Supplemental “Transmit Simultaneously” Test Report

REPORT NO.:	RF120522E09-4
MODEL NO.:	MC92N0
FCC ID:	UZ7MC92N0
RECEIVED:	May 22, 2012
TESTED:	June 01 to 11, 2012
ISSUED:	Aug. 08, 2012

APPLICANT:	Motorola Solutions, Inc.
ADDRESS:	One Motorola Plaza Holtsville NY 11742-1300 USA

ISSUED BY:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
LAB ADDRESS :	No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan, R.O.C.
TEST LOCATION (1):	No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan, R.O.C.
TEST LOCATION (2):	No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan, R.O.C.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF120522E09-4	Original release	Aug. 08, 2012

1. CERTIFICATION

PRODUCT:	Mobile Computer
BRAND NAME:	MOTOROLA
MODEL NO.:	MC92N0
TEST SAMPLE:	ENGINEERING SAMPLE
APPLICANT:	Motorola Solutions, Inc.
TESTED:	June 01 to 11, 2012
STANDARDS:	**FCC Part 15, Subpart C (Section 15.247)** ANSI C63.10-2009

The above equipment (Model: MC92N0) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : _____ **DATE:** *Aug. 08, 2012*
(Midoli Peng, Specialist)

APPROVED BY : _____ , **DATE:** *Aug. 08, 2012*
(May Chen, Deputy Manager)

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

For WLAN 2.4GHz & BT

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)			
STANDARD SECTION	**TEST TYPE**	**RESULT**	**REMARK**
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -11.93dB at 0.47031MHz
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -4.8dB at 4874.00MHz

For WLAN 5GHz & BT

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)			
STANDARD SECTION	**TEST TYPE**	**RESULT**	**REMARK**
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -12.65dB at 0.45859MHz
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -7.5dB at 242.35MHz

2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Measurement	**Value**
Conducted emissions	2.98 dB
Radiated emissions (30MHz-1GHz)	5.59 dB
Radiated emissions (1GHz -6GHz)	3.84 dB
Radiated emissions (6GHz -18GHz)	4.09 dB
Radiated emissions (18GHz -40GHz)	4.24 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Mobile Computer
MODEL NO.	MC92N0
POWER SUPPLY	DC 7.4V from battery DC 12V to direct charging adapter
MODULATION TYPE	**For WLAN** CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
	For BT GFSK,π/4-DQPSK, 8DPSK
MODULATION TECHNOLOGY	**For WLAN** : DSSS, OFDM
	For BT : FHSS
TRANSFER RATE	**For WLAN** 802.11b: up to11Mbps 802.11g / a: up to 54Mbps 802.11n (20MHz, 800ns GI): up to 65Mbps 802.11n (20MHz, 400ns GI): up to 72.2Mbps
	For BT Up to 3Mbps
OPERATING FREQUENCY	**For WLAN(15.407)** 5.18 ~ 5.24GHz, 5.26 ~ 5.32GHz, 5.5~5.58GHz & 5.66~5.7GHz
	For WLAN(15.247) 2.4GHz: 2.412 ~ 2.472GHz 5GHz: 5.745 ~ 5.825GHz
	For BT 2402MHz ~ 2480MHz
NUMBER OF CHANNEL	**For WLAN(15.407)** 16 for 802.11a, 802.11n (20MHz)
	For WLAN(15.247, 2.4GHz) 13 for 802.11b, 802.11g, 802.11n (20MHz) **For WLAN(15.247, 5GHz)** 5 for 802.11a, 802.11n (20MHz)
	For BT 79

MAXIMUM OUTPUT POWER	**For WLAN(15.407)** 802.11a: 66.069mW 802.11n (20MHz): 58.884mW **For WLAN(15.247, 2.4GHz)** 802.11b: 204.174mW 802.11g: 204.174mW 802.11n (20MHz): 208.930mW **For WLAN(15.247, 5GHz)** 802.11a: 169.824mW 802.11n (20MHz): 165.959mW
	For BT 2.891 mW
ANTENNA TYPE	Please see NOTE
DATA CABLE	NA
I/O PORTS	Refer to user's manual
ASSOCIATED DEVICES	Battery x 1 (Part No.: 21-65587-03)

NOTE:

1. The EUT configuration list:

Scanner	With CR	Without CR	Keypad			
			53 key	43 key	33 key	28 key
SE4500	V	-	V	V	V	V
SE4500	-	V	V	V	V	V
SE4600	V	-	V	V	V	V
SE4600	-	V	V	V	V	V
SE965	V	-	V	V	V	V
SE965	-	V	V	V	V	V
SE1524	V	-	V	V	V	V
SE1524		V	V	V	V	V
CR : Condensation Resistant						

2. The Version of EUT information are as below:

Mobile Computer	OS Version	07.00.2806
	OEM Name	MOTOROLA MC92N0G
	OEM Version	00.20.0005
Wireless(Fusion)	Part Number	31-FUSION-X2.00
	Version	X_2.00.0.0.040E
XW2DMT	Version	X_2.00.0.0.28
	Fusion	X_2.00.0.0.040E
BTRegTest Ver4.1	Version	4.1

