FCC TEST REPORT (15.247)

REPORT NO.:	RF130903C26C
MODEL NO.:	AP5r
FCC ID:	2AAUY-URSUS
RECEIVED:	Sep. 03, 2013
TESTED:	Sep. 06, 2013 ~ Mar. 25, 2014
ISSUED:	Oct. 22, 2014

APPLICANT:	Ocedo GmbH
ADDRESS:	Erbprinzenstrasse 27, 76133 Karlsruhe, Germany

ISSUED BY:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
LAB ADDRESS:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan, R.O.C.
TEST LOCATION:	No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, 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.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF130903C26C	Original release	Oct. 22, 2014

1. CERTIFICATION

PRODUCT:	Wireless Access Point
MODEL NO.:	AP5r
BRAND:	OCEDO
APPLICANT:	Ocedo GmbH
TESTED:	Sep. 06, 2013 ~ Mar. 25, 2014
TEST SAMPLE:	ENGINEERING SAMPLE
STANDARDS:	**FCC Part 15, Subpart C (Section 15.247)**
	ANSI C63.10-2009

The above equipment (model: AP5r) 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 : _____ **, DATE :** Oct. 22, 2014

Ivy Lin / Specialist

APPROVED BY : _____ **, DATE :** Oct. 22, 2014

Ken Liu / Senior Manager

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 -11.86dB at 4.08984MHz.
15.205 & 209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.2dB at 2500.00MHz.
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -18.72dB at 5.850GHz.
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is N-type. (The device is professionally installed)

2.1 MEASUREMENT UNCERTAINTY

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

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.34 dB
	200MHz ~1000MHz	3.35 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	Wireless Access Point
MODEL NO.	AP5r
POWER SUPPLY	48Vdc (POE)
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode only.
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b:11.0/ 5.5/ 2.0/ 1.0Mbps 802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 450.0Mbps 802.11ac: up to 1.3Gbps
OPERATING FREQUENCY	**2.4GHz:** 2412 ~ 2462MHz **5.0GHz:** 5745 ~ 5825MHz
NUMBER OF CHANNEL	**2.4GHz:** 11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (40MHz) **5.0GHz:** 5 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz) 1 for 802.11ac (80MHz)
OUTPUT POWER	972.720mW for 2412 ~ 2462MHz 737.166mW for 5745 ~ 5825MHz
ANTENNA TYPE	**2.4GHz:** Dipole antenna with 5dBi gain **5.0GHz:** Dipole antenna with 7dBi gain
ANTENNA CONNECTOR	N-type (The device is professionally installed)
DATA CABLE	0.55m non-shielded RJ45 cable without core
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	POE, Adapter

NOTE:

1. The EUT incorporates a MIMO function. The EUT provides 3 completed transmitters and 3 receivers.

MODULATION MODE	TX FUNCTION
802.11b	3TX
802.11g	3TX
802.11a	3TX
802.11n (20MHz)	3TX
802.11n (40MHz)	3TX
802.11ac (80MHz)	3TX

2. The EUT consumes power from the following POE.

POE	
BRAND:	EnGenius
MODEL:	EPE-48GR
POWER RATING:	48Vdc, 0.8A, 38.4W Max

Adapter (For POE)	
BRAND:	Powertron Electronics Corp.
MODEL:	PA1040-480IB080
INPUT:	100-240Vac, 50-60Hz, 1.5A
OUTPUT:	48Vdc, 0.8A, 38.4W Max
POWER LINE:	DC 1.6m power cable with 1 core attached on adapter

3. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 DESCRIPTION OF TEST MODES

FOR 2.4GHz:

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		

FOR 5.0GHz (5745 ~ 5825MHz):

5 channels are provided for 802.11a, 802.11n (20MHz):

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

2 channels are provided for 802.11n (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (80MHz):

CHANNEL	FREQUENCY
155	5775MHz

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

FOR 2.4GHz:

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

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 **Y-plane**.

RADIATED EMISSION TEST (ABOVE 1GHz):

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

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	7.2
-	802.11n (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	15.0

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)
-	802.11n (20MHz)	1 to 11	11	OFDM	BPSK	7.2

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)
-	802.11n (20MHz)	1 to 11	11	OFDM	BPSK	7.2

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)
-	802.11b	1 to 11	1, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 11	OFDM	BPSK	6.0
-	802.11n (20MHz)	1 to 11	1, 11	OFDM	BPSK	7.2
-	802.11n (40MHz)	3 to 9	3, 9	OFDM	BPSK	15.0

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)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	7.2
-	802.11n (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	15.0

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	26deg. C, 71%RH, 22deg. C, 71%RH	48Vdc	Martin Lee, Jones Chang
RE<1G	26deg. C, 67%RH	48Vdc	Cedric Wu
PLC	26deg. C, 67%RH	48Vdc	Alan Wu
APCM	25deg. C, 60%RH	48Vdc	Jun Wu

FOR 5.0GHz (5745 ~ 5825MHz):

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

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 **Y-plane**.

RADIATED EMISSION TEST (ABOVE 1GHz):

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (20MHz)	149 to 165	149, 157, 165	OFDM	BPSK	7.2
-	802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	15.0
-	802.11ac (80MHz)	155	155	OFDM	BPSK	87.8

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)
-	802.11n (20MHz)	149 to 165	149	OFDM	BPSK	7.2

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)
-	802.11n (20MHz)	149 to 165	149	OFDM	BPSK	7.2

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)
-	802.11a	149 to 165	149, 165	OFDM	BPSK	6.0
-	802.11n (20MHz)	149 to 165	149, 165	OFDM	BPSK	7.2
-	802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	15.0
-	802.11ac (80MHz)	155	155	OFDM	BPSK	87.8

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)
-	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (20MHz)	149 to 165	149, 157, 165	OFDM	BPSK	7.2
-	802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	15.0
-	802.11ac (80MHz)	155	155	OFDM	BPSK	87.8

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 65%RH	48Vdc	Chris Lin
RE<1G	26deg. C, 67%RH	48Vdc	Cedric Wu
PLC	26deg. C, 67%RH	48Vdc	Alan Wu
APCM	25deg. C, 60%RH	48Vdc	Antony Lee

3.3 DUTY CYCLE OF TEST SIGNAL

2.4GHz:

802.11b: Duty cycle > 98 %

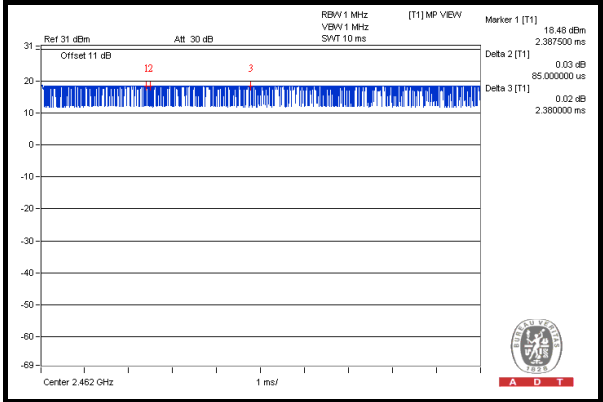
Duty cycle is < 98%, duty factor shall be considered.

802.11g: Duty cycle = 2.020000/2.073750 = 0.974, Duty factor = 10 * log(1/0.974) = 0.11

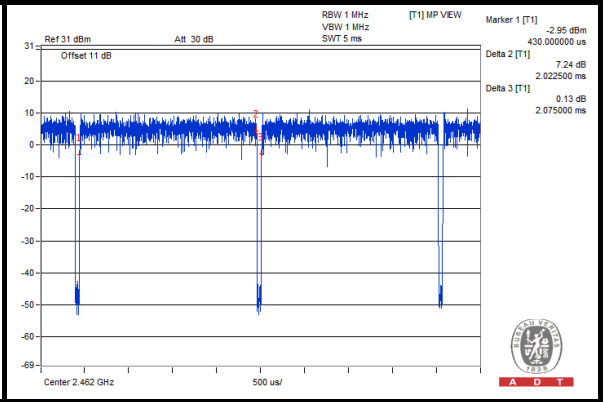
802.11n (20MHz): Duty cycle = 668.75/718.75 = 0.930, Duty factor = 10 * log(1/0.930) = 0.32

802.11n (40MHz): Duty cycle = 342.50/386.25 = 0.887, Duty factor = 10 * log(1/0.887) = 0.51

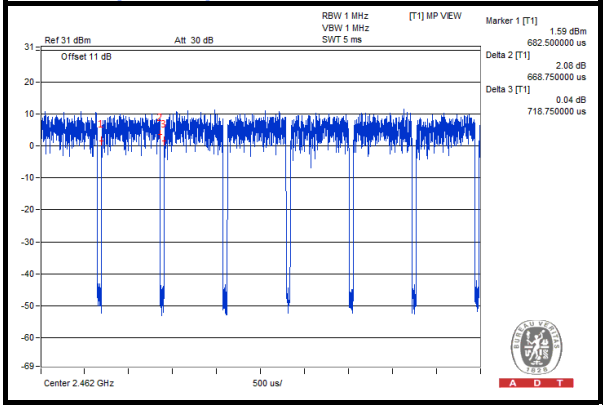
802.11b



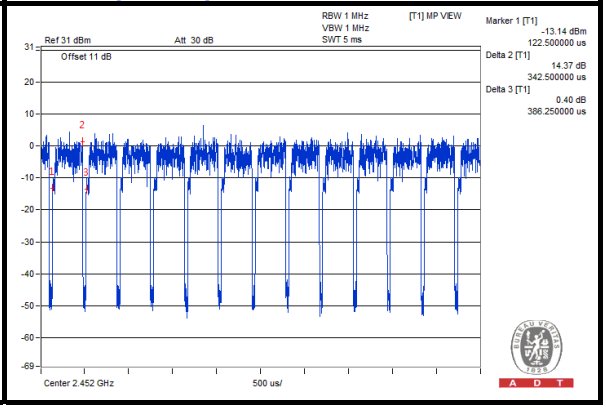
802.11g



802.11n (20MHz)



802.11n (40MHz)



5GHz:

802.11a: Duty cycle > 98 %

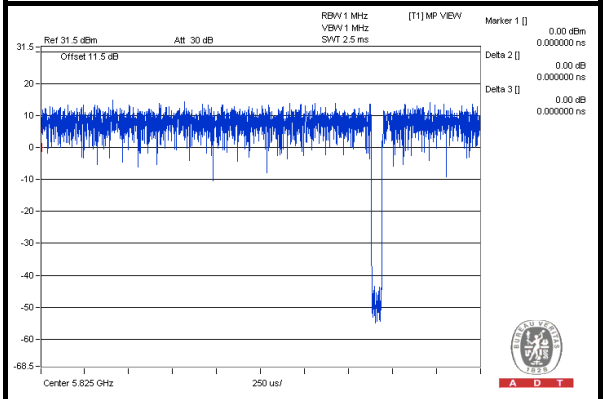
Duty cycle is < 98%, duty factor shall be considered.

802.11n (20MHz): Duty cycle = 667.50/726.875 = 0.918, Duty factor = 10 * log(1/0.918) = 0.38

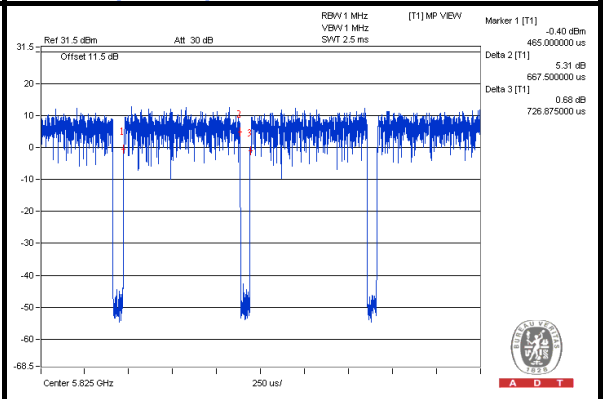
802.11n (40MHz): Duty cycle = 347.50/406.25 = 0.855, Duty factor = 10 * log(1/0.855) = 0.68

802.11ac (80MHz): Duty cycle = 455.625/513.750 = 0.887, Duty factor = 10 * log(1/0.887) = 0.52

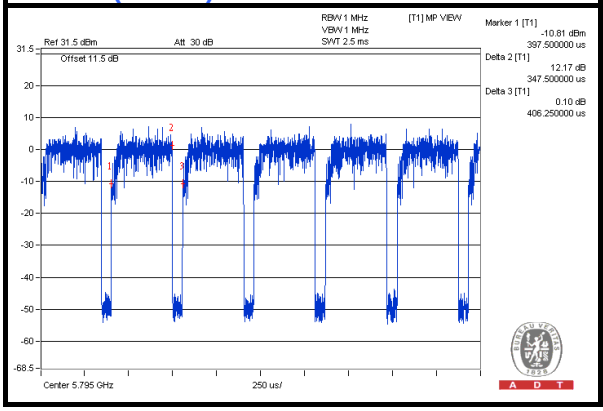
802.11a



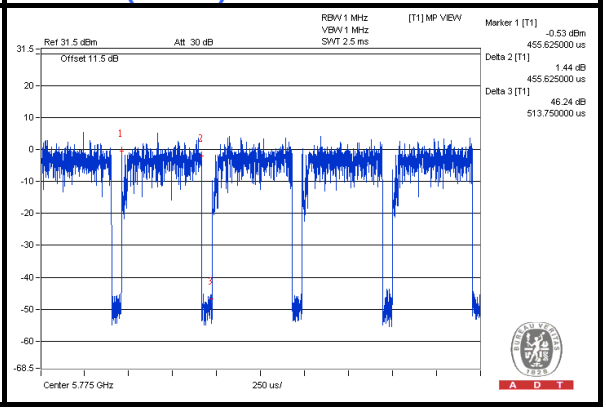
802.11n (20MHz)



802.11n (40MHz)



802.11ac (80MHz)



3.4 DESCRIPTION OF SUPPORT UNITS

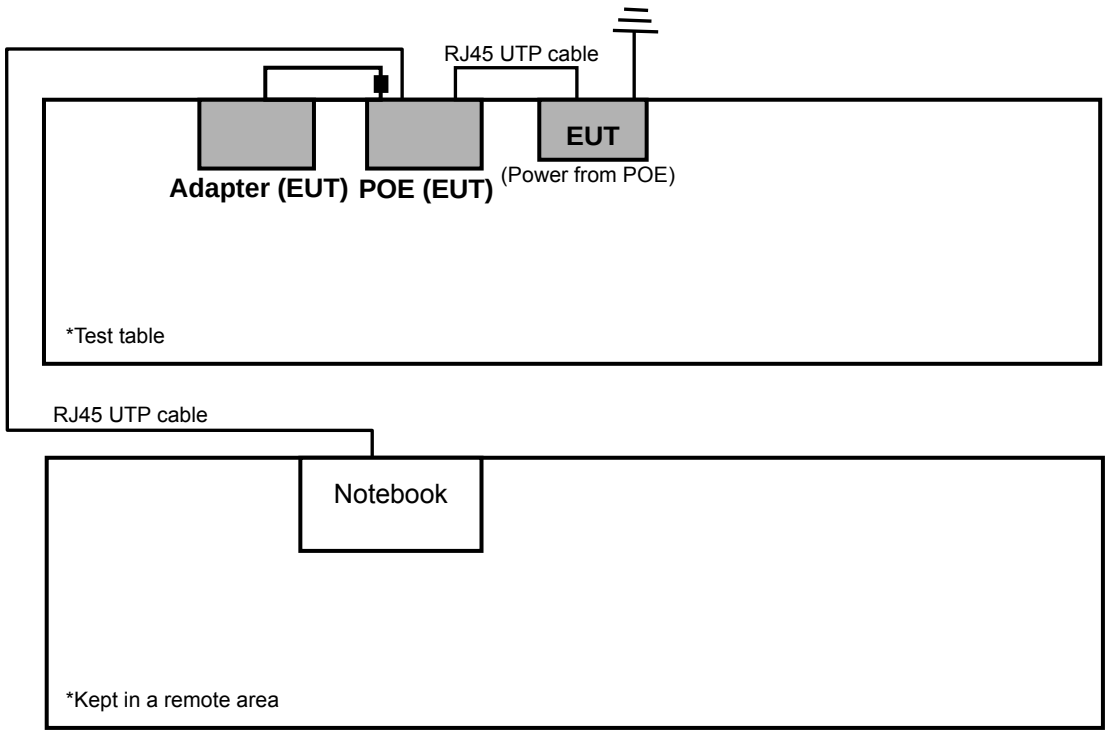
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Notebook	DELL	E5410	6RP2YM1	FCC DoC Approved

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	1.8m RJ45 UTP cable, 10m RJ45 UTP cable

NOTE:
1. All power cords of the above support units are non-shielded (1.8m).
2. Item 1 acted as a communication partner to transfer data.

3.4.1 CONFIGURATION OF SYSTEM UNDER TEST



3.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart C (15.247)
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 is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It 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 30dB below the highest level of the desired power:

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 30dB under any condition of modulation.

4.1.2 TEST INSTRUMENTS

Test Date: Sep. 06 ~ Oct. 07, 2013

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESI7	838496/016	Dec. 25, 2012	Dec. 24, 2013
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Jan. 31, 2013	Jan. 30, 2014
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Mar. 20, 2013	Mar. 19, 2014
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-404	Dec. 22, 2012	Dec. 21, 2013
HORN Antenna SCHWARZBECK	BBHA 9170	148	Jul. 15, 2013	Jul. 14, 2014
Preamplifier Agilent	8447D	2944A10633	Oct. 25, 2012	Oct. 24, 2013
Preamplifier Agilent	8449B	3008A01964	Oct. 25, 2012	Oct. 24, 2013
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250723/4	Aug. 23, 2013	Aug. 22, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 106	12738/6+309224/4	Aug. 23, 2013	Aug. 22, 2014
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA	NA
Turn Table BV ADT	TT100	TT93021703	NA	NA
Turn Table Controller BV ADT	SC100	SC93021703	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 25, 2012	Oct. 24, 2013
High Speed Peak Power Meter	ML2495A	0824011	Jul. 29, 2013	Jul. 28, 2014
Power Sensor	MA2411B	0738171	Jul. 29, 2013	Jul. 28, 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. The test was performed in HwaYa Chamber 3.

3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.

4. The FCC Site Registration No. is 988962.

5. The IC Site Registration No. is IC 7450F-3.

Test Date: Feb. 21 ~ Mar. 25, 2014

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESIB7	100187	Jan. 02, 2014	Jan. 01, 2015
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Mar. 03, 2014	Mar. 02, 2015
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Feb. 26, 2014	Feb. 25, 2015
			Mar. 20, 2013	Mar. 19, 2014
HORN Antenna SCHWARZBECK	9120D	209	Sep. 12, 2013	Sep. 11, 2014
HORN Antenna SCHWARZBECK	BBHA 9170	148	Jul. 15, 2013	Jul. 14, 2014
Preamplifier Agilent	8447D	2944A10633	Oct. 07, 2013	Oct. 06, 2014
Preamplifier Agilent	8449B	3008A01964	Aug. 26, 2013	Aug. 25, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	214378/4	Aug. 26, 2013	Aug. 25, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 106	12738/6 +309224/4	Aug. 26, 2013	Aug. 25, 2014
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA	NA
Turn Table BV ADT	TT100	TT93021703	NA	NA
Turn Table Controller BV ADT	SC100	SC93021703	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 18, 2013	Oct. 17, 2014
High Speed Peak Power Meter	ML2495A	0824011	Jul. 29, 2013	Jul. 28, 2014
Power Sensor	MA2411B	0738171	Jul. 29, 2013	Jul. 28, 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. The test was performed in HwaYa Chamber 3.

3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.

4. The FCC Site Registration No. is 988962.

5. The IC Site Registration No. is IC 7450F-3.

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. The antenna is a broadband antenna, and its height 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:

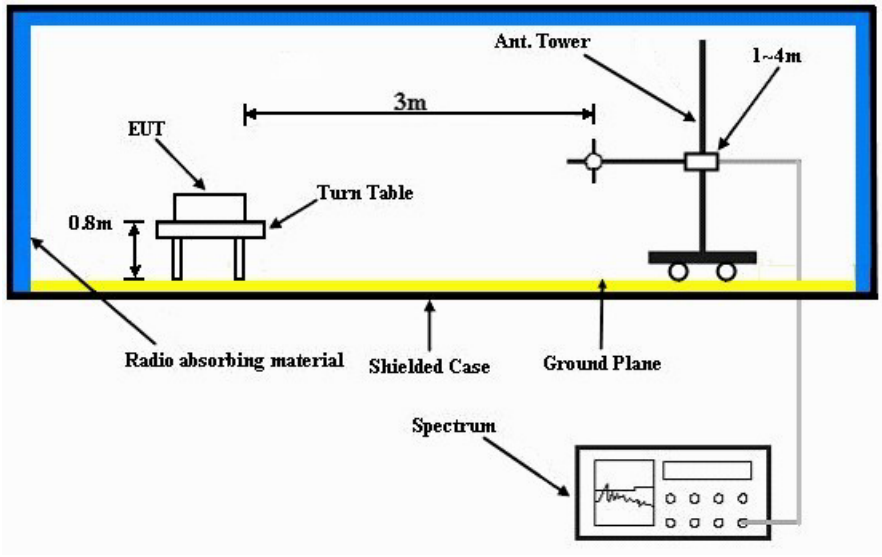
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution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

4.1.4 DEVIATION FROM TEST STANDARD

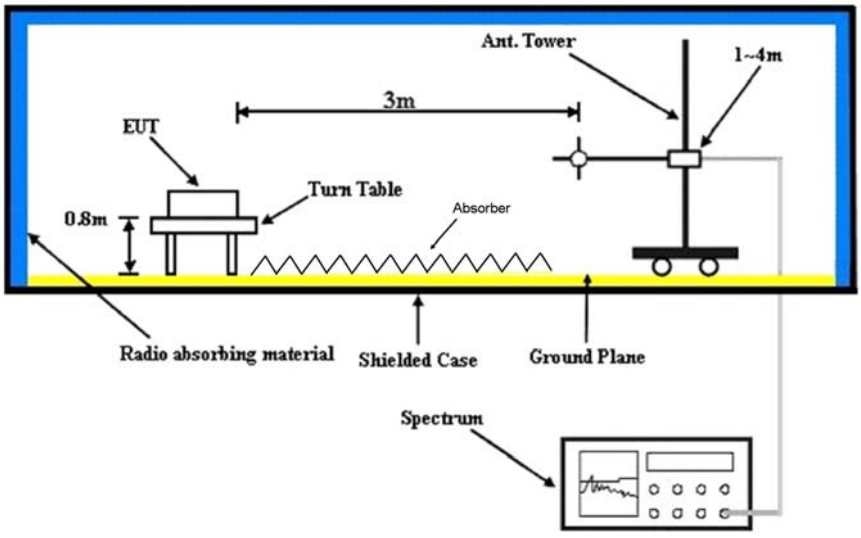
No deviation.

4.1.5 TEST SETUP

Frequency range 30MHz~1GHz



Frequency range above 1GHz



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

4.1.6 EUT OPERATING CONDITIONS

a. Placed the EUT on the testing table.
b. Prepared notebook to act as communication partner and placed it outside of testing area.
c. The communication partner connected with EUT via a RJ45 cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
d. The communication partner sent data to EUT by command "PING".

4.1.7 TEST RESULTS

ABOVE 1GHz DATA：

802.11b

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 71%RH	TESTED BY	Jones Chang

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	2372.00	64.7 PK	74.0	-9.3	1.05 H	351	33.80	30.90
2	2372.00	52.6 AV	54.0	-1.4	1.05 H	351	21.70	30.90
3	*2412.00	122.4 PK			1.00 H	349	91.30	31.10
4	*2412.00	118.9 AV			1.00 H	349	87.80	31.10
5	4824.00	47.9 PK	74.0	-26.1	1.47 H	30	43.00	4.90
6	4824.00	37.6 AV	54.0	-16.4	1.47 H	30	32.70	4.90
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	2372.00	56.9 PK	74.0	-17.1	1.00 V	224	26.00	30.90
2	2372.00	46.0 AV	54.0	-8.0	1.00 V	224	15.10	30.90
3	*2412.00	113.0 PK			1.86 V	73	81.90	31.10
4	*2412.00	109.3 AV			1.86 V	73	78.20	31.10
5	4824.00	48.4 PK	74.0	-25.6	1.07 V	350	43.50	4.90
6	4824.00	38.8 AV	54.0	-15.2	1.07 V	350	33.90	4.90

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 71%RH	TESTED BY	Jones Chang

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	123.8 PK			1.01 H	357	92.60	31.20
2	*2437.00	120.2 AV			1.01 H	357	89.00	31.20
3	2483.50	66.4 PK	74.0	-7.6	1.00 H	17	35.00	31.40
4	2483.50	50.4 AV	54.0	-3.6	1.00 H	17	19.00	31.40
5	4874.00	53.7 PK	74.0	-20.3	1.32 H	27	48.70	5.00
6	4874.00	51.9 AV	54.0	-2.1	1.32 H	27	46.90	5.00
7	7311.00	59.8 PK	74.0	-14.2	1.00 H	169	48.60	11.20
8	7311.00	50.9 AV	54.0	-3.1	1.00 H	169	39.70	11.20
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	116.0 PK			1.00 V	82	84.80	31.20
2	*2437.00	112.7 AV			1.00 V	82	81.50	31.20
3	2483.50	57.9 PK	74.0	-16.1	1.00 V	73	26.50	31.40
4	2483.50	48.9 AV	54.0	-5.1	1.00 V	73	17.50	31.40
5	4874.00	51.1 PK	74.0	-22.9	1.39 V	99	46.10	5.00
6	4874.00	48.6 AV	54.0	-5.4	1.39 V	99	43.60	5.00
7	7311.00	53.8 PK	74.0	-20.2	1.00 V	33	42.60	11.20
8	7311.00	44.8 AV	54.0	-9.2	1.00 V	33	33.60	11.20

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 71%RH	TESTED BY	Jones Chang

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	123.4 PK			1.03 H	353	92.10	31.30
2	*2462.00	119.6 AV			1.03 H	353	88.30	31.30
3	2483.50	62.8 PK	74.0	-11.2	1.00 H	157	31.40	31.40
4	2483.50	52.3 AV	54.0	-1.7	1.00 H	157	20.90	31.40
5	2500.00	64.8 PK	74.0	-9.2	1.15 H	355	33.30	31.50
6	**2500.00**	**52.8 AV**	**54.0**	**-1.2**	**1.15 H**	**355**	**21.30**	**31.50**
7	4924.00	51.3 PK	74.0	-22.7	1.00 H	161	46.10	5.20
8	4924.00	46.2 AV	54.0	-7.8	1.00 H	161	41.00	5.20
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	116.1 PK			1.24 V	81	84.80	31.30
2	*2462.00	112.2 AV			1.24 V	81	80.90	31.30
3	2483.50	58.3 PK	74.0	-15.7	1.00 V	99	26.90	31.40
4	2483.50	48.0 AV	54.0	-6.0	1.00 V	99	16.60	31.40
5	2500.00	59.5 PK	74.0	-14.5	1.00 V	105	28.00	31.50
6	2500.00	48.5 AV	54.0	-5.5	1.00 V	105	17.00	31.50
7	4924.00	49.4 PK	74.0	-24.6	1.09 V	265	44.20	5.20
8	4924.00	42.7 AV	54.0	-11.3	1.09 V	265	37.50	5.20

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 71%RH	TESTED BY	Martin Lee

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	68.7 PK	74.0	-5.3	1.28 H	180	36.50	32.20
2	2390.00	52.4 AV	54.0	-1.6	1.28 H	180	20.20	32.20
3	*2412.00	118.0 PK			1.30 H	357	85.70	32.30
4	*2412.00	108.6 AV			1.30 H	357	76.30	32.30
5	4824.00	48.7 PK	74.0	-25.3	1.14 H	255	42.20	6.50
6	4824.00	35.1 AV	54.0	-18.9	1.14 H	255	28.60	6.50
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	59.2 PK	74.0	-14.8	1.88 V	85	27.00	32.20
2	2390.00	46.9 AV	54.0	-7.1	1.88 V	85	14.70	32.20
3	*2412.00	110.0 PK			1.88 V	85	77.70	32.30
4	*2412.00	100.8 AV			1.88 V	85	68.50	32.30
5	4824.00	48.7 PK	74.0	-25.3	1.35 V	65	42.20	6.50
6	4824.00	34.6 AV	54.0	-19.4	1.35 V	65	28.10	6.50

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 71%RH	TESTED BY	Jones Chang

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	64.9 PK	74.0	-9.1	1.00 H	177	33.90	31.00
2	2390.00	51.0 AV	54.0	-3.0	1.00 H	177	20.00	31.00
3	*2437.00	124.4 PK			1.00 H	347	93.20	31.20
4	*2437.00	115.3 AV			1.00 H	347	84.10	31.20
5	2483.50	70.7 PK	74.0	-3.3	1.00 H	354	39.30	31.40
6	2483.50	52.3 AV	54.0	-1.7	1.00 H	354	20.90	31.40
7	4874.00	52.7 PK	74.0	-21.3	1.00 H	135	47.70	5.00
8	4874.00	38.6 AV	54.0	-15.4	1.00 H	135	33.60	5.00
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	59.0 PK	74.0	-15.0	1.58 V	80	28.00	31.00
2	2390.00	46.1 AV	54.0	-7.9	1.58 V	80	15.10	31.00
3	*2437.00	115.7 PK			1.00 V	261	84.50	31.20
4	*2437.00	106.5 AV			1.00 V	261	75.30	31.20
5	2483.50	63.4 PK	74.0	-10.6	1.39 V	268	32.00	31.40
6	2483.50	48.1 AV	54.0	-5.9	1.39 V	268	16.70	31.40
7	4874.00	46.1 PK	74.0	-27.9	1.20 V	310	41.10	5.00
8	4874.00	34.5 AV	54.0	-19.5	1.20 V	310	29.50	5.00

