FCC Test Report

Report No.: AGC01373140701FE03

FCC ID	:	SAHBTKEYBOARD1GIN
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	Bluetooth Keyboard GI001
BRAND NAME	:	N/A
MODEL NAME	:	GIN01BTKB
CLIENT	:	Group Intellect Technology Limited
DATE OF ISSUE	:	Jul.30, 2014
STANDARD(S)	:	FCC Part 15 Rules
REPORT VERSION	:	V1.0

Attestation of ***G***lobal ***C***ompliance (Shenzhen) Co., Ltd

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Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Jul.30, 2014	Valid	Original Report

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1. VERIFICATION OF CONFORMITY

Applicant	Group Intellect Technology Limited
Address	Room 414,Lippo Sun Plaza,28 Canton Road,Tsim Sha Tsui,Kowloon,Hong Kong
Manufacturer	Group Intellect Technology Limited
Address	Room 414,Lippo Sun Plaza,28 Canton Road,Tsim Sha Tsui,Kowloon,Hong Kong
Product Designation	Bluetooth Keyboard GI001
Brand Name	N/A
Test Model	GIN01BTKB
Date of test	Jul.28, 2014 to Jul.29, 2014
Deviation	None
Condition of Test Sample	Normal

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC Rules Part 15.249.

Prepared By	Water Zuo	Jul.30, 2014
Checked By	Forrest Lei	Jul.30, 2014
Authorized By	Solger Zhang	Jul.30, 2014

2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

The EUT is “Bluetooth Keyboard GI001 ” designed as a “Communication Device”. It is designed by way of utilizing the FHSS technology to achieve the system operation.

A major technical description of EUT is described as following

Operation Frequency	2.402 GHz to 2.480GHz
Bluetooth Version	V 2.1
Modulation	GFSK
Number of channels	79
Hardware Version	V1.0
Software Version	A12
Antenna Designation	PCB Antenna
Antenna Gain	0dBi
Power Supply	DC3.7V By Battery
Note: The USB port only used for charging and can’t be used to transfer data with PC.	

2.2. TABLE OF CARRIER FREQUENCYS

Frequency Band	Channel Number	Frequency
2402~2480MHZ	0	2402MHZ
	1	2403MHZ
	:	:
	38	2440 MHZ
	39	2441 MHZ
	40	2442 MHZ
	:	:
	77	2479 MHZ
	78	2480 MHZ

2.3. RECEIVER INPUT BANDWIDTH

The input bandwidth of the receiver is 1MHZ,In every connection one Bluetooth device is the master and the other one is slave. The master determines the hopping sequence. The slave follows this sequence. Both devices shift between RX and TX time slot according to the clock of the master. Additionally the type of connection(e.g. single of multislot packet) is set up at the beginning of the connection. The master adapts its hopping frequency and its TX/RX timing according to the packet type of the connection. Also the slave of the connection will use these settings.

Repeating of a packet has no influence on the hopping sequence. The hopping sequence generated by the master of the connection will be followed in any case. That means, a repeated packet will not be send on the same frequency, it is send on the next frequency of the hopping sequence.

2.4. EXAMPLE OF A HOPPING SEQUENCY IN DATA MODE

Example of a 79 hopping sequence in data mode:
40,21,44,23,42,53,46,55,48,33,52,35,50,65,54,67
56,37,60,39,58,69,62,71,64,25,68,27,66,57,70,59
72,29,76,31,74,61,78,63,01,41,05,43,03,73,07,75
09,45,13,47,11,77,15,00,64,49,66,53,68,02,70,06
01, 51, 03, 55, 05, 04

2.5. EQUALLY AVERAGE USE OF FREQUENCIES AND BEHAVIOUR

The generation of the hopping sequence in connection mode depends essentially on two input values:
1. LAP/UAP of the master of the connection.
2. Internal master clock

The LAP(lower address part) are the 24 LSB's of the 48 BD_ADDRESS. The BD_ADDRESS is an unambiguous number of every Bluetooth unit. The UAP(upper address part) are the 24MSB's of the 48BD_ADDRESS

The internal clock of a Bluetooth unit is derived from a free running clock which is never adjusted and is never turned off. For ehavior zation with other units only offset are used. It has no relation to the time of the day. Its resolution is at least half the RX/TX slot length of 312.5us.The clock has a cycle of about one day(23h30).In most case it is implemented as 28 bit counter. For the deriving of the hopping sequence the entire. LAP(24 bits),4LSB's(4bits)(Input 1) and the 27MSB's of the clock(Input 2) are used. With this input values different mathematical procedures(permutations, additions, XOR-operations)are performed to generate te Sequence. This will be done at the beginning of every new transmission.

Regarding short transmissions the Bluetooth system has the following ehavior:

The first connection between the two devices is established, a hopping sequence was generated. For Transmitting the wanted data the complete hopping sequence was not used. The connection ended.

The second connection will be established. A new hopping sequence is generated. Due to the fact the Bluetooth clock has a different value, because the period between the two transmission is longer(and it Cannot be shorter) than the minimum resolution of the clock(312.5us).The hopping sequence will always Differ from the first one.

2.6. RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: SAHBTKEYBOARD1GIN** filing to comply with Section 15.249 of the FCC Part 15, Subpart C Rules.

2.7. TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4 (2003).
Radiated testing was performed at an antenna to EUT distance 3 meters.
Test has been referenced to the DA 00-705.

2.8. SPECIAL ACCESSORIES

Refer to section 5.2.

2.9. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

3. MEASUREMENT UNCERTAINTY

Conducted measurement: +/- 2.75dB

Radiated measurement: +/- 3.2dB

4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	Low channel TX
2	Middle channel TX
3	High channel TX
4	Normal Operating (BT)

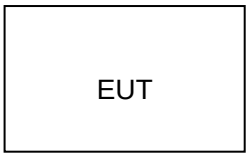
Note:

1. Only the result of the worst case was recorded in the report, if no other cases.
2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.

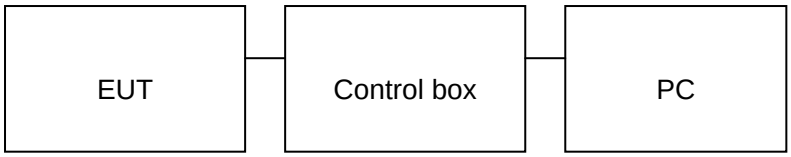
5. SYSTEM TEST CONFIGURATION

5.1. CONFIGURATION OF EUT SYSTEM

Configure 1: (Normal hopping)



Configure 2: (Control continuous TX)



5.2. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Mfr/Brand	Model/Type No.	Remark
1	Bluetooth Keyboard GI001	N/A	GIN01BTKB	EUT
2	PC	Dell	INSPIRON	A.E
3	Control box	N/A	N/A	A.E

5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.249	20 dB Bandwidth	Compliant
§15.209	Radiated Emission	Compliant
§15.249	Bandage	Compliant
§15.207	Conducted Emission	Compliant

6. TEST FACILITY

Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	2/F., Building 2, No.1-No.4, Chaxi Sanwei Technical Industrial Park, Gushu, Xixiang, Bao'an District, Shenzhen, Guangdong, China
Description	The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.4:2003.

ALL TEST EQUIPMENT LIST

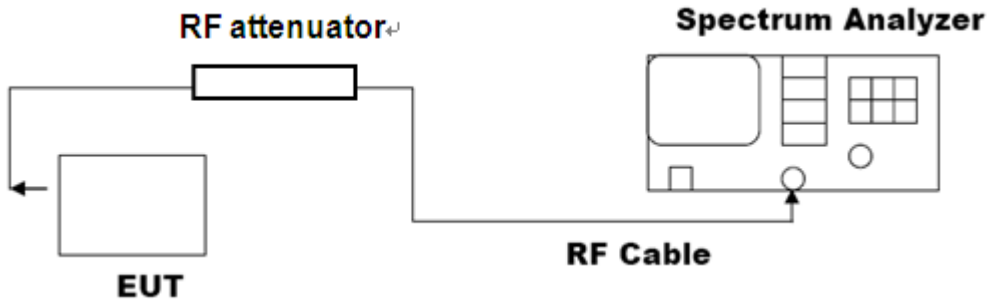
Description	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Power Probe	R&S	NRP-Z23	100323	07/17/2014	07/16/2015
RF attenuator	N/A	RFA20db	68	N/A	N/A
Spectrum Analyzer	Agilent	E4440A	US41421290	07/17/2014	07/16/2015
Amplifier	EM	EM30180	0607030	02/28/2014	02/27/2015
Horn Antenna	EM	EM-AH-10180	67	04/19/2014	04/18/2015
Horn Antenna	A.H. Systems Inc.	SAS-574	--	07/17/2014	07/16/2015
EMI Test Receiver	Rohde & Schwarz	ESCI	100694	07/17/2014	07/16/2015
Bilogical Antenna	A.H. Systems Inc.	SAS-521-4	26	06/06/2014	06/05/2015
LISN	R&S	ESH3-Z5	8389791009	07/17/2014	07/16/2015
Loop Antenna	Daze	ZN30900N	SEL0097	07/17/2014	07/16/2015
Isolation Transformer	LETEAC	LTBK	--	07/17/2014	07/16/2015
Radiation Cable 1	Sat	RE1	R003	06/04/2014	06/03/2015
Radiation Cable 2	Sat	RE2	R002	06/04/2014	06/03/2015
Conduction Cable	Sat	CE1	C001	06/04/2014	06/03/2015

7. 20DB BANDWIDTH

7.1. MEASUREMENT PROCEDURE

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2, Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hoping channel RBW ≥ 1% of the 20 dB bandwidth, VBW ≥ RBW; Sweep = auto; Detector function = peak
4. Set SPA Trace 1 Max hold, then View.

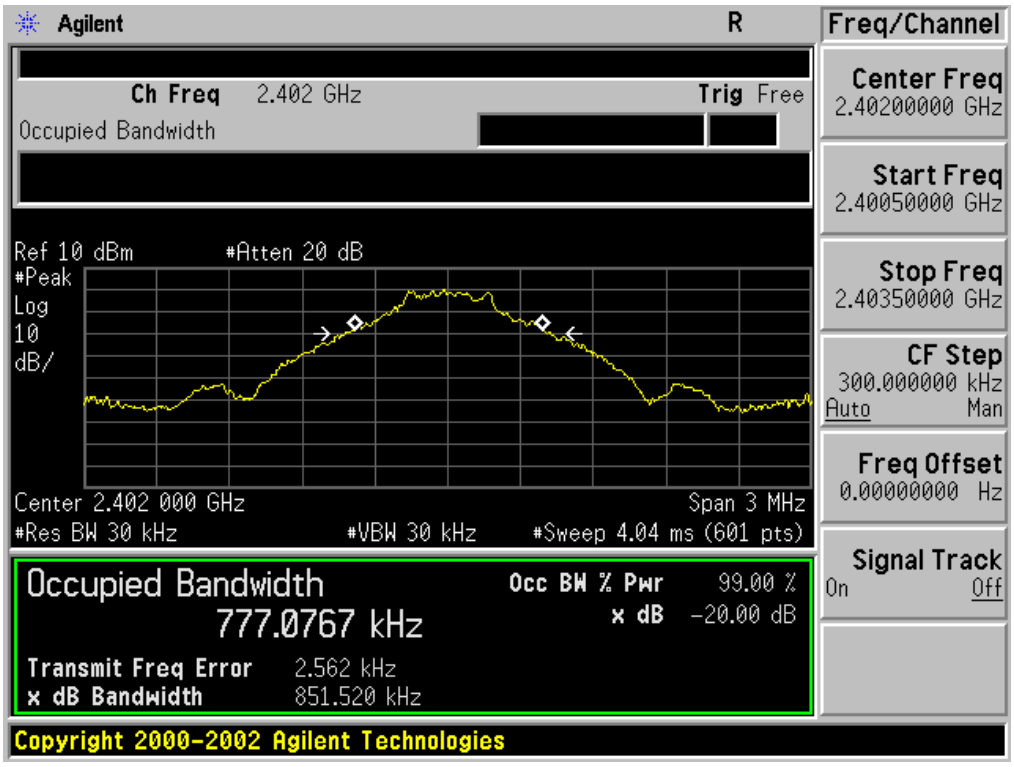
7.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



