

FCC Test Report

Report No.: RF141225E09

FCC ID: NOIKBN437

Test Model: N437

Received Date: Dec. 25, 2014

Test Date: Dec. 31, 2014 to Jan. 07, 2015

Issued Date: Mar. 02, 2015

Applicant: NETRONIX, INC.

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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
RF141225E09	Original release.	Mar. 02, 2015



A D T

1 Certificate of Conformity

Product: Electronic Display Device
Test Model: N437
Sample Status: ENGINEERING SAMPLE
Applicant: NETRONIX, INC.
Test Date: Dec. 31, 2014 to Jan. 07, 2015
Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)
ANSI C63.10:2009

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 : C. Kuan , **Date:** Mar. 02, 2015
Claire Kuan / Specialist

Approved by : May Chen , **Date:** Mar. 02, 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 -6.14dB at 0.58750MHz.
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	Antenna connector is Soldering terminal 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	Expended Uncertainty (k=2) ($\pm$)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.86 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1000MHz	5.37 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.65 dB
	6GHz ~ 18GHz	3.88 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	Electronic Display Device
Test Model	N437
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	2412 ~ 2462MHz
Number of Channel	11
Output Power	71.121mW
Antenna Type	Please see NOTE
Antenna Connector	Please see NOTE
Accessory Device	Battery x 1
Data Cable Supplied	USB cable x1

Note:

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

Brand	Model	Gain (dBi)	Antenna Type	Connector Type	Frequency range (GHz to GHz)
Walsin Technology Corporation	RFECA3216060AAT	2	Ceramic	Soldering terminal	2.4 ~ 2.4835

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

Battery 1		
Brand	Model No.	Spec.
TCL	PR-285083	3.7-4.2Vdc, 1500mAh
Battery 2		
Brand	Model No.	Spec.
PSE	H285083HG	3.7-4.2Vdc, 1500mAh

From the above batteries, the worst radiated test item was found in battery 1. Therefore only the test data of the mode was recorded in this report.

3. The EUT incorporates a SISO function.

Modulation Mode	Data Rate (MCS)	TX/RX FUNCTION
802.11b	1 ~ 11Mbps	1TX/1RX
802.11g	6 ~ 54Mbps	1TX/1RX
802.11n (HT20)	MCS 0~7	1TX/1RX

4. The EUT must be supplied with a USB cable, and it has three different models could be chosen:

Model Name	Spec.
AA782400	USB cable (Shielded, 1m)
AA825000	USB cable (Shielded, 1m)
SH-0152	USB cable (Shielded, 1m)

5. The device WiFi function will be disable automatically when the device is connected to the host unit through one USB cable.

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
	PLC	RE < 1G	RE ≥ 1G	APCM	OB	
-	√	√	√	√	√	-

Where **PLC**: Power Line Conducted Emission

RE<1G: Radiated Emission below 1GHz

RE≥1G: Radiated Emission above 1GHz

APCM: Antenna Port Conducted Measurement

OB: Conducted Out-Band Emission Measurement

NOTE: 1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.

2. "-" means no effect.

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	1.0
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
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)
802.11g	1 to 11	6	OFDM	BPSK	6.0

POWER LINE CONDUCTED EMISSION TEST:

MODE
Charging

CONDUCTED OUT-BAND EMISSION MEASUREMENT:

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 11	DSSS	DBPSK	1.0
802.11g	1 to 11	1, 11	OFDM	BPSK	6.0
802.11n (HT20)	1 to 11	1, 11	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	1.0
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
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	25deg. C, 60%RH	DC 3.7V	Tim Ho
RE<1G	25deg. C, 65%RH	DC 3.7V	Tim Ho
PLC	25deg. C, 68%RH	120Vac, 60Hz (SYSTEM)	Barry Lee
APCM	21deg. C, 60%RH	DC 3.7V	Andy Ho
OB	21deg. C, 60%RH	DC 3.7V	Andy Ho

3.3 Duty Cycle of Test Signal

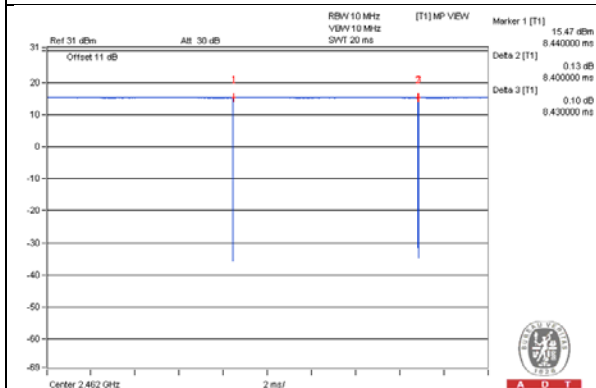
Duty cycle of test signal is > 98 %

802.11b: Duty cycle = $8.4/8.43 = 0.996$

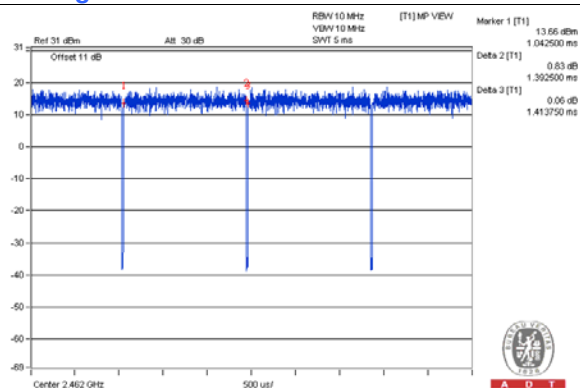
802.11g: Duty cycle = $1.3925/1.41375 = 0.985$

802.11n (HT20): Duty cycle = $1.3075/1.33 = 0.983$

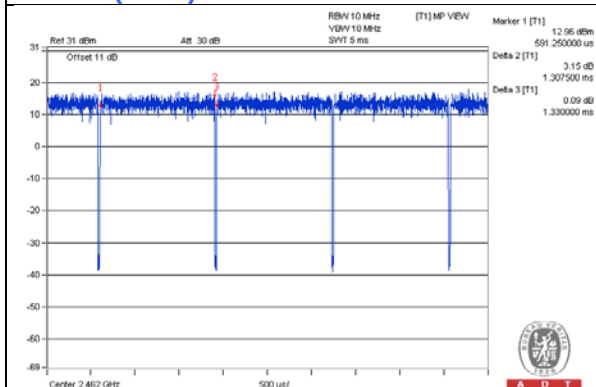
802.11b



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.

