

FCC Test Report (BT-LE)

Report No.: RF140407E07D-5

FCC ID: TLZ-CM389NF

Test Model: AW-CM389NF

Received Date: Apr. 14, 2016

Test Date: May 31 to June 06, 2016

Issued Date: June 17, 2016

Applicant: AzureWave Technologies, Inc.

Address: 8F., No.94, Baozhong Rd. , Xindian Dist., New Taipei City , Taiwan 231

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Hsin Chu Laboratory

Lab Address: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
Taiwan R.O.C.

Test Location (1): E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
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 is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification. The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

Table of Contents

Release Control Record	3
1 Certificate of Conformity	4
2 Summary of Test Results	5
2.1 Measurement Uncertainty	5
2.2 Modification Record	5
3 General Information	6
3.1 General Description of EUT (BT-LE)	6
3.2 Description of Test Modes	8
3.2.1 Test Mode Applicability and Tested Channel Detail	9
3.3 Duty Cycle of Test Signal	11
3.4 Description of Support Units	12
3.4.1 Configuration of System under Test	13
3.5 General Description of Applied Standards	14
4 Test Types and Results	15
4.1 Radiated Emission and Bandedge Measurement	15
4.1.1 Limits of Radiated Emission and Bandedge Measurement	15
4.1.2 Test Instruments	16
4.1.3 Test Procedures	17
4.1.4 Deviation from Test Standard	17
4.1.5 Test Set Up	18
4.1.6 EUT Operating Conditions	18
4.1.7 Test Results (Mode 1)	19
4.1.8 Test Results (Mode 2)	23
4.2 Conducted Output Power Measurement	27
4.2.1 Limits OF Conducted Output Power Measurement	27
4.2.2 Test Setup	27
4.2.3 Test Instruments	27
4.2.4 Test Procedures	27
4.2.5 Deviation from Test Standard	27
4.2.6 EUT Operating Conditions	27
4.2.7 Test Results	28
5 Pictures of Test Arrangements	29
Appendix – Information on the Testing Laboratories	30

Release Control Record

Issue No.	Description	Date Issued
RF140407E07D-5	Original release.	June 17, 2016

1 Certificate of Conformity

Product: IEEE 802.11 2X2 MIMO a/b/g/n/ac Wireless LAN + Bluetooth + NFC NGFF Module

Brand: AzureWave

Test Model: AW-CM389NF

Sample Status: ENGINEERING SAMPLE

Applicant: AzureWave Technologies, Inc.

Test Date: May 31 to June 06, 2016

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)
ANSI C63.10: 2013

The above equipment 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 :

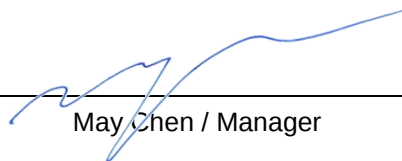


Date:

June 17, 2016

Claire Kuan / Specialist

Approved by :



Date:

June 17, 2016

May Chen / Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (SECTION 15.247)			
FCC Clause	Test Item	Result	Remarks
15.205 & 209 & 15.247(d)	Radiated Emissions Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.10dB at 2483.50MHz.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.

NOTE: This report is prepared for FCC Class II change. Only Radiated Emissions / Conducted Power were presented in this test report.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) ($\pm$)
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.43 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.72 dB
	6GHz ~ 18GHz	4.00 dB
	18GHz ~ 40GHz	4.11 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT (BT-LE)

Product	IEEE 802.11 2X2 MIMO a/b/g/n/ac Wireless LAN + Bluetooth + NFC NGFF Module
Brand	AzureWave
Test Model	AW-CM389NF
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	3.3Vdc from host equipment
Modulation Type	GFSK
Modulation Technology	DTS
Transfer Rate	Up to 1Mbps
Operating Frequency	2402MHz ~ 2480MHz
Number of Channel	40
Output Power	7.031mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Data Cable Supplied	NA

