

FCC Test Report

Report No.: RF150709C02

FCC ID: A4Z-DP520

Test Model: DrivePro 520

Received Date: Jul. 09, 2015

Test Date: Aug. 06 ~ Sep. 01, 2015

Issued Date: Sep. 01, 2015

Applicant: Transcend Information Inc.

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Release Control Record

Issue No.	Description	Date Issued
RF150709C02	Original release.	Sep. 01, 2015

1 Certificate of Conformity

Product: Car Video Recorder

Brand: Transcend

Test Model: DrivePro 520

Sample Status: Engineering Sample


Applicant: Transcend Information Inc.

Test Date: Aug. 06 ~ Sep. 01, 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:** Sep. 01, 2015
Polly Chien / Specialist

Approved by :  , **Date:** Sep. 01, 2015
Ken Liu / Senior 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 -10.69dB at 0.23984MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -0.2dB at 7236.00MHz.
	Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -1.1dB at 2483.50MHz.
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	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	2.44 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.63 dB
	200MHz ~ 1000MHz	3.64 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Car Video Recorder
Brand	Transcend
Test Model	DrivePro 520
Status of EUT	Engineering Sample
Power Supply Rating	3.7Vdc from battery 4.6-5.25Vdc from car charger
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: 11.0/ 5.5/ 2.0/ 1.0Mbps 802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 150Mbps
Operating Frequency	2412 ~ 2462MHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
Output Power	388.150mW
Antenna Type	Chip antenna with 3.32dBi gain
Antenna Connector	NA
Accessory Device	Refer to Note as below
Data Cable Supplied	NA

Note:

1. The EUT provides 1 completed transmitter and 1 receiver.

Modulation Mode	TX Function
802.11b	1TX
802.11g	1TX
802.11n (HT20)	1TX
802.11n (HT40)	1TX

2. The EUT contains the following accessories.

No.	Product	Brand	Model	Description	Remark
1	Car charger	EWI(Asia) Group Ltd.	Common ID CLA 5V 1A	Input: 10-30Vdc, 1A Output: 4.6-5.25Vdc, 1A Power cable: 4m shielded power cable without core	Accessory
2	Battery	MERRY ELECTRONICS CO., LTD.	552535	Rating: 3.7Vdc, 430mA	Accessory
3	microSD Card	Transcend	TS32GUSDHC10U1	32GB	Accessory
4	Bracket	-	-	-	Accessory
5	USB cable	-	-	0.95m shielded USB cable without core	Support unit

3. 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		

7 channels are provided for 802.11n (HT40):

Channel	Frequency	Channel	Frequency
3	2422MHz	7	2442MHz
4	2427MHz	8	2447MHz
5	2432MHz	9	2452MHz
6	2437MHz		

3.2.1 Test Mode Applicability and Tested Channel Detail

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

Where **RE≥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**.

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.

EUT CONFIGURE MODE	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
-	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

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.

EUT CONFIGURE MODE	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.

EUT CONFIGURE MODE	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.

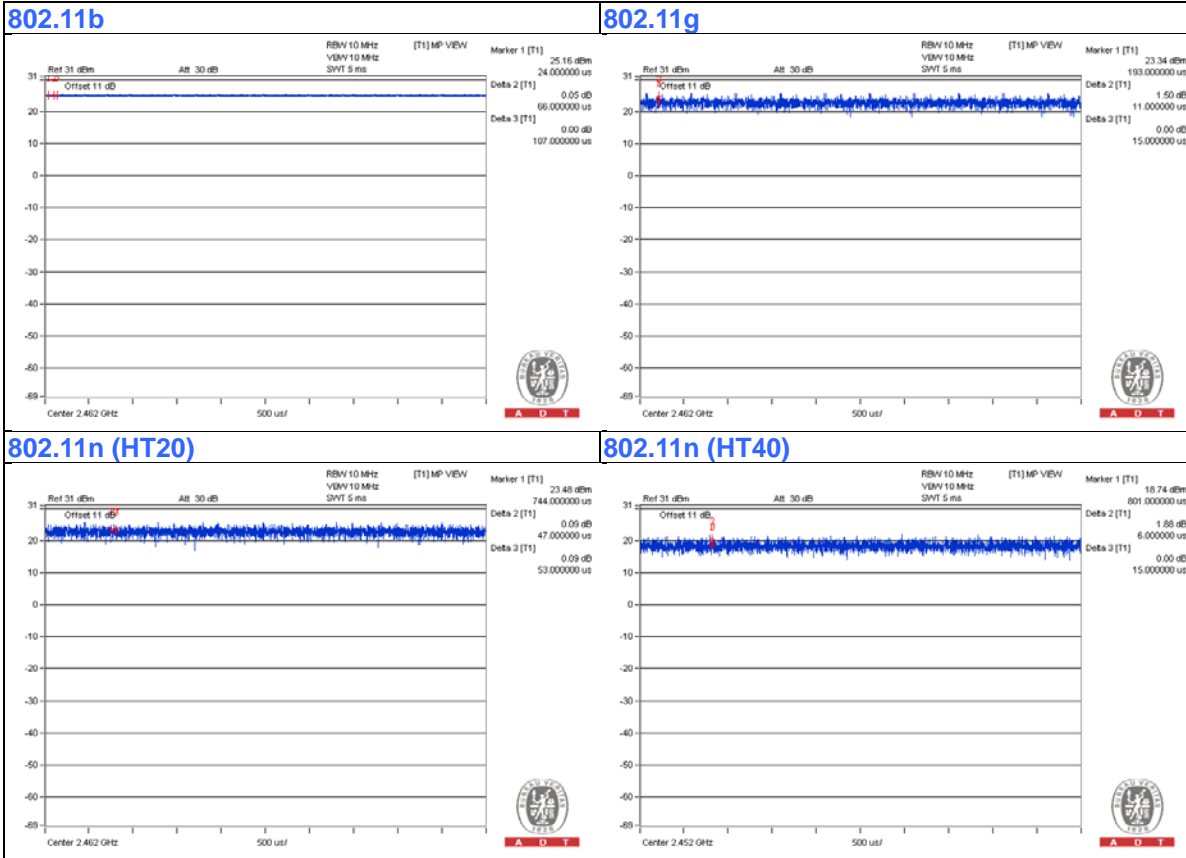
EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
-	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (System)	TESTED BY
RE \geq 1G	25deg. C, 65%RH	120Vac, 60Hz	Tank Wu
RE $<$ 1G	25deg. C, 65%RH	120Vac, 60Hz	Bayu Chen
PLC	25deg. C, 60%RH	120Vac, 60Hz	Tank Wu
APCM	25deg. C, 60%RH	120Vac, 60Hz	Leo Tsai

3.3 Duty Cycle of Test Signal

Duty cycle of test signal is 100 %



3.4 Description of Support Units

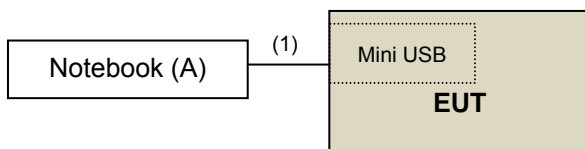
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	V3560D	HGZ5RX1	FCC DoC Approved	-

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB cable	1	0.95	Y	0	Provided 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 v03r03
 ANSI C63.10-2013

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

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100289	Dec. 01, 2014	Nov. 30, 2015
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Mar. 30, 2015	Mar. 29, 2016
BILOG Antenna SCHWARZBECK	VULB9168	9168-156	Feb. 06, 2015	Feb. 05, 2016
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Feb. 09, 2015	Feb. 08, 2016
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Feb. 09, 2015	Feb. 08, 2016
Preamplifier Agilent	8449B	3008A01911	Aug. 09, 2014	Aug. 08, 2015
			Aug. 09, 2015	Aug. 08, 2016
Preamplifier Agilent	8447D	2944A10638	Aug. 09, 2014	Aug. 08, 2015
			Aug. 09, 2015	Aug. 08, 2016
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	248780/4 309222/4 274092/4	Aug. 09, 2014	Aug. 08, 2015
			Aug. 09, 2015	Aug. 08, 2016
RF signal cable Worken	8D-FB	Cable-CH9-01	Aug. 11, 2014	Aug. 10, 2015
			Aug. 11, 2015	Aug. 10, 2016
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower & Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
High Speed Peak Power Meter	ML2495A	0824011	Jul. 09, 2015	Jul. 08, 2016
Power Sensor	MA2411B	0738171	Jul. 09, 2015	Jul. 08, 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 HwaYa Chamber 9.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 215374.
5. The IC Site Registration No. is IC 7450F-9.

