

FCC TEST REPORT

REPORT NO.: RF991126E02N R1

MODEL NO.: AR5B225

FCC ID: PPD-AR5B225

IC: 4104A-AR5B225

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TESTED: July 03 to Aug. 31, 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.

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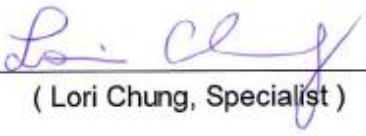
RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF991126E02N	Original release	July 24, 2012
RF991126E02N R1	Add 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 Aug. 31, 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:

[For WLAN](#)

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 -1.9dB at 600.38MHz
15.247(b)	RSS-210 A8.2 (4)	Conducted power	PASS	Meet the requirement of limit.

[For Bluetooth\(LE mode\)](#)

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247) ; RSS-210; RSS-Gen				
STANDARD SECTION		TEST TYPE	RESULT	REMARK
FCC Part 15	RSS-Gen			
15.247(d) 15.209	RSS-210 A8.5	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -8.7dB at 2322.00MHz
15.247(d)	RSS-210 A8.5	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	RSS-210 A8.2 (a)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	RSS-210 A8.2 (4)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	RSS-210 A8.2 (b)	Power Spectral Density	PASS	Meet the requirement of limit.
-	RSS-Gen 4.6	Occupied Bandwidth Measurement	-	Meet the requirement

NOTE:

1. This report is prepared for FCC class II permissive change and IC reassessment change. For WLAN mode only radiated emission and maximum peak output power were presented; For Bluetooth(LE mode) mode all items 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
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	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM GFSK(BT <LE> mode) for DTS
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b: Up to 11Mbps 802.11g: Up to 54Mbps 802.11n: Up to 150Mbps Bluetooth(LE mode): 1Mbps
OPRTAING FREQUENCY	802.11b, 802.11g, 802.11n: 2.412 ~ 2.462GHz BT-LE(GFSK): 2.402 ~ 2.480GHz
NUMBER OF CHANNEL	11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (40MHz) 40 (37 hopping + 3 advertising channel) for Bluetooth(LE mode)
MAXIMUM OUTPUT POWER	802.11b: 109.648mW 802.11g: 169.824mW 802.11n (20MHz): 131.826mW 802.11n (40MHz): 112.202mW Bluetooth(LE mode): 9.419 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 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 Bluetooth test data please refer " RF991126E02N-1">
4. The EUT is 1 * 1 spatial SISO without beam forming function.
5. The EUT complies with 802.11n standards and backwards compatible with 802.11b, 802.11g products.
6. 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
7. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or 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	HBV17	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

Operated in 2400 ~ 2483.5MHz band:

Eleven channels are provided for 802.11b, 802.11g, 802.11n (20MHz):

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		

Seven channels are provided for 802.11n (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
3	2422MHz	7	2442MHz
4	2427MHz	8	2447MHz
5	2432MHz	9	2452MHz
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

3.3.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE < 1G	RE ³ 1G	APCM	OB	
MODE 1	√	√	√	-	WLAN MODE
MODE 2	√	√	√	√	BT <LE> MODE

Where **RE < 1G**: Radiated Emission below 1GHz **RE ³ 1G**: Radiated Emission above 1GHz
APCM: Antenna Port Conducted Measurement **OB**: Conducted Out-Band Emission 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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11g	1 to 11	6	OFDM	BPSK	6
BT-LE	0 to 39	19	FHSS	DTS	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 (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
802.11n (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	13.5
BT-LE	0 to 39	0, 19, 39	FHSS	DTS	1

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.

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 (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
802.11n (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	13.5
BT-LE	0 to 39	0, 19, 39	FHSS	DTS	1

CONDUCTED OUT-BAND EMISSION 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)
BT-LE	0 to 39	0, 19, 39	FHSS	DTS	1

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Nelson Teng
RE ³ 1G	25deg. C, 65%RH	120Vac, 60Hz	Nelson Teng
APCM	25deg. C, 60%RH	120Vac, 60Hz	Rex Huang
OB	25deg. C, 60%RH	120Vac, 60Hz	Rex Huang

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 v01

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.

3.5 DESCRIPTION OF SUPPORT UNITS

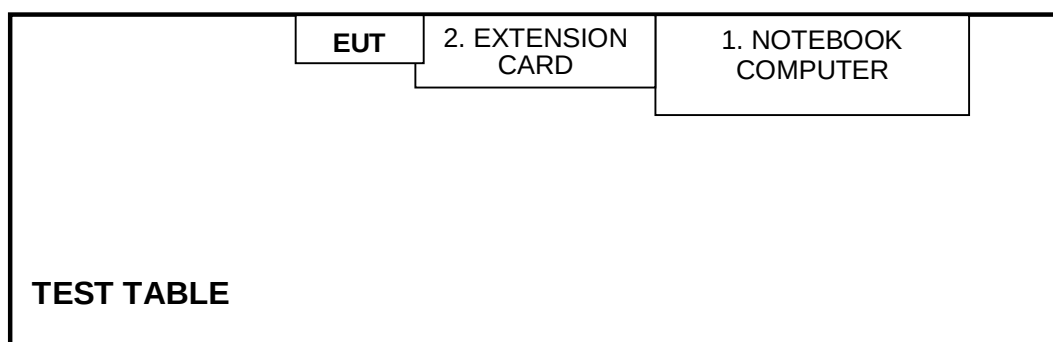
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	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).

3.6 CONFIGURATION OF SYSTEM UNDER TEST



4. TEST TYPES 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-1000VH2 B	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 03 to 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.