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 71%RH	TESTED BY	Martin Lee

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	117.2 PK			1.00 H	168	84.80	32.40
2	*2462.00	108.5 AV			1.00 H	168	76.10	32.40
3	2483.50	65.5 PK	74.0	-8.5	1.00 H	174	33.00	32.50
4	2483.50	52.4 AV	54.0	-1.6	1.00 H	174	19.90	32.50
5	4924.00	48.6 PK	74.0	-25.4	1.00 H	226	41.70	6.90
6	4924.00	36.3 AV	54.0	-17.7	1.00 H	226	29.40	6.90
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	109.0 PK			1.00 V	274	76.60	32.40
2	*2462.00	99.9 AV			1.00 V	274	67.50	32.40
3	2483.50	60.0 PK	74.0	-14.0	1.00 V	277	27.50	32.50
4	2483.50	47.1 AV	54.0	-6.9	1.00 V	277	14.60	32.50
5	4924.00	47.9 PK	74.0	-26.1	1.00 V	218	41.00	6.90
6	4924.00	35.7 AV	54.0	-18.3	1.00 V	218	28.80	6.90

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 (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 71%RH	TESTED BY	Martin Lee

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	64.2 PK	74.0	-9.8	1.01 H	161	32.00	32.20
2	2390.00	52.1 AV	54.0	-1.9	1.01 H	161	19.90	32.20
3	*2412.00	117.8 PK			1.01 H	161	85.50	32.30
4	*2412.00	108.8 AV			1.01 H	161	76.50	32.30
5	4824.00	48.4 PK	74.0	-25.6	1.36 H	254	41.90	6.50
6	4824.00	35.1 AV	54.0	-18.9	1.36 H	254	28.60	6.50
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	59.2 PK	74.0	-14.8	1.52 V	271	27.00	32.20
2	2390.00	47.4 AV	54.0	-6.6	1.52 V	271	15.20	32.20
3	*2412.00	108.2 PK			1.52 V	271	75.90	32.30
4	*2412.00	98.3 AV			1.52 V	271	66.00	32.30
5	4824.00	48.0 PK	74.0	-26.0	1.14 V	147	41.50	6.50
6	4824.00	35.2 AV	54.0	-18.8	1.14 V	147	28.70	6.50

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 71%RH	TESTED BY	Jones Chang

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	63.8 PK	74.0	-10.2	1.36 H	161	32.80	31.00
2	2390.00	49.8 AV	54.0	-4.2	1.36 H	161	18.80	31.00
3	*2437.00	123.2 PK			1.00 H	351	92.00	31.20
4	*2437.00	114.1 AV			1.00 H	351	82.90	31.20
5	2483.50	72.4 PK	74.0	-1.6	1.60 H	175	41.00	31.40
6	2483.50	52.7 AV	54.0	-1.3	1.60 H	175	21.30	31.40
7	4874.00	56.9 PK	74.0	-17.1	1.01 H	158	51.90	5.00
8	4874.00	42.7 AV	54.0	-11.3	1.01 H	158	37.70	5.00
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	57.2 PK	74.0	-16.8	1.00 V	80	26.20	31.00
2	2390.00	45.9 AV	54.0	-8.1	1.00 V	80	14.90	31.00
3	*2437.00	115.9 PK			1.00 V	263	84.70	31.20
4	*2437.00	106.4 AV			1.00 V	263	75.20	31.20
5	2483.50	66.5 PK	74.0	-7.5	1.38 V	264	35.10	31.40
6	2483.50	48.2 AV	54.0	-5.8	1.38 V	264	16.80	31.40
7	4874.00	48.7 PK	74.0	-25.3	1.01 V	90	43.70	5.00
8	4874.00	36.3 AV	54.0	-17.7	1.01 V	90	31.30	5.00

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 71%RH	TESTED BY	Martin Lee

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	2360.00	63.4 PK	74.0	-10.6	1.09 H	167	31.20	32.20
2	2360.00	52.3 AV	54.0	-1.7	1.09 H	167	20.10	32.20
3	*2462.00	117.1 PK			1.00 H	179	84.70	32.40
4	*2462.00	107.3 AV			1.00 H	179	74.90	32.40
5	2483.50	65.8 PK	74.0	-8.2	1.00 H	180	33.30	32.50
6	2483.50	52.0 AV	54.0	-2.0	1.00 H	180	19.50	32.50
7	4924.00	48.9 PK	74.0	-25.1	1.00 H	179	42.00	6.90
8	4924.00	36.7 AV	54.0	-17.3	1.00 H	179	29.80	6.90
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	2360.00	57.8 PK	74.0	-16.2	1.00 V	84	25.60	32.20
2	2360.00	46.0 AV	54.0	-8.0	1.00 V	84	13.80	32.20
3	*2462.00	109.2 PK			1.00 V	270	76.80	32.40
4	*2462.00	100.0 AV			1.00 V	270	67.60	32.40
5	2483.50	59.6 PK	74.0	-14.4	1.00 V	262	27.10	32.50
6	2483.50	46.7 AV	54.0	-7.3	1.00 V	262	14.20	32.50
7	4924.00	48.1 PK	74.0	-25.9	1.00 V	199	41.20	6.90
8	4924.00	35.9 AV	54.0	-18.1	1.00 V	199	29.00	6.90

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 (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 3	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 71%RH	TESTED BY	Martin Lee

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	65.8 PK	74.0	-8.2	1.25 H	345	33.60	32.20
2	2390.00	52.5 AV	54.0	-1.5	1.25 H	345	20.30	32.20
3	*2422.00	110.0 PK			1.26 H	183	77.60	32.40
4	*2422.00	101.7 AV			1.26 H	183	69.30	32.40
5	4844.00	47.4 PK	74.0	-26.6	1.00 H	25	40.90	6.50
6	4844.00	34.8 AV	54.0	-19.2	1.00 H	25	28.30	6.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	58.8 PK	74.0	-15.2	1.79 V	73	26.60	32.20
2	2390.00	46.5 AV	54.0	-7.5	1.79 V	73	14.30	32.20
3	*2422.00	102.8 PK			1.79 V	73	70.40	32.40
4	*2422.00	93.3 AV			1.79 V	73	60.90	32.40
5	4844.00	47.2 PK	74.0	-26.8	1.54 V	25	40.70	6.50
6	4844.00	34.6 AV	54.0	-19.4	1.54 V	25	28.10	6.50

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 71%RH	TESTED BY	Jones Chang

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	1.00 H	175	37.50	31.00
2	2390.00	52.5 AV	54.0	-1.5	1.00 H	175	21.50	31.00
3	*2437.00	114.5 PK			1.00 H	347	83.30	31.20
4	*2437.00	105.1 AV			1.00 H	347	73.90	31.20
5	2483.50	68.9 PK	74.0	-5.1	1.00 H	346	37.50	31.40
6	2483.50	52.6 AV	54.0	-1.4	1.00 H	346	21.20	31.40
7	4874.00	45.2 PK	74.0	-28.8	1.33 H	173	40.20	5.00
8	4874.00	35.1 AV	54.0	-18.9	1.33 H	173	30.10	5.00
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	57.2 PK	74.0	-16.8	1.98 V	278	26.20	31.00
2	2390.00	45.9 AV	54.0	-8.1	1.98 V	278	14.90	31.00
3	*2437.00	105.7 PK			1.00 V	268	74.50	31.20
4	*2437.00	96.5 AV			1.00 V	268	65.30	31.20
5	2483.50	62.0 PK	74.0	-12.0	1.00 V	74	30.60	31.40
6	2483.50	48.6 AV	54.0	-5.4	1.00 V	74	17.20	31.40
7	4874.00	45.9 PK	74.0	-28.1	1.07 V	113	40.90	5.00
8	4874.00	32.8 AV	54.0	-21.2	1.07 V	113	27.80	5.00

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 9	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 71%RH	TESTED BY	Martin Lee

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	111.4 PK			1.37 H	169	79.00	32.40
2	*2452.00	102.2 AV			1.37 H	169	69.80	32.40
3	2483.50	69.9 PK	74.0	-4.1	1.31 H	166	37.40	32.50
4	2483.50	52.5 AV	54.0	-1.5	1.31 H	166	20.00	32.50
5	4904.00	49.3 PK	74.0	-24.7	1.24 H	225	42.40	6.90
6	4904.00	35.5 AV	54.0	-18.5	1.24 H	225	28.60	6.90
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	105.4 PK			1.39 V	263	73.00	32.40
2	*2452.00	95.1 AV			1.39 V	263	62.70	32.40
3	2483.50	66.0 PK	74.0	-8.0	1.39 V	263	33.50	32.50
4	2483.50	50.0 AV	54.0	-4.0	1.39 V	263	17.50	32.50
5	4904.00	49.0 PK	74.0	-25.0	1.32 V	62	42.10	6.90
6	4904.00	35.9 AV	54.0	-18.1	1.32 V	62	29.00	6.90

REMARKS:

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

BELOW 1GHz DATA:

802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	26deg. C, 67%RH	TESTED BY	Cedric Wu

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	124.98	30.9 QP	43.5	-12.6	1.50 H	13	46.60	-15.70
2	161.85	35.9 QP	43.5	-7.6	1.50 H	198	49.30	-13.40
3	249.17	38.3 QP	46.0	-7.7	1.00 H	16	52.50	-14.20
4	375.29	38.7 QP	46.0	-7.3	1.00 H	16	49.50	-10.80
5	625.60	32.1 QP	46.0	-13.9	1.25 H	15	37.50	-5.40
6	751.73	33.5 QP	46.0	-12.5	1.00 H	356	36.60	-3.10
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	37.66	37.3 QP	40.0	-2.7	1.00 V	248	52.40	-15.10
2	66.77	33.0 QP	40.0	-7.0	1.00 V	303	48.70	-15.70
3	161.85	30.3 QP	43.5	-13.2	1.50 V	282	43.70	-13.40
4	249.17	31.1 QP	46.0	-14.9	1.00 V	269	45.30	-14.20
5	375.29	34.1 QP	46.0	-11.9	1.24 V	219	44.90	-10.80
6	751.73	31.6 QP	46.0	-14.4	1.24 V	183	34.70	-3.10

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.

4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 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 0.50MHz.

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

Test Date: Oct. 07, 2013

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100288	Nov. 09, 2012	Nov. 08, 2013
RF signal cable Woken	5D-FB	Cable-HYCO2-01	Dec. 28, 2012	Dec. 27, 2013
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Dec. 21, 2012	Dec. 20, 2013
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 17, 2013	Jul. 16, 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 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.

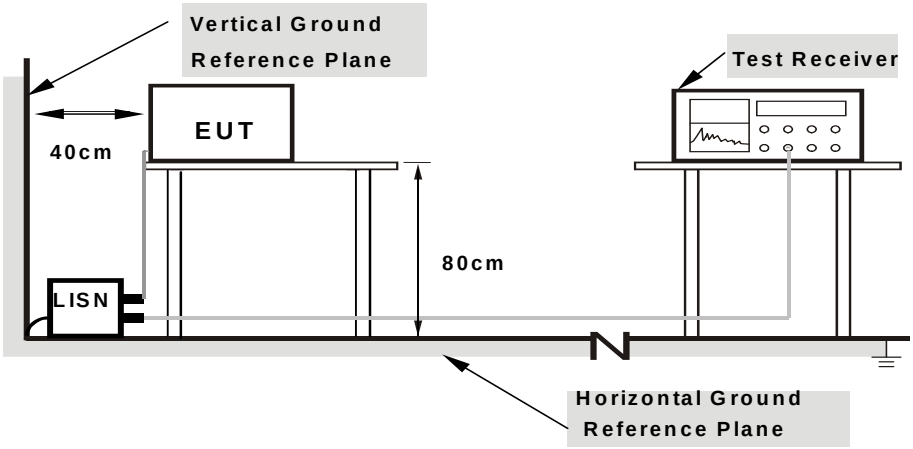
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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 4.1.6.

4.2.7 TEST RESULTS

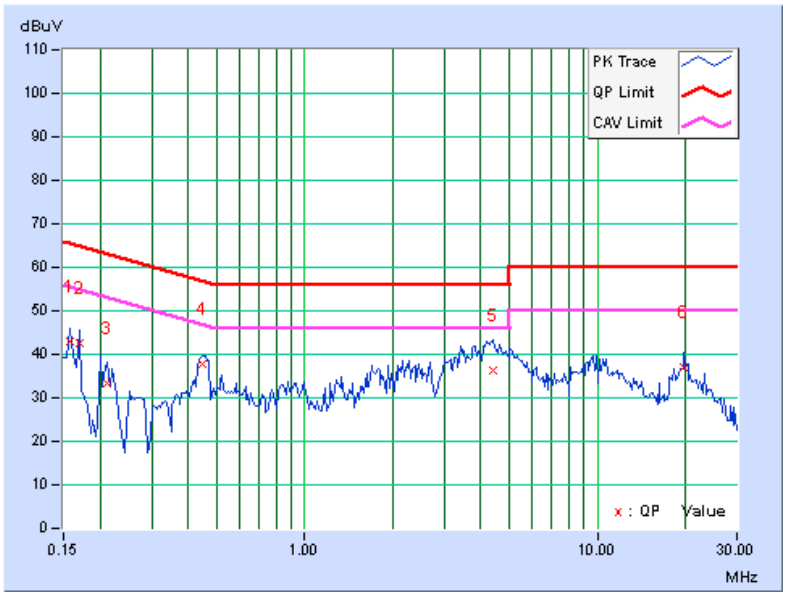
CONDUCTED WORST-CASE DATA：802.11n (20MHz)

PHASE	Line 1	6dB BANDWIDTH	9kHz

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	0.17	42.88	30.05	43.05	30.22	65.58	55.58	-22.52	-25.35
2	0.16953	0.17	42.35	30.50	42.52	30.67	64.98	54.98	-22.46	-24.31
3	0.21250	0.17	33.31	22.40	33.48	22.57	63.11	53.11	-29.62	-30.53
4	0.44688	0.21	37.43	27.99	37.64	28.20	56.93	46.93	-19.29	-18.73
5	4.42578	0.37	35.98	29.41	36.35	29.78	56.00	46.00	-19.65	-16.22
6	19.70703	0.63	36.35	33.02	36.98	33.65	60.00	50.00	-23.02	-16.35

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

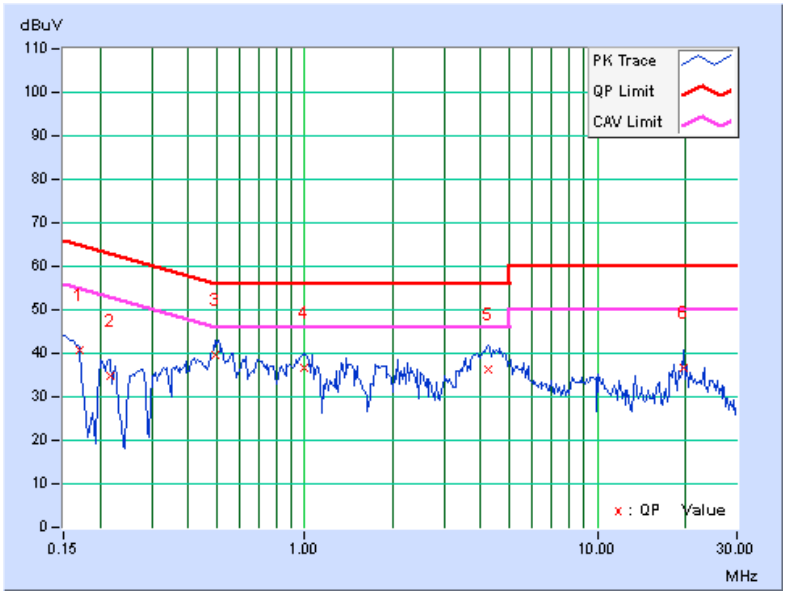


PHASE	Line 2	6dB BANDWIDTH	9kHz

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16953	0.18	40.54	30.30	40.72	30.48	64.98	54.98	-24.26	-24.50
2	0.21641	0.19	34.70	23.94	34.89	24.13	62.96	52.96	-28.07	-28.83
3	0.49375	0.25	39.38	25.74	39.63	25.99	56.10	46.10	-16.48	-20.12
4	0.98984	0.23	36.45	26.13	36.68	26.36	56.00	46.00	-19.32	-19.64
5	4.23047	0.39	35.75	30.43	36.14	30.82	56.00	46.00	-19.86	-15.18
6	19.70703	0.72	36.02	33.17	36.74	33.89	60.00	50.00	-23.26	-16.11

REMARKS:

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

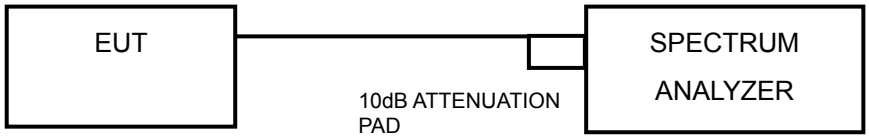


4.3 6dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 TEST SETUP



4.3.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.3.4 TEST PROCEDURE

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

4.3.5 DEVIATION FROM TEST STANDARD

No deviation.

4.3.6 EUT OPERATING CONDITIONS

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

4.3.7 TEST RESULTS

802.11b

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
1	2412	7.07	7.09	7.08	0.5	PASS
6	2437	6.57	7.03	7.07	0.5	PASS
11	2462	7.55	6.59	7.03	0.5	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
1	2412	16.40	16.40	16.39	0.5	PASS
6	2437	16.44	16.46	16.46	0.5	PASS
11	2462	16.40	16.41	16.39	0.5	PASS

802.11n (20MHz)

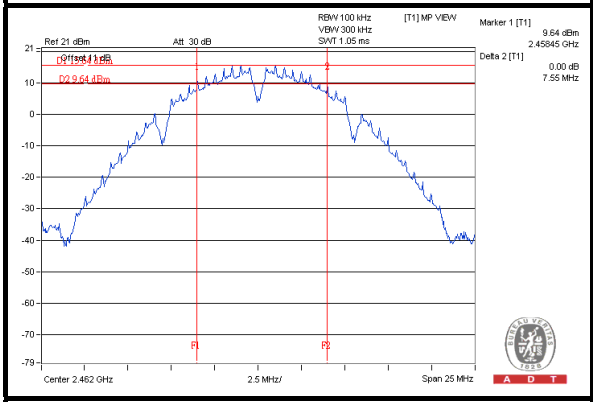
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
1	2412	17.62	17.62	17.68	0.5	PASS
6	2437	17.60	17.38	17.61	0.5	PASS
11	2462	17.62	17.60	17.68	0.5	PASS

802.11n (40MHz)

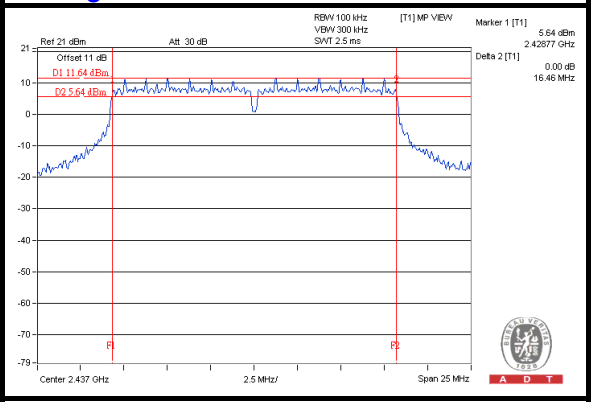
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
3	2422	36.49	36.51	36.08	0.5	PASS
6	2437	36.16	36.37	36.40	0.5	PASS
9	2452	36.54	36.54	35.82	0.5	PASS

SPECTRUM PLOT OF WORST VALUE

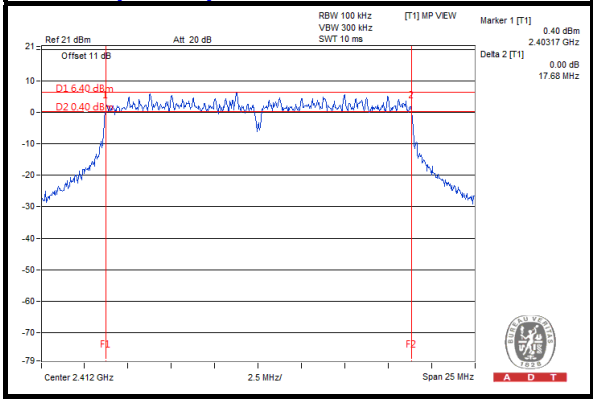
802.11b



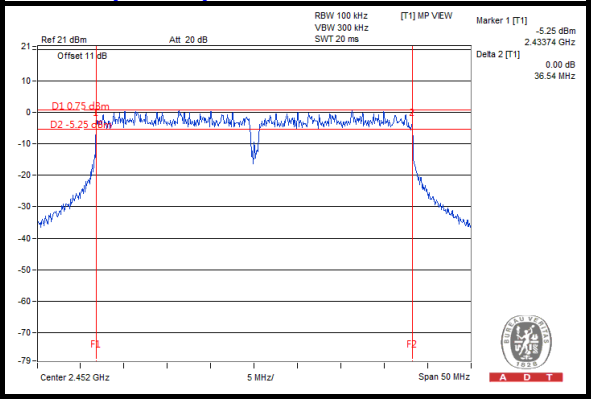
802.11g



802.11n (20MHz)



802.11n (40MHz)



4.4 CONDUCTED OUTPUT POWER

4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

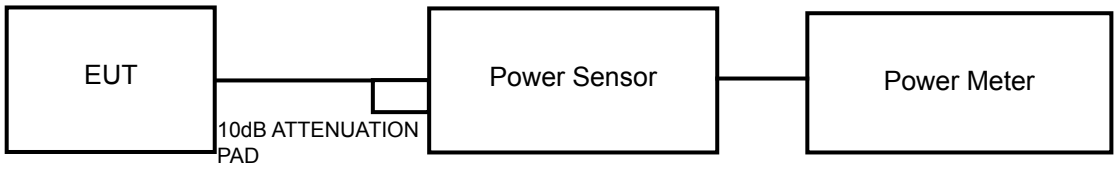
For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

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 ≤ 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 ≥ 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

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

4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6.

4.4.7 TEST RESULTS

802.11b

CHAN.	FREQ. (MHz)	AVG. POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
1	2412	22.29	21.87	20.49	435.193	26.39	30	PASS
6	2437	25.55	25.48	24.16	**972.720**	29.88	30	PASS
11	2462	24.18	24.41	23.73	773.924	28.89	30	PASS

802.11g

CHAN.	FREQ. (MHz)	AVG. POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
1	2412	15.99	16.31	15.73	119.886	20.79	30	PASS
6	2437	22.05	23.78	23.46	620.926	27.93	30	PASS
11	2462	16.34	15.72	15.35	114.655	20.59	30	PASS

802.11n (20MHz)

CHAN.	FREQ. (MHz)	AVG. POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
1	2412	16.24	16.07	15.76	120.201	20.80	30	PASS
6	2437	21.03	22.31	22.04	456.937	26.60	30	PASS
11	2462	16.34	15.61	15.58	115.586	20.63	30	PASS

802.11n (40MHz)

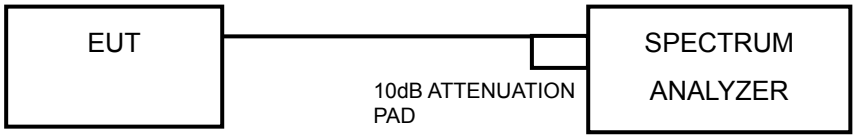
CHAN.	FREQ. (MHz)	AVG. POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
3	2422	13.07	12.72	13.08	59.308	17.73	30	PASS
6	2437	15.18	16.93	16.78	129.921	21.14	30	PASS
9	2452	14.91	14.34	14.51	86.387	19.36	30	PASS

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

a) Set instrument center frequency to DTS channel center frequency.
b) Set span to at least 1.5 times the OBW.
c) Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
d) Set VBW ≥3 x RBW.
e) Detector = power averaging (RMS) or sample detector (when RMS not available).
f) Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.
g) Sweep time = auto couple.
h) Employ trace averaging (RMS) mode over a minimum of 100 traces.
i) Use the peak marker function to determine the maximum amplitude level.

4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6

4.5.7 TEST RESULTS

802.11b

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	1	2412	-9.28	4.77	-4.51	4.2	PASS
	6	2437	-6.39	4.77	-1.62	4.2	PASS
	11	2462	-6.43	4.77	-1.66	4.2	PASS
1	1	2412	-9.84	4.77	-5.07	4.2	PASS
	6	2437	-6.06	4.77	-1.29	4.2	PASS
	11	2462	-7.43	4.77	-2.66	4.2	PASS
2	1	2412	-9.67	4.77	-4.90	4.2	PASS
	6	2437	-7.66	4.77	-2.89	4.2	PASS
	11	2462	-8.06	4.77	-3.29	4.2	PASS

NOTE: Directional gain = 5dBi + 10log(3) = 9.8dBi > 6dBi , so the power density limit shall be reduced to 8-(9.8-6) = 4.2dBm.

802.11g

TX chain	Chan.	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD without Duty Factor (dBm/3kHz)	Duty Factor	Total PSD with Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	1	2412	-17.20	4.77	-12.43	0.11	-12.32	4.2	PASS
	6	2437	-9.70	4.77	-4.93	0.11	-4.82	4.2	PASS
	11	2462	-16.85	4.77	-12.08	0.11	-11.97	4.2	PASS
1	1	2412	-16.63	4.77	-11.86	0.11	-11.75	4.2	PASS
	6	2437	-9.80	4.77	-5.03	0.11	-4.92	4.2	PASS
	11	2462	-16.22	4.77	-11.45	0.11	-11.34	4.2	PASS
2	1	2412	-16.60	4.77	-11.83	0.11	-11.72	4.2	PASS
	6	2437	-11.36	4.77	-6.59	0.11	-6.48	4.2	PASS
	11	2462	-16.92	4.77	-12.15	0.11	-12.04	4.2	PASS

NOTE: Directional gain = 5dBi + 10log(3) = 9.8dBi > 6dBi , so the power density limit shall be reduced to 8-(9.8-6) = 4.2dBm.

802.11n (20MHz)

TX chain	Chan.	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD without Duty Factor (dBm/3kHz)	Duty Factor	Total PSD with Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	1	2412	-17.50	4.77	-12.73	0.32	-12.41	4.2	PASS
	6	2437	-10.17	4.77	-5.40	0.32	-5.08	4.2	PASS
	11	2462	-17.29	4.77	-12.52	0.32	-12.20	4.2	PASS
1	1	2412	-12.65	4.77	-7.88	0.32	-7.56	4.2	PASS
	6	2437	-11.73	4.77	-6.96	0.32	-6.64	4.2	PASS
	11	2462	-17.96	4.77	-13.19	0.32	-12.87	4.2	PASS
2	1	2412	-16.88	4.77	-12.11	0.32	-11.79	4.2	PASS
	6	2437	-12.80	4.77	-8.03	0.32	-7.71	4.2	PASS
	11	2462	-16.85	4.77	-12.08	0.32	-11.76	4.2	PASS

NOTE: Directional gain = 5dBi + 10log(3) = 9.8dBi > 6dBi , so the power density limit shall be reduced to 8-(9.8-6) = 4.2dBm.

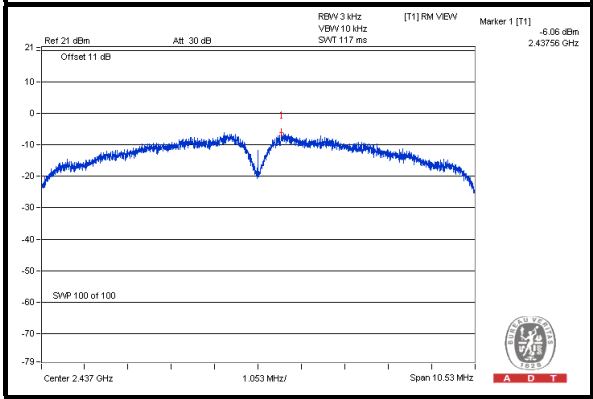
802.11n (40MHz)

TX chain	Chan.	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD without Duty Factor (dBm/3kHz)	Duty Factor	Total PSD with Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	3	2422	-16.49	4.77	-11.72	0.51	-11.21	4.2	PASS
	6	2437	-19.04	4.77	-14.27	0.51	-13.76	4.2	PASS
	9	2452	-20.96	4.77	-16.19	0.51	-15.68	4.2	PASS
1	3	2422	-21.85	4.77	-17.08	0.51	-16.57	4.2	PASS
	6	2437	-20.30	4.77	-15.53	0.51	-15.02	4.2	PASS
	9	2452	-20.98	4.77	-16.21	0.51	-15.70	4.2	PASS
2	3	2422	-17.56	4.77	-12.79	0.51	-12.28	4.2	PASS
	6	2437	-19.60	4.77	-14.83	0.51	-14.32	4.2	PASS
	9	2452	-19.50	4.77	-14.73	0.51	-14.22	4.2	PASS

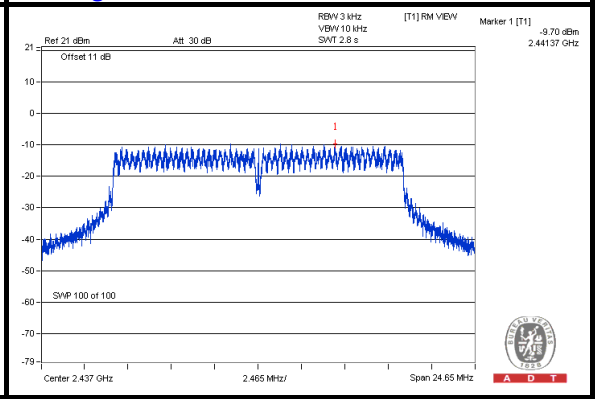
NOTE: Directional gain = 5dBi + 10log(3) = 9.8dBi > 6dBi , so the power density limit shall be reduced to 8-(9.8-6) = 4.2dBm.