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:

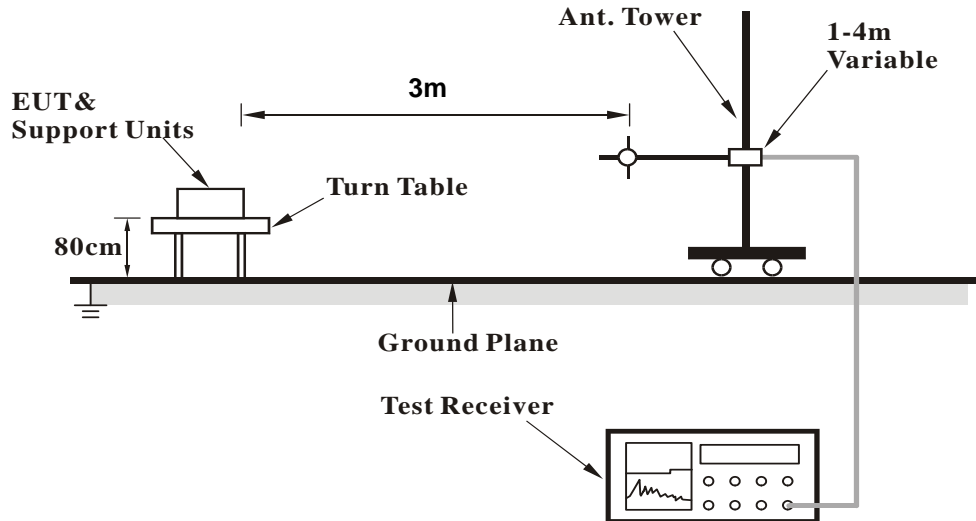
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

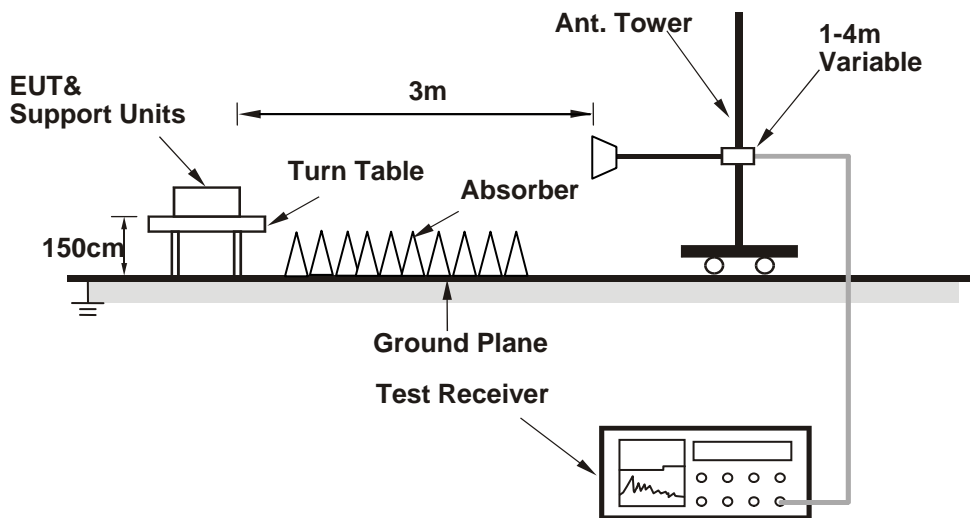
No deviation.

4.1.5 Test 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

- a. Placed the EUT on the testing table.
- b. Prepared a notebook to act as a communication partner.
- c. The communication partner connected with EUT through USB cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.

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	62.0 PK	74.0	-12.0	1.42 H	3	29.00	33.00
2	2390.00	52.5 AV	54.0	-1.5	1.42 H	3	19.50	33.00
3	*2412.00	111.6 PK			1.42 H	3	78.50	33.10
4	*2412.00	107.6 AV			1.42 H	3	74.50	33.10
5	4824.00	49.1 PK	74.0	-24.9	1.72 H	352	47.30	1.80
6	4824.00	39.8 AV	54.0	-14.2	1.72 H	352	38.00	1.80
7	#7236.00	59.9 PK	74.0	-14.1	2.10 H	151	51.30	8.60
8	#7236.00	52.2 AV	54.0	-1.8	2.10 H	151	43.60	8.60

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	58.8 PK	74.0	-15.2	1.46 V	334	25.80	33.00
2	2390.00	46.0 AV	54.0	-8.0	1.46 V	334	13.00	33.00
3	*2412.00	98.8 PK			1.46 V	334	65.70	33.10
4	*2412.00	94.6 AV			1.46 V	334	61.50	33.10
5	4824.00	49.9 PK	74.0	-24.1	1.00 V	255	48.10	1.80
6	4824.00	41.2 AV	54.0	-12.8	1.00 V	255	39.40	1.80
7	#7236.00	60.7 PK	74.0	-13.3	2.55 V	67	52.10	8.60
8	#7236.00	53.8 AV	54.0	-0.2	2.55 V	67	45.20	8.60

REMARKS:

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

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	109.5 PK			1.39 H	1	76.20	33.30
2	*2437.00	105.9 AV			1.39 H	1	72.60	33.30
3	4874.00	47.1 PK	74.0	-26.9	1.44 H	357	45.20	1.90
4	4874.00	36.2 AV	54.0	-17.8	1.44 H	357	34.30	1.90
5	7311.00	58.7 PK	74.0	-15.3	1.00 H	83	50.20	8.50
6	7311.00	50.3 AV	54.0	-3.7	1.00 H	83	41.80	8.50

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	97.5 PK			1.00 V	327	64.20	33.30
2	*2437.00	93.8 AV			1.00 V	327	60.50	33.30
3	4874.00	48.9 PK	74.0	-25.1	1.70 V	245	47.00	1.90
4	4874.00	39.3 AV	54.0	-14.7	1.70 V	245	37.40	1.90
5	7311.00	59.9 PK	74.0	-14.1	1.04 V	100	51.40	8.50
6	7311.00	53.0 AV	54.0	-1.0	1.04 V	100	44.50	8.50

REMARKS:

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



CHANNEL	TX Channel 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	108.6 PK			1.40 H	15	75.20	33.40
2	*2462.00	104.6 AV			1.40 H	15	71.20	33.40
3	2483.50	62.0 PK	74.0	-12.0	1.40 H	15	28.60	33.40
4	2483.50	51.9 AV	54.0	-2.1	1.40 H	15	18.50	33.40
5	4924.00	48.9 PK	74.0	-25.1	1.99 H	32	46.90	2.00
6	4924.00	39.9 AV	54.0	-14.1	1.99 H	32	37.90	2.00
7	7386.00	60.4 PK	74.0	-13.6	2.37 H	2	52.10	8.30
8	7386.00	52.8 AV	54.0	-1.2	2.37 H	2	44.50	8.30

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	*2462.00	96.1 PK			1.30 V	125	62.70	33.40
2	*2462.00	91.0 AV			1.30 V	125	57.60	33.40
3	2483.50	60.2 PK	74.0	-13.8	1.30 V	125	26.80	33.40
4	2483.50	48.7 AV	54.0	-5.3	1.30 V	125	15.30	33.40
5	4924.00	48.3 PK	74.0	-25.7	1.58 V	350	46.30	2.00
6	4924.00	38.4 AV	54.0	-15.6	1.58 V	350	36.40	2.00
7	7386.00	59.9 PK	74.0	-14.1	1.00 V	319	51.60	8.30
8	7386.00	53.0 AV	54.0	-1.0	1.00 V	319	44.70	8.30

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.

802.11g

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	70.1 PK	74.0	-3.9	1.43 H	20	37.10	33.00
2	2390.00	53.0 AV	54.0	-1.0	1.43 H	20	20.00	33.00
3	*2412.00	108.5 PK			1.43 H	16	75.40	33.10
4	*2412.00	99.4 AV			1.43 H	16	66.30	33.10
5	4824.00	47.7 PK	74.0	-26.3	1.77 H	26	45.90	1.80
6	4824.00	34.7 AV	54.0	-19.3	1.77 H	26	32.90	1.80

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	59.4 PK	74.0	-14.6	1.00 V	265	26.40	33.00
2	2390.00	46.9 AV	54.0	-7.1	1.00 V	265	13.90	33.00
3	*2412.00	96.3 PK			1.00 V	265	63.20	33.10
4	*2412.00	86.9 AV			1.00 V	265	53.80	33.10
5	4824.00	47.3 PK	74.0	-26.7	1.13 V	272	45.50	1.80
6	4824.00	33.9 AV	54.0	-20.1	1.13 V	272	32.10	1.80

REMARKS:

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



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	109.6 PK			1.42 H	16	76.30	33.30
2	*2437.00	99.7 AV			1.42 H	16	66.40	33.30
3	4874.00	48.3 PK	74.0	-25.7	1.82 H	36	46.40	1.90
4	4874.00	35.6 AV	54.0	-18.4	1.82 H	36	33.70	1.90
5	7311.00	61.9 PK	74.0	-12.1	1.00 H	309	53.40	8.50
6	7311.00	48.0 AV	54.0	-6.0	1.00 H	309	39.50	8.50

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	98.5 PK			2.93 V	306	65.20	33.30
2	*2437.00	89.4 AV			2.93 V	306	56.10	33.30
3	4874.00	48.1 PK	74.0	-25.9	1.60 V	4	46.20	1.90
4	4874.00	35.9 AV	54.0	-18.1	1.60 V	4	34.00	1.90
5	7311.00	59.3 PK	74.0	-14.7	1.00 V	304	50.80	8.50
6	7311.00	44.5 AV	54.0	-9.5	1.00 V	304	36.00	8.50

REMARKS:

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



CHANNEL	TX Channel 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	108.5 PK			1.39 H	12	75.10	33.40
2	*2462.00	99.2 AV			1.39 H	12	65.80	33.40
3	2483.50	72.4 PK	74.0	-1.6	1.39 H	12	39.00	33.40
4	2483.50	52.9 AV	54.0	-1.1	1.39 H	12	19.50	33.40
5	4924.00	47.1 PK	74.0	-26.9	1.36 H	67	45.10	2.00
6	4924.00	34.1 AV	54.0	-19.9	1.36 H	67	32.10	2.00
7	7386.00	57.1 PK	74.0	-16.9	1.00 H	205	48.80	8.30
8	7386.00	42.9 AV	54.0	-11.1	1.00 H	205	34.60	8.30

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	*2462.00	96.7 PK			2.60 V	304	63.30	33.40
2	*2462.00	87.0 AV			2.60 V	304	53.60	33.40
3	2483.50	60.6 PK	74.0	-13.4	2.60 V	304	27.20	33.40
4	2483.50	46.6 AV	54.0	-7.4	2.60 V	304	13.20	33.40
5	4924.00	47.4 PK	74.0	-26.6	1.75 V	33	45.40	2.00
6	4924.00	35.1 AV	54.0	-18.9	1.75 V	33	33.10	2.00
7	7386.00	58.7 PK	74.0	-15.3	1.52 V	302	50.40	8.30
8	7386.00	43.5 AV	54.0	-10.5	1.52 V	302	35.20	8.30

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.

