FCC Test Report (WLAN)

Report No.: RF171215C04B

FCC ID: VZ9180003

Test Model: OWL550

Received Date: Dec. 15, 2017

Test Date: Jan. 06 to 17, 2018

Issued Date: Apr. 11, 2018

Applicant: 4IPNET, INC.

Address: 5F, NO. 367, FUXING N. RD., SONGSHAN DIST., TAIPEI 105, TAIWAN (R.O.C.)

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

Lab Address: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.

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

FCC Registration / Designation Number: 723255 / TW2022

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Release Control Record

Issue No.	Description	Date Issued
RF171215C04B	Original release.	Apr. 11, 2018

1 Certificate of Conformity

Product: Access Point

Brand: 4ipnet

Test Model: OWL550

Sample Status: ENGINEERING SAMPLE

Applicant: 4IPNET, INC.

Test Date: Jan. 06 to 17, 2018

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

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

Prepared by : Mary Ko , **Date:** Apr. 11, 2018

Mary Ko / Specialist

Approved by : , **Date:** Apr. 11, 2018

May Chen / 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 -9.68dB at 0.38047MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.1dB at 2390.00MHz, 2483.50MHz, 4824.00MHz, 4874.00MHz.
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	The device is professionally installed.

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	1.84 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.30 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.16 dB
	6GHz ~ 18GHz	4.91 dB
	18GHz ~ 40GHz	5.30 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT (WLAN)

Product	Access Point
Brand	4ipnet
Test Model	OWL550
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	48Vdc from POE
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode only
Modulation Technology	DSSS,OFDM
Transfer Rate	802.11a/b: up to 11Mbps 802.11g: up to 54Mbps 802.11n: up to 300Mbps 802.11ac: up to 866.7Mbps
Operating Frequency	**2.4GHz:** 2.412 ~ 2.462GHz **5GHz:** 5.18 ~ 5.24GHz, 5.745 ~5.825GHz
Number of Channel	**2.4GHz:** 802.11b, 802.11g, 802.11n (HT20): 11 802.11n (HT40): 7 **5GHz:** 802.11a, 802.11n (HT20), 802.11ac (VHT20): 9 802.11n (HT40), 802.11ac (VHT40): 4 802.11ac (VHT80): 2
Output Power	**2.4GHz:** 645.727mW **5.18 ~ 5.24GHz:** Master mode: 201.731mW Client mode: 201.971mW **5.745 ~ 5.825GHz:** 782.596mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	POE x 1
Data Cable Supplied	NA

Note:

1. There are WLAN, Bluetooth and GPS technology used for the EUT.
2. This device can support different category application which switched by access point mode and client mode by software.
3. The EUT contains certified BT-LE module which FCC ID: RC6-M2-TBT.
4. Simultaneously transmission condition.

Condition	Technology		
1	WLAN 2.4GHz	WLAN 5GHz	Bluetooth
Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.			

5. The EUT must be supplied with a POE as following table:

No.	Brand	Model No.	Spec.
1	Powertron Electronics corp.	POE1024-480T3A050	AC Input: 100-240Vac, 1.0A, 50-60Hz DC Output: 48V, 0.5A

6. The antennas provided to the EUT, please refer to the following table:

2.4GHz antenna spec.				
Antenna No.	Frequency (MHz)	Peak Gain (dBi)	Antenna Type	Connecter Type
1	2400	4.87	Dipole antenna	N-type
	2450	4.9		
	2500	4.92		
2	2400	4.87		
	2450	4.9		
	2500	4.92		

5GHz antenna spec.				
Antenna No.	Frequency (MHz)	Peak Gain (dBi)	Antenna Type	Connecter Type
1	5150	6.87	Dipole antenna	N-type
	5250	6.8		
	5350	6.76		
	5450	6.83		
	5550	6.85		
	5650	6.75		
	5750	6.92		
	5850	6.83		
2	5150	6.87		
	5250	6.8		
	5350	6.76		
	5450	6.83		
	5550	6.85		
	5650	6.75		
	5750	6.92		
	5850	6.83		

Bluetooth antenna spec.			
Frequency (MHz)	Peak Gain (dBi)	Antenna Type	Connecter Type
2400	3.71	PIFA	None
2450	3.79		
2500	3.88		

GPS antenna spec.				
Frequency (MHz)	Peak Gain (dBiC)		Antenna Type	Connecter Type
	Horizontal	Vertical		
1575	2.8	3.8	PIFA	Mini PCI
1575.4	2.7	3.7		
1610	3.9	3.4		
Note: 1. Max. gain was selected for the final test.				

7. The EUT incorporates a MIMO function:

2.4GHz Band			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11b	1 ~ 11Mbps	2TX	2RX
802.11g	6 ~ 54Mbps	2TX	2RX
802.11n (HT20)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11n (HT40)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
5GHz Band			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11a	6 ~ 54Mbps	2TX	2RX
802.11n (HT20)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11n (HT40)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11ac (VHT20)	MCS 0~8, Nss=1	2TX	2RX
	MCS 0~8, Nss=2	2TX	2RX
802.11ac (VHT40)	MCS 0~9, Nss=1	2TX	2RX
	MCS 0~9, Nss=2	2TX	2RX
802.11ac (VHT80)	MCS 0~9, Nss=1	2TX	2RX
	MCS 0~9, Nss=2	2TX	2RX

8. 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

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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 2, 6, 9, 10, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 2, 6, 9, 10, 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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11g	1 to 11	6	OFDM	BPSK	6

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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11g	1 to 11	6	OFDM	BPSK	6

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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 2, 6, 9, 10, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 2, 6, 9, 10, 11	OFDM	BPSK	6.5
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

Test Condition:

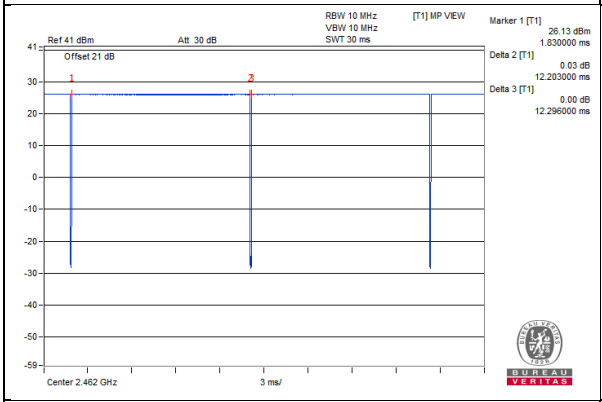
APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	24deg. C, 73%RH	120Vac, 60Hz	Rey Chen
RE<1G	23deg. C, 66%RH	120Vac, 60Hz	Andy Ho
PLC	25deg. C, 75%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Robert Cheng

3.3 Duty Cycle of Test Signal

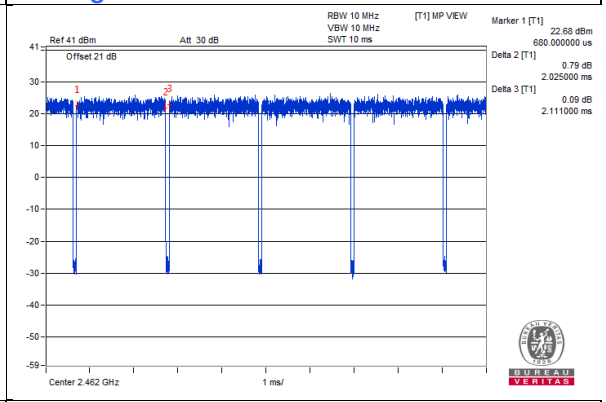
If duty cycle of test signal is ≥ 98 %, duty factor is not required.
If duty cycle of test signal is < 98%, duty factor shall be considered.

802.11b: Duty cycle = 12.203/12.296 = 0.992
802.11g: Duty cycle = 2.025/2.111 = 0.959, Duty factor = 10 * log(1/0.959) = 0.18
802.11n (HT20): Duty cycle = 4.951/5.04 = 0.982
802.11n (HT40): Duty cycle = 2.407/2.495 = 0.965, Duty factor = 10 * log(1/0.965) = 0.16

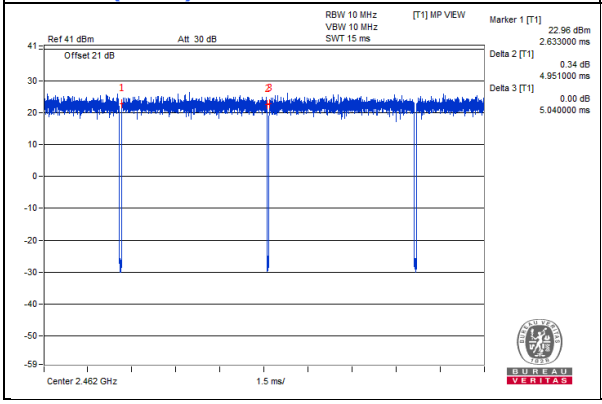
802.11b



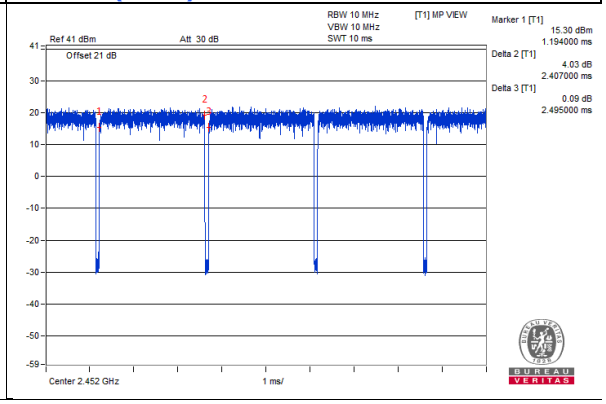
802.11g



802.11n (HT20)



802.11n (HT40)



3.4 Description of Support Units

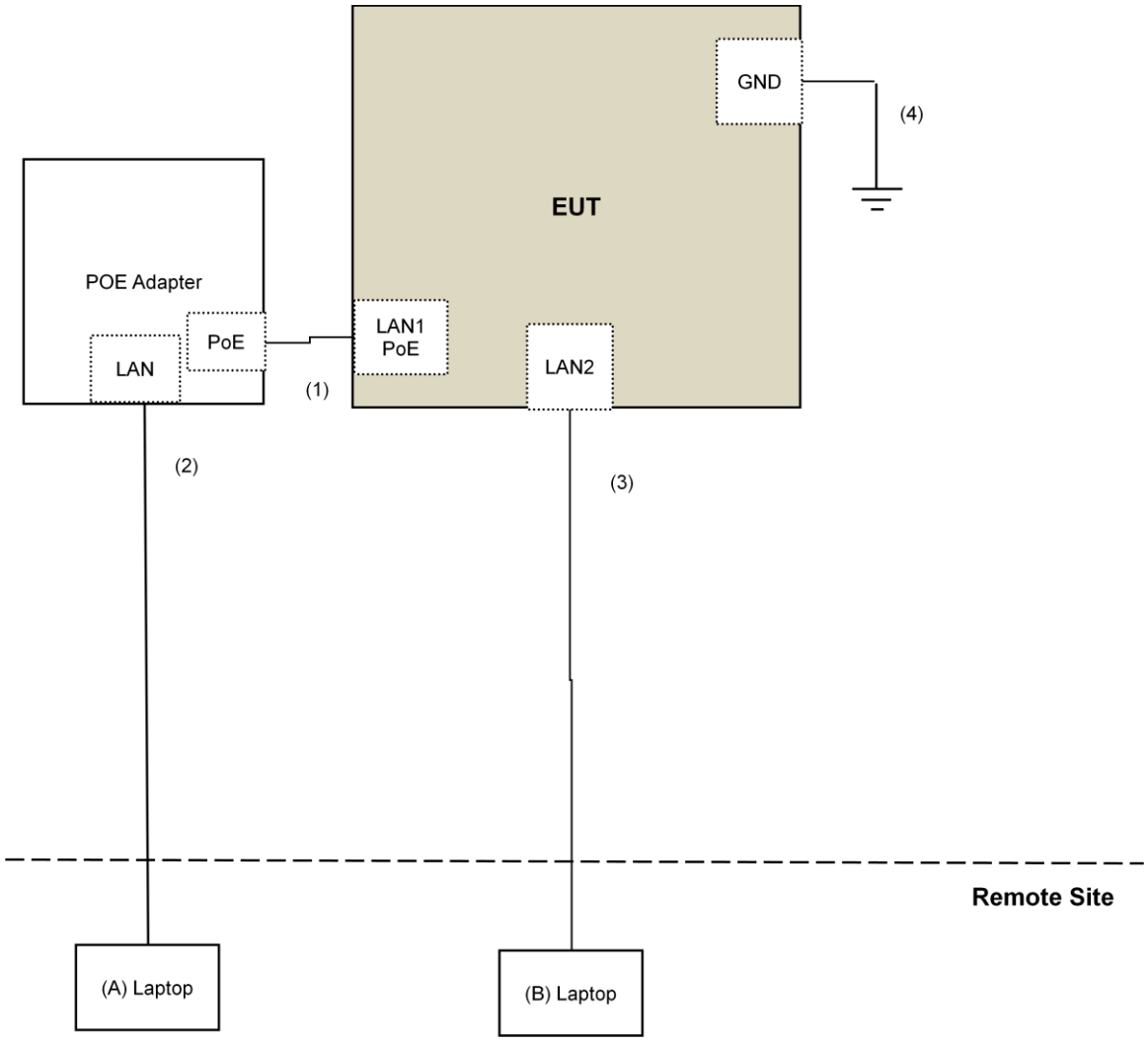
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	DELL	E6420	482T3R1	FCC DoC	Provided by Lab
B.	Laptop	DELL	E6420	B92T3R1	FCC DoC	Provided by Lab

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ-45 Cable	1	3	No	0	Provided by Lab
2.	RJ-45 Cable	1	10	No	0	Provided by Lab
3.	RJ-45 Cable	1	10	No	0	Provided by Lab
4.	GND Cable	1	3	No	0	Supplied by client

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.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 30dB below the highest level of the desired power:

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

NOTE:

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

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 08, 2017	July 07, 2018
Pre-Amplifier(*) EMCI	EMC001340	980142	Jan. 20, 2016	Jan. 19, 2018
Loop Antenna(*) Electro-Metrics	EM-6879	264	Dec. 16, 2016	Dec. 15, 2018
RF Cable	NA	LOOPCAB-001 LOOPCAB-002	Jan. 17, 2017	Jan. 16, 2018
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Nov. 09, 2017	Nov. 08, 2018
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Nov. 29, 2017	Nov. 28, 2018
RF Cable	8D	966-4-1 966-4-2 966-4-3	Apr. 01, 2017	Mar. 31, 2018
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-4-01	Oct. 03, 2017	Oct. 02, 2018
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Dec. 12, 2017	Dec. 11, 2018
Pre-Amplifier EMCI	EMC12630SE	980385	Feb. 02, 2017	Feb. 01, 2018
RF Cable	EMC104-SM-SM-1200 EMC104-SM-SM-2000 EMC104-SM-SM-5000	160923 150318 150321	Feb. 02, 2017 Mar. 29, 2017 Mar. 29, 2017	Feb. 01, 2018 Mar. 28, 2018 Mar. 28, 2018
Pre-Amplifier EMCI	EMC184045SE	980387	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. 15, 2017	Jan. 14, 2018
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208410	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP02	NA	NA
Spectrum Analyzer R&S	FSV40	100964	July 1, 2017	June 30, 2018
Power meter Anritsu	ML2495A	1014008	May 11, 2017	May 10, 2018
Power sensor Anritsu	MA2411B	0917122	May 11, 2017	May 10, 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 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. 4.
4. Loop antenna was used for all emissions below 30 MHz.
5. The CANADA Site Registration No. is 20331-2
6. Tested Date: Jan. 06 to 11, 2018.

