Report No. : FCC-P-03035

# **Measurement Report**

### FCC ID:Q7KREVO-TPC

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

Issued Date	:	Nov. 16, 2003
Project No.	:	03E0458
Equipment	:	Notebook PC
Model No.	:	REVOLUTION SERIES TPC-Edition
Applicant	:	TAIWAN MYCOMP CO., LTD. 1FL, NO. 16, LANE 50, NANKANG RD., SEC. 3, NANKANG DISTRICT, TAIPEI, TAIWAN

Tested by : Neutron Engineering Inc. EMC Laboratory Data of Test : Aug. 11, 2003 ~ Nov. 06, 2003

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#### Limitation

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### Assessment Authorities

# NV (A) Lab Code: 200145-0

### Test Standard/Scope/Item Acceptance

FCC Part 15 Subpart B IEC/CISPR22 AS/NZS 3548 CNS 13438

FCC Part 15 Subpart B CISPR 22/EN 55022 AS/NZS 3548 VCCI -Technical Requirement CNS 13438 SS IEC/CISPR 22 IEC/EN 61000-3-2 IEC/EN 61000-4-5 IEC/EN 61000-3-3 IEC/EN 61000-4-6 IEC/EN 61000-4-2 IEC/EN 61000-4-8 IEC/EN 61000-4-3 IEC/EN 61000-4-11 IEC/EN 61000-4-4



	Table of Contents	Page
1	General Information	6
	1.1 Applicant	6
	1.2 Manufacturer	6
	1.3 Equipment Under Tested	6
	1.4 OEM Brand/Model	6
	1.5 Product Description	6
	1.6 Connecting I/O Port(s)	6
	1.7 Power Supplied	6
	1.8 Products Covered	7
	1.9 Model Difference (Series, Versions, if any)	7
	1.10 EUT Modifications	7
	1.11 Electric Block Diagram	7
	1.12 Photos of EUT	7
2	RFI Emissions Measurement	8
	2.1 Test Facility	8
	2.2 Standard Compliance	8
	2.3 Test Conditions and Channel	8
	2.4 Test Methodology	8
	2.5 Deviations from Standard Test Method	8
	2.6 Sample(s) Tested	9
	2.7 Measurement Instrument	9
	2.8 Measurement Uncertainty 2.9 Tested System Set Up/Configuration Details	9
	Z.9 Tested System Set-Op/Comgutation Details	9 10
	Diagram 1 Block diagram showing the configuration of system	10
	Table - 2 Equipments Used in Tested System	10
	Table - 2 Information of Interface Cable	12
	2 10 Max (Worst Case) RE Emission Evaluation	12
	2.11 FUT Operation	13
3	Justification	14
•	3.1 Limitations	14
	3.1.1 Power Line Conducted Emission	14
	3.1.2 Radiated Emission Limits	14
	3.2 Measurement Justification	15
	3.2.1 Conducted Emission	15
	3.2.2 Radiated Emission	15
	3.2.3 Field Strength Calculation	16
	3.3 Measurement Data	18
	Table 4 Conducted Emission Data	20
	Table 5 Radiated Emission Data	22
4	Hopping Channel Carrier Frequency Separated	30
	4.1 Applied standard / limit	30

	Table of Contents	Page
	4.2 Test Setup	30
	4.3 Test Result	30
5.	Number of Hopping Channel	31
	5.1 Applied standard / limit	31
	5.2 Test Setup	31
	5.3 Test Result	31
6.	Average Time of Occupancy	32
	6.1 Applied standard / limit	32
	6.2 Test Setup	32
	6.3 Test Result	32
7.	Bandwidth	33
	7.1 Applied standard / limit	33
	7.2 Test Setup	33
_	7.3 Test Result	33
8.	Peak Output Power	34
	8.1 Applied standard / limit	34
	8.2 Test Setup	34
-	8.3 Test Result	34
9.	Antenna conducted Spurious Emission	35
	9.1 Applied standard / limit	35
	9.2 Test Setup	35
40	9.3 Test Result	35
10.	Power Spectral Density	36
	10.1 Applied standard / limit	36
		36
	10.3 Test Result	36
11.	Maximum Permissible Exposure (MPE)	37
	11.1 Applied standard / limit	37
10	Attachment	37
12	A Electric Block Diagram	30 20
	R. EIIT Modification Description	39
	C FUT Test Photos	40
	D FUT Photos	41
	E Liser's Manual	113
	E. User's Manual E. Honning Channel Carrier Frequency Senarated	113
	G Number of Hopping Channel	114
	H Average Time of Occupancy	110
	I. Bandwidth	121
	J. Peak Output Power	126
	K. Antenna conducted Spurious Emission	131
	L. Power Spectral Density	133
	M. Restricted Bands Requirements	135-1
	N.Product Labeling	136

### **1. General Information**

1.1 Applicant

Name TAIWAN MYCOMP CO., LTD.

Address 1FL, NO. 16, LANE 50, NANKANG RD., SEC. 3, NANKANG DISTRICT, TAIPEI, TAIWAN

1.2 Manufacturer

Name N/A Address N/A

- 1.3 Equipment Under Tested Name: Notebook PC Trade Name: kontron Model No.: REVOLUTION SERIES TPC-Edition
- 1.4 OEM Brand/Model (if applicable)
   OEM Brand(s)/Model(s) except the basic model in sub-clause 1.3 is(are) the follows:
   OEM Brand: MYCOMP
   Model No.: REVOLUTION SERIES TPC-Edition

1.5 Product Descriptions(Application/Features/Specification)

The EUT is a Notebook PC. A major technical descriptions of EUT is described as following:

	CPU	Intel Mobile Pentium®III-M 1.2 GHz or higher
	Main Battery	Lithium Ion battery - 57 Watt, 3.5 hour life (approximate)
	BIOS	PhoenixBIOS 4.0, Release 6
	RAM	128 MB SDRAM standard
	L2-Cache	512KB
	Keyboard	Full-size QWERTY keyboard with 84 keys (USA Standard)
	Interfaces	1x Power Connector with 10-28 VDC, 4.6 Amps 1x Serial Port (COM 1) 2x USB 2.0 Ports Docking connector 1x RJ11 56K V.90 Modem 1x RJ45 10/100Mbs Ethernet/LAN Audio phone jacks: 1x MIC-In 1x Line-In 1x Speaker-Out Integrated: 802.11b WLAN, Bluetooth PAN
	PCMCIA	Card BUS connector provides two open PC Card slots that accommodate two Type II, or one Type III PCMCIA device.
Graphics Controller		Integrated Direct AGP Graphics Core frequency up to 166 MHz 350 MHz RAM DAC Video-RAM: 8 to 48 MB of Dynamic Video Memory (shared) Up to 32 MB with 128 MB RAM; 48 MB with 256 MB RAM

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 (Attachment - E.)

