FCC Test Report

Report No.:	RF160826C07
FCC ID:	WT8-OM2PHSV4
Test Model:	OM2P-HSv4
Received Date:	Aug. 26, 2016
Test Date:	Oct. 01 ~ Oct. 13, 2016
Issued Date:	Oct. 18, 2016
Applicant:	Open Mesh, Inc.
Address:	5 Centerpointe Drive, Suite 400, Lake Oswego, OR 97035
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan, R.O.C.
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)

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Release Control Record

Issue No.	Description	Date Issued
RF160826C07	Original release.	Oct. 18, 2016

1 Certificate of Conformity

Product:	Wireless 802.11b/g/n Mesh Router
Brand:	Open Mesh
Test Model:	OM2P-HSv4
Sample Status:	Engineering sample
Applicant:	Open Mesh, Inc.
Test Date:	Oct. 01 ~ Oct. 13, 2016
Standards:	47 CFR FCC Part 15, Subpart C (Section 15.247) ANSI C63.10:2013

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

Prepared by : Nadia Wang , **Date:** Oct. 18, 2016

Nadia Wang / Specialist

Approved by : Ken Liu , **Date:** Oct. 18, 2016

Ken Liu / Senior Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (SECTION 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -6.89dB at 0.50051MHz.
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 2386.00 & 2390.00 MHz.
15.247(d)	Antenna Port Emission	Pass	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	Pass	Meet the requirement of limit.
15.247(b)	Conducted power	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is IPEX not a standard connector.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.44 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.86 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	Wireless 802.11b/g/n Mesh Router
Brand	Open Mesh
Test Model	OM2P-HSv4
Status of EUT	Engineering sample
Power Supply Rating	12Vdc from adapter 24~48Vdc from POE
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 300Mbps
Operating Frequency	2412 ~ 2462MHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
Output Power	346.748mW
Antenna Type	PCB antenna with 2dBi gain
Antenna Connector	IPEX
Accessory Device	N/A
Data Cable Supplied	N/A

Note:

1. The EUT consumes power from the following adapter and POE. (Support unit only)

Adapter	
Brand	Powertron Electronics Corp.
Model	PA1015-120DUB150
Input Power	100-240Vac, 50/60Hz, 0.4A
Output Power	12Vdc, 1.5A, 18W Max
Power Line	1.5m cable without core attached on adapter

POE 1	
Brand	EnGenius
Model	EPE-4818G
Power Rating	48Vdc, 0.8A, 38.4W Max

Adapter for POE 1	
Brand	Powertron Electronics Corp.
Model	PA1040-480IB080
Input Power	100-240Vac, 50-60Hz, 1.5A
Output Power	48Vdc, 0.8A, 38.4W Max
Power Line	1.55m cable with one core attached on adapter

POE 2	
Brand	EnGenius
Model	EPE-1212
Power Rating	12-24Vdc, 0.6A

Adapter for POE 2	
Brand	EnGenius
Model	EPA-2406
Input Power	100-240Vac, 50-60Hz, 0.4A
Output Power	24Vdc, 0.6A, 14.4W Max

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

Modulation Mode	TX Function
802.11b	2TX
802.11g	2TX
802.11n (20MHz)	2TX
802.11n (40MHz)	2TX

3. 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	
A	√	√	√	√	Power from Adapter
B	-	√	√	-	Power from POE 1
C	-	√	√	-	Power from POE 2

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-AXIS.
2. "-" means no effect.

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)
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
A	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
A	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)
A, B, C	802.11b	1 to 11	1	DSSS	DBPSK	1

Power Line Conducted Emission Test:

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

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A, B, C	802.11b	1 to 11	1	DSSS	DBPSK	1

Antenna Port Conducted Measurement:

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

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

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

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

Test Condition:

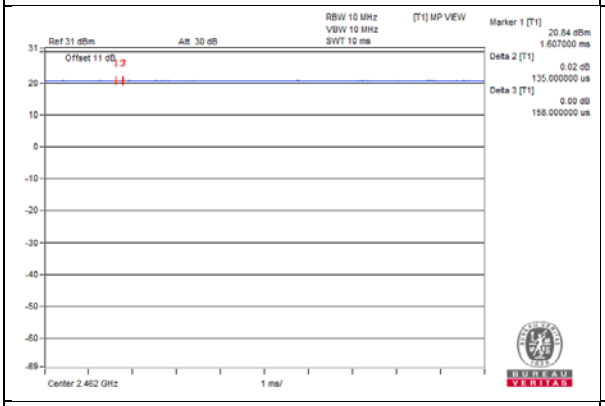
APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	19deg. C, 70%RH	120Vac, 60Hz	Jones Chang
RE<1G	19deg. C, 70%RH	120Vac, 60Hz	Jones Chang
PLC	20deg. C, 70%RH	120Vac, 60Hz	Jones Chang
APCM	25deg. C, 60%RH	120Vac, 60Hz	Ted Chang

3.3 Duty Cycle of Test Signal

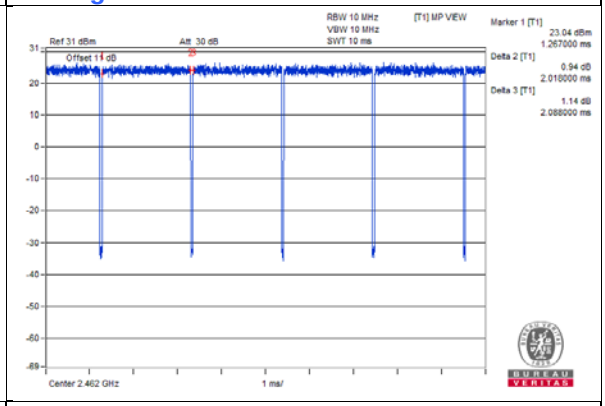
Duty cycle of test signal is > 98%, duty factor is not required.
Duty cycle of test signal is < 98%, duty factor is required.

802.11b: Duty cycle = 100%
802.11g: Duty cycle = 2.018/2.088 = 0.966, Duty factor = 10 * log(1/0.966) = 0.15
802.11n (HT20): Duty cycle = 1.875/1.957 = 0.958, Duty factor = 10 * log(1/0.958) = 0.19
802.11n (HT40): Duty cycle = 0.922/0.967 = 0.953, Duty factor = 10 * log(1/0.953) = 0.21

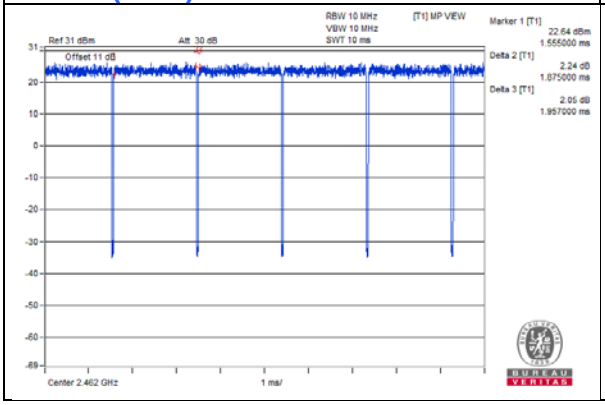
802.11b



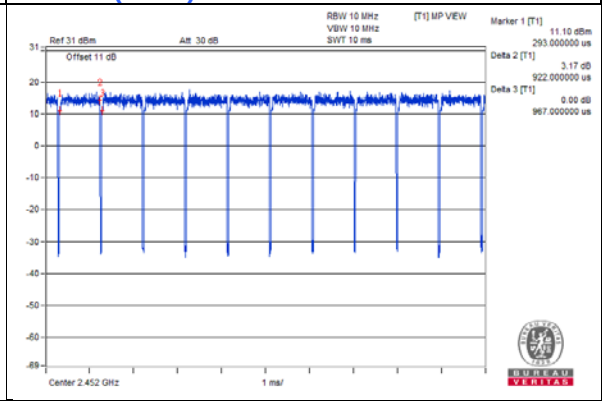
802.11g



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.	Adapter	Powertron Electronics Corp.	PA1015-120DUB150	N/A	N/A	Provided by client
B.	Notebook	DELL	E5410	1HC2XM1	FCC DoC Approved	-
C.	POE	EnGenius	EPE-4818G	N/A	N/A	Provided by client
D.	Adapter	Powertron Electronics Corp.	PA1040-480IB080	N/A	N/A	Provided by client
E.	POE	EnGenius	EPE-1212	N/A	N/A	Provided by client
F.	Adapter	EnGenius	EPA-2406	N/A	N/A	Provided by client

Note:

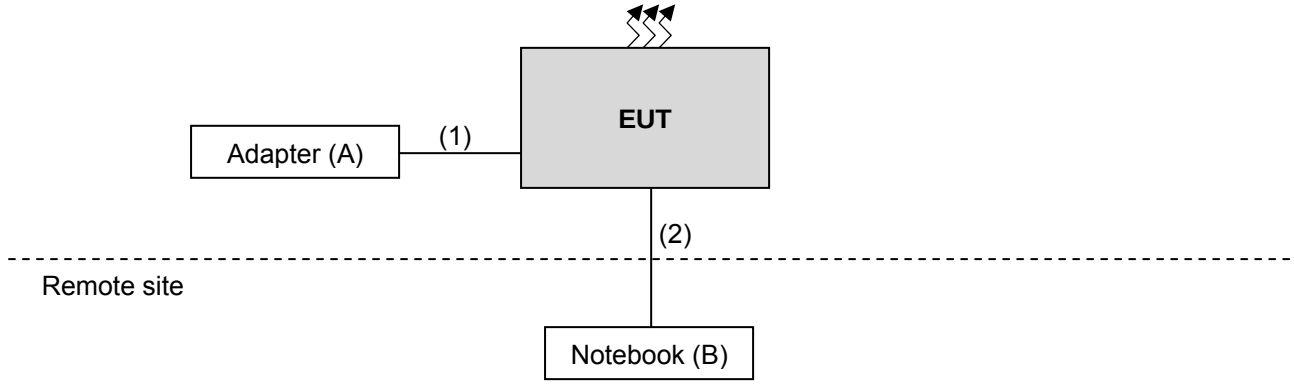
1. All power cords of the above support units are non-shielded (1.8m).
2. Items B, C, E acted as communication partners to transfer data.

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC Cable	1	1.5	N	0	Attached on adapter
2.	Cat5e Cable	1	3	N	0	-
3.	Cat5e Cable	1	1.8	N	0	-
4.	DC Cable	1	1.55	N	1	Attached on adapter
5.	DC Cable	1	1.55	N	0	Provided by client

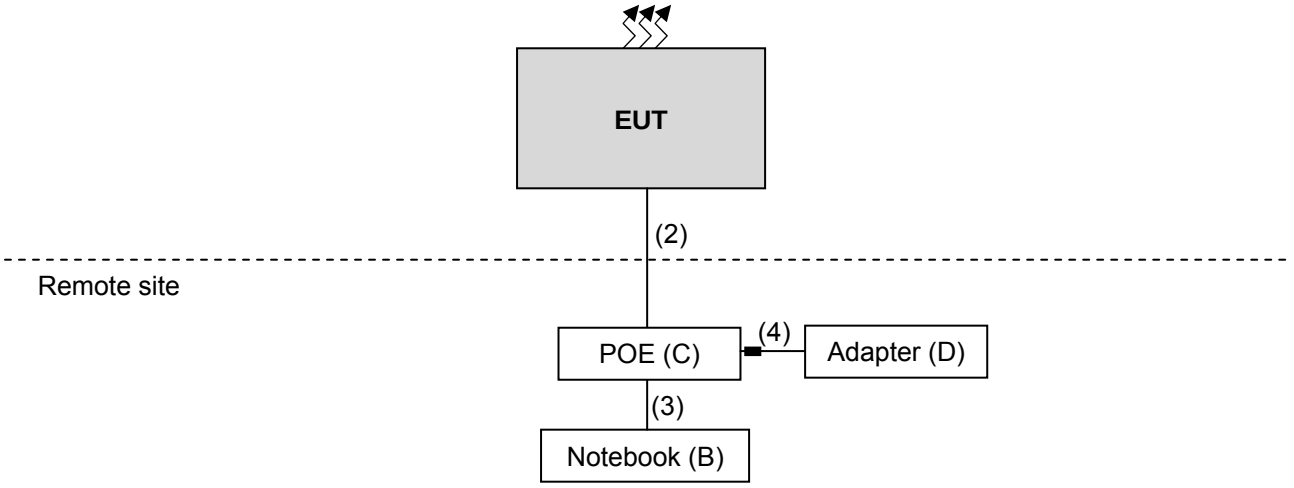
Note: The core(s) is(are) originally attached to the cable(s).

3.4.1 Configuration of System under Test

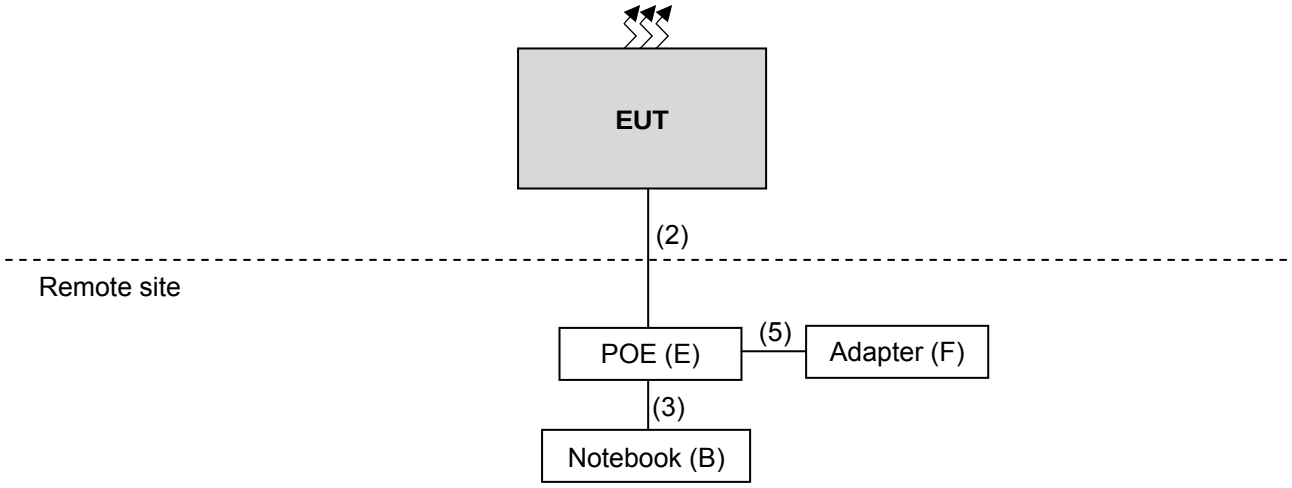
Mode A



Mode B



Mode C



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 v03r05
KDB 662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10-2013

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

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 30dB below the highest level of the desired power:

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

NOTE:

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

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESIB7	100187	Apr. 18, 2016	Apr. 17, 2017
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Aug. 16, 2016	Aug. 15, 2017
BILOG Antenna SCHWARZBECK	VULB9168	9168-171	Jan. 07, 2016	Jan. 06, 2017
HORN Antenna SCHWARZBECK	9120D	209	Jan. 20, 2016	Jan. 19, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Jan. 18, 2016	Jan. 17, 2017
Loop Antenna	EM-6879	269	Aug. 11, 2016	Aug. 10, 2017
Preamplifier Agilent	8447D	2944A10738	Aug. 22, 2016	Aug. 21, 2017
Preamplifier Agilent	8449B	3008A01964	Aug. 22, 2016	Aug. 21, 2017
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH3-03 (214378)	Aug. 22, 2016	Aug. 21, 2017
RF signal cable HUBER+SUHNER	SUCOFLEX 106	Cable-CH3-03 (309224+12738)	Aug. 22, 2016	Aug. 21, 2017
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	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
High Speed Peak Power Meter	ML2495A	0824012	Aug. 11, 2016	Aug. 10, 2017
Power Sensor	MA2411B	0738171	Aug. 11, 2016	Aug. 10, 2017

Note:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 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 Site Registration No. is 988962.
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. Both X and Y axes of the antenna are set to make the measurement.

