

FCC Test Report

Report No.: RF160923E02

FCC ID: U8G-P1811AC

Test Model: MAX HD2 LTE

Series Model: MAX HD2 LTEA

Received Date: Sep. 23, 2016

Test Date: Sep. 28 to Nov. 04, 2016

Issued Date: Nov. 14, 2016

Applicant: Pismo Labs Technology Limited

Address: FLAT/RM A5, 5/F, HK SPINNERS IND BLDG PHASE 6, 481 CASTLE PEAK ROAD, CHEUNG SHA WAN, HONG KONG.

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.



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

Table of Contents

Release Control Record	4
1 Certificate of Conformity	5
2 Summary of Test Results	6
2.1 Measurement Uncertainty	6
2.2 Modification Record	6
3 General Information	7
3.1 General Description of EUT	7
3.2 Description of Test Modes	10
3.2.1 Test Mode Applicability and Tested Channel Detail	11
3.3 Duty Cycle of Test Signal	13
3.4 Description of Support Units	14
3.4.1 Configuration of System under Test	15
3.5 General Description of Applied Standards	16
4 Test Types and Results	17
4.1 Radiated Emission and Bandedge Measurement	17
4.1.1 Limits of Radiated Emission and Bandedge Measurement	17
4.1.2 Test Instruments	18
4.1.3 Test Procedures	19
4.1.4 Deviation from Test Standard	19
4.1.5 Test Setup	20
4.1.6 EUT Operating Conditions	21
4.1.7 Test Results	22
4.2 Conducted Emission Measurement	35
4.2.1 Limits of Conducted Emission Measurement	35
4.2.2 Test Instruments	35
4.2.3 Test Procedures	36
4.2.4 Deviation from Test Standard	36
4.2.5 Test Setup	36
4.2.6 EUT Operating Conditions	36
4.2.7 Test Results	37
4.3 6dB Bandwidth Measurement	39
4.3.1 Limits of 6dB Bandwidth Measurement	39
4.3.2 Test Setup	39
4.3.3 Test Instruments	39
4.3.4 Test Procedure	39
4.3.5 Deviation from Test Standard	39
4.3.6 EUT Operating Conditions	39
4.3.7 Test Result	40
4.4 Conducted Output Power Measurement	42
4.4.1 Limits of Conducted Output Power Measurement	42
4.4.2 Test Setup	42
4.4.3 Test Instruments	42
4.4.4 Test Procedures	42
4.4.5 Deviation from Test Standard	42
4.4.6 EUT Operating Conditions	42
4.4.7 Test Results	43
4.5 Power Spectral Density Measurement	44
4.5.1 Limits of Power Spectral Density Measurement	44
4.5.2 Test Setup	44
4.5.3 Test Instruments	44
4.5.4 Test Procedure	44
4.5.5 Deviation from Test Standard	44
4.5.6 EUT Operating Condition	44

4.5.7 Test Results	45
4.6 Conducted Out of Band Emission Measurement	48
4.6.1 Limits of Conducted Out of Band Emission Measurement.....	48
4.6.2 Test Setup.....	48
4.6.3 Test Instruments	48
4.6.4 Test Procedure	48
4.6.5 Deviation from Test Standard	48
4.6.6 EUT Operating Condition	48
4.6.7 Test Results	48
5 Pictures of Test Arrangements.....	57
Appendix – Information on the Testing Laboratories	58

Release Control Record

Issue No.	Description	Date Issued
RF160923E02	Original release.	Nov. 14, 2016

1 Certificate of Conformity

Product: Pepwave / Peplink / Pismo Labs Wireless Product

Brand: Pepwave

Test Model: MAX HD2 LTE

Series Model: MAX HD2 LTEA

Sample Status: ENGINEERING SAMPLE

Applicant: Pismo Labs Technology Limited

Test Date: Sep. 28 to Nov. 04, 2016

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

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

Prepared by : Wendy Wu , **Date:** Nov. 14, 2016
Wendy Wu / Specialist

Approved by : May Chen , **Date:** Nov. 14, 2016
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 -6.65dB at 0.15000MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.3dB at 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 R-SMA 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) (\pm)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.83 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	Pepwave / Peplink / Pismo Labs Wireless Product
Brand	Pepwave
Test Model	MAX HD2 LTE
Series Model	MAX HD2 LTEA
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 300Mbps 802.11ac: up to 866.7Mbps
Operating Frequency	2.4GHz: 2.412GHz ~ 2.462GHz 5GHz: 5.18GHz ~ 5.24GHz, 5.745GHz ~ 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: 988.867mW 5GHz: 5.18GHz ~ 5.24GHz: 197.885mW 5.745GHz ~ 5.825GHz: 264.424mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	NA

Note:

1. The EUT has below model names, which are identical to each other in all aspects except for the following:

Product name	Brand	Model	Difference	Purpose	Hardware/Software
Pepwave	Pepwave	MAX HD2 LTE	(1) MAX HD2 LTE contains two N7NMC7355 modules. (2) MAX HD2 LTEA contain two N7NMC7455 modules	For marketing requirement	All of hardware and software are identical.
		MAX HD2 LTEA			
Peplink		MAX HD2 LTE			
		MAX HD2 LTEA			
Pismo Labs Wireless		MAX HD2 LTE			
Product		MAX HD2 LTEA			

From the above models, model: **MAX HD2 LTE** was selected as representative model for the test and its data was recorded in this report.

- There are WLAN, GPS, WWAN(LTE) technology used for the EUT.
- EUT contains two WiFi chip as same model, this chip model support dual band operation, but it will be locked to single band operation by firmware. One chip is supported 2.4GHz, other is supported 5GHz.
- EUT contains two same certified LTE module which FCC ID: N7NMC7455 or N7NMC7355.
- EUT could be applied with a plug in USB cellular device.
- Simultaneously transmission condition.

Condition	Technology				
1	WLAN (2.4GHz)	WLAN (5GHz)	WWAN(LTE) module (FCC ID: N7NMC7355)	WWAN(LTE) module (FCC ID: N7NMC7355)	-
2	WLAN (2.4GHz)	WLAN (5GHz)	WWAN(LTE) module (FCC ID: N7NMC7355)	WWAN(LTE) module (FCC ID: N7NMC7355)	3G/LTE (USB cellular device)
3	WLAN (2.4GHz)	WLAN (5GHz)	WWAN(LTE) module (FCC ID: N7NMC7455)	WWAN(LTE) module (FCC ID: N7NMC7455)	-
4	WLAN (2.4GHz)	WLAN (5GHz)	WWAN(LTE) module (FCC ID: N7NMC7455)	WWAN(LTE) module (FCC ID: N7NMC7455)	3G/LTE (USB cellular device)

Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.

7. The EUT must be supplied with a power adapter as following table:

Brand	Model No.	Spec.
ADAPTER TECH.	ATS036T-W120V	Input: 100-240Vac, 50-60Hz, 1A Output: 12Vdc, 3A DC output cable (Unshielded, 1.5m)

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

For WLAN							
Antenna No.	Brand	Model	Antenna Net Gain(dBi)	Frequency range	Antenna Type	Connector Type	Cable Length (mm)
WAN(2.4G)-1	SmartAnt	SAA06-220690	3	2400 ~ 2500 MHz	Dipole	R-SMA	150
WAN(2.4G)-2	SmartAnt	SAA06-220690	3	2400 ~ 2500 MHz	Dipole	R-SMA	150
AP(5G)-1	SmartAnt	SAA06-220690	5.5	5150 ~ 5350 MHz	Dipole	R-SMA	260
			6	5350 ~ 5875 MHz			260
AP(5G)-2	SmartAnt	SAA06-220690	5.5	5150 ~ 5350 MHz	Dipole	R-SMA	260
			6	5350 ~ 5875 MHz			260
For GPS							
Antenna No.	Brand	Model	Antenna Net Gain(dBi)	Frequency range	Antenna Type	Connector Type	
1	MASTER WAVE TECHNOLOGY CO., LTD.	98335KSAF000	4.5 ±0.5	1575.42 MHz	Magnetic	SMA	
For WWAN(LTE)							
Antenna No.	Brand	Model	Antenna Net Gain(dBi)	Frequency range	Antenna Type	Connector Type	
Cellular 1 Main	MASTER WAVE TECHNOLOGY CO., LTD.	98619ZSAX025	1.99	699~960 MHz	Dipole	SMA	
Cellular 1 Diversity/Aux			4	1575~2170 MHz			
Cellular 2 Main			1	2300~2320 MHz			
Cellular 1 Diversity/Aux			2.8	2325~2690 MHz			

9. 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)	MCS0~8 Nss=1	2TX	2RX
	MCS0~8 Nss=2	2TX	2RX
802.11ac (VHT40)	MCS0~9 Nss=1	2TX	2RX
	MCS0~9 Nss=2	2TX	2RX
802.11ac (VHT80)	MCS0~9 Nss=1	2TX	2RX
	MCS0~9 Nss=2	2TX	2RX

10. 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 \geq 1G	RE $<$ 1G	PLC	APCM	
-	√	√	√	√	-

Where RE \geq 1G: Radiated Emission above 1GHz & Bandedge Measurement
 RE $<$ 1G: Radiated Emission below 1GHz
 PLC: Power Line Conducted Emission
 APCM: Antenna Port Conducted Measurement

NOTE: The EUT had been pre-tested on the positioned of each 2 axis. The worst case was found when positioned on **Y-plane**.

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 \geq 1G	21deg. C, 69%RH	120Vac, 60Hz	Andy Ho
RE $<$ 1G	21deg. C, 67%RH	120Vac, 60Hz	Gary Cheng
PLC	25deg. C, 69%RH	120Vac, 60Hz	Eagle Chen
APCM	25deg. C, 60%RH	120Vac, 60Hz	Gary Cheng

3.3 Duty Cycle of Test Signal

If duty cycle of test signal is $\geq 98\%$, duty factor is not required.

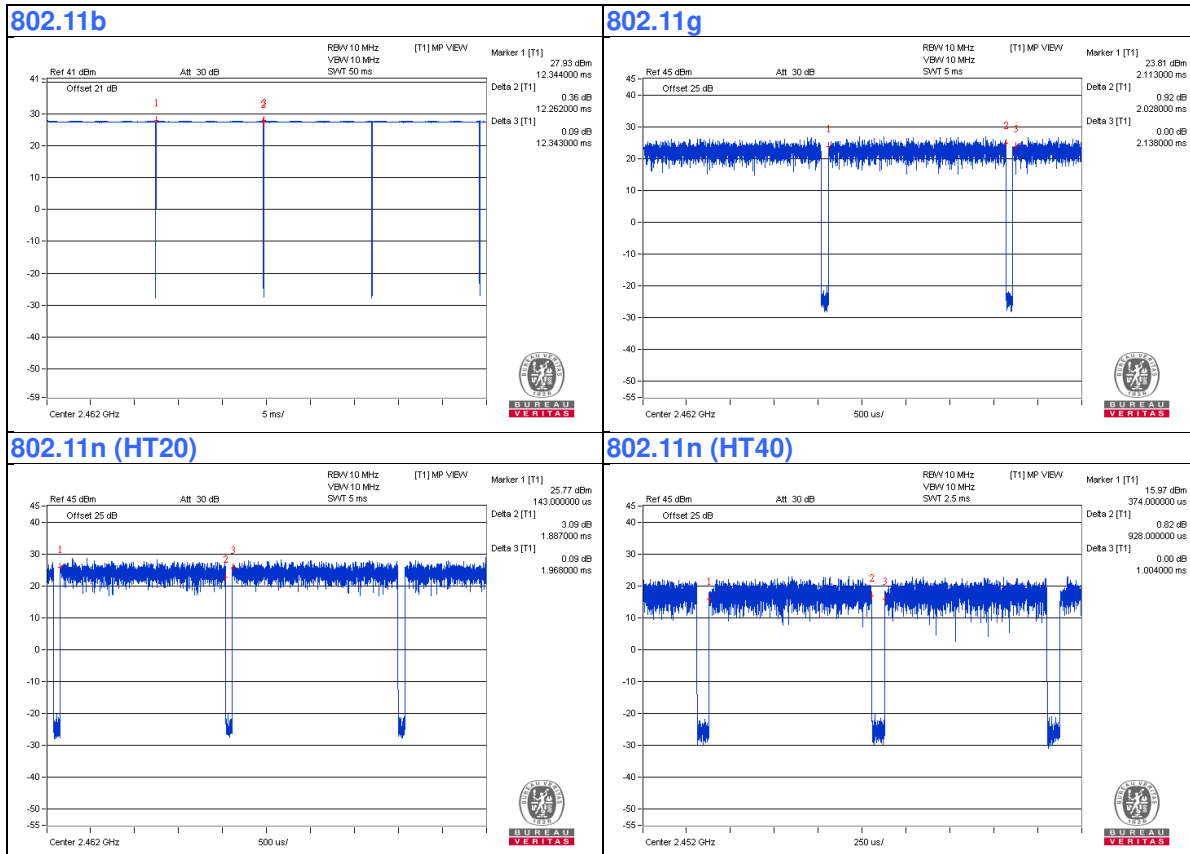
If duty cycle of test signal is $< 98\%$, duty factor shall be considered.

