FCC TEST REPORT

REPORT NO.:	RF120802E01B
MODEL NO.:	J20H064
FCC ID:	MCLJ20H064
RECEIVED:	May 17, 2013
TESTED:	May 28 to June 19, 2013
ISSUED:	June 25, 2013

APPLICANT:	Hon Hai PRECISION IND.CO.,LTD
ADDRESS:	5F-1, Hsin-An Road, Hsinchu, Science Industrial Park, Taiwan, R.O.C.

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.

This report should not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF120802E01B	Original release	June 25, 2013

1. CERTIFICATION

PRODUCT:	WiFi+ BT Module
BRAND NAME:	FOXCONN
MODEL NO.:	J20H064
TEST SAMPLE:	MASS-PRODUCTION
APPLICANT:	Hon Hai PRECISION IND.CO.,LTD
TESTED:	May 28 to June 19, 2013
STANDARDS:	**FCC Part 15, Subpart C (Section 15.247)** ANSI C63.10-2009

The above equipment (Model: J20H064) 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:** *June 25, 2013*
(Lori Chung, Specialist)

APPROVED BY : _____ , **DATE:** *June 25, 2013*
(May Chen, Manager)

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

For 2.4GHz(WLAN), 2412~2462MHz Band

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 -6.22dB at 0.16562MHz
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.3dB at 2390.00MHz
15.247(b)	Conducted power	PASS	Meet the requirement of limit.

NOTE:

1. This report is prepared for FCC class II permissive change. Only conducted emission, radiated emission and conducted power were presented in this test report.

For 2.4GHz(Bluetooth(LE mode)), 2402~2480MHz Band

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 -7.61dB at 0.18516MHz
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -5.5dB at 43.48MHz
15.247(b)	Conducted power	PASS	Meet the requirement of limit.

NOTE:

1. This report is prepared for FCC class II permissive change. Only conducted emission, radiated emission and conducted power were presented in this test report.

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)	5.63 dB
Radiated emissions (1GHz -6GHz) – Chamber G	3.73 dB
Radiated emissions (6GHz -18GHz) – Chamber G	3.90 dB
Radiated emissions (18GHz -40GHz) – Chamber G	4.11 dB
Radiated emissions (1GHz -6GHz) – Chamber H	3.54 dB
Radiated emissions (6GHz -18GHz) – Chamber H	4.08 dB
Radiated emissions (18GHz -40GHz) – Chamber H	4.11 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	WiFi+ BT Module
MODEL NO.	J20H064
POWER SUPPLY	DC 5V ±5% from host equipment
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM BT-LE (GFSK) for DTS
MODULATION TECHNOLOGY	DSSS, OFDM, DTS
TRANSFER RATE	802.11b: Up to 11Mbps 802.11g: Up to 54Mbps 802.11n (HT20): Up to 72.2Mbps Bluetooth LE (GFSK): 1Mbps
OPERATING FREQUENCY	802.11b/g/n (HT20): 2.412 ~ 2.462GHz Bluetooth LE (GFSK): 2.402 ~ 2.480GHz
NUMBER OF CHANNEL	11 for 802.11b, 802.11g, 802.11n (HT20) 40 (37 hopping + 3 advertising channel) for BT-LE (GFSK)
MAXIMUM OUTPUT POWER	802.11b: 62.806mW 802.11g: 220.293mW 802.11n (HT20): 224.905mW Bluetooth LE (GFSK): 1.164 mW
ANTENNA TYPE	Please see NOTE
DATA CABLE	NA
I/O PORTS	Refer to user's manual
ASSOCIATED DEVICES	NA

NOTE:

1. This report is prepared for FCC class II permissive change. The difference compared with the Report No.: RF120802E01 design is as the following information:

   u Add different antenna types as following table:

Original antenna							
Transmitter Circuit	Type	Connector	Gain (dBi)			Diversity Function	Frequency range From MHz to MHz
Chain (0) Ant. 1	PCB printed	NA	1.68			Yes	2400~2483.5
Chain (1) Ant. 2	PCB printed	NA	1.70			Yes	2400~2483.5
Newly antenna (Model: ALLEGRO)							
Transmitter Circuit	Type	Connector	Gain (dBi) (Not include cable loss)	Cable Loss (dB)	Cable Length (mm)	Diversity Function	Frequency range From MHz to MHz
Chain (0) Ant. 3	PCB Type or Slot Antenna	i-pex	0.67	1.13	260	Yes	2400~2483.5
Chain (1) Ant. 4	PCB Type or Slot Antenna	i-pex	1.05	1.13	260	Yes	2400~2483.5
Newly antenna (Model: SPIRITOSO)							
Transmitter Circuit	Type	Connector	Gain (dBi) (Not include cable loss)	Cable Loss (dB)	Cable Length (mm)	Diversity Function	Frequency range From MHz to MHz
Chain (0) Ant. 5	PCB Type or Slot Antenna	i-pex	0.01	0.64	125	Yes	2400~2483.5
Chain (1) Ant. 6	PCB Type or Slot Antenna	i-pex	0.23	1.22	260	Yes	2400~2483.5

NOTE:
1. Chain (0) Ant. 1 -- WLAN / Chain (1) Ant. 2 -- WLAN & BT
2. Chain (0) Ant. 3 -- WLAN / Chain (1) Ant. 4 -- WLAN & BT
3. Chain (0) Ant. 5 -- WLAN / Chain (1) Ant. 6 -- WLAN & BT
4. For original antennas: Chain (1) Ant. 2 was selected as representative model for the test and its data was recorded in this report.
5. For newly antennas: Chain (1) Ant. 4 was selected as representative model for the test and its data was recorded in this report.

2. There are Bluetooth technology and WLAN technology used for the EUT.

3. Spurious emission of the simultaneous operation (WLAN & Bluetooth) has been evaluated and no non-compliance was found.