3. The associated devices(optional) of EUT information are as below:

Product	Brand	Model	S/N
28keypad	NA	KYPD-MC9XMR000-01R	40A11W40H
33keypad	NA	KYPD-MC9XMX000-01R	40B52K50A
43keypad	NA	KYPD-MC9XMT000-01R	40A11R93G
53keypad	NA	KYPD-MC9XMS000-01R	40B63U43F
Product	Brand	Model	P/N
Headset	MOTOROLA	RCH50	RCH50
Headset	VXI	VR10	50-11300-050R
Power adapter (for Direct charging)	HIPRO	HP-A0502R3D	PWRS-14000-148R
Direct charging adapter	SYMBOL	ADP9000-110R	NA
AC Line cord	NA	NA	23844-00-00R
USB cable	NA	NA	25-62166-01R

4. The EUT could be supplied with a direct charging and battery as below table:

Direct charging adapter (not for sale together)	
Brand:	SYMBOL
Part No.:	ADP9000-110R
I/O Ports:	RS232 Port * 1 RJ45 Port *2
Associated Devices:	USB cable (unshielded, 1.8m without core) USB cable (Part No.: 25-62166-01r)
Power Adapter (for Direct charging, and not for sale together) Brand: Model No.: Part No.: Input power : Output power :	 HIPRO HP-A0502R3D PWRS-14000-148R 100-240V, 50-60Hz, 2.4A +12V , 4.16A AC Line cord (unshielded, 2.2m without core) (Part No.: 23844-00-00R)
Battery	
Brand:	SYMBOL
Part No.:	21-65587-03
Rating:	7.4V, 2200mAh, 16.3Wh

5. The antennas provided to the EUT, please refer to the following table:

WLAN Antenna Spec.			
Antenna	Type	Connecter	Gain (dBi)
Lant (Aux)	PIFA	NA	4.07 (2.4GHz) 4.96 (5GHz)
Rant (Main)	PIFA	NA	6.03 (2.4GHz) 4.51 (5GHz)
Bluetooth Antenna Spec			
Type	Connecter		Gain (dBi)
Chip	NA		-3.31

Note: This report chose the max. Antenna gain to do final test.

6. The EUT incorporates a SISO function. Both, main and diversity (aux.) antennas path can transmit but only one can transmit at given time while the other is RX only.

MODULATION MODE	Tx/Rx FUNCTION
802.11b	1Tx/1Rx(Diversity)
802.11g	1Tx/1Rx(Diversity)
802.11a	1Tx/1Rx(Diversity)
802.11n (20MHz)	1Tx/1Rx(Diversity)

7. When the EUT operating in 802.11n, the software operation, which is defined by manufacturer, MCS (Modulation and Coding Schemes) from 0 to 7.

8. The above EUT information was declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 TEST MODE APPLICABLITY AND TESTED CHANNEL DETAIL:

Simultaneously Transmission Mode (WLAN 2.4GHz + BT)

EUT configure mode	Applicable to			Description
	PLC	RE<1G	RE≥1G	
-	√	-	-	EUT(Y-Z) + Scanner (SE1524) + Headset(RCH50) + Keypad(53) + Direct charging & Without CR
-	-	√	-	EUT(X-Y) + Scanner (SE4500) + Headset(VR10) + Keypad(43) + Direct charging & Without CR
-	-	-	√	EUT(Y-Z) + Scanner (SE4500) + Headset(VR10) + Keypad(43) + Direct charging & Without CR

Where PLC: Power Line Conducted Emission RE<1G RE: Radiated Emission below 1GHz
RE≥1G: Radiated Emission above 1GHz

Simultaneously Transmission Mode (WLAN 5GHz + BT)

EUT configure mode	Applicable to			Description
	PLC	RE<1G	RE≥1G	
-	√	-	-	EUT(Y-Z) + Scanner (SE1524) + Headset(RCH50) + Keypad(53) + Direct charging & Without CR
-	-	√	-	EUT(X-Y) + Scanner (SE4500) + Headset(VR10) + Keypad(43) + Direct charging & Without CR
-	-	-	√	EUT(X-Z) + Scanner (SE4500) + Headset(VR10) + Keypad(43) + Direct charging & Without CR

Where PLC: Power Line Conducted Emission RE<1G RE: Radiated Emission below 1GHz
RE≥1G: Radiated Emission above 1GHz

POWER LINE CONDUCTED EMISSION TEST:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type
2.4 GHz (802.11n (20MHz)) + Bluetooth	1 to 13	6	OFDM	BPSK
	0 to 78	0	FHSS	8DPSK
5 GHz (802.11n (20MHz)) + Bluetooth	149 to 165	165	OFDM	BPSK
	0 to 78	0	FHSS	8DPSK

Radiated Emission Test:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type
2.4 GHz (802.11n (20MHz)) + Bluetooth	1 to 13	6	OFDM	BPSK
	0 to 78	0	FHSS	8DPSK
5 GHz (802.11n (20MHz)) + Bluetooth	149 to 165	165	OFDM	BPSK
	0 to 78	0	FHSS	8DPSK