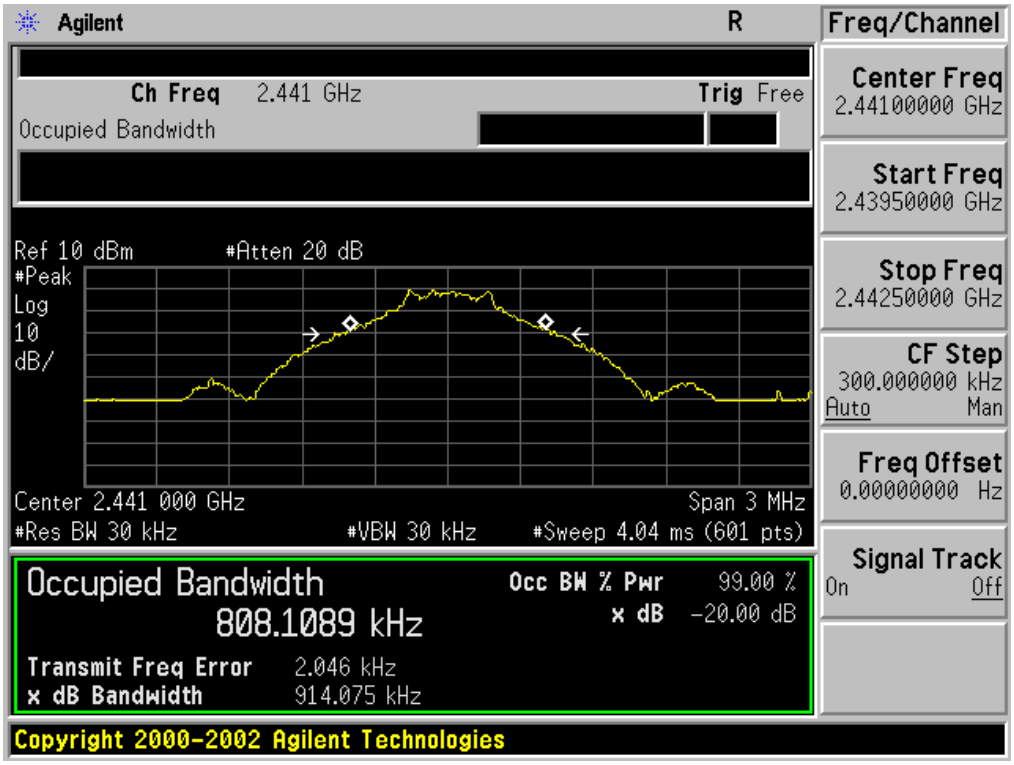
7.3. LIMITS AND MEASUREMENT RESULTS

BLUETOOTH 1MBPS LIMITS AND MEASUREMENT RESUL			
Applicable Limits	Measurement Result		
	Test Data (MHz)		Criteria
N/A	Low Channel	0.852	PASS
	Middle Channel	0.914	PASS
	High Channel	0.903	PASS

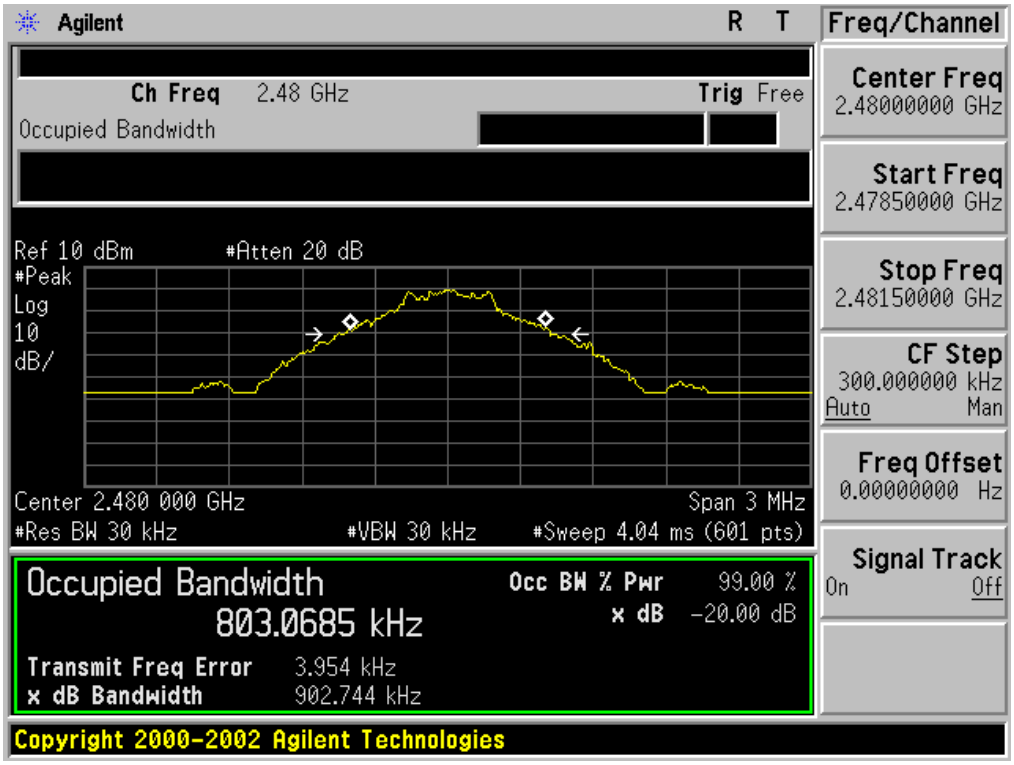
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



8. RADIATED EMISSION

8.1. MEASUREMENT PROCEDURE

1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

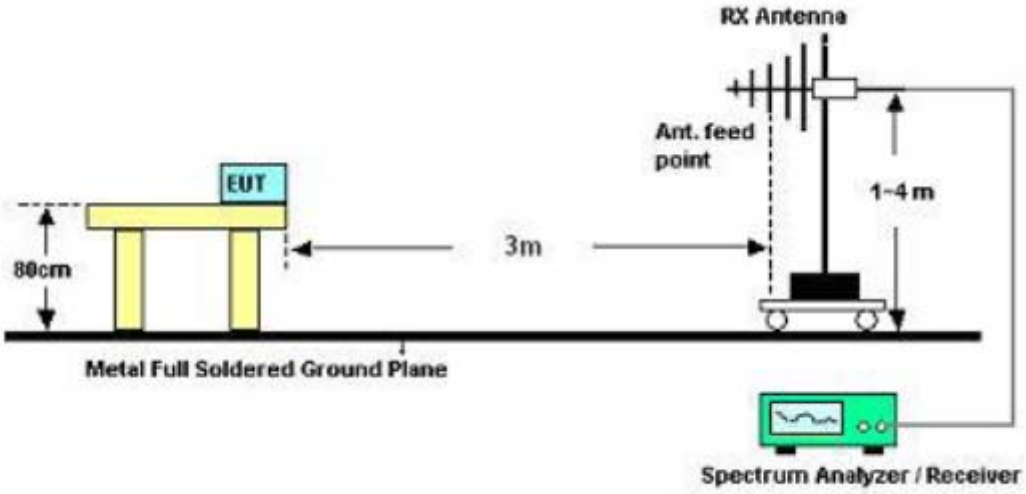
The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
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
Start ~Stop Frequency	1GHz~26.5GHz 1MHz/1MHz for Peak, 1MHz/10Hz for Average

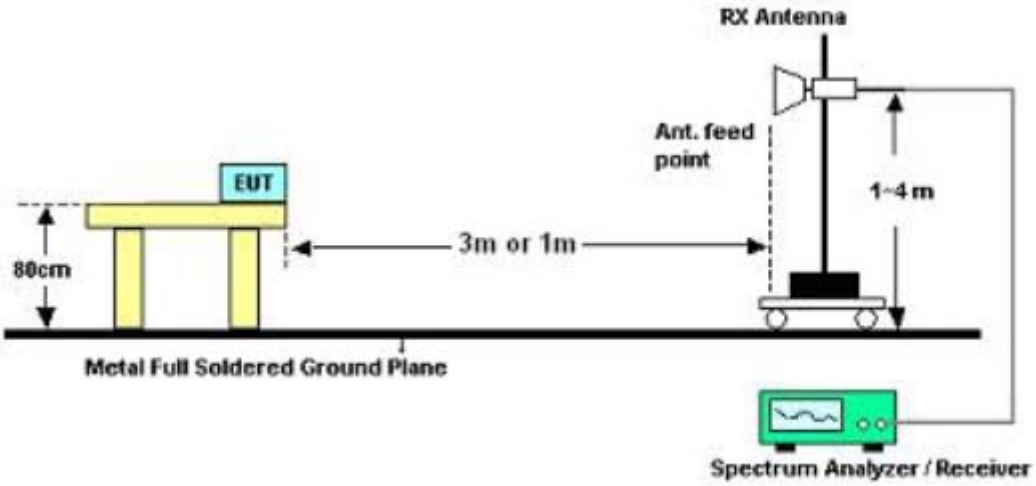
Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

8.2. TEST SETUP

RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



8.3. TEST RESULT (Worst Modulation: GFSK)

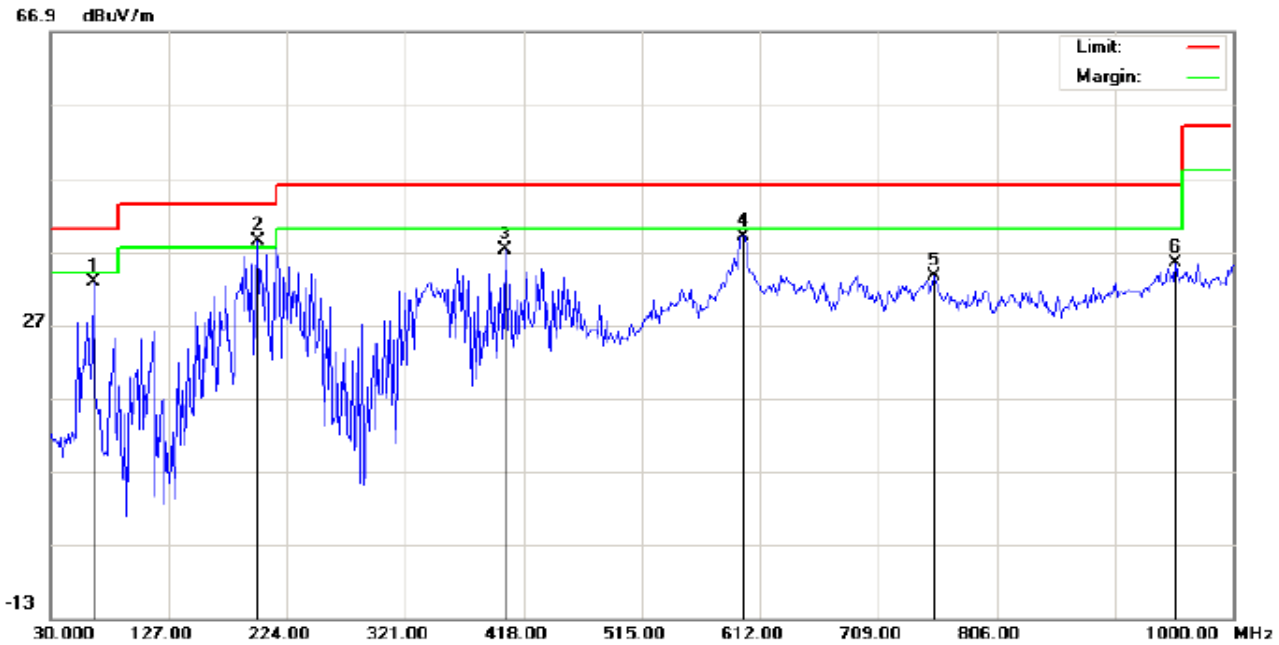
RADIATED EMISSION BELOW 30MHZ

No emission found between lowest internal used/generated frequencies to 30MHz.

