FCC Test Report

Report No.: RF150326C26

FCC ID: TE7C3200

Test Model: Archer C3200

Received Date: Mar. 26, 2015

Test Date: Apr. 19 ~ May 11, 2015

Issued Date: May 14, 2015

Applicant: TP-LINK TECHNOLOGIES CO., LTD.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

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Release Control Record

Issue No.	Description	Date Issued
RF150326C26	Original release	May 14, 2015

1 Certificate of Conformity

Product: AC3200 Wireless Tri-Band Gigabit Router

Brand: TP-LINK

Test Model: Archer C3200

Sample Status: Prototype

Applicant: TP-LINK TECHNOLOGIES CO., LTD.

Test Date: Apr. 19 ~ May 11, 2015

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)
ANSI C63.10:2009

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

Prepared by : Celine Chou , **Date:** May 14, 2015
Celine Chou / Specialist

Approved by : Ken Liu , **Date:** May 14, 2015
Ken Liu / Senior Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (SECTION 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -11.54dB at 0.49846MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.2dB at 2390.00MHz.
15.247(d)	Antenna Port Emission	Pass	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	Pass	Meet the requirement of limit.
15.247(b)	Conducted power	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is i-pex MHF not a standard connector.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expended Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.44 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.59 dB
	200MHz ~1000MHz	3.60 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	AC3200 Wireless Tri-Band Gigabit Router
Brand	TP-LINK
Test Model	Archer C3200
Status of EUT	Prototype
Power Supply Rating	12Vdc from adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM
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 1300Mbps
Operating Frequency	2412 ~ 2462MHz, 5745 ~ 5825MHz
Number of Channel	2412 ~ 2462MHz: 11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (40MHz) 5745 ~ 5825MHz: 5 for 802.11a, 802.11n (20MHz), 802.11ac (20MHz) 2 for 802.11n (40MHz), 802.11ac (40MHz) 1 for 802.11ac (80MHz)
Output Power	2412 ~ 2462MHz: 925.050mW 5745 ~ 5825MHz: 945.527mW
Antenna Type	Omni-Directional antenna with 1.8dBi gain
Antenna Connector	i-pex MHF
Accessory Device	1.4m non-shielded AC power cable without core, adapter
Data Cable Supplied	N/A

Note:

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

Modulation Mode	TX Function
802.11b	3TX
802.11g	3TX
802.11n (20MHz)	3TX
802.11n (40MHz)	3TX
802.11a	3TX
802.11n (20MHz)	3TX
802.11n (40MHz)	3TX
802.11ac (20MHz)	3TX
802.11ac (40MHz)	3TX
802.11ac (80MHz)	3TX

* The modulation and bandwidth are similar for 802.11n mode for 20MHz / 40MHz and 802.11ac mode for 20MHz / 40MHz, therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

2. The EUT uses following adapter.

Adapter	
Brand	Huntkey
Model	HKA06012050-7C
Input Power	100-240Vac, 1.5A, 50/60Hz
Output Power	12.0Vdc, 5A
Power Line	1.8m cable without core attached on adapter

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), 802.11ac (20MHz):

Channel	Frequency	Channel	Frequency
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz		

2 channels are provided for 802.11n (40MHz), 802.11ac (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 & Bandedge Measurement **RE<1G:** Radiated Emission below 1GHz

PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

NOTE: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-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)
-	802.11b	1 to 11	1	DSSS	DBPSK	1.0

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)
-	802.11b	1 to 11	1	DSSS	DBPSK	1.0

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	25deg. C, 65%RH	120Vac, 60Hz	Chris Lin
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Chris Lin
PLC	22deg. C, 70%RH	120Vac, 60Hz	Jones Chang
APCM	25deg. C, 60%RH	120Vac, 60Hz	Antony Lee

FOR 5.0GHz:

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

Where **RE≥1G:** Radiated Emission above 1GHz & Bandedge Measurement **RE<1G:** Radiated Emission below 1GHz

PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

NOTE: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-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)
-	802.11a	149 to 165	149	OFDM	BPSK	6.0

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)
-	802.11a	149 to 165	149	OFDM	BPSK	6.0

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)
-	802.11a	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	120Vac, 60Hz	Chris Lin
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Chris Lin
PLC	22deg. C, 70%RH	120Vac, 60Hz	Jones Chang
APCM	25deg. C, 60%RH	120Vac, 60Hz	Antony Lee

3.3 Duty Cycle of Test Signal

2.4GHz Band:

802.11b: Duty cycle of test signal is > 98%, duty factor is not required

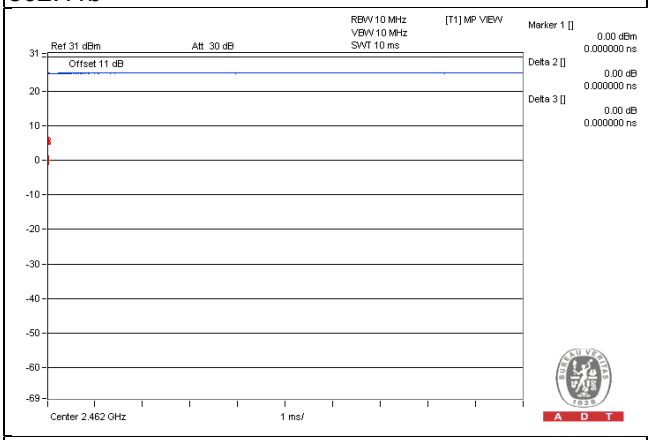
802.11g, 802.11n (20MHz), 802.11n (40MHz): Duty cycle of test signal is < 98 %, duty factor is required

802.11g: Duty cycle = 2.050/2.187= 0.937, Duty factor = 10 * log(1/0.937) = 0.28

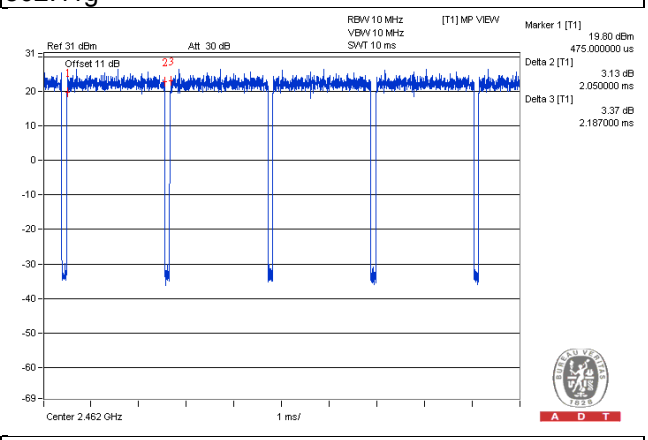
802.11n (20MHz): Duty cycle = 1.912/2.020= 0.947, Duty factor = 10 * log(1/0.947) = 0.24

802.11n (40MHz): Duty cycle = 0.940/1.047= 0.898, Duty factor = 10 * log(1/0.898) = 0.47

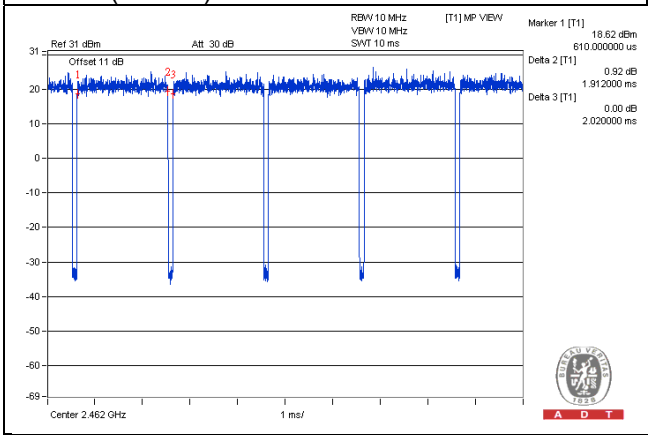
802.11b



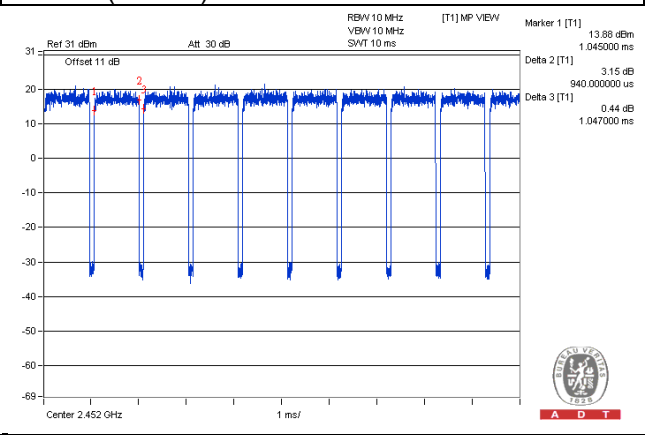
802.11g



802.11n (20MHz)



802.11n (40MHz)



5GHz Band:

802.11n (20MHz): Duty cycle of test signal is > 98%, duty factor is not required

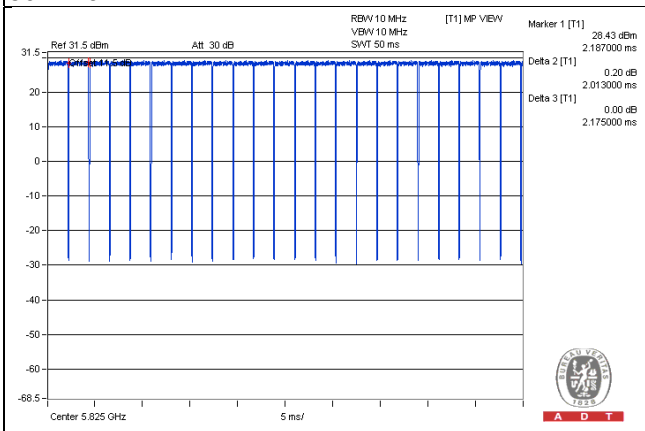
802.11a, 802.11n (40MHz), 802.11ac (80MHz): Duty cycle of test signal is < 98 %, duty factor is required

802.11a: Duty cycle = 2.013/2.175= 0.926, Duty factor = 10 * log(1/0.926) = 0.34

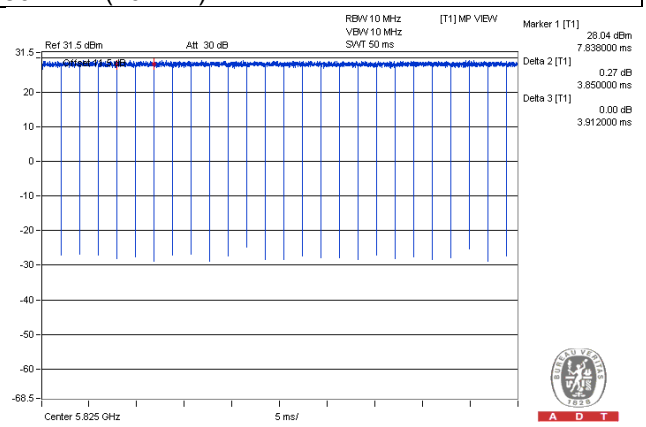
802.11n (40MHz): Duty cycle = 0.888/0.988 = 0.899, Duty factor = 10 * log(1/0.899) = 0.46

802.11ac (80MHz): Duty cycle = 0.425/0.500 = 0.850, Duty factor = 10 * log(1/0.850) = 0.71

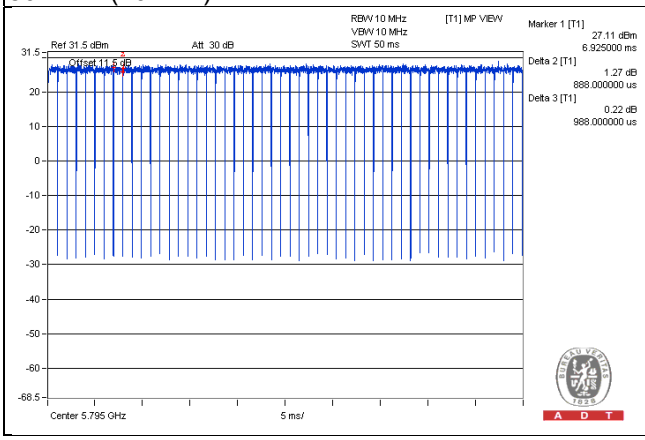
802.11a



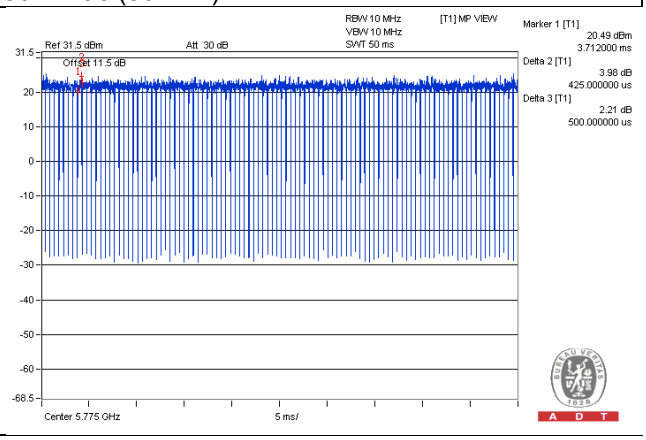
802.11n (20MHz)



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.

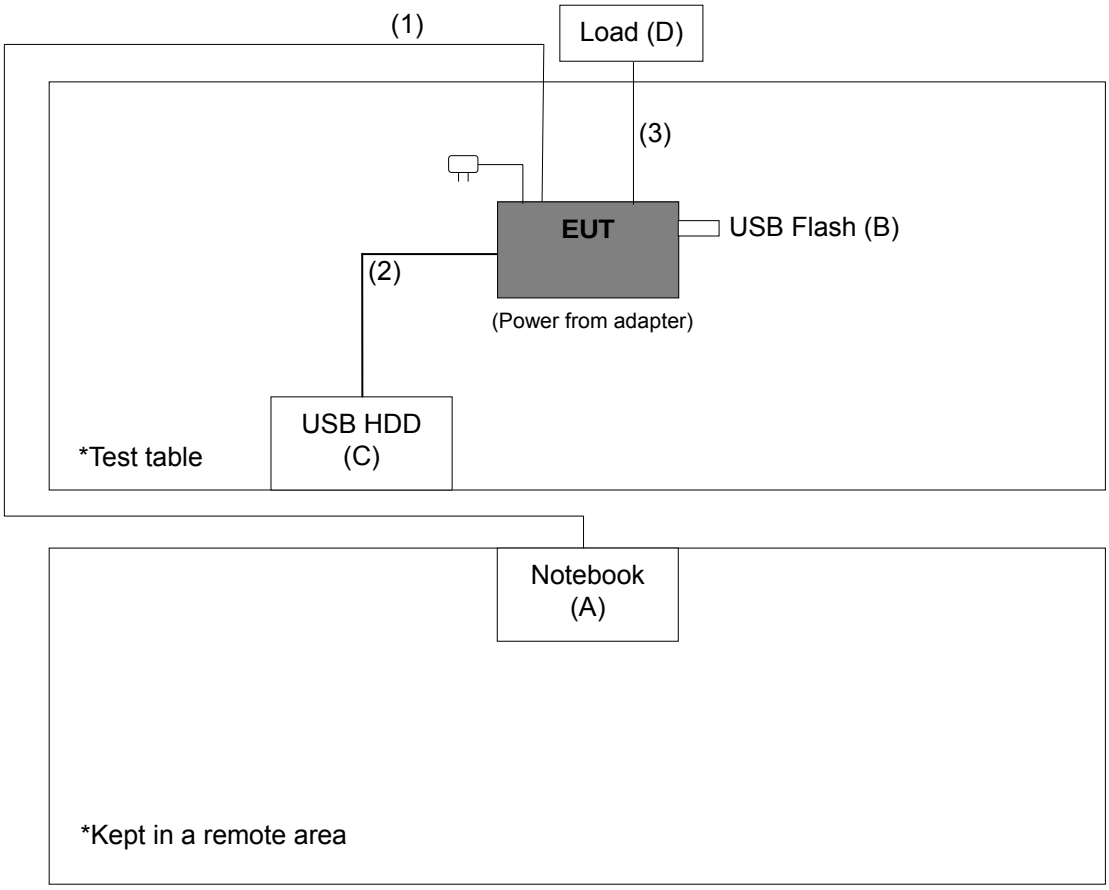
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	E5410	6RP2YM1	FCC DoC Approved	-
B.	USB Flash	Transcend	V85	538455 4489	FCC DoC Approved	-
C.	USB HDD	WD	WDBACY5000ABL	WX41A81P8576	FCC DoC Approved	-
D.	Load	NA	NA	NA	NA	-

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ 45	1	10	N	0	-
2.	USB	1	1.8	Y	0	-
3.	RJ 45	4	1.8	N	0	-

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

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Oct. 06, 2014	Oct. 05, 2015
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Jul. 25, 2014	Jul. 24, 2015
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Feb. 06, 2015	Feb. 05, 2016
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-1170	Feb. 05, 2015	Feb. 04, 2016
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Feb. 09, 2015	Feb. 08, 2016
Preamplifier Agilent	8449B	3008A01960	Aug. 09, 2014	Aug. 08, 2015
Preamplifier Agilent	8447D	2944A10631	Aug. 09, 2014	Aug. 08, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309220/4	Aug. 09, 2014	Aug. 08, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250724/4	Aug. 09, 2014	Aug. 08, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295012/4	Aug. 09, 2014	Aug. 08, 2015
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021703	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, 2014	Oct. 17, 2015
High Speed Peak Power Meter	ML2495A	0824011	Jul. 26, 2014	Jul. 25, 2015
Power Sensor	MA2411B	0738171	Jul. 26, 2014	Jul. 25, 2015

Note:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 4.
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 460141.
5. The IC Site Registration No. is IC7450F-4.

4.1.3 Test Procedures

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

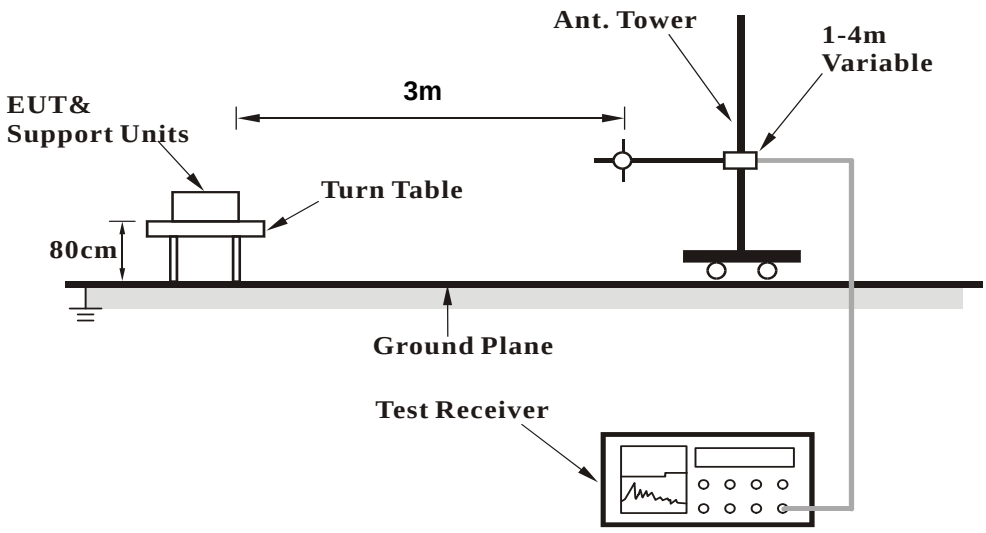
1. For emission measurements above 1 GHz, the EUT shall be placed at a height of 1.5 m above the ground at 3 meter chamber room for test. (Tracking Number 307455)
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (Duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor (10 log(1/duty cycle)).
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1GHz.
6. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

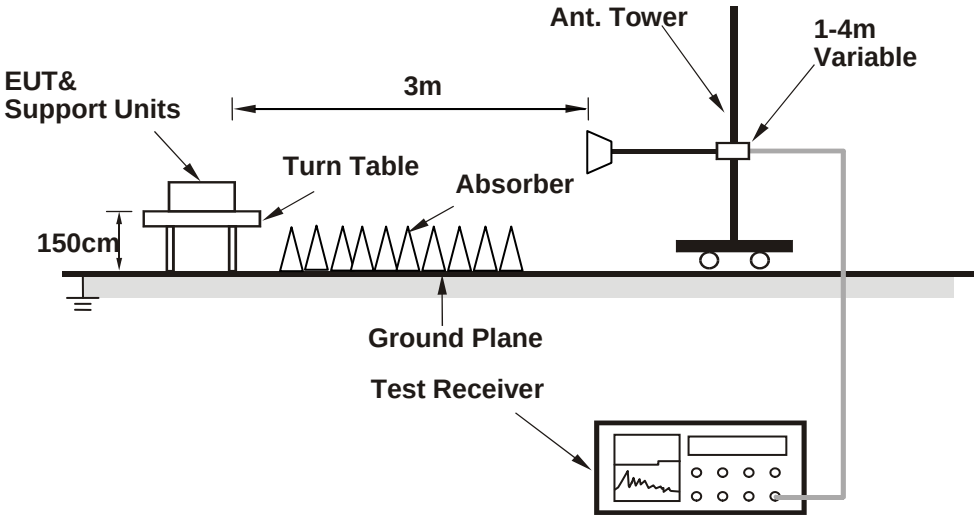
No deviation.

4.1.5 Test Set Up

<Frequency Range below 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 a 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".
e. The necessary accessories enable the system in full functions.

4.1.7 Test Results

Above 1GHz data:

802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	55.8 PK	74.0	-18.2	1.01 H	279	23.70	32.10
2	2390.00	46.2 AV	54.0	-7.8	1.01 H	279	14.10	32.10
3	*2412.00	116.7 PK			1.10 H	57	84.50	32.20
4	*2412.00	112.8 AV			1.10 H	57	80.60	32.20
5	2490.00	61.6 PK	74.0	-12.4	1.03 H	102	29.30	32.30
6	2490.00	53.8 AV	54.0	-0.2	1.03 H	102	21.50	32.30
7	4824.00	46.1 PK	74.0	-27.9	1.10 H	89	40.90	5.20
8	4824.00	33.1 AV	54.0	-20.9	1.10 H	89	27.90	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	2390.00	55.1 PK	74.0	-18.9	1.57 V	41	23.00	32.10
2	2390.00	45.0 AV	54.0	-9.0	1.57 V	41	12.90	32.10
3	*2412.00	106.4 PK			1.02 V	354	74.20	32.20
4	*2412.00	102.6 AV			1.02 V	354	70.40	32.20
5	2490.00	56.3 PK	74.0	-17.7	1.36 V	98	24.00	32.30
6	2490.00	46.0 AV	54.0	-8.0	1.36 V	98	13.70	32.30
7	4824.00	46.1 PK	74.0	-27.9	1.39 V	87	40.90	5.20
8	4824.00	32.4 AV	54.0	-21.6	1.39 V	87	27.20	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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	117.8 PK			1.00 H	266	85.60	32.20
2	*2437.00	114.6 AV			1.00 H	266	82.40	32.20
3	4874.00	46.1 PK	74.0	-27.9	1.52 H	98	40.90	5.20
4	4874.00	33.1 AV	54.0	-20.9	1.52 H	98	27.90	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	*2437.00	111.2 PK			1.03 V	35	79.00	32.20
2	*2437.00	107.4 AV			1.03 V	35	75.20	32.20
3	4874.00	45.4 PK	74.0	-28.6	1.63 V	47	40.20	5.20
4	4874.00	32.7 AV	54.0	-21.3	1.63 V	47	27.50	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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2383.00	62.1 PK	74.0	-11.9	1.09 H	111	30.10	32.00
2	2383.00	53.9 AV	54.0	-0.1	1.09 H	111	21.90	32.00
3	*2462.00	116.1 PK			1.06 H	121	83.80	32.30
4	*2462.00	112.7 AV			1.06 H	121	80.40	32.30
5	2483.50	65.5 PK	74.0	-8.5	1.61 H	107	33.20	32.30
6	2483.50	53.0 AV	54.0	-1.0	1.61 H	107	20.70	32.30
7	4924.00	45.8 PK	74.0	-28.2	1.55 H	203	40.50	5.30
8	4924.00	33.2 AV	54.0	-20.8	1.55 H	203	27.90	5.30
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	2383.00	56.2 PK	74.0	-17.8	1.02 V	41	24.20	32.00
2	2383.00	46.3 AV	54.0	-7.7	1.02 V	41	14.30	32.00
3	*2462.00	108.9 PK			1.01 V	349	76.60	32.30
4	*2462.00	105.2 AV			1.01 V	349	72.90	32.30
5	2483.50	55.4 PK	74.0	-18.6	1.10 V	69	23.10	32.30
6	2483.50	44.1 AV	54.0	-9.9	1.10 V	69	11.80	32.30
7	4924.00	45.4 PK	74.0	-28.6	1.25 V	47	40.10	5.30
8	4924.00	33.1 AV	54.0	-20.9	1.25 V	47	27.80	5.30

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

802.11g

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	62.5 PK	74.0	-11.5	1.78 H	217	30.40	32.10
2	2390.00	50.1 AV	54.0	-3.9	1.78 H	217	18.00	32.10
3	*2412.00	114.1 PK			1.37 H	88	81.90	32.20
4	*2412.00	105.2 AV			1.37 H	88	73.00	32.20
5	4824.00	46.1 PK	74.0	-27.9	1.58 H	74	40.90	5.20
6	4824.00	33.1 AV	54.0	-20.9	1.58 H	74	27.90	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	2390.00	55.8 PK	74.0	-18.2	1.23 V	320	23.70	32.10
2	2390.00	43.7 AV	54.0	-10.3	1.23 V	320	11.60	32.10
3	*2412.00	103.5 PK			1.01 V	354	71.30	32.20
4	*2412.00	93.7 AV			1.01 V	354	61.50	32.20
5	4824.00	45.8 PK	74.0	-28.2	1.55 V	66	40.60	5.20
6	4824.00	33.0 AV	54.0	-21.0	1.55 V	66	27.80	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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	122.0 PK			1.90 H	219	89.80	32.20
2	*2437.00	112.8 AV			1.90 H	219	80.60	32.20
3	4874.00	46.0 PK	74.0	-28.0	1.55 H	230	40.80	5.20
4	4874.00	33.0 AV	54.0	-21.0	1.55 H	230	27.80	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	*2437.00	109.1 PK			1.00 V	25	76.90	32.20
2	*2437.00	100.4 AV			1.00 V	25	68.20	32.20
3	4874.00	45.9 PK	74.0	-28.1	1.57 V	41	40.70	5.20
4	4874.00	33.0 AV	54.0	-21.0	1.57 V	41	27.80	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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	115.2 PK			2.03 H	105	82.90	32.30
2	*2462.00	105.8 AV			2.03 H	105	73.50	32.30
3	2483.50	62.0 PK	74.0	-12.0	2.06 H	113	29.70	32.30
4	2483.50	48.6 AV	54.0	-5.4	2.06 H	113	16.30	32.30
5	4924.00	45.6 PK	74.0	-28.4	1.57 H	44	40.30	5.30
6	4924.00	33.3 AV	54.0	-20.7	1.57 H	44	28.00	5.30
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	*2462.00	103.0 PK			1.00 V	351	70.70	32.30
2	*2462.00	94.2 AV			1.00 V	351	61.90	32.30
3	2483.50	55.6 PK	74.0	-18.4	1.05 V	360	23.30	32.30
4	2483.50	44.2 AV	54.0	-9.8	1.05 V	360	11.90	32.30
5	4924.00	46.2 PK	74.0	-27.8	1.26 V	74	40.90	5.30
6	4924.00	33.1 AV	54.0	-20.9	1.26 V	74	27.80	5.30

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

802.11n (20MHz)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	69.4 PK	74.0	-4.6	2.00 H	217	37.30	32.10
2	**2390.00**	**53.8 AV**	**54.0**	**-0.2**	**2.00 H**	**217**	**21.70**	**32.10**
3	*2412.00	112.1 PK			1.00 H	93	79.90	32.20
4	*2412.00	103.2 AV			1.00 H	93	71.00	32.20
5	4824.00	45.7 PK	74.0	-28.3	1.57 H	89	40.50	5.20
6	4824.00	32.9 AV	54.0	-21.1	1.57 H	89	27.70	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	2390.00	55.0 PK	74.0	-19.0	1.20 V	340	22.90	32.10
2	2390.00	44.7 AV	54.0	-9.3	1.20 V	340	12.60	32.10
3	*2412.00	103.7 PK			1.01 V	349	71.50	32.20
4	*2412.00	94.5 AV			1.01 V	349	62.30	32.20
5	4824.00	45.3 PK	74.0	-28.7	1.08 V	97	40.10	5.20
6	4824.00	32.7 AV	54.0	-21.3	1.08 V	97	27.50	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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	120.0 PK			1.00 H	218	87.80	32.20
2	*2437.00	110.9 AV			1.00 H	218	78.70	32.20
3	4874.00	46.1 PK	74.0	-27.9	1.55 H	201	40.90	5.20
4	4874.00	33.1 AV	54.0	-20.9	1.55 H	201	27.90	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	*2437.00	109.4 PK			1.00 V	330	77.20	32.20
2	*2437.00	101.0 AV			1.00 V	330	68.80	32.20
3	4874.00	45.7 PK	74.0	-28.3	1.03 V	65	40.50	5.20
4	4874.00	32.7 AV	54.0	-21.3	1.03 V	65	27.50	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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	114.3 PK			2.01 H	215	82.00	32.30
2	*2462.00	104.4 AV			2.01 H	215	72.10	32.30
3	2483.50	65.8 PK	74.0	-8.2	2.04 H	96	33.50	32.30
4	2483.50	53.5 AV	54.0	-0.5	2.04 H	96	21.20	32.30
5	4924.00	45.9 PK	74.0	-28.1	1.17 H	41	40.60	5.30
6	4924.00	33.3 AV	54.0	-20.7	1.17 H	41	28.00	5.30
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	*2462.00	103.7 PK			1.00 V	337	71.40	32.30
2	*2462.00	94.1 AV			1.00 V	337	61.80	32.30
3	2483.50	57.4 PK	74.0	-16.6	1.00 V	230	25.10	32.30
4	2483.50	44.8 AV	54.0	-9.2	1.00 V	230	12.50	32.30
5	4924.00	45.8 PK	74.0	-28.2	1.23 V	65	40.50	5.30
6	4924.00	32.9 AV	54.0	-21.1	1.23 V	65	27.60	5.30

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

802.11n (40MHz)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	66.9 PK	74.0	-7.1	1.00 H	216	34.80	32.10
2	2390.00	53.5 AV	54.0	-0.5	1.00 H	216	21.40	32.10
3	*2422.00	107.7 PK			1.06 H	119	75.50	32.20
4	*2422.00	98.3 AV			1.06 H	119	66.10	32.20
5	4844.00	46.7 PK	74.0	-27.3	1.23 H	68	41.50	5.20
6	4844.00	33.1 AV	54.0	-20.9	1.23 H	68	27.90	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	2390.00	55.6 PK	74.0	-18.4	1.38 V	22	23.50	32.10
2	2390.00	46.1 AV	54.0	-7.9	1.38 V	22	14.00	32.10
3	*2422.00	98.0 PK			1.01 V	334	65.80	32.20
4	*2422.00	88.6 AV			1.01 V	334	56.40	32.20
5	4844.00	45.7 PK	74.0	-28.3	1.29 V	87	40.50	5.20
6	4844.00	33.1 AV	54.0	-20.9	1.29 V	87	27.90	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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	68.2 PK	74.0	-5.8	1.64 H	215	36.10	32.10
2	2390.00	53.4 AV	54.0	-0.6	1.64 H	215	21.30	32.10
3	*2437.00	112.7 PK			1.00 H	214	80.50	32.20
4	*2437.00	102.5 AV			1.00 H	214	70.30	32.20
5	2483.50	68.7 PK	74.0	-5.3	2.06 H	92	36.40	32.30
6	2483.50	52.3 AV	54.0	-1.7	2.06 H	92	20.00	32.30
7	4874.00	45.8 PK	74.0	-28.2	1.52 H	69	40.60	5.20
8	4874.00	33.0 AV	54.0	-21.0	1.52 H	69	27.80	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	2390.00	55.7 PK	74.0	-18.3	1.47 V	32	23.60	32.10
2	2390.00	46.2 AV	54.0	-7.8	1.47 V	32	14.10	32.10
3	*2437.00	102.2 PK			1.01 V	332	70.00	32.20
4	*2437.00	93.0 AV			1.01 V	332	60.80	32.20
5	2483.50	55.9 PK	74.0	-18.1	1.44 V	19	23.60	32.30
6	2483.50	45.4 AV	54.0	-8.6	1.44 V	19	13.10	32.30
7	4874.00	46.1 PK	74.0	-27.9	1.26 V	54	40.90	5.20
8	4874.00	32.8 AV	54.0	-21.2	1.26 V	54	27.60	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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 9	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	111.0 PK			1.90 H	214	78.80	32.20
2	*2452.00	101.9 AV			1.90 H	214	69.70	32.20
3	2483.50	67.6 PK	74.0	-6.4	2.00 H	101	35.30	32.30
4	2483.50	53.5 AV	54.0	-0.5	2.00 H	101	21.20	32.30
5	4904.00	45.4 PK	74.0	-28.6	1.85 H	222	40.20	5.20
6	4904.00	32.6 AV	54.0	-21.4	1.85 H	222	27.40	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	*2452.00	100.0 PK			1.00 V	339	67.80	32.20
2	*2452.00	90.6 AV			1.00 V	339	58.40	32.20
3	2483.50	56.8 PK	74.0	-17.2	1.46 V	0	24.50	32.30
4	2483.50	45.3 AV	54.0	-8.7	1.46 V	0	13.00	32.30
5	4904.00	45.9 PK	74.0	-28.1	1.22 V	54	40.70	5.20
6	4904.00	32.2 AV	54.0	-21.8	1.22 V	54	27.00	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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

Below 1GHz worst-case data:

802.11b

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	41.54	26.8 QP	40.0	-13.2	2.00 H	189	41.30	-14.50
2	148.26	26.4 QP	43.5	-17.1	2.00 H	142	40.20	-13.80
3	344.24	33.5 QP	46.0	-12.5	1.00 H	13	45.20	-11.70
4	416.04	34.6 QP	46.0	-11.4	1.00 H	292	45.10	-10.50
5	780.83	29.5 QP	46.0	-16.5	1.00 H	217	32.80	-3.30
6	872.03	28.6 QP	46.0	-17.4	1.26 H	201	30.80	-2.20
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	31.84	36.0 QP	40.0	-4.0	1.24 V	123	51.70	-15.70
2	59.01	34.5 QP	40.0	-5.5	1.24 V	180	48.90	-14.40
3	190.95	23.3 QP	43.5	-20.2	1.00 V	338	39.60	-16.30
4	425.74	36.7 QP	46.0	-9.3	1.24 V	13	46.90	-10.20
5	778.89	30.2 QP	46.0	-15.8	1.00 V	163	33.70	-3.50
6	872.03	28.7 QP	46.0	-17.3	1.49 V	2	30.90	-2.20

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Test Receiver ROHDE & SCHWARZ	ESCI	100612	Sep. 30, 2014	Sep. 29, 2015
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 26, 2014	Dec. 25, 2015
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	847265/023	Oct. 21, 2014	Oct. 20, 2015
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 21, 2014	Jul. 20, 2015
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Shielded Room 1.
3. The VCCI Site Registration No. is C-2040.