802.11b: Duty cycle = $12.262/12.343 = 0.993$

802.11g: Duty cycle = $2.028/2.138 = 0.949$, Duty factor = $10 * \log(1/0.949) = 0.23$

802.11n (HT20): Duty cycle = $1.887/1.968 = 0.959$, Duty factor = $10 * \log(1/0.959) = 0.18$

802.11n (HT40): Duty cycle = $0.928/1.004 = 0.924$, Duty factor = $10 * \log(1/0.924) = 0.34$



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.

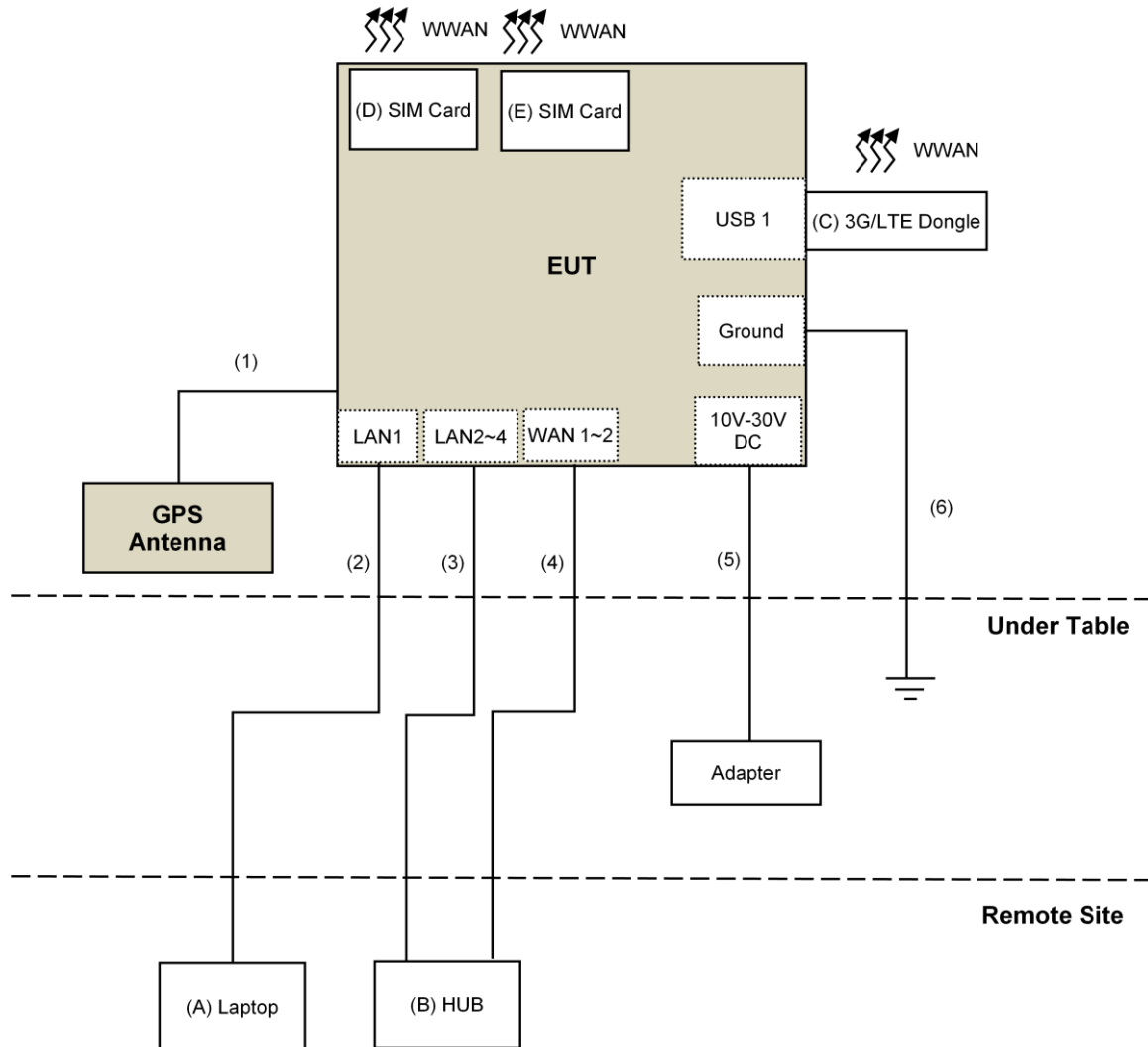
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	DELL	E6420	482T3R1	FCC DoC	Provided by Lab
B.	HUB	ZyXEL	NBG4115	S090A4200153	FCC DoC	Provided by Lab
C.	3G / LTE Wireless Dongle	D-LINK	DWM-221	RD271F8000411	KA2WM221B1	Provided by Lab
D.	SIM Card A	R&S	CRT-Z3	NA	NA	Provided by Lab
E.	SIM Card B	R&S	CRT-Z3	NA	NA	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.	GPS Antenna Cable	1	5	No	0	Supplied by Client
2.	RJ-45 Cable	1	10	No	0	Provided by Lab
3.	RJ-45 Cable	3	3	No	0	Provided by Lab
4.	RJ-45 Cable	2	3	No	0	Provided by Lab
5.	DC Cable	1	1.5	No	0	Supplied by Client
6.	Ground wire	1	1.5	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 v03r05
KDB 662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10-2013

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

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, 2014	Dec. 15, 2016
RF Cable	NA	LOOPCAB-001 LOOPCAB-002	Jan. 18, 2016	Jan. 17, 2017
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Nov. 11, 2015	Nov. 10, 2016
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Jan. 04, 2016	Jan. 03, 2017
RF Cable	8D	966-4-1 966-4-2 966-4-3	Apr. 02, 2016	Apr. 01, 2017
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Jan. 19, 2016	Jan. 18, 2017
Pre-Amplifier Agilent	8449B	3008A01922	Sep. 18, 2016	Sep. 17, 2017
RF Cable	EMC104-SM-SM-2000 EMC104-SM-SM-5000 EMC104-SM-SM-5000	150318 150323 150324	Mar. 30, 2016	Mar. 29, 2017
Pre-Amplifier EMCI	EMC184045	980143	Jan. 15, 2016	Jan. 14, 2017
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Jan. 08, 2016	Jan. 07, 2017
RF Cable	SUCOFLEX 102	36432/2 36441/2	Jan. 16, 2016	Jan. 15, 2017
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	FSP40	100060	May 11, 2016	May 10, 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: Sep. 28 to Nov. 04, 2016

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:

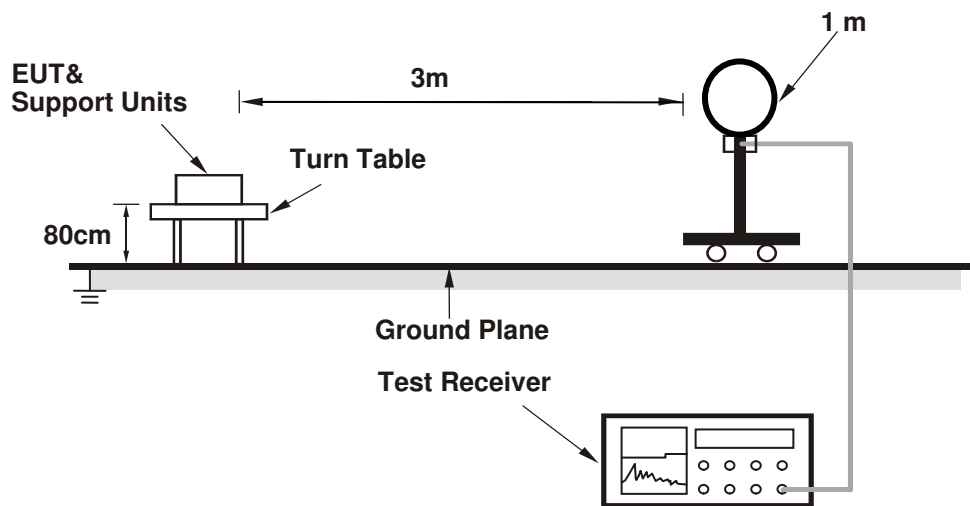
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle $< 98\%$) or 10Hz (Duty cycle $\geq 98\%$) 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

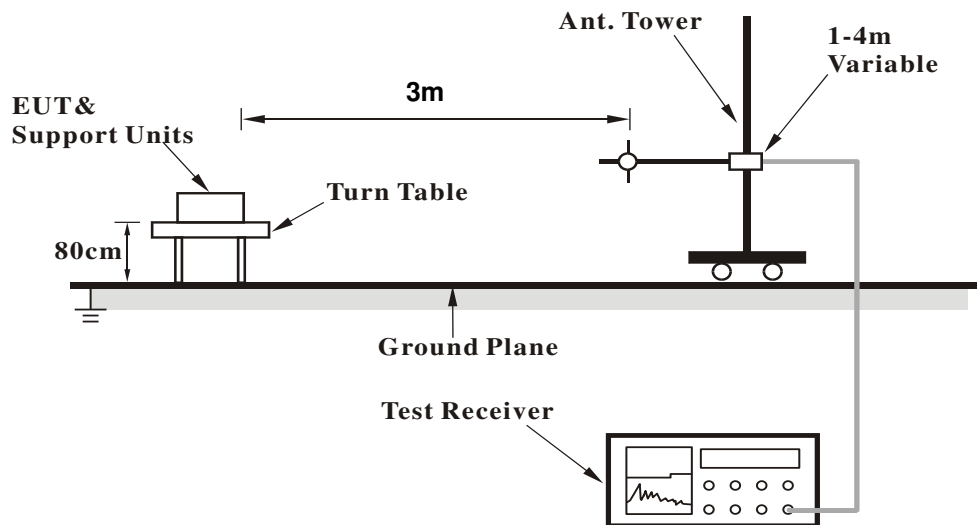
No deviation.

4.1.5 Test Setup

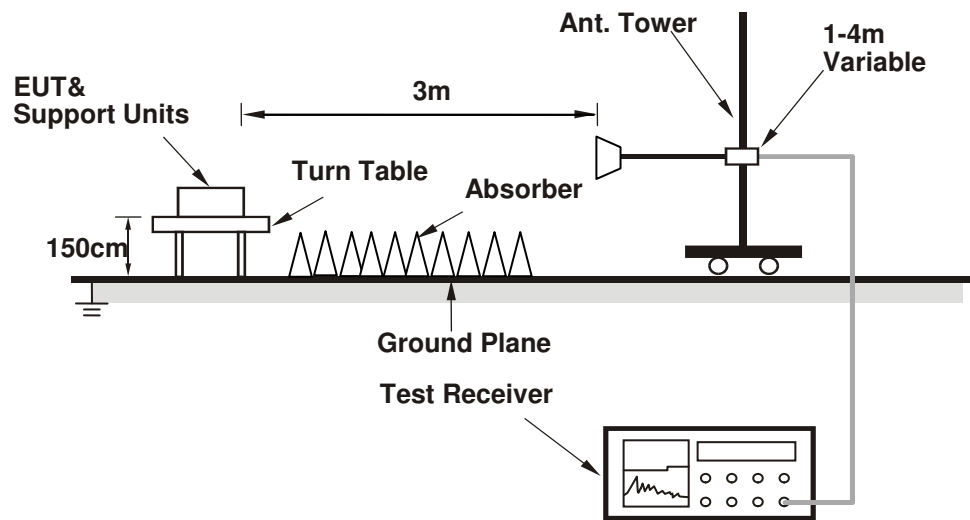
For Radiated emission below 30MHz



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 (artgui.exe[art2_ver_4_9_575_5_cs_u3_bin]) 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)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	52.0 PK	74.0	-22.0	1.09 H	331	57.7	-5.7
2	2390.00	46.8 AV	54.0	-7.2	1.09 H	331	52.5	-5.7
3	*2412.00	96.5 PK			1.09 H	331	102.1	-5.6
4	*2412.00	94.6 AV			1.09 H	331	100.2	-5.6
5	4824.00	47.6 PK	74.0	-26.4	1.08 H	67	46.8	0.8
6	4824.00	42.9 AV	54.0	-11.1	1.08 H	67	42.1	0.8

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	58.1 PK	74.0	-15.9	2.18 V	360	63.8	-5.7
2	2390.00	53.2 AV	54.0	-0.8	2.18 V	360	58.9	-5.7
3	*2412.00	115.7 PK			2.39 V	360	121.3	-5.6
4	*2412.00	113.4 AV			2.39 V	360	119.0	-5.6
5	4824.00	49.2 PK	74.0	-24.8	1.91 V	141	48.4	0.8
6	4824.00	45.6 AV	54.0	-8.4	1.91 V	141	44.8	0.8

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	51.4 PK	74.0	-22.6	1.10 H	320	57.1	-5.7
2	2390.00	43.2 AV	54.0	-10.8	1.10 H	320	48.9	-5.7
3	*2437.00	98.5 PK			1.10 H	320	104.0	-5.5
4	*2437.00	95.9 AV			1.10 H	320	101.4	-5.5
5	2483.50	49.9 PK	74.0	-24.1	1.10 H	320	55.4	-5.5
6	2483.50	45.2 AV	54.0	-8.8	1.10 H	320	50.7	-5.5
7	4874.00	44.7 PK	74.0	-29.3	1.66 H	117	43.8	0.9
8	4874.00	42.1 AV	54.0	-11.9	1.66 H	117	41.2	0.9
9	7311.00	45.7 PK	74.0	-28.3	1.15 H	51	38.3	7.4
10	7311.00	33.6 AV	54.0	-20.4	1.15 H	51	26.2	7.4