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
PLC	25deg. C, 61%RH	120Vac, 60Hz	Timmy Hu
RE<1G	24deg. C, 71%RH	120Vac, 60Hz	Robert Cheng
RE≥1G	23deg. C, 70%RH	120Vac, 60Hz	Rex Huang

3.3 DESCRIPTION OF SUPPORT UNITS

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

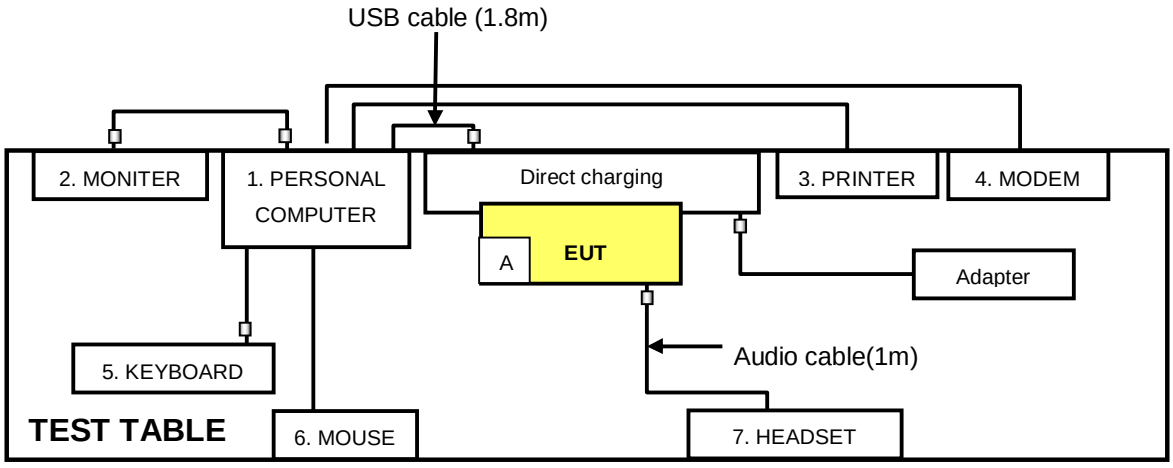
For conducted emission test					
No.	Product	Brand	Model No.	Serial No.	FCC ID
1	PERSONAL COMPUTER	DELL	DCSCMF	9KKB32S	FCC DoC
2	MONITOR	DELL	E2210Hc	CN-OG337R-64180-97S-OQDS	FCC DoC
3	PRINTER	EPSON	LQ-300+II	G88Y074083	FCC DoC
4	MODEM	ACEEX	1414	0206026778	IFAXDM1414
5	KEYBOARD	DELL	SK-8115	MY-0DJ325-71619-99B-0476	FCC DoC
6	MOUSE	DELL	M056UOA	FOROOBF9	FCC DoC
7	HEADSET	Motorola	RCH50	NA	NA
For other test items					
No.	Product	Brand	Model No.	Serial No.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP32LA	FSLB32S	FCC DoC
2	iPod shuffle	Apple	MC749TA/A	CC4DMFJUDFDM	NA
3	HEADSET	VXI	VR10	NA	NA

For conducted emission test	
No.	Signal cable description
1	USB cable (unshielded, 1.8m with one core)
2	VGA cable. (1.8m with two cores)
3	USB cable.(1.8m)
4	RS232 cable.(1.1m)
5	USB cable.(1.8m with one core)
6	USB cable.(1.8m)
7	Audio cable (1m with one core)
For other test items	
No.	Signal cable description
1	USB cable (unshielded, 1.8m with one core)
2	USB cable (shielded, 0.1m)
3	Audio cable (1.1m with one core)

NOTE: All power cords of the above support units are non shielded (1.8m).

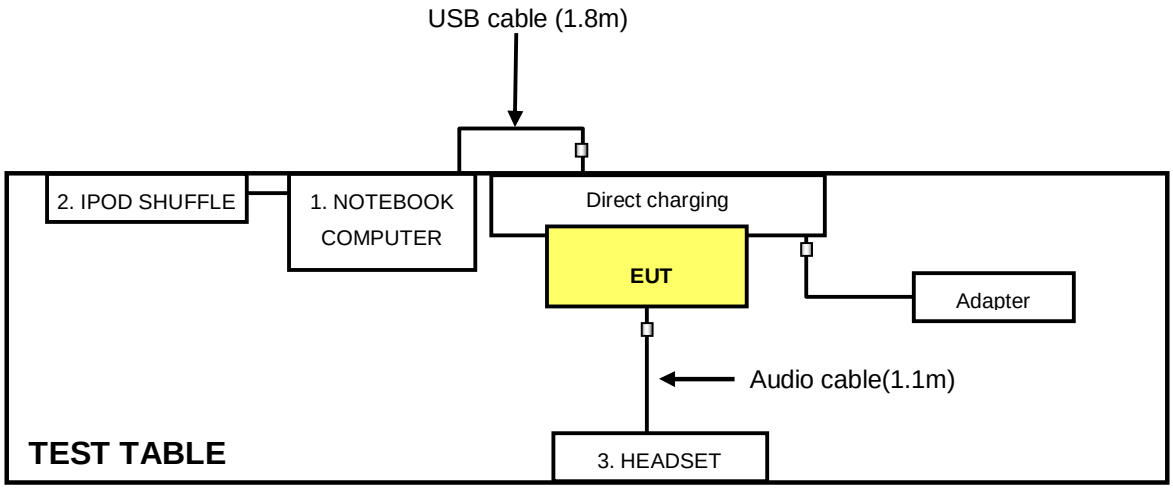
3.4 CONFIGURATION OF SYSTEM UNDER TEST

For Conducted emission test:



NOTE: 1. Item A is the SD Card.