4.2.3 Test Procedures

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

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

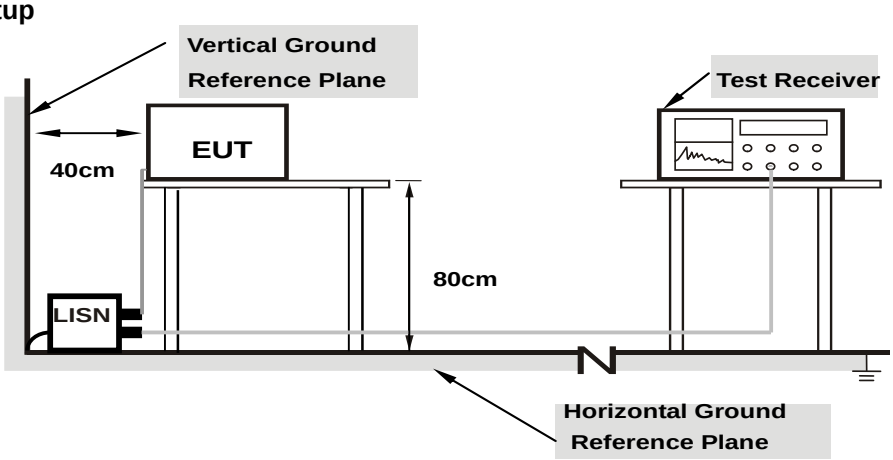
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

Note: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Conditions

Same as 4.1.6.

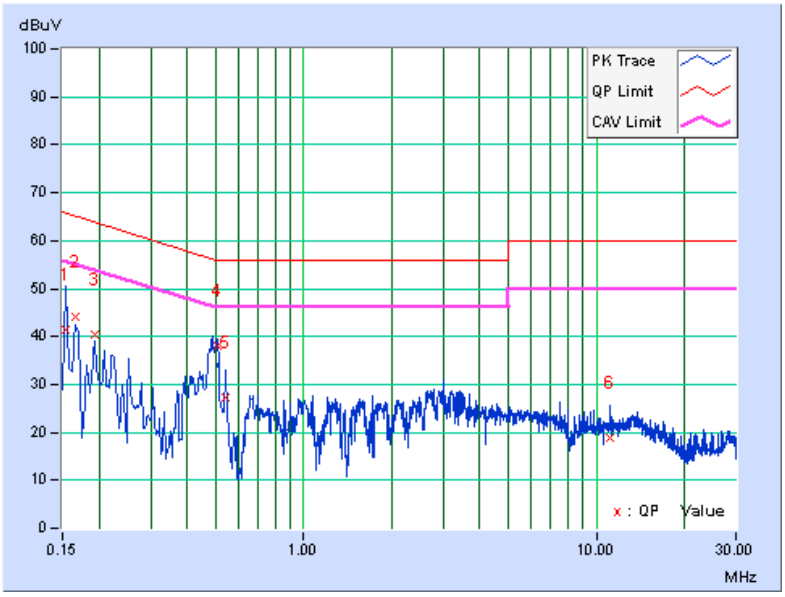
4.2.7 Test Results

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	0.05	41.33	29.92	41.38	29.97	65.79	55.79	-24.41	-25.82
2	0.16569	0.05	44.13	32.93	44.18	32.98	65.17	55.17	-20.99	-22.19
3	0.19305	0.06	40.51	31.27	40.57	31.33	63.90	53.90	-23.34	-22.58
4	0.50507	0.06	38.15	31.32	38.21	31.38	56.00	46.00	-17.79	-14.62
5	0.54100	0.06	27.32	14.12	27.38	14.18	56.00	46.00	-28.62	-31.82
6	11.18793	0.50	18.33	11.74	18.83	12.24	60.00	50.00	-41.17	-37.76

Remarks:

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

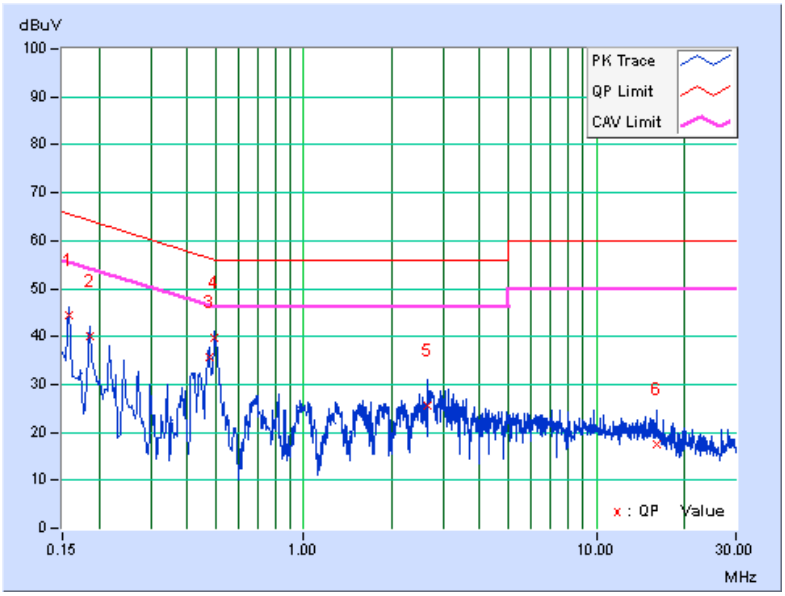


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15782	0.05	44.29	30.88	44.34	30.93	65.58	55.58	-21.24	-24.65
2	0.18519	0.05	40.07	27.71	40.12	27.76	64.25	54.25	-24.13	-26.49
3	0.47453	0.06	35.61	30.13	35.67	30.19	56.43	46.43	-20.76	-16.24
4	0.49454	0.06	39.73	32.70	39.79	32.76	56.09	46.09	-16.30	-13.33
5	2.66413	0.14	25.35	17.75	25.49	17.89	56.00	46.00	-30.51	-28.11
6	16.04806	0.61	16.77	9.98	17.38	10.59	60.00	50.00	-42.62	-39.41

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.

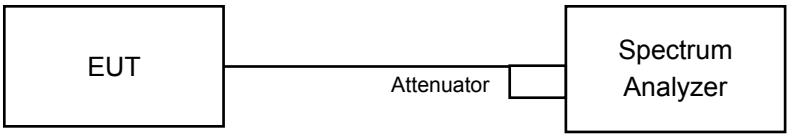


4.3 6dB Bandwidth Measurement

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

558074 D01 DTS Meas Guidance v03r02 section 8.1

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 fromTest Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
1	2412	9.08	9.10	9.11	0.5	Pass
6	2437	9.08	8.61	9.07	0.5	Pass
11	2462	9.07	8.61	9.08	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	16.42	16.43	0.5	Pass
6	2437	16.38	16.35	16.39	0.5	Pass
11	2462	16.37	16.40	16.43	0.5	Pass

802.11n (20MHz)

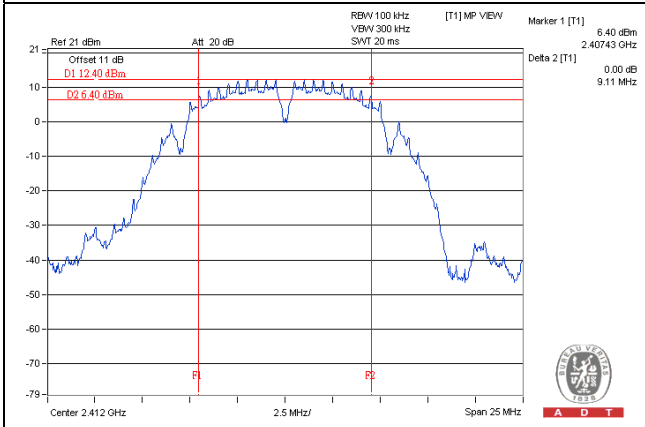
Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
1	2412	17.62	17.66	17.66	0.5	Pass
6	2437	17.61	17.62	17.63	0.5	Pass
11	2462	17.60	17.66	17.65	0.5	Pass

802.11n (40MHz)

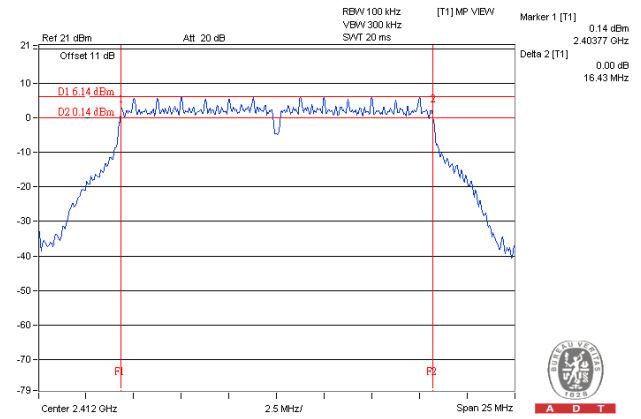
Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
3	2422	36.39	36.49	36.45	0.5	Pass
6	2437	36.14	36.39	36.36	0.5	Pass
9	2452	35.82	35.30	35.84	0.5	Pass

Spectrum Plot of Worst Value

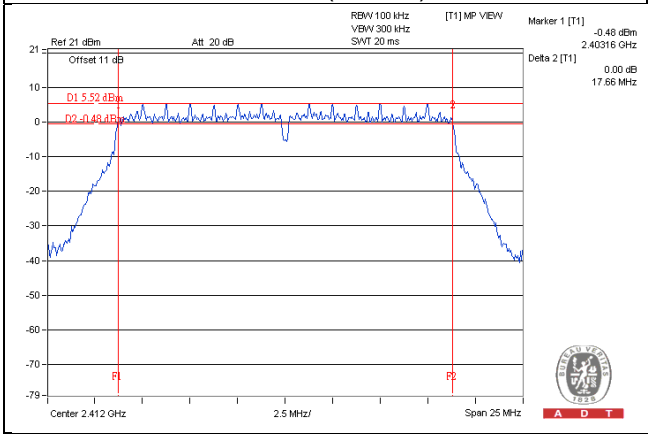
802.11b



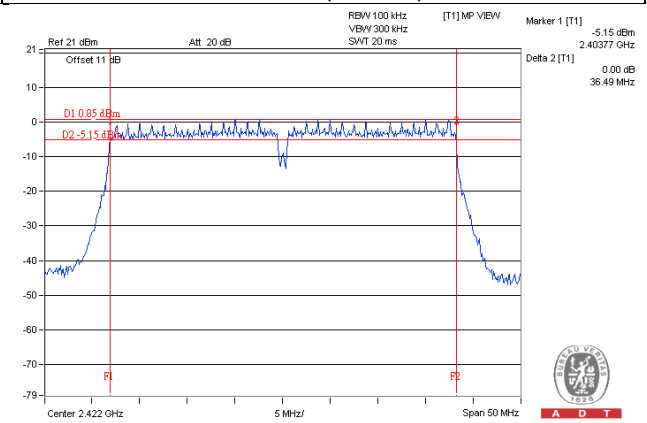
802.11g



802.11n (20MHz)



802.11n (40MHz)



4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

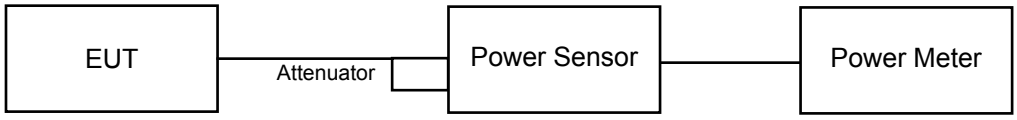
For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

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

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};
Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

For power measurements on all other devices: Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

558074 D01 DTS Meas Guidance v03r02 section 9.2.3.2
A 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 senso and set the detector to AVERAGE . Record the power level.

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as Item 4.3.6.

4.4.7 Test Results

802.11b

Chan.	Freq. (MHz)	Average Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
1	2412	20.76	20.62	20.49	346.413	25.40	30	Pass
6	2437	25.02	24.65	24.87	916.332	29.62	30	Pass
11	2462	23.27	22.93	23.18	616.630	27.90	30	Pass

802.11g

Chan.	Freq. (MHz)	Average Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
1	2412	18.59	18.09	18.25	203.528	23.09	30	Pass
6	2437	24.97	24.88	24.82	**925.050**	29.66	30	Pass
11	2462	19.06	18.83	18.88	234.190	23.70	30	Pass

802.11n (20MHz)

Chan.	Freq. (MHz)	Average Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
1	2412	17.25	17.39	17.21	160.518	22.06	30	Pass
6	2437	25.01	24.54	24.61	890.471	29.50	30	Pass
11	2462	17.32	17.27	17.43	162.619	22.11	30	Pass

802.11n (40MHz)

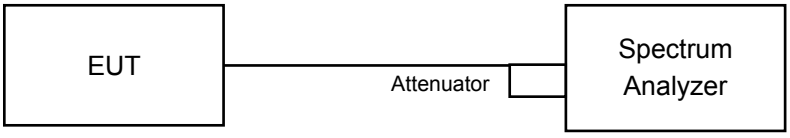
Chan.	Freq. (MHz)	Average Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
3	2422	15.34	15.25	15.31	101.658	20.07	30	Pass
6	2437	19.71	19.45	19.55	271.803	24.34	30	Pass
9	2452	16.42	16.87	16.44	136.549	21.35	30	Pass

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

558074 D01 DTS Meas Guidance v03r02 section 10.3
For AVG. power (duty cycle ≥ 98%)

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.

For AVG. power (duty cycle < 98%)

a. Measure the duty cycle (x).

b. Set instrument center frequency to DTS channel center frequency.

c. Set span to at least 1.5 times the OBW.

d. Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz.

e. Set VBW ≥3 x RBW.

f. Detector = power averaging (RMS) or sample detector (when RMS not available).

g. Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.

h. Sweep time = auto couple.

i. Do not use sweep triggering. Allow sweep to “free run”.

j. Employ trace averaging (RMS) mode over a minimum of 100 traces.

k. Use the peak marker function to determine the maximum amplitude level.

l. Add 10 log (1/x), where x is the duty cycle measured in step (a, to the measured PSD to compute the average PSD during the actual transmission time.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6

4.5.7 Test Results

802.11b

TX chain	Chan.	Freq. (MHz)	PSD (dBm/10kHz)	10 log (N=3) dB	Total PSD (dBm/10kHz)	Limit (dBm/3kHz)	Pass / Fail
0	1	2412	-8.53	4.77	-3.76	7.43	Pass
	6	2437	-6.31	4.77	-1.54	7.43	Pass
	11	2462	-6.87	4.77	-2.10	7.43	Pass
1	1	2412	-8.12	4.77	-3.35	7.43	Pass
	6	2437	-5.04	4.77	-0.27	7.43	Pass
	11	2462	-6.98	4.77	-2.21	7.43	Pass
2	1	2412	-7.56	4.77	-2.79	7.43	Pass
	6	2437	-4.95	4.77	-0.18	7.43	Pass
	11	2462	-5.97	4.77	-1.20	7.43	Pass

Note:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 1.8dBi + 10log(3) = 6.57dBi > 6dBi, so the power density limit shall be reduced to 8-(6.57-6) = 7.43dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11g

TX chain	Chan.	Freq. (MHz)	PSD (dBm/10kHz)	10 log (N=3) dB	Duty Factor	Total PSD with Duty Factor (dBm/10kHz)	Limit (dBm/3kHz)	Pass / Fail
0	1	2412	-12.65	4.77	0.28	-7.60	7.43	Pass
	6	2437	-5.47	4.77	0.28	-0.42	7.43	Pass
	11	2462	-11.08	4.77	0.28	-6.03	7.43	Pass
1	1	2412	-12.72	4.77	0.28	-7.67	7.43	Pass
	6	2437	-5.27	4.77	0.28	-0.22	7.43	Pass
	11	2462	-11.40	4.77	0.28	-6.35	7.43	Pass
2	1	2412	-12.44	4.77	0.28	-7.39	7.43	Pass
	6	2437	-5.32	4.77	0.28	-0.27	7.43	Pass
	11	2462	-11.89	4.77	0.28	-6.84	7.43	Pass

Note:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 1.8dBi + 10log(3) = 6.57dBi > 6dBi, so the power density limit shall be reduced to 8-(6.57-6) = 7.43dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (20MHz)

TX chain	Chan.	Freq. (MHz)	PSD (dBm/10kHz)	10 log (N=3) dB	Duty Factor	Total PSD with Duty Factor (dBm/10kHz)	Limit (dBm/3kHz)	Pass / Fail
0	1	2412	-14.17	4.77	0.24	-9.16	7.43	Pass
	6	2437	-6.80	4.77	0.24	-1.79	7.43	Pass
	11	2462	-13.91	4.77	0.24	-8.90	7.43	Pass
1	1	2412	-14.49	4.77	0.24	-9.48	7.43	Pass
	6	2437	-6.64	4.77	0.24	-1.63	7.43	Pass
	11	2462	-13.93	4.77	0.24	-8.92	7.43	Pass
2	1	2412	-14.48	4.77	0.24	-9.47	7.43	Pass
	6	2437	-6.65	4.77	0.24	-1.64	7.43	Pass
	11	2462	-13.89	4.77	0.24	-8.88	7.43	Pass

Note:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 1.8dBi + 10log(3) = 6.57dBi > 6dBi, so the power density limit shall be reduced to 8-(6.57-6) = 7.43dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

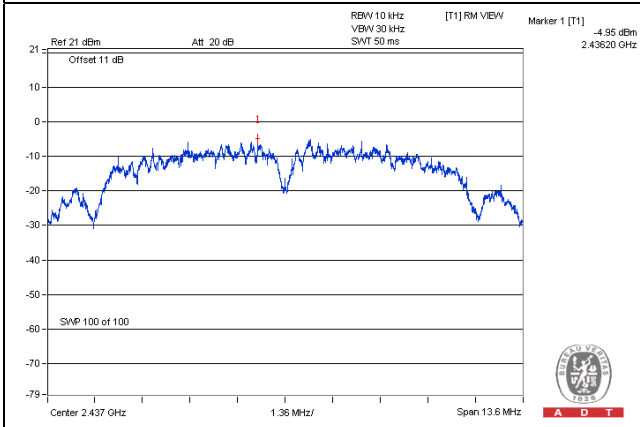
802.11n (40MHz)

TX chain	Chan.	Freq. (MHz)	PSD (dBm/10kHz)	10 log (N=3) dB	Duty Factor	Total PSD with Duty Factor (dBm/10kHz)	Limit (dBm/3kHz)	Pass / Fail
0	3	2422	-19.23	4.77	0.47	-13.99	7.43	Pass
	6	2437	-14.18	4.77	0.47	-8.94	7.43	Pass
	9	2452	-17.11	4.77	0.47	-11.87	7.43	Pass
1	3	2422	-18.46	4.77	0.47	-13.22	7.43	Pass
	6	2437	-13.98	4.77	0.47	-8.74	7.43	Pass
	9	2452	-16.80	4.77	0.47	-11.56	7.43	Pass
2	3	2422	-19.04	4.77	0.47	-13.80	7.43	Pass
	6	2437	-13.43	4.77	0.47	-8.19	7.43	Pass
	9	2452	-16.85	4.77	0.47	-11.61	7.43	Pass

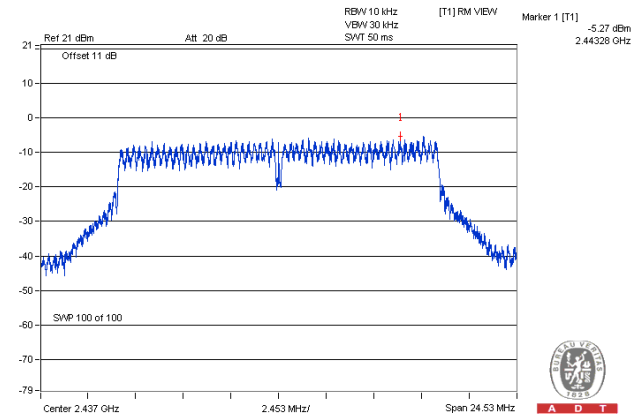
Note:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 1.8dBi + 10log(3) = 6.57dBi > 6dBi, so the power density limit shall be reduced to 8-(6.57-6) = 7.43dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

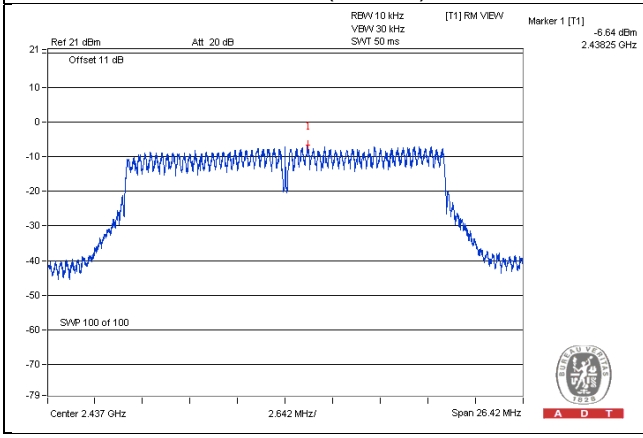
802.11b



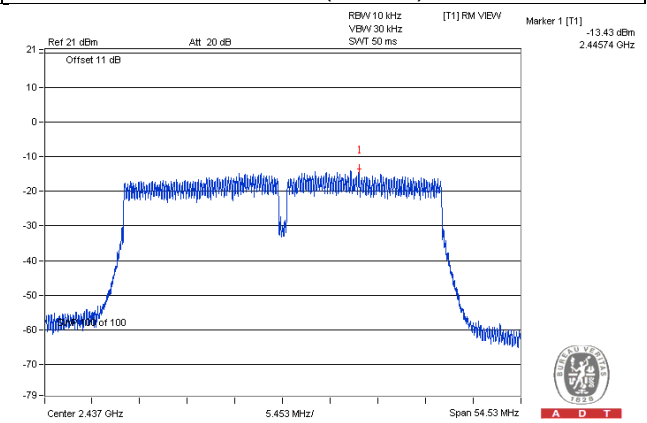
802.11g



802.11n (20MHz)



802.11n (40MHz)

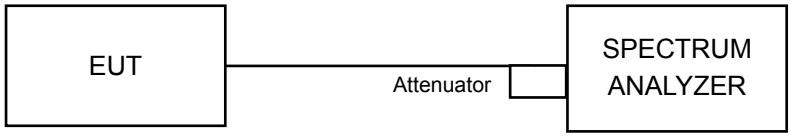


4.6 Conducted Out of Band Emission Measurement

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

558074 D01 DTS Meas Guidance v03r02 section 11.2

a. Set the RBW = 100 kHz.

b. Set the VBW ≥ 300 kHz.

c. Detector = peak.

d. Sweep time = auto couple.

e. Trace mode = max hold.

f. Allow trace to fully stabilize.

g. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

MEASUREMENT PROCEDURE OOBE

558074 D01 DTS Meas Guidance v03r02 section 11.3

a. Set RBW = 100 kHz.

b. Set VBW ≥ 300 kHz.

c. Detector = peak.

d. Sweep = auto couple.

e. Trace Mode = max hold.

f. Allow trace to fully stabilize.

g. 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

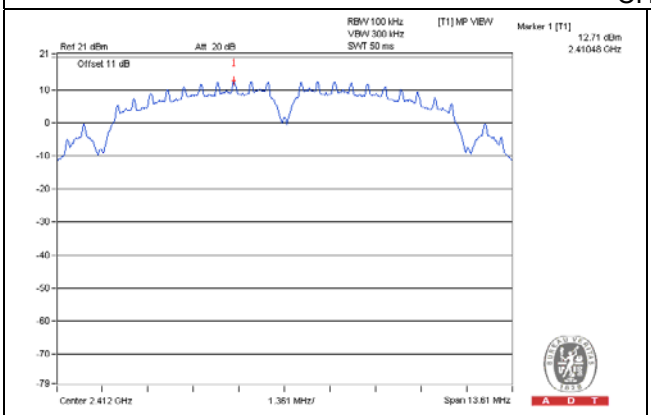
4.6.7 Test Results

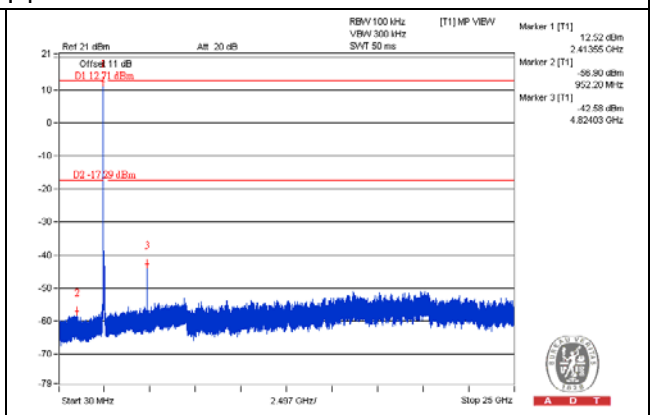
The conducted emission test is performed on each TX port of operating mode without summing or adding 10log (N) since the limit is relative emission limit.

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.