No.	Product	Brand	Model No.	Serial No.	FCC ID	Remark
A	DC USB adapter	tolino	US-T12B	NA	NA	Provided by Lab

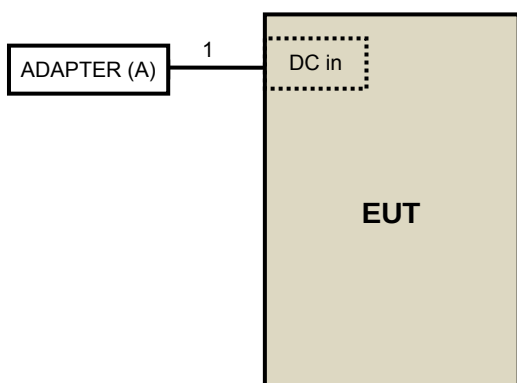
NOTE:

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

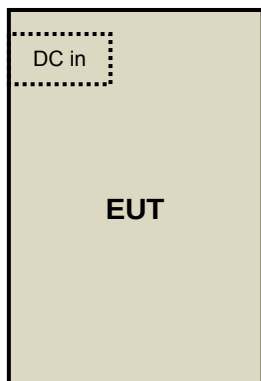
No.	Cable	Qty.	Length (m)	Shielded (Yes/ No)	Cores (Number)	Remark
1	USB	1	1	Yes	0	Supplied by Client

3.4.1 Configuration of System under Test

For conducted test:



For other test items:



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 C63.10-2009

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY51210105	July 21, 2014	July 20, 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. 26, 2014	Feb. 25, 2015
RF Cable	NA	CHGCAB_001	Oct. 04, 2014	Oct. 03, 2015
Horn_Antenna AISI	AIH.8018	0000320091110	Aug. 27, 2014	Aug. 26, 2015
Pre-Amplifier Agilent	8449B	3008A02578	June 24, 2014	June 23, 2015
RF Cable	NA	131205 131214 SNMY23684/4	Jan. 17, 2014	Jan. 16, 2015
Spectrum Analyzer R&S	FSV40	100964	July 05, 2014	July 04, 2015
Pre-Amplifier EMCI	EMC184045	980143	Jan. 17, 2014	Jan. 16, 2015
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Aug. 26, 2014	Aug. 25, 2015
RF Cable	NA	RF104-121 RF104-204	Dec. 11, 2014	Dec. 10, 2015
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 horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
5. The VCCI Site Registration No. is G-137.
6. The CANADA Site Registration No. is IC 7450H-2.
7. Tested Date: Dec. 31, 2014 to Jan. 07, 2015

4.1.3 Test Procedures

- a. The EUT was placed on the top of a rotating table 0.8 meters 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:

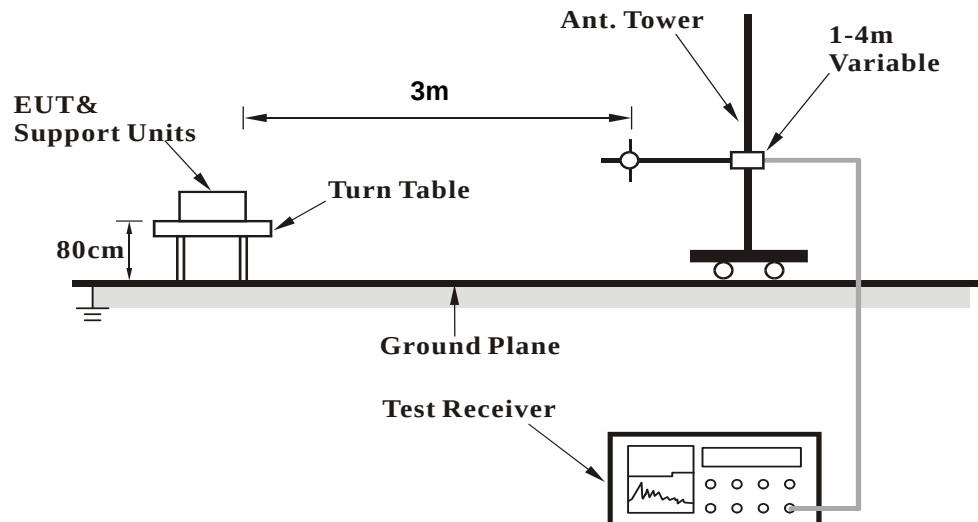
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

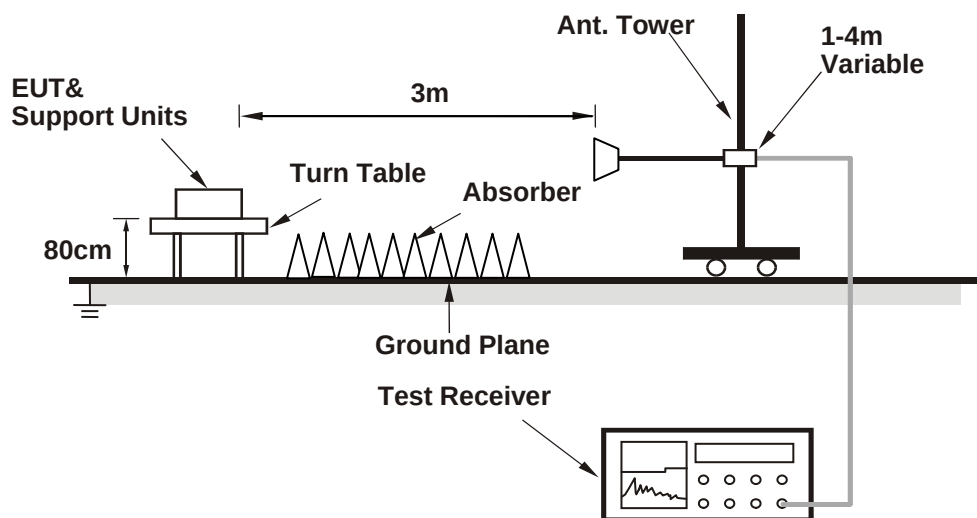
No deviation.

4.1.5 Test Set Up

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



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

4.1.6 EUT Operating Conditions

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

4.1.7 Test Results

BELOW 1GHz WORST-CASE DATA :

802.11g

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	35.43	23.4 QP	40.0	-16.6	2.00 H	79	37.41	-14.02
2	80.25	20.9 QP	40.0	-19.1	2.00 H	318	38.65	-17.76
3	137.91	24.5 QP	43.5	-19.0	2.00 H	87	37.87	-13.35
4	189.37	22.5 QP	43.5	-21.0	2.00 H	43	37.88	-15.37
5	203.58	22.5 QP	43.5	-21.0	1.00 H	66	38.52	-15.98
6	522.32	28.1 QP	46.0	-17.9	1.50 H	121	34.34	-6.22
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	35.29	37.7 QP	40.0	-2.3	1.00 V	141	51.73	-14.03
2	80.05	27.0 QP	40.0	-13.0	1.00 V	54	44.73	-17.71
3	264.01	19.7 QP	46.0	-26.3	1.00 V	54	33.12	-13.40
4	512.87	23.8 QP	46.0	-22.2	1.00 V	65	30.22	-6.42
5	659.97	24.1 QP	46.0	-21.9	2.00 V	109	27.40	-3.27
6	857.99	26.7 QP	46.0	-19.3	1.50 V	183	26.65	0.06

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

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	61.0 PK	74.0	-13.0	1.10 H	318	63.72	-2.72
2	2390.00	53.0 AV	54.0	-1.0	1.10 H	318	55.72	-2.72
3	*2412.00	107.7 PK			1.10 H	318	110.32	-2.62
4	*2412.00	104.1 AV			1.10 H	318	106.72	-2.62
5	4824.00	53.9 PK	74.0	-20.1	1.08 H	338	48.60	5.30
6	4824.00	49.6 AV	54.0	-4.4	1.08 H	338	44.30	5.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	54.4 PK	74.0	-19.6	1.00 V	134	57.12	-2.72
2	2390.00	42.0 AV	54.0	-12.0	1.00 V	134	44.72	-2.72
3	*2412.00	99.9 PK			1.00 V	134	102.52	-2.62
4	*2412.00	95.9 AV			1.00 V	134	98.52	-2.62
5	4824.00	55.6 PK	74.0	-18.4	1.75 V	171	50.30	5.30
6	4824.00	52.5 AV	54.0	-1.5	1.75 V	171	47.20	5.30

