

FCC TEST REPORT (15.247)

REPORT NO.: RF140128E04

MODEL NO.: FXE2000-DG

FCC ID: PQRFXE2000-DG

RECEIVED: Jan. 28, 2014

TESTED: Feb. 10 to 13, 2014

ISSUED: Apr. 01, 2014

APPLICANT: Contec Co., Ltd.

ADDRESS: 3-9-31, Himesato, Nishiyodogawa-ku Osaka
Japan 555-0025

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

LAB ADDRESS : No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen,
Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan,
R.O.C.

TEST LOCATION (1): No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen,
Chiung Lin Hsiang, Hsin Chu Hsien 307, 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 should not be used by the client to claim
product certification, approval, or endorsement by TAF
or any government agencies.



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



A D T

Table of Contents

RELEASE CONTROL RECORD	5
1. CERTIFICATION	6
2. SUMMARY OF TEST RESULTS	7
2.1 MEASUREMENT UNCERTAINTY	8
3. GENERAL INFORMATION	9
3.1 GENERAL DESCRIPTION OF EUT	9
3.2 DESCRIPTION OF TEST MODES	11
3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL	12
3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS	15
3.4 DUTY CYCLE OF TEST SIGNAL	16
3.5 DESCRIPTION OF SUPPORT UNITS.....	18
3.6 CONFIGURATION OF SYSTEM UNDER TEST	19
4. TEST TYPES AND RESULTS (FOR 2.4GHz, 2.400 ~ 2.4835GHz BAND)	20
4.1 CONDUCTED EMISSION MEASUREMENT	20
4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT	20
4.1.2 TEST INSTRUMENTS.....	20
4.1.3 TEST PROCEDURES	21
4.1.4 DEVIATION FROM TEST STANDARD	21
4.1.5 TEST SETUP	21
4.1.6 EUT OPERATING CONDITIONS	22
4.1.7 TEST RESULTS	23
4.2 RADIATED EMISSION AND BANDEDGE MEASUREMENT	25
4.2.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT	25
4.2.2 TEST INSTRUMENTS.....	26
4.2.3 TEST PROCEDURES	28
4.2.4 DEVIATION FROM TEST STANDARD	28
4.2.5 TEST SETUP	29
4.2.6 EUT OPERATING CONDITIONS	29
4.2.7 TEST RESULTS	30
4.3 6DB BANDWIDTH MEASUREMENT	43
4.3.1 LIMITS OF 6DB BANDWIDTH MEASUREMENT	43
4.3.2 TEST INSTRUMENTS.....	43
4.3.3 TEST PROCEDURE.....	43
4.3.4 DEVIATION FROM TEST STANDARD	43
4.3.5 TEST SETUP	43
4.3.6 EUT OPERATING CONDITIONS	43
4.3.7 TEST RESULTS	44
4.4 CONDUCTED OUTPUT POWER MEASUREMENT	46
4.4.1 LIMITS OF MAXIMUM OUTPUT POWER MEASUREMENT	46
4.4.2 INSTRUMENTS.....	46
4.4.3 TEST PROCEDURES	46
4.4.4 DEVIATION FROM TEST STANDARD	46
4.4.5 TEST SETUP	47
4.4.6 EUT OPERATING CONDITIONS	47
4.4.7 TEST RESULTS	48
4.5 AVERAGE OUTPUT POWER.....	49
4.5.1 FOR REFERENCE.....	49
4.5.2 TEST INSTRUMENTS.....	49
4.5.3 TEST PROCEDURES	49
4.5.4 TEST SETUP	49
4.5.5 EUT OPERATING CONDITIONS	49



A D T

4.5.6	TEST RESULTS	50
4.6	POWER SPECTRAL DENSITY MEASUREMENT	51
4.6.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT	51
4.6.2	TEST INSTRUMENTS.....	51
4.6.3	TEST PROCEDURE.....	51
4.6.4	DEVIATION FROM TEST STANDARD	51
4.6.5	TEST SETUP	51
4.6.6	EUT OPERATING CONDITION	51
4.6.7	TEST RESULTS	52
4.7	CONDUCTED OUT-BAND EMISSION MEASUREMENT	55
4.7.1	LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT	55
4.7.2	TEST INSTRUMENTS.....	55
4.7.3	TEST PROCEDURE.....	55
4.7.4	DEVIATION FROM TEST STANDARD	56
4.7.5	TEST SETUP	56
4.7.6	EUT OPERATING CONDITION	56
4.7.7	TEST RESULTS	56
5.	TEST TYPES AND RESULTS (FOR 5GHz, 5.725~5.850GHz BAND)	65
5.1	CONDUCTED EMISSION MEASUREMENT	65
5.1.1	LIMITS OF CONDUCTED EMISSION MEASUREMENT	65
5.1.2	TEST INSTRUMENTS.....	65
5.1.3	TEST PROCEDURES	66
5.1.4	DEVIATION FROM TEST STANDARD	66
5.1.5	TEST SETUP	66
5.1.6	EUT OPERATING CONDITIONS	67
5.1.7	TEST RESULTS	68
5.2	RADIATED AND BANDEDGE EMISSION MEASUREMENT	70
5.2.1	LIMITS OF RADIATED AND BANDEDGE EMISSION MEASUREMENT	70
5.2.2	TEST INSTRUMENTS.....	71
5.2.3	TEST PROCEDURES	73
5.2.4	DEVIATION FROM TEST STANDARD	73
5.2.5	TEST SETUP	74
5.2.6	EUT OPERATING CONDITIONS	74
5.2.7	TEST RESULTS	75
5.3	6DB BANDWIDTH MEASUREMENT	84
5.3.1	LIMITS OF 6DB BANDWIDTH MEASUREMENT	84
5.3.2	TEST INSTRUMENTS.....	84
5.3.3	TEST PROCEDURE.....	84
5.3.4	DEVIATION FROM TEST STANDARD	84
5.3.5	TEST SETUP	84
5.3.6	EUT OPERATING CONDITIONS	85
5.3.7	TEST RESULTS	86
5.4	CONDUCTED OUTPUT POWER MEASUREMENT	88
5.4.1	LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT	88
5.4.2	INSTRUMENTS.....	88
5.4.3	TEST PROCEDURES	88
5.4.4	DEVIATION FROM TEST STANDARD	88
5.4.5	TEST SETUP	89
5.4.6	EUT OPERATING CONDITIONS	89
5.4.7	TEST RESULTS	90
5.5	AVERAGE OUTPUT POWER.....	91
5.5.1	FOR REFERENCE.....	91
5.5.2	TEST INSTRUMENTS.....	91



A D T

5.5.3	TEST PROCEDURES	91
5.5.4	TEST SETUP	91
5.5.5	EUT OPERATING CONDITIONS	91
5.5.6	TEST RESULTS	92
5.6	POWER SPECTRAL DENSITY MEASUREMENT	93
5.6.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT	93
5.6.2	TEST INSTRUMENTS	93
5.6.3	TEST PROCEDURE	93
5.6.4	DEVIATION FROM TEST STANDARD	93
5.6.5	TEST SETUP	93
5.6.6	EUT OPERATING CONDITION	93
5.6.7	TEST RESULTS	94
5.7	CONDUCTED OUT-BAND EMISSION MEASUREMENT	96
5.7.1	LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT	96
5.7.2	TEST INSTRUMENTS	96
5.7.3	TEST PROCEDURE	96
5.7.4	DEVIATION FROM TEST STANDARD	97
5.7.5	TEST SETUP	97
5.7.6	EUT OPERATING CONDITION	97
5.7.7	TEST RESULTS	97
6.	PHOTOGRAPHS OF THE TEST CONFIGURATION	104
7.	INFORMATION ON THE TESTING LABORATORIES	105
8.	APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB	106



RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF140128E04	Original release	Apr. 01, 2014



A D T

1. CERTIFICATION

PRODUCT: Wireless LAN Adapter
BRAND NAME: CONTEC
MODEL NO.: FXE2000-DG
TEST SAMPLE: ENGINEERING SAMPLE
APPLICANT: Contec Co., Ltd.
TESTED: Feb. 10 to 13, 2014
STANDARDS: FCC Part 15, Subpart C (Section 15.247)
ANSI C63.10-2009

The above equipment (Model: FXE2000-DG) 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 : Phoenix Huang , **DATE:** Apr. 01, 2014
(Phoenix Huang, Specialist)

APPROVED BY : May Chen , **DATE:** Apr. 01, 2014
(May Chen, Manager)

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

For 2.4GHz, 2400~2483.5MHz Band

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -5.91dB at 0.52109MHz
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -0.1dB at 2483.50MHz
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted Output 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 U.FL not a standard connector.

For 5GHz, 5725~5850MHz Band

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -7.63dB at 0.50000MHz
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.1dB at 875.02MHz.
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted Output 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 U.FL not a standard connector.

NOTE:

The EUT was operating in 2.400 ~ 2.4835GHz, 5.15~5.35GHz, 5.47~5.6GHz & 5.65~5.725GHz and 5.725~5.850GHz frequencies band. This report was recorded the RF parameters including 2.400 ~ 2.4835GHz and 5.725~5.850GHz. For the 5.15~5.35GHz, 5.47~5.6GHz & 5.65~5.725GHz RF parameters was recorded in another test report.

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:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

Measurement	Value
Conducted emissions	2.98 dB
Radiated emissions (30MHz-1GHz)	5.37 dB
Radiated emissions (1GHz -6GHz)	3.72 dB
Radiated emissions (6GHz -18GHz)	4.00 dB
Radiated emissions (18GHz -40GHz)	4.11 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Wireless LAN Adapter
MODEL NO.	FXE2000-DG
POWER SUPPLY	DC 5V from power adapter
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS,OFDM
TRANSFER RATE	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 300Mbps
OPERATING FREQUENCY	For 15.407 5GHz: 5.18 ~ 5.24GHz 5.50 ~ 5.58GHz & 5.66GHz ~ 5.70GHz
	For 15.247 2.4GHz: 2.412 ~ 2.462GHz 5GHz: 5.745 ~ 5.825GHz
NUMBER OF CHANNEL	For 15.407 16 for 802.11a, 802.11n (HT20) 7 for 802.11n (HT40)
	For 15.247 (2.4GHz) 11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
	For 15.247 (5GHz) 5 for 802.11a, 802.11n (HT20) 2 for 802.11n (HT40)
MAXIMUM OUTPUT POWER	For 15.407 802.11a: 55.700mW 802.11n (HT20): 53.423mW 802.11n (HT40): 54.645mW For 15.247(2.4GHz) 802.11b: 120.318mW 802.11g: 835.103mW 802.11n (HT20): 559.429mW 802.11n (HT40): 532.945mW For 15.247(5GHz) 802.11a: 399.714mW 802.11n (HT20): 413.316mW 802.11n (HT40): 402.163mW

ANTENNA TYPE	Please see NOTE
DATA CABLE	NA
I/O PORTS	Refer to user's manual
ASSOCIATED DEVICES	Adapter x1

NOTE:

- 2.4GHz and 5GHz technology cannot transmit at same time.
- The EUT must be supplied with a power adapter as following table:

Brand	Model No.	Spec.
Sino-American	SA115B-05U	Input: 100-240V, 0.4A, 50-60Hz AC input cable: 1.8m, unshielded Output: 5V, 2.0A, 10W DC output cable: 1.9m, unshielded

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

Transmitter Circuit	Brand	Model	Gain (dBi) (Exclude cable loss)	Cable Loss (dB)	Net Gain (dBi) (Include cable loss)	Antenna Type	Connector Type	Frequency range (GHz to GHz)	Cable Length (cm)
Chain (0)	FDK	A3001	2	1	1	Chip	U.FL	2.4~2.4835	6
			1	2	-1			5.15~5.85	
Chain (1)	FDK	A3001	2	1.5	0.5	Chip	U.FL	2.4~2.4835	16
			1	2.5	-1.5			5.15~5.85	

- The EUT incorporates a MIMO function without beam forming.

MODULATION MODE	Data Rate (MCS)	Tx/Rx FUNCTION
802.11a	6 ~ 54Mbps	2TX / 2RX
802.11b	1 ~ 11Mbps	2TX / 2RX
802.11g	6 ~ 54Mbps	2TX / 2RX
802.11n (HT20)	MCS 0~7	1TX / 1RX
	MCS 8~15	2TX / 2RX
802.11n (HT40)	MCS 0~7	1TX / 1RX
	MCS 8~15	2TX / 2RX

- When the EUT operating in 802.11n, the software operation, which is defined by manufacturer, MCS (Modulation and Coding Schemes) from 0 to 15.
- The above EUT information was declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

Operated in 2400 ~ 2483.5MHz band:

11 channels are provided for 802.11b, 802.11g, 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		

Operated in 5725 ~ 5850MHz band:

5 channels are provided for 802.11a, 802.11n (HT20):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
149	5745 MHz	161	5805 MHz
153	5765 MHz	165	5825 MHz
157	5785 MHz		

2 channels are provided for 802.11n (HT40):

CHANNEL	FREQUENCY
151	5755 MHz
159	5795 MHz

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO					DESCRIPTION
	PLC	RE < 1G	RE ³ 1G	APCM	OB	
-	√	√	√	√	√	-

Where **PLC**: Power Line Conducted Emission **RE < 1G**: Radiated Emission below 1GHz
RE ³ 1G: Radiated Emission above 1GHz **APCM**: Antenna Port Conducted Measurement
OB: Conducted Out-Band Emission Measurement

Note: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-plane** (for below 1GHz), **X-plane** (for above 1GHz of 2.4GHz) and **Z-plane** (for above 1GHz of 5GHz).

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	11	OFDM	BPSK	6
802.11a	149 to 165	165	OFDM	BPSK	6

RADIATED EMISSION TEST (BELOW 1 GHz):

- ☒ 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	11	OFDM	BPSK	6
802.11a	149 to 165	165	OFDM	BPSK	6

RADIATED EMISSION TEST (ABOVE 1 GHz):

- ☒ 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
For 2.4 GHz 802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	13
For 2.4 GHz 802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	27
802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6
For 5 GHz 802.11n (HT20)	149 to 165	149, 157, 165	OFDM	BPSK	13
For 5 GHz 802.11n (HT40)	151 to 159	151, 159	OFDM	BPSK	27

ANTENNA PORT CONDUCTED MEASUREMENT:

- ☒ 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
For 2.4 GHz 802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	13
For 2.4 GHz 802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	27
802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6
For 5 GHz 802.11n (HT20)	149 to 165	149, 157, 165	OFDM	BPSK	13
For 5 GHz 802.11n (HT40)	151 to 159	151, 159	OFDM	BPSK	27



A D T

CONDUCTED OUT-BAND EMISSION MEASUREMENT:

- ☒ 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
For 2.4 GHz 802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	13
For 2.4 GHz 802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	27
802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6
For 5 GHz 802.11n (HT20)	149 to 165	149, 157, 165	OFDM	BPSK	13
For 5 GHz 802.11n (HT40)	151 to 159	151, 159	OFDM	BPSK	27

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
PLC	21deg. C, 68%RH	120Vac, 60Hz	Jason Huang
RE<1G	24deg. C, 68%RH	120Vac, 60Hz	Tim Ho
RE ³ 1G	24deg. C, 67%RH	120Vac, 60Hz	Robert Cheng
APCM	25deg. C, 60%RH	120Vac, 60Hz	Chilin Lee
OB	25deg. C, 60%RH	120Vac, 60Hz	Chilin Lee

3.3 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)

558074 D01 DTS Meas Guidance v03r01

662911 D01 Multiple Transmitter Output v02

ANSI C63.10-2009

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

3.4 DUTY CYCLE OF TEST SIGNAL

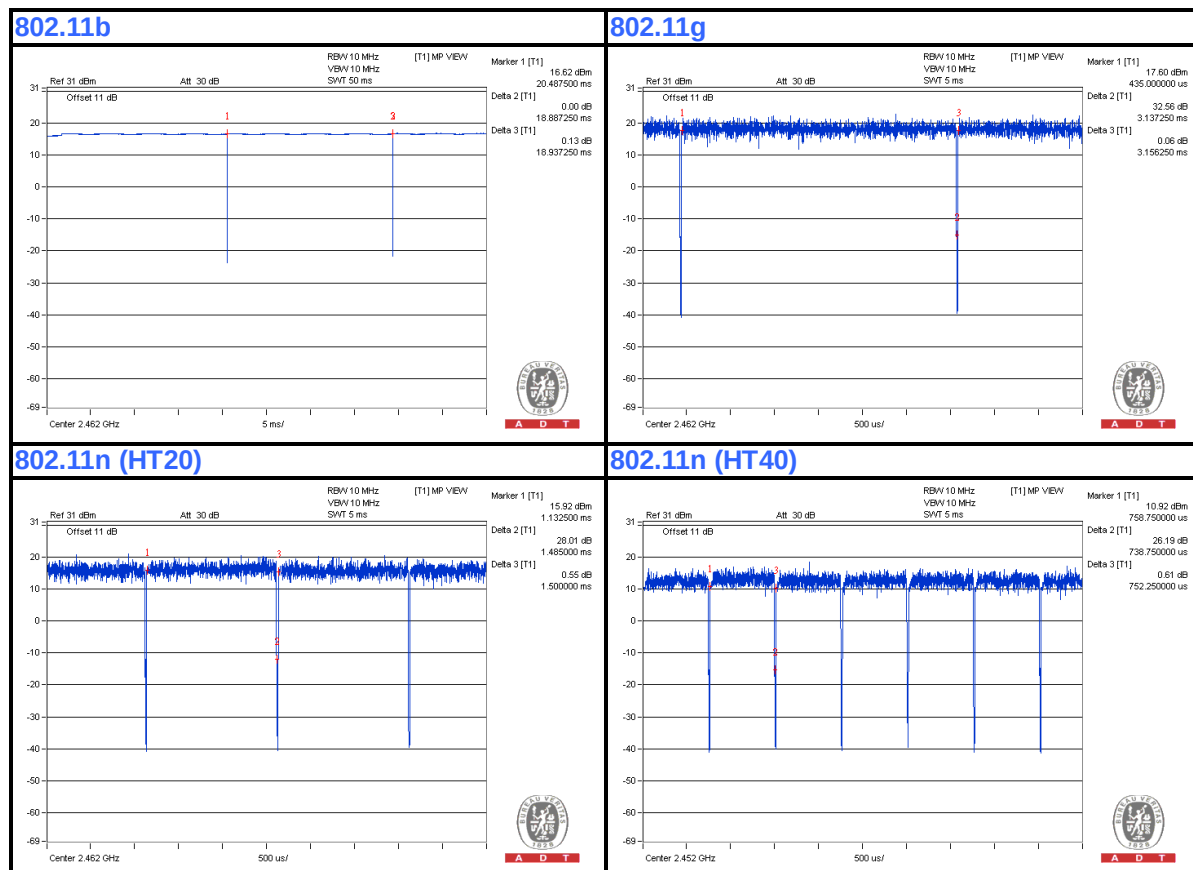
Duty cycle of test signal is $\geq 98\%$, duty factor is not required.

802.11b: Duty cycle = $18.887 \text{ ms} / 18.937 \text{ ms} = 0.997$

802.11g: Duty cycle = $3.137 \text{ ms} / 3.156 \text{ ms} = 0.994$

802.11n (HT20): Duty cycle = $1.485 \text{ ms} / 1.5 \text{ ms} = 0.99$

802.11n (HT40): Duty cycle = $0.739 \text{ ms} / 0.752 \text{ ms} = 0.983$





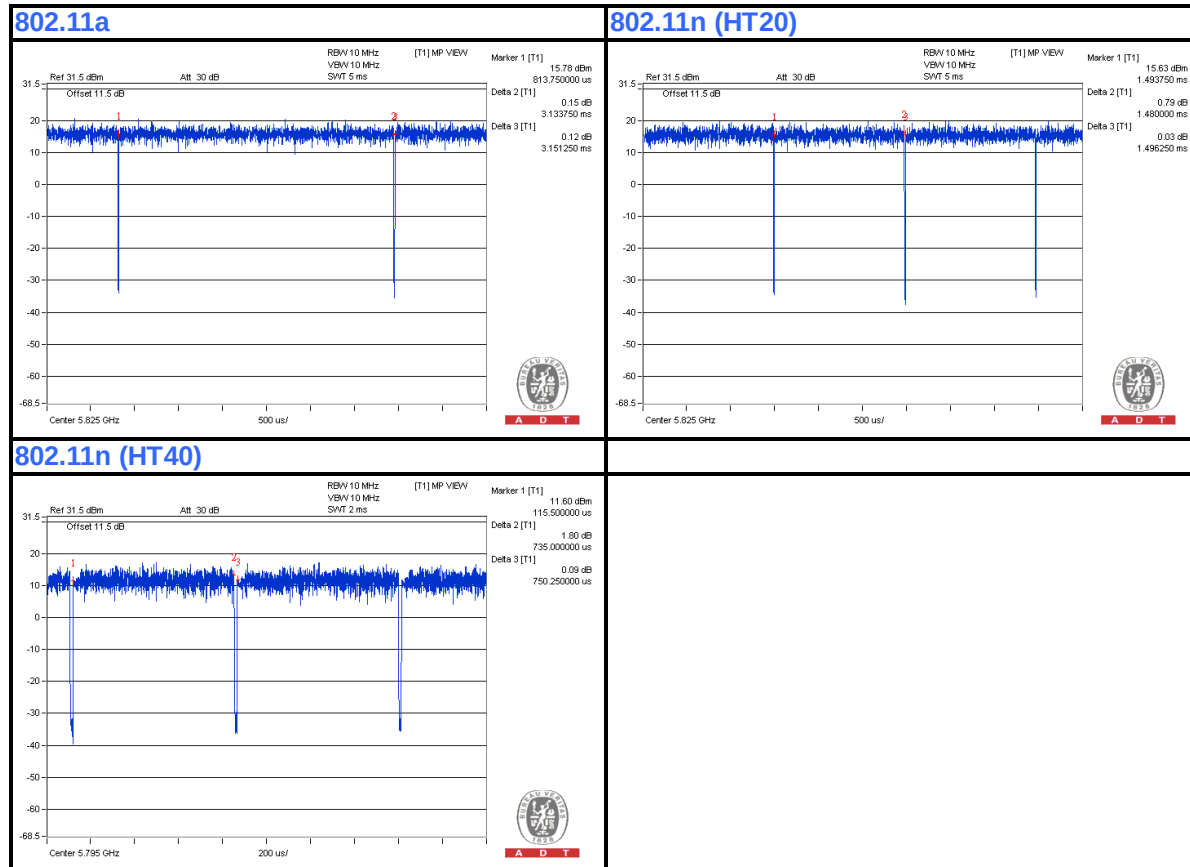
A D T

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

802.11a: Duty cycle = $3.134 \text{ ms} / 3.151 \text{ ms} = 0.995$

802.11n (HT20): Duty cycle = $1.48 \text{ ms} / 1.496 \text{ ms} = 0.989$

802.11n (HT40): Duty cycle = $0.735 \text{ ms} / 0.75 \text{ ms} = 0.98$





A D T

3.5 DESCRIPTION OF SUPPORT UNITS

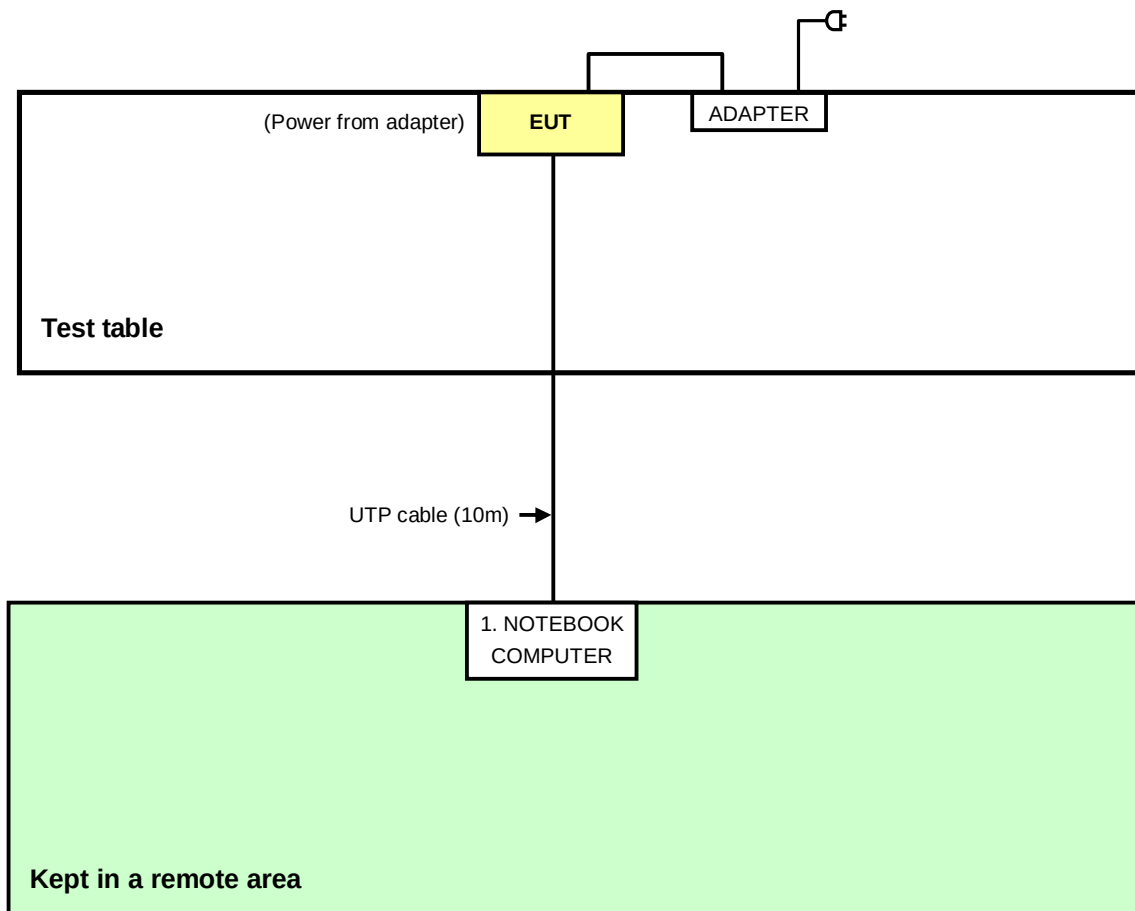
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP32LA	FSLB32S	FCC DoC

