

## RADIO TEST REPORT

**Report Reference No.** ..... NTEK-2011NT0614687E

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### Test specification:

Standard ..... FCC Part 15.247

Test procedure ..... ANSI C63.4 : 2003, DA 00-705

Non-standard test method ..... N/A

### Test item description

Product name ..... Wireless Bluetooth Keyboard

Trademark ..... /

Model and/or type reference ..... K1580,K1580B,K1580C,K1580D,K1580E,K1580W,K1580KR, K1580F

Rating(s) ..... DC 3V

### Testing Laboratory information:

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**Possible test case verdicts:**

- test case does not apply to the test object N/A
- .....
- test object does meet the requirement.: P (Pass)
- test object does not meet the requirement .....: F (Fail)

**Testing .....**

Date of receipt of test item .....: 2011-06-12

Date (s) of performance of tests .....: 2011-06-13~2011-06-25

**General remarks:**

**The test results presented in this report relate only to the object tested.**

**The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.**

**This report would be invalid test report without all the signatures of testing technician and approver.**

**This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.**

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## 1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

<b>FCC Part15 (15.247) , Subpart C</b>			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	
15.247 (c)	Antenna conducted Spurious Emission	PASS	
15.247 (a)(1)	Hopping Channel Separation	PASS	
15.247 (b)(1)	Peak Output Power	PASS	
15.247 (c)	Radiated Spurious Emission	PASS	
15.247 (b)(1)	Number of Hopping Frequency	PASS	
15.247 (a)(1)	Dwell Time	PASS	
15.203	Antenna Requirement	PASS	
1.1307 1.1310 2.1091 2.1093	RF Exposure Compliance	PASS	

NOTE:

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

**1.1 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	

## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

Equipment	Wireless Bluetooth Keyboard														
Trade Name	N/A														
Model Name	K1580,K1580B,K1580C,K1580D,K1580E,K1580W, K1580KR,K1580F														
OEM Brand/Model Name	N/A														
Model Difference	All model is totally identical, Just color is different.														
Product Description	<p>The EUT is a Wireless Bluetooth Keyboard</p> <table border="1"><tr><td>Operation Frequency:</td><td>2402~2480 MHz</td></tr><tr><td>Modulation Type:</td><td>FHSS</td></tr><tr><td>Bit Rate of Transmitter</td><td>GFSK(1Mbps)</td></tr><tr><td>Number Of Channel</td><td>79 CH</td></tr><tr><td>Antenna Designation:</td><td>Please see Note 3.</td></tr><tr><td>Antenna Gain(Peak)</td><td>Please see Note 3.</td></tr><tr><td>Output Power:</td><td>-3.81 dBm (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>	Operation Frequency:	2402~2480 MHz	Modulation Type:	FHSS	Bit Rate of Transmitter	GFSK(1Mbps)	Number Of Channel	79 CH	Antenna Designation:	Please see Note 3.	Antenna Gain(Peak)	Please see Note 3.	Output Power:	-3.81 dBm (Max.)
Operation Frequency:	2402~2480 MHz														
Modulation Type:	FHSS														
Bit Rate of Transmitter	GFSK(1Mbps)														
Number Of Channel	79 CH														
Antenna Designation:	Please see Note 3.														
Antenna Gain(Peak)	Please see Note 3.														
Output Power:	-3.81 dBm (Max.)														
Channel List	Please refer to the Note 2.														
Power Source	DC Voltage supplied from 2* Battery														
Power Rating	DC 3.0V														
Connecting I/O Port(s)	Please refer to the User's Manual														
Products Covered	N/A														

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)
00	2402	27	2429	54	2456
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458
03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462
07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		

3.

Table for Filed Antenna

Ant .	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	N/A	N/A	Printed Antenna	NA	1.82	BT Antenna

## 2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base 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	CH00
Mode 2	CH39
Mode 3	CH78

For Conducted Emission	
Final Test Mode	Charging
-	“N/A” denotes test is not applicable in this Test Report

For Radiated Emission	
Final Test Mode	Description
Mode 1	CH00
Mode 2	CH39
Mode 3	CH78

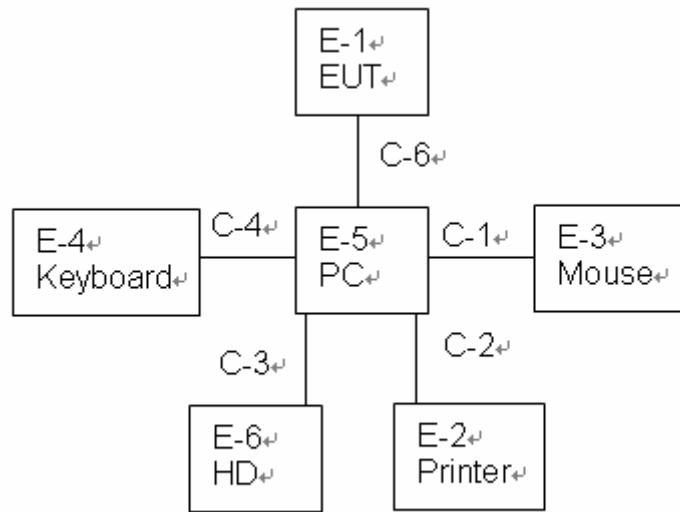
Note:

- (1) The measurements are performed at the highest, middle, lowest available channels.
- (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 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.)
- (4) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode
- (5) Data of measurement within this frequency range in the table means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (6) EUT Orthogonal Axis :  
“X” - denotes Laid on Table ; “Y” - denotes Vertical Stand ; “Z” - denotes Side Stand. The worst case emissions were reported
- (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
- (8) For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission. The power is performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. The worst case emissions were reported.
- (9) The EUT use new battery.

### 2.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of FHSS

Test software Version	Test program: Broadcom		
Frequency	2402 MHz	2441 MHz	2480 MHz
Parameters(1Mbps)	DEF	DEF	DEF

**2.4 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED**

## 2.5 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

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	Wireless Bluetooth Keyboard	N/A	K1580	N/A	N/A	EUT
E-2	Printer	Canon	L11121E	DOC	LBP2900	
E-3	Mouse	HP	MS-SBF96	DOC	417441-002REV.OC	
E-4	Keyboard	DELL	SK-8185	DOC	OY526KUS	
E-5	PC	DELL	FT4Y23X	DOC	34413561645	
E-6	HD	Buffalo Inc	HD-PET320U2	DOC	55571500924085	

Item	Shielded Type	Ferrite Core	Length	Note
N/A	N/A	N/A	N/A	
C-1	NO	NO	1.5M	
C-2	NO	NO	1.2M	
C-3	NO	NO	1.1M	
C-4	NO	NO	1.5M	
C-5	YES	YES	1.2M	
C-6	YES	NO	1.2M	

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.

**2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS**

No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Due Date
1	Spectrum Analyzer	ADVANTEST	R3182	150900201	2012.04.16
2	EMI Measuring Receiver	Schaffner	SCR3501	235	2012.04.06
3	Low Noise Pre Amplifier	Tsj	MLA-10K01-B01-27	1205323	2011.09.06
4	Low Noise Pre Amplifier	Tsj	MLA-0120-A02-34	2648A04738	2012.04.07
5	TRILOG Super Broadband test Antenna	SCHWARZBECK	VULB9160	9160-3206	2011.07.01
6	Broadband Horn Antenna	SCHWARZBECK	BBHA9120D	451	2011.07.14
7	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2011.07.14
8	50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2011.09.06
9	EMI Test Receiver	R&S	ESCI	100124	2011.12.27
10	LISN	Kyoritsu	KNW-242	8-837-4	2012.04.06
11	LISN	Kyoritsu	KNW-407	8-1789-3	2012.04.06
12	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2011.09.06
13	Loop Antenna	ARA	PLA-1030/B	1029	2011.07.14

### 3. EMC EMISSION TEST

#### 3.1 CONDUCTED EMISSION MEASUREMENT

##### 3.1.1 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.

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

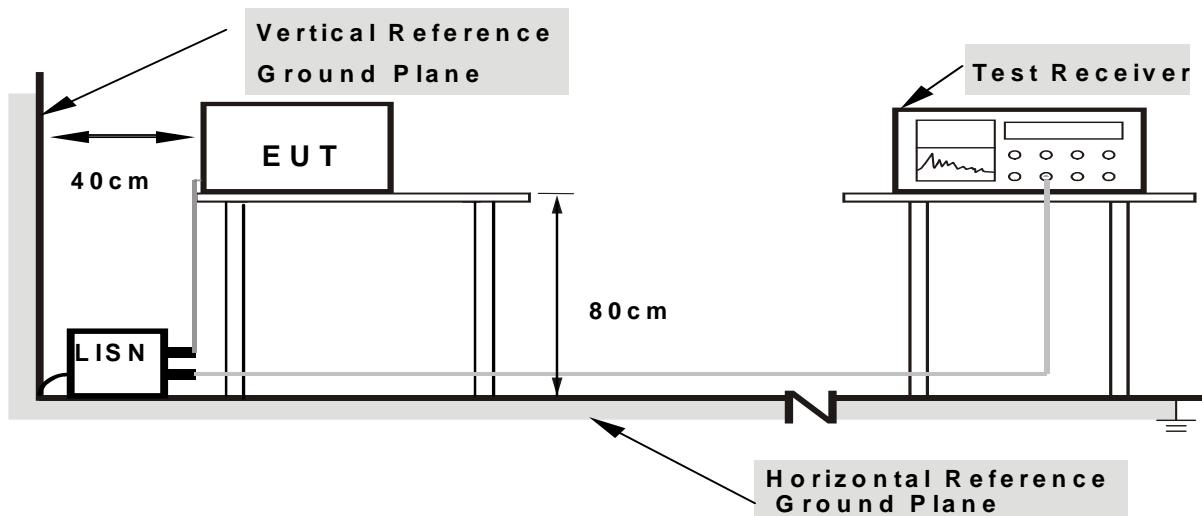
### 3.1.2 TEST PROCEDURE

- 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.

### 3.1.3 DEVIATION FROM TEST STANDARD

No deviation

### 3.1.4 TEST SETUP



Note: 1. Support units were connected to second LISN.

2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

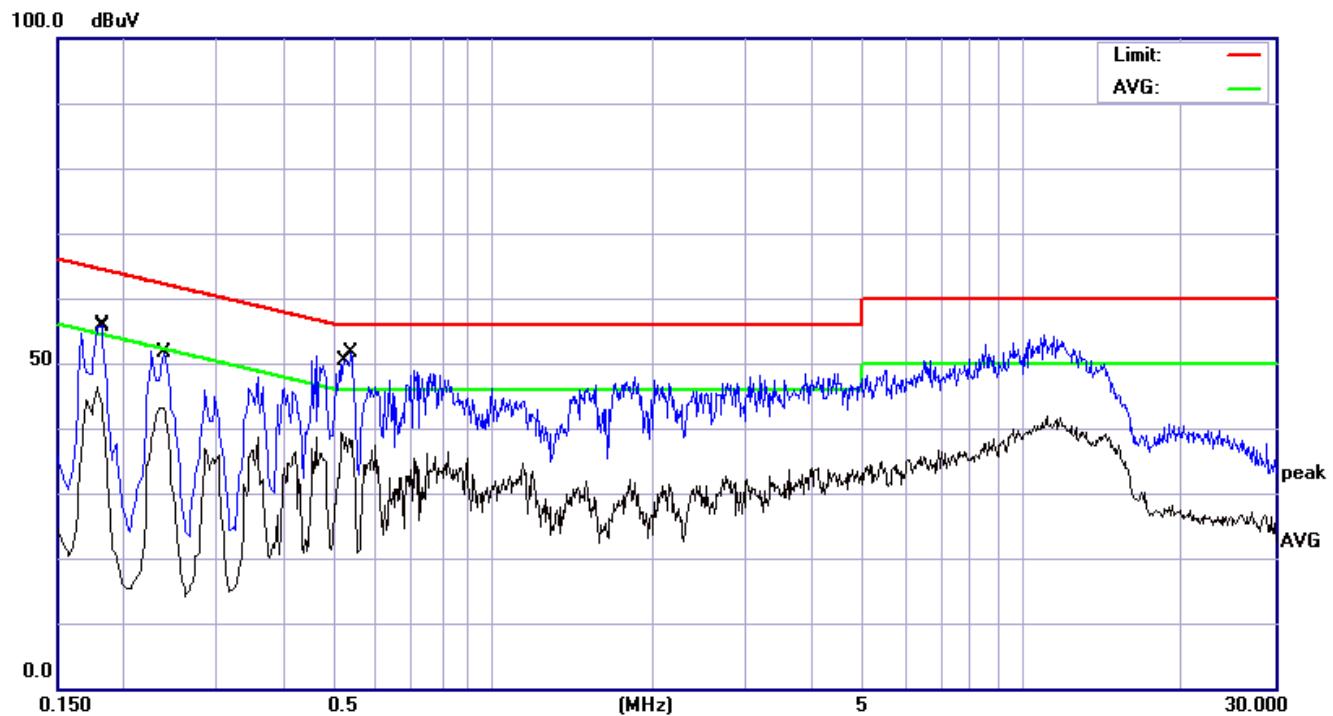
### 3.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

### 3.1.6 TEST RESULTS

EUT :	Wireless Bluetooth Keyboard	Model Name :	K1580
Temperature :	26 °C	Relative Humidity :	45%
Pressure :	1010hPa	Test Power :	DC 5V From PC AC 230V/50Hz
Test Mode :	Charging	Phase :	L

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
1		0.1780	35.92	10.37	46.29	54.57	-8.28	AVG	
2		0.1819	45.47	10.38	55.85	64.39	-8.54	QP	
3		0.2380	41.11	10.43	51.54	62.16	-10.62	QP	
4		0.2380	32.67	10.43	43.10	52.16	-9.06	AVG	
5		0.5180	28.88	10.41	39.29	46.00	-6.71	AVG	
6	*	0.5380	41.14	10.41	51.55	56.00	-4.45	QP	



EUT :	Wireless Bluetooth Keyboard	Model Name :	K1580
Temperature :	26 °C	Relative Humidity :	45%
Pressure :	1010hPa	Test Power :	DC 5V From PC AC 230V/50Hz
Test Mode :	Charging	Phase :	N