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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	2384.00	56.4 PK	74.0	-17.6	1.12 H	317	59.14	-2.74
2	2384.00	46.5 AV	54.0	-7.5	1.12 H	317	49.24	-2.74
3	*2437.00	107.6 PK			1.12 H	317	110.11	-2.51
4	*2437.00	104.0 AV			1.12 H	317	106.51	-2.51
5	2488.00	51.5 PK	74.0	-22.5	1.12 H	317	53.78	-2.28
6	2488.00	40.1 AV	54.0	-13.9	1.12 H	317	42.38	-2.28
7	4874.00	53.5 PK	74.0	-20.5	1.14 H	355	47.98	5.52
8	4874.00	49.6 AV	54.0	-4.4	1.14 H	355	44.08	5.52
9	7311.00	55.5 PK	74.0	-18.5	1.05 H	186	42.75	12.75
10	7311.00	43.1 AV	54.0	-10.9	1.05 H	186	30.35	12.75
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	2384.00	51.8 PK	74.0	-22.2	1.05 V	139	54.54	-2.74
2	2384.00	40.2 AV	54.0	-13.8	1.05 V	139	42.94	-2.74
3	*2437.00	99.5 PK			1.05 V	139	102.01	-2.51
4	*2437.00	95.9 AV			1.05 V	139	98.41	-2.51
5	2488.00	51.1 PK	74.0	-22.9	1.05 V	139	53.38	-2.28
6	2488.00	39.7 AV	54.0	-14.3	1.05 V	139	41.98	-2.28
7	4874.00	56.4 PK	74.0	-17.6	1.70 V	171	50.88	5.52
8	4874.00	53.2 AV	54.0	-0.8	1.70 V	171	47.68	5.52
9	7311.00	55.9 PK	74.0	-18.1	1.00 V	279	43.15	12.75
10	7311.00	42.9 AV	54.0	-11.1	1.00 V	279	30.15	12.75

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	106.2 PK			1.08 H	136	108.60	-2.40
2	*2462.00	102.8 AV			1.08 H	136	105.20	-2.40
3	2483.50	56.8 PK	74.0	-17.2	1.07 H	136	59.10	-2.30
4	2483.50	47.0 AV	54.0	-7.0	1.07 H	136	49.30	-2.30
5	4924.00	53.6 PK	74.0	-20.4	1.09 H	345	47.88	5.72
6	4924.00	49.4 AV	54.0	-4.6	1.09 H	345	43.68	5.72
7	7386.00	55.2 PK	74.0	-18.8	1.00 H	176	42.51	12.69
8	7386.00	42.8 AV	54.0	-11.2	1.00 H	176	30.11	12.69
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	99.4 PK			1.17 V	311	101.80	-2.40
2	*2462.00	95.6 AV			1.17 V	311	98.00	-2.40
3	2483.50	50.3 PK	74.0	-23.7	1.16 V	306	52.60	-2.30
4	2483.50	38.6 AV	54.0	-15.4	1.16 V	306	40.90	-2.30
5	4924.00	56.3 PK	74.0	-17.7	1.68 V	181	50.58	5.72
6	4924.00	53.6 AV	54.0	-0.4	1.68 V	181	47.88	5.72
7	7386.00	55.6 PK	74.0	-18.4	1.00 V	265	42.91	12.69
8	7386.00	42.7 AV	54.0	-11.3	1.00 V	265	30.01	12.69

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	1.11 H	318	76.62	-2.72
2	2390.00	49.1 AV	54.0	-4.9	1.11 H	318	51.82	-2.72
3	*2412.00	106.8 PK			1.11 H	318	109.42	-2.62
4	*2412.00	94.6 AV			1.11 H	318	97.22	-2.62
5	4824.00	57.1 PK	74.0	-16.9	1.04 H	347	51.80	5.30
6	4824.00	45.3 AV	54.0	-8.7	1.04 H	347	40.00	5.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	65.9 PK	74.0	-8.1	1.10 V	142	68.62	-2.72
2	2390.00	41.1 AV	54.0	-12.9	1.10 V	142	43.82	-2.72
3	*2412.00	98.4 PK			1.10 V	142	101.02	-2.62
4	*2412.00	86.1 AV			1.10 V	142	88.72	-2.62
5	4824.00	57.2 PK	74.0	-16.8	1.65 V	163	51.90	5.30
6	4824.00	45.3 AV	54.0	-8.7	1.65 V	163	40.00	5.30

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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	66.8 PK	74.0	-7.2	1.11 H	318	69.52	-2.72
2	2390.00	49.1 AV	54.0	-4.9	1.11 H	318	51.82	-2.72
3	*2437.00	114.0 PK			1.11 H	318	116.51	-2.51
4	*2437.00	103.0 AV			1.11 H	318	105.51	-2.51
5	2483.50	65.3 PK	74.0	-8.7	1.11 H	318	67.60	-2.30
6	2483.50	45.8 AV	54.0	-8.2	1.11 H	318	48.10	-2.30
7	4874.00	56.7 PK	74.0	-17.3	1.07 H	351	51.18	5.52
8	4874.00	45.1 AV	54.0	-8.9	1.07 H	351	39.58	5.52
9	7311.00	55.1 PK	74.0	-18.9	1.02 H	171	42.35	12.75
10	7311.00	42.5 AV	54.0	-11.5	1.02 H	171	29.75	12.75
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	59.3 PK	74.0	-14.7	1.05 V	136	62.02	-2.72
2	2390.00	41.3 AV	54.0	-12.7	1.05 V	136	44.02	-2.72
3	*2437.00	106.6 PK			1.05 V	136	109.11	-2.51
4	*2437.00	95.3 AV			1.05 V	136	97.81	-2.51
5	2483.50	51.0 PK	74.0	-23.0	1.05 V	136	53.30	-2.30
6	2483.50	39.6 AV	54.0	-14.4	1.05 V	136	41.90	-2.30
7	4874.00	57.1 PK	74.0	-16.9	1.69 V	178	51.58	5.52
8	4874.00	45.0 AV	54.0	-9.0	1.69 V	178	39.48	5.52
9	7311.00	55.5 PK	74.0	-18.5	1.04 V	281	42.75	12.75
10	7311.00	42.6 AV	54.0	-11.4	1.04 V	281	29.85	12.75

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	111.1 PK			1.10 H	318	113.50	-2.40
2	*2462.00	97.9 AV			1.10 H	318	100.30	-2.40
3	2483.50	73.1 PK	74.0	-0.9	1.08 H	316	75.40	-2.30
4	2483.50	51.3 AV	54.0	-2.7	1.08 H	316	53.60	-2.30
5	4924.00	57.0 PK	74.0	-17.0	1.05 H	353	51.28	5.72
6	4924.00	45.6 AV	54.0	-8.4	1.05 H	353	39.88	5.72
7	7386.00	54.9 PK	74.0	-19.1	1.07 H	177	42.21	12.69
8	7386.00	42.3 AV	54.0	-11.7	1.07 H	177	29.61	12.69
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	103.2 PK			1.06 V	141	105.60	-2.40
2	*2462.00	89.9 AV			1.06 V	141	92.30	-2.40
3	2483.50	65.7 PK	74.0	-8.3	1.06 V	141	68.00	-2.30
4	2483.50	43.7 AV	54.0	-10.3	1.06 V	141	46.00	-2.30
5	4924.00	57.0 PK	74.0	-17.0	1.74 V	175	51.28	5.72
6	4924.00	44.9 AV	54.0	-9.1	1.74 V	175	39.18	5.72
7	7386.00	55.7 PK	74.0	-18.3	1.04 V	296	43.01	12.69
8	7386.00	43.0 AV	54.0	-11.0	1.04 V	296	30.31	12.69

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.

