FCC Test Report

Report No.: RF150408C04

FCC ID: TE7RE580

Test Model: RE580D

Received Date: Apr. 08, 2015

Test Date: May 04 to Aug. 21, 2015

Issued Date: Oct. 22, 2015

Applicant: TP-LINK TECHNOLOGIES CO., LTD.

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

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Release Control Record

Issue No.	Description	Date Issued
RF150408C04	Original release.	Oct. 22, 2015

1 Certificate of Conformity

Product: AC1900 Wi-Fi Range Extender

Brand: TP-LINK

Test Model: RE580D

Sample Status: PROTOTYPE

Applicant: TP-LINK TECHNOLOGIES CO., LTD.

Test Date: May 04 to Aug. 21, 2015

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

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

Prepared by : _____ , **Date:** Oct. 22, 2015
Lori Chung / Specialist

Approved by : _____ , **Date:** Oct. 22, 2015
May Chen / 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 -3.46dB at 0.15000MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -1.0dB at 2491.30MHz, 2390.00MHz and 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 RP-SMA-F not a standard connector.

NOTE: The EUT was operating in 2400 ~ 2483.5MHz, 5150~5250MHz and 5725~5850MHz frequencies band. This report was recorded the RF parameters including 2400 ~ 2483.5MHz and 5725~5850MHz. For the 5150~5250MHz RF parameters was recorded in another test report.

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	2.86 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.37 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.65 dB
	6GHz ~ 18GHz	3.88 dB
	18GHz ~ 40GHz	4.11 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	AC1900 Wi-Fi Range Extender
Brand	TP-LINK
Test Model	RE580D
Status of EUT	PROTOTYPE
Power Supply Rating	12Vdc from power adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac/11n mode
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11g/a: up to 54Mbps 802.11n: up to 600Mbps 802.11ac: up to 1300Mbps
Operating Frequency	**For 15.407** 5.18 ~ 5.24GHz
	For 15.247 (2.4GHz) 2.412 ~ 2.462GHz **For 15.247 (5GHz)** 5.745 ~ 5.825GHz
Number of Channel	**For 15.407** 4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80)
	For 15.247 (2.4GHz) 11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40) **For 15.247 (5GHz)** 5 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80)

Output Power	**For 15.407** **CDD Mode:** 802.11a: 129.773mW 802.11ac (VHT20): 97.538mW 802.11ac (VHT40): 79.62mW 802.11ac (VHT80): 50.159mW **Beamforming Mode:** 802.11ac (VHT20): 91.869mW 802.11ac (VHT40): 78.347mW 802.11ac (VHT80): 48.68mW
	For 15.247 (2.4GHz) **CDD Mode:** 802.11b: 944.994mW 802.11g: 905.754mW 802.11n (HT20): 985.832mW 802.11n (HT40): 183.341mW **For 15.247 (5GHz)** **CDD Mode:** 802.11a: 941.704mW 802.11ac (VHT20): 929.132mW 802.11ac (VHT40): 939.727mW 802.11ac (VHT80): 325.598mW **Beamforming Mode:** 802.11ac (VHT20): 922.803mW 802.11ac (VHT40): 918.936mW 802.11ac (VHT80): 326.978mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	NA

Note:

1. 2.4GHz and 5GHz technology can transmit at same time.
2. The antennas provided to the EUT, please refer to the following table:

Transmitter Circuit	Brand	Model	Antenna Gain (dBi)	Frequency range (GHz to GHz)	Antenna Type	Connecter Type
Chain (0)	NA	NA	1.59	2.4-2.4835	Dipole	RP-SMA-F
			1.03	5.15-5.25		
			1.43	5.725-5.850		
Chain (1)	NA	NA	1.59	2.4-2.4835	Dipole	RP-SMA-F
			1.03	5.15-5.25		
			1.43	5.725-5.850		
Chain (2)	NA	NA	1.59	2.4-2.4835	Dipole	RP-SMA-F
			1.03	5.15-5.25		
			1.43	5.725-5.850		

3. The EUT must be supplied with a power adapter as following table:

Brand Name	Model No.	Spec.
Ten Pao International Inc.	S040EU1200250	Input: 100-240V~, 1.2A Max., 50/60Hz Output: 12V, 2500mA DC output cable: 1.5m, unshielded

4. The EUT incorporates a MIMO function.

2.4GHz Band			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11b	1 ~ 11Mbps	3TX	3RX
802.11g	6 ~ 54Mbps	3TX	3RX
802.11n (HT20)	MCS 0~7	3TX	3RX
	MCS 8~15	3TX	3RX
	MCS 16~23	3TX	3RX
802.11n (HT40)	MCS 0~7	3TX	3RX
	MCS 8~15	3TX	3RX
	MCS 16~23	3TX	3RX
5GHz Band			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11a	6 ~ 54Mbps	3TX	3RX
802.11n (HT20)	MCS 0~7	3TX	3RX
	MCS 8~15	3TX	3RX
	MCS 16~23	3TX	3RX
802.11n (HT40)	MCS 0~7	3TX	3RX
	MCS 8~15	3TX	3RX
	MCS 16~23	3TX	3RX
802.11ac (VHT20)	MCS 0~8, Nss=1	3TX	3RX
	MCS 0~8, Nss=2	3TX	3RX
	MCS 0~9, Nss=3	3TX	3RX
802.11ac (VHT40)	MCS 0~9, Nss=1	3TX	3RX
	MCS 0~9, Nss=2	3TX	3RX
	MCS 0~9, Nss=3	3TX	3RX
802.11ac (VHT80)	MCS 0~9, Nss=1	3TX	3RX
	MCS 0~9, Nss=2	3TX	3RX
	MCS 0~9, Nss=3	3TX	3RX

Note:
1. The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz) and 802.11ac mode for 20MHz (40MHz), therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)
2. All of modulation mode support beamforming function except 2.4GHz band and 5GHz band (802.11a) modulation mode.

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

3.2 Description of Test Modes

FOR 2.4GHz:

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

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

7 channels are provided for 802.11n (HT40):

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

FOR 5GHz (5745 ~ 5825MHz):

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

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

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

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

FOR 2.4GHz:

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

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

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

NOTE: The EUT had been pre-tested on the positioned of each 2 axis. The worst case was found when positioned on **Y-plane** (for below 1GHz) and **X-plane** (for above 1GHz).

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.

CDD Mode					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

Radiated Emission Test (Below 1GHz):

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

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

CDD Mode					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11n (HT20)	1 to 11	6	OFDM	BPSK	6.5

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.

CDD Mode					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11n (HT20)	1 to 11	6	OFDM	BPSK	6.5

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.

CDD Mode					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	23deg. C, 67%RH	120Vac, 60Hz	Weiwei Lo
RE<1G	22deg. C, 65%RH	120Vac, 60Hz	Weiwei Lo
PLC	25deg. C, 70%RH	120Vac, 60Hz	Mike Hsieh
APCM	25deg. C, 60%RH	120Vac, 60Hz	Gary Cheng

FOR 5GHz (5745 ~ 5825MHz):

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

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

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

NOTE: The EUT had been pre-tested on the positioned of each 2 axis. The worst case was found when positioned on **Y-plane** (for below 1GHz) and **X-plane** (for above 1GHz).

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.

CDD Mode					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6
802.11ac (VHT20)	149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)	151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)	155	155	OFDM	BPSK	29.3
Beamforming Mode					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11ac (VHT20)	149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)	151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)	155	155	OFDM	BPSK	29.3

Radiated Emission Test (Below 1GHz):

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

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

CDD Mode					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	149 to 165	157	OFDM	BPSK	6

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.

CDD Mode					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	149 to 165	157	OFDM	BPSK	6

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.

