FCC TEST REPORT

REPORT NO.:	RF991126E02N-1 R1
MODEL NO.:	AR5B225
FCC ID:	PPD-AR5B225
IC:	4104A-AR5B225
RECEIVED:	June 29, 2012
TESTED:	July 12 to 13, 2012
ISSUED:	Sep. 04, 2012
APPLICANT:	Qualcomm Atheros, Inc.
ADDRESS:	1700 Technology Drive, San Jose, CA 95110
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
RF991126E02N-1	Original release	July 24, 2012
RF991126E02N-1 R1	Remove the Bluetooth(LE mode) test data	Sep. 04, 2012

1 CERTIFICATION

PRODUCT:	1X1 802.11b/g/n - BT Combo PCIe minicard
BRAND NAME:	Atheros
MODEL NO.:	AR5B225
TEST SAMPLE:	ENGINEERING SAMPLE
APPLICANT:	Qualcomm Atheros, Inc.
TESTED:	July 12 to 19, 2012
STANDARDS:	FCC Part 15, Subpart C (Section 15.247) ANSI C63.10-2009 Canada RSS-210 Issue 8 (2010-12) Canada RSS-Gen Issue 3 (2010-12)

The above equipment (Model: AR5B225) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and was in 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:** *Sep. 04, 2012*
(Lori Chung, Specialist)

APPROVED BY : _____ , **DATE:** *Sep. 04, 2012*
(May Chen, Deputy Manager)

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247); RSS-210; RSS-Gen				
STANDARD SECTION		TEST TYPE	RESULT	REMARK
FCC PART 15	CANADA STANDARD			
15.247(d) 15.209	RSS-210 A8.5	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.2dB at 499.81MHz
15.247(b)	RSS-210 A8.2 (4)	Maximum Peak Output Power	PASS	Meet the requirement of limit.

NOTE:

1. This report is prepared for FCC class II permissive change and IC reassessment change. Only radiated emission and maximum peak output power were presented in this test report.

2.1 ME ASUREMENT 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
Radiated emissions (30MHz-1GHz)	5.69 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	1X1 802.11b/g/n - BT Combo PCIe minicard
MODEL NO.	AR5B225
POWER SUPPLY	DC 3.3V from host equipment
MODULATION TYPE	GFSK, π/4-DQPSK, 8DPSK
MODULATION TECHNOLOGY	FHSS
TRANSFER RATE	Up to 3Mbps
OPRTAING FREQUENCY	2402MHz ~ 2480MHz
NUMBER OF CHANNEL	79
MAXIMUM OUTPUT POWER	GFSK: 12.359 mW 8DPSK: 17.061 mW
ANTENNA TYPE	See item 3.2
ANTENNA CONNECTOR	See item 3.2
DATA CABLE	NA
I/O PORTS	NA
ASSOCIATED DEVICES	NA

NOTE:

1. This report is prepared for FCC class II permissive change and IC reassessment change. The difference compared with the Report No.: RF991126E02-1 design is as the following information:

u BOM change –

Chain(0): add external LNA(Rx only) and SPDT
Chain(1): only add external LNA (Rx only)

u H/W version is AW-NB126H.

2. Only radiated spurious emissions were re-evaluated to confirm that the new switch and LNA did not introduce intermodulation issues and the switch did not affect the radiated spurious signal levels. The proposed changes do not affect output power and as the new component locations are not close to the antenna, and power remains the same, RF exposure was also not re-evaluated

3. There are Bluetooth technology and WLAN technology used for the EUT. <the WLAN / BT(LE MODE) test data please refer "RF991126E02N">

4. The Bluetooth version 4.0 supports traditional GFSK and additional GFSK modulation.

5. The test mode was reference to the worst case in the original test report. Therefore only the test data of the mode was recorded in this report individually

6. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

3.2 DESCRIPTION OF ANTENNA

There are five sets of antennas provided to this EUT, please refer to the following table:

No.	Brand	Model	Gain(dBi) (included cable loss)	Antenna Type	Connector	Cable Loss(dB)	Cable Length
1	WNC	81-EBJ15.005	3.62	PIFA	IPEX	1.15	300mm
2	INPAQ	DAMA1BM30000402	3.2	Dipole	SMA Reverse	0.5	N.A.
3	Tyco	TBN009	2.06	PIFA	U.FL	0.96	300mm
4	Tyco	TBN010	2.64	PIFA	U.FL	0.95	300mm
5	Hitachi Cable	HBY17	1.97	PIFA	IPEX	0.99	306mm

Note: 1. Main – Wireless / Aux – BT

2. Antenna (model: 81-EBJ15.005 and DAMA1BM30000402) were chosen for final test.

3.3 DESCRIPTION OF TEST MODES

Seventy-nine channels are provided to this EUT.

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		

3.4 TEST MODE APPLICABLITY AND TESTED CHANNEL DETAIL:

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

Where **RE < 1G:** Radiated Emission below 1GHz **RE ³ 1G:** Radiated Emission above 1GHz

APCM: Antenna Port Conducted Measurement

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:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

☒ 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 (SYSTEM)	TESTED BY
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Nelson Teng
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Nelson Teng
APCM	25deg. C, 60%RH	120Vac, 60Hz	Rex Huang

3.5 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)
ANSI C63.10-2009

Canada RSS-210 Issue 8 (2010-12)

Canada RSS-Gen Issue 3 (2010-12)

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

3.6 DESCRIPTION OF SUPPORT UNITS

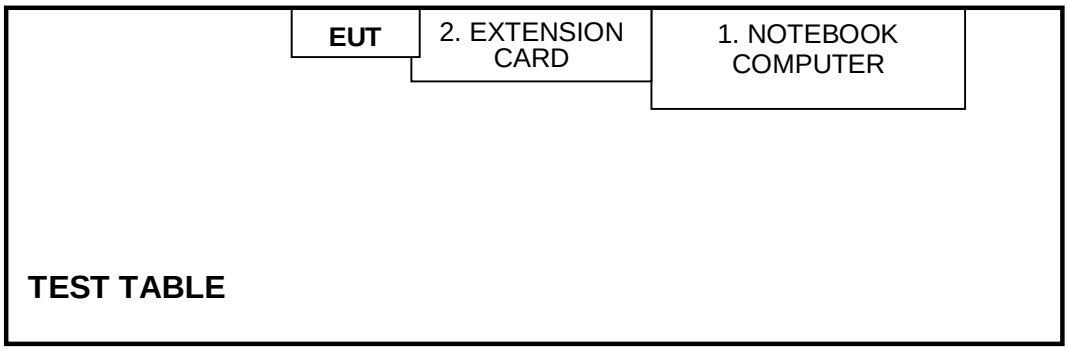
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	Lenovo	3000 N200	NA	NA
2	EXTENSION CARD	Atheros	NA	NA	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	NA

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

3.7 CONFIGURATION OF SYSTEM UNDER TEST



4 TEST PROCEDURES AND RESULTS

4.1 RADIATED EMISSION MEASUREMENT

4.1.1 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.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer Agilent	E4446A	MY48250253	Aug. 29, 2011	Aug. 28, 2012
Pre-Selector Agilent	N9039A	MY46520310	Aug. 29, 2011	Aug. 28, 2012
Signal Generator Agilent	N5181A	MY49060347	July 25, 2011	July 24, 2012
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-04	Nov. 15, 2011	Nov. 14, 2012
Pre-Amplifier Agilent	8449B	3008A02465	Feb. 27, 2012	Feb. 26, 2013
SPACEK LABS	SLKKa-48-6	9K16	Nov. 15, 2011	Nov. 14, 2012
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Apr. 06, 2012	Apr. 05, 2013
Horn_Antenna AISI	AIH.8018	0000220091110	Nov. 23, 2011	Nov. 22, 2012
Horn_Antenna SCHWARZBECK	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
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 test was performed in 966 Chamber No. H.
3 The FCC Site Registration No. is 797305.
4. The CANADA Site Registration No. is IC 7450H-3.
5 Tested Date: July 12, 2012

4.1.3 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 antenna is a broadband antenna, and its height 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.

