



FCC TEST REPORT (15.247)

REPORT NO.: RF141017C16
MODEL NO.: E100-AVL
FCC ID: QYLE100AVL2
RECEIVED: Oct. 17, 2014
TESTED: Oct. 28, 2014 ~ Nov. 06, 2014
ISSUED: Dec. 02, 2014

APPLICANT: Getac Technology Corporation.

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

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TEST LOCATION: No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF141017C16	Original release	Dec. 02, 2014



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1. CERTIFICATION

PRODUCT: Rugged PC
MODEL NO.: E100-AVL
BRAND: Getac
APPLICANT: Getac Technology Corporation.
TESTED: Oct. 28, 2014 ~ Nov. 06, 2014
TEST SAMPLE: Identical Prototype
STANDARDS: **FCC Part 15, Subpart C (Section 15.247)**
ANSI C63.10-2009

The above equipment (model: E100-AVL) 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 : Gina Liu , **DATE** : Dec. 02, 2014
Gina Liu / Specialist

APPROVED BY : Sam Chen , **DATE** : Dec. 02, 2014
Sam Chen / Senior Project Engineer

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

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 -13.57dB at 0.76789MHz.
15.205 & 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -3.90dB at 2484.00MHz.
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used.

2.1 MEASUREMENT UNCERTAINTY

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

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	2.93 dB
	200MHz ~1000MHz	2.95 dB
	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

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



3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	Rugged PC
MODEL NO.	E100-AVL
POWER SUPPLY	19.0Vdc (adapter) 14.4Vdc (battery)
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b: 11.0 / 5.5 / 2.0 / 1.0 Mbps 802.11g: 54.0 / 48.0 / 36.0 / 24.0 / 18.0 / 12.0 / 9.0 / 6.0 Mbps 802.11n: up to MCS7
OPERATING FREQUENCY	2412 ~ 2462MHz
NUMBER OF CHANNEL	11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (40MHz)
OUTPUT POWER	133.97mW for 2412 ~ 2462MHz
ANTENNA TYPE	Main: PIFA antenna with 3.48dBi gain Aux: PIFA antenna with 3.71dBi gain
ANTENNA CONNECTOR	NA
DATA CABLE	Refer to Note as below
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	Refer to Note as below

NOTE:

1. The EUT contains following accessory devices.

ITEM	BRAND	MODEL	SPECIFICATION
Adapter	Delta	ADP-90MD H	I/P: 100-240Vac, 1.5A O/P: 19Vdc, 4.74A
Battery	Getac	E100AVL Battery Pack	14.4Vdc, 4200mAh
WLAN Module	Intel	7260HMW AN	--
CPU	Intel	Cedar Trail N2600	1.6GHz
Chipset	Intel	Tiger Point NM10 Express	2.1W
Panel	AUO	AUO G084SN03V3	8.4" SVGA
SSD	Lite-On	LMT-32M3M	SATA, 32GB
RAM	NANYA	NT2GC64B88B0NS-CG	2GB
Booster	SPEEDY CIRCUITS	PWA-S400G2/650mW WLAN Booster BD(316852100020)	--



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

MODULATION MODE	TX FUNCTION
802.11b	1TX
802.11g	1TX
802.11n (20MHz)	1TX, 2TX
802.11n (40MHz)	1TX, 2TX

3. The above EUT information is 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

11 channels are provided for 802.11b, 802.11g and 802.11n (20MHz):

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 (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
3	2422MHz	7	2442MHz
4	2427MHz	8	2447MHz
5	2432MHz	9	2452MHz
6	2437MHz		



3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
A	√	√	√	√	Chain 0
B	√	√	-	-	Chain 1
C	√	-	-	√	Chain 0 + Chain 1

Where **RE≥1G**: Radiated Emission above 1GHz **RE<1G**: Radiated Emission below 1GHz
PLC: Power Line Conducted Emission **APCM**: Antenna Port Conducted Measurement

NOTE: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.

RADIATED EMISSION TEST (ABOVE 1GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
A, B, C	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
A, B, C	802.11n (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	MCS0

RADIATED EMISSION TEST (BELOW 1GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A, B	802.11n (20MHz)	1 to 11	11	OFDM	BPSK	MCS0

POWER LINE CONDUCTED EMISSION TEST:

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11n (20MHz)	1 to 11	1	OFDM	BPSK	MCS0



BANDEDGE 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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
A, C	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
A, C	802.11n (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	MCS0

ANTENNA PORT CONDUCTED MEASUREMENT:

- This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
A, C	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
A, C	802.11n (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	MCS0

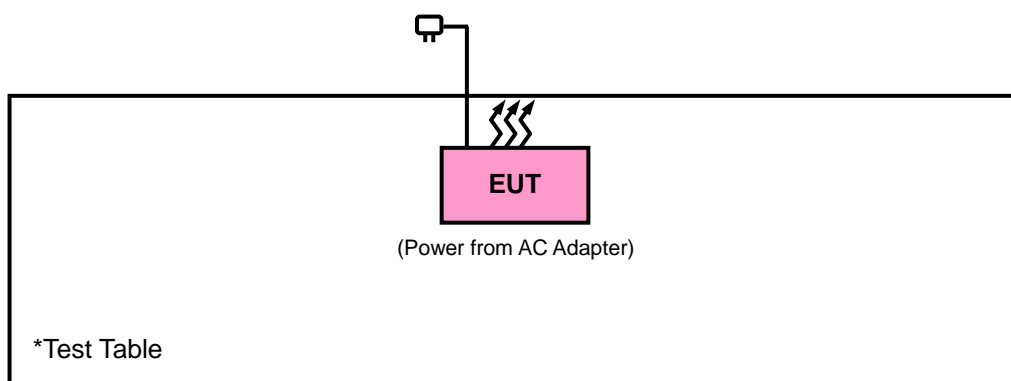
TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Will Chen
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Will Chen
PLC	25deg. C, 65%RH	120Vac, 60Hz	Gavin Wu
APCM	25deg. C, 65%RH	120Vac, 60Hz	David Huang

3.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units.

3.3.1 CONFIGURATION OF SYSTEM UNDER TEST



3.4 DUTY CYCLE TEST SIGNAL

WLAN 2.4GHz

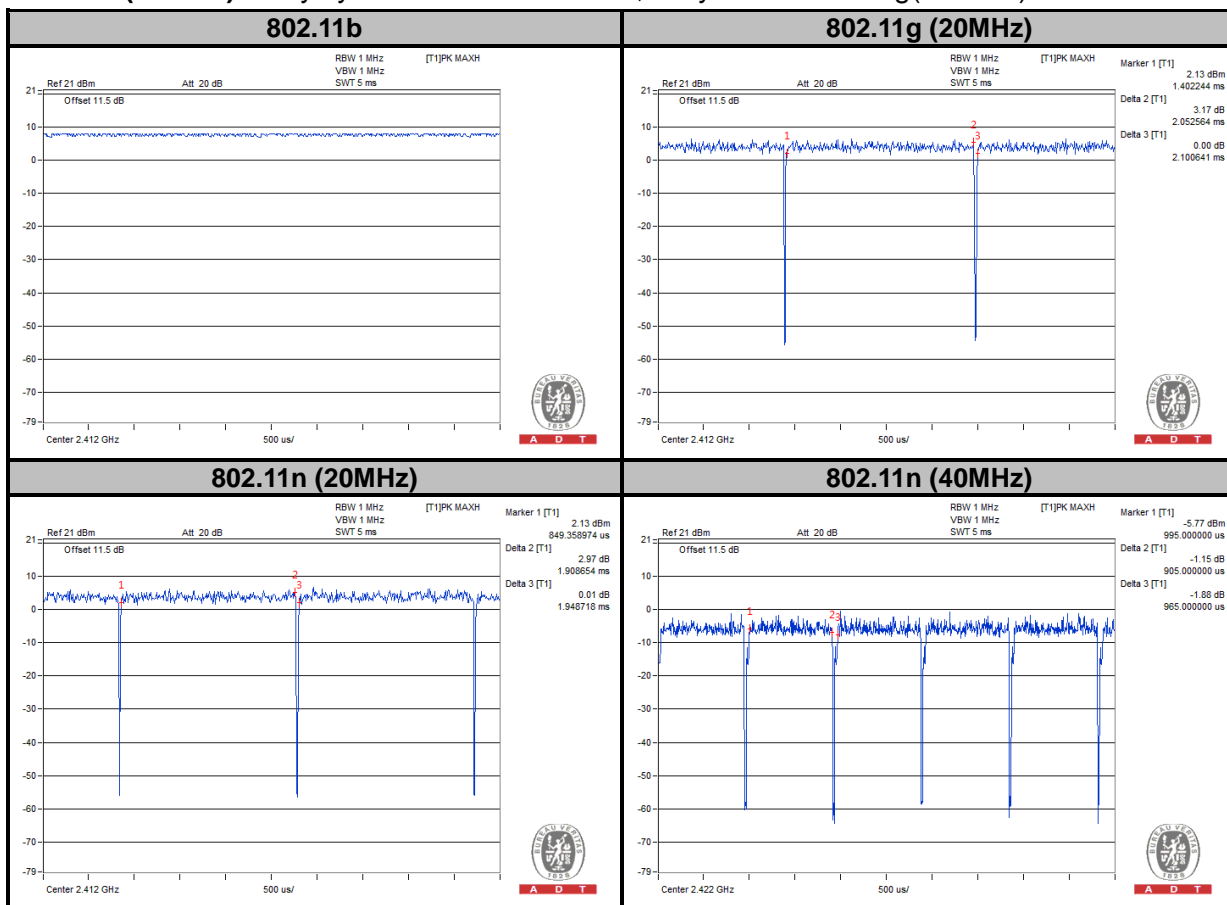
MODE A

802.11b: Duty cycle of test signal is 100 %.

802.11g: Duty cycle = $2.052/2.101 = 0.977$, Duty factor = $10 \cdot \log(1/0.977) = 0.10$

802.11n (20MHz): Duty cycle = $1.908/1.948 = 0.979$, Duty factor = $10 \cdot \log(1/0.979) = 0.09$

802.11n (40MHz): Duty cycle = $905/965 = 0.938$, Duty factor = $10 \cdot \log(1/0.938) = 0.28$



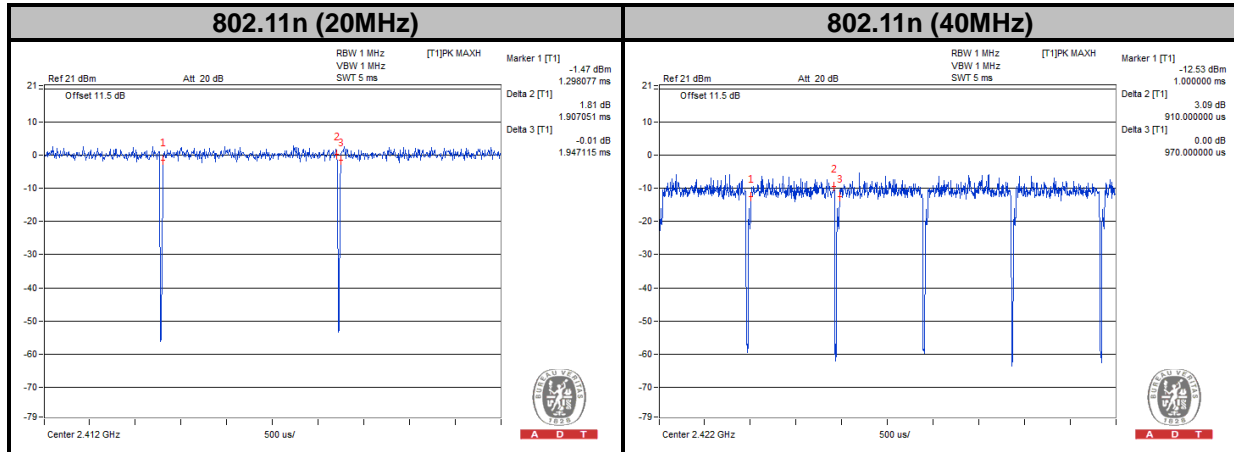


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MODE C

802.11n (20MHz): Duty cycle = $1.907/1.947 = 0.979$, Duty factor = $10 \cdot \log(1/0.979) = 0.09$

802.11n (40MHz): Duty cycle = $910/970 = 0.938$, Duty factor = $10 \cdot \log(1/0.938) = 0.28$





3.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart C (15.247)

558074 D01 DTS Meas Guidance v03r02

662911 D01 Multiple Transmitter Output v02r01

ANSI C63.10-2009

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

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

4. TEST TYPES AND RESULTS (FOR 2.4GHz BAND)

4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 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.



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4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver Agilent	N9038A	MY51210203	Jan. 17, 2014	Jan. 16, 2015
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 21, 2013	Dec. 20, 2014
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Feb. 27, 2014	Feb. 26, 2015
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Feb. 19, 2014	Feb. 18, 2015
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Dec. 18, 2013	Dec. 17, 2014
Loop Antenna	HFH2-Z2	100070	Mar. 06, 2014	Mar. 05, 2016
Preamplifier EMCI	EMC 012645	980115	Dec. 26, 2013	Dec. 25, 2014
Preamplifier EMCI	EMC 184045	980116	Jan. 13, 2014	Jan. 12, 2015
Preamplifier EMCI	EMC 330H	980112	Dec. 27, 2013	Dec. 26, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4 2950114	Oct. 18, 2014	Oct. 17, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Oct. 18, 2014	Oct. 17, 2015
RF signal cable Worken	RG-213	NA	Nov. 07, 2014	Nov. 06, 2015
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	NA	NA	NA
Power Meter	ML2495A	1232002	Sep. 17, 2014	Sep. 16, 2015
Power Sensor	MA2411B	1207325	Sep. 17, 2014	Sep. 16, 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. The calibration interval of the loop antenna is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
 3. The test was performed in HwaYa Chamber 10.
 4. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 5. The FCC Site Registration No. is 690701.
 6. The IC Site Registration No. is IC 7450F-10.

