

FCC Test Report (2.4GHz)

Report No.: RF161018E04

FCC ID: KA2SHC310A1

Test Model: DSH-C310

Received Date: Oct. 18, 2016

Test Date: Oct. 31 to Nov. 22, 2016

Issued Date: Dec. 16, 2016

Applicant: D-Link Corporation

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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Release Control Record

Issue No.	Description	Date Issued
RF161018E04	Original release.	Dec. 16, 2016

1 Certificate of Conformity

Product: Omna 180Cam HD

Brand: D-Link

Test Model: DSH-C310

Sample Status: ENGINEERING SAMPLE

Applicant: D-Link Corporation

Test Date: Oct. 31 to Nov. 22, 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:** Dec. 16, 2016
Claire Kuan / Specialist

Approved by :  , **Date:** Dec. 16, 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
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -21.63dB at 0.82578MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.1dB at 2483.50MHz.
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is MHF not a standard connector.

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)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.83 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.34 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.41 dB
	6GHz ~ 18GHz	3.49 dB
	18GHz ~ 40GHz	3.30 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Omna 180Cam HD
Brand	D-Link
Test Model	DSH-C310
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	DC 5V from adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode only
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 150Mbps 802.11ac: up to 433.3Mbps
Operating Frequency	2.4GHz: 2.412 ~ 2.462GHz 5GHz: 5.18 ~ 5.24GHz, 5.745 ~ 5.825GHz
Number of Channel	2.4GHz: 802.11b, 802.11g, 802.11n (HT20): 11 5GHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 9 802.11n (HT40), 802.11ac (VHT40): 4 802.11ac (VHT80): 2
Output Power	2.4GHz: 349.14mW 5GHz: 5.18GHz ~ 5.24GHz: 221.82mW 5.745GHz ~ 5.825GHz: 224.905mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	NA

Note:

- 2.4GHz and 5GHz technology cannot transmit at same time.
- The antenna provided to the EUT, please refer to the following table:

Brand	Model	Antenna Net Gain(dBi)	Frequency range (GHz ~ GHz)	Antenna Type	Connector Type	Cable Length (mm)
Mgear	C037-511444-A	2.4	2.4~2.4835	PCB	MHF	56.5
		4.8	5.15~5.85			

- The EUT must be supplied with a power adapter and following below table:

Brand	Model No.	Spec.
D-Link	WB-10E05R	Input: 100-240V, 0.4A, 50-60Hz Output: 5V, 2A DC output cable (unshielded, 3m)

4. The EUT incorporates a SISO function.

2.4GHz Band			
MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11b	1 ~ 11Mbps	1TX	1RX
802.11g	6 ~ 54Mbps	1TX	1RX
802.11n (HT20)	MCS 0~7	1TX	1RX
5GHz Band			
MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11a	6 ~ 54Mbps	1TX	1RX
802.11n (HT20)	MCS 0~7	1TX	1RX
802.11n (HT40)	MCS 0~7	1TX	1RX
802.11ac (VHT20)	MCS 0~8, Nss=1	1TX	1RX
802.11ac (VHT40)	MCS 0~9, Nss=1	1TX	1RX
802.11ac (VHT80)	MCS 0~9, Nss=1	1TX	1RX

5. 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

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

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

3.2.1 Test Mode Applicability and Tested Channel Detail

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

Where RE \geq 1G: Radiated Emission above 1GHz & Bandedge Measurement
 RE<1G: Radiated Emission below 1GHz
 PLC: Power Line Conducted Emission
 APCM: Antenna Port Conducted Measurement

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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5

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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11n (HT20)	1 to 11	6	OFDM	BPSK	6.5

Power Line Conducted Emission Test:

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11n (HT20)	1 to 11	6	OFDM	BPSK	6.5

Antenna Port Conducted Measurement:

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE \geq 1G	22deg. C, 64%RH	120Vac, 60Hz	Andy Ho
RE $<$ 1G	25deg. C, 66%RH	120Vac, 60Hz	Gary Cheng
PLC	23deg. C, 73%RH	120Vac, 60Hz	Barry Lee
APCM	25deg. C, 60%RH	120Vac, 60Hz	Tim Ho

3.3 Duty Cycle of Test Signal

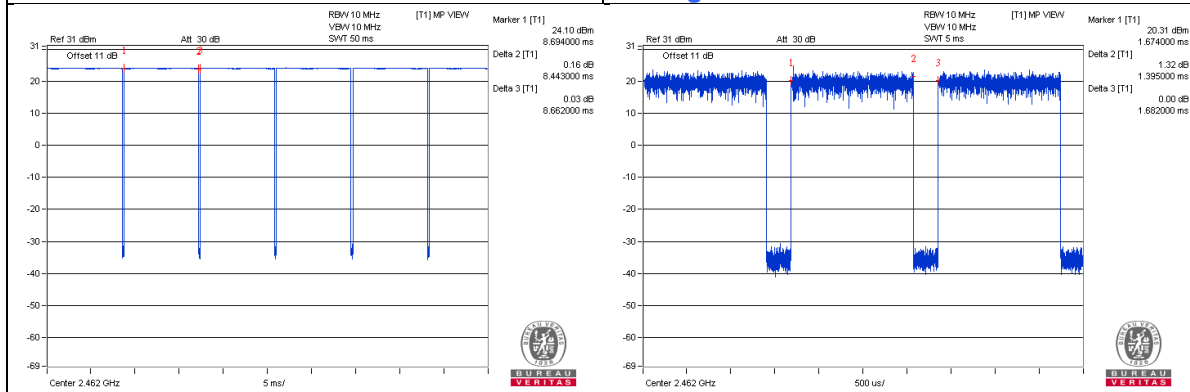
If duty cycle of test signal is < 98%, duty factor shall be considered.

802.11b: Duty cycle = $8.443/8.662 = 0.975$, Duty factor = $10 * \log(1/0.975) = 0.11$

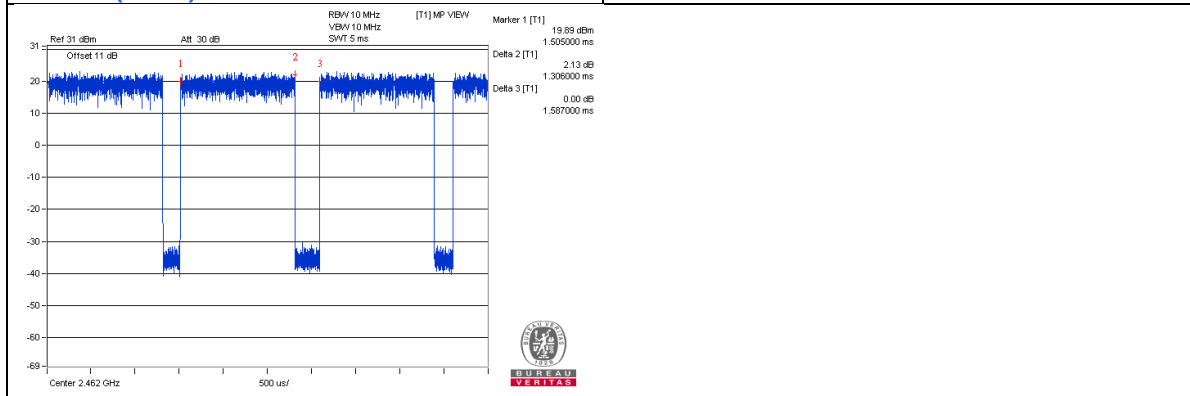
802.11g: Duty cycle = $1.395/1.682 = 0.829$, Duty factor = $10 * \log(1/0.829) = 0.81$

802.11n (HT20): Duty cycle = $1.306/1.587 = 0.823$, Duty factor = $10 * \log(1/0.823) = 0.85$

802.11b 802.11g



802.11n (HT20)



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.