For other test items



4. TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15-0.5 0.5-5 5-30	66 to 56 56 60	56 to 46 46 50

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

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS 30	100287	Mar. 01, 2012	Feb. 28, 2013
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK 8127	8127-523	Sep. 20, 2011	Sep. 19, 2012
Line-Impedance Stabilization Network (for Peripheral) ROHDE & SCHWARZ	ESH3-Z5	848773/004	Nov. 01, 2011	Oct. 31, 2012
RF Cable (JYEBAO)	5DFB	COACAB-002	Aug. 06, 2011	Aug. 05, 2012
50 ohms Terminator	50	3	Nov. 02, 2011	Nov. 01, 2012
Software ADT	BV ADT_Cond_V7.3.7	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. A.
3 The VCCI Con A Registration No. is C-817.
4. Tested Date: June 11, 2012

4.1.3 TEST PROCEDURES

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

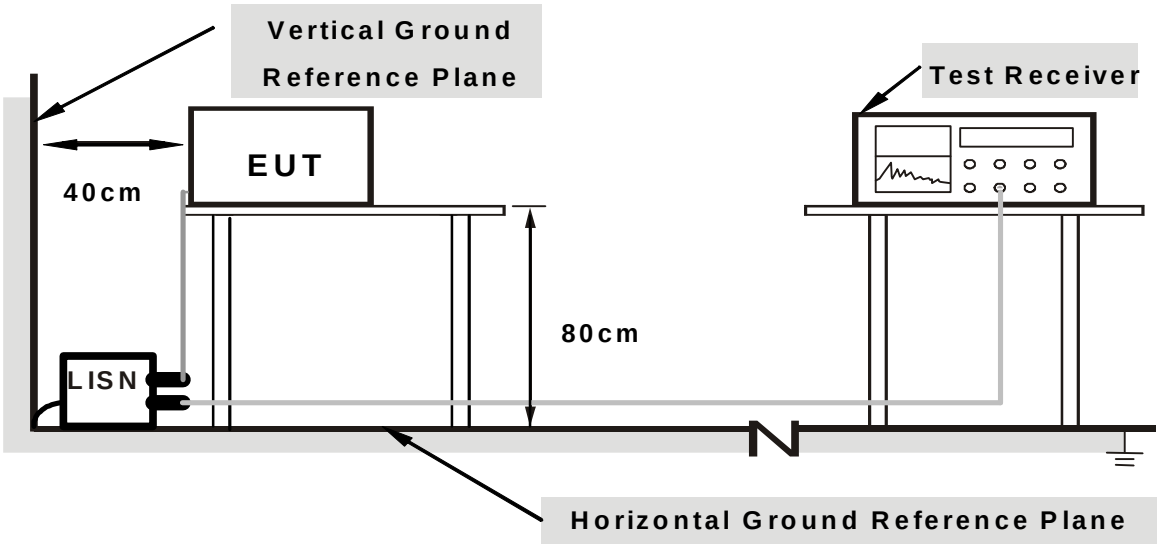
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.1.6 EUT OPERATING CONDITIONS

1. Turn on the power of EUT.
2. The communication partner run test program “XW2DMT.exe” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

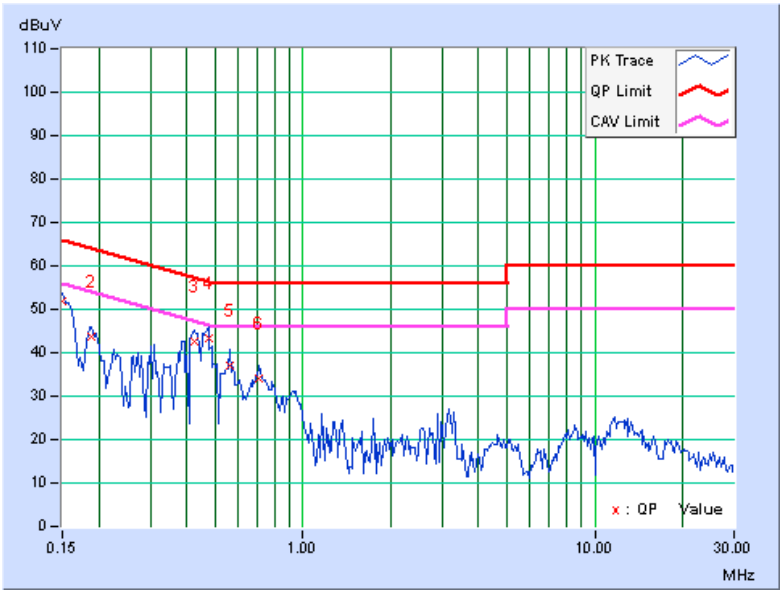
4.1.7 TEST RESULTS (WLAN 2.4GHz + BT)

