FCC TEST REPORT

REPORT NO.:	RF120802E01B-1
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, Taiwan, R.O.C.
TEST LOCATION (2):	No.49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan, 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-1	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 DATE :	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:

APPLIED STANDARD: FCC Part 15, Subpart C			
STANDARD SECTION	**TEST TYPE AND LIMIT**	**RESULT**	**REMARK**
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -7.65dB at 0.17734MHz.
15.247(b)	Maximum Peak Output Power	PASS	Meet the requirement of limit.
15.247(d)	Transmitter Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -4.3dB at 33.30MHz.

NOTE:

1. This report is prepared for FCC class II permissive change. Only conducted emission, radiated emission and Maximum Peak Output 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)	3.54 dB
Radiated emissions (6GHz -18GHz)	4.08 dB
Radiated emissions (18GHz -40GHz)	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	GFSK, π/4-DQPSK, 8DPSK
MODULATION TECHNOLOGY	FHSS
TRANSFER RATE	Up to 3Mbps
OPERATING FREQUENCY	2402MHz ~ 2480MHz
NUMBER OF CHANNEL	79
MAXIMUM OUTPUT POWER	GFSK : 1.225 mW 8DPSK: 2.805 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.: RF120802E01-1 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 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

Seventy-nine channels are provided for Bluetooth.

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461		

3.3 TEST MODE APPLICABLITY 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.

Available Channel	Tested Channel	Modulation Technology	Modulation Type	Packet Type
0 to 78	39	FHSS	8DPSK	DH5

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.

Available Channel	Tested Channel	Modulation Technology	Modulation Type	Packet Type
0 to 78	39	FHSS	8DPSK	DH5

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.

Available Channel	Tested Channel	Modulation Technology	Modulation Type	Packet Type
0 to 78	0, 39, 78	FHSS	GFSK	DH5
0 to 78	0, 39, 78	FHSS	8DPSK	DH5

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.

Available Channel	Tested Channel	Modulation Technology	Modulation Type	Packet Type
0 to 78	0, 39, 78	FHSS	GFSK	DH5
0 to 78	0, 39, 78	FHSS	8DPSK	DH5

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	24deg. C, 74%RH	120Vac, 60Hz (SYSTEM)	Chilin Lee
APCM	25deg. C, 60%RH	DC 5V	James Chan

3.4 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.

3.5 DESCRIPTION OF SUPPORT UNITS

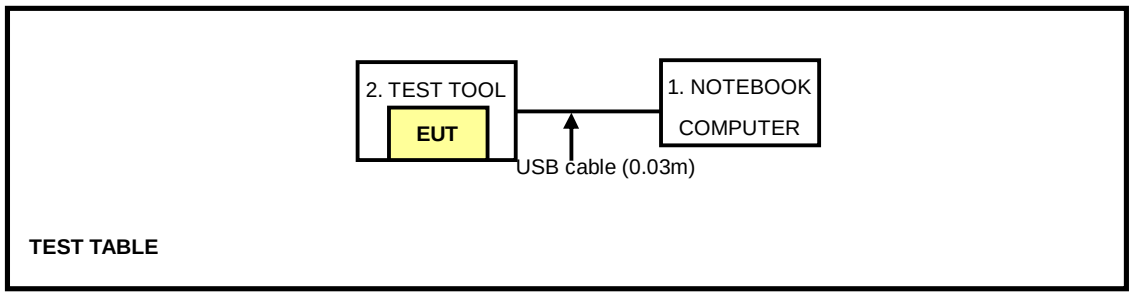
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

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).

3.6 CONFIGURATION OF SYSTEM UNDER TEST



4 TEST PROCEDURES 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	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	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 0.50MHz.

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 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) was not recorded.

