FCC Test Report

Report No.: RF180828C26A

FCC ID: RYK-WUBT236ACNBT

Test Model: WUBT-236ACN(BT) [M4W], WUBT-236ACN(BT) [PU]

Series Model: WUBT-236ACN(BT) [P4W], WUBT-236ACN(BT) [MU]

Received Date: Aug. 28, 2018

Test Date: Dec. 05, 2018 ~ Jan. 14, 2019

Issued Date: Oct. 14, 2019

Applicant: SparkLAN Communications, Inc.

Address: 8F., No.257, Sec. 2, Tiding Blvd., Neihu District, Taipei City 11493, Taiwan (R.O.C.)

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lin Kou Laboratories

Lab Address: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

Test Location: No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN

FCC Registration / Designation Number: 788550 / TW0003

Testing Laboratory
2021

This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification.
The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies

Table of Contents

Release Control Record **4**

1 Certificate of Conformity **5**

2 Summary of Test Results **6**

2.1 Measurement Uncertainty 6
2.2 Modification Record 6

3 General Information **7**

3.1 General Description of EUT 7
3.2 Description of Test Modes 9
3.2.1 Test Mode Applicability and Tested Channel Detail 10
3.3 Duty Cycle of Test Signal 12
3.4 Description of Support Units 13
3.4.1 Configuration of System under Test 13
3.5 General Description of Applied Standards 13

4 Test Types and Results **14**

4.1 Radiated Emission and Bandedge Measurement 14
4.1.1 Limits of Radiated Emission and Bandedge Measurement 14
4.1.2 Test Instruments 15
4.1.3 Test Procedures 16
4.1.4 Deviation from Test Standard 16
4.1.5 Test Set Up 17
4.1.6 EUT Operating Conditions 18
4.1.7 Test Results 19
4.2 Conducted Emission Measurement 47
4.2.1 Limits of Conducted Emission Measurement 47
4.2.2 Test Instruments 47
4.2.3 Test Procedures 48
4.2.4 Deviation from Test Standard 48
4.2.5 Test Setup 48
4.2.6 EUT Operating Conditions 48
4.2.7 Test Results 49
4.3 6dB Bandwidth Measurement 53
4.3.1 Limits of 6dB Bandwidth Measurement 53
4.3.2 Test Setup 53
4.3.3 Test Instruments 53
4.3.4 Test Procedure 53
4.3.5 Deviation from Test Standard 53
4.3.6 EUT Operating Conditions 53
4.3.7 Test Result 54
4.4 Conducted Output Power Measurement 56
4.4.1 Limits of Conducted Output Power Measurement 56
4.4.2 Test Setup 56
4.4.3 Test Instruments 56
4.4.4 Test Procedures 56
4.4.5 Deviation from Test Standard 56
4.4.6 EUT Operating Conditions 56
4.4.7 Test Results 57
4.5 Power Spectral Density Measurement 58
4.5.1 Limits of Power Spectral Density Measurement 58
4.5.2 Test Setup 58
4.5.3 Test Instruments 58
4.5.4 Test Procedure 58
4.5.5 Deviation from Test Standard 58
4.5.6 EUT Operating Condition 58

4.5.7 Test Results 59
4.6 Conducted Out of Band Emission Measurement 61
4.6.1 Limits of Conducted Out of Band Emission Measurement 61
4.6.2 Test Setup 61
4.6.3 Test Instruments 61
4.6.4 Test Procedure 61
4.6.5 Deviation from Test Standard 62
4.6.6 EUT Operating Condition 62
4.6.7 Test Results 62

5 Pictures of Test Arrangements 69

Appendix – Information of the Testing Laboratories 70

Release Control Record

Issue No.	Description	Date Issued
RF180828C26A	Original release	Oct. 14, 2019

1 Certificate of Conformity

Product: 802.11ac/a/b/g/n 2T2R Wi-Fi + Bluetooth 4.2 USB Module

Brand: SparkLAN

Test Model: WUBT-236ACN(BT) [M4W], WUBT-236ACN(BT) [PU]

Series Model: WUBT-236ACN(BT) [P4W], WUBT-236ACN(BT) [MU]

Sample Status: R&D sample

Applicant: SparkLAN Communications, Inc.

Test Date: Dec. 05, 2018 ~ Jan. 14, 2019

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 : Celine Chou , **Date:** Oct. 14, 2019
Celine Chou / Senior Specialist

Approved by : Bruce Chen , **Date:** Oct. 14, 2019
Bruce Chen / Senior 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 -12.36dB at 0.36484MHz.
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 2390.00, 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	For Dipole antenna: Antenna connectors are IPEX MHF I at modular side & RP-SMA (M) at antenna side not standard connector.. For Printed antenna: No antenna connector is used.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

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	2.94 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.86 dB
	200MHz ~1000MHz	3.87 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	802.11ac/a/b/g/n 2T2R Wi-Fi + Bluetooth 4.2 USB Module
Brand	SparkLAN
Test Model	WUBT-236ACN(BT) [M4W], WUBT-236ACN(BT) [PU]
Series Model	WUBT-236ACN(BT) [P4W], WUBT-236ACN(BT) [MU]
Model Difference	Refer to Note
Sample Status	R&D sample
Power Supply Rating	5Vdc (host)
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	802.11b, 802.11g, 802.11n (HT20): 11 802.11n (HT40): 7
Output Power	55.740mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Antenna, 0.15m shielded antenna cable without core
Cable Supplied	NA

Note:

1. This report is prepared for FCC class I permissive change. The differences compared with the original report (BV CPS report no.: RF180828C26) are adding antennas. Due to the new antenna has the same type as the original antenna and the gain value is also small, we didn't re-test for this addendum and the original test data was kept in this report.
2. All models are listed as below.

Model name	Description
WUBT-236ACN(BT) [M4W]	802.11ac/a/b/g/n 2T2R Wi-Fi + BT USB Module(4-Pin Wafer + IPEX)
WUBT-236ACN(BT) [P4W]	802.11ac/a/b/g/n 2T2R Wi-Fi + BT USB Module(4-Pin Wafer + Printed Ant)
WUBT-236ACN(BT) [MU]	802.11ac/a/b/g/n 2T2R Wi-Fi + BT USB Module (USB Type A + IPEX)
WUBT-236ACN(BT) [PU]	802.11ac/a/b/g/n 2T2R Wi-Fi + BT USB Module (USB Type A + Printed Ant)

* Model: WUBT-236ACN(BT) [M4W], WUBT-236ACN(BT) [PU] are for the final tests.

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

Modulation Mode	TX Function
802.11b	1TX
802.11g	1TX
802.11n (HT20)	2TX
802.11n (HT40)	2TX

*For 802.11b/g: The EUT support diversity function. Chain 0 is the worst for the final tests.

4. The EUT uses following antennas. (New antennas are marked in boldface.)

For EUT Model: WUBT-236ACN(BT) [M4W], WUBT-236ACN(BT) [MU]

No.	Transmitter Circuit	Brand	Model	Antenna Type	2.4G gain with cable loss (dBi)	5G gain with cable loss (dBi)	Connector Type
1	Chain(0) Chain(1)	Sparklan	AD-301N	Dipole	4.4	B1&2: 5.2 B3&4: 5.8	IPEX MHF I at modular side & RP-SMA (M) at antenna side
2	Chain(0) Chain(1)	Sparklan	AD-103AG	Dipole	2.02	B1&2: 1.93 B3&4: 2.03	
3	Chain(0) Chain(1)	Sparklan	AD-305N	Dipole	5.0	5.0	
4	Chain(0) Chain(1)	Sparklan	AD-303N	Dipole	3.0	3.0	
5	Chain(0) Chain(1)	Sparklan	AD-302N	Dipole	3.0	2.0	
6	**Chain(0) Chain(1)**	**CHLISIN**	**BTPA003212 25GC1A01**	**Dipole**	**3.72**	**4.90**	**IPEX**
7	**Chain(0) Chain(1)**	**CHLISIN**	**BTPA003212 25GC1A02**	**Dipole**	**4.90**	**4.90**	**IPEX**

For EUT Model: WUBT-236ACN(BT) [P4W], WUBT-236ACN(BT) [PU]

Antenna Type	Printed					
Antenna Connector	NA					
Gain (dBi)	Frequency (MHz)					
	2400	2450	2500	5150	5550	5825
Ant. 1	2.5	3.2	2.8	3.3	3.7	4.2
Ant. 2	3.2	2.9	2.7	3.1	3.5	4.0

* The 5dBi with 2.4GHz max. gain is chosen for final tests.

5. 2.4GHz & 5GHz technologies cannot transmit at same time. WLAN & BT technologies cannot transmit at same time

3.2 Description of Test Modes

11 channels are provided for 802.11b, 802.11g, 802.11n (HT20):

Channel	Frequency	Channel	Frequency
1	2412 MHz	7	2442 MHz
2	2417 MHz	8	2447 MHz
3	2422 MHz	9	2452 MHz
4	2427 MHz	10	2457 MHz
5	2432 MHz	11	2462 MHz
6	2437 MHz		

7 channels are provided for 802.11n (HT40):

Channel	Frequency	Channel	Frequency
3	2422 MHz	7	2442 MHz
4	2427 MHz	8	2447 MHz
5	2432 MHz	9	2452 MHz
6	2437 MHz		

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to				Description
	RE≥1G	RE<1G	PLC	APCM	
A	√	√	√	√	EUT with Dipole antenna
B	√	√	√	-	EUT with Printed antenna

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

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

Note: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane (For Test Mode A), Y-plane (For Test Mode B)**.

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, B	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	7.2	-
	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	15.0	-

Radiated Emission Test (Below 1GHz):

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

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)	Remark
A, B	802.11n (HT20)	1 to 11	6	OFDM	BPSK	7.2	-

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	802.11n (HT20)	1 to 11	6	OFDM	BPSK	7.2	-

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	7.2	-
	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	15.0	-

Test Condition:

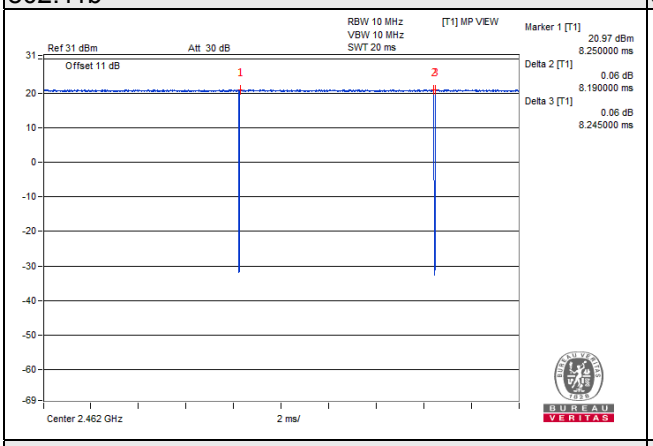
Applicable to	Environmental Conditions	Input Power (system)	Tested by
RE≥1G	22deg. C, 66%RH 23deg. C, 66%RH	120Vac, 60Hz	Adair Peng Willy Cheng
RE<1G	22deg. C, 66%RH	120Vac, 60Hz	Adair Peng
PLC	22deg. C, 66%RH 23deg. C, 66%RH	120Vac, 60Hz	Noah Chang Willy Cheng
APCM	25deg. C, 60%RH	120Vac, 60Hz	Alan Wu

3.3 Duty Cycle of Test Signal

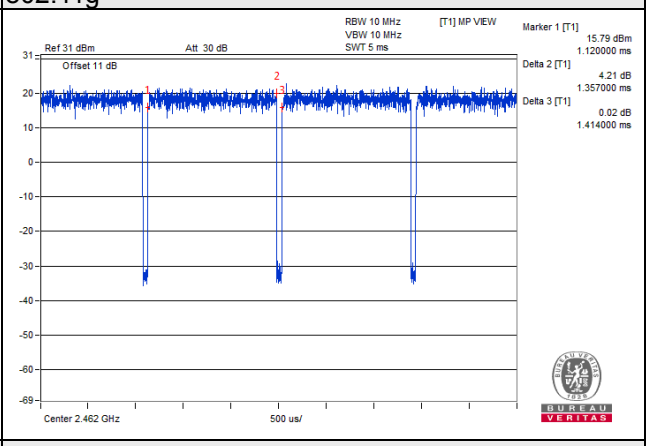
Duty cycle of test signal is ≥ 98%, duty factor is not required.
Duty cycle of test signal is < 98%, duty factor is required.

802.11b: Duty cycle = 8.19/8.245 = 0.993
802.11g: Duty cycle = 1.357/1.414 = 0.960, Duty factor = 10 * log(1/0.960) = 0.18
802.11n (HT20): Duty cycle = 1.269/1.324 = 0.958, Duty factor = 10 * log(1/0.958) = 0.18
802.11n (HT40): Duty cycle = 0.629/0.683 = 0.921, Duty factor = 10 * log(1/0.921) = 0.36

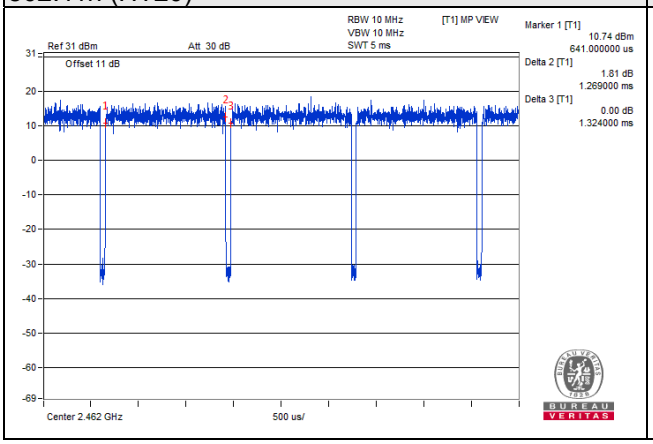
802.11b



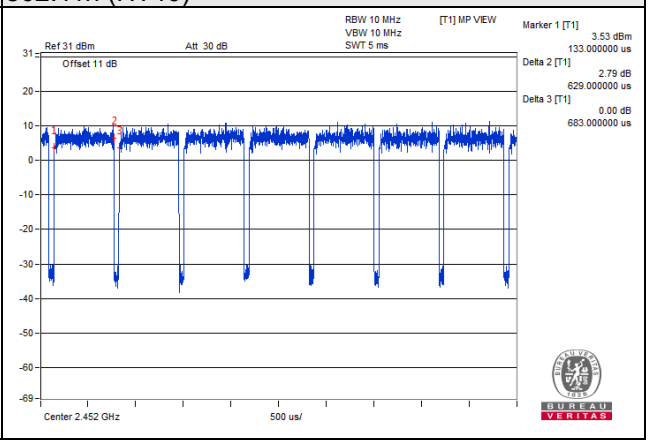
802.11g



802.11n (HT20)



802.11n (HT40)



3.4 Description of Support Units

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

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	E5410	1HC2XM1	FCC DoC Approved	-
B.	Convertible Board	NA	NA	NA	NA	-

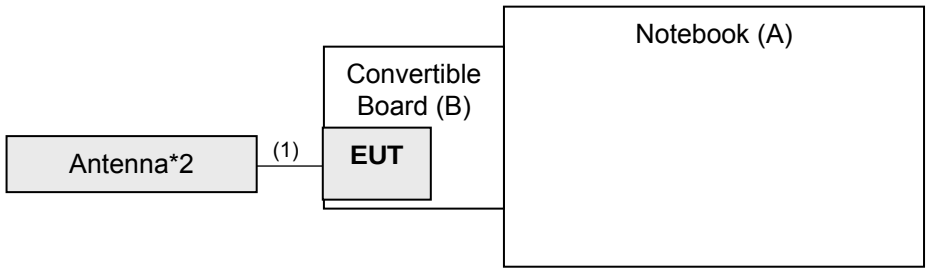
Note:

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

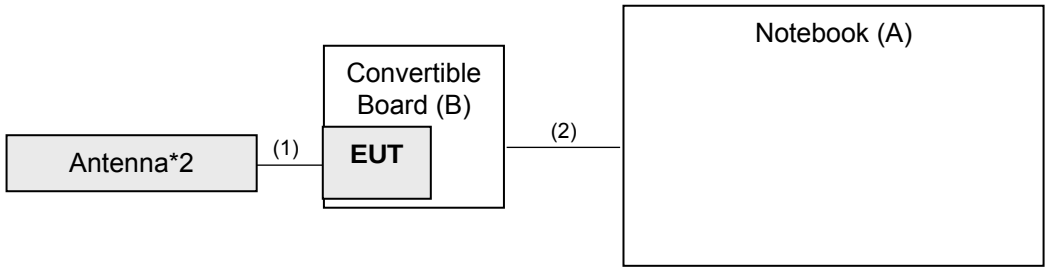
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	Antenna cable	2	0.15	Y	0	Provided by manufacturer
2.	USB cable	1	1.0	Y	0	-

3.4.1 Configuration of System under Test

Test Mode A



Test Mode B



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 v05r02
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 20dB under any condition of modulation.

