FCC Test Report

Report No.: RF150521E04

FCC ID: N5C90173101

Test Model: IC731w

Received Date: May 21, 2015

Test Date: May 25 to June 11, 2015

Issued Date: June 16, 2015

Applicant: StarVedia Technology Inc.

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

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Test Location (2): No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan R.O.C.

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Table of Contents

Release Control Record **4**

1 Certificate of Conformity **5**

2 Summary of Test Results **6**

2.1 Measurement Uncertainty 6
2.2 Modification Record 6

3 General Information **7**

3.1 General Description of EUT 7
3.2 Description of Test Modes 8
3.2.1 Test Mode Applicability and Tested Channel Detail 9
3.3 Duty Cycle of Test Signal 11
3.4 Description of Support Units 12
3.4.1 Configuration of System under Test 12
3.5 General Description of Applied Standards 13

4 Test Types and Results **14**

4.1 Radiated Emission and Bandedge Measurement 14
4.1.1 Limits of Radiated Emission and Bandedge Measurement 14
4.1.2 Test Instruments 15
4.1.3 Test Procedures 17
4.1.4 Deviation from Test Standard 17
4.1.5 Test Setup 18
4.1.6 EUT Operating Conditions 19
4.1.7 Test Results 20
4.2 Conducted Emission Measurement 33
4.2.1 Limits of Conducted Emission Measurement 33
4.2.2 Test Instruments 33
4.2.3 Test Procedures 34
4.2.4 Deviation from Test Standard 34
4.2.5 Test Setup 34
4.2.6 EUT Operating Conditions 34
4.2.7 Test Results 35
4.3 6dB Bandwidth Measurement 37
4.3.1 Limits of 6dB Bandwidth Measurement 37
4.3.2 Test Setup 37
4.3.3 Test Instruments 37
4.3.4 Test Procedure 37
4.3.5 Deviation fromTest Standard 37
4.3.6 EUT Operating Conditions 37
4.3.7 Test Result 38
4.4 Conducted Output Power Measurement 40
4.4.1 Limits of Conducted Output Power Measurement 40
4.4.2 Test Setup 40
4.4.3 Test Instruments 40
4.4.4 Test Procedures 40
4.4.5 Deviation from Test Standard 40
4.4.6 EUT Operating Conditions 40
4.4.7 Test Results 41
4.5 Power Spectral Density Measurement 43
4.5.1 Limits of Power Spectral Density Measurement 43
4.5.2 Test Setup 43
4.5.3 Test Instruments 43
4.5.4 Test Procedure 43
4.5.5 Deviation from Test Standard 43
4.5.6 EUT Operating Condition 43

4.5.7 Test Results 44
4.6 Conducted Out of Band Emission Measurement 46
4.6.1 Limits of Conducted Out of Band Emission Measurement 46
4.6.2 Test Setup 46
4.6.3 Test Instruments 46
4.6.4 Test Procedure 46
4.6.5 Deviation from Test Standard 46
4.6.6 EUT Operating Condition 46
4.6.7 Test Results 46

5 Pictures of Test Arrangements 51

Appendix – Information on the Testing Laboratories 52

Release Control Record

Issue No.	Description	Date Issued
RF150521E04	Original release.	June 16, 2015

1 Certificate of Conformity

Product: IP Camera

Brand: StarVedia

Test Model: IC731w

Sample Status: ENGINEERING SAMPLE

Applicant: StarVedia Technology Inc.

Test Date: May 25 to June 11, 2015

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)
ANSI C63.10:2009

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

Prepared by : _____ , **Date:** June 16, 2015
Elsie Hsu / Specialist

Approved by : _____ , **Date:** June 16, 2015
May Chen / Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (SECTION 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -6.39dB at 0.68078MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.1dB at 4824.00MHz, 4874.00MHz, 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 ~ 1000MHz	5.43 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.65 dB
	6GHz ~ 18GHz	3.88 dB
	18GHz ~ 40GHz	4.11 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	IP Camera
Brand	StarVedia
Test Model	IC731w
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	DC 5V from adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11g: up to 54Mbps 802.11n: up to 150Mbps
Operating Frequency	2.412 ~ 2.462GHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
Output Power	802.11b: 25.235mW 802.11g: 216.272mW 802.11n (HT20): 198.609mW 802.11n (HT40): 171.396mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	RJ45 cable x 4 (Unshielded, 1.8m)

Note:

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

Brand	Model	Gain (dBi)	Antenna Type	Connector Type	Frequency range (MHz to MHz)
NA	NA	2.54	Printed	NA	2400~2500

2. The EUT must be supplied with a power adapter as following table:

Brand	Model No.	Spec.
TEKA	TEKA009-0501500XX	Input: 100-240V, 0.3A, 50/60Hz Output: 5V, 1.5A DC power cable (unshielded, 3.0m)

3. When LANB port is connected to Host unit, the EUT Wi/fi function will be disabled.
4. The EUT incorporates a SISO function.

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

5. The above EUT information is declared by the 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 2 axis. The worst case was found when positioned on **Y-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.

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	1	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	1	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

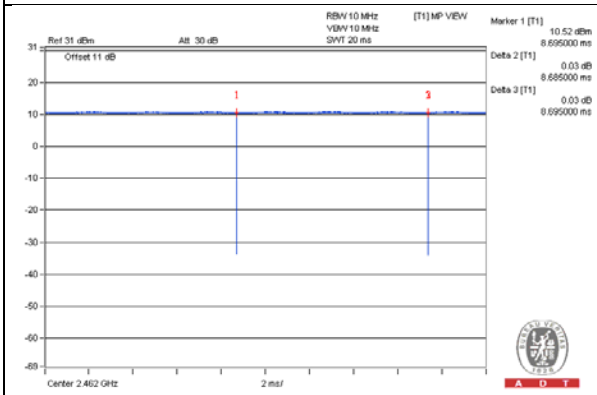
Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	23deg. C, 70%RH	120Vac, 60Hz	Robert Cheng
RE<1G	26deg. C, 72%RH	120Vac, 60Hz	Jason Huang
PLC	25deg. C, 54%RH	120Vac, 60Hz	JyunChun.Lin
APCM	25deg. C, 60%RH	120Vac, 60Hz	Anderson Chen

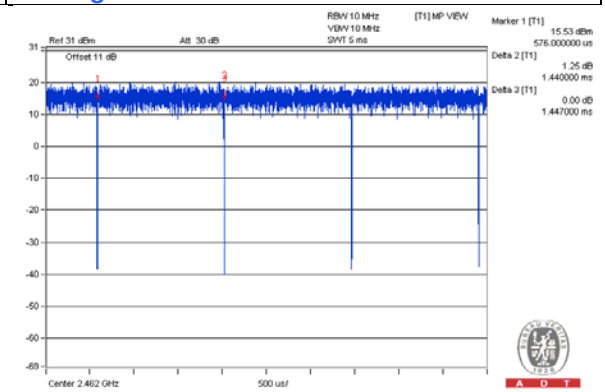
3.3 Duty Cycle of Test Signal

If duty cycle of test signal is ≥ 98 %, duty factor is not required.
If duty cycle of test signal is < 98%, duty factor shall be considered.
802.11b: Duty cycle = 8.685 ms/8.695 ms = 0.999
802.11g: Duty cycle = 1.44 ms/1.447 ms = 0.995
802.11n (HT20): Duty cycle = 1.346 ms/1.367 ms = 0.985
802.11n (HT40): Duty cycle = 0.667 ms/0.682 ms = 0.978, Duty factor = 10 * log(1/0.978) = 0.1

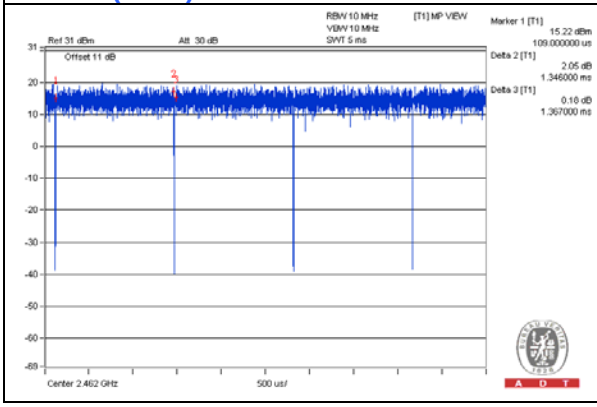
802.11b



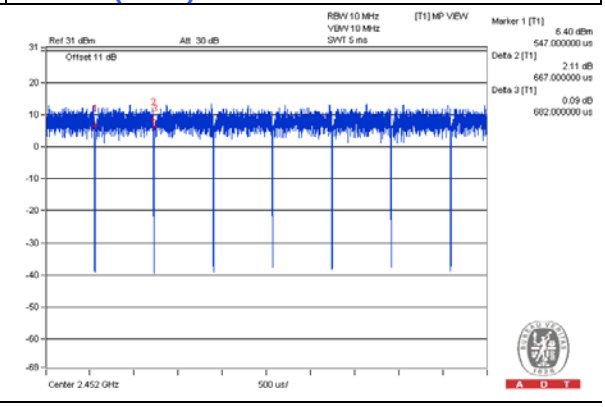
802.11g



802.11n (HT20)



802.11n (HT40)