Report No. : FCC-P-03035

Channel List (for Bluetooth)						
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	
01	2402	31	2432	61	2462	
02	2403	32	2433	62	2463	
03	2404	33	2434	63	2464	
04	2405	34	2435	64	2465	
05	2406	35	2436	65	2466	
06	2407	36	2437	66	2467	
07	2408	37	2438	67	2468	
08	2409	38	2439	68	2469	
09	2410	39	2440	69	2470	
10	2411	40	2441	70	2471	
11	2412	41	2442	71	2472	
12	2413	42	2443	72	2473	
13	2414	43	2444	73	2474	
14	2415	44	2445	74	2475	
15	2416	45	2446	75	2476	
16	2417	46	2447	76	2477	
17	2418	47	2448	77	2478	
18	2419	48	2449	78	2479	
19	2420	49	2450	79	2480	
20	2421	50	2451			
21	2422	51	2452			
22	2423	52	2453			
23	2424	53	2454			
24	2425	54	2455			
25	2426	55	2456			
26	2427	56	2457			
27	2428	57	2458			
28	2429	58	2459			
29	2430	59	2460			
30	2431	60	2461			
	_	Channel List	(for 802.11b)		_	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	⊢requency (MHz)	
01	2412	05	2432	09	2452	
02	2417	06	2437	10	2457	
03	2422	07	2442	11	2462	
04	2427	08	2447			

1.6 Connecting I/O Port(s) Please refer to the User's Manual (Attachment - E.)						
1.7 Power Supplied						
Power Source: AC Mains.						
Power Cord: Permanently co	onnected, non-shielded type, attached v	with a ferrite core.				
Power Rating: AC I/P 100-240	)Vac, 1.8A, 60W, 50-60Hz /DC O/P 12V	dc, 4.58A				
1.8 Products Covered (if applicable) The sample tested including the	following sub-system/module/accessory	·:				
Sub-system/ Module/ Access	ory Model/Type No.	Int. Inst./ Ext. Cont.				
Adapter	F1960A/ ILAN	Ext.				
Adapter	F19603A/ ILAN	Ext.				
Docking	<b>REVO-IOSTICK/</b> kontron	Int.				
3.5" FLOPPY DRIVE MODU	LE REVO-FDD/ kontron	Int.				
CD-RW ROM DRIVE MODU	LE REVO-CD-RW/ kontron	Int.				
DVD ROM DRIVE MODULI	E REVO-DVD/ kontron	Int.				
DVD/CD-RW ROM DRIVE MOI	DULE REVO-DVD/CD-RW/ kontron	Int.				
CD-ROM DRIVE MODULE	E REVO-CD/ kontron	Int.				
RF MODULE	EM9-BT/WISTRON	Int.				
RF MODULE	EM9-NB/WISTRON	Int.				

Note:

RFMODULE: EM9-BT is identical to the RF MODULE: EM9-NB except the function designation. EM9-BT: WLAN and Bluetooth

EM9-NB: Only WLAN(removed the Bluetooth function)

The EUT operated RF Module:EM9-BT was found to be the worst case and collecting test data included in this repoet.

1.9 Model Difference (Series, Versions, if any)

Except the basic model no. (model designation of the sample tested in this test report), additional model no. covered is(are) :

N/A

1.10 EUT Modifications (if applicable)

No any modification required for the EUT to comply with the standards.

1.11 Electric Block Diagram

Please refer to the Attachment – A.

### 1.12 Photos of EUT

Please refer to the Attachment – **D**.

### 2. RFI Emissions Measurement

#### 2.1Test Facility

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

#### 2.2 Standard Compliance

The test data contained in this report relate only to the item(s) listed below : FCC Part15, Subpart C / ANCI C63.4 : 1992

The composite system (including receiver and transmitter) in compliance with Subpart B is authorized under a DoC procedure.

#### 2.3 Test Conditions and Channel

802.11b WLAN NOTE:(3)					
Test Mode	EUT Channel	Test Frequency (MHz)			
1	CH 01	2412			
2	CH 06	2437			
3	CH 11	2462			
Bluetooth PAN (3)		NOTE:(1)(2)			
Test Mode	EUT Channel	Test Frequency (MHz)			
1	CH 01	2402			
2	CH 40	2441			
3	CH 79	2480			

Note:

(1)The measurements are performed at the highest, middle, lowest available channels with the hopping function disabled.

(2)Unless otherwise specified the above condition, the test was performed while EUT had its hopping function enabled.

(3)The measurements are performed at the highest, middle, lowest available channels.

### 2.4 Test Methodolog

Both conducted and radiated testing were performed during the max. EMI emission evaluation.

Test procedures according to the technical standards : (Antenna to EUT distance is 3 m)

	FCC Part15 (15.247) , Subpart C						
Section	Test Item	Equipm requir	Result				
		802.11b	Bluetooth				
15.207	Conducted Emission	Applicable	Applicable	PASS			
15.247 (c)	Antenna conducted Spurious Emission	Applicable	Applicable	PASS			
15.247 (a)(1)	Hopping Channel Carrier Frequency Separated	N/A	Applicable	PASS			
15.247 (a)(1)(ii)	Number of Hopping Channel	N/A	Applicable	PASS			
15.247 (a)(1)(ii)	Average Time of Occupancy	N/A	Applicable	PASS			
15.247 (a)(1)(ii)	20dB Bandwidth	N/A	Applicable	PASS			
15.247 (a)(2)	6dB Bandwidth	Applicable	N/A	PASS			
15.247 (b)	Peak Output Power	Applicable	Applicable	PASS			
15.247 (c)	Radiated Spurious Emission	Applicable	Applicable	PASS			
15.247 (d)	Power Spectral Density	Applicable	N/A	PASS			
15.203	Antenna Requirement	Applicable	Applicable	PASS			
1.1307 1.1310 2.1091 2.1093	RF Exposure Compliance	Applicable	Applicable	PASS			

### 2.5 Deviations from Standard Test Method

N/A

### 2.6 Sample(s) Tested

The representative sample tested in this reports is(are): REVOLUTION SERIES TPC-Edition Test results in this test report relate only to the sample(s) tested.

The EUT has been tested according to the following environmental condition:

Input Power	110 Vac/60Hz
Temperature	28
Relative Humidity	68 %

### 2.7 Measurement Instruments

Valid measurement instruments used in this report refer to **Table-1** enclosed.

### 2.8 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 :5.05dB

B. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	Ant. H / V	U , (dB)	NOTE
OS-01	ANSI	30MHz ~ 200MHz	Н	4.59	
		30MHz ~ 200MHz	V	4.80	
		200MHz ~ 1,000MHz	Н	4.47	
		200MHz ~ 1,000MHz	V	5.03	

### 2.9 Tested System Set-Up/Configuration Details

The system was configured for testing in a typical fashion (as a user would normally use) or in-accordance with the operating configuration specified in the user's manual. A Block Diagram(please refer to the Diagram - 1) and Photos(please refer to the attachment - C) showing the set-up/configuration of system tested. In addition, **Table-2** and **Table-3** provide a detail of all equipment items and cables information used in the system tested.

