FCC Test Report

Report No.:	RF180629C26
FCC ID:	ACQ-VAP4641
Test Model:	VAP4641
Received Date:	Jun. 29, 2018
Test Date:	Aug. 15 ~ Aug. 17, 2018
Issued Date:	Sep. 03, 2018
Applicant:	ARRIS
Address:	101 Tournament Drive, Horsham, Pennsylvania 19044, United States
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C.)
Test Location (1):	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)
FCC Registration / Designation Number:	788550 / TW0003
Test Location (2):	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
FCC Registration / Designation Number:	723255 / TW2022

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Release Control Record

Issue No.	Description	Date Issued
RF180629C26	Original release.	Sep. 03, 2018

1 Certificate of Conformity

Product:	Wireless AP router
Brand:	Arris
Test Model:	VAP4641
Sample Status:	Engineering sample
Applicant:	ARRIS
Test Date:	Aug. 15 ~ Aug. 17, 2018
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 RF characteristics under the conditions specified in this report.

Prepared by : _____ , **Date:** Sep. 03, 2018

Suntee Liu / Specialist

Approved by : _____ , **Date:** Sep. 03, 2018

Bruce Chen / Project Engineer

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 -5.79dB at 0.41197MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.1dB at 2390.00, 2483.50MHz.
15.247(d)	Antenna Port Emission	Pass	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	Pass	Meet the requirement of limit.
15.247(b)	Conducted power	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is i-pex(MHF) not a standard connector.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	30MHz ~ 200MHz	1.84 dB
Radiated Emissions up to 1 GHz	30MHz ~1GHz	5.33 dB
	1GHz ~ 6GHz	5.10 dB
Radiated Emissions above 1 GHz	6GHz ~ 18GHz	4.85 dB
	18GHz ~ 40GHz	5.24 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Wireless AP router
Brand	Arris
Test Model	VAP4641
Sample Status	Engineering sample
Power Supply Rating	100-240Vac, 50-60Hz
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b:11/5.5/2/1Mbps 802.11g: 54/48/36/24/18/12/9/6Mbps 802.11n: up to 300Mbps
Operating Frequency	2412~2462MHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
Output Power	393.131mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Power plug
Cable Supplied	1.45m non-shielded AC cable without core 0.95m non-shielded RJ45 cable without core

Note:

1. The EUT incorporates a MIMO function. Physically, the EUT provides 2 completed transmitters and 2 receivers.

Modulation Mode	TX Function	Beamforming
802.11b	2TX	Not Support
802.11g	2TX	Not Support
802.11n (HT20)	2TX	Not Support
802.11n (HT40)	2TX	Not Support

2. The EUT uses following antenna.

Type	PCB			
Connector	i-pex(MHF)			
Correlated Directional Gain (dBi)				
2400~2500MHz	5150~5250MHz	5250~5350MHz	5470~5725MHz	5725~5825MHz
6.1	7.8	7.4	7.7	7.7
Peak Gain (dBi)				
2400~2500MHz	5150~5250MHz	5250~5350MHz	5470~5725MHz	5725~5825MHz
3.5	5.1	5.6	4.7	5.3

* Correlated directional gain values are declared and measured by manufacturer, for more details please refer to operation description.

3. The EUT uses following internal power supplies. PSU 1 is the worst case for final test.

Internal power supply unit 1	
Brand	APD
Model	FP-18C12-AAAA
Input Power	100-240Vac, 50-60Hz, 0.5A Max
Output Power	12Vdc, 1.5A Max

Internal power supply unit 2	
Brand	Liteon
Model	PA-1180-03R1
Input Power	100-240Vac, 50-60Hz, 0.5A Max
Output Power	12Vdc, 1.5A Max

4. The EUT has two types of extender mounting options for power (Table Top Mount and Wall Plug Mount), after pre-test, Table Top Mount was the worse and chosen for final test.
5. WLAN 2.4GHz + WLAN 5GHz technologies can transmit at same time.
6. Spurious emission of the simultaneous operation (WLAN 2.4GHz + WLAN 5GHz) has been evaluated and no non-compliance was found.

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	
A	√	√	√	√	Powered from Internal power supply unit 1 with Power cable
B	-	-	√	-	Powered from Internal power supply unit 2 with Power cable
C	-	-	√	-	Powered from Internal power supply unit 1 with Power plug
D	-	-	√	-	Powered from Internal power supply unit 2 with Power plug

Where RE≥1G: Radiated Emission above 1GHz & Bandedge Measurement RE<1G: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission APCM: Antenna Port Conducted Measurement

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

Radiated Emission Test (Above 1GHz):

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

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)	Remark
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0	-
	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0	-
	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5	-
	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5	-

Radiated Emission Test (Below 1GHz):

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

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)	Remark
A	802.11b	1 to 11	6	DSSS	DBPSK	1.0	-

Power Line Conducted Emission Test:

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

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)	Remark
A, B, C, D	802.11b	1 to 11	6	DSSS	DBPSK	1.0	-

Antenna Port Conducted Measurement:

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)	Remark
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0	-
	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0	-
	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5	-
	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5	-

Test Condition:

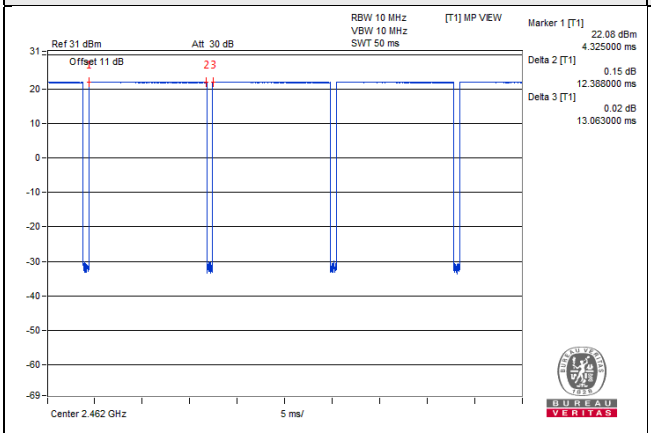
Applicable to	Environmental Conditions	Input Power	Tested by
RE≥1G	23 deg. C, 74% RH	120Vac, 60Hz	Steven Chiang
RE<1G	22 deg. C, 67% RH	120Vac, 60Hz	Frank Chuang
PLC	24 deg. C, 76% RH	120Vac, 60Hz	Andy Ho
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Ted Chang

3.3 Duty Cycle of Test Signal

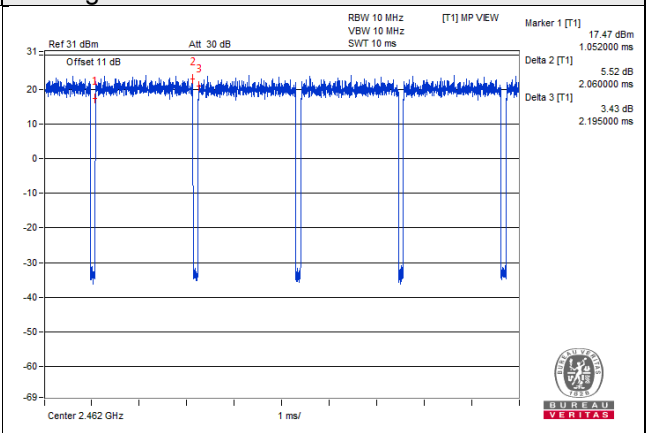
Duty cycle of test signal is ≥ 98%, duty factor is not required.
Duty cycle of test signal is < 98%, duty factor is required.

802.11b: Duty cycle = 12.388/13.063 = 0.948, Duty factor = 10 * log(1/0.948) = 0.23
802.11g: Duty cycle = 2.06/2.195 = 0.938, Duty factor = 10 * log(1/0.938) = 0.28
802.11n (HT20): Duty cycle = 1.92/2.02 = 0.950, Duty factor = 10 * log(1/0.950) = 0.22
802.11n (HT40): Duty cycle = 0.937/1.05 = 0.892, Duty factor = 10 * log(1/0.892) = 0.49

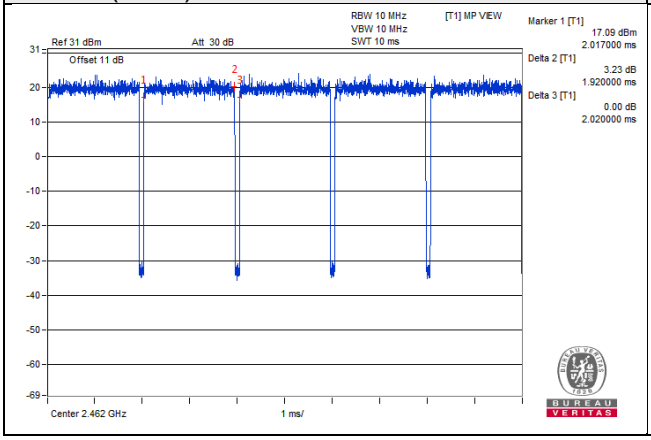
802.11b



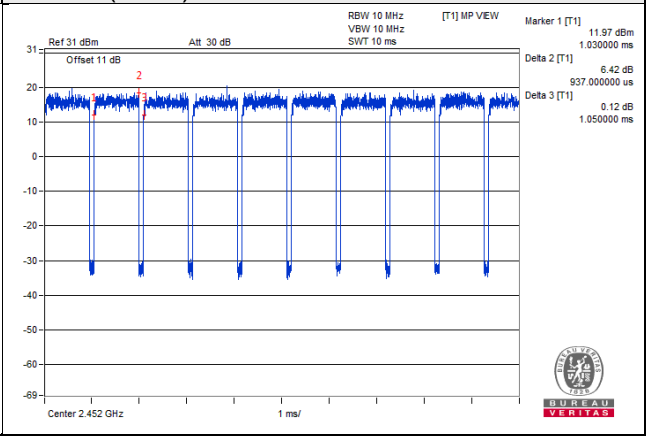
802.11g



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.

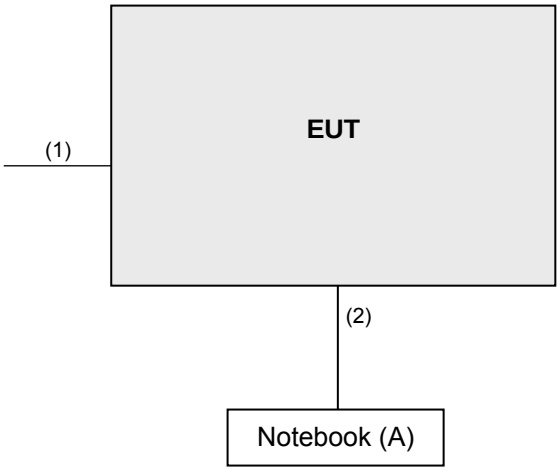
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	HP	Pavilion 14-ab023TU	5CD5340WXZ	FCC DoC Approved	-

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item A acted as a communication partner to transfer data.

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	AC cable	1	1.45	N	0	Accessory
2.	RJ45, Cat5e cable	1	10	N	0	-

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 15.247 Meas Guidance v05
KDB 662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10:2013

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

Note:

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

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver Keysight	N9038A	MY54450088	Jul. 05, 2018	Jul. 04, 2019
Pre-Amplifier EMCI	EMC001340	980142	Feb. 09, 2018	Feb. 08, 2019
Loop Antenna(*) Electro-Metrics	EM-6879	264	Dec. 16, 2016	Dec. 15, 2018
RF Cable	NA	LOOPCAB-001	Jan. 15, 2018	Jan. 14, 2019
RF Cable	NA	LOOPCAB-002	Jan. 15, 2018	Jan. 14, 2019
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Nov. 09, 2017	Nov. 08, 2018
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Nov. 29, 2017	Nov. 28, 2018
RF Cable	8D	966-4-1	Mar. 21, 2018	Mar. 20, 2019
RF Cable	8D	966-4-2	Mar. 21, 2018	Mar. 20, 2019
RF Cable	8D	966-4-3	Mar. 21, 2018	Mar. 20, 2019
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-4-01	Oct. 03, 2017	Oct. 02, 2018
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Dec. 12, 2017	Dec. 11, 2018
Pre-Amplifier Mini-Circuits	ZVA-183-S+	AMP-ZVA-03	May 10, 2018	May 09, 2019
RF Cable	EMC104-SM-SM-1200	160923	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-2000	150318	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-5000	150321	Jan. 29, 2018	Jan. 28, 2019
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 29, 2018	Jan. 28, 2019
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Dec. 14, 2017	Dec. 13, 2018
RF Cable	EMC102-KM-KM-1200	160925	Jan. 29, 2018	Jan. 28, 2019
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	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 calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in HsinChu Chamber 966-4. (TAF No.: 2022)
4. The CANADA Site Registration No. is 20331-2.

4.1.3 Test Procedures

For Radiated emission below 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. 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. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case 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.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 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:

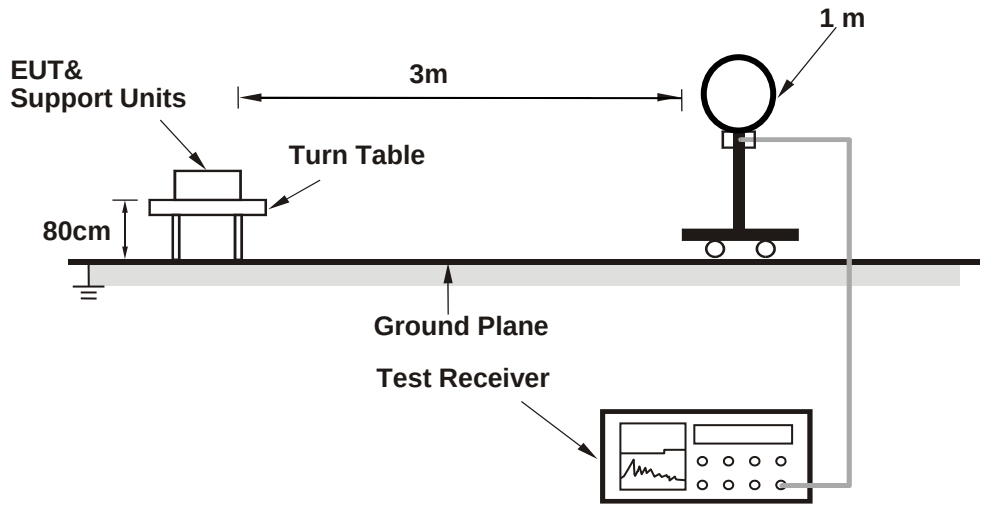
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

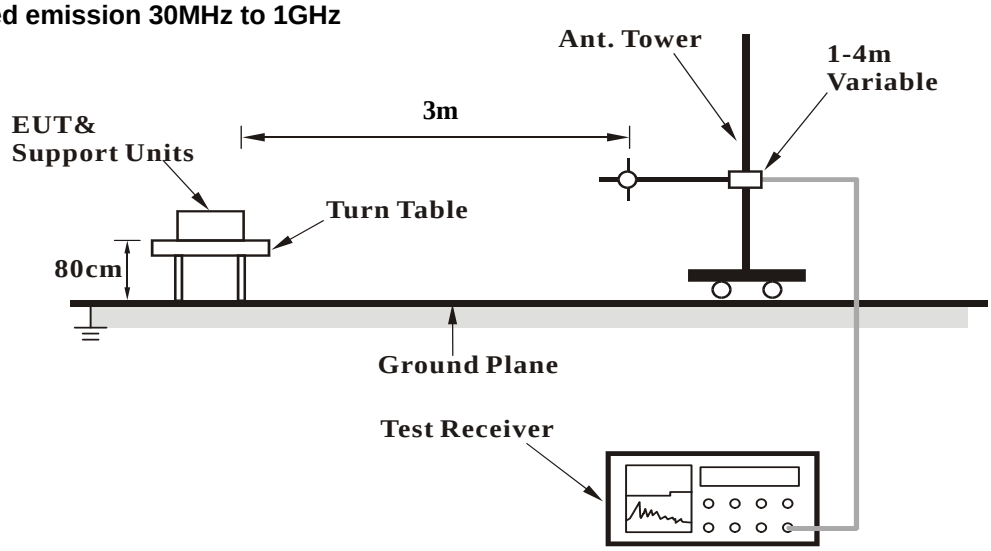
No deviation.