3.4 Description of Support Units

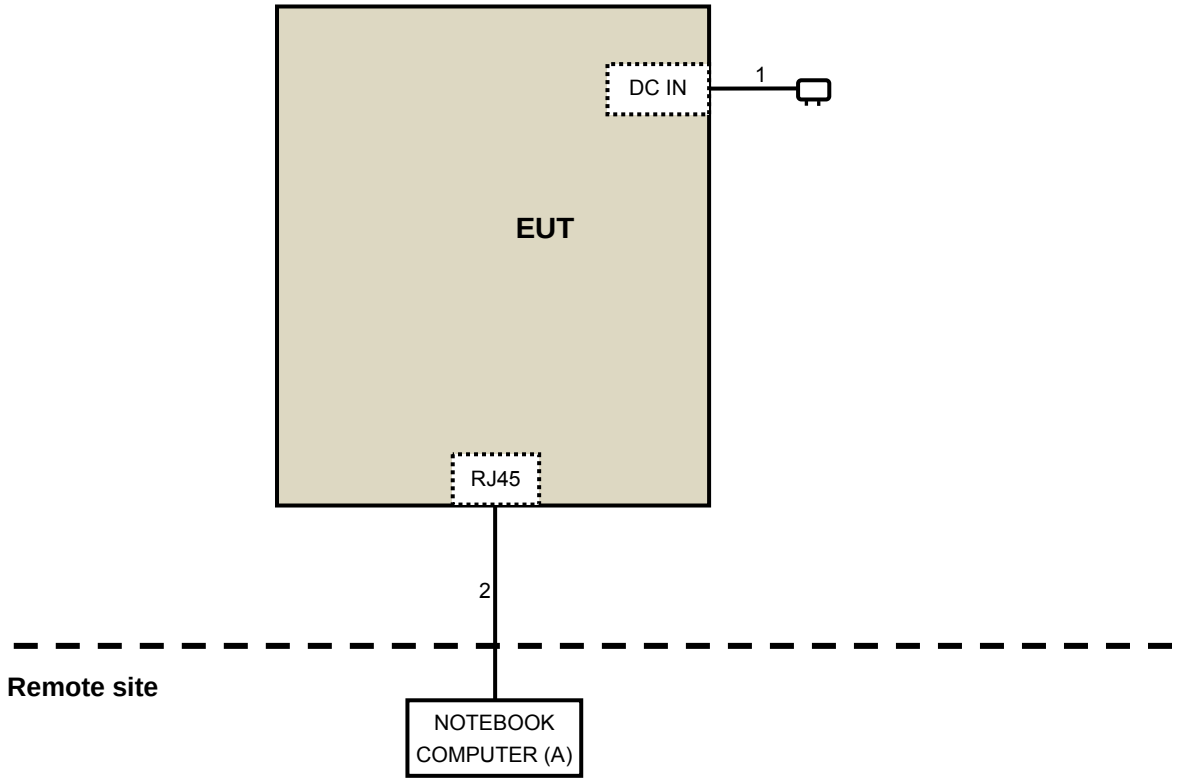
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	NOTEBOOK COMPUTER	DELL	E5430	4YV4VY1	FCC DoC	Provided by Lab

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.	DC	1	3	No	0	Supplied by Client
2.	RJ45	1	10	No	0	Provided by Lab

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards

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

FCC Part 15, Subpart C (15.247)
558074 D01 DTS Meas Guidance v03r02
ANSI C63.10-2009

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

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

4.1.2 Test Instruments

For above 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210105	July 21, 2014	July 20, 2015
Horn_Antenna AISI	AIH.8018	0000320091110	Feb. 09, 2015	Feb. 08, 2016
Pre-Amplifier Agilent	8449B	3008A02578	June 24, 2014	June 23, 2015
RF Cable	NA	131205 131216 131217 SNMY23684/4	Jan. 16, 2015	Jan. 15, 2016
Spectrum Analyzer R&S	FSV40	100964	July 05, 2014	July 04, 2015
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Dec. 12, 2014	Dec. 11, 2015
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Feb. 05, 2015	Feb. 04, 2016
RF Cable	NA	329751/4 RF104-204	Dec. 11, 2014	Dec. 10, 2015
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA
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 test was performed in 966 Chamber No. G.
3. The FCC Site Registration No. is 966073.
4. The VCCI Site Registration No. is G-137.
5. The CANADA Site Registration No. is IC 7450H-2.
7. Tested Date: May 25 to June 11, 2015

For below 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY50010156	Aug. 11, 2014	Aug. 10, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-04	Nov. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Feb. 09, 2015	Feb. 08, 2016
RF Cable	8D-FB	CHHCAB-001-1 CHHCAB-001-2	Oct. 05, 2014	Oct. 04, 2015
	RF-141	CHHCAB-004	Oct. 05, 2014	Oct. 04, 2015
Software	ADT_Radiated_V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. H.
3. The FCC Site Registration No. is 797305.
4. The CANADA Site Registration No. is IC 7450H-3.
5. Tested Date: June 11, 2015

4.1.3 Test Procedures

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

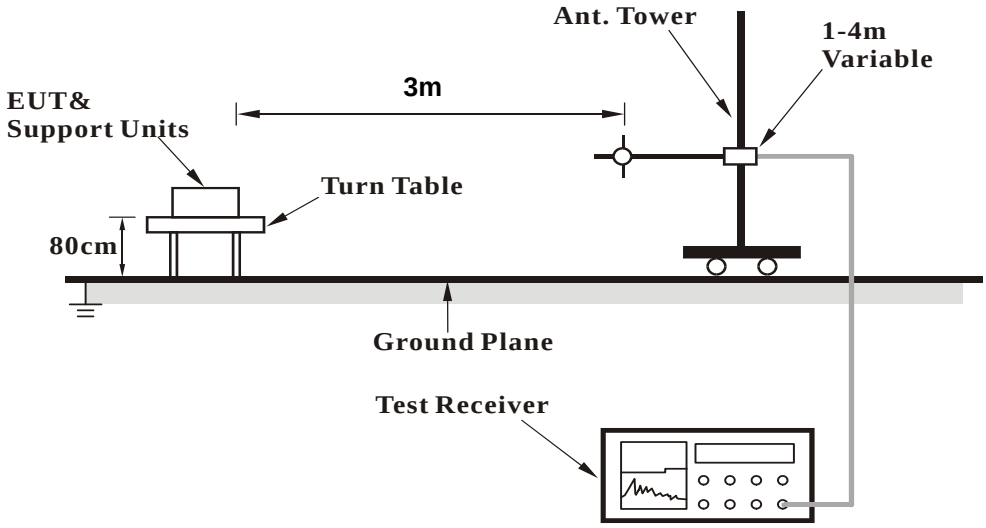
1. For emission measurements above 1 GHz, the EUT shall be placed at a height of 1.5 m above the ground at 3 meter chamber room for test
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
4. 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)).
5. 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.
6. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

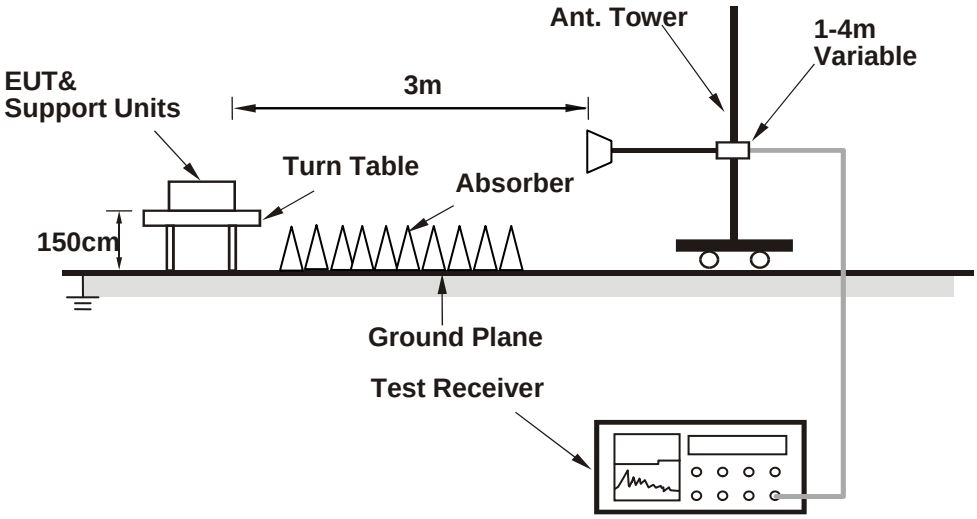
No deviation.

4.1.5 Test Setup

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



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

4.1.6 EUT Operating Conditions

1. Connect the EUT with the support unit A (NOTEBOOK COMPUTER) which is placed on remote site.
2. Controlling software (RT5x7xQA.exe) has been activated to set the EUT on specific status.

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	50.6 PK	74.0	-23.4	1.92 H	327	53.79	-3.19
2	2390.00	38.3 AV	54.0	-15.7	1.92 H	327	41.49	-3.19
3	*2412.00	97.4 PK			1.92 H	327	100.53	-3.13
4	*2412.00	94.1 AV			1.92 H	327	97.23	-3.13
5	4824.00	57.6 PK	74.0	-16.4	2.20 H	309	51.63	5.97
6	**4824.00**	**53.9 AV**	**54.0**	**-0.1**	**2.20 H**	**309**	**47.93**	**5.97**
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2390.00	51.1 PK	74.0	-22.9	2.44 V	36	54.29	-3.19
2	2390.00	38.6 AV	54.0	-15.4	2.44 V	36	41.79	-3.19
3	*2412.00	99.1 PK			2.44 V	36	102.23	-3.13
4	*2412.00	96.0 AV			2.44 V	36	99.13	-3.13
5	4824.00	57.5 PK	74.0	-16.5	1.84 V	162	51.53	5.97
6	4824.00	53.7 AV	54.0	-0.3	1.84 V	162	47.73	5.97

REMARKS:

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

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK) 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	97.1 PK			1.94 H	328	100.14	-3.04
2	*2437.00	93.9 AV			1.94 H	328	96.94	-3.04
3	4874.00	56.7 PK	74.0	-17.3	2.18 H	309	50.65	6.05
4	4874.00	53.6 AV	54.0	-0.4	2.18 H	309	47.55	6.05
5	7311.00	57.9 PK	74.0	-16.1	1.02 H	212	46.96	10.94
6	7311.00	43.6 AV	54.0	-10.4	1.02 H	212	32.66	10.94
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	99.2 PK			2.46 V	23	102.24	-3.04
2	*2437.00	96.2 AV			2.46 V	23	99.24	-3.04
3	4874.00	53.2 PK	74.0	-20.8	1.72 V	199	47.15	6.05
4	4874.00	47.9 AV	54.0	-6.1	1.72 V	199	41.85	6.05
5	7311.00	59.3 PK	74.0	-14.7	1.23 V	297	48.36	10.94
6	7311.00	45.3 AV	54.0	-8.7	1.23 V	297	34.36	10.94

REMARKS:

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

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK) 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	97.2 PK			1.85 H	335	100.14	-2.94
2	*2462.00	93.9 AV			1.85 H	335	96.84	-2.94
3	2483.50	50.0 PK	74.0	-24.0	1.85 H	335	52.87	-2.87
4	2483.50	48.6 AV	54.0	-5.4	1.85 H	335	51.47	-2.87
5	4924.00	57.1 PK	74.0	-16.9	2.17 H	303	51.03	6.07
6	4924.00	53.8 AV	54.0	-0.2	2.17 H	303	47.73	6.07
7	7386.00	58.2 PK	74.0	-15.8	1.00 H	215	46.78	11.42
8	7386.00	45.1 AV	54.0	-8.9	1.00 H	215	33.68	11.42
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	99.2 PK			2.07 V	37	102.14	-2.94
2	*2462.00	96.3 AV			2.07 V	37	99.24	-2.94
3	2483.50	52.3 PK	74.0	-21.7	2.07 V	37	55.17	-2.87
4	2483.50	51.1 AV	54.0	-2.9	2.07 V	37	53.97	-2.87
5	4924.00	55.1 PK	74.0	-18.9	1.67 V	207	49.03	6.07
6	4924.00	49.5 AV	54.0	-4.5	1.67 V	207	43.43	6.07
7	7386.00	59.1 PK	74.0	-14.9	1.24 V	301	47.68	11.42
8	7386.00	45.1 AV	54.0	-8.9	1.24 V	301	33.68	11.42

REMARKS:

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

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	72.9 PK	74.0	-1.1	1.93 H	231	76.09	-3.19
2	2390.00	53.1 AV	54.0	-0.9	1.93 H	231	56.29	-3.19
3	*2412.00	106.9 PK			1.93 H	231	110.03	-3.13
4	*2412.00	96.4 AV			1.93 H	231	99.53	-3.13
5	4824.00	66.4 PK	74.0	-7.6	2.12 H	293	60.43	5.97
6	4824.00	53.8 AV	54.0	-0.2	2.12 H	293	47.83	5.97
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	72.7 PK	74.0	-1.3	1.34 V	189	75.89	-3.19
2	2390.00	51.1 AV	54.0	-2.9	1.34 V	189	54.29	-3.19
3	*2412.00	106.3 PK			1.34 V	189	109.43	-3.13
4	*2412.00	95.3 AV			1.34 V	189	98.43	-3.13
5	4824.00	63.4 PK	74.0	-10.6	1.60 V	195	57.43	5.97
6	4824.00	50.2 AV	54.0	-3.8	1.60 V	195	44.23	5.97

REMARKS:

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

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK) 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	56.4 PK	74.0	-17.6	1.61 H	236	59.59	-3.19
2	2390.00	44.2 AV	54.0	-9.8	1.61 H	236	47.39	-3.19
3	*2437.00	108.1 PK			1.61 H	236	111.14	-3.04
4	*2437.00	96.8 AV			1.61 H	236	99.84	-3.04
5	2483.50	56.2 PK	74.0	-17.8	1.61 H	236	59.07	-2.87
6	2483.50	43.3 AV	54.0	-10.7	1.61 H	236	46.17	-2.87
7	4874.00	66.9 PK	74.0	-7.1	2.16 H	278	60.85	6.05
8	4874.00	53.6 AV	54.0	-0.4	2.16 H	278	47.55	6.05
9	7311.00	58.2 PK	74.0	-15.8	1.00 H	217	47.26	10.94
10	7311.00	44.9 AV	54.0	-9.1	1.00 H	217	33.96	10.94

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	56.8 PK	74.0	-17.2	1.28 V	185	59.99	-3.19
2	2390.00	44.5 AV	54.0	-9.5	1.28 V	185	47.69	-3.19
3	*2437.00	106.9 PK			1.29 V	196	109.94	-3.04
4	*2437.00	95.7 AV			1.29 V	196	98.74	-3.04
5	2483.50	56.5 PK	74.0	-17.5	1.25 V	191	59.37	-2.87
6	2483.50	43.6 AV	54.0	-10.4	1.25 V	191	46.47	-2.87
7	4874.00	63.9 PK	74.0	-10.1	1.71 V	199	57.85	6.05
8	4874.00	50.6 AV	54.0	-3.4	1.71 V	199	44.55	6.05
9	7311.00	57.1 PK	74.0	-16.9	1.15 V	294	46.16	10.94
10	7311.00	43.8 AV	54.0	-10.2	1.15 V	294	32.86	10.94

REMARKS:

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

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK) 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	105.9 PK			1.76 H	231	108.84	-2.94
2	*2462.00	95.6 AV			1.76 H	231	98.54	-2.94
3	2483.50	72.7 PK	74.0	-1.3	1.76 H	231	75.57	-2.87
4	2483.50	53.4 AV	54.0	-0.6	1.76 H	231	56.27	-2.87
5	4924.00	66.3 PK	74.0	-7.7	2.07 H	277	60.23	6.07
6	4924.00	53.7 AV	54.0	-0.3	2.07 H	277	47.63	6.07
7	7386.00	57.5 PK	74.0	-16.5	1.05 H	195	46.08	11.42
8	7386.00	44.9 AV	54.0	-9.1	1.05 H	195	33.48	11.42

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	104.6 PK			1.27 V	187	107.54	-2.94
2	*2462.00	94.0 AV			1.27 V	187	96.94	-2.94
3	2483.50	72.8 PK	74.0	-1.2	1.27 V	87	75.67	-2.87
4	2483.50	53.2 AV	54.0	-0.8	1.27 V	87	56.07	-2.87
5	4924.00	63.5 PK	74.0	-10.5	1.68 V	182	57.43	6.07
6	4924.00	50.2 AV	54.0	-3.8	1.68 V	182	44.13	6.07
7	7386.00	57.4 PK	74.0	-16.6	1.16 V	292	45.98	11.42
8	7386.00	43.9 AV	54.0	-10.1	1.16 V	292	32.48	11.42

REMARKS:

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

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	71.4 PK	74.0	-2.6	1.92 H	235	74.59	-3.19
2	2390.00	53.5 AV	54.0	-0.5	1.92 H	235	56.69	-3.19
3	*2412.00	106.4 PK			1.97 H	233	109.53	-3.13
4	*2412.00	95.7 AV			1.97 H	233	98.83	-3.13
5	4824.00	67.1 PK	74.0	-6.9	2.11 H	282	61.13	5.97
6	4824.00	53.8 AV	54.0	-0.2	2.11 H	282	47.83	5.97
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	70.3 PK	74.0	-3.7	1.34 V	175	73.49	-3.19
2	2390.00	52.2 AV	54.0	-1.8	1.34 V	175	55.39	-3.19
3	*2412.00	104.4 PK			1.34 V	175	107.53	-3.13
4	*2412.00	93.9 AV			1.34 V	175	97.03	-3.13
5	4824.00	63.6 PK	74.0	-10.4	1.73 V	199	57.63	5.97
6	4824.00	50.7 AV	54.0	-3.3	1.73 V	199	44.73	5.97

REMARKS:

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

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK) 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	57.0 PK	74.0	-17.0	1.65 H	236	60.19	-3.19
2	2390.00	44.7 AV	54.0	-9.3	1.65 H	236	47.89	-3.19
3	*2437.00	108.1 PK			1.56 H	235	111.14	-3.04
4	*2437.00	96.5 AV			1.56 H	235	99.54	-3.04
5	2483.50	56.6 PK	74.0	-17.4	1.62 H	245	59.47	-2.87
6	2483.50	43.4 AV	54.0	-10.6	1.62 H	245	46.27	-2.87
7	4874.00	66.4 PK	74.0	-7.6	2.10 H	303	60.35	6.05
8	**4874.00**	**53.9 AV**	**54.0**	**-0.1**	**2.10 H**	**303**	**47.85**	**6.05**
9	7311.00	57.4 PK	74.0	-16.6	1.07 H	188	46.46	10.94
10	7311.00	44.9 AV	54.0	-9.1	1.07 H	188	33.96	10.94

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	56.9 PK	74.0	-17.1	1.23 V	176	60.09	-3.19
2	2390.00	44.8 AV	54.0	-9.2	1.23 V	176	47.99	-3.19
3	*2437.00	107.1 PK			1.23 V	176	110.14	-3.04
4	*2437.00	95.6 AV			1.23 V	176	98.64	-3.04
5	2483.50	55.6 PK	74.0	-18.4	1.23 V	176	58.47	-2.87
6	2483.50	43.0 AV	54.0	-11.0	1.23 V	176	45.87	-2.87
7	4874.00	64.5 PK	74.0	-9.5	1.69 V	197	58.45	6.05
8	4874.00	51.0 AV	54.0	-3.0	1.69 V	197	44.95	6.05
9	7311.00	57.0 PK	74.0	-17.0	1.14 V	276	46.06	10.94
10	7311.00	43.9 AV	54.0	-10.1	1.14 V	276	32.96	10.94

REMARKS:

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

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK) 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	105.1 PK			1.71 H	217	108.04	-2.94
2	*2462.00	95.1 AV			1.71 H	217	98.04	-2.94
3	2483.50	72.3 PK	74.0	-1.7	1.78 H	224	75.17	-2.87
4	2483.50	53.3 AV	54.0	-0.7	1.78 H	224	56.17	-2.87
5	4924.00	66.3 PK	74.0	-7.7	2.17 H	263	60.23	6.07
6	4924.00	53.8 AV	54.0	-0.2	2.17 H	263	47.73	6.07
7	7386.00	58.1 PK	74.0	-15.9	1.07 H	221	46.68	11.42
8	7386.00	45.0 AV	54.0	-9.0	1.07 H	221	33.58	11.42

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	104.1 PK			1.33 V	186	107.04	-2.94
2	*2462.00	94.0 AV			1.33 V	186	96.94	-2.94
3	2483.50	69.5 PK	74.0	-4.5	1.33 V	186	72.37	-2.87
4	2483.50	51.1 AV	54.0	-2.9	1.33 V	186	53.97	-2.87
5	4924.00	63.9 PK	74.0	-10.1	1.69 V	173	57.83	6.07
6	4924.00	50.4 AV	54.0	-3.6	1.69 V	173	44.33	6.07
7	7386.00	56.8 PK	74.0	-17.2	1.14 V	286	45.38	11.42
8	7386.00	43.5 AV	54.0	-10.5	1.14 V	286	32.08	11.42

REMARKS:

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

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	71.4 PK	74.0	-2.6	2.16 H	234	74.59	-3.19
2	**2390.00**	**53.9 AV**	**54.0**	**-0.1**	**2.16 H**	**234**	**57.09**	**-3.19**
3	*2422.00	99.1 PK			2.16 H	234	102.19	-3.09
4	*2422.00	88.5 AV			2.16 H	234	91.59	-3.09
5	4844.00	64.6 PK	74.0	-9.4	2.17 H	229	58.61	5.99
6	4844.00	51.1 AV	54.0	-2.9	2.17 H	229	45.11	5.99
7	7266.00	57.5 PK	74.0	-16.5	1.05 H	212	46.61	10.89
8	7266.00	44.8 AV	54.0	-9.2	1.05 H	212	33.91	10.89

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	69.6 PK	74.0	-4.4	1.44 V	201	72.79	-3.19
2	2390.00	51.1 AV	54.0	-2.9	1.44 V	201	54.29	-3.19
3	*2422.00	98.3 PK			1.44 V	201	101.39	-3.09
4	*2422.00	87.8 AV			1.44 V	201	90.89	-3.09
5	4844.00	61.6 PK	74.0	-12.4	1.70 V	199	55.61	5.99
6	4844.00	48.1 AV	54.0	-5.9	1.70 V	199	42.11	5.99
7	7266.00	57.9 PK	74.0	-16.1	1.19 V	308	47.01	10.89
8	7266.00	44.6 AV	54.0	-9.4	1.19 V	308	33.71	10.89

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	64.5 PK	74.0	-9.5	2.08 H	232	67.69	-3.19
2	2390.00	49.6 AV	54.0	-4.4	2.08 H	232	52.79	-3.19
3	*2437.00	101.6 PK			2.08 H	232	104.64	-3.04
4	*2437.00	91.8 AV			2.08 H	232	94.84	-3.04
5	2483.50	70.0 PK	74.0	-4.0	2.08 H	232	72.87	-2.87
6	2483.50	53.6 AV	54.0	-0.4	2.08 H	232	56.47	-2.87
7	4874.00	64.2 PK	74.0	-9.8	2.20 H	226	58.15	6.05
8	4874.00	50.6 AV	54.0	-3.4	2.20 H	226	44.55	6.05
9	7311.00	57.8 PK	74.0	-16.2	1.02 H	211	46.86	10.94
10	7311.00	44.8 AV	54.0	-9.2	1.02 H	211	33.86	10.94
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	63.3 PK	74.0	-10.7	1.36 V	181	66.49	-3.19
2	2390.00	48.3 AV	54.0	-5.7	1.36 V	181	51.49	-3.19
3	*2437.00	100.6 PK			1.36 V	181	103.64	-3.04
4	*2437.00	91.1 AV			1.36 V	181	94.14	-3.04
5	2483.50	69.1 PK	74.0	-4.9	1.36 V	181	71.97	-2.87
6	2483.50	52.8 AV	54.0	-1.2	1.36 V	181	55.67	-2.87
7	4874.00	61.7 PK	74.0	-12.3	1.68 V	207	55.65	6.05
8	4874.00	48.2 AV	54.0	-5.8	1.68 V	207	42.15	6.05
9	7311.00	57.2 PK	74.0	-16.8	1.20 V	324	46.26	10.94
10	7311.00	44.2 AV	54.0	-9.8	1.20 V	324	33.26	10.94

REMARKS:

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

CHANNEL	TX Channel 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	98.4 PK			2.09 H	231	101.38	-2.98
2	*2452.00	88.0 AV			2.09 H	231	90.98	-2.98
3	2483.50	70.7 PK	74.0	-3.3	2.09 H	231	73.57	-2.87
4	2483.50	53.3 AV	54.0	-0.7	2.09 H	231	56.17	-2.87
5	4904.00	64.7 PK	74.0	-9.3	2.16 H	226	58.62	6.08
6	4904.00	51.1 AV	54.0	-2.9	2.16 H	226	45.02	6.08
7	7356.00	57.6 PK	74.0	-16.4	1.01 H	200	46.38	11.22
8	7356.00	45.1 AV	54.0	-8.9	1.01 H	200	33.88	11.22

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	97.0 PK			1.34 V	179	99.98	-2.98
2	*2452.00	86.7 AV			1.34 V	179	89.68	-2.98
3	2483.50	69.7 PK	74.0	-4.3	1.34 V	179	72.57	-2.87
4	2483.50	52.1 AV	54.0	-1.9	1.34 V	179	54.97	-2.87
5	4904.00	60.5 PK	74.0	-13.5	1.68 V	188	54.42	6.08
6	4904.00	47.2 AV	54.0	-6.8	1.68 V	188	41.12	6.08
7	7356.00	57.6 PK	74.0	-16.4	1.15 V	295	46.38	11.22
8	7356.00	44.3 AV	54.0	-9.7	1.15 V	295	33.08	11.22

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 1	**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	156.70	37.9 QP	43.5	-5.6	1.50 H	91	50.86	-12.95
2	162.02	41.9 QP	43.5	-1.6	2.00 H	280	54.89	-13.02
3	233.99	44.3 QP	46.0	-1.7	1.50 H	314	58.94	-14.60
4	249.17	44.7 QP	46.0	-1.3	1.50 H	305	58.58	-13.88
5	270.03	43.3 QP	46.0	-2.7	1.50 H	226	56.40	-13.12
6	331.52	37.0 QP	46.0	-9.0	1.50 H	229	47.77	-10.78
7	400.01	37.3 QP	46.0	-8.7	2.00 H	98	46.93	-9.62
8	900.04	41.4 QP	46.0	-4.6	1.50 H	261	41.22	0.18

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	150.05	35.9 QP	43.5	-7.6	1.00 V	154	48.74	-12.82
2	162.02	34.7 QP	43.5	-8.8	1.00 V	117	47.72	-13.02
3	253.54	44.8 QP	46.0	-1.2	1.00 V	238	58.60	-13.82
4	272.99	42.4 QP	46.0	-3.6	1.50 V	154	55.40	-12.97
5	324.01	42.9 QP	46.0	-3.1	1.50 V	292	53.82	-10.95
6	331.52	39.6 QP	46.0	-6.4	1.50 V	234	50.38	-10.78
7	600.02	39.1 QP	46.0	-6.9	1.00 V	318	43.75	-4.69
8	999.90	45.7 QP	54.0	-8.3	1.50 V	300	44.02	1.67

REMARKS:

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

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

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

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	100375	May 06, 2015	May 05, 2016
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK-8127	8127-522	Sep. 15, 2014	Sep. 14, 2015
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100071	Nov. 10, 2014	Nov. 09, 2015
RF Cable	5D-FB	COCCAB-001	Mar. 09, 2015	Mar. 08, 2016
50 ohms Terminator	N/A	EMC-03	Sep. 22, 2014	Sep. 21, 2015
50 ohms Terminator	N/A	EMC-02	Sep. 30, 2014	Sep. 29, 2015
Software BVADT	BVADT_Cond_ V7.3.7.3	NA	NA	NA

Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
3 The VCCI Con C Registration No. is C-3611.
4 Tested Date: June 10, 2015

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.

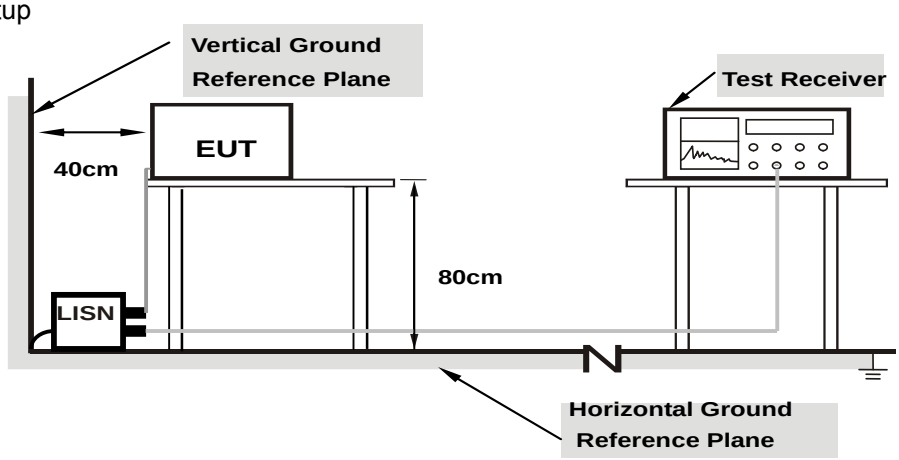
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

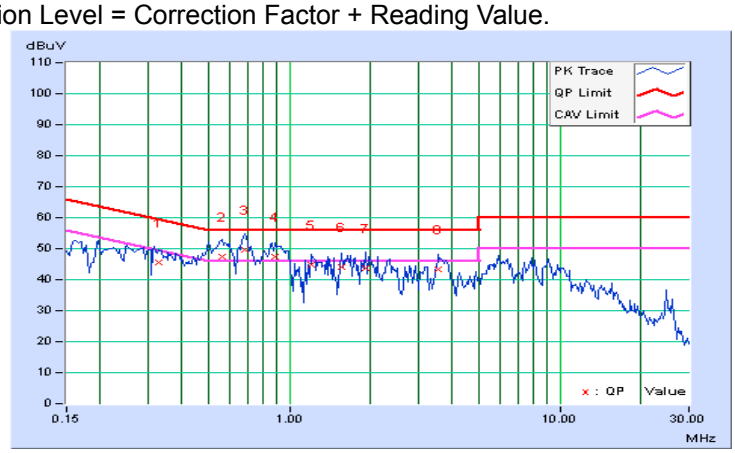
4.2.7 Test Results

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

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.32797	0.16	45.53	33.59	45.69	33.75	59.50	49.50	-13.81	-15.75
2	0.56406	0.18	47.20	32.55	47.38	32.73	56.00	46.00	-8.62	-13.27
3	**0.68078**	**0.18**	**49.43**	**34.05**	**49.61**	**34.23**	**56.00**	**46.00**	**-6.39**	**-11.77**
4	0.88047	0.19	47.13	34.53	47.32	34.72	56.00	46.00	-8.68	-11.28
5	1.21094	0.21	44.61	32.16	44.82	32.37	56.00	46.00	-11.18	-13.63
6	1.55859	0.23	43.78	30.61	44.01	30.84	56.00	46.00	-11.99	-15.16
7	1.92578	0.26	43.35	30.76	43.61	31.02	56.00	46.00	-12.39	-14.98
8	3.57031	0.35	43.03	29.05	43.38	29.40	56.00	46.00	-12.62	-16.60

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.

