

FCC Test Report

Report No.: RF150701E05

FCC ID: XHHBNRV510-A

Test Model: BNRV510

Received Date: July 01, 2015

Test Date: July 06 to Aug. 04, 2015

Issued Date: Aug. 07, 2015

Applicant: Barnes&Noble.com

Address: 76 Ninth Avenue 9th Floor, New York City, NY 10011

Manufacturer: NETRONIX, INC.

Address: No. 945, Boai St., Jubei City, Hsin-Chu, 302, Taiwan, R.O.C.

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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A D T

Release Control Record

Issue No.	Description	Date Issued
RF150701E05	Original release.	Aug. 07, 2015



A D T

1 Certificate of Conformity

Product: EBOOK READER

Brand: Nook

Test Model: BNRV510

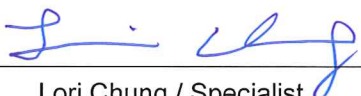
Sample Status: ENGINEERING SAMPLE

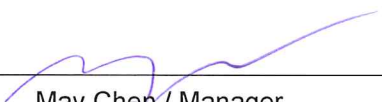
Applicant: Barnes&Noble.com

Test Date: July 06 to Aug. 04, 2015

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:** Aug. 07, 2015
Lori Chung / Specialist

Approved by : , **Date:** Aug. 07, 2015
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 -8.16dB at 0.37125MHz.
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 2390.00MHz.
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	No antenna connector is used.

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	2.86 dB
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

Product	EBOOK READER
Brand	Nook
Test Model	BNRV510
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	3.7-4.2Vdc from battery or 5Vdc from USB interface
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11g: up to 54Mbps 802.11n: up to 72.2Mbps
Operating Frequency	2.412 ~ 2.462GHz
Number of Channel	11
Output Power	802.11b: 91.622mW 802.11g: 186.638mW 802.11n (HT20): 196.789mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Rechargeable battery x 1
Data Cable Supplied	USB cable (Shielded, 1.1m) x 1

Note:

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

Brand	Model	Ant. Gain (dBi)	Frequency range (GHz to GHz)	Antenna Type
Walsin Technology Corporation	RFPCA351400NNAB001	1.26	2.4~2.5	PCB

2. The EUT must be supplied with a rechargeable battery as following table:

Brand	Model No.	Spec.
TCL	PR-285083	DC Output: 3.7~4.2V, 1500mAh

3. The EUT incorporates a SISO function.

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

4. The device WiFi function could be enabled when the device is connected to the host equipment through one USB cable.

5. The EUT was pre-tested under following test modes :

Pre-test Mode	Power
Mode A	Power from Battery (DC 3.7V)
Mode B	Power from USB interface (DC 5V)

From the above modes, the worst radiated emission was found in **Mode B**. Therefore only the test data of the modes were recorded in this report.

6. 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

NOTE: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane** (for below 1GHz) and **Y-plane** (for above 1GHz).

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	24deg. C, 64%RH	120Vac, 60Hz	Robert Cheng
RE $<$ 1G	28deg. C, 66%RH	120Vac, 60Hz	Weiwei Lo
PLC	25deg. C, 65%RH	120Vac, 60Hz	Jyunchun Lin
APCM	25deg. C, 60%RH	120Vac, 60Hz	Anderson Chen

3.3 Duty Cycle of Test Signal

If duty cycle of test signal is $\geq 98\%$, duty factor is not required.

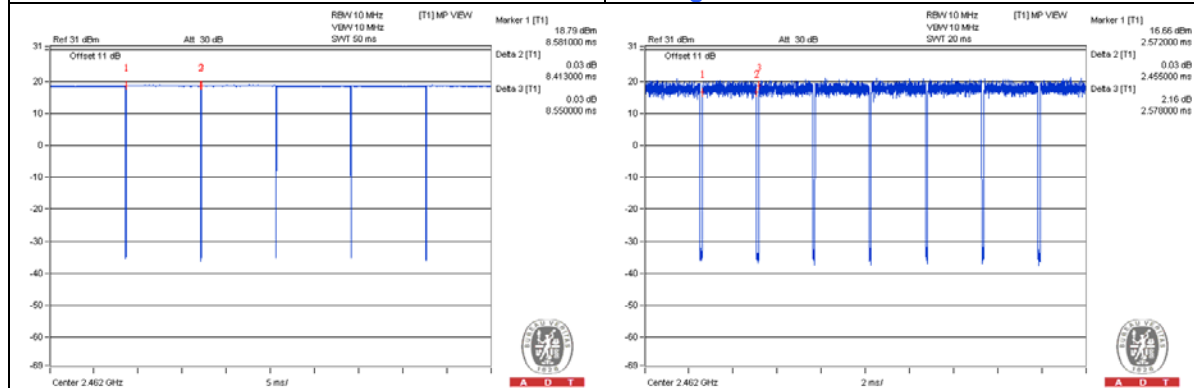
If duty cycle of test signal is $< 98\%$, duty factor shall be considered.

802.11b: Duty cycle = $8.413 \text{ ms} / 8.55 \text{ ms} = 0.984$

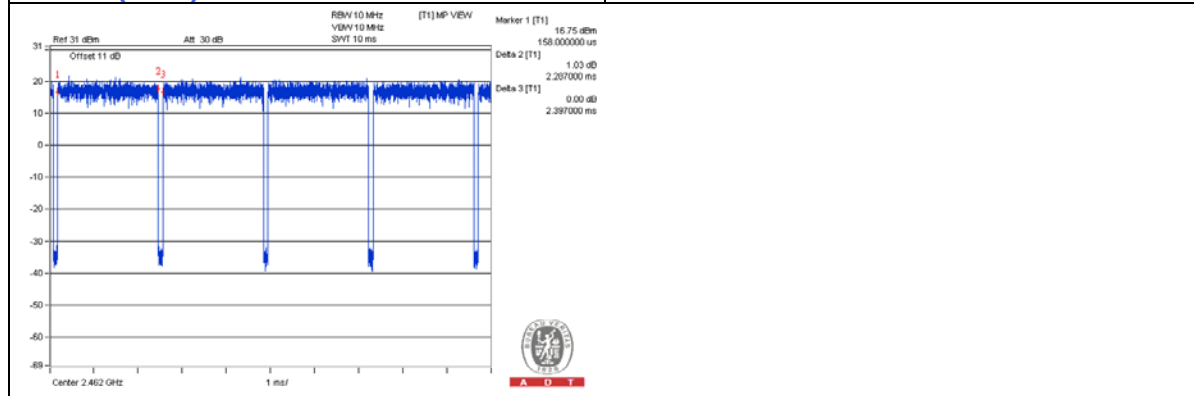
802.11g: Duty cycle = $2.455 \text{ ms} / 2.578 \text{ ms} = 0.952$, Duty factor = $10 * \log(1/0.952) = 0.2$

802.11n (HT20): Duty cycle = $2.287 \text{ ms} / 2.397 \text{ ms} = 0.954$, Duty factor = $10 * \log(1/0.954) = 0.2$

802.11b 802.11g



802.11n (HT20)



3.4 Description of Support Units

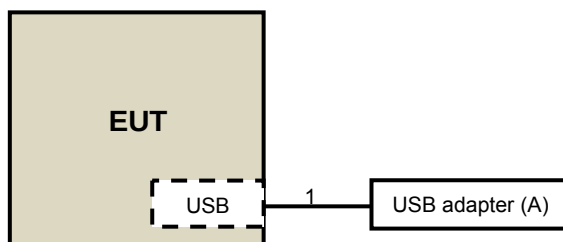
No.	Product	Brand	Model No.	Serial No.	FCC ID	Remark
A	USB adapter (For Conducted emission test)	ASUS	ADB76322	NA	NA	Provided by Lab
	USB adapter (For other test items)	Samsung	ETA061JBE	NA	NA	Provided by Lab