4.1.5 Test Setup

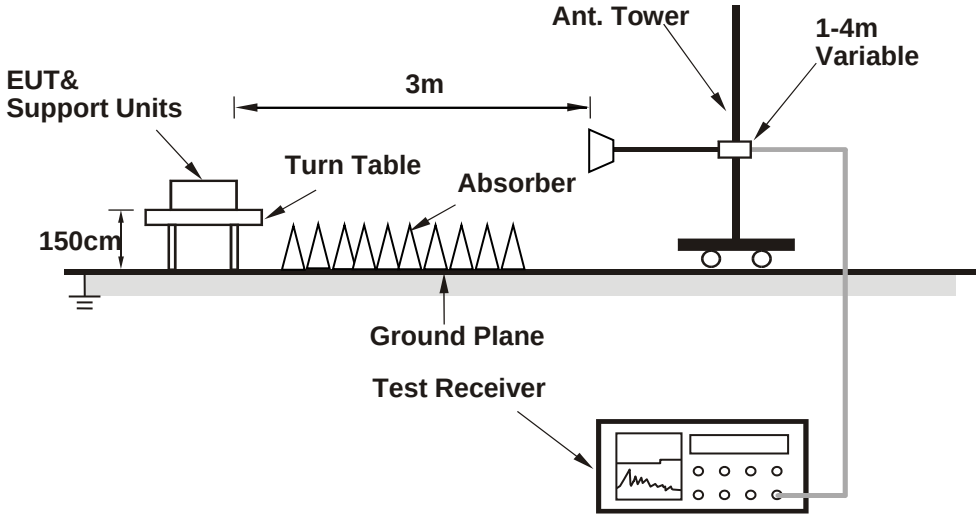
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

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

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	52.3 PK	74.0	-21.7	1.30 H	52	54.5	-2.2
2	2390.00	48.0 AV	54.0	-6.0	1.30 H	52	50.2	-2.2
3	*2412.00	110.1 PK			1.30 H	52	112.5	-2.4
4	*2412.00	107.7 AV			1.30 H	52	110.1	-2.4
5	4824.00	54.3 PK	74.0	-19.7	1.72 H	74	52.5	1.8
6	4824.00	47.4 AV	54.0	-6.6	1.72 H	74	45.6	1.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	59.7 PK	74.0	-14.3	1.75 V	200	61.9	-2.2
2	**2390.00**	**53.9 AV**	**54.0**	**-0.1**	**1.75 V**	**200**	**56.1**	**-2.2**
3	*2412.00	114.6 PK			1.75 V	200	117.0	-2.4
4	*2412.00	111.9 AV			1.75 V	200	114.3	-2.4
5	4824.00	50.0 PK	74.0	-24.0	1.20 V	229	48.2	1.8
6	4824.00	47.3 AV	54.0	-6.7	1.20 V	229	45.5	1.8

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	50.4 PK	74.0	-23.6	1.31 H	38	52.6	-2.2
2	2390.00	41.9 AV	54.0	-12.1	1.31 H	38	44.1	-2.2
3	*2437.00	111.4 PK			1.31 H	38	114.0	-2.6
4	*2437.00	109.0 AV			1.31 H	38	111.6	-2.6
5	2483.50	50.4 PK	74.0	-23.6	1.31 H	38	52.8	-2.4
6	2483.50	41.0 AV	54.0	-13.0	1.31 H	38	43.4	-2.4
7	4874.00	57.7 PK	74.0	-16.3	1.69 H	59	55.7	2.0
8	4874.00	50.5 AV	54.0	-3.5	1.69 H	59	48.5	2.0
9	7311.00	56.3 PK	74.0	-17.7	1.26 H	80	47.9	8.4
10	7311.00	51.7 AV	54.0	-2.3	1.26 H	80	43.3	8.4
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	57.8 PK	74.0	-16.2	1.51 V	186	60.0	-2.2
2	2390.00	47.8 AV	54.0	-6.2	1.51 V	186	50.0	-2.2
3	*2437.00	115.9 PK			1.51 V	186	118.5	-2.6
4	*2437.00	113.2 AV			1.51 V	186	115.8	-2.6
5	2483.50	57.8 PK	74.0	-16.2	1.51 V	186	60.2	-2.4
6	2483.50	46.9 AV	54.0	-7.1	1.51 V	186	49.3	-2.4
7	4874.00	52.8 PK	74.0	-21.2	1.28 V	223	50.8	2.0
8	4874.00	49.4 AV	54.0	-4.6	1.28 V	223	47.4	2.0
9	7311.00	57.8 PK	74.0	-16.2	1.51 V	31	49.4	8.4
10	7311.00	53.5 AV	54.0	-0.5	1.51 V	31	45.1	8.4

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	110.0 PK			1.37 H	58	112.6	-2.6
2	*2462.00	107.6 AV			1.37 H	58	110.2	-2.6
3	2483.50	51.8 PK	74.0	-22.2	1.37 H	58	54.2	-2.4
4	2483.50	47.7 AV	54.0	-6.3	1.37 H	58	50.1	-2.4
5	4924.00	54.2 PK	74.0	-19.8	1.70 H	69	52.2	2.0
6	4924.00	47.2 AV	54.0	-6.8	1.70 H	69	45.2	2.0
7	7386.00	52.9 PK	74.0	-21.1	1.30 H	91	44.3	8.6
8	7386.00	48.4 AV	54.0	-5.6	1.30 H	91	39.8	8.6
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	114.5 PK			1.69 V	188	117.1	-2.6
2	*2462.00	111.8 AV			1.69 V	188	114.4	-2.6
3	2483.50	59.2 PK	74.0	-14.8	1.69 V	188	61.6	-2.4
4	2483.50	53.6 AV	54.0	-0.4	1.69 V	188	56.0	-2.4
5	4924.00	49.9 PK	74.0	-24.1	1.24 V	228	47.9	2.0
6	4924.00	46.9 AV	54.0	-7.1	1.24 V	228	44.9	2.0
7	7386.00	54.9 PK	74.0	-19.1	1.47 V	17	46.3	8.6
8	7386.00	50.7 AV	54.0	-3.3	1.47 V	17	42.1	8.6

Remarks:

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

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CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK) 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	66.2 PK	74.0	-7.8	1.32 H	58	68.4	-2.2
2	2390.00	47.4 AV	54.0	-6.6	1.32 H	58	49.6	-2.2
3	*2412.00	106.8 PK			1.32 H	58	109.2	-2.4
4	*2412.00	96.5 AV			1.32 H	58	98.9	-2.4
5	4824.00	45.8 PK	74.0	-28.2	1.69 H	75	44.0	1.8
6	4824.00	38.9 AV	54.0	-15.1	1.69 H	75	37.1	1.8
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	73.6 PK	74.0	-0.4	2.00 V	166	75.8	-2.2
2	2390.00	53.3 AV	54.0	-0.7	2.00 V	166	55.5	-2.2
3	*2412.00	111.3 PK			2.00 V	166	113.7	-2.4
4	*2412.00	100.7 AV			2.00 V	166	103.1	-2.4
5	4824.00	40.6 PK	74.0	-33.4	1.33 V	231	38.8	1.8
6	4824.00	37.3 AV	54.0	-16.7	1.33 V	231	35.5	1.8

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	50.5 PK	74.0	-23.5	1.38 H	42	52.7	-2.2
2	2390.00	42.0 AV	54.0	-12.0	1.38 H	42	44.2	-2.2
3	*2437.00	109.7 PK			1.38 H	42	112.3	-2.6
4	*2437.00	99.1 AV			1.38 H	42	101.7	-2.6
5	2483.50	66.5 PK	74.0	-7.5	1.38 H	42	68.9	-2.4
6	2483.50	47.8 AV	54.0	-6.2	1.38 H	42	50.2	-2.4
7	4874.00	48.1 PK	74.0	-25.9	1.64 H	70	46.1	2.0
8	4874.00	41.0 AV	54.0	-13.0	1.64 H	70	39.0	2.0
9	7311.00	46.5 PK	74.0	-27.5	1.26 H	88	38.1	8.4
10	7311.00	41.9 AV	54.0	-12.1	1.26 H	88	33.5	8.4
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	57.9 PK	74.0	-16.1	1.47 V	200	60.1	-2.2
2	2390.00	47.9 AV	54.0	-6.1	1.47 V	200	50.1	-2.2
3	*2437.00	114.2 PK			1.94 V	146	116.8	-2.6
4	*2437.00	103.3 AV			1.94 V	146	105.9	-2.6
5	**2483.50**	**73.9 PK**	**74.0**	**-0.1**	**1.94 V**	**146**	**76.3**	**-2.4**
6	2483.50	53.7 AV	54.0	-0.3	1.94 V	146	56.1	-2.4
7	4874.00	42.9 PK	74.0	-31.1	1.33 V	219	40.9	2.0
8	4874.00	39.6 AV	54.0	-14.4	1.33 V	219	37.6	2.0
9	7311.00	48.2 PK	74.0	-25.8	1.46 V	35	39.8	8.4
10	7311.00	43.7 AV	54.0	-10.3	1.46 V	35	35.3	8.4

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	107.9 PK			1.38 H	41	110.5	-2.6
2	*2462.00	97.2 AV			1.38 H	41	99.8	-2.6
3	2483.50	66.3 PK	74.0	-7.7	1.38 H	41	68.7	-2.4
4	2483.50	47.6 AV	54.0	-6.4	1.38 H	41	50.0	-2.4
5	4924.00	46.4 PK	74.0	-27.6	1.60 H	64	44.4	2.0
6	4924.00	39.4 AV	54.0	-14.6	1.60 H	64	37.4	2.0
7	7386.00	44.0 PK	74.0	-30.0	1.28 H	77	35.4	8.6
8	7386.00	39.6 AV	54.0	-14.4	1.28 H	77	31.0	8.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	112.4 PK			1.98 V	151	115.0	-2.6
2	*2462.00	101.4 AV			1.98 V	151	104.0	-2.6
3	2483.50	73.7 PK	74.0	-0.3	1.98 V	151	76.1	-2.4
4	2483.50	53.5 AV	54.0	-0.5	1.98 V	151	55.9	-2.4
5	4924.00	41.3 PK	74.0	-32.7	1.31 V	221	39.3	2.0
6	4924.00	37.8 AV	54.0	-16.2	1.31 V	221	35.8	2.0
7	7386.00	46.3 PK	74.0	-27.7	1.41 V	28	37.7	8.6
8	7386.00	41.7 AV	54.0	-12.3	1.41 V	28	33.1	8.6

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	66.3 PK	74.0	-7.7	1.30 H	32	68.5	-2.2
2	2390.00	47.6 AV	54.0	-6.4	1.30 H	32	49.8	-2.2
3	*2412.00	107.2 PK			1.30 H	32	109.6	-2.4
4	*2412.00	96.6 AV			1.30 H	32	99.0	-2.4
5	4824.00	46.7 PK	74.0	-27.3	1.60 H	77	44.9	1.8
6	4824.00	39.6 AV	54.0	-14.4	1.60 H	77	37.8	1.8
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	73.7 PK	74.0	-0.3	1.93 V	160	75.9	-2.2
2	2390.00	53.5 AV	54.0	-0.5	1.93 V	160	55.7	-2.2
3	*2412.00	111.7 PK			1.93 V	160	114.1	-2.4
4	*2412.00	100.8 AV			1.93 V	160	103.2	-2.4
5	4824.00	41.2 PK	74.0	-32.8	1.33 V	236	39.4	1.8
6	4824.00	37.5 AV	54.0	-16.5	1.33 V	236	35.7	1.8

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	60.5 PK	74.0	-13.5	1.36 H	34	62.7	-2.2
2	2390.00	45.3 AV	54.0	-8.7	1.36 H	34	47.5	-2.2
3	*2437.00	110.1 PK			1.36 H	34	112.7	-2.6
4	*2437.00	99.4 AV			1.36 H	34	102.0	-2.6
5	2483.50	66.5 PK	74.0	-7.5	1.36 H	34	68.9	-2.4
6	2483.50	47.7 AV	54.0	-6.3	1.36 H	34	50.1	-2.4
7	4874.00	57.4 PK	74.0	-16.6	1.70 H	53	55.4	2.0
8	4874.00	50.4 AV	54.0	-3.6	1.70 H	53	48.4	2.0
9	7311.00	56.2 PK	74.0	-17.8	1.24 H	68	47.8	8.4
10	7311.00	51.5 AV	54.0	-2.5	1.24 H	68	43.1	8.4
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	67.9 PK	74.0	-6.1	1.91 V	160	70.1	-2.2
2	2390.00	51.2 AV	54.0	-2.8	1.91 V	160	53.4	-2.2
3	*2437.00	114.6 PK			1.91 V	160	117.2	-2.6
4	*2437.00	103.6 AV			1.91 V	160	106.2	-2.6
5	**2483.50**	**73.9 PK**	**74.0**	**-0.1**	**1.91 V**	**160**	**76.3**	**-2.4**
6	2483.50	53.6 AV	54.0	-0.4	1.91 V	160	56.0	-2.4
7	4874.00	42.7 PK	74.0	-31.3	1.31 V	219	40.7	2.0
8	4874.00	39.7 AV	54.0	-14.3	1.31 V	219	37.7	2.0
9	7311.00	48.0 PK	74.0	-26.0	1.51 V	47	39.6	8.4
10	7311.00	43.5 AV	54.0	-10.5	1.51 V	47	35.1	8.4

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	107.7 PK			1.38 H	33	110.3	-2.6
2	*2462.00	97.0 AV			1.38 H	33	99.6	-2.6
3	2483.50	66.4 PK	74.0	-7.6	1.38 H	33	68.8	-2.4
4	2483.50	47.7 AV	54.0	-6.3	1.38 H	33	50.1	-2.4
5	4924.00	46.4 PK	74.0	-27.6	1.62 H	58	44.4	2.0
6	4924.00	39.7 AV	54.0	-14.3	1.62 H	58	37.7	2.0
7	7386.00	43.6 PK	74.0	-30.4	1.28 H	93	35.0	8.6
8	7386.00	39.2 AV	54.0	-14.8	1.28 H	93	30.6	8.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	112.2 PK			1.98 V	157	114.8	-2.6
2	*2462.00	101.2 AV			1.98 V	157	103.8	-2.6
3	2483.50	73.8 PK	74.0	-0.2	1.98 V	157	76.2	-2.4
4	2483.50	53.6 AV	54.0	-0.4	1.98 V	157	56.0	-2.4
5	4924.00	41.1 PK	74.0	-32.9	1.31 V	211	39.1	2.0
6	4924.00	37.8 AV	54.0	-16.2	1.31 V	211	35.8	2.0
7	7386.00	46.3 PK	74.0	-27.7	1.42 V	20	37.7	8.6
8	7386.00	41.4 AV	54.0	-12.6	1.42 V	20	32.8	8.6

