FCC Test Report

Report No.:	RF160920C16
FCC ID:	WBV-AP122
Test Model:	AP122
Received Date:	Sep. 21, 2016
Test Date:	Oct. 06 ~ Oct. 26, 2016
Issued Date:	Nov. 07, 2016
Applicant:	Aerohive Networks Inc.
Address:	1011 McCarthy Blvd, Milpitas, CA 95035, USA
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:	No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)

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Release Control Record

Issue No.	Description	Date Issued
RF160920C16	Original release.	Nov. 07, 2016

1 Certificate of Conformity

Product:	Access Point
Brand:	Aerohive
Test Model:	AP122
Sample Status:	Engineering sample
Applicant:	Aerohive Networks Inc.
Test Date:	Oct. 06 ~ Oct. 26, 2016
Standards:	47 CFR FCC Part 15, Subpart C (Section 15.247) ANSI C63.10:2013

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

Prepared by : _____ , **Date:** Nov. 07, 2016

Pettie Chen / Senior Specialist

Approved by : _____ , **Date:** Nov. 07, 2016

Ken Liu / Senior Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -5.38dB at 0.41560MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -1.0dB at 2390.00MHz & 7386.00MHz.
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	Antenna connector is IPEX not a standard connector.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.44 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.63 dB
	200MHz ~1000MHz	3.64 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Access Point
Brand	Aerohive
Test Model	AP122
Sample Status	Engineering sample
Power Supply Rating	53Vdc (POE)
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 144.4Mbps
Operating Frequency	2412 ~ 2462MHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (HT20)
Output Power	CDD Mode: 165.261mW Beamforming Mode: 107.513mW
Antenna Type	Refer to note
Antenna Connector	Refer to note
Accessory Device	NA
Cable Supplied	NA

Note:

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

Modulation Mode	Beamforming Mode	TX/RX Function
802.11b	Not Support	1TX/1RX(Radio 1:RSDB on), 2TX/2RX(Radio 1:RSDB off)
802.11g	Not Support	1TX/1RX(Radio 1:RSDB on), 2TX/2RX(Radio 1:RSDB off)
802.11n (HT20)	Support	1TX/1RX(Radio 1:RSDB on), 2TX/2RX(Radio 1:RSDB off)

* CDD mode is the worst case for final radiated emission and power line conducted emission tests after pretesting CDD mode and beamforming mode.

2. The EUT uses the following POE. (Support unit only)

POE	
Brand	CERIO
Model	POE-S53VG
Input Power	100-240Vac~50-60Hz
Output Power	53Vdc / 0.57A

3. Spurious emission of the simultaneous operation (WLAN 2.4GHz and WLAN 5GHz and BT) has been evaluated and no non-compliance was found.

4. There are 2 WiFi Radio modules for the EUT.

Radio	Support Function
Radio 1	a. RSDB off: 2.4GHz: 2Tx/2Rx b. RSDB on: 2.4GHz: 1Tx/1Rx+ 5GHz:1Rx
Radio 2	5GHz: 2Tx/2Rx

5. The power setting are list as below:

	802.11b	802.11g	802.11n (HT20)
1TX			
CH01	84	65	68
CH06	76	72	72
CH11	76	66	69
2TX			
CH01	76	64	58
CH06	74	71	70
CH11	76	66	52

6. The following antenna was provided to the EUT.

Antenna No.	Chain No.	Antenna Net Gain (dBi)	Frequency range	Antenna Type	Connecter Type
ANT0_2.4G (White)	chain0	3.26	2.4~2.4835GHz	PIFA	i-pex(MHF)
ANT1_2.4G RSDB_Ant0_5G (Black)	chain1	3.8 (2.4G) 4.61 (5G)	2.4~2.4835GHz 5.15~5.85GHz	PIFA	i-pex(MHF)
ANT0_5G (Yellow)	chain0	5.44	5.15~5.85GHz	PIFA	i-pex(MHF)
ANT1_5G (Red)	chain1	4.91	5.15~5.85GHz	Dipole	i-pex(MHF)
BT (Blue)	-	3.96	2.4~2.4835GHz	PIFA	i-pex(MHF)

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		

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to				Description
	RE≥1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

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

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

Note: 1. The EUT had been pre-tested on the positioned on Lying & Wall Mount. The worst case was found when positioned on Wall Mount.

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	Date Rate (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5

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	Date Rate (Mbps)
-	802.11b	1 to 13	1	DSSS	DBPSK	1

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	Date Rate (Mbps)
-	802.11b	1 to 13	1	DSSS	DBPSK	1

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	Date Rate (Mbps)
CDD Mode						
-	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
Beamforming Mode						
-	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5

Test Condition:

Applicable to	Environmental Conditions	Input Power	Tested by
RE≥1G	16 deg. C, 70% RH	120Vac, 60Hz	Nick Hsu
RE<1G	20 deg. C, 69% RH	120Vac, 60Hz	Byau Chen
PLC	20 deg. C, 69% RH	120Vac, 60Hz	Byau Chen
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Nick Hsu

3.3 Duty Cycle of Test Signal

1TX:

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

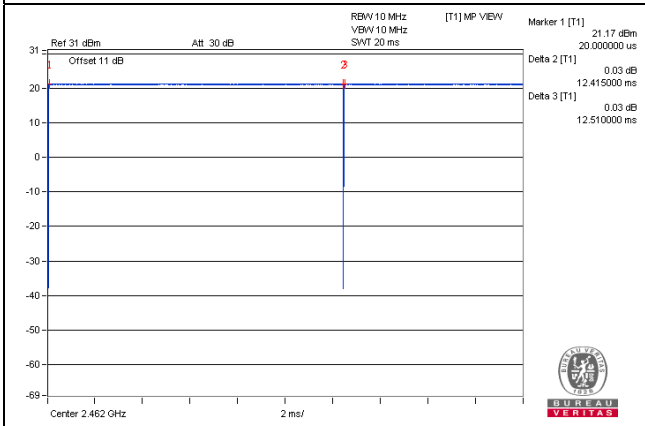
Duty cycle of test signal is < 98 %, duty factor is required

802.11b: Duty cycle = 12.415/12.510 = 0.992

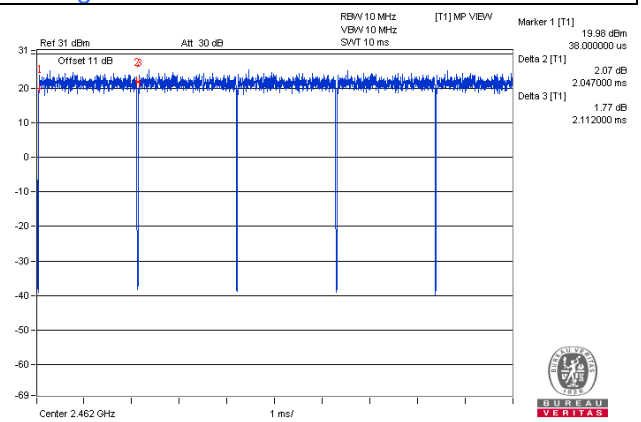
802.11g: Duty cycle = 2.047/2.112 = 0.969, Duty factor = 10 * log(1/0.969) = 0.14

802.11n (HT20): Duty cycle = 1.912/1.947 = 0.982

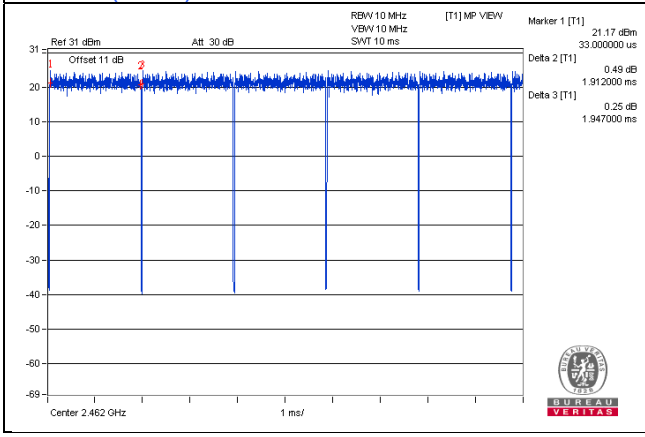
802.11b



802.11g



802.11n (HT20)



2TX:

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

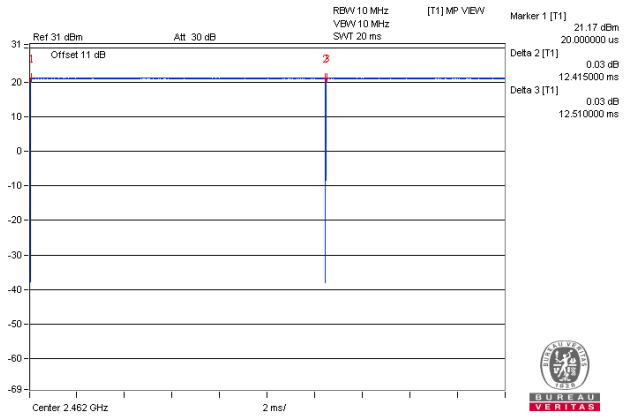
Duty cycle of test signal is < 98 %, duty factor is required

802.11b: Duty cycle = 12.415/12.510 = 0.992

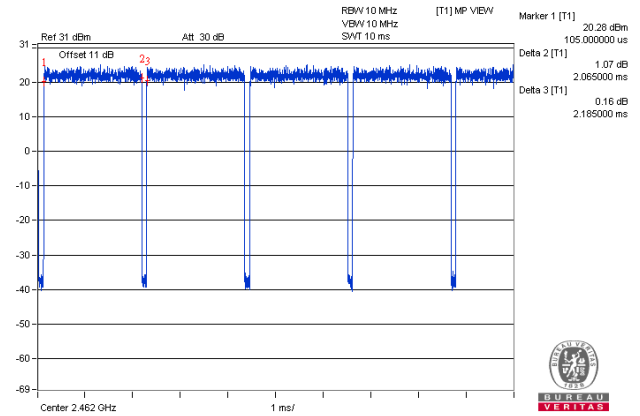
802.11g: Duty cycle = 2.065/2.185 = 0.945, Duty factor = 10 * log(1/0.945) = 0.25

802.11n (HT20): Duty cycle = 1.909/2.037 = 0.937, Duty factor = 10 * log(1/0.937) = 0.28

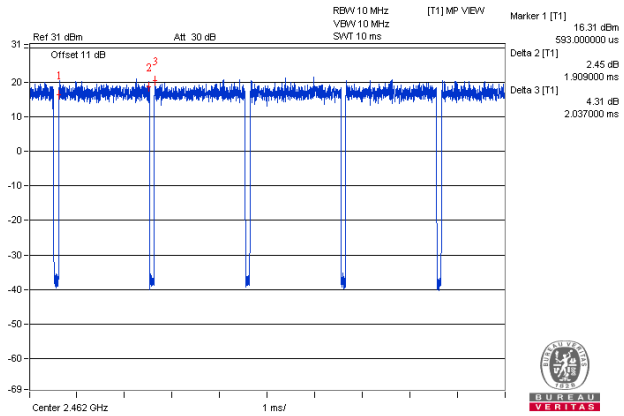
802.11b



802.11g



802.11n (HT20)



3.4 Description of Support Units

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

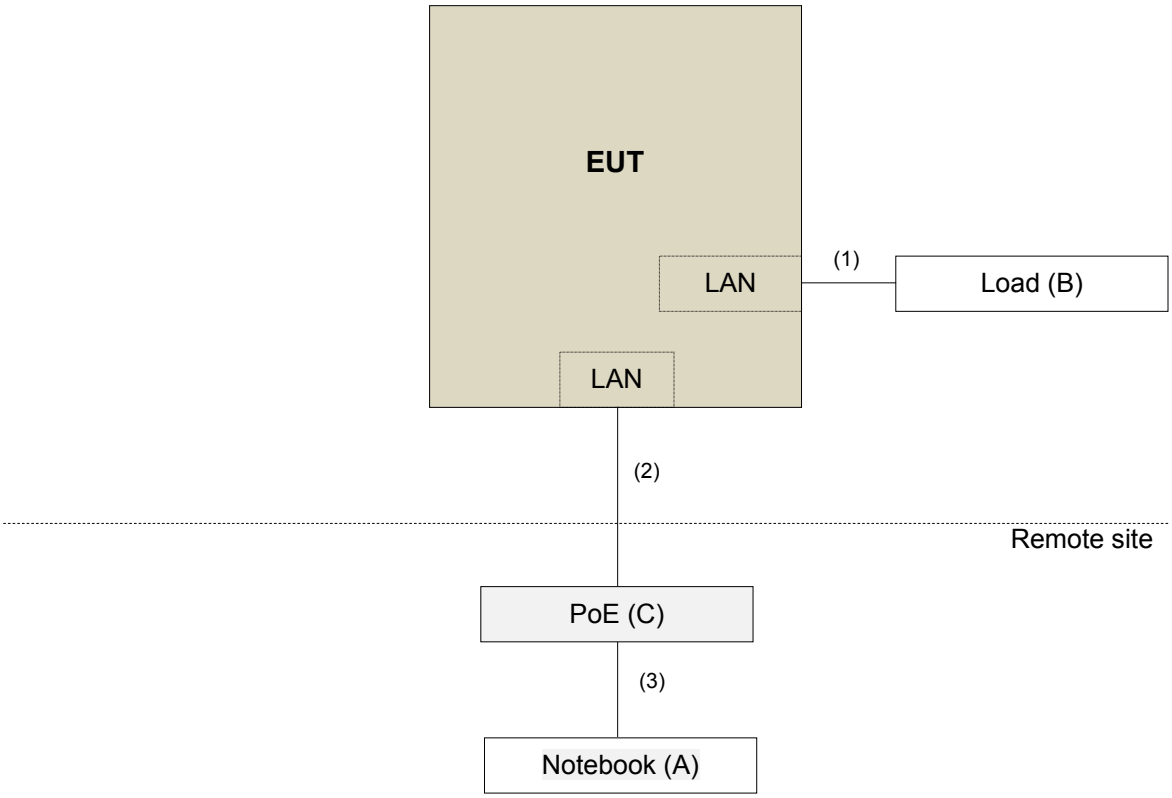
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	E5410	6RP2YM1	FCC DoC Approved	-
B.	Load	NA	NA	NA	NA	-
C.	PoE	CERIO	POE-S53VG	NA	NA	Provided by client

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.	RJ45	1	1.8	N	0	-
2.	RJ45	1	10	N	0	-
3.	RJ45	1	1.8	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 specification of the EUT declared by the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C (15.247)
KDB 558074 D01 DTS Meas Guidance v03r05
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 30dB below the highest level of the desired power:

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

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 30dB under any condition of modulation.

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCS30	100289	Dec. 23, 2015	Dec. 22, 2016
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Apr. 19, 2016	Apr. 18, 2017
BILOG Antenna SCHWARZBECK	VULB9168	9168-148	Jan. 18, 2016	Jan. 17, 2017
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Jan. 08, 2016	Jan. 07, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Jan. 18, 2016	Jan. 17, 2017
Loop Antenna	EM-6879	269	Aug. 11, 2016	Aug. 10, 2017
Preamplifier Agilent	8449B	3008A01911	Aug. 09, 2016	Aug. 08, 2017
Preamplifier Agilent	8447D	2944A10638	Aug. 09, 2016	Aug. 08, 2017
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-02 (309222 +248780)	Aug. 09, 2016	Aug. 08, 2017
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-03 (274092)	Aug. 09, 2016	Aug. 08, 2017
RF signal cable Woken	8D-FB	Cable-CH9-01	Aug. 09, 2016	Aug. 08, 2017
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower &Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
High Speed Peak Power Meter	ML2495A	0824012	Aug. 11, 2016	Aug. 10, 2017
Power Sensor	MA2411B	0738171	Aug. 11, 2016	Aug. 10, 2017

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 9.
3. The horn antenna and preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 215374.
5. The IC Site Registration No. is IC 7450F-9.