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 detects 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:

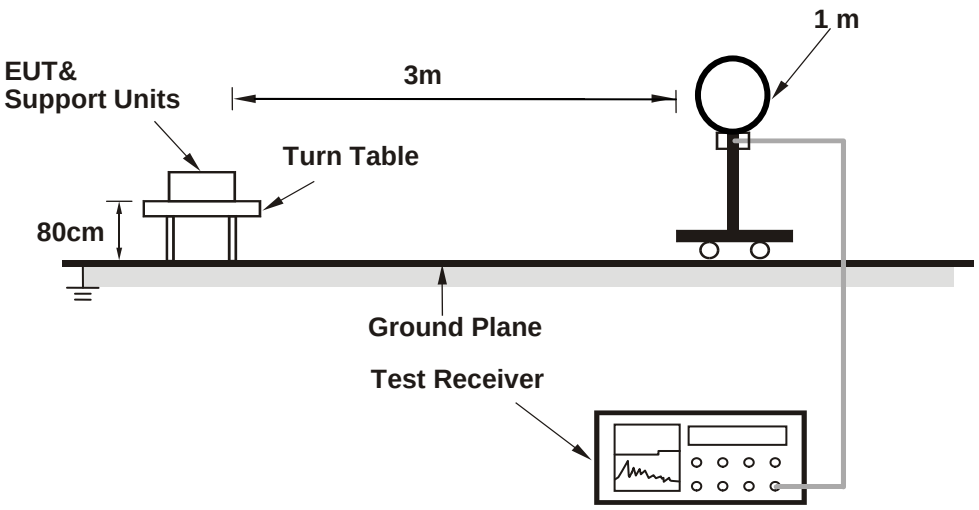
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

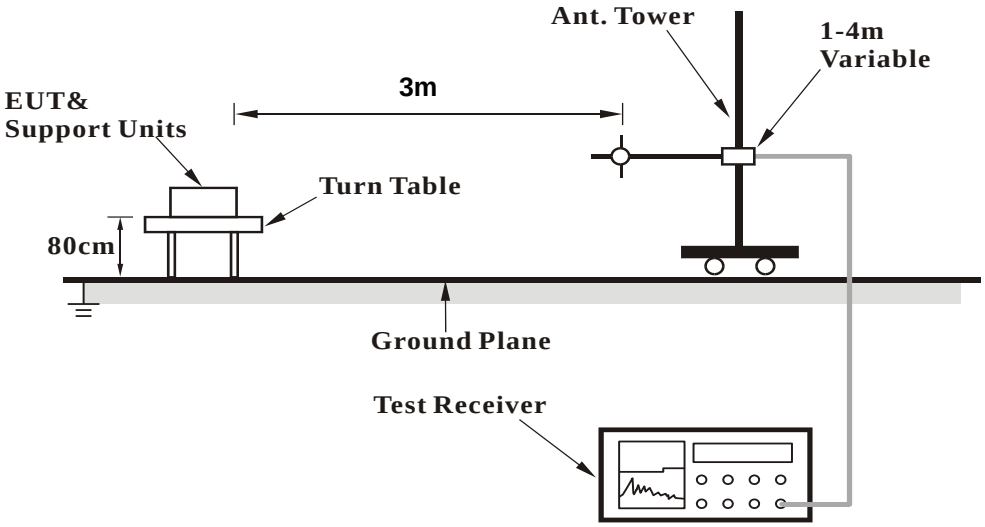
No deviation.

4.1.5 Test Setup

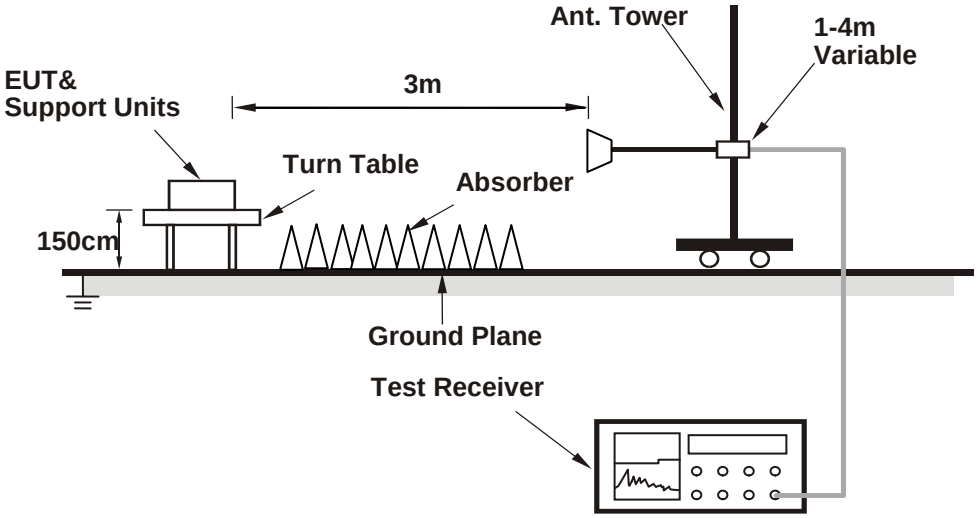
For Radiated emission below 30MHz



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. Connected the EUT with the Laptop which is placed on remote site.
b. Controlling software (QRCT Ver3.0.233.0) has been activated to set the EUT on specific status.

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	54.5 PK	74.0	-19.5	1.45 H	202	55.5	-1.0
2	2390.00	41.4 AV	54.0	-12.6	1.45 H	202	42.4	-1.0
3	*2412.00	103.5 PK			1.45 H	202	104.5	-1.0
4	*2412.00	100.8 AV			1.45 H	202	101.8	-1.0
5	4824.00	55.4 PK	74.0	-18.6	1.43 H	318	52.3	3.1
6	**4824.00**	**53.9 AV**	**54.0**	**-0.1**	**1.43 H**	**318**	**50.8**	**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	56.8 PK	74.0	-17.2	1.37 V	215	57.8	-1.0
2	2390.00	44.3 AV	54.0	-9.7	1.37 V	215	45.3	-1.0
3	*2412.00	118.2 PK			1.37 V	215	119.2	-1.0
4	*2412.00	115.6 AV			1.37 V	215	116.6	-1.0
5	4824.00	48.2 PK	74.0	-25.8	1.63 V	329	45.1	3.1
6	4824.00	46.3 AV	54.0	-7.7	1.63 V	329	43.2	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	2390.00	55.5 PK	74.0	-18.5	1.48 H	201	56.5	-1.0
2	2390.00	41.3 AV	54.0	-12.7	1.48 H	201	42.3	-1.0
3	*2437.00	104.1 PK			1.48 H	201	105.5	-1.4
4	*2437.00	101.7 AV			1.48 H	201	103.1	-1.4
5	2496.00	56.4 PK	74.0	-17.6	1.48 H	201	57.5	-1.1
6	2496.00	41.2 AV	54.0	-12.8	1.48 H	201	42.3	-1.1
7	3664.00	43.9 PK	74.0	-30.1	1.76 H	255	42.8	1.1
8	3664.00	40.5 AV	54.0	-13.5	1.76 H	255	39.4	1.1
9	4874.00	54.8 PK	74.0	-19.2	2.22 H	293	51.5	3.3
10	**4874.00**	**53.9 AV**	**54.0**	**-0.1**	**2.22 H**	**293**	**50.6**	**3.3**
11	7311.00	44.9 PK	74.0	-29.1	1.63 H	334	34.9	10.0
12	7311.00	34.6 AV	54.0	-19.4	1.63 H	334	24.6	10.0

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	56.0 PK	74.0	-18.0	1.49 V	231	57.0	-1.0
2	2390.00	42.6 AV	54.0	-11.4	1.49 V	231	43.6	-1.0
3	*2437.00	118.8 PK			1.49 V	231	120.2	-1.4
4	*2437.00	116.5 AV			1.49 V	231	117.9	-1.4
5	2496.00	62.1 PK	74.0	-11.9	1.49 V	231	63.2	-1.1
6	2496.00	42.9 AV	54.0	-11.1	1.49 V	231	44.0	-1.1
7	3664.00	43.7 PK	74.0	-30.3	1.51 V	156	42.6	1.1
8	3664.00	40.4 AV	54.0	-13.6	1.51 V	156	39.3	1.1
9	4874.00	48.6 PK	74.0	-25.4	1.66 V	315	45.3	3.3
10	4874.00	46.7 AV	54.0	-7.3	1.66 V	315	43.4	3.3
11	7311.00	43.4 PK	74.0	-30.6	1.51 V	155	33.4	10.0
12	7311.00	30.0 AV	54.0	-24.0	1.51 V	155	20.0	10.0

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2352.00	55.3 PK	74.0	-18.7	1.43 H	208	56.1	-0.8
2	2352.00	41.4 AV	54.0	-12.6	1.43 H	208	42.2	-0.8
3	*2462.00	104.1 PK			1.43 H	208	105.5	-1.4
4	*2462.00	101.8 AV			1.43 H	208	103.2	-1.4
5	4924.00	55.1 PK	74.0	-18.9	1.40 H	325	51.6	3.5
6	4924.00	53.8 AV	54.0	-0.2	1.40 H	325	50.3	3.5
7	7386.00	44.9 PK	74.0	-29.1	1.60 H	345	34.7	10.2
8	7386.00	34.7 AV	54.0	-19.3	1.60 H	345	24.5	10.2
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	2352.00	56.5 PK	74.0	-17.5	1.37 V	219	57.3	-0.8
2	2352.00	43.4 AV	54.0	-10.6	1.37 V	219	44.2	-0.8
3	*2462.00	118.8 PK			1.37 V	219	120.2	-1.4
4	*2462.00	116.6 AV			1.37 V	219	118.0	-1.4
5	4924.00	48.2 PK	74.0	-25.8	1.71 V	317	44.7	3.5
6	4924.00	46.4 AV	54.0	-7.6	1.71 V	317	42.9	3.5
7	7386.00	43.1 PK	74.0	-30.9	1.45 V	166	32.9	10.2
8	7386.00	29.9 AV	54.0	-24.1	1.45 V	166	19.7	10.2

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	58.6 PK	74.0	-15.4	1.44 H	208	59.6	-1.0
2	2390.00	42.8 AV	54.0	-11.2	1.44 H	208	43.8	-1.0
3	*2412.00	106.4 PK			1.44 H	208	107.4	-1.0
4	*2412.00	93.3 AV			1.44 H	208	94.3	-1.0
5	4824.00	59.5 PK	74.0	-14.5	1.68 H	39	56.4	3.1
6	4824.00	47.4 AV	54.0	-6.6	1.68 H	39	44.3	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	68.4 PK	74.0	-5.6	1.42 V	208	69.4	-1.0
2	**2390.00**	**53.9 AV**	**54.0**	**-0.1**	**1.42 V**	**208**	**54.9**	**-1.0**
3	*2412.00	121.1 PK			1.42 V	208	122.1	-1.0
4	*2412.00	108.1 AV			1.42 V	208	109.1	-1.0
5	4824.00	56.5 PK	74.0	-17.5	1.58 V	153	53.4	3.1
6	4824.00	41.8 AV	54.0	-12.2	1.58 V	153	38.7	3.1

REMARKS:

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

CHANNEL	TX Channel 2	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	58.3 PK	74.0	-15.7	1.39 H	221	59.3	-1.0
2	2390.00	42.4 AV	54.0	-11.6	1.39 H	221	43.4	-1.0
3	*2417.00	107.2 PK			1.39 H	221	108.3	-1.1
4	*2417.00	94.1 AV			1.39 H	221	95.2	-1.1
5	4834.00	59.1 PK	74.0	-14.9	1.63 H	32	56.0	3.1
6	4834.00	47.2 AV	54.0	-6.8	1.63 H	32	44.1	3.1
7	7251.00	46.3 PK	74.0	-27.7	2.03 H	334	36.6	9.7
8	7251.00	38.3 AV	54.0	-15.7	2.03 H	334	28.6	9.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	68.1 PK	74.0	-5.9	1.36 V	204	69.1	-1.0
2	2390.00	53.5 AV	54.0	-0.5	1.36 V	204	54.5	-1.0
3	*2417.00	121.9 PK			1.36 V	204	123.0	-1.1
4	*2417.00	108.9 AV			1.36 V	204	110.0	-1.1
5	4834.00	56.7 PK	74.0	-17.3	1.64 V	161	53.6	3.1
6	4834.00	41.9 AV	54.0	-12.1	1.64 V	161	38.8	3.1
7	7251.00	44.8 PK	74.0	-29.2	3.70 V	346	35.1	9.7
8	7251.00	36.3 AV	54.0	-17.7	3.70 V	346	26.6	9.7

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	59.1 PK	74.0	-14.9	1.40 H	212	60.1	-1.0
2	2390.00	42.8 AV	54.0	-11.2	1.40 H	212	43.8	-1.0
3	*2437.00	109.5 PK			1.40 H	212	110.9	-1.4
4	*2437.00	96.2 AV			1.40 H	212	97.6	-1.4
5	2483.50	64.1 PK	74.0	-9.9	1.40 H	212	65.3	-1.2
6	2483.50	46.2 AV	54.0	-7.8	1.40 H	212	47.4	-1.2
7	4874.00	59.5 PK	74.0	-14.5	1.60 H	20	56.2	3.3
8	4874.00	47.4 AV	54.0	-6.6	1.60 H	20	44.1	3.3
9	7311.00	46.7 PK	74.0	-27.3	2.07 H	332	36.7	10.0
10	7311.00	38.7 AV	54.0	-15.3	2.07 H	332	28.7	10.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	68.9 PK	74.0	-5.1	1.11 V	206	69.9	-1.0
2	**2390.00**	**53.9 AV**	**54.0**	**-0.1**	**1.11 V**	**206**	**54.9**	**-1.0**
3	*2437.00	124.2 PK			1.11 V	206	125.6	-1.4
4	*2437.00	111.0 AV			1.11 V	206	112.4	-1.4
5	2483.50	69.8 PK	74.0	-4.2	1.11 V	206	71.0	-1.2
6	2483.50	53.1 AV	54.0	-0.9	1.11 V	206	54.3	-1.2
7	4874.00	56.5 PK	74.0	-17.5	1.65 V	150	53.2	3.3
8	4874.00	41.9 AV	54.0	-12.1	1.65 V	150	38.6	3.3
9	7311.00	45.0 PK	74.0	-29.0	3.72 V	340	35.0	10.0
10	7311.00	36.5 AV	54.0	-17.5	3.72 V	340	26.5	10.0