Note:

1. This report is prepared for FCC Class II change. The differences between them are as below information:

◆ Added three sets of antennas as below table:

Original								
For WLAN / BT								
Antenna Set.	Transmitter Circuit	Brand	Model	Antenna Gain(dBi) < including cable loss>	Frequency range (MHz to MHz)	Antenna Type	Connector Type	Cable Length (cm)
1	Chain (0)	MAG.LAYERS	MSA-4008-25GC1-A1	2.98	2400~2500	PIFA	i-pex(MHF)	15
				5.16	4900~5900			
	Chain (1)	MAG.LAYERS	MSA-4008-25GC1-A1	2.98	2400~2500	PIFA	i-pex(MHF)	15
				5.16	4900~5900			
2	Main Antenna Chain 0	Wistron Neweb Corporation	DC33001KT00 (81EAAL15.G92)	1.54	2400~2500	PIFA	i-pex(MHF)	36.3
				1.26	5150~5850			
	Aux Antenna Chain 1	Wistron Neweb Corporation	DC33001KT10 (81EAAL15.G75)	0.63	2400~2500	PIFA	i-pex(MHF)	59.3
				1.84	5150~5850			
Newly								
For WLAN / BT								
Antenna Set.	Transmitter Circuit	Brand	Model	Antenna Gain(dBi)	Frequency range (MHz to MHz)	Antenna Type	Connector Type	Cable Loss (dB)
3	Chain (0)	TE connectivity	2195487	-0.77	2400~2500	Dipole	i-pex(MHF)	0.4
				3.64	5150~5850			0.5
	Chain (1)	TE connectivity	2195487	-0.77	2400~2500	Dipole	i-pex(MHF)	0.4
				3.64	5150~5850			0.5
4	Chain (0)	TE connectivity	2195501-1	2.35	2400~2500	Slot	i-pex(MHF)	0.35
				4.08	5150~5850			0.45
	Chain (1)	TE connectivity	2195501-1	2.35	2400~2500	Slot	i-pex(MHF)	0.35
				4.08	5150~5850			0.45
5	Chain (0)	TE connectivity	2195505-1	0.41	2400~2500	Slot	i-pex(MHF)	0.35
				4.82	5150~5850			0.45
	Chain (1)	TE connectivity	2195505-1	0.41	2400~2500	Slot	i-pex(MHF)	0.35
				4.82	5150~5850			0.45
From the above newly antenna sets, the Set 3, Set 4 were selected as representative antenna for the test and its data was recorded in this report.								

From the above newly antenna sets, the **Set 3, Set 4** were selected as representative antenna for the test and its data was recorded in this report.

2. According to above condition, Only Radiated Emissions / Conducted Power test items need to be performed. And all data were verified to meet the requirements.

3. There are Bluetooth, WLAN and NFC technology used for the EUT.

4. The NFC antenna provided to the EUT, please refer to the following table:

Brand	Model	Antenna Gain(dBi)	Frequency Range (MHz)	Antenna Type	Connector Type
Marvell	30X40X4T_PCB	0.5	13.56	PCB	i-pex(MHF)

5. WLAN/BT/NFC coexistence mode:

Condition	Technology		
1	WLAN(2.4GHz) 1Tx only		NFC
2	WLAN(5GHz) 1Tx only		NFC

6. From above coexistence mode, radiated emission of the simultaneous operation has been evaluated and no non-compliance was found.

7. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Description of Test Modes

40 channels are provided to this EUT:

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

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO			DESCRIPTION
	RE $\geq$ 1G	RE<1G	APCM	
1	√	√	-	EUT With Dipole antenna
2	√	√	√	EUT With Slot antenna

Where **RE $\geq$ 1G:** Radiated Emission above 1GHz **RE<1G:** Radiated Emission below 1GHz

APCM: Antenna Port Conducted Measurement

NOTE: 1. **For Dipole antenna:** The EUT's antenna had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-plane**.
2. **For Slot antenna:** The EUT's antenna had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.