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	66.2 PK	74.0	-7.8	1.03 H	48	68.4	-2.2
2	2390.00	47.6 AV	54.0	-6.4	1.03 H	48	49.8	-2.2
3	*2422.00	102.1 PK			1.03 H	48	104.6	-2.5
4	*2422.00	92.1 AV			1.03 H	48	94.6	-2.5
5	4844.00	47.0 PK	74.0	-27.0	1.61 H	51	45.2	1.8
6	4844.00	39.7 AV	54.0	-14.3	1.61 H	51	37.9	1.8
7	7266.00	44.3 PK	74.0	-29.7	1.30 H	64	36.1	8.2
8	7266.00	40.0 AV	54.0	-14.0	1.30 H	64	31.8	8.2
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	73.6 PK	74.0	-0.4	1.93 V	157	75.8	-2.2
2	2390.00	53.5 AV	54.0	-0.5	1.93 V	157	55.7	-2.2
3	*2422.00	106.6 PK			1.93 V	157	109.1	-2.5
4	*2422.00	96.3 AV			1.93 V	157	98.8	-2.5
5	4844.00	41.4 PK	74.0	-32.6	1.27 V	217	39.6	1.8
6	4844.00	37.6 AV	54.0	-16.4	1.27 V	217	35.8	1.8
7	7266.00	45.7 PK	74.0	-28.3	1.41 V	22	37.5	8.2
8	7266.00	41.2 AV	54.0	-12.8	1.41 V	22	33.0	8.2

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	63.7 PK	74.0	-10.3	1.34 H	45	65.9	-2.2
2	2390.00	43.4 AV	54.0	-10.6	1.34 H	45	45.6	-2.2
3	*2437.00	105.3 PK			1.34 H	45	107.9	-2.6
4	*2437.00	94.9 AV			1.34 H	45	97.5	-2.6
5	2483.50	66.3 PK	74.0	-7.7	1.34 H	45	68.7	-2.4
6	2483.50	47.7 AV	54.0	-6.3	1.34 H	45	50.1	-2.4
7	4874.00	58.4 PK	74.0	-15.6	1.70 H	50	56.4	2.0
8	4874.00	51.0 AV	54.0	-3.0	1.70 H	50	49.0	2.0
9	7311.00	56.0 PK	74.0	-18.0	1.26 H	71	47.6	8.4
10	7311.00	51.7 AV	54.0	-2.3	1.26 H	71	43.3	8.4
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	71.1 PK	74.0	-2.9	1.93 V	157	73.3	-2.2
2	2390.00	49.3 AV	54.0	-4.7	1.93 V	157	51.5	-2.2
3	*2437.00	109.8 PK			1.93 V	157	112.4	-2.6
4	*2437.00	99.1 AV			1.93 V	157	101.7	-2.6
5	2483.50	73.7 PK	74.0	-0.3	1.93 V	157	76.1	-2.4
6	2483.50	53.6 AV	54.0	-0.4	1.93 V	157	56.0	-2.4
7	4874.00	42.7 PK	74.0	-31.3	1.29 V	206	40.7	2.0
8	4874.00	39.6 AV	54.0	-14.4	1.29 V	206	37.6	2.0
9	7311.00	48.3 PK	74.0	-25.7	1.50 V	33	39.9	8.4
10	7311.00	43.9 AV	54.0	-10.1	1.50 V	33	35.5	8.4

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	102.3 PK			1.39 H	31	104.9	-2.6
2	*2452.00	92.5 AV			1.39 H	31	95.1	-2.6
3	2483.50	66.3 PK	74.0	-7.7	1.39 H	31	68.7	-2.4
4	2483.50	47.7 AV	54.0	-6.3	1.39 H	31	50.1	-2.4
5	4904.00	47.0 PK	74.0	-27.0	1.62 H	58	45.0	2.0
6	4904.00	39.7 AV	54.0	-14.3	1.62 H	58	37.7	2.0
7	7356.00	43.9 PK	74.0	-30.1	1.26 H	66	35.3	8.6
8	7356.00	39.5 AV	54.0	-14.5	1.26 H	66	30.9	8.6
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	106.8 PK			1.88 V	158	109.4	-2.6
2	*2452.00	96.7 AV			1.88 V	158	99.3	-2.6
3	2483.50	73.7 PK	74.0	-0.3	1.88 V	158	76.1	-2.4
4	2483.50	53.6 AV	54.0	-0.4	1.88 V	158	56.0	-2.4
5	4904.00	41.7 PK	74.0	-32.3	1.33 V	214	39.7	2.0
6	4904.00	38.3 AV	54.0	-15.7	1.33 V	214	36.3	2.0
7	7356.00	46.3 PK	74.0	-27.7	1.41 V	41	37.7	8.6
8	7356.00	41.6 AV	54.0	-12.4	1.41 V	41	33.0	8.6

Remarks:

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

Below 1GHz worst-case data:

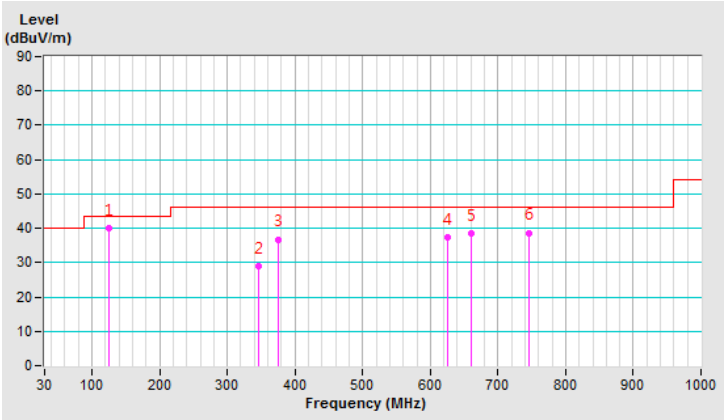
802.11b

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 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	125.01	39.9 QP	43.5	-3.6	1.50 H	256	49.3	-9.4
2	345.78	29.0 QP	46.0	-17.0	1.00 H	360	34.8	-5.8
3	375.00	36.8 QP	46.0	-9.2	1.00 H	298	41.6	-4.8
4	625.00	37.2 QP	46.0	-8.8	1.00 H	360	36.0	1.2
5	660.86	38.6 QP	46.0	-7.4	1.00 H	360	37.1	1.5
6	746.27	38.7 QP	46.0	-7.3	1.50 H	0	35.6	3.1

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. Margin value = Emission Level – Limit value
4. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20dB below the permissible value to be report.

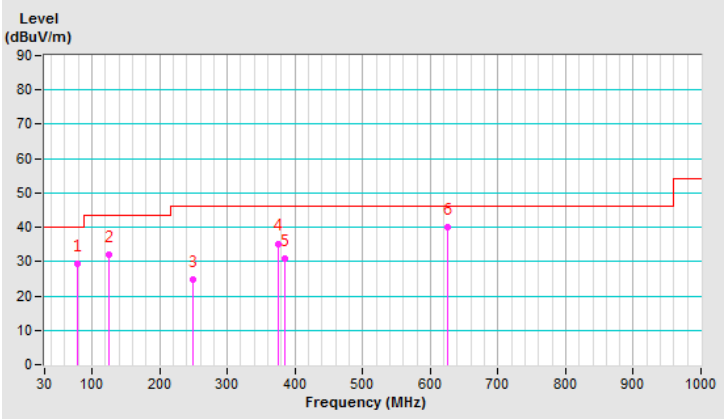


CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	77.65	29.2 QP	40.0	-10.8	1.50 V	310	41.0	-11.8
2	125.01	32.1 QP	43.5	-11.4	2.00 V	360	41.5	-9.4
3	250.00	24.7 QP	46.0	-21.3	1.50 V	360	33.6	-8.9
4	375.00	35.3 QP	46.0	-10.7	1.50 V	237	40.1	-4.8
5	385.46	30.7 QP	46.0	-15.3	1.50 V	0	35.3	-4.6
6	625.02	40.1 QP	46.0	-5.9	1.00 V	236	38.9	1.2

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. Margin value = Emission Level – Limit value
4. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20dB below the permissible value to be report.



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

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

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 23, 2017	Nov. 22, 2018
RF signal cable Woken	5D-FB	Cable-cond1-01	Sep. 05, 2017	Sep. 04, 2018
LISN ROHDE & SCHWARZ (EUT)	ENV216	101826	Feb. 26, 2018	Feb. 25, 2019
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Aug. 15, 2017	Aug. 14, 2018
			Aug. 15, 2018	Aug. 14, 2019
Software ADT	BV ADT_Cond_ V7.3.7.4	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Shielded Room 1.
3. The VCCI Site Registration No. is C-2040.

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.

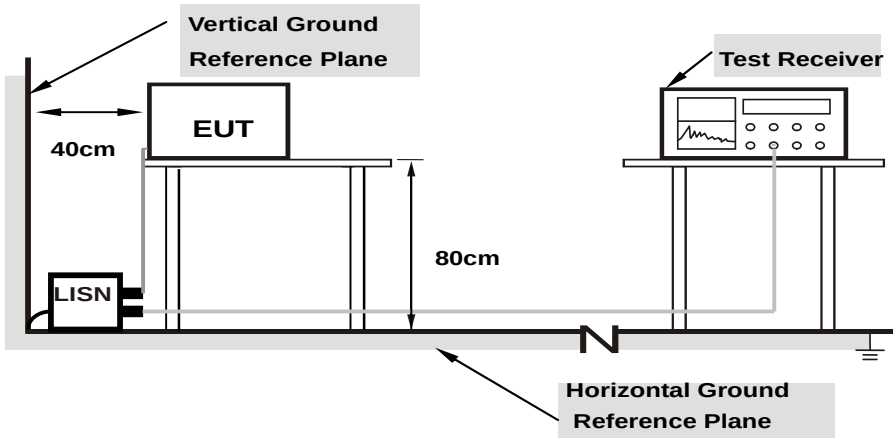
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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 item 4.1.6.

4.2.7 Test Results

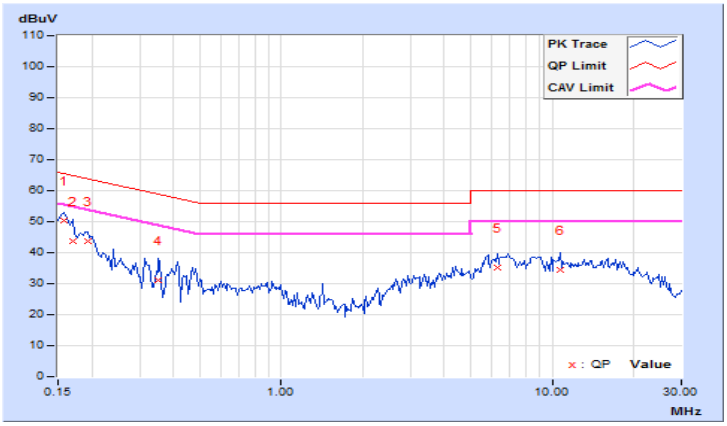
Worst-case data: 802.11b

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	TX Channel 6	Test Mode	A

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	10.04	40.32	28.55	50.36	38.59	65.58	55.58	-15.22	-16.99
2	0.16953	10.04	33.48	20.09	43.52	30.13	64.98	54.98	-21.46	-24.85
3	0.19297	10.06	33.58	21.99	43.64	32.05	63.91	53.91	-20.27	-21.86
4	0.35313	10.10	20.97	13.40	31.07	23.50	58.89	48.89	-27.82	-25.39
5	6.26563	10.37	24.95	17.15	35.32	27.52	60.00	50.00	-24.68	-22.48
6	10.76953	10.58	23.86	17.46	34.44	28.04	60.00	50.00	-25.56	-21.96

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.

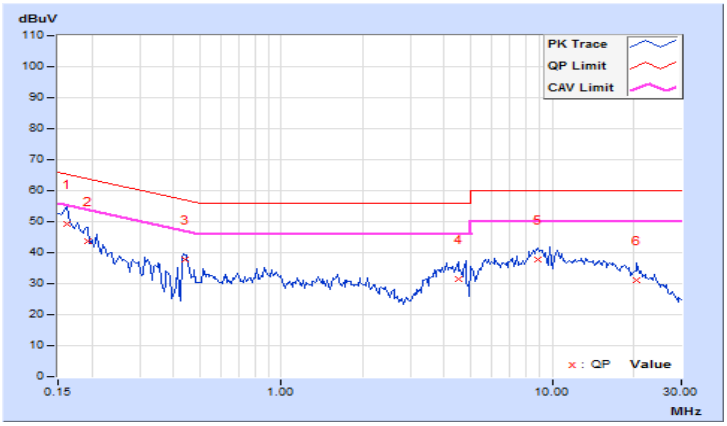


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	TX Channel 6	Test Mode	A

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16172	9.95	39.21	25.52	49.16	35.47	65.38	55.38	-16.22	-19.91
2	0.19297	9.96	33.91	21.50	43.87	31.46	63.91	53.91	-20.04	-22.45
3	0.44166	10.00	27.91	25.88	37.91	35.88	57.03	47.03	-19.12	-11.15
4	4.49219	10.16	21.16	13.31	31.32	23.47	56.00	46.00	-24.68	-22.53
5	8.81250	10.34	27.33	21.39	37.67	31.73	60.00	50.00	-22.33	-18.27
6	20.60547	10.90	20.04	14.58	30.94	25.48	60.00	50.00	-29.06	-24.52

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.

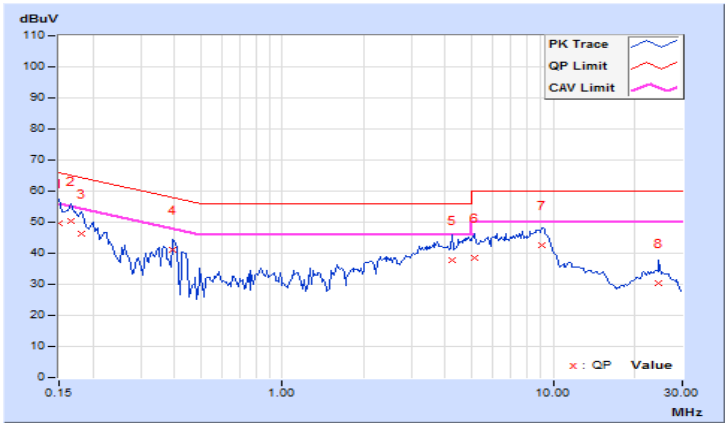


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	TX Channel 6	Test Mode	B

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.03	39.45	23.95	49.48	33.98	66.00	56.00	-16.52	-22.02
2	0.16562	10.04	40.51	25.51	50.55	35.55	65.18	55.18	-14.63	-19.63
3	0.18125	10.05	36.43	21.88	46.48	31.93	64.43	54.43	-17.95	-22.50
4	0.39609	10.11	31.17	25.38	41.28	35.49	57.93	47.93	-16.65	-12.44
5	4.22656	10.28	27.67	19.51	37.95	29.79	56.00	46.00	-18.05	-16.21
6	5.09766	10.32	28.29	21.83	38.61	32.15	60.00	50.00	-21.39	-17.85
7	9.12891	10.50	32.23	26.24	42.73	36.74	60.00	50.00	-17.27	-13.26
8	24.60156	11.14	19.37	14.46	30.51	25.60	60.00	50.00	-29.49	-24.40

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.