PHASE	Line (L)	6dB BANDWIDTH	9 kHz

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.06	51.62	40.04	51.68	40.10	66.00	56.00	-14.32	-15.90
2	0.18906	0.06	43.46	31.76	43.52	31.82	64.08	54.08	-20.56	-22.26
3	0.42344	0.07	42.53	34.62	42.60	34.69	57.38	47.38	-14.78	-12.69
4	0.47422	0.08	43.37	32.71	43.45	32.79	56.44	46.44	-12.99	-13.65
5	0.56016	0.08	36.88	29.06	36.96	29.14	56.00	46.00	-19.04	-16.86
6	0.70859	0.10	33.88	26.52	33.98	26.62	56.00	46.00	-22.02	-19.38

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

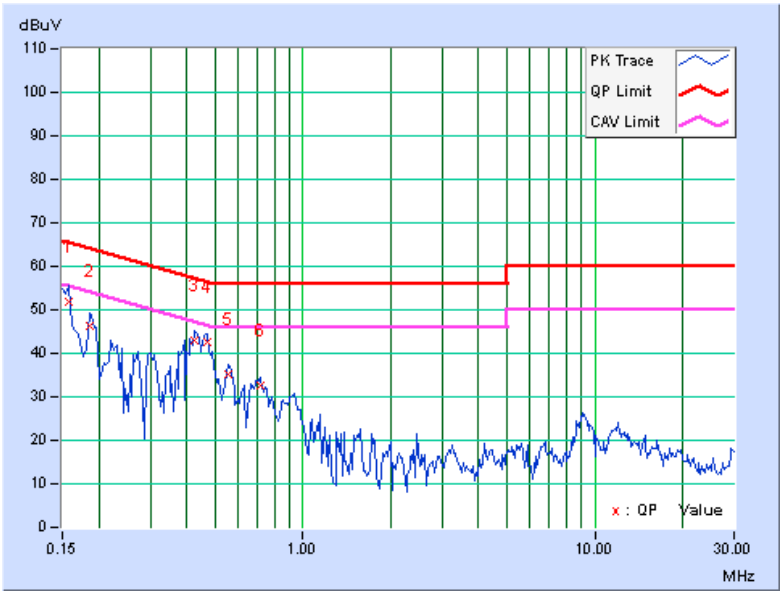


PHASE	Neutral (N)	6dB BANDWIDTH	9 kHz

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	0.07	51.76	38.97	51.83	39.04	65.58	55.58	-13.75	-16.54
2	0.18516	0.07	46.38	31.96	46.45	32.03	64.25	54.25	-17.80	-22.22
3	0.42344	0.08	42.84	34.70	42.92	34.78	57.38	47.38	-14.46	-12.60
4	**0.47031**	**0.08**	**42.62**	**34.49**	**42.70**	**34.57**	**56.51**	**46.51**	**-13.80**	**-11.93**
5	0.55625	0.09	35.04	26.08	35.13	26.17	56.00	46.00	-20.87	-19.83
6	0.71250	0.10	32.42	25.21	32.52	25.31	56.00	46.00	-23.48	-20.69

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.



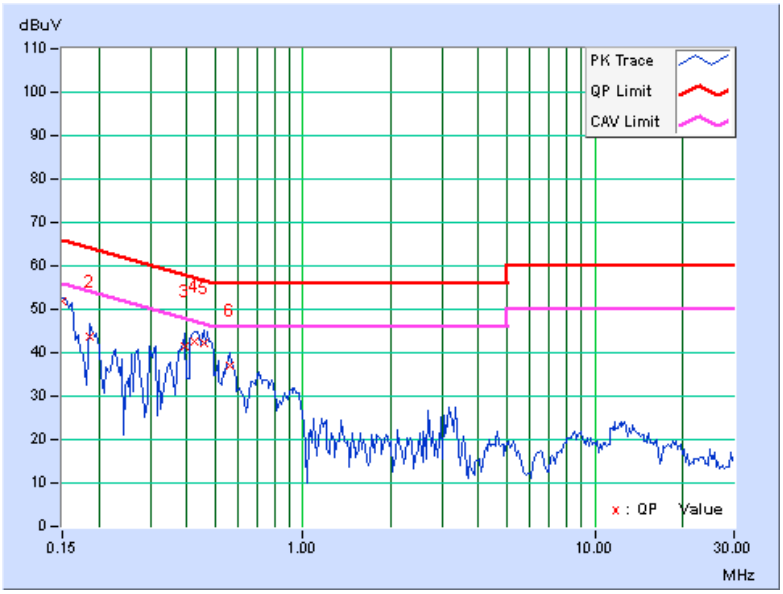
4.1.8 TEST RESULTS (WLAN 5GHz + BT)