REMARKS:

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

CHANNEL	TX Channel 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	107.4 PK			1.37 H	197	108.8	-1.4
2	*2452.00	94.2 AV			1.37 H	197	95.6	-1.4
3	2483.50	63.3 PK	74.0	-10.7	1.37 H	197	64.5	-1.2
4	2483.50	47.0 AV	54.0	-7.0	1.37 H	197	48.2	-1.2
5	4904.00	59.9 PK	74.0	-14.1	1.59 H	21	56.4	3.5
6	4904.00	47.6 AV	54.0	-6.4	1.59 H	21	44.1	3.5
7	7356.00	46.4 PK	74.0	-27.6	2.05 H	331	36.2	10.2
8	7356.00	38.5 AV	54.0	-15.5	2.05 H	331	28.3	10.2
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	*2452.00	122.1 PK			1.50 V	209	123.5	-1.4
2	*2452.00	109.0 AV			1.50 V	209	110.4	-1.4
3	2483.50	69.0 PK	74.0	-5.0	1.50 V	209	70.2	-1.2
4	**2483.50**	**53.9 AV**	**54.0**	**-0.1**	**1.50 V**	**209**	**55.1**	**-1.2**
5	4904.00	56.0 PK	74.0	-18.0	1.66 V	148	52.5	3.5
6	4904.00	41.7 AV	54.0	-12.3	1.66 V	148	38.2	3.5
7	7356.00	44.6 PK	74.0	-29.4	3.71 V	355	34.4	10.2
8	7356.00	36.3 AV	54.0	-17.7	3.71 V	355	26.1	10.2

REMARKS:

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

CHANNEL	TX Channel 10	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	*2457.00	106.4 PK			1.41 H	195	107.8	-1.4
2	*2457.00	93.6 AV			1.41 H	195	95.0	-1.4
3	2483.50	63.0 PK	74.0	-11.0	1.41 H	195	64.2	-1.2
4	2483.50	47.0 AV	54.0	-7.0	1.41 H	195	48.2	-1.2
5	4914.00	60.1 PK	74.0	-13.9	1.64 H	26	56.6	3.5
6	4914.00	48.0 AV	54.0	-6.0	1.64 H	26	44.5	3.5
7	7371.00	46.5 PK	74.0	-27.5	2.02 H	339	36.3	10.2
8	7371.00	38.9 AV	54.0	-15.1	2.02 H	339	28.7	10.2
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	*2457.00	121.1 PK			1.57 V	195	122.5	-1.4
2	*2457.00	108.4 AV			1.57 V	195	109.8	-1.4
3	2483.50	68.7 PK	74.0	-5.3	1.57 V	195	69.9	-1.2
4	**2483.50**	**53.9 AV**	**54.0**	**-0.1**	**1.57 V**	**195**	**55.1**	**-1.2**
5	4914.00	56.1 PK	74.0	-17.9	1.68 V	158	52.6	3.5
6	4914.00	42.0 AV	54.0	-12.0	1.68 V	158	38.5	3.5
7	7371.00	45.0 PK	74.0	-29.0	3.73 V	360	34.8	10.2
8	7371.00	36.6 AV	54.0	-17.4	3.73 V	360	26.4	10.2

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	104.9 PK			1.41 H	182	106.3	-1.4
2	*2462.00	92.2 AV			1.41 H	182	93.6	-1.4
3	2483.50	62.9 PK	74.0	-11.1	1.41 H	182	64.1	-1.2
4	2483.50	46.9 AV	54.0	-7.1	1.41 H	182	48.1	-1.2
5	4924.00	59.7 PK	74.0	-14.3	1.62 H	41	56.2	3.5
6	4924.00	47.7 AV	54.0	-6.3	1.62 H	41	44.2	3.5
7	7386.00	47.0 PK	74.0	-27.0	2.06 H	338	36.8	10.2
8	7386.00	39.1 AV	54.0	-14.9	2.06 H	338	28.9	10.2
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	119.6 PK			1.51 V	207	121.0	-1.4
2	*2462.00	107.0 AV			1.51 V	207	108.4	-1.4
3	2483.50	68.6 PK	74.0	-5.4	1.51 V	207	69.8	-1.2
4	2483.50	53.8 AV	54.0	-0.2	1.51 V	207	55.0	-1.2
5	4924.00	55.9 PK	74.0	-18.1	1.64 V	165	52.4	3.5
6	4924.00	41.9 AV	54.0	-12.1	1.64 V	165	38.4	3.5
7	7386.00	45.1 PK	74.0	-28.9	3.67 V	360	34.9	10.2
8	7386.00	36.6 AV	54.0	-17.4	3.67 V	360	26.4	10.2

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	54.9 PK	74.0	-19.1	1.38 H	185	55.9	-1.0
2	2390.00	42.7 AV	54.0	-11.3	1.38 H	185	43.7	-1.0
3	*2412.00	106.8 PK			1.38 H	185	107.8	-1.0
4	*2412.00	94.6 AV			1.38 H	185	95.6	-1.0
5	4824.00	59.8 PK	74.0	-14.2	1.59 H	13	56.7	3.1
6	4824.00	48.1 AV	54.0	-5.9	1.59 H	13	45.0	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	64.7 PK	74.0	-9.3	1.41 V	209	65.7	-1.0
2	2390.00	53.8 AV	54.0	-0.2	1.41 V	209	54.8	-1.0
3	*2412.00	121.5 PK			1.41 V	209	122.5	-1.0
4	*2412.00	109.4 AV			1.41 V	209	110.4	-1.0
5	4824.00	56.3 PK	74.0	-17.7	1.65 V	147	53.2	3.1
6	4824.00	41.6 AV	54.0	-12.4	1.65 V	147	38.5	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 2	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	58.7 PK	74.0	-15.3	1.44 H	192	59.7	-1.0
2	2390.00	42.8 AV	54.0	-11.2	1.44 H	192	43.8	-1.0
3	*2417.00	106.8 PK			1.44 H	192	107.9	-1.1
4	*2417.00	95.1 AV			1.44 H	192	96.2	-1.1
5	4834.00	60.1 PK	74.0	-13.9	1.60 H	17	57.0	3.1
6	4834.00	48.1 AV	54.0	-5.9	1.60 H	17	45.0	3.1
7	7251.00	45.8 PK	74.0	-28.2	2.03 H	344	36.1	9.7
8	7251.00	38.5 AV	54.0	-15.5	2.03 H	344	28.8	9.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	68.5 PK	74.0	-5.5	1.39 V	214	69.5	-1.0
2	**2390.00**	**53.9 AV**	**54.0**	**-0.1**	**1.39 V**	**214**	**54.9**	**-1.0**
3	*2417.00	121.5 PK			1.39 V	214	122.6	-1.1
4	*2417.00	109.9 AV			1.39 V	214	111.0	-1.1
5	4834.00	56.3 PK	74.0	-17.7	1.60 V	160	53.2	3.1
6	4834.00	41.5 AV	54.0	-12.5	1.60 V	160	38.4	3.1
7	7251.00	45.0 PK	74.0	-29.0	3.73 V	356	35.3	9.7
8	7251.00	36.5 AV	54.0	-17.5	3.73 V	356	26.8	9.7

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	57.4 PK	74.0	-16.6	1.43 H	204	58.4	-1.0
2	2390.00	41.2 AV	54.0	-12.8	1.43 H	204	42.2	-1.0
3	*2437.00	108.6 PK			1.43 H	204	110.0	-1.4
4	*2437.00	97.2 AV			1.43 H	204	98.6	-1.4
5	2483.50	62.6 PK	74.0	-11.4	1.43 H	204	63.8	-1.2
6	2483.50	46.9 AV	54.0	-7.1	1.43 H	204	48.1	-1.2
7	4874.00	59.8 PK	74.0	-14.2	1.55 H	16	56.5	3.3
8	4874.00	47.9 AV	54.0	-6.1	1.55 H	16	44.6	3.3
9	7311.00	46.2 PK	74.0	-27.8	1.98 H	330	36.2	10.0
10	7311.00	38.6 AV	54.0	-15.4	1.98 H	330	28.6	10.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	67.2 PK	74.0	-6.8	1.49 V	235	68.2	-1.0
2	2390.00	51.9 AV	54.0	-2.1	1.49 V	235	52.9	-1.0
3	*2437.00	123.3 PK			1.49 V	235	124.7	-1.4
4	*2437.00	112.0 AV			1.49 V	235	113.4	-1.4
5	2483.50	68.3 PK	74.0	-5.7	1.49 V	235	69.5	-1.2
6	2483.50	53.8 AV	54.0	-0.2	1.49 V	235	55.0	-1.2
7	4874.00	56.3 PK	74.0	-17.7	1.70 V	144	53.0	3.3
8	4874.00	41.9 AV	54.0	-12.1	1.70 V	144	38.6	3.3
9	7311.00	45.1 PK	74.0	-28.9	3.76 V	351	35.1	10.0
10	7311.00	36.8 AV	54.0	-17.2	3.76 V	351	26.8	10.0

REMARKS:

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

CHANNEL	TX Channel 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	107.9 PK			1.42 H	208	109.3	-1.4
2	*2452.00	95.1 AV			1.42 H	208	96.5	-1.4
3	2483.50	63.9 PK	74.0	-10.1	1.42 H	208	65.1	-1.2
4	2483.50	46.9 AV	54.0	-7.1	1.42 H	208	48.1	-1.2
5	4904.00	59.4 PK	74.0	-14.6	1.54 H	29	55.9	3.5
6	4904.00	47.6 AV	54.0	-6.4	1.54 H	29	44.1	3.5
7	7356.00	46.2 PK	74.0	-27.8	2.03 H	334	36.0	10.2
8	7356.00	38.7 AV	54.0	-15.3	2.03 H	334	28.5	10.2
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	*2452.00	122.6 PK			1.46 V	205	124.0	-1.4
2	*2452.00	109.9 AV			1.46 V	205	111.3	-1.4
3	2483.50	69.6 PK	74.0	-4.4	1.46 V	205	70.8	-1.2
4	2483.50	53.8 AV	54.0	-0.2	1.46 V	205	55.0	-1.2
5	4904.00	56.8 PK	74.0	-17.2	1.64 V	151	53.3	3.5
6	4904.00	42.0 AV	54.0	-12.0	1.64 V	151	38.5	3.5
7	7356.00	45.6 PK	74.0	-28.4	3.69 V	339	35.4	10.2
8	7356.00	36.9 AV	54.0	-17.1	3.69 V	339	26.7	10.2

REMARKS:

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

CHANNEL	TX Channel 10	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	*2457.00	106.2 PK			1.48 H	207	107.6	-1.4
2	*2457.00	94.5 AV			1.48 H	207	95.9	-1.4
3	2483.50	63.5 PK	74.0	-10.5	1.48 H	207	64.7	-1.2
4	2483.50	46.9 AV	54.0	-7.1	1.48 H	207	48.1	-1.2
5	4914.00	59.9 PK	74.0	-14.1	1.51 H	14	56.4	3.5
6	4914.00	47.9 AV	54.0	-6.1	1.51 H	14	44.4	3.5
7	7371.00	46.6 PK	74.0	-27.4	1.98 H	326	36.4	10.2
8	7371.00	39.2 AV	54.0	-14.8	1.98 H	326	29.0	10.2
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	*2457.00	120.9 PK			1.31 V	203	122.3	-1.4
2	*2457.00	109.3 AV			1.31 V	203	110.7	-1.4
3	2483.50	69.2 PK	74.0	-4.8	1.31 V	203	70.4	-1.2
4	2483.50	53.8 AV	54.0	-0.2	1.31 V	203	55.0	-1.2
5	4914.00	56.8 PK	74.0	-17.2	1.63 V	154	53.3	3.5
6	4914.00	41.8 AV	54.0	-12.2	1.63 V	154	38.3	3.5
7	7371.00	45.8 PK	74.0	-28.2	3.67 V	325	35.6	10.2
8	7371.00	37.3 AV	54.0	-16.7	3.67 V	325	27.1	10.2

REMARKS:

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

CHANNEL	TX Channel 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	104.7 PK			1.52 H	215	106.1	-1.4
2	*2462.00	93.1 AV			1.52 H	215	94.5	-1.4
3	2483.50	60.5 PK	74.0	-13.5	1.52 H	215	61.7	-1.2
4	2483.50	46.9 AV	54.0	-7.1	1.52 H	215	48.1	-1.2
5	4924.00	59.3 PK	74.0	-14.7	1.59 H	41	55.8	3.5
6	4924.00	47.6 AV	54.0	-6.4	1.59 H	41	44.1	3.5
7	7386.00	45.7 PK	74.0	-28.3	2.08 H	346	35.5	10.2
8	7386.00	38.4 AV	54.0	-15.6	2.08 H	346	28.2	10.2
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	119.4 PK			1.31 V	210	120.8	-1.4
2	*2462.00	107.9 AV			1.31 V	210	109.3	-1.4
3	2483.50	66.2 PK	74.0	-7.8	1.31 V	210	67.4	-1.2
4	2483.50	53.8 AV	54.0	-0.2	1.31 V	210	55.0	-1.2
5	4924.00	56.9 PK	74.0	-17.1	1.67 V	159	53.4	3.5
6	4924.00	42.2 AV	54.0	-11.8	1.67 V	159	38.7	3.5
7	7386.00	45.4 PK	74.0	-28.6	3.69 V	332	35.2	10.2
8	7386.00	36.5 AV	54.0	-17.5	3.69 V	332	26.3	10.2

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	57.2 PK	74.0	-16.8	1.45 H	203	58.2	-1.0
2	2390.00	42.8 AV	54.0	-11.2	1.45 H	203	43.8	-1.0
3	*2422.00	98.7 PK			1.45 H	203	100.0	-1.3
4	*2422.00	88.2 AV			1.45 H	203	89.5	-1.3
5	4844.00	59.3 PK	74.0	-14.7	1.65 H	27	56.2	3.1
6	4844.00	47.5 AV	54.0	-6.5	1.65 H	27	44.4	3.1
7	7266.00	45.3 PK	74.0	-28.7	2.07 H	341	35.5	9.8
8	7266.00	38.2 AV	54.0	-15.8	2.07 H	341	28.4	9.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	67.0 PK	74.0	-7.0	1.66 V	209	68.0	-1.0
2	**2390.00**	**53.9 AV**	**54.0**	**-0.1**	**1.66 V**	**209**	**54.9**	**-1.0**
3	*2422.00	113.4 PK			1.66 V	209	114.7	-1.3
4	*2422.00	103.0 AV			1.66 V	209	104.3	-1.3
5	4844.00	57.4 PK	74.0	-16.6	1.65 V	147	54.3	3.1
6	4844.00	42.3 AV	54.0	-11.7	1.65 V	147	39.2	3.1
7	7266.00	45.7 PK	74.0	-28.3	3.69 V	330	35.9	9.8
8	7266.00	36.9 AV	54.0	-17.1	3.69 V	330	27.1	9.8

