FCC Test Report (WLAN)

Report No.: RF170220E09

FCC ID: XCNRAC2V1U

Test Model: RAC2V1U

Received Date: Feb. 20, 2017

Test Date: Mar. 06 to Apr. 26, 2017

Issued Date: June 21, 2017

Applicant: Ubee Interactive Corp.

Address: 10F-1, No. 5, Taiyuan 1st St. Jhubei Ci, Hsinchu County 302, 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 (1): E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.

Test Location (2): No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan R.O.C.

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Release Control Record

Issue No.	Description	Date Issued
RF170220E09	Original release.	June 21, 2017

1 Certificate of Conformity

Product: Wave 2 WiFi Router

Brand: Ubee

Test Model: RAC2V1U

Sample Status: ENGINEERING SAMPLE

Applicant: Ubee Interactive Corp.

Test Date: Mar. 06 to Apr. 26, 2017

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 : Cindy Hsin , **Date:** June 21, 2017

Cindy Hsin / Specialist

Approved by : , **Date:** June 21, 2017

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 -12.36dB at 0.17344MHz.
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,
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 i-pex(MHF) 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	1.84 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.34 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.41 dB
	6GHz ~ 18GHz	3.49 dB
	18GHz ~ 40GHz	3.30 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Wave 2 WiFi Router
Brand	Ubee
Test Model	RAC2V1U
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	12Vdc from power adapter
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	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 600Mbps 802.11ac: up to 1733.3Mbps
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:** 995.285mW **5GHz:** **5.18 ~ 5.24GHz:** **CDD Mode:** 325.677mW **Beamforming Mode:** 325.677mW **5.745 ~ 5.825GHz:** **CDD Mode:** 986.213mW **Beamforming Mode:** 323.806mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	Ethernet Cable x 1 (1m)

Note:

1. Simultaneously transmission condition.

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

2. The EUT must be supplied with a power adapter and following different models could be chosen as following table:

No	Brand	Model No.	Spec.
1	DVE	DSA-36PFH-12 FUS 120300	Input: 90-264Vac, 1A, 47-63Hz Output: 12V, 3A DC output cable(unshielded, 1.5m)
2	DVE	DSA-30PFG-12 FUS 120250	Input: 100-240Vac, 0.8A, 50/60Hz Output: 12V, 2.5A DC output cable(unshielded, 1.5m)
Note: From the above adapters, the radiated emissions worse case was found in Adapter 1. Therefore only the test data of the mode was recorded in this report.			

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

2.4GHz Band							
Antenna No.	Brand	Model	Antenna Net. Gain(dBi)	Frequency range (GHz)	Antenna Type	Connecter Type	Cable Length (mm)
1	FOXCONN	ANTP2M1-CZZ0R-EF	4.5	2.4~2.4835	Dipole	i-pex(MHF)	248
2	FOXCONN	ANTP2M1-CZZ0S-EF	4.9	2.4~2.4835			200
3	FOXCONN	ANTP2M1-CZZ0P-EF	4.53	2.4~2.4835			70
5GHz Band							
Antenna No.	Brand	Model	Antenna Net. Gain(dBi)	Frequency range (GHz)	Antenna Type	Connecter Type	Cable Length
1	FOXCONN	ANTP2M1-CZZ0M-EF	4.37	5.15~5.25	Dipole	i-pex(MHF)	78
			4.47	5.25~5.35			
			4.5	5.47~5.725			
			4.73	5.725~5.85			
2	FOXCONN	ANTP2M1-CZZ0Q-EF	5.06	5.15~5.25	Dipole	i-pex(MHF)	133
			5.35	5.25~5.35			
			5.18	5.47~5.725			
			5.36	5.725~5.85			
3	FOXCONN	ANTP2M1-CZZ0L-EF	5.35	5.15~5.25	Dipole	i-pex(MHF)	162
			4.20	5.25~5.35			
			3.54	5.47~5.725			
			3.41	5.725~5.85			
4	FOXCONN	ANTP2M1-CZZ0N-EF	4.53	5.15~5.25	Dipole	i-pex(MHF)	153
			4.88	5.25~5.35			
			5.53	5.47~5.725			
			5.69	5.725~5.85			

4. The EUT incorporates a MIMO function.

2.4GHz Band			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11b	1 ~ 11Mbps	3TX	3RX
802.11g	6 ~ 54Mbps	3TX	3RX
802.11n (HT20)	MCS 0~7	3TX	3RX
	MCS 8~15	3TX	3RX
	MCS 16~23	3TX	3RX
802.11n (HT40)	MCS 0~7	3TX	3RX
	MCS 8~15	3TX	3RX
	MCS 16~23	3TX	3RX
5GHz Band			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11a	6 ~ 54Mbps	4TX	4RX
802.11n (HT20)	MCS 0~7	4TX	4RX
	MCS 8~15	4TX	4RX
	MCS 16~23	4TX	4RX
	MCS 24~31	4TX	4RX
802.11n (HT40)	MCS 0~7	4TX	4RX
	MCS 8~15	4TX	4RX
	MCS 16~23	4TX	4RX
	MCS 24~31	4TX	4RX
802.11ac (VHT20)	MCS0~8 Nss=1	4TX	4RX
	MCS0~8 Nss=2	4TX	4RX
	MCS0~9 Nss=3	4TX	4RX
	MCS0~8 Nss=4	4TX	4RX
802.11ac (VHT40)	MCS0~9 Nss=1	4TX	4RX
	MCS0~9 Nss=2	4TX	4RX
	MCS0~9 Nss=3	4TX	4RX
	MCS0~9 Nss=4	4TX	4RX
802.11ac (VHT80)	MCS0~9 Nss=1	4TX	4RX
	MCS0~9 Nss=2	4TX	4RX
	MCS0~9 Nss=3	4TX	4RX
	MCS0~9 Nss=4	4TX	4RX

Note:
1. All of modulation mode support beamforming function except 2.4GHz and 802.11a modulation mode.

5. 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	
1	√	√	√	√	Adapter 1
2	-	-	√	-	Adapter 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

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, 6, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

Radiated Emission Test (Below 1GHz):

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

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

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, 6, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

Test Condition:

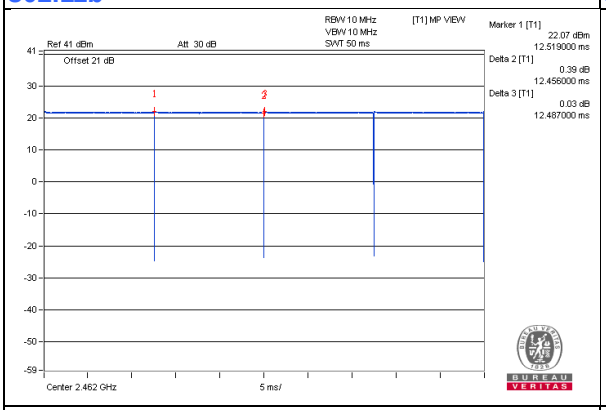
APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	23deg. C, 66%RH	120Vac, 60Hz	Terry Huang
RE<1G	23deg. C, 66%RH	120Vac, 60Hz	JyunChun.Lin
PLC	25deg. C, 75%RH	120Vac, 60Hz	Andy Ho
APCM	24deg. C, 63%RH	120Vac, 60Hz	Robert Cheng

3.3 Duty Cycle of Test Signal

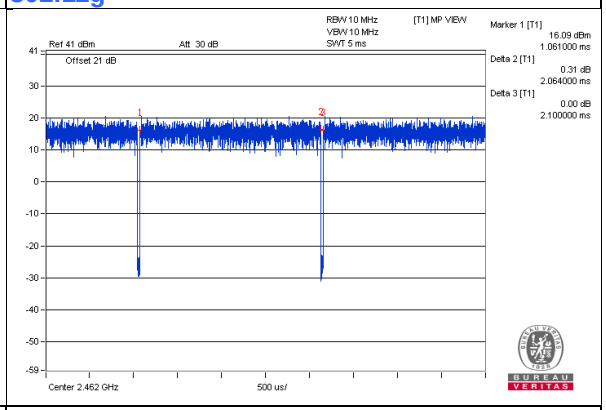
If duty cycle of test signal is ≥ 98 %, duty factor is not required.
If duty cycle of test signal is < 98%, duty factor shall be considered.

802.11b: Duty cycle = 12.456/12.487 = 0.998
802.11g: Duty cycle = 2.064/2.1 = 0.983
802.11n (HT20): Duty cycle = 1.92/1.95 = 0.985
802.11n (HT40): Duty cycle = 0.943/0.973 = 0.969, Duty factor = 10 * log(1/0.969) = 0.14

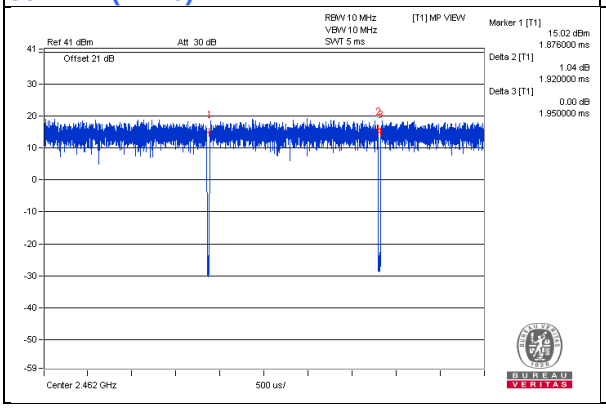
802.11b



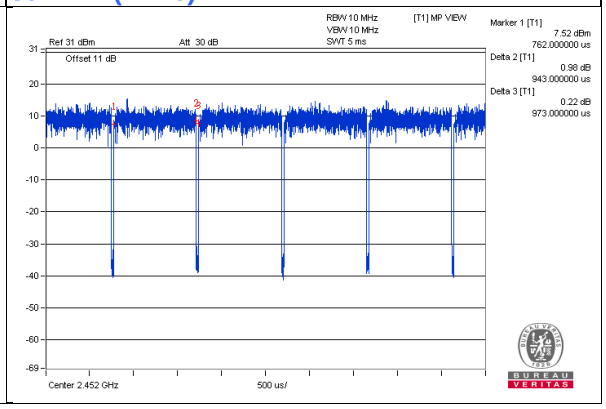
802.11g



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.

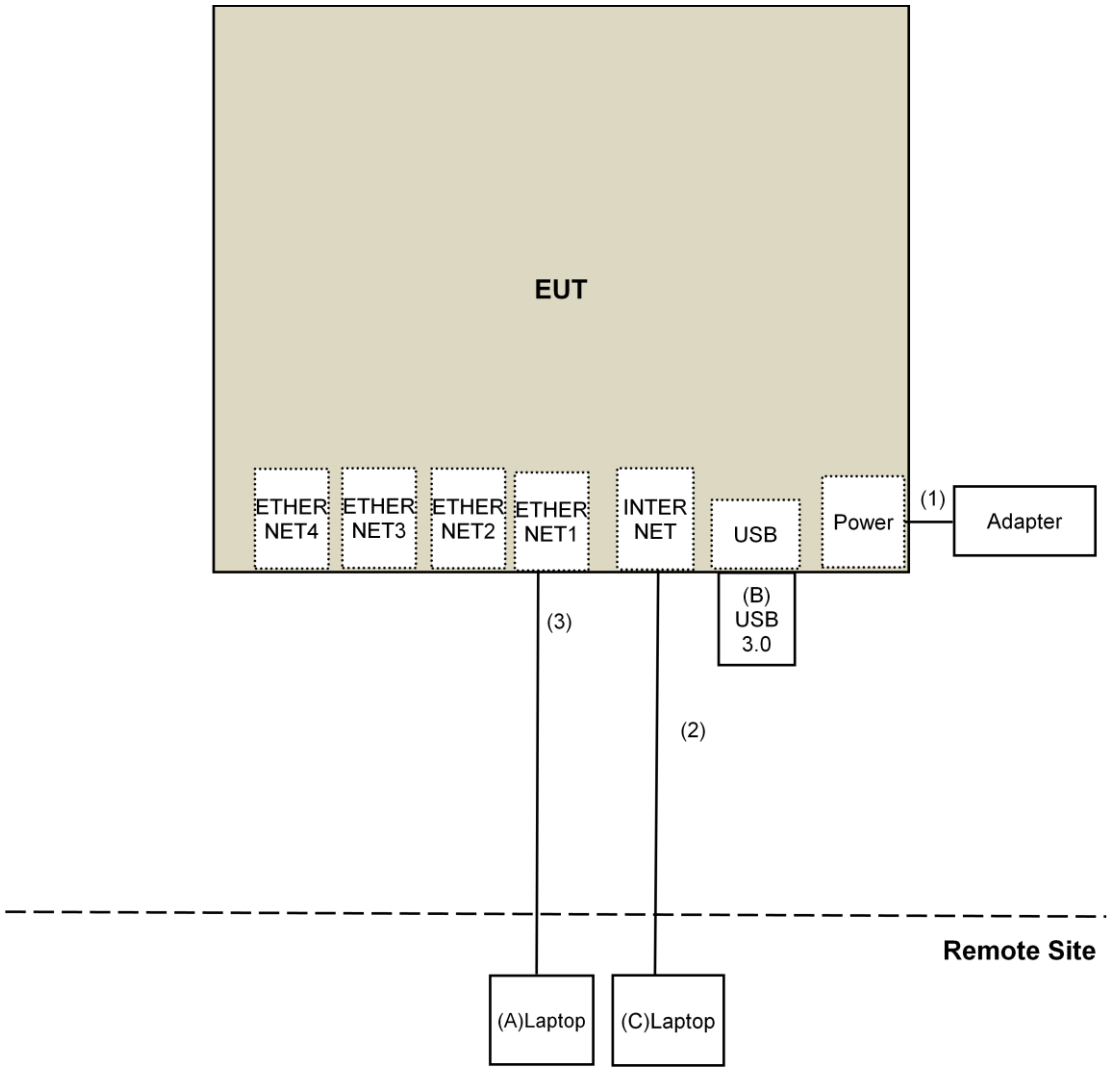
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	DELL	E5430	HYV4VY1	FCC DoC	Provided by Lab
B.	USB 3.0 Disk	NA	NA	NA	NA	Provided by Lab
C.	Laptop	DELL	E5430	4YV4VY1	FCC DoC	Provided by Lab

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC Cable	1	1.5	No	0	Supplied by client
2.	RJ-45 Cable	1	10	No	0	Provided by Lab
3.	RJ-45 Cable	1	10	No	0	Provided by Lab