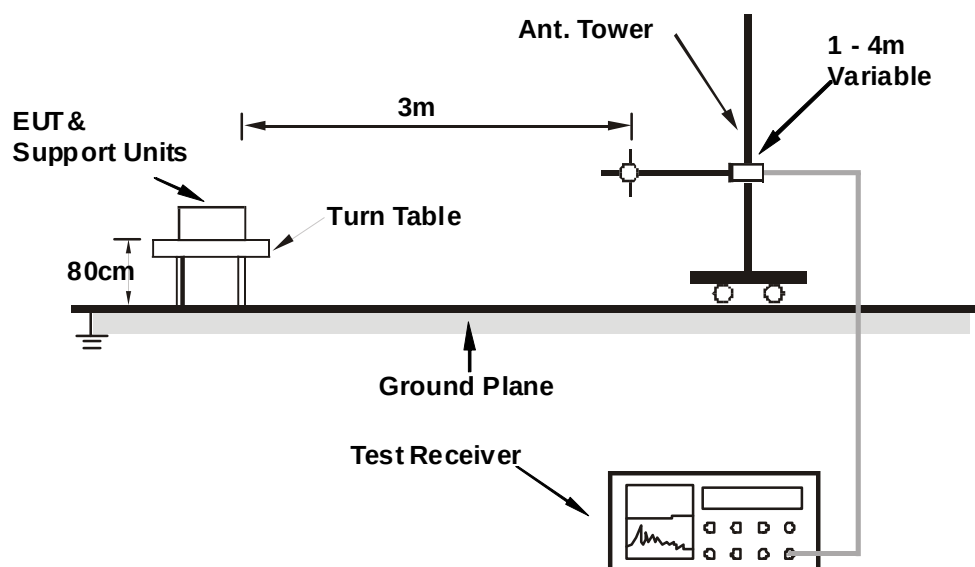
NOTE:

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 “ArcMfgTool 2.0.0.9” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

4.1.7 TEST RESULTS (WLAN MODE)

BELOW 1GHz WORST-CASE DATA

802.11g

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 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	99.63	36.2 QP	43.5	-7.3	1.75 H	283	26.53	9.68
2	299.95	43.6 QP	46.0	-2.4	1.00 H	220	28.28	15.30
3	399.81	39.7 QP	46.0	-6.3	1.00 H	172	21.98	17.70
4	499.84	41.3 QP	46.0	-4.7	1.75 H	227	21.22	20.04
5	600.38	44.1 QP	46.0	-1.9	1.25 H	223	21.87	22.22
6	799.87	41.7 QP	46.0	-4.3	1.00 H	51	16.09	25.62
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	118.34	32.4 QP	43.5	-11.1	1.50 V	277	20.31	12.12
2	299.89	39.6 QP	46.0	-6.4	2.00 V	0	24.34	15.30
3	399.86	41.4 QP	46.0	-4.6	1.25 V	305	23.72	17.70
4	499.83	41.1 QP	46.0	-4.9	1.00 V	294	21.07	20.04
5	600.39	42.3 QP	46.0	-3.7	1.00 V	198	20.09	22.23
6	799.75	41.4 QP	46.0	-4.6	2.00 V	249	15.83	25.61

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

802.11b

CHANNEL	TX Channel 1	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	2386.17	58.8 PK	74.0	-15.2	1.31 H	116	26.43	32.37
2	2386.17	47.5 AV	54.0	-6.5	1.31 H	116	15.13	32.37
3	*2412.00	107.0 PK			1.31 H	116	74.56	32.44
4	*2412.00	104.9 AV			1.31 H	116	72.46	32.44
5	4824.00	53.6 PK	74.0	-20.4	1.14 H	165	11.66	41.94
6	4824.00	48.6 AV	54.0	-5.4	1.14 H	165	6.66	41.94
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2386.28	58.7 PK	74.0	-15.3	1.00 V	218	26.33	32.37
2	2386.28	48.1 AV	54.0	-5.9	1.00 V	218	15.73	32.37
3	*2412.00	106.1 PK			1.00 V	218	73.66	32.44
4	*2412.00	103.9 AV			1.00 V	218	71.46	32.44
5	4824.00	53.6 PK	74.0	-20.4	1.22 V	98	11.66	41.94
6	4824.00	47.9 AV	54.0	-6.1	1.22 V	98	5.96	41.94

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 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	106.2 PK			1.26 H	106	73.69	32.51
2	*2437.00	104.4 AV			1.26 H	106	71.89	32.51
3	4874.00	52.9 PK	74.0	-21.1	1.17 H	176	10.91	41.99
4	4874.00	48.2 AV	54.0	-5.8	1.17 H	176	6.21	41.99
5	7311.00	53.3 PK	74.0	-20.7	1.00 H	65	6.77	46.53
6	7311.00	40.4 AV	54.0	-13.6	1.00 H	65	-6.13	46.53
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	105.9 PK			1.00 V	233	73.39	32.51
2	*2437.00	103.8 AV			1.00 V	233	71.29	32.51
3	4874.00	54.7 PK	74.0	-19.3	1.23 V	101	12.71	41.99
4	4874.00	51.4 AV	54.0	-2.6	1.23 V	101	9.41	41.99
5	7311.00	53.3 PK	74.0	-20.7	1.00 V	56	6.77	46.53
6	7311.00	40.8 AV	54.0	-13.2	1.00 V	56	-5.73	46.53

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.



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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	104.5 PK			1.04 H	111	71.93	32.57
2	*2462.00	102.3 AV			1.04 H	111	69.73	32.57
3	2487.73	58.4 PK	74.0	-15.6	1.04 H	111	25.76	32.64
4	2487.73	45.2 AV	54.0	-8.8	1.04 H	111	12.56	32.64
5	4924.00	52.3 PK	74.0	-21.7	1.14 H	178	10.29	42.01
6	4924.00	47.9 AV	54.0	-6.1	1.14 H	178	5.89	42.01
7	7386.00	53.0 PK	74.0	-21.0	1.03 H	71	6.27	46.73
8	7386.00	40.2 AV	54.0	-13.8	1.03 H	71	-6.53	46.73

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	105.6 PK			1.00 V	219	73.03	32.57
2	*2462.00	103.5 AV			1.00 V	219	70.93	32.57
3	2483.50	58.1 PK	74.0	-15.9	1.00 V	219	25.47	32.63
4	2483.50	47.4 AV	54.0	-6.6	1.00 V	219	14.77	32.63
5	4924.00	52.5 PK	74.0	-21.5	1.24 V	100	10.49	42.01
6	4924.00	47.1 AV	54.0	-6.9	1.24 V	100	5.09	42.01
7	7386.00	53.3 PK	74.0	-20.7	1.00 V	63	6.57	46.73
8	7386.00	40.7 AV	54.0	-13.3	1.00 V	63	-6.03	46.73

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.