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

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

NOTE:

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

For Radiated emission above 30MHz

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

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

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

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

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

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

Note:

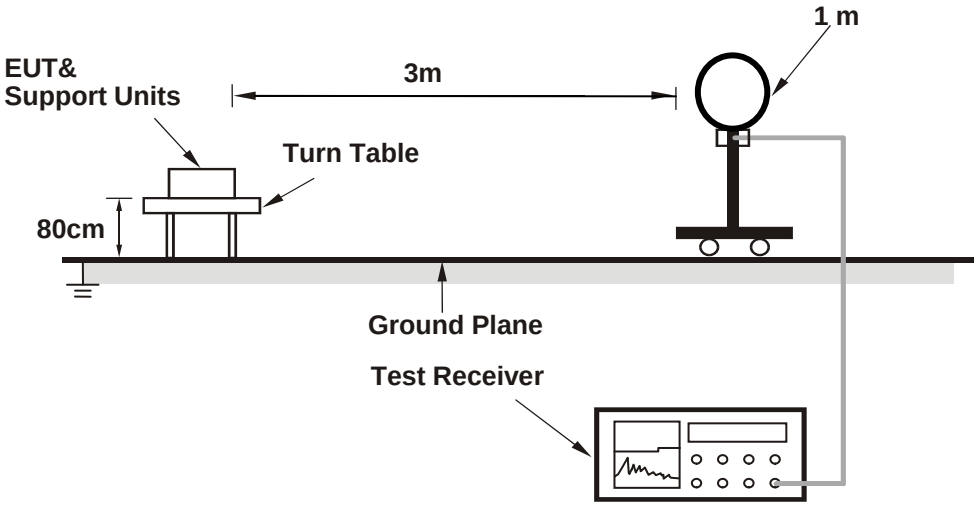
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

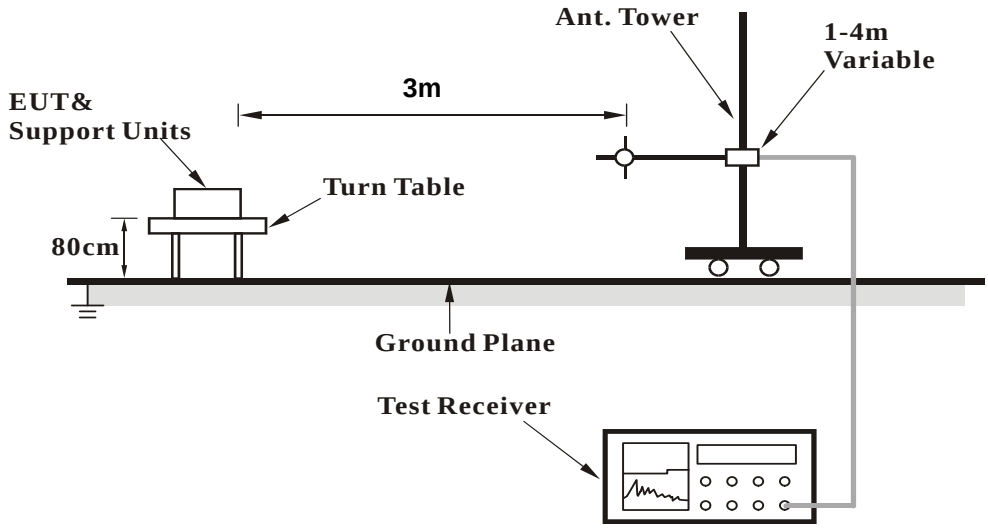
No deviation.

4.1.5 Test Setup

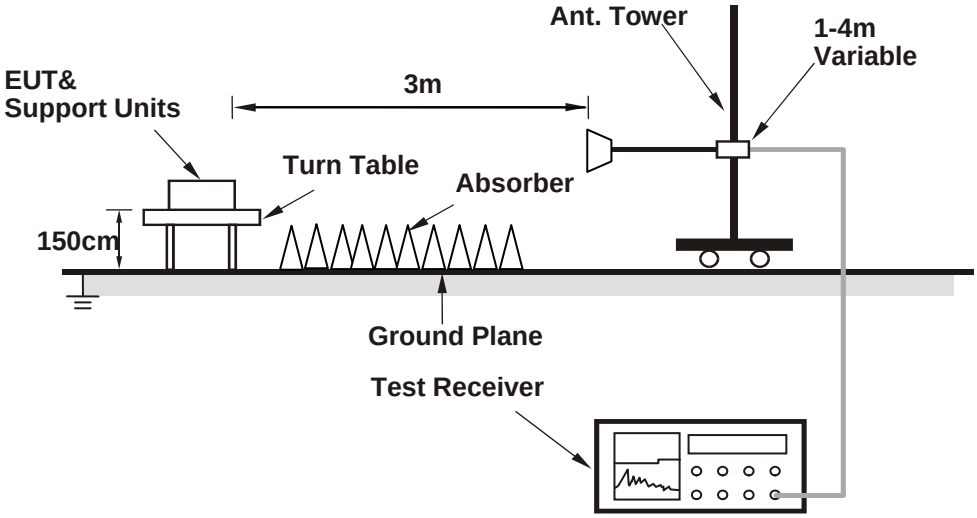
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

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

4.1.7 Test Results

Above 1GHz Data：

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	2386.00	60.4 PK	74.0	-13.6	1.81 H	311	29.50	30.90
2	**2386.00**	**53.0 AV**	**54.0**	**-1.0**	**1.81 H**	**311**	**22.10**	**30.90**
3	*2412.00	107.6 PK			1.94 H	326	76.50	31.10
4	*2412.00	104.4 AV			1.94 H	326	73.30	31.10
5	4824.00	49.8 PK	74.0	-24.2	1.86 H	150	45.30	4.50
6	4824.00	44.3 AV	54.0	-9.7	1.86 H	150	39.80	4.50
7	#7236.00	55.0 PK	74.0	-19.0	2.11 H	353	43.10	11.90
8	#7236.00	47.5 AV	54.0	-6.5	2.11 H	353	35.60	11.90
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	57.6 PK	74.0	-16.4	1.91 V	50	26.70	30.90
2	2390.00	48.2 AV	54.0	-5.8	1.91 V	50	17.30	30.90
3	*2412.00	101.7 PK			1.36 V	103	70.60	31.10
4	*2412.00	98.7 AV			1.36 V	103	67.60	31.10
5	4824.00	51.0 PK	74.0	-23.0	2.15 V	21	46.50	4.50
6	4824.00	45.8 AV	54.0	-8.2	2.15 V	21	41.30	4.50
7	#7236.00	55.4 PK	74.0	-18.6	1.92 V	160	43.50	11.90
8	#7236.00	45.8 AV	54.0	-8.2	1.92 V	160	33.90	11.90

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)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

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	60.1 PK	74.0	-13.9	1.99 H	306	29.20	30.90
2	2390.00	47.4 AV	54.0	-6.6	1.99 H	306	16.50	30.90
3	*2437.00	111.2 PK			1.31 H	326	80.10	31.10
4	*2437.00	107.5 AV			1.31 H	326	76.40	31.10
5	2483.50	67.9 PK	74.0	-6.1	1.24 H	310	36.60	31.30
6	2483.50	52.5 AV	54.0	-1.5	1.24 H	310	21.20	31.30
7	4874.00	53.1 PK	74.0	-20.9	2.62 H	287	48.50	4.60
8	4874.00	46.8 AV	54.0	-7.2	2.62 H	287	42.20	4.60
9	7311.00	56.6 PK	74.0	-17.4	1.73 H	190	44.50	12.10
10	7311.00	49.3 AV	54.0	-4.7	1.73 H	190	37.20	12.10
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	57.2 PK	74.0	-16.8	1.31 V	60	26.30	30.90
2	2390.00	44.7 AV	54.0	-9.3	1.31 V	60	13.80	30.90
3	*2437.00	105.7 PK			1.26 V	57	74.60	31.10
4	*2437.00	101.8 AV			1.26 V	57	70.70	31.10
5	2483.50	58.1 PK	74.0	-15.9	1.20 V	63	26.80	31.30
6	2483.50	47.7 AV	54.0	-6.3	1.20 V	63	16.40	31.30
7	4874.00	52.7 PK	74.0	-21.3	2.04 V	0	48.10	4.60
8	4874.00	46.7 AV	54.0	-7.3	2.04 V	0	42.10	4.60
9	7311.00	58.6 PK	74.0	-15.4	1.98 V	100	46.50	12.10
10	7311.00	48.8 AV	54.0	-5.2	1.98 V	100	36.70	12.10

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)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

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			1.84 H	324	75.30	31.20
2	*2462.00	103.5 AV			1.84 H	324	72.30	31.20
3	2487.00	60.7 PK	74.0	-13.3	2.10 H	311	29.40	31.30
4	2487.00	52.9 AV	54.0	-1.1	2.10 H	311	21.60	31.30
5	4924.00	48.1 PK	74.0	-25.9	1.84 H	179	43.60	4.50
6	4924.00	38.2 AV	54.0	-15.8	1.84 H	179	33.70	4.50
7	7386.00	53.7 PK	74.0	-20.3	1.89 H	358	41.60	12.10
8	7386.00	44.1 AV	54.0	-9.9	1.89 H	358	32.00	12.10
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	102.5 PK			3.46 V	136	71.30	31.20
2	*2462.00	98.8 AV			3.46 V	136	67.60	31.20
3	2483.50	57.3 PK	74.0	-16.7	3.40 V	140	26.00	31.30
4	2483.50	48.3 AV	54.0	-5.7	3.40 V	140	17.00	31.30
5	4924.00	49.0 PK	74.0	-25.0	2.00 V	0	44.50	4.50
6	4924.00	41.4 AV	54.0	-12.6	2.00 V	0	36.90	4.50
7	7386.00	54.5 PK	74.0	-19.5	1.95 V	172	42.40	12.10
8	7386.00	44.2 AV	54.0	-9.8	1.95 V	172	32.10	12.10

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	66.7 PK	74.0	-7.3	1.64 H	310	35.80	30.90
2	2390.00	52.9 AV	54.0	-1.1	1.64 H	310	22.00	30.90
3	*2412.00	112.1 PK			2.64 H	319	81.00	31.10
4	*2412.00	102.2 AV			2.64 H	319	71.10	31.10
5	4824.00	51.9 PK	74.0	-22.1	2.55 H	318	47.40	4.50
6	4824.00	39.3 AV	54.0	-14.7	2.55 H	318	34.80	4.50
7	#7236.00	55.3 PK	74.0	-18.7	1.98 H	352	43.40	11.90
8	#7236.00	44.6 AV	54.0	-9.4	1.98 H	352	32.70	11.90
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	62.8 PK	74.0	-11.2	1.53 V	64	31.90	30.90
2	2390.00	50.6 AV	54.0	-3.4	1.53 V	64	19.70	30.90
3	*2412.00	107.8 PK			1.69 V	74	76.70	31.10
4	*2412.00	97.8 AV			1.69 V	74	66.70	31.10
5	4824.00	51.2 PK	74.0	-22.8	2.23 V	163	46.70	4.50
6	4824.00	38.9 AV	54.0	-15.1	2.23 V	163	34.40	4.50
7	#7236.00	55.2 PK	74.0	-18.8	1.82 V	162	43.30	11.90
8	#7236.00	41.9 AV	54.0	-12.1	1.82 V	162	30.00	11.90

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)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

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	58.7 PK	74.0	-15.3	2.01 H	324	27.80	30.90
2	2390.00	48.0 AV	54.0	-6.0	2.01 H	324	17.10	30.90
3	*2437.00	113.5 PK			1.33 H	322	82.40	31.10
4	*2437.00	104.3 AV			1.33 H	322	73.20	31.10
5	2485.00	66.4 PK	74.0	-7.6	2.01 H	316	35.10	31.30
6	2485.00	52.9 AV	54.0	-1.1	2.01 H	316	21.60	31.30
7	4874.00	51.0 PK	74.0	-23.0	2.52 H	125	46.40	4.60
8	4874.00	37.9 AV	54.0	-16.1	2.52 H	125	33.30	4.60
9	7311.00	57.1 PK	74.0	-16.9	2.18 H	352	45.00	12.10
10	7311.00	45.3 AV	54.0	-8.7	2.18 H	352	33.20	12.10
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	56.2 PK	74.0	-17.8	1.86 V	66	25.30	30.90
2	2390.00	46.4 AV	54.0	-7.6	1.86 V	66	15.50	30.90
3	*2437.00	108.6 PK			1.96 V	79	77.50	31.10
4	*2437.00	99.4 AV			1.96 V	79	68.30	31.10
5	2483.50	59.2 PK	74.0	-14.8	1.96 V	79	27.90	31.30
6	2483.50	48.8 AV	54.0	-5.2	1.96 V	79	17.50	31.30
7	4874.00	49.4 PK	74.0	-24.6	1.87 V	323	44.80	4.60
8	4874.00	37.4 AV	54.0	-16.6	1.87 V	323	32.80	4.60
9	7311.00	62.6 PK	74.0	-11.4	3.46 V	346	50.50	12.10
10	7311.00	50.2 AV	54.0	-3.8	3.46 V	346	38.10	12.10

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	111.4 PK			1.49 H	317	80.20	31.20
2	*2462.00	101.6 AV			1.49 H	317	70.40	31.20
3	2485.00	66.7 PK	74.0	-7.3	1.82 H	320	35.40	31.30
4	2485.00	52.4 AV	54.0	-1.6	1.82 H	320	21.10	31.30
5	4924.00	49.8 PK	74.0	-24.2	3.20 H	131	45.30	4.50
6	4924.00	37.3 AV	54.0	-16.7	3.20 H	131	32.80	4.50
7	7386.00	54.6 PK	74.0	-19.4	1.80 H	354	42.50	12.10
8	7386.00	43.3 AV	54.0	-10.7	1.80 H	354	31.20	12.10
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	106.2 PK			1.78 V	74	75.00	31.20
2	*2462.00	96.7 AV			1.78 V	74	65.50	31.20
3	2483.50	60.8 PK	74.0	-13.2	1.69 V	64	29.50	31.30
4	2483.50	50.0 AV	54.0	-4.0	1.69 V	64	18.70	31.30
5	4924.00	50.5 PK	74.0	-23.5	1.86 V	352	46.00	4.50
6	4924.00	39.3 AV	54.0	-14.7	1.86 V	352	34.80	4.50
7	7386.00	56.5 PK	74.0	-17.5	2.11 V	90	44.40	12.10
8	7386.00	43.8 AV	54.0	-10.2	2.11 V	90	31.70	12.10

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	63.2 PK	74.0	-10.8	1.55 H	60	32.30	30.90
2	2390.00	52.7 AV	54.0	-1.3	1.55 H	60	21.80	30.90
3	*2412.00	111.8 PK			2.60 H	321	80.70	31.10
4	*2412.00	101.5 AV			2.60 H	321	70.40	31.10
5	4824.00	50.1 PK	74.0	-23.9	2.29 H	128	45.60	4.50
6	4824.00	36.8 AV	54.0	-17.2	2.29 H	128	32.30	4.50
7	#7236.00	56.3 PK	74.0	-17.7	1.99 H	197	44.40	11.90
8	#7236.00	43.9 AV	54.0	-10.1	1.99 H	197	32.00	11.90
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	60.0 PK	74.0	-14.0	2.03 V	82	29.10	30.90
2	2390.00	48.6 AV	54.0	-5.4	2.03 V	82	17.70	30.90
3	*2412.00	106.9 PK			2.09 V	81	75.80	31.10
4	*2412.00	95.6 AV			2.09 V	81	64.50	31.10
5	4824.00	51.0 PK	74.0	-23.0	1.90 V	349	46.50	4.50
6	4824.00	41.5 AV	54.0	-12.5	1.90 V	349	37.00	4.50
7	#7236.00	54.2 PK	74.0	-19.8	3.38 V	293	42.30	11.90
8	#7236.00	44.6 AV	54.0	-9.4	3.38 V	293	32.70	11.90

