FCC Test Report

Report No.: RF150802C01

FCC ID: MSQ-CMBT00

Test Model: CM-32_AC2600

Received Date: Aug. 02, 2015

Test Date: Nov. 19 ~ Nov. 30, 2015

Issued Date: Nov. 30, 2015

Applicant: ASUSTek COMPUTER INC.

Address: 4F, NO. 150, LI-TE RD. PEITOU, TAIPEI 112, TAIWAN

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

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Test Location: No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)

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This report should not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

Table of Contents

Release Control Record 5

1 Certificate of Conformity 6

2 Summary of Test Results 7

2.1 Measurement Uncertainty 7
2.2 Modification Record 7

3 General Information 8

3.1 General Description of EUT 8
3.2 Description of Test Modes 10
3.2.1 Test Mode Applicability and Tested Channel Detail 11
3.3 Duty Cycle of Test Signal 15
3.4 Description of Support Units 19
3.4.1 Configuration of System under Test 19
3.5 General Description of Applied Standards 19

4 Test Types and Results (For 2.4GHz Band) 20

4.1 Radiated Emission and Bandedge Measurement 20
4.1.1 Limits of Radiated Emission and Bandedge Measurement 20
4.1.2 Test Instruments 21
4.1.3 Test Procedures 22
4.1.4 Deviation from Test Standard 22
4.1.5 Test Set Up 23
4.1.6 EUT Operating Conditions 23
4.1.7 Test Results 24
4.2 Conducted Emission Measurement 43
4.2.1 Limits of Conducted Emission Measurement 43
4.2.2 Test Instruments 43
4.2.3 Test Procedures 44
4.2.4 Deviation from Test Standard 44
4.2.5 Test Setup 44
4.2.6 EUT Operating Conditions 44
4.2.7 Test Results 45
4.3 6dB Bandwidth Measurement 47
4.3.1 Limits of 6dB Bandwidth Measurement 47
4.3.2 Test Setup 47
4.3.3 Test Instruments 47
4.3.4 Test Procedure 47
4.3.5 Deviation fromTest Standard 47
4.3.6 EUT Operating Conditions 47
4.3.7 Test Result 48
4.4 Conducted Output Power Measurement 51
4.4.1 Limits of Conducted Output Power Measurement 51
4.4.2 Test Setup 51
4.4.3 Test Instruments 51
4.4.4 Test Procedures 51
4.4.5 Deviation from Test Standard 51
4.4.6 EUT Operating Conditions 51
4.4.7 Test Results 52
4.5 Power Spectral Density Measurement 54
4.5.1 Limits of Power Spectral Density Measurement 54
4.5.2 Test Setup 54
4.5.3 Test Instruments 54
4.5.4 Test Procedure 54
4.5.5 Deviation from Test Standard 55
4.5.6 EUT Operating Condition 55

4.5.7 Test Results 56
4.6 Conducted Out of Band Emission Measurement 64
4.6.1 Limits of Conducted Out of Band Emission Measurement 64
4.6.2 Test Setup 64
4.6.3 Test Instruments 64
4.6.4 Test Procedure 64
4.6.5 Deviation from Test Standard 65
4.6.6 EUT Operating Condition 65
4.6.7 Test Results 65

5 Test Types and Results (For 5.0GHz Band) 90

5.1 Radiated Emission and Bandedge Measurement 90
5.1.1 Limits of Radiated Emission and Bandedge Measurement 90
5.1.2 Test Instruments 90
5.1.3 Test Procedures 90
5.1.4 Deviation from Test Standard 90
5.1.5 Test Setup 90
5.1.6 EUT Operating Conditions 90
5.1.7 Test Results 91
5.2 Conducted Emission Measurement 107
5.2.1 Limits of Conducted Emission Measurement 107
5.2.2 Test Instruments 107
5.2.3 Test Procedures 107
5.2.4 Deviation from Test Standard 107
5.2.5 Test Setup 107
5.2.6 EUT Operating Conditions 107
5.2.7 Test Results 108
5.3 6dB Bandwidth Measurement 110
5.3.1 Limits of 6dB Bandwidth Measurement 110
5.3.2 Test Setup 110
5.3.3 Test Instruments 110
5.3.4 Test Procedure 110
5.3.5 Deviation fromTest Standard 110
5.3.6 EUT Operating Conditions 110
5.3.7 Test Result 111
5.4 Conducted Output Power Measurement 115
5.4.1 Limits of Conducted Output Power Measurement 115
5.4.2 Test Setup 115
5.4.3 Test Instruments 115
5.4.4 Test Procedures 115
5.4.5 Deviation from Test Standard 115
5.4.6 EUT Operating Conditions 115
5.4.7 Test Results 116
5.5 Power Spectral Density Measurement 118
5.5.1 Limits of Power Spectral Density Measurement 118
5.5.2 Test Setup 118
5.5.3 Test Instruments 118
5.5.4 Test Procedure 118
5.5.5 Deviation from Test Standard 118
5.5.6 EUT Operating Condition 118
5.5.7 Test Results 119
5.6 Conducted Out of Band Emission Measurement 125
5.6.1 Limits of Conducted Out of Band Emission Measurement 125
5.6.2 Test Setup 125
5.6.3 Test Instruments 125
5.6.4 Test Procedure 125
5.6.5 Deviation from Test Standard 125
5.6.6 EUT Operating Condition 125

5.6.7 Test Results 125
6 Pictures of Test Arrangements 154
Appendix – Information on the Testing Laboratories 155

Release Control Record

Issue No.	Description	Date Issued
RF150802C01	Original release.	Nov. 30, 2015

1 Certificate of Conformity

Product: Wireless-AC3100 Dual Band Gigabit Router

Brand: ASUS

Test Model: CM-32_AC2600

Sample Status: Engineering sample

Applicant: ASUSTek COMPUTER INC.

Test Date: Nov. 19 ~ Nov. 30, 2015

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

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

Prepared by : Celine Chou , **Date:** Nov. 30, 2015
Celine Chou / Specialist

Approved by : Ken Liu , **Date:** Nov. 30, 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 -10.50dB at 0.41560MHz
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -1.0dB at 2390.00MHz, 2483.50MHz and 5850.00MHz.
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 RSMA 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	3.63 dB
	200MHz ~1000MHz	3.64 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	Wireless-AC3100 Dual Band Gigabit Router
Brand	ASUS
Test Model	CM-32_AC2600
Sample Status	Engineering sample
Power Supply Rating	19Vdc 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 800.0Mbps 802.11ac: up to 1733.3Mbps
Operating Frequency	2.4GHz: 2412 ~ 2462MHz 5.0GHz: 5745 ~ 5825MHz
Number of Channel	2.4GHz: 802.11b, 802.11g, 802.11n (HT20): 11 802.11n (HT40): 7 5.0GHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 5 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1
Output Power	Beamforming off Mode: 860.152mW for 2412 ~ 2462MHz 556.549mW for 5745 ~ 5825MHz Beamforming on Mode: 452.599mW for 2412 ~ 2462MHz 359.075mW for 5745 ~ 5825MHz
Antenna Type	Refer to note
Antenna Connector	Refer to note
Accessory Device	Adapter
Data Cable Supplied	1.4m non-shielded RJ45 cable without core

Note:

1. The EUT incorporates a MIMO function. Physically, the EUT provides 4 completed transmitters and 4 receivers.

Band	Modulation Mode	TX Function	Beamforming Mode
2.4GHz	802.11b	4TX	Not Support
	802.11g	4TX	Not Support
	802.11n (HT20)	4TX	Support
	802.11n (HT40)	4TX	Support
5GHz	802.11a	4TX	Not Support
	802.11n (HT20)	4TX	Not Support
	802.11n (HT40)	4TX	Not Support
	802.11ac (VHT20)	4TX	Support
	802.11ac (VHT40)	4TX	Support
	802.11ac (VHT80)	4TX	Support

* For 2.4GHz Band, 802.11b and 802.11g, the EUT doesn't support Beamforming mode.
* For 5GHz Band, 802.11a, 802.11n (HT20) and 802.11n (HT40), the EUT doesn't support Beamforming mode.
* 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 consumes power from the following adapter.

Brand	ASUS
Model	ADP-45BW B
Input Power	100-240Vac, 50-60Hz, 1.2A
Output Power	19Vdc, 2.37A
Power Line	2.25m power cable without core attached on adapter

3. The EUT with follow antennas gain is listed as table below.

No.	Antenna type	Model	Manufacturer	connector	Gain(dBi)		
					2.4GHz	5.18- 5.24GHz	5.745-5.825 GHz
1	Dipole	AREEE-000002	ACON	RSMA	2.70	-	-
	Dipole	AREEE-000002	ACON	RSMA	-	2.1	3.60
2	Dipole	C1335-51008-A	Whayu	RSMA	2.45	-	-
	Dipole	C1335-51008-A	Whayu	RSMA	-	3.39	4.35
3	Dipole	C1335-51008-A	Whayu	RSMA	2.37	-	-
	Dipole	C1335-51008-A	Whayu	RSMA	-	3.26	3.10

* For 2.4GHz Band, Ant. 1 was chosen for final test.
* For 5GHz Band, Ant. 2 was chosen for final test.

3.2 Description of Test Modes

For 2.4GHz:

11 channels are provided for 802.11b, 802.11g and 802.11n (HT20):

Channel	Frequency	Channel	Frequency
1	2412MHz	7	2442MHz
2	2417MHz	8	2447MHz
3	2422MHz	9	2452MHz
4	2427MHz	10	2457MHz
5	2432MHz	11	2462MHz
6	2437MHz		

7 channels are provided for 802.11n (HT40):

Channel	Frequency	Channel	Frequency
3	2422MHz	7	2442MHz
4	2427MHz	8	2447MHz
5	2432MHz	9	2452MHz
6	2437MHz		

For 5.0GHz (5745 ~ 5825MHz):

5 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

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

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

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 **X-plane**.

Radiated Emission Test (Above 1GHz):

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

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	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 (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
-	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

Radiated Emission Test (Below 1GHz):

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

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

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 (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
-	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Bayu Chen
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Tank Wu
PLC	25deg. C, 60%RH	120Vac, 60Hz	Tank Wu
APCM	25deg. C, 60%RH	120Vac, 60Hz	Frank Liu

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 **X-plane**.

Radiated Emission Test (Above 1GHz):

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

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (HT20)	149 to 165	149, 157, 165	OFDM	BPSK	6.5
-	802.11n (HT40)	151 to 159	151, 159	OFDM	BPSK	13.5
-	802.11ac (VHT20)	149 to 165	149, 157, 165	OFDM	BPSK	6.5
-	802.11ac (VHT40)	151 to 159	151, 159	OFDM	BPSK	13.5
-	802.11ac (VHT80)	155	155	OFDM	BPSK	29.3

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 (HT20)	149 to 165	149, 157, 165	OFDM	BPSK	6.5
-	802.11n (HT40)	151 to 159	151, 159	OFDM	BPSK	13.5
-	802.11ac (VHT20)	149 to 165	149, 157, 165	OFDM	BPSK	6.5
-	802.11ac (VHT40)	151 to 159	151, 159	OFDM	BPSK	13.5
-	802.11ac (VHT80)	155	155	OFDM	BPSK	29.3

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Bayu Chen
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Tank Wu
PLC	25deg. C, 60%RH	120Vac, 60Hz	Tank Wu
APCM	25deg. C, 60%RH	120Vac, 60Hz	Leo Tsai

3.3 Duty Cycle of Test Signal

2.4GHz Band:

Beamforming off Mode

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

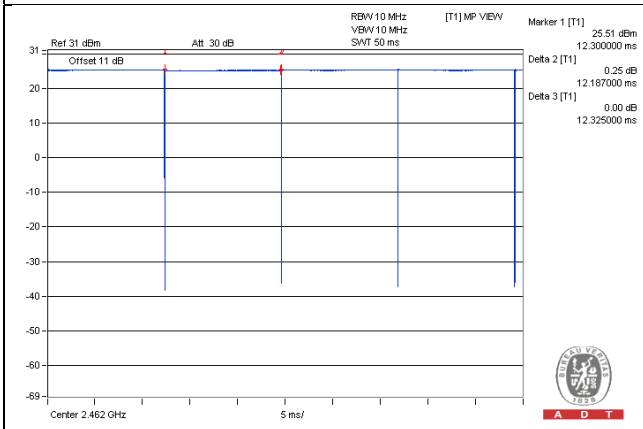
802.11g, 802.11n (HT20), 802.11n (HT40): Duty cycle of test signal is < 98%, duty factor shall be considered.

802.11g: Duty cycle = 2.022/2.152 =0.940, Duty factor = 10 * log(1/0.940) = 0.27

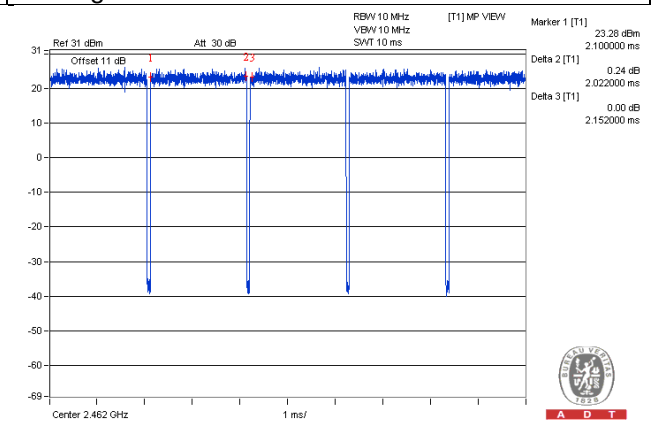
802.11n (HT20): Duty cycle = 4.945/5.095 = 0.971, Duty factor = 10 * log(1/0.971) = 0.13

802.11n (HT40): Duty cycle = 2.385/2.475 = 0.964, Duty factor = 10 * log(1/0.964) = 0.16

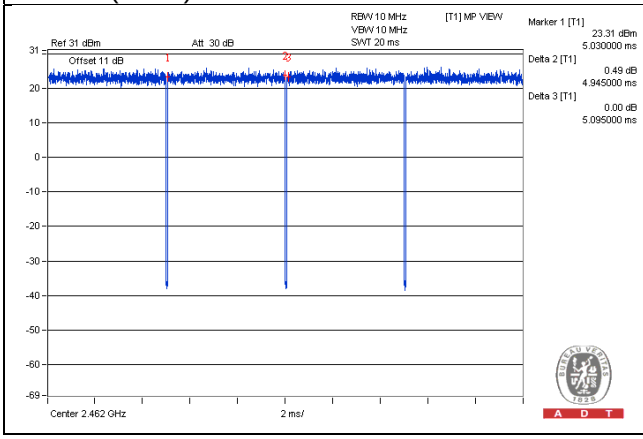
802.11b



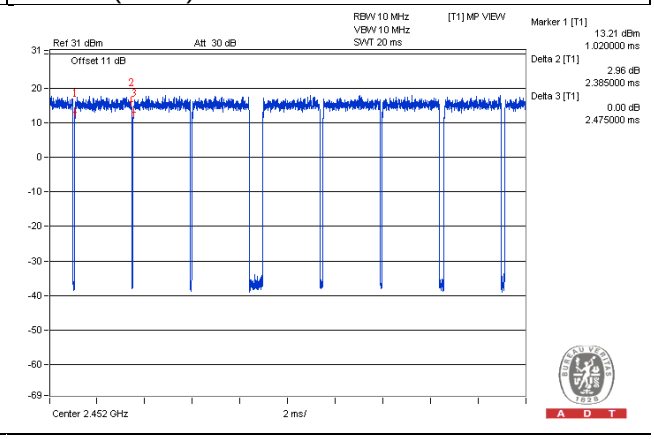
802.11g



802.11n (HT20)



802.11n (HT40)

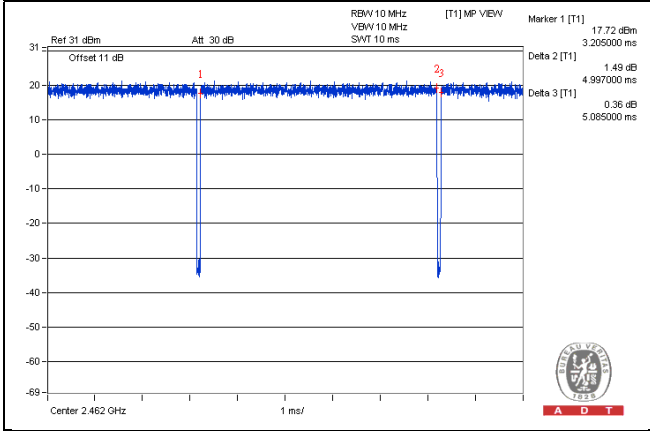
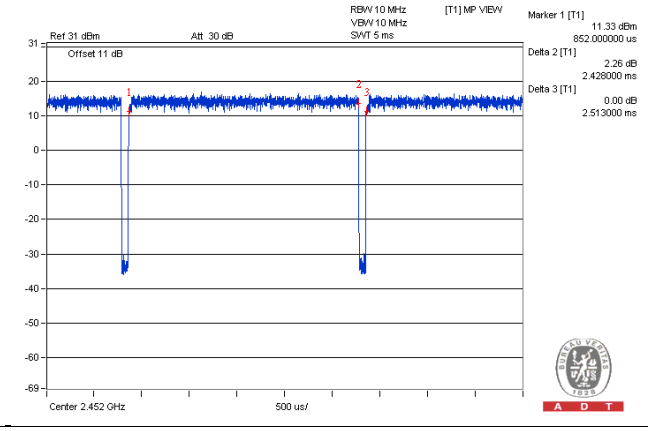


Beamforming on Mode

802.11n (HT20): Duty cycle of test signal is > 98%, duty factor is not request.

802.11n (HT40): Duty cycle of test signal is < 98%, duty factor shall be considered.

802.11n (HT40): Duty cycle = 2.428/2.513 = 0.966, Duty factor = 10 * log(1/0.966) = 0.15

802.11n (HT20)	802.11n (HT40)
	

5GHz Band:

Beamforming off Mode

802.11a, 802.11n (HT40), 802.11ac (VHT80): Duty cycle of test signal is < 98%, duty factor shall be considered.

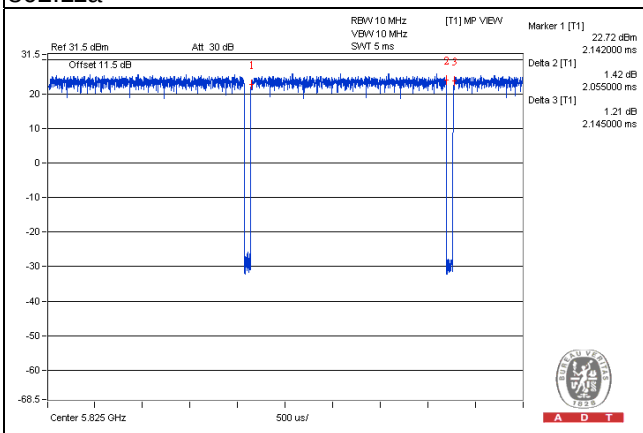
802.11n (HT20): Duty cycle of test signal is > 98%, duty factor is not request.

802.11a: Duty cycle = 2.055/2.145 = 0.958, Duty factor = 10 * log(1/0.958) = 0.19

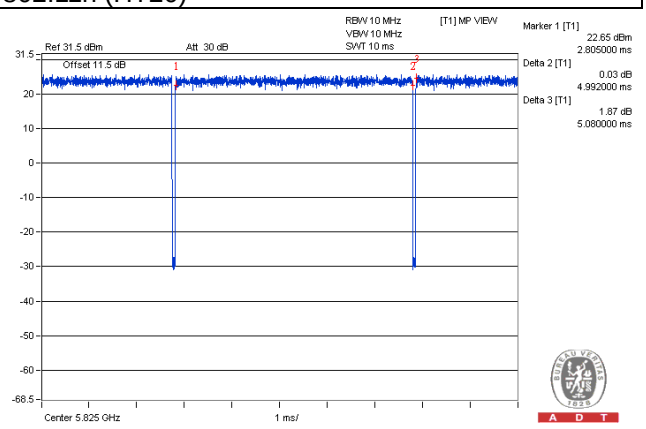
802.11n (HT40): Duty cycle = 2.424/2.504 = 0.968, Duty factor = 10 * log(1/0.968) = 0.14

802.11ac (VHT80): Duty cycle = 1.144/1.220 = 0.938, Duty factor = 10 * log(1/0.938) = 0.28

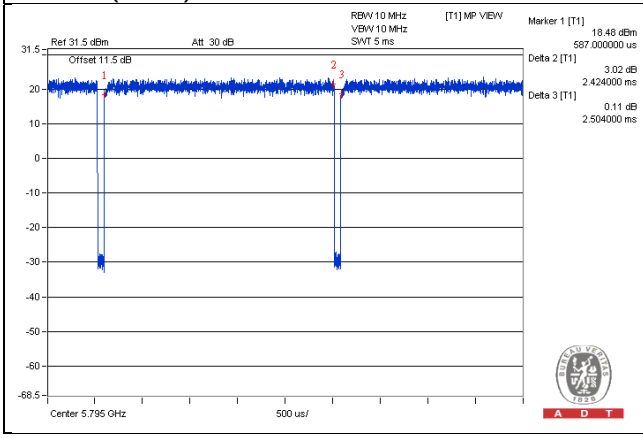
802.11a



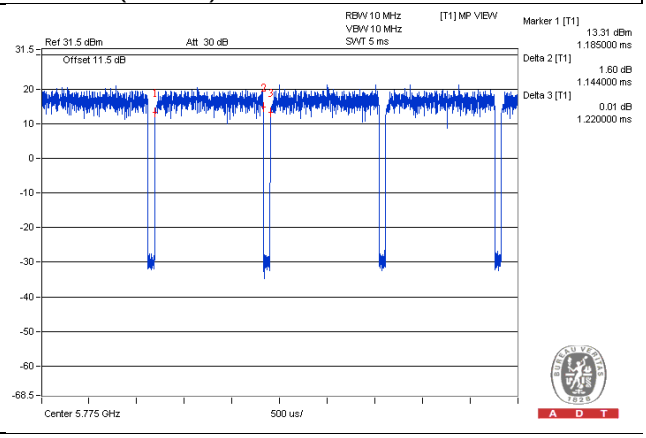
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)



Beamforming on Mode

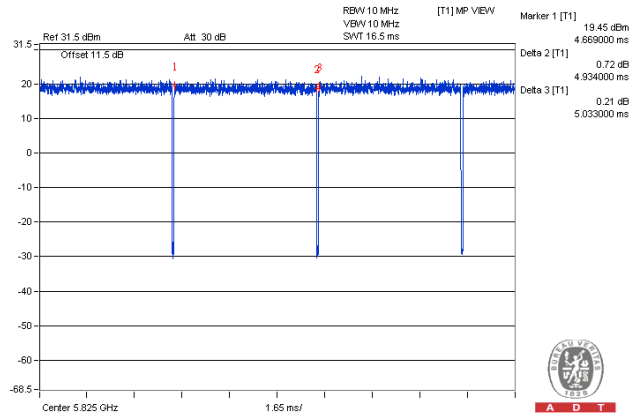
802.11ac (VHT20): Duty cycle of test signal is > 98%, duty factor is not request.

802.11n (HT40), 802.11ac (VHT80): Duty cycle of test signal is < 98%, duty factor shall be considered.

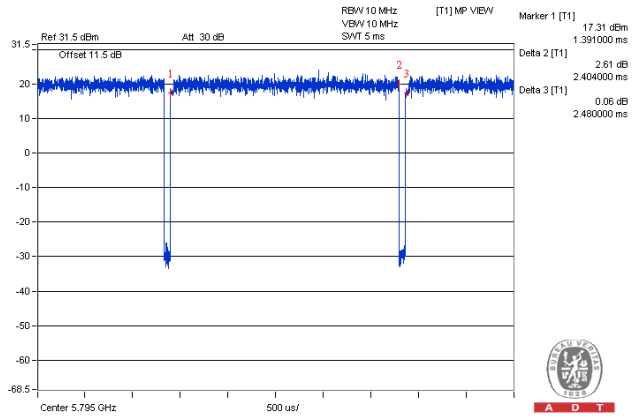
802.11ac (VHT40): Duty cycle = 2.404/2.480 = 0.969, Duty factor = 10 * log(1/0.969) = 0.14

802.11ac (VHT80): Duty cycle = 1.132/1.209 = 0.936, Duty factor = 10 * log(1/0.936) = 0.29

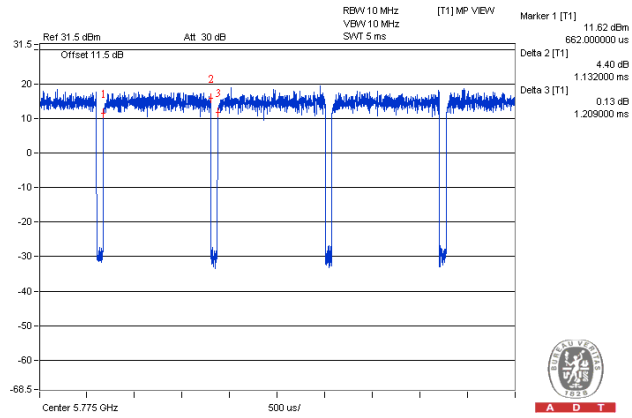
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



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.

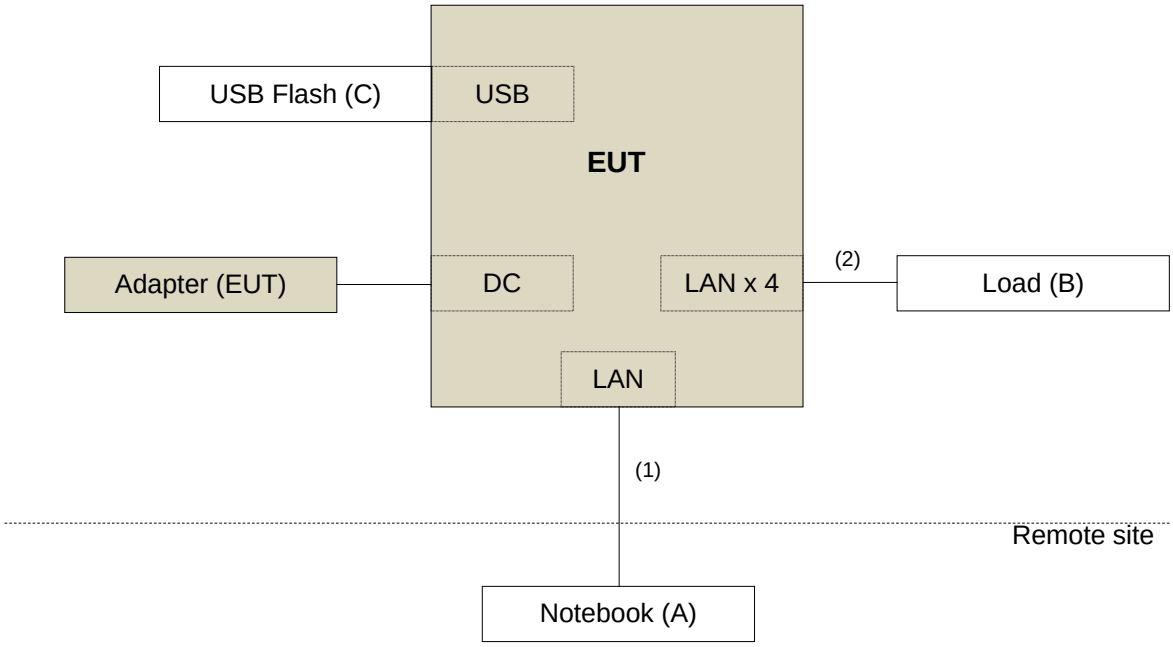
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	D531	CN-0XM006-48643-81U-2610	QDS-BRCM1020	-
B.	Load	NA	NA	NA	NA	-
C.	USB Flash	HP	v250W	01	NA	-

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	LAN cable	1	3	N	0	-
2.	LAN cable	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 v03r03

662911 D01 Multiple Transmitter Output v02r01

ANSI C63.10-2013

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.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCS30	100289	Dec. 01, 2014	Nov. 30, 2015
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Mar. 30, 2015	Mar. 29, 2016
BILOG Antenna SCHWARZBECK	VULB9168	9168-148	Feb. 02, 2015	Feb. 01, 2016
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Feb. 09, 2015	Feb. 08, 2016
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Feb. 09, 2015	Feb. 08, 2016
Preamplifier Agilent	8449B	3008A01911	Aug. 09, 2015	Aug. 08, 2016
Preamplifier Agilent	8447D	2944A10638	Aug. 09, 2015	Aug. 08, 2016
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-02(309222 +248780)	Aug. 09, 2015	Aug. 08, 2016
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-03(274092)	Aug. 09, 2015	Aug. 08, 2016
RF signal cable Woken	8D-FB	Cable-CH9-01	Aug. 11, 2015	Aug. 10, 2016
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower &Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
High Speed Peak Power Meter	ML2495A	0824011	Jul. 09, 2015	Jul. 08, 2016
Power Sensor	MA2411B	0738171	Jul. 09, 2015	Jul. 08, 2016

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 9.
3. The horn antenna and preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 215374.
5. The IC Site Registration No. is IC 7450F-9.

4.1.3 Test Procedures

a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

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

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

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

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

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

Note:

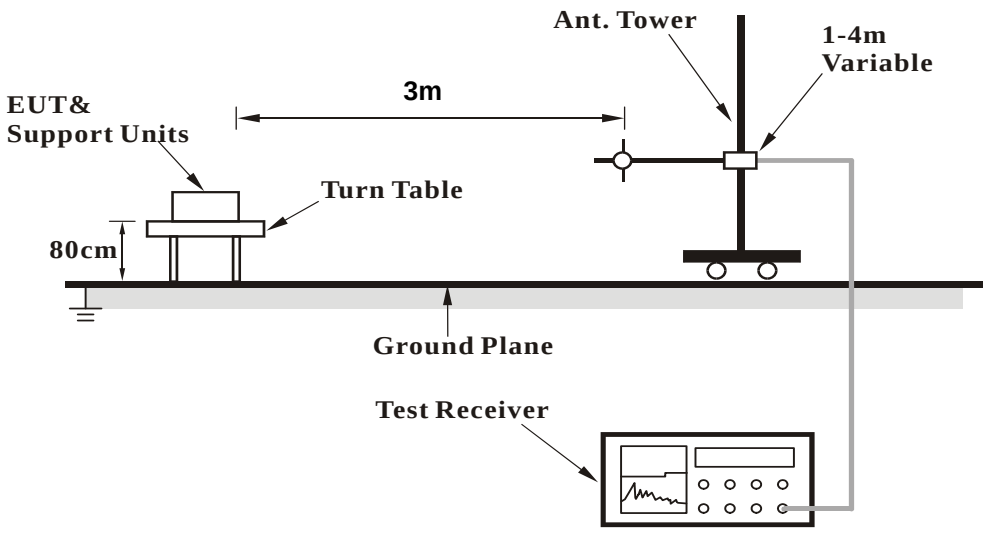
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 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)).
4. 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.
5. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

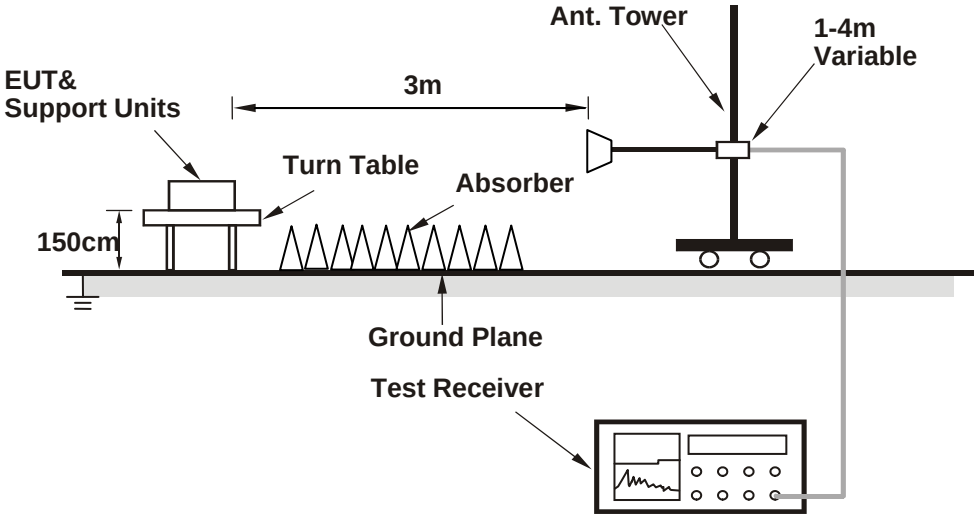
No deviation.

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 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 worst-case data:

Beamforming on Mode

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	59.3 PK	74.0	-14.7	1.00 H	112	24.60	34.70
2	2390.00	47.9 AV	54.0	-6.1	1.00 H	112	13.20	34.70
3	*2412.00	109.1 PK			1.00 H	112	74.20	34.90
4	*2412.00	106.9 AV			1.00 H	112	72.00	34.90
5	4824.00	52.2 PK	74.0	-21.8	1.06 H	110	48.20	4.00
6	4824.00	48.2 AV	54.0	-5.8	1.06 H	110	44.20	4.00
7	#7236.00	55.9 PK	74.0	-18.1	1.00 H	302	46.30	9.60
8	#7236.00	48.1 AV	54.0	-5.9	1.00 H	302	38.50	9.60
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	60.8 PK	74.0	-13.2	2.50 V	190	26.10	34.70
2	2390.00	48.8 AV	54.0	-5.2	2.50 V	190	14.10	34.70
3	*2412.00	121.5 PK			2.50 V	190	86.60	34.90
4	*2412.00	119.4 AV			2.50 V	190	84.50	34.90
5	4824.00	56.6 PK	74.0	-17.4	2.74 V	323	52.60	4.00
6	4824.00	52.0 AV	54.0	-2.0	2.74 V	323	48.00	4.00
7	#7236.00	58.2 PK	74.0	-15.8	1.00 V	339	48.60	9.60
8	#7236.00	51.5 AV	54.0	-2.5	1.00 V	339	41.90	9.60

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. " * ": 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	113.3 PK			1.00 H	100	78.30	35.00
2	*2437.00	110.4 AV			1.00 H	100	75.40	35.00
3	4874.00	51.0 PK	74.0	-23.0	1.00 H	140	47.00	4.00
4	4874.00	42.6 AV	54.0	-11.4	1.00 H	140	38.60	4.00
5	7311.00	58.3 PK	74.0	-15.7	1.17 H	309	48.60	9.70
6	7311.00	51.2 AV	54.0	-2.8	1.17 H	309	41.50	9.70
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	*2437.00	122.1 PK			1.77 V	185	87.10	35.00
2	*2437.00	118.3 AV			1.77 V	185	83.30	35.00
3	4874.00	52.5 PK	74.0	-21.5	1.00 V	248	48.50	4.00
4	4874.00	45.1 AV	54.0	-8.9	1.00 V	248	41.10	4.00
5	7311.00	61.9 PK	74.0	-12.1	1.10 V	336	52.20	9.70
6	7311.00	51.7 AV	54.0	-2.3	1.10 V	336	42.00	9.70

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.

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	108.7 PK			1.00 H	102	73.50	35.20
2	*2462.00	104.9 AV			1.00 H	102	69.70	35.20
3	2483.50	60.0 PK	74.0	-14.0	1.00 H	102	24.80	35.20
4	2483.50	48.2 AV	54.0	-5.8	1.00 H	102	13.00	35.20
5	4924.00	50.5 PK	74.0	-23.5	1.06 H	89	46.30	4.20
6	4924.00	41.5 AV	54.0	-12.5	1.06 H	89	37.30	4.20
7	7386.00	58.2 PK	74.0	-15.8	1.01 H	312	48.60	9.60
8	7386.00	50.2 AV	54.0	-3.8	1.01 H	312	40.60	9.60
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	121.2 PK			1.92 V	185	86.00	35.20
2	*2462.00	117.7 AV			1.92 V	185	82.50	35.20
3	2483.50	62.7 PK	74.0	-11.3	1.92 V	185	27.50	35.20
4	2483.50	52.3 AV	54.0	-1.7	1.92 V	185	17.10	35.20
5	4924.00	52.5 PK	74.0	-21.5	1.18 V	333	48.30	4.20
6	4924.00	46.5 AV	54.0	-7.5	1.18 V	333	42.30	4.20
7	7386.00	59.4 PK	74.0	-14.6	1.07 V	336	49.80	9.60
8	7386.00	51.8 AV	54.0	-2.2	1.07 V	336	42.20	9.60

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. " * ": 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	63.0 PK	74.0	-11.0	1.02 H	205	28.30	34.70
2	2390.00	50.7 AV	54.0	-3.3	1.02 H	205	16.00	34.70
3	*2412.00	109.7 PK			1.02 H	205	74.80	34.90
4	*2412.00	99.7 AV			1.02 H	205	64.80	34.90
5	4824.00	49.3 PK	74.0	-24.7	1.43 H	142	45.30	4.00
6	4824.00	36.3 AV	54.0	-17.7	1.43 H	142	32.30	4.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	68.1 PK	74.0	-5.9	2.41 V	187	33.40	34.70
2	2390.00	52.9 AV	54.0	-1.1	2.41 V	187	18.20	34.70
3	*2412.00	120.0 PK			2.41 V	187	85.10	34.90
4	*2412.00	109.4 AV			2.41 V	187	74.50	34.90
5	4824.00	50.3 PK	74.0	-23.7	1.85 V	344	46.30	4.00
6	4824.00	36.6 AV	54.0	-17.4	1.85 V	344	32.60	4.00

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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	59.9 PK	74.0	-14.1	1.02 H	203	25.20	34.70
2	2390.00	47.9 AV	54.0	-6.1	1.02 H	203	13.20	34.70
3	*2437.00	113.8 PK			1.05 H	203	78.80	35.00
4	*2437.00	103.7 AV			1.05 H	203	68.70	35.00
5	4874.00	49.3 PK	74.0	-24.7	1.47 H	179	45.30	4.00
6	4874.00	36.4 AV	54.0	-17.6	1.47 H	179	32.40	4.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	63.9 PK	74.0	-10.1	2.78 V	185	29.20	34.70
2	2390.00	52.8 AV	54.0	-1.2	2.78 V	185	18.10	34.70
3	*2437.00	125.3 PK			2.75 V	183	90.30	35.00
4	*2437.00	114.6 AV			2.75 V	183	79.60	35.00
5	4874.00	50.3 PK	74.0	-23.7	1.74 V	322	46.30	4.00
6	4874.00	36.4 AV	54.0	-17.6	1.74 V	322	32.40	4.00

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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	109.7 PK			1.52 H	190	74.50	35.20
2	*2462.00	99.4 AV			1.52 H	190	64.20	35.20
3	2483.50	60.7 PK	74.0	-13.3	1.52 H	190	25.50	35.20
4	2483.50	49.0 AV	54.0	-5.0	1.52 H	190	13.80	35.20
5	4924.00	50.2 PK	74.0	-23.8	1.55 H	95	46.00	4.20
6	4924.00	36.9 AV	54.0	-17.1	1.55 H	95	32.70	4.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	122.3 PK			2.31 V	192	87.10	35.20
2	*2462.00	111.2 AV			2.31 V	192	76.00	35.20
3	2483.50	67.0 PK	74.0	-7.0	2.31 V	192	31.80	35.20
4	**2483.50**	**53.0 AV**	**54.0**	**-1.0**	**2.31 V**	**192**	**17.80**	**35.20**
5	4924.00	50.9 PK	74.0	-23.1	1.51 V	343	46.70	4.20
6	4924.00	37.1 AV	54.0	-16.9	1.51 V	343	32.90	4.20

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.

802.11n (HT20)

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	63.9 PK	74.0	-10.1	1.00 H	202	29.20	34.70
2	2390.00	50.8 AV	54.0	-3.2	1.00 H	202	16.10	34.70
3	*2412.00	110.3 PK			1.00 H	202	75.40	34.90
4	*2412.00	100.2 AV			1.00 H	202	65.30	34.90
5	4824.00	49.7 PK	74.0	-24.3	1.56 H	137	45.70	4.00
6	4824.00	36.4 AV	54.0	-17.6	1.56 H	137	32.40	4.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	67.6 PK	74.0	-6.4	2.64 V	191	32.90	34.70
2	**2390.00**	**53.0 AV**	**54.0**	**-1.0**	**2.64 V**	**191**	**18.30**	**34.70**
3	*2412.00	119.3 PK			2.64 V	191	84.40	34.90
4	*2412.00	108.0 AV			2.64 V	191	73.10	34.90
5	4824.00	49.6 PK	74.0	-24.4	1.69 V	344	45.60	4.00
6	4824.00	36.1 AV	54.0	-17.9	1.69 V	344	32.10	4.00

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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	59.6 PK	74.0	-14.4	1.00 H	166	24.90	34.70
2	2390.00	48.2 AV	54.0	-5.8	1.00 H	166	13.50	34.70
3	*2437.00	113.7 PK			1.00 H	166	78.70	35.00
4	*2437.00	103.3 AV			1.00 H	166	68.30	35.00
5	4874.00	49.5 PK	74.0	-24.5	1.51 H	188	45.50	4.00
6	4874.00	36.6 AV	54.0	-17.4	1.51 H	188	32.60	4.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	65.7 PK	74.0	-8.3	2.74 V	182	31.00	34.70
2	2390.00	52.5 AV	54.0	-1.5	2.74 V	182	17.80	34.70
3	*2437.00	123.2 PK			2.74 V	182	88.20	35.00
4	*2437.00	112.6 AV			2.74 V	182	77.60	35.00
5	4874.00	50.5 PK	74.0	-23.5	1.66 V	318	46.50	4.00
6	4874.00	36.8 AV	54.0	-17.2	1.66 V	318	32.80	4.00

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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	111.3 PK			1.00 H	99	76.10	35.20
2	*2462.00	100.1 AV			1.00 H	99	64.90	35.20
3	2483.50	64.7 PK	74.0	-9.3	1.00 H	99	29.50	35.20
4	2483.50	51.8 AV	54.0	-2.2	1.00 H	99	16.60	35.20
5	4924.00	50.4 PK	74.0	-23.6	1.42 H	101	46.20	4.20
6	4924.00	37.0 AV	54.0	-17.0	1.42 H	101	32.80	4.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	121.6 PK			2.33 V	189	86.40	35.20
2	*2462.00	110.6 AV			2.33 V	189	75.40	35.20
3	2483.50	66.6 PK	74.0	-7.4	2.33 V	189	31.40	35.20
4	2483.50	52.9 AV	54.0	-1.1	2.33 V	189	17.70	35.20
5	4924.00	51.1 PK	74.0	-22.9	1.55 V	322	46.90	4.20
6	4924.00	37.2 AV	54.0	-16.8	1.55 V	322	33.00	4.20

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.

802.11n (HT40)

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	59.3 PK	74.0	-14.7	1.00 H	67	24.60	34.70
2	2390.00	47.9 AV	54.0	-6.1	1.00 H	67	13.20	34.70
3	*2422.00	101.4 PK			1.00 H	67	66.50	34.90
4	*2422.00	91.8 AV			1.00 H	67	56.90	34.90
5	4844.00	49.3 PK	74.0	-24.7	1.39 H	155	45.30	4.00
6	4844.00	36.4 AV	54.0	-17.6	1.39 H	155	32.40	4.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	65.1 PK	74.0	-8.9	2.62 V	199	30.40	34.70
2	2390.00	52.8 AV	54.0	-1.2	2.62 V	199	18.10	34.70
3	*2422.00	110.1 PK			2.62 V	199	75.20	34.90
4	*2422.00	100.2 AV			2.62 V	199	65.30	34.90
5	4844.00	49.6 PK	74.0	-24.4	1.44 V	311	45.60	4.00
6	4844.00	36.5 AV	54.0	-17.5	1.44 V	311	32.50	4.00

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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	63.8 PK	74.0	-10.2	1.00 H	203	29.10	34.70
2	2390.00	51.4 AV	54.0	-2.6	1.00 H	203	16.70	34.70
3	*2437.00	107.5 PK			1.00 H	203	72.50	35.00
4	*2437.00	97.2 AV			1.00 H	203	62.20	35.00
5	2483.50	60.6 PK	74.0	-13.4	1.00 H	203	25.40	35.20
6	2483.50	48.2 AV	54.0	-5.8	1.00 H	203	13.00	35.20
7	4874.00	49.5 PK	74.0	-24.5	1.22 H	160	45.50	4.00
8	4874.00	36.3 AV	54.0	-17.7	1.22 H	160	32.30	4.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	67.8 PK	74.0	-6.2	2.21 V	195	33.10	34.70
2	2390.00	52.7 AV	54.0	-1.3	2.21 V	195	18.00	34.70
3	*2437.00	117.7 PK			2.21 V	195	82.70	35.00
4	*2437.00	107.5 AV			2.21 V	195	72.50	35.00
5	2483.50	68.0 PK	74.0	-6.0	2.21 V	195	32.80	35.20
6	2483.50	52.8 AV	54.0	-1.2	2.21 V	195	17.60	35.20
7	4874.00	49.6 PK	74.0	-24.4	1.42 V	339	45.60	4.00
8	4874.00	36.5 AV	54.0	-17.5	1.42 V	339	32.50	4.00

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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	101.2 PK			1.00 H	200	66.20	35.00
2	*2452.00	92.3 AV			1.00 H	200	57.30	35.00
3	2483.50	60.7 PK	74.0	-13.3	1.00 H	200	25.50	35.20
4	2483.50	48.1 AV	54.0	-5.9	1.00 H	200	12.90	35.20
5	4904.00	49.7 PK	74.0	-24.3	1.41 H	166	45.50	4.20
6	4904.00	36.6 AV	54.0	-17.4	1.41 H	166	32.40	4.20
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	110.8 PK			3.22 V	182	75.80	35.00
2	*2452.00	100.7 AV			3.22 V	182	65.70	35.00
3	2483.50	66.5 PK	74.0	-7.5	3.22 V	182	31.30	35.20
4	2483.50	52.6 AV	54.0	-1.4	3.22 V	182	17.40	35.20
5	4904.00	49.9 PK	74.0	-24.1	1.48 V	301	45.70	4.20
6	4904.00	36.7 AV	54.0	-17.3	1.48 V	301	32.50	4.20

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.

Beamforming off Mode

802.11n (HT20)

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	1626.00	52.3 PK	74.0	-21.7	3.64 H	360	58.30	-6.00
2	1626.00	47.4 AV	54.0	-6.6	3.64 H	360	53.40	-6.00
3	2390.00	61.6 PK	74.0	-12.4	2.34 H	222	26.90	34.70
4	2390.00	49.1 AV	54.0	-4.9	2.34 H	222	14.40	34.70
5	*2412.00	108.8 PK			2.34 H	222	73.90	34.90
6	*2412.00	97.0 AV			2.34 H	222	62.10	34.90
7	#3464.00	52.5 PK	74.0	-21.5	2.36 H	128	52.10	0.40
8	#3464.00	48.2 AV	54.0	-5.8	2.36 H	128	47.80	0.40
9	4824.00	50.8 PK	74.0	-23.2	1.00 H	161	46.80	4.00
10	4824.00	41.2 AV	54.0	-12.8	1.00 H	161	37.20	4.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	1626.00	48.6 PK	74.0	-25.4	2.29 V	233	54.60	-6.00
2	1626.00	43.3 AV	54.0	-10.7	2.29 V	233	49.30	-6.00
3	2390.00	65.5 PK	74.0	-8.5	2.58 V	238	30.80	34.70
4	2390.00	52.6 AV	54.0	-1.4	2.58 V	238	17.90	34.70
5	*2412.00	114.9 PK			2.58 V	238	80.00	34.90
6	*2412.00	102.9 AV			2.58 V	238	68.00	34.90
7	#3464.00	55.0 PK	74.0	-19.0	1.63 V	172	54.60	0.40
8	#3464.00	51.9 AV	54.0	-2.1	1.63 V	172	51.50	0.40
9	4824.00	49.8 PK	74.0	-24.2	1.00 V	176	45.80	4.00
10	4824.00	40.5 AV	54.0	-13.5	1.00 V	176	36.50	4.00

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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	113.7 PK			1.69 H	294	78.70	35.00
2	*2437.00	99.5 AV			1.69 H	294	64.50	35.00
3	4874.00	50.1 PK	74.0	-23.9	1.00 H	95	46.10	4.00
4	4874.00	42.1 AV	54.0	-11.9	1.00 H	95	38.10	4.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	121.6 PK			2.67 V	246	86.60	35.00
2	*2437.00	107.8 AV			2.67 V	246	72.80	35.00
3	4874.00	51.4 PK	74.0	-22.6	1.57 V	171	47.40	4.00
4	4874.00	45.1 AV	54.0	-8.9	1.57 V	171	41.10	4.00

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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	105.7 PK			1.50 H	325	70.50	35.20
2	*2462.00	96.4 AV			1.50 H	325	61.20	35.20
3	2483.50	61.1 PK	74.0	-12.9	1.50 H	325	25.90	35.20
4	2483.50	48.6 AV	54.0	-5.4	1.50 H	325	13.40	35.20
5	4924.00	51.1 PK	74.0	-22.9	1.00 H	147	46.90	4.20
6	4924.00	39.1 AV	54.0	-14.9	1.00 H	147	34.90	4.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	117.6 PK			2.84 V	181	82.40	35.20
2	*2462.00	105.3 AV			2.84 V	181	70.10	35.20
3	2483.50	66.3 PK	74.0	-7.7	2.84 V	181	31.10	35.20
4	**2483.50**	**53.0 AV**	**54.0**	**-1.0**	**2.84 V**	**181**	**17.80**	**35.20**
5	4924.00	50.4 PK	74.0	-23.6	1.00 V	198	46.20	4.20
6	4924.00	38.3 AV	54.0	-15.7	1.00 V	198	34.10	4.20

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.

802.11n (HT40)

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	59.3 PK	74.0	-14.7	1.53 H	96	24.60	34.70
2	2390.00	48.2 AV	54.0	-5.8	1.53 H	96	13.50	34.70
3	*2422.00	102.7 PK			1.53 H	96	67.80	34.90
4	*2422.00	89.9 AV			1.53 H	96	55.00	34.90
5	4844.00	50.5 PK	74.0	-23.5	1.75 H	213	46.50	4.00
6	4844.00	36.6 AV	54.0	-17.4	1.75 H	213	32.60	4.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	65.2 PK	74.0	-8.8	2.54 V	180	30.50	34.70
2	2390.00	52.8 AV	54.0	-1.2	2.54 V	180	18.10	34.70
3	*2422.00	112.8 PK			2.54 V	180	77.90	34.90
4	*2422.00	100.8 AV			2.54 V	180	65.90	34.90
5	4844.00	50.2 PK	74.0	-23.8	1.01 V	182	46.20	4.00
6	4844.00	36.5 AV	54.0	-17.5	1.01 V	182	32.50	4.00

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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	60.5 PK	74.0	-13.5	1.57 H	210	25.80	34.70
2	2390.00	48.3 AV	54.0	-5.7	1.57 H	210	13.60	34.70
3	*2437.00	105.8 PK			1.57 H	210	70.80	35.00
4	*2437.00	94.4 AV			1.57 H	210	59.40	35.00
5	4874.00	50.3 PK	74.0	-23.7	1.99 H	233	46.30	4.00
6	4874.00	36.8 AV	54.0	-17.2	1.99 H	233	32.80	4.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	66.3 PK	74.0	-7.7	2.38 V	179	31.60	34.70
2	2390.00	52.9 AV	54.0	-1.1	2.38 V	179	18.20	34.70
3	*2437.00	116.0 PK			2.41 V	178	81.00	35.00
4	*2437.00	104.0 AV			2.41 V	178	69.00	35.00
5	4904.00	50.7 PK	74.0	-23.3	1.00 V	177	46.50	4.20
6	4904.00	36.6 AV	54.0	-17.4	1.00 V	177	32.40	4.20

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	104.2 PK			1.91 H	100	69.20	35.00
2	*2452.00	92.9 AV			1.91 H	100	57.90	35.00
3	2483.50	60.1 PK	74.0	-13.9	1.91 H	100	24.90	35.20
4	2483.50	48.1 AV	54.0	-5.9	1.91 H	100	12.90	35.20
5	4904.00	50.4 PK	74.0	-23.6	2.13 H	211	46.20	4.20
6	4904.00	36.2 AV	54.0	-17.8	2.13 H	211	32.00	4.20
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	113.6 PK			2.19 V	302	78.60	35.00
2	*2452.00	102.4 AV			2.19 V	302	67.40	35.00
3	2483.50	65.3 PK	74.0	-8.7	2.19 V	302	30.10	35.20
4	2483.50	52.7 AV	54.0	-1.3	2.19 V	302	17.50	35.20
5	4904.00	50.0 PK	74.0	-24.0	1.00 V	180	45.80	4.20
6	4904.00	36.7 AV	54.0	-17.3	1.00 V	180	32.50	4.20

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	30.00	28.8 QP	40.0	-11.2	1.24 H	246	44.40	-15.60
2	94.02	24.3 QP	43.5	-19.2	1.99 H	171	43.70	-19.40
3	132.82	20.9 QP	43.5	-22.6	1.99 H	242	36.00	-15.10
4	249.22	29.0 QP	46.0	-17.0	1.24 H	108	43.40	-14.40
5	499.48	40.0 QP	46.0	-6.0	1.50 H	133	48.60	-8.60
6	802.12	35.5 QP	46.0	-10.5	1.00 H	232	38.20	-2.70
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	33.50	32.0 QP	40.0	-8.0	1.00 V	207	47.60	-15.60
2	49.40	28.5 QP	40.0	-11.5	1.24 V	14	42.80	-14.30
3	154.16	21.5 QP	43.5	-22.0	1.00 V	173	35.30	-13.80
4	276.38	23.0 QP	46.0	-23.0	1.50 V	162	36.10	-13.10
5	499.48	37.8 QP	46.0	-8.2	1.00 V	271	46.40	-8.60
6	802.12	33.1 QP	46.0	-12.9	1.50 V	141	35.80	-2.70

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

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.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 16, 2015	Nov. 15, 2016
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Dec. 26, 2014	Dec. 25, 2015
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 26, 2015	Feb. 25, 2016
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 24, 2015	Jul. 23, 2016
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.

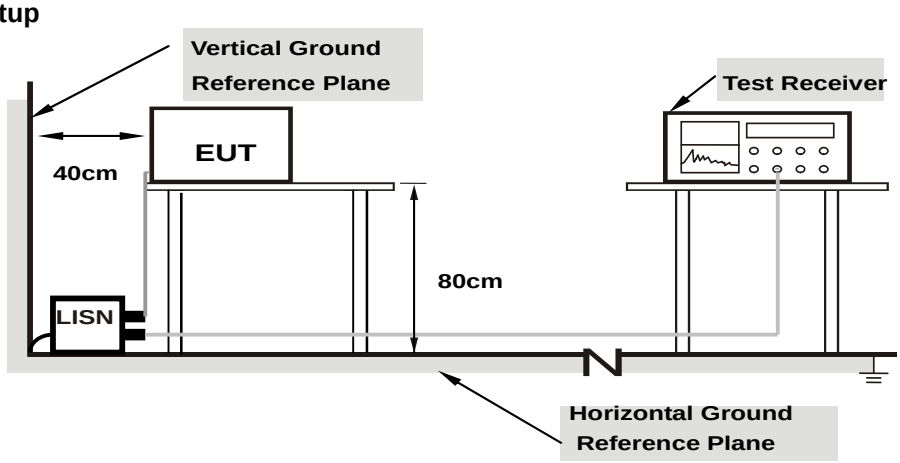
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

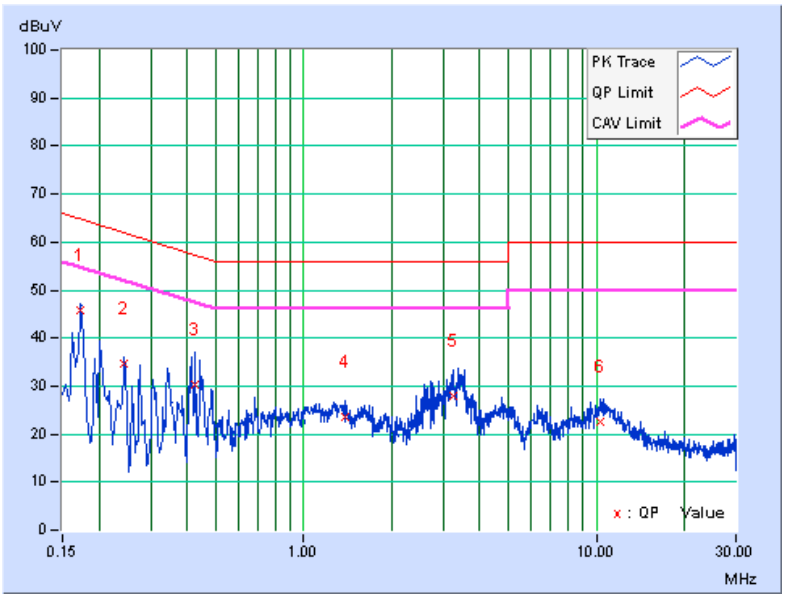
4.2.7 Test Results

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

No	Freq.	Corr. Factor	Reading Value		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	0.17328	9.83	36.00	27.42	45.83	37.25	64.80	54.80	-18.97	-17.55
2	0.24407	9.85	24.80	14.26	34.65	24.11	61.96	51.96	-27.31	-27.85
3	0.42761	9.88	20.50	1.74	30.38	11.62	57.30	47.30	-26.92	-35.68
4	1.38947	9.96	13.68	6.02	23.64	15.98	56.00	46.00	-32.36	-30.02
5	3.23108	10.08	17.94	7.19	28.02	17.27	56.00	46.00	-27.98	-28.73
6	10.27299	10.53	12.11	7.06	22.64	17.59	60.00	50.00	-37.36	-32.41

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.