802.11n (HT20)

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	73.5 PK	74.0	-0.5	1.12 H	318	76.22	-2.72
2	2390.00	52.0 AV	54.0	-2.0	1.12 H	318	54.72	-2.72
3	*2412.00	106.7 PK			1.12 H	318	109.32	-2.62
4	*2412.00	95.2 AV			1.12 H	318	97.82	-2.62
5	4824.00	56.8 PK	74.0	-17.2	1.06 H	339	51.50	5.30
6	4824.00	45.5 AV	54.0	-8.5	1.06 H	339	40.20	5.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	65.5 PK	74.0	-8.5	1.00 V	137	68.22	-2.72
2	2390.00	44.2 AV	54.0	-9.8	1.00 V	137	46.92	-2.72
3	*2412.00	98.4 PK			1.00 V	137	101.02	-2.62
4	*2412.00	87.0 AV			1.00 V	137	89.62	-2.62
5	4824.00	57.2 PK	74.0	-16.8	1.68 V	183	51.90	5.30
6	4824.00	45.4 AV	54.0	-8.6	1.68 V	183	40.10	5.30

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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	70.1 PK	74.0	-3.9	1.10 H	318	72.82	-2.72
2	2390.00	50.5 AV	54.0	-3.5	1.10 H	318	53.22	-2.72
3	*2437.00	114.2 PK			1.10 H	318	116.71	-2.51
4	*2437.00	102.9 AV			1.10 H	318	105.41	-2.51
5	2483.50	65.4 PK	74.0	-8.6	1.10 H	318	67.70	-2.30
6	2483.50	47.6 AV	54.0	-6.4	1.10 H	318	49.90	-2.30
7	4874.00	56.4 PK	74.0	-17.6	1.09 H	336	50.88	5.52
8	4874.00	44.7 AV	54.0	-9.3	1.09 H	336	39.18	5.52
9	7311.00	55.0 PK	74.0	-19.0	1.01 H	179	42.25	12.75
10	7311.00	42.2 AV	54.0	-11.8	1.01 H	179	29.45	12.75
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	62.1 PK	74.0	-11.9	1.02 V	134	64.82	-2.72
2	2390.00	42.4 AV	54.0	-11.6	1.02 V	134	45.12	-2.72
3	*2437.00	105.9 PK			1.02 V	134	108.41	-2.51
4	*2437.00	94.8 AV			1.02 V	134	97.31	-2.51
5	2483.50	57.5 PK	74.0	-16.5	1.02 V	134	59.80	-2.30
6	2483.50	39.9 AV	54.0	-14.1	1.02 V	134	42.20	-2.30
7	4874.00	56.9 PK	74.0	-17.1	1.72 V	170	51.38	5.52
8	4874.00	45.0 AV	54.0	-9.0	1.72 V	170	39.48	5.52
9	7311.00	56.4 PK	74.0	-17.6	1.04 V	276	43.65	12.75
10	7311.00	43.1 AV	54.0	-10.9	1.04 V	276	30.35	12.75

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	108.8 PK			1.09 H	319	111.20	-2.40
2	*2462.00	96.9 AV			1.09 H	319	99.30	-2.40
3	2483.50	73.1 PK	74.0	-0.9	1.09 H	319	75.40	-2.30
4	2483.50	50.4 AV	54.0	-3.6	1.09 H	319	52.70	-2.30
5	4924.00	56.2 PK	74.0	-17.8	1.10 H	348	50.48	5.72
6	4924.00	44.7 AV	54.0	-9.3	1.10 H	348	38.98	5.72
7	7386.00	54.9 PK	74.0	-19.1	1.07 H	178	42.21	12.69
8	7386.00	42.3 AV	54.0	-11.7	1.07 H	178	29.61	12.69
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	101.0 PK			1.00 V	128	103.40	-2.40
2	*2462.00	89.0 AV			1.00 V	128	91.40	-2.40
3	2483.50	65.4 PK	74.0	-8.6	1.00 V	128	67.70	-2.30
4	2483.50	42.6 AV	54.0	-11.4	1.00 V	128	44.90	-2.30
5	4924.00	57.7 PK	74.0	-16.3	1.66 V	176	51.98	5.72
6	4924.00	45.5 AV	54.0	-8.5	1.66 V	176	39.78	5.72
7	7386.00	55.3 PK	74.0	-18.7	1.09 V	287	42.61	12.69
8	7386.00	42.5 AV	54.0	-11.5	1.09 V	287	29.81	12.69

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.

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 ROHDE & SCHWARZ	ESCS 30	100375	Apr. 29, 2014	Apr. 28, 2015
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK-8127	8127-522	Sep. 15, 2014	Sep. 14, 2015
Line-Impedance Stabilization Network (for Peripheral) ROHDE & SCHWARZ	ENV216	100071	Nov. 10, 2014	Nov. 09, 2015
RF Cable (JYEBAO)	5DFB	COCCAB-001	Mar. 10, 2014	Mar. 09, 2015
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 ADT	BV ADT_Cond_V7.3.7. 3	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 Shielded Room No. C.
3. The VCCI Con C Registration No. is C-3611.
4. Tested Date: Jan. 07, 2015

4.2.3 Test Procedures

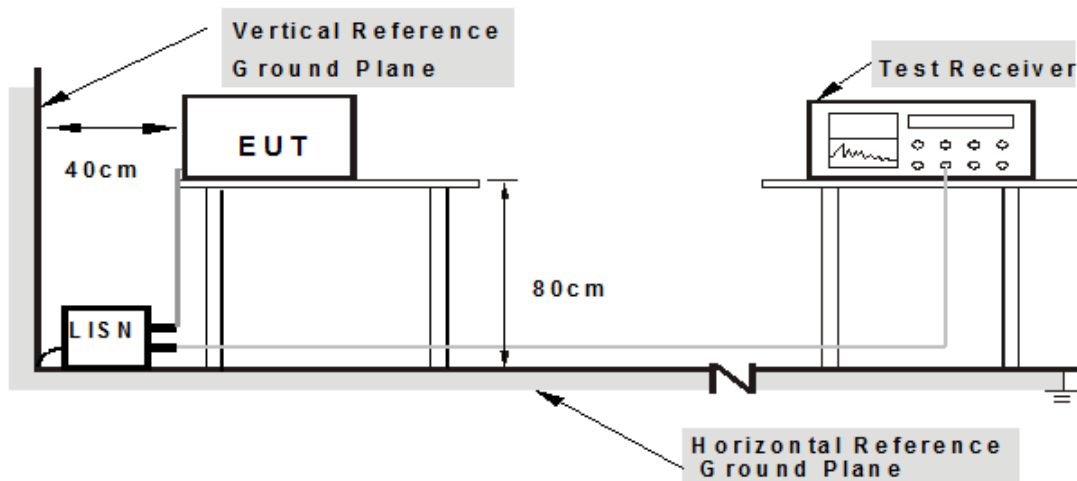
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance 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: All modes of operation were investigated and the worst-case emissions are reported.

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

- Placed the EUT on testing table.
- The EUT (Battery) was recharged from adapter via one USB cable continuously.