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	72.8 PK	74.0	-1.2	1.44 H	3	39.80	33.00
2	2390.00	52.0 AV	54.0	-2.0	1.44 H	3	19.00	33.00
3	*2412.00	106.9 PK			1.44 H	3	73.80	33.10
4	*2412.00	97.0 AV			1.44 H	3	63.90	33.10
5	4824.00	47.2 PK	74.0	-26.8	1.34 H	14	45.40	1.80
6	4824.00	34.0 AV	54.0	-20.0	1.34 H	14	32.20	1.80

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	61.4 PK	74.0	-12.6	1.00 V	266	28.40	33.00
2	2390.00	46.9 AV	54.0	-7.1	1.00 V	266	13.90	33.00
3	*2412.00	95.1 PK			1.00 V	266	62.00	33.10
4	*2412.00	85.3 AV			1.00 V	266	52.20	33.10
5	4824.00	47.2 PK	74.0	-26.8	1.87 V	105	45.40	1.80
6	4824.00	34.1 AV	54.0	-19.9	1.87 V	105	32.30	1.80

REMARKS:

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

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	109.0 PK			1.09 H	2	75.70	33.30
2	*2437.00	99.2 AV			1.09 H	2	65.90	33.30
3	4874.00	46.9 PK	74.0	-27.1	1.40 H	5	45.00	1.90
4	4874.00	34.1 AV	54.0	-19.9	1.40 H	5	32.20	1.90
5	7311.00	58.7 PK	74.0	-15.3	1.10 H	67	50.20	8.50
6	7311.00	43.4 AV	54.0	-10.6	1.10 H	67	34.90	8.50

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	95.7 PK			1.00 V	152	62.40	33.30
2	*2437.00	86.3 AV			1.00 V	152	53.00	33.30
3	4874.00	47.6 PK	74.0	-26.4	1.78 V	18	45.70	1.90
4	4874.00	35.0 AV	54.0	-19.0	1.78 V	18	33.10	1.90
5	7311.00	62.6 PK	74.0	-11.4	2.55 V	291	54.10	8.50
6	7311.00	46.8 AV	54.0	-7.2	2.55 V	291	38.30	8.50

REMARKS:

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

CHANNEL	TX Channel 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	106.9 PK			1.22 H	2	73.50	33.40
2	*2462.00	97.2 AV			1.22 H	2	63.80	33.40
3	2483.50	72.0 PK	74.0	-2.0	1.22 H	2	38.60	33.40
4	2483.50	52.6 AV	54.0	-1.4	1.22 H	2	19.20	33.40
5	4924.00	47.3 PK	74.0	-26.7	1.11 H	56	45.30	2.00
6	4924.00	33.8 AV	54.0	-20.2	1.11 H	56	31.80	2.00
7	7386.00	57.2 PK	74.0	-16.8	1.00 H	65	48.90	8.30
8	7386.00	42.3 AV	54.0	-11.7	1.00 H	65	34.00	8.30

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	*2462.00	94.1 PK			1.00 V	152	60.70	33.40
2	*2462.00	84.4 AV			1.00 V	152	51.00	33.40
3	2483.50	60.3 PK	74.0	-13.7	1.00 V	152	26.90	33.40
4	2483.50	46.5 AV	54.0	-7.5	1.00 V	152	13.10	33.40
5	4924.00	47.8 PK	74.0	-26.2	1.85 V	17	45.80	2.00
6	4924.00	34.8 AV	54.0	-19.2	1.85 V	17	32.80	2.00
7	7386.00	62.1 PK	74.0	-11.9	2.76 V	293	53.80	8.30
8	7386.00	45.0 AV	54.0	-9.0	2.76 V	293	36.70	8.30

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.

802.11n (HT40)

CHANNEL	TX Channel 3	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2360.00	63.4 PK	74.0	-10.6	1.48 H	354	30.50	32.90
2	2360.00	52.6 AV	54.0	-1.4	1.48 H	354	19.70	32.90
3	2390.00	64.7 PK	74.0	-9.3	1.44 H	351	31.70	33.00
4	2390.00	50.6 AV	54.0	-3.4	1.44 H	351	17.60	33.00
5	*2422.00	101.4 PK			1.41 H	347	68.20	33.20
6	*2422.00	91.7 AV			1.41 H	347	58.50	33.20
7	2483.50	63.7 PK	74.0	-10.3	1.37 H	348	30.30	33.40
8	2483.50	52.7 AV	54.0	-1.3	1.37 H	348	19.30	33.40
9	4844.00	47.0 PK	74.0	-27.0	1.38 H	86	45.20	1.80
10	4844.00	34.0 AV	54.0	-20.0	1.38 H	86	32.20	1.80

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2360.00	57.9 PK	74.0	-16.1	1.43 V	262	25.00	32.90
2	2360.00	46.0 AV	54.0	-8.0	1.43 V	262	13.10	32.90
3	2390.00	58.2 PK	74.0	-15.8	1.44 V	263	25.20	33.00
4	2390.00	45.9 AV	54.0	-8.1	1.44 V	263	12.90	33.00
5	*2422.00	90.2 PK			1.38 V	261	57.00	33.20
6	*2422.00	80.6 AV			1.38 V	261	47.40	33.20
7	2483.50	58.8 PK	74.0	-15.2	1.16 V	208	25.40	33.40
8	2483.50	46.7 AV	54.0	-7.3	1.16 V	208	13.30	33.40
9	4844.00	47.3 PK	74.0	-26.7	1.66 V	18	45.50	1.80
10	4844.00	34.6 AV	54.0	-19.4	1.66 V	18	32.80	1.80

REMARKS:

- Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
- The other emission levels were very low against the limit.
- Margin value = Emission Level – Limit value
- " * ": 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	67.1 PK	74.0	-6.9	1.43 H	5	34.10	33.00
2	2390.00	52.5 AV	54.0	-1.5	1.43 H	5	19.50	33.00
3	*2437.00	104.6 PK			1.09 H	2	71.30	33.30
4	*2437.00	94.8 AV			1.09 H	2	61.50	33.30
5	2483.50	67.7 PK	74.0	-6.3	1.22 H	2	34.30	33.40
6	2483.50	51.6 AV	54.0	-2.4	1.22 H	2	18.20	33.40
7	4874.00	47.6 PK	74.0	-26.4	1.18 H	332	45.70	1.90
8	4874.00	33.8 AV	54.0	-20.2	1.18 H	332	31.90	1.90
9	7311.00	55.3 PK	74.0	-18.7	1.00 H	64	46.80	8.50
10	7311.00	41.5 AV	54.0	-12.5	1.00 H	64	33.00	8.50

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	59.2 PK	74.0	-14.8	1.00 V	151	26.20	33.00
2	2390.00	46.2 AV	54.0	-7.8	1.00 V	151	13.20	33.00
3	*2437.00	92.6 PK			1.00 V	151	59.30	33.30
4	*2437.00	82.8 AV			1.00 V	151	49.50	33.30
5	2483.50	58.5 PK	74.0	-15.5	1.00 V	151	25.10	33.40
6	2483.50	46.4 AV	54.0	-7.6	1.00 V	151	13.00	33.40
7	4874.00	47.9 PK	74.0	-26.1	1.75 V	20	46.00	1.90
8	4874.00	34.8 AV	54.0	-19.2	1.75 V	20	32.90	1.90
9	7311.00	58.1 PK	74.0	-15.9	2.19 V	288	49.60	8.50
10	7311.00	43.8 AV	54.0	-10.2	2.19 V	288	35.30	8.50

REMARKS:

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



CHANNEL	TX Channel 9	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	102.9 PK			1.38 H	349	69.60	33.30
2	*2452.00	93.3 AV			1.38 H	349	60.00	33.30
3	2483.50	69.6 PK	74.0	-4.4	1.38 H	349	36.20	33.40
4	2483.50	52.7 AV	54.0	-1.3	1.38 H	349	19.30	33.40
5	4904.00	47.3 PK	74.0	-26.7	1.22 H	128	45.30	2.00
6	4904.00	33.8 AV	54.0	-20.2	1.22 H	128	31.80	2.00

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	90.5 PK			1.00 V	152	57.20	33.30
2	*2452.00	81.4 AV			1.00 V	152	48.10	33.30
3	2483.50	58.9 PK	74.0	-15.1	1.00 V	152	25.50	33.40
4	2483.50	46.4 AV	54.0	-7.6	1.00 V	152	13.00	33.40
5	4904.00	47.4 PK	74.0	-26.6	1.00 V	325	45.40	2.00
6	4904.00	34.0 AV	54.0	-20.0	1.00 V	325	32.00	2.00