RADIATED EMISSION BELOW 1GHZ

RADIATED EMISSION TEST- (30MHZ-1GHZ)-LOW CHANNEL-HORIZONTAL

Radiated Emission Measurement



Site: site #1
Limit: FCC Class B 3M Radiation
EUT: Bluetooth Keyboard GI001
M/N: GIN01BTKB
Mode: Low Channel TX
Note:

Polarization: *Horizontal*
Power:
Distance:

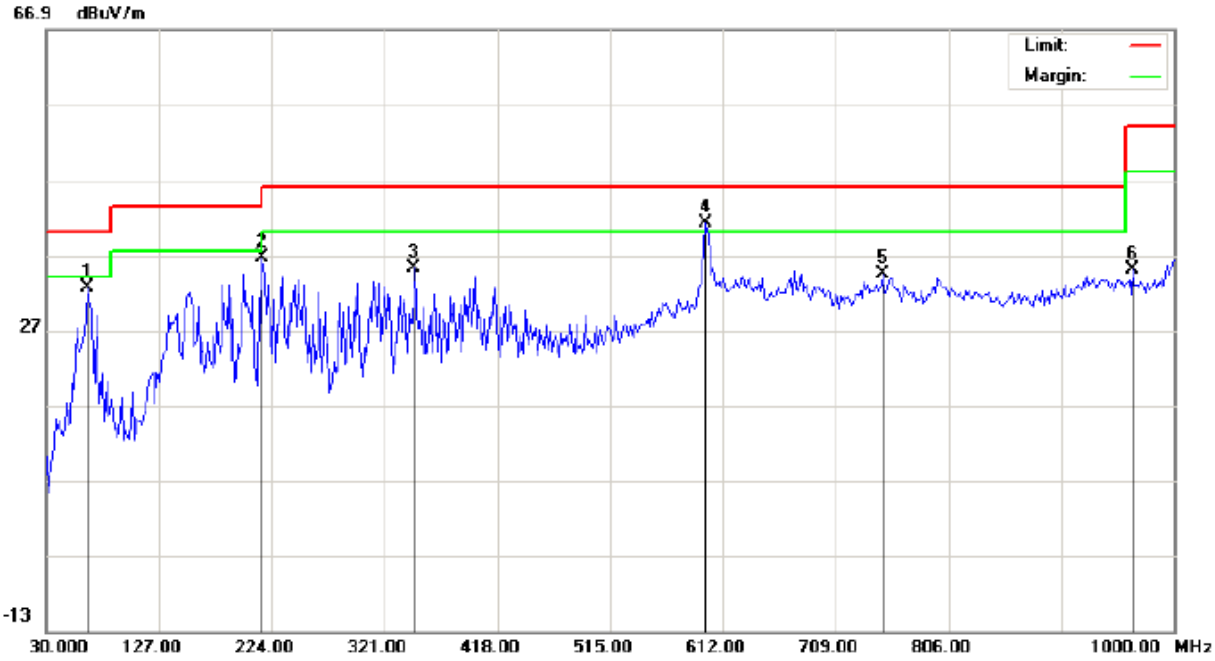
Temperature: 26
Humidity: 60 %

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	.	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		65.5664	22.22	10.65	32.87	40.00	-7.13	peak			
2	*	199.7500	26.34	11.99	38.33	43.50	-5.17	peak			
3		403.4499	18.05	19.17	37.22	46.00	-8.78	peak			
4		599.0665	15.39	23.71	39.10	46.00	-6.90	peak			
5		754.2667	6.84	26.69	33.53	46.00	-12.47	peak			
6		953.1167	5.40	29.97	35.37	46.00	-10.63	peak			

RESULT: PASS

RADIATED EMISSION TEST- (30MHZ-1GHZ)-LOW CHANNEL -VERTICAL

Radiated Emission Measurement



Site: site #1
Limit: FCC Class B 3M Radiation
EUT: Bluetooth Keyboard GI001
M/N: GIN01BTKB
Mode: Low Channel TX
Note:

Polarization: *Vertical*
Power:
Distance:

Temperature: 26
Humidity: 60 %

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	.	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		65.5666	26.56	5.98	32.54	40.00	-7.46	peak			
2		215.9166	26.10	10.56	36.66	43.50	-6.84	peak			
3		346.8666	16.77	18.53	35.30	46.00	-10.70	peak			
4	*	597.4500	18.52	22.72	41.24	46.00	-4.76	peak			
5		749.4166	7.85	26.61	34.46	46.00	-11.54	peak			
6		964.4333	5.06	29.86	34.92	54.00	-19.08	peak			

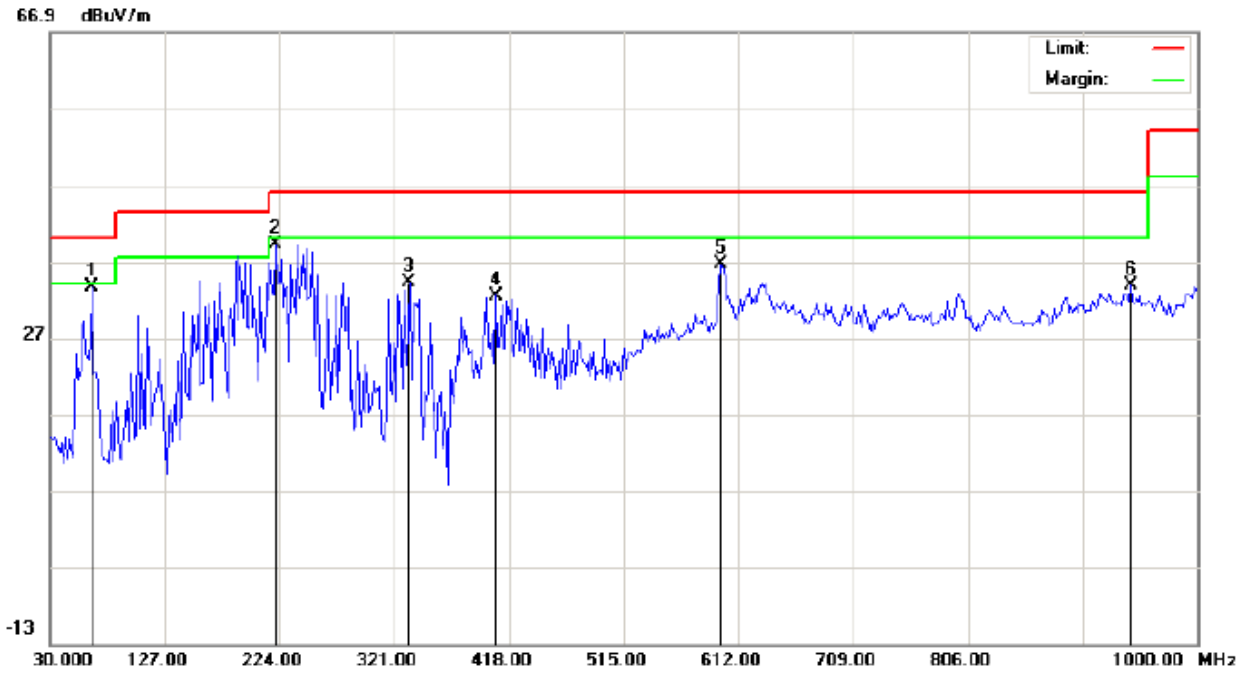
RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

2. The “Factor” value can be calculated automatically by software of measurement system.

RADIATED EMISSION TEST- (30MHZ-1GHZ)-MIDDLE CHANNEL-HORIZONTAL

Radiated Emission Measurement



Site: site #1
Limit: FCC Class B 3M Radiation
EUT: Bluetooth Keyboard GI001
M/N: GIN01BTKB
Mode: Middle Channel TX
Note:

Polarization: *Horizontal*
Power:
Distance:

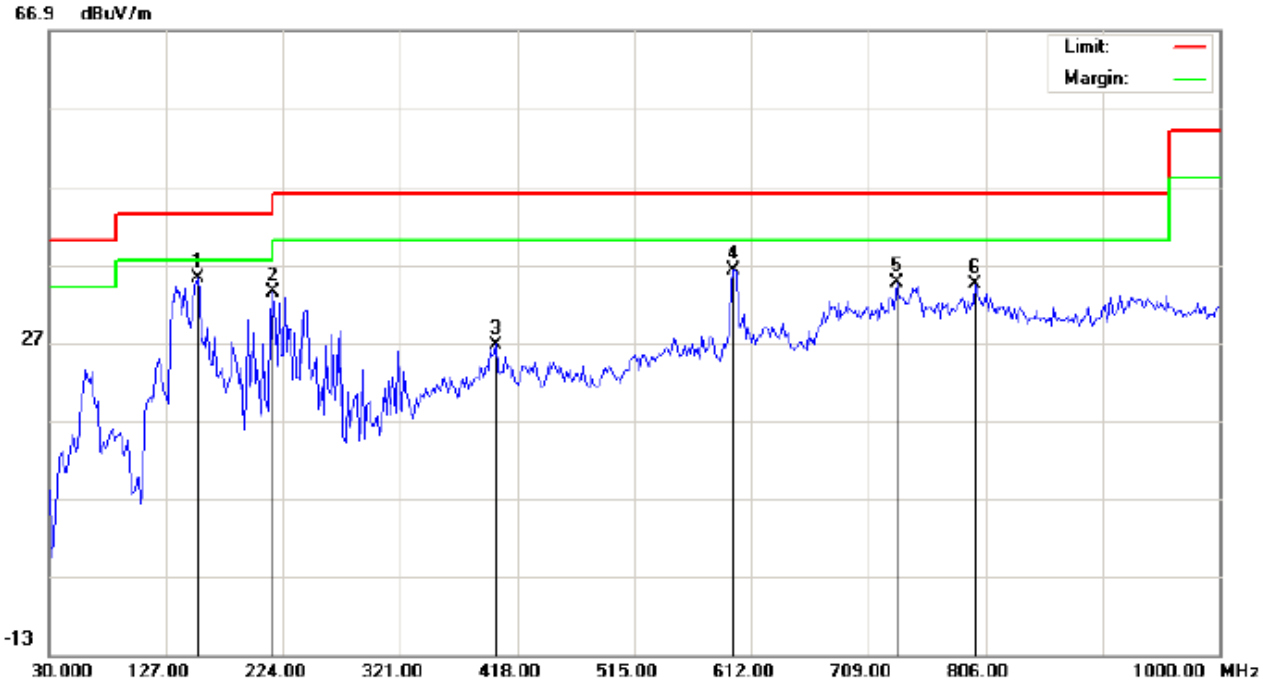
Temperature: 26
Humidity: 60 %

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	.	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	65.5666	22.87	10.65	33.52	40.00	-6.48	peak			
2		220.7666	26.51	12.79	39.30	46.00	-6.70	peak			
3		333.9332	16.55	17.67	34.22	46.00	-11.78	peak			
4		406.6832	13.23	19.27	32.50	46.00	-13.50	peak			
5		597.4500	13.01	23.67	36.68	46.00	-9.32	peak			
6		943.4166	4.04	29.82	33.86	46.00	-12.14	peak			

RESULT: PASS

RADIATED EMISSION TEST- (30MHZ-1GHZ)- MIDDLE CHANNEL -VERTICAL

Radiated Emission Measurement



Site: site #1
Limit: FCC Class B 3M Radiation
EUT: Bluetooth Keyboard GI001
M/N: GIN01BTKB
Mode: Middle Channel TX
Note:

Polarization: *Vertical*
Power:
Distance:

Temperature: 26
Humidity: 60 %

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	.	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	152.8667	19.91	15.28	35.19	43.50	-8.31	peak			
2		215.9167	22.85	10.56	33.41	43.50	-10.09	peak			
3		400.2167	7.62	19.08	26.70	46.00	-19.30	peak			
4		597.4500	13.47	22.72	36.19	46.00	-9.81	peak			
5		733.2500	8.47	26.15	34.62	46.00	-11.38	peak			
6		797.9167	7.17	27.29	34.46	46.00	-11.54	peak			

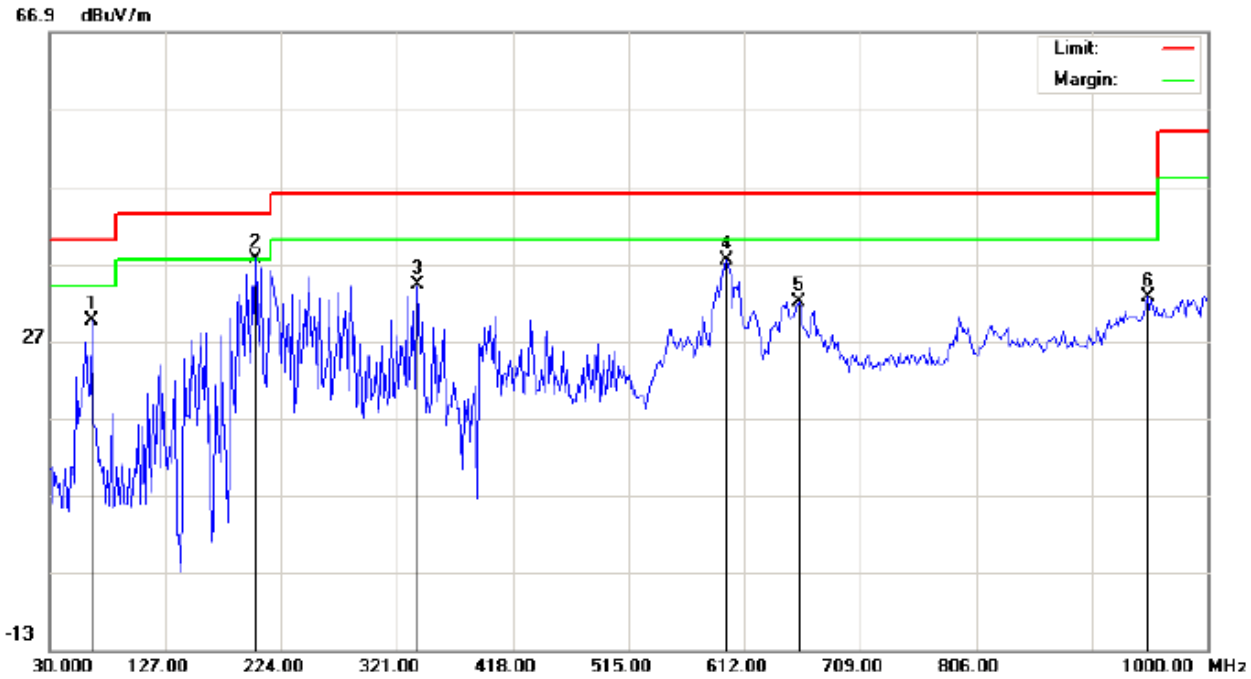
RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