Radiated Emission Test (Above 1GHz):

- ☒ 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 TYPE	DATA RATE (Mbps)
0 to 39	0, 19, 39	GFSK	1

Radiated Emission Test (Below 1GHz):

- ☒ 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 TYPE	DATA RATE (Mbps)
0 to 39	0	GFSK	1

Antenna Port Conducted Measurement:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Mbps)
0 to 39	0, 19, 39	GFSK	1

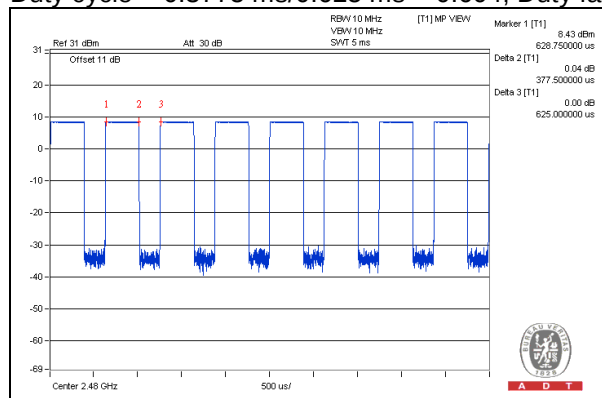
Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
RE$\geq$1G	25deg. C, 69%RH	120Vac, 60Hz	Andy Ho
RE$<$1G	26deg. C, 69%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Anderson Chen

3.3 Duty Cycle of Test Signal

Duty cycle of test signal is < 98%, duty factor shall be considered.

Duty cycle = $0.3775 \text{ ms} / 0.625 \text{ ms} = 0.604$, Duty factor = $10 * \log(1/0.604) = 2.2$



3.4 Description of Support Units

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

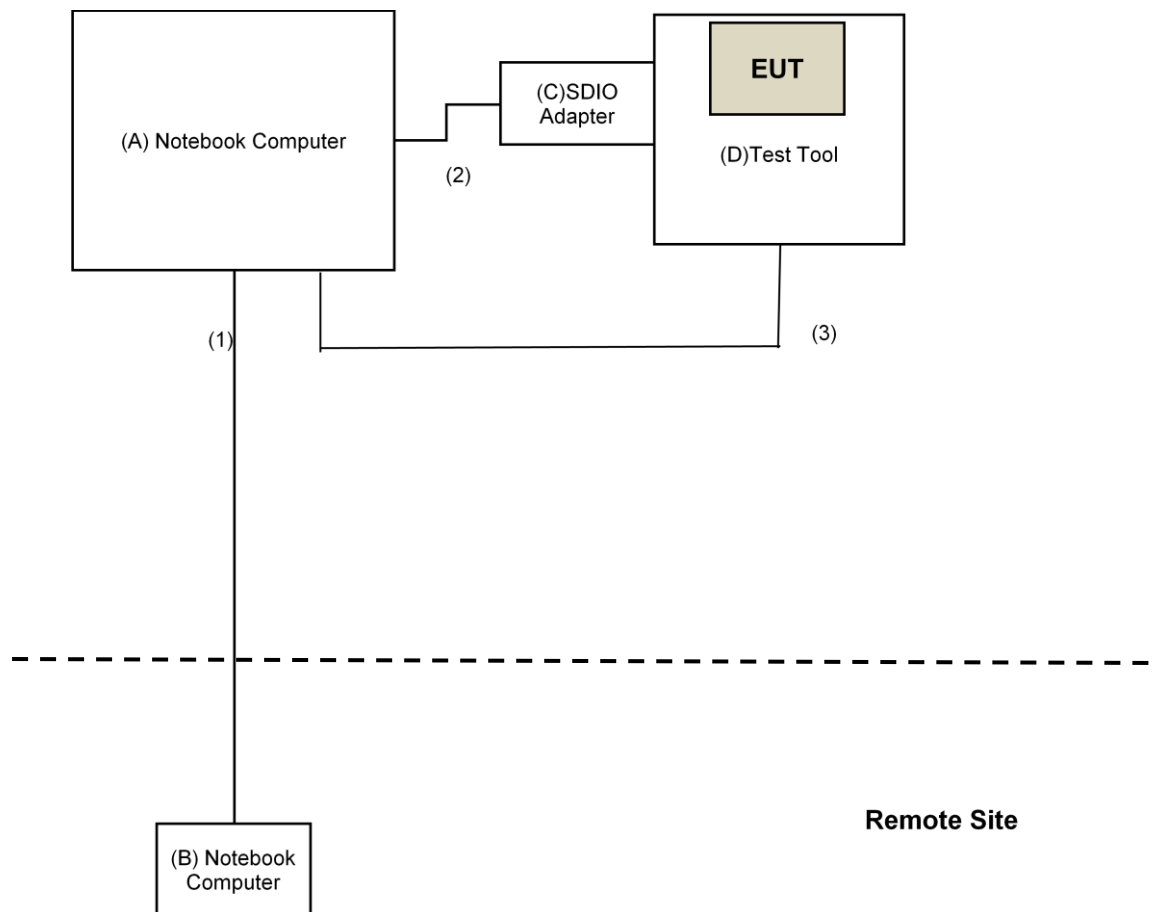
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	NOTEBOOK COMPUTER	Lenovo	769	L3-BE428 08/01	NA	Provided by Lab
B.	NOTEBOOK COMPUTER	DELL	E6420	B92T3R1	FCC DoC	Provided by Lab
C.	SDIO ADAPTER	AzureWave	CK77 94V-0	NA	NA	Supplied by client
D.	TEST TOOLS	AzureWave	1280NF I03	NA	NA	Supplied by client