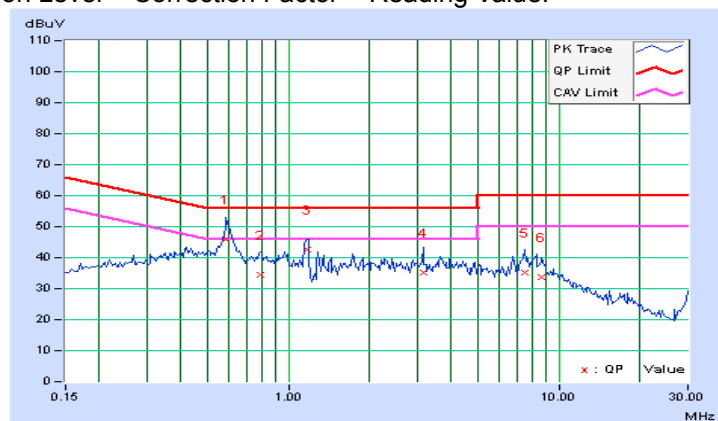
4.2.7 Test Results

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

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.58750	0.10	45.99	39.76	46.09	39.86	56.00	46.00	-9.91	-6.14
2	0.79063	0.12	34.20	28.43	34.32	28.55	56.00	46.00	-21.68	-17.45
3	1.16797	0.14	42.62	33.94	42.76	34.08	56.00	46.00	-13.24	-11.92
4	3.15625	0.22	34.97	28.95	35.19	29.17	56.00	46.00	-20.81	-16.83
5	7.45703	0.37	34.96	28.32	35.33	28.69	60.00	50.00	-24.67	-21.31
6	8.66797	0.41	33.47	25.17	33.88	25.58	60.00	50.00	-26.12	-24.42

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.

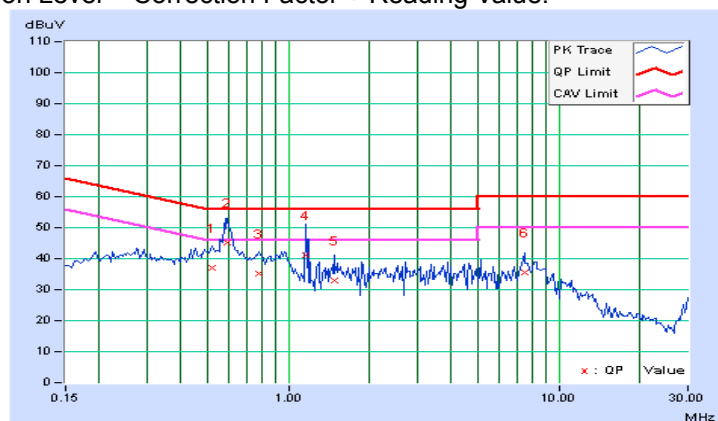


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.52109	0.10	36.88	29.47	36.98	29.57	56.00	46.00	-19.02	-16.43
2	0.59531	0.10	45.25	36.58	45.35	36.68	56.00	46.00	-10.65	-9.32
3	0.77891	0.12	35.07	26.55	35.19	26.67	56.00	46.00	-20.81	-19.33
4	1.16406	0.14	40.89	27.31	41.03	27.45	56.00	46.00	-14.97	-18.55
5	1.47266	0.15	32.93	25.39	33.08	25.54	56.00	46.00	-22.92	-20.46
6	7.44922	0.37	35.15	28.89	35.52	29.26	60.00	50.00	-24.48	-20.74

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.

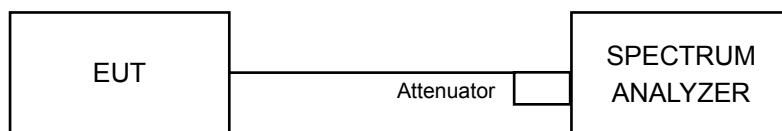


4.3 6dB Bandwidth Measurement

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

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSP 40	100060	May 08, 2014	May 07, 2015

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Jan. 07, 2015

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	8.06	0.5	PASS
6	2437	7.59	0.5	PASS
11	2462	7.61	0.5	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	15.18	0.5	PASS
6	2437	15.48	0.5	PASS
11	2462	15.37	0.5	PASS

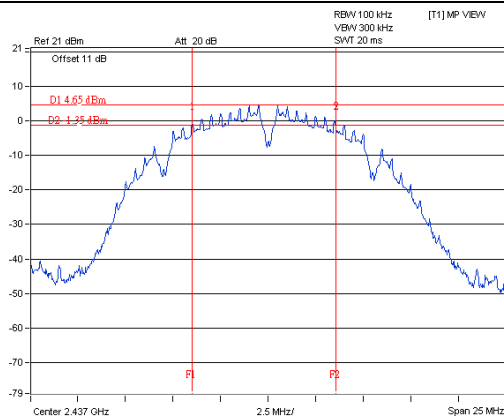
802.11n (HT20)

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	16.05	0.5	PASS

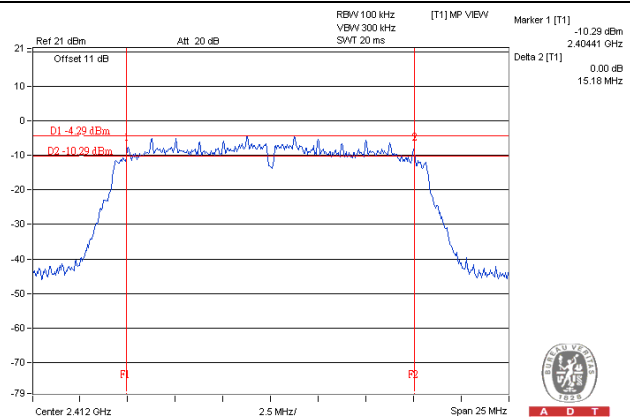
SPECTRUM PLOT OF WORST VALUE

802.11b: CH6

802.11g: CH1

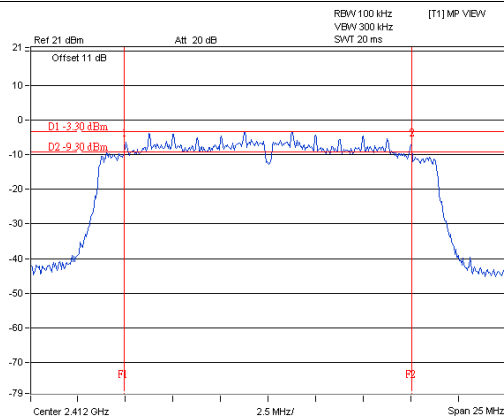


A D T



A D T

802.11n (HT20): CH1



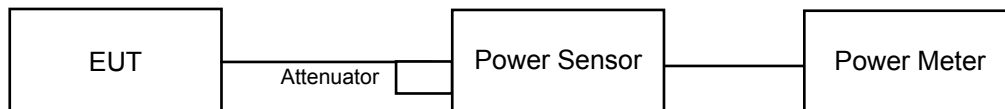
A D T

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

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power meter Anritsu	ML2495A	1014008	Apr. 30, 2014	Apr. 29, 2015
Power sensor Anritsu	MA2411B	0917122	Apr. 30, 2014	Apr. 29, 2015

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Jan. 07, 2014

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

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	32.434	15.11	30	PASS
6	2437	34.594	15.39	30	PASS
11	2462	34.834	15.42	30	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	41.687	16.20	30	PASS
6	2437	65.464	18.16	30	PASS
11	2462	64.863	18.12	30	PASS

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	45.499	16.58	30	PASS
6	2437	71.121	18.52	30	PASS
11	2462	70.307	18.47	30	PASS

FOR AVERAGE POWER

802.11b

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	16.293	12.12
6	2437	18.450	12.66
11	2462	17.824	12.51