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	UTP Cable, 10m

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

3.6 CONFIGURATION OF SYSTEM UNDER TEST



4. TEST TYPES AND RESULTS (FOR 2.4GHz, 2.400 ~ 2.4835GHz Band)

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	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 0.50 MHz.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS 30	100375	Mar. 08, 2013	Mar. 07, 2014
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK8127	8127-522	Sep. 05, 2013	Sep. 04, 2014
Line-Impedance Stabilization Network (for Peripheral)	ENV216	100072	June 06, 2013	June 05, 2014
RF Cable (JYEBAO)	5DFB	COCCAB-001	Mar. 11, 2013	Mar. 10, 2014
50 ohms Terminator	50	EMC-03	Sep. 24, 2013	Sep. 23, 2014
Software ADT	BV ADT_Cond_V7.3.7. 3	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
3. The VCCI Con C Registration No. is C-3611.
4. Tested Date: Feb. 10, 2014

4.1.3 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) were not recorded.

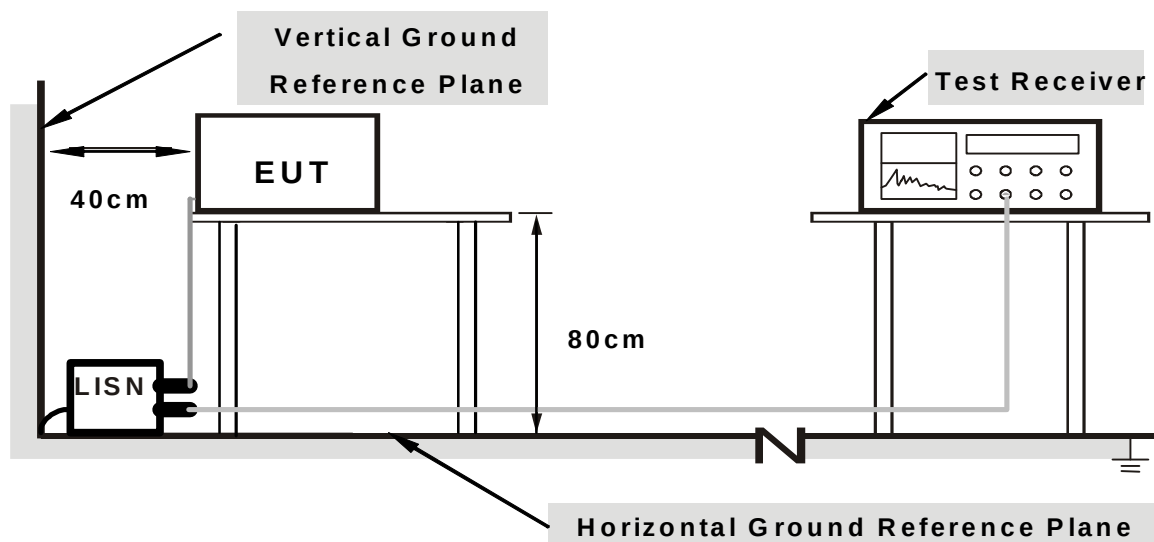
NOTE:

- The resolution bandwidth of test receiver is 9kHz for Quasi-peak detection (QP) & Average detection (AV).

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



Note: 1.Support units were connected to second LISN.

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.1.6 EUT OPERATING CONDITIONS

1. Place the EUT on testing table.
2. Prepare computer system (support unit 1) to act as communication partner.
3. The communication partner runs test program “art.bat[rev 0.7]” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

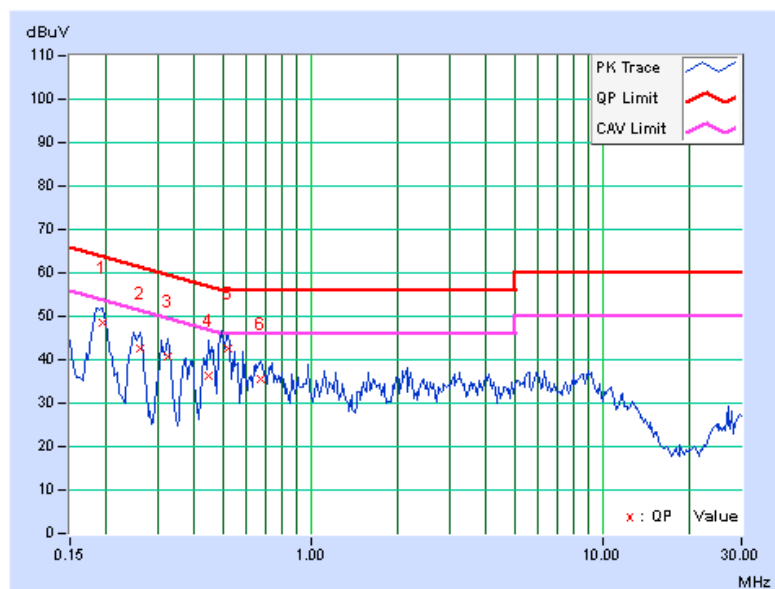
4.1.7 TEST RESULTS

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	0.19297	0.10	48.50	42.15	48.60	42.25	63.91	53.91	-15.31	-11.66
2	0.25938	0.11	42.63	36.36	42.74	36.47	61.45	51.45	-18.71	-14.98
3	0.32578	0.13	40.75	36.71	40.88	36.84	59.56	49.56	-18.68	-12.72
4	0.44688	0.14	36.02	33.17	36.16	33.31	56.93	46.93	-20.77	-13.62
5	0.52109	0.15	42.60	39.94	42.75	40.09	56.00	46.00	-13.25	-5.91
6	0.67734	0.15	35.58	32.81	35.73	32.96	56.00	46.00	-20.27	-13.04

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

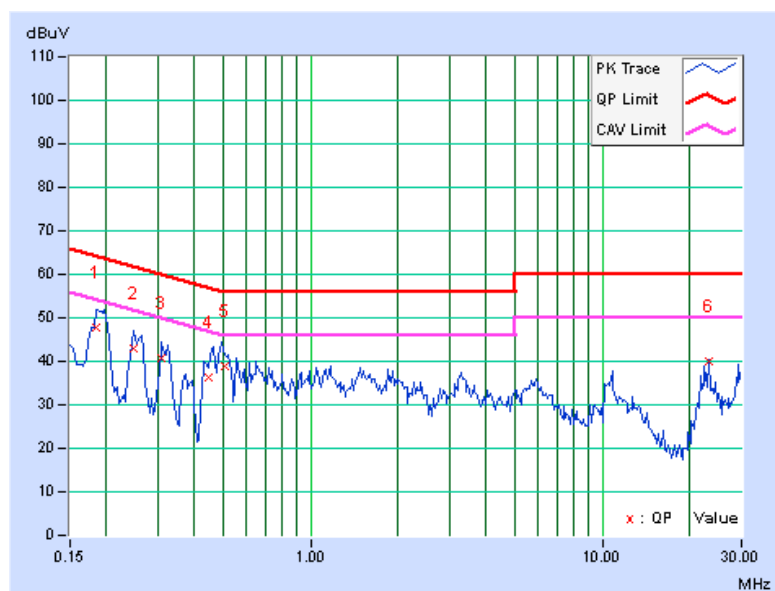


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18516	0.10	47.85	37.72	47.95	37.82	64.25	54.25	-16.30	-16.43
2	0.24766	0.11	42.97	35.04	43.08	35.15	61.84	51.84	-18.76	-16.69
3	0.31016	0.12	40.68	34.74	40.80	34.86	59.97	49.97	-19.16	-15.10
4	0.45000	0.14	36.24	33.66	36.38	33.80	56.88	46.88	-20.49	-13.07
5	0.51050	0.15	38.70	38.64	38.85	38.79	56.00	46.00	-17.15	-7.21
6	23.12891	0.79	39.13	36.39	39.92	37.18	60.00	50.00	-20.08	-12.82

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 RADIATED EMISSION AND BANDEDGE MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

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

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

NOTE:

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

4.2.2 TEST INSTRUMENTS

For below 1GHz test

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY51210105	Jan. 21,2014	Jan. 20,2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 13, 2013	Nov. 12, 2014
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Mar. 19, 2013	Mar. 18, 2014
RF Cable	NA	CHGCAB_001	Oct. 05, 2013	Oct. 04, 2014
Spectrum Analyzer R&S	FSV40	100964	July 15, 2013	July 14, 2014
Horn_Antenna AISI	AIH.8018	0000320091110	Nov. 18, 2013	Nov. 17, 2014
Pre-Amplifier Agilent	8449B	3008A02578	June 25, 2013	June 24, 2014
RF Cable	NA	RF104-201 RF104-203 RF104-204	Dec. 12, 2013	Dec. 11, 2014
Spectrum Analyzer Agilent	E4446A	MY48250253	Aug. 28, 2013	Aug. 27, 2014
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 13, 2013	Nov. 12, 2014
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 08, 2013	Oct. 07, 2014
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
- 3 The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
- 5 The VCCI Site Registration No. is G-137.
- 6 The CANADA Site Registration No. is IC 7450H-2.
- 7 Tested Date: Feb. 13, 2014



A D T

For above 1GHz test

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY50010156	Jan. 15, 2014	Jan. 14, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-04	Nov. 13, 2013	Nov. 12, 2014
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Mar. 25, 2013	Mar. 24, 2014
RF Cable	NA	CHHCAB_001	Oct. 06, 2013	Oct. 05, 2014
Spectrum Analyzer R&S	FSV40	100964	July 15, 2013	July 14, 2014
Horn_Antenna AISI	AIH.8018	0000220091110	Dec. 06, 2013	Dec. 05, 2014
Pre-Amplifier Agilent	8449B	3008A01923	Oct. 29, 2013	Oct. 28, 2014
RF Cable	NA	RF104-205 RF104-207 RF104-202	Dec. 12, 2013	Dec. 11, 2014
Spectrum Analyzer Agilent	E4446A	MY48250253	Aug. 28, 2013	Aug. 27, 2014
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 13, 2013	Nov. 12, 2014
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 08, 2013	Oct. 07, 2014
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
- 3 The test was performed in 966 Chamber No. H.
4. The FCC Site Registration No. is 797305.
- 5 The CANADA Site Registration No. is IC 7450H-3.
- 6 Tested Date: Feb. 13, 2014

4.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters 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:

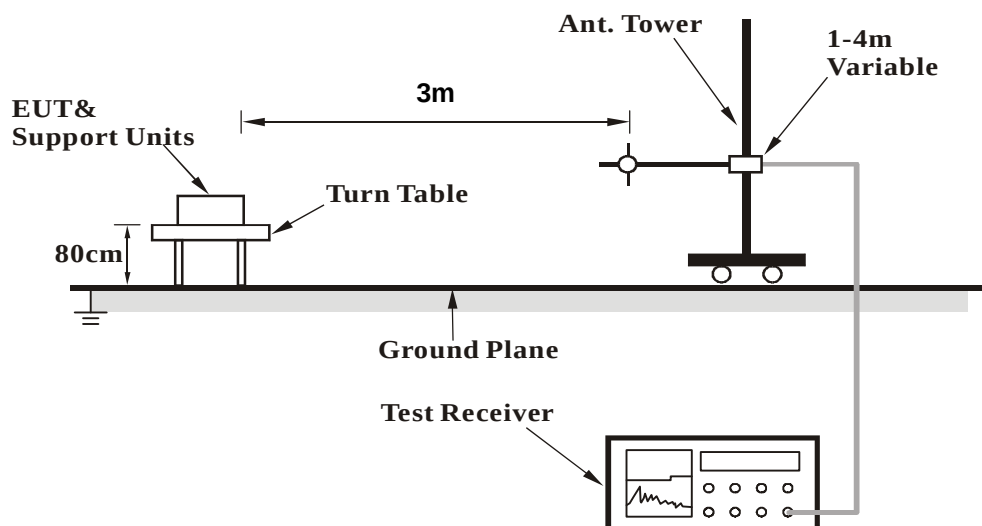
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (Duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor ($10 \log(1/\text{duty cycle})$).
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

4.2.4 DEVIATION FROM TEST STANDARD

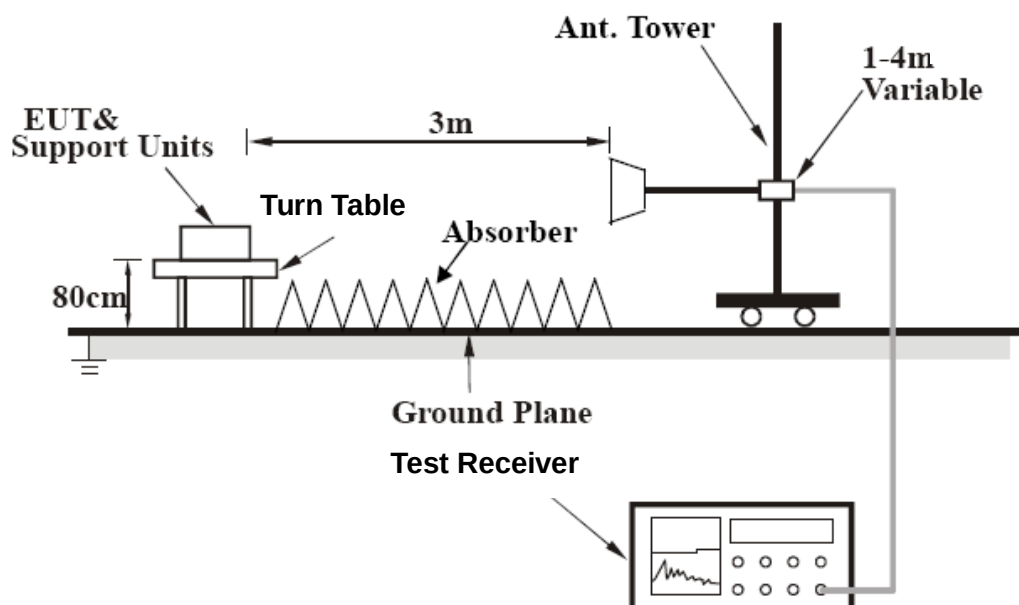
No deviation

4.2.5 TEST SETUP

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

4.2.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

802.11g

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	Below 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	108.81	39.4 QP	43.5	-4.1	1.50 H	306	55.68	-16.28
2	250.00	36.0 QP	46.0	-10.0	1.00 H	285	50.35	-14.31
3	340.01	39.7 QP	46.0	-6.3	1.00 H	32	51.10	-11.39
4	680.00	35.9 QP	46.0	-10.1	1.00 H	321	39.77	-3.89
5	875.02	44.7 QP	46.0	-1.3	1.50 H	207	45.15	-0.48
6	1000.00	41.6 QP	54.0	-12.4	1.00 H	277	40.21	1.41
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	50.61	37.6 QP	40.0	-2.4	1.00 V	31	51.17	-13.59
2	64.78	35.6 QP	40.0	-4.4	1.00 V	316	50.32	-14.71
3	340.01	35.1 QP	46.0	-10.9	1.50 V	0	46.53	-11.39
4	680.00	39.1 QP	46.0	-6.9	2.00 V	345	43.02	-3.89
5	849.99	42.3 QP	46.0	-3.8	1.00 V	162	43.13	-0.88
6	875.02	40.6 QP	46.0	-5.4	1.00 V	45	41.08	-0.48

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

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	56.5 PK	74.0	-17.5	1.18 H	146	22.97	33.53
2	2390.00	51.4 AV	54.0	-2.6	1.18 H	146	17.87	33.53
3	*2412.00	106.8 PK			1.18 H	146	73.21	33.59
4	*2412.00	103.7 AV			1.18 H	146	70.11	33.59
5	4824.00	55.5 PK	74.0	-18.5	1.10 H	42	12.32	43.18
6	4824.00	49.4 AV	54.0	-4.6	1.10 H	42	6.22	43.18
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	65.0 PK	74.0	-9.0	1.13 V	45	31.47	33.53
2	2390.00	44.3 AV	54.0	-9.7	1.13 V	45	10.77	33.53
3	*2412.00	100.4 PK			1.13 V	45	66.81	33.59
4	*2412.00	97.5 AV			1.13 V	45	63.91	33.59
5	4824.00	56.1 PK	74.0	-17.9	1.00 V	84	12.92	43.18
6	4824.00	51.9 AV	54.0	-2.1	1.00 V	84	8.72	43.18

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	*2437.00	106.4 PK			1.19 H	144	72.73	33.67
2	*2437.00	103.5 AV			1.19 H	144	69.83	33.67
3	4874.00	55.8 PK	74.0	-18.2	1.05 H	30	12.56	43.24
4	4874.00	49.5 AV	54.0	-4.5	1.05 H	30	6.26	43.24
5	7311.00	57.2 PK	74.0	-16.8	1.07 H	210	9.13	48.07
6	7311.00	43.9 AV	54.0	-10.1	1.07 H	210	-4.17	48.07
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	100.2 PK			1.12 V	44	66.53	33.67
2	*2437.00	97.5 AV			1.12 V	44	63.83	33.67
3	4874.00	56.4 PK	74.0	-17.6	1.00 V	82	13.16	43.24
4	4874.00	52.2 AV	54.0	-1.8	1.00 V	82	8.96	43.24
5	7311.00	57.3 PK	74.0	-16.7	1.00 V	292	9.23	48.07
6	7311.00	44.3 AV	54.0	-9.7	1.00 V	292	-3.77	48.07

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.



A D T

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	106.3 PK			1.17 H	143	72.56	33.74
2	*2462.00	103.0 AV			1.17 H	143	69.26	33.74
3	2487.80	55.6 PK	74.0	-18.4	1.13 H	132	21.77	33.83
4	2487.80	49.3 AV	54.0	-4.7	1.13 H	132	15.47	33.83
5	4924.00	55.7 PK	74.0	-18.3	1.00 H	33	12.43	43.27
6	4924.00	49.2 AV	54.0	-4.8	1.00 H	33	5.93	43.27
7	7386.00	56.8 PK	74.0	-17.2	1.08 H	210	8.40	48.40
8	7386.00	43.6 AV	54.0	-10.4	1.08 H	210	-4.80	48.40
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	99.8 PK			1.12 V	43	66.06	33.74
2	*2462.00	96.8 AV			1.12 V	43	63.06	33.74
3	4924.00	57.5 PK	74.0	-16.5	1.00 V	81	14.23	43.27
4	4924.00	52.8 AV	54.0	-1.2	1.00 V	81	9.53	43.27
5	7386.00	56.9 PK	74.0	-17.1	1.00 V	302	8.50	48.40
6	7386.00	43.9 AV	54.0	-10.1	1.00 V	302	-4.50	48.40

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	73.8 PK	74.0	-0.2	1.17 H	146	40.27	33.53
2	2390.00	52.1 AV	54.0	-1.9	1.17 H	146	18.57	33.53
3	*2412.00	112.3 PK			1.17 H	146	78.71	33.59
4	*2412.00	100.2 AV			1.17 H	146	66.61	33.59
5	4824.00	52.5 PK	74.0	-21.5	1.01 H	17	9.32	43.18
6	4824.00	39.4 AV	54.0	-14.6	1.01 H	17	-3.78	43.18
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	65.1 PK	74.0	-8.9	1.06 V	21	31.57	33.53
2	2390.00	44.3 AV	54.0	-9.7	1.06 V	21	10.77	33.53
3	*2412.00	106.6 PK			1.06 V	33	73.01	33.59
4	*2412.00	94.2 AV			1.06 V	33	60.61	33.59
5	4824.00	56.2 PK	74.0	-17.8	1.00 V	107	13.02	43.18
6	4824.00	44.1 AV	54.0	-9.9	1.00 V	107	0.92	43.18

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	69.5 PK	74.0	-4.5	1.18 H	144	35.97	33.53
2	2390.00	50.8 AV	54.0	-3.2	1.18 H	144	17.27	33.53
3	*2437.00	112.5 PK			1.17 H	146	78.83	33.67
4	*2437.00	100.4 AV			1.17 H	146	66.73	33.67
5	2483.50	66.7 PK	74.0	-7.3	1.18 H	144	32.89	33.81
6	2483.50	46.7 AV	54.0	-7.3	1.18 H	144	12.89	33.81
7	4874.00	52.3 PK	74.0	-21.7	1.00 H	31	9.06	43.24
8	4874.00	39.4 AV	54.0	-14.6	1.00 H	31	-3.84	43.24
9	7311.00	56.7 PK	74.0	-17.3	1.04 H	191	8.63	48.07
10	7311.00	43.8 AV	54.0	-10.2	1.04 H	191	-4.27	48.07
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	66.0 PK	74.0	-8.0	1.04 V	30	32.47	33.53
2	2390.00	45.2 AV	54.0	-8.8	1.04 V	30	11.67	33.53
3	*2437.00	106.2 PK			1.04 V	30	72.53	33.67
4	*2437.00	94.1 AV			1.04 V	30	60.43	33.67
5	2483.50	65.3 PK	74.0	-8.7	1.04 V	30	31.49	33.81
6	2483.50	44.5 AV	54.0	-9.5	1.04 V	30	10.69	33.81
7	4874.00	56.1 PK	74.0	-17.9	1.00 V	100	12.86	43.24
8	4874.00	44.0 AV	54.0	-10.0	1.00 V	100	0.76	43.24
9	7311.00	56.7 PK	74.0	-17.3	1.00 V	294	8.63	48.07
10	7311.00	44.0 AV	54.0	-10.0	1.00 V	294	-4.07	48.07

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.