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ45	1	10	No	0	Provided by Lab
2.	USB	1	1.5	Yes	0	Provided by Lab
3.	USB	1	1.8	Yes	0	Provided by Lab

3.4.1 Configuration of System under Test



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)

KDB 558074 D01 DTS Meas Guidance v03r05

ANSI C63.10-2013

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210202	Dec. 16, 2015	Dec. 15, 2016
Pre-Amplifier ^(*) EMCI	EMC001340	980142	Jan. 20, 2016	Jan. 19, 2018
Loop Antenna(*) Electro-Metrics	EM-6879	264	Dec. 16, 2014	Dec. 15, 2016
RF Cable	NA	LOOPCAB-001 LOOPCAB-002	Jan. 18, 2016	Jan. 17, 2017
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-04	Nov. 11, 2015	Nov. 10, 2016
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Jan. 07, 2016	Jan. 06, 2017
RF Cable	8D-FB	CHHCAB-001-1 CHHCAB-001-2	Oct. 04, 2015	Oct. 03, 2016
	RF-141	CHHCAB-004	Oct. 04, 2015	Oct. 03, 2016
Horn_Antenna AISI	AIH.8018	0000220091110	Jan. 18, 2016	Jan. 17, 2017
Pre-Amplifier Agilent	8449B	3008A01923	Oct. 27, 2015	Oct. 26, 2016
RF Cable	NA	131206 131213 131215 SNMY23685/4	Jan. 15, 2016	Jan. 14, 2017
Spectrum Analyzer Agilent	E4446A	MY48250254	Nov. 25, 2015	Nov. 24, 2016
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Dec. 11, 2015	Dec. 10, 2016
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Jan. 18, 2016	Jan. 17, 2017
RF Cable	SUCOFLEX 102	36442/2 36434/2	Dec. 10, 2015	Dec.09, 2016
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	CM100	NA	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-WD02	NA	NA
Spectrum Analyzer R&S	FSP40	100060	May 11, 2016	May 10, 2017
Power meter Anritsu	ML2495A	1014008	May 05, 2016	May 04, 2017
Power sensor Anritsu	MA2411B	0917122	May 05, 2016	May 04, 2017