4.1.3 Test Procedures

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. Both X and Y axes 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:

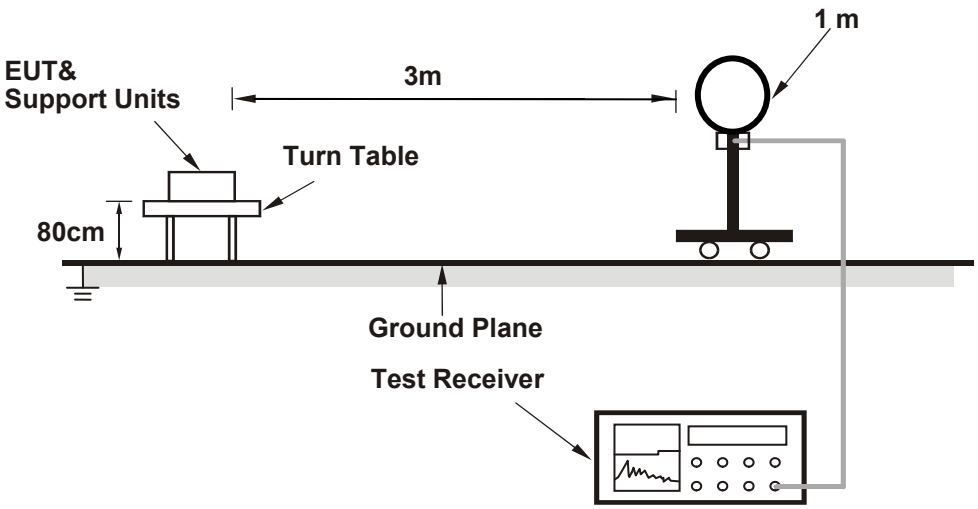
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

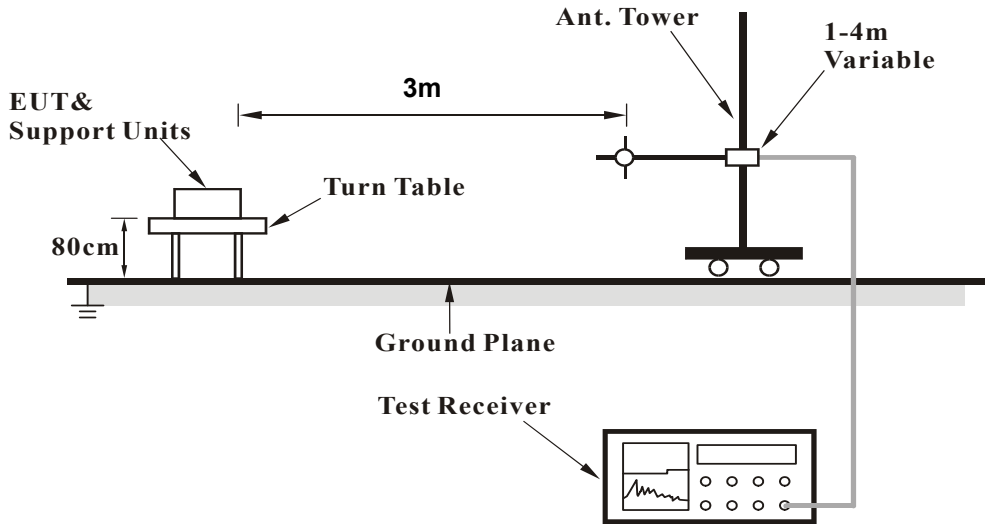
No deviation.

4.1.5 Test Setup

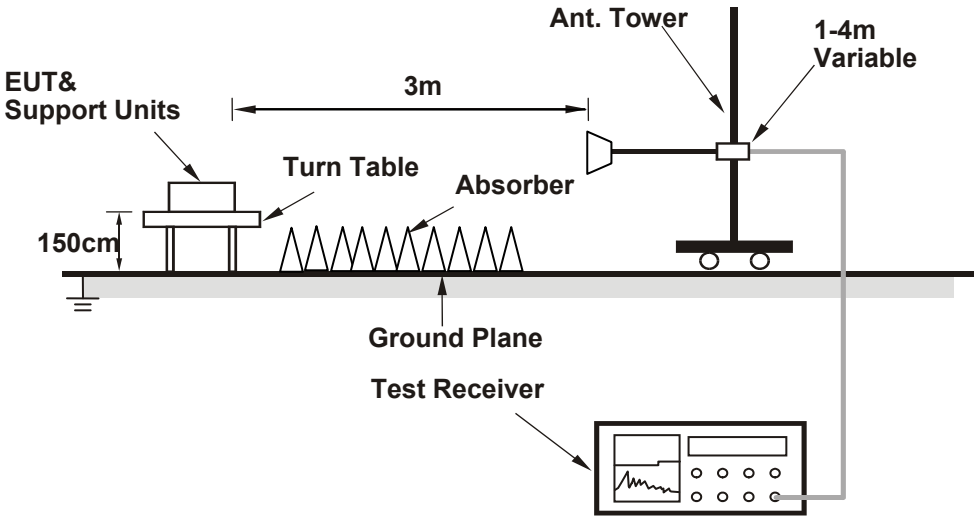
For Radiated emission below 30MHz



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".
e. The necessary accessories enable the system in full functions.

4.1.7 Test Results

Above 1GHz Data：

1TX

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	60.7 PK	74.0	-13.3	1.58 H	318	25.7	35.0
2	2390.00	51.9 AV	54.0	-2.1	1.58 H	318	16.9	35.0
3	*2412.00	108.0 PK			1.58 H	318	73.0	35.0
4	*2412.00	104.2 AV			1.58 H	318	69.2	35.0
5	4824.00	50.8 PK	74.0	-23.2	1.72 H	168	46.6	4.2
6	4824.00	42.4 AV	54.0	-11.6	1.72 H	168	38.2	4.2
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	60.1 PK	74.0	-13.9	4.00 V	17	25.1	35.0
2	2390.00	48.2 AV	54.0	-5.8	4.00 V	17	13.2	35.0
3	*2412.00	103.6 PK			4.00 V	19	68.6	35.0
4	*2412.00	99.9 AV			4.00 V	19	64.9	35.0
5	4824.00	49.8 PK	74.0	-24.2	1.93 V	185	45.6	4.2
6	4824.00	40.5 AV	54.0	-13.5	1.93 V	185	36.3	4.2

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)
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	104.8 PK			1.56 H	64	69.6	35.2
2	*2437.00	100.9 AV			1.56 H	64	65.7	35.2
3	4874.00	50.4 PK	74.0	-23.6	1.99 H	171	46.0	4.4
4	4874.00	41.1 AV	54.0	-12.9	1.99 H	171	36.7	4.4
5	7311.00	60.0 PK	74.0	-14.0	2.80 H	27	49.5	10.5
6	7311.00	52.8 AV	54.0	-1.2	2.80 H	27	42.3	10.5
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	100.8 PK			1.66 V	50	65.6	35.2
2	*2437.00	96.0 AV			1.66 V	50	60.8	35.2
3	4874.00	50.2 PK	74.0	-23.8	1.81 V	193	45.8	4.4
4	4874.00	40.3 AV	54.0	-13.7	1.81 V	193	35.9	4.4
5	7311.00	58.9 PK	74.0	-15.1	1.49 V	341	48.4	10.5
6	7311.00	52.9 AV	54.0	-1.1	1.49 V	341	42.4	10.5

REMARKS:

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

CHANNEL	TX Channel 11	DETECTOR 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	103.0 PK			3.77 H	95	67.7	35.3
2	*2462.00	99.3 AV			3.77 H	95	64.0	35.3
3	2483.50	60.3 PK	74.0	-13.7	3.77 H	95	24.9	35.4
4	2483.50	48.6 AV	54.0	-5.4	3.77 H	95	13.2	35.4
5	4924.00	52.0 PK	74.0	-22.0	1.64 H	64	47.4	4.6
6	4924.00	39.9 AV	54.0	-14.1	1.64 H	64	35.3	4.6
7	7386.00	59.4 PK	74.0	-14.6	3.37 H	19	49.0	10.4
8	7386.00	52.1 AV	54.0	-1.9	3.37 H	19	41.7	10.4
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	*2462.00	98.2 PK			3.92 V	76	62.9	35.3
2	*2462.00	95.0 AV			3.92 V	76	59.7	35.3
3	2483.50	58.7 PK	74.0	-15.3	3.92 V	76	23.3	35.4
4	2483.50	47.8 AV	54.0	-6.2	3.92 V	76	12.4	35.4
5	4924.00	49.9 PK	74.0	-24.1	1.72 V	42	45.3	4.6
6	4924.00	38.4 AV	54.0	-15.6	1.72 V	42	33.8	4.6
7	7386.00	59.6 PK	74.0	-14.4	1.19 V	1	49.2	10.4
8	**7386.00**	**53.0 AV**	**54.0**	**-1.0**	**1.19 V**	**1**	**42.6**	**10.4**

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)
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	2.13 H	75	37.9	35.0
2	2390.00	51.8 AV	54.0	-2.2	2.13 H	75	16.8	35.0
3	*2412.00	105.1 PK			2.13 H	75	70.1	35.0
4	*2412.00	95.5 AV			2.13 H	75	60.5	35.0
5	4824.00	48.4 PK	74.0	-25.6	1.73 H	20	44.2	4.2
6	4824.00	35.6 AV	54.0	-18.4	1.73 H	20	31.4	4.2
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	70.3 PK	74.0	-3.7	4.00 V	43	35.3	35.0
2	2390.00	50.2 AV	54.0	-3.8	4.00 V	43	15.2	35.0
3	*2412.00	102.6 PK			4.00 V	43	67.6	35.0
4	*2412.00	93.0 AV			4.00 V	43	58.0	35.0
5	4824.00	46.6 PK	74.0	-27.4	1.52 V	137	42.4	4.2
6	4824.00	34.8 AV	54.0	-19.2	1.52 V	137	30.6	4.2

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)
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	64.1 PK	74.0	-9.9	1.49 H	51	29.1	35.0
2	2390.00	52.5 AV	54.0	-1.5	1.49 H	51	17.5	35.0
3	*2437.00	107.7 PK			1.49 H	51	72.5	35.2
4	*2437.00	98.0 AV			1.49 H	51	62.8	35.2
5	2483.50	65.2 PK	74.0	-8.8	1.49 H	51	29.8	35.4
6	2483.50	51.3 AV	54.0	-2.7	1.49 H	51	15.9	35.4
7	4874.00	49.4 PK	74.0	-24.6	1.97 H	182	45.0	4.4
8	4874.00	35.6 AV	54.0	-18.4	1.97 H	182	31.2	4.4
9	7311.00	64.4 PK	74.0	-9.6	1.87 H	18	53.9	10.5
10	7311.00	51.2 AV	54.0	-2.8	1.87 H	18	40.7	10.5
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	60.1 PK	74.0	-13.9	1.24 V	318	25.1	35.0
2	2390.00	48.8 AV	54.0	-5.2	1.24 V	318	13.8	35.0
3	*2437.00	103.6 PK			1.24 V	318	68.4	35.2
4	*2437.00	94.0 AV			1.24 V	318	58.8	35.2
5	2483.50	60.7 PK	74.0	-13.3	1.24 V	318	25.3	35.4
6	2483.50	48.9 AV	54.0	-5.1	1.24 V	318	13.5	35.4
7	4874.00	48.9 PK	74.0	-25.1	1.33 V	267	44.5	4.4
8	4874.00	35.2 AV	54.0	-18.8	1.33 V	267	30.8	4.4
9	7311.00	64.8 PK	74.0	-9.2	1.99 V	359	54.3	10.5
10	7311.00	52.3 AV	54.0	-1.7	1.99 V	359	41.8	10.5

REMARKS:

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

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	106.9 PK			1.50 H	65	71.6	35.3
2	*2462.00	97.3 AV			1.50 H	65	62.0	35.3
3	2483.50	70.7 PK	74.0	-3.3	1.50 H	65	35.3	35.4
4	2483.50	52.6 AV	54.0	-1.4	1.50 H	65	17.2	35.4
5	4924.00	49.3 PK	74.0	-24.7	1.66 H	239	44.7	4.6
6	4924.00	36.3 AV	54.0	-17.7	1.66 H	239	31.7	4.6
7	7386.00	59.0 PK	74.0	-15.0	2.31 H	19	48.6	10.4
8	7386.00	45.3 AV	54.0	-8.7	2.31 H	19	34.9	10.4
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	*2462.00	102.1 PK			1.55 V	43	66.8	35.3
2	*2462.00	92.6 AV			1.55 V	43	57.3	35.3
3	2483.50	68.5 PK	74.0	-5.5	1.55 V	43	33.1	35.4
4	2483.50	50.8 AV	54.0	-3.2	1.55 V	43	15.4	35.4
5	4924.00	48.2 PK	74.0	-25.8	1.78 V	183	43.6	4.6
6	4924.00	34.8 AV	54.0	-19.2	1.78 V	183	30.2	4.6
7	7386.00	57.3 PK	74.0	-16.7	1.58 V	193	46.9	10.4
8	7386.00	42.5 AV	54.0	-11.5	1.58 V	193	32.1	10.4

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)
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	72.9 PK	74.0	-1.1	1.60 H	334	37.9	35.0
2	2390.00	50.9 AV	54.0	-3.1	1.60 H	334	15.9	35.0
3	*2412.00	106.9 PK			1.60 H	334	71.9	35.0
4	*2412.00	97.3 AV			1.60 H	334	62.3	35.0
5	4824.00	48.6 PK	74.0	-25.4	1.66 H	37	44.4	4.2
6	4824.00	36.1 AV	54.0	-17.9	1.66 H	37	31.9	4.2
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	70.6 PK	74.0	-3.4	1.77 V	354	35.6	35.0
2	2390.00	48.9 AV	54.0	-5.1	1.77 V	354	13.9	35.0
3	*2412.00	100.4 PK			1.77 V	354	65.4	35.0
4	*2412.00	92.4 AV			1.77 V	354	57.4	35.0
5	4824.00	47.4 PK	74.0	-26.6	1.56 V	165	43.2	4.2
6	4824.00	34.9 AV	54.0	-19.1	1.56 V	165	30.7	4.2

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

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	67.4 PK	74.0	-6.6	1.02 H	319	32.4	35.0
2	**2390.00**	**53.0 AV**	**54.0**	**-1.0**	**1.02 H**	**319**	**18.0**	**35.0**
3	*2437.00	109.1 PK			1.02 H	319	73.9	35.2
4	*2437.00	99.8 AV			1.02 H	319	64.6	35.2
5	2483.50	63.6 PK	74.0	-10.4	1.02 H	319	28.2	35.4
6	2483.50	50.3 AV	54.0	-3.7	1.02 H	319	14.9	35.4
7	4874.00	49.0 PK	74.0	-25.0	1.74 H	159	44.6	4.4
8	4874.00	36.1 AV	54.0	-17.9	1.74 H	159	31.7	4.4
9	7311.00	64.1 PK	74.0	-9.9	3.26 H	33	53.6	10.5
10	7311.00	49.3 AV	54.0	-4.7	3.26 H	33	38.8	10.5
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	66.2 PK	74.0	-7.8	1.51 V	322	31.2	35.0
2	2390.00	50.6 AV	54.0	-3.4	1.51 V	322	15.6	35.0
3	*2437.00	103.9 PK			1.51 V	322	68.7	35.2
4	*2437.00	94.8 AV			1.51 V	322	59.6	35.2
5	2483.50	60.7 PK	74.0	-13.3	1.51 V	322	25.3	35.4
6	2483.50	47.5 AV	54.0	-6.5	1.51 V	322	12.1	35.4
7	4874.00	48.5 PK	74.0	-25.5	1.32 V	197	44.1	4.4
8	4874.00	35.6 AV	54.0	-18.4	1.32 V	197	31.2	4.4
9	7311.00	62.7 PK	74.0	-11.3	1.97 V	189	52.2	10.5
10	7311.00	46.7 AV	54.0	-7.3	1.97 V	189	36.2	10.5

REMARKS:

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

CHANNEL	TX Channel 11	DETECTOR 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	104.9 PK			1.75 H	304	69.6	35.3
2	*2462.00	95.9 AV			1.75 H	304	60.6	35.3
3	2483.50	68.8 PK	74.0	-5.2	1.75 H	304	33.4	35.4
4	2483.50	52.6 AV	54.0	-1.4	1.75 H	304	17.2	35.4
5	4924.00	48.9 PK	74.0	-25.1	1.52 H	61	44.3	4.6
6	4924.00	36.3 AV	54.0	-17.7	1.52 H	61	31.7	4.6
7	7386.00	61.7 PK	74.0	-12.3	3.62 H	14	51.3	10.4
8	7386.00	47.7 AV	54.0	-6.3	3.62 H	14	37.3	10.4
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	*2462.00	100.4 PK			2.02 V	262	65.1	35.3
2	*2462.00	91.0 AV			2.02 V	262	55.7	35.3
3	2483.50	63.0 PK	74.0	-11.0	2.02 V	262	27.6	35.4
4	2483.50	49.1 AV	54.0	-4.9	2.02 V	262	13.7	35.4
5	4924.00	48.2 PK	74.0	-25.8	1.77 V	125	43.6	4.6
6	4924.00	35.8 AV	54.0	-18.2	1.77 V	125	31.2	4.6
7	7386.00	59.6 PK	74.0	-14.4	1.54 V	153	49.2	10.4
8	7386.00	47.1 AV	54.0	-6.9	1.54 V	153	36.7	10.4

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

2TX

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	62.3 PK	74.0	-11.7	1.70 H	314	27.3	35.0
2	2390.00	52.7 AV	54.0	-1.3	1.70 H	314	17.7	35.0
3	*2412.00	111.7 PK			1.63 H	59	76.7	35.0
4	*2412.00	107.9 AV			1.63 H	59	72.9	35.0
5	4824.00	53.5 PK	74.0	-20.5	1.66 H	317	49.3	4.2
6	4824.00	46.7 AV	54.0	-7.3	1.66 H	317	42.5	4.2
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	60.7 PK	74.0	-13.3	1.56 V	319	25.7	35.0
2	2390.00	49.7 AV	54.0	-4.3	1.56 V	319	14.7	35.0
3	*2412.00	104.3 PK			1.69 V	294	69.3	35.0
4	*2412.00	100.5 AV			1.69 V	294	65.5	35.0
5	4824.00	54.1 PK	74.0	-19.9	1.53 V	329	49.9	4.2
6	4824.00	48.1 AV	54.0	-5.9	1.53 V	329	43.9	4.2