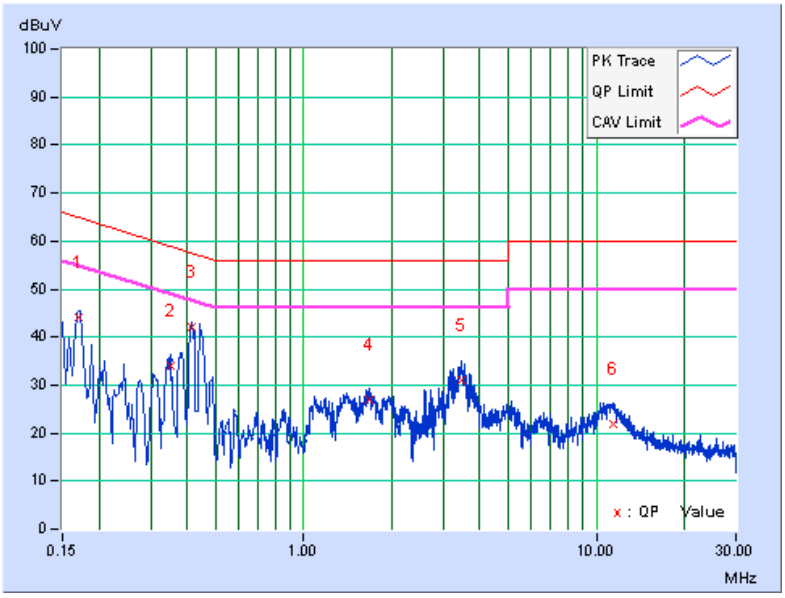


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	0.16967	9.82	34.16	25.14	43.98	34.96	64.98	54.98	-20.99	-20.01
2	0.35332	9.87	24.16	12.94	34.03	22.81	58.88	48.88	-24.86	-26.08
3	**0.41560**	**9.88**	**32.25**	**27.15**	**42.13**	**37.03**	**57.54**	**47.54**	**-15.40**	**-10.50**
4	1.67502	9.97	17.12	11.51	27.09	21.48	56.00	46.00	-28.91	-24.52
5	3.44613	10.09	20.76	10.95	30.85	21.04	56.00	46.00	-25.15	-24.96
6	11.36388	10.54	11.39	5.10	21.93	15.64	60.00	50.00	-38.07	-34.36

Remarks:

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

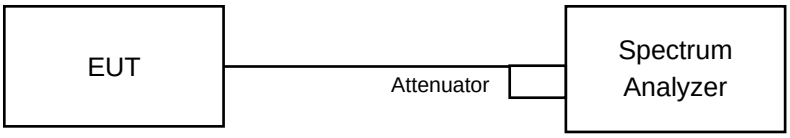


4.3 6dB Bandwidth Measurement

4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

a. Set resolution bandwidth (RBW) = 100kHz

b. Set the video bandwidth (VBW) ≥ 3 x RBW, Detector = Peak.

c. Trace mode = max hold.

d. Sweep = auto couple.

e. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

4.3.5 Deviation 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

Beamforming off Mode

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
1	2412	7.63	7.62	8.60	7.58	0.5	Pass
6	2437	8.58	8.56	8.57	8.60	0.5	Pass
11	2462	7.60	9.04	8.04	9.06	0.5	Pass

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
1	2412	16.36	16.35	16.40	15.97	0.5	Pass
6	2437	16.09	15.93	15.78	16.34	0.5	Pass
11	2462	16.33	15.16	16.35	16.37	0.5	Pass

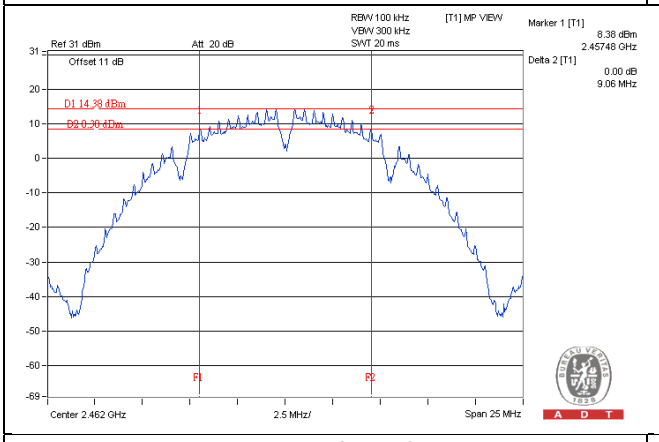
802.11n (HT20)

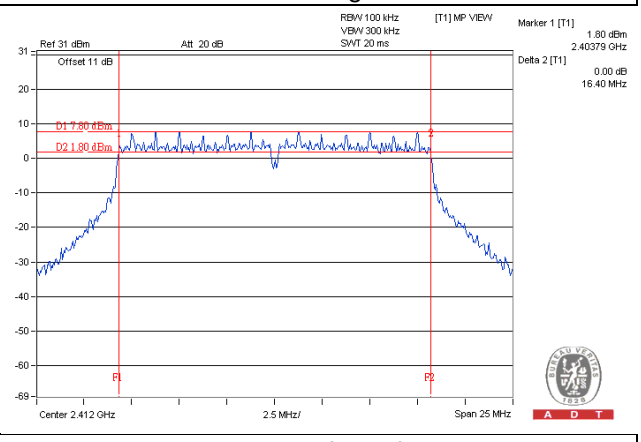
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
1	2412	17.12	15.70	16.34	17.62	0.5	Pass
6	2437	16.92	15.14	17.17	17.19	0.5	Pass
11	2462	16.80	17.56	16.34	16.96	0.5	Pass

802.11n (HT40)

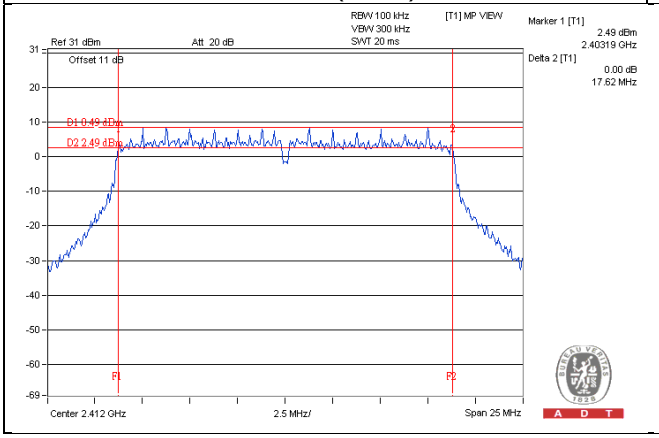
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
3	2422	35.45	35.19	33.98	33.93	0.5	Pass
6	2437	35.25	35.26	35.14	35.14	0.5	Pass
9	2452	35.21	35.16	36.35	36.39	0.5	Pass

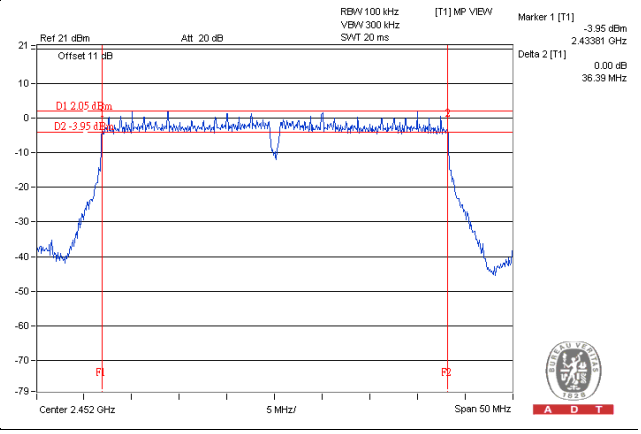
Spectrum Plot of Worst Value	
802.11b	802.11g





802.11n (HT20)	802.11n (HT40)





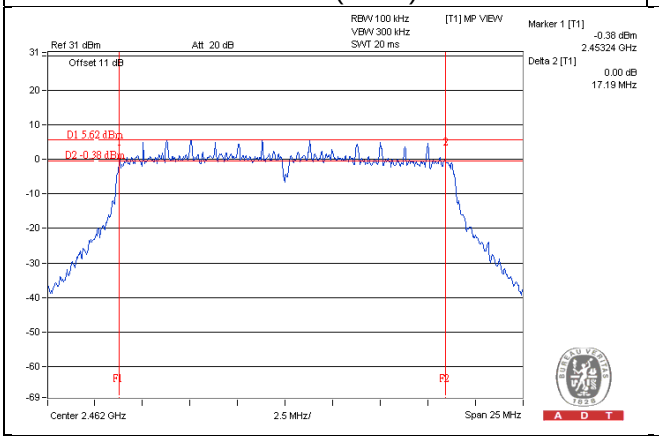
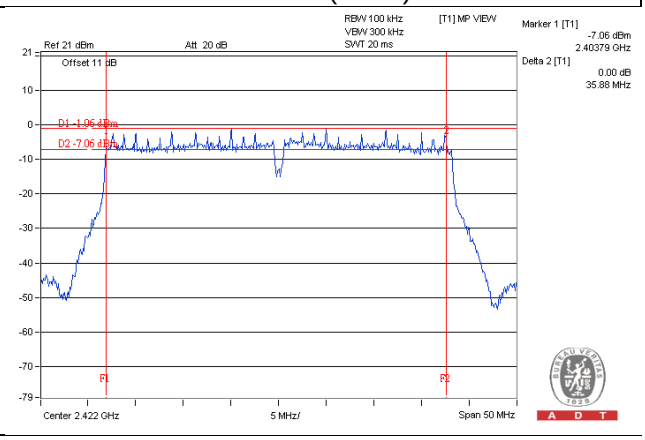
Beamforming on Mode

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
1	2412	16.82	16.97	15.98	16.34	0.5	Pass
6	2437	15.71	16.37	16.59	16.32	0.5	Pass
11	2462	17.19	16.95	15.99	15.40	0.5	Pass

802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
3	2422	35.31	35.23	35.88	35.25	0.5	Pass
6	2437	35.34	35.24	35.19	35.15	0.5	Pass
9	2452	35.31	35.26	35.46	35.21	0.5	Pass

Spectrum Plot of Worst Value	
802.11n (HT20)	802.11n (HT40)
	

4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

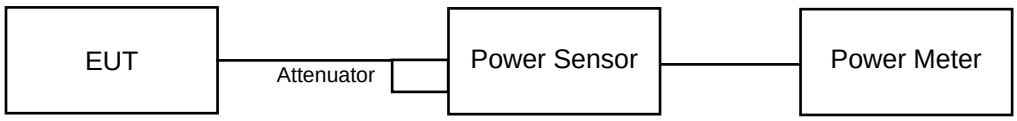
For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

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 NANT ≤ 4;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any NANT;
Array Gain = 5 log(NANT/NSS) dB or 3 dB, whichever is less for 20-MHz channel widths with NANT ≥ 5.

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

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

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

Beamforming off Mode

802.11b

Channel	Frequency (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
1	2412	19.65	19.18	19.45	19.53	352.899	25.48	30	Pass
6	2437	22.81	22.13	22.76	22.78	732.760	28.65	30	Pass
11	2462	21.56	21.00	22.33	22.03	599.702	27.78	30	Pass

802.11g

Channel	Frequency (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
1	2412	18.41	18.47	18.53	23.40	429.711	26.33	30	Pass
6	2437	23.38	23.08	23.63	20.05	752.840	28.77	30	Pass
11	2462	19.28	19.26	19.91	18.58	339.116	25.30	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
1	2412	18.31	18.19	18.39	18.58	274.816	24.39	30	Pass
6	2437	23.28	23.10	23.51	23.40	**860.152**	29.35	30	Pass
11	2462	19.81	19.21	18.95	19.58	348.393	25.42	30	Pass

802.11n (HT40)

Channel	Frequency (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
3	2422	13.20	13.10	13.51	13.69	87.137	19.40	30	Pass
6	2437	18.34	18.42	18.81	18.88	291.037	24.64	30	Pass
9	2452	15.11	14.70	15.55	15.75	135.422	21.32	30	Pass

Beamforming on Mode

802.11n (HT20)

Channel	Frequency (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
1	2412	15.24	15.51	15.33	15.68	140.085	21.46	27.28	Pass
6	2437	20.28	20.22	20.85	20.76	**452.599**	26.56	27.28	Pass
11	2462	15.27	14.76	15.68	15.79	138.488	21.41	27.28	Pass

Note: Directional gain = 2.70dBi + 10log(4) = 8.72dBi > 6dBi, so the power limit shall be reduced to 30-(8.72-6) = 27.28dBm.

802.11n (HT40)

Channel	Frequency (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
3	2422	12.10	12.17	12.54	12.58	68.760	18.37	27.28	Pass
6	2437	16.09	15.98	16.50	16.54	170.022	22.31	27.28	Pass
9	2452	14.12	14.18	14.50	14.95	111.45	20.47	27.28	Pass

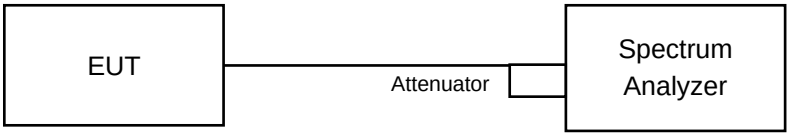
Note: Directional gain = 2.70dBi + 10log(4) = 8.72dBi > 6dBi, so the power limit shall be reduced to 30-(8.72-6) = 27.28dBm.

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

For 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 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

Beamforming off Mode

802.11b

TX chain	Channel	Frequency (MHz)	PSD (dBm)	10 log (N=4) dB	Total PSD (dBm)	Limit (dBm)	Pass / Fail
0	1	2412	-7.48	6.02	-1.46	5.28	Pass
	6	2437	-4.46	6.02	1.56	5.28	Pass
	11	2462	-5.26	6.02	0.76	5.28	Pass
1	1	2412	-8.16	6.02	-2.14	5.28	Pass
	6	2437	-5.35	6.02	0.67	5.28	Pass
	11	2462	-5.92	6.02	0.10	5.28	Pass
2	1	2412	-8.76	6.02	-2.74	5.28	Pass
	6	2437	-4.68	6.02	1.34	5.28	Pass
	11	2462	-5.34	6.02	0.68	5.28	Pass
3	1	2412	-7.02	6.02	-1.00	5.28	Pass
	6	2437	-4.61	6.02	1.41	5.28	Pass
	11	2462	-5.13	6.02	0.89	5.28	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 = 2.70dBi + 10log(4) = 8.72dBi > 6dBi, so the power density limit shall be reduced to 8-(8.72-6) = 5.28dBm.

802.11g

TX chain	Channel	Frequency (MHz)	PSD (dBm)	10 log (N=4) dB	Duty Factor	Total PSD with Duty Factor (dBm)	Limit (dBm)	Pass / Fail
0	1	2412	-11.36	6.02	0.27	-5.07	5.28	Pass
	6	2437	-5.97	6.02	0.27	0.32	5.28	Pass
	11	2462	-10.27	6.02	0.27	-3.98	5.28	Pass
1	1	2412	-11.54	6.02	0.27	-5.25	5.28	Pass
	6	2437	-6.81	6.02	0.27	-0.52	5.28	Pass
	11	2462	-10.47	6.02	0.27	-4.18	5.28	Pass
2	1	2412	-12.29	6.02	0.27	-6.00	5.28	Pass
	6	2437	-6.60	6.02	0.27	-0.31	5.28	Pass
	11	2462	-10.39	6.02	0.27	-4.10	5.28	Pass
3	1	2412	-10.20	6.02	0.27	-3.91	5.28	Pass
	6	2437	-6.01	6.02	0.27	0.28	5.28	Pass
	11	2462	-9.82	6.02	0.27	-3.53	5.28	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 = 2.70dBi + 10log(4) = 8.72dBi > 6dBi, so the power density limit shall be reduced to 8-(8.72-6) = 5.28dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

TX chain	Channel	Frequency (MHz)	PSD (dBm)	10 log (N=4) dB	Duty Factor	Total PSD with Duty Factor (dBm)	Limit (dBm)	Pass / Fail
0	1	2412	-11.47	6.02	0.13	-5.32	5.28	Pass
	6	2437	-6.70	6.02	0.13	-0.55	5.28	Pass
	11	2462	-10.94	6.02	0.13	-4.79	5.28	Pass
1	1	2412	-12.17	6.02	0.13	-6.02	5.28	Pass
	6	2437	-6.94	6.02	0.13	-0.79	5.28	Pass
	11	2462	-11.39	6.02	0.13	-5.24	5.28	Pass
2	1	2412	-12.04	6.02	0.13	-5.89	5.28	Pass
	6	2437	-6.80	6.02	0.13	-0.65	5.28	Pass
	11	2462	-11.20	6.02	0.13	-5.05	5.28	Pass
3	1	2412	-11.76	6.02	0.13	-5.61	5.28	Pass
	6	2437	-6.00	6.02	0.13	0.15	5.28	Pass
	11	2462	-10.57	6.02	0.13	-4.42	5.28	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 = 2.70dBi + 10log(4) = 8.72dBi > 6dBi, so the power density limit shall be reduced to 8-(8.72-6) = 5.28dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

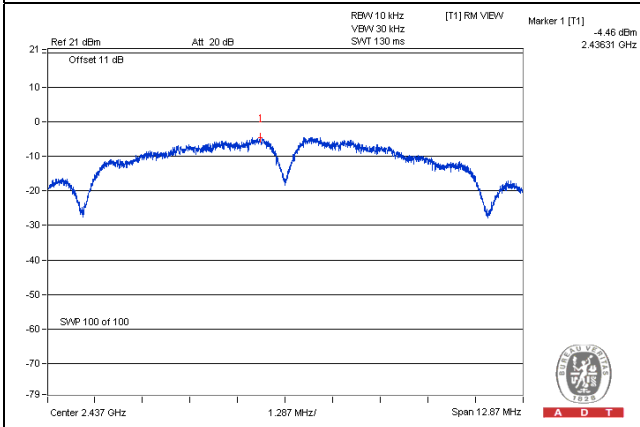
TX chain	Channel	Frequency (MHz)	PSD (dBm)	10 log (N=4) dB	Duty Factor	Total PSD with Duty Factor (dBm)	Limit (dBm)	Pass / Fail
0	3	2422	-19.30	6.02	0.16	-13.12	5.28	Pass
	6	2437	-13.76	6.02	0.16	-7.58	5.28	Pass
	9	2452	-17.14	6.02	0.16	-10.96	5.28	Pass
1	3	2422	-19.98	6.02	0.16	-13.80	5.28	Pass
	6	2437	-14.33	6.02	0.16	-8.15	5.28	Pass
	9	2452	-17.77	6.02	0.16	-11.59	5.28	Pass
2	3	2422	-19.49	6.02	0.16	-13.31	5.28	Pass
	6	2437	-13.32	6.02	0.16	-7.14	5.28	Pass
	9	2452	-17.09	6.02	0.16	-10.91	5.28	Pass
3	3	2422	-19.58	6.02	0.16	-13.40	5.28	Pass
	6	2437	-13.00	6.02	0.16	-6.82	5.28	Pass
	9	2452	-17.04	6.02	0.16	-10.86	5.28	Pass

Note:

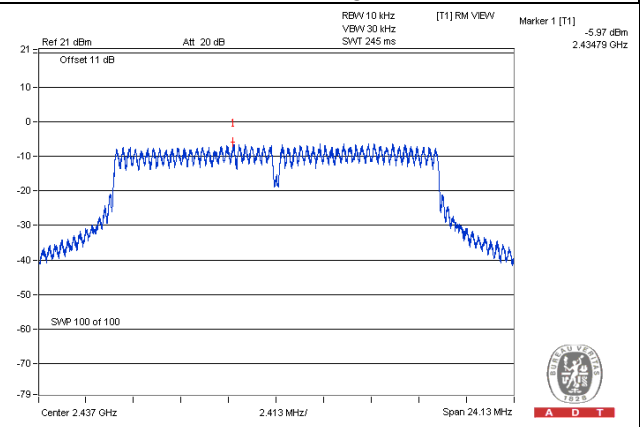
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 2.70dBi + 10log(4) = 8.72dBi > 6dBi, so the power density limit shall be reduced to 8-(8.72-6) = 5.28dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

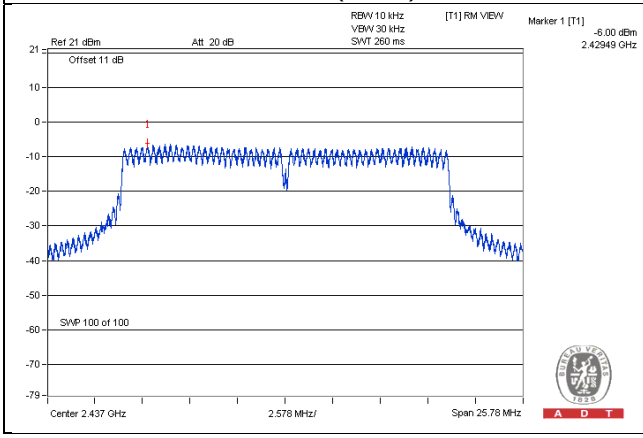
802.11b



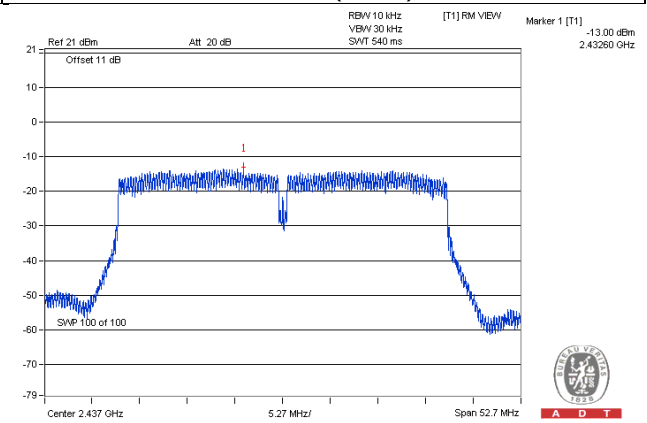
802.11g



802.11n (HT20)



802.11n (HT40)



Beamforming on Mode

802.11n (HT20)

TX chain	Channel	Frequency (MHz)	PSD (dBm)	10 log (N=4) dB	Total PSD (dBm)	Limit (dBm)	Pass / Fail
0	1	2412	-14.65	6.02	-8.63	5.28	Pass
	6	2437	-6.00	6.02	0.02	5.28	Pass
	11	2462	-14.16	6.02	-8.14	5.28	Pass
1	1	2412	-14.66	6.02	-8.64	5.28	Pass
	6	2437	-6.08	6.02	-0.06	5.28	Pass
	11	2462	-14.11	6.02	-8.09	5.28	Pass
2	1	2412	-14.28	6.02	-8.26	5.28	Pass
	6	2437	-5.94	6.02	0.08	5.28	Pass
	11	2462	-14.04	6.02	-8.02	5.28	Pass
3	1	2412	-14.01	6.02	-7.99	5.28	Pass
	6	2437	-5.29	6.02	0.73	5.28	Pass
	11	2462	-13.82	6.02	-7.80	5.28	Pass

Note:

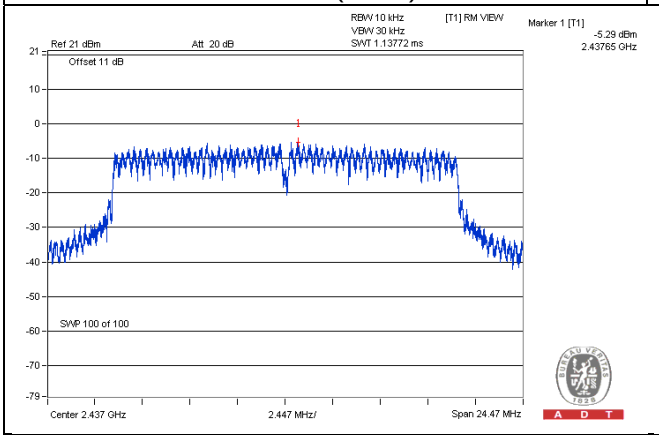
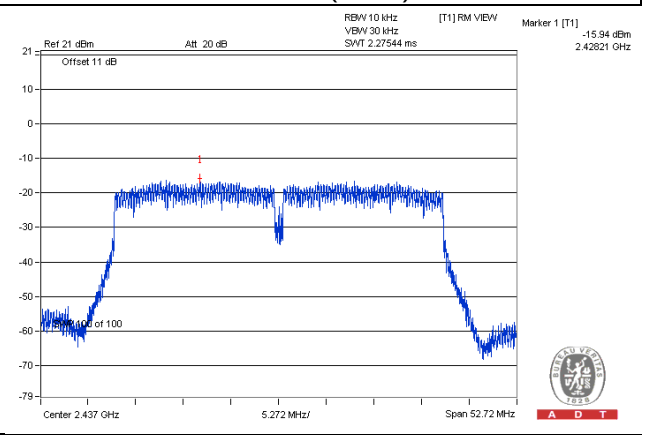
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 2.70dBi + 10log(4) = 8.72dBi > 6dBi, so the power density limit shall be reduced to 8-(8.72-6) = 5.28dBm.

802.11n (HT40)

TX chain	Channel	Frequency (MHz)	PSD (dBm)	10 log (N=4) dB	Duty Factor	Total PSD with Duty Factor (dBm)	Limit (dBm)	Pass / Fail
0	3	2422	-20.40	6.02	0.15	-14.23	5.28	Pass
	6	2437	-16.77	6.02	0.15	-10.60	5.28	Pass
	9	2452	-18.23	6.02	0.15	-12.06	5.28	Pass
1	3	2422	-21.30	6.02	0.15	-15.13	5.28	Pass
	6	2437	-17.54	6.02	0.15	-11.37	5.28	Pass
	9	2452	-18.80	6.02	0.15	-12.63	5.28	Pass
2	3	2422	-20.46	6.02	0.15	-14.29	5.28	Pass
	6	2437	-16.89	6.02	0.15	-10.72	5.28	Pass
	9	2452	-18.55	6.02	0.15	-12.38	5.28	Pass
3	3	2422	-20.26	6.02	0.15	-14.09	5.28	Pass
	6	2437	-15.94	6.02	0.15	-9.77	5.28	Pass
	9	2452	-17.36	6.02	0.15	-11.19	5.28	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 = 2.70dBi + 10log(4) = 8.72dBi > 6dBi, so the power density limit shall be reduced to 8-(8.72-6) = 5.28dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

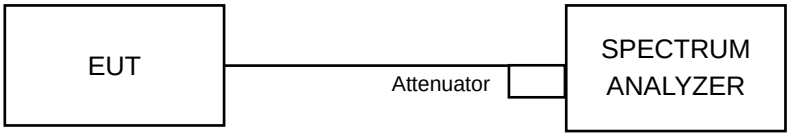
Spectrum Plot of Worst Value	
802.11n (HT20)	802.11n (HT40)
	

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

a. Set the RBW = 100 kHz.

b. Set the VBW ≥ 300 kHz.

c. Detector = average.

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

a. Set RBW = 100 kHz.

b. Set VBW ≥ 300 kHz.

c. Ensure that the number of measurement points ≥ span/RBW

d. According to measurement points to set differ measurement span.

e. Detector = average.

f. Trace Mode = max hold.

g. Sweep = auto couple.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

Same as Item 4.3.6

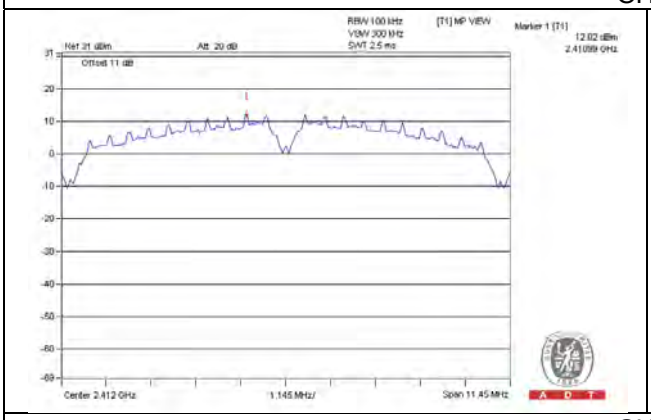
4.6.7 Test Results

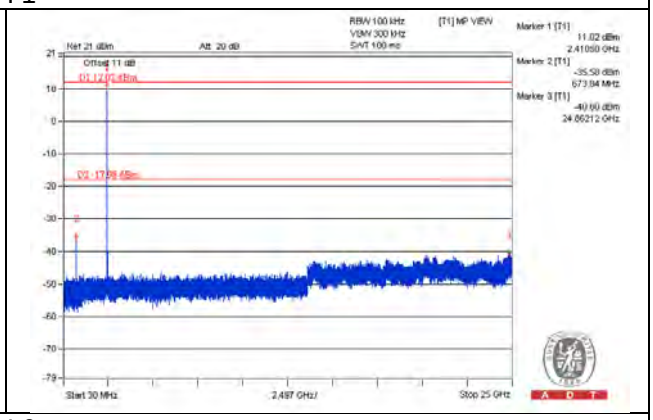
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

Beamforming off Mode

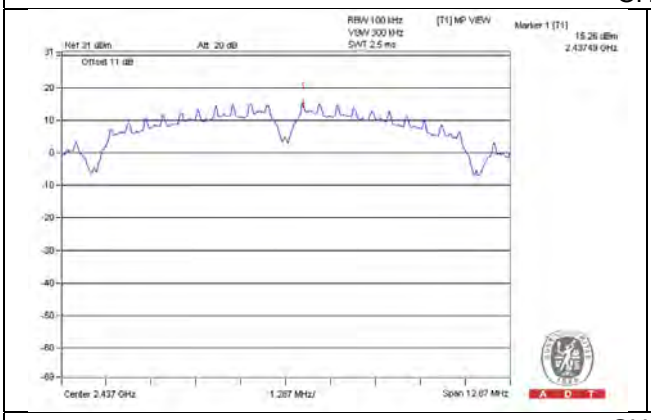
802.11b_Chain 0

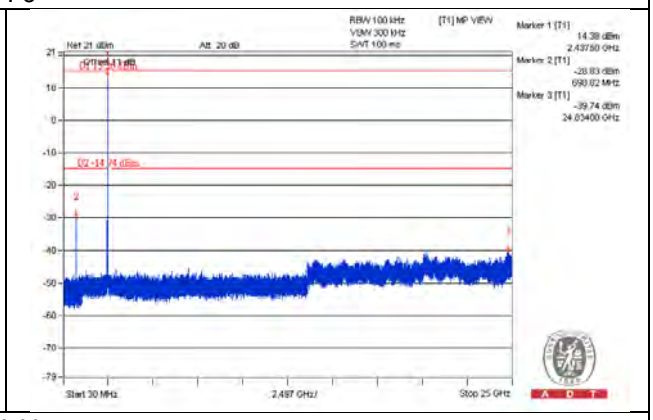
CH 1



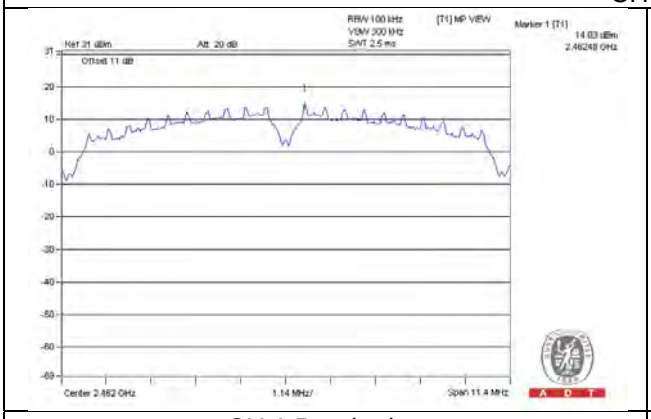


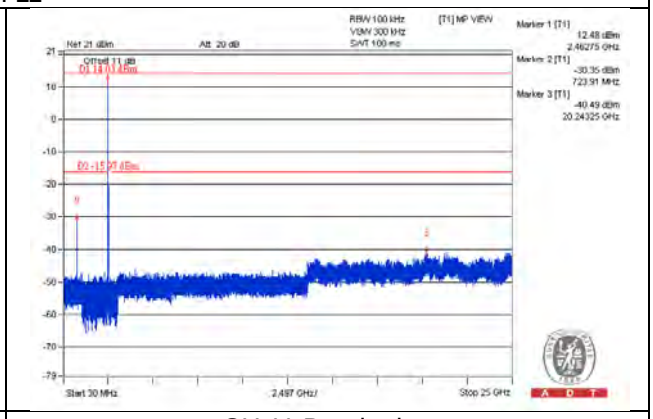
CH 6



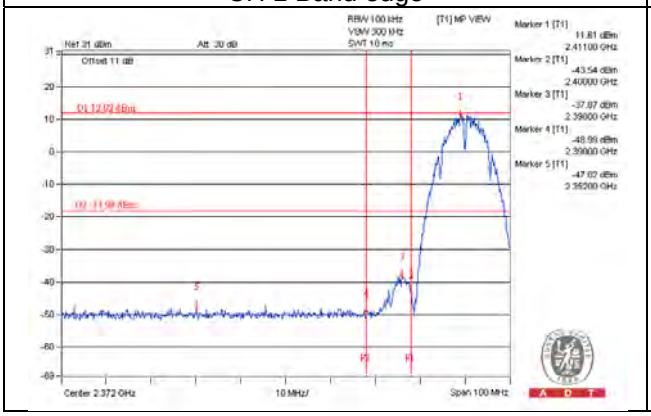


CH 11

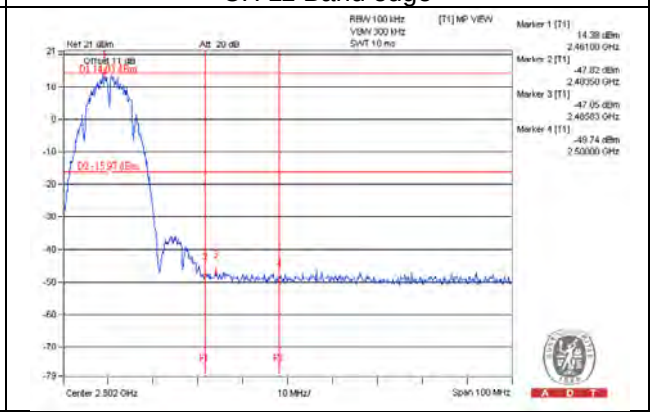




CH 1 Band edge

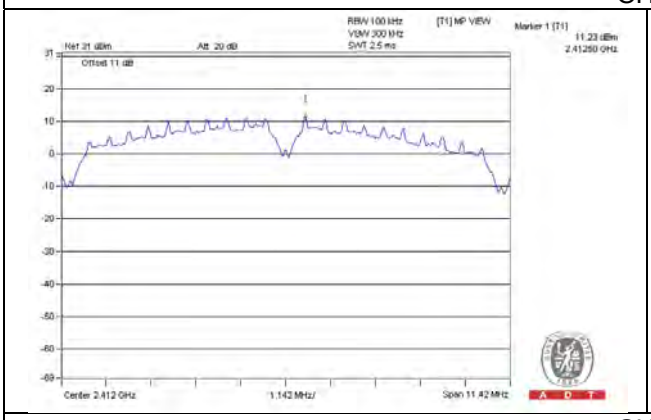


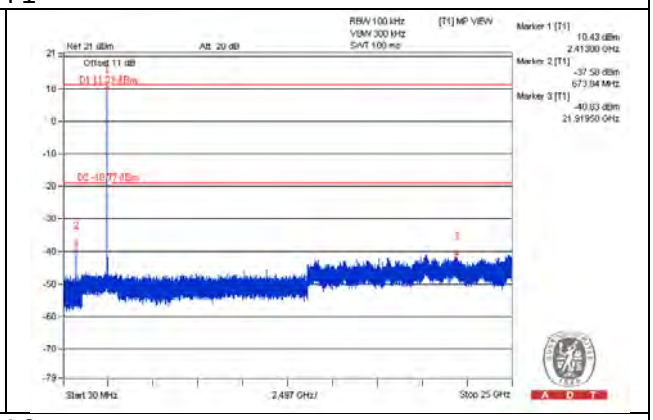
CH 11 Band edge



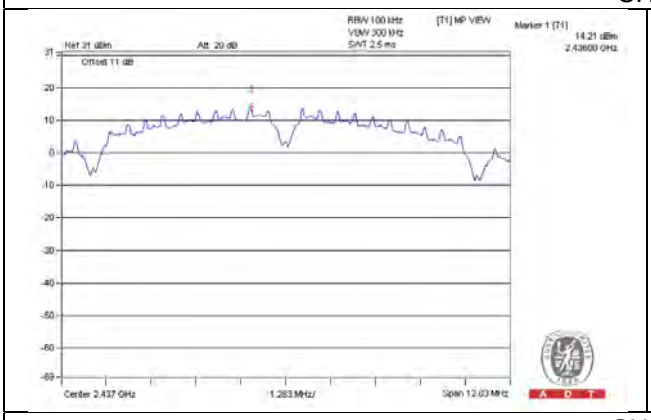
802.11b_Chain 1

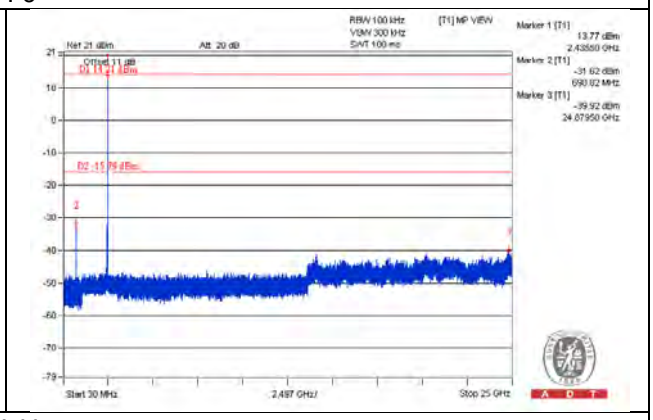
CH 1



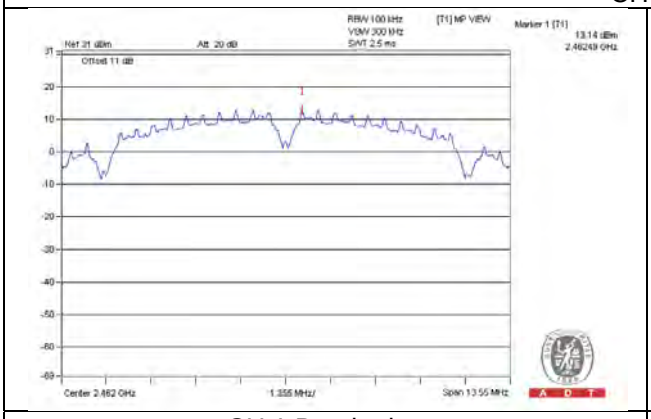


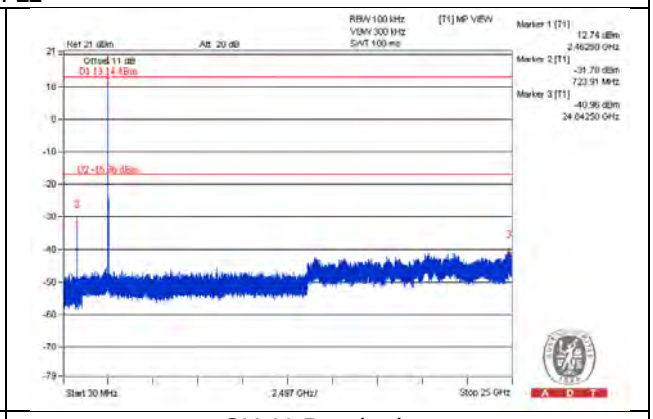
CH 6



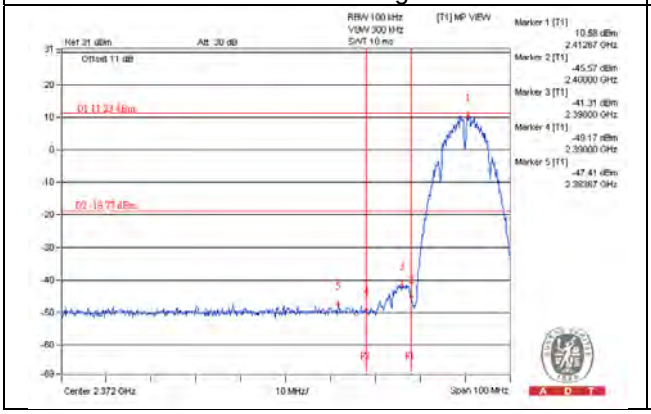


CH 11

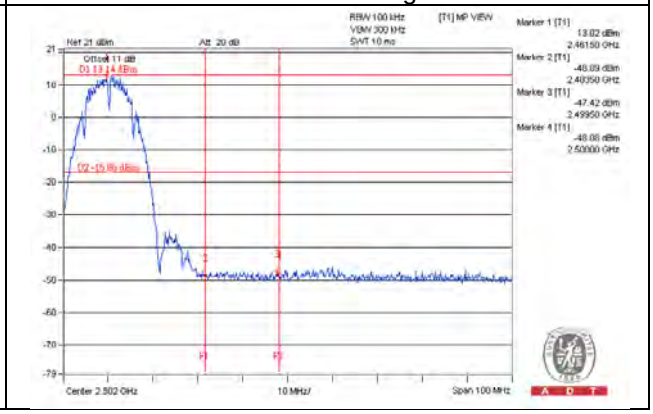




CH 1 Band edge

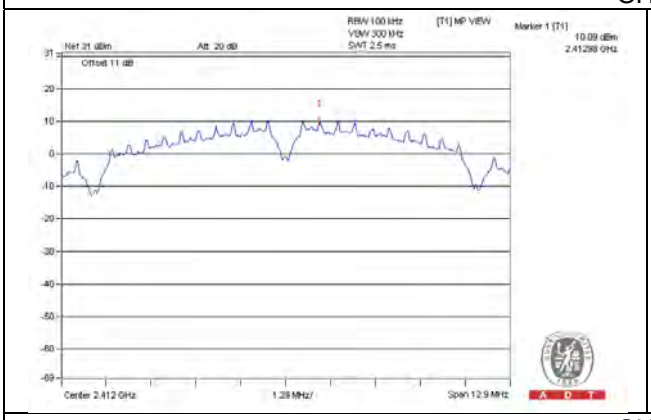


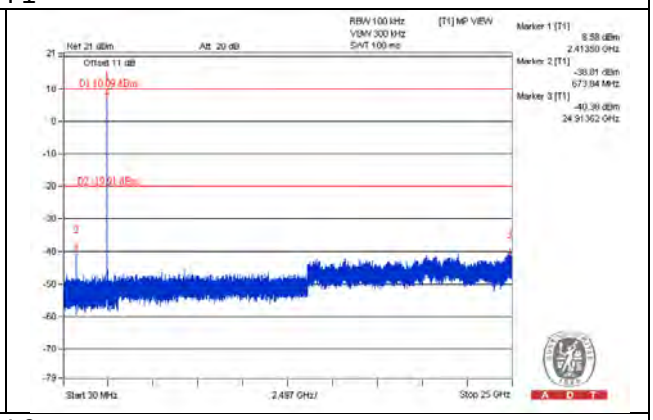
CH 11 Band edge



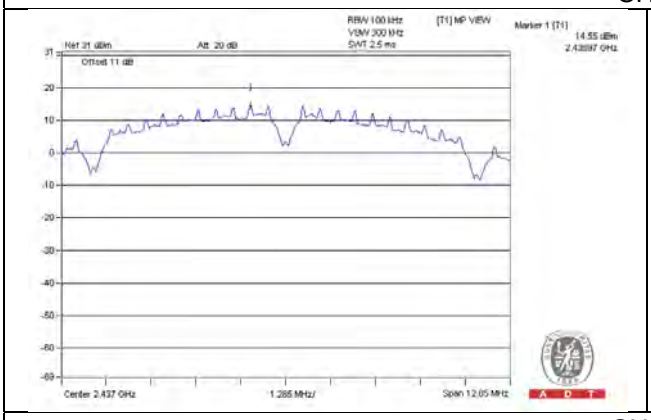
802.11b_Chain 2

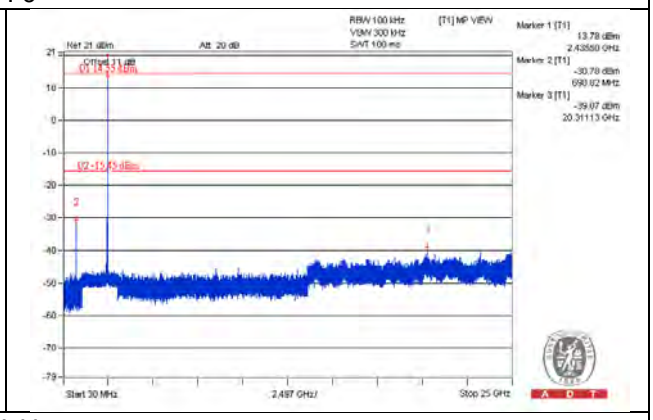
CH 1



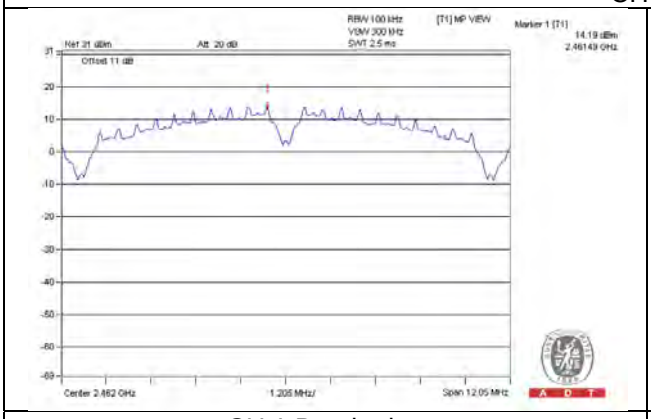


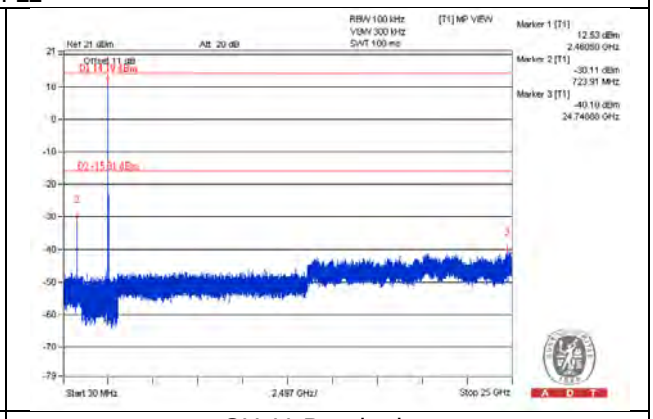
CH 6



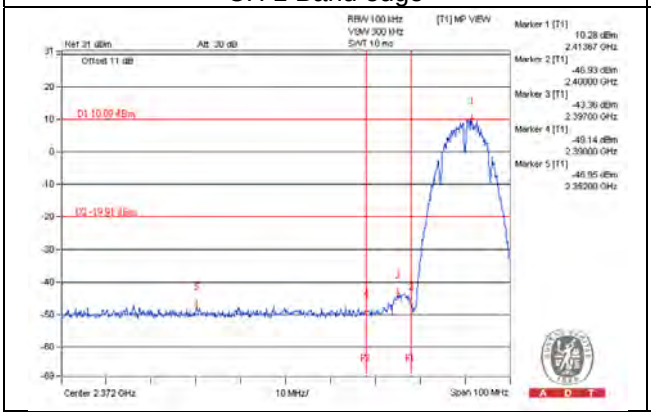


CH 11

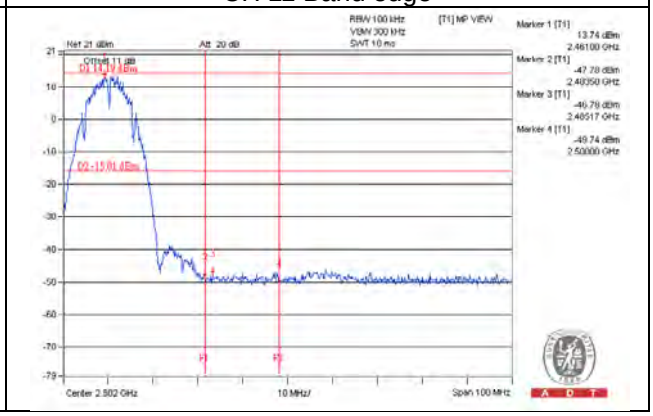




CH 1 Band edge

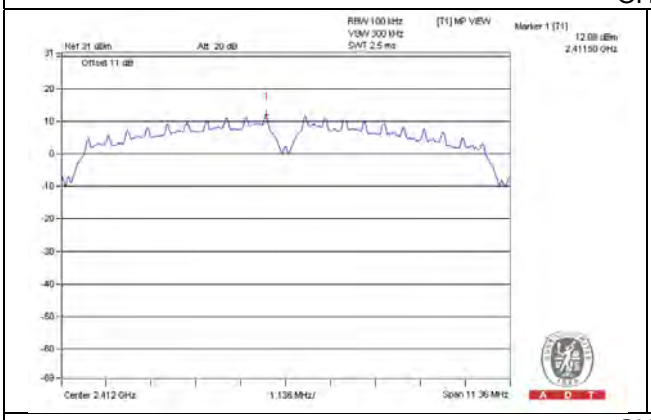


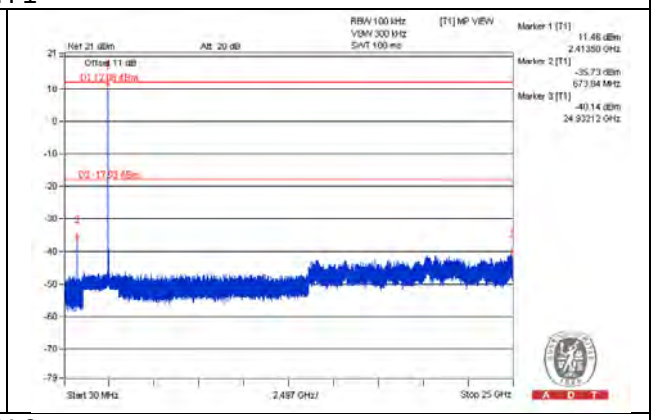
CH 11 Band edge



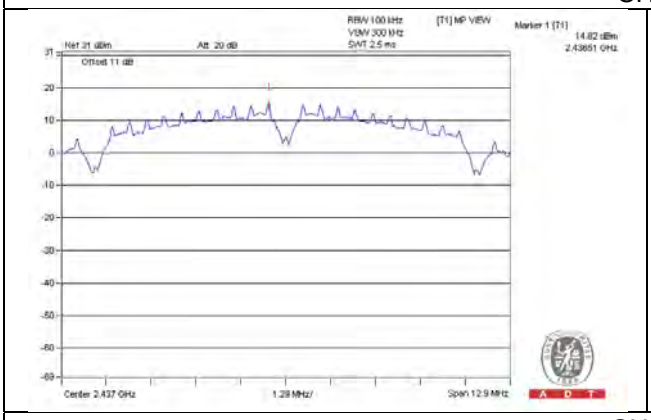
802.11b_Chain 3

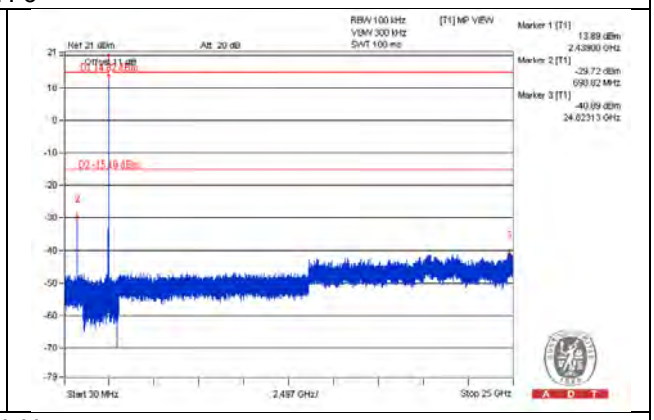
CH 1



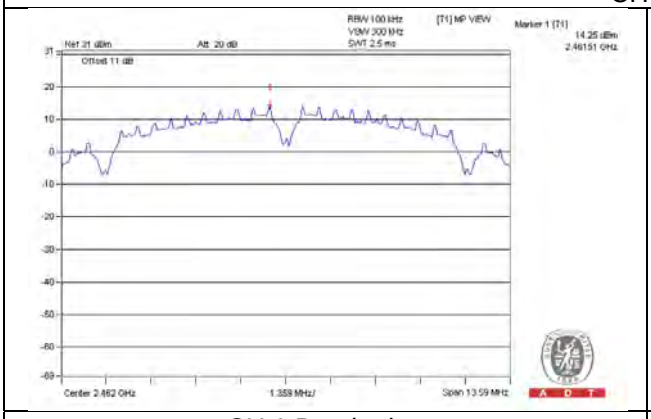


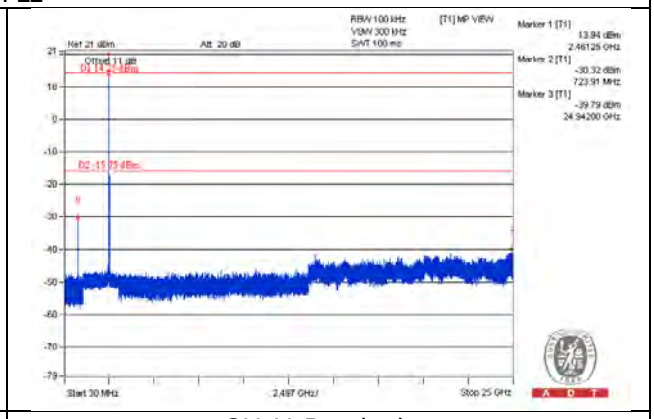
CH 6





CH 11





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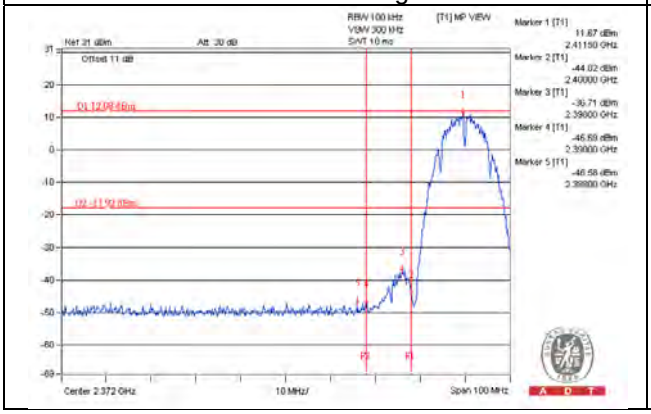

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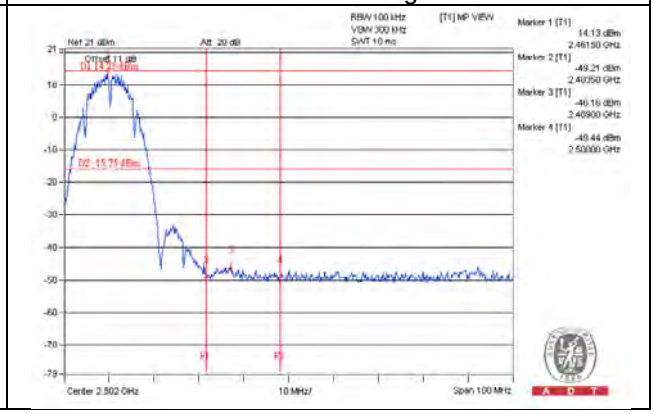
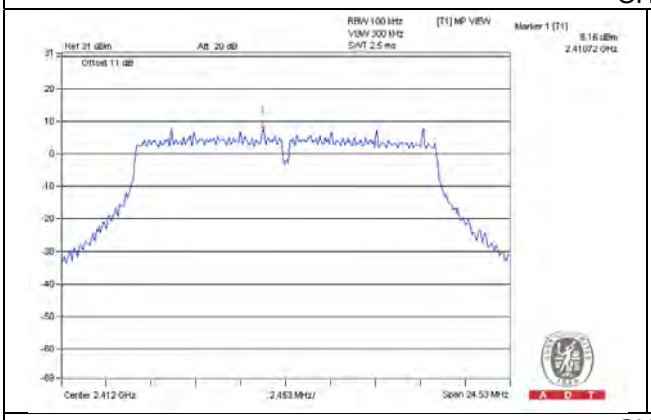
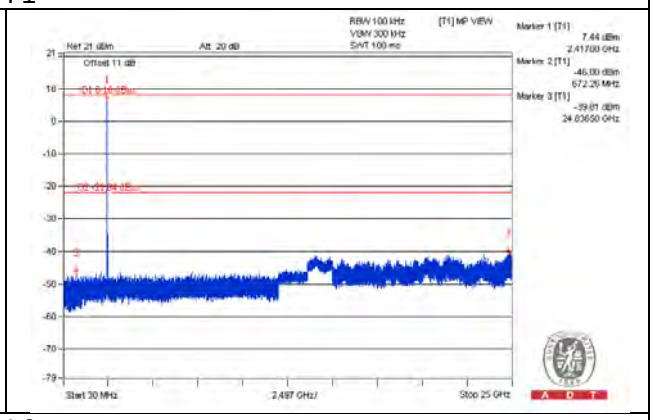