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	54.5 PK	74.0	-19.5	1.86 V	176	60.2	-5.7
2	2390.00	49.0 AV	54.0	-5.0	1.86 V	176	54.7	-5.7
3	*2437.00	117.4 PK			1.86 V	176	122.9	-5.5
4	*2437.00	115.3 AV			1.86 V	176	120.8	-5.5
5	2483.50	55.8 PK	74.0	-18.2	1.86 V	176	61.3	-5.5
6	2483.50	51.2 AV	54.0	-2.8	1.86 V	176	56.7	-5.5
7	4874.00	51.7 PK	74.0	-22.3	1.63 V	176	50.8	0.9
8	4874.00	50.9 AV	54.0	-3.1	1.63 V	176	50.0	0.9
9	7311.00	45.3 PK	74.0	-28.7	1.60 V	92	37.9	7.4
10	7311.00	34.2 AV	54.0	-19.8	1.60 V	92	26.8	7.4

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	95.4 PK			1.12 H	310	100.8	-5.4
2	*2462.00	93.6 AV			1.12 H	310	99.0	-5.4
3	2483.50	51.5 PK	74.0	-22.5	1.12 H	310	57.0	-5.5
4	2483.50	47.5 AV	54.0	-6.5	1.12 H	310	53.0	-5.5
5	4924.00	47.0 PK	74.0	-27.0	1.61 H	116	45.9	1.1
6	4924.00	44.4 AV	54.0	-9.6	1.61 H	116	43.3	1.1
7	7386.00	46.3 PK	74.0	-27.7	1.15 H	63	38.7	7.6
8	7386.00	34.0 AV	54.0	-20.0	1.15 H	63	26.4	7.6

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	*2462.00	114.9 PK			2.23 V	174	120.3	-5.4
2	*2462.00	112.4 AV			2.23 V	174	117.8	-5.4
3	2483.50	57.9 PK	74.0	-16.1	1.95 V	175	63.4	-5.5
4	2483.50	53.7 AV	54.0	-0.3	1.95 V	175	59.2	-5.5
5	4924.00	52.6 PK	74.0	-21.4	1.49 V	193	51.5	1.1
6	4924.00	50.7 AV	54.0	-3.3	1.49 V	193	49.6	1.1
7	7386.00	46.1 PK	74.0	-27.9	1.63 V	98	38.5	7.6
8	7386.00	34.8 AV	54.0	-19.2	1.63 V	98	27.2	7.6

REMARKS:

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

802.11g

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	66.6 PK	74.0	-7.4	1.10 H	306	72.3	-5.7
2	2390.00	46.5 AV	54.0	-7.5	1.10 H	306	52.2	-5.7
3	*2412.00	98.5 PK			1.10 H	306	104.1	-5.6
4	*2412.00	86.6 AV			1.10 H	306	92.2	-5.6
5	4824.00	47.6 PK	74.0	-26.4	1.62 H	115	46.8	0.8
6	4824.00	35.4 AV	54.0	-18.6	1.62 H	115	34.6	0.8

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	72.6 PK	74.0	-1.4	2.51 V	152	78.3	-5.7
2	2390.00	52.9 AV	54.0	-1.1	2.51 V	152	58.6	-5.7
3	*2412.00	116.4 PK			2.51 V	152	122.0	-5.6
4	*2412.00	104.6 AV			2.51 V	152	110.2	-5.6
5	4824.00	50.4 PK	74.0	-23.6	2.94 V	237	49.6	0.8
6	4824.00	38.5 AV	54.0	-15.5	2.94 V	237	37.7	0.8

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	57.7 PK	74.0	-16.3	1.12 H	310	63.4	-5.7
2	2390.00	40.4 AV	54.0	-13.6	1.12 H	310	46.1	-5.7
3	*2437.00	102.8 PK			1.12 H	310	108.3	-5.5
4	*2437.00	91.4 AV			1.12 H	310	96.9	-5.5
5	2483.50	53.4 PK	74.0	-20.6	1.12 H	310	58.9	-5.5
6	2483.50	37.5 AV	54.0	-16.5	1.12 H	310	43.0	-5.5
7	4874.00	48.9 PK	74.0	-25.1	1.50 H	120	48.0	0.9
8	4874.00	36.4 AV	54.0	-17.6	1.50 H	120	35.5	0.9
9	7311.00	46.4 PK	74.0	-27.6	1.16 H	65	39.0	7.4
10	7311.00	35.4 AV	54.0	-18.6	1.16 H	65	28.0	7.4

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	63.3 PK	74.0	-10.7	2.27 V	146	69.0	-5.7
2	2390.00	46.5 AV	54.0	-7.5	2.27 V	146	52.2	-5.7
3	*2437.00	120.8 PK			2.27 V	146	126.3	-5.5
4	*2437.00	109.2 AV			2.27 V	146	114.7	-5.5
5	2483.50	59.4 PK	74.0	-14.6	2.27 V	146	64.9	-5.5
6	2483.50	43.5 AV	54.0	-10.5	2.27 V	146	49.0	-5.5
7	4874.00	52.2 PK	74.0	-21.8	2.99 V	229	51.3	0.9
8	4874.00	40.0 AV	54.0	-14.0	2.99 V	229	39.1	0.9
9	7311.00	45.4 PK	74.0	-28.6	1.65 V	92	38.0	7.4
10	7311.00	34.2 AV	54.0	-19.8	1.65 V	92	26.8	7.4

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	98.3 PK			1.06 H	303	103.7	-5.4
2	*2462.00	86.4 AV			1.06 H	303	91.8	-5.4
3	2483.50	66.2 PK	74.0	-7.8	1.06 H	303	71.7	-5.5
4	2483.50	47.4 AV	54.0	-6.6	1.06 H	303	52.9	-5.5
5	4924.00	47.6 PK	74.0	-26.4	1.58 H	119	46.5	1.1
6	4924.00	35.3 AV	54.0	-18.7	1.58 H	119	34.2	1.1
7	7386.00	46.9 PK	74.0	-27.1	1.13 H	54	39.3	7.6
8	7386.00	35.6 AV	54.0	-18.4	1.13 H	54	28.0	7.6

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	*2462.00	115.3 PK			2.44 V	144	120.7	-5.4
2	*2462.00	103.0 AV			2.44 V	144	108.4	-5.4
3	2483.50	69.5 PK	74.0	-4.5	2.44 V	144	75.0	-5.5
4	2483.50	53.2 AV	54.0	-0.8	2.44 V	144	58.7	-5.5
5	4924.00	50.7 PK	74.0	-23.3	2.92 V	235	49.6	1.1
6	4924.00	39.0 AV	54.0	-15.0	2.92 V	235	37.9	1.1
7	7386.00	43.6 PK	74.0	-30.4	1.62 V	109	36.0	7.6
8	7386.00	32.9 AV	54.0	-21.1	1.62 V	109	25.3	7.6

REMARKS:

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

802.11n (HT20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	62.5 PK	74.0	-11.5	1.12 H	310	68.2	-5.7
2	2390.00	47.2 AV	54.0	-6.8	1.12 H	310	52.9	-5.7
3	*2412.00	97.9 PK			1.12 H	310	103.5	-5.6
4	*2412.00	87.7 AV			1.12 H	310	93.3	-5.6
5	4824.00	48.0 PK	74.0	-26.0	1.64 H	113	47.2	0.8
6	4824.00	35.6 AV	54.0	-18.4	1.64 H	113	34.8	0.8

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	68.0 PK	74.0	-6.0	2.26 V	222	73.7	-5.7
2	2390.00	53.1 AV	54.0	-0.9	2.26 V	222	58.8	-5.7
3	*2412.00	115.9 PK			2.26 V	222	121.5	-5.6
4	*2412.00	105.1 AV			2.26 V	222	110.7	-5.6
5	4824.00	51.1 PK	74.0	-22.9	3.01 V	252	50.3	0.8
6	4824.00	38.8 AV	54.0	-15.2	3.01 V	252	38.0	0.8

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	57.9 PK	74.0	-16.1	1.17 H	304	63.6	-5.7
2	2390.00	40.3 AV	54.0	-13.7	1.17 H	304	46.0	-5.7
3	*2437.00	102.5 PK			1.17 H	304	108.0	-5.5
4	*2437.00	90.9 AV			1.17 H	304	96.4	-5.5
5	2483.50	52.9 PK	74.0	-21.1	1.17 H	304	58.4	-5.5
6	2483.50	37.1 AV	54.0	-16.9	1.17 H	304	42.6	-5.5
7	4874.00	49.2 PK	74.0	-24.8	1.48 H	120	48.3	0.9
8	4874.00	36.6 AV	54.0	-17.4	1.48 H	120	35.7	0.9
9	7311.00	45.8 PK	74.0	-28.2	1.10 H	78	38.4	7.4
10	7311.00	34.9 AV	54.0	-19.1	1.10 H	78	27.5	7.4

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	68.4 PK	74.0	-5.6	2.21 V	147	74.1	-5.7
2	2390.00	49.1 AV	54.0	-4.9	2.21 V	147	54.8	-5.7
3	*2437.00	119.9 PK			2.21 V	147	125.4	-5.5
4	*2437.00	109.5 AV			2.21 V	147	115.0	-5.5
5	2483.50	58.2 PK	74.0	-15.8	2.21 V	147	63.7	-5.5
6	2483.50	43.5 AV	54.0	-10.5	2.21 V	147	49.0	-5.5
7	4874.00	51.9 PK	74.0	-22.1	3.04 V	214	51.0	0.9
8	4874.00	39.7 AV	54.0	-14.3	3.04 V	214	38.8	0.9
9	7311.00	45.9 PK	74.0	-28.1	1.63 V	80	38.5	7.4
10	7311.00	34.7 AV	54.0	-19.3	1.63 V	80	27.3	7.4

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	98.5 PK			1.12 H	301	103.9	-5.4
2	*2462.00	86.7 AV			1.12 H	301	92.1	-5.4
3	2483.50	66.1 PK	74.0	-7.9	1.12 H	301	71.6	-5.5
4	2483.50	47.3 AV	54.0	-6.7	1.12 H	301	52.8	-5.5
5	4924.00	48.2 PK	74.0	-25.8	1.58 H	123	47.1	1.1
6	4924.00	35.8 AV	54.0	-18.2	1.58 H	123	34.7	1.1
7	7386.00	47.3 PK	74.0	-26.7	1.12 H	43	39.7	7.6
8	7386.00	36.0 AV	54.0	-18.0	1.12 H	43	28.4	7.6

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	*2462.00	114.8 PK			2.18 V	120	120.2	-5.4
2	*2462.00	103.7 AV			2.18 V	120	109.1	-5.4
3	2483.50	70.6 PK	74.0	-3.4	2.18 V	120	76.1	-5.5
4	2483.50	53.5 AV	54.0	-0.5	2.18 V	120	59.0	-5.5
5	4924.00	50.9 PK	74.0	-23.1	2.96 V	242	49.8	1.1
6	4924.00	38.9 AV	54.0	-15.1	2.96 V	242	37.8	1.1
7	7386.00	44.2 PK	74.0	-29.8	1.67 V	81	36.6	7.6
8	7386.00	33.4 AV	54.0	-20.6	1.67 V	81	25.8	7.6

REMARKS:

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

802.11n (HT40)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	61.5 PK	74.0	-12.5	1.20 H	306	67.2	-5.7
2	2390.00	47.3 AV	54.0	-6.7	1.20 H	306	53.0	-5.7
3	*2422.00	92.4 PK			1.20 H	306	97.9	-5.5
4	*2422.00	80.6 AV			1.20 H	306	86.1	-5.5
5	4844.00	46.5 PK	74.0	-27.5	1.60 H	126	45.7	0.8
6	4844.00	34.2 AV	54.0	-19.8	1.60 H	126	33.4	0.8
7	7266.00	46.3 PK	74.0	-27.7	1.06 H	59	38.8	7.5
8	7266.00	34.2 AV	54.0	-19.8	1.06 H	59	26.7	7.5

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	2390.00	67.2 PK	74.0	-6.8	2.38 V	182	72.9	-5.7
2	2390.00	53.3 AV	54.0	-0.7	2.38 V	182	59.0	-5.7
3	*2422.00	110.0 PK			2.38 V	182	115.5	-5.5
4	*2422.00	98.6 AV			2.38 V	182	104.1	-5.5
5	4844.00	48.4 PK	74.0	-25.6	2.27 V	222	47.6	0.8
6	4844.00	36.5 AV	54.0	-17.5	2.27 V	222	35.7	0.8
7	7266.00	44.6 PK	74.0	-29.4	1.70 V	80	37.1	7.5
8	7266.00	33.4 AV	54.0	-20.6	1.70 V	80	25.9	7.5

