FCC Test Report

Report No.: RF160122E01

FCC ID: S9J4144

Test Model: RTX4144

Received Date: Jan. 22, 2016

Test Date: Feb. 01 to 16, 2016

Issued Date: June 23, 2016

Applicant: RTX A/S

Address: Stroemmen 6, 9400 Noerresundby, Denmark

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory

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Release Control Record

Issue No.	Description	Date Issued
RF160122E01	Original release.	June 23, 2016

1 Certificate of Conformity

Product: RTX4144 Wi-Fi module

Brand: RTX

Test Model: RTX4144

Sample Status: ENGINEERING SAMPLE

Applicant: RTX A/S

Test Date: Feb. 01 to 16, 2016

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)
ANSI C63.10: 2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by : _____ , **Date:** June 23, 2016
Claire Kaun / Specialist

Approved by : _____ , **Date:** June 23, 2016
May Chen / Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (SECTION 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -11.05dB at 0.15000MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -1.1dB at 2390.00MHz.
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expended Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.86 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.19 dB
	1GHz ~ 6GHz	3.43 dB
Radiated Emissions above 1 GHz	6GHz ~ 18GHz	3.49 dB
	18GHz ~ 40GHz	4.11 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	RTX4144 Wi-Fi module
Brand	RTX
Test Model	RTX4144
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	DC 3.3V from host equipment
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS,OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 150Mbps
Operating Frequency	**For 15.247:** 2.412 ~ 2.462GHz **For 15.407:** 5.18 ~ 5.24GHz, 5.26 ~ 5.32GHz, 5.5 ~ 5.7GHz, 5.745 ~ 5.825GHz
Number of Channel	**For 15.247:** 11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40) **For 15.407:** 24 for 802.11a, 802.11n (HT20)
Output Power	**For 15.247** 802.11b: 62.23mW 802.11g: 233.884mW 802.11n (HT20): 228.034mW 802.11n (HT40): 162.93mW **For 15.407** 5.18 ~ 5.24GHz: 802.11a: 10.864mW 802.11n (HT20): 8.933mW 5.26 ~ 5.32GHz: 802.11a: 12.023mW 802.11n (HT20): 9.441mW 5.5 ~ 5.7GHz: 802.11a: 32.584mW 802.11n (HT20): 30.13mW 5.745 ~ 5.825GHz: 802.11a: 16.634mW 802.11n (HT20): 16.255mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Data Cable Supplied	NA

Note:

1. 2.4GHz & 5GHz technology cannot transmit at same time.
2. The antenna provided to the EUT, please refer to the following table:

Transmitter Circuit	Brand Name	Model Name	Gain (dBi) (Include cable loss)	Antenna Type	Connecter Type	Frequency range (GHz to GHz)
Chain (0)	WNC	DNAS-144-PC BANT	4.9	PCB	NA	2.4~2.5
			3.9			5.15~5.85

3. The EUT incorporates a SISO function.

2.4GHz Band			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11b	1 ~ 11Mbps	1TX	1RX
802.11g	6 ~ 54Mbps	1TX	1RX
802.11n (HT20)	MCS 0~7	1TX	1RX
802.11n (HT40)	MCS 0~7	1TX	1RX
5GHz Band			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11a	6 ~ 54Mbps	1TX	1RX
802.11n (HT20)	MCS 0~7	1TX	1RX

4. 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 (for below 1GHz) and Y-plane (for above 1GHz)
NOTE: "-"means no effect.

Radiated Emission Test (Above 1GHz):

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

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

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

Power Line Conducted Emission Test:

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

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

Antenna Port Conducted Measurement:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

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

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

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

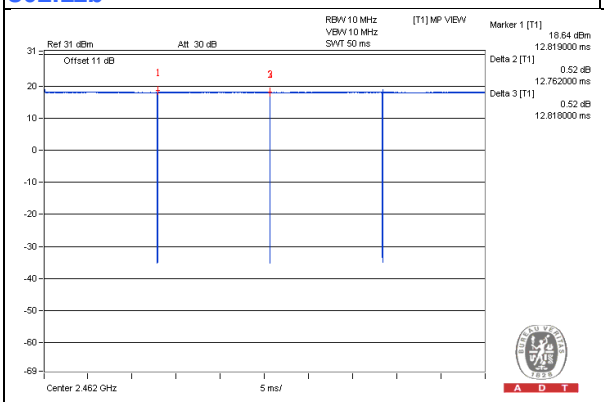
Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Jyunchun Lin
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Gary Cheng
PLC	18deg. C, 60%RH	120Vac, 60Hz	Gavin Peng
APCM	19deg. C, 63%RH	120Vac, 60Hz	Robert Cheng

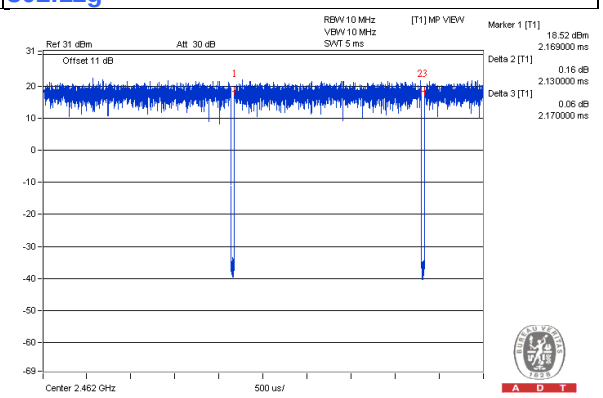
3.3 Duty Cycle of Test Signal

If duty cycle of test signal is ≥ 98 %, duty factor is not required.
If duty cycle of test signal is < 98%, duty factor shall be considered.
802.11b: Duty cycle = 12.762/12.818 = 0.996
802.11g: Duty cycle = 2.13/2.17 = 0.982
802.11n (HT20): Duty cycle = 1.987/2.025 = 0.981
802.11n (HT40): Duty cycle = 0.968/1.026 = 0.943, Duty factor = 10 * log(1/0.943) = 0.3

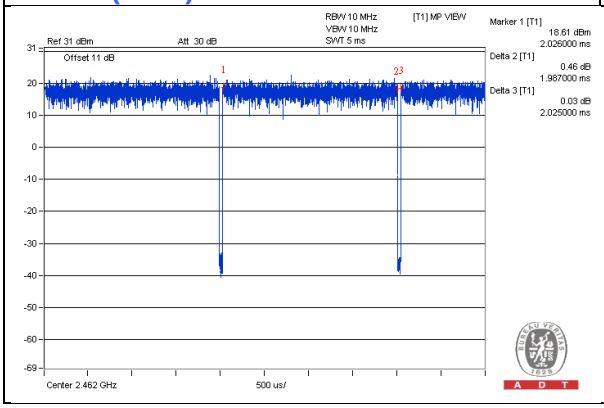
802.11b



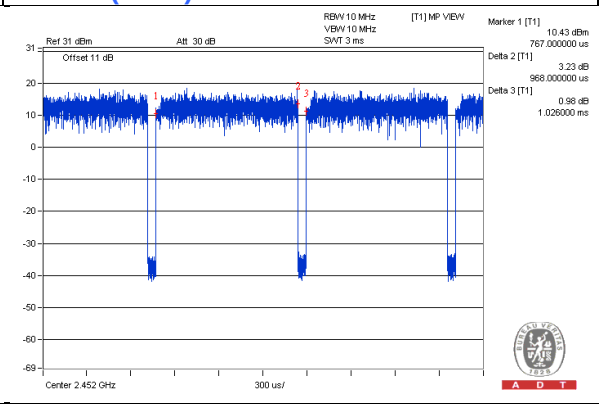
802.11g



802.11n (HT20)



802.11n (HT40)



3.4 Description of Support Units

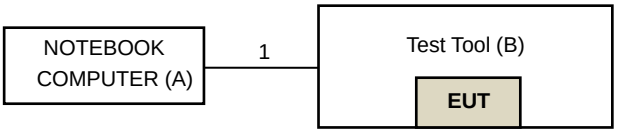
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	NOTEBOOK COMPUTER	Lenovo	R9-DFT3G11/05	NA	NA	Supplied by Client
B.	Test Tool	NA	NA	E187451	NA	Supplied by Client

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB	1	1	No	0	Supplied by Client

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C (15.247)
KDB 558074 D01 DTS Meas Guidance v03r05
ANSI C63.10-2013

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

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY54450088	July 24, 2015	July 23, 2016
Pre-Amplifier(*) EMCI	EMC001340	980142	Jan. 20, 2016	Jan. 19, 2018
Loop Antenna(*) Electro-Metrics	EM-6879	264	Dec. 16, 2014	Dec. 15, 2016
RF Cable	NA	LOOPCAB-001 LOOPCAB-002	Jan. 18, 2016	Jan. 17, 2017
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Nov. 11, 2015	Nov. 10, 2016
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Jan. 04, 2016	Jan. 03, 2017
RF Cable	8D	966-4-1 966-4-2 966-4-3	Apr. 03, 2015	Apr. 02, 2016
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Jan. 19, 2016	Jan. 18, 2017
Pre-Amplifier Agilent	8449B	3008A01922	Sep. 19, 2015	Sep. 18, 2016
RF Cable	EMC104-SM-SM-2000 EMC104-SM-SM-5000 EMC104-SM-SM-5000	150318 150323 150324	Mar. 31, 2015	Mar. 30, 2016
Pre-Amplifier EMCI	EMC184045	980143	Jan. 15, 2016	Jan. 14, 2017
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Jan. 08, 2016	Jan. 07, 2017
RF Cable	SUCOFLEX 102	36432/2 36441/2	Jan. 16, 2016	Jan. 15, 2017
Software	ADT_Radiated_V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA
Spectrum analyzer R&S	FSP 40	100060	May 08, 2015	May 07, 2016
Power meter Anritsu	ML2495A	1014008	Apr. 28, 2015	Apr. 27, 2016
Power sensor Anritsu	MA2411B	0917122	Apr. 28, 2015	Apr. 27, 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 calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. Loop antenna was used for all emissions below 30 MHz.
4. The test was performed in 966 Chamber No. 4.
5. The FCC Site Registration No. is 292998
6. The CANADA Site Registration No. is 20331-2
7 Tested Date: Feb. 01 to 03, 2016

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:

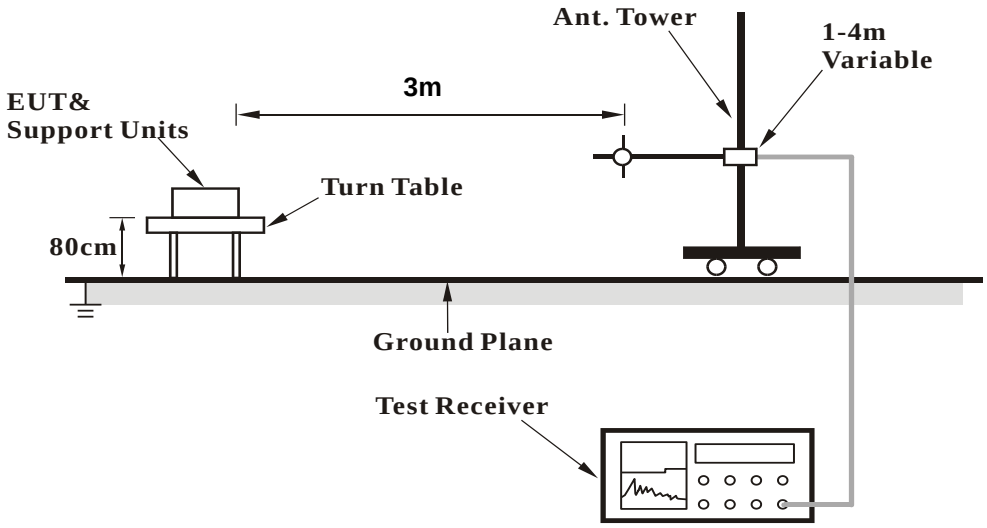
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
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/duty cycle)).
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

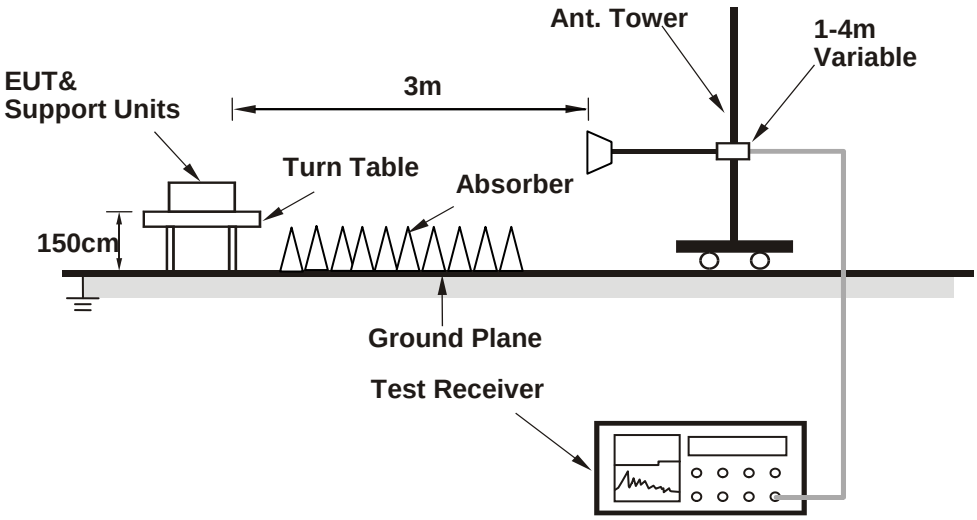
No deviation.

4.1.5 Test Set Up

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



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

4.1.6 EUT Operating Conditions

1. Connect the EUT with the support unit A (Notebook computer) which is placed on the testing table.
2. The communication partner run test program “artqui.exe [ART2 IO]Ver 2.3” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1GHz Data：

802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2390.00	50.5 PK	74.0	-23.5	1.54 H	127	56.69	-6.19
2	2390.00	41.1 AV	54.0	-12.9	1.54 H	127	47.29	-6.19
3	*2412.00	101.1 PK			1.54 H	127	107.19	-6.09
4	*2412.00	98.7 AV			1.54 H	127	104.79	-6.09
5	4824.00	54.2 PK	74.0	-19.8	1.10 H	231	54.39	-0.19
6	4824.00	52.4 AV	54.0	-1.6	1.10 H	231	52.59	-0.19
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2390.00	51.7 PK	74.0	-22.3	1.00 V	96	57.89	-6.19
2	2390.00	42.8 AV	54.0	-11.2	1.00 V	96	48.99	-6.19
3	*2412.00	102.5 PK			1.00 V	96	108.59	-6.09
4	*2412.00	100.0 AV			1.00 V	96	106.09	-6.09
5	4824.00	54.0 PK	74.0	-20.0	1.05 V	202	54.19	-0.19
6	4824.00	52.1 AV	54.0	-1.9	1.05 V	202	52.29	-0.19

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) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	101.3 PK			1.55 H	128	107.30	-6.00
2	*2437.00	99.2 AV			1.55 H	128	105.20	-6.00
3	4874.00	54.4 PK	74.0	-19.6	1.10 H	231	54.39	0.01
4	4874.00	52.6 AV	54.0	-1.4	1.10 H	231	52.59	0.01
5	7311.00	46.7 PK	74.0	-27.3	1.08 H	144	40.39	6.31
6	7311.00	35.2 AV	54.0	-18.8	1.08 H	144	28.89	6.31
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	102.4 PK			1.00 V	71	108.40	-6.00
2	*2437.00	99.9 AV			1.00 V	71	105.90	-6.00
3	4874.00	54.4 PK	74.0	-19.6	1.10 V	193	54.39	0.01
4	4874.00	52.6 AV	54.0	-1.4	1.10 V	193	52.59	0.01
5	7311.00	50.8 PK	74.0	-23.2	1.15 V	297	44.49	6.31
6	7311.00	42.3 AV	54.0	-11.7	1.15 V	297	35.99	6.31

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) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	100.8 PK			1.54 H	117	106.71	-5.91
2	*2462.00	98.5 AV			1.54 H	117	104.41	-5.91
3	2487.70	53.1 PK	74.0	-20.9	1.54 H	117	58.92	-5.82
4	2487.70	46.2 AV	54.0	-7.8	1.54 H	117	52.02	-5.82
5	4924.00	54.4 PK	74.0	-19.6	1.10 H	231	54.26	0.14
6	4924.00	52.6 AV	54.0	-1.4	1.10 H	231	52.46	0.14
7	7386.00	46.7 PK	74.0	-27.3	1.08 H	144	40.24	6.46
8	7386.00	35.2 AV	54.0	-18.8	1.08 H	144	28.74	6.46
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	103.1 PK			1.00 V	69	109.01	-5.91
2	*2462.00	100.6 AV			1.00 V	69	106.51	-5.91
3	2487.70	55.2 PK	74.0	-18.8	1.00 V	69	61.02	-5.82
4	2487.70	48.6 AV	54.0	-5.4	1.00 V	69	54.42	-5.82
5	4924.00	54.0 PK	74.0	-20.0	1.04 V	217	53.86	0.14
6	4924.00	52.2 AV	54.0	-1.8	1.04 V	217	52.06	0.14
7	7386.00	51.1 PK	74.0	-22.9	1.13 V	300	44.64	6.46
8	7386.00	42.4 AV	54.0	-11.6	1.13 V	300	35.94	6.46

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) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	69.5 PK	74.0	-4.5	1.55 H	118	75.69	-6.19
2	2390.00	50.4 AV	54.0	-3.6	1.55 H	118	56.59	-6.19
3	*2412.00	105.2 PK			1.55 H	118	111.29	-6.09
4	*2412.00	92.1 AV			1.55 H	118	98.19	-6.09
5	4824.00	53.5 PK	74.0	-20.5	1.00 H	219	53.69	-0.19
6	4824.00	39.9 AV	54.0	-14.1	1.00 H	219	40.09	-0.19
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	71.3 PK	74.0	-2.7	1.00 V	72	77.49	-6.19
2	2390.00	52.8 AV	54.0	-1.2	1.00 V	72	58.99	-6.19
3	*2412.00	107.1 PK			1.00 V	72	113.19	-6.09
4	*2412.00	94.2 AV			1.00 V	72	100.29	-6.09
5	4824.00	52.2 PK	74.0	-21.8	1.05 V	197	52.39	-0.19
6	4824.00	38.2 AV	54.0	-15.8	1.05 V	197	38.39	-0.19

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) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	108.3 PK			1.55 H	119	114.30	-6.00
2	*2437.00	95.4 AV			1.55 H	119	101.40	-6.00
3	4874.00	58.2 PK	74.0	-15.8	1.00 H	233	58.19	0.01
4	4874.00	42.9 AV	54.0	-11.1	1.00 H	233	42.89	0.01
5	7311.00	56.7 PK	74.0	-17.3	1.03 H	248	50.39	6.31
6	7311.00	40.5 AV	54.0	-13.5	1.03 H	248	34.19	6.31
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	110.1 PK			1.00 V	74	116.10	-6.00
2	*2437.00	97.1 AV			1.00 V	74	103.10	-6.00
3	4874.00	57.0 PK	74.0	-17.0	1.02 V	197	56.99	0.01
4	4874.00	41.3 AV	54.0	-12.7	1.02 V	197	41.29	0.01
5	7311.00	63.6 PK	74.0	-10.4	2.44 V	231	57.29	6.31
6	7311.00	49.1 AV	54.0	-4.9	2.44 V	231	42.79	6.31

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) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	105.5 PK			1.50 H	120	111.41	-5.91
2	*2462.00	92.9 AV			1.50 H	120	98.81	-5.91
3	2483.50	65.3 PK	74.0	-8.7	1.50 H	120	71.12	-5.82
4	2483.50	50.4 AV	54.0	-3.6	1.50 H	120	56.22	-5.82
5	4924.00	53.7 PK	74.0	-20.3	1.03 H	229	53.56	0.14
6	4924.00	40.2 AV	54.0	-13.8	1.03 H	229	40.06	0.14
7	7386.00	56.2 PK	74.0	-17.8	1.09 H	237	49.74	6.46
8	7386.00	38.9 AV	54.0	-15.1	1.09 H	237	32.44	6.46
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	108.1 PK			1.02 V	73	114.01	-5.91
2	*2462.00	95.3 AV			1.02 V	73	101.21	-5.91
3	2483.50	67.2 PK	74.0	-6.8	1.02 V	73	73.02	-5.82
4	2483.50	52.6 AV	54.0	-1.4	1.02 V	73	58.42	-5.82
5	4924.00	52.7 PK	74.0	-21.3	1.01 V	193	52.56	0.14
6	4924.00	38.7 AV	54.0	-15.3	1.01 V	193	38.56	0.14
7	7386.00	56.7 PK	74.0	-17.3	2.43 V	219	50.24	6.46
8	7386.00	39.9 AV	54.0	-14.1	2.43 V	219	33.44	6.46