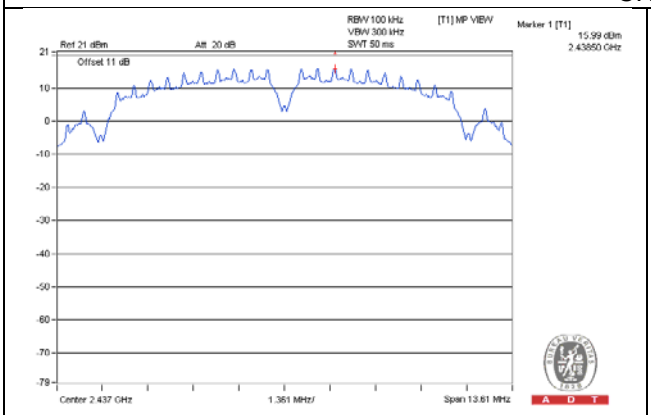
802.11b_ CHAIN 0

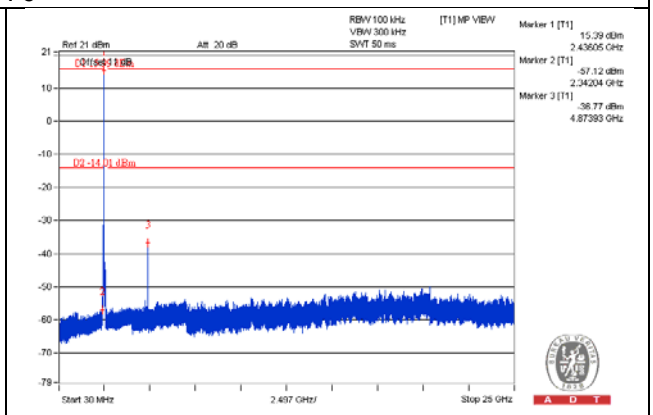
CH 1



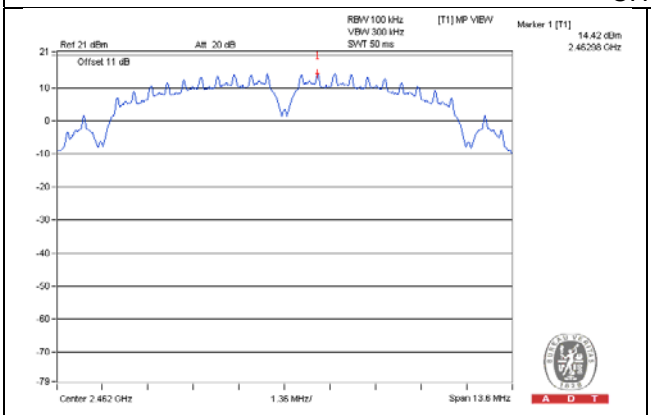


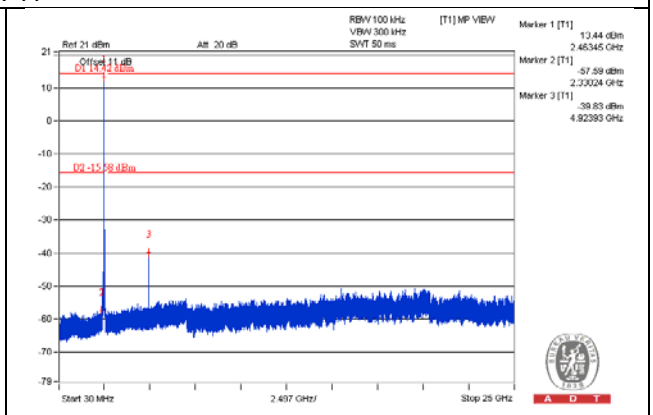
CH 6



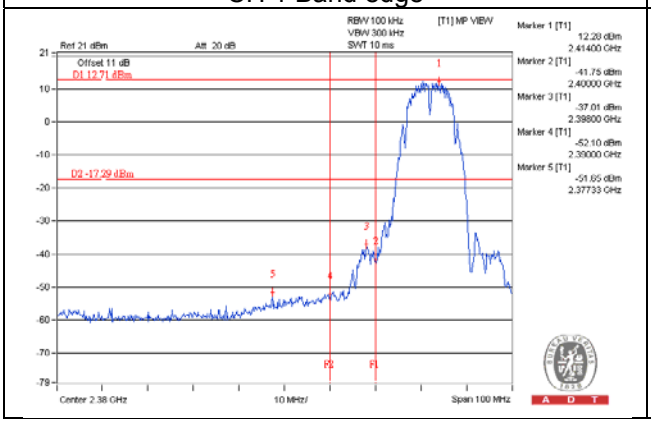


CH 11





CH 1 Band edge



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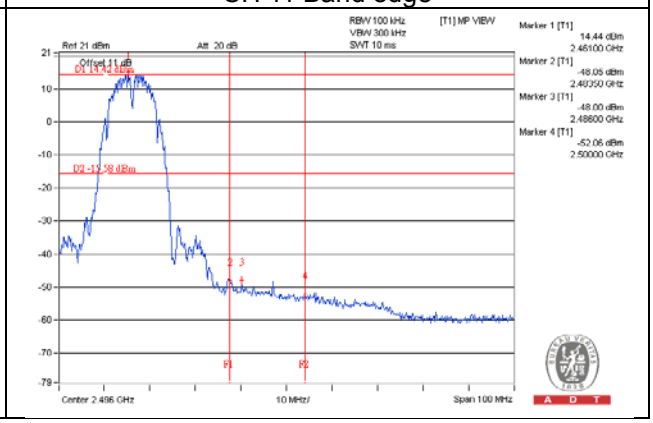
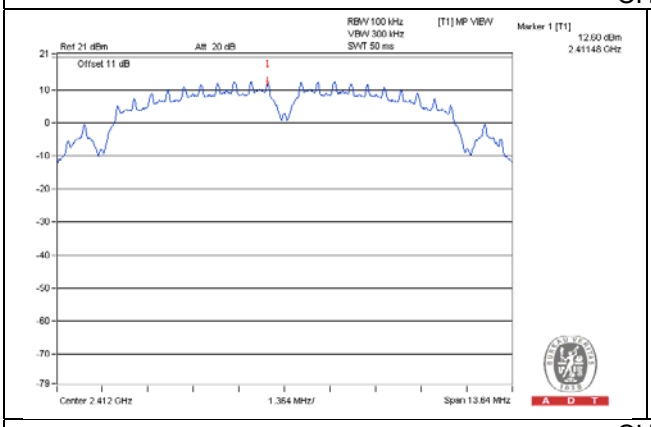
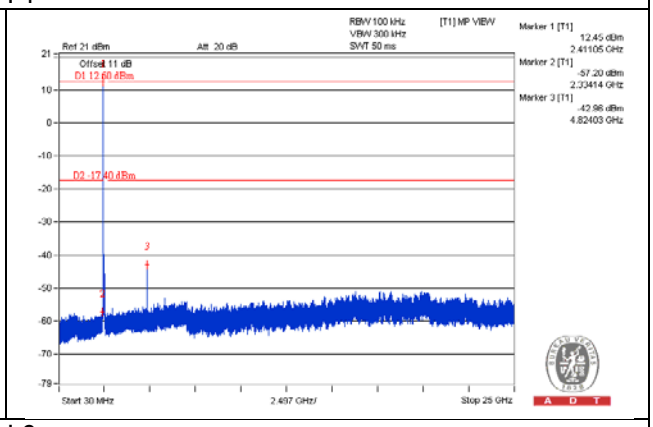


802.11b_ CHAIN 1

CH 1





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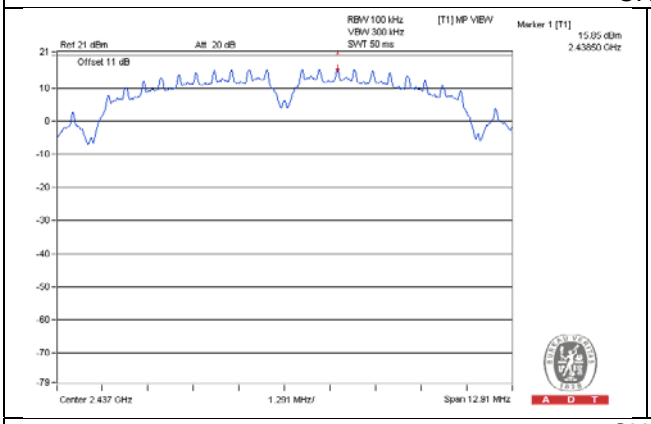
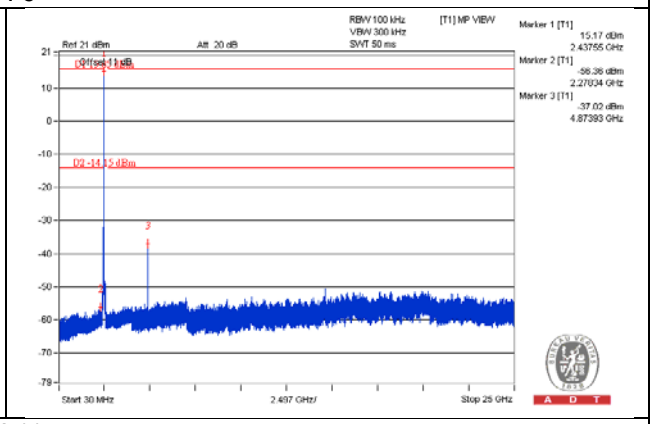
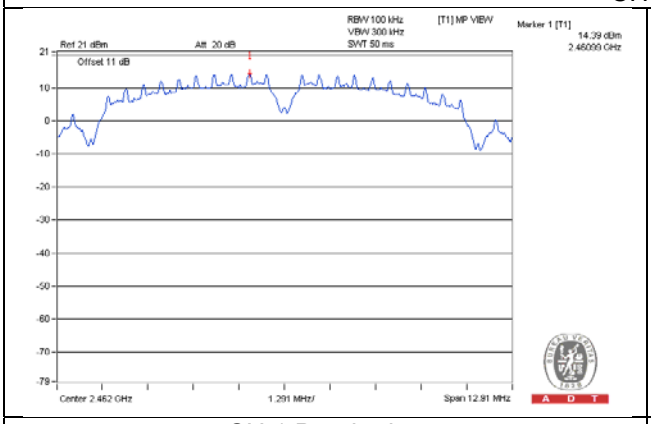
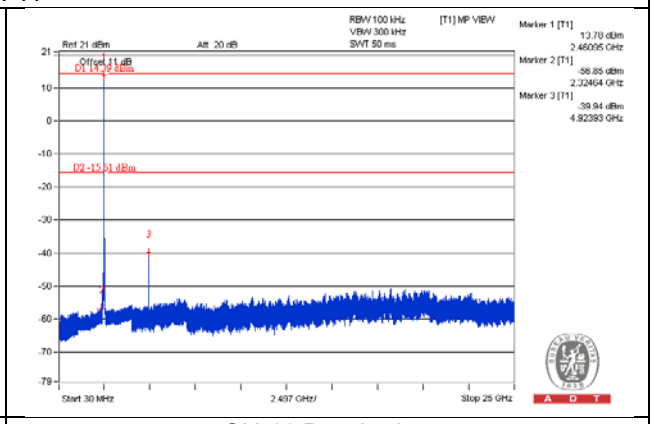


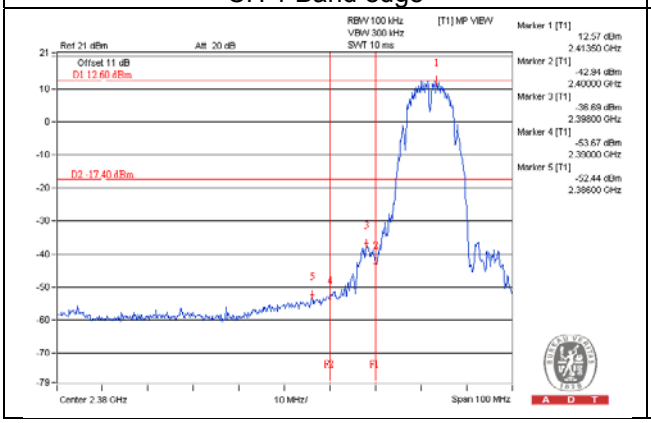


CH 11

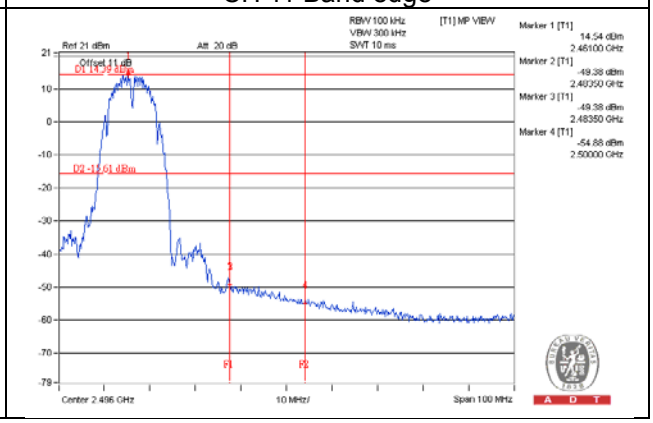




CH 1 Band edge

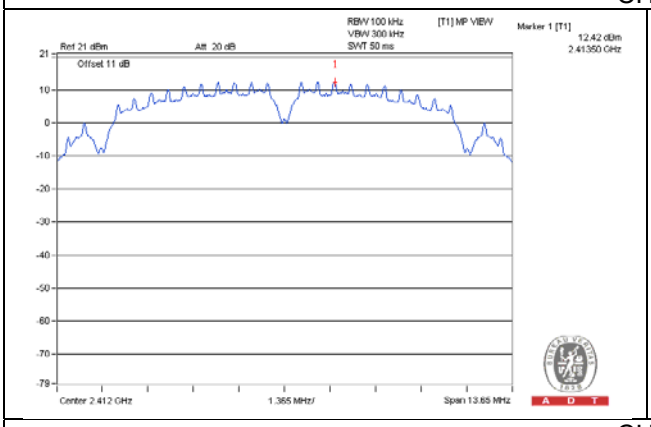


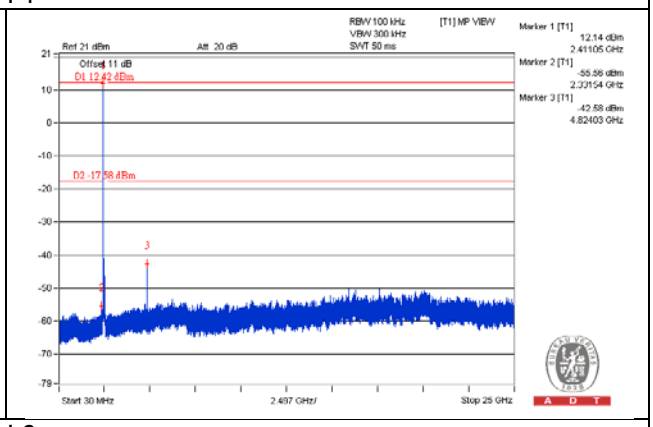
CH 11 Band edge



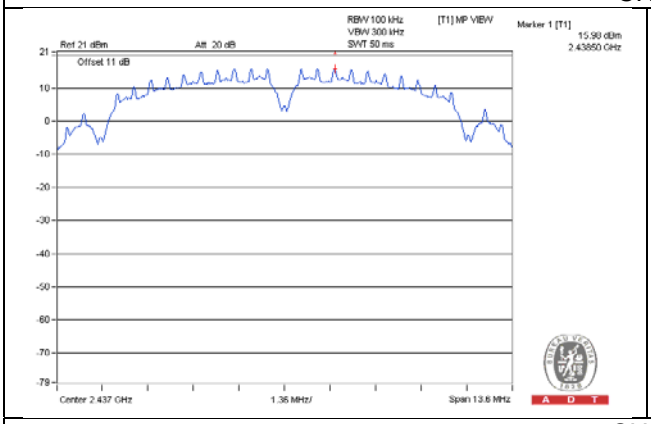
802.11b_ CHAIN 2

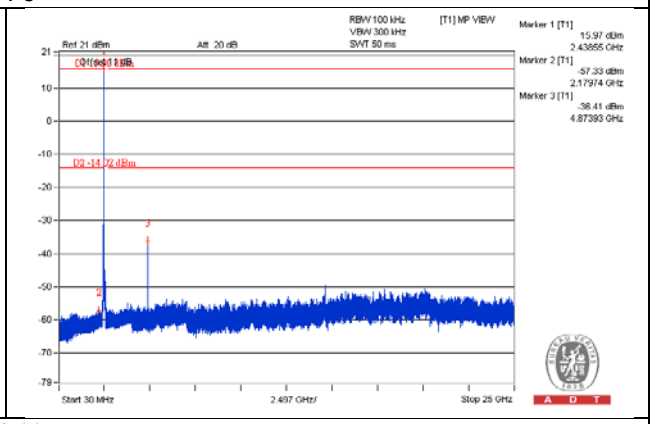
CH 1



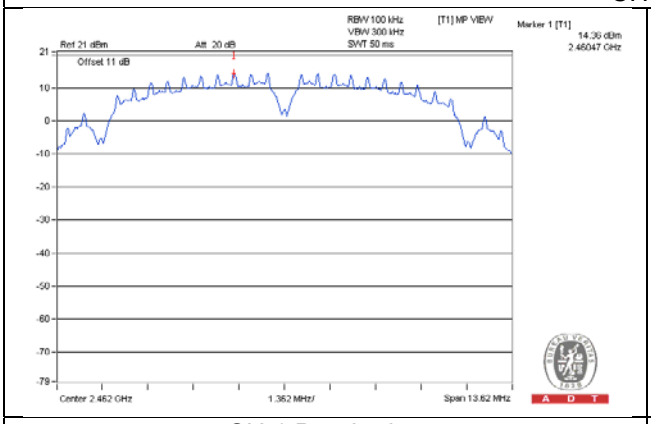


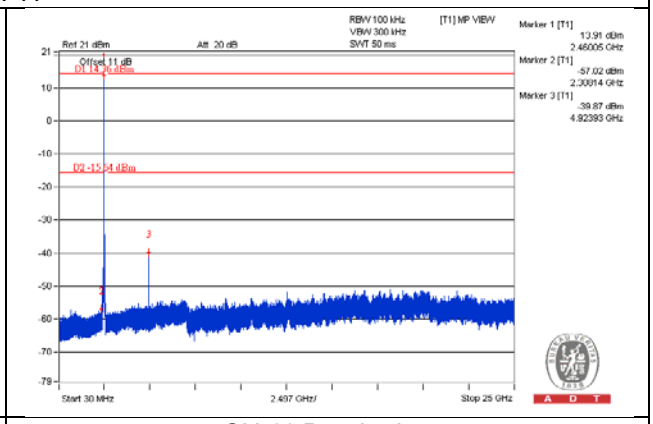
CH 6



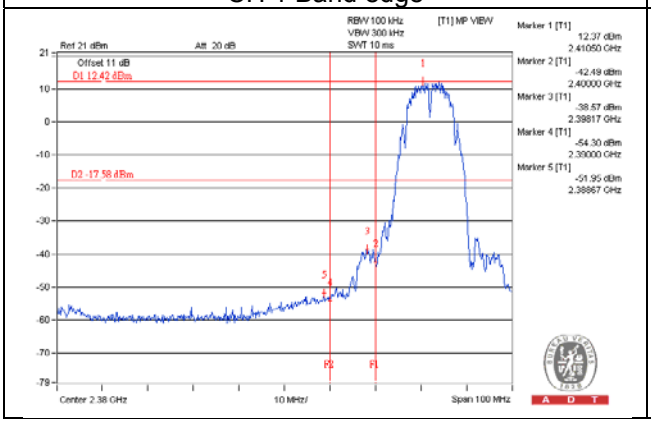


CH 11

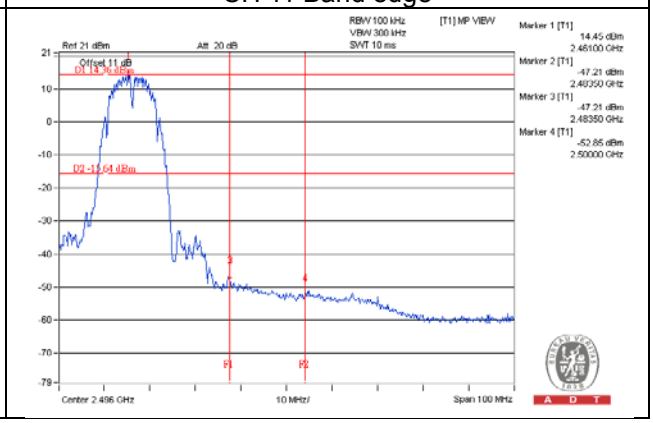




CH 1 Band edge

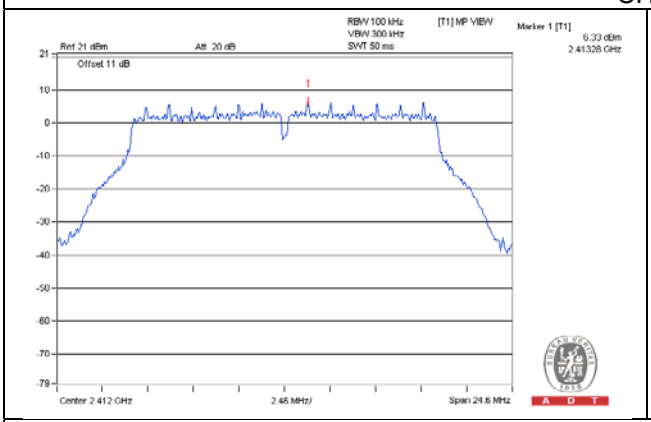


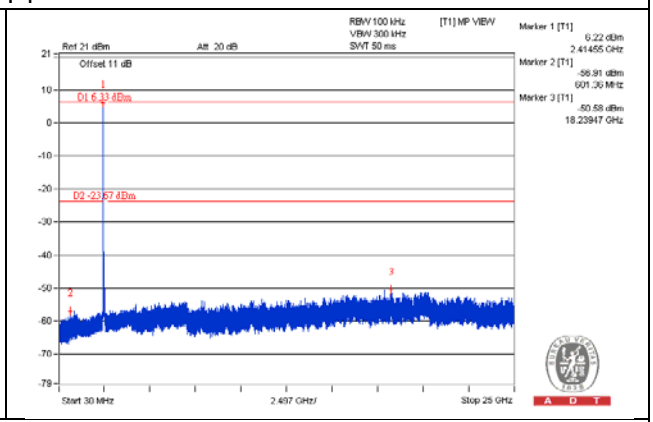
CH 11 Band edge



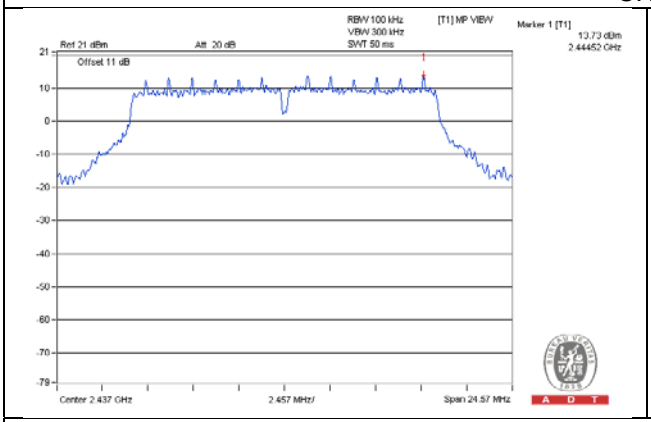
802.11g_ CHAIN 0

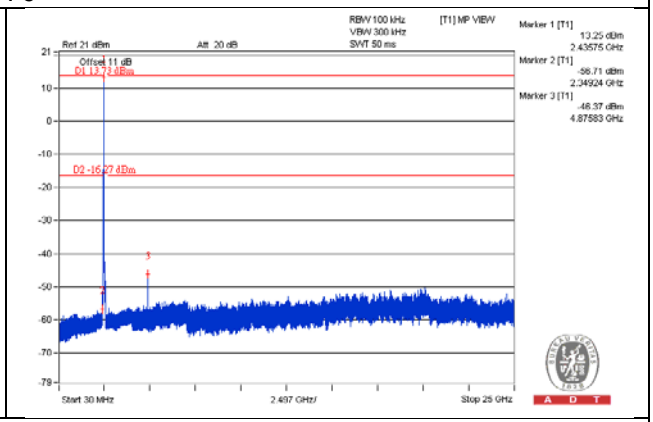
CH 1



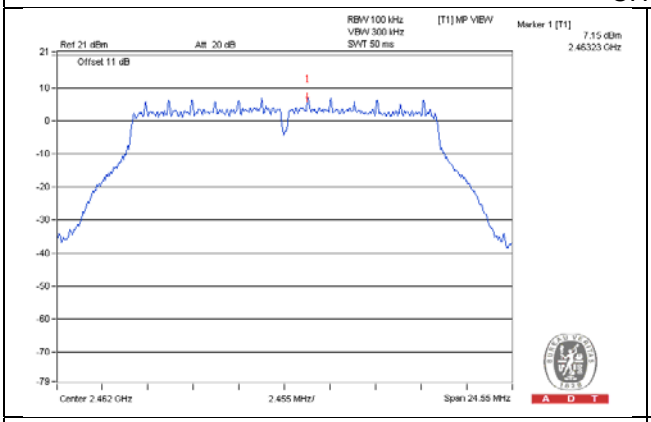


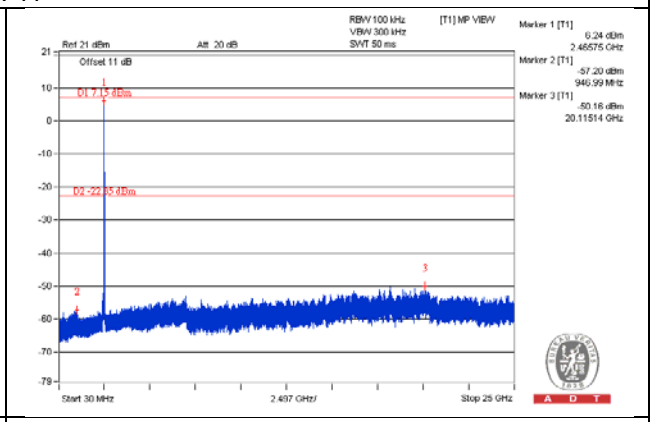
CH 6



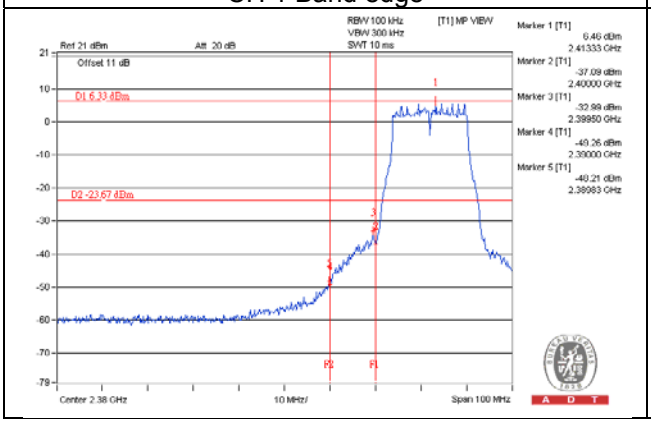


CH 11

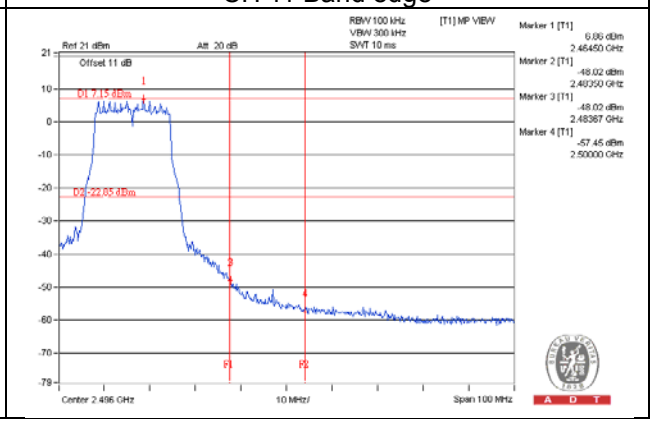




CH 1 Band edge

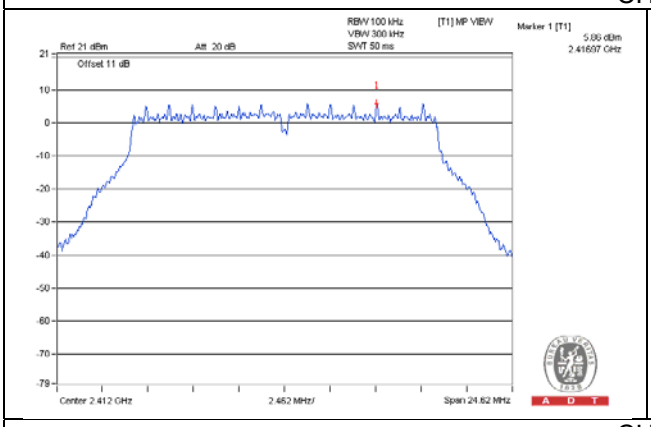


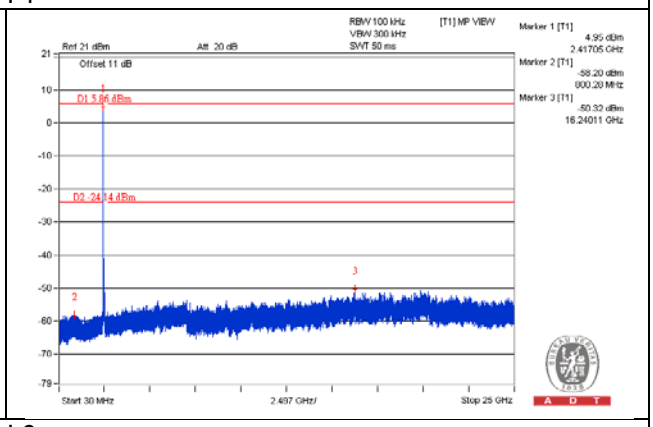
CH 11 Band edge



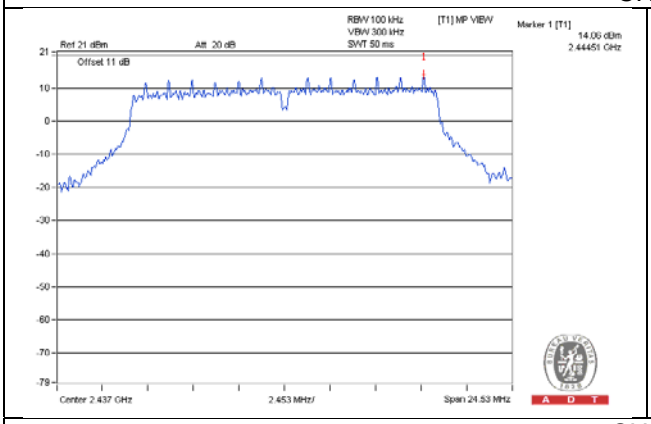
802.11g_ CHAIN 1

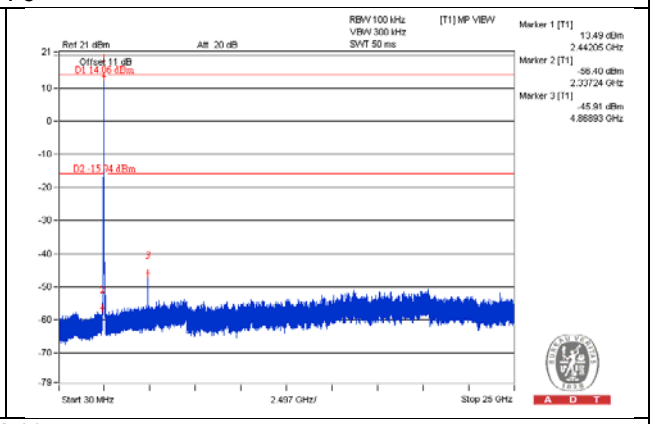
CH 1





CH 6





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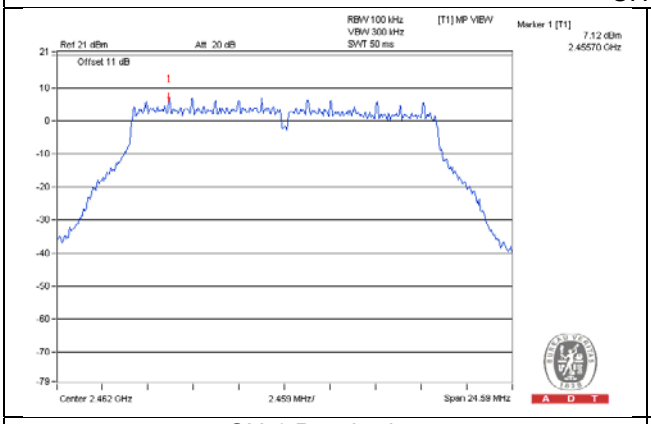
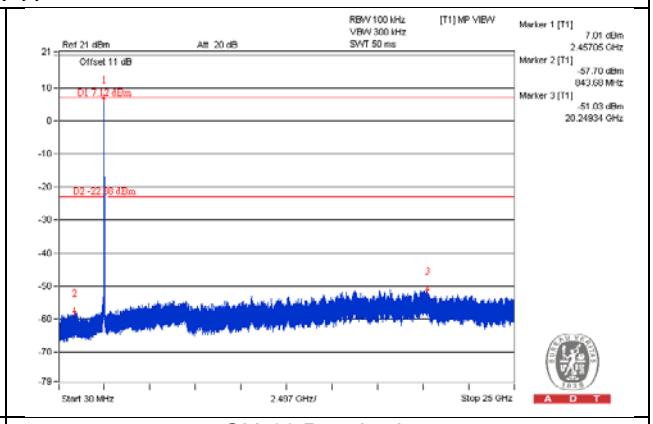
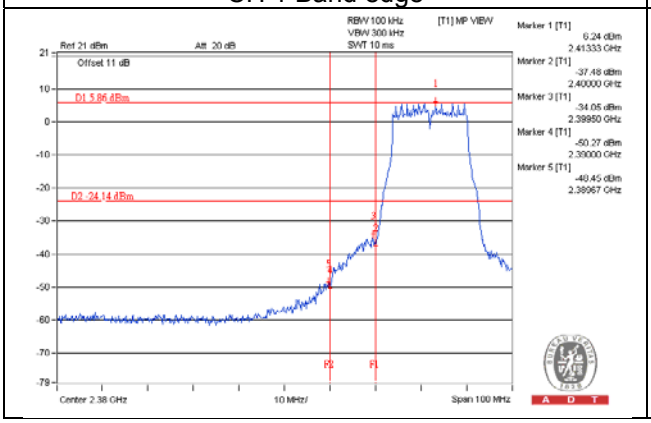