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	62.5 PK	74.0	-11.5	1.16 H	312	68.2	-5.7
2	2390.00	46.6 AV	54.0	-7.4	1.16 H	312	52.3	-5.7
3	*2437.00	97.0 PK			1.16 H	312	102.5	-5.5
4	*2437.00	84.6 AV			1.16 H	312	90.1	-5.5
5	2483.50	64.5 PK	74.0	-9.5	1.16 H	312	70.0	-5.5
6	2483.50	46.4 AV	54.0	-7.6	1.16 H	312	51.9	-5.5
7	4874.00	47.0 PK	74.0	-27.0	1.54 H	125	46.1	0.9
8	4874.00	34.5 AV	54.0	-19.5	1.54 H	125	33.6	0.9
9	7311.00	45.6 PK	74.0	-28.4	1.01 H	54	38.2	7.4
10	7311.00	33.8 AV	54.0	-20.2	1.01 H	54	26.4	7.4

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	68.7 PK	74.0	-5.3	1.85 V	220	74.4	-5.7
2	2390.00	52.8 AV	54.0	-1.2	1.85 V	220	58.5	-5.7
3	*2437.00	115.0 PK			1.85 V	220	120.5	-5.5
4	*2437.00	102.9 AV			1.85 V	220	108.4	-5.5
5	2483.50	70.2 PK	74.0	-3.8	1.85 V	220	75.7	-5.5
6	2483.50	53.2 AV	54.0	-0.8	1.85 V	220	58.7	-5.5
7	4874.00	49.0 PK	74.0	-25.0	2.25 V	221	48.1	0.9
8	4874.00	37.0 AV	54.0	-17.0	2.25 V	221	36.1	0.9
9	7311.00	45.0 PK	74.0	-29.0	1.74 V	93	37.6	7.4
10	7311.00	33.6 AV	54.0	-20.4	1.74 V	93	26.2	7.4

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	93.2 PK			1.20 H	306	98.7	-5.5
2	*2452.00	81.9 AV			1.20 H	306	87.4	-5.5
3	2483.50	60.6 PK	74.0	-13.4	1.20 H	306	66.1	-5.5
4	2483.50	46.7 AV	54.0	-7.3	1.20 H	306	52.2	-5.5
5	4904.00	46.7 PK	74.0	-27.3	1.60 H	123	45.7	1.0
6	4904.00	34.6 AV	54.0	-19.4	1.60 H	123	33.6	1.0
7	7356.00	47.0 PK	74.0	-27.0	1.05 H	45	39.4	7.6
8	7356.00	34.6 AV	54.0	-19.4	1.05 H	45	27.0	7.6

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	*2452.00	111.0 PK			2.29 V	36	116.5	-5.5
2	*2452.00	99.4 AV			2.29 V	36	104.9	-5.5
3	2483.50	66.4 PK	74.0	-7.6	2.29 V	36	71.9	-5.5
4	2483.50	52.9 AV	54.0	-1.1	2.29 V	36	58.4	-5.5
5	4904.00	48.2 PK	74.0	-25.8	2.30 V	210	47.2	1.0
6	4904.00	36.2 AV	54.0	-17.8	2.30 V	210	35.2	1.0
7	7356.00	44.4 PK	74.0	-29.6	1.66 V	90	36.8	7.6
8	7356.00	33.0 AV	54.0	-21.0	1.66 V	90	25.4	7.6

REMARKS:

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

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	35.80	33.4 QP	40.0	-6.6	1.50 H	107	43.0	-9.6
2	146.08	35.1 QP	43.5	-8.4	1.50 H	305	43.7	-8.6
3	239.98	39.0 QP	46.0	-7.0	1.00 H	126	49.3	-10.3
4	359.99	37.7 QP	46.0	-8.3	1.00 H	307	44.2	-6.5
5	625.00	39.8 QP	46.0	-6.2	1.00 H	35	39.8	0.0
6	750.01	39.2 QP	46.0	-6.8	1.00 H	324	37.3	1.9

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	42.65	36.8 QP	40.0	-3.2	1.00 V	360	45.7	-8.9
2	240.00	39.8 QP	46.0	-6.2	1.50 V	85	50.1	-10.3
3	360.02	39.2 QP	46.0	-6.8	1.50 V	151	45.7	-6.5
4	520.00	42.1 QP	46.0	-3.9	1.00 V	156	44.4	-2.3
5	625.01	42.9 QP	46.0	-3.1	1.00 V	360	42.9	0.0
6	1000.00	46.4 QP	54.0	-7.6	1.00 V	159	41.5	4.9

REMARKS:

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

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	100375	May 09, 2016	May 08, 2017
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK-8127	8127-522	Aug. 31, 2016	Aug. 30, 2017
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 13, 2016	June 12, 2017
RF Cable	5D-FB	COACAB-002	Mar. 04, 2016	Mar. 03, 2017
10 dB PAD Mini-Circuits	HAT-10+	CONATT-003	Sep. 13, 2016	Sep. 12, 2017
50 ohms Terminator	N/A	EMC-03	Sep. 29, 2016	Sep. 28, 2017
50 ohms Terminator	N/A	EMC-02	Sep. 29, 2016	Sep. 28, 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. C.
- 3 The VCCI Con C Registration No. is C-3611.
- 4 Tested Date: Nov. 01, 2016

4.2.3 Test Procedures

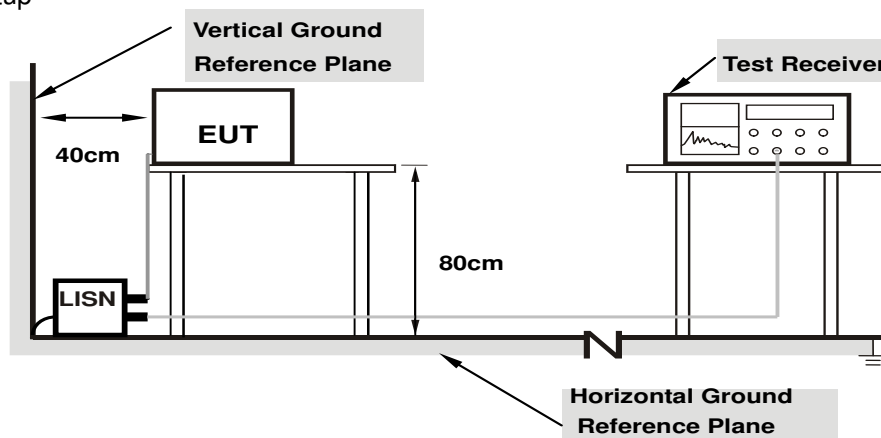
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- 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.

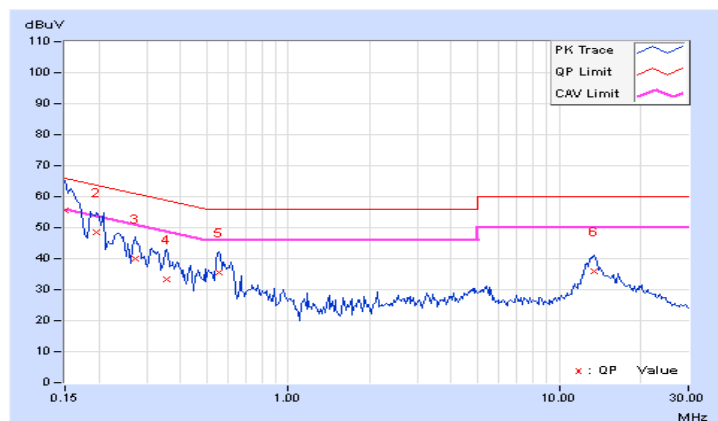
4.2.7 Test Results

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

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor (dB)	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.14	45.45	39.21	55.59	49.35	66.00	56.00	-10.41	-6.65
2	0.19687	10.12	38.53	25.59	48.65	35.71	63.74	53.74	-15.09	-18.03
3	0.27109	10.12	29.80	19.17	39.92	29.29	61.08	51.08	-21.16	-21.79
4	0.35703	10.11	23.28	6.02	33.39	16.13	58.80	48.80	-25.41	-32.67
5	0.55625	10.11	25.38	17.53	35.49	27.64	56.00	46.00	-20.51	-18.36
6	13.39844	10.57	25.52	18.88	36.09	29.45	60.00	50.00	-23.91	-20.55

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.

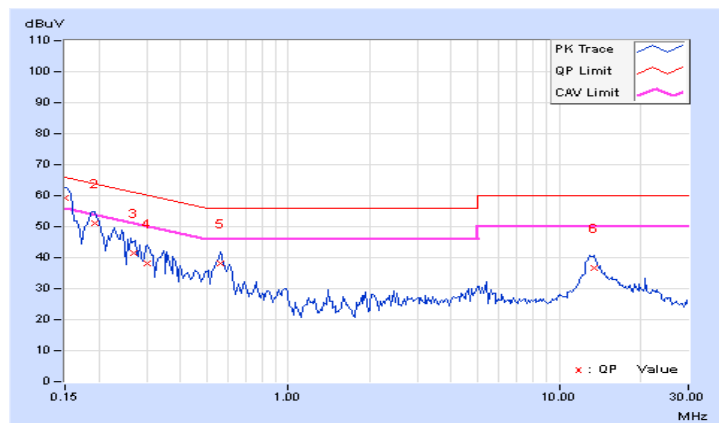


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.19	49.02	38.20	59.21	48.39	66.00	56.00	-6.79	-7.61
2	0.19297	10.09	41.20	30.52	51.29	40.61	63.91	53.91	-12.62	-13.30
3	0.26875	10.08	31.42	22.98	41.50	33.06	61.16	51.16	-19.66	-18.10
4	0.30234	10.08	28.23	15.75	38.31	25.83	60.18	50.18	-21.87	-24.35
5	0.56406	10.12	28.04	21.09	38.16	31.21	56.00	46.00	-17.84	-14.79
6	13.44531	10.61	25.88	19.42	36.49	30.03	60.00	50.00	-23.51	-19.97

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.

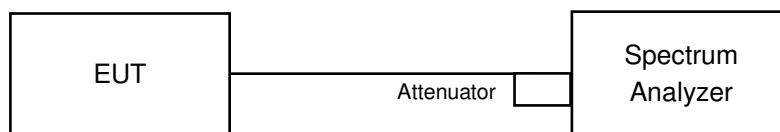


4.3 6dB Bandwidth Measurement

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) $\geq 3 \times$ 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	10.16	9.58	0.5	PASS
6	2437	10.08	10.12	0.5	PASS
11	2462	10.13	9.63	0.5	PASS

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	16.40	15.33	0.5	PASS
6	2437	15.35	16.40	0.5	PASS
11	2462	15.82	9.50	0.5	PASS

802.11n (HT20)

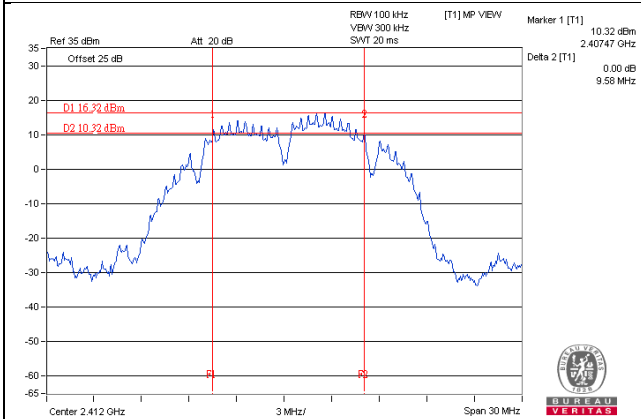
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	15.91	16.34	0.5	Pass
6	2437	15.76	17.36	0.5	Pass
11	2462	16.71	7.59	0.5	Pass

802.11n (HT40)

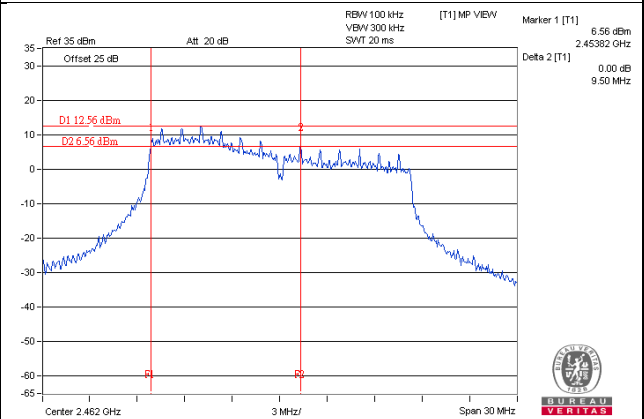
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
3	2422	35.63	32.66	0.5	Pass
6	2437	33.92	36.40	0.5	Pass
9	2452	35.29	19.95	0.5	Pass