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. *The calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The 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: May 18 to June 01, 2016

4.1.3 Test Procedures

- a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

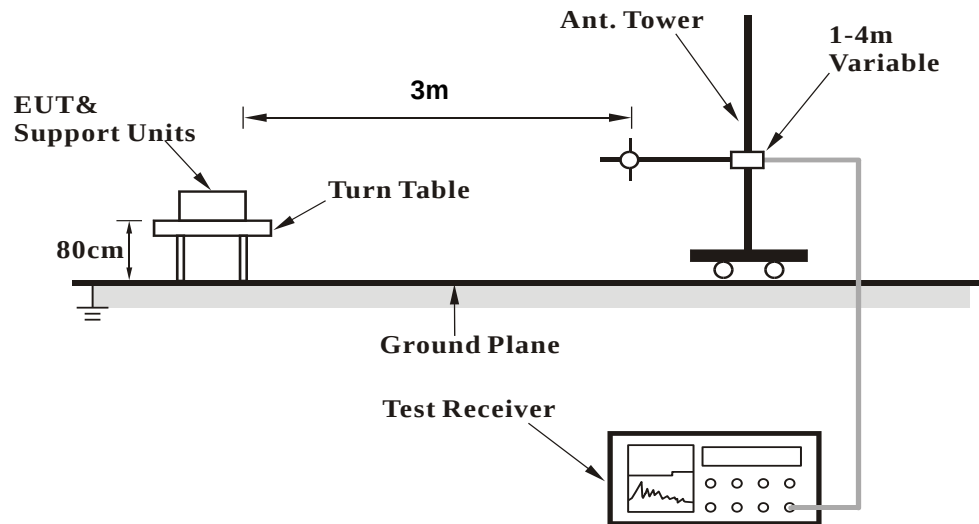
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

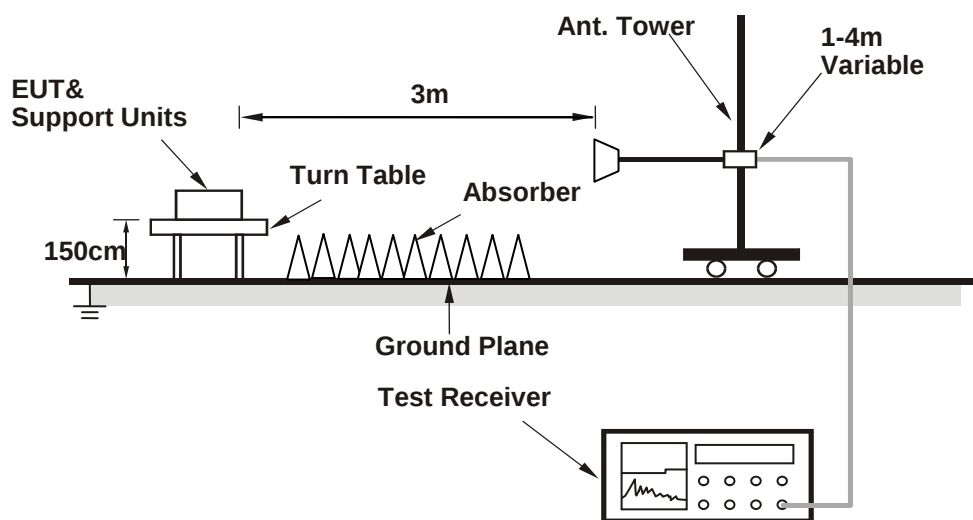
No deviation.

4.1.5 Test Set Up

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT Operating Conditions

- Connected the EUT with the support unit A (Notebook Computer) which is placed on remote site.
- Contorlling software (DutApiMimoBtFmBrdigeEth.exe[ver 2.0.0.47]) has been activated to set the EUT on specific status.