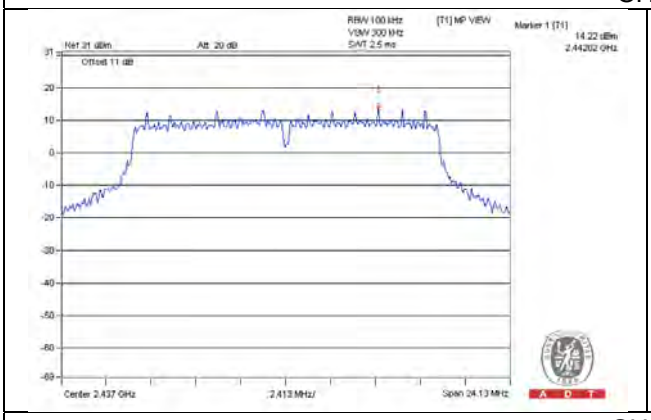
802.11g_Chain 0

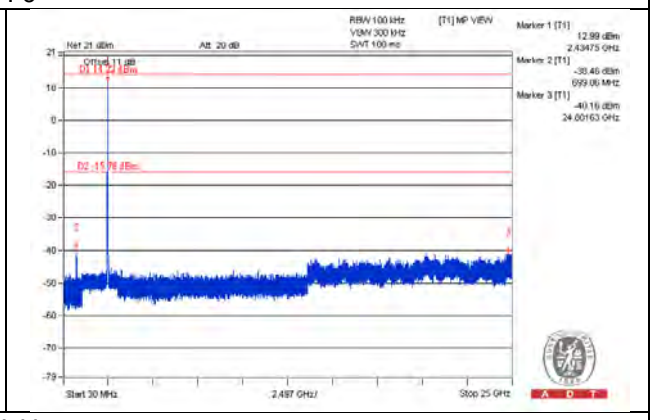
CH 1





CH 6





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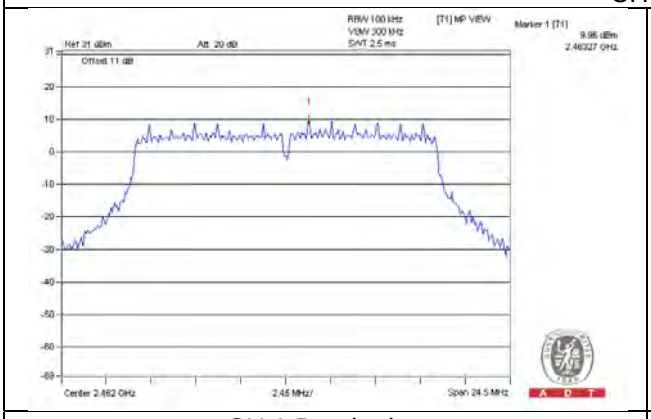
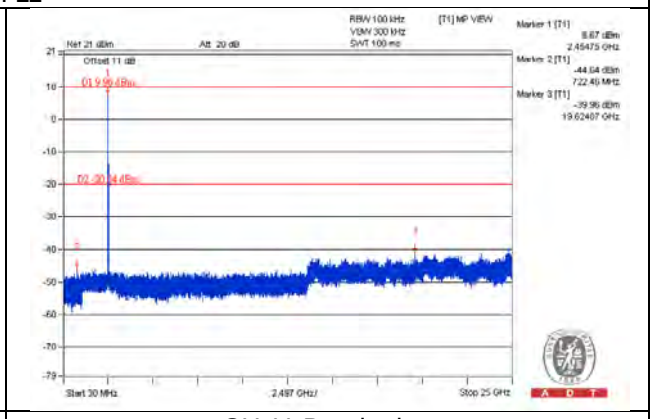
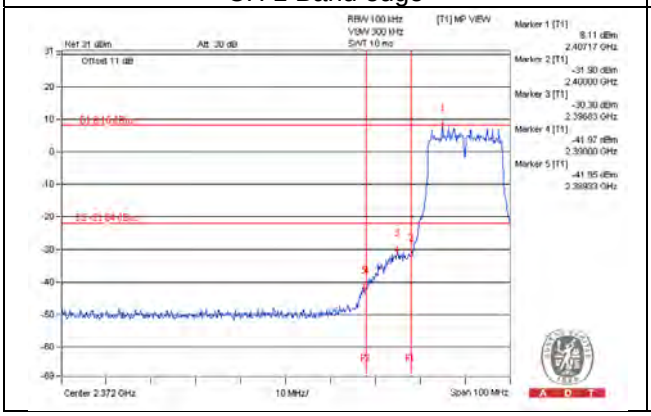
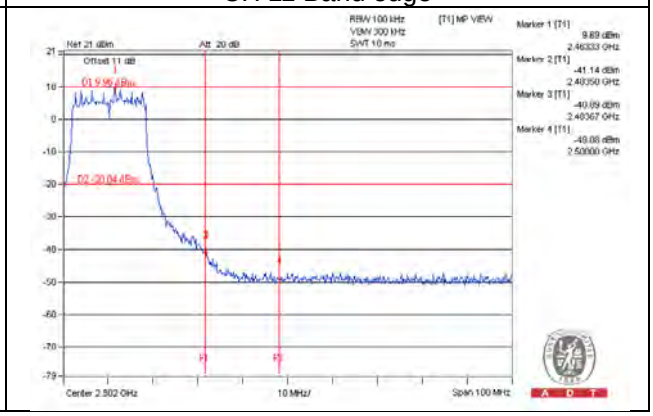




CH 1 Band edge

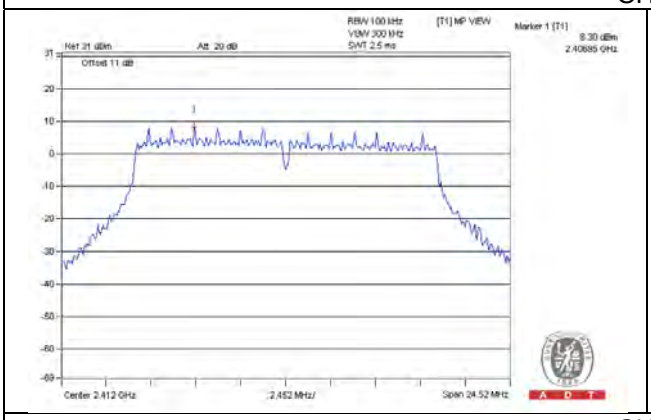


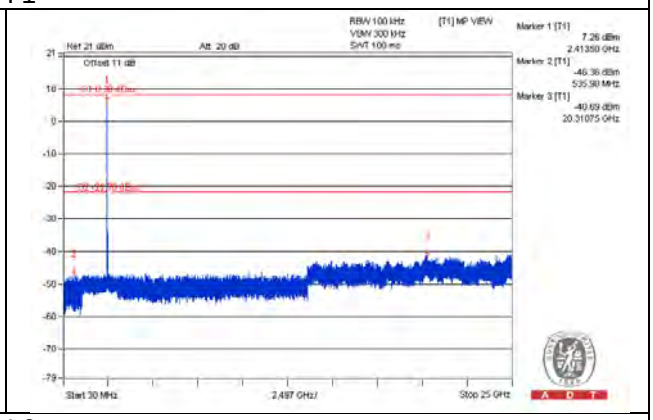
CH 11 Band edge



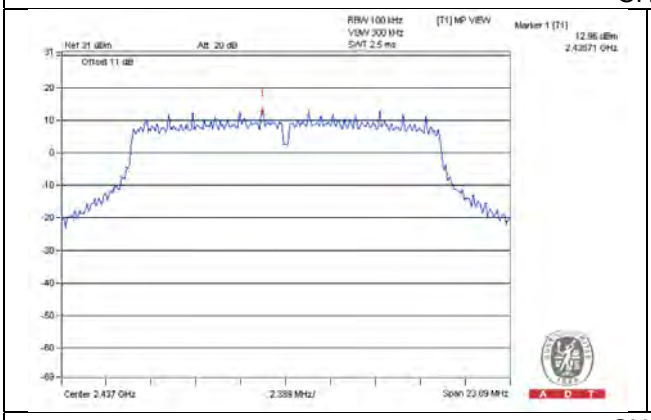
802.11g_Chain 1

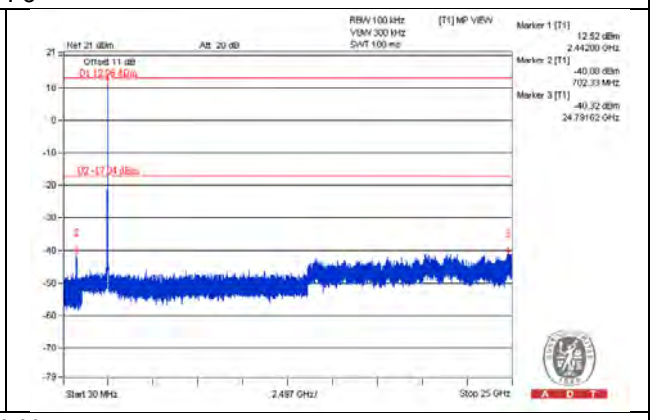
CH 1



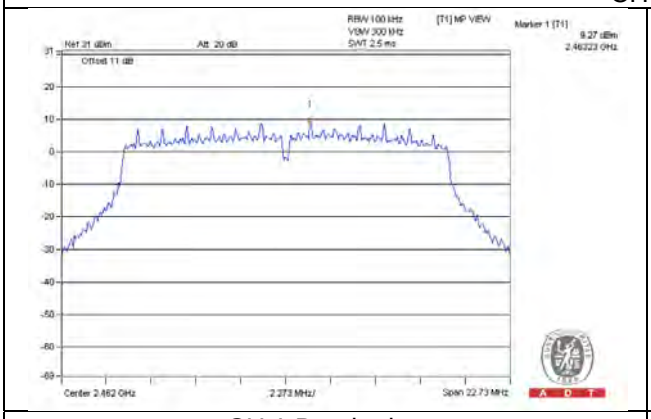


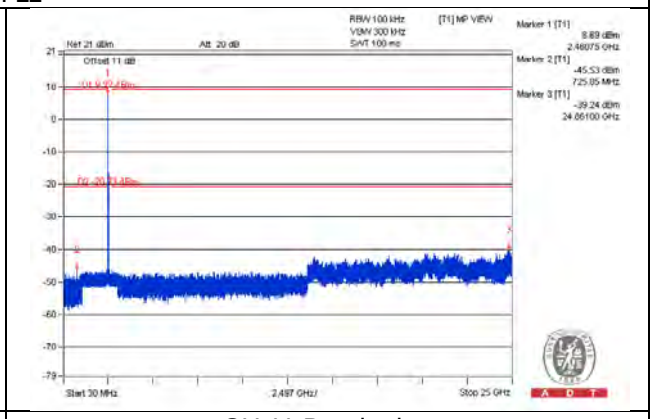
CH 6



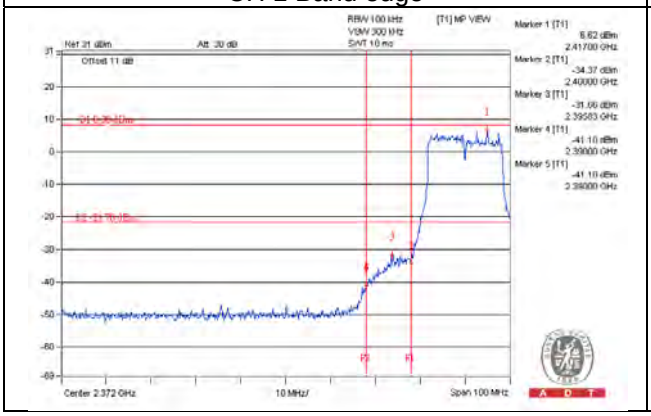


CH 11

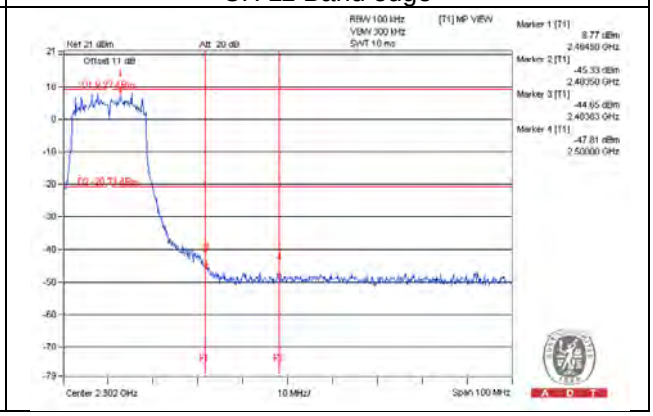




CH 1 Band edge

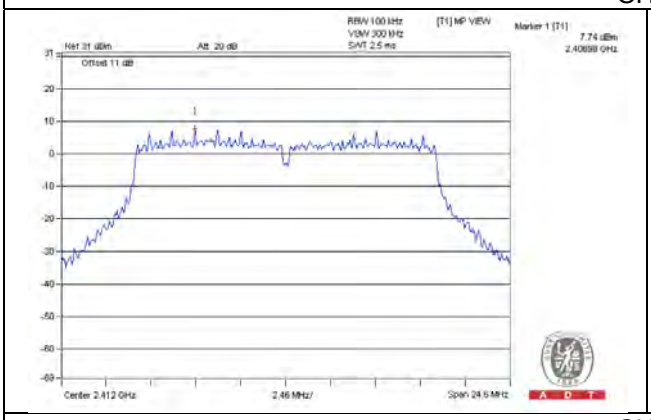


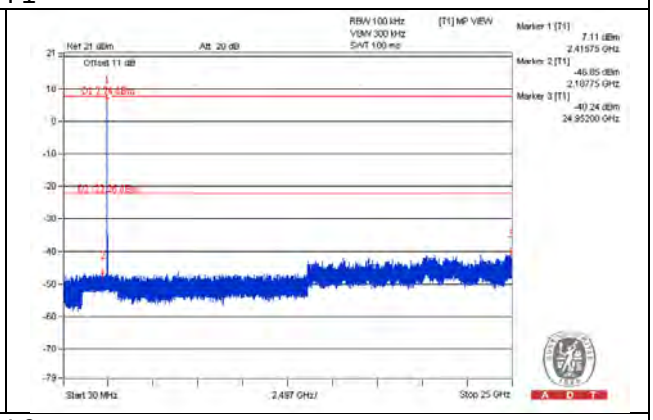
CH 11 Band edge



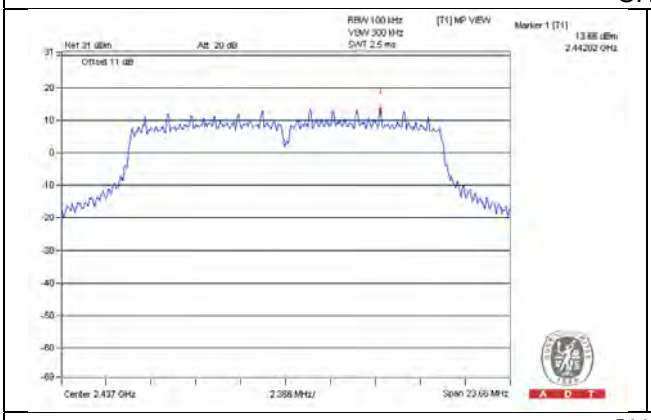
802.11g_Chain 2

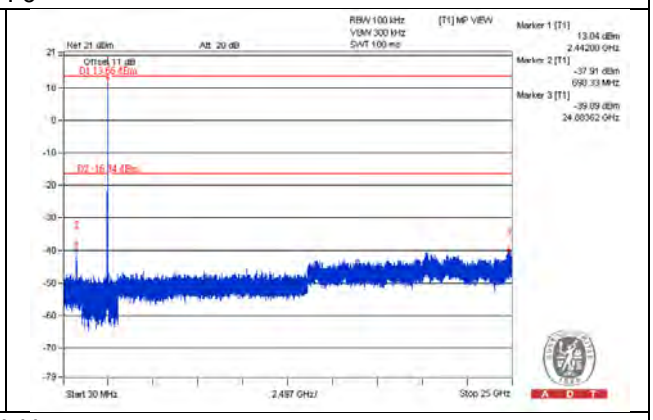
CH 1



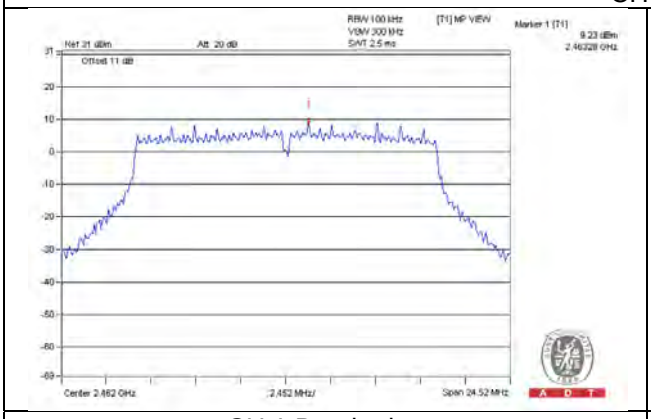


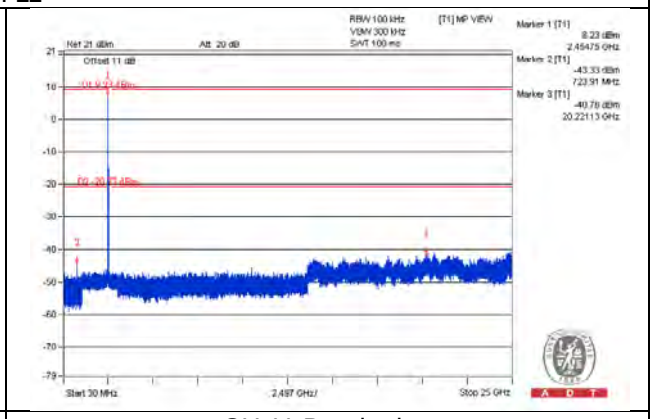
CH 6



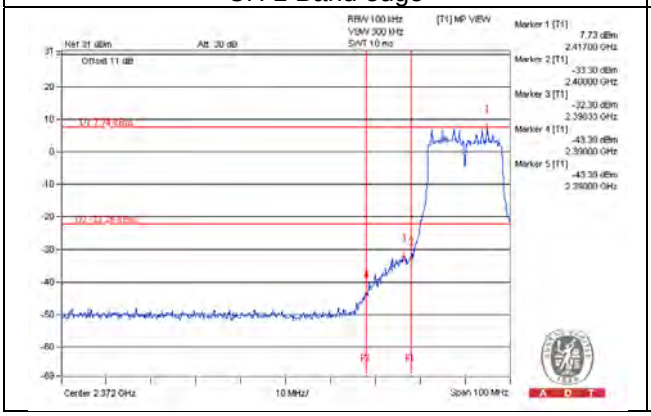


CH 11

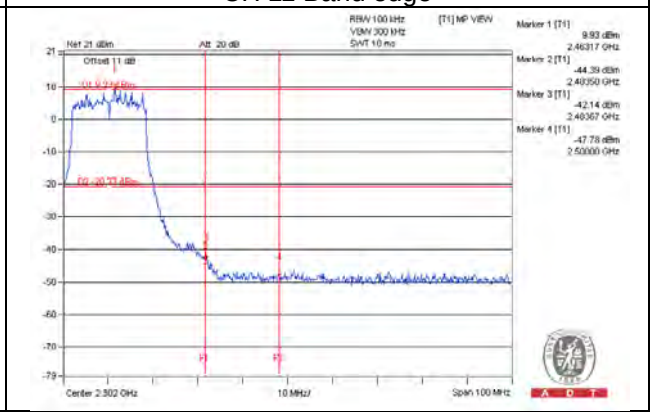




CH 1 Band edge

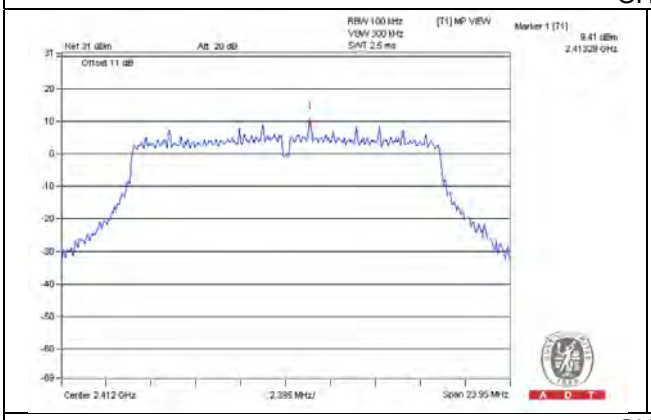


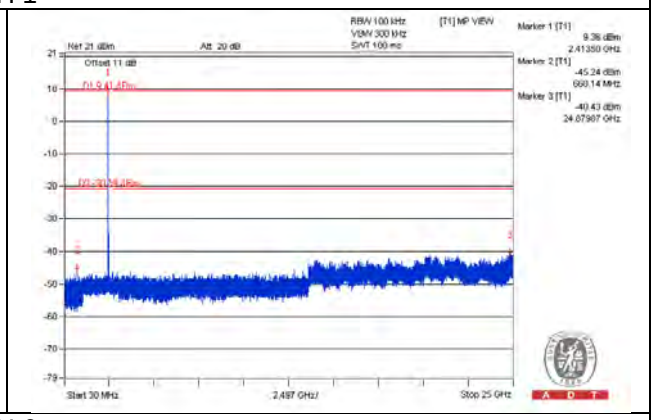
CH 11 Band edge



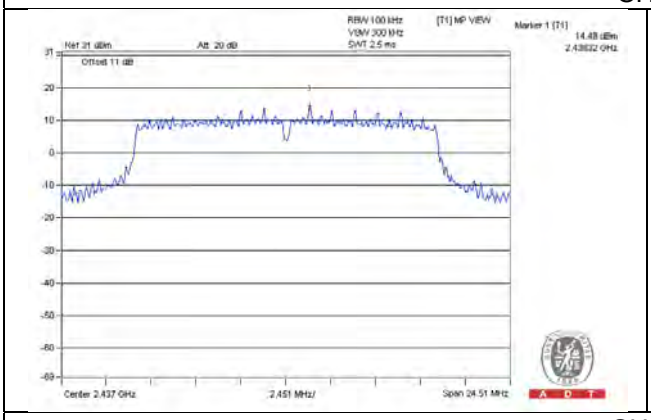
802.11g_Chain 3

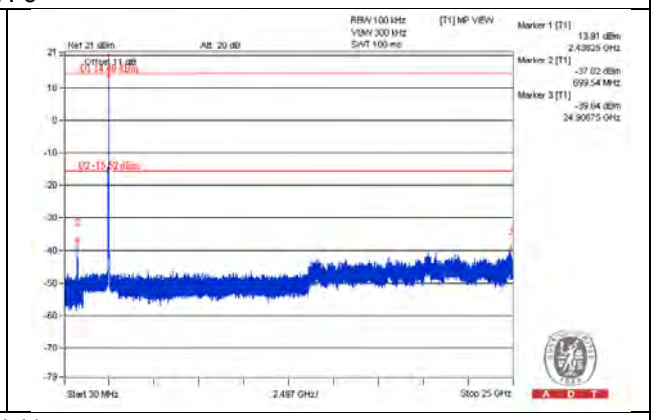
CH 1



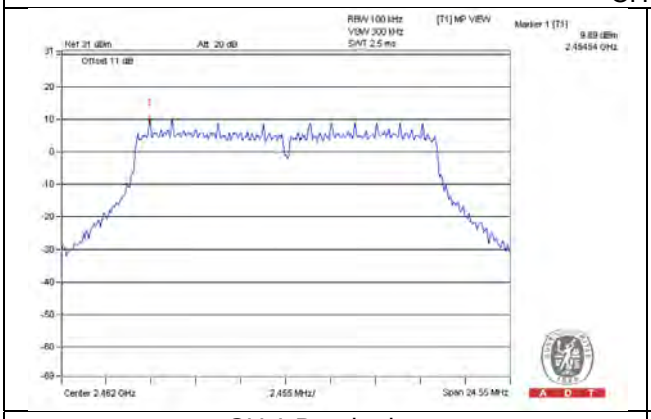


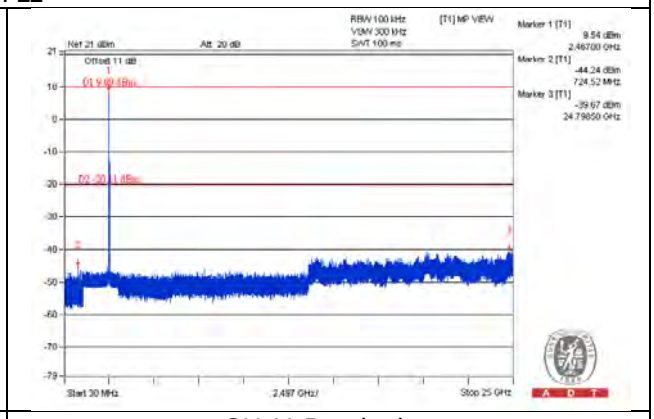
CH 6



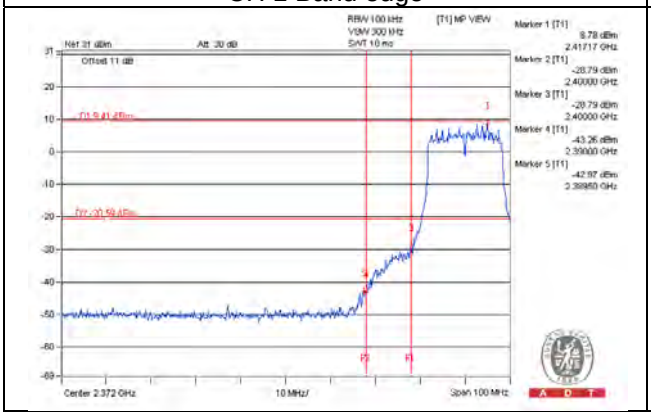


CH 11

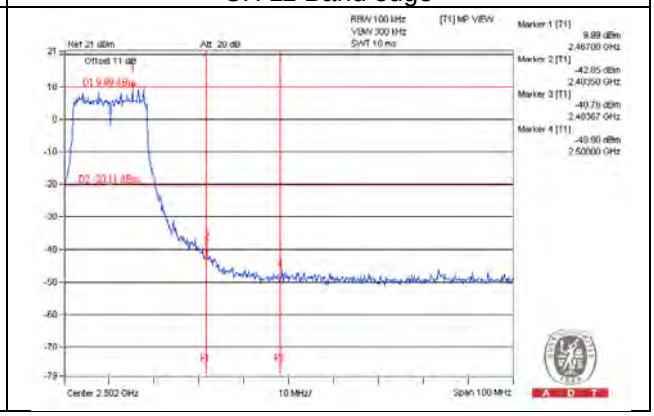




CH 1 Band edge

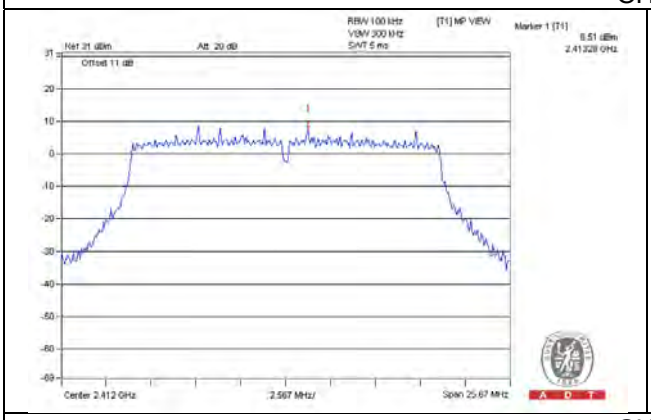


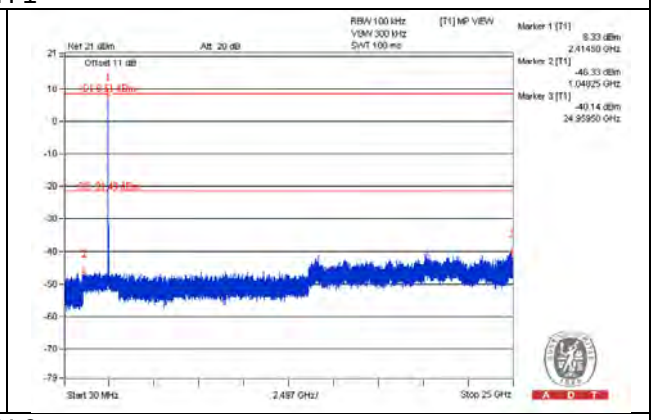
CH 11 Band edge



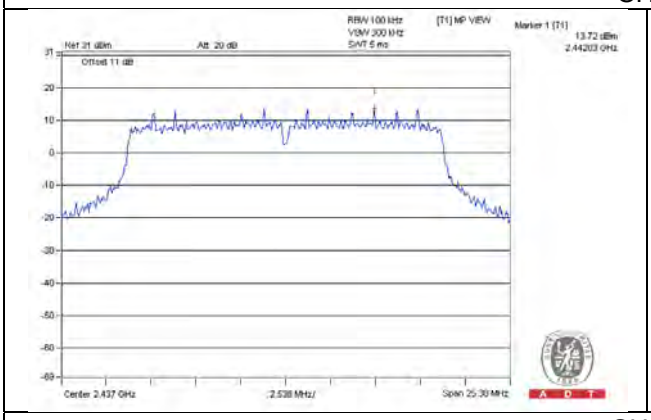
802.11n (HT20)_Chain 0

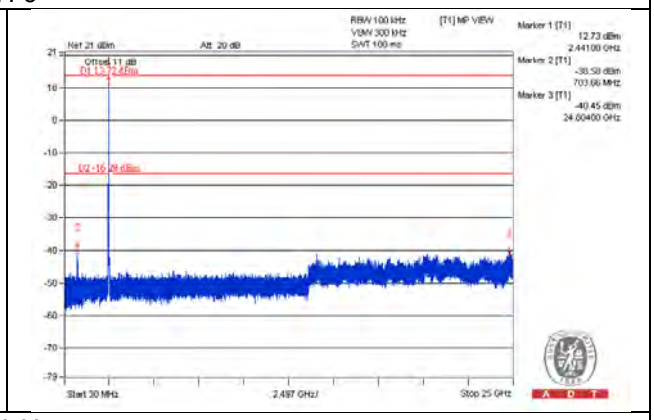
CH 1



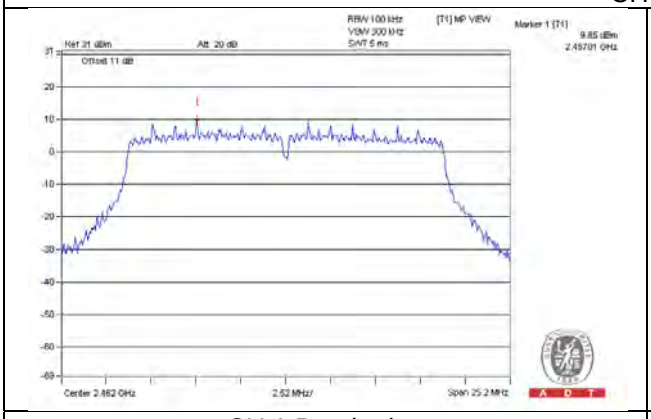


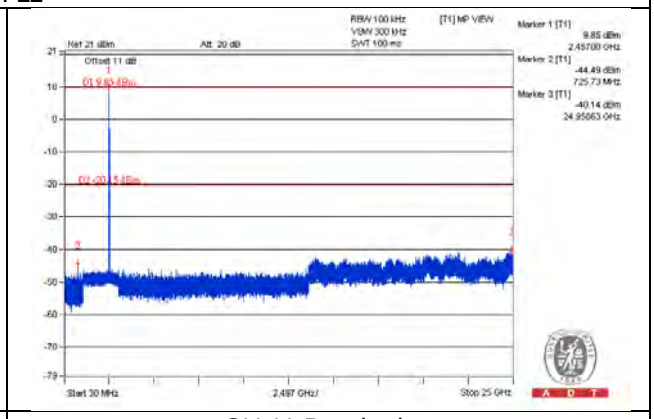
CH 6



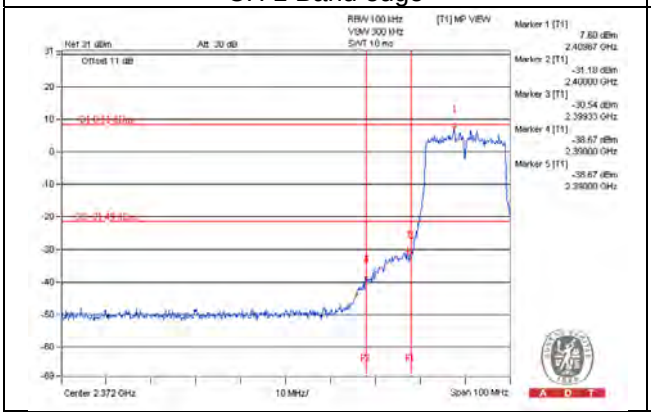


CH 11

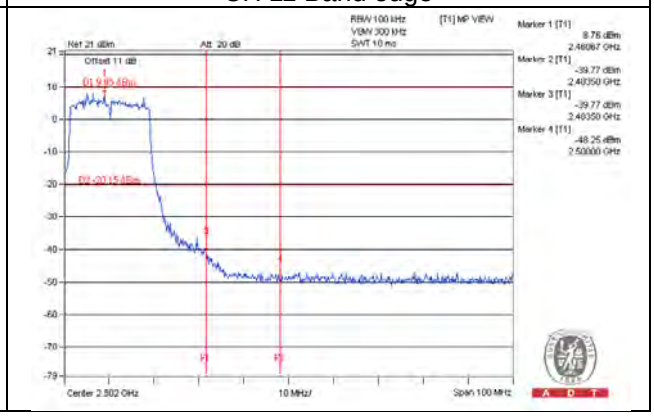




CH 1 Band edge

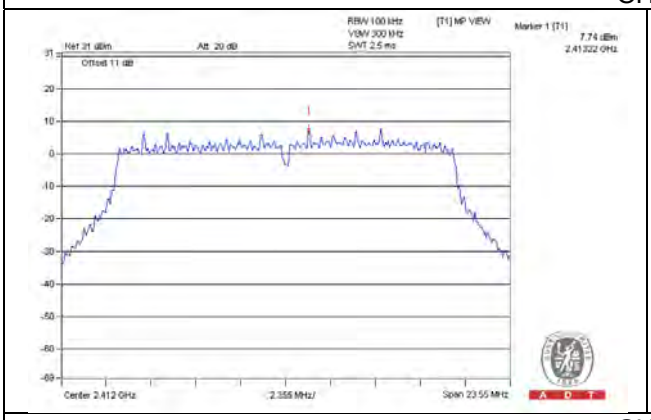


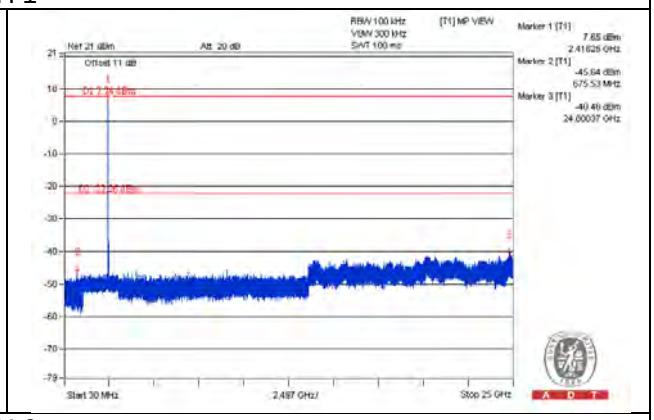
CH 11 Band edge



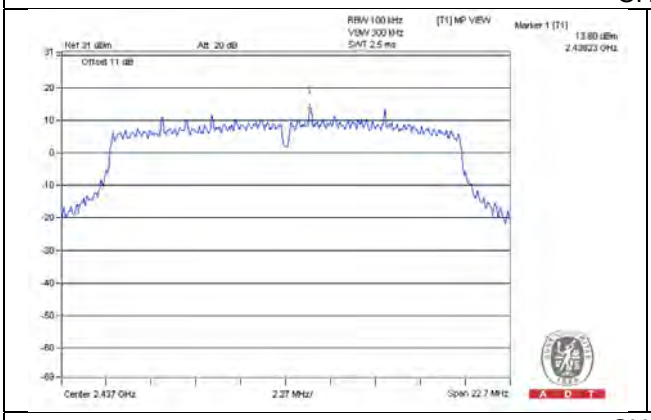
802.11n (HT20)_Chain 1

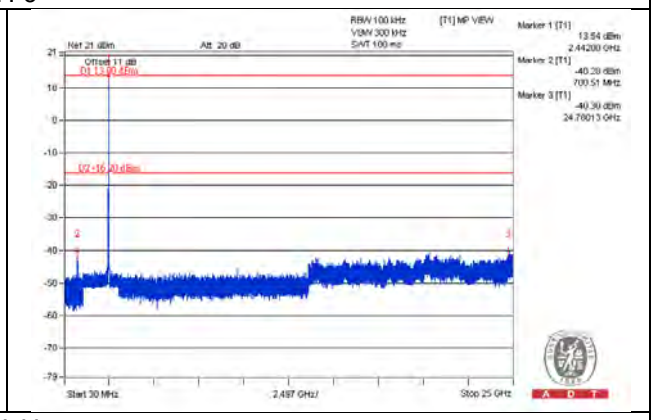
CH 1



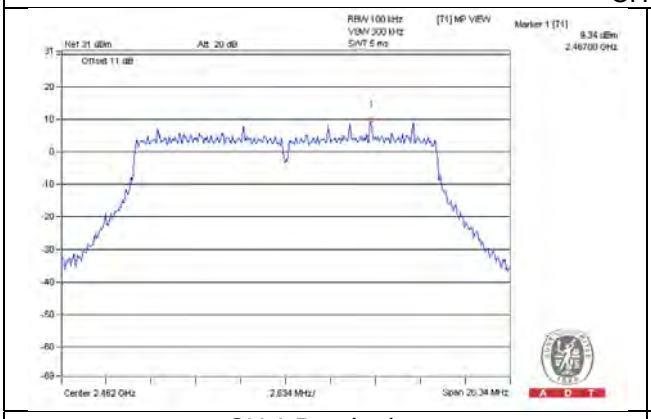


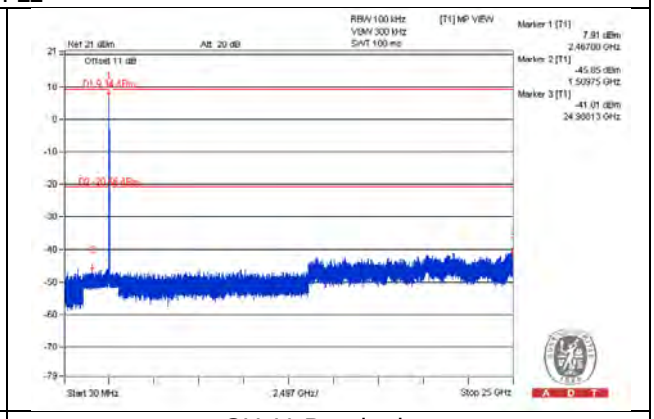
CH 6



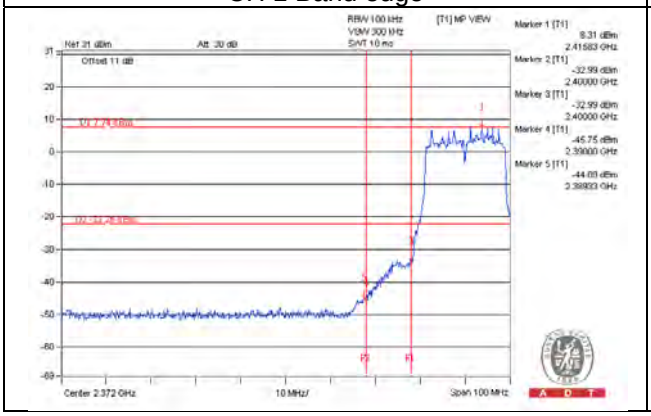


CH 11

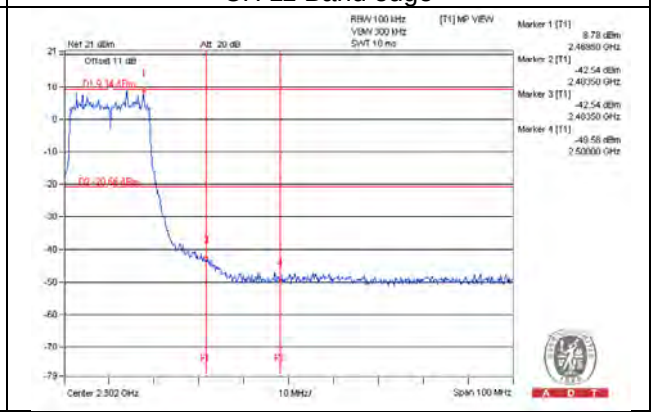




CH 1 Band edge

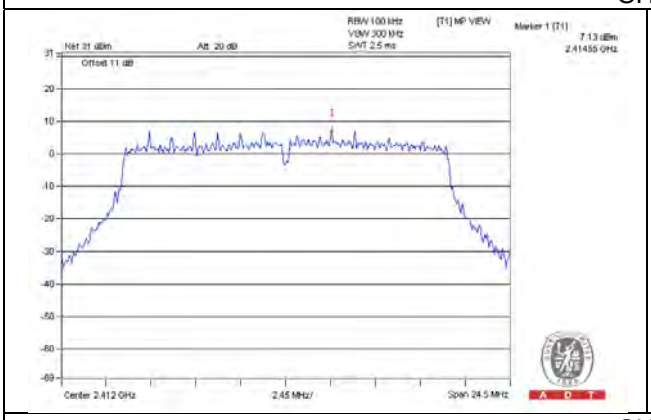


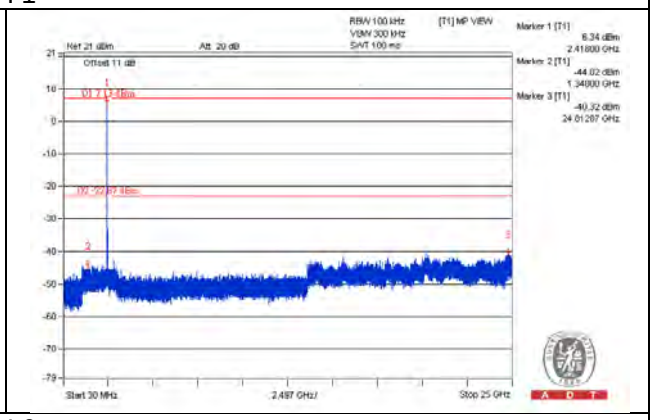
CH 11 Band edge



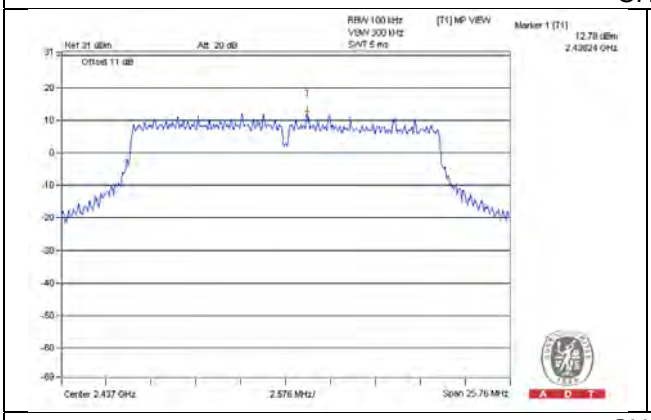
802.11n (HT20)_Chain 2

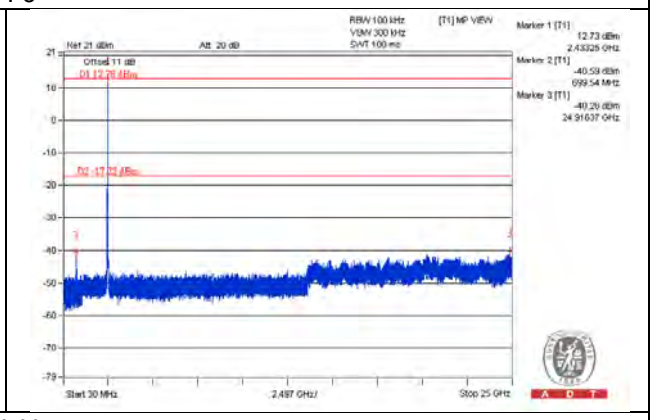
CH 1



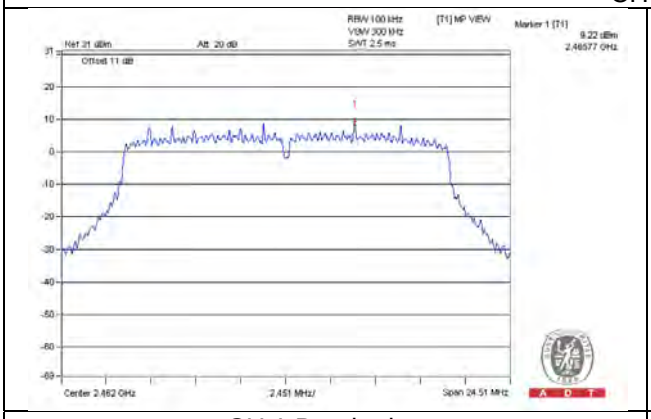


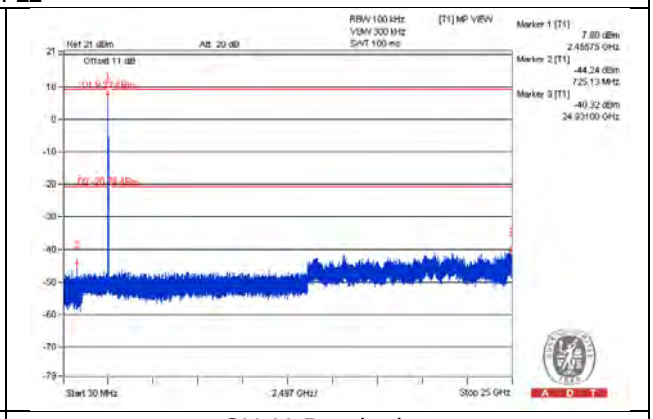
CH 6



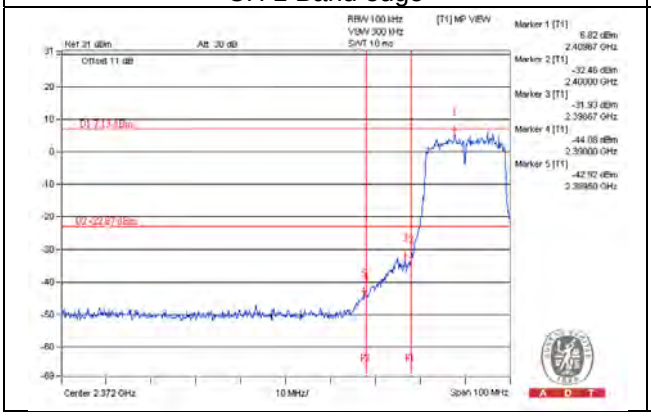


CH 11

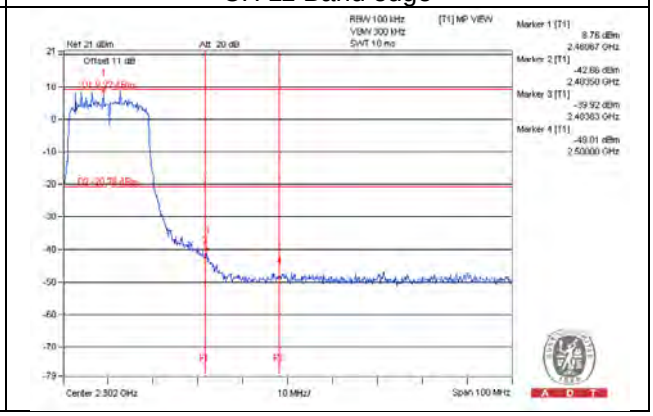




CH 1 Band edge

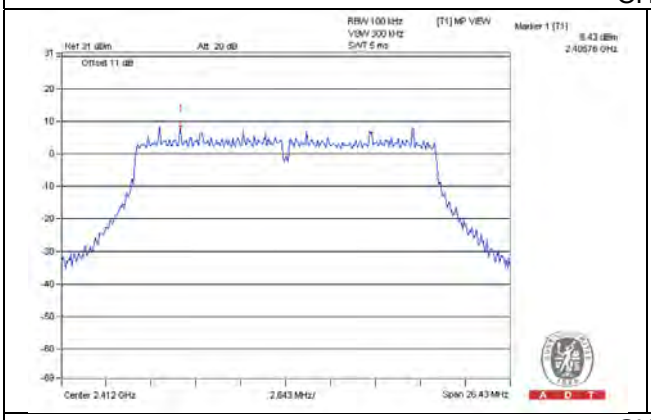


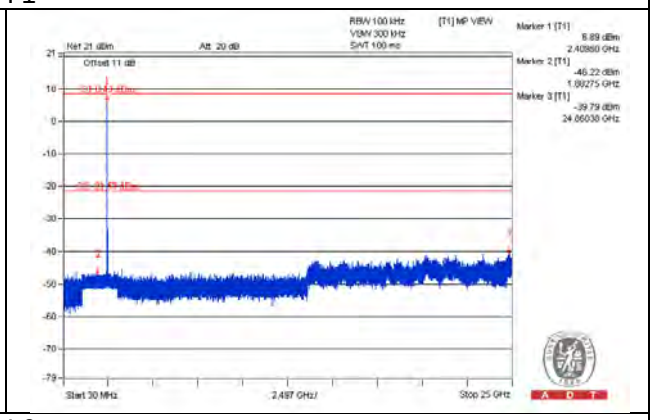
CH 11 Band edge



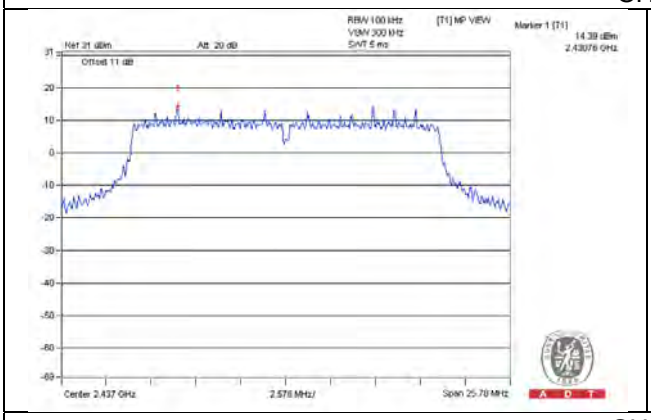
802.11n (HT20)_Chain 3

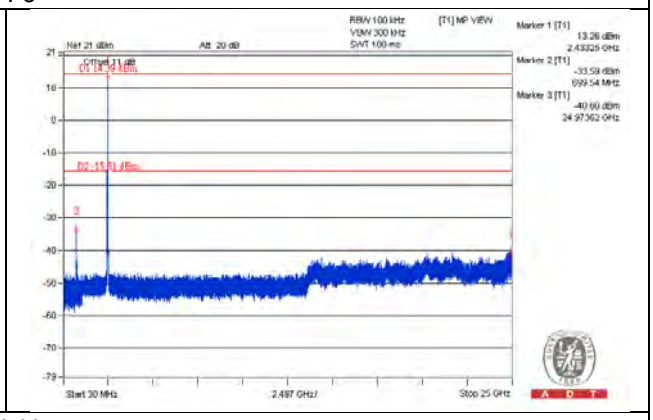
CH 1





CH 6





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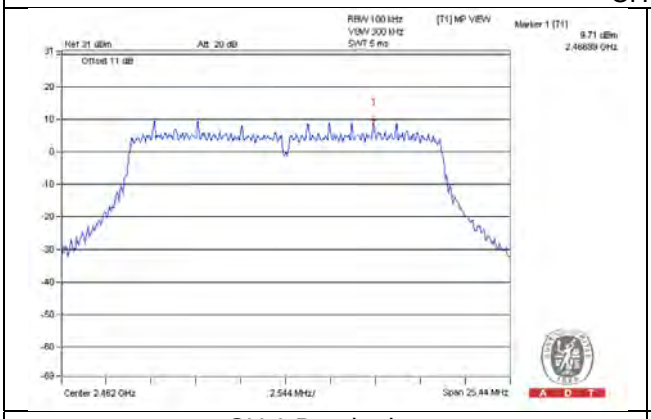
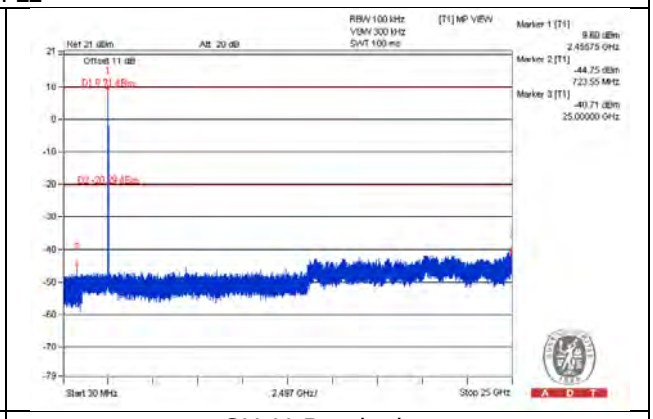
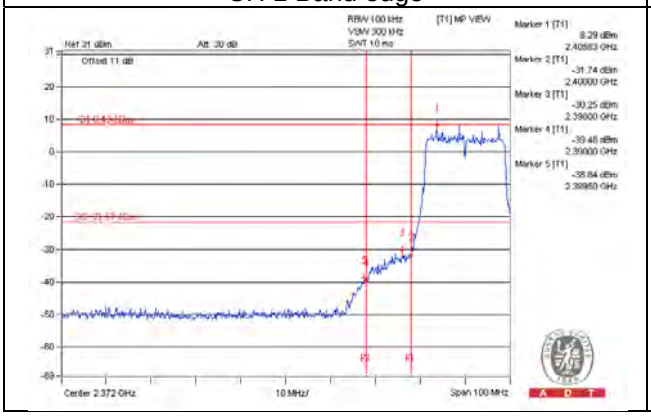
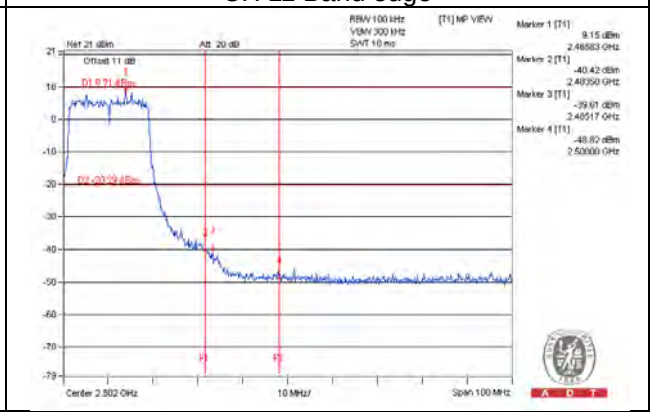




