FCC Test Report

Report No.: RF171218C14-5

FCC ID: NM82Q55200

Test Model: 2Q55200

Received Date: Dec. 18, 2017

Test Date: Jan. 11 ~ Jan. 16, 2018

Issued Date: Jan. 26, 2018

Applicant: HTC Corporation

Address: 88 Section 3, Zhongxing Road, Xindian District, New Taipei City 231, Taiwan

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

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

Test Location (1): No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)

FCC Registration/ Designation Number: 788550 / TW0003

Test Location (2): E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.

FCC Registration/ Designation Number: 810758 / TW1085

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 unless 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 12
3.4.1 Configuration of System under Test 12
3.5 General Description of Applied Standards 13

4 Test Types and Results **14**

4.1 Radiated Emission and Bandedge Measurement 14
4.1.1 Limits of Radiated Emission and Bandedge Measurement 14
4.1.2 Test Instruments 15
4.1.3 Test Procedures 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 32
4.2.1 Limits of Conducted Emission Measurement 32
4.2.2 Test Instruments 32
4.2.3 Test Procedures 32
4.2.4 Deviation from Test Standard 33
4.2.5 Test Setup 33
4.2.6 EUT Operating Conditions 33
4.2.7 Test Results 34
4.3 6dB Bandwidth Measurement 36
4.3.1 Limits of 6dB Bandwidth Measurement 36
4.3.2 Test Setup 36
4.3.3 Test Instruments 36
4.3.4 Test Procedure 36
4.3.5 Deviation fromTest Standard 36
4.3.6 EUT Operating Conditions 36
4.3.7 Test Result 37
4.4 Conducted Output Power Measurement 39
4.4.1 Limits of Conducted Output Power Measurement 39
4.4.2 Test Setup 39
4.4.3 Test Instruments 39
4.4.4 Test Procedures 39
4.4.5 Deviation from Test Standard 39
4.4.6 EUT Operating Conditions 39
4.4.7 Test Results 40
4.5 Power Spectral Density Measurement 41
4.5.1 Limits of Power Spectral Density Measurement 41
4.5.2 Test Setup 41
4.5.3 Test Instruments 41
4.5.4 Test Procedure 41
4.5.5 Deviation from Test Standard 41
4.5.6 EUT Operating Condition 41

4.5.7 Test Results 42
4.6 Conducted Out of Band Emission Measurement 45
4.6.1 Limits of Conducted Out of Band Emission Measurement 45
4.6.2 Test Setup 45
4.6.3 Test Instruments 45
4.6.4 Test Procedure 45
4.6.5 Deviation from Test Standard 45
4.6.6 EUT Operating Condition 45
4.6.7 Test Results 45

5 Pictures of Test Arrangements 52

Appendix – Information on the Testing Laboratories 53

Release Control Record

Issue No.	Description	Date Issued
RF171218C14-5	Original release.	Jan. 26, 2018

1 Certificate of Conformity

Product: Smartphone

Brand: HTC

Test Model: 2Q55200

Sample Status: Production Unit

Applicant: HTC Corporation

Test Date: Jan. 11 ~ Jan. 16, 2018

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

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

Prepared by : _____ , **Date:** Jan. 26, 2018
Pettie Chen / Senior Specialist

Approved by : _____ , **Date:** Jan. 26, 2018
Dylan Chiou / 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 -31.22dB at 0.59965MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -1.1dB at 2390.00MHz.
15.247(d)	Antenna Port Emission	Pass	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	Pass	Meet the requirement of limit.
15.247(b)	Conducted power	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	No antenna connector is used.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.94 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1000MHz	5.53 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.08 dB
	6GHz ~ 18GHz	4.98 dB
	18GHz ~ 40GHz	5.19 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Smartphone
Brand	HTC
Test Model	2Q55200
Status of EUT	Production Unit
Power Supply Rating	5 Vdc or 9 Vdc or 12 Vdc (adapter) 3.85 Vdc (Li-ion battery)
Transfer Rate	802.11b: 11.0/ 5.5/ 2.0/ 1.0Mbps 802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to MCS15
Operating Frequency	2412 ~ 2462MHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
Output Power	238.554mW
Antenna Type	PIFA antenna with -2.4 dBi gain
Antenna Connector	NA
Accessory Device	NA
Data Cable Supplied	NA

Note:
1. The EUT incorporates a MIMO function. Physically, the EUT provides 2 completed transmitter 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: Ant. 1 was the worst case for the final tests.

2. Spurious emission of the simultaneous operation (listed as below) has been evaluated and no non-compliance was found.

No.	Operation Mode
1	GSM+WiFi 2.4GHz
2	GSM+WiFi 5GHz
3	GSM+BT
4	WCDMA+WiFi 2.4GHz
5	WCDMA+WiFi 5GHz
6	WCDMA+BT
7	LTE+WiFi 2.4GHz
8	LTE+WiFi 5GHz
9	LTE+BT
10	WiFi 2.4GHz+BT(WiFi and BT can transmit simultaneously in the different antenna.)
11	WiFi 5GHz+BT(WiFi and BT can transmit simultaneously in the different antenna.)
12	WiFi 2.4GHz+WiFi 5GHz (2.4GHz+5GHz can transmit simultaneously in the different antenna.)
13	WWAN+WiFi 2.4GHz+BT
14	WWAN+WiFi 5GHz+BT

3. The EUT's accessories list refers to Ext. Pho.
4. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Description of Test Modes

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

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

7 channels are provided for 802.11n (HT40):

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

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

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

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

NOTE:

1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-plane(For 802.11b/g), Z-plane (For 802.11n(HT20/HT40))**.

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)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
-	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

Radiated Emission Test (Below 1GHz):

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

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1	DSSS	DBPSK	1.0

Power Line Conducted Emission Test:

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

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1	DSSS	DBPSK	1.0

Antenna Port Conducted Measurement:

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

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

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
-	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

Test Condition:

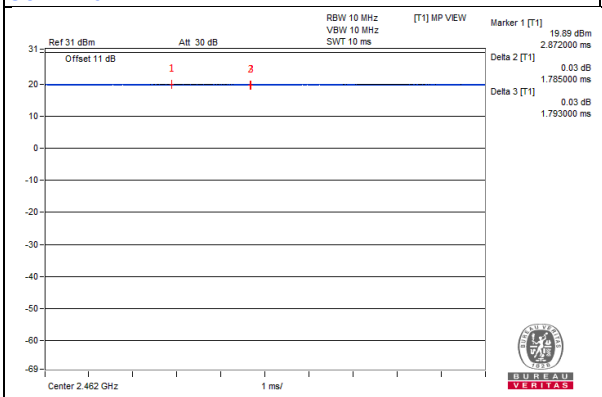
APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	23deg. C, 70%RH	120Vac, 60Hz	Rey Chen
RE<1G	24deg. C, 67%RH	120Vac, 60Hz	Weiwei Lo
PLC	25deg. C, 70%RH	120Vac, 60Hz	Matthew Yang
APCM	25deg. C, 60%RH	120Vac, 60Hz	Ted Chang

3.3 Duty Cycle of Test Signal

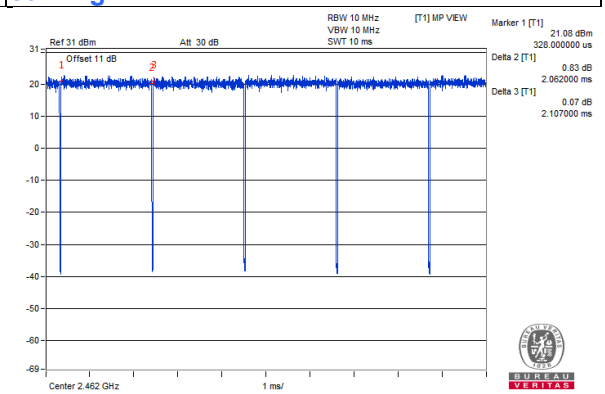
Duty cycle of test signal is ≥ 98%, duty factor is not required.
Duty cycle of test signal is < 98%, duty factor is required.

802.11b: Duty cycle = 100%
802.11g: Duty cycle = 2.062/2.107 = 0.979, Duty factor = 10 * log(1/0.979) = 0.09
802.11n (HT20): Duty cycle = 1.917/1.962 = 0.977, Duty factor = 10 * log(1/0.977) = 0.10
802.11n (HT40): Duty cycle = 0.942/1.004 = 0.938, Duty factor = 10 * log(1/0.938) = 0.28

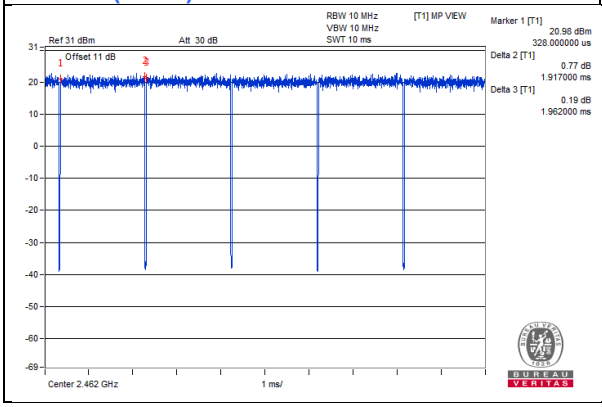
802.11b



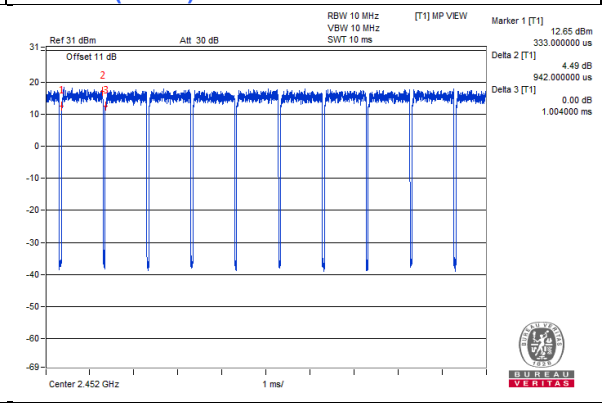
802.11g



802.11n (HT20)



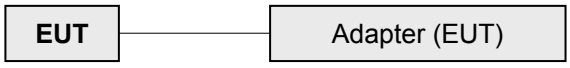
802.11n (HT40)



3.4 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units.

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards

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

FCC Part 15, Subpart C (15.247)
KDB 558074 D01 DTS Meas Guidance v04
KDB 662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10-2013

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

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver Agilent	N9038A	MY50010156	July 12, 2017	July 11, 2018
Loop Antenna(*) TESEQ	HLA 6121	45745	May 19, 2017	May 18, 2018
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-05	May 06, 2017	May 05, 2018
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Nov. 29, 2017	Nov. 28, 2018
RF Cable	8D	966-3-1 966-3-2 966-3-3	Apr. 01, 2017	Mar. 31, 2018
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Oct. 03, 2017	Oct. 02, 2018
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Dec. 12, 2017	Dec. 11, 2018
Pre-Amplifier EMCI	EMC12630SE	980384	Feb. 02, 2017	Feb. 01, 2018
RF Cable	EMC104-SM-SM-1200 EMC104-SM-SM-2000 EMC104-SM-SM-5000	160922 150317 150322	Feb. 02, 2017 Mar. 29, 2017 Mar. 29, 2017	Feb. 01, 2018 Mar. 28, 2018 Mar. 28, 2018
Spectrum Analyzer Keysight	N9030A	MY54490679	July 25, 2017	July 24, 2018
Pre-Amplifier EMCI	EMC184045SE	980386	Feb. 02, 2017	Feb. 01, 2018
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Dec. 14, 2017	Dec. 13, 2018
RF Cable	SUCOFLEX 102	36432/2 36433/2	Jan. 11, 2017 Jan. 11, 2018	Jan. 10, 2018 Jan. 10, 2019
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA

Note:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. *The calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in 966 Chamber No. 3.
4. The CANADA Site Registration No. is 20331-1
5. Loop antenna was used for all emissions below 30 MHz.