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) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	65.6 PK	74.0	-8.4	1.00 H	310	71.79	-6.19
2	2390.00	51.2 AV	54.0	-2.8	1.00 H	310	57.39	-6.19
3	*2412.00	106.8 PK			1.00 H	310	112.89	-6.09
4	*2412.00	94.1 AV			1.00 H	310	100.19	-6.09
5	4824.00	53.3 PK	74.0	-20.7	1.02 H	228	53.49	-0.19
6	4824.00	39.5 AV	54.0	-14.5	1.02 H	228	39.69	-0.19
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	69.2 PK	74.0	-4.8	1.00 V	97	75.39	-6.19
2	2390.00	52.7 AV	54.0	-1.3	1.00 V	97	58.89	-6.19
3	*2412.00	105.9 PK			1.00 V	97	111.99	-6.09
4	*2412.00	93.2 AV			1.00 V	97	99.29	-6.09
5	4824.00	51.8 PK	74.0	-22.2	1.06 V	188	51.99	-0.19
6	4824.00	37.8 AV	54.0	-16.2	1.06 V	188	37.99	-0.19

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) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	55.4 PK	74.0	-18.6	1.05 H	302	61.59	-6.19
2	2390.00	39.6 AV	54.0	-14.4	1.05 H	302	45.79	-6.19
3	*2437.00	108.6 PK			1.05 H	302	114.60	-6.00
4	*2437.00	95.6 AV			1.05 H	302	101.60	-6.00
5	2483.50	56.4 PK	74.0	-17.6	1.05 H	302	62.22	-5.82
6	2483.50	41.5 AV	54.0	-12.5	1.05 H	302	47.32	-5.82
7	4874.00	57.6 PK	74.0	-16.4	1.03 H	231	57.59	0.01
8	4874.00	42.6 AV	54.0	-11.4	1.03 H	231	42.59	0.01
9	7311.00	56.3 PK	74.0	-17.7	1.00 H	247	49.99	6.31
10	7311.00	40.4 AV	54.0	-13.6	1.00 H	247	34.09	6.31
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	57.2 PK	74.0	-16.8	1.00 V	74	63.39	-6.19
2	2390.00	41.9 AV	54.0	-12.1	1.00 V	74	48.09	-6.19
3	*2437.00	110.2 PK			1.00 V	74	116.20	-6.00
4	*2437.00	96.6 AV			1.00 V	74	102.60	-6.00
5	2483.50	58.9 PK	74.0	-15.1	1.00 V	74	64.72	-5.82
6	2483.50	43.4 AV	54.0	-10.6	1.00 V	74	49.22	-5.82
7	4874.00	57.3 PK	74.0	-16.7	1.08 V	201	57.29	0.01
8	4874.00	41.5 AV	54.0	-12.5	1.08 V	201	41.49	0.01
9	7311.00	63.2 PK	74.0	-10.8	2.45 V	232	56.89	6.31
10	7311.00	48.8 AV	54.0	-5.2	2.45 V	232	42.49	6.31

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) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	106.1 PK			1.04 H	300	112.01	-5.91
2	*2462.00	93.2 AV			1.04 H	300	99.11	-5.91
3	2483.50	65.6 PK	74.0	-8.4	1.04 H	300	71.42	-5.82
4	2483.50	50.6 AV	54.0	-3.4	1.04 H	300	56.42	-5.82
5	4924.00	53.7 PK	74.0	-20.3	1.02 H	230	53.56	0.14
6	4924.00	40.2 AV	54.0	-13.8	1.02 H	230	40.06	0.14
7	7386.00	56.3 PK	74.0	-17.7	1.15 H	234	49.84	6.46
8	7386.00	38.8 AV	54.0	-15.2	1.15 H	234	32.34	6.46
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	108.2 PK			1.00 V	69	114.11	-5.91
2	*2462.00	95.2 AV			1.00 V	69	101.11	-5.91
3	2483.50	67.3 PK	74.0	-6.7	1.00 V	69	73.12	-5.82
4	**2483.50**	**52.9 AV**	**54.0**	**-1.1**	**1.00 V**	**69**	**58.72**	**-5.82**
5	4924.00	52.9 PK	74.0	-21.1	1.10 V	194	52.76	0.14
6	4924.00	38.8 AV	54.0	-15.2	1.10 V	194	38.66	0.14
7	7386.00	56.6 PK	74.0	-17.4	2.46 V	217	50.14	6.46
8	7386.00	39.8 AV	54.0	-14.2	2.46 V	217	33.34	6.46

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) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	69.6 PK	74.0	-4.4	1.00 H	294	75.79	-6.19
2	2390.00	50.6 AV	54.0	-3.4	1.00 H	294	56.79	-6.19
3	*2422.00	101.4 PK			1.00 H	294	107.46	-6.06
4	*2422.00	86.5 AV			1.00 H	294	92.56	-6.06
5	4844.00	48.4 PK	74.0	-25.6	1.10 H	239	48.51	-0.11
6	4844.00	34.3 AV	54.0	-19.7	1.10 H	239	34.41	-0.11
7	7266.00	52.4 PK	74.0	-21.6	1.05 H	260	46.14	6.26
8	7266.00	35.2 AV	54.0	-18.8	1.05 H	260	28.94	6.26
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	1.00 V	97	77.89	-6.19
2	**2390.00**	**52.9 AV**	**54.0**	**-1.1**	**1.00 V**	**97**	**59.09**	**-6.19**
3	*2422.00	103.4 PK			1.00 V	97	109.46	-6.06
4	*2422.00	88.7 AV			1.00 V	97	94.76	-6.06
5	4844.00	47.1 PK	74.0	-26.9	1.06 V	185	47.21	-0.11
6	4844.00	33.2 AV	54.0	-20.8	1.06 V	185	33.31	-0.11
7	7266.00	52.8 PK	74.0	-21.2	2.42 V	218	46.54	6.26
8	7266.00	36.2 AV	54.0	-17.8	2.42 V	218	29.94	6.26

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) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	67.5 PK	74.0	-6.5	1.02 H	290	73.69	-6.19
2	2390.00	50.4 AV	54.0	-3.6	1.02 H	290	56.59	-6.19
3	*2437.00	103.6 PK			1.02 H	290	109.60	-6.00
4	*2437.00	89.4 AV			1.02 H	290	95.40	-6.00
5	2483.50	64.3 PK	74.0	-9.7	1.02 H	290	70.12	-5.82
6	2483.50	48.6 AV	54.0	-5.4	1.02 H	290	54.42	-5.82
7	4874.00	50.5 PK	74.0	-23.5	1.13 H	233	50.49	0.01
8	4874.00	36.3 AV	54.0	-17.7	1.13 H	233	36.29	0.01
9	7311.00	52.8 PK	74.0	-21.2	1.10 H	248	46.49	6.31
10	7311.00	35.6 AV	54.0	-18.4	1.10 H	248	29.29	6.31
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	69.5 PK	74.0	-4.5	1.00 V	71	75.69	-6.19
2	2390.00	52.4 AV	54.0	-1.6	1.00 V	71	58.59	-6.19
3	*2437.00	105.9 PK			1.00 V	71	111.90	-6.00
4	*2437.00	91.5 AV			1.00 V	71	97.50	-6.00
5	2483.50	66.7 PK	74.0	-7.3	1.00 V	71	72.52	-5.82
6	2483.50	50.7 AV	54.0	-3.3	1.00 V	71	56.52	-5.82
7	4874.00	49.3 PK	74.0	-24.7	1.00 V	183	49.29	0.01
8	4874.00	35.4 AV	54.0	-18.6	1.00 V	183	35.39	0.01
9	7311.00	53.2 PK	74.0	-20.8	2.40 V	208	46.89	6.31
10	7311.00	36.5 AV	54.0	-17.5	2.40 V	208	30.19	6.31

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) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	102.2 PK			1.08 H	288	108.15	-5.95
2	*2452.00	88.6 AV			1.08 H	288	94.55	-5.95
3	2483.50	67.7 PK	74.0	-6.3	1.08 H	288	73.52	-5.82
4	2483.50	50.6 AV	54.0	-3.4	1.08 H	288	56.42	-5.82
5	4904.00	49.3 PK	74.0	-24.7	1.10 H	232	49.18	0.12
6	4904.00	35.1 AV	54.0	-18.9	1.10 H	232	34.98	0.12
7	7356.00	52.7 PK	74.0	-21.3	1.15 H	240	46.30	6.40
8	7356.00	35.0 AV	54.0	-19.0	1.15 H	240	28.60	6.40
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	*2452.00	104.6 PK			1.00 V	69	110.55	-5.95
2	*2452.00	90.0 AV			1.00 V	69	95.95	-5.95
3	2483.50	69.9 PK	74.0	-4.1	1.00 V	69	75.72	-5.82
4	2483.50	52.7 AV	54.0	-1.3	1.00 V	69	58.52	-5.82
5	4904.00	48.0 PK	74.0	-26.0	1.10 V	190	47.88	0.12
6	4904.00	34.2 AV	54.0	-19.8	1.10 V	190	34.08	0.12
7	7356.00	53.1 PK	74.0	-20.9	2.41 V	208	46.70	6.40
8	7356.00	36.1 AV	54.0	-17.9	2.41 V	208	29.70	6.40

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.

