz, Horizontal
Channel 09: 2448MHz
Orthogonal Axes: X



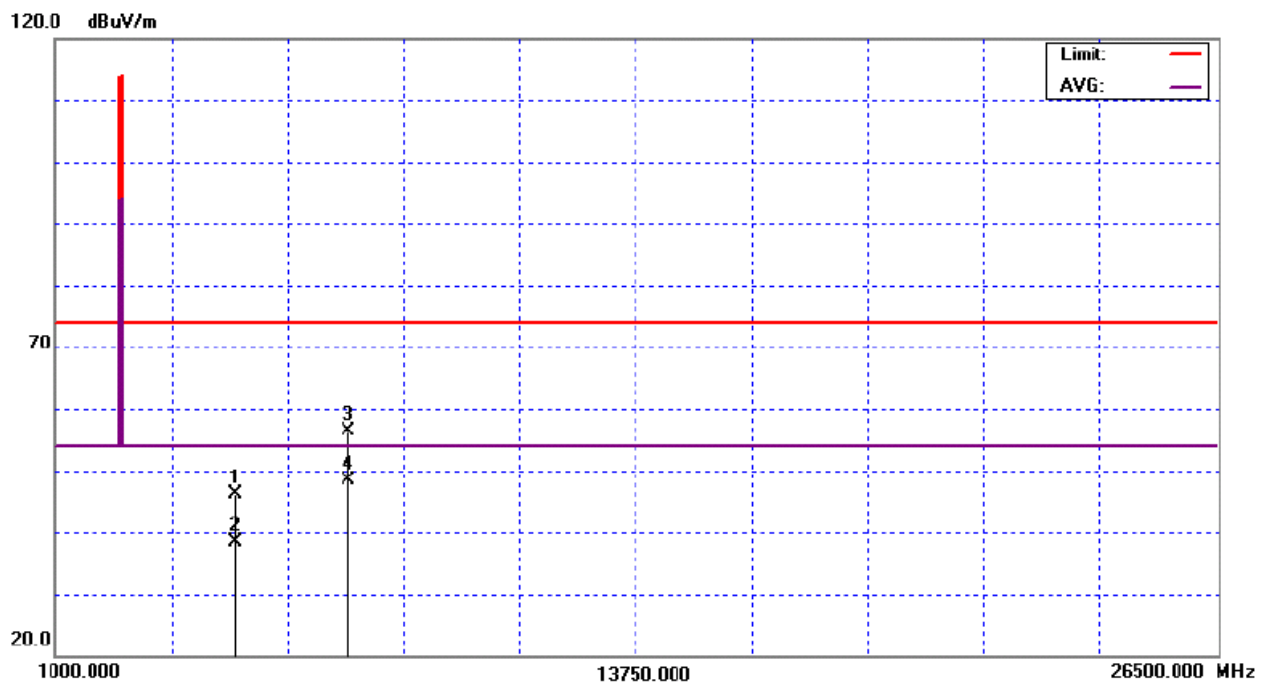
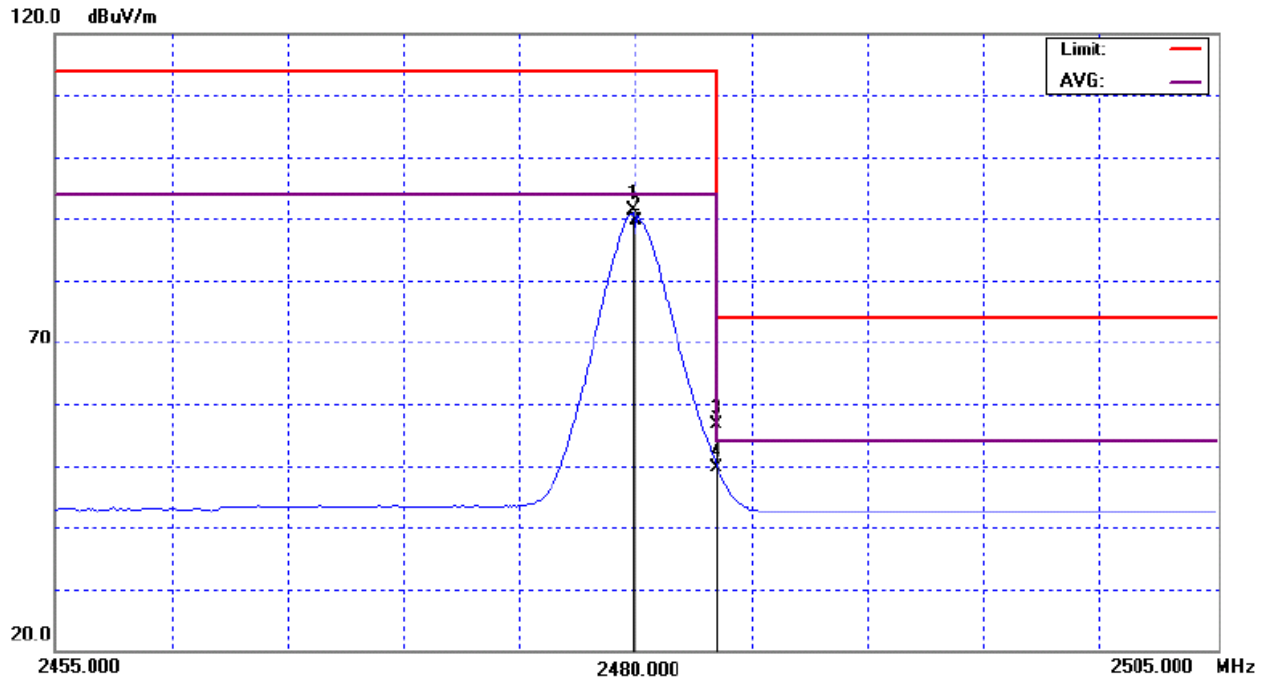
E.U.T :	2.4G RF Dongle	Model Name :	RG-20KM
Temperature :	22 ° C	Relative Humidity :	75%
Pressure :	1016 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	Channel 16: 2480MHz		