2. The “Factor” value can be calculated automatically by software of measurement system.

RADIATED EMISSION TEST- (30MHZ-1GHZ)-HIGH CHANNEL-HORIZONTAL

Radiated Emission Measurement



Site: site #1
Limit: FCC Class B 3M Radiation
EUT: Bluetooth Keyboard GI001
M/N: GIN01BTKB
Mode: High Channel TX
Note:

Polarization: *Horizontal*
Power:
Distance:

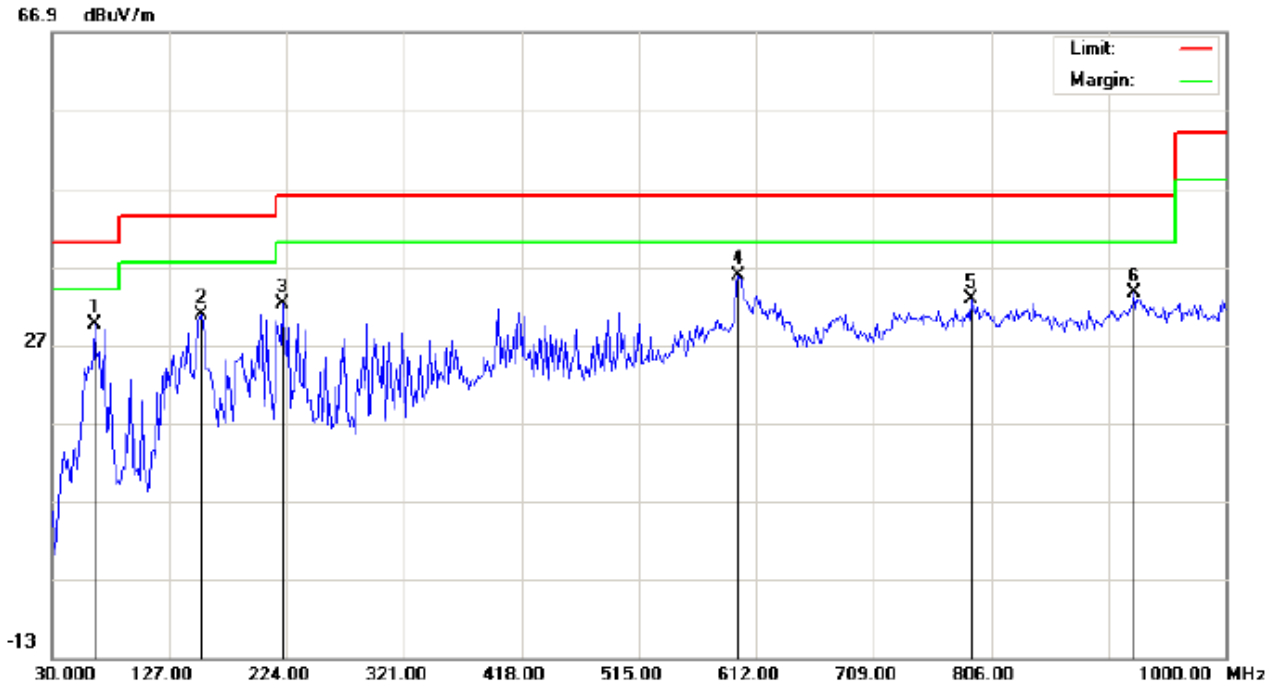
Temperature: 26
Humidity: 60 %

No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		65.5666	18.91	10.65	29.56	40.00	-10.44	peak			
2	*	202.9832	25.44	12.11	37.55	43.50	-5.95	peak			
3		338.7832	16.14	17.99	34.13	46.00	-11.87	peak			
4		597.4500	13.79	23.67	37.46	46.00	-8.54	peak			
5		657.2667	8.02	24.04	32.06	46.00	-13.94	peak			
6		949.8832	2.70	30.00	32.70	46.00	-13.30	peak			

RESULT: PASS

RADIATED EMISSION TEST- (30MHZ-1GHZ)-HIGH CHANNEL -VERTICAL

Radiated Emission Measurement



Site: site #1
Limit: FCC Class B 3M Radiation
EUT: Bluetooth Keyboard GI001
M/N: GIN01BTKB
Mode: High Channel TX
Note:

Polarization: *Vertical*
Power:
Distance:

Temperature: 26
Humidity: 60 %

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	-	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		65.5667	23.71	5.98	29.69	40.00	-10.31	peak			
2		152.8667	15.54	15.28	30.82	43.50	-12.68	peak			
3		220.7667	21.24	11.04	32.28	46.00	-13.72	peak			
4	*	597.4500	13.16	22.72	35.88	46.00	-10.12	peak			
5		789.8333	5.56	27.18	32.74	46.00	-13.26	peak			
6		924.0167	4.30	29.28	33.58	46.00	-12.42	peak			

RESULT: PASS

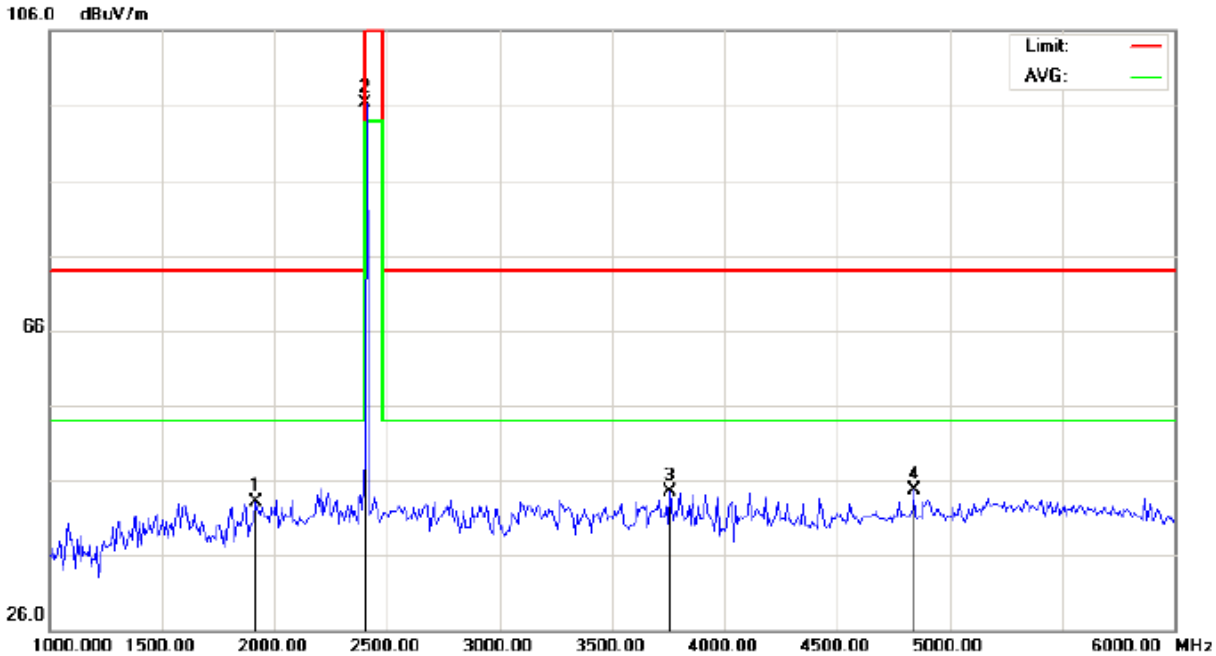
Note: 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

2. The “Factor” value can be calculated automatically by software of measurement systemRADIATED

RADIATED EMISSION ABOVE 1GHZ

RADIATED EMISSION ABOVE 1GHZ (1-10th Harmonics)-LOW CHANNEL-HORIZONTAL

Radiated Emission Measurement



Site: site #1
Limit: FCC Class B 3M Radiation above 1GHZ(PK)-
EUT:Bluetooth Keyboard GI001
M/N: GIN01BTKB
Mode: Low channel TX
Note:

Polarization: ***Horizontal***
Power:
Distance:

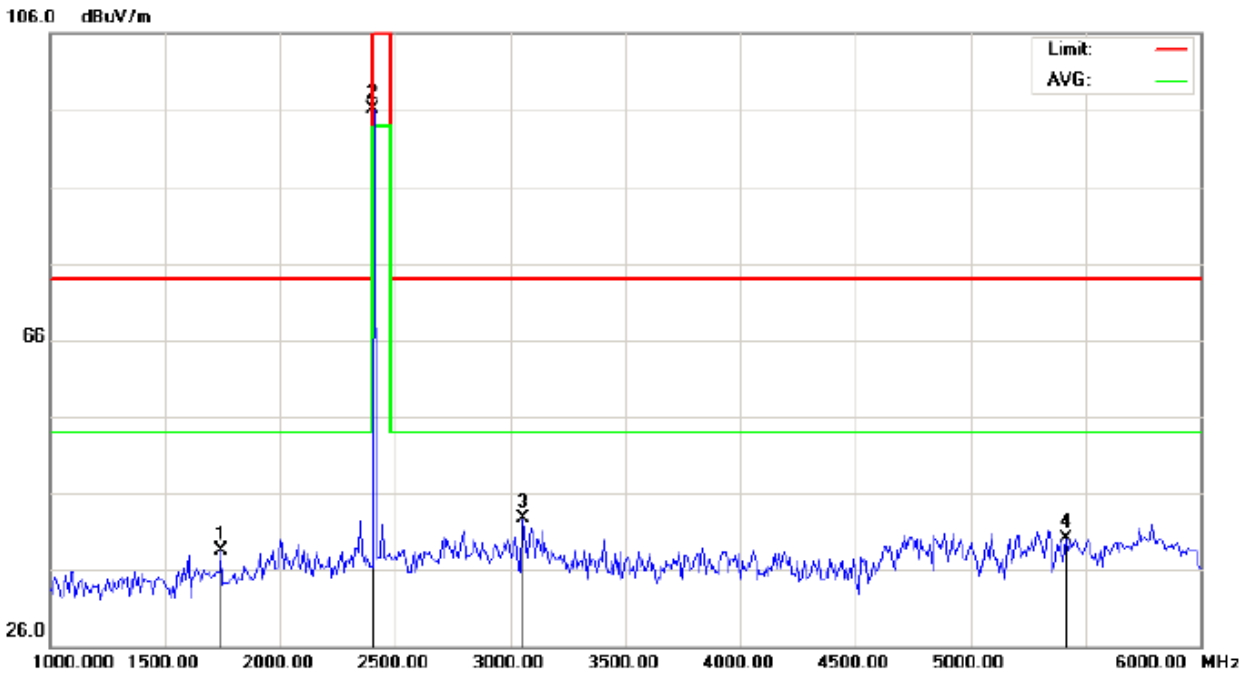
Temperature: 26
Humidity: 60 %

No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		1916.667	34.12	9.00	43.12	74.00	-30.88	peak			
2	*	2402.000	85.96	10.32	96.28	114.00	-17.72	peak			
3		3758.333	30.87	13.70	44.57	74.00	-29.43	peak			
4		4841.667	36.93	7.78	44.71	74.00	-29.29	peak			

Frequency(MHz)	Reading(dBuV)	Factor(dB)	Measurement(dBuv/m)	Limit(dBuv/m)	Over(dB)	Detector
2402.000	85.96	10.32	96.28	114	-17.72	Peak
2402.000	81.45	10.32	91.77	94	-2.23	AV
4804.250	38.14	11.11	49.25	74	-24.75	Peak
4804.250	23.16	11.11	34.27	54	-19.73	AV
7206.560	29.58	10.69	40.27	74	-33.73	Peak
7206.560	15.46	10.69	26.15	54	-27.85	AV
9608.000	---	---	---	---	---	---
12010.000	---	---	---	---	---	---
14412.00	---	---	---	---	---	---
16814.00	---	---	---	---	---	---
---	---	---	---	---	---	---