4.1.7 Test Results (Mode 1)

Above 1GHz Data:

BT_LE-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	2390.00	67.10 PK	74.00	-6.90	1.11 H	350	69.50	-2.40
2	2390.00	45.00 AV	54.00	-9.00	1.11 H	350	47.40	-2.40
3	*2402.00	103.10 PK			1.11 H	350	105.50	-2.40
4	*2402.00	100.50 AV			1.11 H	350	102.90	-2.40
5	4804.00	53.80 PK	74.00	-20.20	1.28 H	12	47.90	5.90
6	4804.00	43.80 AV	54.00	-10.20	1.28 H	12	37.90	5.90
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	73.70 PK	74.00	-0.30	1.23 V	3	76.10	-2.40
2	2390.00	49.50 AV	54.00	-4.50	1.23 V	3	51.90	-2.40
3	*2402.00	111.50 PK			1.23 V	3	113.90	-2.40
4	*2402.00	108.70 AV			1.23 V	3	111.10	-2.40
5	4804.00	53.30 PK	74.00	-20.70	1.19 V	107	47.40	5.90
6	4804.00	42.90 AV	54.00	-11.10	1.19 V	107	37.00	5.90

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 19	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2440.00	103.60 PK			1.15 H	345	106.00	-2.40
2	*2440.00	100.50 AV			1.15 H	345	102.90	-2.40
3	4880.00	53.60 PK	74.00	-20.40	1.29 H	15	47.50	6.10
4	4880.00	43.90 AV	54.00	-10.10	1.29 H	15	37.80	6.10
5	7320.00	59.10 PK	74.00	-14.90	1.25 H	102	48.60	10.50
6	7320.00	49.40 AV	54.00	-4.60	1.25 H	102	38.90	10.50
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	111.60 PK			1.18 V	1	114.00	-2.40
2	*2440.00	108.80 AV			1.18 V	1	111.20	-2.40
3	4880.00	53.00 PK	74.00	-21.00	1.24 V	92	46.90	6.10
4	4880.00	42.50 AV	54.00	-11.50	1.24 V	92	36.40	6.10
5	7320.00	59.80 PK	74.00	-14.20	1.30 V	351	49.30	10.50
6	7320.00	48.00 AV	54.00	-6.00	1.30 V	351	37.50	10.50

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

CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	103.70 PK			1.17 H	360	106.00	-2.30
2	*2480.00	100.80 AV			1.17 H	360	103.10	-2.30
3	2483.50	66.80 PK	74.00	-7.20	1.17 H	360	69.20	-2.40
4	2483.50	44.70 AV	54.00	-9.30	1.17 H	360	47.10	-2.40
5	4960.00	53.80 PK	74.00	-20.20	1.30 H	26	47.60	6.20
6	4960.00	44.10 AV	54.00	-9.90	1.30 H	26	37.90	6.20
7	7440.00	59.50 PK	74.00	-14.50	1.20 H	100	48.40	11.10
8	7440.00	49.50 AV	54.00	-4.50	1.20 H	100	38.40	11.10
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	111.00 PK			1.20 V	0	113.30	-2.30
2	*2480.00	108.40 AV			1.20 V	0	110.70	-2.30
3	2483.50	73.90 PK	74.00	-0.10	1.20 V	0	76.30	-2.40
4	2483.50	49.30 AV	54.00	-4.70	1.20 V	0	51.70	-2.40
5	4960.00	53.20 PK	74.00	-20.80	1.25 V	100	47.00	6.20
6	4960.00	42.90 AV	54.00	-11.10	1.25 V	100	36.70	6.20
7	7440.00	59.50 PK	74.00	-14.50	1.30 V	360	48.40	11.10
8	7440.00	47.90 AV	54.00	-6.10	1.30 V	360	36.80	11.10

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – 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.