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	55.8 PK	74.0	-18.2	1.49 H	207	56.8	-1.0
2	2390.00	42.7 AV	54.0	-11.3	1.49 H	207	43.7	-1.0
3	*2437.00	101.5 PK			1.49 H	207	102.9	-1.4
4	*2437.00	91.2 AV			1.49 H	207	92.6	-1.4
5	2496.00	63.5 PK	74.0	-10.5	1.49 H	207	64.6	-1.1
6	2496.00	42.7 AV	54.0	-11.3	1.49 H	207	43.8	-1.1
7	4874.00	59.1 PK	74.0	-14.9	1.63 H	56	55.8	3.3
8	4874.00	47.5 AV	54.0	-6.5	1.63 H	56	44.2	3.3
9	7311.00	45.7 PK	74.0	-28.3	2.13 H	358	35.7	10.0
10	7311.00	38.5 AV	54.0	-15.5	2.13 H	358	28.5	10.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	65.6 PK	74.0	-8.4	1.78 V	29	66.6	-1.0
2	2390.00	53.8 AV	54.0	-0.2	1.78 V	29	54.8	-1.0
3	*2437.00	116.2 PK			1.78 V	29	117.6	-1.4
4	*2437.00	106.0 AV			1.78 V	29	107.4	-1.4
5	2496.00	68.8 PK	74.0	-5.2	1.78 V	29	69.9	-1.1
6	2496.00	49.6 AV	54.0	-4.4	1.78 V	29	50.7	-1.1
7	4874.00	56.5 PK	74.0	-17.5	1.70 V	136	53.2	3.3
8	4874.00	41.8 AV	54.0	-12.2	1.70 V	136	38.5	3.3
9	7311.00	45.4 PK	74.0	-28.6	3.74 V	333	35.4	10.0
10	7311.00	36.5 AV	54.0	-17.5	3.74 V	333	26.5	10.0

REMARKS:

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

CHANNEL	TX Channel 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	100.5 PK			1.44 H	199	101.9	-1.4
2	*2452.00	90.5 AV			1.44 H	199	91.9	-1.4
3	2483.50	62.1 PK	74.0	-11.9	1.44 H	199	63.3	-1.2
4	2483.50	46.7 AV	54.0	-7.3	1.44 H	199	47.9	-1.2
5	4904.00	59.6 PK	74.0	-14.4	1.58 H	65	56.1	3.5
6	4904.00	48.0 AV	54.0	-6.0	1.58 H	65	44.5	3.5
7	7356.00	45.1 PK	74.0	-28.9	2.18 H	360	34.9	10.2
8	7356.00	38.0 AV	54.0	-16.0	2.18 H	360	27.8	10.2
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	*2452.00	115.2 PK			1.51 V	207	116.6	-1.4
2	*2452.00	105.3 AV			1.51 V	207	106.7	-1.4
3	2483.50	67.4 PK	74.0	-6.6	1.51 V	207	68.6	-1.2
4	2483.50	53.6 AV	54.0	-0.4	1.51 V	207	54.8	-1.2
5	4904.00	56.6 PK	74.0	-17.4	1.64 V	146	53.1	3.5
6	4904.00	42.1 AV	54.0	-11.9	1.64 V	146	38.6	3.5
7	7356.00	46.1 PK	74.0	-27.9	3.65 V	342	35.9	10.2
8	7356.00	37.1 AV	54.0	-16.9	3.65 V	342	26.9	10.2

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.

Below 1GHz Data:

802.11g

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	30.00	34.7 QP	40.0	-5.3	2.50 H	118	43.5	-8.8
2	125.06	36.5 QP	43.5	-7.0	2.50 H	243	45.9	-9.4
3	311.30	41.0 QP	46.0	-5.0	2.00 H	179	47.8	-6.8
4	421.88	38.8 QP	46.0	-7.2	1.50 H	301	42.7	-3.9
5	491.72	39.7 QP	46.0	-6.3	1.50 H	226	42.1	-2.4
6	837.04	36.1 QP	46.0	-9.9	1.00 H	142	32.5	3.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	38.22	32.0 QP	40.0	-8.0	1.00 V	72	40.4	-8.4
2	124.99	39.8 QP	43.5	-3.7	1.00 V	360	49.2	-9.4
3	313.24	36.1 QP	46.0	-9.9	1.00 V	244	42.8	-6.7
4	348.16	35.2 QP	46.0	-10.8	1.00 V	198	41.2	-6.0
5	544.10	40.5 QP	46.0	-5.5	1.50 V	268	42.0	-1.5
6	852.56	36.9 QP	46.0	-9.1	1.50 V	279	33.2	3.7

REMARKS:

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

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.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Nov. 01, 2017	Oct. 31, 2018
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Nov. 15, 20167	Nov. 14, 2018
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 03, 2017	June 02, 2018
50 ohms Terminator	N/A	EMC-02	Sep. 22, 2017	Sep. 21, 2018
RF Cable	5D-FB	COCCAB-001	Sep. 29, 2017	Sep. 28, 2018
10 dB PAD Mini-Circuits	HAT-10+	CONATT-004	June 18, 2017	June 17, 2018
Software BVADT	BVADT_Cond_ V7.3.7.4	NA	NA	NA

Note:
1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. 1.
3 Tested Date: Jan. 17, 2018

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.

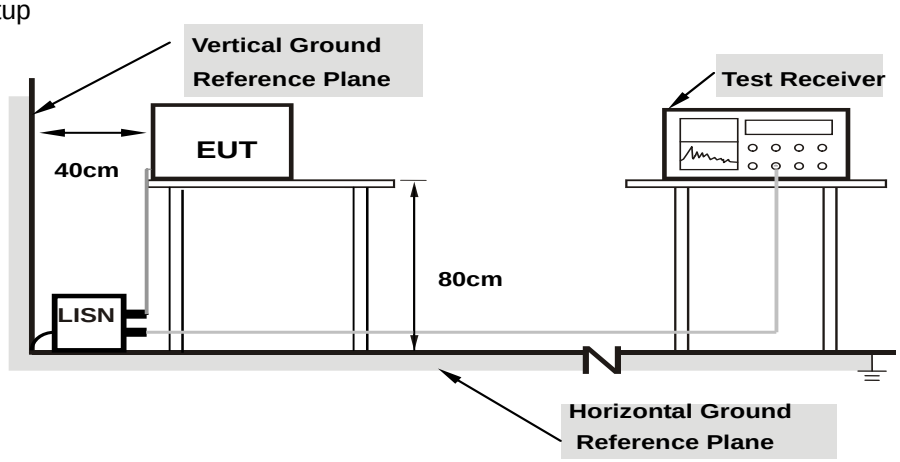
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

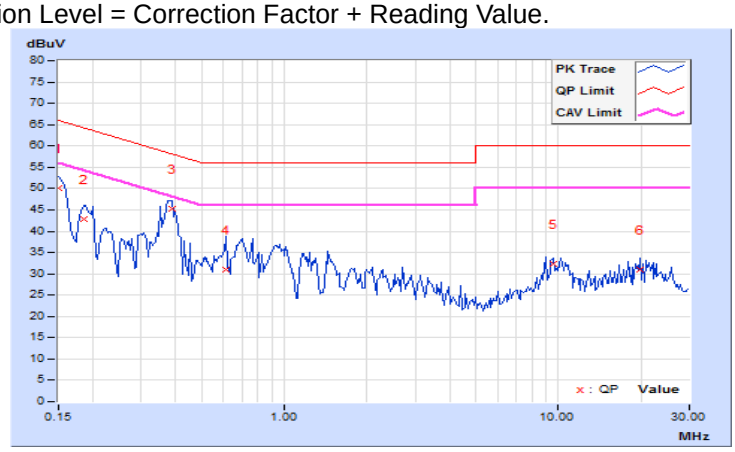
4.2.7 Test Results

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

No	Freq.	Corr. Factor	Reading Value [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	10.13	40.10	28.16	50.23	38.29	66.00	56.00	-15.77	-17.71
2	0.18516	10.14	32.62	19.13	42.76	29.27	64.25	54.25	-21.49	-24.98
3	0.38828	10.19	34.93	26.44	45.12	36.63	58.10	48.10	-12.98	-11.47
4	0.61094	10.20	20.81	12.30	31.01	22.50	56.00	46.00	-24.99	-23.50
5	9.57422	10.62	21.78	18.92	32.40	29.54	60.00	50.00	-27.60	-20.46
6	19.76953	11.21	19.82	18.47	31.03	29.68	60.00	50.00	-28.97	-20.32

REMARKS:

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

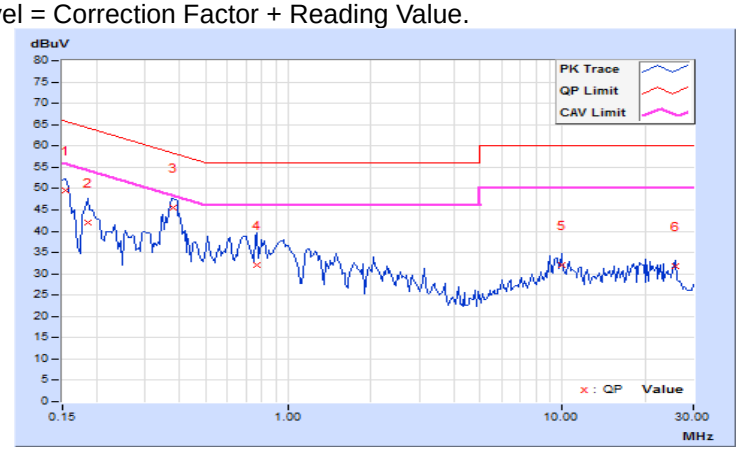


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	10.04	39.41	28.45	49.45	38.49	65.79	55.79	-16.34	-17.30
2	0.18516	10.04	32.08	18.71	42.12	28.75	64.25	54.25	-22.13	-25.50
3	**0.38047**	**10.08**	**35.46**	**28.51**	**45.54**	**38.59**	**58.27**	**48.27**	**-12.73**	**-9.68**
4	0.77109	10.10	22.04	12.18	32.14	22.28	56.00	46.00	-23.86	-23.72
5	9.98828	10.49	21.67	18.81	32.16	29.30	60.00	50.00	-27.84	-20.70
6	25.87109	11.05	20.81	19.51	31.86	30.56	60.00	50.00	-28.14	-19.44

REMARKS:

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

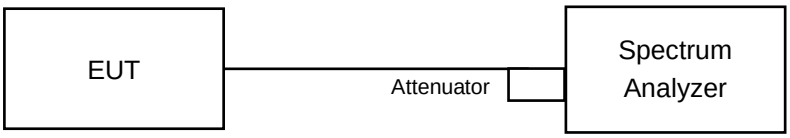


4.3 6dB Bandwidth Measurement

4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	8.12	8.58	0.5	Pass
6	2437	8.09	8.55	0.5	Pass
11	2462	8.11	8.12	0.5	Pass

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	16.37	16.39	0.5	Pass
2	2417	16.37	16.38	0.5	Pass
6	2437	16.37	16.38	0.5	Pass
9	2452	16.38	16.37	0.5	Pass
10	2457	16.37	16.36	0.5	Pass
11	2462	16.35	16.36	0.5	Pass

802.11n (HT20)

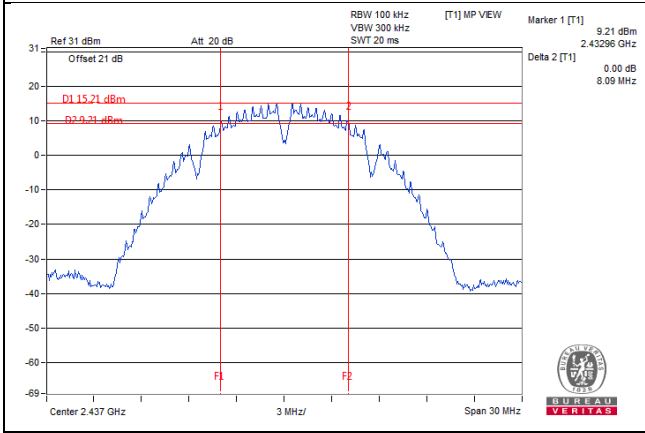
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	17.58	17.57	0.5	Pass
2	2417	17.31	17.58	0.5	Pass
6	2437	17.61	17.65	0.5	Pass
9	2452	17.07	17.59	0.5	Pass
10	2457	17.35	17.56	0.5	Pass
11	2462	17.59	17.30	0.5	Pass

802.11n (HT40)

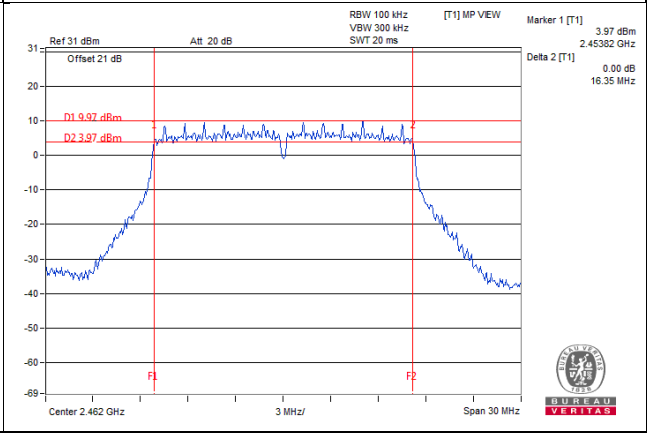
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
3	2422	35.12	35.19	0.5	Pass
6	2437	35.16	35.25	0.5	Pass
9	2452	35.20	35.17	0.5	Pass

Spectrum Plot of Worst Value

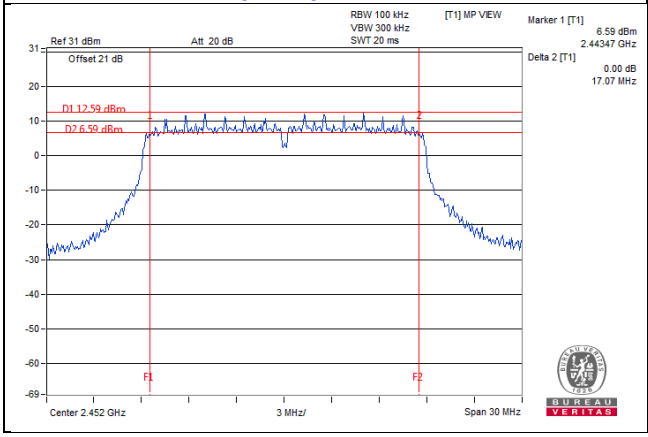
802.11b / Chain 0 : CH6



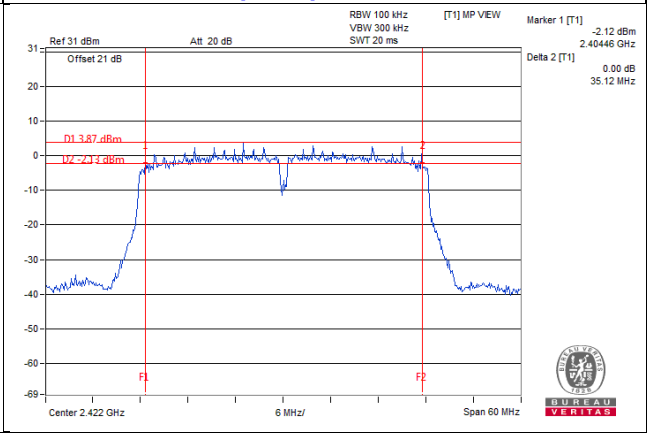
802.11g / Chain 0 : CH11



802.11n (HT20) / Chain 0 : CH9



802.11n (HT40) / Chain 0 : CH3



4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

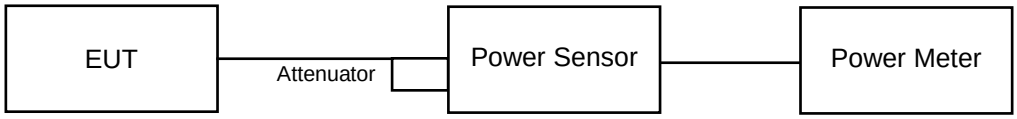
For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

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

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

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

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

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

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as Item 4.3.6.