802.11g

CHANNEL	TX Channel 1	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	2390.00	71.0 PK	74.0	-3.0	1.34 H	124	38.62	32.38
2	2390.00	51.3 AV	54.0	-2.7	1.34 H	124	18.92	32.38
3	*2412.00	105.4 PK			1.34 H	124	72.96	32.44
4	*2412.00	94.9 AV			1.34 H	124	62.46	32.44
5	4824.00	42.6 PK	74.0	-31.4	1.12 H	153	0.66	41.94
6	4824.00	34.3 AV	54.0	-19.7	1.12 H	153	-7.64	41.94
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	70.3 PK	74.0	-3.7	1.00 V	204	37.92	32.38
2	2390.00	50.7 AV	54.0	-3.3	1.00 V	204	18.32	32.38
3	*2412.00	105.1 PK			1.00 V	204	72.66	32.44
4	*2412.00	94.1 AV			1.00 V	204	61.66	32.44
5	4824.00	41.9 PK	74.0	-32.1	1.26 V	153	-0.04	41.94
6	4824.00	33.6 AV	54.0	-20.4	1.26 V	153	-8.34	41.94

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.



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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	2390.00	56.8 PK	74.0	-17.2	1.27 H	91	24.42	32.38
2	2390.00	44.7 AV	54.0	-9.3	1.27 H	91	12.32	32.38
3	*2437.00	109.1 PK			1.27 H	91	76.59	32.51
4	*2437.00	98.4 AV			1.27 H	91	65.89	32.51
5	2483.50	60.8 PK	74.0	-13.2	1.27 H	91	28.17	32.63
6	2483.50	44.3 AV	54.0	-9.7	1.27 H	91	11.67	32.63
7	4874.00	48.3 PK	74.0	-25.7	1.13 H	164	6.31	41.99
8	4874.00	41.4 AV	54.0	-12.6	1.13 H	164	-0.59	41.99
9	7311.00	53.1 PK	74.0	-20.9	1.04 H	69	6.57	46.53
10	7311.00	40.6 AV	54.0	-13.4	1.04 H	69	-5.93	46.53

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	108.4 PK			1.00 V	204	75.89	32.51
2	*2437.00	97.6 AV			1.00 V	204	65.09	32.51
3	4874.00	47.3 PK	74.0	-26.7	1.12 V	179	5.31	41.99
4	4874.00	40.6 AV	54.0	-13.4	1.12 V	179	-1.39	41.99
5	7311.00	52.7 PK	74.0	-21.3	1.02 V	73	6.17	46.53
6	7311.00	40.2 AV	54.0	-13.8	1.02 V	73	-6.33	46.53

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 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	102.3 PK			1.29 H	135	69.73	32.57
2	*2462.00	92.1 AV			1.29 H	135	59.53	32.57
3	2483.50	66.6 PK	74.0	-7.4	1.29 H	135	33.97	32.63
4	2483.50	48.4 AV	54.0	-5.6	1.29 H	135	15.77	32.63
5	4924.00	40.3 PK	74.0	-33.7	1.29 H	112	-1.71	42.01
6	4924.00	32.1 AV	54.0	-21.9	1.29 H	112	-9.91	42.01
7	7386.00	51.6 PK	74.0	-22.4	1.00 H	76	4.87	46.73
8	7386.00	40.3 AV	54.0	-13.7	1.00 H	76	-6.43	46.73
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	101.4 PK			1.00 V	211	68.83	32.57
2	*2462.00	91.7 AV			1.00 V	211	59.13	32.57
3	2483.50	65.4 PK	74.0	-8.6	1.00 V	216	32.77	32.63
4	2483.50	47.2 AV	54.0	-6.8	1.00 V	216	14.57	32.63
5	4924.00	40.9 PK	74.0	-33.1	1.24 V	111	-1.11	42.01
6	4924.00	32.4 AV	54.0	-21.6	1.24 V	111	-9.61	42.01
7	7386.00	51.3 PK	74.0	-22.7	1.03 V	83	4.57	46.73
8	7386.00	40.1 AV	54.0	-13.9	1.03 V	83	-6.63	46.73

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.



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802.11n (20MHz)

CHANNEL	TX Channel 1	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	2390.00	67.6 PK	74.0	-6.4	1.37 H	92	35.22	32.38
2	2390.00	50.5 AV	54.0	-3.5	1.37 H	92	18.12	32.38
3	*2412.00	105.0 PK			1.37 H	92	72.56	32.44
4	*2412.00	94.6 AV			1.37 H	92	62.16	32.44
5	4824.00	41.3 PK	74.0	-32.7	1.13 H	169	-0.64	41.94
6	4824.00	33.6 AV	54.0	-20.4	1.13 H	169	-8.34	41.94
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	66.4 PK	74.0	-7.6	1.00 V	241	34.02	32.38
2	2390.00	49.2 AV	54.0	-4.8	1.00 V	241	16.82	32.38
3	*2412.00	104.6 PK			1.00 V	246	72.16	32.44
4	*2412.00	93.7 AV			1.00 V	246	61.26	32.44
5	4824.00	40.8 PK	74.0	-33.2	1.21 V	103	-1.14	41.94
6	4824.00	32.9 AV	54.0	-21.1	1.21 V	103	-9.04	41.94

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 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	107.4 PK			1.21 H	69	74.89	32.51
2	*2437.00	96.3 AV			1.21 H	69	63.79	32.51
3	4874.00	51.3 PK	74.0	-22.7	1.26 H	157	9.31	41.99
4	4874.00	38.4 AV	54.0	-15.6	1.26 H	157	-3.59	41.99
5	7311.00	53.3 PK	74.0	-20.7	1.02 H	89	6.77	46.53
6	7311.00	40.8 AV	54.0	-13.2	1.02 H	89	-5.73	46.53
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	106.4 PK			1.00 V	257	73.89	32.51
2	*2437.00	95.6 AV			1.00 V	257	63.09	32.51
3	4874.00	51.1 PK	74.0	-22.9	1.11 V	162	9.11	41.99
4	4874.00	38.1 AV	54.0	-15.9	1.11 V	162	-3.89	41.99
5	7311.00	52.9 PK	74.0	-21.1	1.04 V	69	6.37	46.53
6	7311.00	40.6 AV	54.0	-13.4	1.04 V	69	-5.93	46.53