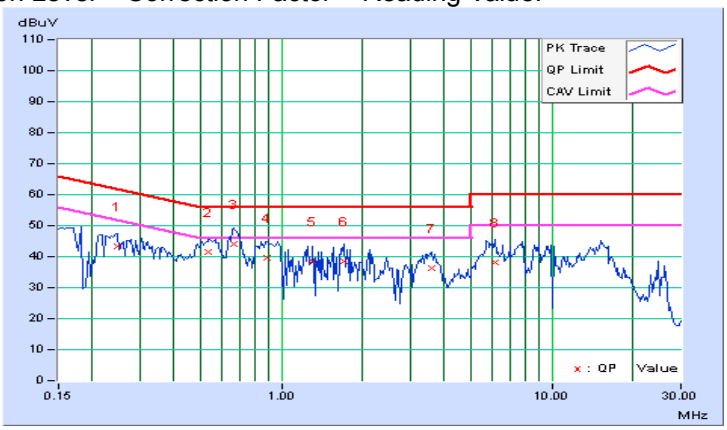


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.24766	0.16	43.29	21.52	43.45	21.68	61.84	51.84	-18.39	-30.16
2	0.53672	0.20	41.45	28.05	41.65	28.25	56.00	46.00	-14.35	-17.75
3	0.66953	0.21	43.70	29.92	43.91	30.13	56.00	46.00	-12.09	-15.87
4	0.88438	0.23	39.31	25.70	39.54	25.93	56.00	46.00	-16.46	-20.07
5	1.30078	0.26	38.15	25.32	38.41	25.58	56.00	46.00	-17.59	-20.42
6	1.71094	0.28	38.23	26.06	38.51	26.34	56.00	46.00	-17.49	-19.66
7	3.59375	0.40	35.77	23.82	36.17	24.22	56.00	46.00	-19.83	-21.78
8	6.19922	0.56	37.67	25.83	38.23	26.39	60.00	50.00	-21.77	-23.61

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.

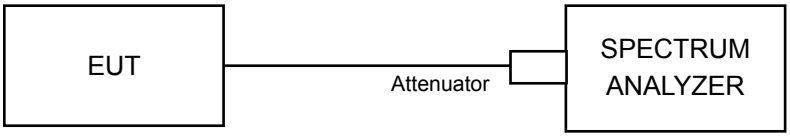


4.3 6dB Bandwidth Measurement

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	12.17	0.5	PASS
6	2437	12.18	0.5	PASS
11	2462	12.18	0.5	PASS

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	15.84	0.5	PASS
6	2437	15.91	0.5	PASS
11	2462	16.09	0.5	PASS

802.11n (HT20)

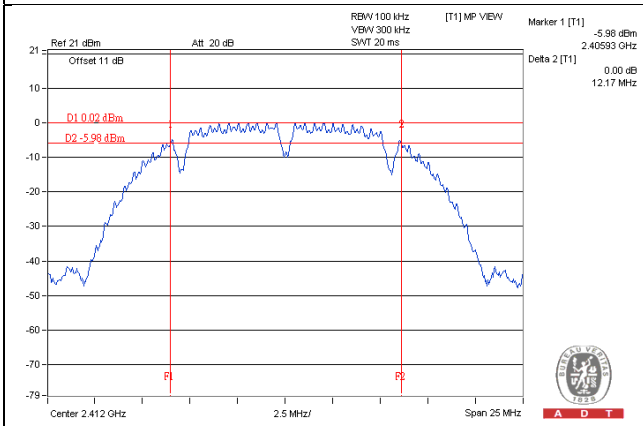
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	15.86	0.5	PASS
6	2437	15.89	0.5	PASS
11	2462	15.89	0.5	PASS

802.11n (HT40)

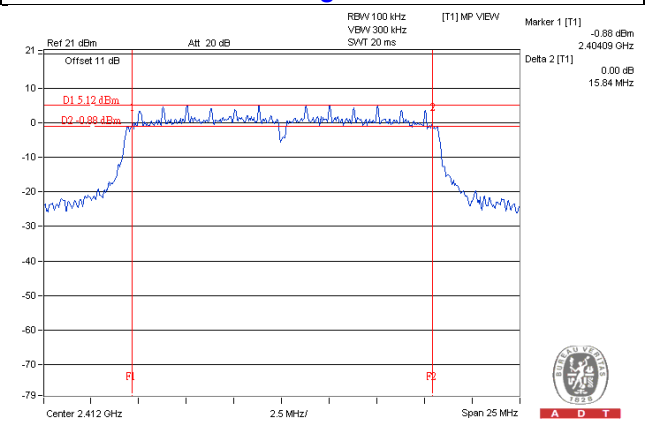
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
3	2422	35.26	0.5	PASS
6	2437	35.24	0.5	PASS
9	2452	35.24	0.5	PASS

Spectrum Plot of Worst Value

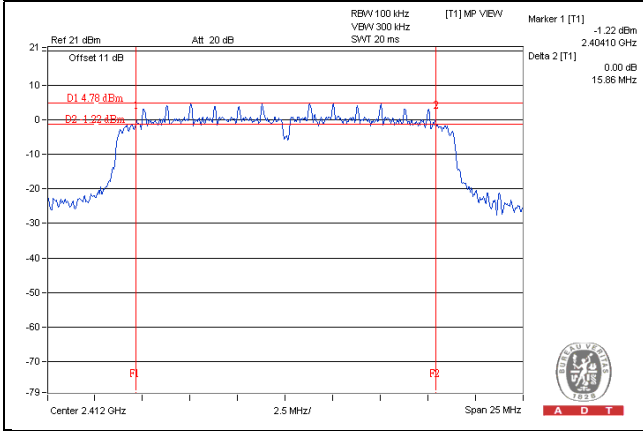
802.11b: CH 1



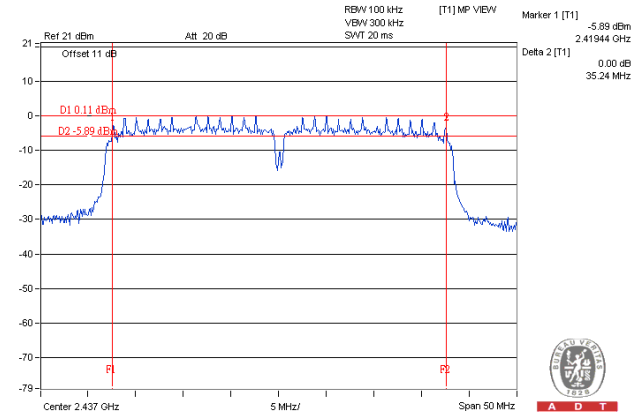
802.11g: CH1



802.11n (HT20): CH1



802.11n (HT40) : CH6

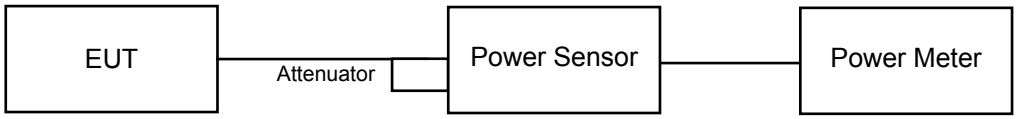


4.4 Conducted Output Power Measurement

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	25.235	14.02	30	Pass
6	2437	24.889	13.96	30	Pass
11	2462	20.559	13.13	30	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	216.272	23.35	30	Pass
6	2437	204.644	23.11	30	Pass
11	2462	198.609	22.98	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	192.752	22.85	30	Pass
6	2437	198.609	22.98	30	Pass
11	2462	184.077	22.65	30	Pass

802.11n (HT40)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
3	2422	102.565	20.11	30	Pass
6	2437	171.396	22.34	30	Pass
9	2452	99.312	19.97	30	Pass

FOR AVERAGE POWER

802.11b

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	15.560	11.92
6	2437	15.171	11.81
11	2462	12.618	11.01

802.11g

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	42.756	16.31
6	2437	39.902	16.01
11	2462	39.446	15.96

802.11n (HT20)

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	38.637	15.87
6	2437	39.264	15.94
11	2462	37.844	15.78

802.11n (HT40)

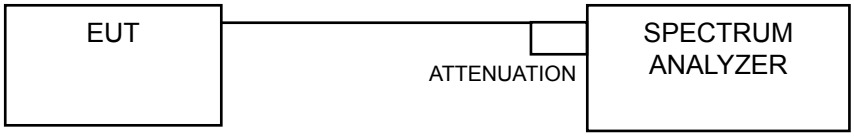
Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
3	2422	17.140	12.34
6	2437	33.189	15.21
9	2452	16.634	12.21

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)	Limit (dBm)	Pass /Fail
1	2412	-12.97	8	Pass
6	2437	-14.71	8	Pass
11	2462	-17.47	8	Pass

802.11g

Channel	Freq. (MHz)	PSD (dBm)	Limit (dBm)	Pass /Fail
1	2412	-11.67	8	Pass
6	2437	-12.48	8	Pass
11	2462	-12.42	8	Pass

802.11n (HT20)

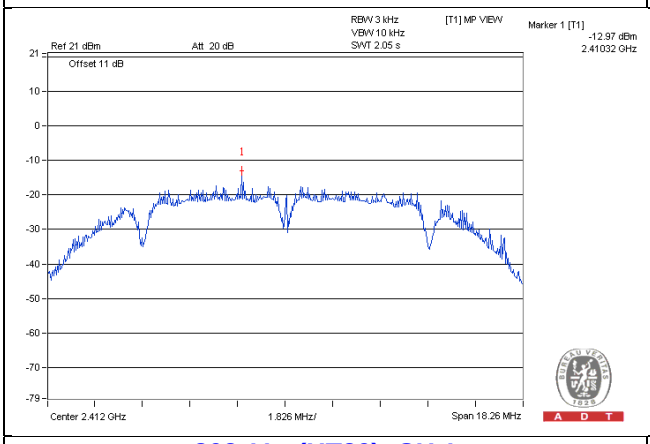
Channel	Freq. (MHz)	PSD (dBm)	Limit (dBm)	Pass /Fail
1	2412	-12.37	8	Pass
6	2437	-12.66	8	Pass
11	2462	-13.20	8	Pass