PHASE	Line (L)	6dB BANDWIDTH	9 kHz

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.06	51.62	39.56	51.68	39.62	66.00	56.00	-14.32	-16.38
2	0.18516	0.06	43.48	28.34	43.54	28.40	64.25	54.25	-20.71	-25.85
3	0.39219	0.07	41.25	33.32	41.32	33.39	58.02	48.02	-16.70	-14.63
4	0.42344	0.07	42.47	33.96	42.54	34.03	57.38	47.38	-14.84	-13.35
5	**0.45859**	**0.07**	**42.15**	**33.99**	**42.22**	**34.06**	**56.72**	**46.72**	**-14.49**	**-12.65**
6	0.56016	0.08	36.86	28.50	36.94	28.58	56.00	46.00	-19.06	-17.42

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

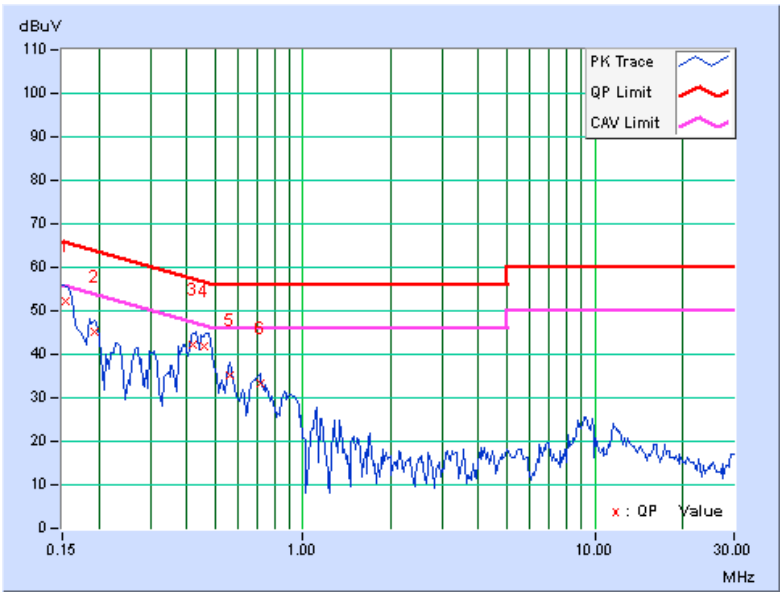


PHASE	Neutral (N)	6dB BANDWIDTH	9 kHz

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	0.07	52.22	40.96	52.29	41.03	65.79	55.79	-13.50	-14.76
2	0.19297	0.07	45.30	32.24	45.37	32.31	63.91	53.91	-18.54	-21.60
3	0.41953	0.08	42.29	34.84	42.37	34.92	57.46	47.46	-15.09	-12.54
4	0.45859	0.08	41.69	33.35	41.77	33.43	56.72	46.72	-14.94	-13.28
5	0.56406	0.09	35.28	27.41	35.37	27.50	56.00	46.00	-20.63	-18.50
6	0.71250	0.10	33.30	26.06	33.40	26.16	56.00	46.00	-22.60	-19.84

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.



4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

Frequencies (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.2.2 TEST INSTRUMENTS

For below 1GHz:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Agilent Spectrum Analyzer	E4446A	MY48250254	July 12, 2011	July 11, 2012
Agilent Pre-Selector	N9039A	MY46520311	July 12, 2011	July 11, 2012
Agilent Signal Generator	N5181A	MY49060517	July 12, 2011	July 11, 2012
Mini-Circuits Pre-Amplifier	ZFL-1000VH2B	AMP-ZFL-03	Nov. 15, 2011	Nov. 14, 2012
Agilent Pre-Amplifier	8449B	3008A02578	July 04, 2011	July 03, 2012
SPACEK LABS	SLKKa-48-6	9K16	Nov. 15, 2011	Nov. 14, 2012
SCHWARZBECK Trilog Broadband Antenna	VULB 9168	9168-360	Apr. 09, 2012	Apr. 08, 2013
AISI Horn_Antenna	AIH.8018	0000320091110	Nov. 14, 2011	Nov. 13, 2012
SCHWARZBECK Horn_Antenna	BBHA 9170	9170-424	Oct. 07, 2011	Oct. 06, 2012
*R&S Loop Antenna	HFH2-Z2	100070	Jan. 31, 2012	Jan. 30, 2014
RF CABLE	NA	RF104-201 RF104-203 RF104-204	Dec. 26, 2011	Dec. 25, 2012
RF Cable	NA	CHGCAB_001	Oct. 07, 2011	Oct. 06, 2012
Software	ADT_Radiated_V8.7.05	NA	NA	NA
CT Antenna Tower & Turn Table	NA	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. * = The calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3 The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The test was performed in 966 Chamber No. G.
5 The FCC Site Registration No. is 966073.
6 The VCCI Site Registration No. is G-137.
7 The CANADA Site Registration No. is IC 7450H-2.
8 Tested Date: June 01, 2012