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards

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

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

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

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 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 20, 2016	July 19, 2017
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. 10, 2016	Nov. 09, 2017
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Dec. 13, 2016	Dec. 12, 2017
RF Cable	8D	966-4-1 966-4-2 966-4-3	Apr. 02, 2016	Apr. 01, 2017
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-4-01	Oct. 05, 2016	Oct. 04, 2017
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Dec. 27, 2016	Dec. 26, 2017
Pre-Amplifier EMCI	EMC12630SE	980385	Feb. 02, 2017	Feb. 01, 2018
RF Cable	EMC104-SM-SM-2000 EMC104-SM-SM-5000 EMC104-SM-SM-5000	160923 150318 150323	Feb. 02, 2017 Mar. 30, 2016 Mar. 30, 2016	Feb. 01, 2018 Mar. 29, 2017 Mar. 29, 2017
Pre-Amplifier EMCI	EMC184045SE	980387	Feb. 02, 2017	Feb. 01, 2018
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Dec. 15, 2016	Dec. 14, 2017
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	June 28, 2016	June 27, 2017
Power meter Anritsu	ML2495A	1014008	May 5, 2016	May 4, 2017
Power sensor Anritsu	MA2411B	0917122	May 5, 2016	May 4, 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 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. The FCC Site Registration No. is 292998
5. The CANADA Site Registration No. is 20331-2
6 Loop antenna was used for all emissions below 30 MHz.
7. Tested Date: Mar. 16 to 17, 2017

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:

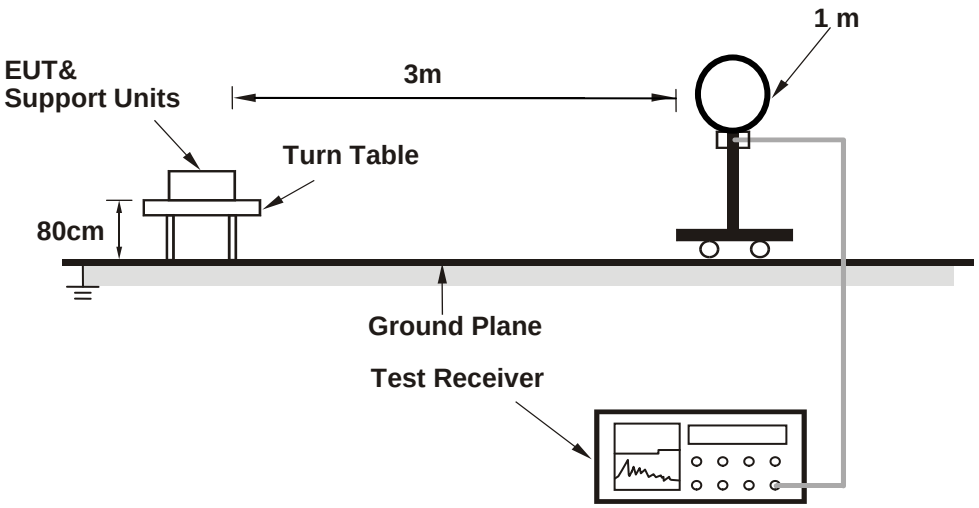
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

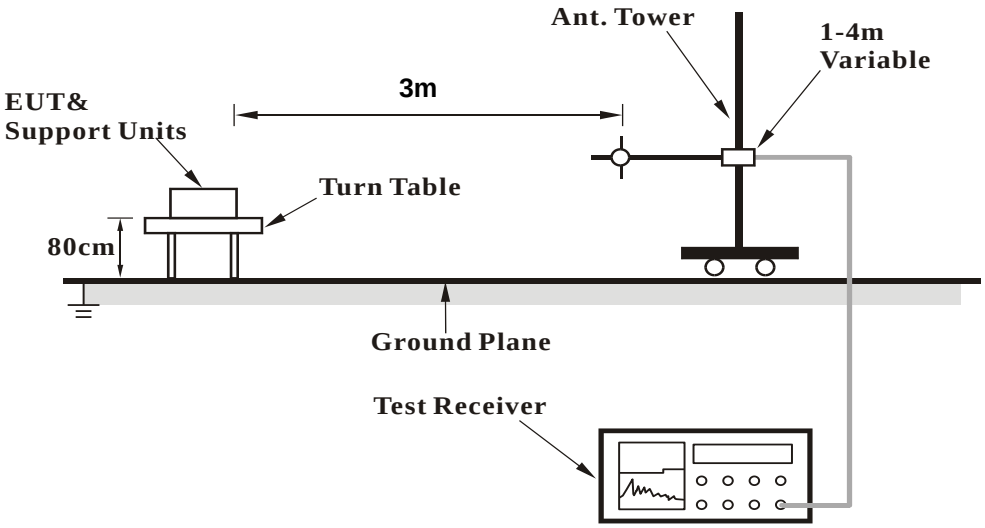
No deviation.

4.1.5 Test Setup

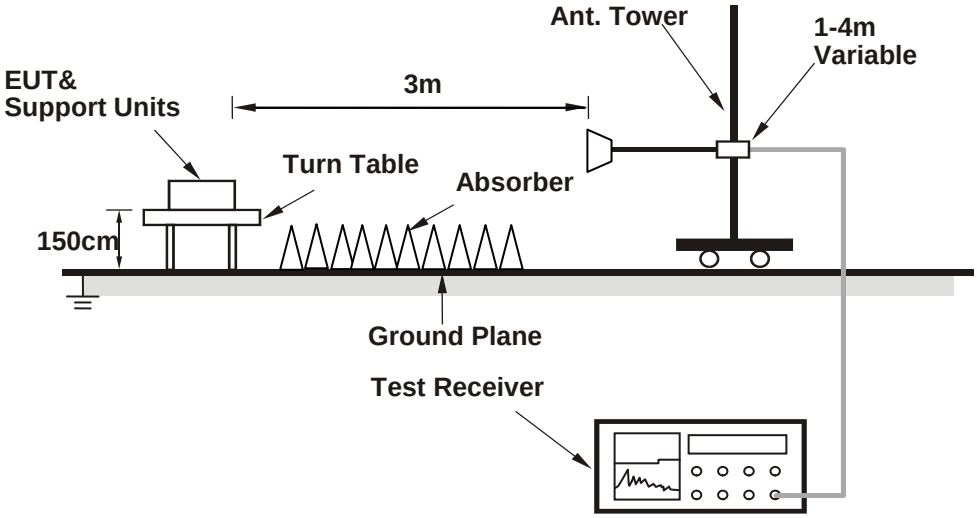
For Radiated emission below 30MHz



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. Connected the EUT with the Laptop which is placed on remote site.

b. Contorlling software (Mtool 2.0.0.8) 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	62.1 PK	74.0	-11.9	3.09 H	256	64.2	-2.1
2	**2390.00**	**53.9 AV**	**54.0**	**-0.1**	**3.09 H**	**256**	**56.0**	**-2.1**
3	*2412.00	117.4 PK			3.09 H	256	119.4	-2.0
4	*2412.00	115.0 AV			3.09 H	256	117.0	-2.0
5	4824.00	49.6 PK	74.0	-24.4	2.64 H	296	47.4	2.2
6	4824.00	46.4 AV	54.0	-7.6	2.64 H	296	44.2	2.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2390.00	56.3 PK	74.0	-17.7	1.72 V	237	58.4	-2.1
2	2390.00	46.6 AV	54.0	-7.4	1.72 V	237	48.7	-2.1
3	*2412.00	115.1 PK			1.72 V	237	117.1	-2.0
4	*2412.00	112.7 AV			1.72 V	237	114.7	-2.0
5	4824.00	45.6 PK	74.0	-28.4	1.50 V	281	43.4	2.2
6	4824.00	41.0 AV	54.0	-13.0	1.50 V	281	38.8	2.2

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 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	3.42 H	260	59.5	-2.1
2	2390.00	47.3 AV	54.0	-6.7	3.42 H	260	49.4	-2.1
3	*2437.00	120.0 PK			3.42 H	260	121.9	-1.9
4	*2437.00	117.6 AV			3.42 H	260	119.5	-1.9
5	2483.50	60.8 PK	74.0	-13.2	3.42 H	260	62.5	-1.7
6	2483.50	48.6 AV	54.0	-5.4	3.42 H	260	50.3	-1.7
7	4874.00	48.8 PK	74.0	-25.2	2.61 H	294	46.5	2.3
8	4874.00	45.6 AV	54.0	-8.4	2.61 H	294	43.3	2.3
9	7311.00	52.6 PK	74.0	-21.4	3.85 H	26	44.2	8.4
10	7311.00	47.7 AV	54.0	-6.3	3.85 H	26	39.3	8.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	51.8 PK	74.0	-22.2	1.70 V	248	53.9	-2.1
2	2390.00	40.2 AV	54.0	-13.8	1.70 V	248	42.3	-2.1
3	*2437.00	117.5 PK			1.70 V	248	119.4	-1.9
4	*2437.00	115.3 AV			1.70 V	248	117.2	-1.9
5	2483.50	48.6 PK	74.0	-25.4	1.70 V	248	50.3	-1.7
6	2483.50	41.8 AV	54.0	-12.2	1.70 V	248	43.5	-1.7
7	4874.00	46.7 PK	74.0	-27.3	3.78 V	278	44.4	2.3
8	4874.00	42.7 AV	54.0	-11.3	3.78 V	278	40.4	2.3
9	7311.00	52.1 PK	74.0	-21.9	1.50 V	206	43.7	8.4
10	7311.00	46.9 AV	54.0	-7.1	1.50 V	206	38.5	8.4

REMARKS:

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

CHANNEL	TX Channel 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	115.9 PK			3.39 H	260	117.7	-1.8
2	*2462.00	113.3 AV			3.39 H	260	115.1	-1.8
3	2483.50	61.3 PK	74.0	-12.7	3.39 H	260	63.0	-1.7
4	2483.50	53.6 AV	54.0	-0.4	3.39 H	260	55.3	-1.7
5	4924.00	46.7 PK	74.0	-27.3	2.63 H	283	44.3	2.4
6	4924.00	43.5 AV	54.0	-10.5	2.63 H	283	41.1	2.4
7	7386.00	50.1 PK	74.0	-23.9	3.89 H	23	41.6	8.5
8	7386.00	45.6 AV	54.0	-8.4	3.89 H	23	37.1	8.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	113.5 PK			1.75 V	245	115.3	-1.8
2	*2462.00	110.8 AV			1.75 V	245	112.6	-1.8
3	2483.50	53.7 PK	74.0	-20.3	1.75 V	245	55.4	-1.7
4	2483.50	46.4 AV	54.0	-7.6	1.75 V	245	48.1	-1.7
5	4924.00	44.2 PK	74.0	-29.8	3.84 V	292	41.8	2.4
6	4924.00	40.3 AV	54.0	-13.7	3.84 V	292	37.9	2.4
7	7386.00	49.8 PK	74.0	-24.2	1.52 V	221	41.3	8.5
8	7386.00	44.7 AV	54.0	-9.3	1.52 V	221	36.2	8.5

REMARKS:

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

802.11g

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	69.6 PK	74.0	-4.4	2.50 H	267	71.7	-2.1
2	**2390.00**	**53.9 AV**	**54.0**	**-0.1**	**2.50 H**	**267**	**56.0**	**-2.1**
3	*2412.00	116.1 PK			2.50 H	267	118.1	-2.0
4	*2412.00	106.0 AV			2.50 H	267	108.0	-2.0
5	4824.00	44.8 PK	74.0	-29.2	2.64 H	297	42.6	2.2
6	4824.00	41.6 AV	54.0	-12.4	2.64 H	297	39.4	2.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	63.5 PK	74.0	-10.5	1.71 V	244	65.6	-2.1
2	2390.00	46.5 AV	54.0	-7.5	1.71 V	244	48.6	-2.1
3	*2412.00	114.0 PK			1.71 V	244	116.0	-2.0
4	*2412.00	103.5 AV			1.71 V	244	105.5	-2.0
5	4824.00	43.1 PK	74.0	-30.9	3.81 V	281	40.9	2.2
6	4824.00	39.2 AV	54.0	-14.8	3.81 V	281	37.0	2.2

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 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	73.3 PK	74.0	-0.7	2.50 H	271	75.4	-2.1
2	2390.00	53.3 AV	54.0	-0.7	2.50 H	271	55.4	-2.1
3	*2437.00	122.8 PK			2.50 H	271	124.7	-1.9
4	*2437.00	113.0 AV			2.50 H	271	114.9	-1.9
5	**2483.50**	**73.9 PK**	**74.0**	**-0.1**	**2.50 H**	**271**	**75.6**	**-1.7**
6	2483.50	52.3 AV	54.0	-1.7	2.50 H	271	54.0	-1.7
7	4874.00	47.7 PK	74.0	-26.3	2.58 H	285	45.4	2.3
8	4874.00	44.3 AV	54.0	-9.7	2.58 H	285	42.0	2.3
9	7311.00	52.2 PK	74.0	-21.8	3.88 H	13	43.8	8.4
10	7311.00	47.0 AV	54.0	-7.0	3.88 H	13	38.6	8.4

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	67.3 PK	74.0	-6.7	1.73 V	232	69.4	-2.1
2	2390.00	46.2 AV	54.0	-7.8	1.73 V	232	48.3	-2.1
3	*2437.00	120.3 PK			1.73 V	232	122.2	-1.9
4	*2437.00	111.5 AV			1.73 V	232	113.4	-1.9
5	2483.50	52.1 PK	74.0	-21.9	1.73 V	232	53.8	-1.7
6	2483.50	45.2 AV	54.0	-8.8	1.73 V	232	46.9	-1.7
7	4874.00	45.4 PK	74.0	-28.6	3.73 V	292	43.1	2.3
8	4874.00	41.5 AV	54.0	-12.5	3.73 V	292	39.2	2.3
9	7311.00	50.9 PK	74.0	-23.1	1.50 V	198	42.5	8.4
10	7311.00	45.7 AV	54.0	-8.3	1.50 V	198	37.3	8.4

REMARKS:

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

CHANNEL	TX Channel 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	114.7 PK			2.50 H	271	116.5	-1.8
2	*2462.00	104.7 AV			2.50 H	271	106.5	-1.8
3	2483.50	70.8 PK	74.0	-3.2	2.50 H	271	72.5	-1.7
4	**2483.50**	**53.9 AV**	**54.0**	**-0.1**	**2.50 H**	**271**	**55.6**	**-1.7**
5	4924.00	44.3 PK	74.0	-29.7	2.61 H	296	41.9	2.4
6	4924.00	41.1 AV	54.0	-12.9	2.61 H	296	38.7	2.4
7	7386.00	48.1 PK	74.0	-25.9	3.94 H	29	39.6	8.5
8	7386.00	43.7 AV	54.0	-10.3	3.94 H	29	35.2	8.5