4. The EUT incorporates a SISO function without beam forming.

MODULATION MODE	TX/RX FUNCTION
802.11b	1TX/1RX
802.11g	1TX/1RX
802.11n (HT20)	1TX/1RX

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

6. 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 DESCRIPTION OF TEST MODES

Eleven channels are provided for 802.11b, 802.11g, 802.11n (HT20):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412MHz	7	2442MHz
2	2417MHz	8	2447MHz
3	2422MHz	9	2452MHz
4	2427MHz	10	2457MHz
5	2432MHz	11	2462MHz
6	2437MHz		

Forty channels are provided for Bluetooth LE mode:

CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	PLC	RE < 1G	RE ³ 1G	APCM	
-	√	√	√	√	-

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

RE ³ 1G: Radiated Emission above 1GHz **APCM:** Antenna Port Conducted Measurement

NOTE: 1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X plane**

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	DATA RATE (Mbps)
802.11g	1 to 11	6	OFDM	BPSK	6
Bluetooth LE	0 to 39	19	DTS	GFSK (LE mode)	1

RADIATED EMISSION TEST (BELOW 1 GHz):

☒ 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	DATA RATE (Mbps)
802.11g	1 to 11	6	OFDM	BPSK	6
Bluetooth LE	0 to 39	19	DTS	GFSK (LE mode)	1

RADIATED EMISSION TEST (ABOVE 1 GHz):

☒ 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	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
Bluetooth LE	0 to 39	0, 19, 39	DTS	GFSK (LE mode)	1

ANTENNA PORT CONDUCTED MEASUREMENT:

☒ 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	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
Bluetooth LE	0 to 39	0, 19, 39	DTS	GFSK (LE mode)	1

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
PLC	25deg. C, 65%RH	120Vac, 60Hz (SYSTEM)	Anderson Chen
RE<1G	23deg. C, 78%RH	120Vac, 60Hz (SYSTEM)	Chilin Lee
RE≥1G	23deg. C, 65%RH 24deg. C, 74%RH	120Vac, 60Hz (SYSTEM)	Chilin Lee
APCM	25deg. C, 60%RH	DC 5V	James Chan

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C. (15.247)

558074 D01 DTS Meas Guidance v03r01

ANSI C63.10-2009

All test items have been performed and recorded as per the above standards.

3.4 DESCRIPTION OF SUPPORT UNITS

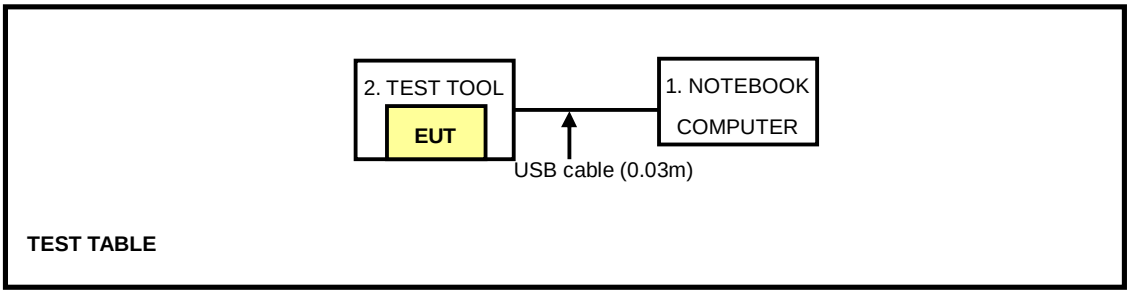
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER (For Conducted emission test)	IBM	2387	99-FV844	NA
	NOTEBOOK COMPUTER (For other test items)	DELL	PP17L	CN-ONF743-48643-7AV-0124	FCC DoC
2	TEST TOOL	Hon Hai	NA	NA	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	USB cable (0.03m)
2	NA

NOTE: The power cords of the above support units were unshielded (1.8m).

3.5 CONFIGURATION OF SYSTEM UNDER TEST



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	ESCS 30	100375	Mar. 08, 2013	Mar. 07, 2014
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK8127	8127-522	Sep. 06, 2012	Sep. 05, 2013
Line-Impedance Stabilization Network (for Peripheral)	ENV216	100072	June 07,2013	June 06,2014
RF Cable (JYEBAO)	5DFB	COCCAB-001	Mar. 11, 2013	Mar. 10, 2014
50 ohms Terminator	50	EMC-3	Sep. 25, 2012	Sep. 24, 2013
Software ADT	BV ADT_Cond_V7.3.7.3	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. C.
3 The VCCI Con C Registration No. is C-3611.
4 Tested Date: May 28, 2013

4.1.3 TEST PROCEDURES

a. The EUT/HOST was placed 0.4 meters from the conducting wall of the shielded room with EUT/HOST 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.

b. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

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

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

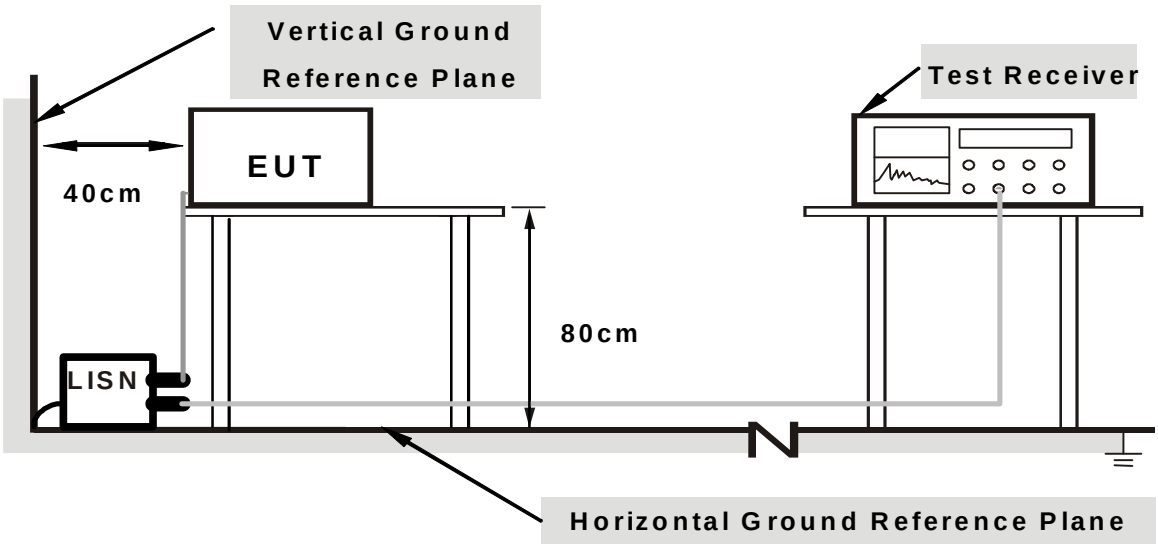
NOTE:

1. The resolution bandwidth of test receiver is 9kHz for Quasi-peak detection (QP) & Average detection (AV).

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



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

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

4.1.6 EUT OPERATING CONDITIONS

1. Turned on the power of all equipment.
2. Support unit 1(Notebook computer) ran test program "DutApiBRIDGEETH8766(V1.1.7.46).exe" to enable EUT under transmission/receiving condition continuously via one USB cable.

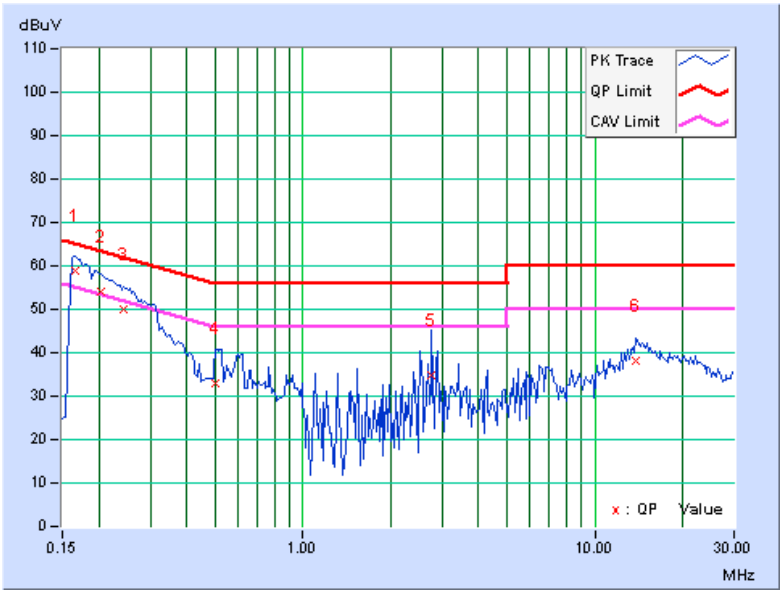
4.1.7 TEST RESULTS (WLAN MODE)

PHASE	Line (L)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.16562**	**0.13**	**58.83**	**44.27**	**58.96**	**44.40**	**65.18**	**55.18**	**-6.22**	**-10.78**
2	0.20469	0.14	54.06	34.52	54.20	34.66	63.42	53.42	-9.22	-18.76
3	0.24375	0.15	49.82	27.73	49.97	27.88	61.97	51.97	-12.00	-24.09
4	0.50156	0.19	32.72	11.29	32.91	11.48	56.00	46.00	-23.09	-34.52
5	2.76563	0.31	34.39	15.42	34.70	15.73	56.00	46.00	-21.30	-30.27
6	13.75391	0.82	37.30	33.73	38.12	34.55	60.00	50.00	-21.88	-15.45

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

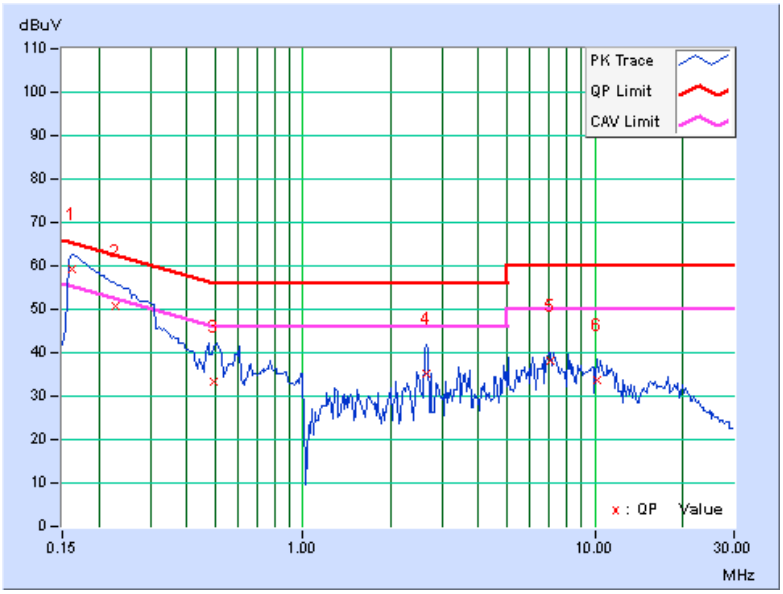


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16172	0.10	59.04	42.69	59.14	42.79	65.38	55.38	-6.23	-12.58
2	0.22812	0.13	50.61	28.72	50.74	28.85	62.52	52.52	-11.78	-23.67
3	0.49375	0.17	33.05	13.77	33.22	13.94	56.10	46.10	-22.88	-32.16
4	2.63281	0.28	35.05	19.37	35.33	19.65	56.00	46.00	-20.67	-26.35
5	7.03906	0.43	37.72	34.94	38.15	35.37	60.00	50.00	-21.85	-14.63
6	10.12500	0.52	33.09	27.73	33.61	28.25	60.00	50.00	-26.39	-21.75