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	23.53	16.53	33.10	56.63	49.63	74.00	54.00	X/H
4960.00	V	41.50	33.68	4.72	46.22	38.40	74.00	54.00	X/H
7440.00	V	44.15	36.09	12.21	56.36	48.30	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

Above 1000 MHz, Vertical
Channel 16: 2480MHz
Orthogonal Axes: X



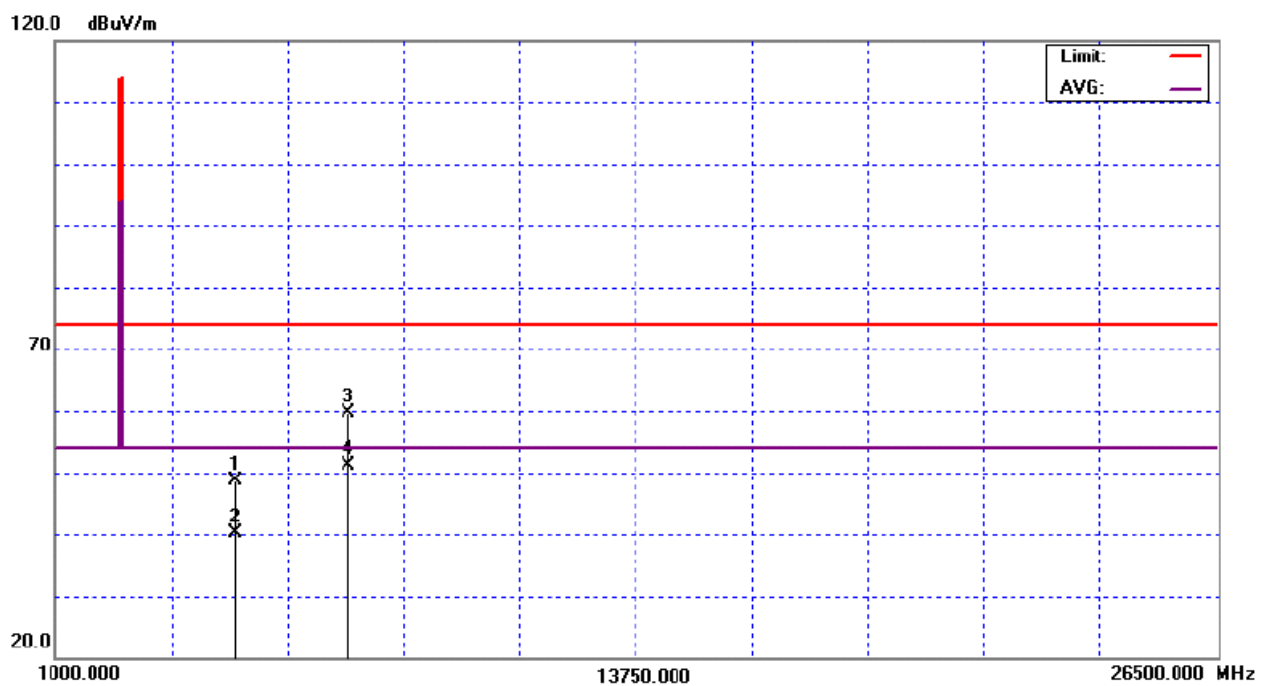
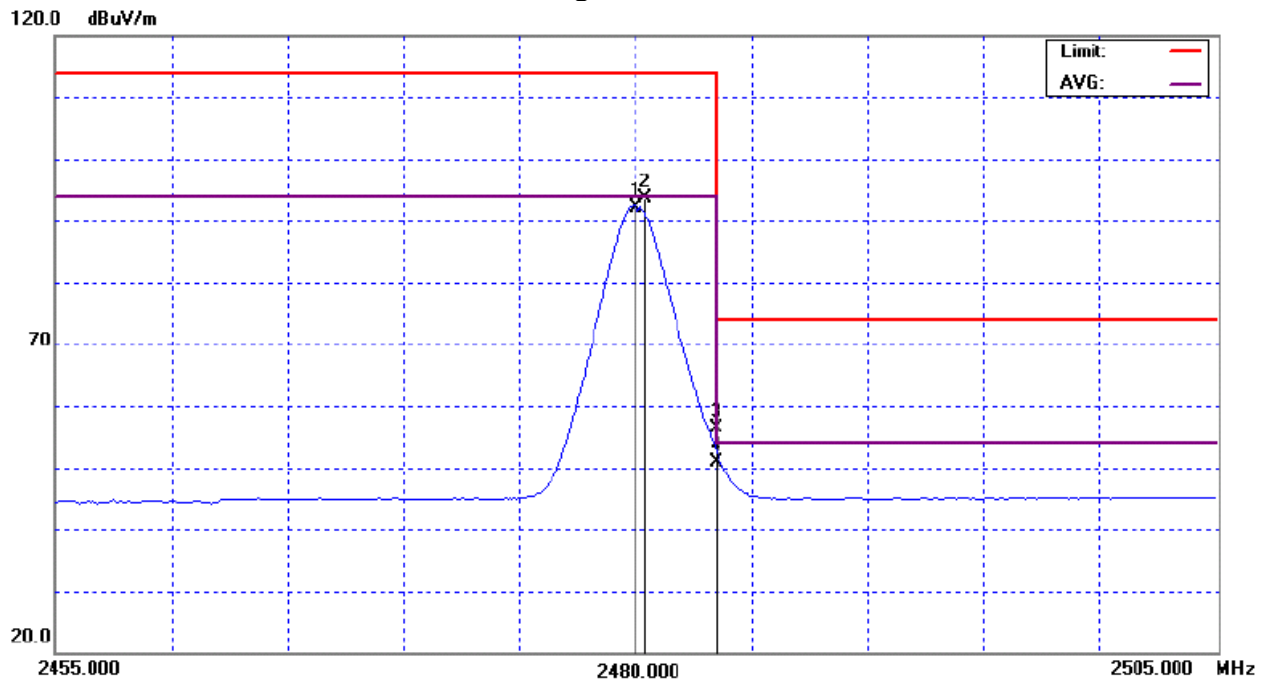
EUT :	2.4G RF Dongle	Model Name :	RG-20KM
Temperature :	22 ° C	Relative Humidity :	75%
Pressure :	1016 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	Channel 16: 2480MHz		