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
1		0.1740	46.60	10.45	57.05	64.76	-7.71	QP	
2		0.1740	37.73	10.45	48.18	54.76	-6.58	AVG	
3		0.2340	43.49	10.44	53.93	62.30	-8.37	QP	
4		0.2340	33.47	10.44	43.91	52.30	-8.39	AVG	
5	*	0.5260	42.43	10.40	52.83	56.00	-3.17	QP	
6		0.5299	30.25	10.40	40.65	46.00	-5.35	AVG	



### 3.2 RADIATED EMISSION MEASUREMENT

#### 3.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

20dBc 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

#### LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

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 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

#### FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5 <sup>th</sup> harmonic of the highest frequency or 40 GHz, whichever is lower

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~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

### 3.2.2 TEST PROCEDURE

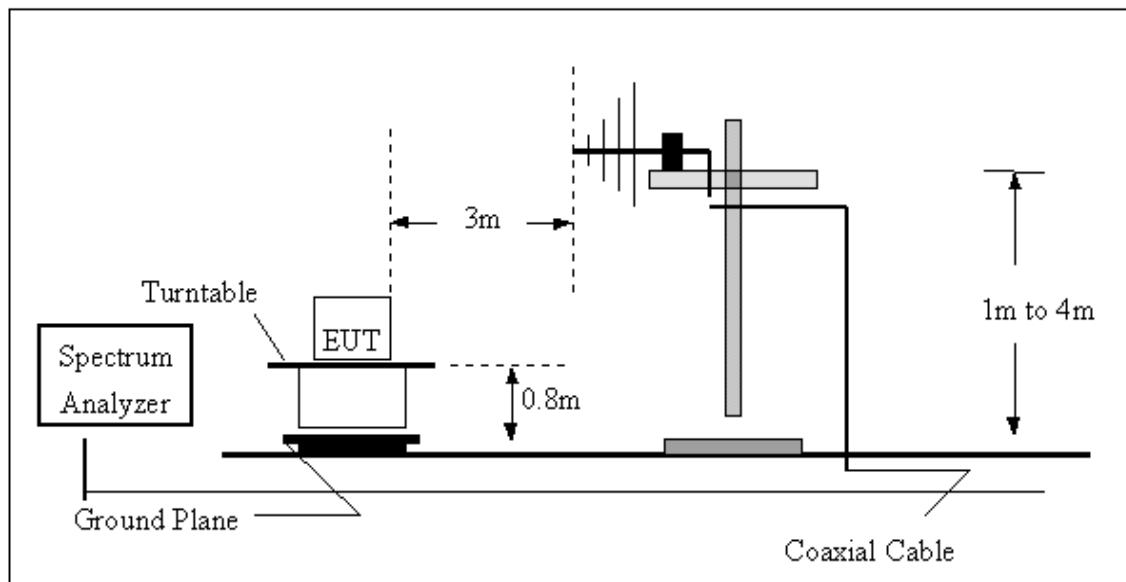
- The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter open area test site. The table was rotated 360 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. performed pretest to three orthogonal axis. The worst case emissions were reported.
- 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.

### 3.2.3 DEVIATION FROM TEST STANDARD

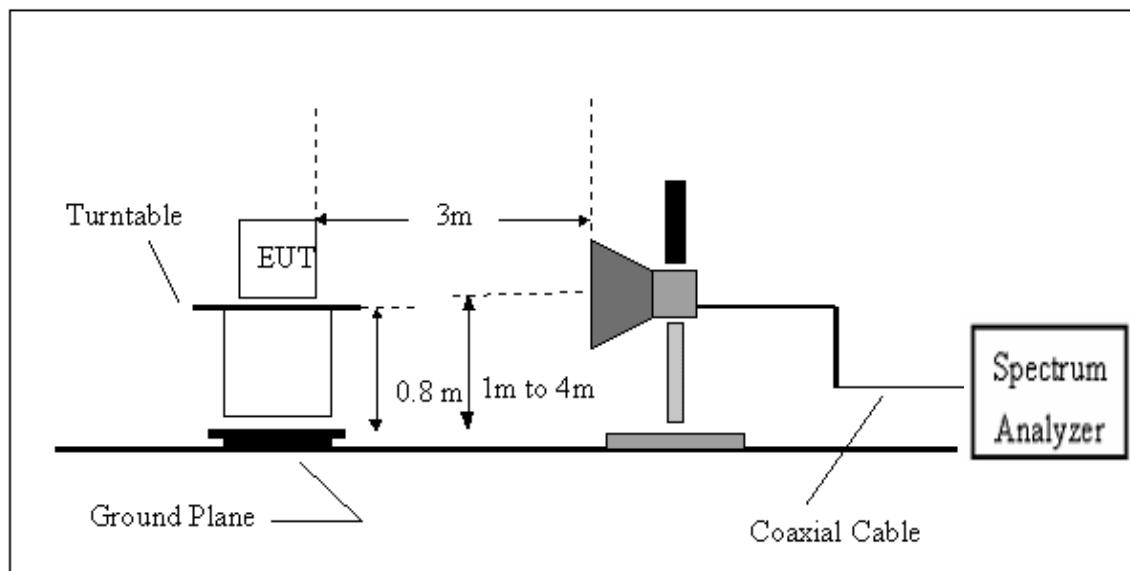
No deviation

### 3.2.4 TEST SETUP

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



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



### 3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

### 3.2.6 TEST RESULTS (BETWEEN 9KHZ – 1000 MHZ)

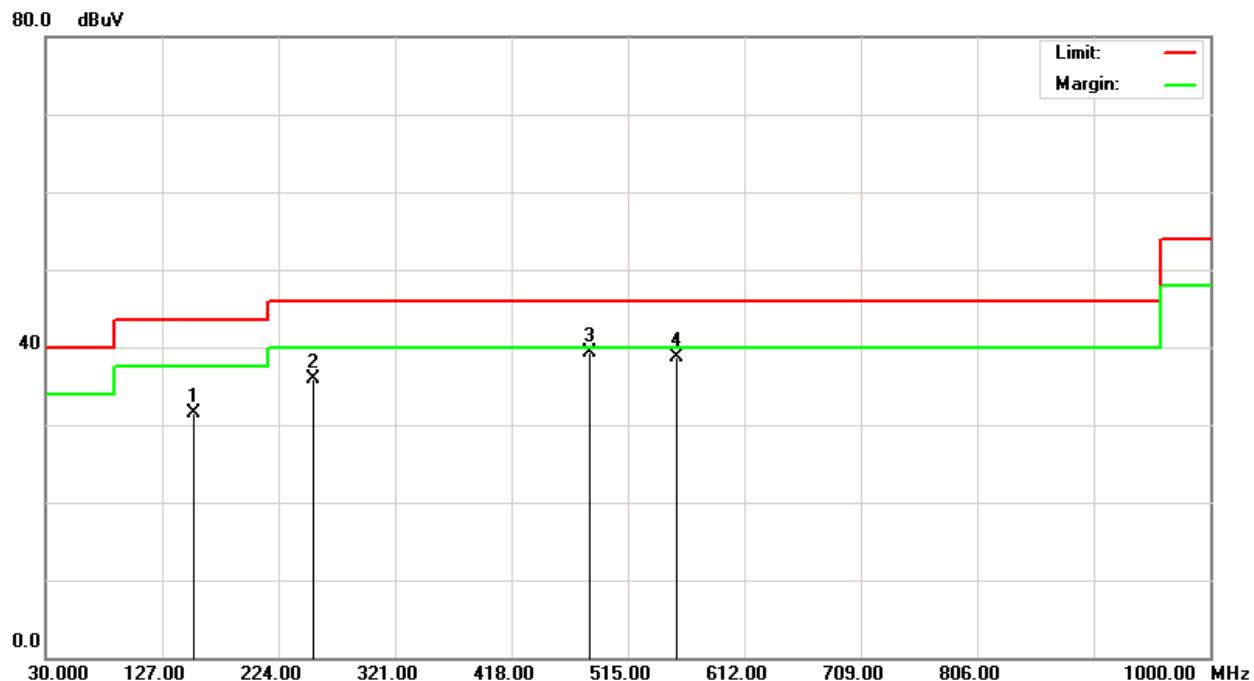
Transmit 2441MHz is the worst case.so it is recorded in the report.

EUT :	Wireless Bluetooth Keyboard	Model Name :	K1580
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.0V
Test Mode :	TX 2441MHz-1Mbps	Polarization :	Horizontal

No. Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Antenna	Table
		Level	Factor	ment				
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	cm
								degree
1	153.7384	20.00	11.43	31.43	43.50	-12.07	QP	
2	253.6505	22.38	13.55	35.93	46.00	-10.07	QP	
3 *	483.5429	20.47	18.84	39.31	46.00	-6.69	QP	
4	556.2354	16.54	22.12	38.66	46.00	-7.34	QP	

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 show in table .
- (5) Corr.Factor = Antenna Factor + Cable Loss – Pre-amplifier.

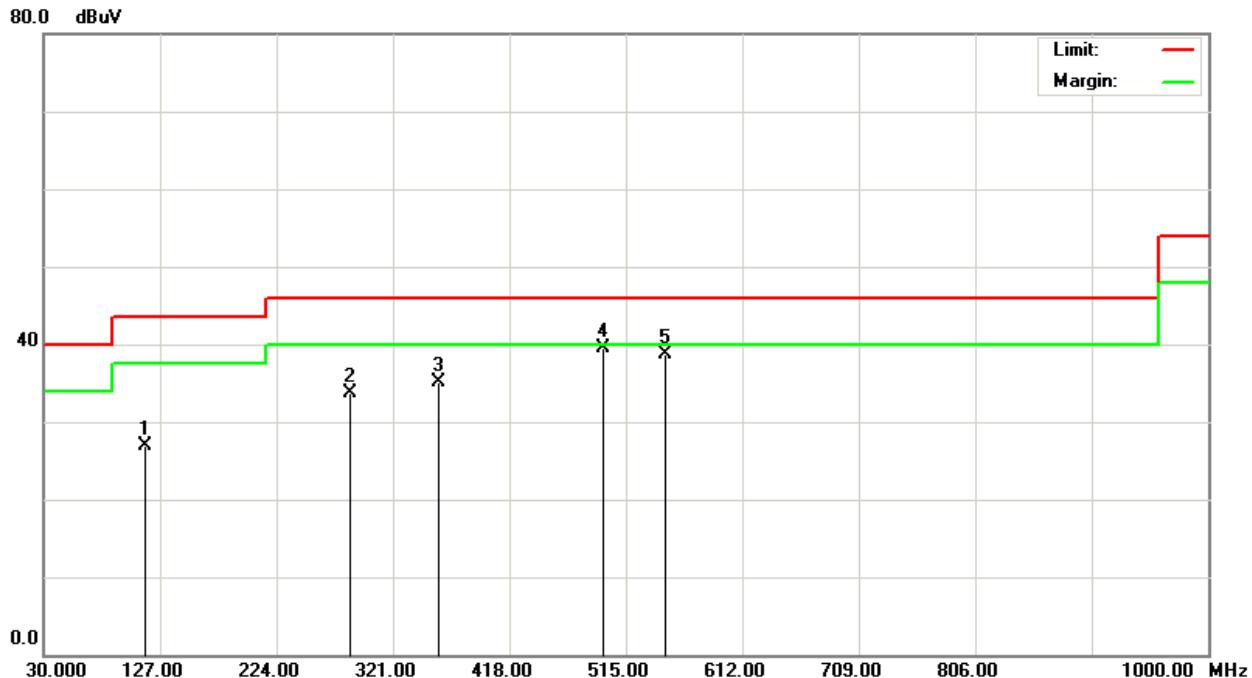


EUT :	Wireless Bluetooth Keyboard	Model Name :	K1580
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.0V
Test Mode :	TX 2441MHz-1Mbps	Polarization :	Vertical

No. Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Antenna	Table		
		Level	Factor	ment						
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	cm	degree	Comment
1	115.2546	15.26	11.69	26.95	43.50	-16.55	QP			
2	285.5632	20.12	13.64	33.76	46.00	-12.24	QP			
3	359.2546	19.65	15.54	35.19	46.00	-10.81	QP			
4 *	496.3254	20.23	19.32	39.55	46.00	-6.45	QP			
5	548.2153	15.26	23.48	38.74	46.00	-7.26	QP			

## 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 show in table .
- (5) Corr.Factor = Antenna Factor + Cable Loss



**3.2.7 TEST RESULTS (ABOVE 1000 MHZ)**

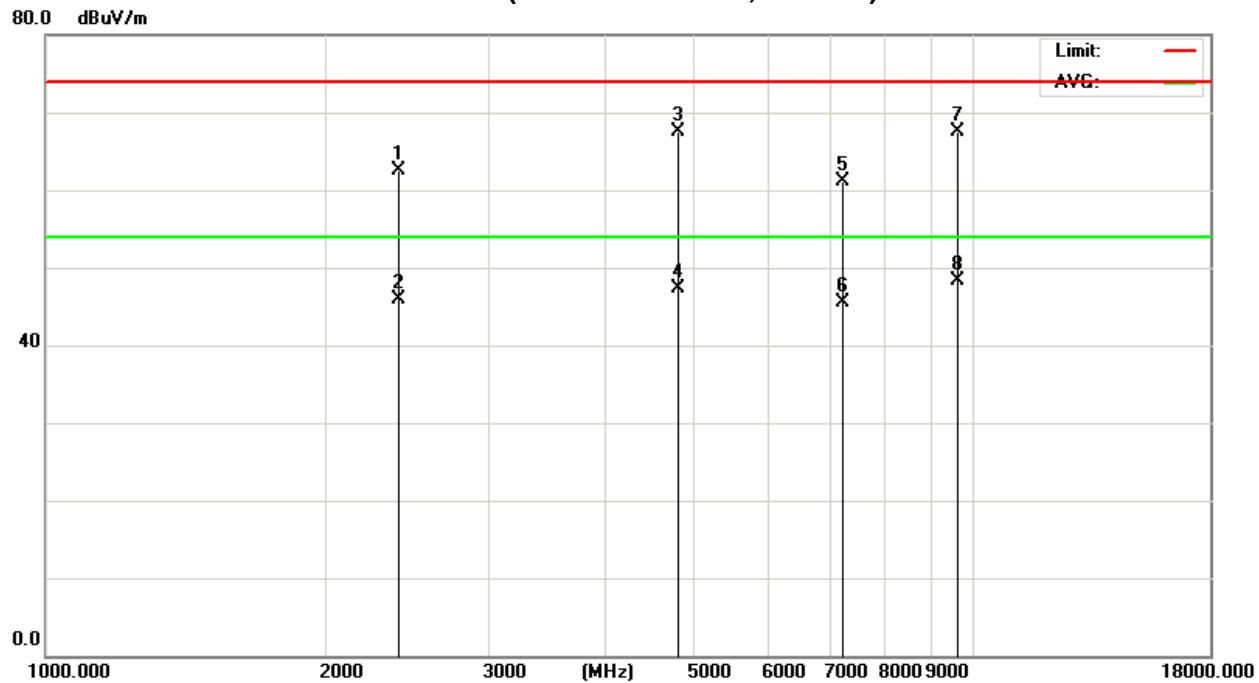
EUT :	Wireless Bluetooth Keyboard	Model Name :	K1580
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.0V
Test Mode :	TX 2402MHz – CH 00(1Mbps)	Polarization :	Vertical