Below 1GHz Data:

802.11g

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	72.03	31.9 QP	40.0	-8.1	2.00 H	342	43.52	-11.60
2	120.02	29.5 QP	43.5	-14.0	1.50 H	104	40.16	-10.64
3	186.27	27.1 QP	43.5	-16.4	1.50 H	296	38.22	-11.11
4	247.40	33.7 QP	46.0	-12.3	1.00 H	182	43.59	-9.86
5	456.02	30.3 QP	46.0	-15.7	1.50 H	264	33.90	-3.59
6	815.63	32.4 QP	46.0	-13.6	1.00 H	181	29.80	2.63
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	72.03	30.7 QP	40.0	-9.3	1.00 V	220	42.28	-11.60
2	120.02	32.5 QP	43.5	-11.0	1.00 V	130	43.15	-10.64
3	144.05	22.8 QP	43.5	-20.7	1.00 V	360	31.49	-8.71
4	432.65	29.2 QP	46.0	-16.8	1.00 V	203	33.34	-4.18
5	456.05	29.9 QP	46.0	-16.1	1.00 V	191	33.49	-3.59
6	618.33	30.0 QP	46.0	-16.0	1.00 V	360	30.31	-0.28

REMARKS:

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

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

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

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	100375	May 06, 2015	May 05, 2016
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK-8127	8127-522	Sep. 01, 2015	Aug. 31, 2016
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 11, 2015	June 10, 2016
RF Cable	5D-FB	COCCAB-001	Mar. 09, 2015	Mar. 08, 2016
50 ohms Terminator	N/A	EMC-03	Sep. 23, 2015	Sep. 22, 2016
50 ohms Terminator	N/A	EMC-02	Oct. 01, 2015	Sep. 30, 2016
Software BVADT	BVADT_Cond_ V7.3.7.3	NA	NA	NA

Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
3 The VCCI Con C Registration No. is C-3611.
4 Tested Date: Feb. 16, 2016

4.2.3 Test Procedures

a. 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.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

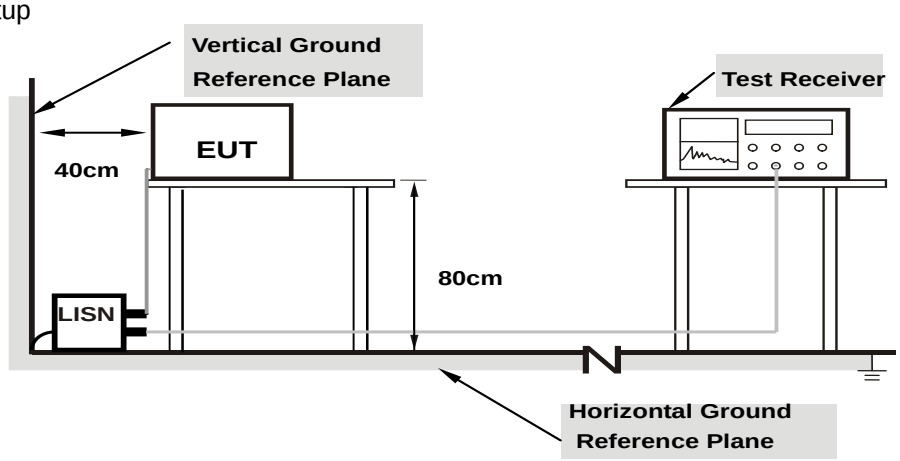
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

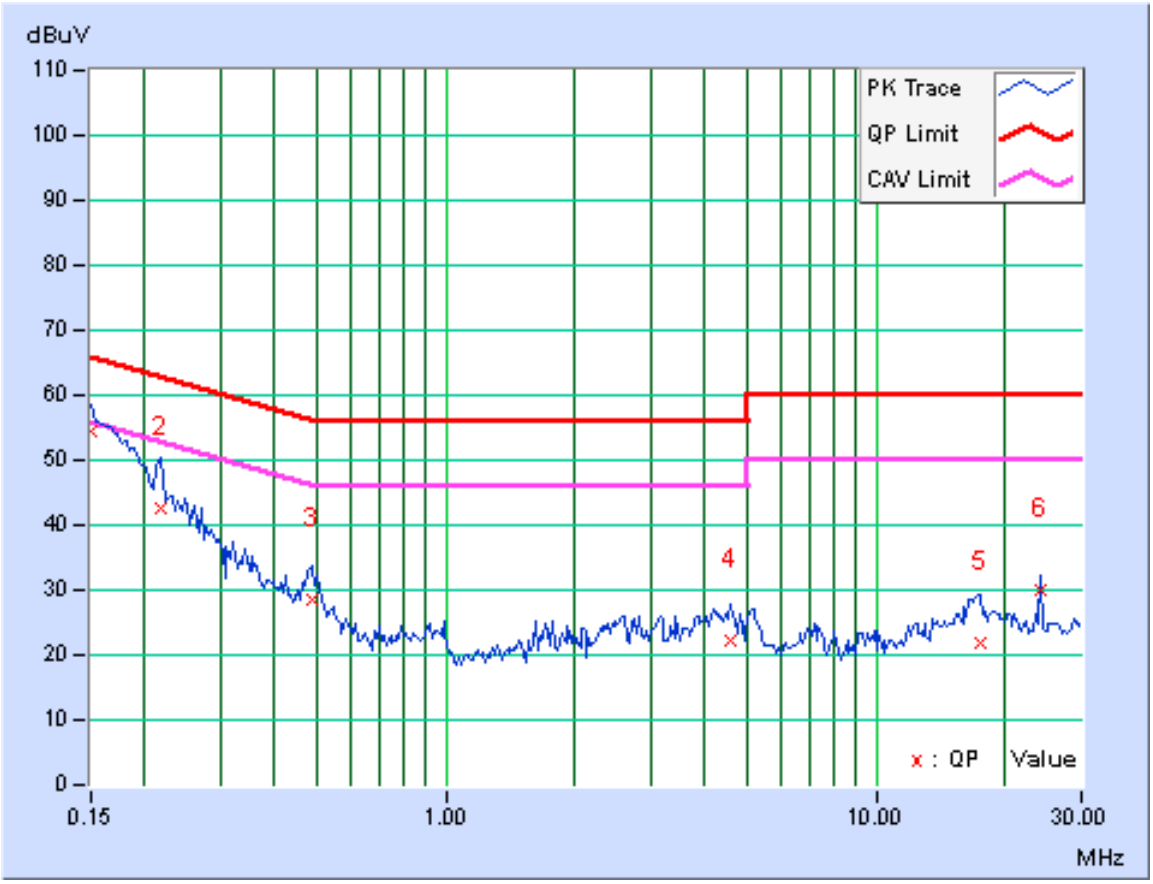
4.2.7 Test Results

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

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.26	44.33	27.93	54.59	38.19	66.00	56.00	-11.41	-17.81
2	0.21641	10.22	32.23	17.84	42.45	28.06	62.96	52.96	-20.50	-24.89
3	0.48984	10.23	18.43	11.68	28.66	21.91	56.17	46.17	-27.51	-24.26
4	4.60547	10.39	11.81	5.41	22.20	15.80	56.00	46.00	-33.80	-30.20
5	17.41406	10.84	11.15	5.23	21.99	16.07	60.00	50.00	-38.01	-33.93
6	24.00000	10.97	19.01	17.61	29.98	28.58	60.00	50.00	-30.02	-21.42

Remarks:

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

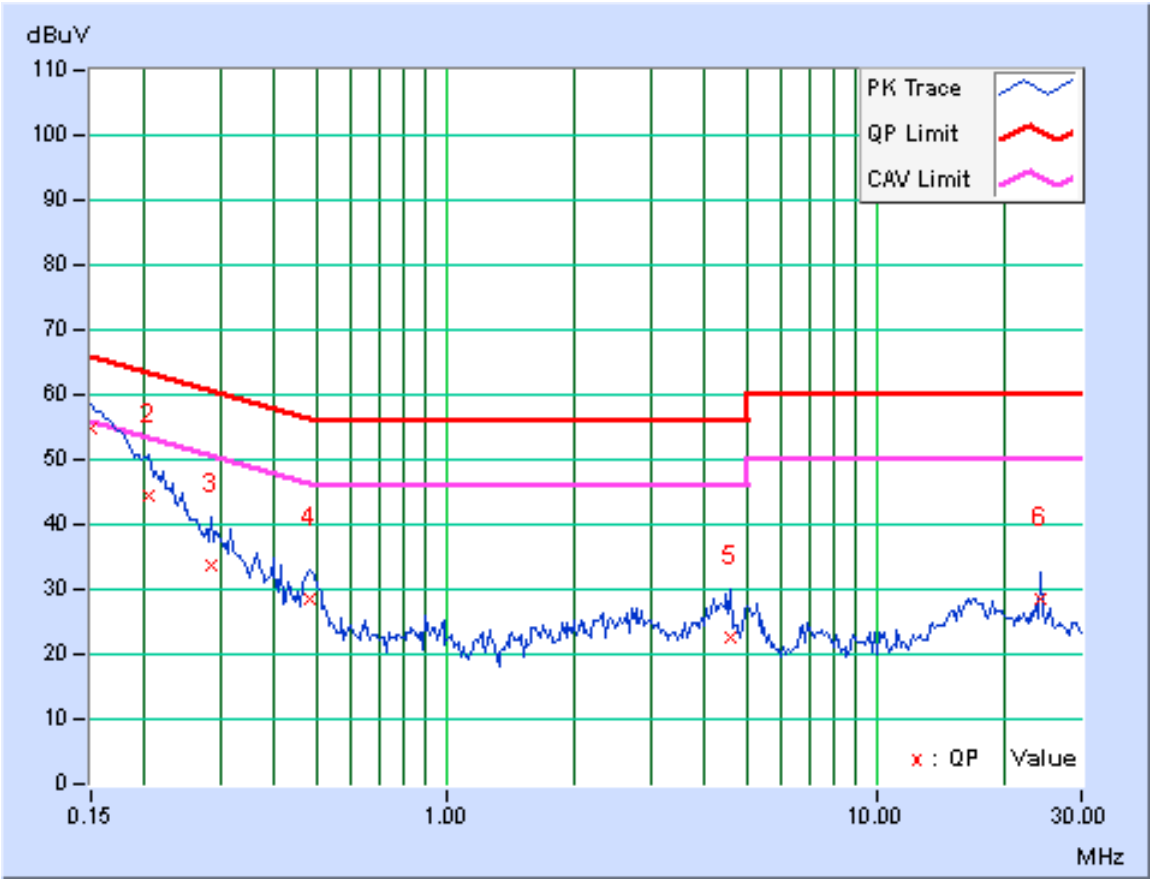


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.15000**	**10.24**	**44.71**	**29.04**	**54.95**	**39.28**	**66.00**	**56.00**	**-11.05**	**-16.72**
2	0.20469	10.20	34.14	19.16	44.34	29.36	63.42	53.42	-19.08	-24.06
3	0.28672	10.21	23.56	10.73	33.77	20.94	60.62	50.62	-26.85	-29.68
4	0.48203	10.21	18.15	10.62	28.36	20.83	56.30	46.30	-27.94	-25.47
5	4.59766	10.40	12.17	6.09	22.57	16.49	56.00	46.00	-33.43	-29.51
6	24.00000	10.99	17.63	17.22	28.62	28.21	60.00	50.00	-31.38	-21.79