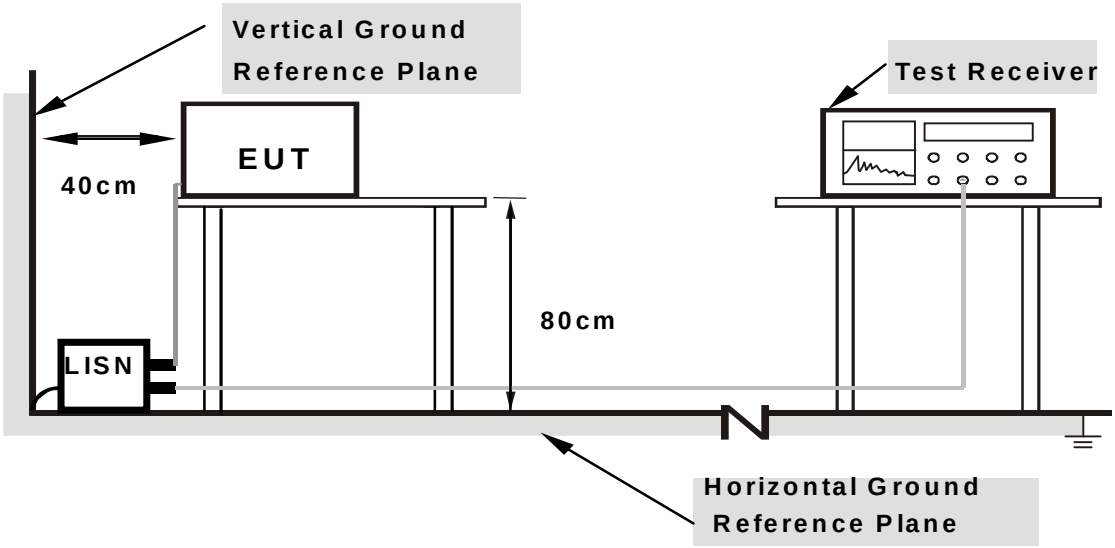
NOTE:

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.

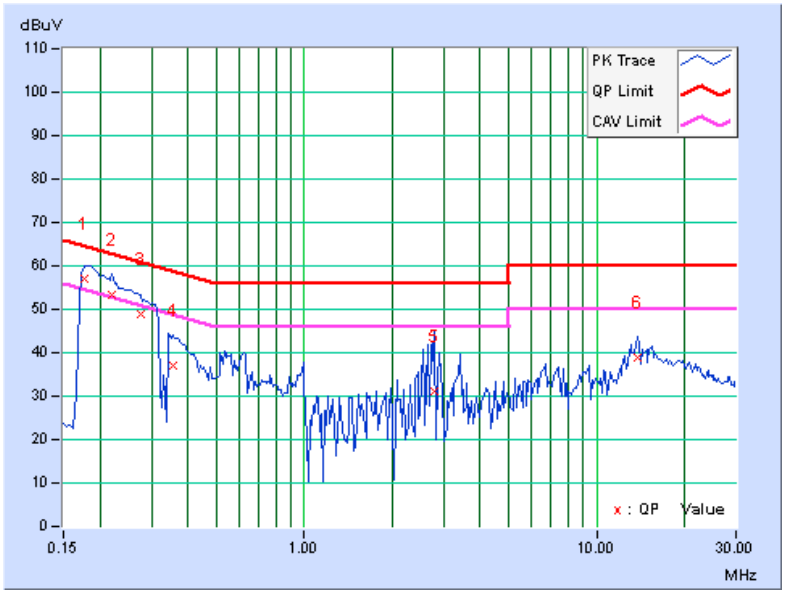
4.1.7 TEST RESULTS

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	**0.17734**	**0.13**	**56.83**	**41.83**	**56.96**	**41.96**	**64.61**	**54.61**	**-7.65**	**-12.65**
2	0.22031	0.14	53.21	35.08	53.35	35.22	62.81	52.81	-9.45	-17.58
3	0.27500	0.16	48.79	24.18	48.95	24.34	60.97	50.97	-12.02	-26.63
4	0.35703	0.17	36.87	19.31	37.04	19.48	58.80	48.80	-21.76	-29.32
5	2.77344	0.31	30.76	13.59	31.07	13.90	56.00	46.00	-24.93	-32.10
6	13.74609	0.82	37.99	33.37	38.81	34.19	60.00	50.00	-21.19	-15.81