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	112.5 PK			1.70 V	241	114.3	-1.8
2	*2462.00	102.4 AV			1.70 V	241	104.2	-1.8
3	2483.50	54.1 PK	74.0	-19.9	1.70 V	241	55.8	-1.7
4	2483.50	46.8 AV	54.0	-7.2	1.70 V	241	48.5	-1.7
5	4924.00	42.8 PK	74.0	-31.2	3.83 V	290	40.4	2.4
6	4924.00	38.6 AV	54.0	-15.4	3.83 V	290	36.2	2.4
7	7386.00	47.6 PK	74.0	-26.4	1.51 V	229	39.1	8.5
8	7386.00	42.5 AV	54.0	-11.5	1.51 V	229	34.0	8.5

REMARKS:

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

802.11n (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**	**73.9 PK**	**74.0**	**-0.1**	**2.50 H**	**276**	**76.0**	**-2.1**
2	2390.00	53.5 AV	54.0	-0.5	2.50 H	276	55.6	-2.1
3	*2412.00	114.6 PK			2.50 H	276	116.6	-2.0
4	*2412.00	104.1 AV			2.50 H	276	106.1	-2.0
5	4824.00	44.6 PK	74.0	-29.4	2.56 H	312	42.4	2.2
6	4824.00	41.4 AV	54.0	-12.6	2.56 H	312	39.2	2.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	67.8 PK	74.0	-6.2	1.67 V	251	69.9	-2.1
2	2390.00	46.4 AV	54.0	-7.6	1.67 V	251	48.5	-2.1
3	*2412.00	112.3 PK			1.67 V	251	114.3	-2.0
4	*2412.00	109.8 AV			1.67 V	251	111.8	-2.0
5	4824.00	43.4 PK	74.0	-30.6	3.80 V	306	41.2	2.2
6	4824.00	39.0 AV	54.0	-15.0	3.80 V	306	36.8	2.2

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	72.4 PK	74.0	-1.6	2.50 H	268	74.5	-2.1
2	2390.00	52.0 AV	54.0	-2.0	2.50 H	268	54.1	-2.1
3	*2437.00	121.8 PK			2.50 H	268	123.7	-1.9
4	*2437.00	111.8 AV			2.50 H	268	113.7	-1.9
5	2483.50	73.5 PK	74.0	-0.5	2.50 H	268	75.2	-1.7
6	2483.50	51.2 AV	54.0	-2.8	2.50 H	268	52.9	-1.7
7	4874.00	46.5 PK	74.0	-27.5	2.64 H	300	44.2	2.3
8	4874.00	43.1 AV	54.0	-10.9	2.64 H	300	40.8	2.3
9	7311.00	51.5 PK	74.0	-22.5	3.84 H	27	43.1	8.4
10	7311.00	46.1 AV	54.0	-7.9	3.84 H	27	37.7	8.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	66.8 PK	74.0	-7.2	1.74 V	239	68.9	-2.1
2	2390.00	44.9 AV	54.0	-9.1	1.74 V	239	47.0	-2.1
3	*2437.00	119.6 PK			1.74 V	239	121.5	-1.9
4	*2437.00	109.3 AV			1.74 V	239	111.2	-1.9
5	2483.50	52.3 PK	74.0	-21.7	1.74 V	239	54.0	-1.7
6	2483.50	44.3 AV	54.0	-9.7	1.74 V	239	46.0	-1.7
7	4874.00	44.3 PK	74.0	-29.7	3.73 V	294	42.0	2.3
8	4874.00	40.2 AV	54.0	-13.8	3.73 V	294	37.9	2.3
9	7311.00	49.7 PK	74.0	-24.3	1.54 V	193	41.3	8.4
10	7311.00	44.5 AV	54.0	-9.5	1.54 V	193	36.1	8.4

REMARKS:

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

CHANNEL	TX Channel 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	113.3 PK			2.50 H	269	115.1	-1.8
2	*2462.00	102.7 AV			2.50 H	269	104.5	-1.8
3	2483.50	73.6 PK	74.0	-0.4	2.50 H	269	75.3	-1.7
4	2483.50	52.8 AV	54.0	-1.2	2.50 H	269	54.5	-1.7
5	4924.00	43.0 PK	74.0	-31.0	2.59 H	304	40.6	2.4
6	4924.00	39.9 AV	54.0	-14.1	2.59 H	304	37.5	2.4
7	7386.00	47.4 PK	74.0	-26.6	3.89 H	38	38.9	8.5
8	7386.00	43.2 AV	54.0	-10.8	3.89 H	38	34.7	8.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	111.0 PK			1.71 V	226	112.8	-1.8
2	*2462.00	100.3 AV			1.71 V	226	102.1	-1.8
3	2483.50	52.9 PK	74.0	-21.1	1.71 V	226	54.6	-1.7
4	2483.50	45.6 AV	54.0	-8.4	1.71 V	226	47.3	-1.7
5	4924.00	41.4 PK	74.0	-32.6	3.82 V	284	39.0	2.4
6	4924.00	37.5 AV	54.0	-16.5	3.82 V	284	35.1	2.4
7	7386.00	46.2 PK	74.0	-27.8	1.57 V	218	37.7	8.5
8	7386.00	41.3 AV	54.0	-12.7	1.57 V	218	32.8	8.5

REMARKS:

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

802.11n (HT40)

CHANNEL	TX Channel 3	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	69.6 PK	74.0	-4.4	2.48 H	268	71.7	-2.1
2	2390.00	53.7 AV	54.0	-0.3	2.48 H	268	55.8	-2.1
3	*2422.00	108.0 PK			2.48 H	268	110.1	-2.1
4	*2422.00	97.0 AV			2.48 H	268	99.1	-2.1
5	4844.00	41.8 PK	74.0	-32.2	2.52 H	323	39.5	2.3
6	4844.00	38.6 AV	54.0	-15.4	2.52 H	323	36.3	2.3
7	7266.00	44.8 PK	74.0	-29.2	3.88 H	24	36.4	8.4
8	7266.00	41.2 AV	54.0	-12.8	3.88 H	24	32.8	8.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	63.7 PK	74.0	-10.3	1.66 V	232	65.8	-2.1
2	2390.00	46.2 AV	54.0	-7.8	1.66 V	232	48.3	-2.1
3	*2422.00	105.3 PK			1.66 V	232	107.4	-2.1
4	*2422.00	95.3 AV			1.66 V	232	97.4	-2.1
5	4844.00	39.6 PK	74.0	-34.4	3.85 V	276	37.3	2.3
6	4844.00	35.8 AV	54.0	-18.2	3.85 V	276	33.5	2.3
7	7266.00	44.7 PK	74.0	-29.3	1.49 V	242	36.3	8.4
8	7266.00	39.2 AV	54.0	-14.8	1.49 V	242	30.8	8.4

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	70.0 PK	74.0	-4.0	2.46 H	268	72.1	-2.1
2	2390.00	51.5 AV	54.0	-2.5	2.46 H	268	53.6	-2.1
3	*2437.00	109.4 PK			2.46 H	268	111.3	-1.9
4	*2437.00	98.4 AV			2.46 H	268	100.3	-1.9
5	**2483.50**	**73.9 PK**	**74.0**	**-0.1**	**2.46 H**	**268**	**75.6**	**-1.7**
6	2483.50	52.6 AV	54.0	-1.4	2.46 H	268	54.3	-1.7
7	4874.00	42.7 PK	74.0	-31.3	2.55 H	317	40.4	2.3
8	4874.00	39.3 AV	54.0	-14.7	2.55 H	317	37.0	2.3
9	7311.00	45.6 PK	74.0	-28.4	3.85 H	24	37.2	8.4
10	7311.00	42.1 AV	54.0	-11.9	3.85 H	24	33.7	8.4

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	64.3 PK	74.0	-9.7	1.73 V	233	66.4	-2.1
2	2390.00	44.6 AV	54.0	-9.4	1.73 V	233	46.7	-2.1
3	*2437.00	107.2 PK			1.73 V	233	109.1	-1.9
4	*2437.00	96.1 AV			1.73 V	233	98.0	-1.9
5	2483.50	53.6 PK	74.0	-20.4	1.73 V	233	55.3	-1.7
6	2483.50	45.8 AV	54.0	-8.2	1.73 V	233	47.5	-1.7
7	4874.00	41.1 PK	74.0	-32.9	3.81 V	279	38.8	2.3
8	4874.00	37.1 AV	54.0	-16.9	3.81 V	279	34.8	2.3
9	7311.00	45.1 PK	74.0	-28.9	1.54 V	231	36.7	8.4
10	7311.00	39.8 AV	54.0	-14.2	1.54 V	231	31.4	8.4

REMARKS:

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

CHANNEL	TX Channel 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	108.8 PK			2.48 H	268	110.6	-1.8
2	*2452.00	97.7 AV			2.48 H	268	99.5	-1.8
3	2483.50	73.8 PK	74.0	-0.2	2.48 H	268	75.5	-1.7
4	2483.50	53.6 AV	54.0	-0.4	2.48 H	268	55.3	-1.7
5	4904.00	41.9 PK	74.0	-32.1	2.48 H	336	39.5	2.4
6	4904.00	38.6 AV	54.0	-15.4	2.48 H	336	36.2	2.4
7	7356.00	44.5 PK	74.0	-29.5	3.90 H	32	36.0	8.5
8	7356.00	41.0 AV	54.0	-13.0	3.90 H	32	32.5	8.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	106.3 PK			1.67 V	251	108.1	-1.8
2	*2452.00	95.6 AV			1.67 V	251	97.4	-1.8
3	2483.50	54.2 PK	74.0	-19.8	1.67 V	251	55.9	-1.7
4	2483.50	46.4 AV	54.0	-7.6	1.67 V	251	48.1	-1.7
5	4904.00	39.1 PK	74.0	-34.9	3.88 V	269	36.7	2.4
6	4904.00	35.4 AV	54.0	-18.6	3.88 V	269	33.0	2.4
7	7356.00	44.5 PK	74.0	-29.5	1.50 V	246	36.0	8.5
8	7356.00	39.3 AV	54.0	-14.7	1.50 V	246	30.8	8.5

REMARKS:

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

Below 1GHz 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	30.63	35.0 QP	40.0	-5.0	1.00 H	213	44.7	-9.7
2	97.20	32.5 QP	43.5	-11.0	2.00 H	53	45.8	-13.3
3	156.73	37.6 QP	43.5	-5.9	2.50 H	82	45.8	-8.2
4	250.00	30.7 QP	46.0	-15.3	1.00 H	60	40.4	-9.7
5	500.01	31.6 QP	46.0	-14.4	1.50 H	42	34.4	-2.8
6	913.38	32.6 QP	46.0	-13.4	1.50 H	247	28.3	4.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	107.72	37.1 QP	43.5	-6.4	1.00 V	223	48.5	-11.4
2	150.06	32.9 QP	43.5	-10.6	1.00 V	20	41.3	-8.4
3	171.72	31.4 QP	43.5	-12.1	1.00 V	143	40.2	-8.8
4	325.51	28.5 QP	46.0	-17.5	1.00 V	130	35.6	-7.1
5	500.01	35.0 QP	46.0	-11.0	1.00 V	300	37.8	-2.8
6	1000.00	36.8 QP	54.0	-17.2	2.00 V	0	31.8	5.0

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

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	Oct. 24, 2016	Oct. 23, 2017
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 26, 2016	Oct. 25, 2017
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 13, 2016	June 12, 2017
50 ohms Terminator	N/A	EMC-02	Sep. 29, 2016	Sep. 28, 2017
RF Cable	5D-FB	COCCAB-001	Sep. 30, 2016	Sep. 29, 2017
10 dB PAD Mini-Circuits	HAT-10+	CONATT-004	June 20, 2016	June 19, 2017
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: Mar. 06 to Apr. 26, 2017

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.

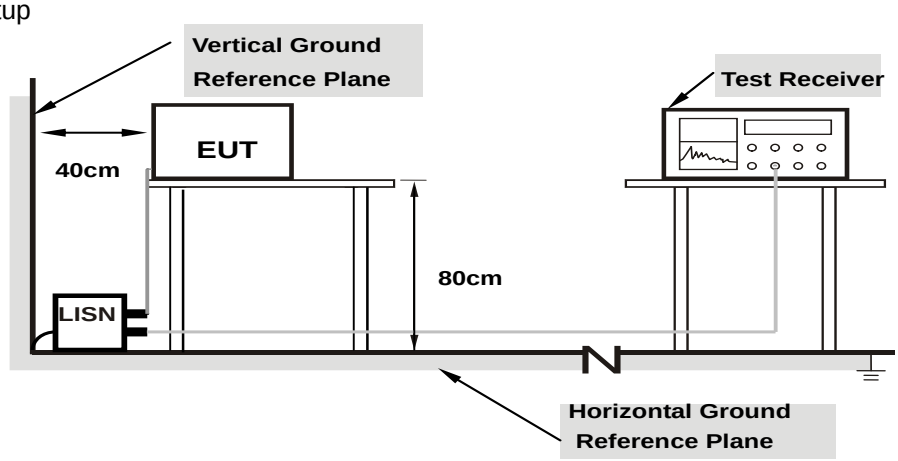
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

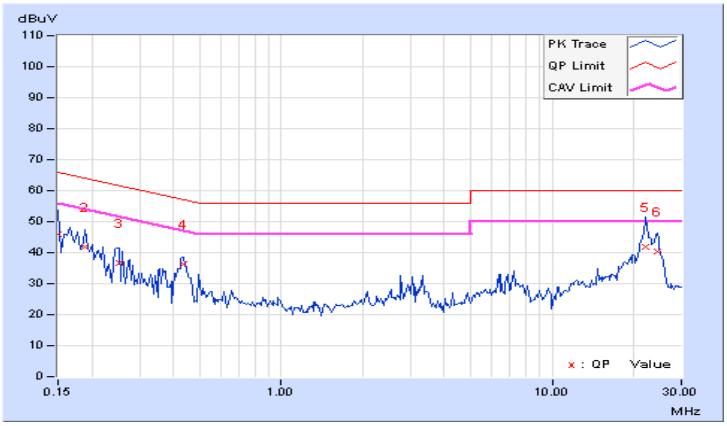
4.2.7 Test Results (Mode 1)

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	10.20	35.57	14.11	45.77	24.31	66.00	56.00	-20.23	-31.69
2	0.18906	10.20	31.60	18.89	41.80	29.09	64.08	54.08	-22.28	-24.99
3	0.25156	10.21	26.55	12.79	36.76	23.00	61.71	51.71	-24.95	-28.71
4	0.43516	10.24	26.04	20.69	36.28	30.93	57.15	47.15	-20.87	-16.22
5	22.25391	11.73	30.08	21.19	41.81	32.92	60.00	50.00	-18.19	-17.08
6	24.43359	11.77	28.61	19.77	40.38	31.54	60.00	50.00	-19.62	-18.46

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.