CH 1 Band edge



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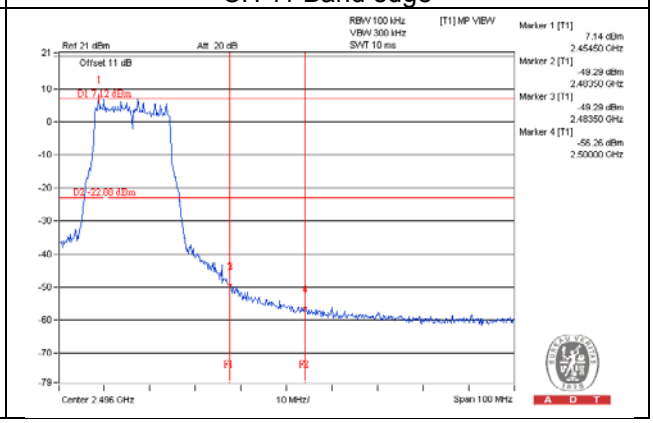
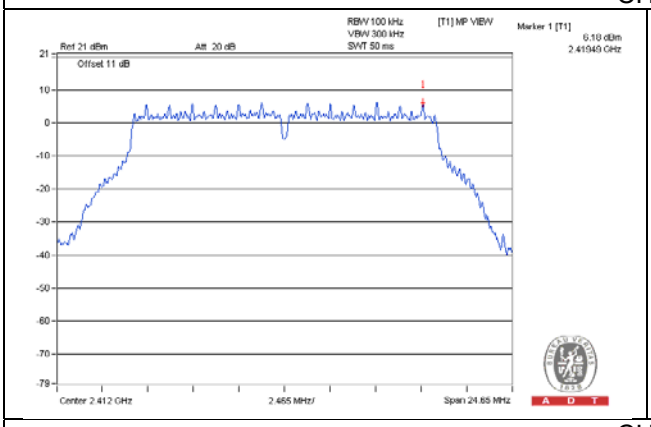
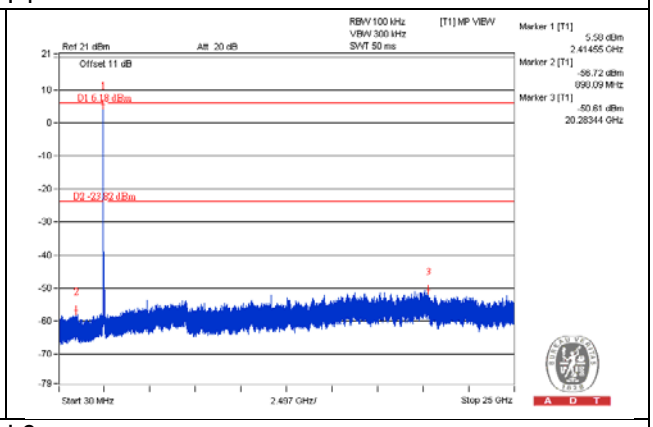


802.11g_ CHAIN 2

CH 1





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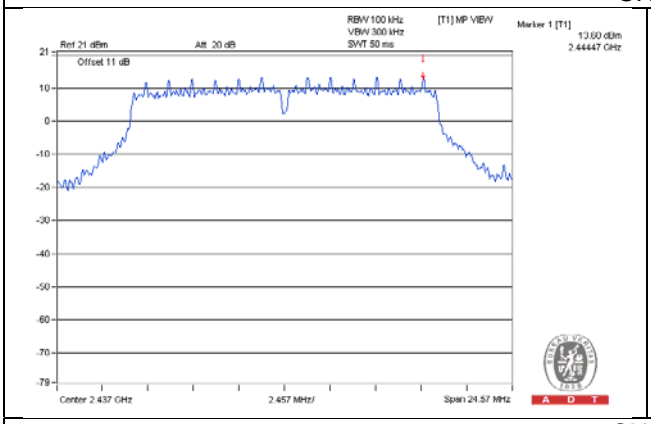

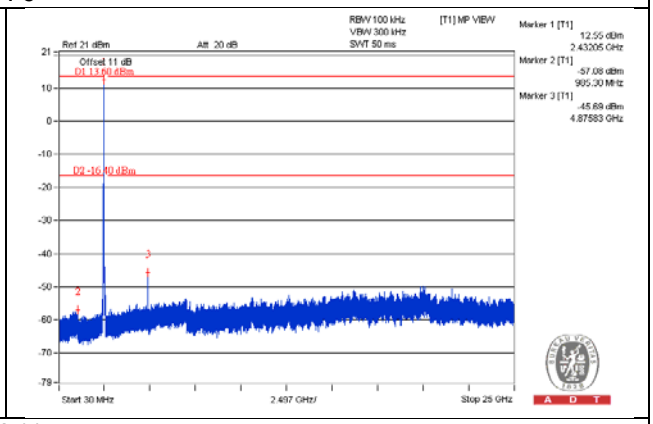

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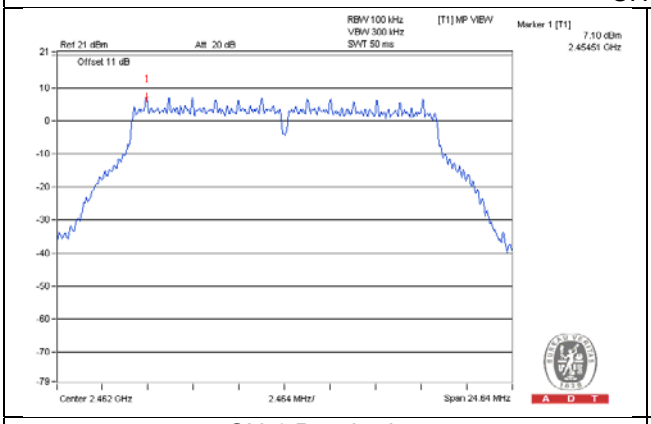
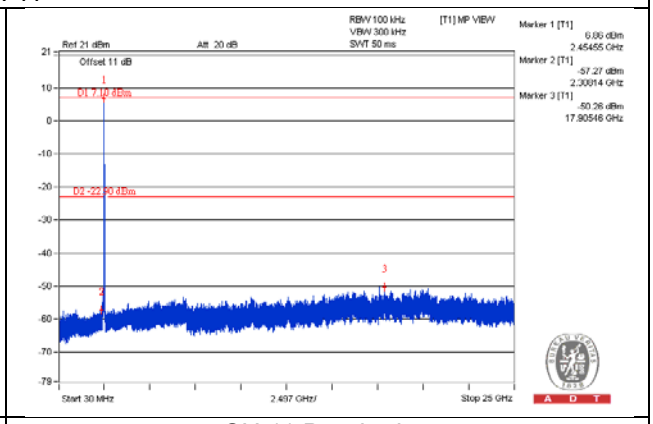
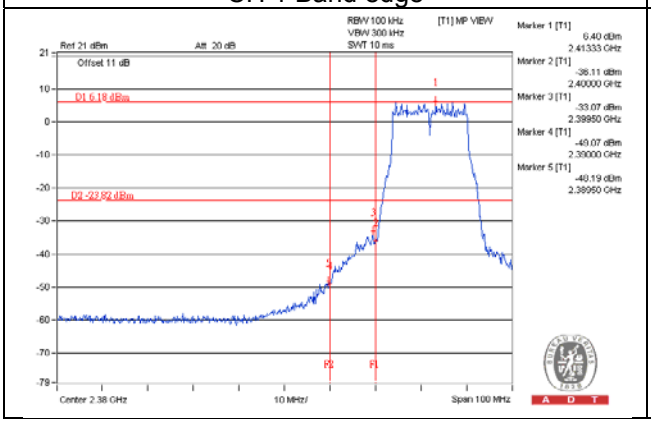
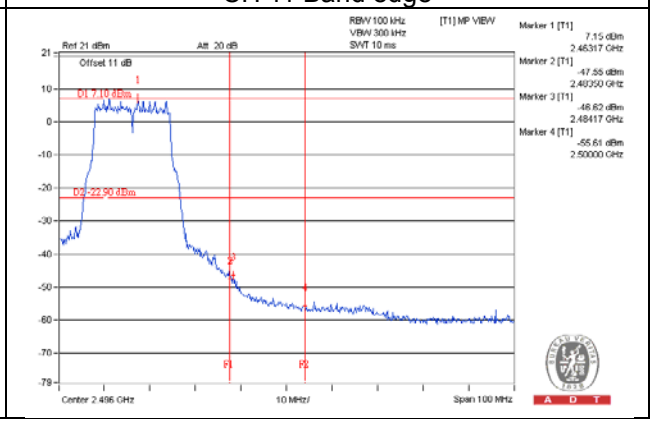




CH 1 Band edge

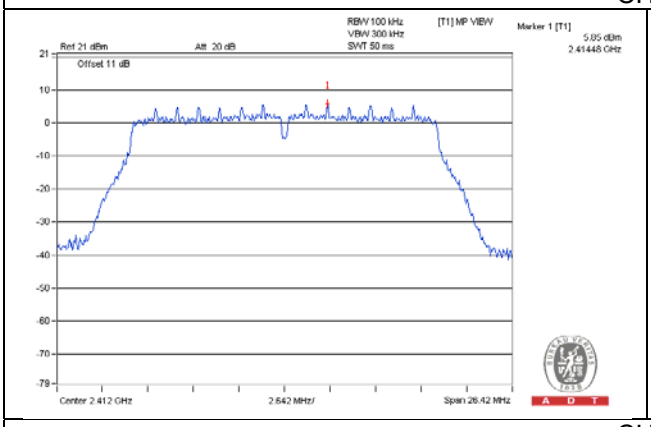


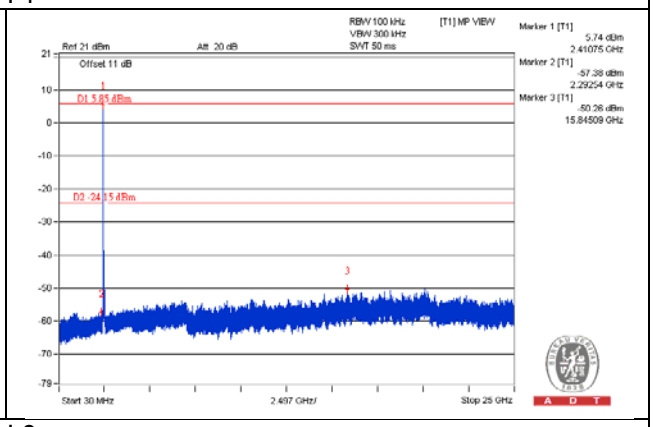
CH 11 Band edge



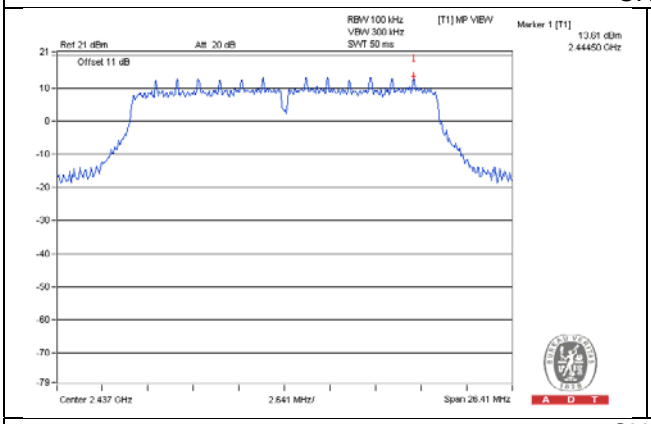
802.11n (20MHz)_ CHAIN 0

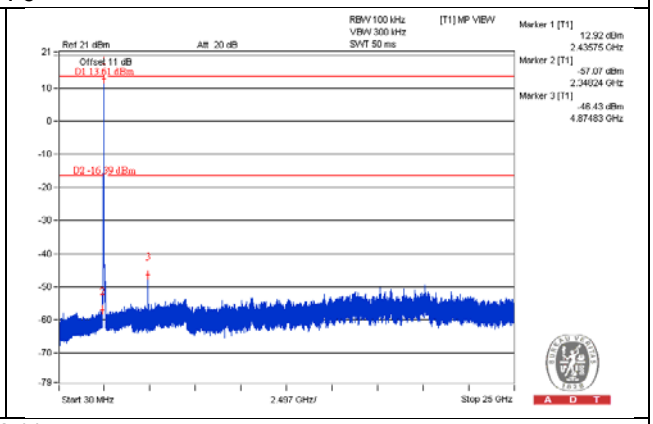
CH 1



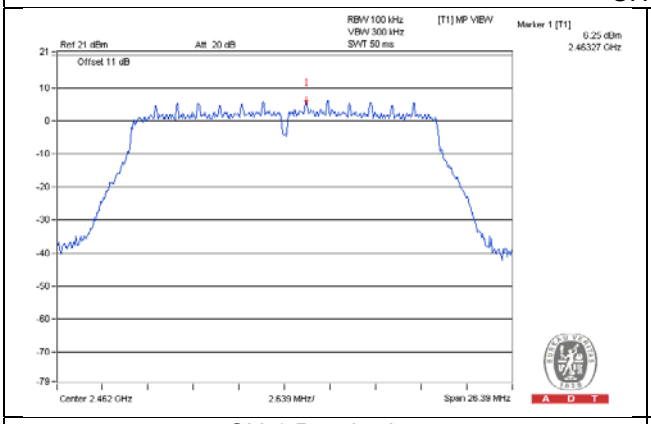


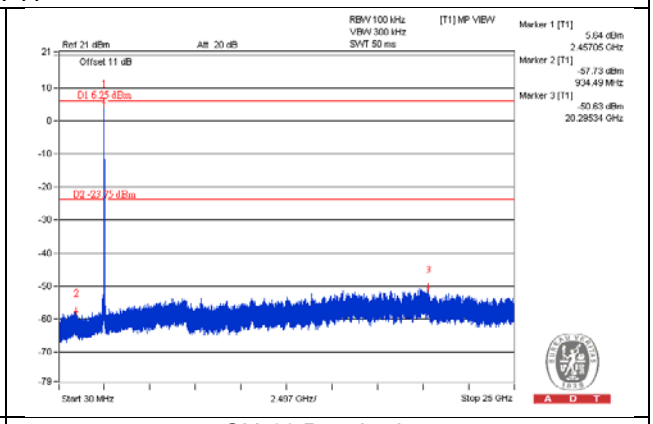
CH 6



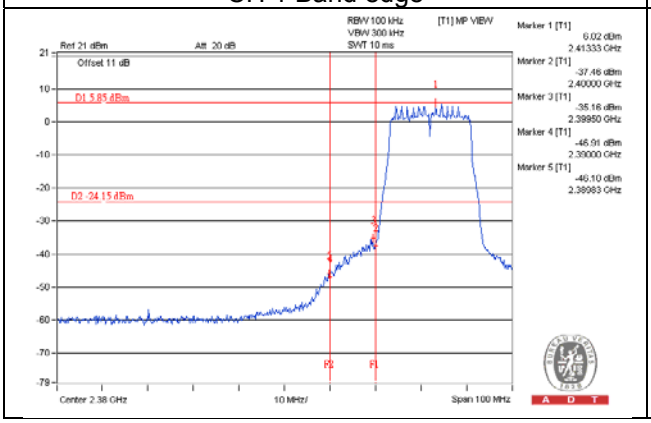


CH 11





CH 1 Band edge



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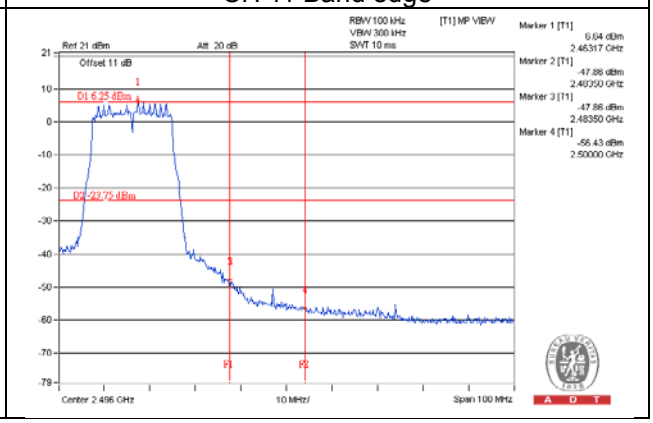
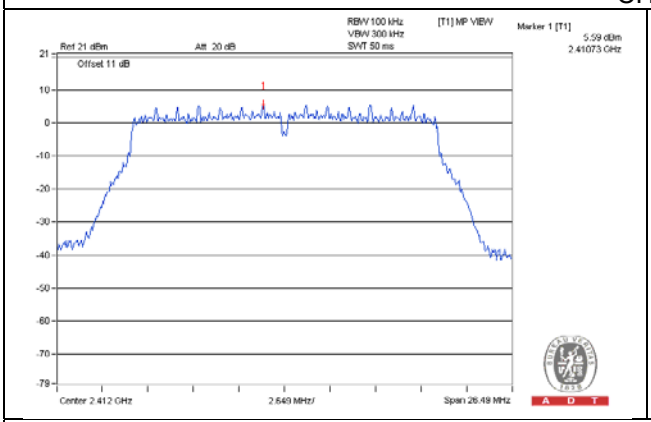
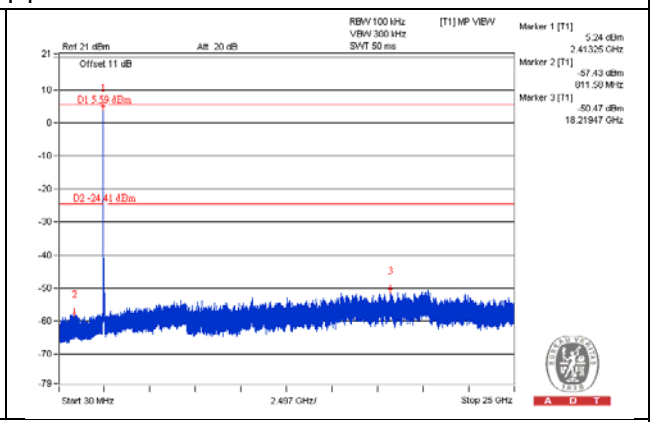


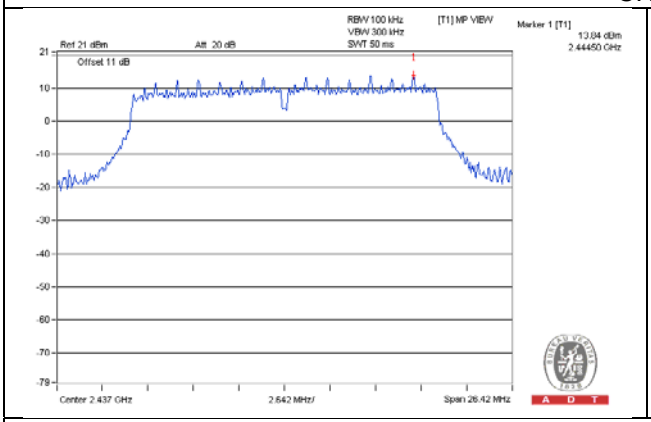
802.11n (20MHz)_ CHAIN 1

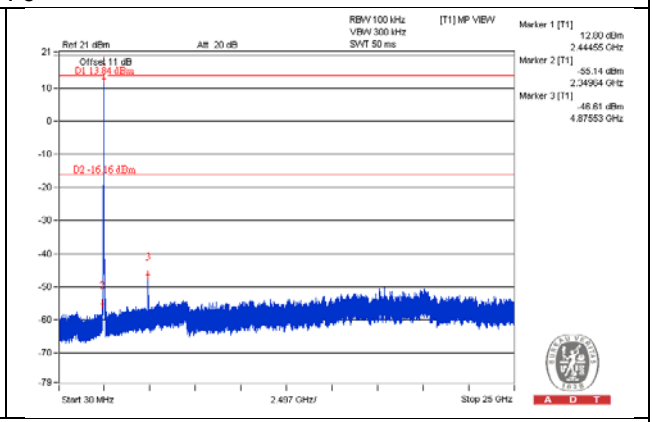
CH 1





CH 6





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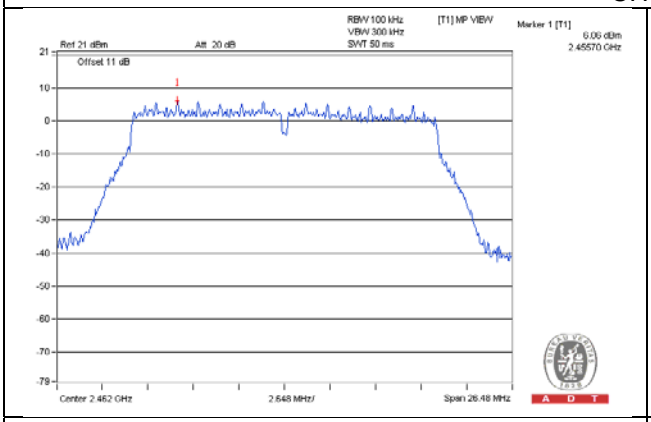
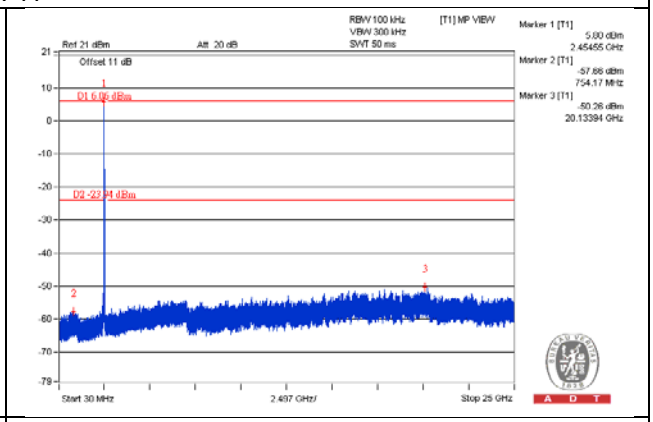
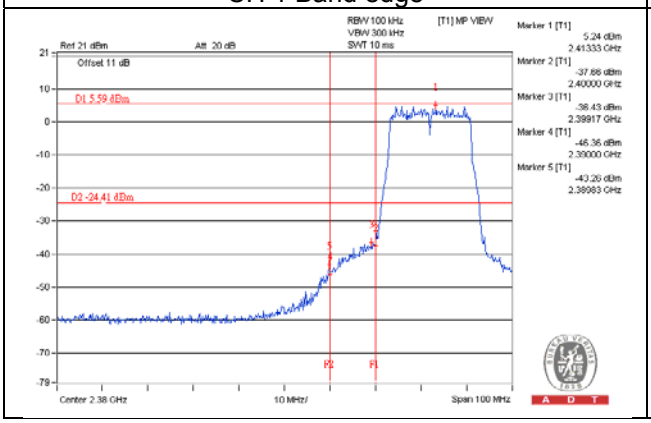
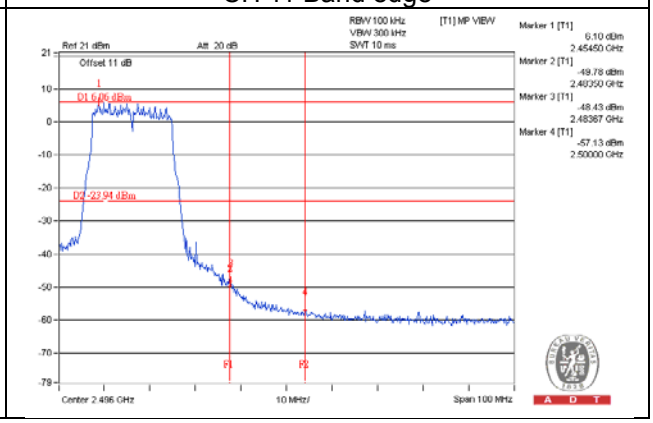