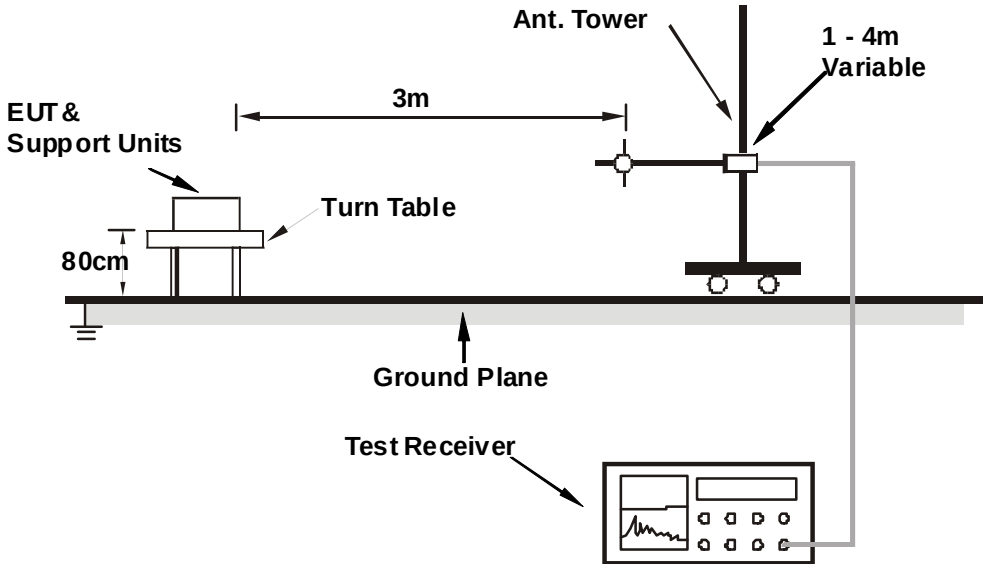
NOTE:

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.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



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

4.1.6 EUT OPERATING CONDITIONS

1. Connect the EUT with the support unit 1 (Notebook Computer) which is placed on a testing table.
2. The communication partner run test program “BtUSB Tool V1.0 B18” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

4.1.7 TEST RESULTS

For GFSK / 8DPSK

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	99.87	30.9 QP	43.5	-12.6	1.75 H	215	21.00	9.86
2	198.99	38.1 QP	43.5	-5.4	1.75 H	210	26.88	11.25
3	299.95	35.8 QP	46.0	-10.2	1.50 H	328	20.50	15.29
4	**499.81**	**44.8 QP**	**46.0**	**-1.2**	**1.50 H**	**255**	**24.38**	**20.39**
5	600.42	41.7 QP	46.0	-4.3	1.00 H	229	19.06	22.67
6	796.55	37.8 QP	46.0	-8.2	2.00 H	248	11.96	25.85
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	99.40	30.2 QP	43.5	-13.3	1.25 V	233	20.37	9.80
2	300.00	38.5 QP	46.0	-7.5	1.75 V	307	23.17	15.29
3	399.86	42.6 QP	46.0	-3.4	1.25 V	264	24.74	17.86
4	497.63	42.3 QP	46.0	-3.7	1.00 V	279	21.99	20.33
5	600.32	41.9 QP	46.0	-4.1	1.25 V	143	19.21	22.66
6	799.87	41.5 QP	46.0	-4.5	1.25 V	211	15.55	25.92