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)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

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	58.8 PK	74.0	-15.2	2.26 H	333	27.90	30.90
2	2390.00	47.8 AV	54.0	-6.2	2.26 H	333	16.90	30.90
3	*2437.00	113.1 PK			2.19 H	311	82.00	31.10
4	*2437.00	102.8 AV			2.19 H	311	71.70	31.10
5	2483.50	64.0 PK	74.0	-10.0	2.07 H	308	32.70	31.30
6	2483.50	52.5 AV	54.0	-1.5	2.07 H	308	21.20	31.30
7	4874.00	49.0 PK	74.0	-25.0	2.40 H	316	44.40	4.60
8	4874.00	36.0 AV	54.0	-18.0	2.40 H	316	31.40	4.60
9	7311.00	57.9 PK	74.0	-16.1	2.08 H	0	45.80	12.10
10	7311.00	44.7 AV	54.0	-9.3	2.08 H	0	32.60	12.10
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	54.8 PK	74.0	-19.2	1.79 V	314	23.90	30.90
2	2390.00	44.9 AV	54.0	-9.1	1.79 V	314	14.00	30.90
3	*2437.00	107.6 PK			1.64 V	74	76.50	31.10
4	*2437.00	98.3 AV			1.64 V	74	67.20	31.10
5	2483.50	58.5 PK	74.0	-15.5	1.66 V	69	27.20	31.30
6	2483.50	48.2 AV	54.0	-5.8	1.66 V	69	16.90	31.30
7	4874.00	48.1 PK	74.0	-25.9	1.98 V	203	43.50	4.60
8	4874.00	35.1 AV	54.0	-18.9	1.98 V	203	30.50	4.60
9	7311.00	61.6 PK	74.0	-12.4	3.48 V	349	49.50	12.10
10	7311.00	47.8 AV	54.0	-6.2	3.48 V	349	35.70	12.10

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	111.6 PK			1.79 H	323	80.40	31.20
2	*2462.00	101.4 AV			1.79 H	323	70.20	31.20
3	2483.50	66.7 PK	74.0	-7.3	1.72 H	338	35.40	31.30
4	2483.50	52.5 AV	54.0	-1.5	1.72 H	338	21.20	31.30
5	4924.00	47.6 PK	74.0	-26.4	2.56 H	153	43.10	4.50
6	4924.00	35.0 AV	54.0	-19.0	2.56 H	153	30.50	4.50
7	7386.00	54.6 PK	74.0	-19.4	1.90 H	352	42.50	12.10
8	7386.00	42.7 AV	54.0	-11.3	1.90 H	352	30.60	12.10
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	107.2 PK			1.78 V	78	76.00	31.20
2	*2462.00	97.1 AV			1.78 V	78	65.90	31.20
3	2483.50	63.6 PK	74.0	-10.4	1.78 V	78	32.30	31.30
4	2483.50	50.1 AV	54.0	-3.9	1.78 V	78	18.80	31.30
5	4924.00	50.4 PK	74.0	-23.6	2.12 V	80	45.90	4.50
6	4924.00	39.2 AV	54.0	-14.8	2.12 V	80	34.70	4.50
7	7386.00	54.6 PK	74.0	-19.4	3.33 V	313	42.50	12.10
8	7386.00	44.8 AV	54.0	-9.2	3.33 V	313	32.70	12.10

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	64.5 PK	74.0	-9.5	2.11 H	303	33.60	30.90
2	**2390.00**	**53.0 AV**	**54.0**	**-1.0**	**2.11 H**	**303**	**22.10**	**30.90**
3	*2422.00	102.2 PK			2.10 H	315	71.10	31.10
4	*2422.00	93.2 AV			2.10 H	315	62.10	31.10
5	4824.00	46.1 PK	74.0	-27.9	1.89 H	82	41.60	4.50
6	4824.00	34.3 AV	54.0	-19.7	1.89 H	82	29.80	4.50
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	60.5 PK	74.0	-13.5	1.86 V	78	29.60	30.90
2	2390.00	50.5 AV	54.0	-3.5	1.86 V	78	19.60	30.90
3	*2422.00	97.4 PK			2.07 V	80	66.30	31.10
4	*2422.00	87.9 AV			2.07 V	80	56.80	31.10
5	4824.00	45.3 PK	74.0	-28.7	2.30 V	300	40.80	4.50
6	4824.00	32.8 AV	54.0	-21.2	2.30 V	300	28.30	4.50

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	64.0 PK	74.0	-10.0	1.97 H	287	33.10	30.90
2	2390.00	52.4 AV	54.0	-1.6	1.97 H	287	21.50	30.90
3	*2437.00	107.3 PK			1.68 H	307	76.20	31.10
4	*2437.00	97.3 AV			1.68 H	307	66.20	31.10
5	4874.00	47.3 PK	74.0	-26.7	1.96 H	127	42.70	4.60
6	4874.00	35.5 AV	54.0	-18.5	1.96 H	127	30.90	4.60
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	58.5 PK	74.0	-15.5	1.57 V	74	27.60	30.90
2	2390.00	48.0 AV	54.0	-6.0	1.57 V	74	17.10	30.90
3	*2437.00	102.7 PK			2.18 V	63	71.60	31.10
4	*2437.00	92.7 AV			2.18 V	63	61.60	31.10
5	4874.00	46.7 PK	74.0	-27.3	1.91 V	333	42.10	4.60
6	4874.00	35.3 AV	54.0	-18.7	1.91 V	333	30.70	4.60

REMARKS:

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

CHANNEL	TX Channel 9	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	102.0 PK			2.13 H	322	70.80	31.20
2	*2452.00	93.7 AV			2.13 H	322	62.50	31.20
3	2483.50	66.0 PK	74.0	-8.0	2.28 H	316	34.70	31.30
4	2483.50	52.8 AV	54.0	-1.2	2.28 H	316	21.50	31.30
5	4904.00	46.3 PK	74.0	-27.7	2.22 H	75	41.80	4.50
6	4904.00	34.0 AV	54.0	-20.0	2.22 H	75	29.50	4.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	97.6 PK			1.47 V	68	66.40	31.20
2	*2452.00	88.5 AV			1.47 V	68	57.30	31.20
3	2483.50	58.1 PK	74.0	-15.9	1.61 V	83	26.80	31.30
4	2483.50	47.9 AV	54.0	-6.1	1.61 V	83	16.60	31.30
5	4904.00	45.6 PK	74.0	-28.4	2.08 V	269	41.10	4.50
6	4904.00	33.5 AV	54.0	-20.5	2.08 V	269	29.00	4.50

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	9kHz ~ 1GHz	TEST MODE	A

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	57.12	29.0 QP	40.0	-11.0	1.99 H	16	43.60	-14.60
2	134.89	37.9 QP	43.5	-5.6	1.99 H	243	52.90	-15.00
3	158.22	32.1 QP	43.5	-11.4	1.49 H	73	45.80	-13.70
4	193.22	29.4 QP	43.5	-14.1	1.49 H	105	45.80	-16.40
5	259.33	25.7 QP	46.0	-20.3	1.49 H	90	39.40	-13.70
6	418.76	26.0 QP	46.0	-20.0	1.00 H	233	35.60	-9.60
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	55.18	38.6 QP	40.0	-1.4	1.99 V	258	53.00	-14.40
2	70.73	35.8 QP	40.0	-4.2	1.50 V	110	52.30	-16.50
3	121.28	38.3 QP	43.5	-5.2	1.50 V	16	54.60	-16.30
4	138.78	37.7 QP	43.5	-5.8	1.00 V	340	52.40	-14.70
5	265.16	24.8 QP	46.0	-21.2	1.00 V	340	38.20	-13.40
6	420.70	28.1 QP	46.0	-17.9	1.50 V	295	37.60	-9.50

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

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

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	41.57	31.1 QP	40.0	-8.9	1.51 H	79	46.20	-15.10
2	57.12	28.1 QP	40.0	-11.9	1.51 H	16	42.70	-14.60
3	103.78	27.6 QP	43.5	-15.9	2.00 H	259	45.70	-18.10
4	158.22	31.6 QP	43.5	-11.9	1.51 H	82	45.30	-13.70
5	424.59	28.3 QP	46.0	-17.7	2.00 H	229	37.60	-9.30
6	1000.00	34.9 QP	54.0	-19.1	2.00 H	148	32.90	2.00
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	41.57	36.6 QP	40.0	-3.4	1.00 V	15	51.70	-15.10
2	59.06	36.0 QP	40.0	-4.0	1.00 V	325	50.70	-14.70
3	105.73	35.6 QP	43.5	-7.9	1.00 V	15	53.50	-17.90
4	142.67	25.9 QP	43.5	-17.6	1.00 V	217	40.20	-14.30
5	307.93	23.5 QP	46.0	-22.5	1.00 V	15	35.40	-11.90
6	426.53	26.1 QP	46.0	-19.9	1.00 V	171	35.30	-9.20

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

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

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	57.12	28.5 QP	40.0	-11.5	1.99 H	8	43.10	-14.60
2	97.95	29.7 QP	43.5	-13.8	1.99 H	252	48.80	-19.10
3	127.11	33.4 QP	43.5	-10.1	1.99 H	213	49.30	-15.90
4	152.39	36.1 QP	43.5	-7.4	1.50 H	230	49.80	-13.70
5	169.89	31.3 QP	43.5	-12.2	1.50 H	105	45.30	-14.00
6	420.70	26.2 QP	46.0	-19.8	1.99 H	224	35.70	-9.50
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	45.24	35.7 QP	40.0	-4.3	1.50 V	294	50.40	-14.70
2	58.73	38.0 QP	40.0	-2.0	1.00 V	330	52.70	-14.70
3	97.95	37.4 QP	43.5	-6.1	1.50 V	120	56.50	-19.10
4	187.39	31.1 QP	43.5	-12.4	1.00 V	50	47.00	-15.90
5	286.55	23.0 QP	46.0	-23.0	1.50 V	3	35.40	-12.40
6	424.59	26.8 QP	46.0	-19.2	1.00 V	167	36.10	-9.30

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.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCS30	100289	Dec. 23, 2015	Dec. 22, 2016
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond2-01	Dec. 26, 2015	Dec. 25, 2016
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Jan. 11, 2016	Jan. 10, 2017
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Jul. 26, 2016	Jul. 25, 2017
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Shielded Room 2.
3. The VCCI Site Registration No. is C-2047.

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.

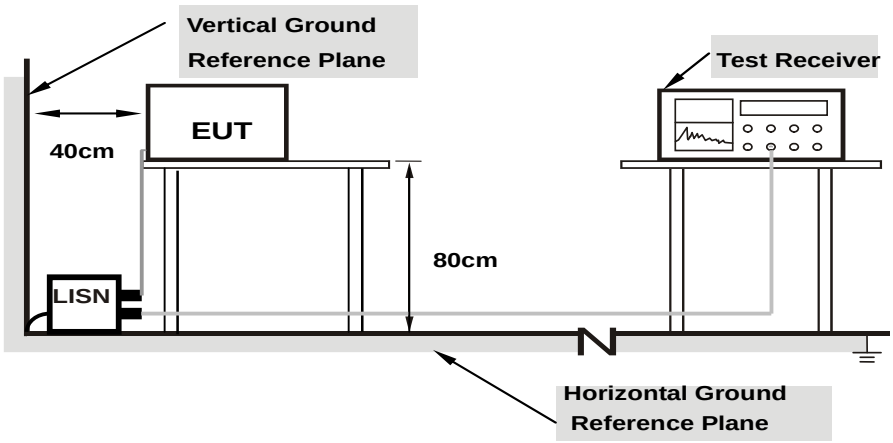
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

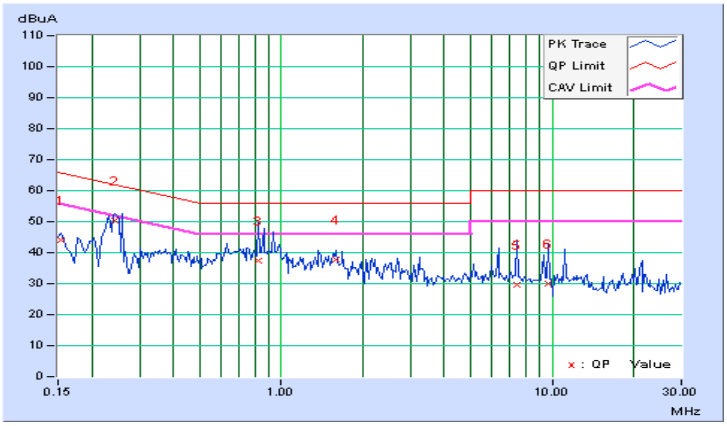
4.2.7 Test Results

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	10.18	33.84	22.92	44.02	33.10	65.79	55.79	-21.77	-22.69
2	0.24375	10.22	40.29	34.34	50.51	44.56	61.97	51.97	-11.46	-7.41
3	0.82578	10.29	27.11	16.53	37.40	26.82	56.00	46.00	-18.60	-19.18
4	1.59766	10.35	27.61	19.01	37.96	29.36	56.00	46.00	-18.04	-16.64
5	7.38672	10.48	19.08	11.39	29.56	21.87	60.00	50.00	-30.44	-28.13
6	9.70313	10.52	19.60	11.40	30.12	21.92	60.00	50.00	-29.88	-28.08

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.

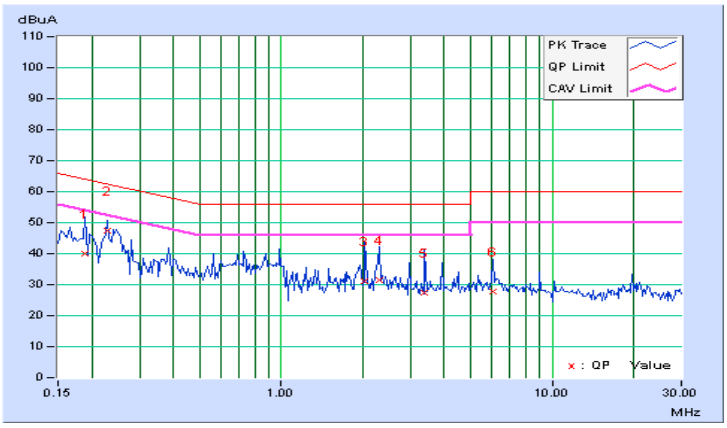


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	A		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18906	10.20	29.80	11.28	40.00	21.48	64.08	54.08	-24.08	-32.60
2	0.22812	10.21	37.09	27.80	47.30	38.01	62.52	52.52	-15.22	-14.51
3	2.03516	10.41	20.58	9.57	30.99	19.98	56.00	46.00	-25.01	-26.02
4	2.29688	10.43	21.06	9.24	31.49	19.67	56.00	46.00	-24.51	-26.33
5	3.37891	10.51	16.86	4.91	27.37	15.42	56.00	46.00	-28.63	-30.58
6	6.08203	10.57	17.10	7.38	27.67	17.95	60.00	50.00	-32.33	-32.05

REMARKS:

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

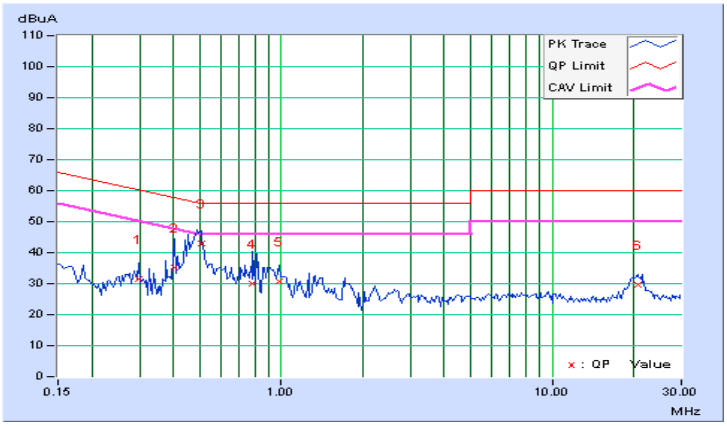


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.29844	10.22	21.31	14.01	31.53	24.23	60.29	50.29	-28.76	-26.06
2	0.40391	10.24	24.96	23.80	35.20	34.04	57.77	47.77	-22.57	-13.73
3	0.50547	10.25	32.74	26.68	42.99	36.93	56.00	46.00	-13.01	-9.07
4	0.78672	10.29	19.77	11.23	30.06	21.52	56.00	46.00	-25.94	-24.48
5	0.98203	10.31	20.28	13.82	30.59	24.13	56.00	46.00	-25.41	-21.87
6	20.64063	10.67	18.94	11.53	29.61	22.20	60.00	50.00	-30.39	-27.80

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.

