

FCC Test Report

Report No.: RF150805C24

FCC ID: TE7RE450

Test Model: RE450

Received Date: Aug. 05, 2015

Test Date: Aug. 10 ~ Oct. 05, 2015

Issued Date: Oct. 07, 2015

Applicant: TP-LINK TECHNOLOGIES CO., LTD.

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Release Control Record

Issue No.	Description	Date Issued
RF150805C24	Original release	Oct. 07, 2015

1 Certificate of Conformity

Product: AC1750 Wi-Fi Range Extender

Brand: TP-LINK

Test Model: RE450

Sample Status: Prototype

Applicant: TP-LINK TECHNOLOGIES CO., LTD.

Test Date: Aug. 10 ~ Oct. 05, 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:** Oct. 07, 2015
Pettie Chen / Senior Specialist

Approved by :  , **Date:** Oct. 07, 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 -11.23dB at 1.82719MHz
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.2dB at 2390.00 and 2483.50MHz.
15.247(d)	Antenna Port Emission	Pass	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	Pass	Meet the requirement of limit.
15.247(b)	Conducted power	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is weld & IPEX not a standard connector.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) ($\pm$)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.44 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.59 dB
	200MHz ~ 1000MHz	3.60 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	AC1750 Wi-Fi Range Extender
Brand	TP-LINK
Test Model	RE450
Status of EUT	Prototype
Power Supply Rating	100~240Vac, 50/60Hz, 0.3A
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 450Mbps
Operating Frequency	2412 ~ 2462MHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
Output Power	622.326mW
Antenna Type	Refer to note
Antenna Connector	Refer to note
Accessory Device	N/A
Data Cable Supplied	N/A

Note:

1. The EUT incorporates a MIMO function. Physically, the EUT provides 3 completed transmitters and 3 receivers.

Modulation Mode	TX Function
802.11b	3TX
802.11g	3TX
802.11n (HT20)	3TX
802.11n (HT40)	3TX

2. The following antennas are for the EUT.

Type	Brand	P/N	Connector	Gain (dBi)	
				2.4GHz	5GHz
Omni-Directional	TP-Link	3101500588	IPEX	2	3
		3101500589	IPEX		
		3101500590	IPEX		

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: 1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-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, 2, 6, 10, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 2, 6, 10, 11	OFDM	BPSK	6.0
-	802.11n (HT20)	1 to 11	1, 2, 6, 10, 11	OFDM	BPSK	7.2
-	802.11n (HT40)	3 to 9	3, 4, 6, 8, 9	OFDM	BPSK	15.0

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)
-	802.11b	1 to 11	6	DSSS	DBPSK	1.0

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)
-	802.11b	1 to 11	6	DSSS	DBPSK	1.0

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, 2, 6, 10, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 2, 6, 10, 11	OFDM	BPSK	6.0
-	802.11n (HT20)	1 to 11	1, 2, 6, 10, 11	OFDM	BPSK	7.2
-	802.11n (HT40)	3 to 9	3, 4, 6, 8, 9	OFDM	BPSK	15.0

Test Condition:

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

3.3 Duty Cycle of Test Signal

Duty cycle of test signal is > 98%, duty factor is not required.

802.11b: Duty cycle = 100%

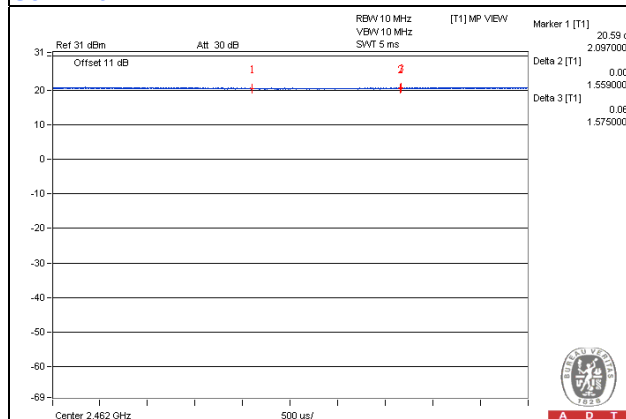
802.11g: Duty cycle = 2.686/2.741 = 0.98

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

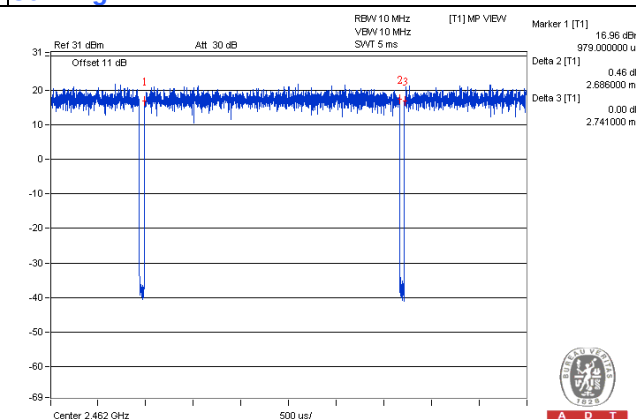
802.11n (HT20): Duty cycle = 2.501/2.571 = 0.973, Duty factor = $10 * \log(1/0.973) = 0.12$

802.11n (HT40): Duty cycle = 1.222/1.263 = 0.968, Duty factor = $10 * \log(1/0.963) = 0.16$

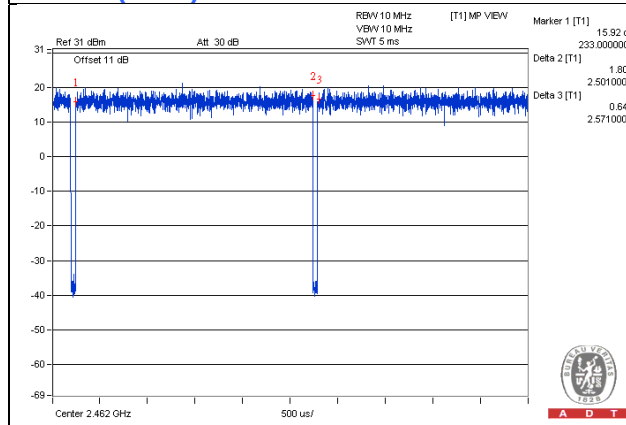
802.11b



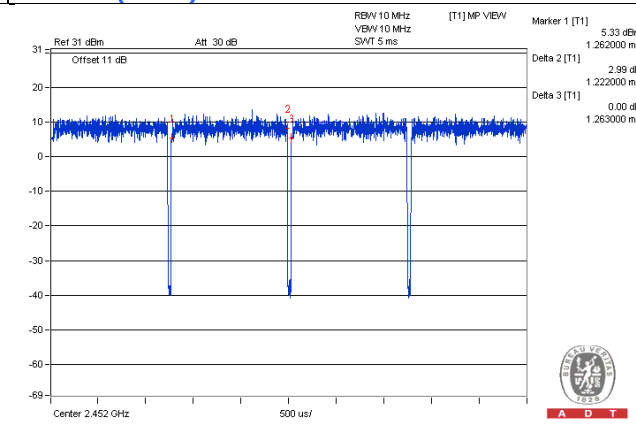
802.11g



802.11n (HT20)



802.11n (HT40)



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.

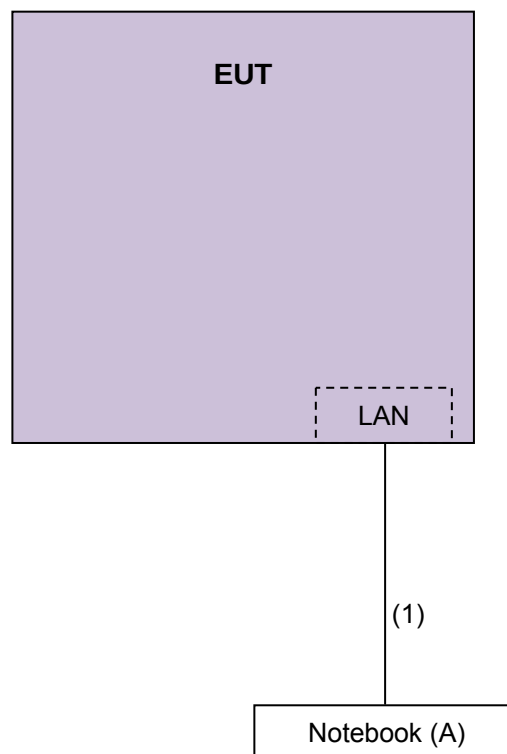
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	D531	CN-0XM006-48643-81U-2786	QDS-BRCM1020	-

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.	LAN cable	1	10	N	0	Cat5e

Note: The core(s) is(are) originally attached to the cable(s).

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

662911 D01 Multiple Transmitter Output v02r01

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 30dB 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 30dB under any condition of modulation.

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
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, 2015	Aug. 08, 2016
Preamplifier Agilent	8447D	2944A10638	Aug. 09, 2015	Aug. 08, 2016
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-02(309222 +248780)	Aug. 09, 2015	Aug. 08, 2016
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-03(274092)	Aug. 09, 2015	Aug. 08, 2016
RF signal cable Woken	8D-FB	Cable-CH9-01	Aug. 11, 2014 Aug. 11, 2015	Aug. 10, 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 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:

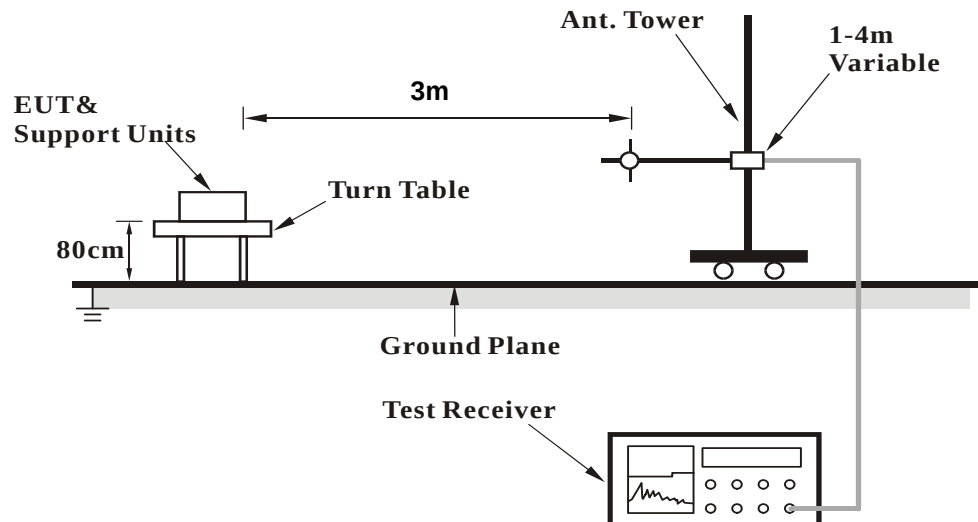
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

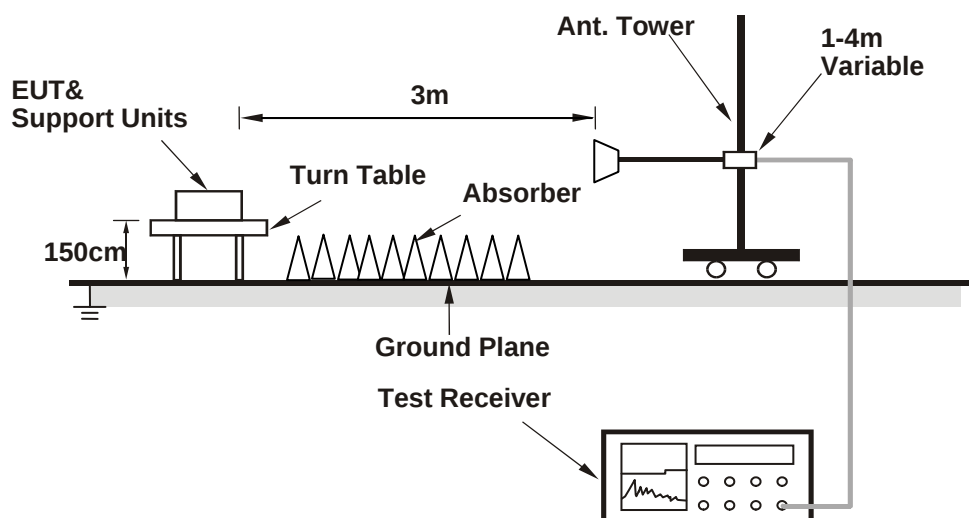
No deviation.

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

- Placed the EUT on the testing table.
- Prepared notebook to act as communication partner and placed it outside of testing area.
- The communication partner connected with EUT via a RJ45 cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
- The communication partner sent data to EUT by command "PING".
- The necessary accessories enable the system in full functions.

4.1.7 Test Results

Above 1GHz data:

802.11b

CHANNEL	TX Channel 1	DETECTOR	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz	FUNCTION	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	60.5 PK	74.0	-13.5	1.02 H	16	26.50	34.00
2	2390.00	50.3 AV	54.0	-3.7	1.02 H	16	16.30	34.00
3	*2412.00	107.4 PK			1.01 H	3	73.30	34.10
4	*2412.00	103.9 AV			1.01 H	3	69.80	34.10
5	4824.00	49.4 PK	74.0	-24.6	1.03 H	241	46.10	3.30
6	4824.00	35.7 AV	54.0	-18.3	1.03 H	241	32.40	3.30
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	63.4 PK	74.0	-10.6	2.27 V	166	29.40	34.00
2	2390.00	53.6 AV	54.0	-0.4	2.27 V	166	19.60	34.00
3	*2412.00	114.0 PK			2.02 V	179	79.90	34.10
4	*2412.00	110.1 AV			2.02 V	179	76.00	34.10
5	4824.00	48.6 PK	74.0	-25.4	1.72 V	274	45.30	3.30
6	4824.00	36.3 AV	54.0	-17.7	1.72 V	274	33.00	3.30

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

CHANNEL	TX Channel 2	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	60.2 PK	74.0	-13.8	1.74 H	104	25.50	34.70
2	2390.00	49.6 AV	54.0	-4.4	1.74 H	104	14.90	34.70
3	*2417.00	107.8 PK			1.91 H	332	72.90	34.90
4	*2417.00	104.0 AV			1.91 H	332	69.10	34.90
5	4834.00	49.1 PK	74.0	-24.9	1.82 H	184	45.10	4.00
6	4834.00	37.5 AV	54.0	-16.5	1.82 H	184	33.50	4.00
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	2390.00	64.5 PK	74.0	-9.5	1.65 V	190	29.80	34.70
2	2390.00	53.5 AV	54.0	-0.5	1.65 V	190	18.80	34.70
3	*2417.00	115.1 PK			1.77 V	59	80.20	34.90
4	*2417.00	111.4 AV			1.77 V	59	76.50	34.90
5	4834.00	49.2 PK	74.0	-24.8	1.15 V	150	45.20	4.00
6	4834.00	37.5 AV	54.0	-16.5	1.15 V	150	33.50	4.00