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

BT_GFSK

CHANNEL	TX Channel 0	**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	2322.00	57.5 PK	74.0	-16.5	1.47 H	88	25.34	32.16
2	2322.00	47.8 AV	54.0	-6.2	1.47 H	88	15.64	32.16
3	*2402.00	108.4 PK			1.44 H	86	75.98	32.42
4	*2402.00	98.5 AV			1.44 H	86	66.08	32.42
5	4804.00	50.1 PK	74.0	-23.9	1.00 H	292	8.19	41.91
6	4804.00	41.7 AV	54.0	-12.3	1.00 H	292	-0.21	41.91
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	2322.00	56.2 PK	74.0	-17.8	1.00 V	242	24.04	32.16
2	2322.00	46.9 AV	54.0	-7.1	1.00 V	242	14.74	32.16
3	*2402.00	107.3 PK			1.00 V	245	74.88	32.42
4	*2402.00	97.7 AV			1.00 V	245	65.28	32.42
5	4804.00	50.9 PK	74.0	-23.1	1.00 V	155	8.99	41.91
6	4804.00	42.4 AV	54.0	-11.6	1.00 V	155	0.49	41.91

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).
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	*2441.00	110.1 PK			1.36 H	85	77.58	32.52
2	*2441.00	99.9 AV			1.36 H	85	67.38	32.52
3	4882.00	51.4 PK	74.0	-22.6	1.00 H	310	9.40	42.00
4	4882.00	44.3 AV	54.0	-9.7	1.00 H	310	2.30	42.00
5	7323.00	55.2 PK	74.0	-18.8	1.35 H	58	8.64	46.56
6	7323.00	42.0 AV	54.0	-12.0	1.35 H	58	-4.56	46.56
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	107.9 PK			1.00 V	241	75.38	32.52
2	*2441.00	99.1 AV			1.00 V	241	66.58	32.52
3	4882.00	51.6 PK	74.0	-22.4	1.00 V	144	9.60	42.00
4	4882.00	42.8 AV	54.0	-11.2	1.00 V	144	0.80	42.00
5	7323.00	54.9 PK	74.0	-19.1	1.36 V	65	8.34	46.56
6	7323.00	41.7 AV	54.0	-12.3	1.36 V	65	-4.86	46.56

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.
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 78	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	108.8 PK			1.42 H	86	76.18	32.62
2	*2480.00	98.9 AV			1.42 H	86	66.28	32.62
3	2483.50	58.2 PK	74.0	-15.8	1.36 H	85	25.57	32.63
4	2483.50	44.3 AV	54.0	-9.7	1.36 H	85	11.67	32.63
5	4960.00	51.5 PK	74.0	-22.5	1.00 H	284	9.51	41.99
6	4960.00	43.1 AV	54.0	-10.9	1.00 H	284	1.11	41.99
7	7440.00	55.7 PK	74.0	-18.3	1.40 H	50	8.89	46.81
8	7440.00	42.2 AV	54.0	-11.8	1.40 H	50	-4.61	46.81
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	107.1 PK			1.00 V	235	74.48	32.62
2	*2480.00	98.1 AV			1.00 V	235	65.48	32.62
3	2483.50	57.6 PK	74.0	-16.4	1.39 V	80	24.97	32.63
4	2483.50	43.9 AV	54.0	-10.1	1.39 V	80	11.27	32.63
5	4960.00	51.9 PK	74.0	-22.1	1.00 V	153	9.91	41.99
6	4960.00	42.8 AV	54.0	-11.2	1.00 V	153	0.81	41.99
7	7440.00	54.7 PK	74.0	-19.3	1.41 V	73	7.89	46.81
8	7440.00	41.4 AV	54.0	-12.6	1.41 V	73	-5.41	46.81

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.
5. " * ": Fundamental frequency.

BT_8DPSK

CHANNEL	TX Channel 0	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	2322.00	58.5 PK	74.0	-15.5	1.40 H	76	26.34	32.16
2	2322.00	44.3 AV	54.0	-9.7	1.40 H	76	12.14	32.16
3	*2402.00	110.1 PK			1.35 H	82	77.68	32.42
4	*2402.00	97.9 AV			1.35 H	82	65.48	32.42
5	4804.00	52.5 PK	74.0	-21.5	1.01 H	295	10.59	41.91
6	4804.00	43.3 AV	54.0	-10.7	1.01 H	295	1.39	41.91
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	2322.00	57.5 PK	74.0	-16.5	1.35 V	94	25.34	32.16
2	2322.00	43.6 AV	54.0	-10.4	1.35 V	94	11.44	32.16
3	*2402.00	109.2 PK			1.00 V	230	76.78	32.42
4	*2402.00	97.1 AV			1.00 V	230	64.68	32.42
5	4804.00	51.8 PK	74.0	-22.2	1.00 V	150	9.89	41.91
6	4804.00	42.9 AV	54.0	-11.1	1.00 V	150	0.99	41.91