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 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	102.3 PK			1.78 H	96	69.73	32.57
2	*2462.00	91.9 AV			1.78 H	96	59.33	32.57
3	2483.50	66.8 PK	74.0	-7.2	1.78 H	96	34.17	32.63
4	2483.50	47.6 AV	54.0	-6.4	1.78 H	96	14.97	32.63
5	4924.00	50.6 PK	74.0	-23.4	1.54 H	144	8.59	42.01
6	4924.00	37.6 AV	54.0	-16.4	1.54 H	144	-4.41	42.01
7	7386.00	53.2 PK	74.0	-20.8	1.02 H	72	6.47	46.73
8	7386.00	40.3 AV	54.0	-13.7	1.02 H	72	-6.43	46.73
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	101.3 PK			1.00 V	264	68.73	32.57
2	*2462.00	90.7 AV			1.00 V	264	58.13	32.57
3	2483.50	65.4 PK	74.0	-8.6	1.00 V	264	32.77	32.63
4	2483.50	46.3 AV	54.0	-7.7	1.00 V	264	13.67	32.63
5	4924.00	39.4 PK	74.0	-34.6	1.24 V	100	-2.61	42.01
6	4924.00	31.2 AV	54.0	-22.8	1.24 V	100	-10.81	42.01
7	7386.00	52.4 PK	74.0	-21.6	1.02 V	73	5.67	46.73
8	7386.00	40.1 AV	54.0	-13.9	1.02 V	73	-6.63	46.73

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.

802.11n (40MHz)

CHANNEL	TX Channel 3	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	2390.00	65.2 PK	74.0	-8.8	1.34 H	97	32.82	32.38
2	2390.00	47.8 AV	54.0	-6.2	1.34 H	97	15.42	32.38
3	*2422.00	101.0 PK			1.34 H	97	68.53	32.47
4	*2422.00	90.3 AV			1.34 H	97	57.83	32.47
5	4844.00	40.3 PK	74.0	-33.7	1.51 H	142	-1.66	41.96
6	4844.00	31.3 AV	54.0	-22.7	1.51 H	142	-10.66	41.96
7	7266.00	53.1 PK	74.0	-20.9	1.04 H	69	6.70	46.40
8	7266.00	40.2 AV	54.0	-13.8	1.04 H	69	-6.20	46.40
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	64.3 PK	74.0	-9.7	1.00 V	259	31.92	32.38
2	2390.00	47.2 AV	54.0	-6.8	1.00 V	259	14.82	32.38
3	*2422.00	100.4 PK			1.00 V	243	67.93	32.47
4	*2422.00	89.6 AV			1.00 V	243	57.13	32.47
5	4844.00	40.4 PK	74.0	-33.6	1.21 V	100	-1.56	41.96
6	4844.00	30.2 AV	54.0	-23.8	1.21 V	100	-11.76	41.96
7	7266.00	52.1 PK	74.0	-21.9	1.04 V	69	5.70	46.40
8	7266.00	40.2 AV	54.0	-13.8	1.04 V	69	-6.20	46.40

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.



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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	2390.00	67.3 PK	74.0	-6.7	1.34 H	100	34.92	32.38
2	2390.00	50.2 AV	54.0	-3.8	1.34 H	100	17.82	32.38
3	*2437.00	103.6 PK			1.34 H	100	71.09	32.51
4	*2437.00	92.8 AV			1.34 H	100	60.29	32.51
5	2483.50	67.7 PK	74.0	-6.3	1.27 H	91	35.07	32.63
6	2483.50	50.0 AV	54.0	-4.0	1.27 H	91	17.37	32.63
7	4874.00	42.3 PK	74.0	-31.7	1.49 H	144	0.31	41.99
8	4874.00	33.4 AV	54.0	-20.6	1.49 H	144	-8.59	41.99
9	7311.00	53.2 PK	74.0	-20.8	1.03 H	73	6.67	46.53
10	7311.00	40.1 AV	54.0	-13.9	1.03 H	73	-6.43	46.53
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	102.7 PK			1.00 V	233	70.19	32.51
2	*2437.00	91.4 AV			1.00 V	233	58.89	32.51
3	4874.00	41.3 PK	74.0	-32.7	1.02 V	159	-0.69	41.99
4	4874.00	32.4 AV	54.0	-21.6	1.02 V	159	-9.59	41.99
5	7311.00	52.4 PK	74.0	-21.6	1.03 V	57	5.87	46.53
6	7311.00	40.2 AV	54.0	-13.8	1.03 V	57	-6.33	46.53

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 9	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	*2452.00	99.8 PK			1.29 H	94	67.25	32.55
2	*2452.00	89.1 AV			1.29 H	94	56.55	32.55
3	2483.50	65.2 PK	74.0	-8.8	1.75 H	97	32.57	32.63
4	2483.50	48.7 AV	54.0	-5.3	1.75 H	97	16.07	32.63
5	4904.00	40.2 PK	74.0	-33.8	1.15 H	136	-1.82	42.02
6	4904.00	30.6 AV	54.0	-23.4	1.15 H	136	-11.42	42.02
7	7356.00	53.2 PK	74.0	-20.8	1.03 H	57	6.55	46.65
8	7356.00	40.3 AV	54.0	-13.7	1.03 H	57	-6.35	46.65
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	*2452.00	99.9 PK			1.23 V	175	67.35	32.55
2	*2452.00	89.1 AV			1.23 V	175	56.55	32.55
3	2483.50	65.0 PK	74.0	-9.0	1.23 V	175	32.37	32.63
4	2483.50	48.2 AV	54.0	-5.8	1.23 V	175	15.57	32.63
5	4904.00	40.4 PK	74.0	-33.6	1.13 V	126	-1.62	42.02
6	4904.00	30.3 AV	54.0	-23.7	1.13 V	126	-11.72	42.02
7	7356.00	53.1 PK	74.0	-20.9	1.04 V	63	6.45	46.65
8	7356.00	40.2 AV	54.0	-13.8	1.04 V	63	-6.45	46.65

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.