For above 1GHz:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Agilent Spectrum Analyzer	E4446A	MY48250253	Aug. 29, 2011	Aug. 28, 2012
Agilent Pre-Selector	N9039A	MY46520310	Aug. 29, 2011	Aug. 28, 2012
Agilent Signal Generator	N5181A	MY49060347	July 25, 2011	July 24, 2012
Mini-Circuits Pre-Amplifier	ZFL-1000VH2B	AMP-ZFL-04	Nov. 15, 2011	Nov. 14, 2012
Agilent Pre-Amplifier	8449B	3008A02465	Feb. 27, 2012	Feb. 26, 2013
SPACEK LABS	SLKKa-48-6	9K16	Nov. 15, 2011	Nov. 14, 2012
SCHWARZBECK Trilog Broadband Antenna	VULB 9168	9168-361	Apr. 06, 2012	Apr. 05, 2013
AISI Horn_Antenna	AIH.8018	0000220091110	Nov. 23, 2011	Nov. 22, 2012
SCHWARZBECK Horn_Antenna	BBHA 9170	9170-424	Oct. 07, 2011	Oct. 06, 2012
RF CABLE	NA	RF104-205 RF104-207 RF104-202	Dec. 27, 2011	Dec. 26, 2012
RF Cable	NA	CHHCAB_001	Oct. 08, 2011	Oct. 07, 2012
Software	ADT_Radiated_ V8.7.05	NA	NA	NA
CT Antenna Tower & Turn Table	NA	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3 The test was performed in 966 Chamber No. H.
4. The FCC Site Registration No. is 797305.
5 The CANADA Site Registration No. is IC 7450H-3.
6 Tested Date: June 06, 2012

4.2.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

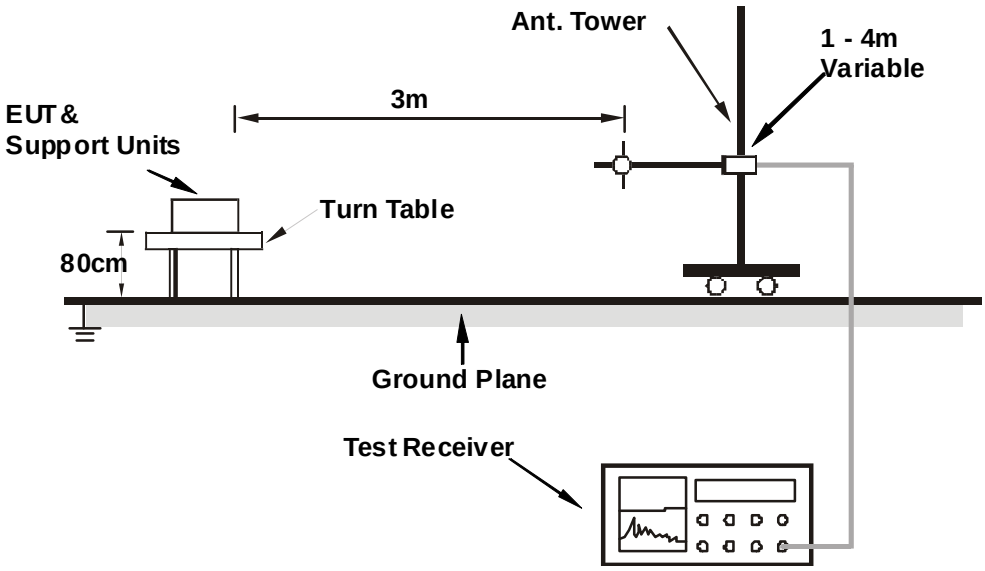
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

4.2.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

4.2.7 TEST RESULTS (WLAN 2.4GHz +BT)

BELOW 1GHz DATA：

FREQUENCY RANGE	Below 1GHz	DETECTOR FUNCTION	Quasi-Peak (QP)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	221.36	36.1 QP	46.0	-9.9	1.50 H	222	24.00	12.10
2	304.20	38.2 QP	46.0	-7.8	1.00 H	237	22.78	15.40
3	478.55	33.5 QP	46.0	-12.5	1.50 H	335	13.63	19.85
4	611.00	35.6 QP	46.0	-10.4	1.50 H	314	12.82	22.80
5	696.50	33.3 QP	46.0	-12.7	1.00 H	308	9.37	23.92
6	747.56	37.2 QP	46.0	-8.8	1.02 H	232	12.33	24.86
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	225.86	35.7 QP	46.0	-10.3	1.00 V	189	23.42	12.29
2	242.02	38.5 QP	46.0	-7.5	2.00 V	203	25.49	13.00
3	294.80	37.0 QP	46.0	-9.0	1.50 V	314	21.87	15.09
4	319.40	37.5 QP	46.0	-8.5	1.50 V	309	21.70	15.79
5	475.49	35.7 QP	46.0	-10.3	2.00 V	207	15.92	19.78
6	521.88	34.5 QP	46.0	-11.5	2.00 V	175	13.62	20.90

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.