No.	Mk.	Freq.	Level	Factor	ment	Limit	Over		Height	Degree	Comment
							MHz	dBuV	dB	dBuV/m	dBuV/m
1		2400.000	55.98	6.53	62.51	74.00	-11.49	peak			
2		2400.000	39.35	6.53	45.88	54.00	-8.12	AVG			
3		4804.000	58.75	8.70	67.45	74.00	-6.55	peak			
4		4804.000	38.55	8.70	47.25	54.00	-6.75	AVG			
5		7206.000	49.29	11.83	61.12	74.00	-12.88	peak			
6		7206.000	33.75	11.83	45.58	54.00	-8.42	AVG			
7		9608.000	51.66	15.92	67.58	74.00	-6.42	peak			
8	*	9608.000	32.45	15.92	48.37	54.00	-5.63	AVG			

## Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No emission detected above 18GHz

**TX CH00(Above 1000 MHz, Vertical)**

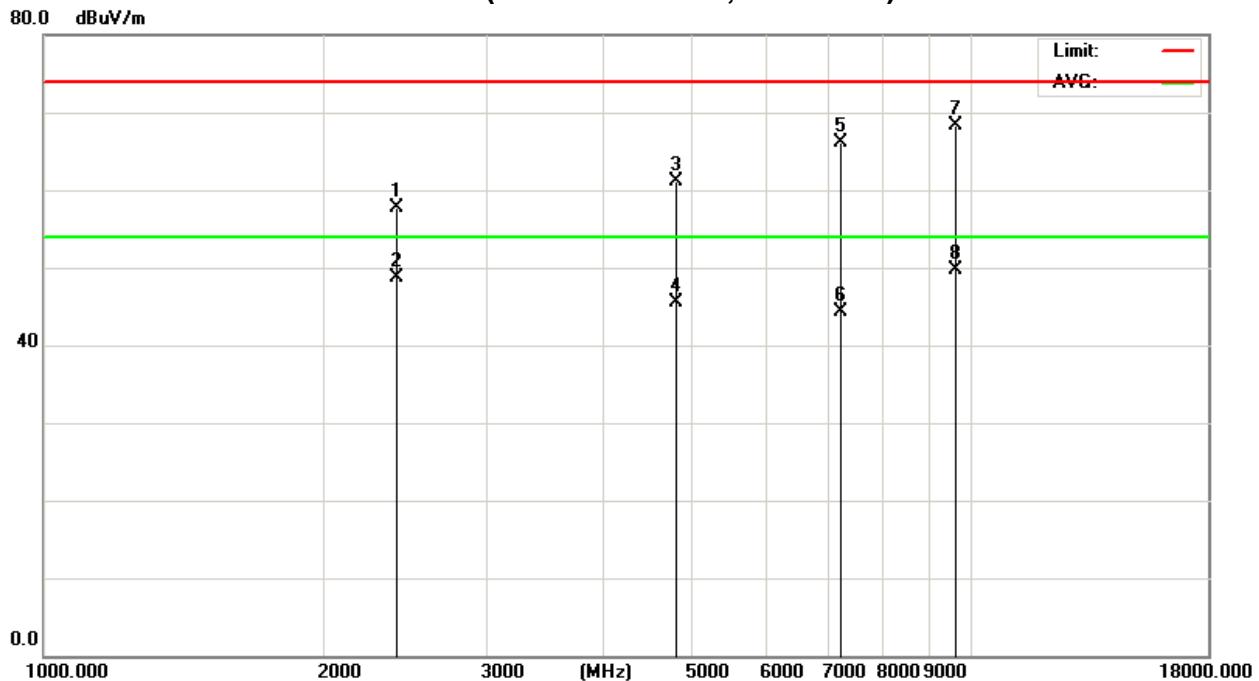
EUT :	Wireless Bluetooth Keyboard	Model Name :	K1580
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010hPa	Test Voltage :	DC 3.0V
Test Mode :	TX 2402MHz – CH 00(1Mbps)	Polarization :	Horizontal

No.	Mk.	Freq.	Level	Factor	ment	Limit	Over	Height	Degree									
									MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2400.000	51.25	6.53	57.78	74.00	-16.22	peak										
2		2400.000	42.25	6.53	48.78	54.00	-5.22	AVG										
3		4804.000	52.35	8.70	61.05	74.00	-12.95	peak										
4		4804.000	36.74	8.70	45.44	54.00	-8.56	AVG										
5		7206.000	54.24	11.83	66.07	74.00	-7.93	peak										
6		7206.000	32.48	11.83	44.31	54.00	-9.69	AVG										
7		9608.000	52.47	15.92	68.39	74.00	-5.61	peak										
8	*	9608.000	33.85	15.92	49.77	54.00	-4.23	AVG										

**Remark:**

2. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No emission detected above 18GHz

**TX CH00(Above 1000 MHz, Horizontal)**

EUT :	Wireless Bluetooth Keyboard	Model Name :	K1580
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.0V
Test Mode :	TX 2441MHz –CH39(1Mbps)	Polarization :	Vertical

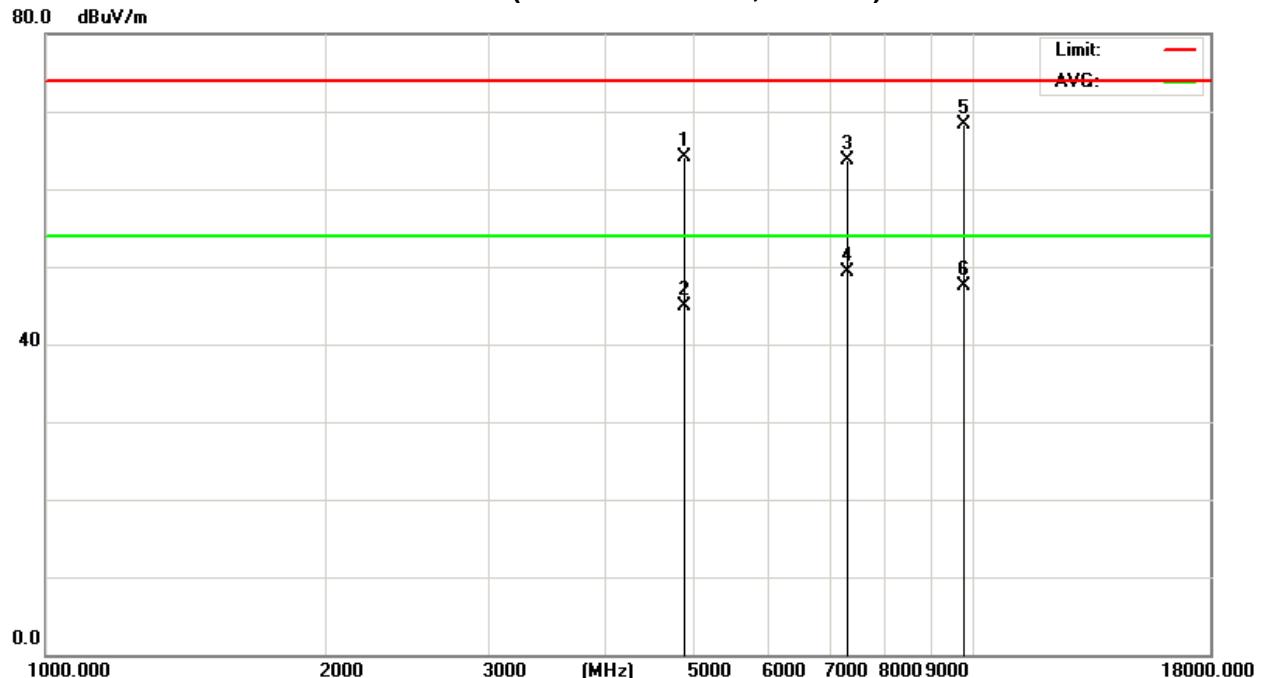
No.	Mk.	Freq.	Level	Factor	ment	Limit	Over	Height	Degree	Comment
								MHz	dBuV	
								dB	dB	
1		4882.000	55.45	8.72	64.17	74.00	-9.83	peak		
2		4882.000	36.12	8.72	44.84	54.00	-9.16	AVG		
3		7323.000	51.74	11.98	63.72	74.00	-10.28	peak		
4	*	7323.000	37.26	11.98	49.24	54.00	-4.76	AVG		
5		9764.000	52.11	16.18	68.29	74.00	-5.71	peak		
6		9764.000	31.25	16.18	47.43	54.00	-6.57	AVG		

## Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No emission detected above 18GHz

## TX CH39 (Above 1000 MHz, Vertical)



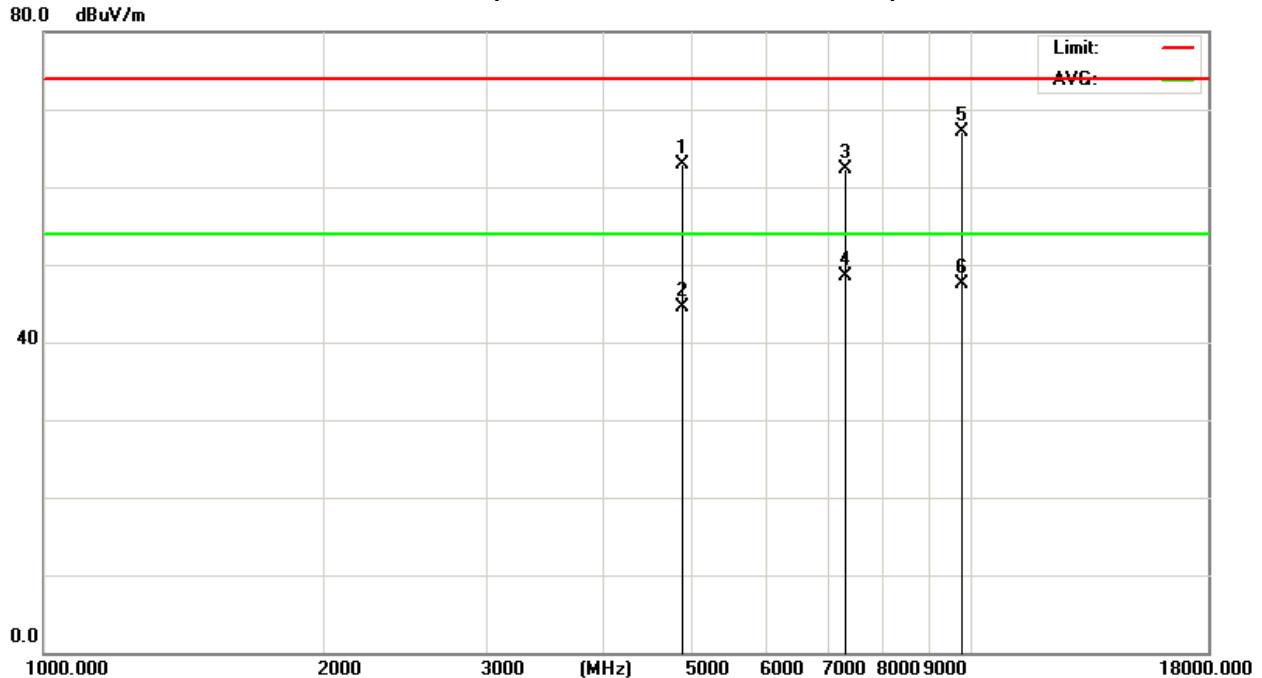
EUT :	Wireless Bluetooth Keyboard	Model Name :	K1580
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.0V
Test Mode :	TX 2441MHz –CH39(1Mbps)	Polarization :	Horizontal

No.	Mk.	Freq.	Level	Factor	ment	Limit	Over	Height	Degree	Comment
								MHz	dBuV	
								dB	dB	
1		4882.000	54.09	8.72	62.81	74.00	-11.19	peak		
2		4882.000	35.86	8.72	44.58	54.00	-9.42	AVG		
3		7323.000	50.25	11.98	62.23	74.00	-11.77	peak		
4	*	7323.000	36.43	11.98	48.41	54.00	-5.59	AVG		
5		9764.000	51.02	16.18	67.20	74.00	-6.80	peak		
6		9764.000	31.25	16.18	47.43	54.00	-6.57	AVG		

**Remark:**

3. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No emission detected above 18GHz

**TX CH39 (Above 1000 MHz, Horizontal)**

EUT :	Wireless Bluetooth Keyboard	Model Name :	K1580
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010hPa	Test Voltage :	DC 3.0V
Test Mode :	TX 2480MHz –CH78(1Mbps)	Polarization :	Vertical