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)
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	110.8 PK			1.29 H	246	76.50	34.30
2	*2437.00	107.1 AV			1.29 H	246	72.80	34.30
3	2483.50	60.2 PK	74.0	-13.8	1.26 H	230	25.80	34.40
4	2483.50	48.8 AV	54.0	-5.2	1.26 H	230	14.40	34.40
5	4874.00	51.4 PK	74.0	-22.6	1.44 H	172	48.10	3.30
6	4874.00	41.5 AV	54.0	-12.5	1.44 H	172	38.20	3.30
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	*2437.00	117.8 PK			1.84 V	50	83.50	34.30
2	*2437.00	114.2 AV			1.84 V	50	79.90	34.30
3	2483.50	62.7 PK	74.0	-11.3	1.84 V	213	28.30	34.40
4	2483.50	53.7 AV	54.0	-0.3	1.84 V	213	19.30	34.40
5	4874.00	52.9 PK	74.0	-21.1	1.69 V	225	49.60	3.30
6	4874.00	47.2 AV	54.0	-6.8	1.69 V	225	43.90	3.30

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

CHANNEL	TX Channel 10	DETECTOR	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz	FUNCTION	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	*2457.00	106.5 PK			1.66 H	131	71.40	35.10
2	*2457.00	102.5 AV			1.66 H	131	67.40	35.10
3	2483.50	60.8 PK	74.0	-13.2	1.70 H	168	25.60	35.20
4	2483.50	49.3 AV	54.0	-4.7	1.70 H	168	14.10	35.20
5	4914.00	50.7 PK	74.0	-23.3	1.78 H	136	46.50	4.20
6	4914.00	40.0 AV	54.0	-14.0	1.78 H	136	35.80	4.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2457.00	114.0 PK			1.57 V	189	78.90	35.10
2	*2457.00	110.8 AV			1.57 V	189	75.70	35.10
3	2483.50	64.3 PK	74.0	-9.7	2.18 V	203	29.10	35.20
4	2483.50	53.5 AV	54.0	-0.5	2.18 V	203	18.30	35.20
5	4914.00	50.1 PK	74.0	-23.9	1.71 V	215	45.90	4.20
6	4914.00	39.6 AV	54.0	-14.4	1.71 V	215	35.40	4.20

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz	FUNCTION	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	107.7 PK			1.13 H	331	73.30	34.40
2	*2462.00	104.1 AV			1.13 H	331	69.70	34.40
3	2483.50	61.6 PK	74.0	-12.4	1.33 H	291	27.20	34.40
4	2483.50	50.3 AV	54.0	-3.7	1.33 H	291	15.90	34.40
5	4924.00	49.0 PK	74.0	-25.0	1.76 H	129	45.60	3.40
6	4924.00	38.3 AV	54.0	-15.7	1.76 H	129	34.90	3.40
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	112.6 PK			1.63 V	220	78.20	34.40
2	*2462.00	108.8 AV			1.63 V	220	74.40	34.40
3	2483.50	62.8 PK	74.0	-11.2	1.77 V	228	28.40	34.40
4	2483.50	53.5 AV	54.0	-0.5	1.77 V	228	19.10	34.40
5	4924.00	49.3 PK	74.0	-24.7	1.76 V	235	45.90	3.40
6	4924.00	38.2 AV	54.0	-15.8	1.76 V	235	34.80	3.40

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)
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	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz	FUNCTION	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	2288.00	50.4 PK	74.0	-23.6	1.09 H	49	51.30	-0.90
2	2288.00	41.2 AV	54.0	-12.8	1.09 H	49	42.10	-0.90
3	2390.00	60.5 PK	74.0	-13.5	1.00 H	222	26.50	34.00
4	2390.00	48.2 AV	54.0	-5.8	1.00 H	222	14.20	34.00
5	*2412.00	103.7 PK			1.00 H	230	69.60	34.10
6	*2412.00	95.6 AV			1.00 H	230	61.50	34.10
7	4824.00	48.9 PK	74.0	-25.1	1.02 H	205	45.60	3.30
8	4824.00	35.7 AV	54.0	-18.3	1.02 H	205	32.40	3.30
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	2288.00	53.6 PK	74.0	-20.4	1.79 V	162	54.50	-0.90
2	2288.00	43.7 AV	54.0	-10.3	1.79 V	162	44.60	-0.90
3	2390.00	69.9 PK	74.0	-4.1	1.35 V	19	35.90	34.00
4	2390.00	53.6 AV	54.0	-0.4	1.35 V	19	19.60	34.00
5	*2412.00	110.9 PK			1.50 V	22	76.80	34.10
6	*2412.00	101.4 AV			1.50 V	22	67.30	34.10
7	4824.00	48.7 PK	74.0	-25.3	1.02 V	157	45.40	3.30
8	4824.00	35.8 AV	54.0	-18.2	1.02 V	157	32.50	3.30

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

CHANNEL	TX Channel 2	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	64.7 PK	74.0	-9.3	1.81 H	215	30.00	34.70
2	2390.00	49.4 AV	54.0	-4.6	1.81 H	215	14.70	34.70
3	*2417.00	107.7 PK			1.73 H	336	72.80	34.90
4	*2417.00	98.0 AV			1.73 H	336	63.10	34.90
5	4834.00	49.2 PK	74.0	-24.8	1.07 H	216	45.20	4.00
6	4834.00	35.2 AV	54.0	-18.8	1.07 H	216	31.20	4.00
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	2390.00	70.9 PK	74.0	-3.1	1.64 V	328	36.20	34.70
2	2390.00	53.5 AV	54.0	-0.5	1.64 V	328	18.80	34.70
3	*2417.00	113.5 PK			1.43 V	188	78.60	34.90
4	*2417.00	104.0 AV			1.43 V	188	69.10	34.90
5	4834.00	49.4 PK	74.0	-24.6	1.33 V	66	45.40	4.00
6	4834.00	35.3 AV	54.0	-18.7	1.33 V	66	31.30	4.00

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)
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	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz	FUNCTION	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	2288.00	51.4 PK	74.0	-22.6	1.09 H	13	52.30	-0.90
2	2288.00	42.2 AV	54.0	-11.8	1.09 H	13	43.10	-0.90
3	2390.00	64.4 PK	74.0	-9.6	1.02 H	168	30.40	34.00
4	2390.00	49.5 AV	54.0	-4.5	1.02 H	168	15.50	34.00
5	*2437.00	111.8 PK			1.00 H	329	77.50	34.30
6	*2437.00	102.8 AV			1.00 H	329	68.50	34.30
7	2483.50	65.2 PK	74.0	-8.8	1.26 H	340	30.80	34.40
8	2483.50	49.8 AV	54.0	-4.2	1.26 H	340	15.40	34.40
9	4874.00	48.6 PK	74.0	-25.4	1.03 H	200	45.30	3.30
10	4874.00	35.0 AV	54.0	-19.0	1.03 H	200	31.70	3.30
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	2288.00	54.0 PK	74.0	-20.0	1.60 V	174	54.90	-0.90
2	2288.00	43.9 AV	54.0	-10.1	1.60 V	174	44.80	-0.90
3	2390.00	69.7 PK	74.0	-4.3	1.68 V	287	35.70	34.00
4	2390.00	53.6 AV	54.0	-0.4	1.68 V	287	19.60	34.00
5	*2437.00	117.9 PK			1.31 V	181	83.60	34.30
6	*2437.00	107.8 AV			1.31 V	181	73.50	34.30
7	2483.50	69.5 PK	74.0	-4.5	2.54 V	194	35.10	34.40
8	2483.50	53.5 AV	54.0	-0.5	2.54 V	194	19.10	34.40
9	4874.00	48.6 PK	74.0	-25.4	1.31 V	69	45.30	3.30
10	4874.00	35.6 AV	54.0	-18.4	1.31 V	69	32.30	3.30

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

CHANNEL	TX Channel 10	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	*2457.00	108.3 PK			1.88 H	336	73.20	35.10
2	*2457.00	98.7 AV			1.88 H	336	63.60	35.10
3	2483.50	65.9 PK	74.0	-8.1	1.66 H	163	30.70	35.20
4	2483.50	50.2 AV	54.0	-3.8	1.66 H	163	15.00	35.20
5	4914.00	50.0 PK	74.0	-24.0	1.06 H	211	45.80	4.20
6	4914.00	36.2 AV	54.0	-17.8	1.06 H	211	32.00	4.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2457.00	113.3 PK			1.42 V	196	78.20	35.10
2	*2457.00	103.3 AV			1.42 V	196	68.20	35.10
3	2483.50	71.3 PK	74.0	-2.7	2.24 V	202	36.10	35.20
4	2483.50	53.5 AV	54.0	-0.5	2.24 V	202	18.30	35.20
5	4914.00	49.9 PK	74.0	-24.1	1.29 V	98	45.70	4.20
6	4914.00	35.9 AV	54.0	-18.1	1.29 V	98	31.70	4.20

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz	FUNCTION	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	2288.00	48.0 PK	74.0	-26.0	1.39 H	21	48.90	-0.90
2	2288.00	39.4 AV	54.0	-14.6	1.39 H	21	40.30	-0.90
3	*2462.00	106.4 PK			1.14 H	153	72.00	34.40
4	*2462.00	96.0 AV			1.14 H	153	61.60	34.40
5	2483.50	66.4 PK	74.0	-7.6	1.00 H	329	32.00	34.40
6	2483.50	50.6 AV	54.0	-3.4	1.00 H	329	16.20	34.40
7	4924.00	48.7 PK	74.0	-25.3	1.00 H	247	45.30	3.40
8	4924.00	35.5 AV	54.0	-18.5	1.00 H	247	32.10	3.40
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	2288.00	51.0 PK	74.0	-23.0	1.00 V	180	51.90	-0.90
2	2288.00	41.3 AV	54.0	-12.7	1.00 V	180	42.20	-0.90
3	*2462.00	111.2 PK			1.48 V	183	76.80	34.40
4	*2462.00	100.8 AV			1.48 V	183	66.40	34.40
5	2483.50	69.5 PK	74.0	-4.5	1.76 V	285	35.10	34.40
6	2483.50	53.6 AV	54.0	-0.4	1.76 V	285	19.20	34.40
7	4924.00	48.6 PK	74.0	-25.4	1.02 V	155	45.20	3.40
8	4924.00	34.8 AV	54.0	-19.2	1.02 V	155	31.40	3.40

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)
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	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz	FUNCTION	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	2288.00	47.9 PK	74.0	-26.1	1.39 H	18	48.80	-0.90
2	2288.00	37.2 AV	54.0	-16.8	1.39 H	18	38.10	-0.90
3	2390.00	60.8 PK	74.0	-13.2	1.48 H	358	26.80	34.00
4	2390.00	48.5 AV	54.0	-5.5	1.48 H	358	14.50	34.00
5	*2412.00	102.6 PK			1.00 H	359	68.50	34.10
6	*2412.00	92.8 AV			1.00 H	359	58.70	34.10
7	4824.00	48.6 PK	74.0	-25.4	1.01 H	258	45.30	3.30
8	4824.00	34.7 AV	54.0	-19.3	1.01 H	258	31.40	3.30
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	2288.00	52.7 PK	74.0	-21.3	2.15 V	174	53.60	-0.90
2	2288.00	40.9 AV	54.0	-13.1	2.15 V	174	41.80	-0.90
3	2390.00	68.0 PK	74.0	-6.0	1.50 V	192	34.00	34.00
4	2390.00	53.5 AV	54.0	-0.5	1.50 V	192	19.50	34.00
5	*2412.00	109.1 PK			2.42 V	196	75.00	34.10
6	*2412.00	99.1 AV			2.42 V	196	65.00	34.10
7	4824.00	49.1 PK	74.0	-24.9	1.00 V	165	45.80	3.30
8	4824.00	34.9 AV	54.0	-19.1	1.00 V	165	31.60	3.30

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

CHANNEL	TX Channel 2	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	62.3 PK	74.0	-11.7	1.64 H	221	27.60	34.70
2	2390.00	49.3 AV	54.0	-4.7	1.64 H	221	14.60	34.70
3	*2417.00	107.8 PK			1.40 H	223	72.90	34.90
4	*2417.00	98.0 AV			1.40 H	223	63.10	34.90
5	4834.00	49.3 PK	74.0	-24.7	1.00 H	131	45.30	4.00
6	4834.00	36.1 AV	54.0	-17.9	1.00 H	131	32.10	4.00
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	2390.00	71.7 PK	74.0	-2.3	1.61 V	36	37.00	34.70
2	2390.00	53.5 AV	54.0	-0.5	1.61 V	36	18.80	34.70
3	*2417.00	113.9 PK			1.97 V	199	79.00	34.90
4	*2417.00	104.2 AV			1.97 V	199	69.30	34.90
5	4834.00	49.6 PK	74.0	-24.4	1.03 V	179	45.60	4.00
6	4834.00	36.3 AV	54.0	-17.7	1.03 V	179	32.30	4.00

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)
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	2288.00	50.1 PK	74.0	-23.9	1.41 H	25	51.00	-0.90
2	2288.00	41.9 AV	54.0	-12.1	1.41 H	25	42.80	-0.90
3	2390.00	63.4 PK	74.0	-10.6	1.65 H	327	29.40	34.00
4	2390.00	49.1 AV	54.0	-4.9	1.65 H	327	15.10	34.00
5	*2437.00	111.5 PK			1.00 H	329	77.20	34.30
6	*2437.00	101.8 AV			1.00 H	329	67.50	34.30
7	2483.50	63.7 PK	74.0	-10.3	1.59 H	137	29.30	34.40
8	2483.50	49.8 AV	54.0	-4.2	1.59 H	137	15.40	34.40
9	4874.00	48.4 PK	74.0	-25.6	1.00 H	119	45.10	3.30
10	4874.00	35.2 AV	54.0	-18.8	1.00 H	119	31.90	3.30
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	2288.00	52.3 PK	74.0	-21.7	1.00 V	35	53.20	-0.90
2	2288.00	43.6 AV	54.0	-10.4	1.00 V	35	44.50	-0.90
3	2390.00	70.4 PK	74.0	-3.6	2.39 V	215	36.40	34.00
4	2390.00	53.7 AV	54.0	-0.3	2.39 V	215	19.70	34.00
5	*2437.00	117.4 PK			1.47 V	189	83.10	34.30
6	*2437.00	107.0 AV			1.47 V	189	72.70	34.30
7	2483.50	69.3 PK	74.0	-4.7	1.62 V	41	34.90	34.40
8	2483.50	53.8 AV	54.0	-0.2	1.62 V	41	19.40	34.40
9	4874.00	48.8 PK	74.0	-25.2	1.01 V	202	45.50	3.30
10	4874.00	35.4 AV	54.0	-18.6	1.01 V	202	32.10	3.30

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

CHANNEL	TX Channel 10	DETECTOR	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz	FUNCTION	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	*2457.00	108.7 PK			2.06 H	332	73.60	35.10
2	*2457.00	98.8 AV			2.06 H	332	63.70	35.10
3	2483.50	65.1 PK	74.0	-8.9	1.50 H	44	29.90	35.20
4	2483.50	50.1 AV	54.0	-3.9	1.50 H	44	14.90	35.20
5	4914.00	49.7 PK	74.0	-24.3	1.01 H	177	45.50	4.20
6	4914.00	36.4 AV	54.0	-17.6	1.01 H	177	32.20	4.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2457.00	113.8 PK			1.72 V	20	78.70	35.10
2	*2457.00	104.3 AV			1.72 V	20	69.20	35.10
3	2483.50	72.6 PK	74.0	-1.4	1.56 V	193	37.40	35.20
4	2483.50	53.6 AV	54.0	-0.4	1.56 V	193	18.40	35.20
5	4914.00	49.8 PK	74.0	-24.2	1.04 V	186	45.60	4.20
6	4914.00	36.4 AV	54.0	-17.6	1.04 V	186	32.20	4.20