A D T

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	112.6 PK			1.16 H	146	78.86	33.74
2	*2462.00	100.6 AV			1.16 H	146	66.86	33.74
3	2483.50	73.9 PK	74.0	-0.1	1.16 H	146	40.09	33.81
4	2483.50	50.7 AV	54.0	-3.3	1.16 H	146	16.89	33.81
5	4924.00	51.8 PK	74.0	-22.2	1.00 H	40	8.53	43.27
6	4924.00	39.0 AV	54.0	-15.0	1.00 H	40	-4.27	43.27
7	7386.00	57.1 PK	74.0	-16.9	1.00 H	186	8.70	48.40
8	7386.00	44.0 AV	54.0	-10.0	1.00 H	186	-4.40	48.40

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	106.7 PK			1.02 V	44	72.96	33.74
2	*2462.00	94.4 AV			1.02 V	44	60.66	33.74
3	2483.50	65.3 PK	74.0	-8.7	1.02 V	44	31.49	33.81
4	2483.50	44.5 AV	54.0	-9.5	1.02 V	44	10.69	33.81
5	4924.00	55.9 PK	74.0	-18.1	1.02 V	94	12.63	43.27
6	4924.00	44.0 AV	54.0	-10.0	1.02 V	94	0.73	43.27
7	7386.00	57.3 PK	74.0	-16.7	1.00 V	290	8.90	48.40
8	7386.00	44.3 AV	54.0	-9.7	1.00 V	290	-4.10	48.40

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	69.5 PK	74.0	-4.5	1.18 H	144	35.97	33.53
2	2390.00	48.3 AV	54.0	-5.7	1.18 H	144	14.77	33.53
3	*2412.00	109.9 PK			1.18 H	144	76.31	33.59
4	*2412.00	97.4 AV			1.18 H	144	63.81	33.59
5	4824.00	52.8 PK	74.0	-21.2	1.00 H	43	9.62	43.18
6	4824.00	39.8 AV	54.0	-14.2	1.00 H	43	-3.38	43.18
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	65.8 PK	74.0	-8.2	1.06 V	35	32.27	33.53
2	2390.00	44.8 AV	54.0	-9.2	1.06 V	35	11.27	33.53
3	*2412.00	102.9 PK			1.06 V	35	69.31	33.59
4	*2412.00	91.0 AV			1.06 V	35	57.41	33.59
5	4824.00	56.4 PK	74.0	-17.6	1.06 V	109	13.22	43.18
6	4824.00	44.3 AV	54.0	-9.7	1.06 V	109	1.12	43.18

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	*2437.00	109.7 PK			1.18 H	144	76.03	33.67
2	*2437.00	97.2 AV			1.18 H	144	63.53	33.67
3	4874.00	51.7 PK	74.0	-22.3	1.05 H	32	8.46	43.24
4	4874.00	39.0 AV	54.0	-15.0	1.05 H	32	-4.24	43.24
5	7311.00	56.8 PK	74.0	-17.2	1.08 H	179	8.73	48.07
6	7311.00	44.2 AV	54.0	-9.8	1.08 H	179	-3.87	48.07
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	102.4 PK			1.01 V	37	68.73	33.67
2	*2437.00	90.7 AV			1.01 V	37	57.03	33.67
3	4874.00	55.8 PK	74.0	-18.2	1.00 V	113	12.56	43.24
4	4874.00	43.8 AV	54.0	-10.2	1.00 V	113	0.56	43.24
5	7311.00	56.4 PK	74.0	-17.6	1.00 V	292	8.33	48.07
6	7311.00	43.8 AV	54.0	-10.2	1.00 V	292	-4.27	48.07

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.



A D T

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	109.1 PK			1.19 H	144	75.36	33.74
2	*2462.00	97.0 AV			1.19 H	144	63.26	33.74
3	2483.50	69.6 PK	74.0	-4.4	1.19 H	144	35.79	33.81
4	2483.50	48.9 AV	54.0	-5.1	1.19 H	144	15.09	33.81
5	4924.00	52.5 PK	74.0	-21.5	1.03 H	16	9.23	43.27
6	4924.00	39.6 AV	54.0	-14.4	1.03 H	16	-3.67	43.27
7	7386.00	56.6 PK	74.0	-17.4	1.01 H	178	8.20	48.40
8	7386.00	43.7 AV	54.0	-10.3	1.01 H	178	-4.70	48.40
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	103.1 PK			1.12 V	40	69.36	33.74
2	*2462.00	91.4 AV			1.12 V	40	57.66	33.74
3	2483.50	65.8 PK	74.0	-8.2	1.07 V	38	31.99	33.81
4	2483.50	44.8 AV	54.0	-9.2	1.07 V	38	10.99	33.81
5	4924.00	55.9 PK	74.0	-18.1	1.00 V	94	12.63	43.27
6	4924.00	43.8 AV	54.0	-10.2	1.00 V	94	0.53	43.27
7	7386.00	56.8 PK	74.0	-17.2	1.00 V	307	8.40	48.40
8	7386.00	44.0 AV	54.0	-10.0	1.00 V	307	-4.40	48.40

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	72.3 PK	74.0	-1.7	1.18 H	145	38.77	33.53
2	2390.00	52.9 AV	54.0	-1.1	1.18 H	145	19.37	33.53
3	*2422.00	105.6 PK			1.18 H	145	71.98	33.62
4	*2422.00	94.7 AV			1.18 H	145	61.08	33.62
5	4844.00	52.7 PK	74.0	-21.3	1.03 H	18	9.50	43.20
6	4844.00	39.7 AV	54.0	-14.3	1.03 H	18	-3.50	43.20
7	7266.00	56.7 PK	74.0	-17.3	1.07 H	176	8.79	47.91
8	7266.00	43.8 AV	54.0	-10.2	1.07 H	176	-4.11	47.91
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	68.2 PK	74.0	-5.8	1.00 V	306	34.67	33.53
2	2390.00	50.6 AV	54.0	-3.4	1.00 V	306	17.07	33.53
3	*2422.00	100.1 PK			1.00 V	306	66.48	33.62
4	*2422.00	88.1 AV			1.00 V	306	54.48	33.62
5	4844.00	56.0 PK	74.0	-18.0	1.00 V	91	12.80	43.20
6	4844.00	43.7 AV	54.0	-10.3	1.00 V	91	0.50	43.20
7	7266.00	56.3 PK	74.0	-17.7	1.00 V	294	8.39	47.91
8	7266.00	43.6 AV	54.0	-10.4	1.00 V	294	-4.31	47.91

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	68.5 PK	74.0	-5.5	1.19 H	145	34.97	33.53
2	2390.00	49.4 AV	54.0	-4.6	1.19 H	145	15.87	33.53
3	*2437.00	105.4 PK			1.19 H	145	71.73	33.67
4	*2437.00	94.9 AV			1.19 H	145	61.23	33.67
5	2483.50	63.3 PK	74.0	-10.7	1.19 H	145	29.49	33.81
6	2483.50	45.9 AV	54.0	-8.1	1.19 H	145	12.09	33.81
7	4874.00	52.3 PK	74.0	-21.7	1.00 H	42	9.06	43.24
8	4874.00	39.1 AV	54.0	-14.9	1.00 H	42	-4.14	43.24
9	7311.00	57.0 PK	74.0	-17.0	1.10 H	175	8.93	48.07
10	7311.00	43.9 AV	54.0	-10.1	1.10 H	175	-4.17	48.07
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	66.0 PK	74.0	-8.0	1.06 V	37	32.47	33.53
2	2390.00	44.8 AV	54.0	-9.2	1.06 V	37	11.27	33.53
3	*2437.00	100.4 PK			1.06 V	37	66.73	33.67
4	*2437.00	88.3 AV			1.06 V	37	54.63	33.67
5	2483.50	65.8 PK	74.0	-8.2	1.06 V	37	31.99	33.81
6	2483.50	44.1 AV	54.0	-9.9	1.06 V	37	10.29	33.81
7	4874.00	55.6 PK	74.0	-18.4	1.00 V	107	12.36	43.24
8	4874.00	43.8 AV	54.0	-10.2	1.00 V	107	0.56	43.24
9	7311.00	56.9 PK	74.0	-17.1	1.00 V	280	8.83	48.07
10	7311.00	44.2 AV	54.0	-9.8	1.00 V	280	-3.87	48.07

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.



A D T

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	105.8 PK			1.16 H	144	72.09	33.71
2	*2452.00	94.3 AV			1.16 H	144	60.59	33.71
3	2483.50	71.9 PK	74.0	-2.1	1.16 H	144	38.09	33.81
4	2483.50	51.7 AV	54.0	-2.3	1.16 H	144	17.89	33.81
5	4904.00	51.9 PK	74.0	-22.1	1.00 H	35	8.63	43.27
6	4904.00	39.0 AV	54.0	-15.0	1.00 H	35	-4.27	43.27
7	7356.00	57.1 PK	74.0	-16.9	1.07 H	202	8.83	48.27
8	7356.00	44.3 AV	54.0	-9.7	1.07 H	202	-3.97	48.27
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	100.3 PK			1.09 V	25	66.59	33.71
2	*2452.00	88.4 AV			1.09 V	25	54.69	33.71
3	2483.50	65.3 PK	74.0	-8.7	1.09 V	25	31.49	33.81
4	2483.50	44.5 AV	54.0	-9.5	1.09 V	25	10.69	33.81
5	4904.00	55.9 PK	74.0	-18.1	1.00 V	112	12.63	43.27
6	4904.00	43.9 AV	54.0	-10.1	1.00 V	112	0.63	43.27
7	7356.00	57.3 PK	74.0	-16.7	1.00 V	25	9.03	48.27
8	7356.00	44.4 AV	54.0	-9.6	1.00 V	25	-3.87	48.27

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.

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 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSP40	100036	Jan. 21, 2014	Jan. 20, 2015

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. Tested date : Feb. 13, 2014

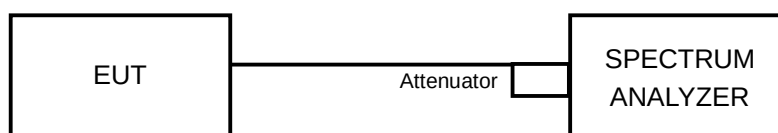
4.3.3 TEST PROCEDURE

1. Set resolution bandwidth (RBW) = 100kHz
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
3. Trace mode = max hold.
4. Sweep = auto couple.
5. 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

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP



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 RESULTS

802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	12.10	13.08	0.5	PASS
6	2437	11.18	12.12	0.5	PASS
11	2462	12.15	12.60	0.5	PASS

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	16.46	16.48	0.5	PASS
6	2437	16.47	16.49	0.5	PASS
11	2462	16.48	16.50	0.5	PASS

802.11n (HT20)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	17.72	17.82	0.5	PASS
6	2437	17.76	17.83	0.5	PASS
11	2462	17.75	17.83	0.5	PASS

802.11n (HT40)

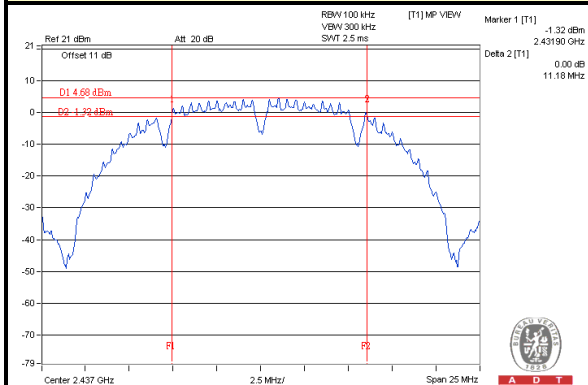
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
3	2422	36.23	36.45	0.5	PASS
6	2437	35.95	36.24	0.5	PASS
9	2452	35.87	36.17	0.5	PASS



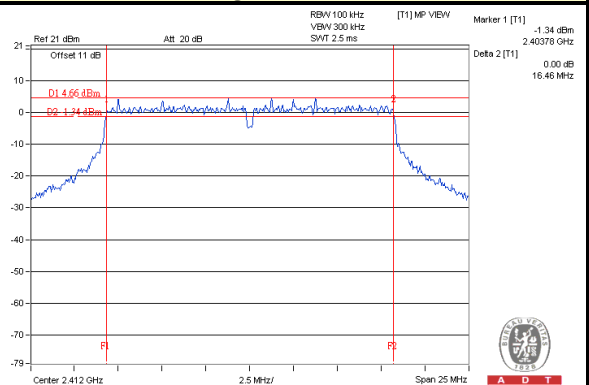
A D T

SPECTRUM PLOT OF WORST VALUE

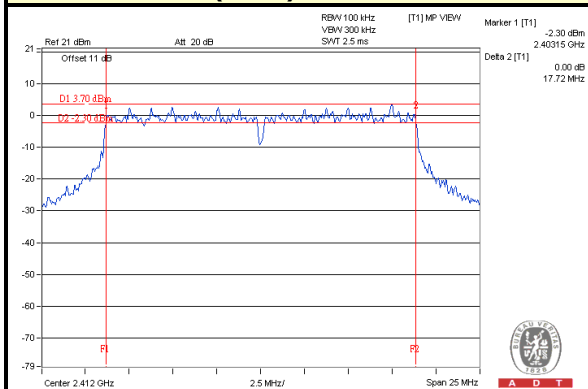
802.11b_Chain 0 / CH6



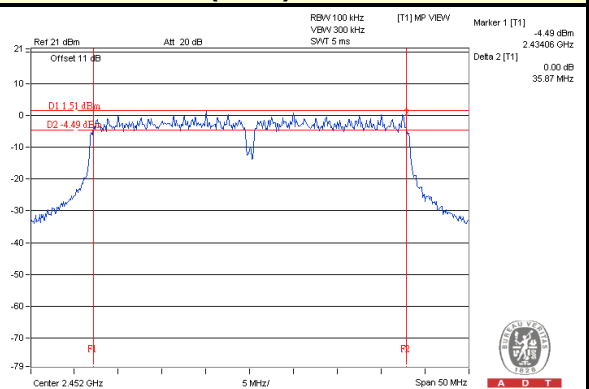
802.11g_Chain 0 / CH1



802.11n (HT20)_Chain 0 / CH11



802.11n (HT40)_Chain 0 / CH9



4.4 CONDUCTED OUTPUT POWER MEASUREMENT

4.4.1 LIMITS OF MAXIMUM 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 $NANT \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any NANT;

Array Gain = $5 \log(NANT/NSS)$ dB or 3 dB, whichever is less for 20-MHz channel widths with $NANT \geq 5$.

For power measurements on all other devices: Array Gain = $10 \log(NANT/NSS)$ dB.

4.4.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power meter Anritsu	ML2495A	0824006	May 20, 2013	May 19, 2014
Power sensor Anritsu	MA2411B	0738172	May 20, 2013	May 19, 2014

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. Tested date : Feb. 13, 2014

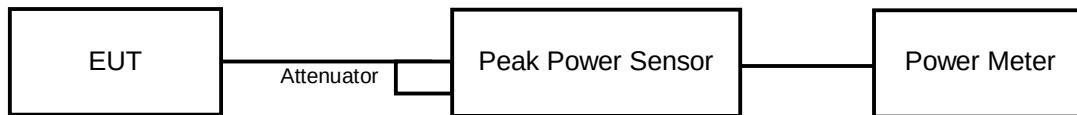
4.4.3 TEST PROCEDURES

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

4.4.4 DEVIATION FROM TEST STANDARD

No deviation.

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6

4.4.7 TEST RESULTS

802.11b

CHANNEL	FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2412	17.10	18.04	114.966	20.61	30	PASS
6	2437	17.08	17.89	112.568	20.51	30	PASS
11	2462	17.06	18.42	120.318	20.80	30	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2412	25.98	26.20	813.147	29.10	30	PASS
6	2437	25.69	25.71	743.073	28.71	30	PASS
11	2462	26.07	26.34	835.103	29.22	30	PASS

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2412	24.12	24.72	554.709	27.44	30	PASS
6	2437	24.13	24.78	559.429	27.48	30	PASS
11	2462	24.18	24.19	524.240	27.20	30	PASS

802.11n (HT40)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
3	2422	24.37	24.14	532.945	27.27	30	PASS
6	2437	24.44	23.16	484.985	26.86	30	PASS
9	2452	24.41	23.44	496.858	26.96	30	PASS

4.5 AVERAGE OUTPUT POWER

4.5.1 FOR REFERENCE

4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power meter Anritsu	ML2495A	0824006	May 20, 2013	May 19, 2014
Power sensor Anritsu	MA2411B	0738172	May 20, 2013	May 19, 2014

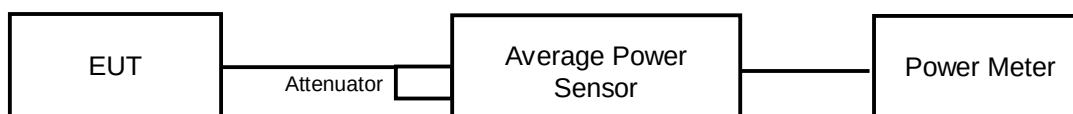
Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Feb. 13, 2014

4.5.3 TEST PROCEDURES

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

4.5.4 TEST SETUP



4.5.5 EUT OPERATING CONDITIONS

Same as Item 4.3.6

4.5.6 TEST RESULTS

802.11b

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1		
1	2412	15.14	15.69	69.727	18.43
6	2437	15.16	15.54	68.620	18.36
11	2462	15.13	15.91	71.578	18.55

802.11g

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1		
1	2412	16.76	17.27	100.757	20.03
6	2437	17.34	17.23	107.045	20.30
11	2462	17.14	17.31	105.588	20.24

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1		
1	2412	15.03	15.79	69.773	18.44
6	2437	15.06	15.94	71.327	18.53
11	2462	15.05	15.59	68.213	18.34

802.11n (HT40)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1		
3	2422	15.06	15.37	66.498	18.23
6	2437	15.07	15.33	66.256	18.21
9	2452	15.05	15.45	67.064	18.26

4.6 POWER SPECTRAL DENSITY MEASUREMENT

4.6.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSP 40	100036	Jan. 21, 2014	Jan. 20, 2015

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. Tested date : Feb. 13, 2014

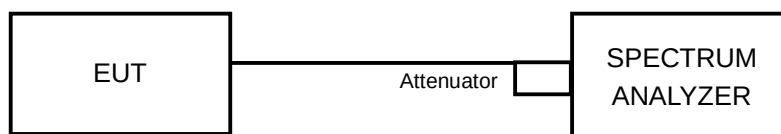
4.6.3 TEST PROCEDURE

1. Set the RBW = 3 kHz, VBW =10 kHz, Detector = peak.
2. Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
3. Use the peak marker function to determine the maximum amplitude level.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SETUP



4.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6

4.6.7 TEST RESULTS

802.11b

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD (dBm)	10 log (N=2) dB	TOTAL PSD (dBm)	LIMIT (dBm)	PASS /FAIL
0	1	2412	-10.36	3.01	-7.35	8	PASS
	6	2437	-10.63	3.01	-7.62	8	PASS
	11	2462	-9.71	3.01	-6.70	8	PASS
1	1	2412	-8.29	3.01	-5.28	8	PASS
	6	2437	-9.55	3.01	-6.54	8	PASS
	11	2462	-9.68	3.01	-6.67	8	PASS

NOTE: 1. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 3.76\text{dBi} > 6\text{dBi}$, so the power density limit shall not be reduced.

802.11g

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD (dBm)	10 log (N=2) dB	TOTAL PSD (dBm)	LIMIT (dBm)	PASS /FAIL
0	1	2412	-9.14	3.01	-6.13	8	PASS
	6	2437	-9.24	3.01	-6.23	8	PASS
	11	2462	-9.25	3.01	-6.24	8	PASS
1	1	2412	-7.32	3.01	-4.31	8	PASS
	6	2437	-6.68	3.01	-3.67	8	PASS
	11	2462	-9.16	3.01	-6.15	8	PASS

NOTE: 1. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 3.76\text{dBi} > 6\text{dBi}$, so the power density limit shall not be reduced

802.11n (HT20)

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD (dBm)	10 log (N=2) dB	TOTAL PSD (dBm)	LIMIT (dBm)	PASS /FAIL
0	1	2412	-11.82	3.01	-8.81	8	PASS
	6	2437	-11.10	3.01	-8.09	8	PASS
	11	2462	-10.74	3.01	-7.73	8	PASS
1	1	2412	-10.36	3.01	-7.35	8	PASS
	6	2437	-10.18	3.01	-7.17	8	PASS
	11	2462	-7.64	3.01	-4.63	8	PASS

802.11n (HT40)

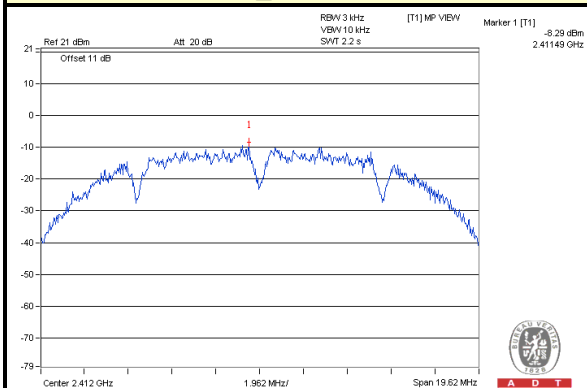
TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD (dBm)	10 log (N=2) dB	TOTAL PSD (dBm)	LIMIT (dBm)	PASS /FAIL
0	3	2422	-13.62	3.01	-10.61	8	PASS
	6	2437	-14.10	3.01	-11.09	8	PASS
	9	2452	-14.36	3.01	-11.35	8	PASS
1	3	2422	-13.09	3.01	-10.08	8	PASS
	6	2437	-10.43	3.01	-7.42	8	PASS
	9	2452	-14.00	3.01	-10.99	8	PASS



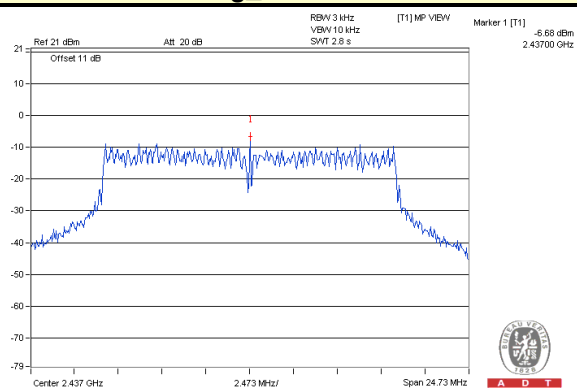
A D T

SPECTRUM PLOT OF WORST VALUE

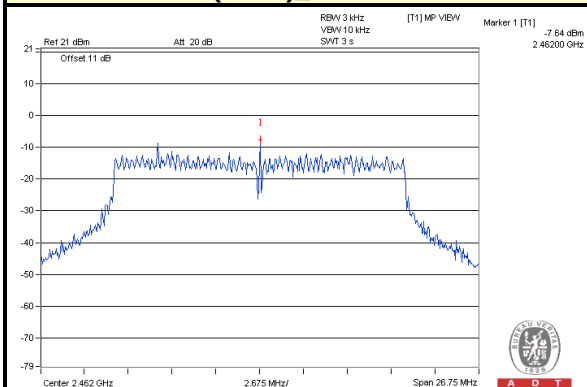
802.11b Chain 1 / CH1



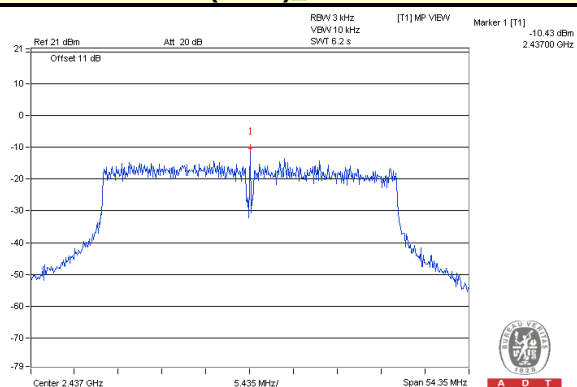
802.11g Chain 1 / CH6



802.11n (HT20) Chain 1 / CH11



802.11n (HT40) Chain 1 / CH6





A D T

4.7 CONDUCTED OUT-BAND EMISSION MEASUREMENT

4.7.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

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

4.7.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSP 40	100036	Jan. 21, 2014	Jan. 20, 2015

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. Tested date : Feb. 13, 2014

4.7.3 TEST PROCEDURE

Measurement Procedure - Reference Level

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.

