FCC Test Report (15.247)

Report No.: RF150325C05

FCC ID: PY315100301

Test Model: R7500v2

Received Date: Mar. 24, 2015

Test Date: Apr. 11 ~ May 12, 2015

Issued Date: May 13, 2015

Applicant: NETGEAR INC.

Address: 350 East Plumeria Drive, San Jose, CA 95134, USA

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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The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies

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Release Control Record

Issue No.	Description	Date Issued
RF150325C05	Original release	May 13, 2015

1 Certificate of Conformity

Product: AC2350 Smart WiFi Router

Brand: NETGEAR

Test Model: R7500v2

Sample Status: Engineering sample

Applicant: NETGEAR INC.

Test Date: Apr. 11 ~ May 12, 2015

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

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

Prepared by : Celine Chou , **Date:** May 13, 2015
Celine Chou / Specialist

Approved by : Ken Liu , **Date:** May 13, 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 -8.12dB at 0.16955MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.2dB at 2483.50MHz.
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	3.59 dB
	200MHz ~1000MHz	3.60 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	AC2350 Smart WiFi Router
Brand	NETGEAR
Test Model	R7500v2
Status of EUT	Engineering sample
Power Supply Rating	12Vdc from adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b:11.0/ 5.5/ 2.0/ 1.0Mbps 802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 600.0Mbps 802.11ac: up to 1733.0Mbps
Operating Frequency	2.4GHz: 2412 ~ 2462MHz 5.0GHz: 5745 ~ 5825MHz
Number of Channel	2.4GHz: 11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (40MHz) 5.0GHz: 5 for 802.11a, 802.11n (20MHz) , 802.11ac (20MHz) 2 for 802.11n (40MHz), 802.11ac (40MHz) 1 for 802.11ac (80MHz)
Output Power	CDD Mode: 978.285mW for 2412 ~ 2462MHz 989.624mW for 5745 ~ 5825MHz Beamforming_NSS1 Mode: 696.295mW for 5745 ~ 5825MHz Beamforming_NSS2 Mode: 998.440mW for 5745 ~ 5825MHz
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter
Data Cable Supplied	1.45m 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	Beamforming Mode	TX Function
2.4GHz	802.11b	Not Support	3TX
	802.11g	Not Support	3TX
	802.11n (20MHz)	Not Support	3TX
	802.11n (40MHz)	Not Support	3TX
5GHz	802.11a	Not Support	4TX
	802.11n (20MHz)	Support	4TX
	802.11n (40MHz)	Support	4TX
	802.11ac (80MHz)	Support	4TX

* For 2.4GHz Band and 802.11a, 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 V20MHz / V40MHz, therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)
* For 5GHz band 802.11n and 802.11ac, after pre-tested two modes (with beamforming mode Nss=1 / 2 and without beamforming mode) found without beamforming mode was the worst, therefore chosen for final test for radiated emission and power line conducted emission test and presented in the test report.

2. The EUT uses following antennas.

Ant. Type	Connecter Type	Antenna Gain (dBi)				
		2412MHz	2422MHz	2437MHz	2452MHz	2462MHz
Dipole	RSMA	0.21	0.41	0.41	0.21	0.11
		5180MHz	5190MHz	5200MHz	5210MHz	5230MHz
		0.61	0.71	0.71	0.81	0.91
		5240MHz	5745MHz	5755MHz	5775MHz	5785MHz
		0.91	1.61	1.51	1.51	1.51
		5795MHz	5825MHz			
		1.61	1.61			

3. The EUT consumes power from the following adapters.

Adapter 1	
Brand	NETGEAR
Model	MU42-3120350-A1
Part No.	332-10762-01 (LEI)
Input Power	100-240Vac, 50/60Hz, 1.5A
Output Power	12Vdc, 3.5A
Power Line	1.8m cable without core attached on adapter

Adapter 2	
Brand	NETGEAR
Model	2ABN042F NA
Part No.	332-10761-01 (CWT)
Input Power	100-240Vac, 50/60Hz, 1.3A
Output Power	12Vdc, 3.5A
Power Line	1.85m cable without core attached on adapter

3.2 Description of Test Modes

For 2.4GHz:

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

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

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

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

For 5.0GHz (5745 ~ 5825MHz):

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

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

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

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

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

Channel	Frequency
155	5775MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

FOR 2.4GHz:

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
A	√	√	√	√	Adapter 1
B	-	√	√	-	Adapter 2

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

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

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

Radiated Emission Test (Above 1GHz):

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

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

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

Radiated Emission Test (Below 1GHz):

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

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

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

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	26deg. C, 63%RH	120Vac, 60Hz	Alan Wu
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Chris Lin
PLC	18deg. C, 70%RH	120Vac, 60Hz	Nick Hsu
APCM	25deg. C, 60%RH	120Vac, 60Hz	Nick Hsu

FOR 5.0GHz:

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
A	√	√	√	√	Adapter 1
B	-	√	√	-	Adapter 2

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)
A	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
A	802.11n (20MHz)	149 to 165	149, 157, 165	OFDM	BPSK	7.2
A	802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	15.0
A	802.11ac (80MHz)	155	155	OFDM	BPSK	130.0

Radiated Emission Test (Below 1GHz):

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

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A, B	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)
A, B	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)
A	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
A	802.11n (20MHz)	149 to 165	149, 157, 165	OFDM	BPSK	7.2
A	802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	15.0
A	802.11ac (80MHz)	155	155	OFDM	BPSK	130.0

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	26deg. C, 63%RH	120Vac, 60Hz	Alan Wu
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Chris Lin
PLC	18deg. C, 70%RH	120Vac, 60Hz	Nick Hsu
APCM	25deg. C, 60%RH	120Vac, 60Hz	Nick Hsu

3.3 Duty Cycle of Test Signal

2.4GHz Band:

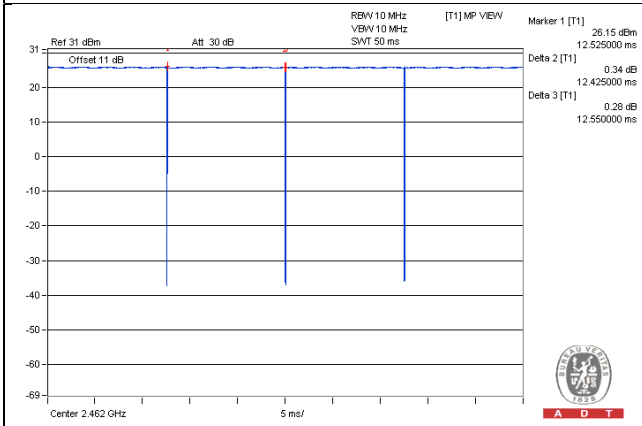
802.11b, 802.11n (20MHz): Duty cycle of test signal is > 98 %, duty factor is not required.

802.11g, 802.11n (40MHz): Duty cycle is < 98%, duty factor shall be considered.

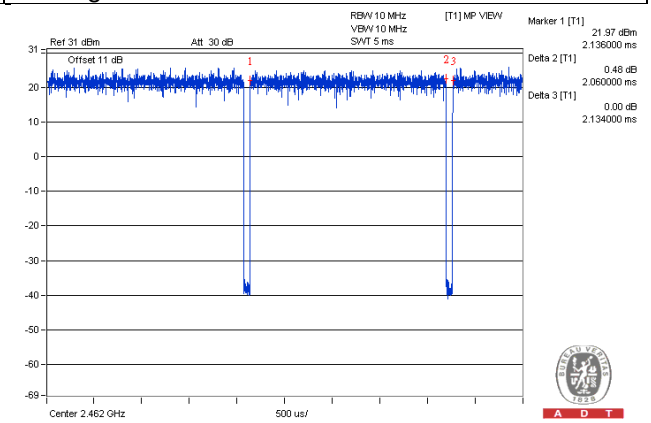
802.11g: Duty cycle = 2.060/2.134 = 0.965, Duty factor = 10 * log(1/0.965) = 0.15

802.11n (40MHz): Duty cycle = 2.426/2.504 = 0.969, Duty factor = 10 * log(1/0.969) = 0.14

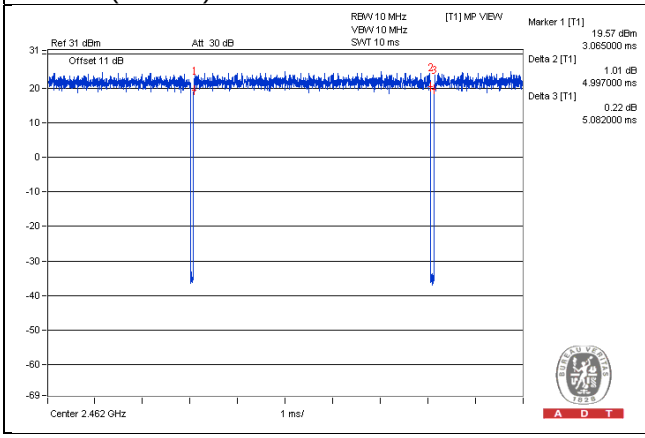
802.11b



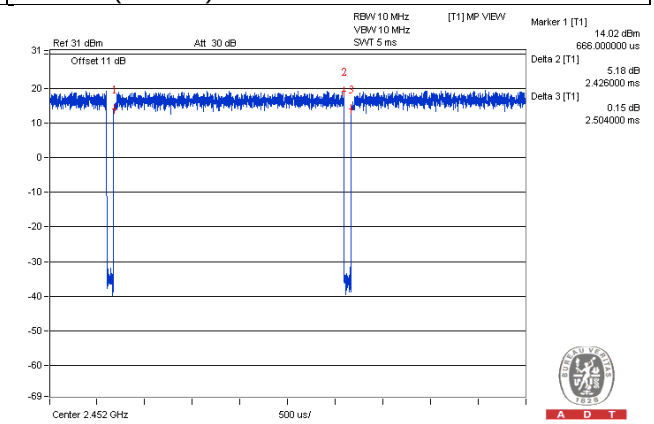
802.11g



802.11n (20MHz)



802.11n (40MHz)

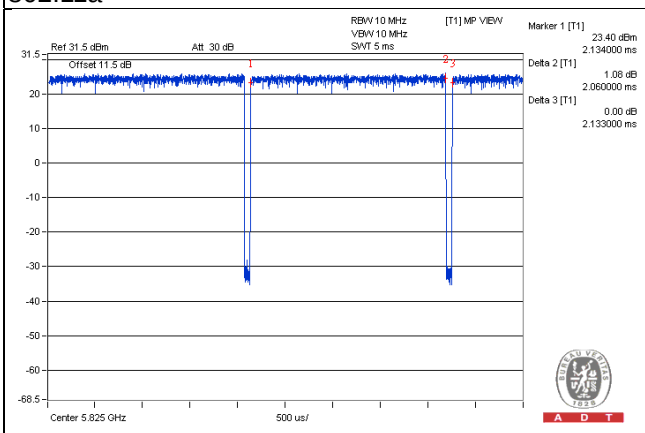


5GHz Band:

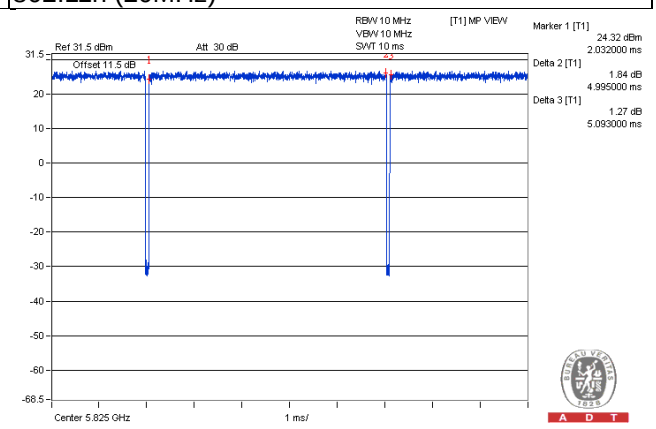
CDD Mode

802.11n (20MHz): Duty cycle of test signal is > 98 %, duty factor is not required.
802.11a, 802.11n (40MHz), 802.11ac (80MHz):Duty cycle is < 98%, duty factor shall be considered.
802.11a: Duty cycle = 2.060/2.133 = 0.966, Duty factor = 10 * log(1/0.966) = 0.15
802.11n (40MHz): Duty cycle = 2.433/2.507 = 0.970, Duty factor = 10 * log(1/0.970) = 0.13
802.11ac (80MHz): Duty cycle = 1.142/1.217 = 0.938, Duty factor = 10 * log(1/0.938) = 0.28

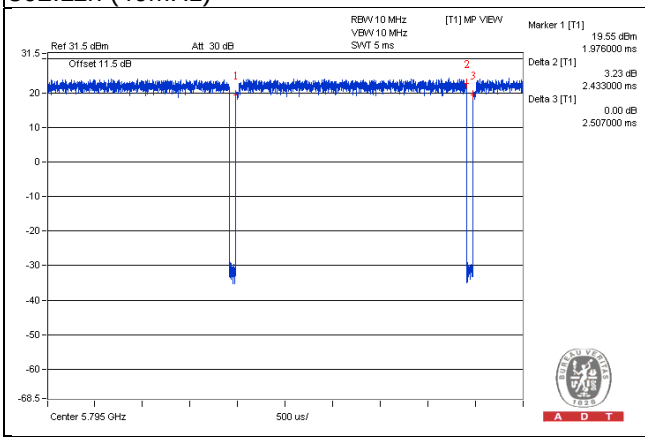
802.11a



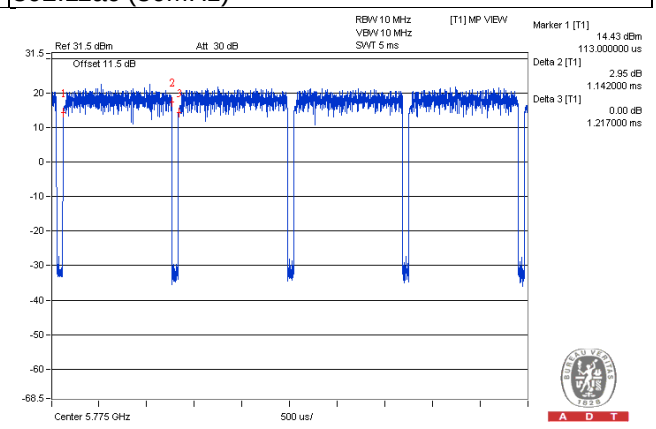
802.11n (20MHz)



802.11n (40MHz)



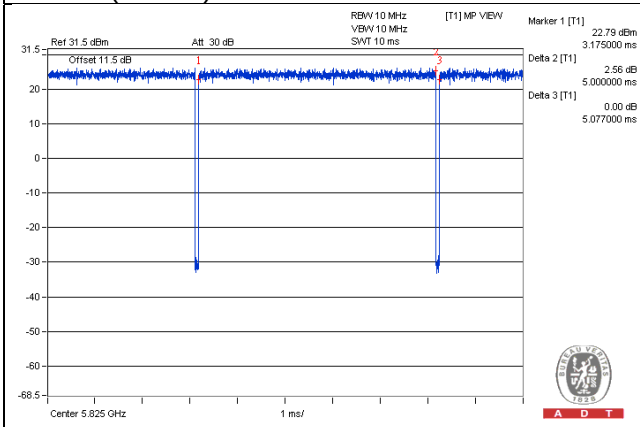
802.11ac (80MHz)



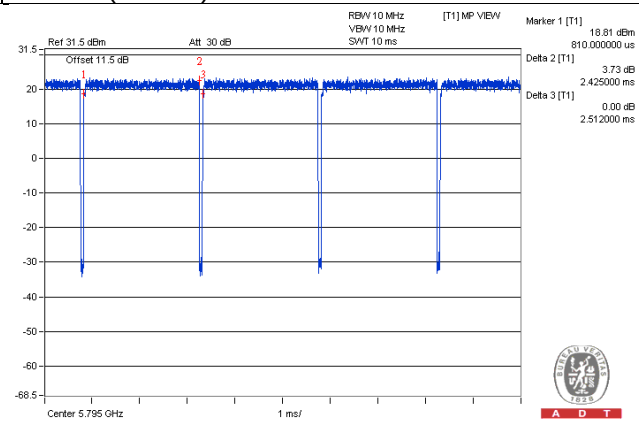
Beamforming_NSS1 Mode

802.11n (20MHz): Duty cycle of test signal is > 98 %, duty factor is not required.
802.11n (40MHz), 802.11ac (80MHz):Duty cycle is < 98%, duty factor shall be considered.
802.11n (40MHz): Duty cycle = 2.425/2.512 = 0.965, Duty factor = 10 * log(1/0.965) = 0.15
802.11ac (80MHz): Duty cycle = 1.142/1.217 = 0.938, Duty factor = 10 * log(1/0.938) = 0.28

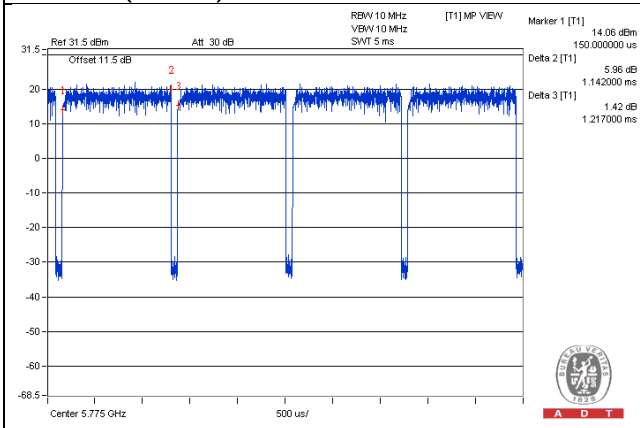
802.11n (20MHz)



802.11n (40MHz)



802.11ac (80MHz)



Beamforming_NSS2 Mode

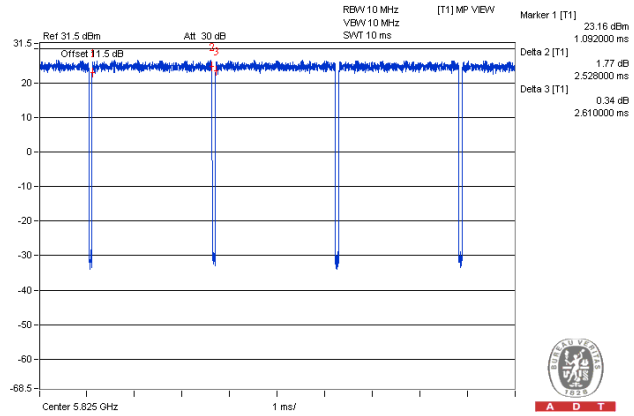
Duty cycle is < 98%, duty factor shall be considered.

802.11n (20MHz): Duty cycle = 2.528/2.610 = 0.969, Duty factor = 10 * log(1/0.969) = 0.14

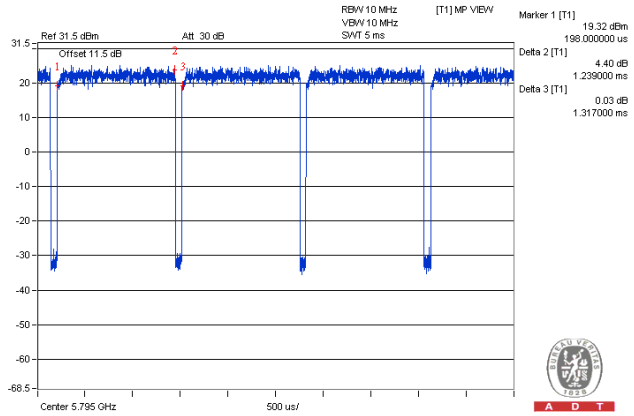
802.11n (40MHz): Duty cycle = 1.239/1.317 = 0.941, Duty factor = 10 * log(1/0.941) = 0.27

802.11ac (80MHz): Duty cycle = 0.595/0.668 = 0.891, Duty factor = 10 * log(1/0.891) = 0.50

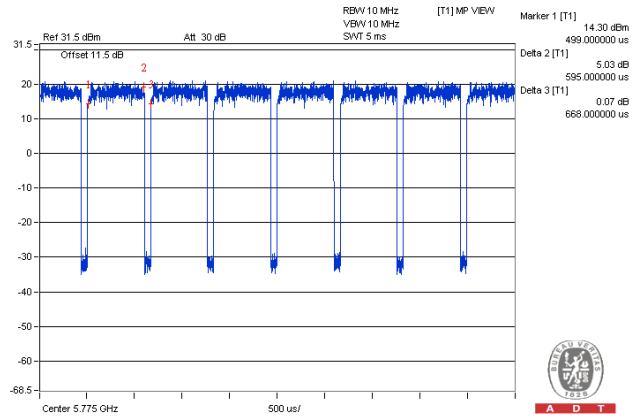
802.11n (20MHz)



802.11n (40MHz)



802.11ac (80MHz)



3.4 Description of Support Units

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

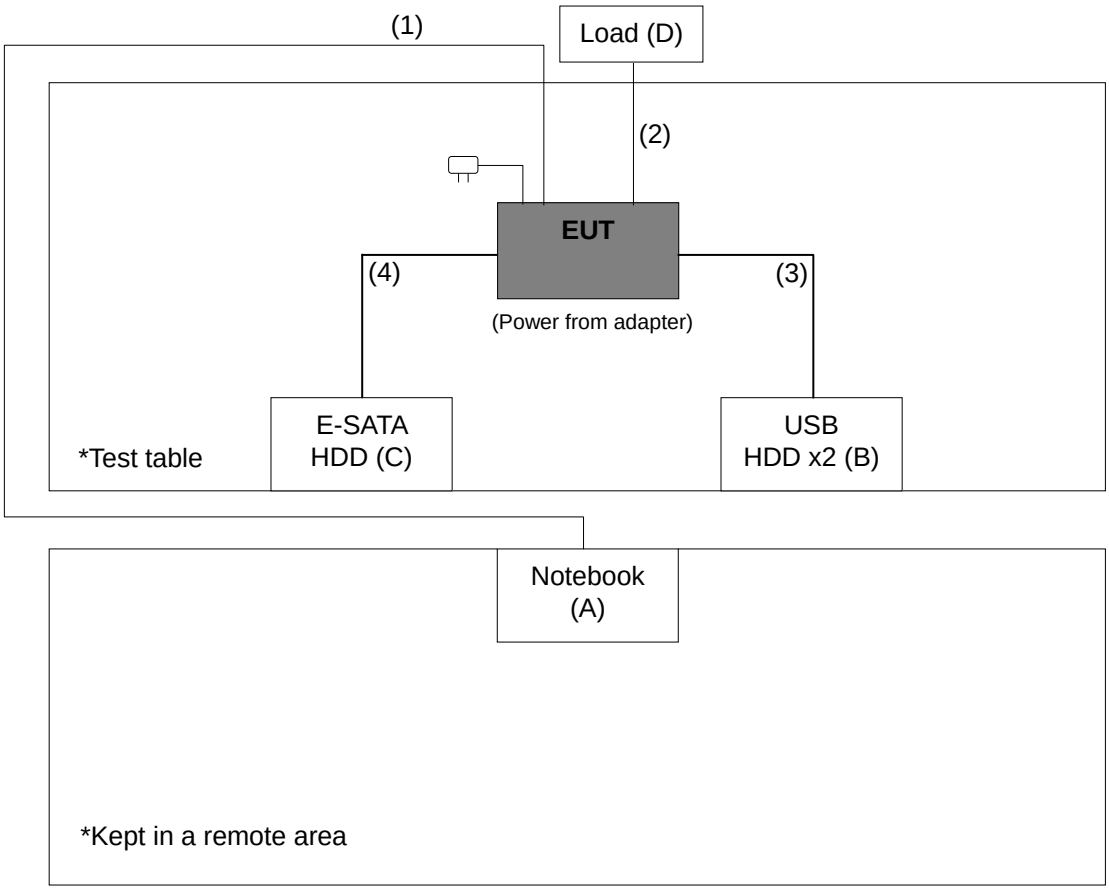
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	SONY	SVS151A12P	275548477000805	FCC DoC Approved	-
B.	USB HDD x 2	WD	WDBACY5000ABL -01	WX51C1245403	FCC DoC Approved	-
		WD	WDBACY5000ABL	WX41A81P8576	FCC DoC Approved	-
C.	E-SATA HDD	Sarotech	FHD-354	NA	FCC DoC Approved	-
D.	Load	PHILIPS	SBC HL150	NA	NA	-

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ 45	1	3	N	0	-
2.	RJ 45	4	1.8	N	0	-
3.	USB	2	1.8	Y	0	-
4.	E-SATA	1	0.5	Y	0	-

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards

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

FCC Part 15, Subpart C (15.247)
558074 D01 DTS Meas Guidance v03r02
662911 D01 Multiple Transmitter Output v02r01

ANSI C63.10-2009

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

Note: The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

4 Test Types and Results (For 2.4GHz Band)

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 30dB below the highest level of the desired power:

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

Note:

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

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Oct. 06, 2014	Oct. 05, 2015
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Jul. 25, 2014	Jul. 24, 2015
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Feb. 06, 2015	Feb. 05, 2016
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-1170	Feb. 05, 2015	Feb. 04, 2016
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Feb. 09, 2015	Feb. 08, 2016
Preamplifier Agilent	8449B	3008A01960	Aug. 09, 2014	Aug. 08, 2015
Preamplifier Agilent	8447D	2944A10631	Aug. 09, 2014	Aug. 08, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309220/4	Aug. 09, 2014	Aug. 08, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250724/4	Aug. 09, 2014	Aug. 08, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295012/4	Aug. 09, 2014	Aug. 08, 2015
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021703	NA	NA
Turn Table BV ADT	TT100.	TT93021703	NA	NA
Turn Table Controller BV ADT	SC100.	SC93021703	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 18, 2014	Oct. 17, 2015
High Speed Peak Power Meter	ML2495A	0824011	Jul. 26, 2014	Jul. 25, 2015
Power Sensor	MA2411B	0738171	Jul. 26, 2014	Jul. 25, 2015

Note:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 4.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 460141.
5. The IC Site Registration No. is IC7450F-4.

4.1.3 Test Procedures

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

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

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

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

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

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

Note:

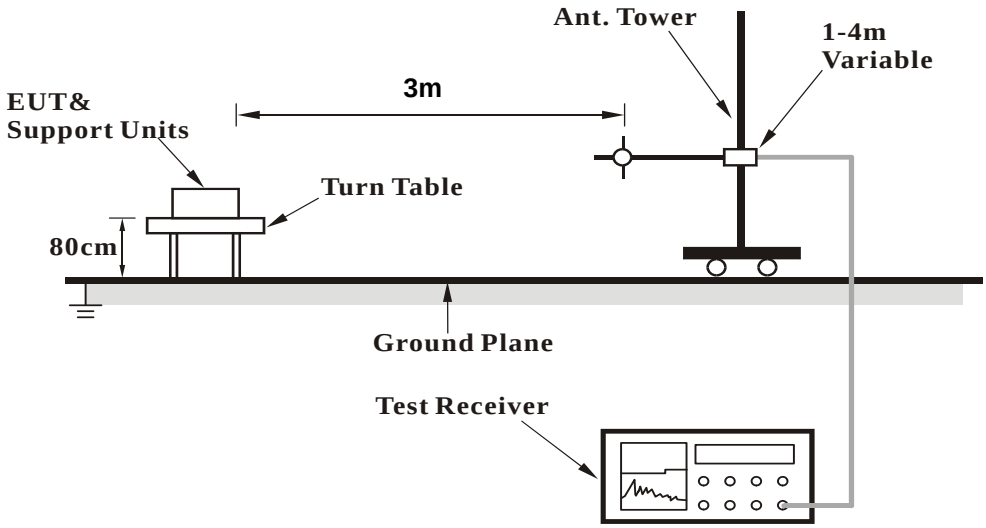
1. For emission measurements above 1 GHz, the EUT shall be placed at a height of 1.5 m above the ground at 3 meter chamber room for test
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
3. The resolution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

4.1.4 Deviation from Test Standard

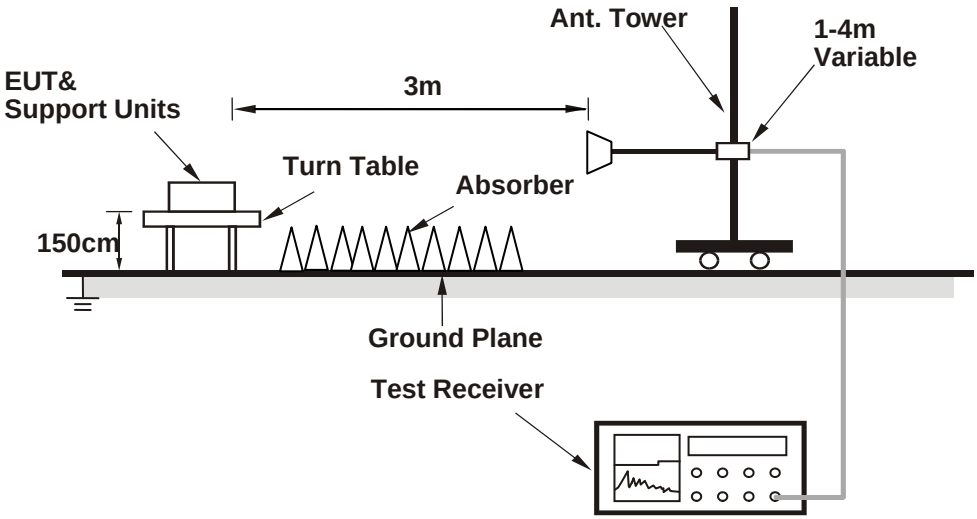
No deviation.

4.1.5 Test Set Up

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



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

4.1.6 EUT Operating Conditions

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

4.1.7 Test Results

Above 1GHz Data:

802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	56.7 PK	74.0	-17.3	1.31 H	132	24.60	32.10
2	2390.00	47.6 AV	54.0	-6.4	1.31 H	132	15.50	32.10
3	*2412.00	112.8 PK			1.31 H	132	80.60	32.20
4	*2412.00	109.0 AV			1.31 H	132	76.80	32.20
5	4824.00	52.6 PK	74.0	-21.4	1.37 H	148	47.40	5.20
6	4824.00	48.1 AV	54.0	-5.9	1.37 H	148	42.90	5.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	58.0 PK	74.0	-16.0	1.43 V	11	25.90	32.10
2	2390.00	50.7 AV	54.0	-3.3	1.43 V	11	18.60	32.10
3	*2412.00	120.8 PK			1.43 V	11	88.60	32.20
4	*2412.00	116.8 AV			1.43 V	11	84.60	32.20
5	4824.00	49.7 PK	74.0	-24.3	1.24 V	193	44.50	5.20
6	4824.00	43.0 AV	54.0	-11.0	1.24 V	193	37.80	5.20

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	112.8 PK			1.15 H	135	80.60	32.20
2	*2437.00	108.0 AV			1.15 H	135	75.80	32.20
3	4874.00	52.1 PK	74.0	-21.9	1.97 H	248	46.90	5.20
4	4874.00	47.2 AV	54.0	-6.8	1.97 H	248	42.00	5.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	119.3 PK			1.04 V	14	87.10	32.20
2	*2437.00	115.4 AV			1.04 V	14	83.20	32.20
3	4874.00	49.9 PK	74.0	-24.1	1.00 V	180	44.70	5.20
4	4874.00	44.7 AV	54.0	-9.3	1.00 V	180	39.50	5.20

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	112.8 PK			1.44 H	140	80.50	32.30
2	*2462.00	109.1 AV			1.44 H	140	76.80	32.30
3	2483.50	58.6 PK	74.0	-15.4	1.44 H	140	26.30	32.30
4	2483.50	50.7 AV	54.0	-3.3	1.44 H	140	18.40	32.30
5	4924.00	51.8 PK	74.0	-22.2	1.48 H	139	46.50	5.30
6	4924.00	45.8 AV	54.0	-8.2	1.48 H	139	40.50	5.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	119.7 PK			1.00 V	42	87.40	32.30
2	*2462.00	115.8 AV			1.00 V	42	83.50	32.30
3	2483.50	60.3 PK	74.0	-13.7	1.00 V	42	28.00	32.30
4	2483.50	52.8 AV	54.0	-1.2	1.00 V	42	20.50	32.30
5	4924.00	50.1 PK	74.0	-23.9	1.00 V	209	44.80	5.30
6	4924.00	43.0 AV	54.0	-11.0	1.00 V	209	37.70	5.30

Remarks:

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

802.11g

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	28.9 PK	74.0	-45.1	1.26 H	147	31.00	-2.10
2	2390.00	16.0 AV	54.0	-38.0	1.26 H	147	18.10	-2.10
3	*2412.00	111.2 PK			1.26 H	147	79.00	32.20
4	*2412.00	100.3 AV			1.26 H	147	68.10	32.20
5	4824.00	46.1 PK	74.0	-27.9	1.04 H	15	40.90	5.20
6	4824.00	33.1 AV	54.0	-20.9	1.04 H	15	27.90	5.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2385.00	69.0 PK	74.0	-5.0	1.00 V	224	37.00	32.00
2	2385.00	53.2 AV	54.0	-0.8	1.00 V	224	21.20	32.00
3	*2412.00	116.5 PK			1.00 V	224	84.30	32.20
4	*2412.00	104.1 AV			1.00 V	224	71.90	32.20
5	4824.00	46.1 PK	74.0	-27.9	1.08 V	56	40.90	5.20
6	4824.00	33.1 AV	54.0	-20.9	1.08 V	56	27.90	5.20

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	112.1 PK			1.00 H	148	79.90	32.20
2	*2437.00	101.5 AV			1.00 H	148	69.30	32.20
3	4874.00	47.7 PK	74.0	-26.3	1.55 H	203	42.50	5.20
4	4874.00	34.2 AV	54.0	-19.8	1.55 H	203	29.00	5.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	120.1 PK			1.00 V	155	87.90	32.20
2	*2437.00	110.3 AV			1.00 V	155	78.10	32.20
3	4874.00	46.1 PK	74.0	-27.9	1.55 V	207	40.90	5.20
4	4874.00	33.0 AV	54.0	-21.0	1.55 V	207	27.80	5.20

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	110.4 PK			1.52 H	151	78.10	32.30
2	*2462.00	99.4 AV			1.52 H	151	67.10	32.30
3	2483.50	67.7 PK	74.0	-6.3	1.52 H	151	35.40	32.30
4	2483.50	50.7 AV	54.0	-3.3	1.52 H	151	18.40	32.30
5	4924.00	47.9 PK	74.0	-26.1	1.55 H	223	42.60	5.30
6	4924.00	34.3 AV	54.0	-19.7	1.55 H	223	29.00	5.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	116.2 PK			1.01 V	182	83.90	32.30
2	*2462.00	105.3 AV			1.01 V	182	73.00	32.30
3	2483.50	69.0 PK	74.0	-5.0	1.01 V	182	36.70	32.30
4	2483.50	53.2 AV	54.0	-0.8	1.01 V	182	20.90	32.30
5	4924.00	45.9 PK	74.0	-28.1	1.23 V	98	40.60	5.30
6	4924.00	33.2 AV	54.0	-20.8	1.23 V	98	27.90	5.30

Remarks:

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

802.11n (20MHz)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	62.4 PK	74.0	-11.6	1.26 H	151	30.30	32.10
2	2390.00	48.7 AV	54.0	-5.3	1.26 H	151	16.60	32.10
3	*2412.00	109.9 PK			1.26 H	151	77.70	32.20
4	*2412.00	99.7 AV			1.26 H	151	67.50	32.20
5	4824.00	46.7 PK	74.0	-27.3	1.56 H	203	41.50	5.20
6	4824.00	33.9 AV	54.0	-20.1	1.56 H	203	28.70	5.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	67.8 PK	74.0	-6.2	1.00 V	247	35.70	32.10
2	2390.00	53.7 AV	54.0	-0.3	1.00 V	247	21.60	32.10
3	*2412.00	117.5 PK			1.00 V	247	85.30	32.20
4	*2412.00	107.1 AV			1.00 V	247	74.90	32.20
5	4824.00	46.1 PK	74.0	-27.9	1.29 V	74	40.90	5.20
6	4824.00	32.7 AV	54.0	-21.3	1.29 V	74	27.50	5.20

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	112.4 PK			1.36 H	151	80.20	32.20
2	*2437.00	101.8 AV			1.36 H	151	69.60	32.20
3	4874.00	46.7 PK	74.0	-27.3	1.23 H	147	41.50	5.20
4	4874.00	33.9 AV	54.0	-20.1	1.23 H	147	28.70	5.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	120.1 PK			1.00 V	228	87.90	32.20
2	*2437.00	110.6 AV			1.00 V	228	78.40	32.20
3	4874.00	46.2 PK	74.0	-27.8	1.47 V	89	41.00	5.20
4	4874.00	33.1 AV	54.0	-20.9	1.47 V	89	27.90	5.20

Remarks:

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

CHANNEL	TX Channel 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	110.1 PK			1.54 H	147	77.80	32.30
2	*2462.00	99.2 AV			1.54 H	147	66.90	32.30
3	2483.50	67.3 PK	74.0	-6.7	1.54 H	147	35.00	32.30
4	2483.50	50.5 AV	54.0	-3.5	1.54 H	147	18.20	32.30
5	4924.00	46.8 PK	74.0	-27.2	1.23 H	229	41.50	5.30
6	4924.00	33.8 AV	54.0	-20.2	1.23 H	229	28.50	5.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	117.0 PK			1.36 V	229	84.70	32.30
2	*2462.00	106.5 AV			1.36 V	229	74.20	32.30
3	2483.50	71.2 PK	74.0	-2.8	1.36 V	229	38.90	32.30
4	2483.50	53.7 AV	54.0	-0.3	1.36 V	229	21.40	32.30
5	4924.00	45.8 PK	74.0	-28.2	1.23 V	97	40.50	5.30
6	4924.00	33.2 AV	54.0	-20.8	1.23 V	97	27.90	5.30

Remarks:

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

802.11n (40MHz)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	60.1 PK	74.0	-13.9	1.54 H	156	28.00	32.10
2	2390.00	48.3 AV	54.0	-5.7	1.54 H	156	16.20	32.10
3	*2422.00	102.4 PK			1.54 H	156	70.20	32.20
4	*2422.00	93.1 AV			1.54 H	156	60.90	32.20
5	4844.00	46.8 PK	74.0	-27.2	1.26 H	258	41.60	5.20
6	4844.00	33.7 AV	54.0	-20.3	1.26 H	258	28.50	5.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	66.9 PK	74.0	-7.1	1.00 V	233	34.80	32.10
2	2390.00	53.7 AV	54.0	-0.3	1.00 V	233	21.60	32.10
3	*2422.00	111.3 PK			1.00 V	233	79.10	32.20
4	*2422.00	102.2 AV			1.00 V	233	70.00	32.20
5	4844.00	45.5 PK	74.0	-28.5	1.22 V	54	40.30	5.20
6	4844.00	33.1 AV	54.0	-20.9	1.22 V	54	27.90	5.20

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	106.7 PK			1.55 H	153	74.50	32.20
2	*2437.00	97.1 AV			1.55 H	153	64.90	32.20
3	2483.50	62.9 PK	74.0	-11.1	1.55 H	153	30.60	32.30
4	2483.50	49.8 AV	54.0	-4.2	1.55 H	153	17.50	32.30
5	4874.00	46.7 PK	74.0	-27.3	1.32 H	89	41.50	5.20
6	4874.00	33.1 AV	54.0	-20.9	1.32 H	89	27.90	5.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	112.1 PK			2.04 V	351	79.90	32.20
2	*2437.00	103.1 AV			2.04 V	351	70.90	32.20
3	2483.50	68.2 PK	74.0	-5.8	2.04 V	351	35.90	32.30
4	**2483.50**	**53.8 AV**	**54.0**	**-0.2**	**2.04 V**	**351**	**21.50**	**32.30**
5	4874.00	45.3 PK	74.0	-28.7	1.55 V	203	40.10	5.20
6	4874.00	32.8 AV	54.0	-21.2	1.55 V	203	27.60	5.20

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	101.9 PK			1.00 H	351	69.70	32.20
2	*2452.00	93.0 AV			1.00 H	351	60.80	32.20
3	2483.50	57.1 PK	74.0	-16.9	1.00 H	351	24.80	32.30
4	2483.50	44.9 AV	54.0	-9.1	1.00 H	351	12.60	32.30
5	4904.00	46.7 PK	74.0	-27.3	1.54 H	123	41.50	5.20
6	4904.00	33.0 AV	54.0	-21.0	1.54 H	123	27.80	5.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	112.6 PK			1.83 V	153	80.40	32.20
2	*2452.00	101.4 AV			1.83 V	153	69.20	32.20
3	2483.50	67.2 PK	74.0	-6.8	1.83 V	153	34.90	32.30
4	2483.50	53.1 AV	54.0	-0.9	1.83 V	153	20.80	32.30
5	4904.00	45.8 PK	74.0	-28.2	1.56 V	24	40.60	5.20
6	4904.00	33.2 AV	54.0	-20.8	1.56 V	24	28.00	5.20

Remarks:

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

Below 1GHz Data:

802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	124.98	32.7 QP	43.5	-10.8	1.51 H	0	48.70	-16.00
2	256.93	33.3 QP	46.0	-12.7	1.01 H	53	47.60	-14.30
3	400.52	39.9 QP	46.0	-6.1	1.01 H	353	50.70	-10.80
4	627.54	36.3 QP	46.0	-9.7	1.26 H	6	42.50	-6.20
5	742.03	31.8 QP	46.0	-14.2	2.00 H	290	35.50	-3.70
6	938.01	36.3 QP	46.0	-9.7	1.01 H	13	37.30	-1.00
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	62.89	33.7 QP	40.0	-6.3	1.00 V	247	48.80	-15.10
2	154.09	29.0 QP	43.5	-14.5	1.00 V	97	42.70	-13.70
3	305.44	33.3 QP	46.0	-12.7	1.24 V	110	45.80	-12.50
4	375.29	37.1 QP	46.0	-8.9	1.24 V	130	48.30	-11.20
5	625.60	30.9 QP	46.0	-15.1	1.24 V	12	37.20	-6.30
6	875.91	34.1 QP	46.0	-11.9	1.49 V	7	36.30	-2.20

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

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

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	60.95	26.5 QP	40.0	-13.5	1.99 H	156	41.30	-14.80
2	140.50	32.5 QP	43.5	-11.0	1.99 H	291	46.80	-14.30
3	375.29	39.0 QP	46.0	-7.0	1.00 H	153	50.20	-11.20
4	408.28	40.4 QP	46.0	-5.6	1.99 H	347	51.20	-10.80
5	625.60	33.5 QP	46.0	-12.5	1.24 H	236	39.80	-6.30
6	875.91	33.6 QP	46.0	-12.4	1.00 H	217	35.80	-2.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	47.36	35.8 QP	40.0	-4.2	1.00 V	11	49.80	-14.00
2	103.64	33.7 QP	43.5	-9.8	1.00 V	223	51.60	-17.90
3	140.50	30.9 QP	43.5	-12.6	1.00 V	252	45.20	-14.30
4	375.29	36.0 QP	46.0	-10.0	1.25 V	316	47.20	-11.20
5	747.85	35.4 QP	46.0	-10.6	1.00 V	324	39.00	-3.60
6	875.91	34.9 QP	46.0	-11.1	1.25 V	153	37.10	-2.20

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

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

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 11, 2014	Nov. 10, 2015
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 26, 2014	Dec. 25, 2015
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Mar. 02, 2015	Mar. 01, 2016
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 21, 2014	Jul. 20, 2015
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

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

4.2.3 Test Procedures

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

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

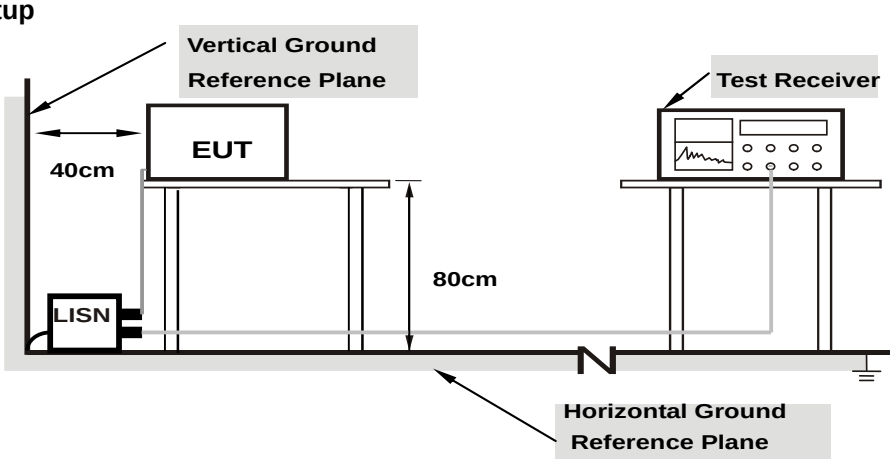
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Conditions

Same as 4.1.6.