SPECTRUM PLOT OF WORST VALUE

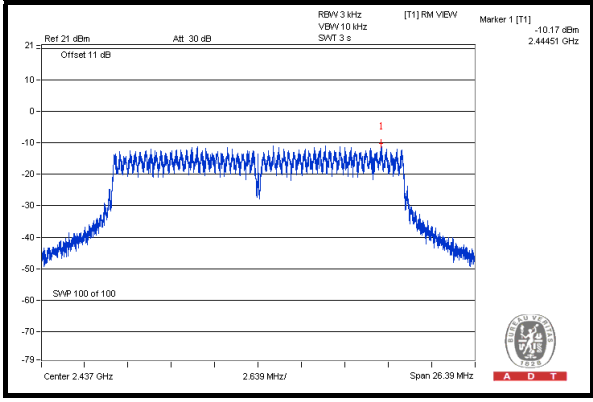
802.11b



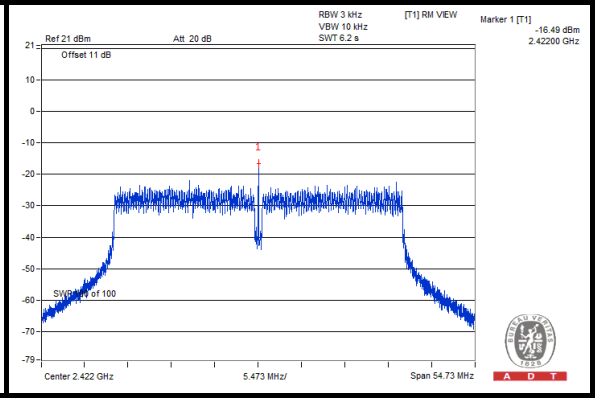
802.11g



802.11n (20MHz)



802.11n (40MHz)

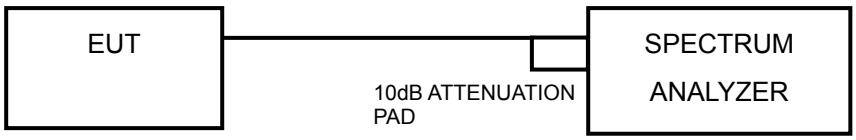


4.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

4.6.1 LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT

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

4.6.2 TEST SETUP



4.6.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.6.4 TEST PROCEDURE

MEASUREMENT PROCEDURE REF

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

MEASUREMENT PROCEDURE OOBE

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

4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

4.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6

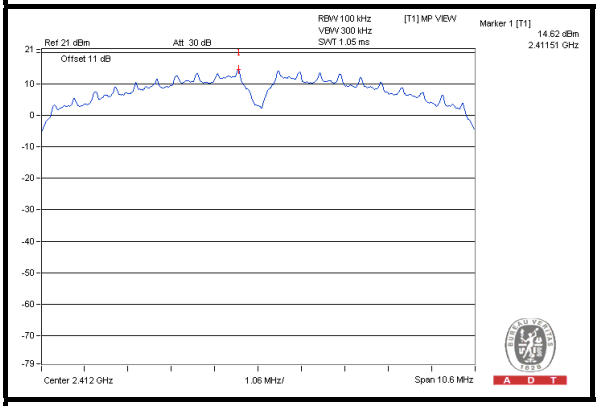
4.6.7 TEST RESULTS

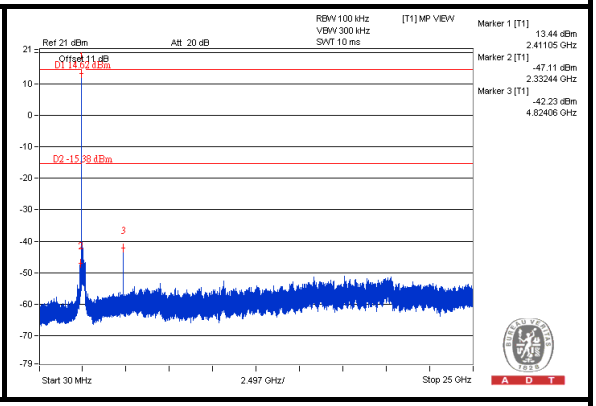
The conducted emission test is performed on each TX port of operating mode without summing or adding 10log (N) since the limit is relative emission limit.

The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

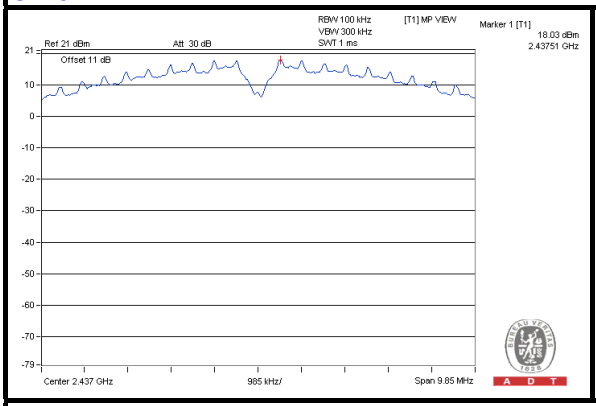
802.11b: CHAIN 0

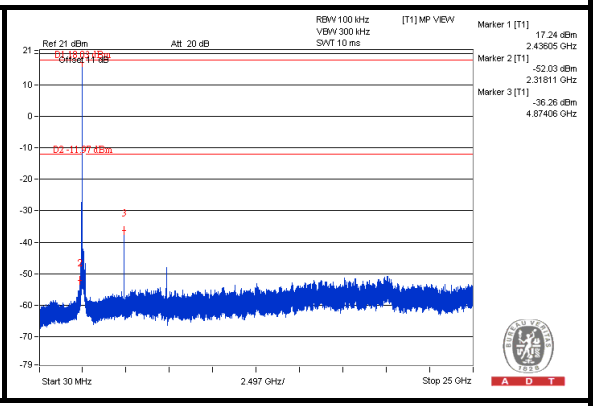
CH 1



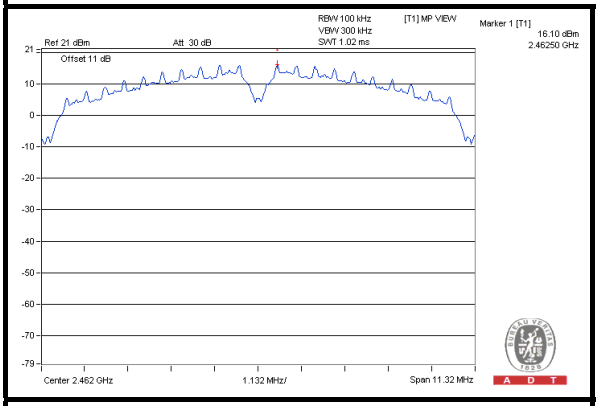


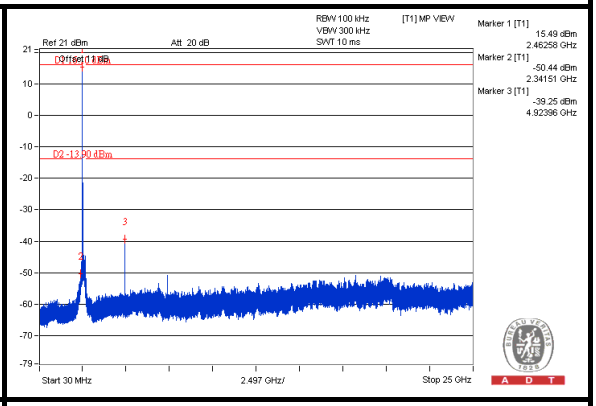
CH 6



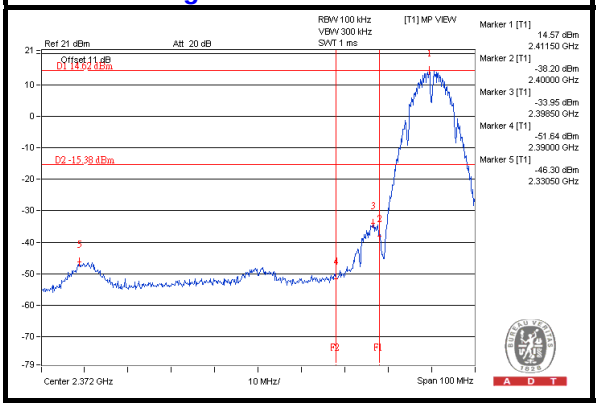


CH 11

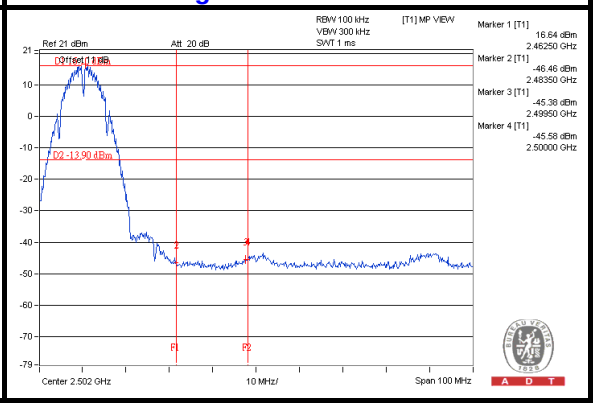




CH 1 Band edge

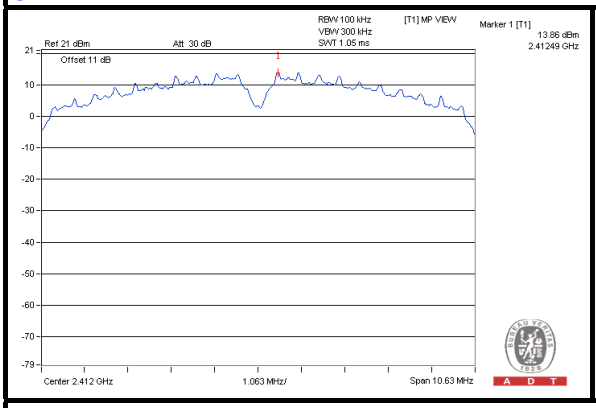


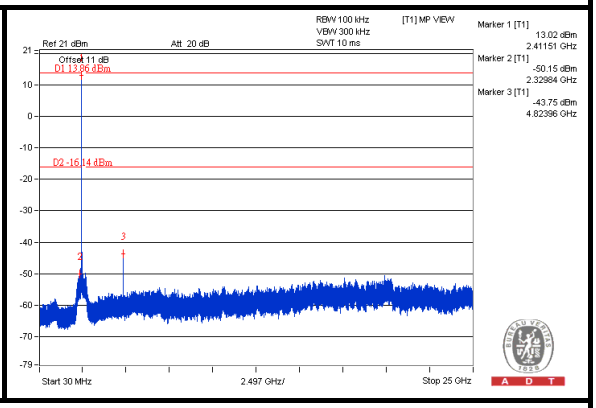
CH 11 Band edge



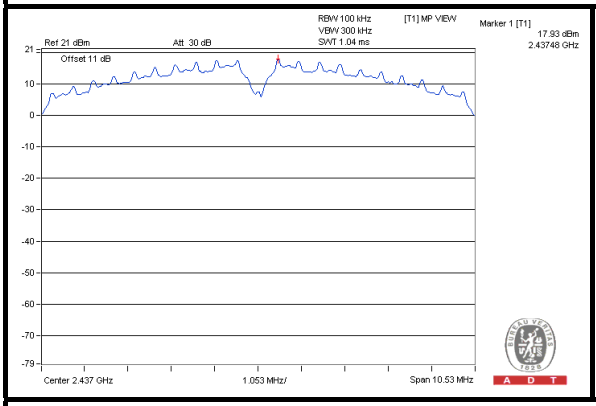
CHAIN 1

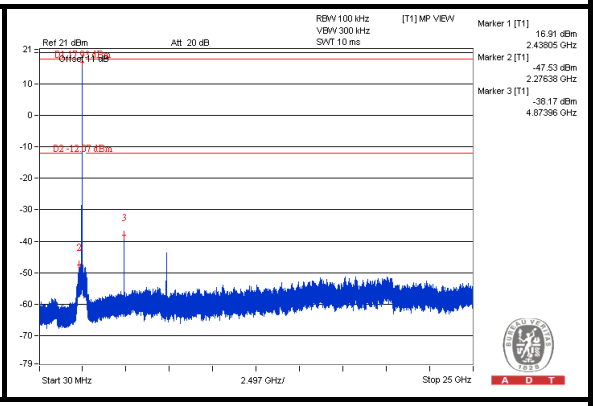
CH 1



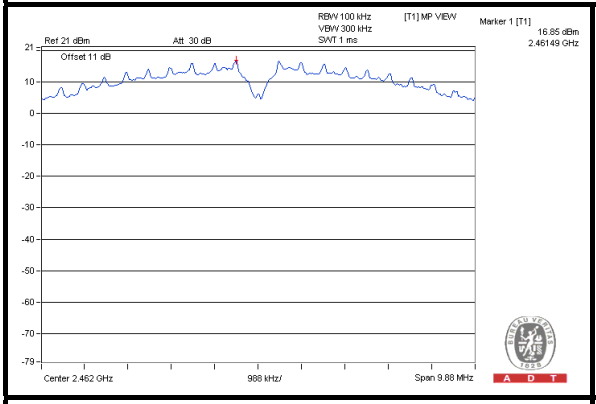


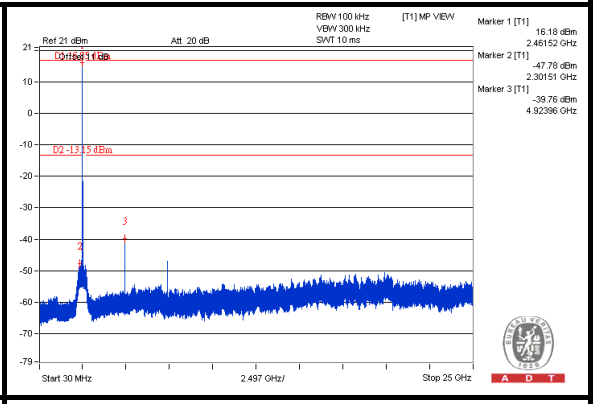
CH 6



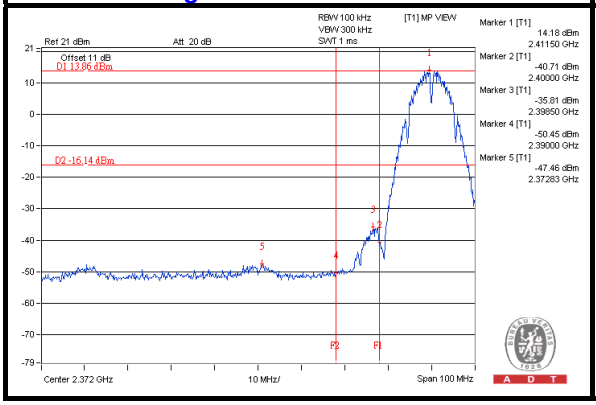


CH 11

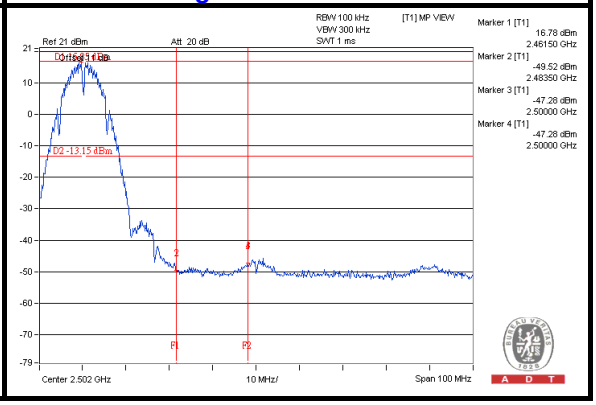




CH 1 Band edge

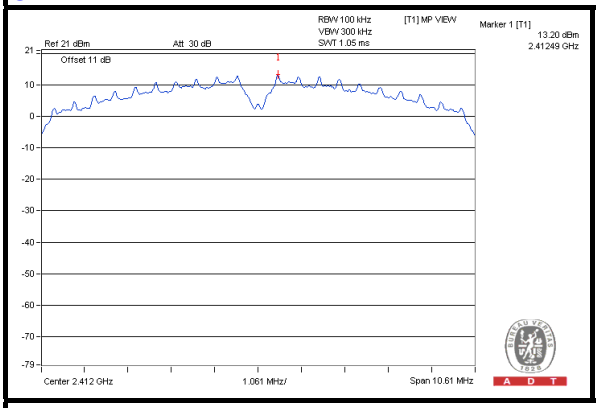


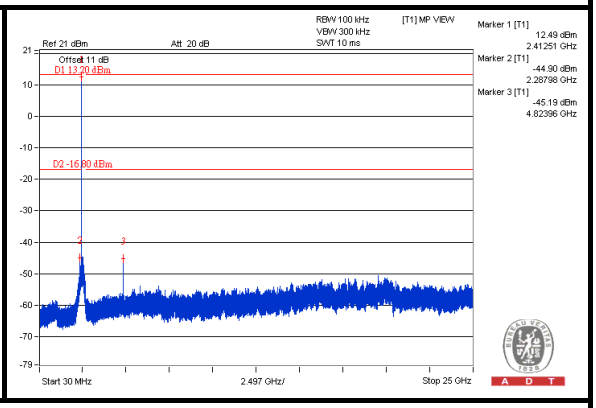
CH 11 Band edge



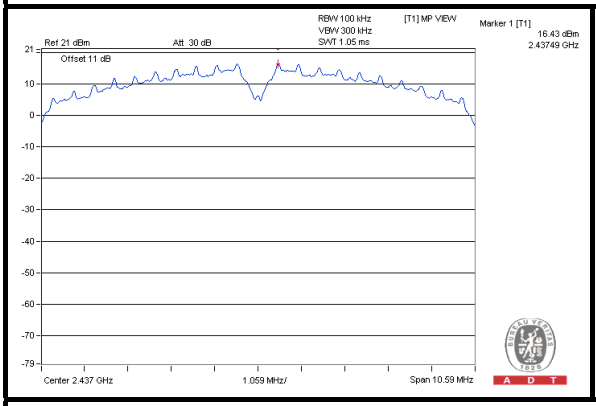
CHAIN 2

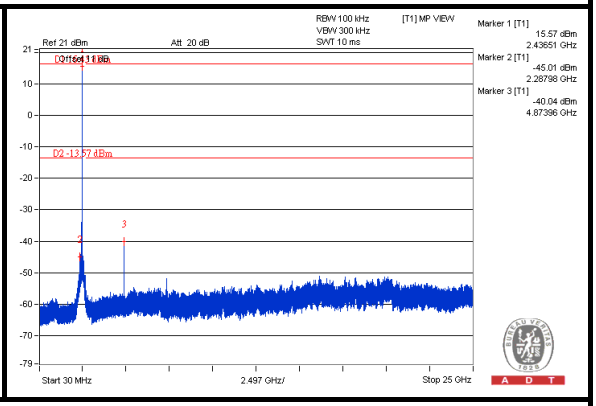
CH 1



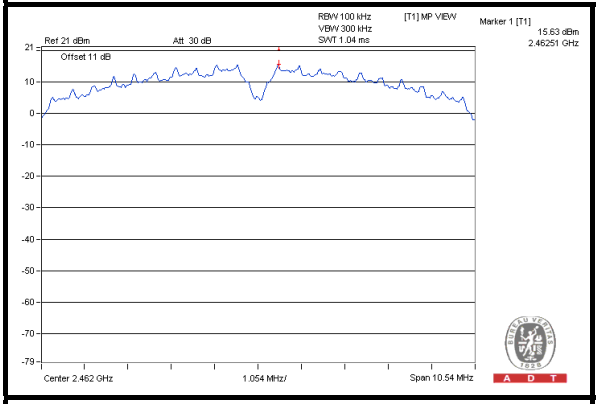


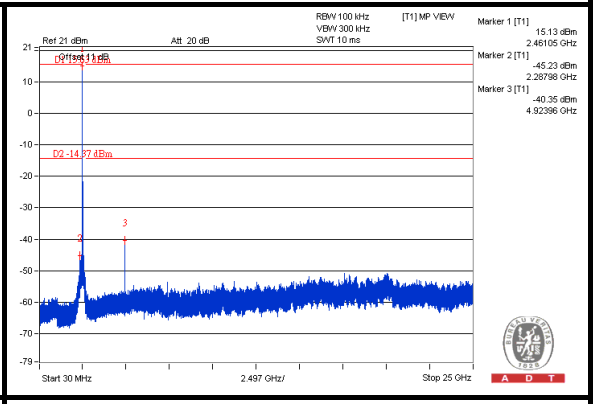
CH 6



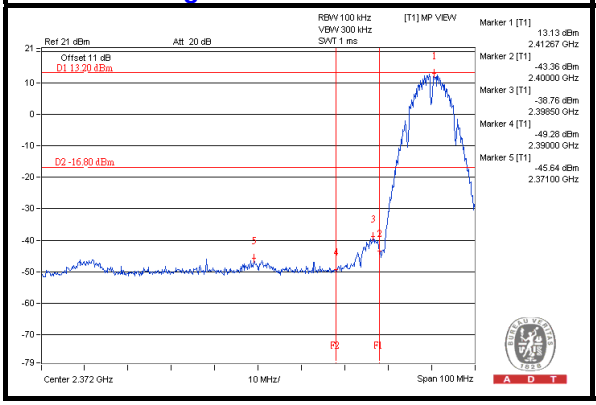


CH 11

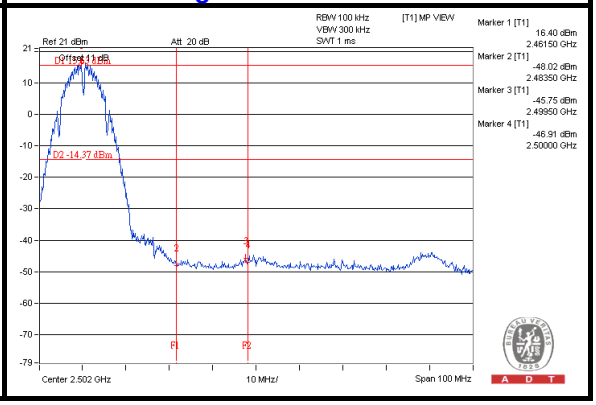




CH 1 Band edge

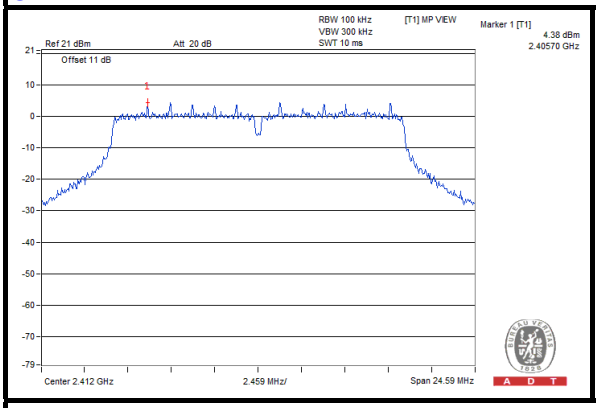


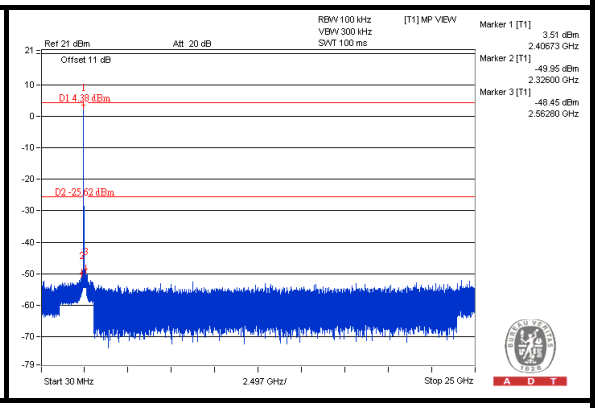
CH 11 Band edge



802.11g: CHAIN 0

CH 1





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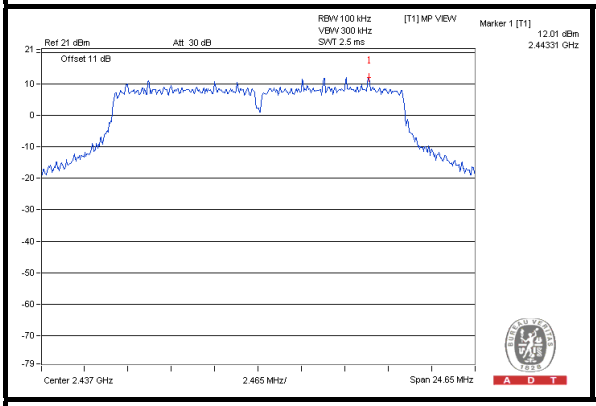

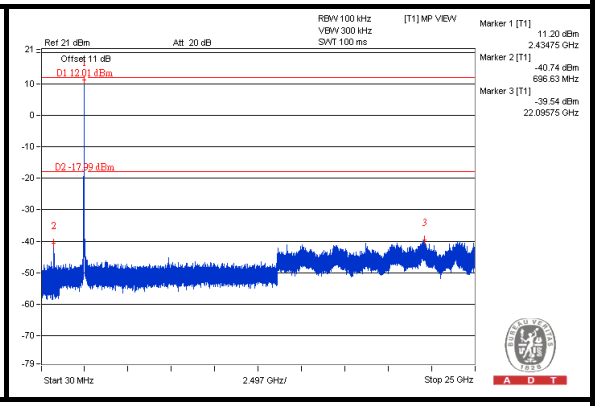

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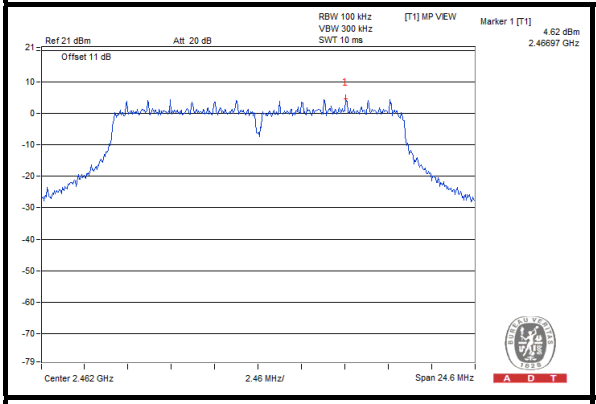

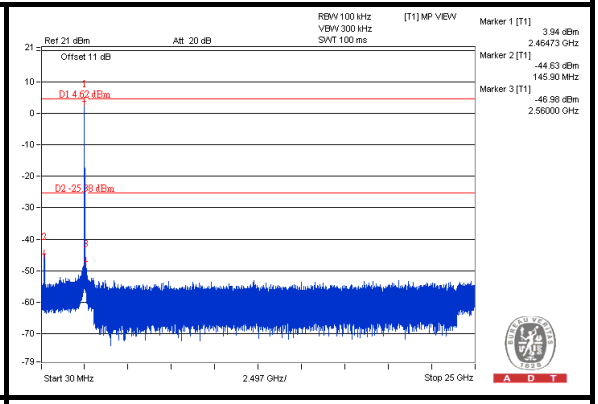

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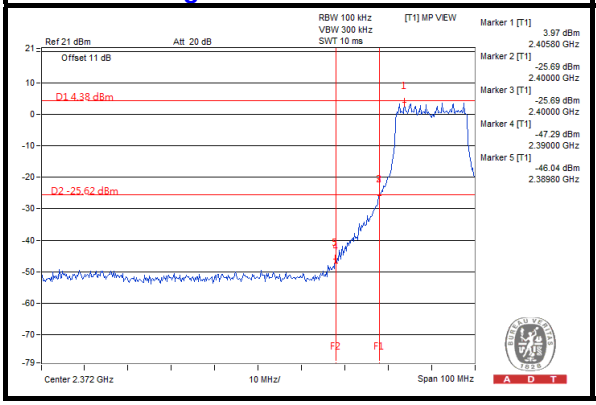

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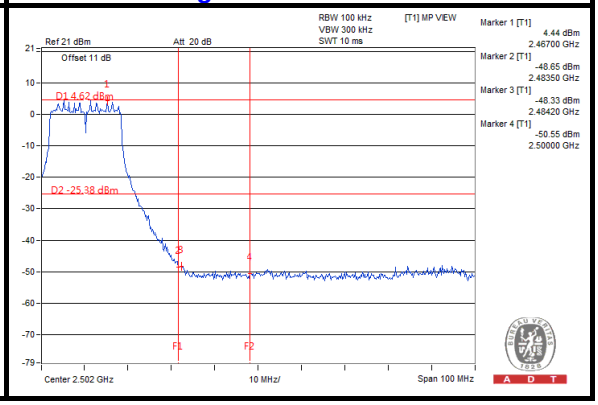