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz	FUNCTION	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	2288.00	45.6 PK	74.0	-28.4	1.59 H	23	46.50	-0.90
2	2288.00	34.6 AV	54.0	-19.4	1.59 H	23	35.50	-0.90
3	*2462.00	103.9 PK			1.00 H	153	69.50	34.40
4	*2462.00	93.8 AV			1.00 H	153	59.40	34.40
5	2483.50	66.4 PK	74.0	-7.6	1.26 H	327	32.00	34.40
6	2483.50	50.8 AV	54.0	-3.2	1.26 H	327	16.40	34.40
7	4924.00	47.9 PK	74.0	-26.1	1.00 H	132	44.50	3.40
8	4924.00	35.1 AV	54.0	-18.9	1.00 H	132	31.70	3.40
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	2288.00	51.2 PK	74.0	-22.8	1.60 V	31	52.10	-0.90
2	2288.00	41.4 AV	54.0	-12.6	1.60 V	31	42.30	-0.90
3	*2462.00	110.2 PK			1.46 V	185	75.80	34.40
4	*2462.00	100.3 AV			1.46 V	185	65.90	34.40
5	2483.50	69.0 PK	74.0	-5.0	1.01 V	263	34.60	34.40
6	2483.50	53.6 AV	54.0	-0.4	1.01 V	263	19.20	34.40
7	4924.00	48.1 PK	74.0	-25.9	1.01 V	211	44.70	3.40
8	4924.00	35.3 AV	54.0	-18.7	1.01 V	211	31.90	3.40

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)
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	2288.00	47.2 PK	74.0	-26.8	1.58 H	35	48.10	-0.90
2	2288.00	37.0 AV	54.0	-17.0	1.58 H	35	37.90	-0.90
3	2390.00	62.0 PK	74.0	-12.0	1.47 H	329	28.00	34.00
4	2390.00	49.9 AV	54.0	-4.1	1.47 H	329	15.90	34.00
5	*2422.00	99.8 PK			1.46 H	153	65.70	34.10
6	*2422.00	89.4 AV			1.46 H	153	55.30	34.10
7	4844.00	48.3 PK	74.0	-25.7	1.00 H	36	45.00	3.30
8	4844.00	34.8 AV	54.0	-19.2	1.00 H	36	31.50	3.30
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	2288.00	50.2 PK	74.0	-23.8	1.79 V	26	51.10	-0.90
2	2288.00	40.7 AV	54.0	-13.3	1.79 V	26	41.60	-0.90
3	2390.00	67.0 PK	74.0	-7.0	2.07 V	5	33.00	34.00
4	2390.00	53.5 AV	54.0	-0.5	2.07 V	5	19.50	34.00
5	*2422.00	104.7 PK			2.18 V	196	70.60	34.10
6	*2422.00	94.3 AV			2.18 V	196	60.20	34.10
7	4844.00	48.5 PK	74.0	-25.5	1.07 V	155	45.20	3.30
8	4844.00	34.9 AV	54.0	-19.1	1.07 V	155	31.60	3.30

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

CHANNEL	TX Channel 4	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	61.2 PK	74.0	-12.8	1.24 H	23	26.50	34.70
2	2390.00	49.0 AV	54.0	-5.0	1.24 H	23	14.30	34.70
3	*2427.00	100.4 PK			1.72 H	339	65.50	34.90
4	*2427.00	90.8 AV			1.72 H	339	55.90	34.90
5	4854.00	49.1 PK	74.0	-24.9	1.00 H	63	45.10	4.00
6	4854.00	35.8 AV	54.0	-18.2	1.00 H	63	31.80	4.00
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	2390.00	70.2 PK	74.0	-3.8	1.61 V	43	35.50	34.70
2	2390.00	53.7 AV	54.0	-0.3	1.61 V	43	19.00	34.70
3	*2427.00	106.2 PK			1.48 V	23	71.30	34.90
4	*2427.00	96.2 AV			1.48 V	23	61.30	34.90
5	4854.00	49.0 PK	74.0	-25.0	1.03 V	131	45.00	4.00
6	4854.00	35.8 AV	54.0	-18.2	1.03 V	131	31.80	4.00

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)
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	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz	FUNCTION	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	2288.00	49.4 PK	74.0	-24.6	1.57 H	14	50.30	-0.90
2	2288.00	39.4 AV	54.0	-14.6	1.57 H	14	40.30	-0.90
3	2390.00	62.6 PK	74.0	-11.4	1.68 H	45	28.60	34.00
4	2390.00	49.7 AV	54.0	-4.3	1.68 H	45	15.70	34.00
5	*2437.00	103.2 PK			1.15 H	332	68.90	34.30
6	*2437.00	93.3 AV			1.15 H	332	59.00	34.30
7	2483.50	60.7 PK	74.0	-13.3	1.00 H	12	26.30	34.40
8	2483.50	48.8 AV	54.0	-5.2	1.00 H	12	14.40	34.40
9	4874.00	48.4 PK	74.0	-25.6	1.00 H	77	45.10	3.30
10	4874.00	35.1 AV	54.0	-18.9	1.00 H	77	31.80	3.30
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	2288.00	52.9 PK	74.0	-21.1	1.80 V	21	53.80	-0.90
2	2288.00	43.9 AV	54.0	-10.1	1.80 V	21	44.80	-0.90
3	2390.00	67.5 PK	74.0	-6.5	2.45 V	220	33.50	34.00
4	2390.00	53.8 AV	54.0	-0.2	2.45 V	220	19.80	34.00
5	*2437.00	107.3 PK			1.81 V	191	73.00	34.30
6	*2437.00	97.6 AV			1.81 V	191	63.30	34.30
7	2483.50	66.2 PK	74.0	-7.8	1.42 V	229	31.80	34.40
8	2483.50	50.5 AV	54.0	-3.5	1.42 V	229	16.10	34.40
9	4874.00	48.6 PK	74.0	-25.4	1.02 V	191	45.30	3.30
10	4874.00	35.5 AV	54.0	-18.5	1.02 V	191	32.20	3.30

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

CHANNEL	TX Channel 8	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	*2447.00	100.6 PK			1.77 H	341	65.60	35.00
2	*2447.00	91.1 AV			1.77 H	341	56.10	35.00
3	2483.50	64.8 PK	74.0	-9.2	1.19 H	51	29.60	35.20
4	2483.50	50.2 AV	54.0	-3.8	1.19 H	51	15.00	35.20
5	4894.00	49.1 PK	74.0	-24.9	1.00 H	57	45.10	4.00
6	4894.00	36.4 AV	54.0	-17.6	1.00 H	57	32.40	4.00
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	*2447.00	107.3 PK			1.79 V	40	72.30	35.00
2	*2447.00	97.6 AV			1.79 V	40	62.60	35.00
3	2483.50	68.1 PK	74.0	-5.9	2.10 V	341	32.90	35.20
4	2483.50	53.5 AV	54.0	-0.5	2.10 V	341	18.30	35.20
5	4894.00	49.3 PK	74.0	-24.7	1.01 V	144	45.30	4.00
6	4894.00	36.3 AV	54.0	-17.7	1.01 V	144	32.30	4.00

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)
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	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz	FUNCTION	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	2288.00	44.9 PK	74.0	-29.1	1.76 H	19	45.80	-0.90
2	2288.00	33.9 AV	54.0	-20.1	1.76 H	19	34.80	-0.90
3	*2452.00	97.6 PK			1.00 H	150	63.30	34.30
4	*2452.00	88.5 AV			1.00 H	150	54.20	34.30
5	2483.50	62.2 PK	74.0	-11.8	1.01 H	13	27.80	34.40
6	2483.50	49.5 AV	54.0	-4.5	1.01 H	13	15.10	34.40
7	4904.00	48.3 PK	74.0	-25.7	1.00 H	111	44.90	3.40
8	4904.00	35.0 AV	54.0	-19.0	1.00 H	111	31.60	3.40
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	2288.00	50.1 PK	74.0	-23.9	1.96 V	92	51.00	-0.90
2	2288.00	39.5 AV	54.0	-14.5	1.96 V	92	40.40	-0.90
3	*2452.00	104.5 PK			1.91 V	210	70.20	34.30
4	*2452.00	94.3 AV			1.91 V	210	60.00	34.30
5	2483.50	68.9 PK	74.0	-5.1	1.76 V	215	34.50	34.40
6	2483.50	53.5 AV	54.0	-0.5	1.76 V	215	19.10	34.40
7	4904.00	48.7 PK	74.0	-25.3	1.01 V	255	45.30	3.40
8	4904.00	35.2 AV	54.0	-18.8	1.01 V	255	31.80	3.40

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)
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: 802.11b

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	31.94	28.3 QP	40.0	-11.7	1.99 H	16	44.20	-15.90
2	94.02	22.1 QP	43.5	-21.4	1.99 H	303	41.50	-19.40
3	138.64	23.8 QP	43.5	-19.7	1.99 H	313	38.50	-14.70
4	249.22	32.1 QP	46.0	-13.9	1.00 H	157	46.50	-14.40
5	375.32	26.9 QP	46.0	-19.1	1.00 H	173	37.80	-10.90
6	625.58	27.2 QP	46.0	-18.8	1.24 H	183	33.00	-5.80
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	30.27	31.6 QP	40.0	-8.4	1.48 V	205	47.30	-15.70
2	47.46	28.7 QP	40.0	-11.3	1.24 V	9	43.00	-14.30
3	173.56	24.0 QP	43.5	-19.5	1.24 V	71	38.40	-14.40
4	249.22	31.1 QP	46.0	-14.9	1.00 V	309	45.50	-14.40
5	375.32	27.7 QP	46.0	-18.3	1.24 V	289	38.60	-10.90
6	439.34	31.3 QP	46.0	-14.7	2.00 V	307	40.80	-9.50

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

Note: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 11, 2014	Nov. 10, 2015
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Dec. 26, 2014	Dec. 25, 2015
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 26, 2015	Feb. 25, 2016
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 24, 2015	Jul. 23, 2016
Software ADT	BV ADT_Conc_ V7.3.7.3	NA	NA	NA

Notes: 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 1.
3. The VCCI Site Registration No. is C-2040.

4.2.3 Test Procedures

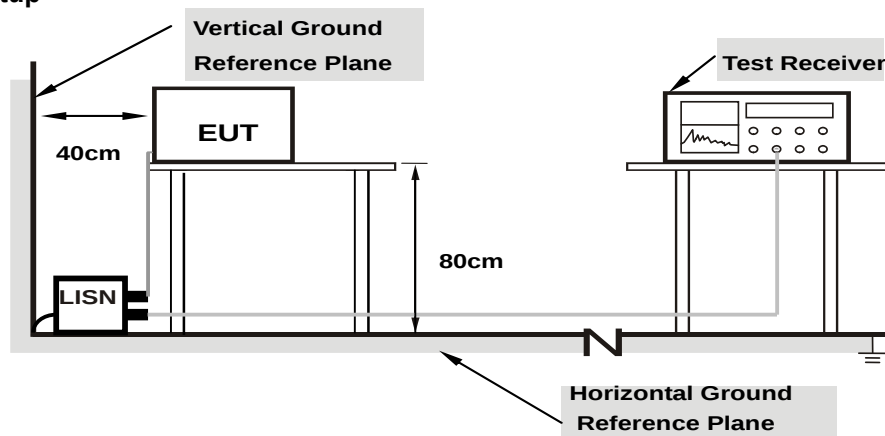
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Conditions

Same as 4.1.6.

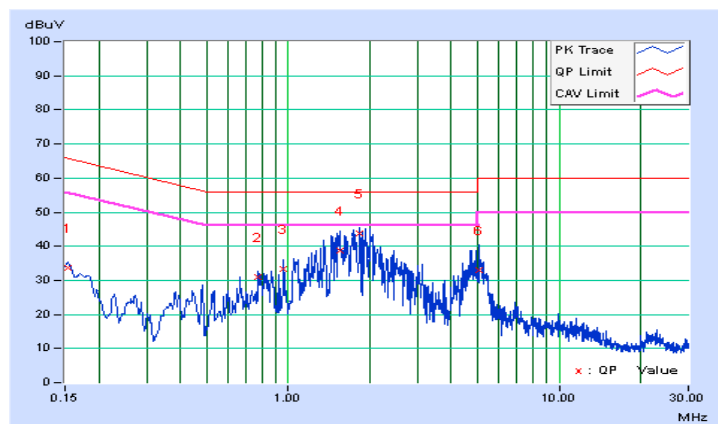
4.2.7 Test Results

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

No	Freq. [MHz]	Corr. Factor (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	0.15391	0.05	33.57	31.04	33.62	31.09	65.79	55.79	-32.17	-24.70
2	0.77560	0.07	31.02	22.72	31.09	22.79	56.00	46.00	-24.91	-23.21
3	0.95561	0.08	33.16	25.62	33.24	25.70	56.00	46.00	-22.76	-20.30
4	1.54978	0.10	38.75	24.91	38.85	25.01	56.00	46.00	-17.15	-20.99
5	1.83130	0.11	43.54	33.85	43.65	33.96	56.00	46.00	-12.35	-12.04
6	5.04923	0.24	32.81	24.19	33.05	24.43	60.00	50.00	-26.95	-25.57

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.

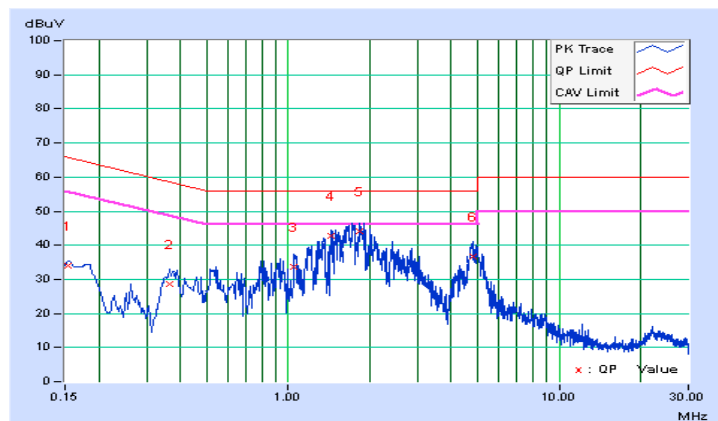


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	0.05	33.81	30.49	33.86	30.54	65.79	55.79	-31.93	-25.25
2	0.36505	0.06	28.60	26.36	28.66	26.42	58.61	48.61	-29.95	-22.19
3	1.05321	0.08	33.47	22.42	33.55	22.50	56.00	46.00	-22.45	-23.50
4	1.43639	0.09	42.69	34.08	42.78	34.17	56.00	46.00	-13.22	-11.83
5	1.82719	0.10	43.86	34.67	43.96	34.77	56.00	46.00	-12.04	-11.23
6	4.79117	0.22	36.61	29.66	36.83	29.88	56.00	46.00	-19.17	-16.12

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.