802.11g

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	5.236	7.19
6	2437	8.204	9.14
11	2462	8.185	9.13

802.11n (HT20)

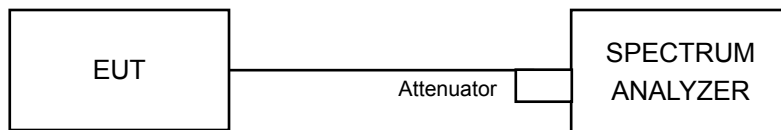
CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	6.637	8.22
6	2437	10.447	10.19
11	2462	10.399	10.17

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 4.3.3 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 4.3.6

4.5.7 Test Results

802.11b

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-10.91	8	PASS
6	2437	-8.80	8	PASS
11	2462	-9.11	8	PASS

802.11g

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-18.76	8	PASS
6	2437	-15.01	8	PASS
11	2462	-13.58	8	PASS

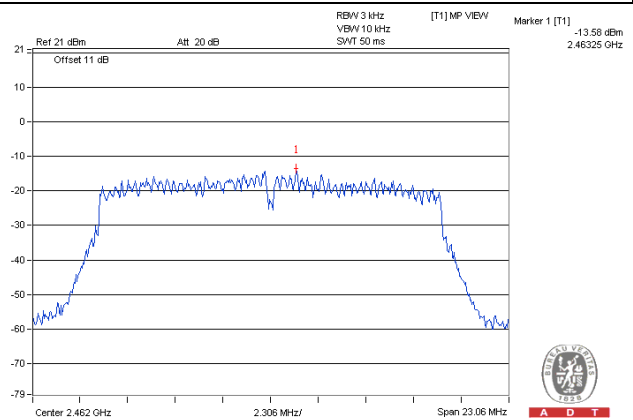
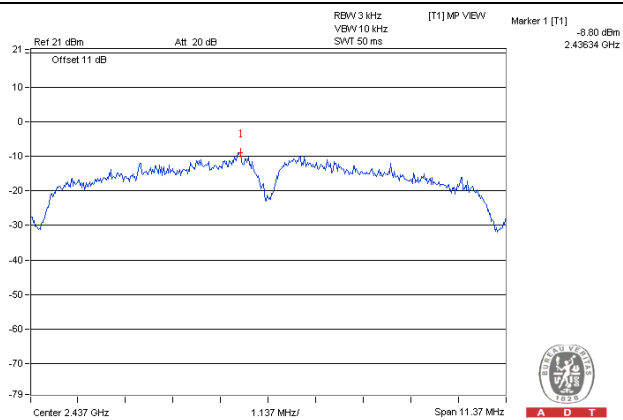
802.11n (HT20)

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-17.02	8	PASS
6	2437	-13.34	8	PASS
11	2462	-13.97	8	PASS

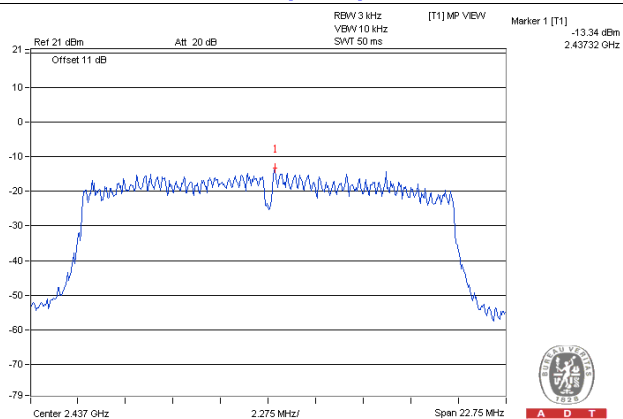
SPECTRUM PLOT OF WORST VALUE

802.11b: CH6

802.11g: CH11



802.11n (HT20): CH6

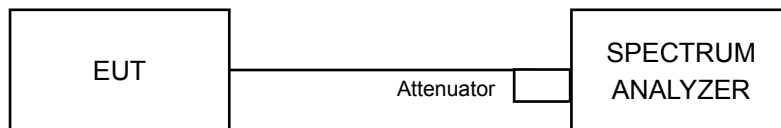


4.6 Conducted Out of Band Emission Measurement

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 4.3.3 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.