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



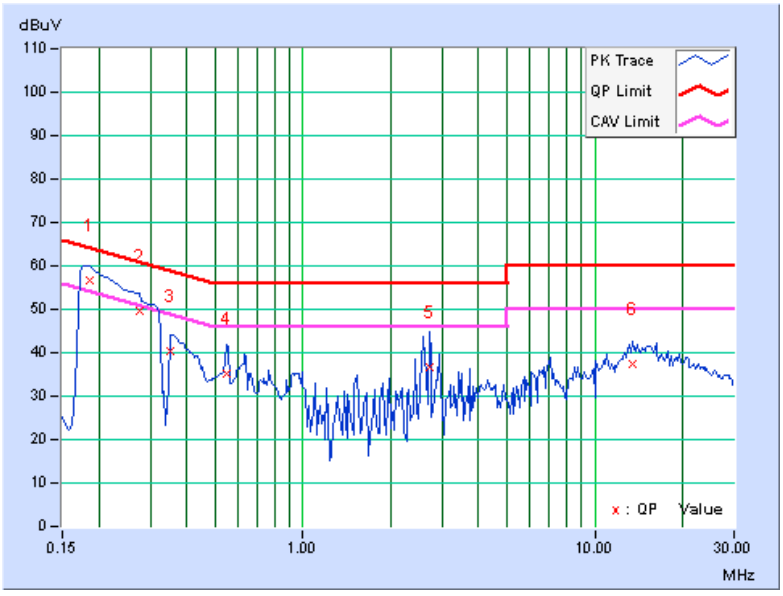
4.1.8 TEST RESULTS (Bluetooth LE GFSK MODE)

PHASE	Line (L)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.18516**	**0.13**	**56.51**	**38.74**	**56.64**	**38.87**	**64.25**	**54.25**	**-7.61**	**-15.38**
2	0.27500	0.16	49.65	28.73	49.81	28.89	60.97	50.97	-11.16	-22.08
3	0.34922	0.17	40.38	21.43	40.55	21.60	58.98	48.98	-18.43	-27.38
4	0.54844	0.19	35.16	27.75	35.35	27.94	56.00	46.00	-20.65	-18.06
5	2.72266	0.31	36.37	16.00	36.68	16.31	56.00	46.00	-19.32	-29.69
6	13.41789	0.81	36.74	34.21	37.55	35.02	60.00	50.00	-22.45	-14.98

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

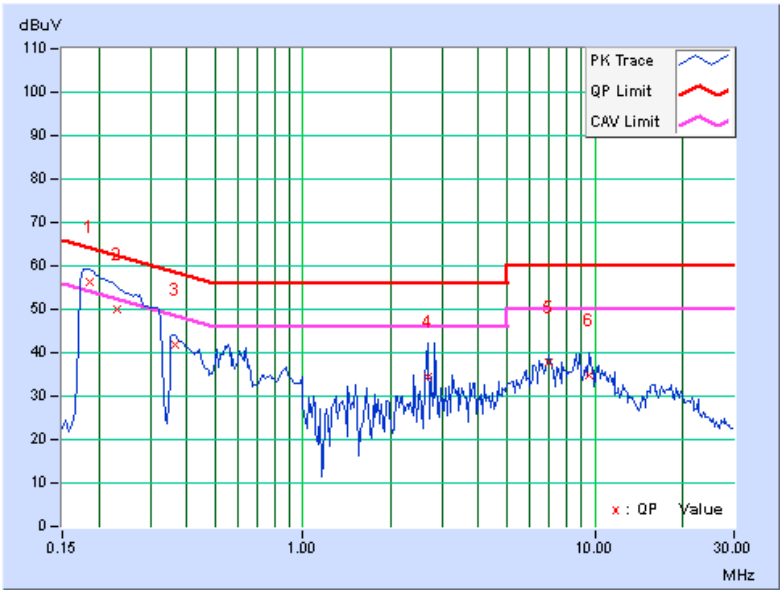


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18516	0.11	56.23	38.56	56.34	38.67	64.25	54.25	-7.91	-15.58
2	0.23203	0.13	49.92	27.87	50.05	28.00	62.38	52.38	-12.33	-24.38
3	0.36484	0.16	41.61	22.80	41.77	22.96	58.62	48.62	-16.85	-25.66
4	2.67969	0.28	34.16	15.77	34.44	16.05	56.00	46.00	-21.56	-29.95
5	6.92969	0.42	37.22	33.25	37.64	33.67	60.00	50.00	-22.36	-16.33
6	9.57031	0.51	34.22	29.84	34.73	30.35	60.00	50.00	-25.27	-19.65

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 AND BANDEDGE MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION AND BANDEDGE 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 WLAN mode radiated emission &

Bluetooth LE (GFSK) Below 1GHz radiated emission test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer Agilent	E4446A	MY48250253	Sep. 03, 2012	Sep. 02, 2013
MXE EMI Receiver Agilent	N9038A	MY51210105	Jan. 29, 2013	Jan. 28, 2014
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 14, 2012	Nov. 13, 2013
Pre-Amplifier Agilent	8449B	3008A02578	June 26, 2012	June 25, 2013
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 14, 2012	Nov. 13, 2013
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Mar. 19, 2013	Mar. 18, 2014
Horn_Antenna AISI	AIH.8018	0000320091110	Nov. 19, 2012	Nov. 18, 2013
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 12, 2012	Oct. 11, 2013
RF Cable	NA	RF104-201 RF104-203 RF104-204	Dec. 25, 2012	Dec. 24, 2013
RF Cable	NA	CHGCAB_001	Oct. 06, 2012	Oct. 05, 2013
Software	ADT_Radiated _V8.7.05	NA	NA	NA
Antenna Tower & Turn Table CT	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. G.
4. The FCC Site Registration No. is 966073.
5 The VCCI Site Registration No. is G-137.
6 The CANADA Site Registration No. is IC 7450H-2.
7 Tested Date: June 06, 2013