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)
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	110.6 PK			1.84 H	68	75.4	35.2
2	*2437.00	105.9 AV			1.84 H	68	70.7	35.2
3	4874.00	54.1 PK	74.0	-19.9	1.47 H	311	49.7	4.4
4	4874.00	46.5 AV	54.0	-7.5	1.47 H	311	42.1	4.4
5	7311.00	60.7 PK	74.0	-13.3	2.21 H	37	50.2	10.5
6	7311.00	51.9 AV	54.0	-2.1	2.21 H	37	41.4	10.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	102.6 PK			1.50 V	300	67.4	35.2
2	*2437.00	99.0 AV			1.50 V	300	63.8	35.2
3	4874.00	54.7 PK	74.0	-19.3	1.46 V	345	50.3	4.4
4	4874.00	48.7 AV	54.0	-5.3	1.46 V	345	44.3	4.4
5	7311.00	62.0 PK	74.0	-12.0	3.32 V	12	51.5	10.5
6	7311.00	52.9 AV	54.0	-1.1	3.32 V	12	42.4	10.5

REMARKS:

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

CHANNEL	TX Channel 11	DETECTOR 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	111.7 PK			1.57 H	308	76.4	35.3
2	*2462.00	108.2 AV			1.57 H	308	72.9	35.3
3	2483.50	62.7 PK	74.0	-11.3	1.68 H	316	27.3	35.4
4	2483.50	52.4 AV	54.0	-1.6	1.68 H	316	17.0	35.4
5	4924.00	53.3 PK	74.0	-20.7	1.69 H	309	48.7	4.6
6	4924.00	46.4 AV	54.0	-7.6	1.69 H	309	41.8	4.6
7	7386.00	59.7 PK	74.0	-14.3	1.98 H	36	49.3	10.4
8	7386.00	51.0 AV	54.0	-3.0	1.98 H	36	40.6	10.4
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	*2462.00	110.9 PK			3.87 V	42	75.6	35.3
2	*2462.00	107.3 AV			3.87 V	42	72.0	35.3
3	2483.50	62.1 PK	74.0	-11.9	3.64 V	68	26.7	35.4
4	2483.50	51.9 AV	54.0	-2.1	3.64 V	68	16.5	35.4
5	4924.00	53.3 PK	74.0	-20.7	1.31 V	346	48.7	4.6
6	4924.00	47.0 AV	54.0	-7.0	1.31 V	346	42.4	4.6
7	7386.00	61.7 PK	74.0	-12.3	3.42 V	16	51.3	10.4
8	7386.00	52.6 AV	54.0	-1.4	3.42 V	16	42.2	10.4

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)
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	72.2 PK	74.0	-1.8	1.76 H	319	37.2	35.0
2	2390.00	52.8 AV	54.0	-1.2	1.76 H	319	17.8	35.0
3	*2412.00	110.7 PK			1.65 H	60	75.7	35.0
4	*2412.00	101.6 AV			1.65 H	60	66.6	35.0
5	4824.00	50.0 PK	74.0	-24.0	2.02 H	318	45.8	4.2
6	4824.00	36.8 AV	54.0	-17.2	2.02 H	318	32.6	4.2
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	70.3 PK	74.0	-3.7	1.64 V	319	35.3	35.0
2	2390.00	50.0 AV	54.0	-4.0	1.64 V	319	15.0	35.0
3	*2412.00	108.3 PK			3.96 V	27	73.3	35.0
4	*2412.00	99.1 AV			3.96 V	27	64.1	35.0
5	4824.00	49.6 PK	74.0	-24.4	1.55 V	330	45.4	4.2
6	4824.00	36.4 AV	54.0	-17.6	1.55 V	330	32.2	4.2

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)
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	66.4 PK	74.0	-7.6	1.55 H	297	31.4	35.0
2	2390.00	52.8 AV	54.0	-1.2	1.55 H	297	17.8	35.0
3	*2437.00	111.4 PK			1.79 H	68	76.2	35.2
4	*2437.00	102.5 AV			1.79 H	68	67.3	35.2
5	2483.50	66.7 PK	74.0	-7.3	1.55 H	321	31.3	35.4
6	2483.50	52.3 AV	54.0	-1.7	1.55 H	321	16.9	35.4
7	4874.00	49.9 PK	74.0	-24.1	1.83 H	304	45.5	4.4
8	4874.00	36.9 AV	54.0	-17.1	1.83 H	304	32.5	4.4
9	7311.00	63.3 PK	74.0	-10.7	2.29 H	41	52.8	10.5
10	7311.00	49.7 AV	54.0	-4.3	2.29 H	41	39.2	10.5
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	67.2 PK	74.0	-6.8	3.81 V	360	32.2	35.0
2	**2390.00**	**53.0 AV**	**54.0**	**-1.0**	**3.81 V**	**360**	**18.0**	**35.0**
3	*2437.00	109.7 PK			4.00 V	6	74.5	35.2
4	*2437.00	100.5 AV			4.00 V	6	65.3	35.2
5	2483.50	65.5 PK	74.0	-8.5	3.89 V	6	30.1	35.4
6	2483.50	50.9 AV	54.0	-3.1	3.89 V	6	15.5	35.4
7	4874.00	49.5 PK	74.0	-24.5	1.48 V	328	45.1	4.4
8	4874.00	37.1 AV	54.0	-16.9	1.48 V	328	32.7	4.4
9	7311.00	63.6 PK	74.0	-10.4	3.17 V	41	53.1	10.5
10	7311.00	50.6 AV	54.0	-3.4	3.17 V	41	40.1	10.5

REMARKS:

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

CHANNEL	TX Channel 11	DETECTOR 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	109.5 PK			2.01 H	65	74.2	35.3
2	*2462.00	100.3 AV			2.01 H	65	65.0	35.3
3	2483.50	71.3 PK	74.0	-2.7	1.97 H	318	35.9	35.4
4	2483.50	52.9 AV	54.0	-1.1	1.97 H	318	17.5	35.4
5	4924.00	50.4 PK	74.0	-23.6	1.94 H	300	45.8	4.6
6	4924.00	36.5 AV	54.0	-17.5	1.94 H	300	31.9	4.6
7	7386.00	59.2 PK	74.0	-14.8	2.76 H	39	48.8	10.4
8	7386.00	45.2 AV	54.0	-8.8	2.76 H	39	34.8	10.4
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	*2462.00	110.0 PK			3.86 V	14	74.7	35.3
2	*2462.00	100.6 AV			3.86 V	14	65.3	35.3
3	2483.50	71.5 PK	74.0	-2.5	3.89 V	6	36.1	35.4
4	2483.50	52.6 AV	54.0	-1.4	3.89 V	6	17.2	35.4
5	4924.00	50.3 PK	74.0	-23.7	1.44 V	322	45.7	4.6
6	4924.00	36.6 AV	54.0	-17.4	1.44 V	322	32.0	4.6
7	7386.00	60.0 PK	74.0	-14.0	3.22 V	35	49.6	10.4
8	7386.00	45.5 AV	54.0	-8.5	3.22 V	35	35.1	10.4

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)
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	71.6 PK	74.0	-2.4	1.69 H	300	36.6	35.0
2	2390.00	49.5 AV	54.0	-4.5	1.69 H	300	14.5	35.0
3	*2412.00	109.6 PK			1.68 H	57	74.6	35.0
4	*2412.00	100.6 AV			1.68 H	57	65.6	35.0
5	4824.00	49.3 PK	74.0	-24.7	1.71 H	327	45.1	4.2
6	4824.00	35.5 AV	54.0	-18.5	1.71 H	327	31.3	4.2
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**	**73.0 PK**	**74.0**	**-1.0**	**3.81 V**	**9**	**38.0**	**35.0**
2	2390.00	50.0 AV	54.0	-4.0	3.81 V	9	15.0	35.0
3	*2412.00	109.5 PK			3.97 V	43	74.5	35.0
4	*2412.00	98.9 AV			3.97 V	43	63.9	35.0
5	4824.00	49.4 PK	74.0	-24.6	1.59 V	321	45.2	4.2
6	4824.00	35.7 AV	54.0	-18.3	1.59 V	321	31.5	4.2

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)
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	72.3 PK	74.0	-1.7	1.43 H	309	37.3	35.0
2	2390.00	52.8 AV	54.0	-1.2	1.43 H	309	17.8	35.0
3	*2437.00	111.5 PK			1.63 H	72	76.3	35.2
4	*2437.00	102.4 AV			1.63 H	72	67.2	35.2
5	2483.50	69.9 PK	74.0	-4.1	1.78 H	320	34.5	35.4
6	2483.50	51.2 AV	54.0	-2.8	1.78 H	320	15.8	35.4
7	4874.00	49.5 PK	74.0	-24.5	1.77 H	301	45.1	4.4
8	4874.00	36.0 AV	54.0	-18.0	1.77 H	301	31.6	4.4
9	7311.00	62.5 PK	74.0	-11.5	2.60 H	44	52.0	10.5
10	7311.00	47.1 AV	54.0	-6.9	2.60 H	44	36.6	10.5
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	4.00 V	31	37.7	35.0
2	2390.00	52.8 AV	54.0	-1.2	4.00 V	31	17.8	35.0
3	*2437.00	111.9 PK			3.64 V	22	76.7	35.2
4	*2437.00	101.9 AV			3.64 V	22	66.7	35.2
5	2483.50	72.6 PK	74.0	-1.4	3.89 V	6	37.2	35.4
6	2483.50	51.3 AV	54.0	-2.7	3.89 V	6	15.9	35.4
7	4874.00	49.6 PK	74.0	-24.4	1.78 V	329	45.2	4.4
8	4874.00	36.2 AV	54.0	-17.8	1.78 V	329	31.8	4.4
9	7311.00	63.6 PK	74.0	-10.4	2.83 V	33	53.1	10.5
10	7311.00	48.5 AV	54.0	-5.5	2.83 V	33	38.0	10.5

REMARKS:

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

CHANNEL	TX Channel 11	DETECTOR 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	108.9 PK			1.73 H	66	73.6	35.3
2	*2462.00	98.8 AV			1.73 H	66	63.5	35.3
3	2483.50	72.5 PK	74.0	-1.5	1.66 H	320	37.1	35.4
4	2483.50	50.1 AV	54.0	-3.9	1.66 H	320	14.7	35.4
5	4924.00	49.6 PK	74.0	-24.4	1.79 H	322	45.0	4.6
6	4924.00	35.9 AV	54.0	-18.1	1.79 H	322	31.3	4.6
7	7386.00	56.1 PK	74.0	-17.9	2.33 H	56	45.7	10.4
8	7386.00	41.8 AV	54.0	-12.2	2.33 H	56	31.4	10.4
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	*2462.00	108.4 PK			3.96 V	33	73.1	35.3
2	*2462.00	98.1 AV			3.96 V	33	62.8	35.3
3	2483.50	72.8 PK	74.0	-1.2	3.99 V	3	37.4	35.4
4	2483.50	50.6 AV	54.0	-3.4	3.99 V	3	15.2	35.4
5	4924.00	49.8 PK	74.0	-24.2	1.80 V	312	45.2	4.6
6	4924.00	36.1 AV	54.0	-17.9	1.80 V	312	31.5	4.6
7	7386.00	58.1 PK	74.0	-15.9	2.49 V	26	47.7	10.4
8	7386.00	43.0 AV	54.0	-11.0	2.49 V	26	32.6	10.4

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)
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 1	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	30.00	26.0 QP	40.0	-14.0	2.00 H	281	41.6	-15.6
2	49.40	28.5 QP	40.0	-11.5	2.00 H	15	42.1	-13.6
3	142.52	31.9 QP	43.5	-11.6	1.50 H	278	45.7	-13.8
4	375.32	33.4 QP	46.0	-12.6	1.00 H	144	42.7	-9.3
5	534.40	35.1 QP	46.0	-10.9	1.50 H	169	40.9	-5.8
6	625.58	42.6 QP	46.0	-3.4	1.24 H	165	45.7	-3.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	30.12	35.9 QP	40.0	-4.1	1.00 V	1	51.5	-15.6
2	101.78	32.9 QP	43.5	-10.6	1.00 V	314	51.2	-18.3
3	204.60	29.3 QP	43.5	-14.2	1.00 V	144	45.3	-16.0
4	375.32	31.7 QP	46.0	-14.3	1.00 V	164	41.0	-9.3
5	532.46	32.2 QP	46.0	-13.8	1.00 V	160	38.0	-5.8
6	625.58	36.8 QP	46.0	-9.2	1.24 V	309	39.9	-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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

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

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 16, 2015	Nov. 15, 2016
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Dec. 26, 2015	Dec. 25, 2016
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 26, 2016	Feb. 25, 2017
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 28, 2016	Jul. 27, 2017
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Shielded Room 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.

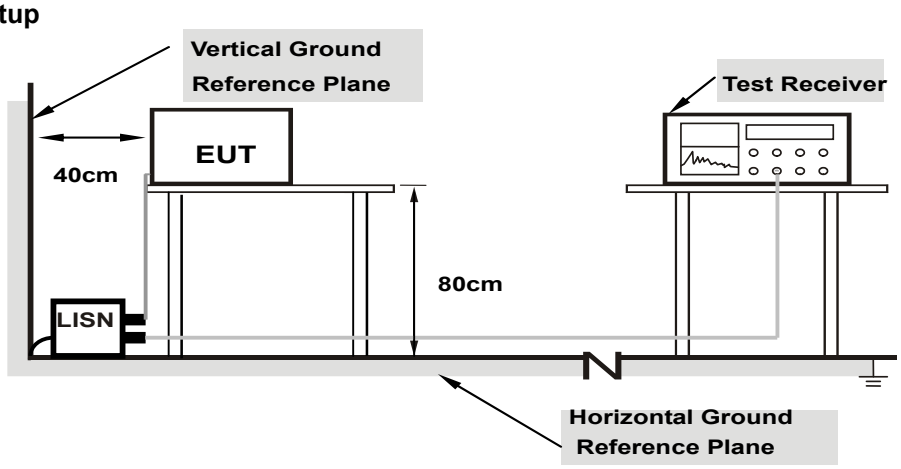
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

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.

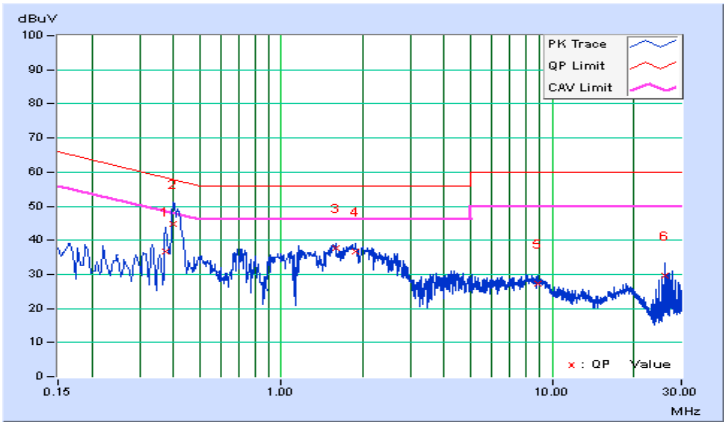
4.2.7 Test Results

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

No	Freq.	Corr. 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	0.37304	10.11	26.70	17.94	36.81	28.05	58.43	48.43	-21.62	-20.38
2	0.40055	10.12	34.79	25.52	44.91	35.64	57.84	47.84	-12.93	-12.20
3	1.59279	10.24	27.35	20.25	37.59	30.49	56.00	46.00	-18.41	-15.51
4	1.88213	10.26	26.46	19.21	36.72	29.47	56.00	46.00	-19.28	-16.53
5	8.86539	10.67	16.73	10.41	27.40	21.08	60.00	50.00	-32.60	-28.92
6	26.00683	11.74	17.87	17.29	29.61	29.03	60.00	50.00	-30.39	-20.97

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.