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 Worst-Case Data: 802.11n (HT20)

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	68.80	31.1 QP	40.0	-8.9	2.00 H	4	46.90	-15.80
2	119.24	32.8 QP	43.5	-10.7	1.25 H	15	49.30	-16.50
3	167.74	30.6 QP	43.5	-12.9	2.00 H	325	44.60	-14.00
4	720.64	40.1 QP	46.0	-5.9	1.01 H	231	44.70	-4.60
5	769.14	40.5 QP	46.0	-5.5	1.01 H	219	43.50	-3.00
6	864.20	40.4 QP	46.0	-5.6	1.51 H	298	42.00	-1.60

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	49.40	28.8 QP	40.0	-11.2	1.49 V	115	43.10	-14.30
2	68.80	29.7 QP	40.0	-10.3	1.24 V	163	45.50	-15.80
3	127.00	30.9 QP	43.5	-12.6	1.49 V	96	46.60	-15.70
4	167.74	24.9 QP	43.5	-18.6	1.00 V	104	38.90	-14.00
5	864.01	43.0 QP	46.0	-3.0	1.24 V	22	44.60	-1.60
6	889.42	45.3 QP	46.0	-0.7	1.24 V	29	46.70	-1.40

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– 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.	Date Of Calibration	Due Date Of Calibration
Test Receiver ROHDE & SCHWARZ	ESCS30	100288	Apr. 27, 2015	Apr. 26, 2016
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond2-01	Dec. 26, 2014	Dec. 25, 2015
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Dec. 30, 2014	Dec. 29, 2015
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Jul. 21, 2015	Jul. 20, 2016
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 HwaYa Shielded Room 2.

3. The VCCI Site Registration No. is C-2047.

4.2.3 Test Procedures

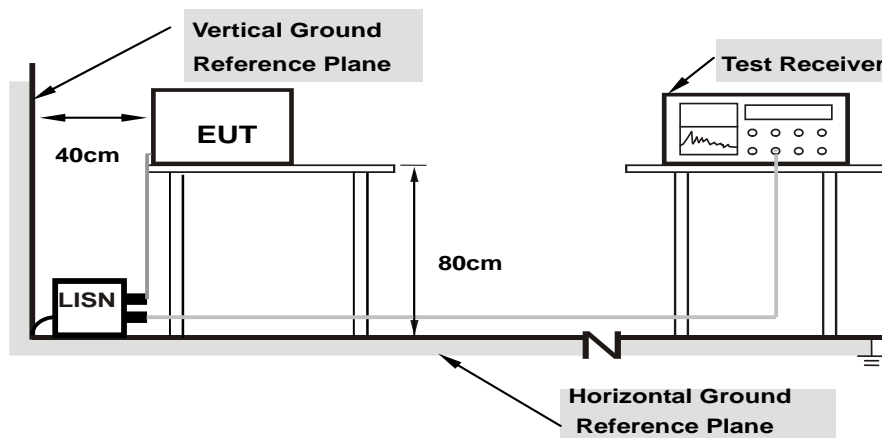
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

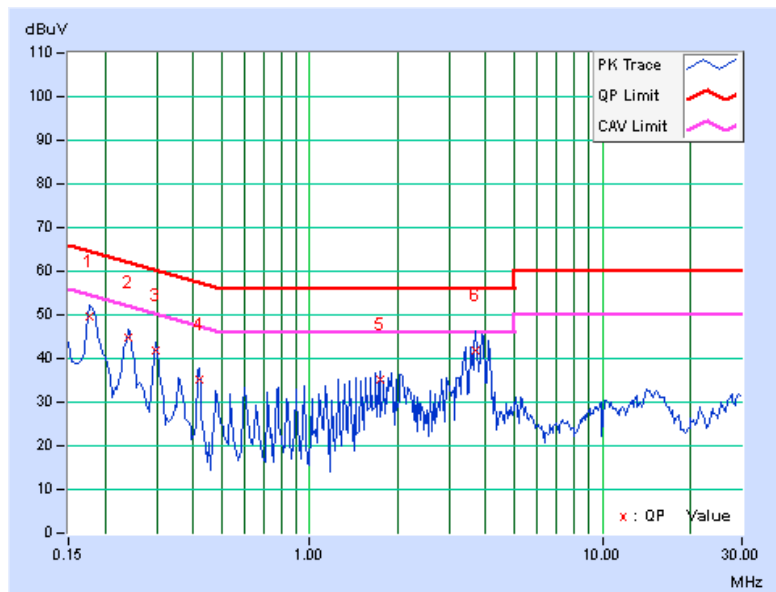
4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17734	0.17	49.56	42.39	49.73	42.56	64.61	54.61	-14.88	-12.05
2	0.23984	0.17	44.52	40.25	44.69	40.42	62.10	52.10	-17.41	-11.68
3	0.29844	0.17	41.65	36.04	41.82	36.21	60.29	50.29	-18.46	-14.07
4	0.41953	0.18	34.91	30.54	35.09	30.72	57.46	47.46	-22.37	-16.74
5	1.73438	0.26	34.97	32.39	35.23	32.65	56.00	46.00	-20.77	-13.35
6	3.70703	0.34	41.65	32.20	41.99	32.54	56.00	46.00	-14.01	-13.46

REMARKS:

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

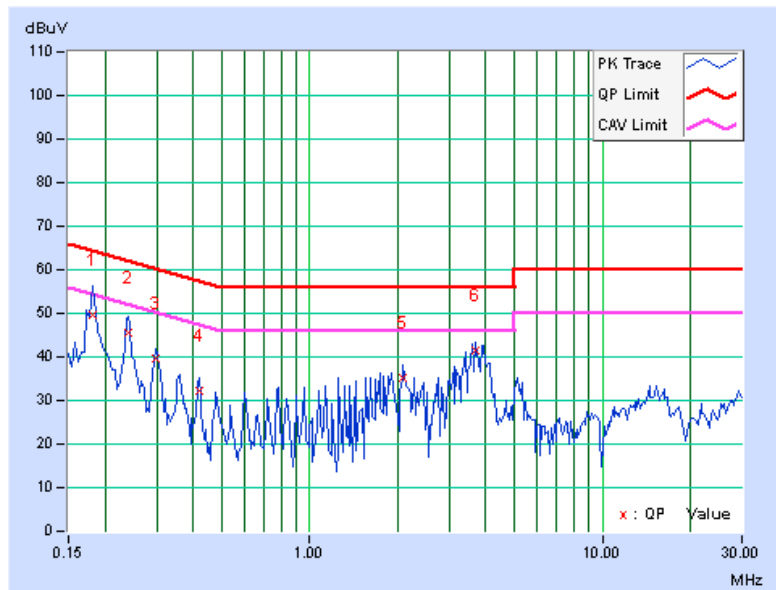


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.18125	0.18	49.51	42.40	49.69	42.58	64.43
2	0.23984	0.18	45.50	41.23	45.68	41.41	62.10	52.10	-16.42	-10.69
3	0.29844	0.19	39.48	34.69	39.67	34.88	60.29	50.29	-20.62	-15.41
4	0.41953	0.20	32.00	28.26	32.20	28.46	57.46	47.46	-25.26	-19.00
5	2.09375	0.29	34.87	31.24	35.16	31.53	56.00	46.00	-20.84	-14.47
6	3.70703	0.37	41.05	31.88	41.42	32.25	56.00	46.00	-14.58	-13.75

REMARKS:

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

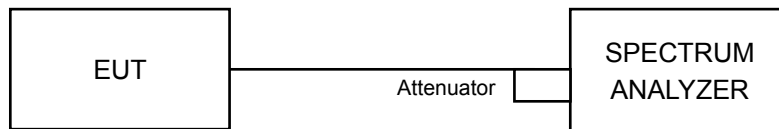


4.3 6dB Bandwidth Measurement

4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

- a. Set resolution bandwidth (RBW) = 100kHz
- b. Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- c. Trace mode = max hold.
- d. Sweep = auto couple.
- e. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