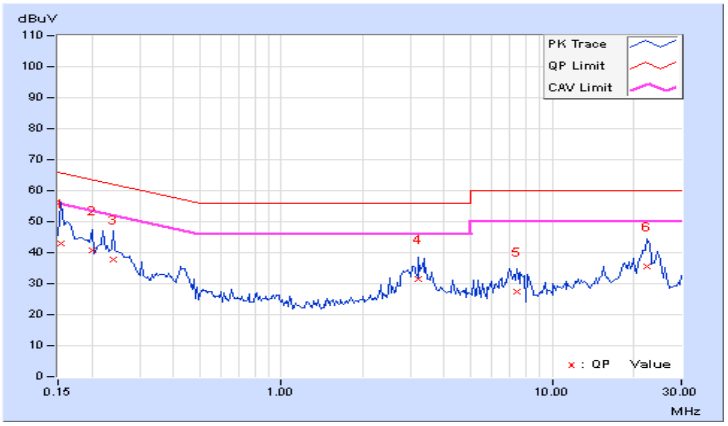


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	10.19	32.90	10.66	43.09	20.85	65.79	55.79	-22.70	-34.94
2	0.20078	10.17	30.43	13.29	40.60	23.46	63.58	53.58	-22.98	-30.12
3	0.23984	10.18	27.43	11.71	37.61	21.89	62.10	52.10	-24.49	-30.21
4	3.22266	10.25	21.24	10.12	31.49	20.37	56.00	46.00	-24.51	-25.63
5	7.39844	10.45	16.94	12.47	27.39	22.92	60.00	50.00	-32.61	-27.08
6	22.49219	11.38	24.33	15.84	35.71	27.22	60.00	50.00	-24.29	-22.78

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.



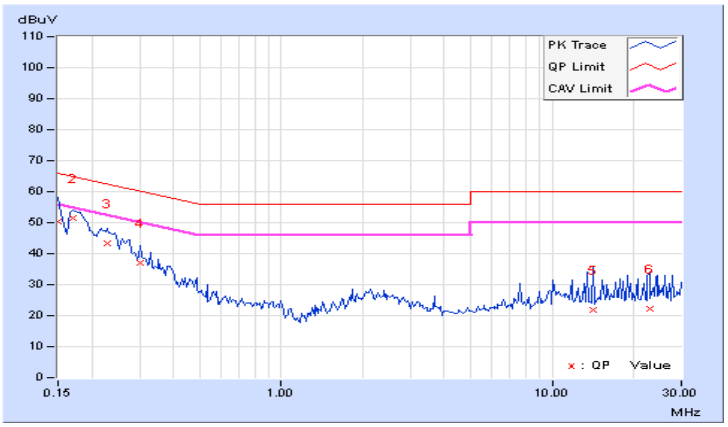
4.2.8 Test Results (Mode 2)

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

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.20	40.12	21.09	50.32	31.29	66.00	56.00	-15.68	-24.71
2	0.16953	10.20	41.21	24.13	51.41	34.33	64.98	54.98	-13.57	-20.65
3	0.22812	10.21	33.11	18.41	43.32	28.62	62.52	52.52	-19.20	-23.90
4	0.30234	10.22	26.64	11.92	36.86	22.14	60.18	50.18	-23.32	-28.04
5	14.21094	11.21	10.82	0.74	22.03	11.95	60.00	50.00	-37.97	-38.05
6	22.87109	11.74	10.30	-2.91	22.04	8.83	60.00	50.00	-37.96	-41.17

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.

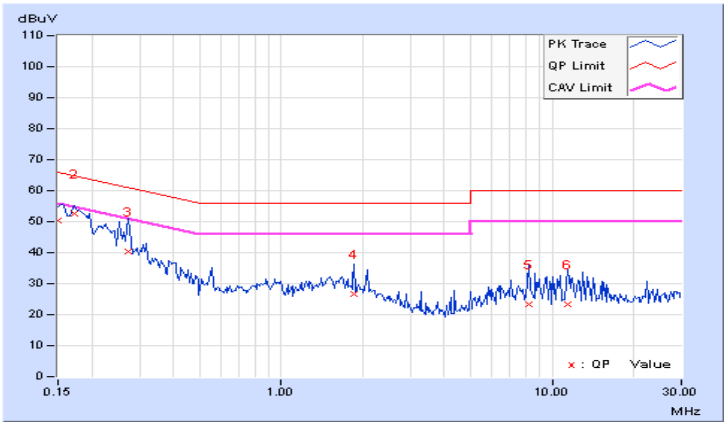


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	0.15000	10.19	40.10	19.59	50.29	29.78	66.00	56.00	-15.71	-26.22
2	**0.17344**	**10.18**	**42.25**	**28.11**	**52.43**	**38.29**	**64.79**	**54.79**	**-12.36**	**-16.50**
3	0.27109	10.19	30.09	16.66	40.28	26.85	61.08	51.08	-20.80	-24.23
4	1.86328	10.30	16.28	11.17	26.58	21.47	56.00	46.00	-29.42	-24.53
5	8.24219	10.51	12.69	3.47	23.20	13.98	60.00	50.00	-36.80	-36.02
6	11.38281	10.76	12.68	4.77	23.44	15.53	60.00	50.00	-36.56	-34.47

REMARKS:

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

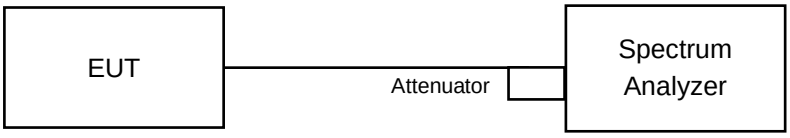


4.3 6dB Bandwidth Measurement

4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
1	2412	9.02	8.60	8.60	0.5	PASS
6	2437	8.62	9.09	9.08	0.5	PASS
11	2462	9.08	8.62	8.60	0.5	PASS

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
1	2412	16.37	15.79	16.11	0.5	PASS
6	2437	16.40	16.40	16.11	0.5	PASS
11	2462	16.38	16.06	16.10	0.5	PASS

802.11n (HT20)

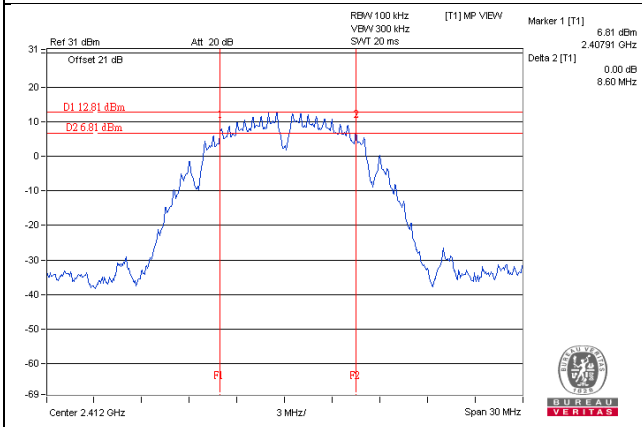
Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
1	2412	17.34	16.72	17.37	0.5	PASS
6	2437	17.64	17.63	17.66	0.5	PASS
11	2462	17.62	16.76	17.20	0.5	PASS

802.11n (HT40)

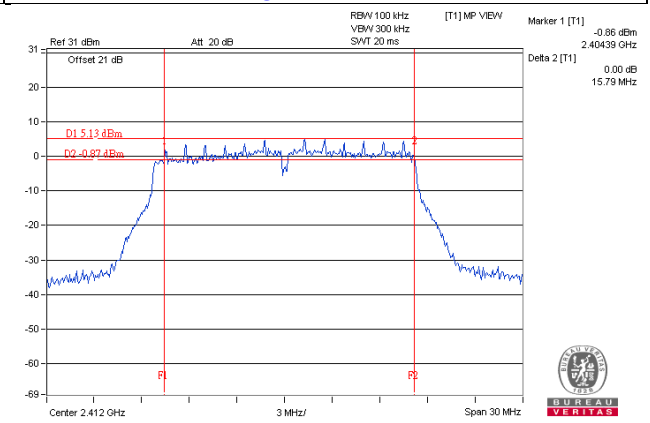
Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
3	2422	36.12	35.79	36.01	0.5	PASS
6	2437	36.12	36.56	36.26	0.5	PASS
9	2452	36.15	35.97	35.95	0.5	PASS

Spectrum Plot of Worst Value

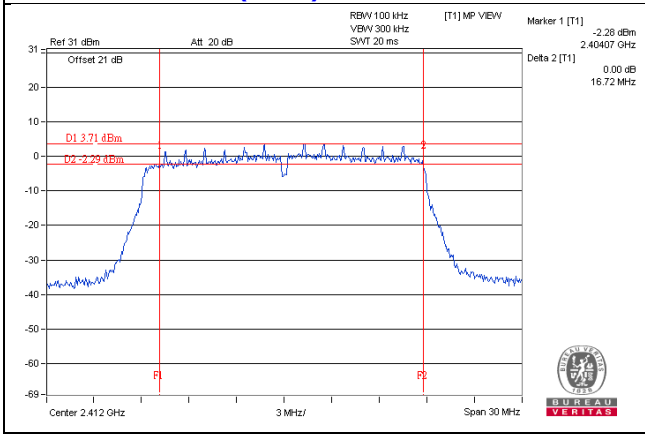
802.11b / Chain 1 : CH1



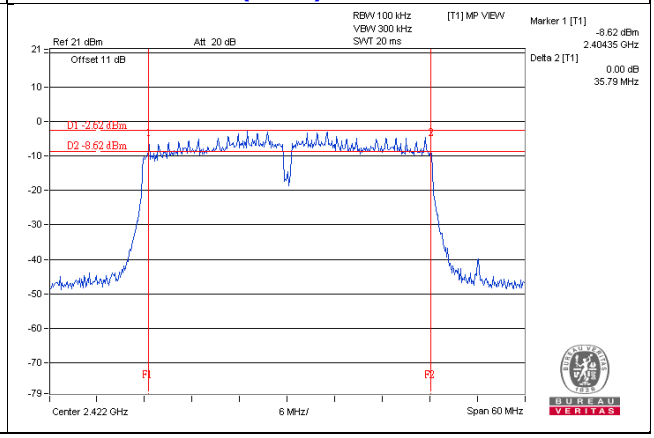
802.11g / Chain 1 : CH1



802.11n (HT20) / Chain 1 : CH1



802.11n (HT40) / Chain 1 : CH3



4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

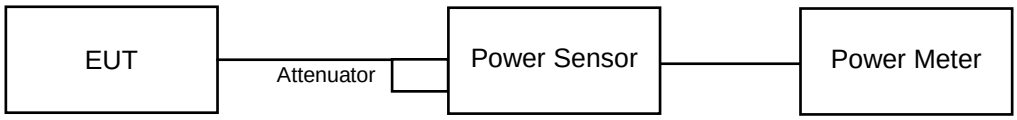
For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

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

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	Chain 2				
1	2412	21.80	21.37	21.60	432.988	26.36	30	Pass
6	2437	25.24	24.95	25.30	985.647	29.94	30	Pass
11	2462	19.94	19.99	19.75	292.804	24.67	30	Pass

802.11g

Chan.	Freq. (MHz)	Avg. Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
1	2412	16.61	16.38	16.40	132.917	21.24	30	Pass
6	2437	25.28	25.04	25.30	995.285	29.98	30	Pass
11	2462	15.57	15.43	15.25	104.469	20.19	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	Chain 2				
1	2412	15.54	15.06	15.27	101.524	20.07	30	Pass
6	2437	24.22	24.03	24.13	775.992	28.90	30	Pass
11	2462	14.00	13.75	13.88	73.267	18.65	30	Pass

802.11n (HT40)

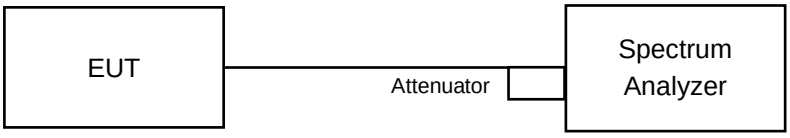
Chan.	Freq. (MHz)	Avg. Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
3	2422	11.66	11.31	11.52	42.367	16.27	30	Pass
6	2437	13.04	12.91	13.06	59.91	17.77	30	Pass
9	2452	11.95	11.51	11.74	44.754	16.51	30	Pass

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

802.11b, 802.11g, 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.

802.11n (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=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-10.12	4.77	-5.35	4.58	Pass
	6	2437	-5.84	4.77	-1.07	4.58	Pass
	11	2462	-11.38	4.77	-6.61	4.58	Pass
1	1	2412	-9.49	4.77	-4.72	4.58	Pass
	6	2437	-6.58	4.77	-1.81	4.58	Pass
	11	2462	-11.39	4.77	-6.62	4.58	Pass
2	1	2412	-8.86	4.77	-4.09	4.58	Pass
	6	2437	-5.05	4.77	-0.28	4.58	Pass
	11	2462	-10.89	4.77	-6.12	4.58	Pass

Note: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 3] = 9.42dBi > 6dBi , so the power density limit shall be reduced to 8-(9.42-6) = 4.58dBm.

802.11g

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-15.91	4.77	-11.14	4.58	Pass
	6	2437	-6.19	4.77	-1.42	4.58	Pass
	11	2462	-15.94	4.77	-11.17	4.58	Pass
1	1	2412	-15.39	4.77	-10.62	4.58	Pass
	6	2437	-5.92	4.77	-1.15	4.58	Pass
	11	2462	-16.82	4.77	-12.05	4.58	Pass
2	1	2412	-15.06	4.77	-10.29	4.58	Pass
	6	2437	-7.34	4.77	-2.57	4.58	Pass
	11	2462	-16.70	4.77	-11.93	4.58	Pass

Note: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 3] = 9.42dBi > 6dBi , so the power density limit shall be reduced to 8-(9.42-6) = 4.58dBm.