NOTE:

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

No.	Cable	Qty.	Length (m)	Shielded (Yes/ No)	Cores (Number)	Remark
1	USB	1	1.1	Yes	0	Supplied by Client

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)

558074 D01 DTS Meas Guidance v03r02

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

For above 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY50010156	Aug. 11, 2014	Aug. 10, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-04	Nov. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Feb. 09, 2015	Feb. 08, 2016
RF Cable	8D-FB	CHHCAB-001-1 CHHCAB-001-2	Oct. 05, 2014	Oct. 04, 2015
	RF-141	CHHCAB-004	Oct. 05, 2014	Oct. 04, 2015
Horn_Antenna AISI	AIH.8018	0000220091110	Feb. 06, 2015	Feb. 05, 2016
Pre-Amplifier Agilent	8449B	3008A01923	Oct. 28, 2014	Oct. 27, 2015
RF Cable	NA	131206 131213 131215 SNMY23685/4	Jan. 16, 2015	Jan. 15, 2016
Spectrum Analyzer R&S	FSV40	100964	Jun. 26, 2015	Jun 25, 2016
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Dec. 12, 2014	Dec. 11, 2015
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Feb. 05, 2015	Feb. 04, 2016
RF Cable	NA	329751/4 RF104-204	Dec. 11, 2014	Dec. 10, 2015
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA
Power Meter Anritsu	ML2495A	1014008	Apr. 28, 2015	Apr. 27, 2016
Power Sensor Anritsu	MA2411B	0917122	Apr. 28, 2015	Apr. 27, 2016
SPECTRUM ANALYZER R&S	FSP 40	100060	May 08, 2015	May 07, 2016

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 06, 2015

For below 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210202	Dec. 12, 2014	Dec. 11, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Feb. 06, 2015	Feb. 05, 2016
RF Cable	8D-FB	CHGCAB-001 -1 CHGCAB-001 -2	Oct. 04, 2014	Oct. 03, 2015
	RF-141	CHGCAB-004	Oct. 04, 2014	Oct. 03, 2015
Software	ADT_Radiated _V8.7.07	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. G.
3. The FCC Site Registration No. is 966073.
4. The CANADA Site Registration No. is IC 7450H-2.
5. Tested Date: Aug. 04, 2015

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:

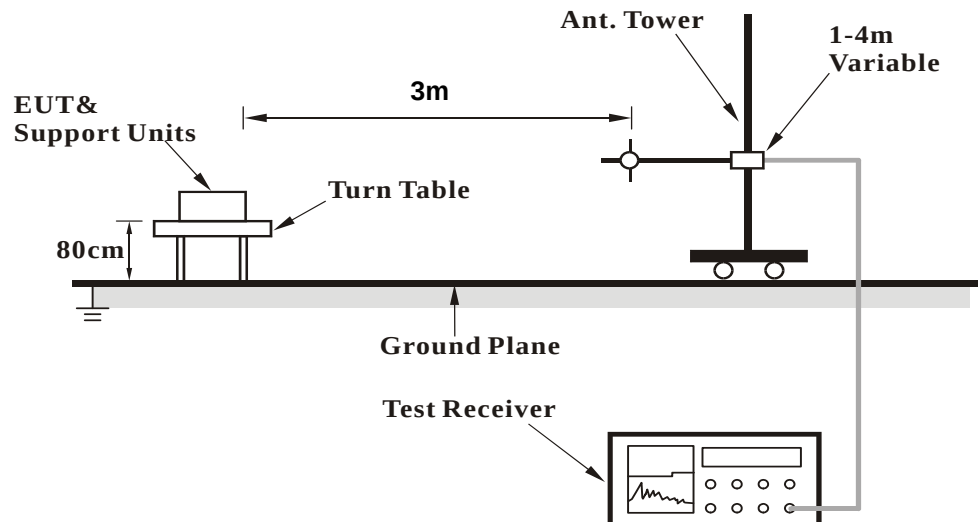
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (Duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor ($10 \log(1/\text{duty cycle})$).
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

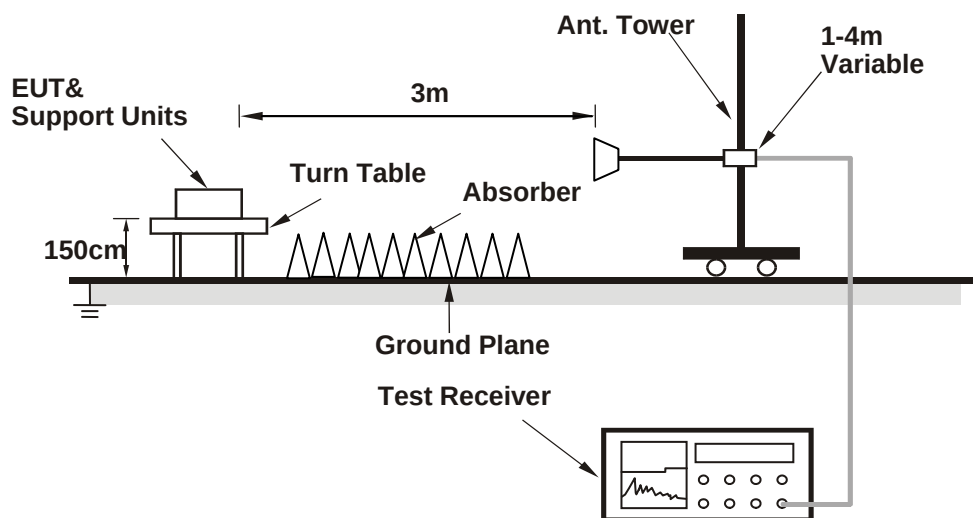
No deviation.

4.1.5 Test Setup

<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

1. Placed the EUT on testing table.
2. Controlling software (Hyper Terminal paste command) has been activated to set the EUT under transmission/receiving condition continuously.

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	51.0 PK	74.0	-23.0	1.49 H	188	54.19	-3.19
2	2390.00	42.6 AV	54.0	-11.4	1.49 H	188	45.79	-3.19
3	*2412.00	102.1 PK			1.49 H	188	105.23	-3.13
4	*2412.00	99.2 AV			1.49 H	188	102.33	-3.13
5	4824.00	57.1 PK	74.0	-16.9	2.11 H	360	51.13	5.97
6	4824.00	53.7 AV	54.0	-0.3	2.11 H	360	47.73	5.97
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	51.1 PK	74.0	-22.9	2.20 V	88	54.29	-3.19
2	2390.00	41.5 AV	54.0	-12.5	2.20 V	88	44.69	-3.19
3	*2412.00	104.3 PK			2.20 V	88	107.43	-3.13
4	*2412.00	91.4 AV			2.20 V	88	94.53	-3.13
5	4824.00	54.7 PK	74.0	-19.3	1.25 V	341	48.73	5.97
6	4824.00	52.1 AV	54.0	-1.9	1.25 V	341	46.13	5.97

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	*2437.00	99.7 PK			1.48 H	186	102.74	-3.04
2	*2437.00	96.9 AV			1.48 H	186	99.94	-3.04
3	4874.00	56.7 PK	74.0	-17.3	2.30 H	0	50.65	6.05
4	4874.00	53.8 AV	54.0	-0.2	2.30 H	0	47.75	6.05
5	7311.00	51.2 PK	74.0	-22.8	1.19 H	166	40.26	10.94
6	7311.00	38.6 AV	54.0	-15.4	1.19 H	166	27.66	10.94
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	*2437.00	101.5 PK			2.22 V	93	104.54	-3.04
2	*2437.00	88.6 AV			2.22 V	93	91.64	-3.04
3	4874.00	54.4 PK	74.0	-19.6	1.24 V	325	48.35	6.05
4	4874.00	52.1 AV	54.0	-1.9	1.24 V	325	46.05	6.05
5	7311.00	52.2 PK	74.0	-21.8	1.00 V	198	41.26	10.94
6	7311.00	38.7 AV	54.0	-15.3	1.00 V	198	27.76	10.94