CDD Mode					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6
802.11ac (VHT20)	149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)	151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)	155	155	OFDM	BPSK	29.3
Beamforming Mode					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11ac (VHT20)	149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)	151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)	155	155	OFDM	BPSK	29.3

Test Condition:

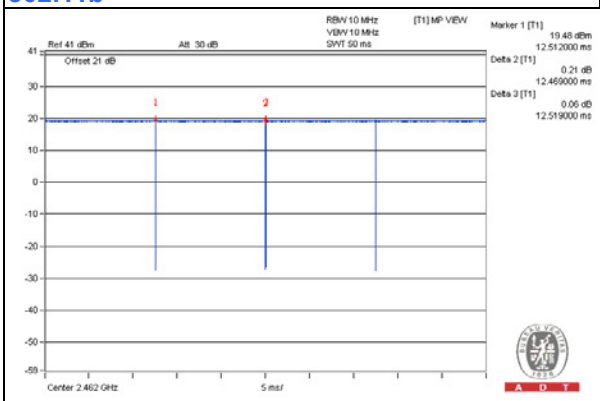
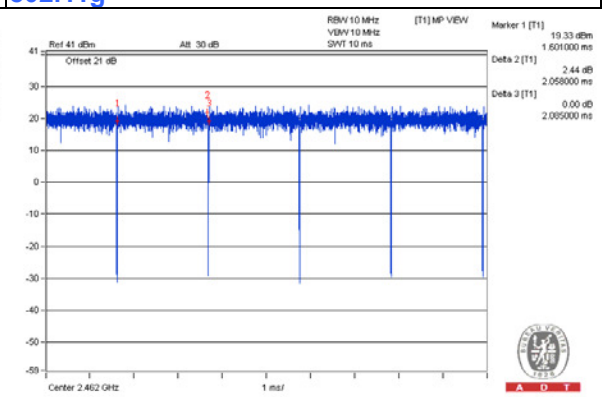
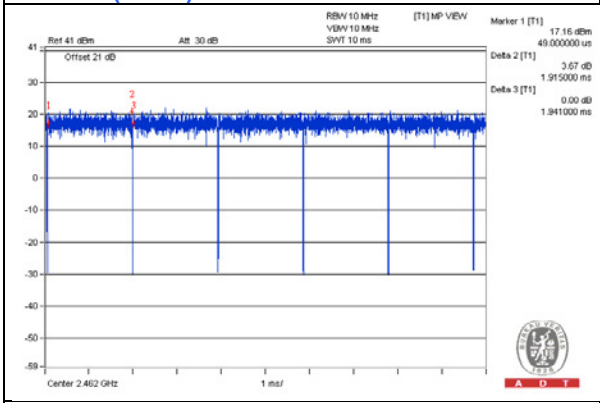
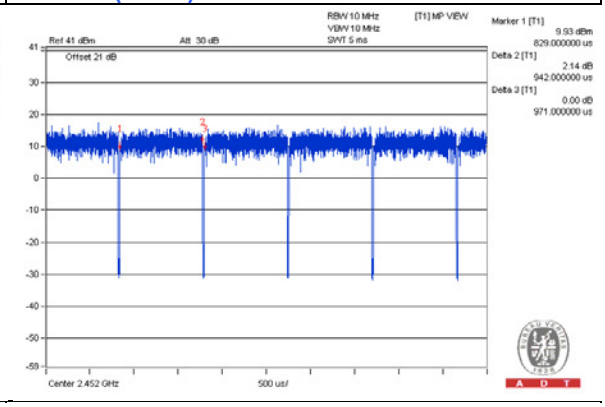
APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Chris Lin
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Chris Lin
PLC	25deg. C, 68%RH	120Vac, 60Hz	Sun Lin
APCM	25deg. C, 60%RH	120Vac, 60Hz	Gary Cheng

3.3 Duty Cycle of Test Signal

FOR 2.4GHz:

CDD Mode

If duty cycle of test signal is ≥ 98 %, duty factor is not required.
If duty cycle of test signal is < 98%, duty factor shall be considered.
802.11b: Duty cycle = 12.469 ms/12.519 ms = 0.996
802.11g: Duty cycle = 2.058 ms/2.085 ms = 0.987
802.11n (HT20): Duty cycle = 1.915 ms/1.941 ms = 0.987
802.11n (HT40): Duty cycle = 0.942 ms/0.971 ms = 0.97, Duty factor = 10 * log(1/0.97) = 0.13

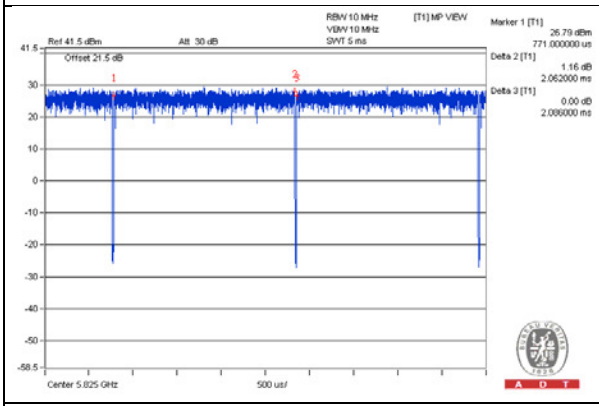
802.11b	802.11g
	
802.11n (HT20)	**802.11n (HT40)**
	

FOR 5GHz:

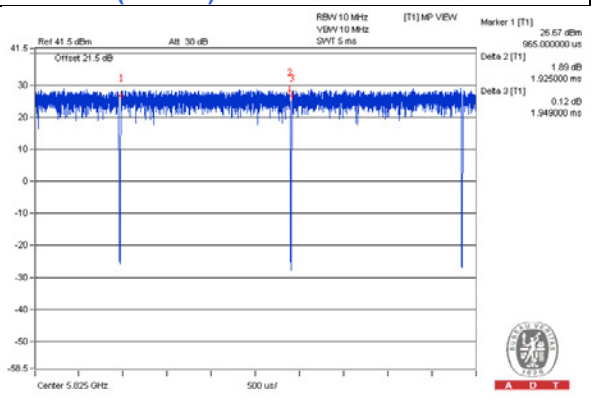
CDD Mode

If duty cycle of test signal is ≥ 98 %, duty factor is not required.
If duty cycle of test signal is < 98%, duty factor shall be considered.
802.11a: Duty cycle = 2.062 ms/2.086 ms = 0.988
802.11ac (VHT20): Duty cycle = 1.925 ms/1.949 ms = 0.988
802.11ac (VHT40): Duty cycle = 0.953 ms/0.97 ms = 0.982
802.11ac (VHT80): Duty cycle = 0.459 ms/0.479 ms = 0.958, Duty factor = 10 * log(1/0.958) = 0.19

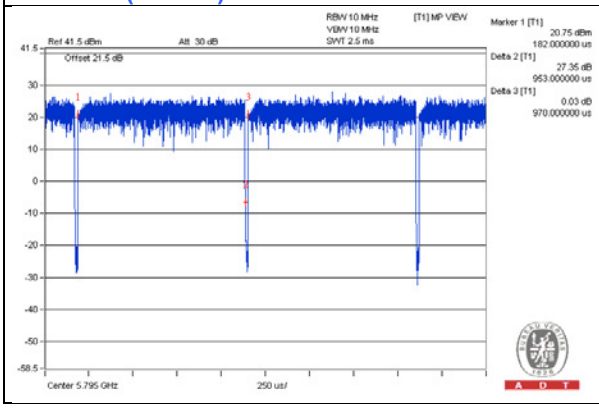
802.11a



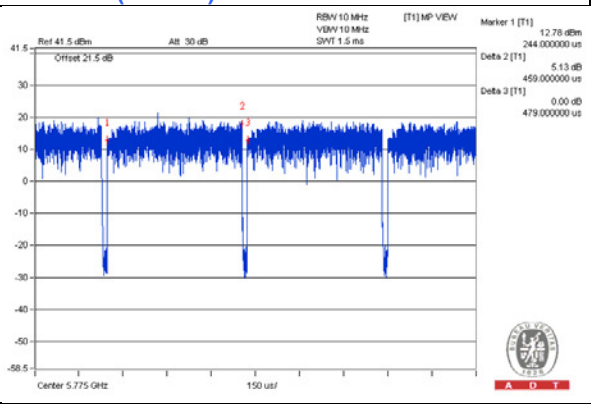
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



Beamforming Mode

If duty cycle of test signal is ≥ 98 %, duty factor is not required.