ltem	Instruments	Mfr/Brand	Model/Type No	Serial No.	Calibrated Date	Next Cali, Date	Note
1	LISN	EMCO	3825/2	9605-2539	2003-06-10	2004-06-09	√
2	LISN	Rolf Heine	NNB-2/16Z	98083	2003-10-31	2004-10-30	✓
3	LISN	Rolf Heine	NNB-2/16Z	98053	2003-11-14	2004-11-13	
4	Pulse Limiter	Electro-Metrics	EM-7600	112644	2002-12-09	2003-12-08	✓
5	50 Terminator	N/A	N/A	N/A	2003-05-09	2004-05-08	~
6	Test Cable	N/A	C01	N/A	2002-12-10	2003-12-09	~
7	Log-Bicon Antenna	MESS-ELEKTRONIK	VULB 9160	3058	2003-10-21	2004-10-20	
8	Log-Bicon Antenna	MESS-ELEKTRONIK	VULB 9160	3060	2003-10-21	2004-10-20	~
9	Log-Bicon Antenna	MESS-ELEKTRONIK	VULB 9160	3115	2003-04-17	2004-04-16	
10	Log-Bicon Antenna	MESS-ELEKTRONIK	VULB 9161	4022	2003-07-14	2004-07-13	
11	Test Cable	N/A	10M_OS01	N/A	2002-12-10	2003-12-09	
12	Test Cable	N/A	OS01-1/-2	N/A	2002-12-10	2003-12-09	~
13	Test Cable	N/A	10M_OS02	N/A	2002-12-10	2003-12-09	~
14	Test Cable	N/A	OS02-1/-2/-3	N/A	2002-12-10	2003-12-09	
15	RF Switch	Anritsu	MP59B	M65982	2001-12-09	2003-12-08	
16	Quasi-Peak Adapter	HP	85650A	2521A00844	2003-10-20	2004-04-19	
17	RF Pre-Selector	HP	85685A	2648A00417	2003-10-20	2004-04-19	
18	Spectrum Analyzer	HP	85680B	2634A03025	2003-10-20	2004-04-19	
19	Spectrum Monitor	HP	85662B	2648A13616	2003-10-20	2004-04-19	
20	Pre-Amplifier	Anritsu	MH648A	M09961	2002-12-09	2003-12-08	~
21	Spectrum Analyzer	ADVAN TEST	R3261C	81720298	2003-08-13	2004-08-12	$\checkmark$
22	Test Receiver	R&S	ESH3	860156/018	2003-10-21	2004-10-20	
23	Test Receiver	R&S	ESVP	860687/009	2002-12-06	2003-12-05	
24	Test Receiver	MEB	SMV41	130	2002-12-06	2003-12-05	~
25	Test Receiver	PMM	PMM 9000	4310J01002	2003-10-03	2004-10-02	
26	Horn Antenna	EMCO	3115	9605-4803	2003-05-23	2004-05-22	~
27	Test Receiver	R&S	ESMI	843977/005	2003-01-13	2004-01-12	
28	Pre-Amplifier	R&S	ESMI-Z7	1045.5020.9801 (612.278 041 00)	2003-05-19	2004-05-18	
29	Absorbing Clamp	R&S	MDS-21	841077/011	2003-08-14	2004-08-13	
30	Voltage Probe	R&S	ESH2-Z3	841.800/023	2003-08-26	2004-08-25	
31	Signal Generator	HP	8648A	3426A01034	2002-10-11	2004-10-08	
32	Antenna Mast	Chance Most	CMTB-1.5	N/A	N/A	N/A	$\checkmark$
33	Turn Table	Chance Most	CMTB-1.5	N/A	N/A	N/A	$\checkmark$

### Table -1 Measurement Instruments List

Report No. : FCC-P-03035

Remark :
(1)" ✓" indicates the instrument used in Test Report.
(2)" N/A" denotes No Model No. / Serial No. and No Calibration specified.



Diagram - 1 Block diagram showing the configuration of system tested

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.	Note
E-1	Notebook PC	otebook PC kontron REVOLUTION SERIES TPC-Edition		Q7KREVO-TPC		EUT
E-2	Monitor	HITACHI	CM753ET	N/A(3)	T8L000003	
E-3	Modem	ACEEX	DM-1414V	N/A(3)	8041708	
E-4	Printer	SII	DPU-414	N/A(3)	1045105A	
E-5	PS/2 Mouse	HP	P8131	N/A(3)	5185-1212	
E-6	Walkman	N/A	KT-V860	N/A	N/A	
E-7	Earphone	N/A	N/A	N/A	N/A	
E-8	USB 2.0 Flash Drive	Transcend	TS512MJF2A	N/A(3)	N/A	
E-9	USB 2.0 Flash Drive	Transcend	TS1GJF2A	N/A(3)	N/A	

### Table - 2 Equipments Used in Tested System

Report No. : FCC-P-03035

Note:

- (1) Unless otherwise denoted as EUT in <sup></sup>Remark<sub>J</sub> column , device(s) used in tested system is a support equipment.
- (2) Unless otherwise marked as in <sup>r</sup>Remark<sub>a</sub> column, Neutron consigns the support equipment to the tested system.
- (3) The support equipment was authorized by Declaration of Confirmation.

Table - 3 Information of Interface Cable	Table - 3	Information	of Interface	Cable
--	-----------	-------------	--------------	-------

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	
C-5	NO	NO	1.5M	
C-6	NO	NO	1.5M	
C-7	YES	NO	1.2M	
C-8	YES	NO	1.2M	
C-9	NO	NO	10M	
C-10	NO	NO	10M	

Note:

- (1) Unless otherwise marked as in <sup>r</sup>Remark<sub>a</sub> column, Neutron consigns the support equipment to the tested system.
- (2) For detachable type I/O cable should be specified the length in cm in  $\[ \]$  Length  $\[ \]$  column.

### 2.10 Max.(Worst Case) RF Emission Evaluation

- (a) Both conducted and radiated testing were performed during the max. EMI emission evaluation.
- (b) This system was configured for testing in a typical fashion (as a customer would normally use it). The EUT was connected to support equipment such as monitor, keyboard, modem ..and printer were contained in this system in order to comply with the CISPR22 (1997) and ANSI C63.4 (1992) Rules requirement. This operating condition was tested and used to collect the included data. The EUT tested by connecting RJ 11 and RJ45 cables to the remote system. The simulation testing was used to collect the final test data. About RF device, it's programmed to continuously transmit & receive during test. This operating condition was tested and used to collect the included data.
- (c) 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 this EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

These operation modes were used for final testing and collecting test data included in this report.

2.11 EUT Operation

The EUT exercise program 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 EUT 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 (Monitor).
- 3. Send " H " pattern to parallel port device (Printer).
- 4. Send " H " pattern to serial port device (Modem).
- 5. Repeated from 2 to 4 continuously.

The EUT exercise program 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 measurements are performed at the highest, middle, lowest available channels with the operating function disabled. Unless otherwise specified the above condition, the test was performed while EUT had its operating function enabled.

### 3. Justification

### 3.1 Limitations

3.1.1 Power Line Conducted Emission

Measurement	Mains	Terminal	Mains Te	Note	
Frequency	Class A	A Limits	Class E	3 Limits	CISPR
Range	(dB	uV)	(dB	uV)	FCC
(MHz)	QP Mode	AV Mode	QP Mode	AV Mode	Std.
0.15 - 0.50	79.00	66.00	66 - 56 *	56 - 46 *	CISPR
0.50 - 5.00	73.00	60.00	56.00	46.00	CISPR
5.00 - 30.0	73.00	60.00	60.00	50.00	CISPR
0.45-1.705	60.00	N/A	48.00	N/A	FCC
1.705-30.0	69.50	N/A	48.00	N/A	FCC

### Notes:

- (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.

### 3.1.2 Radiated Emission Limits (Frequency Range 30MHz-1000MHz)

Measurement	Quasi-Pe	ak Mode	Quasi-Pe	ak Mode	Note
Frequency	Class A	A Limits	Class E	3 Limits	CISPR
Range	(dBu	V/m)	(dBu	V/m)	FCC
(MHz)	10m	30m	10m	3m	Std.
30.00 -230.00	40.00	30.00	30.00	40.00	CISPR
230.0 -1000.0	47.00	37.00	37.00	47.00	CISPR
30.00 - 88.00	39.00	N/A	30.00	40.00	FCC
88.00 - 216.0	43.50	N/A	33.50	43.50	FCC
216.0 -960.0	46.00	N/A	36.00	46.00	FCC
above 960.0	49.50	N/A	46.00	54.00	FCC

Notes:

- (1). The tighter limit applies at the band edges.
- (2). Emission level (dBuV/m)=20log Emission level (uV/m).
- (3). A measuring distance of 10m is a primary used. However, either 3m or 10m (instead of 10m) distance my be allowed. If the distance is 3m, add 10dB to the QP-limit above. If the distance is 10m, subtract 10dB from the QP-limit above.