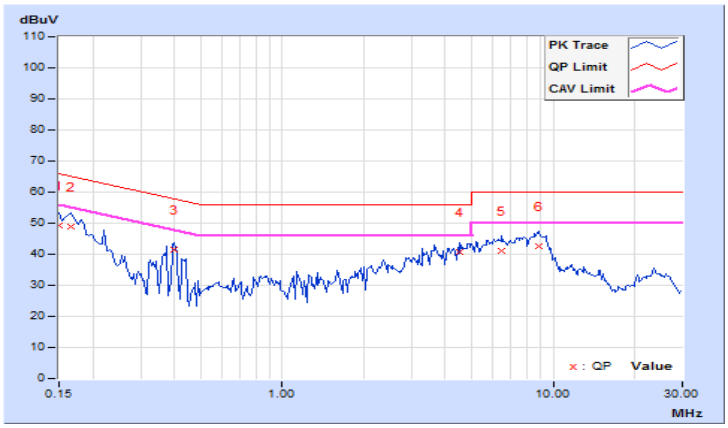


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	TX Channel 6	Test Mode	B

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.94	39.43	24.15	49.37	34.09	66.00	56.00	-16.63	-21.91
2	0.16562	9.95	39.00	23.49	48.95	33.44	65.18	55.18	-16.23	-21.74
3	0.40000	10.00	31.63	30.00	41.63	40.00	57.85	47.85	-16.22	-7.85
4	4.51172	10.16	30.43	19.92	40.59	30.08	56.00	46.00	-15.41	-15.92
5	6.46094	10.24	30.85	22.88	41.09	33.12	60.00	50.00	-18.91	-16.88
6	8.83594	10.34	32.36	26.19	42.70	36.53	60.00	50.00	-17.30	-13.47

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.

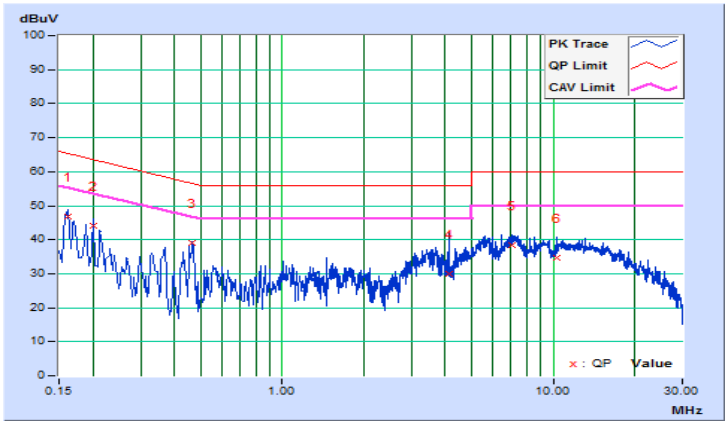


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	TX Channel 6	Test Mode	C

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16173	9.73	37.05	25.91	46.78	35.64	65.37	55.37	-18.59	-19.73
2	0.20084	9.73	34.29	23.68	44.02	33.41	63.58	53.58	-19.56	-20.17
3	0.46669	9.75	29.39	26.94	39.14	36.69	56.57	46.57	-17.43	-9.88
4	4.11474	9.82	20.13	9.48	29.95	19.30	56.00	46.00	-26.05	-26.70
5	7.07461	9.86	28.51	20.01	38.37	29.87	60.00	50.00	-21.63	-20.13
6	10.35901	9.91	24.67	17.46	34.58	27.37	60.00	50.00	-25.42	-22.63

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.

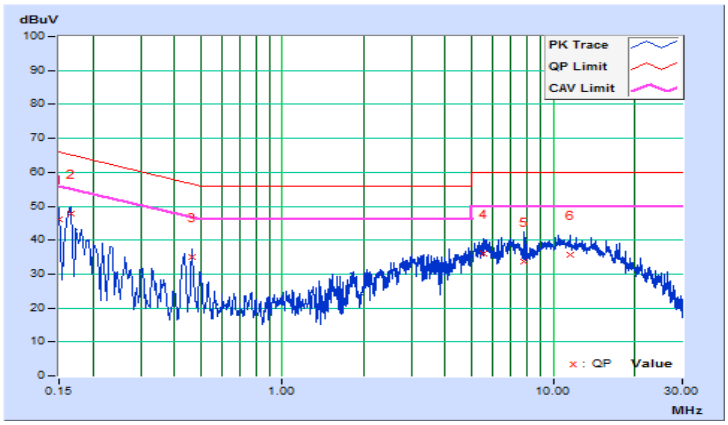


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	TX Channel 6	Test Mode	C

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.72	36.25	18.37	45.97	28.09	66.00	56.00	-20.03	-27.91
2	0.16564	9.73	38.11	25.86	47.84	35.59	65.18	55.18	-17.34	-19.59
3	0.46301	9.76	25.35	20.76	35.11	30.52	56.64	46.64	-21.53	-16.12
4	5.56535	9.86	26.31	17.08	36.17	26.94	60.00	50.00	-23.83	-23.06
5	7.84097	9.90	23.83	15.25	33.73	25.15	60.00	50.00	-26.27	-24.85
6	11.51637	9.96	25.69	18.98	35.65	28.94	60.00	50.00	-24.35	-21.06

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.

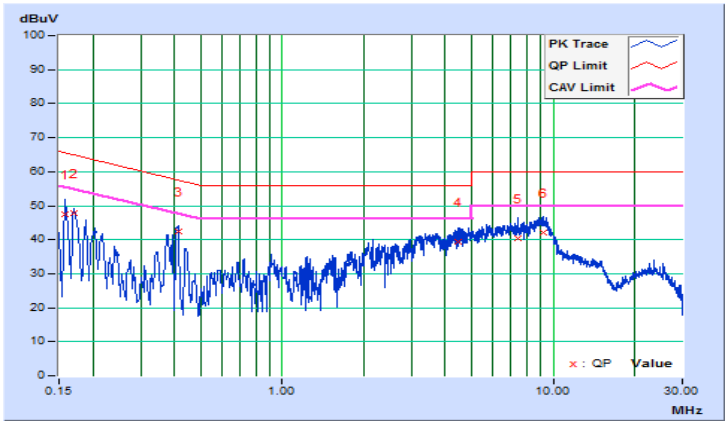


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	TX Channel 6	Test Mode	D

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15782	9.73	37.70	19.85	47.43	29.58	65.58	55.58	-18.15	-26.00
2	0.16967	9.73	38.11	26.09	47.84	35.82	64.98	54.98	-17.14	-19.16
3	0.41197	9.76	32.75	30.89	42.51	40.65	57.61	47.61	-15.10	-6.96
4	4.47560	9.82	29.44	19.85	39.26	29.67	56.00	46.00	-16.74	-16.33
5	7.38350	9.86	30.60	22.02	40.46	31.88	60.00	50.00	-19.54	-18.12
6	9.25248	9.89	32.35	24.94	42.24	34.83	60.00	50.00	-17.76	-15.17

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.

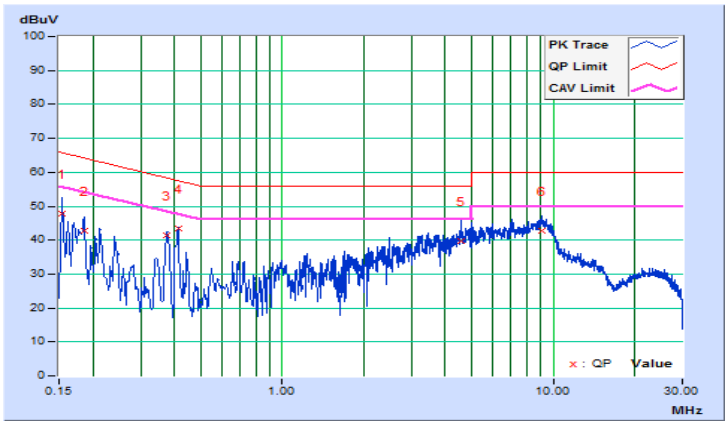


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	TX Channel 6	Test Mode	D

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	9.73	37.94	21.32	47.67	31.05	65.79	55.79	-18.12	-24.74
2	0.18508	9.73	33.12	18.60	42.85	28.33	64.25	54.25	-21.40	-25.92
3	0.37678	9.76	31.79	31.15	41.55	40.91	58.35	48.35	-16.80	-7.44
4	**0.41197**	**9.76**	**33.69**	**32.06**	**43.45**	**41.82**	**57.61**	**47.61**	**-14.16**	**-5.79**
5	4.57221	9.84	30.00	20.49	39.84	30.33	56.00	46.00	-16.16	-15.67
6	9.04916	9.92	32.85	24.98	42.77	34.90	60.00	50.00	-17.23	-15.10

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.

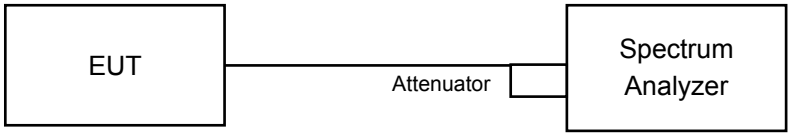


4.3 6dB Bandwidth Measurement

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
		Chain 0	Chain 1		
1	2412	7.56	7.11	0.5	Pass
6	2437	7.60	8.06	0.5	Pass
11	2462	7.58	7.58	0.5	Pass

802.11g

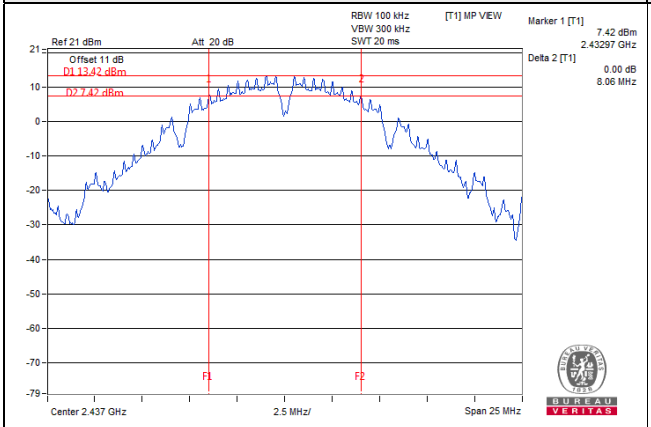
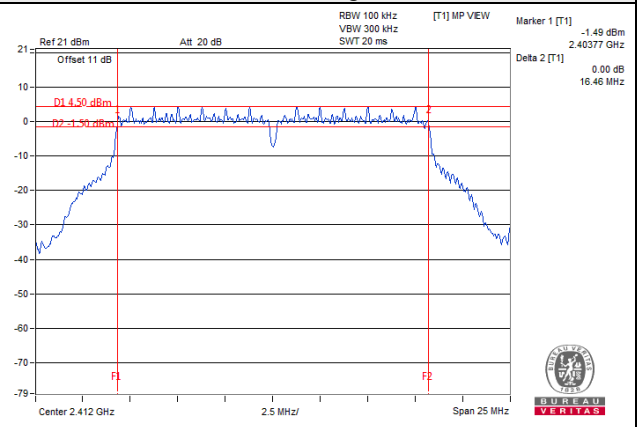
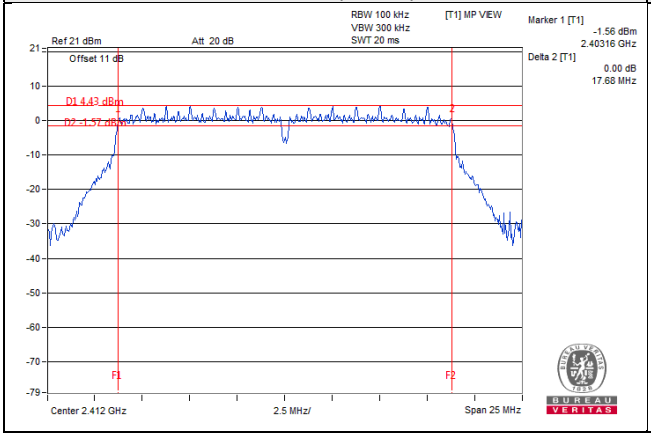
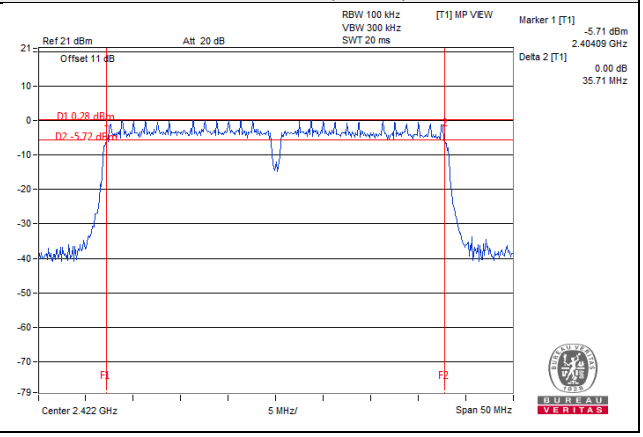
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	16.43	16.46	0.5	Pass
6	2437	16.42	16.42	0.5	Pass
11	2462	16.43	16.45	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	17.64	17.68	0.5	Pass
6	2437	17.66	17.67	0.5	Pass
11	2462	17.66	17.66	0.5	Pass

802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
3	2422	35.71	35.52	0.5	Pass
6	2437	35.60	35.59	0.5	Pass
9	2452	35.58	35.53	0.5	Pass

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

4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

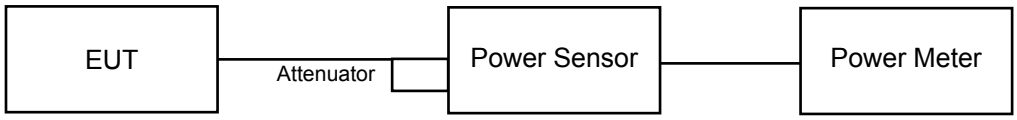
For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

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

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};
Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

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

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

Average power sensor was used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as item 4.3.6.

4.4.7 Test Results

802.11b

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	18.97	19.53	168.629	22.27	30.00	Pass
6	2437	23.14	22.72	**393.131**	25.95	30.00	Pass
11	2462	19.30	19.82	181.054	22.58	30.00	Pass

802.11g

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	16.48	16.46	88.722	19.48	30.00	Pass
6	2437	19.74	19.41	181.486	22.59	30.00	Pass
11	2462	16.70	16.69	93.440	19.71	30.00	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	16.06	16.39	83.916	19.24	30.00	Pass
6	2437	19.40	19.27	171.624	22.35	30.00	Pass
11	2462	16.45	16.64	90.289	19.56	30.00	Pass

802.11n (HT40)

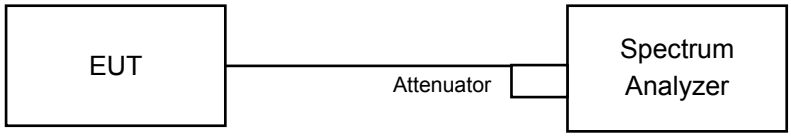
Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	14.80	14.34	57.364	17.59	30.00	Pass
6	2437	17.25	17.06	103.904	20.17	30.00	Pass
9	2452	14.91	14.49	59.093	17.72	30.00	Pass

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm in any 3 kHz.

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

For Average Power (Duty cycle ≥ 98%)
a) Set instrument center frequency to DTS channel center frequency.
b) Set span to at least 1.5 times the OBW.
c) Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
d) Set VBW ≥3 x RBW.
e) Detector = power averaging (RMS) or sample detector (when RMS not available).
f) Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.
g) Sweep time = auto couple.
h) Employ trace averaging (RMS) mode over a minimum of 100 traces.
i) Use the peak marker function to determine the maximum amplitude level.

For Average Power (Duty cycle < 98%)
a) Measure the duty cycle (x).
b) Set instrument center frequency to DTS channel center frequency.
c) Set span to at least 1.5 times the OBW.
d) Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
e) Set VBW ≥3 x RBW.
f) Detector = power averaging (RMS) or sample detector (when RMS not available).
g) Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.
h) Sweep time = auto couple.
i) Do not use sweep triggering. Allow sweep to “free run”.
j) Employ trace averaging (RMS) mode over a minimum of 100 traces.
k) Use the peak marker function to determine the maximum amplitude level.
l) Add 10 log (1/x), where x is the duty cycle measured in step (a, to the measured PSD to compute the average PSD during the actual transmission time.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as item 4.3.6.