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) – 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	97.4 PK			1.77 H	184	100.34	-2.94
2	*2462.00	94.3 AV			1.77 H	184	97.24	-2.94
3	2483.50	50.4 PK	74.0	-23.6	1.77 H	184	53.27	-2.87
4	2483.50	42.1 AV	54.0	-11.9	1.77 H	184	44.97	-2.87
5	4924.00	56.4 PK	74.0	-17.6	2.34 H	13	50.33	6.07
6	4924.00	53.5 AV	54.0	-0.5	2.34 H	13	47.43	6.07
7	7386.00	51.4 PK	74.0	-22.6	1.25 H	178	39.98	11.42
8	7386.00	38.6 AV	54.0	-15.4	1.25 H	178	27.18	11.42
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	98.2 PK			2.19 V	88	101.14	-2.94
2	*2462.00	85.9 AV			2.19 V	88	88.84	-2.94
3	2483.50	50.1 PK	74.0	-23.9	2.19 V	88	52.97	-2.87
4	2483.50	40.3 AV	54.0	-13.7	2.19 V	88	43.17	-2.87
5	4924.00	55.2 PK	74.0	-18.8	1.29 V	333	49.13	6.07
6	4924.00	52.7 AV	54.0	-1.3	1.29 V	333	46.63	6.07
7	7386.00	52.2 PK	74.0	-21.8	1.00 V	215	40.78	11.42
8	7386.00	38.7 AV	54.0	-15.3	1.00 V	215	27.28	11.42

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	73.9 PK	74.0	-0.1	1.56 H	177	77.09	-3.19
2	2390.00	48.9 AV	54.0	-5.1	1.56 H	177	52.09	-3.19
3	*2412.00	101.9 PK			1.56 H	177	105.03	-3.13
4	*2412.00	91.0 AV			1.56 H	177	94.13	-3.13
5	4824.00	49.3 PK	74.0	-24.7	1.50 H	130	43.33	5.97
6	4824.00	44.6 AV	54.0	-9.4	1.50 H	130	38.63	5.97
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	66.2 PK	74.0	-7.8	2.23 V	60	69.39	-3.19
2	2390.00	48.2 AV	54.0	-5.8	2.23 V	60	51.39	-3.19
3	*2412.00	93.7 PK			2.23 V	60	96.83	-3.13
4	*2412.00	83.0 AV			2.23 V	60	86.13	-3.13
5	4824.00	49.2 PK	74.0	-24.8	1.46 V	200	43.23	5.97
6	4824.00	44.6 AV	54.0	-9.4	1.46 V	200	38.63	5.97

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	61.1 PK	74.0	-12.9	1.56 H	177	64.29	-3.19
2	2390.00	46.1 AV	54.0	-7.9	1.56 H	177	49.29	-3.19
3	*2437.00	105.1 PK			1.56 H	177	108.14	-3.04
4	*2437.00	93.5 AV			1.56 H	177	96.54	-3.04
5	2483.50	60.1 PK	74.0	-13.9	1.56 H	177	62.97	-2.87
6	2483.50	42.6 AV	54.0	-11.4	1.56 H	177	45.47	-2.87
7	4874.00	49.2 PK	74.0	-24.8	1.52 H	127	43.15	6.05
8	4874.00	44.9 AV	54.0	-9.1	1.52 H	127	38.85	6.05
9	7311.00	51.1 PK	74.0	-22.9	1.55 H	146	40.16	10.94
10	7311.00	36.6 AV	54.0	-17.4	1.55 H	146	25.66	10.94

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	55.6 PK	74.0	-18.4	2.25 V	110	58.79	-3.19
2	2390.00	43.1 AV	54.0	-10.9	2.25 V	110	46.29	-3.19
3	*2437.00	97.6 PK			2.25 V	110	100.64	-3.04
4	*2437.00	85.4 AV			2.25 V	110	88.44	-3.04
5	2483.50	57.9 PK	74.0	-16.1	2.25 V	110	60.77	-2.87
6	2483.50	43.7 AV	54.0	-10.3	2.25 V	110	46.57	-2.87
7	4874.00	49.6 PK	74.0	-24.4	1.49 V	187	43.55	6.05
8	4874.00	45.0 AV	54.0	-9.0	1.49 V	187	38.95	6.05
9	7311.00	53.2 PK	74.0	-20.8	1.46 V	107	42.26	10.94
10	7311.00	39.7 AV	54.0	-14.3	1.46 V	107	28.76	10.94

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) – 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	98.4 PK			1.49 H	202	101.34	-2.94
2	*2462.00	88.2 AV			1.49 H	202	91.14	-2.94
3	2483.50	71.6 PK	74.0	-2.4	1.49 H	182	74.47	-2.87
4	2483.50	53.4 AV	54.0	-0.6	1.49 H	182	56.27	-2.87
5	4924.00	49.5 PK	74.0	-24.5	1.45 H	136	43.43	6.07
6	4924.00	44.7 AV	54.0	-9.3	1.45 H	136	38.63	6.07
7	7386.00	50.9 PK	74.0	-23.1	1.54 H	155	39.48	11.42
8	7386.00	36.5 AV	54.0	-17.5	1.54 H	155	25.08	11.42
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	91.6 PK			2.19 V	92	94.54	-2.94
2	*2462.00	80.6 AV			2.19 V	92	83.54	-2.94
3	2483.50	65.7 PK	74.0	-8.3	2.19 V	92	68.57	-2.87
4	2483.50	47.8 AV	54.0	-6.2	2.19 V	92	50.67	-2.87
5	4924.00	49.0 PK	74.0	-25.0	1.51 V	188	42.93	6.07
6	4924.00	44.6 AV	54.0	-9.4	1.51 V	188	38.53	6.07
7	7386.00	54.5 PK	74.0	-19.5	1.45 V	103	43.08	11.42
8	7386.00	40.4 AV	54.0	-13.6	1.45 V	103	28.98	11.42

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	73.4 PK	74.0	-0.6	1.63 H	171	76.59	-3.19
2	2390.00	47.3 AV	54.0	-6.7	1.63 H	171	50.49	-3.19
3	*2412.00	101.8 PK			1.63 H	171	104.93	-3.13
4	*2412.00	90.2 AV			1.63 H	171	93.33	-3.13
5	4824.00	48.2 PK	74.0	-25.8	1.49 H	146	42.23	5.97
6	4824.00	44.1 AV	54.0	-9.9	1.49 H	146	38.13	5.97
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	73.4 PK	74.0	-0.6	1.63 V	171	76.59	-3.19
2	2390.00	47.3 AV	54.0	-6.7	1.63 V	171	50.49	-3.19
3	*2412.00	101.8 PK			1.63 V	171	104.93	-3.13
4	*2412.00	90.2 AV			1.63 V	171	93.33	-3.13
5	4824.00	48.2 PK	74.0	-25.8	1.49 V	146	42.23	5.97
6	4824.00	44.1 AV	54.0	-9.9	1.49 V	146	38.13	5.97

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	61.3 PK	74.0	-12.7	1.53 H	179	64.49	-3.19
2	2390.00	46.3 AV	54.0	-7.7	1.53 H	179	49.49	-3.19
3	*2437.00	103.9 PK			1.46 H	163	106.94	-3.04
4	*2437.00	92.8 AV			1.46 H	163	95.84	-3.04
5	2483.50	59.9 PK	74.0	-14.1	1.61 H	175	62.77	-2.87
6	2483.50	42.4 AV	54.0	-11.6	1.61 H	175	45.27	-2.87
7	4874.00	49.1 PK	74.0	-24.9	1.49 H	136	43.05	6.05
8	4874.00	44.4 AV	54.0	-9.6	1.49 H	136	38.35	6.05
9	7311.00	51.3 PK	74.0	-22.7	1.54 H	160	40.36	10.94
10	7311.00	37.2 AV	54.0	-16.8	1.54 H	160	26.26	10.94