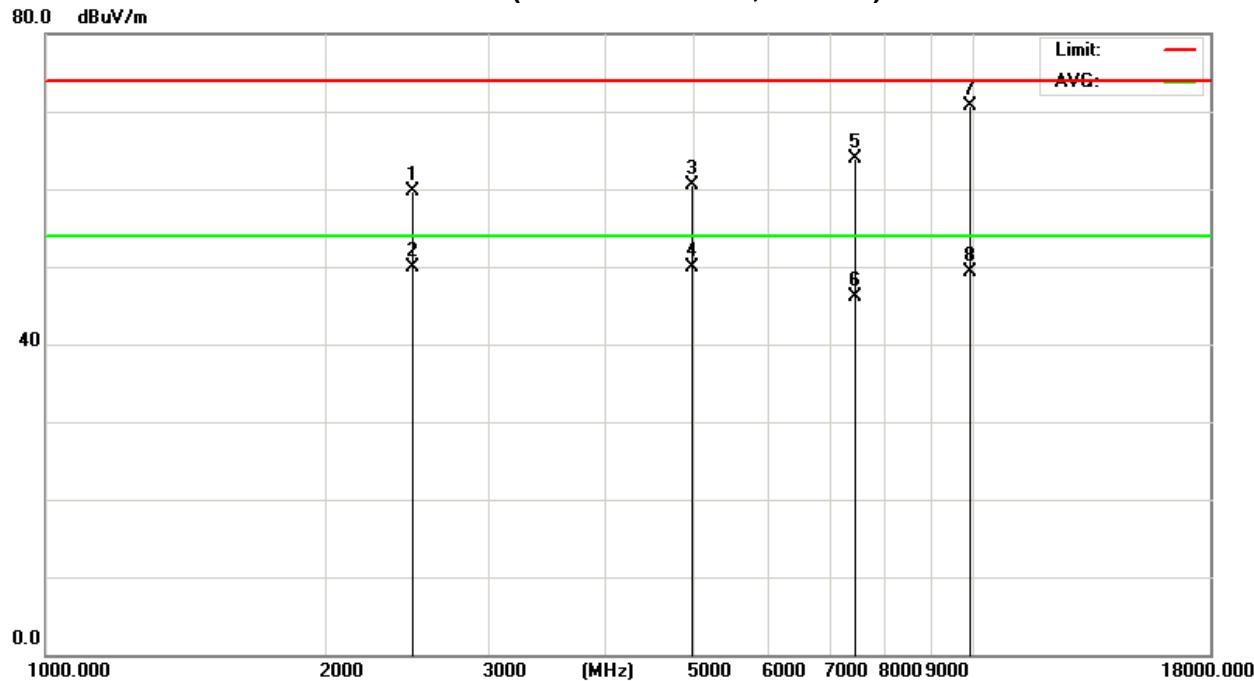
No.	Mk.	Freq.	Level	Factor	ment	Limit	Over		Height	Degree	Comment					
							MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2483.500	53.26	6.50	59.76	74.00	-14.24	peak								
2		2483.500	43.46	6.50	49.96	54.00	-4.04	AVG								
3		4960.000	51.86	8.73	60.59	74.00	-13.41	peak								
4		4960.000	41.23	8.73	49.96	54.00	-4.04	AVG								
5		7440.000	51.77	12.14	63.91	74.00	-10.09	peak								
6		7440.000	34.02	12.14	46.16	54.00	-7.84	AVG								
7	*	9920.000	54.16	16.45	70.61	74.00	-3.39	peak								
8		9920.000	32.88	16.45	49.33	54.00	-4.67	AVG								

## Remark:

4. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No emission detected above 18GHz

## TX CH78 (Above 1000 MHz, Vertical)



EUT :	Wireless Bluetooth Keyboard	Model Name :	K1580
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.0V
Test Mode :	TX 2480MHz –CH78(1Mbps)	Polarization :	Horizontal

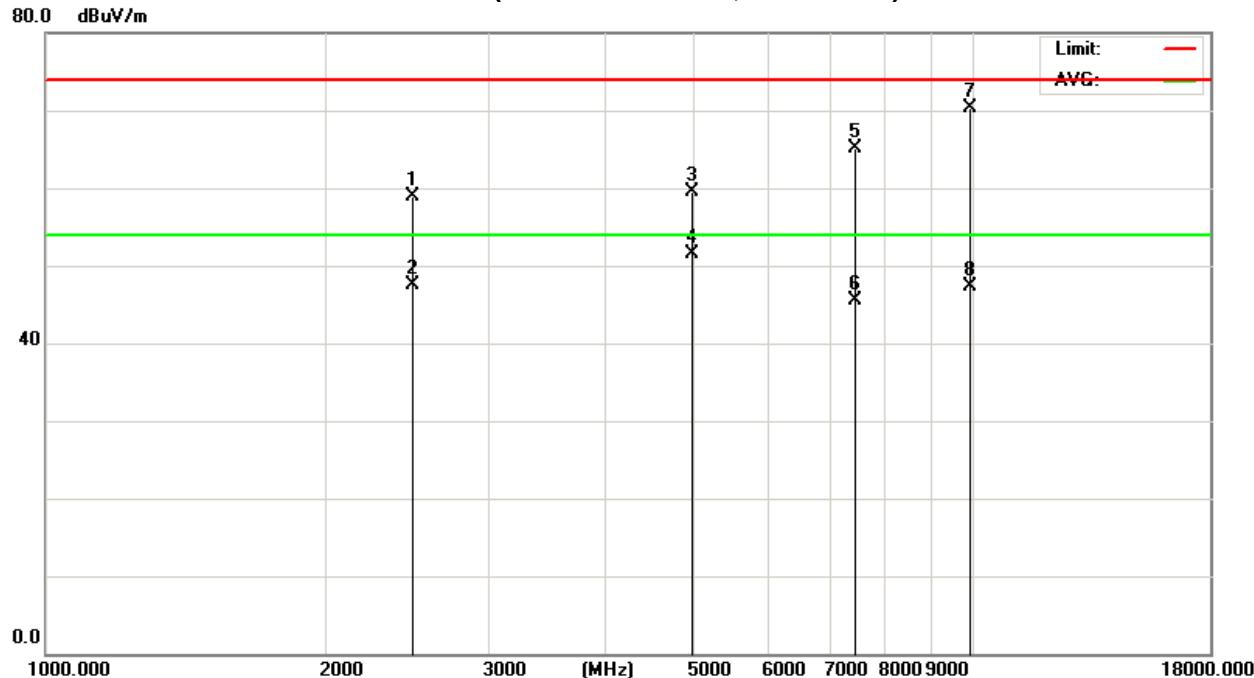
No.	Mk.	Freq.	Level	Factor	ment	Limit	Over	Height	Degree	Comment
									cm	
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment	
1	2483.500	52.32	6.50	58.82	74.00	-15.18	peak			
2	2483.500	41.08	6.50	47.58	54.00	-6.42	AVG			
3	4960.000	50.86	8.73	59.59	74.00	-14.41	peak			
4	* 4960.000	42.75	8.73	51.48	54.00	-2.52	AVG			
5	7440.000	52.89	12.14	65.03	74.00	-8.97	peak			
6	7440.000	33.45	12.14	45.59	54.00	-8.41	AVG			
7	9920.000	53.85	16.45	70.30	74.00	-3.70	peak			
8	9920.000	30.76	16.45	47.21	54.00	-6.79	AVG			

## Remark:

5. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No emission detected above 18GHz

## TX CH78 (Above 1000 MHz, Horizontal)



## 4. NUMBER OF HOPPING CHANNEL

### 4.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C			
Section	Test Item	Frequency Range (MHz)	Result
15.247 (a)(1)(iii)	Number of Hopping Channel	2400-2483.5	PASS

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> Operating Frequency Range
RB	100 kHz
VB	100 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

#### 4.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW= 100KHz, VBW=100KHz, Sweep time = Auto.

#### 4.1.2 DEVIATION FROM STANDARD

No deviation.

#### 4.1.3 TEST SETUP



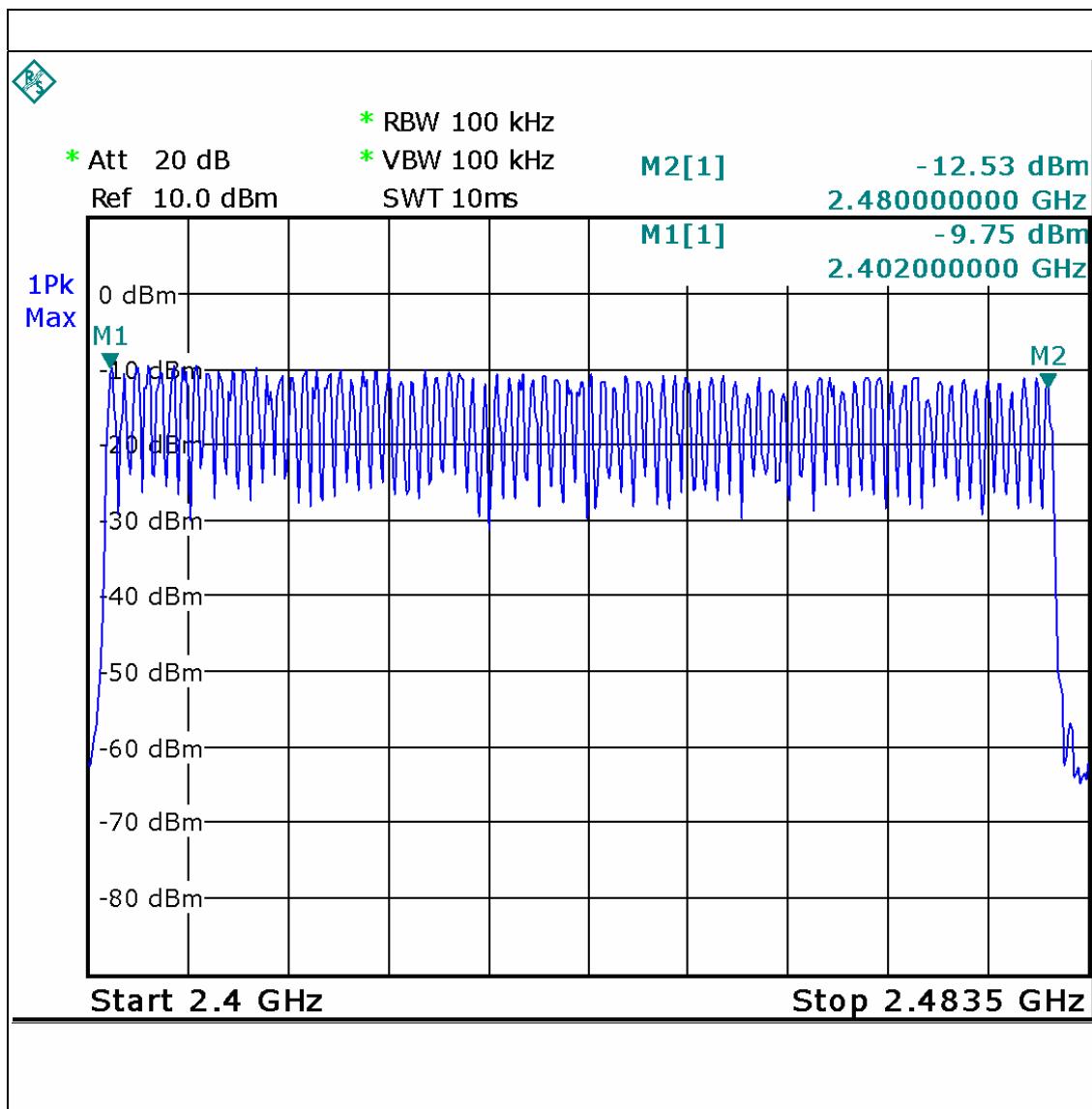
#### 4.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

#### 4.1.5 TEST RESULTS

EUT :	Wireless Bluetooth Keyboard	Model Name :	K1580
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1015 hPa	Test Voltage :	DC 3.0V
Test Mode :	Hopping Mode –1Mbps mode		

Number of Hopping Channel	79
---------------------------	----



## 5. AVERAGE TIME OF OCCUPANCY

### 5.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (a)(1)(iii)	Average Time of Occupancy	0.4sec	2400-2483.5	PASS

#### 5.1.1 TEST PROCEDURE

- a. The transmitter output (antenna port) was connected to the spectrum analyzer
- b. Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz.
- c. Use a video trigger with the trigger level set to enable triggering only on full pulses.
- d. Sweep Time is more than once pulse time.
- e. Set the center frequency on any frequency would be measure and set the frequency span to zero span.
- f. Measure the maximum time duration of one single pulse.
- g. Set the EUT for DH5, DH3 and DH1 packet transmitting.
- h. Measure the maximum time duration of one single pulse.
- i. DH5 Packet permit maximum  $1600 / 79 / 6 = 3.37$  hops per second in each channel (5 time slots RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times  $3.37 \times 31.6 = 106.6$  within 31.6 seconds.
- j. DH3 Packet permit maximum  $1600 / 79 / 4 = 5.06$  hops per second in each channel (3 time slots RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times  $5.06 \times 31.6 = 160$  within 31.6 seconds.
- k. DH1 Packet permit maximum  $1600 / 79 / 2 = 10.12$  hops per second in each channel (1 time slot RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times  $10.12 \times 31.6 = 320$  within 31.6 seconds.

#### 5.1.2 DEVIATION FROM STANDARD

No deviation.