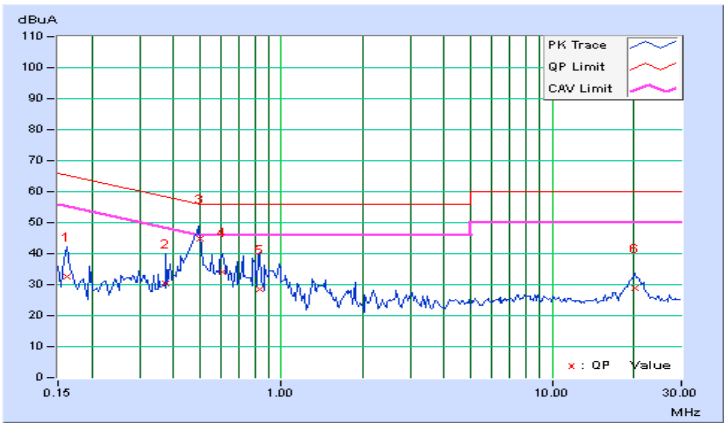


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16172	10.19	22.57	15.71	32.76	25.90	65.38	55.38	-32.62	-29.48
2	0.37656	10.29	20.03	11.74	30.32	22.03	58.35	48.35	-28.03	-26.32
3	**0.50051**	**10.30**	**34.53**	**28.81**	**44.83**	**39.11**	**56.00**	**46.00**	**-11.17**	**-6.89**
4	0.60703	10.30	23.70	16.99	34.00	27.29	56.00	46.00	-22.00	-18.71
5	0.83750	10.29	18.33	6.51	28.62	16.80	56.00	46.00	-27.38	-29.20
6	20.17188	10.89	18.11	9.45	29.00	20.34	60.00	50.00	-31.00	-29.66

REMARKS:

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

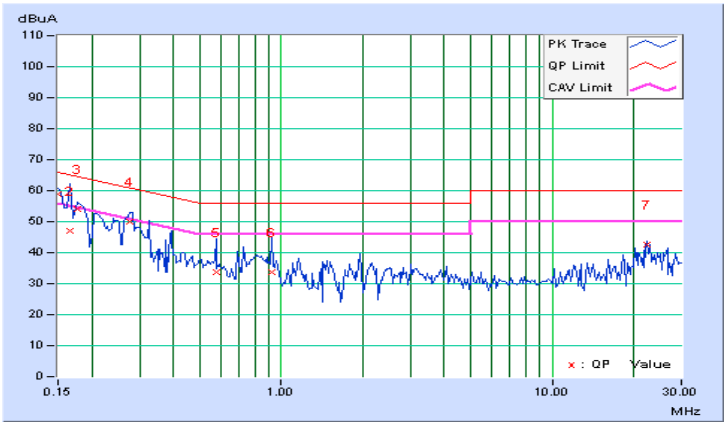


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	C		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.18	48.73	34.24	58.91	44.42	66.00	56.00	-7.09	-11.58
2	0.16562	10.19	36.92	14.64	47.11	24.83	65.18	55.18	-18.07	-30.35
3	0.17734	10.20	43.77	26.95	53.97	37.15	64.61	54.61	-10.64	-17.46
4	0.27500	10.22	39.88	29.65	50.10	39.87	60.97	50.97	-10.87	-11.10
5	0.57578	10.26	23.30	13.44	33.56	23.70	56.00	46.00	-22.44	-22.30
6	0.92344	10.30	23.50	13.03	33.80	23.33	56.00	46.00	-22.20	-22.67
7	22.45703	10.63	31.96	29.11	42.59	39.74	60.00	50.00	-17.41	-10.26

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.

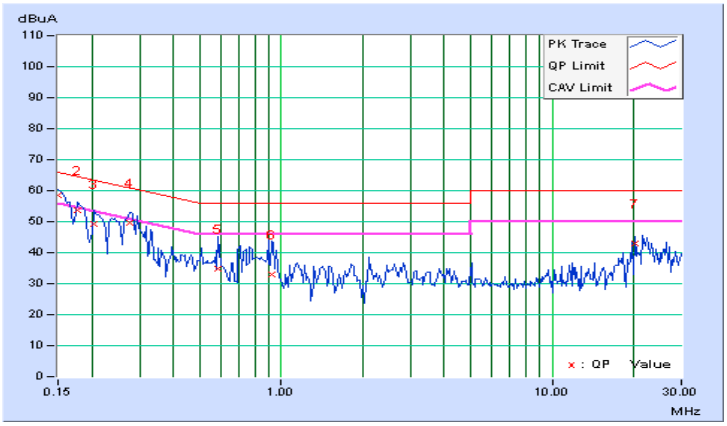


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	C		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.19	48.29	33.88	58.48	44.07	66.00	56.00	-7.52	-11.93
2	0.17734	10.20	43.43	26.73	53.63	36.93	64.61	54.61	-10.98	-17.68
3	0.20469	10.20	38.94	20.16	49.14	30.36	63.42	53.42	-14.28	-23.06
4	0.27500	10.24	39.49	30.11	49.73	40.35	60.97	50.97	-11.24	-10.62
5	0.58750	10.30	24.52	15.83	34.82	26.13	56.00	46.00	-21.18	-19.87
6	0.92344	10.29	22.64	12.65	32.93	22.94	56.00	46.00	-23.07	-23.06
7	20.25781	10.88	32.25	28.93	43.13	39.81	60.00	50.00	-16.87	-10.19

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.

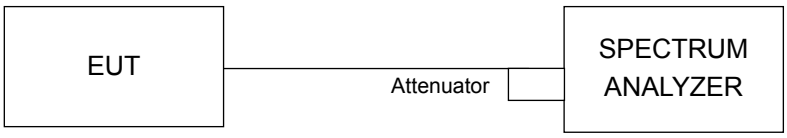


4.3 6dB Bandwidth Measurement

4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

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

4.3.5 Deviation fromTest Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	9.58	10.07	0.5	Pass
6	2437	9.59	10.09	0.5	Pass
11	2462	10.10	9.61	0.5	Pass

802.11g

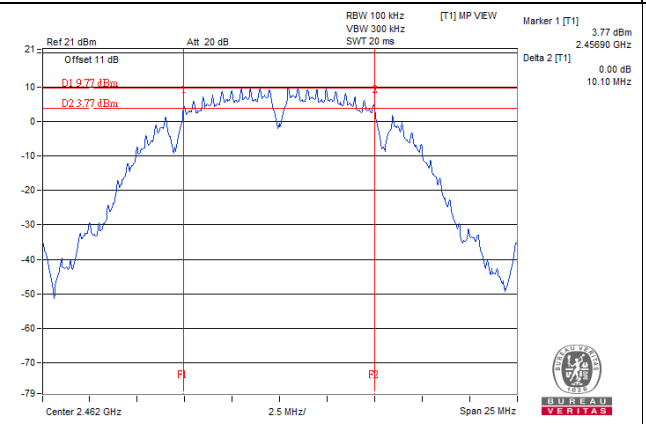
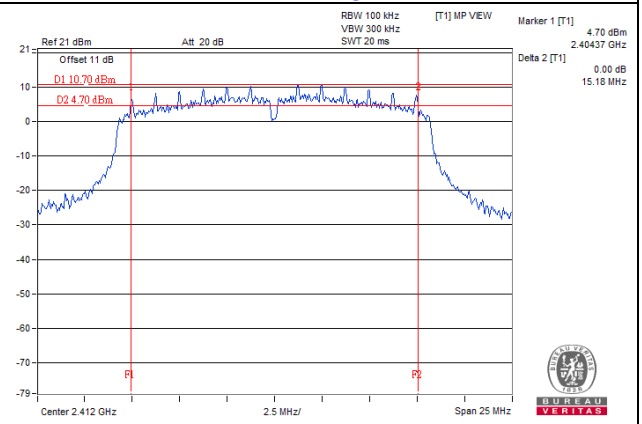
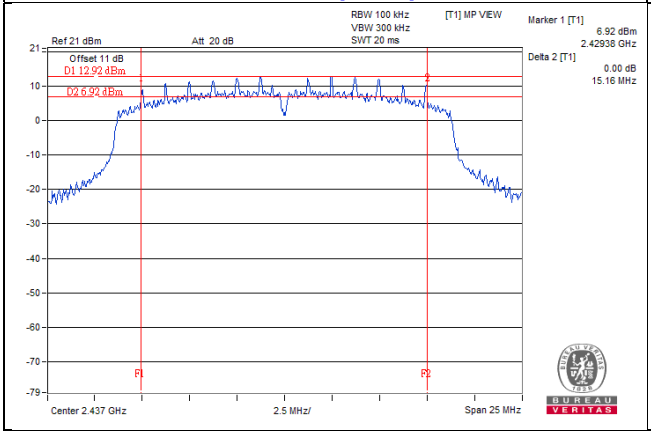
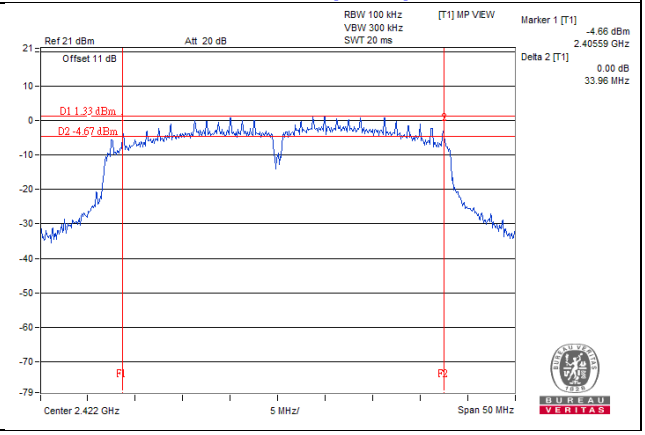
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	15.18	15.16	0.5	Pass
6	2437	15.13	15.11	0.5	Pass
11	2462	15.14	15.14	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	15.16	15.14	0.5	Pass
6	2437	15.15	15.16	0.5	Pass
11	2462	15.14	15.14	0.5	Pass

802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
3	2422	33.96	33.94	0.5	Pass
6	2437	33.90	33.91	0.5	Pass
9	2452	33.92	33.91	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

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

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as Item 4.3.6.

4.4.7 Test Results

802.11b

Chan.	Freq. (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	21.54	21.16	273.178	24.36	30	Pass
6	2437	22.59	22.18	**346.748**	25.40	30	Pass
11	2462	19.51	19.17	171.935	22.35	30	Pass

802.11g

Chan.	Freq. (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	20.45	20.07	212.542	23.27	30	Pass
6	2437	22.40	22.09	335.588	25.26	30	Pass
11	2462	20.82	20.18	225.013	23.52	30	Pass

802.11n (HT20)

Chan.	Freq. (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	20.73	20.13	221.343	23.45	30	Pass
6	2437	22.35	21.90	326.673	25.14	30	Pass
11	2462	20.55	19.52	203.037	23.08	30	Pass

802.11n (HT40)

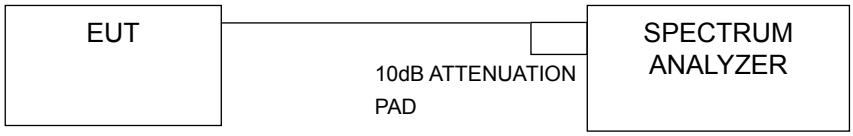
Chan.	Freq. (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	14.43	13.43	49.762	16.97	30	Pass
6	2437	19.75	19.59	185.397	22.68	30	Pass
9	2452	14.20	13.66	49.53	16.95	30	Pass

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

TX chain	Chan.	Freq. (MHz)	PSD (dBm/10kHz)	10 log (N=2) dB	Total PSD (dBm/10kHz)	Limit (dBm/3kHz)	Pass / Fail
0	1	2412	-7.12	3.01	-4.11	8.00	Pass
	6	2437	-6.40	3.01	-3.39	8.00	Pass
	11	2462	-9.34	3.01	-6.33	8.00	Pass
1	1	2412	-8.28	3.01	-5.27	8.00	Pass
	6	2437	-6.61	3.01	-3.60	8.00	Pass
	11	2462	-10.33	3.01	-7.32	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 = 2dBi + 10log(2) = 5.01dBi< 6dBi, so the limit no need to reduced.

802.11g

TX chain	Chan.	Freq. (MHz)	PSD (dBm/10kHz)	10 log (N=2) dB	Duty Factor	Total PSD with Duty Factor (dBm/10kHz)	Limit (dBm/3kHz)	Pass / Fail
0	1	2412	-9.59	3.01	0.15	-6.43	8.00	Pass
	6	2437	-7.42	3.01	0.15	-4.26	8.00	Pass
	11	2462	-9.45	3.01	0.15	-6.29	8.00	Pass
1	1	2412	-9.99	3.01	0.15	-6.83	8.00	Pass
	6	2437	-7.91	3.01	0.15	-4.75	8.00	Pass
	11	2462	-9.68	3.01	0.15	-6.52	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 = 2dBi + 10log(2) = 5.01dBi < 6dBi, so the limit no need to reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

TX chain	Chan.	Freq. (MHz)	PSD (dBm/10kHz)	10 log (N=2) dB	Duty Factor	Total PSD with Duty Factor (dBm/10kHz)	Limit (dBm/3kHz)	Pass / Fail
0	1	2412	-9.69	3.01	0.19	-6.49	8.00	Pass
	6	2437	-7.97	3.01	0.19	-4.77	8.00	Pass
	11	2462	-9.57	3.01	0.19	-6.37	8.00	Pass
1	1	2412	-10.11	3.01	0.19	-6.91	8.00	Pass
	6	2437	-7.93	3.01	0.19	-4.73	8.00	Pass
	11	2462	-9.55	3.01	0.19	-6.35	8.00	Pass

NOTE:

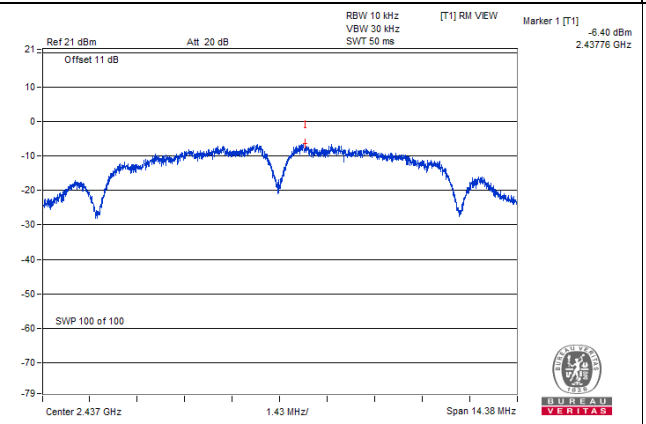
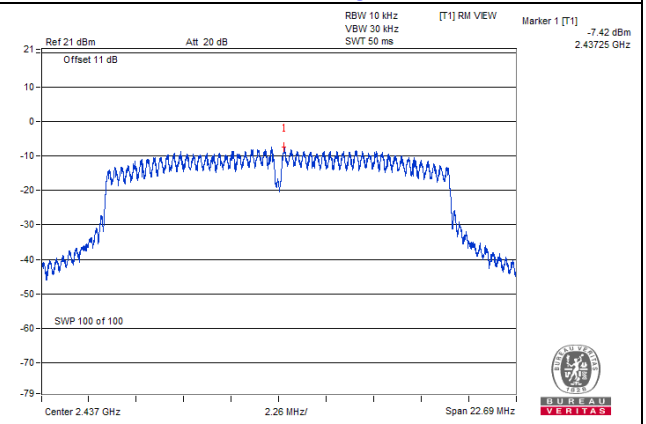
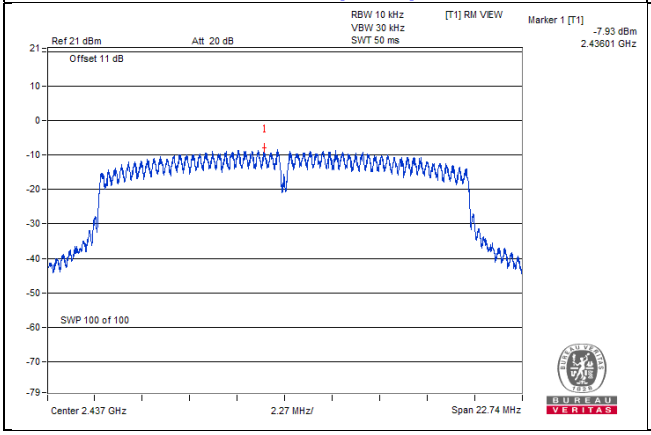
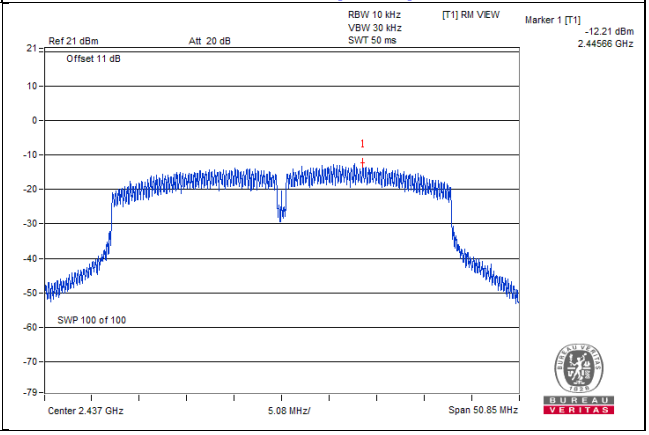
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 2dBi + 10log(2) = 5.01dBi < 6dBi, so the limit no need to reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

TX chain	Chan.	Freq. (MHz)	PSD (dBm/10kHz)	10 log (N=2) dB	Duty Factor	Total PSD with Duty Factor (dBm/10kHz)	Limit (dBm/3kHz)	Pass / Fail
0	3	2422	-18.30	3.01	0.21	-15.08	8.00	Pass
	6	2437	-12.21	3.01	0.21	-8.99	8.00	Pass
	9	2452	-18.45	3.01	0.21	-15.23	8.00	Pass
1	3	2422	-19.61	3.01	0.21	-16.39	8.00	Pass
	6	2437	-12.64	3.01	0.21	-9.42	8.00	Pass
	9	2452	-18.50	3.01	0.21	-15.28	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 = 2dBi + 10log(2) = 5.01dBi < 6dBi, so the limit no need to reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

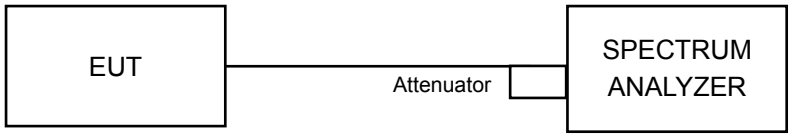
Spectrum Plot of Worst Value	
802.11b	**802.11g**
	