4.1.8 TEST RESULTS (BT <LE> MODE)

BELOW 1GHz WORST-CASE DATA

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	250.00	31.2 QP	46.0	-14.8	1.00 H	21	17.94	13.30
2	374.80	34.5 QP	46.0	-11.5	1.50 H	360	17.42	17.08
3	625.01	33.2 QP	46.0	-12.8	1.24 H	214	10.70	22.54
4	875.02	32.2 QP	46.0	-13.8	1.00 H	350	5.58	26.66
5	950.00	31.0 QP	46.0	-15.0	1.50 H	342	3.16	27.84
6	998.00	32.0 QP	54.0	-22.0	1.48 H	358	3.52	28.51
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	250.00	31.5 QP	46.0	-14.5	1.10 V	35	18.20	13.30
2	374.80	32.4 QP	46.0	-13.6	1.24 V	211	15.32	17.08
3	625.02	31.9 QP	46.0	-14.1	1.49 V	124	9.33	22.54
4	875.02	32.2 QP	46.0	-13.8	1.42 V	24	5.54	26.66
5	950.11	31.1 QP	46.0	-14.9	1.50 V	340	3.23	27.84
6	997.00	31.9 QP	54.0	-22.1	1.48 V	360	3.37	28.50

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.



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ABOVE 1GHz DATA

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	55.9 PK	74.0	-18.1	1.41 H	86	23.74	32.16
2	2322.00	45.3 AV	54.0	-8.7	1.41 H	86	13.14	32.16
3	*2402.00	107.3 PK			1.41 H	86	74.88	32.42
4	*2402.00	90.4 AV			1.41 H	86	57.98	32.42
5	4804.00	50.1 PK	74.0	-23.9	1.00 H	292	8.19	41.91
6	4804.00	41.4 AV	54.0	-12.6	1.00 H	292	-0.51	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	25.09	31.11
2	2322.00	44.6 AV	54.0	-9.4	1.00 V	242	13.49	31.11
3	*2402.00	105.4 PK			1.00 V	245	73.92	31.48
4	*2402.00	89.4 AV			1.00 V	245	57.92	31.48
5	4804.00	50.9 PK	74.0	-23.1	1.00 V	155	13.27	37.63
6	4804.00	42.4 AV	54.0	-11.6	1.00 V	155	4.77	37.63

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 19	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	*2440.00	110.3 PK			1.36 H	85	77.79	32.51
2	*2440.00	92.4 AV			1.36 H	85	59.89	32.51
3	4880.00	50.8 PK	74.0	-23.2	1.00 H	310	8.80	42.00
4	4880.00	43.2 AV	54.0	-10.8	1.00 H	310	1.20	42.00
5	7320.00	54.9 PK	74.0	-19.1	1.35 H	58	8.35	46.55
6	7320.00	41.8 AV	54.0	-12.2	1.35 H	58	-4.75	46.55
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	107.2 PK			1.00 V	241	74.69	32.51
2	*2440.00	91.1 AV			1.00 V	241	58.59	32.51
3	4880.00	51.6 PK	74.0	-22.4	1.00 V	144	9.60	42.00
4	4880.00	42.8 AV	54.0	-11.2	1.00 V	144	0.80	42.00
5	7320.00	54.9 PK	74.0	-19.1	1.36 V	65	8.35	46.55
6	7320.00	41.7 AV	54.0	-12.3	1.36 V	65	-4.85	46.55

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		

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	109.3 PK			1.37 H	85	76.68	32.62
2	*2480.00	91.8 AV			1.37 H	85	59.18	32.62
3	2483.50	56.9 PK	74.0	-17.1	1.37 H	85	24.27	32.63
4	2483.50	44.1 AV	54.0	-9.9	1.37 H	85	11.47	32.63
5	4960.00	51.2 PK	74.0	-22.8	1.00 H	284	9.21	41.99
6	4960.00	43.0 AV	54.0	-11.0	1.00 H	284	1.01	41.99
7	7440.00	55.1 PK	74.0	-18.9	1.40 H	50	8.29	46.81
8	7440.00	42.1 AV	54.0	-11.9	1.40 H	50	-4.71	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	106.1 PK			1.00 V	235	73.48	32.62
2	*2480.00	89.7 AV			1.00 V	235	57.08	32.62
3	2483.50	55.8 PK	74.0	-18.2	1.39 V	80	23.17	32.63
4	2483.50	43.8 AV	54.0	-10.2	1.39 V	80	11.17	32.63
5	4960.00	51.8 PK	74.0	-22.2	1.00 V	153	9.81	41.99
6	4960.00	41.8 AV	54.0	-12.2	1.00 V	153	-0.19	41.99
7	7440.00	54.0 PK	74.0	-20.0	1.41 V	73	7.19	46.81
8	7440.00	41.1 AV	54.0	-12.9	1.41 V	73	-5.71	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 6dB BANDWIDTH MEASUREMENT

4.2.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.2.2 TEST 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 : Aug. 31, 2012

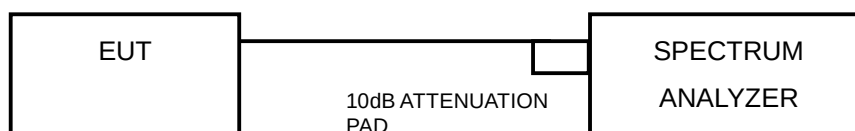
4.2.3 TEST PROCEDURE

1. Set resolution bandwidth (RBW) = approximately 1% of the emission bandwidth
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
3. Trace mode = max hold.
4. Sweep = auto couple.
5. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

4.2.5 TEST SETUP



4.2.6 EUT OPERATING CONDITIONS

Same as Item 4.1.6

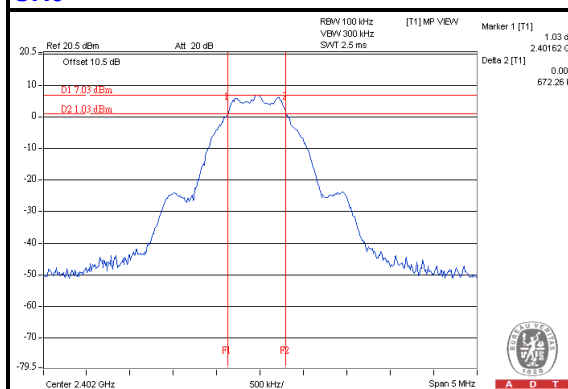


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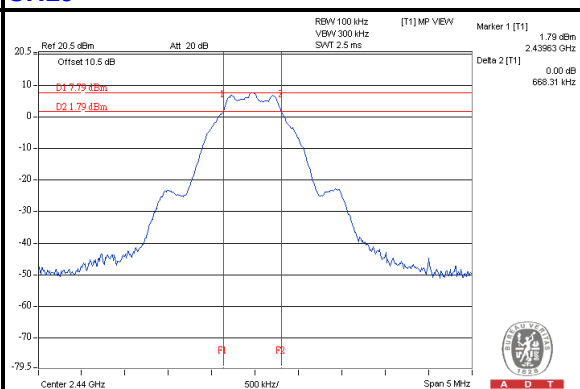
BT_LE-GFSK