802.11n (HT20)

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-17.10	4.77	-12.33	4.58	Pass
	6	2437	-9.36	4.77	-4.59	4.58	Pass
	11	2462	-19.94	4.77	-15.17	4.58	Pass
1	1	2412	-16.58	4.77	-11.81	4.58	Pass
	6	2437	-6.55	4.77	-1.78	4.58	Pass
	11	2462	-19.84	4.77	-15.07	4.58	Pass
2	1	2412	-17.50	4.77	-12.73	4.58	Pass
	6	2437	-9.23	4.77	-4.46	4.58	Pass
	11	2462	-19.45	4.77	-14.68	4.58	Pass

Note: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 3] = 9.42dBi > 6dBi , so the power density limit shall be reduced to 8-(9.42-6) = 4.58dBm.

802.11n (HT40)

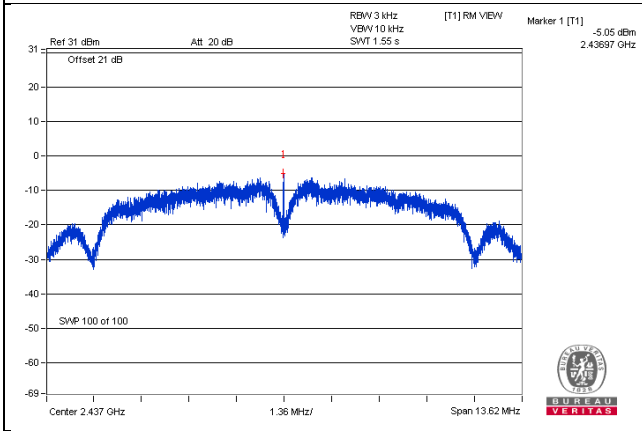
TX chain	Channel	Freq. (MHz)	PSD W/O Duty Factor (dBm/3kHz)	10 log (N=3) dB	Duty Factor (dB)	TOTAL PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	3	2422	-24.34	4.77	0.14	-19.43	4.58	Pass
	6	2437	-22.89	4.77	0.14	-17.98	4.58	Pass
	9	2452	-23.77	4.77	0.14	-18.86	4.58	Pass
1	3	2422	-24.60	4.77	0.14	-19.69	4.58	Pass
	6	2437	-23.06	4.77	0.14	-18.15	4.58	Pass
	9	2452	-23.58	4.77	0.14	-18.67	4.58	Pass
2	3	2422	-23.86	4.77	0.14	-18.95	4.58	Pass
	6	2437	-23.31	4.77	0.14	-18.40	4.58	Pass
	9	2452	-23.90	4.77	0.14	-18.99	4.58	Pass

Note: 1. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 3] = 9.42dBi > 6dBi , so the power density limit shall be reduced to 8-(9.42-6) = 4.58dBm.

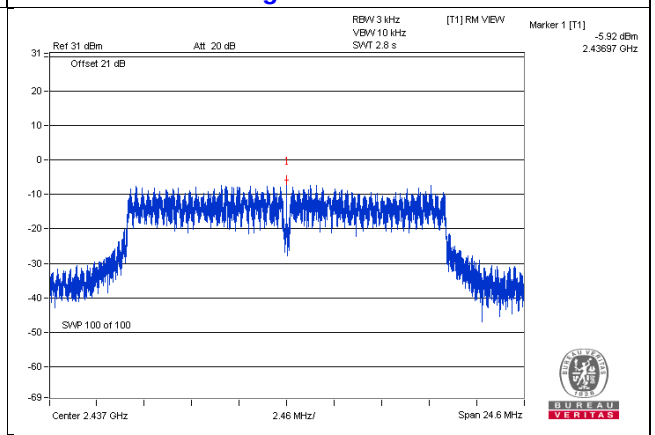
2. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

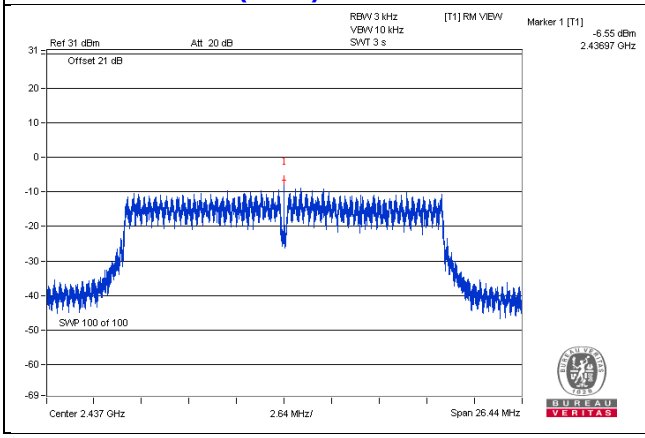
802.11b / Chain 2 : CH6



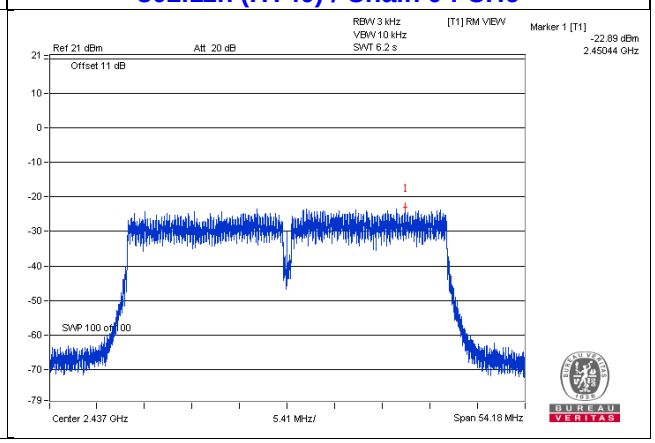
802.11g / Chain 1 : CH6



802.11n (HT20) / Chain 1 : CH6



802.11n (HT40) / Chain 0 : CH6

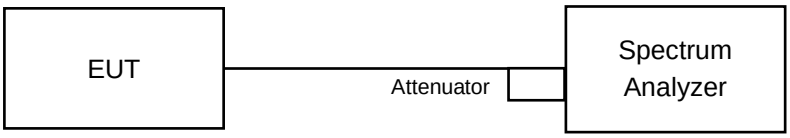


4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

Below 30dBc 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

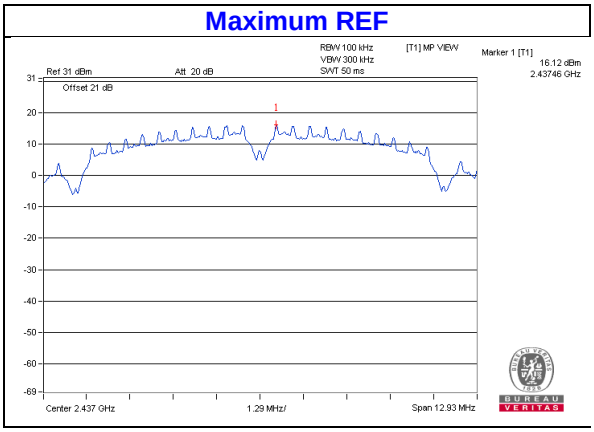
Same as Item 4.3.6

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 30dBc offset below D1. It shows compliance with the requirement.