CH 1 Band edge

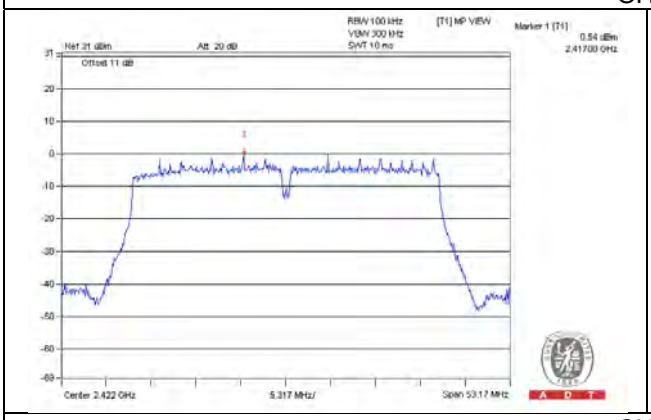


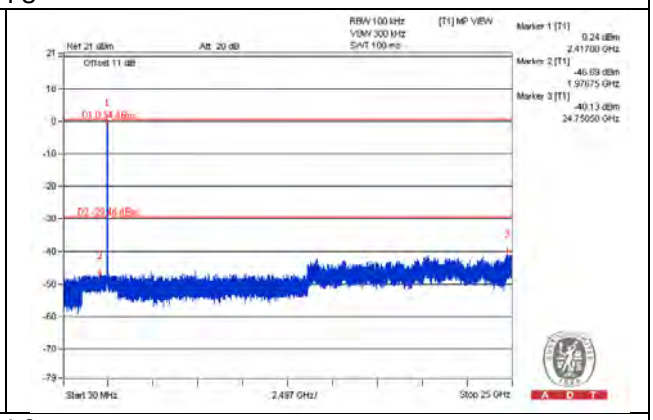
CH 11 Band edge



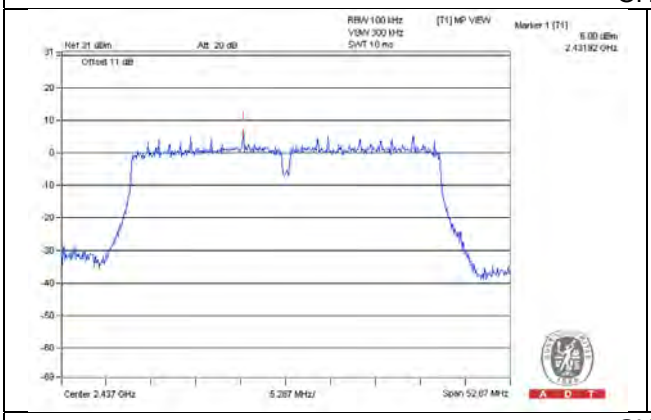
802.11n (HT40)_Chain 0

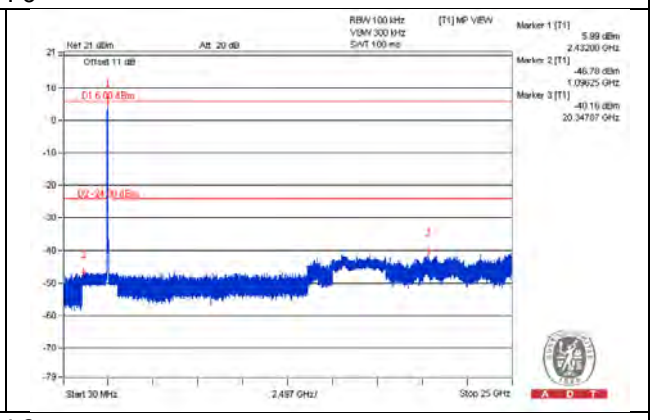
CH 3



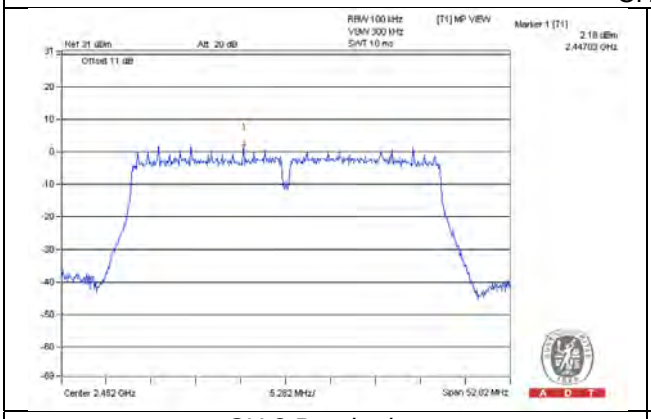


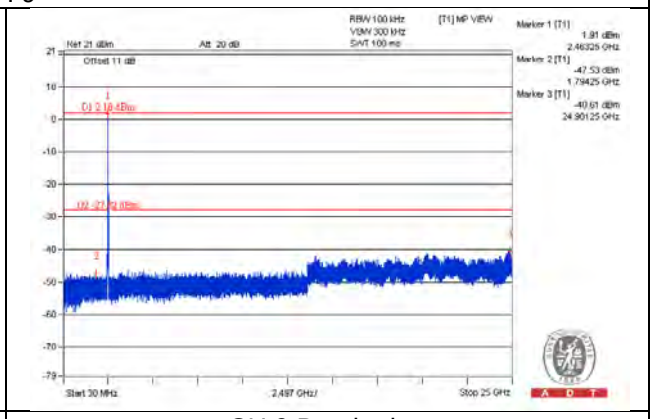
CH 6



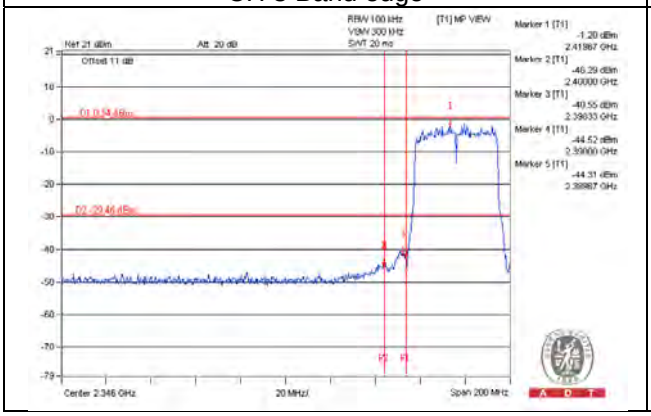


CH 9

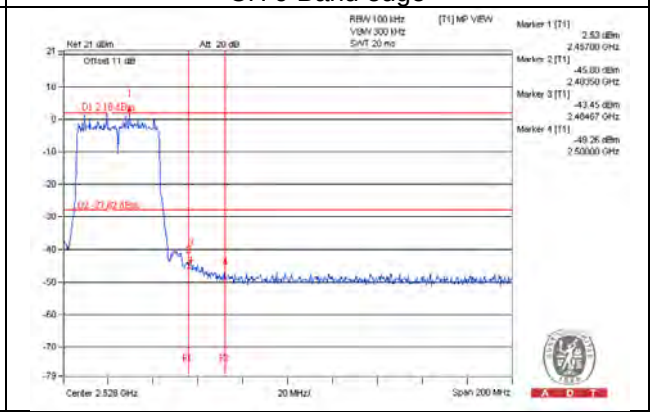




CH 3 Band edge

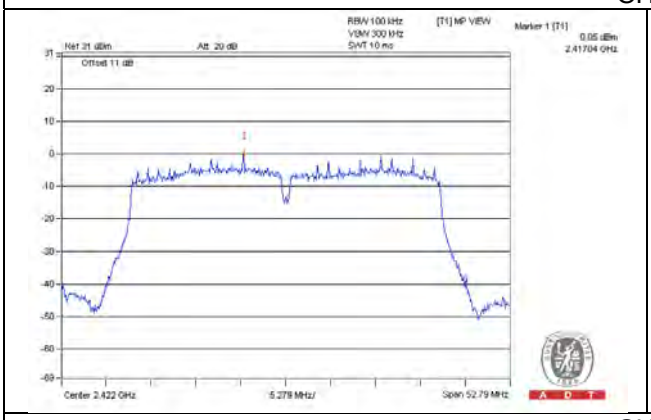


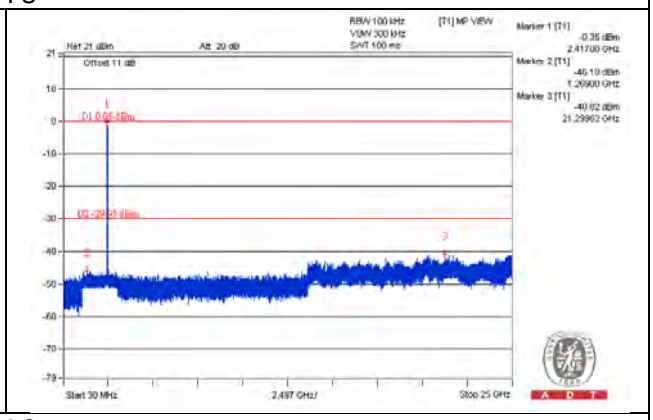
CH 9 Band edge



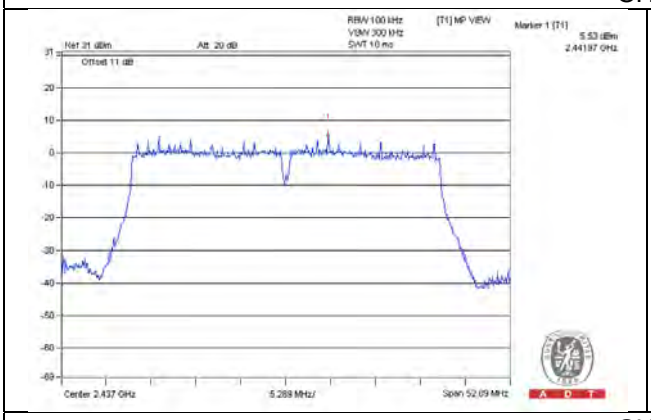
802.11n (HT40)_Chain 1

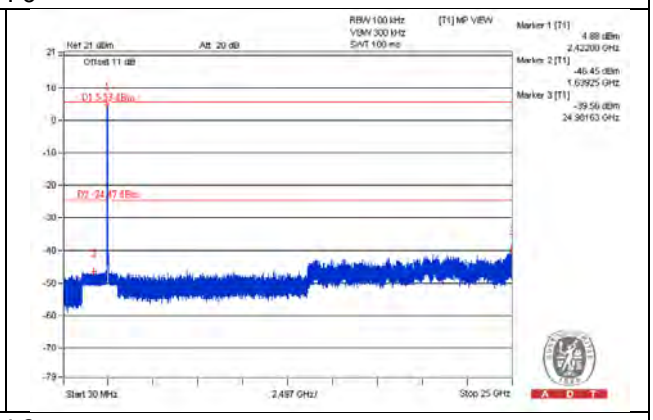
CH 3



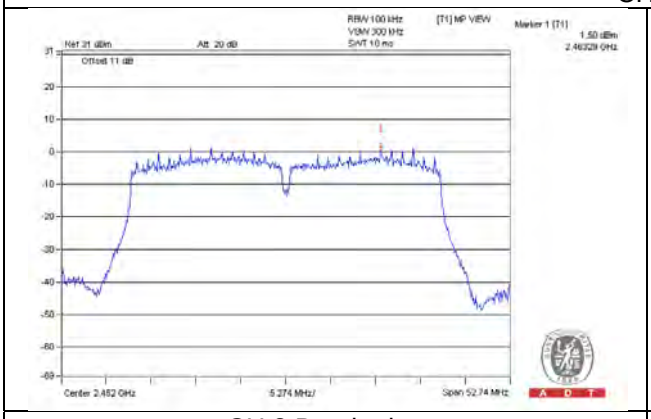


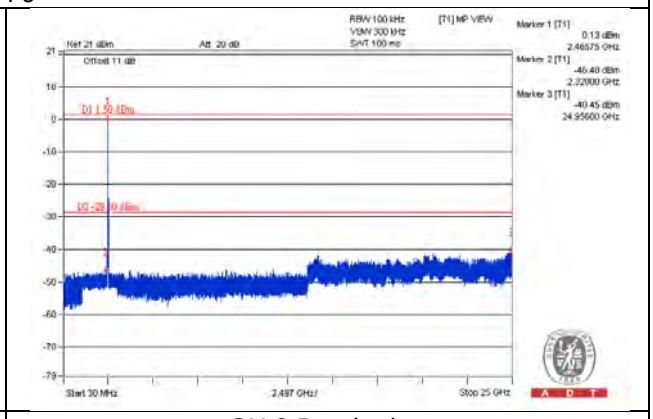
CH 6



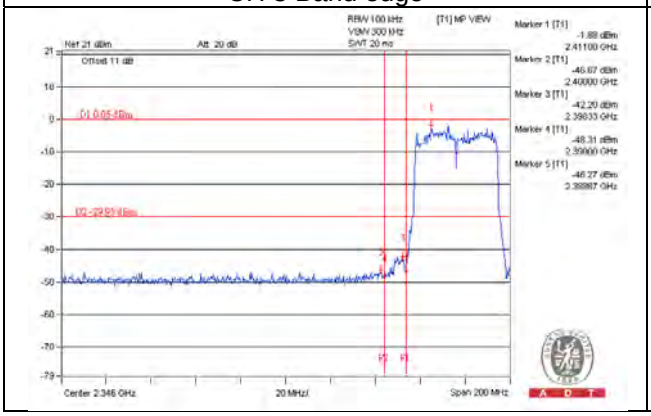


CH 9

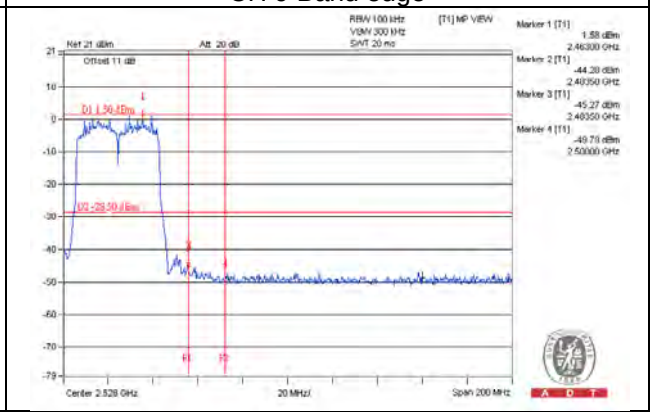




CH 3 Band edge

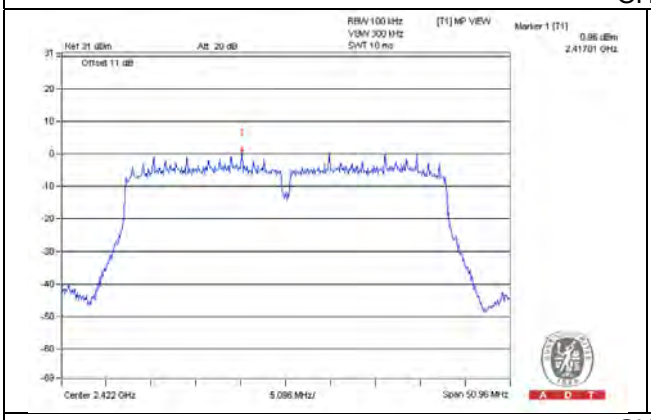


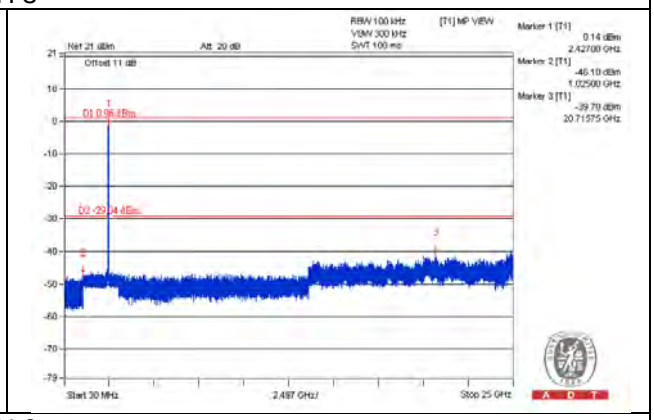
CH 9 Band edge



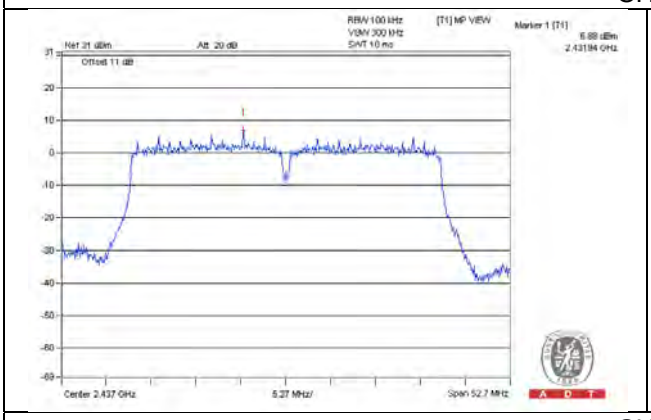
802.11n (HT40)_Chain 2

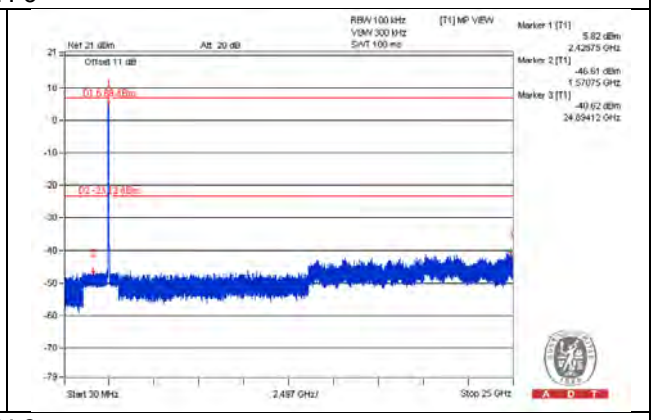
CH 3



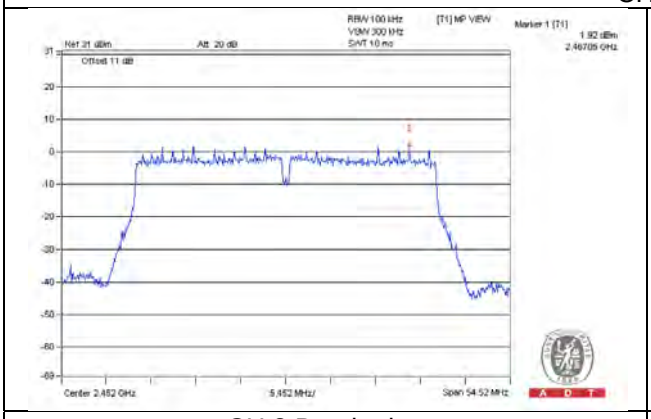


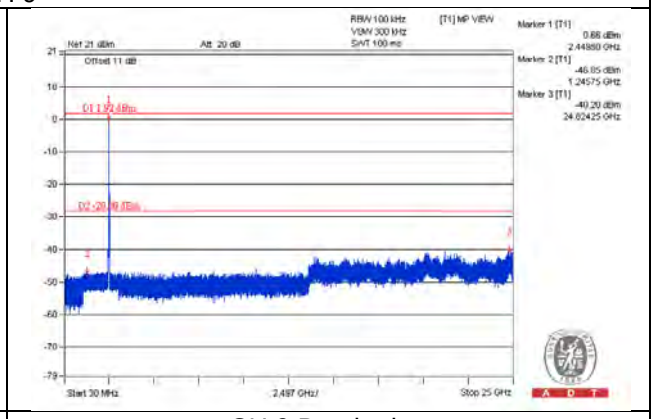
CH 6



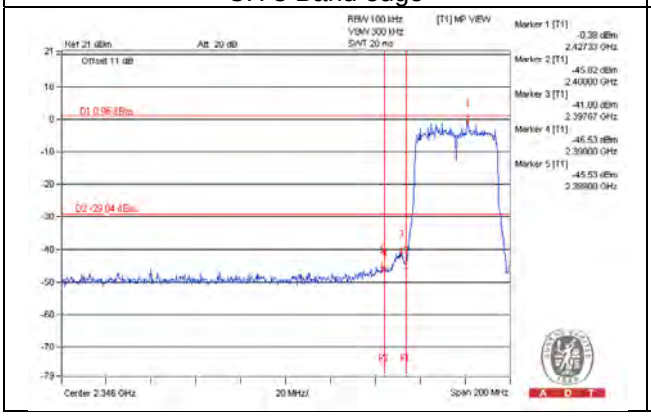


CH 9

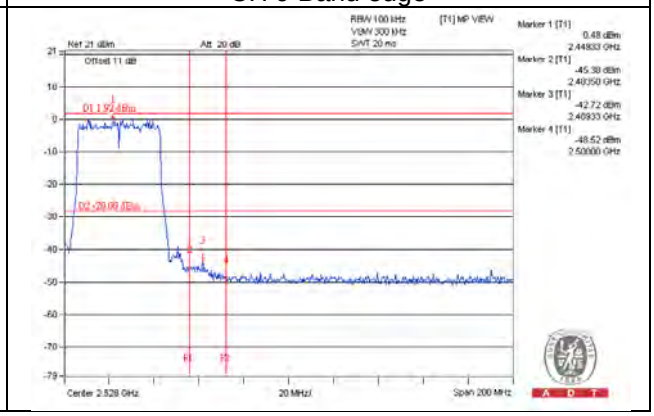




CH 3 Band edge

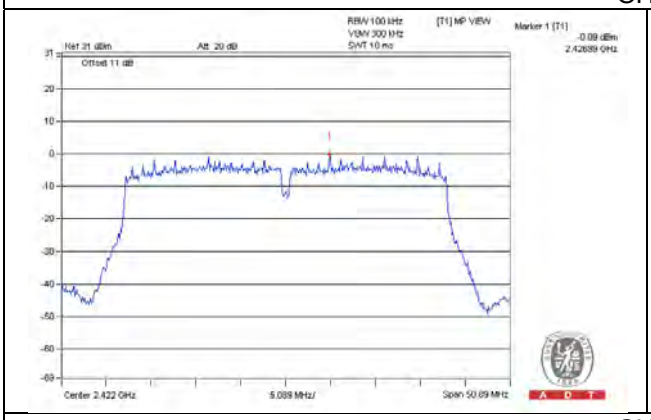


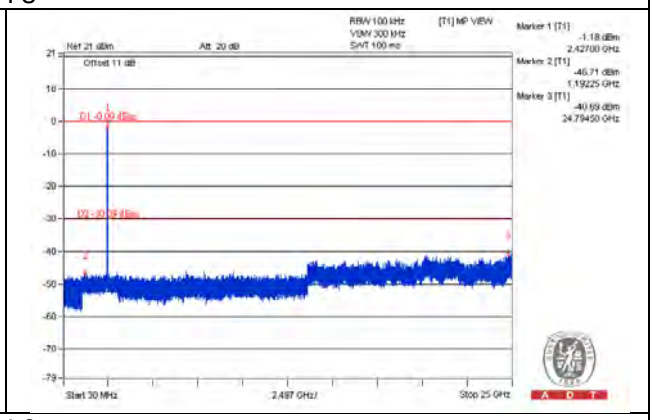
CH 9 Band edge



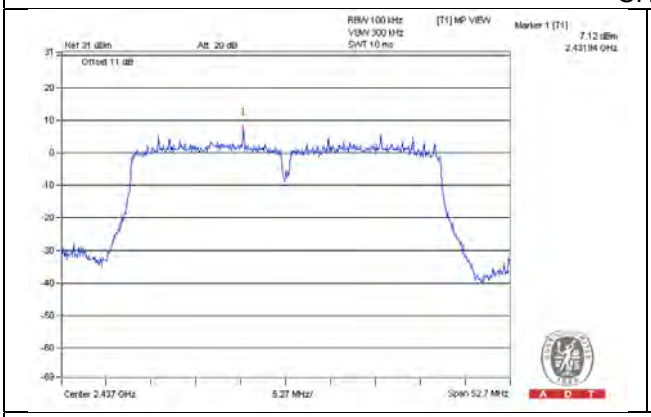
802.11n (HT40)_Chain 3

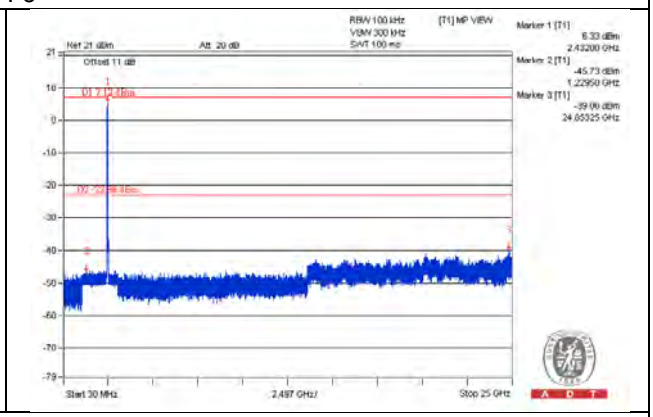
CH 3



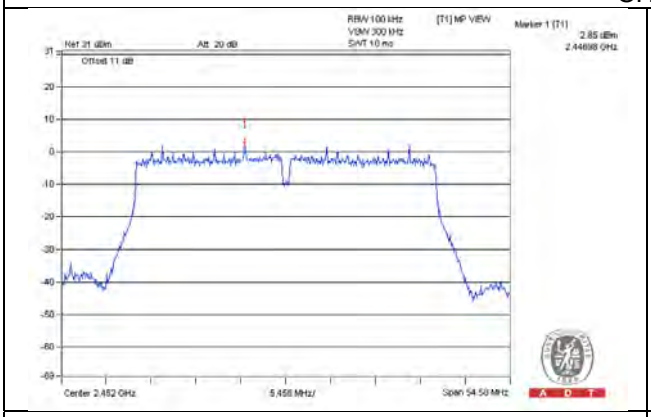


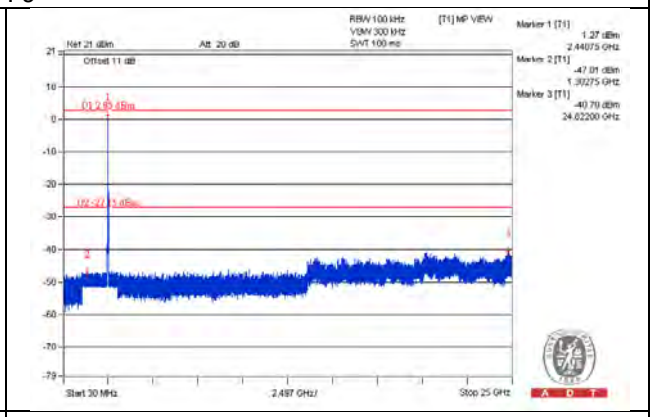
CH 6



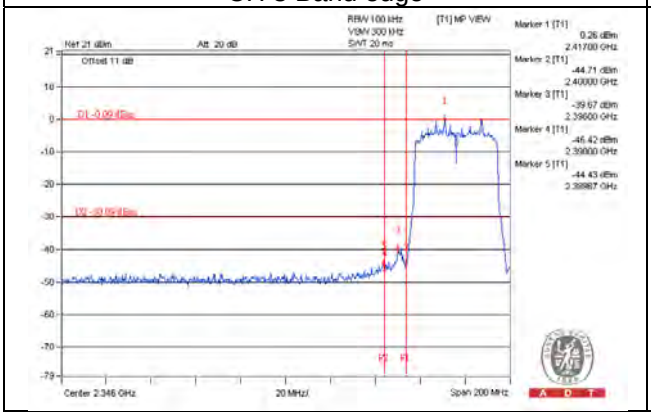


CH 9

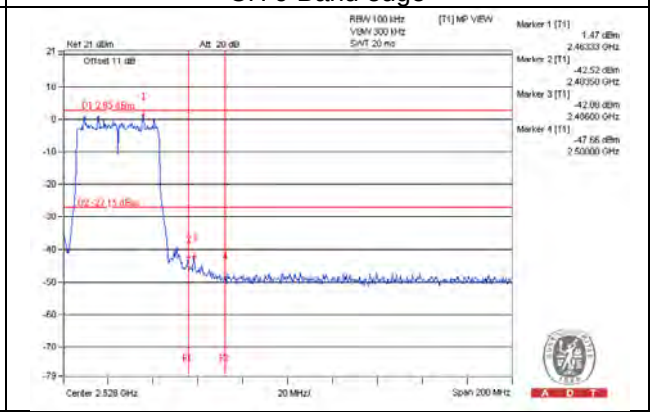




CH 3 Band edge



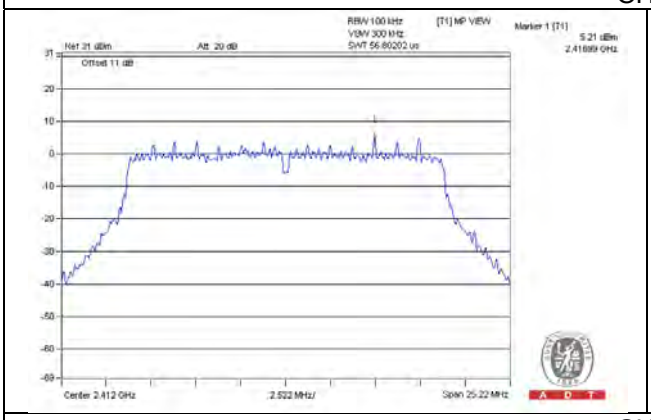
CH 9 Band edge

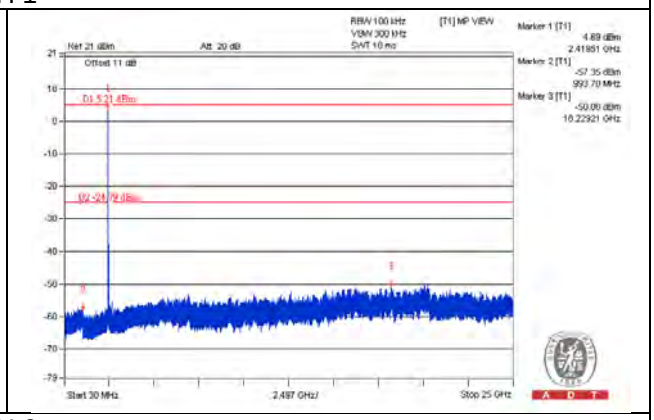


Beamforming on Mode

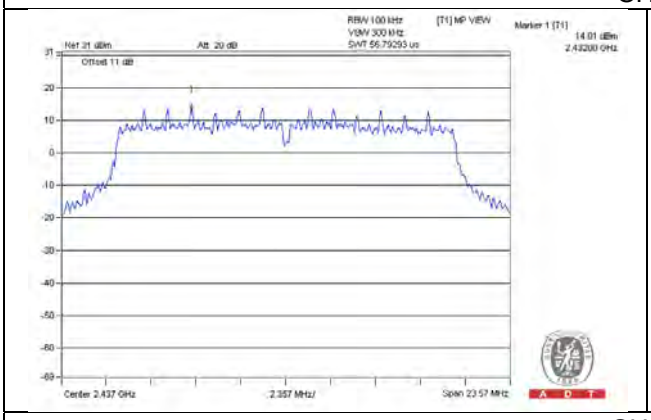
802.11n (HT20)_Chain 0

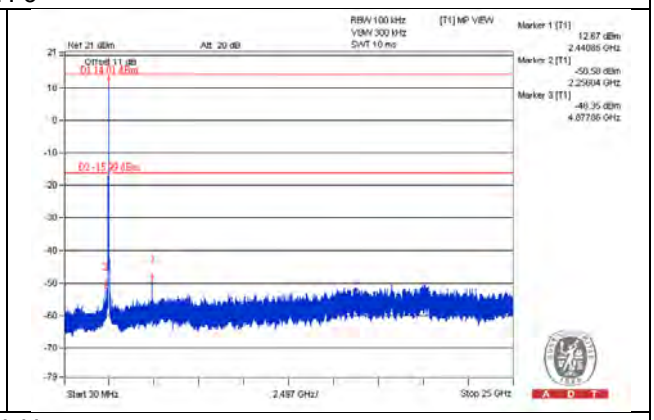
CH 1



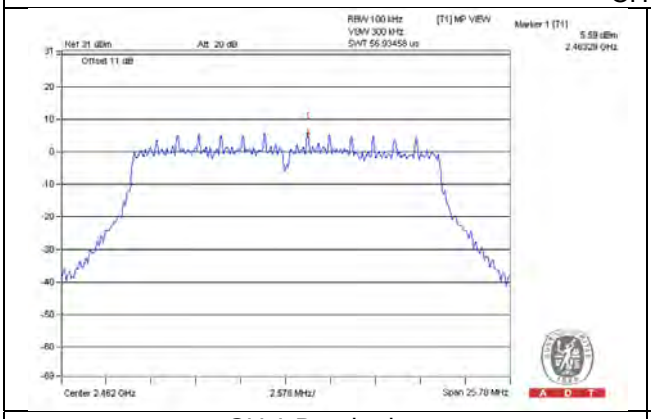


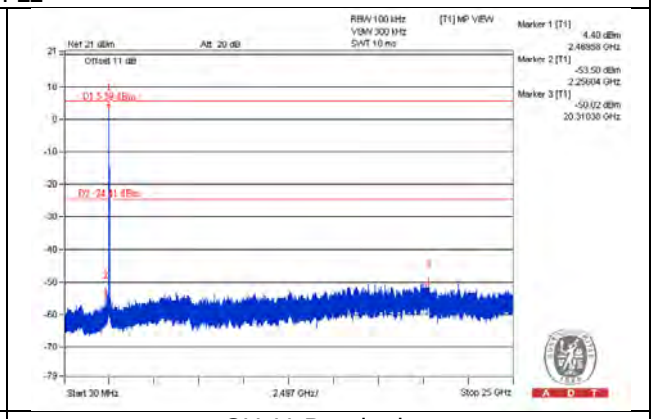
CH 6



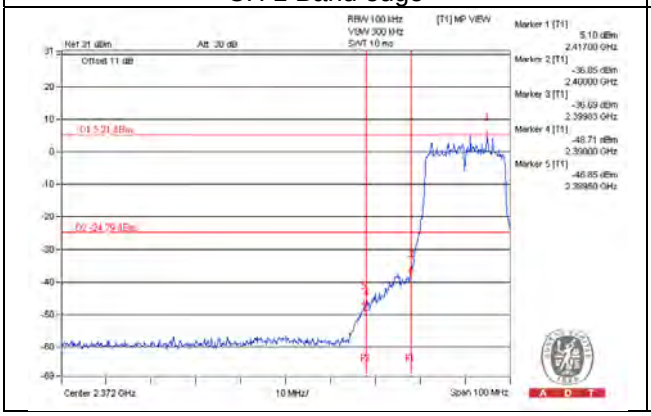


CH 11

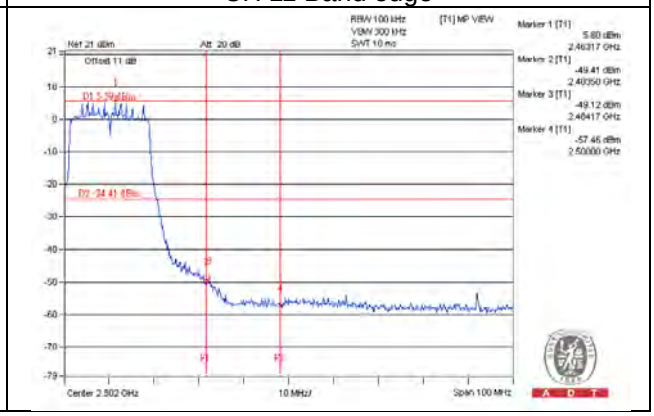




CH 1 Band edge

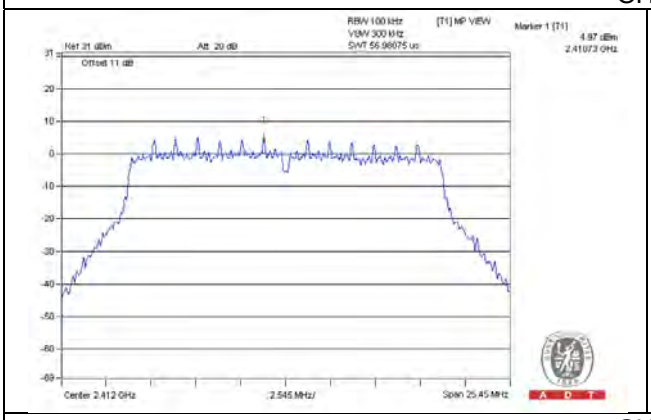


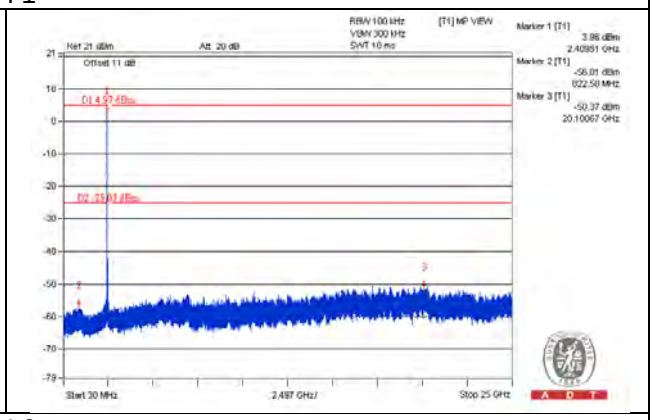
CH 11 Band edge



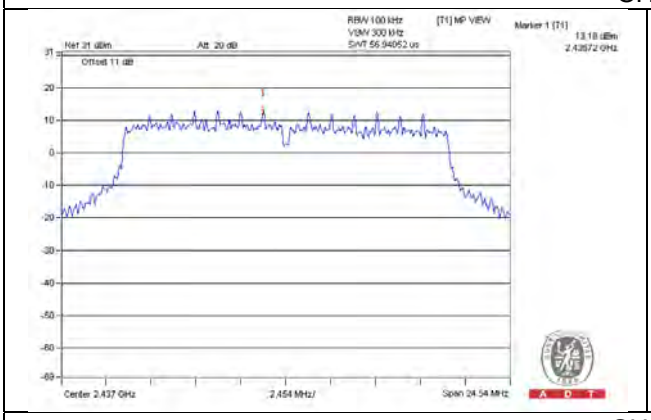
802.11n (HT20)_Chain 1

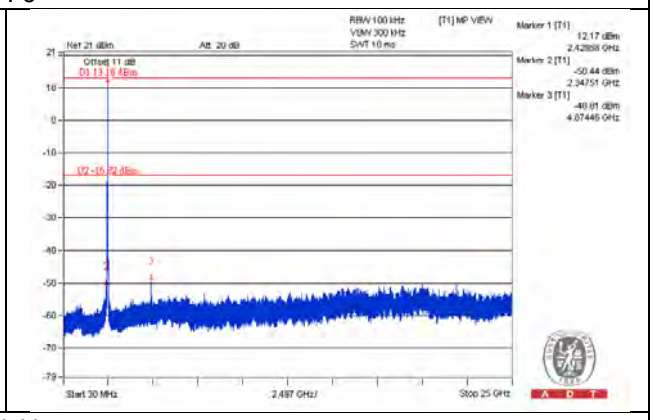
CH 1



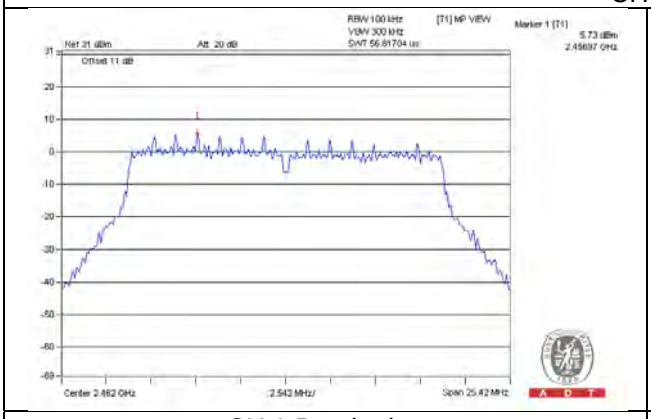


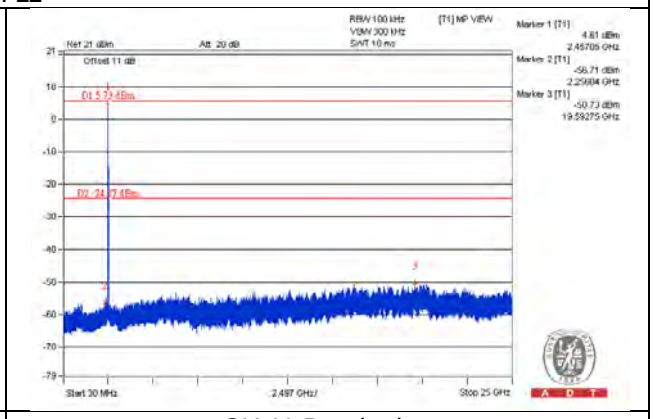
CH 6



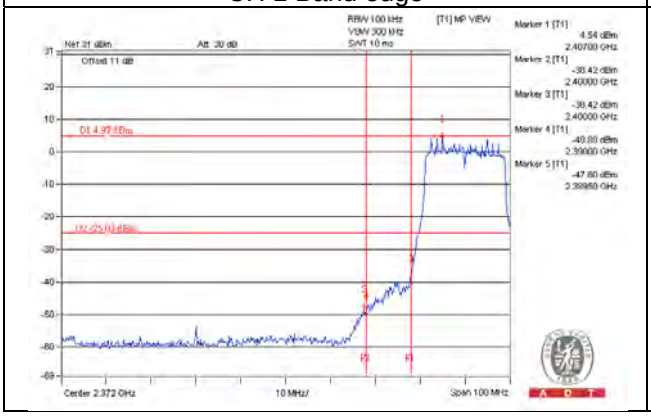


CH 11





CH 1 Band edge



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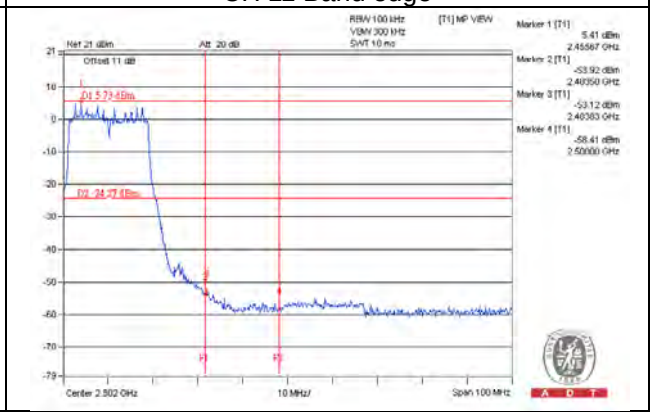
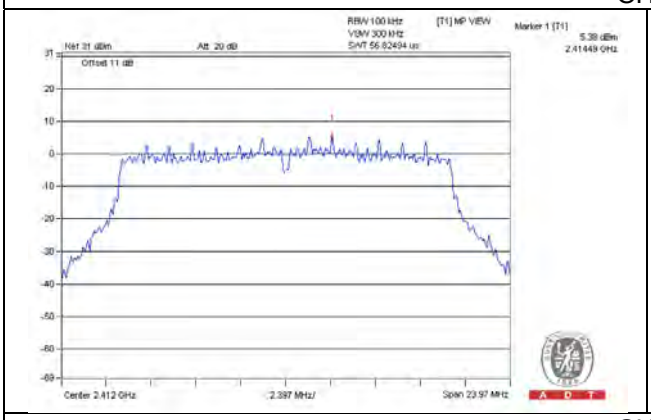
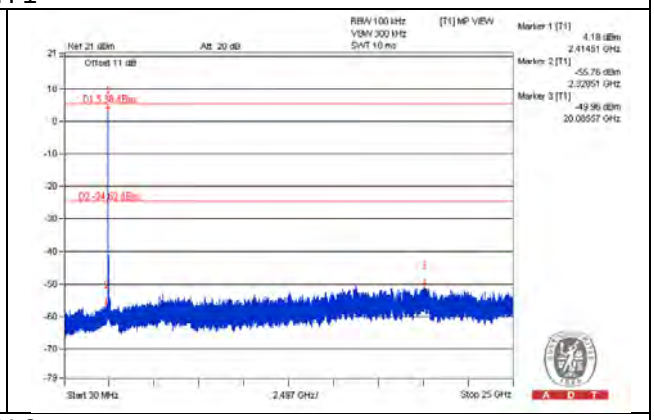