4.1.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters semi-anechoic chamber. 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. Height of receiving 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 Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE:

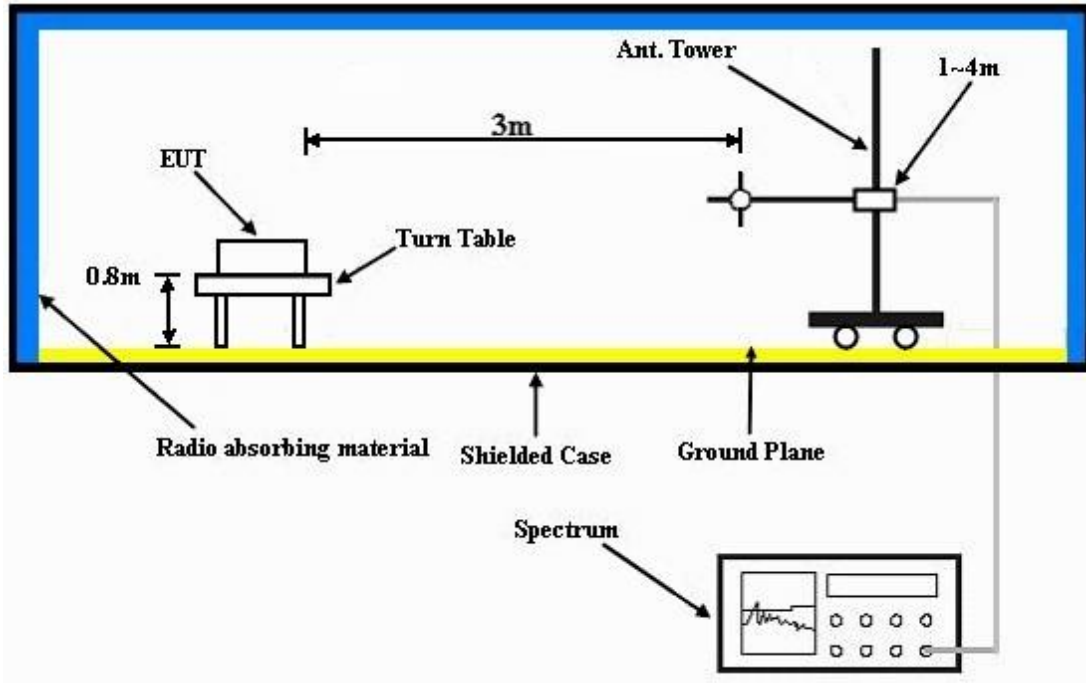
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution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

4.1.4 DEVIATION FROM TEST STANDARD

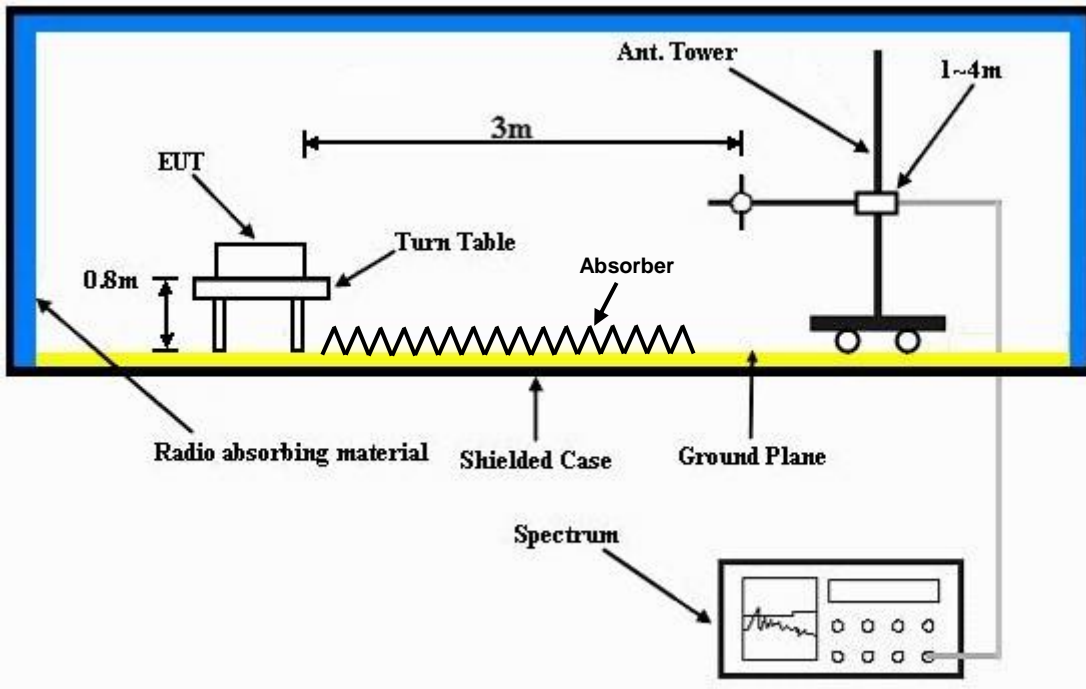
No deviation.

4.1.5 TEST SETUP

Frequency Range 30MHz ~ 1GHz



Frequency Range above 1GHz



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



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4.1.6 EUT OPERATING CONDITIONS

- a. Placed the EUT on a testing table.
- b. Use the software to control the EUT under transmission condition continuously at specific channel frequency.



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4.1.7 TEST RESULTS

ABOVE 1GHz WORST-CASE DATA

MODE A

802.11b

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	45.96	44.23	54	-8.04	31.8	5.4	35.47	100	70	Average
2390	57.18	55.45	74	-16.82	31.8	5.4	35.47	100	70	Peak
2412	110.75	108.98			31.81	5.43	35.47	100	70	Average
2412	113.56	111.79			31.81	5.43	35.47	100	70	Peak
2494	43.41	41.39	54	-10.59	31.9	5.53	35.41	100	70	Average
2494	57.2	55.18	74	-16.8	31.9	5.53	35.41	100	70	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2388	42.18	40.47	54	-11.82	31.8	5.4	35.49	100	340	Average
2388	56.23	54.52	74	-17.77	31.8	5.4	35.49	100	340	Peak
2412	104.91	103.14			31.81	5.43	35.47	100	340	Average
2412	107.85	106.08			31.81	5.43	35.47	100	340	Peak
2500	40.59	38.57	54	-13.41	31.9	5.53	35.41	100	340	Average
2500	55.93	53.91	74	-18.07	31.9	5.53	35.41	100	340	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2412MHz: Fundamental frequency.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2350	42.56	40.99	54	-11.44	31.74	5.33	35.5	130	69	Average
2350	56.53	54.96	74	-17.47	31.74	5.33	35.5	130	69	Peak
2437	110.36	108.51			31.85	5.46	35.46	130	69	Average
2437	113.09	111.24			31.85	5.46	35.46	130	69	Peak
2492	44.06	42.04	54	-9.94	31.9	5.53	35.41	130	69	Average
2492	56.98	54.96	74	-17.02	31.9	5.53	35.41	130	69	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2366	39.61	37.97	54	-14.39	31.76	5.37	35.49	103	288	Average
2366	56.15	54.51	74	-17.85	31.76	5.37	35.49	103	288	Peak
2437	105.21	103.36			31.85	5.46	35.46	103	288	Average
2437	107.89	106.04			31.85	5.46	35.46	103	288	Peak
2494	41.14	39.12	54	-12.86	31.9	5.53	35.41	103	288	Average
2494	55.98	53.96	74	-18.02	31.9	5.53	35.41	103	288	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2437MHz: Fundamental frequency.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	42.3	40.57	54	-11.7	31.8	5.4	35.47	100	70	Average
2390	56.93	55.2	74	-17.07	31.8	5.4	35.47	100	70	Peak
2462	111.12	109.19			31.87	5.5	35.44	100	70	Average
2462	113.9	111.97			31.87	5.5	35.44	100	70	Peak
2484	45.03	43.07	54	-8.97	31.88	5.5	35.42	100	70	Average
2484	57.58	55.62	74	-16.42	31.88	5.5	35.42	100	70	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2370	39.51	37.85	54	-14.49	31.78	5.37	35.49	100	287	Average
2370	55.74	54.08	74	-18.26	31.78	5.37	35.49	100	287	Peak
2462	104.8	102.87			31.87	5.5	35.44	100	287	Average
2462	107.76	105.83			31.87	5.5	35.44	100	287	Peak
2484	42.49	40.53	54	-11.51	31.88	5.5	35.42	100	287	Average
2484	56.34	54.38	74	-17.66	31.88	5.5	35.42	100	287	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2462MHz: Fundamental frequency.



A D T

802.11g

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	47.36	45.63	54	-6.64	31.8	5.4	35.47	100	70	Average
2390	60.25	58.52	74	-13.75	31.8	5.4	35.47	100	70	Peak
2412	104.2	102.43			31.81	5.43	35.47	100	70	Average
2412	112.13	110.36			31.81	5.43	35.47	100	70	Peak
2484	43.03	41.07	54	-10.97	31.88	5.5	35.42	100	70	Average
2484	56.17	54.21	74	-17.83	31.88	5.5	35.42	100	70	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2352	42.64	41.05	54	-11.36	31.76	5.33	35.5	100	352	Average
2352	56.16	54.57	74	-17.84	31.76	5.33	35.5	100	352	Peak
2412	98.97	97.2			31.81	5.43	35.47	100	352	Average
2412	106.48	104.71			31.81	5.43	35.47	100	352	Peak
2490	41.08	39.07	54	-12.92	31.9	5.53	35.42	100	352	Average
2490	55.24	53.23	74	-18.76	31.9	5.53	35.42	100	352	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2412MHz: Fundamental frequency.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	43.77	42.04	54	-10.23	31.8	5.4	35.47	130	69	Average
2390	56.3	54.57	74	-17.7	31.8	5.4	35.47	130	69	Peak
2437	107.8	105.95			31.85	5.46	35.46	130	69	Average
2437	115.22	113.37			31.85	5.46	35.46	130	69	Peak
2496	45.7	43.68	54	-8.3	31.9	5.53	35.41	130	69	Average
2496	58.13	56.11	74	-15.87	31.9	5.53	35.41	130	69	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2366	40.74	39.1	54	-13.26	31.76	5.37	35.49	103	288	Average
2366	55.64	54	74	-18.36	31.76	5.37	35.49	103	288	Peak
2437	101.67	99.82			31.85	5.46	35.46	103	288	Average
2437	109.6	107.75			31.85	5.46	35.46	103	288	Peak
2486	42.22	40.23	54	-11.78	31.88	5.53	35.42	103	288	Average
2486	55.95	53.96	74	-18.05	31.88	5.53	35.42	103	288	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2437MHz: Fundamental frequency.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	42.47	40.74	54	-11.53	31.8	5.4	35.47	100	70	Average
2390	56.67	54.94	74	-17.33	31.8	5.4	35.47	100	70	Peak
2462	104.04	102.11			31.87	5.5	35.44	100	70	Average
2462	112.15	110.22			31.87	5.5	35.44	100	70	Peak
2484	48.4	46.44	54	-5.6	31.88	5.5	35.42	100	70	Average
2484	64.09	62.13	74	-9.91	31.88	5.5	35.42	100	70	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2350	40.37	38.8	54	-13.63	31.74	5.33	35.5	100	287	Average
2350	55.45	53.88	74	-18.55	31.74	5.33	35.5	100	287	Peak
2462	98.64	96.71			31.87	5.5	35.44	100	287	Average
2462	106.65	104.72			31.87	5.5	35.44	100	287	Peak
2484	44.47	42.51	54	-9.53	31.88	5.5	35.42	100	287	Average
2484	58.44	56.48	74	-15.56	31.88	5.5	35.42	100	287	Peak

REMARKS:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2462MHz: Fundamental frequency.



A D T

802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	48.45	46.72	54	-5.55	31.8	5.4	35.47	100	70	Average
2390	61.47	59.74	74	-12.53	31.8	5.4	35.47	100	70	Peak
2412	104.93	103.16			31.81	5.43	35.47	100	70	Average
2412	112.76	110.99			31.81	5.43	35.47	100	70	Peak
2490	42.97	40.96	54	-11.03	31.9	5.53	35.42	100	70	Average
2490	57.1	55.09	74	-16.9	31.9	5.53	35.42	100	70	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2332	43.04	41.5	54	-10.96	31.73	5.33	35.52	100	352	Average
2332	55.59	54.05	74	-18.41	31.73	5.33	35.52	100	352	Peak
2412	98.03	96.26			31.81	5.43	35.47	100	352	Average
2412	106.47	104.7			31.81	5.43	35.47	100	352	Peak
2490	41.22	39.21	54	-12.78	31.9	5.53	35.42	100	352	Average
2490	56.43	54.42	74	-17.57	31.9	5.53	35.42	100	352	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2412MHz: Fundamental frequency.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	44.06	42.33	54	-9.94	31.8	5.4	35.47	130	69	Average
2390	56.6	54.87	74	-17.4	31.8	5.4	35.47	130	69	Peak
2437	107.4	105.55			31.85	5.46	35.46	130	69	Average
2437	115.55	113.7			31.85	5.46	35.46	130	69	Peak
2490	45.96	43.95	54	-8.04	31.9	5.53	35.42	130	69	Average
2490	57.75	55.74	74	-16.25	31.9	5.53	35.42	130	69	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2368	40.89	39.25	54	-13.11	31.76	5.37	35.49	103	288	Average
2368	56.34	54.7	74	-17.66	31.76	5.37	35.49	103	288	Peak
2437	101.63	99.78			31.85	5.46	35.46	103	288	Average
2437	109.69	107.84			31.85	5.46	35.46	103	288	Peak
2490	42.29	40.28	54	-11.71	31.9	5.53	35.42	103	288	Average
2490	56.43	54.42	74	-17.57	31.9	5.53	35.42	103	288	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2437MHz: Fundamental frequency.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2354	42.36	40.77	54	-11.64	31.76	5.33	35.5	100	70	Average
2354	56.29	54.7	74	-17.71	31.76	5.33	35.5	100	70	Peak
2462	104.63	102.7			31.87	5.5	35.44	100	70	Average
2462	112.21	110.28			31.87	5.5	35.44	100	70	Peak
2484	50.1	48.14	54	-3.9	31.88	5.5	35.42	100	70	Average
2484	66.25	64.29	74	-7.75	31.88	5.5	35.42	100	70	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2358	40.36	38.73	54	-13.64	31.76	5.37	35.5	100	287	Average
2358	55.46	53.83	74	-18.54	31.76	5.37	35.5	100	287	Peak
2462	98.07	96.14			31.87	5.5	35.44	100	287	Average
2462	105.97	104.04			31.87	5.5	35.44	100	287	Peak
2486	45.47	43.48	54	-8.53	31.88	5.53	35.42	100	287	Average
2486	59.28	57.29	74	-14.72	31.88	5.53	35.42	100	287	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2462MHz: Fundamental frequency.