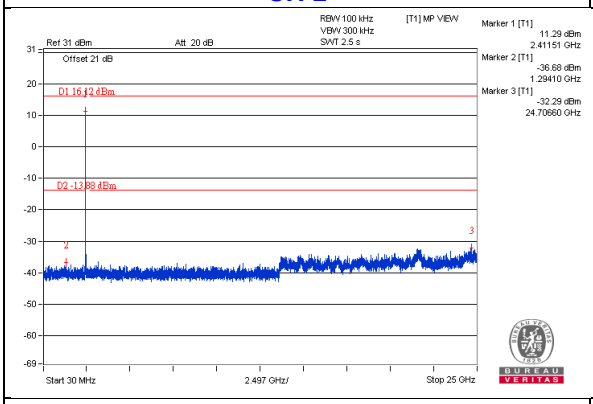
802.11b

Maximum REF

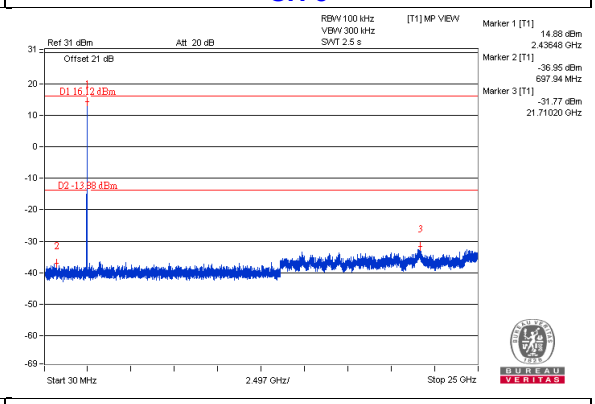


CHAIN 0

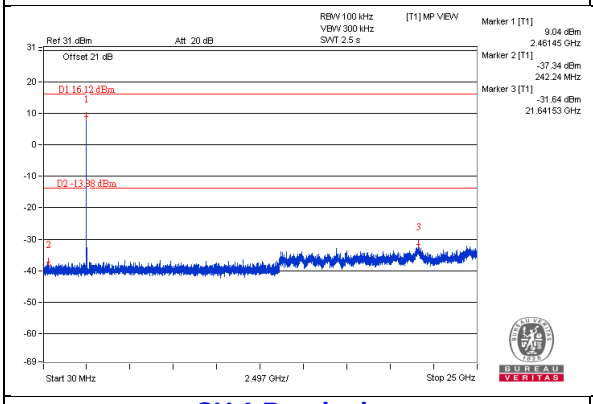
CH 1



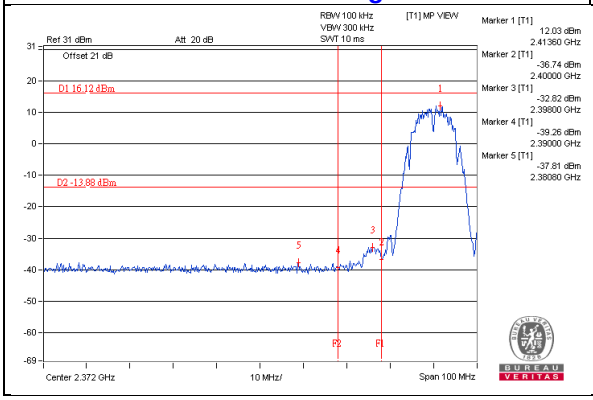
CH 6



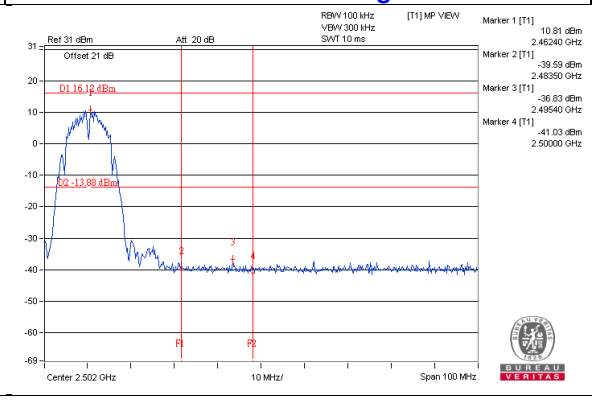
CH 11



CH 1 Band edge

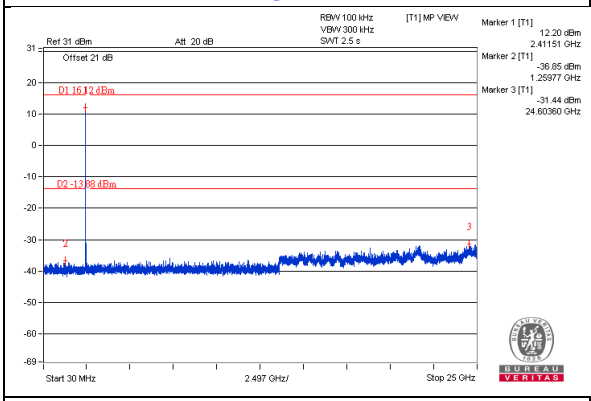


CH 11 Band edge

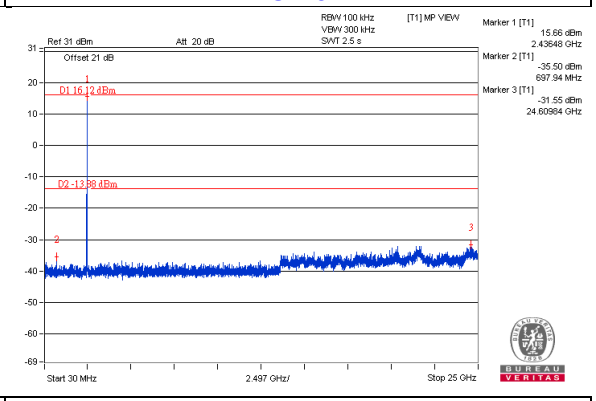


CHAIN 1

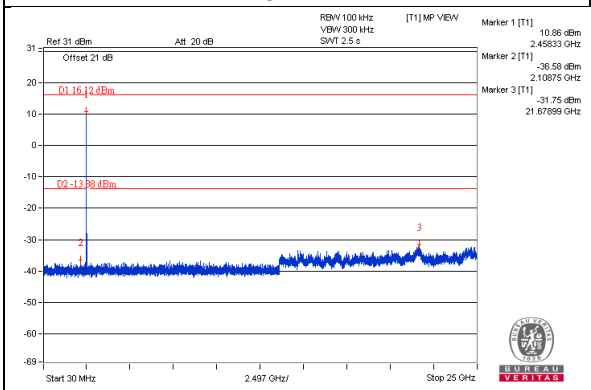
CH 1



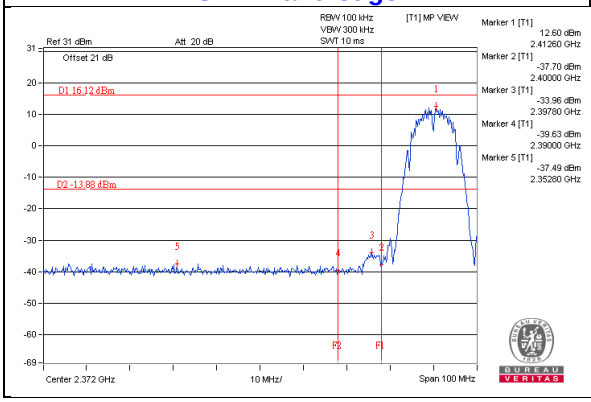
CH 6



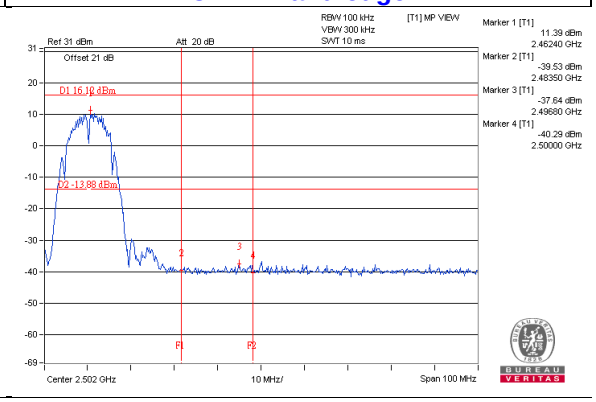
CH 11



CH 1 Band edge

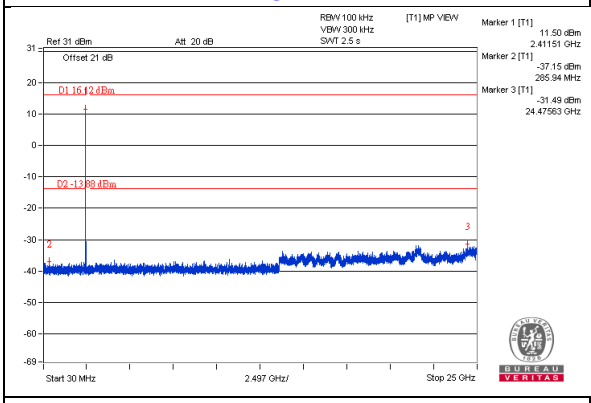


CH 11 Band edge

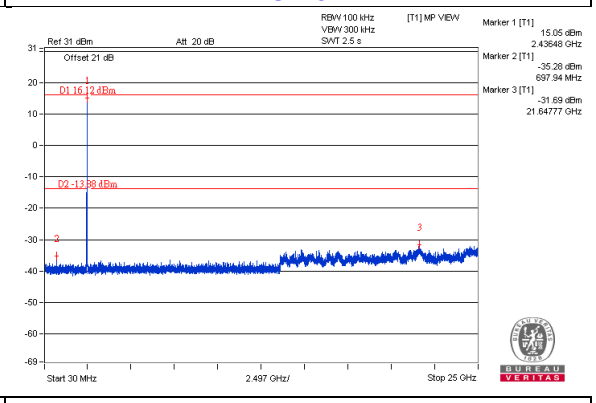


CHAIN 2

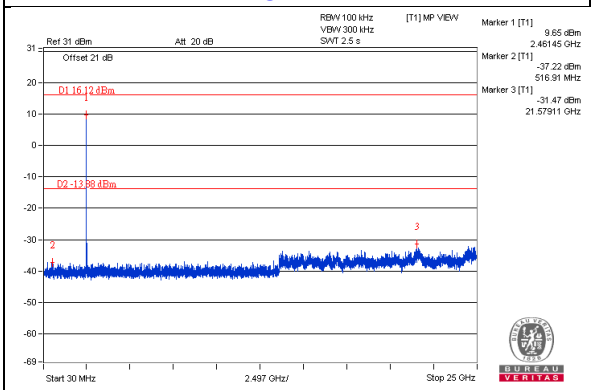
CH 1



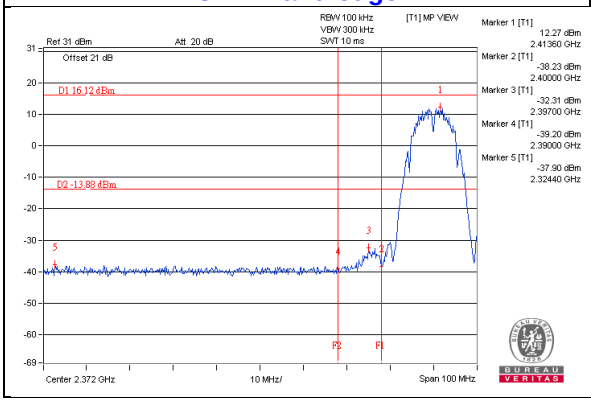
CH 6



CH 11



CH 1 Band edge



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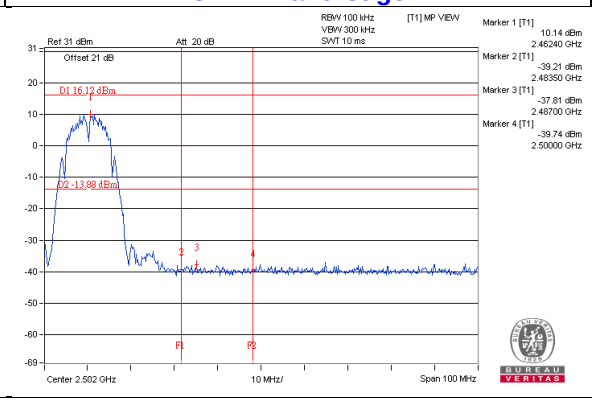
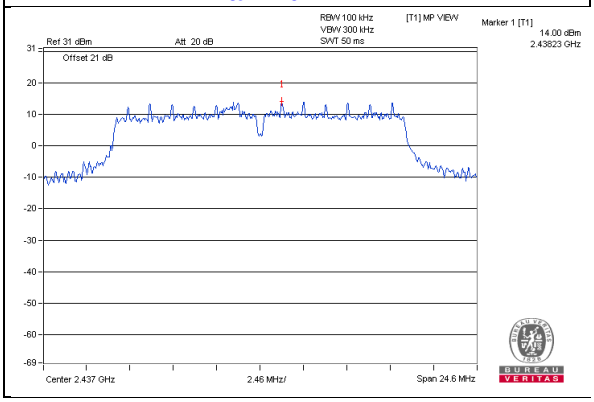


802.11g

Maximum REF



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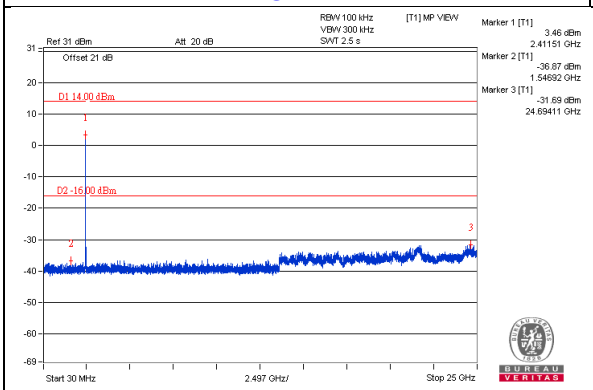

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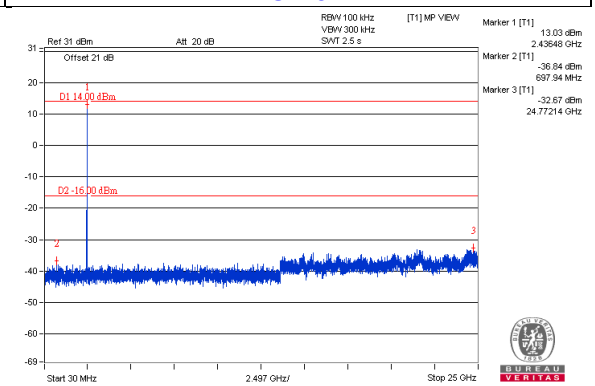

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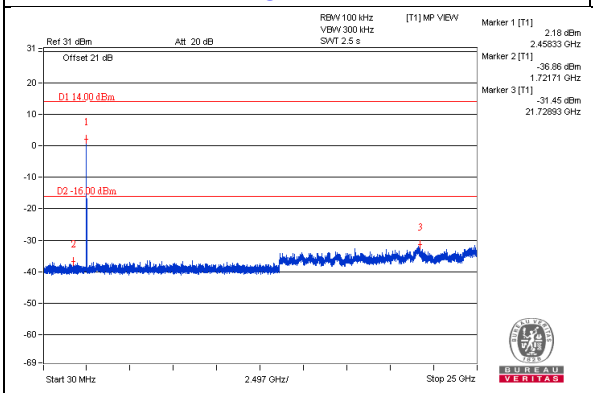

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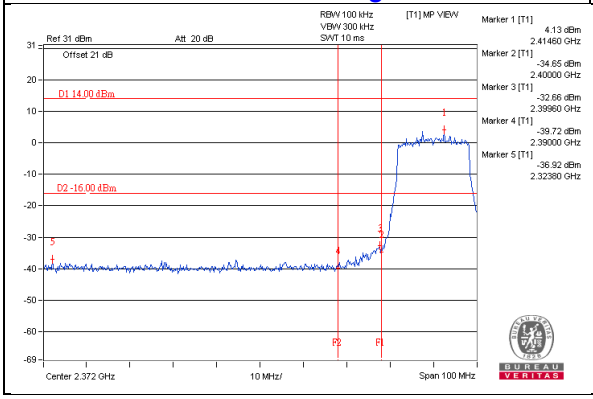

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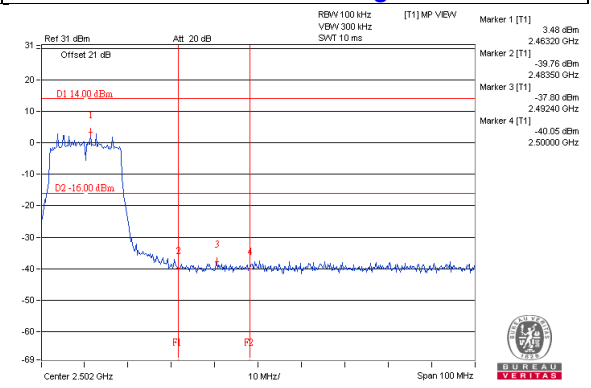
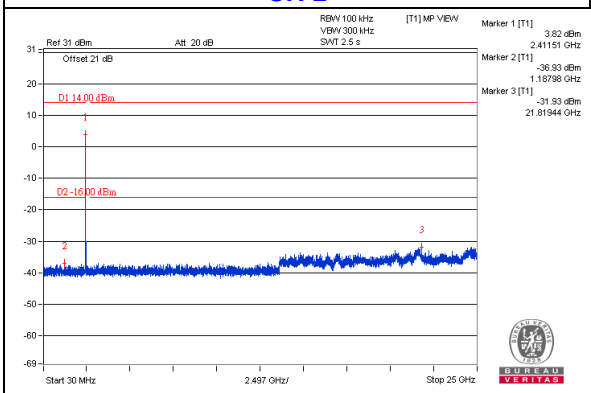


CHAIN 1

CH 1



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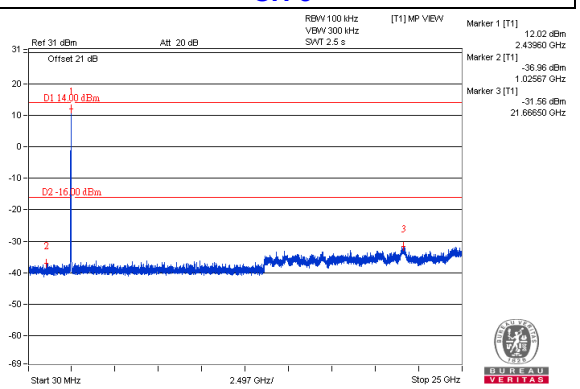

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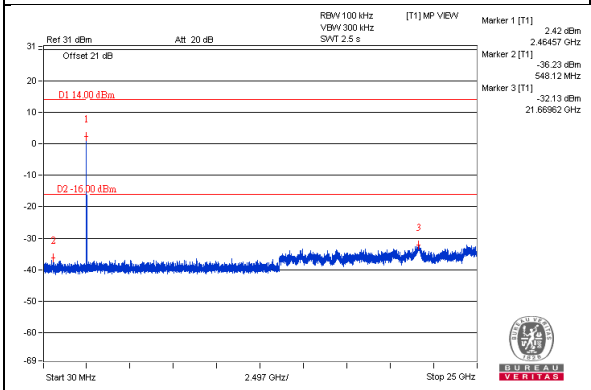

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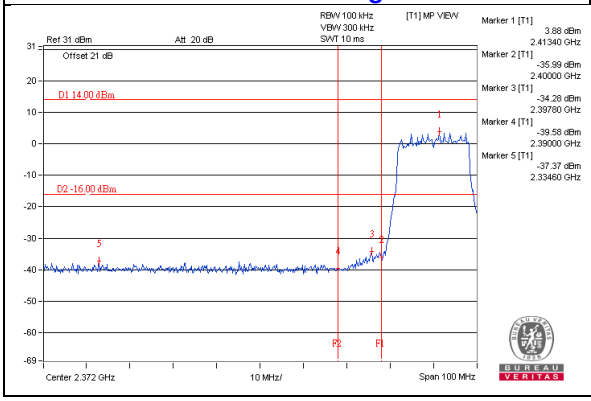

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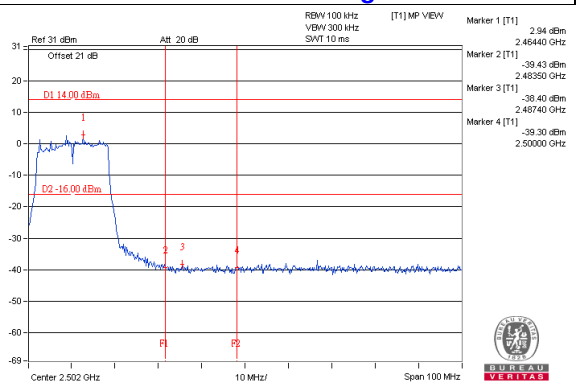
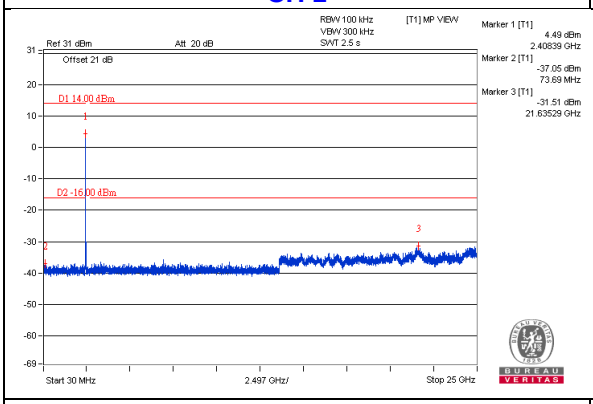