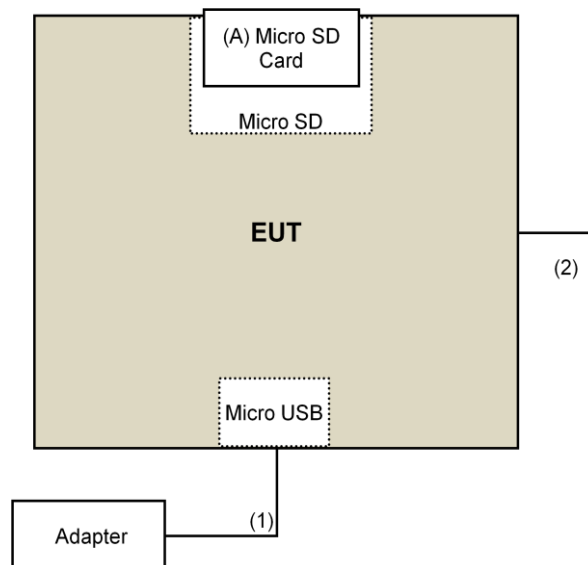
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Micro SD Card	SanDisk	NA	NA	NA	Provided by Lab

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.	DC Cable	1	3	No	0	Supplied by client
2.	Console Cable	1	0.1	No	0	Supplied by client(for RF Setup)

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.

NOTE: The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

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 Keysight	N9038A	MY54450088	July 20, 2016	July 19, 2017
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-1000VH2B	AMP-ZFL-01	Nov. 11, 2015	Nov. 10, 2016
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Jan. 04, 2016	Jan. 03, 2017
RF Cable	8D	966-4-1 966-4-2 966-4-3	Apr. 02, 2016	Apr. 01, 2017
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-4-01	Oct. 05, 2016	Oct. 04, 2017
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Jan. 19, 2016	Jan. 18, 2017
Pre-Amplifier Agilent	8449B	3008A01922	Sep. 18, 2016	Sep. 17, 2017
RF Cable	EMC104-SM-SM-2000 EMC104-SM-SM-5000 EMC104-SM-SM-5000	150318 150323 150324	Mar. 30, 2016	Mar. 29, 2017
Pre-Amplifier EMCI	EMC184045	980143	Jan. 15, 2016	Jan. 14, 2017
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Jan. 08, 2016	Jan. 07, 2017
RF Cable	SUCOFLEX 102	36432/2 36441/2	Jan. 16, 2016	Jan. 15, 2017
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208410	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP02	NA	NA
Spectrum Analyzer R&S	FSv40	100964	June 28, 2016	June 27, 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. 4.
4. The FCC Site Registration No. is 292998
5. The CANADA Site Registration No. is 20331-2
6. Tested Date: Oct. 31 to Nov. 03, 2016

4.1.3 Test Procedures

For Radiated emission below 30MHz

- 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. Both X and Y axes of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case 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.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 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:

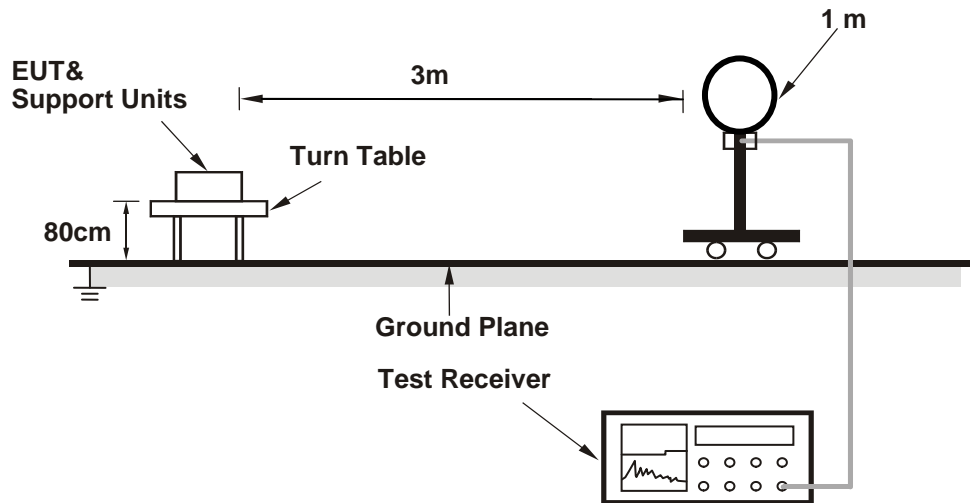
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
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

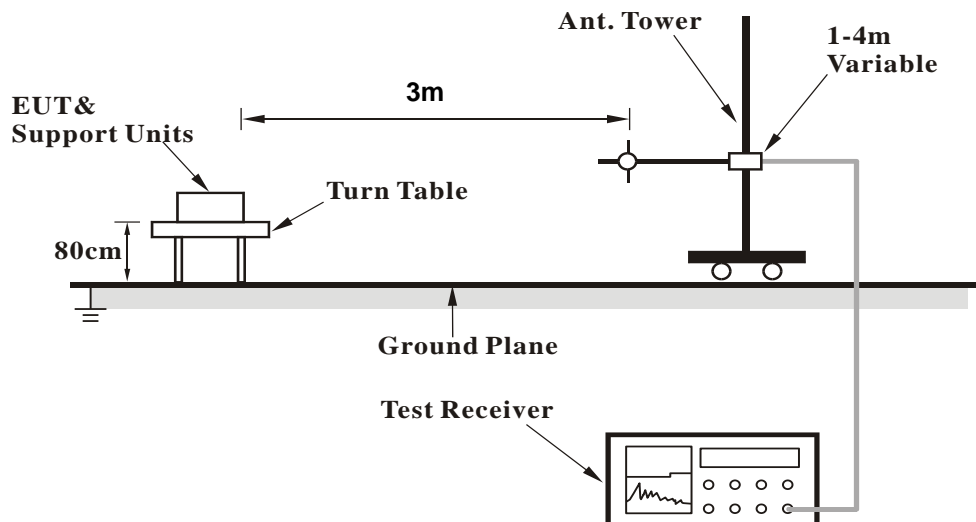
No deviation.

4.1.5 Test Setup

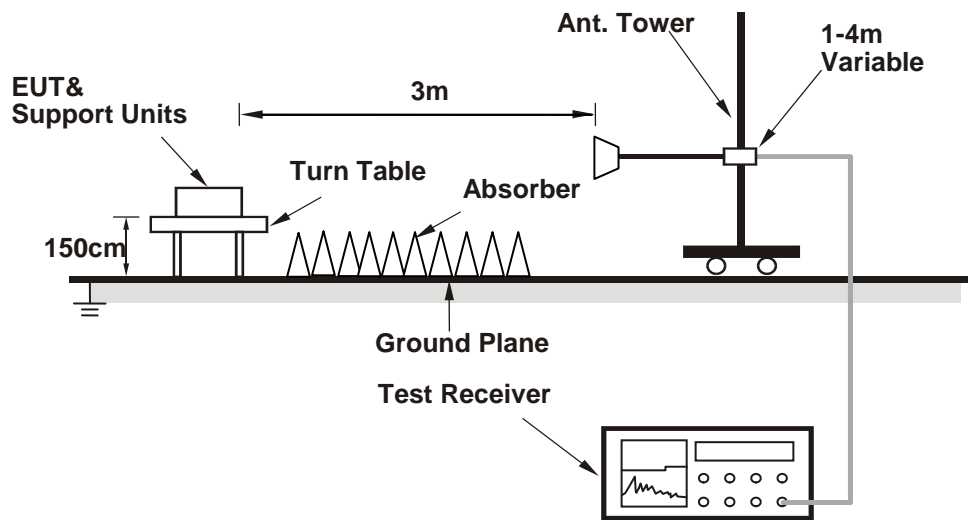
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

- a. Controlling software ((QA Tool MT76xxE)Ver:0.0.096) has been activated to set the EUT on specific status.