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)
0	2402	0.67
19	2440	0.67
39	2480	0.67

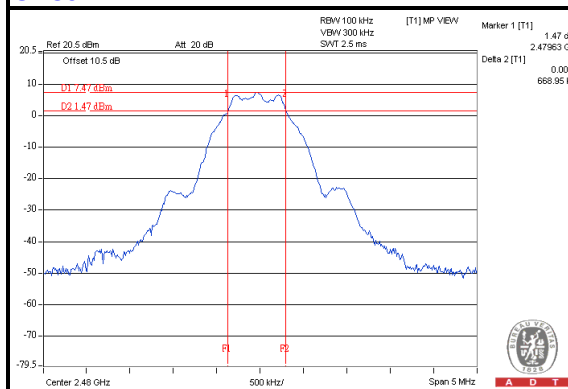
CH0



CH19



CH39



4.3 OCCUPIED BANDWIDTH MEASUREMENT

4.3.1 TEST INSTRUMENTS

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

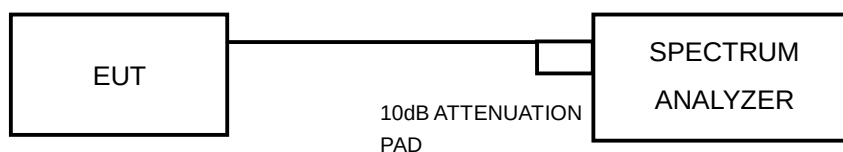
Note:

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 : Aug. 31, 2012

4.3.2 TEST PROCEDURE

1. Set RBW $\geq 1\%$ of the emission bandwidth.
2. Set the VBW $> 3 \times$ RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Record the 99% emission bandwidth.

4.3.3 TEST SETUP



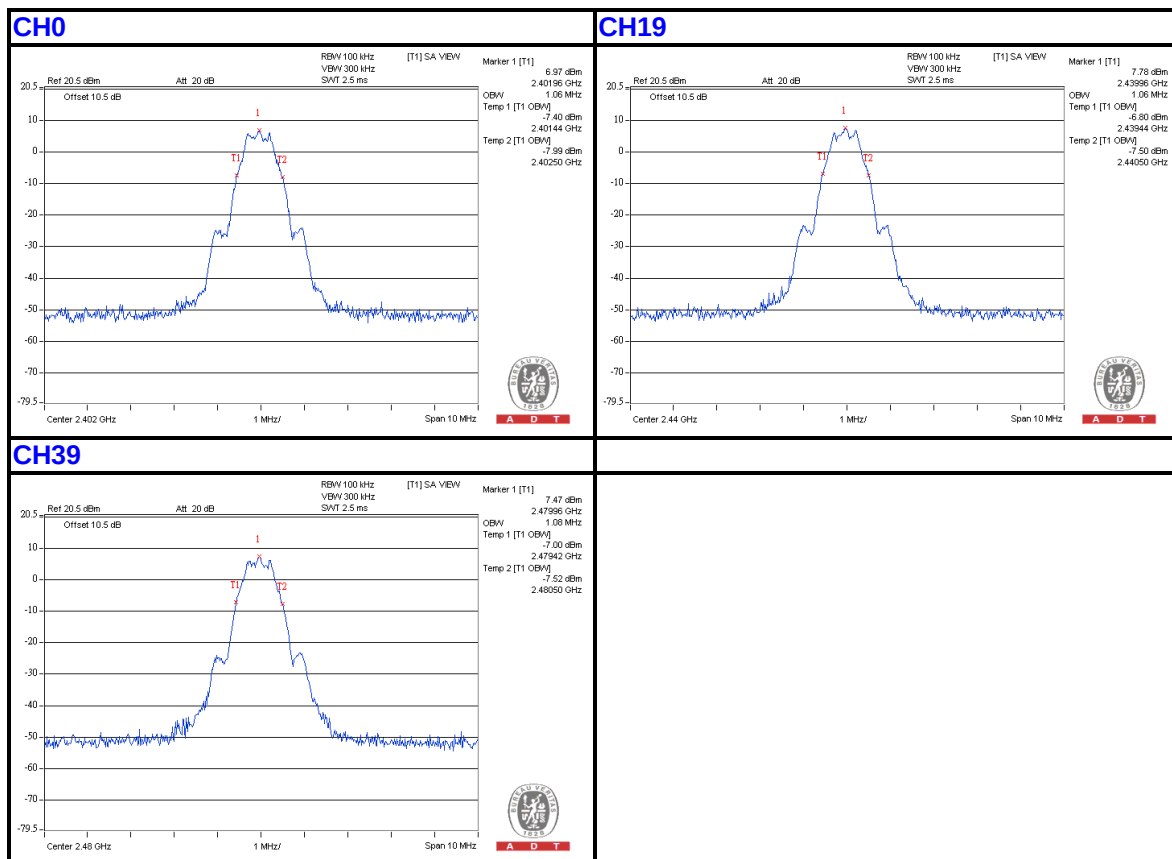
4.3.4 EUT OPERATING CONDITIONS

Same as Item 4.1.6

4.3.5 TEST RESULTS

BT_LE-GFSK

CHANNEL	CHANNEL FREQUENCY (MHz)	OCCUPIED BANDWIDTH (MHz)
0	2402	1.06
19	2440	1.06
39	2480	1.08



4.4 CONDUCTED OUTPUT POWER

4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

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

4.4.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power Meter	ML2495A	0824006	May 10, 2012	May 09, 2013
Peak 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 and Aug. 31, 2012