### Report No. : FCC-P-03035

### 3.2 Measurement Justification

### 3.2.1 Conducted Emission

The EUT is a placed on as table which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4-1992. Conducted emissions from the EUT measured in the **frequency range between 0.15 MHz and 30MHz** were made with a **Spectrum Analyzer** using **CISPR Quasi-Peak detector mode**.

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 these signals are then Quasi Peak detector mode and/or Average detector mode re-measured. Data of **Table - 4**. lists the significant emission frequencies, measured levels, limits and safe margins. All readings are Peak Mode measured unless otherwise stated as QP or AV in column of " Remark ".

If the Peak Mode measured value lower than both QP Mode and AV Mode Limit, EUT shall be deemed to compliance with both QP & AV Limits and then no additional QP Mode or AV Mode measurement performed.

If additional QP or AV Mode measurement needed, and if the QP Mode measured value compliance with the QP Mode Limit and lower than AV Mode Limit, the EUT shall be deemed to meet both QP & AV Limits and then only QP Mode was measured, but AV Mode was not performed.

### 3.2.2 Radiated Emission

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.4-1992.

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, Peak or Average detector mode re-measured.

Data of **Table – 5** lists the significant emission frequencies, measured levels, limits and safe margins. All readings are Peak Mode measured unless otherwise stated as QP or AV in column of " Remark ".

If the Peak Mode measured value compliance with and lower than Quasi Peak or Average Mode Limit, the EUT shall be deemed to meet QP/AV Limits and then no additional QP/AV Mode measurement performed.

Report No. : FCC-P-03035

### 3.2.3 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as FS = RA + AF + CL - AG

Where FS = Field Strength

RA = Receiver Amplitude

AF = Antenna Factor (1)

- CL = Cable Attenuation Factor(Cable Loss) (1)
- AG = Amplifier Gain (1)

Remark :

- (1) The Correction Factor = AF + CL AG, as shown in the data tables' Correction Factor column.
- 3.3 Measurement Data
  - Table 4. Conducted Emission Data
  - Table 5. Radiated Emission Data (30-1000MHz)-

Radiated Emission Data (above 1000MHz)



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

(B) Radiated Emission Test Set-UP Frequency Over 1 GHz



### **Table 4 Conducted Emission Data**

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable) 802.11b WLAN

The following table lists worst case data from TX / RX with various bit-rates on various channels.

Freq.	Terminal	Measured(dBuV)		Limits	s(dBuV)	Safe Margins		
<u>(MHz)</u>	L/N	QP-Mode	AV-Mode	QP-Mode	AV-Mode	<u>(dBuV)</u>	Note	
0.17	Line	47.64	*	64.96	54.96	-17.32	(QP)	
0.85	Line	37.61	*	56.00	46.00	-18.39	(QP)	
2.04	Line	36.19	*	56.00	46.00	-19.81	(QP)	
3.96	Line	37.82	*	56.00	46.00	-18.18	(QP)	
7.94	Line	37.62	*	60.00	50.00	-22.38	(QP)	
13.48	Line	36.70	*	60.00	50.00	-23.30	(QP)	
0.34	Neutral	40.32	*	59.18	37.40	-18.86	(QP)	
0.91	Neutral	36.68	*	56.00	46.00	-19.32	(QP)	
1.87	Neutral	35.20	*	56.00	46.00	-20.80	(QP)	
3.96	Neutral	36.18	*	56.00	46.00	-19.82	(QP)	
7.94	Neutral	36.10	*	60.00	50.00	-23.90	(QP)	
14.29	Neutral	34.11	*	60.00	50.00	-25.89	(QP)	

#### Remark

- (1) Reading in which marked as QP means measurements by using are Quasi-Peak Mode with Detector RBW=9KHz ; SPA setting in RBW=10KHz,VBW =10KHz, Sweep 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, Sweep Time =0.3 sec./MHz.
- (2) All readings are QP Mode value unless otherwise stated AVG in column of "Note<sub>a</sub>. 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  $30MHz_{\circ}$
- (4) If the peak scan value lower limit more than 20dB, then this signal data does not how in table,

### Table 4 Conducted Emission Data

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable) Bluetooth PAN

The following table lists worst case data from TX / RX with various bit-rates on various channels.

Freq.	Terminal	Measure	ed(dBuV)	Limits	s(dBuV)	Safe Margins		
<u>(MHz)</u>	L/N	QP-Mode	AV-Mode	<u>QP-Mode</u>	AV-Mode	<u>(dBuV)</u>	Note	
0.23	Line	42.57	*	62.45	52.45	-19.88	(QP)	
0.34	Line	37.66	*	59.23	49.23	-21.57	(QP)	
0.45	Line	35.23	*	56.80	46.80	-21.57	(QP)	
1.86	Line	35.24	*	56.00	46.00	-20.76	(QP)	
3.96	Line	35.39	*	56.00	46.00	-20.61	(QP)	
7.94	Line	33.15	*	60.00	50.00	-26.85	(QP)	
0.23	Neutral	41.74	*	62.49	37.40	-20.75	(QP)	
0.51	Neutral	34.83	*	56.00	46.00	-21.17	(QP)	
0.85	Neutral	36.53	*	56.00	46.00	-19.47	(QP)	
1.74	Neutral	34.92	*	56.00	46.00	-21.08	(QP)	
3.96	Neutral	36.30	*	56.00	46.00	-19.70	(QP)	
5.305	Neutral	33.02	*	60.00	50.00	-26.98	(QP)	

#### Remark

- (1) Reading in which marked as QP means measurements by using are Quasi-Peak Mode with Detector RBW=9KHz ; SPA setting in RBW=10KHz,VBW =10KHz, Sweep 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, Sweep Time =0.3 sec./MHz.
- (2) All readings are QP Mode value unless otherwise stated AVG in column of "Note<sub>a</sub>. 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  $30MHz_{\circ}$
- (4) If the peak scan value lower limit more than 20dB, then this signal data does not how in table,

### Table 5 Radiated Emission Data (30-1000MHz)

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable) 802.11b WLAN The following table lists worst case data from TX / RX with various bit-rates on various channels.