4.5.7 Test Results

802.11b

TX chain	Channel	Freq. (MHz)	PSD W/O Duty Factor (dBm/10kHz)	10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/10kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-9.06	3.01	0.23	-5.82	7.90	Pass
	6	2437	-6.68	3.01	0.23	-3.44	7.90	Pass
	11	2462	-9.36	3.01	0.23	-6.12	7.90	Pass
1	1	2412	-8.92	3.01	0.23	-5.68	7.90	Pass
	6	2437	-7.10	3.01	0.23	-3.86	7.90	Pass
	11	2462	-7.98	3.01	0.23	-4.74	7.90	Pass

Note:
1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 6.10 > 6dBi, so the limit shall be reduced to 8-(6.10-6) = 7.90dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11g

TX chain	Channel	Freq. (MHz)	PSD W/O Duty Factor (dBm/10kHz)	10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/10kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-14.14	3.01	0.28	-10.85	7.90	Pass
	6	2437	-10.82	3.01	0.28	-7.53	7.90	Pass
	11	2462	-13.70	3.01	0.28	-10.41	7.90	Pass
1	1	2412	-14.00	3.01	0.28	-10.71	7.90	Pass
	6	2437	-10.24	3.01	0.28	-6.95	7.90	Pass
	11	2462	-13.67	3.01	0.28	-10.38	7.90	Pass

Note:
1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 6.10 > 6dBi, so the limit shall be reduced to 8-(6.10-6) = 7.90dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

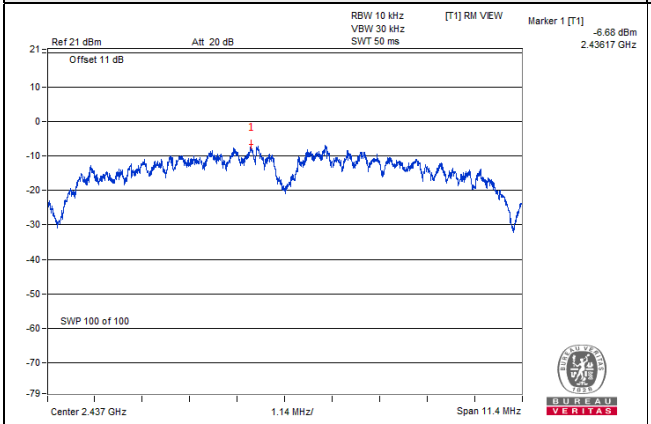
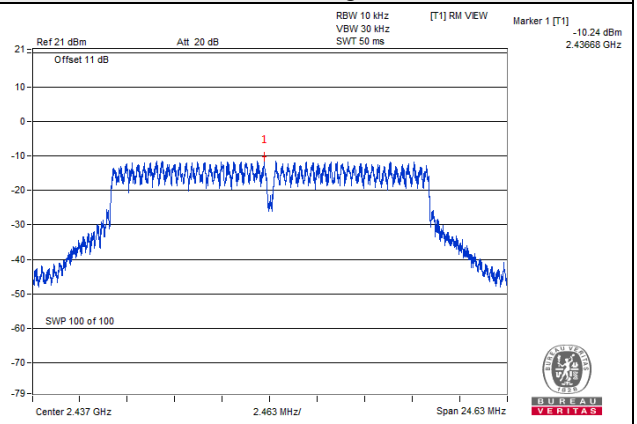
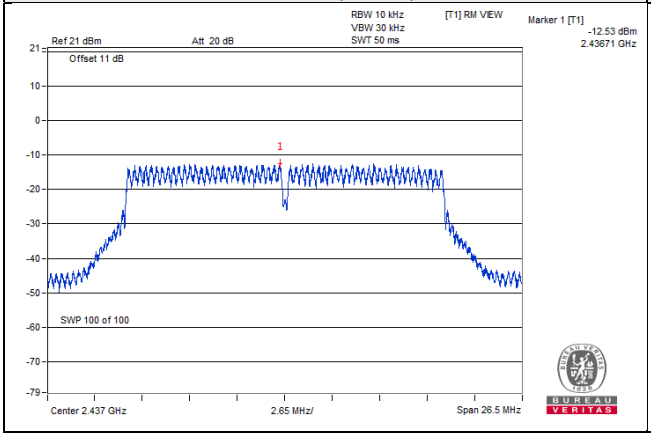
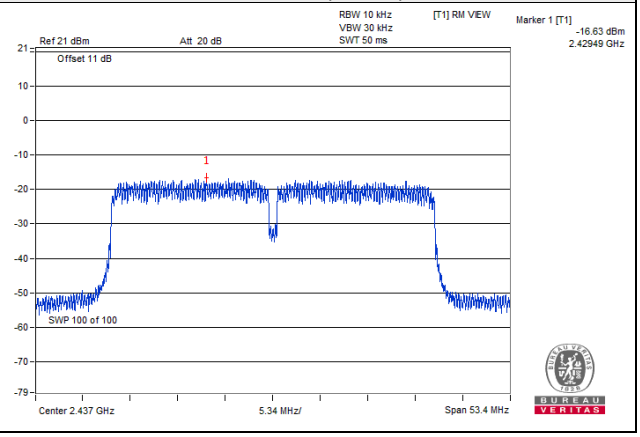
TX chain	Channel	Freq. (MHz)	PSD W/O Duty Factor (dBm/10kHz)	10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/10kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-15.80	3.01	0.22	-12.57	7.90	Pass
	6	2437	-12.59	3.01	0.22	-9.36	7.90	Pass
	11	2462	-14.92	3.01	0.22	-11.69	7.90	Pass
1	1	2412	-15.41	3.01	0.22	-12.18	7.90	Pass
	6	2437	-12.53	3.01	0.22	-9.30	7.90	Pass
	11	2462	-15.20	3.01	0.22	-11.97	7.90	Pass

Note:
1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 6.10 > 6dBi, so the limit shall be reduced to 8-(6.10-6) = 7.90dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

TX chain	Channel	Freq. (MHz)	PSD W/O Duty Factor (dBm/10kHz)	10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/10kHz)	Limit (dBm/3kHz)	Pass /Fail
0	3	2422	-19.16	3.01	0.49	-15.66	7.90	Pass
	6	2437	-16.63	3.01	0.49	-13.13	7.90	Pass
	9	2452	-18.91	3.01	0.49	-15.41	7.90	Pass
1	3	2422	-20.12	3.01	0.49	-16.62	7.90	Pass
	6	2437	-16.98	3.01	0.49	-13.48	7.90	Pass
	9	2452	-20.19	3.01	0.49	-16.69	7.90	Pass

Note:
1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 6.10 > 6dBi, so the limit shall be reduced to 8-(6.10-6) = 7.90dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

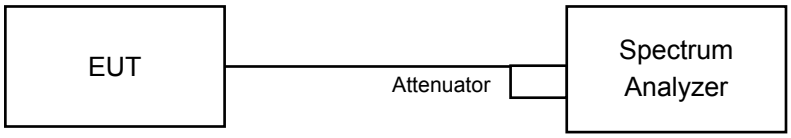
Spectrum Plot of Worst Value	
802.11b	802.11g
	
802.11n (HT20)	802.11n (HT40)
	

4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

Below -30dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

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

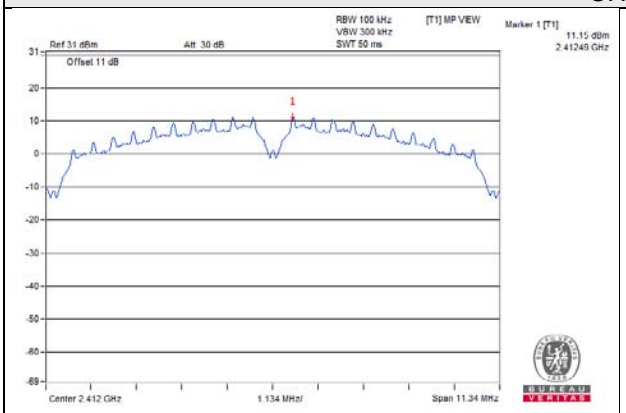
Same as item 4.3.6.

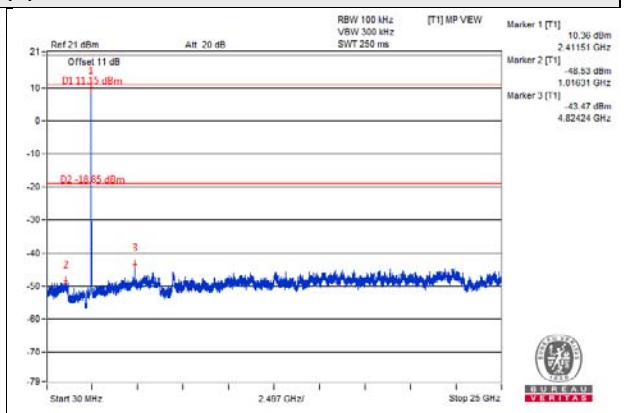
4.6.7 Test Results

The conducted emission test is performed on each TX port of operating mode without summing or adding 10log (N) since the limit is relative emission limit.
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