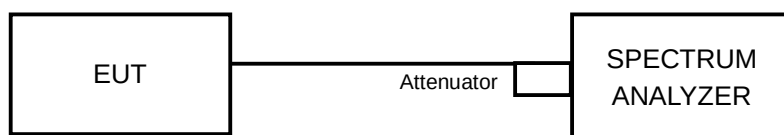
Measurement Procedure –Unwanted Emission Level

1. Set RBW = 100 kHz.
2. Set VBW $\geq$ 300 kHz.
3. Set span to encompass the spectrum to be examined
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.

4.7.4 DEVIATION FROM TEST STANDARD

No deviation

4.7.5 TEST SETUP



4.7.6 EUT OPERATING CONDITION

Same as Item 4.3.6

4.7.7 TEST RESULTS

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

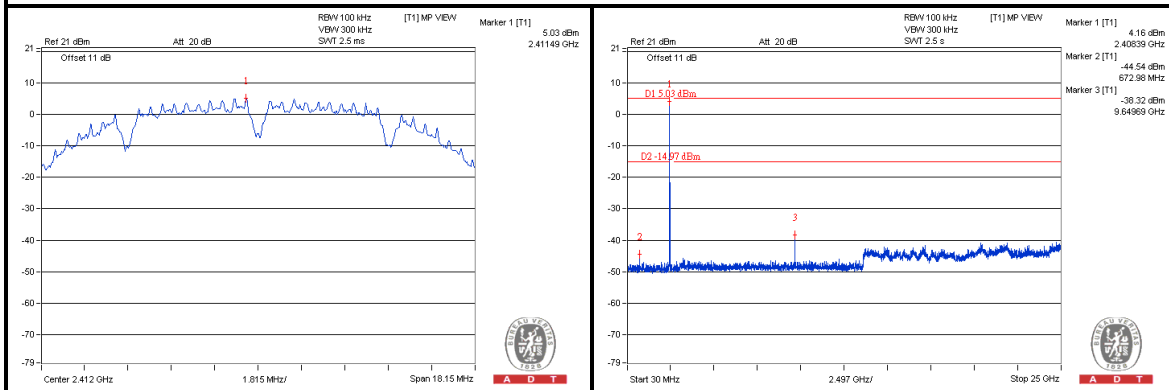


A D T

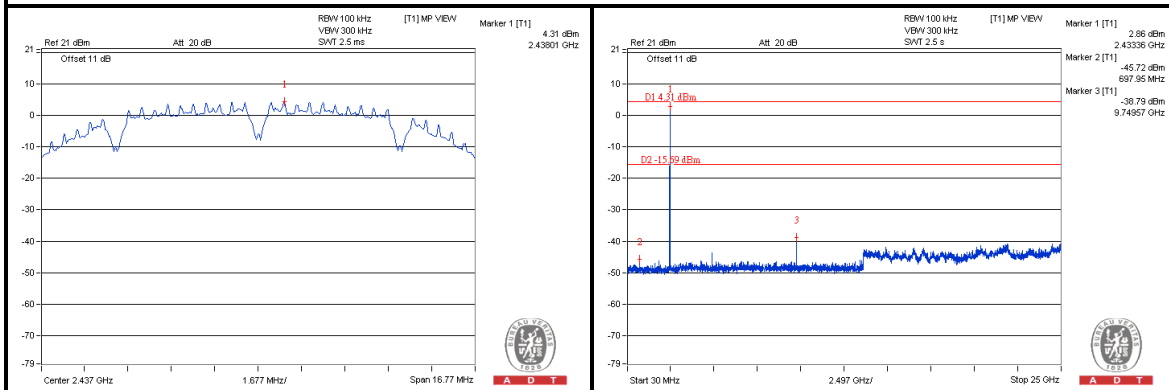
802.11b:

Chain 0

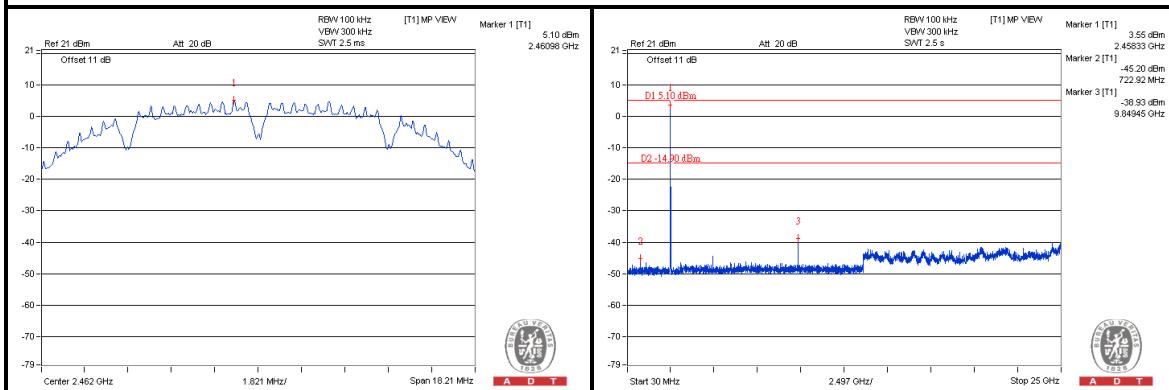
CH 1



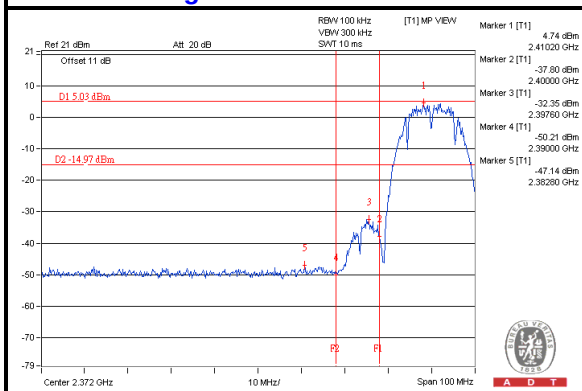
CH 6



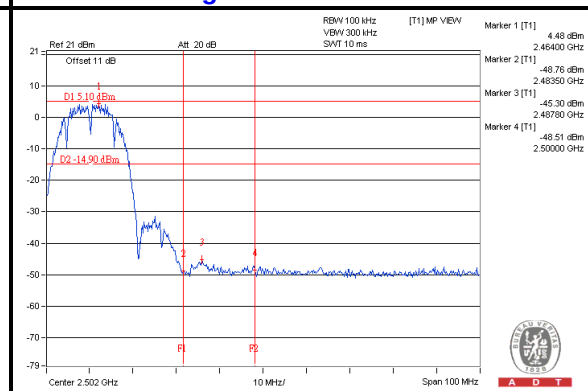
CH 11



CH 1 Band edge



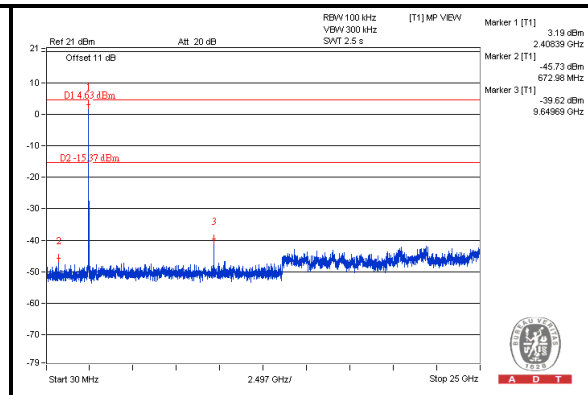
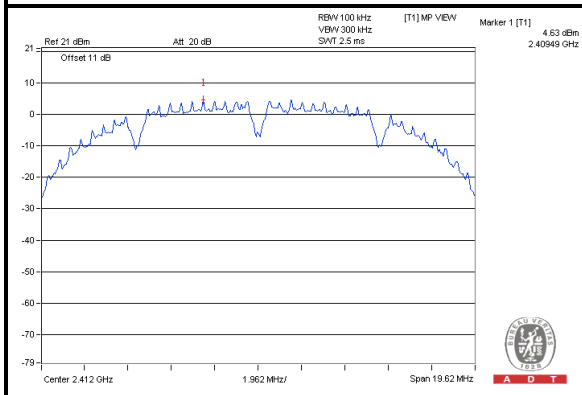
CH 11 Band edge



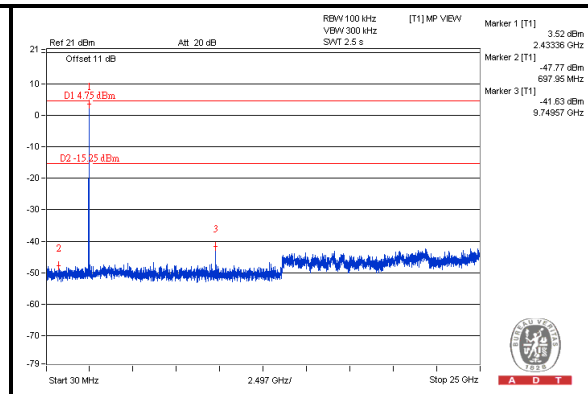
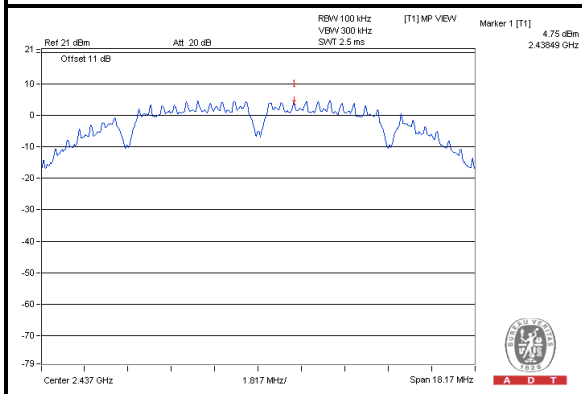


A D T

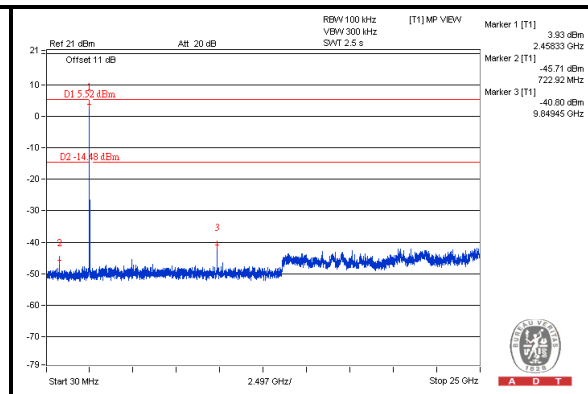
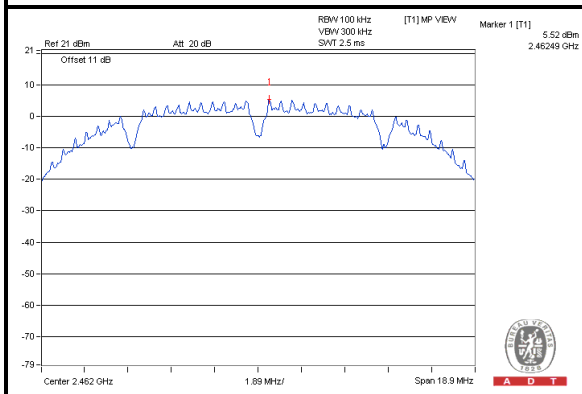
Chain 1 CH 1



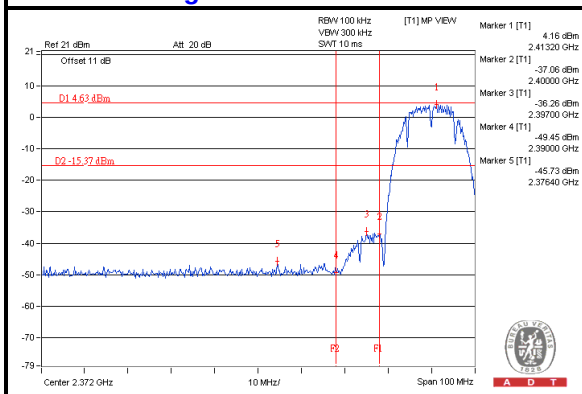
CH 6



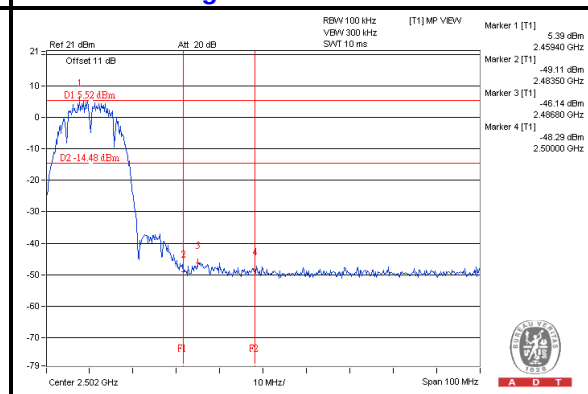
CH 11



CH 1 Band edge



CH 11 Band edge



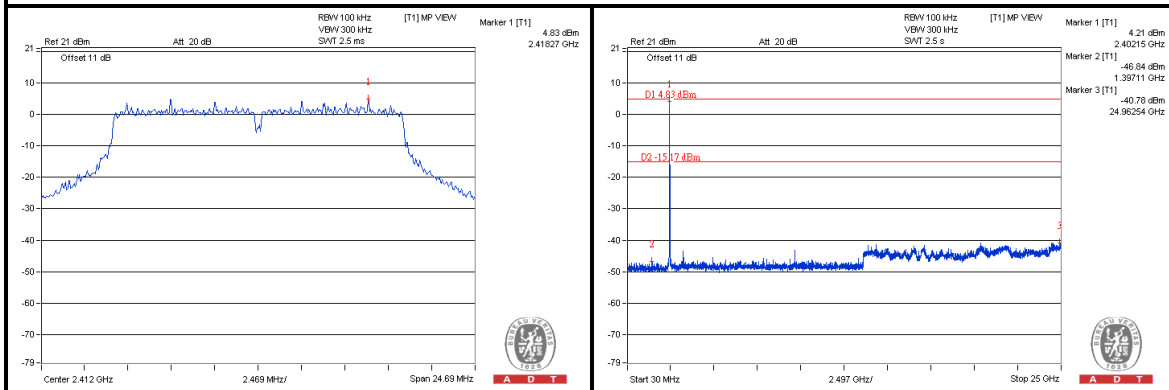


A D T

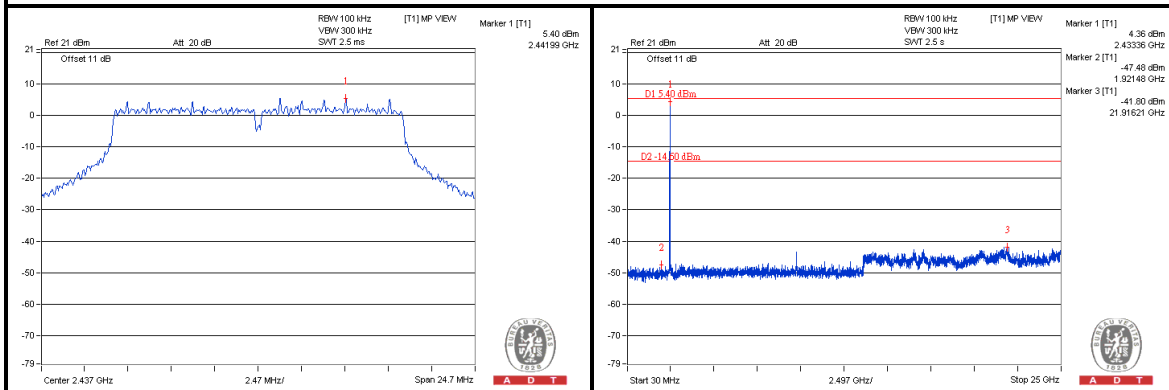
802.11g:

Chain 0

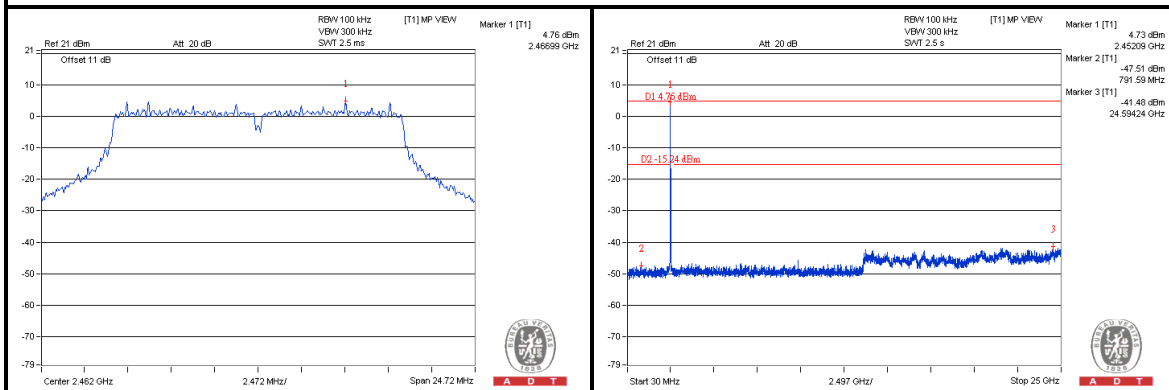
CH 1



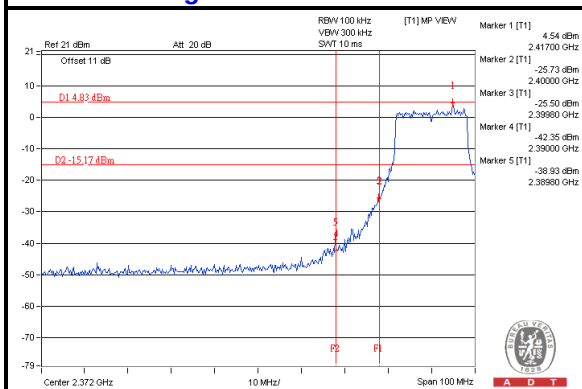
CH 6



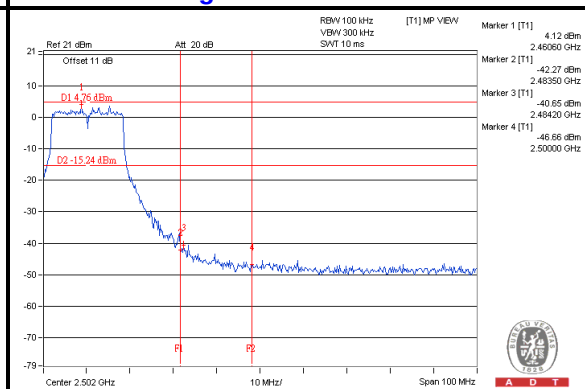
CH 11



CH 1 Band edge



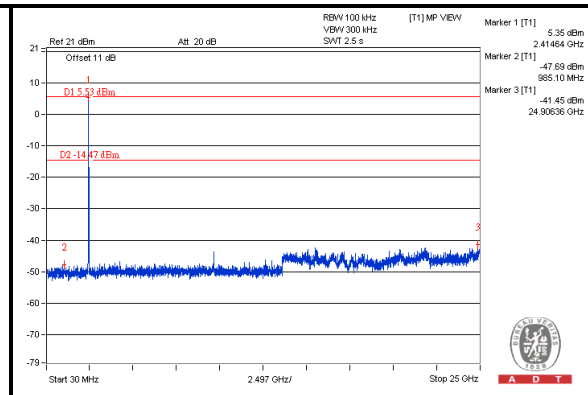
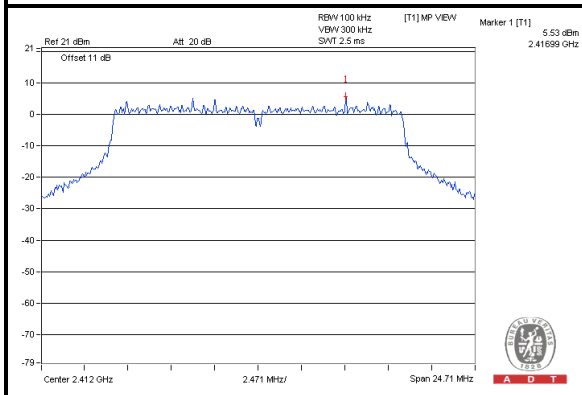
CH 11 Band edge



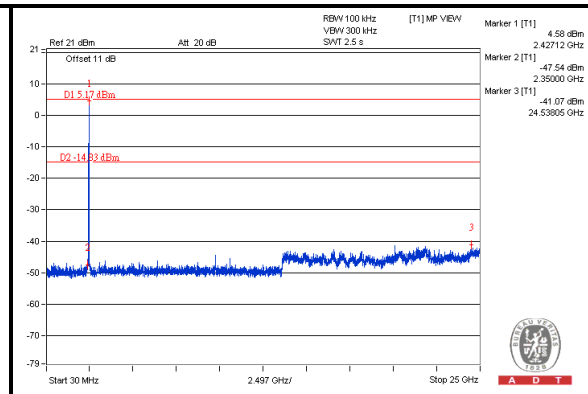
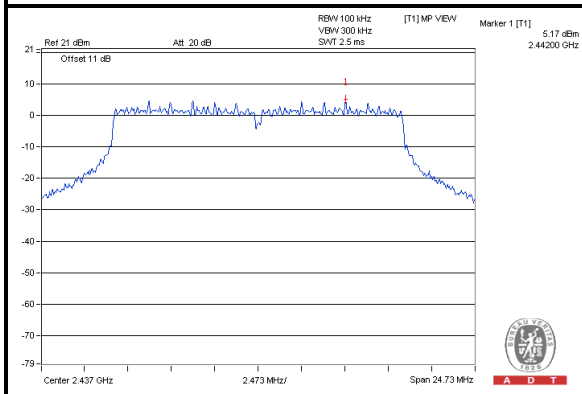