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

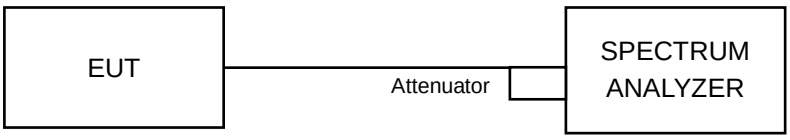


4.3 6dB Bandwidth Measurement

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) ≥ 3 x 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 fromTest 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	10.13	0.5	PASS
6	2437	10.13	0.5	PASS
11	2462	10.10	0.5	PASS

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.35	0.5	PASS
6	2437	16.37	0.5	PASS
11	2462	16.38	0.5	PASS

802.11n (HT20)

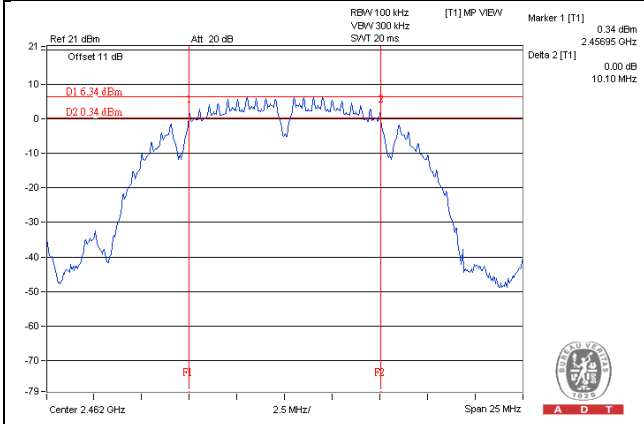
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	17.58	0.5	Pass
6	2437	17.54	0.5	Pass
11	2462	17.59	0.5	Pass

802.11n (HT40)

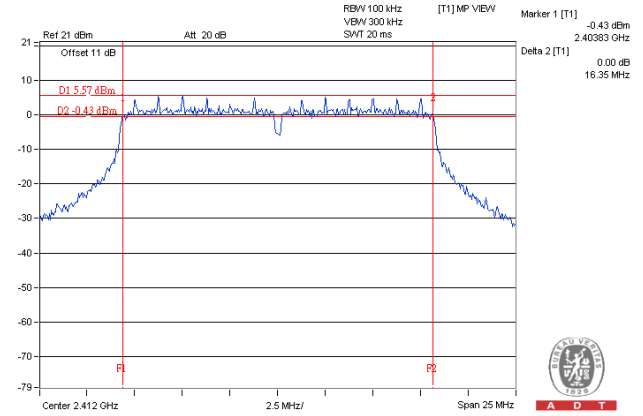
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
3	2422	35.24	0.5	Pass
6	2437	35.17	0.5	Pass
9	2452	35.20	0.5	Pass

Spectrum Plot of Worst Value

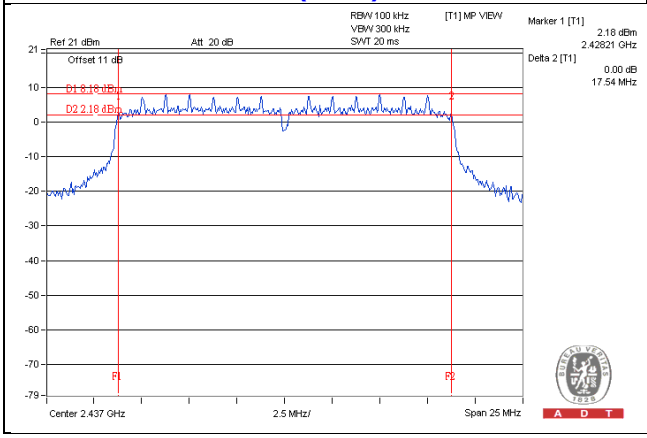
802.11b / CH11



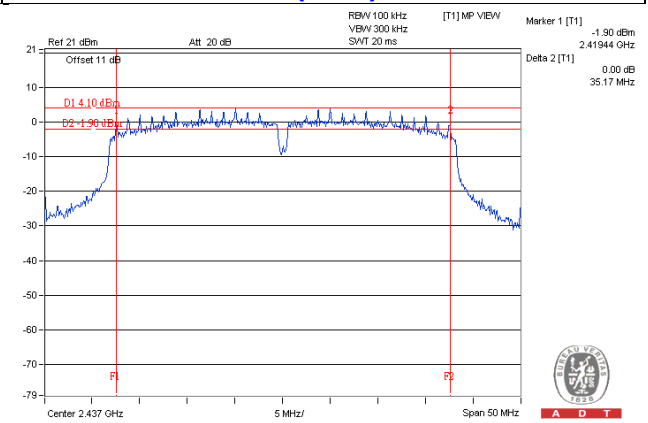
802.11g / CH1



802.11n (HT20) / CH6



802.11n (HT40) / CH6

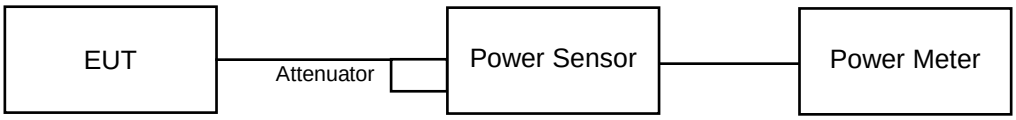


4.4 Conducted Output Power Measurement

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	60.117	17.79	30	Pass
6	2437	59.02	17.71	30	Pass
11	2462	62.23	17.94	30	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	147.911	21.70	30	Pass
6	2437	233.884	23.69	30	Pass
11	2462	168.267	22.26	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	141.254	21.50	30	Pass
6	2437	228.034	23.58	30	Pass
11	2462	168.655	22.27	30	Pass

802.11n (HT40)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
3	2422	107.399	20.31	30	Pass
6	2437	162.93	22.12	30	Pass
9	2452	125.314	20.98	30	Pass

FOR AVERAGE POWER

802.11b

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	33.574	15.26
6	2437	32.584	15.13
11	2462	34.041	15.32

802.11g

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	38.548	15.86
6	2437	70.958	18.51
11	2462	44.668	16.50

802.11n (HT20)

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	34.356	15.36
6	2437	68.391	18.35
11	2462	42.855	16.32

802.11n (HT40)

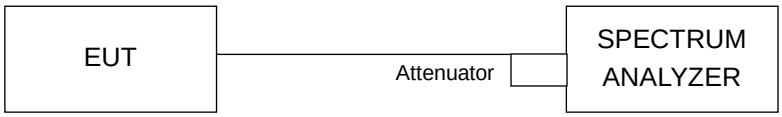
Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
3	2422	22.542	13.53
6	2437	45.92	16.62
9	2452	32.063	15.06

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 kHz ≤ RBW ≤ 100 kHz.
d. Set the VBW ≥ 3 × 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/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-8.46	8	Pass
6	2437	-8.84	8	Pass
11	2462	-8.02	8	Pass

802.11g

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-8.49	8	Pass
6	2437	-7.63	8	Pass
11	2462	-8.69	8	Pass

802.11n (HT20)

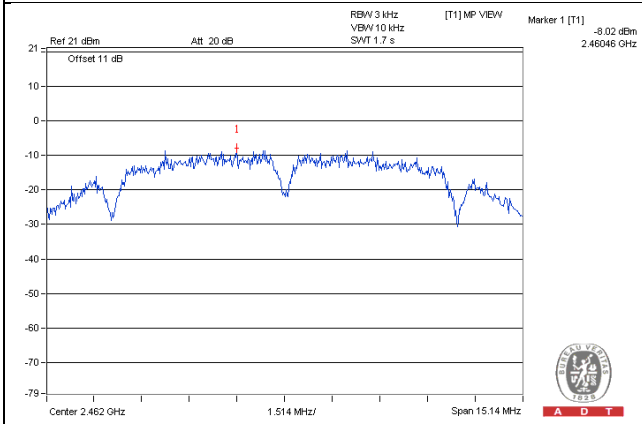
Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-11.22	8	Pass
6	2437	-8.36	8	Pass
11	2462	-9.33	8	Pass

802.11n (HT40)

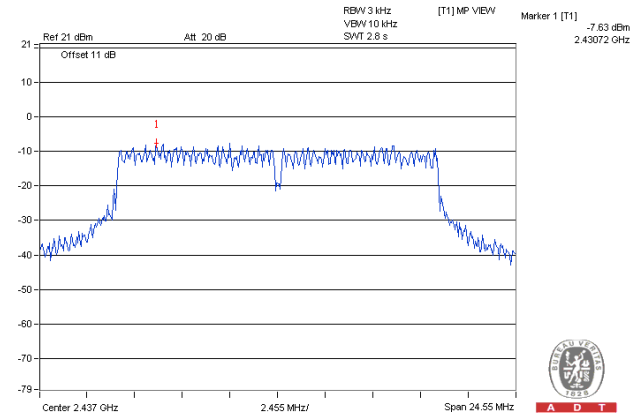
Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
3	2422	-14.99	8	PASS
6	2437	-10.47	8	PASS
9	2452	-13.05	8	PASS