A D T

802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 3	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2372	47.01	45.35	54	-6.99	31.78	5.37	35.49	128	72	Average
2372	57.33	55.67	74	-16.67	31.78	5.37	35.49	128	72	Peak
2422	102.43	100.63			31.83	5.43	35.46	128	72	Average
2422	110.35	108.55			31.83	5.43	35.46	128	72	Peak
2494	47	44.98	54	-7	31.9	5.53	35.41	128	72	Average
2494	56.18	54.16	74	-17.82	31.9	5.53	35.41	128	72	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	44.06	42.33	54	-9.94	31.8	5.4	35.47	100	357	Average
2390	55.03	53.3	74	-18.97	31.8	5.4	35.47	100	357	Peak
2422	96.83	95.03			31.83	5.43	35.46	100	357	Average
2422	104.59	102.79			31.83	5.43	35.46	100	357	Peak
2500	44.29	42.27	54	-9.71	31.9	5.53	35.41	100	357	Average
2500	56.13	54.11	74	-17.87	31.9	5.53	35.41	100	357	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2422MHz: Fundamental frequency.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2386	47.09	45.38	54	-6.91	31.8	5.4	35.49	129	70	Average
2386	56.79	55.08	74	-17.21	31.8	5.4	35.49	129	70	Peak
2437	107.91	106.06			31.85	5.46	35.46	129	70	Average
2437	115.35	113.5			31.85	5.46	35.46	129	70	Peak
2488	46.67	44.66	54	-7.33	31.9	5.53	35.42	129	70	Average
2488	57.67	55.66	74	-16.33	31.9	5.53	35.42	129	70	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2368	45.99	44.35	54	-8.01	31.76	5.37	35.49	100	357	Average
2368	55.83	54.19	74	-18.17	31.76	5.37	35.49	100	357	Peak
2437	101.58	99.73			31.85	5.46	35.46	100	357	Average
2437	109.54	107.69			31.85	5.46	35.46	100	357	Peak
2494	47.33	45.31	54	-6.67	31.9	5.53	35.41	100	357	Average
2494	55.33	53.31	74	-18.67	31.9	5.53	35.41	100	357	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2437MHz: Fundamental frequency.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 9	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2334	42.63	41.09	54	-11.37	31.73	5.33	35.52	129	70	Average
2334	55.77	54.23	74	-18.23	31.73	5.33	35.52	129	70	Peak
2452	103.84	101.97			31.85	5.46	35.44	129	70	Average
2452	111.58	109.71			31.85	5.46	35.44	129	70	Peak
2483.5	49.91	47.95	54	-4.09	31.88	5.5	35.42	129	70	Average
2483.5	59.86	57.9	74	-14.14	31.88	5.5	35.42	129	70	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2352	44.66	43.07	54	-9.34	31.76	5.33	35.5	100	355	Average
2352	54.72	53.13	74	-19.28	31.76	5.33	35.5	100	355	Peak
2452	97.88	96.01			31.85	5.46	35.44	100	355	Average
2452	105.22	103.35			31.85	5.46	35.44	100	355	Peak
2486	46.97	44.98	54	-7.03	31.88	5.53	35.42	100	355	Average
2486	56.31	54.32	74	-17.69	31.88	5.53	35.42	100	355	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2452MHz: Fundamental frequency.



A D T

MODE B

802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	42.3	40.57	54	-11.7	31.8	5.4	35.47	100	70	Average
2390	56.93	55.2	74	-17.07	31.8	5.4	35.47	100	70	Peak
2462	111.12	109.19			31.87	5.5	35.44	100	70	Average
2462	113.9	111.97			31.87	5.5	35.44	100	70	Peak
2484	45.03	43.07	54	-8.97	31.88	5.5	35.42	100	70	Average
2484	57.58	55.62	74	-16.42	31.88	5.5	35.42	100	70	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2370	39.51	37.85	54	-14.49	31.78	5.37	35.49	100	287	Average
2370	55.74	54.08	74	-18.26	31.78	5.37	35.49	100	287	Peak
2462	104.8	102.87			31.87	5.5	35.44	100	287	Average
2462	107.76	105.83			31.87	5.5	35.44	100	287	Peak
2484	42.49	40.53	54	-11.51	31.88	5.5	35.42	100	287	Average
2484	56.34	54.38	74	-17.66	31.88	5.5	35.42	100	287	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2462MHz: Fundamental frequency.



A D T

MODE C

802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	52.85	51.12	54	-1.15	31.8	5.4	35.47	133	274	Average
2390	65.51	63.78	74	-8.49	31.8	5.4	35.47	133	274	Peak
2412	101.1	99.33			31.81	5.43	35.47	132	280	Average
2412	109.48	107.71			31.81	5.43	35.47	132	280	Peak
2496	47	44.98	54	-7	31.9	5.53	35.41	132	280	Average
2496	56.66	54.64	74	-17.34	31.9	5.53	35.41	132	280	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	46.76	45.03	54	-7.24	31.8	5.4	35.47	163	264	Average
2390	56.67	54.94	74	-17.33	31.8	5.4	35.47	163	264	Peak
2412	97.81	96.04			31.81	5.43	35.47	163	264	Average
2412	105.39	103.62			31.81	5.43	35.47	163	264	Peak
2490	46	43.99	54	-8	31.9	5.53	35.42	163	264	Average
2490	55.98	53.97	74	-18.02	31.9	5.53	35.42	163	264	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2412MHz: Fundamental frequency.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	47.43	45.7	54	-6.57	31.8	5.4	35.47	134	275	Average
2390	58.38	56.65	74	-15.62	31.8	5.4	35.47	134	275	Peak
2437	105.55	103.7			31.85	5.46	35.46	134	275	Average
2437	113.26	111.41			31.85	5.46	35.46	134	275	Peak
2500	47	44.98	54	-7	31.9	5.53	35.41	134	275	Average
2500	57.08	55.06	74	-16.92	31.9	5.53	35.41	134	275	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2388	44.79	43.08	54	-9.21	31.8	5.4	35.49	163	264	Average
2388	55.47	53.76	74	-18.53	31.8	5.4	35.49	163	264	Peak
2437	100.84	98.99			31.85	5.46	35.46	163	264	Average
2437	109	107.15			31.85	5.46	35.46	163	264	Peak
2484	46.28	44.32	54	-7.72	31.88	5.5	35.42	163	264	Average
2484	58.29	56.33	74	-15.71	31.88	5.5	35.42	163	264	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2437MHz: Fundamental frequency.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	44.05	42.32	54	-9.95	31.8	5.4	35.47	132	280	Average
2390	55.63	53.9	74	-18.37	31.8	5.4	35.47	132	280	Peak
2462	100.57	98.64			31.87	5.5	35.44	132	280	Average
2462	108.46	106.53			31.87	5.5	35.44	132	280	Peak
2483.5	52.71	50.75	54	-1.29	31.88	5.5	35.42	126	278	Average
2483.5	65.4	63.44	74	-8.6	31.88	5.5	35.42	126	278	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2384	43.75	42.06	54	-10.25	31.78	5.4	35.49	163	264	Average
2384	55.47	53.78	74	-18.53	31.78	5.4	35.49	163	264	Peak
2462	97.22	95.29			31.87	5.5	35.44	163	264	Average
2462	104.4	102.47			31.87	5.5	35.44	163	264	Peak
2483.5	49.91	47.95	54	-4.09	31.88	5.5	35.42	163	264	Average
2483.5	64.46	62.5	74	-9.54	31.88	5.5	35.42	163	264	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2462MHz: Fundamental frequency.



A D T

802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 3	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	51.98	50.25	54	-2.02	31.8	5.4	35.47	131	272	Average
2390	63.36	61.63	74	-10.64	31.8	5.4	35.47	131	272	Peak
2422	100.63	98.83			31.83	5.43	35.46	133	280	Average
2422	108.24	106.44			31.83	5.43	35.46	133	280	Peak
2494	46.02	44	54	-7.98	31.9	5.53	35.41	133	280	Average
2494	55.23	53.21	74	-18.77	31.9	5.53	35.41	133	280	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2386	46.76	45.05	54	-7.24	31.8	5.4	35.49	163	264	Average
2386	56	54.29	74	-18	31.8	5.4	35.49	163	264	Peak
2422	95.5	93.7			31.83	5.43	35.46	163	264	Average
2422	104.07	102.27			31.83	5.43	35.46	163	264	Peak
2486	43.98	41.99	54	-10.02	31.88	5.53	35.42	163	264	Average
2486	51.54	49.55	74	-22.46	31.88	5.53	35.42	163	264	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2422MHz: Fundamental frequency.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	48.76	47.03	54	-5.24	31.8	5.4	35.47	132	280	Average
2390	61.5	59.77	74	-12.5	31.8	5.4	35.47	132	280	Peak
2437	103.88	102.03			31.85	5.46	35.46	132	280	Average
2437	112.11	110.26			31.85	5.46	35.46	132	280	Peak
2483.5	51.98	50.02	54	-2.02	31.88	5.5	35.42	126	278	Average
2483.5	61.44	59.48	74	-12.56	31.88	5.5	35.42	126	278	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2384	46.75	45.06	54	-7.25	31.78	5.4	35.49	163	264	Average
2384	56.94	55.25	74	-17.06	31.78	5.4	35.49	163	264	Peak
2437	100.88	99.03			31.85	5.46	35.46	163	264	Average
2437	108.38	106.53			31.85	5.46	35.46	163	264	Peak
2486	48.94	46.95	54	-5.06	31.88	5.53	35.42	163	264	Average
2486	58.58	56.59	74	-15.42	31.88	5.53	35.42	163	264	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2437MHz: Fundamental frequency.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 9	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2364	46.99	45.36	54	-7.01	31.76	5.37	35.5	132	280	Average
2364	55.15	53.52	74	-18.85	31.76	5.37	35.5	132	280	Peak
2452	100.88	99.01			31.85	5.46	35.44	132	280	Average
2452	108.83	106.96			31.85	5.46	35.44	132	280	Peak
2483.5	52.62	50.66	54	-1.38	31.88	5.5	35.42	128	278	Average
2483.5	63.92	61.96	74	-10.08	31.88	5.5	35.42	128	278	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2356	44.03	42.4	54	-9.97	31.76	5.37	35.5	163	264	Average
2356	56.08	54.45	74	-17.92	31.76	5.37	35.5	163	264	Peak
2452	96.88	95.01			31.85	5.46	35.44	163	264	Average
2452	104.6	102.73			31.85	5.46	35.44	163	264	Peak
2483.5	49.95	47.99	54	-4.05	31.88	5.5	35.42	163	264	Average
2483.5	60.31	58.35	74	-13.69	31.88	5.5	35.42	163	264	Peak

REMARKS:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2452MHz: Fundamental frequency.



A D T

BELOW 1GHz WORST-CASE DATA:

MODE A

802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
159.87	26.67	46.62	43.5	-16.83	10.8	1.52	32.27	118	138	Peak
250.05	31.3	48.55	46	-14.7	13	1.85	32.1	162	284	Peak
299.46	33.68	49.89	46	-12.32	13.9	2.03	32.14	105	289	Peak
398.7	28.71	40.49	46	-17.29	18.1	2.34	32.22	151	113	Peak
598.9	27.98	36.2	46	-18.02	21.1	2.87	32.19	198	248	Peak
995.8	32.38	32.97	54	-21.62	26.04	3.72	30.35	126	357	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
48.09	23.6	46.52	40	-16.4	8.4	0.9	32.22	176	83	Peak
187.68	21.28	41.52	43.5	-22.22	10.4	1.61	32.25	101	276	Peak
299.19	32.01	48.22	46	-13.99	13.9	2.03	32.14	107	59	Peak
398.7	29.05	40.83	46	-16.95	18.1	2.34	32.22	137	175	Peak
598.9	32.71	40.93	46	-13.29	21.1	2.87	32.19	141	258	Peak
999.3	34.15	34.63	54	-19.85	26.1	3.72	30.3	168	160	Peak

REMARKS: Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor

Margin value = Emission level – Limit value



A D T

MODE B

802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Will Chen

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
42.96	19.7	40.99	40	-20.3	10.19	0.74	32.22	155	264	Peak
98.31	21.8	43.13	43.5	-21.7	9.54	1.28	32.15	108	198	Peak
188.76	27.57	47.81	43.5	-15.93	10.4	1.61	32.25	116	127	Peak
381.2	30.12	43.2	46	-15.88	16.75	2.34	32.17	189	103	Peak
581.4	25.41	34.44	46	-20.59	20.35	2.82	32.2	172	213	Peak
936.3	28.57	29.96	46	-17.43	26.2	3.62	31.21	169	138	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
38.1	26.11	45.2	40	-13.89	12.4	0.74	32.23	107	78	Peak
187.95	21.77	42.01	43.5	-21.73	10.4	1.61	32.25	134	251	Peak
279.75	22.37	38.71	46	-23.63	13.75	2.03	32.12	110	289	Peak
399.4	24.84	36.62	46	-21.16	18.1	2.34	32.22	162	270	Peak
581.4	27.72	36.75	46	-18.28	20.35	2.82	32.2	124	312	Peak
840.4	26.65	31.42	46	-19.35	23.7	3.38	31.85	191	258	Peak

REMARKS: Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor

Margin value = Emission level – Limit value

4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB μ V)	
	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 0.50MHz.
 3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100288	Apr. 24, 2014	Apr. 23, 2015
RF signal cable Woken	5D-FB	Cable-HYCO2-01	Dec. 27, 2013	Dec. 26, 2014
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Dec. 23, 2013	Dec. 22, 2014
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Jul. 10, 2014	Jul. 09, 2015
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

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

4.2.3 TEST PROCEDURES

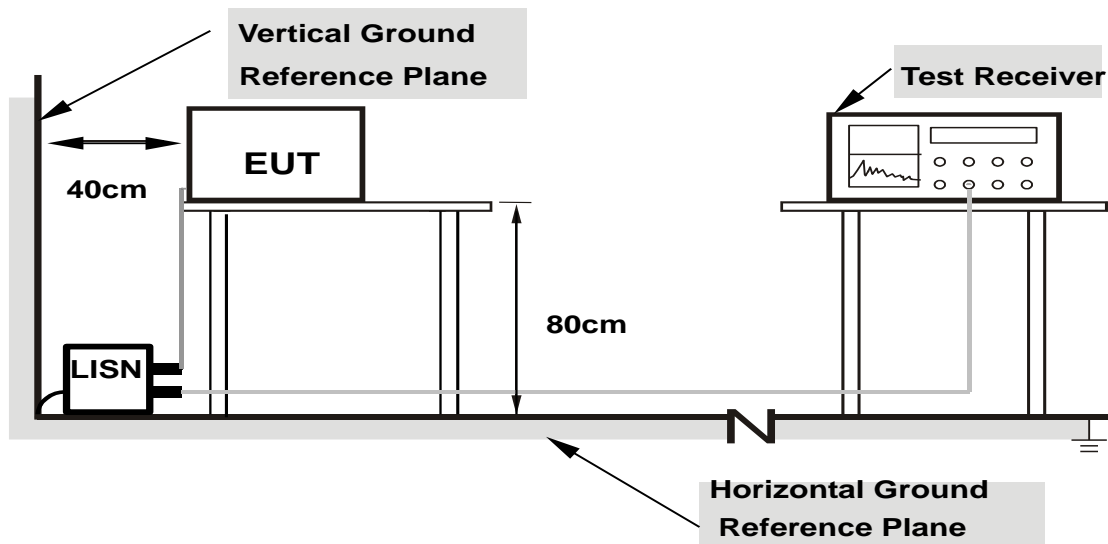
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: 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



- Note:**
1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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

4.2.6 EUT OPERATING CONDITIONS

Same as section 4.1.6.