4.1.3 Test Procedures

For Radiated emission below 30MHz

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

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

c. Both X and Y axes of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTE:

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

For Radiated emission above 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

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

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

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

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

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

Note:

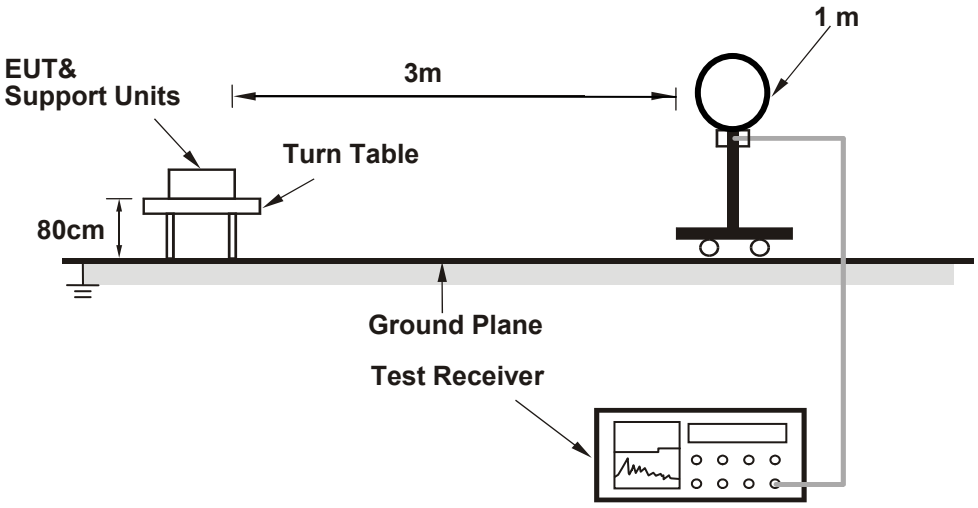
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

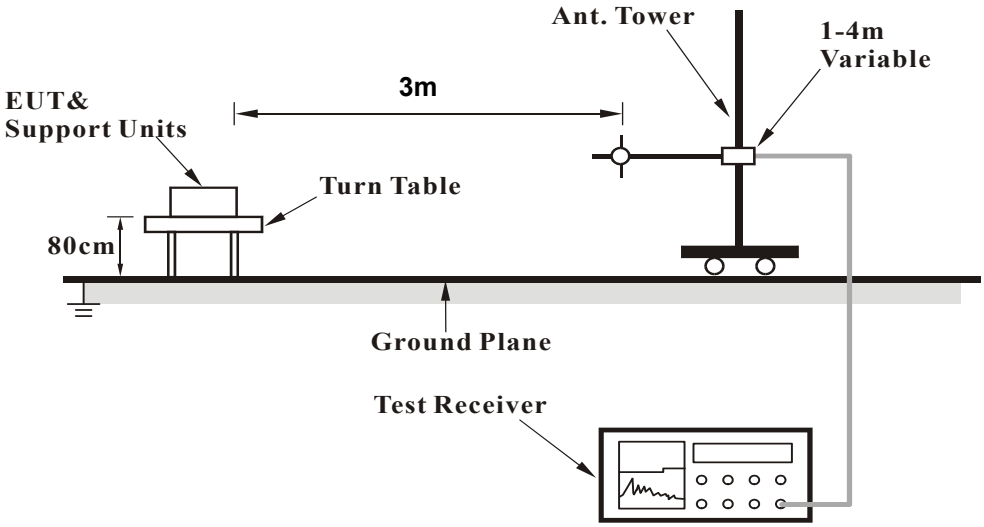
No deviation.

4.1.5 Test Set Up

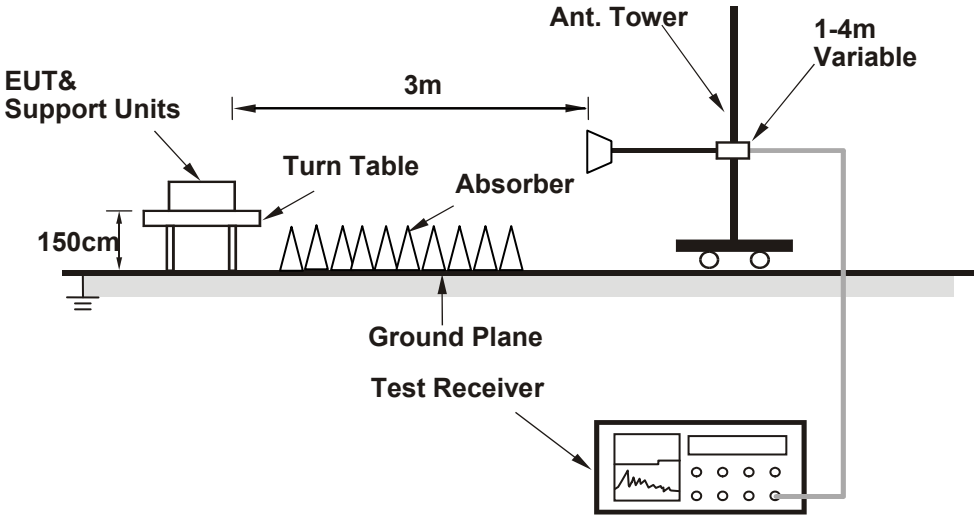
For Radiated emission below 30MHz



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：

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	53.3 PK	74.0	-20.7	1.03 H	225	54.5	-1.2
2	2390.00	44.6 AV	54.0	-9.4	1.03 H	225	45.8	-1.2
3	*2412.00	100.9 PK			1.03 H	225	102.2	-1.3
4	*2412.00	98.6 AV			1.03 H	225	99.9	-1.3
5	4824.00	40.4 PK	74.0	-33.6	1.21 H	321	37.3	3.1
6	4824.00	34.4 AV	54.0	-19.6	1.21 H	321	31.3	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	2390.00	57.3 PK	74.0	-16.7	1.02 V	91	58.5	-1.2
2	2390.00	48.0 AV	54.0	-6.0	1.02 V	91	49.2	-1.2
3	*2412.00	105.4 PK			1.02 V	91	106.7	-1.3
4	*2412.00	102.9 AV			1.02 V	91	104.2	-1.3
5	4824.00	38.5 PK	74.0	-35.5	1.09 V	150	35.4	3.1
6	4824.00	31.3 AV	54.0	-22.7	1.09 V	150	28.2	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.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	101.3 PK			1.00 H	212	102.9	-1.6
2	*2437.00	98.8 AV			1.00 H	212	100.4	-1.6
3	4874.00	40.2 PK	74.0	-33.8	1.24 H	335	37.0	3.2
4	4874.00	34.5 AV	54.0	-19.5	1.24 H	335	31.3	3.2
5	7311.00	41.7 PK	74.0	-32.3	1.56 H	152	32.8	8.9
6	7311.00	29.4 AV	54.0	-24.6	1.56 H	152	20.5	8.9
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	105.6 PK			1.02 V	94	107.2	-1.6
2	*2437.00	103.2 AV			1.02 V	94	104.8	-1.6
3	4874.00	39.6 PK	74.0	-34.4	1.10 V	153	36.4	3.2
4	4874.00	32.3 AV	54.0	-21.7	1.10 V	153	29.1	3.2
5	7311.00	41.9 PK	74.0	-32.1	1.65 V	352	33.0	8.9
6	7311.00	29.3 AV	54.0	-24.7	1.65 V	352	20.4	8.9

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	101.1 PK			1.01 H	214	102.7	-1.6
2	*2462.00	98.7 AV			1.01 H	214	100.3	-1.6
3	2483.50	53.4 PK	74.0	-20.6	1.01 H	214	54.9	-1.5
4	2483.50	44.9 AV	54.0	-9.1	1.01 H	214	46.4	-1.5
5	4924.00	40.7 PK	74.0	-33.3	1.24 H	345	37.4	3.3
6	4924.00	35.0 AV	54.0	-19.0	1.24 H	345	31.7	3.3
7	7386.00	41.9 PK	74.0	-32.1	1.52 H	147	32.7	9.2
8	7386.00	29.5 AV	54.0	-24.5	1.52 H	147	20.3	9.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	105.5 PK			1.08 V	86	107.1	-1.6
2	*2462.00	103.0 AV			1.08 V	86	104.6	-1.6
3	2483.50	53.2 PK	74.0	-20.8	1.08 V	86	54.7	-1.5
4	2483.50	41.4 AV	54.0	-12.6	1.08 V	86	42.9	-1.5
5	4924.00	39.2 PK	74.0	-34.8	1.12 V	163	35.9	3.3
6	4924.00	32.0 AV	54.0	-22.0	1.12 V	163	28.7	3.3
7	7386.00	42.0 PK	74.0	-32.0	1.60 V	340	32.8	9.2
8	7386.00	29.1 AV	54.0	-24.9	1.60 V	340	19.9	9.2

REMARKS:

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

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	61.6 PK	74.0	-12.4	1.23 H	327	62.8	-1.2
2	2390.00	50.3 AV	54.0	-3.7	1.23 H	327	51.5	-1.2
3	*2412.00	103.3 PK			1.23 H	327	104.6	-1.3
4	*2412.00	92.9 AV			1.23 H	327	94.2	-1.3
5	4824.00	36.9 PK	74.0	-37.1	1.75 H	205	33.8	3.1
6	4824.00	25.2 AV	54.0	-28.8	1.75 H	205	22.1	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	2390.00	66.3 PK	74.0	-7.7	1.05 V	95	67.5	-1.2
2	2390.00	52.8 AV	54.0	-1.2	1.05 V	95	54.0	-1.2
3	*2412.00	106.1 PK			1.05 V	95	107.4	-1.3
4	*2412.00	96.2 AV			1.05 V	95	97.5	-1.3
5	4824.00	36.6 PK	74.0	-37.4	1.61 V	122	33.5	3.1
6	4824.00	25.6 AV	54.0	-28.4	1.61 V	122	22.5	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.

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	103.4 PK			1.27 H	323	105.0	-1.6
2	*2437.00	92.8 AV			1.27 H	323	94.4	-1.6
3	4874.00	37.0 PK	74.0	-37.0	1.65 H	218	33.8	3.2
4	4874.00	26.0 AV	54.0	-28.0	1.65 H	218	22.8	3.2
5	7311.00	41.4 PK	74.0	-32.6	1.72 H	355	32.5	8.9
6	7311.00	29.9 AV	54.0	-24.1	1.72 H	355	21.0	8.9
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	106.3 PK			1.03 V	66	107.9	-1.6
2	*2437.00	96.3 AV			1.03 V	66	97.9	-1.6
3	4874.00	36.5 PK	74.0	-37.5	1.62 V	130	33.3	3.2
4	4874.00	25.4 AV	54.0	-28.6	1.62 V	130	22.2	3.2
5	7311.00	41.6 PK	74.0	-32.4	1.77 V	221	32.7	8.9
6	7311.00	29.7 AV	54.0	-24.3	1.77 V	221	20.8	8.9

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	104.1 PK			1.23 H	333	105.7	-1.6
2	*2462.00	93.1 AV			1.23 H	333	94.7	-1.6
3	2483.50	59.6 PK	74.0	-14.4	1.23 H	333	61.1	-1.5
4	2483.50	48.6 AV	54.0	-5.4	1.23 H	333	50.1	-1.5
5	4924.00	36.6 PK	74.0	-37.4	1.64 H	223	33.3	3.3
6	4924.00	25.5 AV	54.0	-28.5	1.64 H	223	22.2	3.3
7	7386.00	42.1 PK	74.0	-31.9	1.78 H	350	32.9	9.2
8	7386.00	30.3 AV	54.0	-23.7	1.78 H	350	21.1	9.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	107.3 PK			1.00 V	89	108.9	-1.6
2	*2462.00	97.5 AV			1.00 V	89	99.1	-1.6
3	2483.50	64.6 PK	74.0	-9.4	1.00 V	89	66.1	-1.5
4	2483.50	50.2 AV	54.0	-3.8	1.00 V	89	51.7	-1.5
5	4924.00	36.9 PK	74.0	-37.1	1.62 V	126	33.6	3.3
6	4924.00	25.5 AV	54.0	-28.5	1.62 V	126	22.2	3.3
7	7386.00	41.8 PK	74.0	-32.2	1.77 V	201	32.6	9.2
8	7386.00	30.0 AV	54.0	-24.0	1.77 V	201	20.8	9.2