Freq.	Ant.	Reading(RA)	Corr.Factor(CF)	Measured(FS)	Limits(QP)	Safe M	argins
(IMHZ)	H/V	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	<u>(dBuV/m)</u>	Note
100.720	V	51.40	- 13.83	37.57	43.50	- 5.93	
147.470	V	50.40	- 10.27	40.13	43.50	- 3.37	
166.510	V	50.68	- 10.62	40.06	43.50	- 3.44	
226.400	V	53.18	- 12.91	40.27	46.00	- 5.73	
605.600	V	45.41	- 3.36	42.05	46.00	- 3.95	
632.000	V	42.80	- 2.95	39.85	46.00	- 6.15	
99.870	Н	50.40	- 13.99	36.41	43.50	- 7.09	
147.810	Н	47.24	- 10.30	36.94	43.50	- 6.56	
216.000	Н	53.60	- 13.36	40.24	46.00	- 5.76	
360.800	Н	49.23	- 8.88	40.35	46.00	- 5.65	
383.200	Н	50.50	- 8.60	41.90	46.00	- 4.10	
864.800	Н	36.60	1.51	38.11	46.00	- 7.89	

		Peak	AV		Peak	AV	Peak	AV	
Freq.	Ant.Pol.	Rea	ding	Ant./CF	A	ct.	Lii	mit	
(MHz)	<u>(H/V)</u>	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	NOTE
1460.0	Н	54.57	-	-18.90	35.67	-	74.00	54.00	
2068.0	Н	55.94	-	-16.82	39.12	-	74.00	54.00	
4016.0	V	52.51	-	-13.52	38.99	-	74.00	54.00	

Remark :

- (1) Spectrum Setting : 30MHz 1000MHz , RBW= 100KHz, VBW=100KHz, Sweep time = 200 ms. 1GHz- 25GHz, RBW= 1MHz, VBW= 1MHz, Sweep time = 200 ms
- (2) All readings are Peak unless otherwise stated QP in column of <sup>II</sup>Note <sup>II</sup>. 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.
- (4) Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Peak detector mode or QP detector mode of the emission 。
- (5) 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.

### Table 5 Radiated Emission Data (30-1000MHz)

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable)
Bluetooth PAN
The following table lists worst case data from TX / RX with various bit-rates on various channels.

Freq.	Ant.	Reading(RA)	Corr.Factor(CF)	Measured(FS)	Limits(QP)		Safe M	argins
(MHz)	H/V	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB	uV/m)_	Note
100.210	V	54.31	- 13.99	40.32	43.50	-	3.18	Ν
147.470	V	51.31	- 10.30	41.01	43.50	-	2.49	Ν
166.510	V	51.20	- 10.57	40.63	43.50	-	2.87	Ν
228.800	V	55.80	- 12.82	42.98	46.00	-	3.02	Ν
603.200	V	43.60	- 3.38	40.22	46.00	-	5.78	Ν
629.600	V	42.48	- 2.95	39.53	46.00	-	6.47	Ν
99.870	Н	54.40	- 13.99	40.41	43.50	-	3.09	Ν
147.470	Н	51.00	- 10.30	40.70	43.50	-	2.80	Ν
159.880	Н	47.20	- 10.09	37.11	43.50	-	6.39	Ν
166.510	Н	51.00	- 10.57	40.43	43.50	-	3.07	Ν
216.000	Н	53.80	- 13.36	40.44	46.00	-	5.56	Ν
602,400	н	45.00	- 3.38	41.62	46.00	-	4.38	Ν

		Peak	AV		Peak	AV	Peak	AV	
Freq.	Ant.Pol.	Rea	din <u>g</u>	Ant./CF	A	ct.	Lii	mit	
(MHz)	(H/V)	(dBuV)	(dBuV)	CF(dB)	<u>(dBuV/m)</u>	(dBuV/m)	(dBuV/m)	(dBuV/m)	NOTE
1912.0	V	54.06	-	-18.39	35.67	-	74.00	54.00	
3612.0	Н	52.33	-	-14.18	38.15	-	74.00	54.00	
2070.0	V	55.02	-	-16.82	38.20	-	74.00	54.00	

Remark :

- (1) Spectrum Setting : 30MHz 1000MHz , RBW= 100KHz, VBW=100KHz, Sweep time = 200 ms. 1GHz- 25GHz, RBW= 1MHz, VBW= 1MHz, Sweep time = 200 ms
- (2) All readings are Peak unless otherwise stated QP in column of <sup>II</sup>Note <sup>II</sup>. 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.
- (4) Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Peak detector mode or QP detector mode of the emission 。
- (5) 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.

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable) The following table lists worst case data from TX / RX with various orthogonal planes on the EUT antenna.

802.11b WLAN : CH1(2412MHz)

Freq.	Ant.Pol.	Peak Rea	AV ding	Ant./CF	Peak Ac	AV ct.	Peak Li	AV mit	
<u>(MHz)</u>	<u>(H/V)</u>	<u>(dBuV)</u>	<u>(dBuV)</u>	<u>CF(dB)</u>	<u>(dBuV/m)</u>	<u>(dBuV/m)</u>	(dBuV/m)	<u>(dBuV/m)</u>	NOTE
4824.2	V	45.26	-	-11.71	33.55	-	74.00	54.00	X/H
7236.3	V	44.70	-	- 6.64	38.06	-	74.00	54.00	X/H
9648.0	V	45.00	-	- 5.27	39.73	-	74.00	54.00	X/H
12060.6	V	43.66	-	- 4.54	39.12	-	74.00	54.00	X/H
14472.3	V	42.69	-	- 2.19	40.50	-	74.00	54.00	X/H
16884.2	V	45.54	-	- 3.67	41.87	-	74.00	54.00	X/H
4824.2	Н	45.14	-	-11.71	33.43	-	74.00	54.00	X/H
7236.3	Н	44.72	-	- 6.64	38.08	-	74.00	54.00	X/H
9648.0	Н	44.19	-	- 5.27	38.92	-	74.00	54.00	X/H
12060.6	Н	44.37	-	- 4.54	39.83	-	74.00	54.00	X/H
14472.3	Н	43.05	-	- 2.19	40.86	-	74.00	54.00	X/H
16884.2	Н	45.23	-	- 3.67	41.56	-	74.00	54.00	X/H

Remark :

- (1) Spectrum Setting : 30MHz 1000MHz , RBW= 100KHz, VBW=100KHz, Sweep time = 200 ms. 1GHz- 25GHz, RBW= 1MHz, VBW= 1MHz, Sweep time = 200 ms
- (2) All readings are Peak unless otherwise stated QP in column of "Note a . 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 include the Band Edge Requirement.)

- (4) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission .
- (5) 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.
- (6) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (7) EUT Orthogonal Axes :

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable) The following table lists worst case data from TX / RX with various orthogonal planes on the EUT antenna.

802.11b WLAN : CH6(2437MHz)

Freq.	Ant.Pol.	Peak Rea	AV ding	Ant./CF	Peak Ac	AV ct.	Peak Li	AV mit	
<u>(MHz)</u>	<u>(H/V)</u>	<u>(dBuV)</u>	<u>(dBuV)</u>	<u>CF(dB)</u>	<u>(dBuV/m)</u>	<u>(dBuV/m)</u>	<u>(dBuV/m)</u>	<u>(dBuV/m)</u>	NOTE
4874.0	V	44.80	-	-11.7	33.10	-	74.00	54.00	X/H
7311.0	V	44.47	-	-6.57	37.90	-	74.00	54.00	X/H
9748.0	V	44.19	-	-5.14	39.05	-	74.00	54.00	X/H
12185.0	V	43.66	-	-4.56	39.10	-	74.00	54.00	X/H
14622.0	V	44.42	-	-2.68	41.74	-	74.00	54.00	X/H
17059.0	V	44.85	-	-3.0	41.82	-	74.00	54.00	X/H
4874.0	Н	45.33	-	-11.7	33.63	-	74.00	54.00	X/H
7311.0	Н	44.29	-	-6.57	37.72	-	74.00	54.00	X/H
9748.0	Н	44.49	-	-5.14	39.35	-	74.00	54.00	X/H
12185.0	Н	44.16	-	-4.56	39.60	-	74.00	54.00	X/H
14622.0	Н	44.16	-	-2.68	41.48	-	74.00	54.00	X/H
17059.0	Н	44.22	-	-3.03	41.19	-	74.00	54.00	X/H

Remark :

- (1) Spectrum Setting : 30MHz 1000MHz , RBW= 100KHz, VBW=100KHz, Sweep time = 200 ms. 1GHz- 25GHz, RBW= 1MHz, VBW= 1MHz, Sweep time = 200 ms
- (2) All readings are Peak unless otherwise stated QP in column of "Note a . 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 include the Band Edge Requirement.)