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESIB7	100187	May 29, 2018	May 28, 2019
BILOG Antenna SCHWARZBECK	VULB9168	9168-171	Nov. 22, 2018	Nov. 21, 2019
HORN Antenna SCHWARZBECK	9120D	209	Nov. 25, 2018	Nov. 24, 2019
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 25, 2018	Nov. 24, 2019
Loop Antenna EMCI	EM-6879	269	Sep. 07, 2018	Sep. 06, 2019
Preamplifier Agilent (Below 1GHz)	8447D	2944A10738	Aug. 21, 2018	Aug. 20, 2019
Preamplifier Agilent (Above 1GHz)	8449B	3008A02465	Apr. 03, 2018	Apr. 02, 2019
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH3-03 (223653/4)	Aug. 21, 2018	Aug. 20, 2019
RF signal cable HUBER+SUHNER& EMCI	SUCOFLEX 104&EMC104-SM-S M-8000	Cable-CH3-03 (309224+170907)	Aug. 21, 2018	Aug. 20, 2019
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021702	NA	NA
Turn Table BV ADT	TT100	TT93021702	NA	NA
Turn Table Controller BV ADT	SC100	SC93021702	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
USB Wideband Power Meter (Including Power Sensor) KEYSIGHT	U2021XA	MY55050005/MY5519 0004/MY55190007/MY 55210005	Jul. 17, 2018	Jul. 16, 2019

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 3.
3. The horn antenna and preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Designation Number is TW0003. The number will be varied with the Lab location and scope as attached.
5. The IC Site Registration No. is IC 7450F-3.

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:

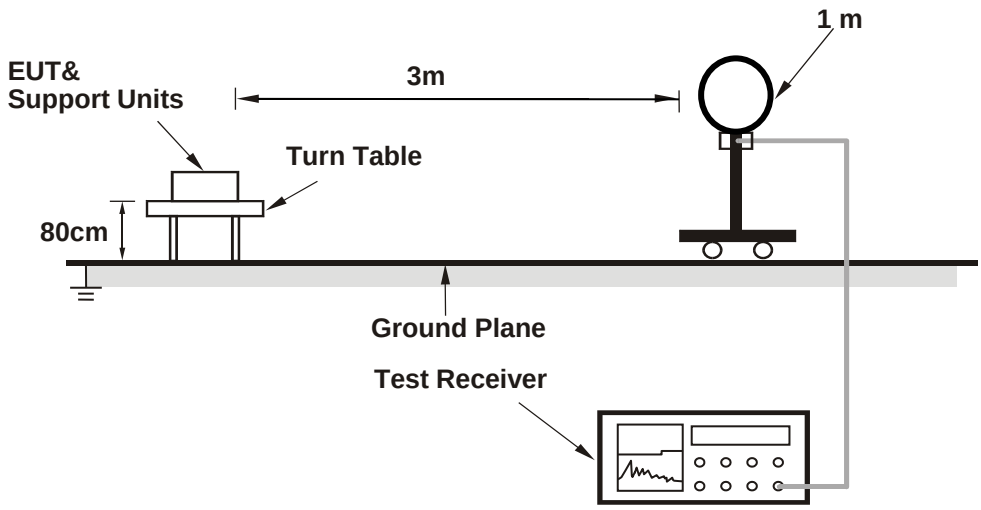
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

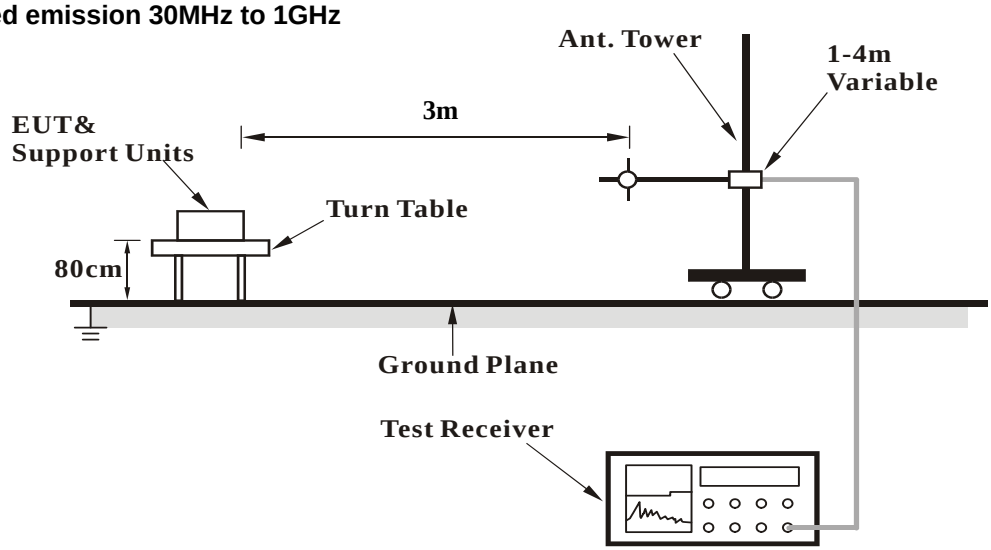
No deviation.

4.1.5 Test Set Up

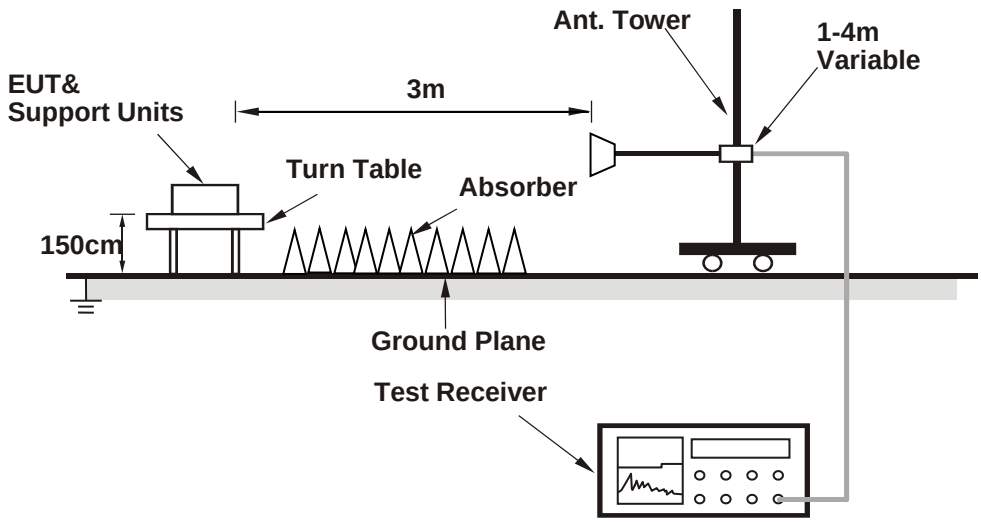
For Radiated emission below 30MHz



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. Set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1GHz data:

Test Mode A

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	59.5 PK	74.0	-14.5	1.17 H	193	26.5	33.0
2	2390.00	47.3 AV	54.0	-6.7	1.17 H	193	14.3	33.0
3	*2412.00	99.1 PK			1.05 H	175	66.2	32.9
4	*2412.00	95.3 AV			1.05 H	175	62.4	32.9
5	4824.00	47.6 PK	74.0	-26.4	1.07 H	242	44.0	3.6
6	4824.00	37.0 AV	54.0	-17.0	1.07 H	242	33.4	3.6
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	2390.00	60.7 PK	74.0	-13.3	1.92 V	261	27.7	33.0
2	2390.00	48.8 AV	54.0	-5.2	1.92 V	261	15.8	33.0
3	*2412.00	111.2 PK			1.75 V	269	78.3	32.9
4	*2412.00	107.2 AV			1.75 V	269	74.3	32.9
5	4824.00	49.6 PK	74.0	-24.4	2.86 V	33	46.0	3.6
6	4824.00	41.0 AV	54.0	-13.0	2.86 V	33	37.4	3.6

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.

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	98.4 PK			1.06 H	180	65.5	32.9
2	*2437.00	94.5 AV			1.06 H	180	61.6	32.9
3	4874.00	46.4 PK	74.0	-27.6	1.19 H	240	43.1	3.3
4	4874.00	40.9 AV	54.0	-13.1	1.19 H	240	37.6	3.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	110.4 PK			2.00 V	274	77.5	32.9
2	*2437.00	106.4 AV			2.00 V	274	73.5	32.9
3	4874.00	50.5 PK	74.0	-23.5	2.32 V	89	47.2	3.3
4	4874.00	43.1 AV	54.0	-10.9	2.32 V	89	39.8	3.3

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	98.3 PK			1.09 H	177	65.5	32.8
2	*2462.00	94.0 AV			1.09 H	177	61.2	32.8
3	2483.50	59.2 PK	74.0	-14.8	1.19 H	190	26.5	32.7
4	2483.50	47.1 AV	54.0	-6.9	1.19 H	190	14.4	32.7
5	4924.00	47.8 PK	74.0	-26.2	1.29 H	229	44.7	3.1
6	4924.00	44.2 AV	54.0	-9.8	1.29 H	229	41.1	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	*2462.00	110.2 PK			1.55 V	268	77.4	32.8
2	*2462.00	106.2 AV			1.55 V	268	73.4	32.8
3	2483.50	60.4 PK	74.0	-13.6	1.68 V	266	27.7	32.7
4	2483.50	48.6 AV	54.0	-5.4	1.68 V	266	15.9	32.7
5	4924.00	51.8 PK	74.0	-22.2	2.25 V	89	48.7	3.1
6	4924.00	46.1 AV	54.0	-7.9	2.25 V	89	43.0	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. 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	60.4 PK	74.0	-13.6	1.23 H	183	27.4	33.0
2	2390.00	47.7 AV	54.0	-6.3	1.23 H	183	14.7	33.0
3	*2412.00	97.3 PK			1.60 H	174	64.4	32.9
4	*2412.00	87.3 AV			1.60 H	174	54.4	32.9
5	4824.00	46.6 PK	74.0	-27.4	1.22 H	241	43.0	3.6
6	4824.00	34.7 AV	54.0	-19.3	1.22 H	241	31.1	3.6
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	2390.00	68.7 PK	74.0	-5.3	1.85 V	275	35.7	33.0
2	2390.00	52.4 AV	54.0	-1.6	1.85 V	275	19.4	33.0
3	*2412.00	108.8 PK			1.78 V	264	75.9	32.9
4	*2412.00	98.8 AV			1.78 V	264	65.9	32.9
5	4824.00	47.4 PK	74.0	-26.6	3.37 V	254	43.8	3.6
6	4824.00	36.2 AV	54.0	-17.8	3.37 V	254	32.6	3.6

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.

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	99.3 PK			1.53 H	177	66.4	32.9
2	*2437.00	89.3 AV			1.53 H	177	56.4	32.9
3	4874.00	47.4 PK	74.0	-26.6	1.17 H	253	44.1	3.3
4	4874.00	35.2 AV	54.0	-18.8	1.17 H	253	31.9	3.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	110.8 PK			2.01 V	266	77.9	32.9
2	*2437.00	100.9 AV			2.01 V	266	68.0	32.9
3	4874.00	49.5 PK	74.0	-24.5	3.51 V	269	46.2	3.3
4	4874.00	36.5 AV	54.0	-17.5	3.51 V	269	33.2	3.3

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	97.3 PK			1.57 H	173	64.5	32.8
2	*2462.00	86.8 AV			1.57 H	173	54.0	32.8
3	2483.50	60.5 PK	74.0	-13.5	1.23 H	183	27.8	32.7
4	2483.50	47.5 AV	54.0	-6.5	1.23 H	183	14.8	32.7
5	4924.00	46.0 PK	74.0	-28.0	1.11 H	239	42.9	3.1
6	4924.00	34.6 AV	54.0	-19.4	1.11 H	239	31.5	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	*2462.00	108.7 PK			1.53 V	271	75.9	32.8
2	*2462.00	98.5 AV			1.53 V	271	65.7	32.8
3	2483.50	72.3 PK	74.0	-1.7	1.40 V	285	39.6	32.7
4	2483.50	51.2 AV	54.0	-2.8	1.40 V	285	18.5	32.7
5	4924.00	47.2 PK	74.0	-26.8	3.29 V	263	44.1	3.1
6	4924.00	35.8 AV	54.0	-18.2	3.29 V	263	32.7	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. 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	59.8 PK	74.0	-14.2	1.61 H	199	26.8	33.0
2	2390.00	47.5 AV	54.0	-6.5	1.61 H	199	14.5	33.0
3	*2412.00	97.5 PK			1.00 H	172	64.6	32.9
4	*2412.00	88.1 AV			1.00 H	172	55.2	32.9
5	4824.00	47.1 PK	74.0	-26.9	1.69 H	210	43.5	3.6
6	4824.00	34.5 AV	54.0	-19.5	1.69 H	210	30.9	3.6
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	2390.00	66.3 PK	74.0	-7.7	1.53 V	346	33.3	33.0
2	2390.00	52.6 AV	54.0	-1.4	1.53 V	346	19.6	33.0
3	*2412.00	112.3 PK			1.56 V	246	79.4	32.9
4	*2412.00	102.5 AV			1.56 V	246	69.6	32.9
5	4824.00	48.4 PK	74.0	-25.6	2.67 V	322	44.8	3.6
6	4824.00	35.0 AV	54.0	-19.0	2.67 V	322	31.4	3.6