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	23.22	17.90	33.10	56.32	51.00	74.00	54.00	X/H
4960.00	H	44.02	35.42	4.72	48.74	40.14	74.00	54.00	X/H
7440.00	H	47.43	39.01	12.21	59.64	51.22	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

Above 1000 MHz, Horizontal
Channel 16: 2480MHz
Orthogonal Axes: X



4.2.9 TEST RESULTS-BETWEEN 2400MHZ AND 2483.5MHZ

EUT :	2.4G RF Dongle	Model Name :	RG-20KM
Temperature :	22 °C	Relative Humidity :	75%
Pressure :	1016 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	Channel 01: 2402MHz / Channel 09: 2448MHz / Channel 16: 2480MHz		

Freq.	Ant.Pol.	Peak	AV	Ant./CL/	Peak	AV	Peak	AV	NOTE
		Reading			Actual FS		Limit3m		
(MHz)	(H/V)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2402.30	V	56.47	55.57	32.64	89.11	88.21	114.00	94.00	CH01
2402.30	H	59.85	58.12	32.64	92.49	90.76	114.00	94.00	CH01
2448.30	V	55.21	54.94	32.90	88.11	87.84	114.00	94.00	CH09
2448.40	H	57.73	56.50	32.90	90.63	89.40	114.00	94.00	CH09
2480.00	V	58.28	56.65	33.08	91.36	89.73	114.00	94.00	CH16
2480.40	H	60.45	58.98	33.08	93.53	92.06	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