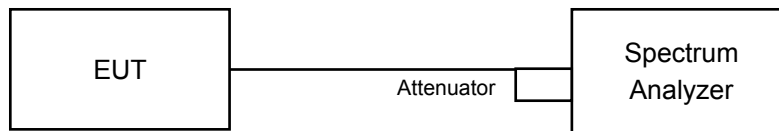


4.3 6dB Bandwidth Measurement

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

558074 D01 DTS Meas Guidance v03r02 section 8.1

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		CHAIN 0	CHAIN 1	CHAIN 2		
1	2412	10.15	10.13	10.13	0.5	PASS
6	2437	10.12	10.12	10.12	0.5	PASS
11	2462	10.11	10.11	10.12	0.5	PASS

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		CHAIN 0	CHAIN 1	CHAIN 2		
1	2412	16.43	16.43	16.42	0.5	PASS
6	2437	16.39	16.37	16.38	0.5	PASS
11	2462	16.42	16.42	16.41	0.5	PASS

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		CHAIN 0	CHAIN 1	CHAIN 2		
1	2412	17.65	17.64	17.63	0.5	PASS
6	2437	17.39	17.57	17.60	0.5	PASS
11	2462	17.62	17.63	17.64	0.5	PASS

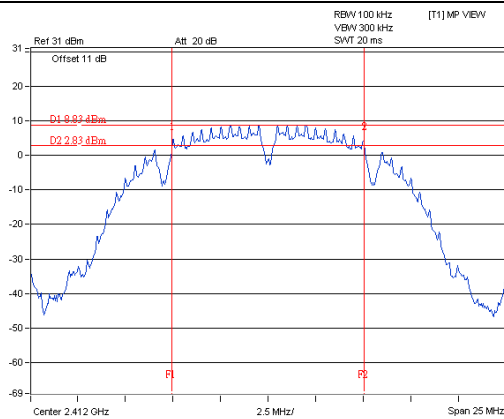
802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		CHAIN 0	CHAIN 1	CHAIN 2		
3	2422	36.44	36.47	36.45	0.5	PASS
6	2437	36.41	36.41	36.42	0.5	PASS
9	2452	36.15	36.46	36.46	0.5	PASS

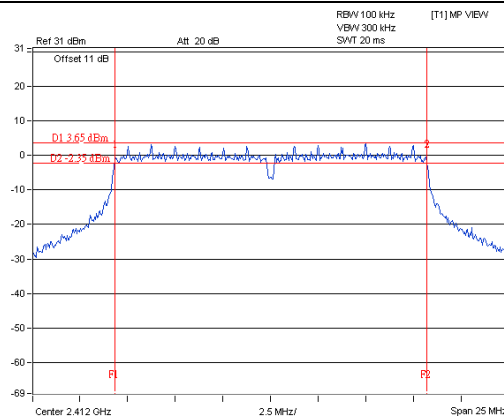
Spectrum Plot of Worst Value

802.11b

802.11g



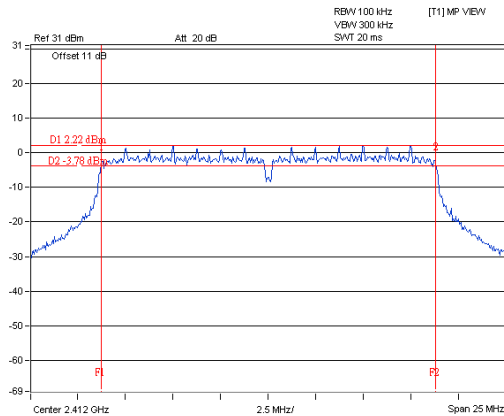
Marker 1 [T1]
2.83 dBm
2.40892 GHz
Delta 2 [T1]
0.00 dB
10.15 MHz



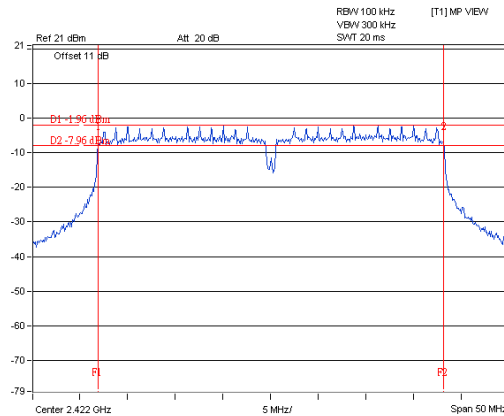
Marker 1 [T1]
-2.35 dBm
2.40378 GHz
Delta 2 [T1]
0.00 dB
16.43 MHz

802.11n (HT20)

802.11n (HT40)



Marker 1 [T1]
-3.78 dBm
2.40318 GHz
Delta 2 [T1]
0.00 dB
17.65 MHz



Marker 1 [T1]
-7.96 dBm
2.40378 GHz
Delta 2 [T1]
0.00 dB
36.47 MHz

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)

Per KDB 662911 D01 Multiple Transmitter Output Method of conducted output power measurement on IEEE 802.11 devices,

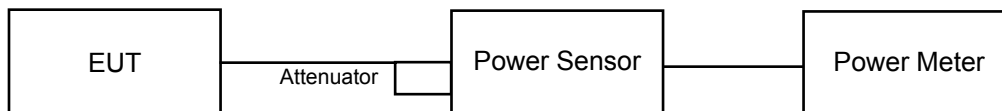
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

Array Gain = $5 \log(N_{ANT}/N_{SS})$ dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

For power measurements on all other devices: Array Gain = $10 \log(N_{ANT}/N_{SS})$ dB.

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

558074 D01 DTS Meas Guidance v03r03 section 9.2.3.2

An average power sensor was used on the output port of the EUT. A power meter was used to read the response of the 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

802.11b

Chan.	Freq. (MHz)	Average Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
1	2412	18.03	18.00	17.80	186.885	22.72	30	Pass
2	2417	18.76	18.71	18.91	227.268	23.57	30	Pass
6	2437	22.93	23.00	23.55	622.326	27.94	30	Pass
10	2457	18.80	18.68	18.47	219.955	23.42	30	Pass
11	2462	17.70	17.56	17.17	168.019	22.25	30	Pass

802.11g

Chan.	Freq. (MHz)	Average Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
1	2412	13.67	13.58	14.00	71.203	18.52	30	Pass
2	2417	14.64	15.54	15.30	98.801	19.95	30	Pass
6	2437	21.14	21.22	21.78	413.112	26.16	30	Pass
10	2457	15.44	15.66	16.12	112.733	20.52	30	Pass
11	2462	14.37	14.55	14.06	81.331	19.10	30	Pass

802.11n (HT20)

Chan.	Freq. (MHz)	Average Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
1	2412	12.94	12.81	12.93	58.412	17.67	30	Pass
2	2417	14.04	14.78	14.92	86.458	19.37	30	Pass
6	2437	21.36	21.35	21.86	426.693	26.30	30	Pass
10	2457	14.29	14.96	14.94	89.375	19.51	30	Pass
11	2462	13.58	14.06	13.95	73.102	18.64	30	Pass

802.11n (HT40)

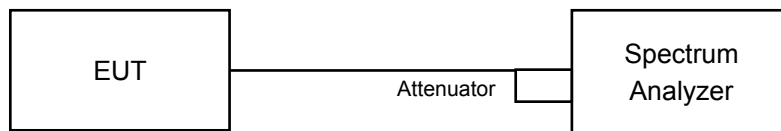
Chan.	Freq. (MHz)	Average Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
3	2422	10.65	11.62	11.58	40.523	16.08	30	Pass
4	2427	9.72	10.74	10.79	33.228	15.22	30	Pass
6	2437	14.59	15.09	15.32	95.100	19.78	30	Pass
8	2447	9.79	10.93	11.22	35.159	15.46	30	Pass
9	2452	9.83	10.86	11.22	35.049	15.45	30	Pass

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

558074 D01 DTS Meas Guidance v03r03 section 10.3

For duty cycle $\geq 98\%$

- Set instrument center frequency to DTS channel center frequency.
- Set span to at least 1.5 times the OBW.
- Set RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- Set VBW $\geq 3 \times \text{RBW}$.
- Detector = power averaging (RMS) or sample detector (when RMS not available).
- Ensure that the number of measurement points in the sweep $\geq 2 \times \text{span}/\text{RBW}$.
- Sweep time = auto couple.
- Employ trace averaging (RMS) mode over a minimum of 100 traces.
- Use the peak marker function to determine the maximum amplitude level.

For duty cycle $< 98\%$

- Measure the duty cycle (x).
- Set instrument center frequency to DTS channel center frequency.
- Set span to at least 1.5 times the OBW.
- Set RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- Set VBW $\geq 3 \times \text{RBW}$.
- Detector = power averaging (RMS) or sample detector (when RMS not available).
- Ensure that the number of measurement points in the sweep $\geq 2 \times \text{span}/\text{RBW}$.
- Sweep time = auto couple.
- Do not use sweep triggering. Allow sweep to "free run".
- Employ trace averaging (RMS) mode over a minimum of 100 traces.
- Use the peak marker function to determine the maximum amplitude level.
- Add $10 \log (1/x)$, where x is the duty cycle measured in step (a), to the measured PSD to compute the average PSD during the actual transmission time.

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

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=3) dB	Total PSD (dBm)	Limit (dBm)	Pass /Fail
0	1	2412	-6.44	4.77	-1.67	7.23	Pass
	6	2437	-1.18	4.77	3.59	7.23	Pass
	11	2462	-6.12	4.77	-1.35	7.23	Pass
1	1	2412	-5.55	4.77	-0.78	7.23	Pass
	6	2437	-1.41	4.77	3.36	7.23	Pass
	11	2462	-5.79	4.77	-1.02	7.23	Pass
2	1	2412	-5.22	4.77	-0.45	7.23	Pass
	6	2437	-0.70	4.77	4.07	7.23	Pass
	11	2462	-6.16	4.77	-1.39	7.23	Pass

Note:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $2\text{dBi} + 10\log(3) = 6.77\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $8-(6.77-6) = 7.23\text{dBm}$.

802.11g

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=3) dB	Total PSD (dBm)	Limit (dBm)	Pass /Fail
0	1	2412	-10.18	4.77	-5.41	7.23	Pass
	6	2437	-3.30	4.77	1.47	7.23	Pass
	11	2462	-10.90	4.77	-6.13	7.23	Pass
1	1	2412	-10.54	4.77	-5.77	7.23	Pass
	6	2437	-4.63	4.77	0.14	7.23	Pass
	11	2462	-10.61	4.77	-5.84	7.23	Pass
2	1	2412	-12.42	4.77	-7.65	7.23	Pass
	6	2437	-4.27	4.77	0.50	7.23	Pass
	11	2462	-12.39	4.77	-7.62	7.23	Pass

Note:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $2\text{dBi} + 10\log(3) = 6.77\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $8-(6.77-6) = 7.23\text{dBm}$.

802.11n (HT20)

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=3) dB	Duty Factor	Total PSD (dBm)	Limit (dBm)	Pass /Fail
0	1	2412	-12.85	4.77	0.12	-7.96	7.23	Pass
	6	2437	-4.57	4.77	0.12	0.32	7.23	Pass
	11	2462	-11.71	4.77	0.12	-6.82	7.23	Pass
1	1	2412	-12.35	4.77	0.12	-7.46	7.23	Pass
	6	2437	-4.50	4.77	0.12	0.39	7.23	Pass
	11	2462	-11.68	4.77	0.12	-6.79	7.23	Pass
2	1	2412	-11.16	4.77	0.12	-6.27	7.23	Pass
	6	2437	-4.84	4.77	0.12	0.05	7.23	Pass
	11	2462	-13.15	4.77	0.12	-8.26	7.23	Pass

Note:

- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- Directional gain = $2\text{dBi} + 10\log(3) = 6.77\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $8-(6.77-6) = 7.23\text{dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=3) dB	Duty Factor	Total PSD (dBm)	Limit (dBm)	Pass /Fail
0	3	2422	-18.15	4.77	0.16	-13.22	7.23	Pass
	6	2437	-12.32	4.77	0.16	-7.39	7.23	Pass
	9	2452	-18.40	4.77	0.16	-13.47	7.23	Pass
1	3	2422	-16.11	4.77	0.16	-11.18	7.23	Pass
	6	2437	-12.98	4.77	0.16	-8.05	7.23	Pass
	9	2452	-18.65	4.77	0.16	-13.72	7.23	Pass
2	3	2422	-17.51	4.77	0.16	-12.58	7.23	Pass
	6	2437	-12.95	4.77	0.16	-8.02	7.23	Pass
	9	2452	-17.64	4.77	0.16	-12.71	7.23	Pass

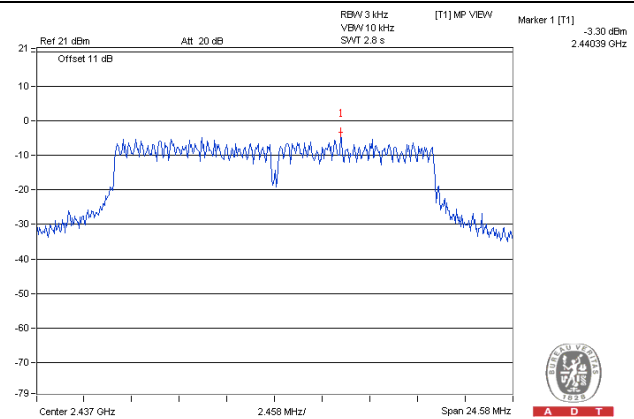
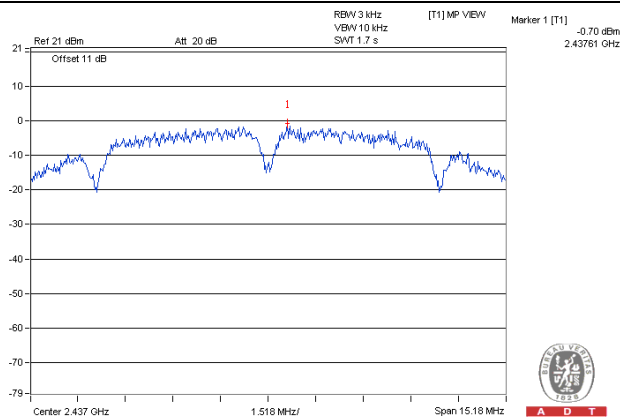
Note:

- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- Directional gain = $2\text{dBi} + 10\log(3) = 6.77\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $8-(6.77-6) = 7.23\text{dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

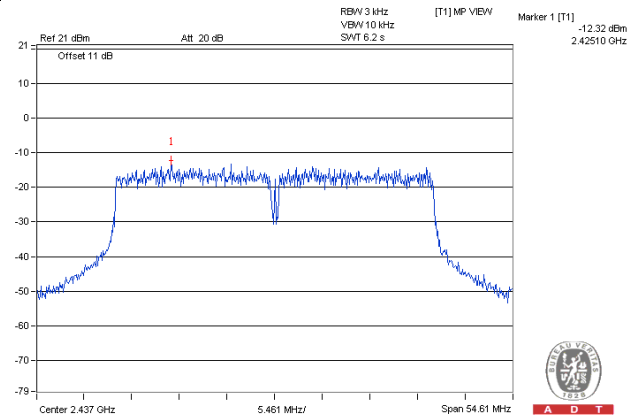
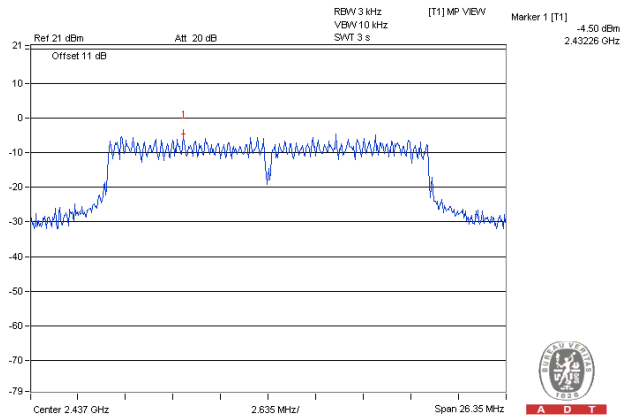
802.11b