802.11b

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

802.11g

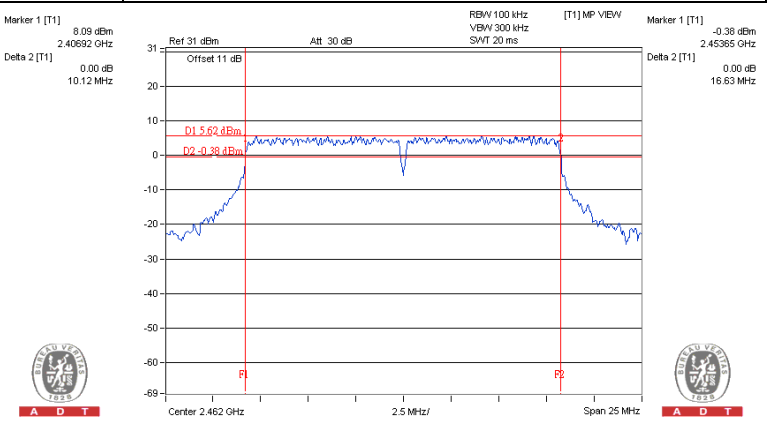
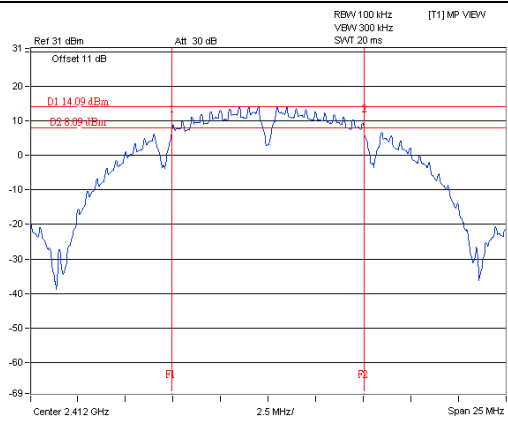
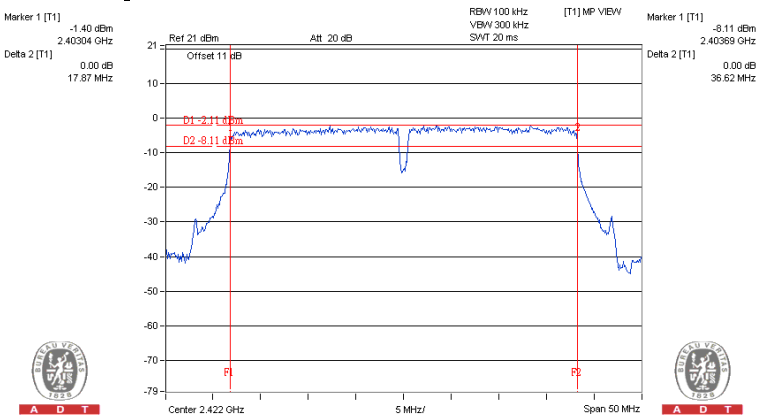
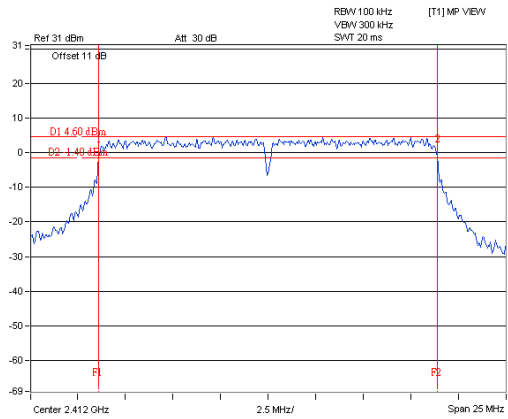
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.62	0.5	PASS
6	2437	16.62	0.5	PASS
11	2462	16.63	0.5	PASS

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	17.87	0.5	PASS
6	2437	17.87	0.5	PASS
11	2462	17.86	0.5	PASS

802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
3	2422	36.62	0.5	PASS
6	2437	36.60	0.5	PASS
9	2452	36.60	0.5	PASS

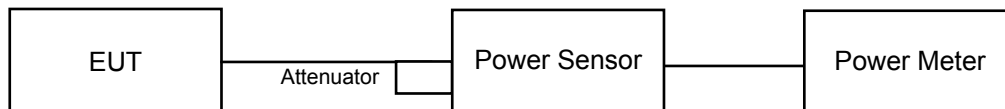
Spectrum Plot of Worst Value**802.11b****802.11g****802.11n (HT20)****802.11n (HT40)**

4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

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

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

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

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as Item 4.3.6.

4.4.7 Test Results

FOR PEAK POWER

802.11b

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	354.813	25.50	30	Pass
6	2437	328.095	25.16	30	Pass
11	2462	309.742	24.91	30	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	358.922	25.55	30	Pass
6	2437	384.592	25.85	30	Pass
11	2462	367.282	25.65	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	343.558	25.36	30	Pass
6	2437	388.150	25.89	30	Pass
11	2462	366.438	25.64	30	Pass

802.11n (HT40)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
3	2422	208.930	23.20	30	Pass
6	2437	375.837	25.75	30	Pass
9	2452	332.660	25.22	30	Pass

FOR AVERAGE POWER
802.11b

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	247.742	23.94
6	2437	215.278	23.33
11	2462	190.985	22.81

802.11g

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	79.250	18.99
6	2437	116.145	20.65
11	2462	81.283	19.10

802.11n (HT20)

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	68.865	18.38
6	2437	114.025	20.57
11	2462	89.743	19.53

802.11n (HT40)

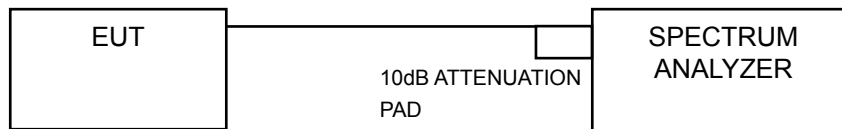
Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
3	2422	35.645	15.52
6	2437	104.472	20.19
9	2452	69.183	18.40

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6

4.5.7 Test Results

802.11b

Channel	Freq. (MHz)	PSD (dBm)	Limit (dBm)	Pass /Fail
1	2412	-6.27	8	Pass
6	2437	-6.52	8	Pass
11	2462	-6.71	8	Pass

802.11g

Channel	Freq. (MHz)	PSD (dBm)	Limit (dBm)	Pass /Fail
1	2412	-10.06	8	Pass
6	2437	-7.53	8	Pass
11	2462	-8.92	8	Pass

802.11n (HT20)

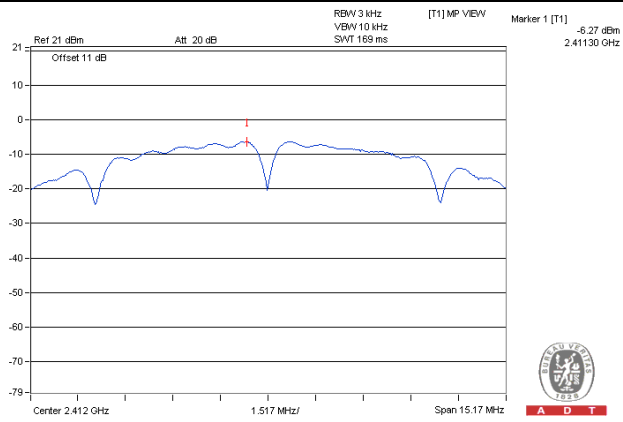
Channel	Freq. (MHz)	PSD (dBm)	Limit (dBm)	Pass /Fail
1	2412	-9.35	8	Pass
6	2437	-7.40	8	Pass
11	2462	-8.11	8	Pass

802.11n (HT40)

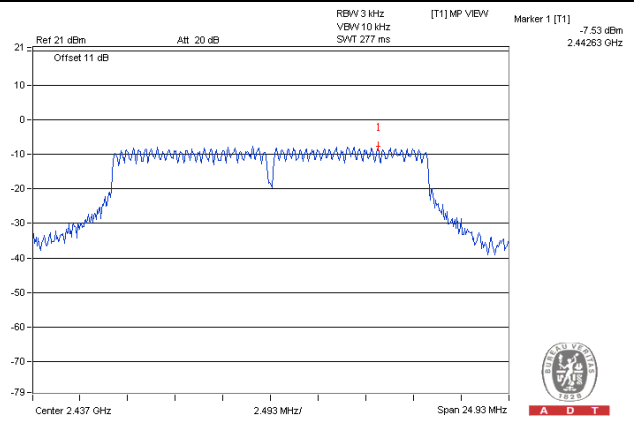
Channel	Freq. (MHz)	PSD (dBm)	Limit (dBm)	PASS /FAIL
3	2422	-14.59	8	PASS
6	2437	-7.86	8	PASS
9	2452	-11.21	8	PASS

Spectrum Plot of Worst Value

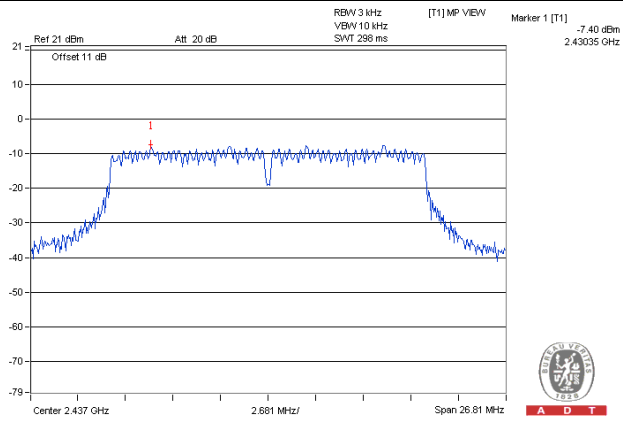
802.11b



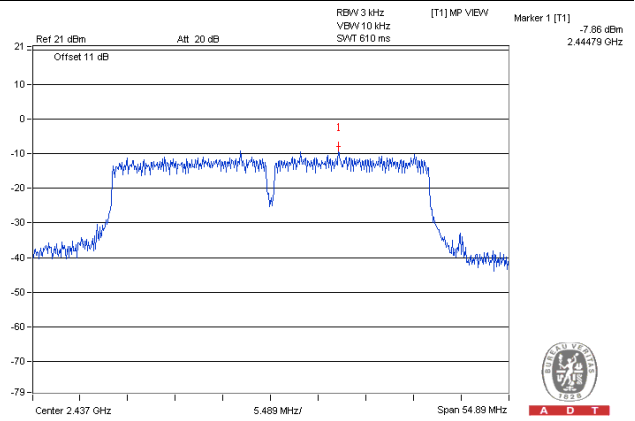
802.11g



802.11n (HT20)



802.11n (HT40)