REMARKS:

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

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	69.5 PK	74.0	-4.5	1.47 H	224	70.7	-1.2
2	2390.00	52.8 AV	54.0	-1.2	1.47 H	224	54.0	-1.2
3	*2412.00	106.6 PK			1.47 H	224	107.9	-1.3
4	*2412.00	95.6 AV			1.47 H	224	96.9	-1.3
5	4824.00	37.1 PK	74.0	-36.9	1.70 H	214	34.0	3.1
6	4824.00	25.7 AV	54.0	-28.3	1.70 H	214	22.6	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	2390.00	70.2 PK	74.0	-3.8	1.56 V	253	71.4	-1.2
2	**2390.00**	**52.9 AV**	**54.0**	**-1.1**	**1.56 V**	**253**	**54.1**	**-1.2**
3	*2412.00	106.2 PK			1.56 V	253	107.5	-1.3
4	*2412.00	95.1 AV			1.56 V	253	96.4	-1.3
5	4824.00	36.9 PK	74.0	-37.1	1.67 V	121	33.8	3.1
6	4824.00	25.4 AV	54.0	-28.6	1.67 V	121	22.3	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.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	53.4 PK	74.0	-20.6	1.47 H	223	54.6	-1.2
2	2390.00	41.5 AV	54.0	-12.5	1.47 H	223	42.7	-1.2
3	*2437.00	107.3 PK			1.47 H	223	108.9	-1.6
4	*2437.00	97.6 AV			1.47 H	223	99.2	-1.6
5	2483.50	53.2 PK	74.0	-20.8	1.47 H	223	54.7	-1.5
6	2483.50	40.3 AV	54.0	-13.7	1.47 H	223	41.8	-1.5
7	4874.00	37.4 PK	74.0	-36.6	1.71 H	210	34.2	3.2
8	4874.00	25.9 AV	54.0	-28.1	1.71 H	210	22.7	3.2
9	7311.00	42.1 PK	74.0	-31.9	1.75 H	333	33.2	8.9
10	7311.00	30.2 AV	54.0	-23.8	1.75 H	333	21.3	8.9
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	53.1 PK	74.0	-20.9	1.56 V	201	54.3	-1.2
2	2390.00	41.2 AV	54.0	-12.8	1.56 V	201	42.4	-1.2
3	*2437.00	107.1 PK			1.56 V	201	108.7	-1.6
4	*2437.00	97.5 AV			1.56 V	201	99.1	-1.6
5	2483.50	53.0 PK	74.0	-21.0	1.56 V	201	54.5	-1.5
6	2483.50	40.1 AV	54.0	-13.9	1.56 V	201	41.6	-1.5
7	4874.00	36.3 PK	74.0	-37.7	1.66 V	135	33.1	3.2
8	4874.00	24.8 AV	54.0	-29.2	1.66 V	135	21.6	3.2
9	7311.00	41.1 PK	74.0	-32.9	1.74 V	222	32.2	8.9
10	7311.00	29.2 AV	54.0	-24.8	1.74 V	222	20.3	8.9

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	106.5 PK			1.47 H	220	108.1	-1.6
2	*2462.00	96.3 AV			1.47 H	220	97.9	-1.6
3	2483.50	62.3 PK	74.0	-11.7	1.47 H	220	63.8	-1.5
4	2483.50	52.6 AV	54.0	-1.4	1.47 H	220	54.1	-1.5
5	4924.00	36.8 PK	74.0	-37.2	1.69 H	215	33.5	3.3
6	4924.00	25.6 AV	54.0	-28.4	1.69 H	215	22.3	3.3
7	7386.00	41.5 PK	74.0	-32.5	1.77 H	341	32.3	9.2
8	7386.00	29.9 AV	54.0	-24.1	1.77 H	341	20.7	9.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	106.3 PK			1.53 V	129	107.9	-1.6
2	*2462.00	96.0 AV			1.53 V	129	97.6	-1.6
3	2483.50	65.1 PK	74.0	-8.9	1.53 V	129	66.6	-1.5
4	2483.50	52.7 AV	54.0	-1.3	1.53 V	129	54.2	-1.5
5	4924.00	36.5 PK	74.0	-37.5	1.66 V	125	33.2	3.3
6	4924.00	25.2 AV	54.0	-28.8	1.66 V	125	21.9	3.3
7	7386.00	41.3 PK	74.0	-32.7	1.78 V	215	32.1	9.2
8	7386.00	29.6 AV	54.0	-24.4	1.78 V	215	20.4	9.2

REMARKS:

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

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	62.7 PK	74.0	-11.3	1.45 H	220	63.9	-1.2
2	2390.00	51.2 AV	54.0	-2.8	1.45 H	220	52.4	-1.2
3	*2422.00	98.7 PK			1.45 H	220	100.2	-1.5
4	*2422.00	89.9 AV			1.45 H	220	91.4	-1.5
5	4844.00	36.9 PK	74.0	-37.1	1.65 H	210	33.8	3.1
6	4844.00	25.7 AV	54.0	-28.3	1.65 H	210	22.6	3.1
7	7266.00	42.1 PK	74.0	-31.9	1.78 H	331	33.2	8.9
8	7266.00	30.4 AV	54.0	-23.6	1.78 H	331	21.5	8.9
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	64.3 PK	74.0	-9.7	2.14 V	87	65.5	-1.2
2	**2390.00**	**52.9 AV**	**54.0**	**-1.1**	**2.14 V**	**87**	**54.1**	**-1.2**
3	*2422.00	102.2 PK			2.14 V	87	103.7	-1.5
4	*2422.00	93.0 AV			2.14 V	87	94.5	-1.5
5	4844.00	36.2 PK	74.0	-37.8	1.68 V	139	33.1	3.1
6	4844.00	24.9 AV	54.0	-29.1	1.68 V	139	21.8	3.1
7	7266.00	40.9 PK	74.0	-33.1	1.78 V	212	32.0	8.9
8	7266.00	29.5 AV	54.0	-24.5	1.78 V	212	20.6	8.9

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	65.2 PK	74.0	-8.8	1.82 H	224	66.4	-1.2
2	2390.00	51.6 AV	54.0	-2.4	1.82 H	224	52.8	-1.2
3	*2437.00	102.2 PK			1.82 H	224	103.8	-1.6
4	*2437.00	93.2 AV			1.82 H	224	94.8	-1.6
5	2483.50	59.9 PK	74.0	-14.1	1.82 H	224	61.4	-1.5
6	2483.50	47.2 AV	54.0	-6.8	1.82 H	224	48.7	-1.5
7	4874.00	36.9 PK	74.0	-37.1	1.66 H	203	33.7	3.2
8	4874.00	26.0 AV	54.0	-28.0	1.66 H	203	22.8	3.2
9	7311.00	41.3 PK	74.0	-32.7	1.74 H	334	32.4	8.9
10	7311.00	29.5 AV	54.0	-24.5	1.74 H	334	20.6	8.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	66.2 PK	74.0	-7.8	1.89 V	104	67.4	-1.2
2	2390.00	52.6 AV	54.0	-1.4	1.89 V	104	53.8	-1.2
3	*2437.00	104.3 PK			1.89 V	104	105.9	-1.6
4	*2437.00	95.0 AV			1.89 V	104	96.6	-1.6
5	2483.50	58.6 PK	74.0	-15.4	1.89 V	104	60.1	-1.5
6	2483.50	47.7 AV	54.0	-6.3	1.89 V	104	49.2	-1.5
7	4874.00	36.3 PK	74.0	-37.7	1.63 V	129	33.1	3.2
8	4874.00	25.3 AV	54.0	-28.7	1.63 V	129	22.1	3.2
9	7311.00	41.2 PK	74.0	-32.8	1.79 V	205	32.3	8.9
10	7311.00	29.5 AV	54.0	-24.5	1.79 V	205	20.6	8.9

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	103.8 PK			1.82 H	224	105.4	-1.6
2	*2452.00	94.5 AV			1.82 H	224	96.1	-1.6
3	2483.50	66.2 PK	74.0	-7.8	1.82 H	224	67.7	-1.5
4	2483.50	50.6 AV	54.0	-3.4	1.82 H	224	52.1	-1.5
5	4904.00	36.8 PK	74.0	-37.2	1.67 H	200	33.5	3.3
6	4904.00	25.5 AV	54.0	-28.5	1.67 H	200	22.2	3.3
7	7356.00	41.7 PK	74.0	-32.3	1.77 H	337	32.6	9.1
8	7356.00	30.2 AV	54.0	-23.8	1.77 H	337	21.1	9.1
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	105.6 PK			2.07 V	122	107.2	-1.6
2	*2452.00	96.1 AV			2.07 V	122	97.7	-1.6
3	2483.50	65.5 PK	74.0	-8.5	2.07 V	122	67.0	-1.5
4	2483.50	51.4 AV	54.0	-2.6	2.07 V	122	52.9	-1.5
5	4904.00	37.1 PK	74.0	-36.9	1.63 V	122	33.8	3.3
6	4904.00	25.6 AV	54.0	-28.4	1.63 V	122	22.3	3.3
7	7356.00	41.7 PK	74.0	-32.3	1.80 V	212	32.6	9.1
8	7356.00	29.7 AV	54.0	-24.3	1.80 V	212	20.6	9.1

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.

Below 1GHz Data:

802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	62.96	33.3 QP	40.0	-6.7	3.00 H	287	42.2	-8.9
2	135.49	38.6 QP	43.5	-4.9	2.00 H	290	47.3	-8.7
3	144.00	33.8 QP	43.5	-9.7	2.00 H	315	42.0	-8.2
4	199.65	30.1 QP	43.5	-13.4	1.00 H	81	41.4	-11.3
5	249.05	30.9 QP	46.0	-15.1	1.00 H	308	40.3	-9.4
6	668.77	29.4 QP	46.0	-16.6	1.50 H	92	29.2	0.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	62.52	36.6 QP	40.0	-3.4	1.00 V	166	45.4	-8.8
2	135.49	29.8 QP	43.5	-13.7	1.00 V	296	38.5	-8.7
3	245.61	25.6 QP	46.0	-20.4	2.00 V	276	35.0	-9.4
4	461.55	28.9 QP	46.0	-17.1	1.00 V	332	32.3	-3.4
5	644.35	30.4 QP	46.0	-15.6	3.00 V	360	30.2	0.2
6	798.85	33.5 QP	46.0	-12.5	1.50 V	346	31.0	2.5

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

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.	Date Of Calibration	Due Date Of Calibration
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 23, 2017	Nov. 22, 2018
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Sep. 05, 2017	Sep. 04, 2018
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Mar. 10, 2017	Mar. 09, 2018
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Aug. 15, 2017	Aug. 14, 2018
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA
Extension Cord	Extension Cord	1-1	Dec. 22, 2017	Dec. 21, 2018

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.

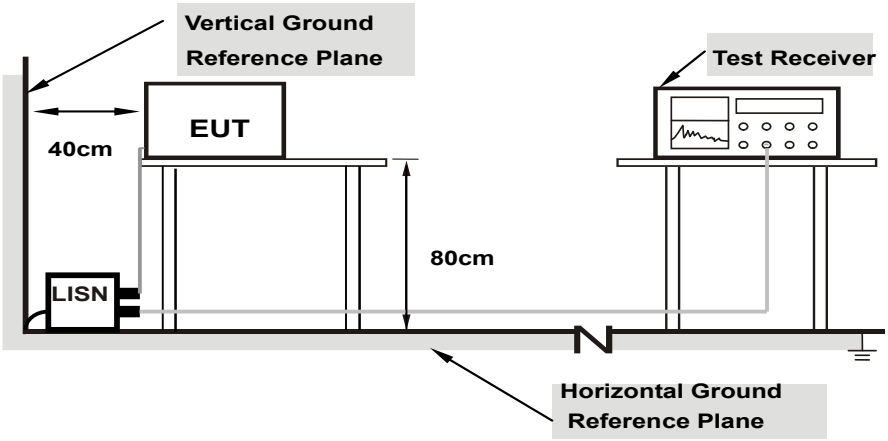
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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 4.1.6.