802.11g



802.11n (HT20)

802.11n (HT40)

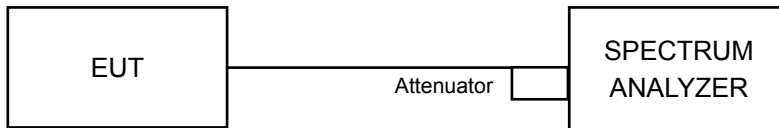


4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

Below 30dB 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

558074 D01 DTS Meas Guidance v03r03 section 11.2

- Set the RBW = 100 kHz.
- Set the VBW $\geq$ 300 kHz.
- Detector = average.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

MEASUREMENT PROCEDURE OOB

558074 D01 DTS Meas Guidance v03r03 section 11.3

- Set RBW = 100 kHz.
- Set VBW $\geq$ 300 kHz.
- Ensure that the number of measurement points $\geq$ span/RBW
- According to measurement points to set differ measurement span.
- Detector = average.
- Trace Mode = max hold.
- Sweep = auto couple.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

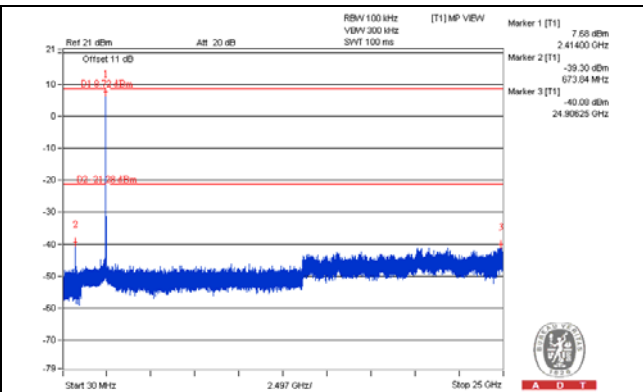
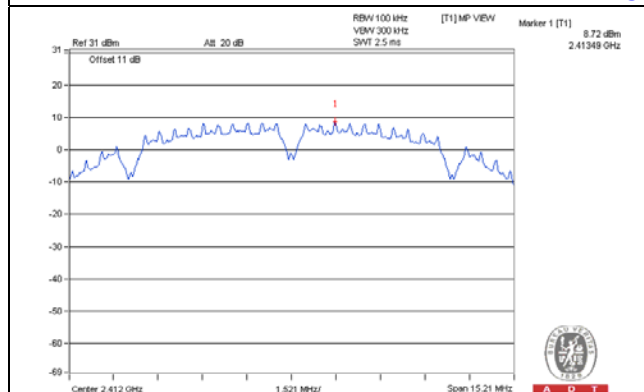
Same as Item 4.3.6

4.6.7 Test Results

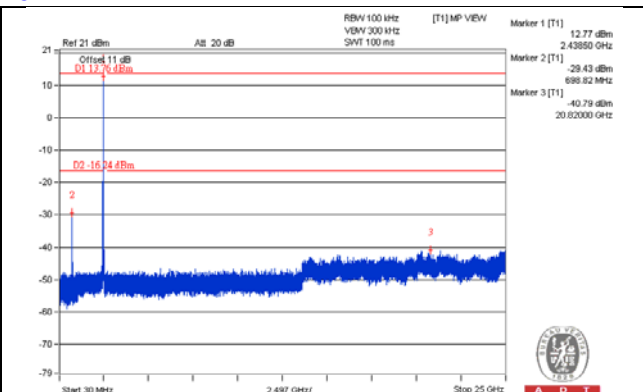
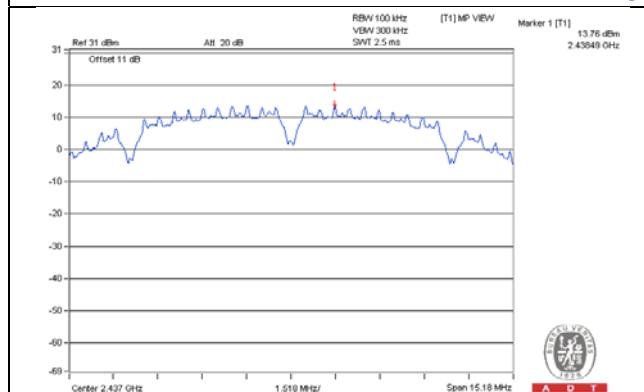
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

802.11b CHAIN 0

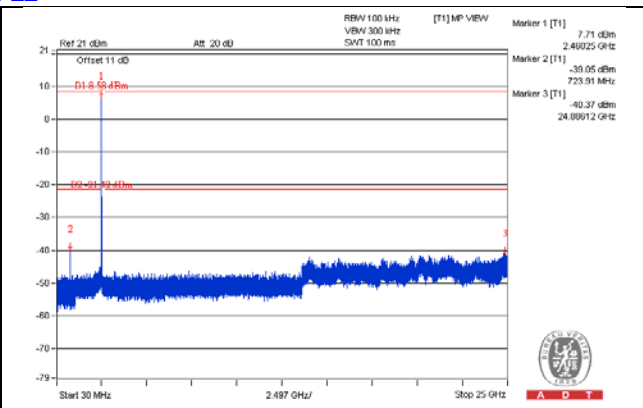
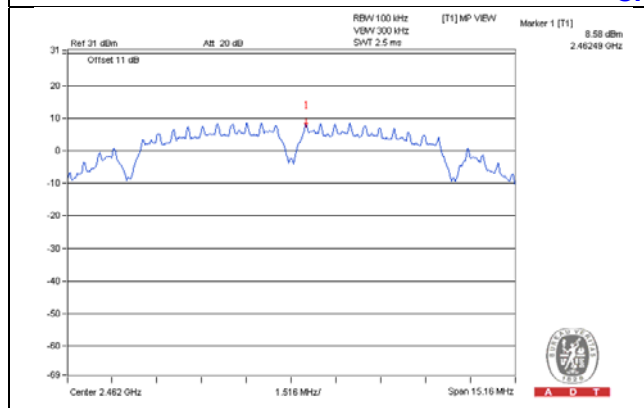
CH 1



CH 6

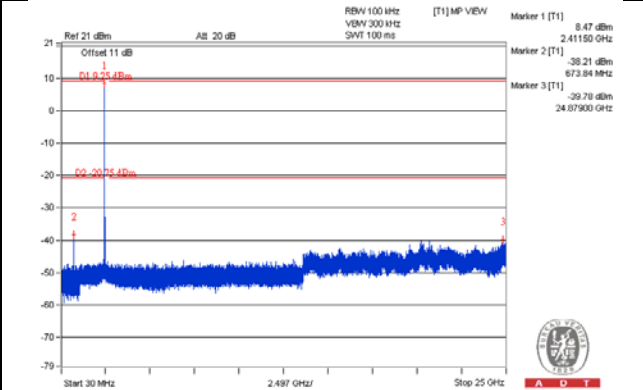
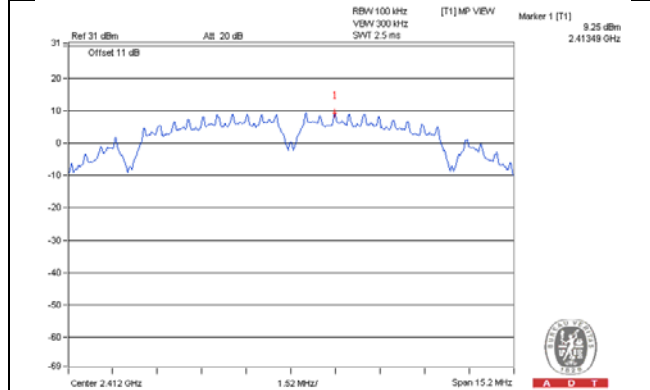


CH 11

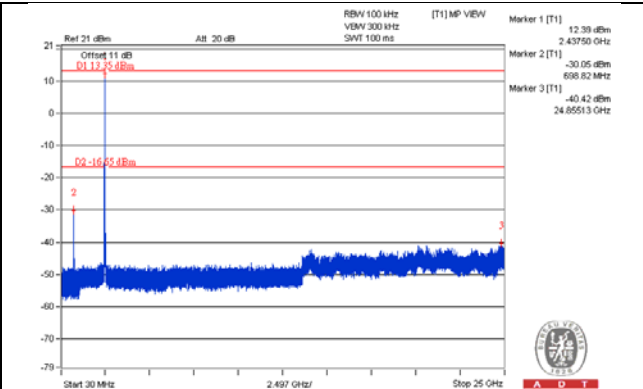
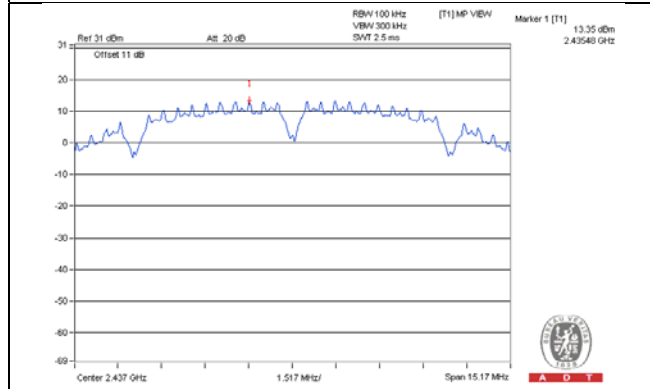


CHAIN 1

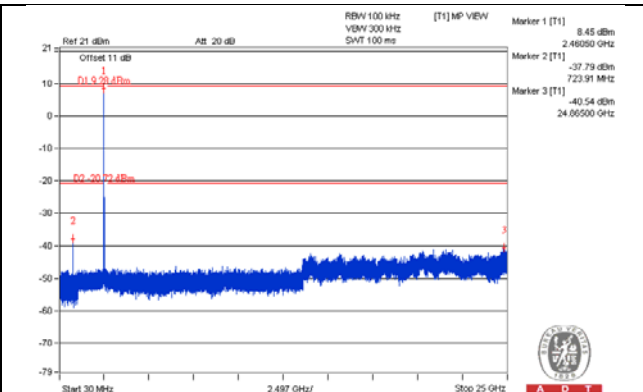
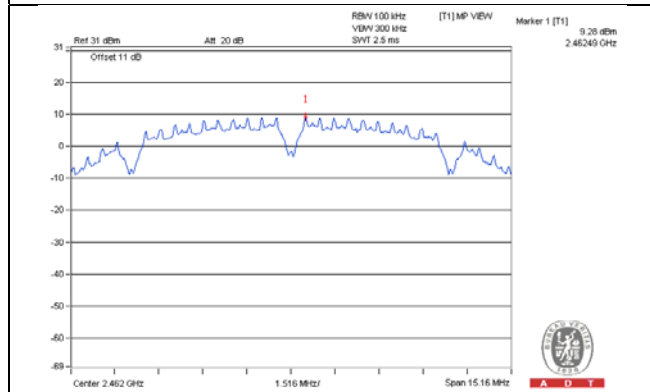
CH 1



CH 6

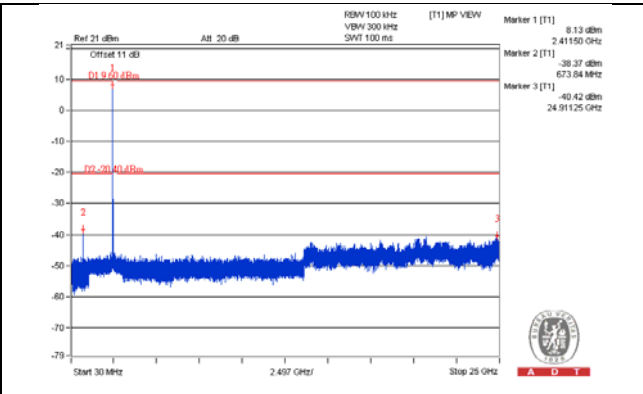
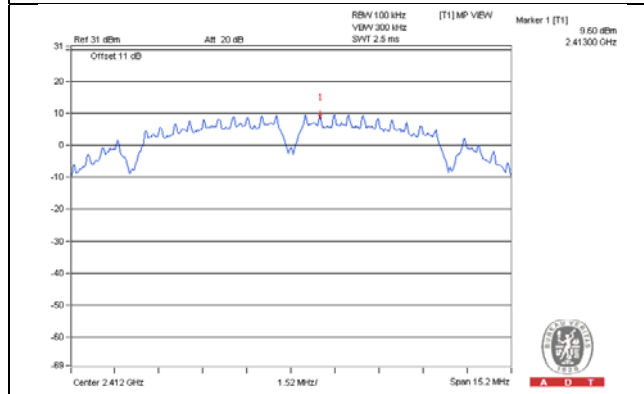


CH 11

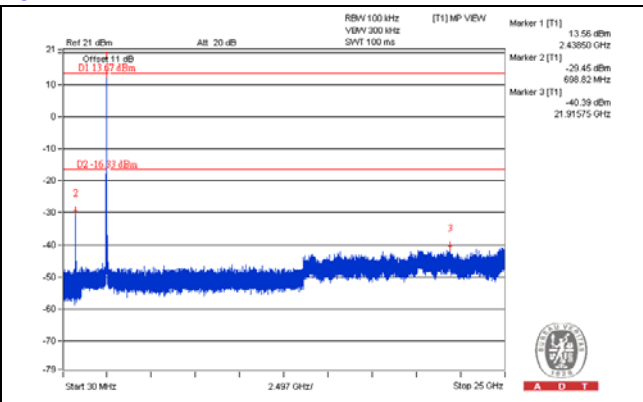
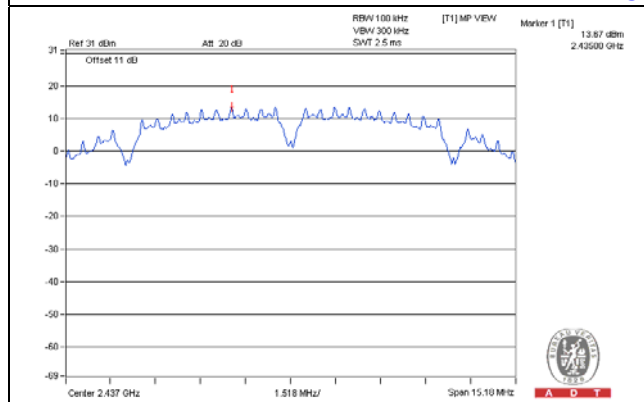


CHAIN 2

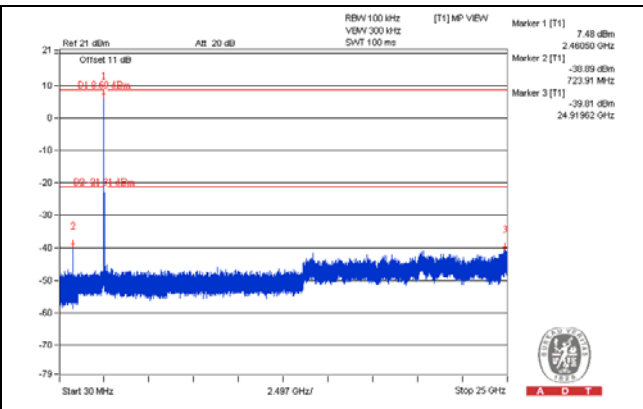
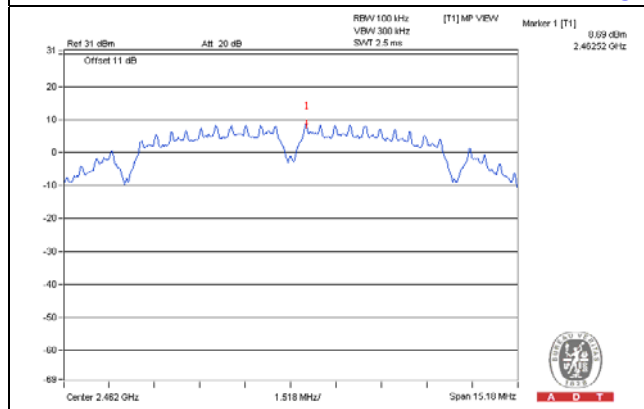
CH 1