4.4.7 Test Results

802.11b

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	23.06	23.03	403.211	26.06	30.00	Pass
6	2437	23.33	23.32	430.061	26.34	30.00	Pass
11	2462	23.32	23.18	422.753	26.26	30.00	Pass

Note: Max. gain is 4.92dBi < 6dBi , so the power limit shall not be reduced.

802.11g

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	21.42	21.25	272.028	24.35	30.00	Pass
2	2417	22.25	22.23	334.989	25.25	30.00	Pass
6	2437	25.13	25.05	645.727	28.10	30.00	Pass
9	2452	23.02	23.01	400.433	26.03	30.00	Pass
10	2457	22.08	22.03	321.024	25.07	30.00	Pass
11	2462	20.54	20.42	223.394	23.49	30.00	Pass

Note: Max. gain is 4.92dBi < 6dBi , so the power limit shall not be reduced.

802.11n (HT20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	20.97	20.86	246.925	23.93	30.00	Pass
2	2417	22.00	21.96	315.525	24.99	30.00	Pass
6	2437	24.92	24.72	606.939	27.83	30.00	Pass
9	2452	22.66	22.61	366.892	25.65	30.00	Pass
10	2457	21.63	21.61	290.423	24.63	30.00	Pass
11	2462	20.02	19.98	200.003	23.01	30.00	Pass

Note: Max. gain is 4.92dBi < 6dBi , so the power limit shall not be reduced.

802.11n (HT40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	17.02	17.01	100.584	20.03	30.00	Pass
6	2437	20.17	20.01	204.223	23.10	30.00	Pass
9	2452	19.68	19.38	179.593	22.54	30.00	Pass

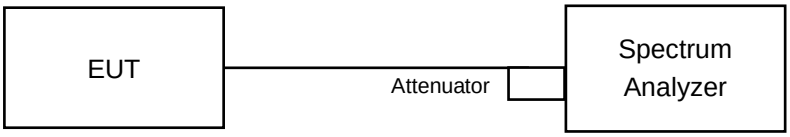
Note: Max. gain is 4.92dBi < 6dBi , so the power limit shall not be reduced.

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

802.11b, 802.11n (HT20)

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.

802.11g, 802.11n (HT40)

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6

4.5.7 Test Results

802.11b

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-7.36	3.01	-4.35	6.07	Pass
	6	2437	-7.20	3.01	-4.19	6.07	Pass
	11	2462	-7.26	3.01	-4.25	6.07	Pass
1	1	2412	-7.27	3.01	-4.26	6.07	Pass
	6	2437	-7.64	3.01	-4.63	6.07	Pass
	11	2462	-7.39	3.01	-4.38	6.07	Pass

Note: 1. Directional gain =10 log[$(10^{G0/20} + 10^{G1/20})^2$ / 2] = 7.93dBi > 6dBi , so the power density limit shall be reduced to 8-(7.93-6) = 6.07dBm

802.11g

TX chain	Channel	Freq. (MHz)	PSD W/O Duty Factor (dBm/3kHz)	10 log (N=2) dB	Duty Factor (dB)	TOTAL PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-11.89	3.01	0.18	-8.70	6.07	Pass
	2	2417	-10.31	3.01	0.18	-7.12	6.07	Pass
	6	2437	-7.29	3.01	0.18	-4.10	6.07	Pass
	9	2452	-10.29	3.01	0.18	-7.10	6.07	Pass
	10	2457	-10.75	3.01	0.18	-7.56	6.07	Pass
	11	2462	-12.53	3.01	0.18	-9.34	6.07	Pass
1	1	2412	-11.46	3.01	0.18	-8.27	6.07	Pass
	2	2417	-10.11	3.01	0.18	-6.92	6.07	Pass
	6	2437	-8.07	3.01	0.18	-4.88	6.07	Pass
	9	2452	-9.68	3.01	0.18	-6.49	6.07	Pass
	10	2457	-10.39	3.01	0.18	-7.20	6.07	Pass
	11	2462	-12.09	3.01	0.18	-8.90	6.07	Pass

Note: 1. Directional gain =10 log[$(10^{G0/20} + 10^{G1/20})^2$ / 2] = 7.93dBi > 6dBi , so the power density limit shall be reduced to 8-(7.93-6) = 6.07dBm

802.11n (HT20)

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-12.32	3.01	-9.31	6.07	Pass
	2	2417	-10.93	3.01	-7.92	6.07	Pass
	6	2437	-8.60	3.01	-5.59	6.07	Pass
	9	2452	-10.60	3.01	-7.59	6.07	Pass
	10	2457	-11.58	3.01	-8.57	6.07	Pass
	11	2462	-12.25	3.01	-9.24	6.07	Pass
1	1	2412	-11.05	3.01	-8.04	6.07	Pass
	2	2417	-10.51	3.01	-7.50	6.07	Pass
	6	2437	-7.68	3.01	-4.67	6.07	Pass
	9	2452	-10.04	3.01	-7.03	6.07	Pass
	10	2457	-10.98	3.01	-7.97	6.07	Pass
	11	2462	-12.35	3.01	-9.34	6.07	Pass

Note: 1. Directional gain =10 log[$(10^{G0/20} + 10^{G1/20})^2$ / 2] = 7.93dBi > 6dBi , so the power density limit shall be reduced to 8-(7.93-6) = 6.07dBm

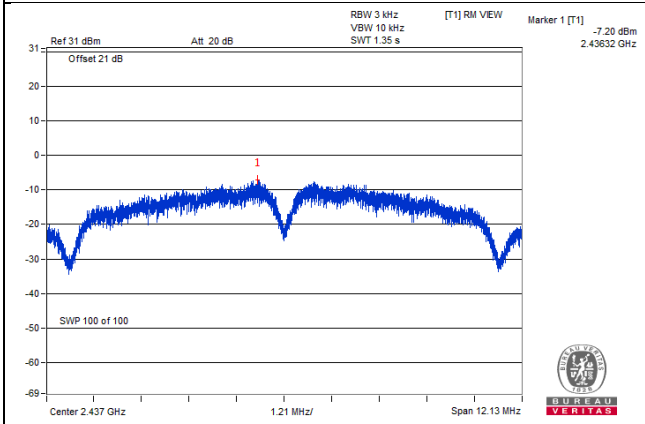
802.11n (HT40)

TX chain	Channel	Freq. (MHz)	PSD W/O Duty Factor (dBm/3kHz)	10 log (N=2) dB	Duty Factor (dB)	TOTAL PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	3	2422	-18.41	3.01	0.16	-15.24	6.07	Pass
	6	2437	-14.99	3.01	0.16	-11.82	6.07	Pass
	9	2452	-15.85	3.01	0.16	-12.68	6.07	Pass
1	3	2422	-17.75	3.01	0.16	-14.58	6.07	Pass
	6	2437	-15.86	3.01	0.16	-12.69	6.07	Pass
	9	2452	-15.55	3.01	0.16	-12.38	6.07	Pass

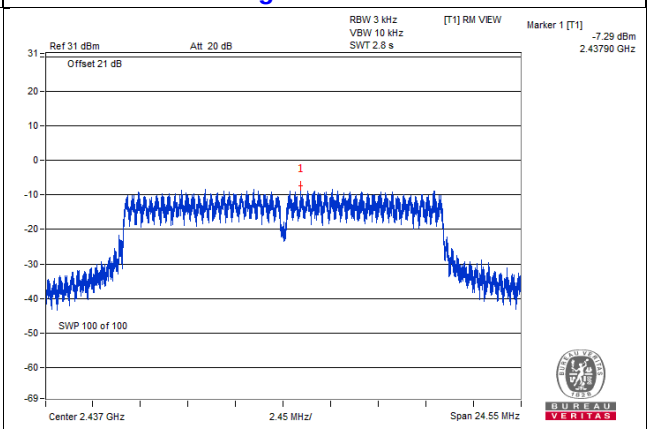
Note: 1. Directional gain =10 log[$(10^{G0/20} + 10^{G1/20})^2$ / 2] = 7.93dBi > 6dBi , so the power density limit shall be reduced to 8-(7.93-6) = 6.07dBm

Spectrum Plot of Worst Value

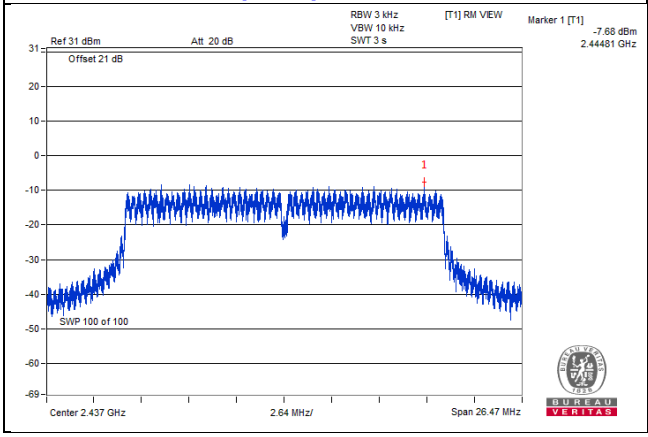
802.11b / Chain 0 : CH6



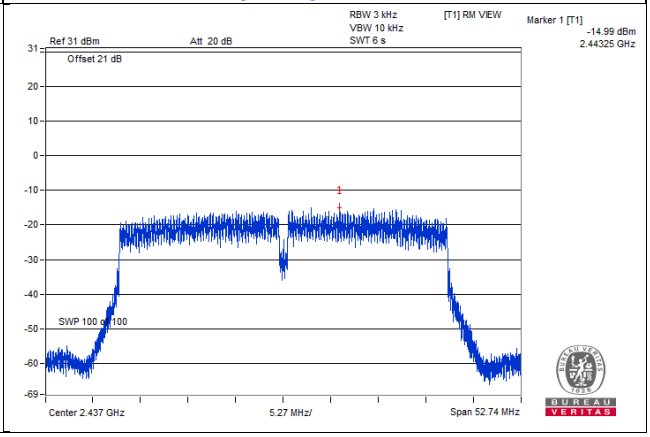
802.11g / Chain 0 : CH6



802.11n (HT20) / Chain 1 : CH6



802.11n (HT40) / Chain 0 : CH6

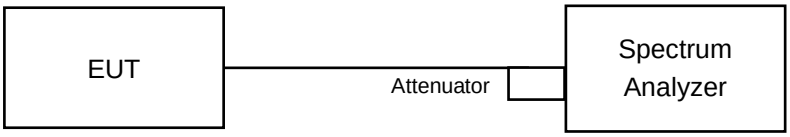


4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW ≥ 300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

MEASUREMENT PROCEDURE OOBE

1. Set RBW = 100 kHz.
2. Set VBW ≥ 300 kHz.
3. Detector = peak.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

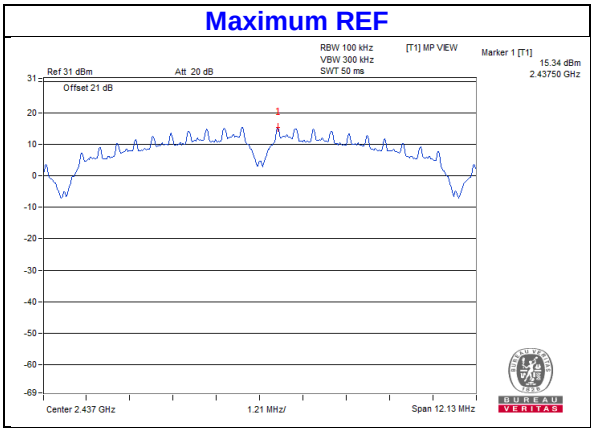
Same as Item 4.3.6

4.6.7 Test Results

The 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.