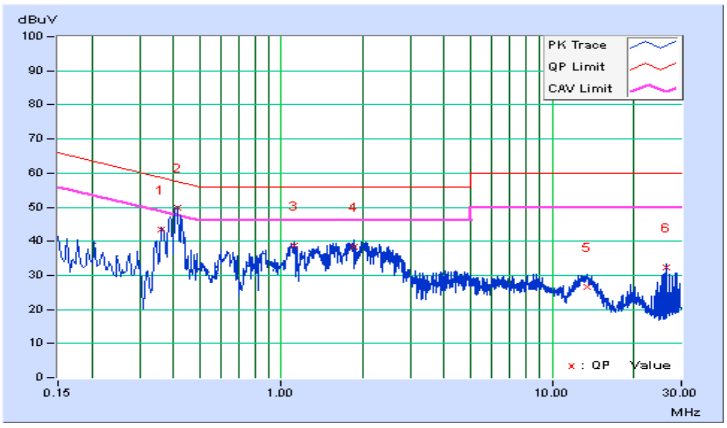


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	0.36143	10.11	33.26	30.92	43.37	41.03	58.70	48.70	-15.33	-7.67
2	**0.41560**	**10.13**	**39.56**	**32.03**	**49.69**	**42.16**	**57.54**	**47.54**	**-7.85**	**-5.38**
3	1.11968	10.22	28.44	20.32	38.66	30.54	56.00	46.00	-17.34	-15.46
4	1.86258	10.27	28.25	19.48	38.52	29.75	56.00	46.00	-17.48	-16.25
5	13.49092	11.02	15.61	10.38	26.63	21.40	60.00	50.00	-33.37	-28.60
6	26.49167	11.93	20.27	19.60	32.20	31.53	60.00	50.00	-27.80	-18.47

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.

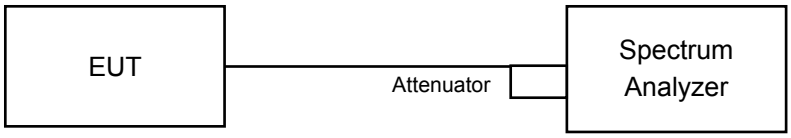


4.3 6dB Bandwidth Measurement

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 from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

1TX

802.11b

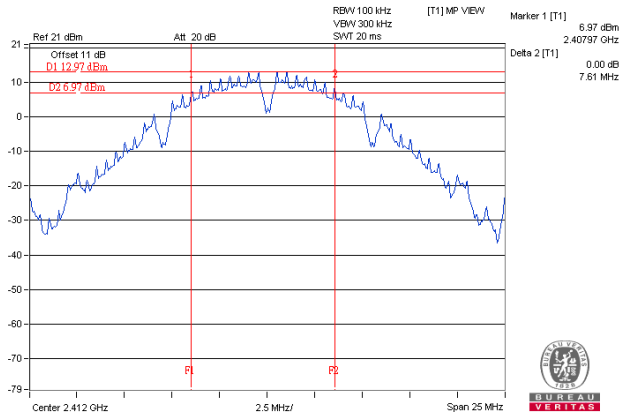
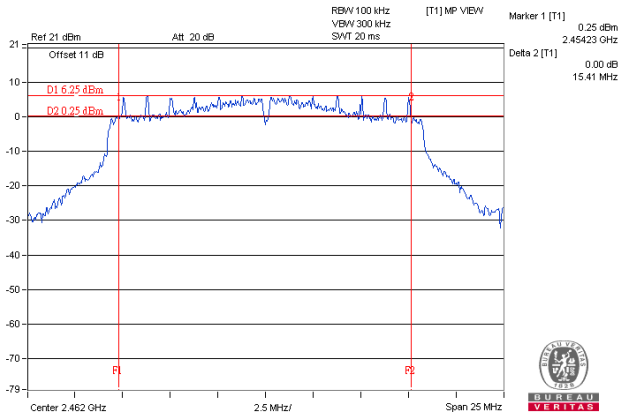
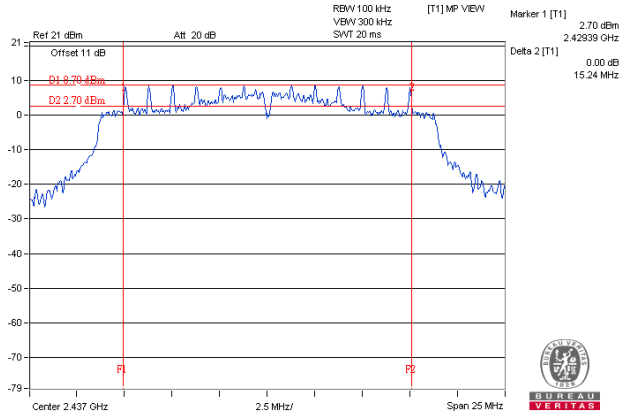
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	7.61	0.5	Pass
6	2437	7.13	0.5	Pass
11	2462	7.58	0.5	Pass

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	15.38	0.5	Pass
6	2437	15.40	0.5	Pass
11	2462	15.41	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	15.22	0.5	Pass
6	2437	15.24	0.5	Pass
11	2462	15.21	0.5	Pass

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

2TX

802.11b

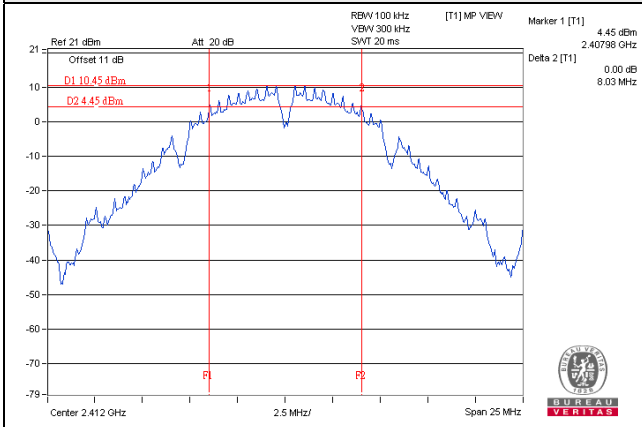
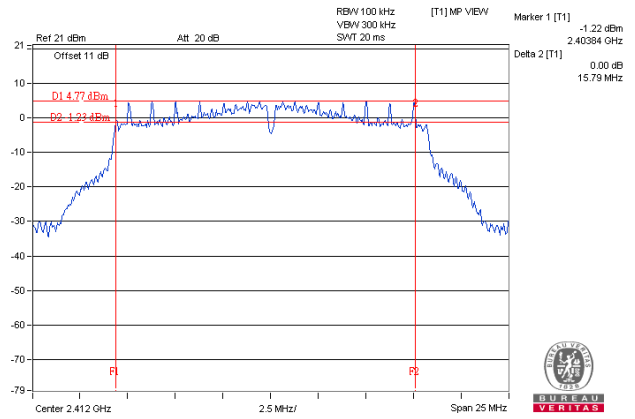
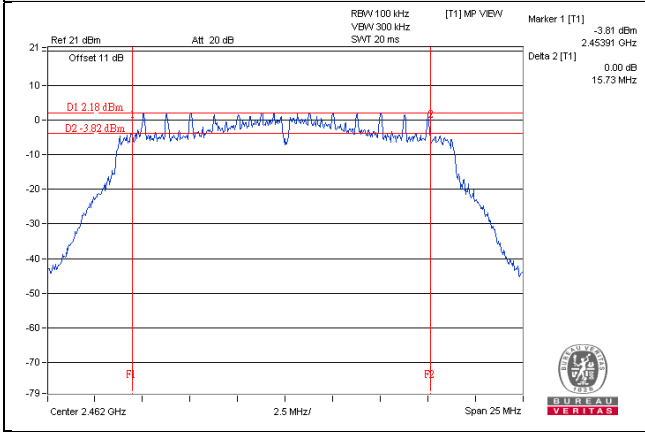
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	8.03	7.59	0.5	Pass
6	2437	7.55	7.58	0.5	Pass
11	2462	7.13	7.11	0.5	Pass

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	15.21	15.79	0.5	Pass
6	2437	15.23	15.76	0.5	Pass
11	2462	15.25	15.77	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	15.25	15.45	0.5	Pass
6	2437	15.23	15.43	0.5	Pass
11	2462	15.24	15.73	0.5	Pass

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

4.4 Conducted Output Power Measurement

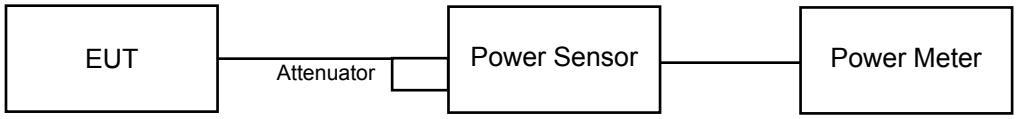
4.4.1 Limits of Conducted Output Power Measurement

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

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

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as item 4.3.6.

4.4.7 Test Results

For Average Power

CDD Mode

1TX

802.11b

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	121.339	20.84	30	Pass
6	2437	66.222	18.21	30	Pass
11	2462	69.183	18.40	30	Pass

802.11g

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	54.576	17.37	30	Pass
6	2437	95.719	19.81	30	Pass
11	2462	56.364	17.51	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	53.703	17.30	30	Pass
6	2437	72.611	18.61	30	Pass
11	2462	53.951	17.32	30	Pass

CDD Mode

2TX

802.11b

Chan.	Freq. (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	18.02	19.13	145.233	21.62	30	Pass
6	2437	17.68	18.43	128.277	21.08	30	Pass
11	2462	18.21	19.31	151.532	21.81	30	Pass

802.11g

Chan.	Freq. (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	17.21	16.03	92.689	19.67	30	Pass
6	2437	19.28	19.06	**165.261**	22.18	30	Pass
11	2462	17.32	16.95	103.496	20.15	30	Pass

802.11n (HT20)

Chan.	Freq. (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	14.02	13.31	46.664	16.69	30	Pass
6	2437	17.74	16.82	107.513	20.31	30	Pass
11	2462	12.57	12.43	35.570	15.51	30	Pass

Beamforming Mode

802.11n (HT20)

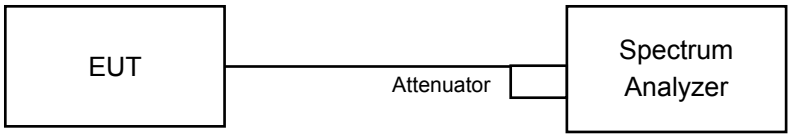
Chan.	Freq. (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	14.02	13.31	46.664	16.69	30	Pass
6	2437	17.74	16.82	**107.513**	20.31	30	Pass
11	2462	12.57	12.43	35.570	15.51	30	Pass

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

For AVG. 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 AVG. 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

1TX

802.11b

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-1.57	8	Pass
6	2437	-4.76	8	Pass
11	2462	-2.56	8	Pass

802.11g

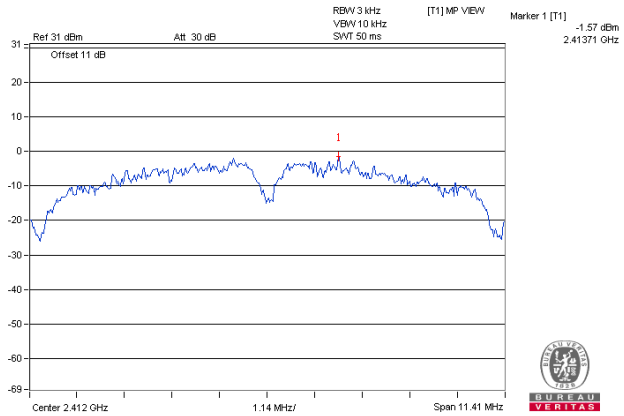
Channel	Freq. (MHz)	PSD w/o Duty Factor (dBm/10kHz)	Duty Factor (dB)	Total PSD With Duty Factor (dBm/10kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-10.24	0.14	-10.10	8	Pass
6	2437	-8.53	0.14	-8.39	8	Pass
11	2462	-10.89	0.14	-10.75	8	Pass

802.11n (HT20)

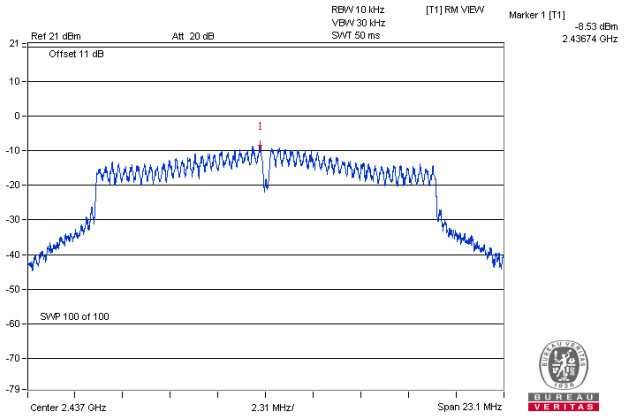
Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-7.81	8	Pass
6	2437	-6.71	8	Pass
11	2462	-7.67	8	Pass

Spectrum Plot of Worst Value

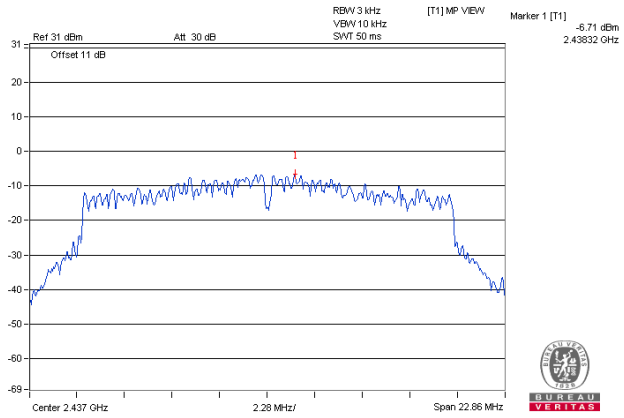
802.11b



802.11g



802.11n (HT20)



2TX

802.11b

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-4.34	3.01	-1.33	7.46	Pass
	6	2437	-3.36	3.01	-0.35	7.46	Pass
	11	2462	-3.80	3.01	-0.79	7.46	Pass
1	1	2412	-3.88	3.01	-0.87	7.46	Pass
	6	2437	-4.77	3.01	-1.76	7.46	Pass
	11	2462	-2.12	3.01	0.89	7.46	Pass

Note:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2$/N] = 6.54dBi > 6dBi, therefore the limit shall be reduced to 8-(6.54-6) = 7.46dBm.

802.11g

TX chain	Channel	Freq. (MHz)	PSD (dBm/10kHz)	10 log (N=2) dB	Duty Factor (dB)	Total PSD (dBm/10kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-11.37	3.01	0.14	-8.11	7.46	Pass
	6	2437	-9.32	3.01	0.14	-6.06	7.46	Pass
	11	2462	-10.21	3.01	0.14	-6.95	7.46	Pass
1	1	2412	-11.15	3.01	0.14	-7.89	7.46	Pass
	6	2437	-9.22	3.01	0.14	-5.96	7.46	Pass
	11	2462	-10.59	3.01	0.14	-7.33	7.46	Pass

Note:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2$/N] = 6.54dBi > 6dBi, therefore the limit shall be reduced to 8-(6.54-6) = 7.46dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

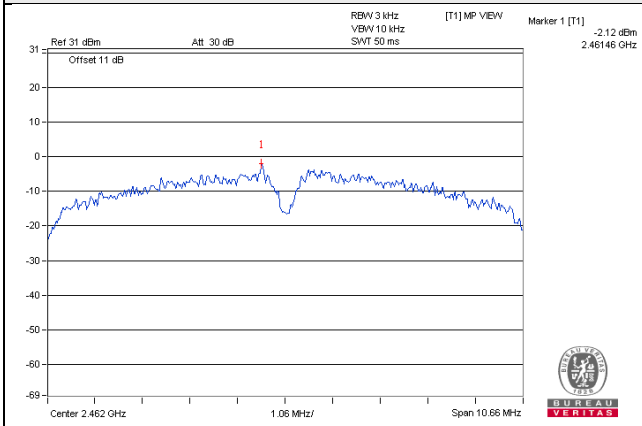
TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-8.82	3.01	-5.81	7.46	Pass
	6	2437	-6.68	3.01	-3.67	7.46	Pass
	11	2462	-10.69	3.01	-7.68	7.46	Pass
1	1	2412	-11.31	3.01	-8.30	7.46	Pass
	6	2437	-8.10	3.01	-5.09	7.46	Pass
	11	2462	-12.20	3.01	-9.19	7.46	Pass

Note:

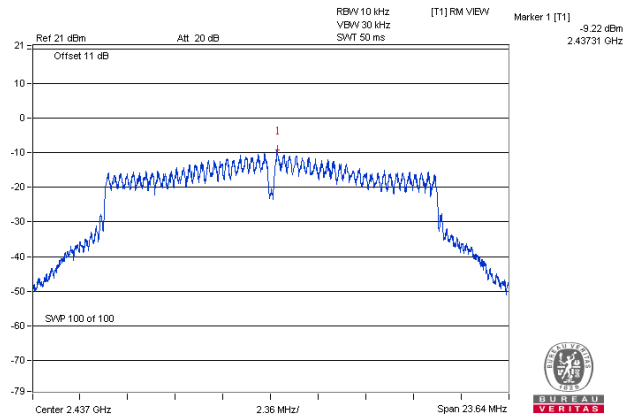
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + ... + $10^{GN/20}$)^2/N] = 6.54dBi > 6dBi, therefore the limit shall be reduced to 8-(6.54-6) = 7.46dBm.