CH 1 Band edge

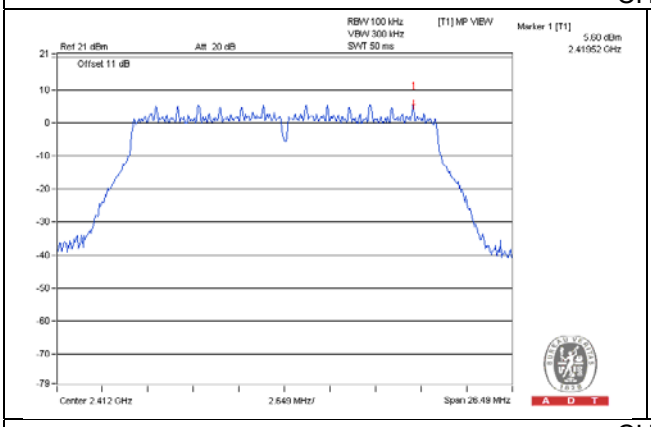


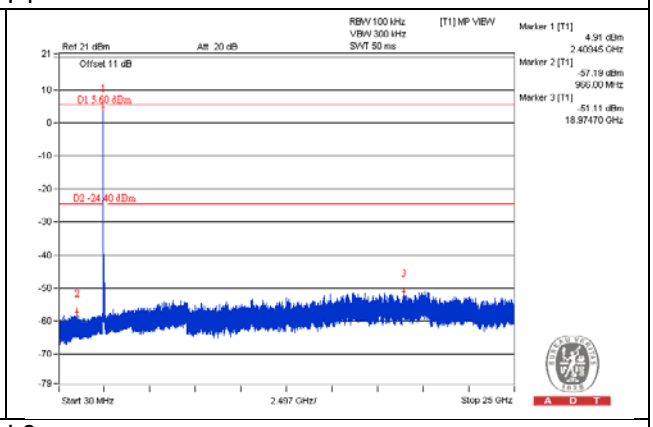
CH 11 Band edge



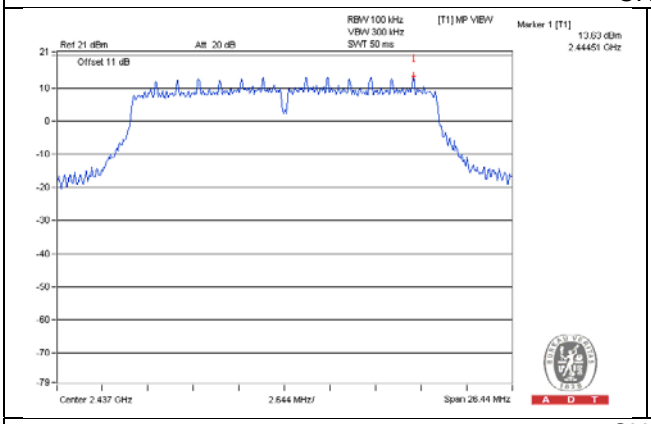
802.11n (20MHz)_ CHAIN 2

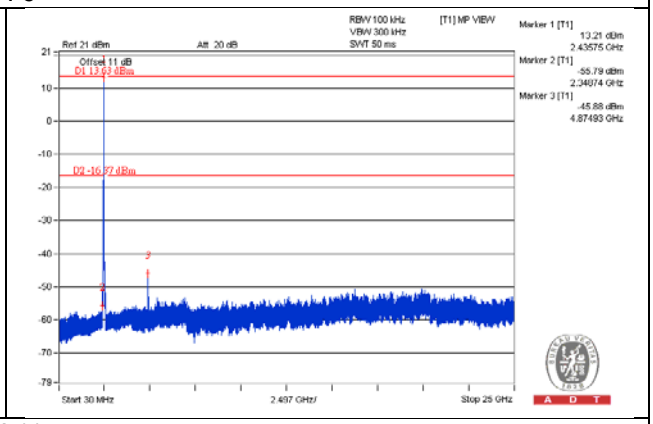
CH 1



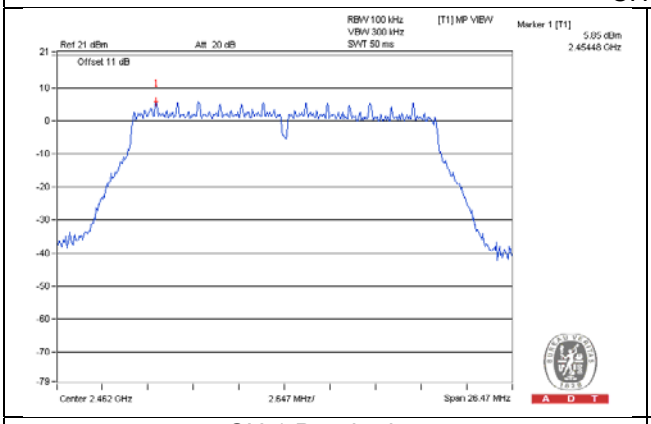


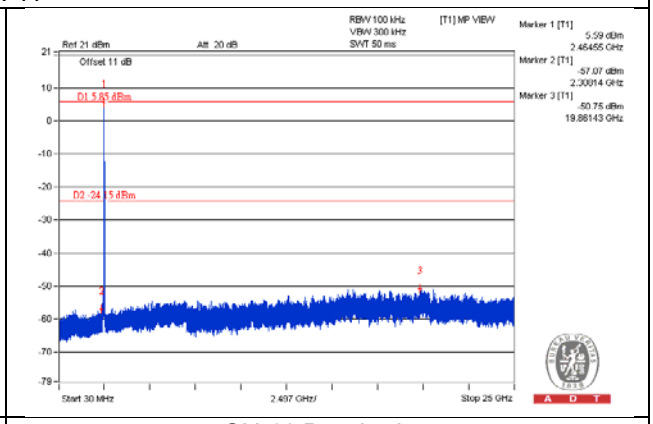
CH 6



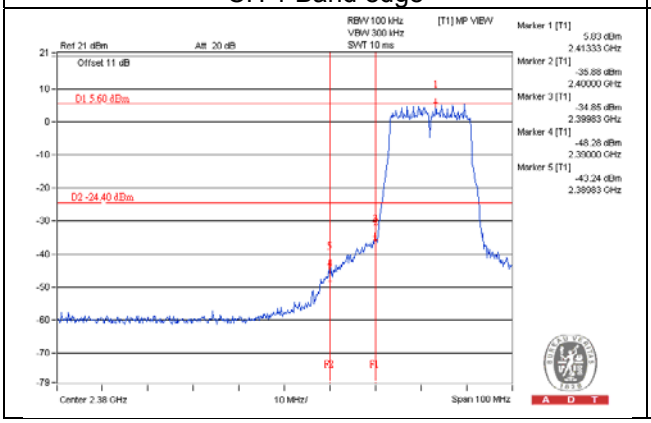


CH 11

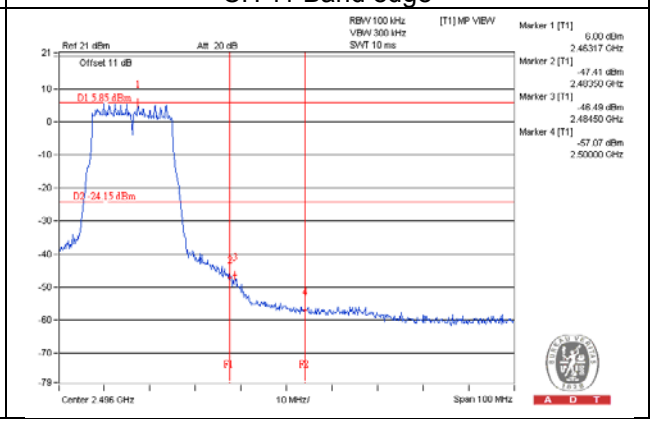




CH 1 Band edge

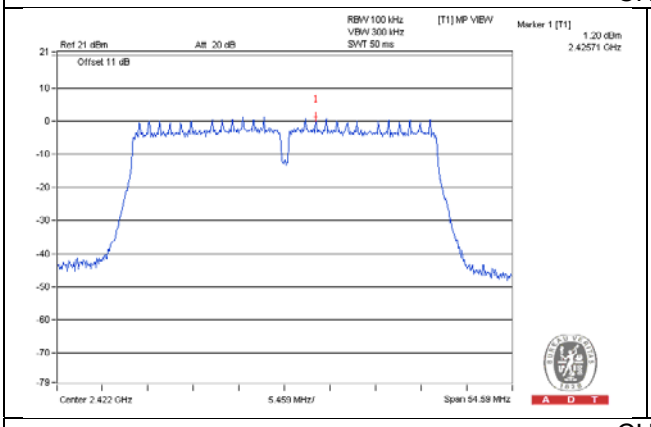


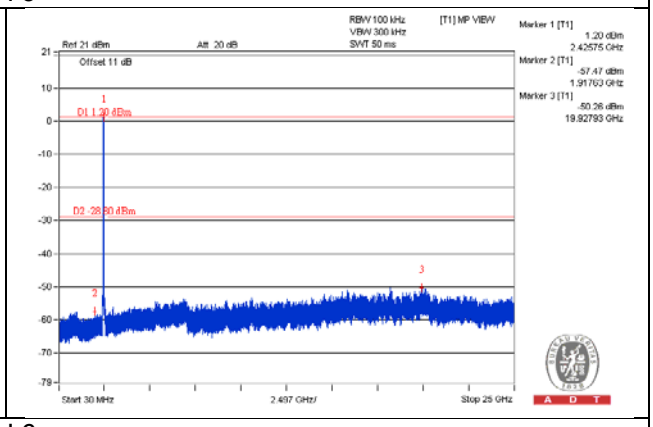
CH 11 Band edge



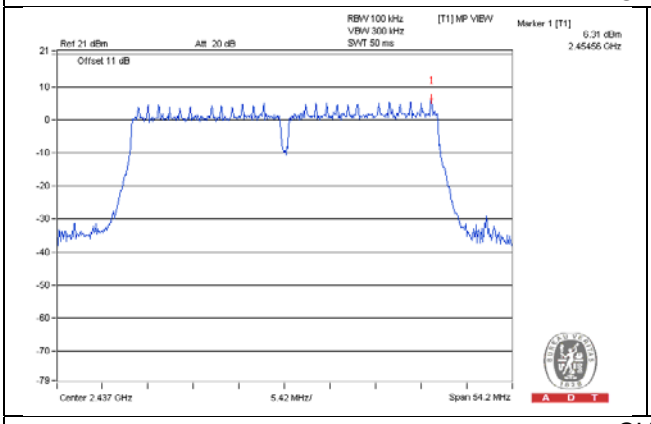
802.11n (40MHz)_ CHAIN 0

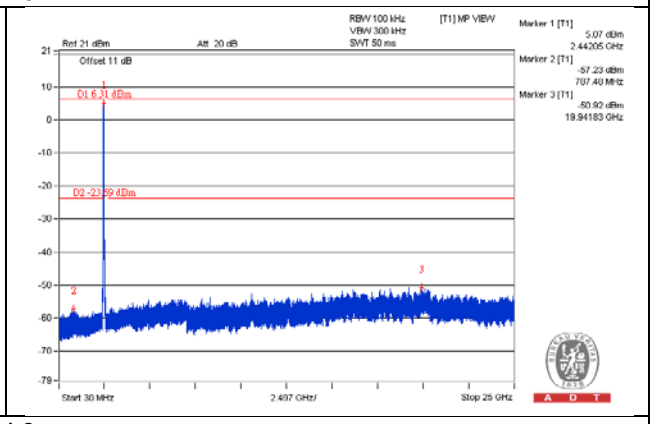
CH 3



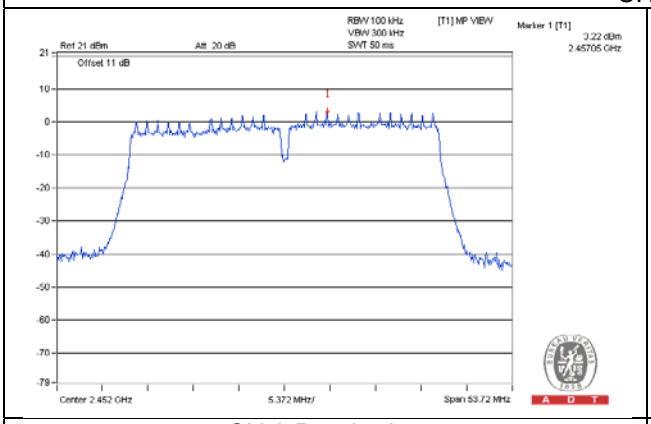


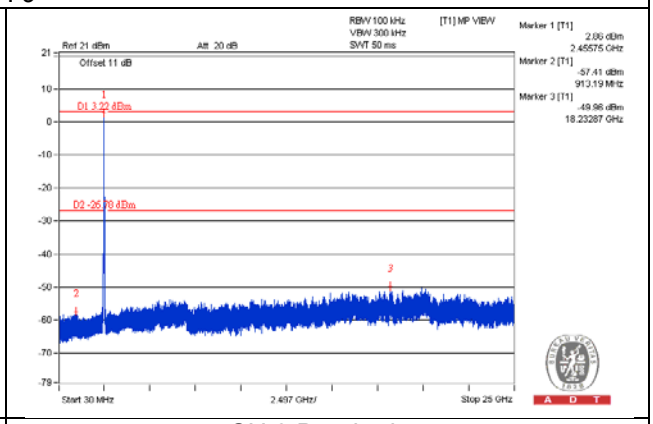
CH 6



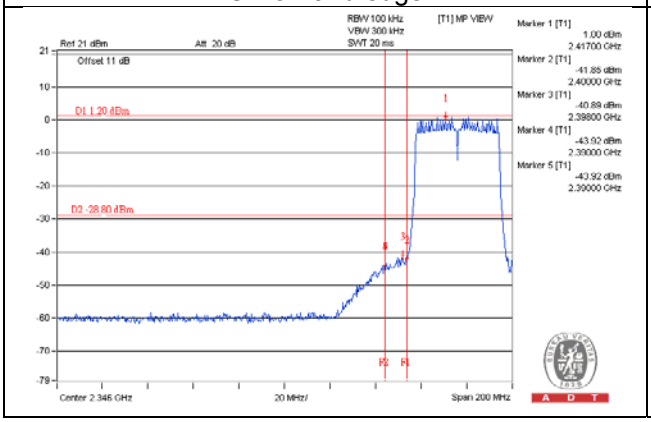


CH 9

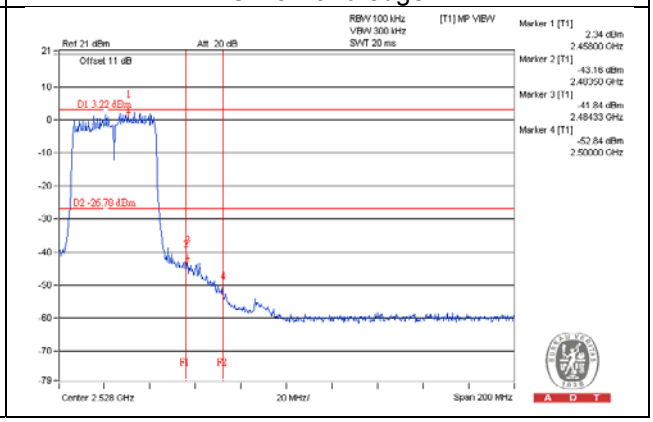




CH 3 Band edge

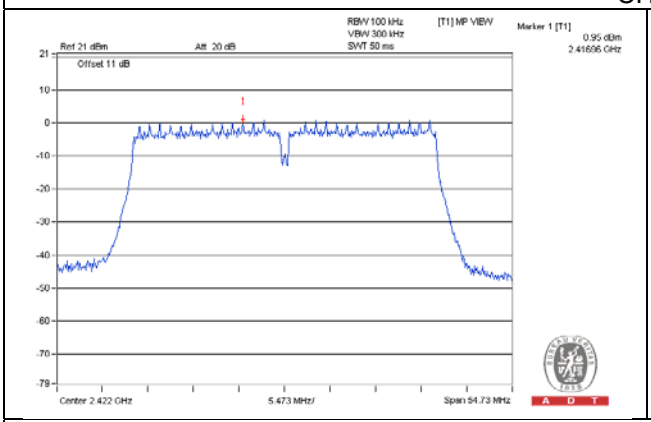


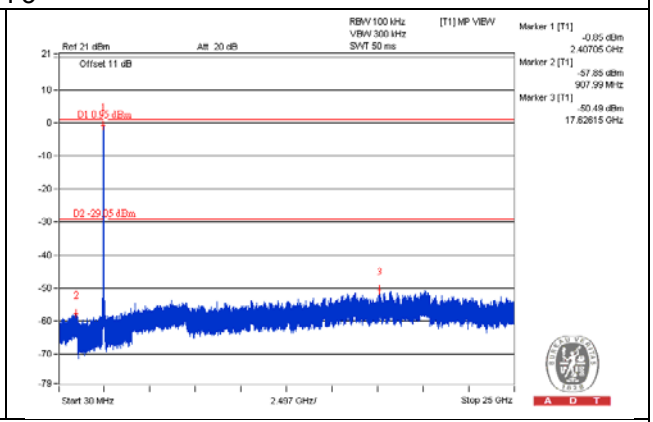
CH 9 Band edge



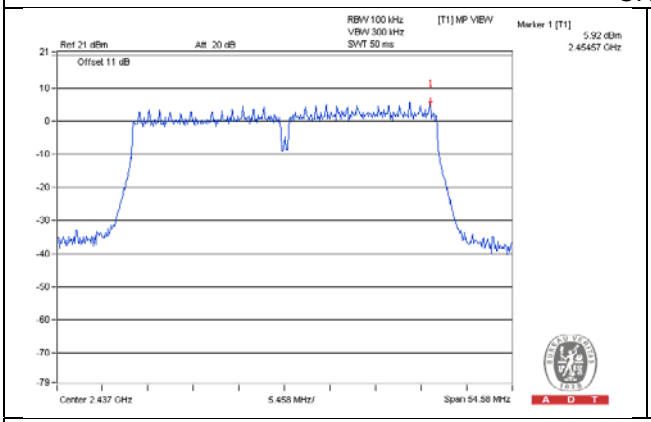
802.11n (40MHz)_ CHAIN 1

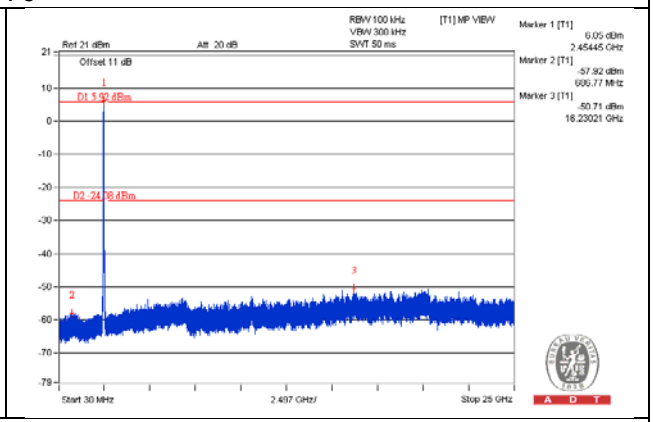
CH 3



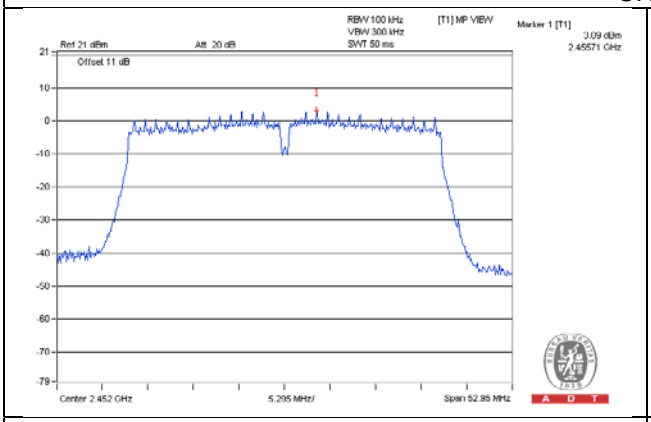


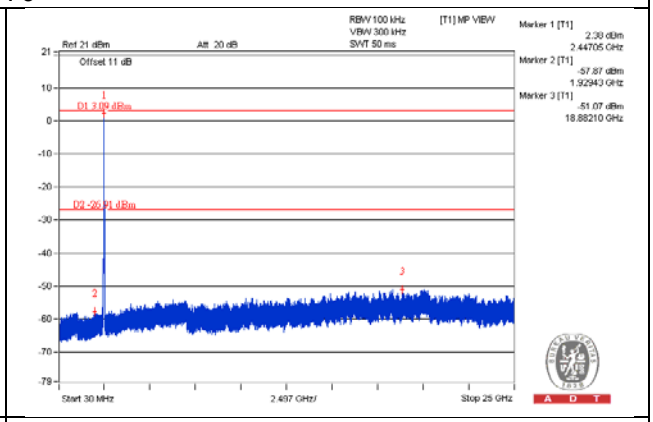
CH 6



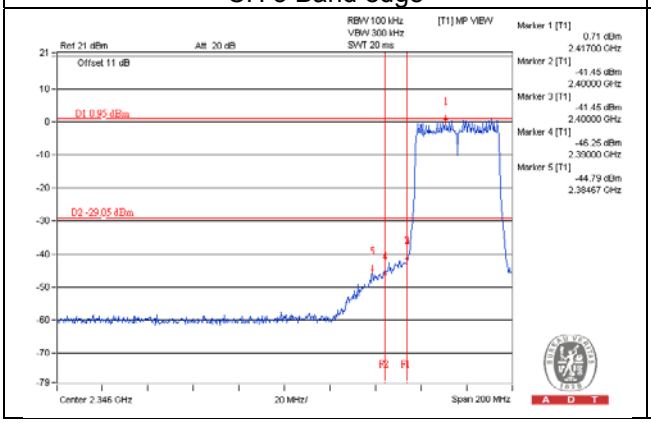


CH 9

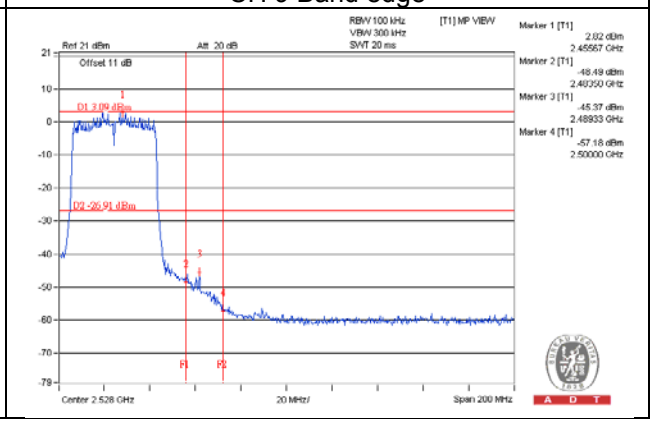




CH 3 Band edge

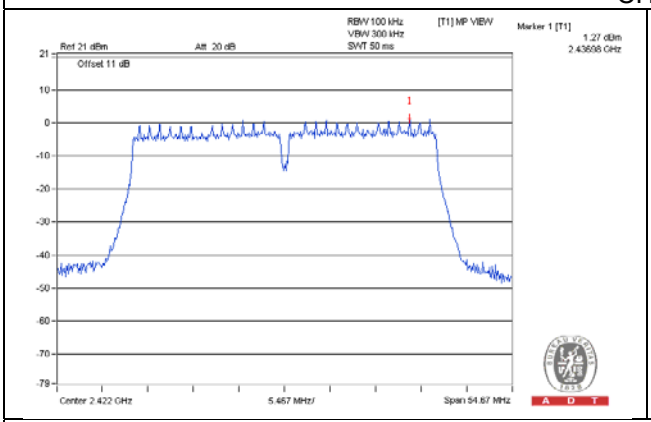


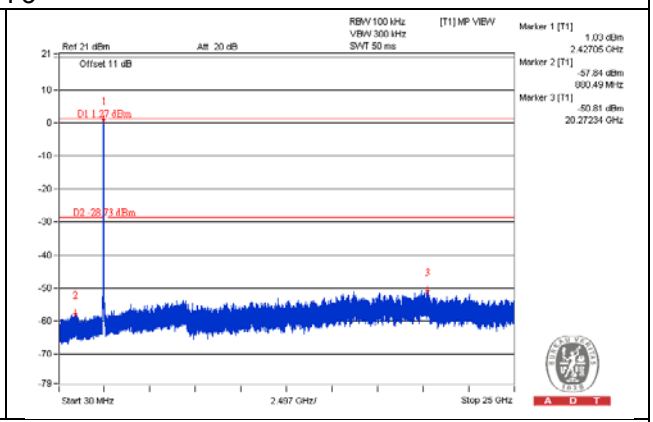
CH 9 Band edge



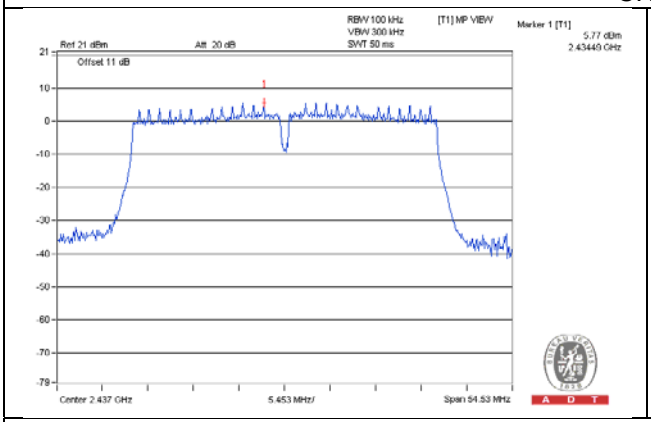
802.11n (40MHz)_ CHAIN 2

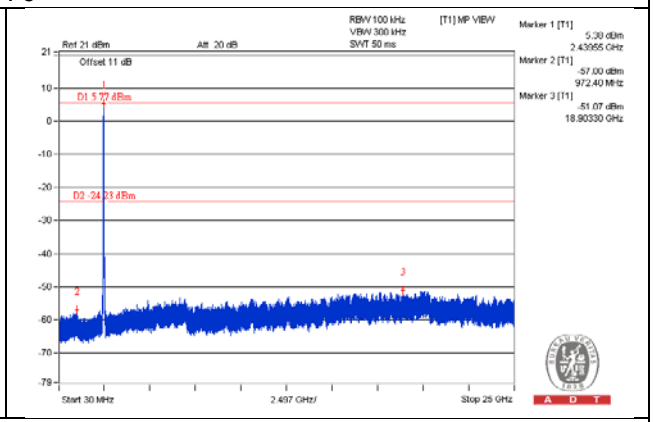
CH 3



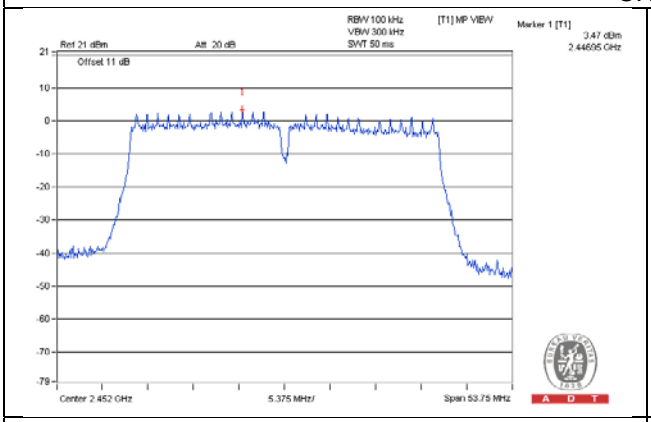


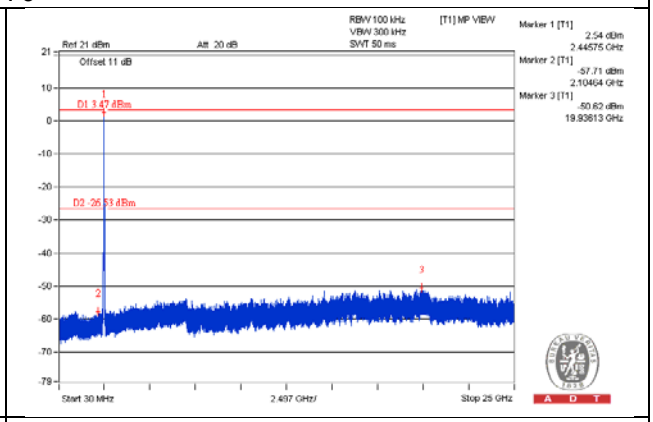
CH 6



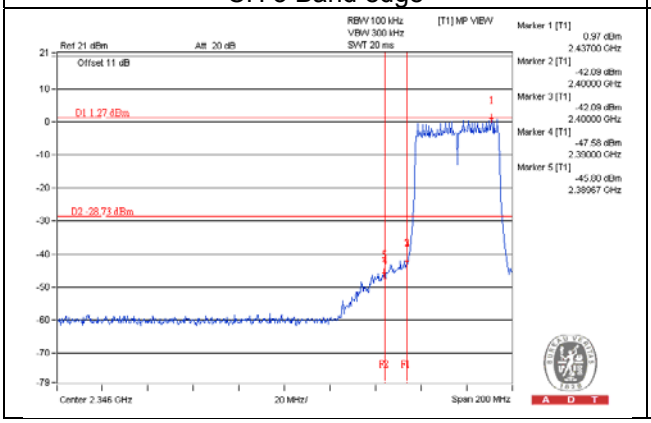


CH 9

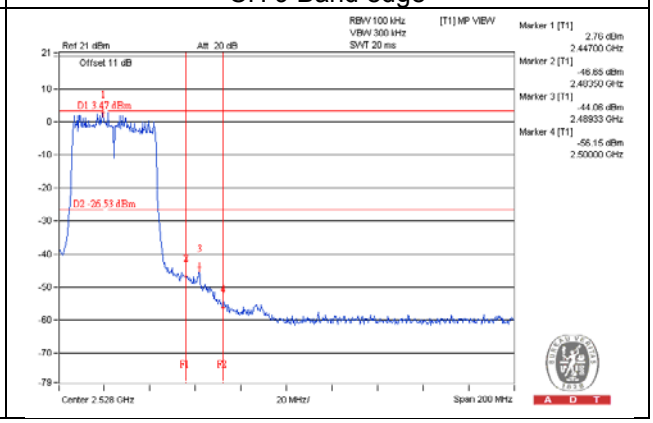




CH 3 Band edge



CH 9 Band edge



5 Test Types and Results (FOR 5.0GHz BAND)

5.1 Radiated Emission and Bandedge Measurement

5.1.1 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.

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 Set Up

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

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	91.5 PK	94.5	-3.0	1.00 H	272	85.20	6.30
2	#5725.00	82.1 AV	85.1	-3.0	1.00 H	272	75.80	6.30
3	*5745.00	124.5 PK			1.60 H	281	84.20	40.30
4	*5745.00	115.1 AV			1.60 H	281	74.80	40.30
5	11490.00	59.9 PK	74.0	-14.1	1.47 H	44	42.70	17.20
6	11490.00	48.0 AV	54.0	-6.0	1.47 H	44	30.80	17.20
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	80.6 PK	83.6	-3.0	1.71 V	55	74.30	6.30
2	#5725.00	71.4 AV	74.4	-3.0	1.71 V	55	65.10	6.30
3	*5745.00	113.6 PK			1.71 V	55	73.30	40.30
4	*5745.00	104.4 AV			1.71 V	55	64.10	40.30
5	11490.00	59.1 PK	74.0	-14.9	1.23 V	78	41.90	17.20
6	11490.00	47.1 AV	54.0	-6.9	1.23 V	78	29.90	17.20

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.
7. The limit value is defined as per 15.247.

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	124.6 PK			1.84 H	286	84.20	40.40
2	*5785.00	114.6 AV			1.84 H	286	74.20	40.40
3	11570.00	58.5 PK	74.0	-15.5	1.11 H	256	41.20	17.30
4	11570.00	47.9 AV	54.0	-6.1	1.11 H	256	30.60	17.30
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	*5785.00	114.0 PK			1.84 V	54	73.60	40.40
2	*5785.00	104.8 AV			1.84 V	54	64.40	40.40
3	11570.00	59.3 PK	74.0	-14.7	1.56 V	203	42.00	17.30
4	11570.00	46.0 AV	54.0	-8.0	1.56 V	203	28.70	17.30

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)
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.

CHANNEL	TX Channel 165	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	124.8 PK			1.69 H	285	84.30	40.50
2	*5825.00	114.5 AV			1.69 H	285	74.00	40.50
3	#5850.00	80.1 PK	94.8	-14.7	1.80 H	270	73.50	6.60
4	#5850.00	69.8 AV	84.5	-14.7	1.80 H	270	63.20	6.60
5	11650.00	60.7 PK	74.0	-13.3	1.52 H	77	43.00	17.70
6	11650.00	48.1 AV	54.0	-5.9	1.52 H	77	30.40	17.70
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	114.7 PK			1.49 V	38	74.20	40.50
2	*5825.00	105.3 AV			1.49 V	38	64.80	40.50
3	#5850.00	70.0 PK	84.7	-14.7	1.80 V	270	63.40	6.60
4	#5850.00	60.6 AV	75.3	-14.7	1.80 V	270	54.00	6.60
5	11650.00	59.0 PK	74.0	-15.0	1.58 V	221	41.30	17.70
6	11650.00	46.5 AV	54.0	-7.5	1.58 V	221	28.80	17.70

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.
7. The limit value is defined as per 15.247.

802.11n (20MHz)

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	93.4 PK	93.9	-0.5	1.00 H	279	87.10	6.30
2	#5725.00	83.4 AV	83.9	-0.5	1.00 H	279	77.10	6.30
3	*5745.00	123.9 PK			1.44 H	276	83.60	40.30
4	*5745.00	113.9 AV			1.44 H	276	73.60	40.30
5	11490.00	59.1 PK	74.0	-14.9	1.18 H	249	41.90	17.20
6	11490.00	45.5 AV	54.0	-8.5	1.18 H	249	28.30	17.20
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	84.0 PK	84.5	-0.5	1.00 V	279	77.70	6.30
2	#5725.00	74.6 AV	75.1	-0.5	1.00 V	279	68.30	6.30
3	*5745.00	114.5 PK			1.58 V	39	74.20	40.30
4	*5745.00	105.1 AV			1.58 V	39	64.80	40.30
5	11490.00	57.3 PK	74.0	-16.7	1.58 V	207	40.10	17.20
6	11490.00	45.1 AV	54.0	-8.9	1.58 V	207	27.90	17.20

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.
7. The limit value is defined as per 15.247.

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	124.2 PK			1.55 H	286	83.80	40.40
2	*5785.00	114.2 AV			1.55 H	286	73.80	40.40
3	11570.00	59.2 PK	74.0	-14.8	1.39 H	87	41.90	17.30
4	11570.00	46.3 AV	54.0	-7.7	1.39 H	87	29.00	17.30
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	*5785.00	114.0 PK			1.71 V	48	73.60	40.40
2	*5785.00	104.4 AV			1.71 V	48	64.00	40.40
3	11570.00	58.7 PK	74.0	-15.3	1.30 V	74	41.40	17.30
4	11570.00	46.2 AV	54.0	-7.8	1.30 V	74	28.90	17.30

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)
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.

CHANNEL	TX Channel 165	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	125.2 PK			1.95 H	277	84.70	40.50
2	*5825.00	115.2 AV			1.95 H	277	74.70	40.50
3	#5850.00	86.1 PK	95.2	-9.1	1.95 H	277	79.50	6.60
4	#5850.00	76.1 AV	85.2	-9.1	1.95 H	277	69.50	6.60
5	11650.00	59.6 PK	74.0	-14.4	1.55 H	230	41.90	17.70
6	11650.00	46.6 AV	54.0	-7.4	1.55 H	230	28.90	17.70
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	115.7 PK			1.00 V	335	75.20	40.50
2	*5825.00	105.1 AV			1.00 V	335	64.60	40.50
3	#5850.00	76.6 PK	85.7	-9.1	1.00 V	335	70.00	6.60
4	#5850.00	66.0 AV	75.1	-9.1	1.00 V	335	59.40	6.60
5	11650.00	57.9 PK	74.0	-16.1	1.29 V	64	40.20	17.70
6	11650.00	45.1 AV	54.0	-8.9	1.29 V	64	27.40	17.70

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.
7. The limit value is defined as per 15.247.

802.11n (40MHz)

CHANNEL	TX Channel 151	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	89.6 PK	90.0	-0.4	1.09 H	278	83.30	6.30
2	#5725.00	79.0 AV	89.4	-0.4	1.09 H	278	72.70	6.30
3	*5755.00	120.0 PK			1.56 H	280	79.70	40.30
4	*5755.00	109.4 AV			1.56 H	280	69.10	40.30
5	11510.00	58.1 PK	74.0	-15.9	1.58 H	74	41.00	17.10
6	11510.00	45.8 AV	54.0	-8.2	1.58 H	74	28.70	17.10
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	#5725.00	81.6 PK	82.0	-0.4	1.09 V	278	75.30	6.30
2	#5725.00	70.6 AV	71.0	-0.4	1.09 V	278	64.30	6.30
3	*5755.00	112.0 PK			1.50 V	36	71.70	40.30
4	*5755.00	101.0 AV			1.50 V	36	60.70	40.30
5	11510.00	57.3 PK	74.0	-16.7	1.56 V	203	40.20	17.10
6	11510.00	45.1 AV	54.0	-8.9	1.56 V	203	28.00	17.10

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.
7. The limit value is defined as per 15.247.