4.1.7 Test Results

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	2390.00	55.2 PK	74.0	-18.8	1.91 H	41	60.9	-5.7
2	2390.00	49.1 AV	54.0	-4.9	1.91 H	41	54.8	-5.7
3	*2412.00	107.1 PK			1.91 H	41	112.7	-5.6
4	*2412.00	104.6 AV			1.91 H	41	110.2	-5.6
5	4824.00	41.4 PK	74.0	-32.6	2.88 H	23	40.6	0.8
6	4824.00	34.6 AV	54.0	-19.4	2.88 H	23	33.8	0.8

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	57.5 PK	74.0	-16.5	1.08 V	358	63.2	-5.7
2	2390.00	53.2 AV	54.0	-0.8	1.08 V	358	58.9	-5.7
3	*2412.00	110.2 PK			1.08 V	358	115.8	-5.6
4	*2412.00	107.7 AV			1.08 V	358	113.3	-5.6
5	4824.00	47.3 PK	74.0	-26.7	4.00 V	286	46.5	0.8
6	4824.00	44.0 AV	54.0	-10.0	4.00 V	286	43.2	0.8

REMARKS:

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

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	50.7 PK	74.0	-23.3	1.86 H	41	56.4	-5.7
2	2390.00	39.3 AV	54.0	-14.7	1.86 H	41	45.0	-5.7
3	*2437.00	109.2 PK			1.86 H	41	114.7	-5.5
4	*2437.00	106.8 AV			1.86 H	41	112.3	-5.5
5	2483.50	56.7 PK	74.0	-17.3	1.86 H	41	62.2	-5.5
6	2483.50	51.6 AV	54.0	-2.4	1.86 H	41	57.1	-5.5
7	4874.00	41.6 PK	74.0	-32.4	2.88 H	36	40.7	0.9
8	4874.00	34.9 AV	54.0	-19.1	2.88 H	36	34.0	0.9
9	7311.00	49.7 PK	74.0	-24.3	2.31 H	256	42.3	7.4
10	7311.00	40.2 AV	54.0	-13.8	2.31 H	256	32.8	7.4

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	51.2 PK	74.0	-22.8	1.10 V	48	56.9	-5.7
2	2390.00	43.5 AV	54.0	-10.5	1.10 V	48	49.2	-5.7
3	*2437.00	107.7 PK			1.10 V	48	113.2	-5.5
4	*2437.00	105.3 AV			1.10 V	48	110.8	-5.5
5	2483.50	57.6 PK	74.0	-16.4	1.10 V	48	63.1	-5.5
6	2483.50	52.6 AV	54.0	-1.4	1.10 V	48	58.1	-5.5
7	4874.00	47.4 PK	74.0	-26.6	4.00 V	301	46.5	0.9
8	4874.00	44.0 AV	54.0	-10.0	4.00 V	301	43.1	0.9
9	7311.00	51.9 PK	74.0	-22.1	1.70 V	170	44.5	7.4
10	7311.00	45.6 AV	54.0	-8.4	1.70 V	170	38.2	7.4

REMARKS:

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

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	105.5 PK			1.87 H	51	110.9	-5.4
2	*2462.00	103.4 AV			1.87 H	51	108.8	-5.4
3	2483.50	55.7 PK	74.0	-18.3	1.87 H	51	61.2	-5.5
4	2483.50	50.0 AV	54.0	-4.0	1.87 H	51	55.5	-5.5
5	4924.00	41.5 PK	74.0	-32.5	2.92 H	30	40.4	1.1
6	4924.00	34.8 AV	54.0	-19.2	2.92 H	30	33.7	1.1
7	7386.00	49.5 PK	74.0	-24.5	2.31 H	245	41.9	7.6
8	7386.00	40.3 AV	54.0	-13.7	2.31 H	245	32.7	7.6

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	108.2 PK			2.90 V	29	113.6	-5.4
2	*2462.00	105.8 AV			2.90 V	29	111.2	-5.4
3	2483.50	58.2 PK	74.0	-15.8	2.90 V	29	63.7	-5.5
4	2483.50	53.0 AV	54.0	-1.0	2.90 V	29	58.5	-5.5
5	4924.00	42.1 PK	74.0	-31.9	3.36 V	338	41.0	1.1
6	4924.00	35.3 AV	54.0	-18.7	3.36 V	338	34.2	1.1
7	7386.00	50.2 PK	74.0	-23.8	1.82 V	46	42.6	7.6
8	7386.00	42.0 AV	54.0	-12.0	1.82 V	46	34.4	7.6

REMARKS:

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

802.11g

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
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	68.2 PK	74.0	-5.8	1.92 H	38	73.9	-5.7
2	2390.00	52.3 AV	54.0	-1.7	1.92 H	38	58.0	-5.7
3	*2412.00	108.0 PK			1.92 H	38	113.6	-5.6
4	*2412.00	98.7 AV			1.92 H	38	104.3	-5.6
5	4824.00	40.8 PK	74.0	-33.2	2.91 H	14	40.0	0.8
6	4824.00	29.3 AV	54.0	-24.7	2.91 H	14	28.5	0.8

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	69.4 PK	74.0	-4.6	1.03 V	355	75.1	-5.7
2	2390.00	53.7 AV	54.0	-0.3	1.03 V	355	59.4	-5.7
3	*2412.00	109.7 PK			1.03 V	355	115.3	-5.6
4	*2412.00	100.5 AV			1.03 V	355	106.1	-5.6
5	4824.00	41.1 PK	74.0	-32.9	1.51 V	215	40.3	0.8
6	4824.00	29.1 AV	54.0	-24.9	1.51 V	215	28.3	0.8

REMARKS:

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

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	50.8 PK	74.0	-23.2	1.90 H	39	56.5	-5.7
2	2390.00	38.6 AV	54.0	-15.4	1.90 H	39	44.3	-5.7
3	*2437.00	109.9 PK			1.90 H	39	115.4	-5.5
4	*2437.00	100.8 AV			1.90 H	39	106.3	-5.5
5	2483.50	57.0 PK	74.0	-17.0	1.90 H	39	62.5	-5.5
6	2483.50	43.0 AV	54.0	-11.0	1.90 H	39	48.5	-5.5
7	4874.00	40.7 PK	74.0	-33.3	2.93 H	27	39.8	0.9
8	4874.00	28.9 AV	54.0	-25.1	2.93 H	27	28.0	0.9
9	7311.00	46.6 PK	74.0	-27.4	2.34 H	248	39.2	7.4
10	7311.00	36.9 AV	54.0	-17.1	2.34 H	248	29.5	7.4

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	48.9 PK	74.0	-25.1	2.53 V	42	54.6	-5.7
2	2390.00	38.6 AV	54.0	-15.4	2.53 V	42	44.3	-5.7
3	*2437.00	110.4 PK			2.53 V	42	115.9	-5.5
4	*2437.00	101.3 AV			2.53 V	42	106.8	-5.5
5	2483.50	57.1 PK	74.0	-16.9	2.53 V	42	62.6	-5.5
6	2483.50	43.8 AV	54.0	-10.2	2.53 V	42	49.3	-5.5
7	4874.00	41.2 PK	74.0	-32.8	1.56 V	221	40.3	0.9
8	4874.00	29.3 AV	54.0	-24.7	1.56 V	221	28.4	0.9
9	7311.00	46.2 PK	74.0	-27.8	1.37 V	360	38.8	7.4
10	7311.00	36.6 AV	54.0	-17.4	1.37 V	360	29.2	7.4

REMARKS:

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

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	105.1 PK			1.89 H	47	110.5	-5.4
2	*2462.00	96.0 AV			1.89 H	47	101.4	-5.4
3	2483.50	65.8 PK	74.0	-8.2	1.89 H	47	71.3	-5.5
4	2483.50	49.5 AV	54.0	-4.5	1.89 H	47	55.0	-5.5
5	4924.00	40.8 PK	74.0	-33.2	2.98 H	20	39.7	1.1
6	4924.00	28.8 AV	54.0	-25.2	2.98 H	20	27.7	1.1
7	7386.00	47.1 PK	74.0	-26.9	2.40 H	235	39.5	7.6
8	7386.00	37.3 AV	54.0	-16.7	2.40 H	235	29.7	7.6

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	108.9 PK			2.84 V	29	114.3	-5.4
2	*2462.00	99.7 AV			2.84 V	29	105.1	-5.4
3	2483.50	68.2 PK	74.0	-5.8	2.84 V	29	73.7	-5.5
4	2483.50	53.7 AV	54.0	-0.3	2.84 V	29	59.2	-5.5
5	4924.00	41.4 PK	74.0	-32.6	1.58 V	221	40.3	1.1
6	4924.00	29.5 AV	54.0	-24.5	1.58 V	221	28.4	1.1
7	7386.00	46.7 PK	74.0	-27.3	1.34 V	360	39.1	7.6
8	7386.00	37.0 AV	54.0	-17.0	1.34 V	360	29.4	7.6

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.