4.2.7 TEST RESULTS

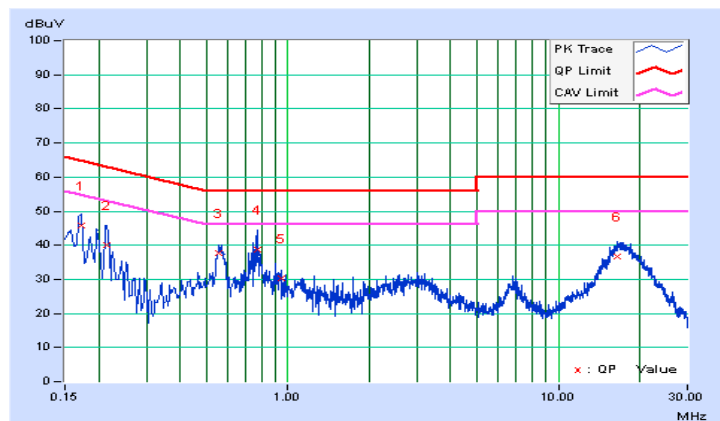
CONDUCTED WORST-CASE DATA :

PHASE	Line 1	6dB BANDWIDTH	9kHz
--------------	--------	----------------------	------

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17147	0.08	45.55	35.93	45.63	36.01	64.89	54.89	-19.26	-18.88
2	0.21282	0.07	39.85	31.13	39.92	31.20	63.09	53.09	-23.17	-21.89
3	0.55273	0.09	37.56	29.60	37.65	29.69	56.00	46.00	-18.35	-16.31
4	0.77195	0.10	38.66	29.34	38.76	29.44	56.00	46.00	-17.24	-16.56
5	0.94310	0.11	30.31	26.68	30.42	26.79	56.00	46.00	-25.58	-19.21
6	16.45861	0.85	35.69	30.66	36.54	31.51	60.00	50.00	-23.46	-18.49

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





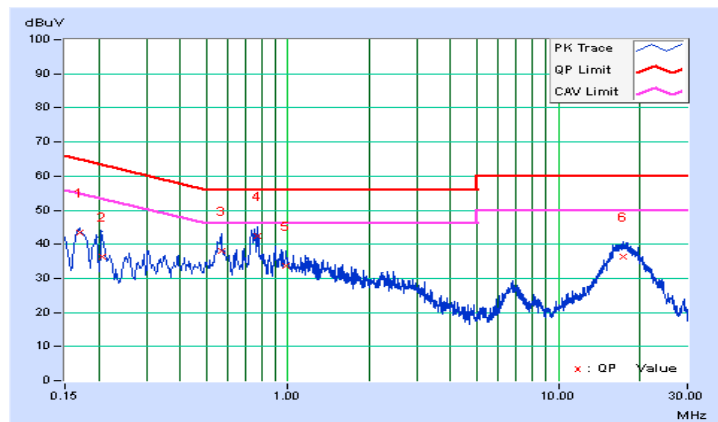
A D T

PHASE	Line 2	6dB BANDWIDTH	9kHz
--------------	--------	----------------------	------

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16967	0.05	43.30	32.23	43.35	32.28	64.98	54.98	-21.63	-22.70
2	0.20511	0.05	36.19	29.92	36.24	29.97	63.40	53.40	-27.16	-23.43
3	0.56866	0.08	38.10	32.26	38.18	32.34	56.00	46.00	-17.82	-13.66
4	0.76789	0.08	42.35	31.69	42.43	31.77	56.00	46.00	-13.57	-14.23
5	0.98283	0.09	33.69	28.73	33.78	28.82	56.00	46.00	-22.22	-17.18
6	17.26798	0.78	35.47	30.58	36.25	31.36	60.00	50.00	-23.75	-18.64

Remarks:

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

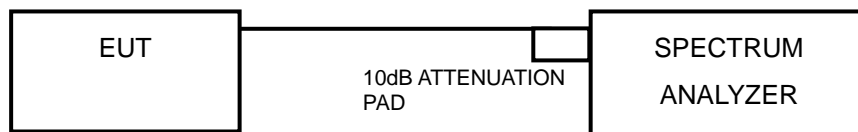


4.3 6dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 TEST SETUP



4.3.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.3.4 TEST PROCEDURE

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

4.3.5 DEVIATION FROM TEST STANDARD

No deviation.

4.3.6 EUT OPERATING CONDITIONS

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



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4.3.7 TEST RESULTS

MODE A

802.11b

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	12.08	0.5	PASS
6	2437	12.07	0.5	PASS
11	2462	12.10	0.5	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.38	0.5	PASS
6	2437	16.39	0.5	PASS
11	2462	16.39	0.5	PASS

802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	17.62	0.5	PASS
6	2437	17.63	0.5	PASS
11	2462	17.64	0.5	PASS

802.11n (40MHz)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
3	2422	35.15	0.5	PASS
6	2437	35.20	0.5	PASS
9	2452	35.19	0.5	PASS



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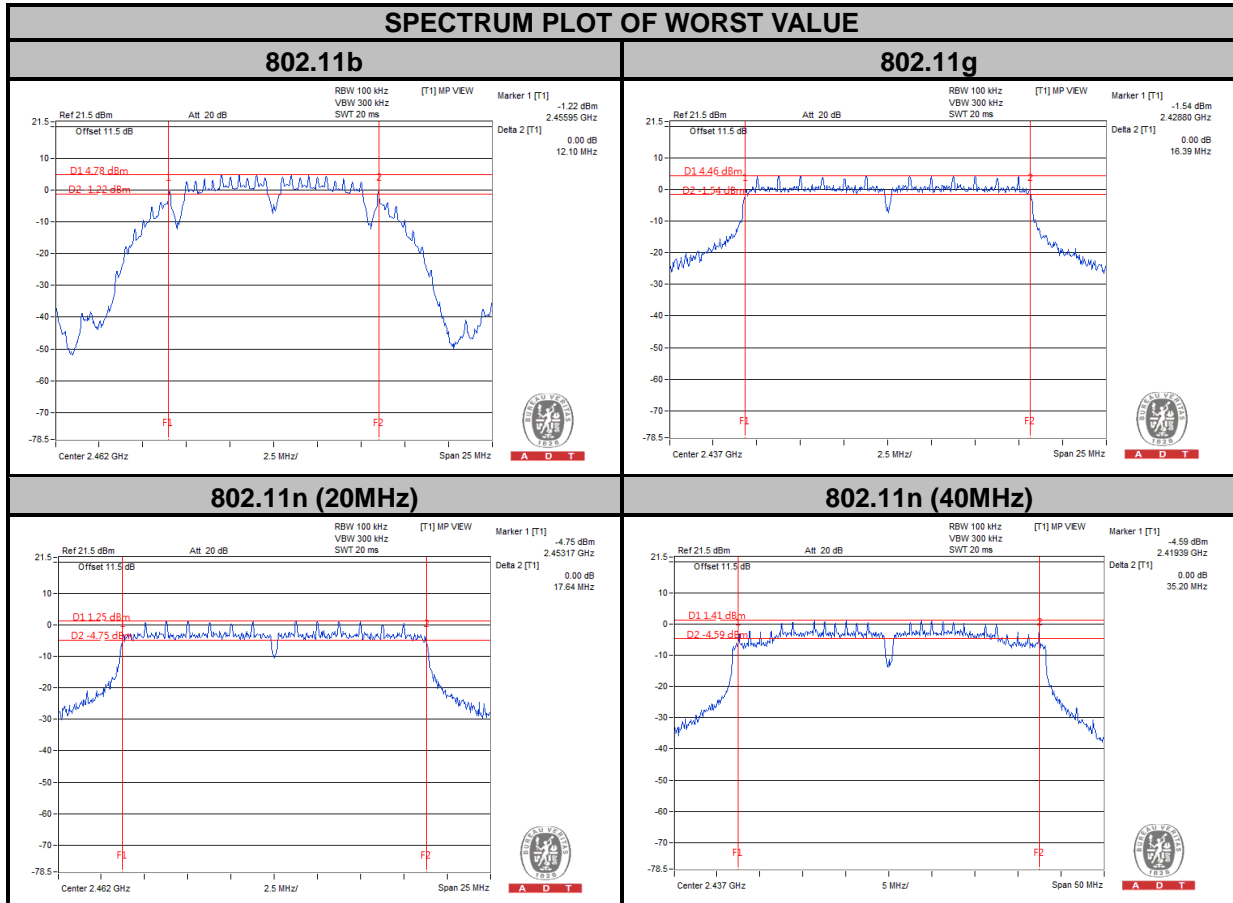
MODE C

802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	16.37	17.61	0.5	PASS
6	2437	17.63	17.63	0.5	PASS
11	2462	16.39	17.63	0.5	PASS

802.11n (40MHz)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
3	2422	35.13	35.13	0.5	PASS
6	2437	35.18	35.13	0.5	PASS
9	2452	35.08	35.16	0.5	PASS



4.4 CONDUCTED OUTPUT POWER

4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

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

Per KDB 662911 D01 Multiple Transmitter Output v02r01 Method of conducted output power measurement on IEEE 802.11 devices,

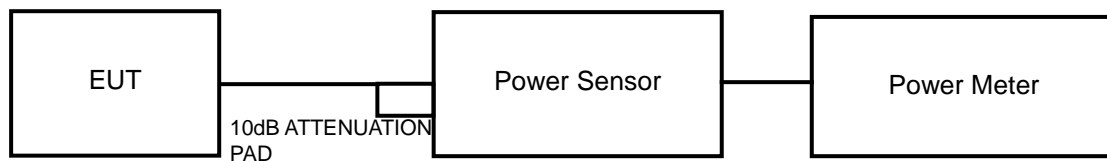
Array Gain = 0 dB (i.e., no array gain) for $NANT \leq 4$;

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 TEST SETUP



4.4.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.4.4 TEST PROCEDURES

A 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.

4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

4.4.6 EUT OPERATING CONDITIONS

Same as section 4.3.6.



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4.4.7 TEST RESULTS

MODE A

802.11b

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS / FAIL
1	2412	55.59	17.45	30	PASS
6	2437	56.10	17.49	30	PASS
11	2462	53.83	17.31	30	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS / FAIL
1	2412	72.28	18.59	30	PASS
6	2437	130.32	21.15	30	PASS
11	2462	69.66	18.43	30	PASS

802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS / FAIL
1	2412	72.11	18.58	30	PASS
6	2437	133.97	21.27	30	PASS
11	2462	71.61	18.55	30	PASS

802.11n (40MHz)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS / FAIL
3	2422	48.64	16.87	30	PASS
6	2437	130.32	21.15	30	PASS
9	2452	58.08	17.64	30	PASS



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MODE C

802.11n (20MHz)

CHAN.	FREQ. (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2412	12.95	11.97	35.464	15.50	30	PASS
6	2437	16.24	15.98	81.700	19.12	30	PASS
11	2462	11.45	10.56	25.340	14.04	30	PASS

802.11n (40MHz)

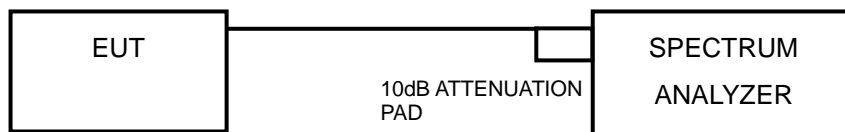
CHAN.	FREQ. (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
3	2422	10.12	9.44	19.070	12.80	30	PASS
6	2437	13.46	12.10	38.400	15.84	30	PASS
9	2452	9.68	7.98	15.570	11.92	30	PASS

4.5 POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 TEST SETUP



4.5.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.5.4 TEST PROCEDURE

- Set the RBW = 3 kHz, VBW =10 kHz, Detector = peak.
- Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
- Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

4.5.6 EUT OPERATING CONDITION

Same as section 4.3.6.