CHAIN 1

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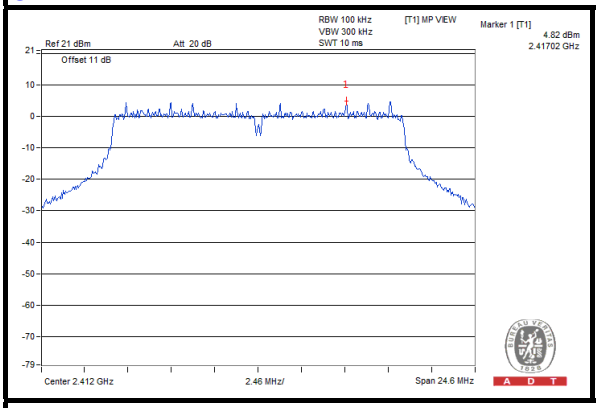

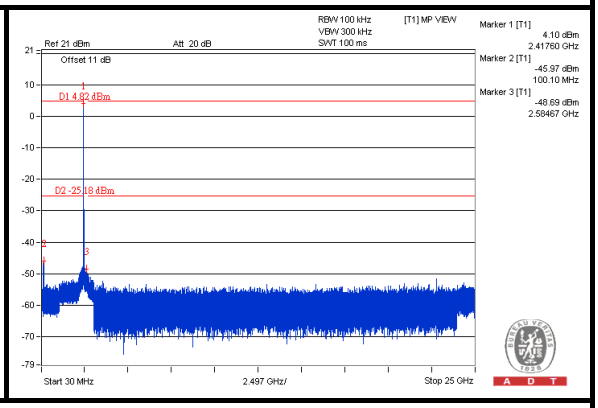

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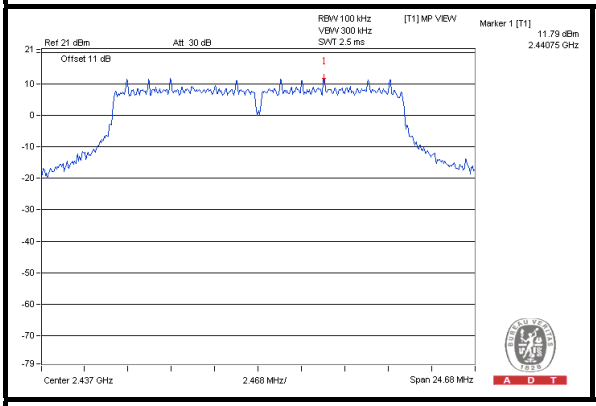

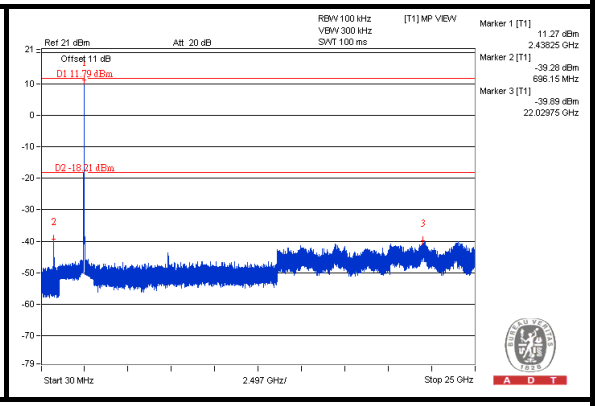

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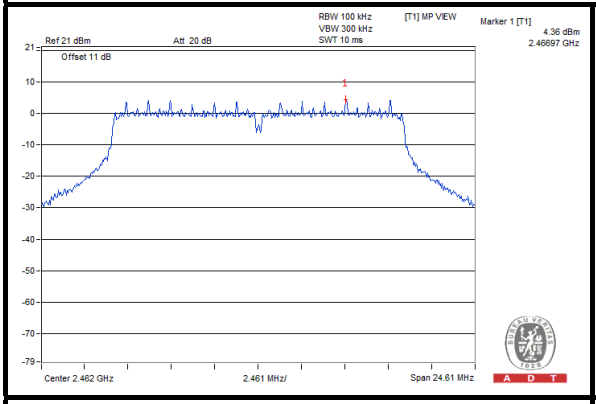

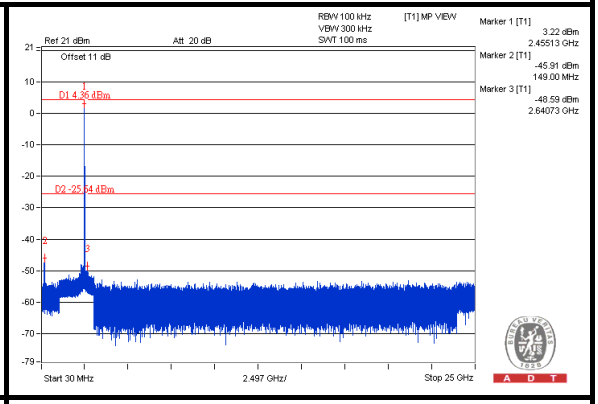

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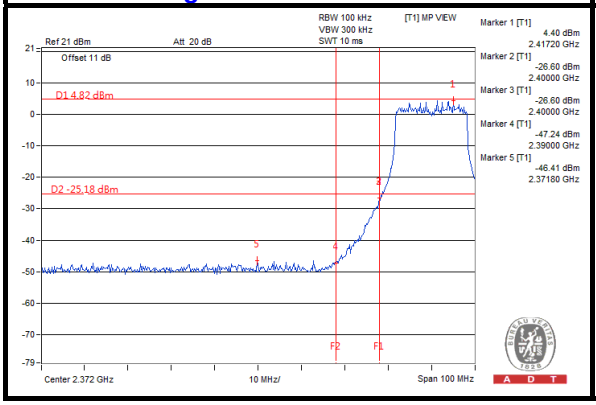

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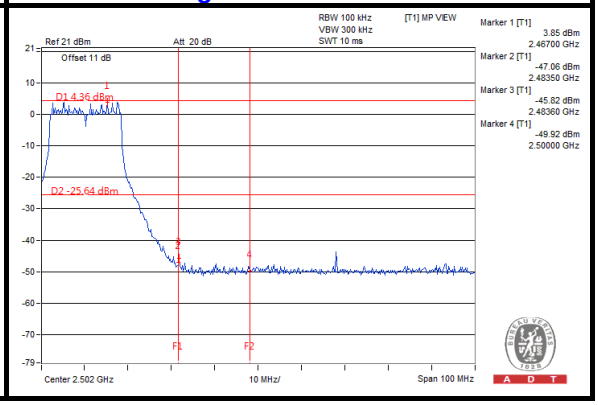

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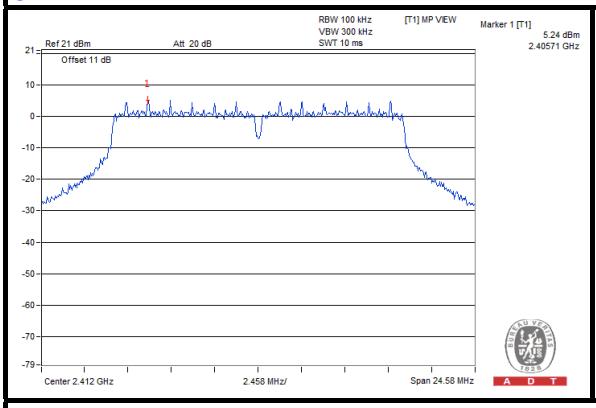

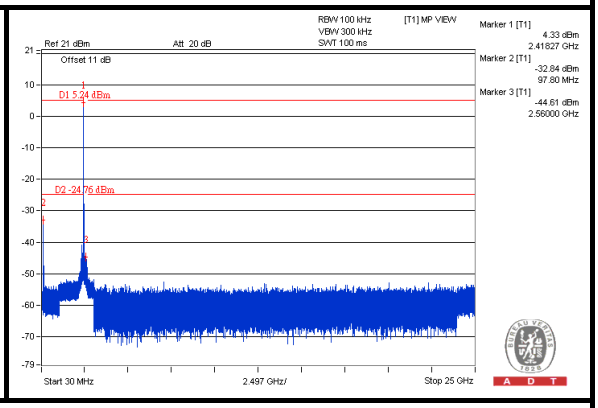

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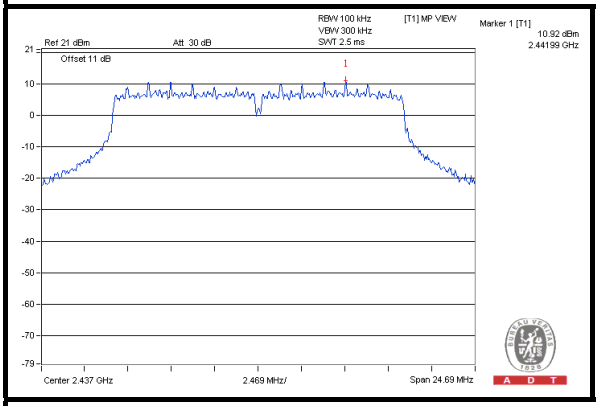

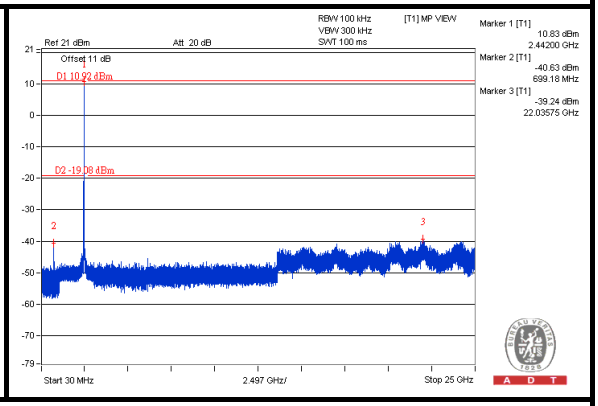

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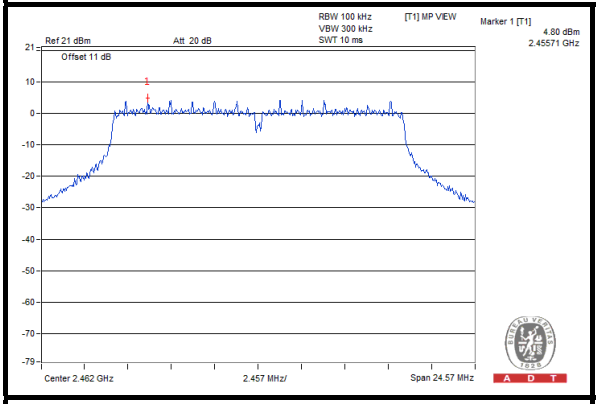

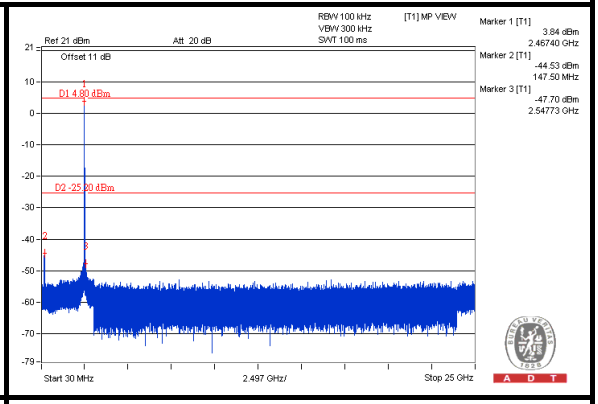

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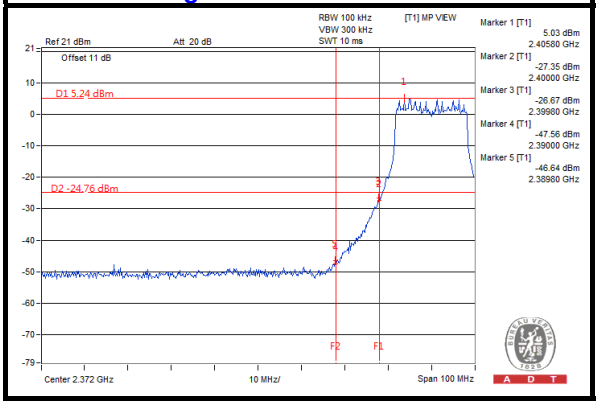

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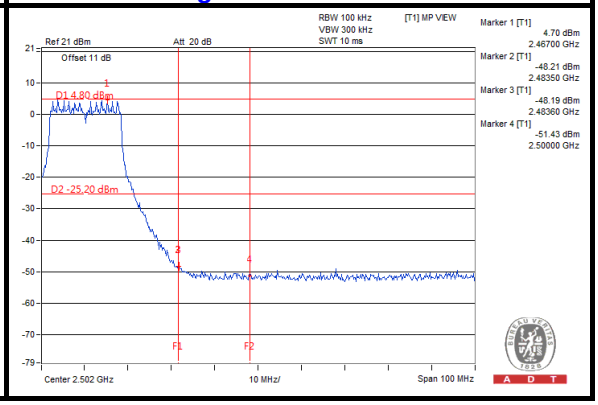

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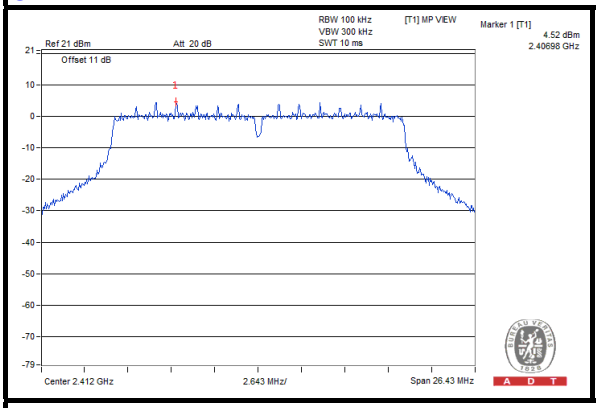
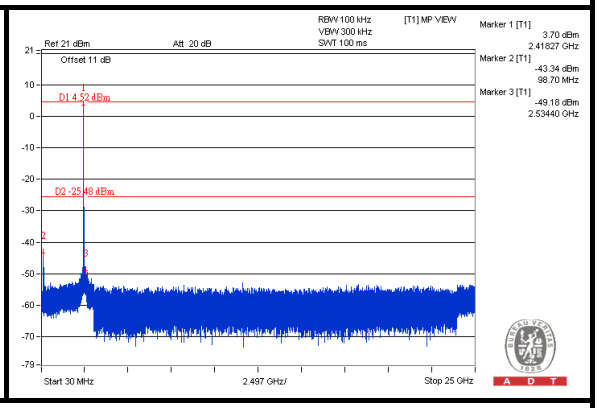
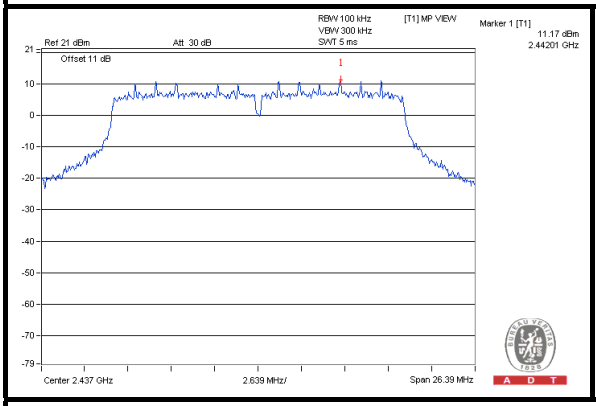
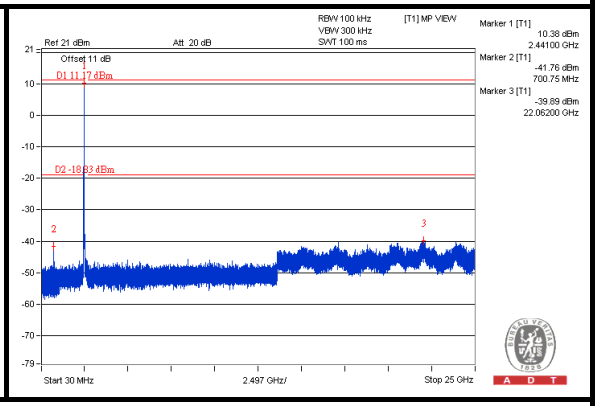




CH 6





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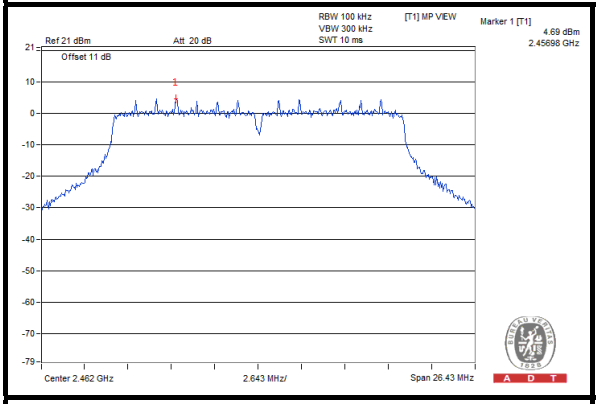

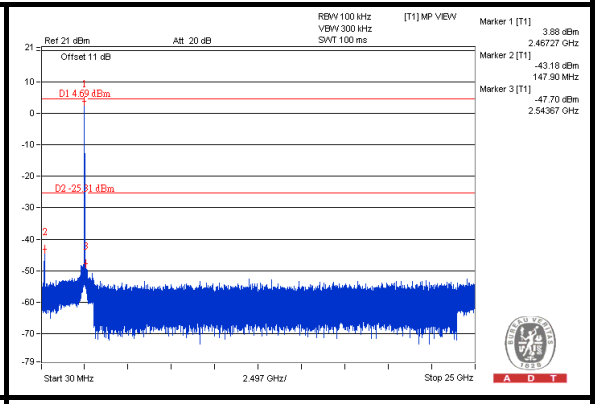

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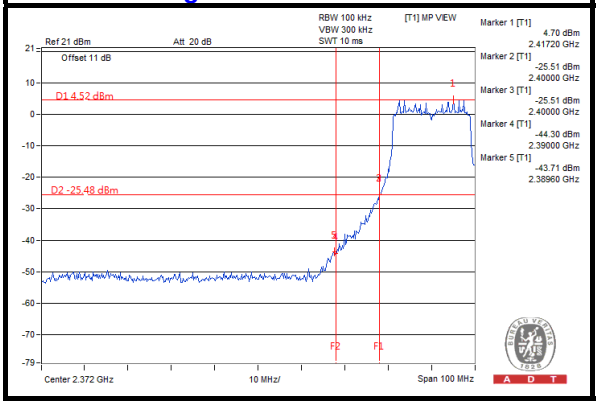

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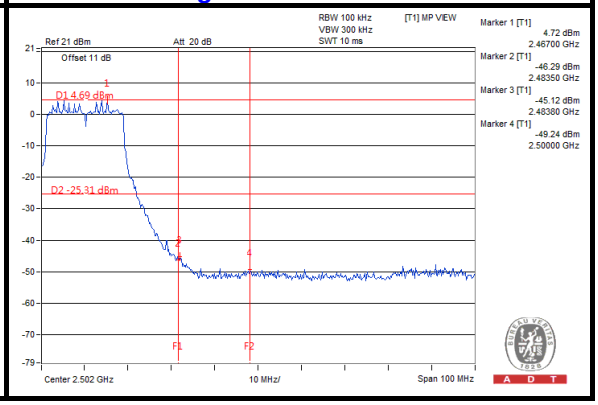
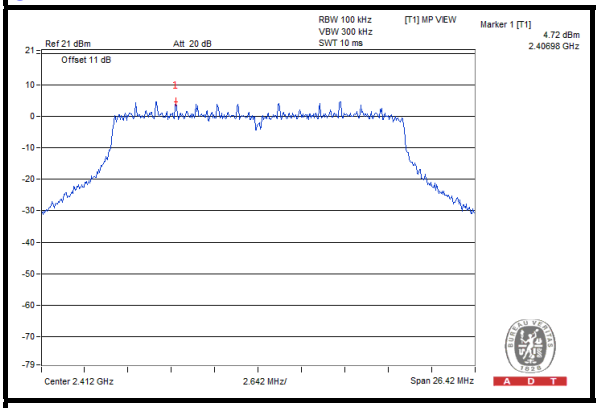
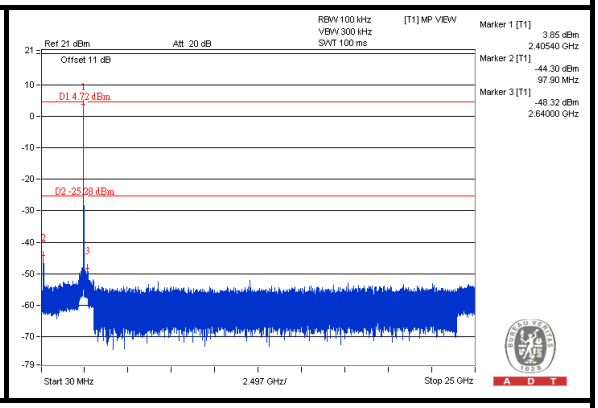


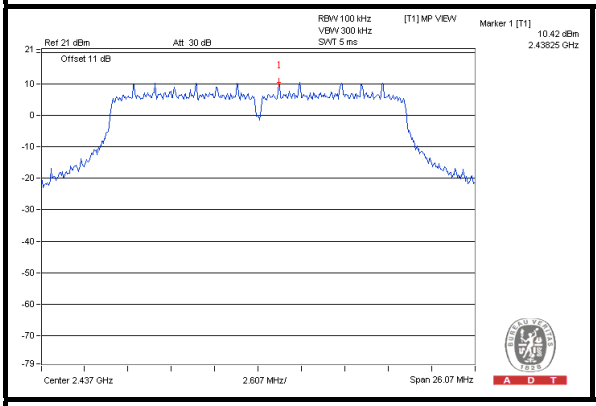
CHAIN 1

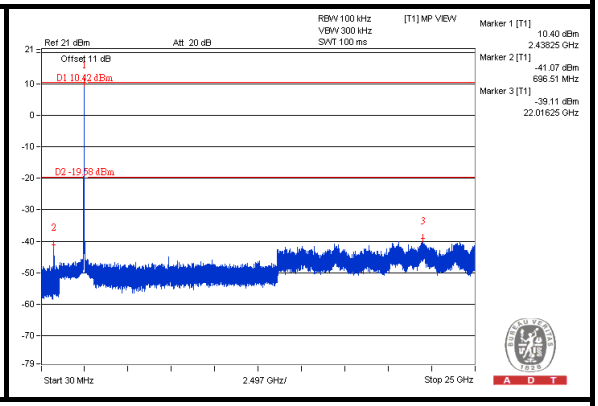
CH 1





CH 6





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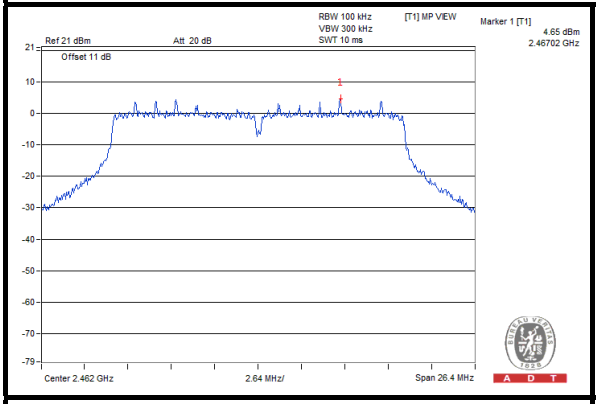

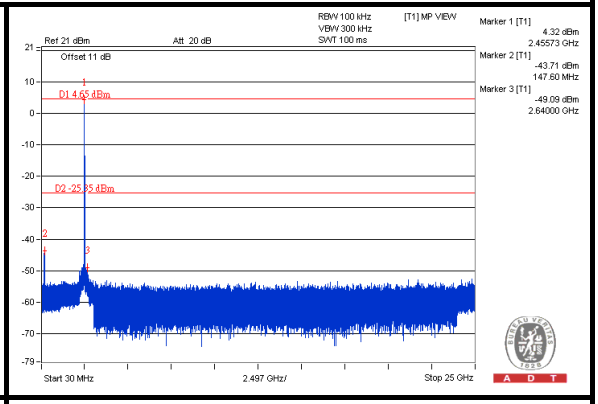

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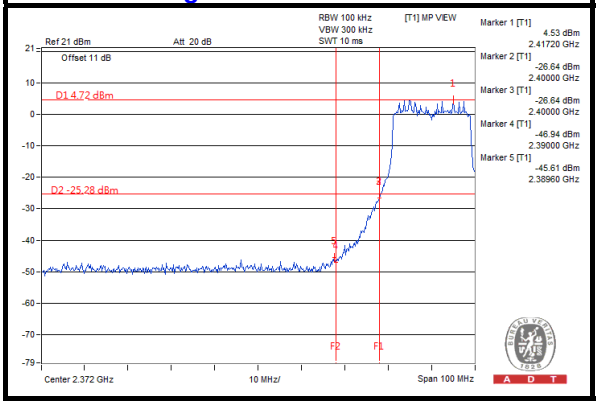

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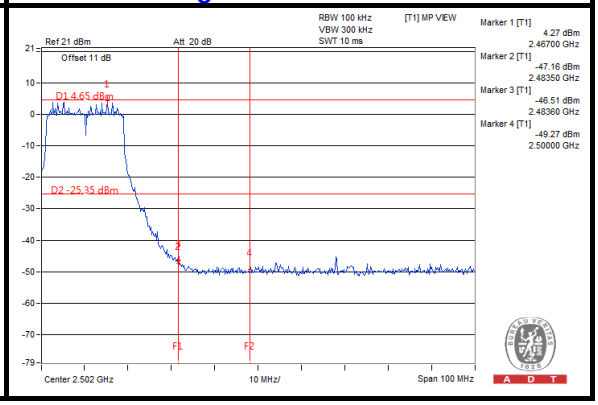

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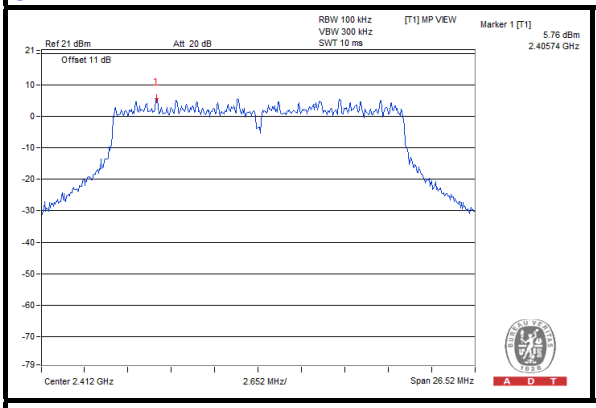

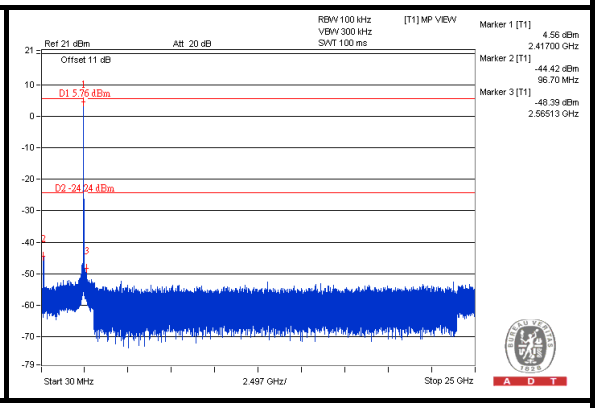

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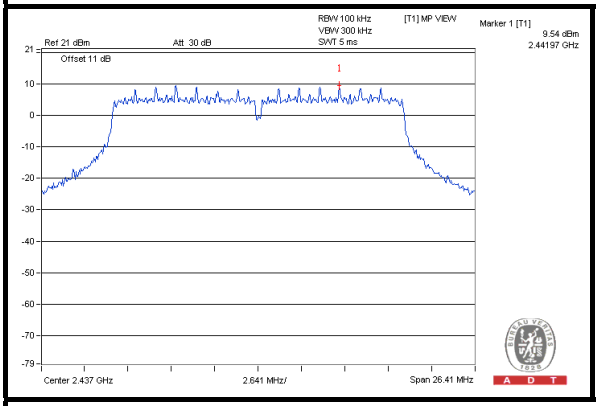

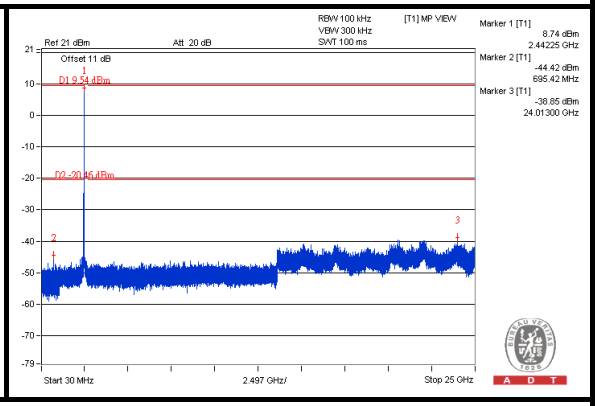

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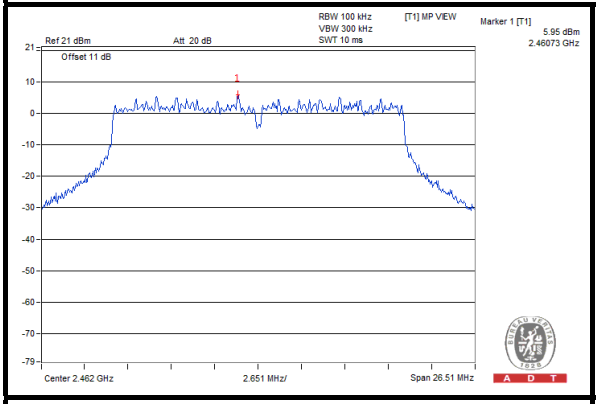