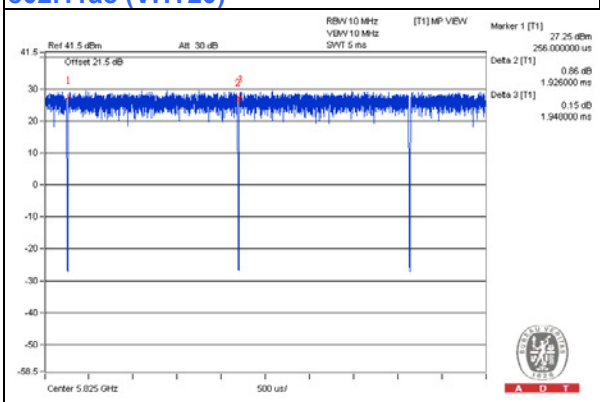
If duty cycle of test signal is < 98%, duty factor shall be considered.

802.11ac (VHT20): Duty cycle = 1.926 ms/1.948 ms = 0.989

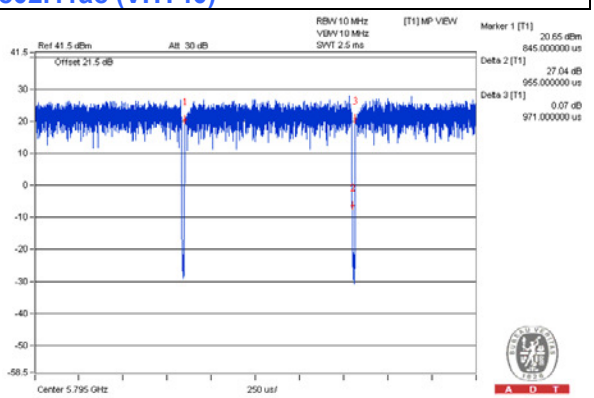
802.11ac (VHT40): Duty cycle = 0.955 ms/0.971 ms = 0.984

802.11ac (VHT80): Duty cycle = 0.46 ms/0.479 ms = 0.96, Duty factor = 10 * log(1/0.96) = 0.18

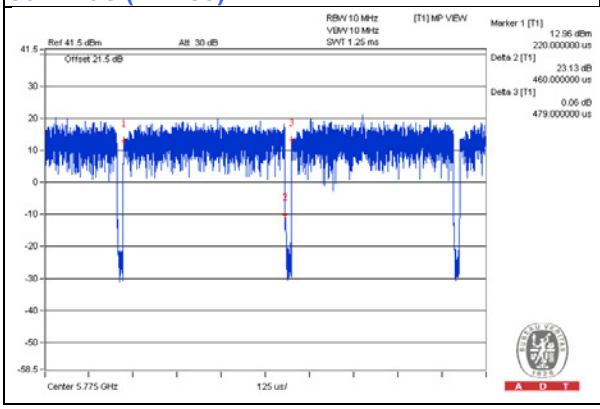
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



3.4 Description of Support Units

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

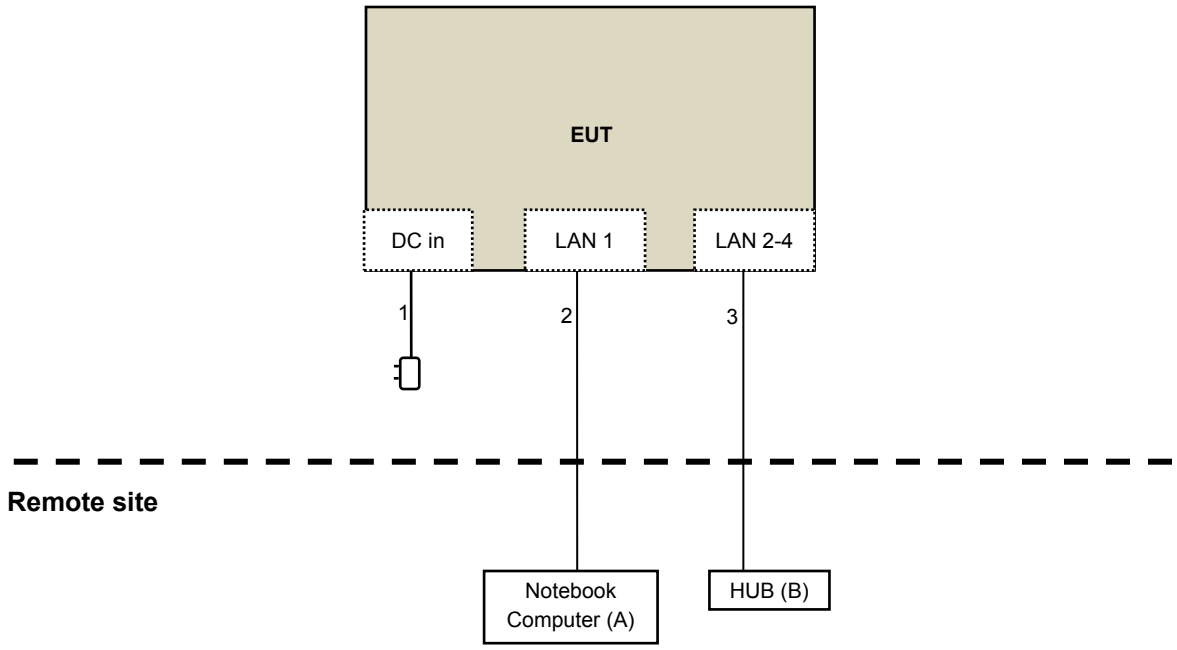
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook Computer	DELL	PP32LA	GSLB32S	FCC DoC	Provided by Lab
B.	HUB	ZyXEL	ES-116P	S060H02000215	FCC DoC	Provided by Lab

Note:

1. All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC	1	1.5	No	0	Supplied by Client
2.	RJ-45	1	10	No	0	Provided by Lab
3.	RJ-45	3	10	No	0	Provided by Lab

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards

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

FCC Part 15, Subpart C (15.247)
558074 D01 DTS Meas Guidance v03r03
662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10-2013

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

NOTE: The EUT 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 20dB under any condition of modulation.

4.1.2 Test Instruments

For Below 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210105	July 21, 2014	July 20, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Feb. 06, 2015	Feb. 05, 2016
RF Cable	NA	CHGCAB_001	Oct. 04, 2014	Oct. 03, 2015
Antenna Tower & Turn Table CT	NA	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 horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
5. The VCCI Site Registration No. is G-137.
6. The CANADA Site Registration No. is IC 7450H-2.
7. Tested Date: May 26, 2015

For other test items:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210105	July 24, 2015	July 23, 2016
Horn_Antenna AISI	AIH.8018	000032009111 0	Feb. 09, 2015	Feb. 08, 2016
Pre-Amplifier Agilent	8449B	3008A02578	June 23, 2015	June 22, 2016
RF Cable	NA	131205 131216 131217 SNMY23684/ 4	Jan. 16, 2015	Jan. 15, 2016
Spectrum Analyzer R&S	FSV40	100964	June 26, 2015	June 25, 2016
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Dec. 12, 2014	Dec. 11, 2015
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Feb. 05, 2015	Feb. 04, 2016
RF Cable	NA	329751/4 RF104-204	Dec. 11, 2014	Dec. 10, 2015
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA
Power Meter Anritsu	ML2495A	1014008	Apr. 28, 2015	Apr. 27, 2016
Power Sensor Anritsu	MA2411B	0917122	Apr. 28, 2015	Apr. 27, 2016
Spectrum Analyzer R&S	FSP 40	100060	May 08, 2015	May 07, 2016

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. G.
3. The FCC Site Registration No. is 966073.
4. The VCCI Site Registration No. is G-137.
5. The CANADA Site Registration No. is IC 7450H-2.
6. Tested Date: Aug. 18 to 21, 2015

4.1.3 Test Procedures

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

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

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

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

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

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

Note:

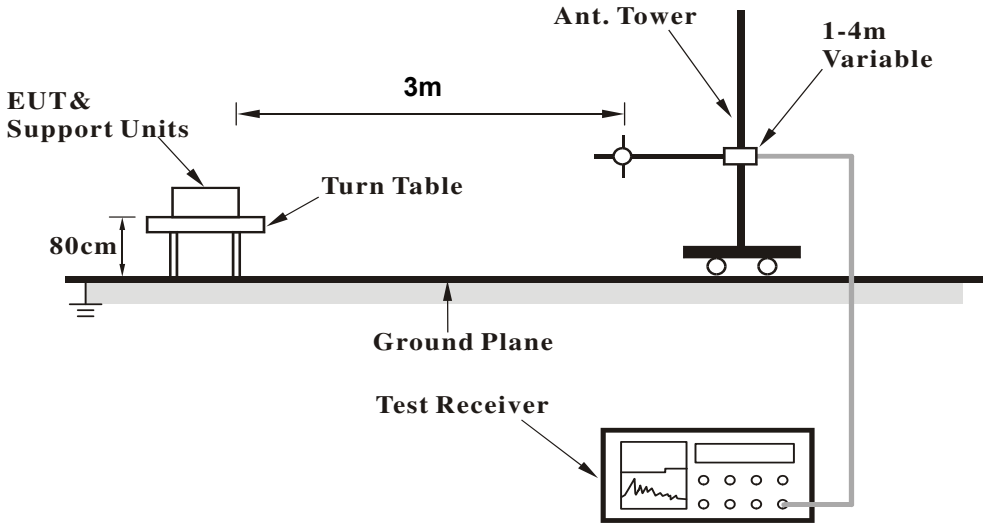
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

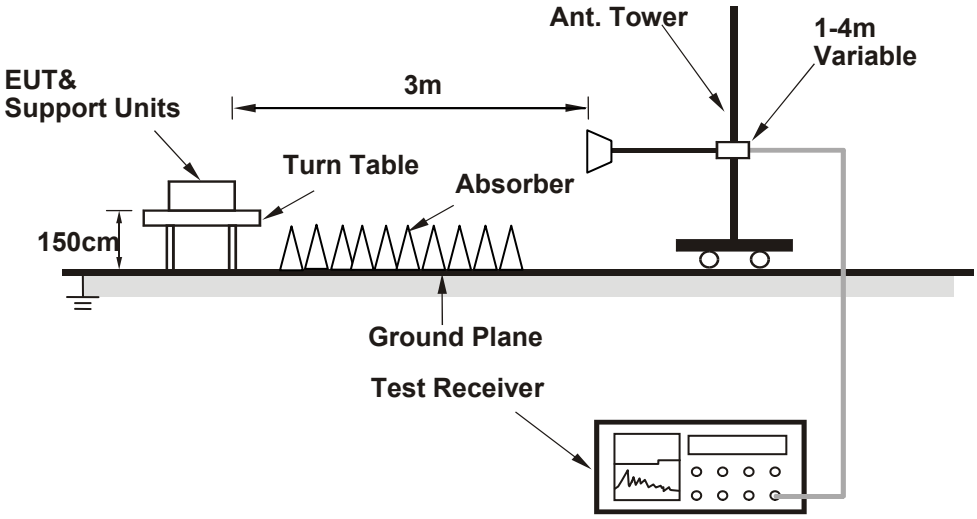
No deviation.

4.1.5 Test Setup

<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

1. Connect the EUT with the support unit A (Notebook Computer) which is placed on remote site.
2. Controlling software (MTool_2.0.1.1.exe) has been activated to set the EUT on specific status.

4.1.7 Test Results

CDD Mode

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	50.1 PK	74.0	-23.9	2.11 H	313	50.26	-0.16
2	2390.00	36.5 AV	54.0	-17.5	2.11 H	313	36.66	-0.16
3	*2412.00	107.1 PK			2.11 H	313	107.20	-0.10
4	*2412.00	104.3 AV			2.11 H	313	104.40	-0.10
5	2491.30	52.0 PK	74.0	-22.0	2.11 H	313	51.87	0.13
6	2491.30	42.1 AV	54.0	-11.9	2.11 H	313	41.97	0.13
7	4824.00	49.6 PK	74.0	-24.4	1.78 H	156	40.84	8.76
8	4824.00	37.1 AV	54.0	-16.9	1.78 H	156	28.34	8.76
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	56.4 PK	74.0	-17.6	1.59 V	24	56.56	-0.16
2	2390.00	42.8 AV	54.0	-11.2	1.59 V	24	42.96	-0.16
3	*2412.00	117.6 PK			1.59 V	24	117.70	-0.10
4	*2412.00	114.8 AV			1.59 V	24	114.90	-0.10
5	2491.30	60.0 PK	74.0	-14.0	1.72 V	24	59.87	0.13
6	**2491.30**	**53.0 AV**	**54.0**	**-1.0**	**1.72 V**	**24**	**52.87**	**0.13**
7	4824.00	51.6 PK	74.0	-22.4	1.84 V	163	42.84	8.76
8	4824.00	40.1 AV	54.0	-13.9	1.84 V	163	31.34	8.76

REMARKS:

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

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	2312.70	51.3 PK	74.0	-22.7	2.09 H	311	51.74	-0.44
2	2312.70	41.0 AV	54.0	-13.0	2.09 H	311	41.44	-0.44
3	*2437.00	114.8 PK			2.09 H	311	114.83	-0.03
4	*2437.00	111.7 AV			2.09 H	311	111.73	-0.03
5	2500.00	53.2 PK	74.0	-20.8	2.09 H	311	53.04	0.16
6	2500.00	44.1 AV	54.0	-9.9	2.09 H	311	43.94	0.16
7	4874.00	51.0 PK	74.0	-23.0	1.82 H	165	42.09	8.91
8	4874.00	39.2 AV	54.0	-14.8	1.82 H	165	30.29	8.91
9	7311.00	59.4 PK	74.0	-14.6	1.92 H	146	42.95	16.45
10	7311.00	47.1 AV	54.0	-6.9	1.92 H	146	30.65	16.45
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	2312.70	57.9 PK	74.0	-16.1	1.75 V	24	58.34	-0.44
2	2312.70	49.1 AV	54.0	-4.9	1.75 V	24	49.54	-0.44
3	*2437.00	124.3 PK			1.75 V	24	124.33	-0.03
4	*2437.00	121.9 AV			1.75 V	24	121.93	-0.03
5	2500.00	59.2 PK	74.0	-14.8	1.45 V	25	59.04	0.16
6	2500.00	50.4 AV	54.0	-3.6	1.45 V	25	50.24	0.16
7	4874.00	51.4 PK	74.0	-22.6	1.78 V	166	42.49	8.91
8	4874.00	39.8 AV	54.0	-14.2	1.78 V	166	30.89	8.91
9	7311.00	60.4 PK	74.0	-13.6	1.98 V	165	43.95	16.45
10	7311.00	47.2 AV	54.0	-6.8	1.98 V	165	30.75	16.45

REMARKS:

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

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	2382.70	58.2 PK	74.0	-15.8	2.11 H	314	59.67	-1.47
2	2382.70	47.7 AV	54.0	-6.3	2.11 H	314	49.17	-1.47
3	*2462.00	107.9 PK			2.11 H	314	109.16	-1.26
4	*2462.00	104.7 AV			2.11 H	314	105.96	-1.26
5	2483.50	56.4 PK	74.0	-17.6	2.11 H	314	57.61	-1.21
6	2483.50	42.1 AV	54.0	-11.9	2.11 H	314	43.31	-1.21
7	4924.00	51.6 PK	74.0	-22.4	1.83 H	168	44.15	7.45
8	4924.00	39.6 AV	54.0	-14.4	1.83 H	168	32.15	7.45
9	7386.00	59.3 PK	74.0	-14.7	1.88 H	156	44.78	14.52
10	7386.00	47.2 AV	54.0	-6.8	1.88 H	156	32.68	14.52
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	2382.70	61.5 PK	74.0	-12.5	1.80 V	23	62.97	-1.47
2	2382.70	52.7 AV	54.0	-1.3	1.80 V	23	54.17	-1.47
3	*2462.00	117.8 PK			1.89 V	22	119.06	-1.26
4	*2462.00	115.0 AV			1.89 V	22	116.26	-1.26
5	2483.50	54.2 PK	74.0	-19.8	1.89 V	22	55.41	-1.21
6	2483.50	41.6 AV	54.0	-12.4	1.89 V	22	42.81	-1.21
7	4924.00	51.2 PK	74.0	-22.8	1.80 V	163	43.75	7.45
8	4924.00	39.5 AV	54.0	-14.5	1.80 V	163	32.05	7.45
9	7386.00	60.8 PK	74.0	-13.2	2.00 V	171	46.28	14.52
10	7386.00	47.6 AV	54.0	-6.4	2.00 V	171	33.08	14.52