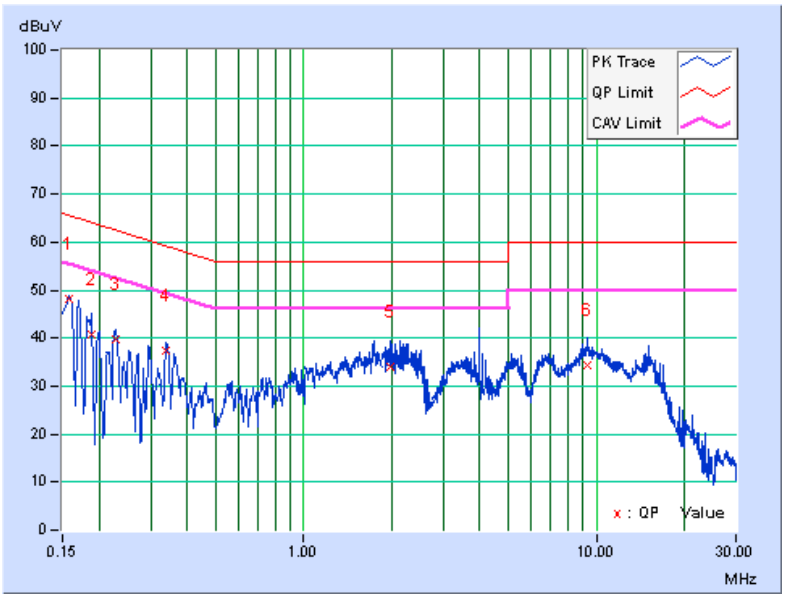
4.2.7 Test Results

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15760	0.08	48.23	34.70	48.31	34.78	65.59	55.59	-17.28	-20.81
2	0.18903	0.13	40.75	27.56	40.88	27.69	64.08	54.08	-23.20	-26.39
3	0.22791	0.14	39.43	29.76	39.57	29.90	62.53	52.53	-22.96	-22.63
4	0.33839	0.10	37.18	34.37	37.28	34.47	59.24	49.24	-21.96	-14.77
5	1.96815	0.22	33.80	27.99	34.02	28.21	56.00	46.00	-21.98	-17.79
6	9.35414	0.46	34.01	28.49	34.47	28.95	60.00	50.00	-25.53	-21.05

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.

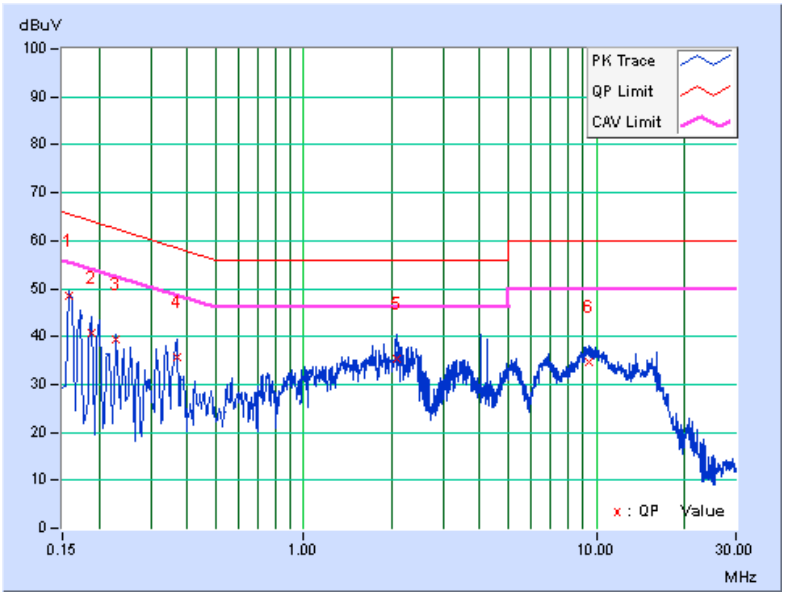


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test mode	A		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15782	0.14	48.22	34.27	48.36	34.41	65.58	55.58	-17.22	-21.17
2	0.18903	0.22	40.52	26.91	40.74	27.13	64.08	54.08	-23.34	-26.95
3	0.22820	0.24	38.99	28.80	39.23	29.04	62.51	52.51	-23.29	-23.48
4	0.36896	0.18	35.41	26.34	35.59	26.52	58.52	48.52	-22.93	-22.00
5	2.09327	0.22	35.02	26.22	35.24	26.44	56.00	46.00	-20.76	-19.56
6	9.39324	0.52	34.01	28.56	34.53	29.08	60.00	50.00	-25.47	-20.92

Remarks:

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

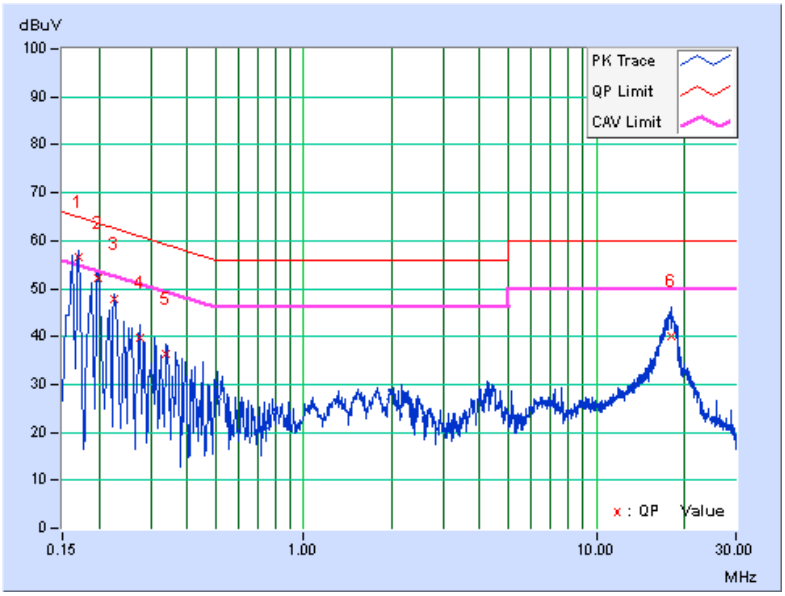


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test mode	B		

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	0.10	56.59	43.36	56.69	43.46	64.98	54.98	-8.29	-11.52
2	0.19717	0.15	52.03	38.72	52.18	38.87	63.73	53.73	-11.55	-14.86
3	0.22434	0.14	47.62	34.58	47.76	34.72	62.66	52.66	-14.90	-17.94
4	0.27512	0.12	39.74	24.89	39.86	25.01	60.96	50.96	-21.10	-25.95
5	0.33839	0.10	36.38	21.93	36.48	22.03	59.24	49.24	-22.76	-27.21
6	18.09299	0.87	39.11	31.86	39.98	32.73	60.00	50.00	-20.02	-17.27

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.

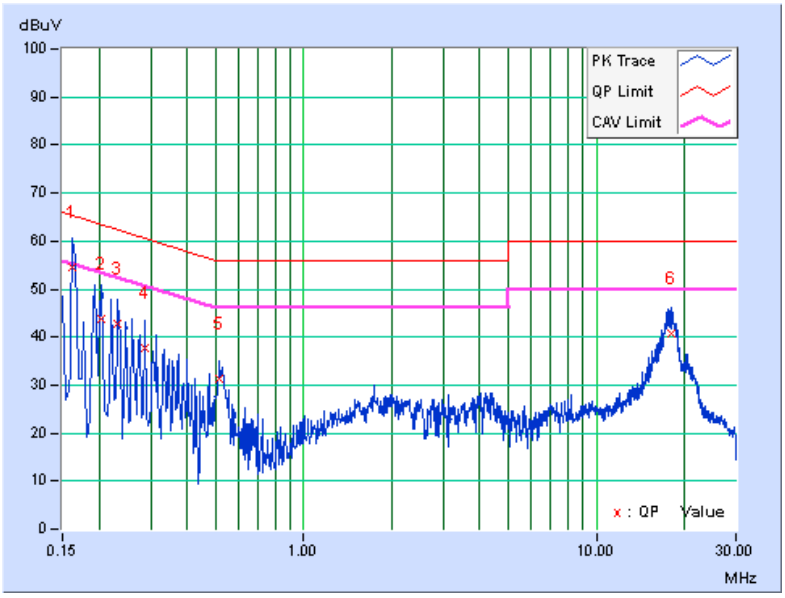


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test mode	B		

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	0.16181	0.15	54.51	37.28	54.66	37.43	65.37	55.37	-10.71	-17.94
2	0.20474	0.25	43.63	24.86	43.88	25.11	63.42	53.42	-19.54	-28.31
3	0.23211	0.24	42.36	24.85	42.60	25.09	62.37	52.37	-19.78	-27.29
4	0.28685	0.22	37.36	21.38	37.58	21.60	60.62	50.62	-23.04	-29.02
5	0.51363	0.17	31.03	19.23	31.20	19.40	56.00	46.00	-24.80	-26.60
6	18.15164	0.80	39.88	31.92	40.68	32.72	60.00	50.00	-19.32	-17.28

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.

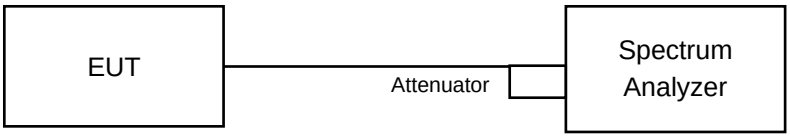


4.3 6dB Bandwidth Measurement

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

802.11b

Channel	Frequency (MHz)	6db Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
1	2412	8.10	8.08	8.13	0.5	Pass
6	2437	8.11	8.10	8.07	0.5	Pass
11	2462	8.12	8.10	8.13	0.5	Pass

802.11g

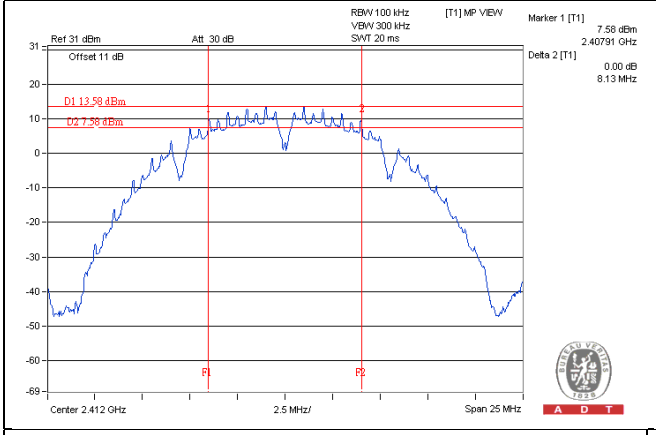
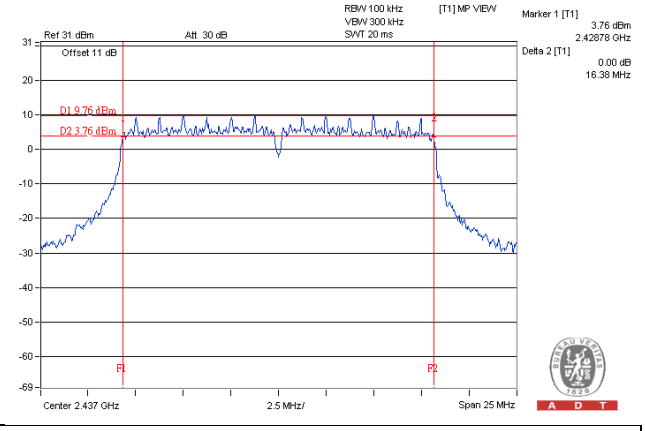
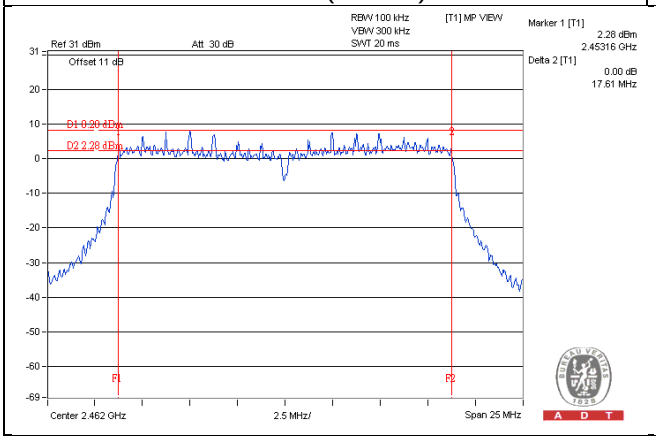
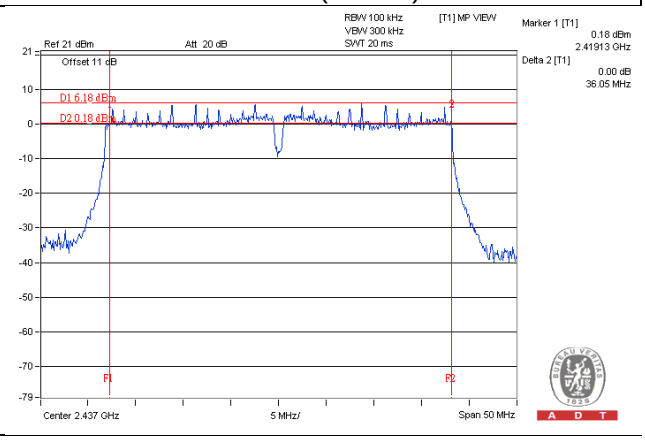
Channel	Frequency (MHz)	6db Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
1	2412	16.37	16.38	15.53	0.5	Pass
6	2437	16.38	15.76	15.17	0.5	Pass
11	2462	16.38	15.77	15.15	0.5	Pass

802.11n (20MHz)

Channel	Frequency (MHz)	6db Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
1	2412	17.34	17.22	17.60	0.5	Pass
6	2437	17.22	16.98	15.44	0.5	Pass
11	2462	17.24	17.14	17.61	0.5	Pass

802.11n (40MHz)

Channel	Frequency (MHz)	6db Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
3	2422	35.88	36.00	35.28	0.5	Pass
6	2437	35.75	35.22	36.05	0.5	Pass
9	2452	35.85	35.27	33.93	0.5	Pass

Spectrum Plot of Worst Value	
802.11b	802.11g
	
802.11n (20MHz)	802.11n (40MHz)
	

4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

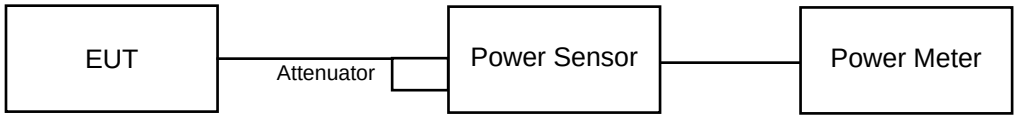
For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

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

Array Gain = 0 dB (i.e., no array gain) for 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 NANT ≥ 5.

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

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

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

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as Item 4.3.6.

4.4.7 Test Results

802.11b

Chan.	Chan. Freq. (MHz)	AVG. Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
1	2412	25.06	24.99	25.09	958.976	29.82	30	Pass
6	2437	25.05	24.89	25.06	948.836	29.77	30	Pass
11	2462	25.03	24.79	25.13	945.558	29.76	30	Pass

802.11g

Chan.	Chan. Freq. (MHz)	AVG. Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
1	2412	21.67	21.84	21.98	457.411	26.60	30	Pass
6	2437	25.16	25.09	25.15	**978.285**	29.90	30	Pass
11	2462	21.45	21.48	21.33	416.073	26.19	30	Pass

802.11n (20MHz)

Chan.	Chan. Freq. (MHz)	AVG. Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
1	2412	21.48	21.49	21.37	418.622	26.22	30	Pass
6	2437	25.13	25.06	25.18	976.074	29.89	30	Pass
11	2462	21.39	21.29	21.47	412.588	26.16	30	Pass

802.11n (40MHz)

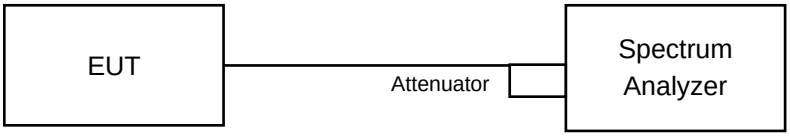
Chan.	Chan. Freq. (MHz)	AVG. Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
3	2422	18.38	18.48	18.46	209.480	23.21	30	Pass
6	2437	21.84	21.77	21.97	460.469	26.63	30	Pass
9	2452	19.99	19.65	19.98	291.568	24.65	30	Pass

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

a. Measure the duty cycle (x).

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

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

d. Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz.

e. Set VBW ≥3 x RBW.

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

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

h. Sweep time = auto couple.

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

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

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

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6

4.5.7 Test Results

802.11b

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=3) dB	Total PSD (dBm)	Limit (dBm)	Pass / Fail
0	1	2412	-4.51	4.77	0.26	8.00	Pass
	6	2437	-4.09	4.77	0.68	8.00	Pass
	11	2462	-3.93	4.77	0.84	8.00	Pass
1	1	2412	-5.51	4.77	-0.74	8.00	Pass
	6	2437	-5.46	4.77	-0.69	8.00	Pass
	11	2462	-4.81	4.77	-0.04	8.00	Pass
2	1	2412	-5.44	4.77	-0.67	8.00	Pass
	6	2437	-5.38	4.77	-0.61	8.00	Pass
	11	2462	-5.14	4.77	-0.37	8.00	Pass

Note:

2412MHz: Directional gain = 0.21dBi + 10log(3) = 4.98dBi < 6dBi, so the power density limit no need to reduced.

2437MHz: Directional gain = 0.41dBi + 10log(3) = 5.18dBi < 6dBi, so the power density limit no need to reduced.

2462MHz: Directional gain = 0.11dBi + 10log(3) = 4.88dBi < 6dBi, so the power density limit no need to reduced.

802.11g

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=3) dB	Duty Factor	Total PSD with Duty Factor (dBm)	Limit (dBm)	Pass / Fail
0	1	2412	-9.60	4.77	0.15	-4.68	8.00	Pass
	6	2437	-9.54	4.77	0.15	-4.62	8.00	Pass
	11	2462	-10.23	4.77	0.15	-5.31	8.00	Pass
1	1	2412	-10.59	4.77	0.15	-5.67	8.00	Pass
	6	2437	-7.57	4.77	0.15	-2.65	8.00	Pass
	11	2462	-11.46	4.77	0.15	-6.54	8.00	Pass
2	1	2412	-11.30	4.77	0.15	-6.38	8.00	Pass
	6	2437	-7.88	4.77	0.15	-2.96	8.00	Pass
	11	2462	-11.19	4.77	0.15	-6.27	8.00	Pass

Note:

1. 2412MHz: Directional gain = 0.21dBi + 10log(3) = 4.98dBi < 6dBi, so the power density limit no need to reduced.

   2437MHz: Directional gain = 0.41dBi + 10log(3) = 5.18dBi < 6dBi, so the power density limit no need to reduced.

   2462MHz: Directional gain = 0.11dBi + 10log(3) = 4.88dBi < 6dBi, so the power density limit no need to reduced.
2. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (20MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=3) dB	Total PSD (dBm)	Limit (dBm)	Pass / Fail
0	1	2412	-11.62	4.77	-6.85	8.00	Pass
	6	2437	-7.63	4.77	-2.86	8.00	Pass
	11	2462	-11.47	4.77	-6.70	8.00	Pass
1	1	2412	-10.14	4.77	-5.37	8.00	Pass
	6	2437	-7.62	4.77	-2.85	8.00	Pass
	11	2462	-10.94	4.77	-6.17	8.00	Pass
2	1	2412	-11.60	4.77	-6.83	8.00	Pass
	6	2437	-6.49	4.77	-1.72	8.00	Pass
	11	2462	-10.69	4.77	-5.92	8.00	Pass

Note:

2412MHz: Directional gain = 0.21dBi + 10log(3) = 4.98dBi < 6dBi, so the power density limit no need to reduced.

2437MHz: Directional gain = 0.41dBi + 10log(3) = 5.18dBi < 6dBi, so the power density limit no need to reduced.

2462MHz: Directional gain = 0.11dBi + 10log(3) = 4.88dBi < 6dBi, so the power density limit no need to reduced.

802.11n (40MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=3) dB	Duty Factor	Total PSD with Duty Factor (dBm)	Limit (dBm)	Pass / Fail
0	3	2422	-18.11	4.77	0.14	-13.20	8.00	Pass
	6	2437	-14.12	4.77	0.14	-9.21	8.00	Pass
	9	2452	-16.31	4.77	0.14	-11.40	8.00	Pass
1	3	2422	-12.31	4.77	0.14	-7.40	8.00	Pass
	6	2437	-14.32	4.77	0.14	-9.41	8.00	Pass
	9	2452	-15.92	4.77	0.14	-11.01	8.00	Pass
2	3	2422	-16.80	4.77	0.14	-11.89	8.00	Pass
	6	2437	-13.63	4.77	0.14	-8.72	8.00	Pass
	9	2452	-15.74	4.77	0.14	-10.83	8.00	Pass

Note:

1. 2422MHz: Directional gain = 0.41dBi + 10log(3) = 5.18dBi < 6dBi, so the power density limit no need to reduced.

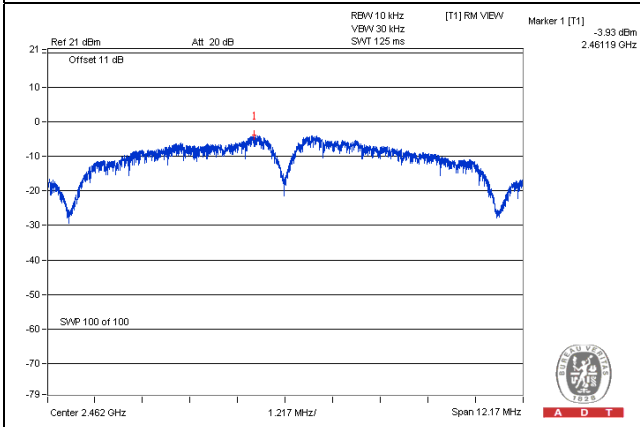
   2437MHz: Directional gain = 0.41dBi + 10log(3) = 5.18dBi < 6dBi, so the power density limit no need to reduced.

   2452MHz: Directional gain = 0.21dBi + 10log(3) = 4.98dBi < 6dBi, so the power density limit no need to reduced.

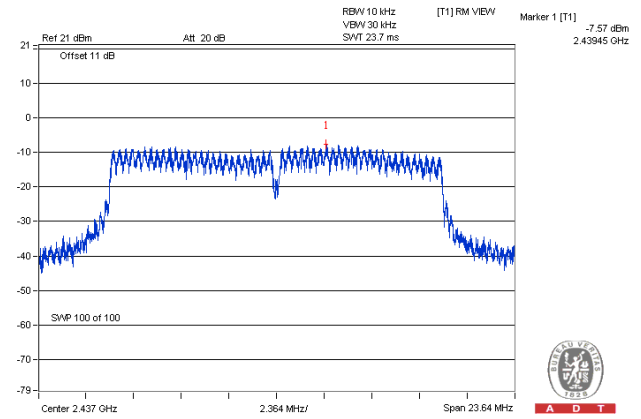
2. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

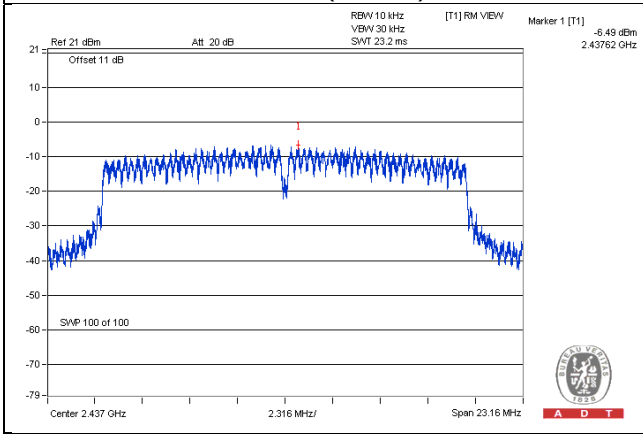
802.11b



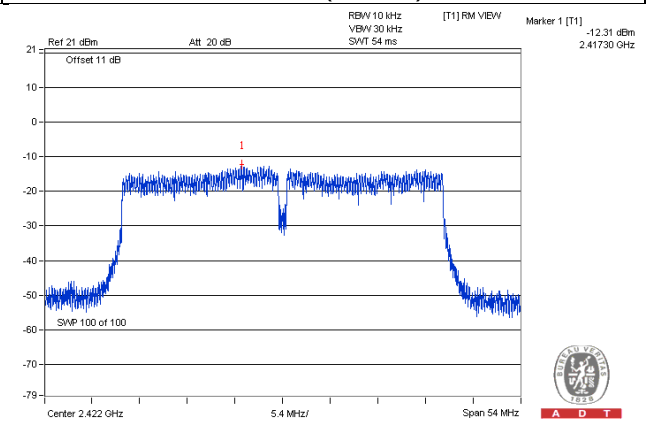
802.11g



802.11n (20MHz)



802.11n (40MHz)

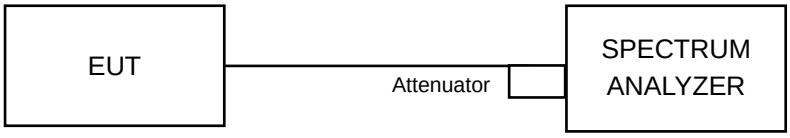


4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

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. Detector = peak.

d. Sweep = auto couple.

e. Trace Mode = max hold.

f. Allow trace to fully stabilize.

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

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

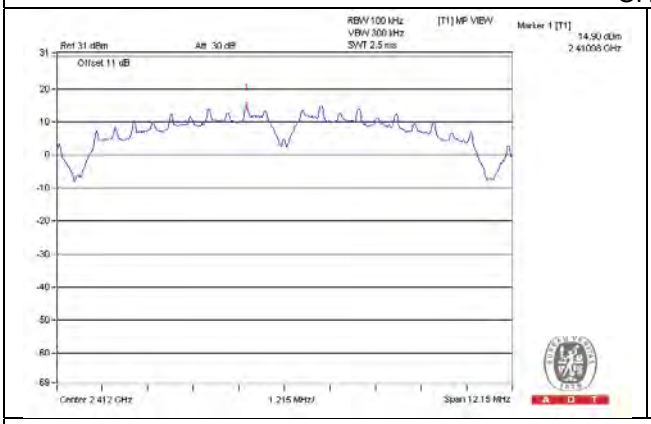
Same as Item 4.3.6

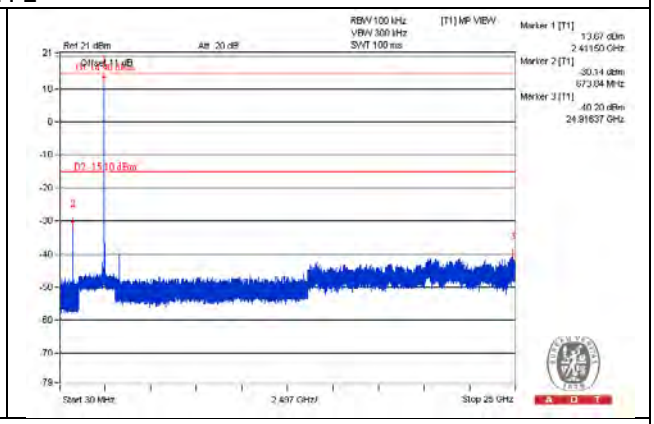
4.6.7 Test Results

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

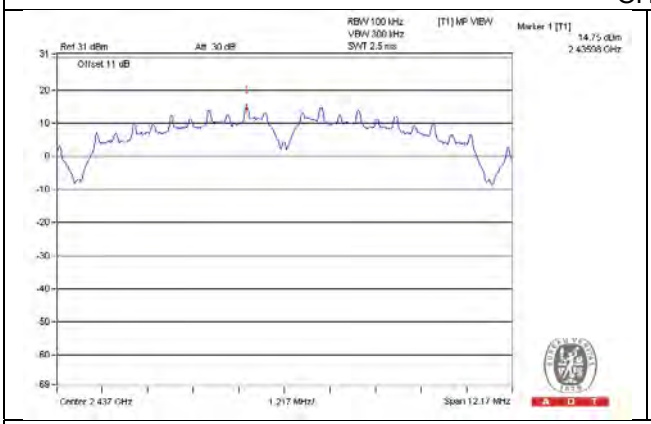
802.11b_Chain 0

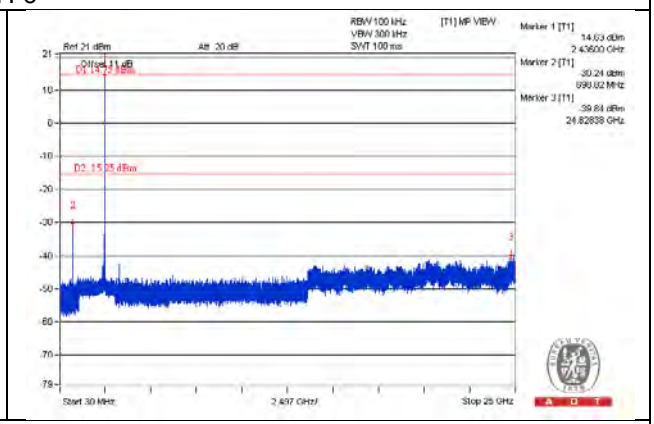
CH 1



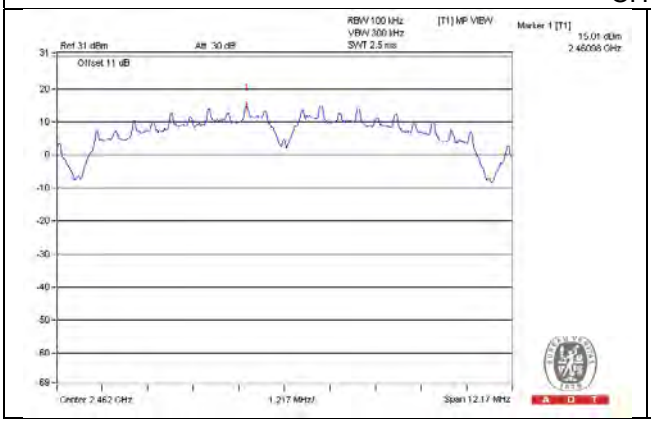


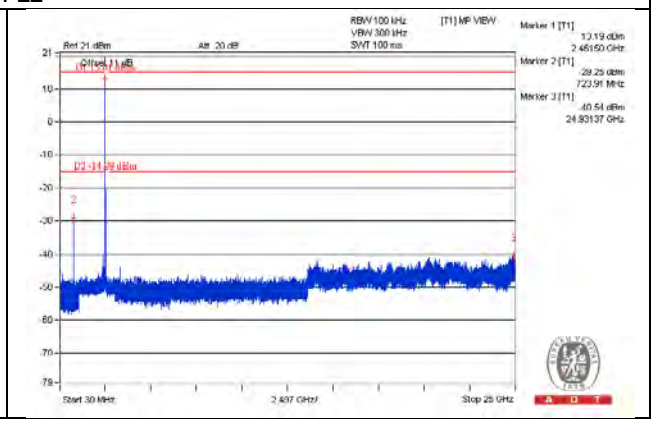
CH 6





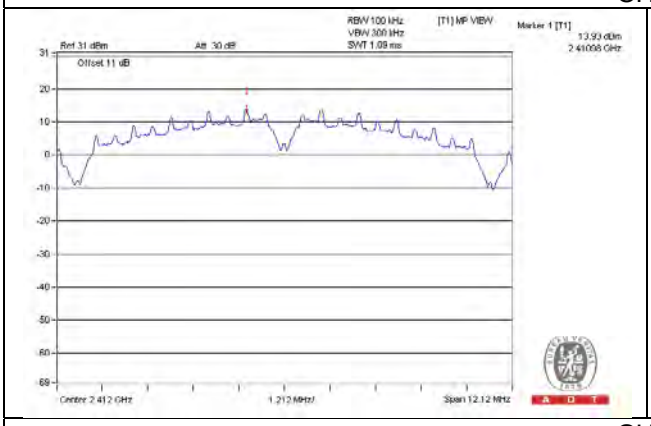
CH 11

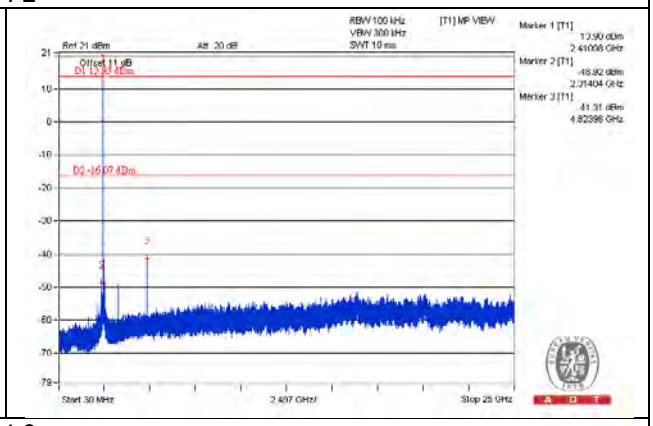




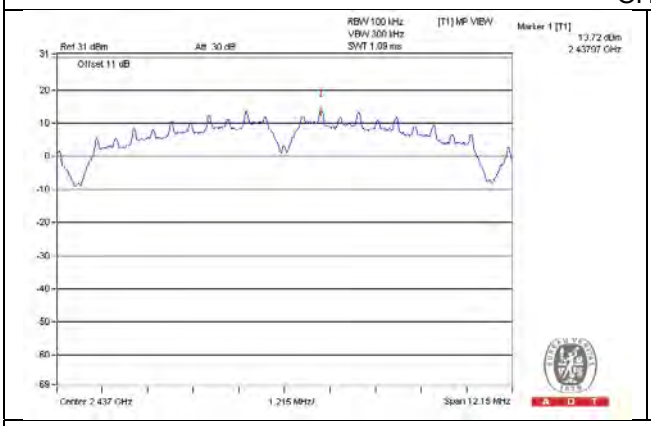
802.11b_Chain 1

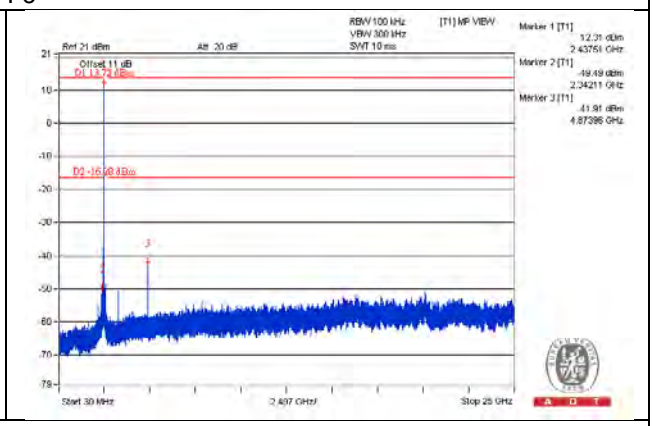
CH 1



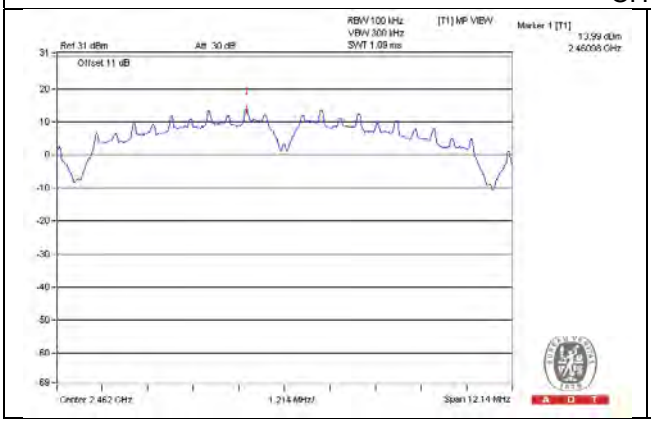


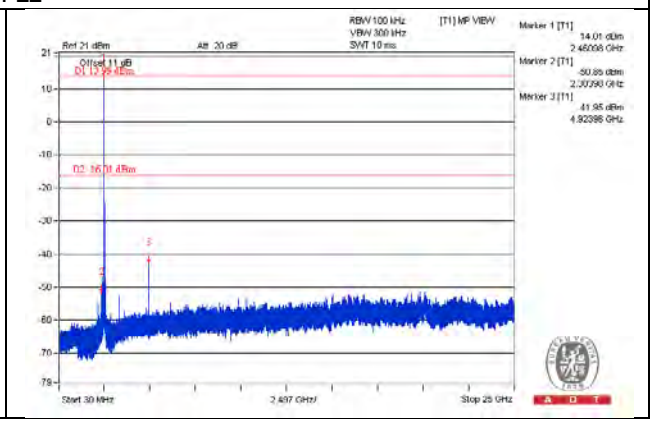
CH 6





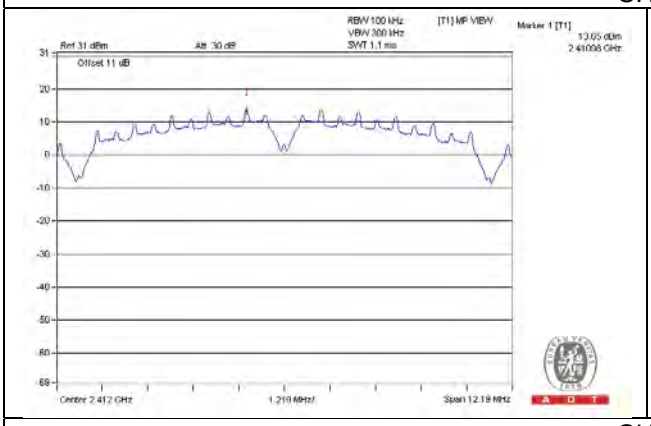
CH 11

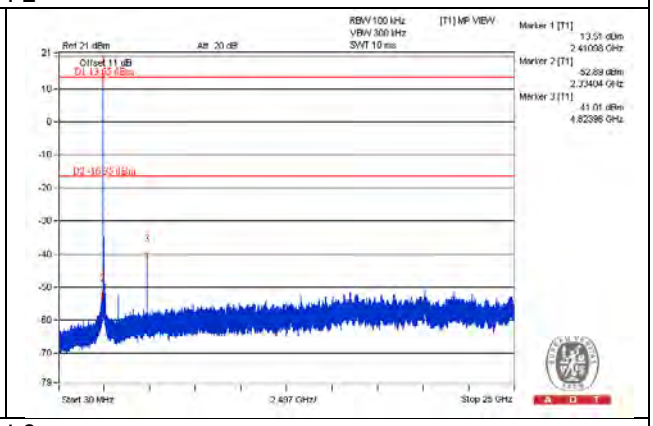




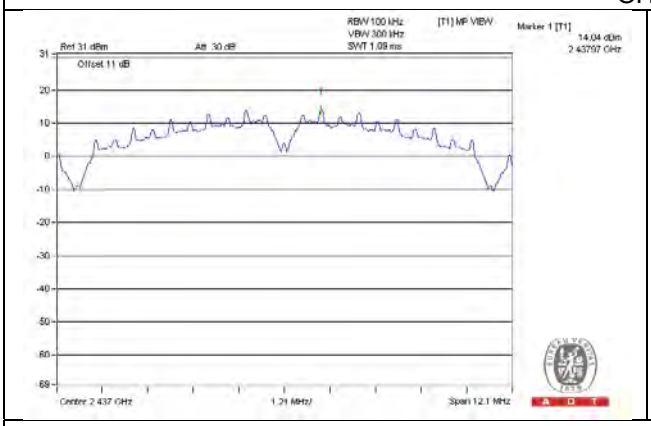
802.11b_Chain 2

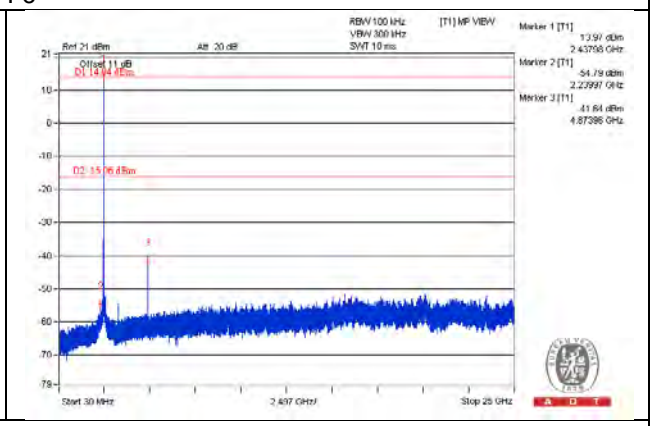
CH 1



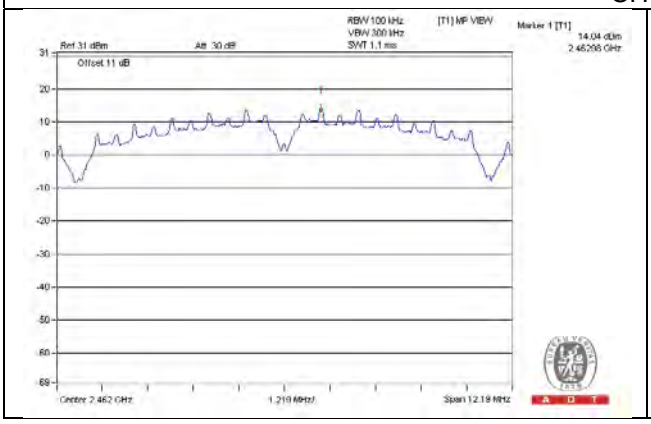


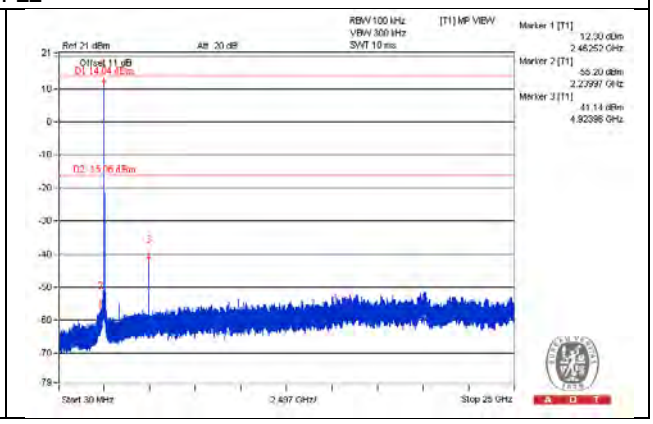
CH 6





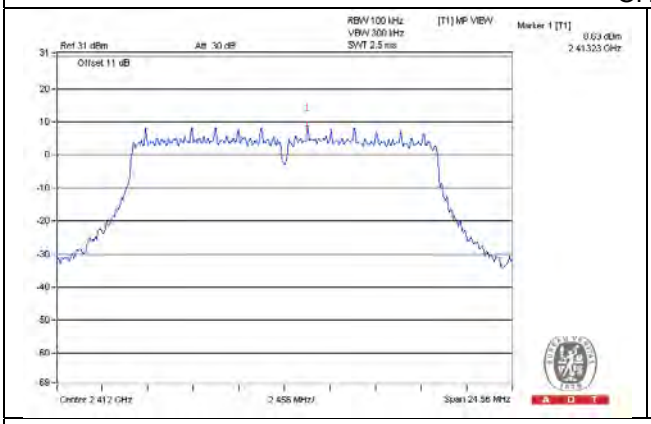
CH 11

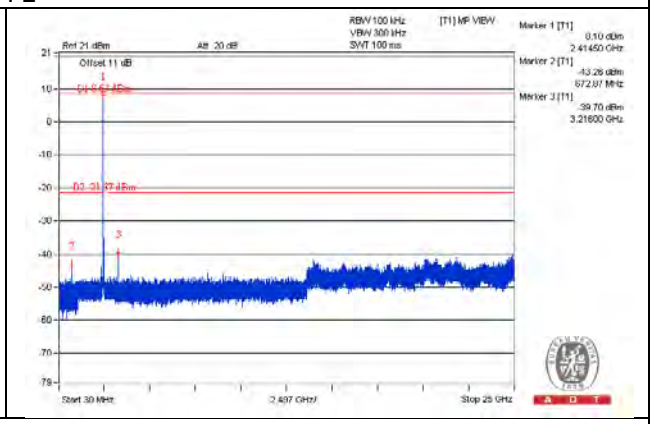




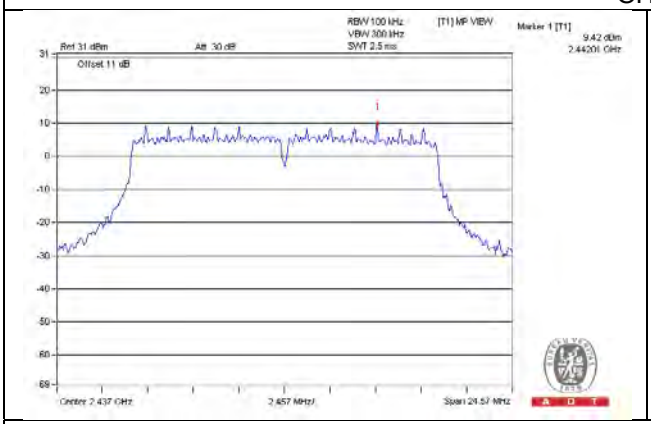
802.11g_Chain 0

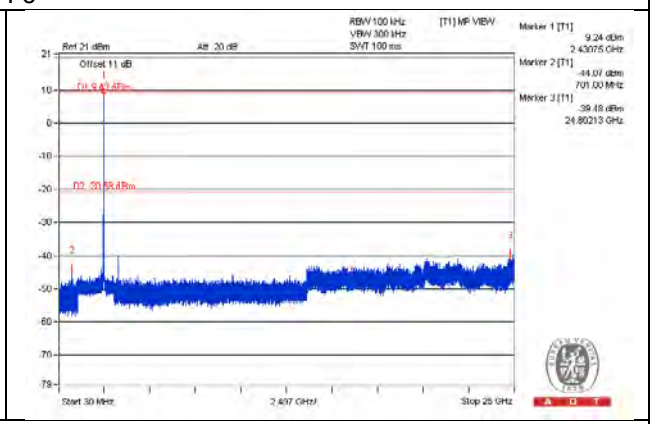
CH 1





CH 6





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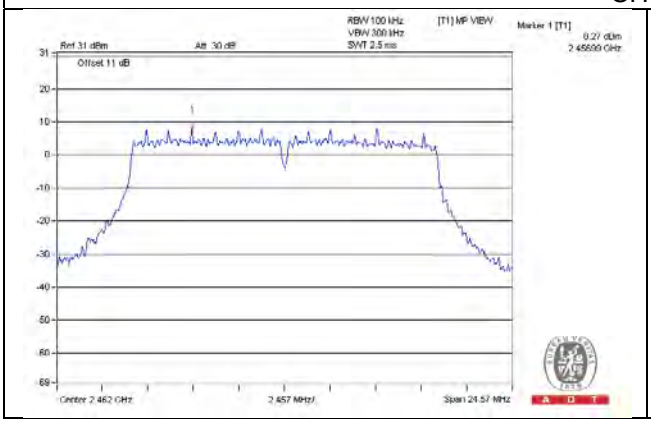
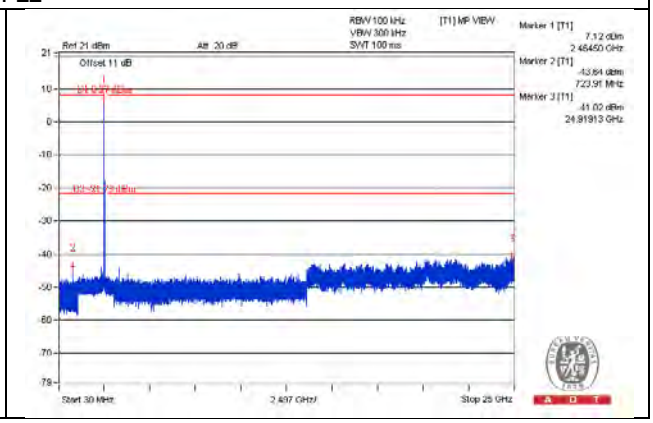
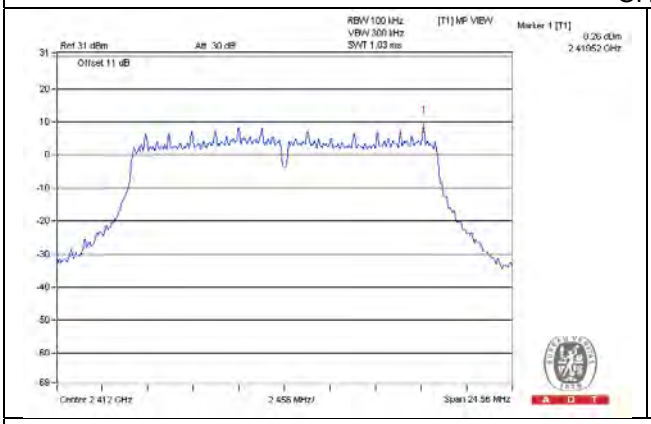
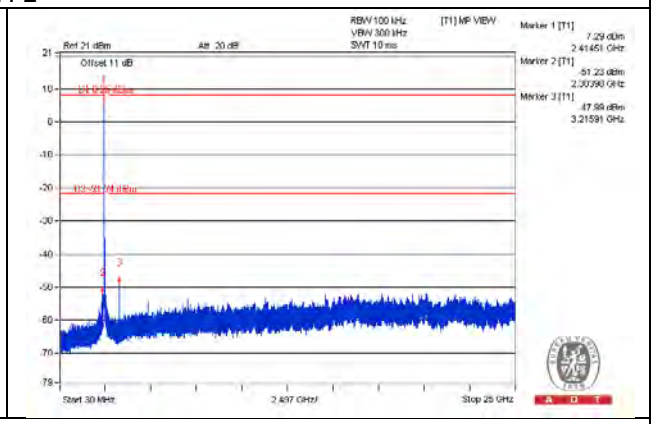