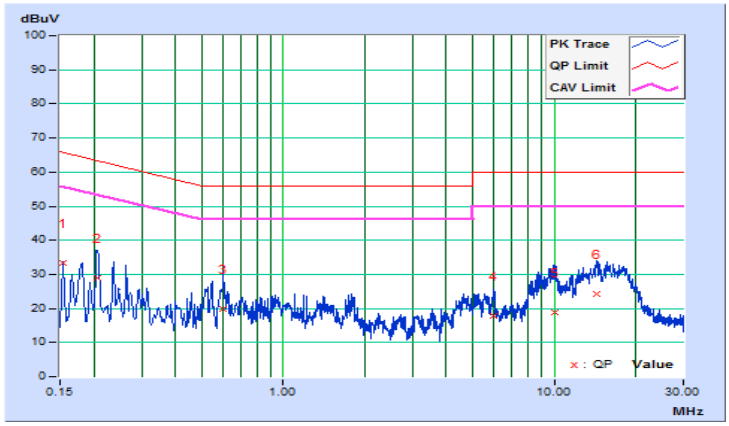
4.2.7 Test Results

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

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	10.16	23.16	8.99	33.32	19.15	65.79	55.79	-32.47	-36.64
2	0.20511	10.16	18.71	7.05	28.87	17.21	63.40	53.40	-34.53	-36.19
3	**0.59965**	**10.19**	**9.69**	**4.59**	**19.88**	**14.78**	**56.00**	**46.00**	**-36.12**	**-31.22**
4	5.99936	10.45	7.33	2.26	17.78	12.71	60.00	50.00	-42.22	-37.29
5	10.10095	10.66	8.23	1.38	18.89	12.04	60.00	50.00	-41.11	-37.96
6	14.27292	10.91	13.21	6.50	24.12	17.41	60.00	50.00	-35.88	-32.59

REMARKS:

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

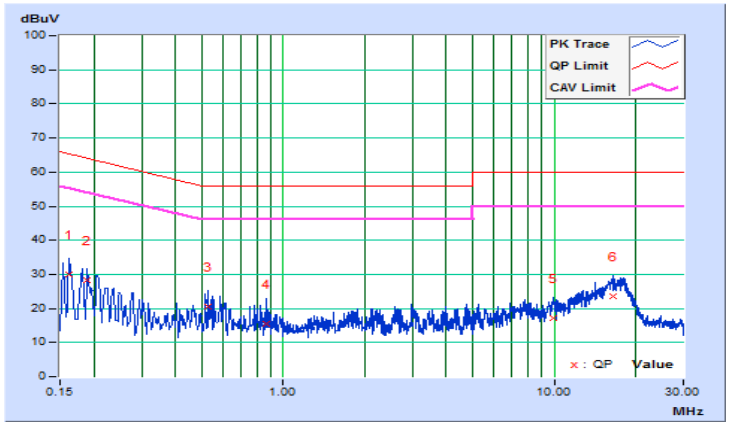


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value		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	0.16181	10.15	19.74	5.91	29.89	16.06	65.37	55.37	-35.48	-39.31
2	0.18910	10.16	18.09	4.29	28.25	14.45	64.08	54.08	-35.83	-39.63
3	0.52927	10.20	10.32	1.29	20.52	11.49	56.00	46.00	-35.48	-34.51
4	0.86553	10.20	5.22	1.55	15.42	11.75	56.00	46.00	-40.58	-34.25
5	9.90545	10.57	6.72	2.19	17.29	12.76	60.00	50.00	-42.71	-37.24
6	16.59155	10.87	12.56	7.45	23.43	18.32	60.00	50.00	-36.57	-31.68

REMARKS:

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

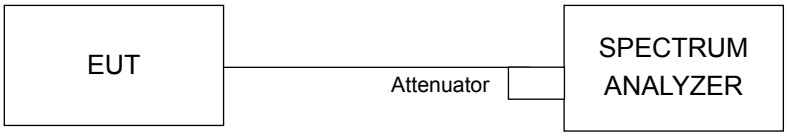


4.3 6dB Bandwidth Measurement

4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

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

4.3.5 Deviation fromTest Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	8.13	0.5	Pass
6	2437	8.11	0.5	Pass
11	2462	9.06	0.5	Pass

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	15.38	0.5	Pass
6	2437	15.49	0.5	Pass
11	2462	15.51	0.5	Pass

802.11n (HT20)

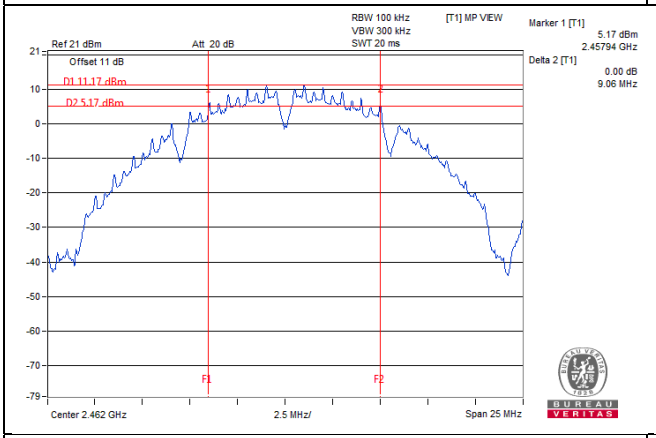
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	16.01	16.56	0.5	Pass
6	2437	15.99	16.59	0.5	Pass
11	2462	15.97	15.18	0.5	Pass

802.11n (HT40)

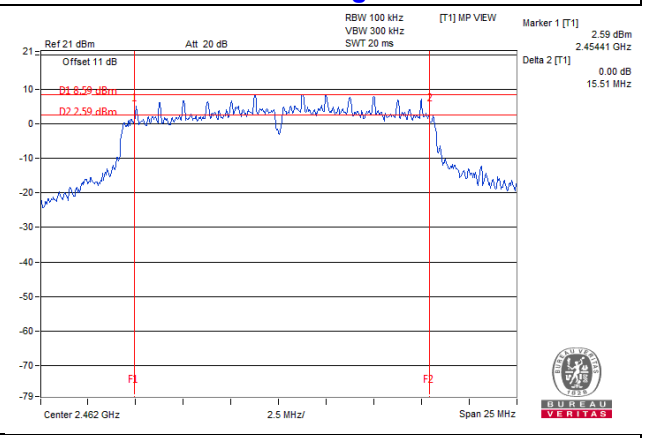
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
3	2422	35.24	35.18	0.5	Pass
6	2437	35.17	35.57	0.5	Pass
9	2452	36.41	35.56	0.5	Pass

Spectrum Plot of Worst Value

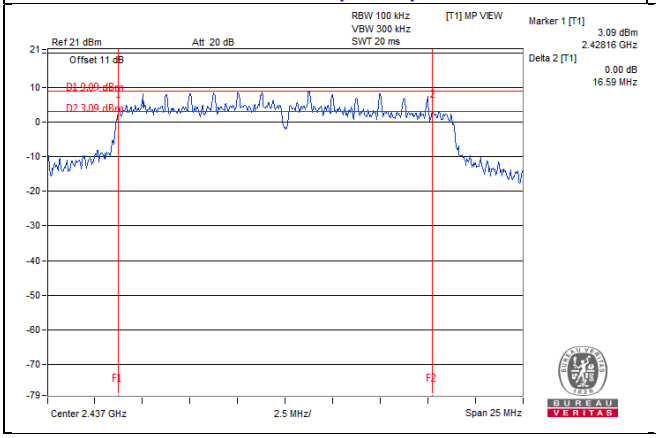
802.11b



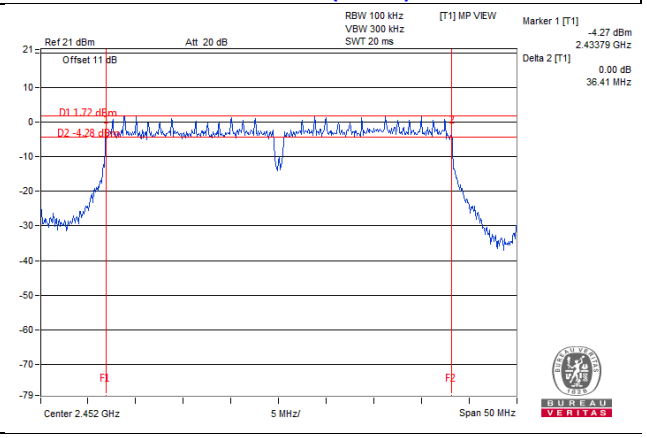
802.11g



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

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

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as Item 4.3.6.

4.4.7 Test Results

802.11b

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	149.624	21.75	30	Pass
6	2437	155.597	21.92	30	Pass
11	2462	153.462	21.86	30	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	219.280	23.41	30	Pass
6	2437	215.774	23.34	30	Pass
11	2462	210.863	23.24	30	Pass

802.11n (HT20)

Chan.	Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	18.61	18.85	149.347	21.74	30	Pass
6	2437	20.54	20.98	**238.554**	23.78	30	Pass
11	2462	20.05	20.13	204.197	23.10	30	Pass

802.11n (HT40)

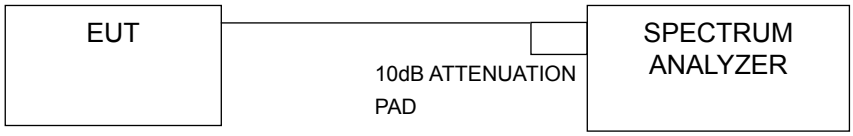
Chan.	Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	17.54	18.25	123.588	20.92	30	Pass
6	2437	20.16	20.80	223.979	23.50	30	Pass
9	2452	19.83	20.18	200.393	23.02	30	Pass

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

For 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 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. Don't 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	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Pass / Fail
1	2412	-2.16	8.00	Pass
6	2437	-1.75	8.00	Pass
11	2462	-0.59	8.00	Pass

802.11g

Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Pass / Fail
1	2412	-6.87	8.00	Pass
6	2437	-6.79	8.00	Pass
11	2462	-8.02	8.00	Pass

802.11n (HT20)

TX chain	Chan.	Freq. (MHz)	PSD (dBm/10kHz)	10 log (N=2) dB	Total PSD (dBm/10kHz)	Limit (dBm/10kHz)	Pass / Fail
0	1	2412	-11.49	3.01	-8.48	8.00	Pass
	6	2437	-8.37	3.01	-5.36	8.00	Pass
	11	2462	-8.89	3.01	-5.88	8.00	Pass
1	1	2412	-10.28	3.01	-7.27	8.00	Pass
	6	2437	-7.63	3.01	-4.62	8.00	Pass
	11	2462	-8.86	3.01	-5.85	8.00	Pass

NOTE:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = -2.4dBi +10log(2) = 0.61dBi < 6dBi, so the power density limit no need to reduce.