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

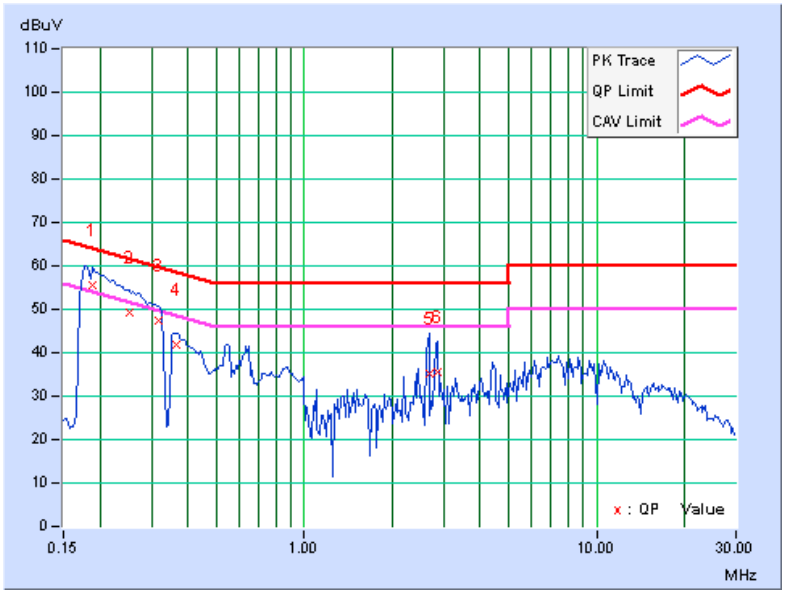


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

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	0.18906	0.12	55.32	38.22	55.44	38.34	64.08	54.08	-8.64	-15.74
2	0.25156	0.13	49.27	26.68	49.40	26.81	61.71	51.71	-12.30	-24.89
3	0.31797	0.15	47.09	24.66	47.24	24.81	59.76	49.76	-12.52	-24.95
4	0.36484	0.16	41.55	28.53	41.71	28.69	58.62	48.62	-16.91	-19.93
5	2.67578	0.28	35.09	14.44	35.37	14.72	56.00	46.00	-20.63	-31.28
6	2.86328	0.29	35.12	27.24	35.41	27.53	56.00	46.00	-20.59	-18.47

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.

4.2.2 TEST INSTRUMENTS

For 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-1000VH2B	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 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 a 3 meters 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 detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.

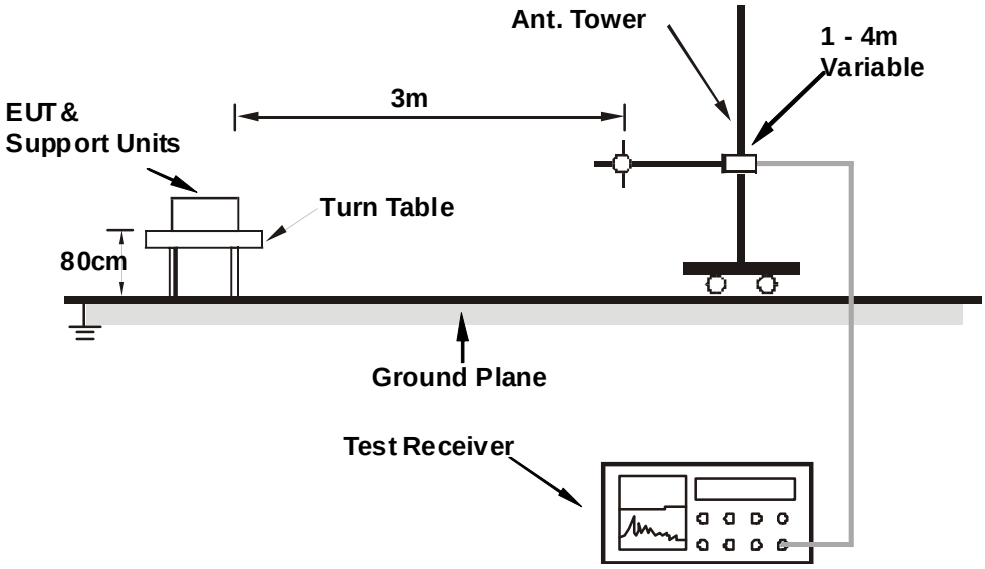
NOTE:

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 1MHz and video bandwidth is 1MHz for Peak detection 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