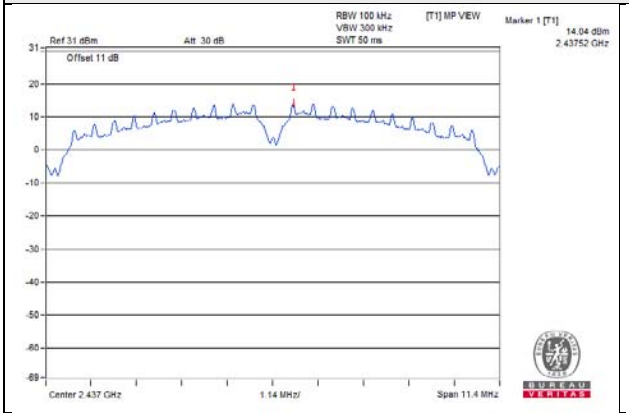
802.11b_Chain 0

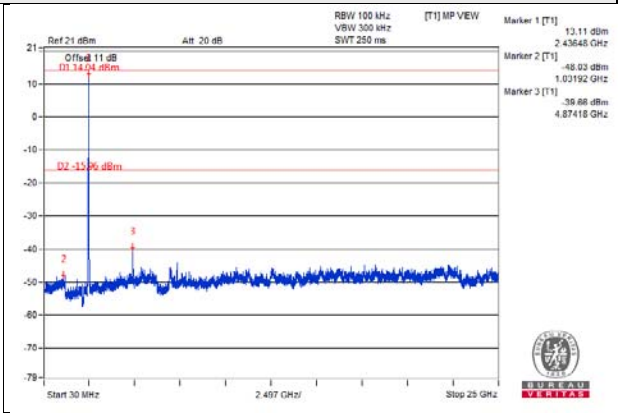
CH 1



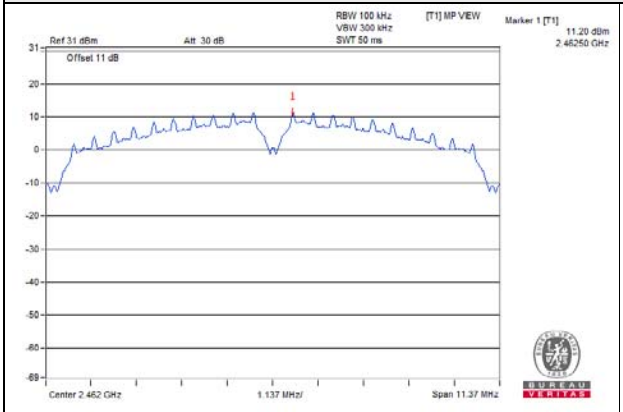


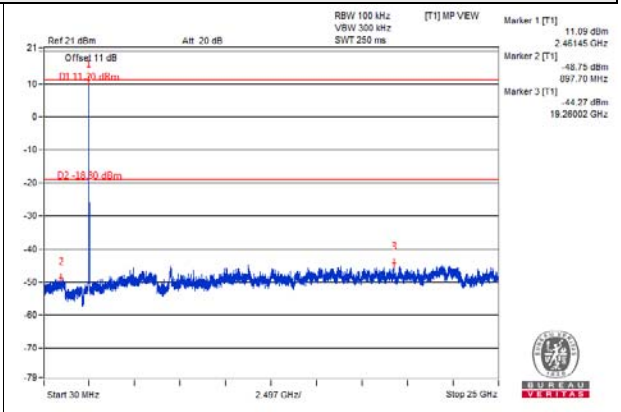
CH 6



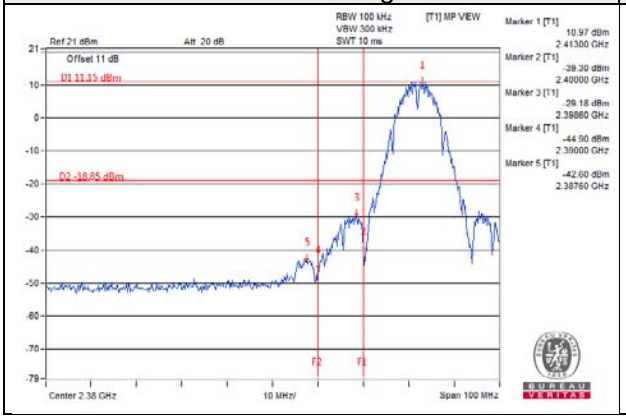


CH 11

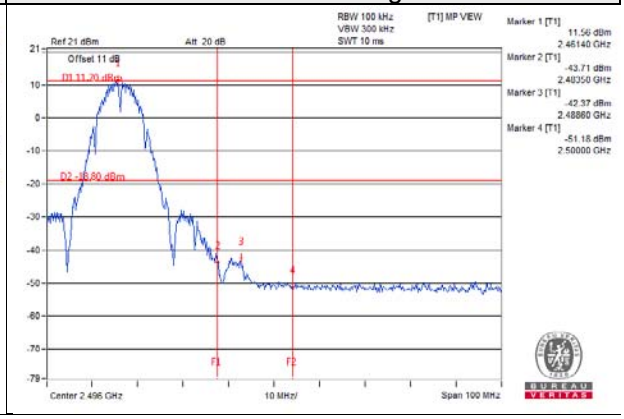




CH 1 Band edge

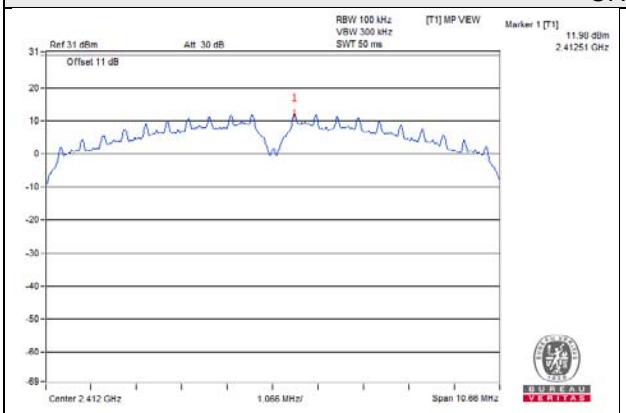


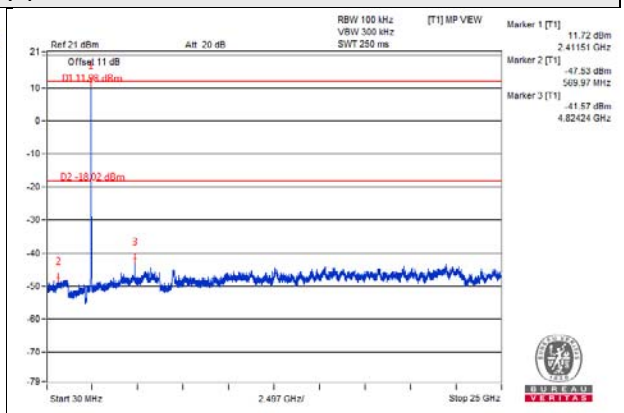
CH 11 Band edge



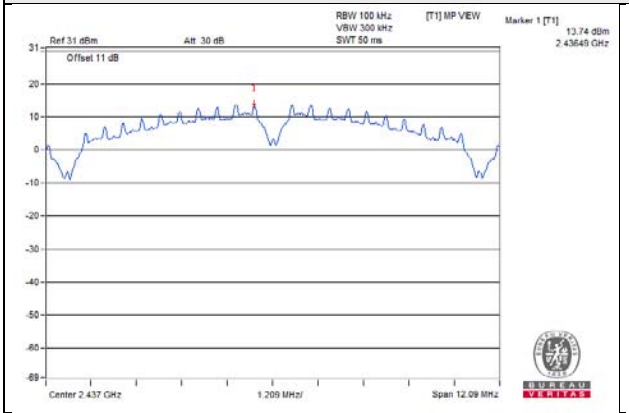
802.11b_Chain 1

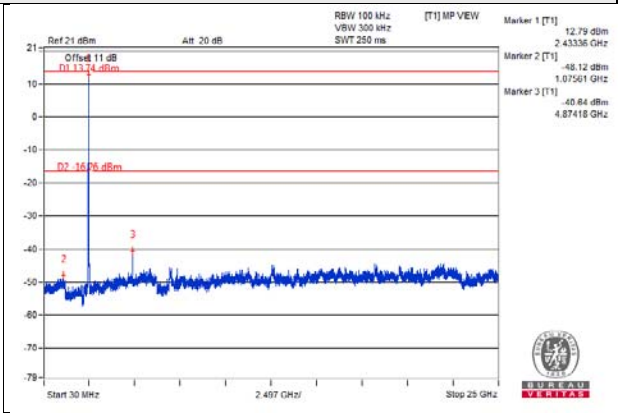
CH 1



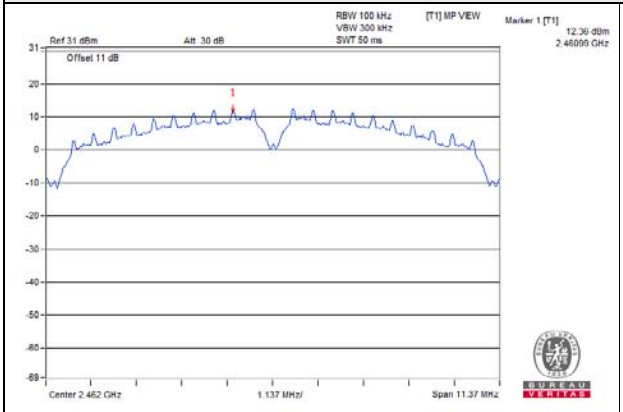


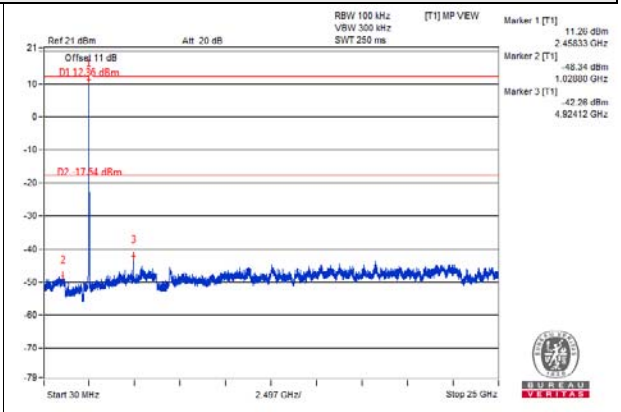
CH 6



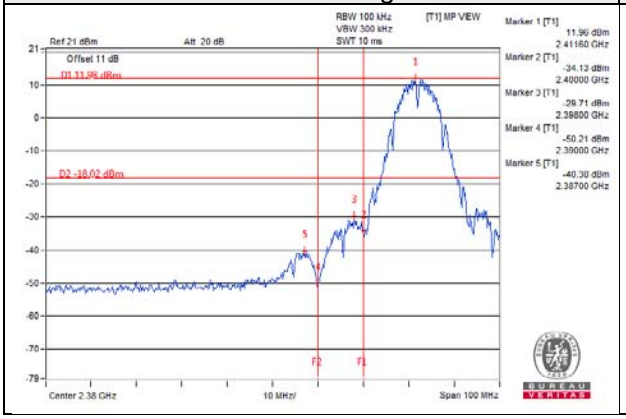


CH 11

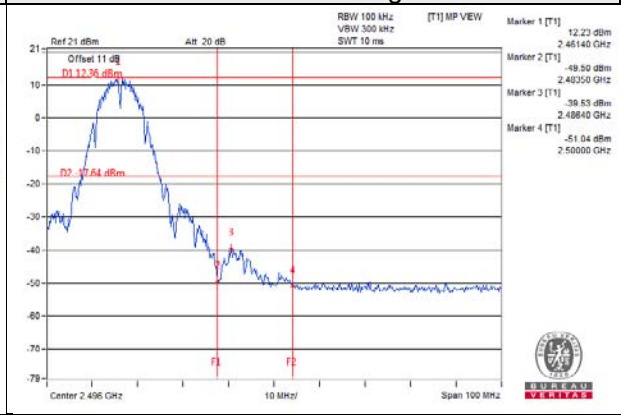




CH 1 Band edge

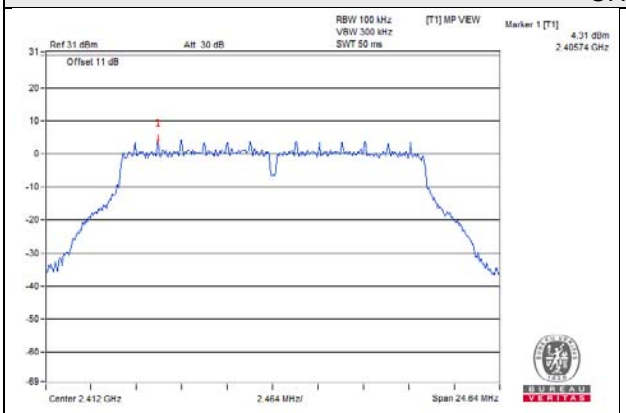


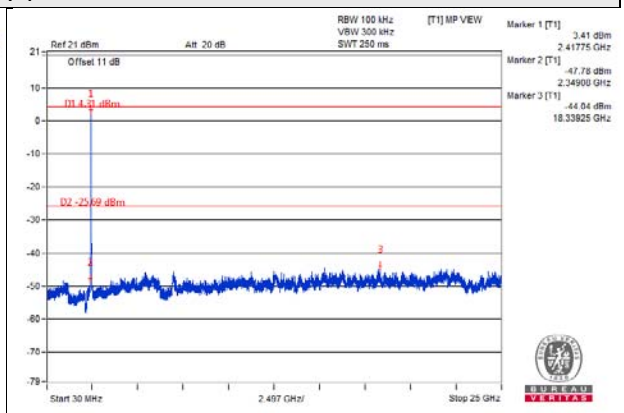
CH 11 Band edge



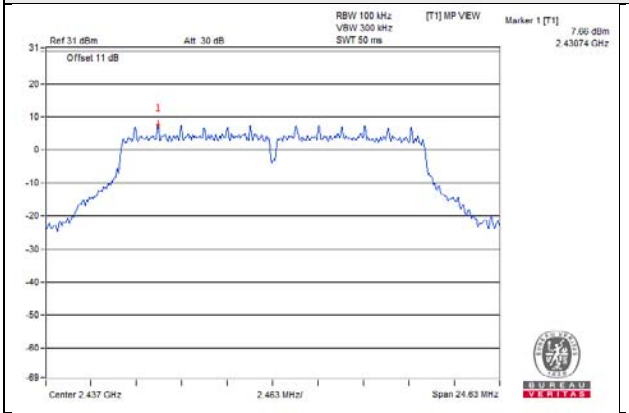
802.11g_Chain 0

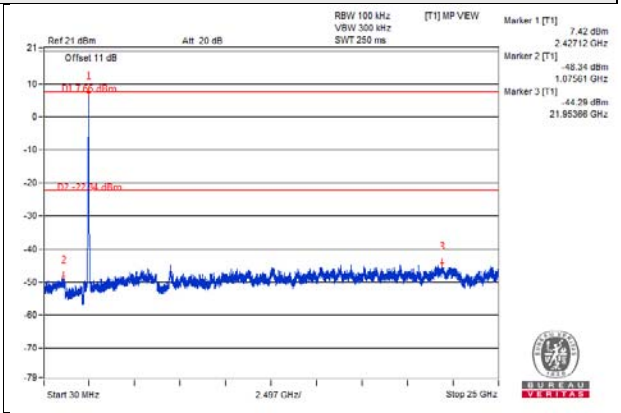
CH 1



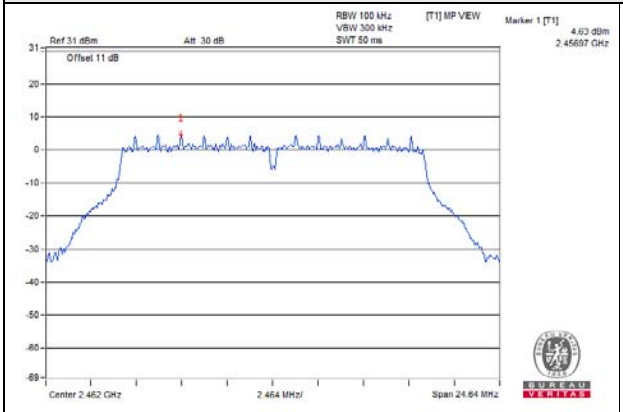


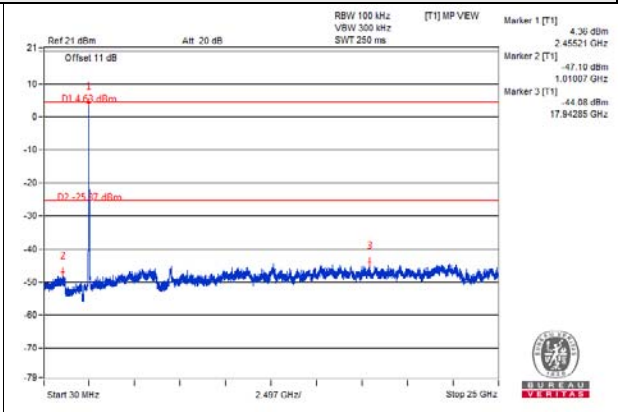
CH 6



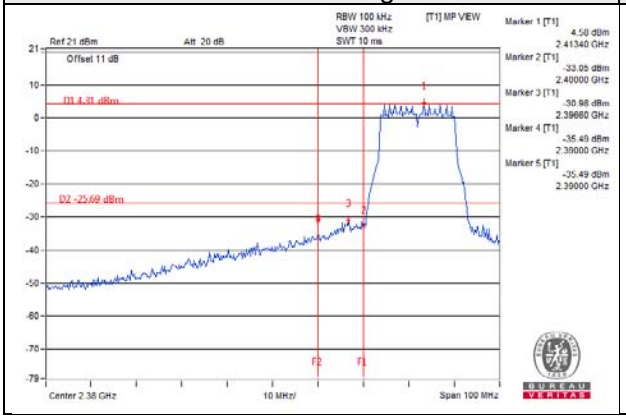


CH 11

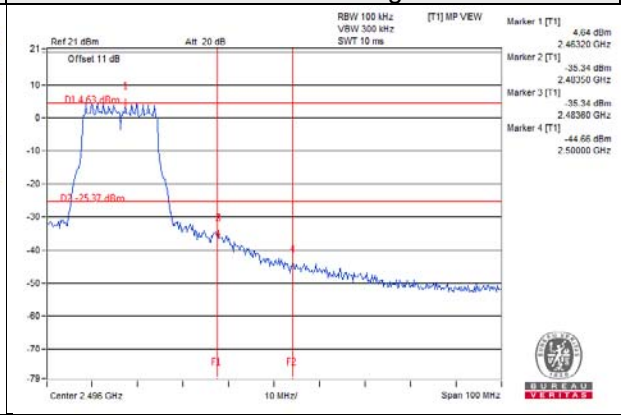




CH 1 Band edge

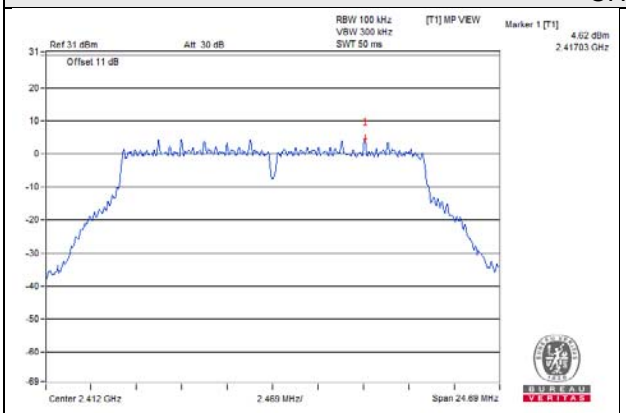


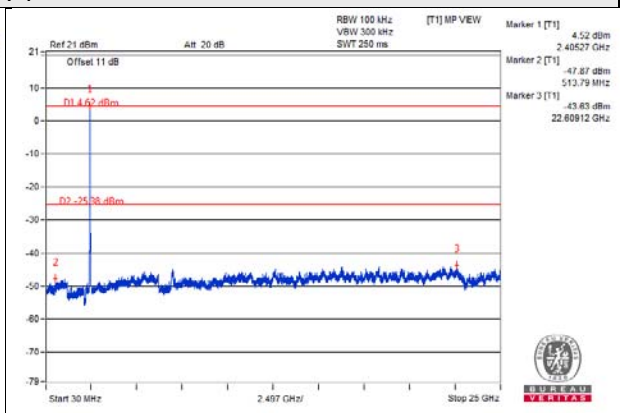
CH 11 Band edge