REMARKS:

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

802.11g

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	61.9 PK	74.0	-12.1	2.08 H	303	62.06	-0.16
2	2390.00	46.5 AV	54.0	-7.5	2.08 H	303	46.66	-0.16
3	*2412.00	108.8 PK			2.08 H	303	108.90	-0.10
4	*2412.00	98.7 AV			2.08 H	303	98.80	-0.10
5	2489.00	55.4 PK	74.0	-18.6	2.08 H	303	55.27	0.13
6	2489.00	43.0 AV	54.0	-11.0	2.08 H	303	42.87	0.13
7	4824.00	51.2 PK	74.0	-22.8	1.73 H	183	42.44	8.76
8	4824.00	39.4 AV	54.0	-14.6	1.73 H	183	30.64	8.76
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	68.8 PK	74.0	-5.2	1.66 V	0	68.96	-0.16
2	2390.00	52.9 AV	54.0	-1.1	1.66 V	0	53.06	-0.16
3	*2412.00	119.2 PK			1.66 V	0	119.30	-0.10
4	*2412.00	108.9 AV			1.66 V	0	109.00	-0.10
5	2489.00	59.2 PK	74.0	-14.8	1.66 V	0	59.07	0.13
6	2489.00	46.5 AV	54.0	-7.5	1.66 V	0	46.37	0.13
7	4824.00	51.0 PK	74.0	-23.0	1.77 V	158	42.24	8.76
8	4824.00	39.6 AV	54.0	-14.4	1.77 V	158	30.84	8.76

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	58.0 PK	74.0	-16.0	2.11 H	291	58.16	-0.16
2	2390.00	44.3 AV	54.0	-9.7	2.11 H	291	44.46	-0.16
3	*2437.00	117.2 PK			2.11 H	291	117.23	-0.03
4	*2437.00	106.1 AV			2.11 H	291	106.13	-0.03
5	2483.50	57.7 PK	74.0	-16.3	2.11 H	291	57.59	0.11
6	2483.50	46.4 AV	54.0	-7.6	2.11 H	291	46.29	0.11
7	4874.00	51.2 PK	74.0	-22.8	1.78 H	167	42.29	8.91
8	4874.00	39.2 AV	54.0	-14.8	1.78 H	167	30.29	8.91
9	7311.00	59.0 PK	74.0	-15.0	1.92 H	167	42.55	16.45
10	7311.00	47.1 AV	54.0	-6.9	1.92 H	167	30.65	16.45
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	69.1 PK	74.0	-4.9	1.59 V	0	69.26	-0.16
2	2390.00	50.9 AV	54.0	-3.1	1.59 V	0	51.06	-0.16
3	*2437.00	127.0 PK			1.59 V	0	127.03	-0.03
4	*2437.00	116.4 AV			1.59 V	0	116.43	-0.03
5	2483.50	69.3 PK	74.0	-4.7	1.59 V	0	69.19	0.11
6	2483.50	51.8 AV	54.0	-2.2	1.59 V	0	51.69	0.11
7	4874.00	51.4 PK	74.0	-22.6	1.83 V	154	42.49	8.91
8	4874.00	39.6 AV	54.0	-14.4	1.83 V	154	30.69	8.91
9	7311.00	60.7 PK	74.0	-13.3	1.95 V	162	44.25	16.45
10	7311.00	47.7 AV	54.0	-6.3	1.95 V	162	31.25	16.45

REMARKS:

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

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	2390.00	61.3 PK	74.0	-12.7	2.14 H	295	61.46	-0.16
2	2390.00	40.2 AV	54.0	-13.8	2.14 H	295	40.36	-0.16
3	*2462.00	109.6 PK			2.14 H	295	109.55	0.05
4	*2462.00	98.4 AV			2.14 H	295	98.35	0.05
5	2483.50	60.4 PK	74.0	-13.6	2.14 H	295	60.29	0.11
6	2483.50	40.6 AV	54.0	-13.4	2.14 H	295	40.49	0.11
7	4924.00	50.9 PK	74.0	-23.1	1.82 H	153	41.81	9.09
8	4924.00	39.1 AV	54.0	-14.9	1.82 H	153	30.01	9.09
9	7386.00	58.3 PK	74.0	-15.7	1.96 H	168	41.70	16.60
10	7386.00	46.6 AV	54.0	-7.4	1.96 H	168	30.00	16.60
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	62.5 PK	74.0	-11.5	1.52 V	0	62.66	-0.16
2	2390.00	51.3 AV	54.0	-2.7	1.52 V	0	51.46	-0.16
3	*2462.00	119.2 PK			1.52 V	0	119.15	0.05
4	*2462.00	108.7 AV			1.52 V	0	108.65	0.05
5	2483.50	71.1 PK	74.0	-2.9	1.52 V	0	70.99	0.11
6	2483.50	52.9 AV	54.0	-1.1	1.52 V	0	52.79	0.11
7	4924.00	51.2 PK	74.0	-22.8	1.83 V	155	42.11	9.09
8	4924.00	39.2 AV	54.0	-14.8	1.83 V	155	30.11	9.09
9	7386.00	61.3 PK	74.0	-12.7	1.96 V	156	44.70	16.60
10	7386.00	48.1 AV	54.0	-5.9	1.96 V	156	31.50	16.60

REMARKS:

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

802.11n (HT20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	62.8 PK	74.0	-11.2	2.16 H	293	62.96	-0.16
2	2390.00	46.6 AV	54.0	-7.4	2.16 H	293	46.76	-0.16
3	*2412.00	107.1 PK			2.16 H	293	107.20	-0.10
4	*2412.00	96.8 AV			2.16 H	293	96.90	-0.10
5	2483.50	52.1 PK	74.0	-21.9	2.16 H	293	51.99	0.11
6	2483.50	42.3 AV	54.0	-11.7	2.16 H	293	42.19	0.11
7	4824.00	50.4 PK	74.0	-23.6	1.81 H	166	41.64	8.76
8	4824.00	38.7 AV	54.0	-15.3	1.81 H	166	29.94	8.76
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**	**73.0 PK**	**74.0**	**-1.0**	**1.56 V**	**0**	**73.16**	**-0.16**
2	2390.00	51.1 AV	54.0	-2.9	1.56 V	0	51.26	-0.16
3	*2412.00	117.0 PK			1.56 V	0	117.10	-0.10
4	*2412.00	107.0 AV			1.56 V	0	107.10	-0.10
5	2483.50	56.3 PK	74.0	-17.7	1.56 V	0	56.19	0.11
6	2483.50	44.6 AV	54.0	-9.4	1.56 V	0	44.49	0.11
7	4824.00	50.7 PK	74.0	-23.3	1.84 V	125	41.94	8.76
8	4824.00	39.2 AV	54.0	-14.8	1.84 V	125	30.44	8.76