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	56.2 PK	74.0	-17.8	2.25 V	87	59.39	-3.19
2	2390.00	43.6 AV	54.0	-10.4	2.25 V	87	46.79	-3.19
3	*2437.00	95.1 PK			2.25 V	87	98.14	-3.04
4	*2437.00	84.5 AV			2.25 V	87	87.54	-3.04
5	2483.50	58.5 PK	74.0	-15.5	2.25 V	87	61.37	-2.87
6	2483.50	44.6 AV	54.0	-9.4	2.25 V	87	47.47	-2.87
7	4874.00	48.7 PK	74.0	-25.3	1.43 V	189	42.65	6.05
8	4874.00	44.4 AV	54.0	-9.6	1.43 V	189	38.35	6.05
9	7311.00	53.9 PK	74.0	-20.1	1.55 V	117	42.96	10.94
10	7311.00	40.2 AV	54.0	-13.8	1.55 V	117	29.26	10.94

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) – 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	99.0 PK			1.63 H	176	101.94	-2.94
2	*2462.00	87.8 AV			1.63 H	176	90.74	-2.94
3	2483.50	73.0 PK	74.0	-1.0	1.63 H	176	75.87	-2.87
4	2483.50	52.0 AV	54.0	-2.0	1.63 H	176	54.87	-2.87
5	4924.00	49.4 PK	74.0	-24.6	1.55 H	118	43.33	6.07
6	4924.00	44.6 AV	54.0	-9.4	1.55 H	118	38.53	6.07
7	7386.00	50.4 PK	74.0	-23.6	1.52 H	137	38.98	11.42
8	7386.00	36.6 AV	54.0	-17.4	1.52 H	137	25.18	11.42
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	91.2 PK			2.15 V	89	94.14	-2.94
2	*2462.00	80.1 AV			2.15 V	89	83.04	-2.94
3	2483.50	65.5 PK	74.0	-8.5	2.15 V	89	68.37	-2.87
4	2483.50	47.7 AV	54.0	-6.3	2.15 V	89	50.57	-2.87
5	4924.00	49.3 PK	74.0	-24.7	1.41 V	185	43.23	6.07
6	4924.00	44.7 AV	54.0	-9.3	1.41 V	185	38.63	6.07
7	7386.00	53.9 PK	74.0	-20.1	1.47 V	105	42.48	11.42
8	7386.00	40.1 AV	54.0	-13.9	1.47 V	105	28.68	11.42

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:

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CHANNEL	TX Channel 6	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	38.88	16.7 QP	40.0	-23.4	1.00 H	271	30.23	-13.58
2	75.93	14.1 QP	40.0	-25.9	2.00 H	63	30.72	-16.66
3	132.77	18.0 QP	43.5	-25.5	2.00 H	85	31.86	-13.87
4	145.38	19.0 QP	43.5	-24.5	2.00 H	283	32.09	-13.09
5	178.46	16.0 QP	43.5	-27.5	1.50 H	298	30.25	-14.28
6	286.37	16.3 QP	46.0	-29.7	1.50 H	253	28.74	-12.45
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	46.05	25.9 QP	40.0	-14.2	1.00 V	127	39.15	-13.30
2	72.92	22.8 QP	40.0	-17.2	1.00 V	266	38.91	-16.15
3	117.06	16.1 QP	43.5	-27.4	1.50 V	1	31.28	-15.20
4	145.38	20.5 QP	43.5	-23.0	1.50 V	0	33.57	-13.09
5	286.37	17.1 QP	46.0	-28.9	1.00 V	223	29.54	-12.45
6	594.01	25.0 QP	46.0	-21.0	1.50 V	158	29.48	-4.51

REMARKS:

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

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	100375	May 06, 2015	May 05, 2016
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK-8127	8127-522	Sep. 15, 2014	Sep. 14, 2015
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 11, 2015	June 10, 2016
RF Cable	5D-FB	COCCAB-001	Mar. 09, 2015	Mar. 08, 2016
50 ohms Terminator	N/A	EMC-03	Sep. 22, 2014	Sep. 21, 2015
50 ohms Terminator	N/A	EMC-02	Sep. 30, 2014	Sep. 29, 2015
Software BVADT	BVADT_Cond_ V7.3.7.3	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. C.
3. The VCCI Con C Registration No. is C-3611.
4. Tested Date: July 06, 2015

4.2.3 Test Procedures

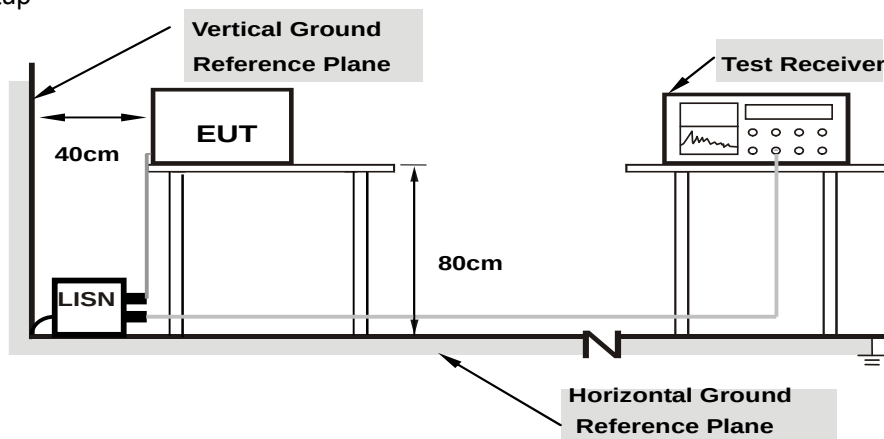
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance 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.

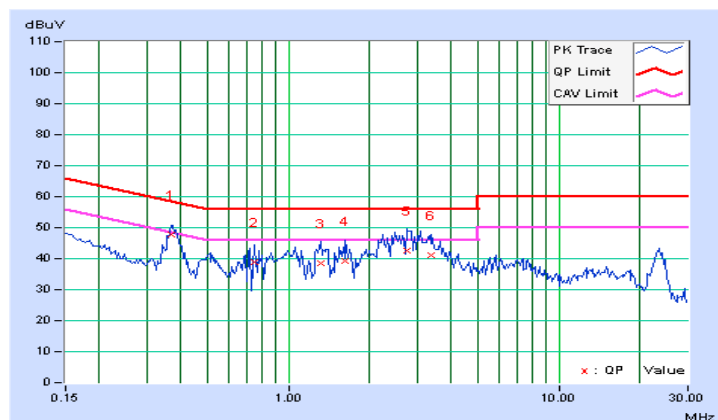
4.2.7 Test Results

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

No	Freq. [MHz]	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.37125	0.17	47.67	40.15	47.84	40.32	58.47	48.47	-10.64	-8.16
2	0.74687	0.19	38.86	26.32	39.05	26.51	56.00	46.00	-16.95	-19.49
3	1.31950	0.22	38.16	29.97	38.38	30.19	56.00	46.00	-17.62	-15.81
4	1.62891	0.24	39.17	31.83	39.41	32.07	56.00	46.00	-16.59	-13.93
5	2.74219	0.30	42.47	33.76	42.77	34.06	56.00	46.00	-13.23	-11.94
6	3.37891	0.34	40.80	33.01	41.14	33.35	56.00	46.00	-14.86	-12.65

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.