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.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	101.2 PK			1.34 H	169	68.3	32.9
2	*2437.00	91.7 AV			1.34 H	169	58.8	32.9
3	4874.00	47.2 PK	74.0	-26.8	1.91 H	203	43.9	3.3
4	4874.00	34.6 AV	54.0	-19.4	1.91 H	203	31.3	3.3
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	116.3 PK			1.68 V	243	83.4	32.9
2	*2437.00	106.3 AV			1.68 V	243	73.4	32.9
3	4874.00	49.9 PK	74.0	-24.1	3.01 V	319	46.6	3.3
4	4874.00	35.6 AV	54.0	-18.4	3.01 V	319	32.3	3.3

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	96.9 PK			1.03 H	165	64.1	32.8
2	*2462.00	87.2 AV			1.03 H	165	54.4	32.8
3	2483.50	59.5 PK	74.0	-14.5	1.31 H	179	26.8	32.7
4	2483.50	47.5 AV	54.0	-6.5	1.31 H	179	14.8	32.7
5	4924.00	45.8 PK	74.0	-28.2	1.66 H	233	42.7	3.1
6	4924.00	34.0 AV	54.0	-20.0	1.66 H	233	30.9	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	*2462.00	112.3 PK			2.01 V	245	79.5	32.8
2	*2462.00	102.2 AV			2.01 V	245	69.4	32.8
3	2483.50	69.0 PK	74.0	-5.0	1.48 V	277	36.3	32.7
4	2483.50	52.6 AV	54.0	-1.4	1.48 V	277	19.9	32.7
5	4924.00	48.0 PK	74.0	-26.0	2.89 V	331	44.9	3.1
6	4924.00	34.8 AV	54.0	-19.2	2.89 V	331	31.7	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. 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	59.9 PK	74.0	-14.1	1.61 H	219	26.9	33.0
2	2390.00	47.4 AV	54.0	-6.6	1.61 H	219	14.4	33.0
3	*2422.00	95.0 PK			1.48 H	214	62.1	32.9
4	*2422.00	84.5 AV			1.48 H	214	51.6	32.9
5	4844.00	46.4 PK	74.0	-27.6	1.71 H	223	43.0	3.4
6	4844.00	33.7 AV	54.0	-20.3	1.71 H	223	30.3	3.4
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	64.2 PK	74.0	-9.8	1.35 V	251	31.2	33.0
2	2390.00	52.6 AV	54.0	-1.4	1.35 V	251	19.6	33.0
3	*2422.00	107.4 PK			1.57 V	245	74.5	32.9
4	*2422.00	97.4 AV			1.57 V	245	64.5	32.9
5	4844.00	47.2 PK	74.0	-26.8	2.79 V	325	43.8	3.4
6	4844.00	34.3 AV	54.0	-19.7	2.79 V	325	30.9	3.4

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 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	96.3 PK			1.55 H	214	63.4	32.9
2	*2437.00	85.5 AV			1.55 H	214	52.6	32.9
3	2483.50	59.7 PK	74.0	-14.3	1.42 H	223	27.0	32.7
4	2483.50	47.5 AV	54.0	-6.5	1.42 H	223	14.8	32.7
5	4874.00	46.8 PK	74.0	-27.2	1.71 H	227	43.5	3.3
6	4874.00	34.3 AV	54.0	-19.7	1.71 H	227	31.0	3.3
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	111.0 PK			1.63 V	242	78.1	32.9
2	*2437.00	100.5 AV			1.63 V	242	67.6	32.9
3	2483.50	70.3 PK	74.0	-3.7	1.73 V	250	37.6	32.7
4	2483.50	52.5 AV	54.0	-1.5	1.73 V	250	19.8	32.7
5	4874.00	48.0 PK	74.0	-26.0	2.91 V	321	44.7	3.3
6	4874.00	34.8 AV	54.0	-19.2	2.91 V	321	31.5	3.3

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	92.4 PK			1.51 H	213	59.5	32.9
2	*2452.00	82.4 AV			1.51 H	213	49.5	32.9
3	2483.50	60.3 PK	74.0	-13.7	1.61 H	229	27.6	32.7
4	2483.50	47.4 AV	54.0	-6.6	1.61 H	229	14.7	32.7
5	4904.00	45.7 PK	74.0	-28.3	1.63 H	222	42.6	3.1
6	4904.00	34.2 AV	54.0	-19.8	1.63 H	222	31.1	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	*2452.00	107.9 PK			1.97 V	247	75.0	32.9
2	*2452.00	95.3 AV			1.97 V	247	62.4	32.9
3	2483.50	68.8 PK	74.0	-5.2	1.66 V	250	36.1	32.7
4	2483.50	52.6 AV	54.0	-1.4	1.66 V	250	19.9	32.7
5	4904.00	47.3 PK	74.0	-26.7	2.63 V	331	44.2	3.1
6	4904.00	34.9 AV	54.0	-19.1	2.63 V	331	31.8	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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

Test Mode B

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	59.5 PK	74.0	-14.5	1.22 H	157	26.5	33.0
2	2390.00	47.9 AV	54.0	-6.1	1.22 H	157	14.9	33.0
3	*2412.00	106.2 PK			1.18 H	192	73.3	32.9
4	*2412.00	102.2 AV			1.18 H	192	69.3	32.9
5	4824.00	47.7 PK	74.0	-26.3	1.07 H	181	44.1	3.6
6	4824.00	39.6 AV	54.0	-14.4	1.07 H	181	36.0	3.6
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	2390.00	59.7 PK	74.0	-14.3	1.75 V	231	26.7	33.0
2	2390.00	48.3 AV	54.0	-5.7	1.75 V	231	15.3	33.0
3	*2412.00	106.2 PK			1.69 V	208	73.3	32.9
4	*2412.00	102.0 AV			1.69 V	208	69.1	32.9
5	4824.00	47.6 PK	74.0	-26.4	1.09 V	90	44.0	3.6
6	4824.00	36.9 AV	54.0	-17.1	1.09 V	90	33.3	3.6

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.

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	106.0 PK			1.15 H	193	73.1	32.9
2	*2437.00	102.0 AV			1.15 H	193	69.1	32.9
3	4874.00	51.0 PK	74.0	-23.0	1.49 H	182	47.7	3.3
4	4874.00	45.1 AV	54.0	-8.9	1.49 H	182	41.8	3.3
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	107.4 PK			2.43 V	259	74.5	32.9
2	*2437.00	103.4 AV			2.43 V	259	70.5	32.9
3	4874.00	50.0 PK	74.0	-24.0	3.54 V	253	46.7	3.3
4	4874.00	43.7 AV	54.0	-10.3	3.54 V	253	40.4	3.3

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	105.4 PK			1.99 H	195	72.6	32.8
2	*2462.00	101.4 AV			1.99 H	195	68.6	32.8
3	2483.50	60.7 PK	74.0	-13.3	1.94 H	197	28.0	32.7
4	2483.50	49.7 AV	54.0	-4.3	1.94 H	197	17.0	32.7
5	4924.00	53.4 PK	74.0	-20.6	1.03 H	182	50.3	3.1
6	4924.00	49.6 AV	54.0	-4.4	1.03 H	182	46.5	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	*2462.00	104.9 PK			3.60 V	88	72.1	32.8
2	*2462.00	101.0 AV			3.60 V	88	68.2	32.8
3	2483.50	61.5 PK	74.0	-12.5	3.47 V	91	28.8	32.7
4	2483.50	49.3 AV	54.0	-4.7	3.47 V	91	16.6	32.7
5	4924.00	53.3 PK	74.0	-20.7	3.60 V	236	50.2	3.1
6	4924.00	48.7 AV	54.0	-5.3	3.60 V	236	45.6	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. 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	65.6 PK	74.0	-8.4	1.37 H	204	32.6	33.0
2	2390.00	50.2 AV	54.0	-3.8	1.37 H	204	17.2	33.0
3	*2412.00	103.7 PK			1.35 H	200	70.8	32.9
4	*2412.00	93.2 AV			1.35 H	200	60.3	32.9
5	4824.00	47.3 PK	74.0	-26.7	1.67 H	180	43.7	3.6
6	4824.00	33.8 AV	54.0	-20.2	1.67 H	180	30.2	3.6
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	2390.00	66.5 PK	74.0	-7.5	2.85 V	261	33.5	33.0
2	2390.00	50.2 AV	54.0	-3.8	2.85 V	261	17.2	33.0
3	*2412.00	104.7 PK			2.74 V	263	71.8	32.9
4	*2412.00	94.5 AV			2.74 V	263	61.6	32.9
5	4824.00	46.3 PK	74.0	-27.7	2.34 V	257	42.7	3.6
6	4824.00	33.6 AV	54.0	-20.4	2.34 V	257	30.0	3.6

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.

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	107.2 PK			1.13 H	147	74.3	32.9
2	*2437.00	96.9 AV			1.13 H	147	64.0	32.9
3	4874.00	49.1 PK	74.0	-24.9	1.21 H	213	45.8	3.3
4	4874.00	34.9 AV	54.0	-19.1	1.21 H	213	31.6	3.3
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	108.3 PK			2.44 V	261	75.4	32.9
2	*2437.00	97.7 AV			2.44 V	261	64.8	32.9
3	4874.00	48.6 PK	74.0	-25.4	3.51 V	238	45.3	3.3
4	4874.00	34.6 AV	54.0	-19.4	3.51 V	238	31.3	3.3

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	104.0 PK			1.27 H	145	71.2	32.8
2	*2462.00	93.7 AV			1.27 H	145	60.9	32.8
3	2483.50	67.5 PK	74.0	-6.5	1.29 H	142	34.8	32.7
4	2483.50	51.9 AV	54.0	-2.1	1.29 H	142	19.2	32.7
5	4924.00	50.4 PK	74.0	-23.6	1.28 H	182	47.3	3.1
6	4924.00	35.7 AV	54.0	-18.3	1.28 H	182	32.6	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	*2462.00	105.7 PK			2.67 V	261	72.9	32.8
2	*2462.00	95.1 AV			2.67 V	261	62.3	32.8
3	2483.50	68.0 PK	74.0	-6.0	2.35 V	261	35.3	32.7
4	2483.50	52.0 AV	54.0	-2.0	2.35 V	261	19.3	32.7
5	4924.00	49.9 PK	74.0	-24.1	3.45 V	253	46.8	3.1
6	4924.00	35.5 AV	54.0	-18.5	3.45 V	253	32.4	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. 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	68.3 PK	74.0	-5.7	1.21 H	204	35.4	32.9
2	2390.00	49.4 AV	54.0	-4.6	1.21 H	204	16.5	32.9
3	*2412.00	107.3 PK			1.21 H	202	74.4	32.9
4	*2412.00	97.7 AV			1.21 H	202	64.8	32.9
5	4824.00	48.1 PK	74.0	-25.9	1.30 H	216	44.3	3.8
6	4824.00	34.4 AV	54.0	-19.6	1.30 H	216	30.6	3.8
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	68.1 PK	74.0	-5.9	2.11 V	252	35.2	32.9
2	2390.00	52.6 AV	54.0	-1.4	2.11 V	252	19.7	32.9
3	*2412.00	106.5 PK			2.12 V	219	73.6	32.9
4	*2412.00	96.9 AV			2.12 V	219	64.0	32.9
5	4824.00	46.6 PK	74.0	-27.4	2.47 V	249	42.8	3.8
6	4824.00	34.3 AV	54.0	-19.7	2.47 V	249	30.5	3.8

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	*2437.00	111.1 PK			1.39 H	208	78.2	32.9
2	*2437.00	101.4 AV			1.39 H	208	68.5	32.9
3	4874.00	54.1 PK	74.0	-19.9	1.31 H	214	50.5	3.6
4	4874.00	39.9 AV	54.0	-14.1	1.31 H	214	36.3	3.6
5	7311.00	68.2 PK	74.0	-5.8	1.72 H	164	58.2	10.0
6	7311.00	49.6 AV	54.0	-4.4	1.72 H	164	39.6	10.0
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	108.3 PK			2.09 V	221	75.4	32.9
2	*2437.00	98.9 AV			2.09 V	221	66.0	32.9
3	4874.00	55.9 PK	74.0	-18.1	2.52 V	247	52.3	3.6
4	4874.00	40.8 AV	54.0	-13.2	2.52 V	247	37.2	3.6
5	7311.00	70.5 PK	74.0	-3.5	2.15 V	254	60.5	10.0
6	7311.00	52.4 AV	54.0	-1.6	2.15 V	254	42.4	10.0

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	106.1 PK			1.13 H	202	73.2	32.9
2	*2462.00	96.2 AV			1.13 H	202	63.3	32.9
3	2483.50	67.5 PK	74.0	-6.5	1.12 H	203	34.5	33.0
4	**2483.50**	**53.0 AV**	**54.0**	**-1.0**	**1.12 H**	**203**	**20.0**	**33.0**
5	4924.00	48.1 PK	74.0	-25.9	1.43 H	215	44.6	3.5
6	4924.00	34.3 AV	54.0	-19.7	1.43 H	215	30.8	3.5
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	*2462.00	104.1 PK			2.30 V	219	71.2	32.9
2	*2462.00	94.1 AV			2.30 V	219	61.2	32.9
3	2483.50	67.7 PK	74.0	-6.3	2.24 V	250	34.7	33.0
4	2483.50	50.9 AV	54.0	-3.1	2.24 V	250	17.9	33.0
5	4924.00	48.0 PK	74.0	-26.0	2.33 V	249	44.5	3.5
6	4924.00	34.3 AV	54.0	-19.7	2.33 V	249	30.8	3.5

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) – 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	63.4 PK	74.0	-10.6	1.23 H	203	30.5	32.9
2	2390.00	51.2 AV	54.0	-2.8	1.23 H	203	18.3	32.9
3	*2422.00	103.2 PK			1.14 H	203	70.4	32.8
4	*2422.00	94.0 AV			1.14 H	203	61.2	32.8
5	4844.00	46.4 PK	74.0	-27.6	1.39 H	261	42.7	3.7
6	4844.00	34.2 AV	54.0	-19.8	1.39 H	261	30.5	3.7
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	65.7 PK	74.0	-8.3	2.39 V	218	32.8	32.9
2	**2390.00**	**53.0 AV**	**54.0**	**-1.0**	**2.39 V**	**218**	**20.1**	**32.9**
3	*2422.00	101.8 PK			2.44 V	217	69.0	32.8
4	*2422.00	93.0 AV			2.44 V	217	60.2	32.8
5	4844.00	46.5 PK	74.0	-27.5	2.03 V	255	42.8	3.7
6	4844.00	34.5 AV	54.0	-19.5	2.03 V	255	30.8	3.7

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	105.4 PK			1.06 H	212	72.5	32.9
2	*2437.00	95.9 AV			1.06 H	212	63.0	32.9
3	2483.50	68.3 PK	74.0	-5.7	1.00 H	210	35.3	33.0
4	2483.50	52.9 AV	54.0	-1.1	1.00 H	210	19.9	33.0
5	4874.00	47.4 PK	74.0	-26.6	1.37 H	206	43.8	3.6
6	4874.00	35.0 AV	54.0	-19.0	1.37 H	206	31.4	3.6
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	*2437.00	102.7 PK			2.69 V	249	69.8	32.9
2	*2437.00	93.6 AV			2.69 V	249	60.7	32.9
3	2483.50	67.9 PK	74.0	-6.1	1.52 V	230	34.9	33.0
4	2483.50	52.3 AV	54.0	-1.7	1.52 V	230	19.3	33.0
5	4874.00	46.9 PK	74.0	-27.1	2.58 V	250	43.3	3.6
6	4874.00	35.2 AV	54.0	-18.8	2.58 V	250	31.6	3.6

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.