802.11n (HT20)	**802.11n (HT40)**
	

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

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

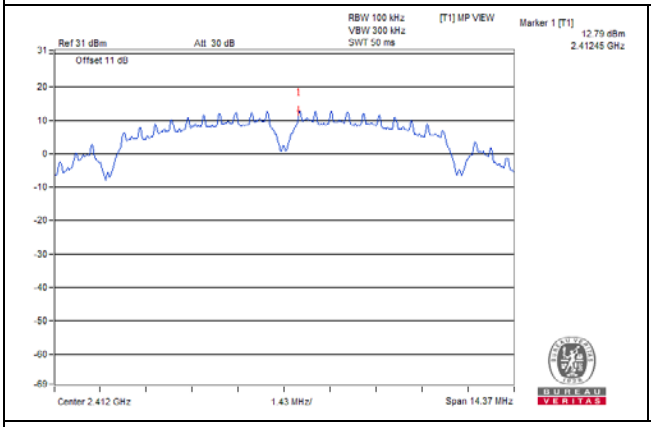
Same as Item 4.3.6

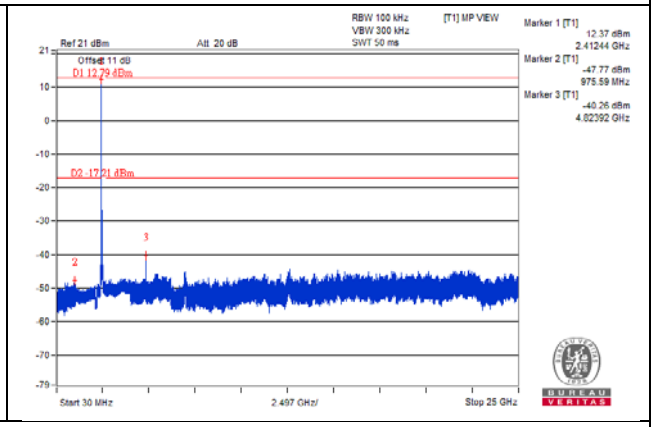
4.6.7 Test Results

The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

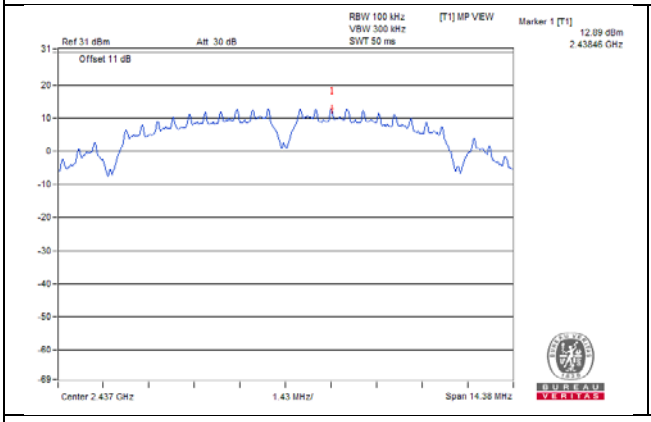
802.11b
CHAIN 0

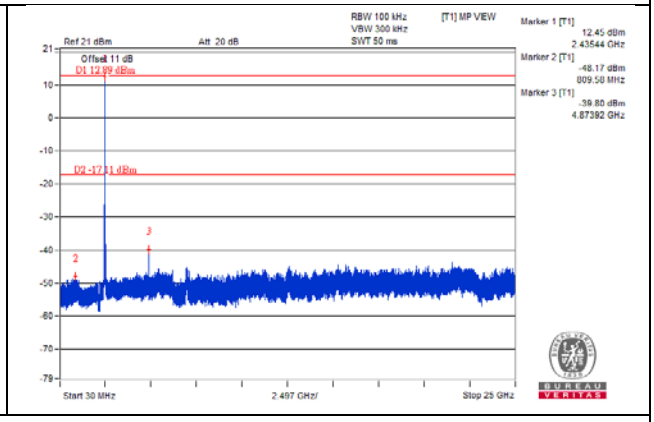
CH 1



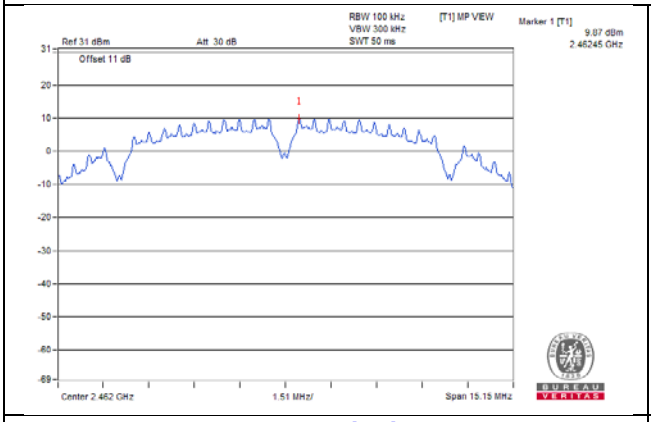


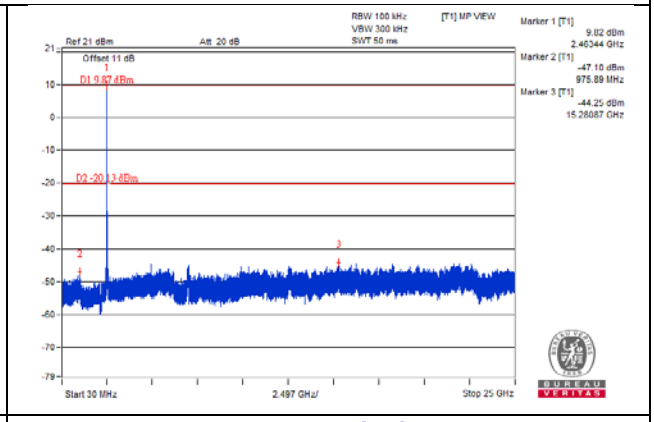
CH 6



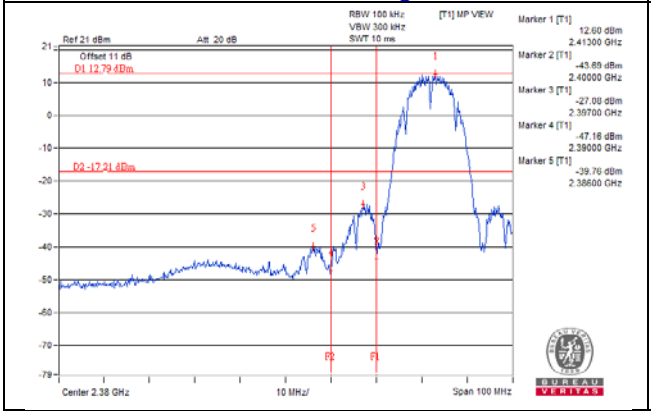


CH 11

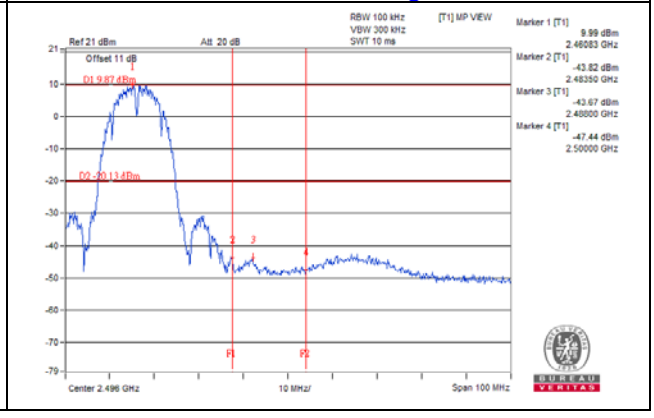




CH 1 Band edge

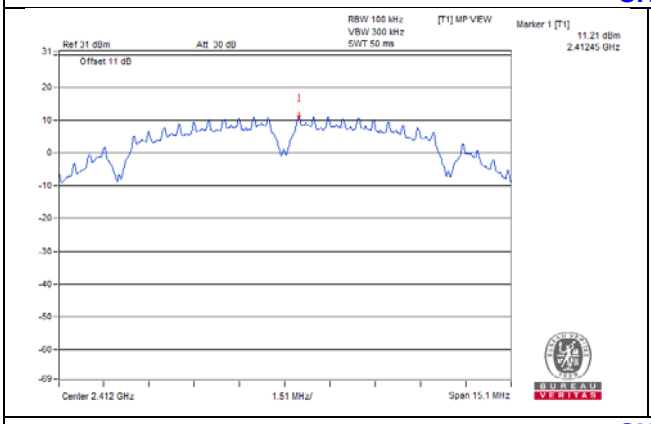


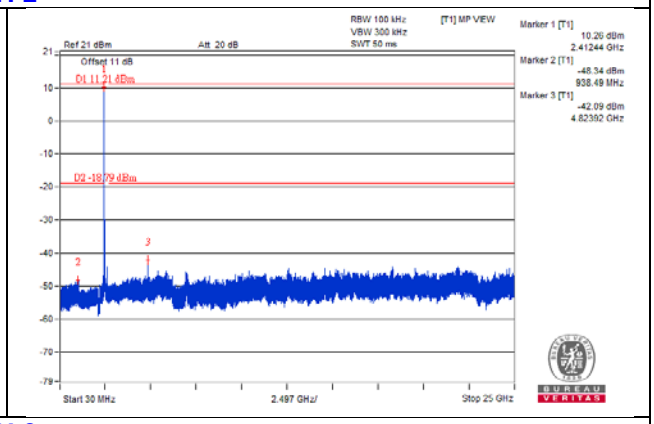
CH 11 Band edge



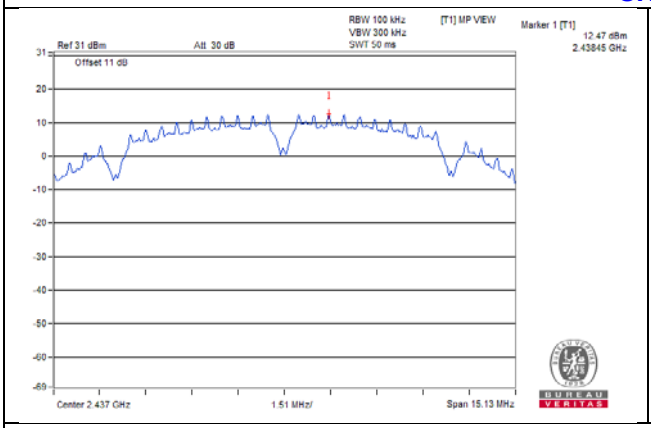
CHAIN 1

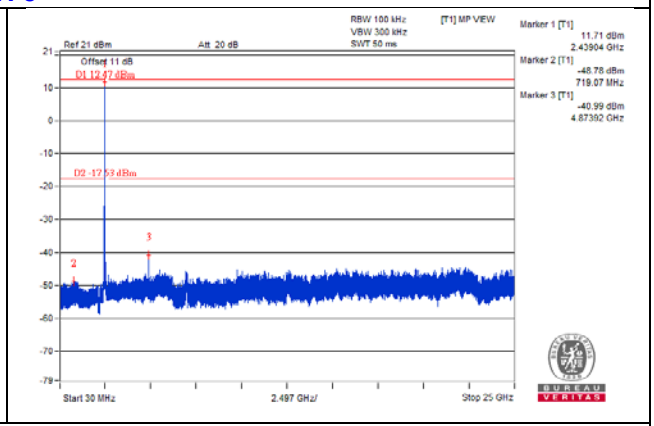
CH 1



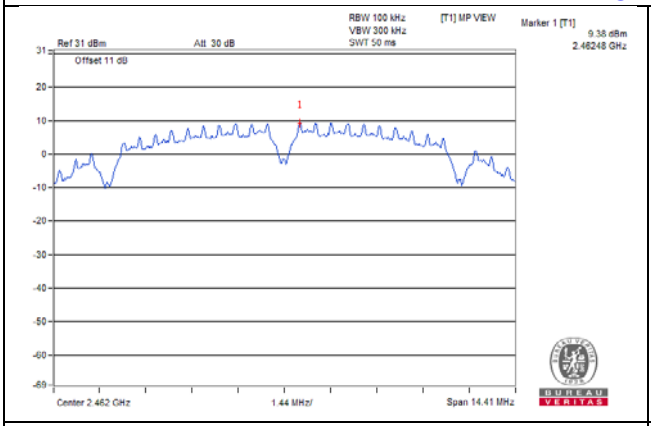


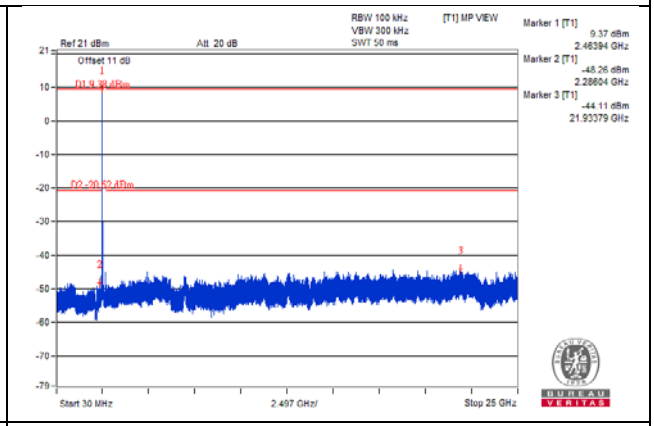
CH 6



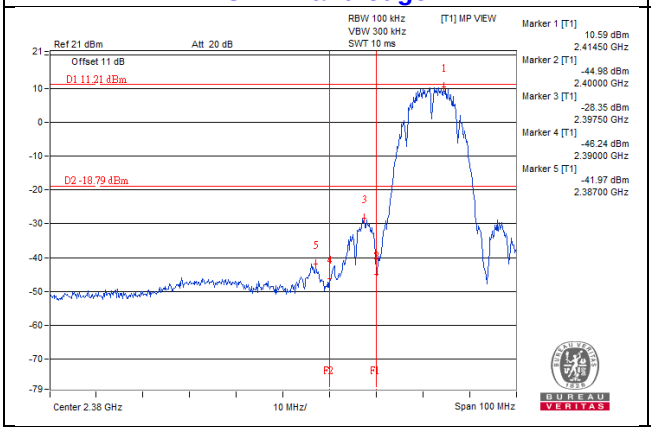


CH 11

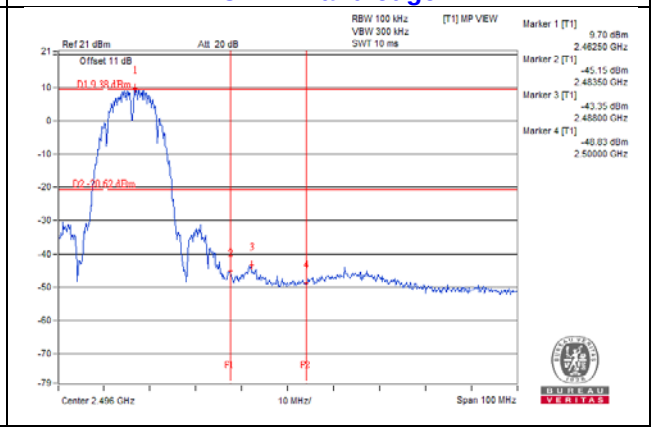




CH 1 Band edge