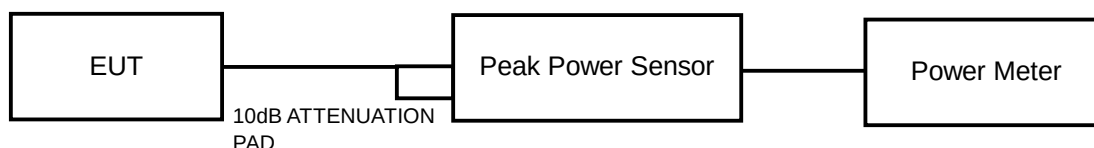
4.4.3 TEST PROCEDURES

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.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.1.6

4.4.7 TEST RESULTS

802.11b

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	107.152	20.30	30	PASS
6	2437	109.648	20.40	30	PASS
11	2462	93.325	19.70	30	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	125.893	21.00	30	PASS
6	2437	169.824	22.30	30	PASS
11	2462	97.724	19.90	30	PASS

802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	104.713	20.20	30	PASS
6	2437	131.826	21.20	30	PASS
11	2462	79.433	19.00	30	PASS

802.11n (40MHz)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
3	2422	69.183	18.40	30	PASS
6	2437	112.202	20.50	30	PASS
9	2452	56.234	17.50	30	PASS

BT_LE-GFSK

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
0	2402	8.337	9.21	30	PASS
19	2440	9.268	9.67	30	PASS
39	2480	9.419	9.74	30	PASS



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4.5 AVERAGE OUTPUT POWER

4.5.1 FOR REFERENCE.

4.5.2 TEST INSTRUMENTS

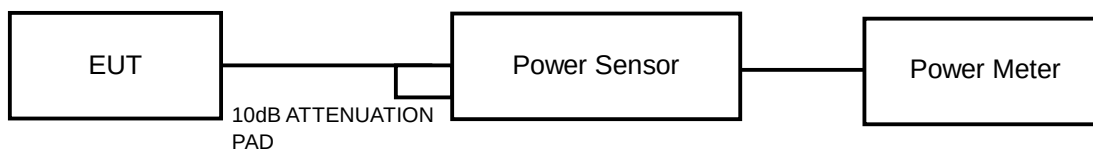
DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power Meter	ML2495A	0824006	May 10, 2012	May 09, 2013
Power Sensor	MA2411B	0738172	May 10, 2012	May 09, 2013

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 and Aug. 31, 2012

4.5.3 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.

4.5.4 TEST SETUP



4.5.5 EUT OPERATING CONDITIONS

Same as Item 4.1.6

4.5.6 TEST RESULTS

802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER OUTPUT (dBm)
1	2412	18.4
6	2437	18.3
11	2462	17.8

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER OUTPUT (dBm)
1	2412	14.3
6	2437	17.9
11	2462	13.0

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER OUTPUT (DBM)
1	2412	13.5
6	2437	16.0
11	2462	12.1

802.11n (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER OUTPUT (dBm)
3	2422	11.1
6	2437	13.3
9	2452	10.3

BT_LE-GFSK

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER OUTPUT (dBm)
0	2402	8.76
19	2440	9.17
39	2480	9.34

4.6 POWER SPECTRAL DENSITY MEASUREMENT

4.6.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP40	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 : Aug. 31, 2012

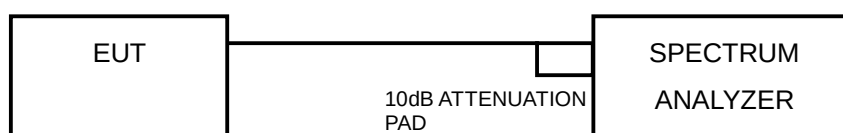
4.6.3 TEST PROCEDURE

1. Set the RBW = 100 kHz, VBW = 300 kHz, Detector = peak.
2. Sweep time = auto couple.
3. Trace mode = max hold.
4. Allow trace to fully stabilize.
5. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
6. Scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where $BWCF = 10\log(3 \text{ kHz}/100\text{kHz})$