Spectrum Plot of Worst Value

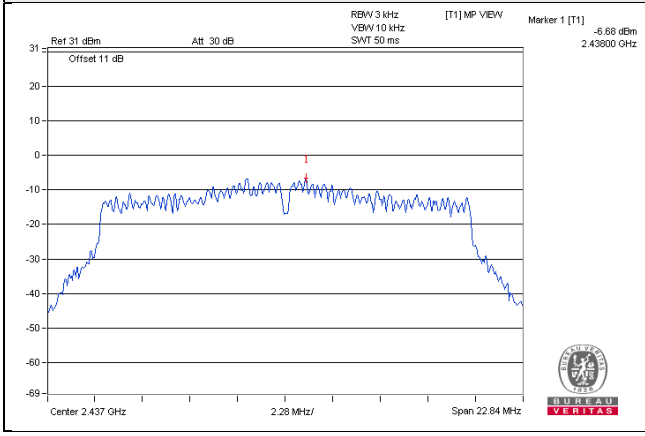
802.11b



802.11g



802.11n (HT20)

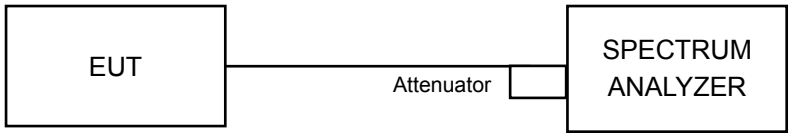


4.6 Conducted Out of Band Emission Measurement

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

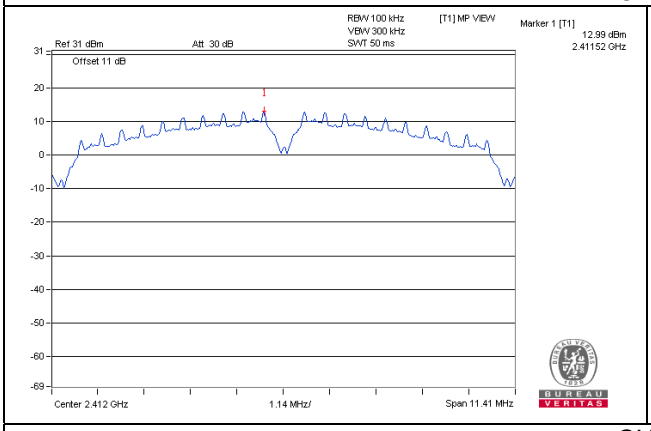
4.6.7 Test Results

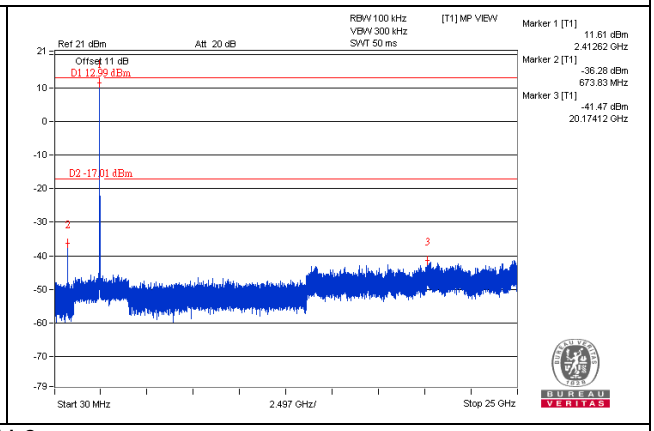
The conducted emission test is performed on each TX port of operating mode without summing or adding 10log (N) since the limit is relative emission limit.
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows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

1TX

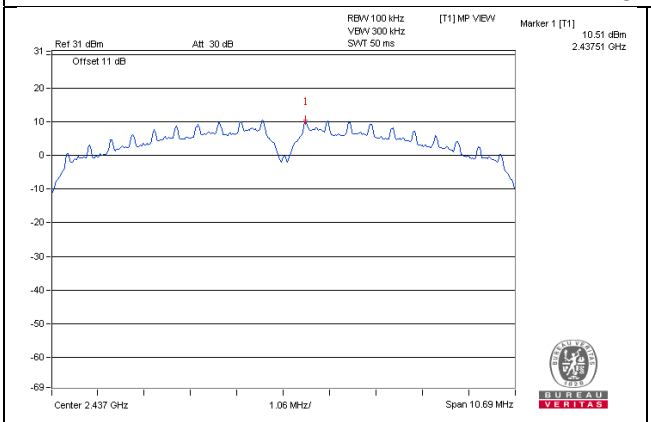
802.11b

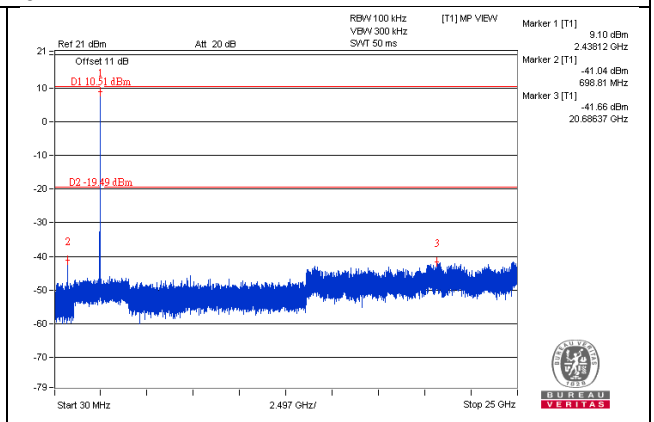
CH 1



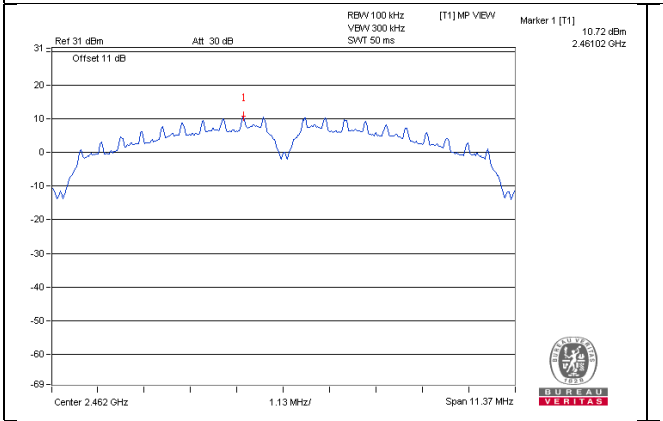


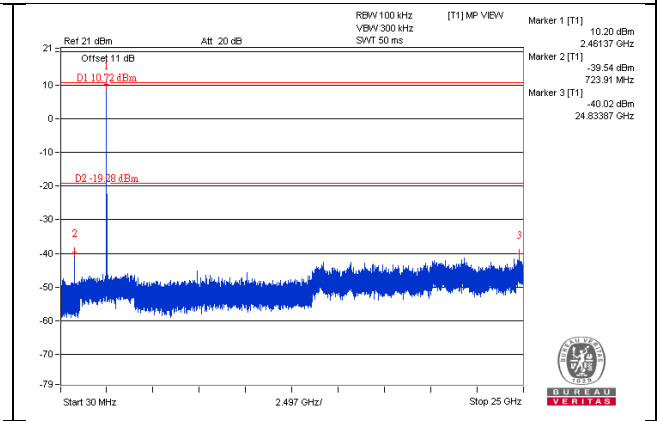
CH 6



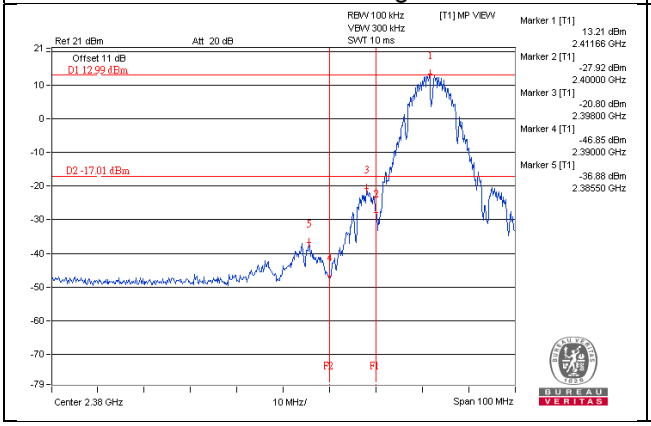


CH 11

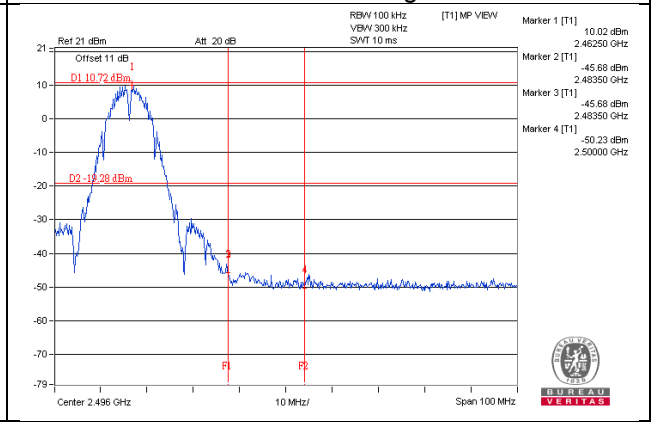




CH 1 Band edge



CH 11 Band edge



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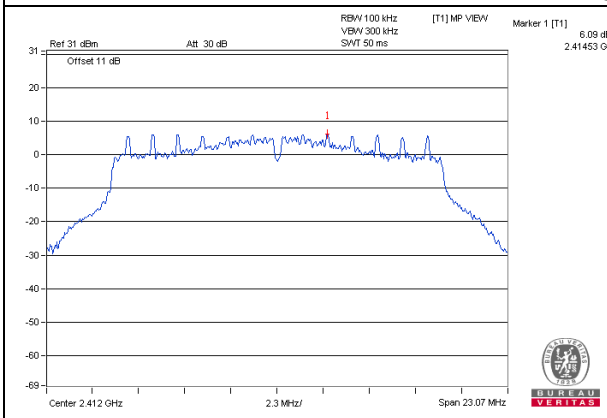
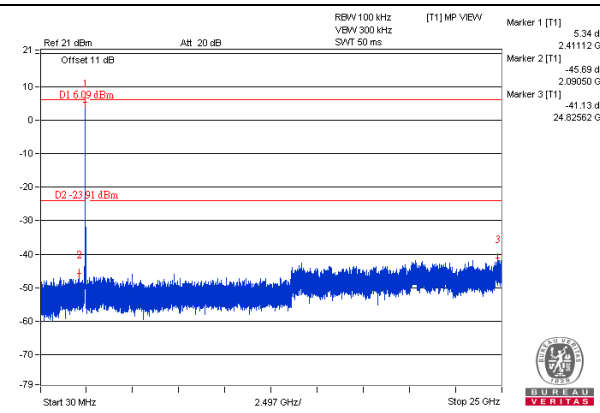
CH 1





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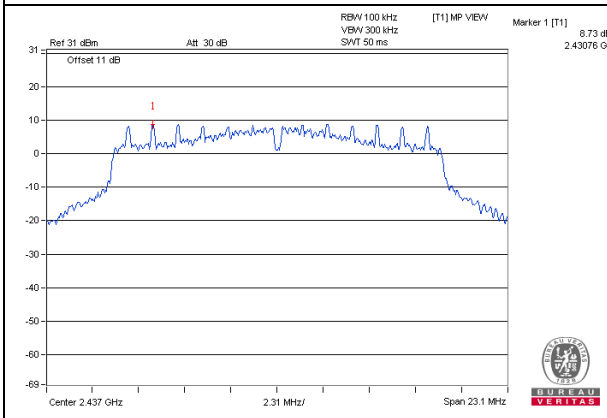
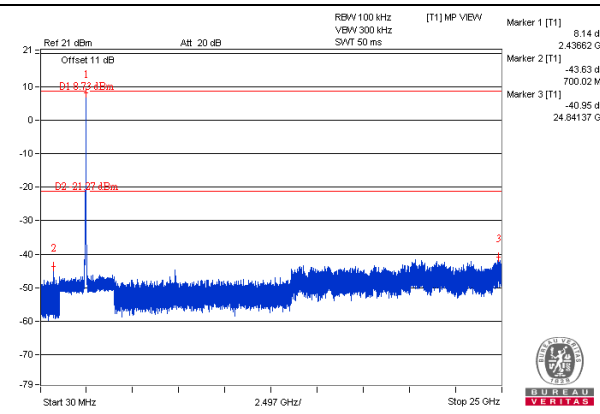
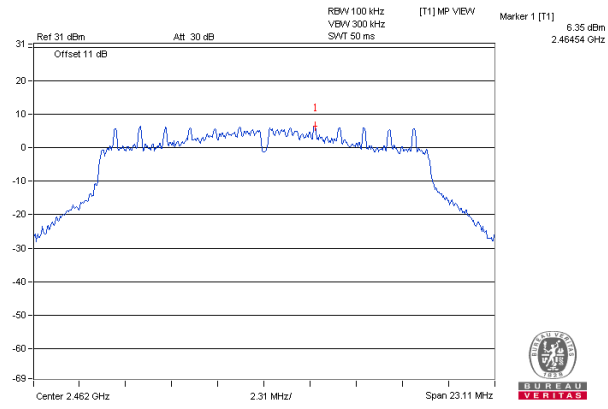
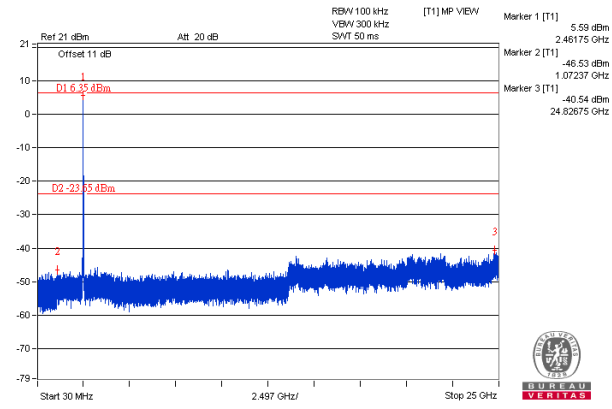


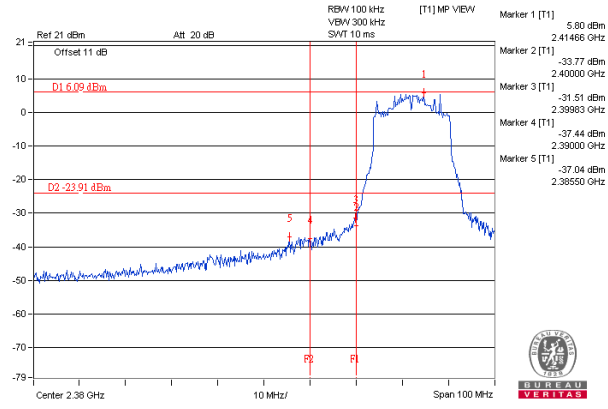


CH 11

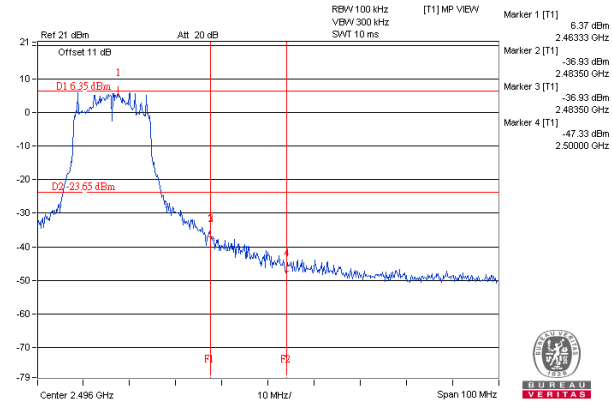




CH 1 Band edge

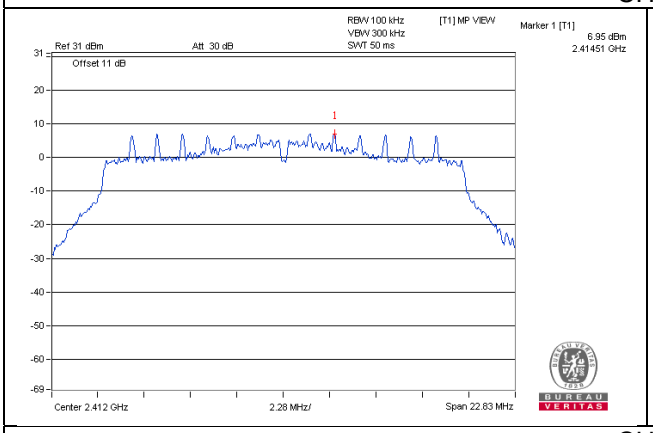


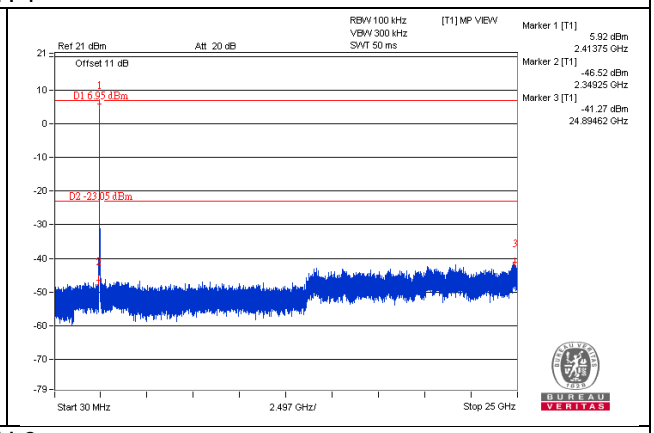
CH 11 Band edge



802.11n (HT20)