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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	1.87 H	35	73.3	-5.7
2	2390.00	51.9 AV	54.0	-2.1	1.87 H	35	57.6	-5.7
3	*2412.00	105.1 PK			1.87 H	35	110.7	-5.6
4	*2412.00	96.4 AV			1.87 H	35	102.0	-5.6
5	4824.00	40.6 PK	74.0	-33.4	2.98 H	16	39.8	0.8
6	4824.00	28.7 AV	54.0	-25.3	2.98 H	16	27.9	0.8

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	69.2 PK	74.0	-4.8	1.00 V	0	74.9	-5.7
2	2390.00	53.6 AV	54.0	-0.4	1.00 V	0	59.3	-5.7
3	*2412.00	107.6 PK			1.00 V	0	113.2	-5.6
4	*2412.00	98.9 AV			1.00 V	0	104.5	-5.6
5	4824.00	41.7 PK	74.0	-32.3	1.58 V	222	40.9	0.8
6	4824.00	29.7 AV	54.0	-24.3	1.58 V	222	28.9	0.8

REMARKS:

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

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	50.9 PK	74.0	-23.1	1.91 H	41	56.6	-5.7
2	2390.00	38.8 AV	54.0	-15.2	1.91 H	41	44.5	-5.7
3	*2437.00	107.6 PK			1.91 H	41	113.1	-5.5
4	*2437.00	98.7 AV			1.91 H	41	104.2	-5.5
5	2483.50	56.9 PK	74.0	-17.1	1.91 H	41	62.4	-5.5
6	2483.50	43.2 AV	54.0	-10.8	1.91 H	41	48.7	-5.5
7	4874.00	40.1 PK	74.0	-33.9	2.90 H	25	39.2	0.9
8	4874.00	28.5 AV	54.0	-25.5	2.90 H	25	27.6	0.9
9	7311.00	46.5 PK	74.0	-27.5	2.32 H	235	39.1	7.4
10	7311.00	37.1 AV	54.0	-16.9	2.32 H	235	29.7	7.4

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	53.3 PK	74.0	-20.7	1.00 V	359	59.0	-5.7
2	2390.00	41.1 AV	54.0	-12.9	1.00 V	359	46.8	-5.7
3	*2437.00	109.9 PK			1.00 V	359	115.4	-5.5
4	*2437.00	101.0 AV			1.00 V	359	106.5	-5.5
5	2483.50	60.6 PK	74.0	-13.4	1.00 V	359	66.1	-5.5
6	2483.50	45.4 AV	54.0	-8.6	1.00 V	359	50.9	-5.5
7	4874.00	41.8 PK	74.0	-32.2	1.50 V	228	40.9	0.9
8	4874.00	29.6 AV	54.0	-24.4	1.50 V	228	28.7	0.9
9	7311.00	46.0 PK	74.0	-28.0	1.42 V	360	38.6	7.4
10	7311.00	36.6 AV	54.0	-17.4	1.42 V	360	29.2	7.4

REMARKS:

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

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	104.1 PK			1.86 H	60	109.5	-5.4
2	*2462.00	95.0 AV			1.86 H	60	100.4	-5.4
3	2483.50	66.1 PK	74.0	-7.9	1.86 H	60	71.6	-5.5
4	2483.50	49.8 AV	54.0	-4.2	1.86 H	60	55.3	-5.5
5	4924.00	40.5 PK	74.0	-33.5	2.97 H	29	39.4	1.1
6	4924.00	28.9 AV	54.0	-25.1	2.97 H	29	27.8	1.1
7	7386.00	46.3 PK	74.0	-27.7	2.39 H	245	38.7	7.6
8	7386.00	36.6 AV	54.0	-17.4	2.39 H	245	29.0	7.6

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	106.2 PK			2.88 V	2	111.6	-5.4
2	*2462.00	97.3 AV			2.88 V	2	102.7	-5.4
3	2483.50	69.6 PK	74.0	-4.4	2.88 V	2	75.1	-5.5
4	2483.50	53.9 AV	54.0	-0.1	2.88 V	2	59.4	-5.5
5	4924.00	41.3 PK	74.0	-32.7	1.58 V	218	40.2	1.1
6	4924.00	29.2 AV	54.0	-24.8	1.58 V	218	28.1	1.1
7	7386.00	45.6 PK	74.0	-28.4	1.41 V	360	38.0	7.6
8	7386.00	36.1 AV	54.0	-17.9	1.41 V	360	28.5	7.6

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:

802.11n (HT20)

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 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	32.57	28.8 QP	40.0	-11.2	3.00 H	304	38.6	-9.8
2	66.01	25.6 QP	40.0	-14.4	2.00 H	326	35.7	-10.1
3	289.79	34.7 QP	46.0	-11.3	1.00 H	308	42.9	-8.2
4	400.39	38.0 QP	46.0	-8.0	1.00 H	49	43.4	-5.4
5	575.02	36.9 QP	46.0	-9.1	1.50 H	37	38.3	-1.4
6	666.90	40.5 QP	46.0	-5.5	1.00 H	42	40.3	0.2

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	73.75	30.8 QP	40.0	-9.2	1.00 V	360	42.5	-11.7
2	437.25	37.5 QP	46.0	-8.5	1.50 V	87	41.5	-4.0
3	459.03	38.6 QP	46.0	-7.4	1.00 V	179	42.2	-3.6
4	575.02	40.1 QP	46.0	-5.9	1.00 V	124	41.5	-1.4
5	666.51	40.6 QP	46.0	-5.4	1.00 V	360	40.4	0.2
6	958.31	37.8 QP	46.0	-8.2	1.00 V	132	33.2	4.6

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 Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Oct. 24, 2016	Oct. 23, 2017
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 26, 2016	Oct. 25, 2017
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 13, 2016	June 12, 2017
RF Cable	5D-FB	COCCAB-001	Sep. 30, 2016	Sep. 29, 2017
10 dB PAD Mini-Circuits	HAT-10+	CONATT-004	June 20, 2016	June 19, 2017
Software BVADT	BVADT_Cond_ V7.3.7.4	NA	NA	NA

Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. 1.
3. Tested Date: Nov. 22, 2016

4.2.3 Test Procedures

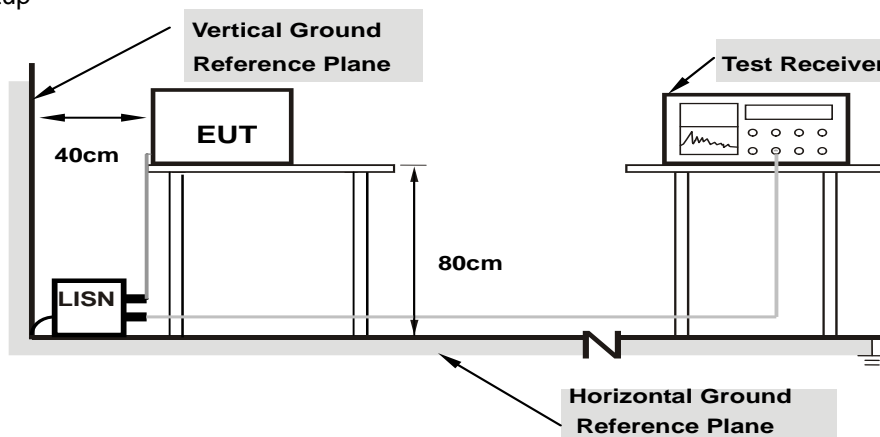
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Conditions

Same as 4.1.6.