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	101.6 PK			1.15 H	203	68.7	32.9
2	*2452.00	92.2 AV			1.15 H	203	59.3	32.9
3	2483.50	64.9 PK	74.0	-9.1	1.12 H	199	31.9	33.0
4	**2483.50**	**53.0 AV**	**54.0**	**-1.0**	**1.12 H**	**199**	**20.0**	**33.0**
5	4904.00	46.7 PK	74.0	-27.3	1.32 H	296	43.2	3.5
6	4904.00	34.6 AV	54.0	-19.4	1.32 H	296	31.1	3.5
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	*2452.00	99.2 PK			2.41 V	217	66.3	32.9
2	*2452.00	90.1 AV			2.41 V	217	57.2	32.9
3	2483.50	63.9 PK	74.0	-10.1	1.84 V	251	30.9	33.0
4	2483.50	51.7 AV	54.0	-2.3	1.84 V	251	18.7	33.0
5	4904.00	46.6 PK	74.0	-27.4	2.69 V	242	43.1	3.5
6	4904.00	34.2 AV	54.0	-19.8	2.69 V	242	30.7	3.5

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) – 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:

Test Mode A

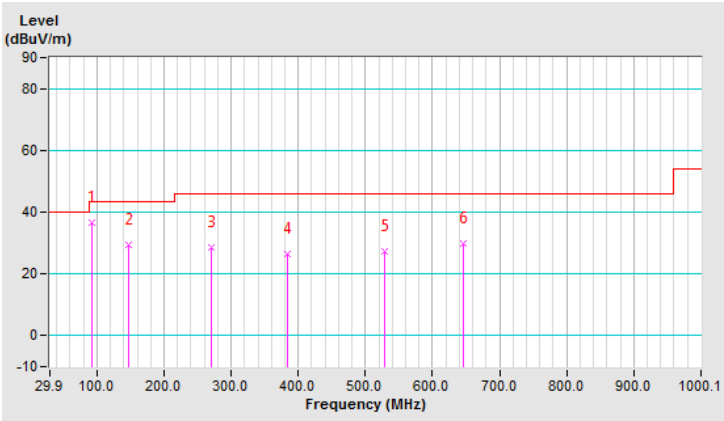
802.11n (HT20)

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	92.09	36.6 QP	43.5	-6.9	2.00 H	118	51.0	-14.4
2	146.51	29.2 QP	43.5	-14.3	2.00 H	118	38.4	-9.2
3	270.90	28.6 QP	46.0	-17.4	1.50 H	167	36.9	-8.3
4	384.40	26.3 QP	46.0	-19.7	1.00 H	184	32.1	-5.8
5	528.99	27.2 QP	46.0	-18.8	2.00 H	159	30.4	-3.2
6	645.60	29.8 QP	46.0	-16.2	2.00 H	238	30.3	-0.5

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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
4. Margin value = Emission Level – Limit value
5. 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.

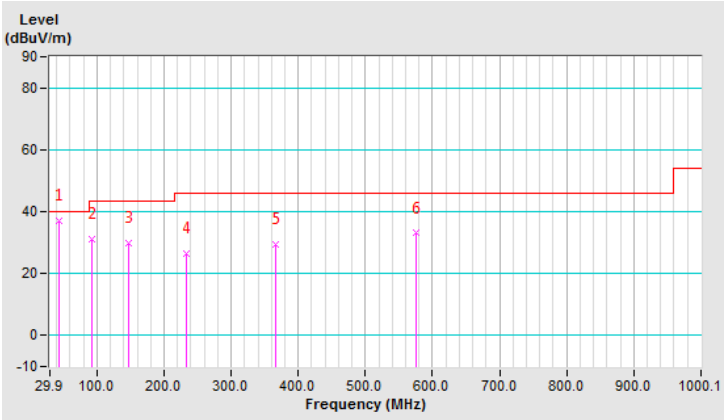


CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	43.89	36.9 QP	40.0	-3.1	1.00 V	251	46.8	-9.9
2	92.09	31.1 QP	43.5	-12.4	1.51 V	169	45.5	-14.4
3	146.51	30.0 QP	43.5	-13.5	1.00 V	246	39.2	-9.2
4	233.58	26.3 QP	46.0	-19.7	1.00 V	101	36.4	-10.1
5	367.29	29.6 QP	46.0	-16.4	1.51 V	22	35.8	-6.2
6	575.64	33.0 QP	46.0	-13.0	1.00 V	196	35.0	-2.0

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 of frequency range 30MHz~1000MHz.
4. Margin value = Emission Level – Limit value
5. 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.



Test Mode B

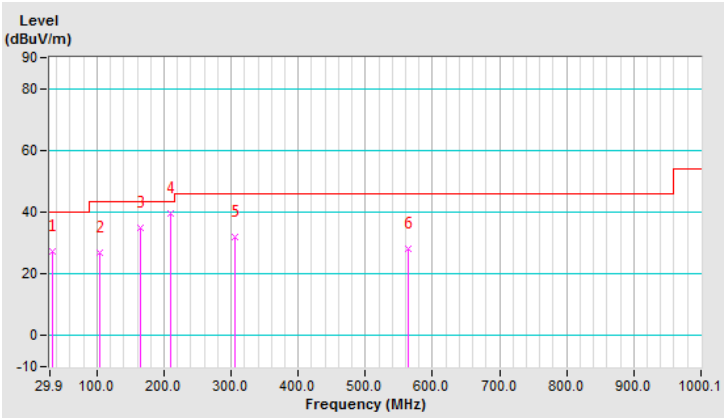
802.11n (HT20)

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	33.01	27.3 QP	40.0	-12.7	1.00 H	26	38.8	-11.5
2	104.53	26.8 QP	43.5	-16.7	2.00 H	185	39.8	-13.0
3	165.17	34.9 QP	43.5	-8.6	1.50 H	333	44.1	-9.2
4	210.26	39.5 QP	43.5	-4.0	1.00 H	156	50.5	-11.0
5	306.66	32.1 QP	46.0	-13.9	1.00 H	169	39.3	-7.2
6	564.75	28.2 QP	46.0	-17.8	2.00 H	344	30.5	-2.3

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 of frequency range 30MHz~1000MHz.
4. Margin value = Emission Level – Limit value
5. 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.

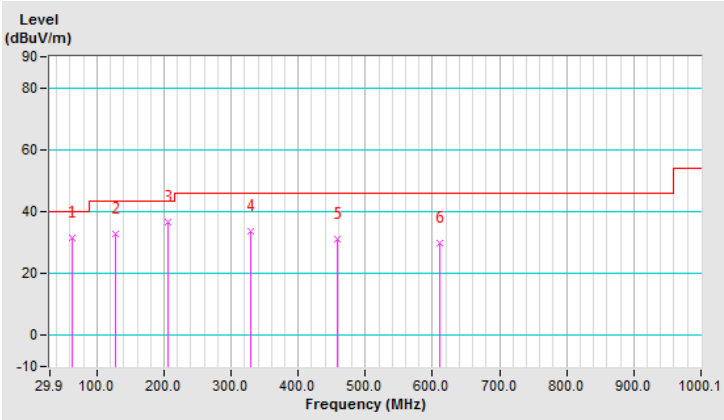


CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	62.55	31.7 QP	40.0	-8.3	1.00 V	17	42.1	-10.4
2	127.85	33.0 QP	43.5	-10.5	1.50 V	204	43.8	-10.8
3	205.59	36.6 QP	43.5	-6.9	2.00 V	111	47.7	-11.1
4	329.98	33.8 QP	46.0	-12.2	1.00 V	109	40.5	-6.7
5	457.47	31.1 QP	46.0	-14.9	2.00 V	230	35.4	-4.3
6	611.40	29.9 QP	46.0	-16.1	1.00 V	155	30.9	-1.0

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 of frequency range 30MHz~1000MHz.
4. Margin value = Emission Level – Limit value
5. 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	ESCS30	100291	Sep. 03, 2018	Sep. 02, 2019
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Sep. 05, 2018	Sep. 04, 2019
LISN ROHDE & SCHWARZ (EUT)	ENV216	101826	Feb. 26, 2018	Feb. 25, 2019
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Aug. 19, 2018	Aug. 18, 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.

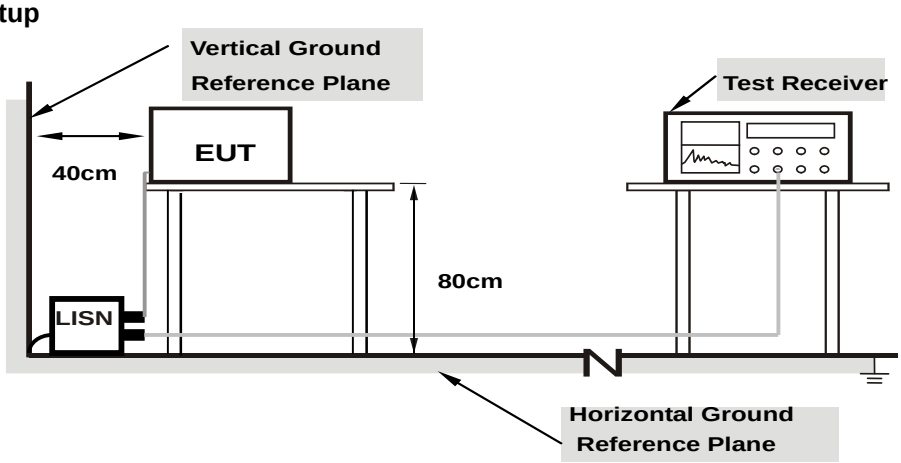
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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 4.3.6.

4.2.7 Test Results

Worst-case data:

Test Mode A

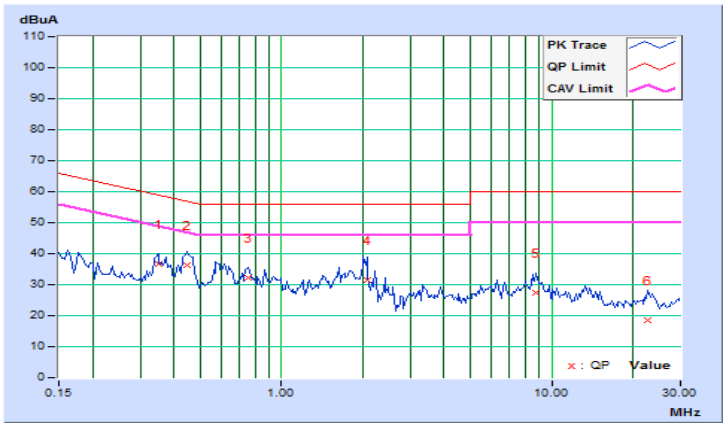
802.11n (HT20)

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

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	0.34922	9.74	27.06	22.87	36.80	32.61	58.98	48.98	-22.18	-16.37
2	0.44688	9.74	26.39	20.68	36.13	30.42	56.93	46.93	-20.80	-16.51
3	0.75156	9.71	22.40	17.36	32.11	27.07	56.00	46.00	-23.89	-18.93
4	2.07031	9.74	21.92	14.24	31.66	23.98	56.00	46.00	-24.34	-22.02
5	8.78906	9.86	17.55	12.62	27.41	22.48	60.00	50.00	-32.59	-27.52
6	22.77734	9.96	8.57	4.85	18.53	14.81	60.00	50.00	-41.47	-35.19

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.

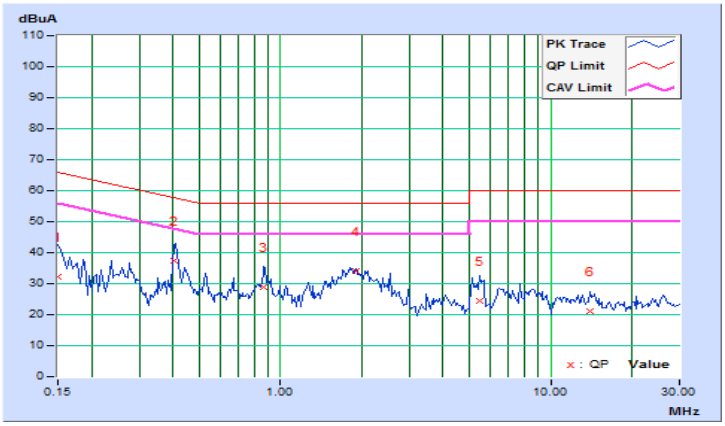


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	TX Channel 6		

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	22.50	12.94	32.22	22.66	66.00	56.00	-33.78	-33.34
2	0.40391	9.75	27.52	21.94	37.27	31.69	57.77	47.77	-20.50	-16.08
3	0.86484	9.73	18.98	12.55	28.71	22.28	56.00	46.00	-27.29	-23.72
4	1.90234	9.73	24.26	20.70	33.99	30.43	56.00	46.00	-22.01	-15.57
5	5.47266	9.83	14.75	4.81	24.58	14.64	60.00	50.00	-35.42	-35.36
6	14.00391	9.99	11.19	5.85	21.18	15.84	60.00	50.00	-38.82	-34.16

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.