4.5.7 TEST RESULTS

MODE A

802.11b

CHANNEL	FREQUENCY (MHz)	PSD (dBm/3kHz)	LIMIT (dBm/3kHz)	PASS / FAIL
1	2412	-9.72	8	PASS
6	2437	-10.15	8	PASS
11	2462	-10.20	8	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	PSD (dBm/3kHz)	LIMIT (dBm/3kHz)	PASS / FAIL
1	2412	-13.67	8	PASS
6	2437	-11.09	8	PASS
11	2462	-14.21	8	PASS

802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	PSD (dBm/3kHz)	LIMIT (dBm/3kHz)	PASS / FAIL
1	2412	-13.82	8	PASS
6	2437	-9.91	8	PASS
11	2462	-14.78	8	PASS

802.11n (40MHz)

CHANNEL	FREQUENCY (MHz)	PSD (dBm/3kHz)	LIMIT (dBm/3kHz)	PASS / FAIL
3	2422	-17.93	8	PASS
6	2437	-14.18	8	PASS
9	2452	-18.07	8	PASS



MODE C

802.11n (20MHz)

TX CHAIN	CHANNEL	FREQ. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	1	2412	-17.06	3.01	-14.05	7.39	PASS
	6	2437	-16.39	3.01	-13.38	7.39	PASS
	11	2462	-18.43	3.01	-15.42	7.39	PASS
1	1	2412	-22.22	3.01	-19.21	7.39	PASS
	6	2437	-20.05	3.01	-17.04	7.39	PASS
	11	2462	-23.55	3.01	-20.54	7.39	PASS

NOTE: Directional gain = $10 \log[(10G1 / 20 + 10G2 / 20 + \dots + 10GN / 20)2 / NANT] = 6.61 > 6\text{dBi}$, so the density limit shall be reduced to $8 - (6.61 - 6) = 7.39$

802.11n (40MHz)

TX CHAIN	CHANNEL	FREQ. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	3	2422	-23.72	3.01	-20.71	7.39	PASS
	6	2437	-18.82	3.01	-15.81	7.39	PASS
	9	2452	-22.83	3.01	-19.82	7.39	PASS
1	3	2422	-26.71	3.01	-23.70	7.39	PASS
	6	2437	-24.21	3.01	-21.20	7.39	PASS
	9	2452	-26.99	3.01	-23.98	7.39	PASS

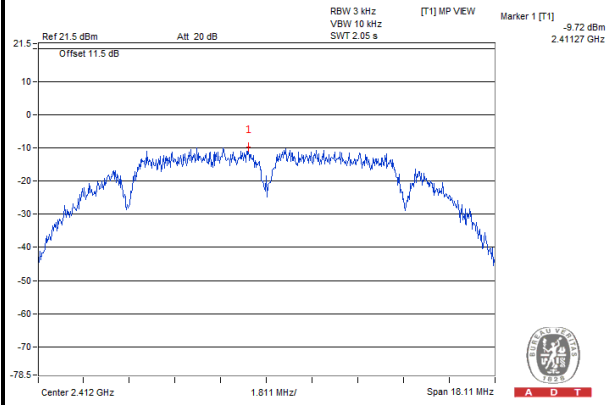
NOTE: Directional gain = $10 \log[(10G1 / 20 + 10G2 / 20 + \dots + 10GN / 20)2 / NANT] = 6.61 > 6\text{dBi}$, so the density limit shall be reduced to $8 - (6.61 - 6) = 7.39$



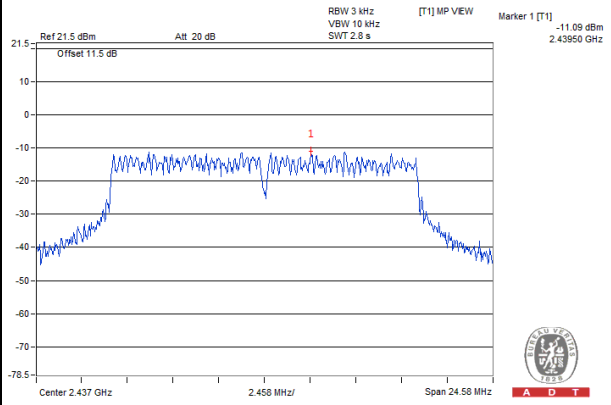
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SPECTRUM PLOT OF WORST VALUE

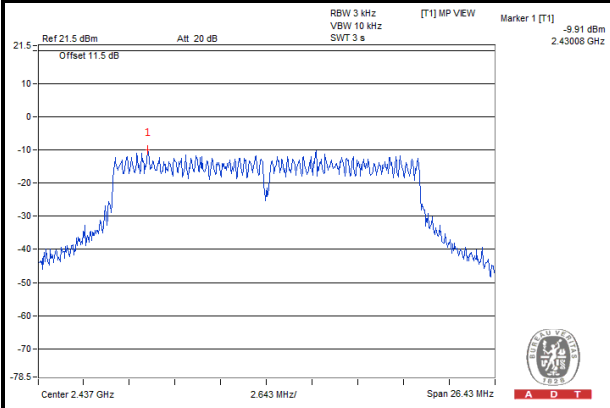
802.11b



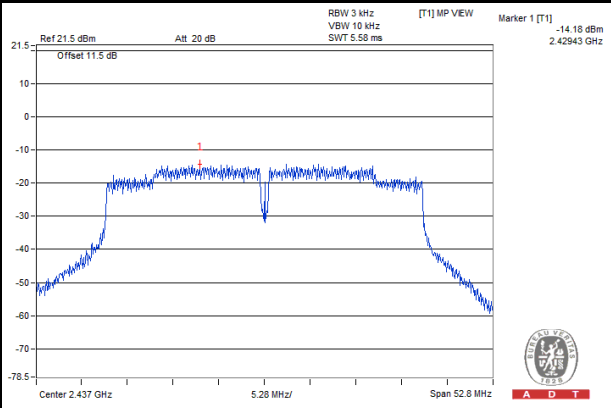
802.11g



802.11n (20MHz)



802.11n (40MHz)

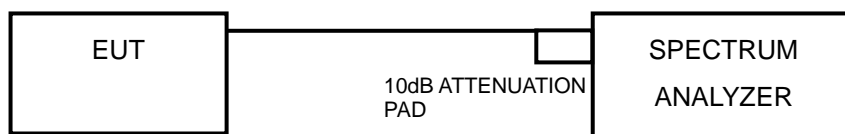


4.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

4.6.1 LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT

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

4.6.2 TEST SETUP



4.6.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.6.4 TEST PROCEDURE

MEASUREMENT PROCEDURE REF

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

MEASUREMENT PROCEDURE OOB

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

4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

4.6.6 EUT OPERATING CONDITION

Same as section 4.3.6.

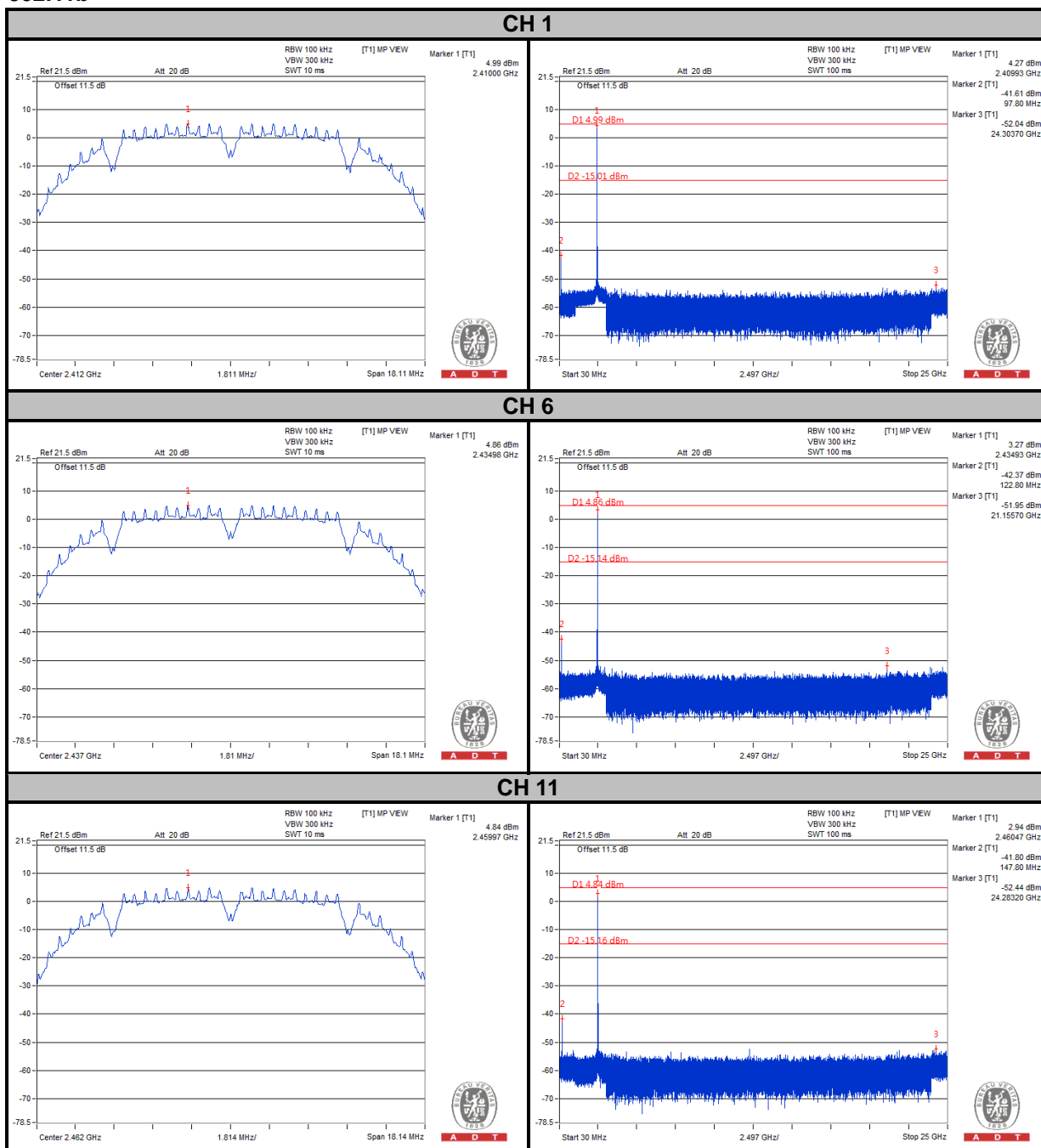
4.6.7 TEST RESULTS

The conducted emission test is performed on each TX port of operating mode without summing or adding 10log (N) since the limit is relative emission limit.

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

MODE A

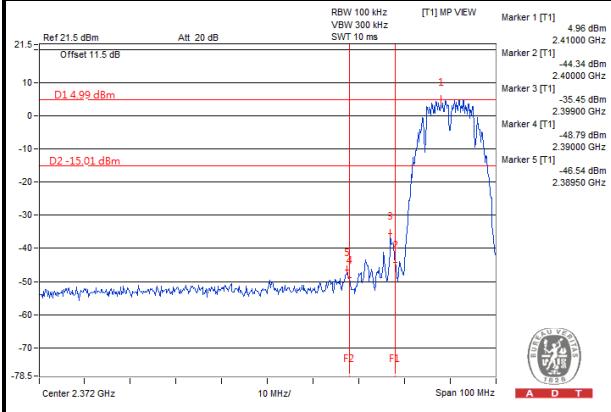
802.11b



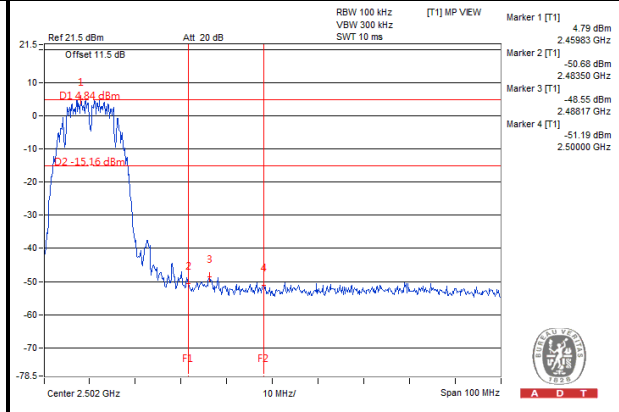


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CH 1 Band edge



CH 11 Band edge

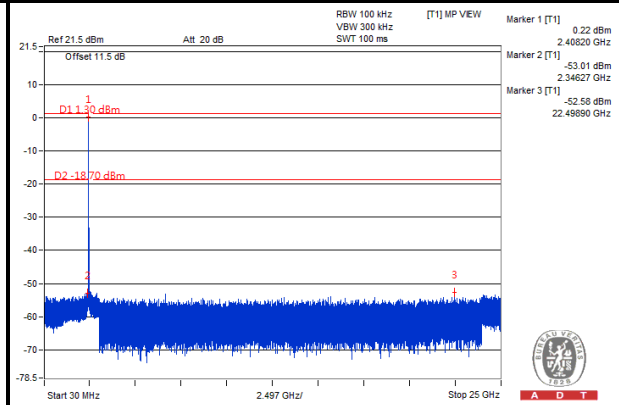
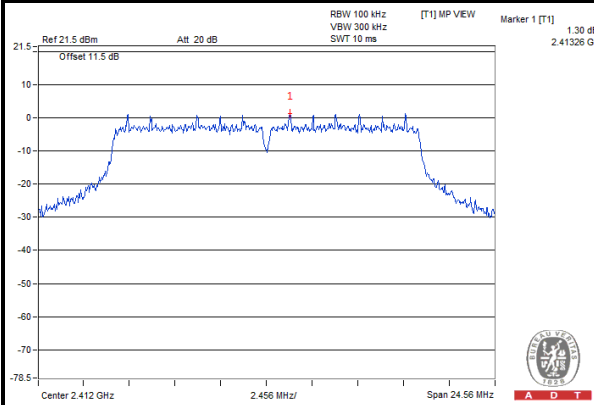




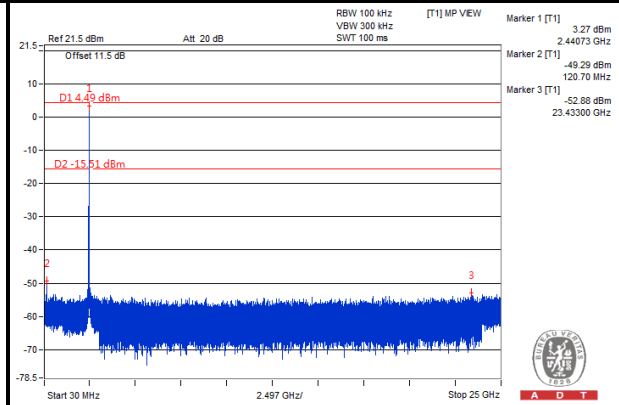
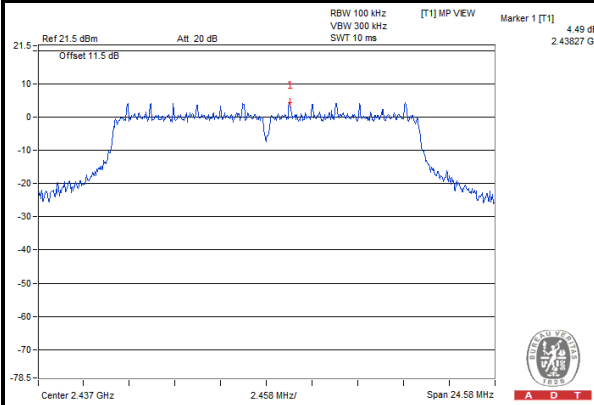
A D T