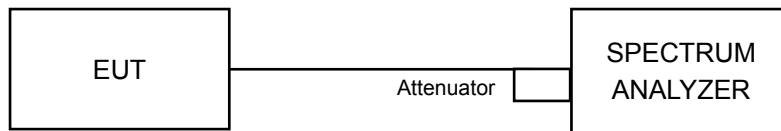


4.6 Conducted Out of Band Emission Measurement

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

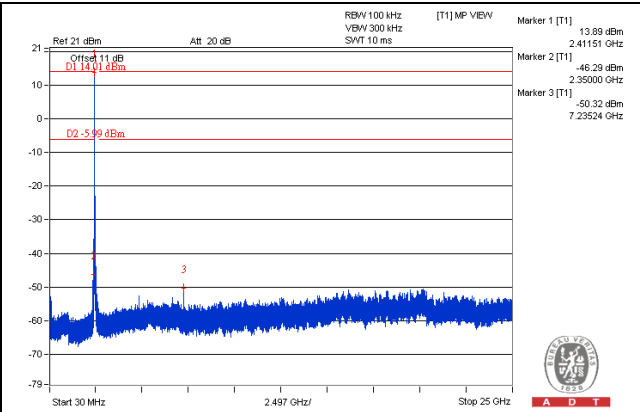
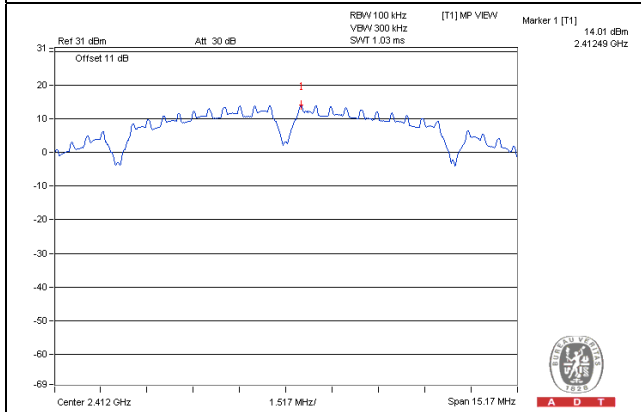
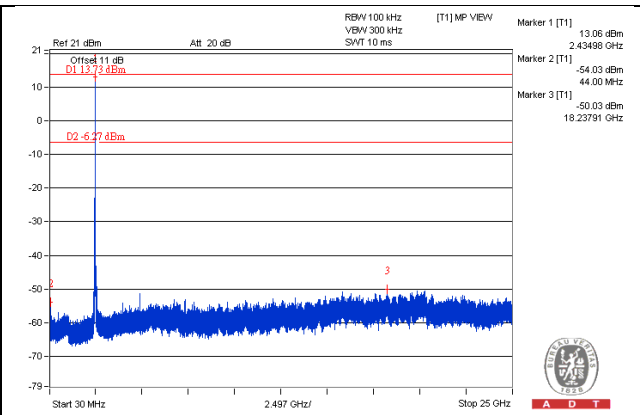
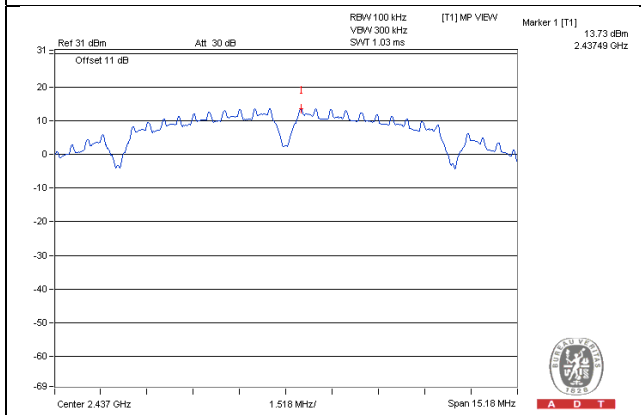
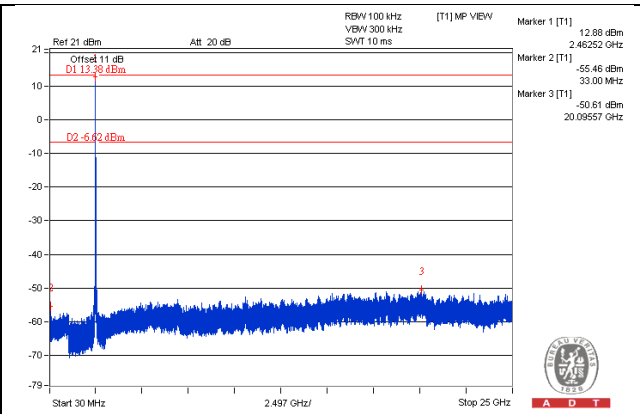
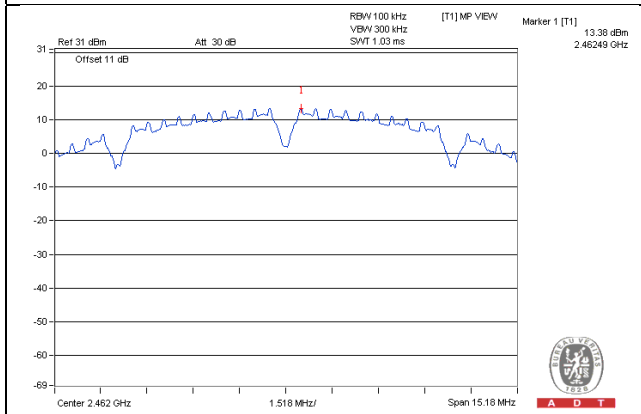
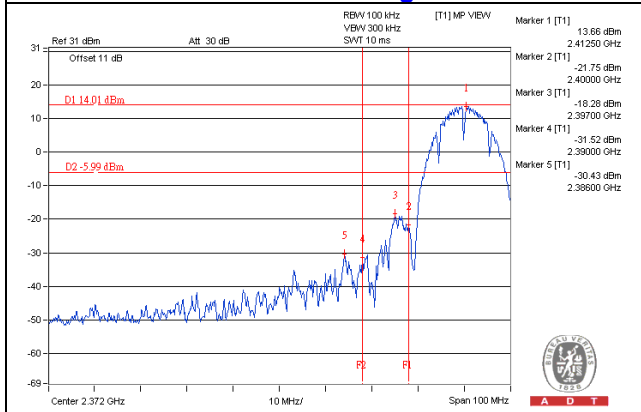
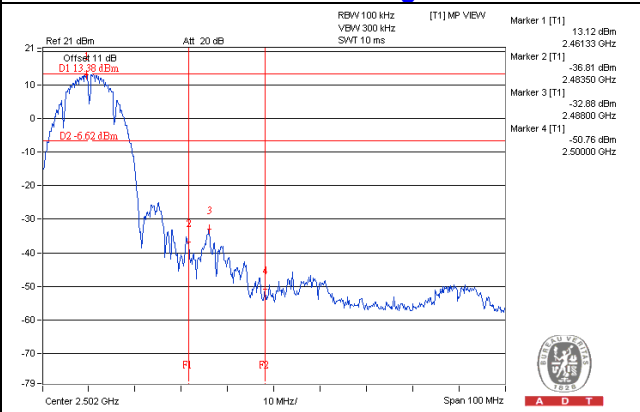
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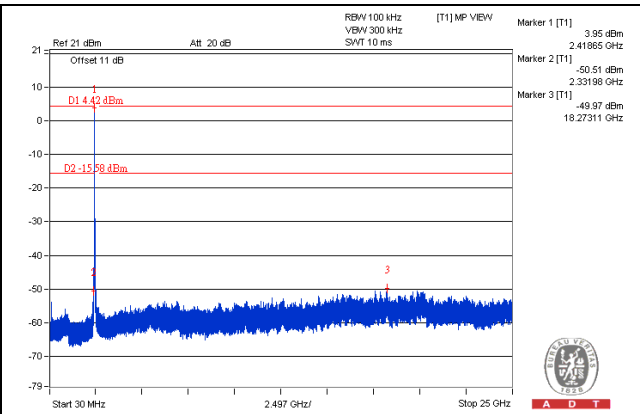
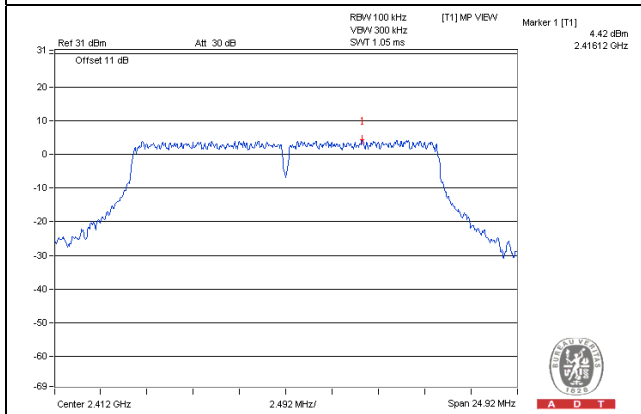
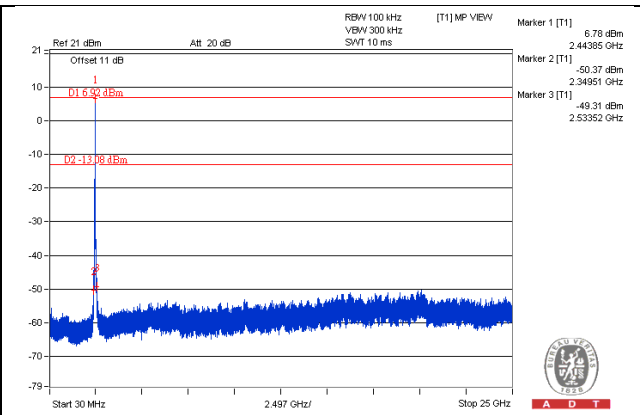
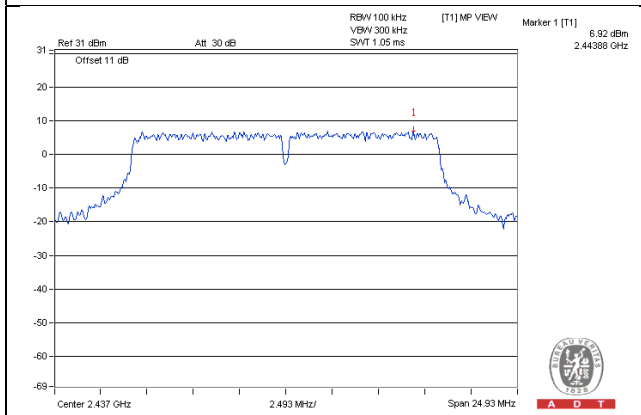
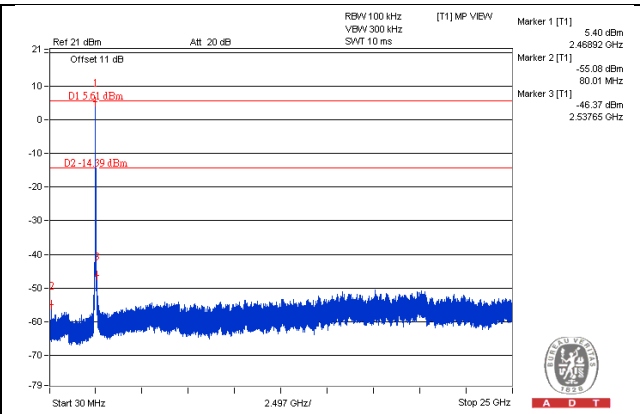
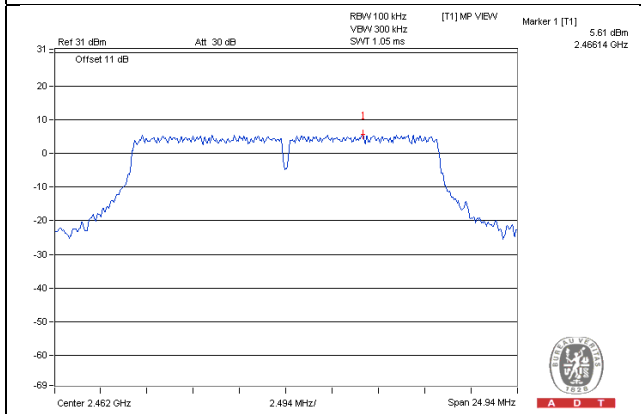
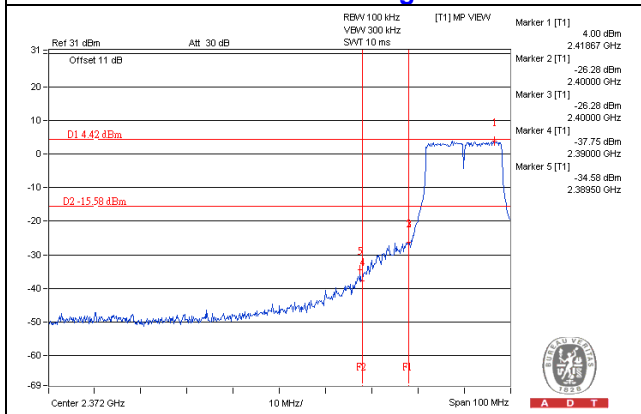
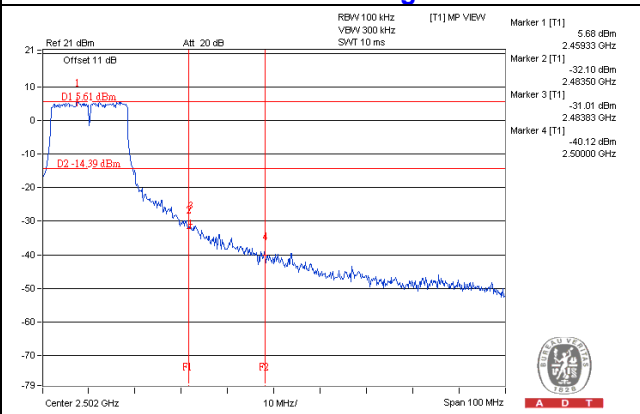
4.6.6 EUT Operating Condition