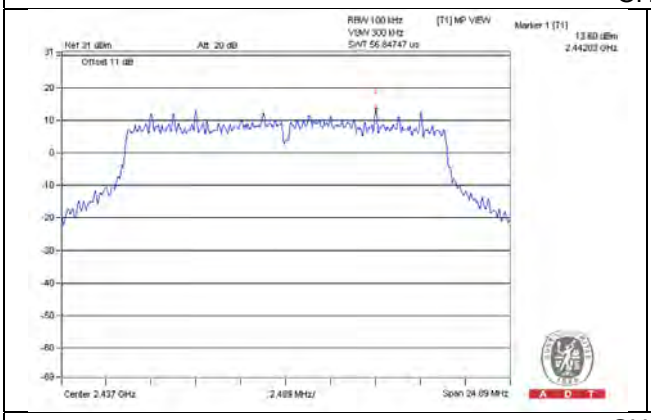
802.11n (HT20)_Chain 2

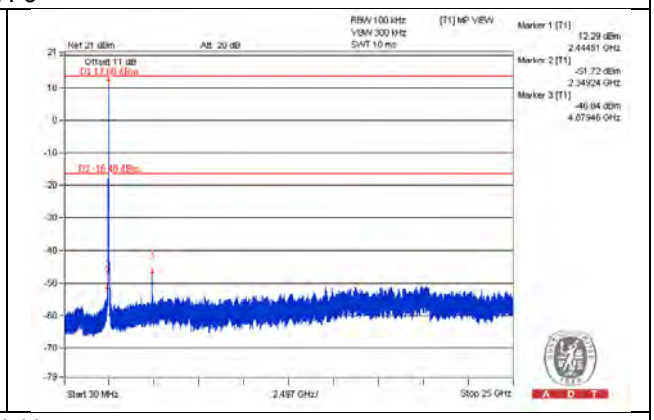
CH 1



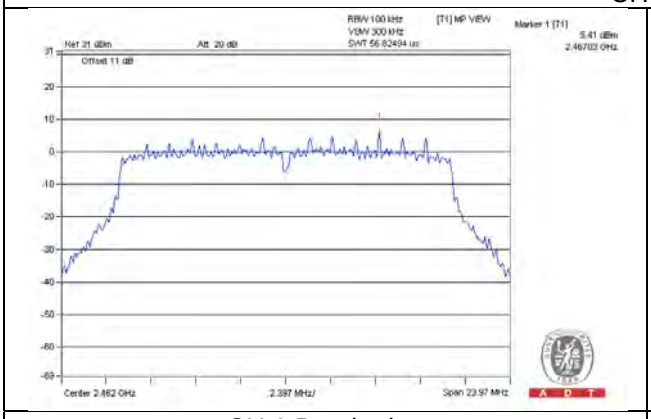


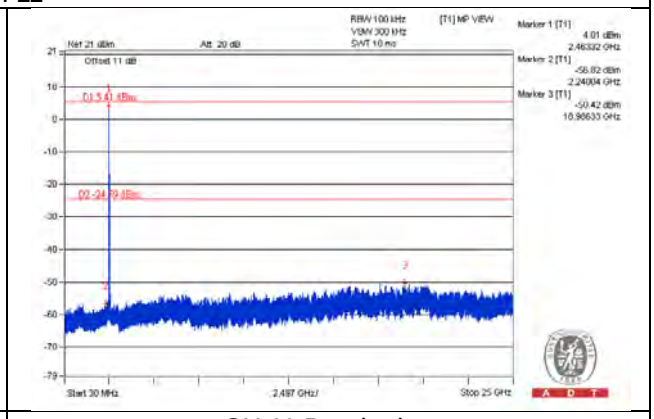
CH 6



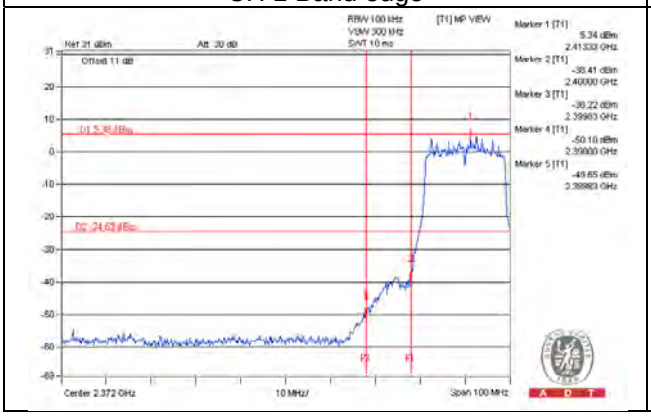


CH 11

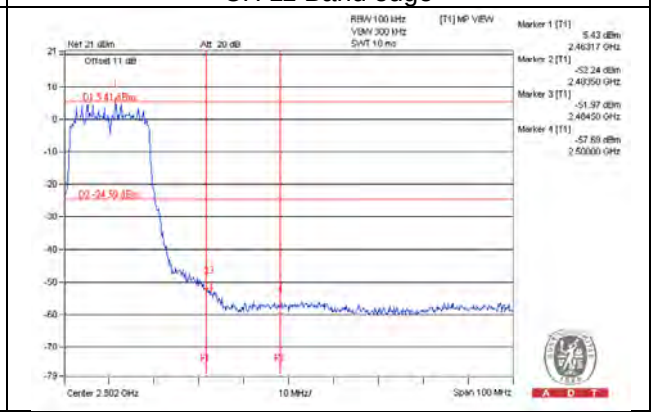




CH 1 Band edge

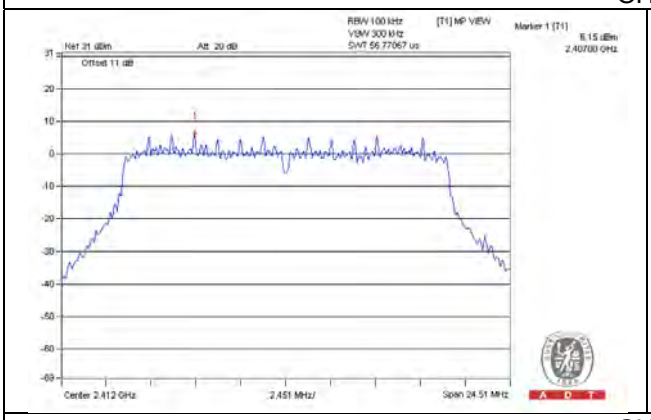


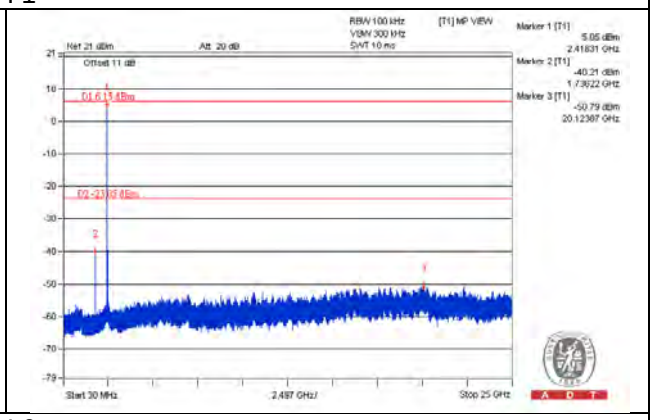
CH 11 Band edge



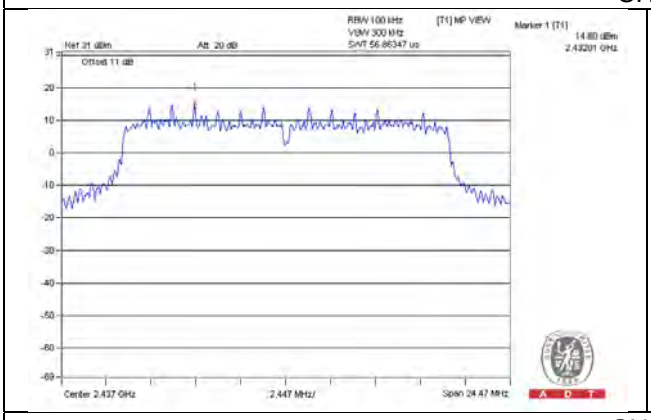
802.11n (HT20)_Chain 3

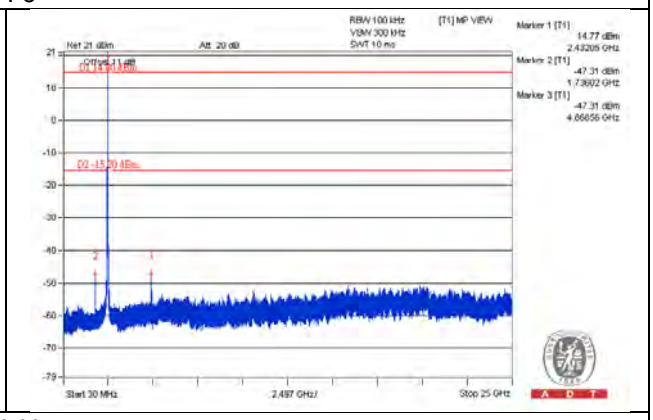
CH 1



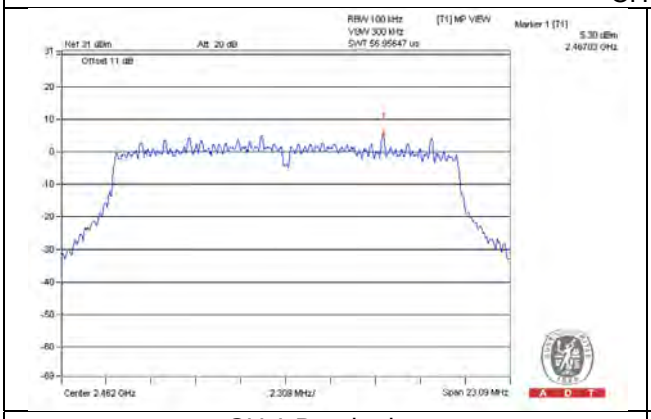


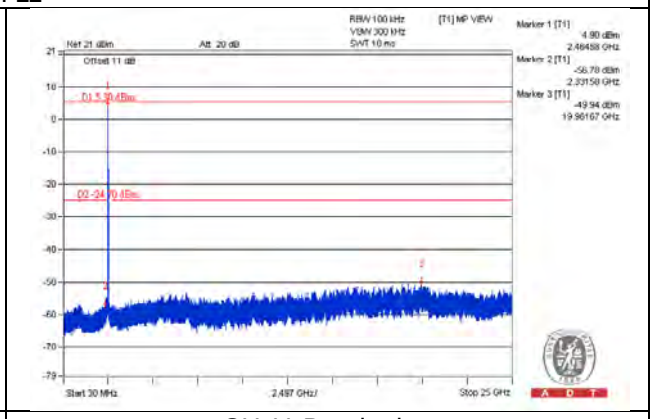
CH 6



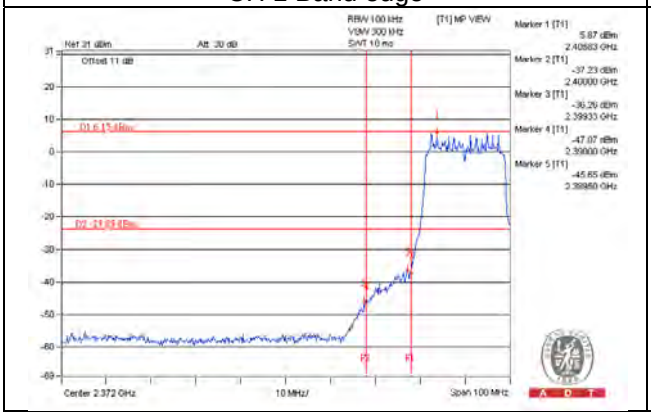


CH 11

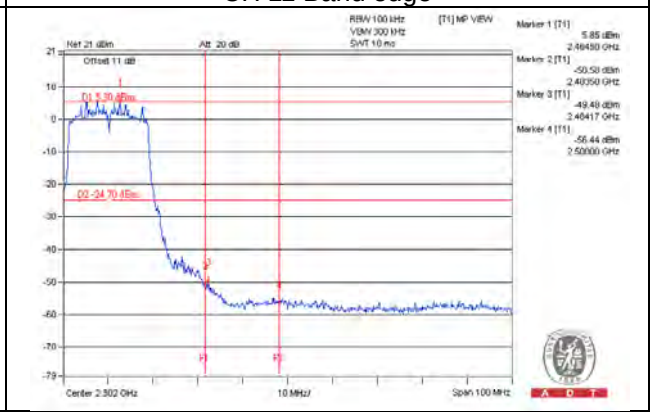




CH 1 Band edge

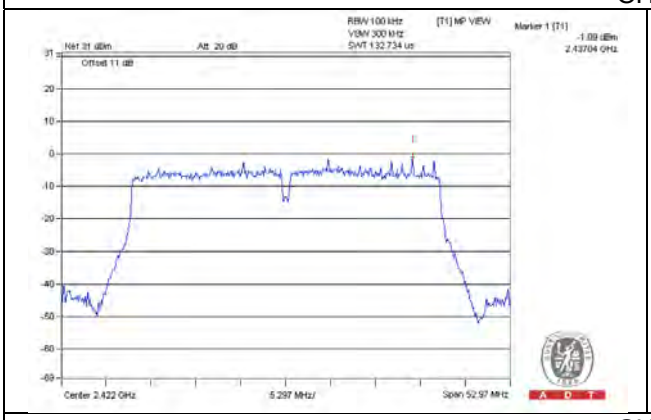


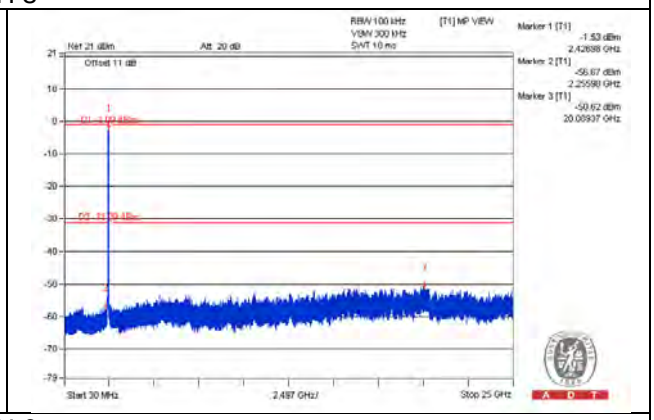
CH 11 Band edge



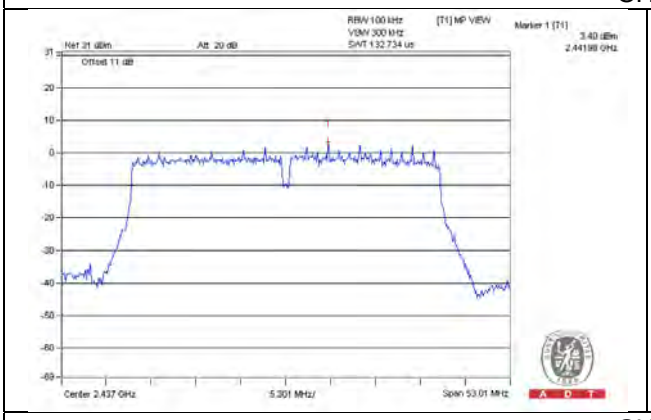
802.11n (HT40)_Chain 0

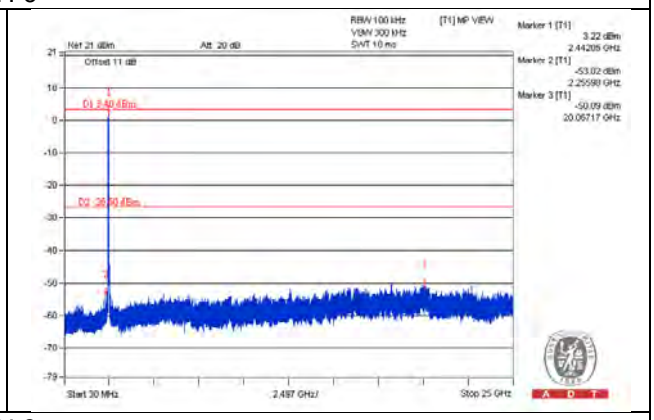
CH 3



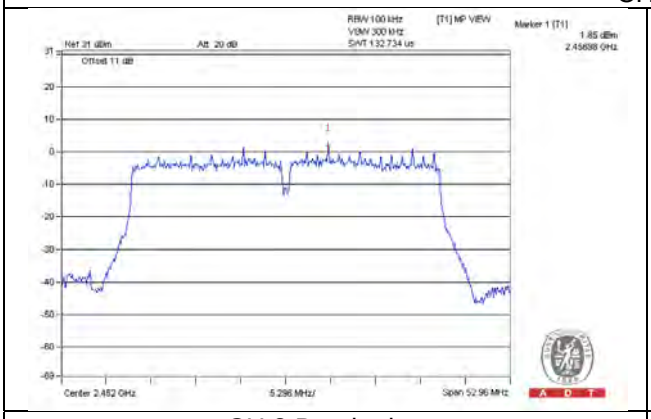


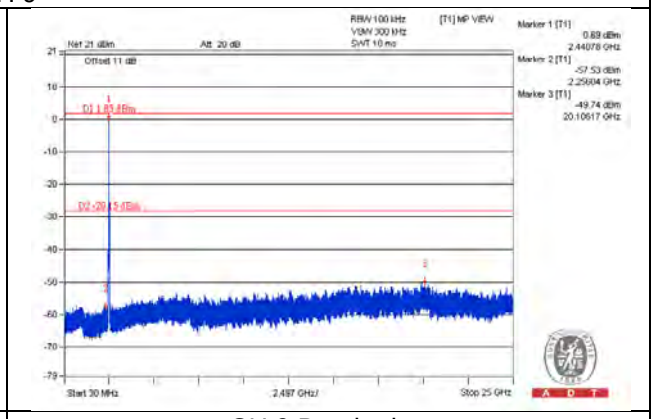
CH 6



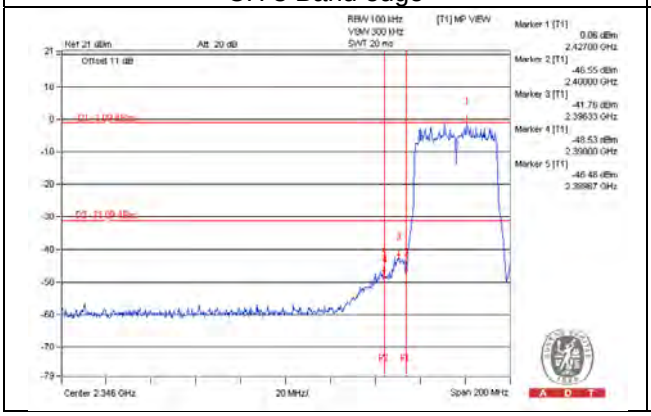


CH 9

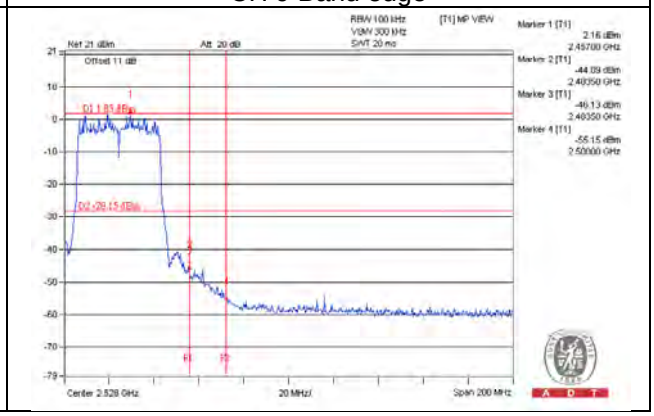




CH 3 Band edge

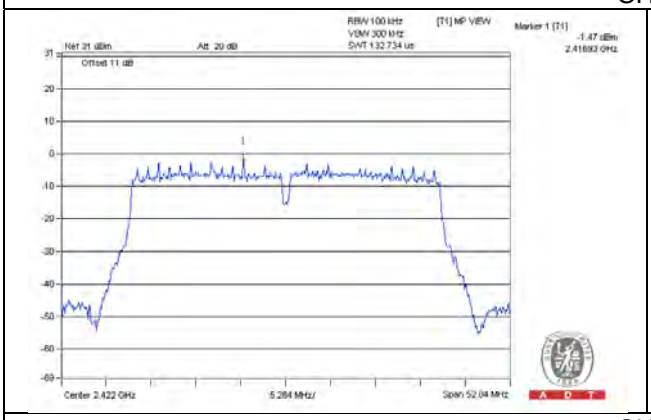


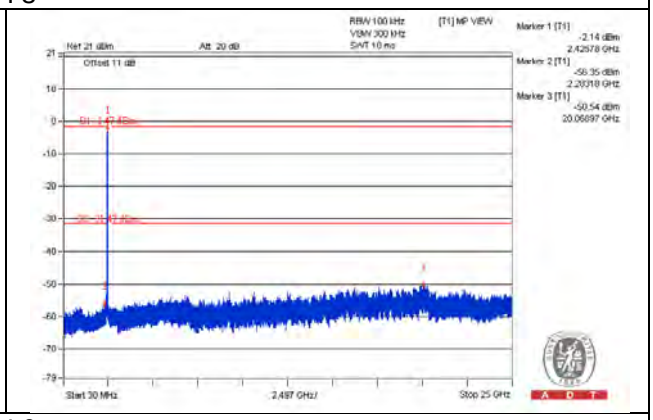
CH 9 Band edge



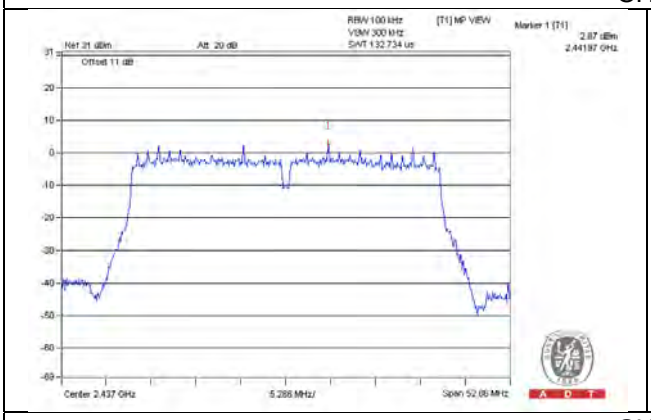
802.11n (HT40)_Chain 1

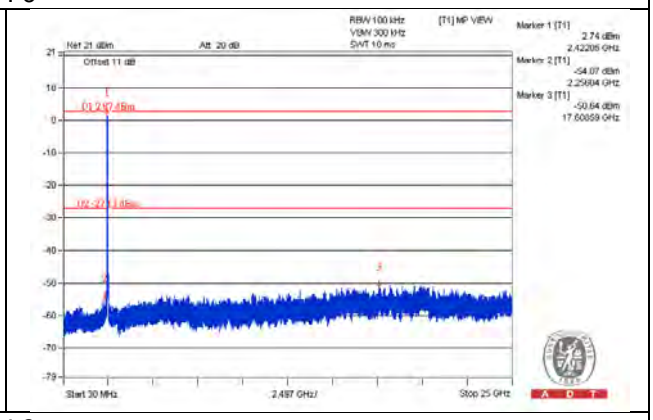
CH 3



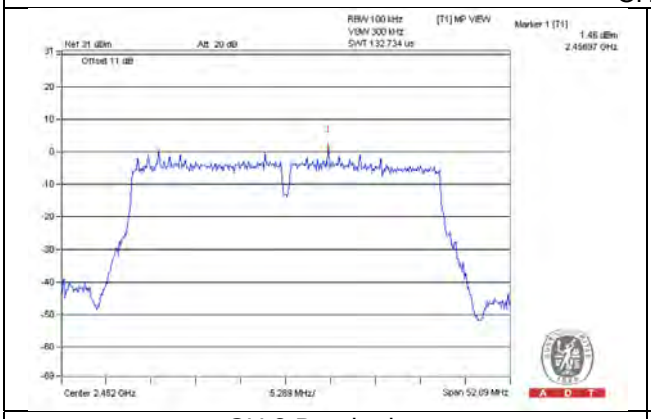


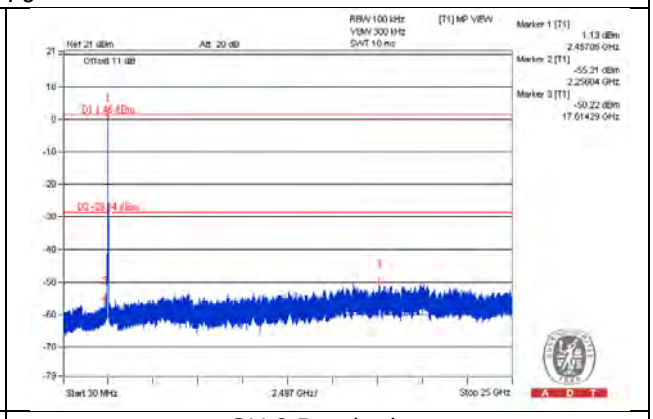
CH 6



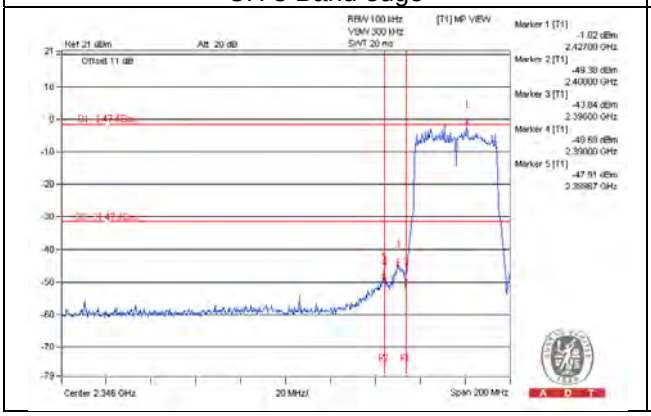


CH 9

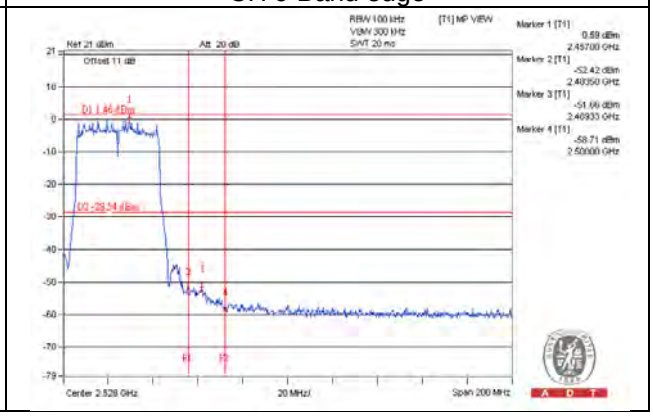




CH 3 Band edge

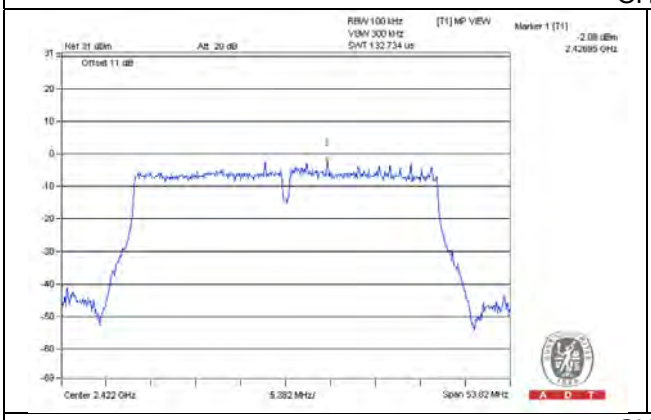


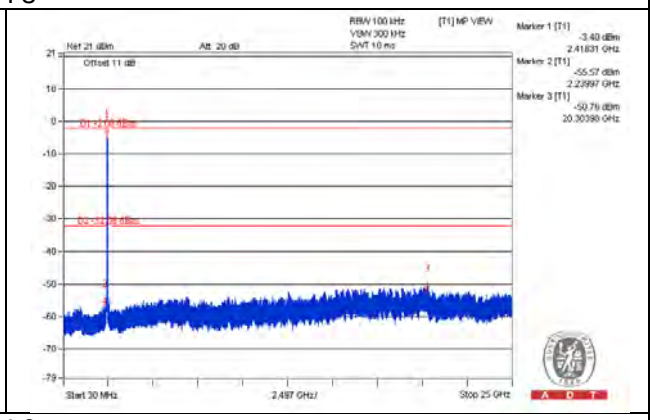
CH 9 Band edge



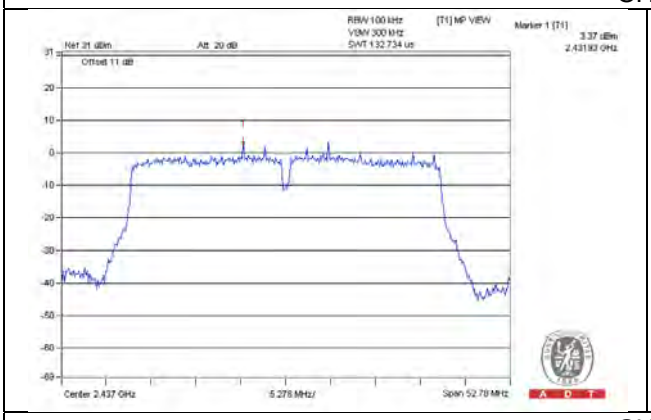
802.11n (HT40)_Chain 2

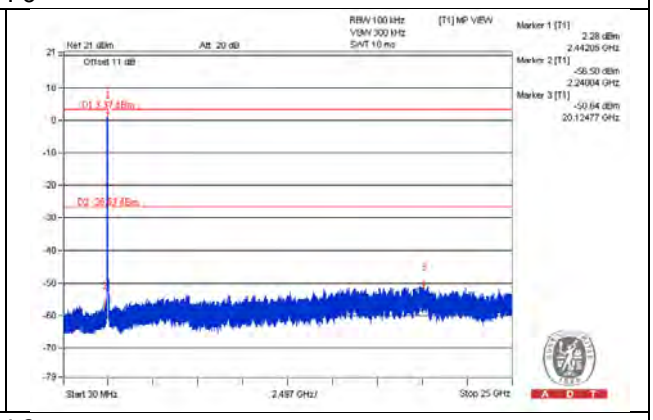
CH 3



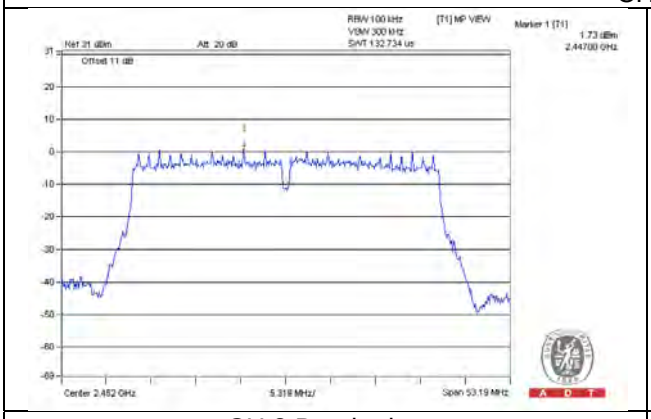


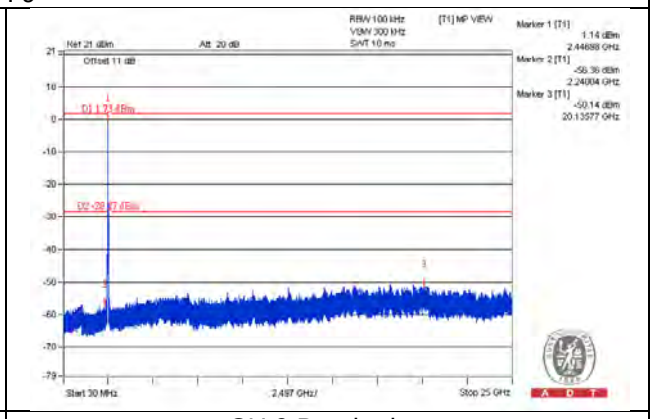
CH 6



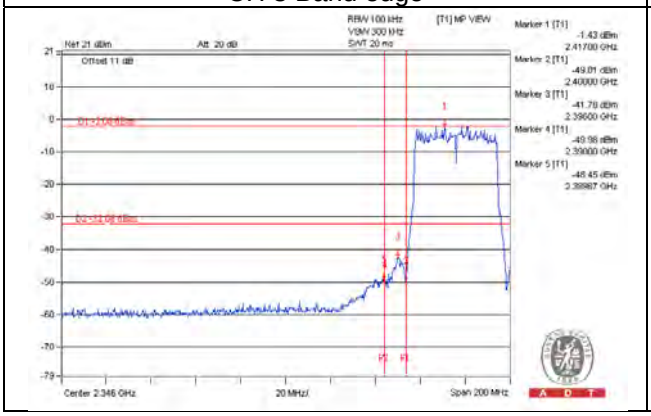


CH 9

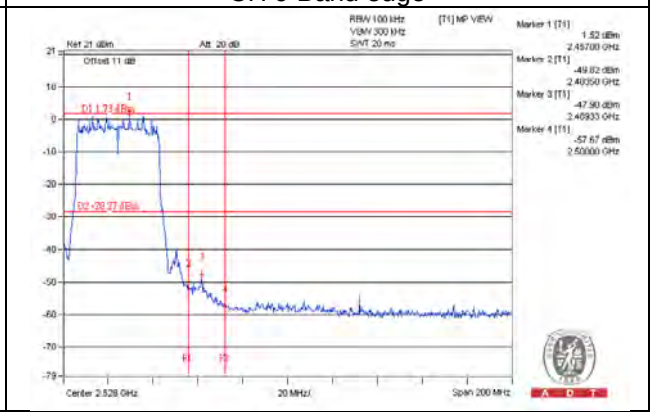




CH 3 Band edge

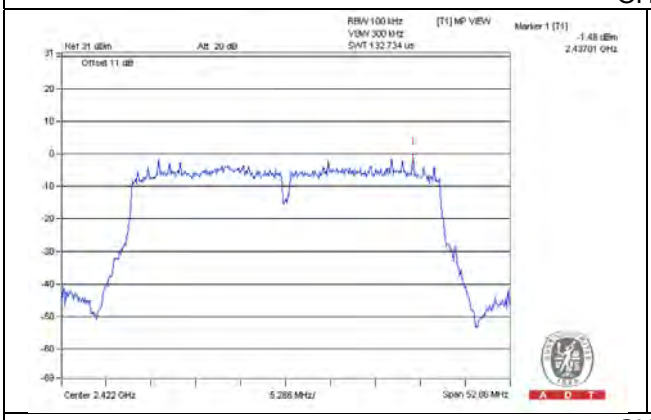


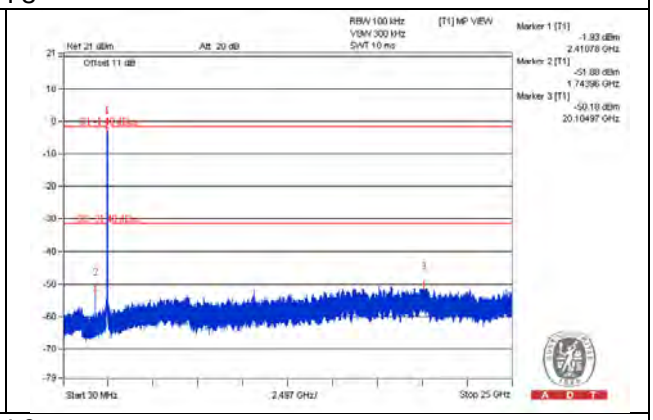
CH 9 Band edge



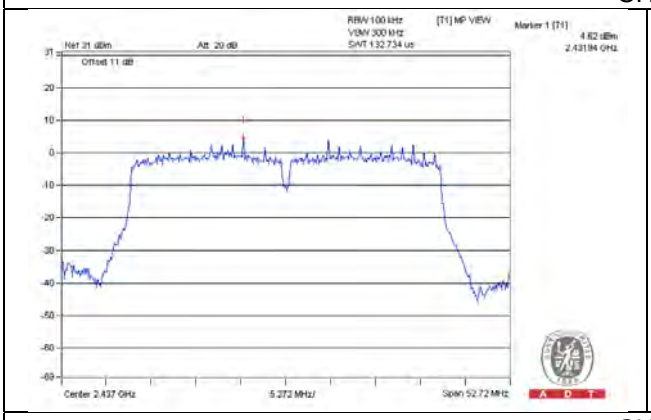
802.11n (HT40)_Chain 3

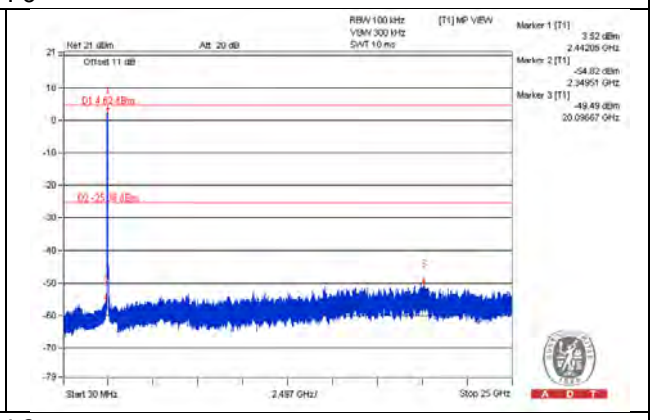
CH 3



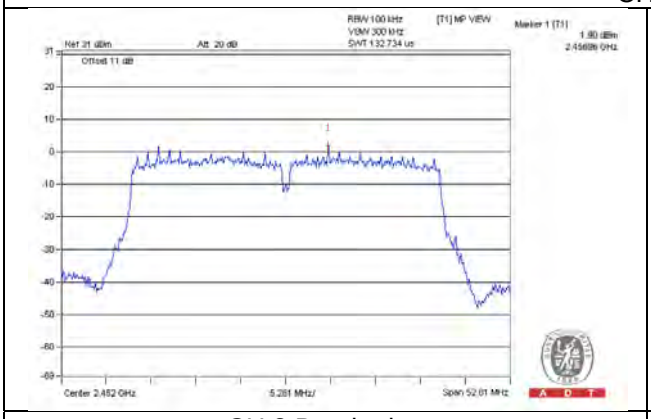


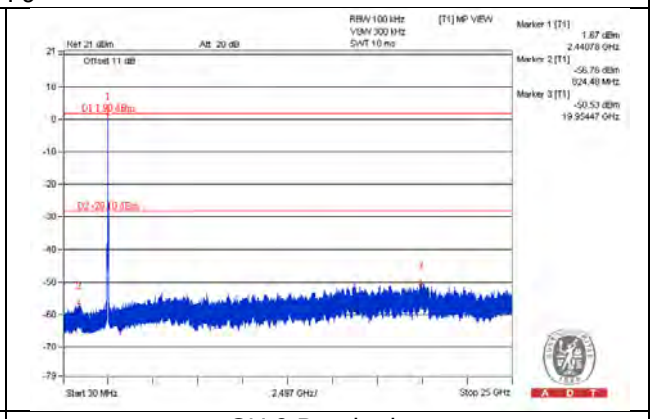
CH 6



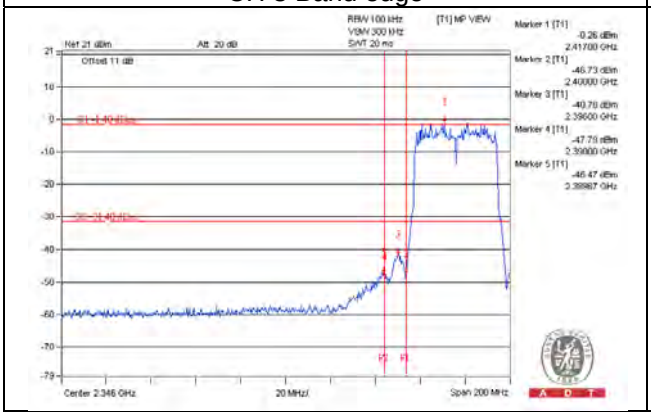


CH 9

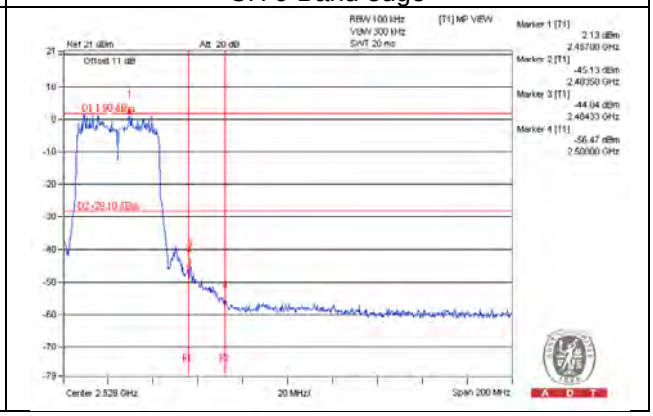




CH 3 Band edge



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 Setup

Same as item 4.1.5.

5.1.6 EUT Operating Conditions

Same as item 4.1.6.

5.1.7 Test Results

Above 1GHz Data:

Beamforming off Mode

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	69.5 PK	76.7	-7.2	1.89 H	325	65.10	4.40
2	#5725.00	59.2 AV	66.4	-7.2	1.89 H	325	54.80	4.40
3	*5745.00	106.7 PK			2.14 H	304	64.50	42.20
4	*5745.00	96.4 AV			2.14 H	304	54.20	42.20
5	7660.00	57.0 PK	74.0	-17.0	1.36 H	154	46.70	10.30
6	7660.00	44.1 AV	54.0	-9.9	1.36 H	154	33.80	10.30
7	11490.00	64.2 PK	74.0	-9.8	2.34 H	151	48.70	15.50
8	11490.00	50.2 AV	54.0	-3.8	2.34 H	151	34.70	15.50
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	#5725.00	84.9 PK	92.1	-7.2	1.01 V	231	80.50	4.40
2	#5725.00	74.3 AV	81.5	-7.2	1.01 V	231	69.90	4.40
3	*5745.00	122.1 PK			2.42 V	354	79.90	42.20
4	*5745.00	111.5 AV			2.42 V	354	69.30	42.20
5	7660.00	57.0 PK	74.0	-17.0	1.00 V	285	46.70	10.30
6	7660.00	46.2 AV	54.0	-7.8	1.00 V	285	35.90	10.30
7	11490.00	65.3 PK	74.0	-8.7	2.22 V	163	49.80	15.50
8	11490.00	52.0 AV	54.0	-2.0	2.22 V	163	36.50	15.50

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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	104.9 PK			1.95 H	246	62.60	42.30
2	*5785.00	95.0 AV			1.95 H	246	52.70	42.30
3	7713.00	54.7 PK	74.0	-19.3	1.62 H	149	44.30	10.40
4	7713.00	43.8 AV	54.0	-10.2	1.62 H	149	33.40	10.40
5	11570.00	64.0 PK	74.0	-10.0	2.51 H	132	48.90	15.10
6	11570.00	49.0 AV	54.0	-5.0	2.51 H	132	33.90	15.10
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	120.2 PK			2.53 V	134	77.90	42.30
2	*5785.00	109.9 AV			2.53 V	134	67.60	42.30
3	7713.00	57.0 PK	74.0	-17.0	1.45 V	155	46.60	10.40
4	7713.00	46.0 AV	54.0	-8.0	1.45 V	155	35.60	10.40
5	11570.00	64.3 PK	74.0	-9.7	1.02 V	107	49.20	15.10
6	11570.00	50.9 AV	54.0	-3.1	1.02 V	107	35.80	15.10

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 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	105.3 PK			1.88 H	256	63.00	42.30
2	*5825.00	95.0 AV			1.88 H	256	52.70	42.30
3	#5850.00	59.6 PK	75.3	-15.7	2.12 H	302	54.90	4.70
4	#5850.00	49.4 AV	65.0	-15.6	2.12 H	302	44.70	4.70
5	#7766.00	55.2 PK	75.3	-20.1	1.20 H	263	44.60	10.60
6	#7766.00	44.8 AV	65.0	-20.2	1.20 H	263	34.20	10.60
7	11650.00	62.9 PK	74.0	-11.1	1.13 H	98	47.60	15.30
8	11650.00	49.6 AV	54.0	-4.4	1.13 H	98	34.30	15.30
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	*5825.00	120.4 PK			2.50 V	357	78.10	42.30
2	*5825.00	110.2 AV			2.50 V	357	67.90	42.30
3	#5850.00	74.8 PK	90.4	-15.6	2.32 V	348	70.10	4.70
4	#5850.00	64.5 AV	80.2	-15.7	2.32 V	348	59.80	4.70
5	#7766.00	57.7 PK	90.4	-32.7	1.00 V	283	47.10	10.60
6	#7766.00	47.0 AV	80.2	-33.2	1.00 V	283	36.40	10.60
7	11650.00	65.9 PK	74.0	-8.1	1.09 V	108	50.60	15.30
8	11650.00	51.8 AV	54.0	-2.2	1.09 V	108	36.50	15.30

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 radiated frequency is out of the restricted band.
7. The limit value is defined as per 15.247.

802.11n (HT20)

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	74.3 PK	77.6	-3.3	1.00 H	162	69.90	4.40
2	#5725.00	64.3 AV	67.6	-3.3	1.00 H	162	59.90	4.40
3	*5745.00	107.6 PK			1.20 H	122	65.40	42.20
4	*5745.00	97.6 AV			1.20 H	122	55.40	42.20
5	7660.00	56.3 PK	74.0	-17.7	2.04 H	26	46.00	10.30
6	7660.00	44.1 AV	54.0	-9.9	2.04 H	26	33.80	10.30
7	11490.00	66.4 PK	74.0	-7.6	2.31 H	151	50.90	15.50
8	11490.00	52.0 AV	54.0	-2.0	2.31 H	151	36.50	15.50
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	#5725.00	88.3 PK	91.6	-3.3	1.00 V	228	83.90	4.40
2	#5725.00	78.2 AV	81.5	-3.3	1.00 V	228	73.80	4.40
3	*5745.00	121.6 PK			2.52 V	357	79.40	42.20
4	*5745.00	111.5 AV			2.52 V	357	69.30	42.20
5	7660.00	57.1 PK	74.0	-16.9	1.09 V	285	46.80	10.30
6	7660.00	45.8 AV	54.0	-8.2	1.09 V	285	35.50	10.30
7	11490.00	64.4 PK	74.0	-9.6	1.18 V	153	48.90	15.50
8	11490.00	50.4 AV	54.0	-3.6	1.18 V	153	34.90	15.50

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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	108.9 PK			1.15 H	121	66.60	42.30
2	*5785.00	98.0 AV			1.15 H	121	55.70	42.30
3	7713.00	56.8 PK	74.0	-17.2	1.00 H	187	46.40	10.40
4	7713.00	44.3 AV	54.0	-9.7	1.00 H	187	33.90	10.40
5	11570.00	63.9 PK	74.0	-10.1	1.00 H	157	48.80	15.10
6	11570.00	49.8 AV	54.0	-4.2	1.00 H	157	34.70	15.10
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	113.1 PK			2.43 V	2	70.80	42.30
2	*5785.00	112.1 AV			2.43 V	2	69.80	42.30
3	7713.00	58.3 PK	74.0	-15.7	1.00 V	283	47.90	10.40
4	7713.00	46.1 AV	54.0	-7.9	1.00 V	283	35.70	10.40
5	11570.00	64.3 PK	74.0	-9.7	1.00 V	150	49.20	15.10
6	11570.00	50.4 AV	54.0	-3.6	1.00 V	150	35.30	15.10

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 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	105.5 PK			1.24 H	128	63.20	42.30
2	*5825.00	95.1 AV			1.24 H	128	52.80	42.30
3	#5850.00	61.8 PK	75.5	-13.7	1.00 H	113	57.10	4.70
4	#5850.00	51.4 AV	65.1	-13.7	1.00 H	113	46.70	4.70
5	#7766.00	55.2 PK	75.5	-20.3	1.00 H	186	44.60	10.60
6	#7766.00	44.6 AV	65.1	-20.5	1.00 H	186	34.00	10.60
7	11650.00	64.8 PK	74.0	-9.2	1.00 H	158	49.50	15.30
8	11650.00	50.9 AV	54.0	-3.1	1.00 H	158	35.60	15.30
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	*5825.00	119.8 PK			2.58 V	358	77.50	42.30
2	*5825.00	109.3 AV			2.58 V	358	67.00	42.30
3	#5850.00	76.1 PK	89.8	-13.7	2.33 V	348	71.40	4.70
4	#5850.00	65.6 AV	79.3	-13.7	2.33 V	348	60.90	4.70
5	#7766.00	57.7 PK	89.8	-32.1	1.00 V	283	47.10	10.60
6	#7766.00	46.7 AV	79.3	-32.6	1.00 V	283	36.10	10.60
7	11650.00	66.7 PK	74.0	-7.3	2.24 V	105	51.40	15.30
8	11650.00	51.9 AV	54.0	-2.1	2.24 V	105	36.60	15.30

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 radiated frequency is out of the restricted band.
7. The limit value is defined as per 15.247.

802.11n (HT40)

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	70.8 PK	72.1	-1.3	1.07 H	140	66.40	4.40
2	#5725.00	61.5 AV	62.8	-1.3	1.07 H	140	57.10	4.40
3	*5755.00	102.1 PK			1.07 H	140	59.90	42.20
4	*5755.00	92.8 AV			1.07 H	140	50.60	42.20
5	7673.00	56.5 PK	74.0	-17.5	1.21 H	312	46.20	10.30
6	7673.00	43.8 AV	54.0	-10.2	1.21 H	312	33.50	10.30
7	11510.00	62.4 PK	74.0	-11.6	2.61 H	152	47.20	15.20
8	11510.00	49.5 AV	54.0	-4.5	2.61 H	152	34.30	15.20
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	86.0 PK	87.3	-1.3	2.48 V	343	81.60	4.40
2	#5725.00	76.2 AV	77.5	-1.3	2.48 V	343	71.80	4.40
3	*5755.00	117.3 PK			2.48 V	343	75.10	42.20
4	*5755.00	107.5 AV			2.48 V	343	65.30	42.20
5	7673.00	58.0 PK	74.0	-16.0	1.05 V	153	47.70	10.30
6	7673.00	45.9 AV	54.0	-8.1	1.05 V	153	35.60	10.30
7	11510.00	63.1 PK	74.0	-10.9	3.35 V	137	47.90	15.20
8	11510.00	50.5 AV	54.0	-3.5	3.35 V	137	35.30	15.20

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 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	102.9 PK			1.00 H	120	60.60	42.30
2	*5795.00	92.9 AV			1.00 H	120	50.60	42.30
3	#5850.00	56.4 PK	72.9	-16.5	1.00 H	120	51.70	4.70
4	#5850.00	46.4 AV	62.9	-16.5	1.00 H	120	41.70	4.70
5	7726.00	57.8 PK	74.0	-16.2	1.00 H	202	47.40	10.40
6	7726.00	45.3 AV	54.0	-8.7	1.00 H	202	34.90	10.40
7	11590.00	63.0 PK	74.0	-11.0	2.88 H	151	47.90	15.10
8	11590.00	49.7 AV	54.0	-4.3	2.88 H	151	34.60	15.10
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5795.00	116.6 PK			2.42 V	358	74.30	42.30
2	*5795.00	106.9 AV			2.42 V	358	64.60	42.30
3	#5850.00	70.1 PK	86.6	-16.5	2.42 V	358	65.40	4.70
4	#5850.00	60.4 AV	76.9	-16.5	2.42 V	358	55.70	4.70
5	7726.00	57.2 PK	74.0	-16.8	1.07 V	285	46.80	10.40
6	7726.00	46.2 AV	54.0	-7.8	1.07 V	285	35.80	10.40
7	11590.00	65.3 PK	74.0	-8.7	3.46 V	151	50.20	15.10
8	11590.00	51.9 AV	54.0	-2.1	3.46 V	151	36.80	15.10

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.

802.11ac (VHT80)

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	66.5 PK	67.9	-1.4	1.02 H	75	62.10	4.40
2	#5725.00	56.4 AV	57.8	-1.4	1.02 H	75	52.00	4.40
3	*5775.00	97.9 PK			1.01 H	75	55.70	42.20
4	*5775.00	87.8 AV			1.01 H	75	45.60	42.20
5	#5850.00	61.5 PK	67.9	-6.4	1.02 H	75	56.80	4.70
6	#5850.00	51.4 AV	57.8	-6.4	1.02 H	75	46.70	4.70
7	7700.00	56.4 PK	74.0	-17.6	1.11 H	183	46.00	10.40
8	7700.00	44.6 AV	54.0	-9.4	1.11 H	183	34.20	10.40
9	11550.00	58.9 PK	74.0	-15.1	1.54 H	331	43.80	15.10
10	11550.00	46.4 AV	54.0	-7.6	1.54 H	331	31.30	15.10
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	80.1 PK	81.5	-1.4	2.72 V	352	75.70	4.40
2	#5725.00	70.1 AV	71.5	-1.4	2.72 V	352	65.70	4.40
3	*5775.00	111.5 PK			2.72 V	352	69.30	42.20
4	*5775.00	101.5 AV			2.72 V	352	59.30	42.20
5	#5850.00	75.1 PK	81.5	-6.4	2.72 V	352	70.40	4.70
6	#5850.00	65.1 AV	71.5	-6.4	2.72 V	352	60.40	4.70
7	7700.00	58.6 PK	74.0	-15.4	1.66 V	148	48.20	10.40
8	7700.00	47.1 AV	54.0	-6.9	1.66 V	148	36.70	10.40
9	11550.00	62.7 PK	74.0	-11.3	3.20 V	146	47.60	15.10
10	11550.00	49.4 AV	54.0	-4.6	3.20 V	146	34.30	15.10

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.

Beamforming on Mode

802.11ac (VHT20)

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	63.5 PK	78.0	-14.5	2.07 H	299	59.10	4.40
2	#5725.00	52.7 AV	67.2	-14.5	2.07 H	299	48.30	4.40
3	*5745.00	108.0 PK			2.07 H	299	65.80	42.20
4	*5745.00	97.2 AV			2.07 H	299	55.00	42.20
5	7660.00	56.6 PK	74.0	-17.4	1.76 H	163	46.30	10.30
6	7660.00	44.6 AV	54.0	-9.4	1.76 H	163	34.30	10.30
7	11490.00	63.8 PK	74.0	-10.2	2.31 H	151	48.30	15.50
8	11490.00	50.5 AV	54.0	-3.5	2.31 H	151	35.00	15.50
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	#5725.00	76.4 PK	90.9	-14.5	2.01 V	329	72.00	4.40
2	#5725.00	65.4 AV	79.9	-14.5	2.01 V	329	61.00	4.40
3	*5745.00	120.9 PK			2.01 V	329	78.70	42.20
4	*5745.00	109.9 AV			2.01 V	329	67.70	42.20
5	7660.00	57.0 PK	74.0	-17.0	2.20 V	188	46.70	10.30
6	7660.00	46.6 AV	54.0	-7.4	2.20 V	188	36.30	10.30
7	11490.00	64.8 PK	74.0	-9.2	1.95 V	173	49.30	15.50
8	11490.00	52.0 AV	54.0	-2.0	1.95 V	173	36.50	15.50

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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	107.7 PK			1.84 H	175	65.40	42.30
2	*5785.00	96.9 AV			1.84 H	175	54.60	42.30
3	7713.00	57.2 PK	74.0	-16.8	1.71 H	14	46.80	10.40
4	7713.00	44.2 AV	54.0	-9.8	1.71 H	14	33.80	10.40
5	11570.00	62.4 PK	74.0	-11.6	2.48 H	169	47.30	15.10
6	11570.00	50.5 AV	54.0	-3.5	2.48 H	169	35.40	15.10
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	119.0 PK			1.00 V	117	76.70	42.30
2	*5785.00	107.5 AV			1.00 V	117	65.20	42.30
3	7713.00	57.8 PK	74.0	-16.2	1.02 V	284	47.40	10.40
4	7713.00	46.8 AV	54.0	-7.2	1.02 V	284	36.40	10.40
5	11570.00	63.9 PK	74.0	-10.1	1.18 V	297	48.80	15.10
6	11570.00	51.8 AV	54.0	-2.2	1.18 V	297	36.70	15.10

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 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	106.7 PK			1.98 H	276	64.40	42.30
2	*5825.00	93.6 AV			1.98 H	276	51.30	42.30
3	#5850.00	53.2 PK	76.7	-23.5	1.98 H	276	48.50	4.70
4	#5850.00	40.1 AV	63.6	-23.5	1.98 H	276	35.40	4.70
5	#7766.00	56.4 PK	74.0	-17.6	1.88 H	157	45.80	10.60
6	#7766.00	45.2 AV	54.0	-8.8	1.88 H	157	34.60	10.60
7	11650.00	63.9 PK	74.0	-10.1	2.24 H	168	48.60	15.30
8	11650.00	50.3 AV	54.0	-3.7	2.24 H	168	35.00	15.30
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	*5825.00	117.6 PK			2.13 V	312	75.30	42.30
2	*5825.00	106.2 AV			2.13 V	312	63.90	42.30
3	#5850.00	64.1 PK	87.6	-23.5	2.13 V	312	59.40	4.70
4	#5850.00	52.7 AV	76.2	-23.5	2.13 V	312	48.00	4.70
5	#7766.00	57.7 PK	74.0	-16.3	2.07 V	166	47.10	10.60
6	#7766.00	46.5 AV	54.0	-7.5	2.07 V	166	35.90	10.60
7	11650.00	65.5 PK	74.0	-8.5	1.83 V	177	50.20	15.30
8	11650.00	51.6 AV	54.0	-2.4	1.83 V	177	36.30	15.30

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 radiated frequency is out of the restricted band.
7. The limit value is defined as per 15.247.

802.11ac (VHT40)

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	71.1 PK	72.3	-1.2	1.02 H	174	66.70	4.40
2	#5725.00	61.2 AV	62.4	-1.2	1.02 H	174	56.80	4.40
3	*5755.00	102.3 PK			1.02 H	174	60.10	42.20
4	*5755.00	92.4 AV			1.02 H	174	50.20	42.20
5	7673.00	56.8 PK	74.0	-17.2	1.09 H	333	46.50	10.30
6	7673.00	43.8 AV	54.0	-10.2	1.09 H	333	33.50	10.30
7	11510.00	62.4 PK	74.0	-11.6	2.11 H	172	47.20	15.20
8	11510.00	49.1 AV	54.0	-4.9	2.11 H	172	33.90	15.20
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	87.3 PK	88.5	-1.2	2.56 V	117	82.90	4.40
2	#5725.00	75.6 AV	76.8	-1.2	2.56 V	117	71.20	4.40
3	*5755.00	118.5 PK			2.56 V	117	76.30	42.20
4	*5755.00	106.8 AV			2.56 V	117	64.60	42.20
5	7673.00	58.5 PK	74.0	-15.5	1.19 V	282	48.20	10.30
6	7673.00	46.6 AV	54.0	-7.4	1.19 V	282	36.30	10.30
7	11510.00	63.6 PK	74.0	-10.4	3.90 V	166	48.40	15.20
8	11510.00	49.8 AV	54.0	-4.2	3.90 V	166	34.60	15.20

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 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	103.5 PK			1.00 H	165	61.20	42.30
2	*5795.00	92.1 AV			1.00 H	165	49.80	42.30
3	#5850.00	56.0 PK	73.5	-17.5	1.00 H	165	51.30	4.70
4	#5850.00	44.6 AV	62.1	-17.5	1.00 H	165	39.90	4.70
5	7726.00	58.0 PK	74.0	-16.0	1.03 H	199	47.60	10.40
6	7726.00	45.6 AV	54.0	-8.4	1.03 H	199	35.20	10.40
7	11590.00	62.7 PK	74.0	-11.3	2.71 H	132	47.60	15.10
8	11590.00	49.5 AV	54.0	-4.5	2.71 H	132	34.40	15.10
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5795.00	117.7 PK			2.19 V	300	75.40	42.30
2	*5795.00	104.8 AV			2.19 V	300	62.50	42.30
3	#5850.00	70.2 PK	87.7	-17.5	2.19 V	300	65.50	4.70
4	#5850.00	57.3 AV	74.8	-17.5	2.19 V	300	52.60	4.70
5	7726.00	57.6 PK	74.0	-16.4	1.01 V	300	47.20	10.40
6	7726.00	46.4 AV	54.0	-7.6	1.01 V	300	36.00	10.40
7	11590.00	64.0 PK	74.0	-10.0	3.59 V	151	48.90	15.10
8	11590.00	51.8 AV	54.0	-2.2	3.59 V	151	36.70	15.10

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.

802.11ac (VHT80)

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	69.6 PK	70.8	-1.2	1.00 H	124	65.20	4.40
2	#5725.00	58.2 AV	59.4	-1.2	1.00 H	124	53.80	4.40
3	*5775.00	100.8 PK			1.00 H	124	58.60	42.20
4	*5775.00	89.4 AV			1.00 H	124	47.20	42.20
5	#5850.00	57.7 PK	70.8	-13.1	1.00 H	124	53.00	4.70
6	#5850.00	46.3 AV	59.4	-13.1	1.00 H	124	41.60	4.70
7	7700.00	55.9 PK	74.0	-18.1	1.20 H	171	45.50	10.40
8	7700.00	44.4 AV	54.0	-9.6	1.20 H	171	34.00	10.40
9	11550.00	60.7 PK	74.0	-13.3	1.49 H	279	45.60	15.10
10	11550.00	48.2 AV	54.0	-5.8	1.49 H	279	33.10	15.10
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	83.1 PK	84.3	-1.2	2.46 V	116	78.70	4.40
2	#5725.00	71.3 AV	72.5	-1.2	2.46 V	116	66.90	4.40
3	*5775.00	114.3 PK			2.46 V	116	72.10	42.20
4	*5775.00	102.5 AV			2.46 V	116	60.30	42.20
5	#5850.00	71.2 PK	84.3	-13.1	2.46 V	116	66.50	4.70
6	#5850.00	59.4 AV	72.5	-13.1	2.46 V	116	54.70	4.70
7	7700.00	58.1 PK	74.0	-15.9	1.57 V	191	47.70	10.40
8	7700.00	46.0 AV	54.0	-8.0	1.57 V	191	35.60	10.40
9	11550.00	62.6 PK	74.0	-11.4	2.13 V	166	47.50	15.10
10	11550.00	49.4 AV	54.0	-4.6	2.13 V	166	34.30	15.10

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 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	30.00	30.5 QP	40.0	-9.5	2.00 H	15	46.10	-15.60
2	169.68	23.1 QP	43.5	-20.4	1.00 H	257	37.20	-14.10
3	249.22	30.7 QP	46.0	-15.3	1.00 H	124	45.10	-14.40
4	499.48	40.0 QP	46.0	-6.0	1.50 H	136	48.60	-8.60
5	625.58	35.5 QP	46.0	-10.5	1.00 H	140	41.30	-5.80
6	802.12	35.3 QP	46.0	-10.7	1.00 H	218	38.00	-2.70
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	33.26	32.0 QP	40.0	-8.0	1.00 V	171	47.70	-15.70
2	42.77	26.5 QP	40.0	-13.5	1.00 V	61	41.00	-14.50
3	107.60	26.7 QP	43.5	-16.8	1.00 V	277	44.20	-17.50
4	274.44	25.4 QP	46.0	-20.6	1.50 V	225	38.60	-13.20
5	499.48	39.1 QP	46.0	-6.9	1.00 V	36	47.70	-8.60
6	875.84	34.8 QP	46.0	-11.2	1.00 V	9	36.50	-1.70

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

5.2 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.

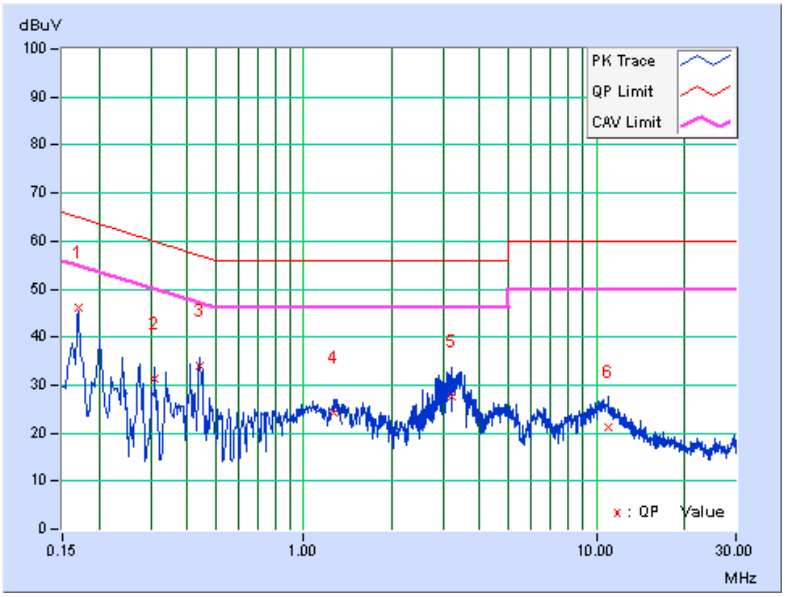
5.2.7 Test Results

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	0.16955	9.83	36.23	26.51	46.06	36.34	64.98	54.98	-18.92	-18.64
2	0.31031	9.86	21.29	13.22	31.15	23.08	59.96	49.96	-28.81	-26.88
3	0.44040	9.88	24.25	12.97	34.13	22.85	57.05	47.05	-22.92	-24.20
4	1.26435	9.95	14.43	6.92	24.38	16.87	56.00	46.00	-31.62	-29.13
5	3.18807	10.08	17.67	7.53	27.75	17.61	56.00	46.00	-28.25	-28.39
6	10.97679	10.57	10.60	5.11	21.17	15.68	60.00	50.00	-38.83	-34.32

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.

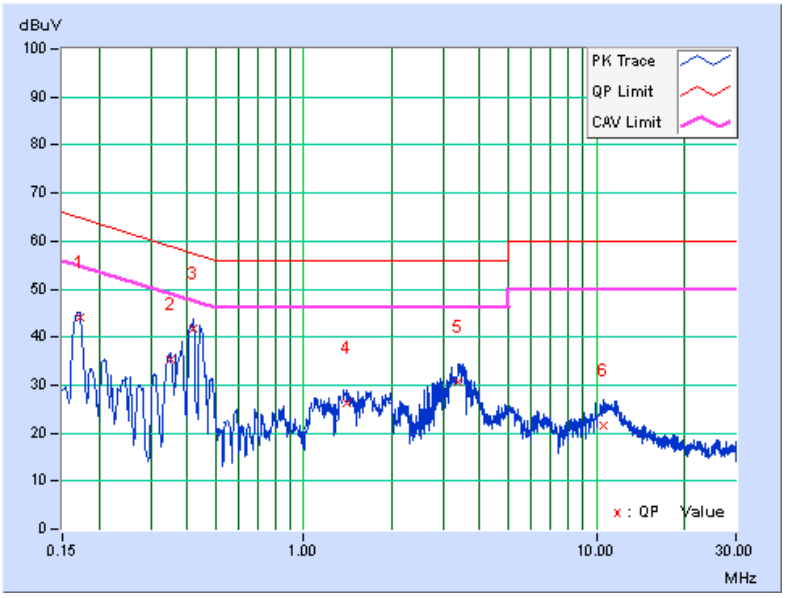


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	0.17346	9.82	34.14	26.57	43.96	36.39	64.79	54.79	-20.83	-18.40
2	0.34926	9.87	25.64	18.01	35.51	27.88	58.98	48.98	-23.47	-21.10
3	0.41979	9.88	32.03	23.44	41.91	33.32	57.45	47.45	-15.54	-14.13
4	1.39729	9.95	16.25	9.55	26.20	19.50	56.00	46.00	-29.80	-26.50
5	3.38357	10.09	20.44	9.49	30.53	19.58	56.00	46.00	-25.47	-26.42
6	10.61707	10.51	11.20	5.53	21.71	16.04	60.00	50.00	-38.29	-33.96

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

Same as item 4.3.3.

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 4.3.3.

5.3.7 Test Result

Beamforming off Mode

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	16.32	15.80	16.35	16.35	0.5	Pass
157	5785	15.98	15.75	16.05	16.28	0.5	Pass
165	5825	16.37	15.75	16.35	15.36	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	16.82	16.56	17.61	16.57	0.5	Pass
157	5785	17.19	16.94	16.60	16.33	0.5	Pass
165	5825	17.60	16.37	17.19	15.74	0.5	Pass

802.11n (HT40)

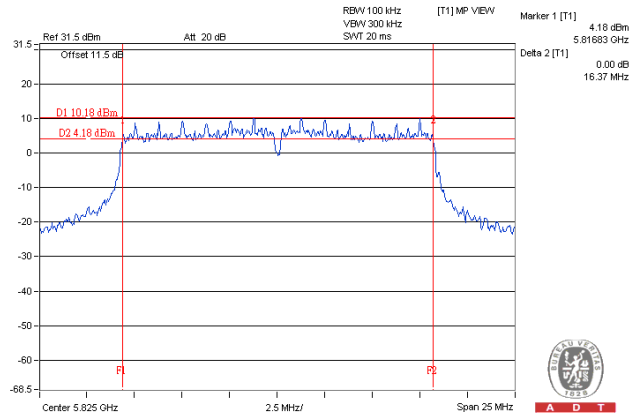
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	35.35	35.25	35.87	35.50	0.5	Pass
159	5795	35.51	35.19	35.43	36.35	0.5	Pass

802.11ac (VHT80)

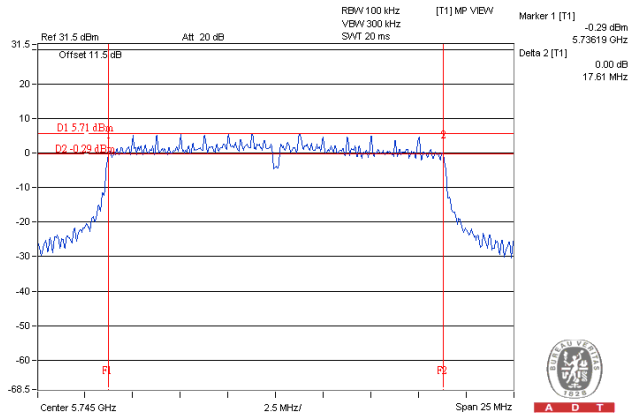
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
155	5775	75.98	76.21	76.02	76.47	0.5	Pass

Spectrum Plot of Worst Value

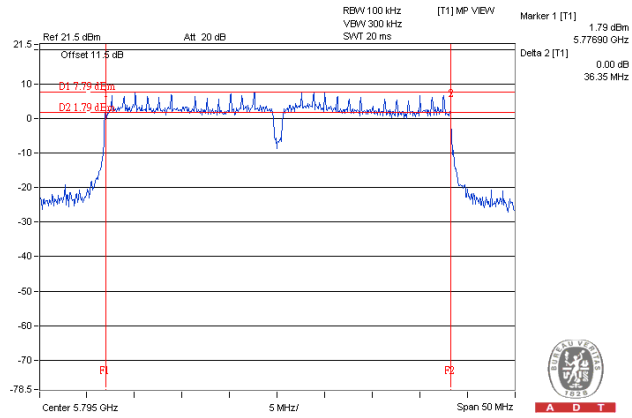
802.11a



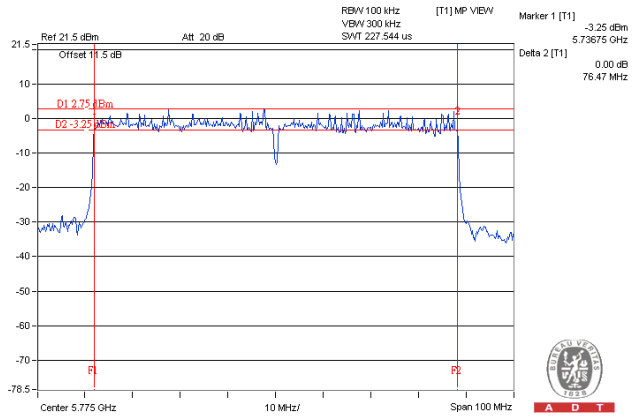
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)



Beamforming on Mode

802.11ac (VHT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	17.15	17.55	17.62	17.60	0.5	Pass
157	5785	17.59	17.60	17.62	17.51	0.5	Pass
165	5825	17.63	17.22	17.60	16.35	0.5	Pass

802.11an (VHT40)

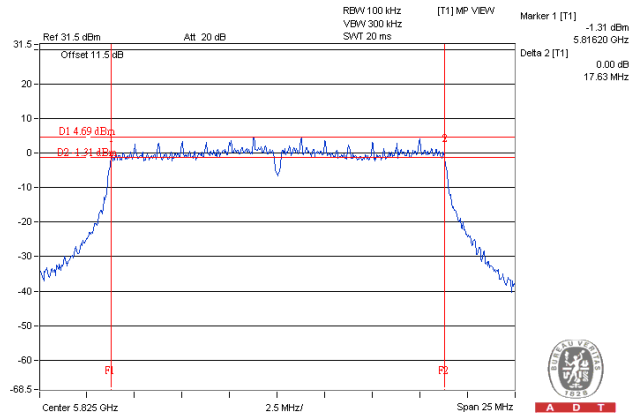
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	35.68	36.03	36.46	36.07	0.5	Pass
159	5795	35.26	35.59	35.80	36.42	0.5	Pass

802.11ac (VHT80)

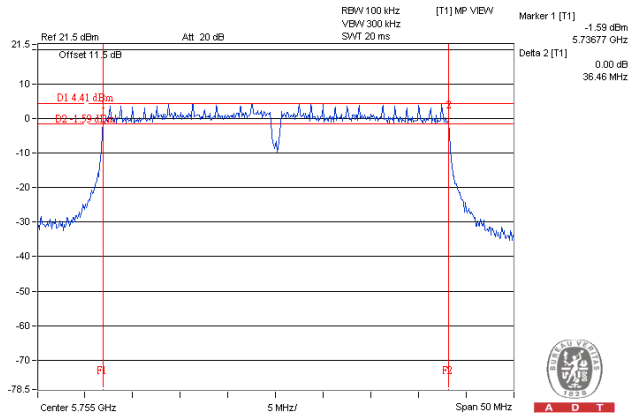
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
155	5775	75.76	76.01	76.48	76.01	0.5	Pass

Spectrum Plot of Worst Value

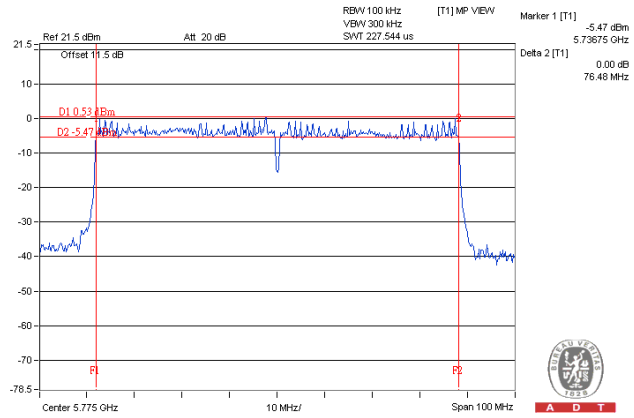
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



5.4 Conducted Output Power Measurement

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 NANT ≤ 4;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any NANT;
Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less for 20-MHz channel widths with N_{ANT} ≥ 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 4.4.2.