802.11n (HT40)

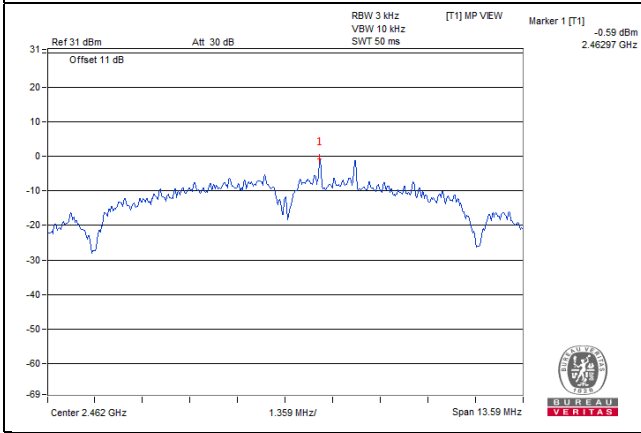
TX chain	Chan.	Freq. (MHz)	PSD (dBm/10kHz)	10 log (N=2) dB	Total PSD (dBm/10kHz)	Limit (dBm/10kHz)	Pass / Fail
0	3	2422	-15.47	3.01	-12.46	8.00	Pass
	6	2437	-12.28	3.01	-9.27	8.00	Pass
	9	2452	-14.79	3.01	-11.78	8.00	Pass
1	3	2422	-13.76	3.01	-10.75	8.00	Pass
	6	2437	-11.17	3.01	-8.16	8.00	Pass
	9	2452	-12.07	3.01	-9.06	8.00	Pass

NOTE:

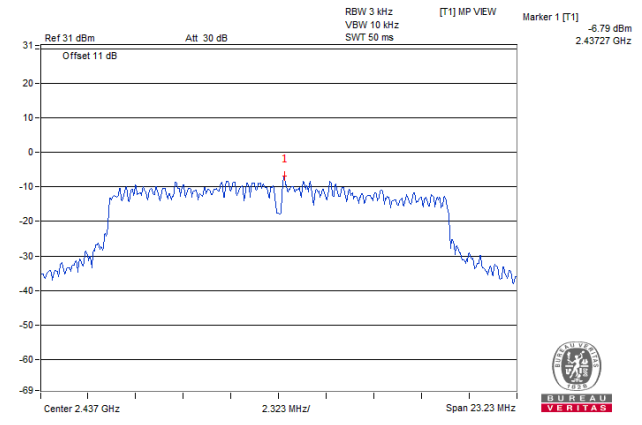
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = -2.4dBi +10log(2) = 0.61dBi < 6dBi, so the power density limit no need to reduce.

Spectrum Plot of Worst Value

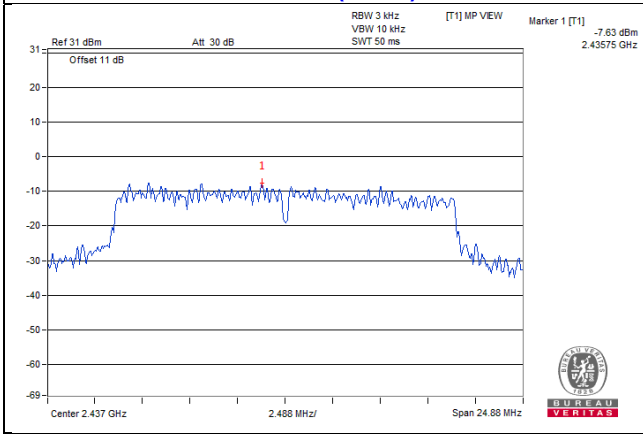
802.11b



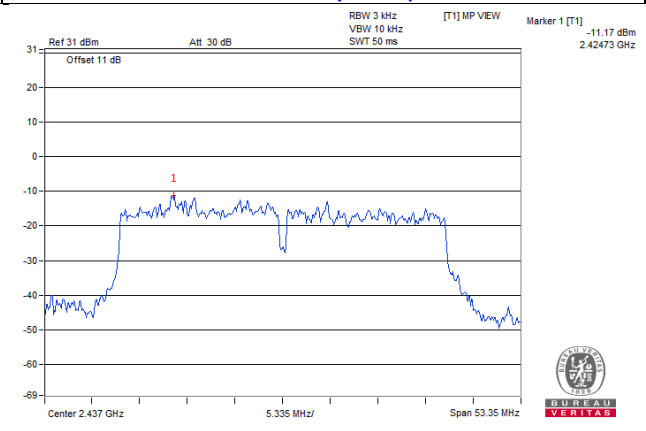
802.11g



802.11n (HT20)



802.11n (HT40)

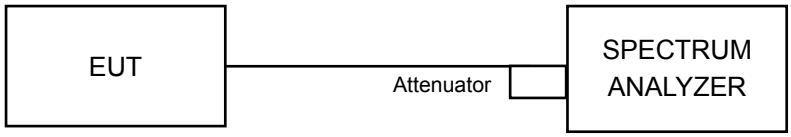


4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

a. Set the RBW = 100 kHz.
b. Set the VBW ≥ 300 kHz.
c. Detector = average.
d. Sweep time = auto couple.
e. Trace mode = max hold.
f. Allow trace to fully stabilize.
g. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

MEASUREMENT PROCEDURE OOBE

a. Set RBW = 100 kHz.
b. Set VBW ≥ 300 kHz.
c. Ensure that the number of measurement points ≥ span/RBW
d. According to measurement points to set differ measurement span.
e. Detector = average.
f. Trace Mode = max hold.
g. Sweep = auto couple.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