Test Mode B

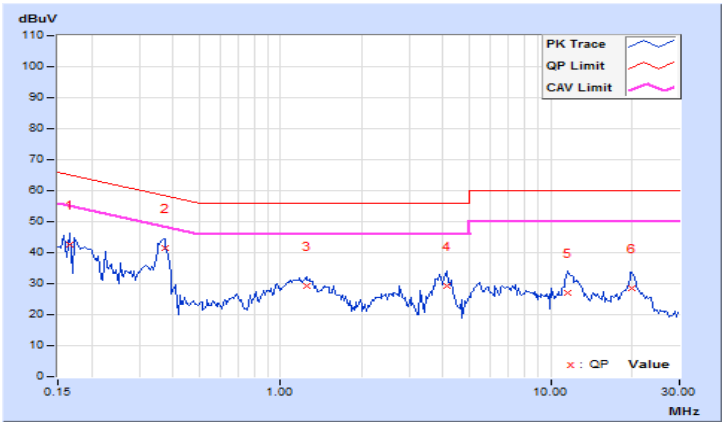
802.11n (HT20)

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

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	0.16562	9.67	32.82	15.56	42.49	25.23	65.18	55.18	-22.69	-29.95
2	0.37266	9.66	31.68	24.55	41.34	34.21	58.44	48.44	-17.10	-14.23
3	1.24609	9.66	19.76	13.58	29.42	23.24	56.00	46.00	-26.58	-22.76
4	4.10938	9.73	19.38	10.45	29.11	20.18	56.00	46.00	-26.89	-25.82
5	11.64063	9.86	17.07	8.71	26.93	18.57	60.00	50.00	-33.07	-31.43
6	20.02734	9.91	18.61	15.19	28.52	25.10	60.00	50.00	-31.48	-24.90

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.

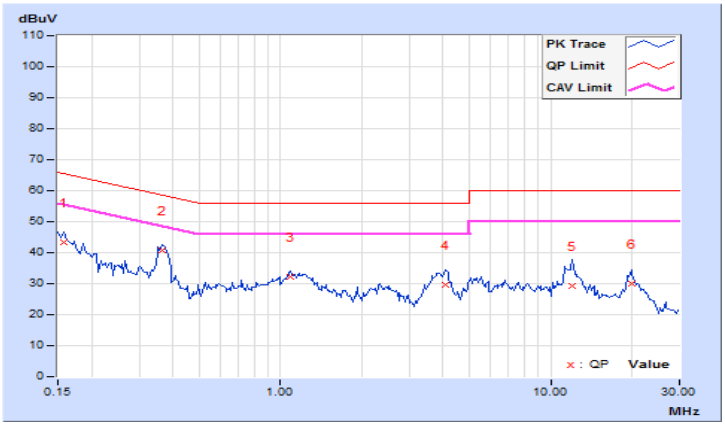


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	TX Channel 6		

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	9.68	33.75	20.67	43.43	30.35	65.58	55.58	-22.15	-25.23
2	**0.36484**	**9.67**	**31.12**	**26.59**	**40.79**	**36.26**	**58.62**	**48.62**	**-17.83**	**-12.36**
3	1.09375	9.65	22.46	15.47	32.11	25.12	56.00	46.00	-23.89	-20.88
4	4.05859	9.73	19.90	12.08	29.63	21.81	56.00	46.00	-26.37	-24.19
5	12.06641	9.89	19.53	12.44	29.42	22.33	60.00	50.00	-30.58	-27.67
6	19.86719	10.01	20.12	16.38	30.13	26.39	60.00	50.00	-29.87	-23.61

Remarks:

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

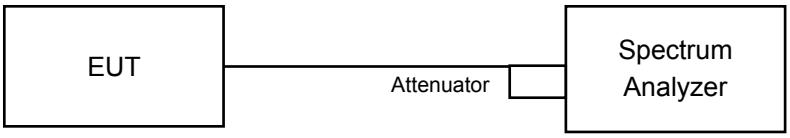


4.3 6dB Bandwidth Measurement

4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

a. Set resolution bandwidth (RBW) = 100kHz.
b. Set the video bandwidth (VBW) ≥ 3 x RBW, Detector = peak.
c. Trace mode = max hold.
d. Sweep = auto couple.
e. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	9.14	0.5	Pass
6	2437	9.15	0.5	Pass
11	2462	9.15	0.5	Pass

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.55	0.5	Pass
6	2437	16.56	0.5	Pass
11	2462	16.56	0.5	Pass

802.11n (HT20)

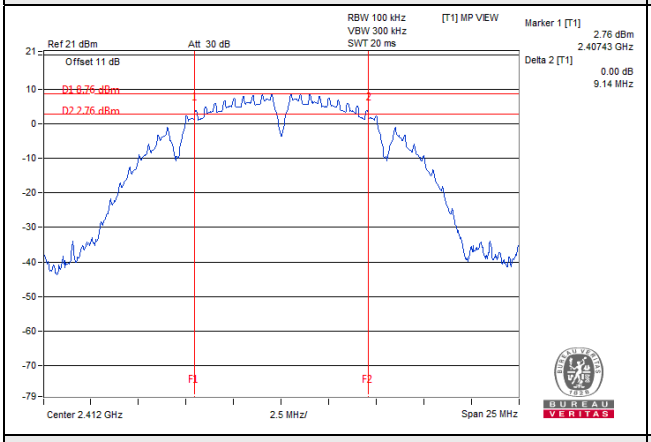
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	17.67	17.65	0.5	Pass
6	2437	17.67	17.67	0.5	Pass
11	2462	17.67	17.68	0.5	Pass

802.11n (HT40)

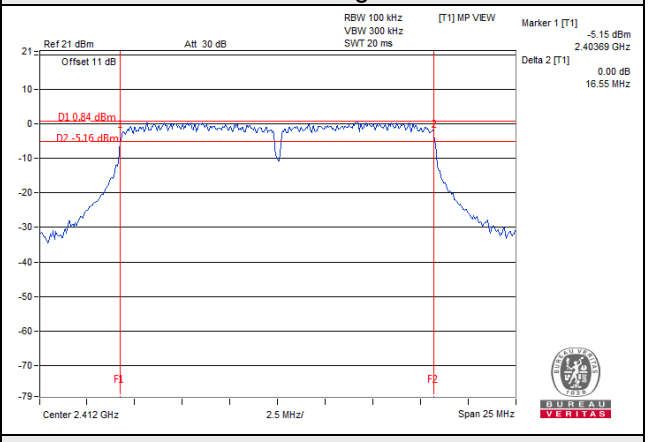
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
3	2422	36.62	36.62	0.5	Pass
6	2437	36.62	36.63	0.5	Pass
9	2452	36.62	36.62	0.5	Pass

Spectrum Plot of Worst Value

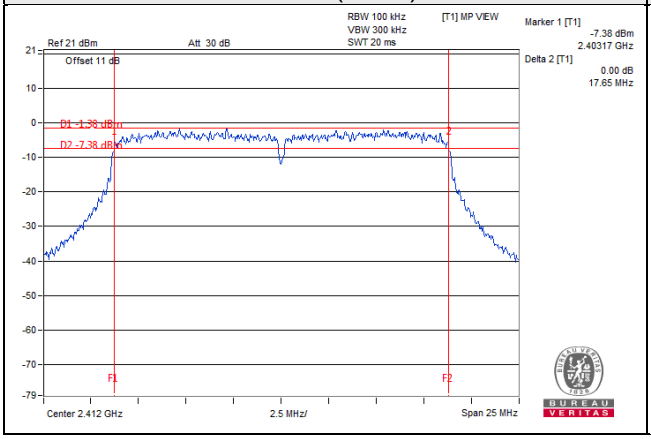
802.11b



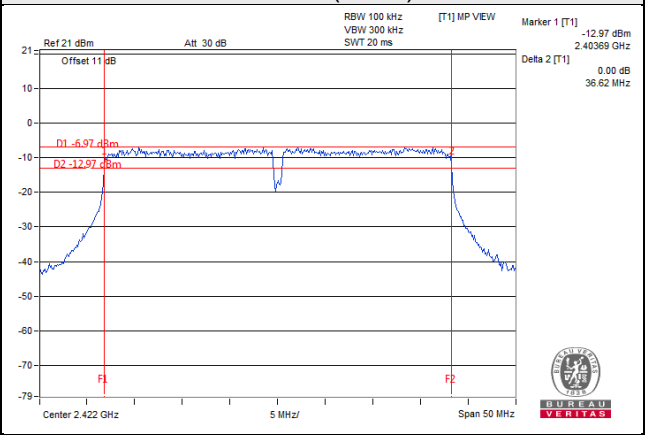
802.11g



802.11n (HT20)



802.11n (HT40)



4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

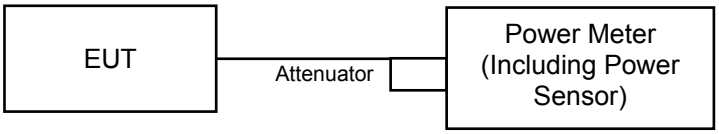
For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

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

Average Power

802.11b

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	48.306	16.84	30	Pass
6	2437	46.881	16.71	30	Pass
11	2462	46.238	16.65	30	Pass

Note: Gain = 5dBi < 6dBi, so the limit no need to be reduced.

802.11g

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	20.417	13.10	30	Pass
6	2437	38.459	15.85	30	Pass
11	2462	22.336	13.49	30	Pass

Note: Gain = 5dBi < 6dBi, so the limit no need to be reduced.

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	10.92	11.39	26.131	14.17	30	Pass
6	2437	14.56	14.34	**55.740**	17.46	30	Pass
11	2462	8.17	7.96	12.813	11.08	30	Pass

Note: Gain = 5dBi < 6dBi, so the limit no need to be reduced.

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	8.89	8.80	15.331	11.86	30	Pass
6	2437	11.25	10.89	25.609	14.08	30	Pass
9	2452	6.28	5.96	8.191	9.13	30	Pass

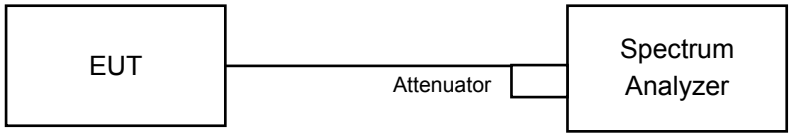
Note: Gain = 5dBi < 6dBi, so the limit no need to be reduced.

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

Channel	Freq. (MHz)	PSD (dBm/10kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-9.42	8	Pass
6	2437	-9.80	8	Pass
11	2462	-9.31	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	-16.00	0.18	-15.82	8	Pass
6	2437	-12.14	0.18	-11.96	8	Pass
11	2462	-15.70	0.18	-15.52	8	Pass

Note:
1. 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	-19.07	3.01	0.18	-15.88	5.99	Pass
	6	2437	-14.19	3.01	0.18	-11.00	5.99	Pass
	11	2462	-20.66	3.01	0.18	-17.47	5.99	Pass
1	1	2412	-18.61	3.01	0.18	-15.42	5.99	Pass
	6	2437	-14.28	3.01	0.18	-11.09	5.99	Pass
	11	2462	-20.93	3.01	0.18	-17.74	5.99	Pass

Note:
1. Method c) of power density measurement of KDB 662911 is using for Measure and add 10 log(N_{ANT}) dB.
2. Directional gain = 5dBi + 10log(2) = 8.01dBi > 6dBi, so the limit shall be reduced to 8-(8.01-6) = 5.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

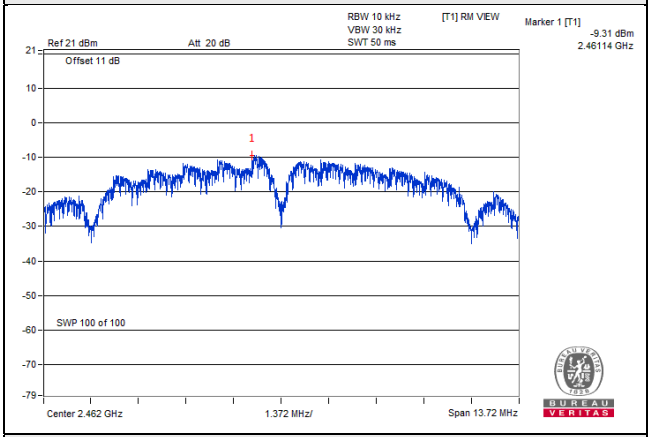
802.11n (HT40)

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	-23.31	3.01	0.36	-19.94	5.99	Pass
	6	2437	-20.86	3.01	0.36	-17.49	5.99	Pass
	9	2452	-26.34	3.01	0.36	-22.97	5.99	Pass
1	3	2422	-23.21	3.01	0.36	-19.84	5.99	Pass
	6	2437	-21.78	3.01	0.36	-18.41	5.99	Pass
	9	2452	-26.48	3.01	0.36	-23.11	5.99	Pass

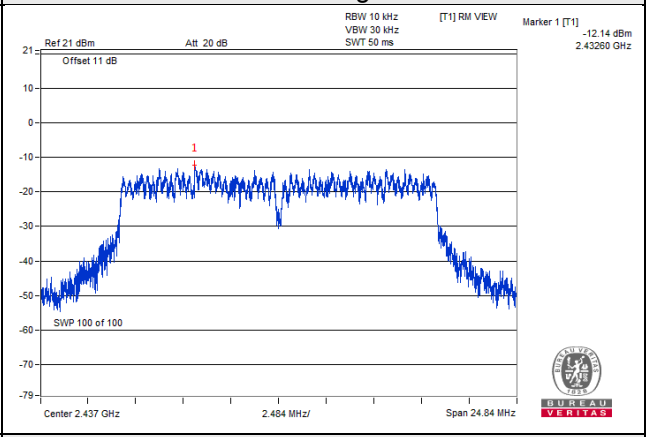
Note:
1. Method c) of power density measurement of KDB 662911 is using for Measure and add 10 log(N_{ANT}) dB.
2. Directional gain = 5dBi + 10log(2) = 8.01dBi > 6dBi, so the limit shall be reduced to 8-(8.01-6) = 5.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

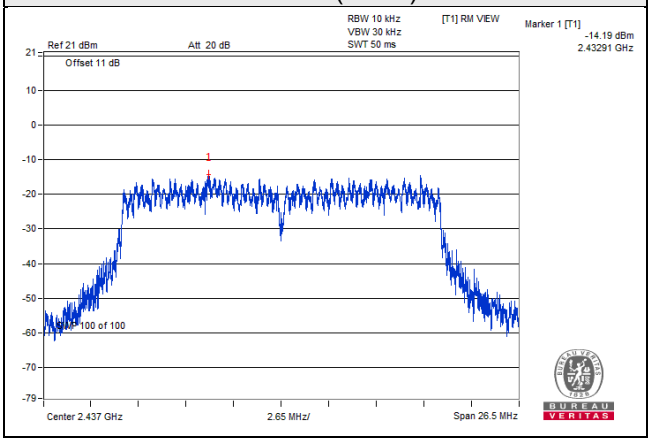
802.11b



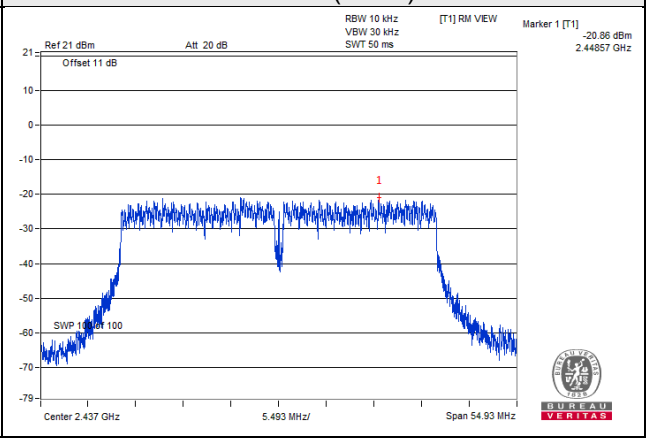
802.11g



802.11n (HT20)



802.11n (HT40)

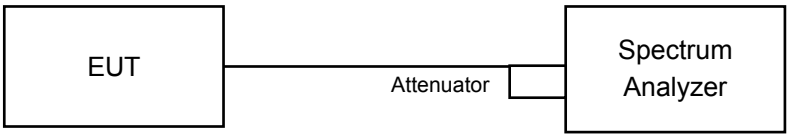


4.6 Conducted Out of Band Emission Measurement

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

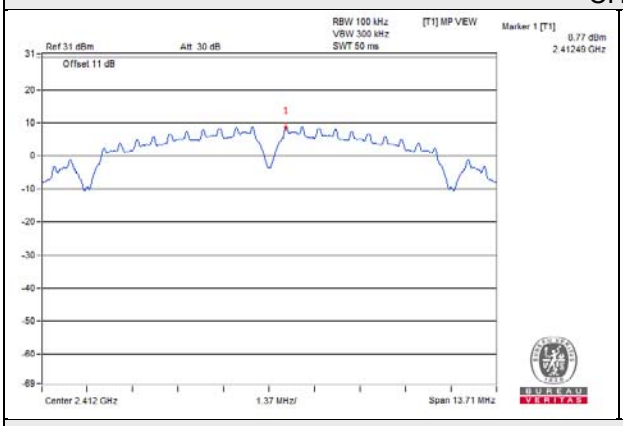
Same as item 4.3.6.