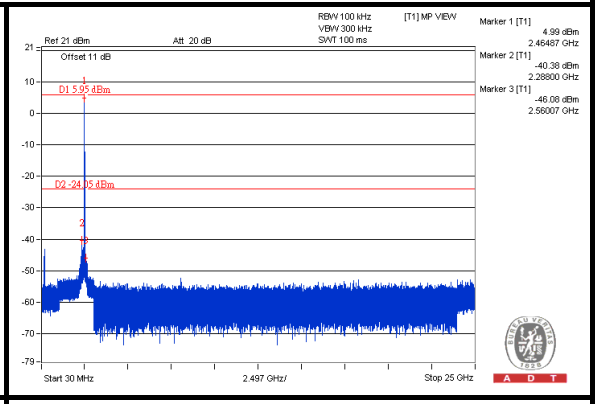

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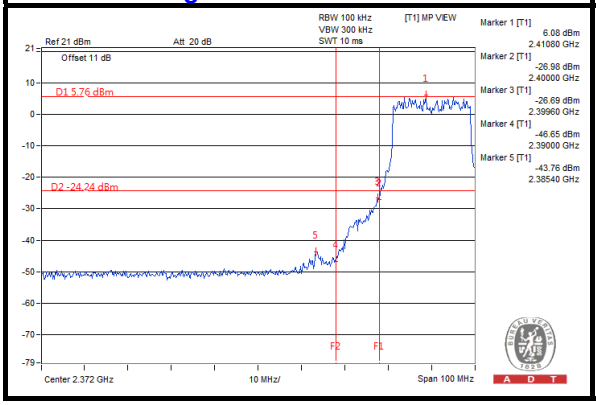

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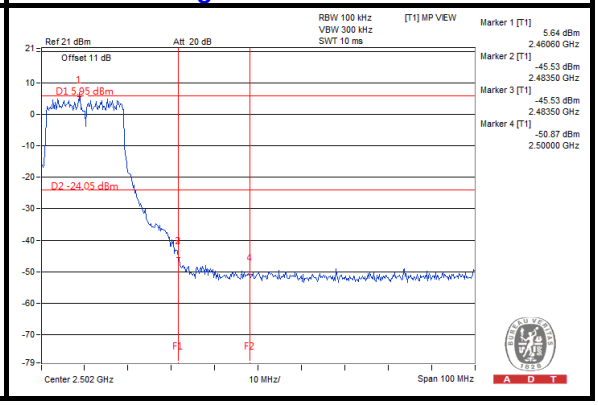

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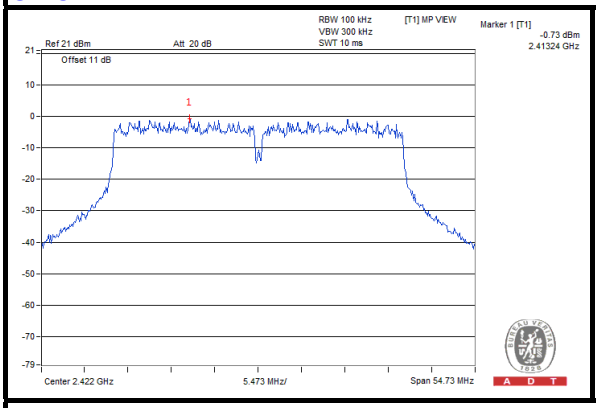
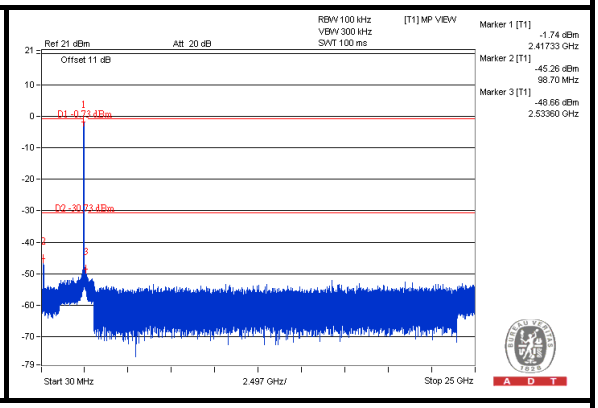
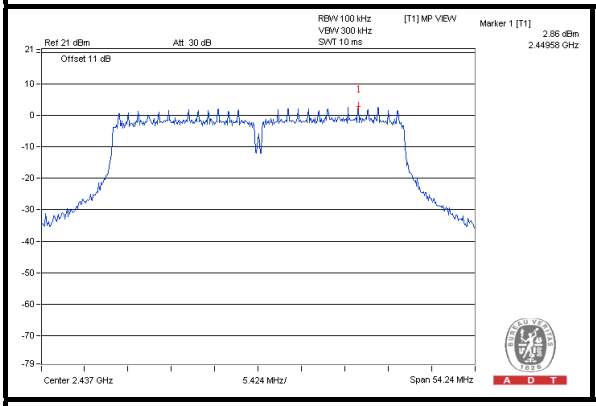
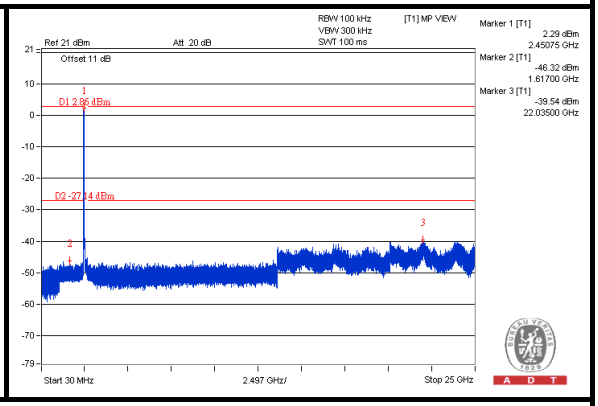


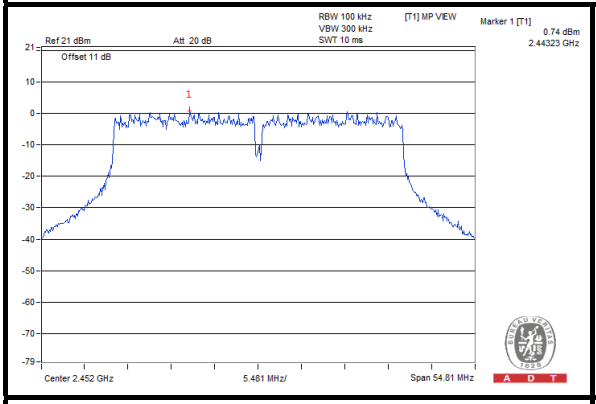


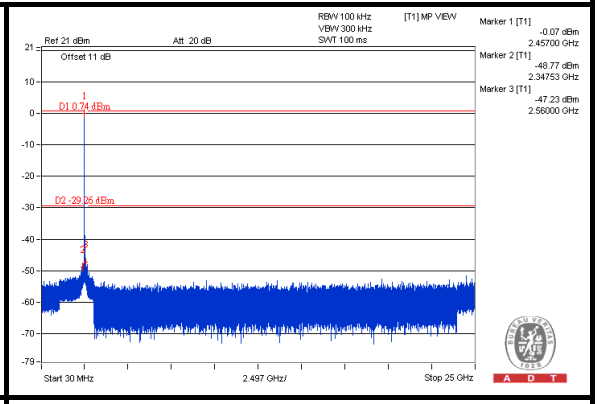
CH 6



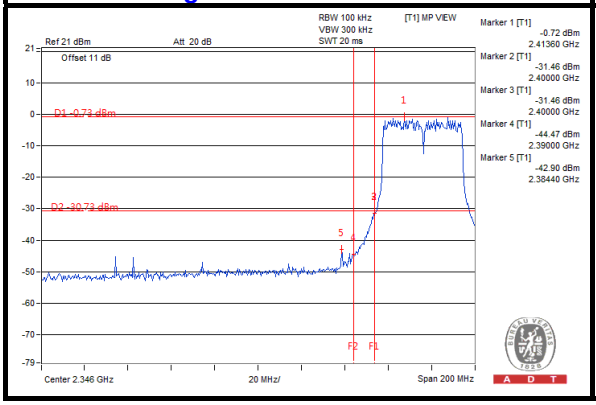


CH 9

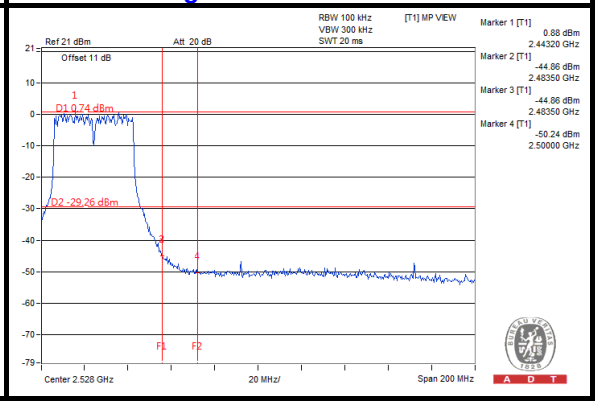




CH 3 Band edge



CH 9 Band edge



CHAIN 1

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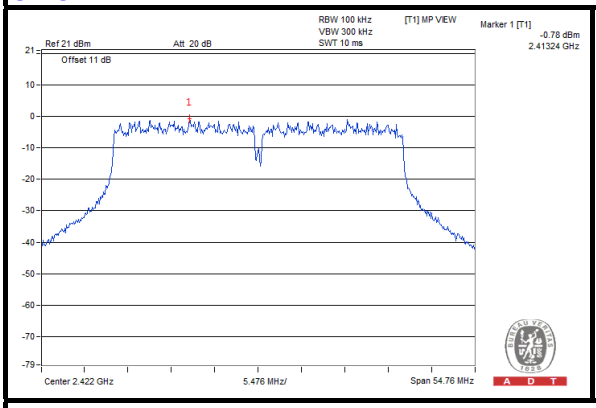
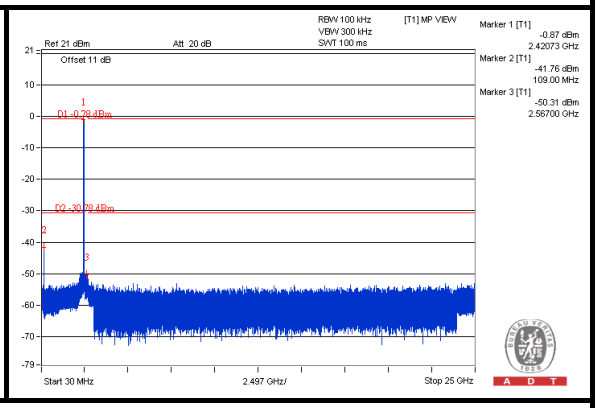
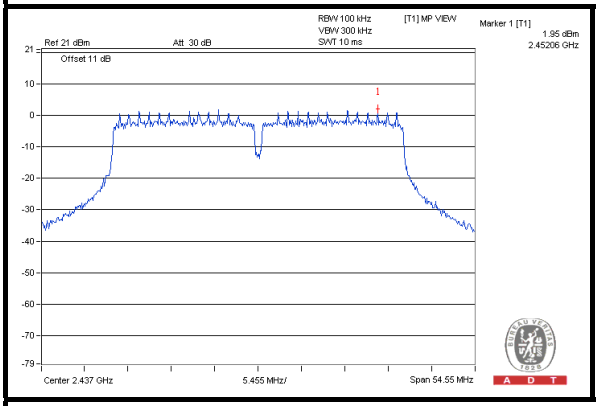
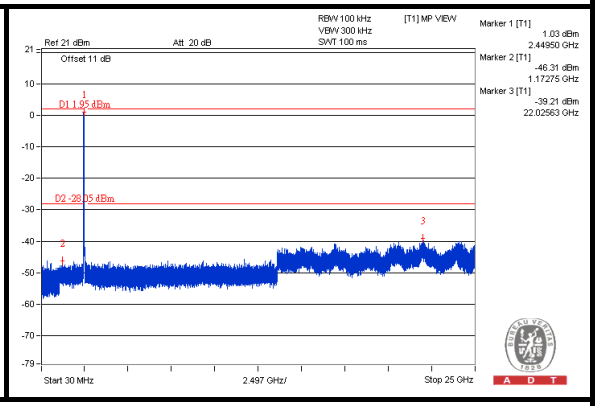


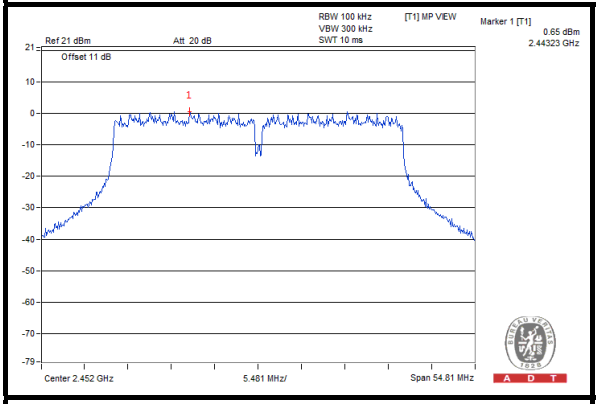


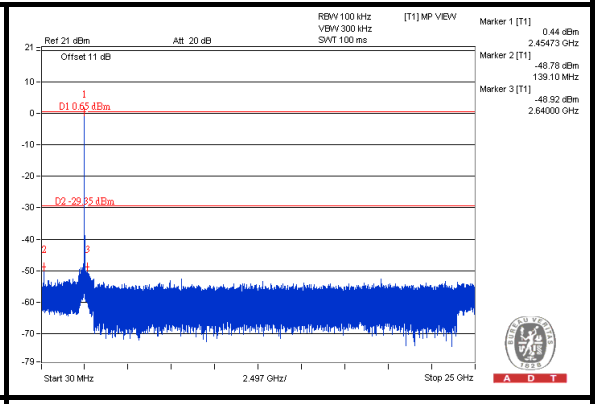
CH 6



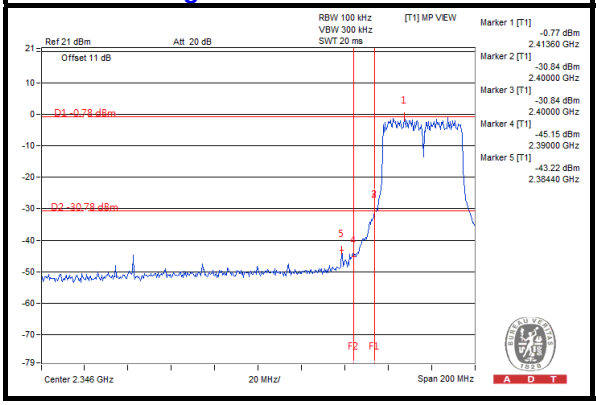


CH 9

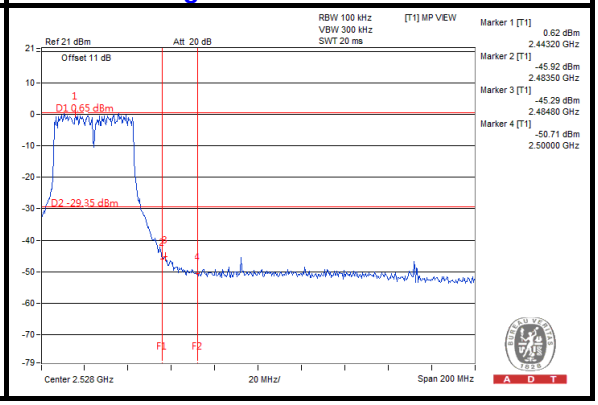




CH 3 Band edge

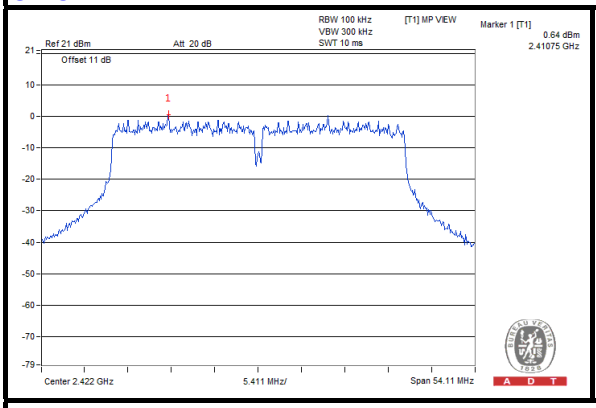


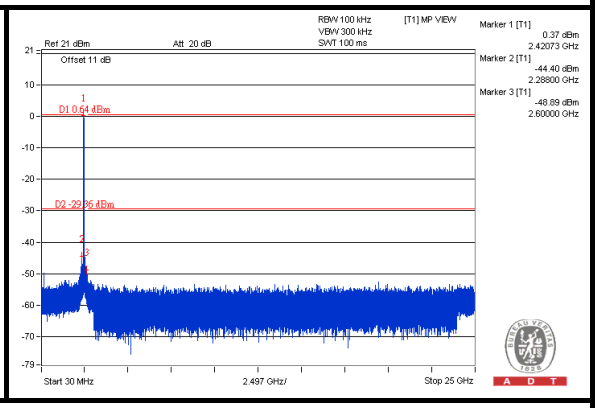
CH 9 Band edge



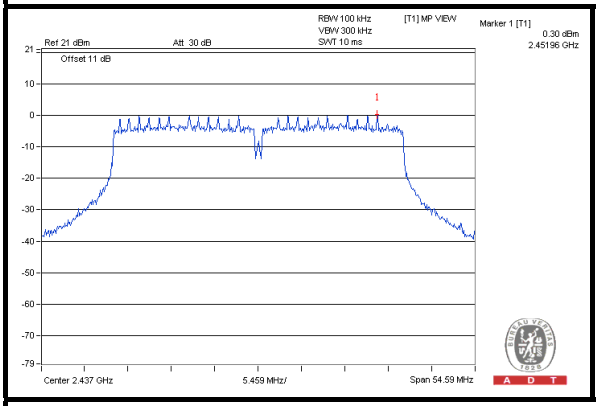
CHAIN 2

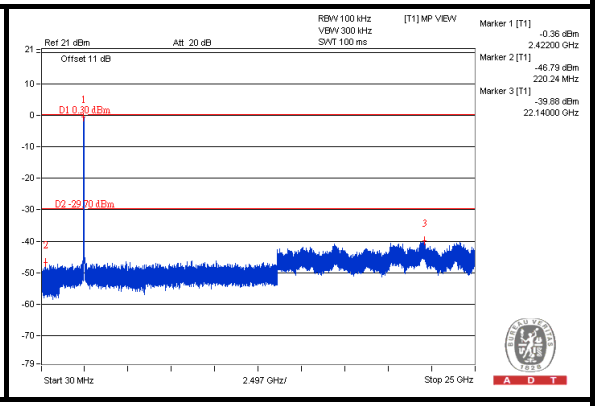
CH 3



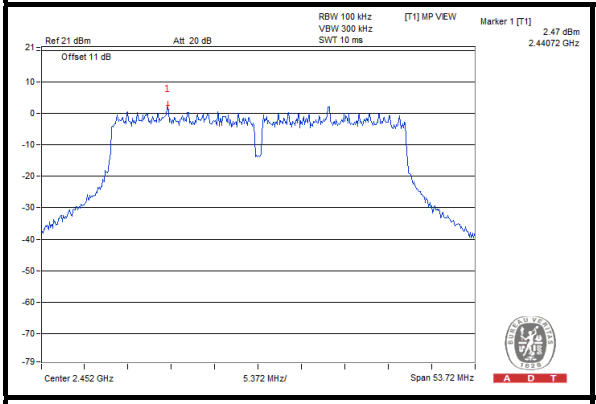


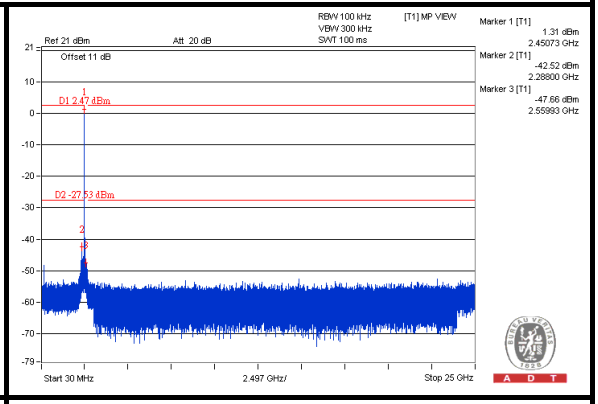
CH 6



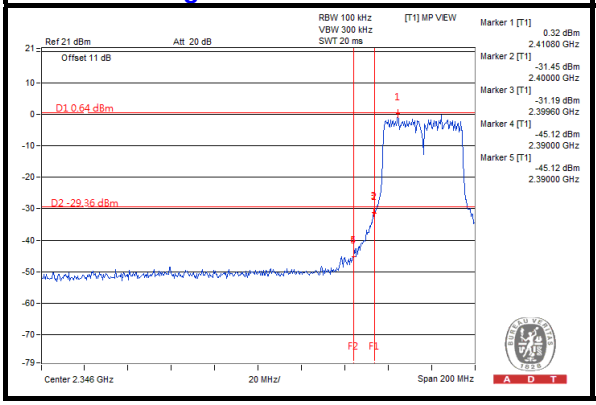


CH 9

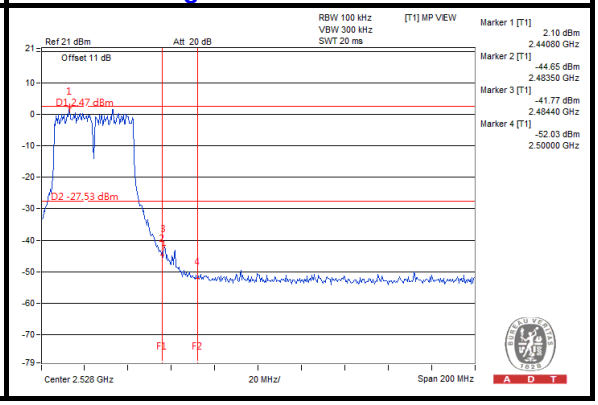




CH 3 Band edge



CH 9 Band edge



5. TEST TYPES AND RESULTS (FOR 5.0GHz BAND)

5.1 RADIATED EMISSION MEASUREMENT

5.1.1 LIMITS OF RADIATED 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 30dB below the highest level of the desired power:

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 30dB under any condition of modulation.

5.1.2 TEST INSTRUMENTS

Same as item 4.1.2.

5.1.3 TEST PROCEDURES

Same as item 4.1.3.

5.1.4 DEVIATION FROM TEST STANDARD

No deviation.

5.1.5 TEST SETUP

Same as item 4.1.5.

5.1.6 EUT OPERATING CONDITIONS

Same as item 4.1.6.

5.1.7 TEST RESULTS

ABOVE 1GHz DATA：

802.11a

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 71%RH	TESTED BY	Chris Lin

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	#5725.00	74.7 PK	91.1	-16.4	1.00 H	190	35.60	39.10
2	#5725.00	64.3 AV	80.7	-16.4	1.00 H	190	57.70	6.60
3	*5745.00	121.1 PK			1.00 H	332	82.00	39.10
4	*5745.00	110.7 AV			1.00 H	332	71.60	39.10
5	11490.00	64.7 PK	74.0	-9.3	1.49 H	3	44.40	20.30
6	11490.00	50.0 AV	54.0	-4.0	1.49 H	3	29.70	20.30
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	#5725.00	62.0 PK	78.4	-16.4	1.00 V	190	55.40	6.60
2	#5725.00	52.4 AV	68.8	-16.4	1.00 V	190	45.80	6.60
3	*5745.00	108.4 PK			1.00 V	151	69.30	39.10
4	*5745.00	98.8 AV			1.00 V	151	59.70	39.10
5	11490.00	60.5 PK	74.0	-13.5	1.00 V	245	40.20	20.30
6	11490.00	47.8 AV	54.0	-6.2	1.00 V	245	27.50	20.30

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.
7. "#":The radiated frequency is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 157	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 71%RH	TESTED BY	Chris Lin

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	122.1 PK			1.00 H	337	82.90	39.20
2	*5785.00	111.7 AV			1.00 H	337	72.50	39.20
3	11570.00	64.5 PK	74.0	-9.5	1.51 H	5	44.40	20.10
4	11570.00	51.1 AV	54.0	-2.9	1.51 H	5	31.00	20.10
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	111.1 PK			1.00 V	12	71.90	39.20
2	*5785.00	100.3 AV			1.00 V	12	61.10	39.20
3	11570.00	59.1 PK	74.0	-14.9	1.18 V	176	39.00	20.10
4	11570.00	47.2 AV	54.0	-6.8	1.18 V	176	27.10	20.10

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 165	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 71%RH	TESTED BY	Chris Lin

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	122.7 PK			1.00 H	330	83.40	39.30
2	*5825.00	112.1 AV			1.00 H	330	72.80	39.30
3	#5850.00	84.0 PK	92.7	-8.7	1.20 H	16	77.30	6.70
4	#5850.00	73.4 AV	82.1	-8.7	1.20 H	16	66.70	6.70
5	11650.00	62.3 PK	74.0	-11.7	1.58 H	5	42.60	19.70
6	11650.00	49.9 AV	54.0	-4.1	1.58 H	5	30.20	19.70
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	112.1 PK			1.00 V	93	72.80	39.30
2	*5825.00	101.6 AV			1.00 V	93	62.30	39.30
3	#5850.00	73.4 PK	82.1	-8.7	1.20 V	16	66.70	6.70
4	#5850.00	62.9 AV	71.6	-8.7	1.20 V	16	56.20	6.70
5	11650.00	60.0 PK	74.0	-14.0	1.14 V	239	40.30	19.70
6	11650.00	47.3 AV	54.0	-6.7	1.14 V	239	27.60	19.70

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.
7. "#":The radiated frequency is out the restricted band.

802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 71%RH	TESTED BY	Chris Lin

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	#5725.00	77.0 PK	91.5	-14.5	1.15 H	153	70.40	6.60
2	#5725.00	66.5 AV	80.9	-14.4	1.15 H	153	59.90	6.60
3	*5745.00	121.5 PK			1.00 H	334	82.40	39.10
4	*5745.00	110.9 AV			1.00 H	334	71.80	39.10
5	11490.00	61.4 PK	74.0	-12.6	1.00 H	3	41.10	20.30
6	11490.00	48.8 AV	54.0	-5.2	1.00 H	3	28.50	20.30
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	#5725.00	63.8 PK	78.2	-14.4	1.15 V	153	57.20	6.60
2	#5725.00	53.5 AV	68.0	-14.5	1.15 V	153	46.90	6.60
3	*5745.00	108.2 PK			1.02 V	12	69.10	39.10
4	*5745.00	98.0 AV			1.02 V	12	58.90	39.10
5	11490.00	61.5 PK	74.0	-12.5	1.23 V	66	41.20	20.30
6	11490.00	47.9 AV	54.0	-6.1	1.23 V	66	27.60	20.30

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.
7. "#":The radiated frequency is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 157	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 71%RH	TESTED BY	Chris Lin

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	122.6 PK			1.10 H	157	83.40	39.20
2	*5785.00	112.6 AV			1.10 H	157	73.40	39.20
3	11570.00	62.7 PK	74.0	-11.3	1.42 H	164	42.60	20.10
4	11570.00	51.0 AV	54.0	-3.0	1.42 H	164	30.90	20.10
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	114.5 PK			1.00 V	83	75.30	39.20
2	*5785.00	104.2 AV			1.00 V	83	65.00	39.20
3	11570.00	60.4 PK	74.0	-13.6	1.11 V	79	40.30	20.10
4	11570.00	47.2 AV	54.0	-6.8	1.11 V	79	27.10	20.10

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 165	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 71%RH	TESTED BY	Chris Lin

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	122.7 PK			1.01 H	15	83.40	39.30
2	*5825.00	112.8 AV			1.01 H	15	73.50	39.30
3	#5850.00	83.0 PK	92.7	-9.7	1.01 H	15	76.30	6.70
4	#5850.00	73.4 AV	82.8	-9.4	1.01 H	15	66.70	6.70
5	11650.00	61.3 PK	74.0	-12.7	1.03 H	17	41.60	19.70
6	11650.00	50.1 AV	54.0	-3.9	1.03 H	17	30.40	19.70
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	112.9 PK			1.30 V	93	73.60	39.30
2	*5825.00	102.1 AV			1.30 V	93	62.80	39.30
3	#5850.00	73.2 PK	82.9	-9.7	1.01 V	15	66.50	6.70
4	#5850.00	62.4 AV	72.1	-9.7	1.01 V	15	55.70	6.70
5	11650.00	59.8 PK	74.0	-14.2	1.06 V	8	40.10	19.70
6	11650.00	47.4 AV	54.0	-6.6	1.06 V	8	27.70	19.70

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.
7. "#":The radiated frequency is out the restricted band.