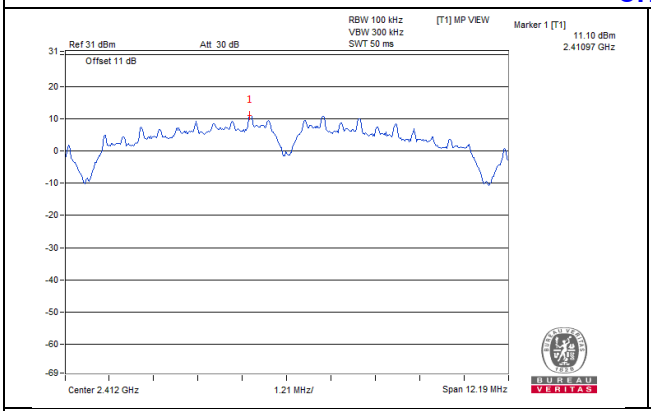
Same as Item 4.3.6

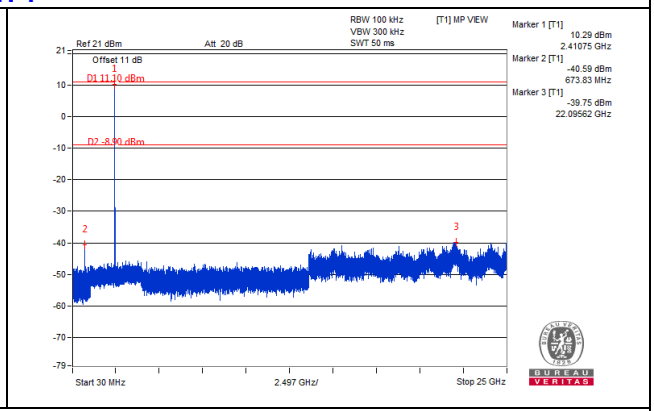
4.6.7 Test Results

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

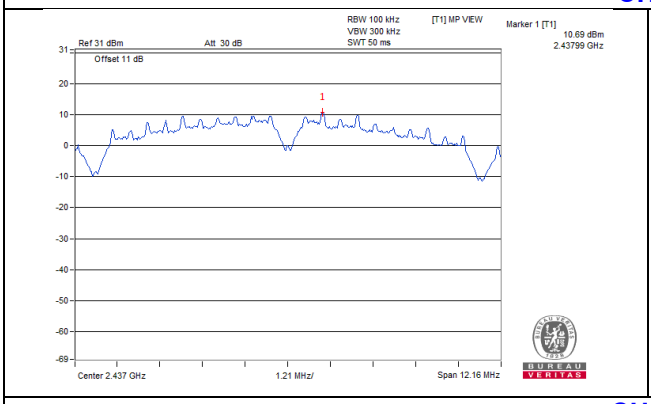
802.11b

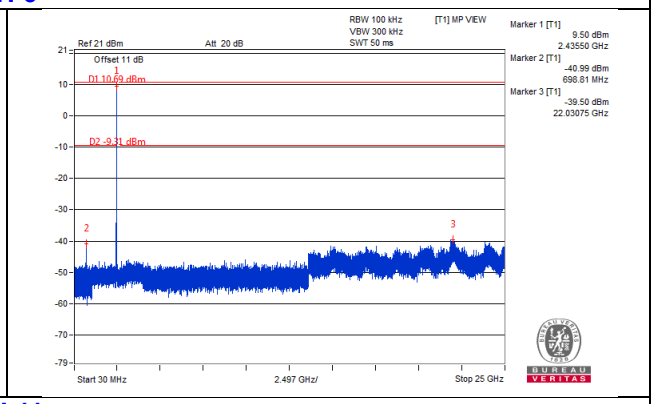
CH 1



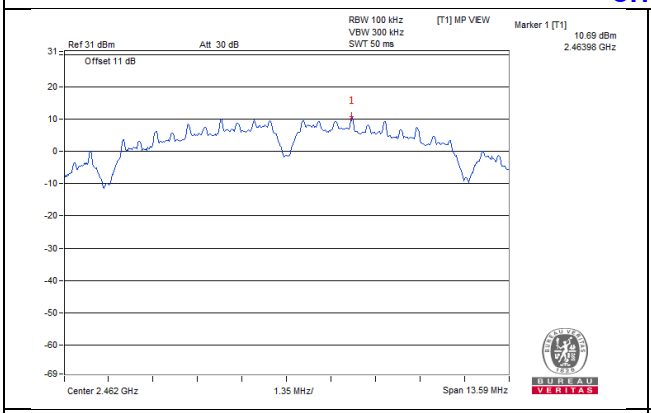


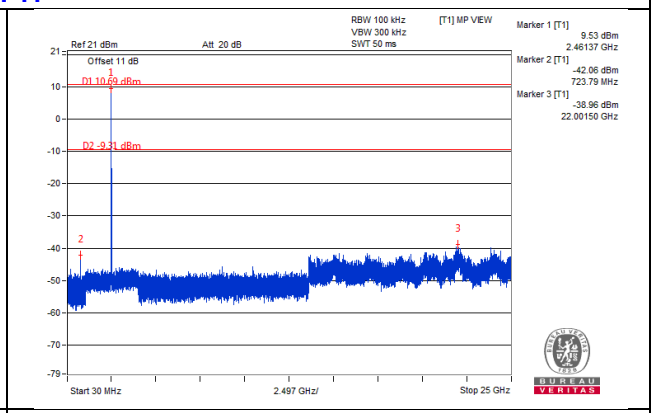
CH 6



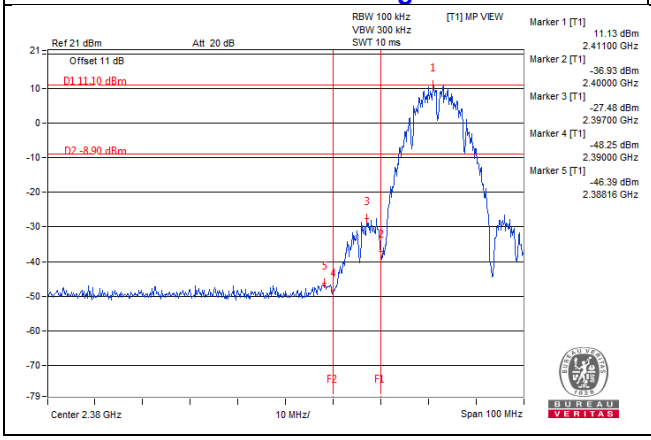


CH 11

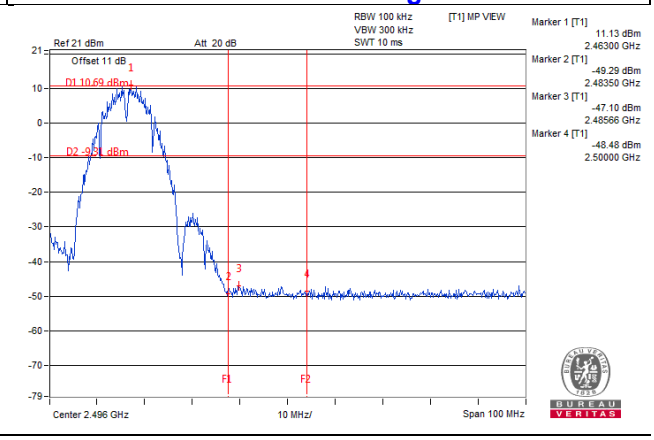




CH 1 Band edge

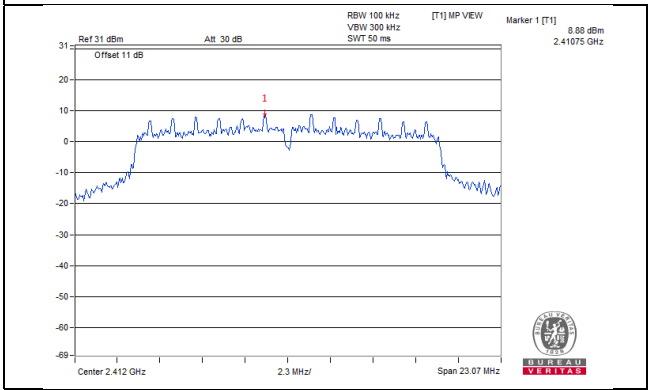


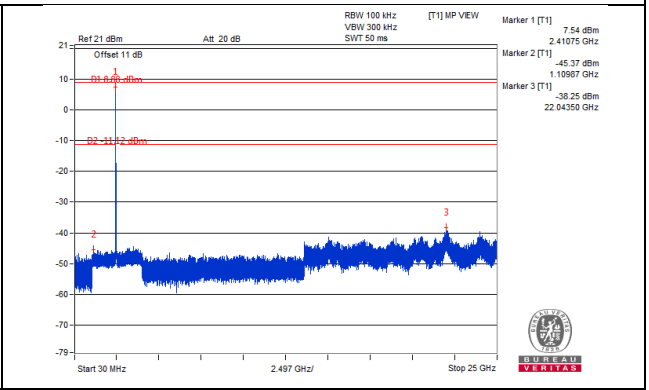
CH 11 Band edge



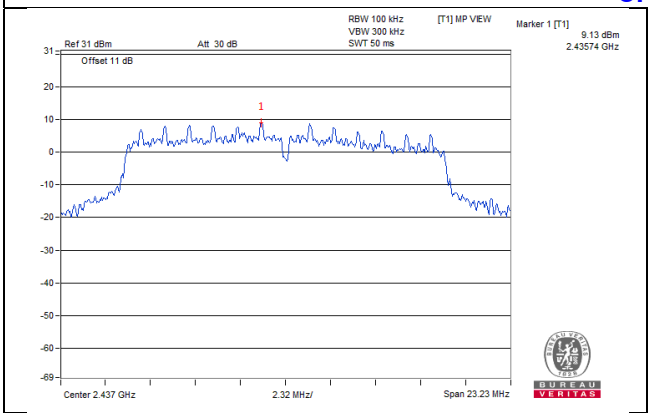
802.11g

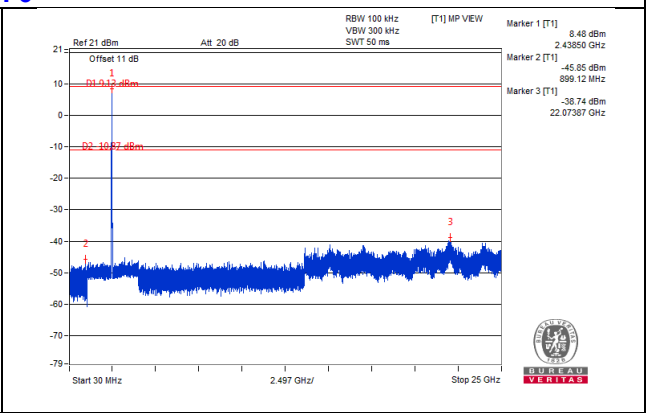
CH 1



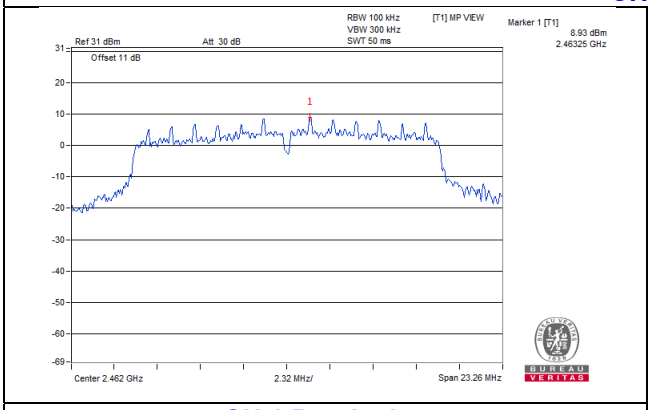


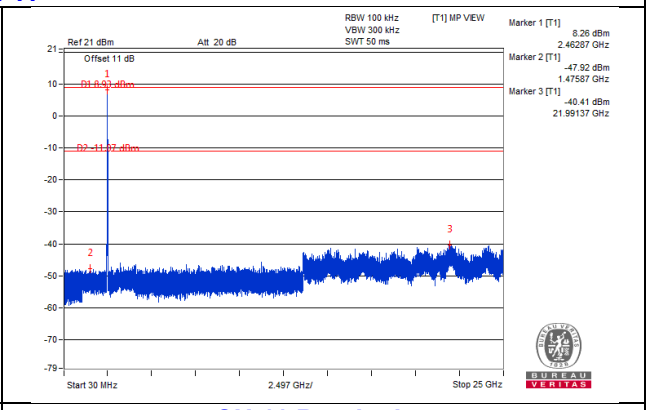
CH 6



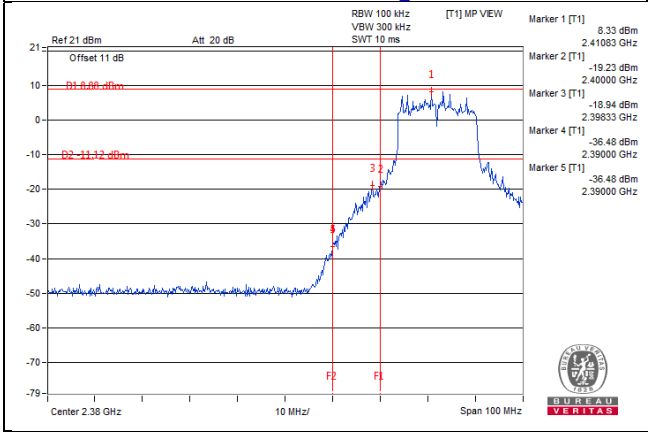


CH 11

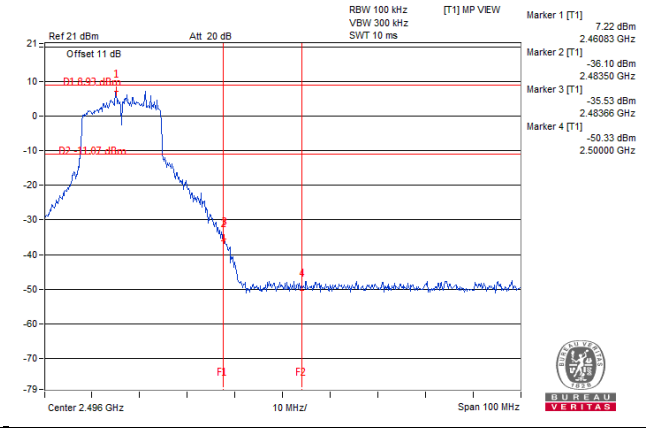




CH 1 Band edge

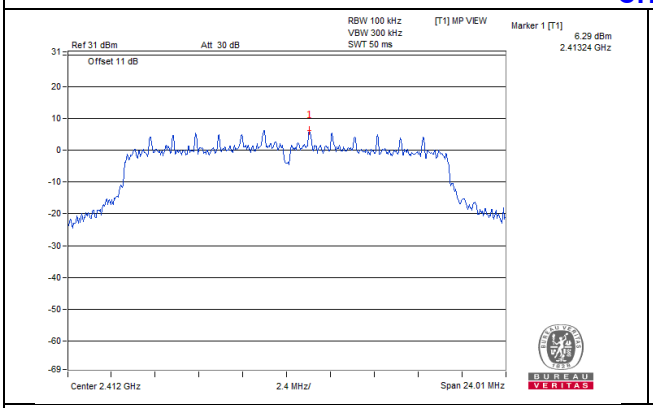


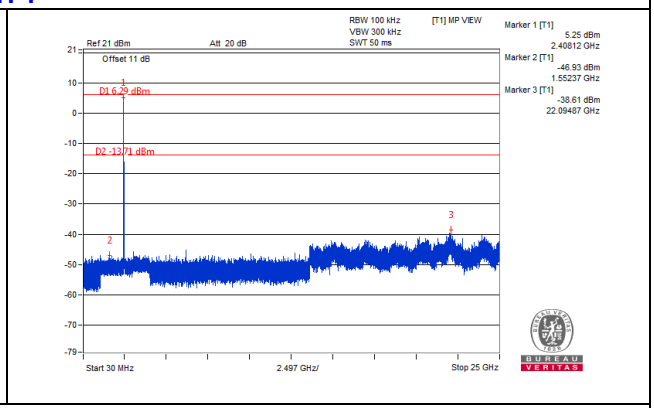