### 5.1.3 TEST SETUP



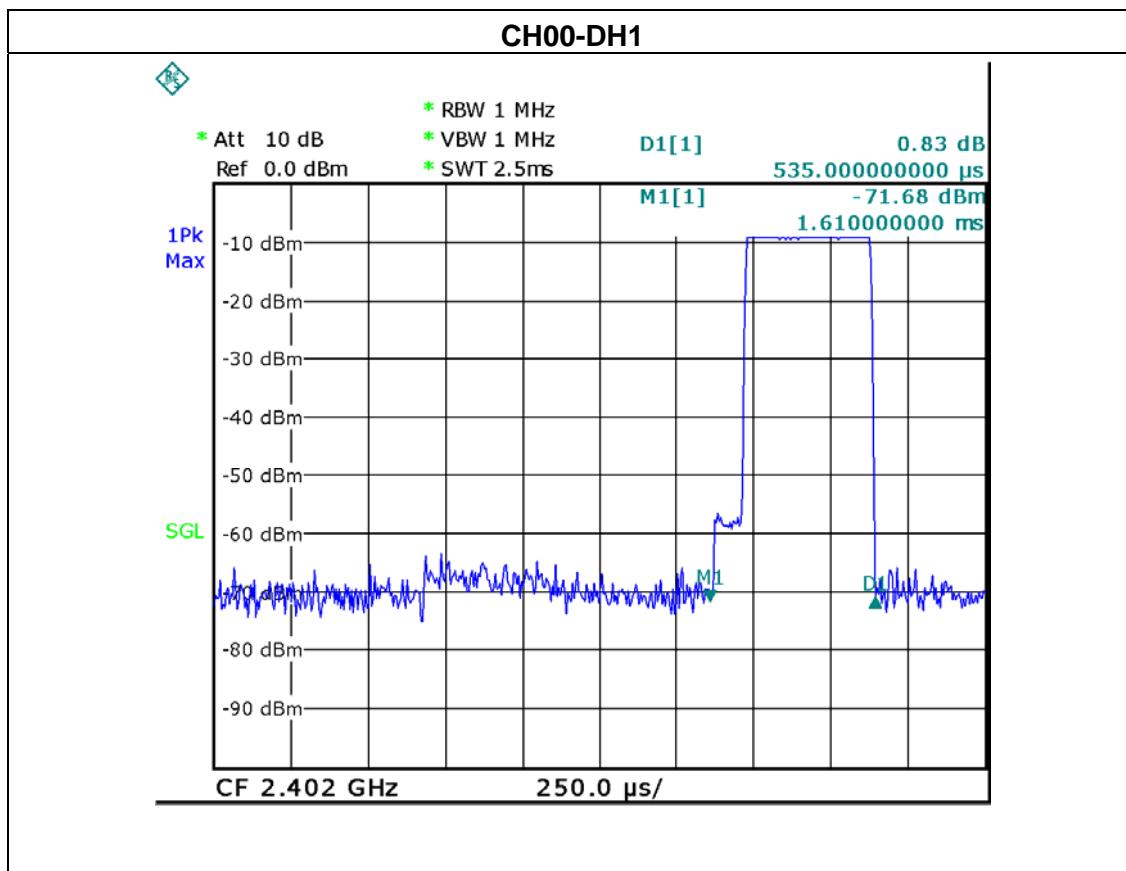
### 5.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

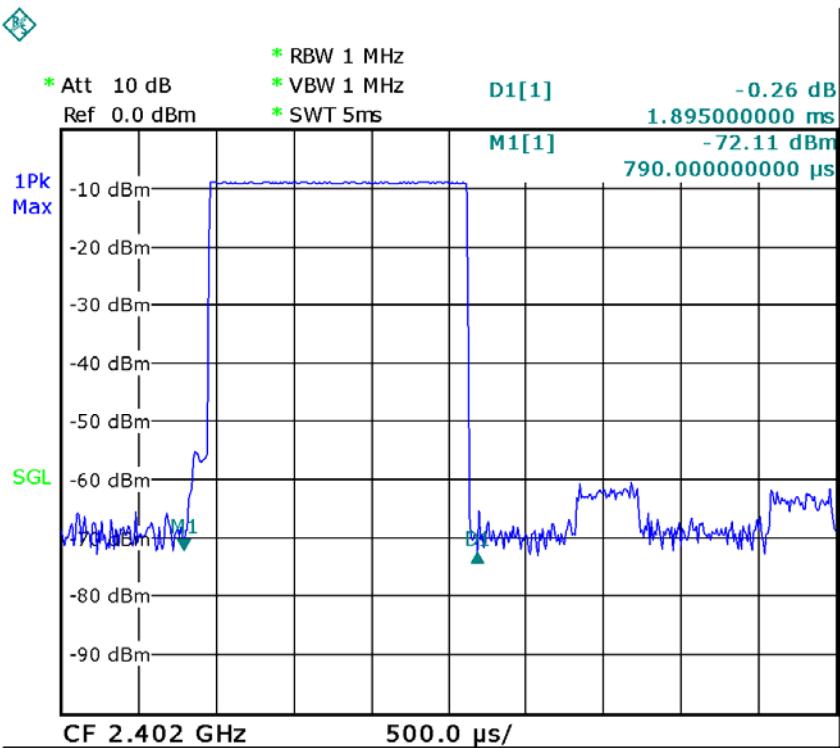
**5.1.5 TEST RESULTS**

EUT :	Wireless Bluetooth Keyboard	Model Name :	K1580
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.0V
Test Mode :	CH00-DH1/DH3/DH5 (1Mbps Mode)		

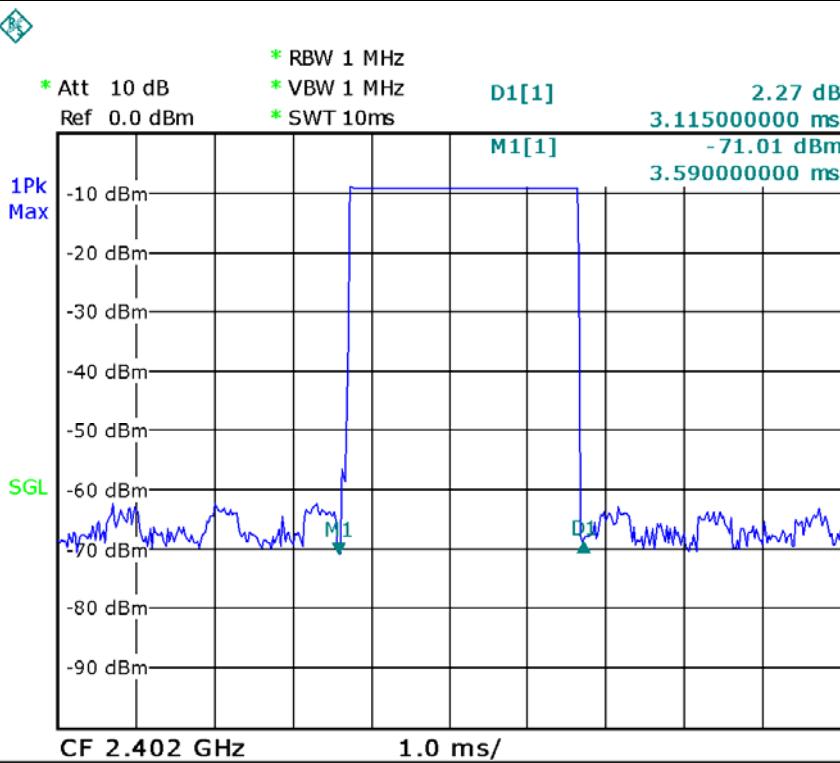
Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limits (s)
DH5	2402 MHz	3.1150	0.3323	0.4000
DH3	2402 MHz	1.8950	0.3032	0.4000
DH1	2402 MHz	0.5350	0.1712	0.4000



## CH00-DH3

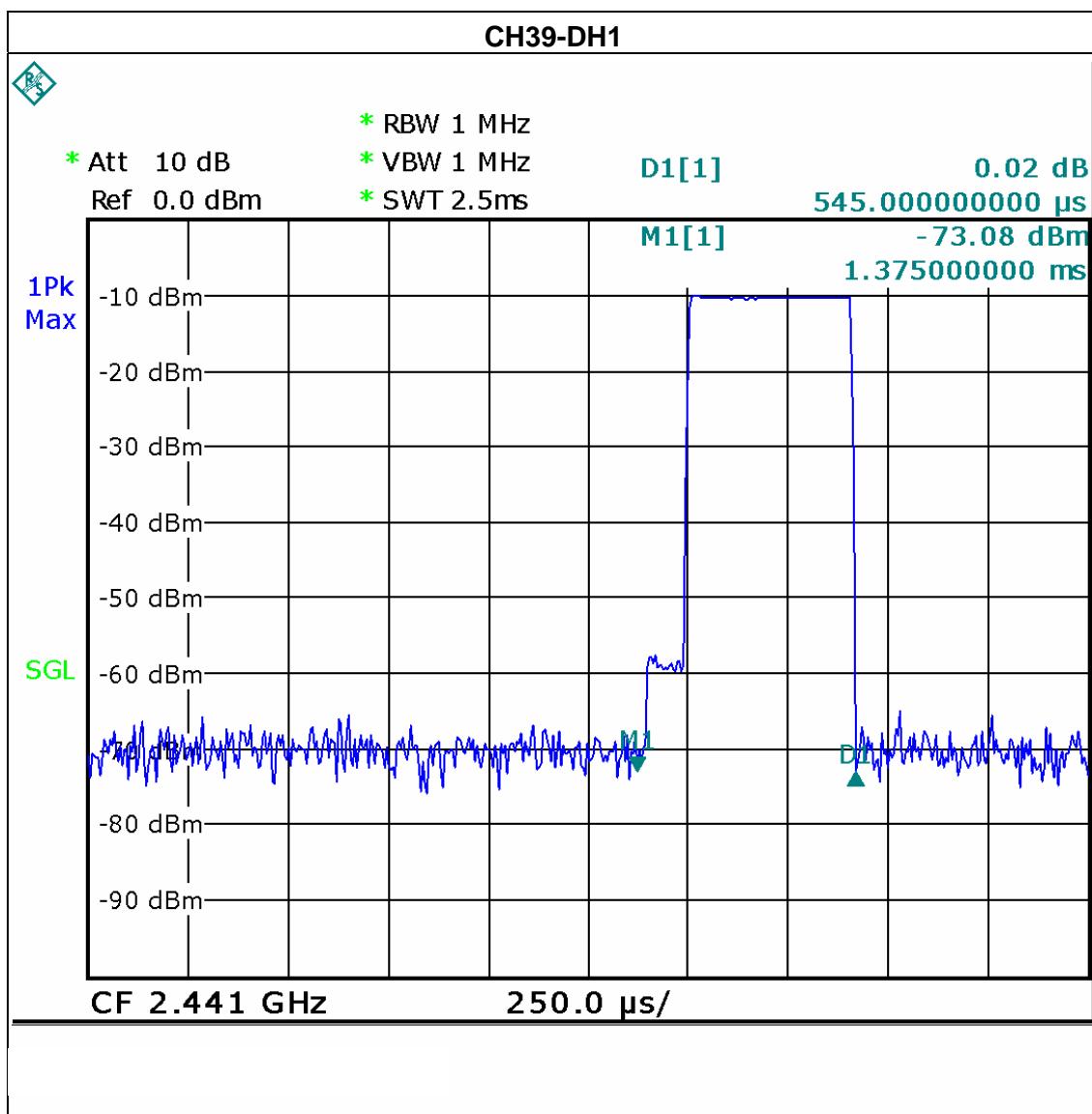


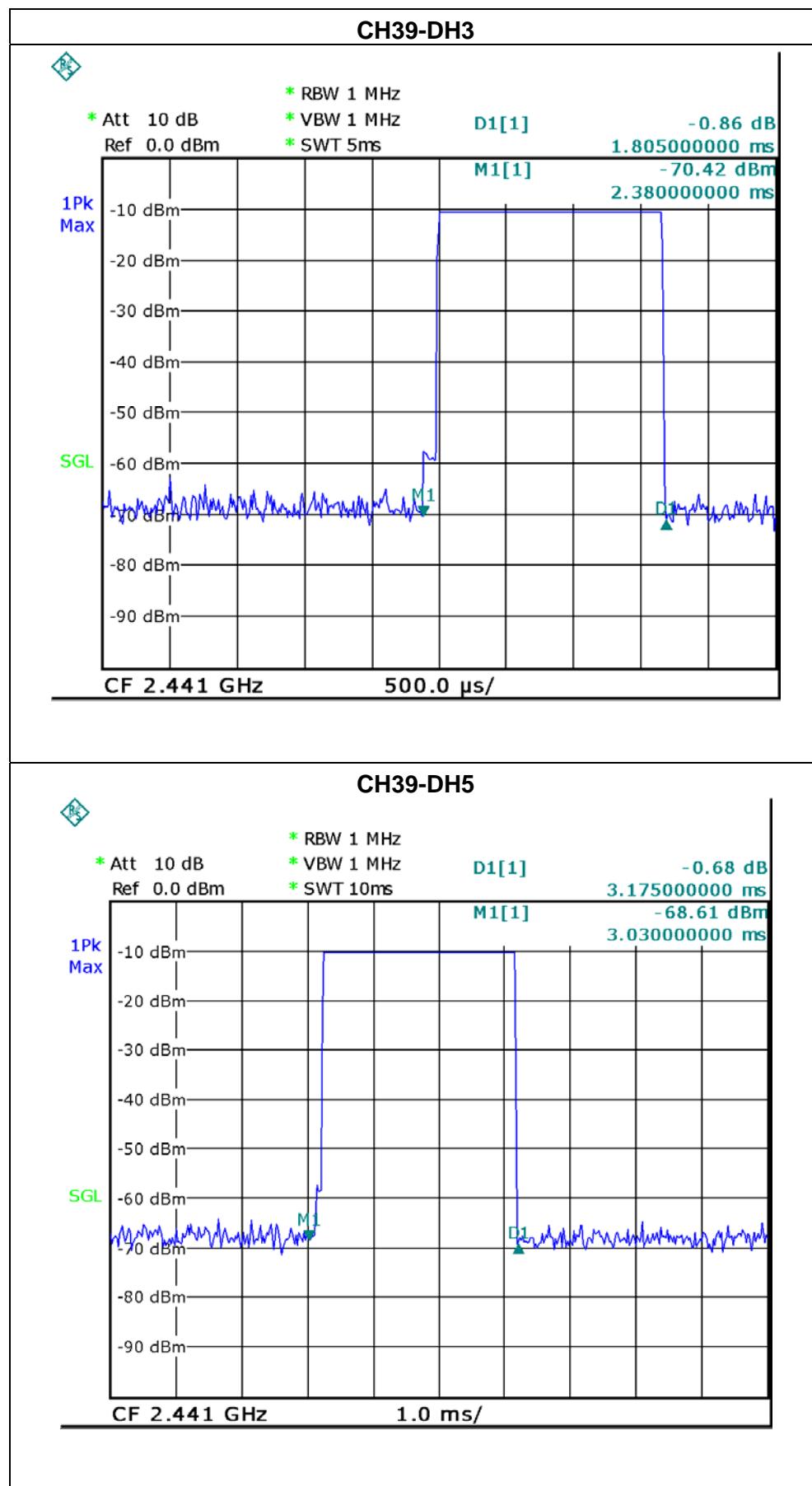
## CH00-DH5



EUT :	Wireless Bluetooth Keyboard	Model Name :	K1580
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.0V
Test Mode :	CH39 -DH1/DH3/DH5 (1Mbps Mode)		