BT_8DPSK

CHANNEL	TX Channel 39	**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	95.81	30.6 QP	43.5	-12.9	2.00 H	83	49.29	-18.73
2	242.82	35.3 QP	46.0	-10.7	1.00 H	161	50.10	-14.79
3	374.98	31.9 QP	46.0	-14.1	1.00 H	305	42.70	-10.77
4	479.98	36.0 QP	46.0	-10.0	1.50 H	98	44.22	-8.20
5	663.56	36.1 QP	46.0	-9.9	1.00 H	85	40.59	-4.50
6	800.03	36.7 QP	46.0	-9.3	1.00 H	148	38.64	-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	**33.30**	**35.7 QP**	**40.0**	**-4.3**	**1.00 V**	**351**	**50.44**	**-14.76**
2	237.19	27.2 QP	46.0	-18.8	1.50 V	119	42.44	-15.27
3	304.17	24.7 QP	46.0	-21.3	1.50 V	61	37.27	-12.61
4	480.03	32.4 QP	46.0	-13.6	1.00 V	211	40.61	-8.20
5	640.03	36.3 QP	46.0	-9.7	1.50 V	103	40.93	-4.60
6	800.03	35.6 QP	46.0	-10.4	1.00 V	89	37.50	-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_GFSK

CHANNEL	TX Channel 0	**DETECTOR FUNCTION**	Peak (PK)
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	58.5 PK	74.0	-15.5	1.52 H	82	61.95	-3.45
2	2390.00	28.4 AV	54.0	-25.6	1.52 H	82	31.85	-3.45
3	*2402.00	98.7 PK			1.52 H	82	102.12	-3.42
4	*2402.00	68.6 AV			1.52 H	82	72.02	-3.42
5	4804.00	49.2 PK	74.0	-24.8	1.13 H	132	42.72	6.48
6	4804.00	19.1 AV	54.0	-34.9	1.13 H	132	12.62	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	58.1 PK	74.0	-15.9	1.00 V	143	61.55	-3.45
2	2390.00	28.0 AV	54.0	-26.0	1.00 V	143	31.45	-3.45
3	*2402.00	93.6 PK			1.00 V	143	97.02	-3.42
4	*2402.00	63.5 AV			1.00 V	143	66.92	-3.42
5	4804.00	49.9 PK	74.0	-24.1	1.12 V	29	43.42	6.48
6	4804.00	19.8 AV	54.0	-34.2	1.12 V	29	13.32	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.
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625 * 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB
7. Average value = peak reading + 20log(duty cycle).

CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK)
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	*2441.00	98.6 PK			1.50 H	81	101.90	-3.30
2	*2441.00	68.5 AV			1.50 H	81	71.80	-3.30
3	4882.00	50.1 PK	74.0	-23.9	1.21 H	142	43.57	6.53
4	4882.00	20.0 AV	54.0	-34.0	1.21 H	142	13.47	6.53
5	7323.00	56.2 PK	74.0	-17.8	1.15 H	58	45.05	11.15
6	7323.00	26.1 AV	54.0	-27.9	1.15 H	58	14.95	11.15
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	*2441.00	93.6 PK			1.00 V	132	96.90	-3.30
2	*2441.00	63.5 AV			1.00 V	132	66.80	-3.30
3	4882.00	50.4 PK	74.0	-23.6	1.15 V	36	43.87	6.53
4	4882.00	20.3 AV	54.0	-33.7	1.15 V	36	13.77	6.53
5	7323.00	55.6 PK	74.0	-18.4	1.31 V	128	44.45	11.15
6	7323.00	25.5 AV	54.0	-28.5	1.31 V	128	14.35	11.15

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.
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625 * 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB
7. Average value = peak reading + 20log(duty cycle).