RADIATED EMISSION ABOVE 1GHZ (1-10th Harmonics)-LOW CHANNEL –VERTICAL

Radiated Emission Measurement



Site: site #1 | Polarization: *Vertical* | Temperature: 26
Limit: FCC Class B 3M Radiation above 1GHZ(PK)- | Power: | Humidity: 60 %
EUT: Bluetooth Keyboard GI001 | Distance:
M/N: GIN01BTKB
Mode: Low channel TX
Note:

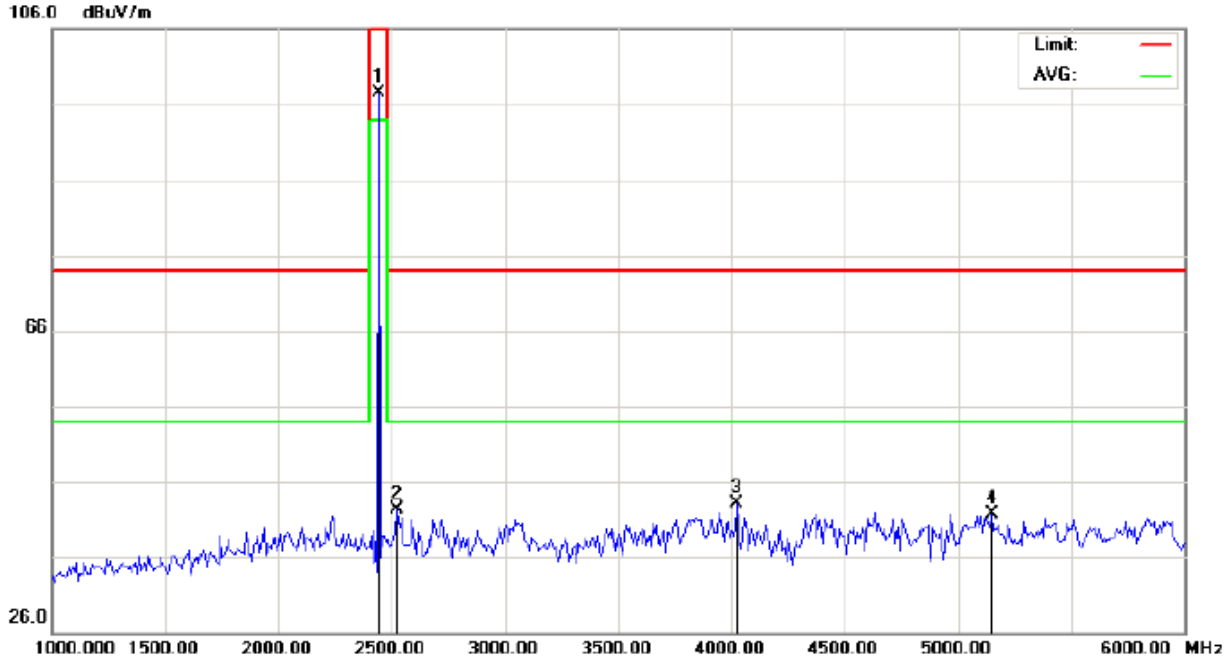
No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		1741.667	31.33	7.16	38.49	74.00	-35.51	peak			
2	*	2402.000	85.82	10.32	96.14	114.00	-17.86	peak			
3		3058.333	31.02	11.69	42.71	74.00	-31.29	peak			
4		5416.667	40.30	-0.14	40.16	74.00	-33.84	peak			

Frequency(MHz)	Reading(dBuV)	Factor(dB)	Measurement(dBuv/m)	Limit(dBuv/m)	Over(dB)	Detector
2402.000	85.82	10.32	96.14	114	-17.86	Peak
2402.000	80.63	10.32	90.95	94	-3.05	AV
4804.250	29.24	11.11	40.35	74	-33.65	Peak
4804.250	19.30	11.11	30.41	54	-23.59	AV
7206.560	24.98	10.69	35.67	74	-38.33	Peak
7206.560	11.49	10.69	22.18	54	-31.82	AV
9608.000	---	---	---	---	---	---
12010.000	---	---	---	---	---	---
14412.00	---	---	---	---	---	---
16814.00	---	---	---	---	---	---
---	---	---	---	---	---	---

RESULT: PASS

RADIATED EMISSION ABOVE 1GHZ (1-10th Harmonics)-MIDDLE CHANNEL-HORIZONTAL

Radiated Emission Measurement



Site: site #1 | Polarization: ***Horizontal*** | Temperature: 26
Limit: FCC Class B 3M Radiation above 1GHZ(PK)- | Power: | Humidity: 60 %
EUT: Bluetooth Keyboard GI001 | Distance:
M/N: GIN01BTKB
Mode: Middle channel TX
Note:

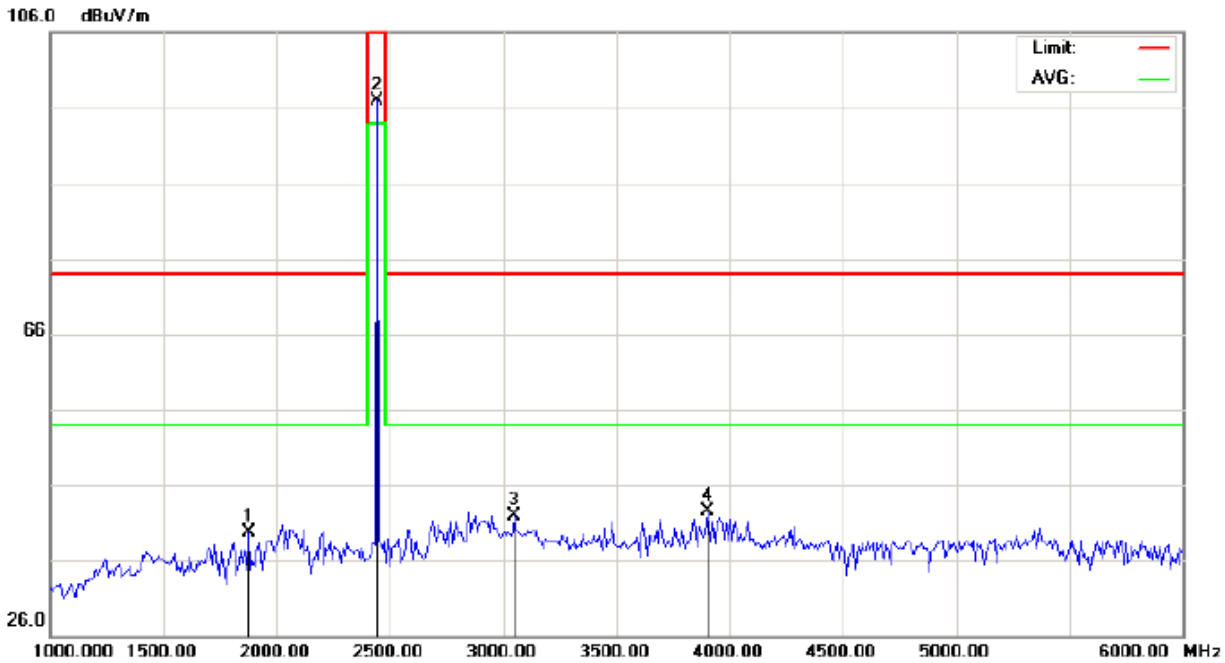
No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	-	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	2441.000	87.21	10.36	97.57	114.00	-16.43	peak			
2		2525.000	31.89	10.49	42.38	74.00	-31.62	peak			
3		4025.000	28.38	14.77	43.15	74.00	-30.85	peak			
4		5150.000	36.49	5.20	41.69	74.00	-32.31	peak			

Frequency(MHz)	Reading(dBuV)	Factor(dB)	Measurement(dBuv/m)	Limit(dBuv/m)	Over(dB)	Detector
2441.000	87.21	10.36	97.57	114	-16.43	Peak
2441.000	79.65	10.36	90.01	94	-3.99	AV
4882.150	---	---	---	---	---	Peak
4882.150	---	---	---	---	---	AV
7326.070	---	---	---	---	---	Peak
7326.070	---	---	---	---	---	AV
9678.000	---	---	---	---	---	---
12210.00	---	---	---	---	---	---
14652.00	---	---	---	---	---	---
17094.00	---	---	---	---	---	---
---	---	---	---	---	---	---

RESULT: PASS

RADIATED EMISSION ABOVE 1GHZ (1-10th Harmonics) - MIDDLE CHANNEL –VERTICAL

Radiated Emission Measurement



Site: site #1 | Polarization: *Vertical* | Temperature: 26
Limit: FCC Class B 3M Radiation above 1GHZ(PK)- | Power: | Humidity: 60 %
EUT: Bluetooth Keyboard GI001 | Distance:
M/N: GIN01BTKB
Mode: Middle channel TX
Note:

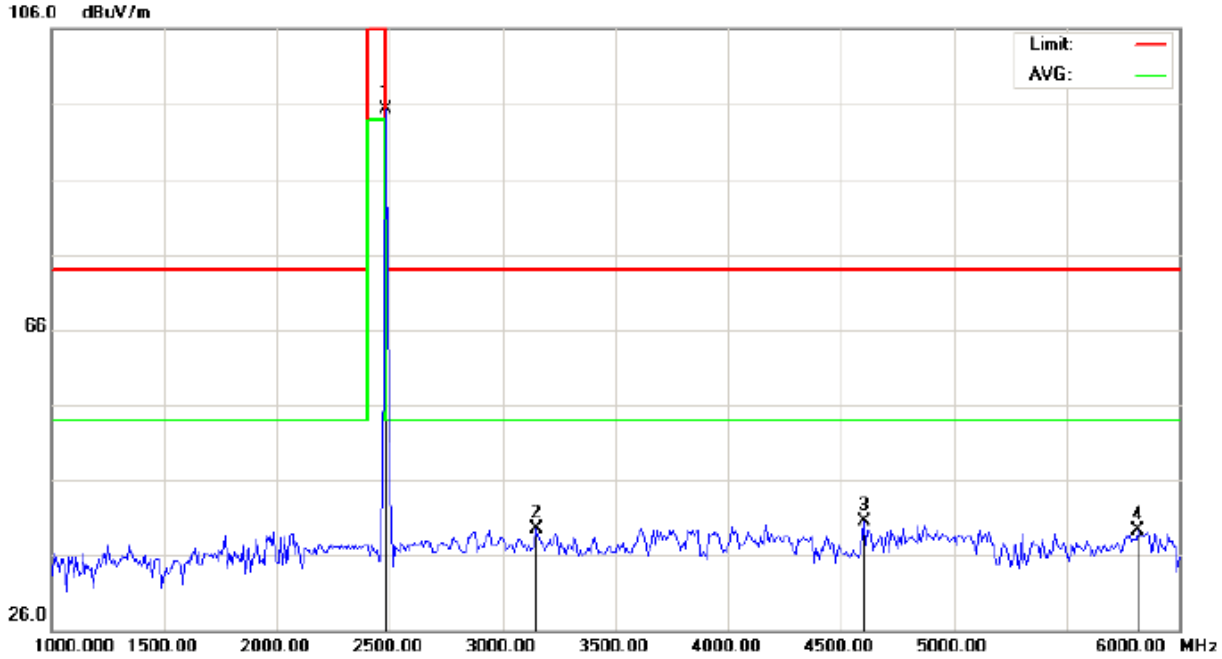
No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	.	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		1875.000	31.10	8.57	39.67	74.00	-34.33	peak			
2	*	2441.000	86.64	10.36	97.00	114.00	-17.00	peak			
3		3050.000	30.31	11.69	42.00	74.00	-32.00	peak			
4		3900.000	27.88	14.57	42.45	74.00	-31.55	peak			

Frequency(MHz)	Reading(dBuV)	Factor(dB)	Measurement(dBuv/m)	Limit(dBuv/m)	Over(dB)	Detector
2441.000	86.64	10.36	97.00	114	-17.00	Peak
2441.000	80.76	10.36	91.12	94	-2.88	AV
4882.150	---	---	---	---	---	Peak
4882.150	---	---	---	---	---	AV
7326.070	---	---	---	---	---	Peak
7326.070	---	---	---	---	---	AV
9678.000	---	---	---	---	---	---
12210.00	---	---	---	---	---	---
14652.00	---	---	---	---	---	---
17094.00	---	---	---	---	---	---
---	---	---	---	---	---	---