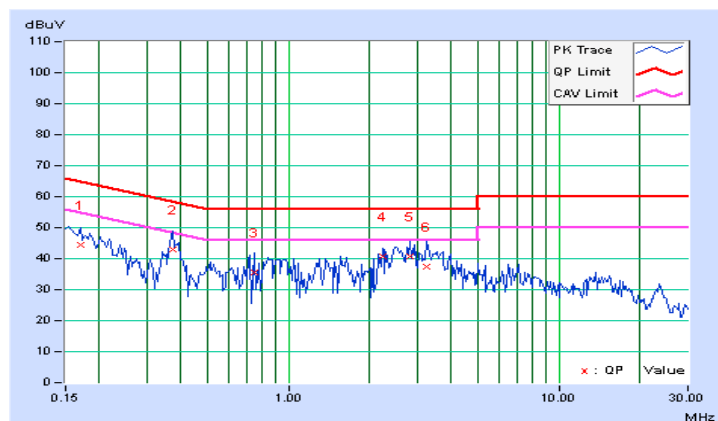


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16953	0.14	44.35	29.77	44.49	29.91	64.98	54.98	-20.49	-25.07
2	0.37266	0.18	42.90	32.98	43.08	33.16	58.44	48.44	-15.36	-15.28
3	0.74375	0.22	35.17	30.89	35.39	31.11	56.00	46.00	-20.61	-14.89
4	2.23319	0.31	40.57	35.56	40.88	35.87	56.00	46.00	-15.12	-10.13
5	2.81641	0.35	40.33	32.99	40.68	33.34	56.00	46.00	-15.32	-12.66
6	3.24219	0.37	36.90	27.52	37.27	27.89	56.00	46.00	-18.73	-18.11

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.

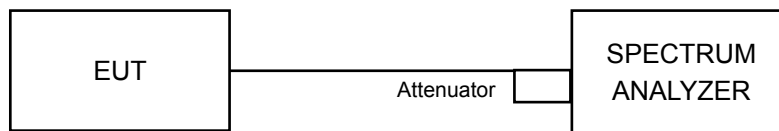


4.3 6dB Bandwidth Measurement

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

- Set resolution bandwidth (RBW) = 100kHz
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- 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	8.09	0.5	PASS
6	2437	8.10	0.5	PASS
11	2462	8.08	0.5	PASS

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	15.16	0.5	PASS
6	2437	15.17	0.5	PASS
11	2462	15.38	0.5	PASS

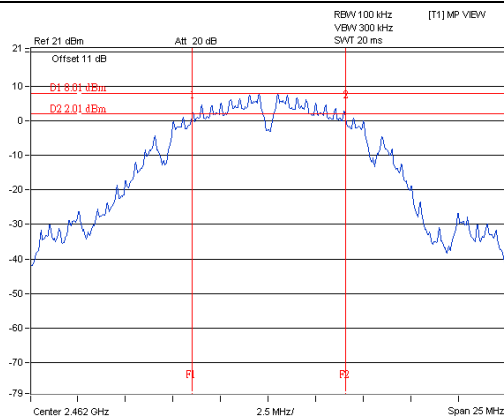
802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	15.14	0.5	PASS
6	2437	15.19	0.5	PASS
11	2462	16.02	0.5	PASS

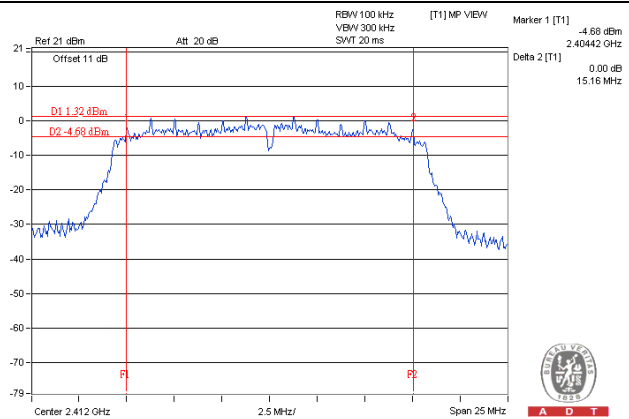
Spectrum Plot of Worst Value

802.11b: CH11

802.11g: CH1

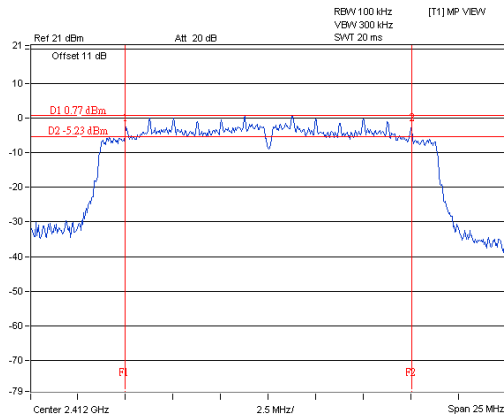


A D T



A D T

802.11n (HT20): CH1



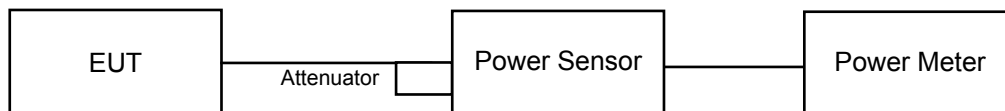
A D T

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 4.2.6.

4.4.7 Test Results

FOR PEAK POWER

802.11b

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	90.782	19.58	30	Pass
6	2437	91.622	19.62	30	Pass
11	2462	87.7	19.43	30	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	179.887	22.55	30	Pass
6	2437	186.638	22.71	30	Pass
11	2462	157.398	21.97	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	147.571	21.69	30	Pass
6	2437	196.789	22.94	30	Pass
11	2462	160.694	22.06	30	Pass

FOR AVERAGE POWER

802.11b

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	42.658	16.30
6	2437	43.451	16.38
11	2462	44.055	16.44

802.11g

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	19.364	12.87
6	2437	65.464	18.16
11	2462	36.559	15.63

802.11n (HT20)

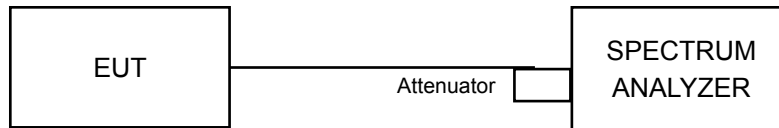
Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	15.560	11.92
6	2437	66.374	18.22
11	2462	37.325	15.72

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

- Set analyzer center frequency to DTS channel center frequency.
- Set the span to 1.5 times the DTS bandwidth.
- Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- Set the VBW $\geq 3 \times \text{RBW}$.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- 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 4.2.6

4.5.7 Test Results

802.11b

Channel	Freq. (MHz)	PSD (dBm)	Limit (dBm)	Pass /Fail
1	2412	-5.79	8	Pass
6	2437	-6.49	8	Pass
11	2462	-6.93	8	Pass

802.11g

Channel	Freq. (MHz)	PSD (dBm)	Limit (dBm)	Pass /Fail
1	2412	-13.07	8	Pass
6	2437	-8.08	8	Pass
11	2462	-10.76	8	Pass

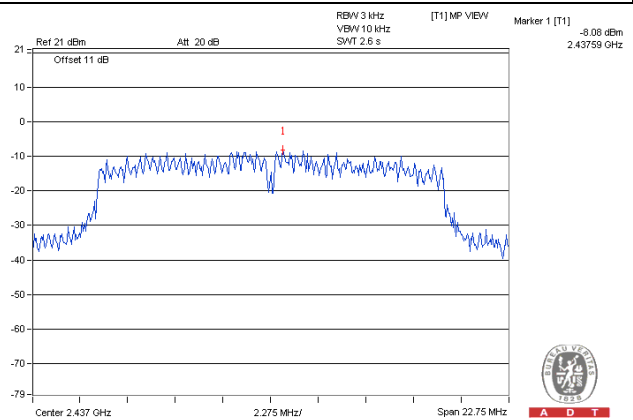
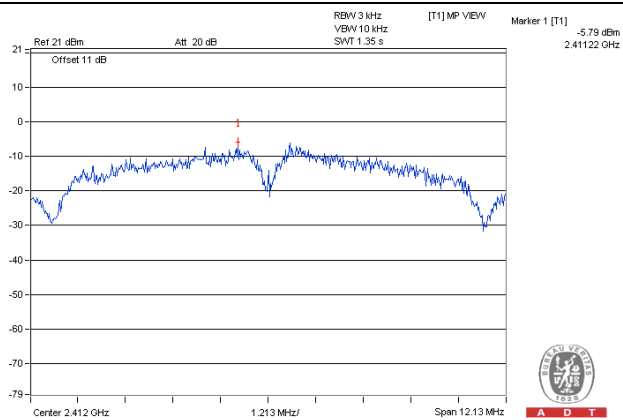
802.11n (HT20)