5.4.3 Test Instruments

Same as item 4.4.3.

5.4.4 Test Procedures

Same as item 4.4.4.

5.4.5 Deviation from Test Standard

No deviation.

5.4.6 EUT Operating Conditions

Same as item 4.4.6.

5.4.7 Test Results

Beamforming off Mode

802.11a

Channel	Frequency (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
149	5745	19.18	18.87	19.21	19.02	323.051	25.09	30	Pass
157	5785	21.17	21.32	21.56	21.67	**556.549**	27.46	30	Pass
165	5825	20.28	20.31	20.62	20.71	447.165	26.50	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
149	5745	20.53	20.13	20.49	20.45	438.880	26.42	30	Pass
157	5785	21.14	21.32	21.66	21.45	551.728	27.42	30	Pass
165	5825	20.25	20.32	20.67	20.52	442.973	26.46	30	Pass

802.11n (HT40)

Channel	Frequency (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
151	5755	20.18	19.91	20.02	20.10	404.972	26.07	30	Pass
159	5795	20.42	20.31	20.40	20.14	430.477	26.34	30	Pass

802.11ac (VHT80)

Channel	Frequency (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
155	5775	19.10	19.13	19.18	19.32	331.430	25.20	30	Pass

Beamforming on Mode

802.11ac (VHT20)

Channel	Frequency (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
149	5745	15.57	15.64	15.85	15.53	146.888	21.67	25.63	Pass
157	5785	19.92	19.01	19.22	19.90	**359.075**	25.55	25.63	Pass
165	5825	16.66	16.51	16.63	16.79	184.895	22.67	25.63	Pass

Note: Directional gain = 4.35dBi + 10log(4) = 10.37dBi > 6dBi, so the power limit shall be reduced to 30-(10.37-6) = 25.63dBm.

802.11ac (VHT40)

Channel	Frequency (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
151	5755	19.67	19.34	19.39	19.61	356.891	25.53	25.63	Pass
159	5795	18.71	19.16	19.32	19.87	339.274	25.31	25.63	Pass

Note: Directional gain = 4.35dBi + 10log(4) = 10.37dBi > 6dBi, so the power limit shall be reduced to 30-(10.37-6) = 25.63dBm.

802.11ac (VHT80)

Channel	Frequency (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
155	5775	18.00	17.86	17.70	18.09	247.491	23.94	25.63	Pass

Note: Directional gain = 4.35dBi + 10log(4) = 10.37dBi > 6dBi, so the power limit shall be reduced to 30-(10.37-6) = 25.63dBm.

5.5 Power Spectral Density Measurement

5.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm.

5.5.2 Test Setup

Same as Item 4.5.2

5.5.3 Test Instruments

Same as Item 4.5.3

5.5.4 Test Procedure

Same as Item 4.5.4

5.5.5 Deviation from Test Standard

No deviation.

5.5.6 EUT Operating Condition

Same as Item 4.3.6

5.5.7 Test Results

Beamforming off Mode

802.11a

TX chain	Channel	Frequency (MHz)	PSD (dBm)	10 log (N=4) dB	Duty Factor	Total PSD with Duty Factor (dBm)	Limit (dBm)	Pass / Fail
0	149	5745	-10.48	6.02	0.19	-4.27	3.63	Pass
	157	5785	-8.60	6.02	0.19	-2.39	3.63	Pass
	165	5825	-8.90	6.02	0.19	-2.69	3.63	Pass
1	149	5745	-11.20	6.02	0.19	-4.99	3.63	Pass
	157	5785	-8.23	6.02	0.19	-2.02	3.63	Pass
	165	5825	-9.19	6.02	0.19	-2.98	3.63	Pass
2	149	5745	-13.52	6.02	0.19	-7.31	3.63	Pass
	157	5785	-12.37	6.02	0.19	-6.16	3.63	Pass
	165	5825	-13.22	6.02	0.19	-7.01	3.63	Pass
3	149	5745	-10.68	6.02	0.19	-4.47	3.63	Pass
	157	5785	-7.76	6.02	0.19	-1.55	3.63	Pass
	165	5825	-9.30	6.02	0.19	-3.09	3.63	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 = 4.35dBi + 10log(4) = 10.37dBi > 6dBi, so the power density limit shall be reduced to 8-(10.37-6) = 3.63dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

TX chain	Channel	Frequency (MHz)	PSD (dBm)	10 log (N=4) dB	Total PSD (dBm)	Limit (dBm)	Pass / Fail
0	149	5745	-8.86	6.02	-2.84	3.63	Pass
	157	5785	-8.02	6.02	-2.00	3.63	Pass
	165	5825	-9.25	6.02	-3.23	3.63	Pass
1	149	5745	-9.00	6.02	-2.98	3.63	Pass
	157	5785	-7.46	6.02	-1.44	3.63	Pass
	165	5825	-8.43	6.02	-2.41	3.63	Pass
2	149	5745	-12.74	6.02	-6.72	3.63	Pass
	157	5785	-12.39	6.02	-6.37	3.63	Pass
	165	5825	-14.71	6.02	-8.69	3.63	Pass
3	149	5745	-7.74	6.02	-1.72	3.63	Pass
	157	5785	-7.61	6.02	-1.59	3.63	Pass
	165	5825	-8.78	6.02	-2.76	3.63	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 = 4.35dBi + 10log(4) = 10.37dBi > 6dBi, so the power density limit shall be reduced to 8-(10.37-6) = 3.63dBm.

802.11n (HT40)

TX chain	Channel	Frequency (MHz)	PSD (dBm)	10 log (N=4) dB	Duty Factor	Total PSD with Duty Factor (dBm)	Limit (dBm)	Pass / Fail
0	151	5755	-12.02	6.02	0.14	-5.86	3.63	Pass
	159	5795	-11.63	6.02	0.14	-5.47	3.63	Pass
1	151	5755	-12.70	6.02	0.14	-6.54	3.63	Pass
	159	5795	-12.06	6.02	0.14	-5.90	3.63	Pass
2	151	5755	-16.54	6.02	0.14	-10.38	3.63	Pass
	159	5795	-17.22	6.02	0.14	-11.06	3.63	Pass
3	151	5755	-12.11	6.02	0.14	-5.95	3.63	Pass
	159	5795	-11.63	6.02	0.14	-5.47	3.63	Pass

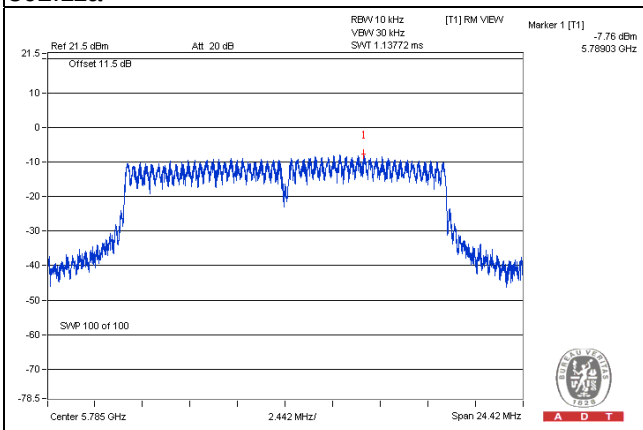
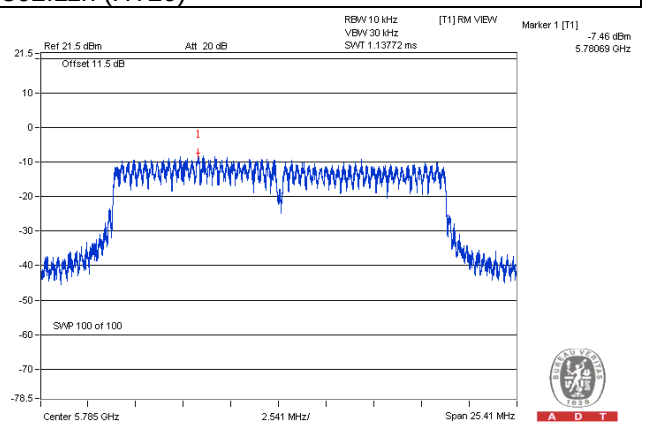
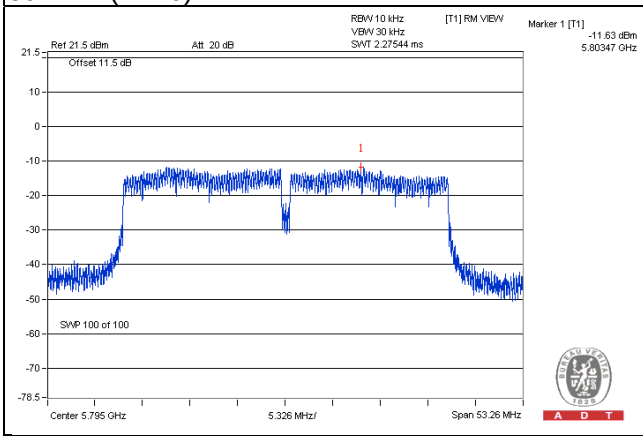
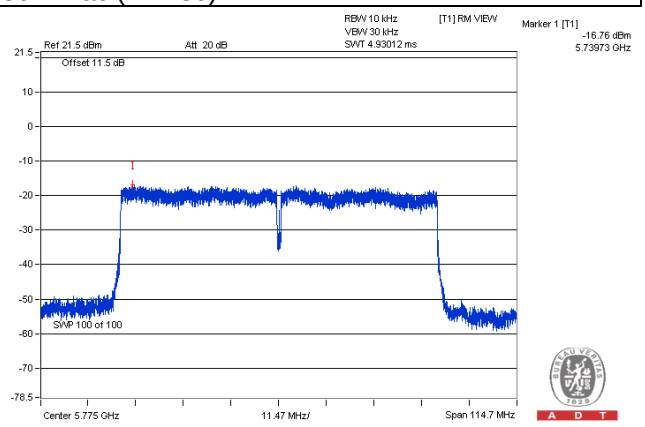
Note:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 4.35dBi + 10log(4) = 10.37dBi > 6dBi, so the power density limit shall be reduced to 8-(10.37-6) = 3.63dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

TX chain	Channel	Frequency (MHz)	PSD (dBm)	10 log (N=4) dB	Duty Factor	Total PSD with Duty Factor (dBm)	Limit (dBm)	Pass / Fail
0	155	5775	-16.80	6.02	0.28	-10.50	3.63	Pass
1	155	5775	-17.20	6.02	0.28	-10.90	3.63	Pass
2	155	5775	-19.43	6.02	0.28	-13.13	3.63	Pass
3	155	5775	-16.76	6.02	0.28	-10.46	3.63	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 = 4.35dBi + 10log(4) = 10.37dBi > 6dBi, so the power density limit shall be reduced to 8-(10.37-6) = 3.63dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	802.11ac (VHT80)
	

Beamforming on Mode

802.11ac (VHT20)

TX chain	Channel	Frequency (MHz)	PSD (dBm)	10 log (N=4) dB	Total PSD (dBm)	Limit (dBm)	Pass / Fail
0	149	5745	-15.47	6.02	-9.45	3.63	Pass
	157	5785	-10.53	6.02	-4.51	3.63	Pass
	165	5825	-15.18	6.02	-9.16	3.63	Pass
1	149	5745	-15.69	6.02	-9.67	3.63	Pass
	157	5785	-10.28	6.02	-4.26	3.63	Pass
	165	5825	-14.33	6.02	-8.31	3.63	Pass
2	149	5745	-16.59	6.02	-10.57	3.63	Pass
	157	5785	-12.01	6.02	-5.99	3.63	Pass
	165	5825	-16.62	6.02	-10.60	3.63	Pass
3	149	5745	-15.21	6.02	-9.19	3.63	Pass
	157	5785	-9.91	6.02	-3.89	3.63	Pass
	165	5825	-14.96	6.02	-8.94	3.63	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 = 4.35dBi + 10log(4) = 10.37dBi > 6dBi, so the power density limit shall be reduced to 8-(10.37-6) = 3.63dBm.

802.11ac (VHT40)

TX chain	Channel	Frequency (MHz)	PSD (dBm)	10 log (N=4) dB	Duty Factor	Total PSD with Duty Factor (dBm)	Limit (dBm)	Pass / Fail
0	151	5755	-13.42	6.02	0.14	-7.26	3.63	Pass
	159	5795	-13.82	6.02	0.14	-7.66	3.63	Pass
1	151	5755	-13.36	6.02	0.14	-7.20	3.63	Pass
	159	5795	-13.52	6.02	0.14	-7.36	3.63	Pass
2	151	5755	-14.32	6.02	0.14	-8.16	3.63	Pass
	159	5795	-14.49	6.02	0.14	-8.33	3.63	Pass
3	151	5755	-13.60	6.02	0.14	-7.44	3.63	Pass
	159	5795	-13.57	6.02	0.14	-7.41	3.63	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 = 4.35dBi + 10log(4) = 10.37dBi > 6dBi, so the power density limit shall be reduced to 8-(10.37-6) = 3.63dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

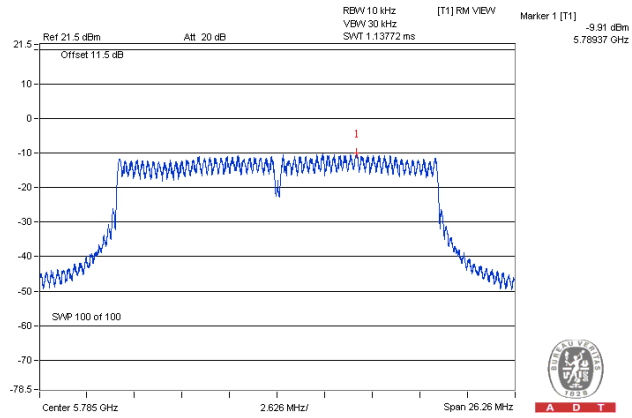
802.11ac (VHT80)

TX chain	Channel	Frequency (MHz)	PSD (dBm)	10 log (N=4) dB	Duty Factor	Total PSD with Duty Factor (dBm)	Limit (dBm)	Pass / Fail
0	155	5775	-18.06	6.02	0.29	-11.75	3.63	Pass
1	155	5775	-18.34	6.02	0.29	-12.03	3.63	Pass
2	155	5775	-19.67	6.02	0.29	-13.36	3.63	Pass
3	155	5775	-16.61	6.02	0.29	-10.30	3.63	Pass

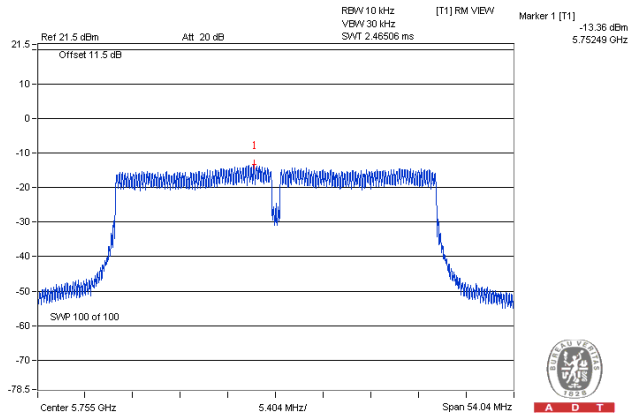
Note:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 4.35dBi + 10log(4) = 10.37dBi > 6dBi, so the power density limit shall be reduced to 8-(10.37-6) = 3.63dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

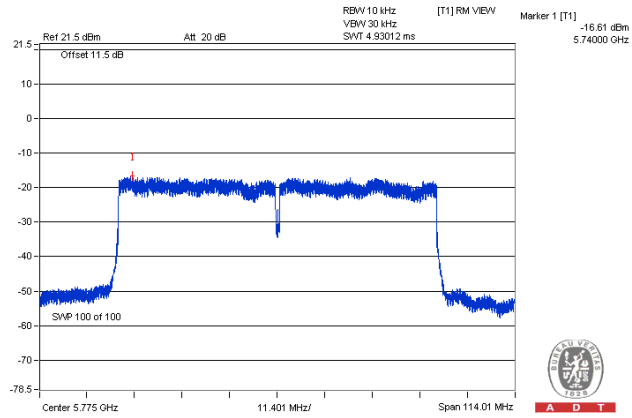
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



5.6 Conducted Out of Band Emission Measurement

5.6.1 Limits of Conducted Out of Band Emission Measurement

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

5.6.2 Test Setup

Same as Item 4.6.2

5.6.3 Test Instruments

Same as Item 4.6.3

5.6.4 Test Procedure

Same as Item 4.6.4

5.6.5 Deviation from Test Standard

No deviation.

5.6.6 EUT Operating Condition

Same as Item 4.3.6

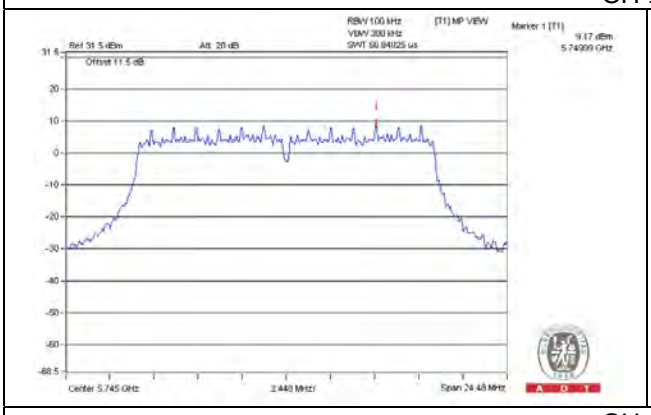
5.6.7 Test Results

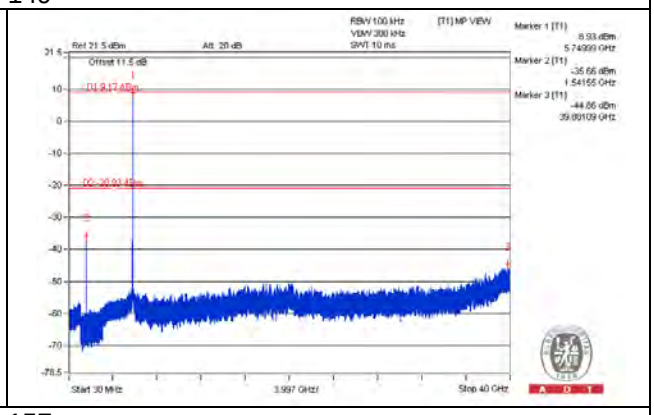
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

Beamforming off Mode

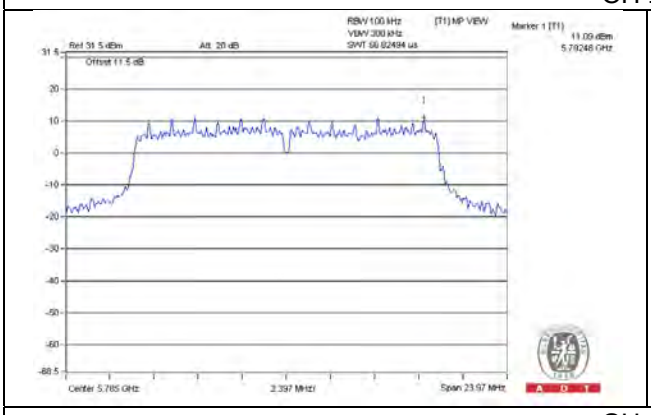
802.11a_Chain 0

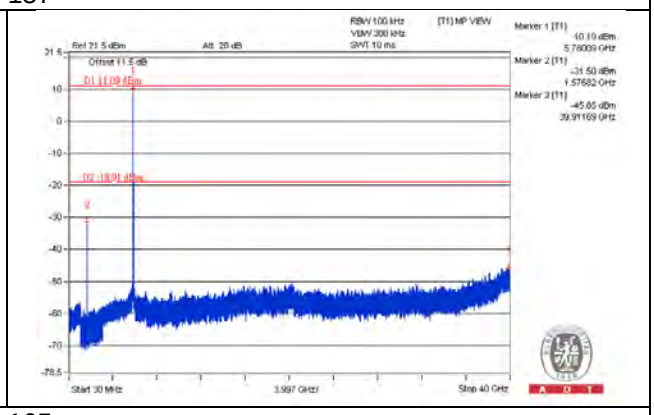
CH 149



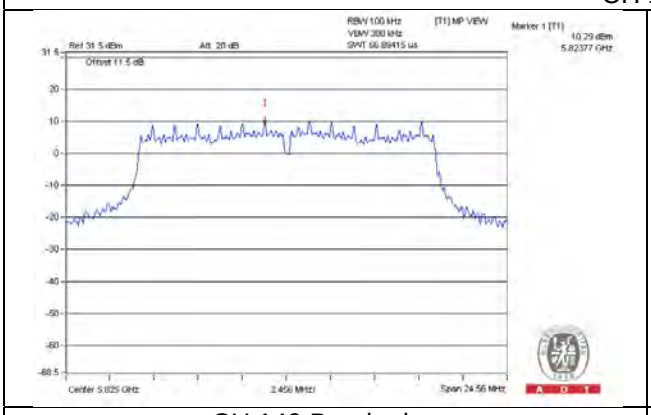


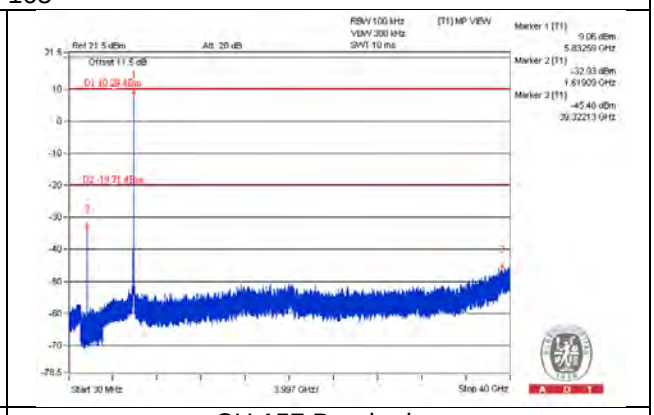
CH 157



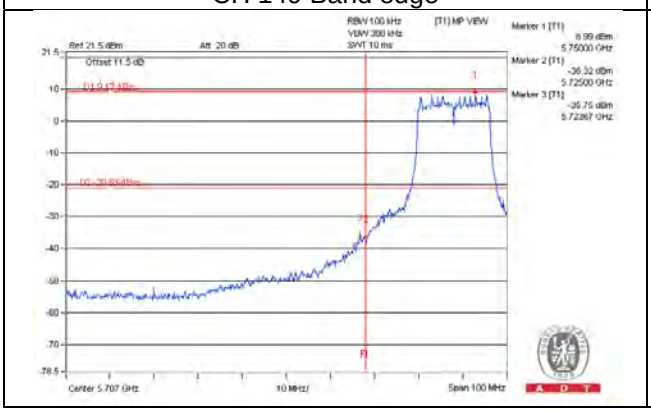


CH 165

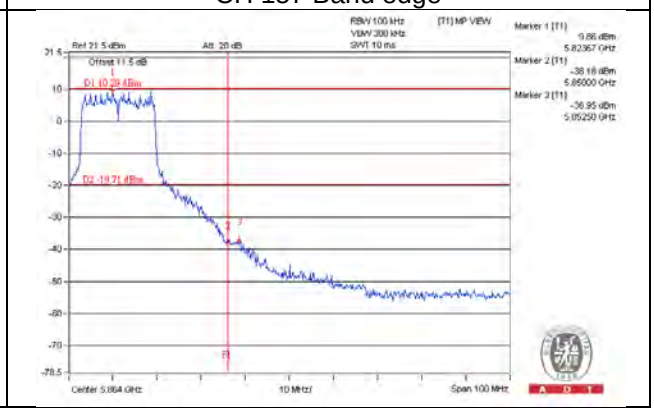




CH 149 Band edge

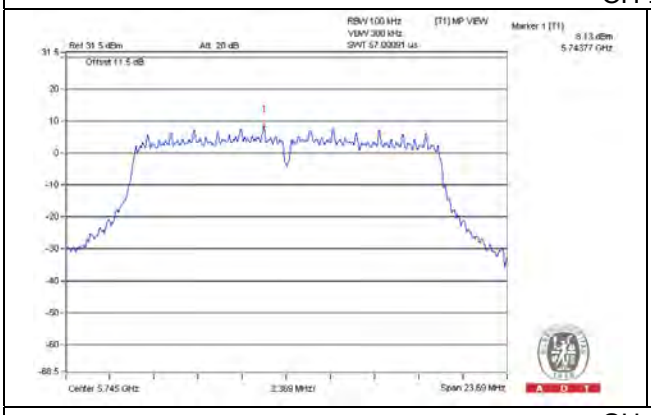


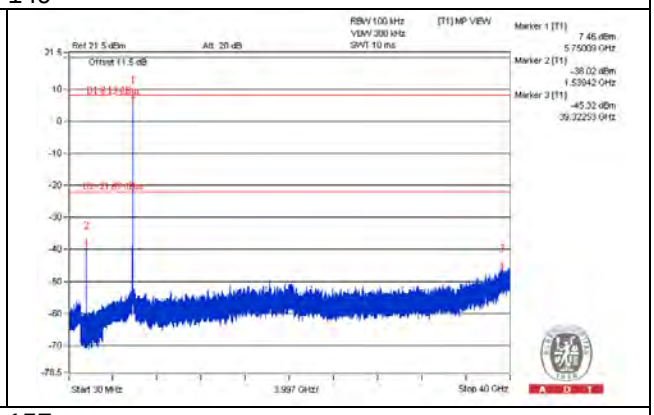
CH 157 Band edge



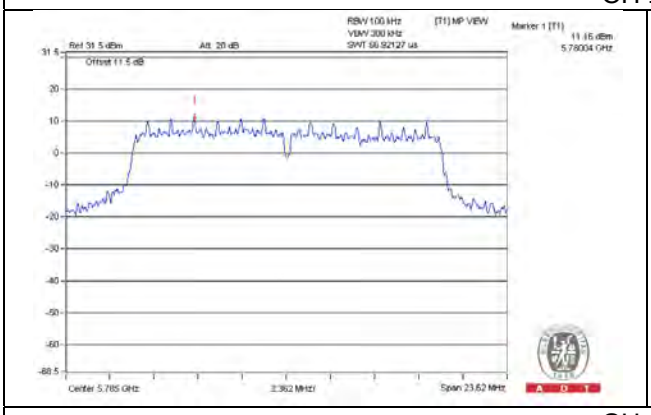
802.11a_Chain 1

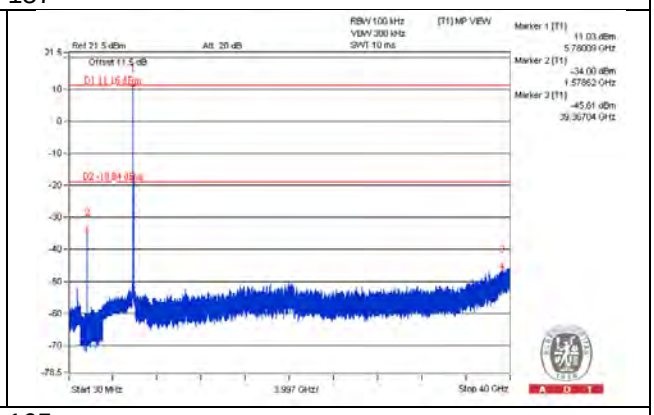
CH 149



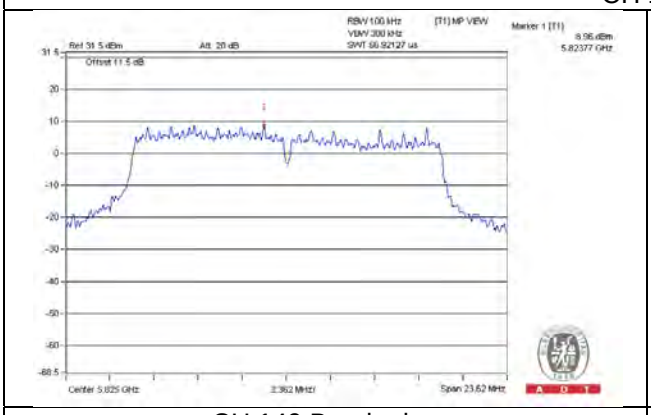


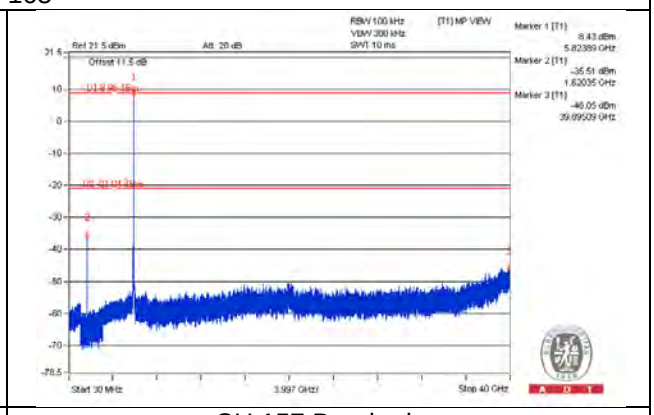
CH 157



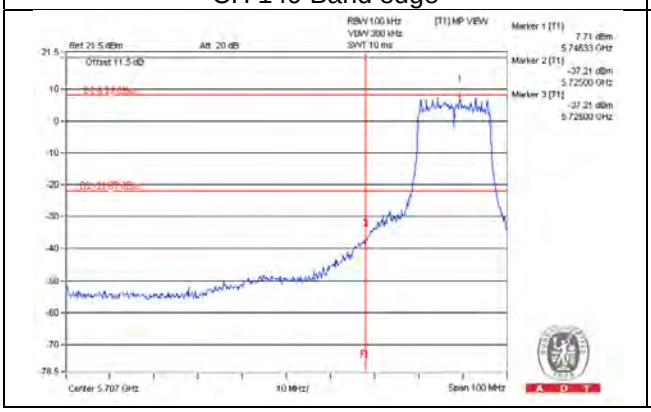


CH 165

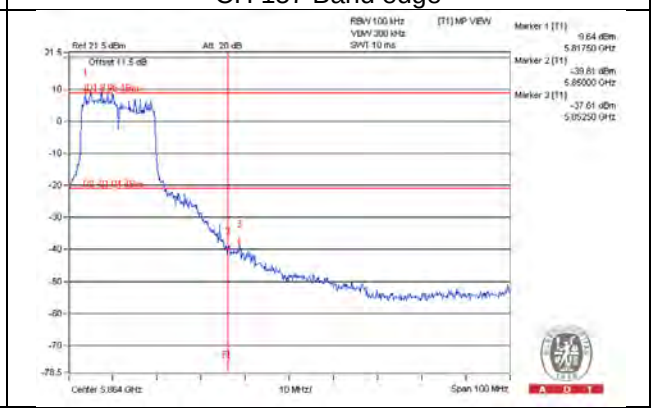




CH 149 Band edge

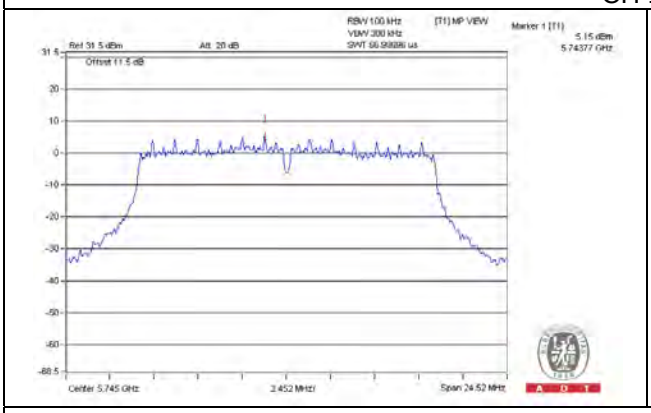


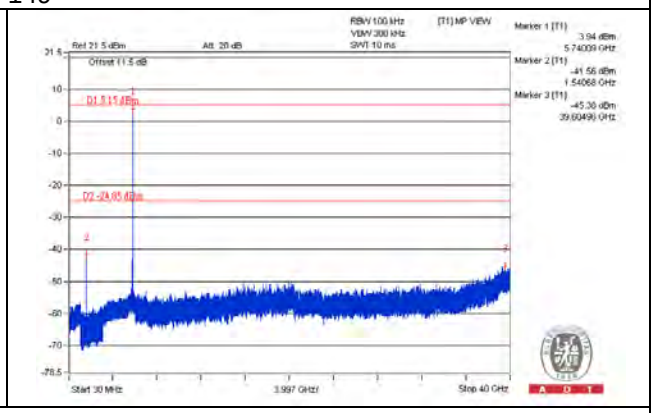
CH 157 Band edge



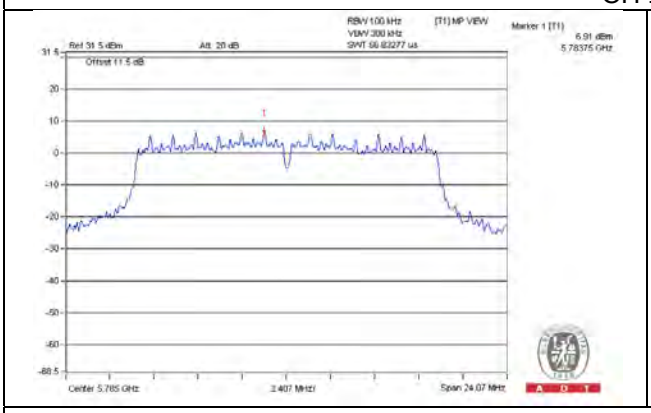
802.11a_Chain 2

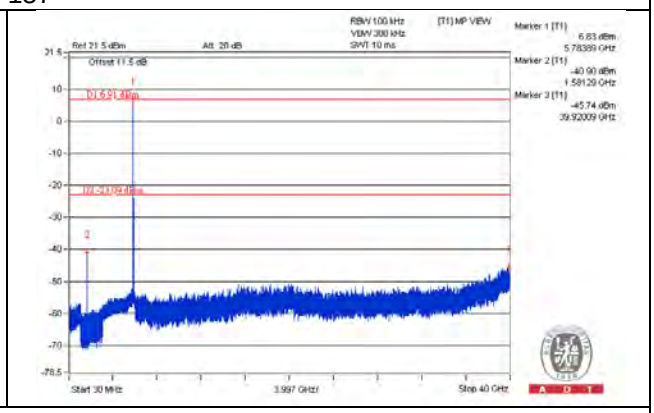
CH 149





CH 157





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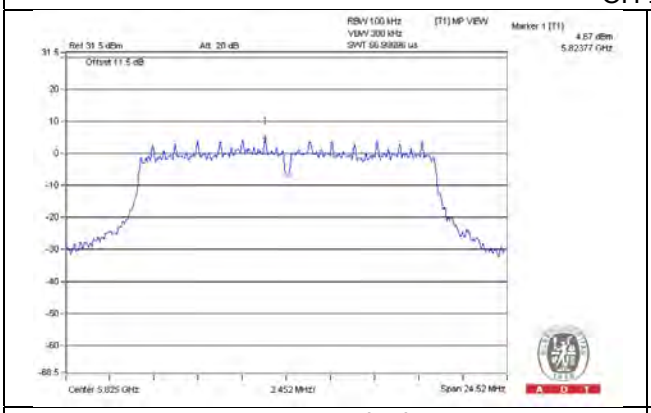
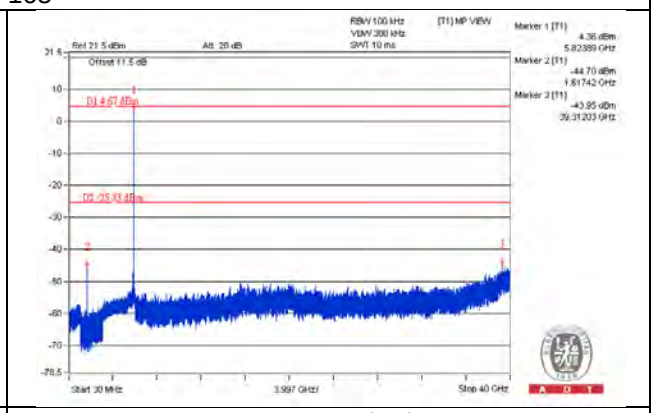
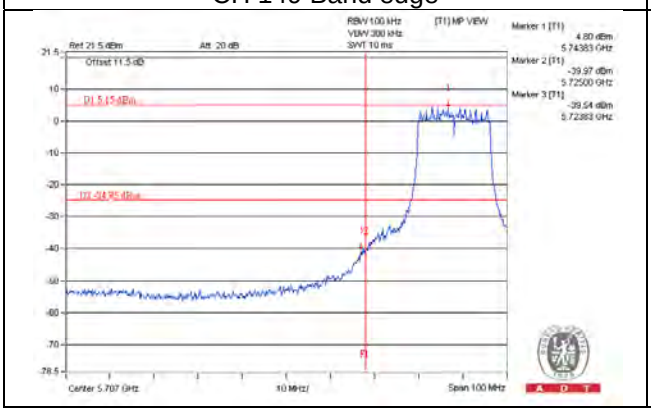
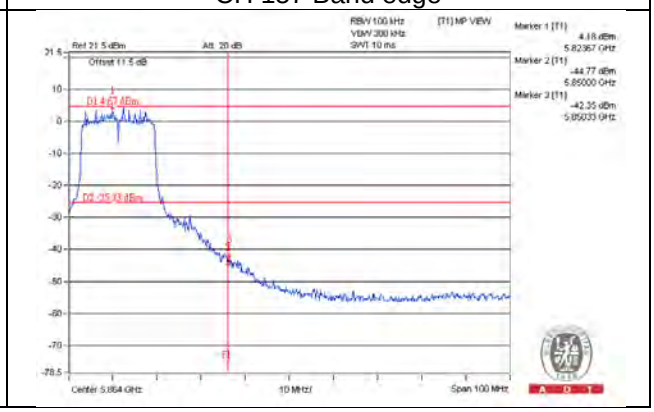