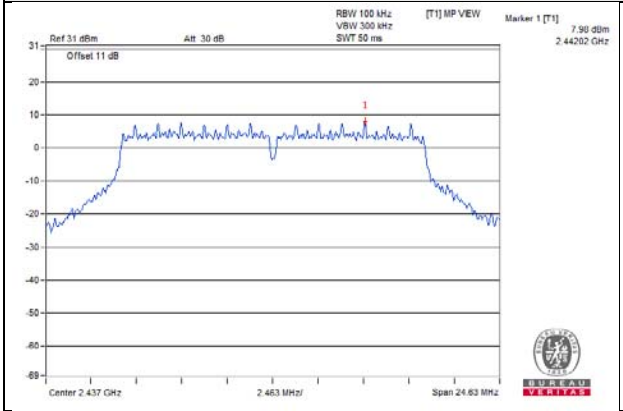
802.11g_Chain 1

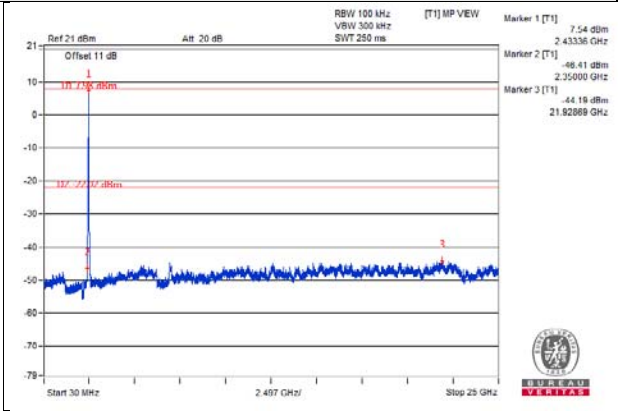
CH 1



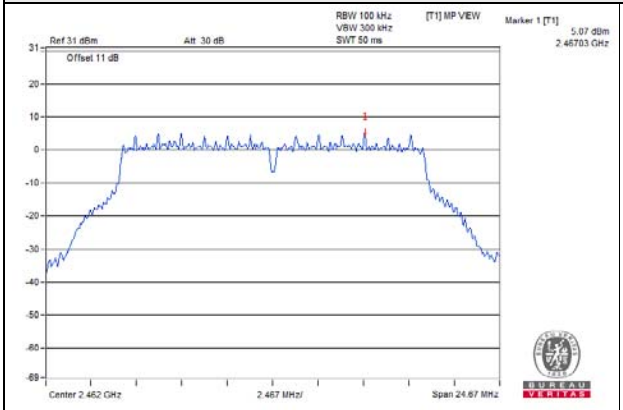


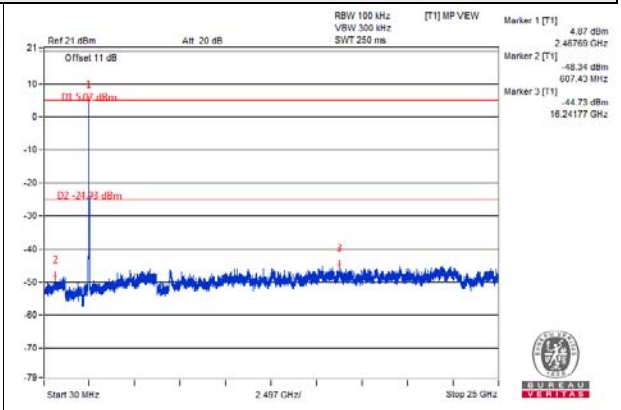
CH 6



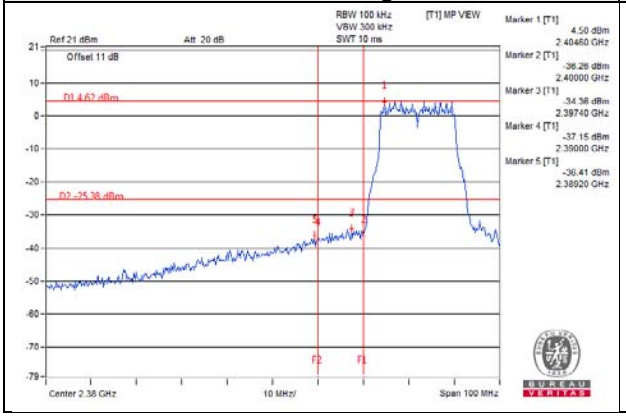


CH 11

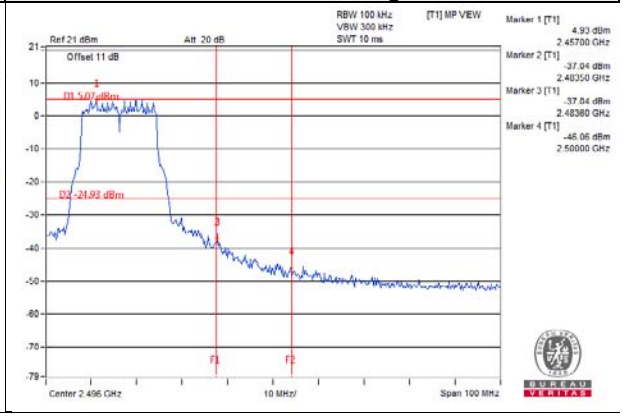




CH 1 Band edge

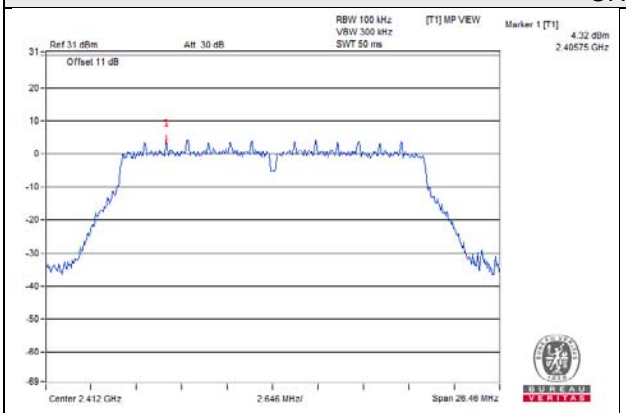


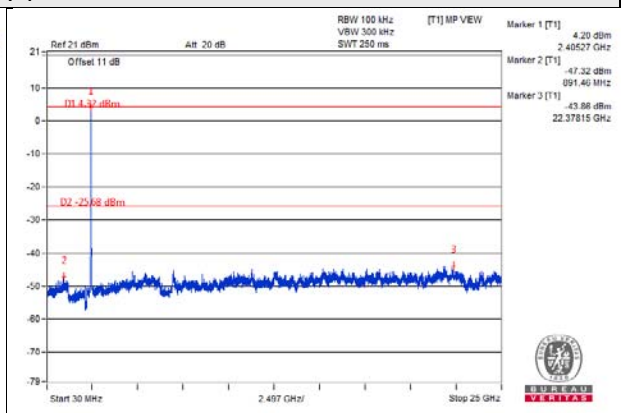
CH 11 Band edge



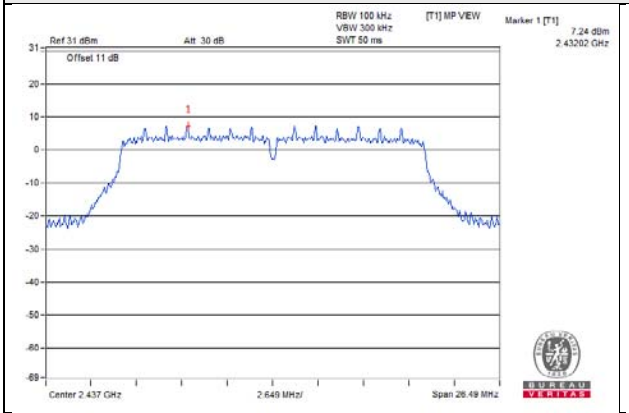
802.11n (HT20)_Chain 0

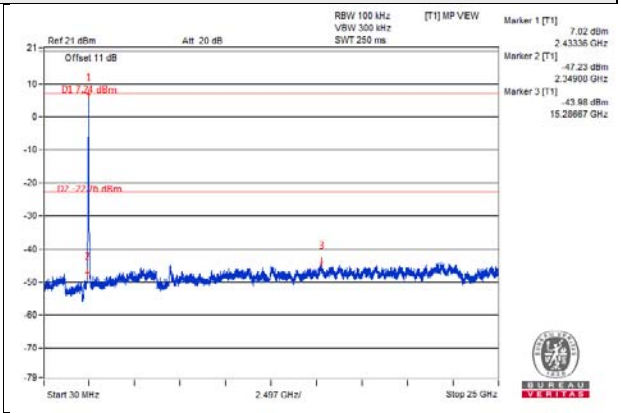
CH 1



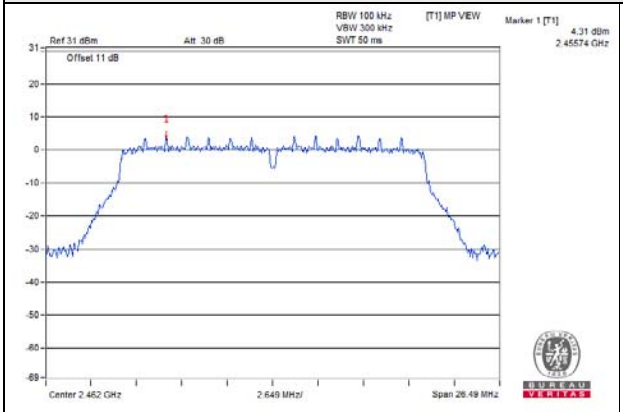


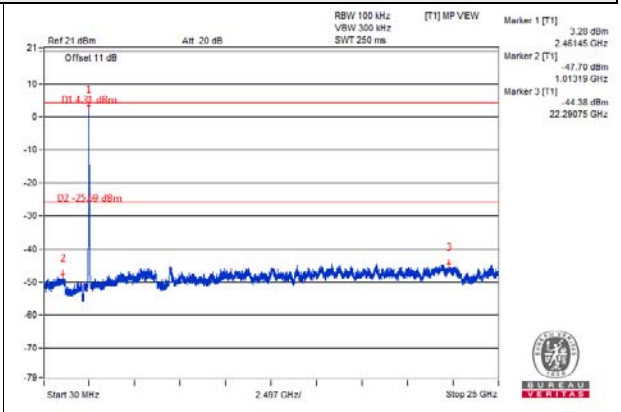
CH 6



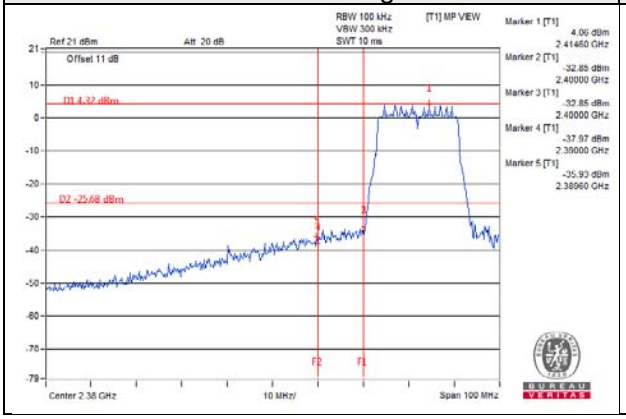


CH 11

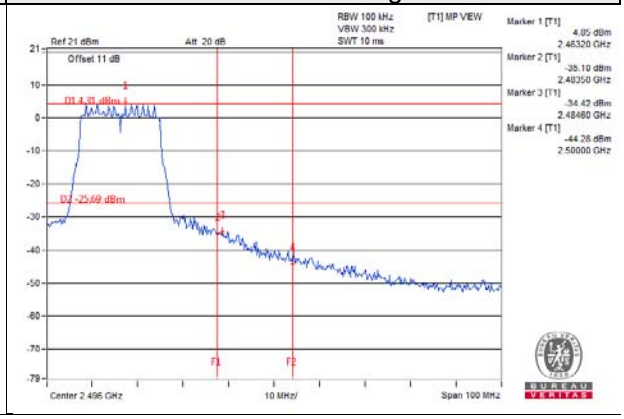




CH 1 Band edge

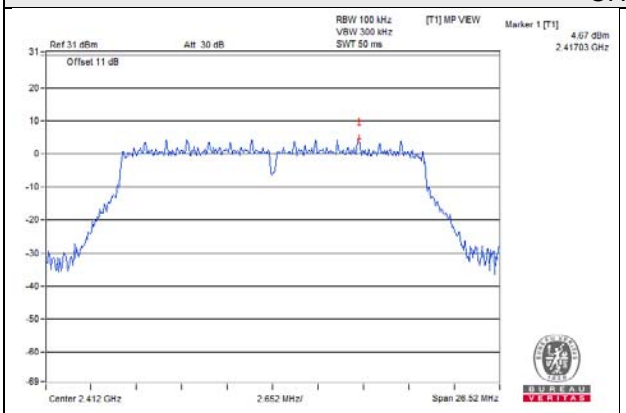


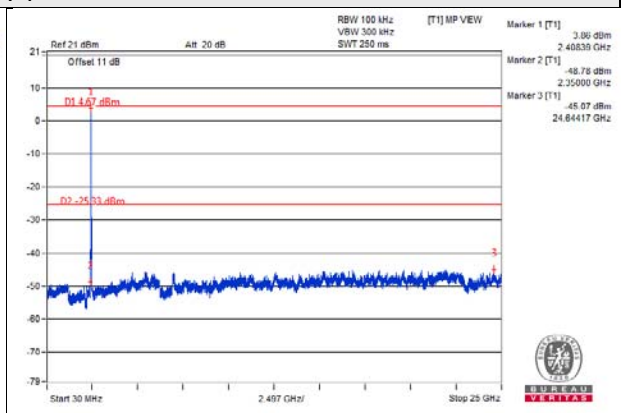
CH 11 Band edge



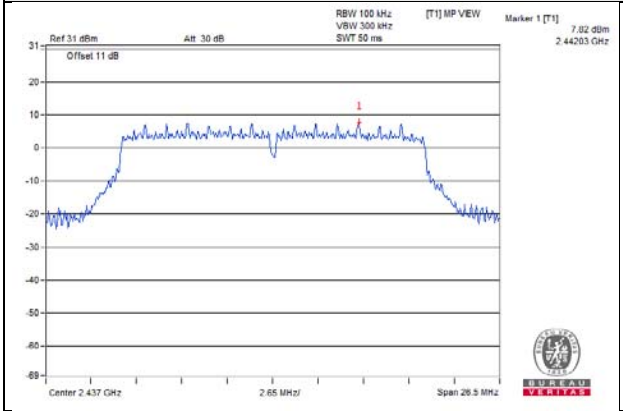
802.11n (HT20)_Chain 1

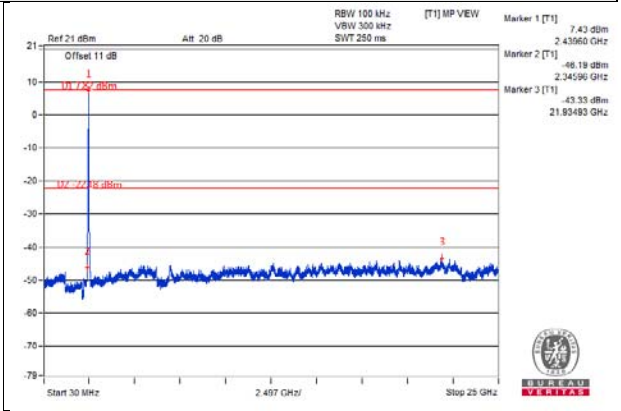
CH 1



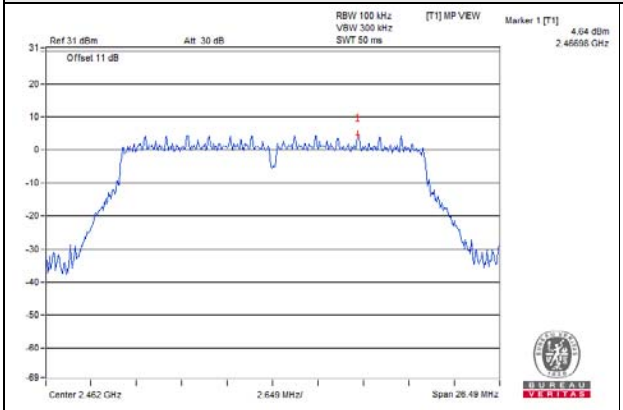


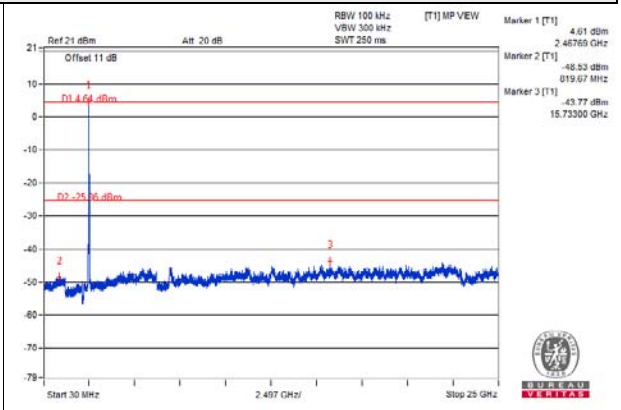
CH 6



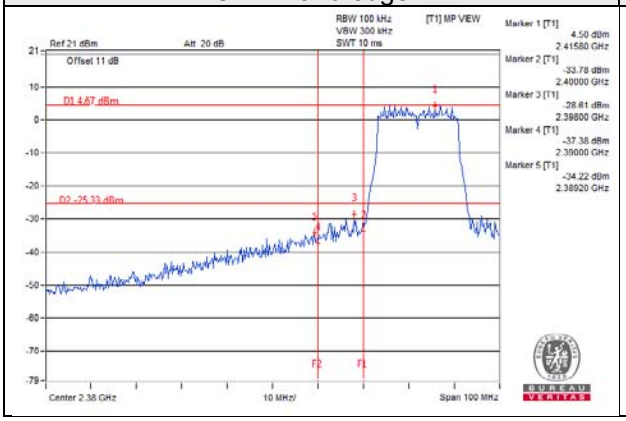


CH 11

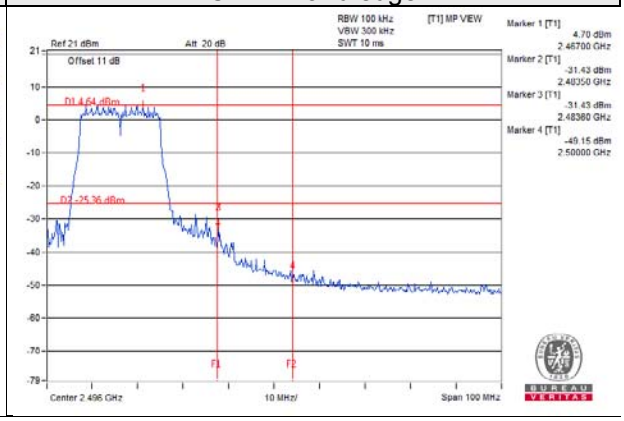




CH 1 Band edge

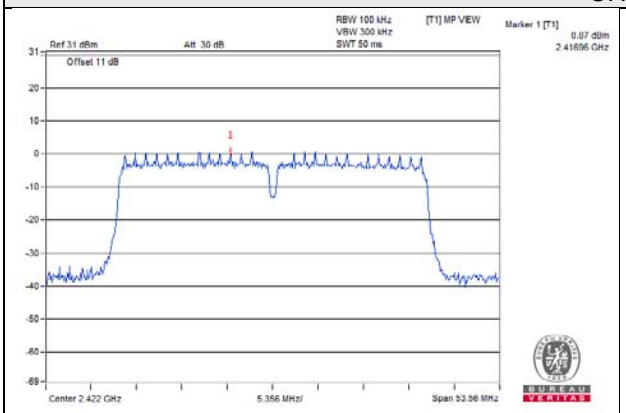


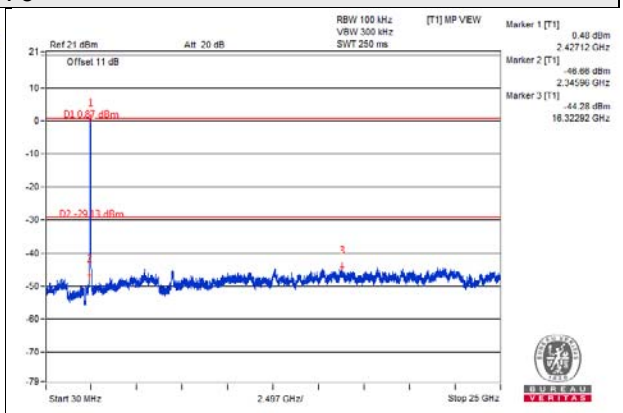