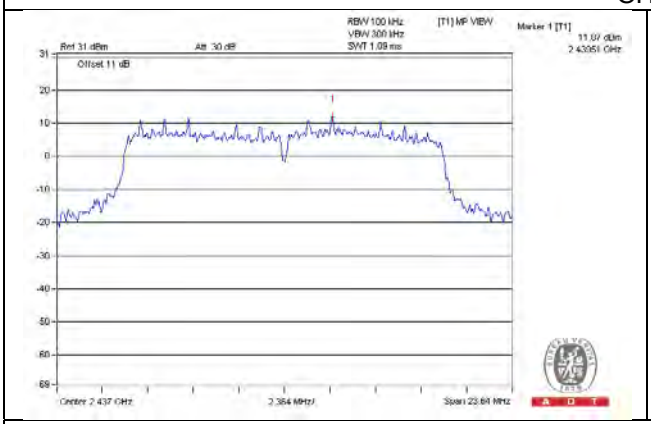
802.11g_Chain 1

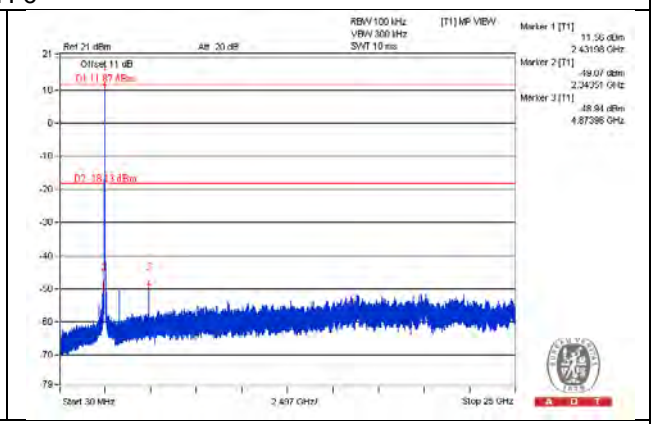
CH 1



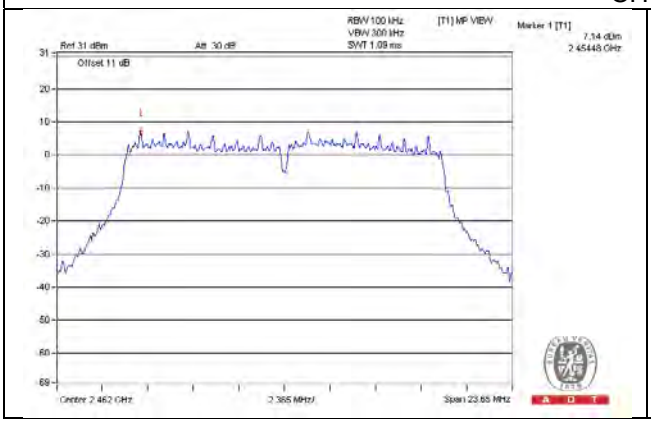


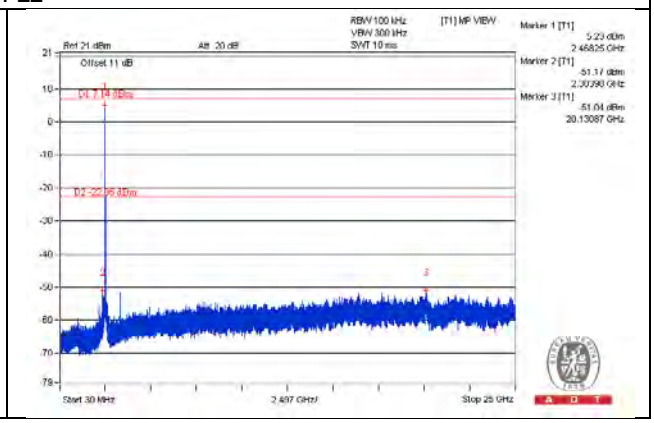
CH 6





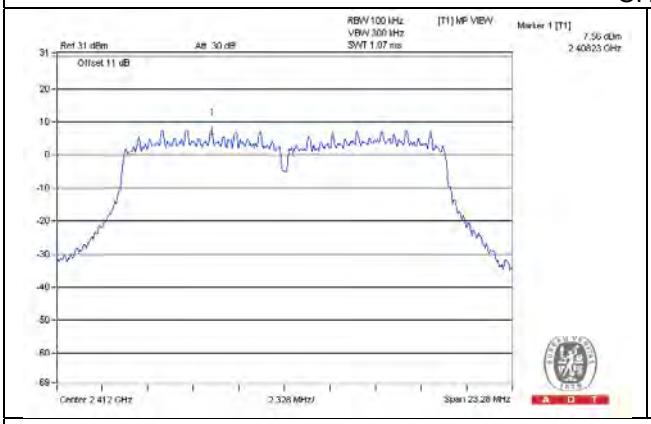
CH 11

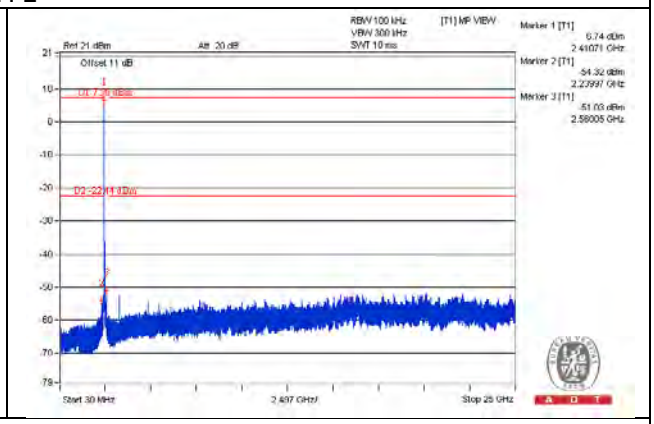




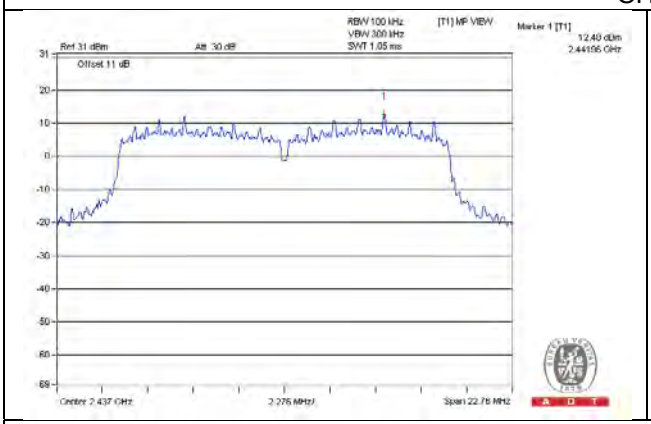
802.11g_Chain 2

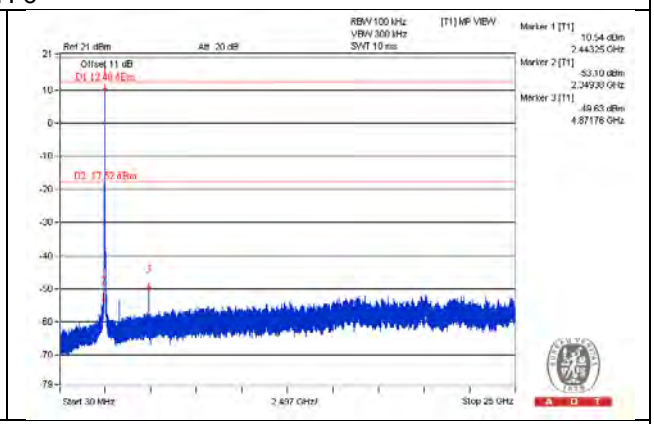
CH 1



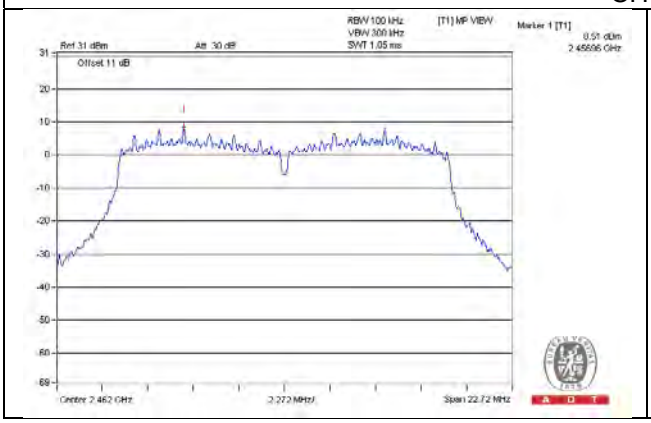


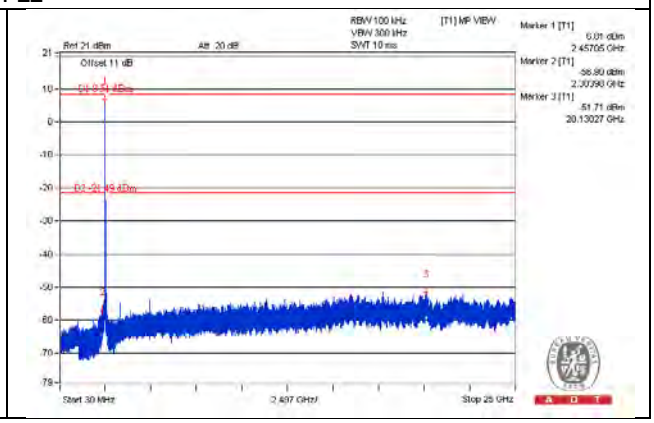
CH 6





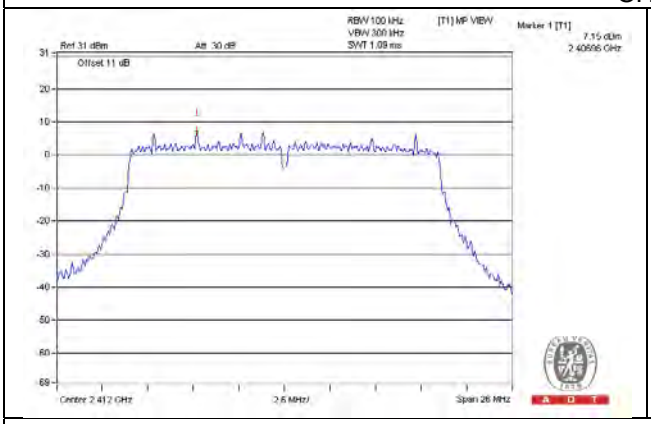
CH 11

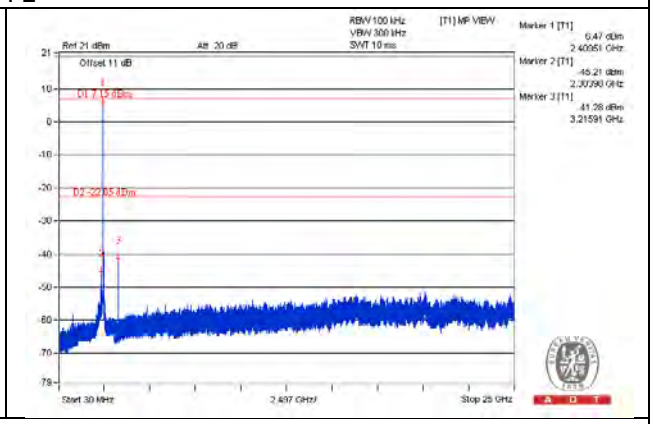




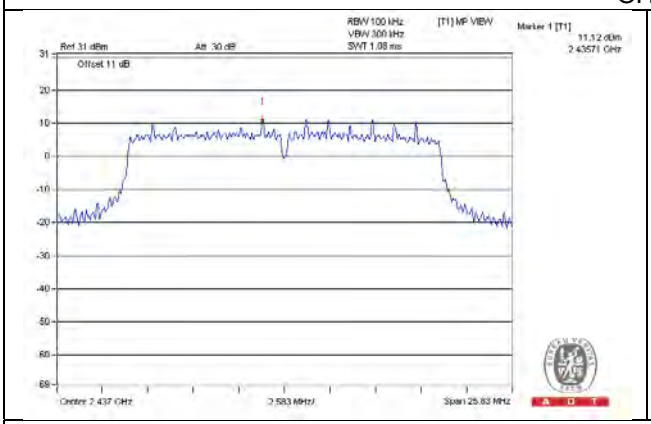
802.11n (20MHz)_Chain 0

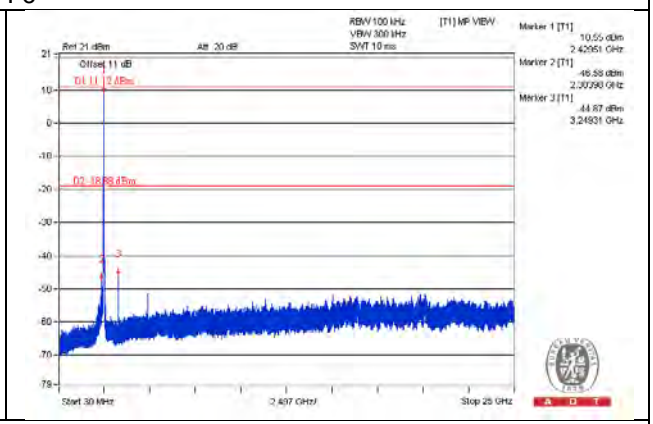
CH 1



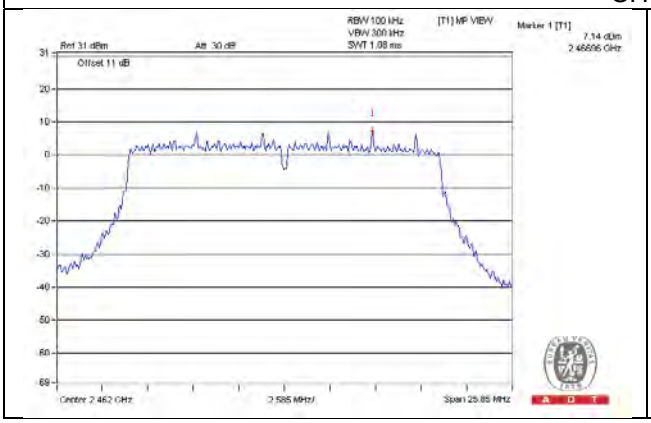


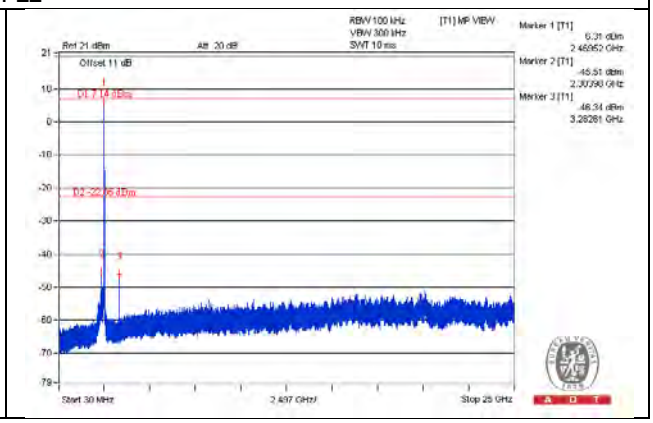
CH 6





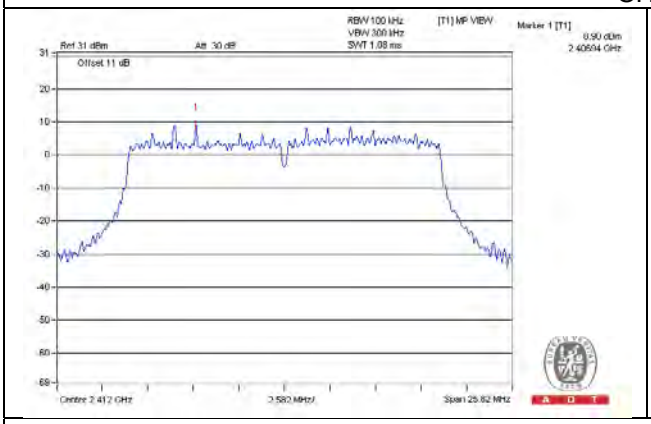
CH 11

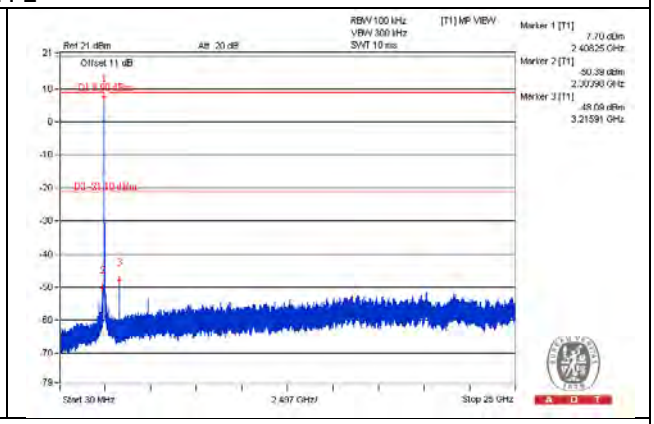




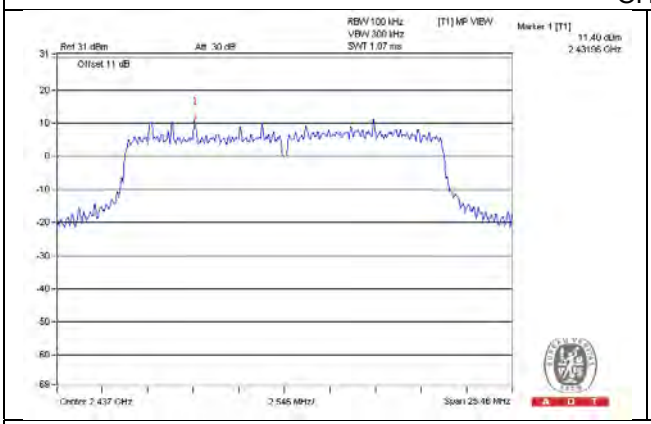
802.11n (20MHz)_Chain 1

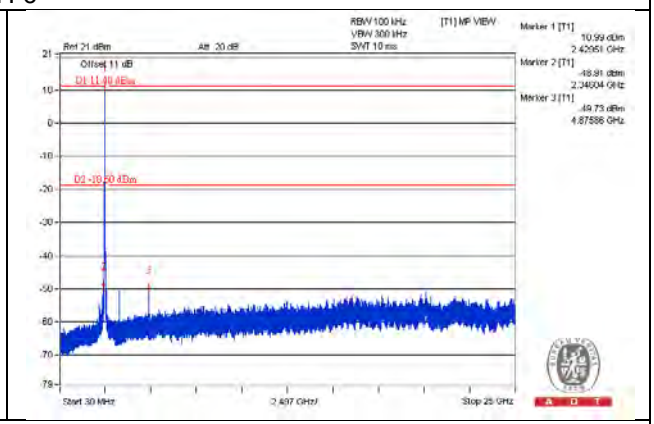
CH 1



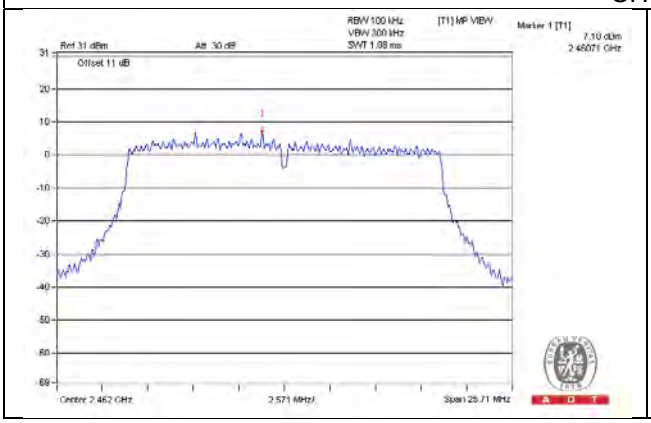


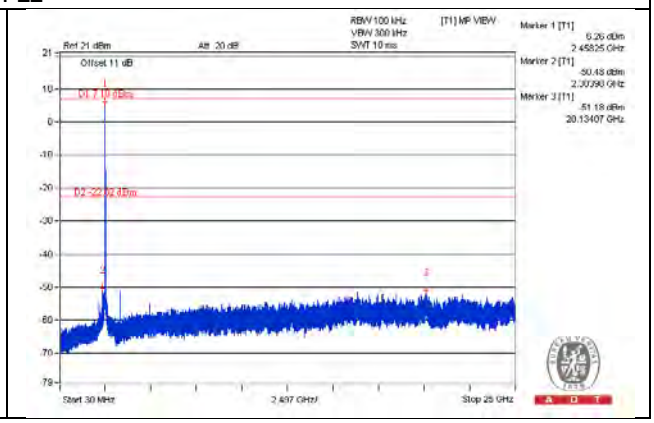
CH 6





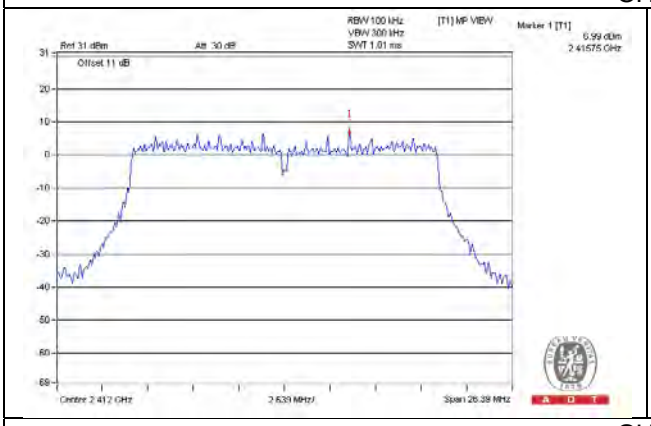
CH 11

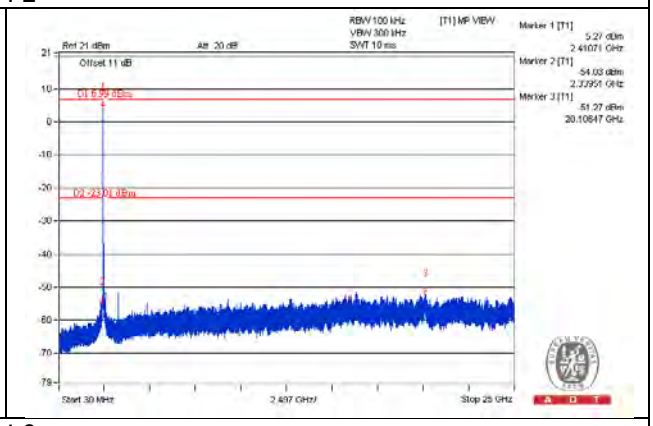




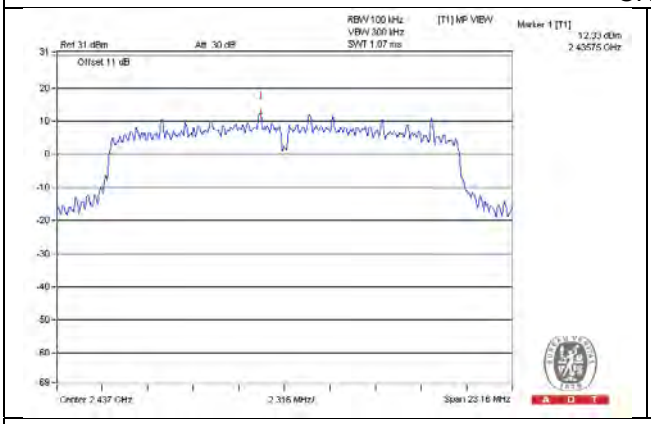
802.11n (20MHz)_Chain 2

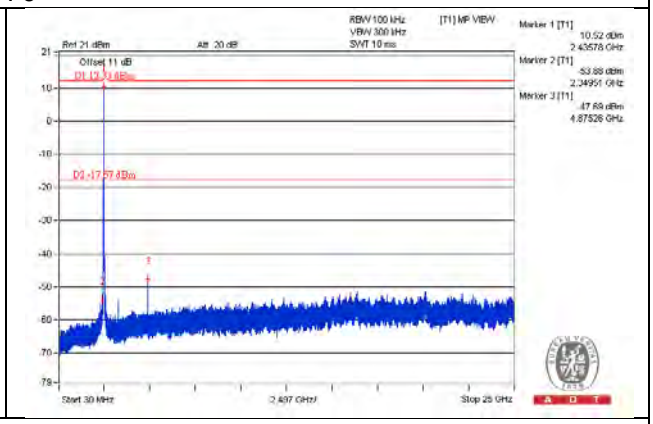
CH 1



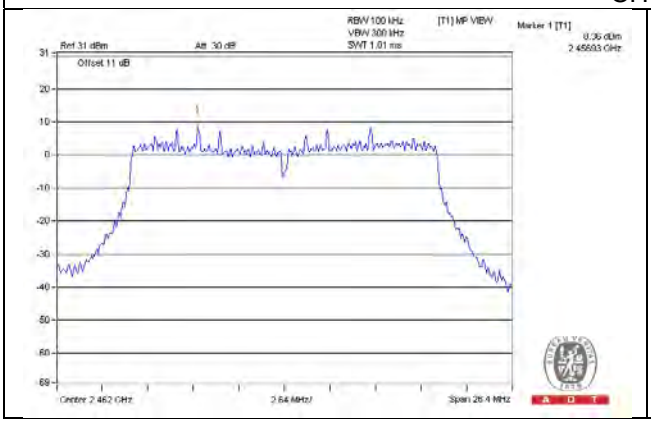


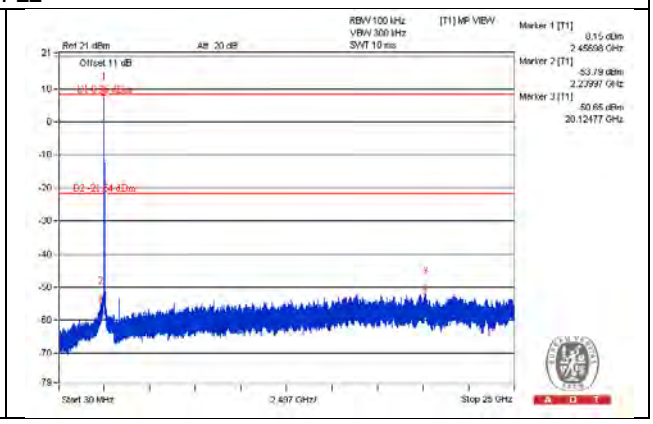
CH 6





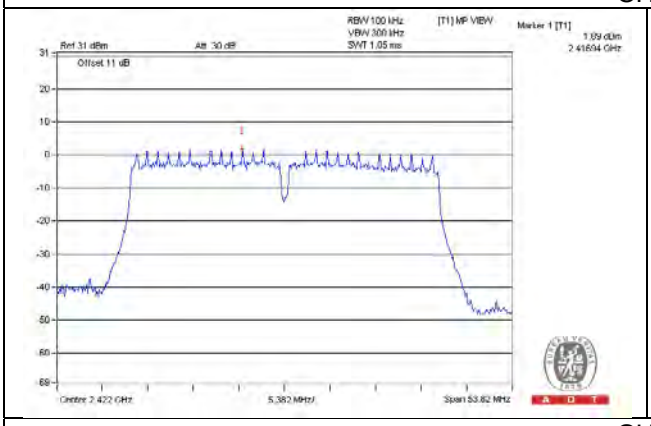
CH 11

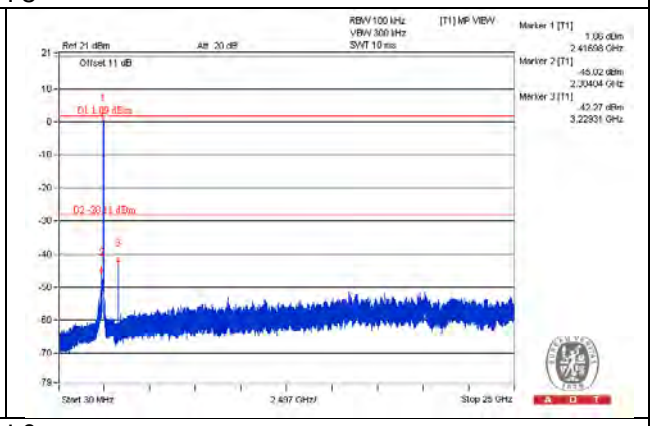




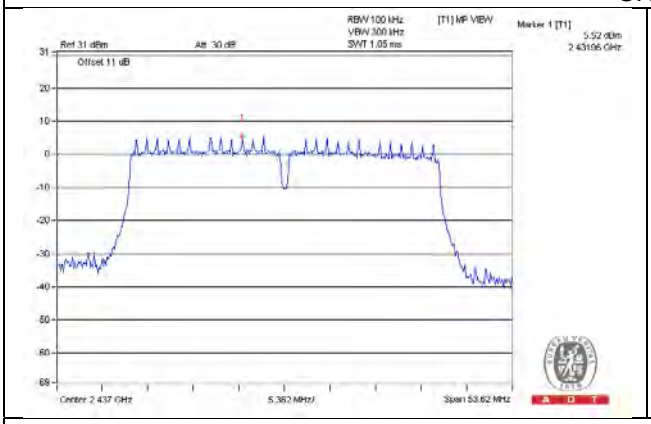
802.11n (40MHz)_Chain 0

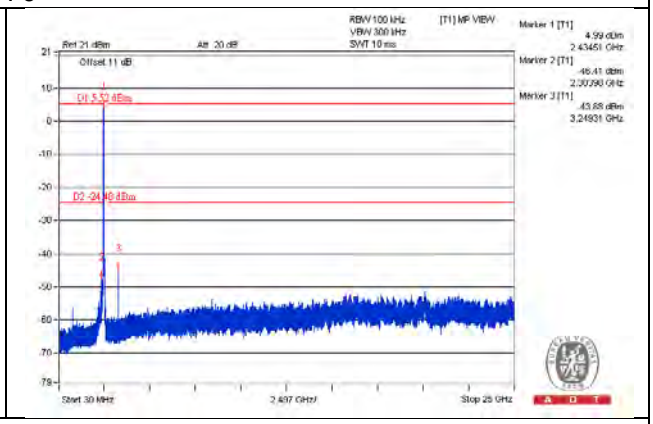
CH 3



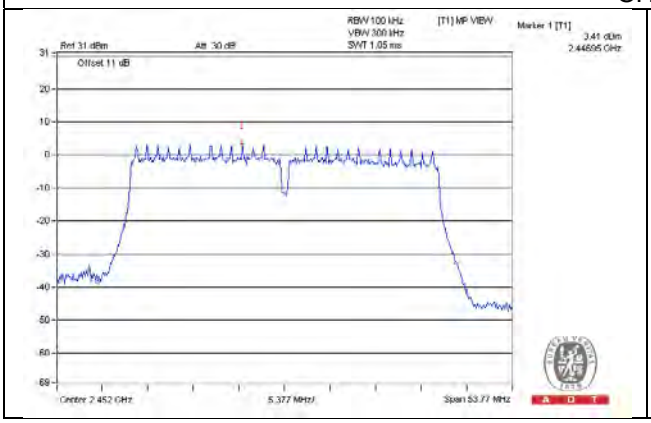


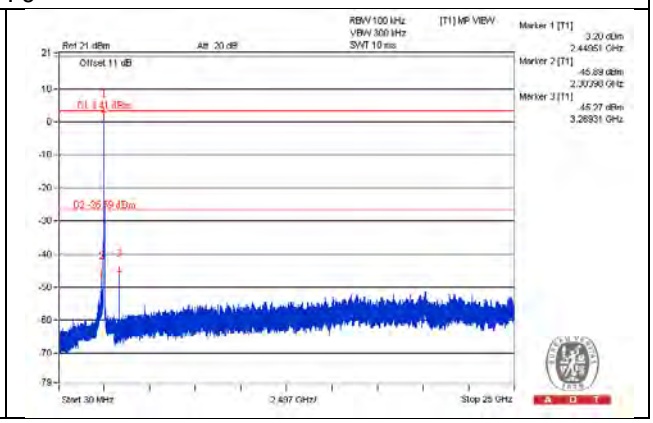
CH 6





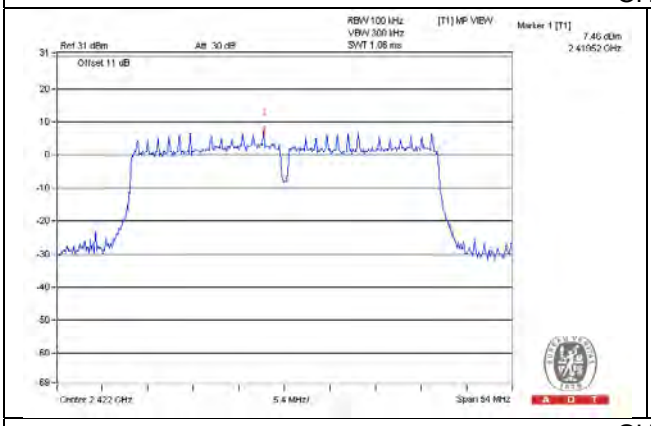
CH 9

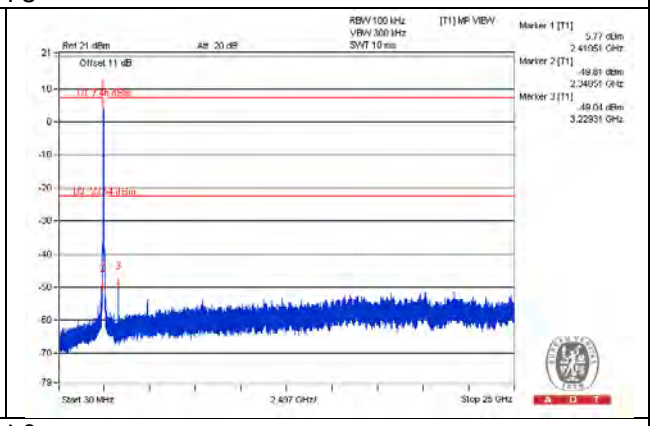




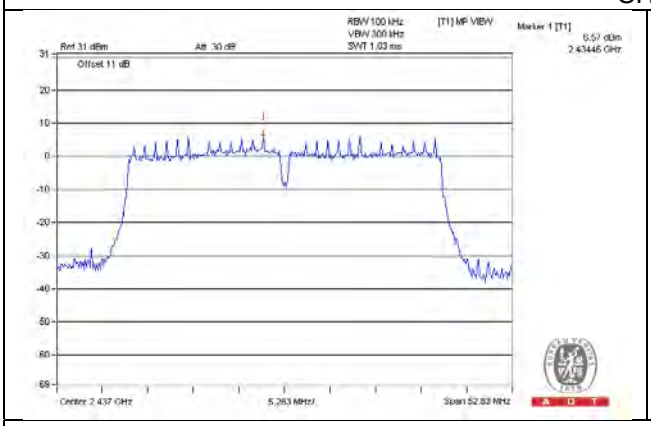
802.11n (40MHz)_Chain 1

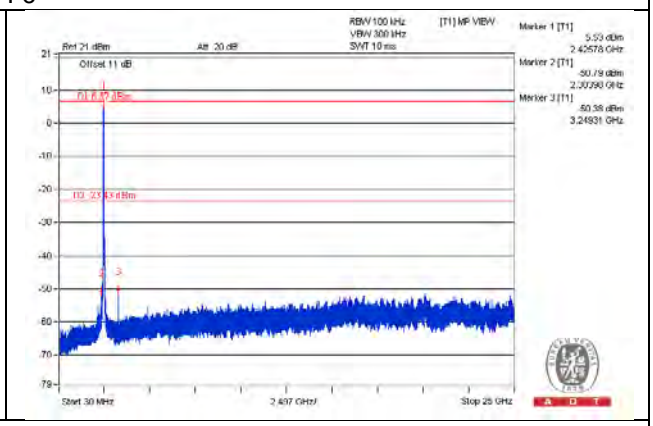
CH 3



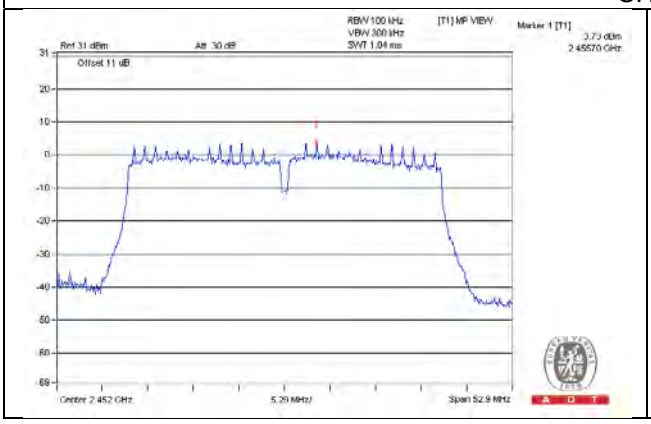


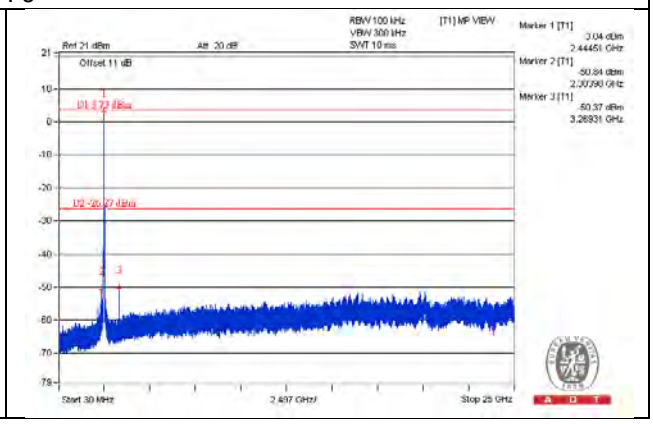
CH 6





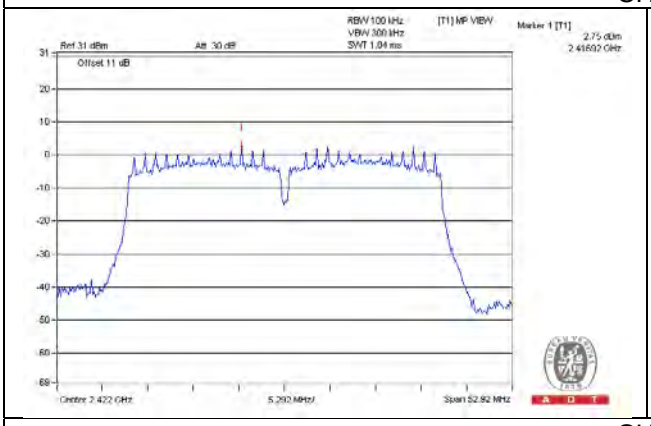
CH 9

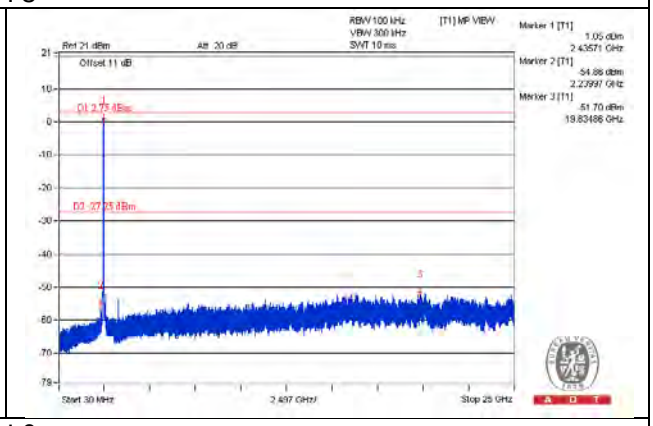




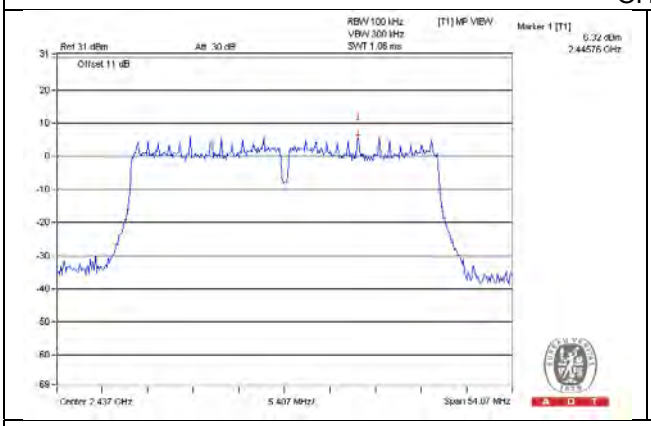
802.11n (40MHz)_Chain 2

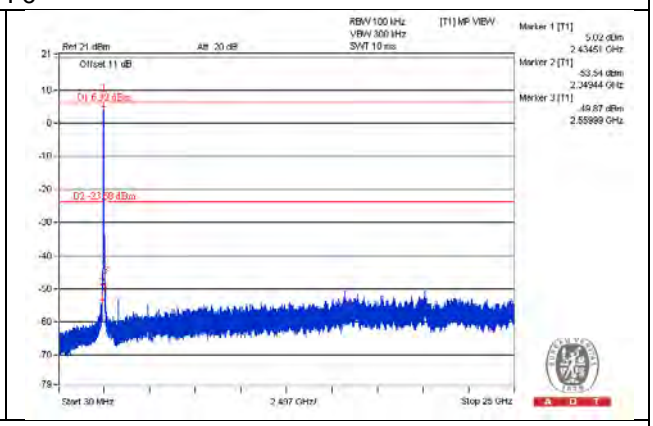
CH 3



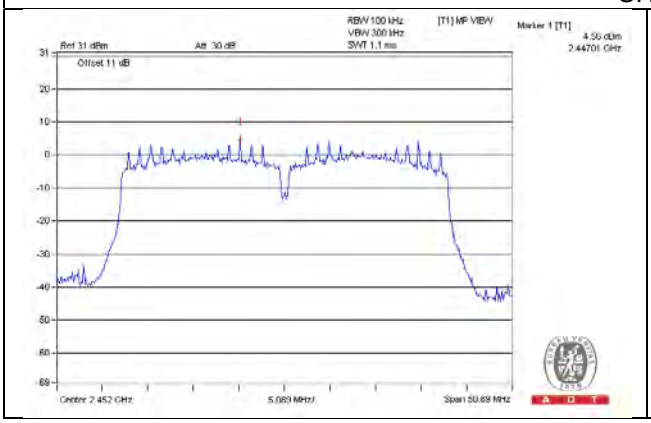


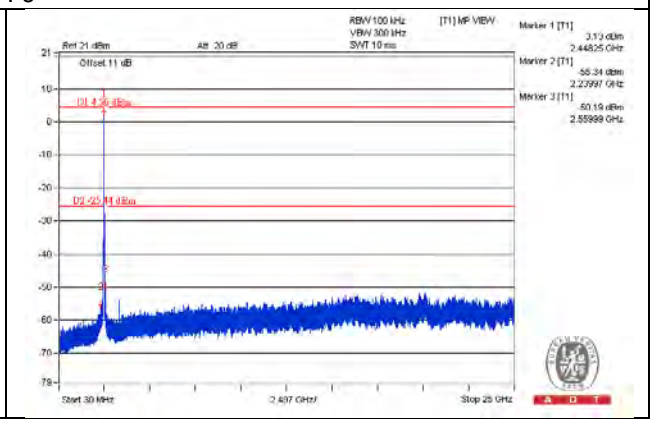
CH 6





CH 9





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:

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	74.7 PK	80.5	-5.8	1.19 H	60	68.40	6.30
2	#5725.00	64.5 AV	70.3	-5.8	1.19 H	60	58.20	6.30
3	*5745.00	110.5 PK			1.19 H	60	70.20	40.30
4	*5745.00	100.3 AV			1.19 H	60	60.00	40.30
5	11490.00	59.8 PK	74.0	-14.2	1.25 H	89	42.60	17.20
6	11490.00	45.9 AV	54.0	-8.1	1.25 H	89	28.70	17.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5725.00	87.5 PK	93.3	-5.8	1.61 V	21	81.20	6.30
2	#5725.00	77.4 AV	83.2	-5.8	1.61 V	21	71.10	6.30
3	*5745.00	123.3 PK			1.61 V	21	83.00	40.30
4	*5745.00	113.2 AV			1.61 V	21	72.90	40.30
5	11490.00	58.5 PK	74.0	-15.5	1.74 V	335	41.30	17.20
6	11490.00	45.3 AV	54.0	-8.7	1.74 V	335	28.10	17.20

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.
7. The limit value is defined as per 15.247.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	110.3 PK			1.88 H	148	69.90	40.40
2	*5785.00	100.0 AV			1.88 H	148	59.60	40.40
3	11570.00	58.9 PK	74.0	-15.1	1.26 H	32	41.60	17.30
4	11570.00	45.3 AV	54.0	-8.7	1.26 H	32	28.00	17.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	123.4 PK			1.53 V	21	83.00	40.40
2	*5785.00	113.6 AV			1.53 V	21	73.20	40.40
3	11570.00	60.1 PK	74.0	-13.9	1.00 V	341	42.80	17.30
4	11570.00	47.8 AV	54.0	-6.2	1.00 V	341	30.50	17.30

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. The limit value is defined as per 15.247.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	109.9 PK			1.10 H	226	69.40	40.50
2	*5825.00	100.0 AV			1.10 H	226	59.50	40.50
3	#5850.00	65.3 PK	79.9	-14.6	1.10 H	226	58.70	6.60
4	#5850.00	55.4 AV	70.0	-14.6	1.10 H	226	48.80	6.60
5	11650.00	59.7 PK	74.0	-14.3	1.57 H	48	42.00	17.70
6	11650.00	45.5 AV	54.0	-8.5	1.57 H	48	27.80	17.70
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	123.8 PK			1.67 V	22	83.30	40.50
2	*5825.00	113.7 AV			1.67 V	22	73.20	40.50
3	#5850.00	79.2 PK	93.8	-14.6	1.67 V	22	72.60	6.60
4	#5850.00	69.1 AV	83.7	-14.6	1.67 V	22	62.50	6.60
5	11650.00	65.1 PK	74.0	-8.9	1.97 V	358	47.40	17.70
6	11650.00	50.7 AV	54.0	-3.3	1.97 V	358	33.00	17.70

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.
7. The limit value is defined as per 15.247.

802.11n (20MHz)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5725.00	76.6 PK	79.7	-3.1	1.00 H	44	70.30	6.30
2	#5725.00	67.1 AV	70.2	-3.1	1.00 H	44	60.80	6.30
3	*5745.00	109.7 PK			1.00 H	44	69.40	40.30
4	*5745.00	100.2 AV			1.00 H	44	59.90	40.30
5	11490.00	57.8 PK	74.0	-16.2	1.24 H	84	40.60	17.20
6	11490.00	44.6 AV	54.0	-9.4	1.24 H	84	27.40	17.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5725.00	90.0 PK	93.1	-3.1	1.61 V	21	83.70	6.30
2	#5725.00	79.6 AV	82.7	-3.1	1.61 V	21	73.30	6.30
3	*5745.00	123.1 PK			1.61 V	21	82.80	40.30
4	*5745.00	112.7 AV			1.61 V	21	72.40	40.30
5	11490.00	58.4 PK	74.0	-15.6	1.76 V	340	41.20	17.20
6	11490.00	45.1 AV	54.0	-8.9	1.76 V	340	27.90	17.20

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.
7. The limit value is defined as per 15.247.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	110.2 PK			1.00 H	43	69.80	40.40
2	*5785.00	99.7 AV			1.00 H	43	59.30	40.40
3	11570.00	59.0 PK	74.0	-15.0	1.20 H	36	41.70	17.30
4	11570.00	45.6 AV	54.0	-8.4	1.20 H	36	28.30	17.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	123.3 PK			1.61 V	21	82.90	40.40
2	*5785.00	112.9 AV			1.61 V	21	72.50	40.40
3	11570.00	60.4 PK	74.0	-13.6	2.20 V	348	43.10	17.30
4	11570.00	46.9 AV	54.0	-7.1	2.20 V	348	29.60	17.30

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. The limit value is defined as per 15.247.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	109.8 PK			1.00 H	226	69.30	40.50
2	*5825.00	99.2 AV			1.00 H	226	58.70	40.50
3	#5850.00	64.6 PK	79.8	-15.2	1.00 H	226	58.00	6.60
4	#5850.00	54.0 AV	69.2	-15.2	1.00 H	226	47.40	6.60
5	11650.00	60.1 PK	74.0	-13.9	1.50 H	43	42.40	17.70
6	11650.00	45.7 AV	54.0	-8.3	1.50 H	43	28.00	17.70
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	123.3 PK			1.66 V	21	82.80	40.50
2	*5825.00	112.8 AV			1.66 V	21	72.30	40.50
3	#5850.00	78.1 PK	93.3	-15.2	1.66 V	21	71.50	6.60
4	#5850.00	67.6 AV	82.8	-15.2	1.66 V	21	61.00	6.60
5	11650.00	62.6 PK	74.0	-11.4	1.86 V	20	44.90	17.70
6	11650.00	48.9 AV	54.0	-5.1	1.86 V	20	31.20	17.70

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.
7. The limit value is defined as per 15.247.

802.11n (40MHz)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5725.00	74.5 PK	75.1	-0.6	1.00 H	42	68.20	6.30
2	#5725.00	53.9 AV	64.5	-10.6	1.00 H	42	47.60	6.30
3	*5755.00	105.1 PK			1.00 H	42	64.80	40.30
4	*5755.00	94.5 AV			1.00 H	42	54.20	40.30
5	11510.00	58.9 PK	74.0	-15.1	1.20 H	88	41.80	17.10
6	11510.00	44.9 AV	54.0	-9.1	1.20 H	88	27.80	17.10
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5725.00	89.7 PK	90.3	-0.6	1.60 V	19	83.40	6.30
2	#5725.00	80.0 AV	80.6	-0.6	1.60 V	19	73.70	6.30
3	*5755.00	120.3 PK			1.60 V	19	80.00	40.30
4	*5755.00	110.6 AV			1.60 V	19	70.30	40.30
5	11510.00	59.0 PK	74.0	-15.0	1.73 V	29	41.90	17.10
6	11510.00	45.3 AV	54.0	-8.7	1.73 V	29	28.20	17.10

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.
7. The limit value is defined as per 15.247.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5795.00	105.7 PK			1.00 H	42	65.30	40.40
2	*5795.00	95.8 AV			1.00 H	42	55.40	40.40
3	#5850.00	60.5 PK	75.7	-15.2	1.00 H	42	53.90	6.60
4	#5850.00	50.6 AV	65.8	-15.2	1.00 H	42	44.00	6.60
5	11590.00	60.0 PK	74.0	-14.0	1.22 H	86	42.80	17.20
6	11590.00	46.4 AV	54.0	-7.6	1.22 H	86	29.20	17.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5795.00	120.8 PK			1.68 V	7	80.40	40.40
2	*5795.00	111.0 AV			1.68 V	7	70.60	40.40
3	#5850.00	75.6 PK	90.8	-15.2	1.68 V	7	69.00	6.60
4	#5850.00	65.8 AV	81.0	-15.2	1.68 V	7	59.20	6.60
5	11590.00	62.4 PK	74.0	-11.6	1.81 V	27	45.20	17.20
6	11590.00	48.6 AV	54.0	-5.4	1.81 V	27	31.40	17.20

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.
7. The limit value is defined as per 15.247.

802.11ac (80MHz)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5725.00	69.8 PK	70.1	-0.3	1.00 H	43	63.50	6.30
2	#5725.00	59.6 AV	59.9	-0.3	1.00 H	43	53.30	6.30
3	*5775.00	100.1 PK			1.00 H	43	59.70	40.40
4	*5775.00	89.9 AV			1.00 H	43	49.50	40.40
5	11550.00	58.6 PK	74.0	-15.4	1.22 H	86	41.50	17.10
6	11550.00	44.8 AV	54.0	-9.2	1.22 H	86	27.70	17.10
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5725.00	84.8 PK	85.1	-0.3	1.60 V	19	78.50	6.30
2	#5725.00	75.3 AV	75.6	-0.3	1.60 V	19	69.00	6.30
3	*5775.00	115.1 PK			1.60 V	19	74.70	40.40
4	*5775.00	105.6 AV			1.60 V	19	65.20	40.40
5	11550.00	58.8 PK	74.0	-15.2	1.75 V	23	41.70	17.10
6	11550.00	45.1 AV	54.0	-8.9	1.75 V	23	28.00	17.10

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.
7. The limit value is defined as per 15.247.

Below 1GHz Data: 802.11a

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	124.98	30.7 QP	43.5	-12.8	1.99 H	13	46.70	-16.00
2	256.93	34.2 QP	46.0	-11.8	1.00 H	30	48.50	-14.30
3	375.29	40.2 QP	46.0	-5.8	1.00 H	9	51.40	-11.20
4	627.54	36.7 QP	46.0	-9.3	1.49 H	7	42.90	-6.20
5	720.68	32.7 QP	46.0	-13.3	1.00 H	270	37.60	-4.90
6	938.01	37.3 QP	46.0	-8.7	1.24 H	13	38.30	-1.00
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	60.95	35.6 QP	40.0	-4.4	1.01 V	3	50.40	-14.80
2	154.09	29.2 QP	43.5	-14.3	1.25 V	87	42.90	-13.70
3	375.29	35.7 QP	46.0	-10.3	1.25 V	181	46.90	-11.20
4	625.60	31.4 QP	46.0	-14.6	1.01 V	4	37.70	-6.30
5	782.78	31.5 QP	46.0	-14.5	2.00 V	258	34.70	-3.20
6	875.91	33.4 QP	46.0	-12.6	1.25 V	6	35.60	-2.20

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

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

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	62.89	30.2 QP	40.0	-9.8	1.49 H	11	45.30	-15.10
2	140.50	31.7 QP	43.5	-11.8	2.00 H	283	46.00	-14.30
3	375.29	38.6 QP	46.0	-7.4	1.00 H	15	49.80	-11.20
4	404.40	41.1 QP	46.0	-4.9	2.00 H	347	51.90	-10.80
5	625.60	34.0 QP	46.0	-12.0	1.49 H	220	40.30	-6.30
6	875.91	33.6 QP	46.0	-12.4	1.00 H	40	35.80	-2.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	47.36	35.0 QP	40.0	-5.0	1.24 V	309	49.00	-14.00
2	103.64	33.4 QP	43.5	-10.1	1.00 V	250	51.30	-17.90
3	375.29	36.4 QP	46.0	-9.6	1.24 V	308	47.60	-11.20
4	402.46	35.1 QP	46.0	-10.9	1.99 V	99	45.90	-10.80
5	625.60	33.0 QP	46.0	-13.0	1.00 V	136	39.30	-6.30
6	875.91	34.6 QP	46.0	-11.4	1.24 V	19	36.80	-2.20

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

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 4.1.6.

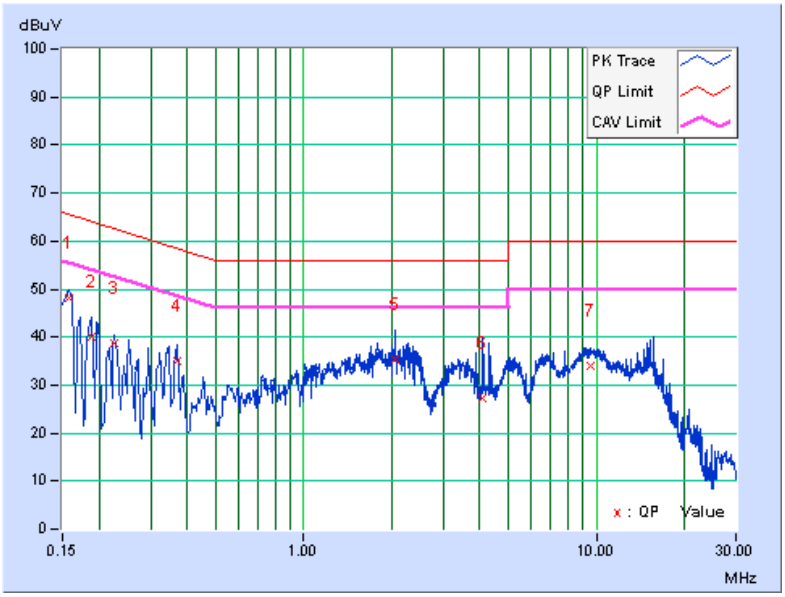
5.2.7 Test Results

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

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	0.15760	0.08	47.90	34.31	47.98	34.39	65.59	55.59	-17.61	-21.20
2	0.18903	0.13	39.94	26.78	40.07	26.91	64.08	54.08	-24.01	-27.17
3	0.22434	0.14	38.63	28.27	38.77	28.41	62.66	52.66	-23.89	-24.25
4	0.36896	0.09	34.76	25.69	34.85	25.78	58.52	48.52	-23.67	-22.74
5	2.05808	0.22	35.07	26.93	35.29	27.15	56.00	46.00	-20.71	-18.85
6	4.06782	0.25	26.89	20.06	27.14	20.31	56.00	46.00	-28.86	-25.69
7	9.53791	0.46	33.71	28.36	34.17	28.82	60.00	50.00	-25.83	-21.18

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.

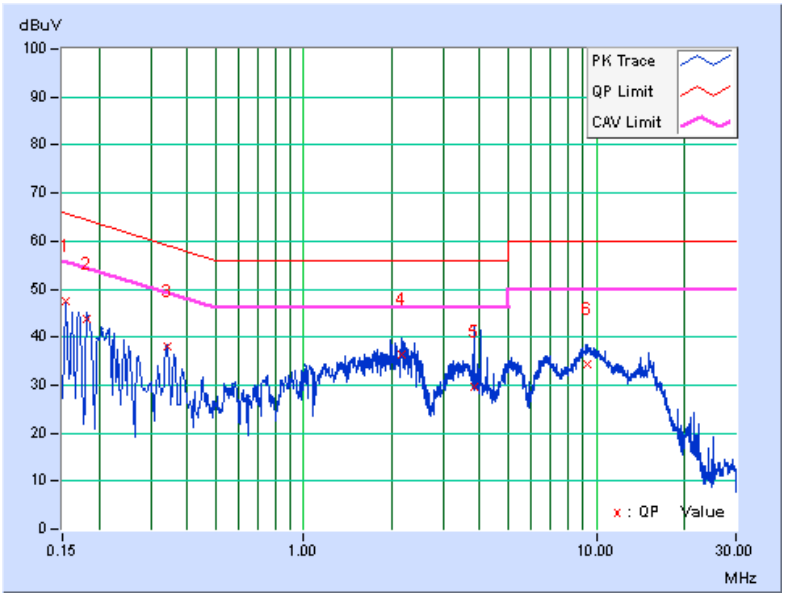


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test mode	A		

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	0.15391	0.13	47.24	36.12	47.37	36.25	65.79	55.79	-18.42	-19.54
2	0.18128	0.20	43.69	29.17	43.89	29.37	64.43	54.43	-20.54	-25.06
3	0.34159	0.19	37.80	34.90	37.99	35.09	59.16	49.16	-21.17	-14.07
4	2.16365	0.22	36.03	25.96	36.25	26.18	56.00	46.00	-19.75	-19.82
5	3.82149	0.37	29.14	21.64	29.51	22.01	56.00	46.00	-26.49	-23.99
6	9.34632	0.51	33.78	28.41	34.29	28.92	60.00	50.00	-25.71	-21.08

Remarks:

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

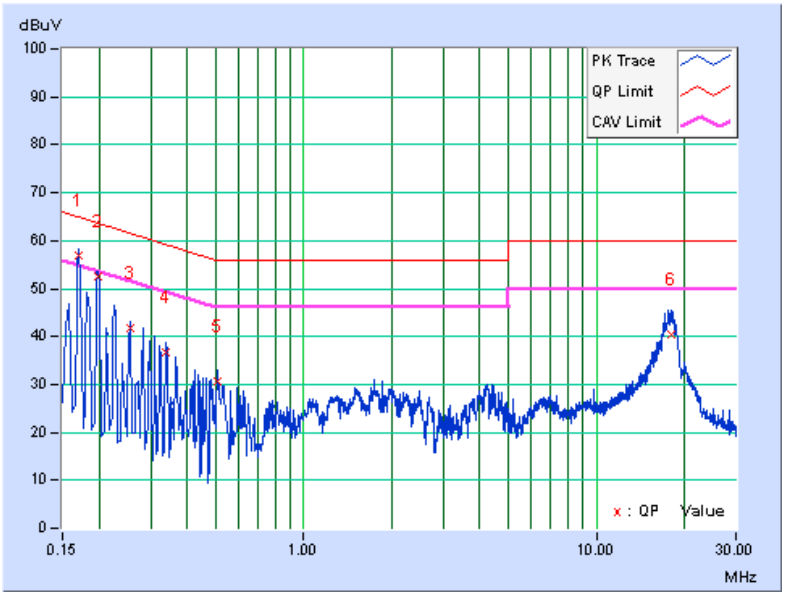


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test mode	B		

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**	**0.10**	**56.76**	**44.36**	**56.86**	**44.46**	**64.98**	**54.98**	**-8.12**	**-10.52**
2	0.19717	0.15	52.25	39.74	52.40	39.89	63.73	53.73	-11.33	-13.84
3	0.25557	0.13	41.71	27.43	41.84	27.56	61.57	51.57	-19.73	-24.01
4	0.33768	0.10	36.69	23.83	36.79	23.93	59.26	49.26	-22.47	-25.33
5	0.50581	0.10	30.44	21.07	30.54	21.17	56.00	46.00	-25.46	-24.83
6	18.10472	0.87	39.49	32.01	40.36	32.88	60.00	50.00	-19.64	-17.12

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.

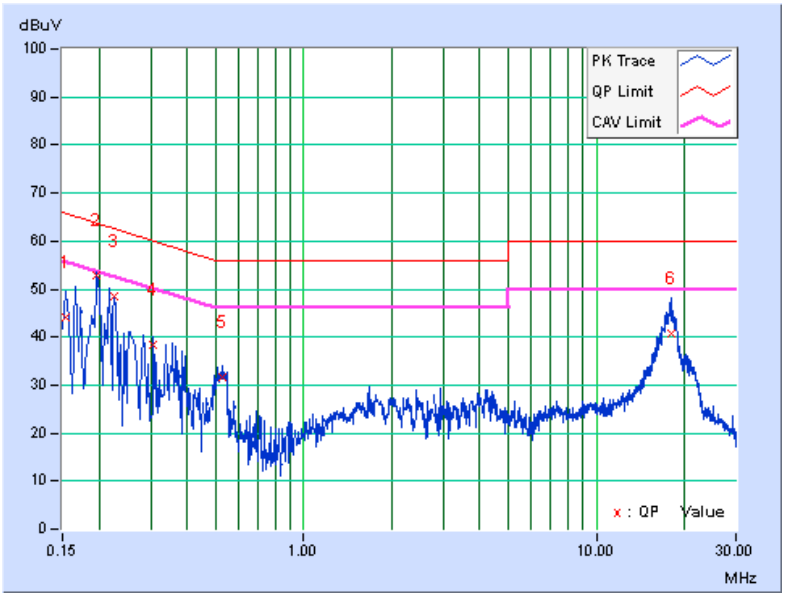


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test mode	B		

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	0.15391	0.13	44.09	29.14	44.22	29.27	65.79	55.79	-21.57	-26.52
2	0.19692	0.24	52.48	41.27	52.72	41.51	63.74	53.74	-11.02	-12.23
3	0.22434	0.24	48.11	36.83	48.35	37.07	62.66	52.66	-14.31	-15.59
4	0.30640	0.21	38.10	26.63	38.31	26.84	60.07	50.07	-21.76	-23.23
5	0.52544	0.17	31.33	22.51	31.50	22.68	56.00	46.00	-24.50	-23.32
6	17.95223	0.79	40.08	32.07	40.87	32.86	60.00	50.00	-19.13	-17.14

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

CDD Mode

802.11a

Channel	Frequency (MHz)	6db Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	16.34	16.33	15.76	15.76	0.5	PASS
157	5785	16.36	16.35	16.32	15.72	0.5	PASS
165	5825	16.35	16.38	15.73	15.66	0.5	PASS

802.11n (20MHz)

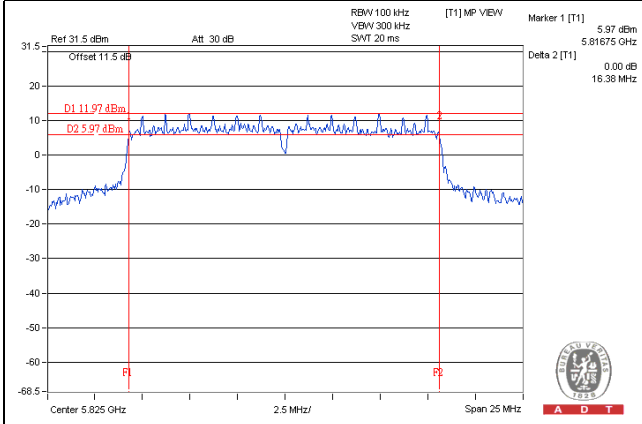
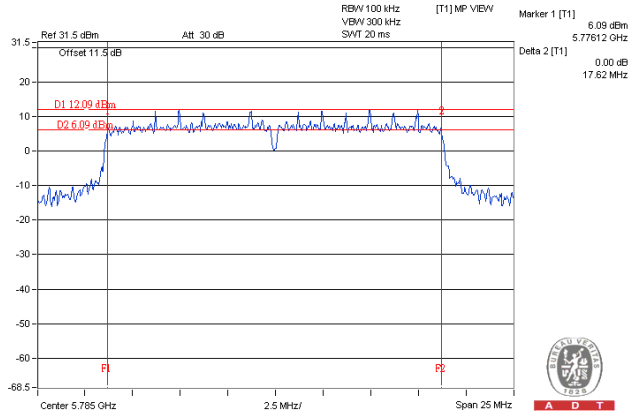
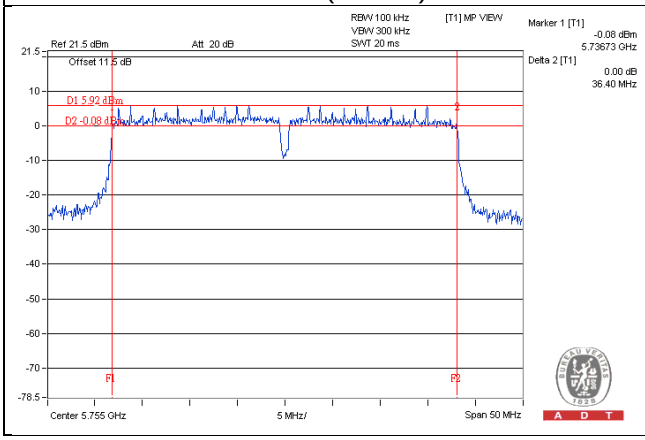
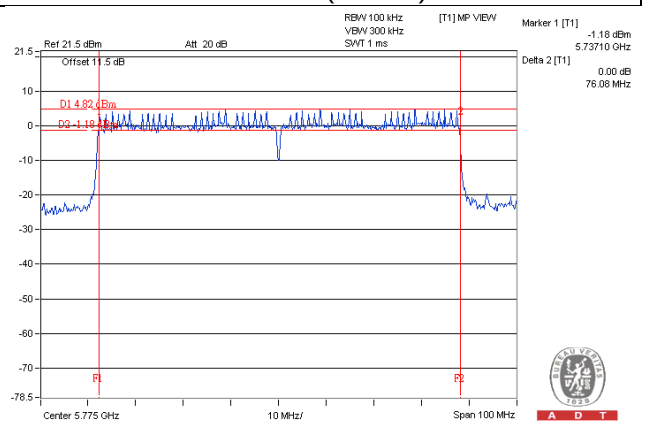
Channel	Frequency (MHz)	6db Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	17.23	17.59	16.57	17.19	0.5	PASS
157	5785	17.61	17.62	16.60	16.36	0.5	PASS
165	5825	17.60	17.60	16.95	16.59	0.5	PASS

802.11n (40MHz)

Channel	Frequency (MHz)	6db Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	35.27	36.40	35.21	35.79	0.5	PASS
159	5795	35.20	35.39	35.25	36.01	0.5	PASS

802.11ac (80MHz)

Channel	Frequency (MHz)	6db Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
155	5775	76.08	76.06	75.57	76.00	0.5	PASS

Spectrum Plot of Worst Value	
802.11a	802.11n (20MHz)
	
802.11n (40MHz)	802.11ac (80MHz)
	

Beamforming_NSS1 Mode

802.11n (20MHz)

Channel	Frequency (MHz)	6db Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	17.23	17.59	17.19	16.97	0.5	PASS
157	5785	17.61	17.36	17.59	17.19	0.5	PASS
165	5825	17.60	17.60	16.97	17.19	0.5	PASS

802.11n (40MHz)

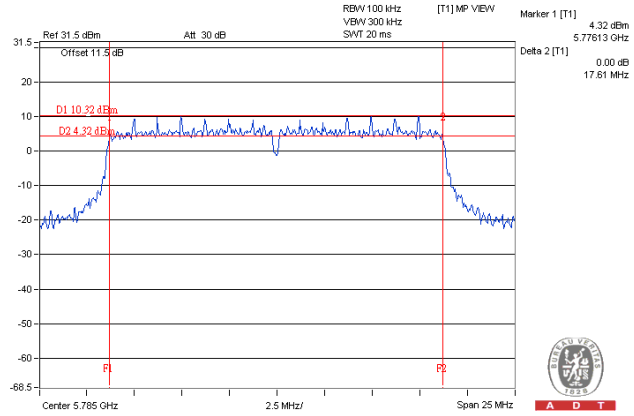
Channel	Frequency (MHz)	6db Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	35.79	35.55	35.36	36.03	0.5	PASS
159	5795	35.25	35.44	35.28	35.97	0.5	PASS

802.11ac (80MHz)

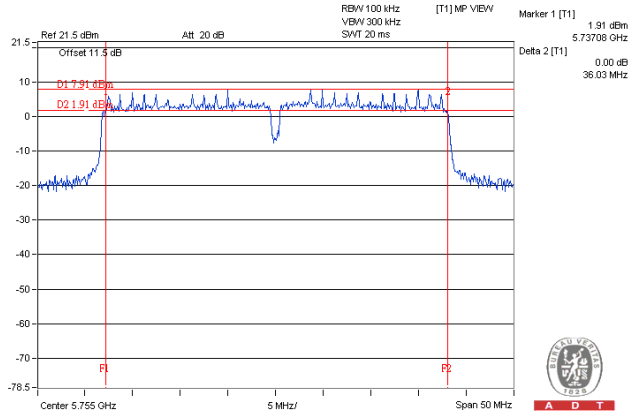
Channel	Frequency (MHz)	6db Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
155	5775	76.33	76.01	75.86	76.01	0.5	PASS

Spectrum Plot of Worst Value

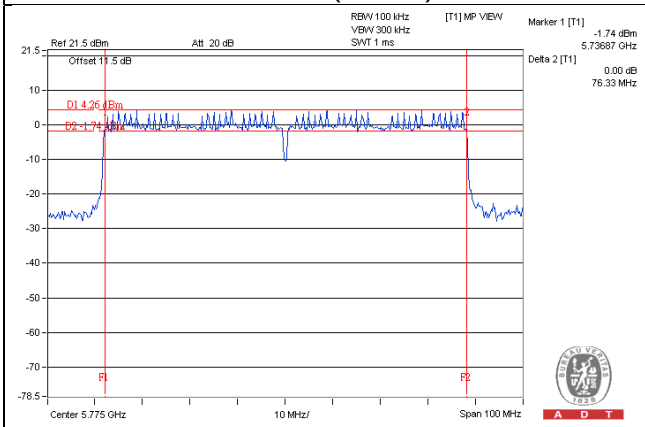
802.11n (20MHz)



802.11n (40MHz)



802.11ac (80MHz)



Beamforming_NSS2 Mode

802.11n (20MHz)

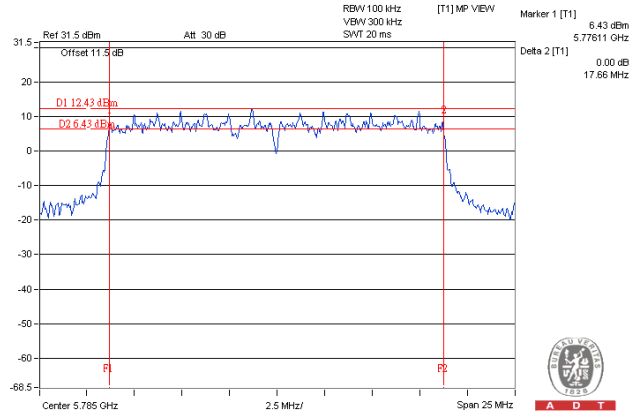
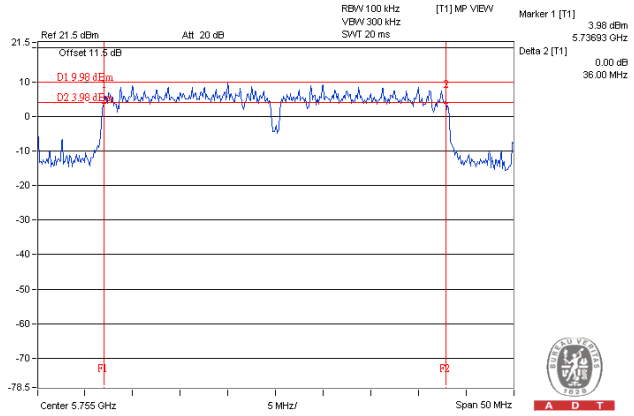
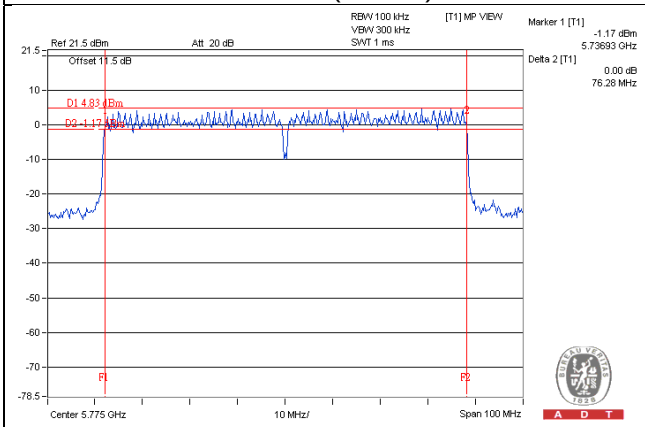
Channel	Frequency (MHz)	6db Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	17.65	17.65	17.61	17.61	0.5	PASS
157	5785	17.66	17.65	17.63	17.62	0.5	PASS
165	5825	17.65	17.65	17.64	17.63	0.5	PASS

802.11n (40MHz)

Channel	Frequency (MHz)	6db Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	35.33	36.00	35.97	35.98	0.5	PASS
159	5795	35.94	35.98	35.94	35.93	0.5	PASS

802.11ac (80MHz)

Channel	Frequency (MHz)	6db Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
155	5775	76.28	76.22	76.10	76.25	0.5	PASS

Spectrum Plot of Worst Value	
802.11n (20MHz)	802.11n (40MHz)
	
802.11ac (80MHz)	
	

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 NANT ≥ 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

CDD Mode

802.11a

Chan.	Chan. Freq. (MHz)	AVG. Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
149	5745	23.46	23.79	24.01	24.05	967.017	29.85	30	Pass
157	5785	23.86	23.94	23.81	24.12	**989.624**	29.95	30	Pass
165	5825	23.21	23.75	24.05	24.16	961.260	29.83	30	Pass

802.11n (20MHz)

Chan.	Chan. Freq. (MHz)	AVG. Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
149	5745	23.73	23.80	23.87	23.97	969.171	29.86	30	Pass
157	5785	23.48	23.80	24.11	24.17	981.575	29.92	30	Pass
165	5825	23.12	23.86	24.07	24.09	960.054	29.82	30	Pass

802.11n (40MHz)

Chan.	Chan. Freq. (MHz)	AVG. Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
151	5755	23.25	23.76	24.03	24.13	960.784	29.83	30	Pass
159	5795	23.59	23.57	23.84	24.15	958.189	29.81	30	Pass

802.11ac (80MHz)

Chan.	Chan. Freq. (MHz)	AVG. Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
155	5775	22.13	22.05	22.54	22.72	690.171	28.39	30	Pass

Beamforming_NSS1 Mode

802.11n (20MHz)

Chan.	Chan. Freq. (MHz)	AVG. Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
149	5745	22.21	22.28	22.35	22.45	682.968	28.34	28.37	Pass
157	5785	22.01	22.34	22.61	22.64	**696.295**	28.43	28.47	Pass
165	5825	22.30	22.13	22.42	22.42	682.293	28.34	28.37	Pass

Note:

5745MHz: Directional gain = 1.61dBi + 10log(4) = 7.63dBi > 6dBi, so the power limit shall be reduced to 30-(7.63-6) = 28.37dBm.

5785MHz: Directional gain = 1.51dBi + 10log(4) = 7.53dBi > 6dBi, so the power limit shall be reduced to 30-(7.53-6) = 28.47dBm.

5825MHz: Directional gain = 1.61dBi + 10log(4) = 7.63dBi > 6dBi, so the power limit shall be reduced to 30-(7.63-6) = 28.37dBm.

802.11n (40MHz)

Chan.	Chan. Freq. (MHz)	AVG. Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
151	5755	21.53	21.83	22.09	22.59	637.998	28.05	28.47	Pass
159	5795	22.15	22.38	22.61	22.21	685.772	28.36	28.37	Pass

Note:

5755MHz: Directional gain = 1.51dBi + 10log(4) = 7.53dBi > 6dBi, so the power limit shall be reduced to 30-(7.53-6) = 28.47dBm.

5795MHz: Directional gain = 1.61dBi + 10log(4) = 7.63dBi > 6dBi, so the power limit shall be reduced to 30-(7.63-6) = 28.37dBm.

802.11ac (80MHz)

Chan.	Chan. Freq. (MHz)	AVG. Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
155	5775	21.31	21.62	22.02	22.33	610.641	27.86	28.37	Pass

Note:

5775MHz: Directional gain = 1.61dBi + 10log(4) = 7.63dBi > 6dBi, so the power limit shall be reduced to 30-(7.63-6) = 28.37dBm.

Beamforming_NSS2 Mode

802.11n (20MHz)

Chan.	Chan. Freq. (MHz)	AVG. Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
149	5745	23.73	23.80	23.87	23.97	969.171	29.86	30	Pass
157	5785	23.48	23.80	24.11	24.17	981.575	29.92	30	Pass
165	5825	23.12	23.86	24.07	24.09	960.054	29.82	30	Pass

Note:

5745MHz: Directional gain = 1.61dBi + 10log(4/2) = 4.62dBi < 6dBi, so the power limit no need to reduced.

5785MHz: Directional gain = 1.51dBi + 10log(4/2) = 4.52dBi < 6dBi, so the power limit no need to reduced.

5825MHz: Directional gain = 1.61dBi + 10log(4/2) = 4.62dBi < 6dBi, so the power limit no need to reduced.

802.11n (40MHz)

Chan.	Chan. Freq. (MHz)	AVG. Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
151	5755	23.75	23.92	24.06	24.15	**998.440**	29.99	30	Pass
159	5795	23.53	23.95	24.10	24.18	992.595	29.97	30	Pass

Note:

5755MHz: Directional gain = 1.51dBi + 10log(4/2) = 4.52dBi < 6dBi, so the power limit no need to reduced.

5795MHz: Directional gain = 1.61dBi + 10log(4/2) = 4.62dBi < 6dBi, so the power limit no need to reduced.

802.11ac (80MHz)

Chan.	Chan. Freq. (MHz)	AVG. Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
155	5775	21.85	22.05	22.55	22.73	680.820	28.33	30	Pass

Note:

5775MHz: Directional gain = 1.61dBi + 10log(4/2) = 4.62dBi < 6dBi, so the power limit no need to reduced.

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

CDD Mode

802.11a

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=4) dB	Duty Factor	Total PSD with Duty Factor (dBm)	Limit (dBm)	Pass / Fail
0	149	5745	-7.60	6.02	0.15	-1.43	6.37	Pass
	157	5785	-7.91	6.02	0.15	-1.74	6.47	Pass
	165	5825	-8.41	6.02	0.15	-2.24	6.37	Pass
1	149	5745	-7.34	6.02	0.15	-1.17	6.37	Pass
	157	5785	-7.46	6.02	0.15	-1.29	6.47	Pass
	165	5825	-7.55	6.02	0.15	-1.38	6.37	Pass
2	149	5745	-6.48	6.02	0.15	-0.31	6.37	Pass
	157	5785	-7.62	6.02	0.15	-1.45	6.47	Pass
	165	5825	-6.91	6.02	0.15	-0.74	6.37	Pass
3	149	5745	-7.03	6.02	0.15	-0.86	6.37	Pass
	157	5785	-7.19	6.02	0.15	-1.02	6.47	Pass
	165	5825	-7.62	6.02	0.15	-1.45	6.37	Pass

Note:

1. 5745MHz: Directional gain = 1.61dBi + 10log(4) = 7.63dBi > 6dBi, so the power density limit shall be reduced to 8-(7.63-6) = 6.37dBm.

   5785MHz: Directional gain = 1.51dBi + 10log(4) = 7.53dBi > 6dBi, so the power density limit shall be reduced to 8-(7.53-6) = 6.47dBm.

   5825MHz: Directional gain = 1.61dBi + 10log(4) = 7.63dBi > 6dBi, so the power density limit shall be reduced to 8-(7.63-6) = 6.37dBm.
2. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (20MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=4) dB	Total PSD (dBm)	Limit (dBm)	Pass / Fail
0	149	5745	-7.11	6.02	-1.09	6.37	Pass
	157	5785	-7.36	6.02	-1.34	6.47	Pass
	165	5825	-7.35	6.02	-1.33	6.37	Pass
1	149	5745	-7.56	6.02	-1.54	6.37	Pass
	157	5785	-7.09	6.02	-1.07	6.47	Pass
	165	5825	-7.18	6.02	-1.16	6.37	Pass
2	149	5745	-7.03	6.02	-1.01	6.37	Pass
	157	5785	-6.96	6.02	-0.94	6.47	Pass
	165	5825	-6.61	6.02	-0.59	6.37	Pass
3	149	5745	-6.71	6.02	-0.69	6.37	Pass
	157	5785	-6.63	6.02	-0.61	6.47	Pass
	165	5825	-7.37	6.02	-1.35	6.37	Pass

Note:

5745MHz: Directional gain = 1.61dBi + 10log(4) = 7.63dBi > 6dBi, so the power density limit shall be reduced to 8-(7.63-6) = 6.37dBm.