Spectrum Plot of Worst Value

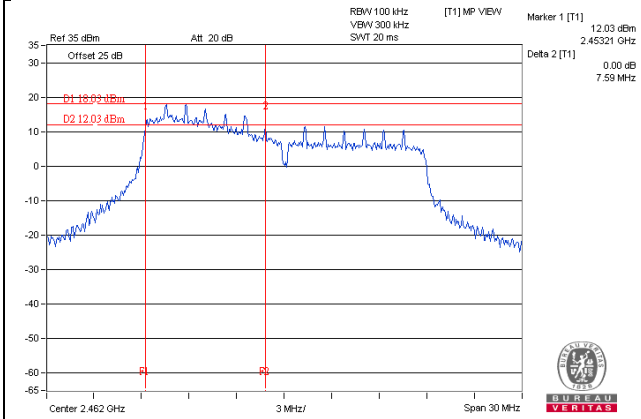
802.11b / Chain 1 : CH1



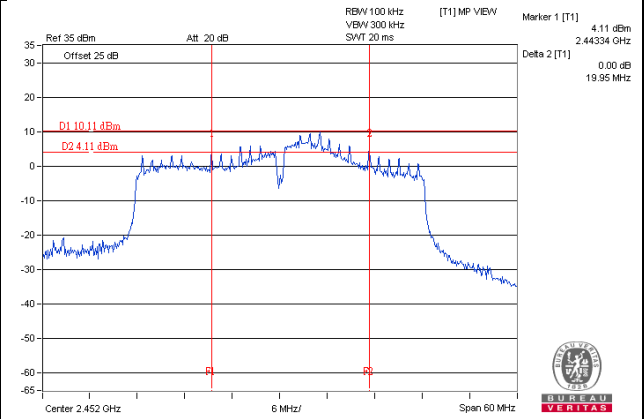
802.11g / Chain 1 : CH11



802.11n (HT20) / Chain 1 : CH11



802.11n (HT40) / Chain 1 : CH9



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,

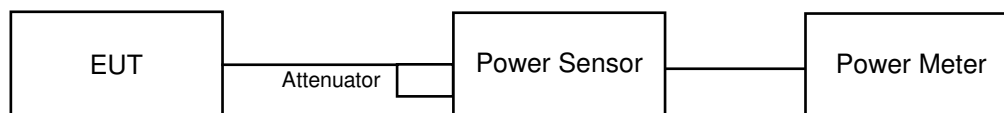
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

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)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	24.58	23.31	501.367	27.00	30	Pass
6	2437	28.27	24.85	976.921	29.90	30	Pass
11	2462	23.55	21.42	365.14	25.62	30	Pass

802.11g

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	22.07	20.61	276.145	24.41	30	Pass
6	2437	28.23	25.10	988.867	29.95	30	Pass
11	2462	20.86	19.27	206.427	23.15	30	Pass

802.11n (HT20)

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	22.24	22.28	336.538	25.27	30	Pass
6	2437	27.13	25.42	864.753	29.37	30	Pass
11	2462	23.06	24.33	473.321	26.75	30	Pass

802.11n (HT40)

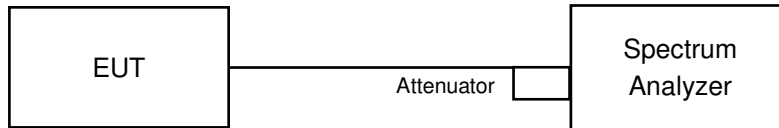
Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	19.88	18.04	160.955	22.07	30	Pass
6	2437	24.54	22.81	475.431	26.77	30	Pass
9	2452	20.84	19.24	205.285	23.12	30	Pass

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

For AVG. power (duty cycle \geq 98%)

- Set instrument center frequency to DTS channel center frequency.
- Set span to at least 1.5 times the OBW.
- Set RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- Set VBW $\geq 3 \times \text{RBW}$.
- Detector = power averaging (RMS) or sample detector (when RMS not available).
- Ensure that the number of measurement points in the sweep $\geq 2 \times \text{span}/\text{RBW}$.
- Sweep time = auto couple.
- Employ trace averaging (RMS) mode over a minimum of 100 traces.
- Use the peak marker function to determine the maximum amplitude level.

For AVG. power (duty cycle $<$ 98%)

- Measure the duty cycle (x).
- Set instrument center frequency to DTS channel center frequency.
- Set span to at least 1.5 times the OBW.
- Set RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- Set VBW $\geq 3 \times \text{RBW}$.
- Detector = power averaging (RMS) or sample detector (when RMS not available).
- Ensure that the number of measurement points in the sweep $\geq 2 \times \text{span}/\text{RBW}$.
- Sweep time = auto couple.
- Do not use sweep triggering. Allow sweep to "free run".
- Employ trace averaging (RMS) mode over a minimum of 100 traces.
- Use the peak marker function to determine the maximum amplitude level.
- 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	-6.52	3.01	-3.51	7.99	Pass
	6	2437	-1.77	3.01	1.24	7.99	Pass
	11	2462	-7.17	3.01	-4.16	7.99	Pass
1	1	2412	-6.55	3.01	-3.54	7.99	Pass
	6	2437	-5.79	3.01	-2.78	7.99	Pass
	11	2462	-9.02	3.01	-6.01	7.99	Pass

NOTE: Directional gain = $3\text{dBi} + 10\log(2) = 6.01\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $8-(6.01-6) = 7.99\text{dBm}$.

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	-10.21	3.01	0.23	-6.97	7.99	Pass
	6	2437	-3.71	3.01	0.23	-0.47	7.99	Pass
	11	2462	-10.84	3.01	0.23	-7.60	7.99	Pass
1	1	2412	-8.39	3.01	0.23	-5.15	7.99	Pass
	6	2437	-6.02	3.01	0.23	-2.78	7.99	Pass
	11	2462	-9.62	3.01	0.23	-6.38	7.99	Pass

NOTE: Directional gain = $3\text{dBi} + 10\log(2) = 6.01\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $8-(6.01-6) = 7.99\text{dBm}$.

802.11n (HT20)

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	-9.54	3.01	0.18	-6.35	7.99	Pass
	6	2437	-5.17	3.01	0.18	-1.98	7.99	Pass
	11	2462	-7.84	3.01	0.18	-4.65	7.99	Pass
1	1	2412	-8.05	3.01	0.18	-4.86	7.99	Pass
	6	2437	-6.30	3.01	0.18	-3.11	7.99	Pass
	11	2462	-5.15	3.01	0.18	-1.96	7.99	Pass

NOTE: Directional gain = $3\text{dBi} + 10\log(2) = 6.01\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $8-(6.01-6) = 7.99\text{dBm}$.

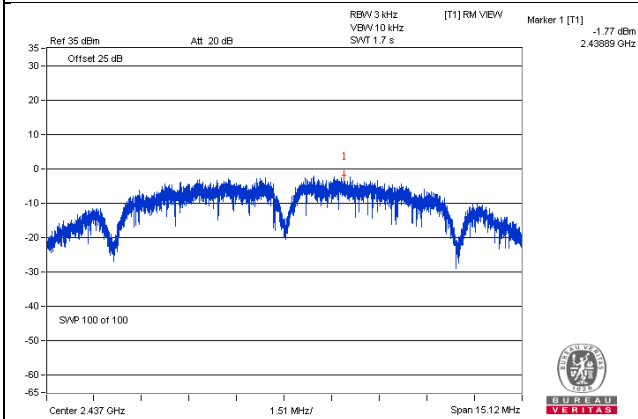
802.11n (HT40)

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	-16.07	3.01	0.34	-12.72	7.99	Pass
	6	2437	-9.77	3.01	0.34	-6.42	7.99	Pass
	9	2452	-12.89	3.01	0.34	-9.54	7.99	Pass
1	3	2422	-14.10	3.01	0.34	-10.75	7.99	Pass
	6	2437	-10.37	3.01	0.34	-7.02	7.99	Pass
	9	2452	-12.33	3.01	0.34	-8.98	7.99	Pass

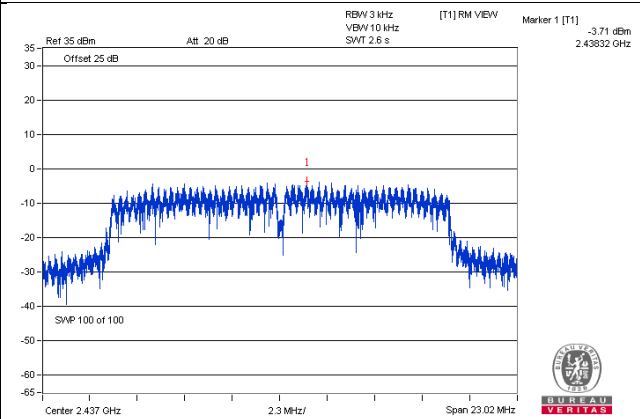
NOTE: Directional gain = $3\text{dBi} + 10\log(2) = 6.01\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $8-(6.01-6) = 7.99\text{dBm}$.

Spectrum Plot of Worst Value

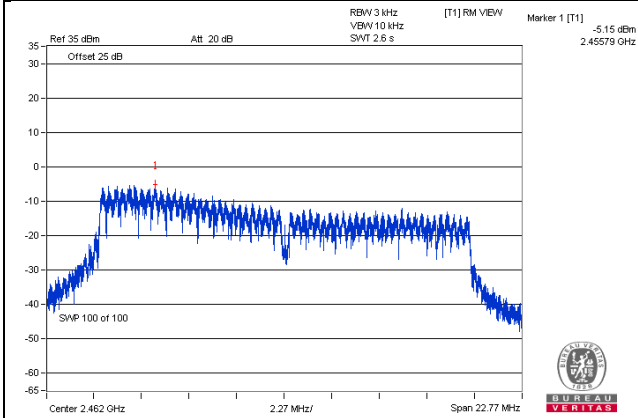
802.11b / Chain 0 : CH6



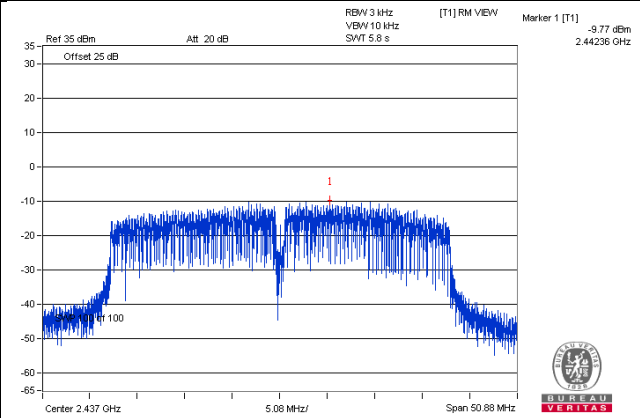
802.11g / Chain 0 : CH6



802.11n (HT20) / Chain 1 : CH11



802.11n (HT40) / Chain 0 : CH6

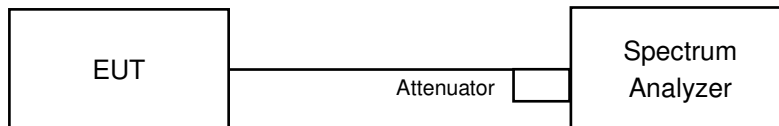


4.6 Conducted Out of Band Emission Measurement

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 \geq 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 \geq 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.