CH 1





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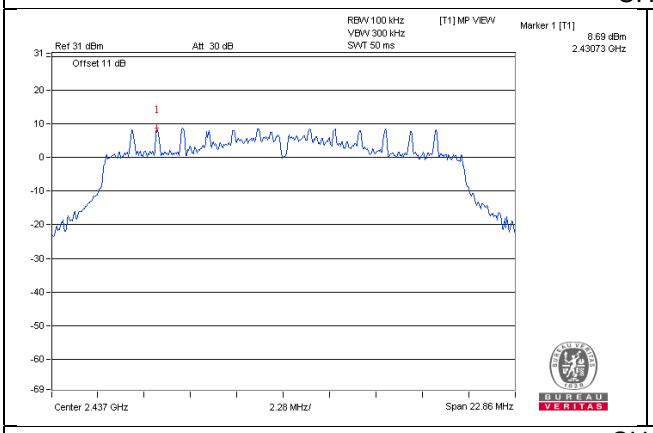

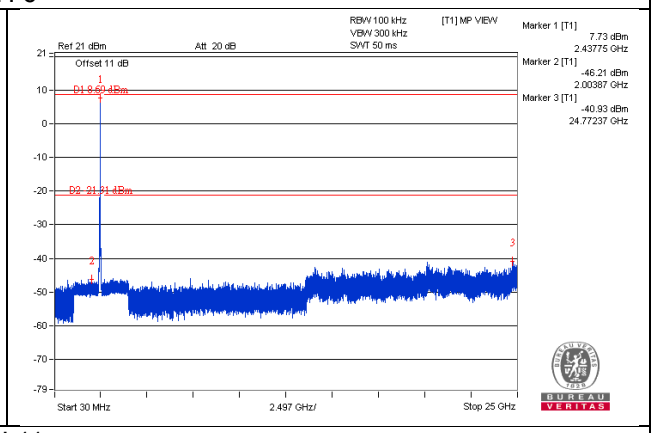

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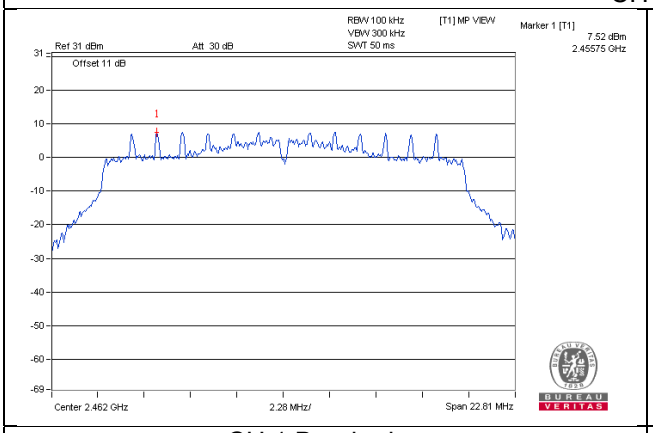
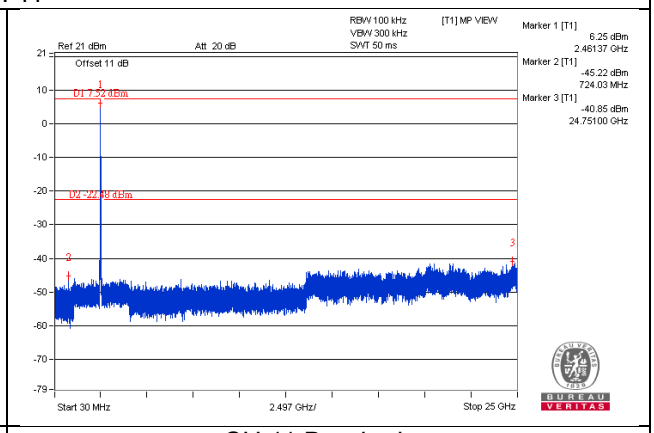
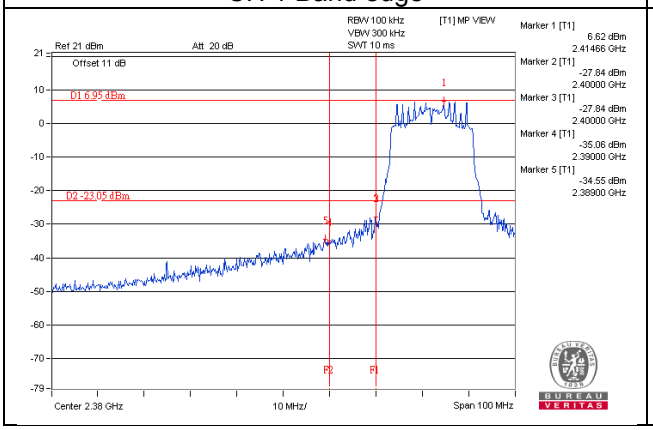




CH 1 Band edge



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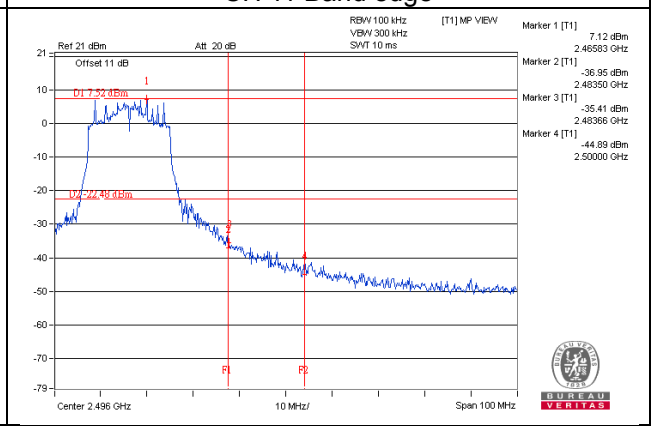

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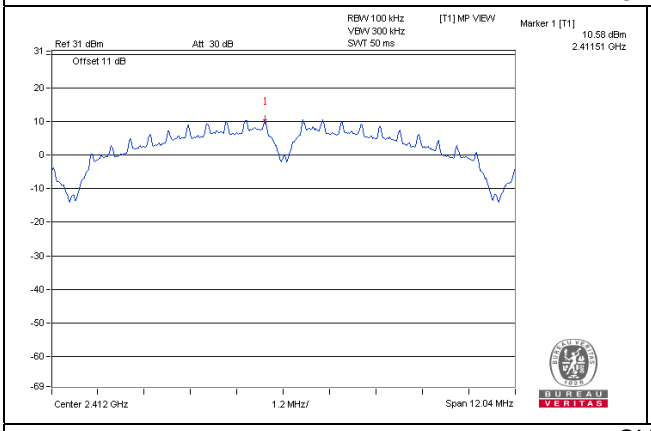
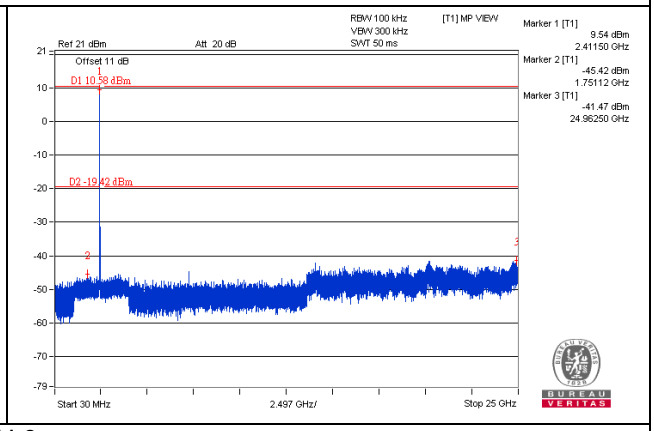
CH 1





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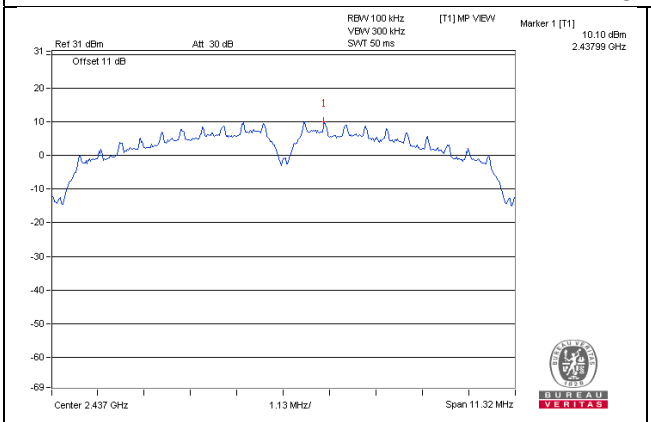

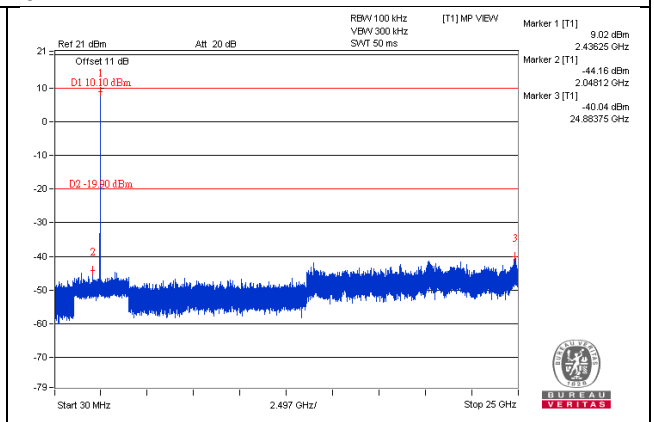

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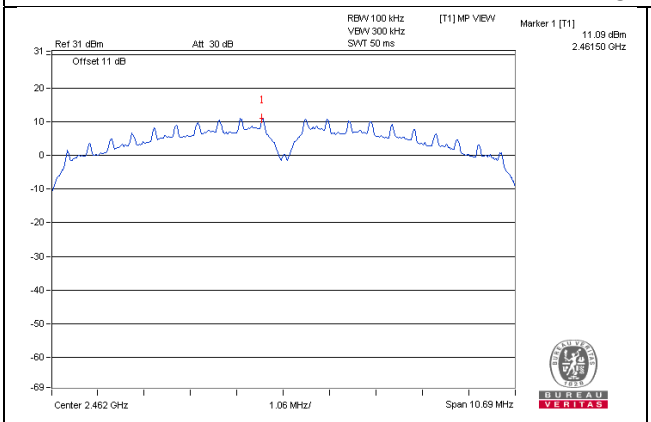
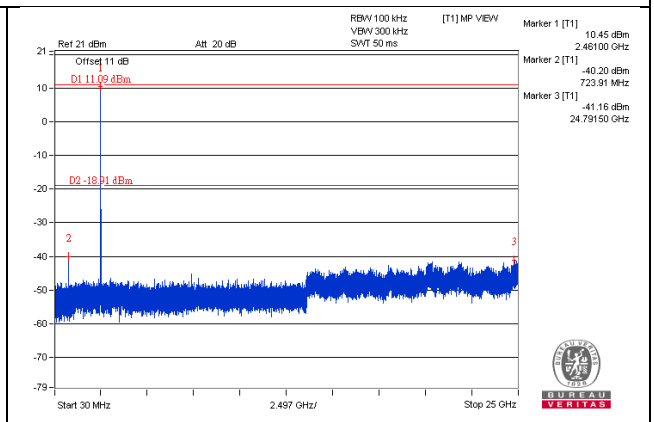
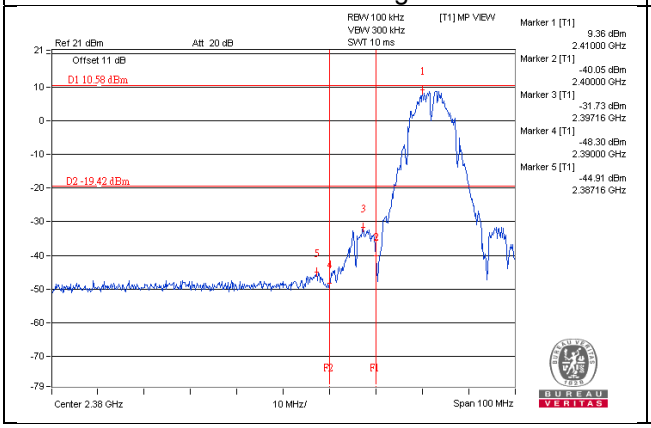




CH 1 Band edge



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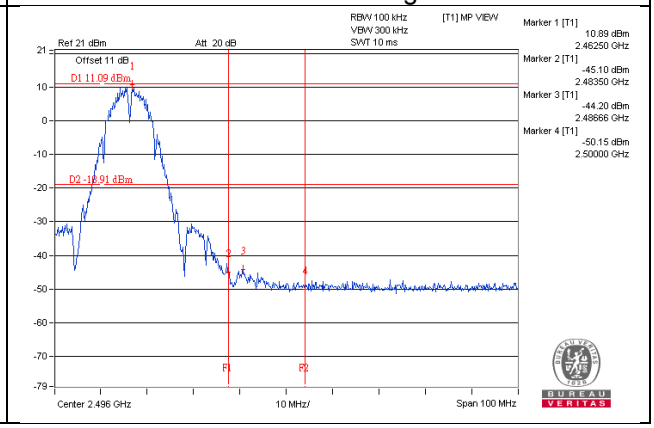

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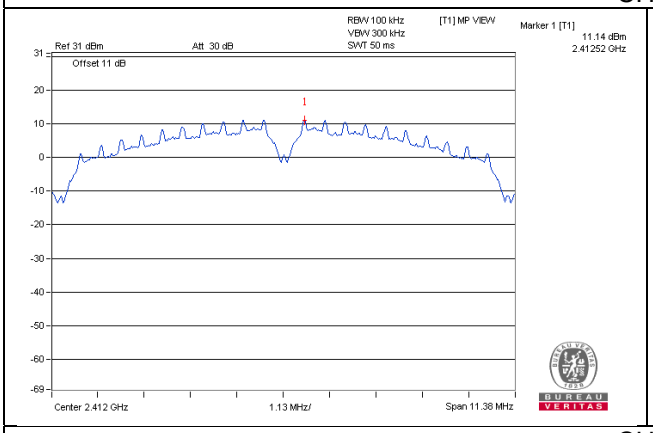
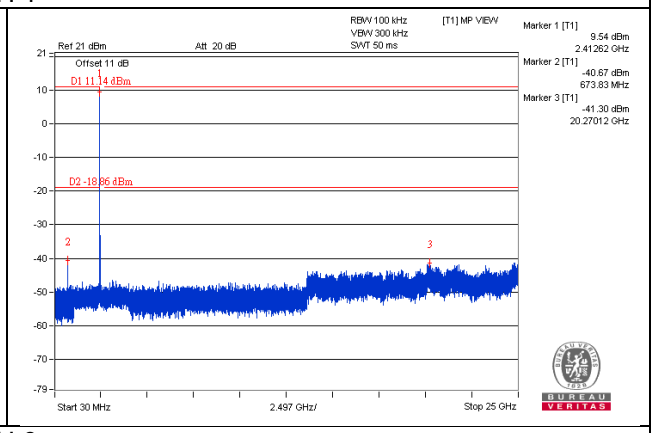
CH 1





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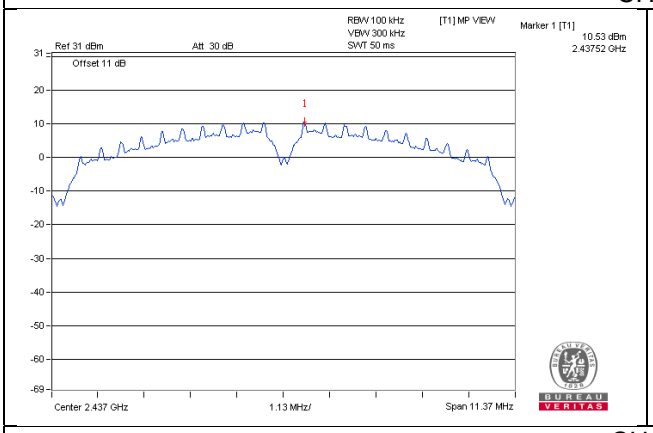