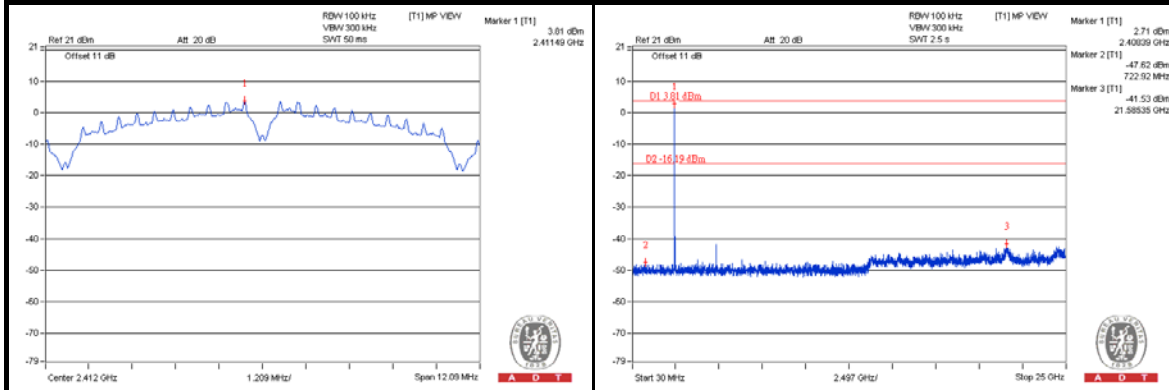
4.6.6 EUT Operating Condition

Same as Item 4.3.6

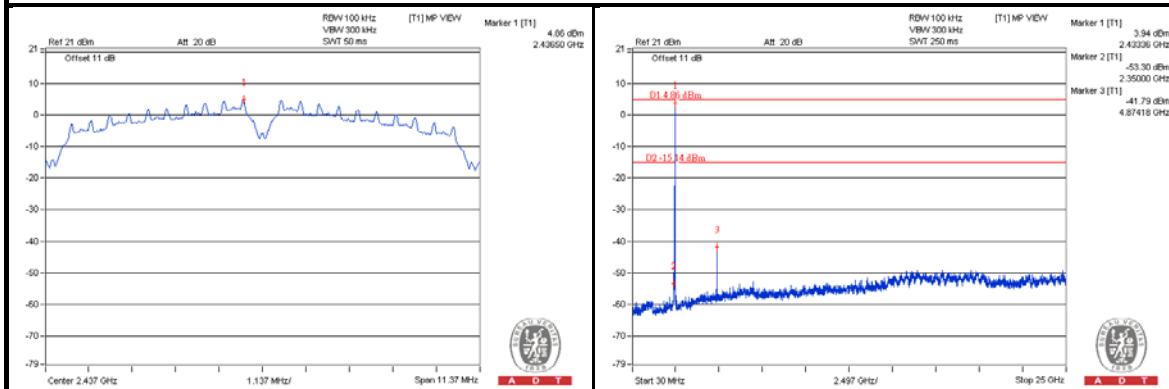
4.6.7 Test Results

802.11b

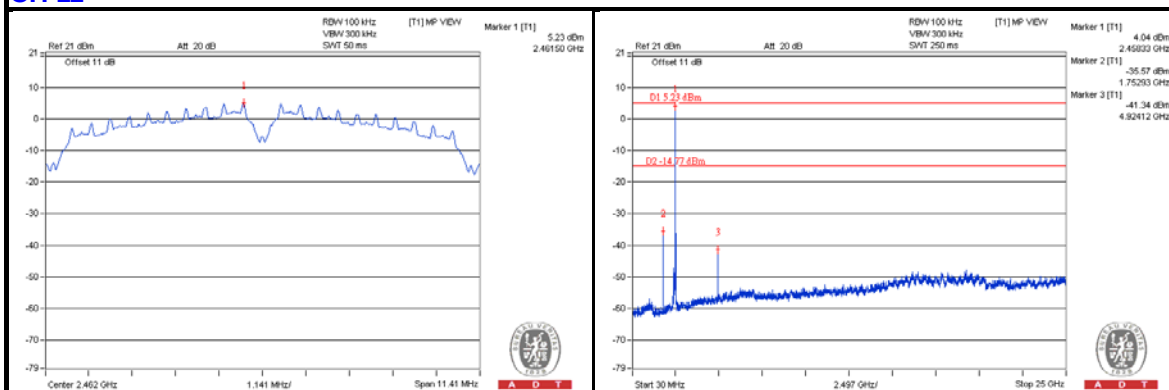
CH 1



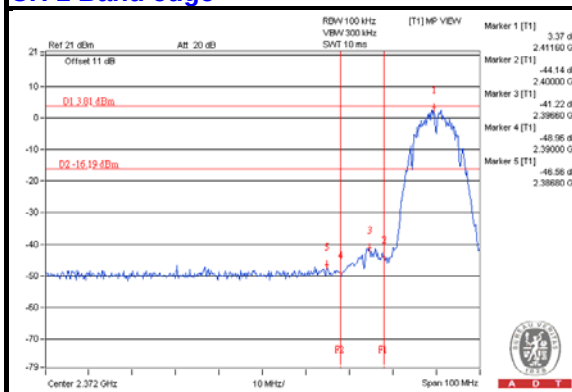
CH 6



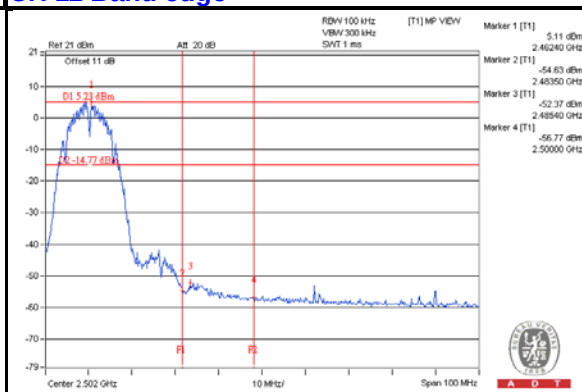
CH 11



CH 1 Band edge

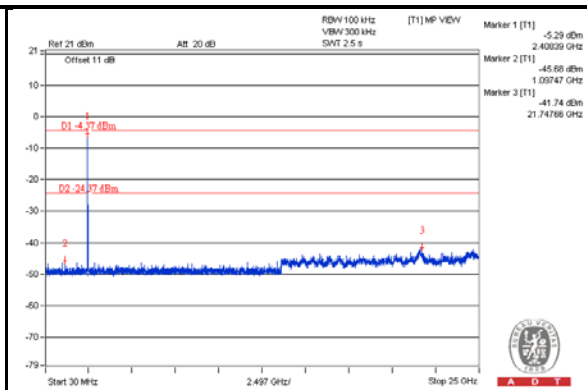
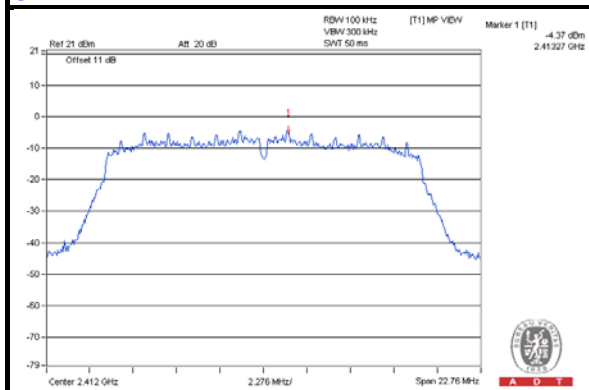


CH 11 Band edge

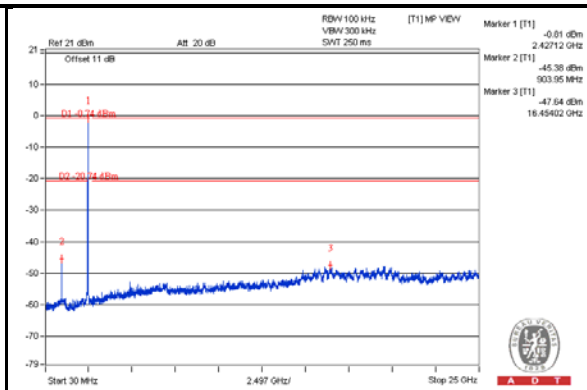
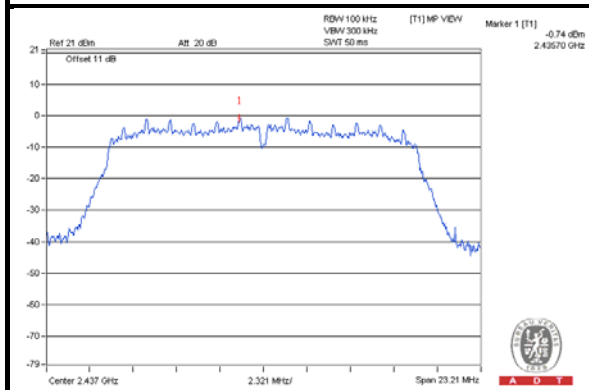


802.11g

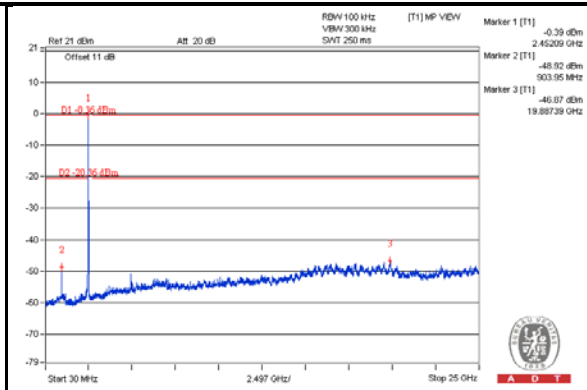
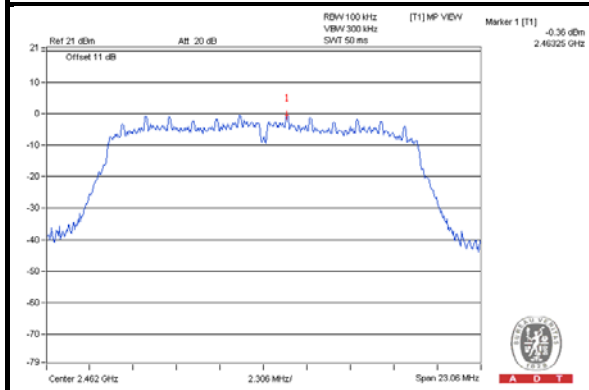
CH 1