CHANNEL	TX Channel 78	DETECTOR FUNCTION	Peak (PK)
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	*2480.00	98.2 PK			1.42 H	80	101.37	-3.17
2	*2480.00	68.1 AV			1.42 H	80	71.27	-3.17
3	2483.50	59.3 PK	74.0	-14.7	1.42 H	80	62.46	-3.16
4	2483.50	29.2 AV	54.0	-24.8	1.42 H	80	32.36	-3.16
5	4960.00	50.0 PK	74.0	-24.0	1.17 H	146	43.46	6.54
6	4960.00	19.9 AV	54.0	-34.1	1.17 H	146	13.36	6.54
7	7440.00	56.4 PK	74.0	-17.6	1.19 H	69	44.89	11.51
8	7440.00	26.3 AV	54.0	-27.7	1.19 H	69	14.79	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	93.2 PK			1.02 V	151	96.37	-3.17
2	*2480.00	63.1 AV			1.02 V	151	66.27	-3.17
3	2483.50	59.1 PK	74.0	-14.9	1.02 V	151	62.26	-3.16
4	2483.50	29.0 AV	54.0	-25.0	1.02 V	151	32.16	-3.16
5	4960.00	50.7 PK	74.0	-23.3	1.11 V	21	44.16	6.54
6	4960.00	20.6 AV	54.0	-33.4	1.11 V	21	14.06	6.54
7	7440.00	55.5 PK	74.0	-18.5	1.35 V	135	43.99	11.51
8	7440.00	25.4 AV	54.0	-28.6	1.35 V	135	13.89	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.
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625 * 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB
7. Average value = peak reading + 20log(duty cycle).

BT_8DPSK

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Peak (PK)
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	59.2 PK	74.0	-14.8	1.50 H	81	62.65	-3.45
2	2390.00	29.1 AV	54.0	-24.9	1.50 H	81	32.55	-3.45
3	*2402.00	101.5 PK			1.50 H	81	104.92	-3.42
4	*2402.00	71.4 AV			1.50 H	81	74.82	-3.42
5	4804.00	50.3 PK	74.0	-23.7	1.11 H	156	43.82	6.48
6	4804.00	20.2 AV	54.0	-33.8	1.11 H	156	13.72	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	58.9 PK	74.0	-15.1	1.05 V	146	62.35	-3.45
2	2390.00	28.8 AV	54.0	-25.2	1.05 V	146	32.25	-3.45
3	*2402.00	97.6 PK			1.05 V	146	101.02	-3.42
4	*2402.00	67.5 AV			1.05 V	146	70.92	-3.42
5	4804.00	50.1 PK	74.0	-23.9	1.26 V	131	43.62	6.48
6	4804.00	20.0 AV	54.0	-34.0	1.26 V	131	13.52	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.
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625 * 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB
7. Average value = peak reading + 20log(duty cycle).

CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK)
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	*2441.00	101.9 PK			1.40 H	68	105.20	-3.30
2	*2441.00	71.8 AV			1.40 H	68	75.10	-3.30
3	4882.00	50.4 PK	74.0	-23.6	1.12 H	138	43.87	6.53
4	4882.00	20.3 AV	54.0	-33.7	1.12 H	138	13.77	6.53
5	7323.00	57.1 PK	74.0	-16.9	1.24 H	83	45.95	11.15
6	7323.00	27.0 AV	54.0	-27.0	1.24 H	83	15.85	11.15
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	*2441.00	97.9 PK			1.02 V	155	101.20	-3.30
2	*2441.00	67.8 AV			1.02 V	155	71.10	-3.30
3	4882.00	50.2 PK	74.0	-23.8	1.22 V	133	43.67	6.53
4	4882.00	20.1 AV	54.0	-33.9	1.22 V	133	13.57	6.53
5	7323.00	56.8 PK	74.0	-17.2	1.20 V	58	45.65	11.15
6	7323.00	26.7 AV	54.0	-27.3	1.20 V	58	15.55	11.15

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.
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625 * 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB
7. Average value = peak reading + 20log(duty cycle).

CHANNEL	TX Channel 78	DETECTOR FUNCTION	Peak (PK)
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	*2480.00	102.0 PK			1.37 H	70	105.17	-3.17
2	*2480.00	71.9 AV			1.37 H	70	75.07	-3.17
3	2483.50	59.5 PK	74.0	-14.5	1.37 H	70	62.66	-3.16
4	2483.50	29.4 AV	54.0	-24.6	1.37 H	70	32.56	-3.16
5	4960.00	50.5 PK	74.0	-23.5	1.21 H	144	43.96	6.54
6	4960.00	20.4 AV	54.0	-33.6	1.21 H	144	13.86	6.54
7	7440.00	56.7 PK	74.0	-17.3	1.14 H	81	45.19	11.51
8	7440.00	26.6 AV	54.0	-27.4	1.14 H	81	15.09	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	98.2 PK			1.06 V	163	101.37	-3.17
2	*2480.00	68.1 AV			1.06 V	163	71.27	-3.17
3	2483.50	59.3 PK	74.0	-14.7	1.06 V	163	62.46	-3.16
4	2483.50	29.2 AV	54.0	-24.8	1.06 V	163	32.36	-3.16
5	4960.00	50.1 PK	74.0	-23.9	1.22 V	102	43.56	6.54
6	4960.00	20.0 AV	54.0	-34.0	1.22 V	102	13.46	6.54
7	7440.00	56.6 PK	74.0	-17.4	1.15 V	42	45.09	11.51
8	7440.00	26.5 AV	54.0	-27.5	1.15 V	42	14.99	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.
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625 * 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB
7. Average value = peak reading + 20log(duty cycle).