802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 151	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 71%RH	TESTED BY	Chris Lin

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	#5725.00	79.5 PK	85.9	-6.4	1.00 H	334	72.90	6.60
2	#5725.00	69.0 AV	75.4	-6.4	1.00 H	334	62.40	6.60
3	*5755.00	115.9 PK			1.00 H	339	76.70	39.20
4	*5755.00	105.4 AV			1.00 H	339	66.20	39.20
5	11510.00	62.7 PK	74.0	-11.3	1.15 H	96	42.40	20.30
6	11510.00	50.7 AV	54.0	-3.3	1.15 H	96	30.40	20.30
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	#5725.00	70.0 PK	76.4	-6.4	1.00 V	334	63.40	6.60
2	#5725.00	59.6 AV	66.0	-6.4	1.00 V	334	53.00	6.60
3	*5755.00	106.4 PK			1.34 V	93	67.20	39.20
4	*5755.00	96.0 AV			1.34 V	93	56.80	39.20
5	11510.00	60.5 PK	74.0	-13.5	1.23 V	148	40.20	20.30
6	11510.00	48.0 AV	54.0	-6.0	1.23 V	148	27.70	20.30

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.
7. "#":The radiated frequency is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 159	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 71%RH	TESTED BY	Chris Lin

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	120.2 PK			1.00 H	339	81.00	39.20
2	*5795.00	109.7 AV			1.00 H	339	70.50	39.20
3	#5850.00	82.1 PK	90.2	-8.1	1.20 H	13	75.40	6.70
4	#5850.00	71.6 AV	79.7	-8.1	1.20 H	13	64.90	6.70
5	11590.00	62.8 PK	74.0	-11.2	1.15 H	341	42.70	20.10
6	11590.00	50.2 AV	54.0	-3.8	1.15 H	341	30.10	20.10
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	111.1 PK			1.32 V	93	71.90	39.20
2	*5795.00	100.4 AV			1.32 V	93	61.20	39.20
3	#5850.00	73.0 PK	81.1	-8.1	1.20 V	13	66.30	6.70
4	#5850.00	62.3 AV	70.4	-8.1	1.20 V	13	55.60	6.70
5	11590.00	61.1 PK	74.0	-12.9	1.24 V	85	41.00	20.10
6	11590.00	47.8 AV	54.0	-6.2	1.24 V	85	27.70	20.10

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.
7. "#":The radiated frequency is out the restricted band.

802.11ac (80MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 155	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Chris Lin

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	#5725.00	73.3 PK	80.3	-7.0	1.00 H	339	66.70	6.60
2	#5725.00	63.2 AV	70.2	-7.0	1.00 H	339	56.60	6.60
3	*5775.00	110.3 PK			1.00 H	339	71.10	39.20
4	*5775.00	100.2 AV			1.00 H	339	61.00	39.20
5	#5850.00	74.2 PK	80.3	-6.1	1.18 H	17	67.50	6.70
6	#5850.00	64.1 AV	70.2	-6.1	1.18 H	17	57.40	6.70
7	11550.00	62.5 PK	74.0	-11.5	1.15 H	96	42.30	20.20
8	11550.00	50.6 AV	54.0	-3.4	1.15 H	96	30.40	20.20
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	#5725.00	63.3 PK	70.3	-7.0	1.00 V	339	56.70	6.60
2	#5725.00	53.1 AV	60.1	-7.0	1.00 V	339	46.50	6.60
3	*5775.00	100.3 PK			1.33 V	90	61.10	39.20
4	*5775.00	90.1 AV			1.33 V	90	50.90	39.20
5	#5850.00	64.2 PK	70.3	-6.1	1.18 V	17	57.50	6.70
6	#5850.00	54.0 AV	60.1	-6.1	1.18 V	17	47.30	6.70
7	11550.00	60.4 PK	74.0	-13.6	1.14 V	87	40.20	20.20
8	11550.00	47.8 AV	54.0	-6.2	1.14 V	87	27.60	20.20

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.
7. "#":The radiated frequency is out the restricted band.

BELOW 1GHz WORST-CASE DATA：802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	26deg. C, 67%RH	TESTED BY	Cedric Wu

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	124.98	31.6 QP	43.5	-11.9	1.25 H	38	47.30	-15.70
2	175.43	35.5 QP	43.5	-8.0	1.25 H	3	50.30	-14.80
3	249.17	37.6 QP	46.0	-8.4	1.75 H	177	51.80	-14.20
4	375.29	33.6 QP	46.0	-12.4	1.50 H	11	44.40	-10.80
5	625.60	31.0 QP	46.0	-15.0	1.25 H	11	36.40	-5.40
6	897.26	27.5 QP	46.0	-18.5	1.00 H	260	28.00	-0.50
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	39.60	35.3 QP	40.0	-4.7	1.00 V	244	50.50	-15.20
2	70.65	32.5 QP	40.0	-7.5	1.25 V	334	48.10	-15.60
3	171.55	29.4 QP	43.5	-14.1	1.50 V	14	43.50	-14.10
4	276.33	31.0 QP	46.0	-15.0	1.75 V	278	43.80	-12.80
5	386.93	31.6 QP	46.0	-14.4	1.00 V	235	42.20	-10.60
6	875.91	27.8 QP	46.0	-18.2	1.25 V	289	28.90	-1.10

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

5.2 CONDUCTED EMISSION MEASUREMENT

5.2.1 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 0.50MHz.

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.

5.2.2 TEST INSTRUMENTS

Same as item 4.2.2.

5.2.3 TEST PROCEDURES

Same as item 4.2.3.

5.2.4 DEVIATION FROM TEST STANDARD

No deviation.

5.2.5 TEST SETUP

Same as item 4.2.5.

5.2.6 EUT OPERATING CONDITIONS

Same as item 4.1.6.

5.2.7 TEST RESULTS

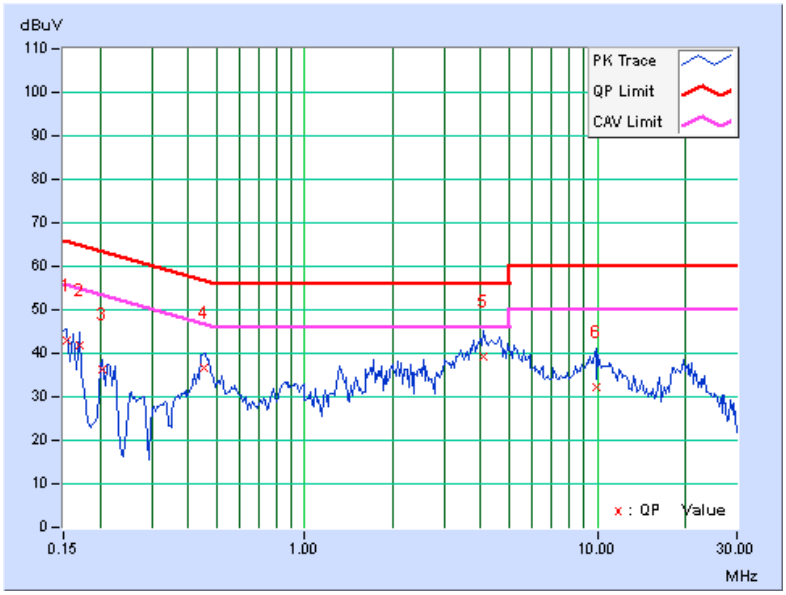
CONDUCTED WORST-CASE DATA：802.11n (20MHz)

PHASE	Line 1	6dB BANDWIDTH	9kHz

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	0.17	42.91	28.56	43.08	28.73	65.79	55.79	-22.70	-27.05
2	0.16953	0.17	41.65	30.88	41.82	31.05	64.98	54.98	-23.16	-23.93
3	0.20469	0.17	35.97	24.19	36.14	24.36	63.42	53.42	-27.28	-29.06
4	0.45469	0.22	36.39	23.63	36.61	23.85	56.79	46.79	-20.18	-22.94
5	**4.08984**	**0.37**	**38.91**	**33.77**	**39.28**	**34.14**	**56.00**	**46.00**	**-16.72**	**-11.86**
6	9.91016	0.43	31.62	25.68	32.05	26.11	60.00	50.00	-27.95	-23.89

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

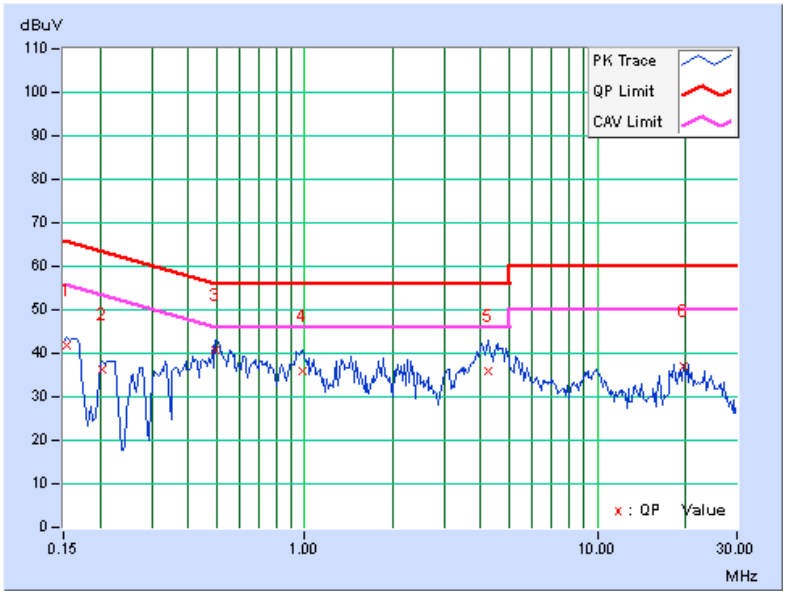


PHASE	Line 2	6dB BANDWIDTH	9kHz

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	0.18	41.56	29.06	41.74	29.24	65.79	55.79	-24.04	-26.54
2	0.20469	0.18	36.26	25.29	36.44	25.47	63.42	53.42	-26.98	-27.95
3	0.49766	0.25	40.36	29.58	40.61	29.83	56.04	46.04	-15.43	-16.21
4	0.97813	0.23	35.62	25.01	35.85	25.24	56.00	46.00	-20.15	-20.76
5	4.21484	0.39	35.55	30.74	35.94	31.13	56.00	46.00	-20.06	-14.87
6	19.71094	0.72	36.24	33.41	36.96	34.13	60.00	50.00	-23.04	-15.87

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



5.3 6dB BANDWIDTH MEASUREMENT

5.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

5.3.2 TEST SETUP

Same as item 4.3.2.

5.3.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

5.3.4 TEST PROCEDURE

Same as item 4.3.4.

5.3.5 DEVIATION FROM TEST STANDARD

No deviation.

5.3.6 EUT OPERATING CONDITIONS

Same as item 4.3.6.

5.3.7 TEST RESULTS

802.11a

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
149	5745	16.39	16.08	16.38	0.5	PASS
157	5785	16.06	16.40	16.36	0.5	PASS
165	5825	16.37	16.36	16.39	0.5	PASS

802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
149	5745	17.58	17.58	17.59	0.5	PASS
157	5785	16.42	17.57	17.31	0.5	PASS
165	5825	17.59	16.97	17.29	0.5	PASS

802.11n (40MHz)

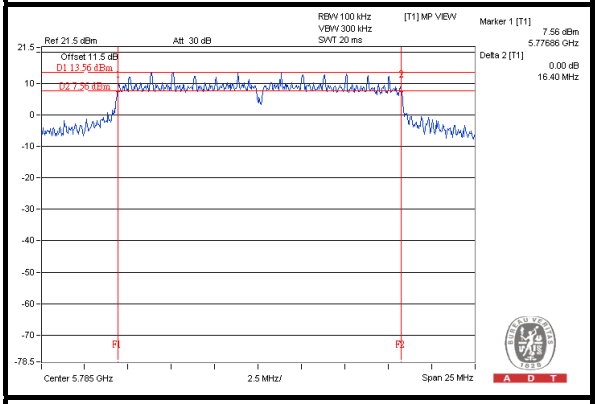
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
151	5755	36.46	36.38	36.44	0.5	PASS
159	5795	36.34	35.69	36.11	0.5	PASS

802.11ac (80MHz)

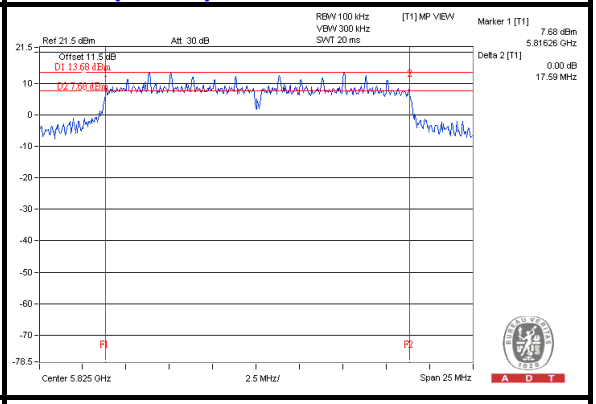
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
155	5775	76.54	75.95	75.20	0.5	PASS

SPECTRUM PLOT OF WORST VALUE

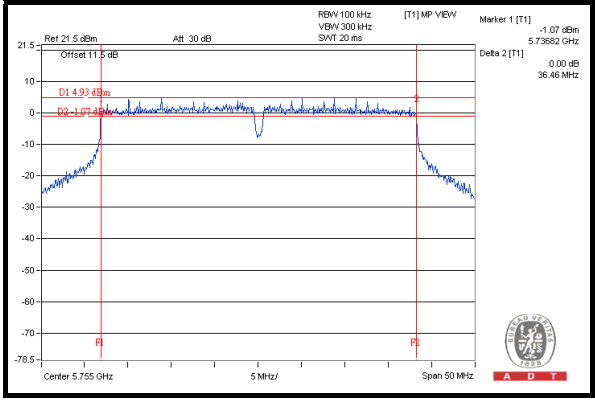
802.11a



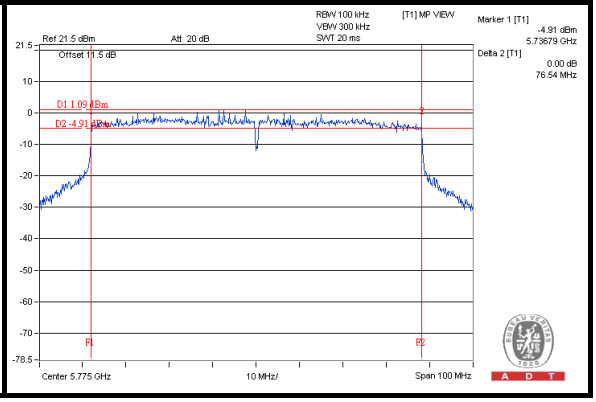
802.11n (20MHz)



802.11n (40MHz)



802.11ac (80MHz)



5.4 CONDUCTED OUTPUT POWER

5.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

For systems using digital modulation in the 5725 –5850 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 ≤ 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 ≥ 5.

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

5.4.2 TEST SETUP

Same as Item 4.4.2.

5.4.3 INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

5.4.4 TEST PROCEDURES

Same as Item 4.4.4.

5.4.5 DEVIATION FROM TEST STANDARD

No deviation.

5.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6.

5.4.7 TEST RESULTS

802.11a

CHAN.	FREQ. (MHz)	AVG. POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
149	5745	22.31	22.55	21.77	500.417	26.99	29	PASS
157	5785	23.71	23.54	23.48	683.751	28.35	29	PASS
165	5825	23.46	23.84	23.93	711.095	28.52	29	PASS

Note: Antenna gain =7dBi > 6dBi, so the conducted power limit shall be reduced to 30-(7-6) = 29dBm

802.11n (20MHz)

CHAN.	FREQ. (MHz)	AVG. POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
149	5745	22.07	21.63	22.79	496.719	26.96	29	PASS
157	5785	24.44	23.89	23.31	**737.166**	28.68	29	PASS
165	5825	23.70	23.86	23.29	690.947	28.39	29	PASS

Note: Antenna gain =7dBi > 6dBi, so the conducted power limit shall be reduced to 30-(7-6) = 29dBm

802.11n (40MHz)

CHAN.	FREQ. (MHz)	AVG. POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
151	5755	20.06	19.87	20.80	318.668	25.03	29	PASS
159	5795	23.48	23.36	24.54	724.060	28.60	29	PASS

Note: Antenna gain =7dBi > 6dBi, so the conducted power limit shall be reduced to 30-(7-6) = 29dBm

802.11ac (80MHz)

CHAN.	CHAN. FREQ. (MHz)	AVG. POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
155	5775	18.62	18.41	19.08	223.031	23.48	29	PASS

Note: Antenna gain =7dBi > 6dBi, so the conducted power limit shall be reduced to 30-(7-6) = 29dBm

5.5 POWER SPECTRAL DENSITY MEASUREMENT

5.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

5.5.2 TEST SETUP

Same as item 4.5.2.

5.5.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

5.5.4 TEST PROCEDURE.

Same as item 4.5.4.

5.5.5 DEVIATION FROM TEST STANDARD

No deviation.

5.5.6 EUT OPERATING CONDITION

Same as item 4.3.6.

5.5.7 TEST RESULTS

802.11a

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	149	5745	-11.32	4.77	-6.55	2.23	PASS
	157	5785	-8.65	4.77	-3.88	2.23	PASS
	165	5825	-10.98	4.77	-6.21	2.23	PASS
1	149	5745	-10.74	4.77	-5.97	2.23	PASS
	157	5785	-10.04	4.77	-5.27	2.23	PASS
	165	5825	-10.14	4.77	-5.37	2.23	PASS
2	149	5745	-12.01	4.77	-7.24	2.23	PASS
	157	5785	-9.42	4.77	-4.65	2.23	PASS
	165	5825	-11.61	4.77	-6.84	2.23	PASS

NOTE: Directional gain = 7dBi + 10log(3) = 11.77dBi > 6dBi , so the power density limit shall be reduced to 8-(11.77-6) = 2.23dBm.

802.11n (20MHz)

TX chain	Chan.	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD without Duty Factor (dBm/3kHz)	Duty Factor	Total PSD with Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	149	5745	-12.12	4.77	-7.35	0.38	-6.97	2.23	PASS
	157	5785	-9.39	4.77	-4.62	0.38	-4.24	2.23	PASS
	165	5825	-10.47	4.77	-5.70	0.38	-5.32	2.23	PASS
1	149	5745	-10.91	4.77	-6.14	0.38	-5.76	2.23	PASS
	157	5785	-8.96	4.77	-4.19	0.38	-3.81	2.23	PASS
	165	5825	-10.60	4.77	-5.83	0.38	-5.45	2.23	PASS
2	149	5745	-12.40	4.77	-7.63	0.38	-7.25	2.23	PASS
	157	5785	-9.79	4.77	-5.02	0.38	-4.64	2.23	PASS
	165	5825	-11.99	4.77	-7.22	0.38	-6.84	2.23	PASS

NOTE: Directional gain = 7dBi + 10log(3) = 11.77dBi > 6dBi , so the power density limit shall be reduced to 8-(11.77-6) = 2.23dBm.

802.11n (40MHz)

TX chain	Chan.	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD without Duty Factor (dBm/3kHz)	Duty Factor	Total PSD with Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	151	5755	-16.42	4.77	-11.65	0.68	-10.97	2.23	PASS
	159	5795	-12.51	4.77	-7.74	0.68	-7.06	2.23	PASS
1	151	5755	-17.41	4.77	-12.64	0.68	-11.96	2.23	PASS
	159	5795	-12.79	4.77	-8.02	0.68	-7.34	2.23	PASS
2	151	5755	-19.49	4.77	-14.72	0.68	-14.04	2.23	PASS
	159	5795	-14.58	4.77	-9.81	0.68	-9.13	2.23	PASS

NOTE: Directional gain = 7dBi + 10log(3) = 11.77dBi > 6dBi , so the power density limit shall be reduced to 8-(11.77-6) = 2.23dBm.

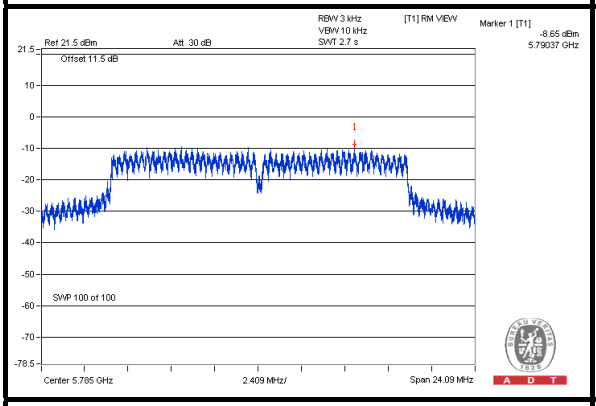
802.11ac (80MHz)

TX chain	Chan.	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=3) dB	Total PSD without Duty Factor (dBm/3kHz)	Duty Factor	Total PSD with Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	155	5775	-21.27	4.77	-16.50	0.52	-15.98	2.23	PASS
1	155	5775	-21.99	4.77	-17.22	0.52	-16.70	2.23	PASS
2	155	5775	-14.98	4.77	-10.21	0.52	-9.69	2.23	PASS

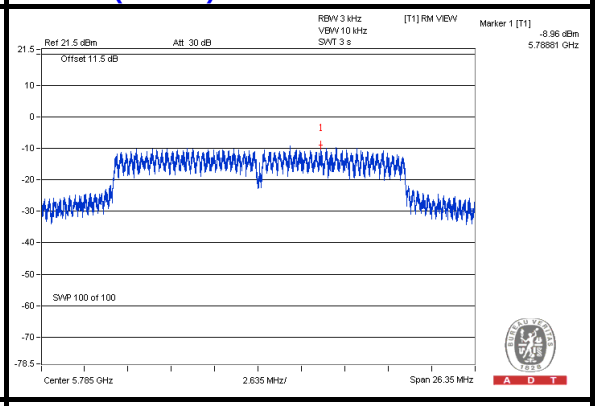
NOTE: Directional gain = 7dBi + 10log(3) = 11.77dBi > 6dBi , so the power density limit shall be reduced to 8-(11.77-6) = 2.23dBm.

SPECTRUM PLOT OF WORST VALUE

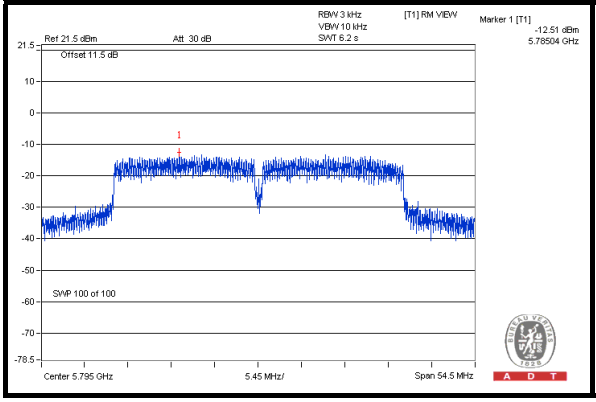
802.11a



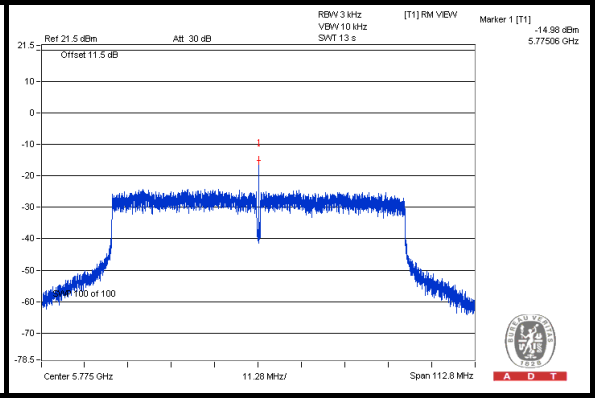
802.11n (20MHz)



802.11n (40MHz)



802.11ac (80MHz)



5.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

5.6.1 LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT

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

5.6.2 TEST SETUP

Same as Item 4.6.2

5.6.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

5.6.4 TEST PROCEDURE

Same as Item 4.6.4

5.6.5 DEVIATION FROM TEST STANDARD

No deviation.

5.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6

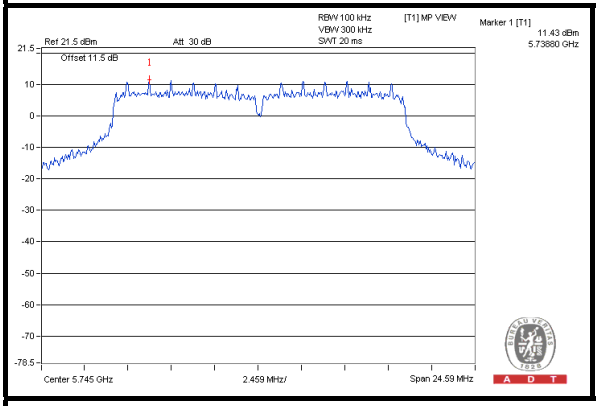
5.6.7 TEST RESULTS

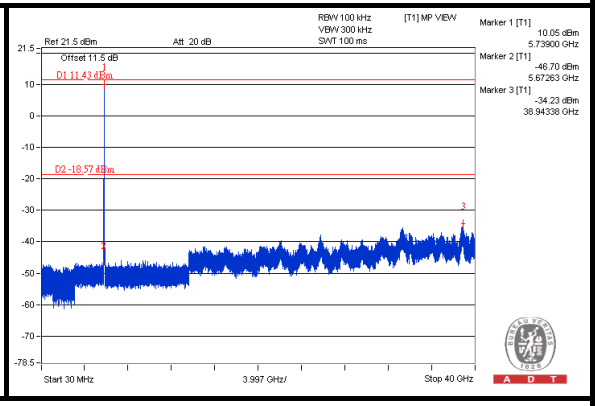
The conducted emission test is performed on each TX port of operating mode without summing or adding 10log (N) since the limit is relative emission limit.