Spectrum Plot of Worst Value

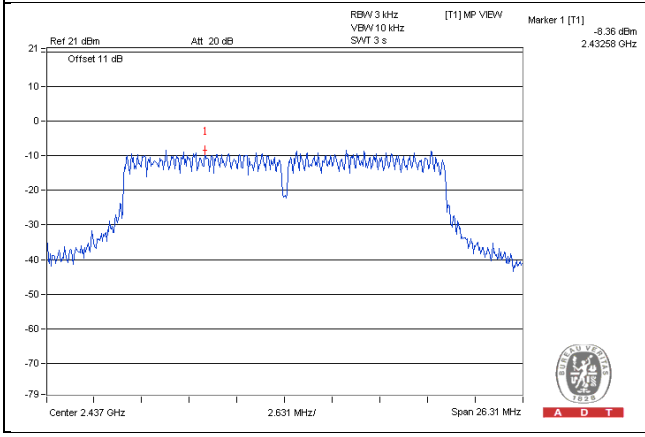
802.11b / CH11



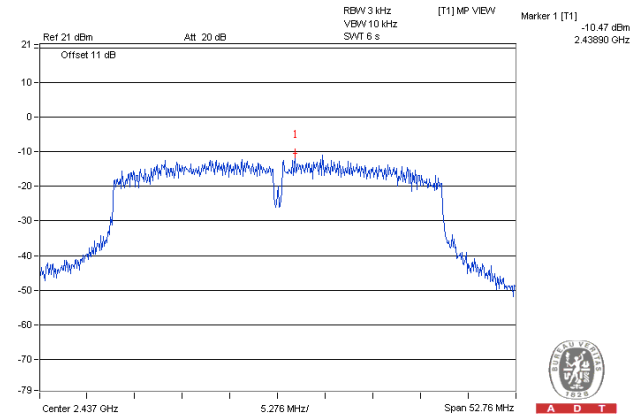
802.11g / CH6



802.11n (HT20) / CH6



802.11n (HT40) / CH6

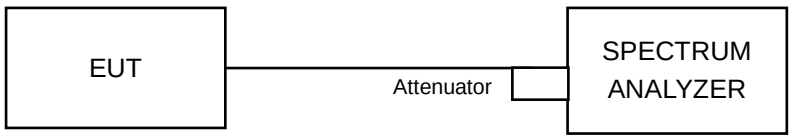


4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW ≥ 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 OOBE