CH 11 Band edge



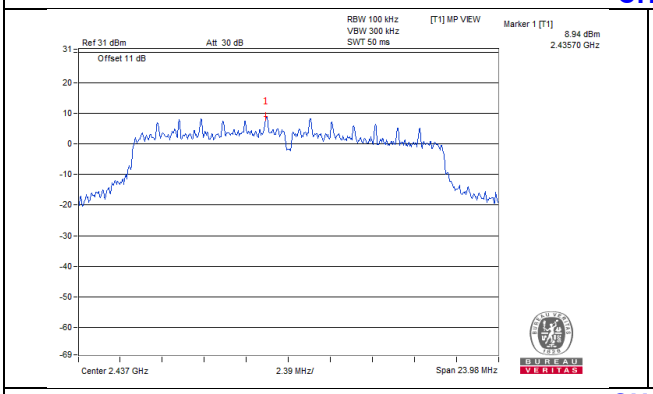
802.11n (HT20)
CHAIN 0

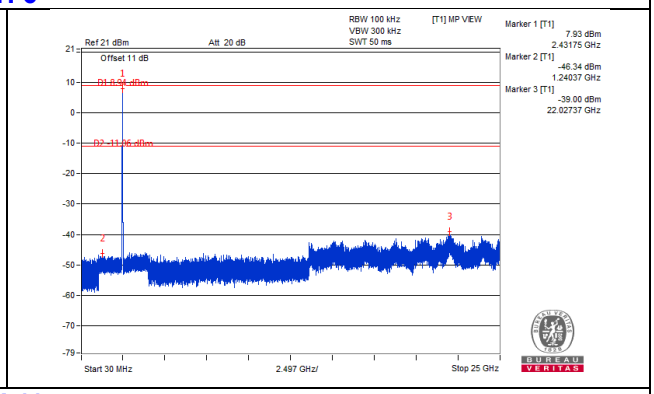
CH 1



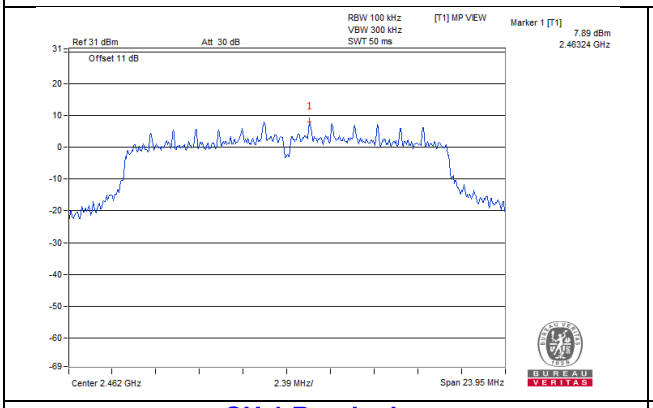


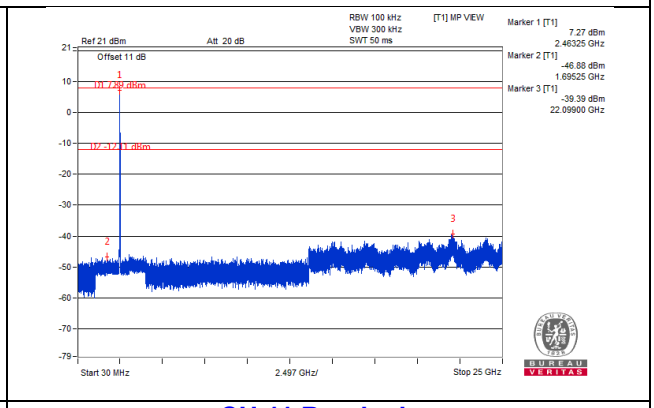
CH 6



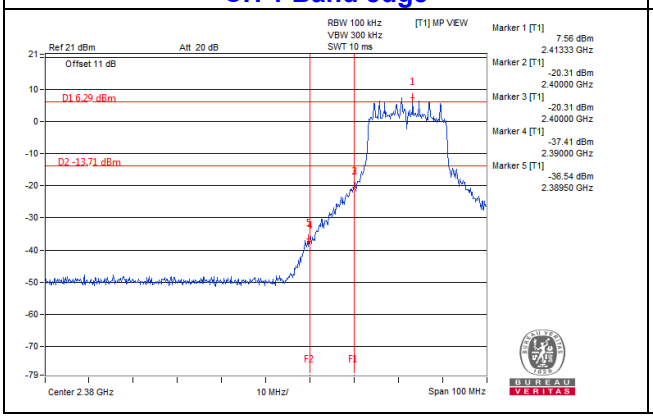


CH 11

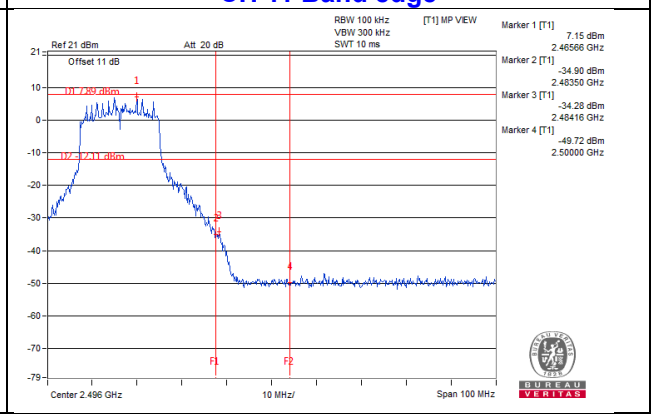




CH 1 Band edge

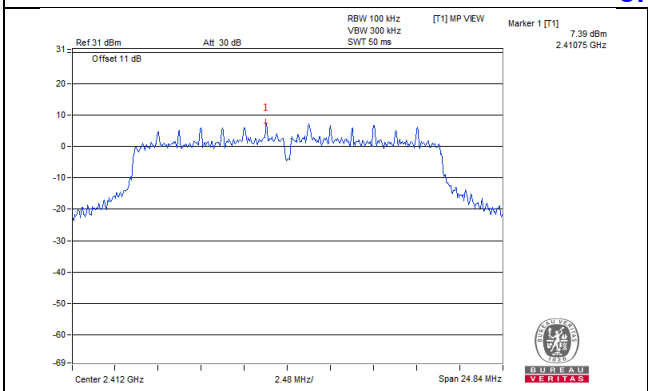


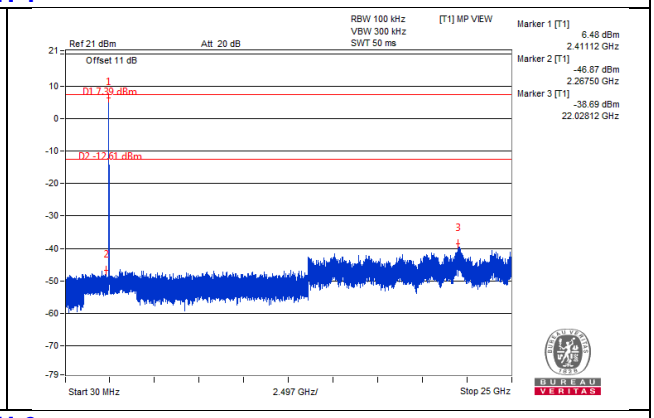
CH 11 Band edge



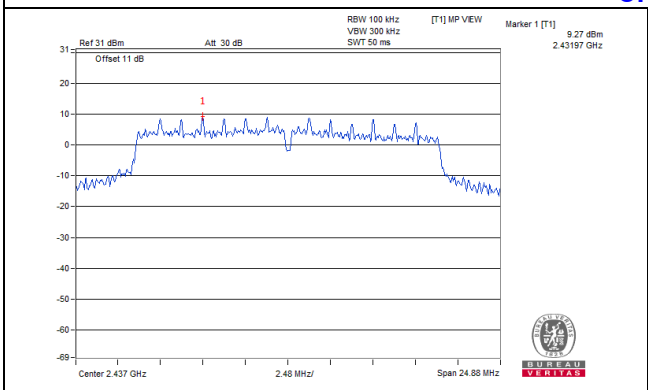
CHAIN 1

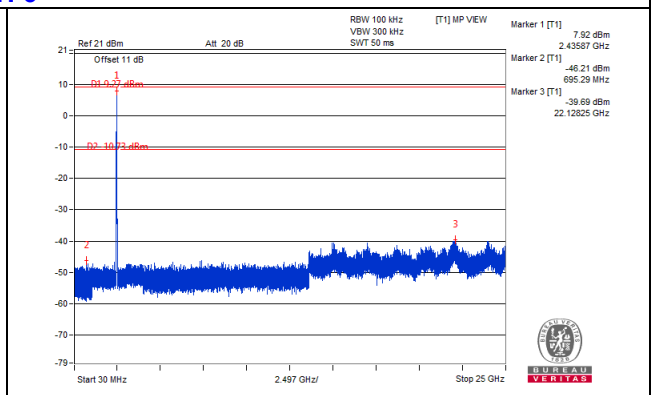
CH 1



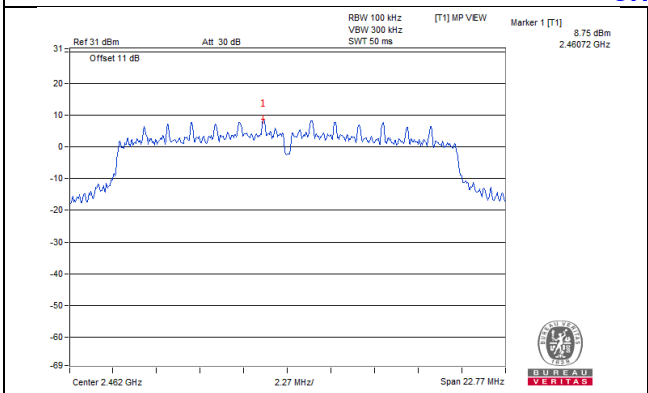


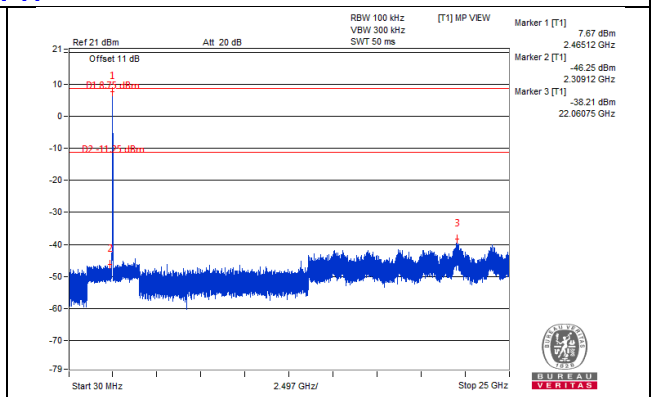
CH 6



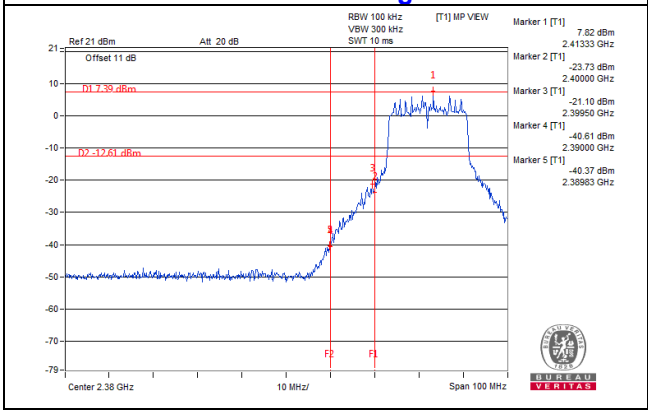


CH 11

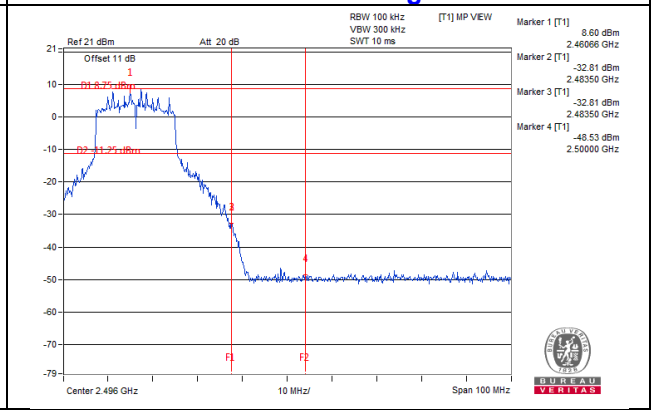




CH 1 Band edge

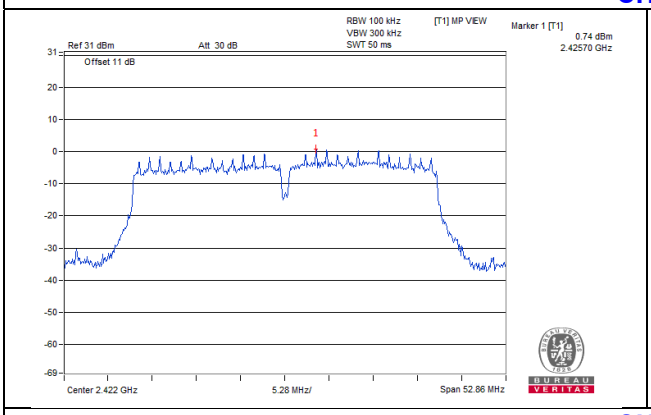


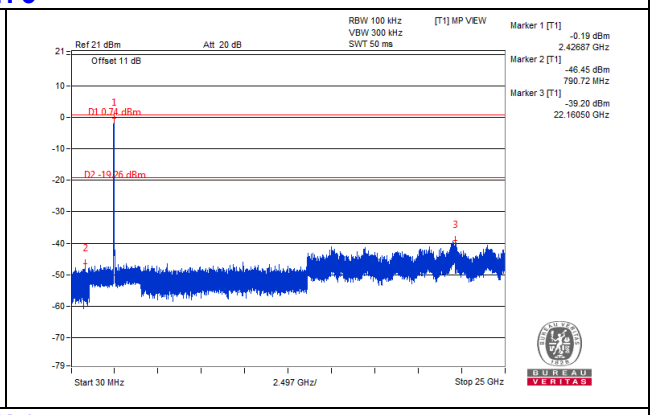
CH 11 Band edge



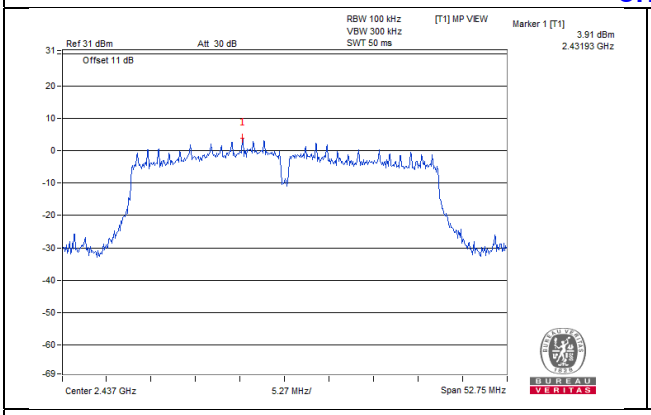
802.11n (HT40)
CHAIN 0

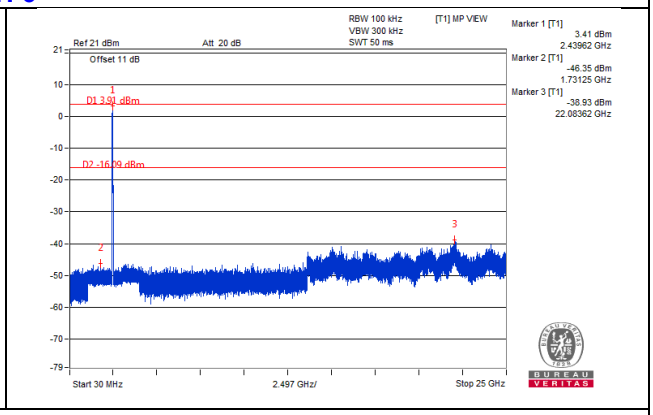
CH 3