CH 6

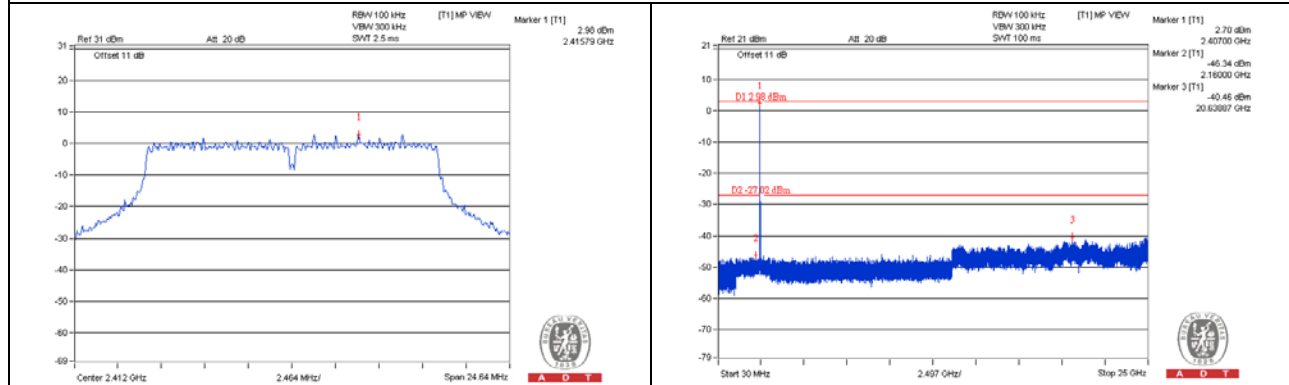


CH 11

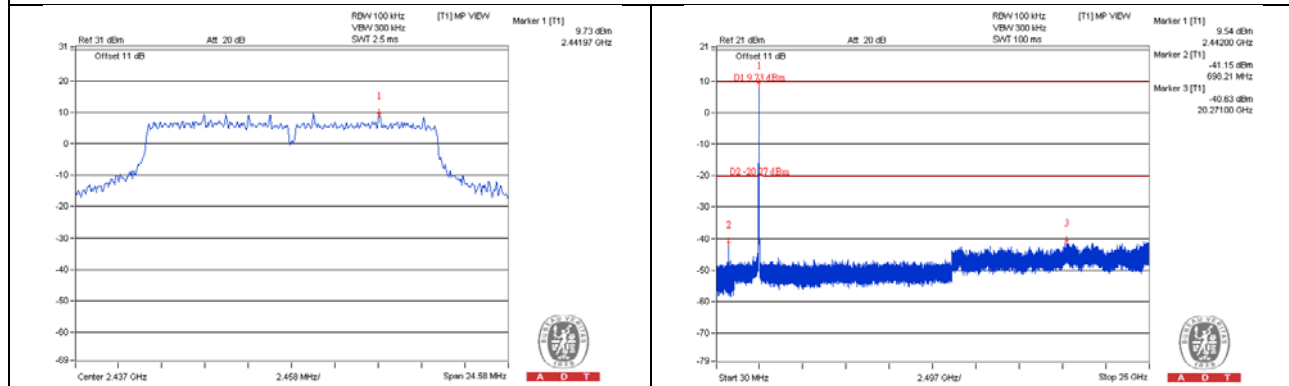


802.11g CHAIN 0

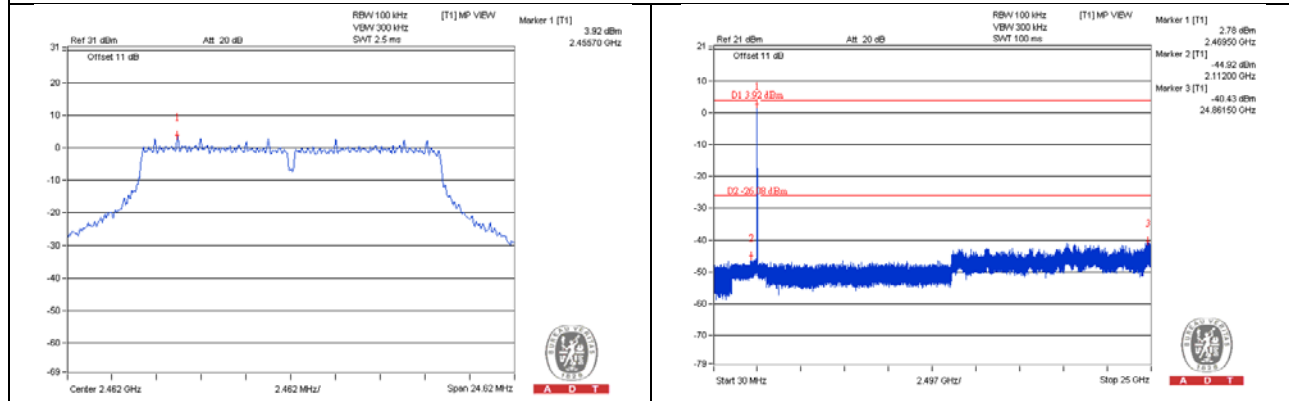
CH 1



CH 6

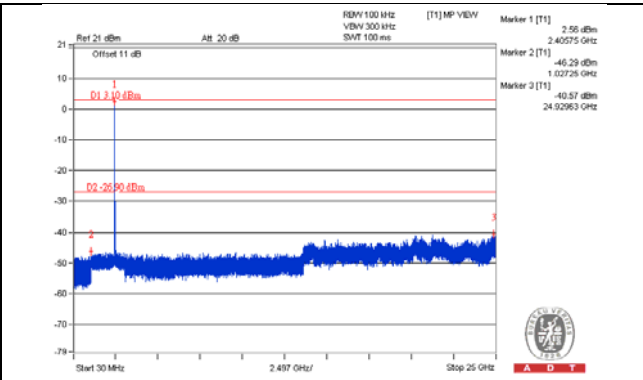
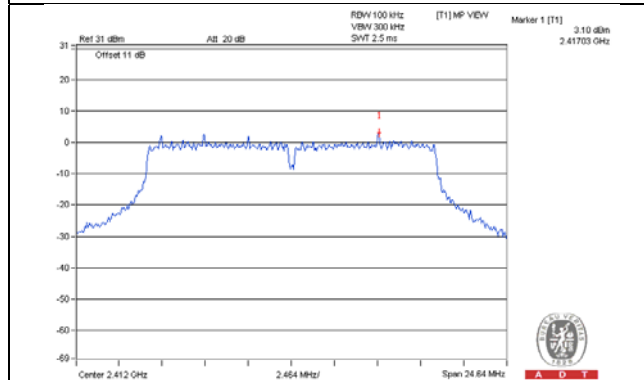


CH 11

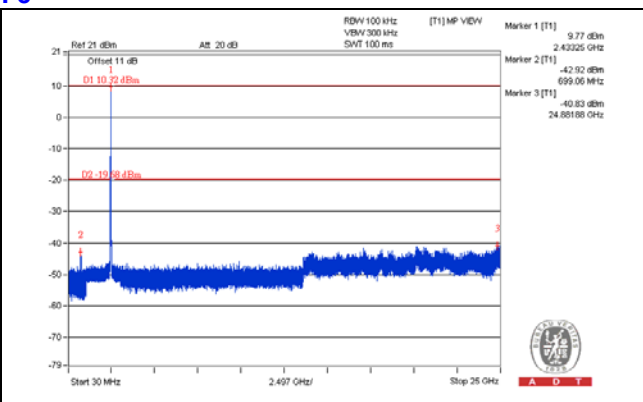
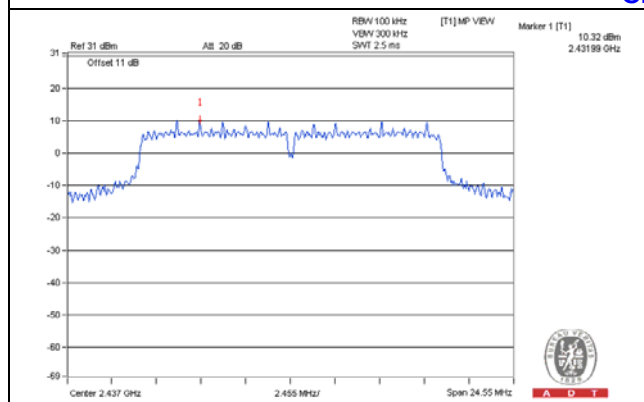


CHAIN 1

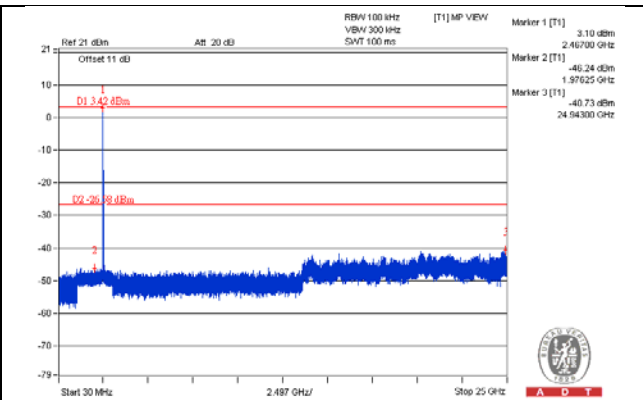
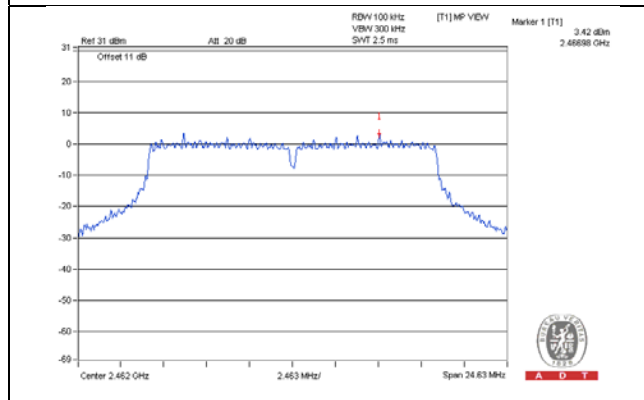
CH 1