A D T

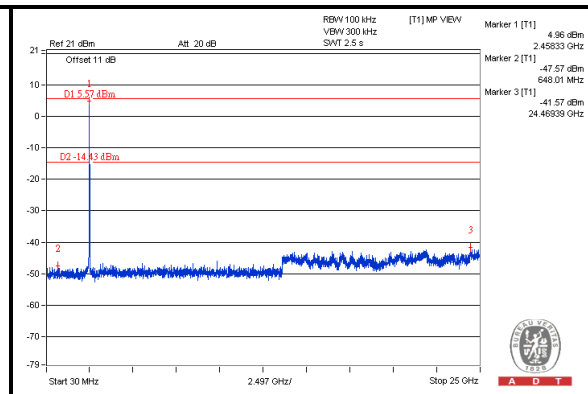
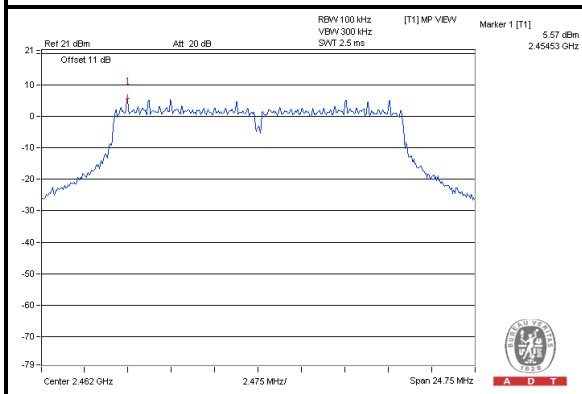
Chain 1 CH 1



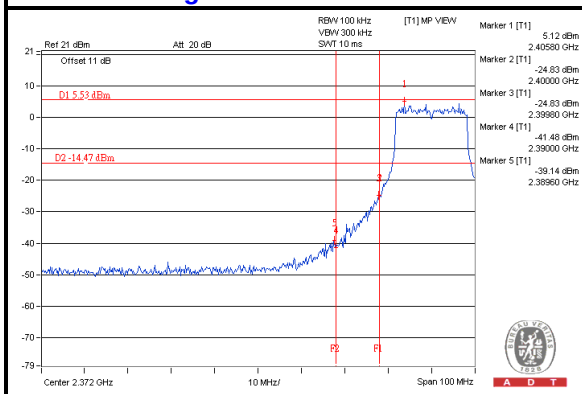
CH 6



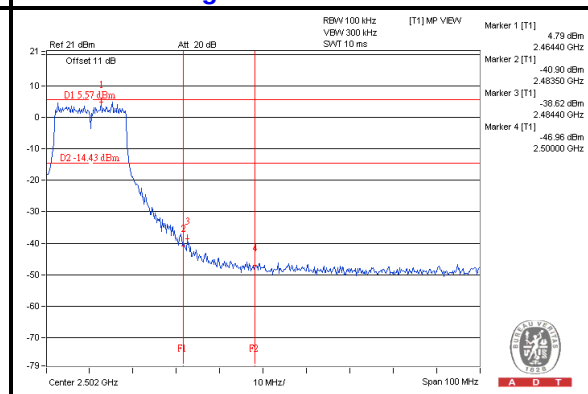
CH 11



CH 1 Band edge



CH 11 Band edge



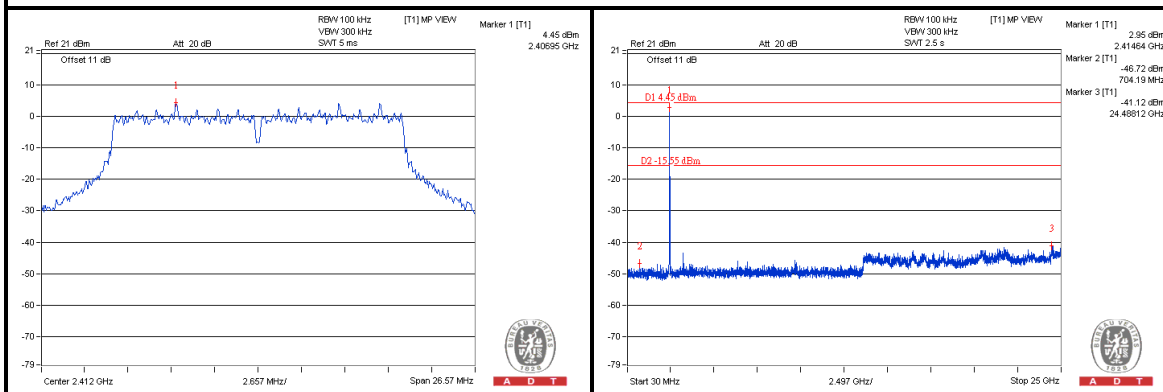


A D T

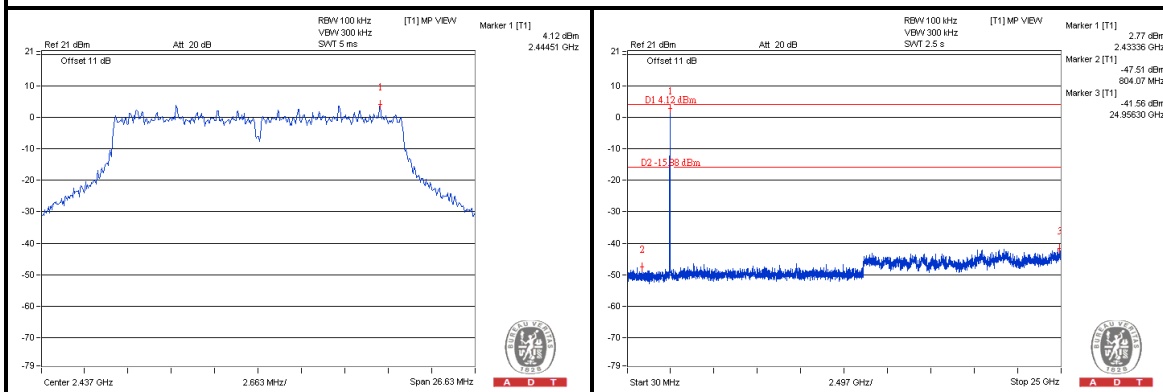
802.11n (HT20):

Chain 0

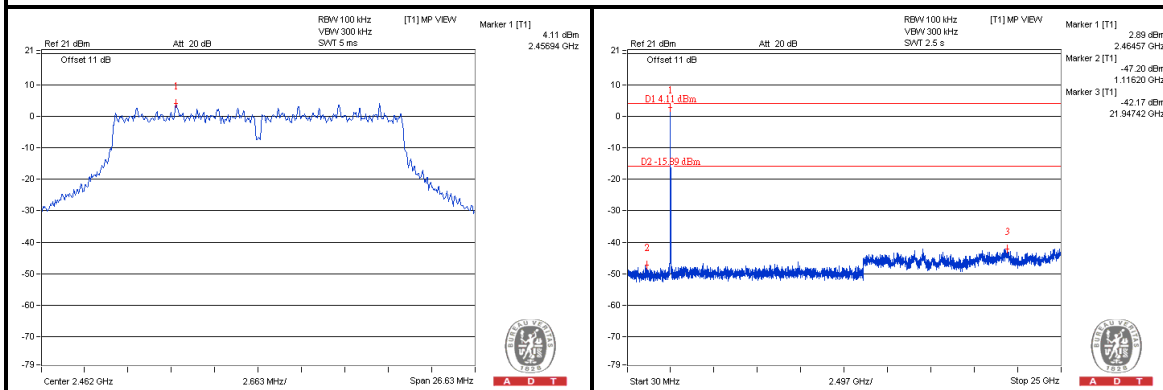
CH 1



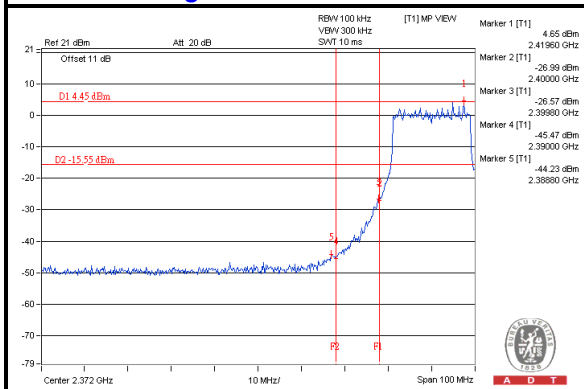
CH 6



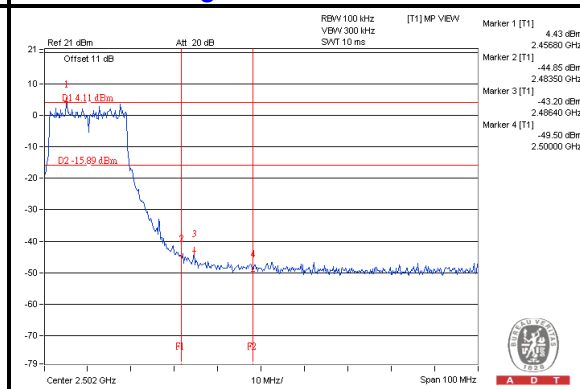
CH 11



CH 1 Band edge



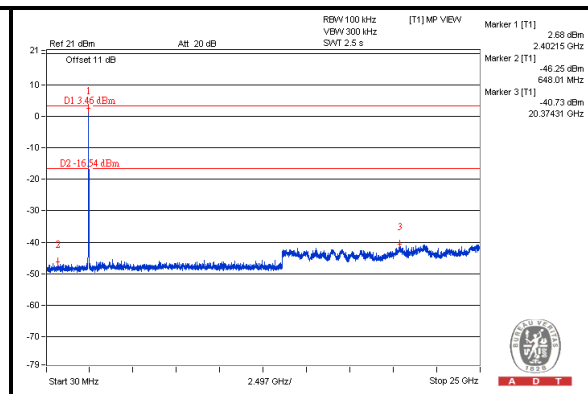
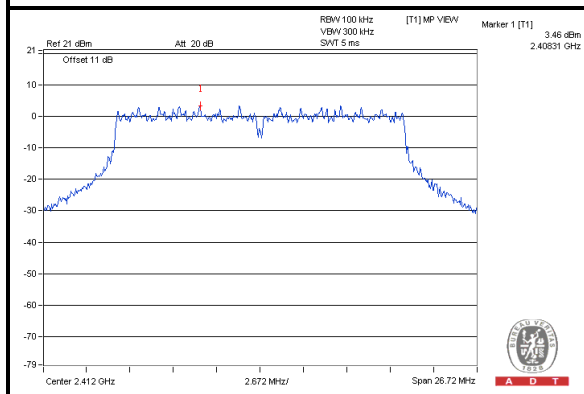
CH 11 Band edge



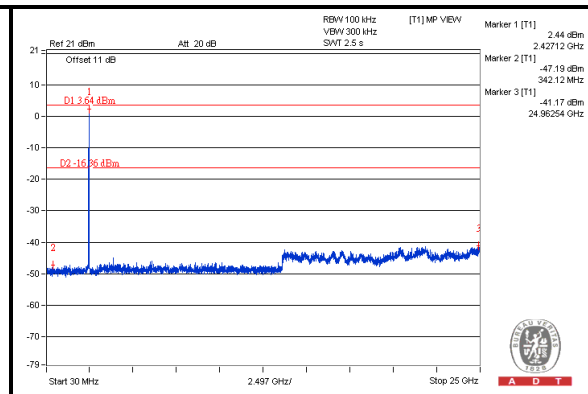
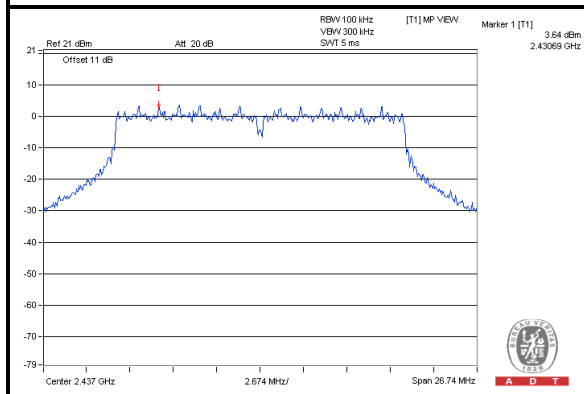


A D T

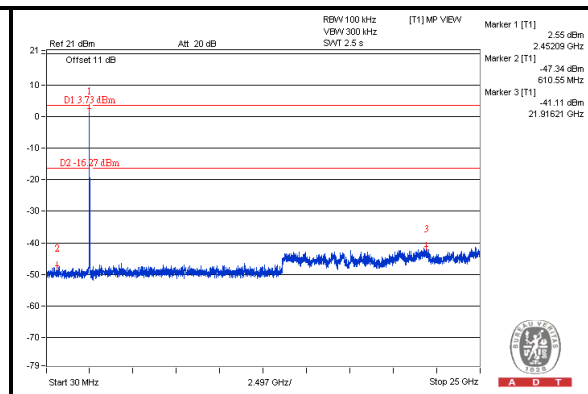
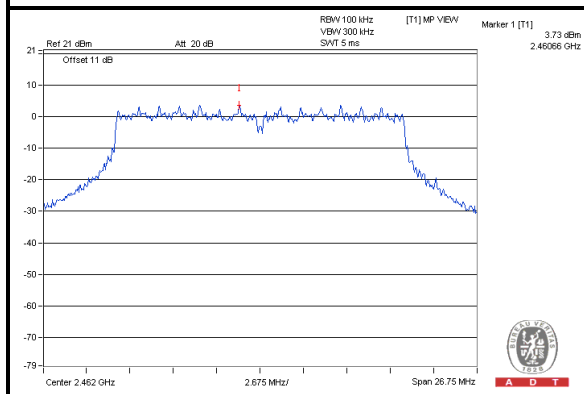
Chain 1 CH 1



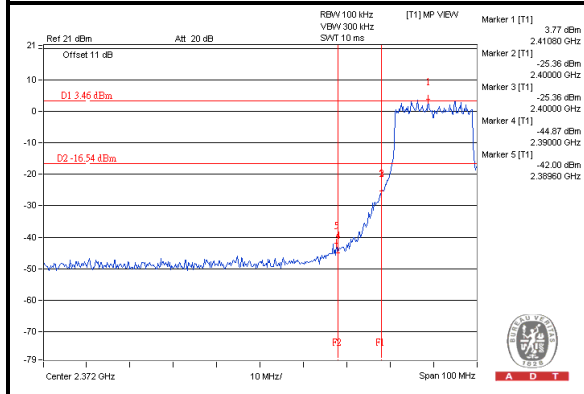
CH 6



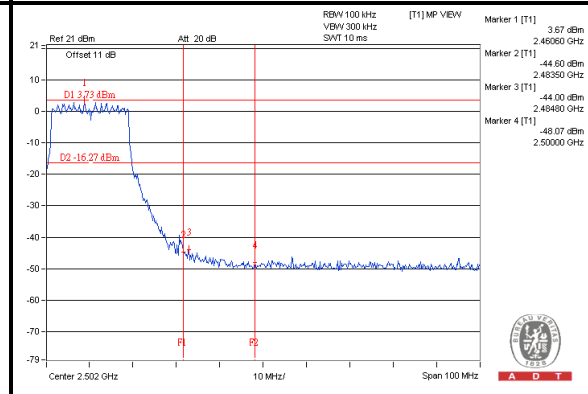
CH 11



CH 1 Band edge



CH 11 Band edge



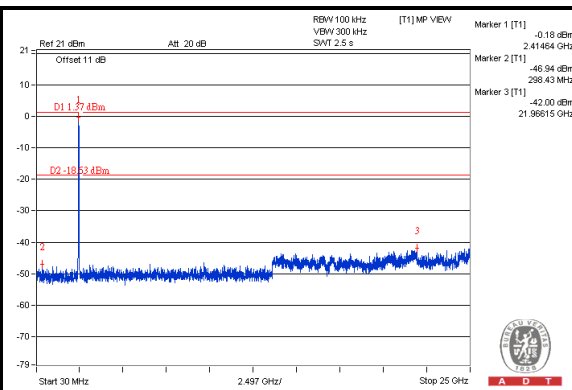
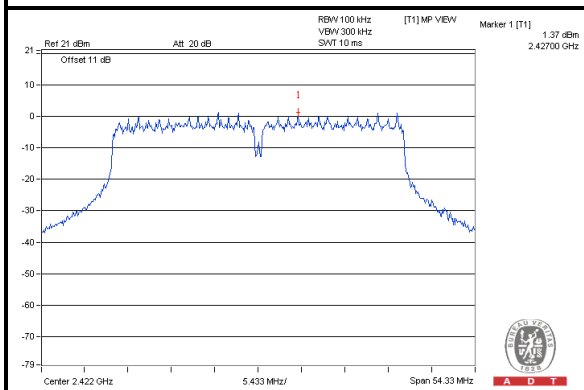


A D T

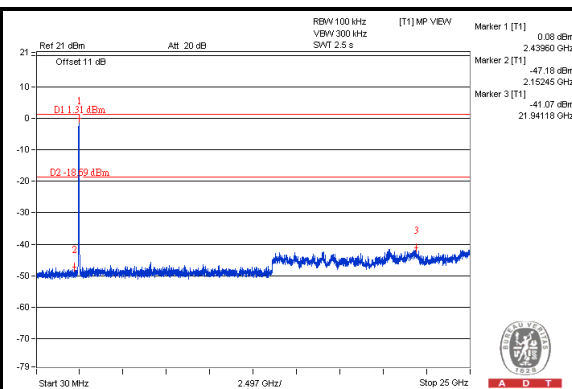
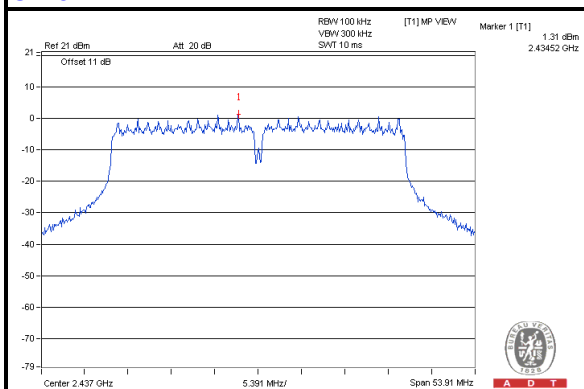
802.11n (HT40):

Chain 0

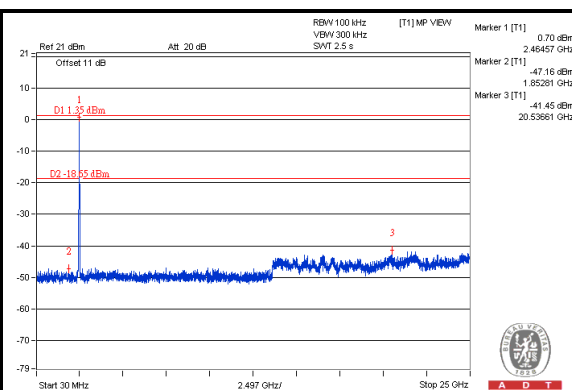
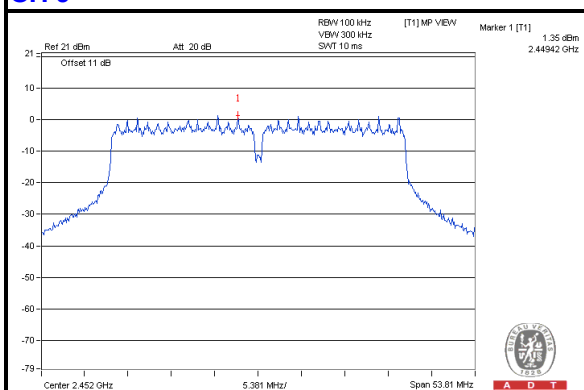
CH 3



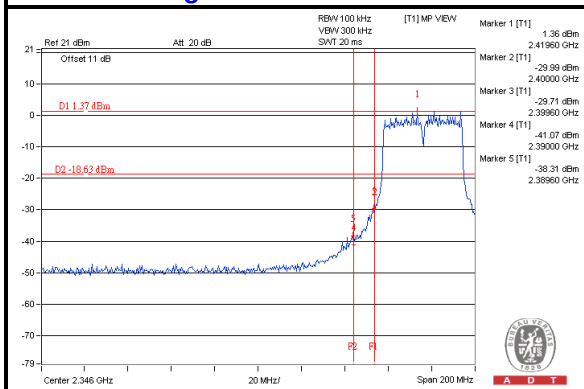
CH 6



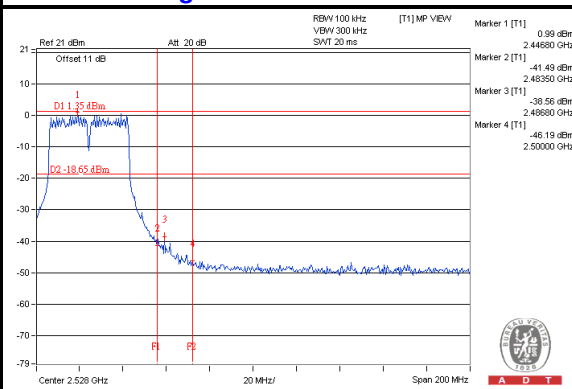
CH 9



CH 3 Band edge



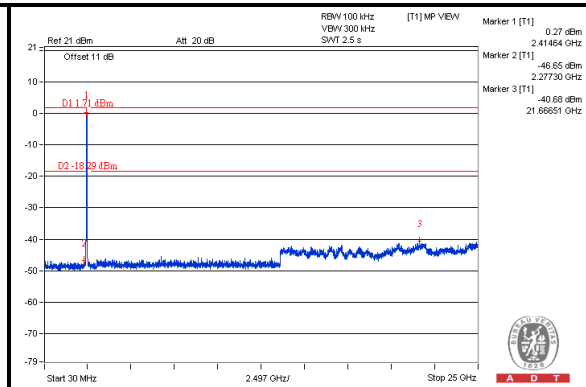
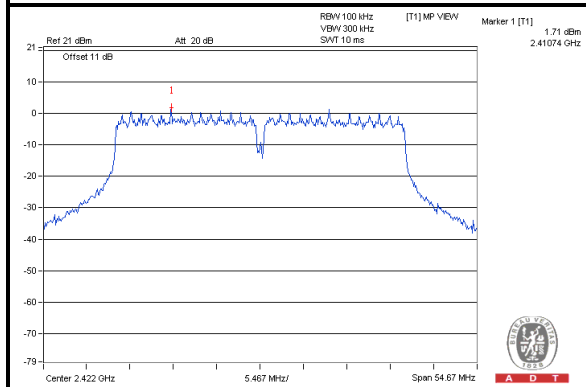
CH 9 Band edge



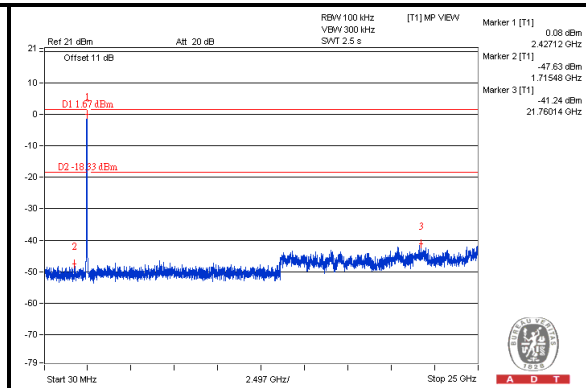
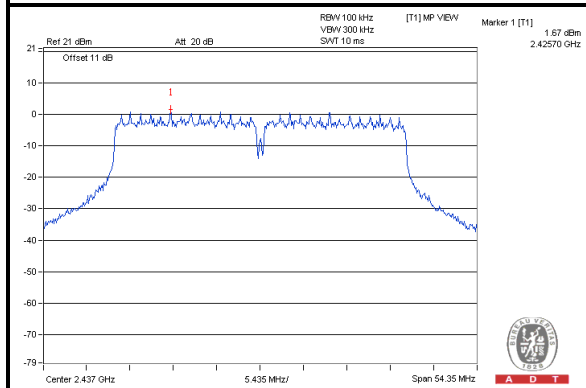


A D T

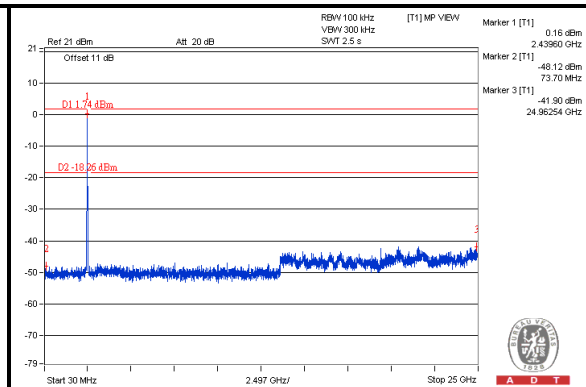
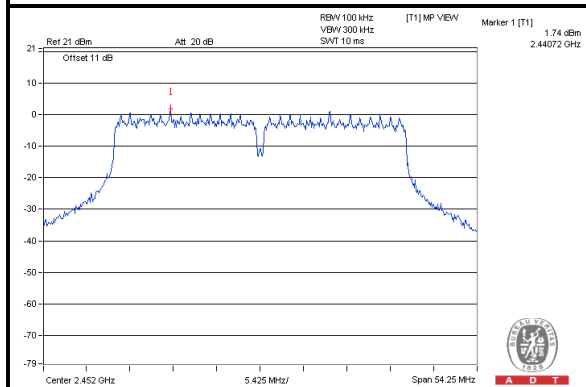
Chain 1 CH 3



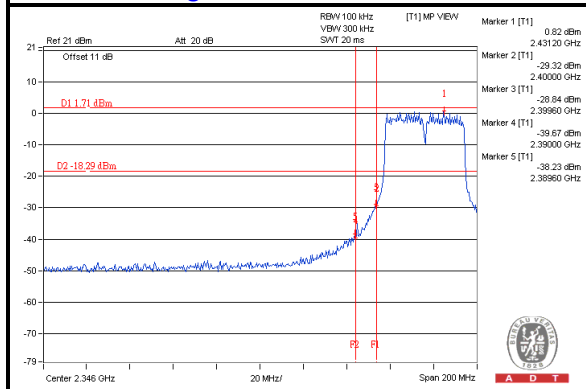
CH 6



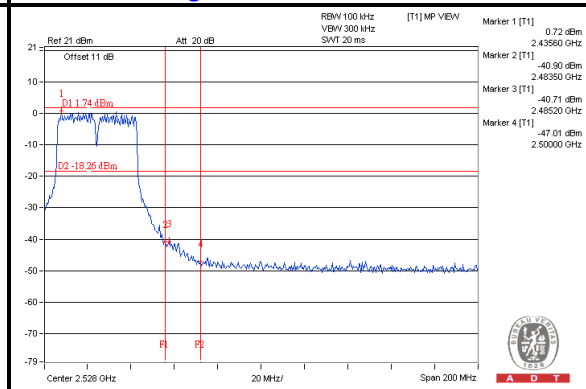
CH 9



CH 3 Band edge



CH 9 Band edge



5. TEST TYPES AND RESULTS (FOR 5GHZ, 5.725~5.850GHz Band)

5.1 CONDUCTED EMISSION MEASUREMENT

5.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	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 0.50 MHz.