CH 149 Band edge

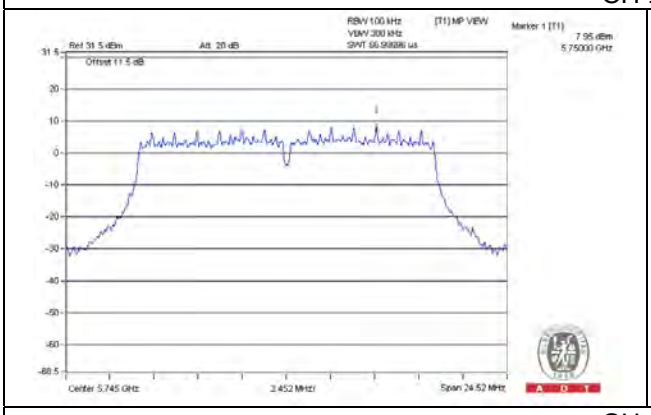


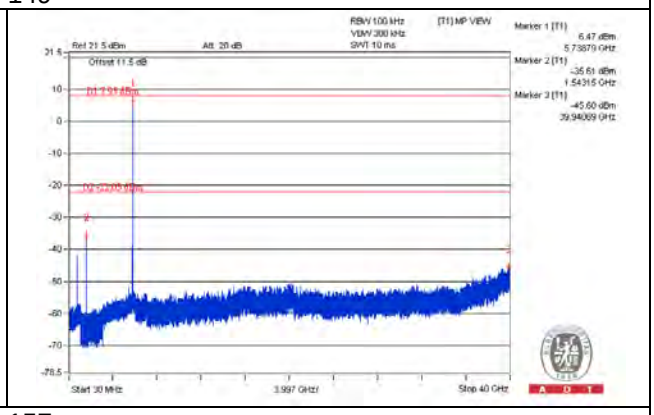
CH 157 Band edge



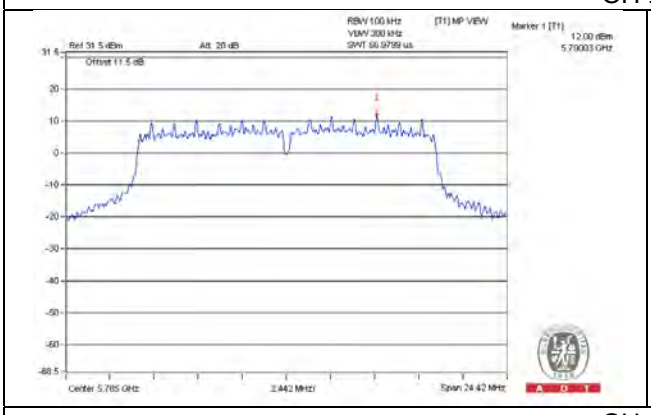
802.11a_Chain 3

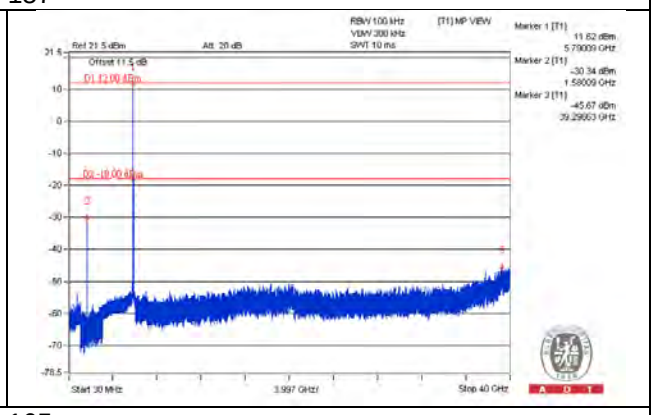
CH 149



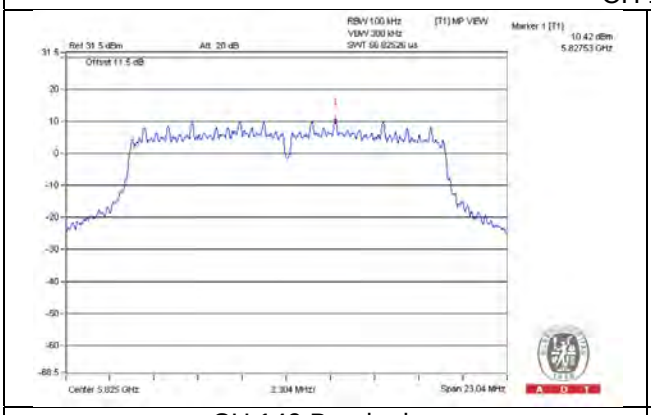


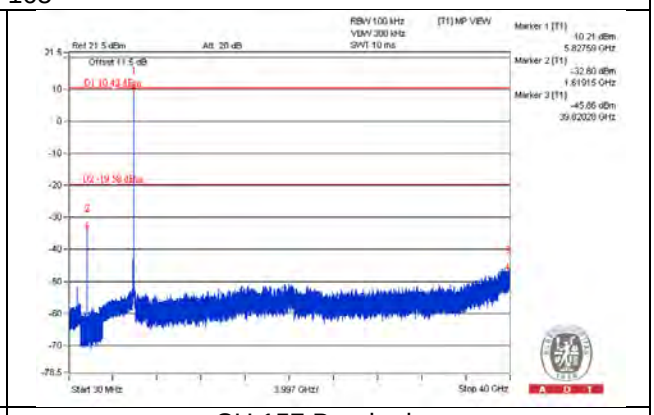
CH 157



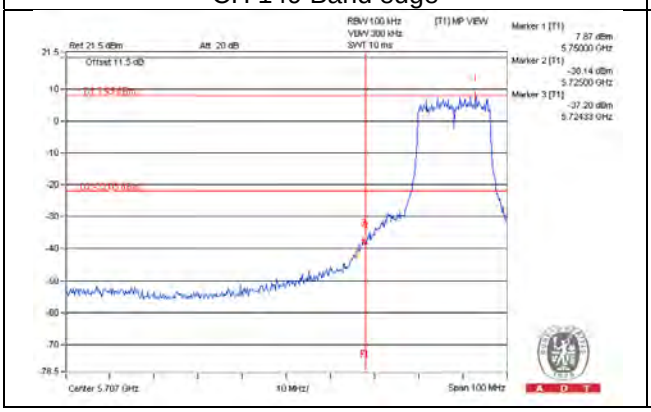


CH 165

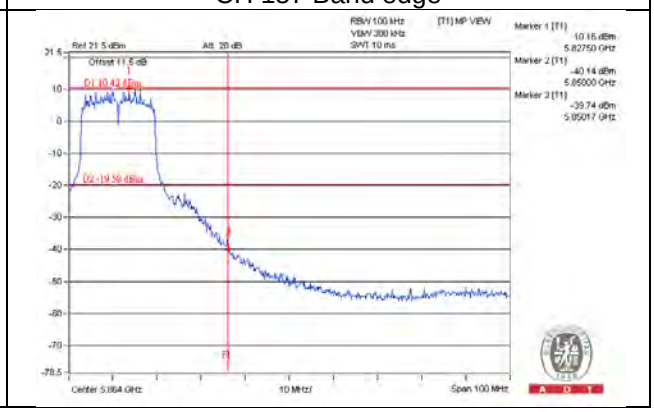




CH 149 Band edge

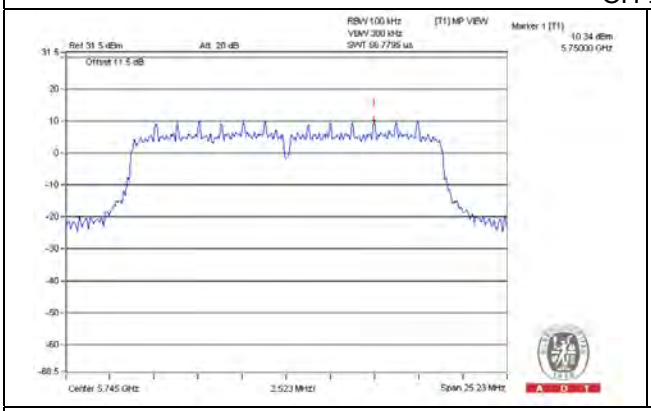


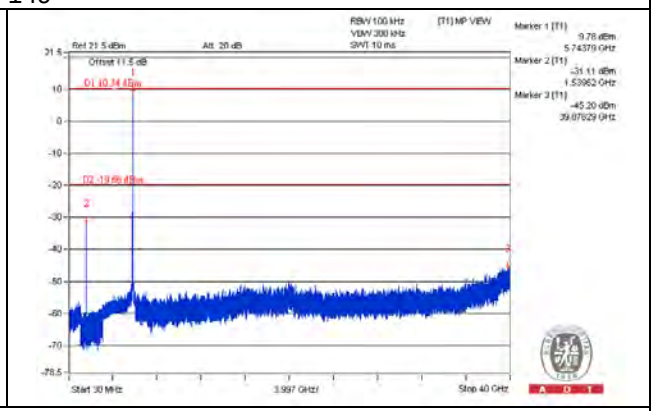
CH 157 Band edge



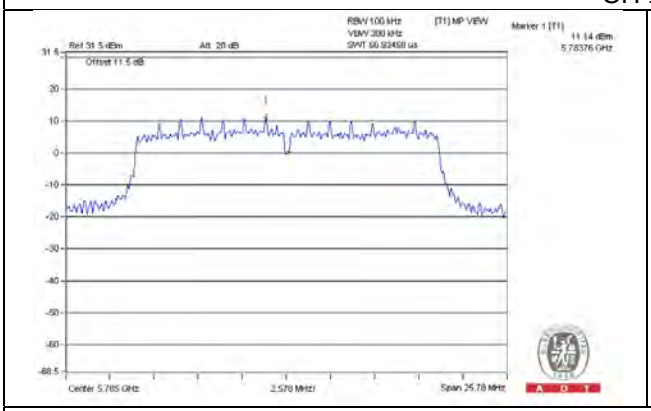
802.11n (HT20)_Chain 0

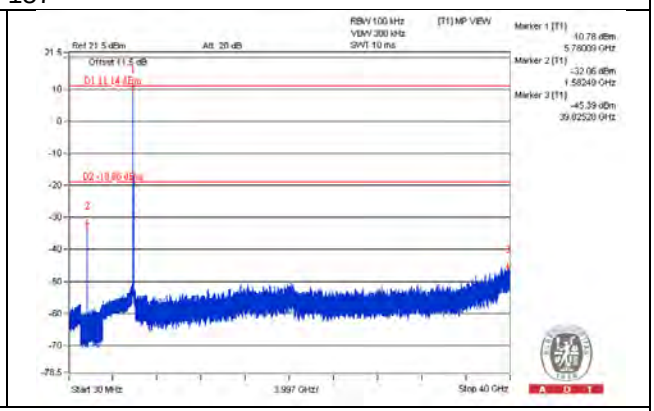
CH 149



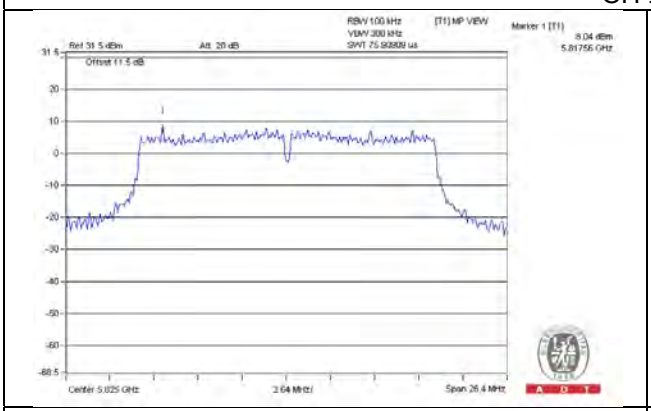


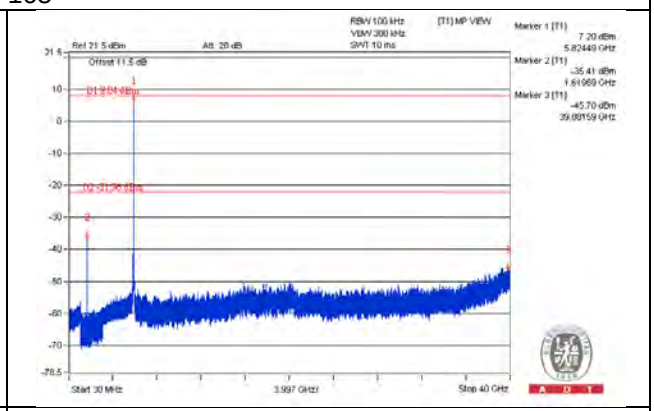
CH 157



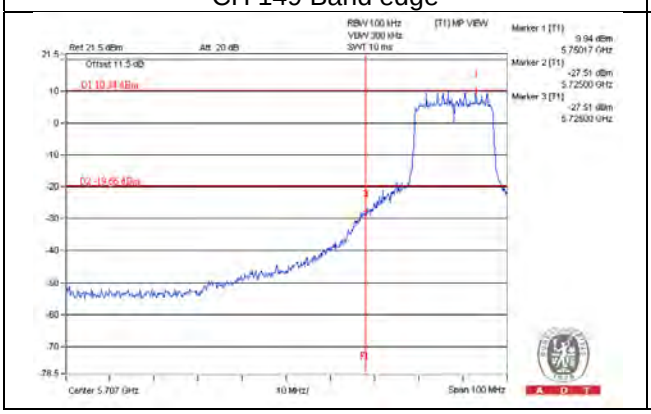


CH 165

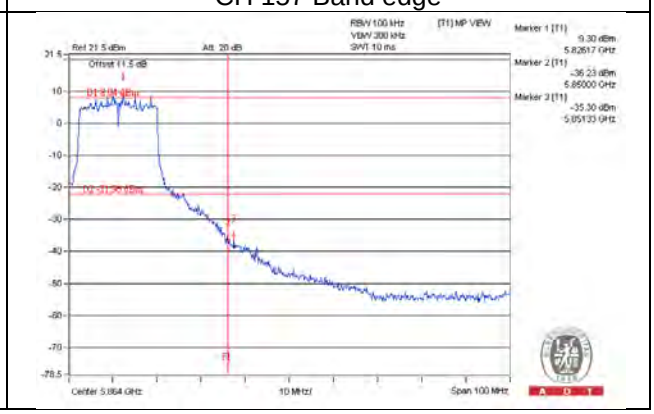




CH 149 Band edge

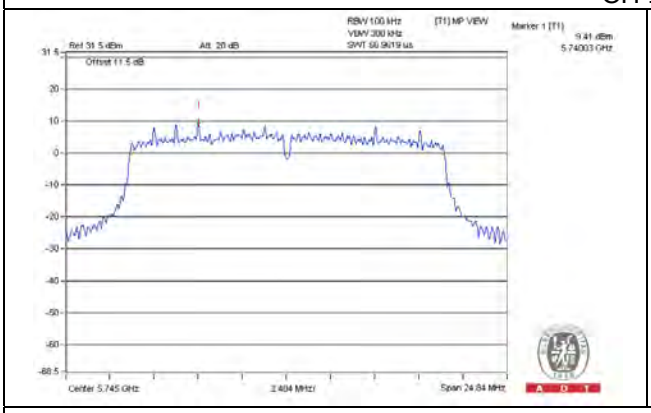


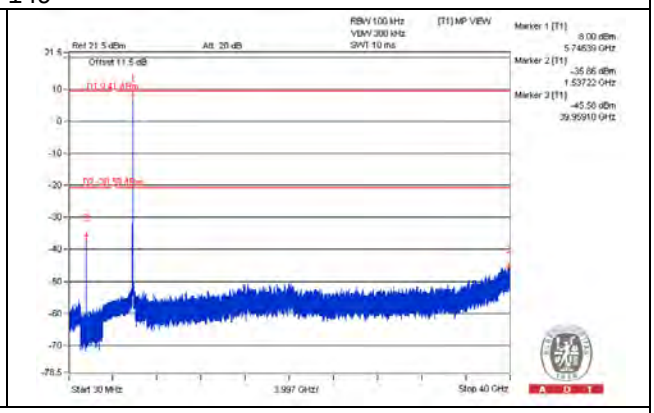
CH 157 Band edge



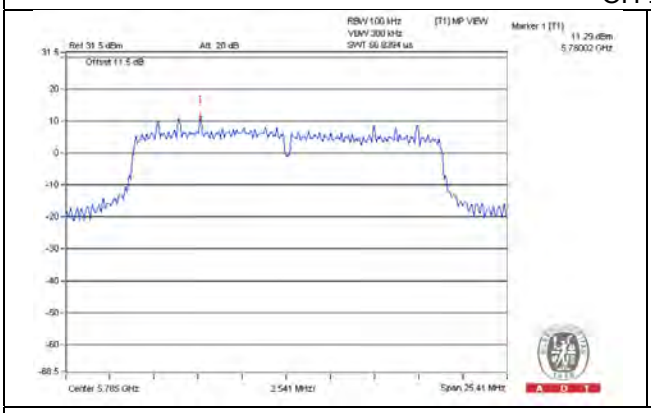
802.11n (HT20)_Chain 1

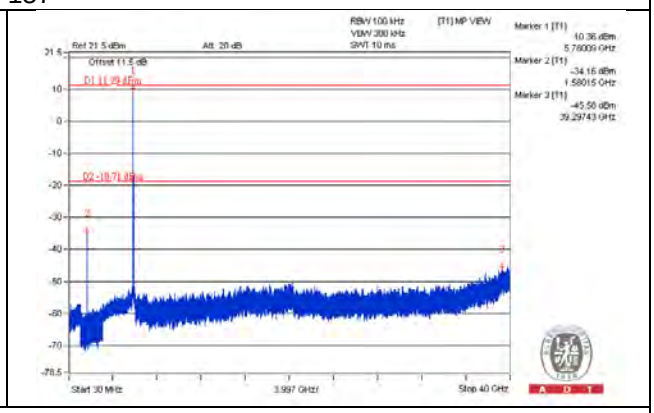
CH 149



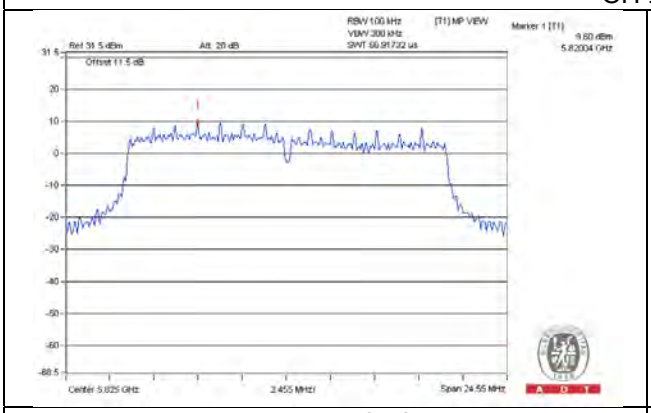


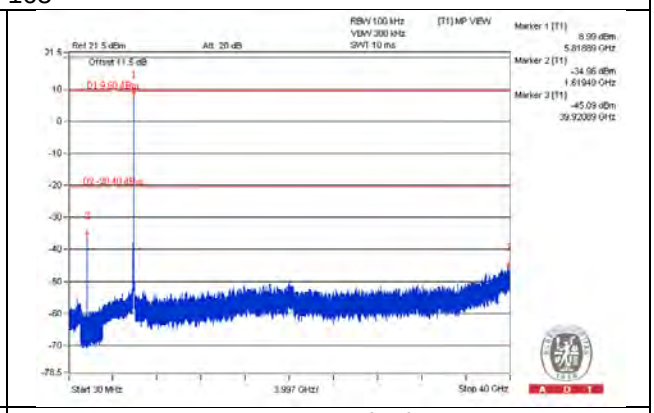
CH 157



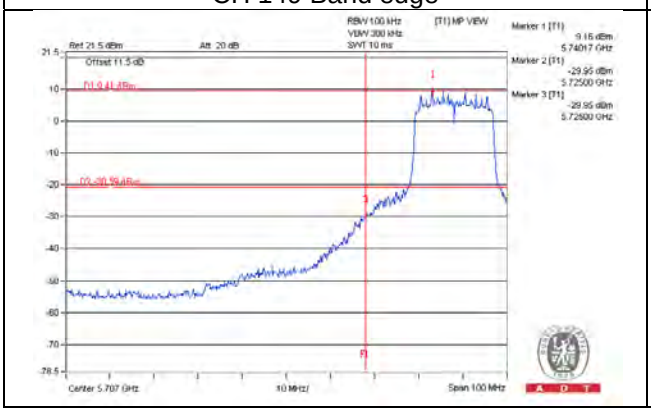


CH 165

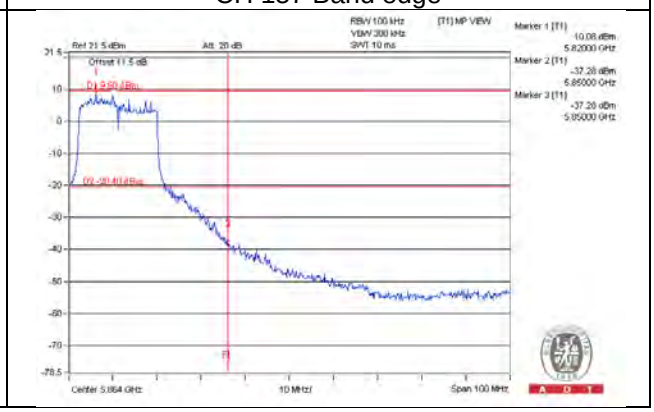




CH 149 Band edge

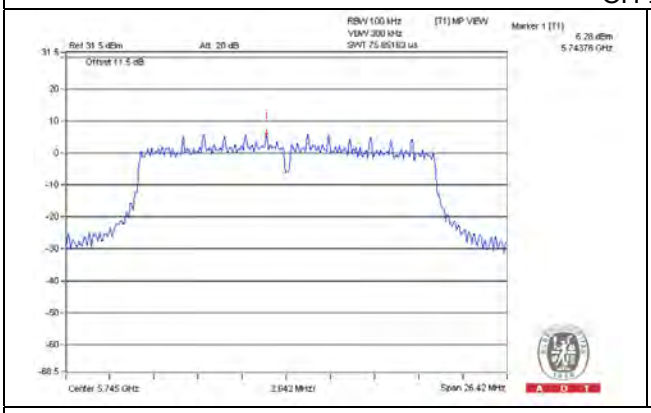


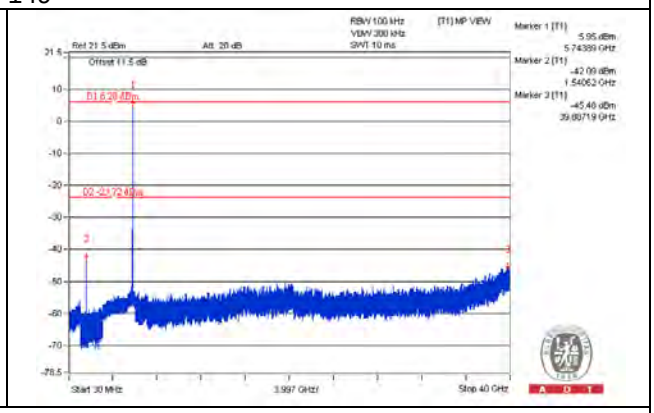
CH 157 Band edge



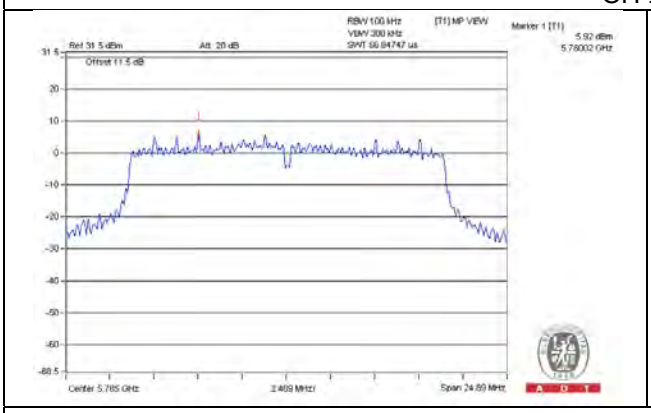
802.11n (HT20)_Chain 2

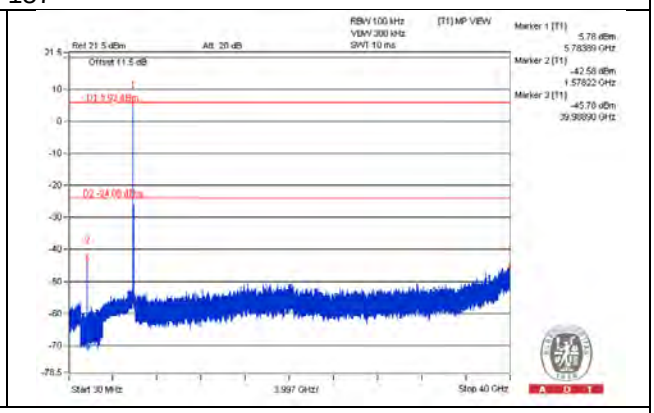
CH 149



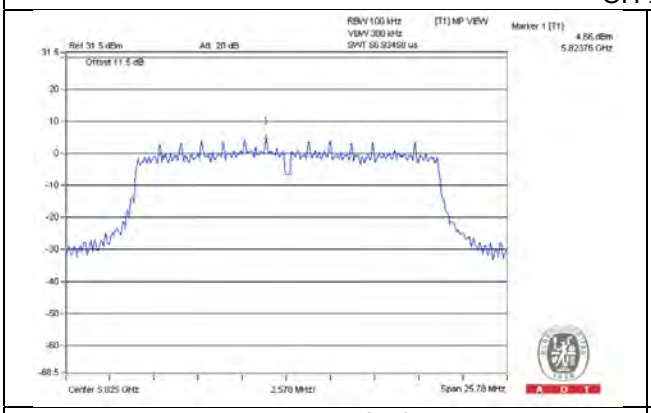


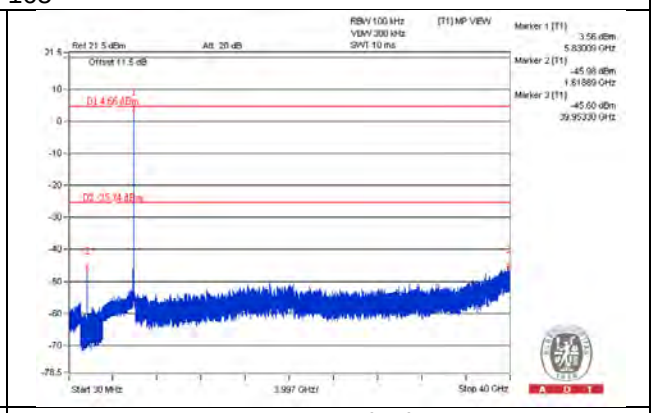
CH 157



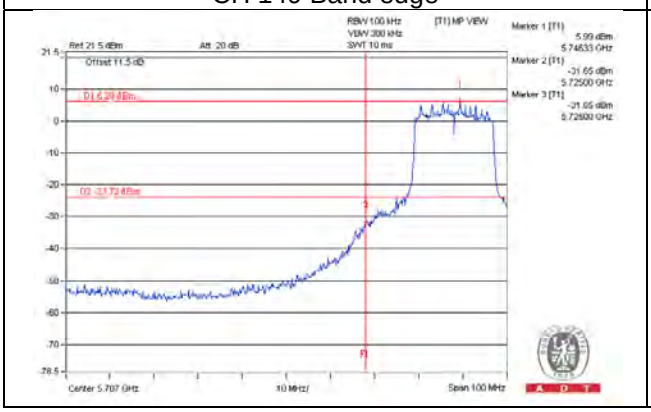


CH 165

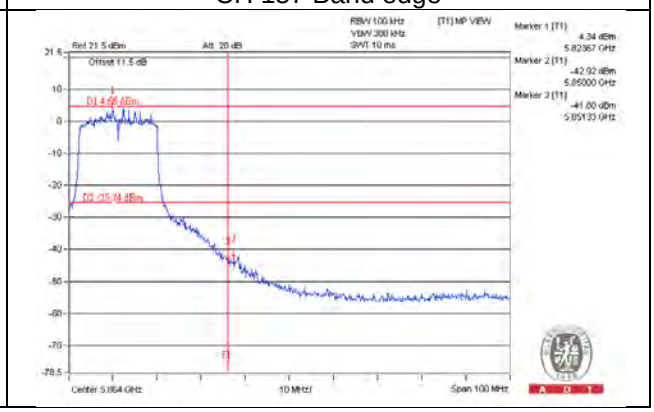




CH 149 Band edge

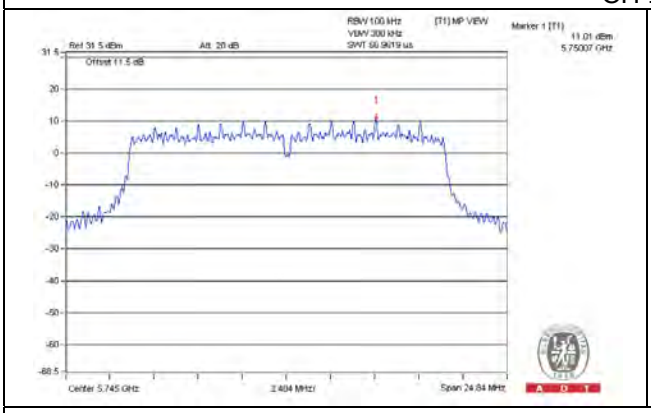


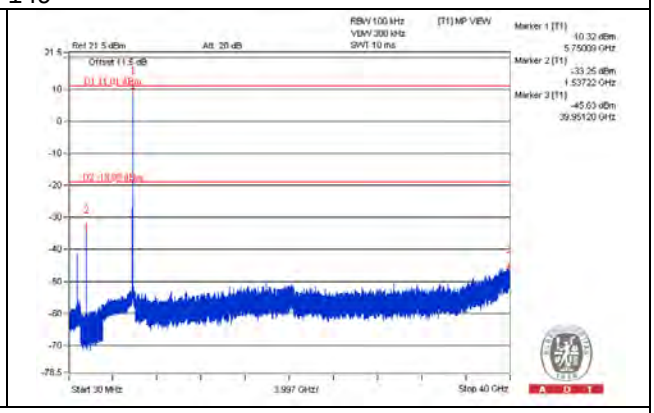
CH 157 Band edge



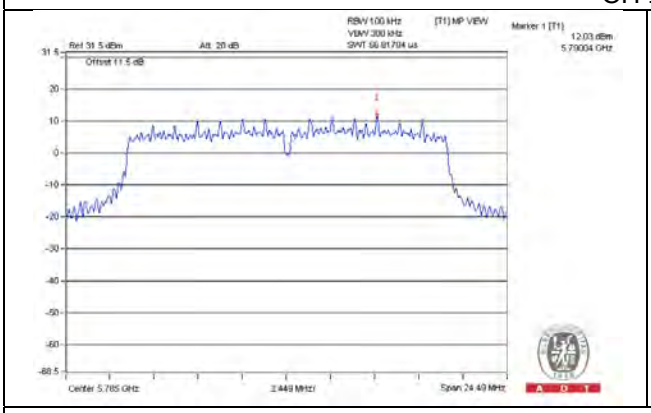
802.11n (HT20)_Chain 3

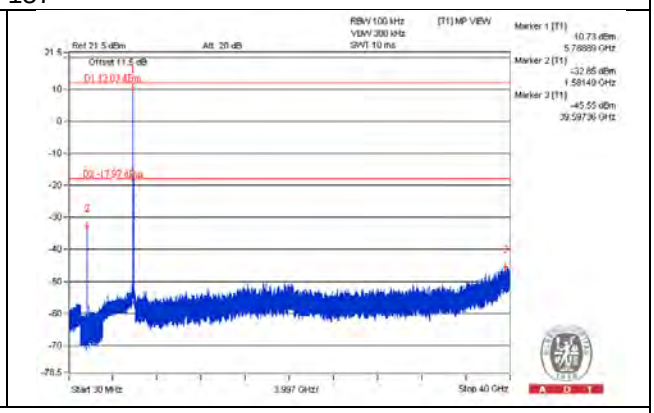
CH 149



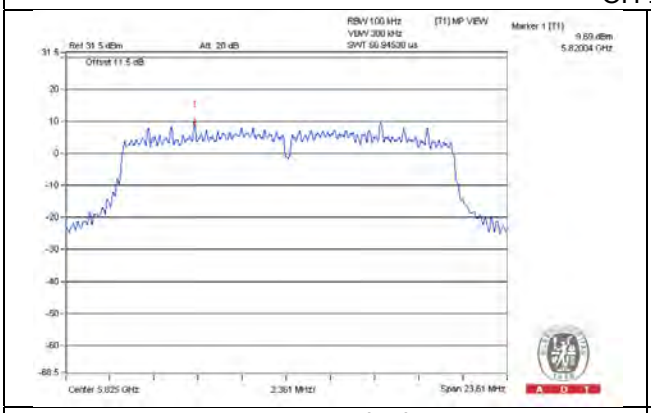


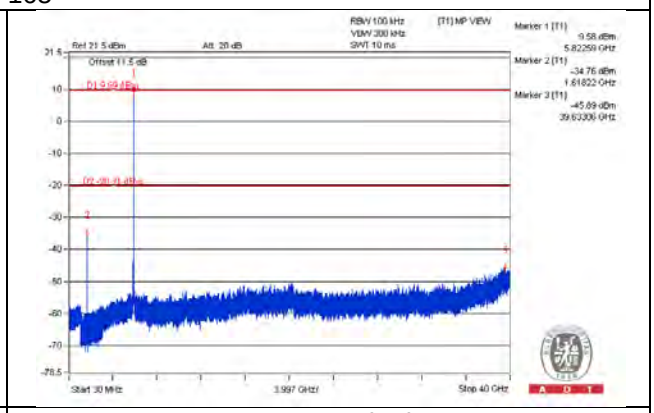
CH 157



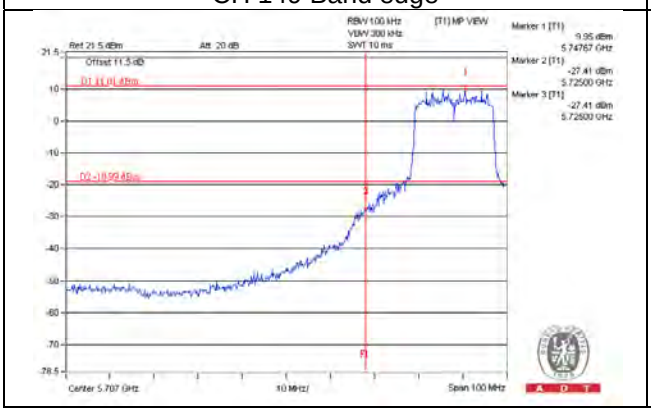


CH 165

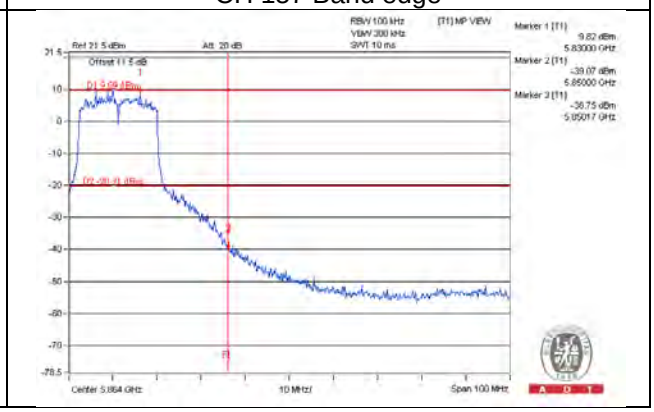




CH 149 Band edge

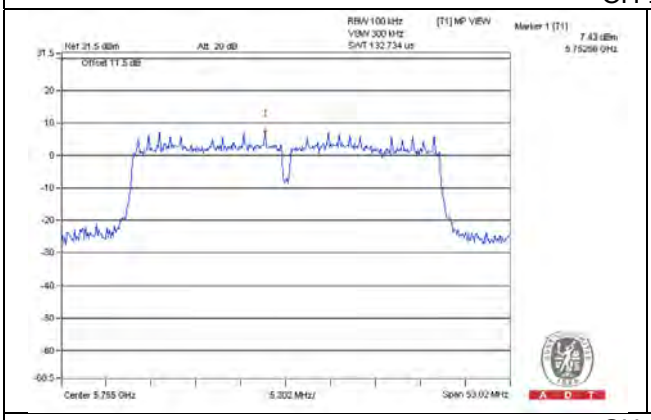


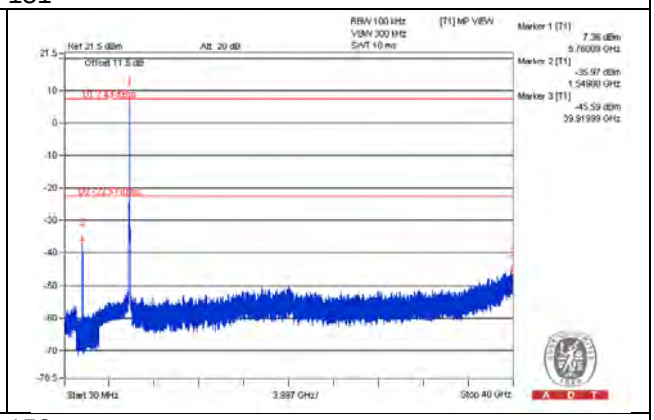
CH 157 Band edge



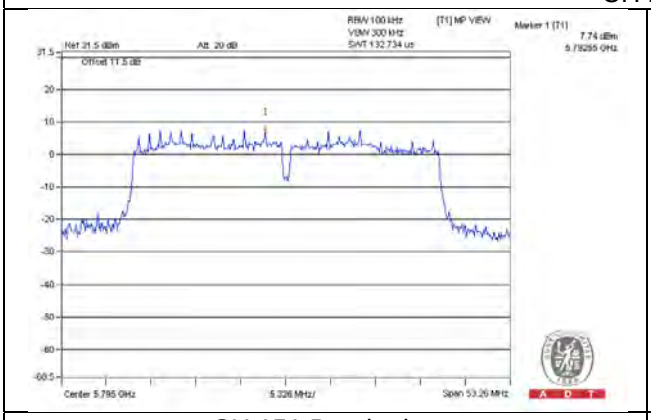
802.11n (HT40)_Chain 0

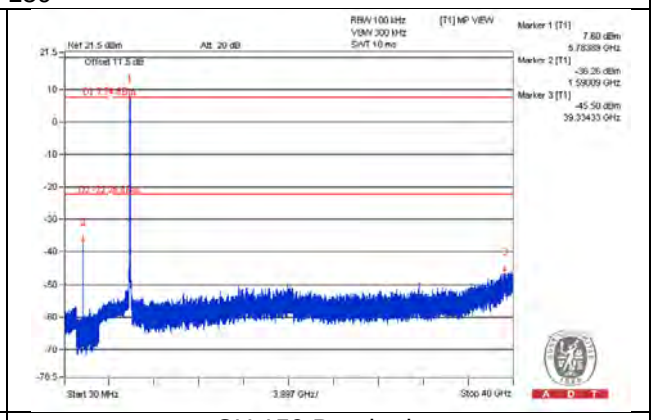
CH 151



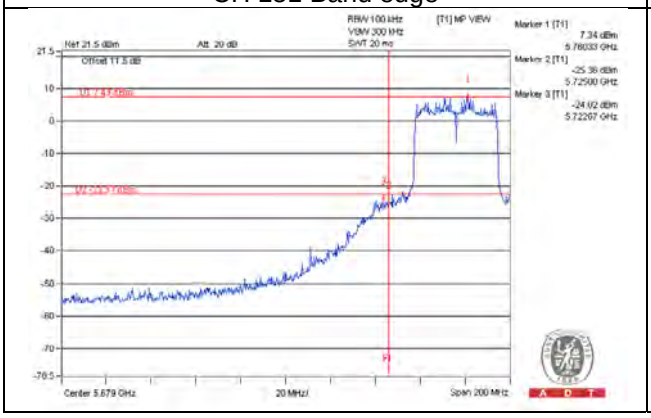


CH 159

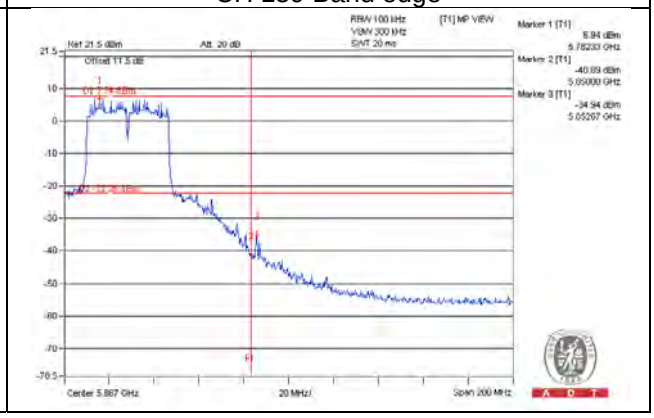




CH 151 Band edge

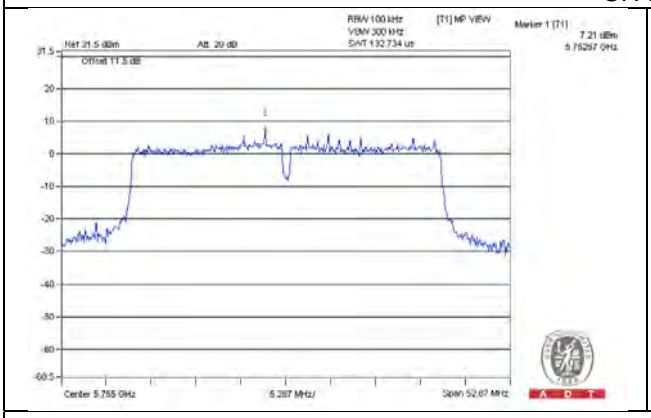


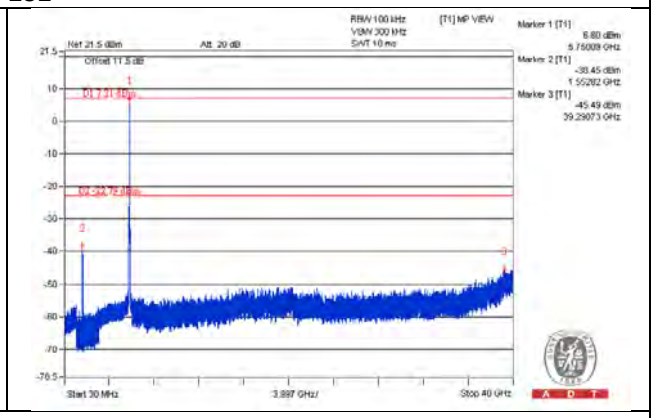
CH 159 Band edge



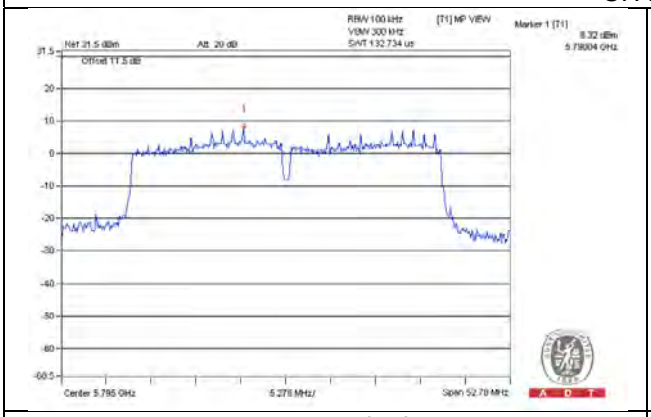
802.11n (HT40)_Chain 1

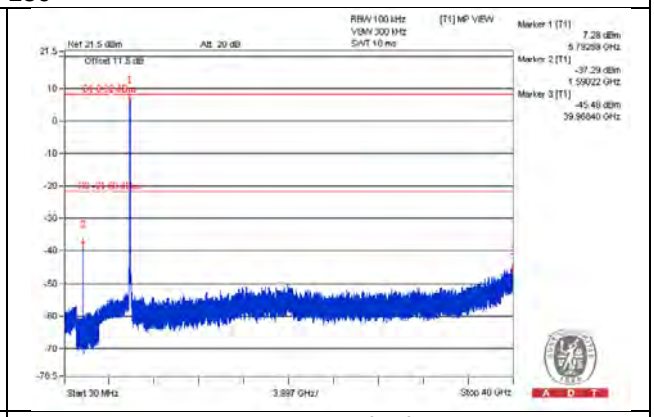
CH 151



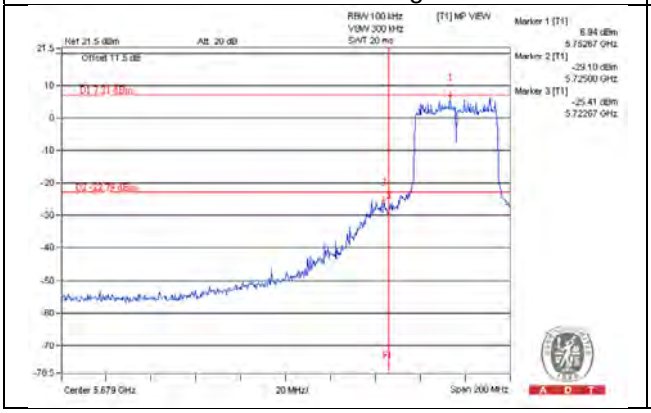


CH 159

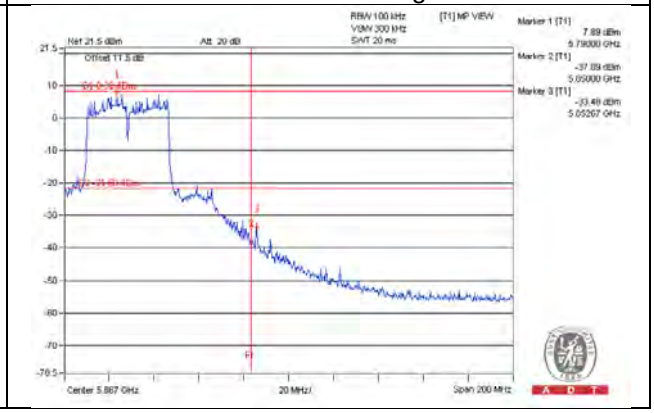




CH 151 Band edge

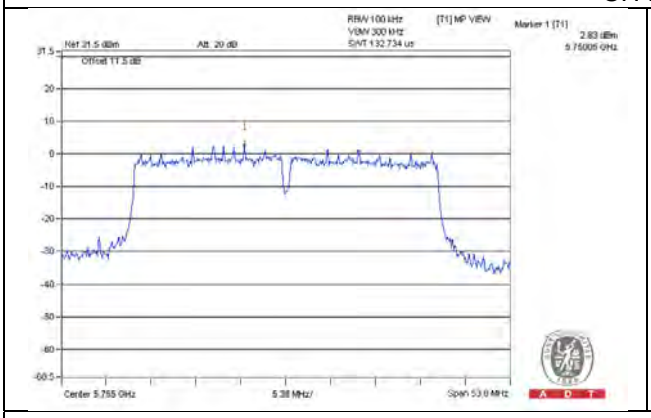


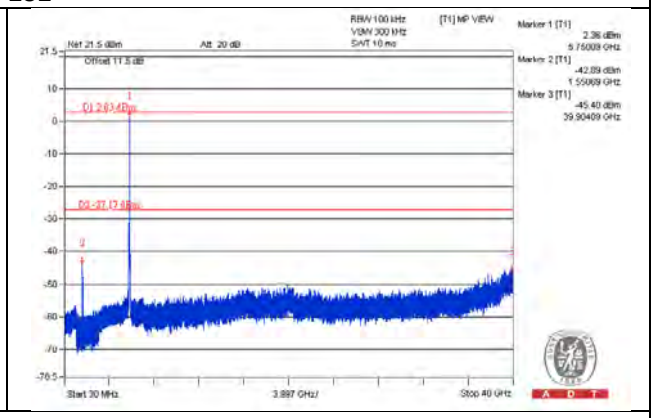
CH 159 Band edge



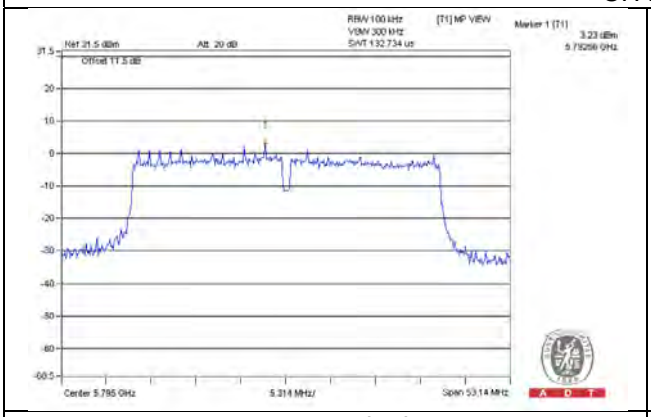
802.11n (HT40)_Chain 2

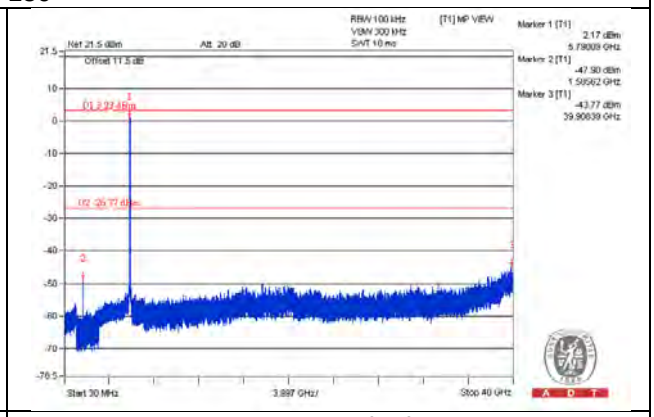
CH 151



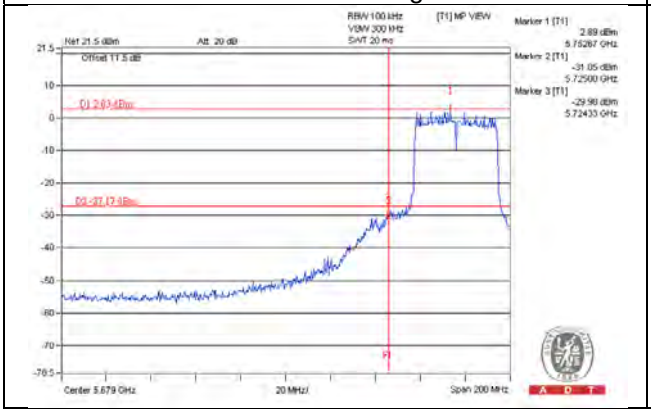


CH 159

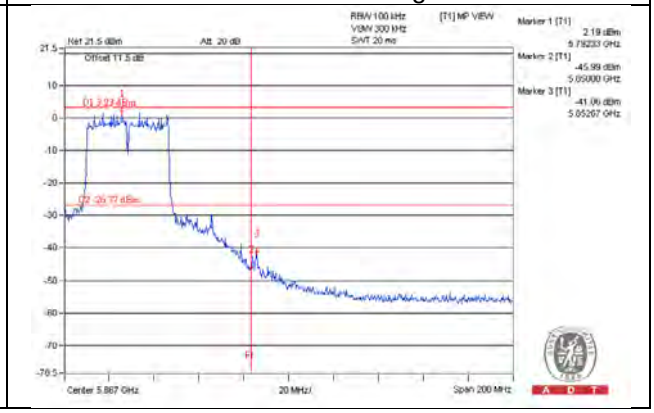




CH 151 Band edge

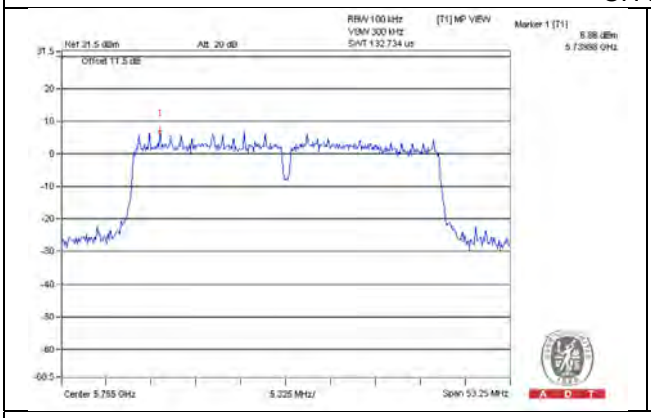


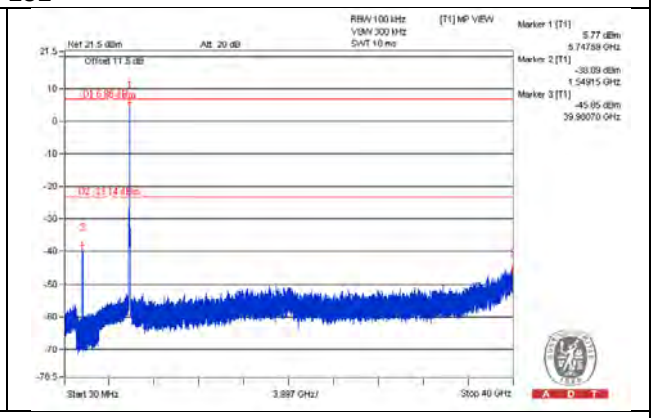
CH 159 Band edge



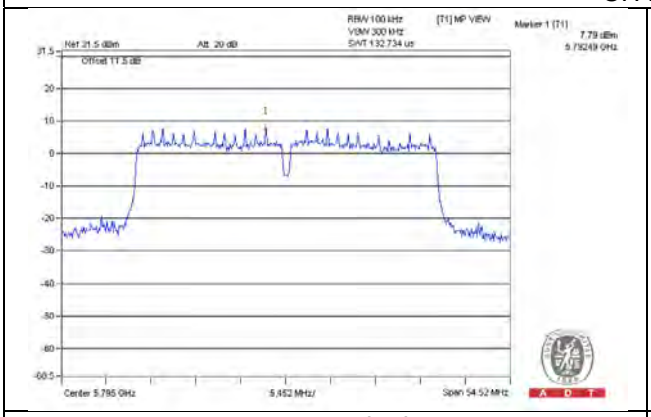
802.11n (HT40)_Chain 3

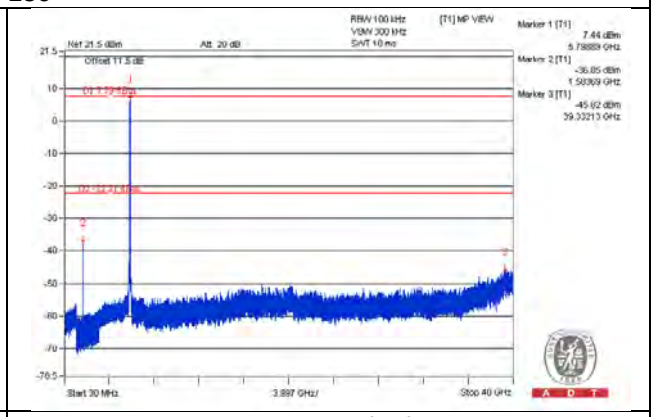
CH 151



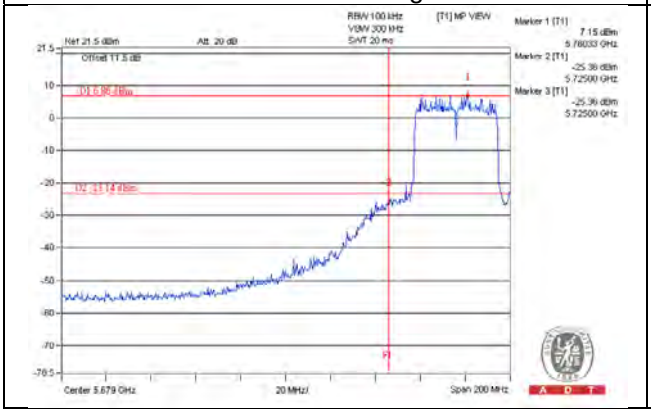


CH 159

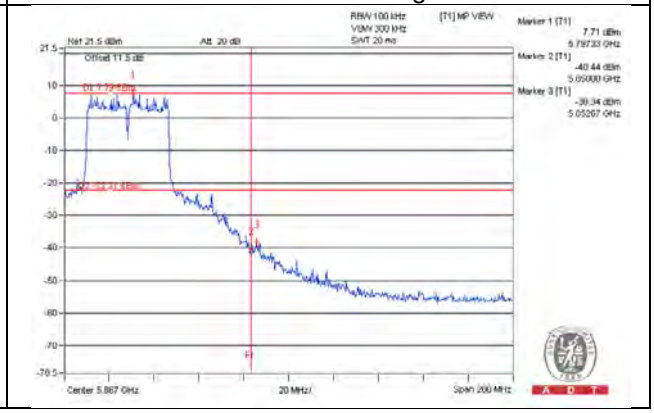




CH 151 Band edge

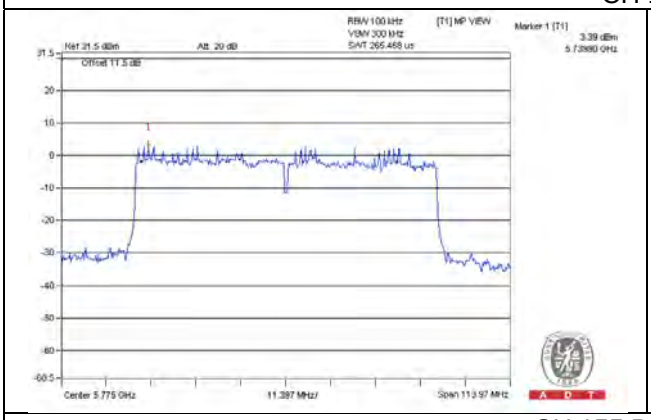


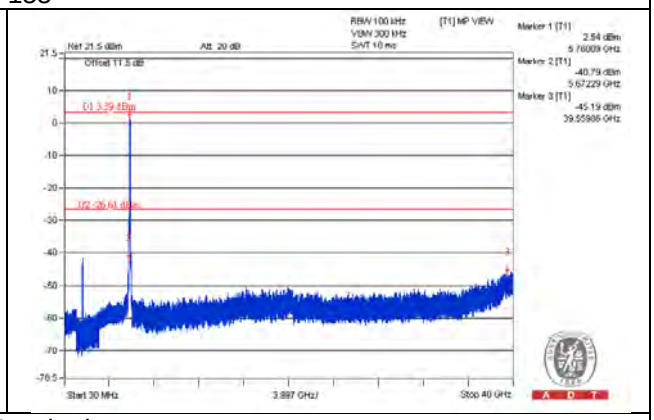
CH 159 Band edge



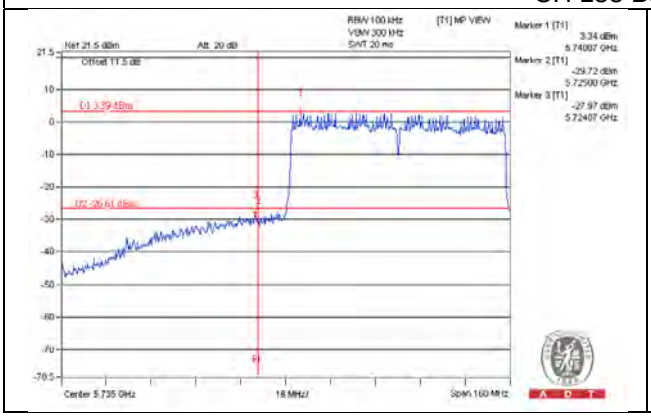
802.11ac (VHT80)_Chain 0

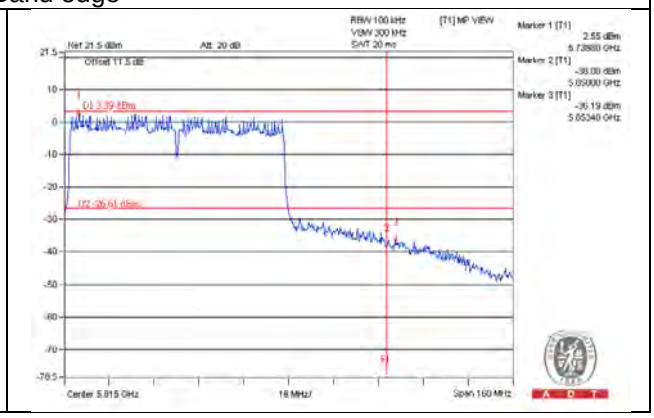
CH 155





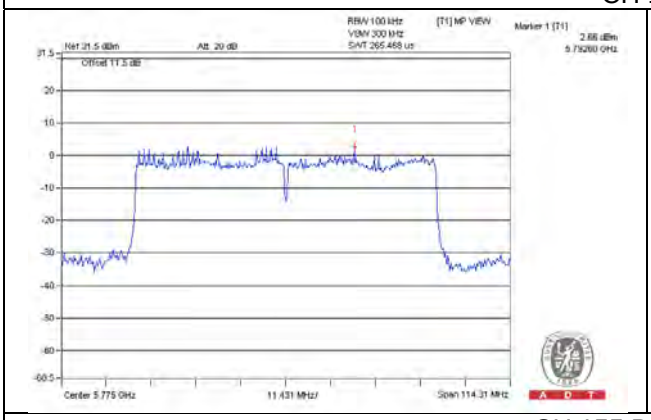
CH 155 Band edge

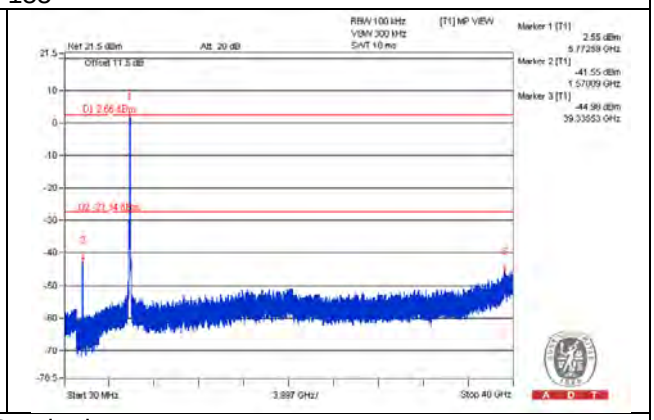




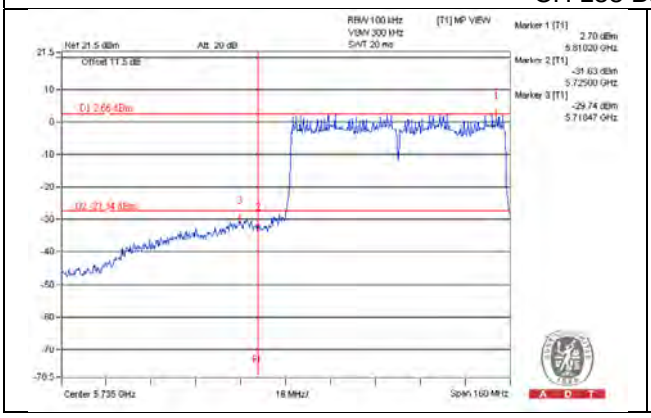
802.11ac (VHT80)_Chain 1

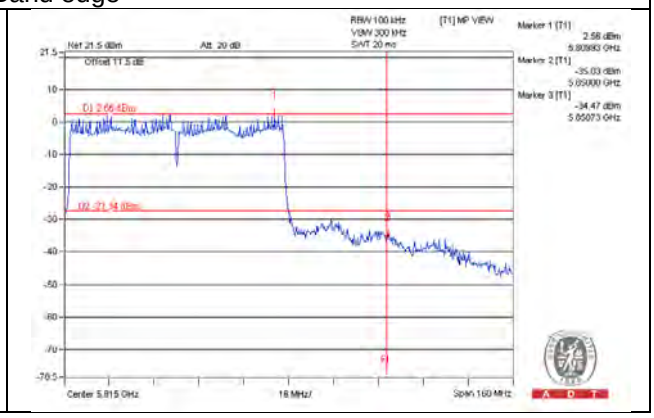
CH 155





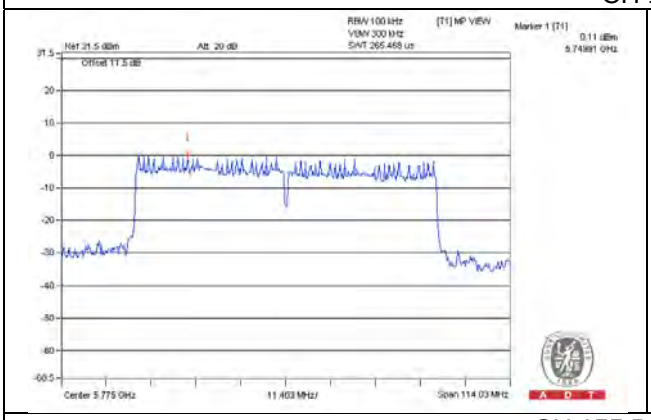
CH 155 Band edge

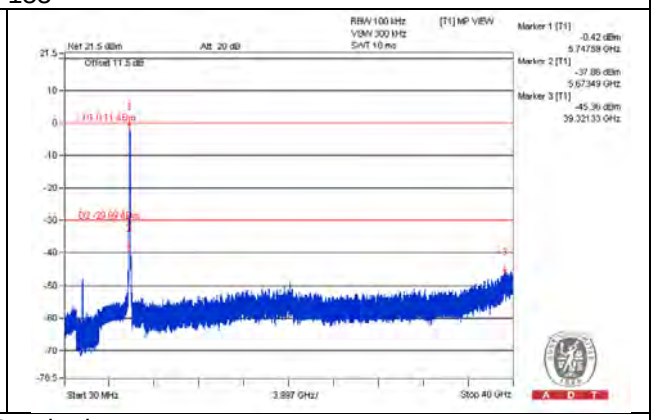




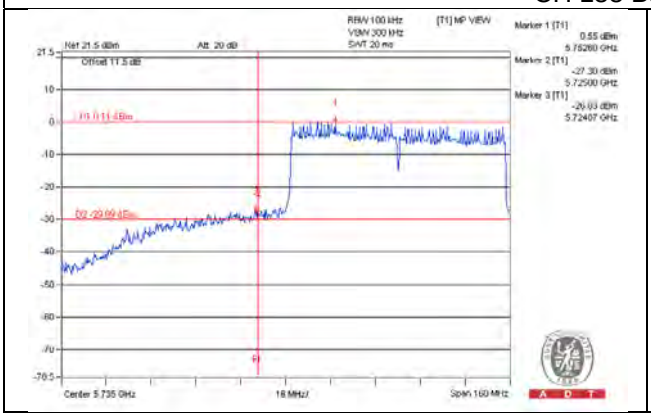
802.11ac (VHT80)_Chain 2

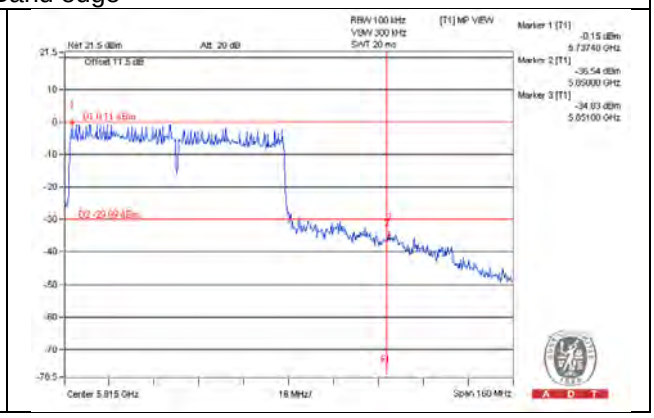
CH 155





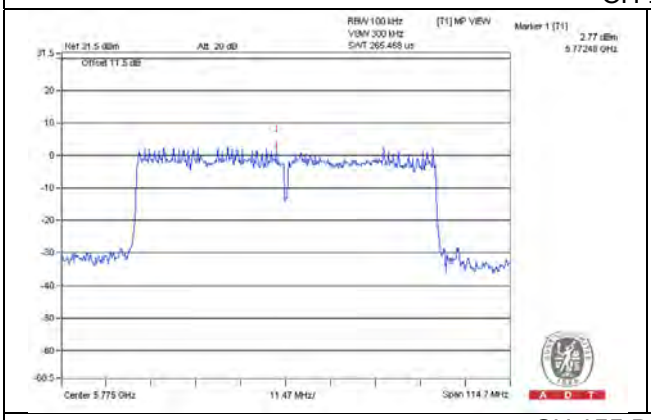
CH 155 Band edge