4.2.10 TEST RESULTS-RESTRICTED BANDS REQUIREMENTS

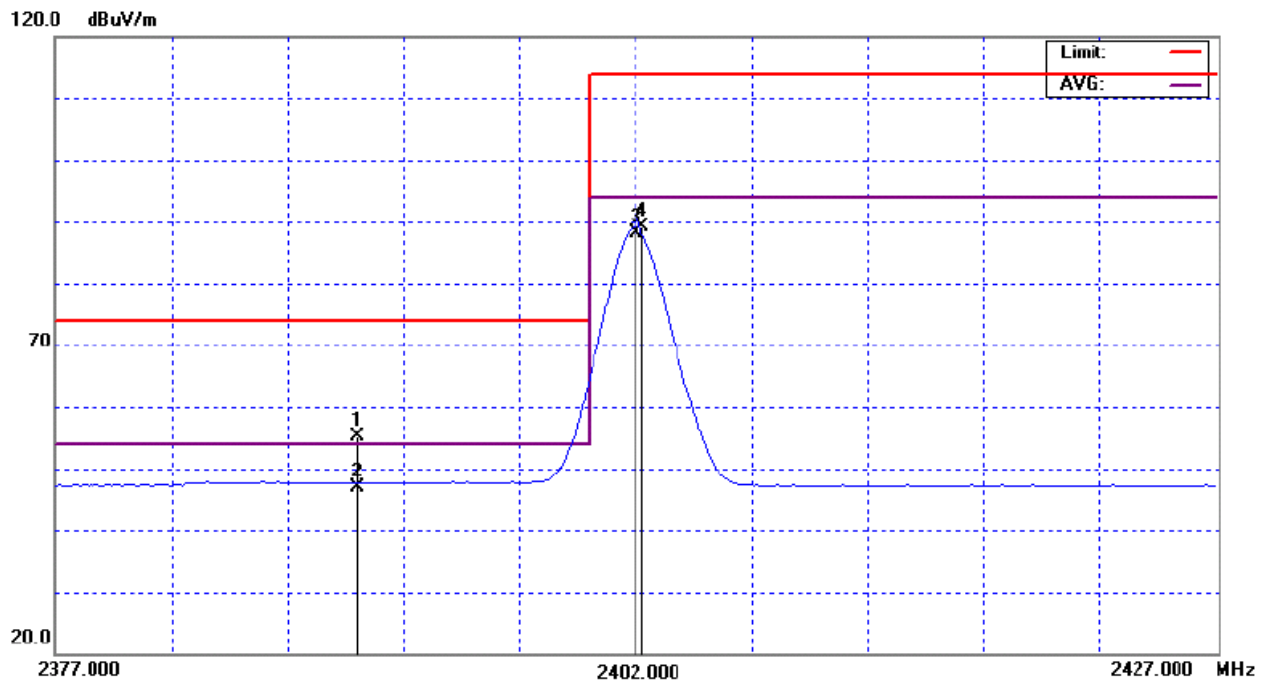
EUT :	2.4G RF Dongle	Model Name :	RG-20KM
Temperature :	22 ° C	Relative Humidity :	75%
Pressure :	1016 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	Channel 01: 2402MHz / Channel 16: 2480MHz (Vertical)		