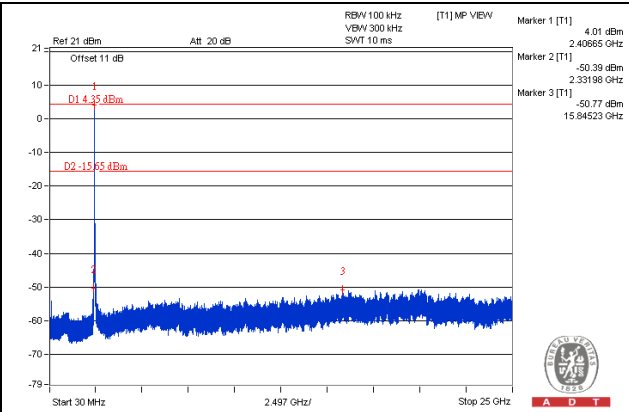
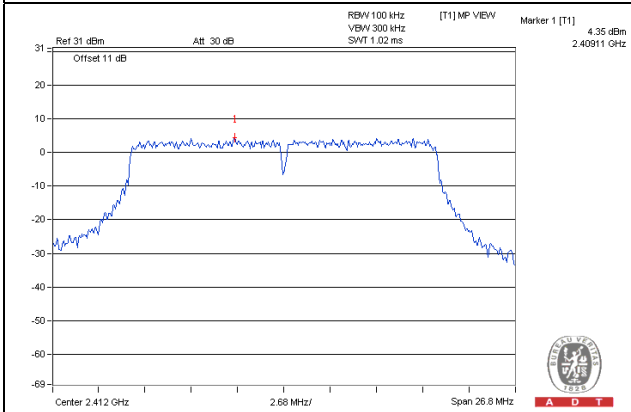
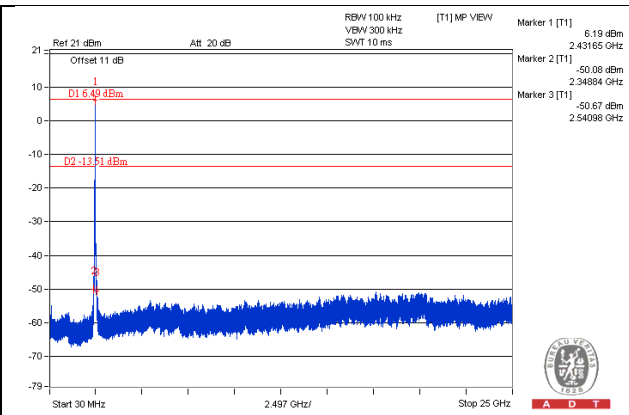
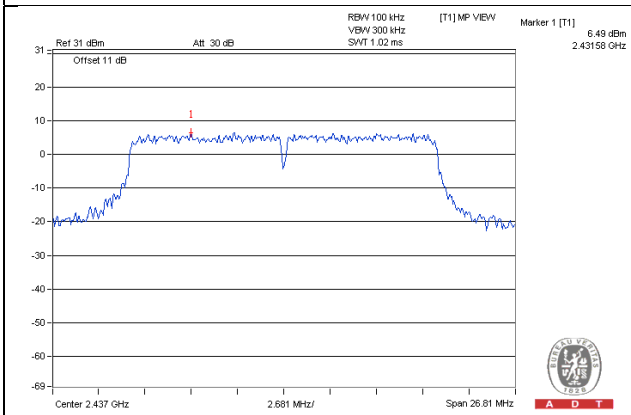
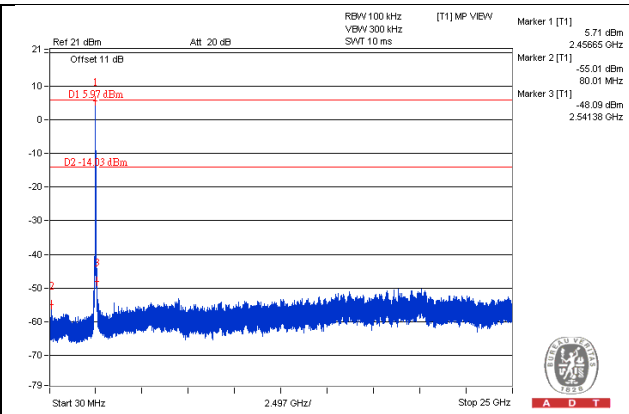
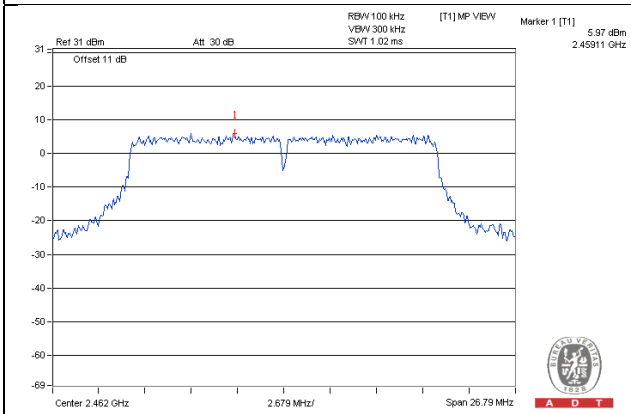
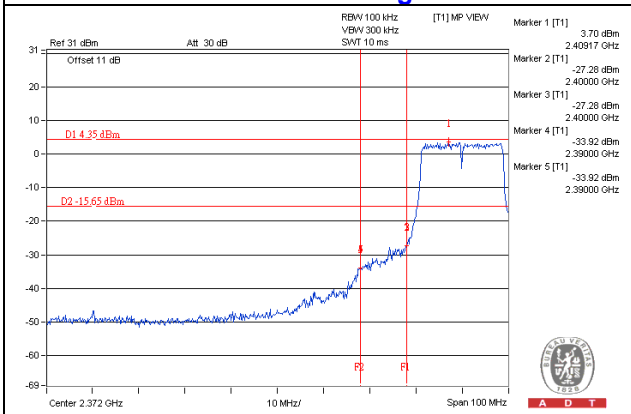
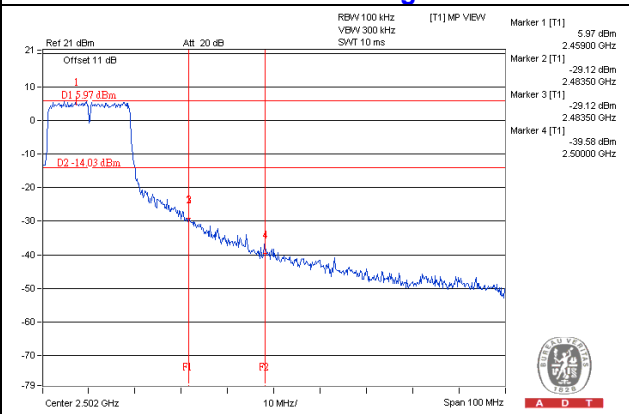
Same as Item 4.3.6