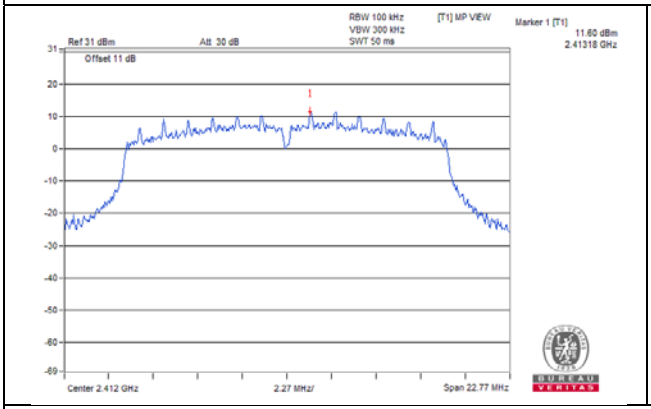


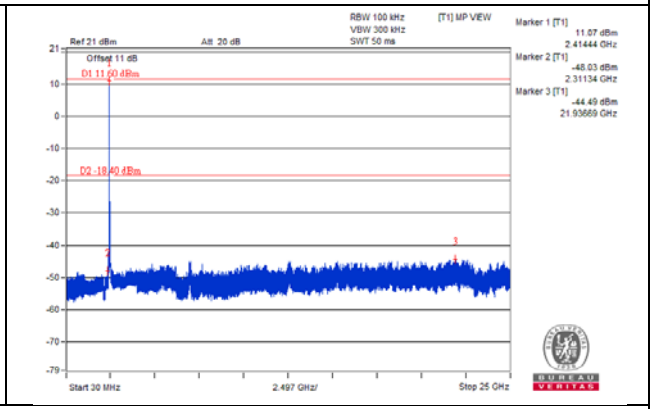
CH 11 Band edge



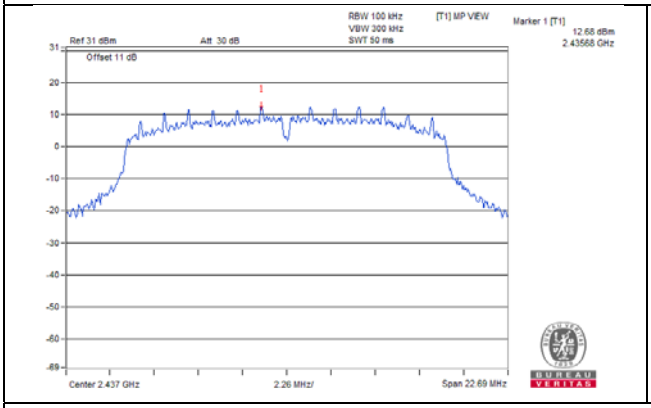
802.11g
CHAIN 0

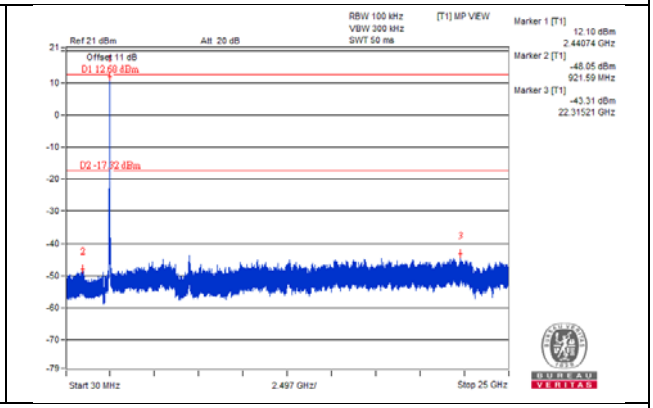
CH 1



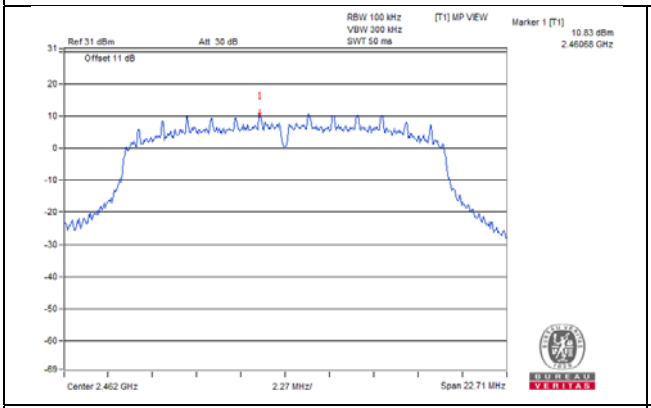


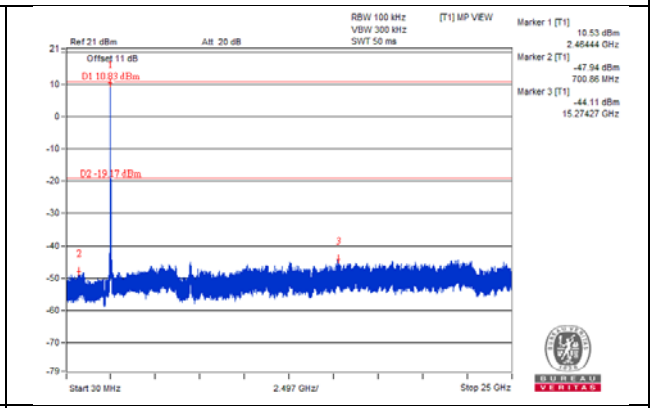
CH 6



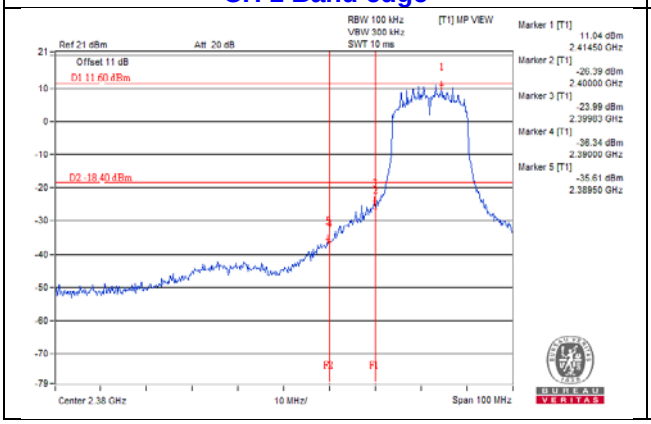


CH 11

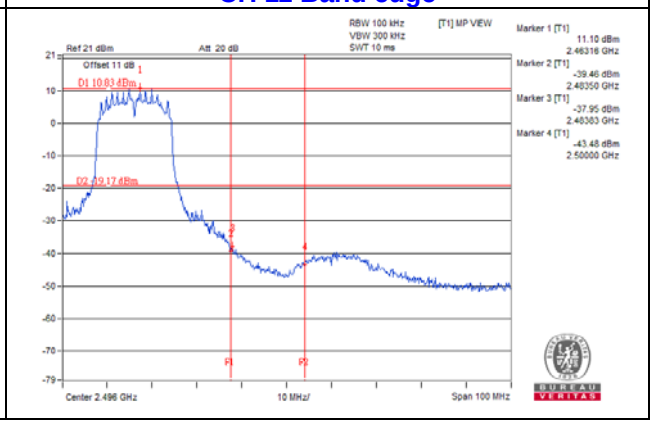




CH 1 Band edge

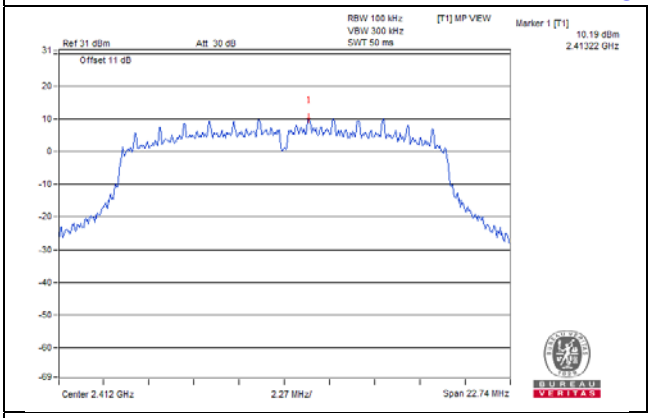


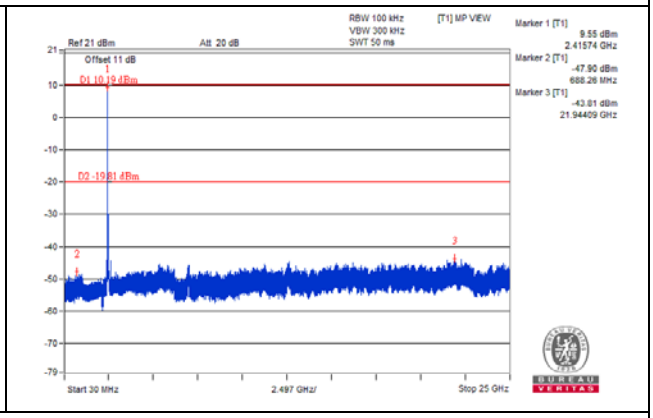
CH 11 Band edge



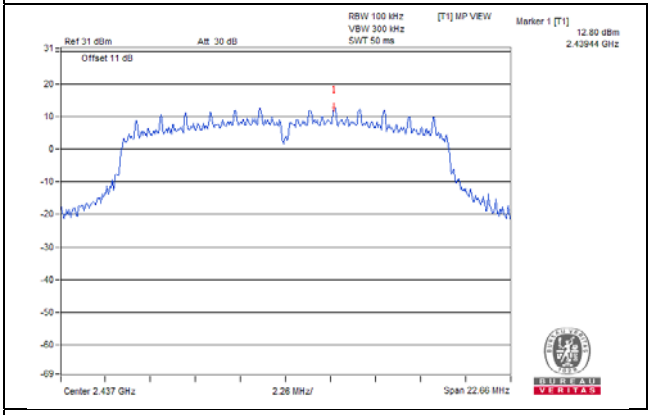
CHAIN 1

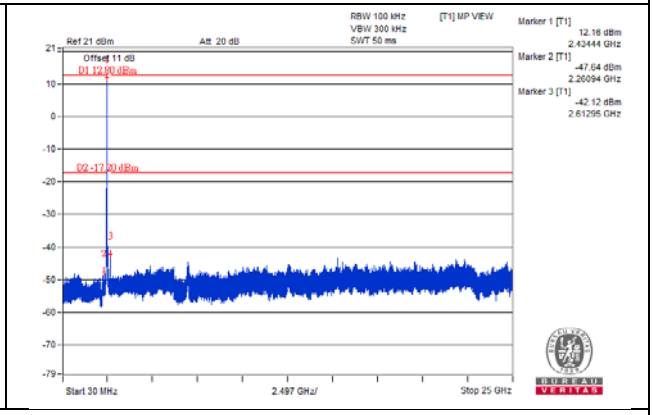
CH 1



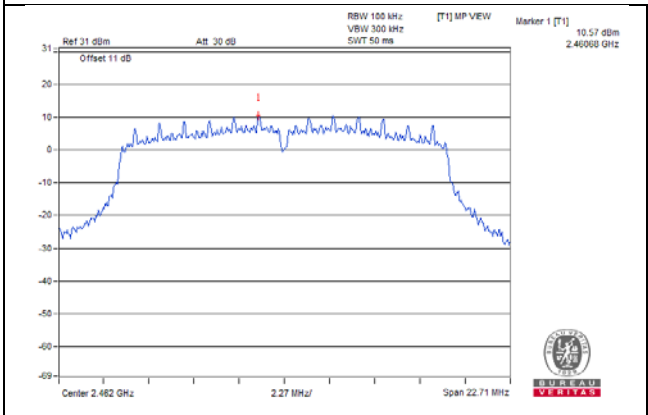


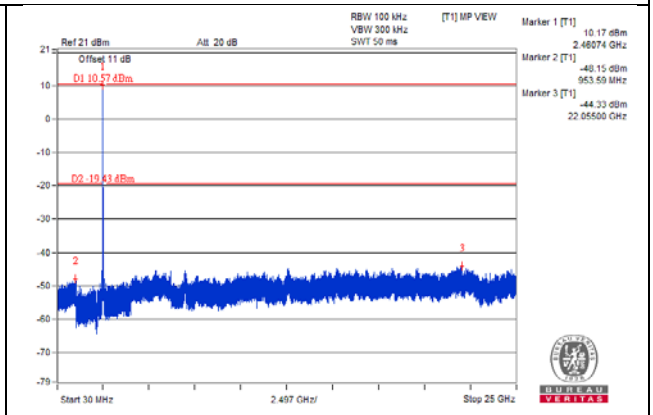
CH 6



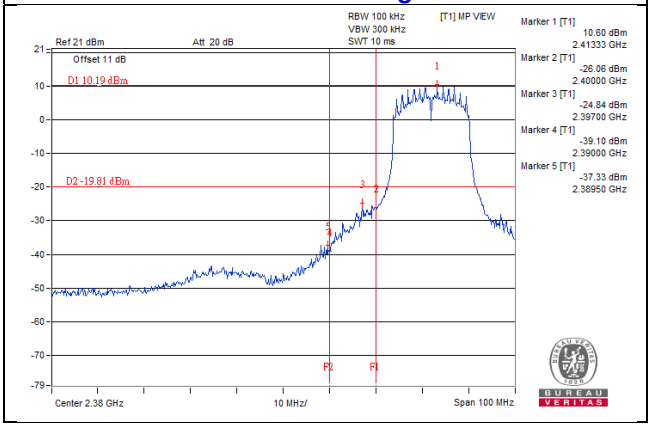


CH 11

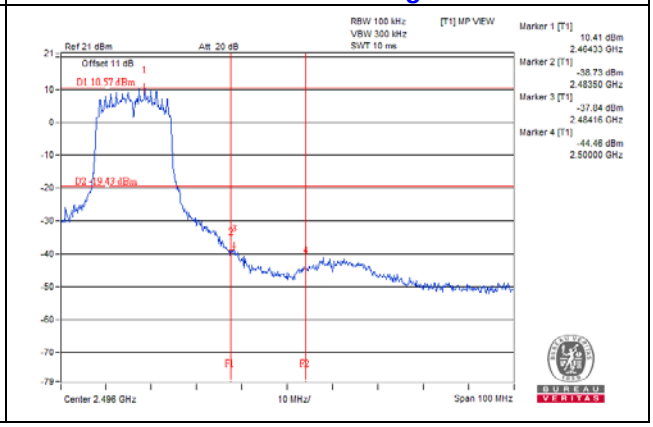




CH 1 Band edge



CH 11 Band edge



802.11n (HT20)
CHAIN 0

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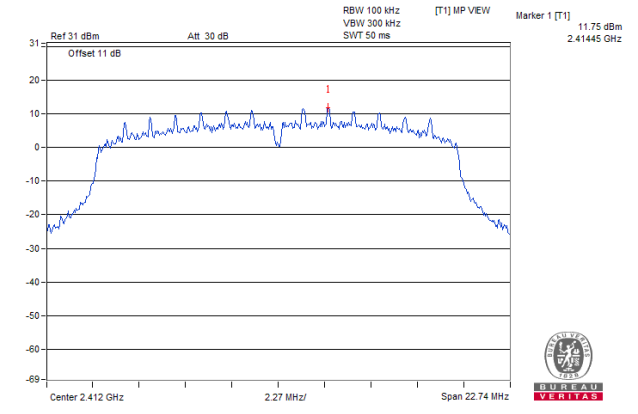
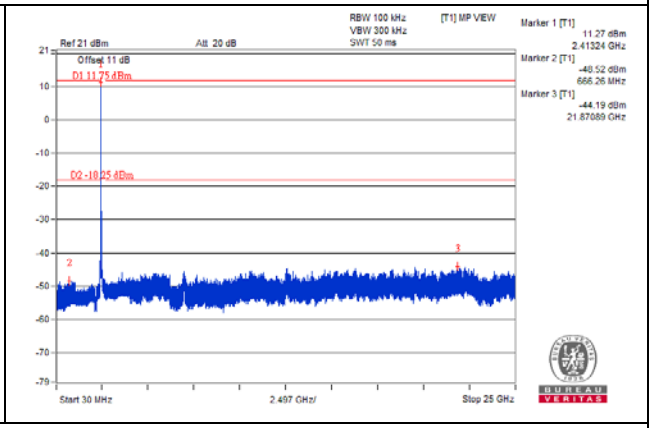
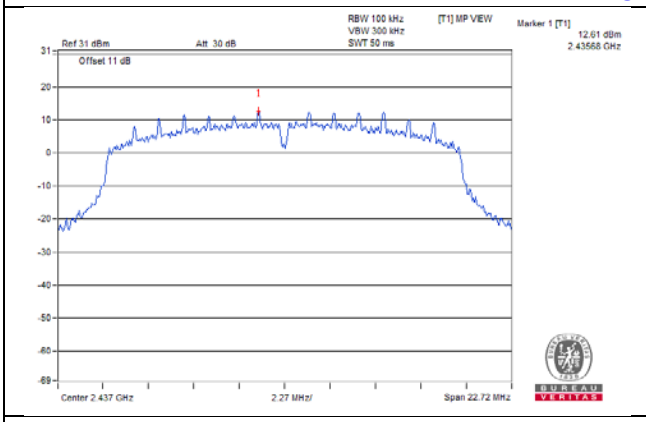
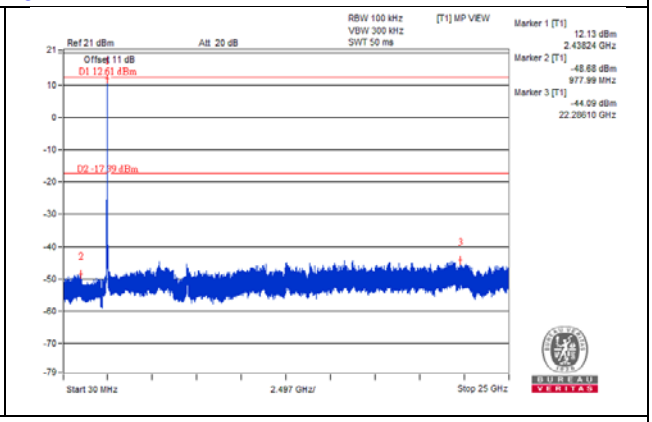