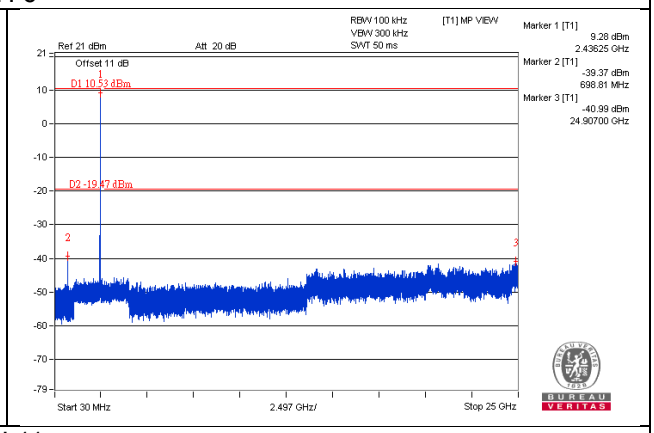

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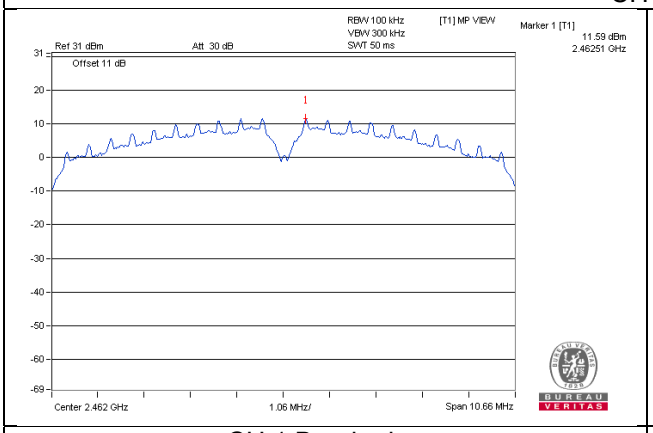
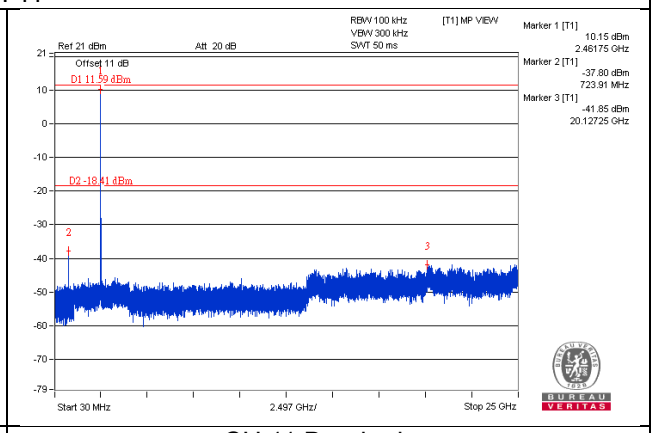
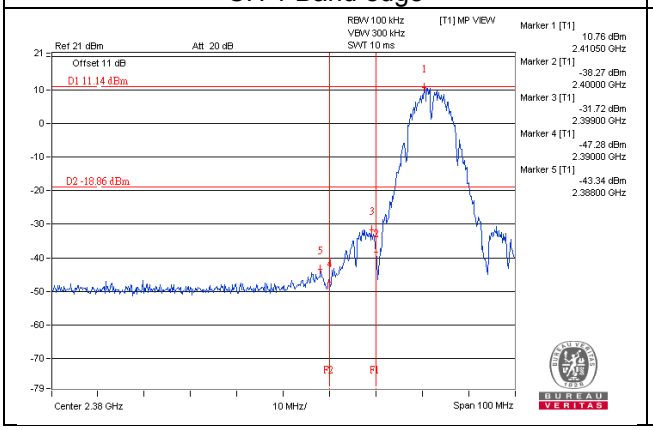




CH 1 Band edge



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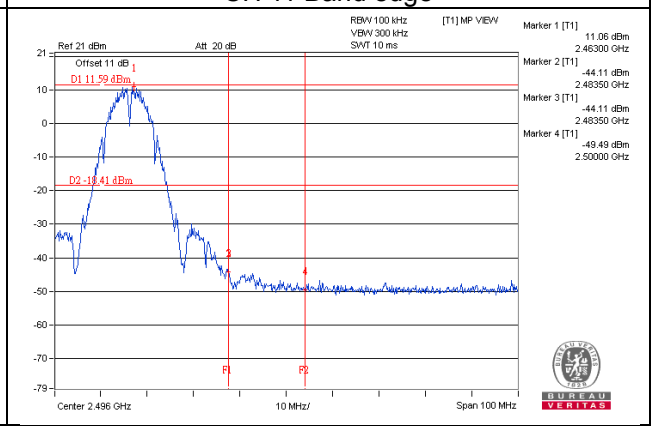

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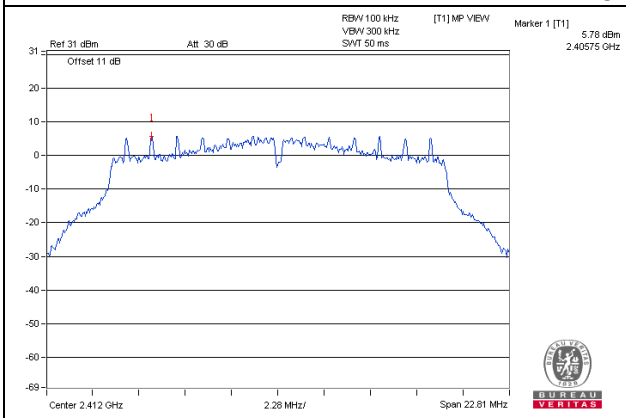
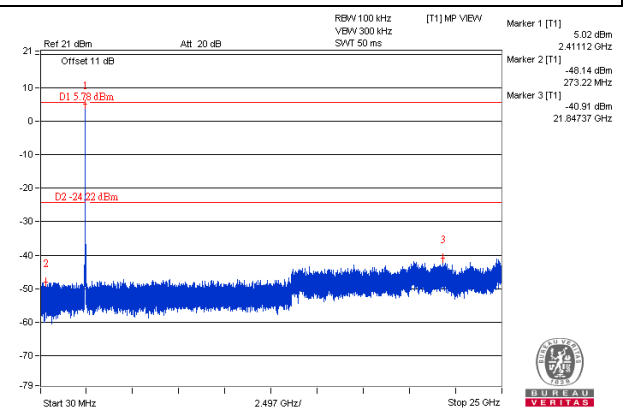
CH 1





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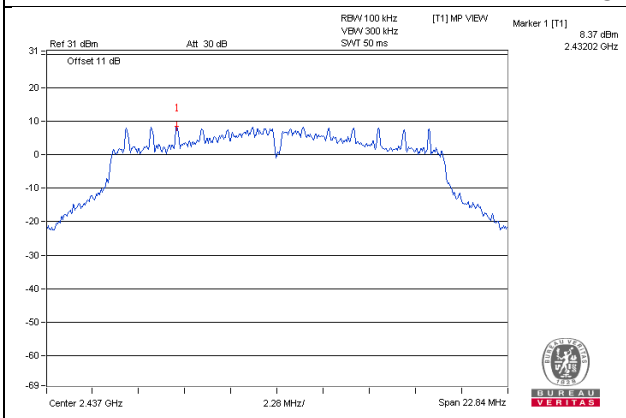

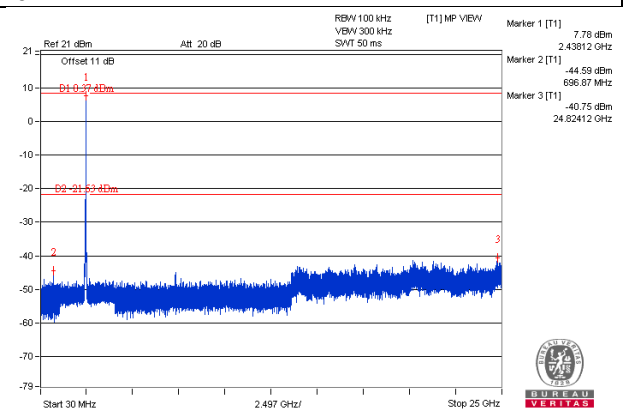

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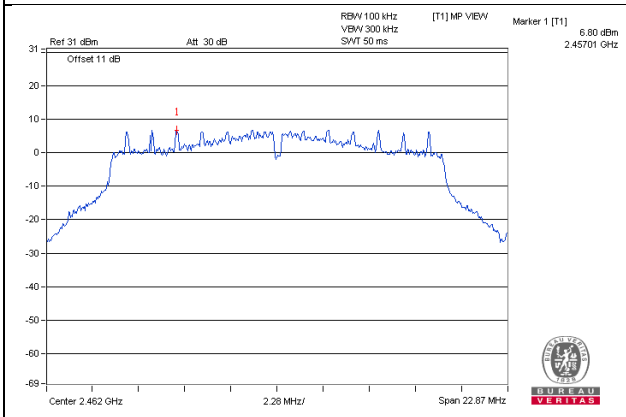
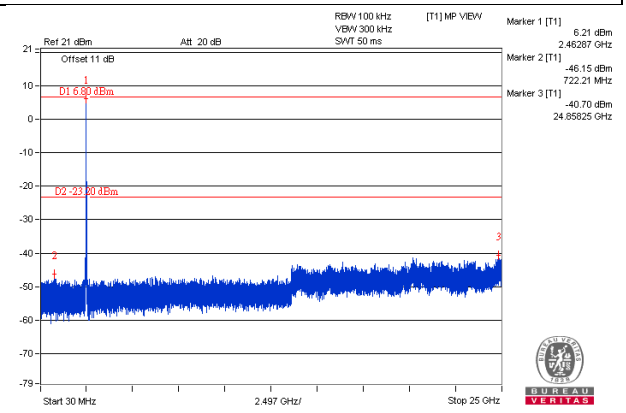
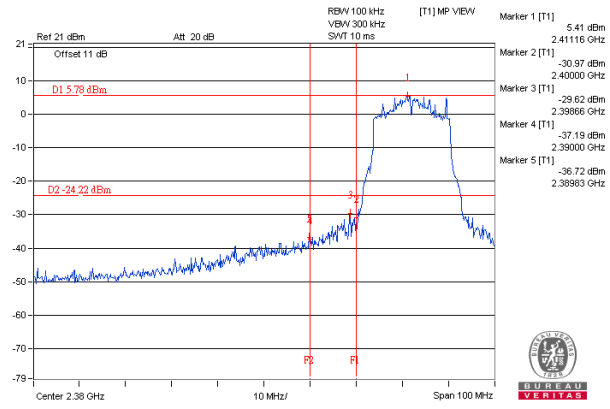
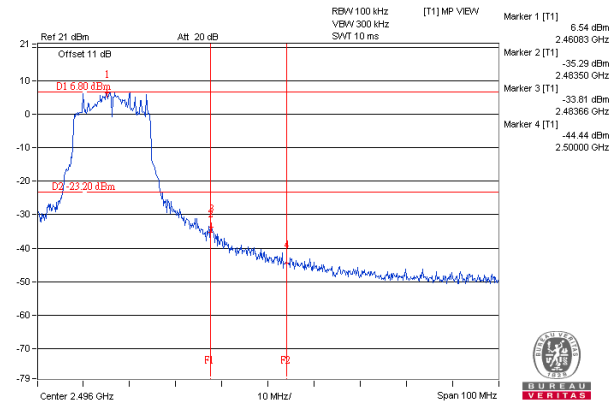