The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

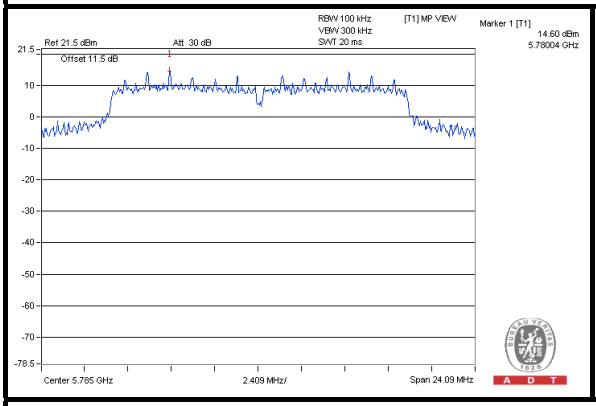
802.11a: CHAIN 0

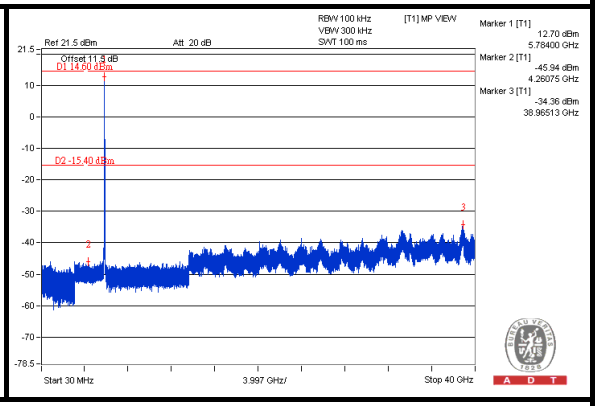
CH 149



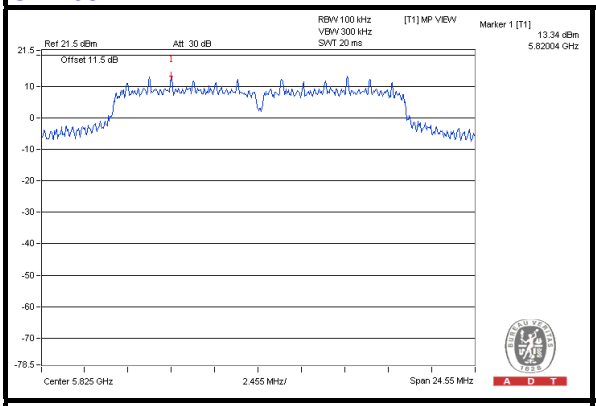


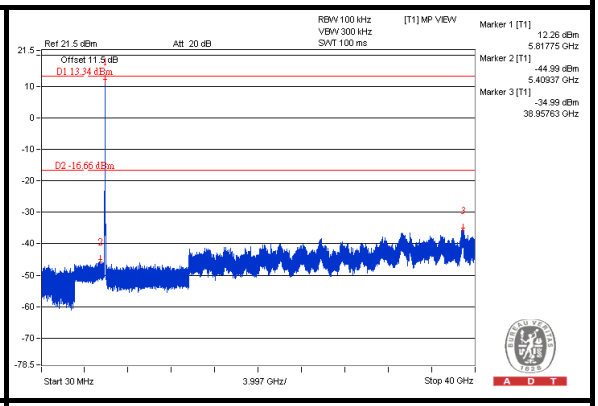
CH 157



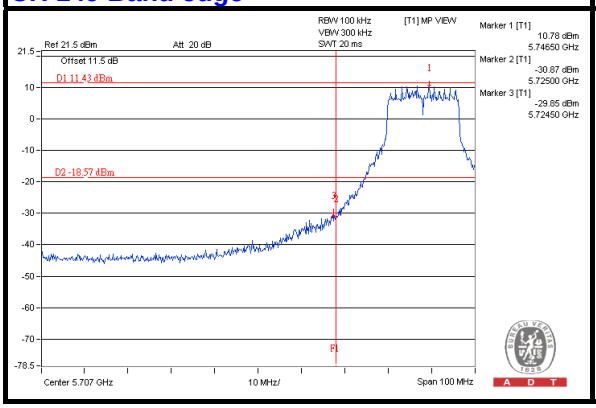


CH 165

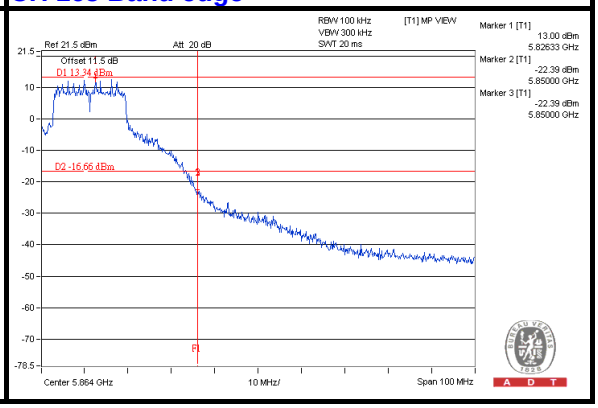




CH 149 Band edge

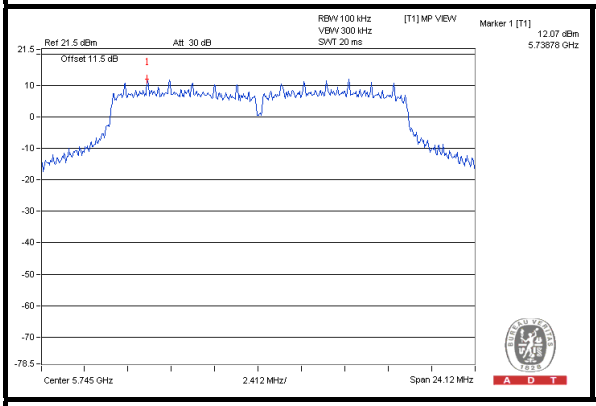


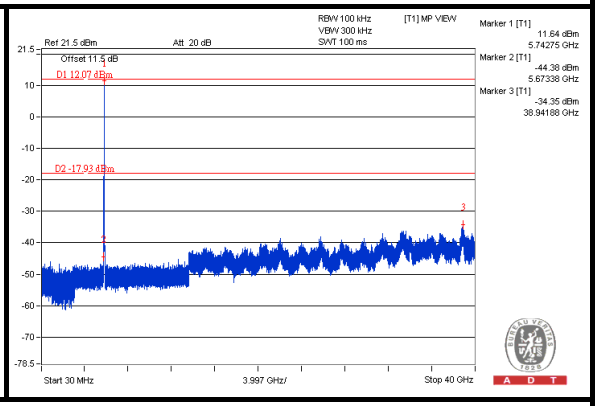
CH 165 Band edge



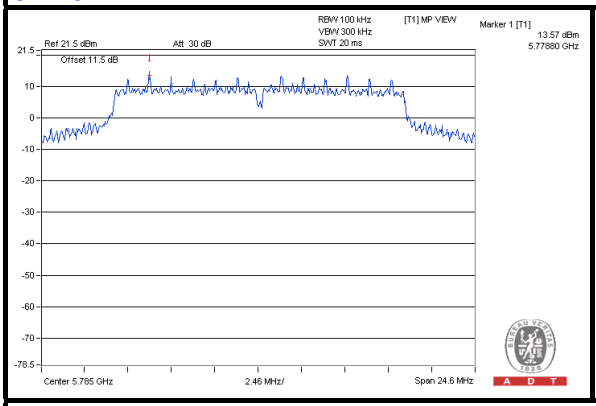
CHAIN 1

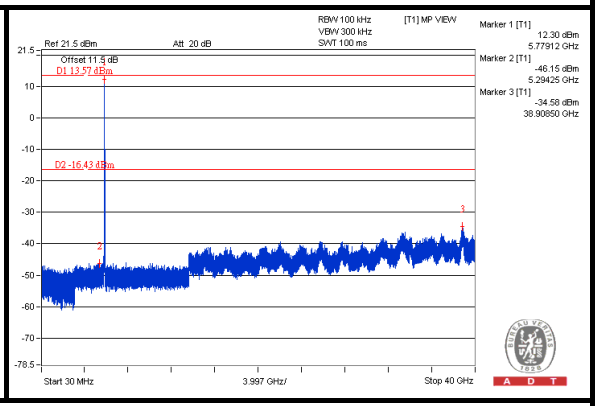
CH 149



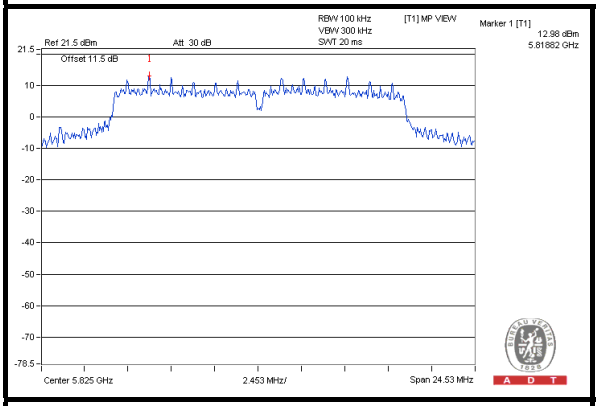


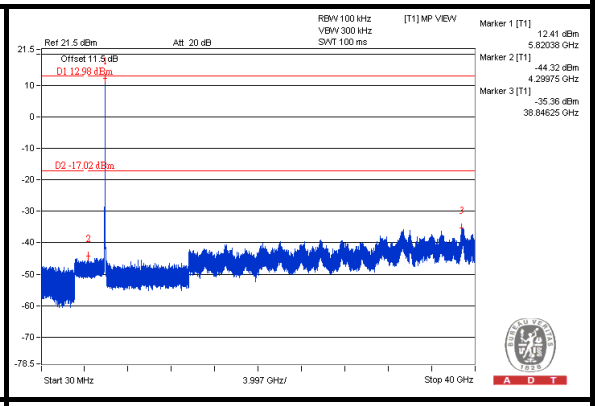
CH 157



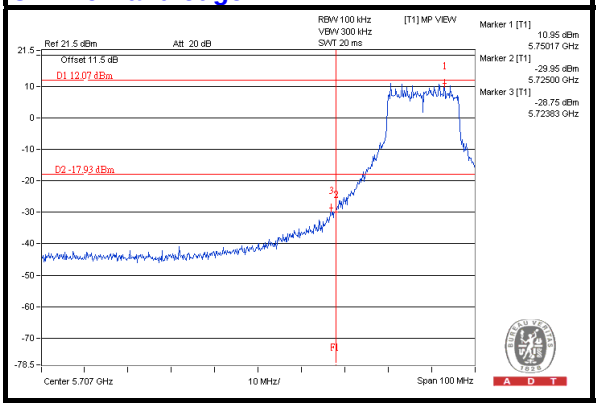


CH 165

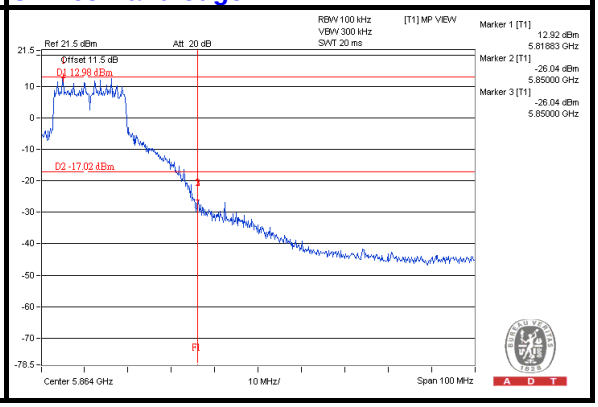




CH 149 Band edge

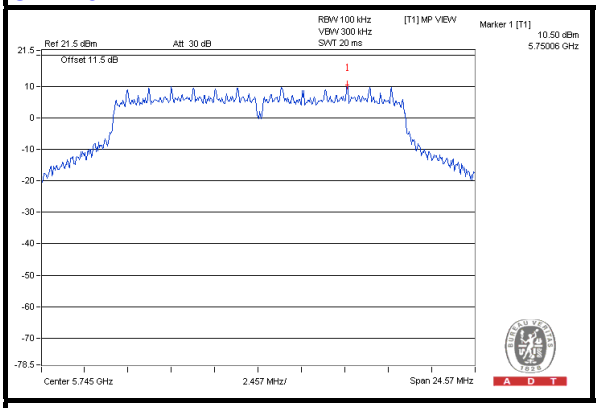


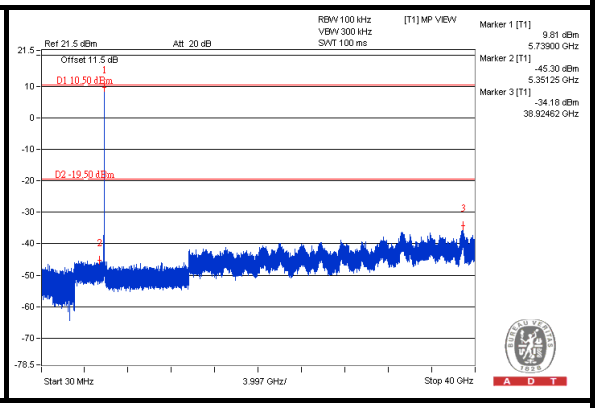
CH 165 Band edge



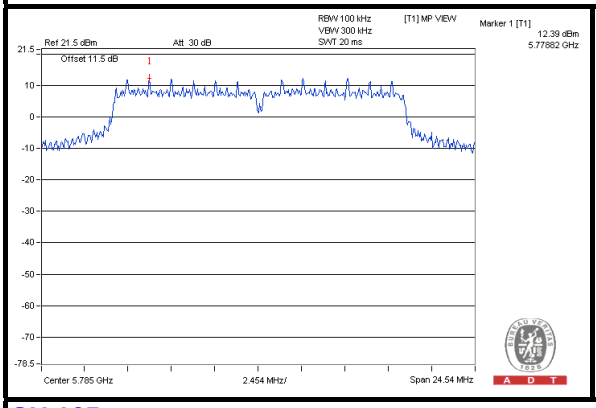
CHAIN 2

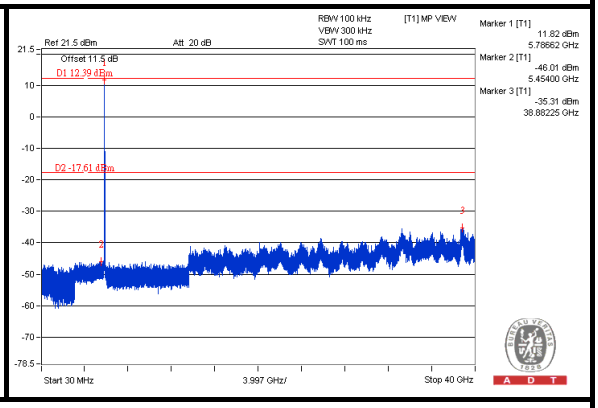
CH 149



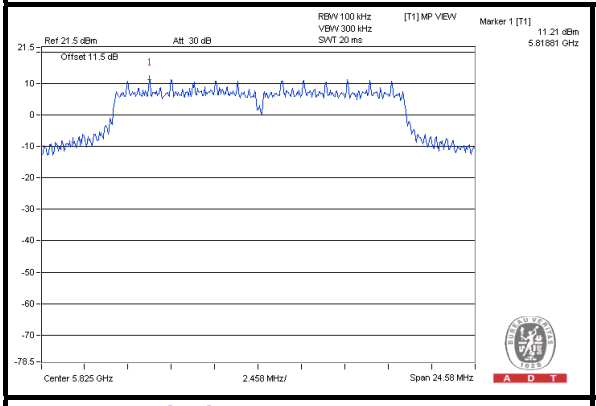


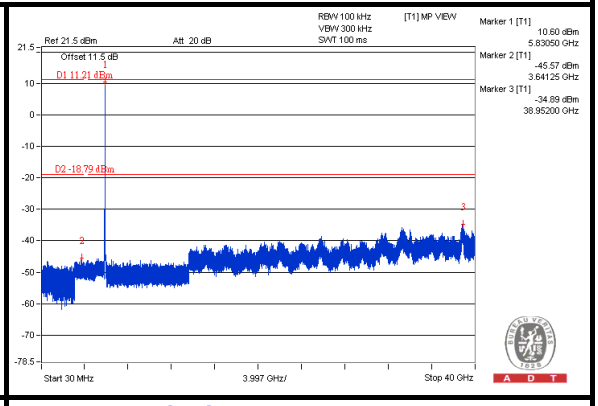
CH 157



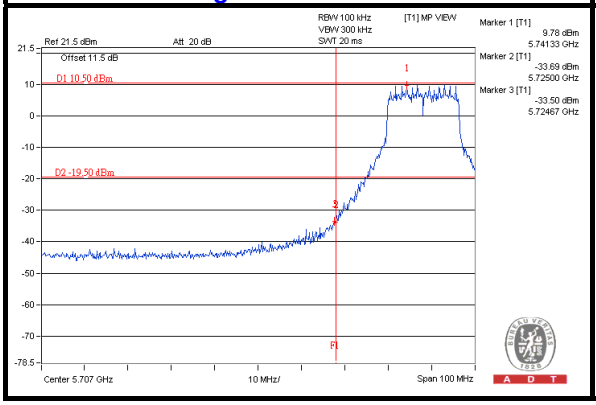


CH 165

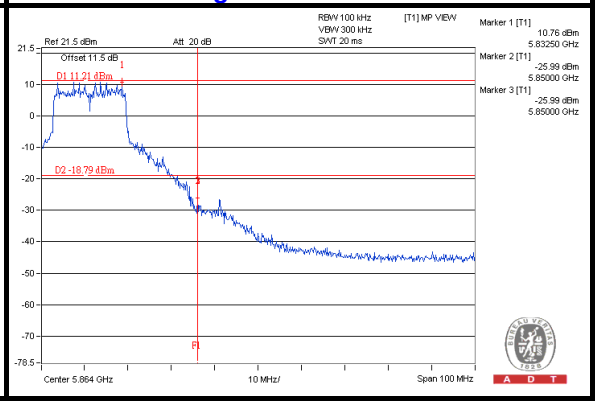




CH 149 Band edge

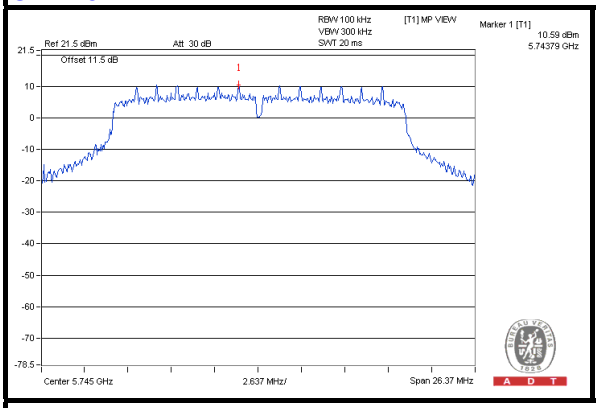


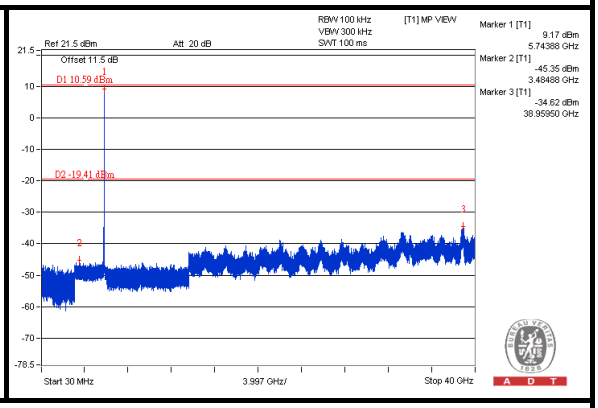
CH 165 Band edge



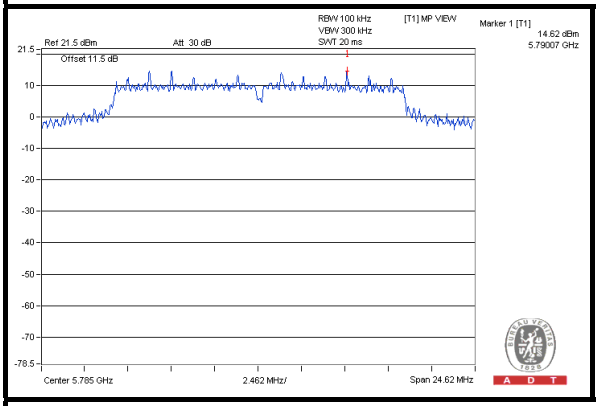
802.11n (20MHz): CHAIN 0

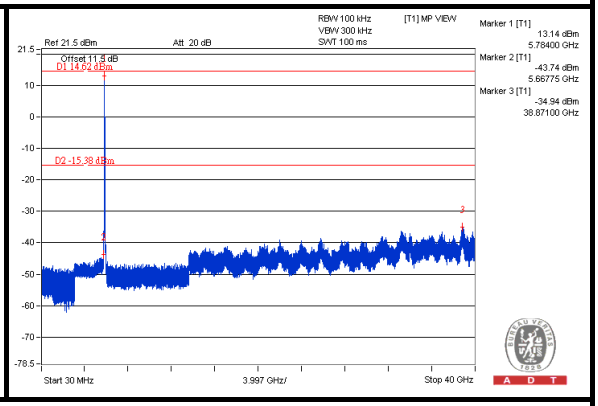
CH 149



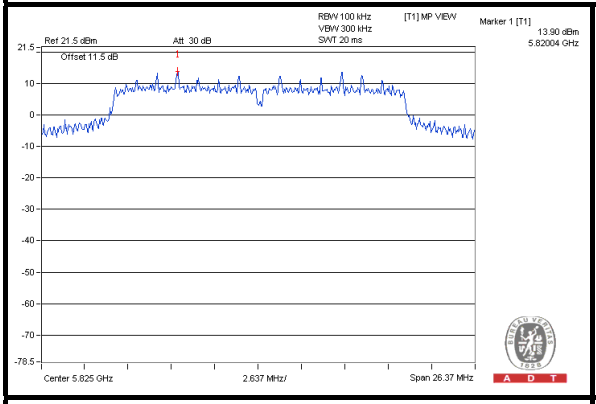


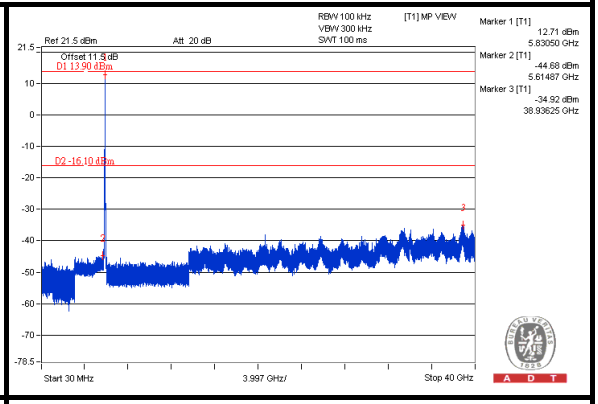
CH 157



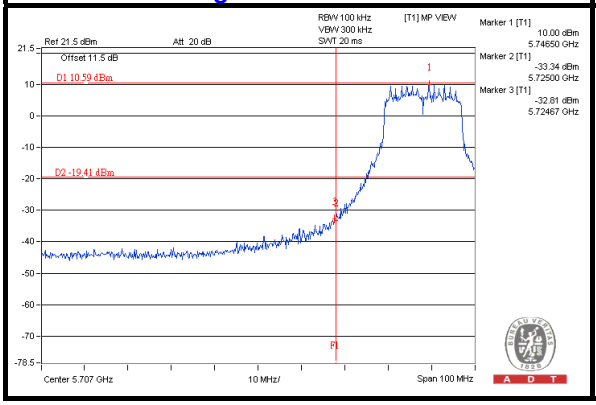


CH 165

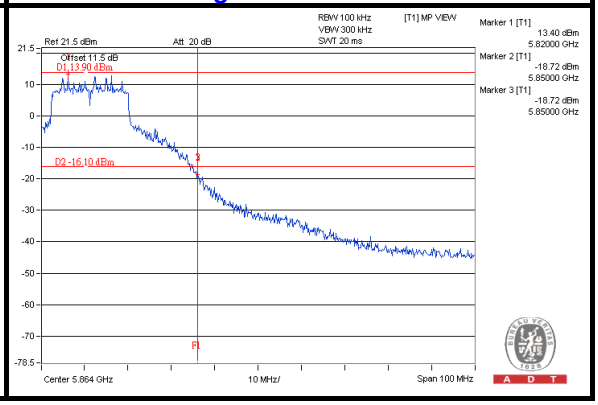




CH 149 Band edge

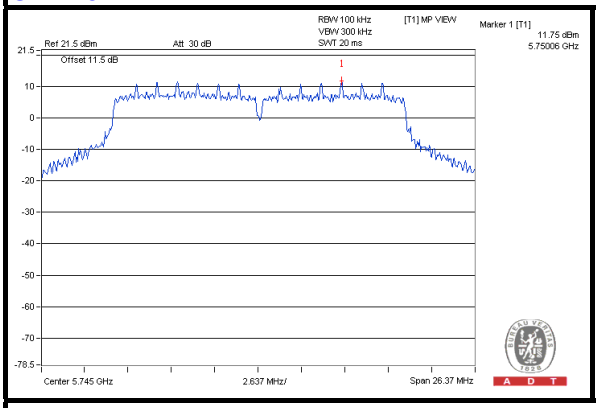


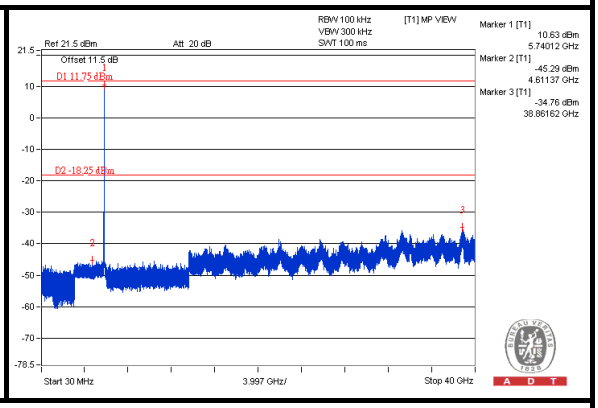
CH 165 Band edge



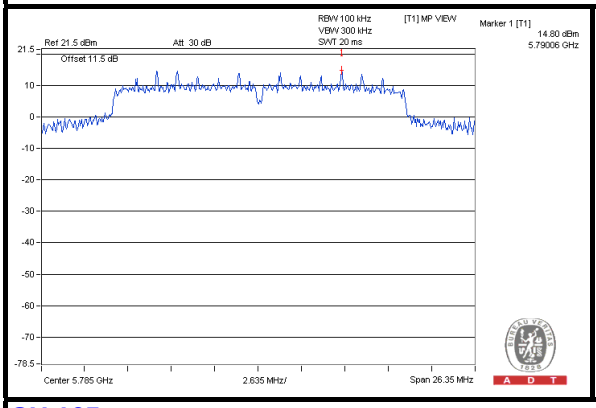
CHAIN 1

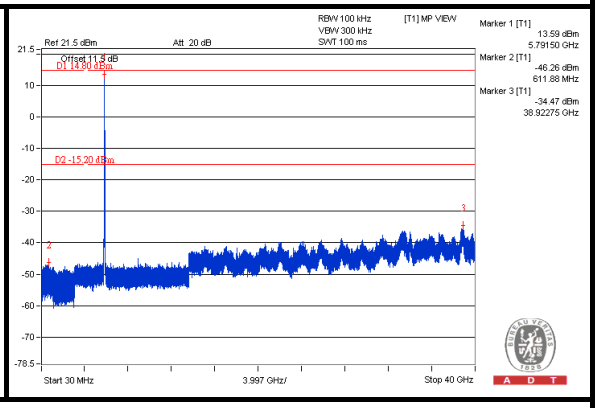
CH 149



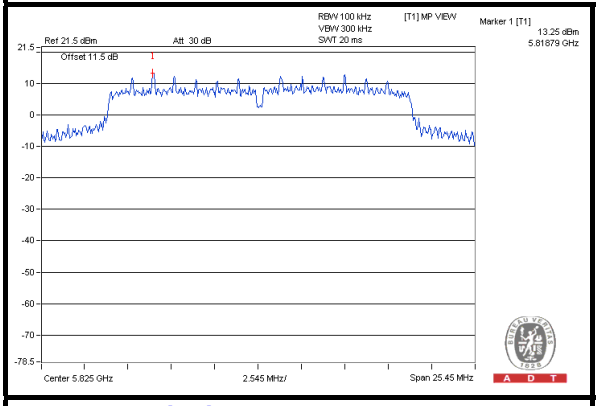


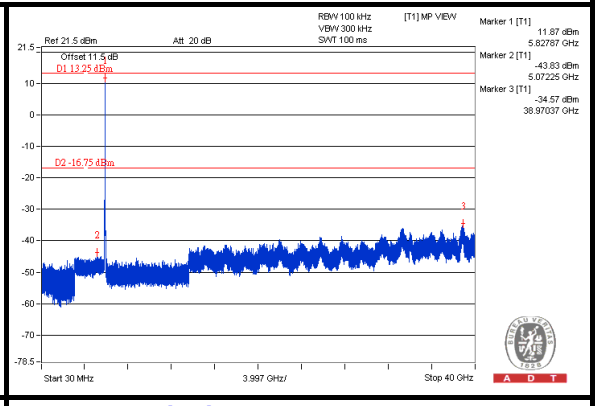
CH 157



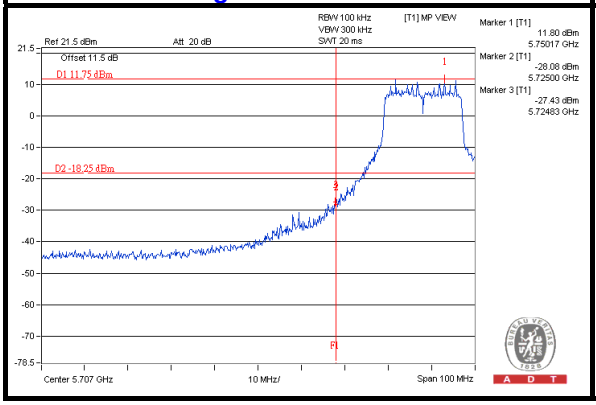


CH 165

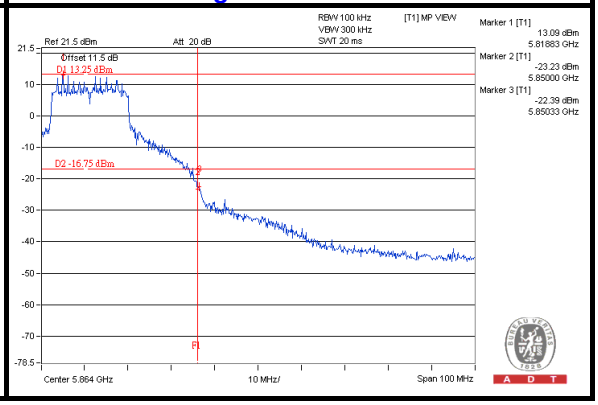




CH 149 Band edge

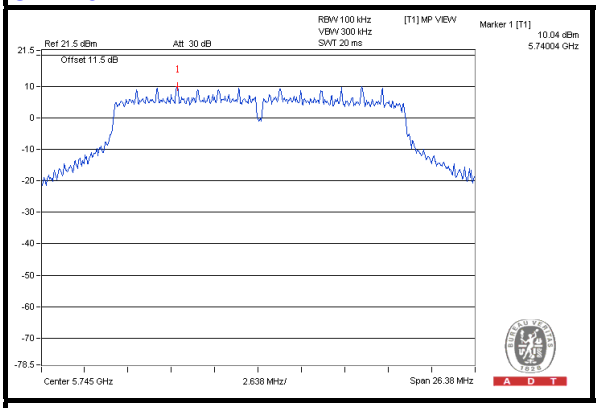


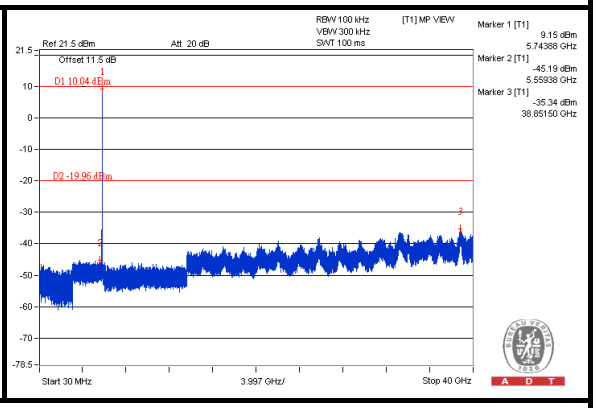
CH 165 Band edge



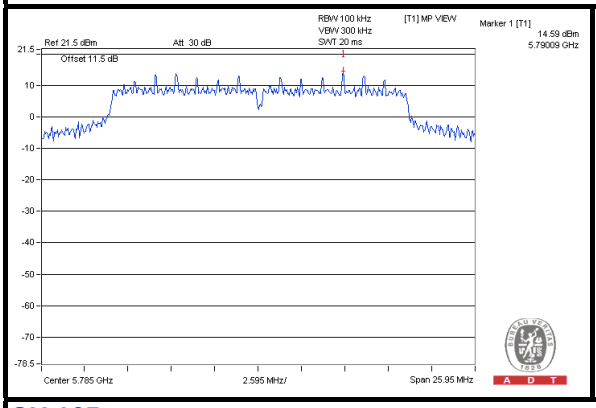
CHAIN 2