CH 6

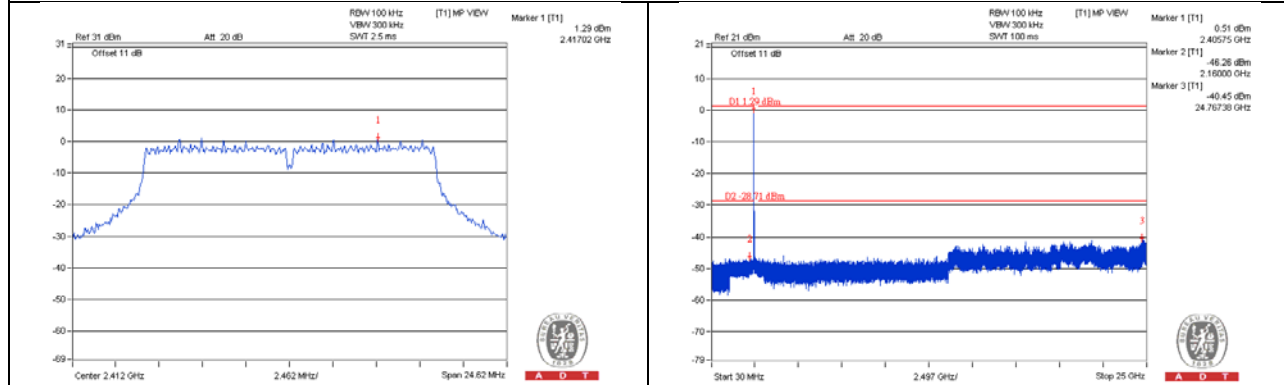


CH 11

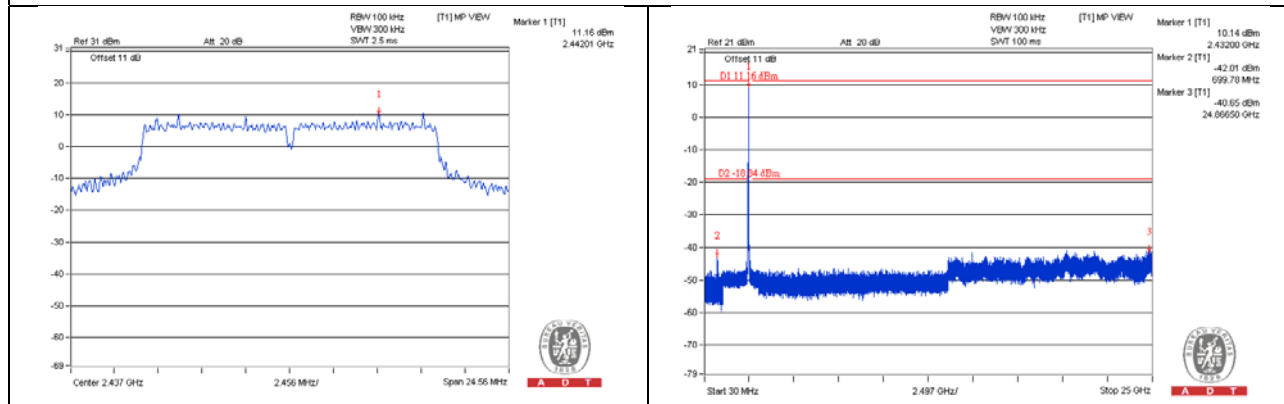


CHAIN 2

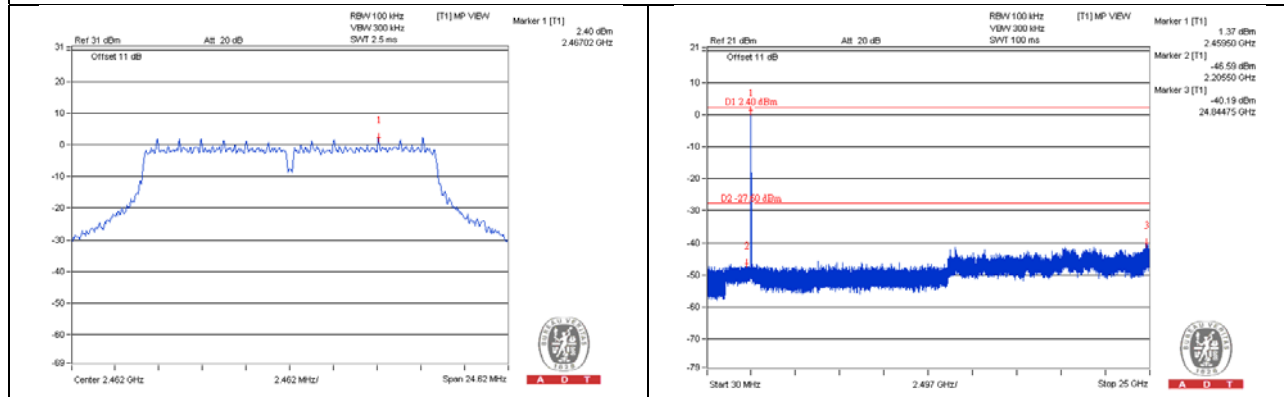
CH 1



CH 6

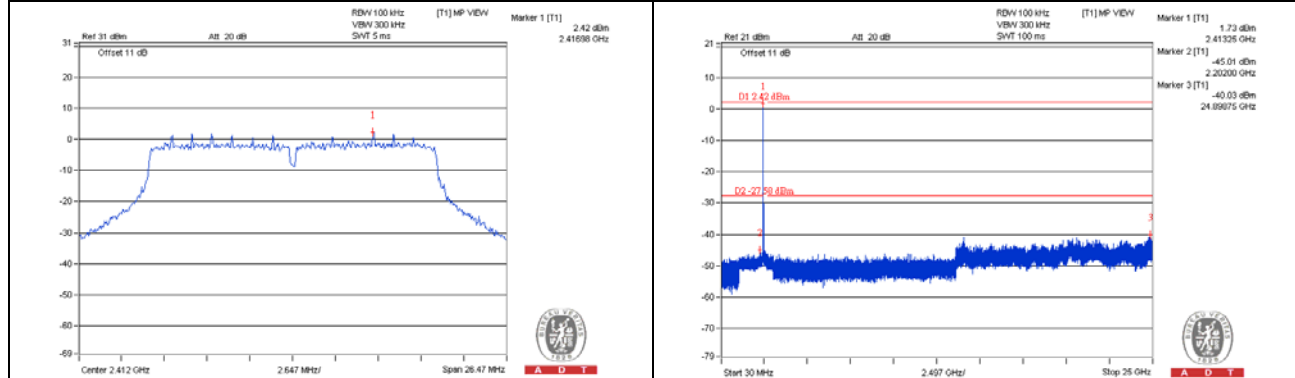


CH 11

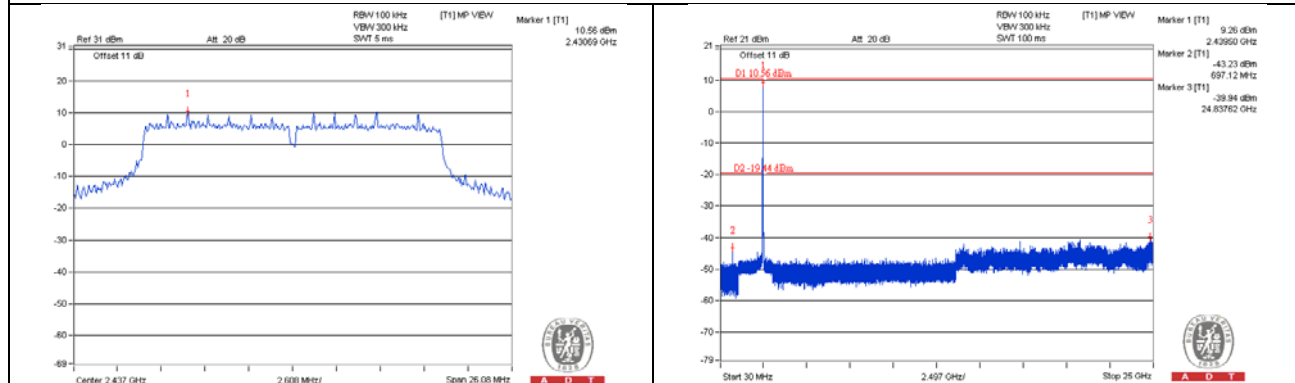


802.11n (HT20) CHAIN 0

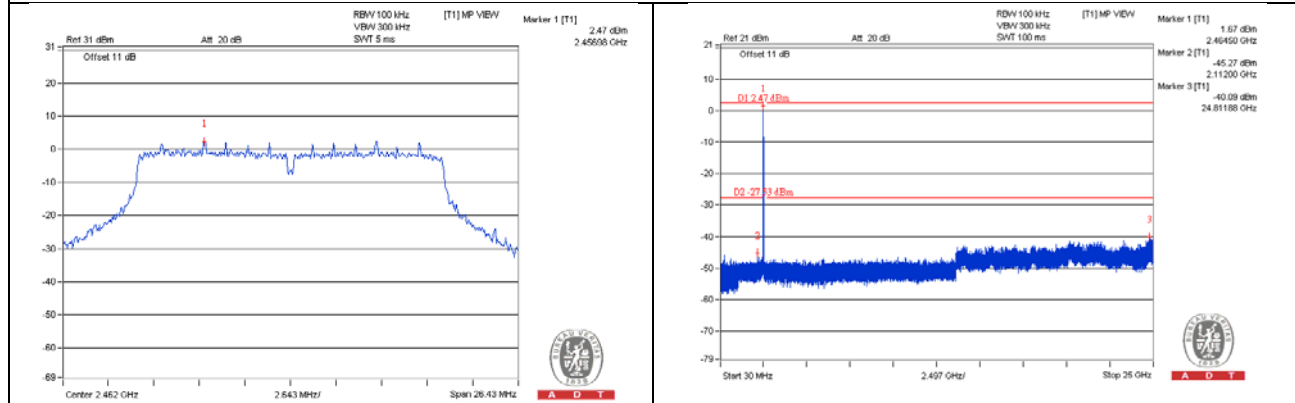
CH 1



CH 6

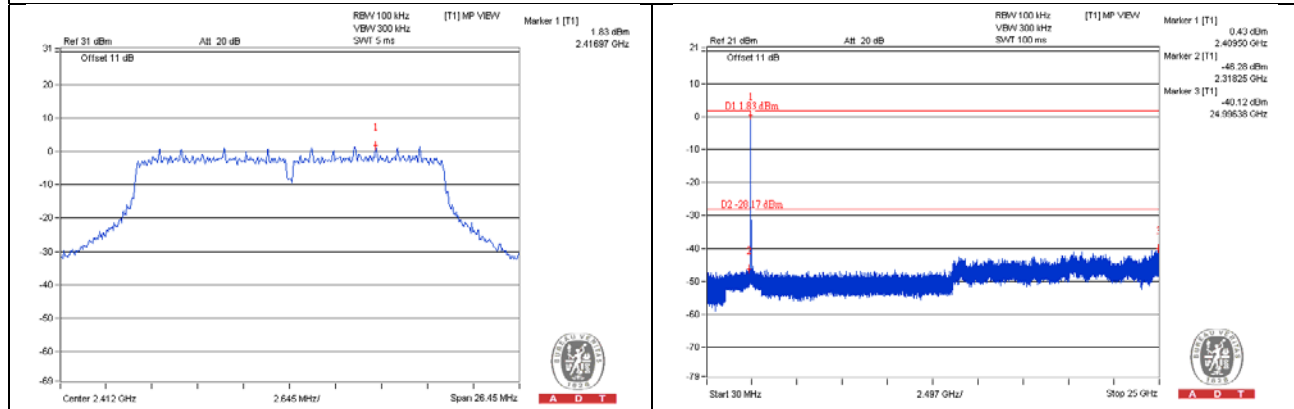


CH 11

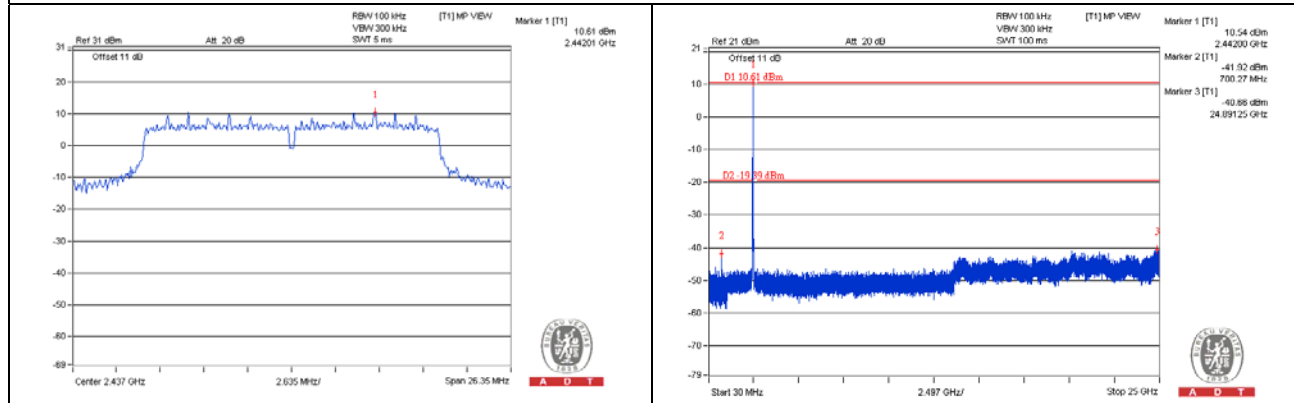


CHAIN 1

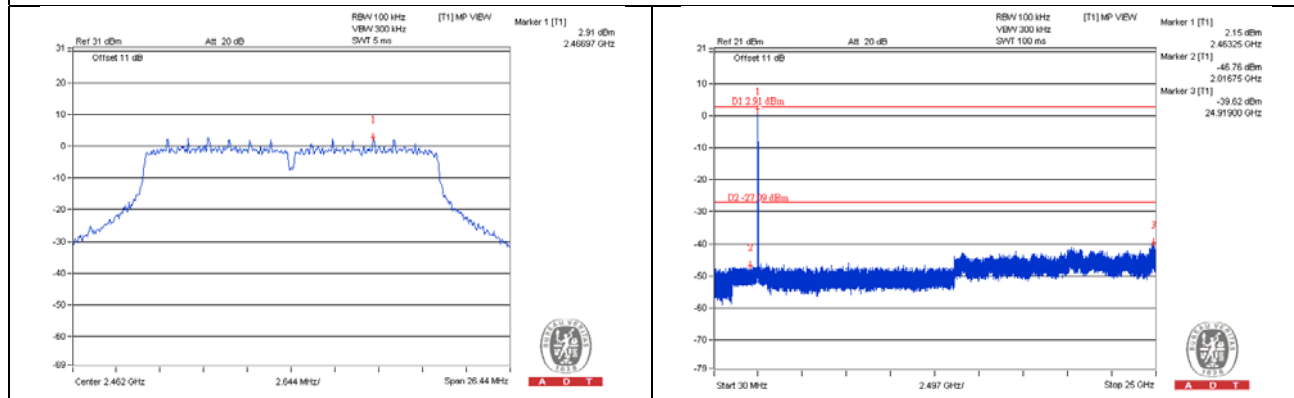
CH 1



CH 6

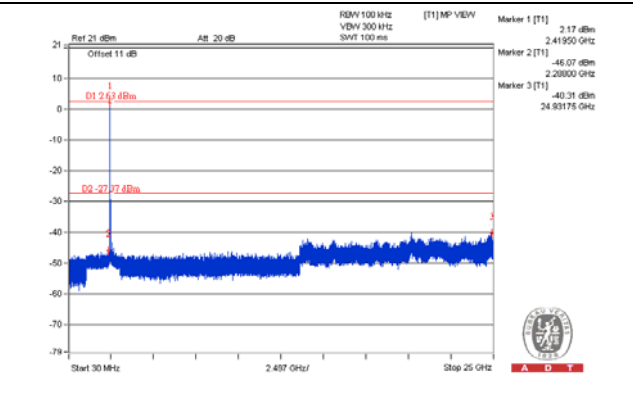
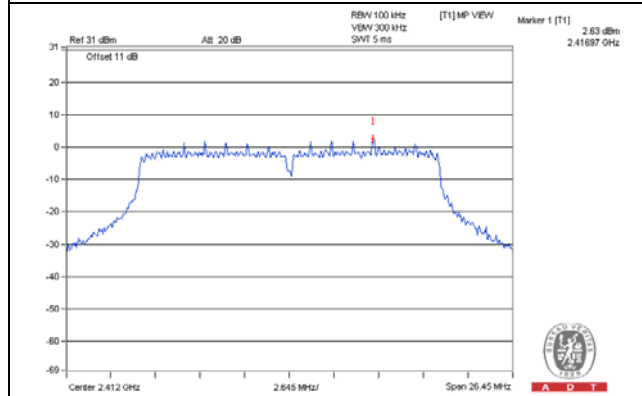


CH 11

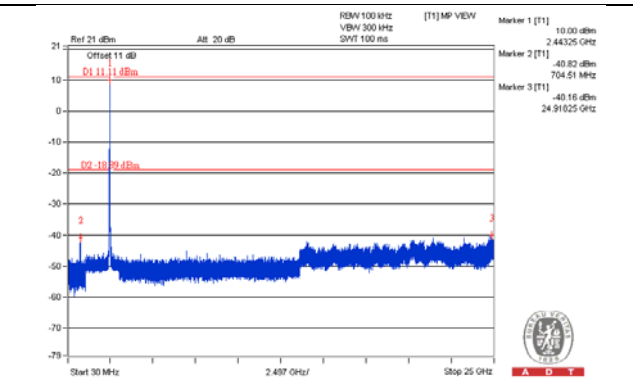
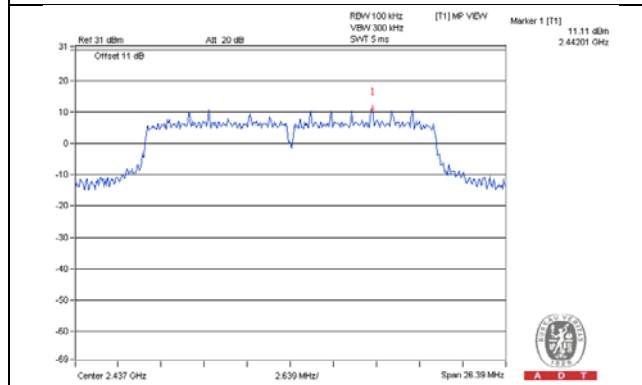


CHAIN 2

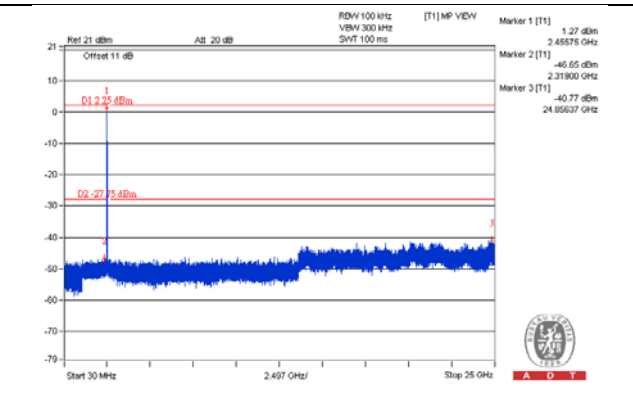
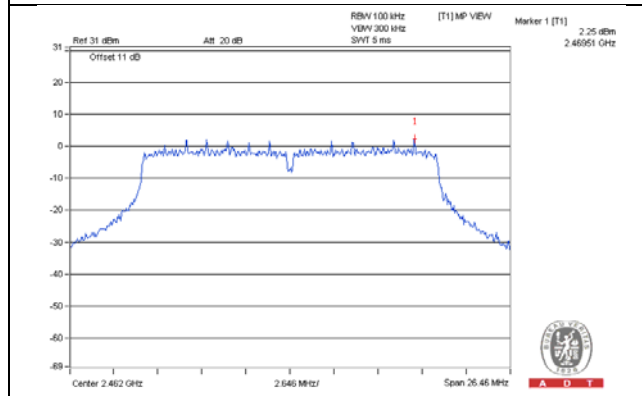
CH 1