802.11n (HT40)

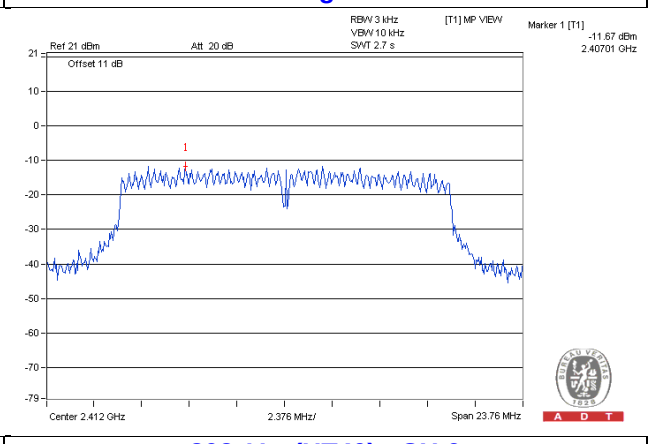
Channel	Freq. (MHz)	PSD (dBm)	Limit (dBm)	Pass /Fail
3	2422	-18.45	8	Pass
6	2437	-16.32	8	Pass
9	2452	-18.00	8	Pass

Spectrum Plot of Worst Value

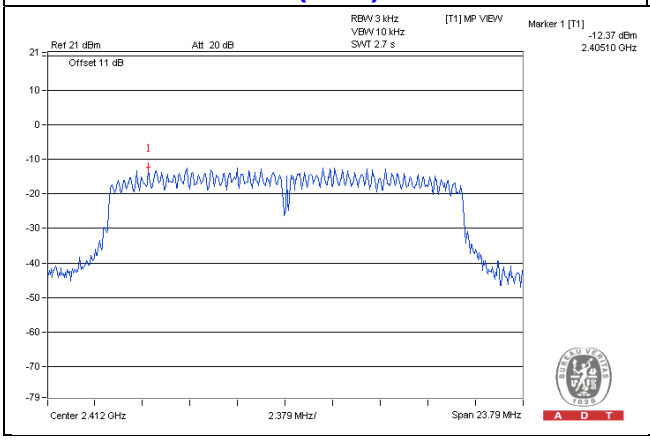
802.11b / CH 1



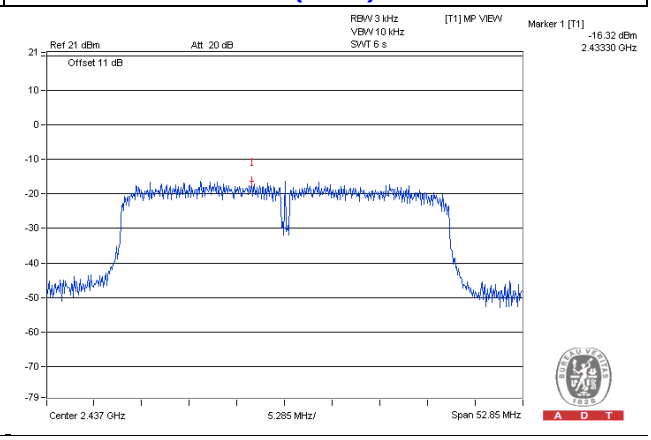
802.11g: CH 1



802.11n (HT20): CH 1



802.11n (HT40) : CH 6

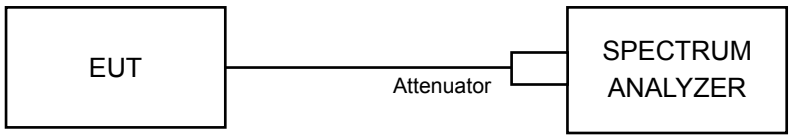


4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

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

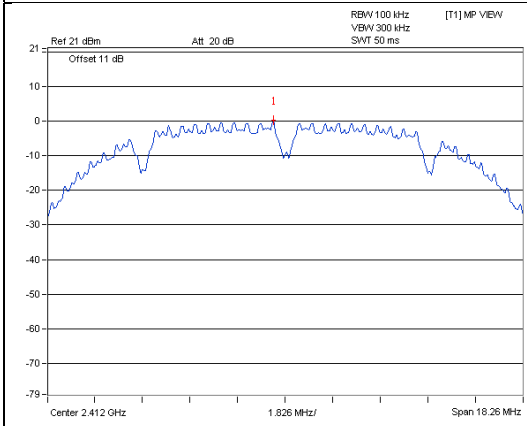
Same as Item 4.3.6

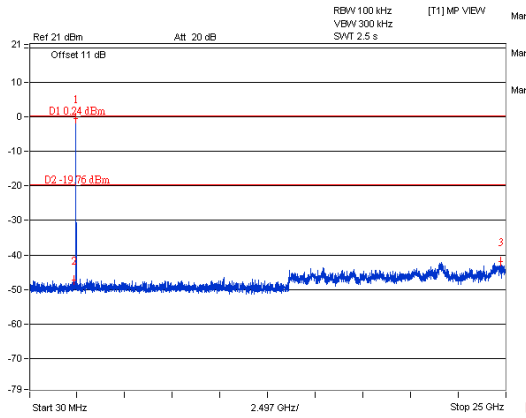
4.6.7 Test Results

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.