CHANNEL	TX Channel 159	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	123.2 PK			1.58 H	280	82.80	40.40
2	*5795.00	113.2 AV			1.58 H	280	72.80	40.40
3	#5850.00	88.9 PK	93.2	-14.3	1.00 H	261	82.30	6.60
4	#5850.00	78.9 AV	83.2	-14.3	1.00 H	261	72.30	6.60
5	11590.00	58.1 PK	74.0	-15.9	1.52 H	96	40.90	17.20
6	11590.00	45.0 AV	54.0	-9.0	1.52 H	96	27.80	17.20
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	*5795.00	113.4 PK			1.02 V	19	73.00	40.40
2	*5795.00	103.7 AV			1.02 V	19	63.30	40.40
3	#5850.00	72.5 PK	83.4	-10.9	1.00 V	261	65.90	6.60
4	#5850.00	62.8 AV	73.7	-10.9	1.00 V	261	56.20	6.60
5	11590.00	57.2 PK	74.0	-16.8	1.52 V	69	40.00	17.20
6	11590.00	45.0 AV	54.0	-9.0	1.52 V	69	27.80	17.20

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.
7. The limit value is defined as per 15.247.

802.11ac (80MHz)

CHANNEL	TX Channel 155	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	84.8 PK	85.1	-0.3	1.05 H	280	78.50	6.30
2	#5725.00	74.7 AV	75.0	-0.3	1.05 H	280	68.40	6.30
3	*5775.00	115.1 PK			1.58 H	278	74.70	40.40
4	*5775.00	105.0 AV			1.58 H	278	64.60	40.40
5	#5850.00	80.2 PK	85.1	-4.9	1.03 H	277	73.60	6.60
6	#5850.00	70.1 AV	75.0	-4.9	1.03 H	277	63.50	6.60
7	11550.00	58.7 PK	74.0	-15.3	1.52 H	97	41.60	17.10
8	11550.00	46.1 AV	54.0	-7.9	1.52 H	97	29.00	17.10
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	#5725.00	75.7 PK	76.0	-0.3	1.05 V	280	69.40	6.30
2	#5725.00	66.0 AV	66.3	-0.3	1.05 V	280	59.70	6.30
3	*5775.00	106.0 PK			1.00 V	335	65.60	40.40
4	*5775.00	96.3 AV			1.00 V	335	55.90	40.40
5	#5850.00	71.1 PK	76.0	-4.9	1.03 V	277	64.50	6.60
6	#5850.00	61.4 AV	66.3	-4.9	1.03 V	277	54.80	6.60
7	11550.00	57.1 PK	74.0	-16.9	1.55 V	221	40.00	17.10
8	11550.00	44.6 AV	54.0	-9.4	1.55 V	221	27.50	17.10

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.
7. The limit value is defined as per 15.247.

Below 1GHz worst-case data:

802.11a

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	64.83	29.3 QP	40.0	-10.7	1.51 H	266	44.50	-15.20
2	192.89	25.1 QP	43.5	-18.4	2.00 H	349	41.60	-16.50
3	293.79	29.2 QP	46.0	-16.8	1.01 H	12	42.00	-12.80
4	416.04	35.0 QP	46.0	-11.0	1.01 H	307	45.50	-10.50
5	780.83	28.2 QP	46.0	-17.8	1.01 H	12	31.50	-3.30
6	961.29	38.7 QP	54.0	-15.3	1.51 H	58	39.20	-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	31.84	38.2 QP	40.0	-1.8	1.99 V	48	53.90	-15.70
2	64.83	38.2 QP	40.0	-1.8	1.00 V	256	53.40	-15.20
3	140.50	39.2 QP	43.5	-4.3	1.24 V	13	53.50	-14.30
4	423.80	35.7 QP	46.0	-10.3	1.24 V	13	46.00	-10.30
5	780.83	32.1 QP	46.0	-13.9	1.24 V	13	35.40	-3.30
6	959.35	33.8 QP	46.0	-12.2	1.49 V	313	34.40	-0.60

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)
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 (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

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.

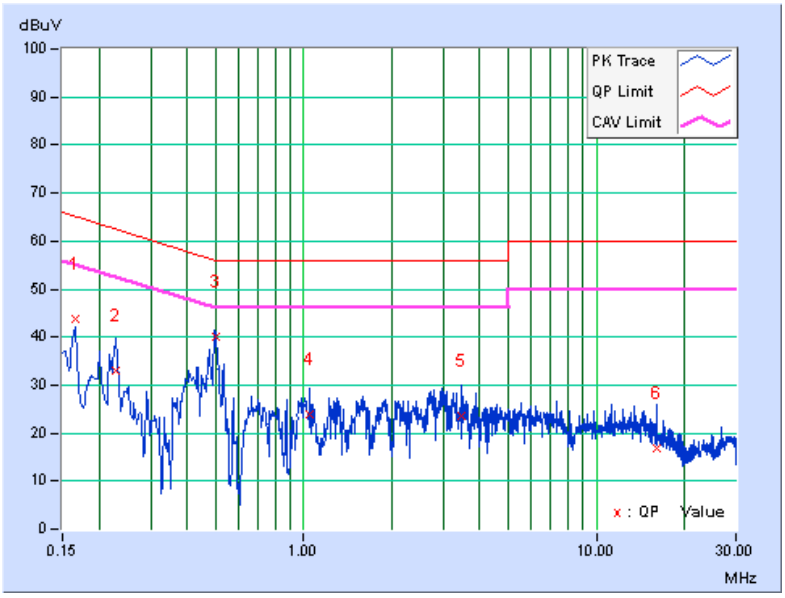
5.2.7 Test Results

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

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16564	0.05	43.71	32.60	43.76	32.65	65.18	55.18	-21.41	-22.52
2	0.22820	0.06	32.99	23.21	33.05	23.27	62.51	52.51	-29.46	-29.24
3	**0.49846**	**0.06**	**39.95**	**34.42**	**40.01**	**34.48**	**56.03**	**46.03**	**-16.01**	**-11.54**
4	1.04930	0.08	23.76	15.83	23.84	15.91	56.00	46.00	-32.16	-30.09
5	3.43831	0.17	23.52	14.83	23.69	15.00	56.00	46.00	-32.31	-31.00
6	16.14190	0.73	15.99	9.11	16.72	9.84	60.00	50.00	-43.28	-40.16

Remarks:

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

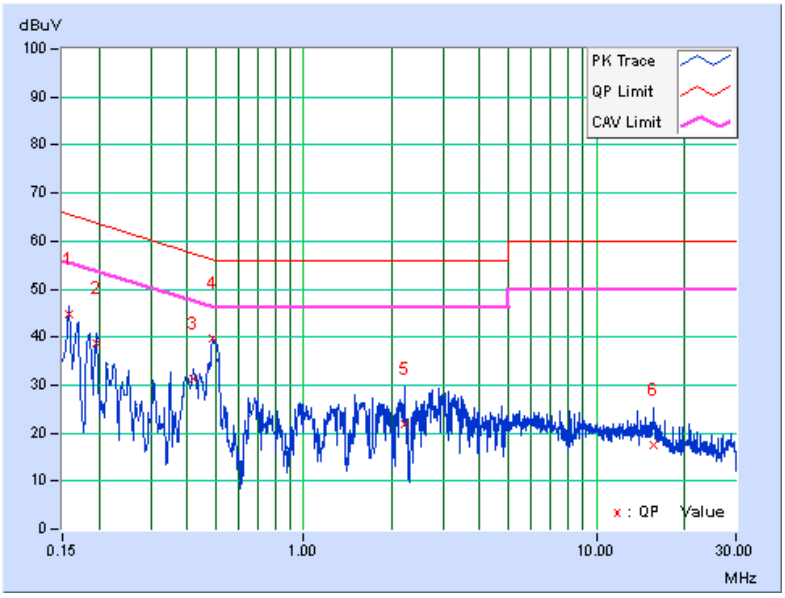


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15782	0.05	44.63	30.84	44.68	30.89	65.58	55.58	-20.90	-24.69
2	0.19692	0.05	38.59	27.85	38.64	27.90	63.74	53.74	-25.10	-25.84
3	0.41979	0.06	31.32	24.73	31.38	24.79	57.45	47.45	-26.07	-22.66
4	0.49017	0.06	39.54	29.87	39.60	29.93	56.16	46.16	-16.56	-16.23
5	2.21448	0.12	21.62	11.25	21.74	11.37	56.00	46.00	-34.26	-34.63
6	15.79000	0.60	17.05	10.10	17.65	10.70	60.00	50.00	-42.35	-39.30

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 0.5 MHz.

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 fromTest Standard

No deviation.

5.3.6 EUT Operating Conditions

Same as item 4.3.6.

5.3.7 Test Result

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
149	5745	16.41	16.41	16.41	0.5	Pass
157	5785	16.38	16.42	16.41	0.5	Pass
165	5825	16.39	16.41	16.42	0.5	Pass

802.11n (20MHz)

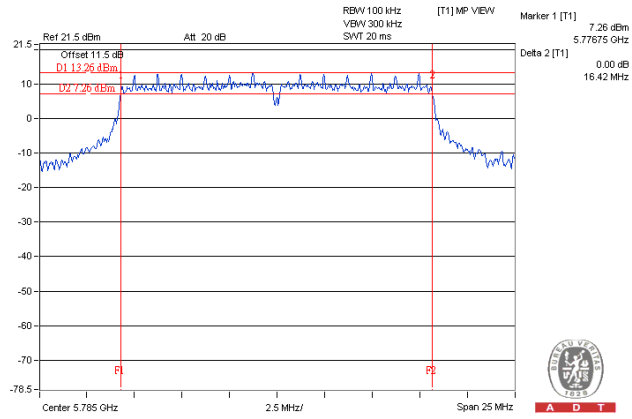
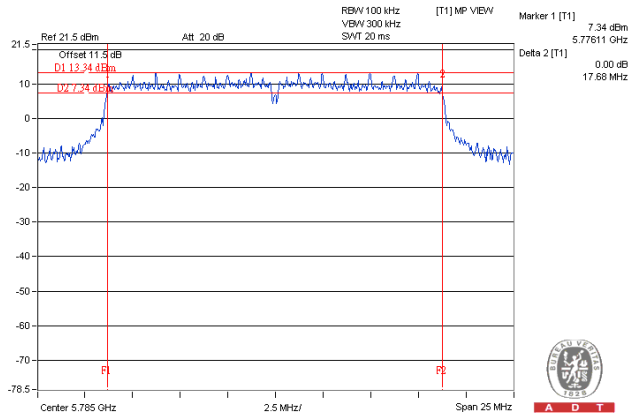
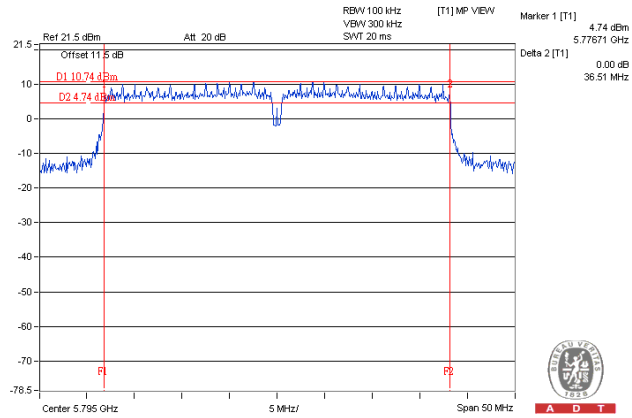
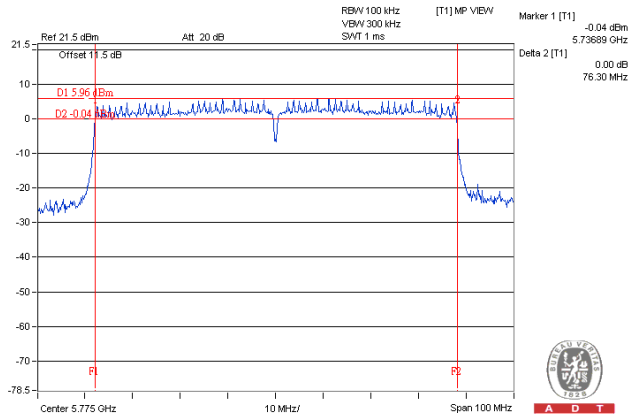
Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
149	5745	17.65	17.68	17.65	0.5	Pass
157	5785	17.62	17.68	17.64	0.5	Pass
165	5825	17.61	17.66	17.65	0.5	Pass

802.11n (40MHz)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
151	5755	36.46	36.47	36.49	0.5	Pass
159	5795	36.46	36.51	36.47	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	76.28	76.29	76.30	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 2400–2483.5 MHz bands: 1 Watt (30dBm)

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

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};
Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

For power measurements on all other devices: Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

5.4.2 Test Setup

Same as Item 4.5.2.

5.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

5.4.4 Test Procedures

Same as Item 4.5.4.

5.4.5 Deviation from Test Standard

No deviation.

5.4.6 EUT Operating Conditions

Same as Item 4.5.6.

5.4.7 Test Results

802.11a

Chan.	Freq. (MHz)	Average Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
149	5745	25.04	24.92	24.26	896.296	29.52	30.00	Pass
157	5785	25.27	24.97	24.14	909.981	29.59	30.00	Pass
165	5825	25.08	24.88	24.61	918.785	29.63	30.00	Pass

802.11n (20MHz)

Chan.	Freq. (MHz)	Average Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
149	5745	24.88	24.61	23.71	831.641	29.20	30.00	Pass
157	5785	25.01	24.81	24.32	890.044	29.49	30.00	Pass
165	5825	25.20	24.86	24.28	905.244	29.57	30.00	Pass

802.11n (40MHz)

Chan.	Freq. (MHz)	Average Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
151	5755	22.43	22.52	22.28	522.678	27.18	30.00	Pass
159	5795	25.30	25.21	24.39	**945.527**	29.76	30.00	Pass

802.11ac (80MHz)

Chan.	Freq. (MHz)	Average Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
155	5775	21.64	21.73	21.55	437.706	26.41	30.00	Pass

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 4.6.2.

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 4.6.4.

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	Chan.	Freq. (MHz)	PSD (dBm/10kHz)	10 log (N=3) dB	Duty Factor	Total PSD with Duty Factor (dBm/10kHz)	Limit (dBm/3kHz)	Pass / Fail
0	149	5745	-4.58	4.77	0.34	0.53	7.43	Pass
	157	5785	-5.06	4.77	0.34	0.05	7.43	Pass
	165	5825	-4.90	4.77	0.34	0.21	7.43	Pass
1	149	5745	-2.64	4.77	0.34	2.47	7.43	Pass
	157	5785	-4.06	4.77	0.34	1.05	7.43	Pass
	165	5825	-3.68	4.77	0.34	1.43	7.43	Pass
2	149	5745	-5.14	4.77	0.34	-0.03	7.43	Pass
	157	5785	-6.06	4.77	0.34	-0.95	7.43	Pass
	165	5825	-5.26	4.77	0.34	-0.15	7.43	Pass

Note:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 1.8dBi + 10log(3) = 6.57dBi > 6dBi, so the power density limit shall be reduced to 8-(6.57-6) = 7.43dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (20MHz)

TX chain	Chan.	Freq. (MHz)	PSD (dBm/10kHz)	10 log (N=3) dB	Total PSD (dBm/10kHz)	Limit (dBm/3kHz)	Pass / Fail
0	149	5745	-5.70	4.77	-0.93	7.43	Pass
	157	5785	-4.74	4.77	0.03	7.43	Pass
	165	5825	-5.26	4.77	-0.49	7.43	Pass
1	149	5745	-3.79	4.77	0.98	7.43	Pass
	157	5785	-3.13	4.77	1.64	7.43	Pass
	165	5825	-2.22	4.77	2.55	7.43	Pass
2	149	5745	-6.61	4.77	-1.84	7.43	Pass
	157	5785	-6.22	4.77	-1.45	7.43	Pass
	165	5825	-5.93	4.77	-1.16	7.43	Pass

Note:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 1.8dBi + 10log(3) = 6.57dBi > 6dBi, so the power density limit shall be reduced to 8-(6.57-6) = 7.43dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (40MHz)

TX chain	Chan.	Freq. (MHz)	PSD (dBm/10kHz)	10 log (N=3) dB	Duty Factor	Total PSD with Duty Factor (dBm/10kHz)	Limit (dBm/3kHz)	Pass / Fail
0	151	5755	-9.62	4.77	0.46	-4.39	7.43	Pass
	159	5795	-7.94	4.77	0.46	-2.71	7.43	Pass
1	151	5755	-10.28	4.77	0.46	-5.05	7.43	Pass
	159	5795	-5.03	4.77	0.46	0.20	7.43	Pass
2	151	5755	-10.03	4.77	0.46	-4.80	7.43	Pass
	159	5795	-8.83	4.77	0.46	-3.60	7.43	Pass

Note:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 1.8dBi + 10log(3) = 6.57dBi > 6dBi, so the power density limit shall be reduced to 8-(6.57-6) = 7.43dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

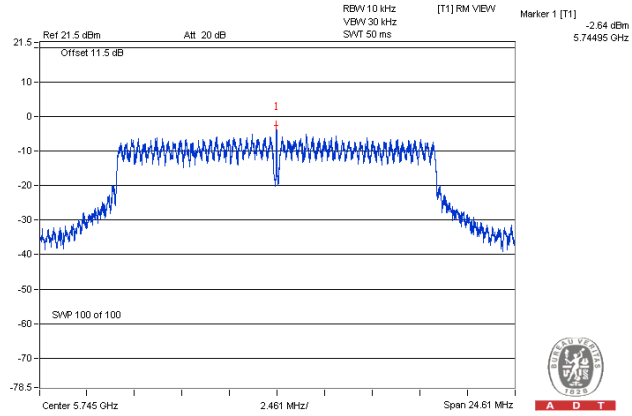
802.11ac (80MHz)

TX chain	Chan.	Freq. (MHz)	PSD (dBm/10kHz)	10 log (N=3) dB	Duty Factor	Total PSD with Duty Factor (dBm/10kHz)	Limit (dBm/3kHz)	Pass / Fail
0	155	5775	-14.15	4.77	0.71	-8.67	7.43	Pass
1	155	5775	-14.06	4.77	0.71	-8.58	7.43	Pass
2	155	5775	-14.06	4.77	0.71	-8.58	7.43	Pass

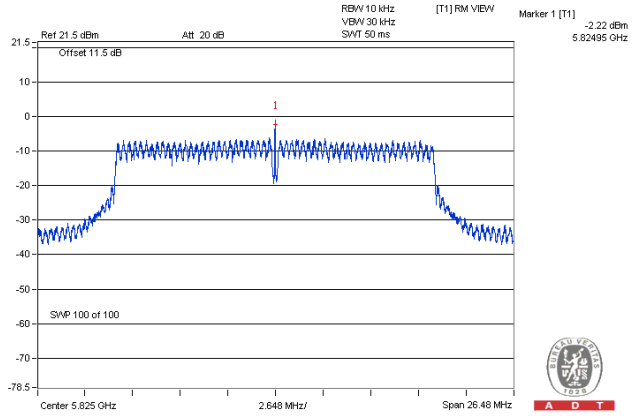
Note:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 1.8dBi + 10log(3) = 6.57dBi > 6dBi, so the power density limit shall be reduced to 8-(6.57-6) = 7.43dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

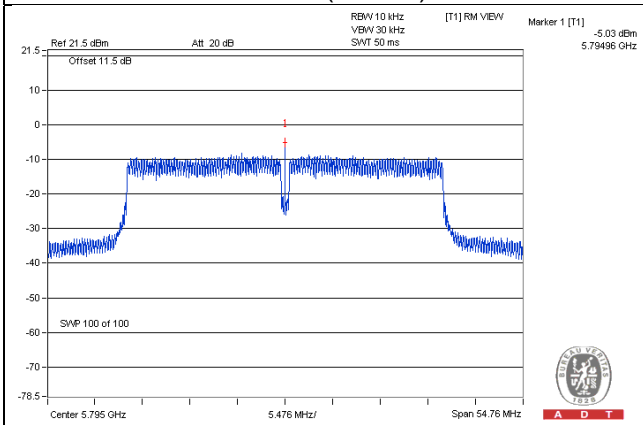
802.11a



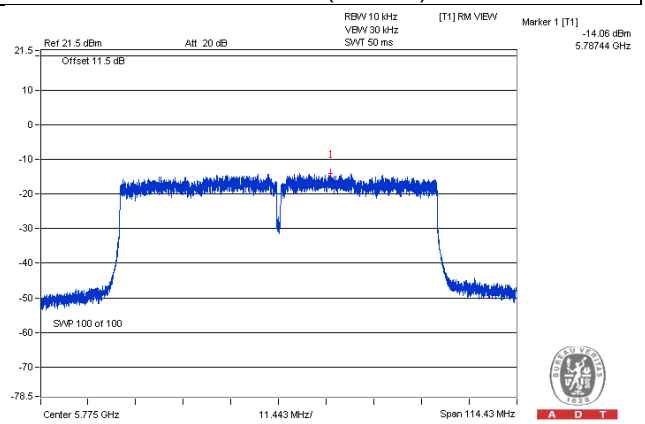
802.11n (20MHz)



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 4.7.2

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 4.7.4

5.6.5 Deviation from Test Standard

No deviation.

5.6.6 EUT Operating Condition

Same as Item 4.3.6

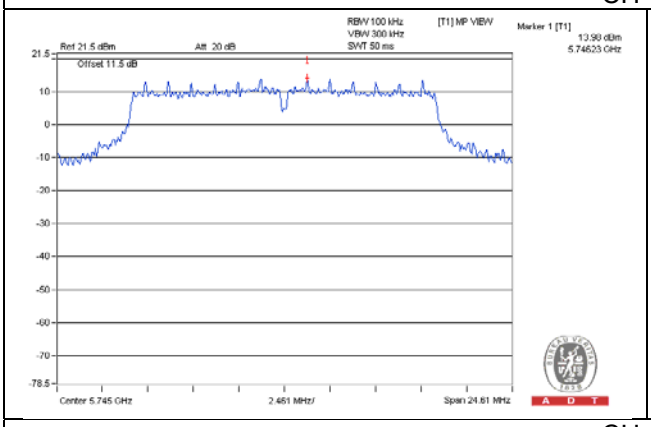
5.6.7 Test Results

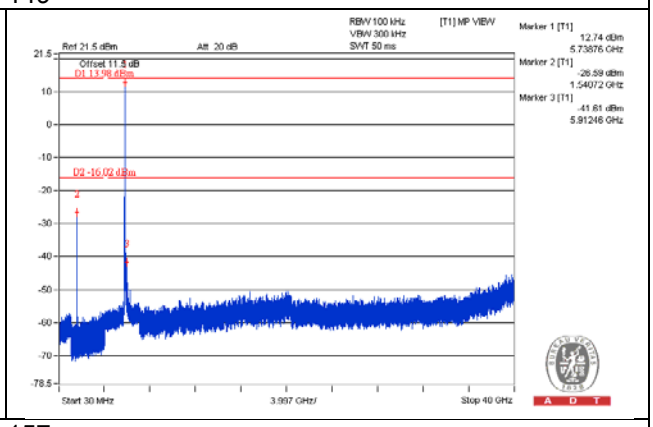
The conducted emission test is performed on each TX port of operating mode without summing or adding 10log (N) since the limit is relative emission limit.

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.

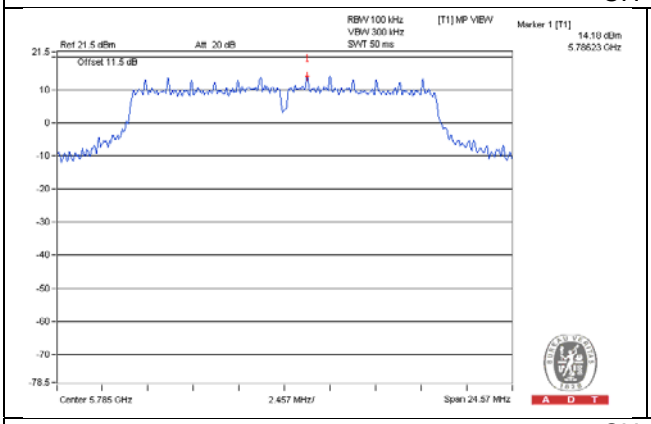
802.11a_ CHAIN 0

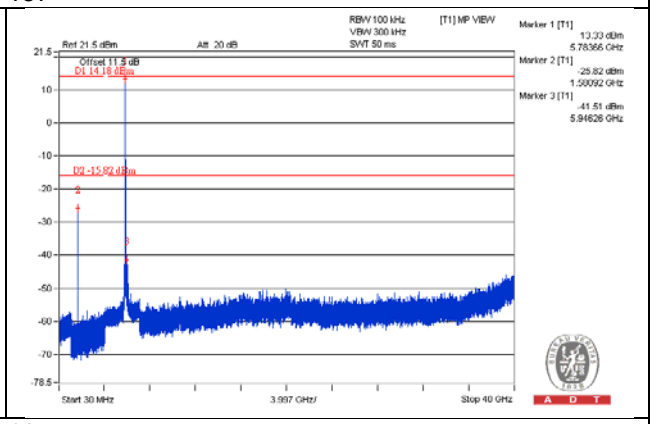
CH 149



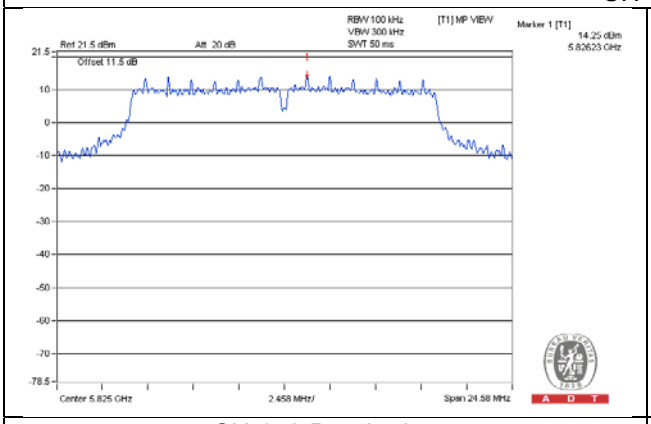


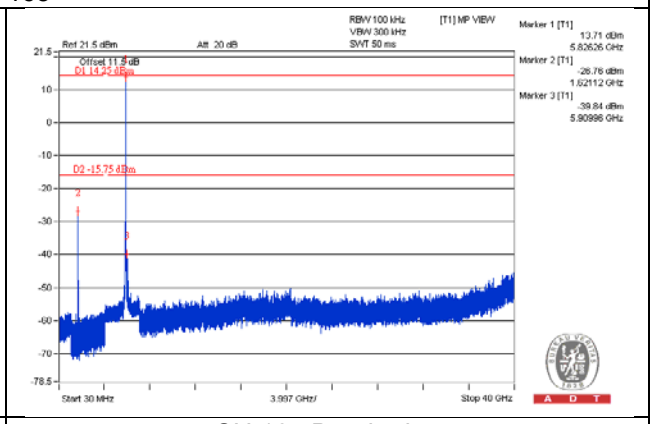
CH 157



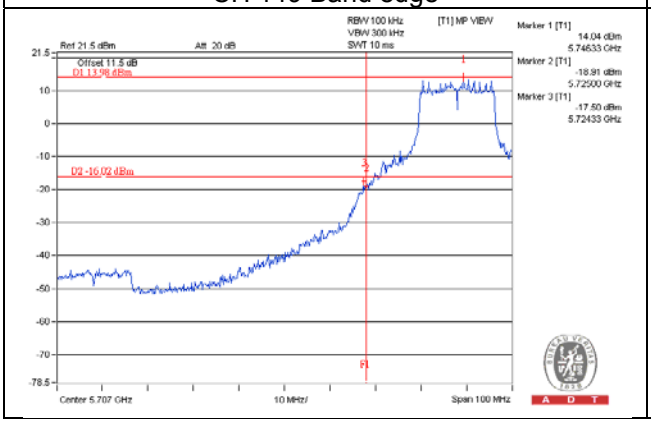


CH 165

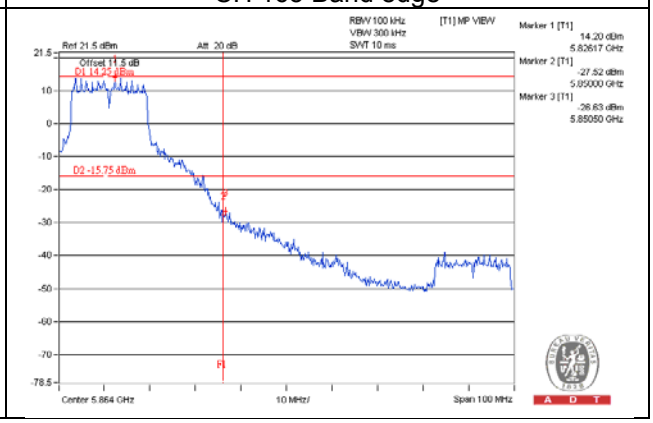




CH 149 Band edge

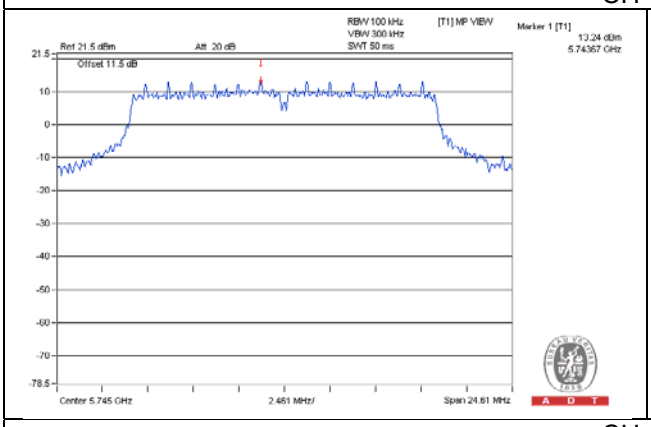


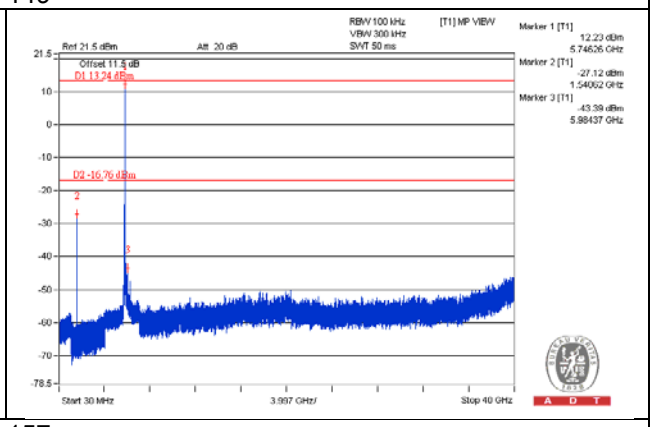
CH 165 Band edge



802.11a_ CHAIN 1

CH 149





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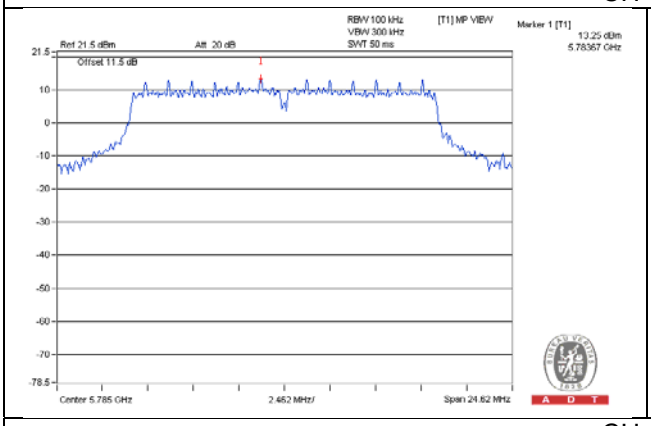