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

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

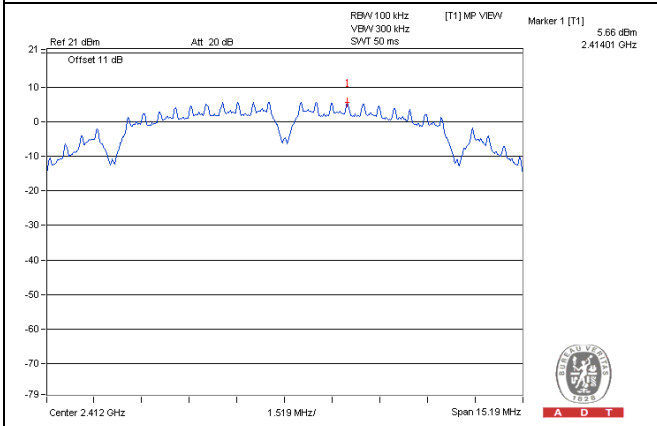
Same as Item 4.3.6

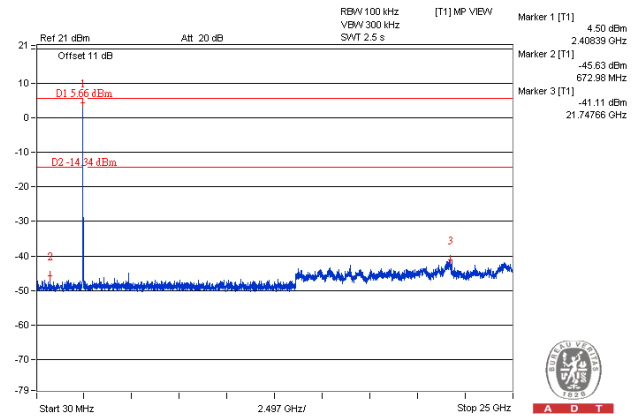
4.6.7 Test Results

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

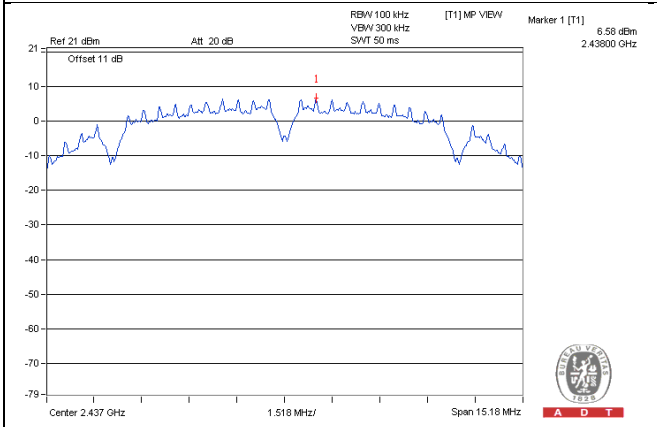
802.11b

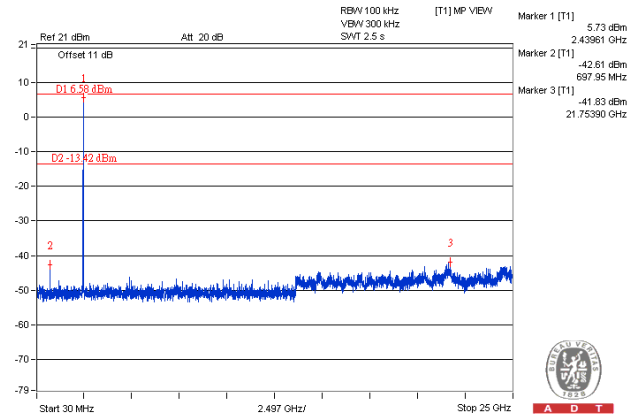
CH 1



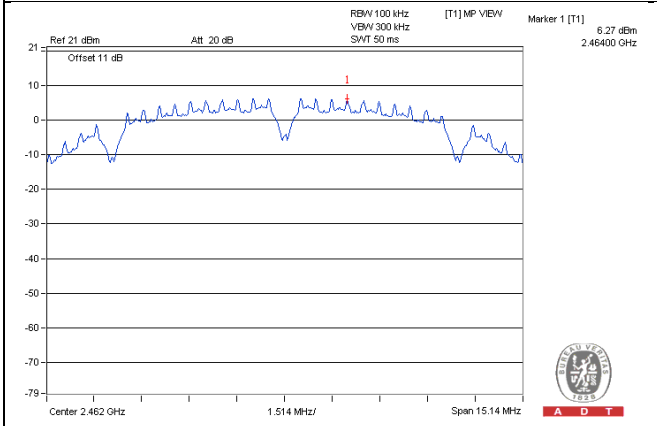


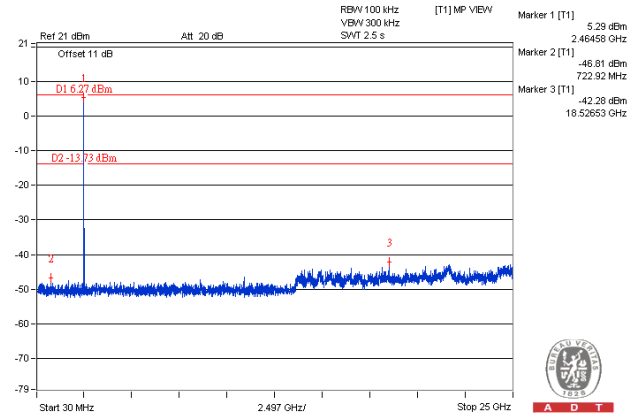
CH 6



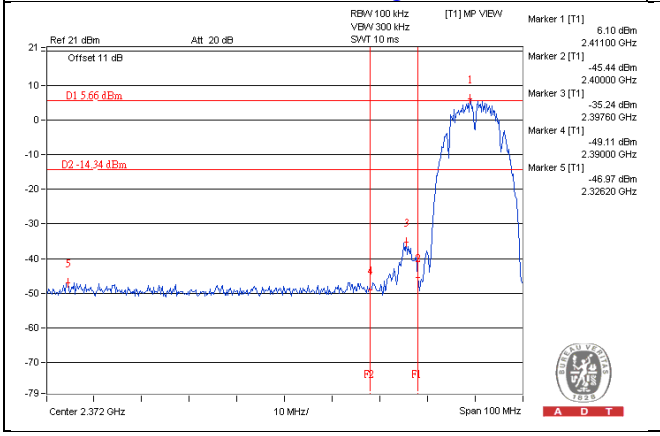


CH 11

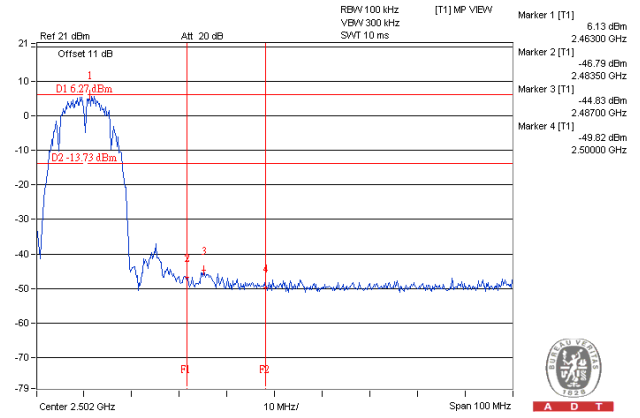




CH 1 Band edge

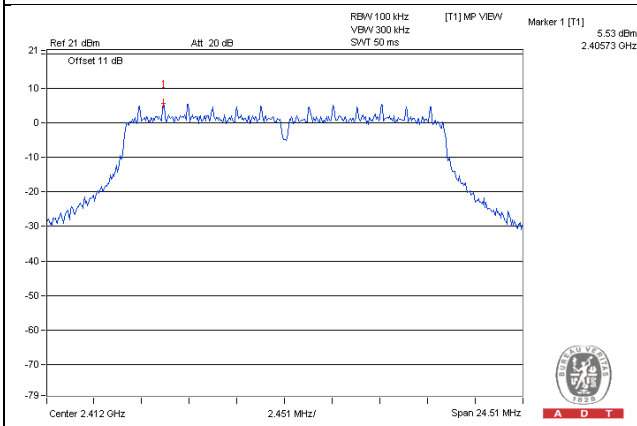


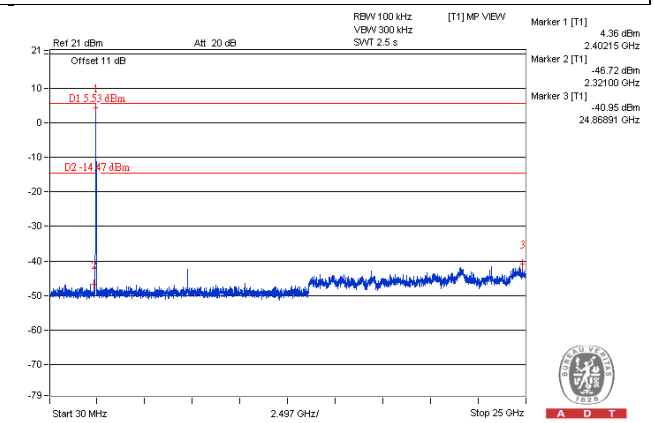
CH 11 Band edge



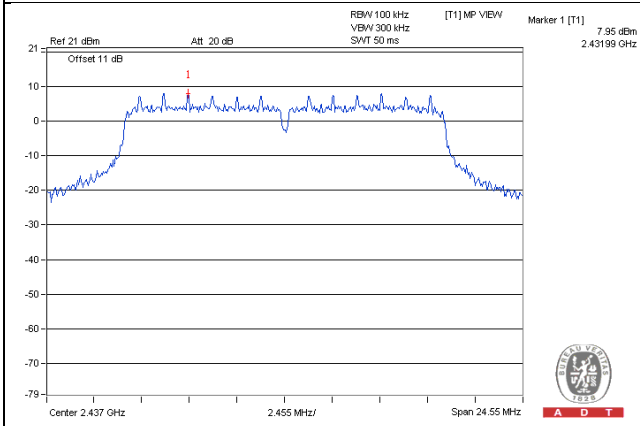
802.11g

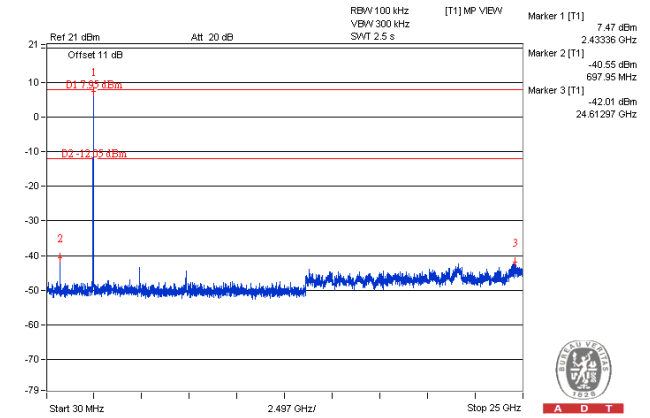
CH 1



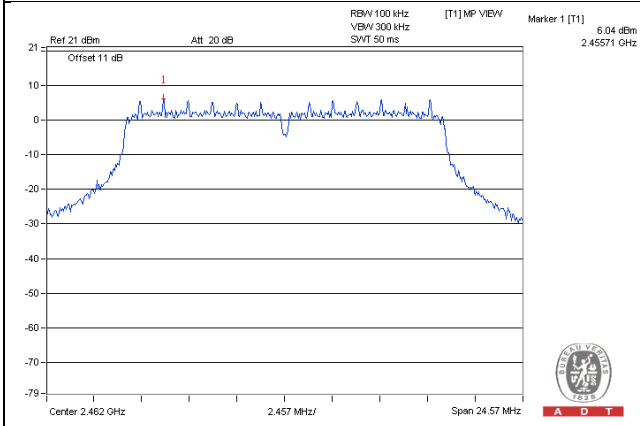


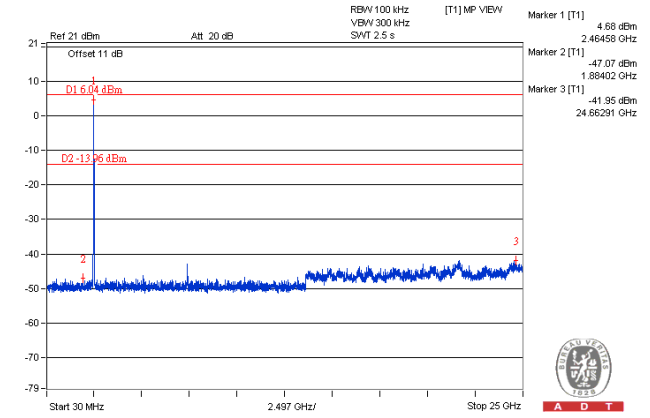
CH 6



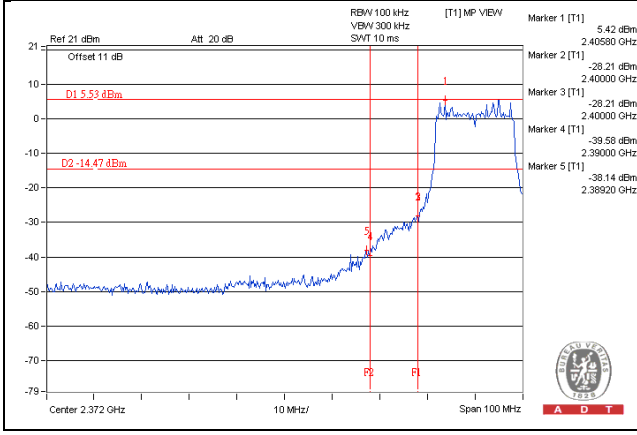


CH 11

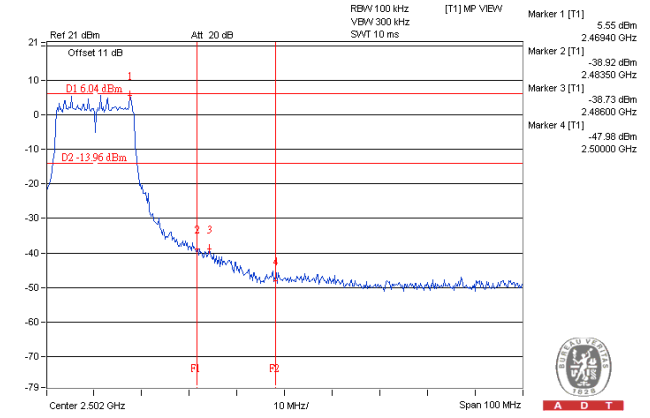




CH 1 Band edge

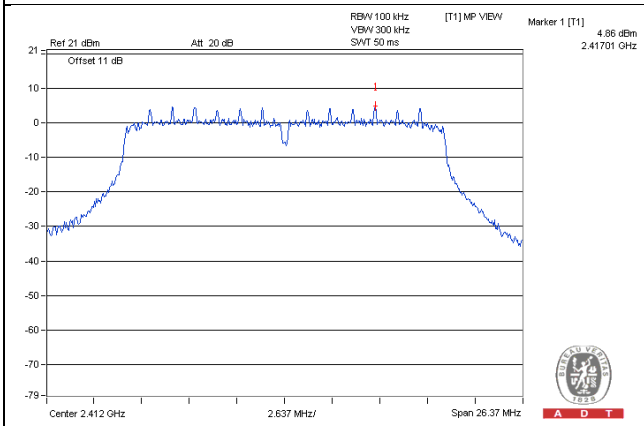


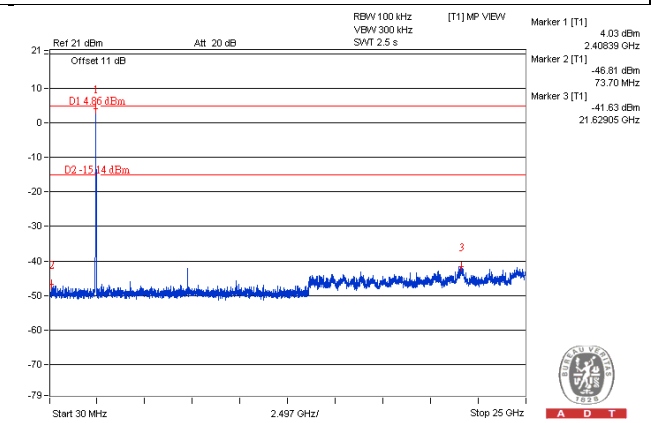
CH 11 Band edge



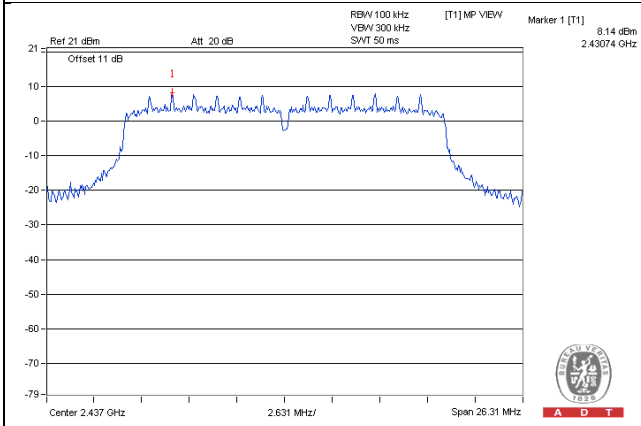
802.11n (HT20)