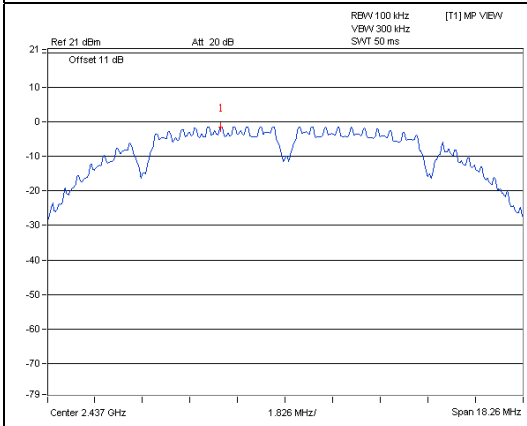
802.11b

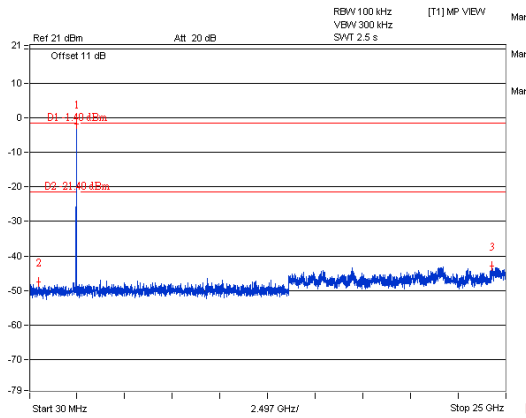
CH 1



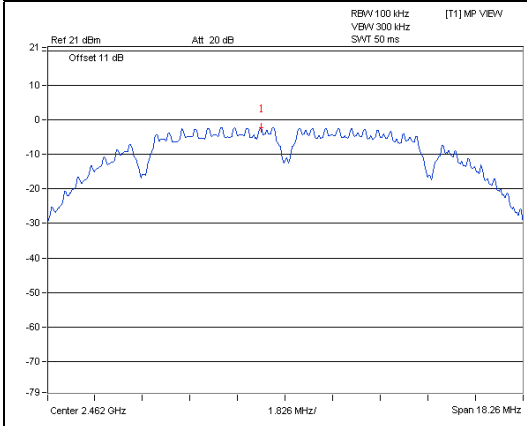


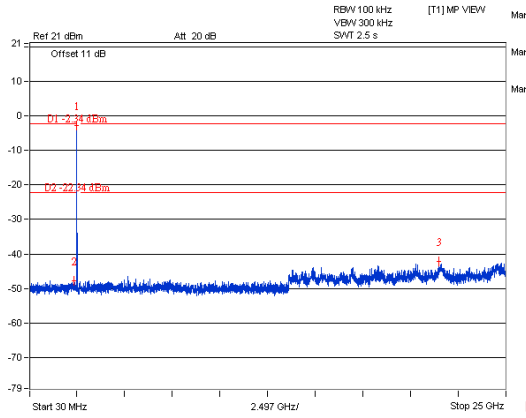
CH 6



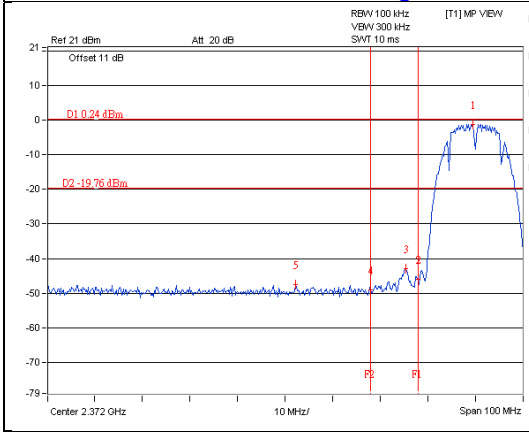


CH 11

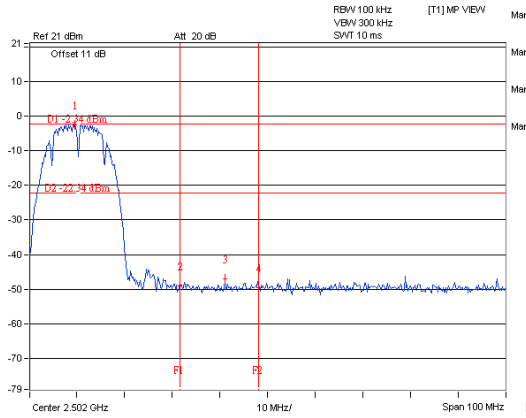




CH 1 Band edge

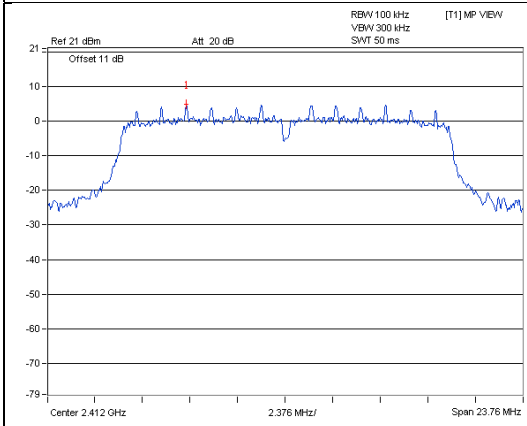


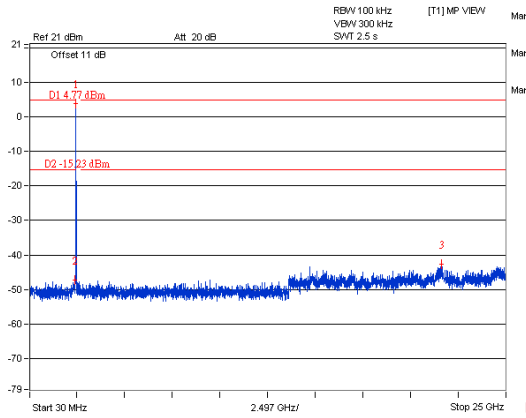
CH 11 Band edge



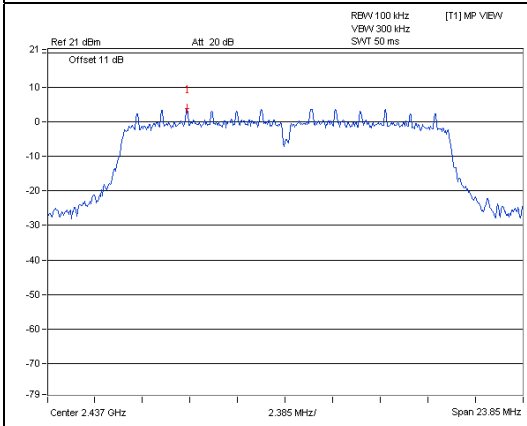
802.11g

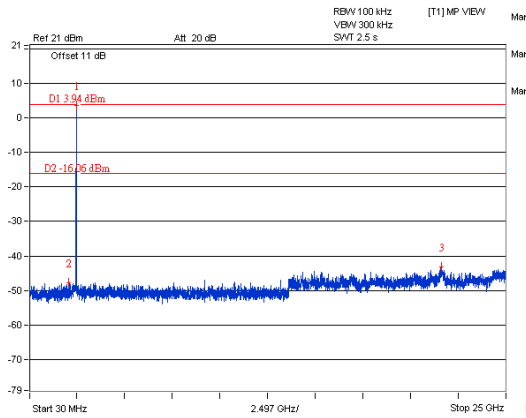
CH 1



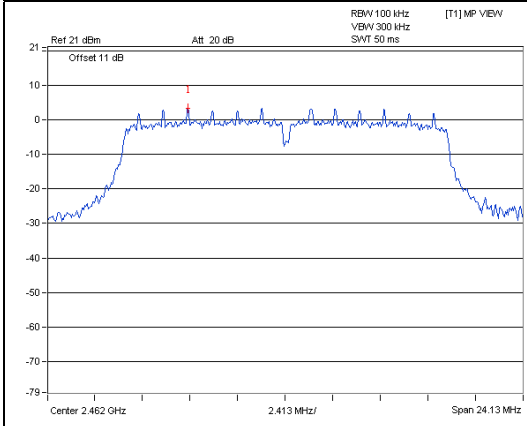


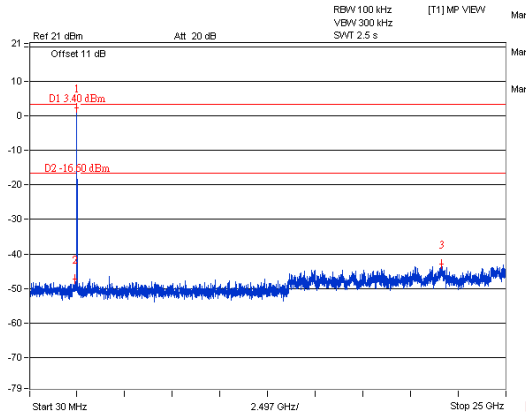
CH 6



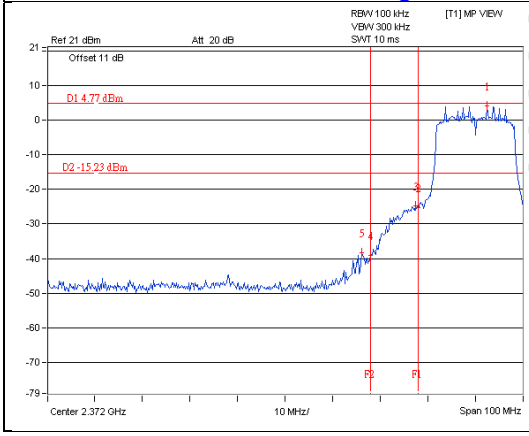


CH 11

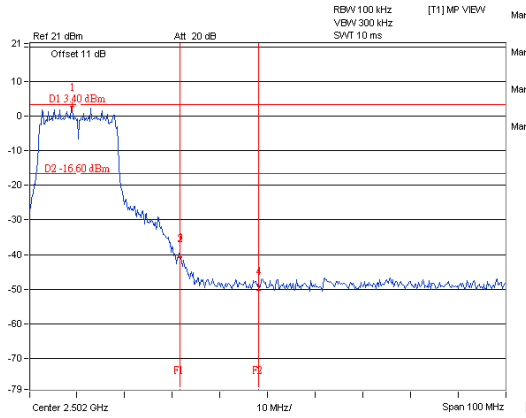




CH 1 Band edge

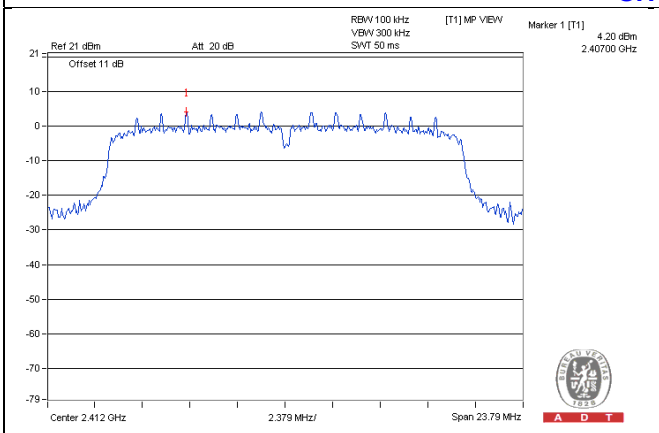


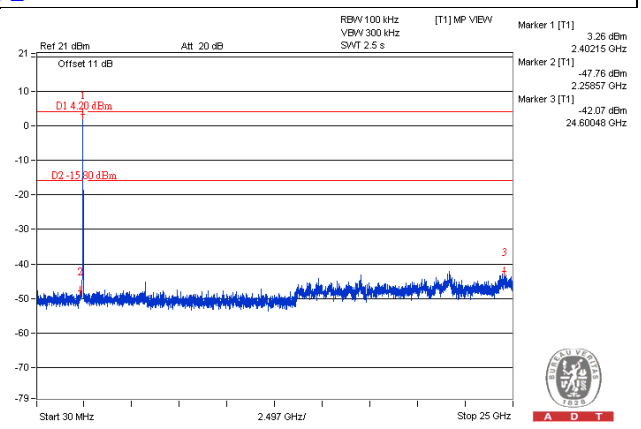
CH 11 Band edge



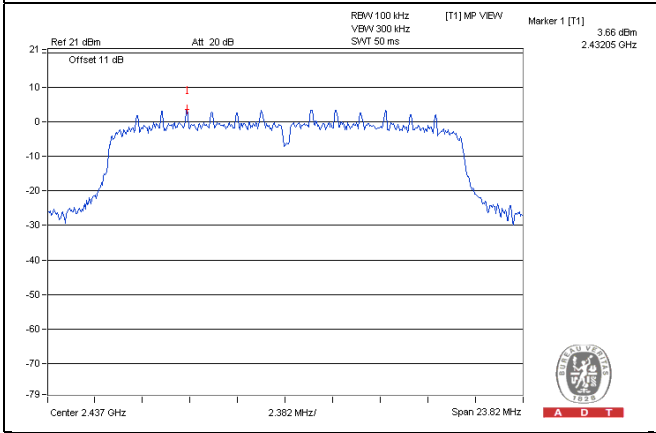
802.11n (HT20)