CH 6

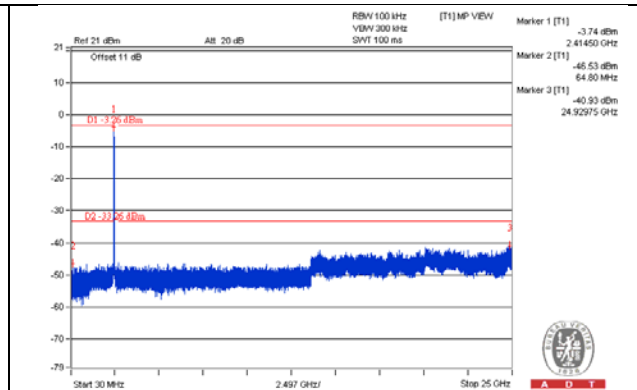
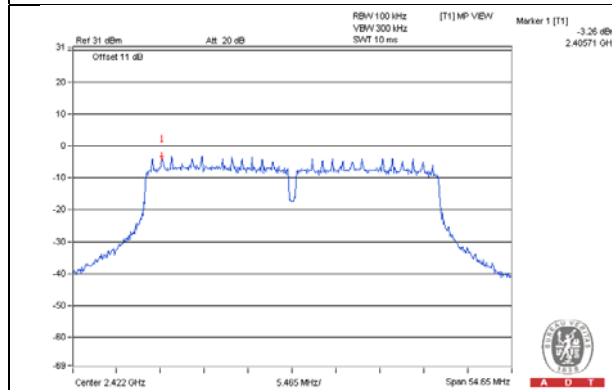


CH 11

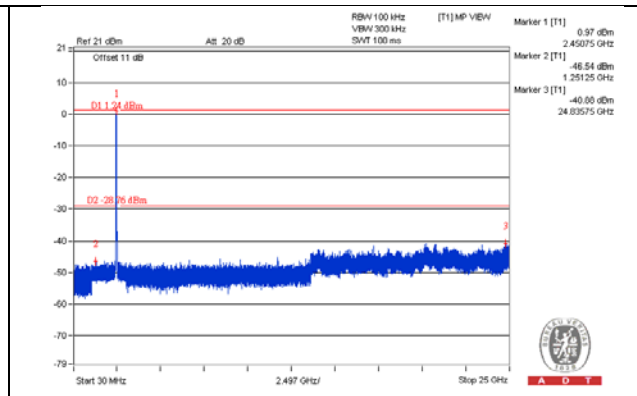
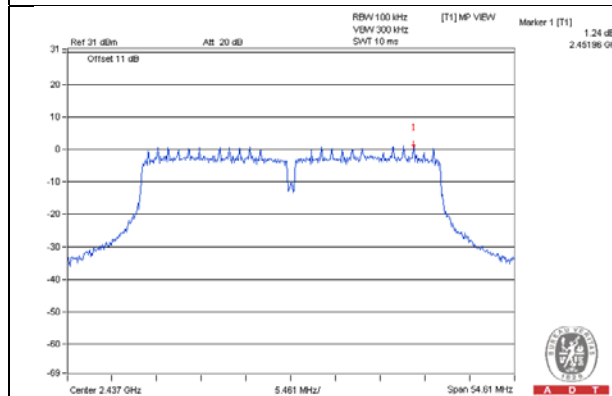


802.11n (HT40) CHAIN 0

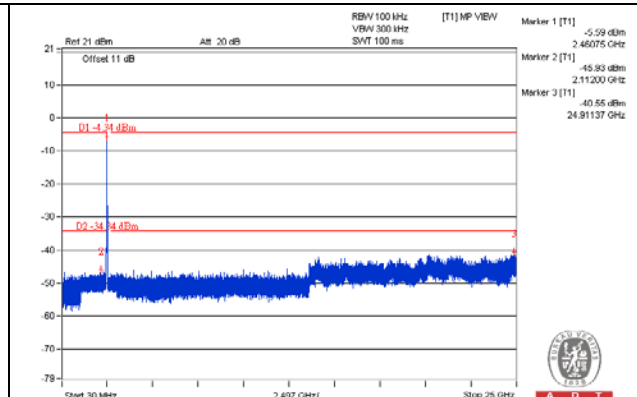
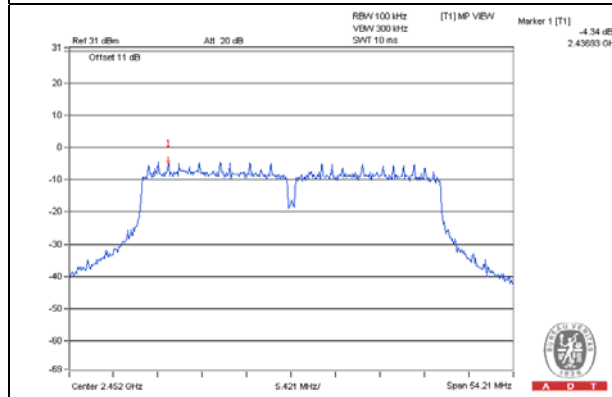
CH 3



CH 6

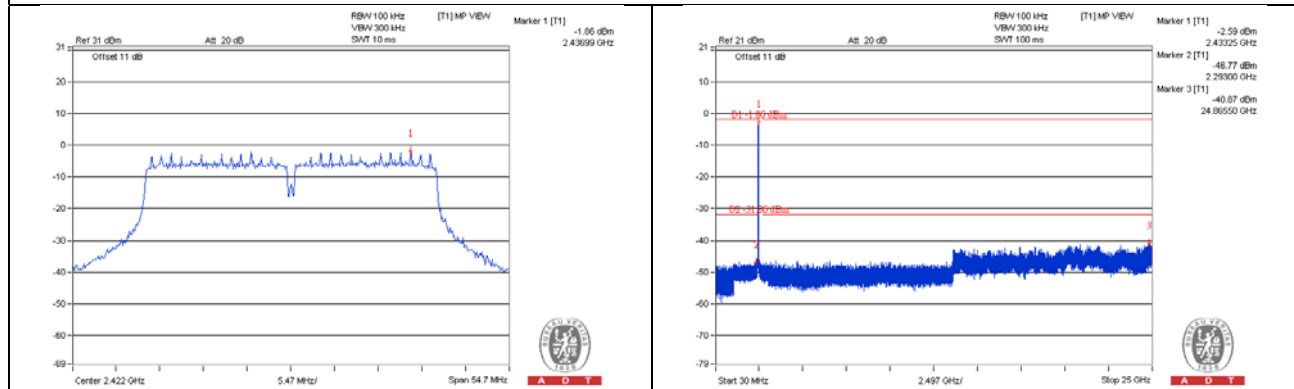


CH 9

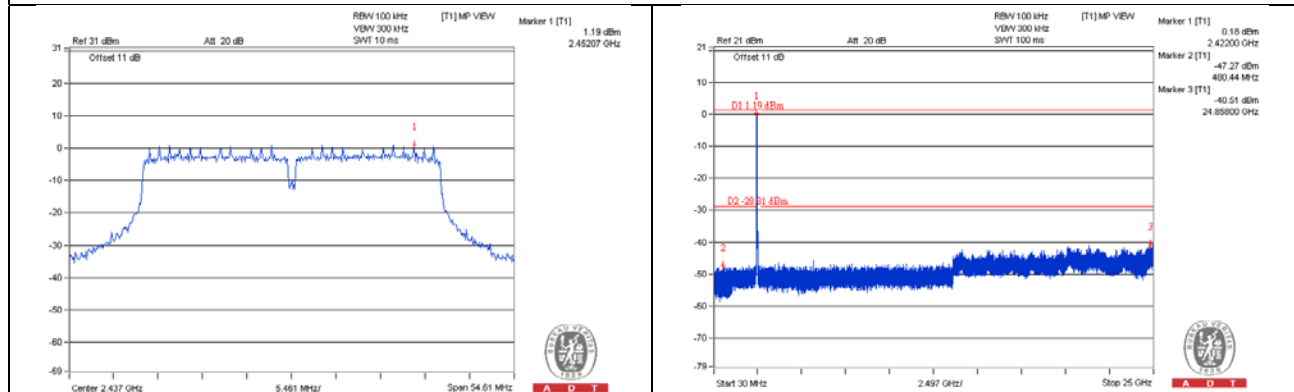


CHAIN 1

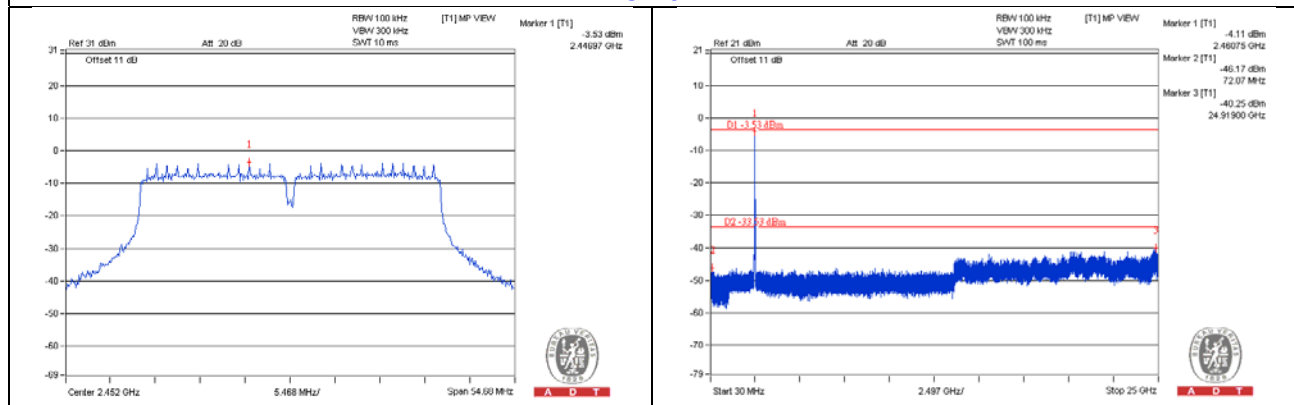
CH 3



CH 6

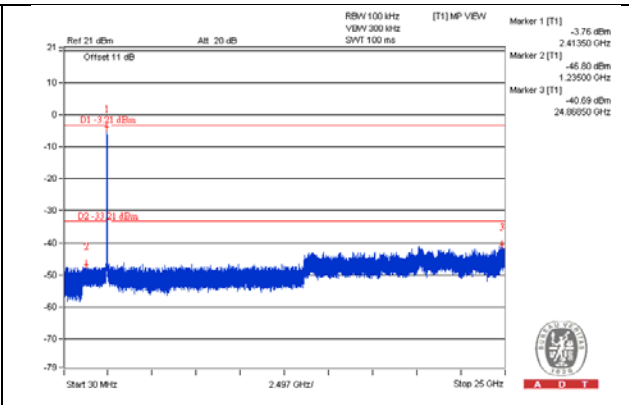
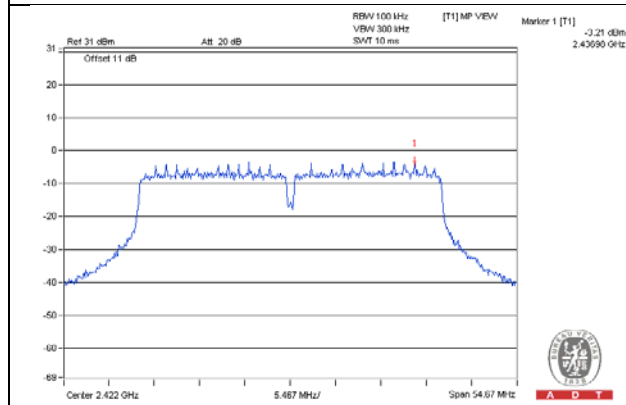


CH 9

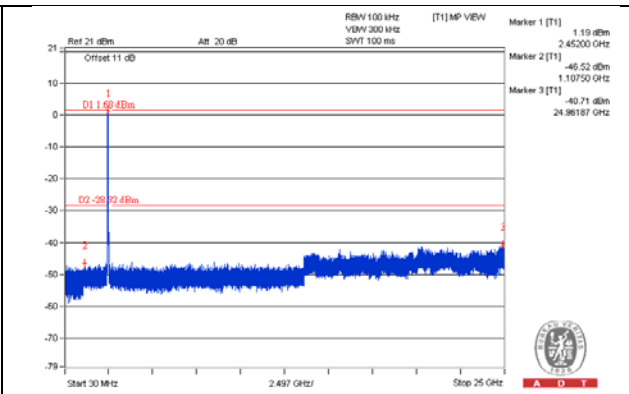
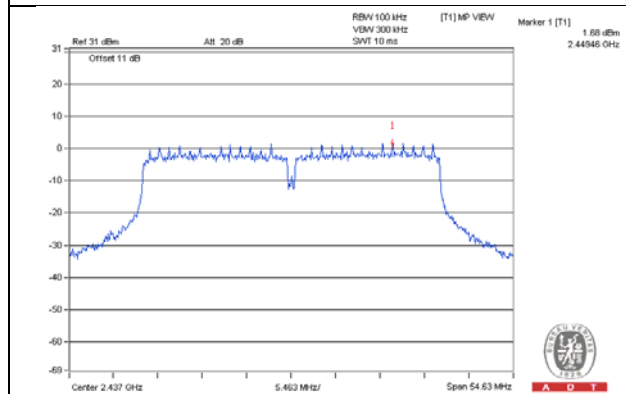


CHAIN 2

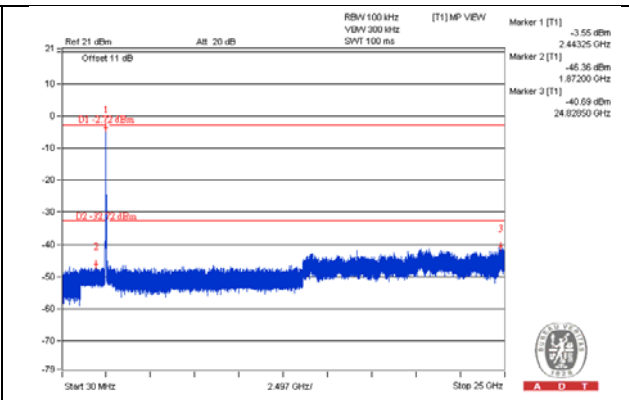
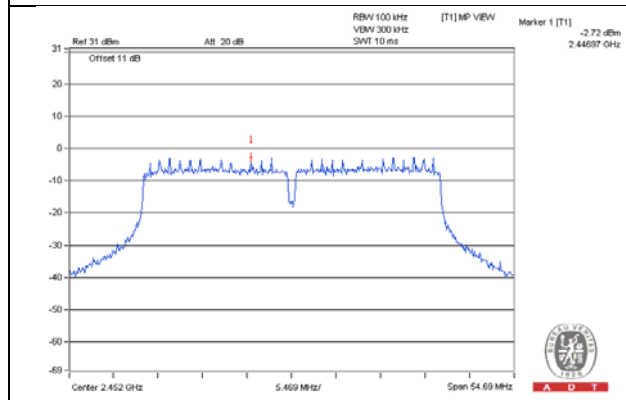
CH 3



CH 6



CH 9



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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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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