5.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS 30	100375	Mar. 08, 2013	Mar. 07, 2014
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK8127	8127-522	Sep. 05, 2013	Sep. 04, 2014
Line-Impedance Stabilization Network (for Peripheral)	ENV216	100072	June 06, 2013	June 05, 2014
RF Cable (JYEBAO)	5DFB	COCCAB-001	Mar. 11, 2013	Mar. 10, 2014
50 ohms Terminator	50	EMC-03	Sep. 24, 2013	Sep. 23, 2014
Software ADT	BV ADT_Cond_V7.3.7. 3	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
3. The VCCI Con C Registration No. is C-3611.
4. Tested Date: Feb. 10, 2014

5.1.3 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) were not recorded.

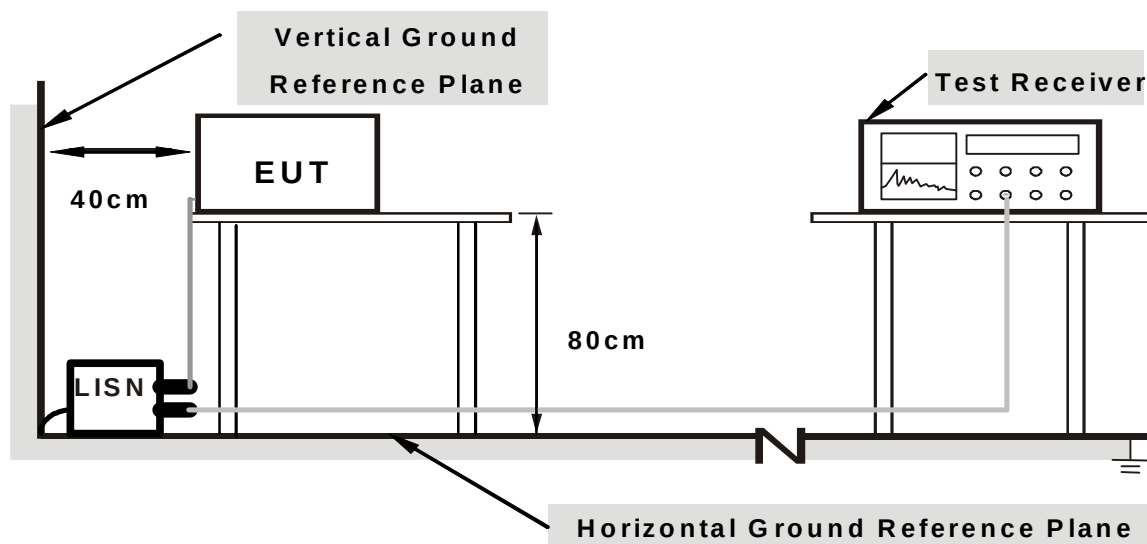
NOTE:

- The resolution bandwidth of test receiver is 9kHz for Quasi-peak detection (QP) & Average detection (AV).

5.1.4 DEVIATION FROM TEST STANDARD

No deviation

5.1.5 TEST SETUP



Note: 1.Support units were connected to second LISN.

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

5.1.6 EUT OPERATING CONDITIONS

Same as the 4.1.6

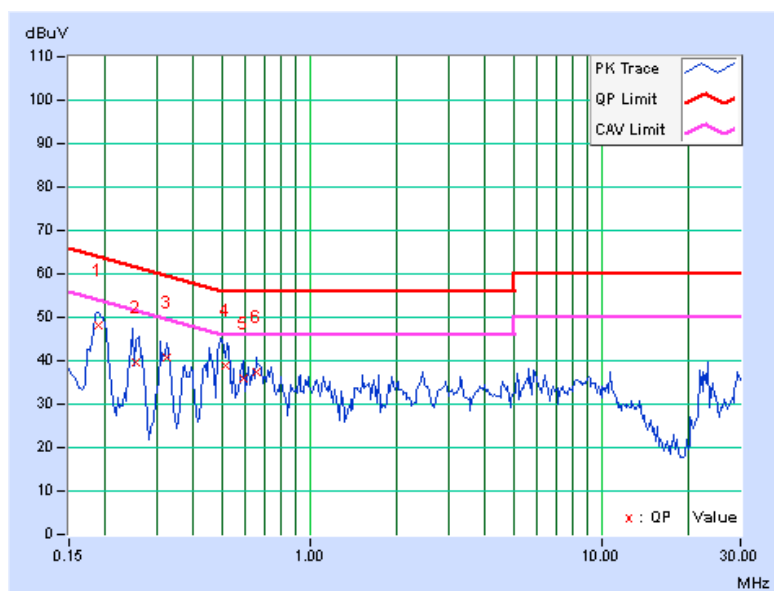
5.1.7 TEST RESULTS

PHASE	Line (L)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
-------	----------	----------------------	-----------------------------------

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18906	0.10	48.22	42.01	48.32	42.11	64.08	54.08	-15.76	-11.97
2	0.25547	0.11	39.48	34.28	39.59	34.39	61.58	51.58	-21.99	-17.19
3	0.32578	0.13	40.57	37.28	40.70	37.41	59.56	49.56	-18.86	-12.15
4	0.51675	0.15	38.92	35.91	39.07	36.06	56.00	46.00	-16.93	-9.94
5	0.59141	0.15	35.89	32.97	36.04	33.12	56.00	46.00	-19.96	-12.88
6	0.65781	0.15	37.34	34.43	37.49	34.58	56.00	46.00	-18.51	-11.42

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

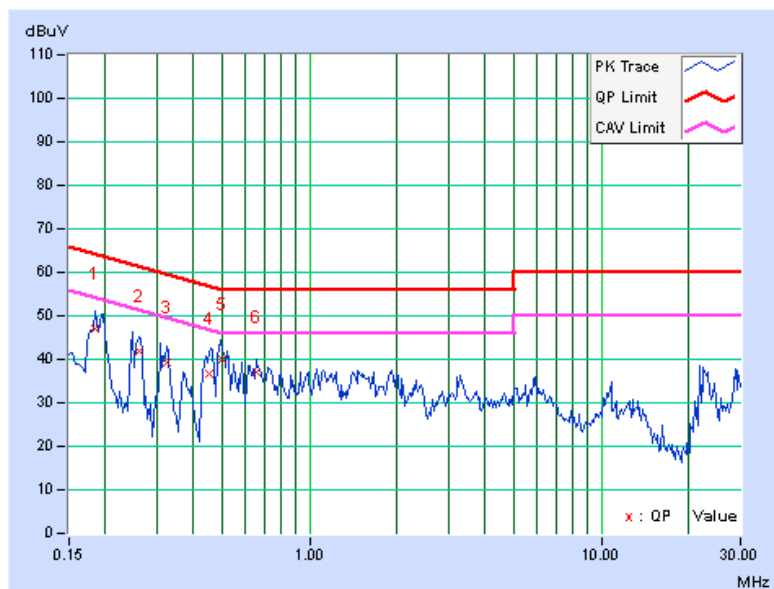


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor	[dB (uV)]	[dB (uV)]	[dB (uV)]	[dB (uV)]	[dB (uV)]	[dB (uV)]	(dB)	(dB)
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18516	0.10	46.98	36.75	47.08	36.85	64.25	54.25	-17.17	-17.40
2	0.25938	0.11	41.84	34.62	41.95	34.73	61.45	51.45	-19.50	-16.72
3	0.32578	0.13	39.23	34.73	39.36	34.86	59.56	49.56	-20.20	-14.70
4	0.45184	0.14	36.42	33.72	36.56	33.86	56.84	46.84	-20.28	-12.98
5	0.50000	0.15	39.80	38.22	39.95	38.37	56.00	46.00	-16.05	-7.63
6	0.65781	0.15	36.96	34.09	37.11	34.24	56.00	46.00	-18.89	-11.76

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



5.2 RADIATED AND BANDEDGE EMISSION MEASUREMENT

5.2.1 LIMITS OF RADIATED AND BANDEDGE EMISSION MEASUREMENT

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

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

NOTE:

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

5.2.2 TEST INSTRUMENTS

For below 1GHz test

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY51210105	Jan. 21,2014	Jan. 20,2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 13, 2013	Nov. 12, 2014
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Mar. 19, 2013	Mar. 18, 2014
RF Cable	NA	CHGCAB_001	Oct. 05, 2013	Oct. 04, 2014
Spectrum Analyzer R&S	FSV40	100964	July 15, 2013	July 14, 2014
Horn_Antenna AISI	AIH.8018	0000320091110	Nov. 18, 2013	Nov. 17, 2014
Pre-Amplifier Agilent	8449B	3008A02578	June 25, 2013	June 24, 2014
RF Cable	NA	RF104-201 RF104-203 RF104-204	Dec. 12, 2013	Dec. 11, 2014
Spectrum Analyzer Agilent	E4446A	MY48250253	Aug. 28, 2013	Aug. 27, 2014
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 13, 2013	Nov. 12, 2014
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 08, 2013	Oct. 07, 2014
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
- 3 The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
- 5 The VCCI Site Registration No. is G-137.
- 6 The CANADA Site Registration No. is IC 7450H-2.
- 7 Tested Date: Feb. 13, 2014



A D T

For above 1GHz test

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY50010156	Jan. 15, 2014	Jan. 14, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-04	Nov. 13, 2013	Nov. 12, 2014
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Mar. 25, 2013	Mar. 24, 2014
RF Cable	NA	CHHCAB_001	Oct. 06, 2013	Oct. 05, 2014
Spectrum Analyzer R&S	FSV40	100964	July 15, 2013	July 14, 2014
Horn_Antenna AISl	AIH.8018	0000220091110	Dec. 06, 2013	Dec. 05, 2014
Pre-Amplifier Agilent	8449B	3008A01923	Oct. 29, 2013	Oct. 28, 2014
RF Cable	NA	RF104-205 RF104-207 RF104-202	Dec. 12, 2013	Dec. 11, 2014
Spectrum Analyzer Agilent	E4446A	MY48250253	Aug. 28, 2013	Aug. 27, 2014
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 13, 2013	Nov. 12, 2014
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 08, 2013	Oct. 07, 2014
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
- 3 The test was performed in 966 Chamber No. H.
4. The FCC Site Registration No. is 797305.
- 5 The CANADA Site Registration No. is IC 7450H-3.
- 6 Tested Date: Feb. 13, 2014

5.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters 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:

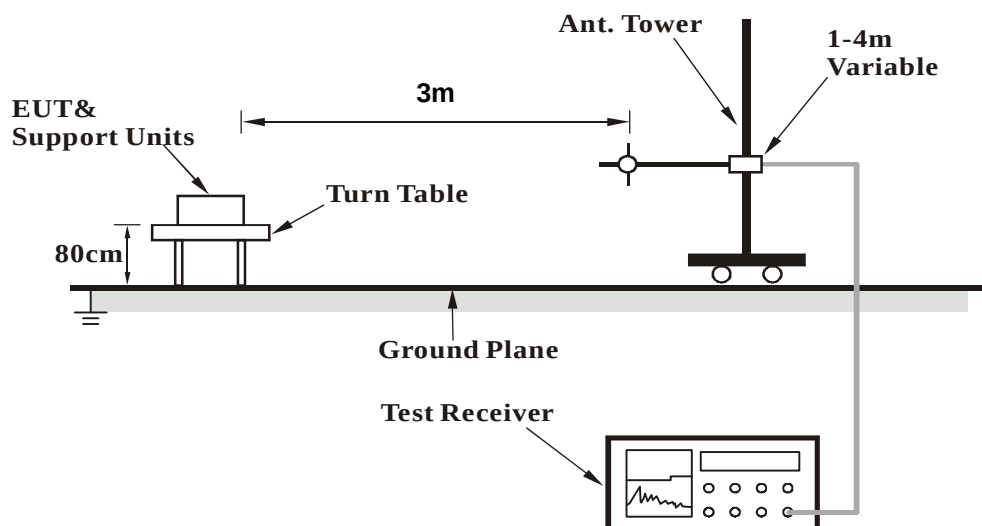
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (Duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor ($10 \log(1/\text{duty cycle})$).
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

5.2.4 DEVIATION FROM TEST STANDARD

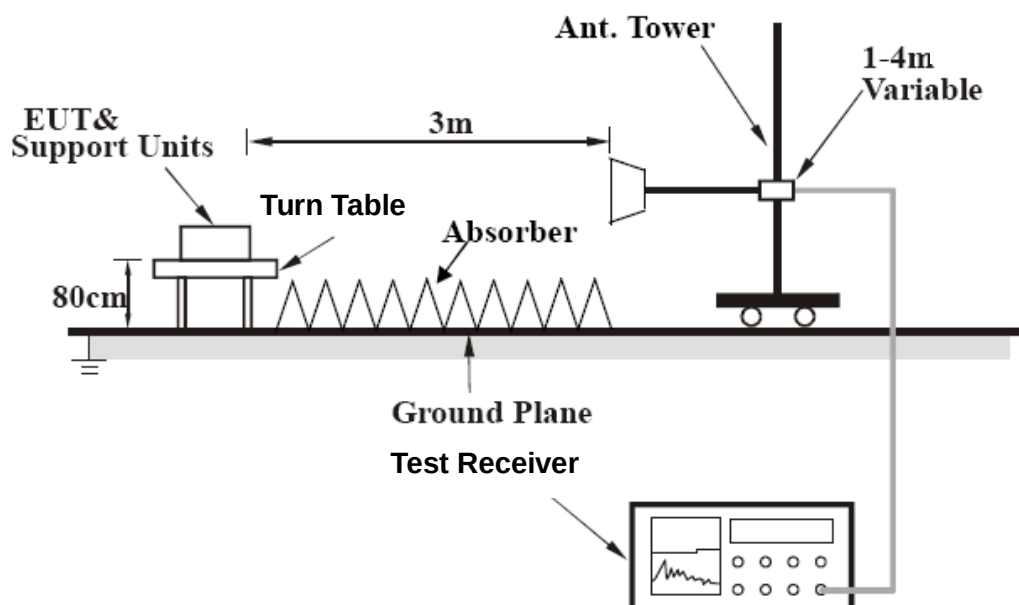
No deviation

5.2.5 TEST SETUP

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

5.2.6 EUT OPERATING CONDITIONS

Same as the 4.1.6

5.2.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

802.11a

CHANNEL	TX Channel 165	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	Below 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	108.81	39.2 QP	43.5	-4.3	1.50 H	306	55.50	-16.28
2	250.00	36.2 QP	46.0	-9.8	1.00 H	285	50.55	-14.31
3	340.01	39.7 QP	46.0	-6.3	1.00 H	32	51.13	-11.39
4	680.00	35.8 QP	46.0	-10.2	1.00 H	321	39.65	-3.89
5	875.02	44.9 QP	46.0	-1.1	1.50 H	207	45.34	-0.48
6	1000.00	41.7 QP	54.0	-12.3	1.00 H	277	40.25	1.41
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	50.61	37.5 QP	40.0	-2.5	1.00 V	31	51.13	-13.59
2	64.78	35.6 QP	40.0	-4.4	1.00 V	316	50.32	-14.71
3	340.01	35.3 QP	46.0	-10.7	1.50 V	0	46.73	-11.39
4	680.00	39.3 QP	46.0	-6.7	2.00 V	345	43.19	-3.89
5	849.99	42.5 QP	46.0	-3.5	1.00 V	162	43.34	-0.88
6	875.02	40.5 QP	46.0	-5.6	1.00 V	45	40.93	-0.48

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

ABOVE 1GHz DATA

802.11a

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5745.00	102.1 PK			1.62 H	128	57.62	44.48
2	*5745.00	90.4 AV			1.62 H	128	45.92	44.48
3	11490.00	53.8 PK	74.0	-20.2	1.00 H	51	2.18	51.62
4	11490.00	42.2 AV	54.0	-11.8	1.00 H	51	-9.42	51.62
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	*5745.00	107.0 PK			1.00 V	75	62.52	44.48
2	*5745.00	95.5 AV			1.00 V	75	51.02	44.48
3	11490.00	56.2 PK	74.0	-17.8	1.45 V	4	4.58	51.62
4	11490.00	43.5 AV	54.0	-10.5	1.45 V	4	-8.12	51.62

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 157	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5785.00	102.4 PK			1.56 H	114	57.88	44.52
2	*5785.00	90.9 AV			1.56 H	114	46.38	44.52
3	11570.00	53.7 PK	74.0	-20.3	1.04 H	36	2.21	51.49
4	11570.00	41.9 AV	54.0	-12.1	1.04 H	36	-9.59	51.49
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	*5785.00	106.9 PK			1.06 V	98	62.38	44.52
2	*5785.00	95.1 AV			1.06 V	98	50.58	44.52
3	11570.00	57.4 PK	74.0	-16.6	1.43 V	9	5.91	51.49
4	11570.00	44.6 AV	54.0	-9.4	1.43 V	9	-6.89	51.49

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 165	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5825.00	102.6 PK			1.57 H	116	58.01	44.59
2	*5825.00	91.1 AV			1.57 H	116	46.51	44.59
3	11650.00	53.8 PK	74.0	-20.2	1.03 H	48	2.39	51.41
4	11650.00	42.4 AV	54.0	-11.6	1.03 H	48	-9.01	51.41
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	*5825.00	107.2 PK			1.01 V	89	62.61	44.59
2	*5825.00	95.3 AV			1.01 V	89	50.71	44.59
3	11650.00	56.4 PK	74.0	-17.6	1.38 V	9	4.99	51.41
4	11650.00	43.7 AV	54.0	-10.3	1.38 V	9	-7.71	51.41

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.
6. The limit value is defined as per 15.247.

802.11n (HT20)

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5745.00	102.9 PK			1.60 H	138	58.42	44.48
2	*5745.00	90.8 AV			1.60 H	138	46.32	44.48
3	11490.00	53.9 PK	74.0	-20.1	1.00 H	62	2.28	51.62
4	11490.00	42.4 AV	54.0	-11.6	1.00 H	62	-9.22	51.62
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	*5745.00	107.2 PK			1.03 V	90	62.72	44.48
2	*5745.00	95.9 AV			1.03 V	90	51.42	44.48
3	11490.00	56.1 PK	74.0	-17.9	1.44 V	14	4.48	51.62
4	11490.00	43.3 AV	54.0	-10.7	1.44 V	14	-8.32	51.62

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 157	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5785.00	102.8 PK			1.65 H	123	58.28	44.52
2	*5785.00	90.7 AV			1.65 H	123	46.18	44.52
3	11570.00	53.7 PK	74.0	-20.3	1.00 H	36	2.21	51.49
4	11570.00	42.2 AV	54.0	-11.8	1.00 H	36	-9.29	51.49
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	*5785.00	106.8 PK			1.03 V	91	62.28	44.52
2	*5785.00	95.2 AV			1.03 V	91	50.68	44.52
3	11570.00	56.8 PK	74.0	-17.2	1.41 V	10	5.31	51.49
4	11570.00	44.6 AV	54.0	-9.4	1.41 V	10	-6.89	51.49

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 165	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5825.00	103.5 PK			1.61 H	129	58.91	44.59
2	*5825.00	91.2 AV			1.61 H	129	46.61	44.59
3	11650.00	54.1 PK	74.0	-19.9	1.11 H	42	2.69	51.41
4	11650.00	42.4 AV	54.0	-11.6	1.11 H	42	-9.01	51.41
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	*5825.00	107.2 PK			1.02 V	90	62.61	44.59
2	*5825.00	95.7 AV			1.02 V	90	51.11	44.59
3	11650.00	57.1 PK	74.0	-16.9	1.41 V	8	5.69	51.41
4	11650.00	44.1 AV	54.0	-9.9	1.41 V	8	-7.31	51.41

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 151	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5755.00	97.4 PK			1.62 H	131	52.91	44.49
2	*5755.00	85.4 AV			1.62 H	131	40.91	44.49
3	11510.00	54.1 PK	74.0	-19.9	1.03 H	47	2.49	51.61
4	11510.00	42.6 AV	54.0	-11.4	1.03 H	47	-9.01	51.61
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	*5755.00	103.3 PK			1.03 V	90	58.81	44.49
2	*5755.00	92.1 AV			1.03 V	90	47.61	44.49
3	11510.00	56.9 PK	74.0	-17.1	1.36 V	20	5.29	51.61
4	11510.00	43.6 AV	54.0	-10.4	1.36 V	20	-8.01	51.61

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 159	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5795.00	97.9 PK			1.62 H	132	53.36	44.54
2	*5795.00	85.9 AV			1.62 H	132	41.36	44.54
3	11590.00	54.1 PK	74.0	-19.9	1.00 H	42	2.66	51.44
4	11590.00	42.7 AV	54.0	-11.3	1.00 H	42	-8.74	51.44
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	*5795.00	103.6 PK			1.02 V	91	59.06	44.54
2	*5795.00	92.7 AV			1.02 V	91	48.16	44.54
3	11590.00	57.0 PK	74.0	-17.0	1.34 V	22	5.56	51.44
4	11590.00	43.6 AV	54.0	-10.4	1.34 V	22	-7.84	51.44

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.