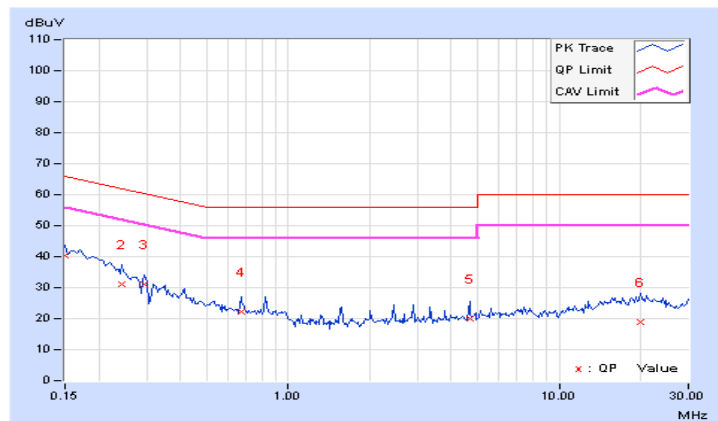
4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	----------	-------------------	--------------------------------

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor (dB)	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.20	30.29	17.62	40.49	27.82	66.00	56.00	-25.51	-28.18
2	0.24375	10.21	21.02	7.96	31.23	18.17	61.97	51.97	-30.74	-33.80
3	0.29453	10.22	20.96	11.48	31.18	21.70	60.40	50.40	-29.22	-28.70
4	0.66953	10.27	11.86	8.50	22.13	18.77	56.00	46.00	-33.87	-27.23
5	4.69531	10.36	9.65	4.75	20.01	15.11	56.00	46.00	-35.99	-30.89
6	19.91797	11.69	7.04	0.85	18.73	12.54	60.00	50.00	-41.27	-37.46

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

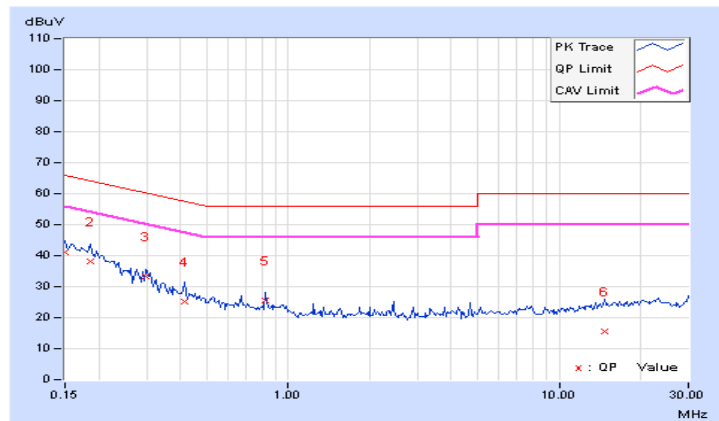


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	
1	0.15000	10.19	31.03	17.40	41.22	27.59	66.00	56.00	-24.78	-28.41
2	0.18516	10.18	28.12	15.92	38.30	26.10	64.25	54.25	-25.95	-28.15
3	0.29844	10.20	23.08	14.25	33.28	24.45	60.29	50.29	-27.01	-25.84
4	0.41563	10.24	14.92	10.63	25.16	20.87	57.54	47.54	-32.38	-26.67
5	0.82578	10.25	15.16	14.12	25.41	24.37	56.00	46.00	-30.59	-21.63
6	14.72266	11.06	4.61	-0.50	15.67	10.56	60.00	50.00	-44.33	-39.44

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

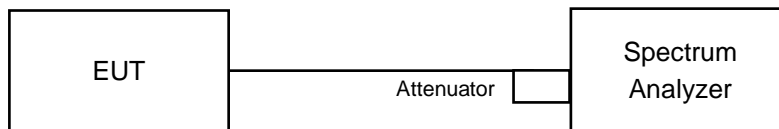


4.3 6dB Bandwidth Measurement

4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

- a. Set resolution bandwidth (RBW) = 100kHz
- b. Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- c. Trace mode = max hold.
- d. Sweep = auto couple.
- e. 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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.3.7 Test Result

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	10.12	0.5	Pass
6	2437	10.12	0.5	Pass
11	2462	10.10	0.5	Pass

802.11g

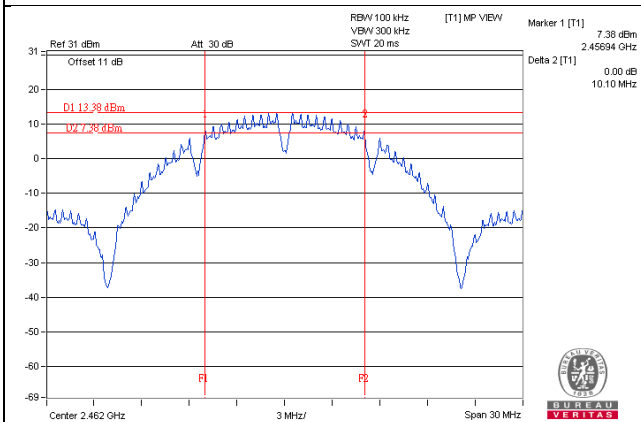
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.36	0.5	Pass
6	2437	16.41	0.5	Pass
11	2462	16.36	0.5	Pass

802.11n (HT20)

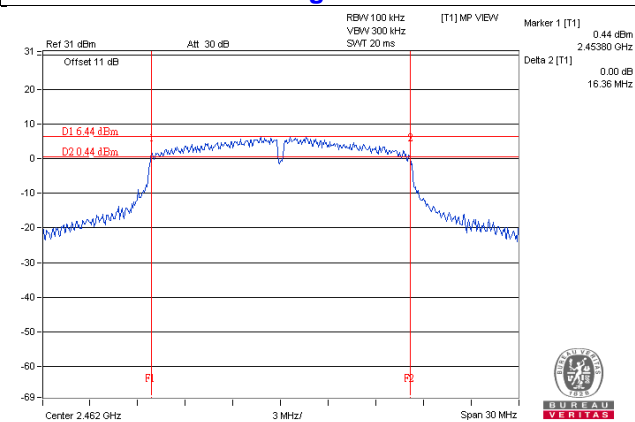
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	17.62	0.5	Pass
6	2437	17.61	0.5	Pass
11	2462	17.60	0.5	Pass

Spectrum Plot of Worst Value

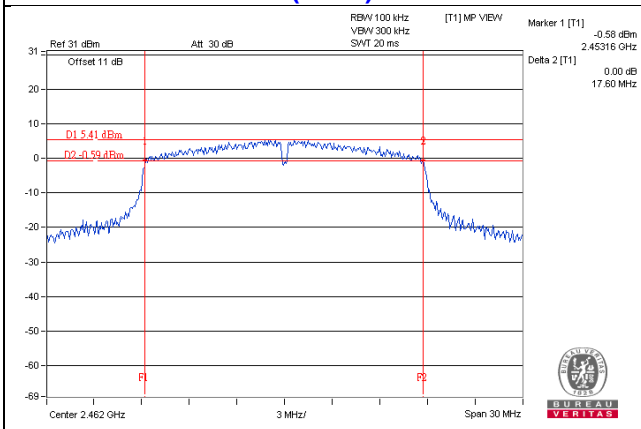
802.11b / CH11



802.11g / CH11



802.11n (HT20) / CH11

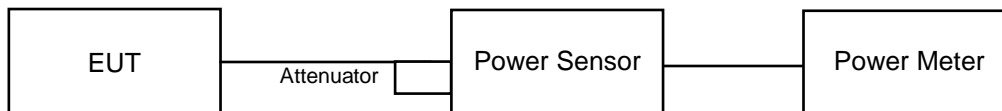


4.4 Conducted Output Power Measurement

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 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 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.

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as Item 4.3.6.

4.4.7 Test Results

FOR PEAK POWER

802.11b

Chan.	Chan. Freq. (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	251.768	24.01	30	Pass
6	2437	341.193	25.33	30	Pass
11	2462	206.063	23.14	30	Pass

802.11g

Chan.	Chan. Freq. (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	284.446	24.54	30	Pass
6	2437	344.35	25.37	30	Pass
11	2462	220.8	23.44	30	Pass

802.11n (HT20)

Chan.	Chan. Freq. (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	249.459	23.97	30	Pass
6	2437	349.14	25.43	30	Pass
11	2462	231.206	23.64	30	Pass

FOR AVERAGE POWER
802.11b

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	181.134	22.58
6	2437	277.332	24.43
11	2462	144.877	21.61

802.11g

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	93.111	19.69
6	2437	159.221	22.02
11	2462	60.117	17.79

802.11n (HT20)

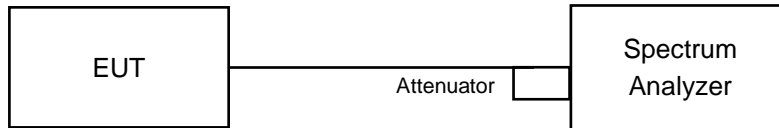
Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	65.013	18.13
6	2437	157.398	21.97
11	2462	50.35	17.02

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

- a. Set analyzer center frequency to DTS channel center frequency.
- b. Set the span to 1.5 times the DTS bandwidth.
- c. Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- d. Set the VBW $\geq 3 \times \text{RBW}$.
- e. Detector = peak.
- f. Sweep time = auto couple.
- g. Trace mode = max hold.
- h. Allow trace to fully stabilize.
- i. Use the peak marker function to determine the maximum amplitude level within the RBW.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6