802.11g

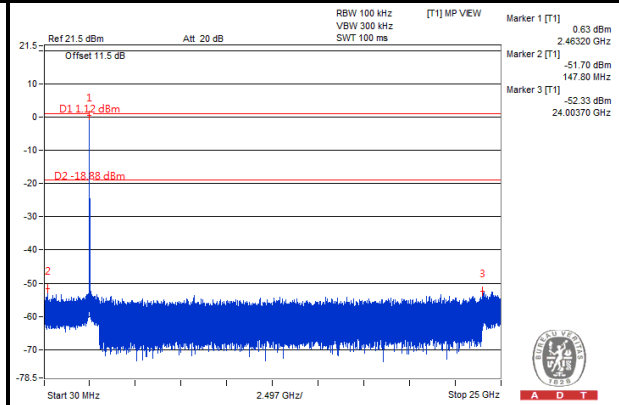
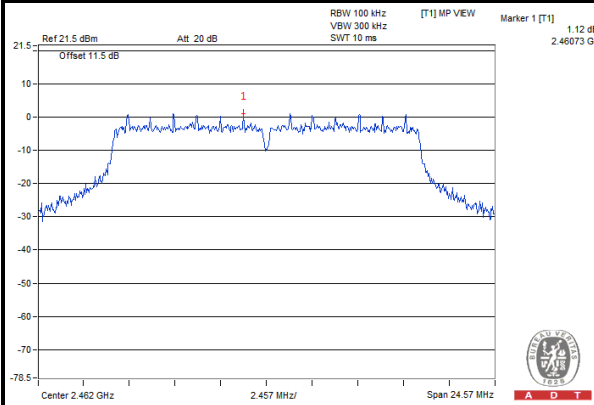
CH 1



CH 6



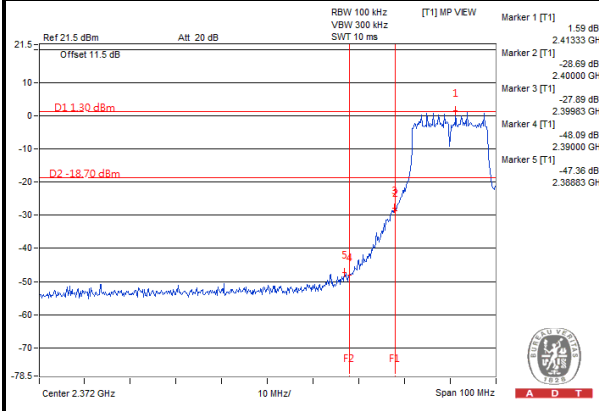
CH 11



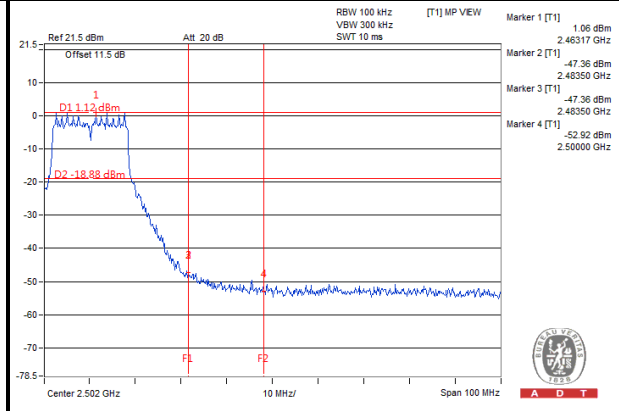


A D T

CH 1 Band edge



CH 11 Band edge

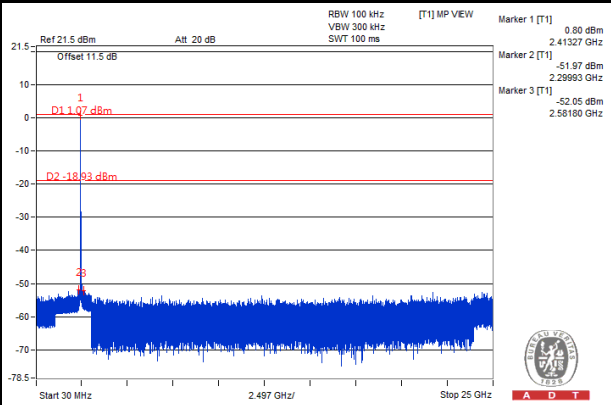
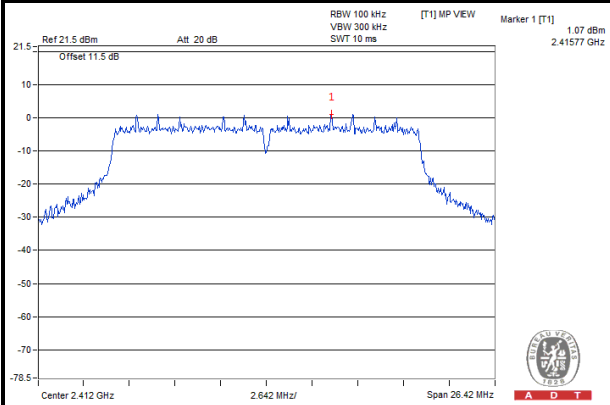




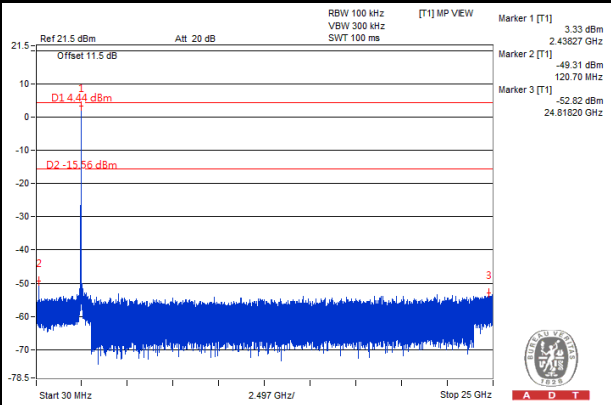
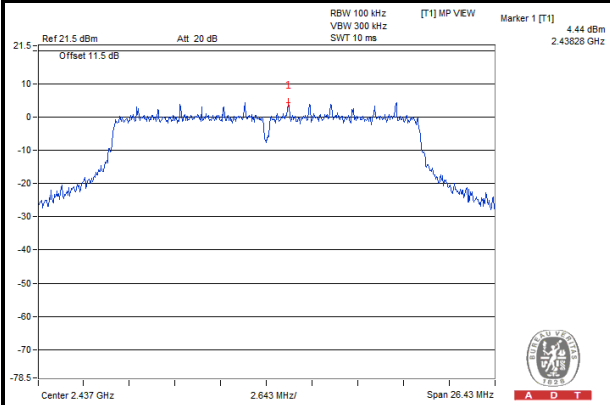
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802.11n (20MHz)

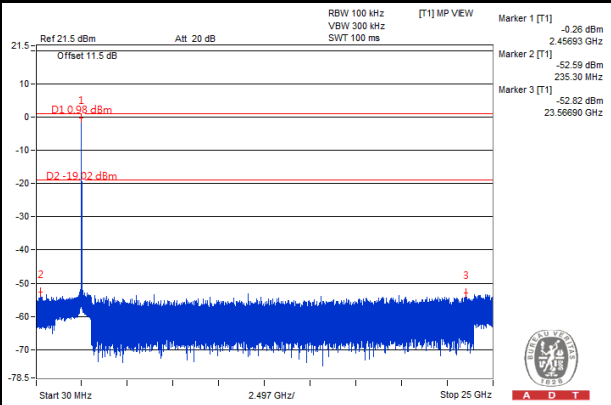
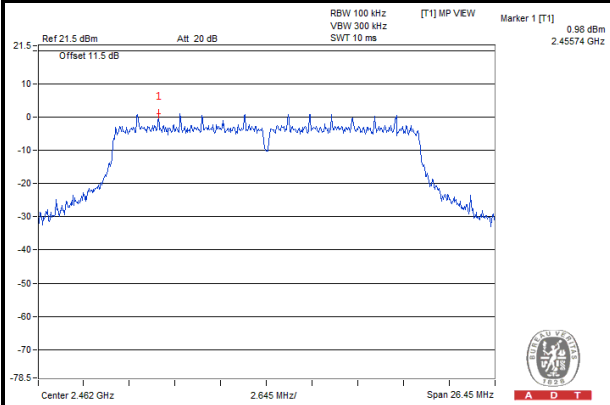
CH 1



CH 6



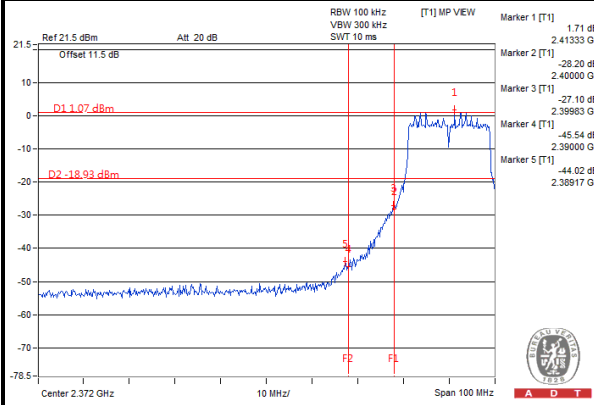
CH 11



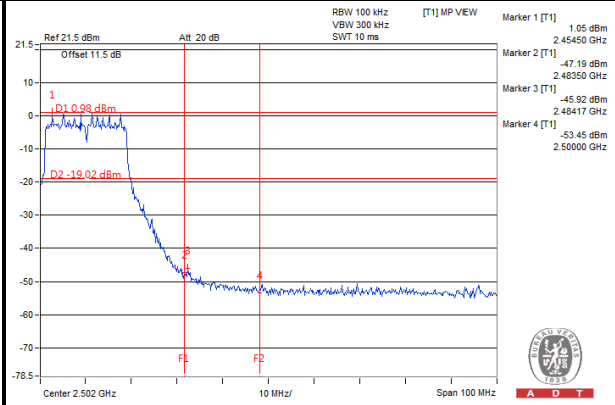


A D T

CH 1 Band edge



CH 11 Band edge

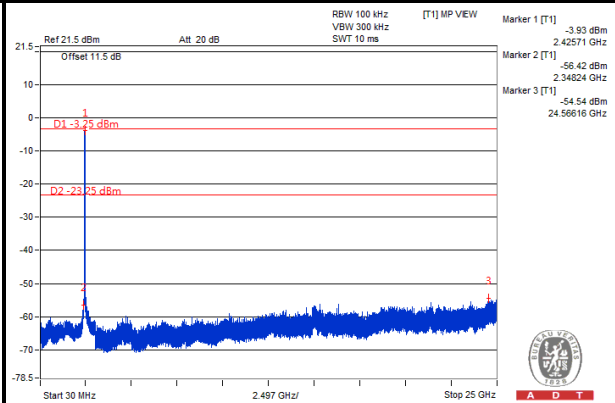
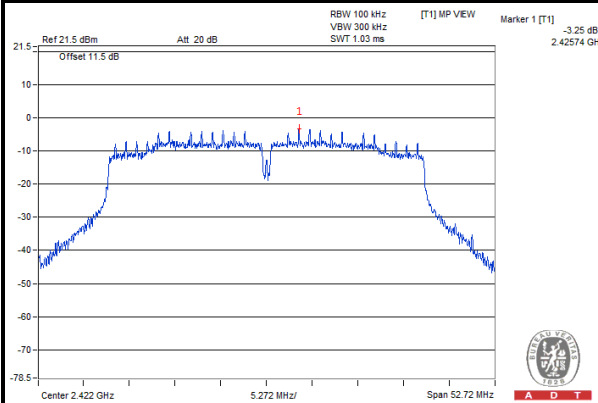




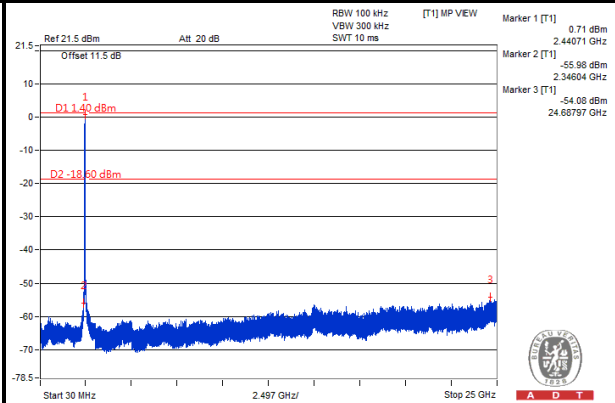
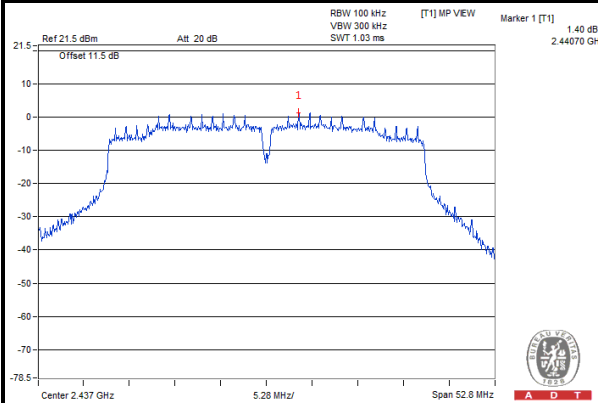
A D T

802.11n (40MHz)

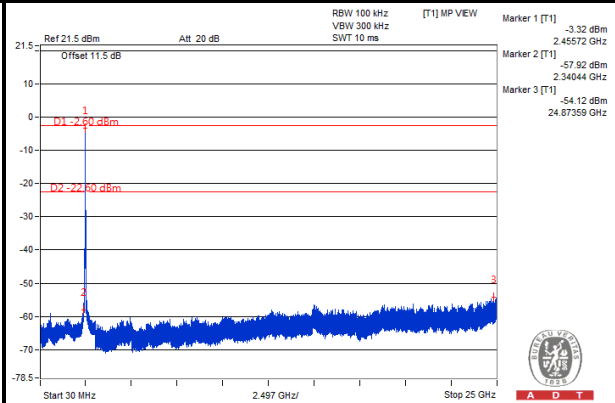
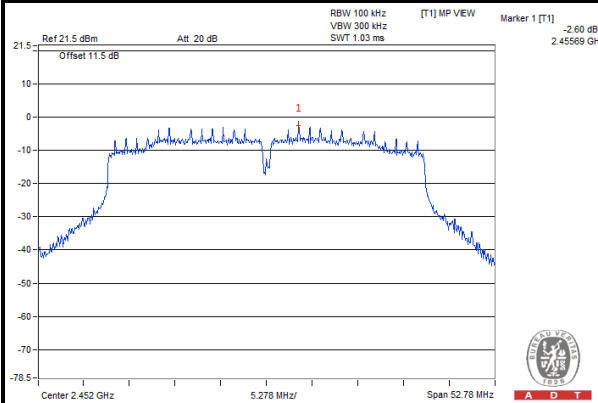
CH 3