For Bluetooth LE (GFSK) Above 1GHz radiated emission test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer Agilent	E4446A	MY48250253	Sep. 03, 2012	Sep. 02, 2013
MXE EMI Receiver Agilent	N9038A	MY50010156	Jan. 16, 2013	Jan. 15, 2014
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-04	Nov. 14, 2012	Nov. 13, 2013
Pre-Amplifier Agilent	8449B	3008A01923	Oct. 30, 2012	Oct. 29, 2013
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 14, 2012	Nov. 13, 2013
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Mar. 25, 2013	Mar. 24, 2014
Horn_Antenna AISI	AIH.8018	0000220091110	Nov. 27, 2012	Nov. 26, 2013
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 12, 2012	Oct. 11, 2013
RF Cable	NA	RF104-205 RF104-207 RF104-202	Dec. 26, 2012	Dec. 25, 2013
RF Cable	NA	CHHCAB_001	Oct. 07, 2012	Oct. 06, 2013
Software	ADT_Radiated _V8.7.05	NA	NA	NA
Antenna Tower & Turn Table CT	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 19, 2013

4.2.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 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.

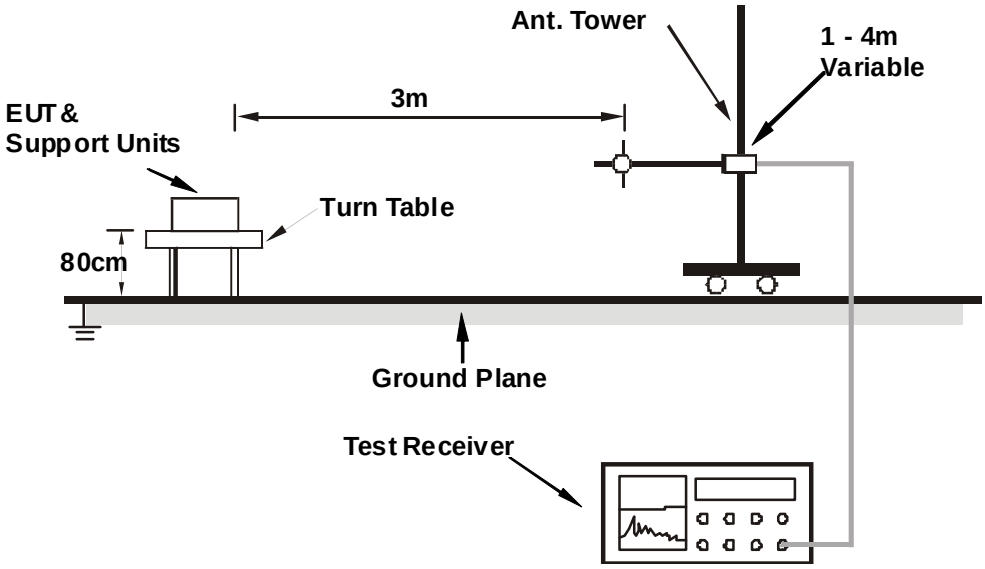
NOTE:

1. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
2. 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.
3. All modes of operation were investigated and the worst-case emissions are reported.

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

BELOW 1GHz WORST-CASE DATA

802.11g

CHANNEL	TX Channel 6	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	Below 1GHz		

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	95.18	31.2 QP	43.5	-12.4	2.00 H	103	49.92	-18.77
2	240.00	35.0 QP	46.0	-11.0	1.00 H	175	49.95	-14.91
3	375.03	32.6 QP	46.0	-13.4	1.00 H	317	43.37	-10.77
4	480.03	36.0 QP	46.0	-10.0	1.50 H	164	44.22	-8.20
5	666.37	36.2 QP	46.0	-9.8	1.00 H	83	40.65	-4.48
6	800.03	38.7 QP	46.0	-7.3	1.50 H	140	40.62	-1.91
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	32.23	35.6 QP	40.0	-4.4	1.50 V	16	50.62	-15.03
2	237.34	28.1 QP	46.0	-18.0	1.00 V	98	43.31	-15.26
3	275.41	25.8 QP	46.0	-20.3	1.00 V	255	39.37	-13.62
4	480.03	32.9 QP	46.0	-13.1	1.50 V	192	41.06	-8.20
5	640.03	36.4 QP	46.0	-9.6	1.50 V	86	41.00	-4.60
6	800.03	37.6 QP	46.0	-8.5	1.00 V	82	39.46	-1.91

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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

ABOVE 1GHz DATA

802.11b

CHANNEL	TX Channel 1	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	61.1 PK	74.0	-12.9	1.15 H	182	62.29	-1.19
2	2390.00	46.1 AV	54.0	-7.9	1.15 H	182	47.29	-1.19
3	*2412.00	101.5 PK			1.15 H	182	102.59	-1.09
4	*2412.00	99.4 AV			1.15 H	182	100.49	-1.09
5	4824.00	48.4 PK	74.0	-25.6	1.00 H	279	40.81	7.59
6	4824.00	36.2 AV	54.0	-17.8	1.00 H	279	28.61	7.59
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	57.3 PK	74.0	-16.7	1.00 V	123	58.49	-1.19
2	2390.00	45.7 AV	54.0	-8.3	1.00 V	123	46.89	-1.19
3	*2412.00	95.5 PK			1.00 V	123	96.59	-1.09
4	*2412.00	92.8 AV			1.00 V	123	93.89	-1.09
5	4824.00	47.9 PK	74.0	-26.1	1.00 V	112	40.31	7.59
6	4824.00	36.1 AV	54.0	-17.9	1.00 V	112	28.51	7.59