4.5.7 Test Results

802.11b

Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	0.13	8	Pass
6	2437	-0.41	8	Pass
11	2462	-0.64	8	Pass

802.11g

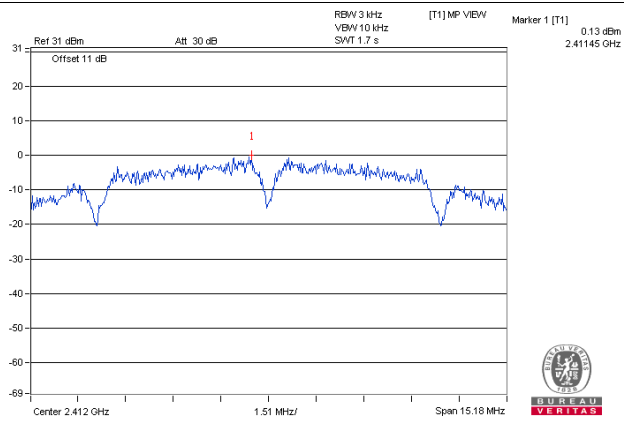
Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-5.68	8	Pass
6	2437	-2.93	8	Pass
11	2462	-7.02	8	Pass

802.11n (HT20)

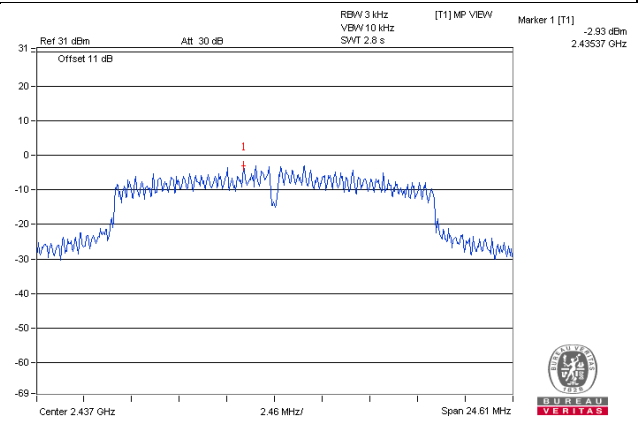
Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-6.42	8	Pass
6	2437	-2.63	8	Pass
11	2462	-7.63	8	Pass

Spectrum Plot of Worst Value

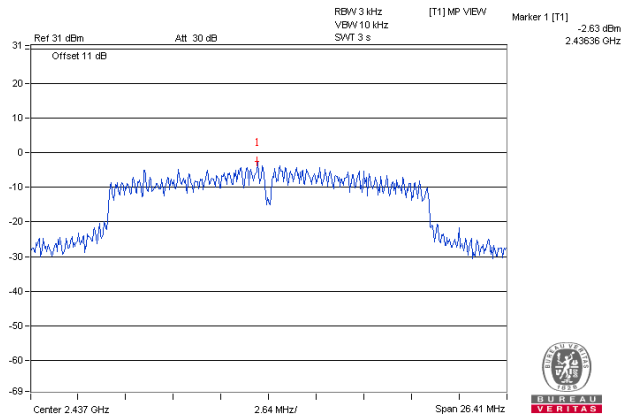
802.11b / CH1



802.11g / CH6



802.11n (HT20) / CH6

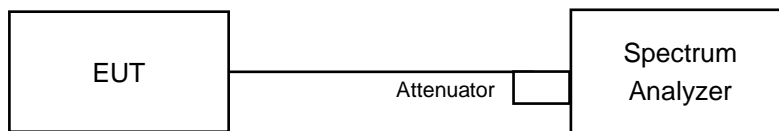


4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 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.

MEASUREMENT PROCEDURE OOB

1. Set RBW = 100 kHz.
2. Set VBW \geq 300 kHz.
3. Detector = peak.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

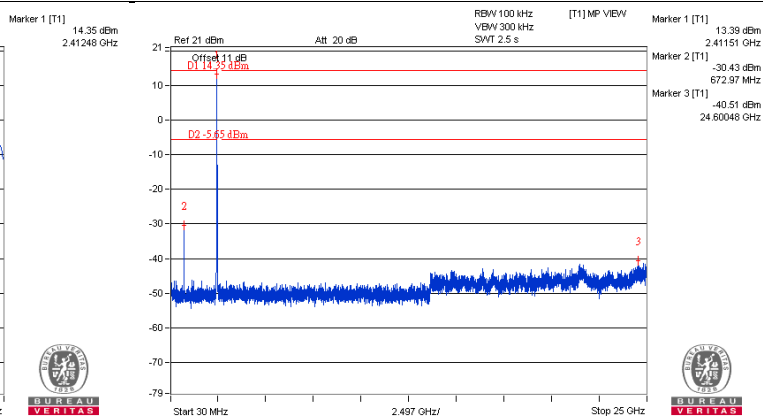
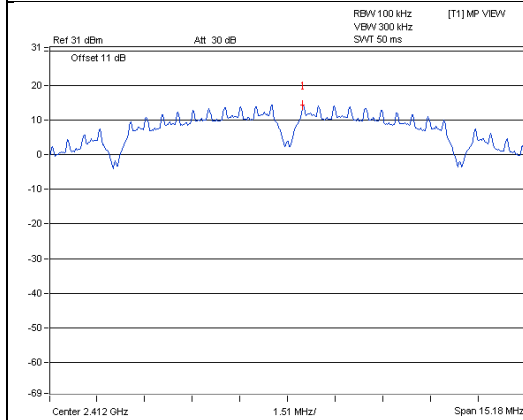
Same as Item 4.3.6

4.6.7 Test Results

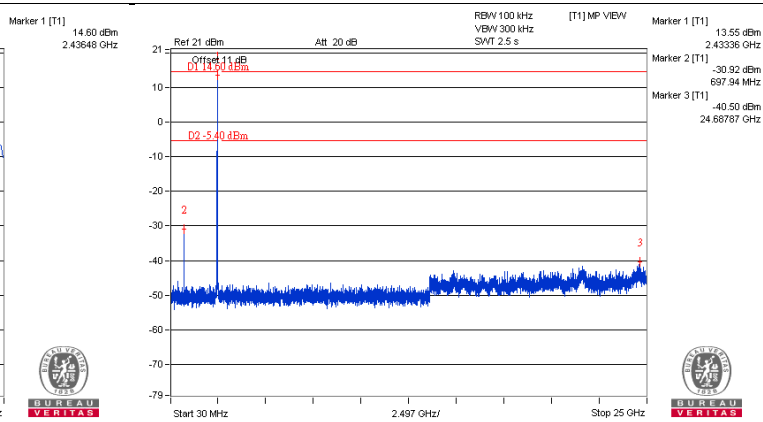
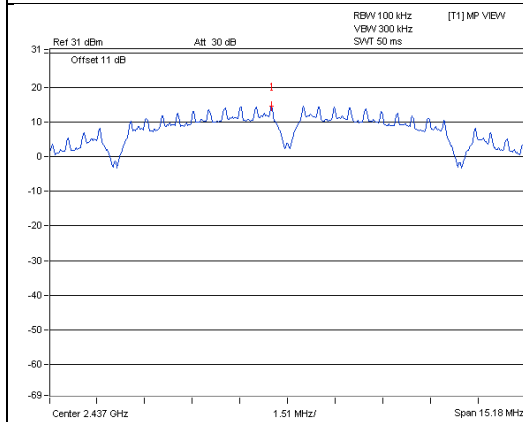
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