CH 6



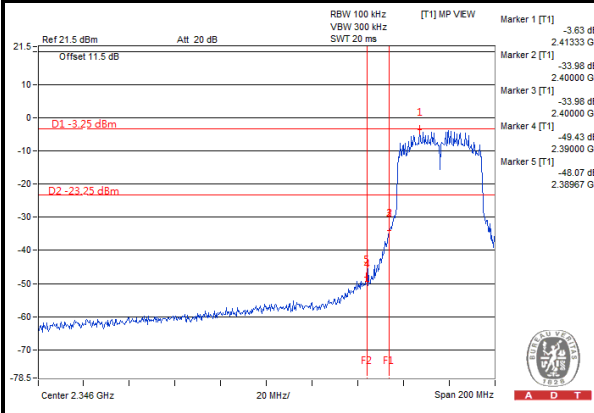
CH 9



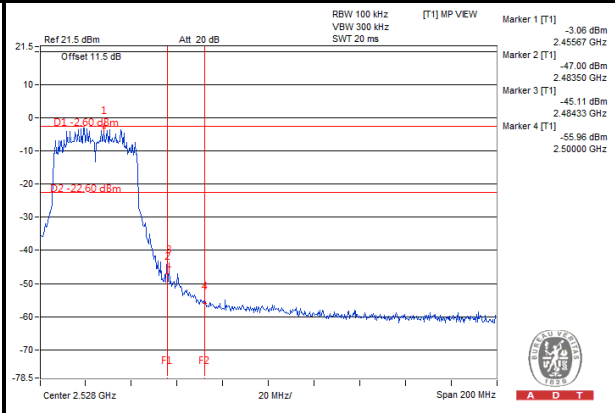


A D T

CH 3 Band edge



CH 9 Band edge



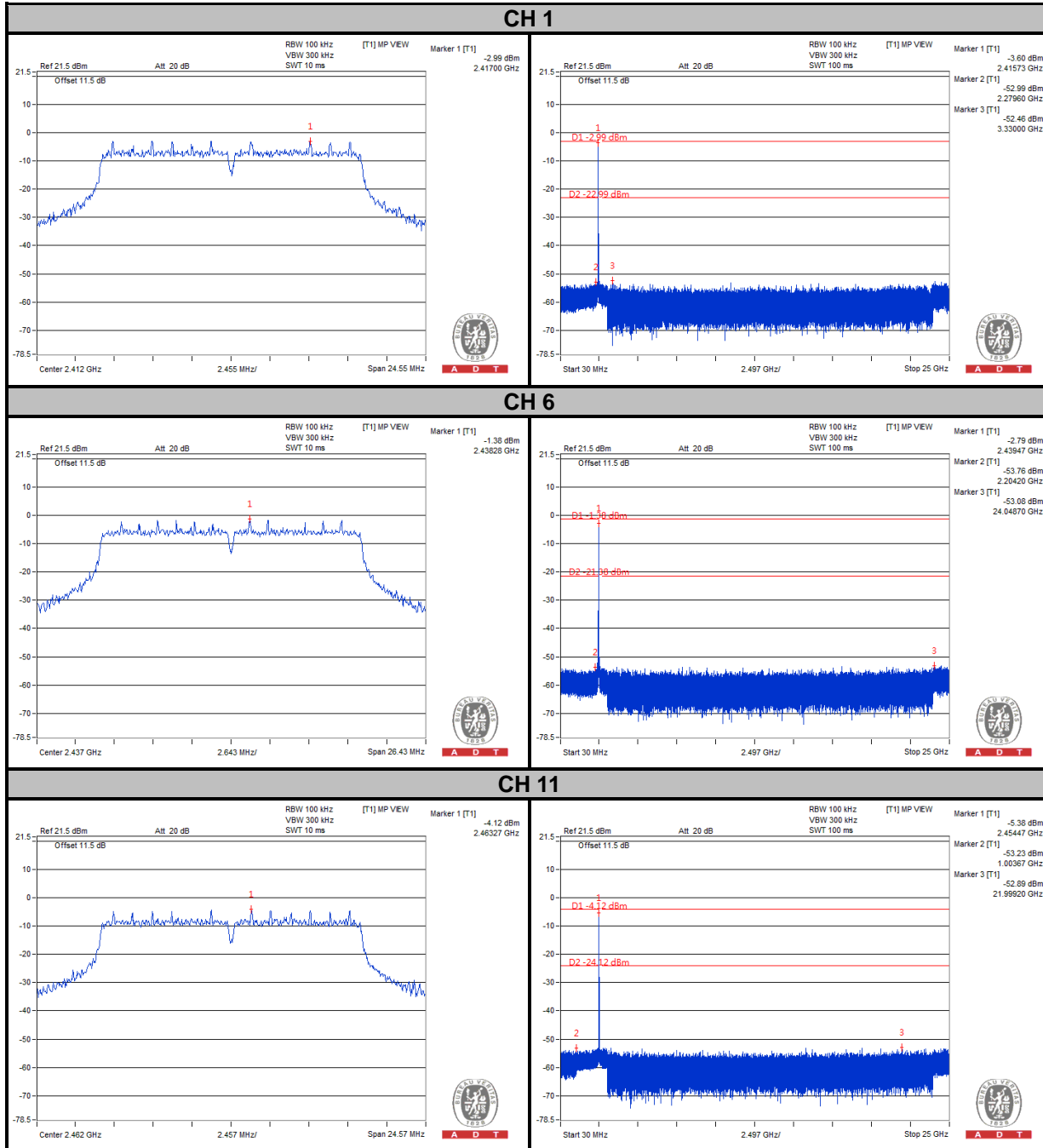


A D T

MODE C

802.11n (20MHz)

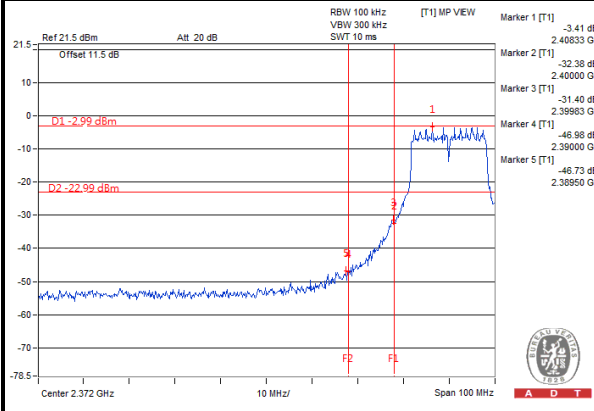
CHAIN 0



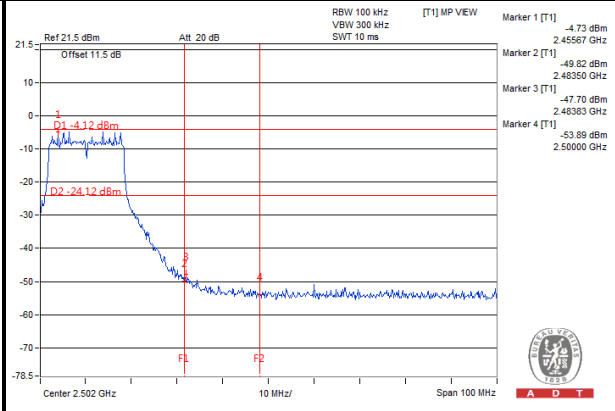


A D T

CH 1 Band edge



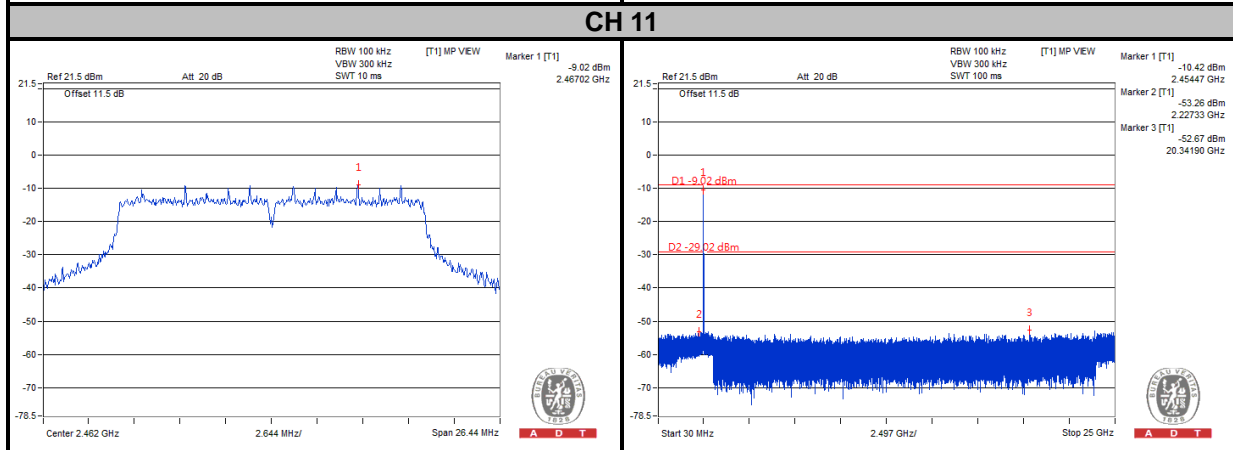
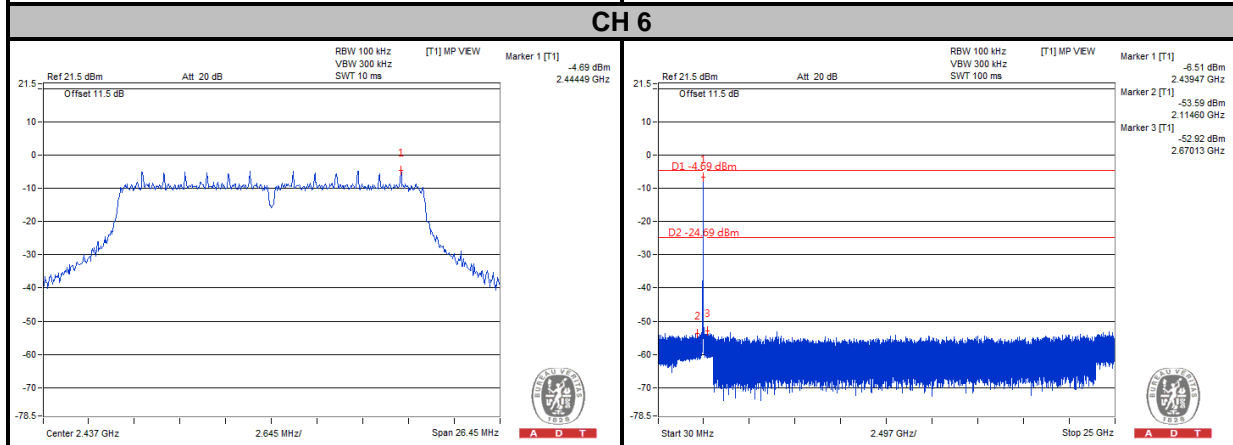
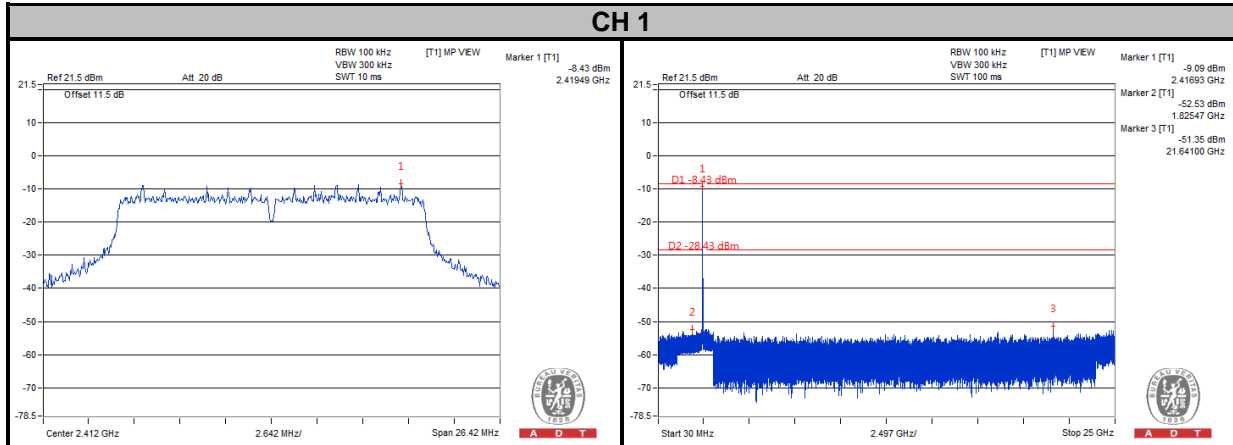
CH 11 Band edge