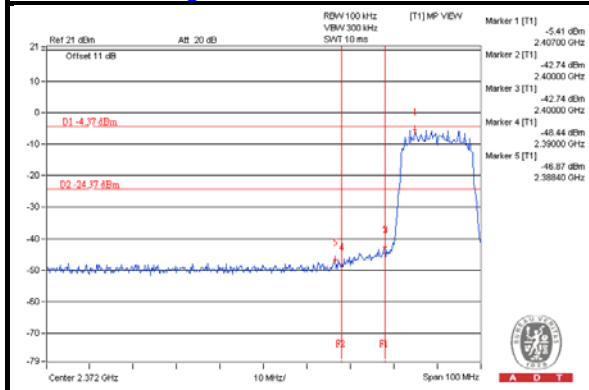
CH 6



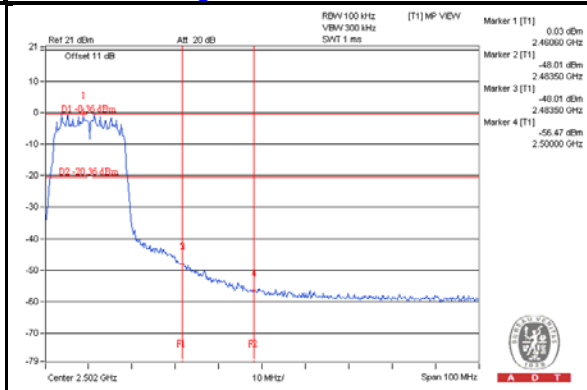
CH 11



CH 1 Band edge

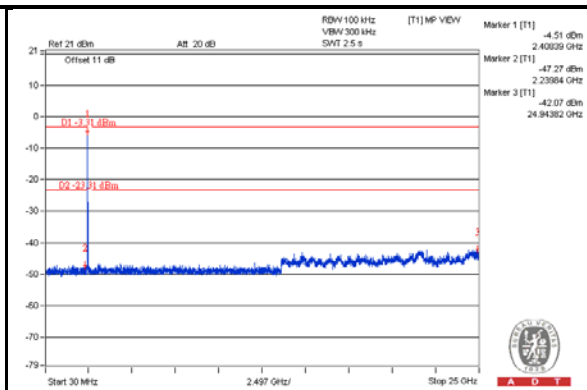
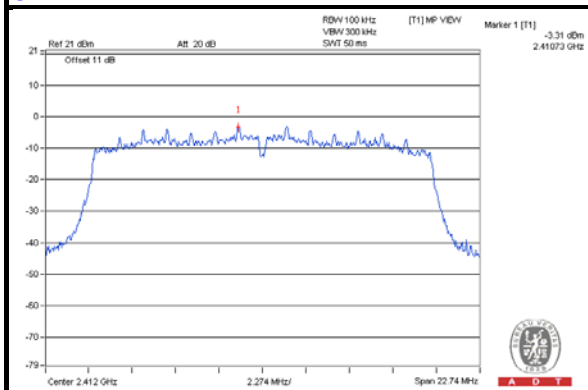


CH 11 Band edge

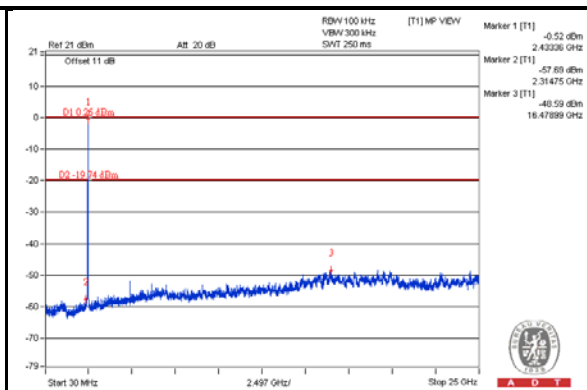
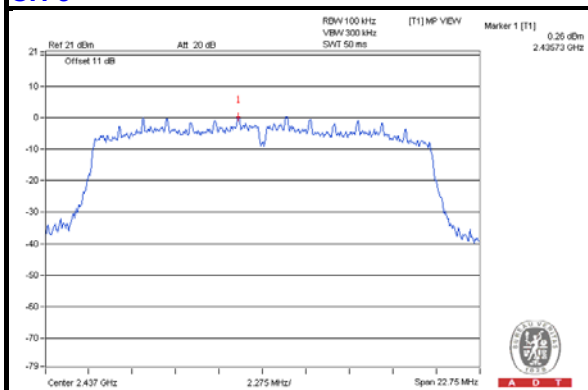


802.11n (HT20)

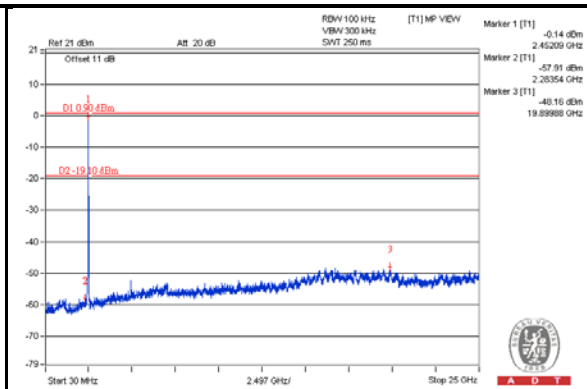
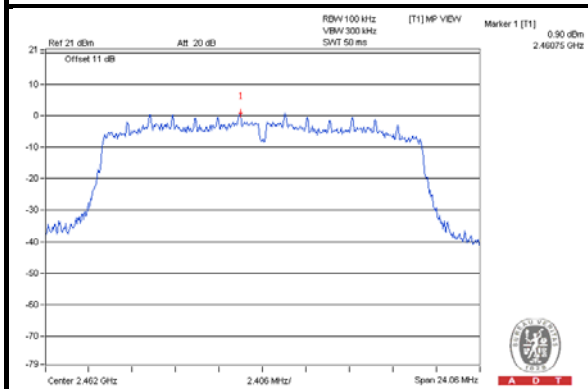
CH 1



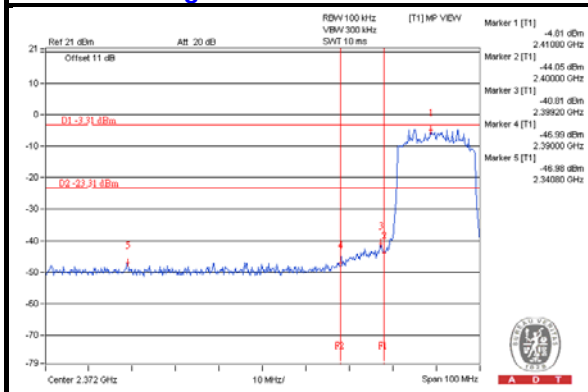
CH 6



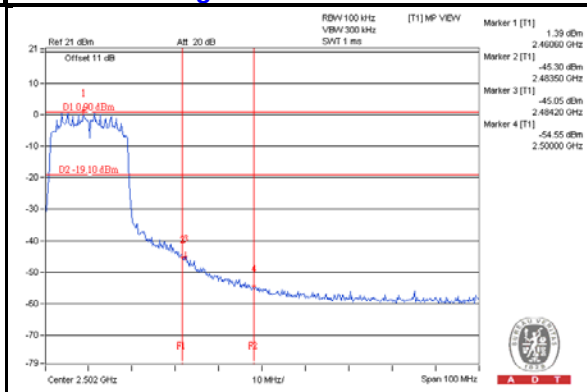
CH 11



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

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Fax: 886-2-26051924

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Tel: 886-3-5935343

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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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