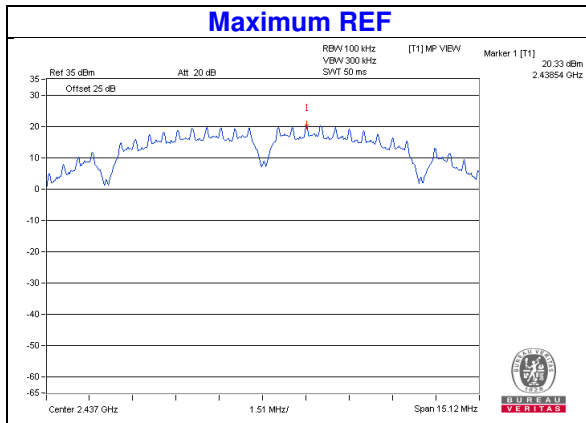
4.6.6 EUT Operating Condition

Same as Item 4.3.6

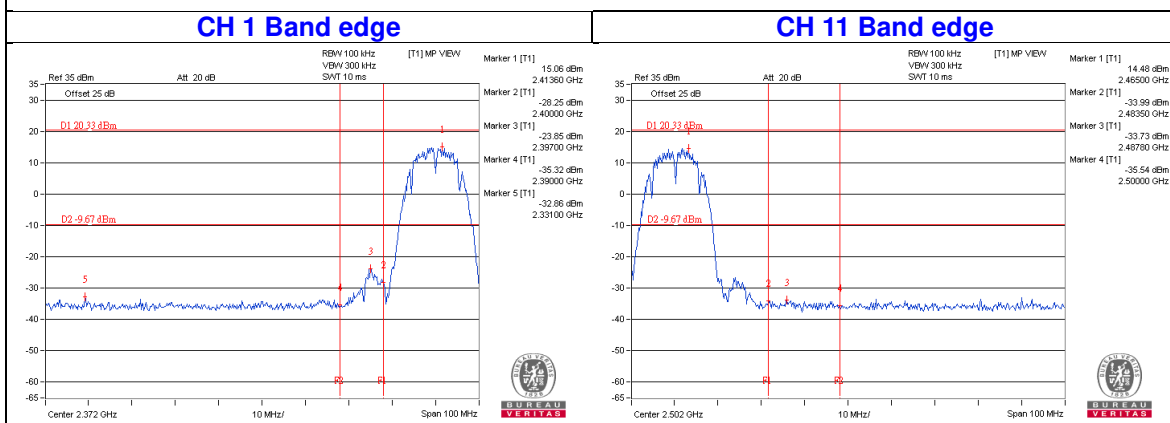
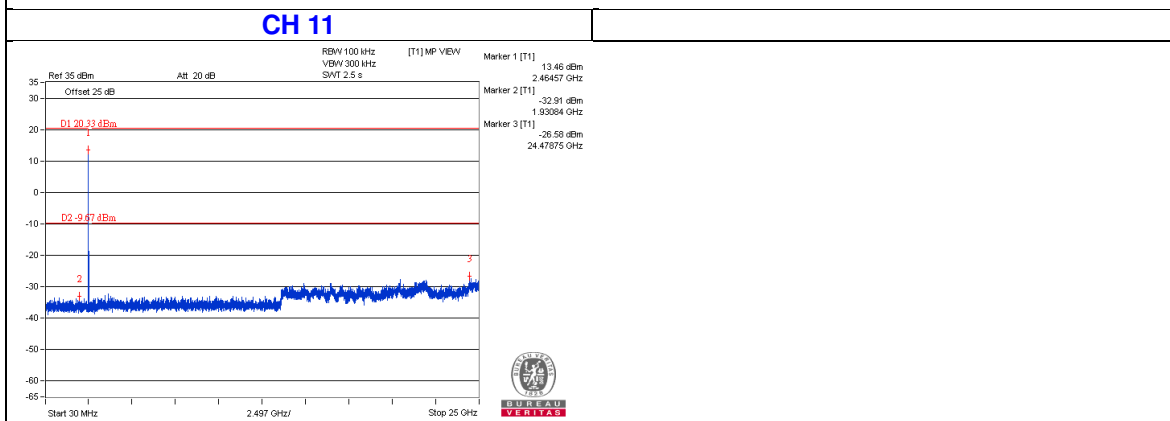
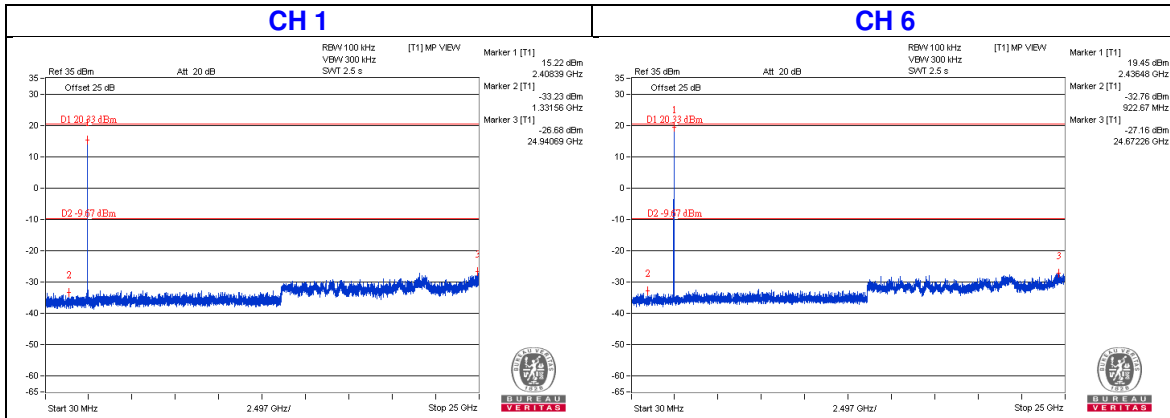
4.6.7 Test Results

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.

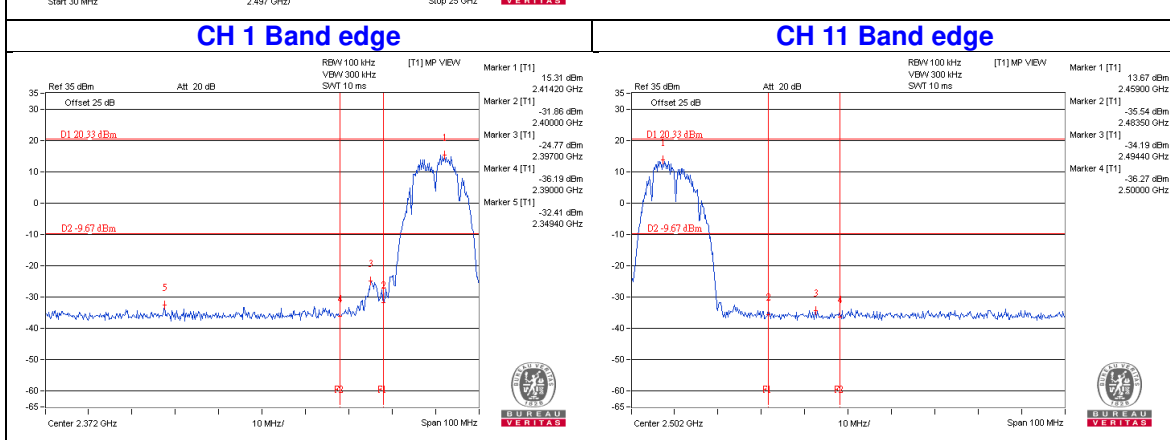
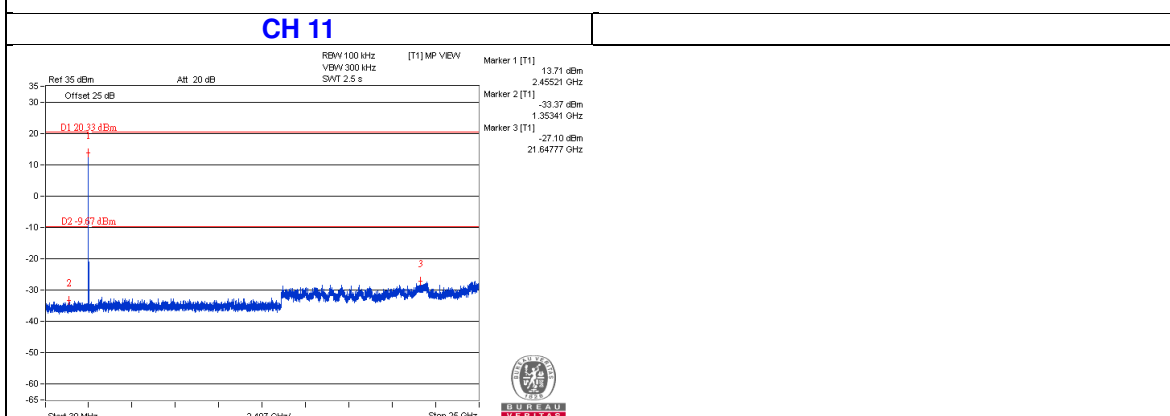
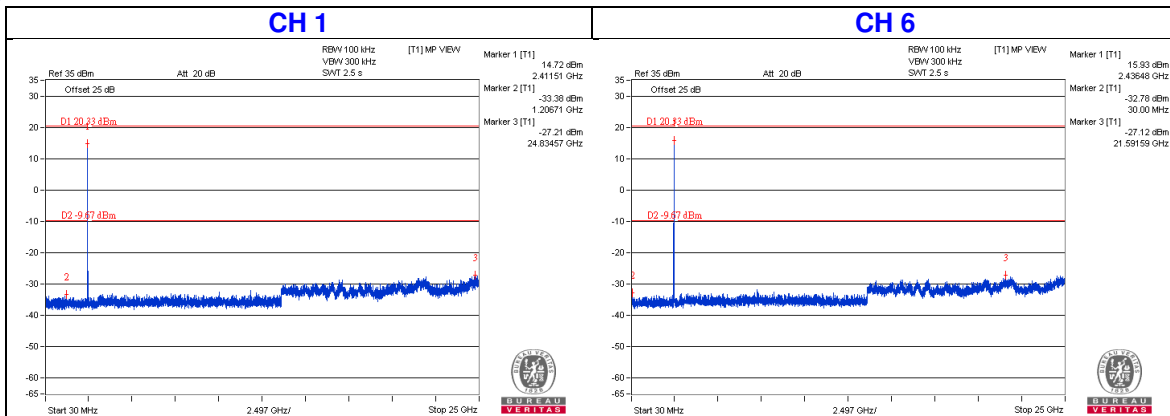
802.11b



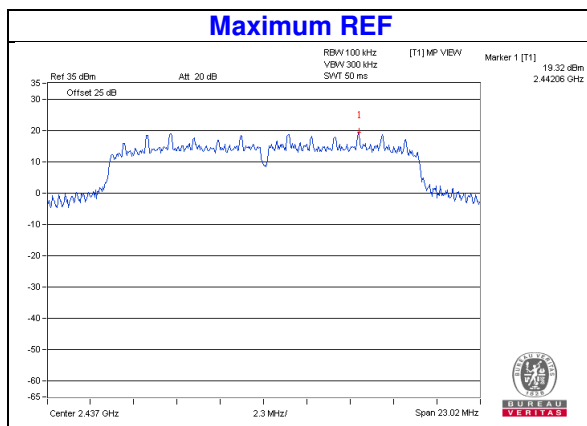
CHAIN 0



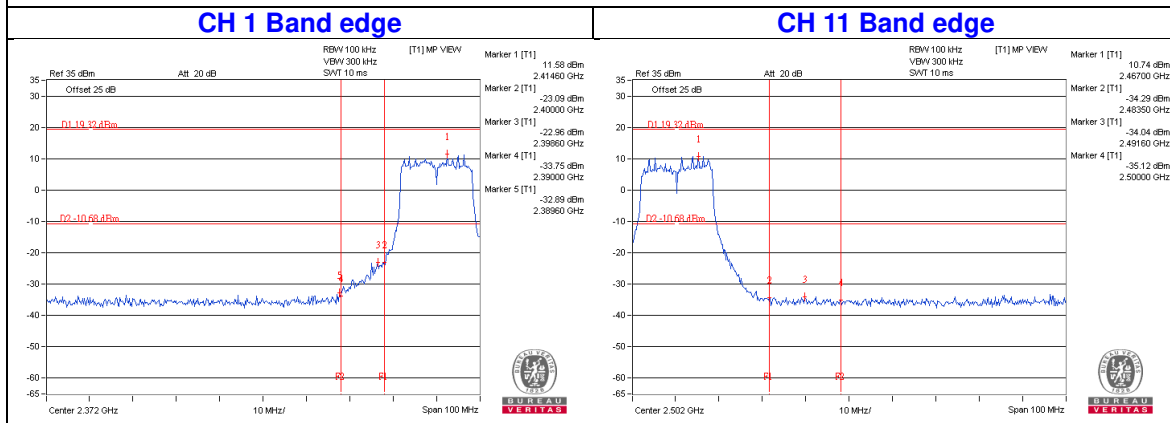
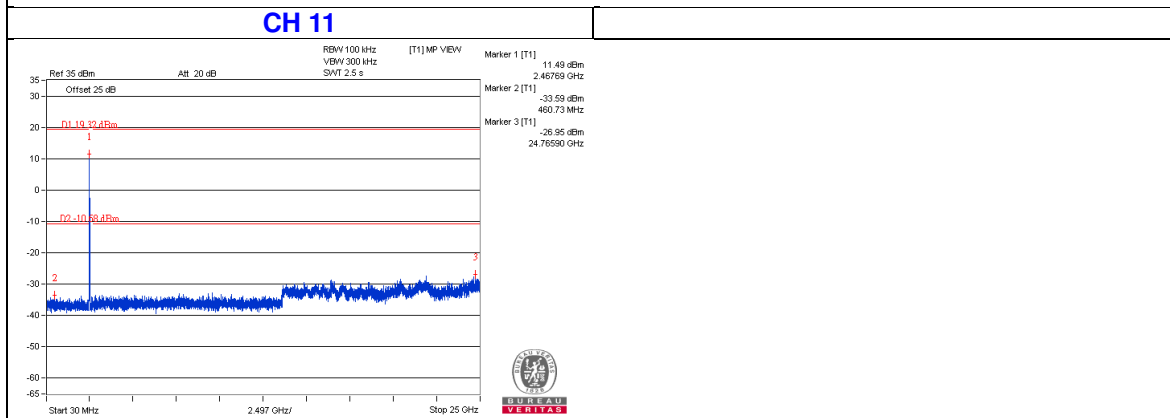
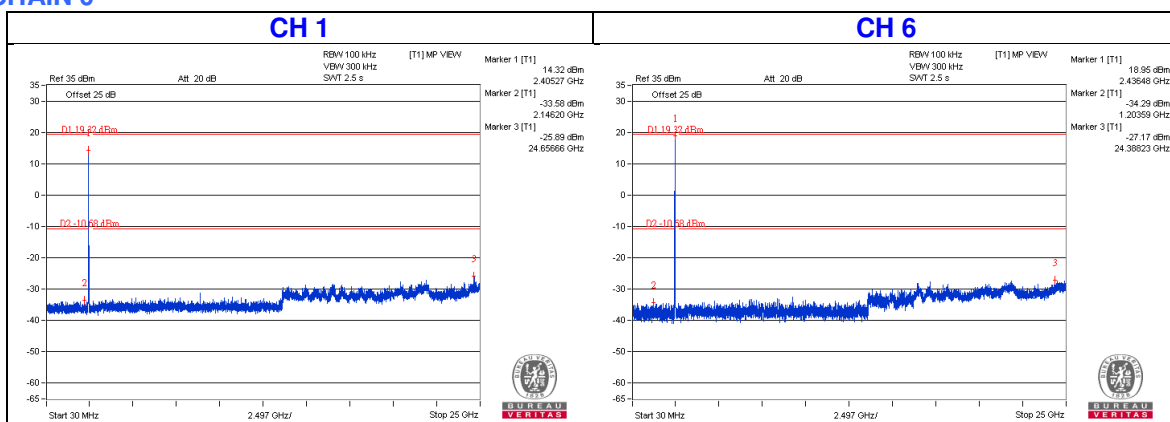
CHAIN 1