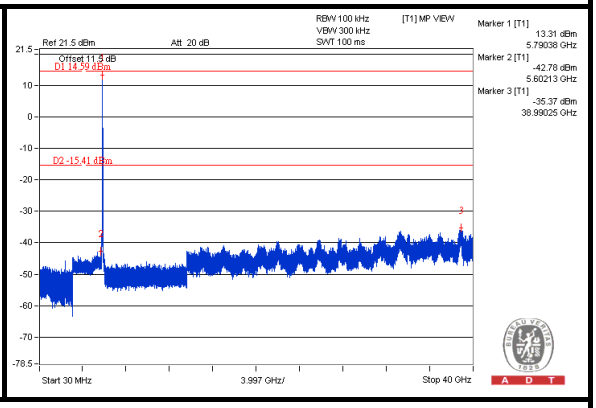
CH 149



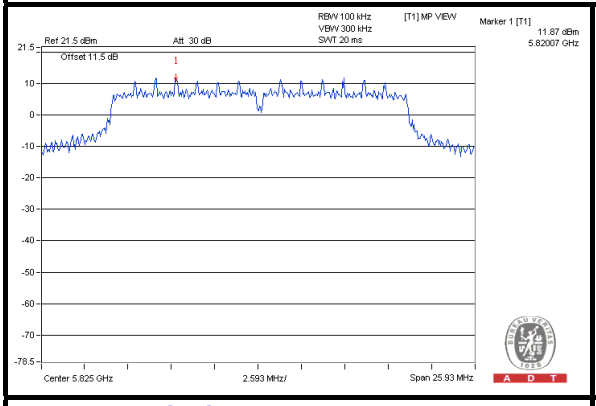


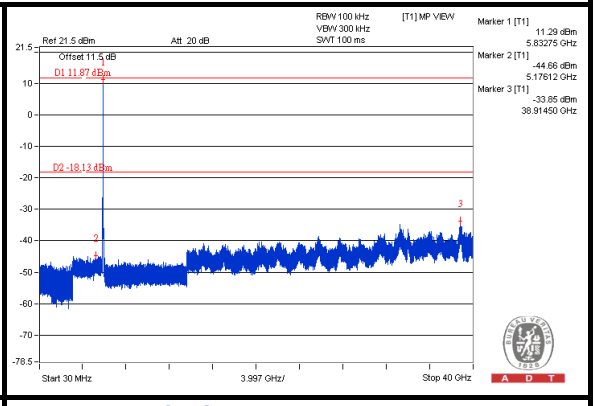
CH 157



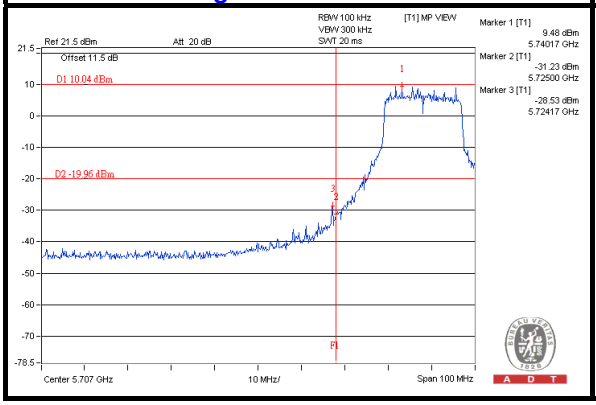


CH 165

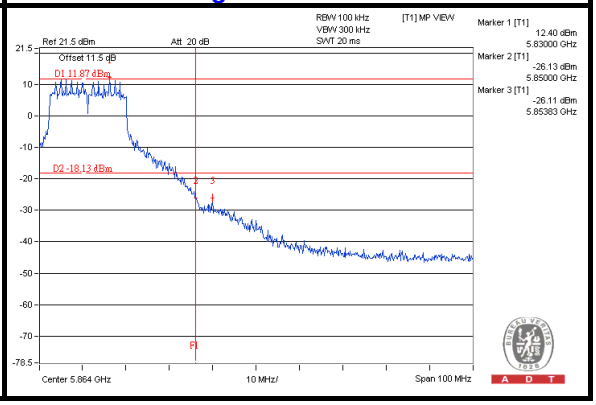




CH 149 Band edge

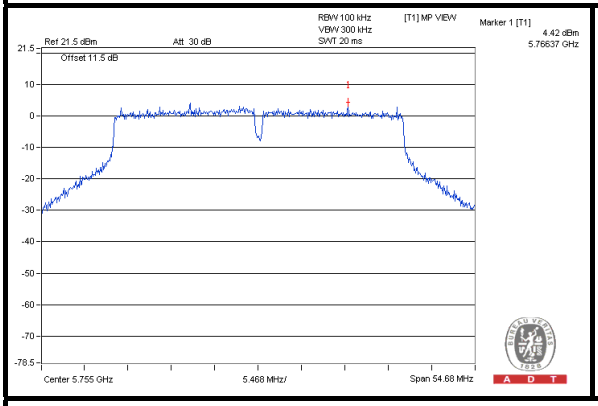


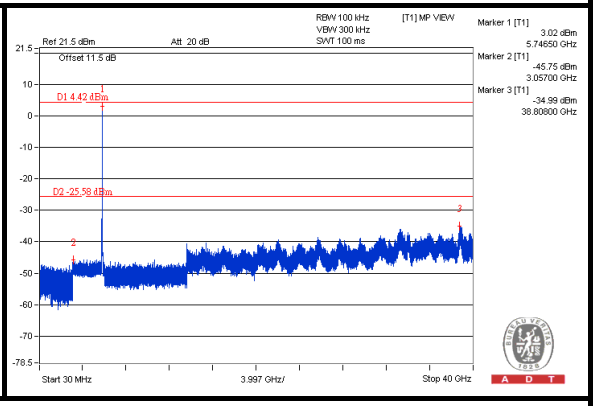
CH 165 Band edge



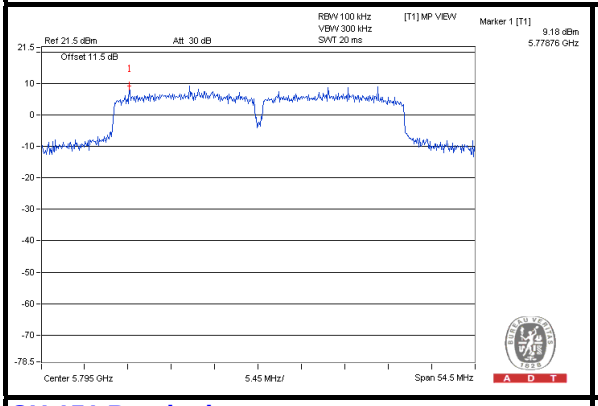
802.11n (40MHz): CHAIN 0

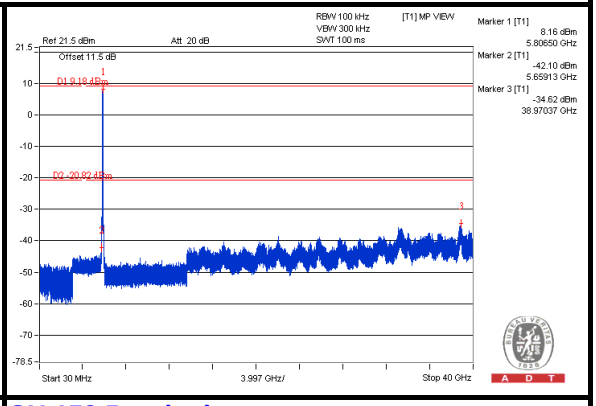
CH 151



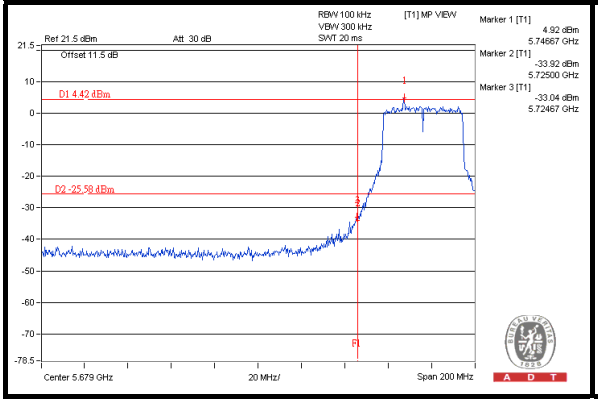


CH 159

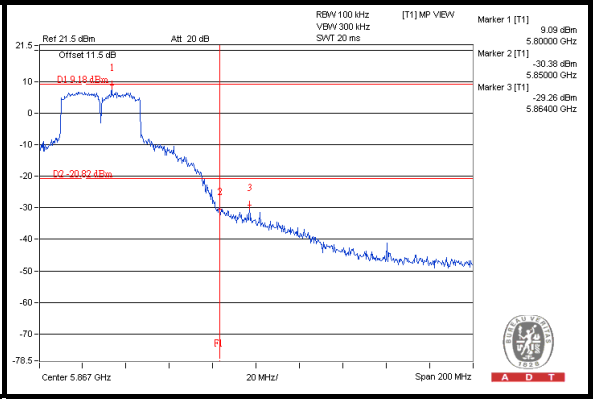




CH 151 Band edge

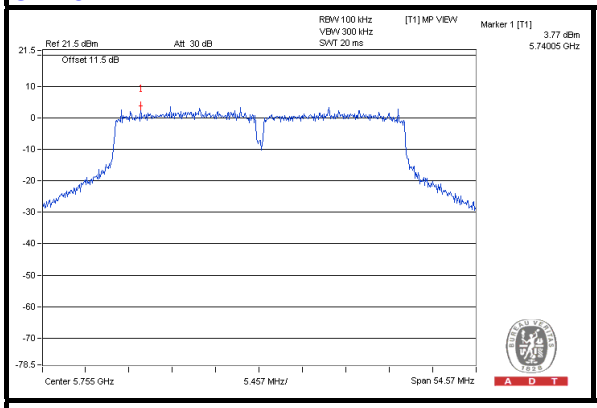


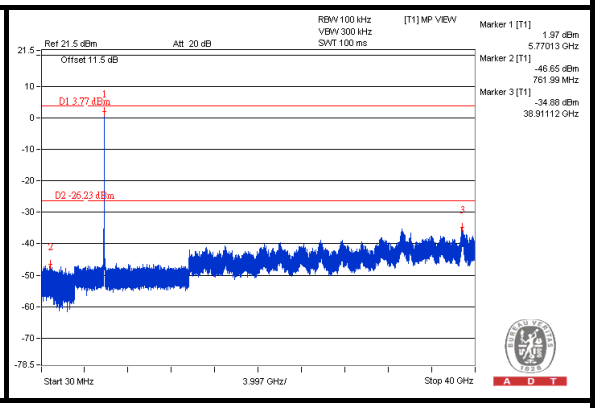
CH 159 Band edge



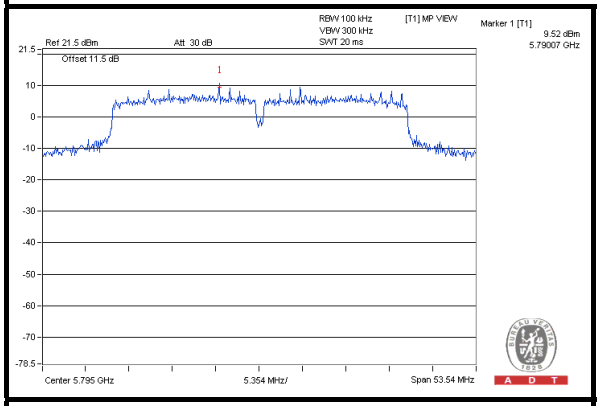
CHAIN 1

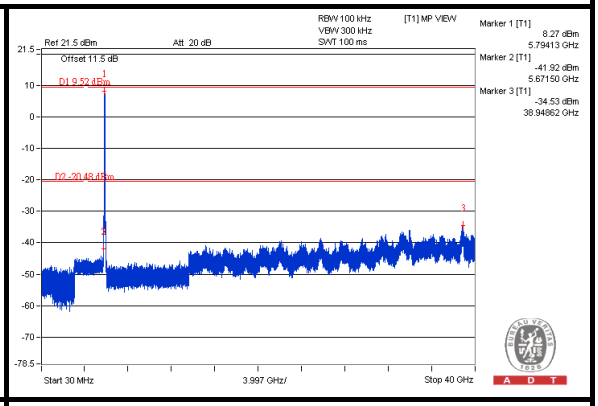
CH 151



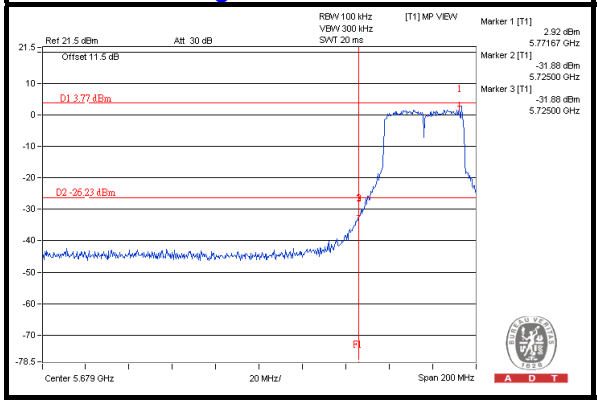


CH 159

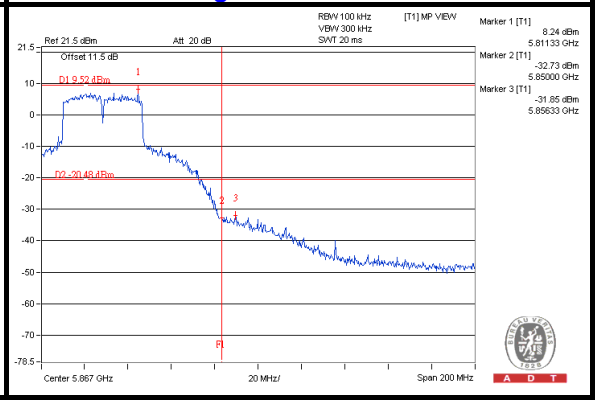




CH 151 Band edge

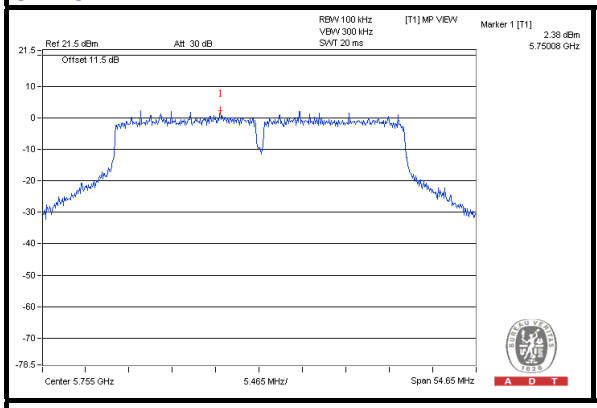


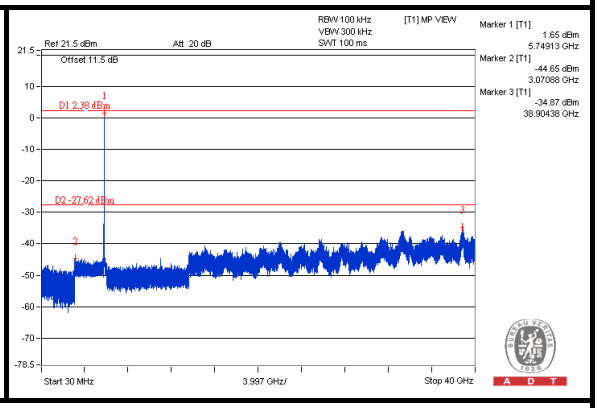
CH 159 Band edge



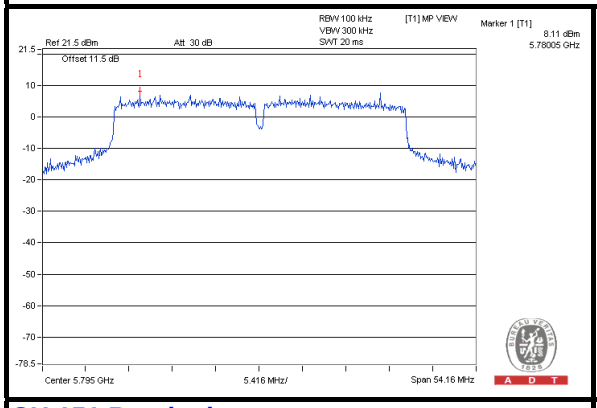
CHAIN 2

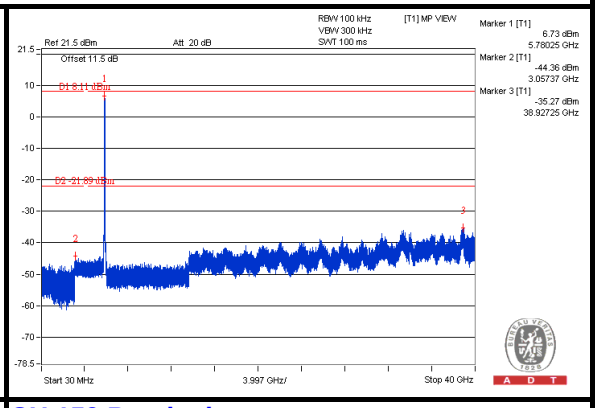
CH 151



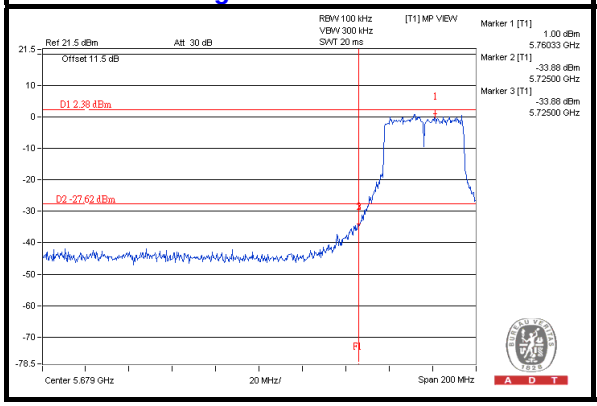


CH 159

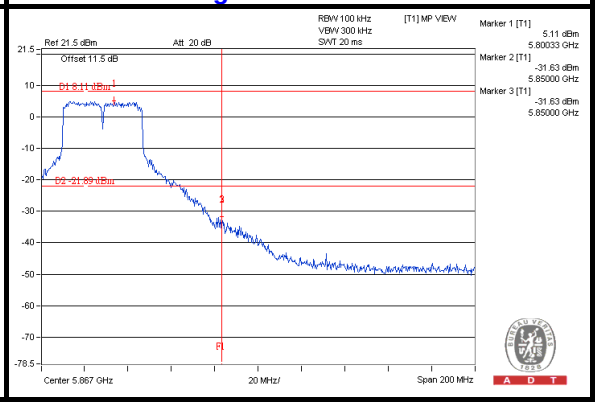




CH 151 Band edge

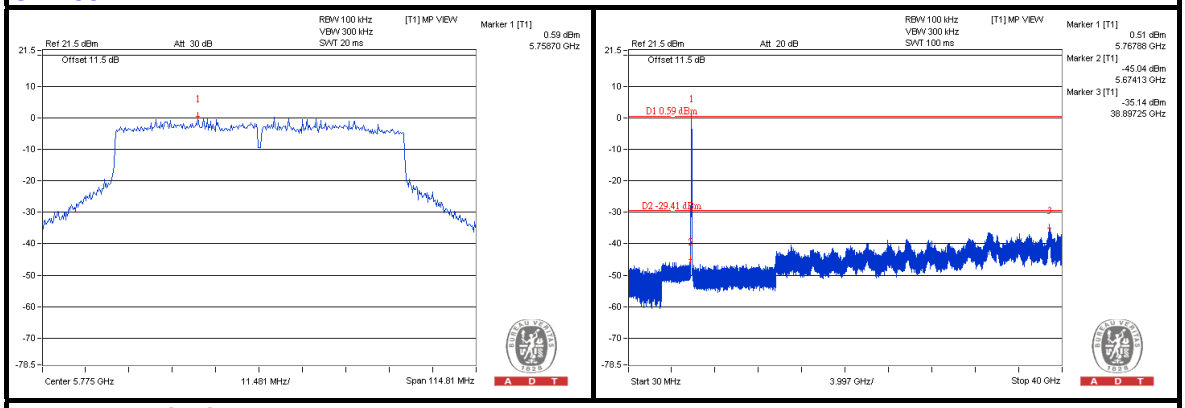


CH 159 Band edge

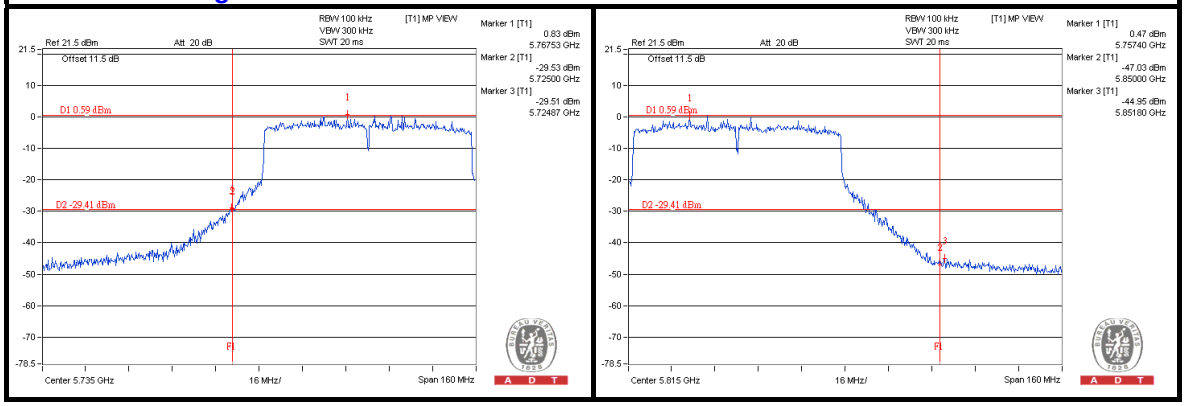


802.11ac (80MHz): CHAIN 0

CH 155

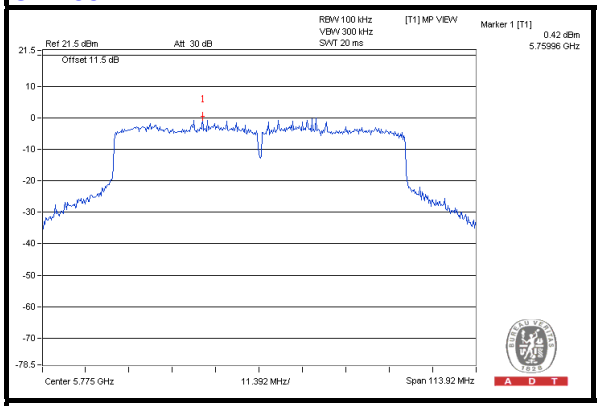


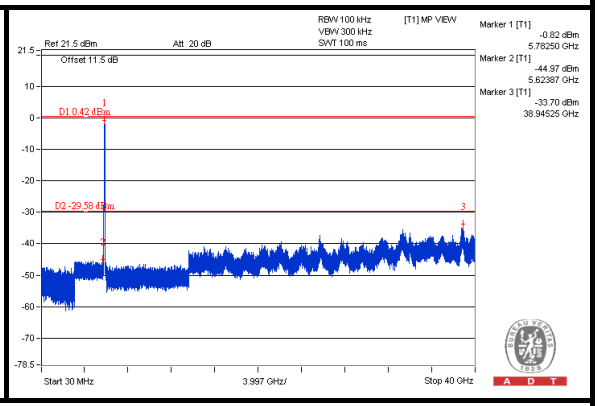
CH 155 Band edge



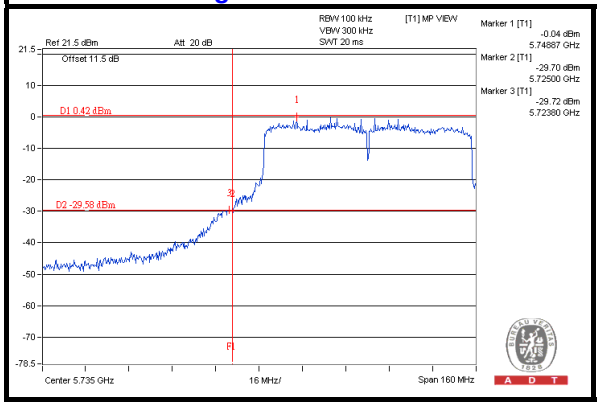
CHAIN 1

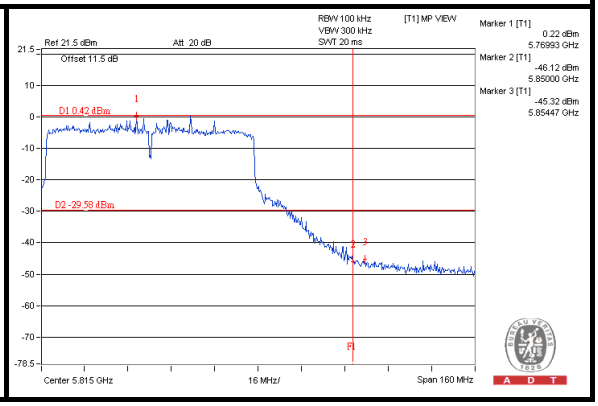
CH 155





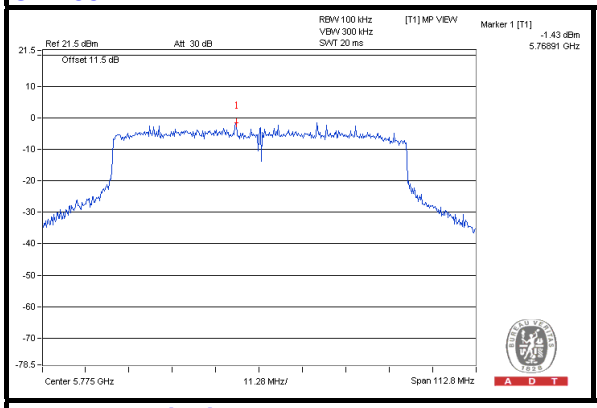
CH 155 Band edge

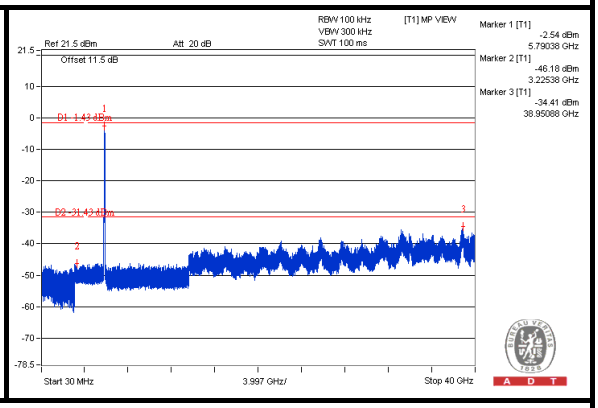




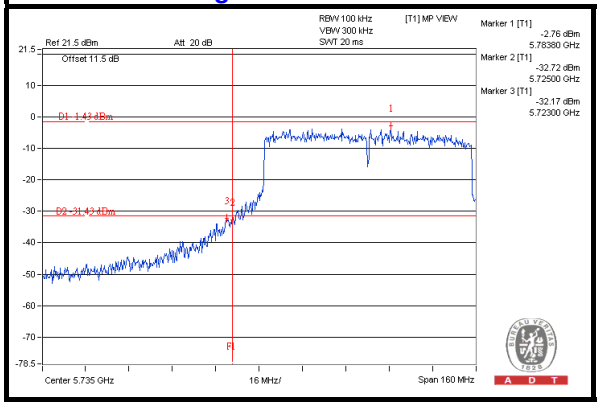
CHAIN 2

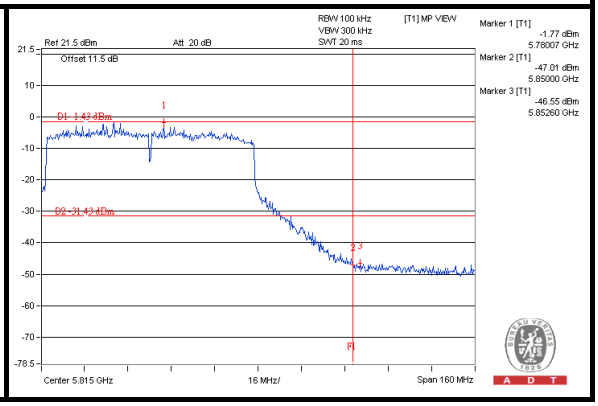
CH 155





CH 155 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: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab
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Fax: 886-3-5935342

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

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

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

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---