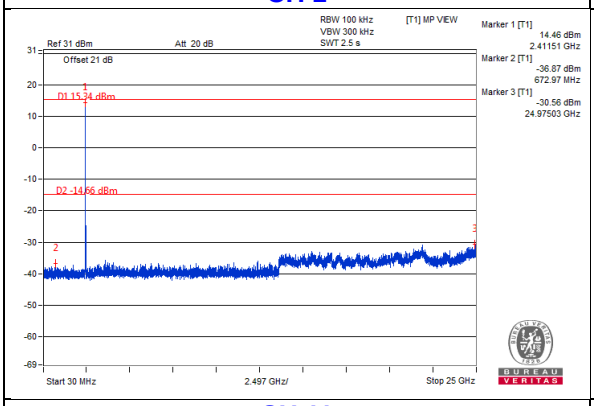
802.11b

Maximum REF

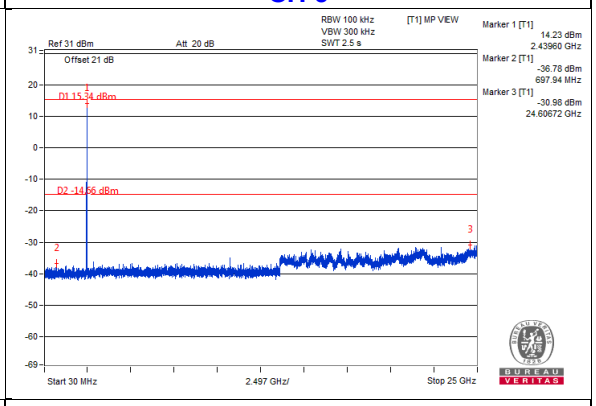


Chain 0

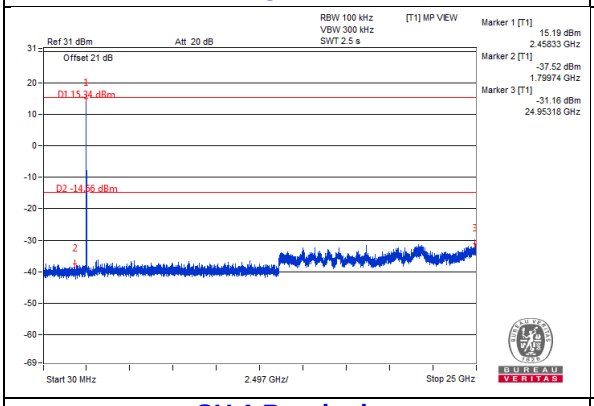
CH 1



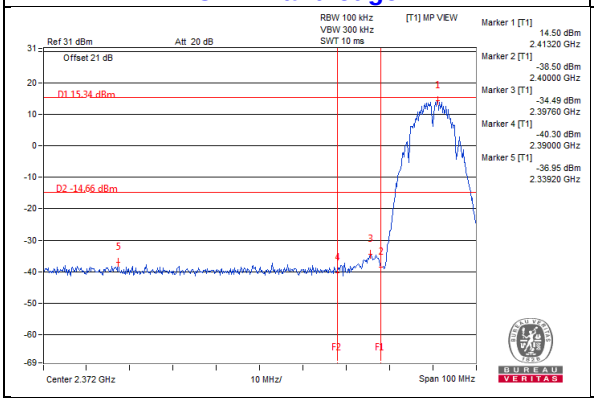
CH 6



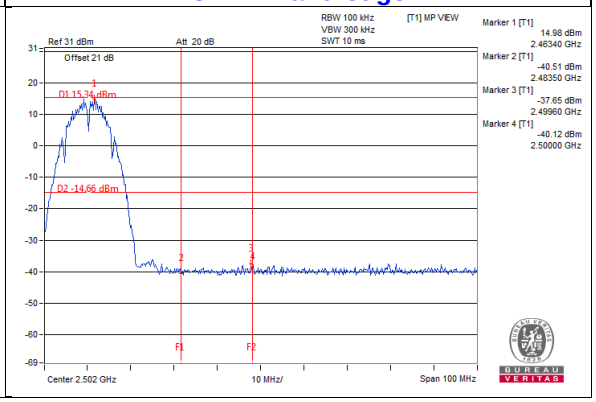
CH 11



CH 1 Band edge

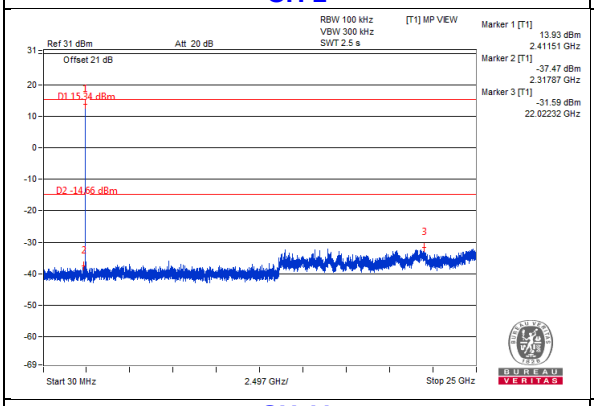


CH 11 Band edge

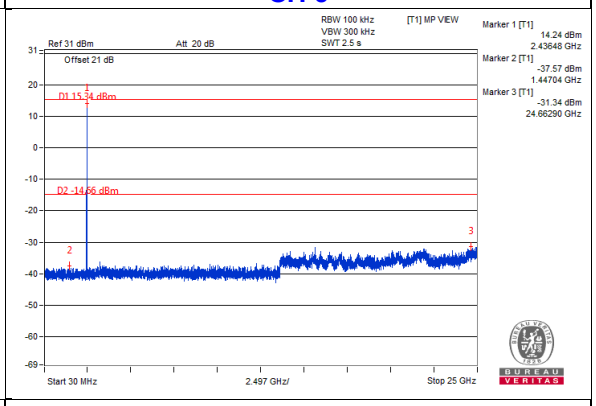


Chain 1

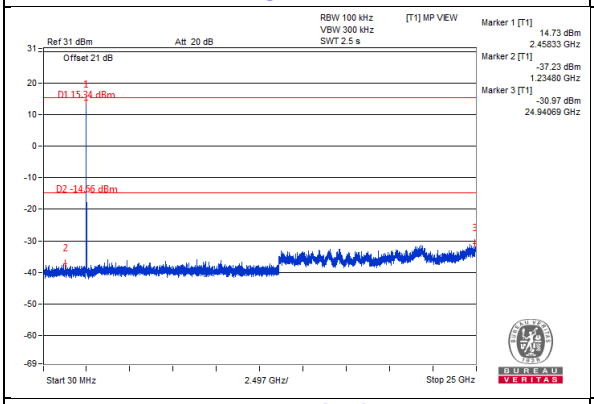
CH 1



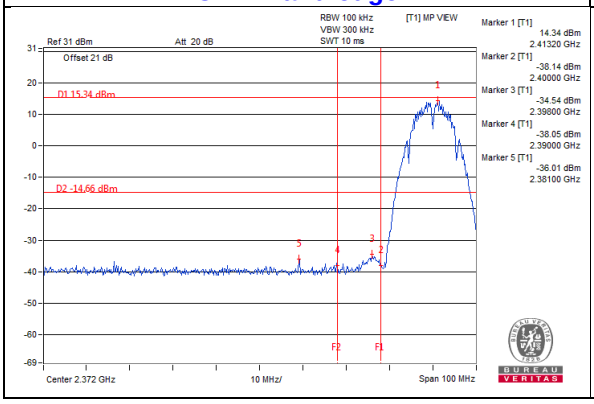
CH 6



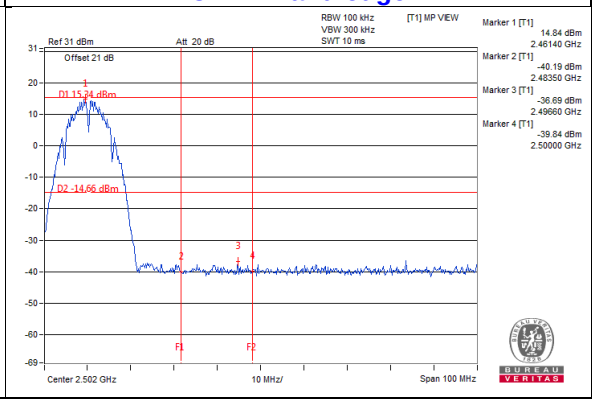
CH 11



CH 1 Band edge

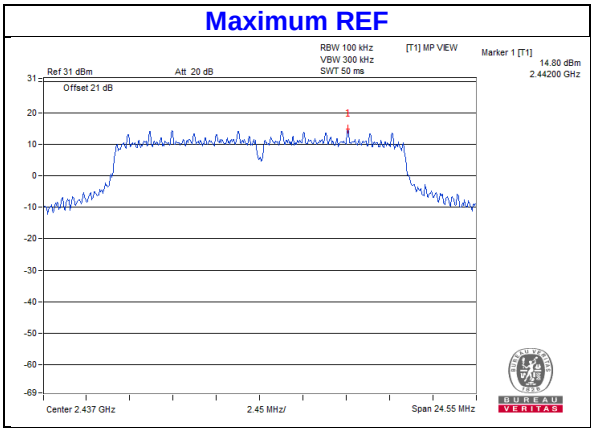


CH 11 Band edge



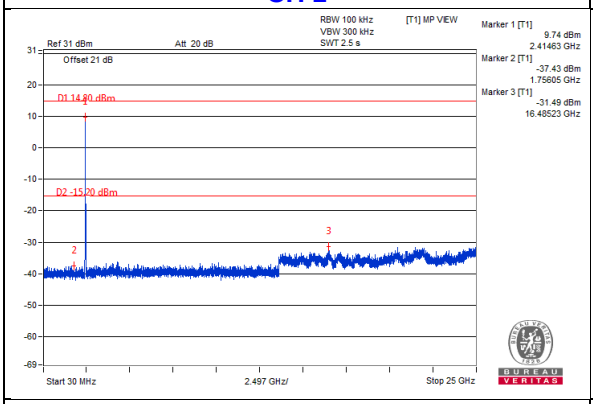
802.11g

Maximum REF

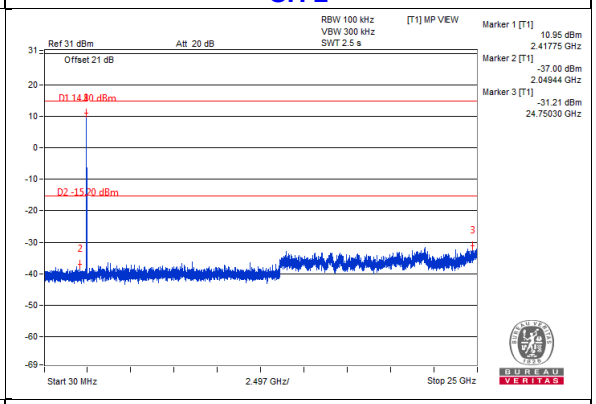


Chain 0

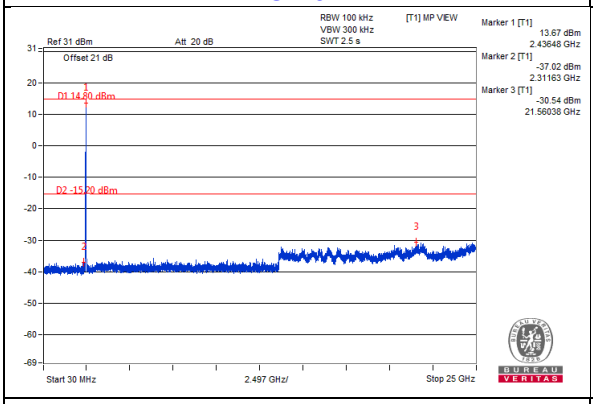
CH 1



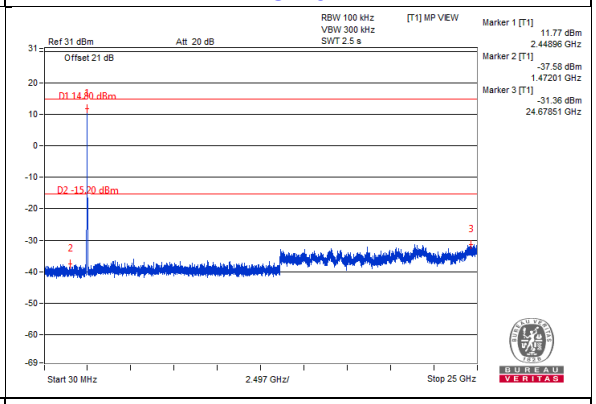
CH 2



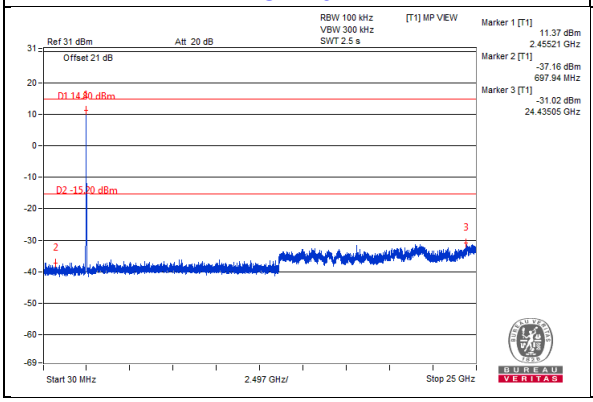
CH 6



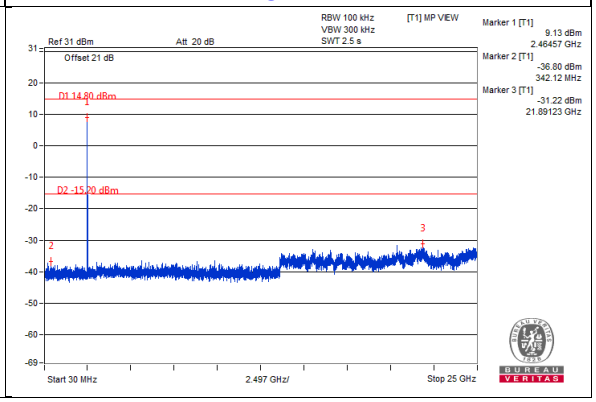
CH 9



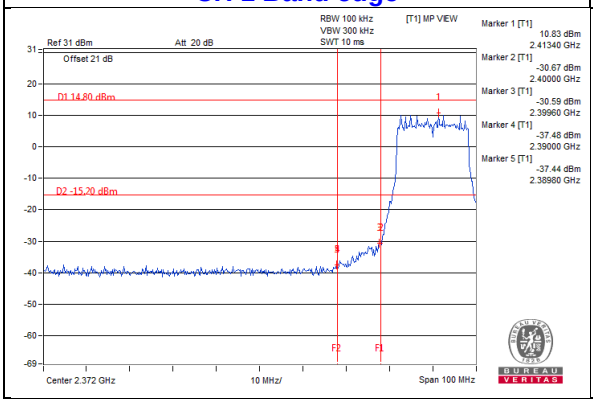
CH 10



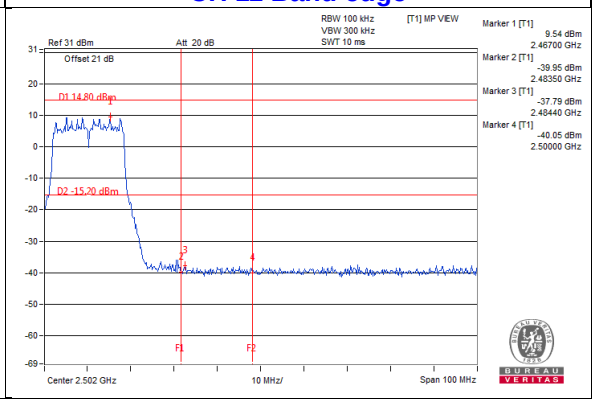
CH 11



CH 1 Band edge

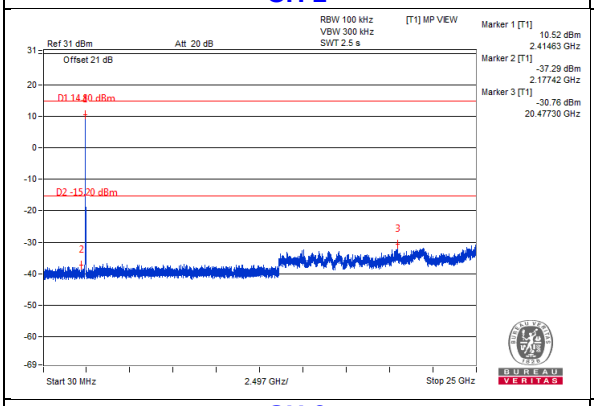


CH 11 Band edge

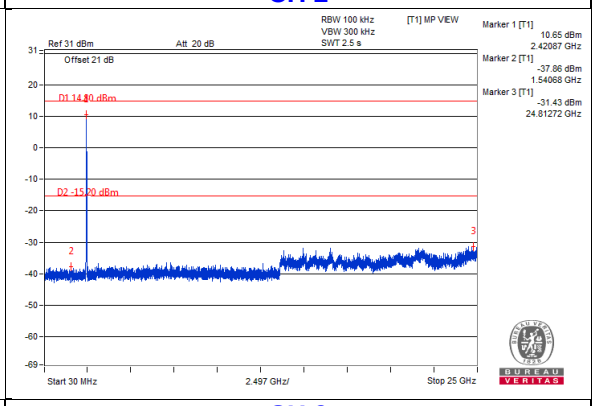