RESULT: PASS

RADIATED EMISSION ABOVE 1GHZ (1-10th Harmonics)-HIGH CHANNEL-HORIZONTAL

Radiated Emission Measurement



Site: site #1
Limit: FCC Class B 3M Radiation above 1GHZ(PK)-
EUT: Bluetooth Keyboard GI001
M/N: GIN01BTKB
Mode: High channel TX
Note:

Polarization: ***Horizontal***
Power:
Distance:

Temperature: 26
Humidity: 60 %

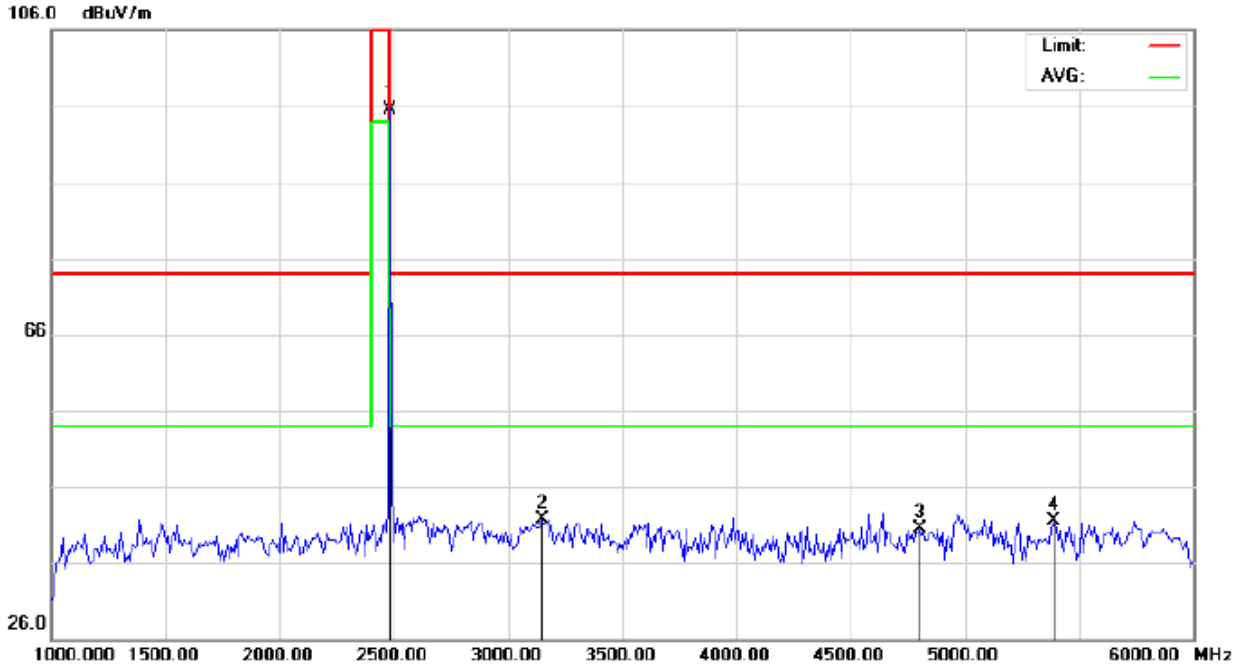
No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	2480.000	84.88	10.41	95.29	114.00	-18.71	peak			
2		3150.000	27.67	11.78	39.45	74.00	-34.55	peak			
3		4600.000	33.39	7.15	40.54	74.00	-33.46	peak			
4		5816.667	40.89	-1.66	39.23	74.00	-34.77	peak			

Frequency(MHz)	Reading(dBuV)	Factor(dB)	Measurement(dBuv/m)	Limit(dBuv/m)	Over(dB)	Detector
2480.000	84.88	10.41	95.29	114	-18.71	Peak
2480.000	80.03	10.41	90.44	94	-3.56	AV

RESULT: PASS

RADIATED EMISSION ABOVE 1GHZ (1-10th Harmonics)-HIGH CHANNEL –VERTICAL

Radiated Emission Measurement



Site: site #1 | Polarization: *Vertical* | Temperature: 26
Limit: FCC Class B 3M Radiation above 1GHZ(PK)- | Power: | Humidity: 60 %
EUT: Bluetooth Keyboard GI001 | Distance:
M/N: GIN01BTKB
Mode: High channel TX
Note:

No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	2480.000	85.19	10.41	95.60	114.00	-18.40	peak			
2		3150.000	29.84	11.78	41.62	74.00	-32.38	peak			
3		4800.000	32.87	7.68	40.55	74.00	-33.45	peak			
4		5391.667	41.13	0.36	41.49	74.00	-32.51	peak			

Frequency(MHz)	Reading(dBuV)	Factor(dB)	Measurement(dBuv/m)	Limit(dBuv/m)	Over(dB)	Detector
2480.000	85.19	10.41	95.60	114	-18.40	Peak
2480.000	80.22	10.41	90.63	94	-3.37	AV

RESULT: PASS

Note: 6~25GHz at least have 20dB margin. No recording in the test report.

Factor=Antenna Factor+ Cable loss-Amplifier gain, Margin=Measurement-Limit.

The “Factor” value can be calculated automatically by software of measurement system.

“—“means other frequencies have enough margin and no recording.

9. BAND EDGE EMISSION

9.1. MEASUREMENT PROCEDURE

1. Set the EUT Work on the top, the bottom operation frequency individually.
2. Set SPA Start or Stop Frequency = Operation Frequency, RBW=100kHz, VBW>=3RBW
3. The band edges was measured and recorded.

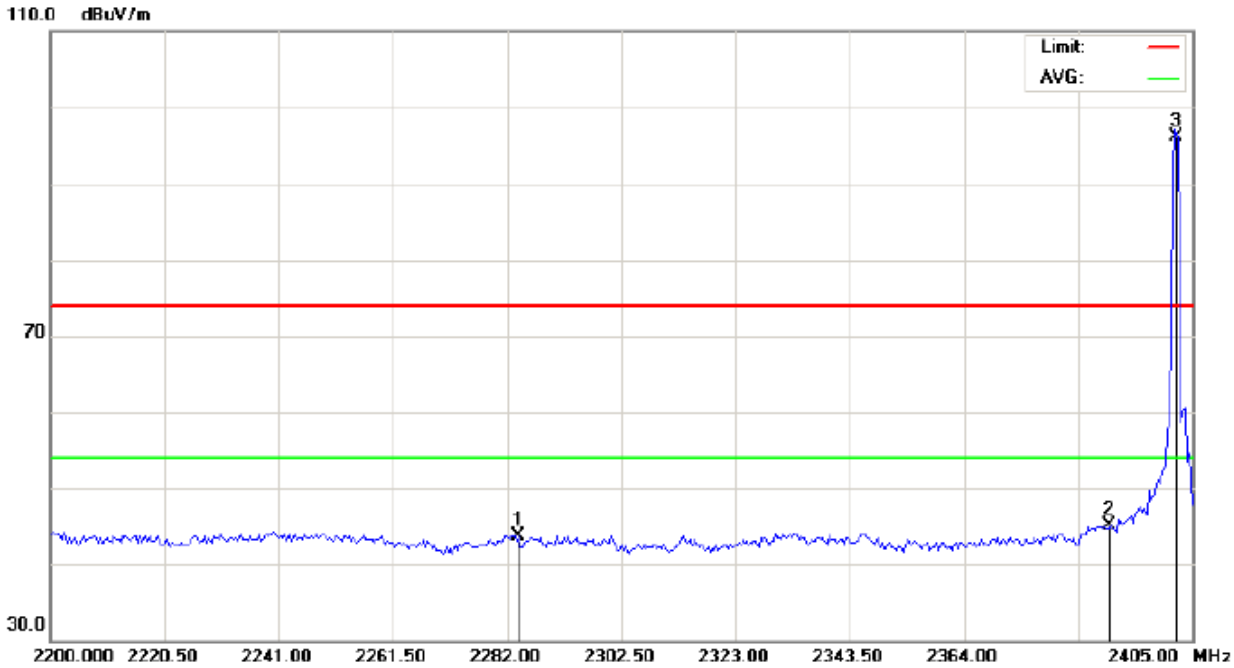
9.2. TEST SET-UP

Radiated same as 10.2

9.3. TEST RESULT

TEST PLOT OF BAND EDGE FOR LOW CHANNEL -Horizontal

Radiated Emission Measurement



Site: site #1
Limit: FCC Class B 3M Radiation above 1GHZ(PK)
EUT: Bluetooth Keyboard GI001
M/N: GIN01BTKB
Mode: Low Channel TX
Note:

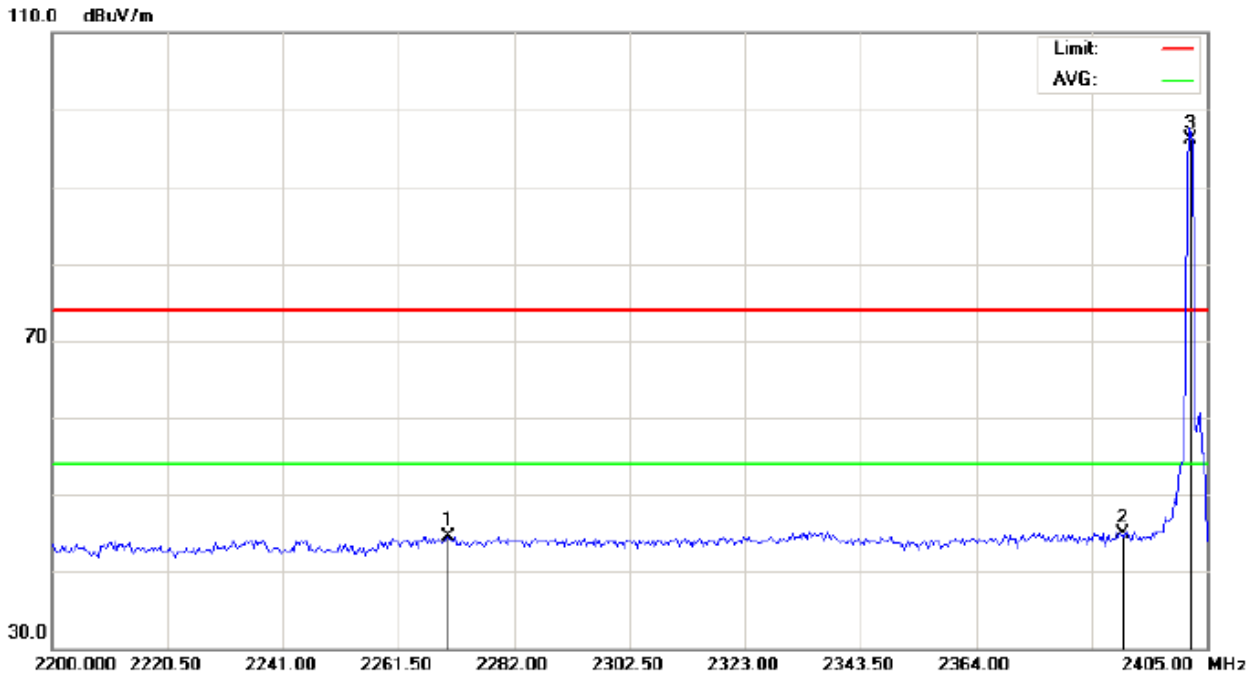
Polarization: *Horizontal*
Power:
Distance:

Temperature: 26
Humidity: 60 %

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	.	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		2284.050	33.59	10.19	43.78	74.00	-30.22	peak			
2		2390.000	34.72	10.31	45.03	74.00	-28.97	peak			
3	*	2402.000	85.83	10.32	96.15	74.00	22.15	peak			

TEST PLOT OF BAND EDGE FOR LOW CHANNEL -Vertical

Radiated Emission Measurement



Site: site #1
Limit: FCC Class B 3M Radiation above 1GHZ(PK)
EUT: Bluetooth Keyboard GI001
M/N: GIN01BTKB
Mode: Low Channel TX
Note:

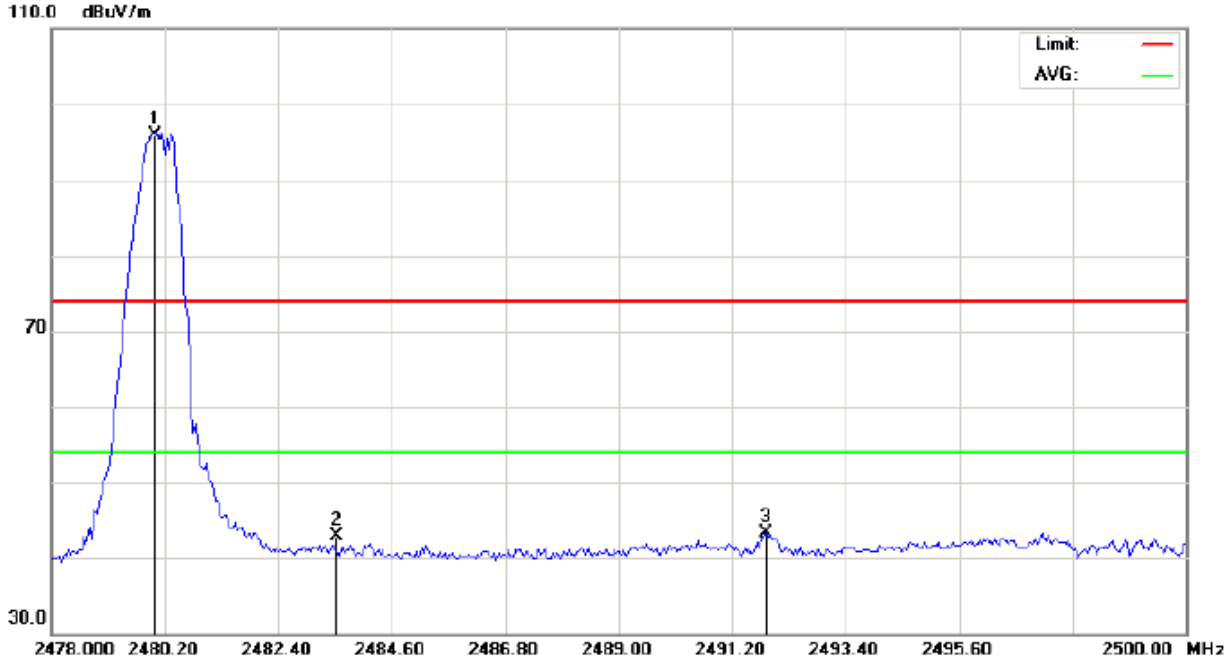
Polarization: *Vertical*
Power:
Distance:

Temperature: 26
Humidity: 60 %

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	.	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		2270.383	34.39	10.18	44.57	74.00	-29.43	peak			
2		2390.000	34.58	10.31	44.89	74.00	-29.11	peak			
3	*	2402.000	85.78	10.32	96.10	74.00	22.10	peak			

TEST PLOT OF BAND EDGE FOR HIGH CHANNEL -Horizontal

Radiated Emission Measurement



Site: site #1
Limit: FCC Class B 3M Radiation above 1GHZ(PK)
EUT: Bluetooth Keyboard GI001
M/N: GIN01BTKB
Mode: High Channel TX
Note:

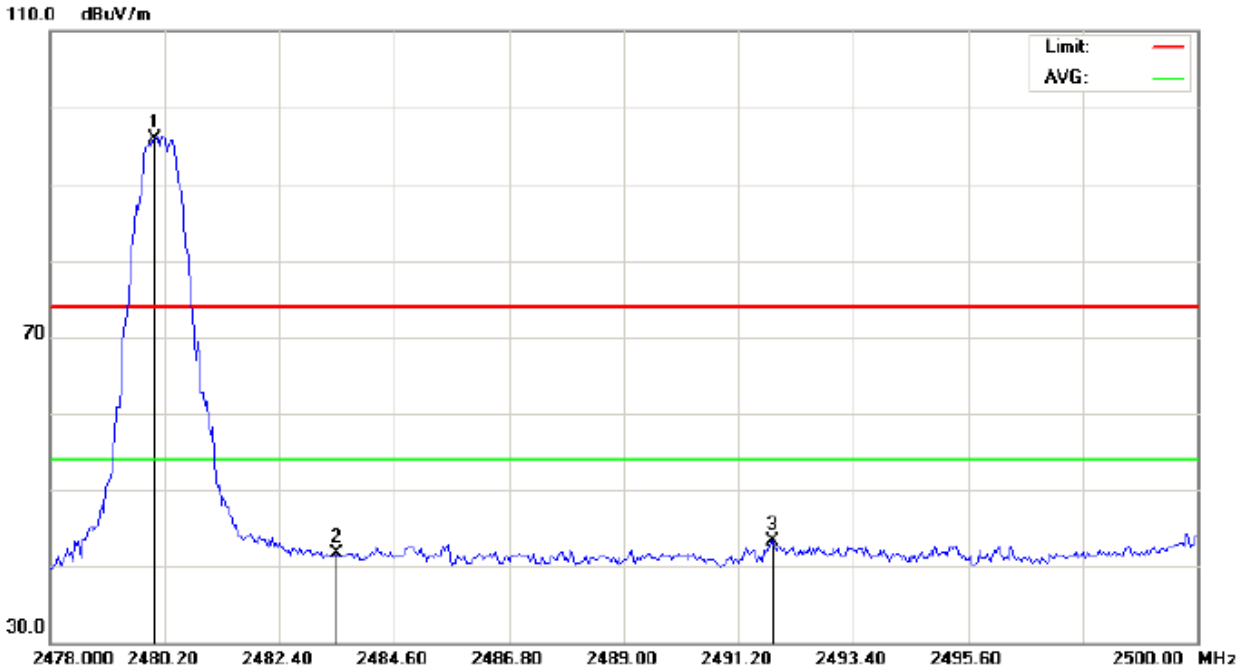
Polarization: ***Horizontal***
Power:
Distance:

Temperature: 26
Humidity: 60 %

No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	2480.000	85.44	10.41	95.85	74.00	21.85	peak			
2		2483.537	32.53	10.41	42.94	74.00	-31.06	peak			
3		2491.860	32.93	10.42	43.35	74.00	-30.65	peak			

TEST PLOT OF BAND EDGE FOR HIGH CHANNEL -Vertical

Radiated Emission Measurement



Site: site #1
Limit: FCC Class B 3M Radiation above 1GHZ(PK)
EUT: Bluetooth Keyboard GI001
M/N: GIN01BTKB
Mode: High Channel TX
Note:

Polarization: *Vertical*
Power:
Distance:

Temperature: 26
Humidity: 60 %

No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	2480.000	85.41	10.41	95.82	74.00	21.82	peak			
2		2483.500	31.29	10.41	41.70	74.00	-32.30	peak			
3		2491.860	32.87	10.42	43.29	74.00	-30.71	peak			

RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

2. The “Factor” value can be calculated automatically by software of measurement system.

3.Hopping on and hopping off mode have been tested and only worst case record.

10. FCC LINE CONDUCTED EMISSION TEST

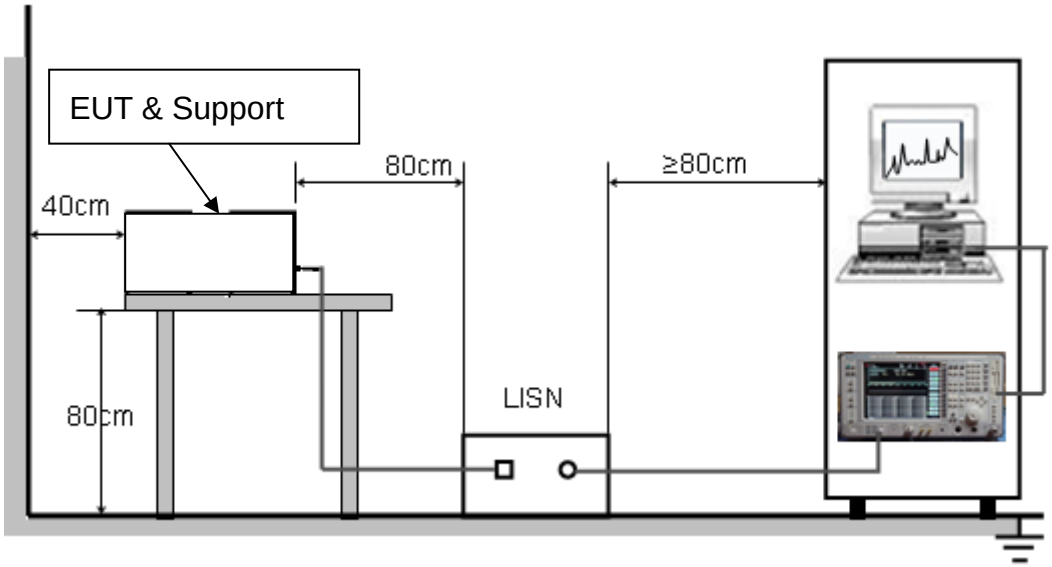
10.1. LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P.(dBuV)	Average(dBuV)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Note:

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

10.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



10.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.4.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
4. All support equipments received AC120V/60Hz power from a LISN, if any.
5. The EUT received DC charging voltage by PC which received 120V/60Hzpower by a LISN..
6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.
9. The test mode(s) were scanned during the preliminary test.

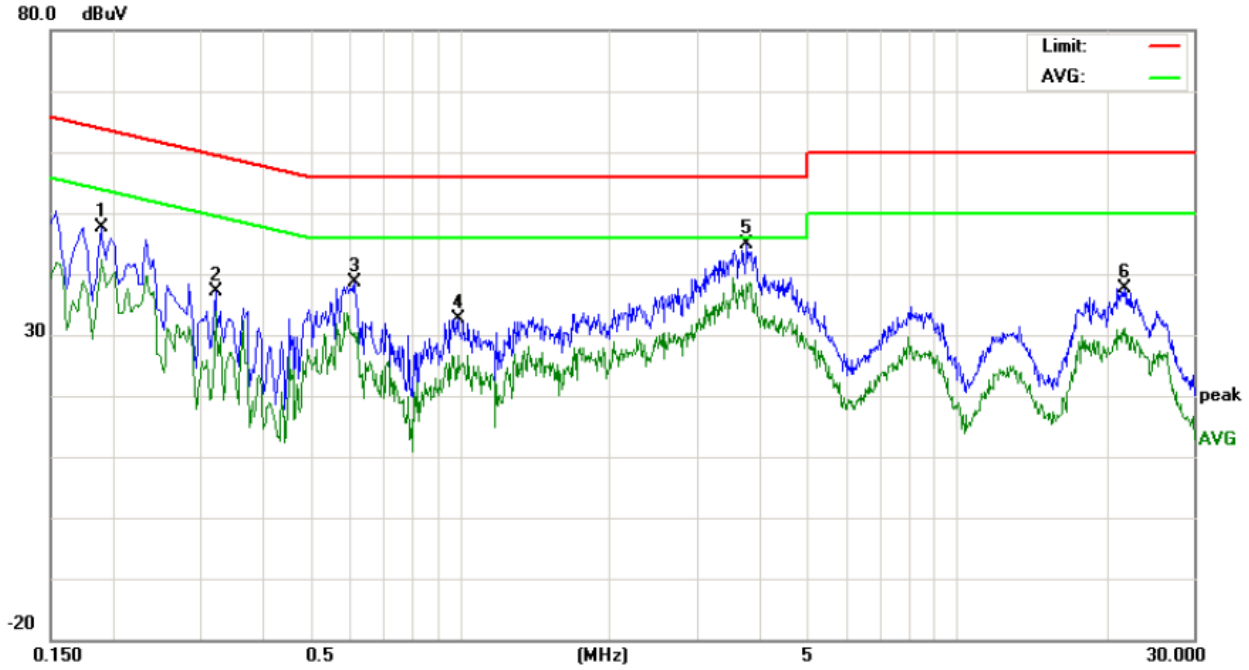
Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

10.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less –2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3. The test data of the worst case condition(s) was reported on the Summary Data page.