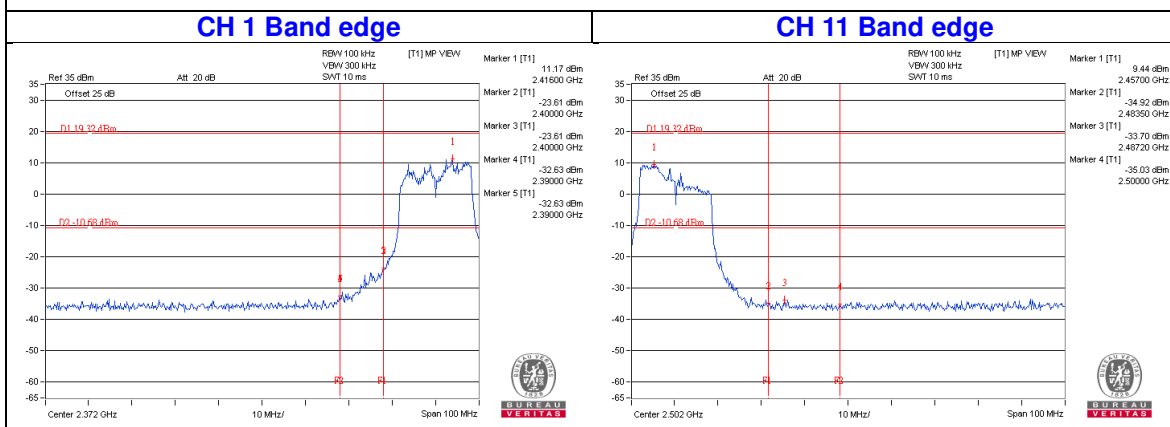
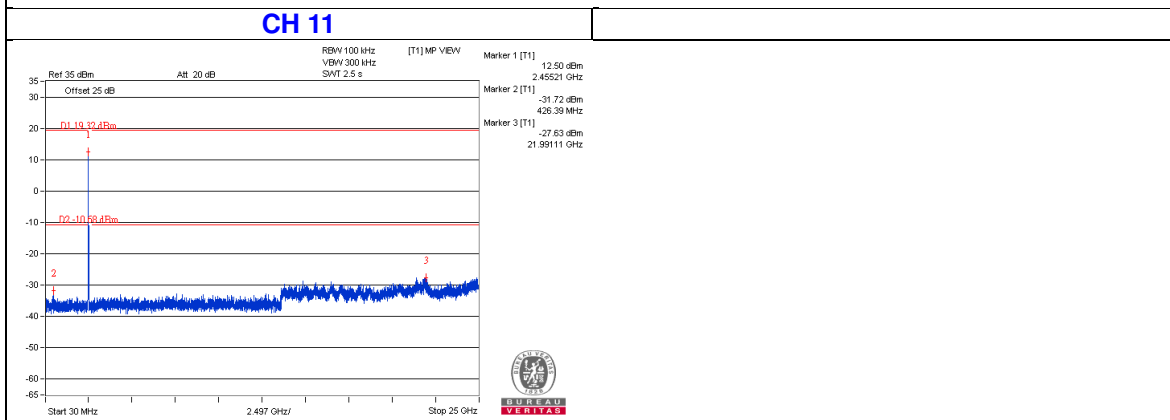
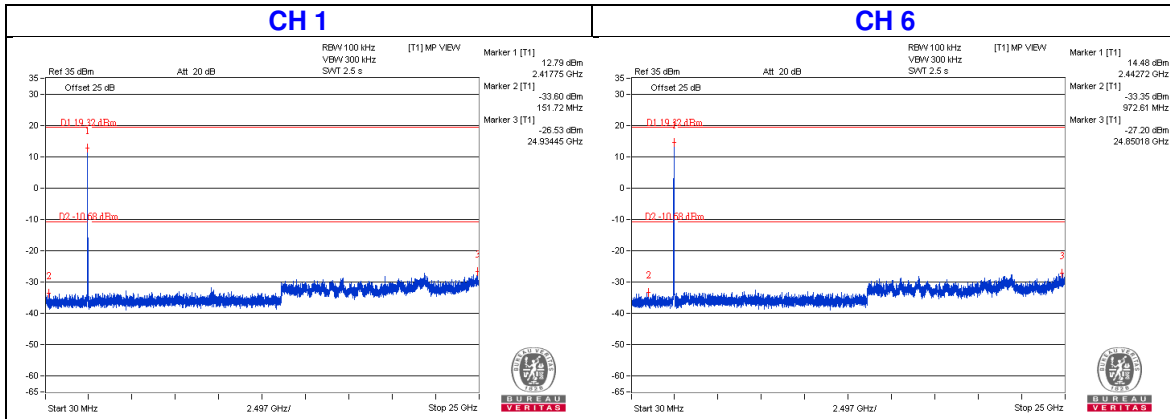
802.11g



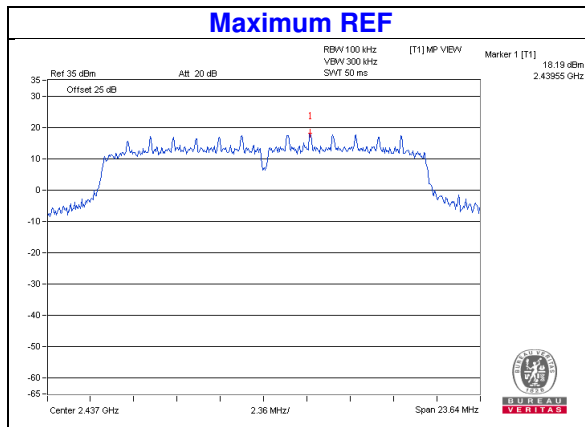
CHAIN 0



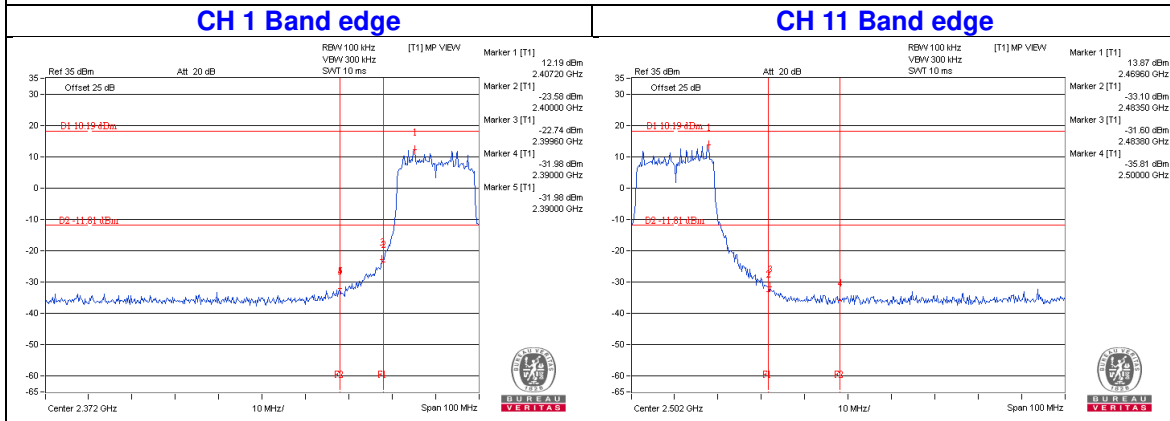
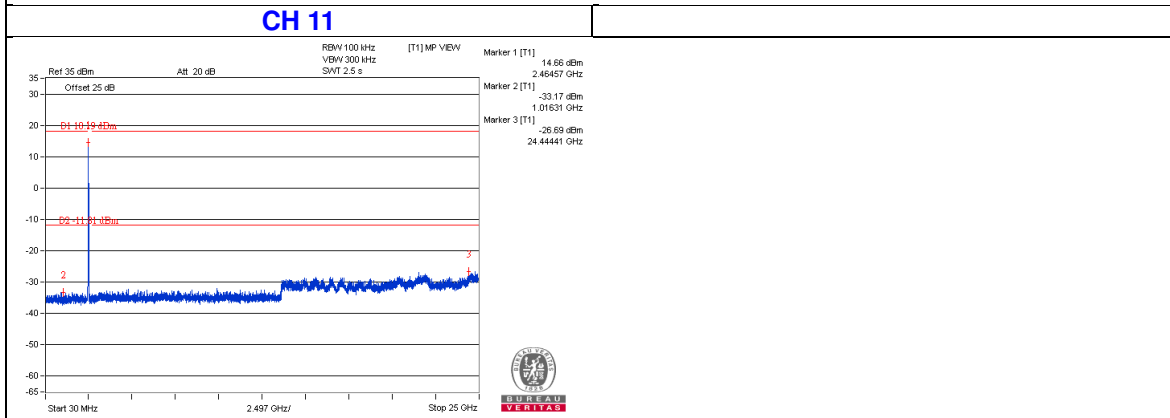
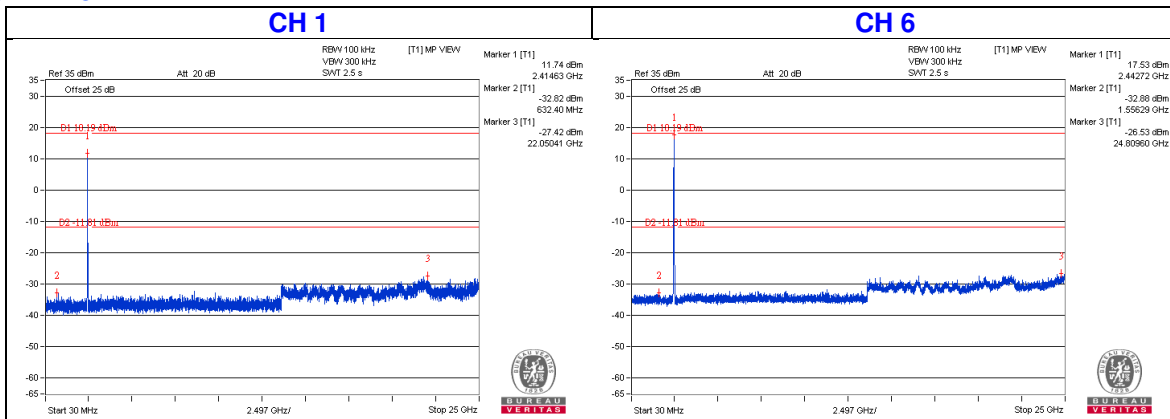
CHAIN 1