CHAIN 2

CH 1



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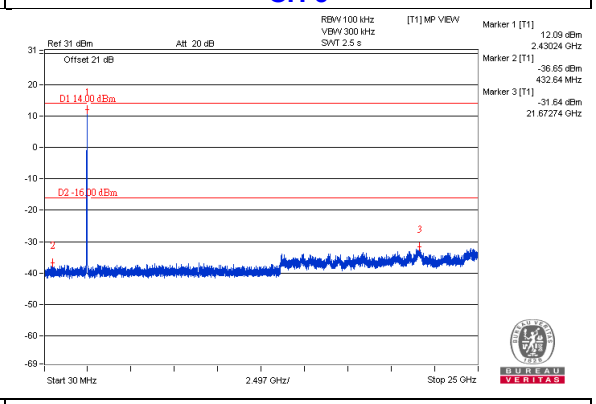

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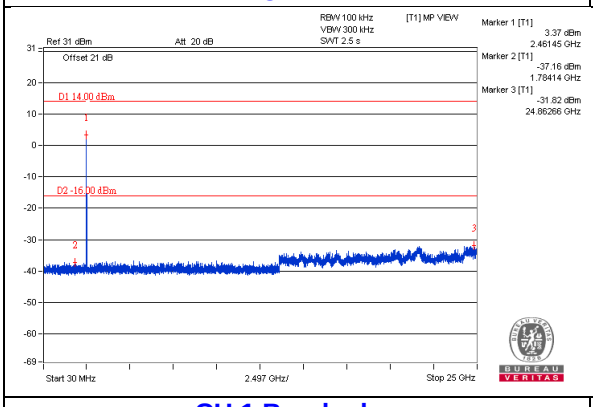

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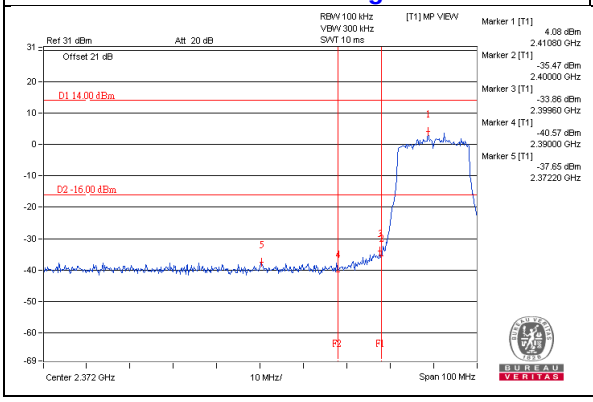

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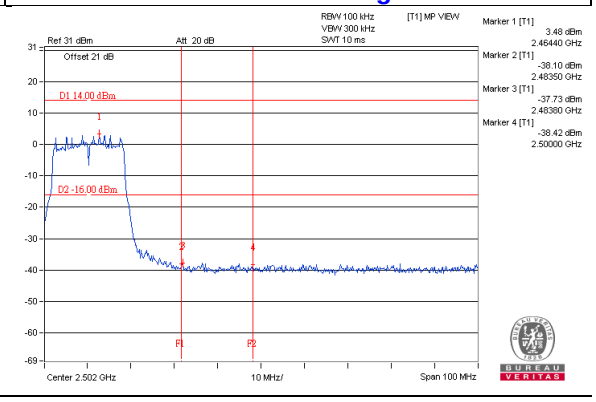
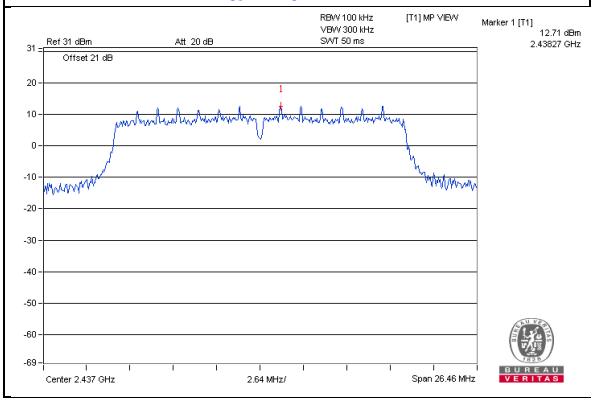


802.11n (HT20)

Maximum REF



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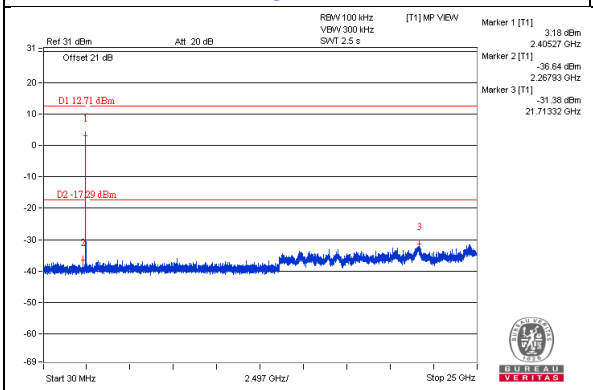
CH 1



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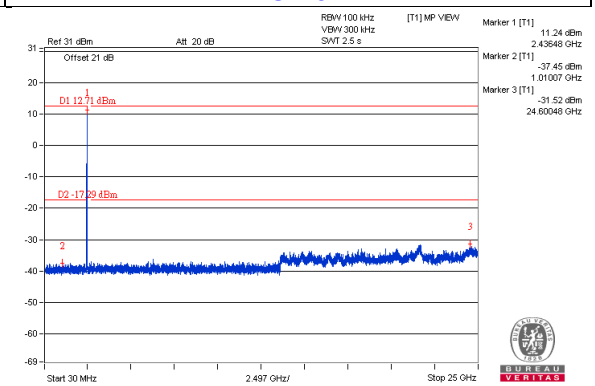

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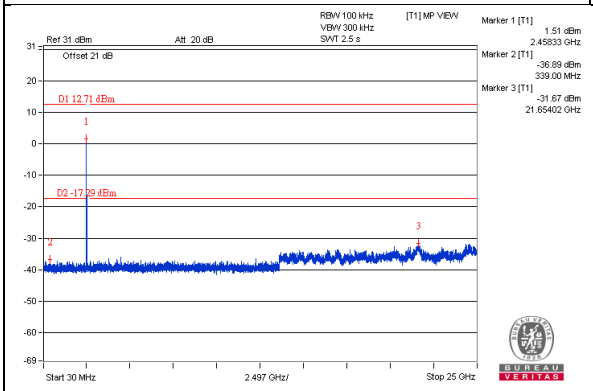

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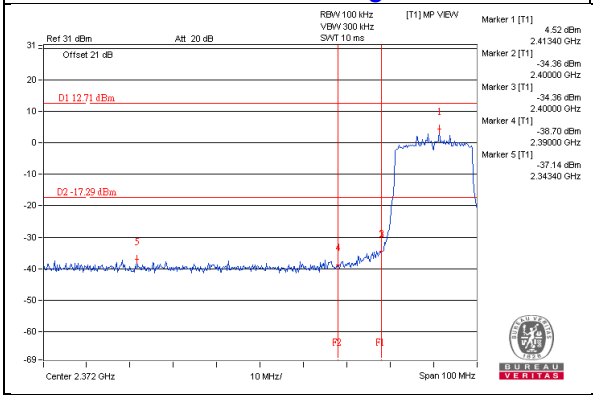

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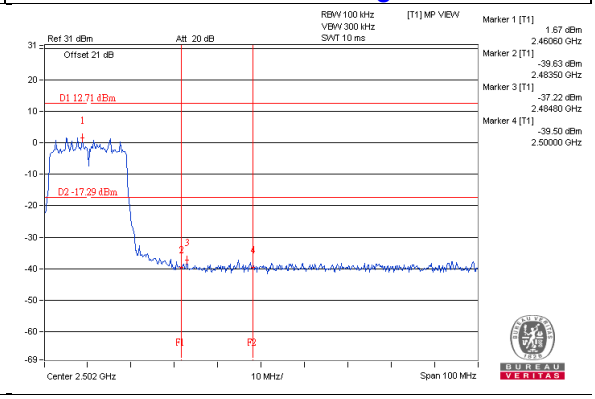
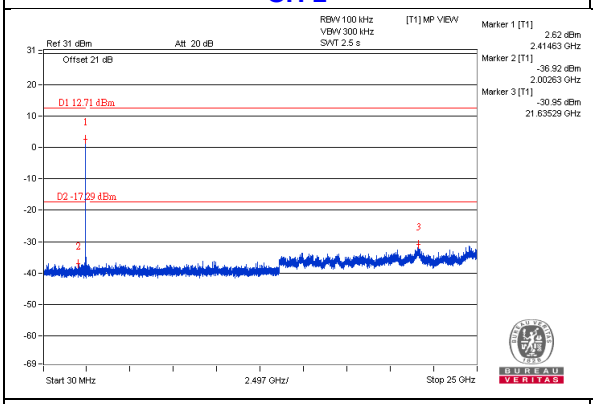


CHAIN 1

CH 1



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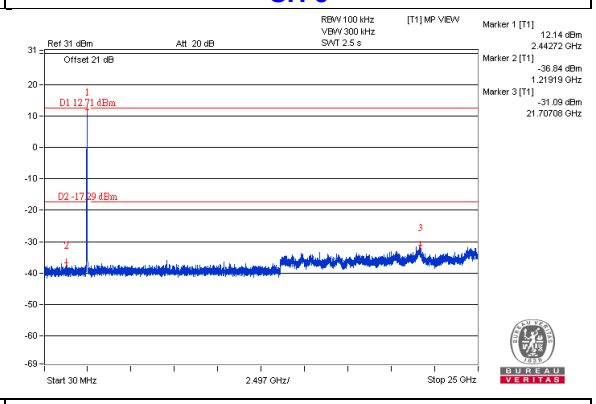

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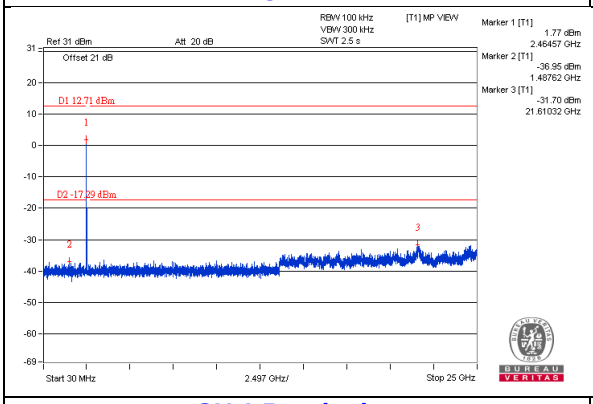

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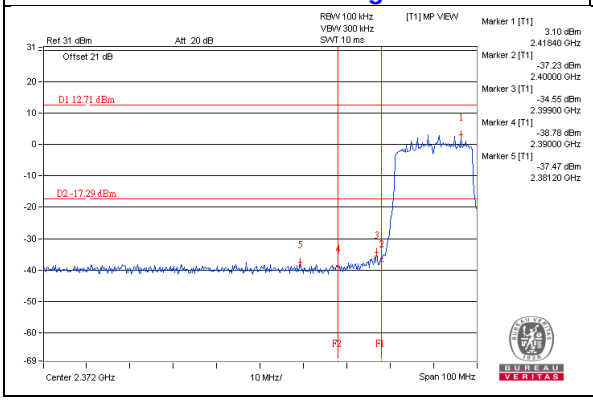

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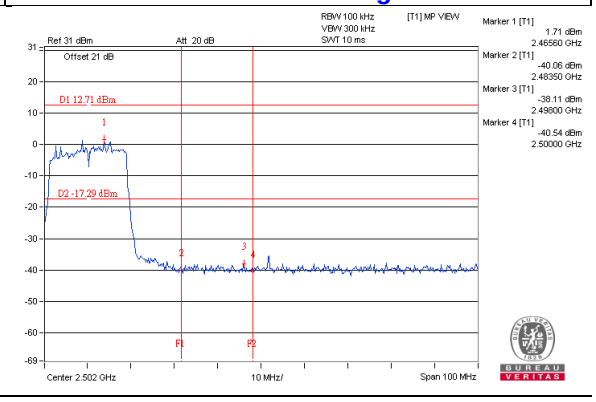
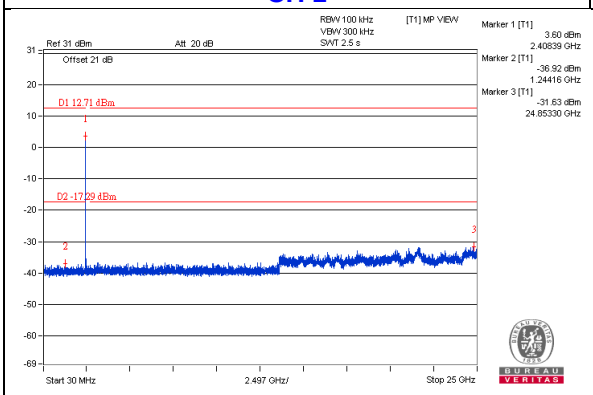


CHAIN 2

CH 1



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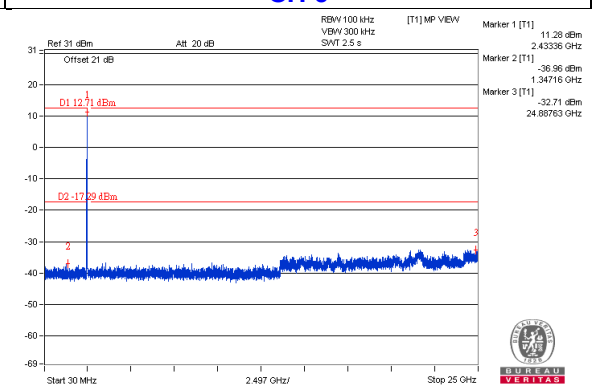
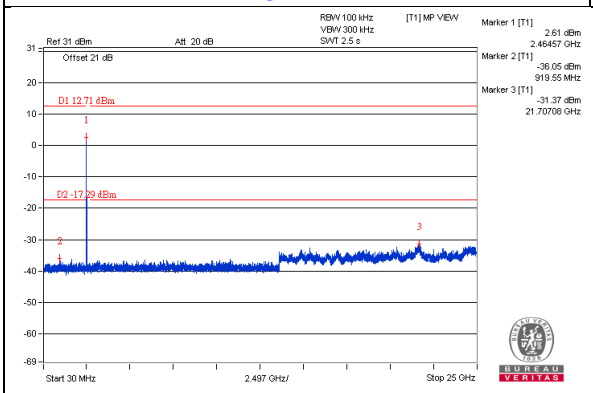