A D T

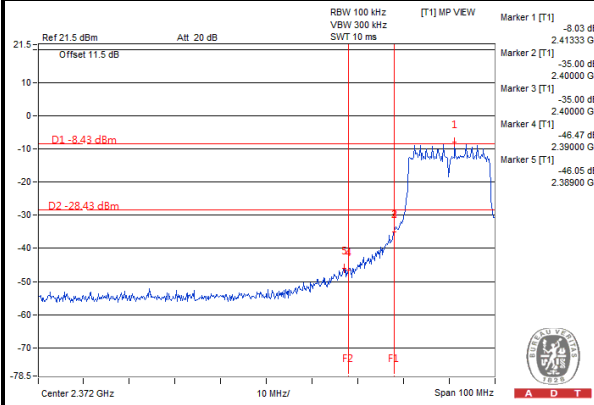
CHAIN 1



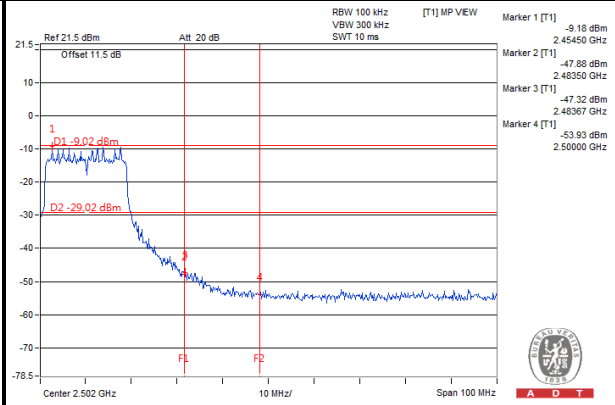


A D T

CH 1 Band edge



CH 11 Band edge



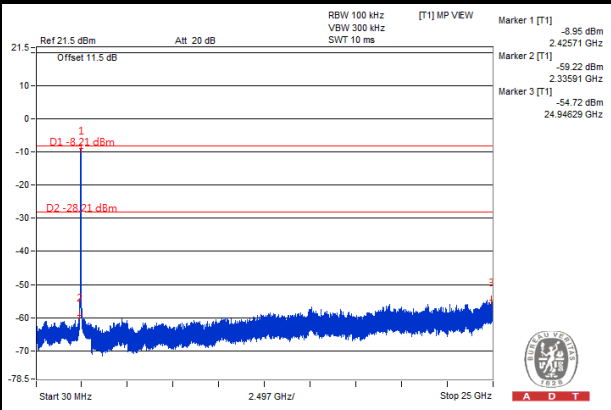
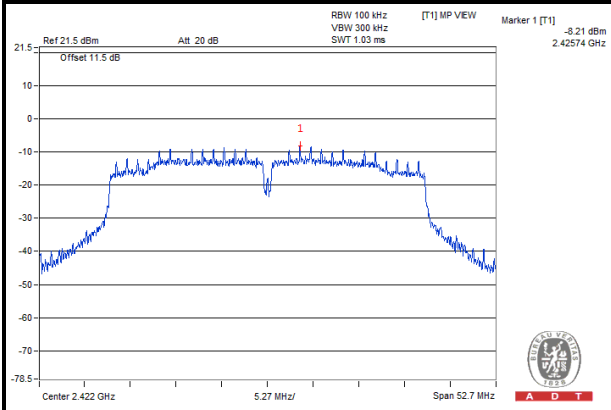


A D T

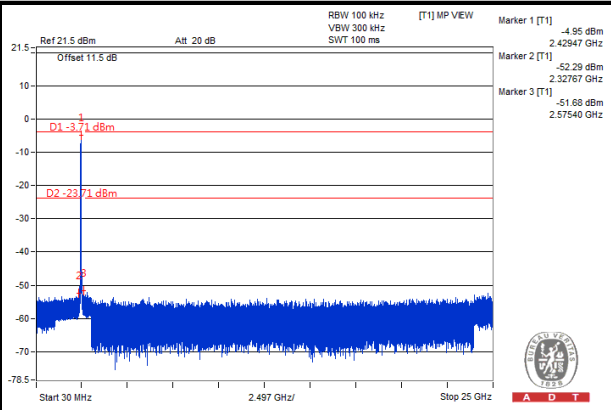
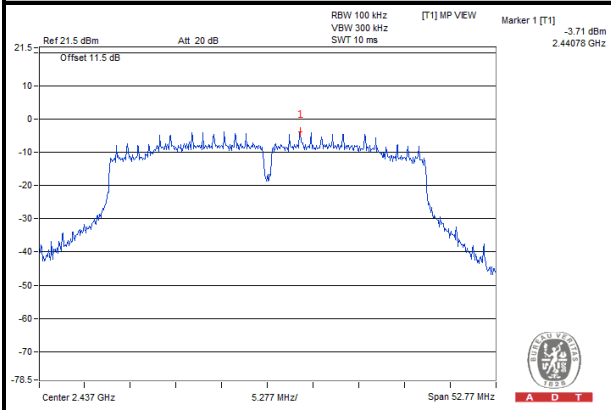
802.11n (40MHz)

CHAIN 0

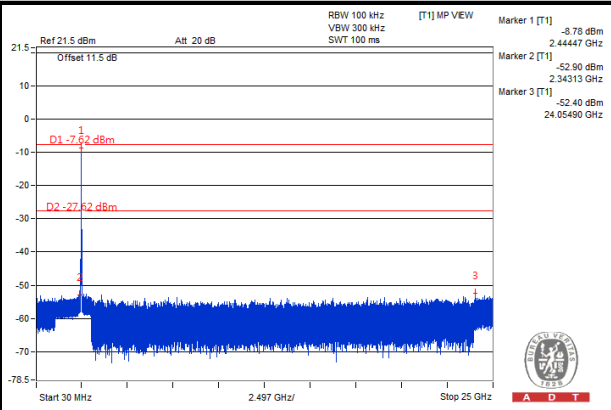
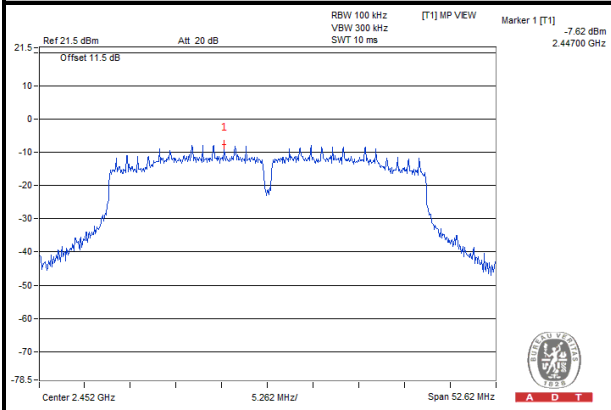
CH 3



CH 6



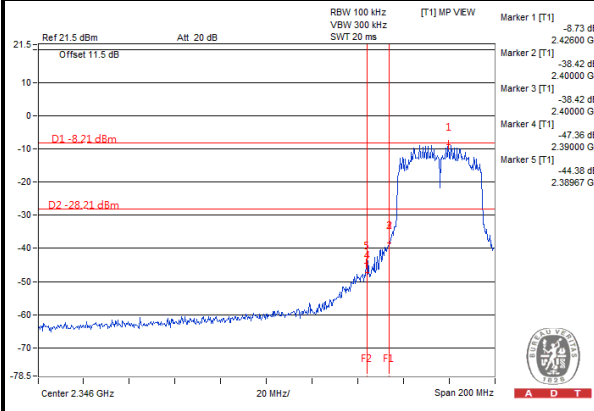
CH 9



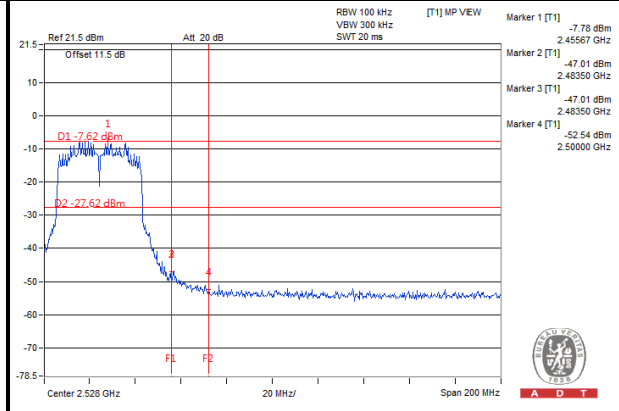


A D T

CH 3 Band edge



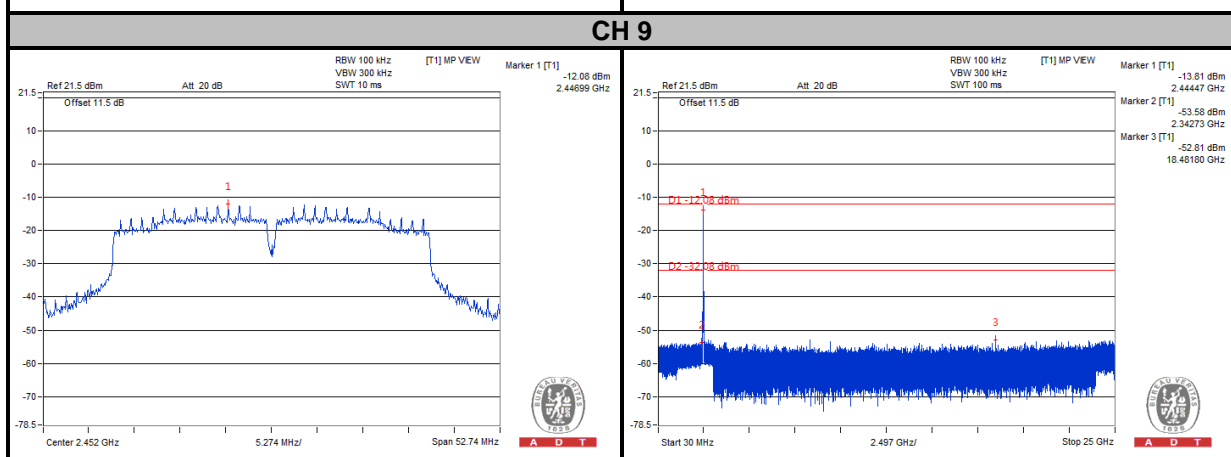
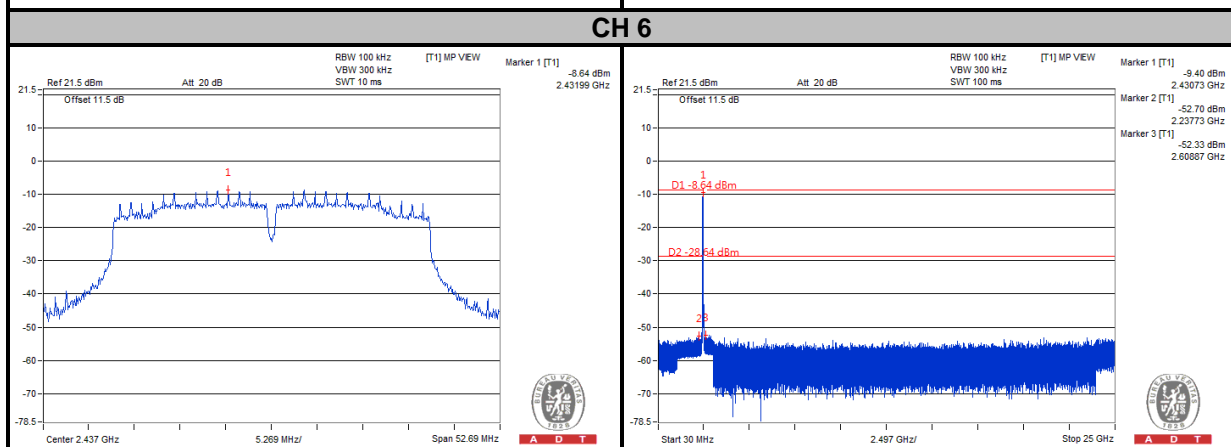
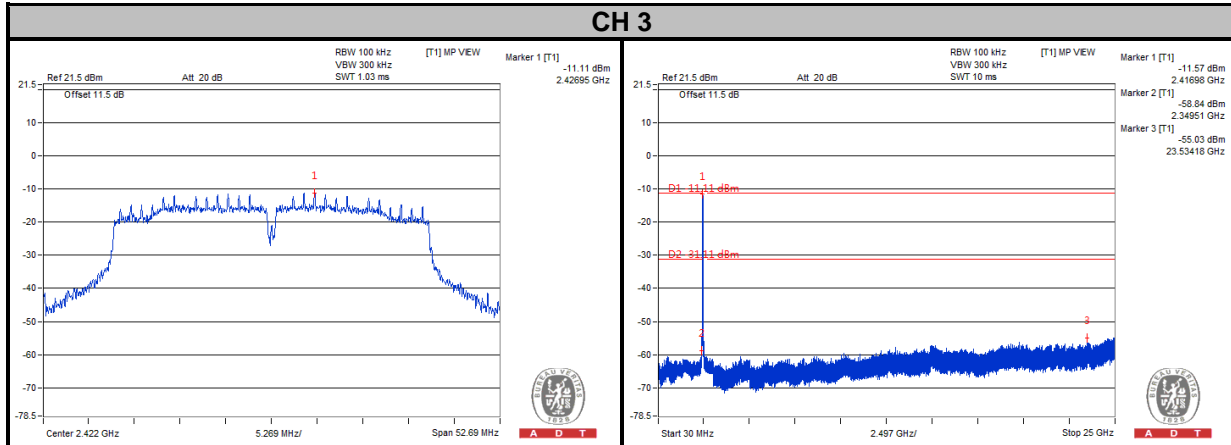
CH 9 Band edge





A D T

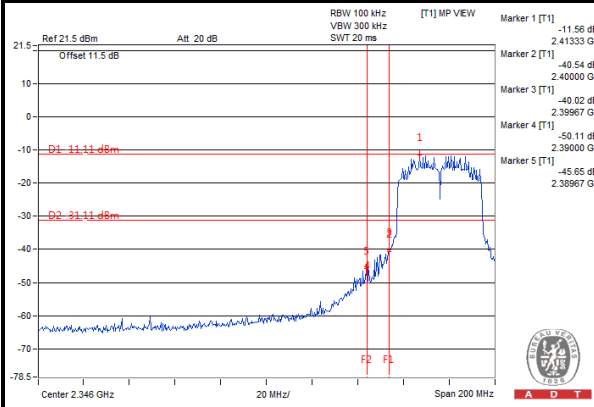
CHAIN 1



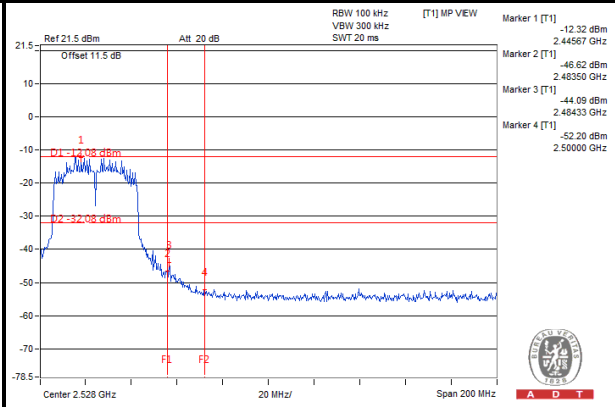


A D T

CH 3 Band edge



CH 9 Band edge





A D T

5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



6. INFORMATION ON THE TESTING LABORATORIES

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

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

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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

7. APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

---END---