5.3 6dB BANDWIDTH MEASUREMENT

5.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

5.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSP40	100036	Jan. 21, 2014	Jan. 20, 2015

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. Tested date : Feb. 13, 2014

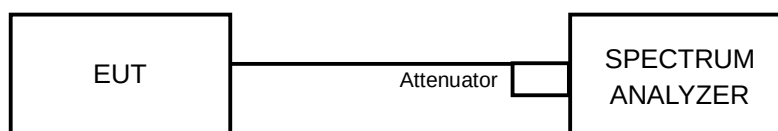
5.3.3 TEST PROCEDURE

1. Set resolution bandwidth (RBW) = 100kHz
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
3. Trace mode = max hold.
4. Sweep = auto couple.
5. 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

5.3.4 DEVIATION FROM TEST STANDARD

No deviation

5.3.5 TEST SETUP



5.3.6 EUT OPERATING CONDITIONS

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

5.3.7 TEST RESULTS

802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
149	5745	16.45	16.43	0.5	PASS
157	5785	16.41	16.44	0.5	PASS
165	5825	16.45	16.43	0.5	PASS

802.11n (HT20)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
149	5745	17.72	17.83	0.5	PASS
157	5785	17.71	17.77	0.5	PASS
165	5825	17.69	17.77	0.5	PASS

802.11n (HT40)

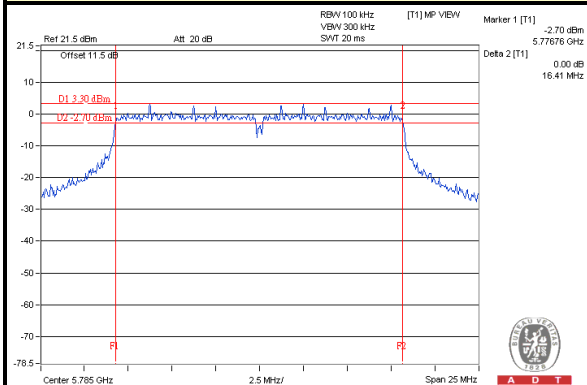
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
151	5755	35.98	36.20	0.5	PASS
159	5795	35.99	36.40	0.5	PASS



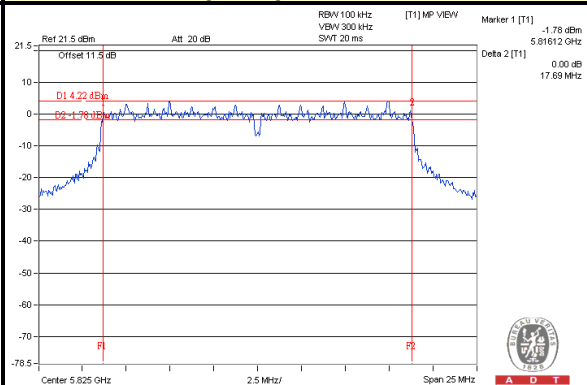
A D T

SPECTRUM PLOT OF WORST VALUE

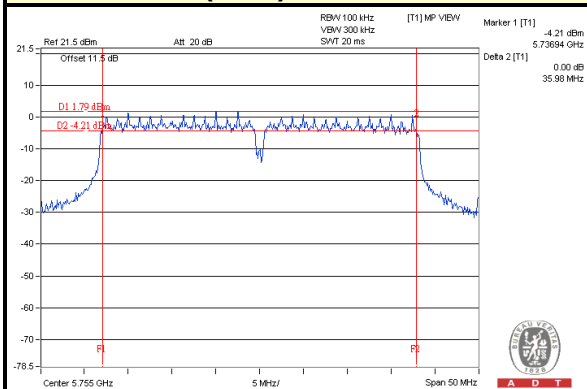
802.11a_Chain 0 / CH157



802.11n (HT20)_Chain 0 / CH165



802.11n (HT40)_Chain 0 / CH151



5.4 CONDUCTED OUTPUT POWER MEASUREMENT

5.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

For systems using digital modulation in the 5725 –5850 MHz band: 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 $NANT \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any NANT;

Array Gain = $5 \log(NANT/NSS)$ dB or 3 dB, whichever is less for 20-MHz channel widths with $NANT \geq 5$.

For power measurements on all other devices: Array Gain = $10 \log(NANT/NSS)$ dB.

5.4.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power meter Anritsu	ML2495A	0824006	May 20, 2013	May 19, 2014
Power sensor Anritsu	MA2411B	0738172	May 20, 2013	May 19, 2014

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. Tested date : Feb. 13, 2014

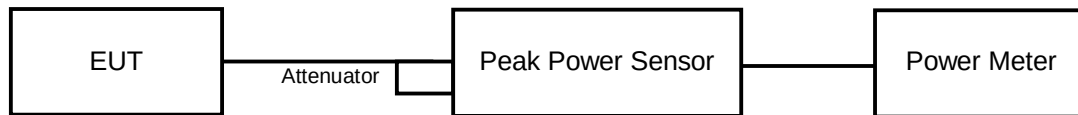
5.4.3 TEST PROCEDURES

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

5.4.4 DEVIATION FROM TEST STANDARD

No deviation.

5.4.5 TEST SETUP



5.4.6 EUT OPERATING CONDITIONS

Same as Item 5.3.6

5.4.7 TEST RESULTS

802.11a

CHANNEL	FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
149	5745	22.77	23.16	396.248	25.98	30	PASS
157	5785	22.73	23.18	395.469	25.97	30	PASS
165	5825	22.75	23.25	399.714	26.02	30	PASS

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
149	5745	22.81	23.47	413.316	26.16	30	PASS
157	5785	22.83	23.37	409.137	26.12	30	PASS
165	5825	22.79	23.28	402.922	26.05	30	PASS

802.11n (HT40)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
151	5755	22.82	23.18	399.396	26.01	30	PASS
159	5795	22.85	23.21	402.163	26.04	30	PASS

5.5 AVERAGE OUTPUT POWER

5.5.1 FOR REFERENCE

5.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power meter Anritsu	ML2495A	0824006	May 20, 2013	May 19, 2014
Power sensor Anritsu	MA2411B	0738172	May 20, 2013	May 19, 2014

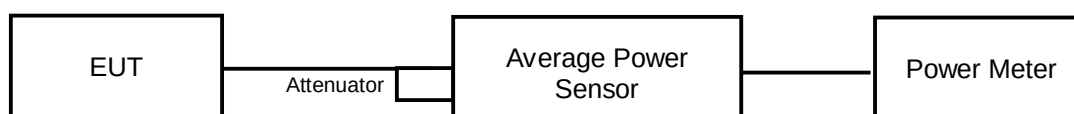
Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Feb. 13, 2014

5.5.3 TEST PROCEDURES

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

5.5.4 TEST SETUP



5.5.5 EUT OPERATING CONDITIONS

Same as Item 4.3.6

5.5.6 TEST RESULTS

802.11a

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1		
149	5745	14.67	15.42	64.143	18.07
157	5785	14.69	15.28	63.173	18.01
165	5825	14.65	15.07	61.311	17.88

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1		
149	5745	14.68	15.37	63.811	18.05
157	5785	14.63	15.29	62.846	17.98
165	5825	14.66	15.18	62.203	17.94

802.11n (HT40)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1		
151	5755	14.59	15.35	63.051	18.00
159	5795	14.58	15.16	61.518	17.89

5.6 POWER SPECTRAL DENSITY MEASUREMENT

5.6.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

5.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSP 40	100036	Jan. 21, 2014	Jan. 20, 2015

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. Tested date : Feb. 13, 2014

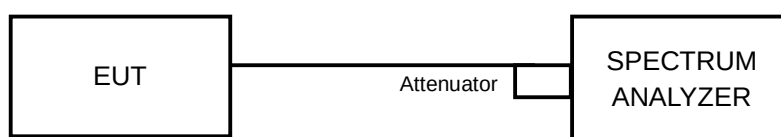
5.6.3 TEST PROCEDURE

1. Set the RBW = 3 kHz, VBW = 10 kHz, Detector = peak.
2. Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
3. Use the peak marker function to determine the maximum amplitude level.

5.6.4 DEVIATION FROM TEST STANDARD

No deviation

5.6.5 TEST SETUP



5.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6

5.6.7 TEST RESULTS

802.11a

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD (dBm)	10 log (N=2) dB	TOTAL PSD (dBm)	LIMIT (dBm)	PASS /FAIL
0	149	5745	-5.55	3.01	-2.54	8	PASS
	157	5785	-11.61	3.01	-8.60	8	PASS
	165	5825	-7.31	3.01	-4.30	8	PASS
1	149	5745	-10.88	3.01	-7.87	8	PASS
	157	5785	-9.77	3.01	-6.76	8	PASS
	165	5825	-11.27	3.01	-8.26	8	PASS

NOTE: 1. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 1.76\text{dBi} > 6\text{dBi}$, so the power density limit shall not be reduced

802.11n (HT20)

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD (dBm)	10 log (N=2) dB	TOTAL PSD (dBm)	LIMIT (dBm)	PASS /FAIL
0	149	5745	-8.43	3.01	-5.42	8	PASS
	157	5785	-11.65	3.01	-8.64	8	PASS
	165	5825	-10.03	3.01	-7.02	8	PASS
1	149	5745	-6.13	3.01	-3.12	8	PASS
	157	5785	-11.11	3.01	-8.10	8	PASS
	165	5825	-10.02	3.01	-7.01	8	PASS

802.11n (HT40)

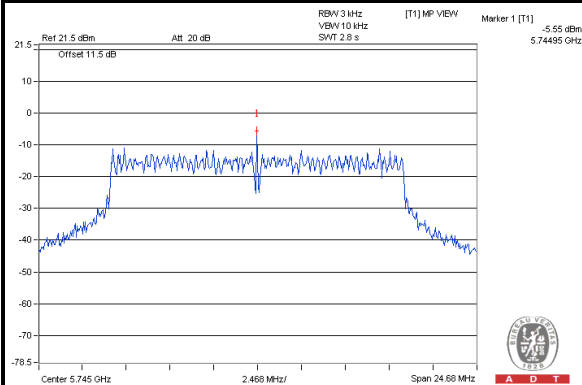
TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD (dBm)	10 log (N=2) dB	TOTAL PSD (dBm)	LIMIT (dBm)	PASS /FAIL
0	151	5755	-15.04	3.01	-12.03	8	PASS
	159	5795	-7.36	3.01	-4.35	8	PASS
1	151	5755	-4.27	3.01	-1.26	8	PASS
	159	5795	-8.21	3.01	-5.20	8	PASS



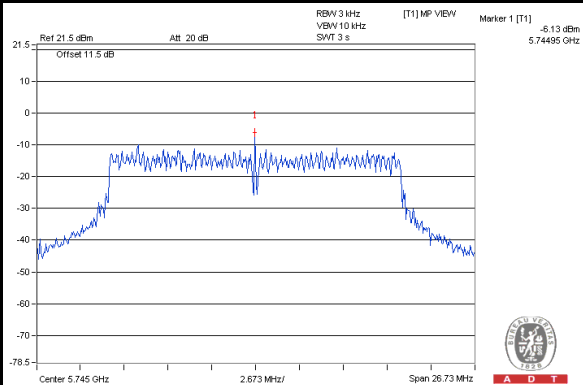
A D T

SPECTRUM PLOT OF WORST VALUE

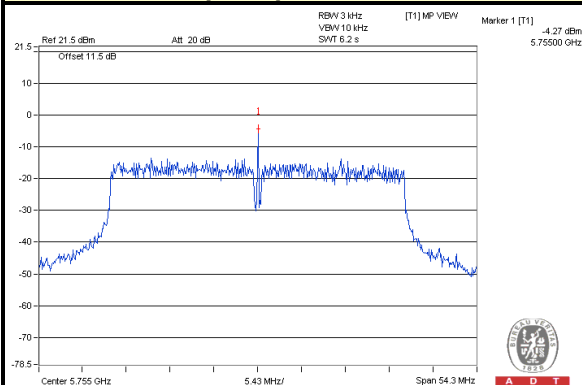
802.11a Chain 0 / CH149



802.11n (HT20) Chain 1 / CH149



802.11n (HT40) Chain 1 / CH151





A D T

5.7 CONDUCTED OUT-BAND EMISSION MEASUREMENT

5.7.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

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

5.7.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSP 40	100036	Jan. 21, 2014	Jan. 20, 2015

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. Tested date : Feb. 13, 2014

5.7.3 TEST PROCEDURE

Measurement Procedure - Reference Level

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.

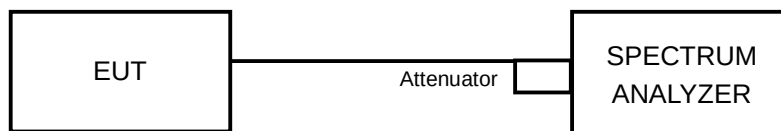
Measurement Procedure –Unwanted Emission Level

1. Set RBW = 100 kHz.
2. Set VBW $\geq$ 300 kHz.
3. Set span to encompass the spectrum to be examined
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.

5.7.4 DEVIATION FROM TEST STANDARD

No deviation

5.7.5 TEST SETUP



5.7.6 EUT OPERATING CONDITION

Same as Item 4.3.6

5.7.7 TEST RESULTS

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

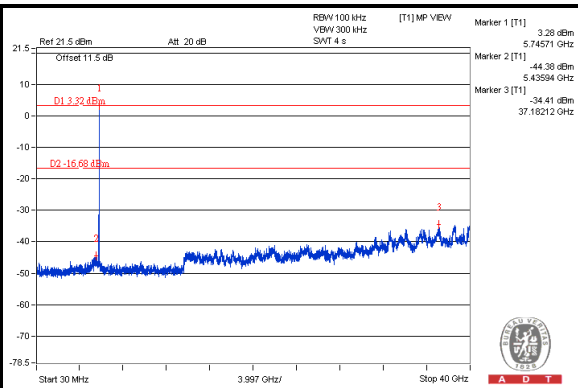
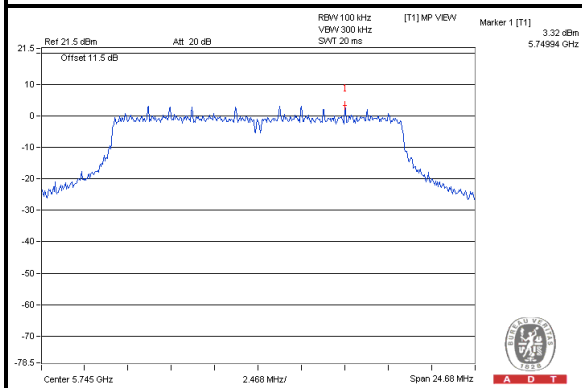


A D T

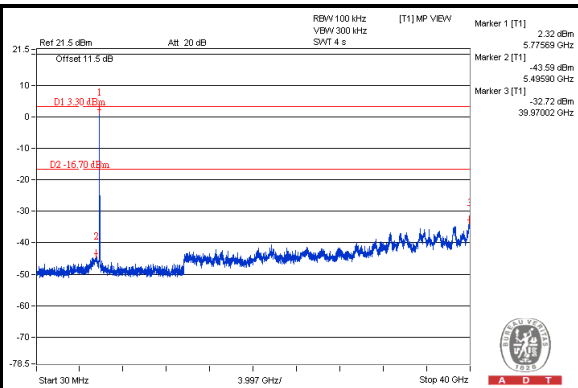
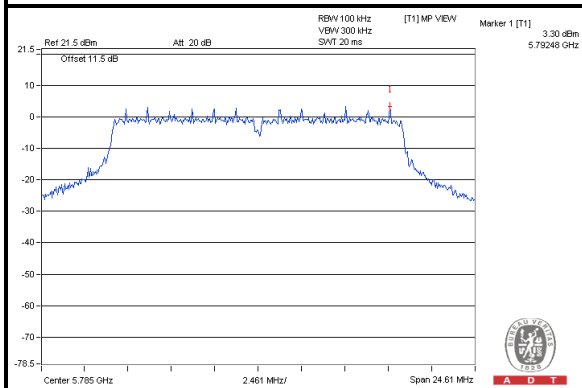
802.11a:

Chain 0

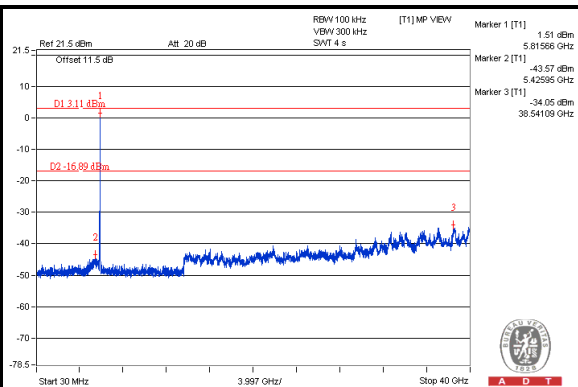
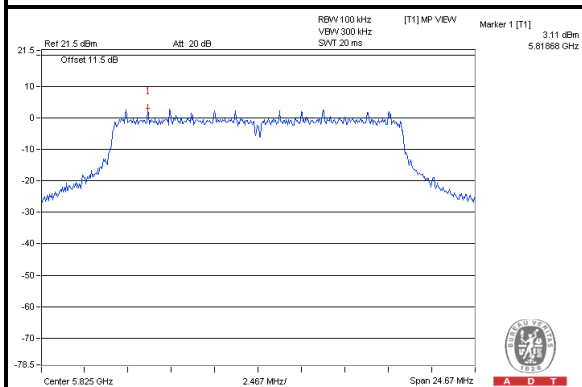
CH 149



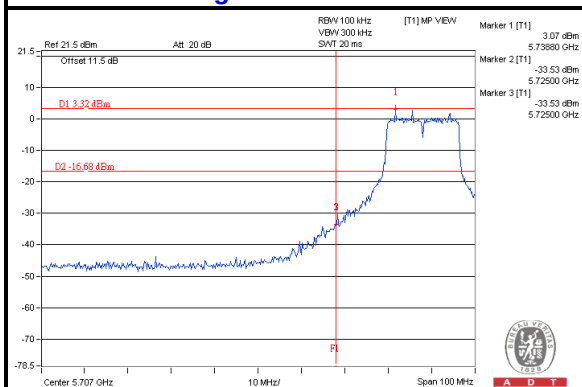
CH 157



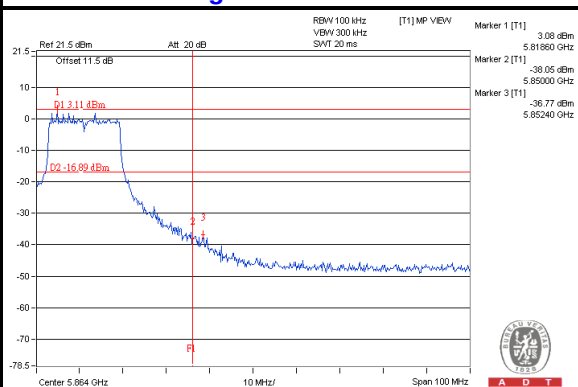
CH 165



CH 149 Band edge



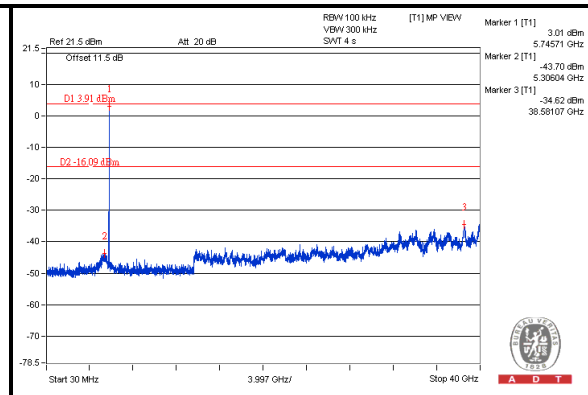
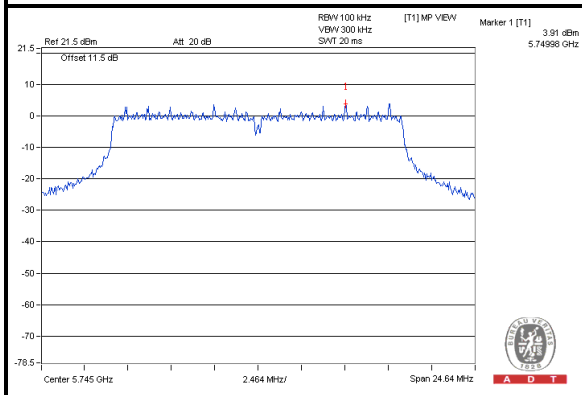
CH 165 Band edge



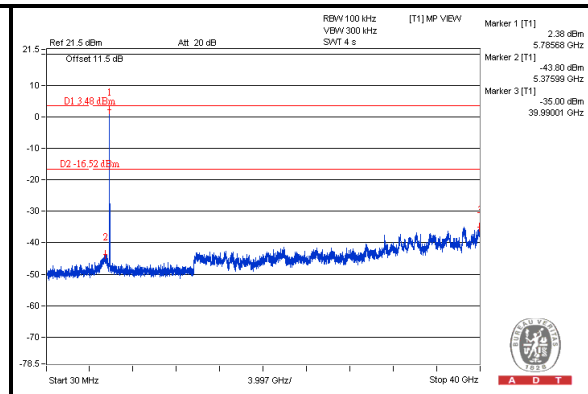
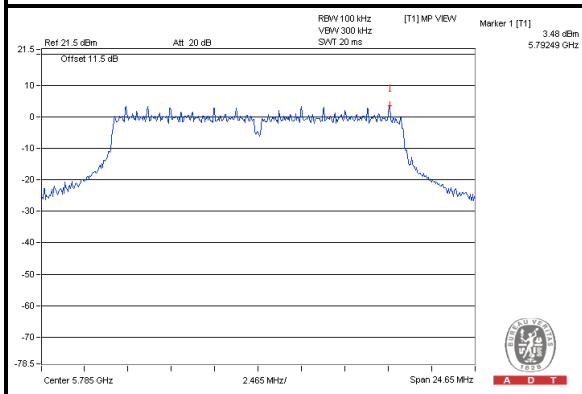