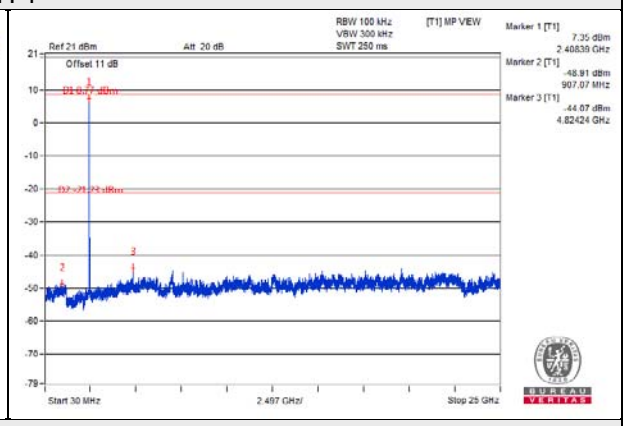
4.6.7 Test Results

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.

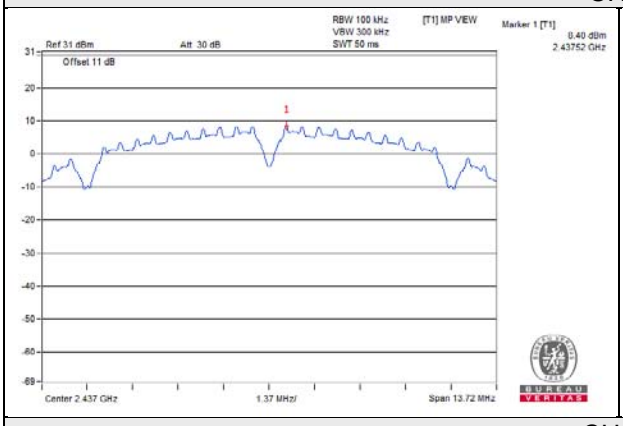
802.11b

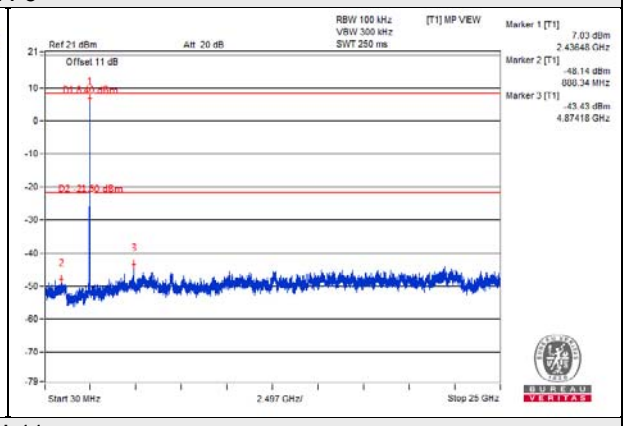
CH 1



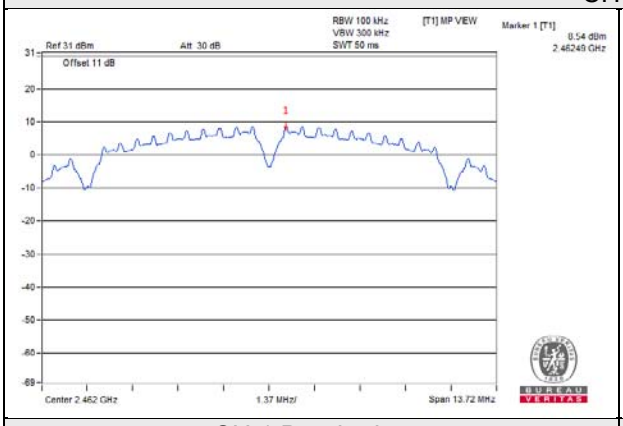


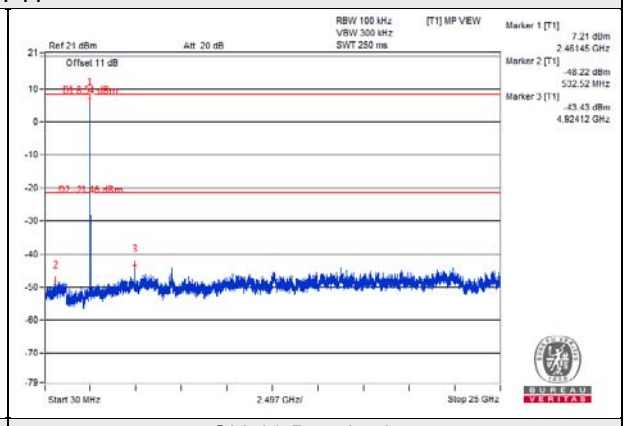
CH 6



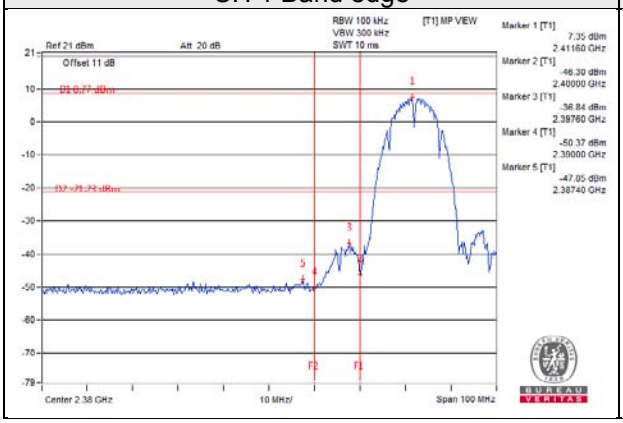


CH 11

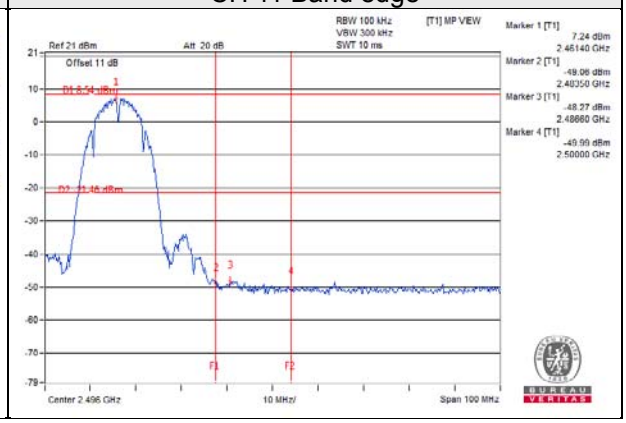




CH 1 Band edge

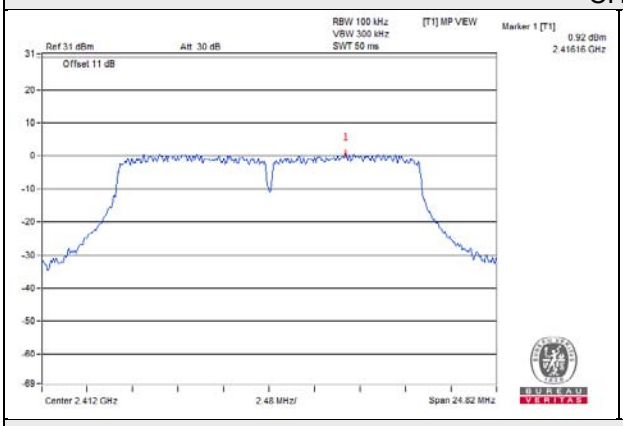


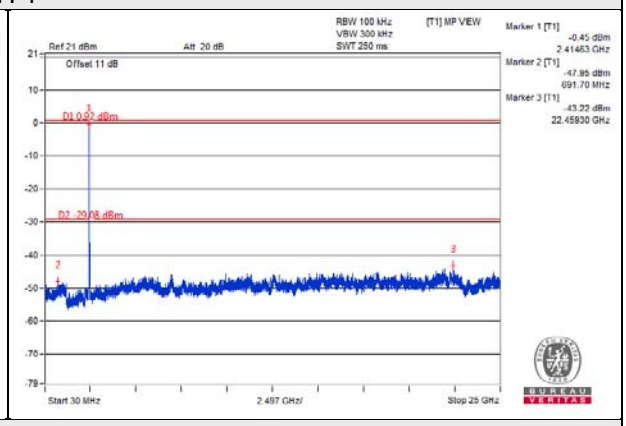
CH 11 Band edge



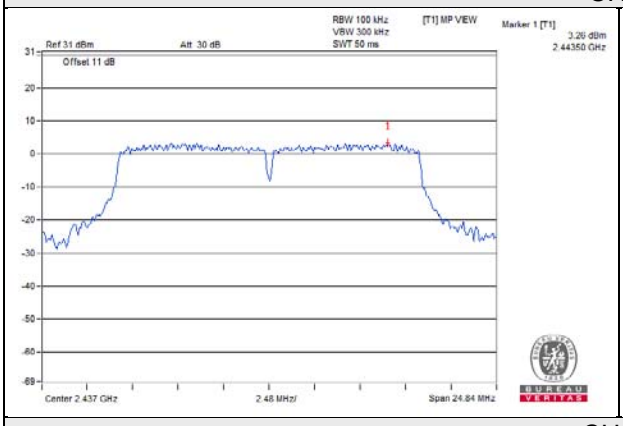
802.11g

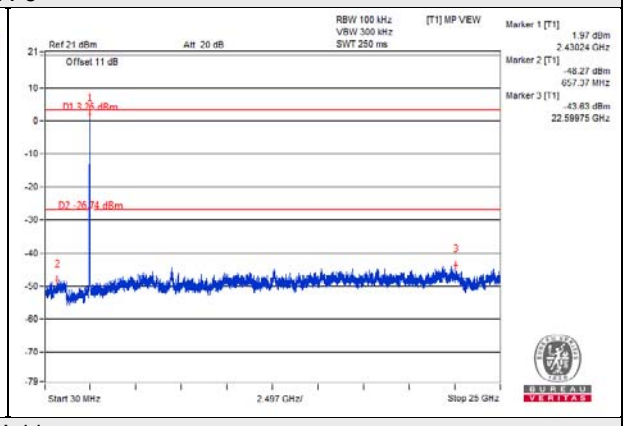
CH 1



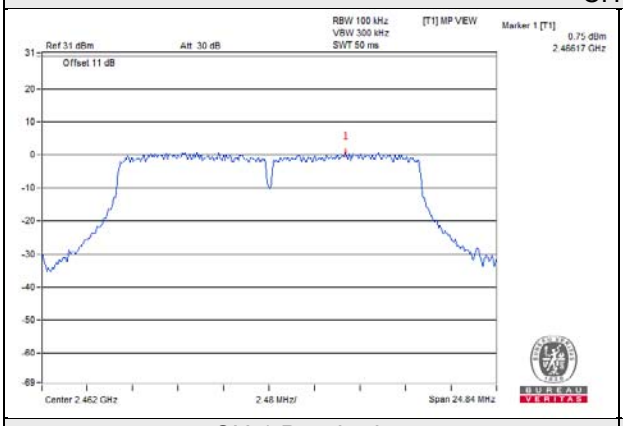


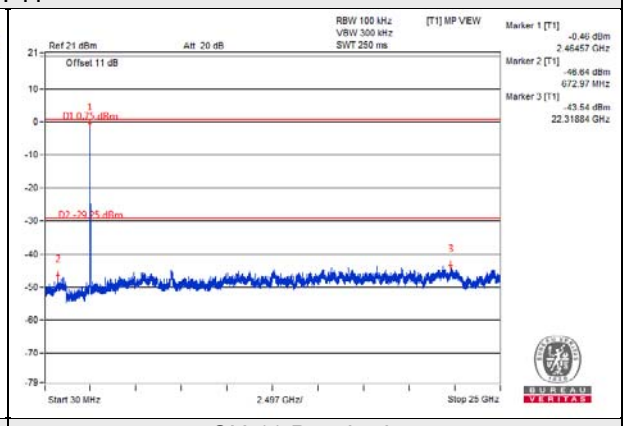
CH 6



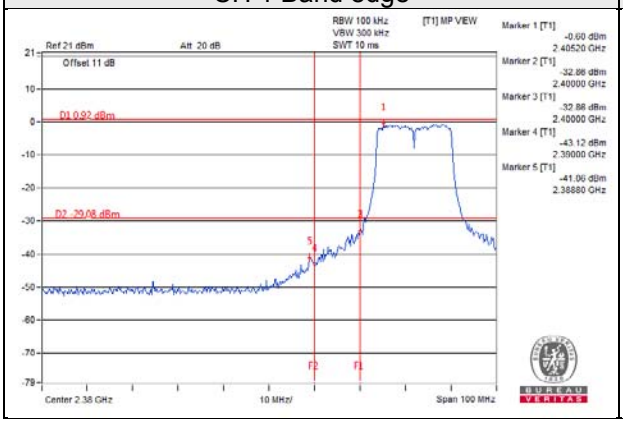


CH 11

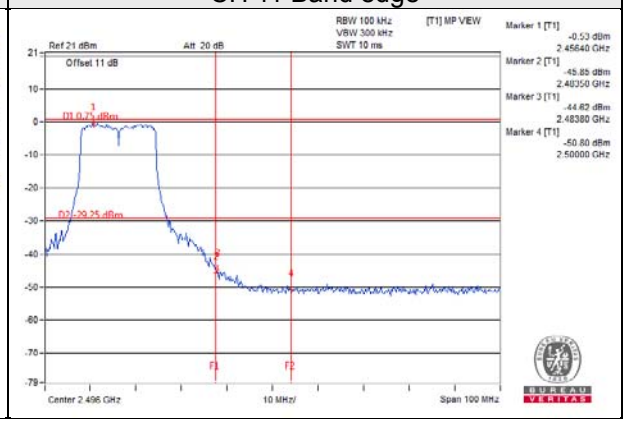




CH 1 Band edge

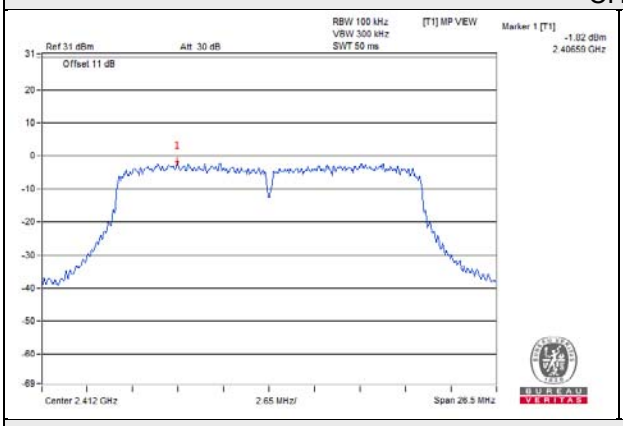


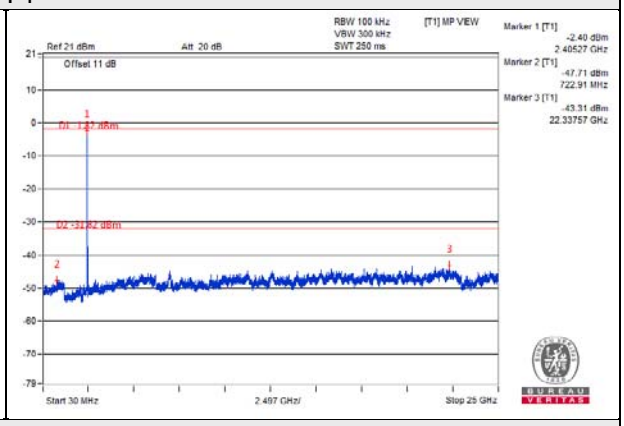
CH 11 Band edge



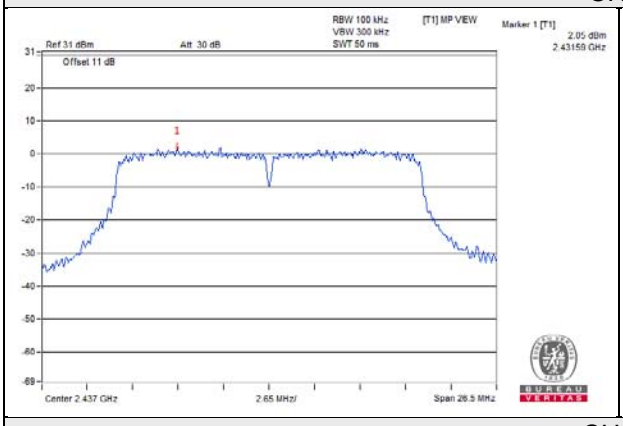
802.11n (HT20)_Chain 0