802.11b

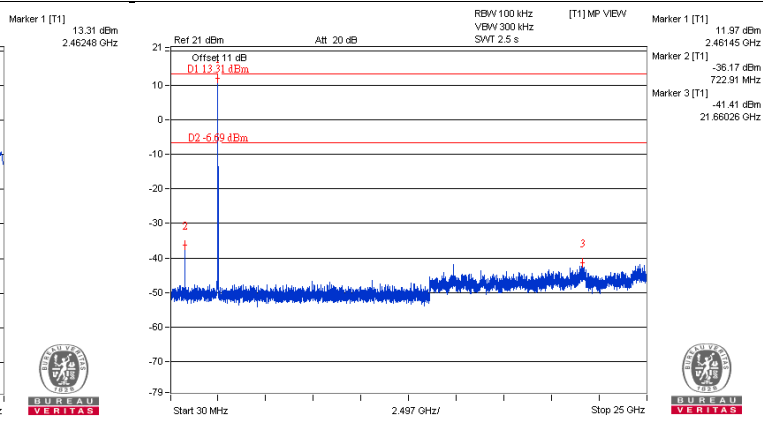
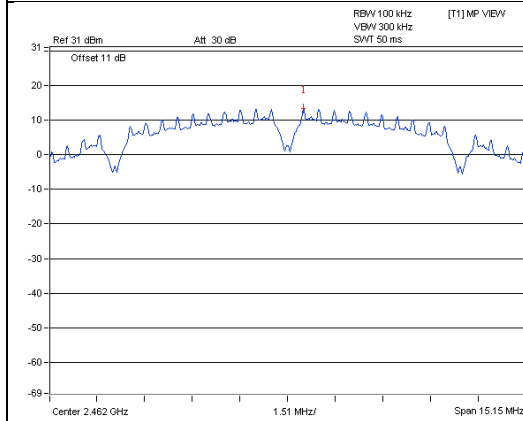
CH 1



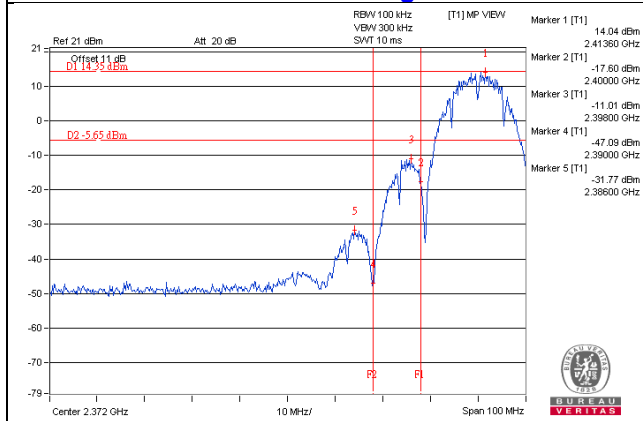
CH 6



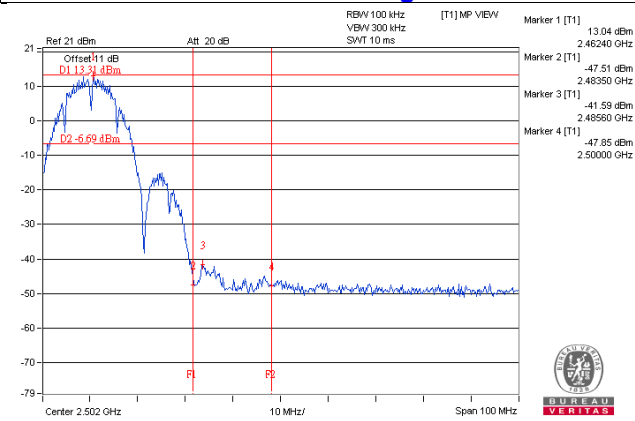
CH 11



CH 1 Band edge

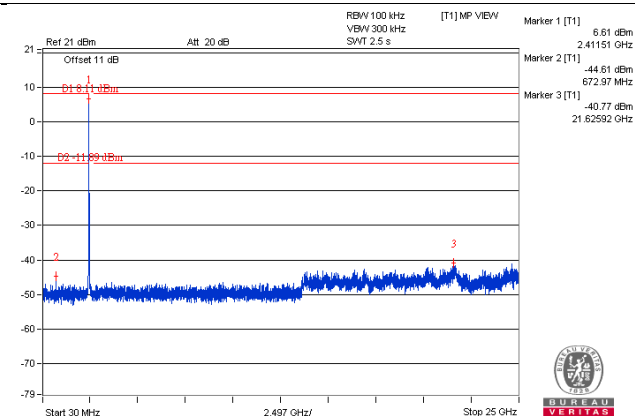
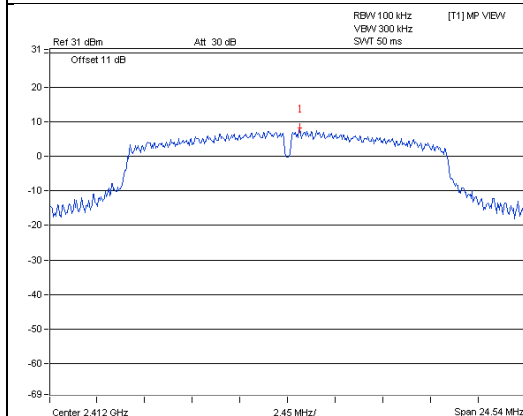


CH 11 Band edge

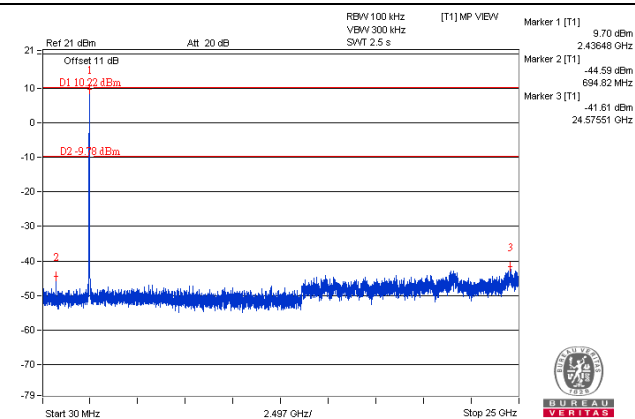
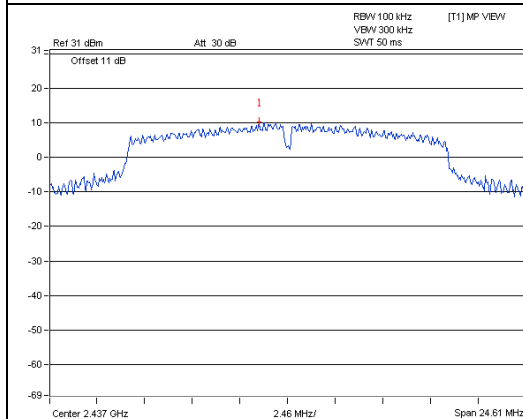


802.11g

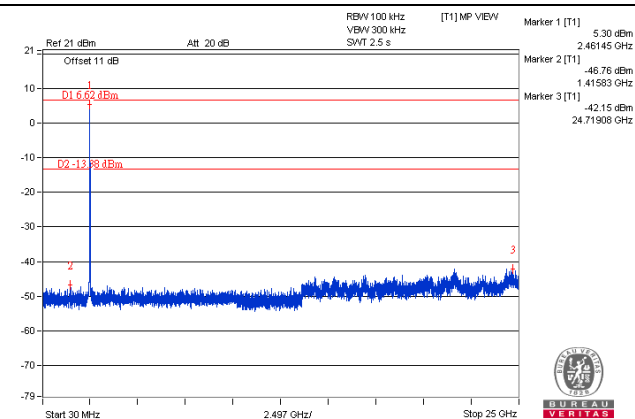
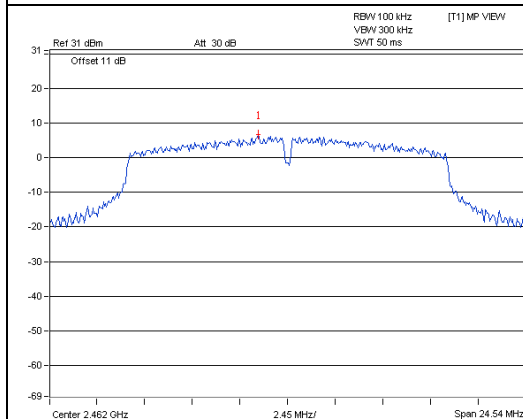
CH 1