5785MHz: Directional gain = 1.51dBi + 10log(4) = 7.53dBi > 6dBi, so the power density limit shall be reduced to 8-(7.53-6) = 6.47dBm.

5825MHz: Directional gain = 1.61dBi + 10log(4) = 7.63dBi > 6dBi, so the power density limit shall be reduced to 8-(7.63-6) = 6.37dBm.

802.11n (40MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=4) dB	Duty Factor	Total PSD with Duty Factor (dBm)	Limit (dBm)	Pass / Fail
0	151	5755	-12.45	6.02	0.13	-6.30	6.47	Pass
	159	5795	-10.78	6.02	0.13	-4.63	6.37	Pass
1	151	5755	-13.08	6.02	0.13	-6.93	6.47	Pass
	159	5795	-10.45	6.02	0.13	-4.30	6.37	Pass
2	151	5755	-9.33	6.02	0.13	-3.18	6.47	Pass
	159	5795	-10.87	6.02	0.13	-4.72	6.37	Pass
3	151	5755	-9.86	6.02	0.13	-3.71	6.47	Pass
	159	5795	-9.62	6.02	0.13	-3.47	6.37	Pass

Note:

1. 5755MHz: Directional gain = 1.51dBi + 10log(4) = 7.53dBi > 6dBi, so the power density limit shall be reduced to 8-(7.53-6) = 6.47dBm.

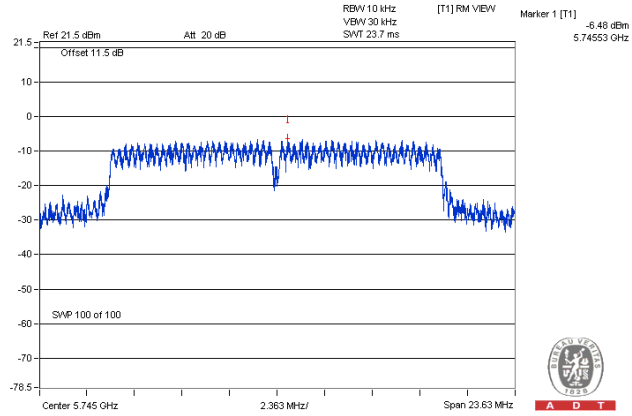
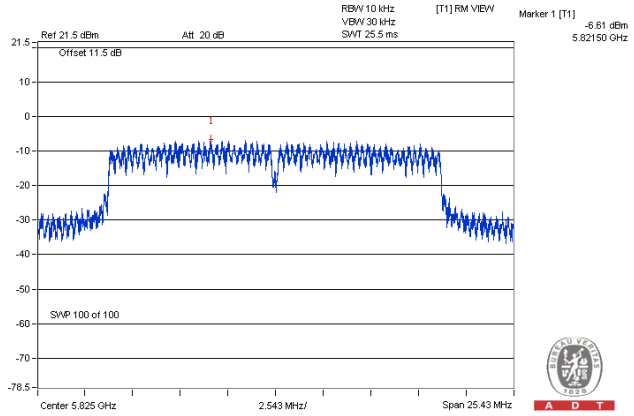
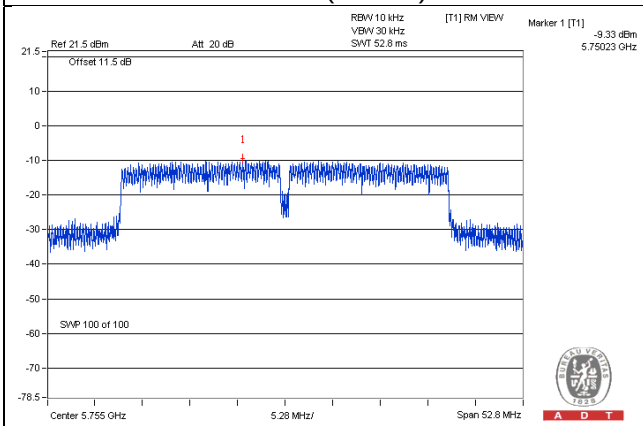
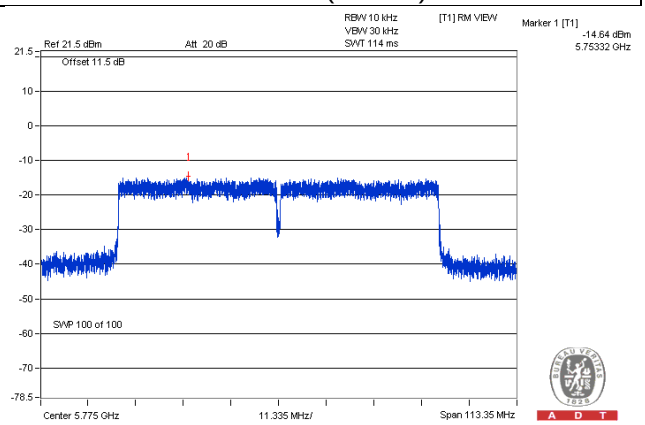
   5795MHz: Directional gain = 1.61dBi + 10log(4) = 7.63dBi > 6dBi, so the power density limit shall be reduced to 8-(7.63-6) = 6.37dBm.
2. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (80MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=4) dB	Duty Factor	Total PSD with Duty Factor (dBm)	Limit (dBm)	Pass / Fail
0	155	5775	-14.72	6.02	0.28	-8.42	6.37	Pass
1	155	5775	-15.62	6.02	0.28	-9.32	6.37	Pass
2	155	5775	-14.64	6.02	0.28	-8.34	6.37	Pass
3	155	5775	-14.85	6.02	0.28	-8.55	6.37	Pass

Note:

1. 5775MHz: Directional gain = 1.61dBi + 10log(4) = 7.63dBi > 6dBi, so the power density limit shall be reduced to 8-(7.63-6) = 6.37dBm.
2. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value	
802.11a	802.11n (20MHz)
	
802.11n (40MHz)	802.11ac (80MHz)
	

Beamforming_NSS1 Mode

802.11n (20MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=4) dB	Total PSD (dBm)	Limit (dBm)	Pass / Fail
0	149	5745	-9.06	6.02	-3.04	6.37	Pass
	157	5785	-8.50	6.02	-2.48	6.47	Pass
	165	5825	-8.73	6.02	-2.71	6.37	Pass
1	149	5745	-8.15	6.02	-2.13	6.37	Pass
	157	5785	-8.47	6.02	-2.45	6.47	Pass
	165	5825	-8.80	6.02	-2.78	6.37	Pass
2	149	5745	-7.77	6.02	-1.75	6.37	Pass
	157	5785	-8.33	6.02	-2.31	6.47	Pass
	165	5825	-8.22	6.02	-2.20	6.37	Pass
3	149	5745	-7.73	6.02	-1.71	6.37	Pass
	157	5785	-8.67	6.02	-2.65	6.47	Pass
	165	5825	-8.77	6.02	-2.75	6.37	Pass

Note:

5745MHz: Directional gain = 1.61dBi + 10log(4) = 7.63dBi > 6dBi, so the power density limit shall be reduced to 8-(7.63-6) = 6.37dBm.

5785MHz: Directional gain = 1.51dBi + 10log(4) = 7.53dBi > 6dBi, so the power density limit shall be reduced to 8-(7.53-6) = 6.47dBm.

5825MHz: Directional gain = 1.61dBi + 10log(4) = 7.63dBi > 6dBi, so the power density limit shall be reduced to 8-(7.63-6) = 6.37dBm.

802.11n (40MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=4) dB	Duty Factor	Total PSD with Duty Factor (dBm)	Limit (dBm)	Pass / Fail
0	151	5755	-12.69	6.02	0.15	-6.52	6.47	Pass
	159	5795	-12.18	6.02	0.15	-6.01	6.37	Pass
1	151	5755	-12.64	6.02	0.15	-6.47	6.47	Pass
	159	5795	-11.92	6.02	0.15	-5.75	6.37	Pass
2	151	5755	-12.70	6.02	0.15	-6.53	6.47	Pass
	159	5795	-11.07	6.02	0.15	-4.90	6.37	Pass
3	151	5755	-11.72	6.02	0.15	-5.55	6.47	Pass
	159	5795	-12.50	6.02	0.15	-6.33	6.37	Pass

Note:

1. 5755MHz: Directional gain = 1.51dBi + 10log(4) = 7.53dBi > 6dBi, so the power density limit shall be reduced to 8-(7.53-6) = 6.47dBm.

   5795MHz: Directional gain = 1.61dBi + 10log(4) = 7.63dBi > 6dBi, so the power density limit shall be reduced to 8-(7.63-6) = 6.37dBm.
2. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (80MHz)

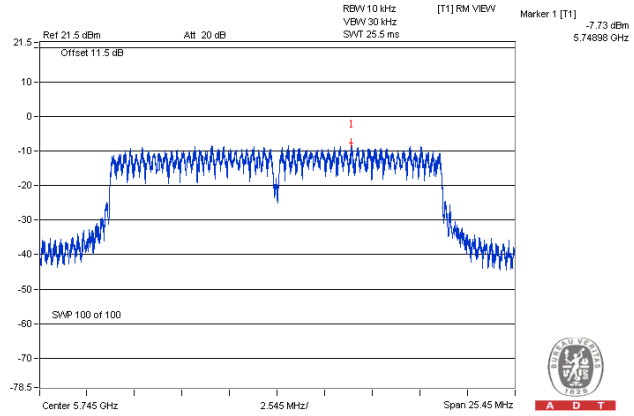
TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=4) dB	Duty Factor	Total PSD with Duty Factor (dBm)	Limit (dBm)	Pass / Fail
0	155	5775	-15.78	6.02	0.28	-9.48	6.37	Pass
1	155	5775	-15.65	6.02	0.28	-9.35	6.37	Pass
2	155	5775	-15.66	6.02	0.28	-9.36	6.37	Pass
3	155	5775	-14.86	6.02	0.28	-8.56	6.37	Pass

Note:

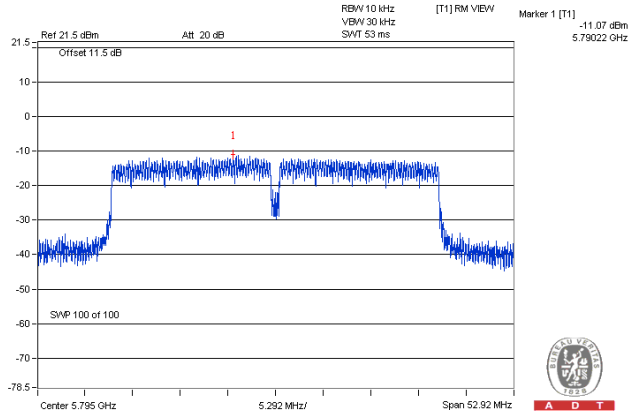
1. 5775MHz: Directional gain = 1.61dBi + 10log(4) = 7.63dBi > 6dBi, so the power density limit shall be reduced to 8-(7.63-6) = 6.37dBm.
2. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

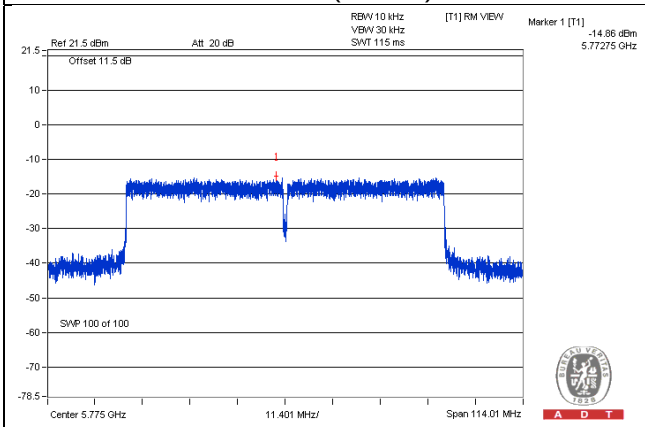
802.11n (20MHz)



802.11n (40MHz)



802.11ac (80MHz)



Beamforming_NSS2 Mode

802.11n (20MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=4) dB	Duty Factor	Total PSD with Duty Factor (dBm)	Limit (dBm)	Pass / Fail
0	149	5745	-6.85	6.02	0.14	-0.69	8.00	Pass
	157	5785	-6.82	6.02	0.14	-0.66	8.00	Pass
	165	5825	-6.55	6.02	0.14	-0.39	8.00	Pass
1	149	5745	-6.31	6.02	0.14	-0.15	8.00	Pass
	157	5785	-6.36	6.02	0.14	-0.20	8.00	Pass
	165	5825	-6.74	6.02	0.14	-0.58	8.00	Pass
2	149	5745	-6.08	6.02	0.14	0.08	8.00	Pass
	157	5785	-5.67	6.02	0.14	0.49	8.00	Pass
	165	5825	-6.15	6.02	0.14	0.01	8.00	Pass
3	149	5745	-5.33	6.02	0.14	0.83	8.00	Pass
	157	5785	-5.74	6.02	0.14	0.42	8.00	Pass
	165	5825	-6.03	6.02	0.14	0.13	8.00	Pass

Note:

1. 5745MHz: Directional gain = 1.61dBi + 10log(4/2) = 4.62dBi < 6dBi, so the power density limit no need to reduced.

   5785MHz: Directional gain = 1.51dBi + 10log(4/2) = 4.52dBi < 6dBi, so the power density limit no need to reduced.

   5825MHz: Directional gain = 1.61dBi + 10log(4/2) = 4.62dBi < 6dBi, so the power density limit no need to reduced.
2. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (40MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=4) dB	Duty Factor	Total PSD with Duty Factor (dBm)	Limit (dBm)	Pass / Fail
0	151	5755	-10.69	6.02	0.27	-4.40	8.00	Pass
	159	5795	-9.39	6.02	0.27	-3.10	8.00	Pass
1	151	5755	-8.61	6.02	0.27	-2.32	8.00	Pass
	159	5795	-8.64	6.02	0.27	-2.35	8.00	Pass
2	151	5755	-8.39	6.02	0.27	-2.10	8.00	Pass
	159	5795	-9.18	6.02	0.27	-2.89	8.00	Pass
3	151	5755	-8.78	6.02	0.27	-2.49	8.00	Pass
	159	5795	-8.94	6.02	0.27	-2.65	8.00	Pass

Note:

1. 5755MHz: Directional gain = 1.51dBi + 10log(4/2) = 4.52dBi < 6dBi, so the power density limit no need to reduced.

   5795MHz: Directional gain = 1.61dBi + 10log(4/2) = 4.62dBi < 6dBi, so the power density limit no need to reduced.
2. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (80MHz)

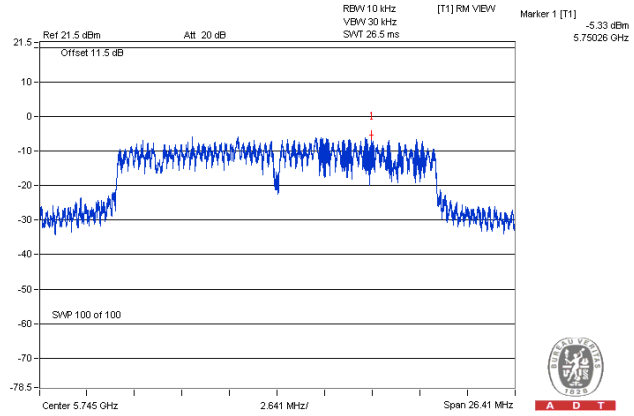
TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=4) dB	Duty Factor	Total PSD with Duty Factor (dBm)	Limit (dBm)	Pass / Fail
0	155	5775	-13.99	6.02	0.50	-7.47	8.00	Pass
1	155	5775	-14.64	6.02	0.50	-8.12	8.00	Pass
2	155	5775	-13.58	6.02	0.50	-7.06	8.00	Pass
3	155	5775	-13.54	6.02	0.50	-7.02	8.00	Pass

Note:

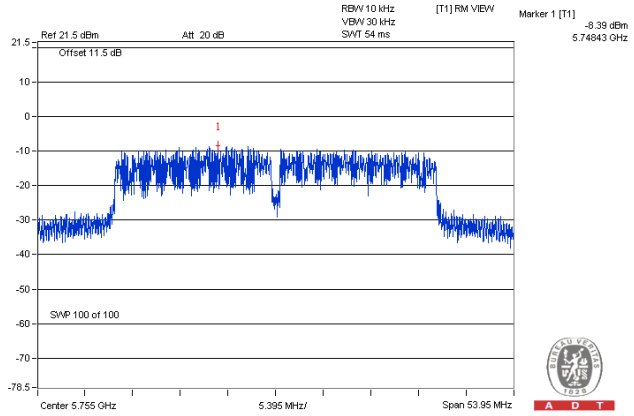
1. 5775MHz: Directional gain = 1.61dBi + 10log(4/2) = 4.62dBi < 6dBi, so the power density limit no need to reduced.
2. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

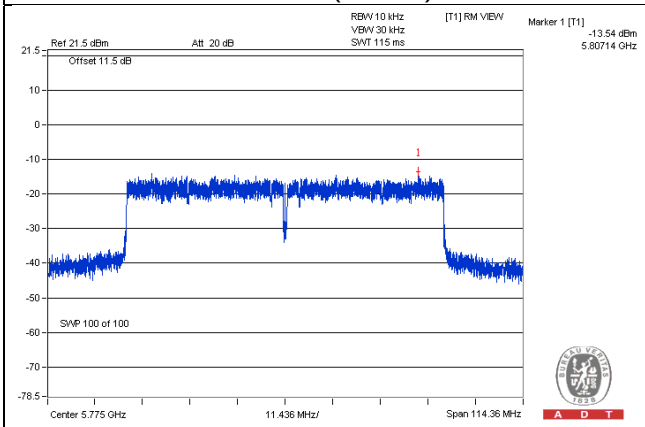
802.11n (20MHz)



802.11n (40MHz)



802.11ac (80MHz)



5.6 Conducted Out of Band Emission Measurement

5.6.1 Limits of Conducted Out of Band Emission Measurement

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

5.6.2 Test Setup

Same as Item 4.6.2

5.6.3 Test Instruments

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.

CDD Mode

802.11a_Chain 0

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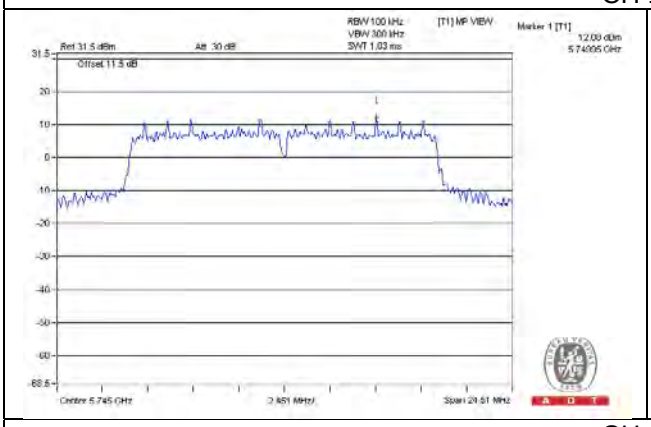
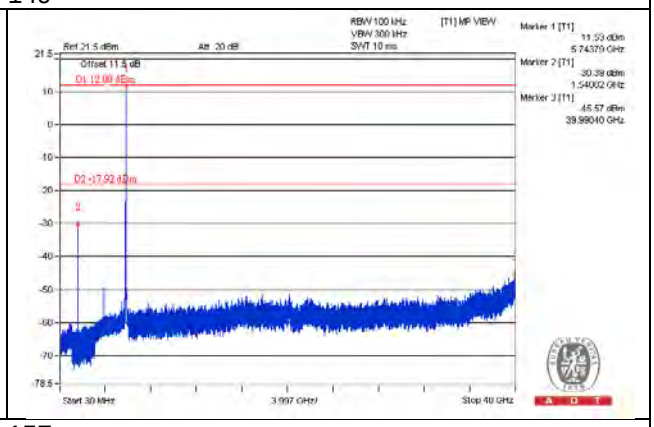
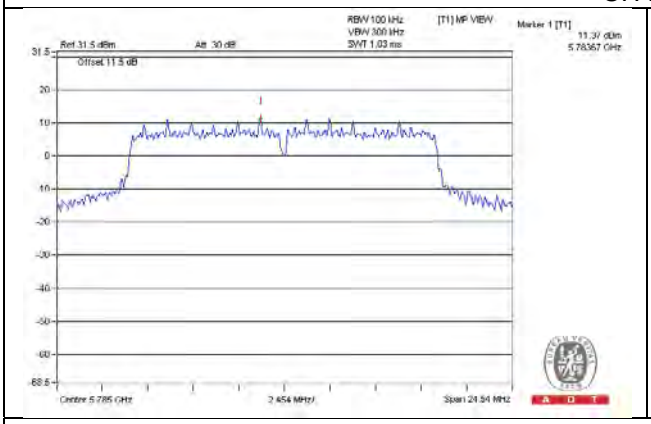
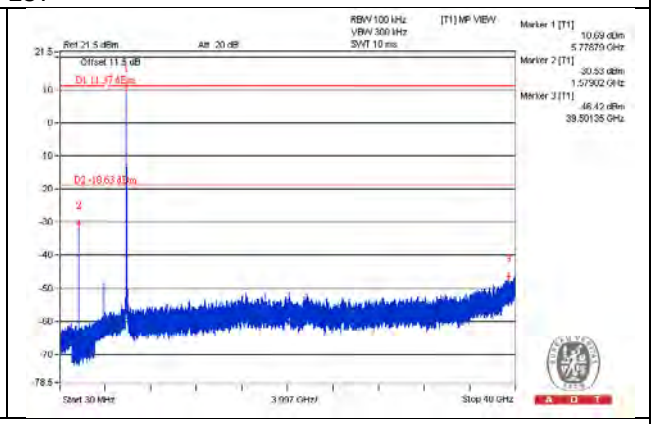


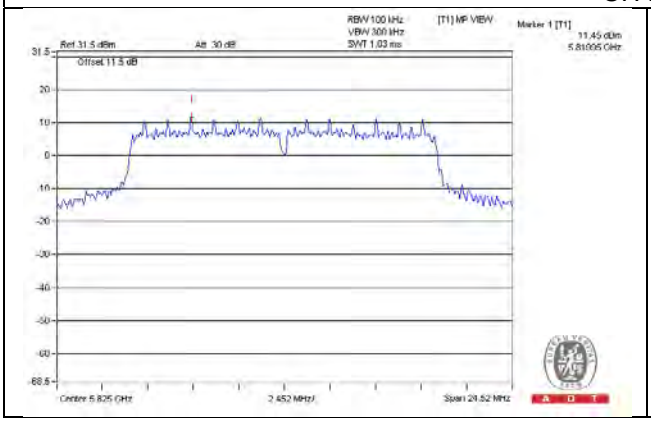


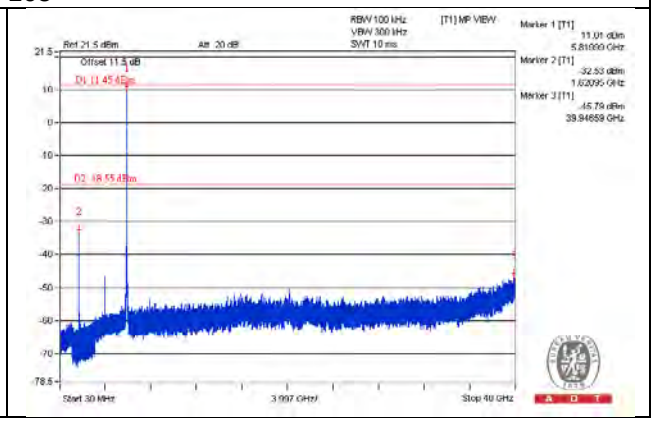
CH 157





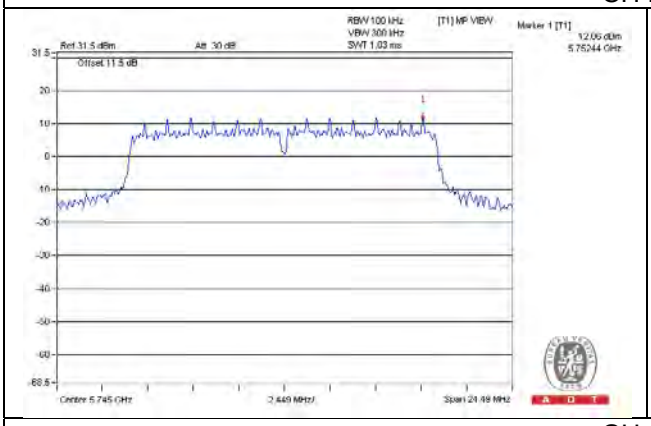
CH 165

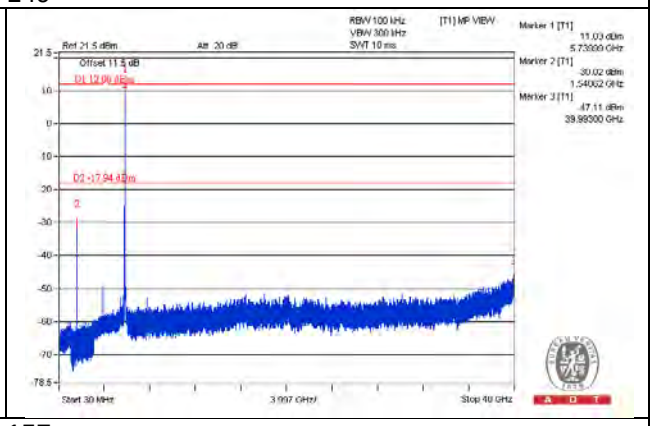




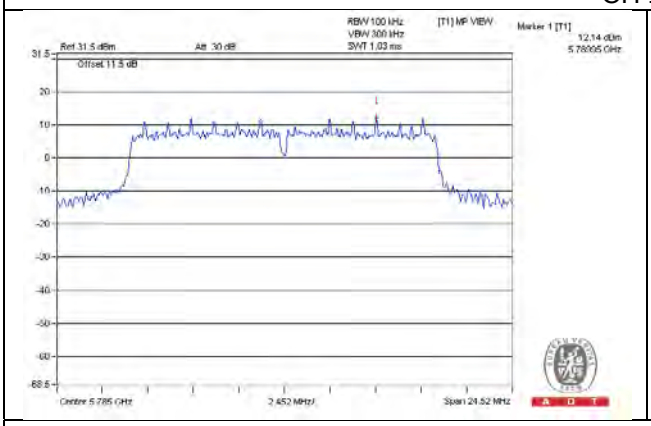
802.11a_Chain 1

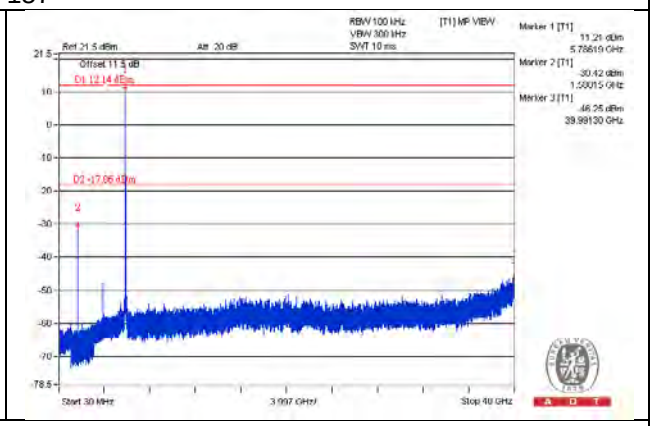
CH 149



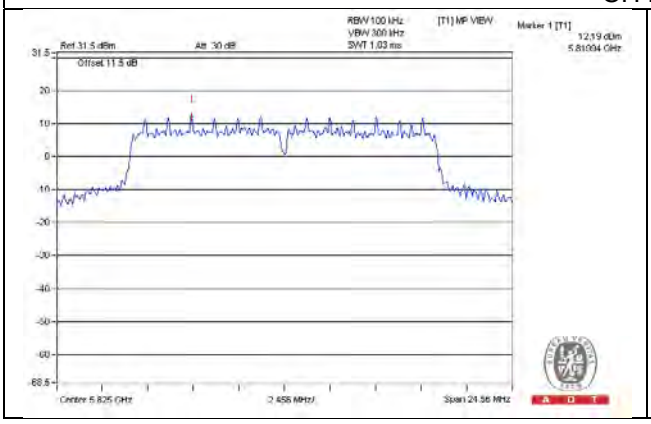


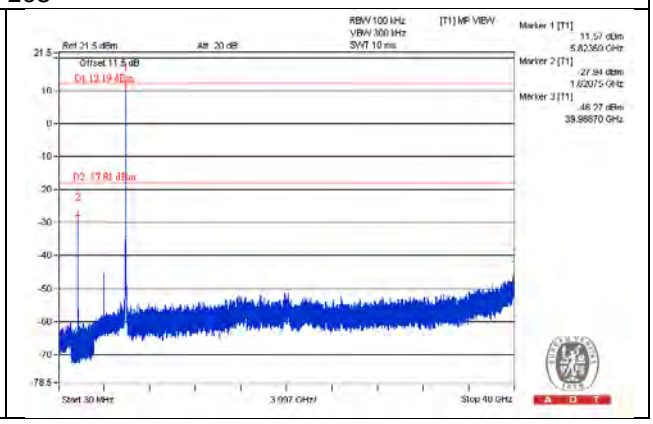
CH 157





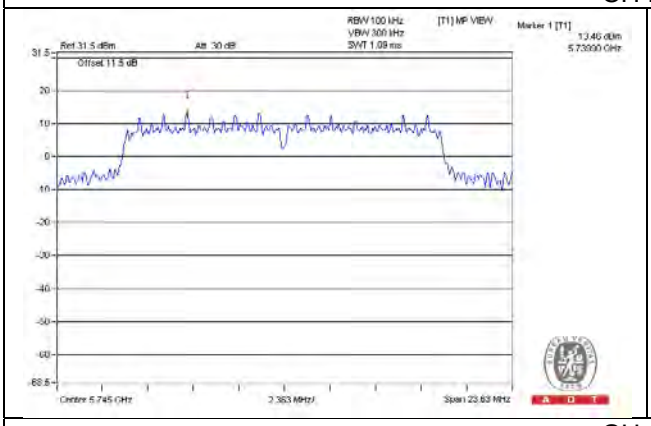
CH 165

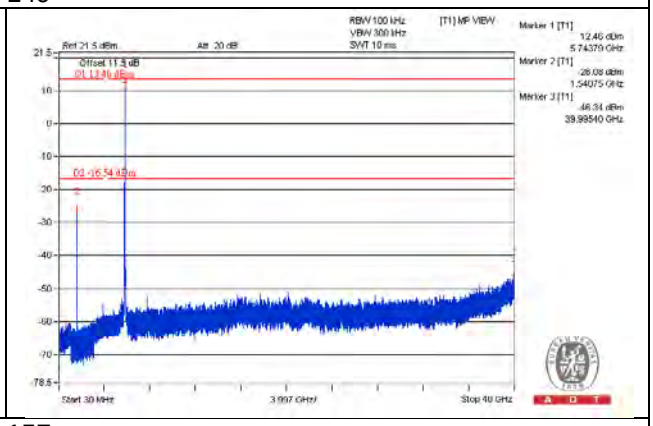




802.11a_Chain 2

CH 149





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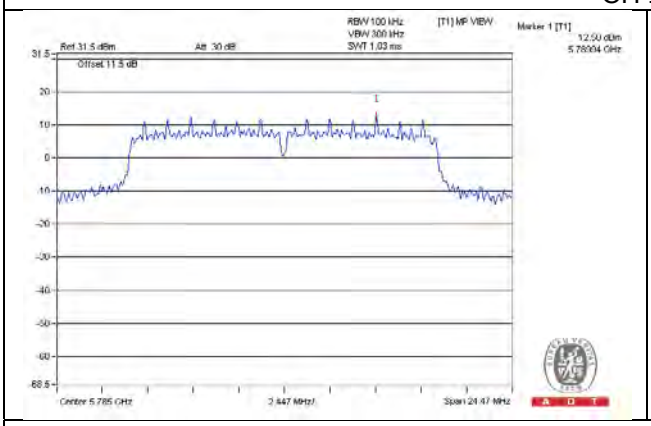

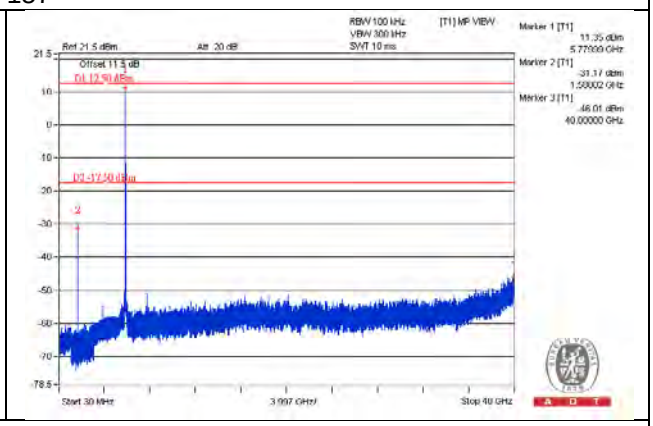

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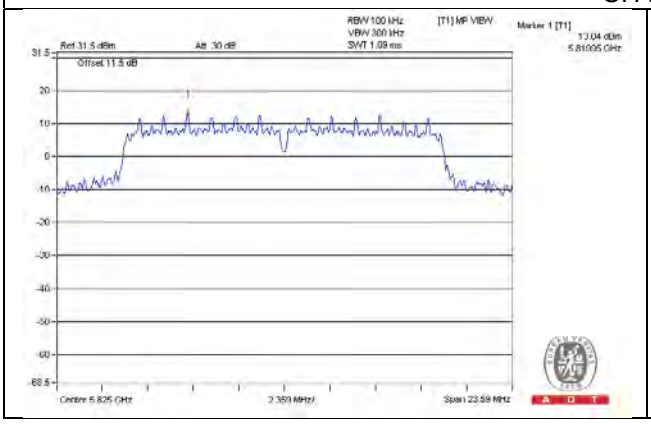
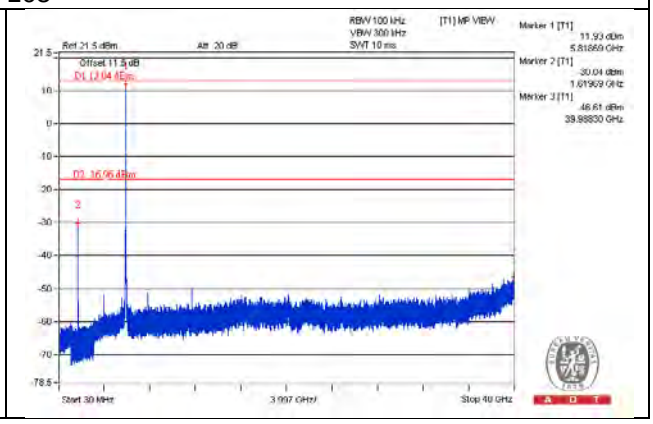
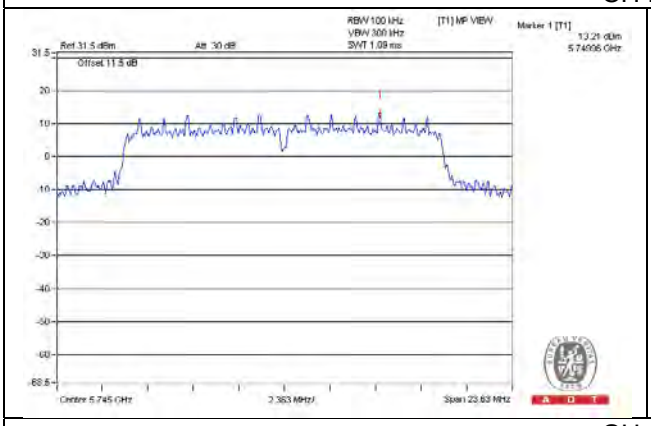
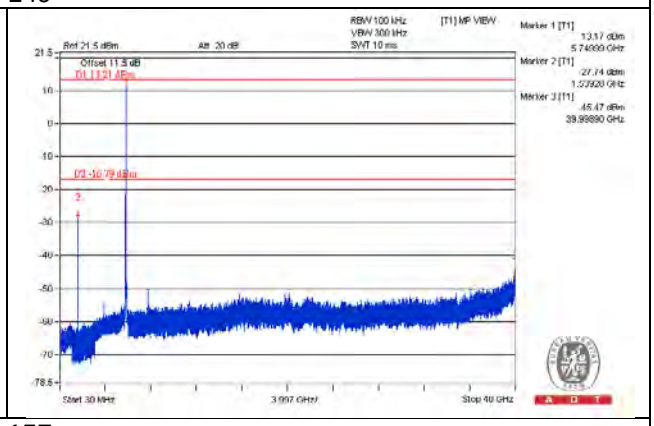




802.11a_Chain 3

CH 149





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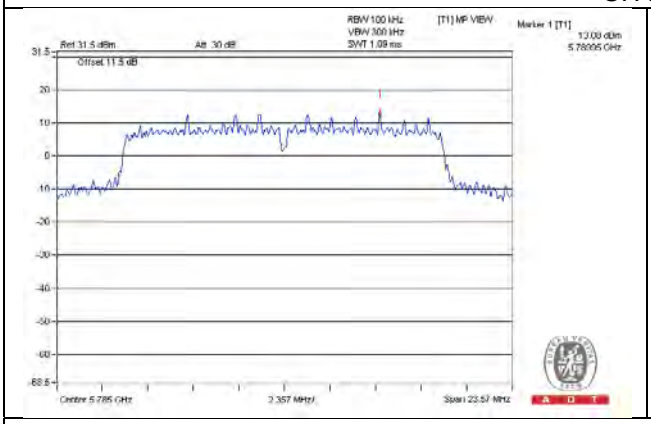

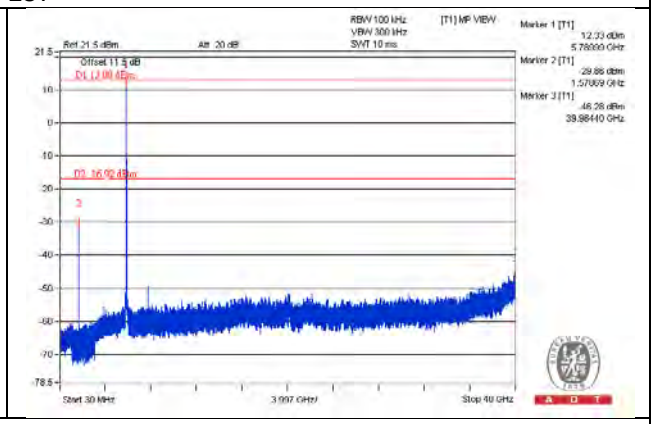

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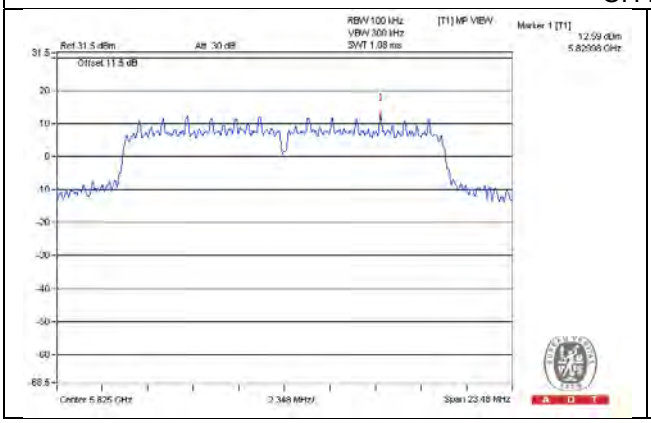
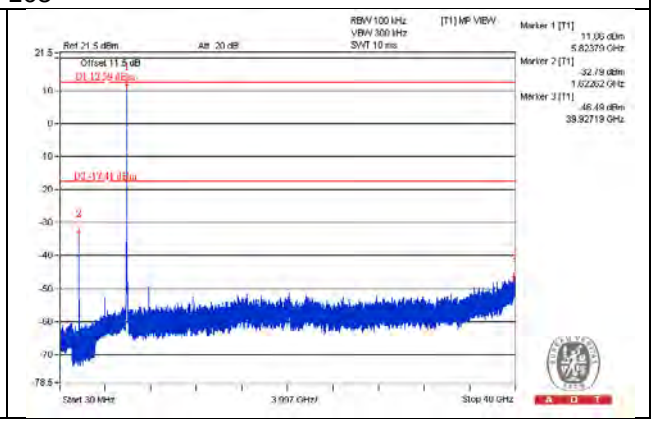
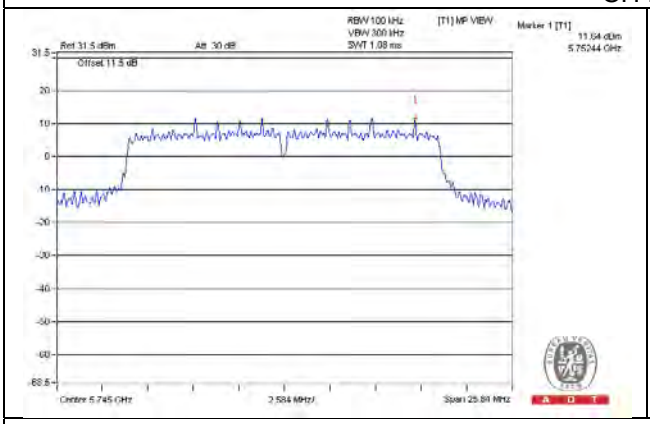
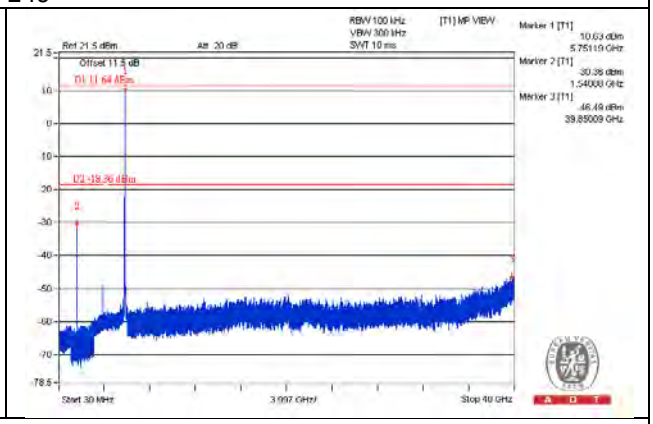




802.11n (20MHz)_Chain 0

CH 149





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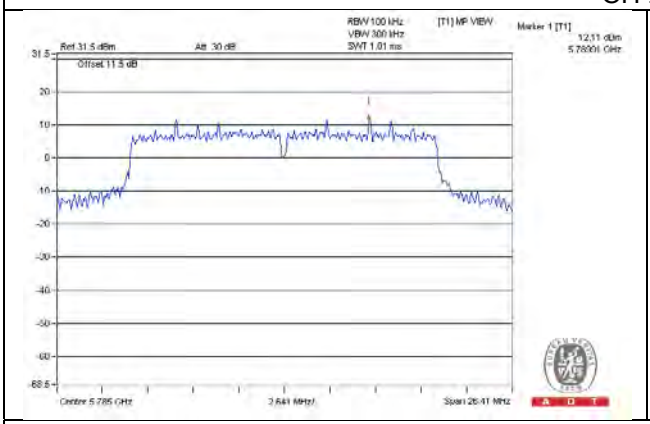