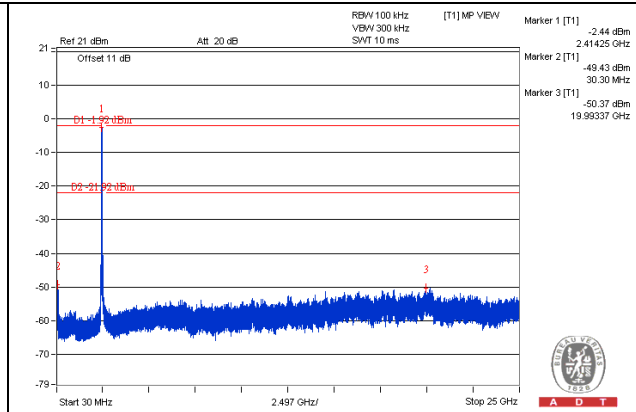
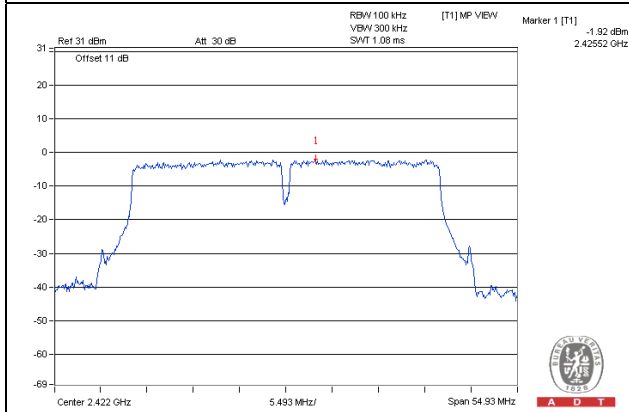
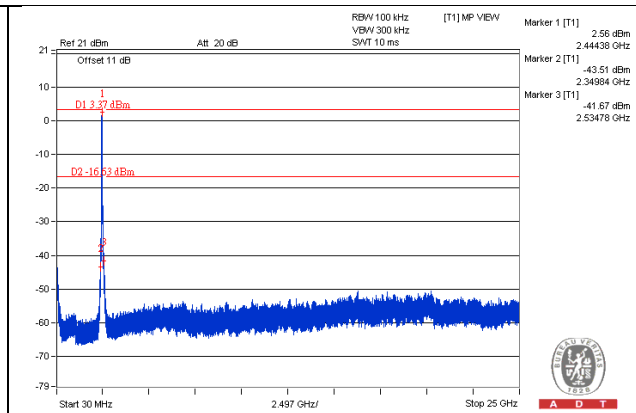
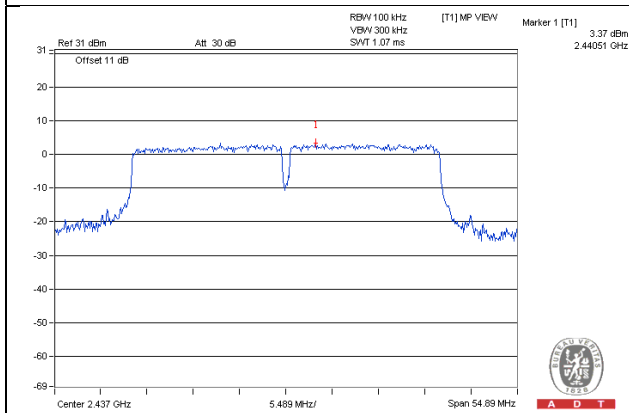
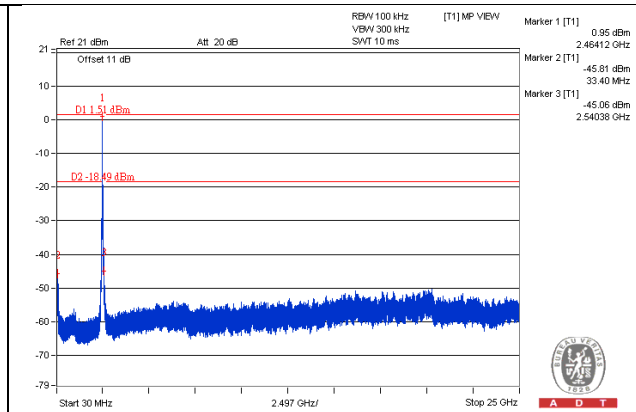
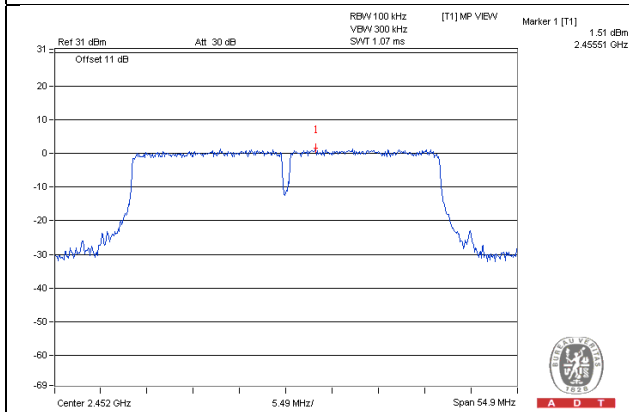
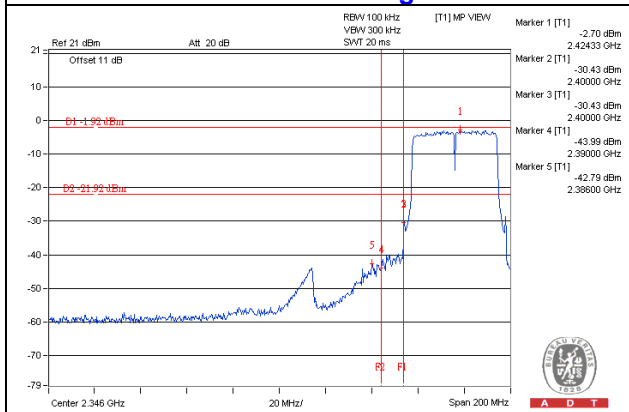
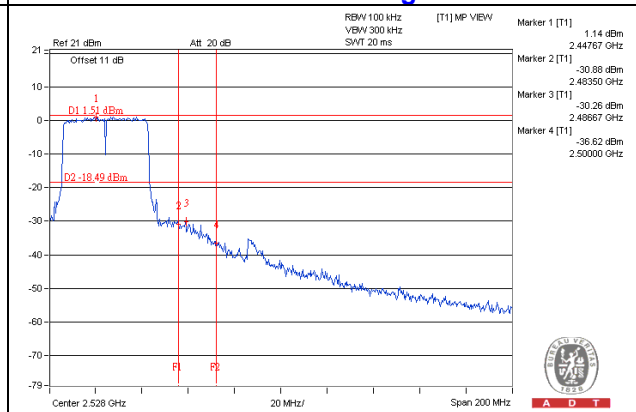
4.6.7 Test Results

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

802.11b
CH 1

CH 6

CH 11

CH 1 Band edge

CH 11 Band edge


802.11g
CH 1

CH 6

CH 11

CH 1 Band edge

CH 11 Band edge


802.11n (HT20)
CH 1

CH 6

CH 11

CH 1 Band edge

CH 11 Band edge


802.11n (HT40)
CH 3

CH 6

CH 9

CH 3 Band edge

CH 9 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:

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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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