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).
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	*2441.00	111.5 PK			1.31 H	97	78.98	32.52
2	*2441.00	99.2 AV			1.31 H	97	66.68	32.52
3	4882.00	52.6 PK	74.0	-21.4	1.00 H	289	10.60	42.00
4	4882.00	43.1 AV	54.0	-10.9	1.00 H	289	1.10	42.00
5	7323.00	55.9 PK	74.0	-18.1	1.38 H	65	9.34	46.56
6	7323.00	42.6 AV	54.0	-11.4	1.38 H	65	-3.96	46.56
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	110.2 PK			1.00 V	241	77.68	32.52
2	*2441.00	98.4 AV			1.00 V	241	65.88	32.52
3	4882.00	52.0 PK	74.0	-22.0	1.00 V	151	10.00	42.00
4	4882.00	42.8 AV	54.0	-11.2	1.00 V	151	0.80	42.00
5	7323.00	54.8 PK	74.0	-19.2	1.45 V	72	8.24	46.56
6	7323.00	41.7 AV	54.0	-12.3	1.45 V	72	-4.86	46.56

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.
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 78	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	110.5 PK			1.34 H	87	77.88	32.62
2	*2480.00	98.2 AV			1.34 H	87	65.58	32.62
3	2483.50	58.8 PK	74.0	-15.2	1.35 H	90	26.17	32.63
4	2483.50	44.6 AV	54.0	-9.4	1.35 H	90	11.97	32.63
5	4960.00	53.5 PK	74.0	-20.5	1.00 H	283	11.51	41.99
6	4960.00	42.6 AV	54.0	-11.4	1.00 H	283	0.61	41.99
7	7440.00	56.1 PK	74.0	-17.9	1.44 H	65	9.29	46.81
8	7440.00	42.6 AV	54.0	-11.4	1.44 H	65	-4.21	46.81
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	109.8 PK			1.00 V	231	77.18	32.62
2	*2480.00	97.1 AV			1.00 V	231	64.48	32.62
3	2483.50	57.2 PK	74.0	-16.8	1.44 V	91	24.57	32.63
4	2483.50	43.6 AV	54.0	-10.4	1.44 V	91	10.97	32.63
5	4960.00	52.5 PK	74.0	-21.5	1.02 V	166	10.51	41.99
6	4960.00	43.3 AV	54.0	-10.7	1.02 V	166	1.31	41.99
7	7440.00	54.2 PK	74.0	-19.8	1.43 V	86	7.39	46.81
8	7440.00	41.0 AV	54.0	-13.0	1.43 V	86	-5.81	46.81

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.
5. " * ": Fundamental frequency.

4.2 MAXIMUM PEAK OUTPUT POWER

4.2.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Limit is 125mW.

4.2.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP 40	100036	Dec. 14, 2011	Dec. 13, 2012

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: July 13, 2012

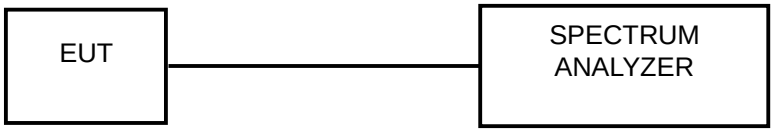
4.2.3 TEST PROCEDURES

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 3 MHz RBW and 10 MHz VBW.
d. Measure the captured power within the band and recording the plot.
e. Repeat above procedures until all frequencies measured were complete.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