Below 1GHz Data:

BT_LE-GFSK

CHANNEL	TX Channel 0	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	48.02	30.50 QP	40.00	-9.50	2.00 H	175	39.00	-8.50
2	96.01	33.40 QP	43.50	-10.10	1.50 H	1	46.40	-13.00
3	264.01	40.90 QP	46.00	-5.10	1.00 H	130	49.10	-8.20
4	359.99	39.50 QP	46.00	-6.50	1.00 H	259	44.60	-5.10
5	729.83	37.50 QP	46.00	-8.50	1.50 H	97	34.70	2.80
6	887.99	42.20 QP	46.00	-3.80	1.00 H	178	36.70	5.50
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	132.75	29.70 QP	43.50	-13.80	1.00 V	93	38.70	-9.00
2	312.00	33.20 QP	46.00	-12.80	1.00 V	73	39.20	-6.00
3	431.99	32.20 QP	46.00	-13.80	2.00 V	55	35.00	-2.80
4	528.00	39.00 QP	46.00	-7.00	1.50 V	102	40.10	-1.10
5	738.22	40.30 QP	46.00	-5.70	1.00 V	350	37.00	3.30
6	984.02	37.80 QP	54.00	-16.20	1.00 V	56	30.50	7.30

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

4.1.8 Test Results (Mode 2)

Above 1GHz Data:

BT_LE-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	2390.00	66.80 PK	74.00	-7.20	1.79 H	159	68.70	-1.90
2	2390.00	41.40 AV	54.00	-12.60	1.79 H	159	43.30	-1.90
3	*2402.00	105.50 PK			1.79 H	159	107.30	-1.80
4	*2402.00	104.30 AV			1.79 H	159	106.10	-1.80
5	4804.00	46.70 PK	74.00	-27.30	1.00 H	236	40.10	6.60
6	4804.00	37.80 AV	54.00	-16.20	1.00 H	236	31.20	6.60
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	66.40 PK	74.00	-7.60	1.20 V	195	68.30	-1.90
2	2390.00	40.80 AV	54.00	-13.20	1.20 V	195	42.70	-1.90
3	*2402.00	103.10 PK			1.20 V	195	104.90	-1.80
4	*2402.00	102.70 AV			1.20 V	195	104.50	-1.80
5	4804.00	49.10 PK	74.00	-24.90	1.80 V	33	42.50	6.60
6	4804.00	39.30 AV	54.00	-14.70	1.80 V	33	32.70	6.60

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 19	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2440.00	104.80 PK			1.74 H	174	106.60	-1.80
2	*2440.00	103.70 AV			1.74 H	174	105.50	-1.80
3	4880.00	47.10 PK	74.00	-26.90	1.00 H	252	40.30	6.80
4	4880.00	38.20 AV	54.00	-15.80	1.00 H	252	31.40	6.80
5	7320.00	52.90 PK	74.00	-21.10	1.21 H	302	41.70	11.20
6	7320.00	43.70 AV	54.00	-10.30	1.21 H	302	32.50	11.20
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	103.50 PK			1.23 V	201	105.30	-1.80
2	*2440.00	102.80 AV			1.23 V	201	104.60	-1.80
3	4880.00	48.80 PK	74.00	-25.20	1.68 V	46	42.00	6.80
4	4880.00	38.90 AV	54.00	-15.10	1.68 V	46	32.10	6.80
5	7320.00	50.60 PK	74.00	-23.40	1.25 V	44	39.40	11.20
6	7320.00	43.20 AV	54.00	-10.80	1.25 V	44	32.00	11.20