A D T

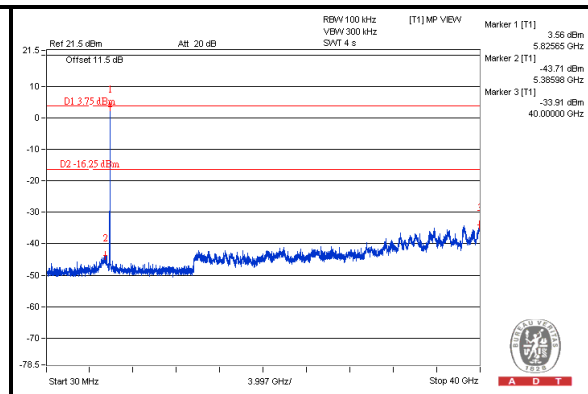
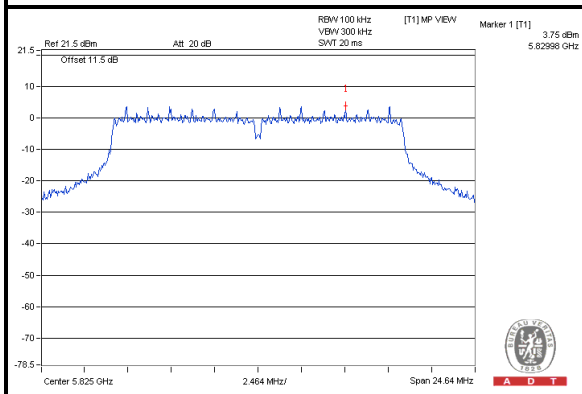
Chain 1 CH 149



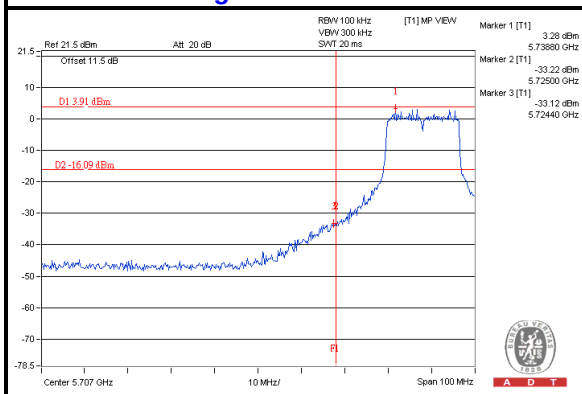
CH 157



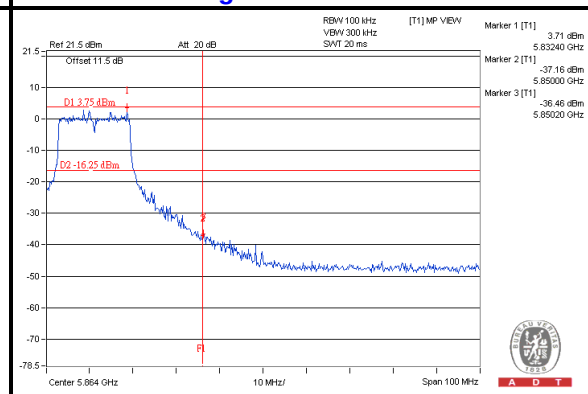
CH 165



CH 149 Band edge



CH 165 Band edge



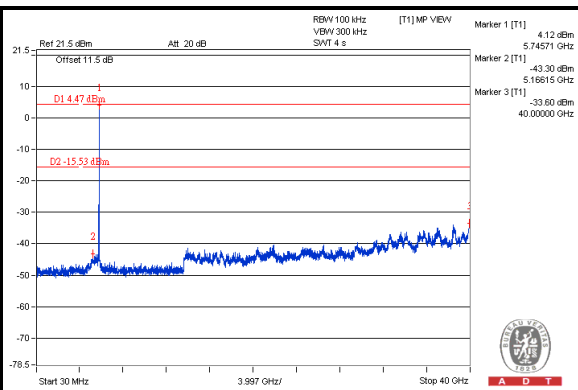
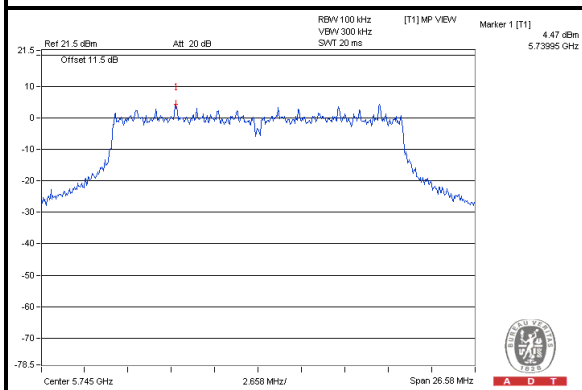


A D T

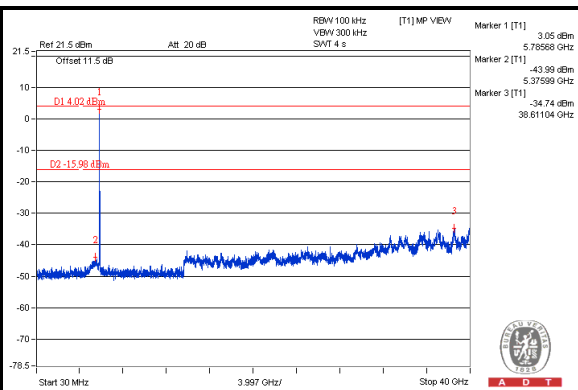
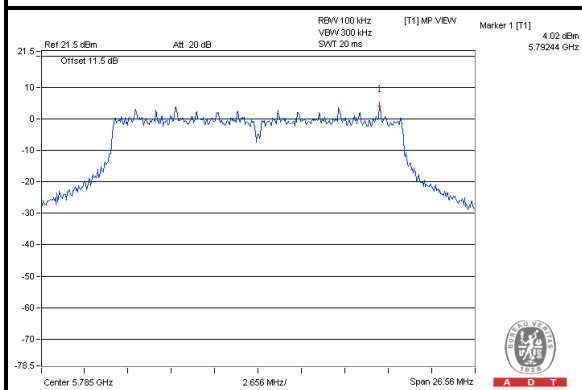
802.11n (HT20):

Chain 0

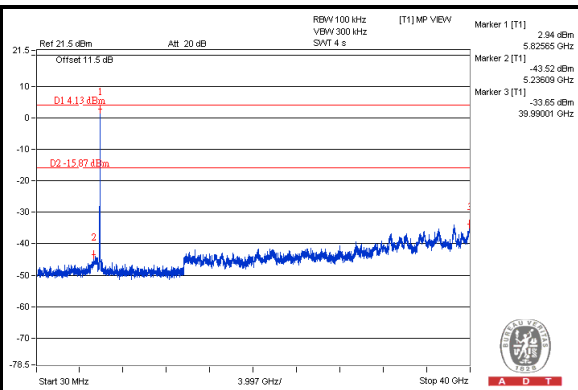
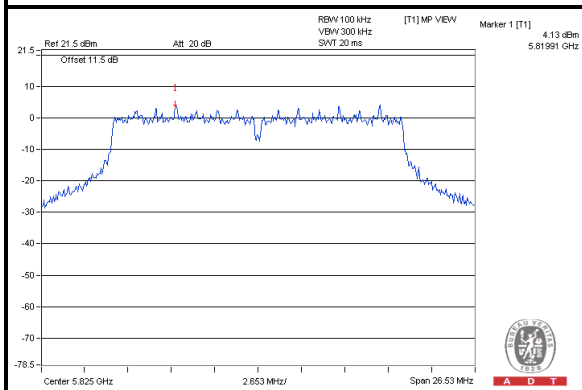
CH 149



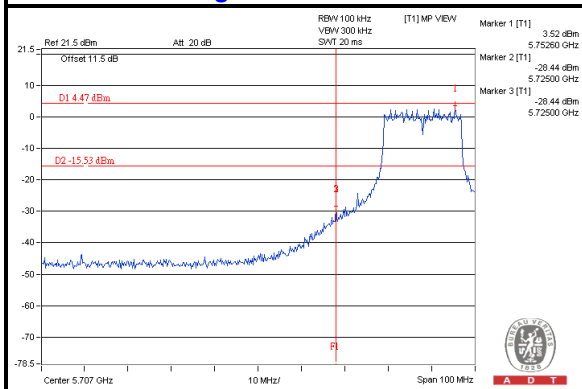
CH 157



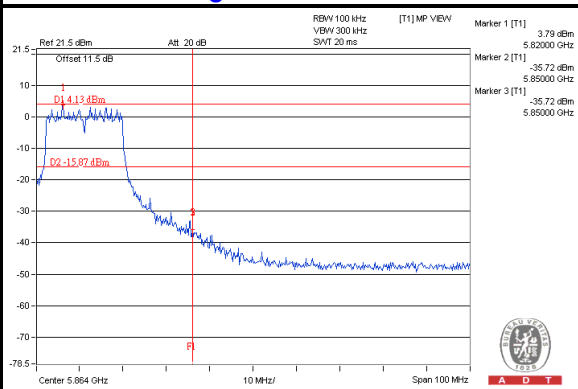
CH 165



CH 149 Band edge



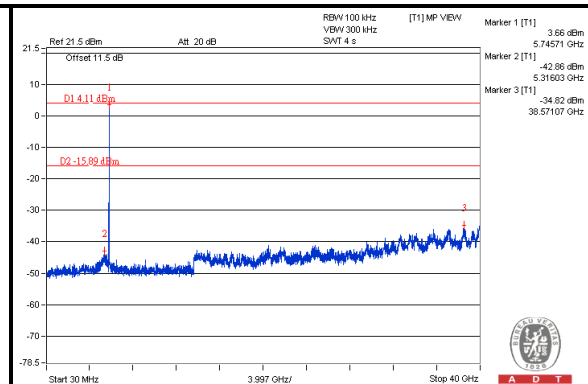
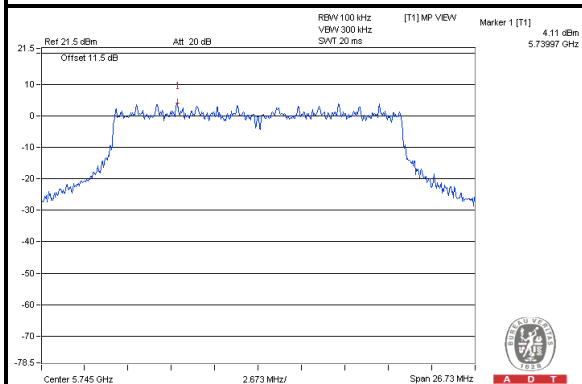
CH 165 Band edge



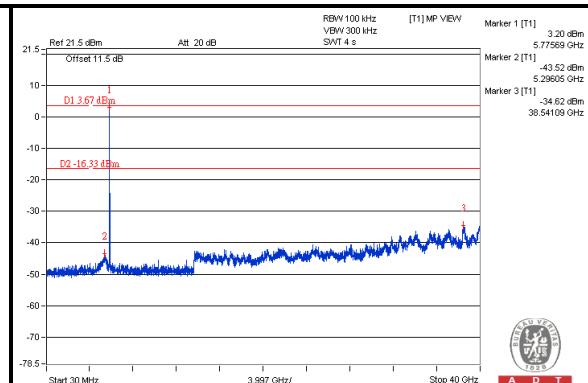
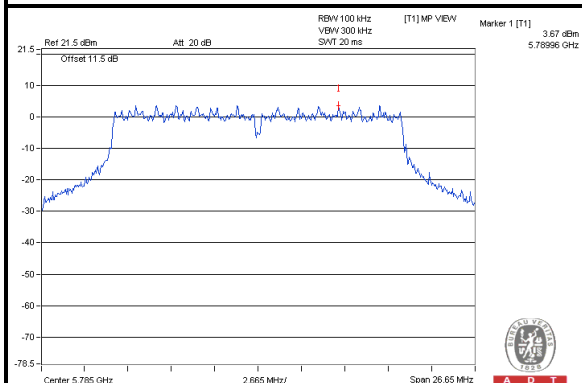


A D T

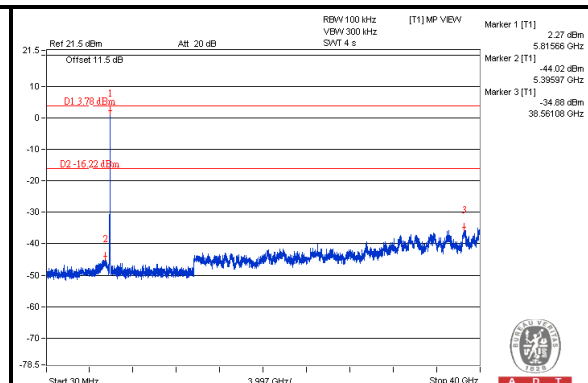
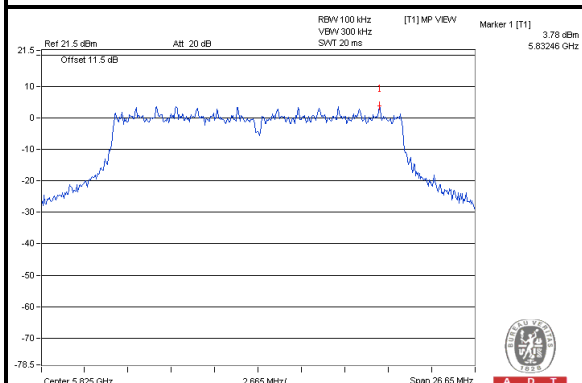
Chain 1 CH 149



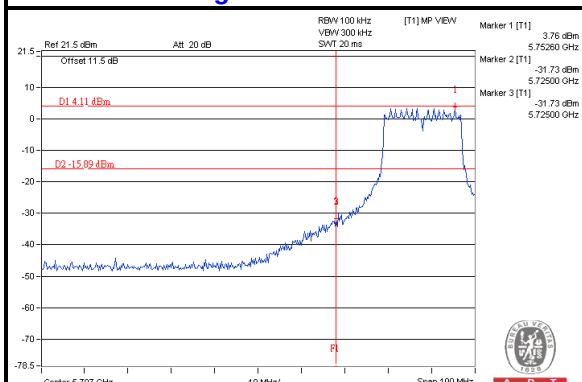
CH 157



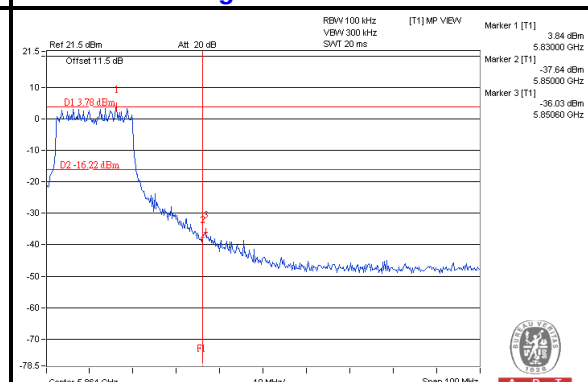
CH 165



CH 149 Band edge



CH 165 Band edge



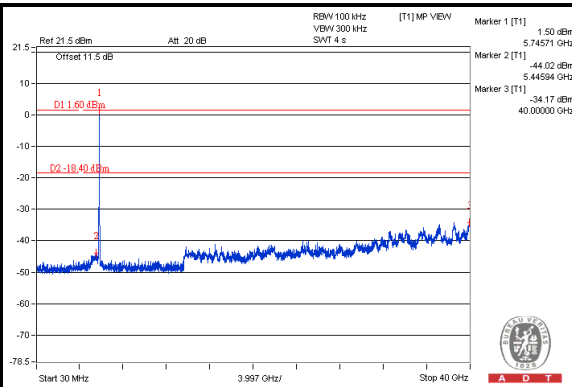
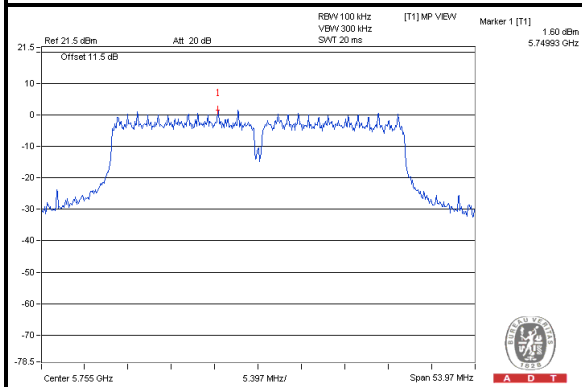


A D T

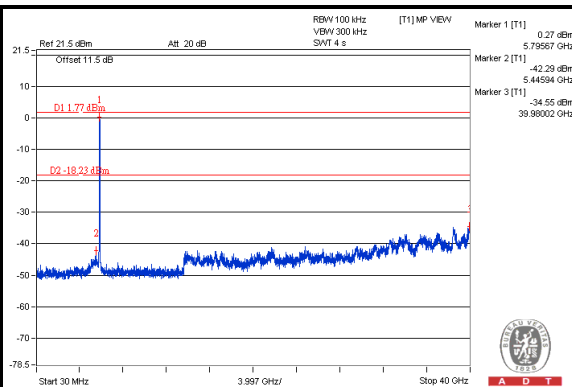
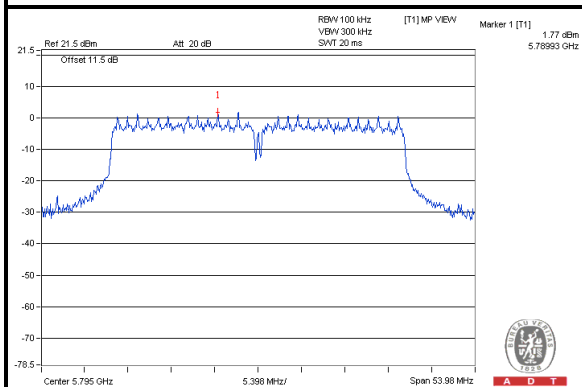
802.11n (HT40):

Chain 0

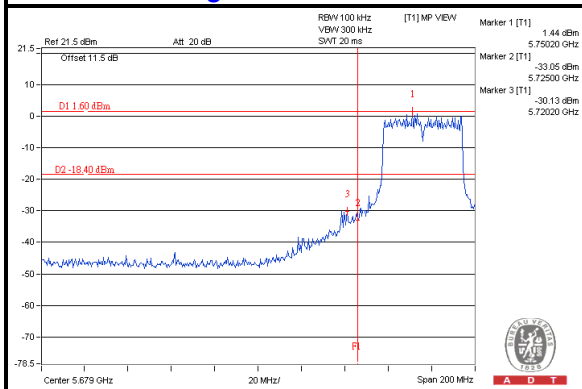
CH 151



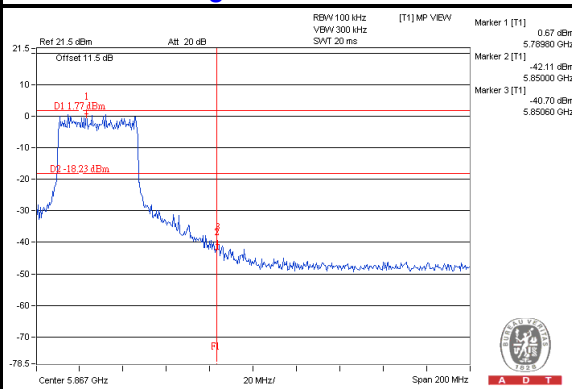
CH 159



CH 151 Band edge



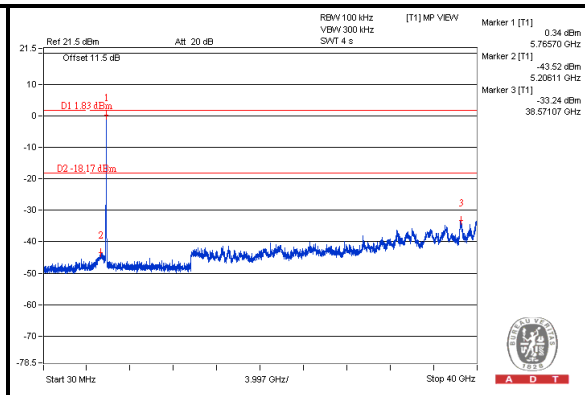
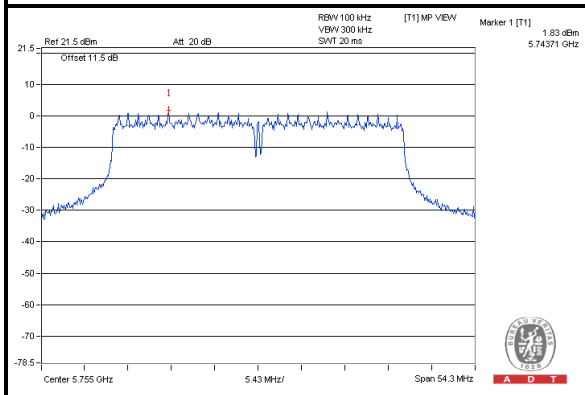
CH 159 Band edge



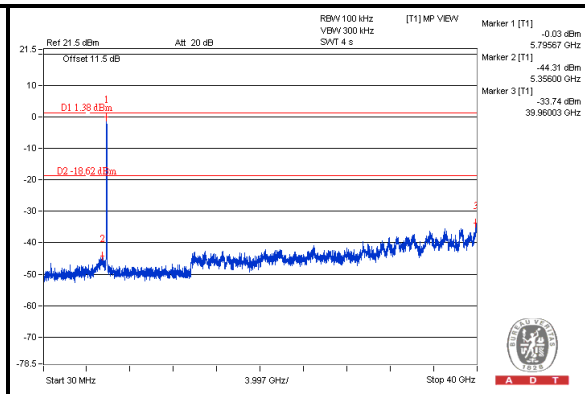
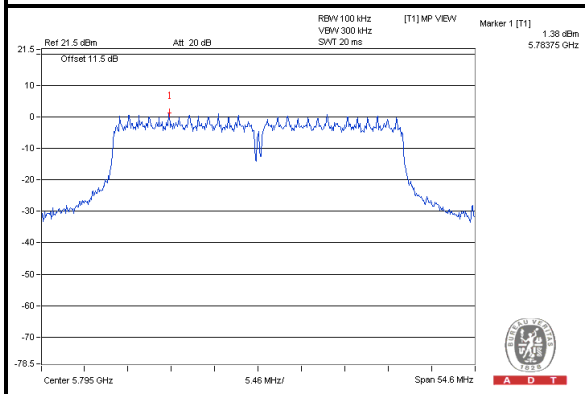


A D T

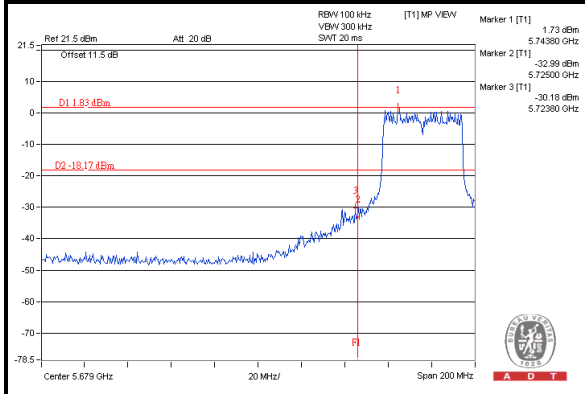
Chain 1 CH 151



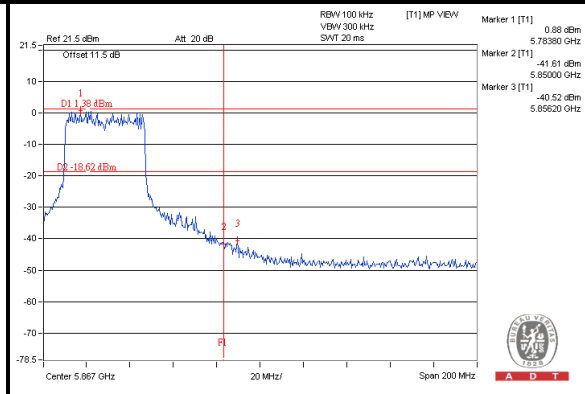
CH 159



CH 151 Band edge



CH 159 Band edge



6. PHOTOGRAPHS OF THE TEST CONFIGURATION

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

7. 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: 886-2-26052943

Hsin Chu EMC/RF Lab:

Tel: 886-3-5935343

Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety/Telecom 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.



A D T

8. APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

--- END ---