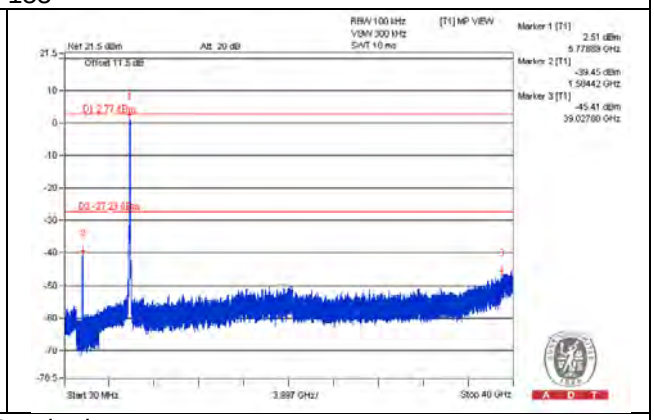




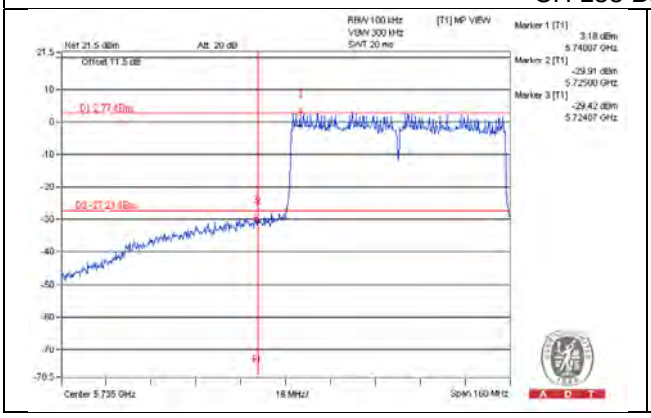
802.11ac (VHT80)_Chain 3

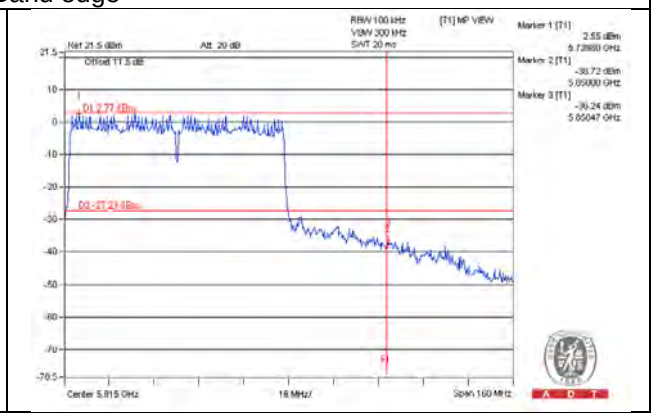
CH 155





CH 155 Band edge

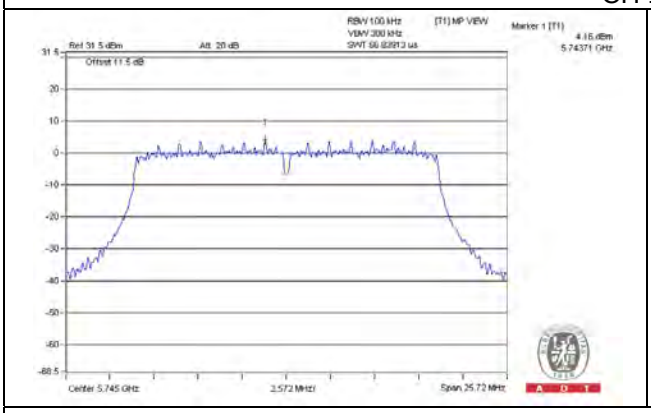


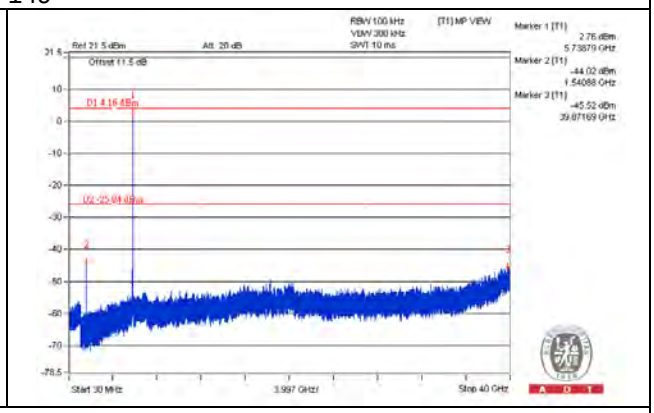


Beamforming on Mode

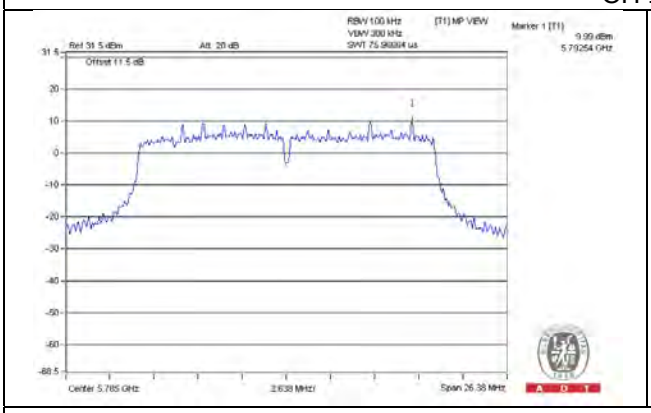
802.11ac (VHT20)_Chain 0

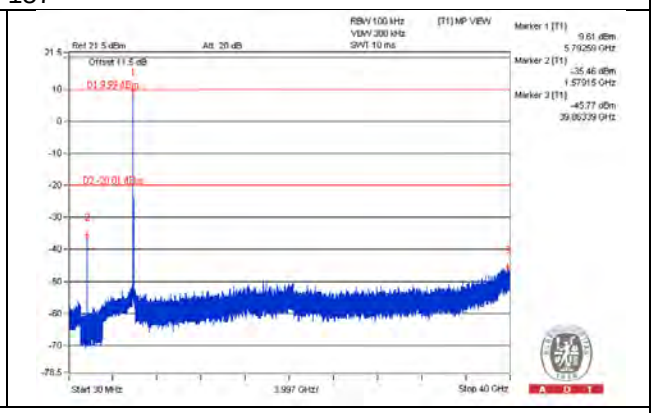
CH 149



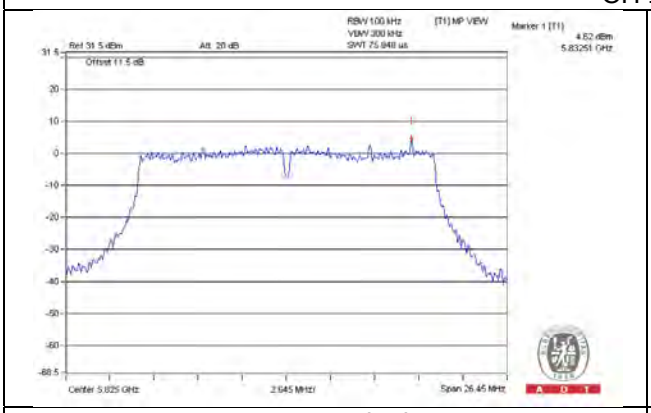


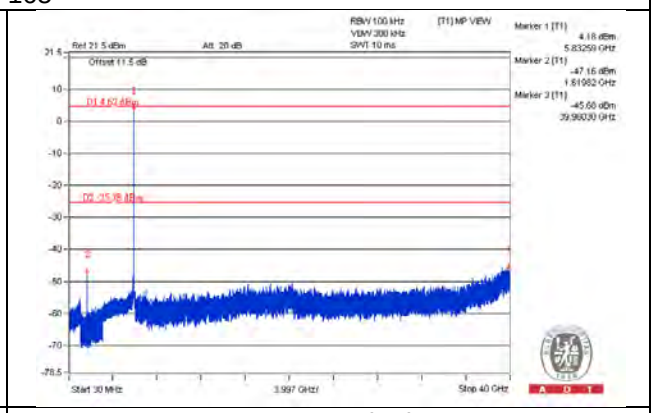
CH 157



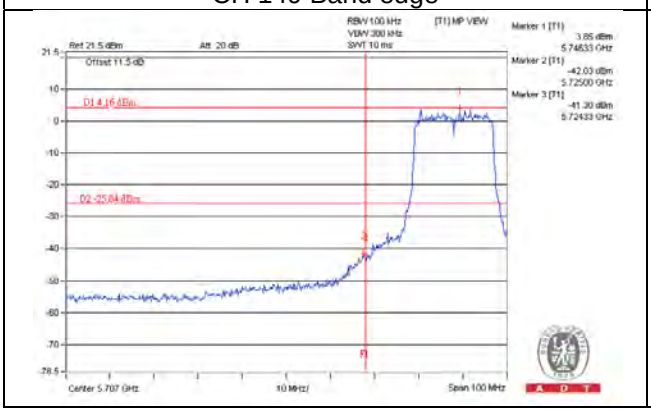


CH 165

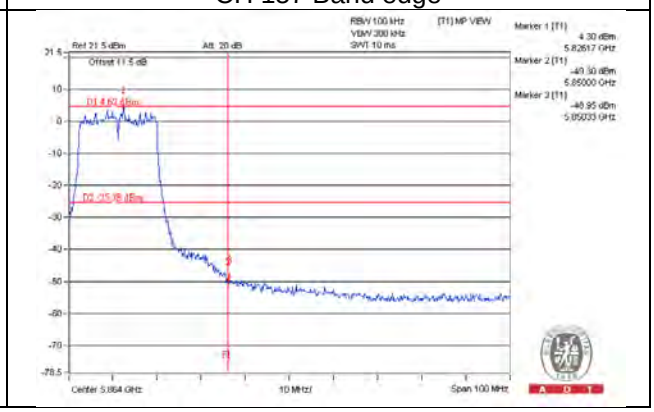




CH 149 Band edge

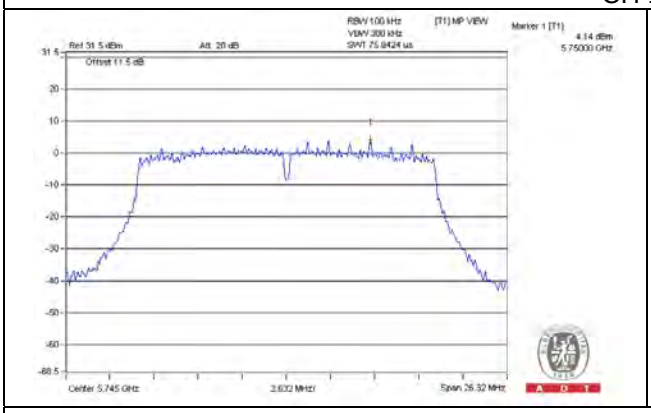


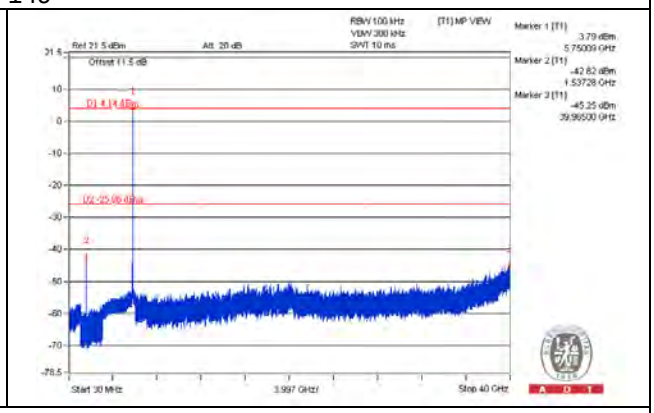
CH 157 Band edge



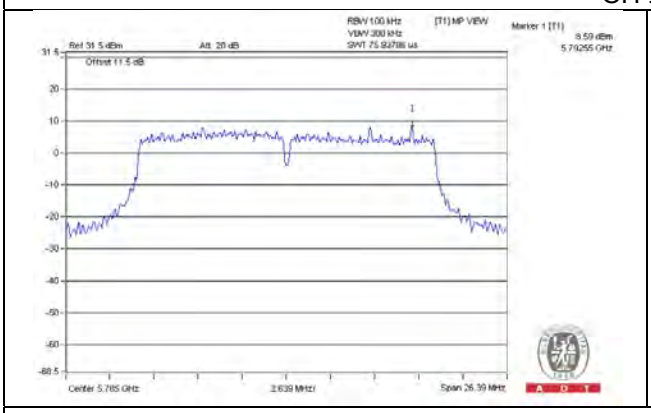
802.11ac (VHT20)_Chain 1

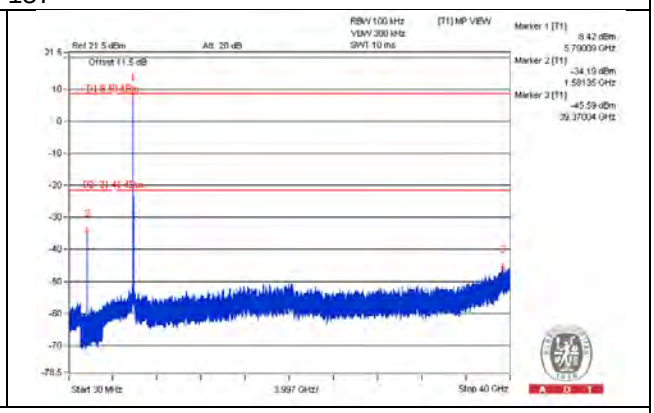
CH 149



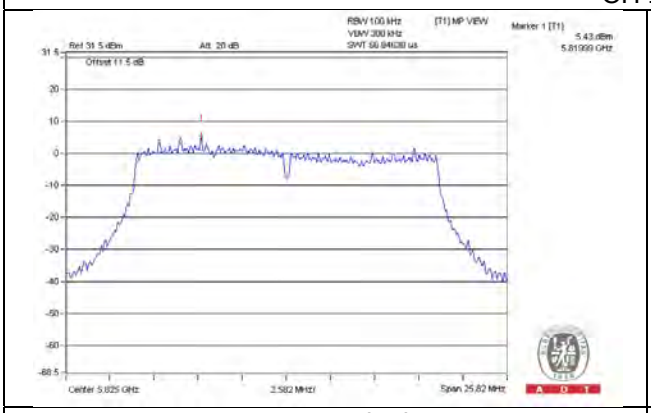


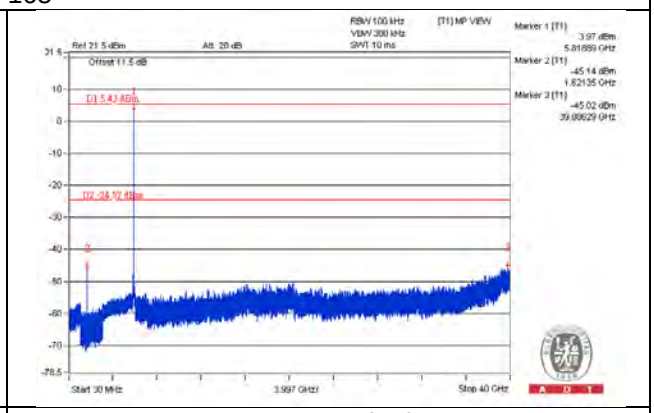
CH 157



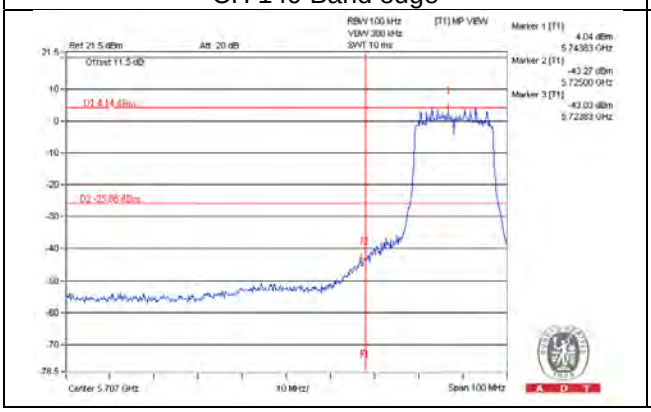


CH 165

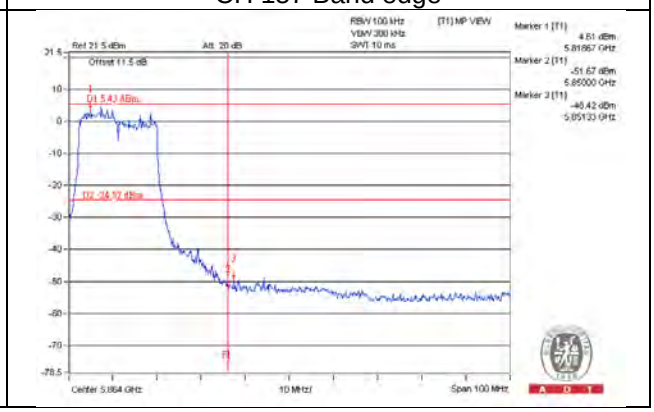




CH 149 Band edge

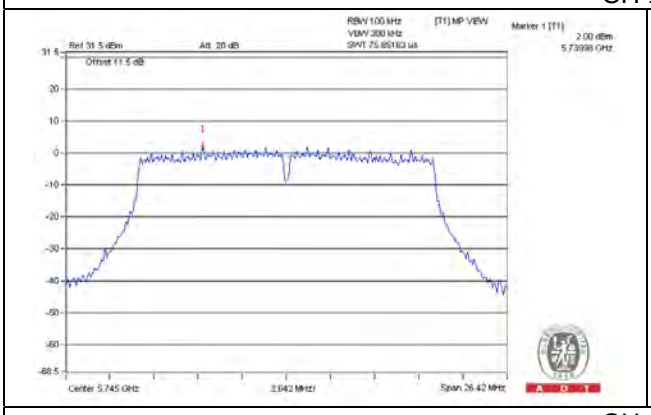


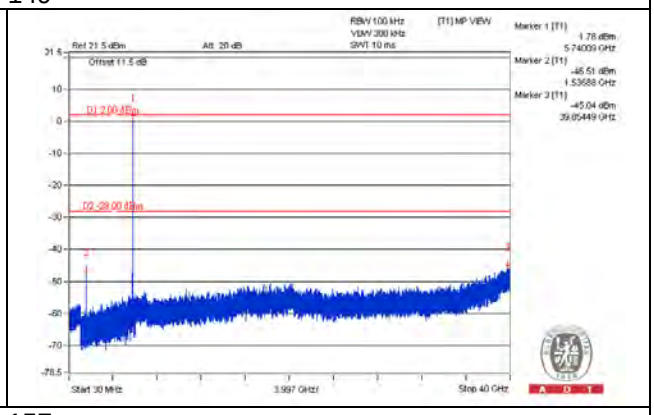
CH 157 Band edge



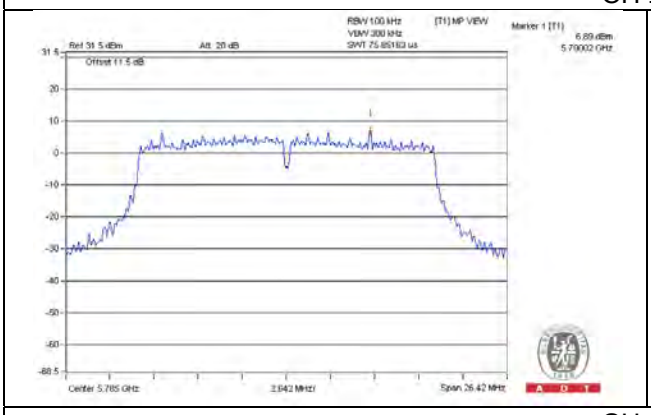
802.11ac (VHT20)_Chain 2

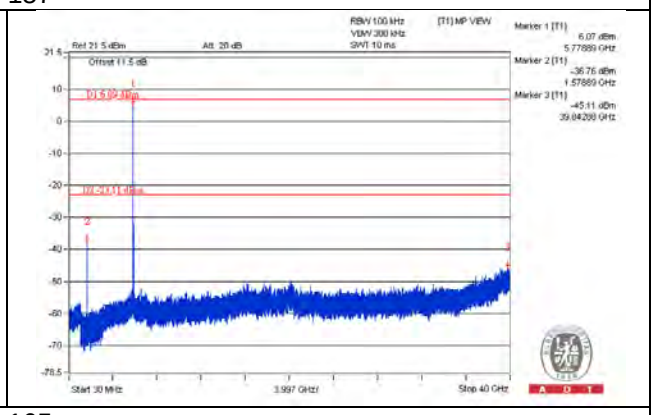
CH 149



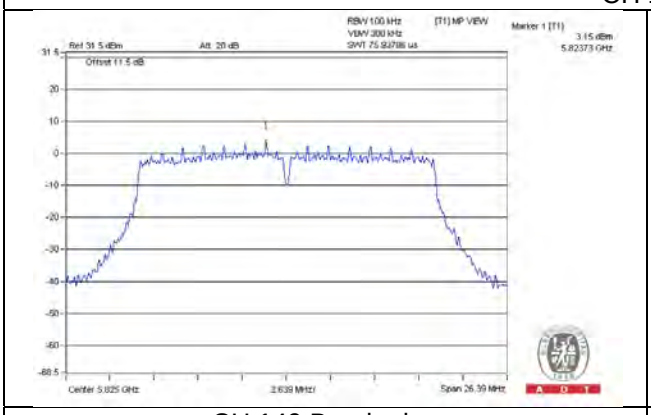


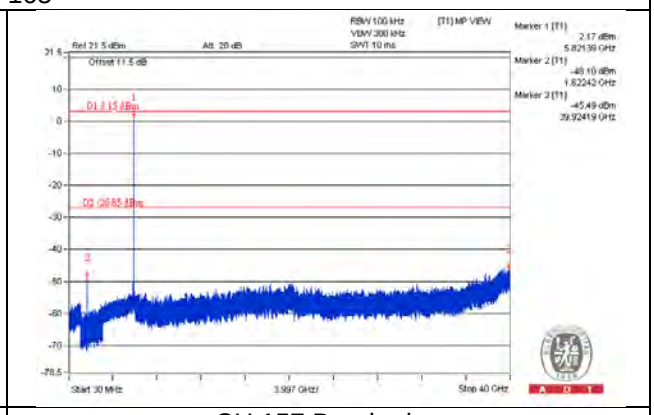
CH 157



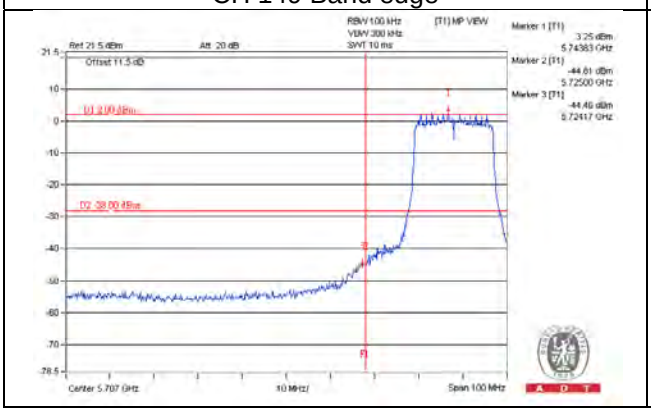


CH 165

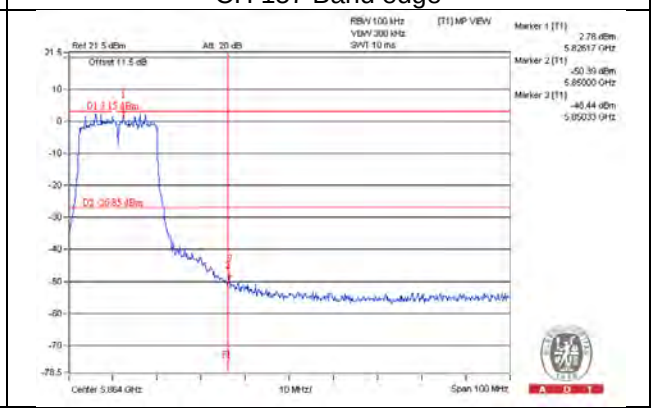




CH 149 Band edge

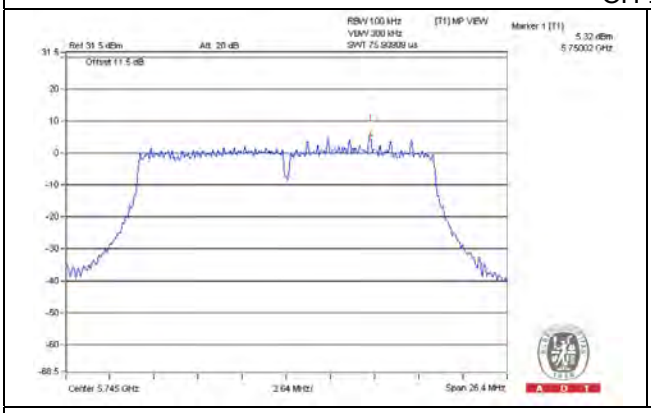


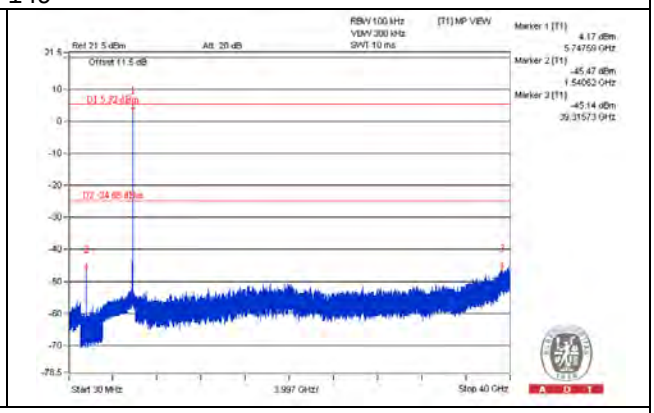
CH 157 Band edge



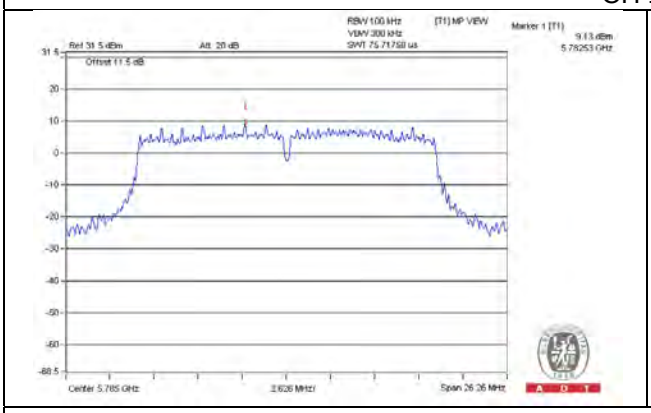
802.11ac (VHT20)_Chain 3

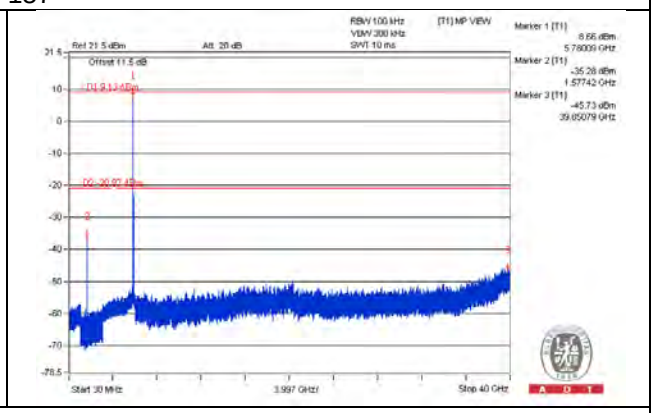
CH 149



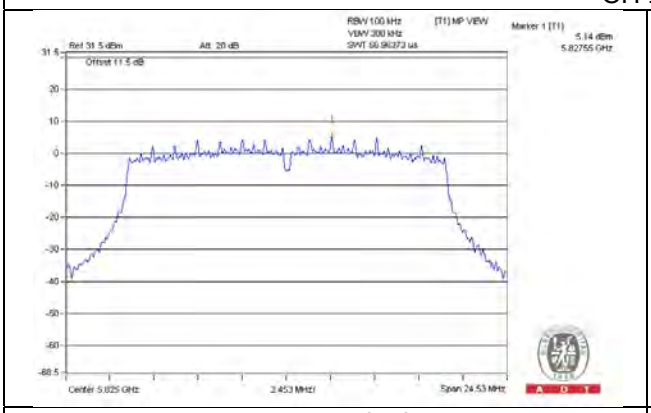


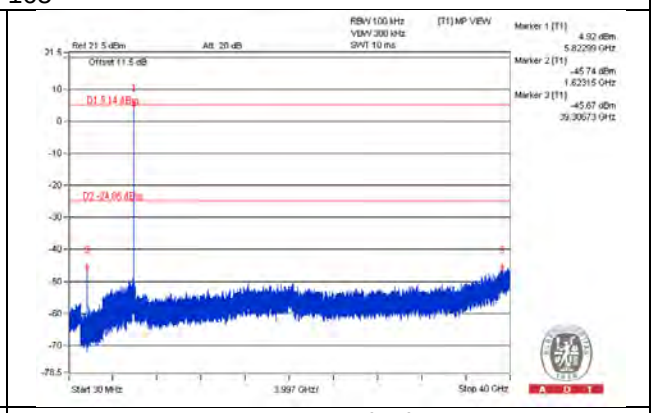
CH 157



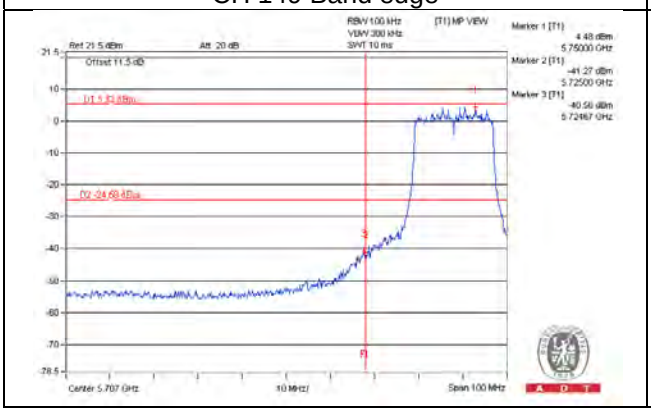


CH 165

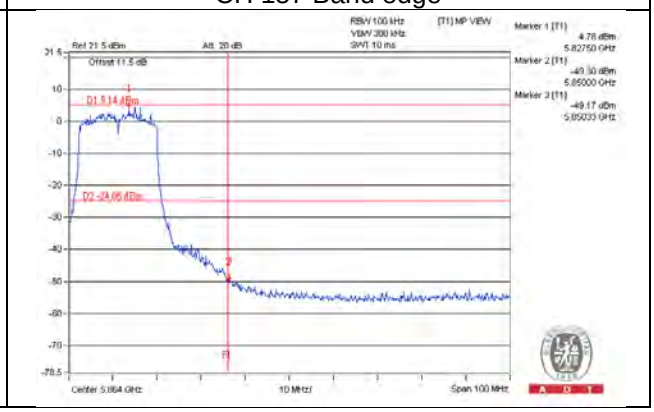




CH 149 Band edge

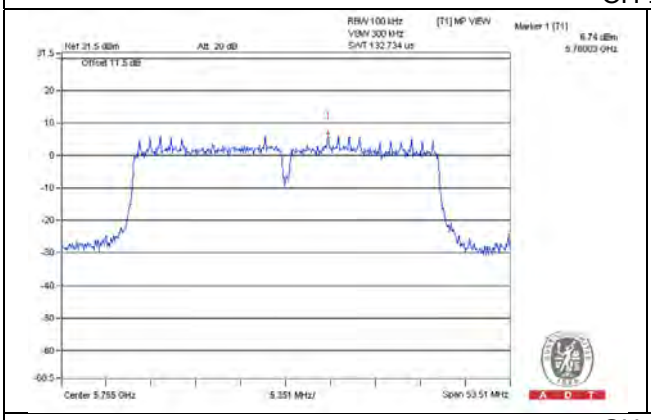


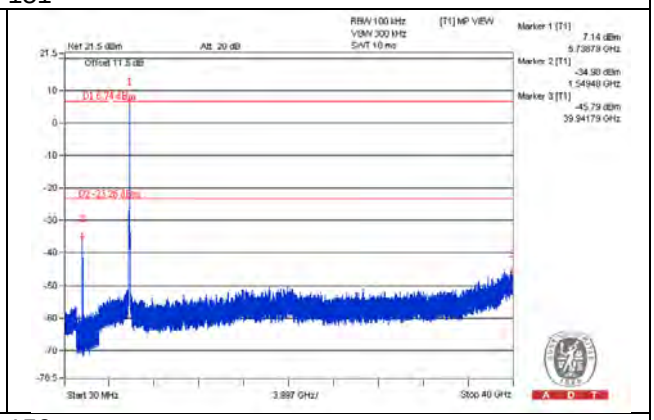
CH 157 Band edge



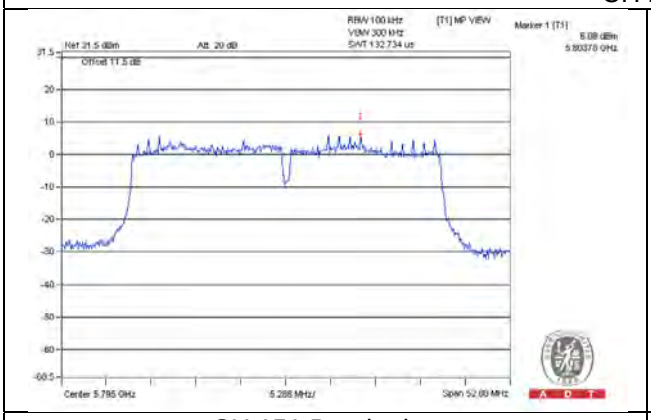
802.11ac (VHT40)_Chain 0

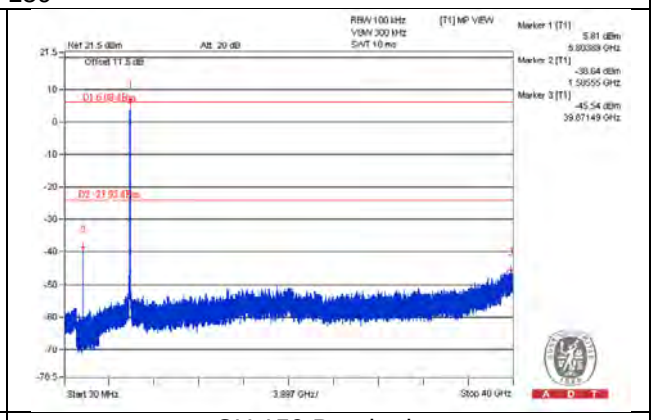
CH 151



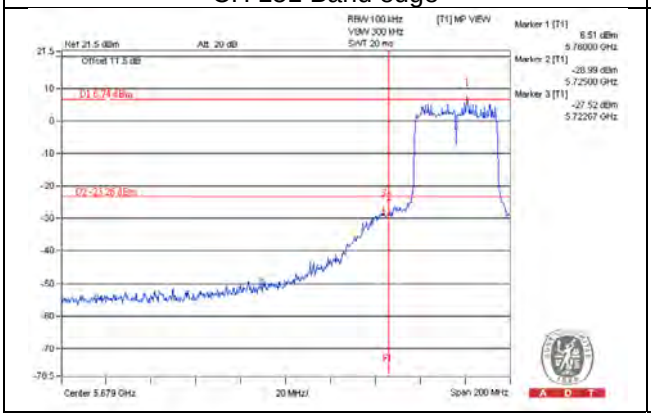


CH 159

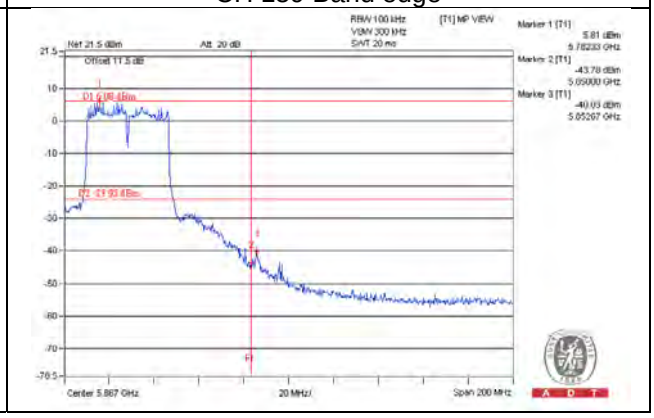




CH 151 Band edge

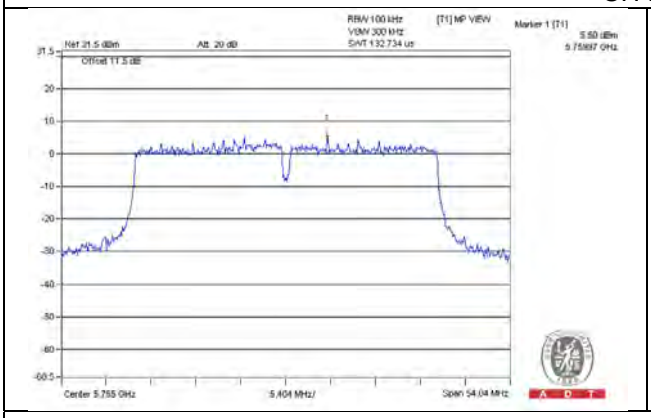


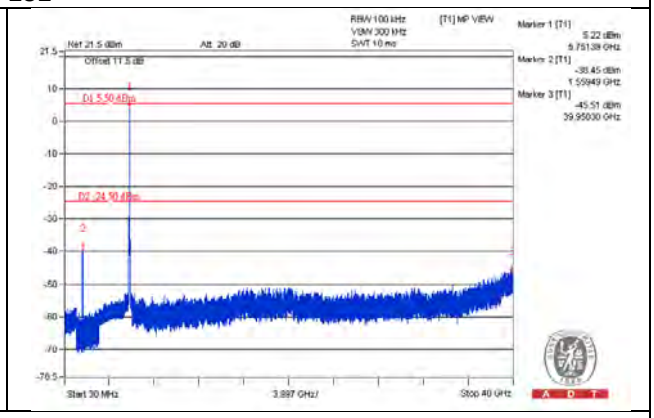
CH 159 Band edge



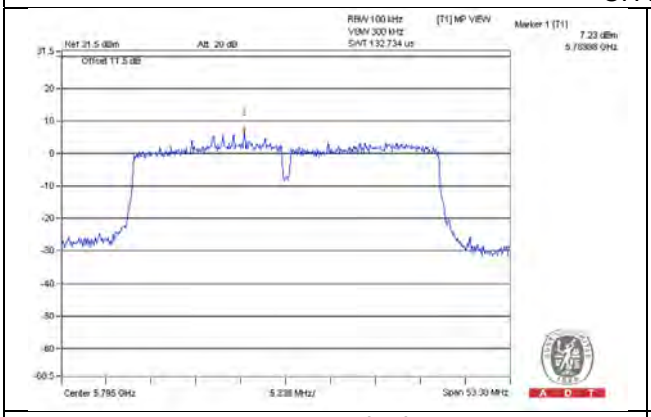
802.11ac (VHT40)_Chain 1

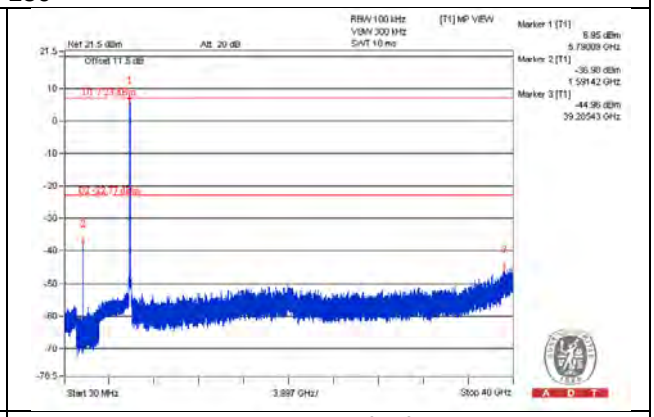
CH 151



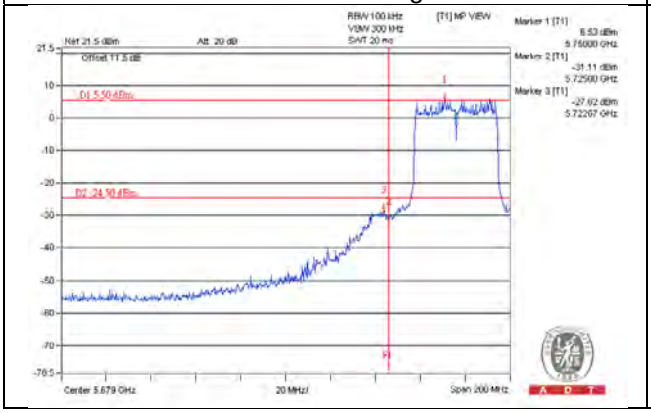


CH 159

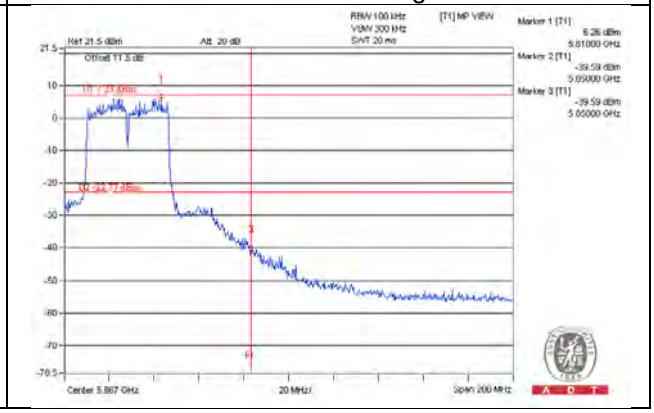




CH 151 Band edge

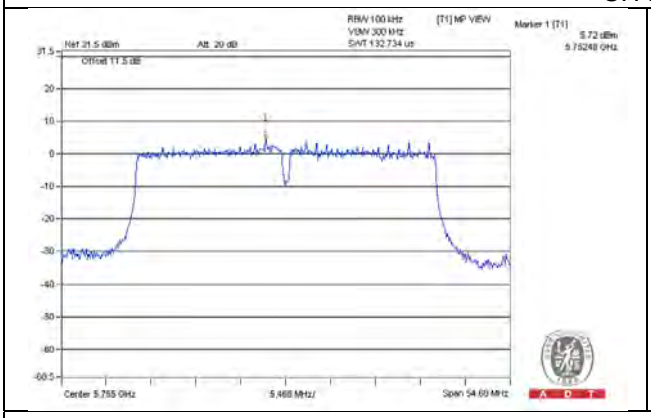


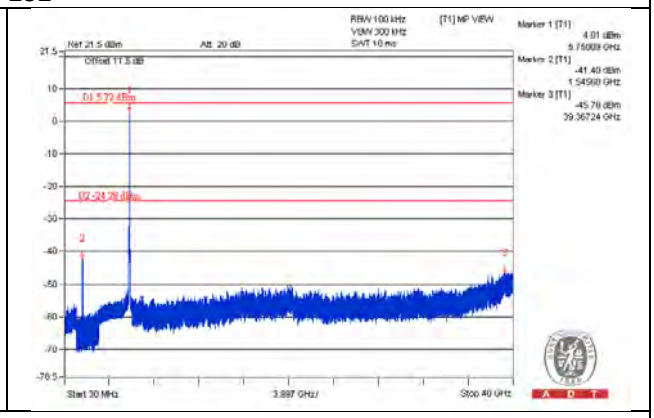
CH 159 Band edge



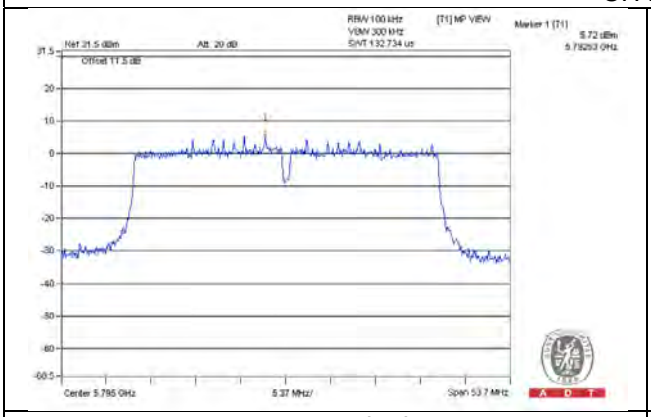
802.11ac (VHT40)_Chain 2

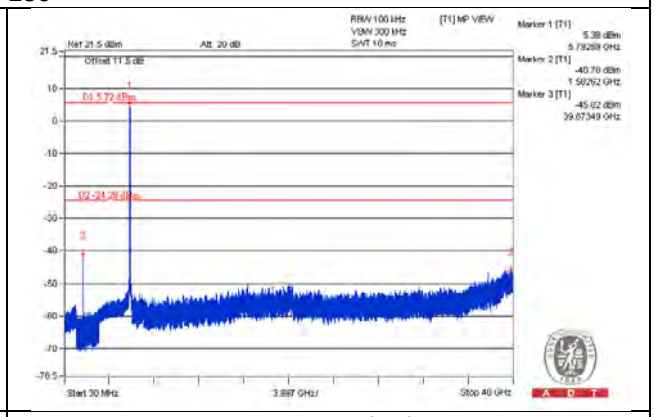
CH 151



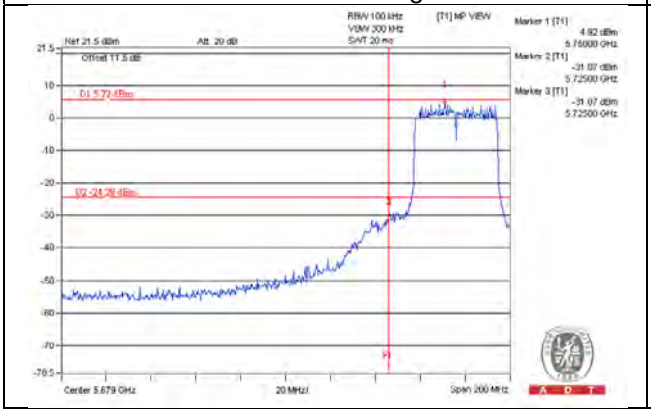


CH 159

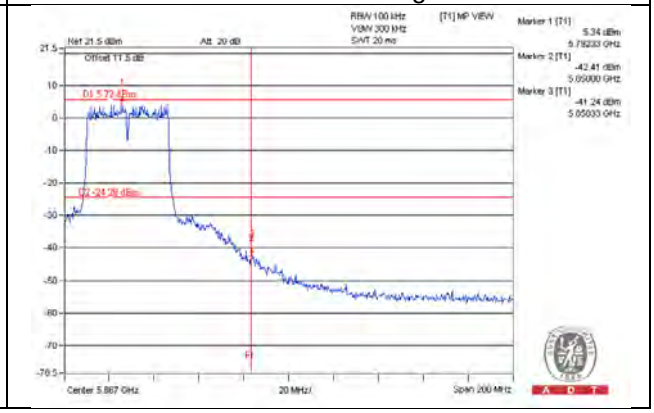




CH 151 Band edge

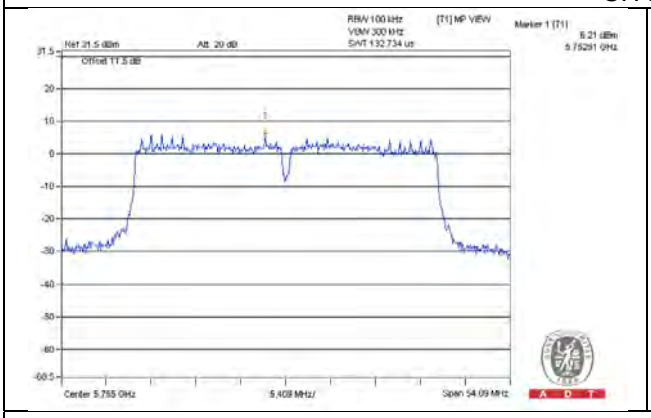


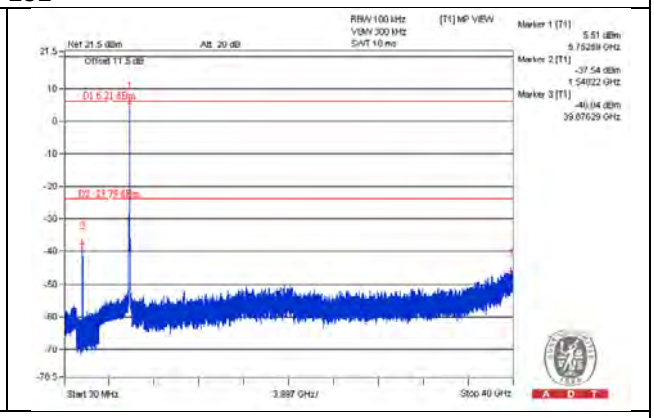
CH 159 Band edge



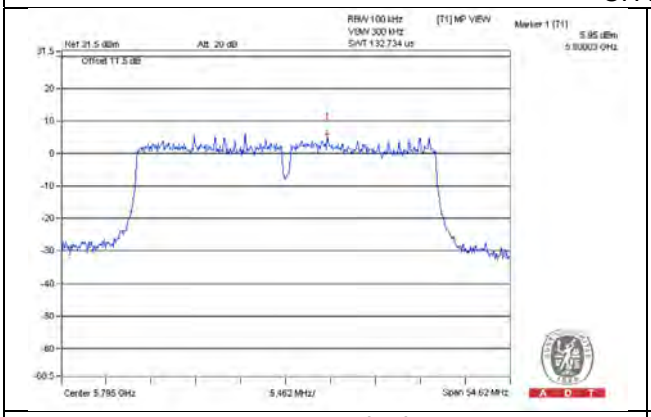
802.11ac (VHT40)_Chain 3

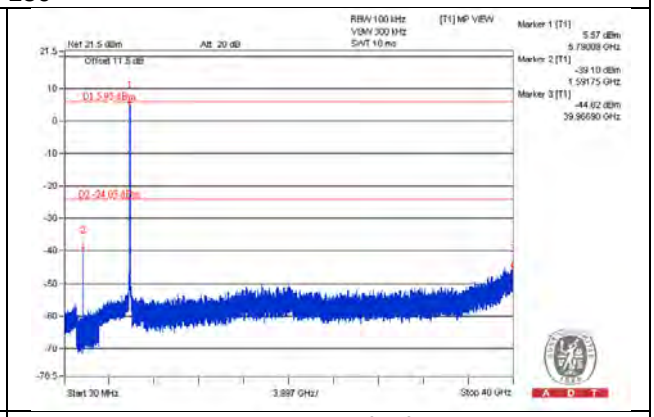
CH 151



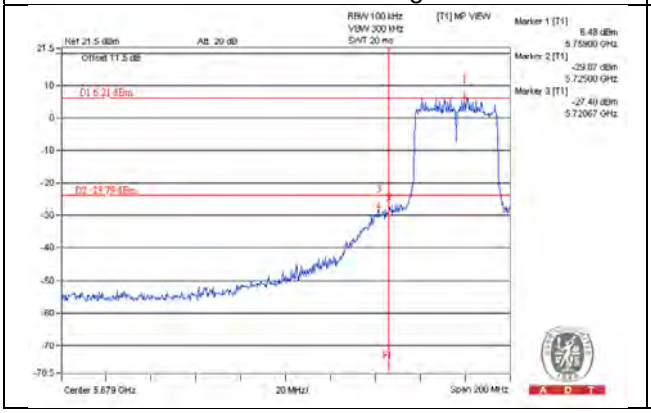


CH 159

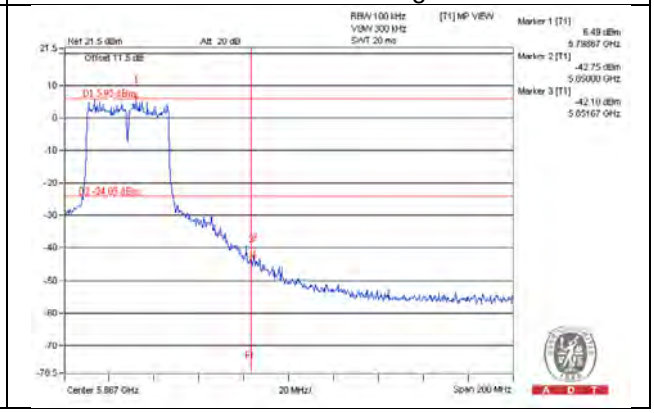




CH 151 Band edge

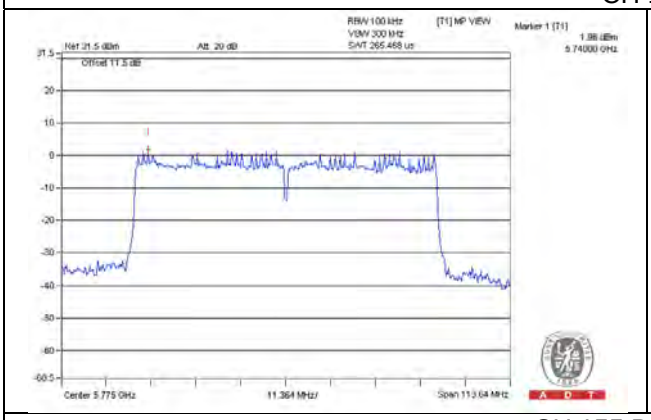


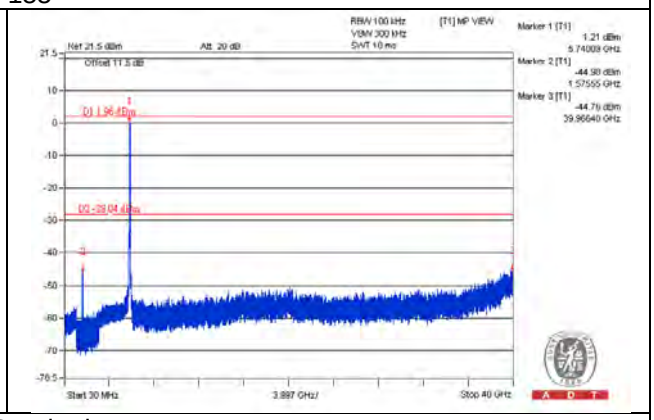
CH 159 Band edge



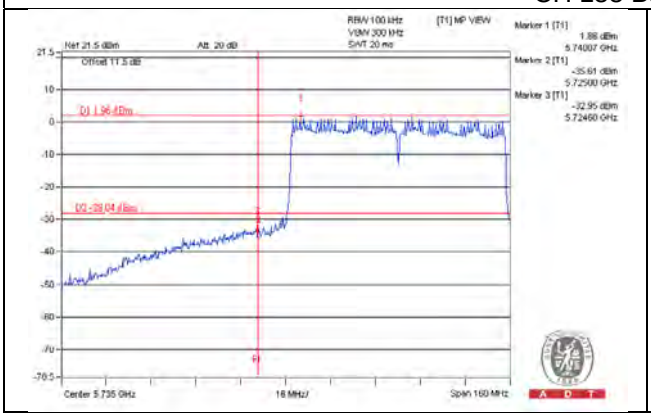
802.11ac (VHT80)_Chain 0

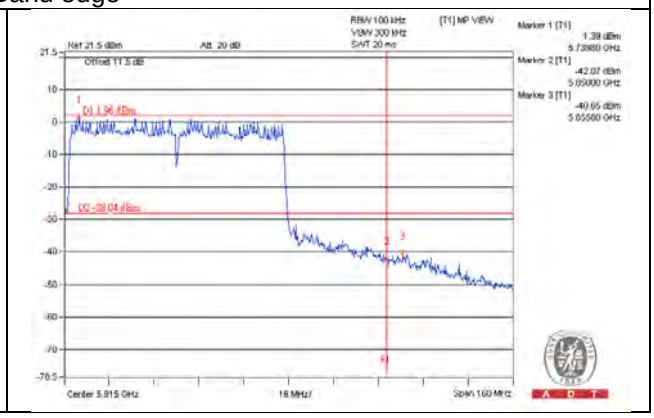
CH 155





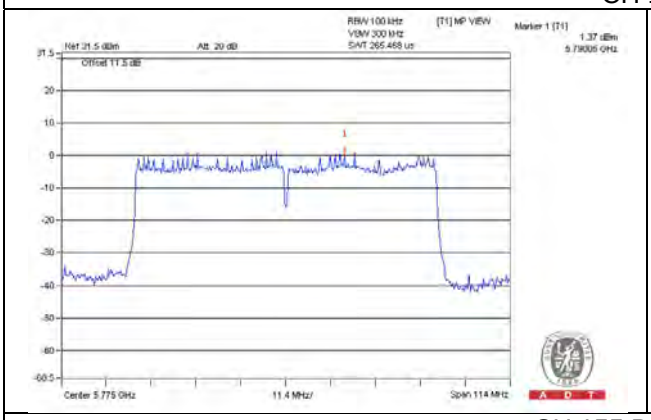
CH 155 Band edge

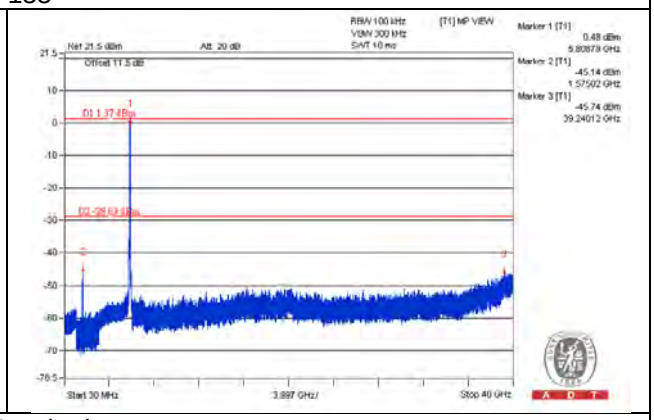




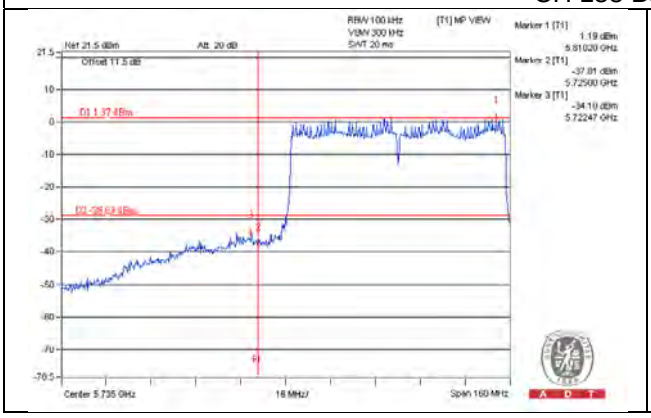
802.11ac (VHT80)_Chain 1

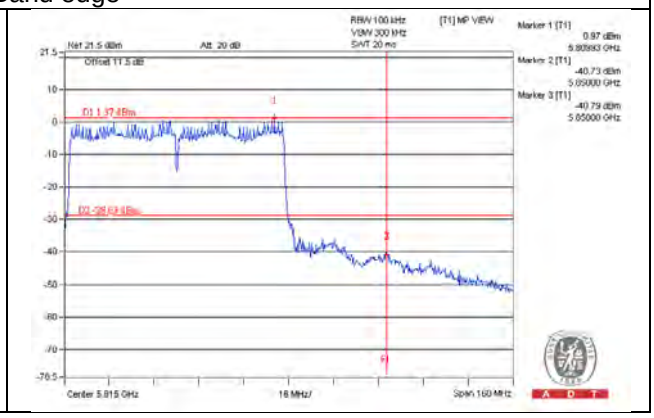
CH 155





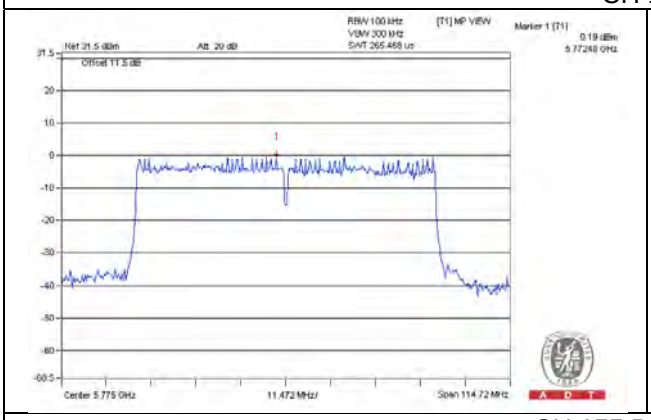
CH 155 Band edge

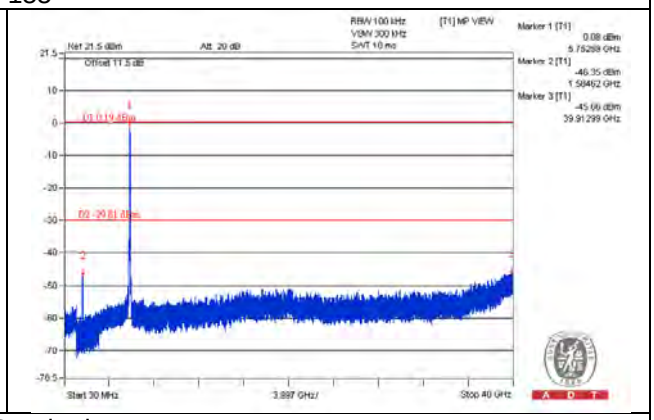




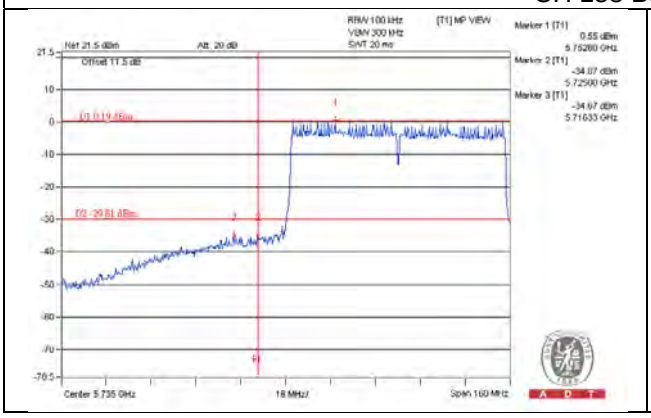
802.11ac (VHT80)_Chain 2

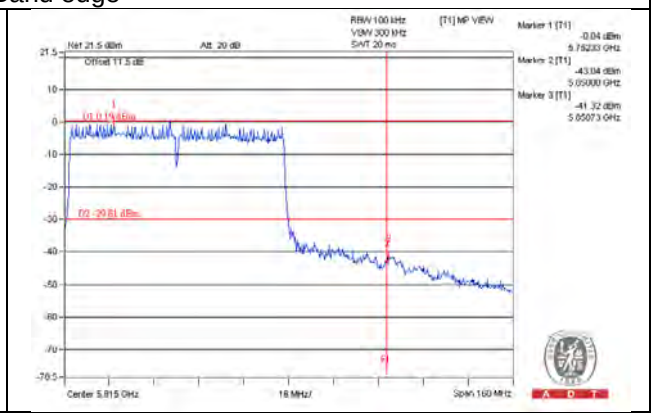
CH 155





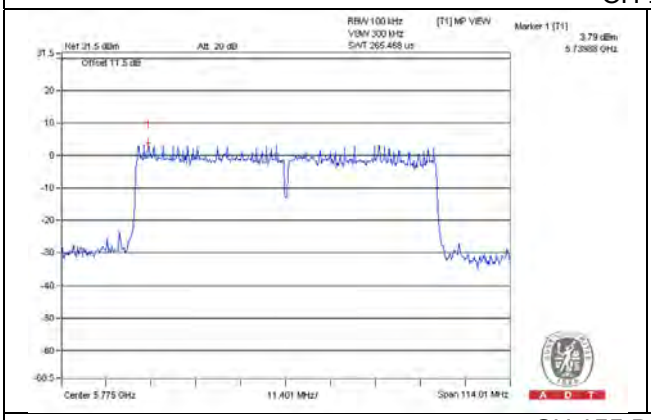
CH 155 Band edge

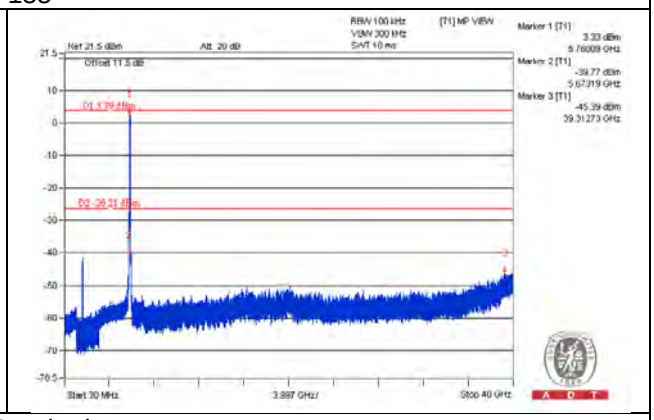




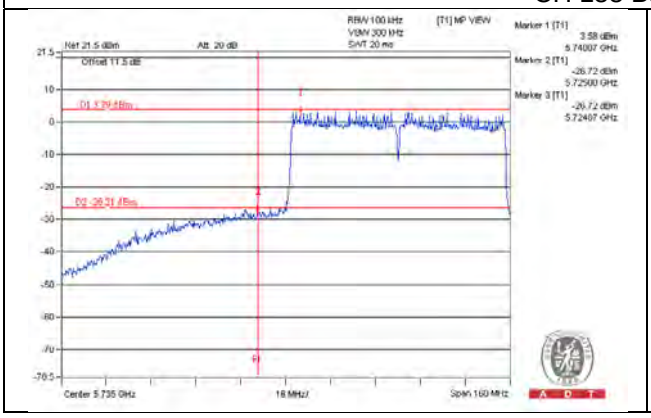
802.11ac (VHT80)_Chain 3

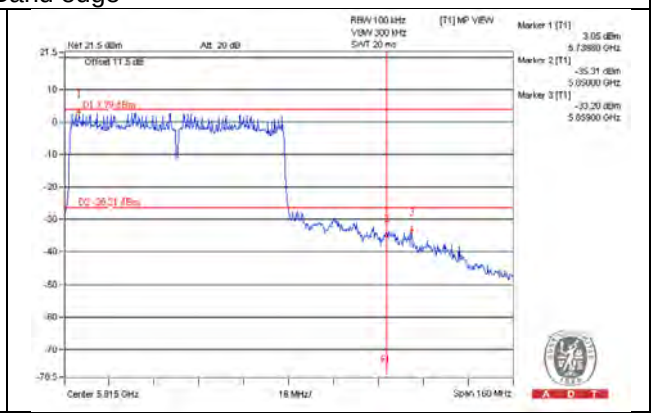
CH 155





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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