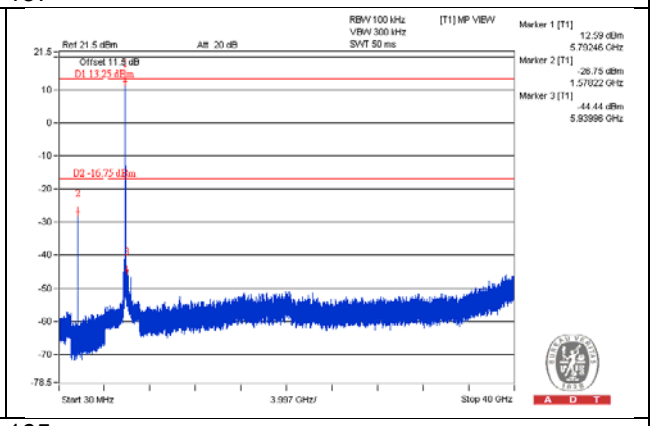

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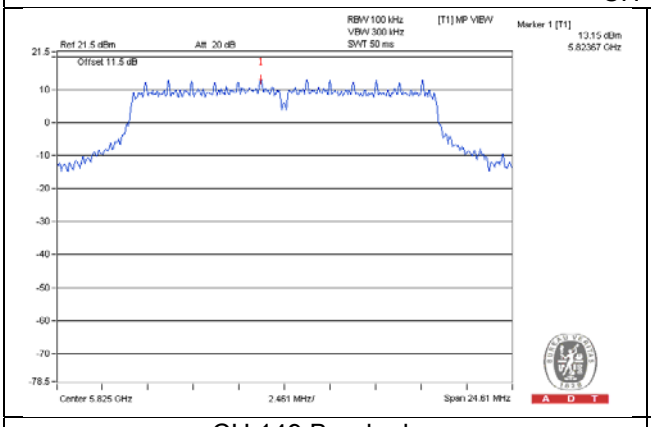
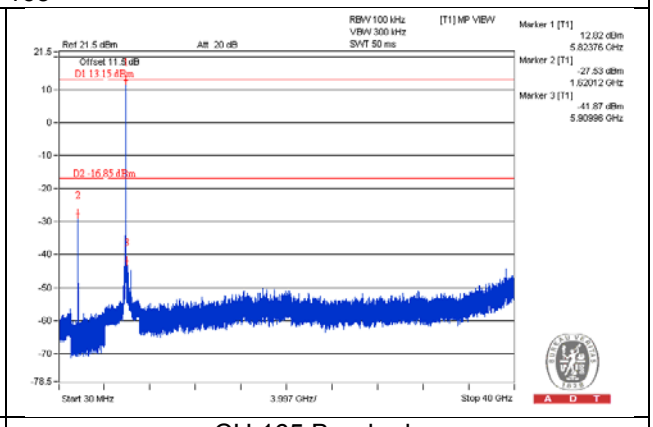
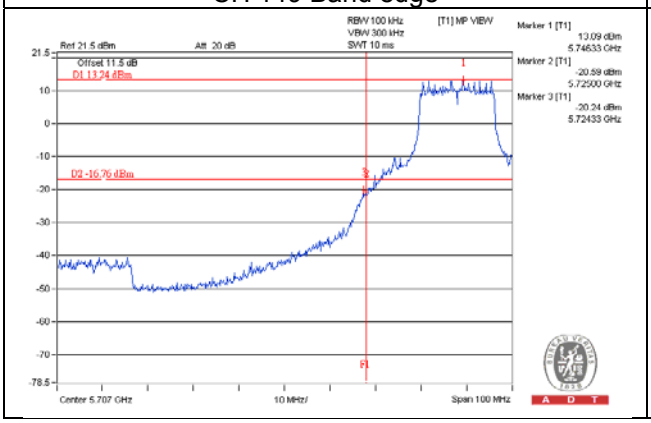
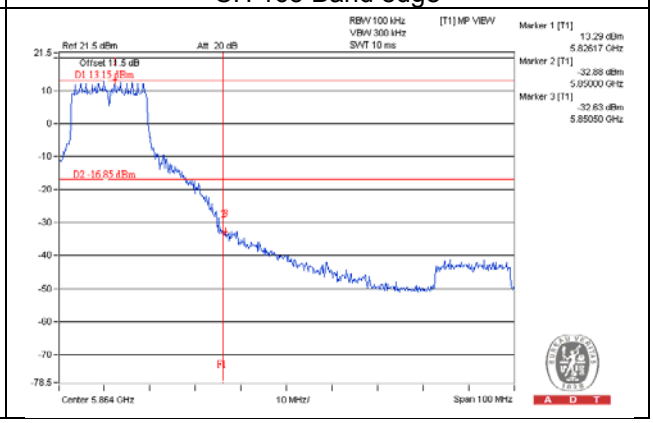




CH 149 Band edge

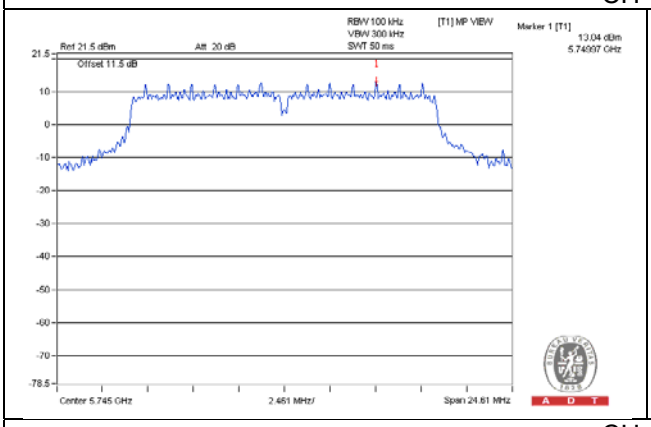


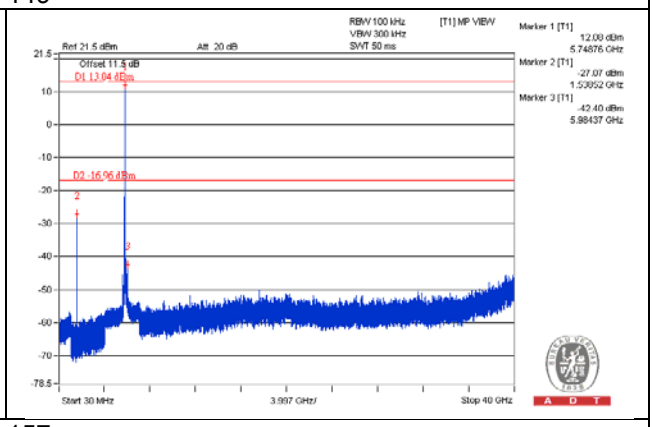
CH 165 Band edge



802.11a_ CHAIN 2

CH 149





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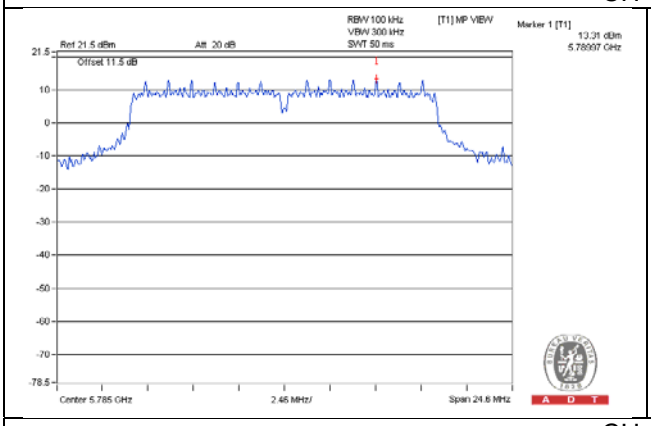

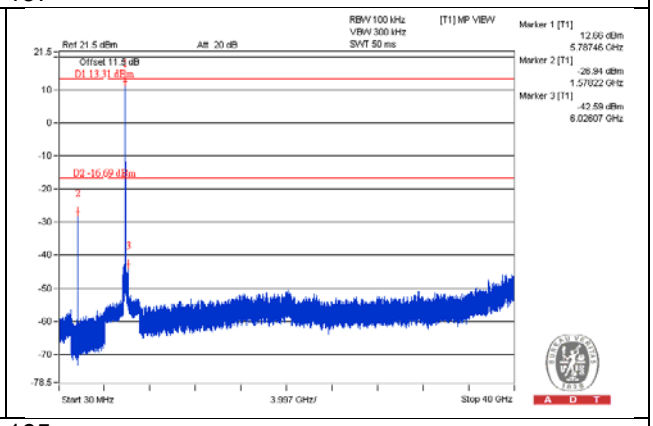

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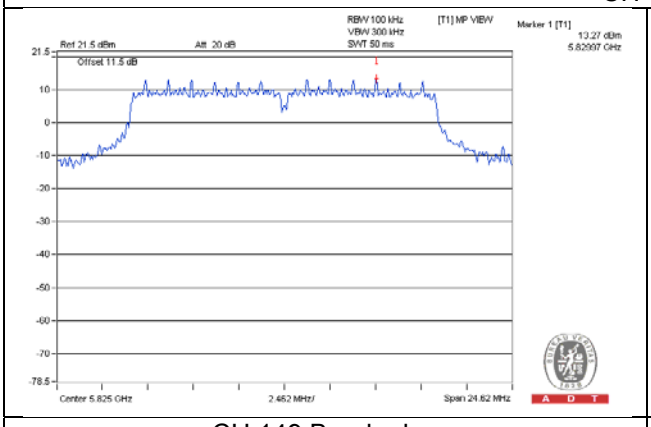
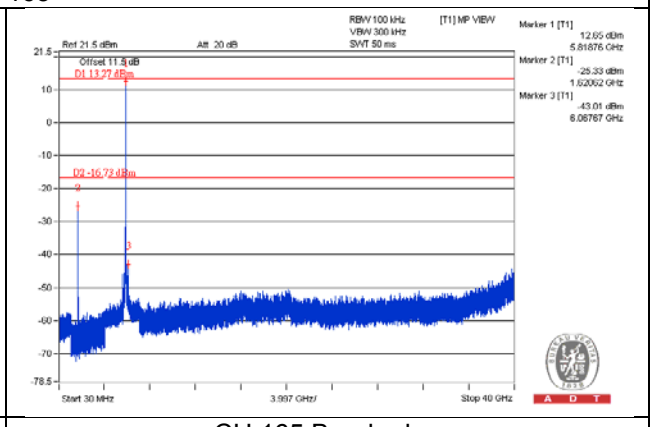
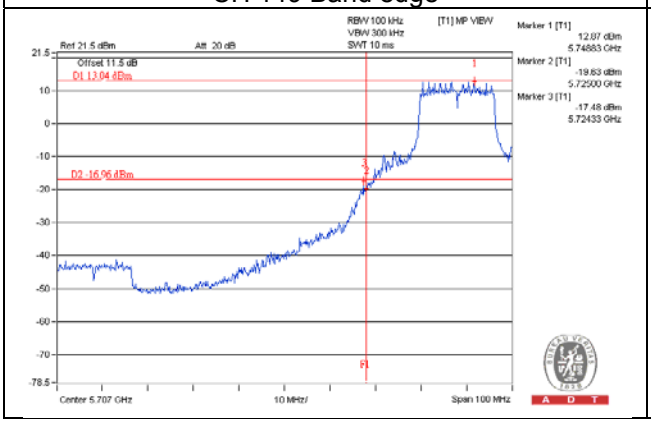
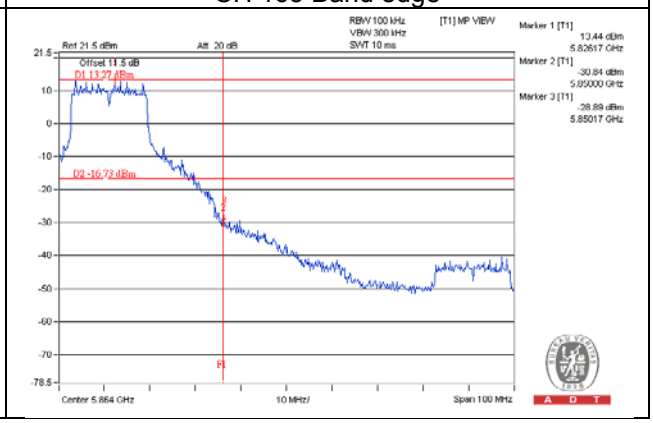




CH 149 Band edge

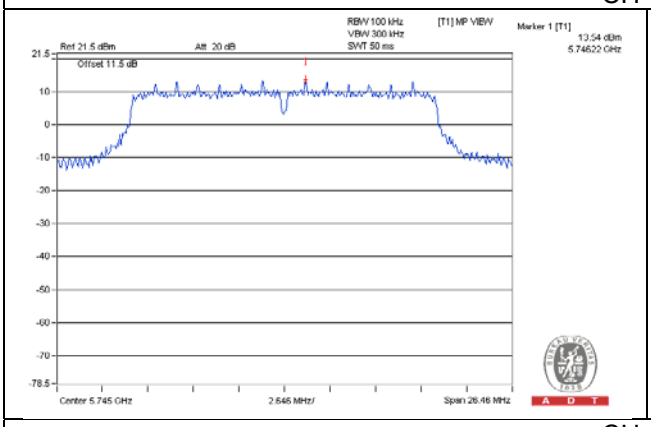


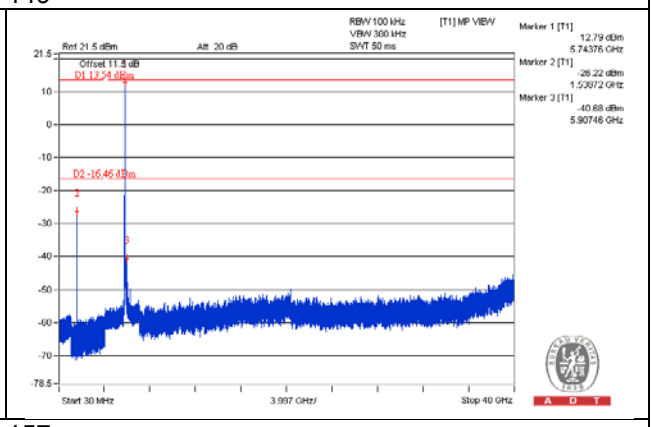
CH 165 Band edge



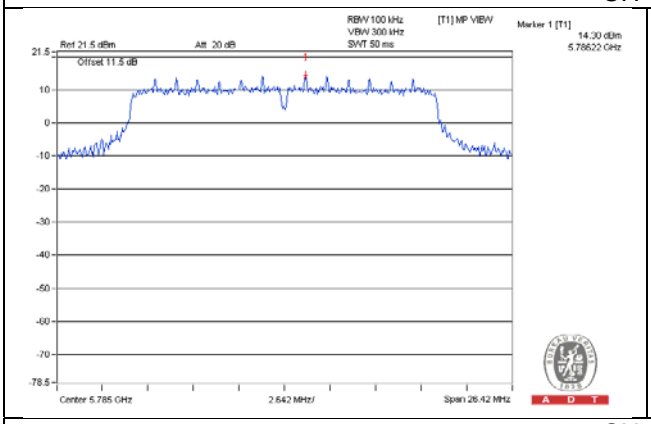
802.11n (20MHz)_ CHAIN 0

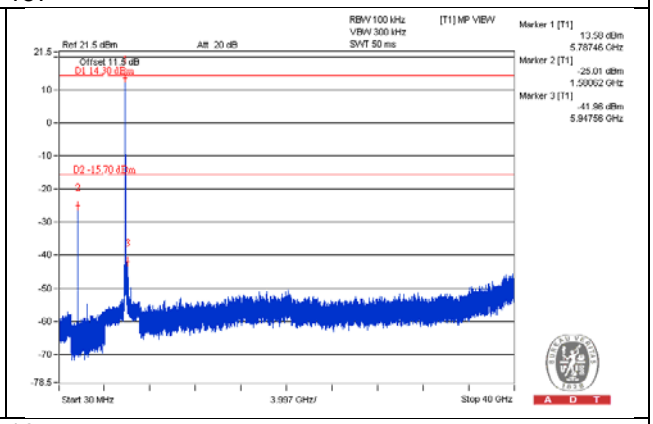
CH 149





CH 157





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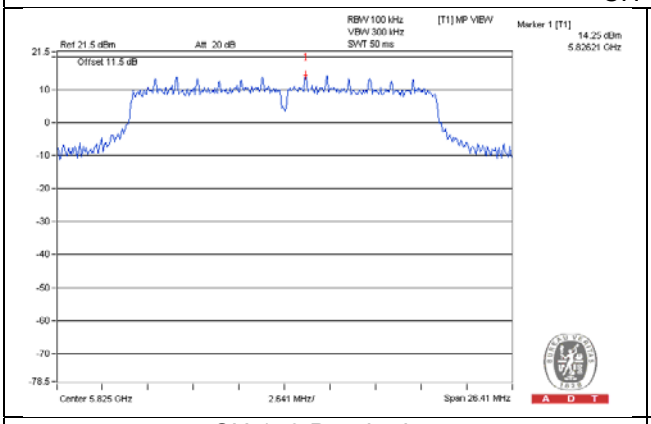
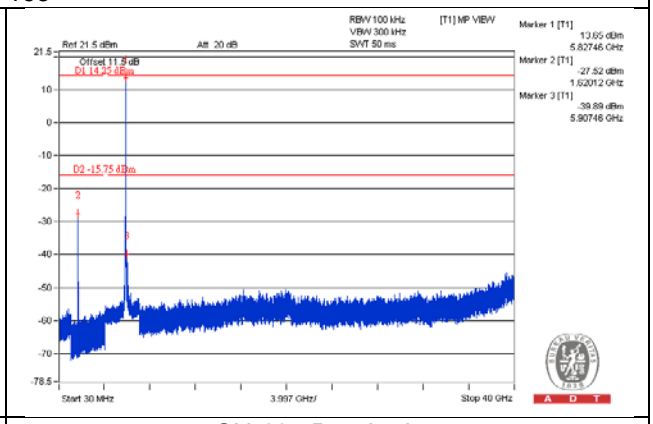
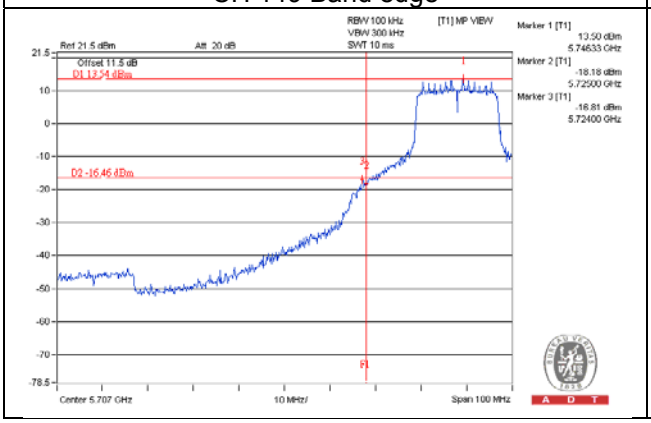
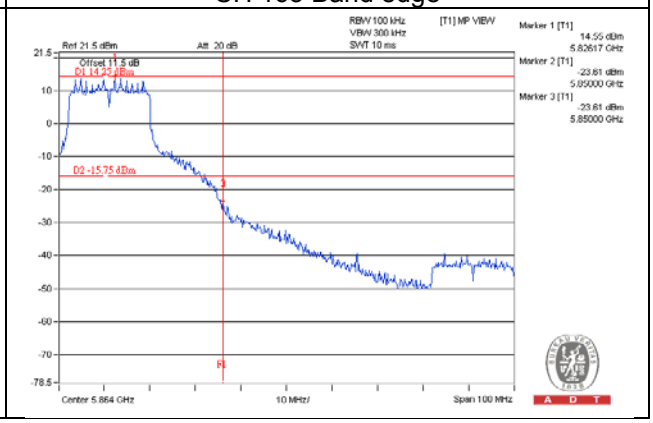




CH 149 Band edge

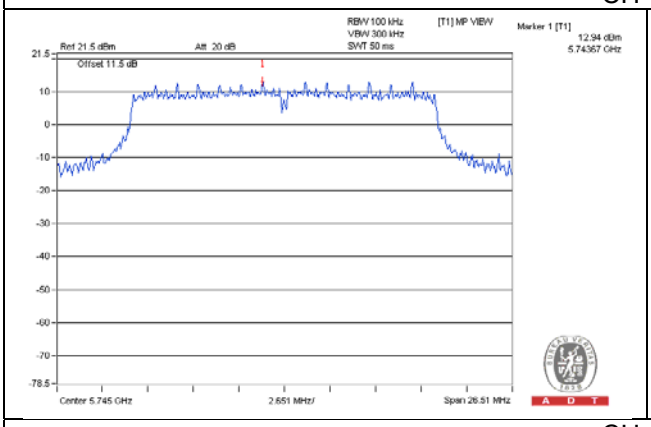


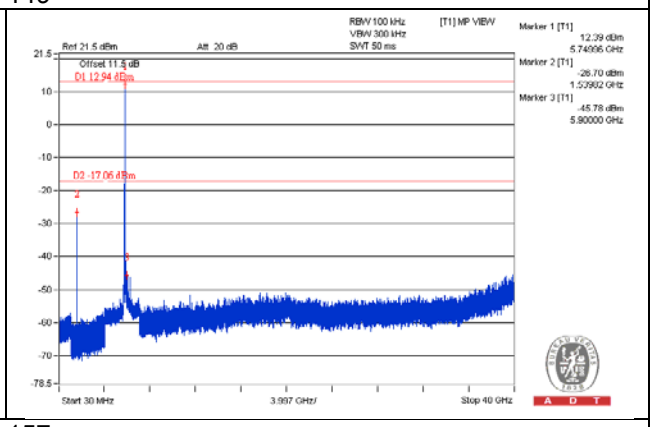
CH 165 Band edge



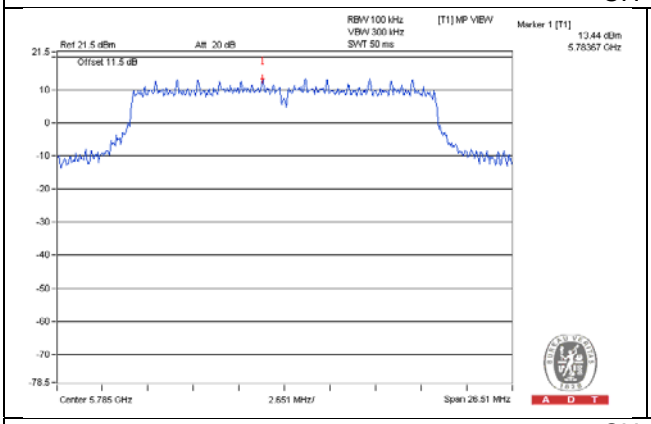
802.11n (20MHz)_ CHAIN 1

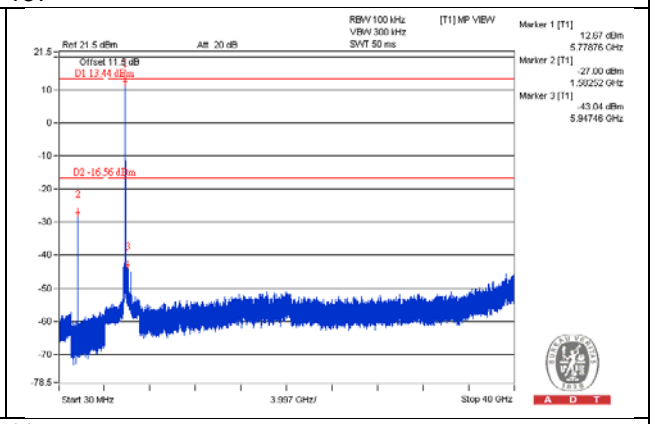
CH 149





CH 157





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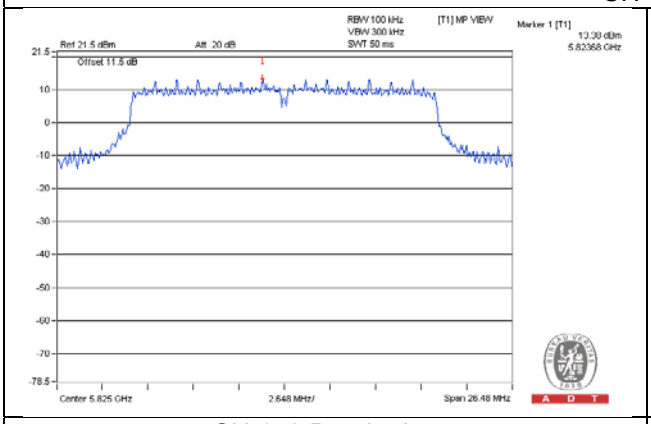
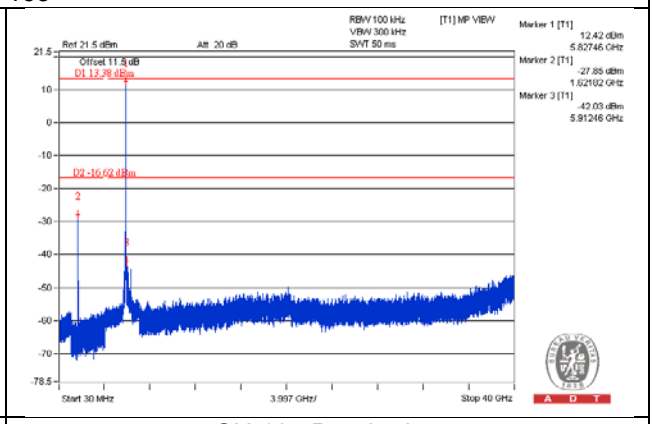
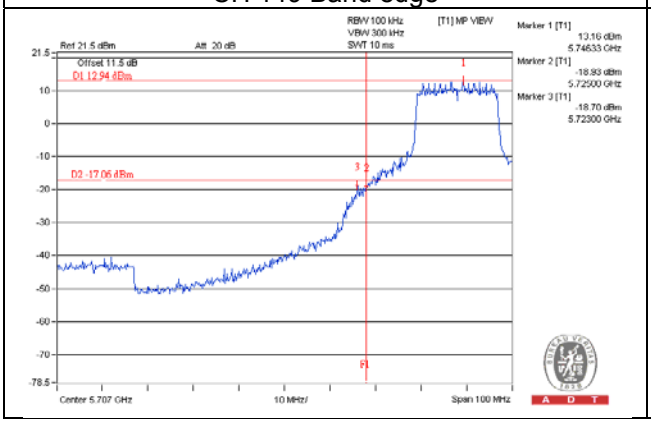
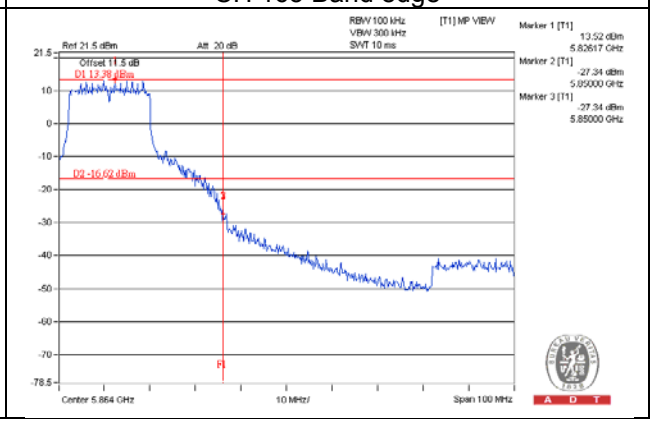