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	63.8 PK	74.0	-10.2	2.15 H	291	63.96	-0.16
2	2390.00	46.7 AV	54.0	-7.3	2.15 H	291	46.86	-0.16
3	*2437.00	116.4 PK			2.15 H	291	116.43	-0.03
4	*2437.00	106.0 AV			2.15 H	291	106.03	-0.03
5	2483.50	62.8 PK	74.0	-11.2	2.15 H	291	62.69	0.11
6	2483.50	46.2 AV	54.0	-7.8	2.15 H	291	46.09	0.11
7	4874.00	50.9 PK	74.0	-23.1	1.78 H	150	41.99	8.91
8	4874.00	38.9 AV	54.0	-15.1	1.78 H	150	29.99	8.91
9	7311.00	58.4 PK	74.0	-15.6	1.94 H	179	41.95	16.45
10	7311.00	46.9 AV	54.0	-7.1	1.94 H	179	30.45	16.45
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	72.7 PK	74.0	-1.3	1.56 V	3	72.86	-0.16
2	**2390.00**	**53.0 AV**	**54.0**	**-1.0**	**1.56 V**	**3**	**53.16**	**-0.16**
3	*2437.00	126.8 PK			1.56 V	3	126.83	-0.03
4	*2437.00	116.3 AV			1.56 V	3	116.33	-0.03
5	2483.50	68.7 PK	74.0	-5.3	1.56 V	3	68.59	0.11
6	2483.50	52.4 AV	54.0	-1.6	1.56 V	3	52.29	0.11
7	4874.00	50.7 PK	74.0	-23.3	1.83 V	141	41.79	8.91
8	4874.00	38.9 AV	54.0	-15.1	1.83 V	141	29.99	8.91
9	7311.00	61.2 PK	74.0	-12.8	2.02 V	156	44.75	16.45
10	7311.00	48.2 AV	54.0	-5.8	2.02 V	156	31.75	16.45

REMARKS:

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

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	2390.00	54.9 PK	74.0	-19.1	2.16 H	283	55.06	-0.16
2	2390.00	45.3 AV	54.0	-8.7	2.16 H	283	45.46	-0.16
3	*2462.00	106.4 PK			2.16 H	283	106.35	0.05
4	*2462.00	96.2 AV			2.16 H	283	96.15	0.05
5	2483.50	65.1 PK	74.0	-8.9	2.16 H	283	64.99	0.11
6	2483.50	47.1 AV	54.0	-6.9	2.16 H	283	46.99	0.11
7	4924.00	51.1 PK	74.0	-22.9	1.78 H	147	42.01	9.09
8	4924.00	38.8 AV	54.0	-15.2	1.78 H	147	29.71	9.09
9	7386.00	59.0 PK	74.0	-15.0	1.91 H	185	42.40	16.60
10	7386.00	47.4 AV	54.0	-6.6	1.91 H	185	30.80	16.60
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	60.5 PK	74.0	-13.5	1.68 V	0	60.66	-0.16
2	2390.00	49.1 AV	54.0	-4.9	1.68 V	0	49.26	-0.16
3	*2462.00	116.6 PK			1.68 V	0	116.55	0.05
4	*2462.00	106.3 AV			1.68 V	0	106.25	0.05
5	2483.50	71.3 PK	74.0	-2.7	1.68 V	0	71.19	0.11
6	2483.50	52.7 AV	54.0	-1.3	1.68 V	0	52.59	0.11
7	4924.00	50.2 PK	74.0	-23.8	1.88 V	131	41.11	9.09
8	4924.00	38.4 AV	54.0	-15.6	1.88 V	131	29.31	9.09
9	7386.00	60.8 PK	74.0	-13.2	1.97 V	161	44.20	16.60
10	7386.00	47.9 AV	54.0	-6.1	1.97 V	161	31.30	16.60

REMARKS:

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

802.11n (HT40)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	64.0 PK	74.0	-10.0	2.17 H	273	64.16	-0.16
2	2390.00	47.2 AV	54.0	-6.8	2.17 H	273	47.36	-0.16
3	*2422.00	102.8 PK			2.17 H	273	102.88	-0.08
4	*2422.00	91.7 AV			2.17 H	273	91.78	-0.08
5	4844.00	50.5 PK	74.0	-23.5	1.76 H	161	41.68	8.82
6	4844.00	38.4 AV	54.0	-15.6	1.76 H	161	29.58	8.82
7	7266.00	59.2 PK	74.0	-14.8	1.96 H	184	42.59	16.61
8	7266.00	47.4 AV	54.0	-6.6	1.96 H	184	30.79	16.61
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	69.4 PK	74.0	-4.6	1.64 V	0	69.56	-0.16
2	**2390.00**	**53.0 AV**	**54.0**	**-1.0**	**1.64 V**	**0**	**53.16**	**-0.16**
3	*2422.00	112.5 PK			1.64 V	0	112.58	-0.08
4	*2422.00	101.9 AV			1.64 V	0	101.98	-0.08
5	4844.00	49.9 PK	74.0	-24.1	1.88 V	122	41.08	8.82
6	4844.00	38.0 AV	54.0	-16.0	1.88 V	122	29.18	8.82
7	7266.00	60.9 PK	74.0	-13.1	1.98 V	175	44.29	16.61
8	7266.00	48.2 AV	54.0	-5.8	1.98 V	175	31.59	16.61

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	66.2 PK	74.0	-7.8	2.13 H	278	66.36	-0.16
2	2390.00	48.7 AV	54.0	-5.3	2.13 H	278	48.86	-0.16
3	*2437.00	106.9 PK			2.13 H	278	106.93	-0.03
4	*2437.00	95.6 AV			2.13 H	278	95.63	-0.03
5	2483.50	63.8 PK	74.0	-10.2	2.13 H	278	63.69	0.11
6	2483.50	46.6 AV	54.0	-7.4	2.13 H	278	46.49	0.11
7	4874.00	51.2 PK	74.0	-22.8	1.77 H	161	42.29	8.91
8	4874.00	38.9 AV	54.0	-15.1	1.77 H	161	29.99	8.91
9	7311.00	59.1 PK	74.0	-14.9	1.98 H	173	42.65	16.45
10	7311.00	47.4 AV	54.0	-6.6	1.98 H	173	30.95	16.45
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	71.7 PK	74.0	-2.3	1.38 V	0	71.86	-0.16
2	2390.00	52.9 AV	54.0	-1.1	1.38 V	0	53.06	-0.16
3	*2437.00	117.1 PK			1.38 V	0	117.13	-0.03
4	*2437.00	105.8 AV			1.38 V	0	105.83	-0.03
5	2483.50	69.2 PK	74.0	-4.8	1.38 V	0	69.09	0.11
6	2483.50	51.8 AV	54.0	-2.2	1.38 V	0	51.69	0.11
7	4874.00	49.9 PK	74.0	-24.1	1.92 V	128	40.99	8.91
8	4874.00	38.1 AV	54.0	-15.9	1.92 V	128	29.19	8.91
9	7311.00	61.6 PK	74.0	-12.4	1.94 V	191	45.15	16.45
10	7311.00	48.6 AV	54.0	-5.4	1.94 V	191	32.15	16.45

REMARKS:

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

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	101.5 PK			1.34 H	311	101.48	0.02
2	*2452.00	90.5 AV			1.34 H	311	90.48	0.02
3	2483.50	58.9 PK	74.0	-15.1	1.34 H	311	58.79	0.11
4	2483.50	43.0 AV	54.0	-11.0	1.34 H	311	42.89	0.11
5	4904.00	51.7 PK	74.0	-22.3	1.77 H	168	42.69	9.01
6	4904.00	39.2 AV	54.0	-14.8	1.77 H	168	30.19	9.01
7	7356.00	58.9 PK	74.0	-15.1	1.97 H	188	42.35	16.55
8	7356.00	47.1 AV	54.0	-6.9	1.97 H	188	30.55	16.55
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	112.7 PK			1.56 V	0	112.68	0.02
2	*2452.00	101.8 AV			1.56 V	0	101.78	0.02
3	2483.50	71.1 PK	74.0	-2.9	1.56 V	0	70.99	0.11
4	**2483.50**	**53.0 AV**	**54.0**	**-1.0**	**1.56 V**	**0**	**52.89**	**0.11**
5	4904.00	50.5 PK	74.0	-23.5	1.94 V	132	41.49	9.01
6	4904.00	38.5 AV	54.0	-15.5	1.94 V	132	29.49	9.01
7	7356.00	61.3 PK	74.0	-12.7	1.91 V	197	44.75	16.55
8	7356.00	48.3 AV	54.0	-5.7	1.91 V	197	31.75	16.55

REMARKS:

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

Below 1GHz Data:

802.11n (HT20)