10.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

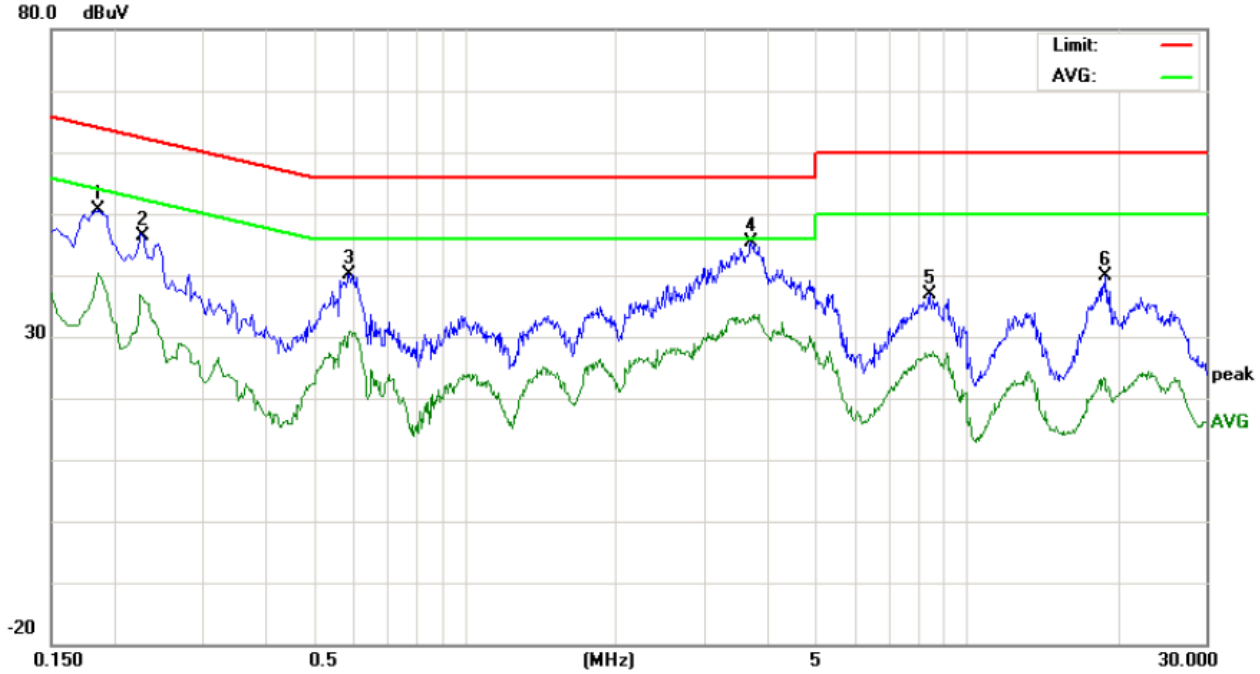
Conducted Emission Measurement



Site: Conduction | Phase: *L1* | Temperature: 26
Limit: FCC Class B Conduction(QP) | Power: | Humidity: 60 %
EUT: Bluetooth Keyboard GI001
M/N: GIN01BTKB
Mode: Normal operation
Note:

No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG	dB	Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1900	37.30		32.10	10.20	47.50		42.30	64.03	54.03	-16.53	-11.73	P	
2	0.3220	26.79		23.62	10.30	37.09		33.92	59.65	49.65	-22.56	-15.73	P	
3	0.6140	28.31		19.93	10.32	38.63		30.25	56.00	46.00	-17.37	-15.75	P	
4	0.9900	22.37		16.26	10.37	32.74		26.63	56.00	46.00	-23.26	-19.37	P	
5	3.7860	34.33		27.98	10.46	44.79		38.44	56.00	46.00	-11.21	-7.56	P	
6	21.7860	27.44		20.99	10.12	37.56		31.11	60.00	50.00	-22.44	-18.89	P	

Conducted Emission Measurement



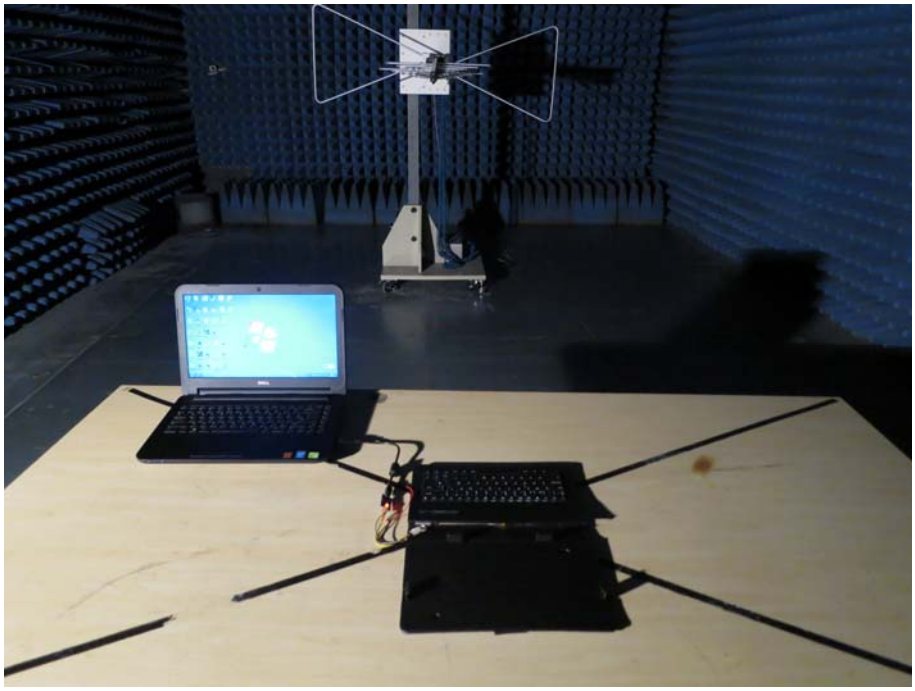
Site: Conduction | Phase: *N* | Temperature: 26
Limit: FCC Class B Conduction(QP) | Power: | Humidity: 60 %
EUT: Bluetooth Keyboard GI001
M/N: GIN01BTKB
Mode: Normal operation
Note:

No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG	dB	Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1860	40.37		30.13	10.20	50.57		40.33	64.21	54.21	-13.64	-13.88	P	
2	0.2304	36.88		26.84	10.25	47.13		37.09	62.43	52.43	-15.30	-15.34	P	
3	0.5899	29.88		20.53	10.32	40.20		30.85	56.00	46.00	-15.80	-15.15	P	
4	3.7340	34.82		22.20	10.47	45.29		32.67	56.00	46.00	-10.71	-13.33	P	
5	8.4500	26.52		16.77	10.34	36.86		27.11	60.00	50.00	-23.14	-22.89	P	
6	18.9940	29.65		11.51	10.12	39.77		21.63	60.00	50.00	-20.23	-28.37	P	

APPENDIX A: PHOTOGRAPHS OF TEST SETUP

FCC LINE CONDUCTED EMISSION TEST SETUP

FCC RADIATED EMISSION TEST SETUP



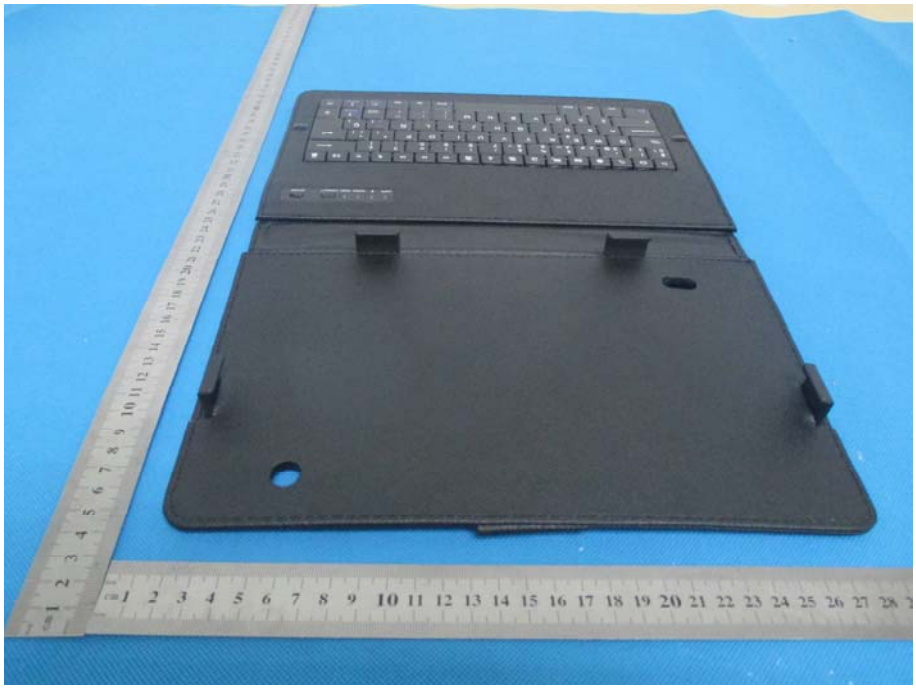
APPENDIX B: PHOTOGRAPHS OF EUT

TOP VIEW OF EUT

BOTTOM VIEW OF EUT

FRONT VIEW OF EUT

BACK VIEW OF EUT

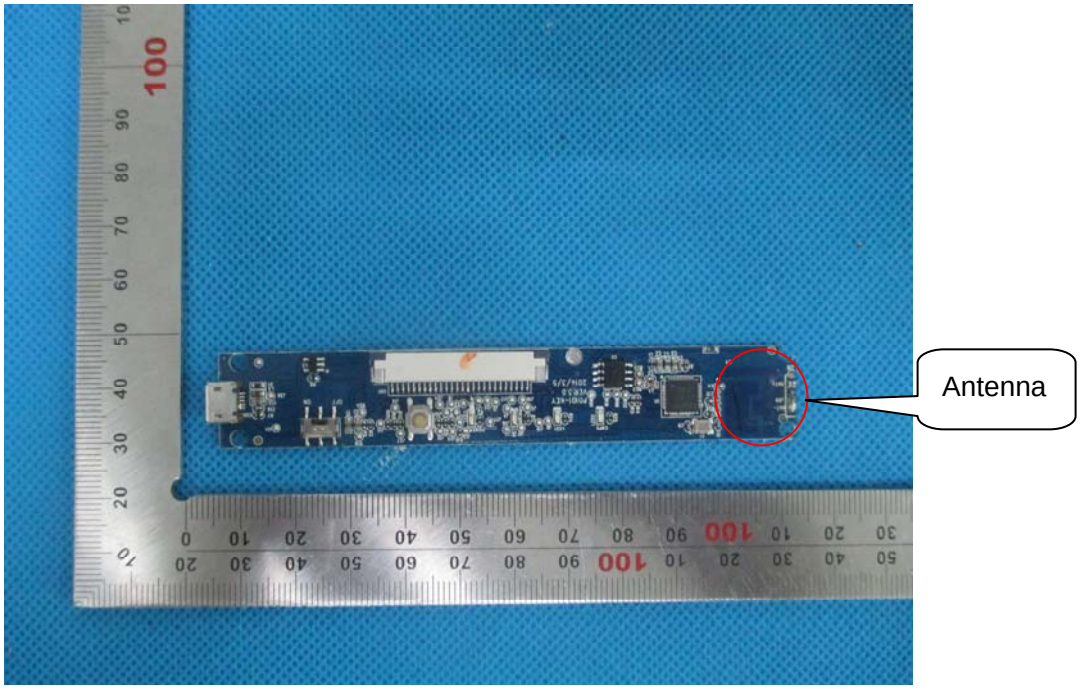


LEFT VIEW OF EUT

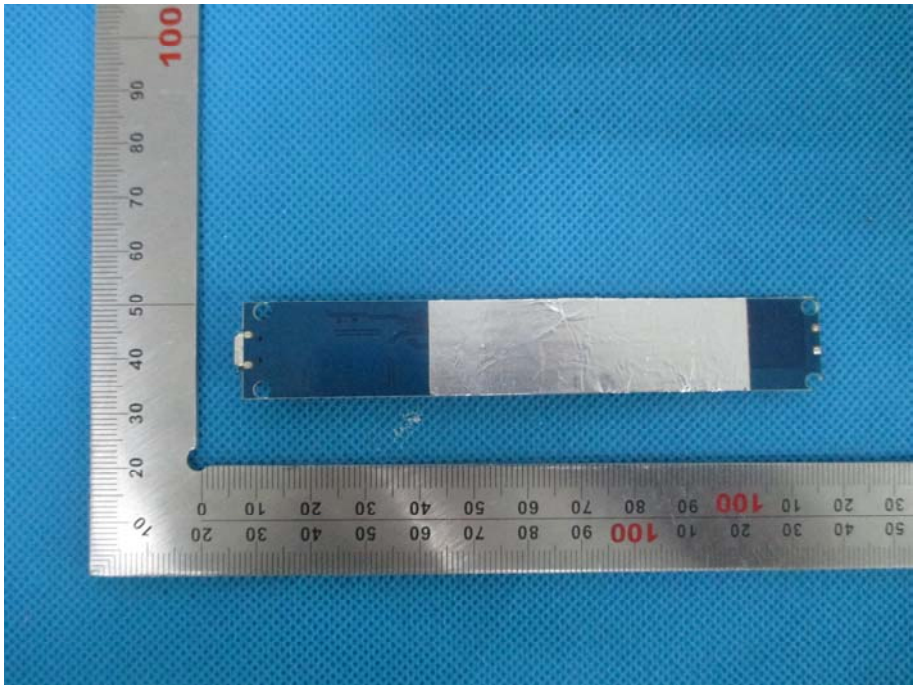
RIGHT VIEW OF EUT

OPEN VIEW OF EUT

INTERNAL VIEW OF EUT-1



INTERNAL VIEW OF EUT-2



----END OF REPORT----