Note :	<p>The emission of the carrier radiated field strength is measured for (Peak and AV) as following:</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. 		

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
2390.00	V	24.45	14.30	32.57	57.02	46.87	74.00	54.00	CH01
2483.50	V	23.53	16.53	33.10	56.63	49.63	74.00	54.00	CH16

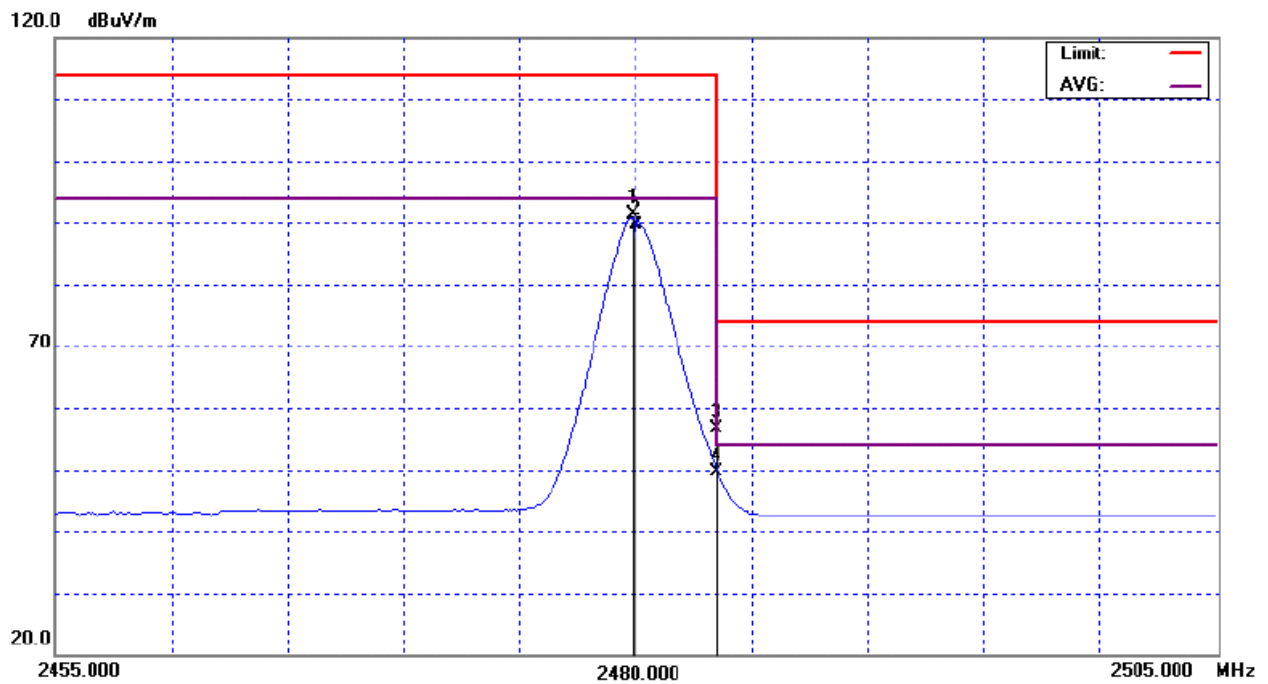
Remark :