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	103.80 PK			1.80 H	157	105.50	-1.70
2	*2480.00	102.70 AV			1.80 H	157	104.40	-1.70
3	2483.50	66.80 PK	74.00	-7.20	1.80 H	157	68.60	-1.80
4	2483.50	41.20 AV	54.00	-12.80	1.80 H	157	43.00	-1.80
5	4960.00	46.60 PK	74.00	-27.40	1.00 H	232	39.70	6.90
6	4960.00	38.10 AV	54.00	-15.90	1.00 H	232	31.20	6.90
7	7440.00	52.70 PK	74.00	-21.30	1.24 H	301	40.90	11.80
8	7440.00	43.60 AV	54.00	-10.40	1.24 H	301	31.80	11.80

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	103.50 PK			1.17 V	187	105.20	-1.70
2	*2480.00	103.10 AV			1.17 V	187	104.80	-1.70
3	2483.50	67.20 PK	74.00	-6.80	1.17 V	187	69.00	-1.80
4	2483.50	41.50 AV	54.00	-12.50	1.17 V	187	43.30	-1.80
5	4960.00	48.80 PK	74.00	-25.20	1.69 V	41	41.90	6.90
6	4960.00	38.60 AV	54.00	-15.40	1.69 V	41	31.70	6.90
7	7440.00	50.60 PK	74.00	-23.40	1.20 V	60	38.80	11.80
8	7440.00	43.20 AV	54.00	-10.80	1.20 V	60	31.40	11.80

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.

Below 1GHz Data:

BT_LE-GFSK

CHANNEL	TX Channel 0	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	96.01	33.20 QP	43.50	-10.30	1.50 H	1	46.20	-13.00
2	165.12	31.10 QP	43.50	-12.40	1.50 H	54	39.30	-8.20
3	359.99	38.80 QP	46.00	-7.20	1.00 H	251	43.90	-5.10
4	431.99	38.70 QP	46.00	-7.30	2.00 H	140	41.50	-2.80
5	840.00	40.80 QP	46.00	-5.20	1.00 H	188	35.90	4.90
6	984.00	41.40 QP	54.00	-12.60	1.00 H	180	34.10	7.30
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	133.79	28.80 QP	43.50	-14.70	1.00 V	61	37.60	-8.80
2	311.98	33.10 QP	46.00	-12.90	1.50 V	71	39.10	-6.00
3	431.99	32.80 QP	46.00	-13.20	2.00 V	52	35.60	-2.80
4	528.00	39.20 QP	46.00	-6.80	1.50 V	107	40.30	-1.10
5	648.01	38.00 QP	46.00	-8.00	1.50 V	69	36.50	1.50
6	972.02	37.90 QP	54.00	-16.10	1.50 V	97	30.70	7.20

REMARKS:

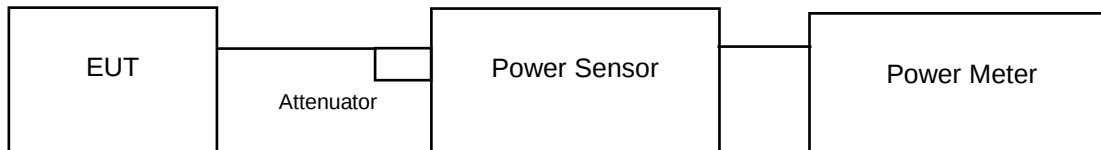
1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

4.2 Conducted Output Power Measurement

4.2.1 Limits OF Conducted Output Power Measurement

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

4.2.2 Test Setup



4.2.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.2.4 Test Procedures

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

4.2.5 Deviation from Test Standard

No deviation.

4.2.6 EUT Operating Conditions

Same as Item 4.3.6.

4.2.7 Test Results

FOR PEAK POWER

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
0	2402	7.031	8.47	30	Pass
19	2440	6.592	8.19	30	Pass
39	2480	6.31	8.00	30	Pass

FOR AVERAGE POWER

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
0	2402	6.546	8.16
19	2440	6.353	8.03
39	2480	6.152	7.89

5 Pictures of Test Arrangements

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

Appendix – 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: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety 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.

--- END ---