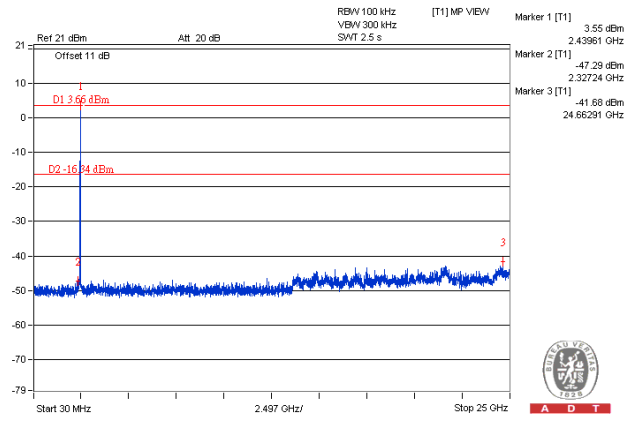
CH 1



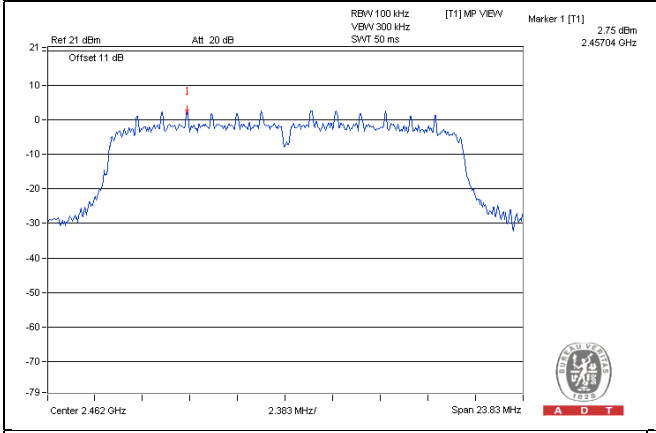


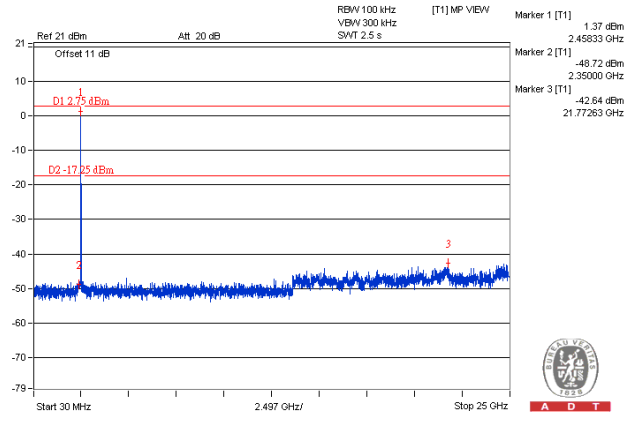
CH 6



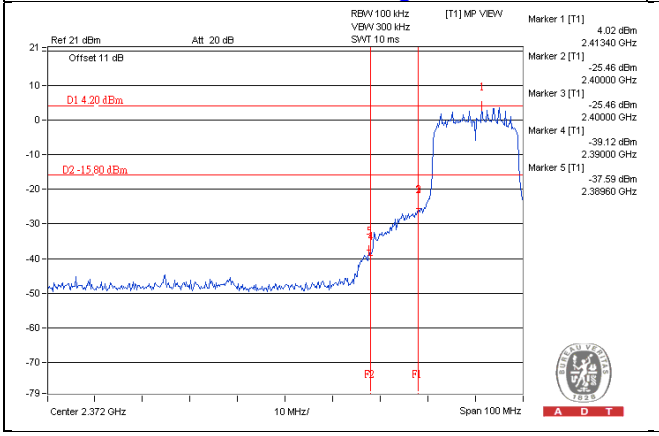


CH 11

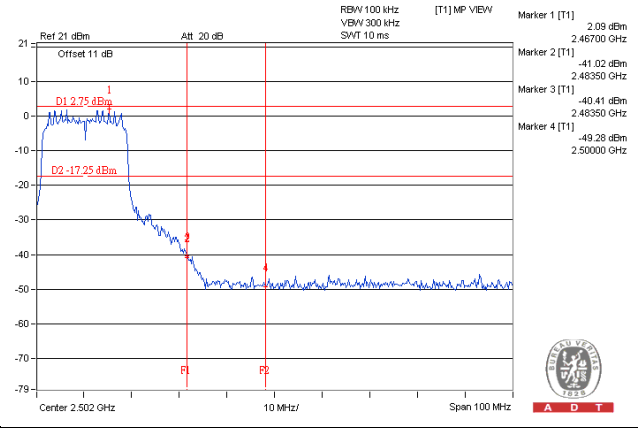




CH 1 Band edge

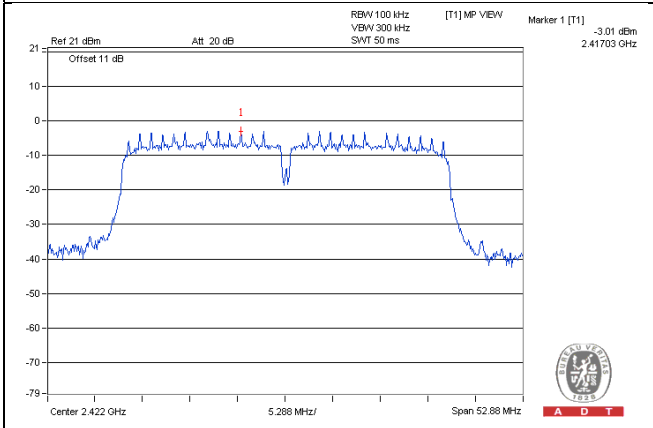


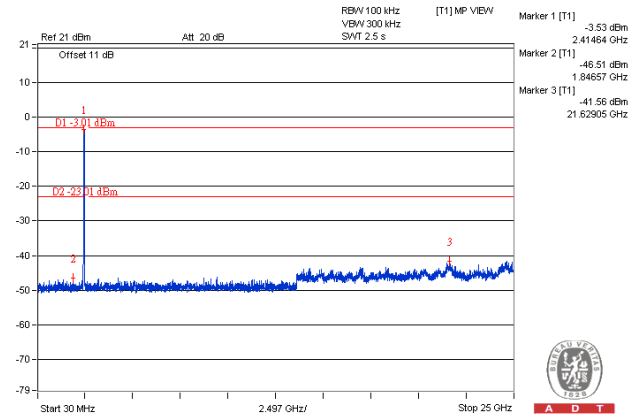
CH 11 Band edge



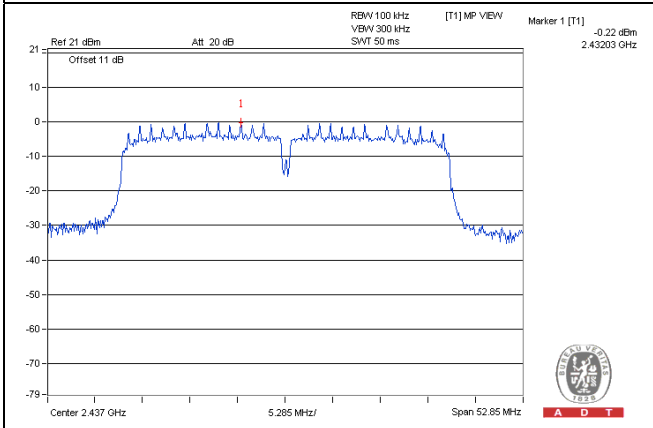
802.11n (HT40)

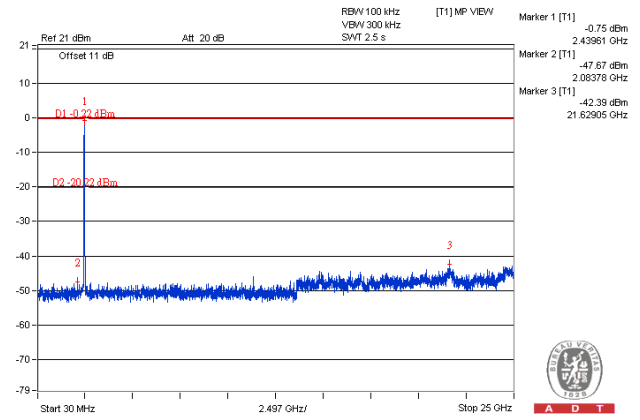
CH 3



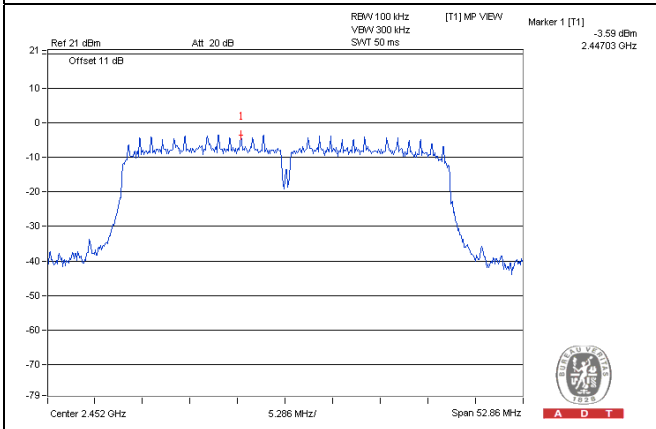


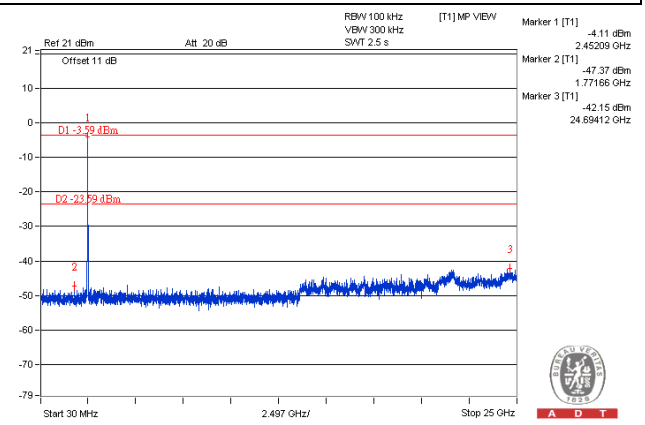
CH 6



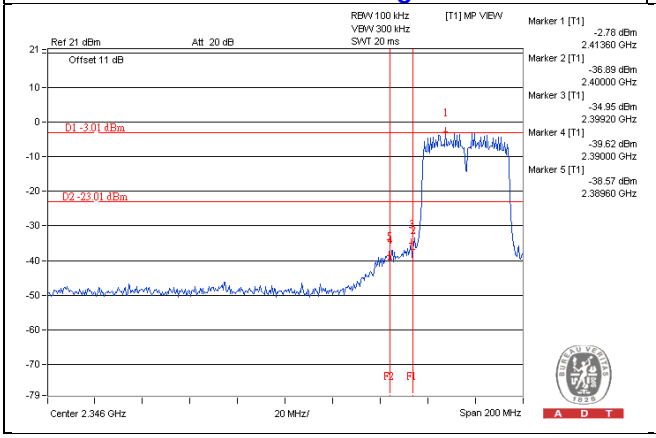


CH 9

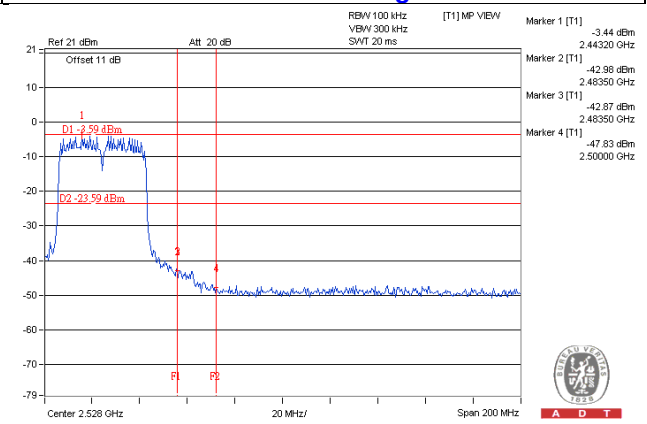




CH 3 Band edge



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:

Linko EMC/RF Lab
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab
Tel: 886-3-5935343
Fax: 886-3-5935342

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