Channel	Freq. (MHz)	PSD (dBm)	Limit (dBm)	Pass /Fail
1	2412	-12.68	8	Pass
6	2437	-7.64	8	Pass
11	2462	-10.48	8	Pass

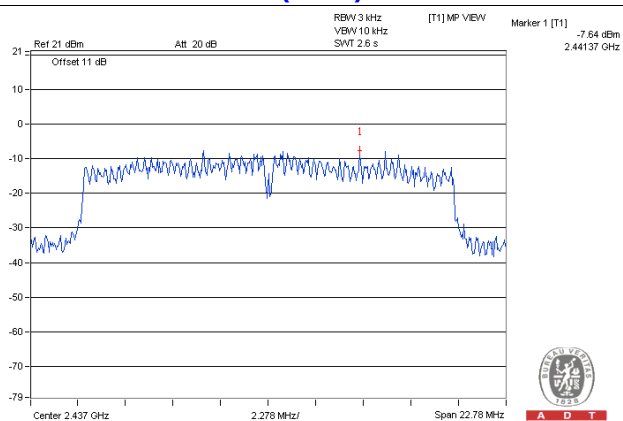
Spectrum Plot of Worst Value

802.11b: CH 1

802.11g: CH 6



802.11n (HT20): CH 6

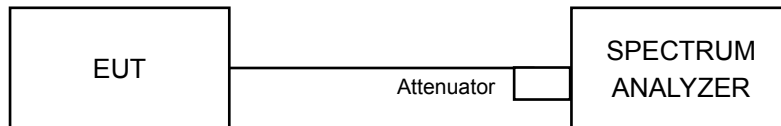


4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

Below 20dB 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

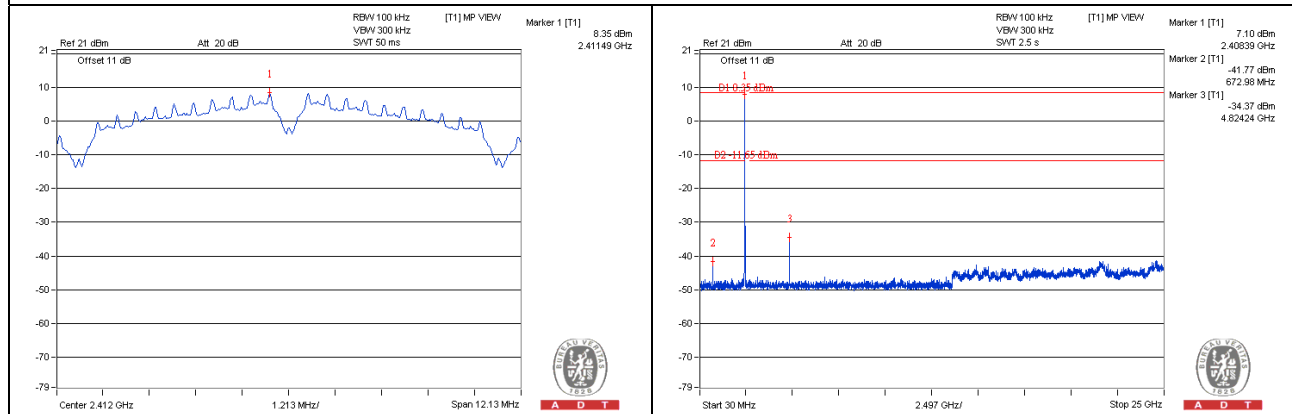
Same as Item 4.2.6

4.6.7 Test Results

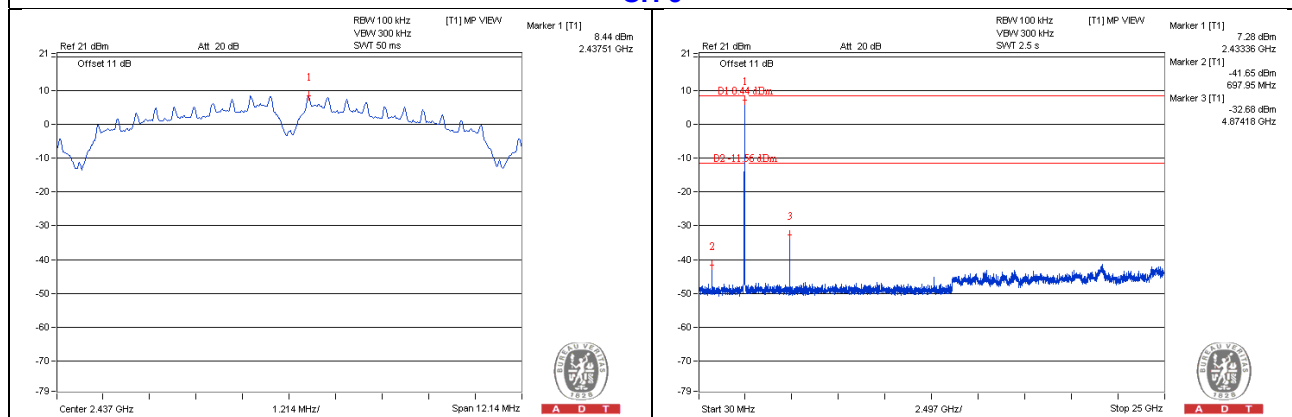
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