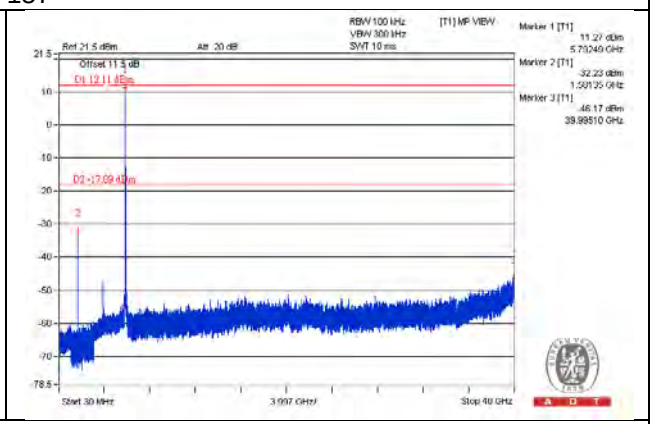

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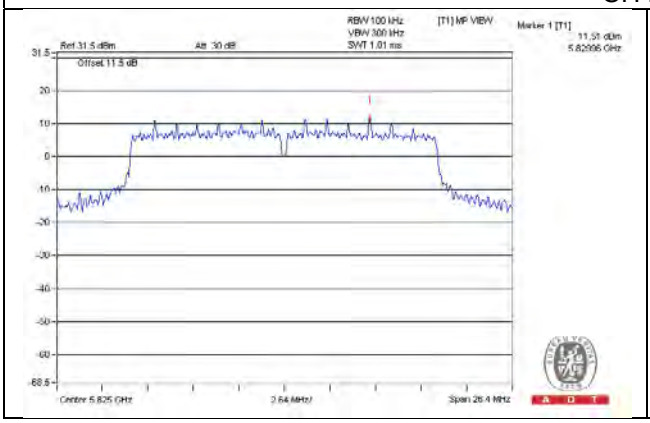
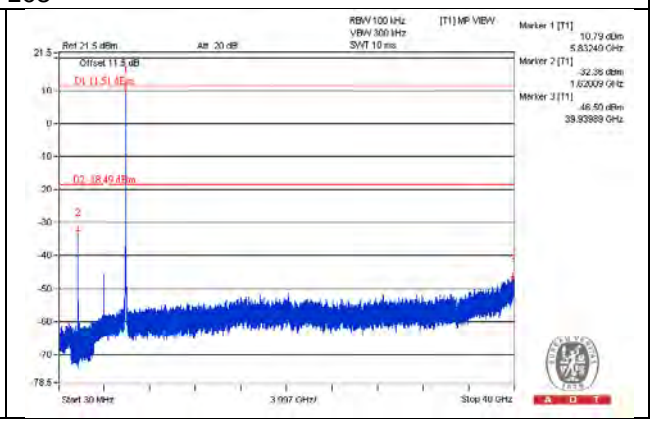
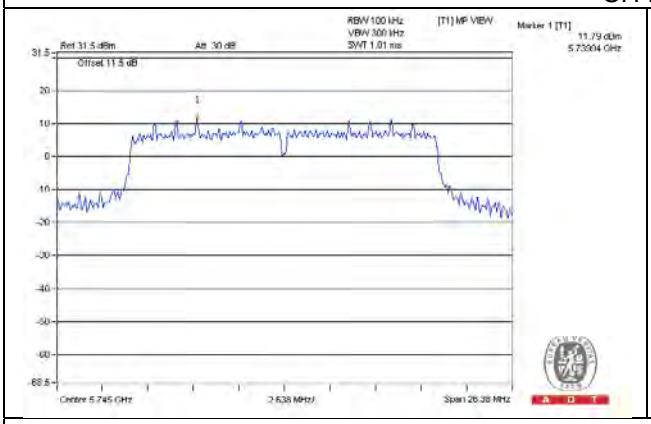
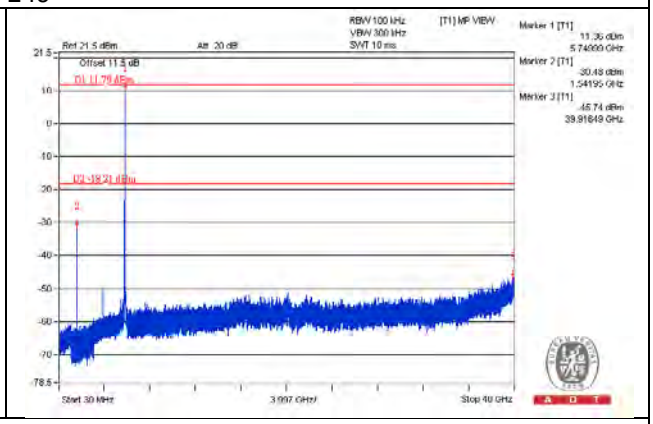




802.11n (20MHz)_Chain 1

CH 149





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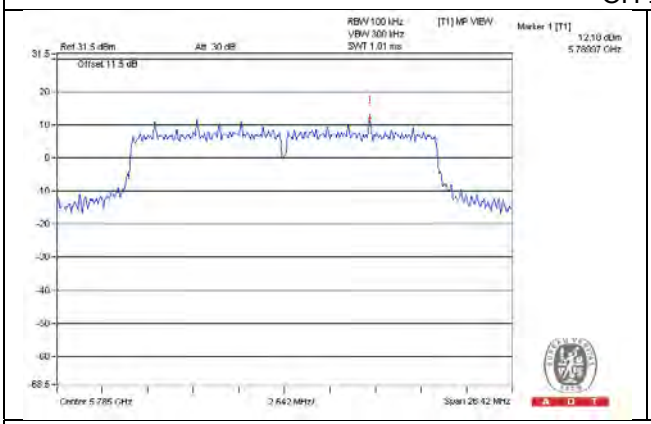
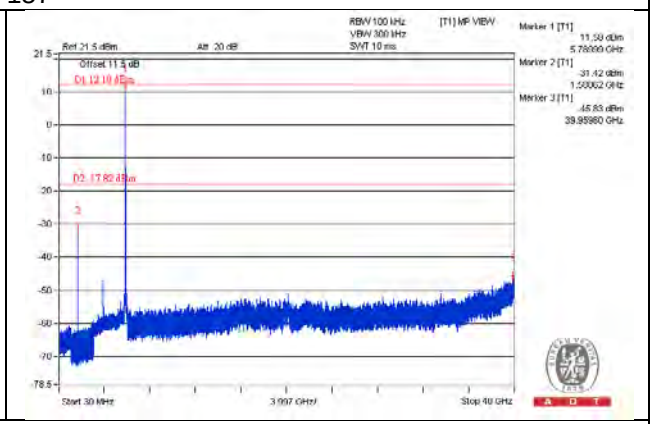
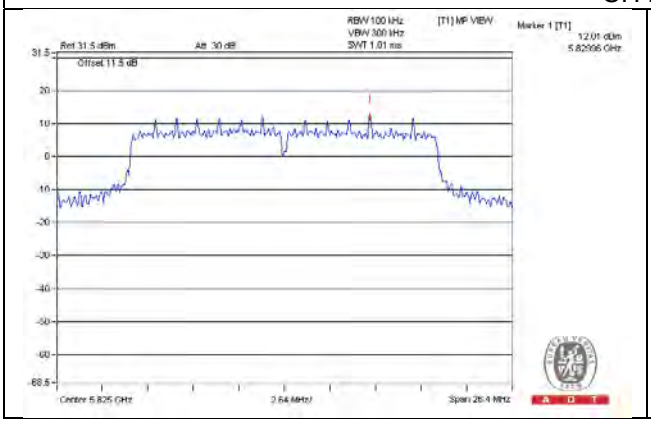
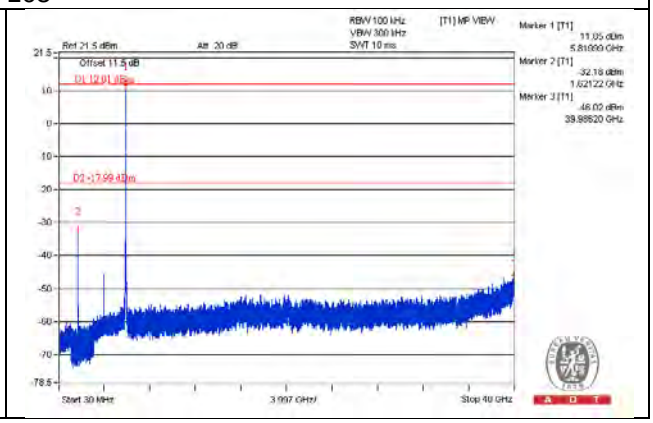




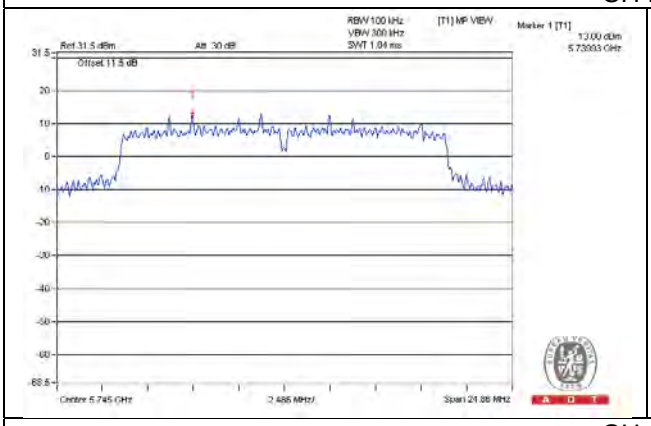
CH 165

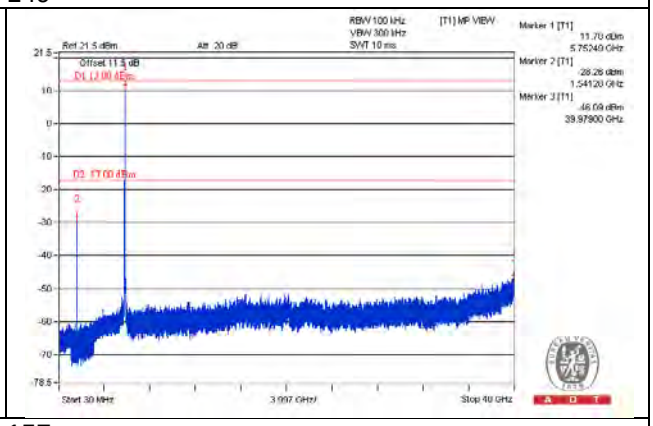




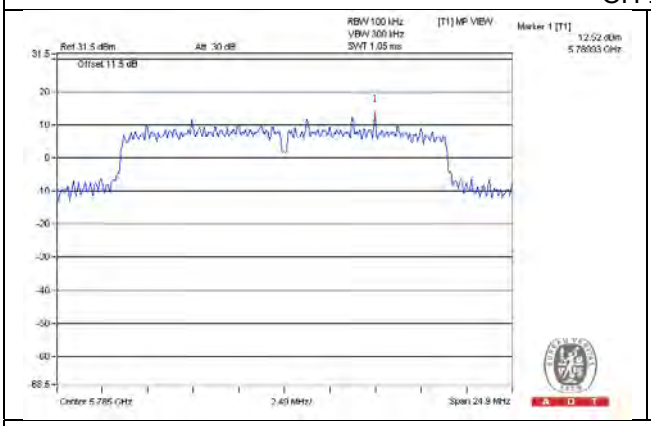
802.11n (20MHz)_Chain 2

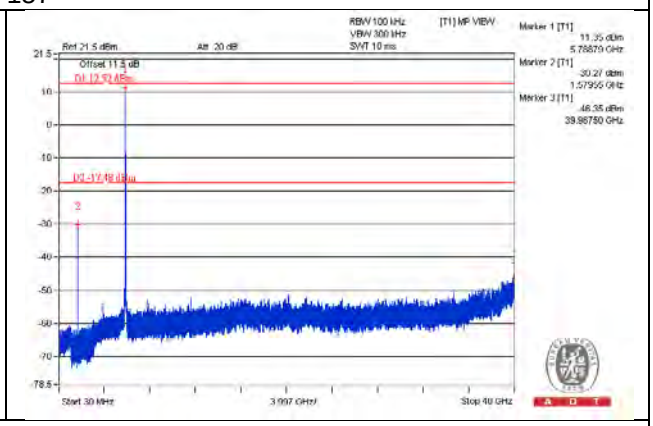
CH 149



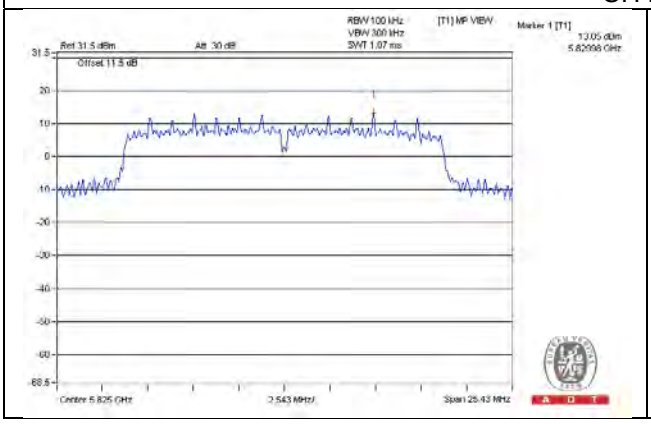


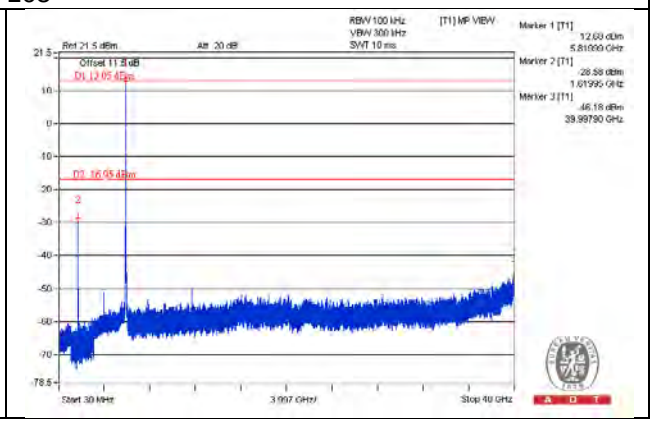
CH 157





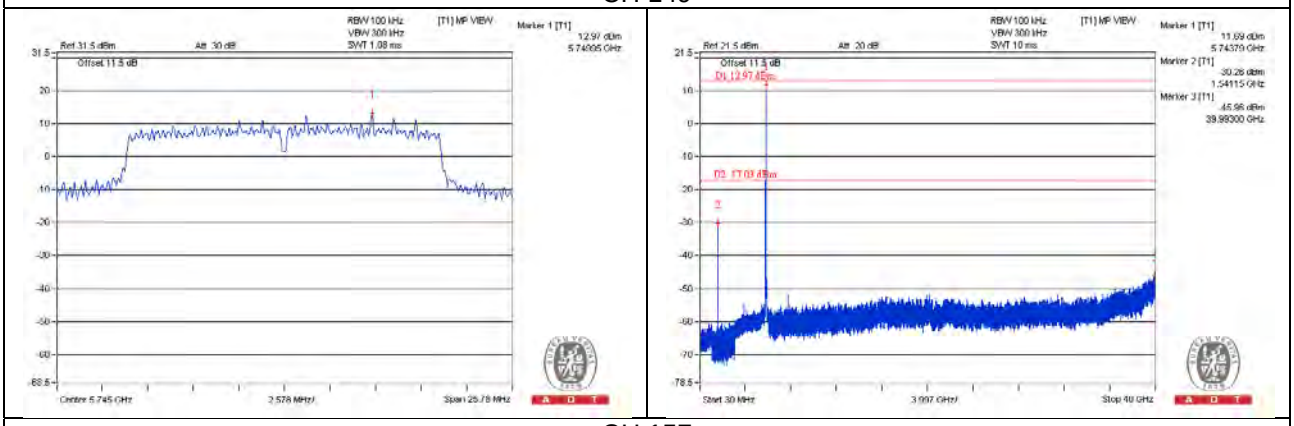
CH 165



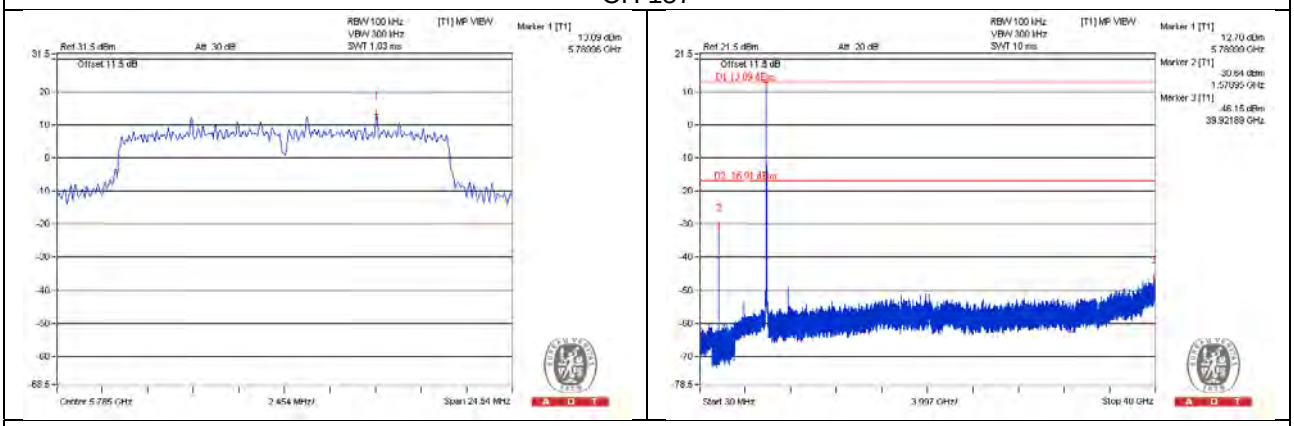


802.11n (20MHz)_Chain 3

CH 149



CH 157



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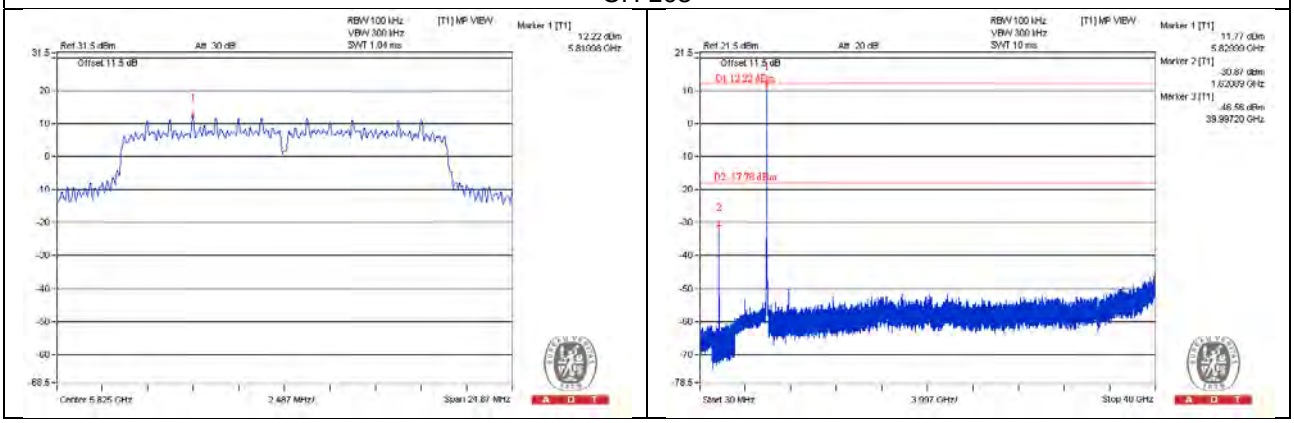
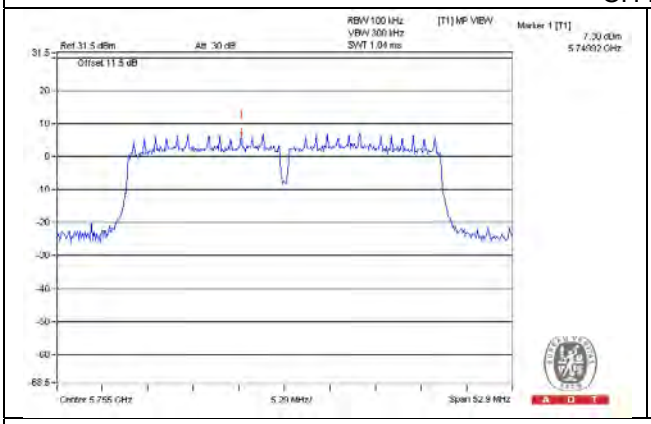
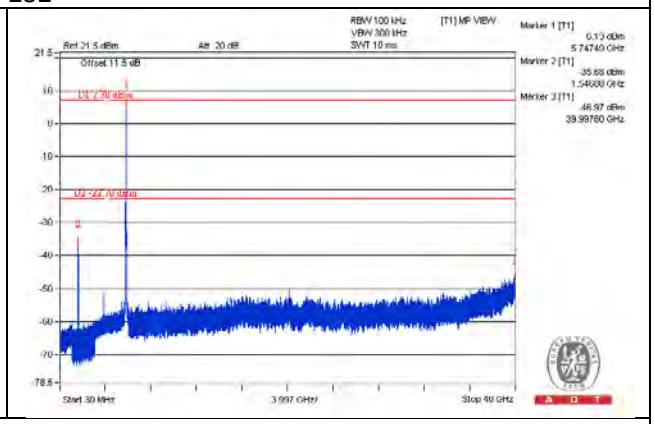


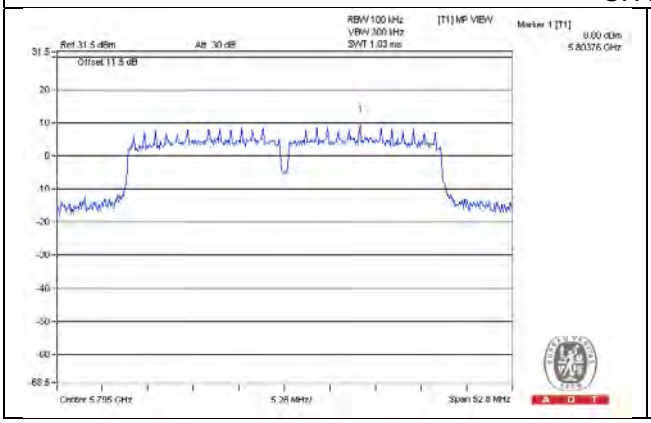
802.11n (40MHz)_Chain 0

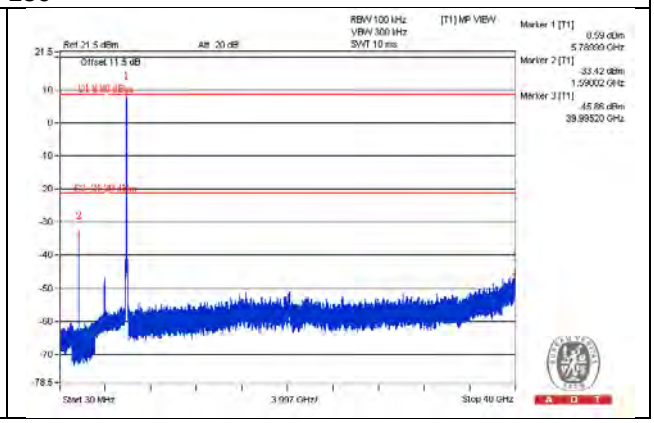
CH 151





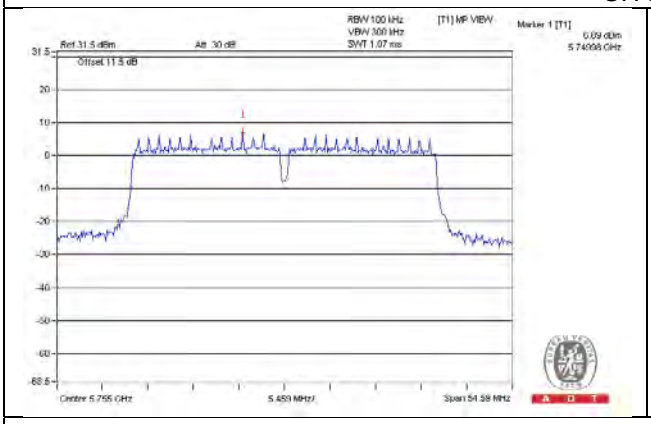
CH 159

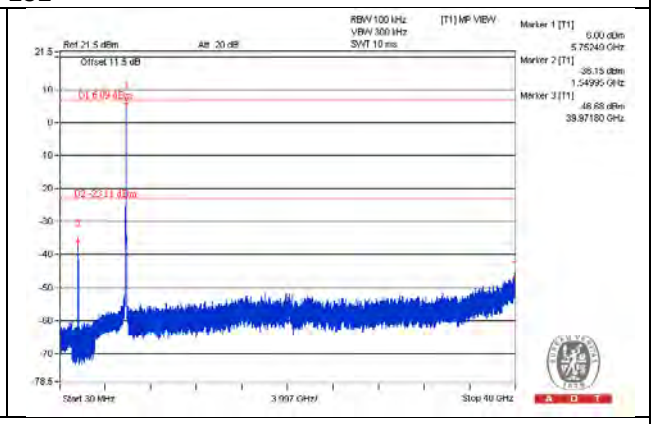




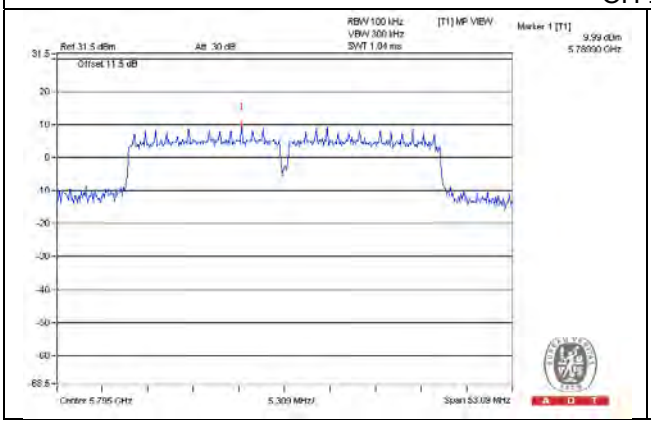
802.11n (40MHz)_Chain 1

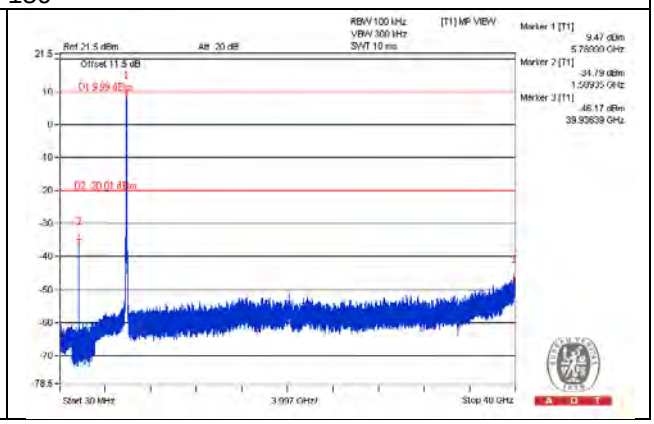
CH 151





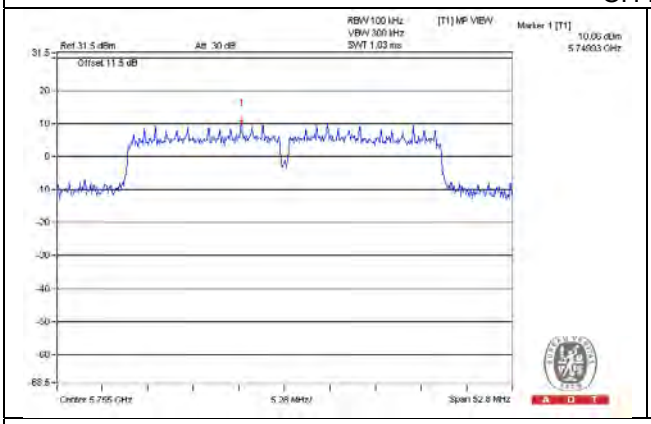
CH 159

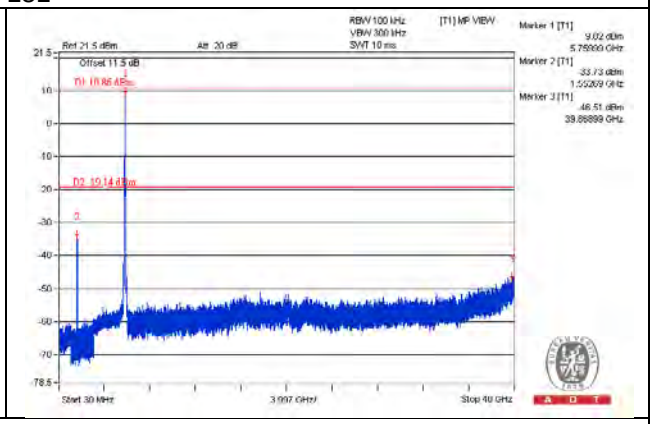




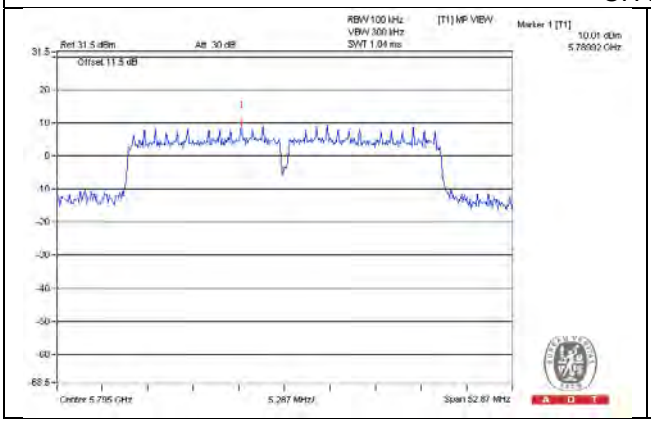
802.11n (40MHz)_Chain 2

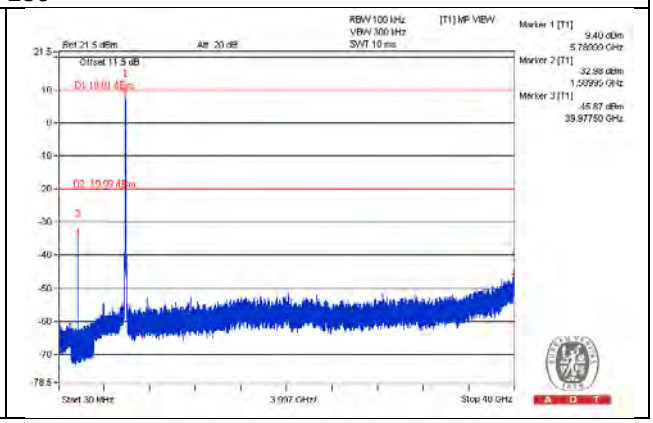
CH 151





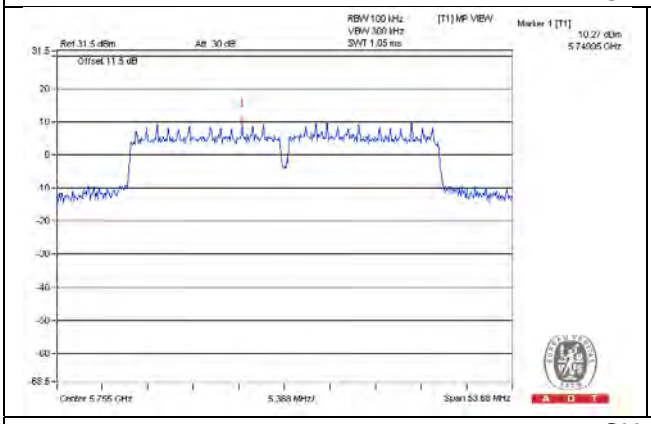
CH 159

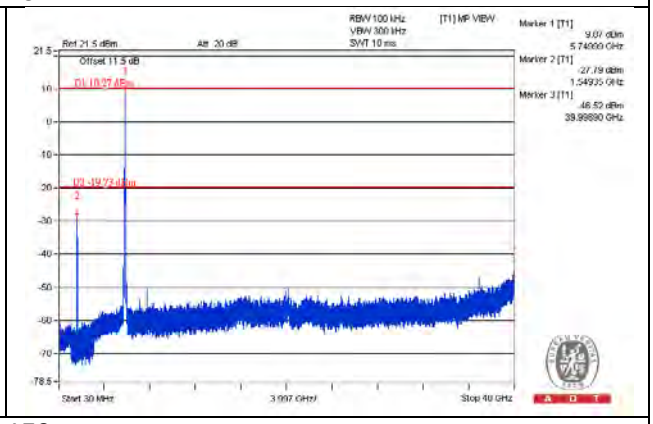




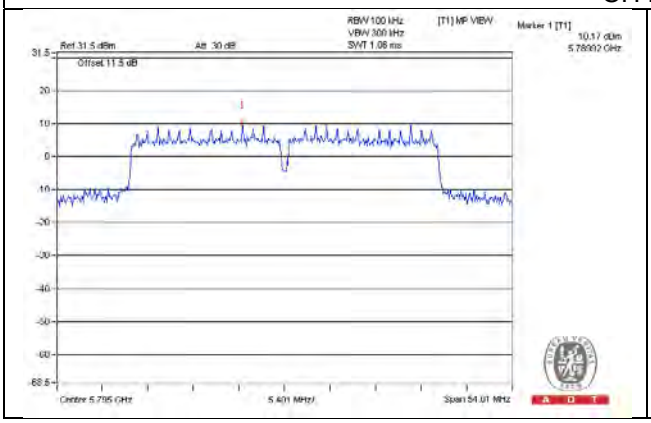
802.11n (40MHz)_Chain 3

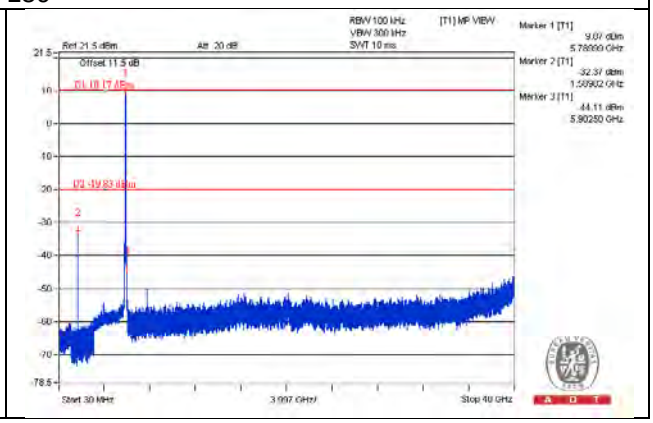
CH 151



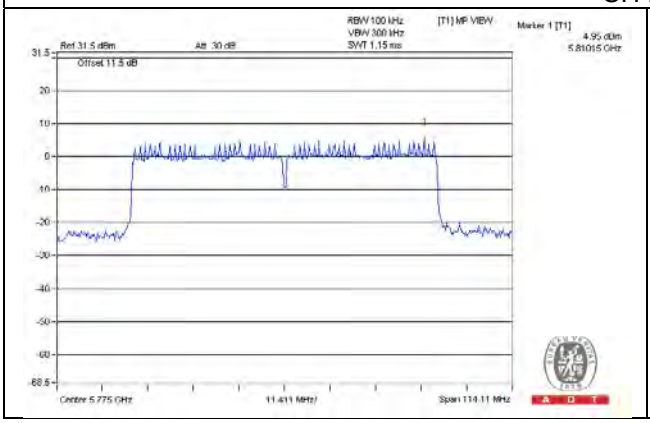
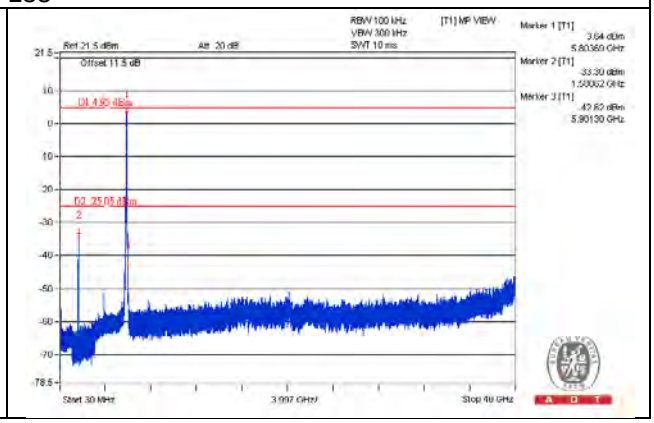


CH 159

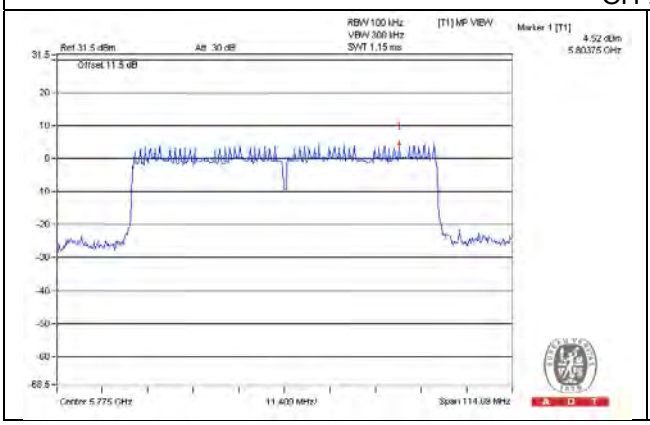
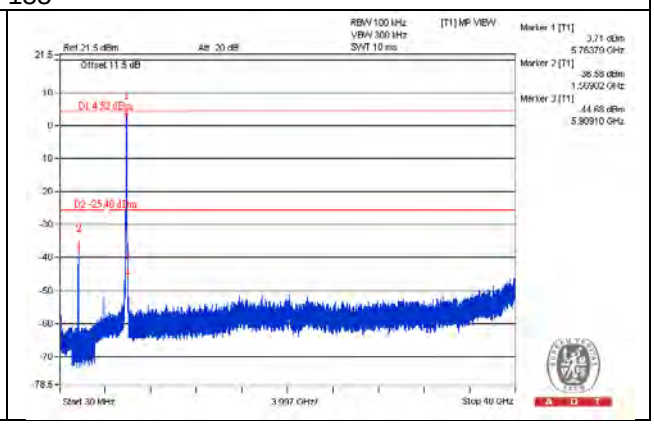