CH 149 Band edge

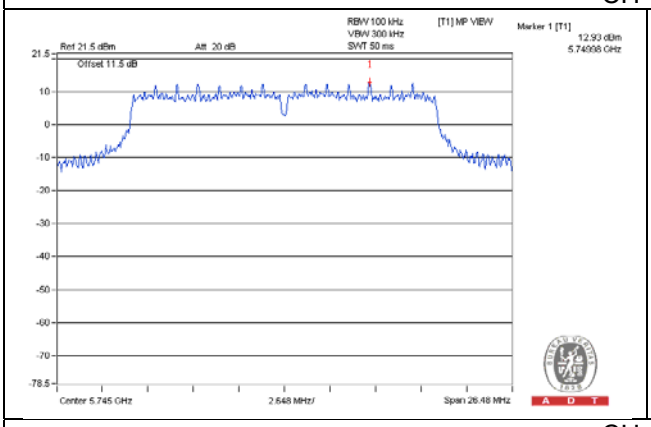


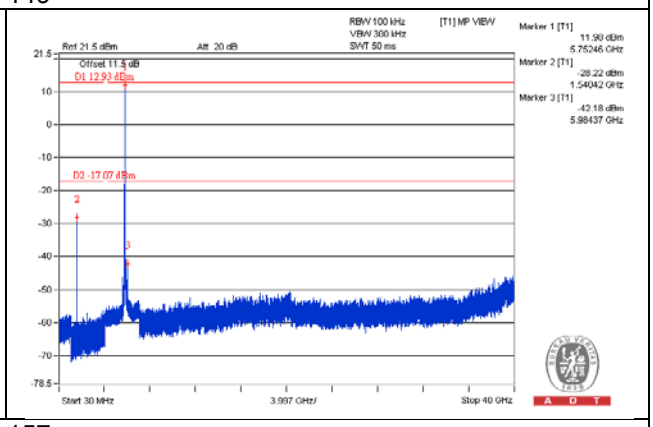
CH 165 Band edge



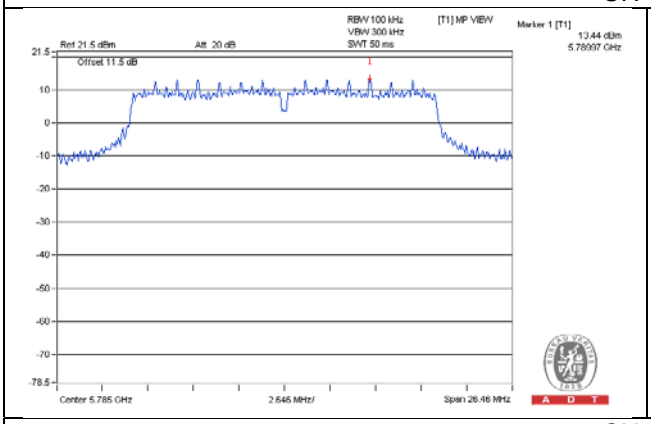
802.11n (20MHz)_ CHAIN 2

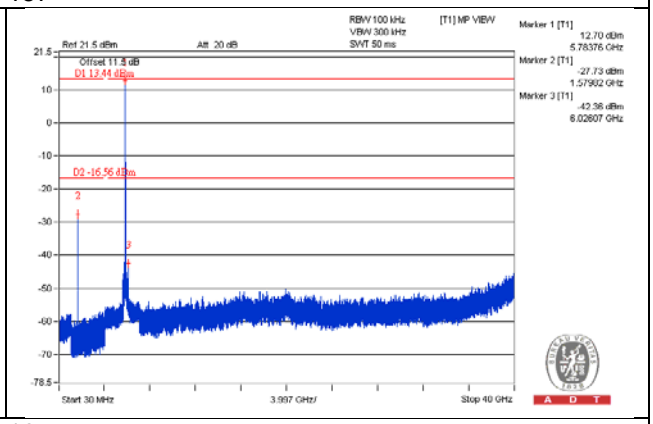
CH 149





CH 157





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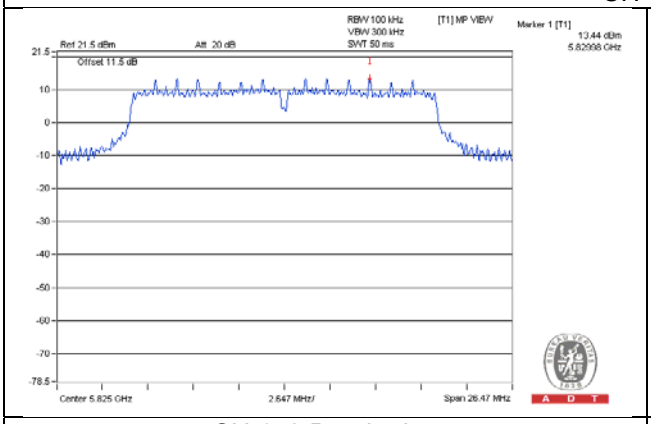
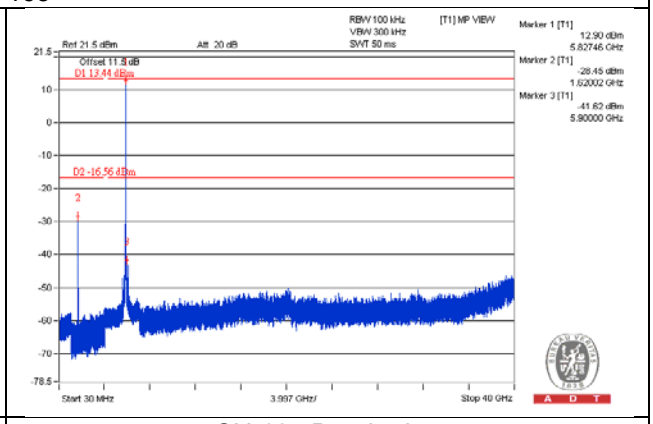
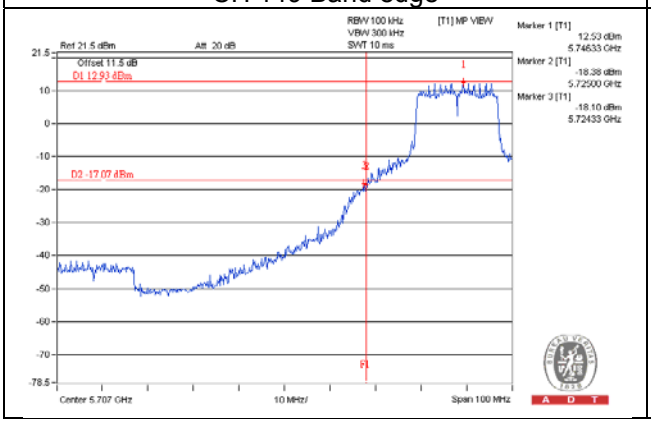
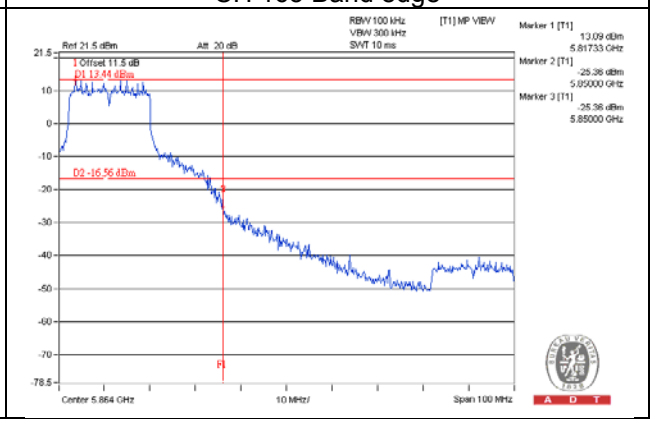




CH 149 Band edge

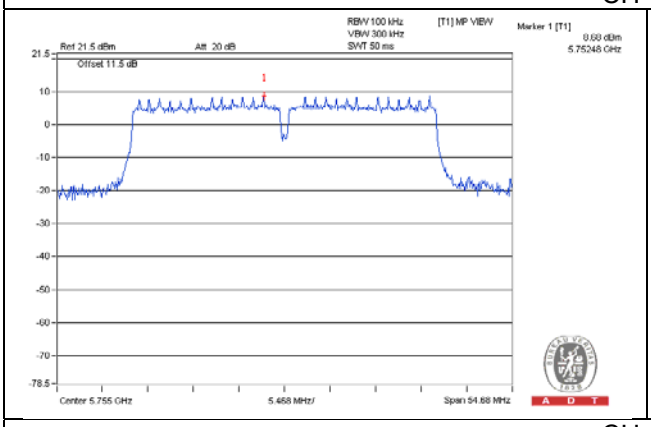


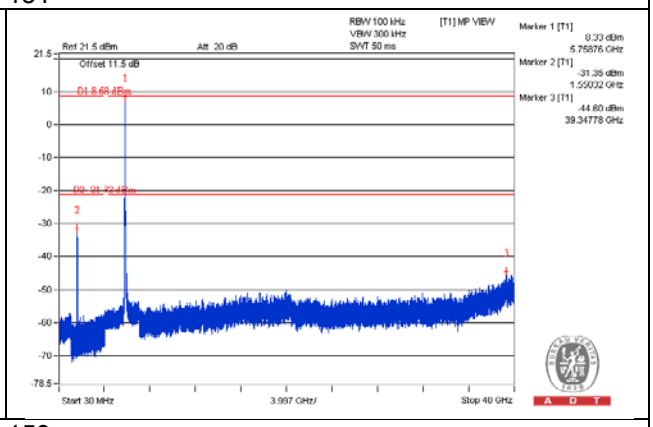
CH 165 Band edge



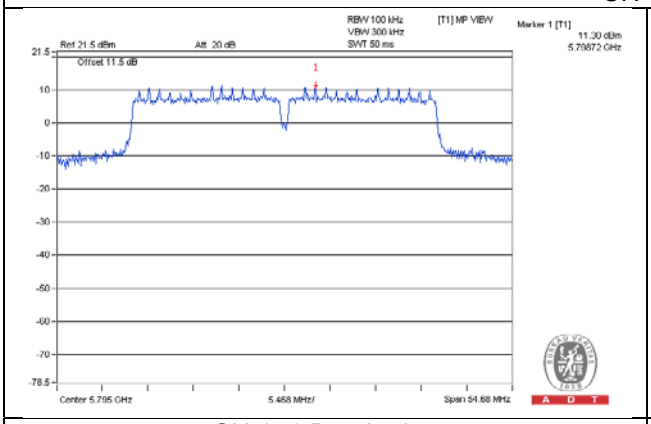
802.11n (40MHz)_ CHAIN 0

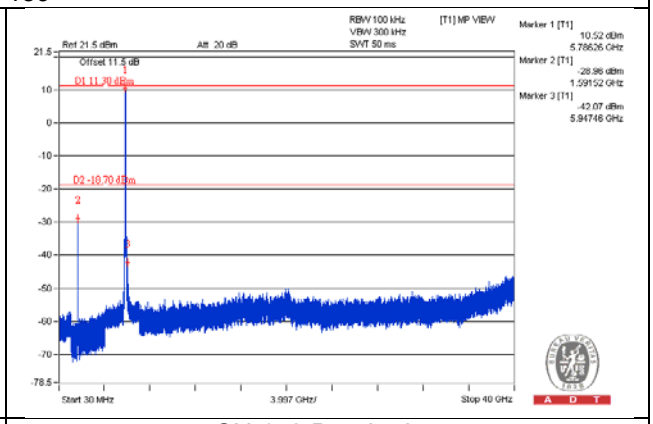
CH 151



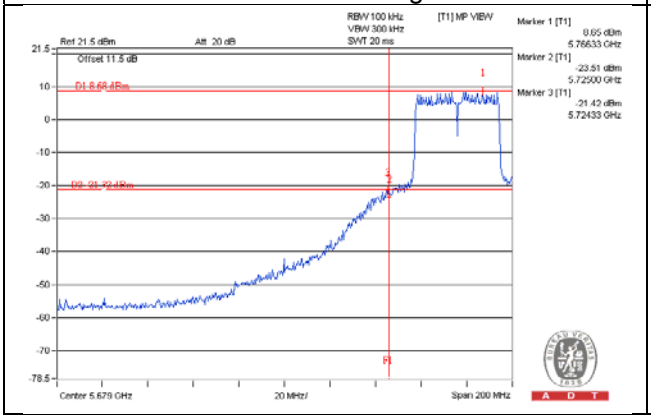


CH 159

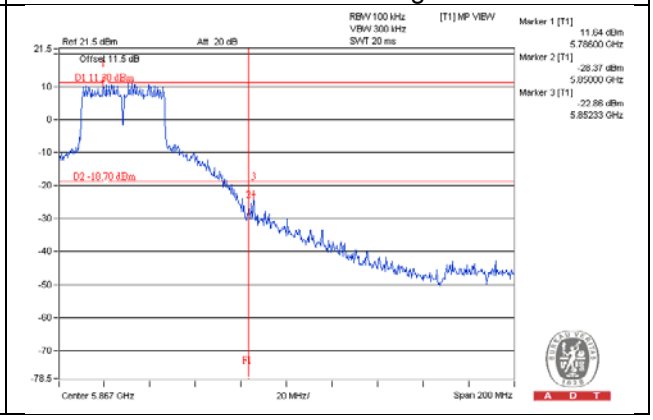




CH 151 Band edge

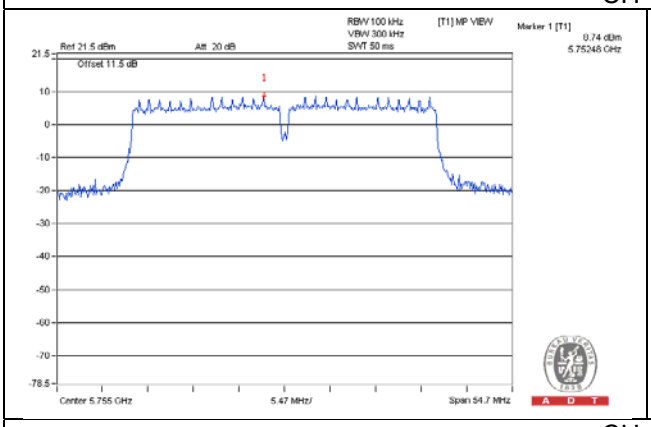


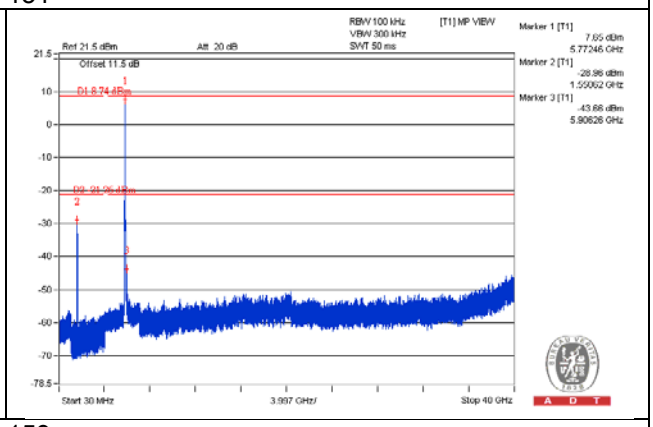
CH 159 Band edge



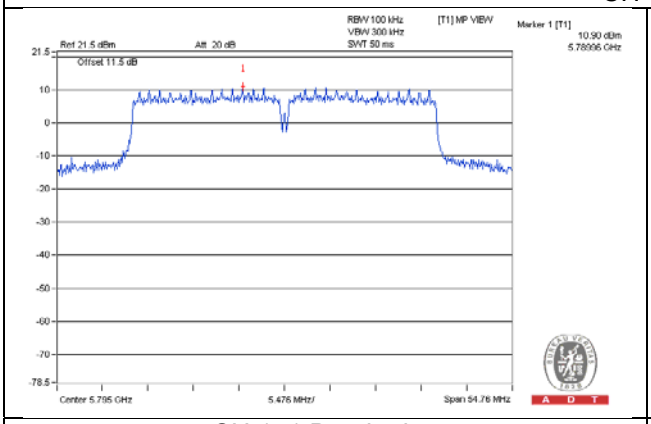
802.11n (40MHz)_ CHAIN 1

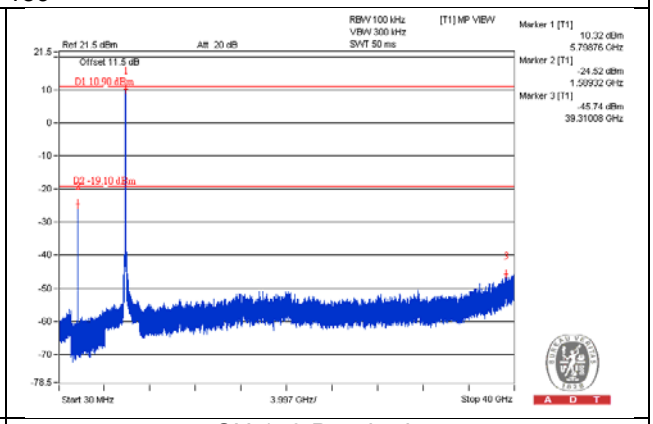
CH 151



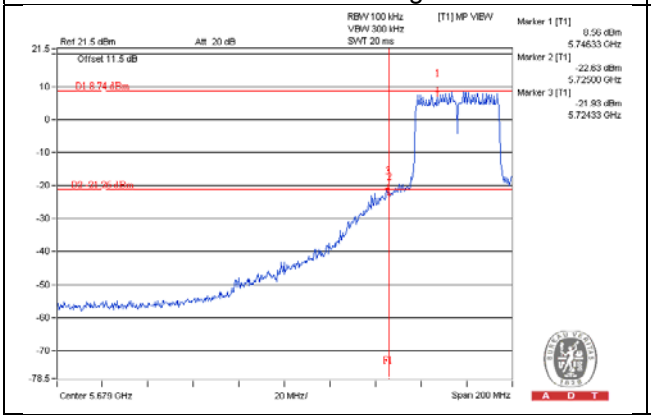


CH 159

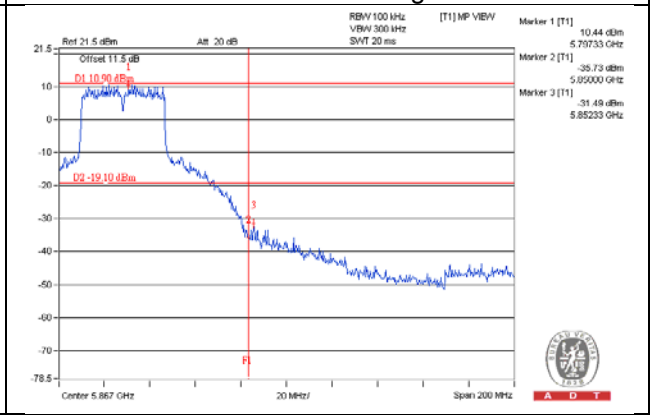




CH 151 Band edge

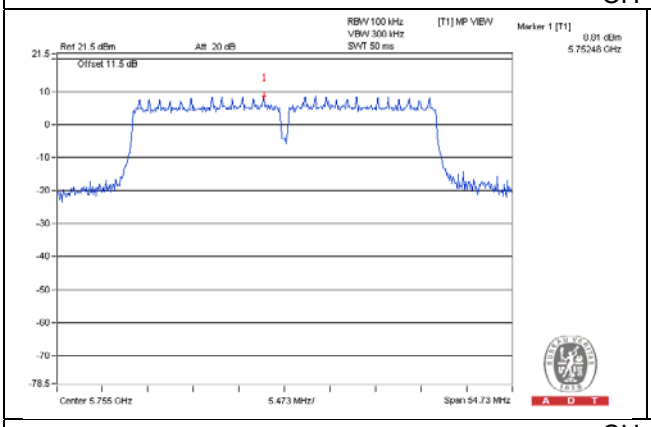


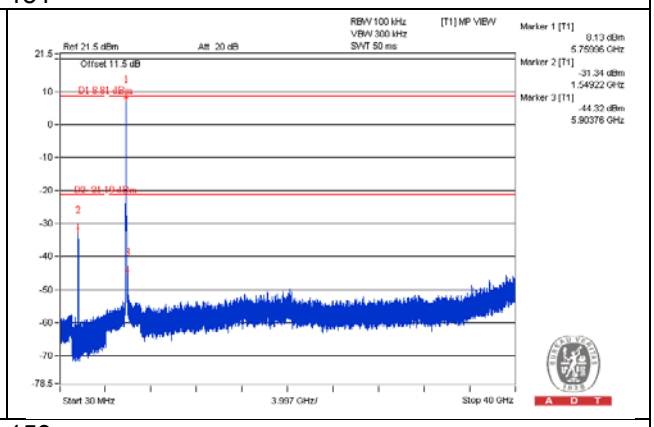
CH 159 Band edge



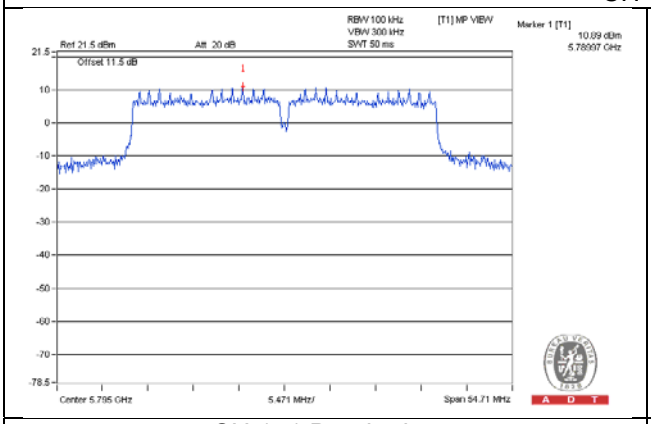
802.11n (40MHz)_ CHAIN 2

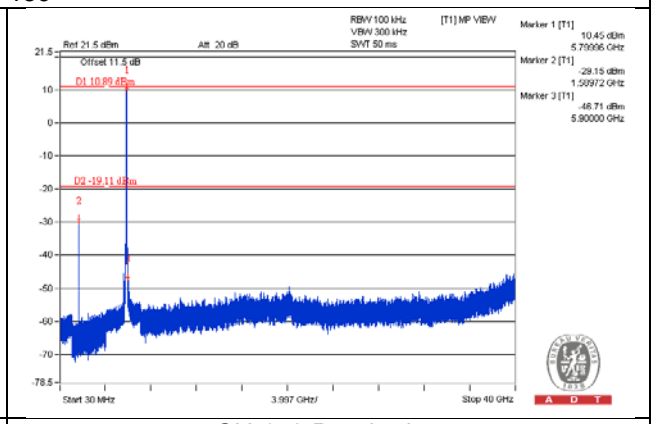
CH 151



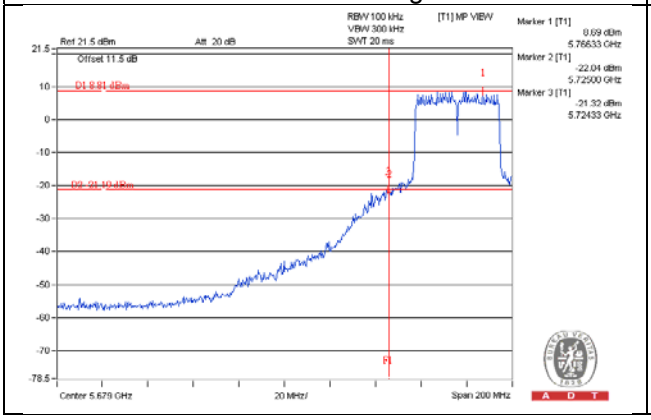


CH 159

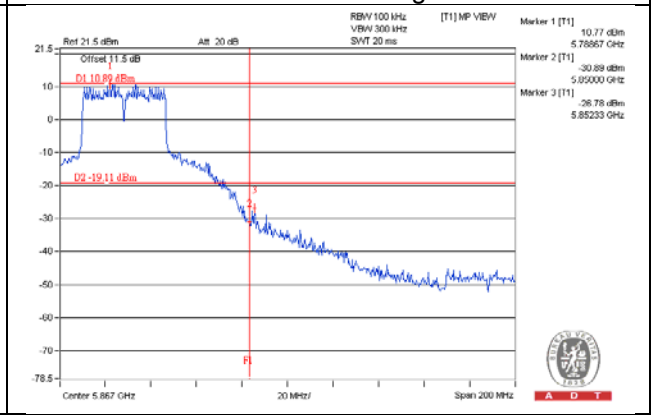




CH 151 Band edge

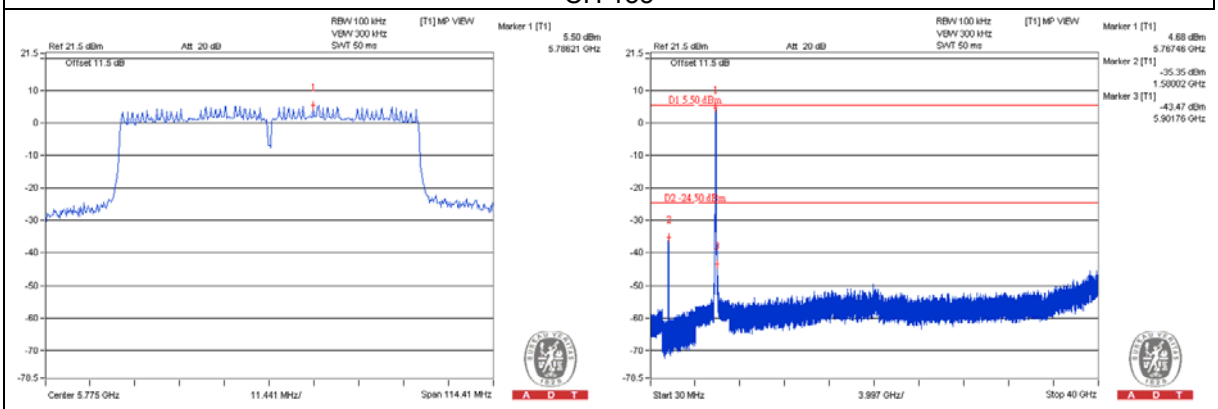


CH 159 Band edge

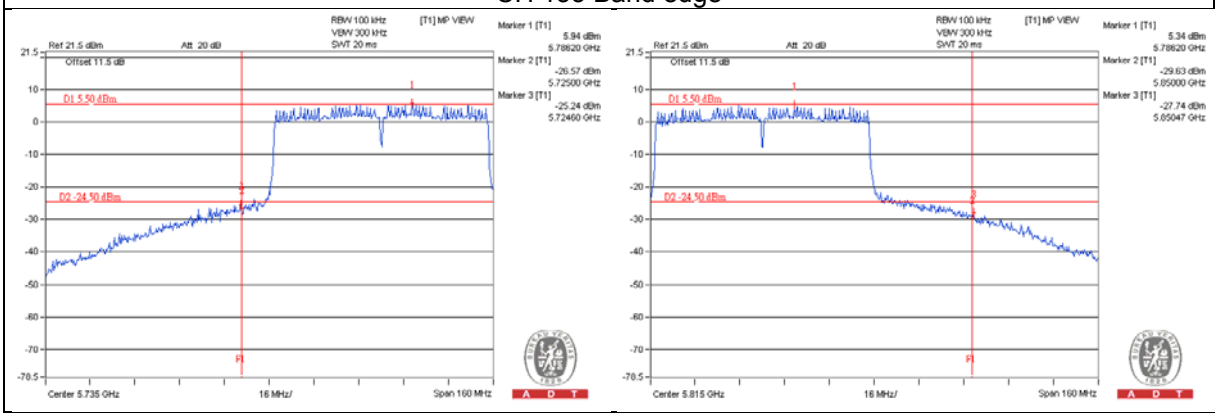


802.11ac (80MHz)_ CHAIN 0

CH 155

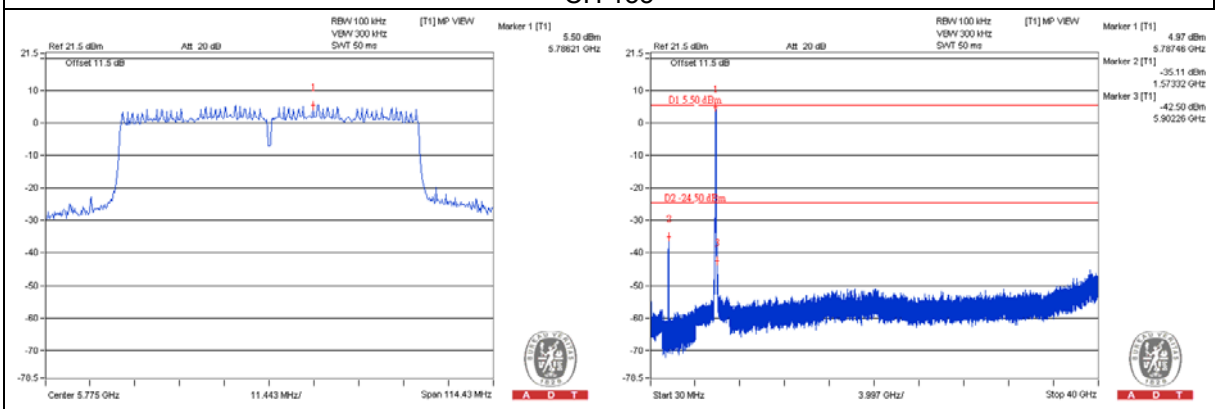


CH 155 Band edge

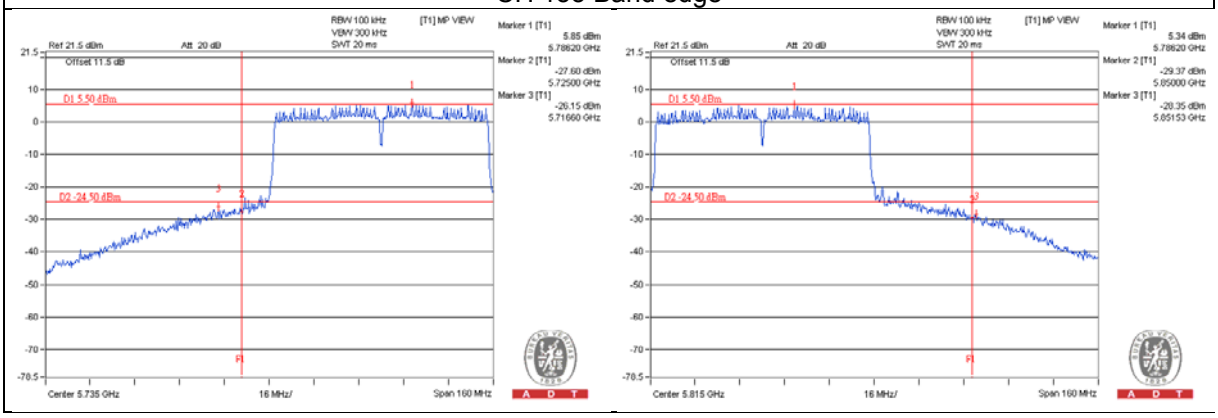


802.11ac (80MHz)_ CHAIN 1

CH 155

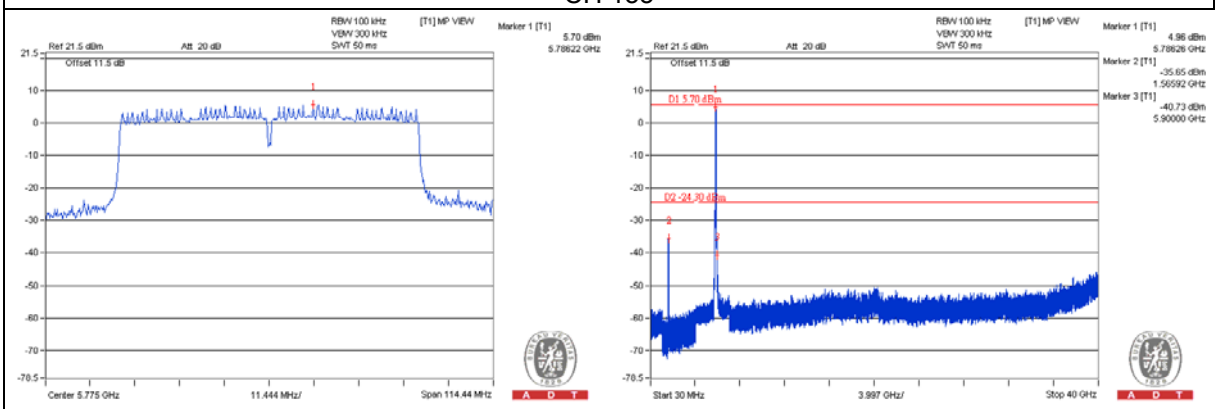


CH 155 Band edge

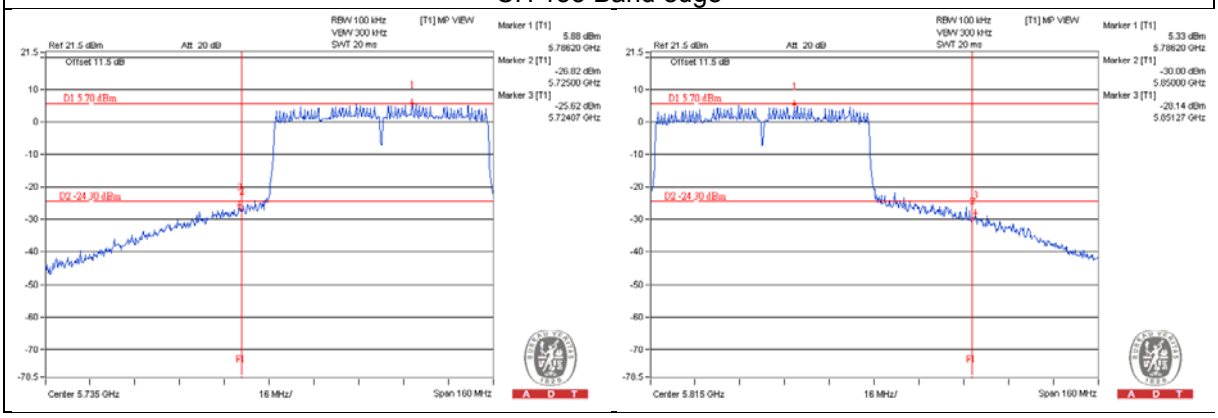


802.11ac (80MHz)_ CHAIN 2

CH 155



CH 155 Band edge



6 Pictures of Test Arrangements

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

Appendix – Information on the Testing Laboratories

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

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

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

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

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