CH 11 Band edge



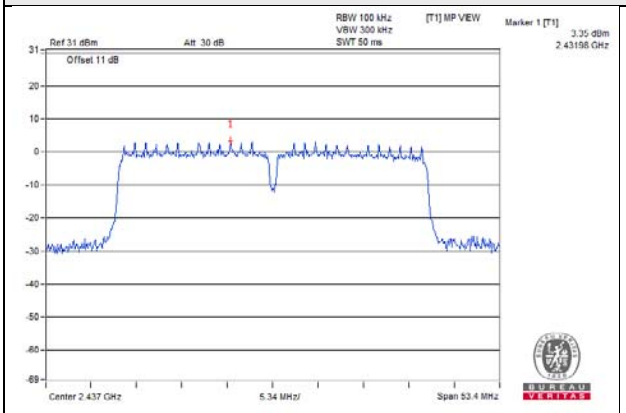
802.11n (HT40)_Chain 0

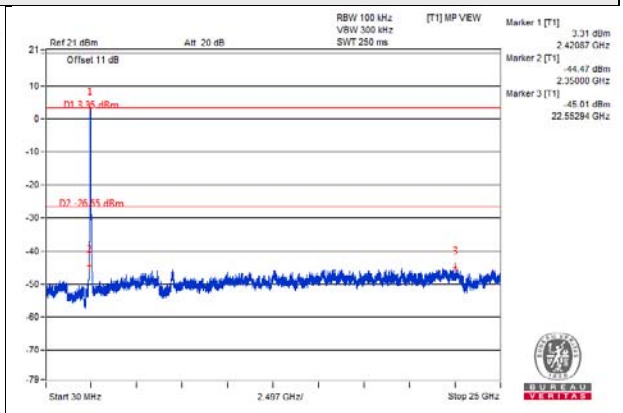
CH 3



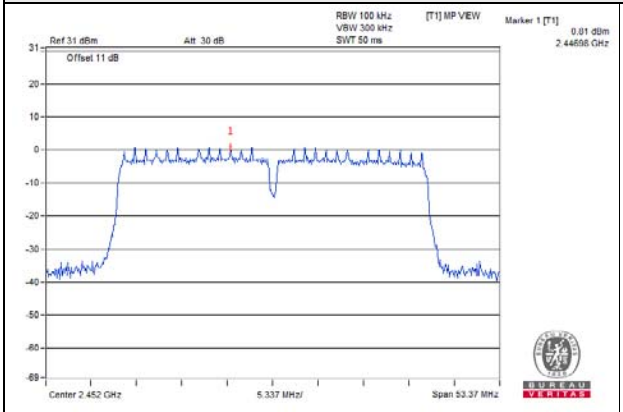


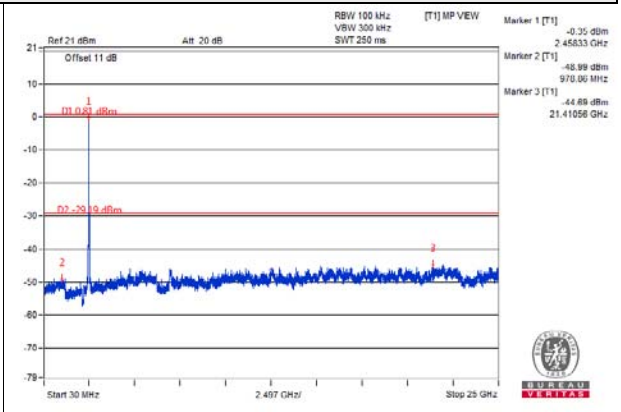
CH 6



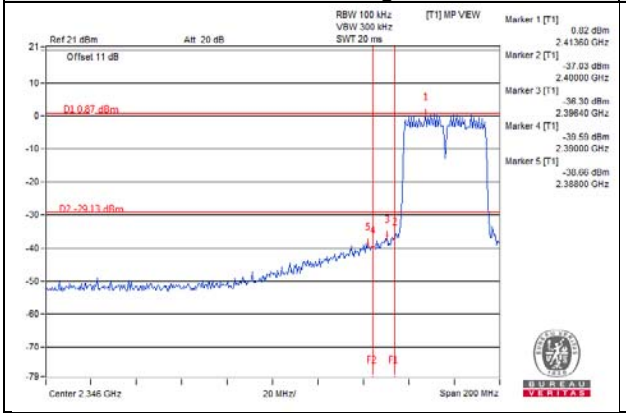


CH 9

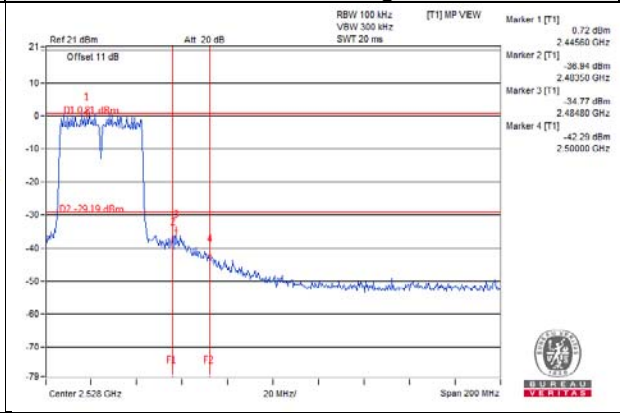




CH 3 Band edge

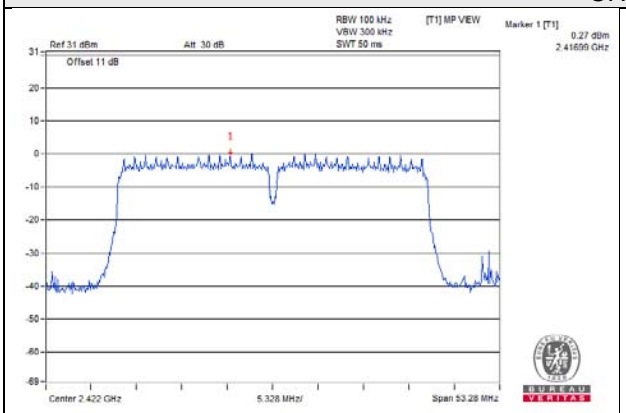


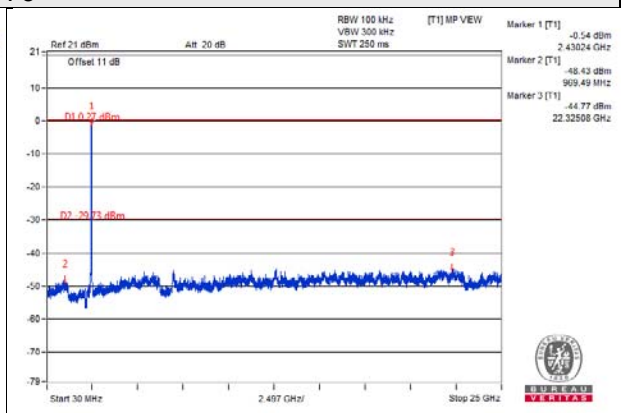
CH 9 Band edge



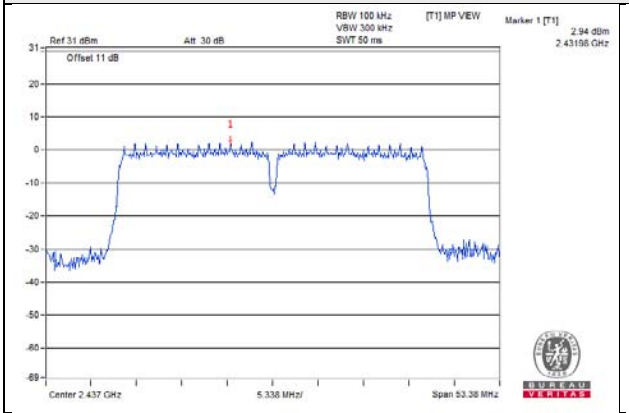
802.11n (HT40)_Chain 1

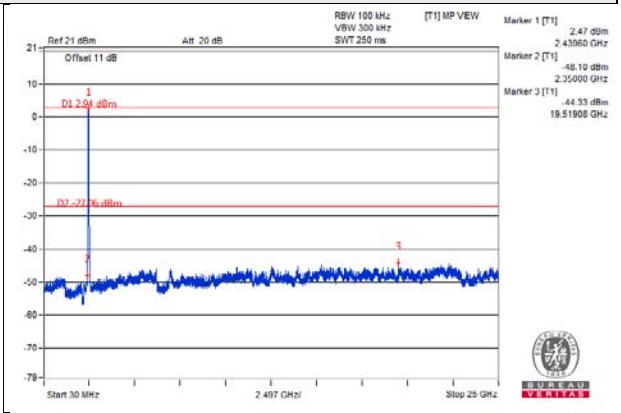
CH 3



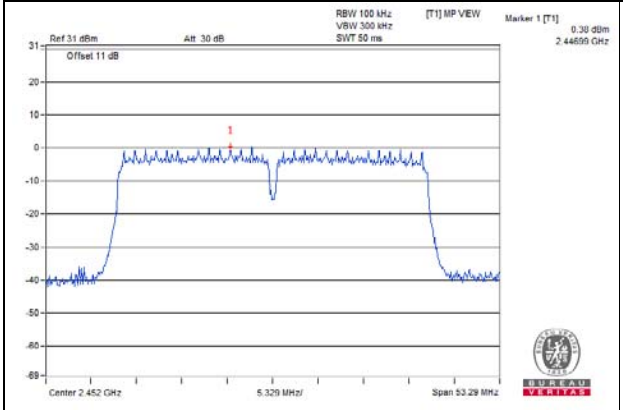


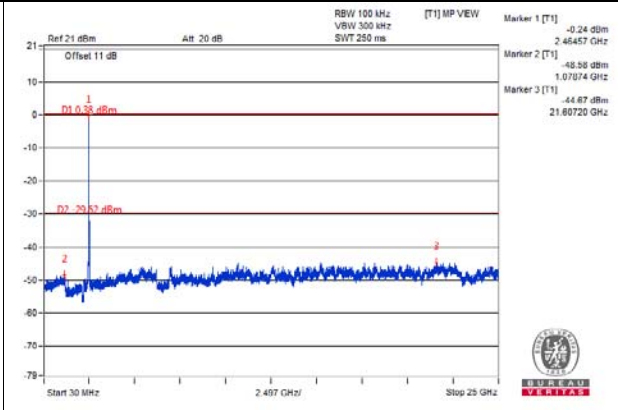
CH 6



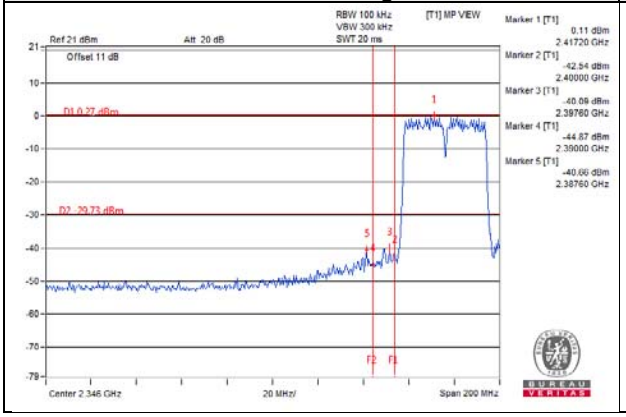


CH 9

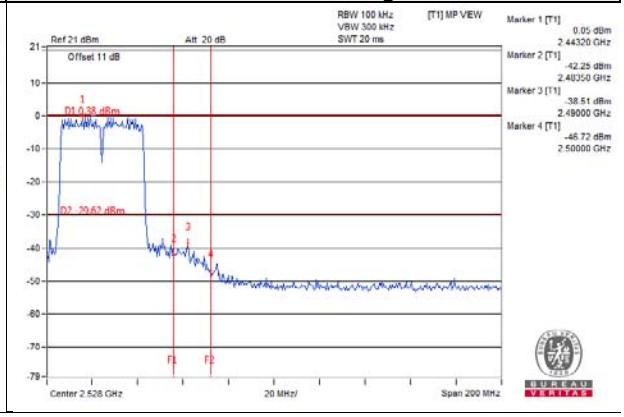




CH 3 Band edge



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 FCC recognized accredited test firms and 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: 886-2-26052180
Fax: 886-2-26051924

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Tel: 886-3-6668565
Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab
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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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