- (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

Restricted Bands Requirements, Vertical
Channel 01: 2402MHz



Channel 16: 2480MHz



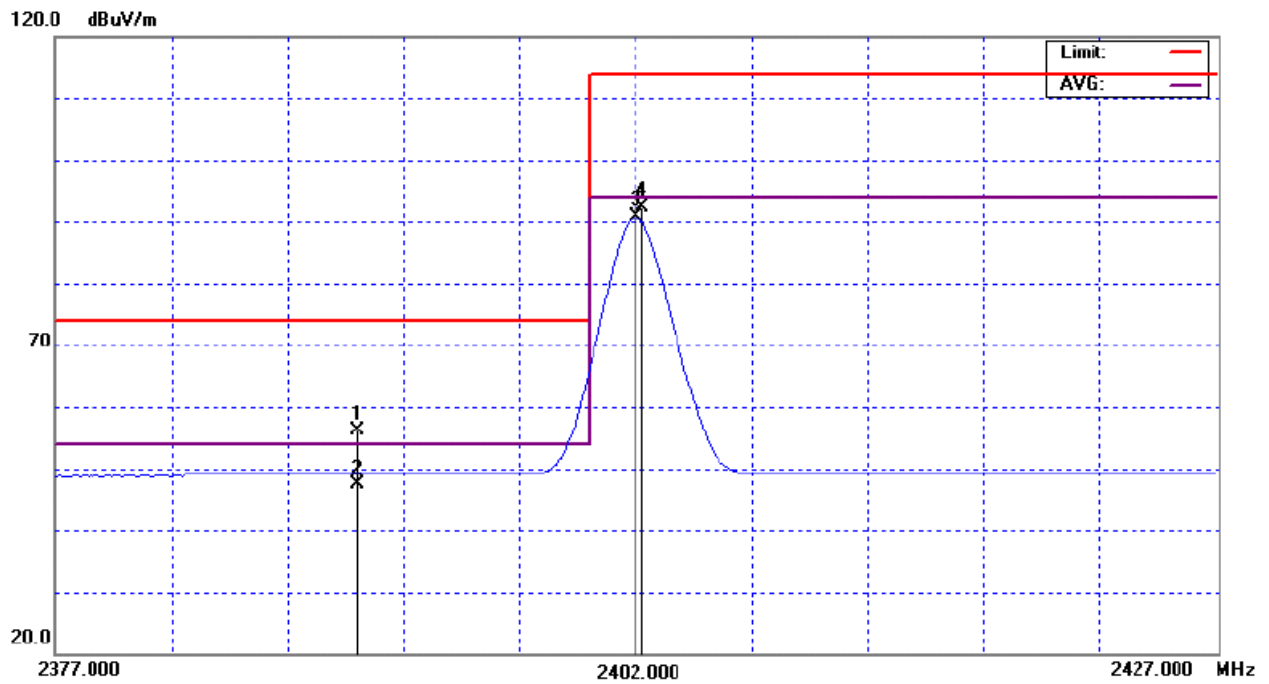
EUT :	2.4G RF Dongle	Model Name :	RG-20KM
Temperature :	22 ° C	Relative Humidity :	75%
Pressure :	1016 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	Channel 01: 2402MHz / Channel 16: 2480MHz (Horizontal)		
Note :	<p>The emission of the carrier radiated field strength is measured for (Peak and AV) as following:</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. 		