Chain 1

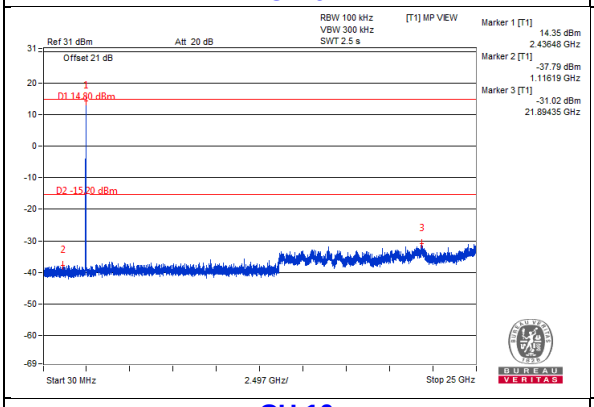
CH 1



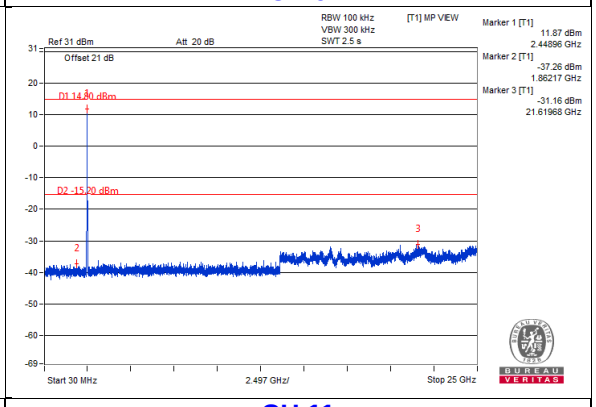
CH 2



CH 6



CH 9



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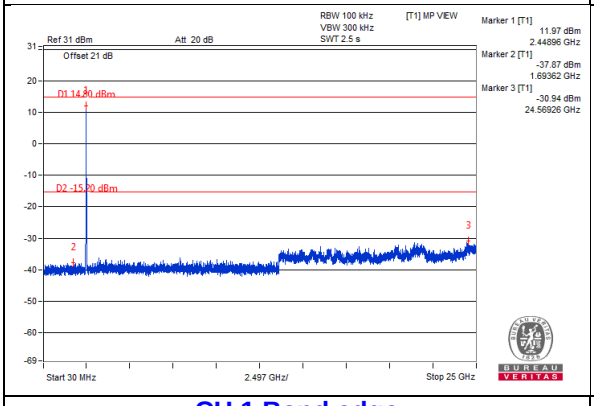

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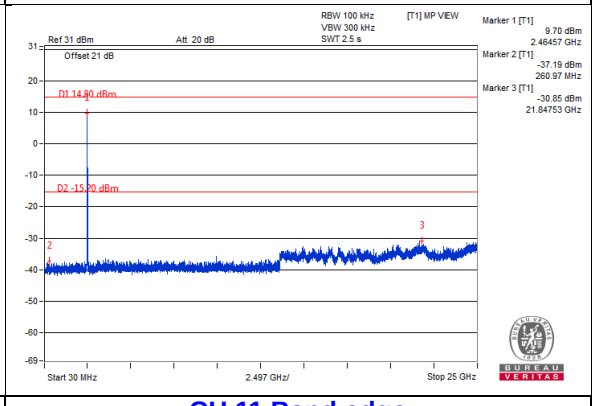
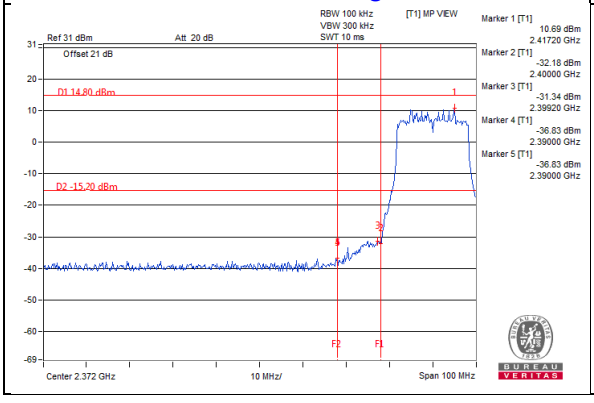
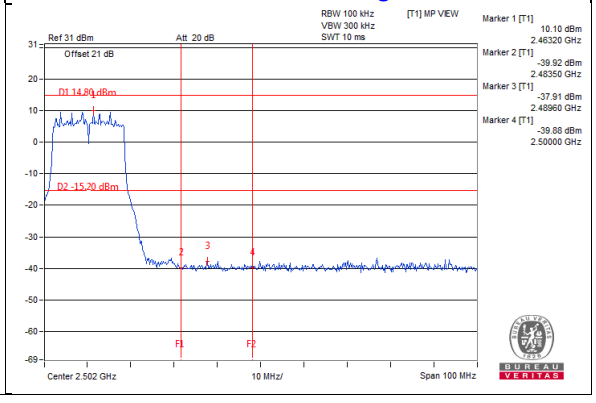


CH 1 Band edge

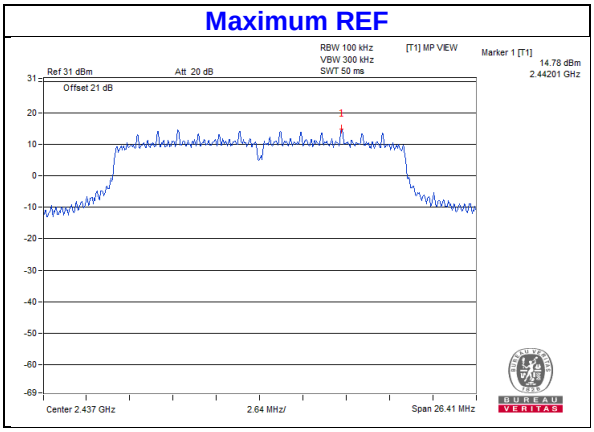


CH 11 Band edge



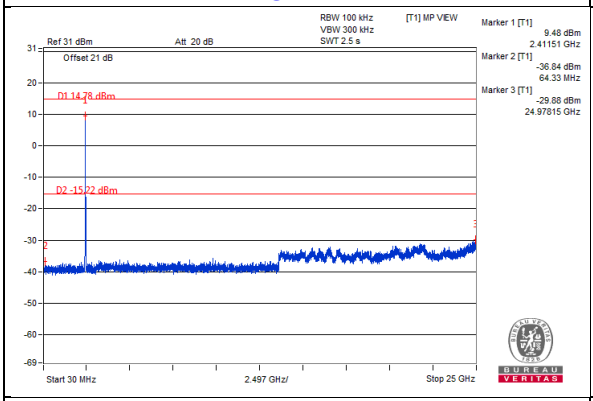
802.11n (HT20)

Maximum REF

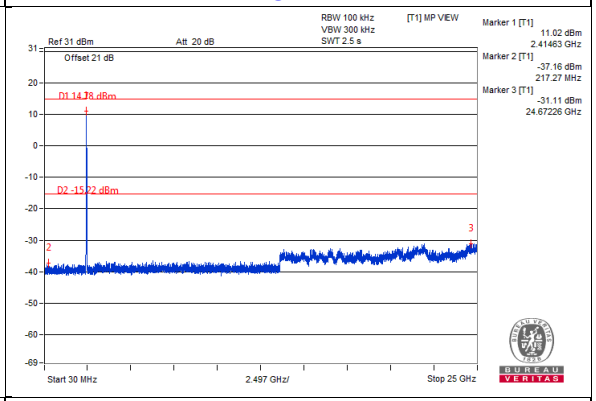


Chain 0

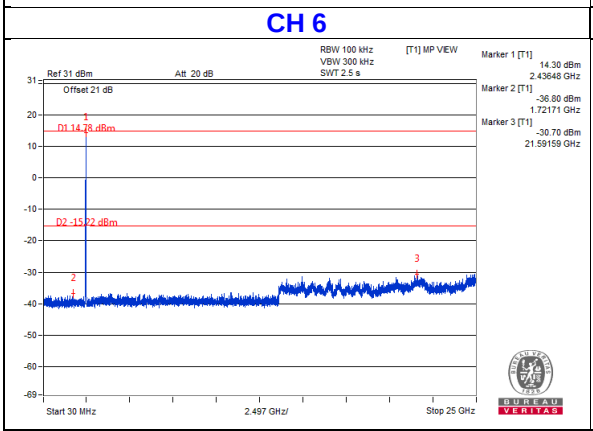
CH 1



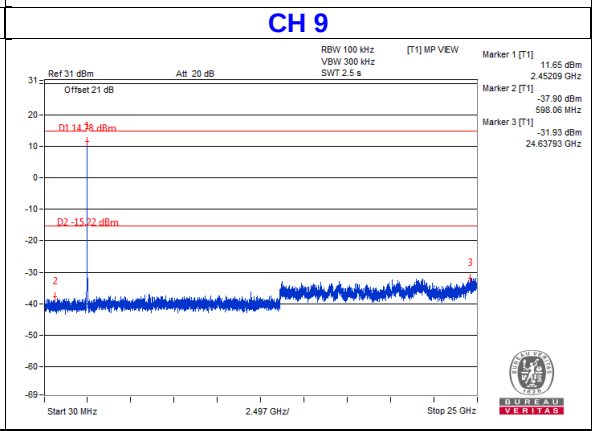
CH 2



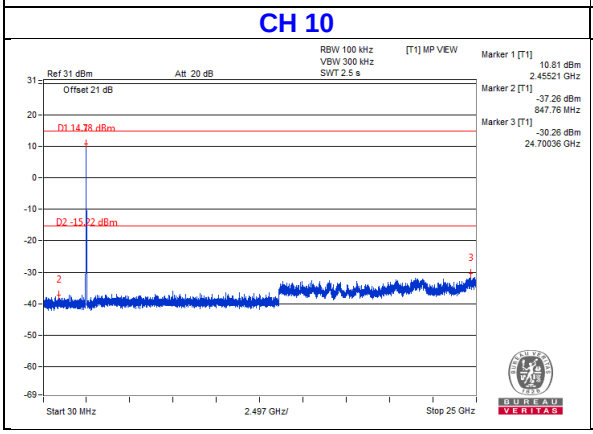
CH 6



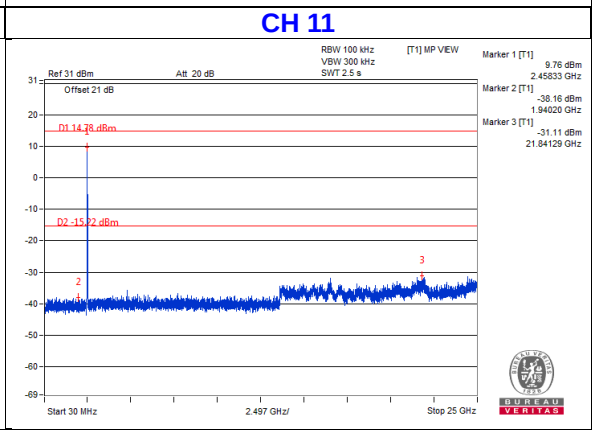
CH 9



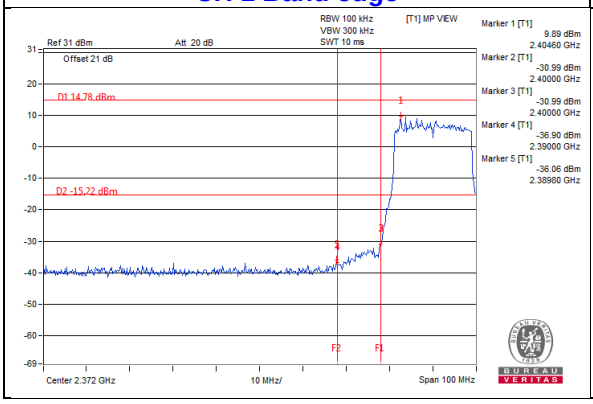
CH 10



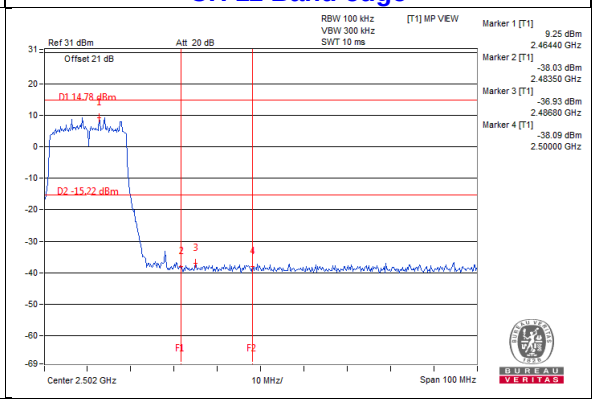
CH 11



CH 1 Band edge

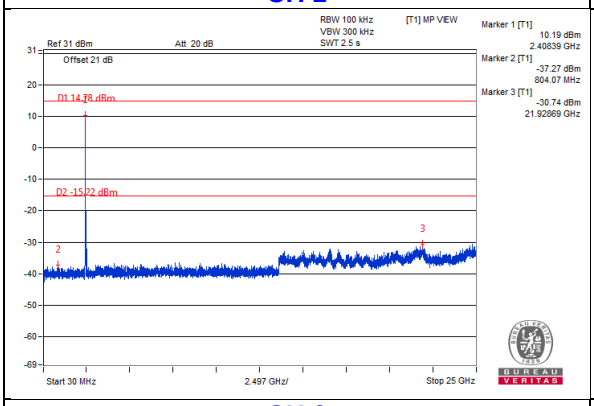


CH 11 Band edge

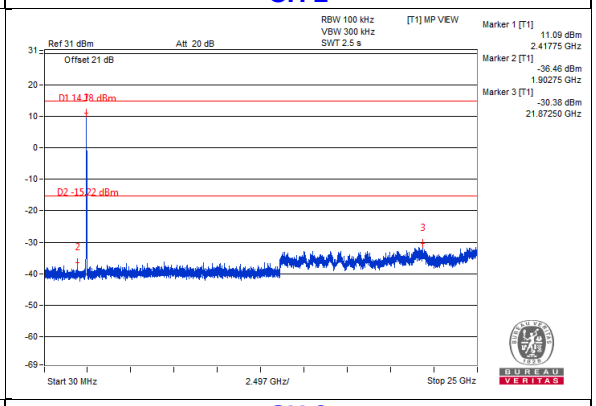


Chain 1

CH 1



CH 2



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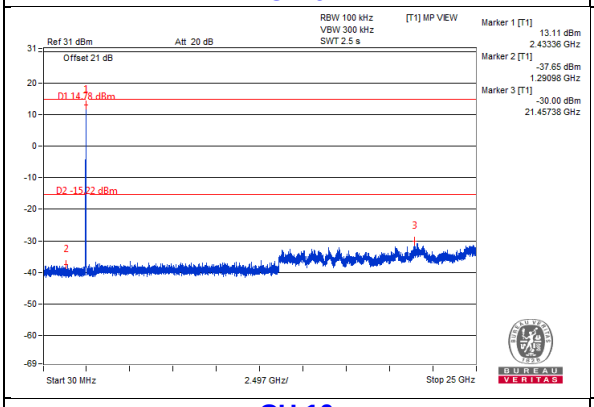