CH 1 Band edge

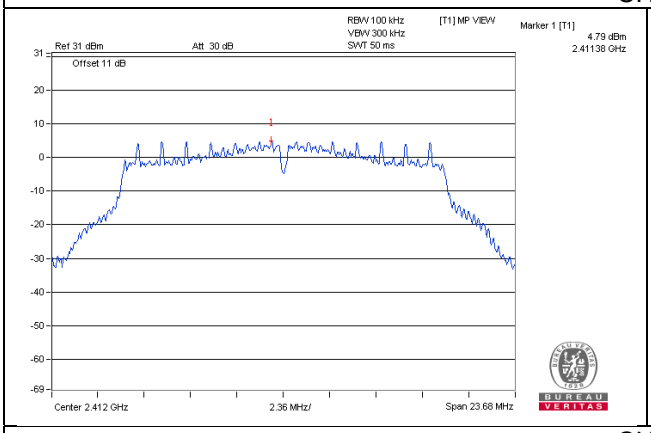


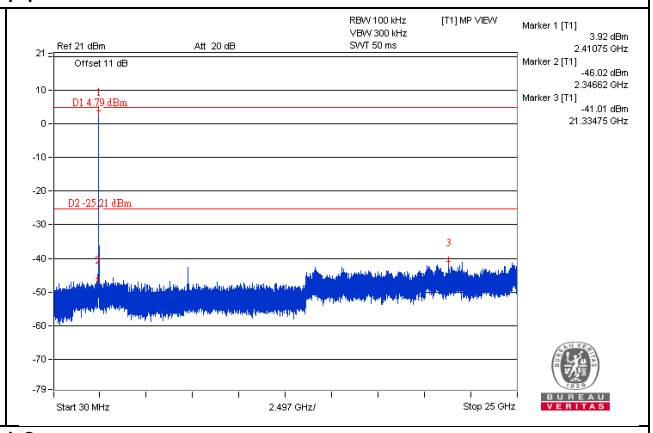
CH 11 Band edge



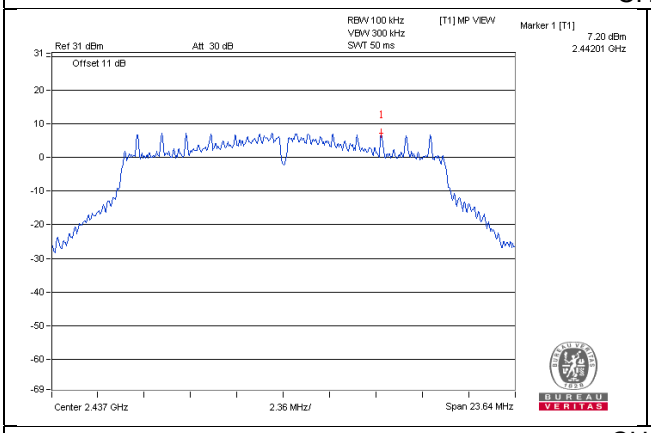
802.11g_CHAIN 1

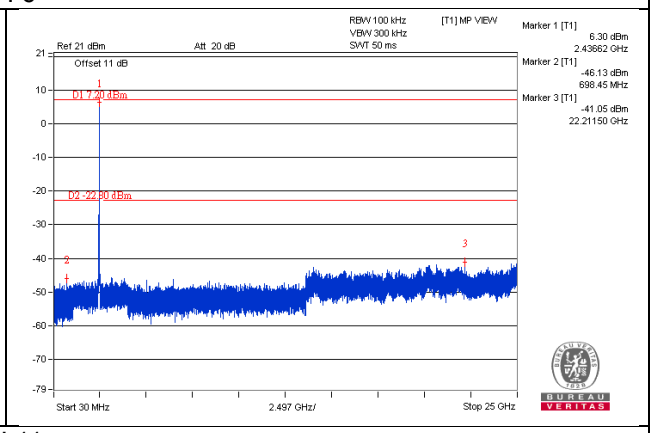
CH 1



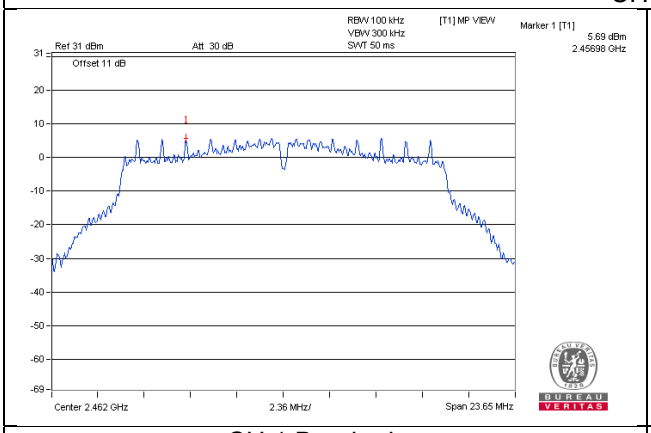


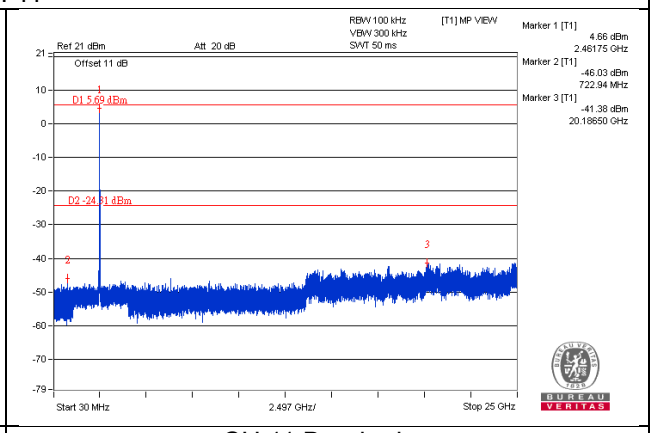
CH 6



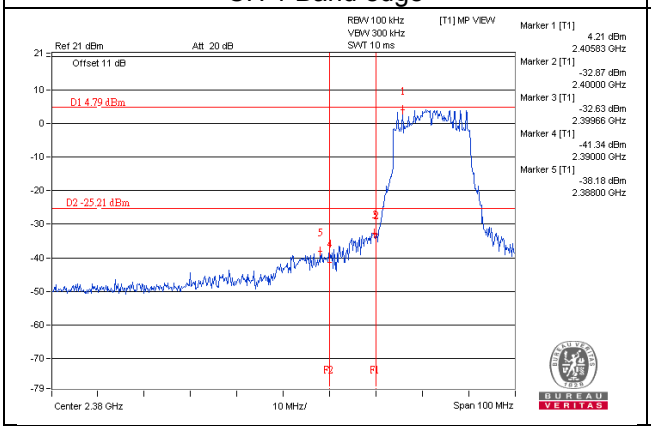


CH 11

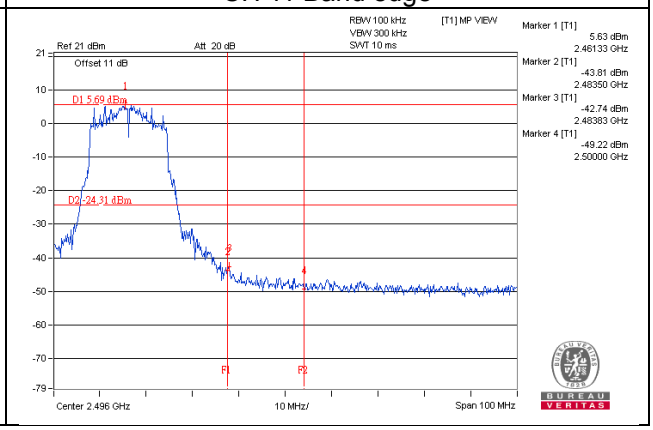




CH 1 Band edge

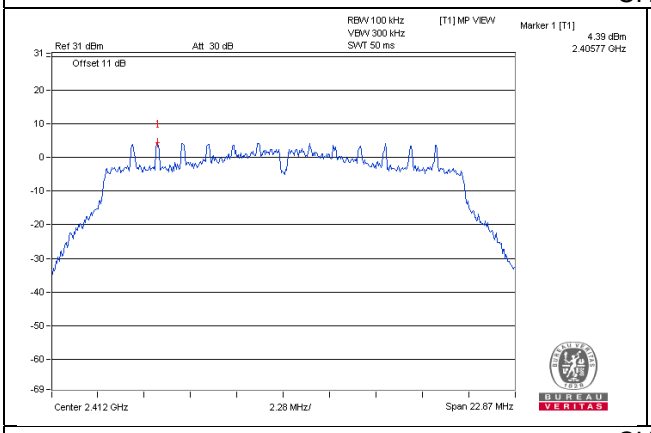


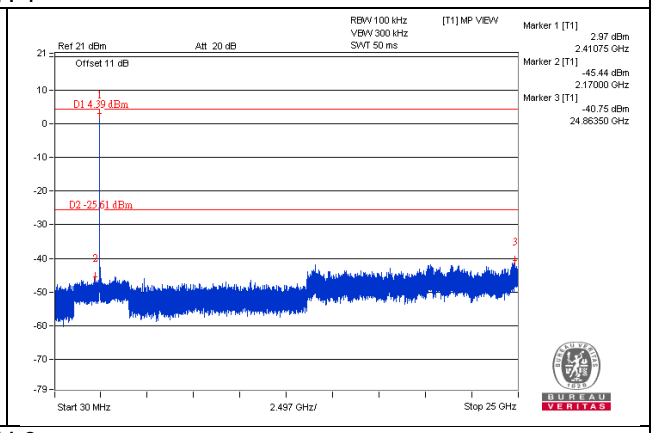
CH 11 Band edge



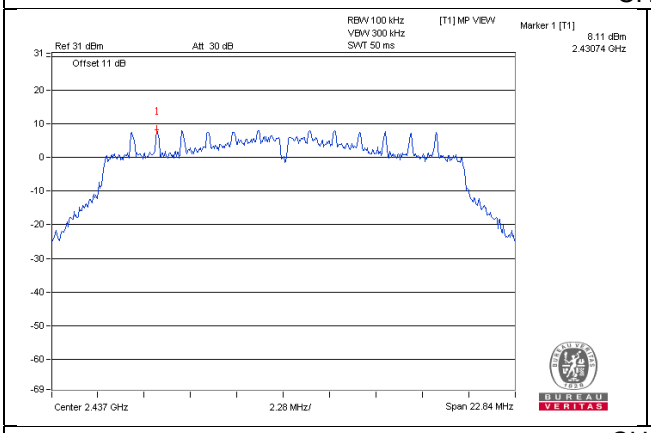
802.11n (HT20)_CHAIN 0

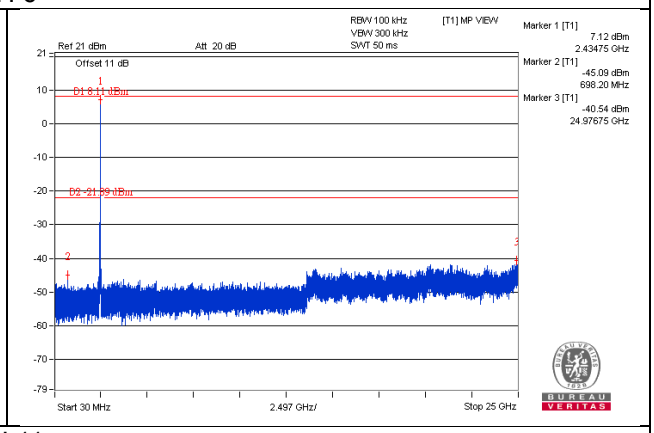
CH 1



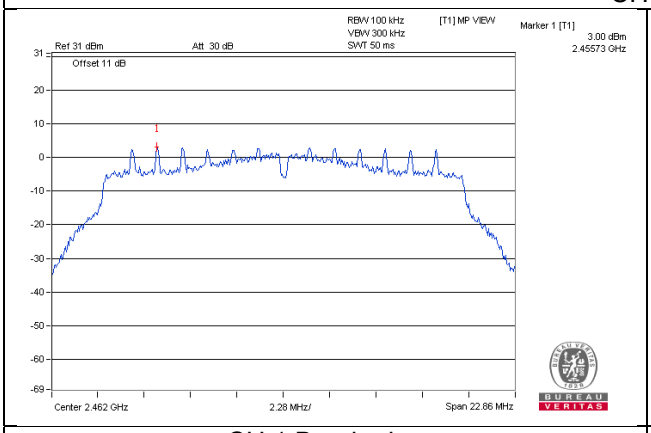


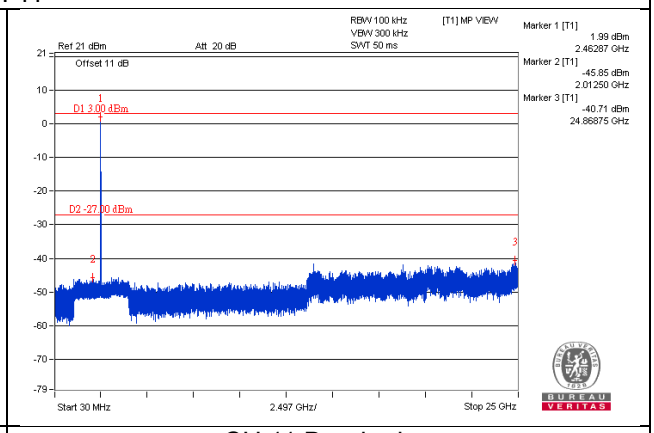
CH 6



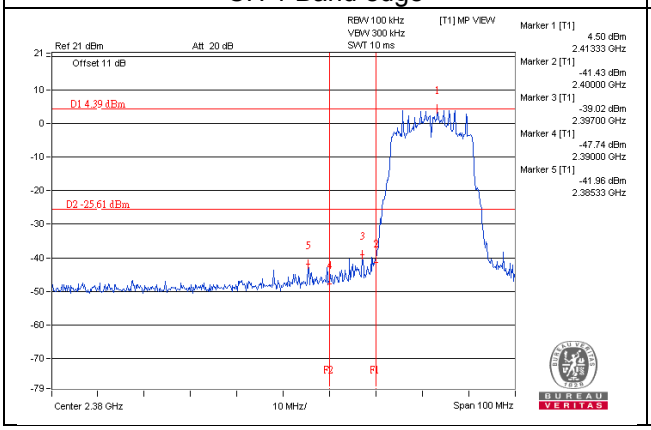


CH 11

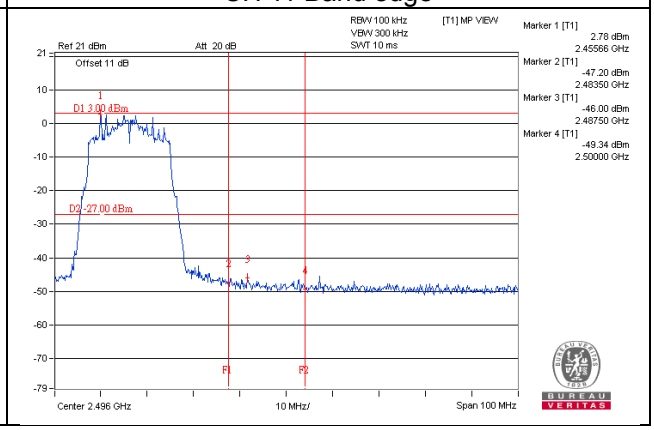




CH 1 Band edge

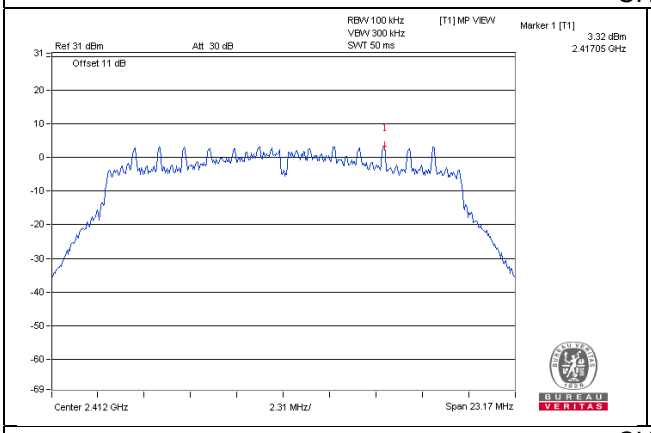


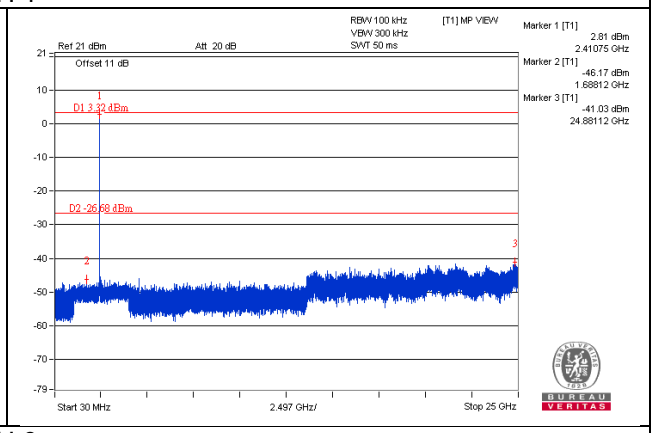
CH 11 Band edge



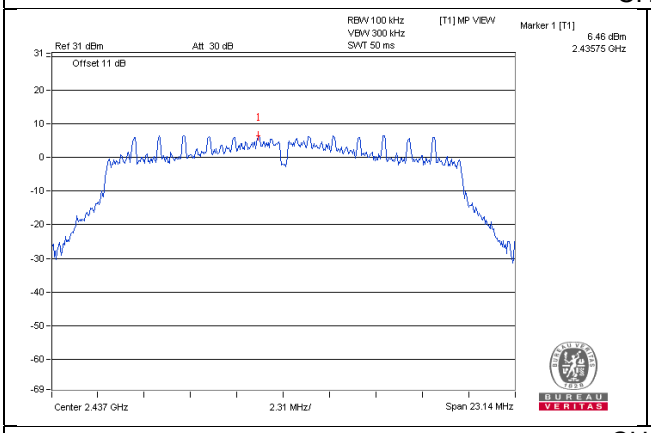
802.11n (HT20)_CHAIN 1

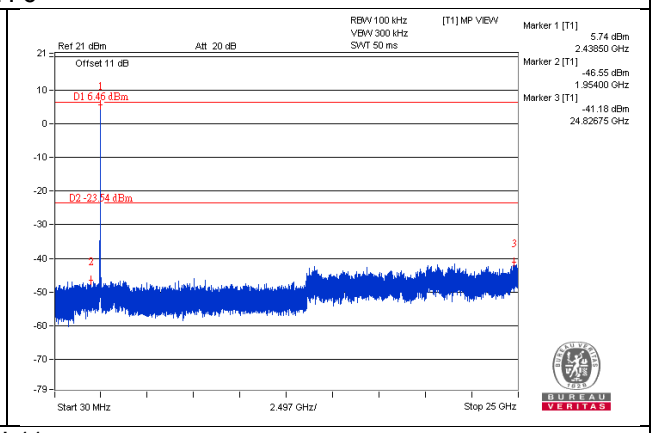
CH 1



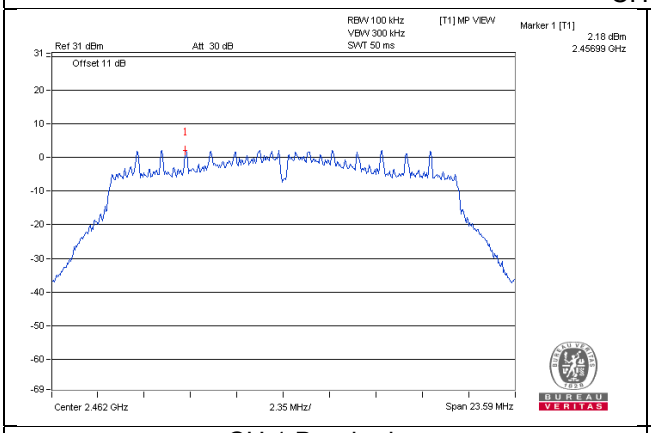


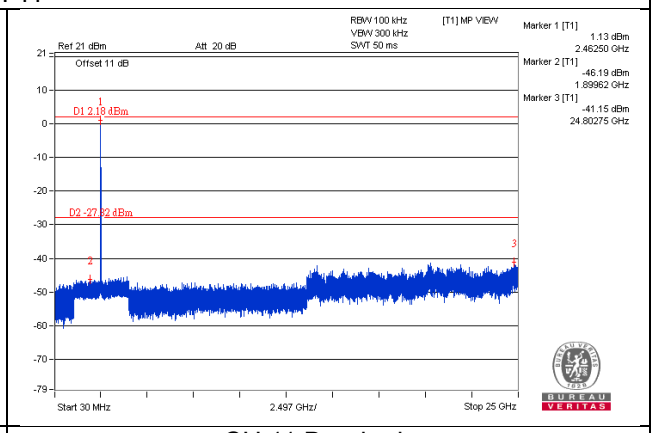
CH 6



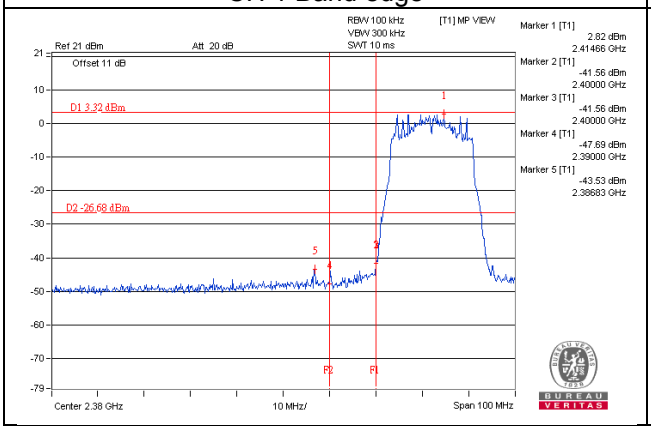


CH 11

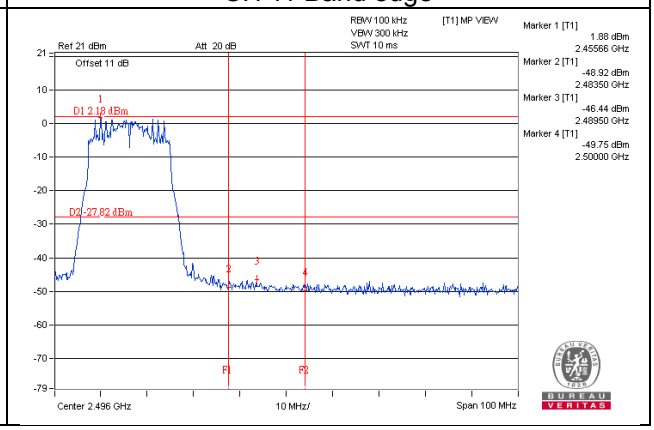




CH 1 Band edge



CH 11 Band edge



5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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

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

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