802.11b

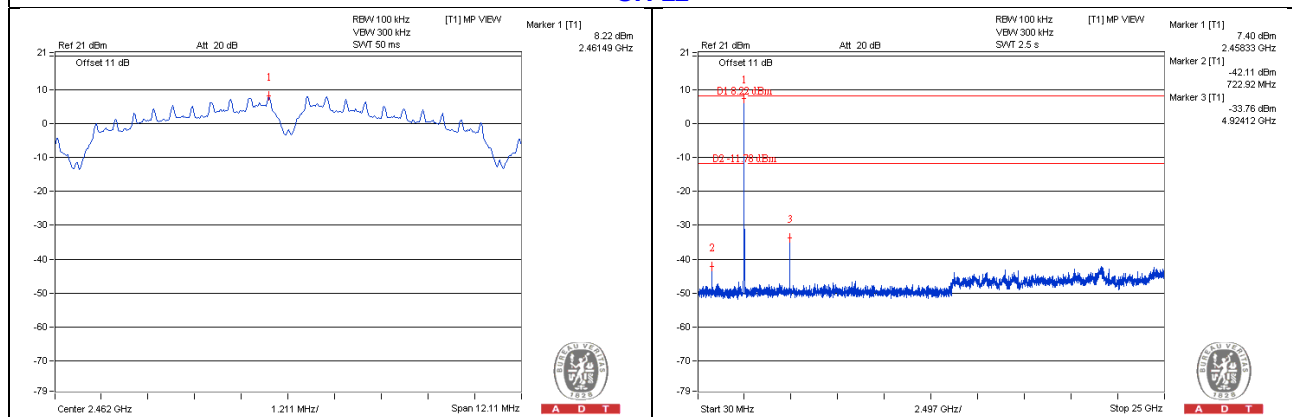
CH 1



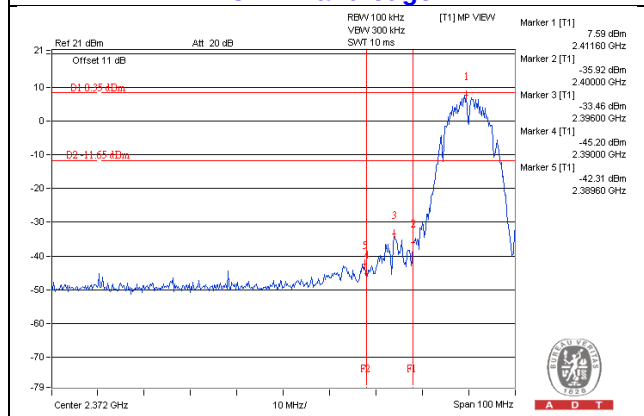
CH 6



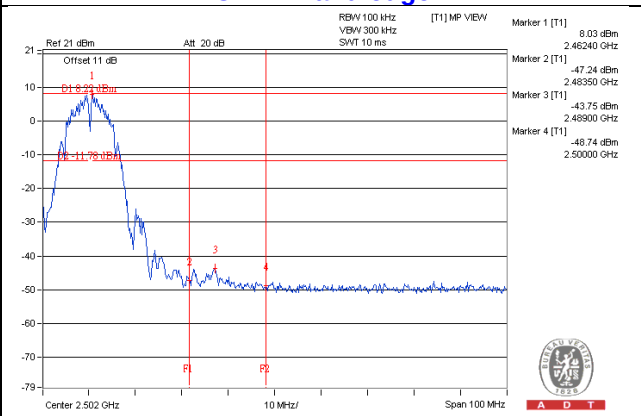
CH 11



CH 1 Band edge

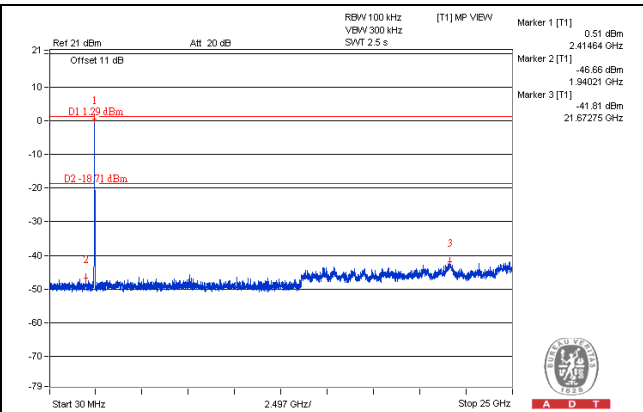
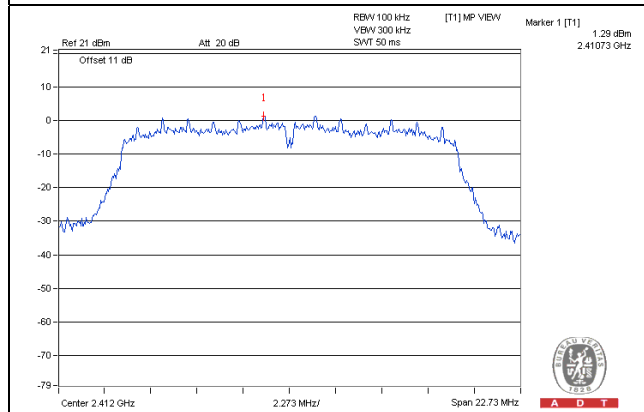


CH 11 Band edge

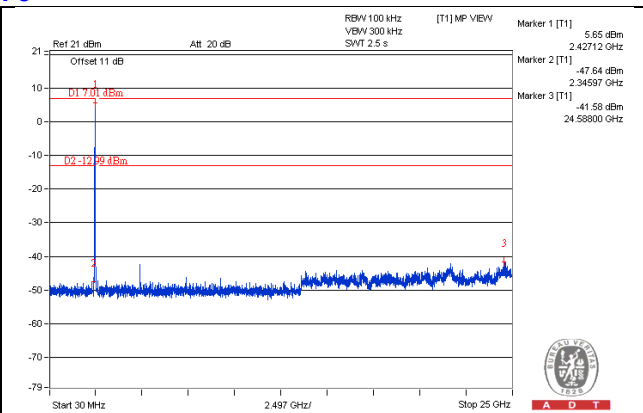
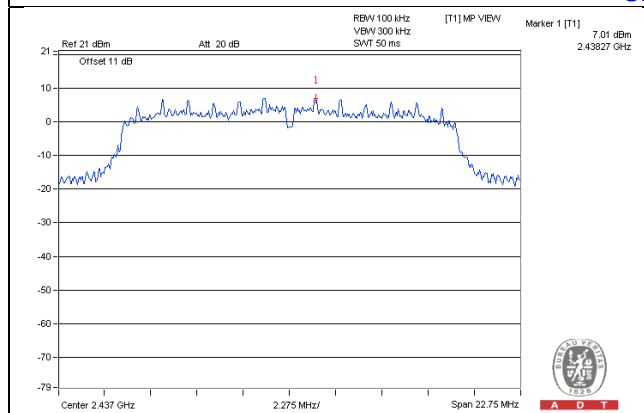


802.11g

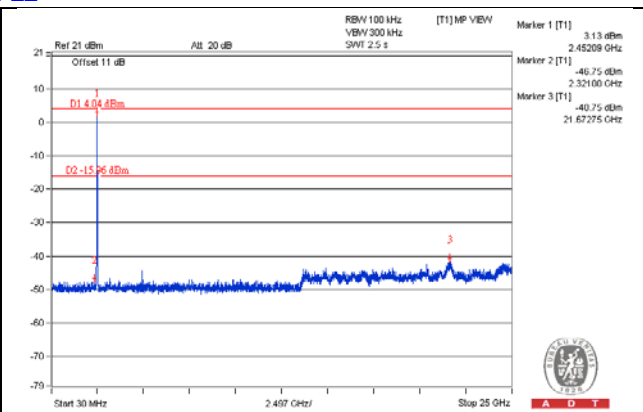
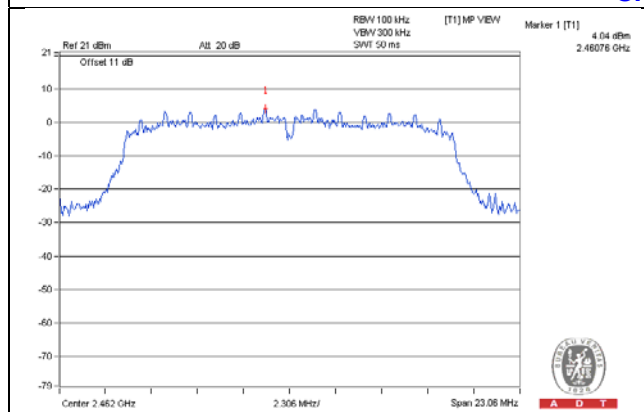
CH 1



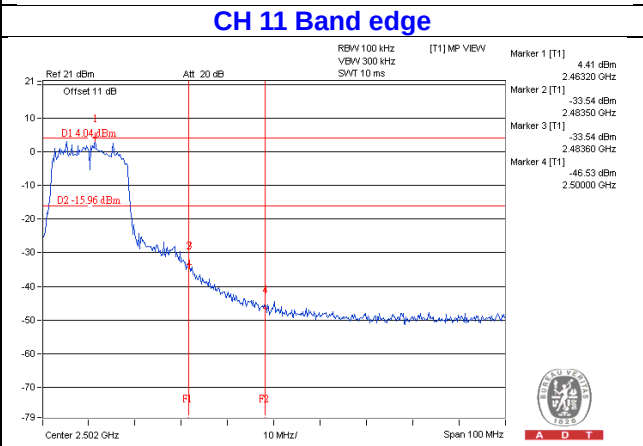
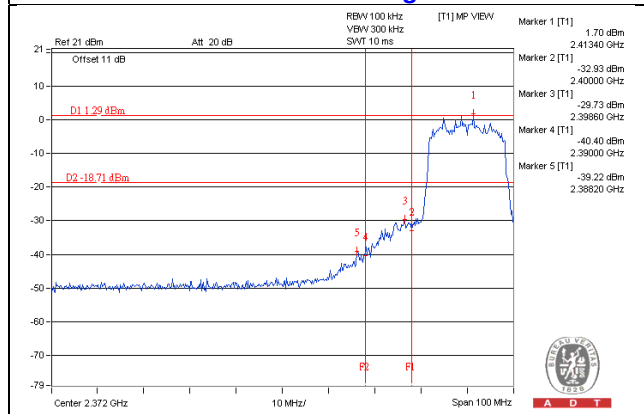
CH 6