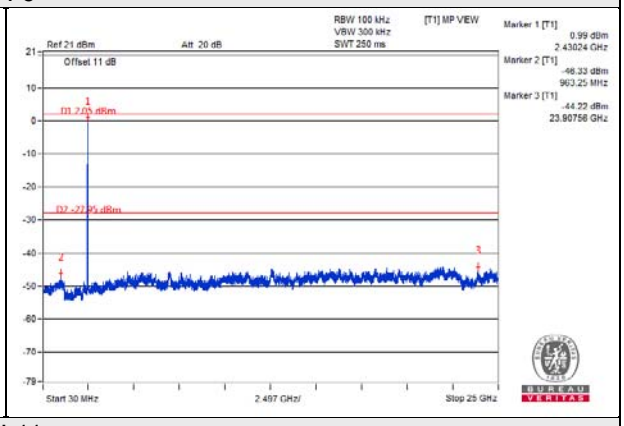
CH 1



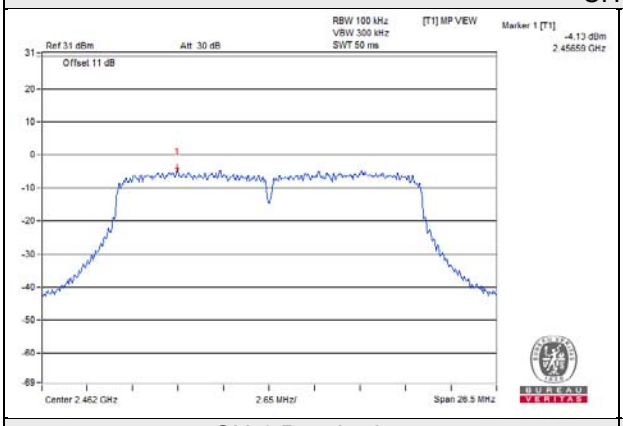


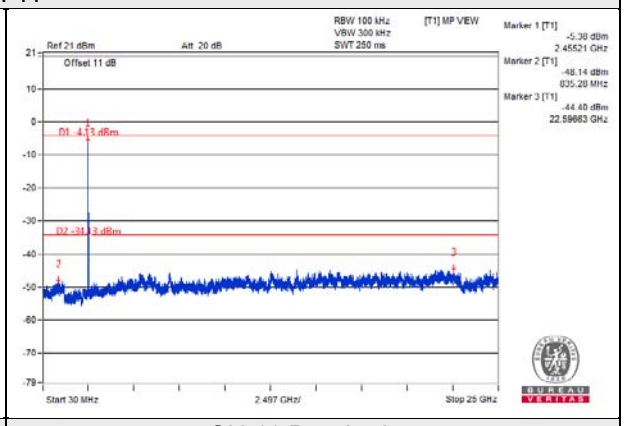
CH 6



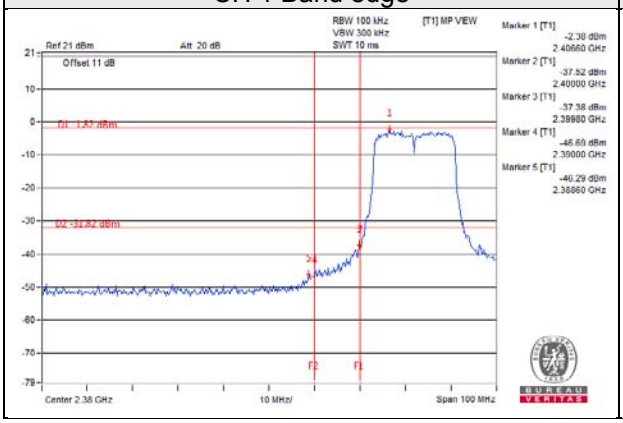


CH 11

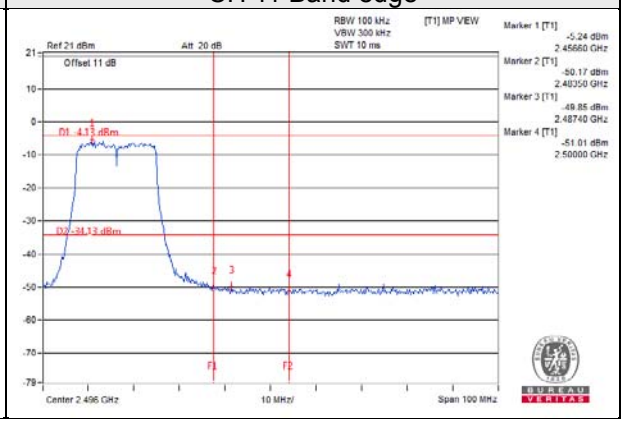




CH 1 Band edge

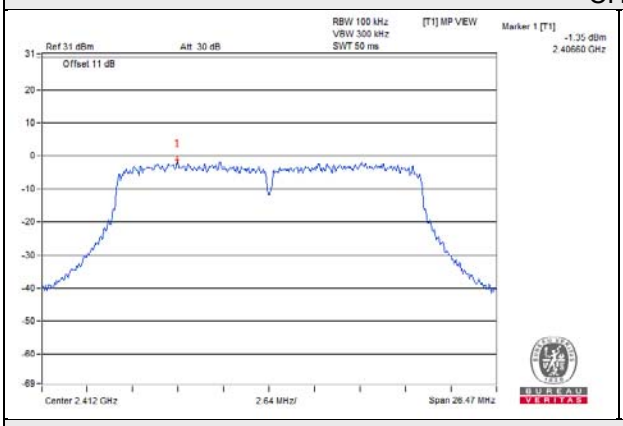


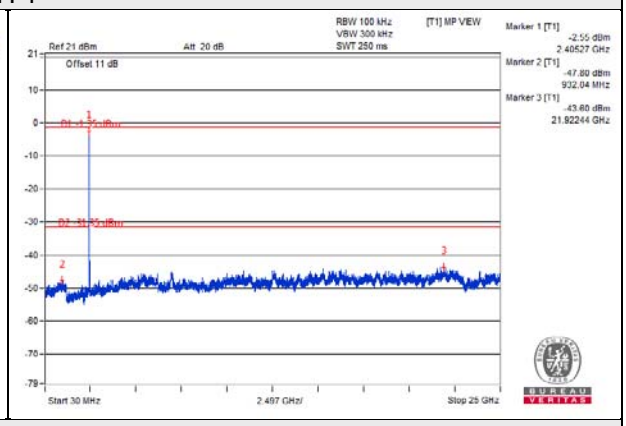
CH 11 Band edge



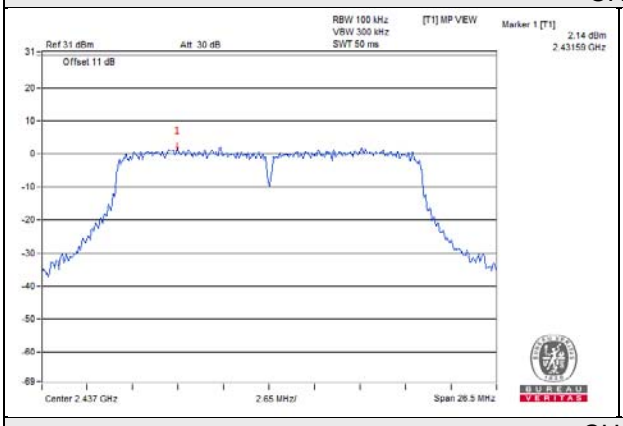
802.11n (HT20)_Chain 1

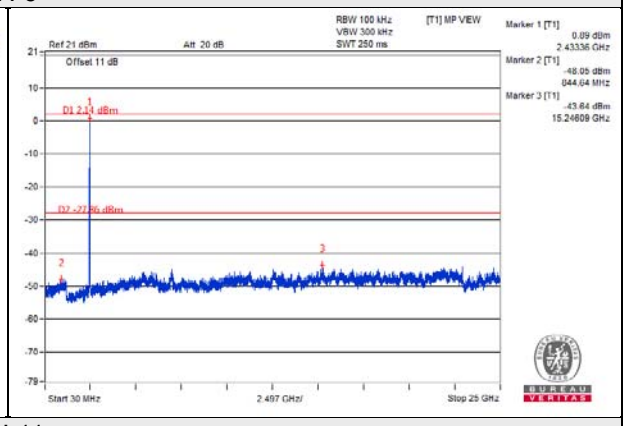
CH 1



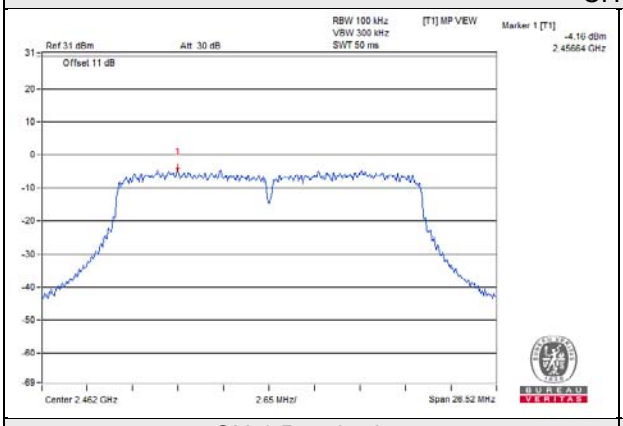


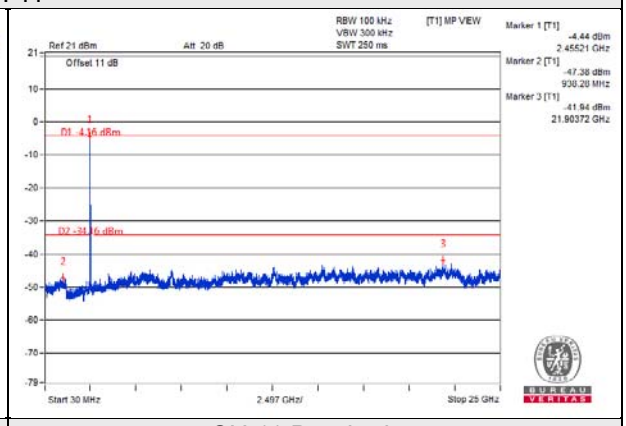
CH 6



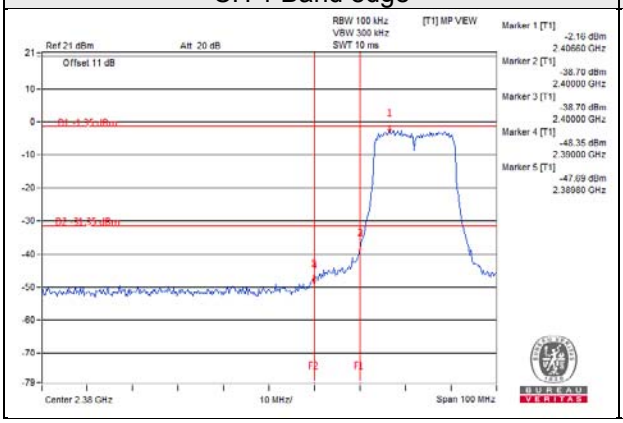


CH 11

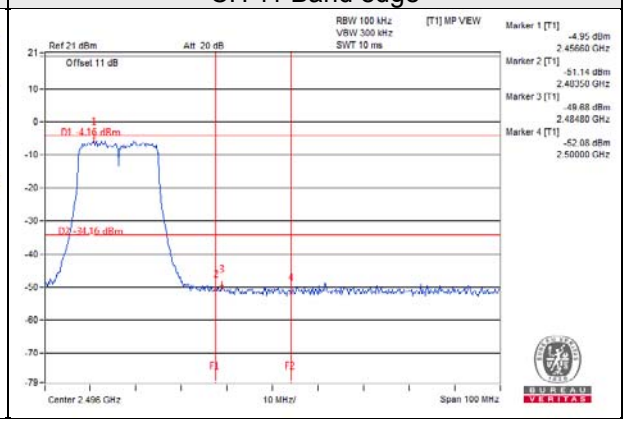




CH 1 Band edge

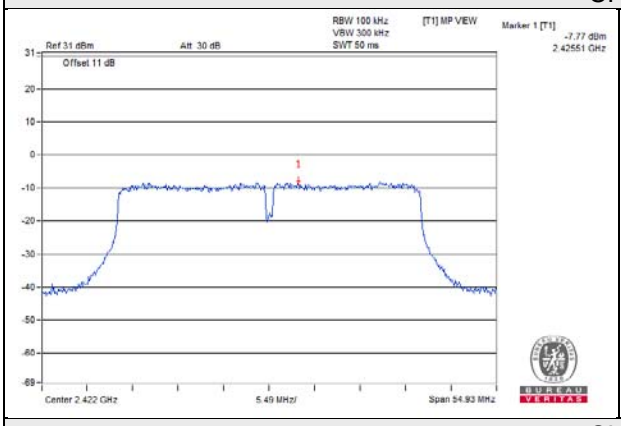


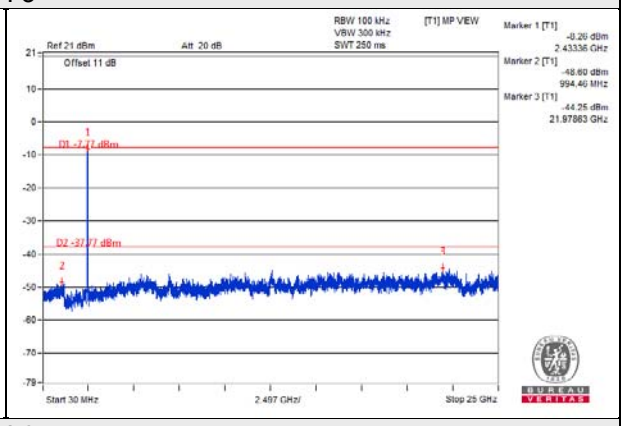
CH 11 Band edge



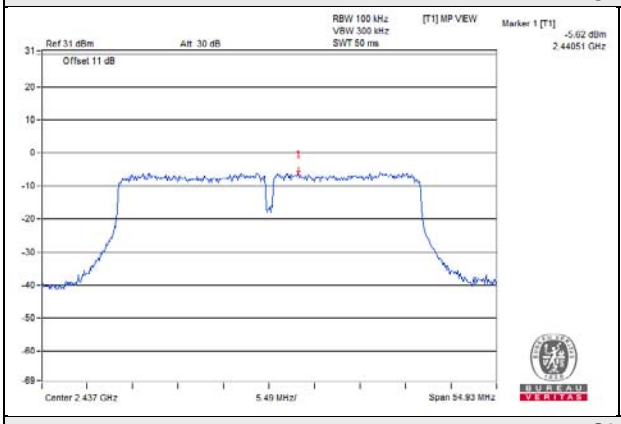
802.11n (HT40)_Chain 0

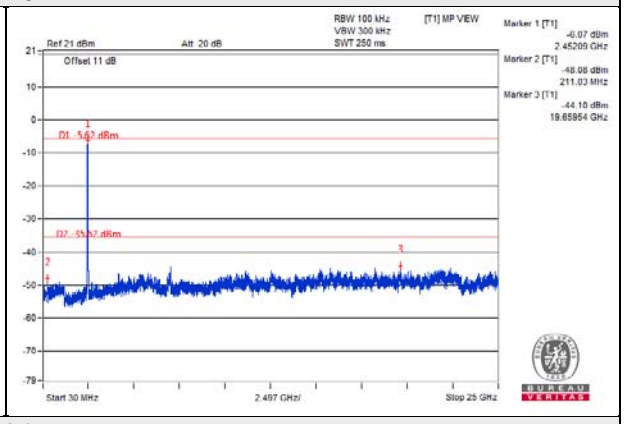
CH 3



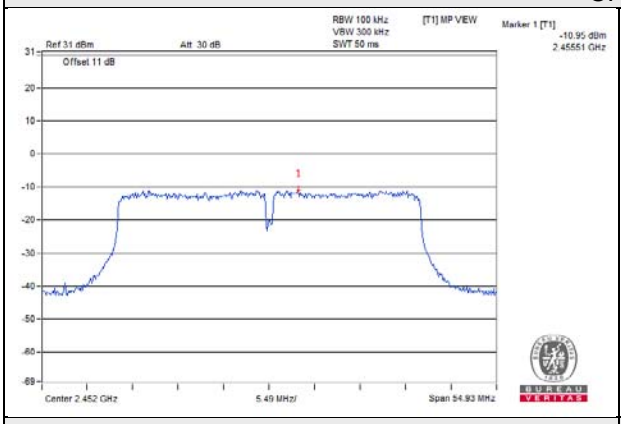


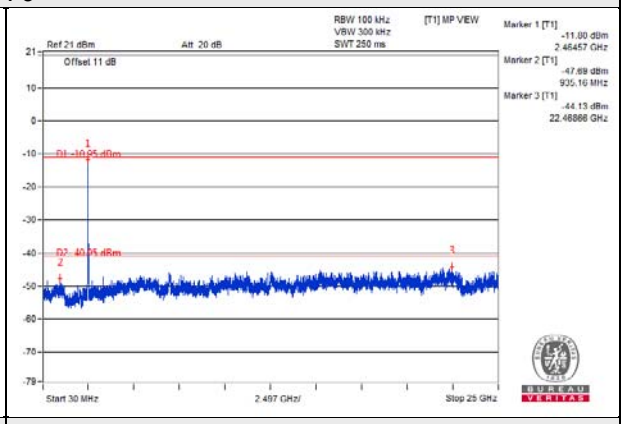
CH 6