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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	*2437.00	103.2 PK			1.13 H	181	104.19	-0.99
2	*2437.00	101.1 AV			1.13 H	181	102.09	-0.99
3	4874.00	49.1 PK	74.0	-24.9	1.00 H	249	41.33	7.77
4	4874.00	37.0 AV	54.0	-17.0	1.00 H	249	29.23	7.77
5	7311.00	56.2 PK	74.0	-17.8	1.02 H	309	40.71	15.49
6	7311.00	44.5 AV	54.0	-9.5	1.02 H	309	29.01	15.49
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	*2437.00	95.4 PK			1.04 V	132	96.39	-0.99
2	*2437.00	92.9 AV			1.04 V	132	93.89	-0.99
3	4874.00	48.0 PK	74.0	-26.0	1.04 V	136	40.23	7.77
4	4874.00	36.0 AV	54.0	-18.0	1.04 V	136	28.23	7.77
5	7311.00	55.0 PK	74.0	-19.0	1.01 V	172	39.51	15.49
6	7311.00	44.6 AV	54.0	-9.4	1.01 V	172	29.11	15.49

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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	*2462.00	103.9 PK			1.12 H	207	104.79	-0.89
2	*2462.00	101.7 AV			1.12 H	207	102.59	-0.89
3	2483.50	66.5 PK	74.0	-7.5	1.12 H	207	67.30	-0.80
4	2483.50	47.4 AV	54.0	-6.6	1.12 H	207	48.20	-0.80
5	4924.00	48.6 PK	74.0	-25.4	1.00 H	245	40.66	7.94
6	4924.00	36.7 AV	54.0	-17.3	1.00 H	245	28.76	7.94
7	7386.00	56.8 PK	74.0	-17.2	1.00 H	322	41.29	15.51
8	7386.00	44.8 AV	54.0	-9.2	1.00 H	322	29.29	15.51
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	*2462.00	95.9 PK			1.00 V	108	96.79	-0.89
2	*2462.00	93.5 AV			1.00 V	108	94.39	-0.89
3	2483.50	57.2 PK	74.0	-16.8	1.03 V	132	58.00	-0.80
4	2483.50	45.6 AV	54.0	-8.4	1.03 V	132	46.40	-0.80
5	4924.00	48.1 PK	74.0	-25.9	1.00 V	132	40.16	7.94
6	4924.00	36.4 AV	54.0	-17.6	1.00 V	132	28.46	7.94
7	7386.00	55.1 PK	74.0	-18.9	1.00 V	156	39.59	15.51
8	7386.00	44.5 AV	54.0	-9.5	1.00 V	156	28.99	15.51

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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

802.11g

CHANNEL	TX Channel 1	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	64.3 PK	74.0	-9.7	1.14 H	180	65.49	-1.19
2	2390.00	52.1 AV	54.0	-1.9	1.14 H	180	53.29	-1.19
3	*2412.00	104.7 PK			1.14 H	180	105.79	-1.09
4	*2412.00	97.2 AV			1.14 H	180	98.29	-1.09
5	4824.00	48.3 PK	74.0	-25.7	1.00 H	259	40.71	7.59
6	4824.00	36.3 AV	54.0	-17.7	1.00 H	259	28.71	7.59
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	63.0 PK	74.0	-11.0	1.03 V	83	64.19	-1.19
2	2390.00	48.6 AV	54.0	-5.4	1.03 V	83	49.79	-1.19
3	*2412.00	96.1 PK			1.04 V	77	97.19	-1.09
4	*2412.00	88.8 AV			1.04 V	77	89.89	-1.09
5	4824.00	48.2 PK	74.0	-25.8	1.00 V	147	40.61	7.59
6	4824.00	36.3 AV	54.0	-17.7	1.00 V	147	28.71	7.59

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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	*2437.00	104.7 PK			1.12 H	182	105.69	-0.99
2	*2437.00	97.3 AV			1.12 H	182	98.29	-0.99
3	4874.00	48.9 PK	74.0	-25.1	1.00 H	242	41.13	7.77
4	4874.00	36.8 AV	54.0	-17.2	1.00 H	242	29.03	7.77
5	7311.00	56.7 PK	74.0	-17.3	1.03 H	333	41.21	15.49
6	7311.00	45.0 AV	54.0	-9.0	1.03 H	333	29.51	15.49
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	*2437.00	97.2 PK			1.04 V	79	98.19	-0.99
2	*2437.00	89.7 AV			1.04 V	79	90.69	-0.99
3	4874.00	47.3 PK	74.0	-26.7	1.00 V	137	39.53	7.77
4	4874.00	35.7 AV	54.0	-18.3	1.00 V	137	27.93	7.77
5	7311.00	55.3 PK	74.0	-18.7	1.00 V	147	39.81	15.49
6	7311.00	44.8 AV	54.0	-9.2	1.00 V	147	29.31	15.49

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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	*2462.00	103.3 PK			1.12 H	207	104.19	-0.89
2	*2462.00	96.1 AV			1.12 H	207	96.99	-0.89
3	2483.50	67.6 PK	74.0	-6.4	1.12 H	207	68.40	-0.80
4	2483.50	51.8 AV	54.0	-2.2	1.12 H	207	52.60	-0.80
5	4924.00	49.0 PK	74.0	-25.0	1.02 H	256	41.06	7.94
6	4924.00	36.8 AV	54.0	-17.2	1.02 H	256	28.86	7.94
7	7386.00	56.2 PK	74.0	-17.8	1.00 H	334	40.69	15.51
8	7386.00	44.5 AV	54.0	-9.5	1.00 H	334	28.99	15.51
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	*2462.00	96.8 PK			1.00 V	78	97.69	-0.89
2	*2462.00	89.3 AV			1.00 V	78	90.19	-0.89
3	2483.50	62.6 PK	74.0	-11.4	1.00 V	78	63.40	-0.80
4	2483.50	48.3 AV	54.0	-5.7	1.00 V	78	49.10	-0.80
5	4924.00	47.6 PK	74.0	-26.4	1.00 V	132	39.66	7.94
6	4924.00	36.0 AV	54.0	-18.0	1.00 V	132	28.06	7.94
7	7386.00	55.2 PK	74.0	-18.8	1.00 V	158	39.69	15.51
8	7386.00	44.4 AV	54.0	-9.6	1.00 V	158	28.89	15.51