- (4) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission 。
- (5) 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.
- (6) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (7) EUT Orthogonal Axes :

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable) The following table lists worst case data from TX / RX with various orthogonal planes on the EUT antenna.

802.11b WLAN : CH11(2462MHz)

Freq. (MHz)	Ant.Pol.	Peak Rea (dBu\/)	AV ding (dBuV)	Ant./CF	Peak Ac (dBu\//m)	AV ct. (dBuV/m)	Peak Li	AV mit (dBu\//m)	NOTE
4924.0	V	45.51	-	-11.63	33.88	-	74.00	54.00	X/H
7386.0	V	43.99	-	-6.46	37.53	-	74.00	54.00	X/H
9848.0	V	44.55	-	-5.12	39.43	-	74.00	54.00	X/H
12310.0	V	43.40	-	-4.59	38.81	-	74.00	54.00	X/H
14772.0	V	43.89	-	-3.27	40.62	-	74.00	54.00	X/H
17234.0	V	44.38	-	-2.38	42.00	-	74.00	54.00	X/H
4924.0	Н	45.79	-	-11.63	34.16	-	74.00	54.00	X/H
7386.0	Н	43.89	-	-6.46	37.43	-	74.00	54.00	X/H
9848.0	Н	44.14	-	-5.12	39.02	-	74.00	54.00	X/H
12310.0	Н	43.71	-	-4.59	39.12	-	74.00	54.00	X/H
14772.0	Н	43.43	-	-3.27	40.16	-	74.00	54.00	X/H
17234.0	Н	44.14	-	-2.38	41.76	-	74.00	54.00	X/H

Remark :

- (1) Spectrum Setting : 30MHz 1000MHz , RBW= 100KHz, VBW=100KHz, Sweep time = 200 ms. 1GHz- 25GHz, RBW= 1MHz, VBW= 1MHz, Sweep time = 200 ms
- (2) All readings are Peak unless otherwise stated QP in column of "Note a . 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 include the Band Edge Requirement.)

- (4) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission .
- (5) 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.
- (6) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (7) EUT Orthogonal Axes :

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable) The following table lists worst case data from TX / RX with various orthogonal planes on the EUT antenna.

Bluetooth	PAN : CF	11(2402101	HZ)						
Frea.	Ant.Pol.	Peak Rea	AV	Ant./CF	Peak Ad	AV ct.	Peak Li	AV mit	
(MHz)	(HΛ/)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBu\//m)	NOTE
<u>((()))</u>				<u> </u>					
4804.0	V	32.89	-	-11.72	21.17	-	74.00	54.00	X/H
7206.0	V	31.49	-	-6.72	24.77	-	74.00	54.00	X/H
9608.0	V	32.28	-	-5.32	26.96	-	74.00	54.00	X/H
12010.0	V	31.09	-	-4.54	26.55	-	74.00	54.00	X/H
14412.0	V	29.54	-	-2.08	27.46	-	74.00	54.00	X/H
16814.0	V	34.24	-	-3.89	30.35	-	74.00	54.00	X/H
4804.0	Н	34.89	-	-11.72	23.17	-	74.00	54.00	X/H
7206.0	Н	34.49	-	-6.72	27.77	-	74.00	54.00	X/H
9608.0	Н	35.41	-	-5.32	30.09	-	74.00	54.00	X/H
12010.0	Н	35.09	-	-4.54	30.55	-	74.00	54.00	X/H
14412.0	Н	33.54	-	-2.08	31.46	-	74.00	54.00	X/H
16814.0	Н	35.24	-	-3.89	31.35	-	74.00	54.00	X/H

Remark :

- (1) Spectrum Setting : 30MHz 1000MHz , RBW= 100KHz, VBW=100KHz, Sweep time = 200 ms. 1GHz- 25GHz, RBW= 1MHz, VBW= 1MHz, Sweep time = 200 ms
- (2) All readings are Peak unless otherwise stated QP in column of "Note a . 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.
- (4) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission .
- (5) 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.

### (This judgment method include the Band Edge Requirement.)

- (6) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (7) EUT Orthogonal Axes :

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable) The following table lists worst case data from TX / RX with various orthogonal planes on the EUT antenna.

Bluetooth PAN : CH40(2441MHz)

Freq.	Ant.Pol.	Peak Rea (dBu\/)	AV ding (dBuW)	Ant./CF	Peak Ac (dBu\\/m)	AV t. (dBu\//m)	Peak Lii (dBu\//m)	AV mit (dBu\//m)	NOTE
	<u>(IVV)</u>								NOTL
4882.0	V	32.71	-	-11.7	21.01	-	74.00	54.00	X/H
7323.0	V	30.87	-	-6.53	24.34	-	74.00	54.00	X/H
9764.0	V	31.57	-	-5.14	26.43	-	74.00	54.00	X/H
12205.0	V	30.68	-	-4.59	26.09	-	74.00	54.00	X/H
14646.0	V	30.55	-	-2.71	27.84	-	74.00	54.00	X/H
17087.0	V	32.69	-	-2.82	29.87	-	74.00	54.00	X/H
4882.0	Н	34.71	-	-11.7	23.01	-	74.00	54.00	X/H
7323.0	Н	33.91	-	-6.53	27.38	-	74.00	54.00	X/H
9764.0	Н	35.61	-	-5.14	30.47	-	74.00	54.00	X/H
12205.0	Н	34.68	-	-4.59	30.09	-	74.00	54.00	X/H
14646.0	Н	34.55	-	-2.71	31.84	-	74.00	54.00	X/H
17087.0	Н	33.69	-	-2.82	30.87	-	74.00	54.00	X/H

#### Remark :

- (1) Spectrum Setting : 30MHz 1000MHz , RBW= 100KHz, VBW=100KHz, Sweep time = 200 ms. 1GHz- 25GHz, RBW= 1MHz, VBW= 1MHz, Sweep time = 200 ms
- (2) All readings are Peak unless otherwise stated QP in column of "Note a . 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.
- (4) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission 。
- (5) 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.

### (This judgment method include the Band Edge Requirement.)

- (6) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (7) EUT Orthogonal Axes :
  - "X" denotes Laid on Table ; "Y" denotes Vertical Stand ; "Z" denotes Side Stand

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable) The following table lists worst case data from TX / RX with various orthogonal planes on the EUT antenna.