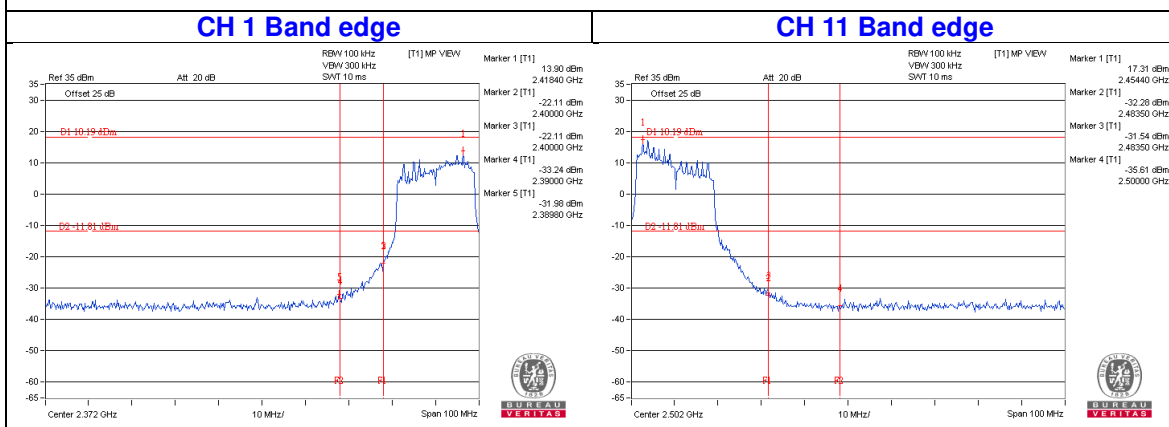
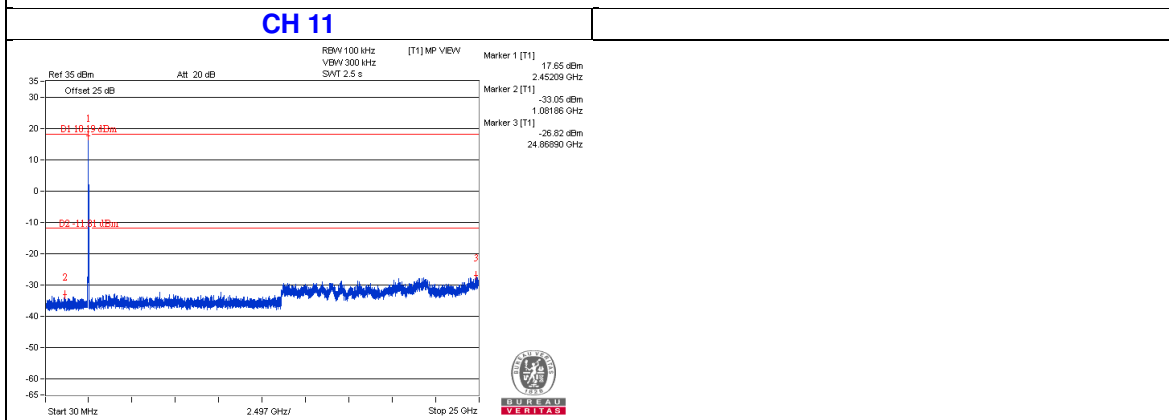
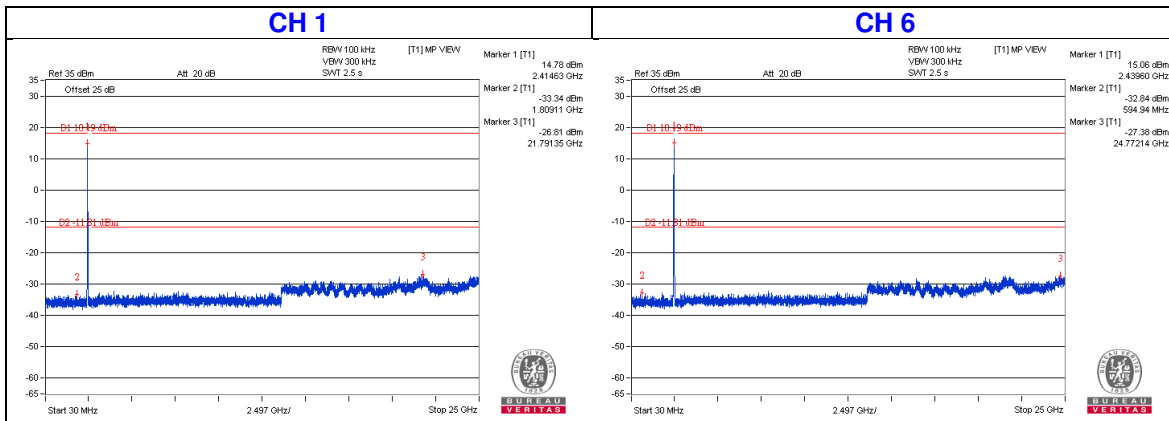
802.11n (HT20)



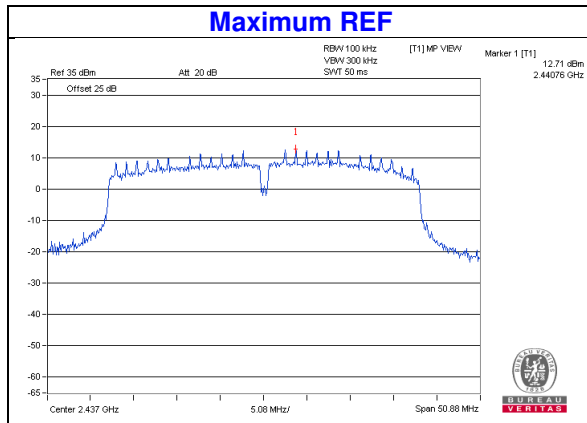
CHAIN 0



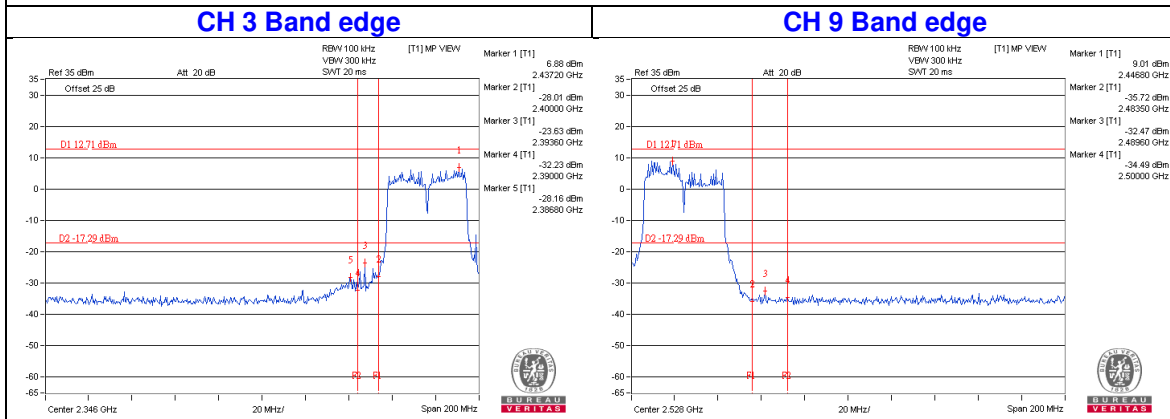
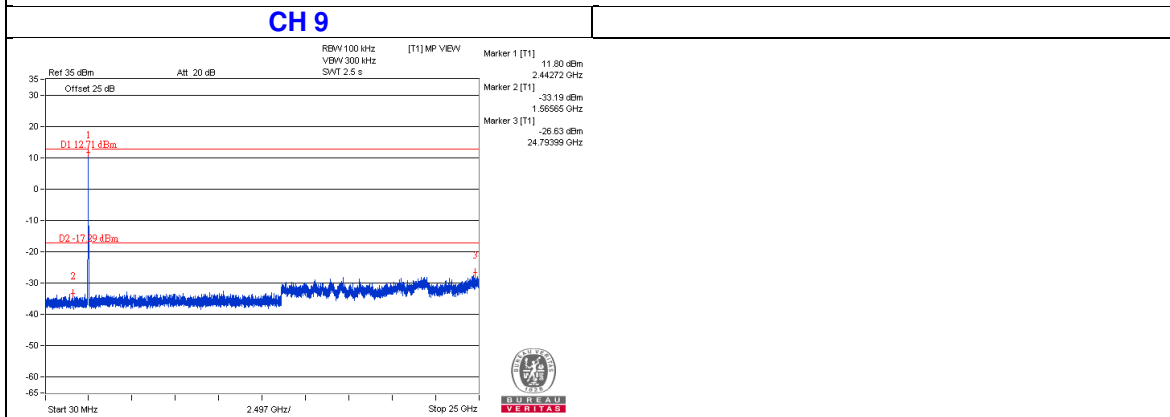
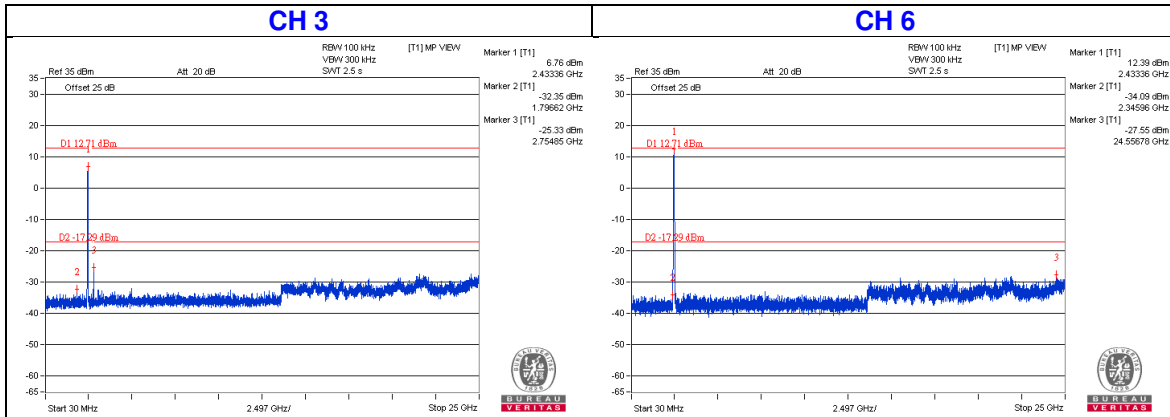
CHAIN 1



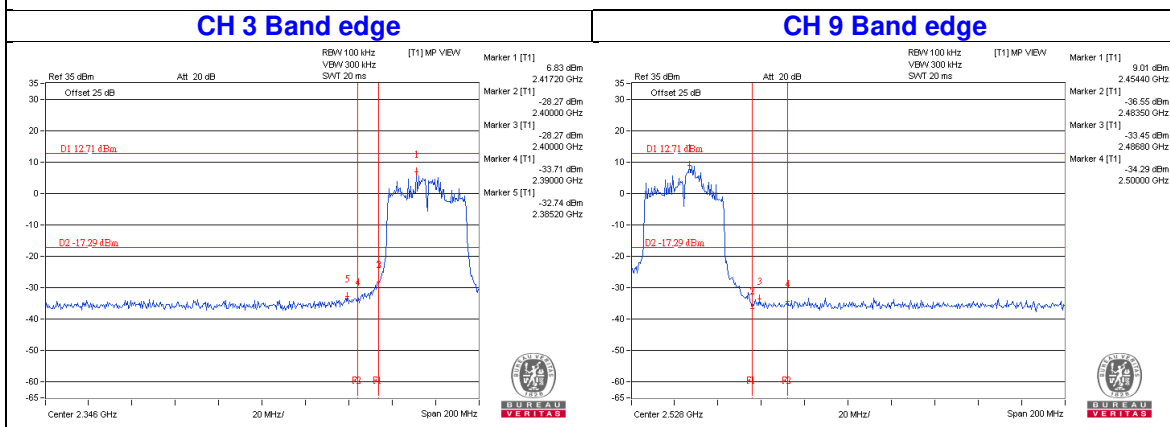
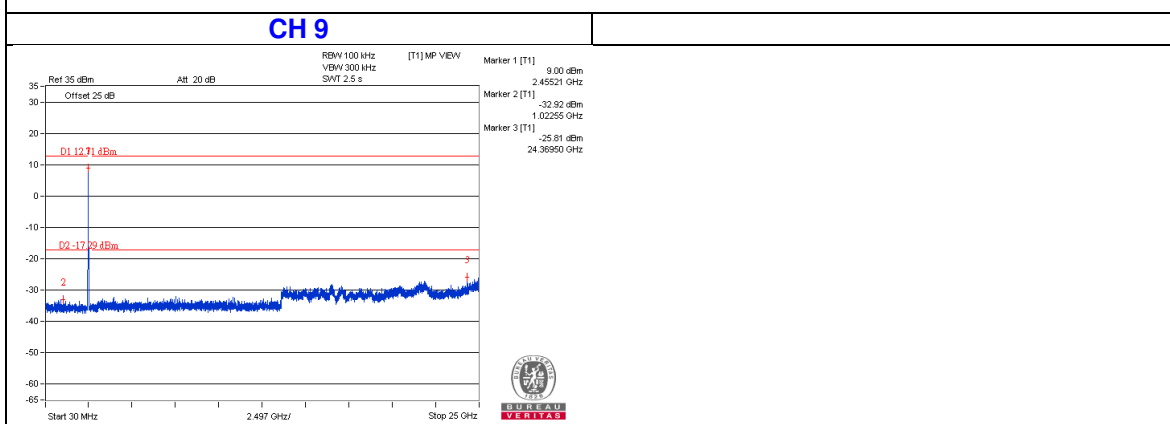
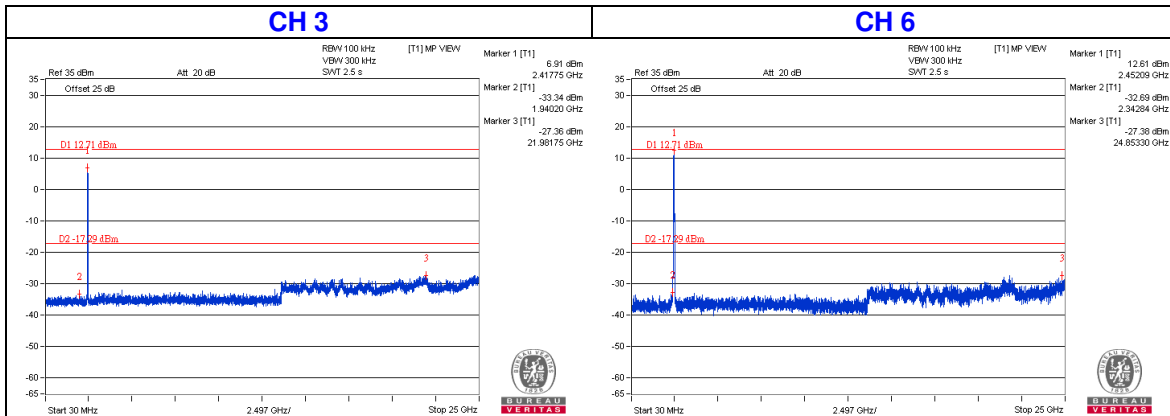
802.11n (HT40)



CHAIN 0



CHAIN 1



5 Pictures of Test Arrangements

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

Appendix – Information on the Testing Laboratories

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

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

Linko EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

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

--- END ---