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	23.58	14.76	32.57	56.15	47.33	74.00	54.00	CH01
2483.50	H	23.22	17.90	33.10	56.32	51.00	74.00	54.00	CH16

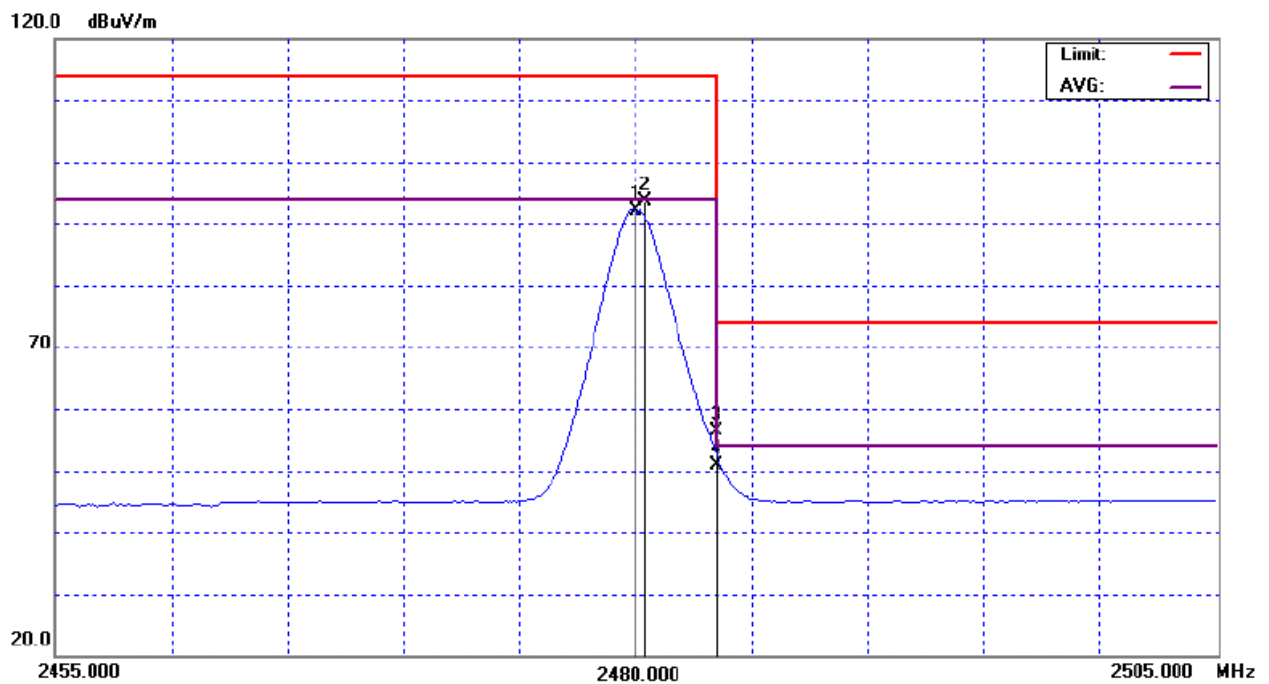
Remark :