Bluetooth PAN : CH79(2480MHz)

Freq.	Ant.Pol.	Peak Rea	AV ding	Ant./CF	Peak Ac	AV xt.	Peak Li	AV mit	NOTE
<u>(MHz)</u>	<u>(H/V)</u>	(dBuV)	<u>(dBuV)</u>	<u>CF(dB)</u>	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	NOTE
4960.0	V	33.42	-	-11.49	21.93	-	74.00	54.00	X/H
7440.0	V	31.39	-	-6.53	24.86	-	74.00	54.00	X/H
9920.0	V	31.06	-	-5.15	25.91	-	74.00	54.00	X/H
12400.0	V	30.86	-	-4.60	26.26	-	74.00	54.00	X/H
14880.0	V	29.97	-	-3.65	26.32	-	74.00	54.00	X/H
17360.0	V	33.17	-	-1.95	31.22	-	74.00	54.00	X/H
4960.0	Н	35.42	-	-11.49	23.93	-	74.00	54.00	X/H
7440.0	Н	34.39	-	-6.53	27.86	-	74.00	54.00	X/H
9920.0	Н	34.06	-	-5.15	28.91	-	74.00	54.00	X/H
12400.0	Н	34.86	-	-4.60	30.26	-	74.00	54.00	X/H
14880.0	Н	33.97	-	-3.65	30.32	-	74.00	54.00	X/H
17360.0	Н	34.17	-	-1.95	32.22	-	74.00	54.00	X/H
17360.0	Н	34.17	-	-1.95	32.22	-	74.00	54.00	X/H

#### Remark :

- (1) Spectrum Setting : 30MHz 1000MHz , RBW= 100KHz, VBW=100KHz, Sweep time = 200 ms. 1GHz- 25GHz, RBW= 1MHz, VBW= 1MHz, Sweep time = 200 ms
- (2) All readings are Peak unless otherwise stated QP in column of "Note a . 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.
- (4) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission 。
- (5) 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.

### (This judgment method include the Band Edge Requirement.)

- (6) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (7) EUT Orthogonal Axes :
  - "X" denotes Laid on Table ; "Y" denotes Vertical Stand ; "Z" denotes Side Stand

### Table 5 Radiated Emission Data (Restricted Bands Requirements)

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable) The emission of the carrier radiated field strength is measured for channel 1 and channel 11 (Peak and AV) as following: (for 8802.11 b)

- 1. The transmitter was configured with the worst case antenna and setup to transmit at the highest channel (CH 11). Then the field strength was measured at 2483.5-2500 MHz.
- 2. The transmitter was then configured with the worst case antenna and setup to transmit at the lowest channel (CH 01). Then the field strength was measured at 2310-2390 MHz.

Please refer to the attachment M about the Restricted Bands emission plot.

		Peak	AV		Peak	AV	Peak	AV	
Freq.	Ant.Pol.	Rea	ding	Ant./CF	A	ct.	Lir	nit	
<u>(MHz)</u>	<u>(H/V)</u>	(dBuV)	(dBuV)	CF(dB)	<u>(dBuV/m)</u>	(dBuV/m)	(dBuV/m)	<u>(dBuV/m)</u>	NOTE
2386.7	V	49.57	-	-15.81	33.76	-	74.00	54.00	
2498.9	V	48.53	-	-15.99	32.54	-	74.00	54.00	
2387.0	Н	50.36	-	-15.81	34.55	-	74.00	54.00	
2497.4	Н	48.05	-	-15.99	32.06	-	74.00	54.00	

Remark :

- (1) Spectrum Setting : 30MHz 1000MHz , RBW= 100KHz, VBW=100KHz, Sweep time = 200 ms. 1GHz- 25GHz, RBW= 1MHz, VBW= 1MHz, Sweep time = 200 ms
- (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) EUT Orthogonal Axes :
  - "X" denotes Laid on Table ; "Y" denotes Vertical Stand ; "Z" denotes Side Stand

### Table 5 Radiated Emission Data (Restricted Bands Requirements)

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable) The emission of the carrier radiated field strength is measured for channel 1 and channel 79 (Peak and AV) as following: (for bluetooth)

- 1. The transmitter was configured with the worst case antenna and setup to transmit at the highest channel (CH 79). Then the field strength was measured at 2483.5-2500 MHz.
- 2. The transmitter was then configured with the worst case antenna and setup to transmit at the lowest channel (CH 01). Then the field strength was measured at 2310-2390 MHz.

Please refer to the attachment M about the Restricted Bands emission plot.

Freq	Ant Pol	Peak Rea	AV	Ant /CE	Peak	AV ~t	Peak	AV	
( <u>MHz</u> )	<u>    (H/V)     </u>	(dBuV)	<u>(dBuV)</u>	<u>CF(dB)</u>	<u>(dBuV/m)</u>	<u>(dBuV/m)</u>	(dBuV/m)	<u>(dBuV/m)</u>	NOTE
2335.9	V	48.14	-	-15.66	32.48	-	74.00	54.00	
2487.5	V	48.20	-	-16.00	32.20	-	74.00	54.00	
2388.5	Н	50.31	-	-15.81	34.50	-	74.00	54.00	
2499.3	Н	48.23	-	-15.99	32.24	-	74.00	54.00	

Remark :

- (1) Spectrum Setting : 30MHz 1000MHz , RBW= 100KHz, VBW=100KHz, Sweep time = 200 ms. 1GHz- 25GHz, RBW= 1MHz, VBW= 1MHz, Sweep time = 200 ms
- (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) EUT Orthogonal Axes :
  - "X" denotes Laid on Table ; "Y" denotes Vertical Stand ; "Z" denotes Side Stand

### 4. Hopping Channel Carrier Frequency Separated

### 4.1 Applied Standard / limit

FCC Part15 (15.247), Subpart C (for bluetooth device)							
Section	Test Item	Limit	Frequency Range (MHz)	Result			
15.247 (a)(1)	Hopping Channel Carrier Frequency Separated	>= 25KHz or the 20dB bandwidth of the hopping channel	2400-2483.5	PASS			

#### 4.2 Test Setup

- (1) EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- (2) Spectrum Setting : RBW= 100KHz, VBW=100KHz, Sweep time = 200 ms.



### 4.3 Test Result

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable) Please refer to the Attachment "F"

Hopping Channel Carrier Frequency Separated	LIMIT (KHz)
1 MHz	>= 25

### **5 Number of Hopping Channel**

### 5.1 Applied Standard / limit

	FCC Part15 (15.247), Subpart C (for bluetooth device)							
Section	Test Item	Frequency Range (MHz)						
15.247 (a)(1)(ii)	Number of Hopping Channel	2400-2483.5						

### 5.2 Test Setup

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- (2) Spectrum Setting : RBW= 100KHz, VBW=100KHz, Sweep time = 200 ms.

EUT	SPECTRUM
	ANALYZER

### 5.3 Test Result

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable) Please refer to the Attachment "G"

Number of Hopping Channel	79

### 6 Average Time of Occupancy

### 6.1 Applied Standard / limit

FCC Part15 (15.247), Subpart C (for bluetooth device)				
Section Test Item Limit Frequency Range (MHz) Result				
15.247 (a)(1)(ii)	Average Time of Occupancy	< = 0.4 sec (a 30 second period)	2400-2483.5	PASS

#### 6.2 Test Setup

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- (2) Spectrum Setting : RBW= 100KHz, VBW=100KHz, Sweep time = 200 ms.



### 6.3 Test Result

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable) Please refer to the Attachment "H"

The EUT total hops / second (1)	1600 times
Total channel (2)	79
each channel hops/second (3)=(1)/(2)	20.25 times
each channel hops in 30 second (4)=30 x(3)	607.5 times
Average time of signal channel occupancy (5)	0.44ms(see plot below)
Average Time of Occupancy (6)=(4) x (5)	0.27 second
LIMIT(second)	<= 0.4 second

### 7 Bandwidth

### 7.1 Applied Standard / limit

FCC Part15 (15.247), Subpart C (for bluetooth device)				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (a)(1)(ii)	Bandwidth	<= 1MHz (20dB bandwidth)	2400-2483.5	PASS
	FCC Part15	5 (15.247) , Subpart C (for 802	2.11b device)	
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (a)(2)	Bandwidth	>= 500KHz (6dB bandwidth)	2400-2483.5	PASS

### 7.2 Test Setup

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- (2) Spectrum Setting : RBW= 10KHz, VBW=30KHz, Sweep time = 200 ms.