4.2.5 TEST SETUP



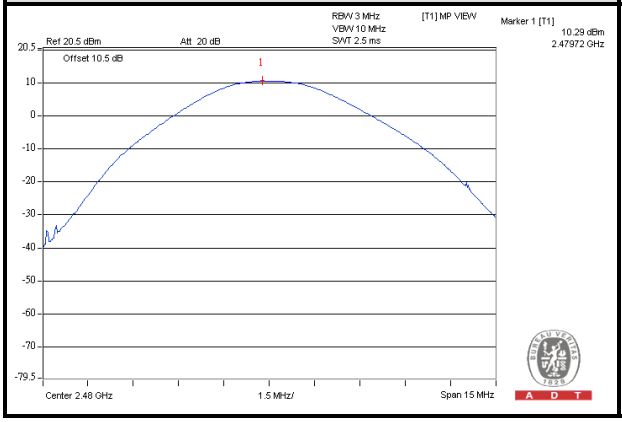
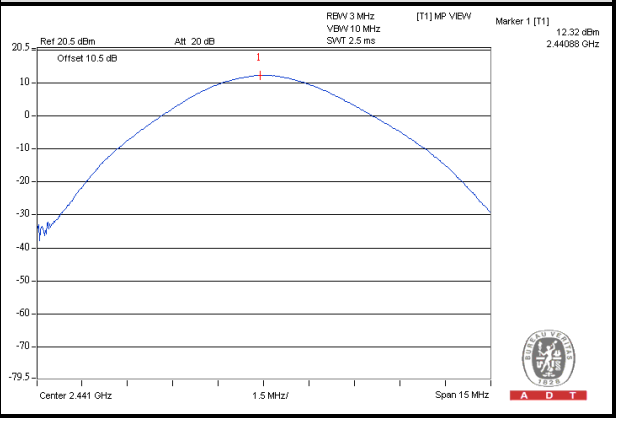
For the actual test configuration, please refer to the related Item – Photographs of the Test Configuration.

4.2.6 EUT OPERATING CONDITION

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

4.2.7 TEST RESULTS

CHANNEL	FREQUENCY (MHz)	OUTPUT POWER (mW)		OUTPUT POWER (dBm)		POWER LIMIT (mW)	PASS / FAIL
		GFSK	8DPSK	GFSK	8DPSK		
0	2402	10.666	17.022	10.28	12.31	125	PASS
39	2441	10.447	17.061	10.19	12.32	125	PASS
78	2480	10.691	16.032	10.29	12.05	125	PASS

SPECTRUM PLOT OF WORST VALUE	
GFSK	8DPSK
	

4.3 AVERAGE OUTPUT POWER

4.3.1 FOR REFERENCE.

4.3.2 INSTRUMENTS

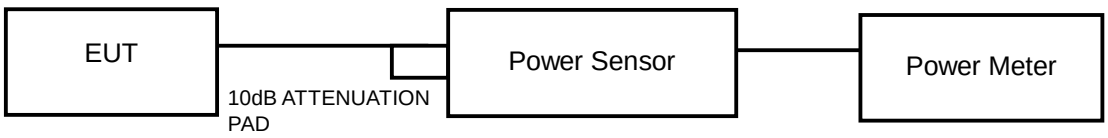
DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power Meter	ML2495A	0824006	May 10, 2012	May 09, 2013
Power Sensor	MA2411B	0738172	May 10, 2012	May 09, 2013

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: July 13, 2012

4.3.3 TEST PROCEDURES

1. The transmitter output was connected to the power meter through an attenuator, the bandwidth of the fundamental frequency was measured with the power meter.
2. Record the average power level.

4.3.4 TEST SETUP



4.3.5 EUT OPERATING CONDITION

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

4.3.6 TEST RESULTS

For GFSK

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER OUTPUT (dBm)
0	2402	10.21
39	2441	10.49
78	2480	10.47

For 8DPSK

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER OUTPUT (dBm)
0	2402	10.26
39	2441	10.54
78	2480	10.52

5 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.adt.com.tw

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

6 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.

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