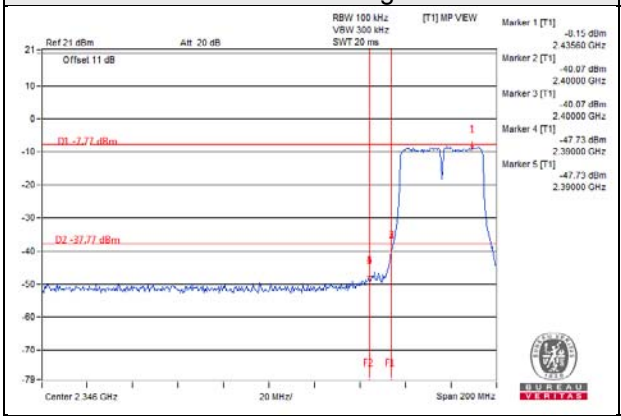


CH 9

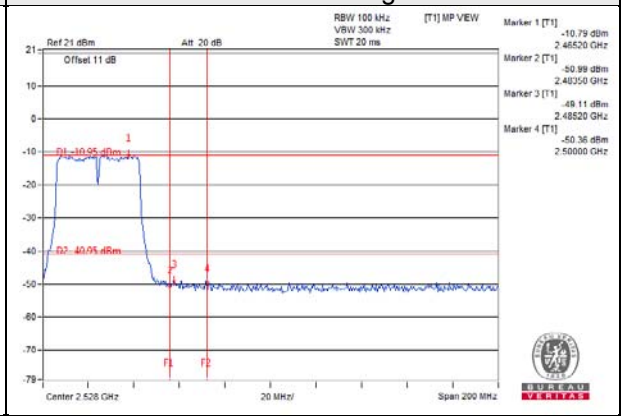




CH 3 Band edge

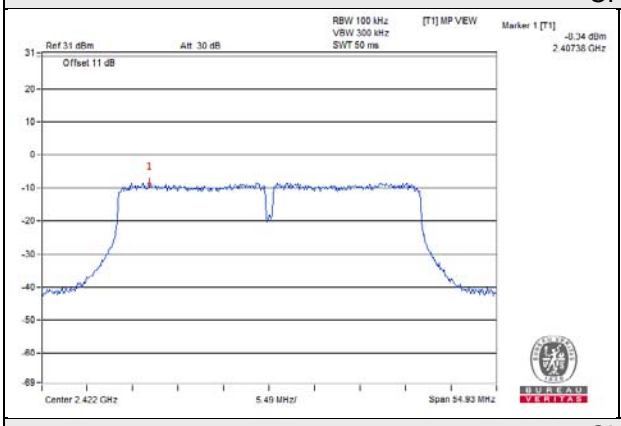


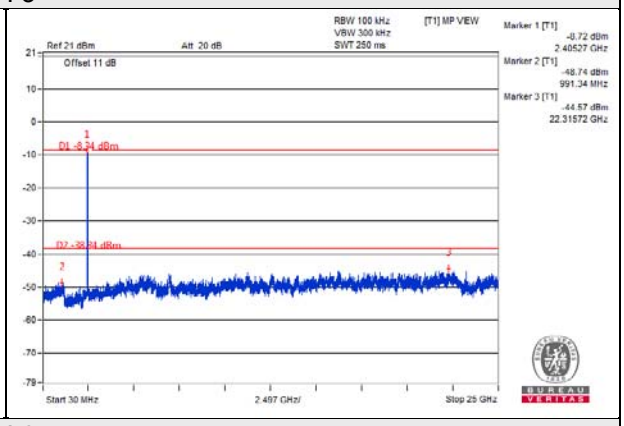
CH 9 Band edge



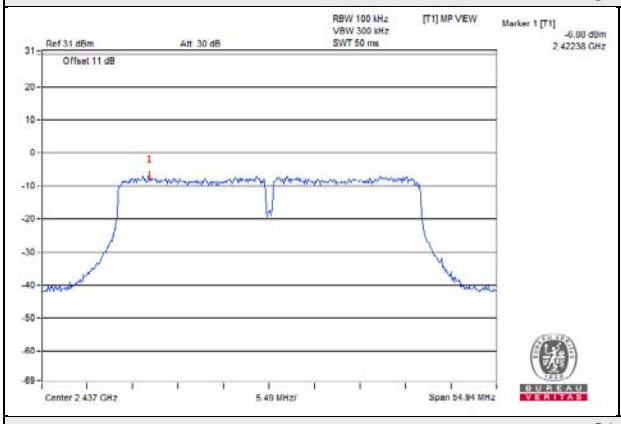
802.11n (HT40)_Chain 1

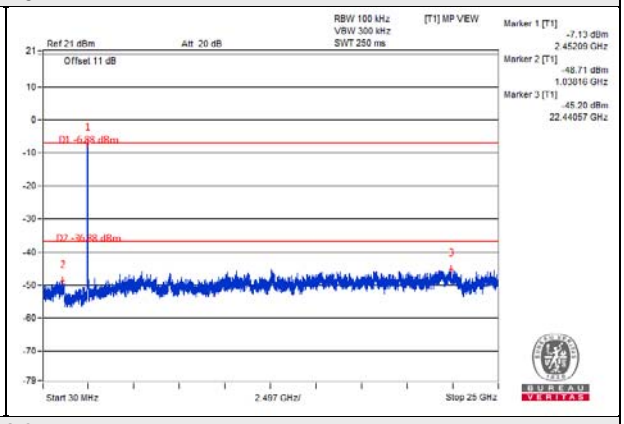
CH 3



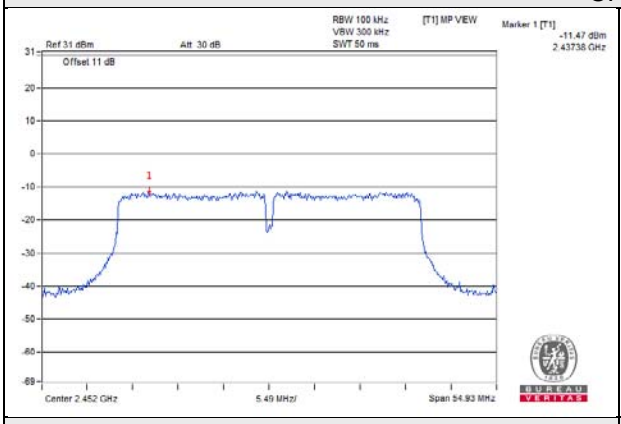


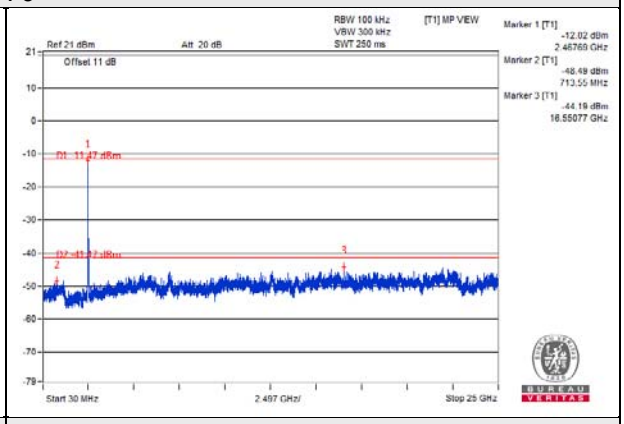
CH 6



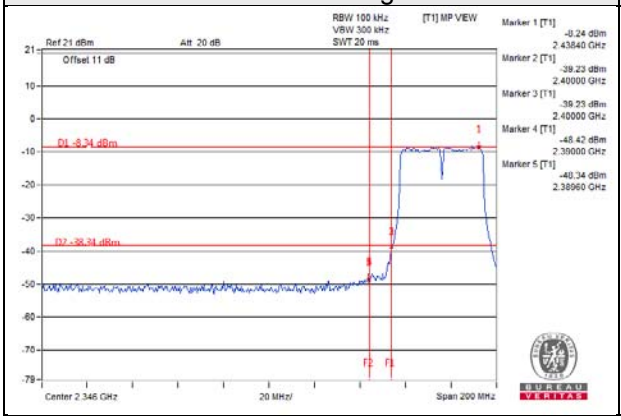


CH 9

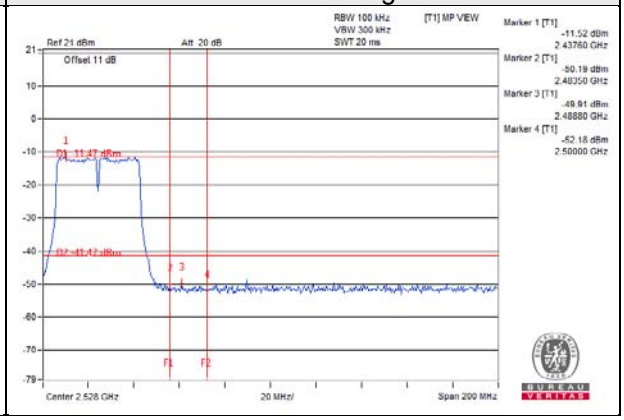




CH 3 Band edge



CH 9 Band edge



5 Pictures of Test Arrangements

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

Appendix – Information of 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:

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

Hsin Chu EMC/RF/Telecom Lab
Tel: 886-3-6668565
Fax: 886-3-6668323

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

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

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

--- END ---