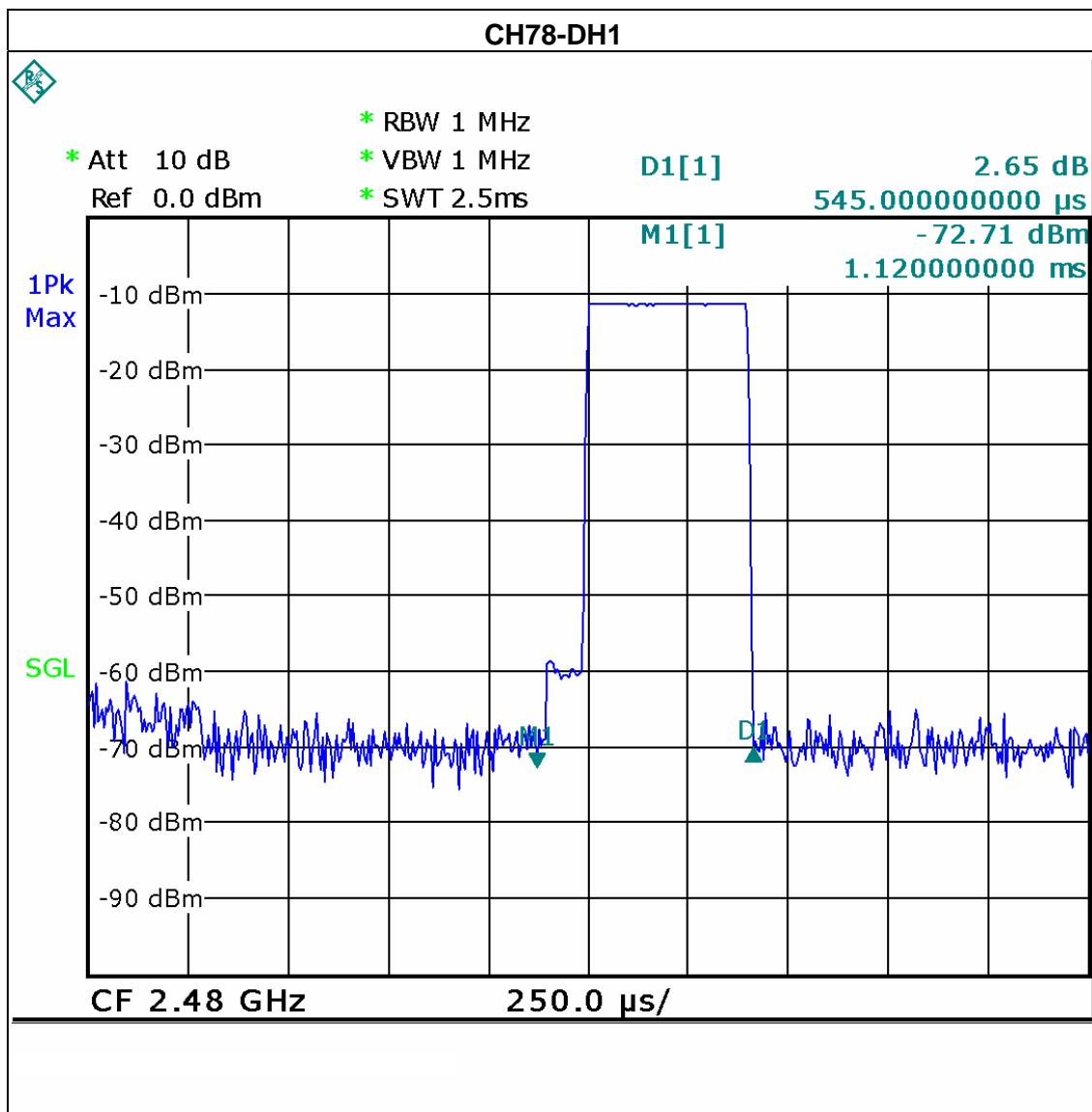
Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limits (s)
DH5	2441 MHz	3.1750	0.3387	0.4000
DH3	2441 MHz	1.8050	0.2888	0.4000
DH1	2441 MHz	0.5450	0.1744	0.4000

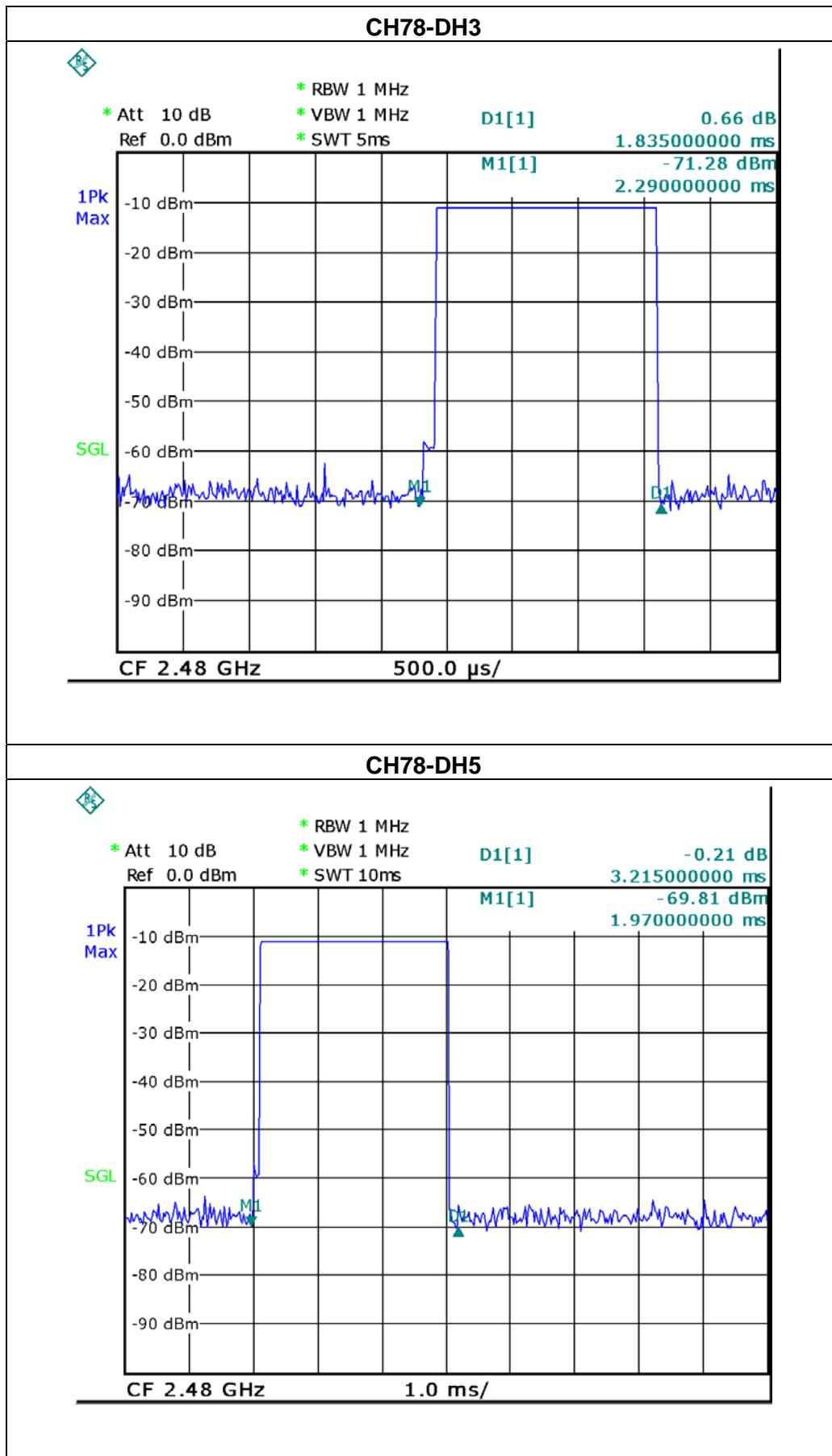




EUT :	Wireless Bluetooth Keyboard	Model Name :	K1580
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.0V
Test Mode :	CH78 -DH1/DH3/DH5 (1Mbps Mode)		

Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limits (s)
DH5	2480 MHz	3.2150	0.3429	0.4000
DH3	2480 MHz	1.8350	0.2936	0.4000
DH1	2480 MHz	0.5450	0.1744	0.4000





## 6. HOPPING CHANNEL SEPARATION MEASUREMENT

### 6.1 APPLIED PROCEDURES / LIMIT

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	30 kHz (20dB Bandwidth) / 100 kHz (Channel Separation)
VB	100 kHz (20dB Bandwidth) / 300 kHz (Channel Separation)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

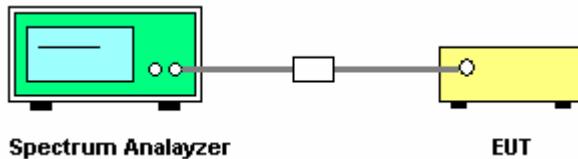
#### 6.1.1 TEST PROCEDURE

- The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
- The resolution bandwidth of 30 kHz and the video bandwidth of 100 kHz were utilised for 20 dB bandwidth measurement.
- The resolution bandwidth of 100 kHz and the video bandwidth of 300 kHz were utilised for channel separation measurement.

#### 6.1.2 DEVIATION FROM STANDARD

No deviation.