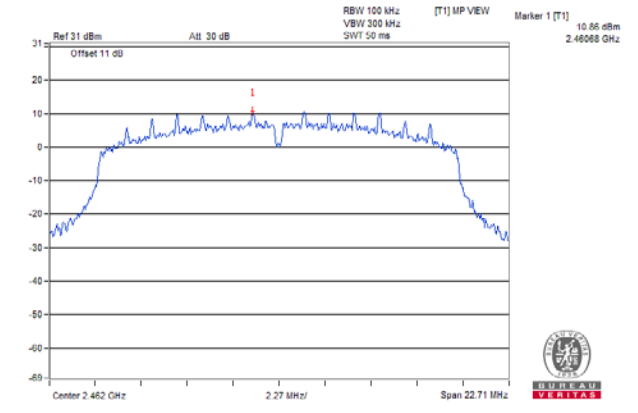


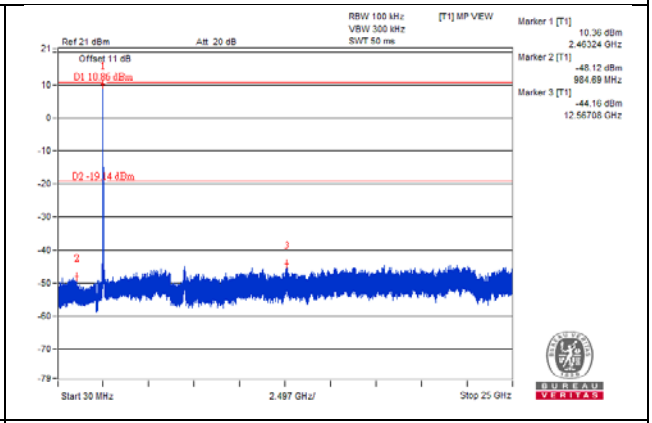
CH 6



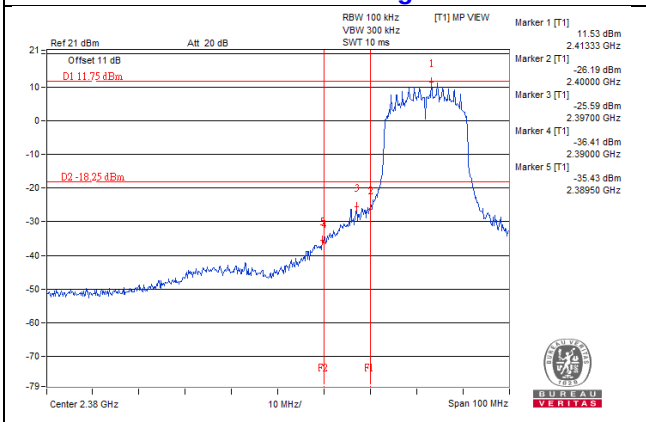


CH 11

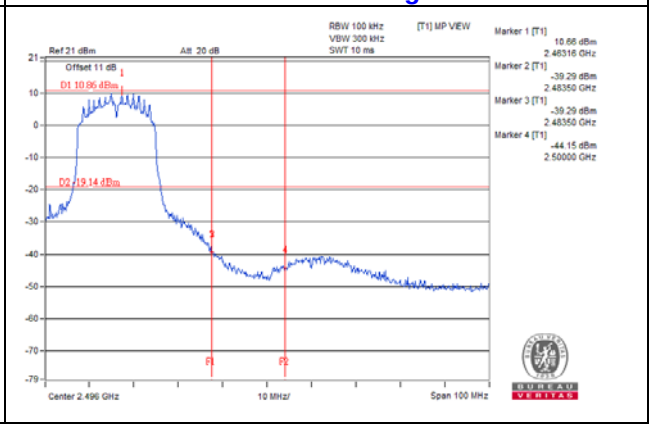




CH 1 Band edge

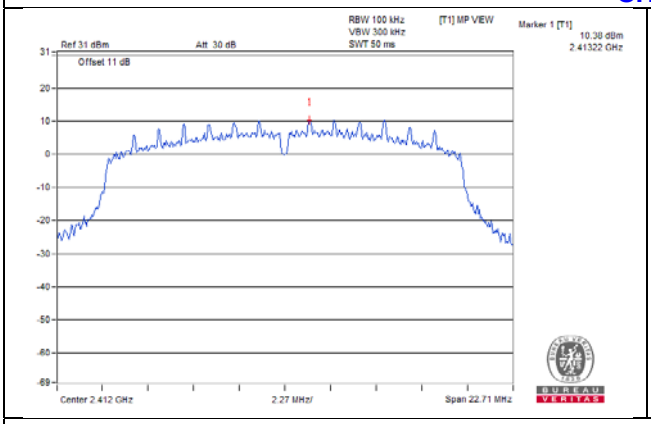


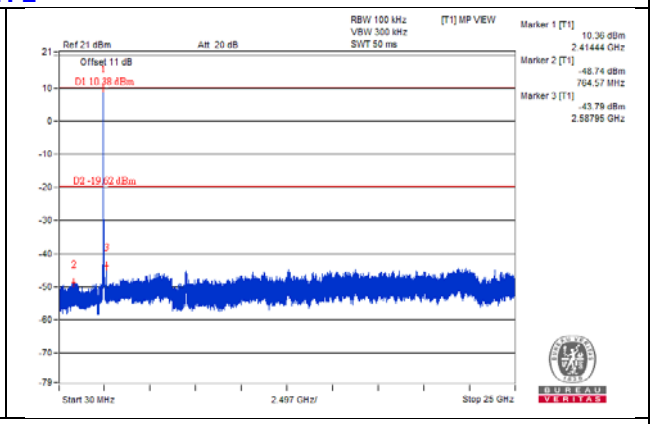
CH 11 Band edge



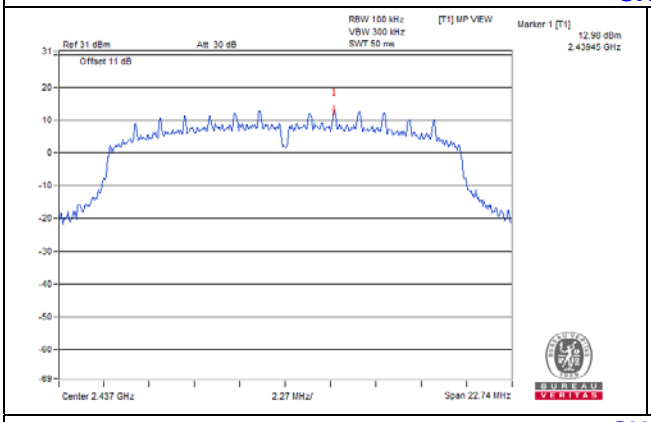
CHAIN 1

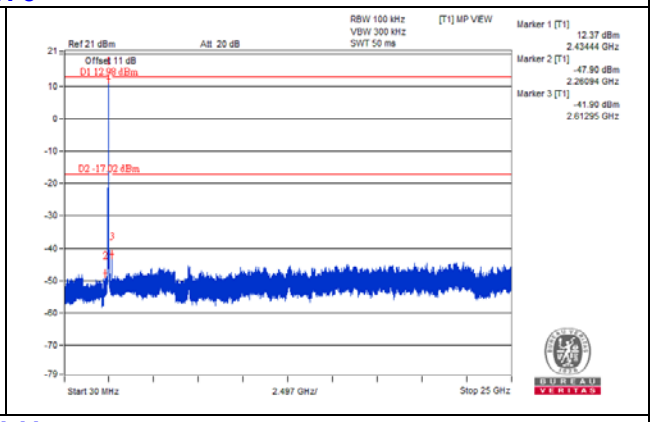
CH 1



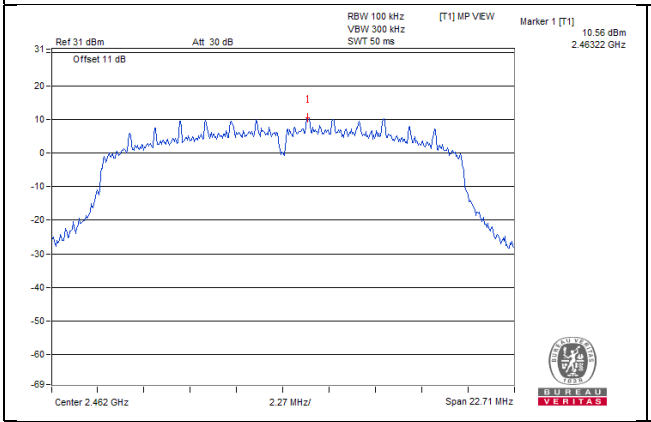


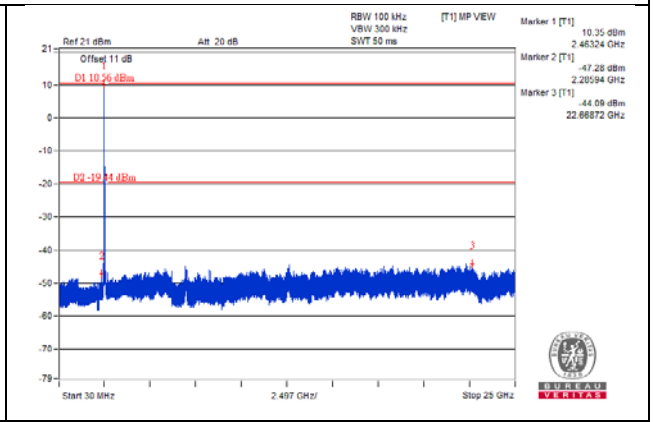
CH 6



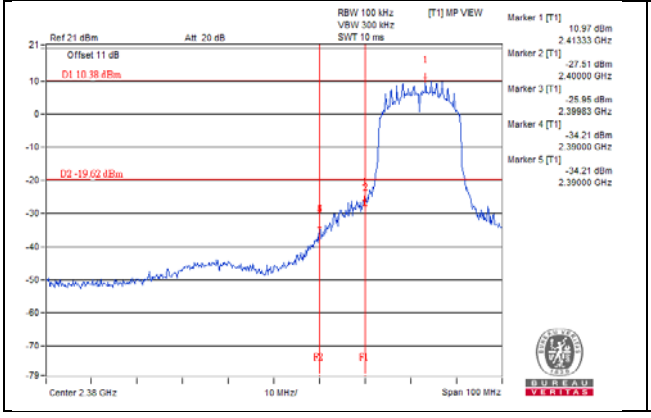


CH 11

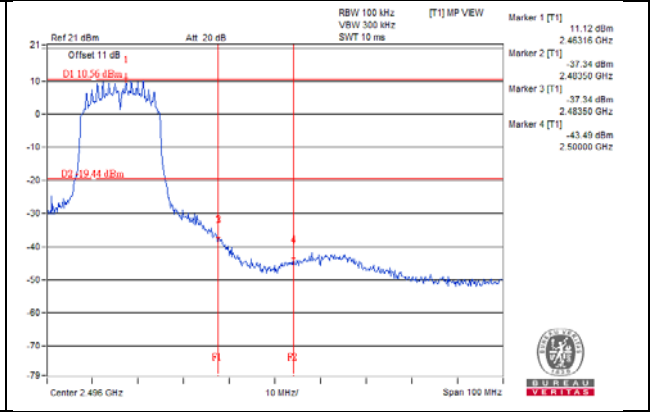




CH 1 Band edge

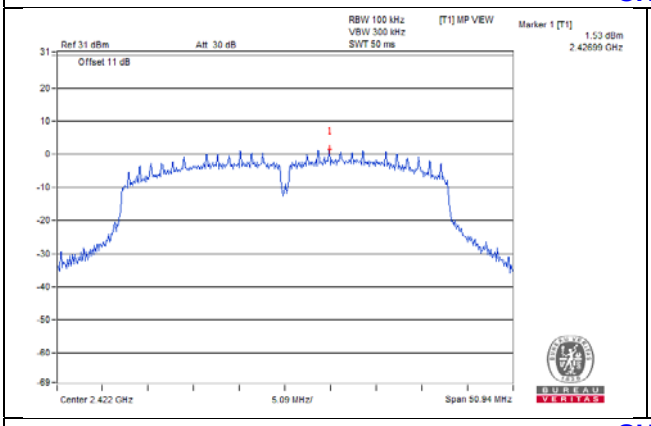


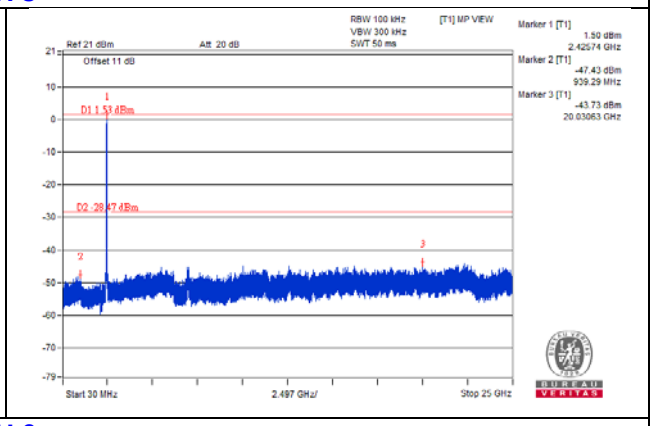
CH 11 Band edge



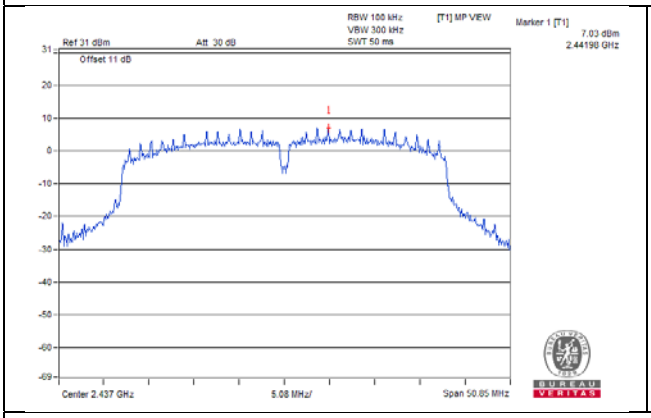
802.11n (HT40)
CHAIN 0

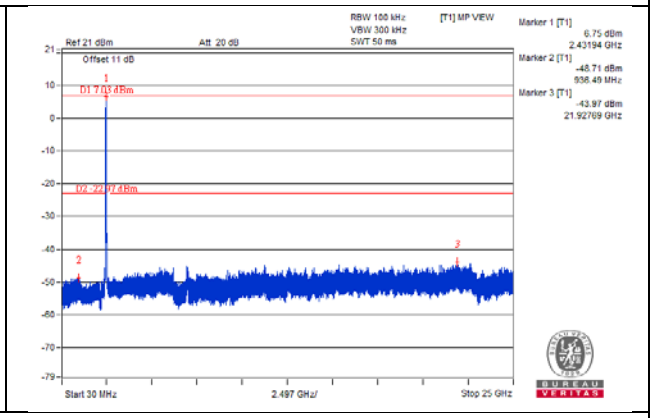
CH 3



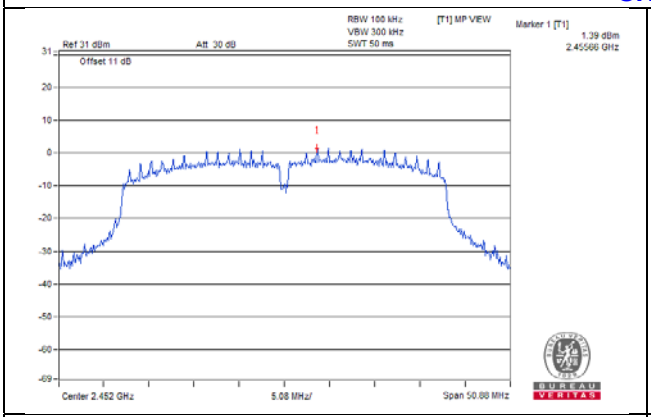


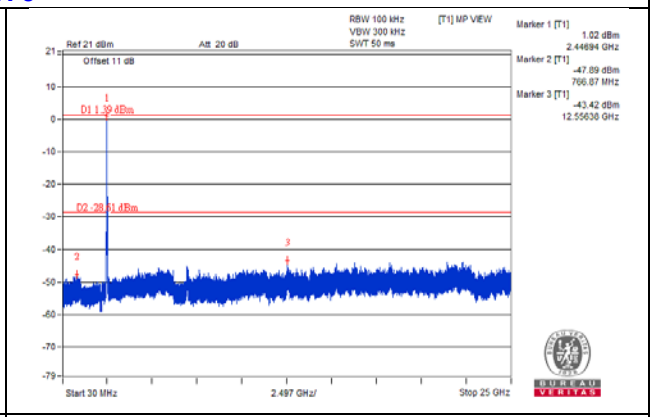
CH 6



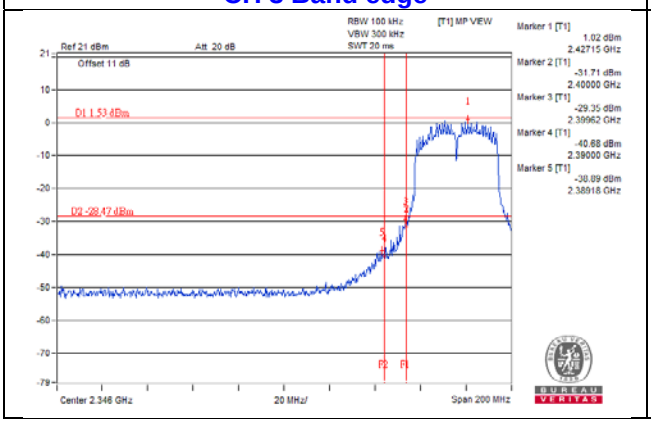


CH 9

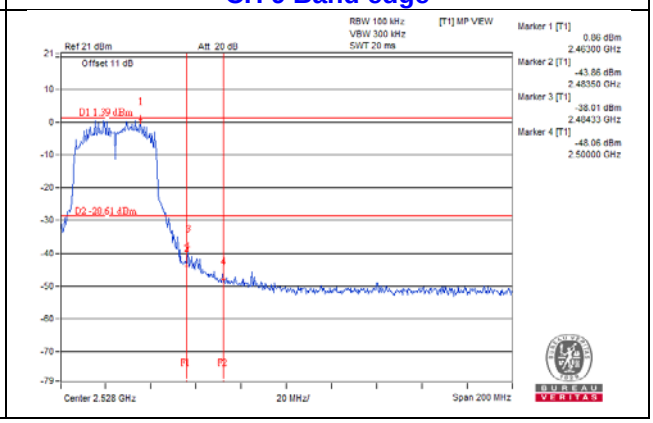




CH 3 Band edge

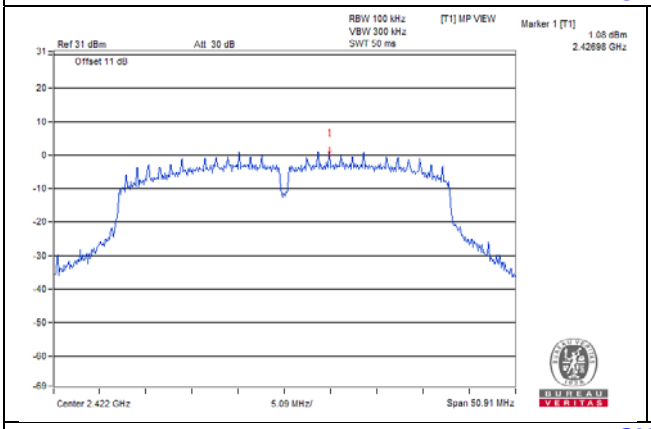


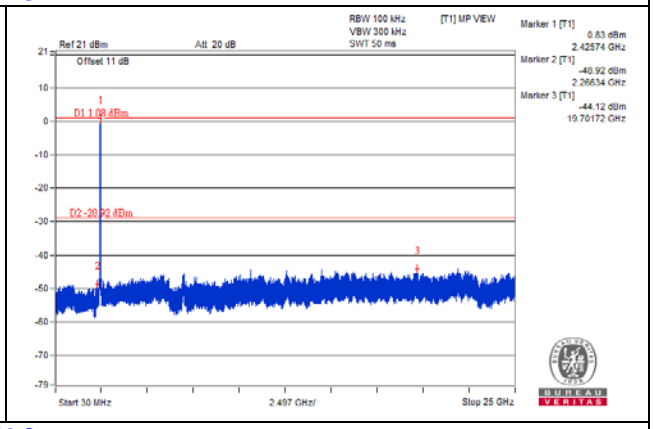
CH 9 Band edge



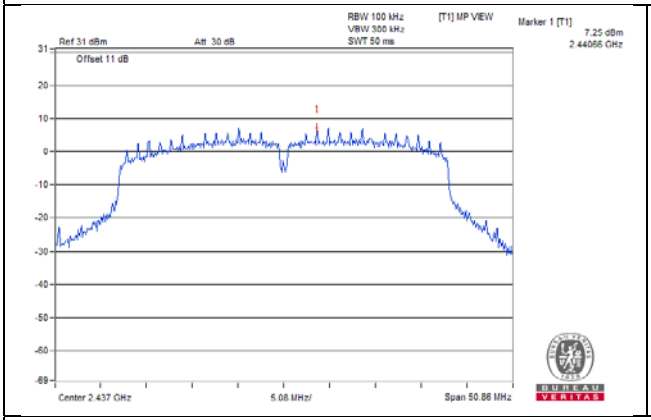
CHAIN 1

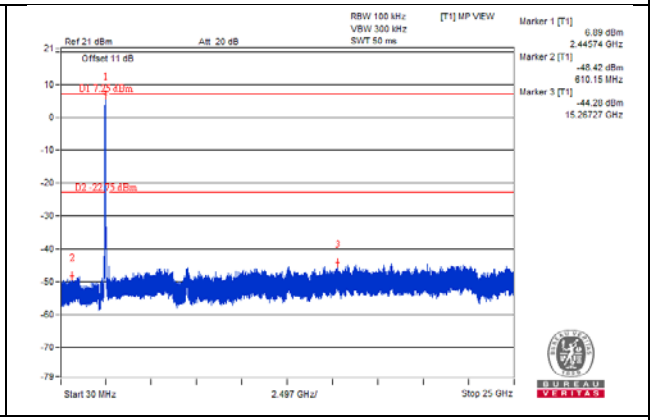
CH 3



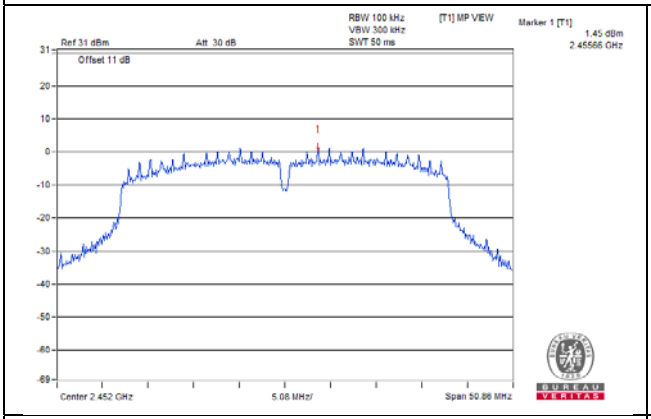


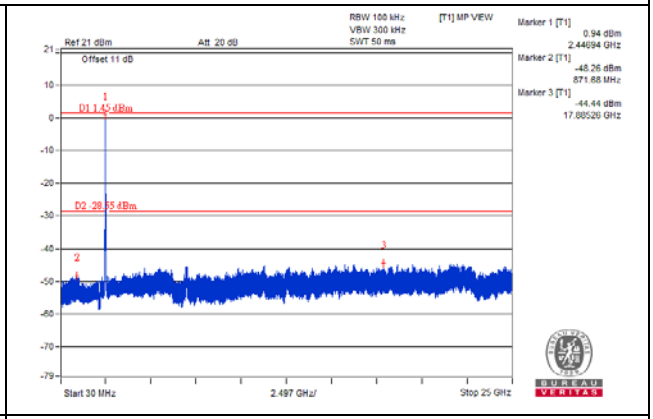
CH 6



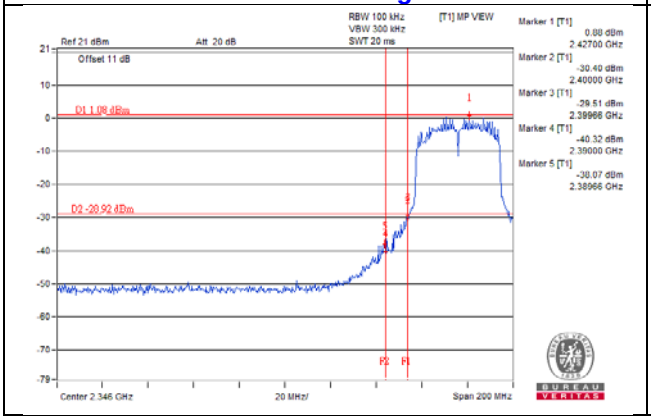


CH 9

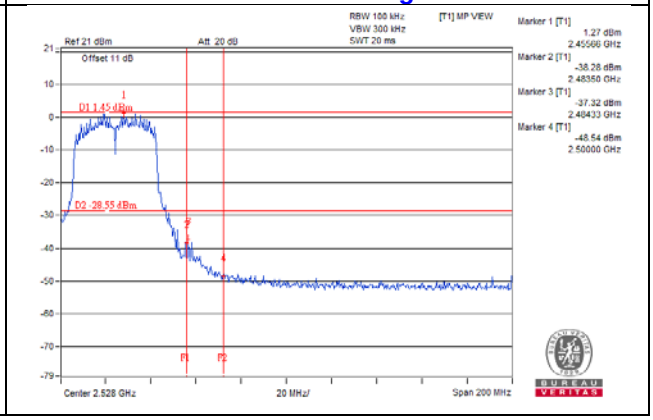




CH 3 Band edge



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:

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Tel: 886-2-26052180
Fax: 886-2-26051924

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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.

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