- (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

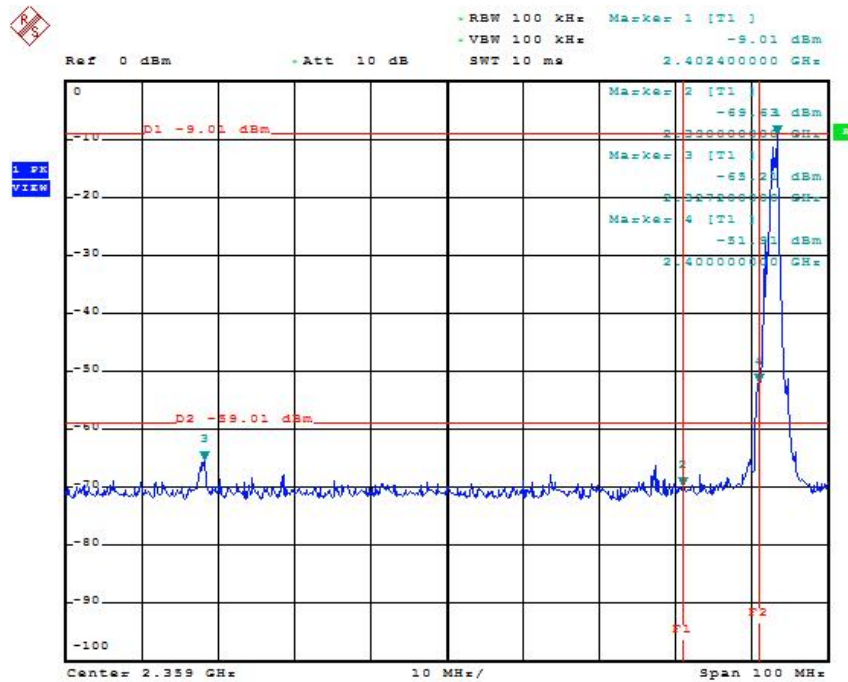
Restricted Bands Requirements, Horizontal
Channel 01: 2402MHz



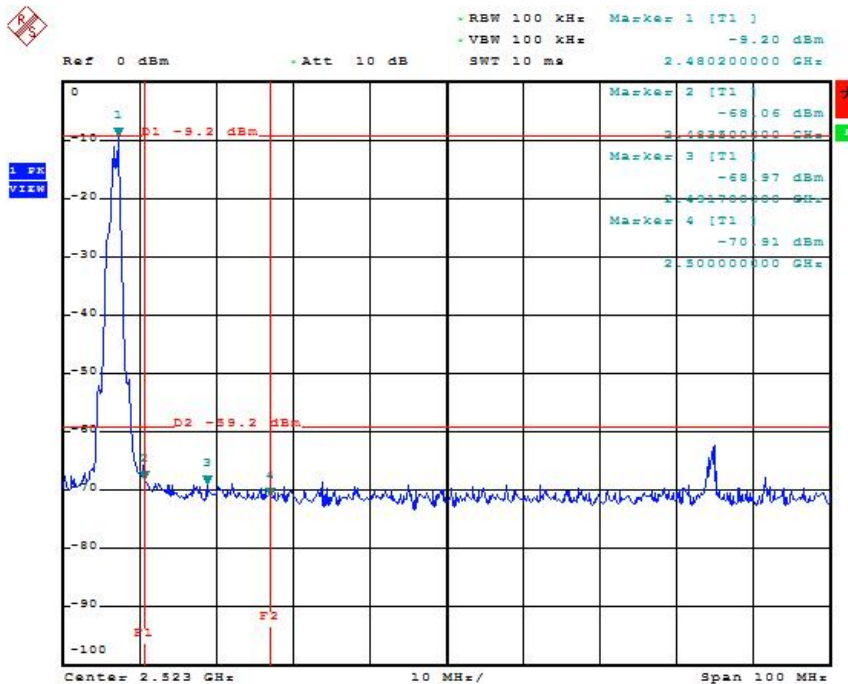
Channel 16: 2480MHz



Channel 01: 2402MHz –Average-Lower



Channel 16: 2480MHz –Average-Upper



5. EUT TEST PHOTO

Conducted Measurement Photos



Radiated Measurement Photos