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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

802.11n (HT20)

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

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	67.4 PK	74.0	-6.6	1.14 H	183	68.59	-1.19
2	**2390.00**	**52.7 AV**	**54.0**	**-1.3**	**1.14 H**	**183**	**53.89**	**-1.19**
3	*2412.00	105.1 PK			1.14 H	183	106.19	-1.09
4	*2412.00	97.3 AV			1.14 H	183	98.39	-1.09
5	4824.00	48.8 PK	74.0	-25.2	1.00 H	244	41.21	7.59
6	4824.00	36.4 AV	54.0	-17.6	1.00 H	244	28.81	7.59
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	63.4 PK	74.0	-10.6	1.09 V	75	64.59	-1.19
2	2390.00	48.8 AV	54.0	-5.2	1.09 V	75	49.99	-1.19
3	*2412.00	96.2 PK			1.00 V	71	97.29	-1.09
4	*2412.00	89.1 AV			1.00 V	71	90.19	-1.09
5	4824.00	48.4 PK	74.0	-25.6	1.00 V	141	40.81	7.59
6	4824.00	36.7 AV	54.0	-17.3	1.00 V	141	29.11	7.59

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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	*2437.00	104.5 PK			1.16 H	197	105.49	-0.99
2	*2437.00	96.9 AV			1.16 H	197	97.89	-0.99
3	4874.00	48.8 PK	74.0	-25.2	1.00 H	257	41.03	7.77
4	4874.00	36.8 AV	54.0	-17.2	1.00 H	257	29.03	7.77
5	7311.00	56.2 PK	74.0	-17.8	1.09 H	348	40.71	15.49
6	7311.00	44.5 AV	54.0	-9.5	1.09 H	348	29.01	15.49
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	*2437.00	97.6 PK			1.00 V	88	98.59	-0.99
2	*2437.00	90.2 AV			1.00 V	88	91.19	-0.99
3	4874.00	47.4 PK	74.0	-26.6	1.00 V	151	39.63	7.77
4	4874.00	35.8 AV	54.0	-18.2	1.00 V	151	28.03	7.77
5	7311.00	55.5 PK	74.0	-18.5	1.04 V	138	40.01	15.49
6	7311.00	44.8 AV	54.0	-9.2	1.04 V	138	29.31	15.49

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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	*2462.00	102.7 PK			1.13 H	207	103.59	-0.89
2	*2462.00	94.8 AV			1.13 H	207	95.69	-0.89
3	2483.50	66.1 PK	74.0	-7.9	1.13 H	207	66.90	-0.80
4	2483.50	52.2 AV	54.0	-1.8	1.13 H	207	53.00	-0.80
5	4924.00	48.9 PK	74.0	-25.1	1.04 H	228	40.96	7.94
6	4924.00	36.5 AV	54.0	-17.5	1.04 H	228	28.56	7.94
7	7386.00	56.6 PK	74.0	-17.4	1.09 H	345	41.09	15.51
8	7386.00	44.7 AV	54.0	-9.3	1.09 H	345	29.19	15.51
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	*2462.00	96.9 PK			1.00 V	70	97.79	-0.89
2	*2462.00	89.3 AV			1.00 V	70	90.19	-0.89
3	2483.50	62.4 PK	74.0	-11.6	1.00 V	87	63.20	-0.80
4	2483.50	47.9 AV	54.0	-6.1	1.00 V	87	48.70	-0.80
5	4924.00	47.6 PK	74.0	-26.4	1.00 V	133	39.66	7.94
6	4924.00	36.1 AV	54.0	-17.9	1.00 V	133	28.16	7.94
7	7386.00	55.6 PK	74.0	-18.4	1.00 V	171	40.09	15.51
8	7386.00	44.7 AV	54.0	-9.3	1.00 V	171	29.19	15.51

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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

4.2.7.1 TEST RESULTS (Bluetooth LE (GFSK) MODE)

BELOW 1GHz WORST-CASE DATA

Bluetooth LE (GFSK)

CHANNEL	TX Channel 19	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	Below 1GHz		

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	94.36	30.6 QP	43.5	-12.9	2.00 H	81	49.43	-18.85
2	240.00	35.4 QP	46.0	-10.6	1.00 H	360	50.28	-14.91
3	375.03	32.7 QP	46.0	-13.3	1.00 H	303	43.49	-10.77
4	479.98	37.1 QP	46.0	-8.9	2.00 H	178	45.32	-8.20
5	666.42	36.2 QP	46.0	-9.8	1.00 H	84	40.65	-4.48
6	800.03	36.8 QP	46.0	-9.2	1.00 H	150	38.71	-1.91
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	**43.48**	**34.5 QP**	**40.0**	**-5.5**	**1.00 V**	**148**	**47.86**	**-13.40**
2	237.19	28.1 QP	46.0	-17.9	1.00 V	99	43.36	-15.27
3	305.19	24.2 QP	46.0	-21.8	2.00 V	63	36.79	-12.57
4	480.03	33.9 QP	46.0	-12.1	1.00 V	191	42.12	-8.20
5	640.03	36.3 QP	46.0	-9.7	1.50 V	98	40.87	-4.60
6	800.03	35.9 QP	46.0	-10.1	1.00 V	79	37.78	-1.91