ABOVE 1GHz DATA

FREQUENCY RANGE	1GHz ~ 25GHz	DETECTOR FUNCTION	Peak (PK) Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	56.1 PK	74.0	-17.9	1.37 H	95	24.89	31.21
2	2390.00	44.4 AV	54.0	-9.6	1.37 H	95	13.19	31.21
3	2484.00	58.2 PK	74.0	-15.8	1.30 H	61	26.74	31.46
4	2484.00	46.0 AV	54.0	-8.0	1.30 H	61	14.54	31.46
5	4804.00	65.6 PK	74.0	-8.4	1.00 H	216	26.25	39.35
6	4804.00	35.5 AV	54.0	-18.5	1.00 H	216	-3.85	39.35
7	4874.00	53.1 PK	74.0	-20.9	1.41 H	254	13.48	39.62
8	4874.00	47.0 AV	54.0	-7.0	1.41 H	254	7.38	39.62
9	7311.00	57.1 PK	74.0	-16.9	1.00 H	0	13.00	44.10
10	7311.00	42.1 AV	54.0	-11.9	1.00 H	0	-2.00	44.10
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2386.00	56.6 PK	74.0	-17.4	1.08 V	200	25.40	31.20
2	2386.00	44.9 AV	54.0	-9.1	1.08 V	200	13.70	31.20
3	2390.00	56.3 PK	74.0	-17.7	1.04 V	201	25.09	31.21
4	2390.00	44.5 AV	54.0	-9.5	1.04 V	201	13.29	31.21
5	4804.00	65.1 PK	74.0	-8.9	1.11 V	150	25.75	39.35
6	4804.00	35.0 AV	54.0	-19.0	1.11 V	150	-4.35	39.35
7	4874.00	53.6 PK	74.0	-20.4	1.00 V	156	13.98	39.62
8	**4874.00**	**49.2 AV**	**54.0**	**-4.8**	**1.00 V**	**156**	**9.58**	**39.62**
9	7311.00	55.1 PK	74.0	-18.9	1.01 V	137	11.00	44.10
10	7311.00	43.1 AV	54.0	-10.9	1.01 V	137	-1.00	44.10

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.

4.2.8 TEST RESULTS (WLAN 5GHz +BT)

BELOW 1GHz DATA：

FREQUENCY RANGE	Below 1GHz	DETECTOR FUNCTION	Quasi-Peak (QP)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	221.85	36.2 QP	46.0	-9.8	1.50 H	216	24.07	12.12
2	304.33	38.4 QP	46.0	-7.6	1.00 H	224	22.99	15.40
3	478.05	33.4 QP	46.0	-12.6	1.50 H	355	13.58	19.84
4	605.60	35.5 QP	46.0	-10.5	1.50 H	256	12.80	22.73
5	696.66	33.5 QP	46.0	-12.6	1.00 H	208	9.53	23.92
6	747.00	37.1 QP	46.0	-8.9	1.00 H	266	12.23	24.85
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	225.98	35.6 QP	46.0	-10.4	1.07 V	187	23.33	12.30
2	**242.35**	**38.5 QP**	**46.0**	**-7.5**	**2.00 V**	**163**	**25.51**	**13.01**
3	294.91	36.8 QP	46.0	-9.2	1.50 V	215	21.74	15.09
4	319.63	37.5 QP	46.0	-8.5	1.50 V	219	21.66	15.80
5	475.79	35.4 QP	46.0	-10.6	2.00 V	192	15.58	19.78
6	521.49	34.3 QP	46.0	-11.7	2.00 V	305	13.44	20.89

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.

ABOVE 1GHz DATA

FREQUENCY RANGE	1GHz ~ 40GHz	DETECTOR FUNCTION	Peak (PK) Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	55.3 PK	74.0	-18.7	1.20 H	85	24.09	31.21
2	2390.00	25.2 AV	54.0	-28.8	1.20 H	85	-6.01	31.21
3	4804.00	65.7 PK	74.0	-8.3	1.00 H	173	26.35	39.35
4	4804.00	35.6 AV	54.0	-18.4	1.00 H	173	-3.75	39.35
5	11650.00	58.1 PK	74.0	-15.9	1.00 H	118	10.27	47.83
6	11650.00	44.9 AV	54.0	-9.1	1.00 H	118	-2.93	47.83
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	56.4 PK	74.0	-17.6	1.01 V	310	25.19	31.21
2	2390.00	26.3 AV	54.0	-27.7	1.01 V	310	-4.91	31.21
3	4804.00	64.8 PK	74.0	-9.2	1.16 V	146	25.45	39.35
4	4804.00	34.7 AV	54.0	-19.3	1.16 V	146	-4.65	39.35
5	11650.00	54.1 PK	74.0	-19.9	1.00 V	28	6.27	47.83
6	11650.00	43.7 AV	54.0	-10.3	1.00 V	28	-4.13	47.83

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.

4. INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab:
Tel: 886-2-26052180
Fax: 886-2-26052943

Hsin Chu EMC/RF Lab:
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Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety/Telecom Lab:
Tel: 886-3-3183232
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Email: service.adt@tw.bureauveritas.com
Web Site: www.adt.com.tw

The address and road map of all our labs can be found in our web site also.

5.APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

---END---