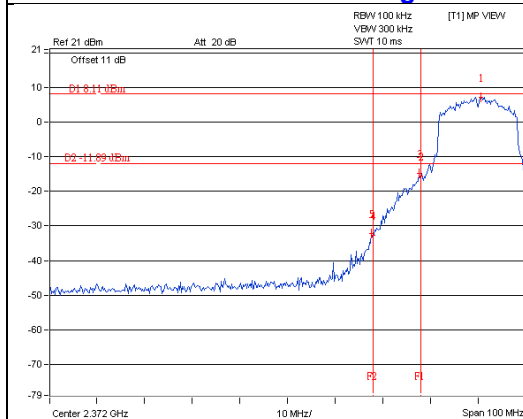
CH 6



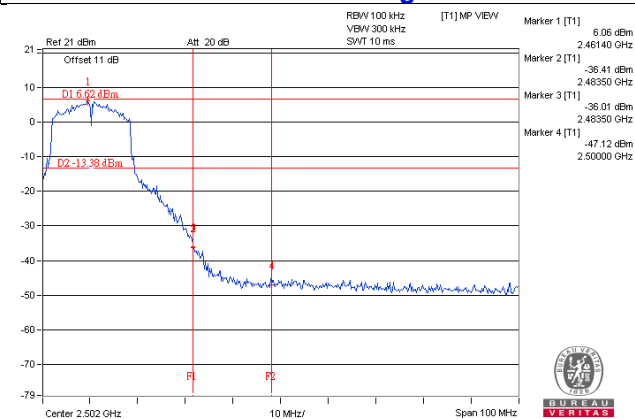
CH 11



CH 1 Band edge

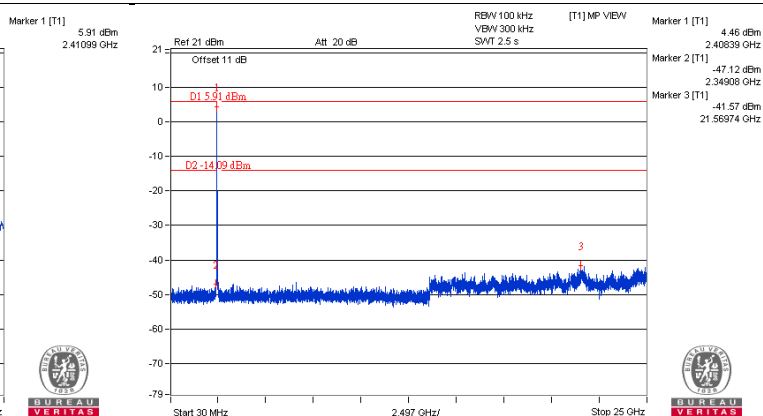
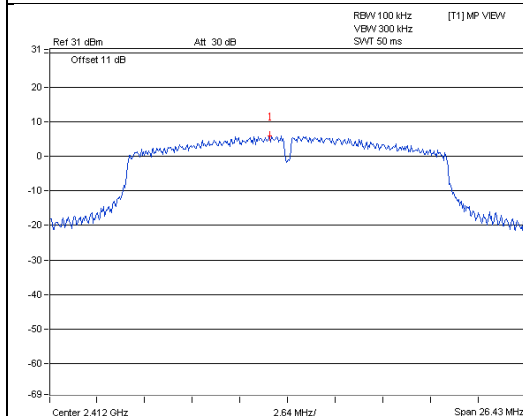


CH 11 Band edge

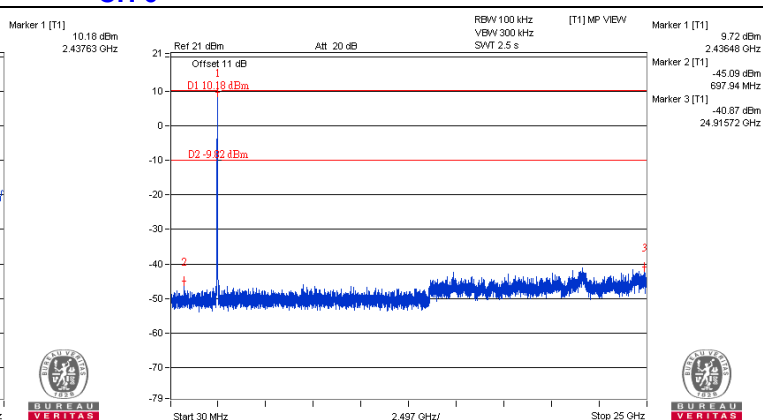
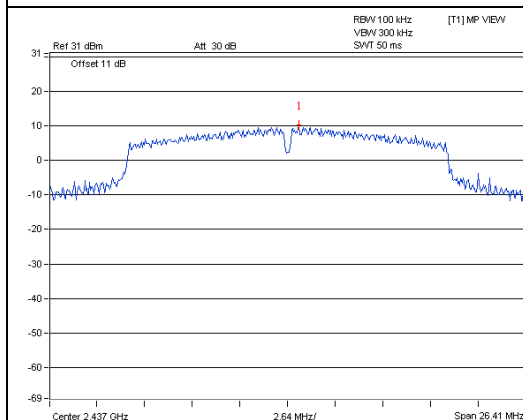


802.11n (HT20)

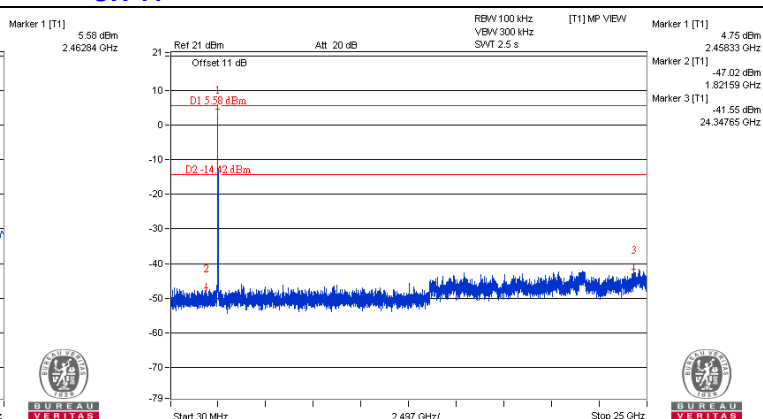
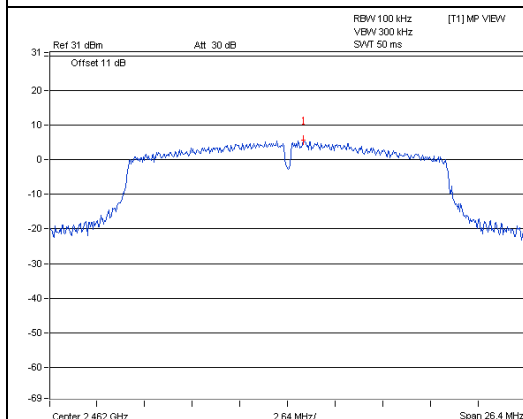
CH 1



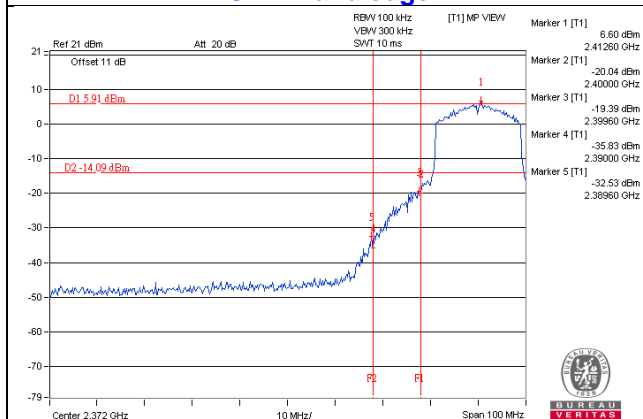
CH 6



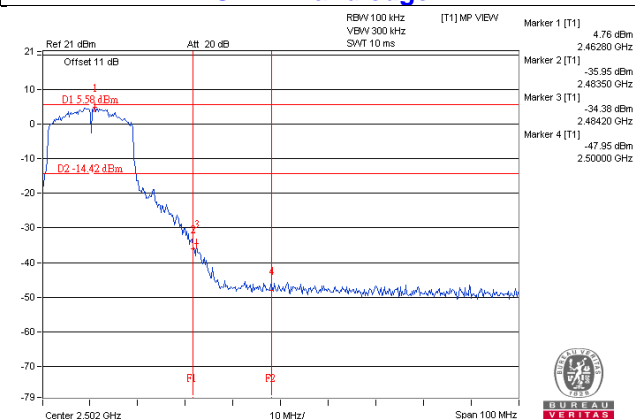
CH 11



CH 1 Band edge



CH 11 Band edge



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.

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