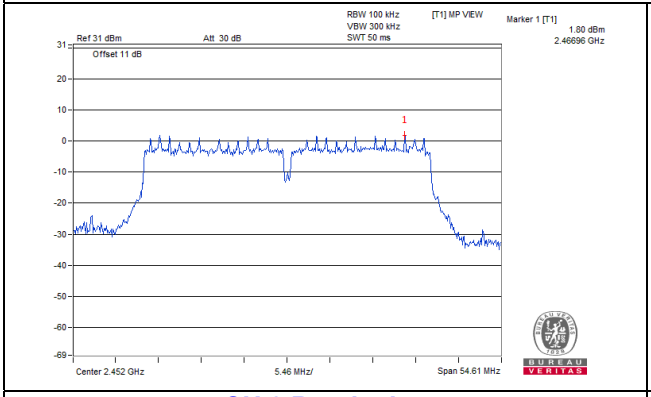


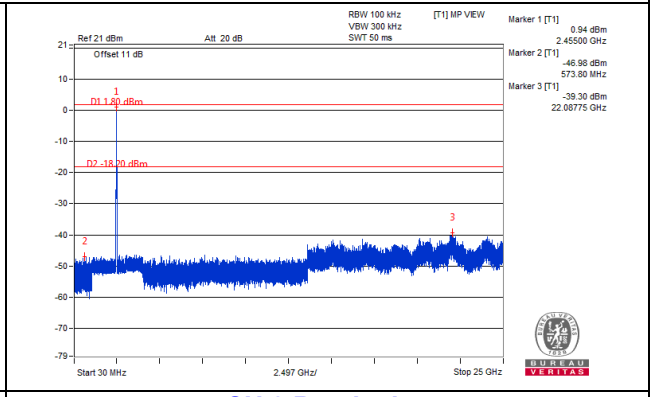
CH 6



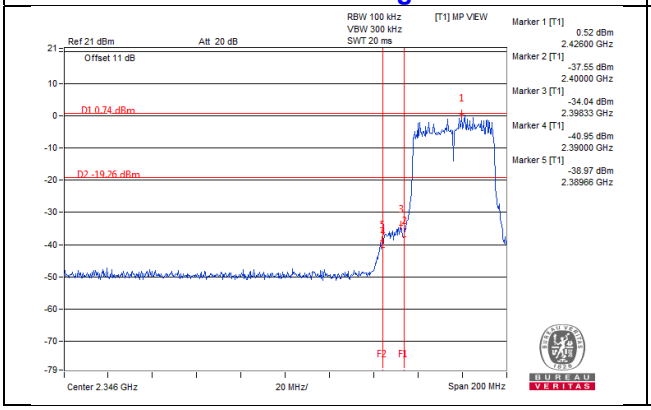


CH 9

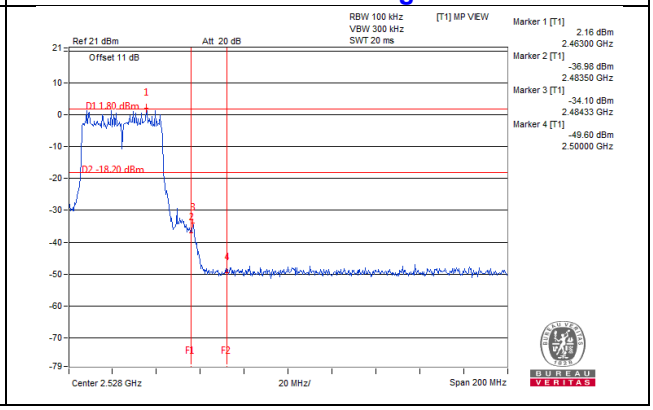




CH 3 Band edge

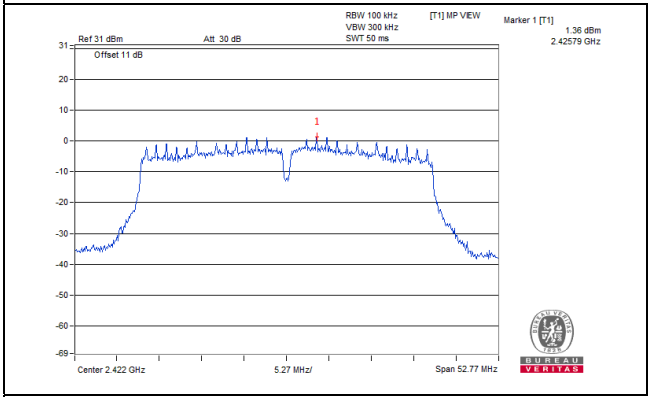


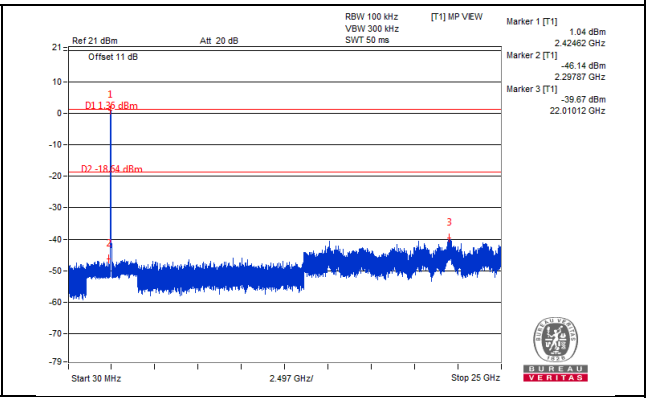
CH 9 Band edge



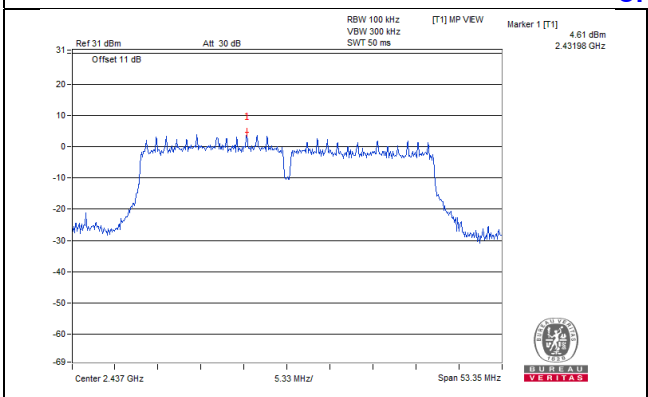
CHAIN 1

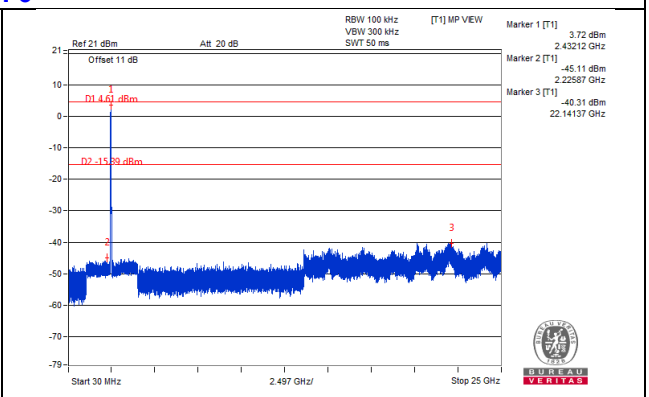
CH 3



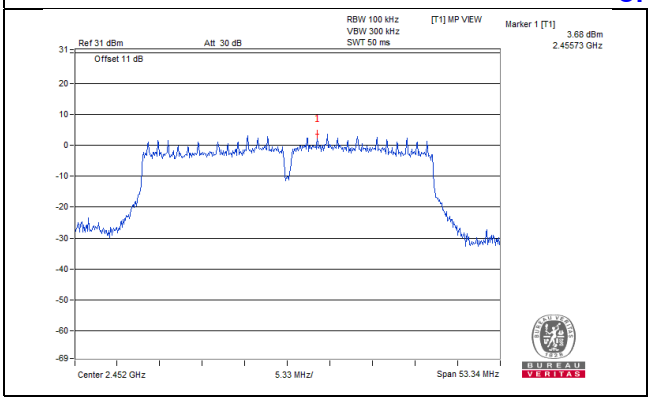


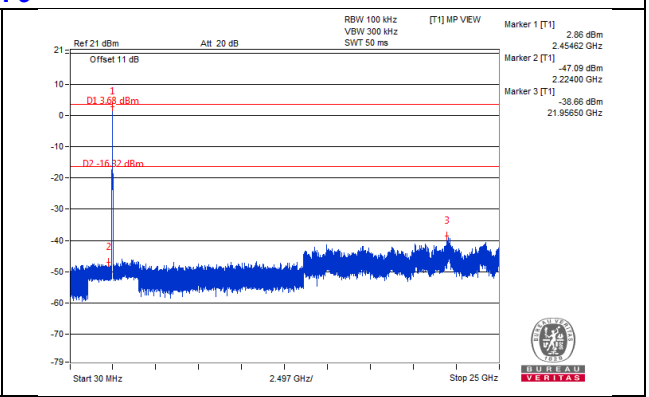
CH 6



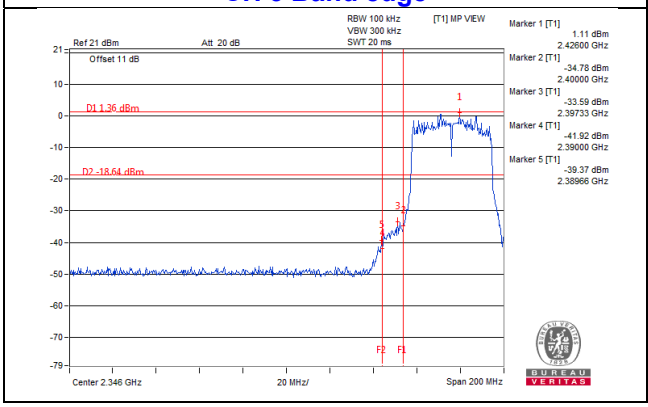


CH 9

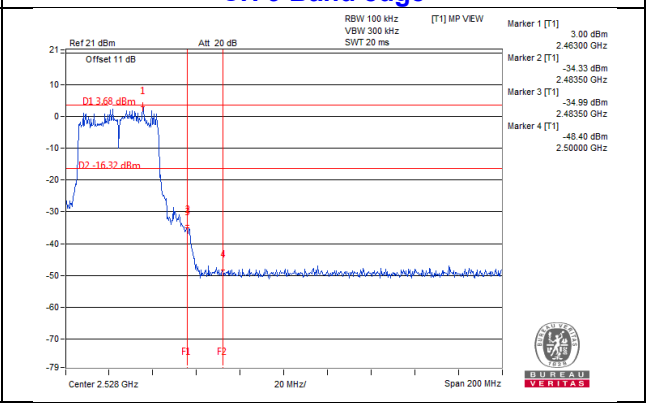




CH 3 Band edge



CH 9 Band edge



5 Pictures of Test Arrangements

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

Appendix – Information on the Testing Laboratories

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

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

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

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