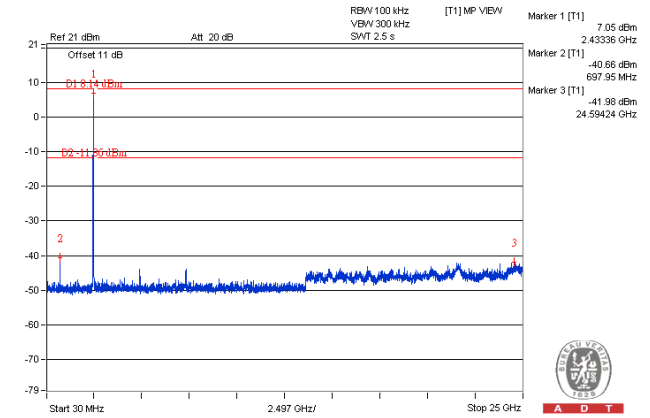
CH 1



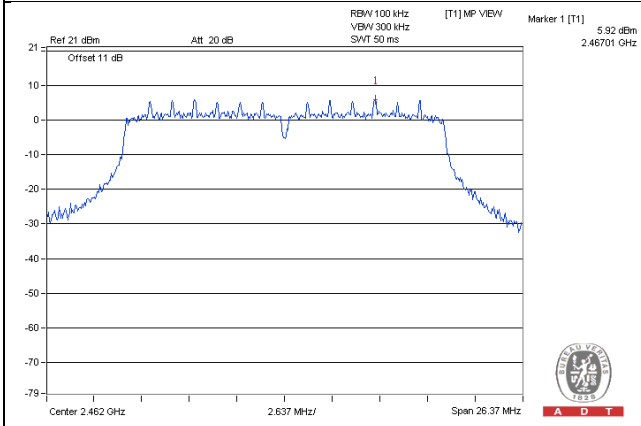


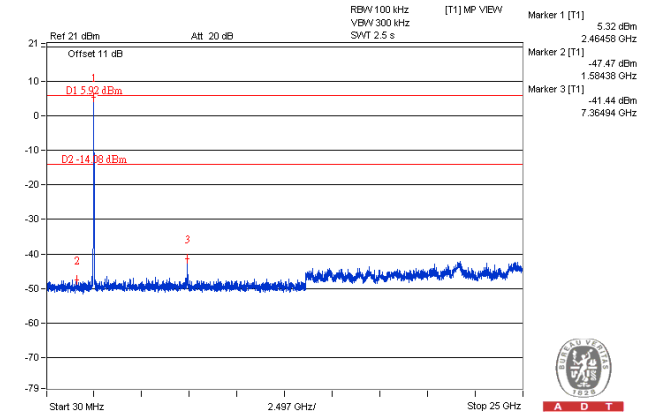
CH 6



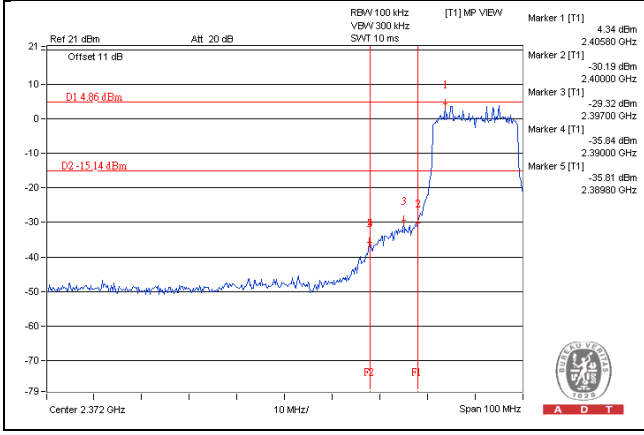


CH 11

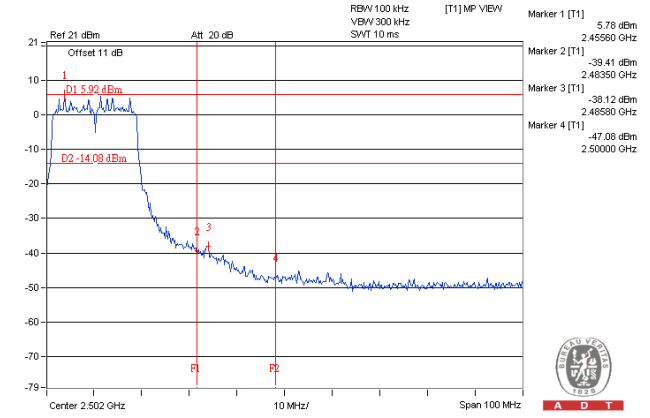




CH 1 Band edge

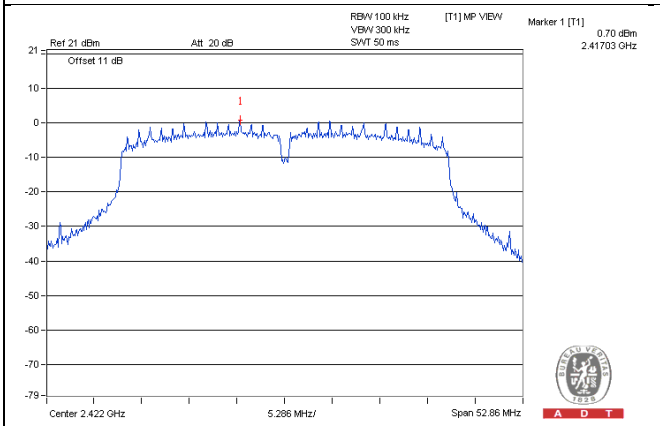


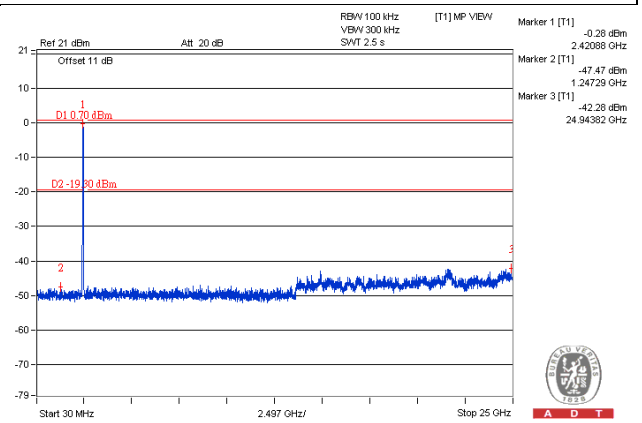
CH 11 Band edge



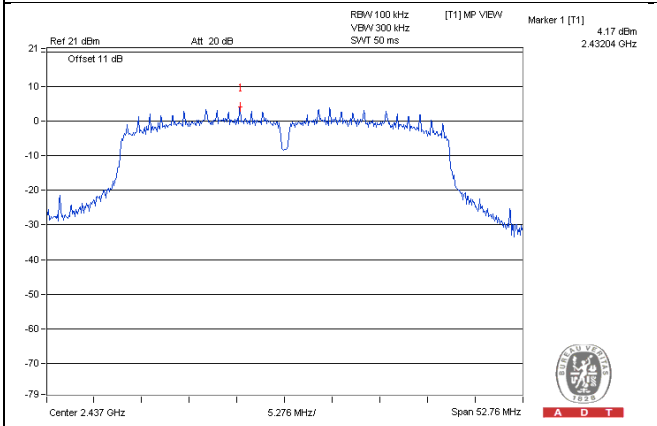
802.11n (HT40)

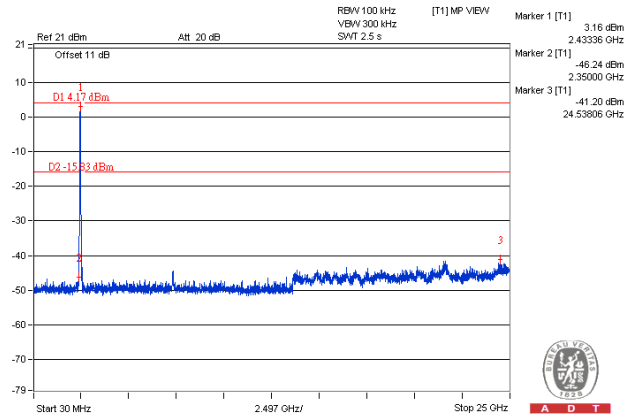
CH 3



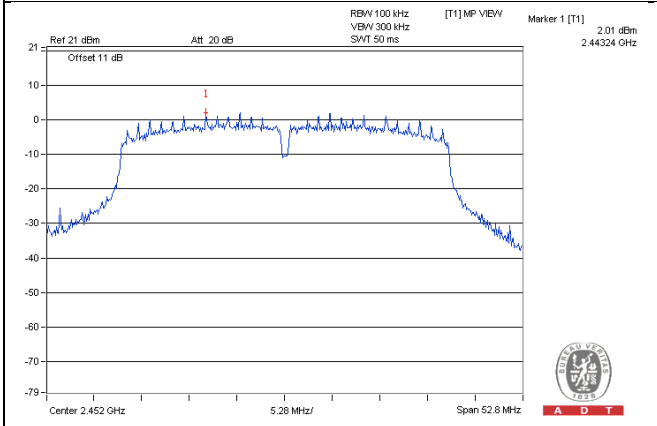


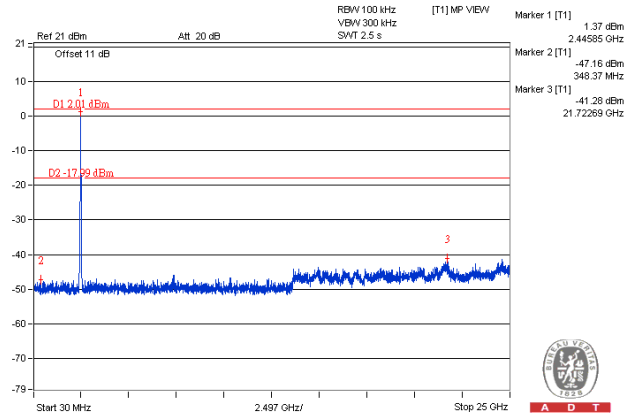
CH 6



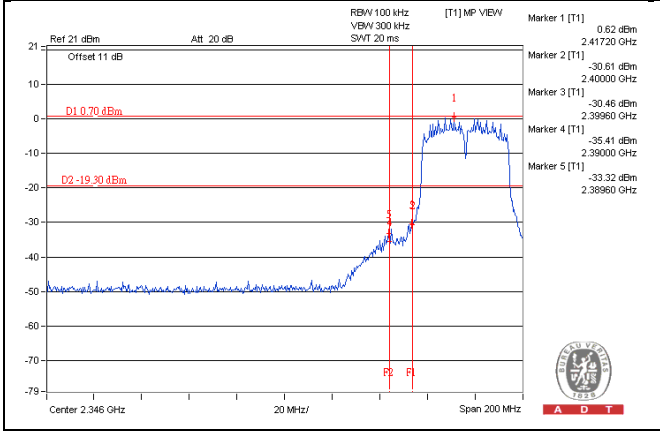


CH 9

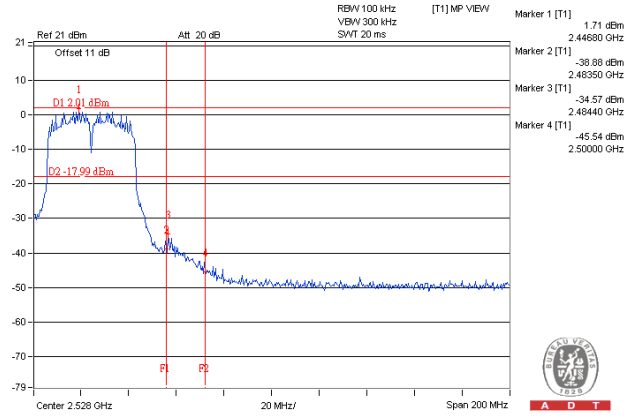




CH 3 Band edge



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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Tel: 886-3-6668565
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Hwa Ya EMC/RF/Safety Lab
Tel: 886-3-3183232
Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

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