EUT	SPECTRUM	
	ANALYZER	

### 7.3 Test Result

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable) Please refer to the Attachment "I"

Bluetooth PAN			
СЦ	CH Frequency	Bandwidth	LIMIT
СП	(MHz)	(KHz)	(MHz)
1	2402	786.6	<= 1
40	2441	770.0	<= 1
79	2480	823.3	<= 1

802.11b WLAN			
СЦ	CH Frequency	Bandwidth	LIMIT
Сп	(MHz)	(MHz)	(MHz)
1	2412	12.33	>= 500KHz
6	2437	12.75	>= 500KHz
11	2462	13.33	>= 500KHz

### 8 Peak Output Power

### 8.1 Applied Standard / limit

FCC Part15 (15.247), Subpart C (for bluetooth device)				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (b)(1)	Peak Output Power	1 watt or 30dBm (at least 75 hopping channel)	2400-2483.5	PASS
	FCC Part15	5 (15.247) , Subpart C (for 802	.11b device)	
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (b)(1)	Peak Output Power	1 watt or 30dBm	2400-2483.5	PASS

### 8.2 Test Setup

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- (2) Spectrum Setting : RBW= 3MHz, VBW= 3MHz, Sweep time = 200 ms.

EUT	SPECTRUM	
	ANALYZER	

#### 8.3 Test Result

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable) Please refer to the Attachment "J"

Bluetooth PAN				
СЦ	CH Frequency	Peak Output Power	LIMIT	LIMIT
СП	(MHz)	(dBm)	(dBm)	(W)
1	2402	-1.17	30	1
40	2441	-0.51	30	1
79	2480	0.33	30	1

802.11b WLAN				
сц	CH Frequency	Peak Output Power	LIMIT	LIMIT
Сп	(MHz)	(dBm)	(dBm)	(W)
1	2412	16.83	30	1
6	2437	17.36	30	1
11	2462	16.32	30	1

### 9 Antenna conducted Spurious Emission

### 9.1 Applied Standard / limit

FCC Part15 (15.247), Subpart C (for 802.11b & bluetooth device)				
Section Test Item Limit Frequency Range (MHz) Result				
15.247 (c)	Antenna conducted Spurious Emission	20dB less than the peak value of fundamental frequency	30-25000	PASS

### 9.2 Test Setup

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- (2) Spectrum Setting : RBW= 100KHz, VBW=100KHz, Sweep time = 200 ms.



### 9.3 Test Result

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable) Please refer to the Attachment "K"

Bluetooth PAN					
The max. radio frequent	cy power in any 100kHz	The max. radio frequency power in any 100 kHz			
bandwidth outside	the frequency band	bandwidth within the frequency band.			
FREQUENCY(MHz)	POWER(dBm)	FREQUENCY(MHz)	POWER(dBm)		
2400	-45.89	2438	-34.38		
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.					

802.11b WLAN					
The max. radio frequen	cy power in any 100kHz	The max. radio frequency power in any 100 kHz			
bandwidth outside the frequency band		bandwidth within the frequency band.			
FREQUENCY(MHz)	POWER(dBm)	FREQUENCY(MHz)	POWER(dBm)		
2400	-28.14	2438	-33.04		
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.					

### **10** Power Spectral Density

### 10.1 Applied Standard / limit

FCC Part15 (15.247), Subpart C (for 802.11b device)					
Section	Frequency Range (MHz)	Result			
15.247 (d)	Power Spectral Density	8 dBm (in any 3KHz)	2400-2483.5	PASS	

### 10.2 Test Setup

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- (2) Spectrum Setting : RBW= 3KHz, VBW= 30KHz, Sweep time = Span/3KHz



### 10.3 Test Result

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable) Please refer to the Attachment "J"

802.11b WLAN						
сц	CH Frequency	Peak Output Power	LIMIT	LIMIT		
Сп	(MHz)	(dBm)	(dBm)	(W)		
1	2412	-10.8	30	1		
6	2437	-12.88	30	1		
11	2462	-13.59	30	1		

### 11 RF Exposure

### 11.1 Applied Standard / limit

Based upon the new TCB exclusion list published by FCC on July 2002				
Frequency Range(MHz) Limit (mw)				
2402-2480	60/f(GHz)			
2402 2400	note: f (GHz) is the mid band frequency of transmitter			

#### 11.2 Test Result

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable)

Bluetooth PAN					
Peak output power	Ant Gain	EIRF	P (1)	LIMIT(2)	Pocult
(dBm)	(dBi)	(dBm)	mW	(mw)	Result
0.33	1.2	1.53	1.42	24.5	PASS

802.11b WLAN					
Peak output power	Ant Gain	EIRF	P (1)	LIMIT(2)	Pocult
(dBm)	(dBi)	(dBm)	mW	(mw)	Result
17.36	2	19.36	86.2	24.5	Note(3)

NOTE: (1) EIRP= Peak output power + Ant Gain (2) LIMIT=60/2.441(GHz)=24.5(mw) (3) This device have to submit the test report of SAR evaluation.

### Attachment

### **Table Contents**

- A. Electric Block Diagram
- B. EUT Modification Description
- C. EUT Photos
- D. EUT Test Photos
- E. User's Manual
- F. Hopping Channel Carrier Frequency Separated
- G. Number of Hopping Channel
- H. Average Time of Occupancy
- I. Bandwidth
- J. Peak Output Power
- K. Antenna conducted Spurious Emission
- L. Power Spectral Density
- M. Restricted Bands Requirements
- N. Product Labeling



Attachment - A.

**Electric Block Diagram** 



Attachment - B.

### **EUT Modification Description**



Attachment - C.

### **EUT Test Photos**

- 1. Conducted Measurement Photos
- 2. Radiated Measurement Photos

Report No. : FCC-P-03035

### Attachment – D

### **EUT Photos**

- 1. Photo #1~4 Front View
- 2. Photo # 5~27 Unit Partially Disassembled
- 3. Photo #28 Front View
- 4. Photo # 29~32 Unit Partially Disassembled
- 5. Photo #33 Front View
- 6. Photo #34~37 Unit Partially Disassembled
- 7. Photo #38 Front View
- 8. Photo # 39~42 Unit Partially Disassembled
- 9. Photo #43 Front View
- 10. Photo #44~47 Unit Partially Disassembled
- 11. Photo #48 Front View
- 12. Photo #49~52 Unit Partially Disassembled
- 13. Photo # 53~54 Front View
- 14. Photo # 55~59 Unit Partially Disassembled
- 15. Photo #60~62 Front View
- 16. Photo #63~64 Unit Partially Disassembled
- 17. Photo #65~66 Front View
- 18. Photo #67~68 Unit Partially Disassembled



Attachment – E

User's Manual



### Attachment - F.

## Hopping Channel Carrier Frequency Separated



Attachment - G.

Number of Hopping Channel



Attachment – J

**Peak Output Power** 



### Attachment - M.

## **Restricted Bands Requirements**



Attachment - N.

**Product Labeling**