4.3 MAXIMUM PEAK OUTPUT POWER

4.3.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Limit is 125mW.

4.3.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP40	100037	Nov. 01, 2012	Oct. 31, 2013

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. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.

c. The center frequency of the spectrum analyzer is set to the fundamental frequency and using 3MHz RBW and 10 MHz VBW.

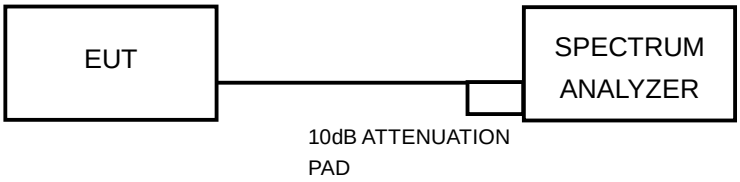
d. Measure the captured power within the band and recording the plot.

e. Repeat above procedures until all frequencies required were complete.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP

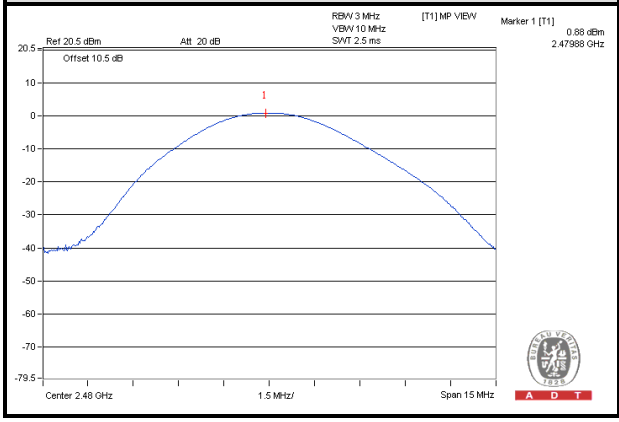
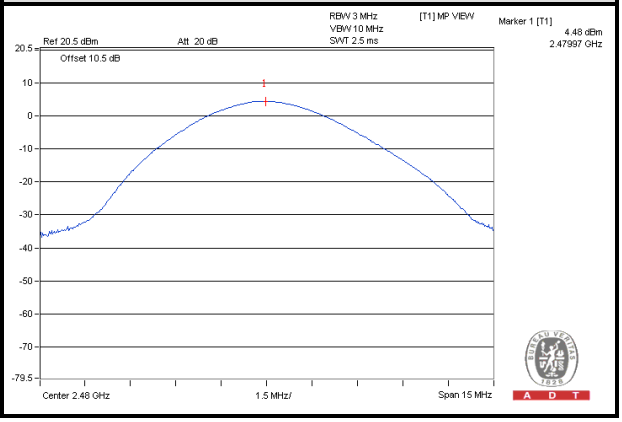


4.3.6 EUT OPERATING CONDITION

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.3.7 TEST RESULTS

CHANNEL	FREQUENCY (MHz)	OUTPUT POWER (mW)		OUTPUT POWER (dBm)		POWER LIMIT (mW)	PASS / FAIL
		GFSK	8DPSK	GFSK	8DPSK		
0	2402	1.109	2.630	0.45	4.20	125	PASS
39	2441	1.197	2.748	0.78	4.39	125	PASS
78	2480	1.225	2.805	0.88	4.48	125	PASS

SPECTRUM PLOT OF WORST VALUE	
GFSK	8DPSK
	

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
Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety/Telecom Lab:
Tel: 886-3-3183232
Fax: 886-3-3270892

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 ---