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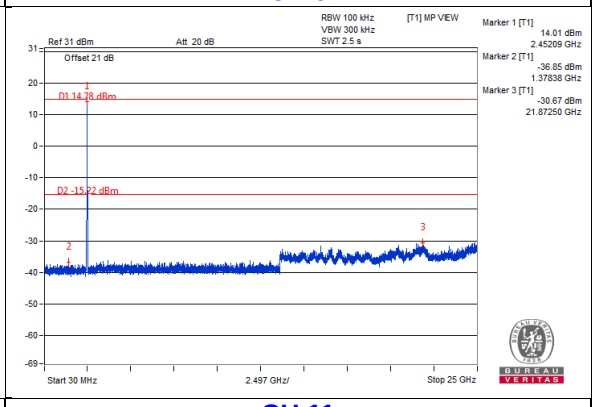

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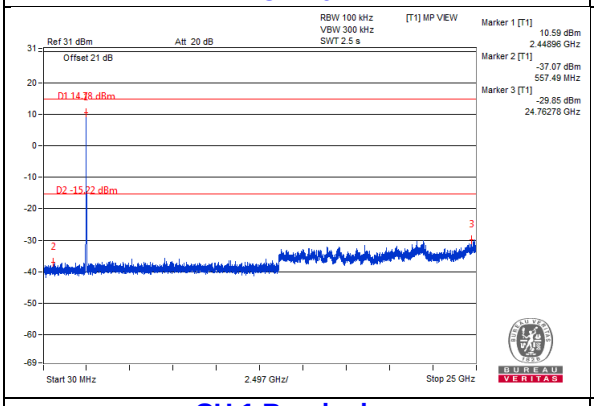

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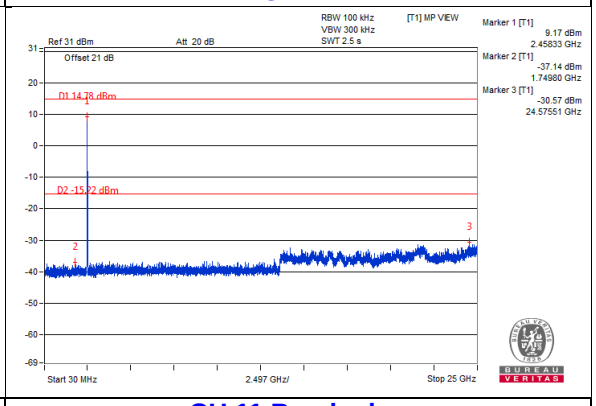
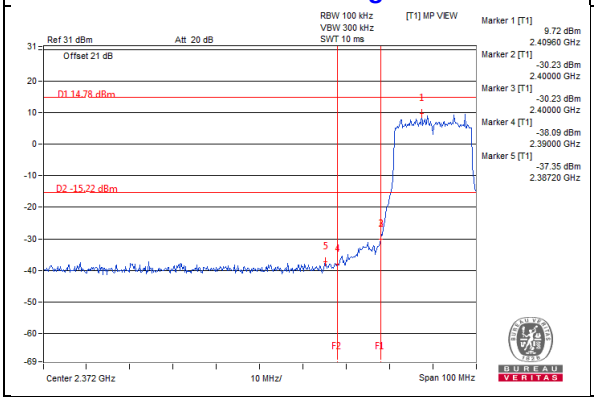
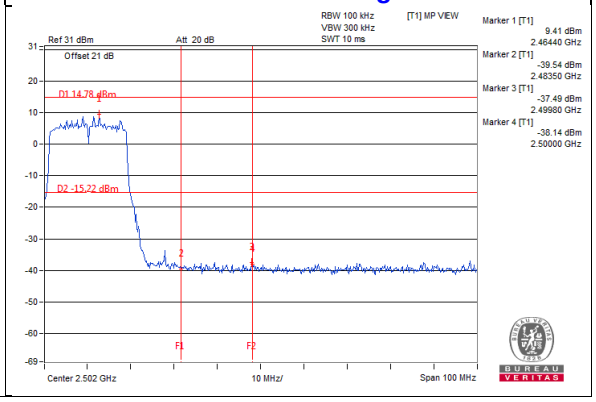


CH 1 Band edge

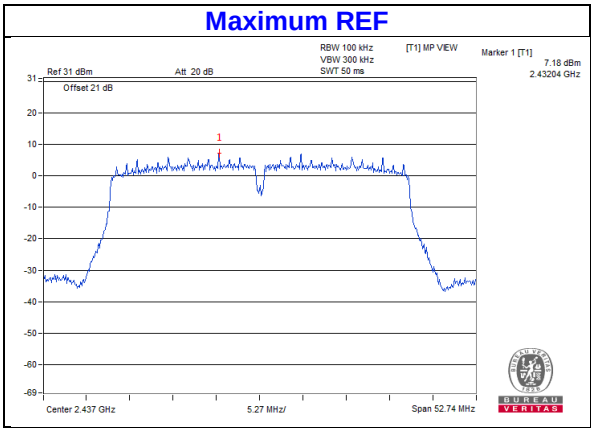


CH 11 Band edge



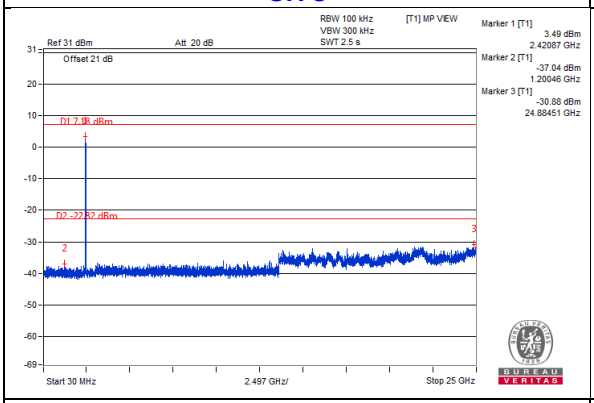
802.11n (HT40)

Maximum REF



Chain 0

CH 3



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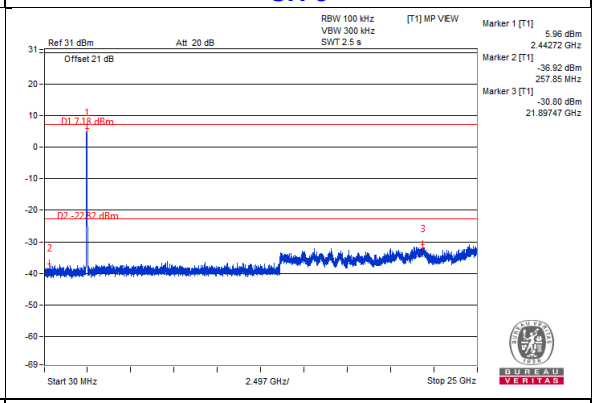
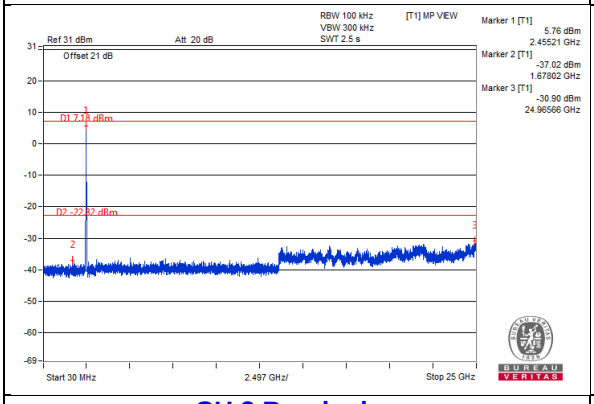
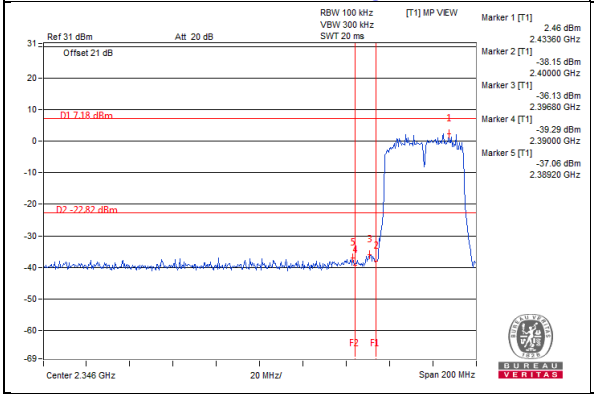


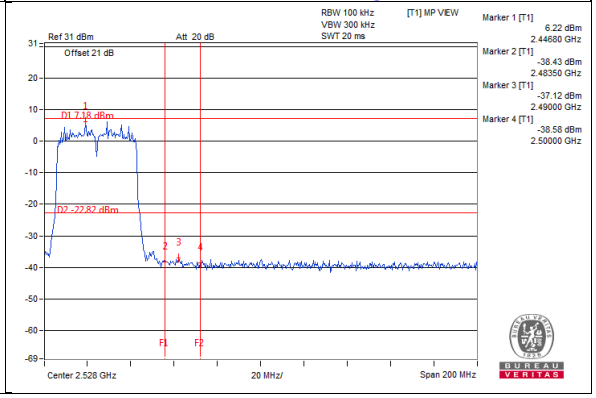
CH 9



CH 3 Band edge

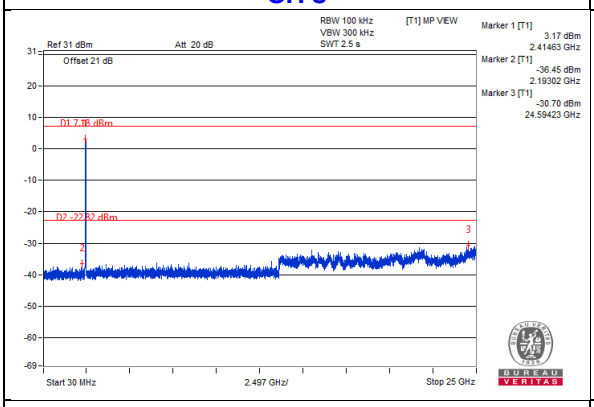


CH 9 Band edge

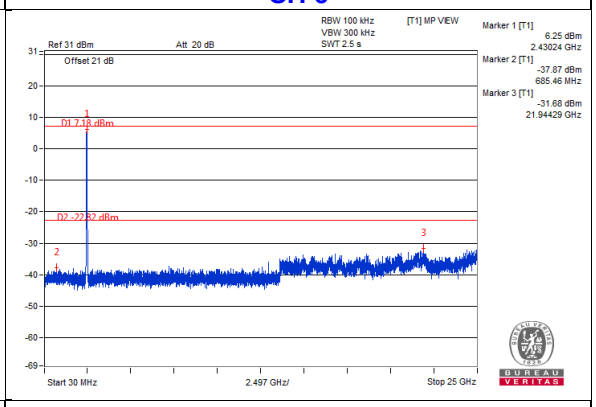


Chain 1

CH 3



CH 6



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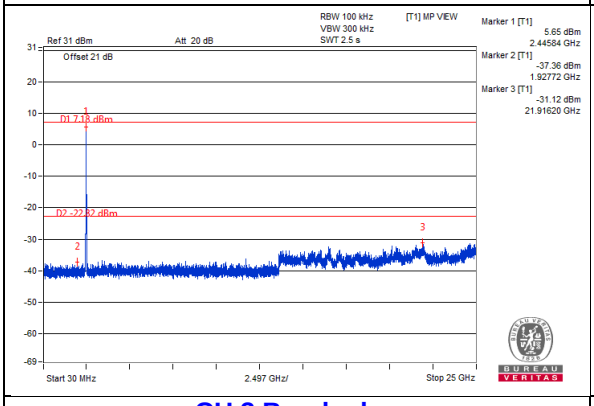
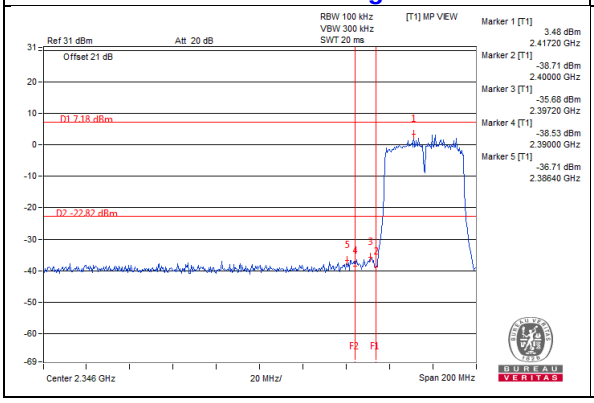


CH 3 Band edge



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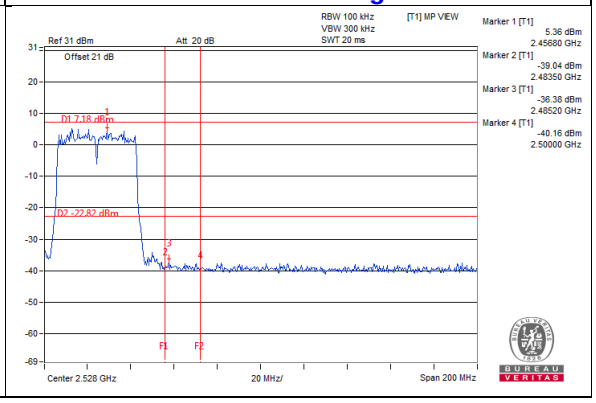

5 Pictures of Test Arrangements

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

Appendix – Information on the Testing Laboratories

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

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

Linkou 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.

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