CH 11

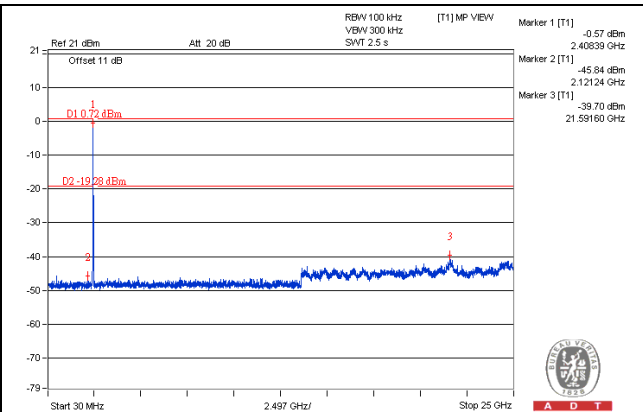
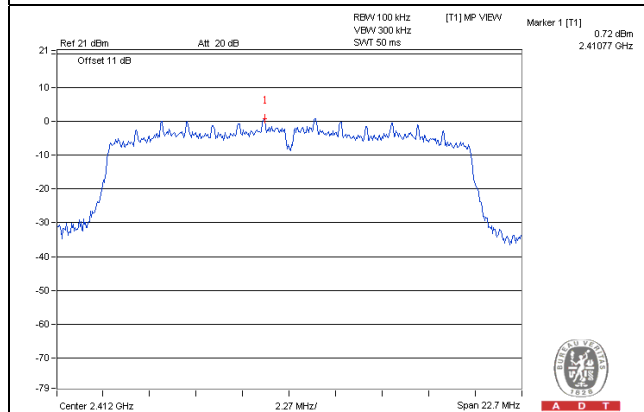


CH 1 Band edge

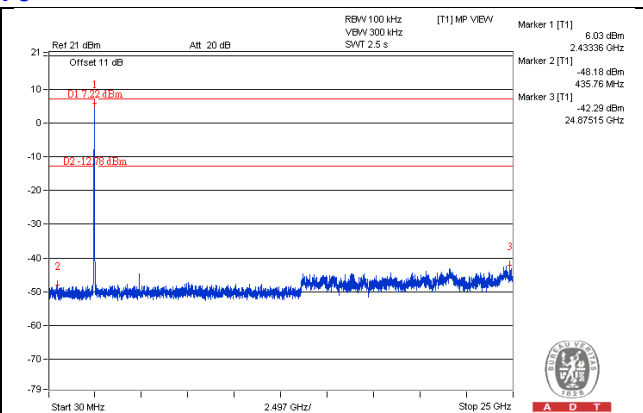
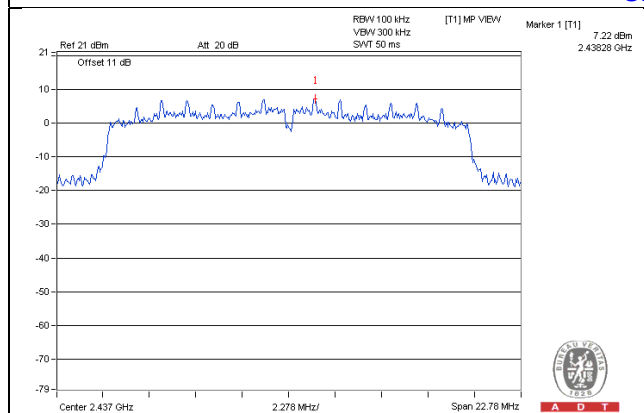


802.11n (HT20)

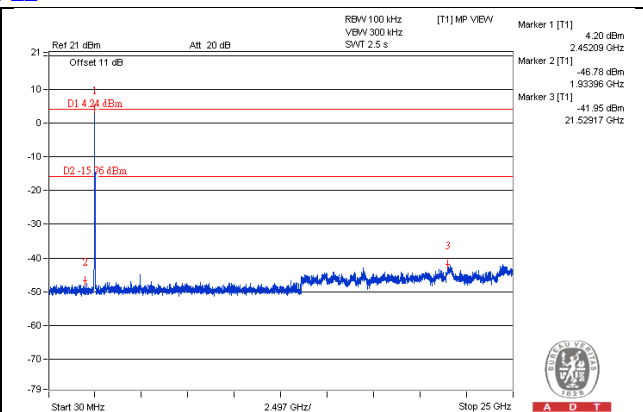
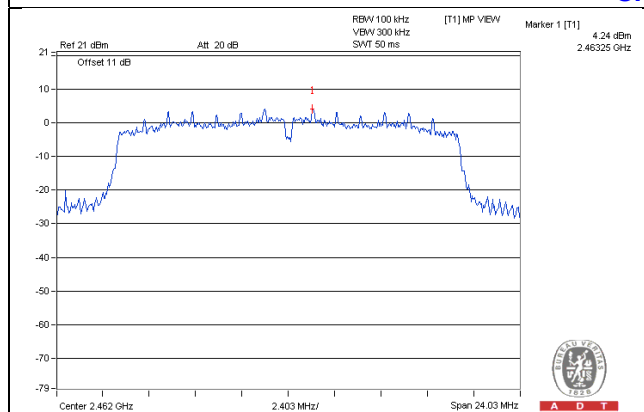
CH 1



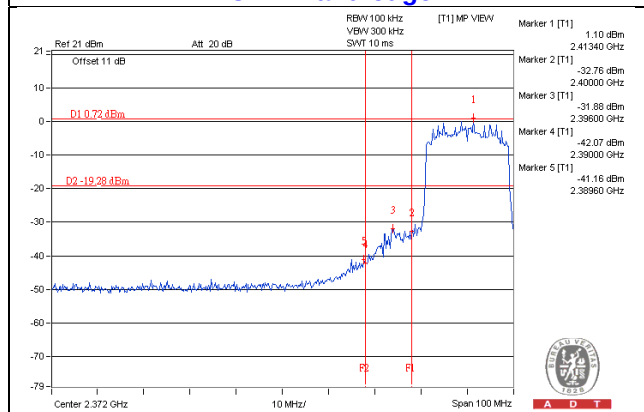
CH 6



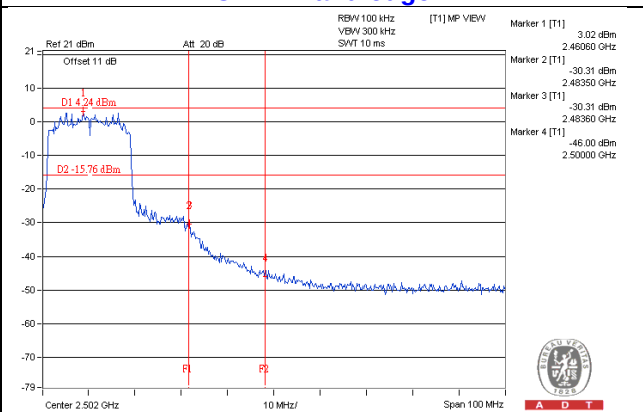
CH 11



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: 886-3-5935343

Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

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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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