#### 6.1.3 TEST SETUP



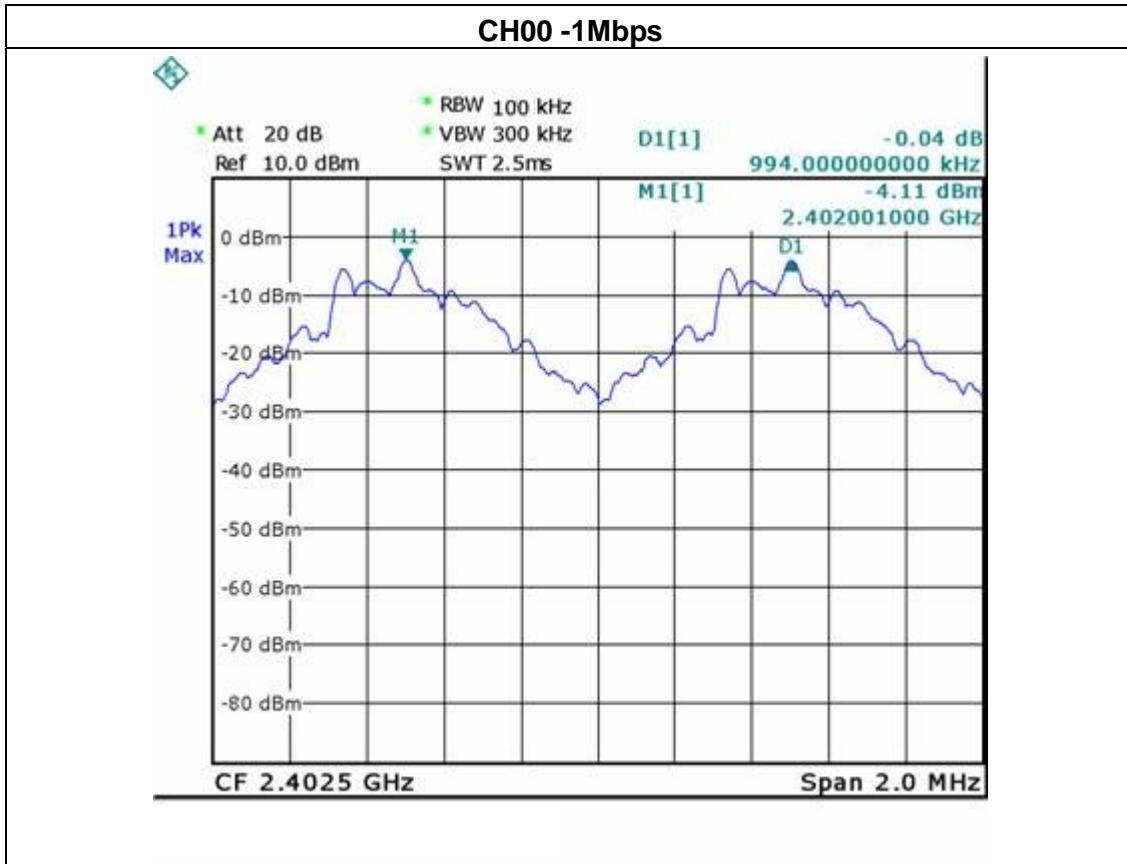
#### 6.1.4 EUT OPERATION CONDITIONS

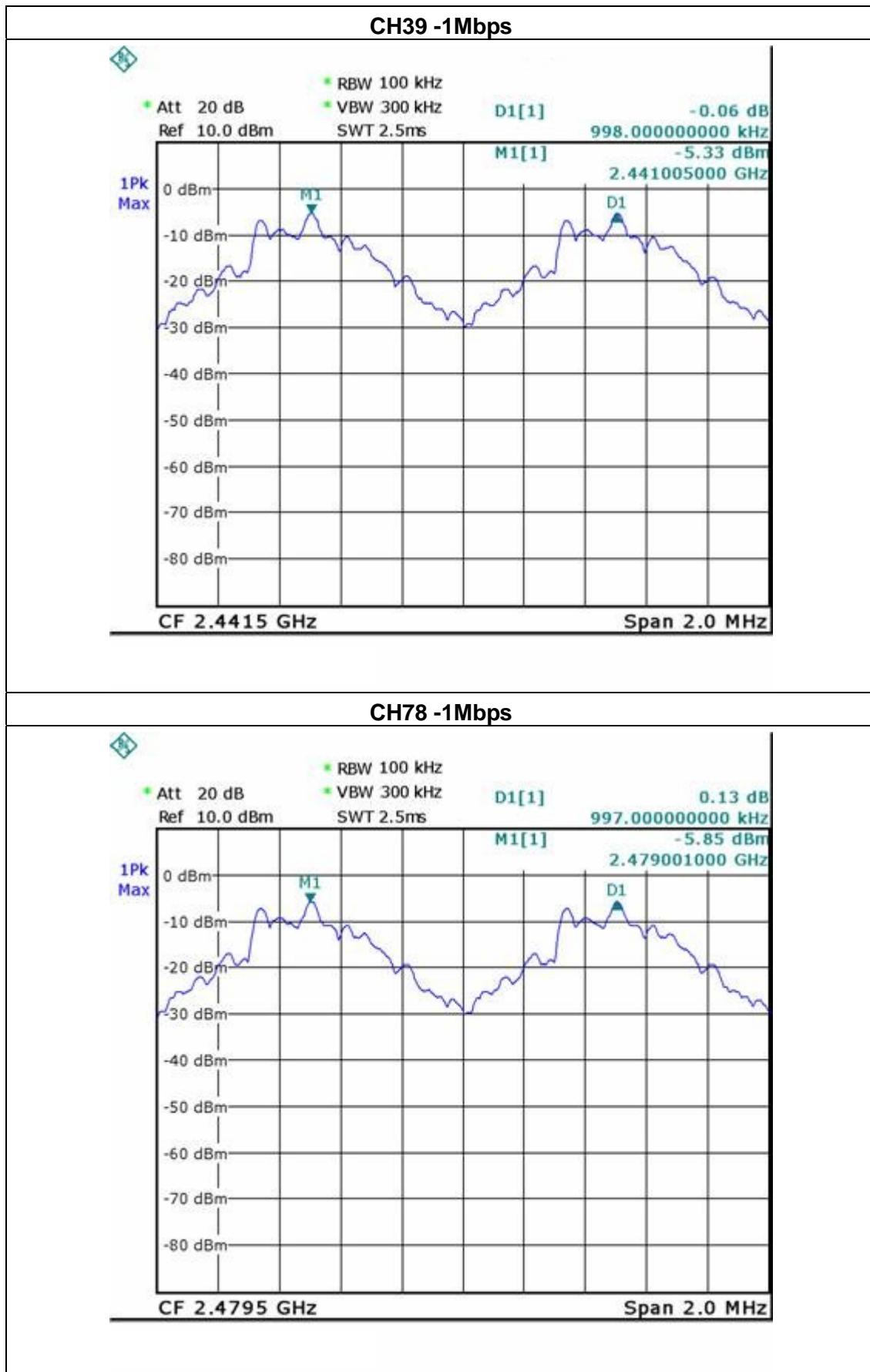
The EUT was programmed to be in continuously transmitting mode.

### 6.1.5 TEST RESULTS

EUT :	Wireless Bluetooth Keyboard	Model Name :	K1580
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.0V
Test Mode :	CH00 / CH39 /CH78 (1Mbps Mode)		

Frequency	Ch. Separation (MHz)	20d Bandwidth B (kHz)	Result
2402 MHz	994	846.30	Complies
2441 MHz	998	838.30	Complies
2480 MHz	997	846.30	Complies





## 7. BANDWIDTH TEST

### 7.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.215.C	Bandwidth	(20dB bandwidth)	2400-2483.5	PASS

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	30 kHz (20dB Bandwidth) / 100 kHz (Channel Separation)
VB	100 kHz (20dB Bandwidth) / 300 kHz (Channel Separation)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

#### 7.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW= 100KHz, VBW=100KHz, Sweep time = Auto.

#### 7.1.2 DEVIATION FROM STANDARD

No deviation.

#### 7.1.3 TEST SETUP



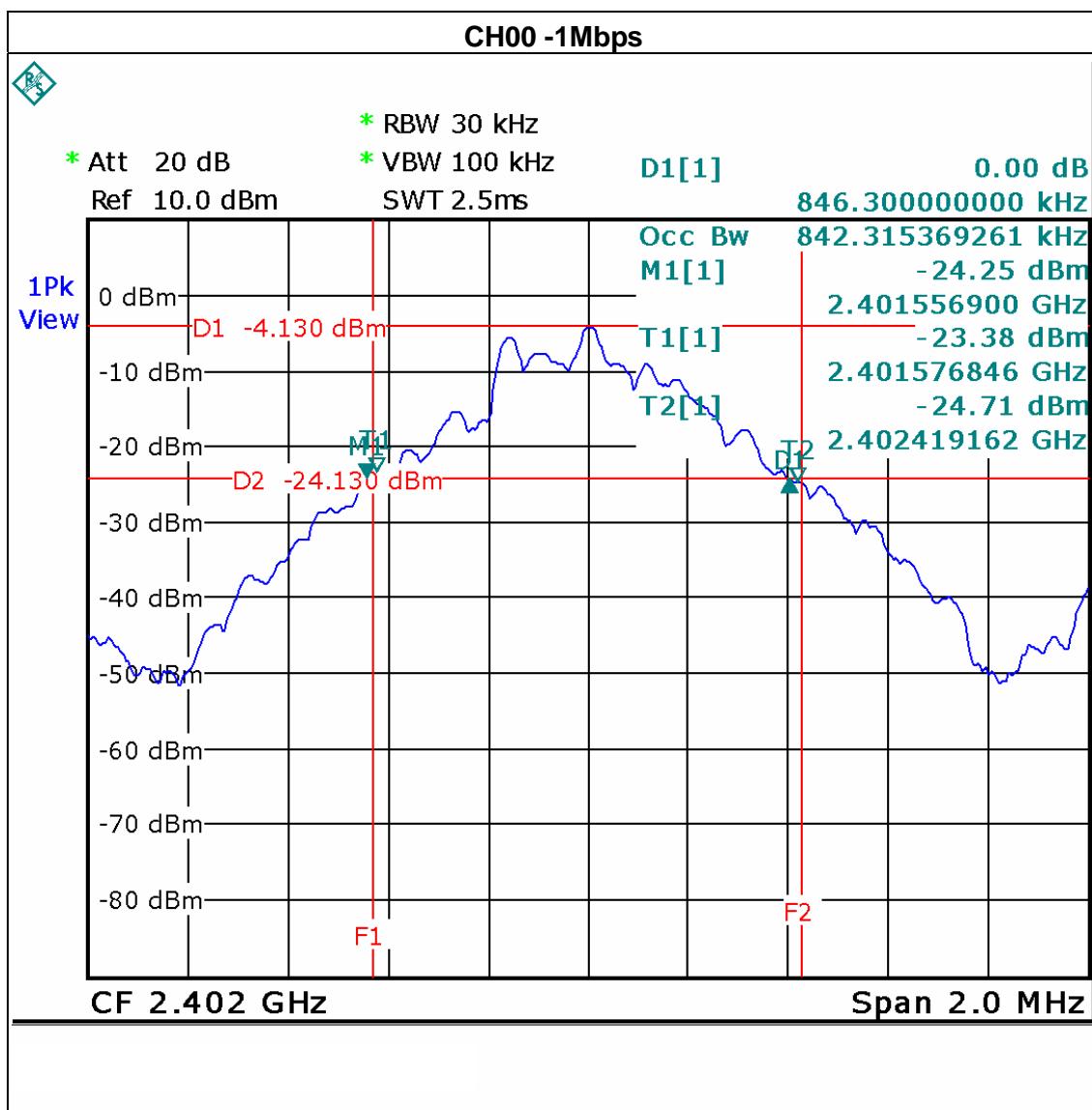
#### 7.1.4 EUT OPERATION CONDITIONS

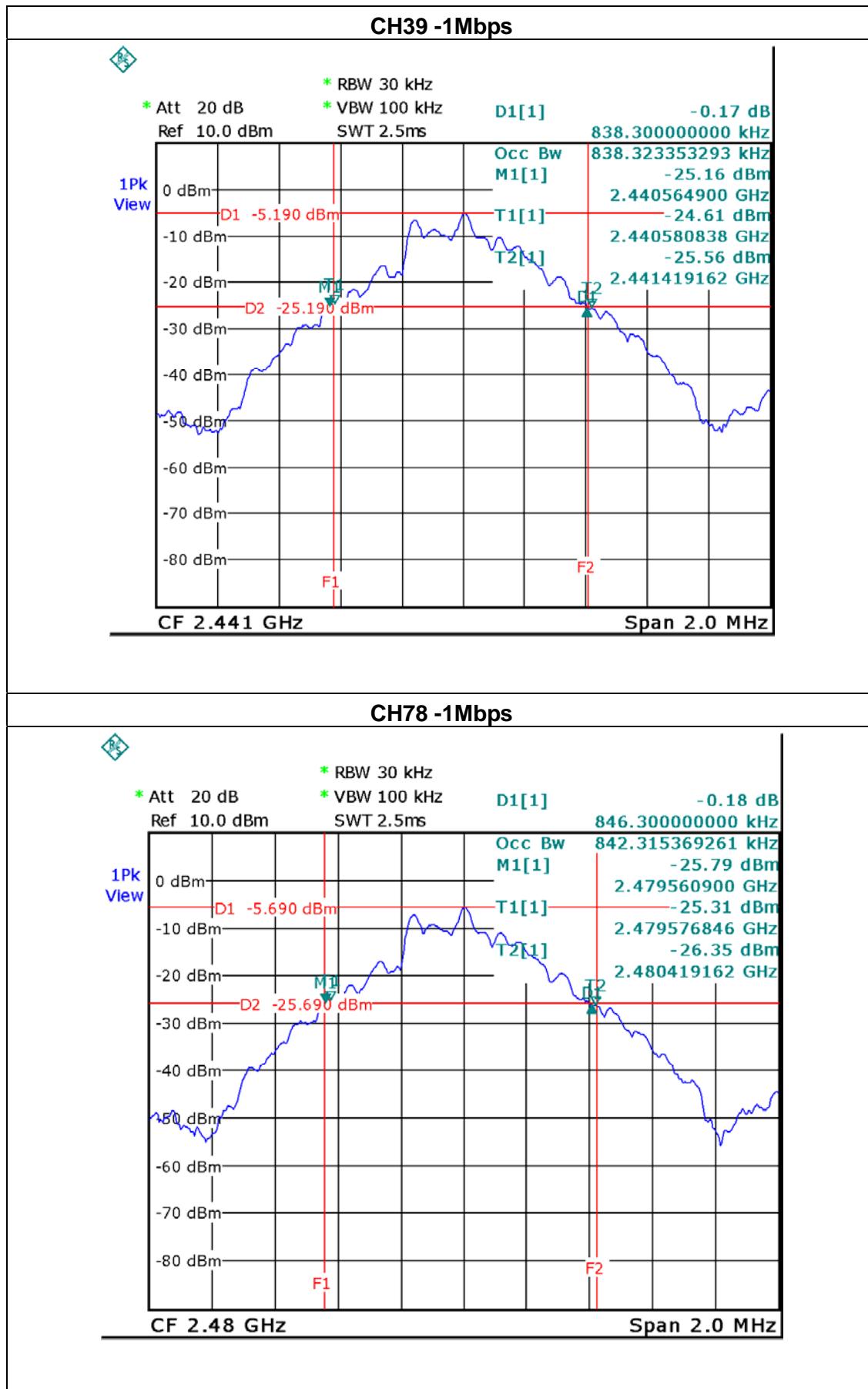
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

### 7.1.5 TEST RESULTS

EUT :	Wireless Bluetooth Keyboard	Model Name :	K1580
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.0V
Test Mode :	CH00 / CH39 /CH78 (1Mbps Mode)		

Frequency	20dB Bandwidth (kHz)	Limit (MHz)	Result
2402 MHz	846.30	N/A	PASS
2441 MHz	838.30	N/A	PASS
2480 MHz	846.30	N/A	PASS





## 8. PEAK OUTPUT POWER TEST

### 8.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (b)(1)	Peak Output Power	1 watt or 30dBm	2400-2483.5	PASS

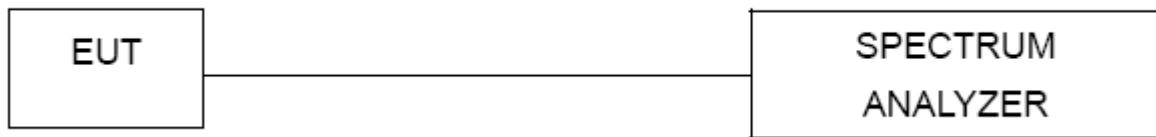
#### 8.1.1 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting : RBW= 1MHz, VBW= 1MHz, Sweep time = Auto.

#### 8.1.2 DEVIATION FROM STANDARD

No deviation.