802.11ac (80MHz)_Chain 0

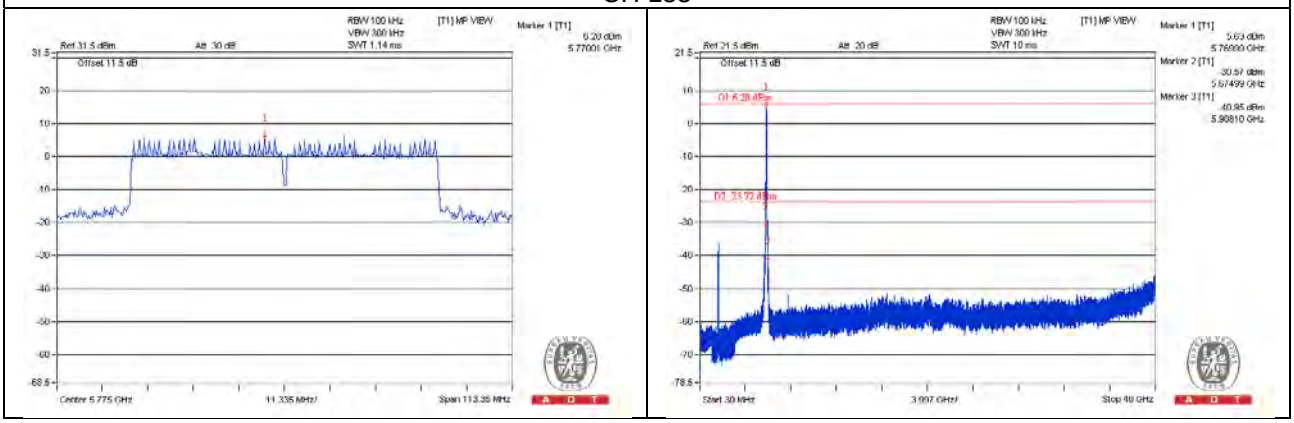
CH 155	
	

802.11ac (80MHz)_Chain 1

CH 155	
	

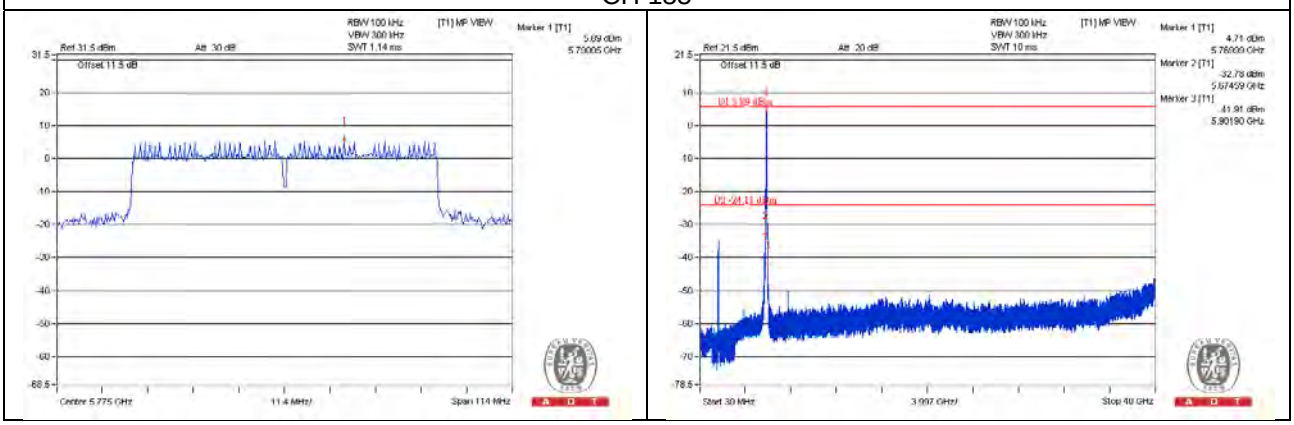
802.11ac (80MHz)_Chain 2

CH 155



802.11ac (80MHz)_Chain 3

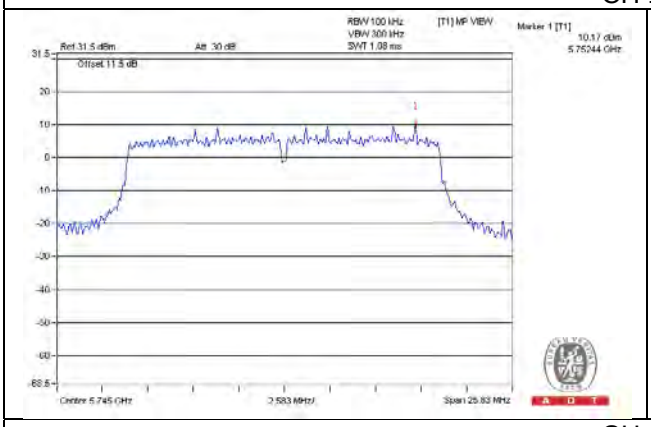
CH 155

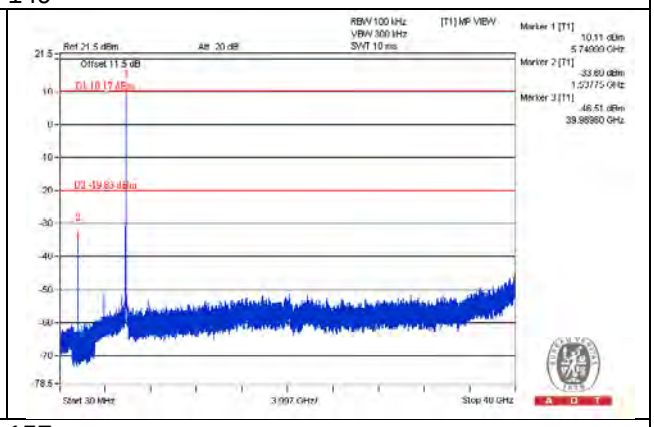


Beamforming_NSS1 Mode

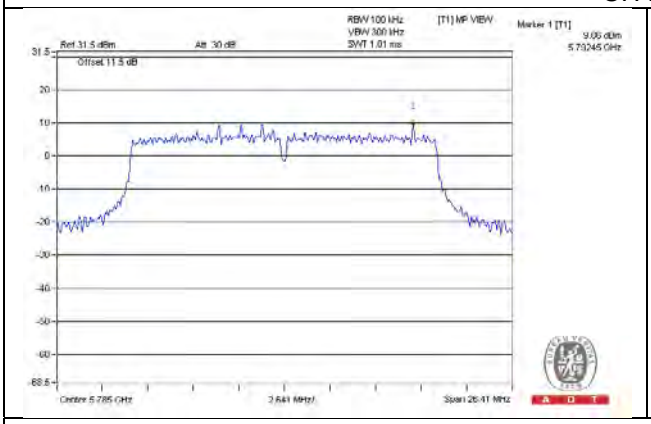
802.11n (20MHz)_Chain 0

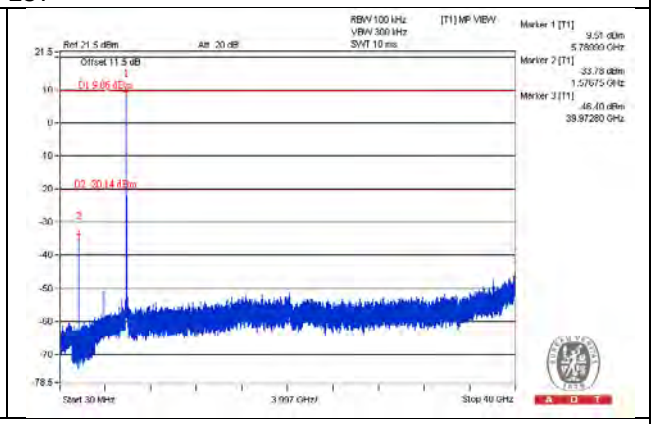
CH 149



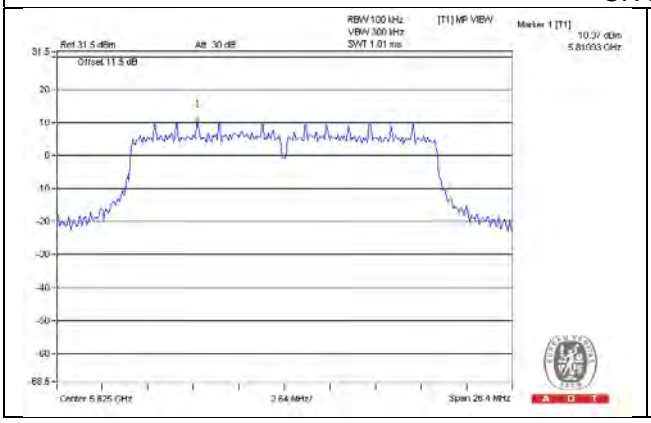


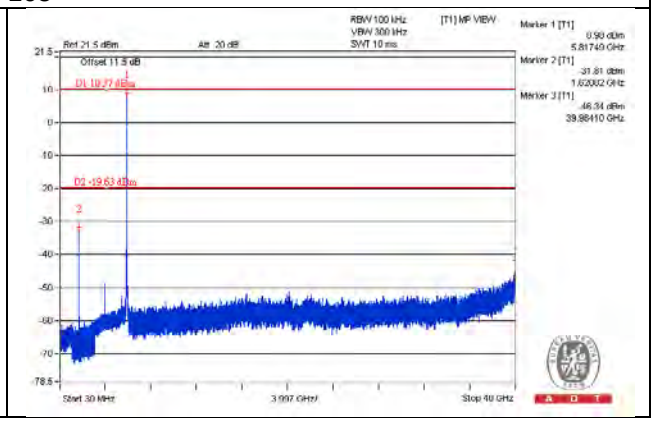
CH 157





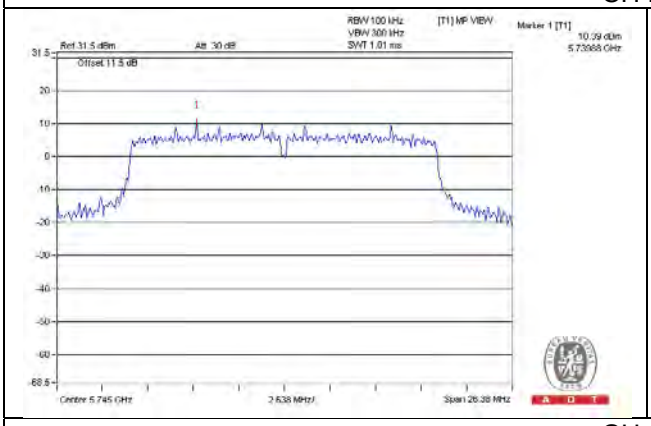
CH 165

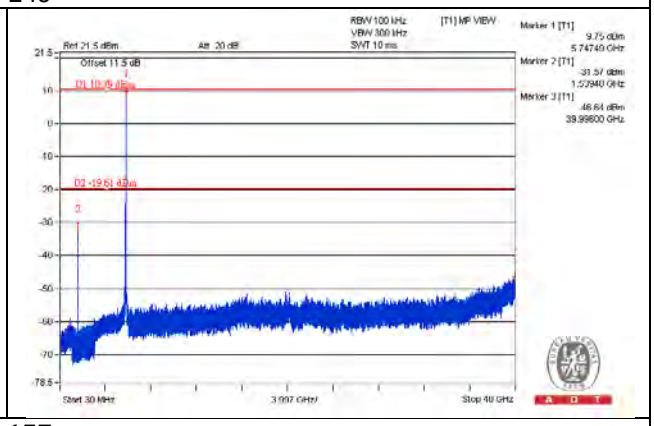




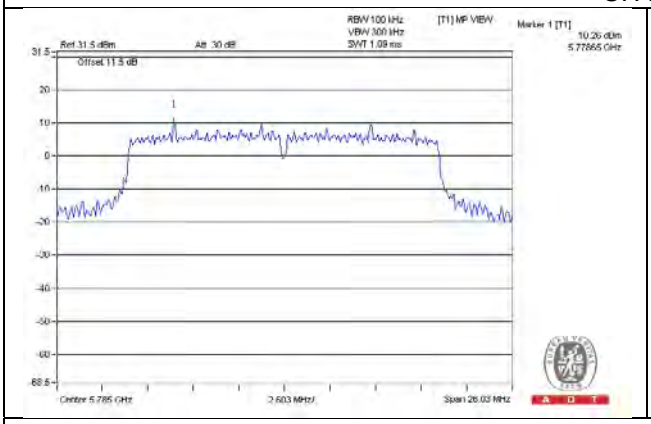
802.11n (20MHz)_Chain 1

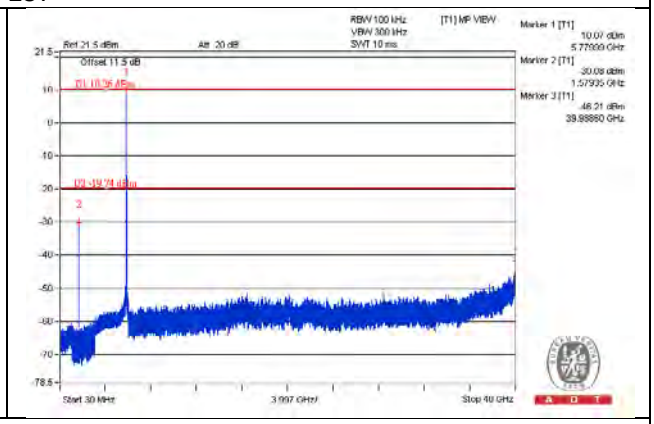
CH 149



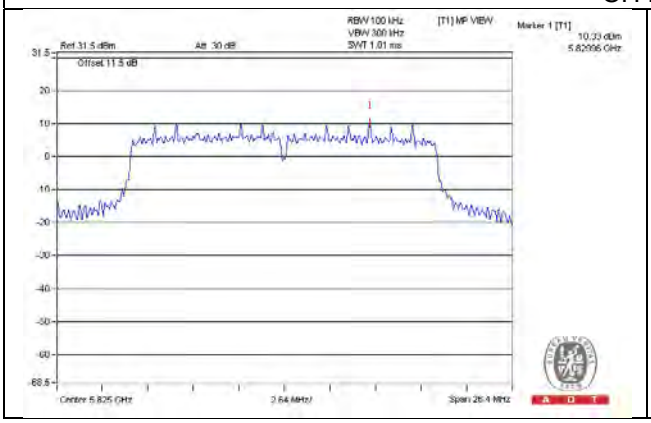


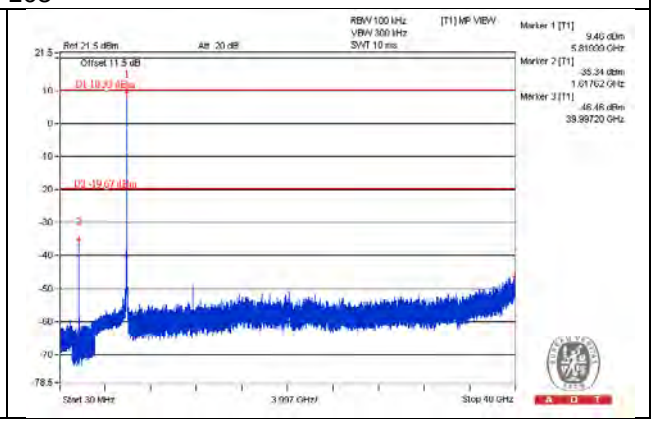
CH 157





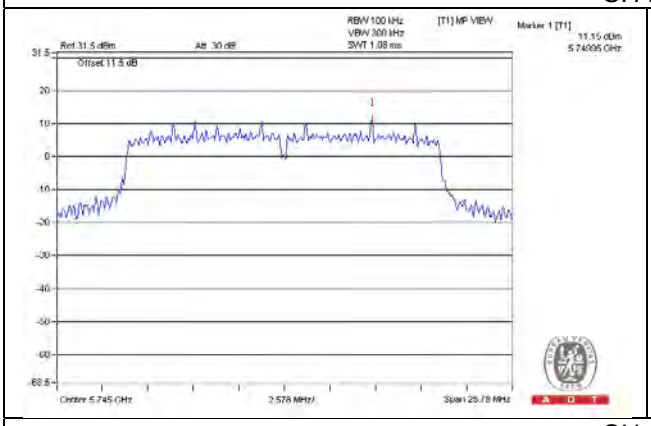
CH 165

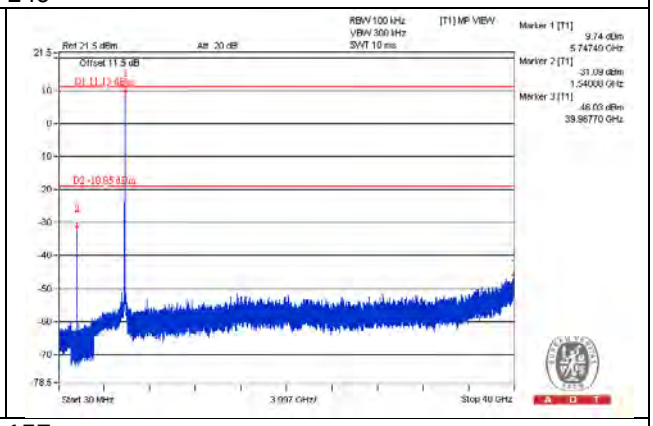




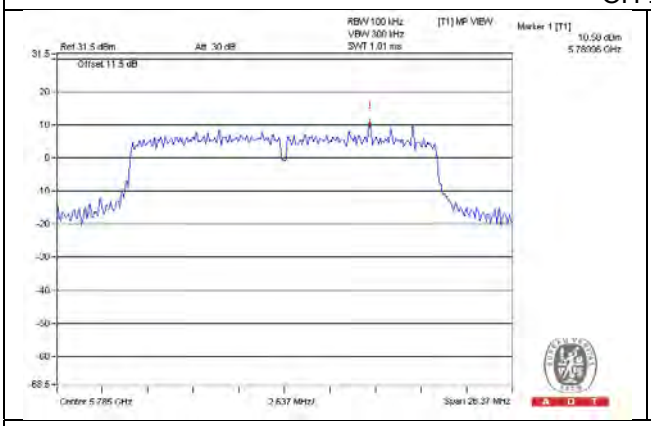
802.11n (20MHz)_Chain 2

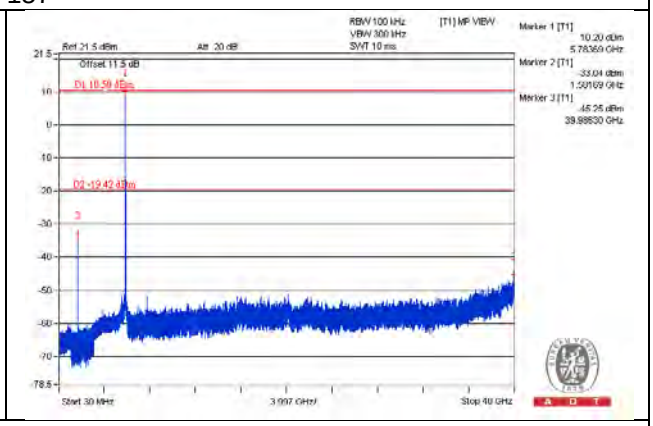
CH 149



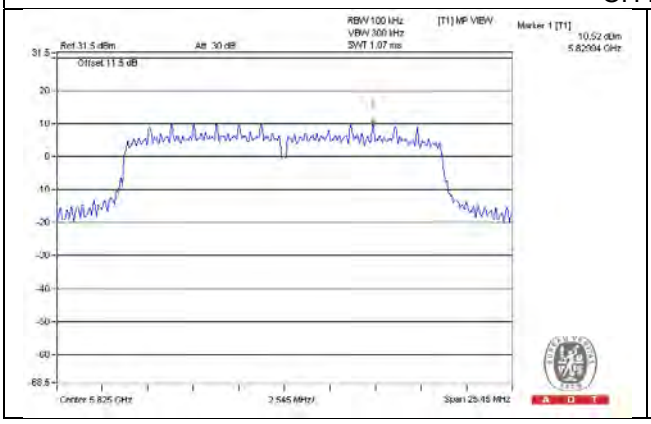


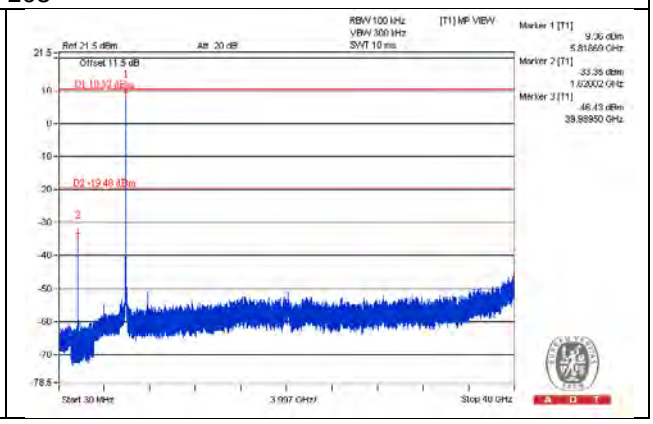
CH 157





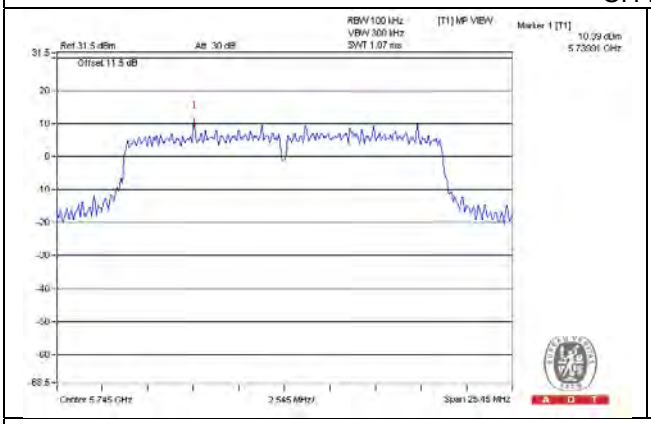
CH 165

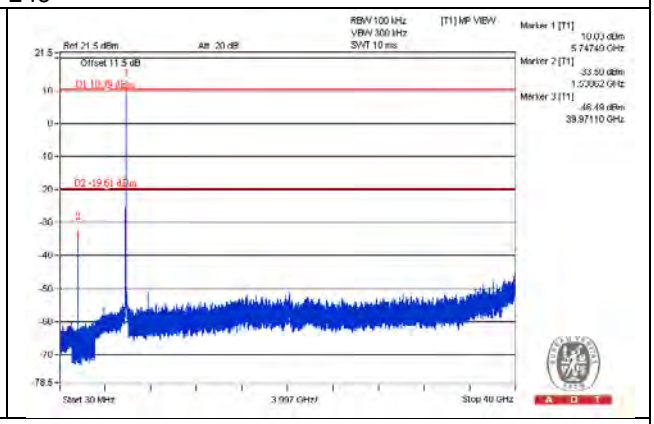




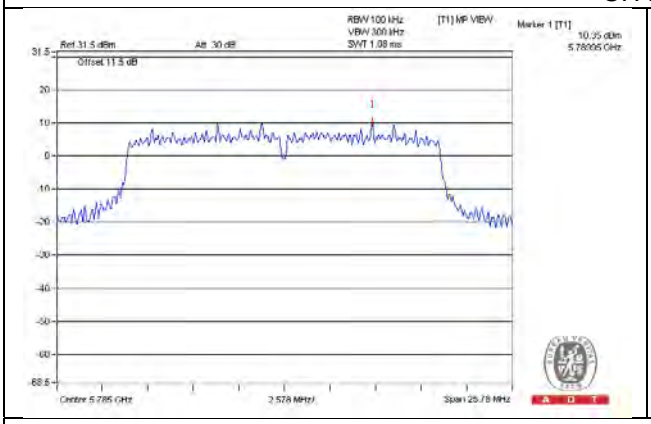
802.11n (20MHz)_Chain 3

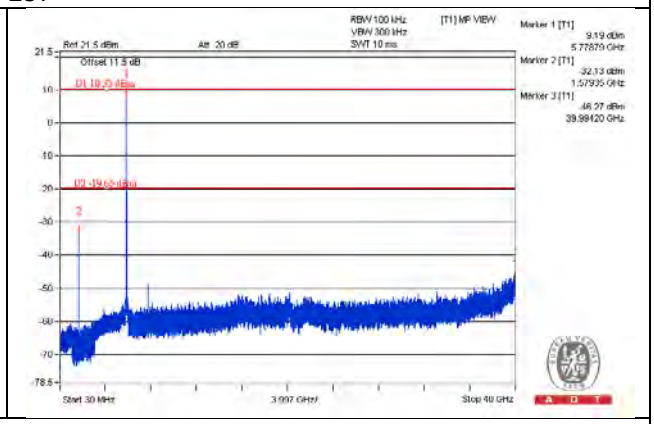
CH 149



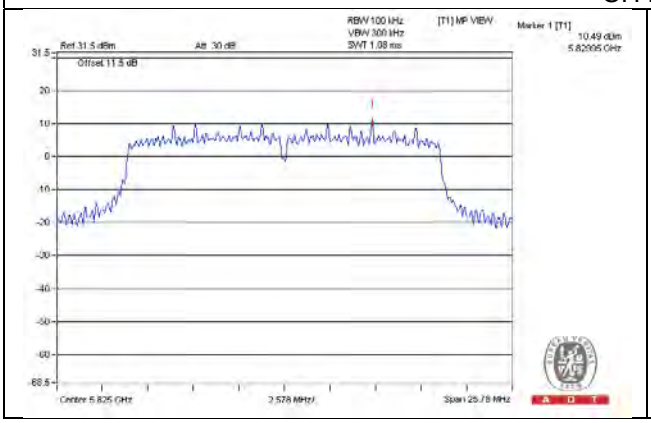


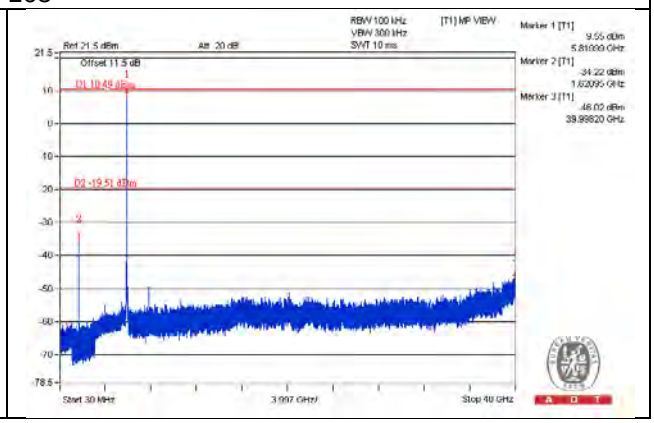
CH 157





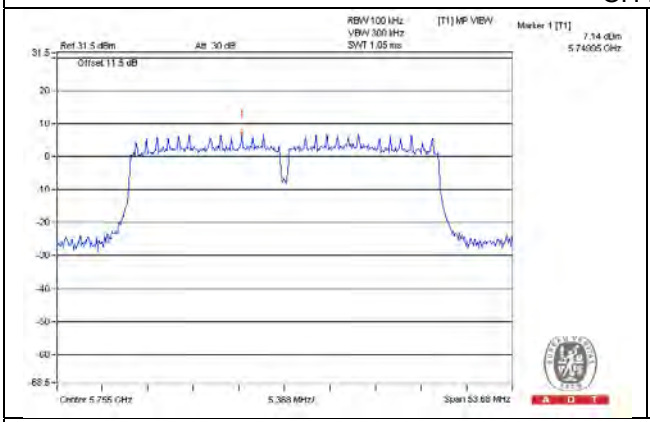
CH 165

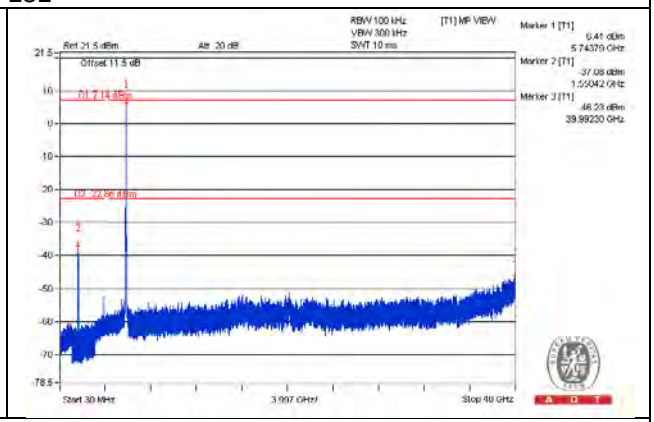




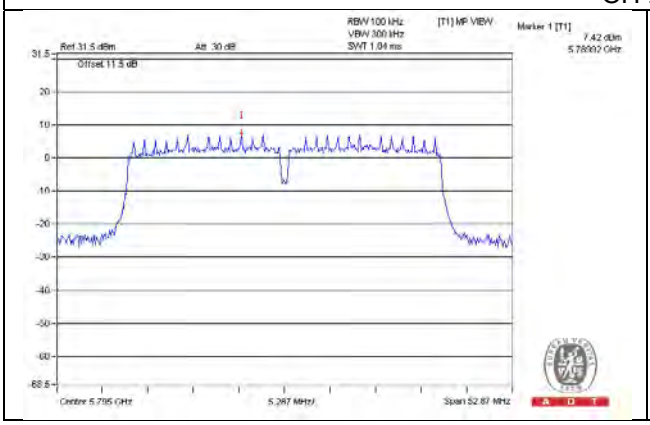
802.11n (40MHz)_Chain 0

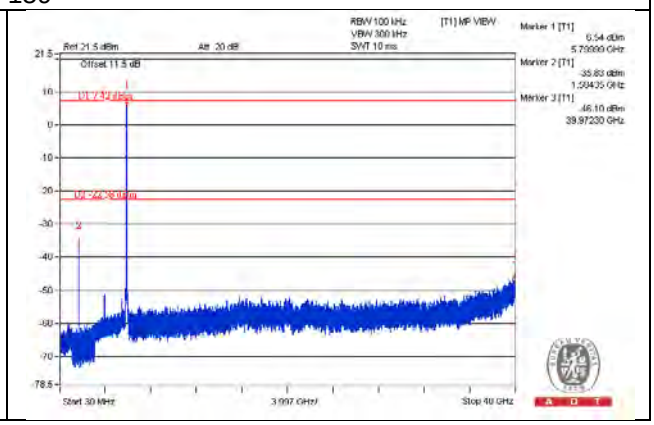
CH 151





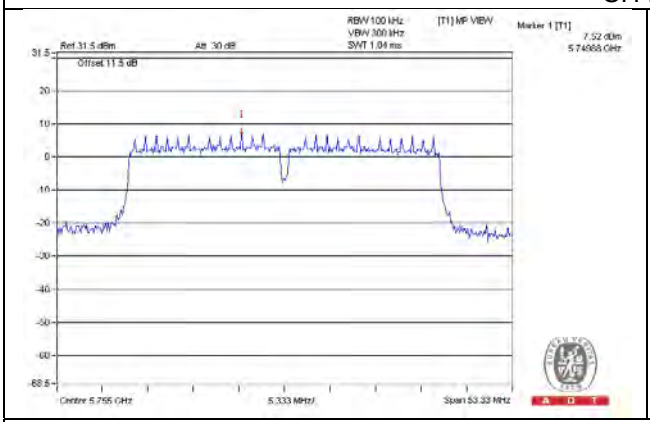
CH 159

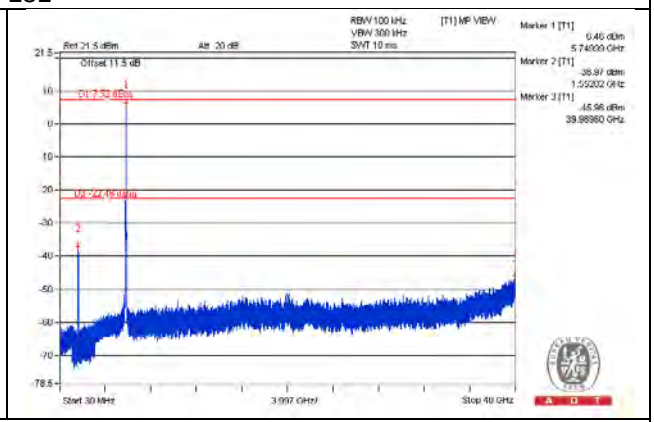




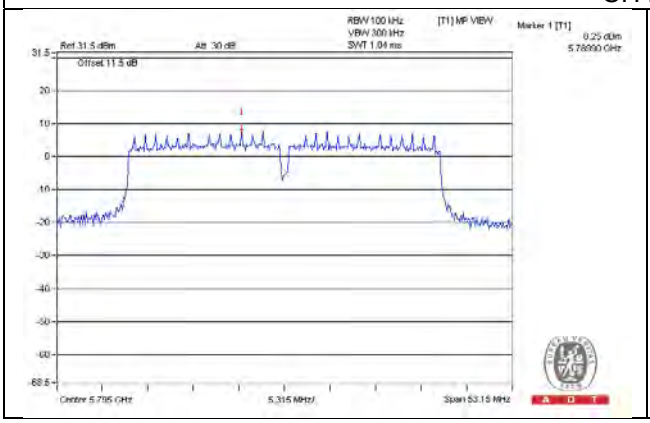
802.11n (40MHz)_Chain 1

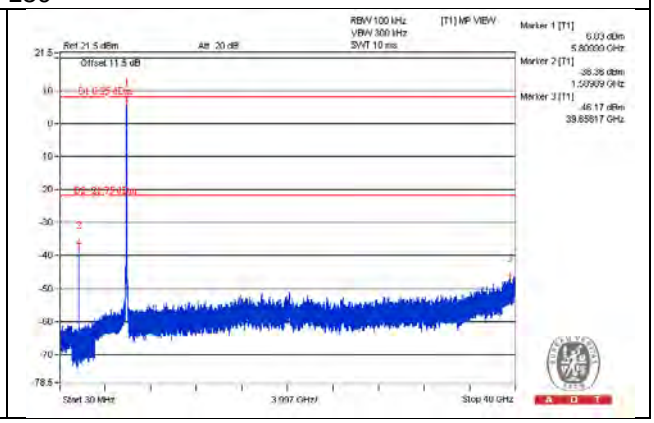
CH 151





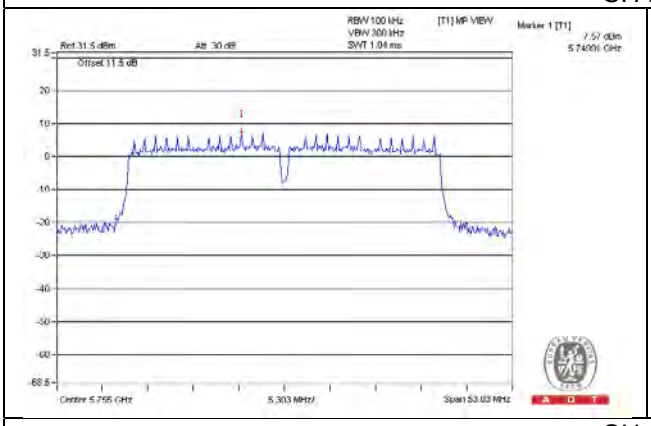
CH 159

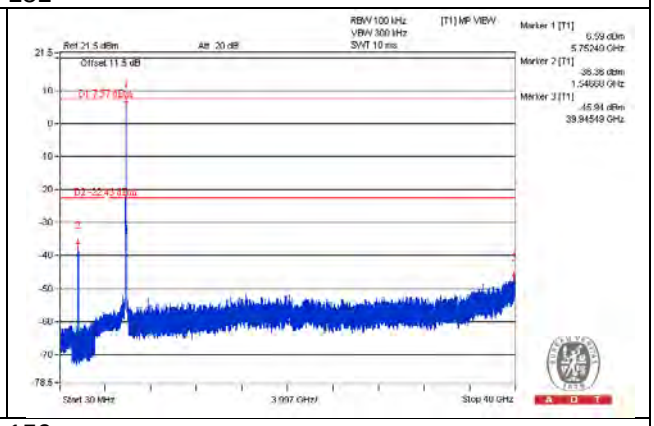




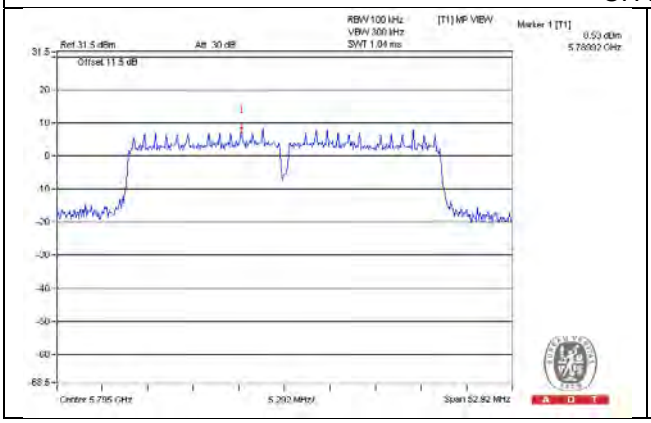
802.11n (40MHz)_Chain 2

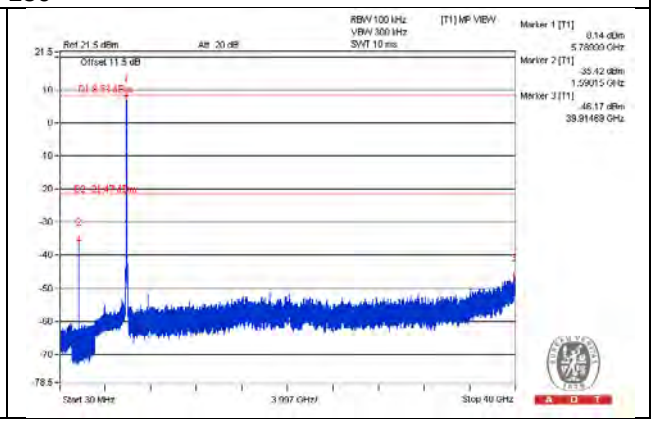
CH 151





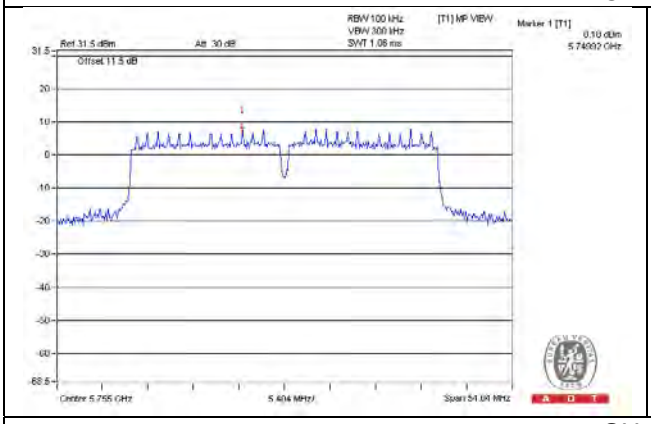
CH 159

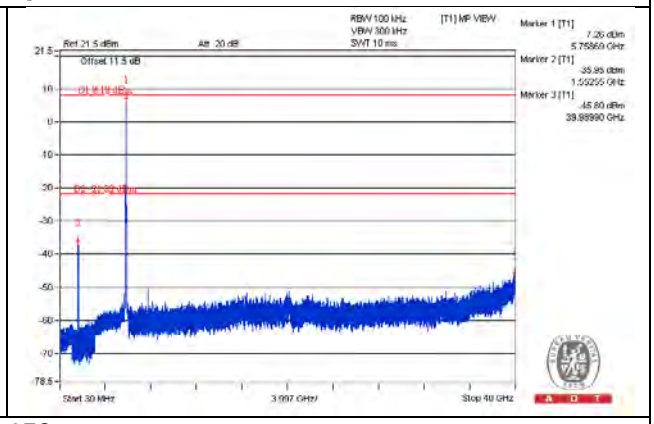




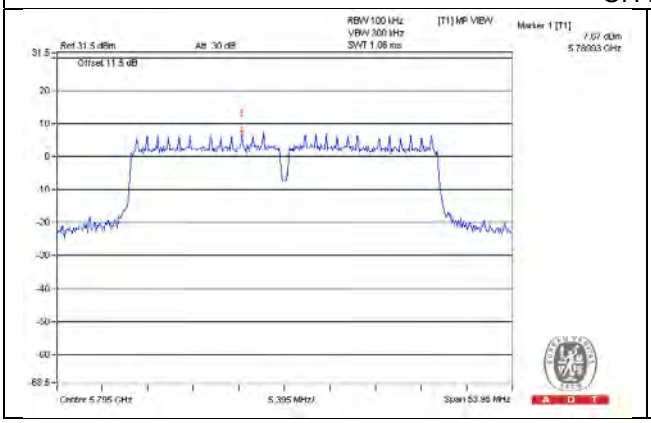
802.11n (40MHz)_Chain 3

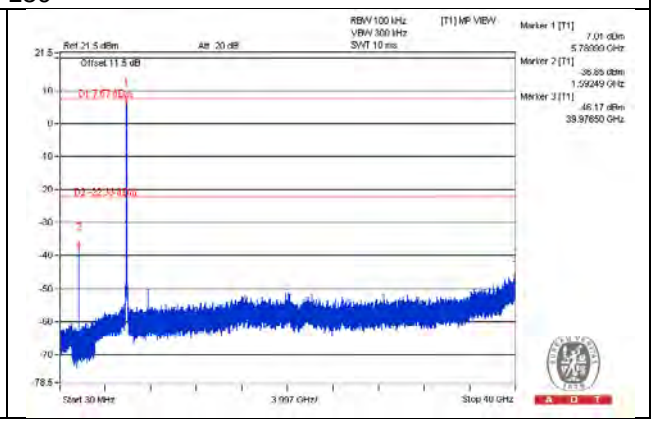
CH 151





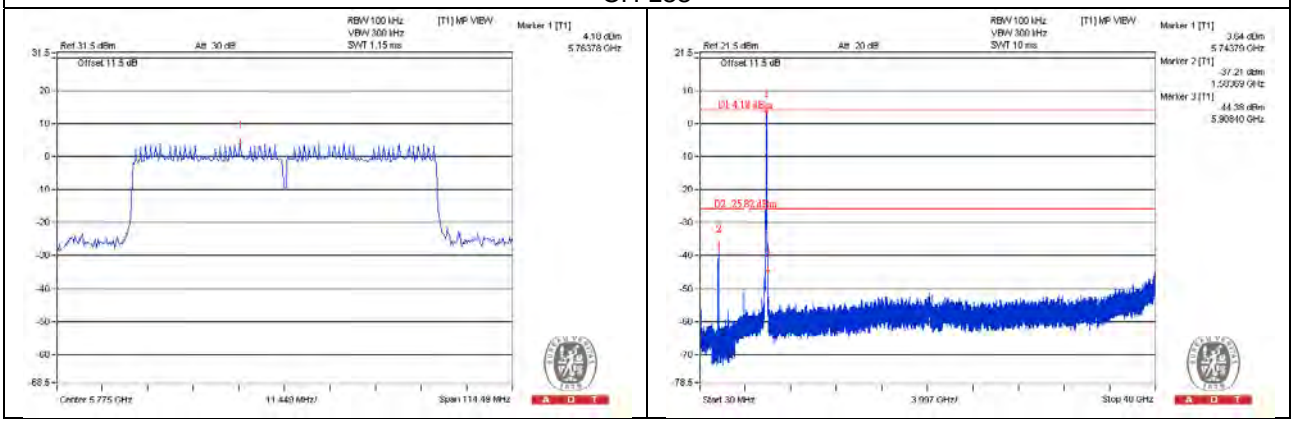
CH 159





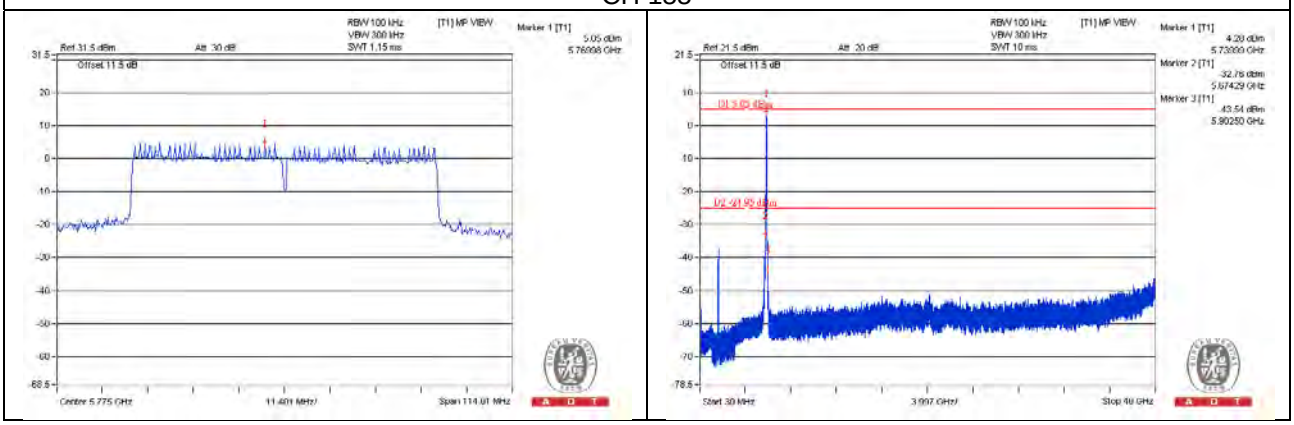
802.11ac (80MHz)_Chain 0

CH 155



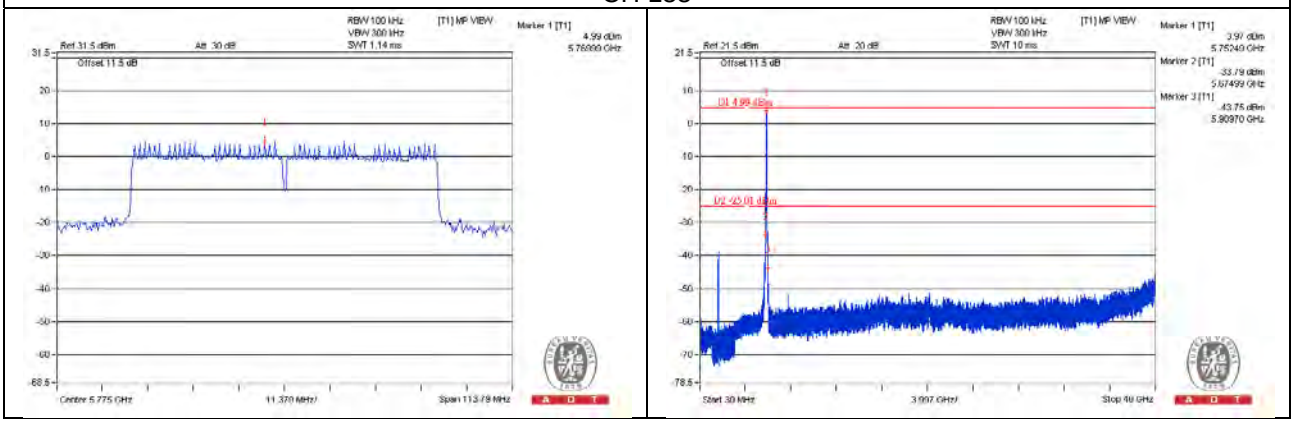
802.11ac (80MHz)_Chain 1

CH 155



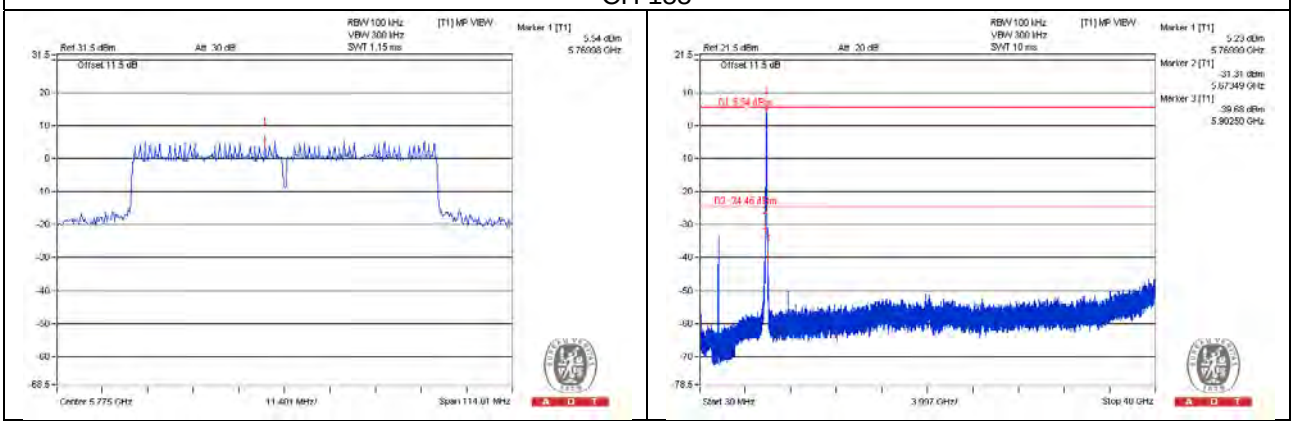
802.11ac (80MHz)_Chain 2

CH 155



802.11ac (80MHz)_Chain 3

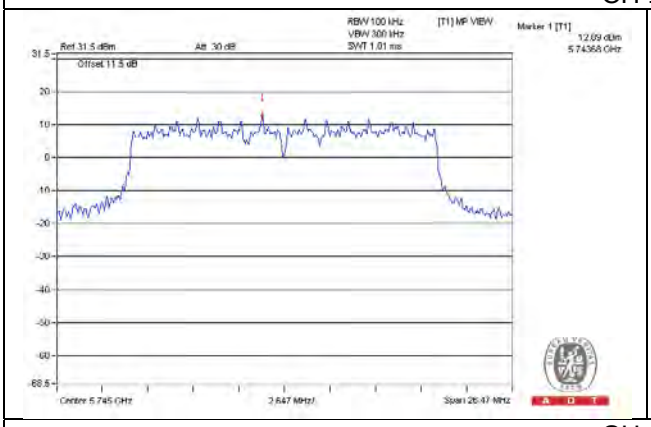