CH 11



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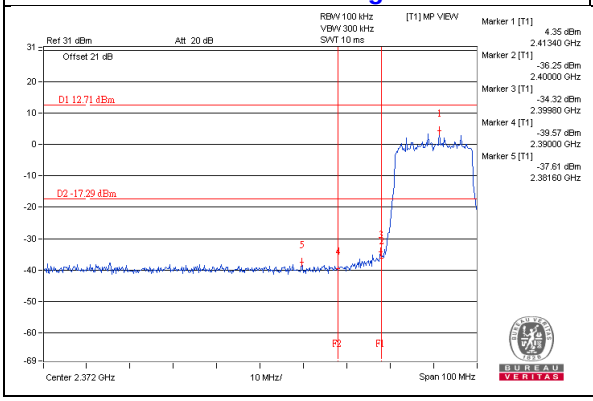
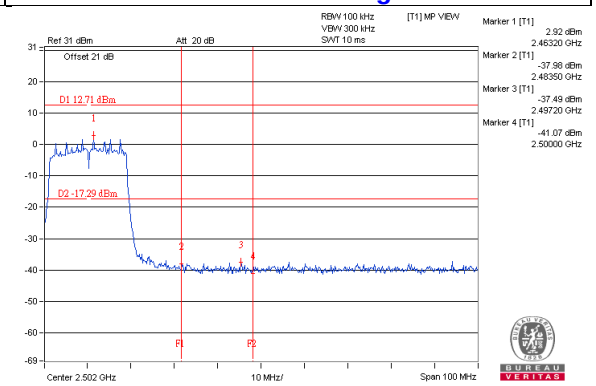
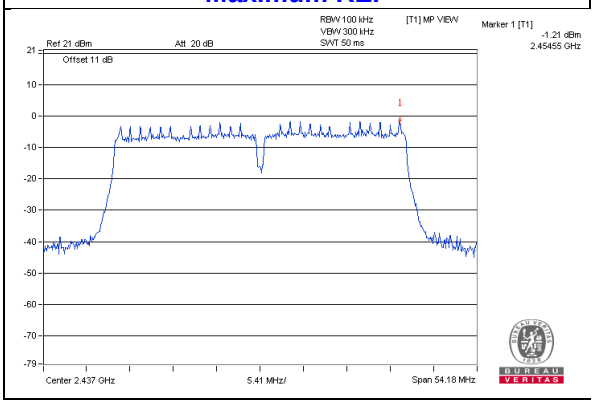


CH 11 Band edge



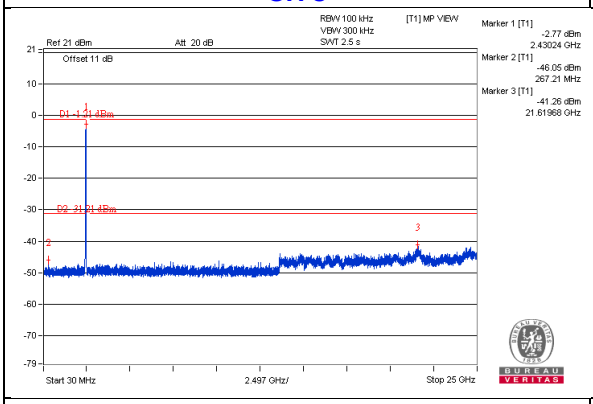
802.11n (HT40)

Maximum REF



CHAIN 0

CH 3



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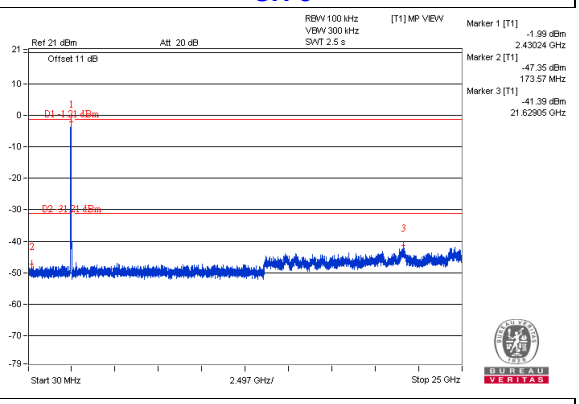

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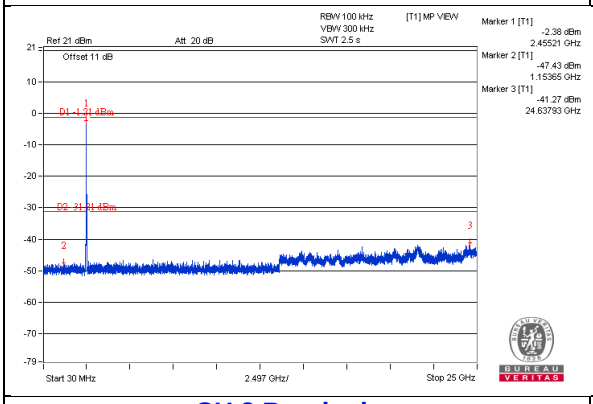
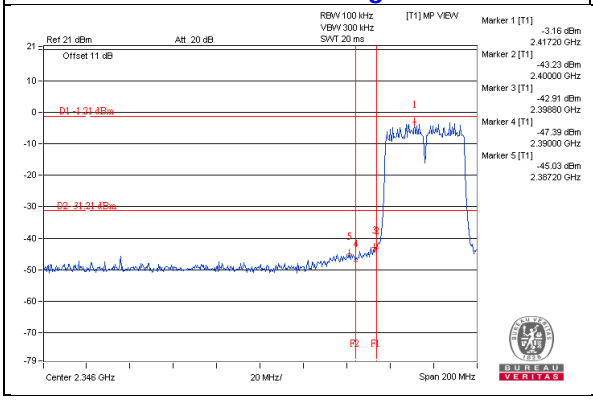
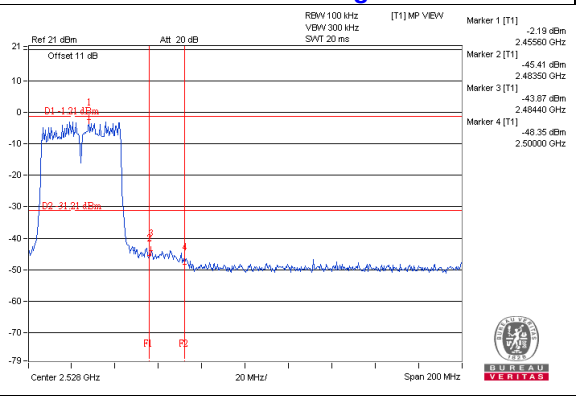


CH 3 Band edge

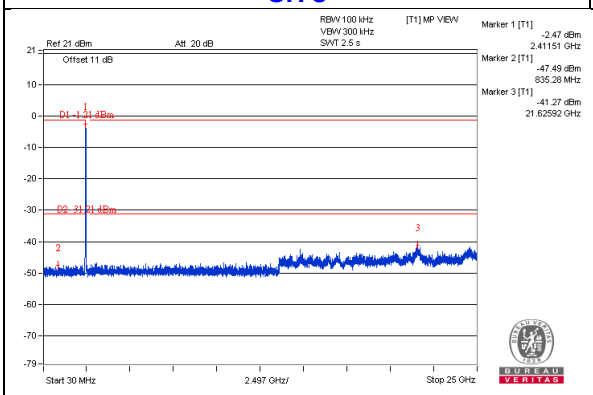


CH 9 Band edge



CHAIN 1

CH 3



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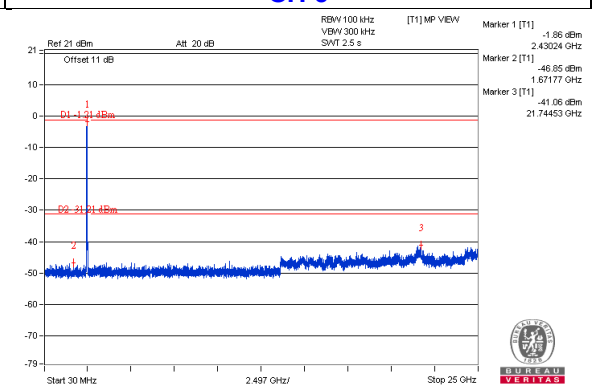

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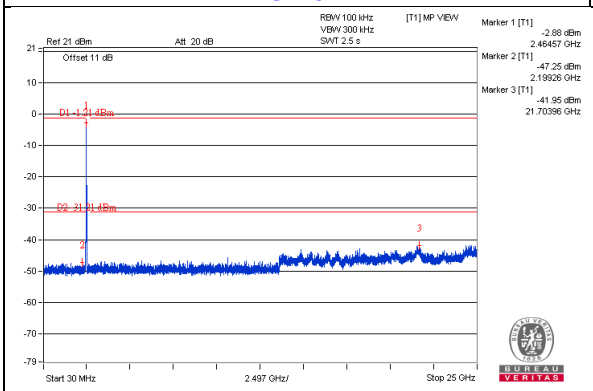
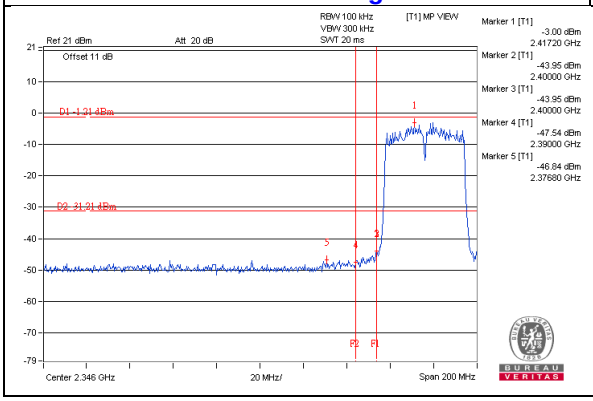
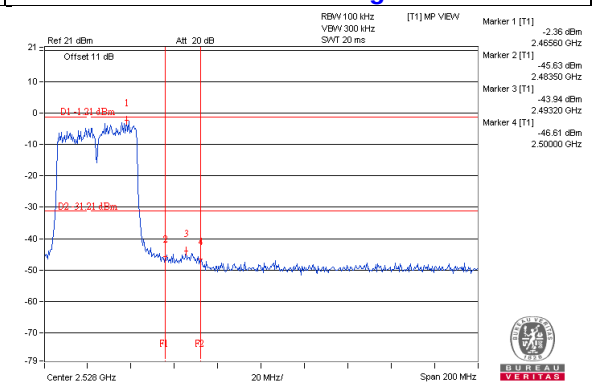


CH 3 Band edge

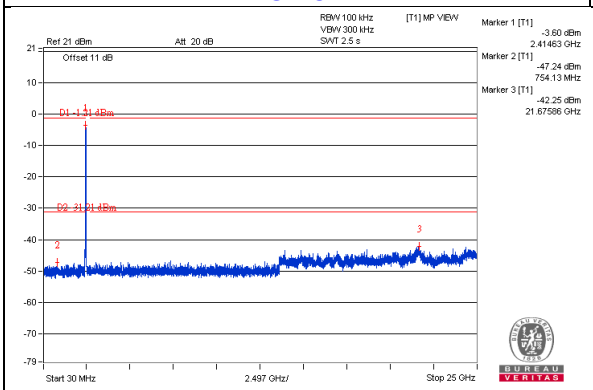


CH 9 Band edge



CHAIN 2

CH 3



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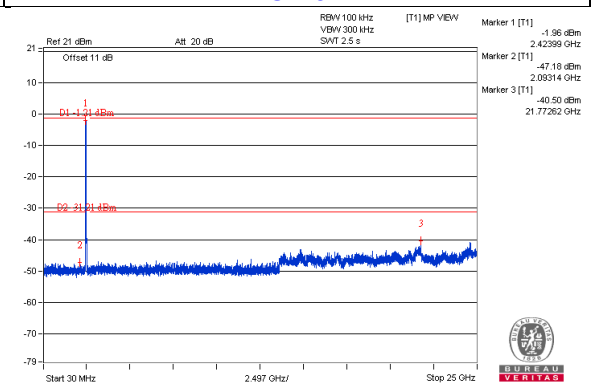
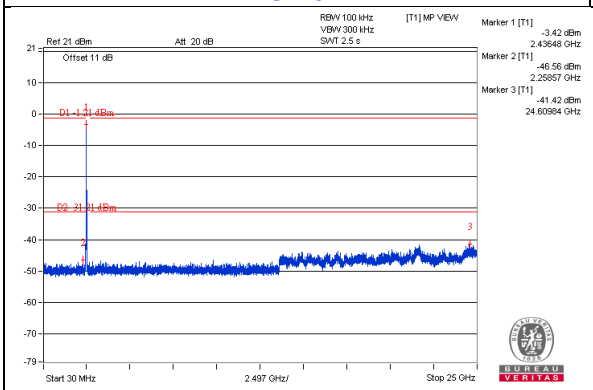
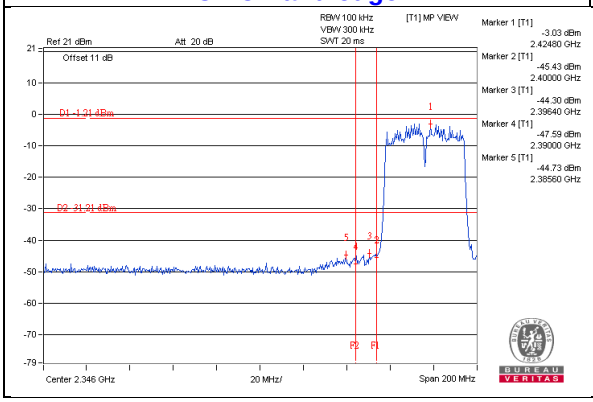


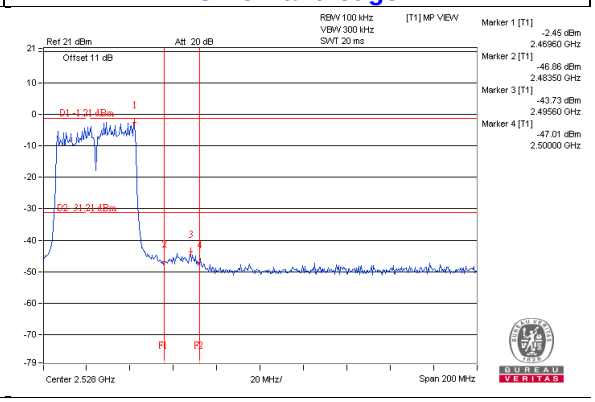
CH 9



CH 3 Band edge



CH 9 Band edge



5 Pictures of Test Arrangements

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

Appendix – Information on the Testing Laboratories

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

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

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

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

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

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

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

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