#### 8.1.3 TEST SETUP



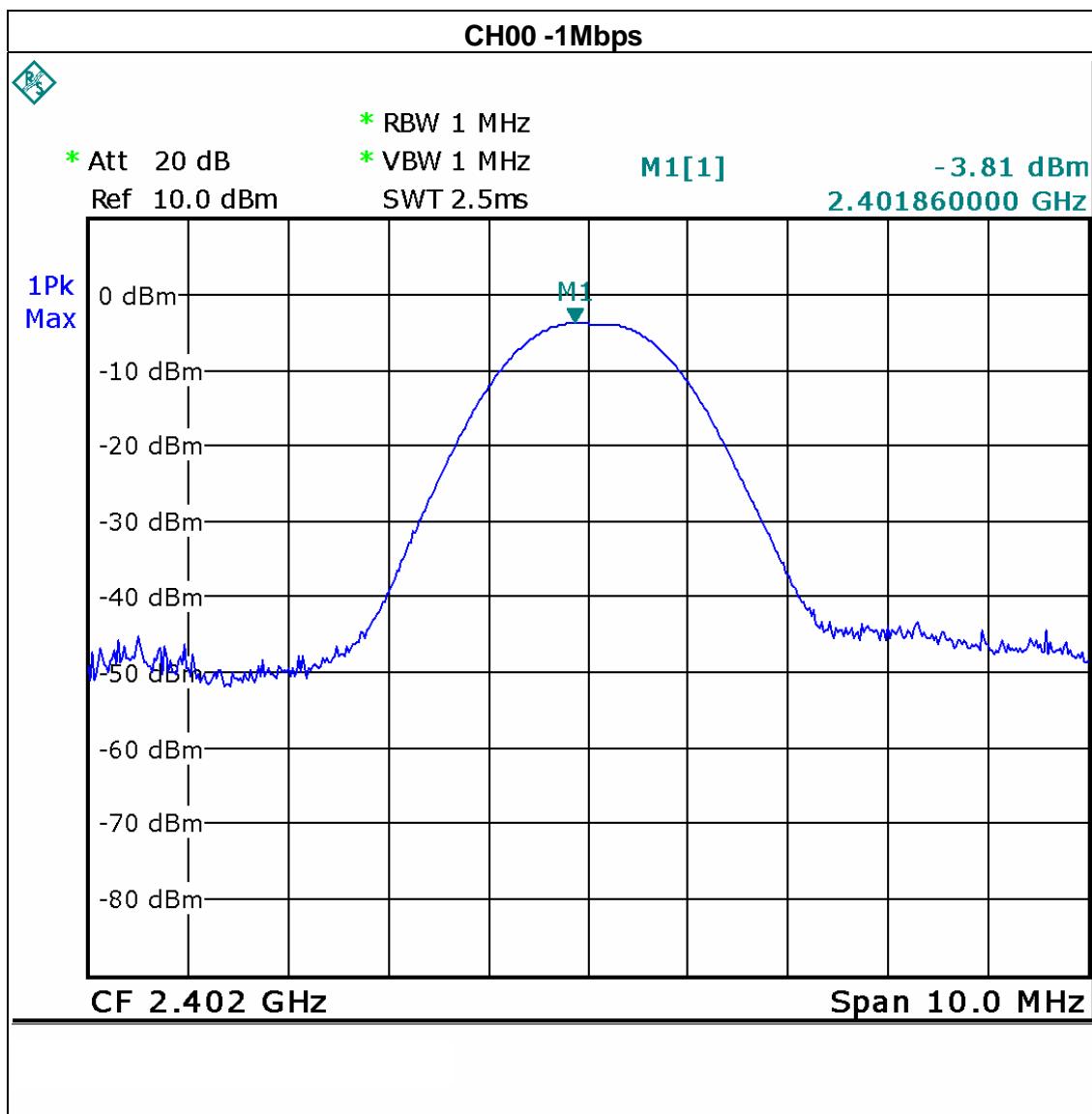
#### 8.1.4 EUT OPERATION CONDITIONS

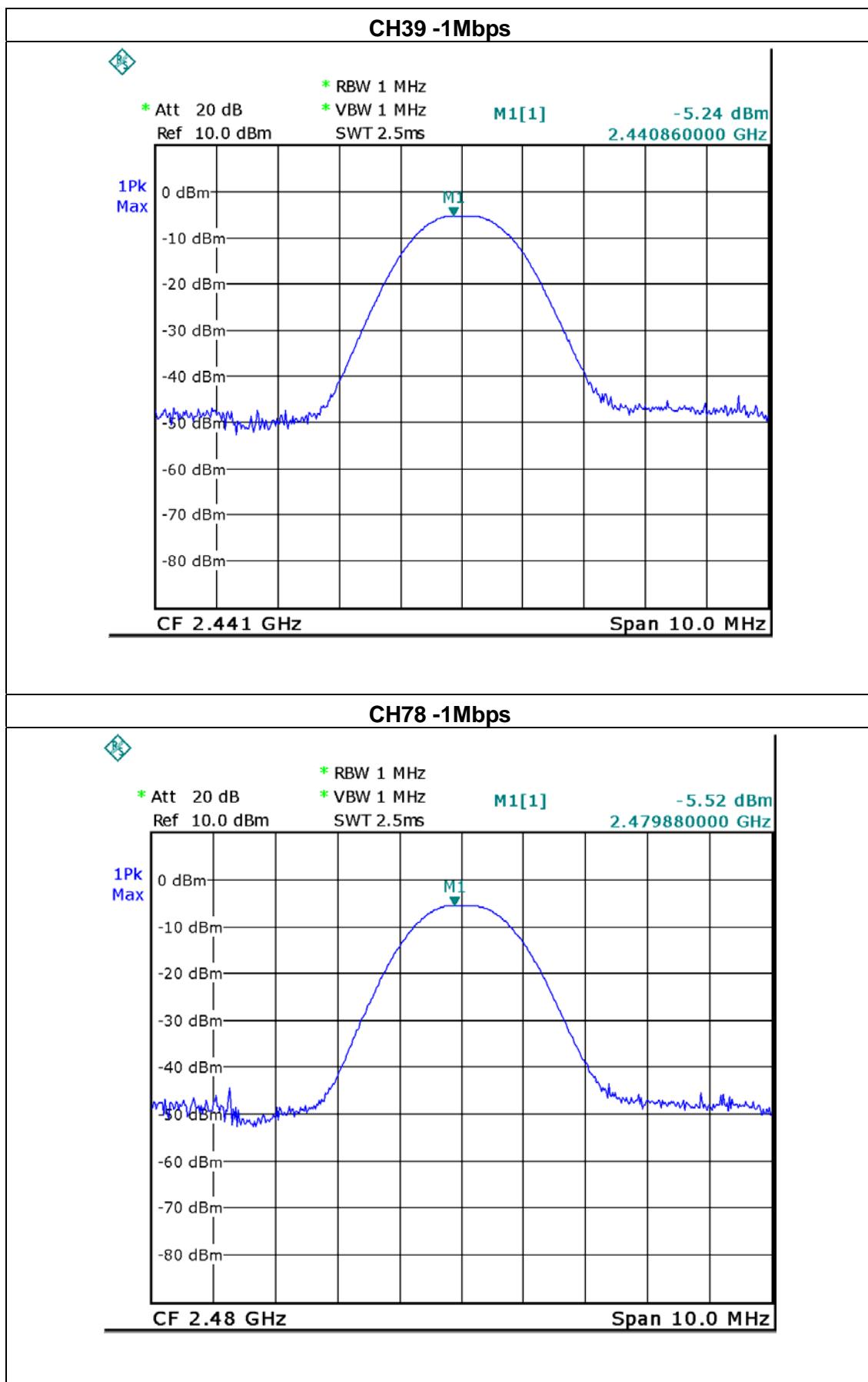
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

### 8.1.5 TEST RESULTS

EUT :	Wireless Bluetooth Keyboard	Model Name :	K1580
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.0V
Test Mode :	CH00/ CH39 /CH78 (1Mbps Mode)		

Test Channel	Frequency (MHz)	Peak Output Power (dBm)	LIMIT (dBm)	LIMIT (W)
CH00	2402	-3.81	30	1
CH39	2441	-5.24	30	1
CH78	2480	-5.52	30	1





## 9. ANTENNA CONDUCTED SPURIOUS EMISSION

### 9.1 APPLIED PROCEDURES / LIMIT

20dBc 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

The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	100 MHz
RB / VB (emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (other emission)	100 KHz /100 KHz for Peak
Detector	Peak

#### 9.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW= 100KHz, VBW=100KHz, Sweep time = Auto.

#### 9.1.2 DEVIATION FROM STANDARD

No deviation.

### 9.1.3 TEST SETUP



### 9.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

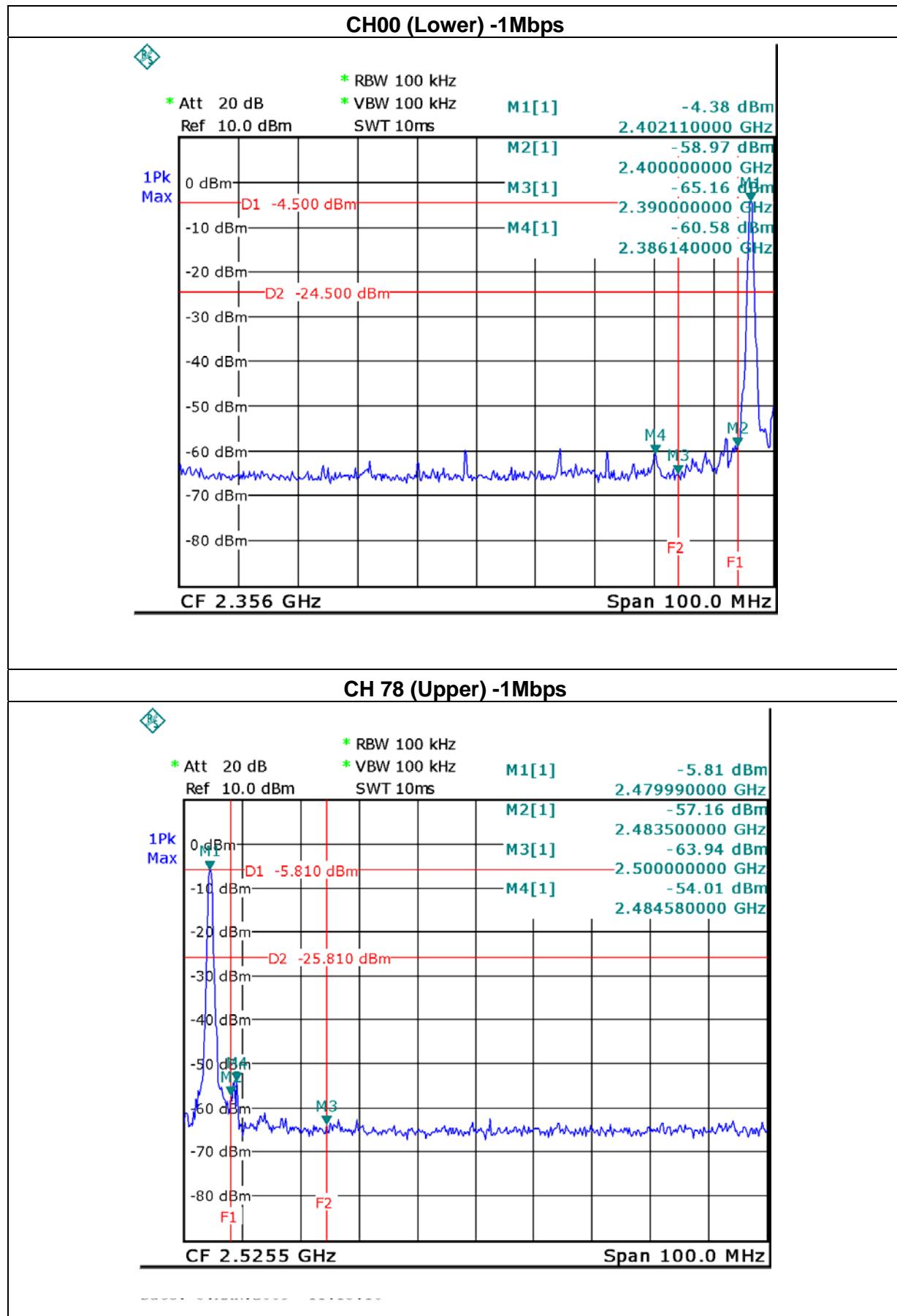
**9.1.5 TEST RESULTS**

EUT :	Wireless Bluetooth Keyboard	Model Name :	K1580
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.0V
Test Mode :	CH00 / CH78 (1Mbps)		

The max. radio frequency power in any 100kHz bandwidth outside the frequency band		The max. radio frequency power in any 100 kHz bandwidth outside the frequency band.	
FREQUENCY(MHz)	POWER(dBm)	FREQUENCY(MHz)	POWER(dBm)
2386.14	-60.58	2484.58	-54.01
Result			
In any 100kHz bandwidth outside the frequency band, the radio frequency power is at least 20dB below that in the 100kHz bandwidth within the band that contains the highest lever of the desired power.			

Remark :

(1) Hopping enabled and disabled have evaluated, and the worst data was reported



## 10. RF EXPOSURE TEST

### 10.1 APPLIED PROCEDURES / LIMIT

These devices are not exempted from compliance does not exceed the Commission's RF exposure guidelines. Unless a device operates at substantially low power levels, with a low gain antenna(s), supporting information is generally needed to establish the various potential operating configurations and exposure conditions of a transmitter and its antenna(s) in order to determine compliance with the RF exposure guidelines.

In order to demonstrate compliance with MPE requirement (see Section 2.1091), the following information is typically needed:

Calculation that estimates the minimum separation distance (20 cm or more) between an antenna and persons required to satisfy power density limits defined for free space.

Antenna installation and device operating instructions for installers (professional/unskilled users), and the parties responsible for ensuring compliance with the RF exposure requirement. Any caution statements and/or warning labels that are necessary in order to comply with the exposure limits. Any other RF exposure related issues that may affect MPE compliance.

FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in 1.1307(b).

#### (A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6

#### (B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

Note: f = frequency in MHz ; \*Plane-wave equivalent power density

### 10.1.1 MPE CALCULATION METHOD

Calculation Method of RF Safety Distance:

$$S = \frac{PG}{4\pi r^2} = \frac{EIRP}{4\pi r^2}$$

P :power input to the antenna in Mw

EIRP :Equivalent(effective) isotropic radiated power.

S :power density mW/ cm<sup>2</sup>

G :numeric gain of antenna relative to isotropic radiator

R :distance to centre of radiation in cm

FCC radio frequency exposure limits may be exceeded at distances closer than r cm from the antenna of this device

$$r = \sqrt{\frac{PG}{4\pi S}} = \sqrt{\frac{EIRP}{4\pi S}}$$

EIRP=10<sup>(Antenna Gain+Peak Output Power/10)</sup>

Note:

1. s=1.0 mW /cm<sup>2</sup> for limits for General Population/Uncontrolled Exposures.
2. The time averaged power over 30 minutes will be equaled Output Power.
3. For portable device,the power limit is 60/f(in GHz) mW
4. For limit 60/f is equal:  
60/2.402=24.98mW  
60/2.441=24.58 mW  
60/2.480=24.19mW
5. The max.output power E.I.R.P is 0.6324 mW

So it is complied with the limit,SAR report is not requied.