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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

ABOVE 1GHz DATA

BT_LE-GFSK

CHANNEL	TX Channel 0	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	59.4 PK	74.0	-14.6	1.23 H	145	62.85	-3.45
2	2390.00	47.2 AV	54.0	-6.8	1.23 H	145	50.65	-3.45
3	*2402.00	89.7 PK			1.23 H	145	93.12	-3.42
4	*2402.00	88.9 AV			1.23 H	145	92.32	-3.42
5	4804.00	50.1 PK	74.0	-23.9	1.05 H	198	43.62	6.48
6	4804.00	39.0 AV	54.0	-15.0	1.05 H	198	32.52	6.48
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	59.1 PK	74.0	-14.9	1.07 V	241	62.55	-3.45
2	2390.00	47.0 AV	54.0	-7.0	1.07 V	241	50.45	-3.45
3	*2402.00	84.3 PK			1.07 V	241	87.72	-3.42
4	*2402.00	83.5 AV			1.07 V	241	86.92	-3.42
5	4804.00	50.0 PK	74.0	-24.0	1.04 V	136	43.52	6.48
6	4804.00	38.3 AV	54.0	-15.7	1.04 V	136	31.82	6.48

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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 19	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	*2440.00	89.1 PK			1.23 H	146	92.40	-3.30
2	*2440.00	88.0 AV			1.23 H	146	91.30	-3.30
3	4880.00	49.8 PK	74.0	-24.2	1.00 H	198	43.27	6.53
4	4880.00	38.5 AV	54.0	-15.5	1.00 H	198	31.97	6.53
5	7320.00	56.4 PK	74.0	-17.6	1.00 H	211	45.27	11.13
6	7320.00	44.1 AV	54.0	-9.9	1.00 H	211	32.97	11.13
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	*2440.00	83.7 PK			1.08 V	240	87.00	-3.30
2	*2440.00	83.2 AV			1.08 V	240	86.50	-3.30
3	4880.00	49.6 PK	74.0	-24.4	1.00 V	122	43.07	6.53
4	4880.00	38.1 AV	54.0	-15.9	1.00 V	122	31.57	6.53
5	7320.00	56.2 PK	74.0	-17.8	1.00 V	85	45.07	11.13
6	7320.00	43.6 AV	54.0	-10.4	1.00 V	85	32.47	11.13

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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	*2480.00	89.2 PK			1.20 H	150	92.37	-3.17
2	*2480.00	88.6 AV			1.20 H	150	91.77	-3.17
3	2483.50	59.9 PK	74.0	-14.1	1.23 H	149	63.06	-3.16
4	2483.50	47.5 AV	54.0	-6.5	1.23 H	149	50.66	-3.16
5	4960.00	49.8 PK	74.0	-24.2	1.04 H	200	43.26	6.54
6	4960.00	38.7 AV	54.0	-15.3	1.04 H	200	32.16	6.54
7	7440.00	57.2 PK	74.0	-16.8	1.00 H	224	45.69	11.51
8	7440.00	44.6 AV	54.0	-9.4	1.00 H	224	33.09	11.51
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	*2480.00	84.5 PK			1.07 V	230	87.67	-3.17
2	*2480.00	83.6 AV			1.07 V	230	86.77	-3.17
3	2483.50	59.7 PK	74.0	-14.3	1.04 V	245	62.86	-3.16
4	2483.50	47.4 AV	54.0	-6.6	1.04 V	245	50.56	-3.16
5	4960.00	49.0 PK	74.0	-25.0	1.05 V	134	42.46	6.54
6	4960.00	37.7 AV	54.0	-16.3	1.05 V	134	31.16	6.54
7	7440.00	56.0 PK	74.0	-18.0	1.00 V	84	44.49	11.51
8	7440.00	43.7 AV	54.0	-10.3	1.00 V	84	32.19	11.51

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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

4.3 CONDUCTED OUTPUT POWER MEASUREMENT

4.3.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

For systems using digital modulation in the 2400–2483.5 MHz band: 1 Watt (30dBm)

4.3.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power Meter	ML2495A	0824006	May 20, 2013	May 19, 2014
Power Sensor	MA2411B	0738172	May 20, 2013	May 19, 2014

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. Tested date : June 17, 2013

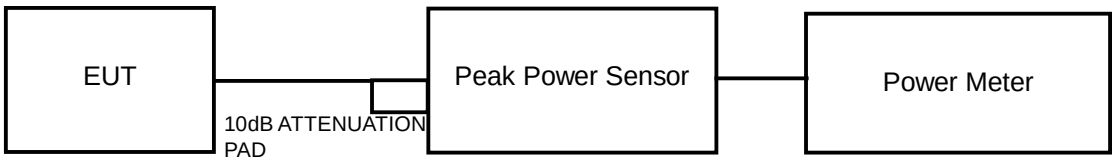
4.3.3 TEST PROCEDURES

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the peak power level.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP



4.3.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6

4.3.7 TEST RESULTS

802.11b

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	62.806	17.98	30	PASS
6	2437	59.020	17.71	30	PASS
11	2462	58.210	17.65	30	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	215.278	23.33	30	PASS
6	2437	220.293	23.43	30	PASS
11	2462	210.378	23.23	30	PASS

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	175.792	22.45	30	PASS
6	2437	224.905	23.52	30	PASS
11	2462	167.494	22.24	30	PASS

Bluetooth LE (GFSK)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
0	2402	1.132	0.54	30	PASS
19	2440	1.164	0.66	30	PASS
39	2480	1.159	0.64	30	PASS

5.PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

6. 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:
Tel: 886-3-5935343
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Tel: 886-3-3183232
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Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

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

7. 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 ---