CHANNEL	TX Channel 6	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	Below 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	40.04	26.3 QP	40.0	-13.7	1.50 H	360	39.76	-13.50
2	98.63	28.2 QP	43.5	-15.3	2.00 H	276	46.11	-17.95
3	192.14	36.7 QP	43.5	-6.8	1.00 H	71	52.47	-15.79
4	263.19	36.8 QP	46.0	-9.2	1.00 H	293	50.32	-13.49
5	498.80	26.6 QP	46.0	-19.4	1.50 H	148	33.42	-6.86
6	940.25	28.7 QP	46.0	-17.3	1.00 H	360	27.27	1.47
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	40.04	35.9 QP	40.0	-4.2	1.00 V	97	49.35	-13.50
2	63.85	36.0 QP	40.0	-4.0	1.50 V	71	50.12	-14.16
3	193.01	32.5 QP	43.5	-11.1	1.00 V	211	48.26	-15.81
4	279.53	33.0 QP	46.0	-13.0	1.50 V	312	45.67	-12.65
5	608.46	26.6 QP	46.0	-19.4	1.50 V	83	30.56	-3.94
6	940.20	29.3 QP	46.0	-16.7	1.00 V	352	27.86	1.47

REMARKS:

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

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.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS 30	847124/029	Oct. 22, 2014	Oct. 21, 2015
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK-8127	8127-522	Sep. 15, 2014	Sep. 14, 2015
Line-Impedance Stabilization Network (for Peripheral) ROHDE & SCHWARZ	ENV216	100071	Nov. 10, 2014	Nov. 09, 2015
RF Cable (JYEBAO)	5D-FB	COCCAB-001	Mar. 09, 2015	Mar. 08, 2016
50 ohms Terminator	N/A	EMC-03	Sep. 22, 2014	Sep. 21, 2015
50 ohms Terminator	N/A	EMC-02	Sep. 30, 2014	Sep. 29, 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 Shielded Room No. C.
3 The VCCI Con C Registration No. is C-3611.
4 Tested Date: May 04, 2015

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.

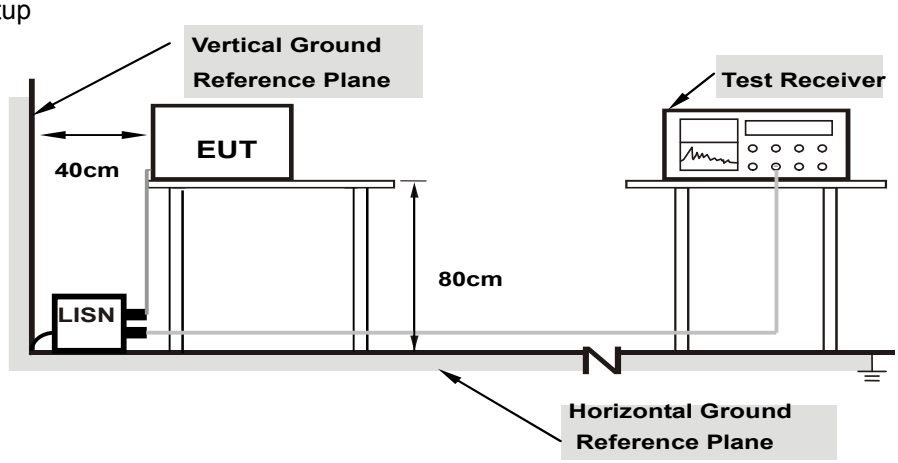
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

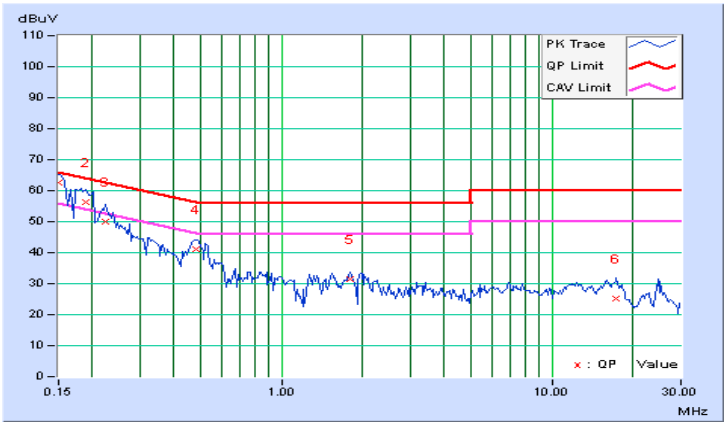
CDD Mode

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

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.15000**	**0.08**	**62.46**	**50.82**	**62.54**	**50.90**	**66.00**	**56.00**	**-3.46**	**-5.10**
2	0.18906	0.09	56.04	44.12	56.13	44.21	64.08	54.08	-7.95	-9.87
3	0.22422	0.09	50.02	38.24	50.11	38.33	62.66	52.66	-12.55	-14.33
4	0.48203	0.10	40.93	32.29	41.03	32.39	56.30	46.30	-15.27	-13.91
5	1.78906	0.16	31.14	23.63	31.30	23.79	56.00	46.00	-24.70	-22.21
6	17.36328	0.63	24.72	19.56	25.35	20.19	60.00	50.00	-34.65	-29.81

REMARKS:

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

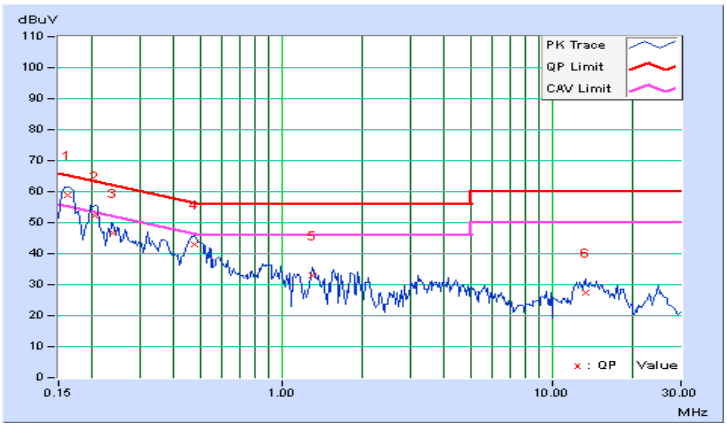


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16172	0.08	58.82	46.32	58.90	46.40	65.38	55.38	-6.48	-8.98
2	0.20469	0.08	52.28	42.33	52.36	42.41	63.42	53.42	-11.06	-11.01
3	0.23984	0.08	46.64	34.30	46.72	34.38	62.10	52.10	-15.38	-17.72
4	0.47813	0.10	42.73	34.35	42.83	34.45	56.37	46.37	-13.54	-11.92
5	1.30078	0.14	32.88	24.60	33.02	24.74	56.00	46.00	-22.98	-21.26
6	13.34766	0.55	27.02	21.28	27.57	21.83	60.00	50.00	-32.43	-28.17

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.

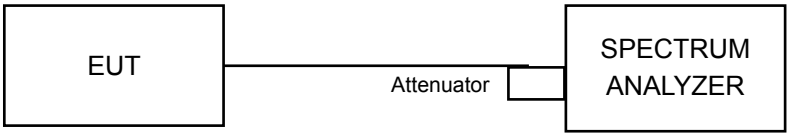


4.3 6dB Bandwidth Measurement

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

CDD Mode

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
1	2412	9.08	8.58	9.07	0.5	Pass
6	2437	8.58	8.60	8.12	0.5	Pass
11	2462	9.02	8.13	8.61	0.5	Pass

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
1	2412	16.39	16.42	16.43	0.5	Pass
6	2437	16.35	16.39	16.39	0.5	Pass
11	2462	16.40	16.44	16.41	0.5	Pass

802.11n (HT20)