CH 155

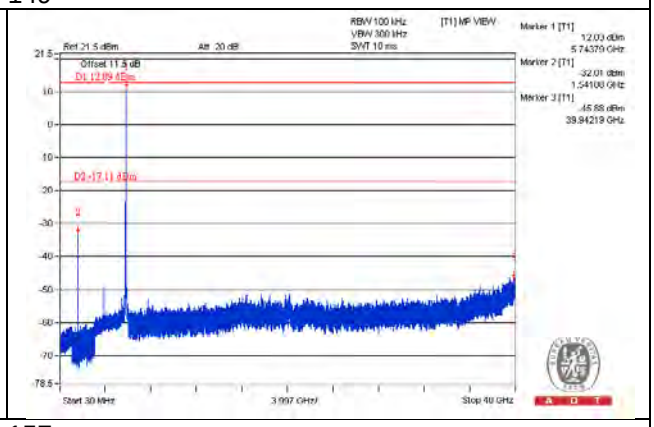


Beamforming_NSS2 Mode

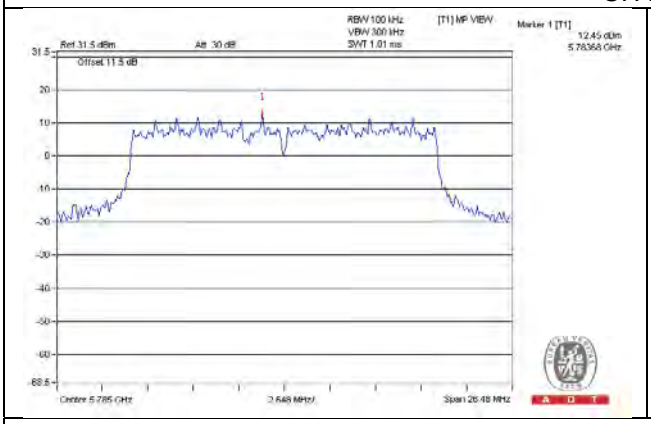
802.11n (20MHz)_Chain 0

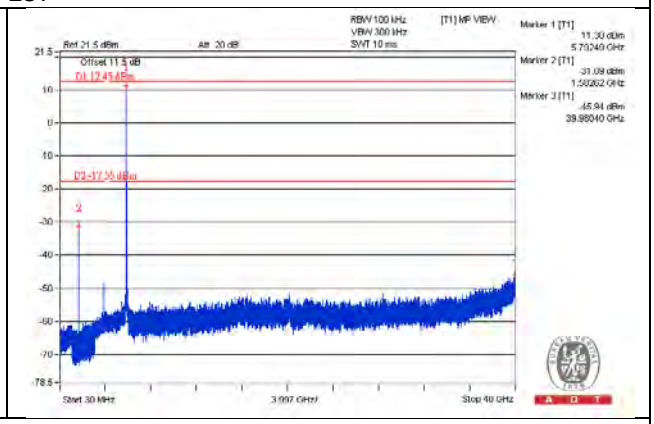
CH 149



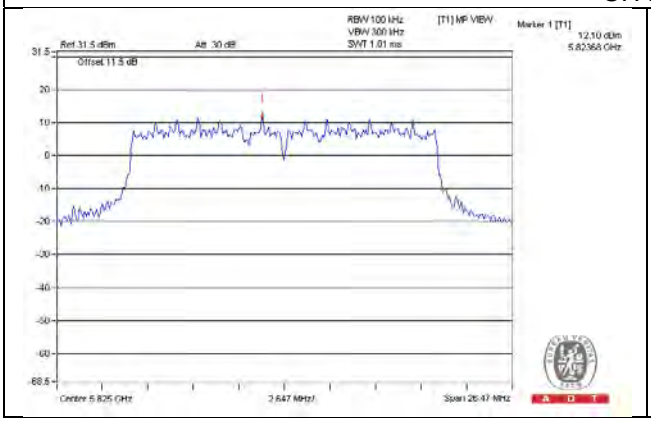


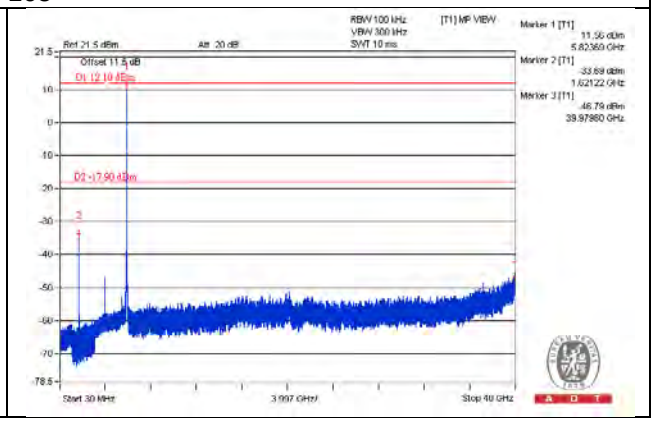
CH 157





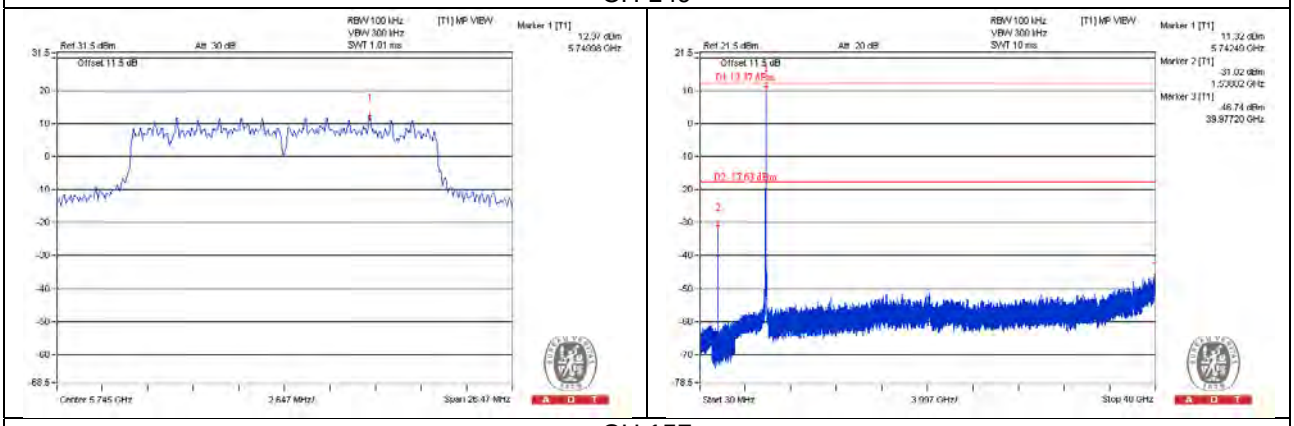
CH 165



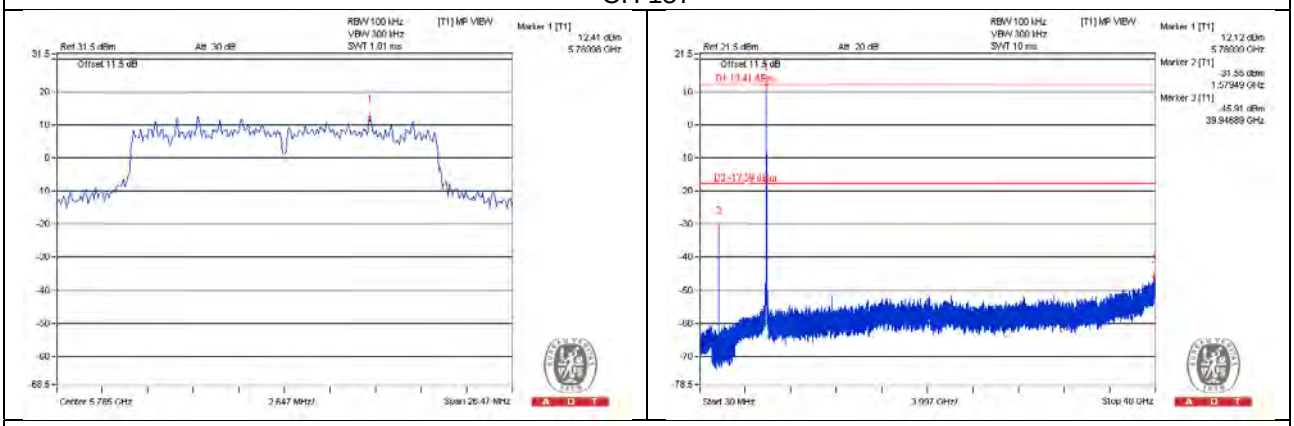


802.11n (20MHz)_Chain 1

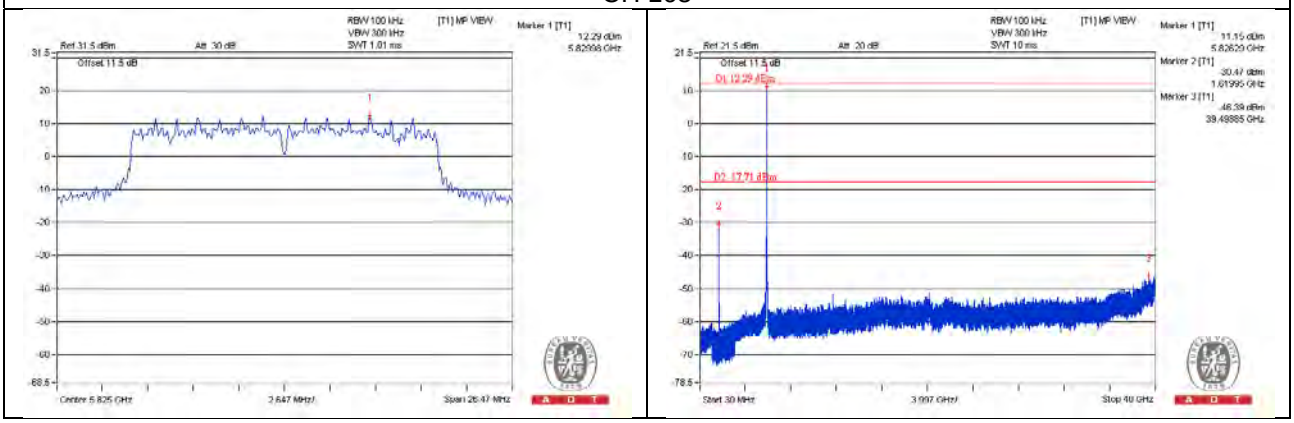
CH 149



CH 157

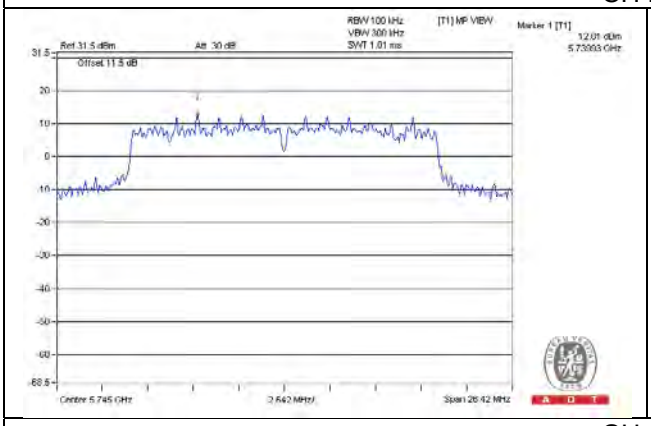


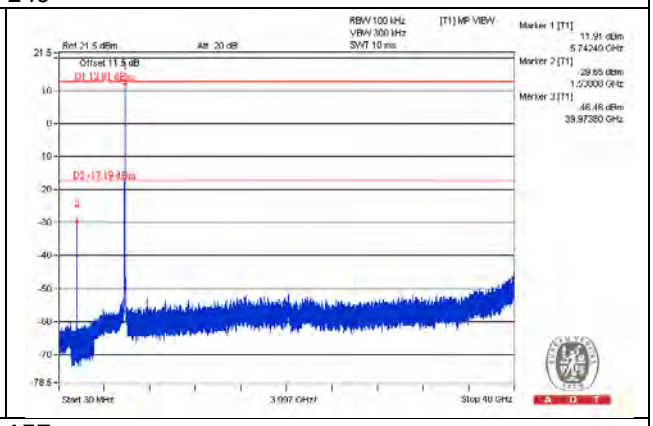
CH 165



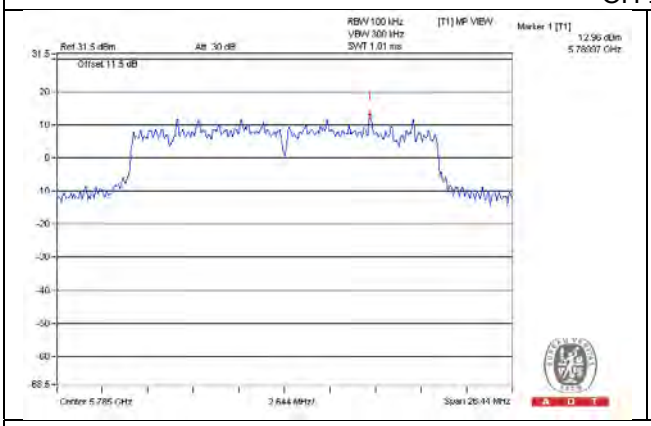
802.11n (20MHz)_Chain 2

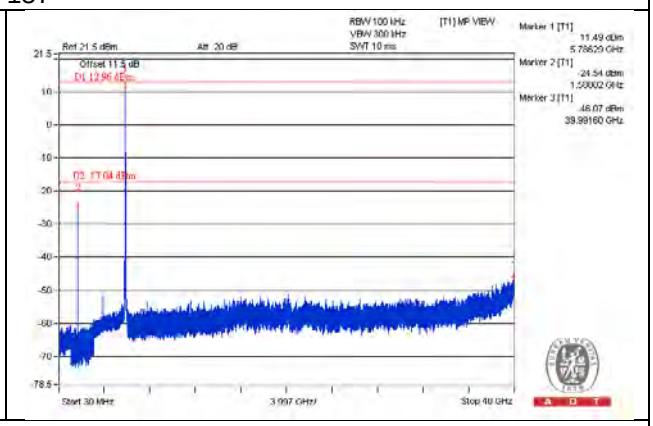
CH 149



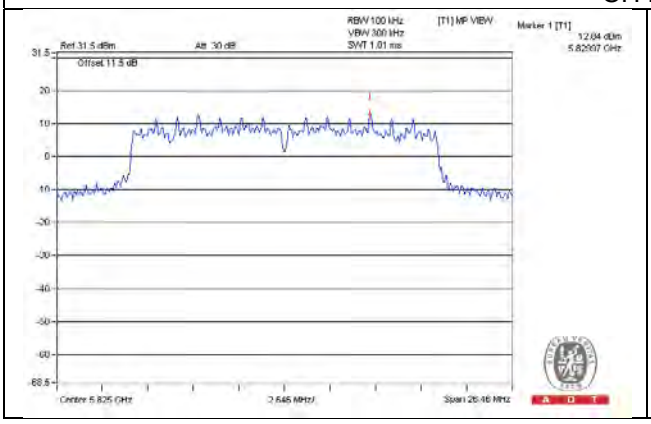


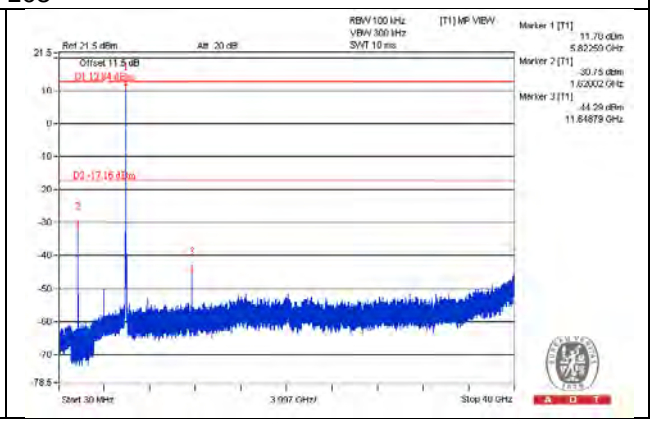
CH 157





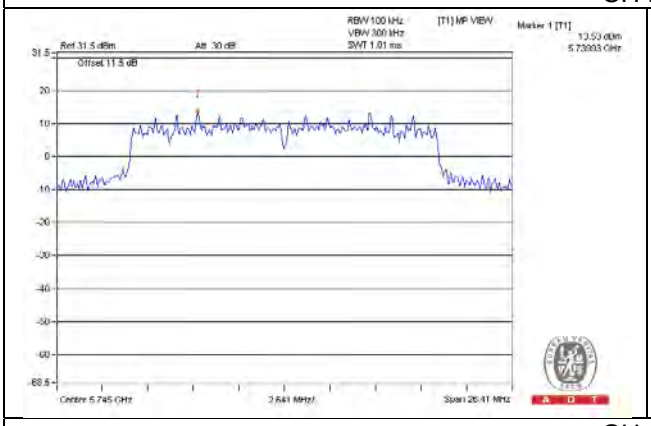
CH 165

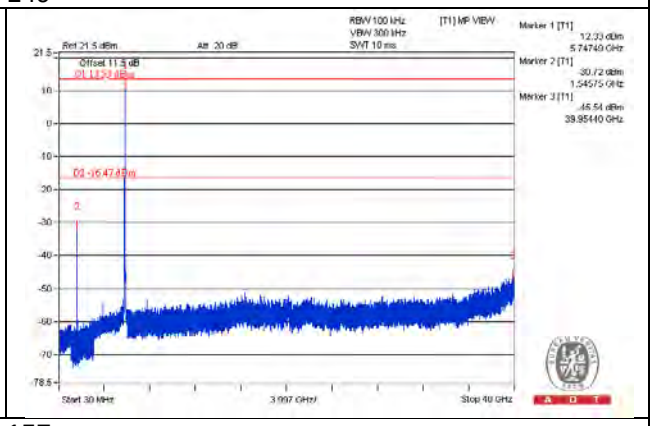




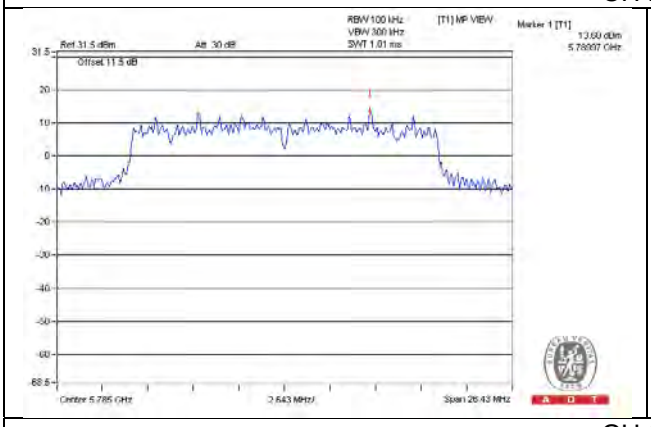
802.11n (20MHz)_Chain 3

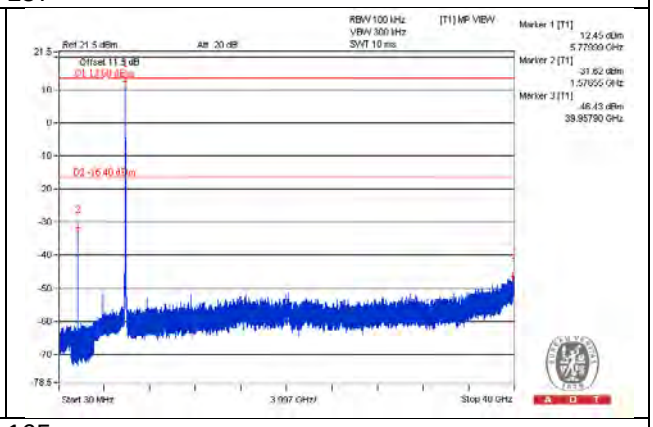
CH 149



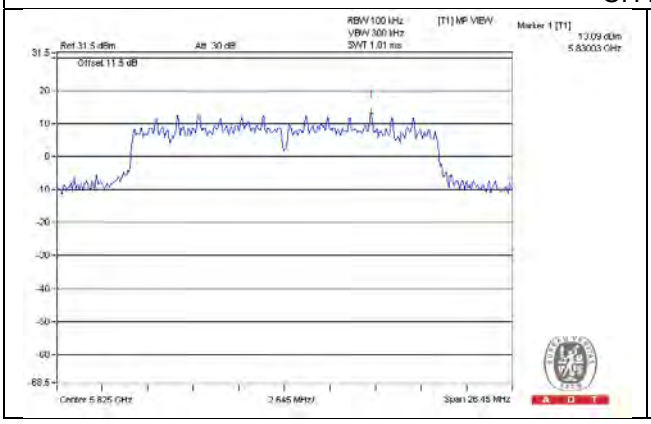


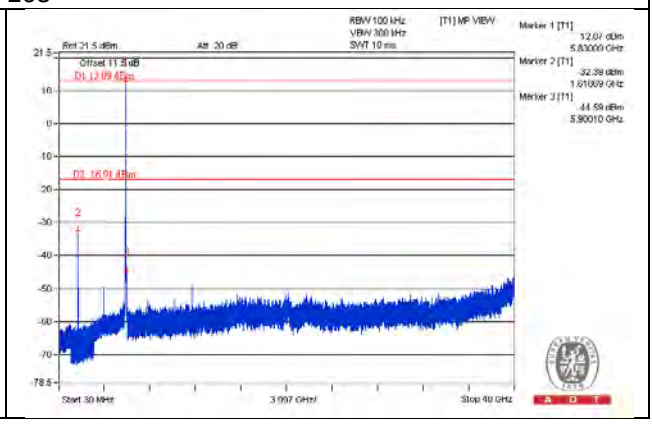
CH 157





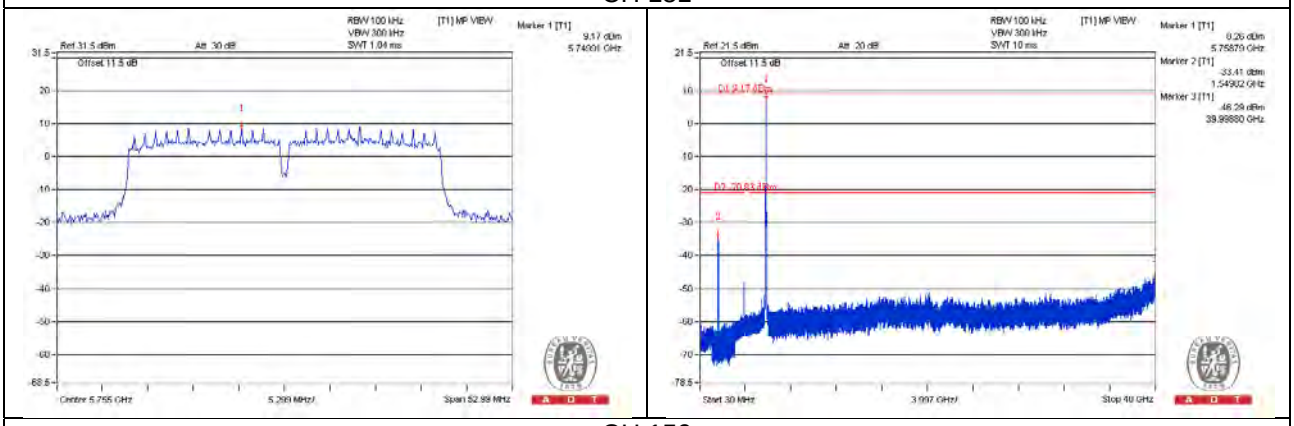
CH 165



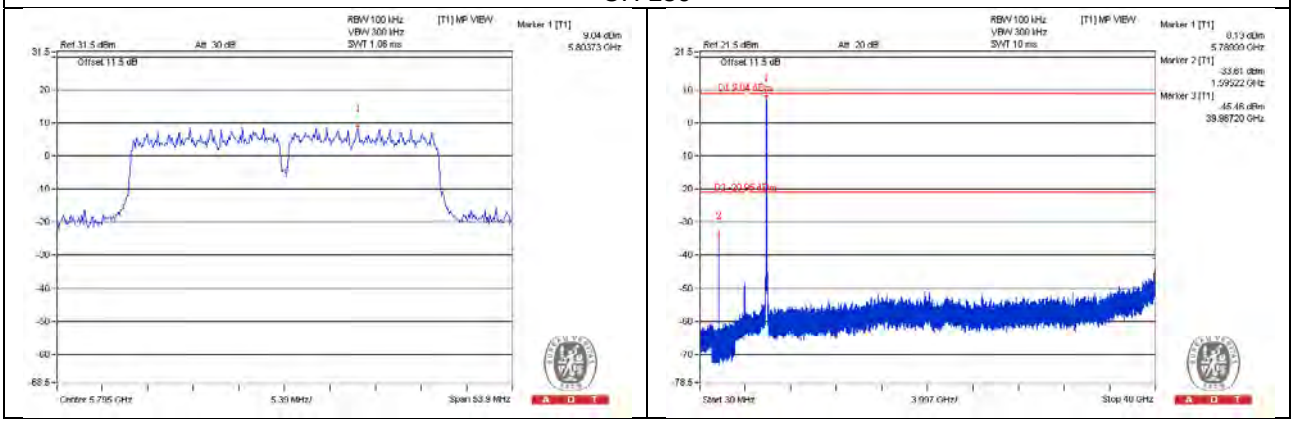


802.11n (40MHz)_Chain 0

CH 151

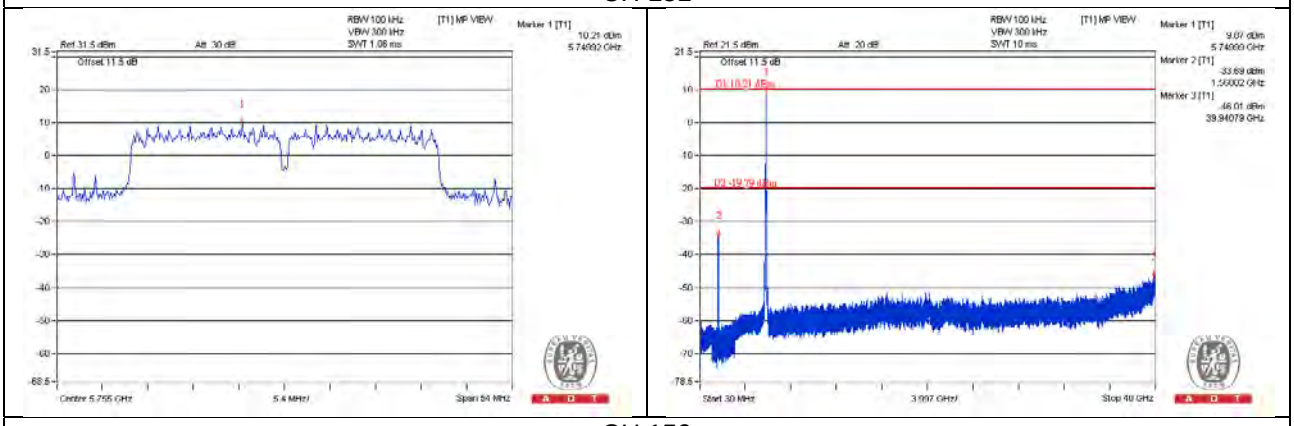


CH 159

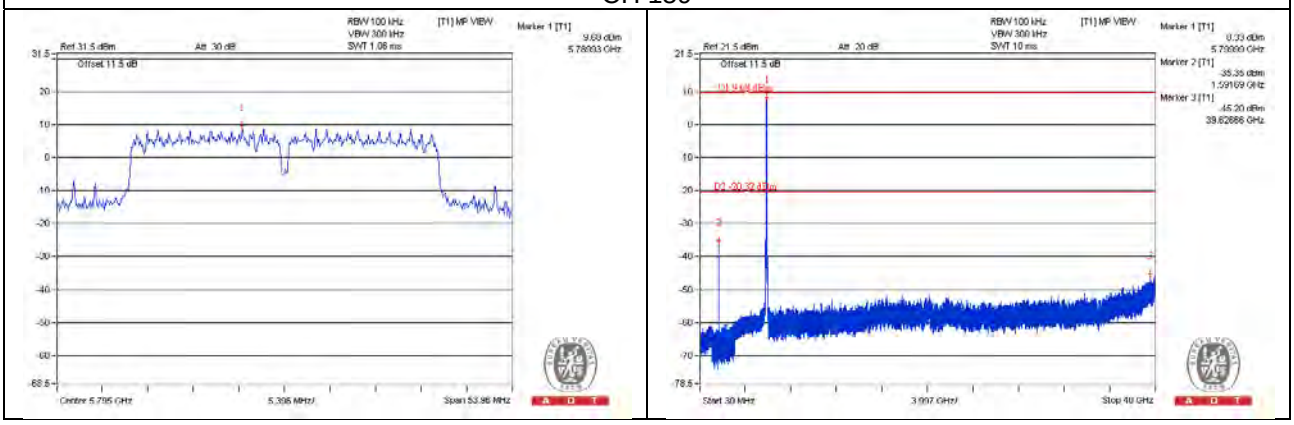


802.11n (40MHz)_Chain 1

CH 151

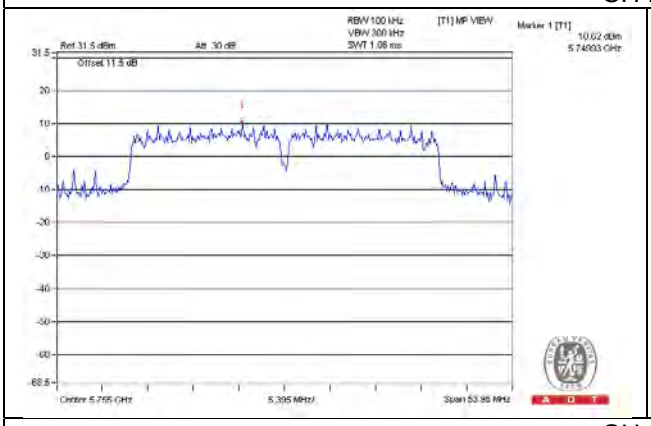


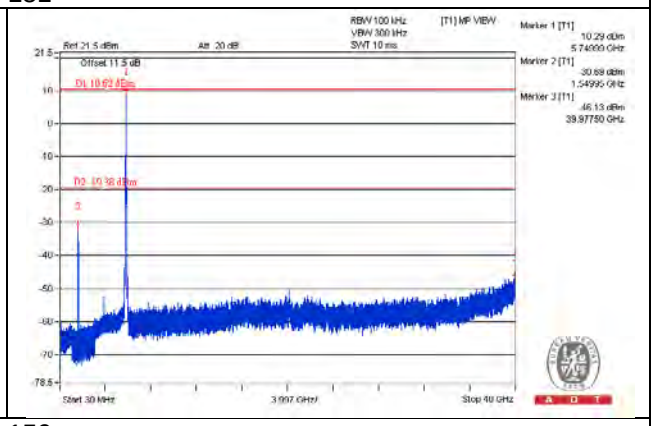
CH 159



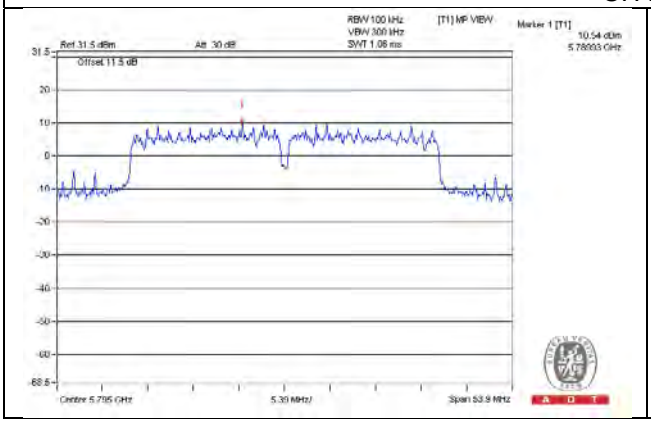
802.11n (40MHz)_Chain 2

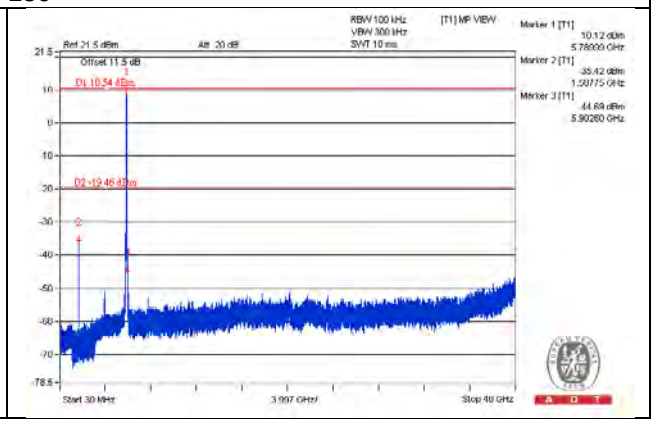
CH 151





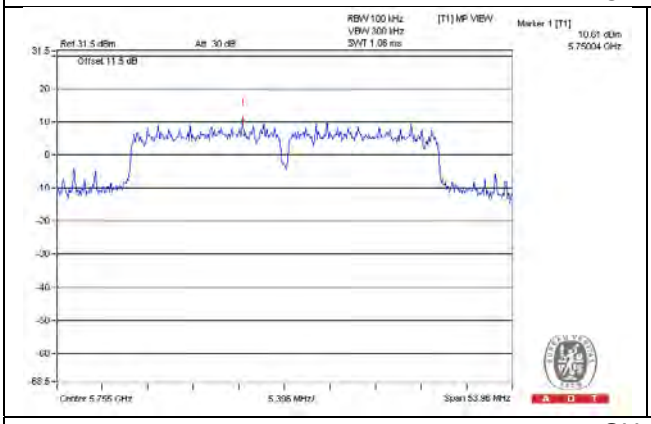
CH 159

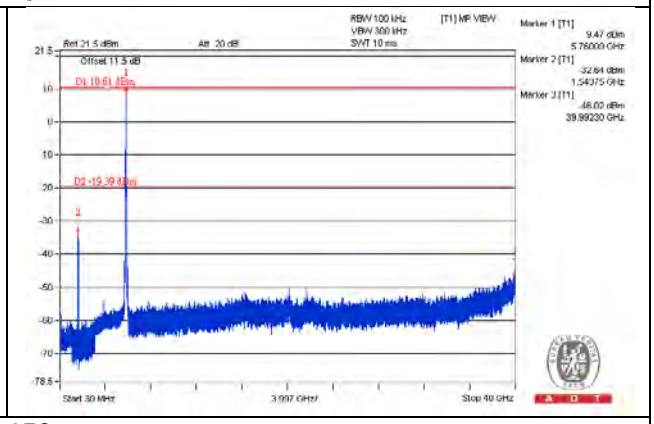




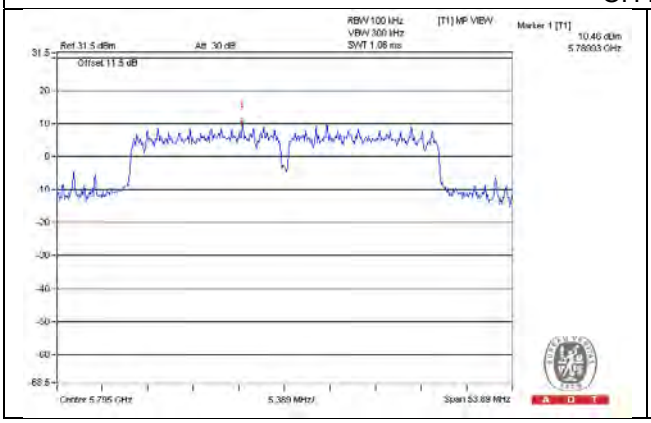
802.11n (40MHz)_Chain 3

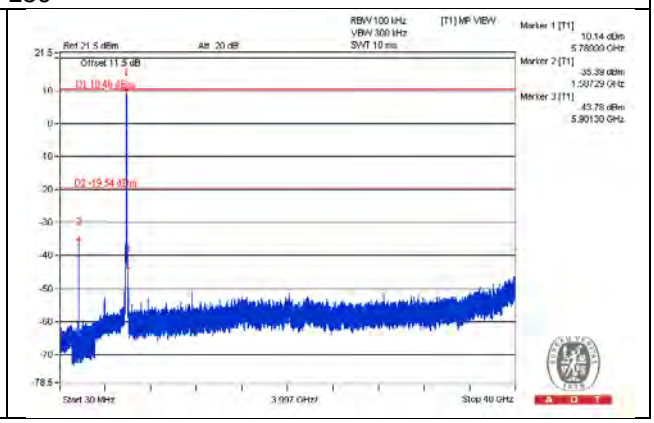
CH 151





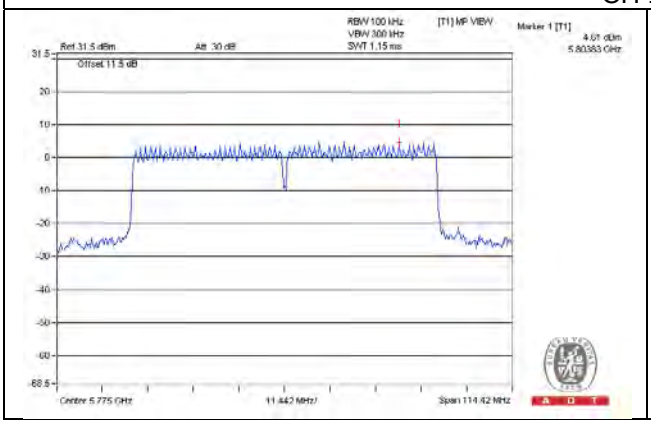
CH 159

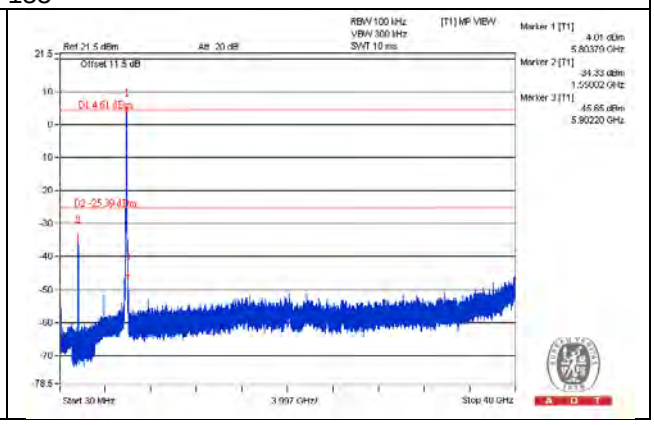




802.11ac (80MHz)_Chain 0

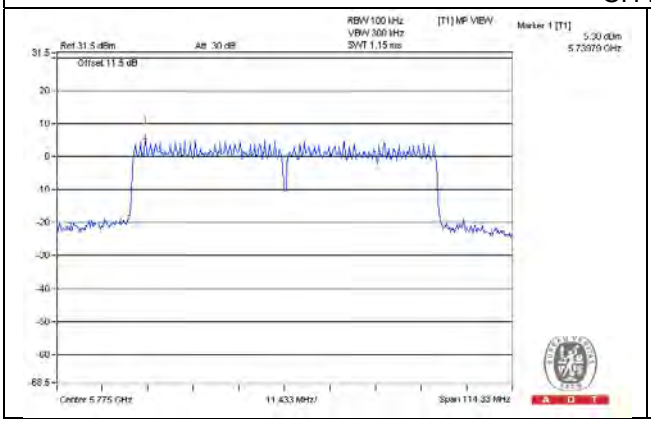
CH 155

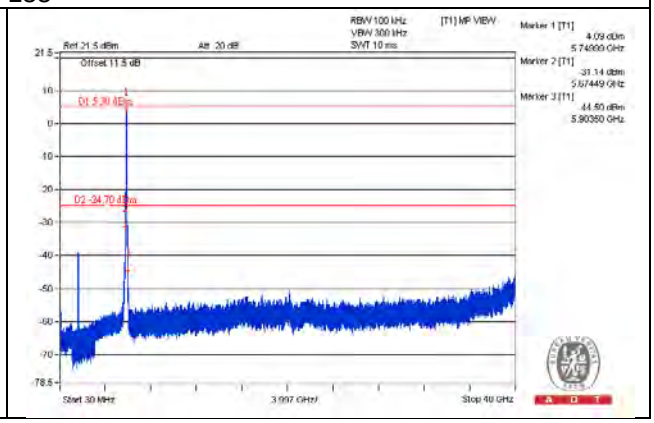




802.11ac (80MHz)_Chain 1

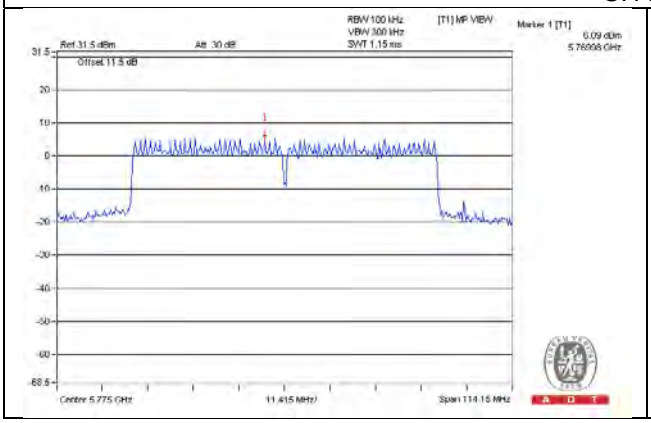
CH 155

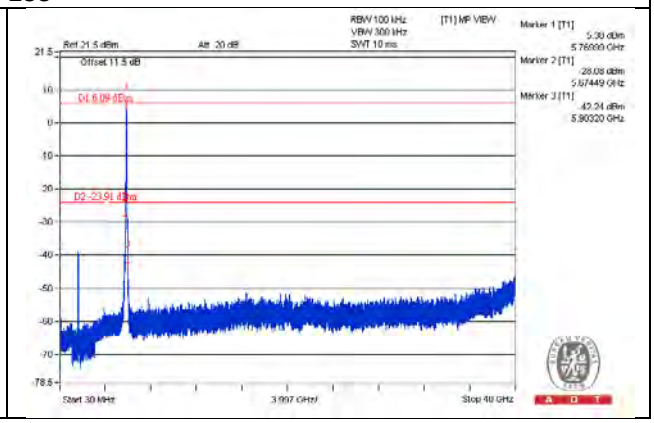




802.11ac (80MHz)_Chain 2

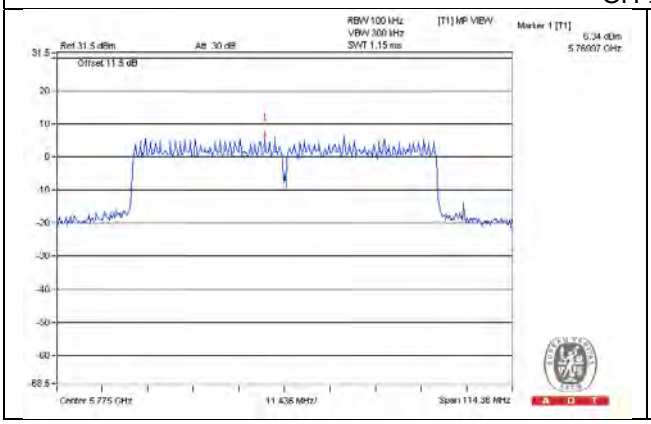
CH 155

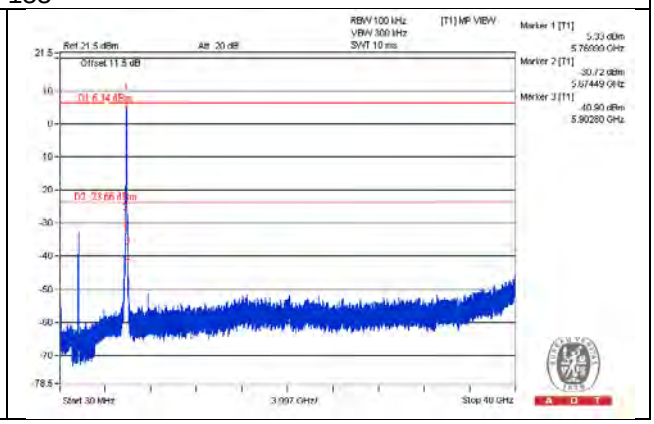




802.11ac (80MHz)_Chain 3

CH 155





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:

Linko EMC/RF Lab
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab
Tel: 886-3-5935343
Fax: 886-3-5935342

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

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

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

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