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SETUP



4.6.6 EUT OPERATING CONDITION

Same as Item 4.1.6

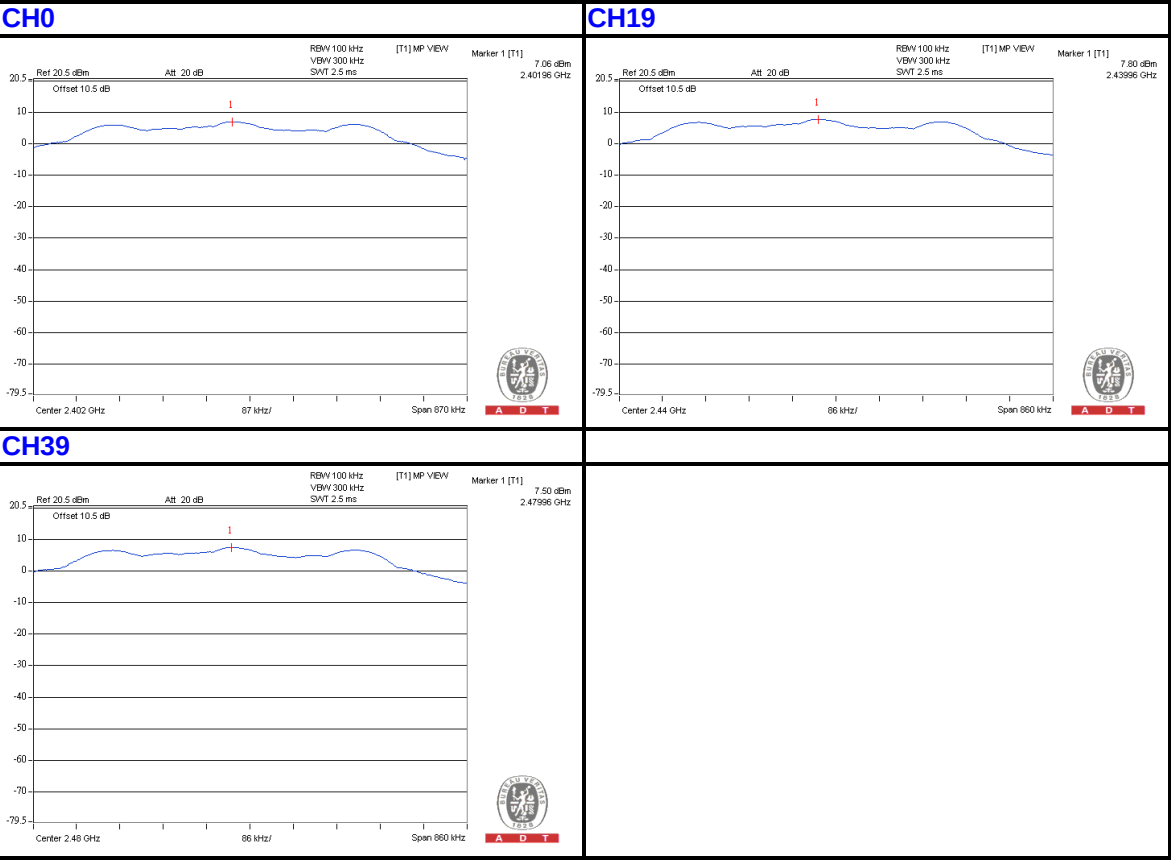


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4.6.7 TEST RESULTS

BT_LE-GFSK

Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	2402	7.06	-8.17	8	PASS
19	2440	7.80	-7.43	8	PASS
39	2480	7.50	-7.73	8	PASS





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4.7 CONDUCTED OUT-BAND EMISSION MEASUREMENT

4.7.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

Below -20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.7.2 TEST 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 : Aug. 31, 2012

4.7.3 TEST PROCEDURE

MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW $\geq$ 300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.



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MEASUREMENT PROCEDURE OOB

1. Set RBW = 100 kHz.
2. Set VBW $\geq$ 300 kHz.
3. Set span to encompass the spectrum to be examined
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.

4.7.4 DEVIATION FROM TEST STANDARD

No deviation

4.7.5 EUT OPERATING CONDITION

Same as Item 4.1.6

4.7.6 TEST RESULTS

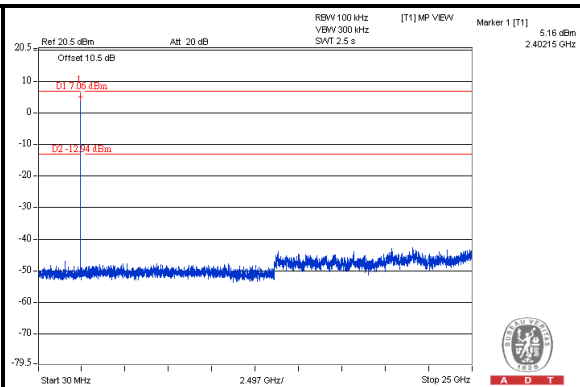
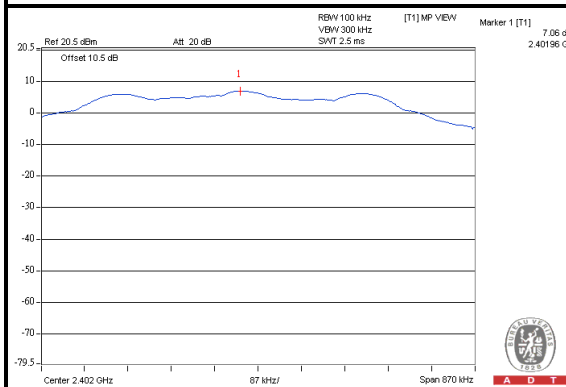
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.



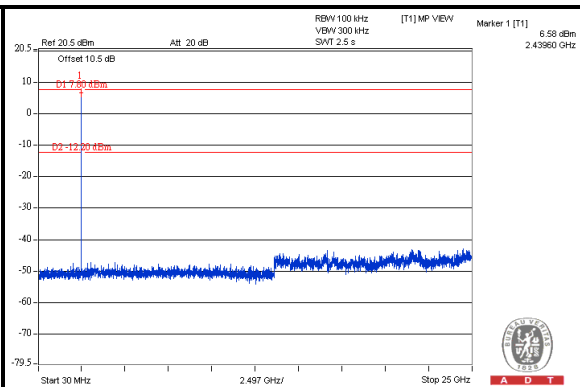
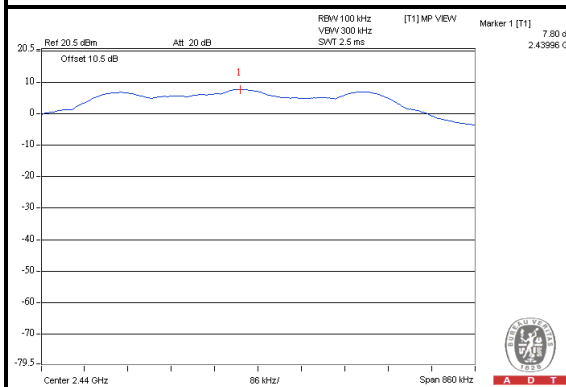
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BT_LE-GFSK

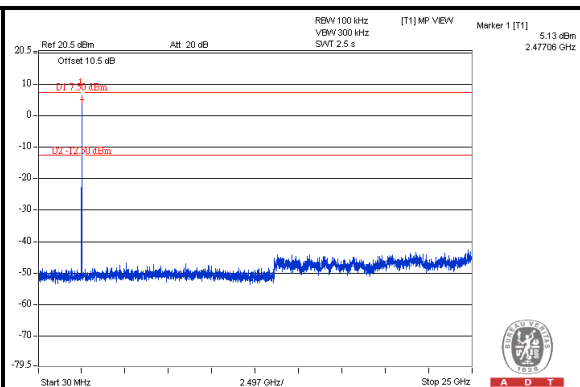
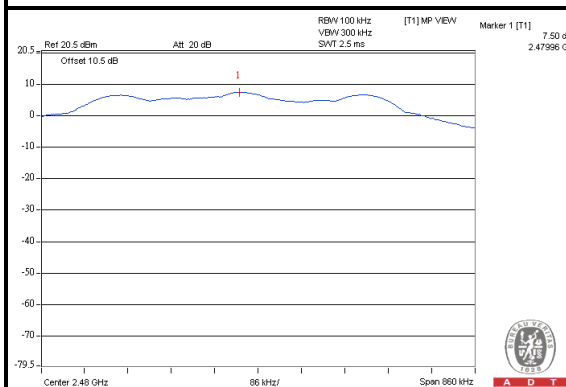
CH 0



CH 19



CH 39



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



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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.

---END---