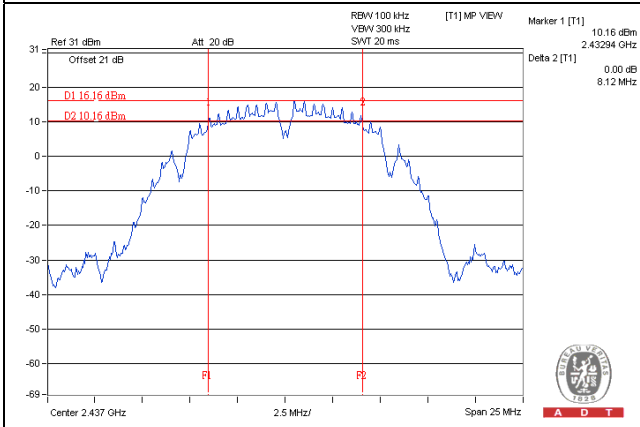
Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
1	2412	17.64	17.66	17.65	0.5	Pass
6	2437	17.61	17.63	17.64	0.5	Pass
11	2462	17.65	17.66	17.67	0.5	Pass

802.11n (HT40)

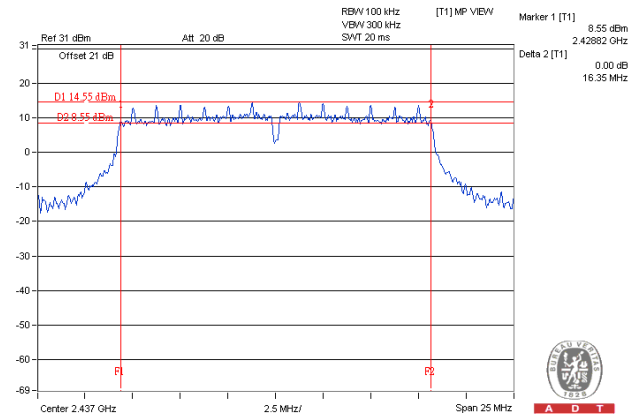
Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
3	2422	36.17	35.93	36.47	0.5	Pass
6	2437	35.83	35.88	36.03	0.5	Pass
9	2452	36.14	36.46	35.89	0.5	Pass

Spectrum Plot of Worst Value

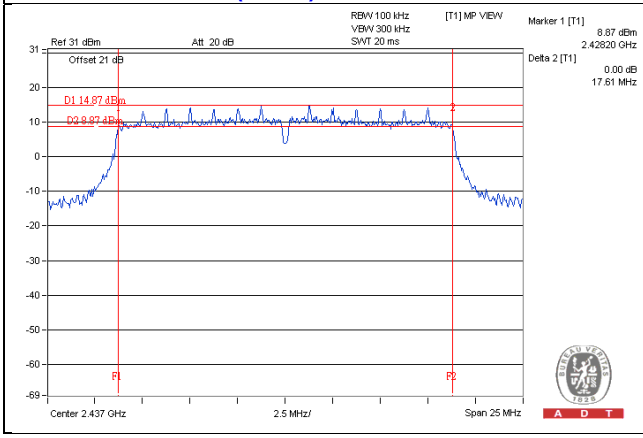
802.11b – Chain 2: CH 6



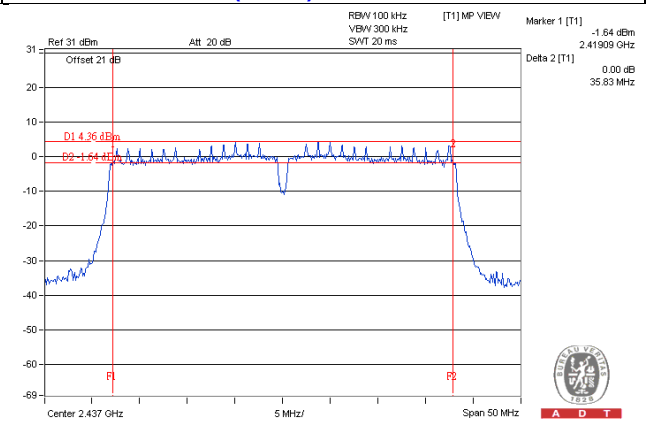
802.11g – Chain 0: CH 6



802.11n (HT20) – Chain 0: CH 6



802.11n (HT40) – Chain 0: CH 6



4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

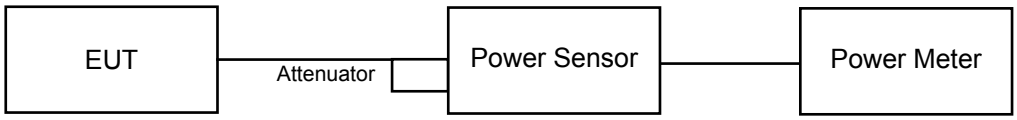
For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

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

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

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

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

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

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as Item 4.3.6.

4.4.7 Test Results

CDD Mode

802.11b

Channel	Frequency (MHz)	Average Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
1	2412	19.03	18.00	18.81	219.112	23.41	30	Pass
6	2437	25.56	24.39	24.92	944.994	29.75	30	Pass
11	2462	17.43	16.03	16.75	142.737	21.55	30	Pass

802.11g

Channel	Frequency (MHz)	Average Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
1	2412	17.77	16.71	17.49	162.827	22.12	30	Pass
6	2437	25.64	24.47	24.14	905.754	29.57	30	Pass
11	2462	18.23	16.45	17.77	170.525	22.32	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Average Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
1	2412	16.06	15.11	15.84	111.17	20.46	30	Pass
6	2437	25.71	24.72	25.01	985.832	29.94	30	Pass
11	2462	16.31	15.05	15.94	114.009	20.57	30	Pass

802.11n (HT40)

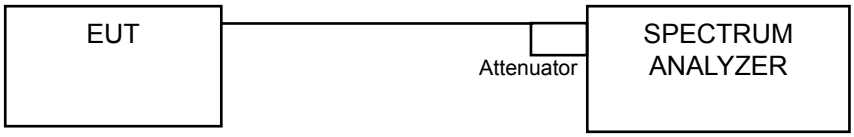
Channel	Frequency (MHz)	Average Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
3	2422	14.22	13.01	14.04	71.774	18.56	30	Pass
6	2437	18.26	17.24	18.02	183.341	22.63	30	Pass
9	2452	14.17	12.93	13.22	66.745	18.24	30	Pass

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

For AVG. power (duty cycle ≥ 98%)

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

For AVG. power (duty cycle < 98%)

a) Measure the duty cycle (x).
b) Set instrument center frequency to DTS channel center frequency.
c) Set span to at least 1.5 times the OBW.
d) Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz..
e) Set VBW ≥3 x RBW.
f) Detector = power averaging (RMS) or sample detector (when RMS not available).
g) Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.
h) Sweep time = auto couple.
i) Do not use sweep triggering. Allow sweep to “free run”.
j) Employ trace averaging (RMS) mode over a minimum of 100 traces.
k) Use the peak marker function to determine the maximum amplitude level.
l) Add 10 log (1/x), where x is the duty cycle measured in step (a, to the measured PSD to compute the average PSD during the actual transmission time.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6

4.5.7 Test Results

CDD Mode

802.11b

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=3) dB	Total PSD (dBm)	Limit (dBm)	Pass /Fail
0	1	2412	-9.48	4.77	-4.71	7.64	Pass
	6	2437	-3.08	4.77	1.69	7.64	Pass
	11	2462	-10.95	4.77	-6.18	7.64	Pass
1	1	2412	-10.14	4.77	-5.37	7.64	Pass
	6	2437	-4.03	4.77	0.74	7.64	Pass
	11	2462	-12.19	4.77	-7.42	7.64	Pass
2	1	2412	-11.37	4.77	-6.60	7.64	Pass
	6	2437	-3.37	4.77	1.40	7.64	Pass
	11	2462	-12.26	4.77	-7.49	7.64	Pass

Note: 1. Directional gain = 1.59dBi + 10log(3) = 6.36dBi > 6dBi , so the power density limit shall be reduced to 8-(6.36-6) = 7.64dBm.

802.11g

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=3) dB	Total PSD (dBm)	Limit (dBm)	Pass /Fail
0	1	2412	-11.77	4.77	-7.00	7.64	Pass
	6	2437	-3.39	4.77	1.38	7.64	Pass
	11	2462	-11.62	4.77	-6.85	7.64	Pass
1	1	2412	-13.47	4.77	-8.70	7.64	Pass
	6	2437	-5.14	4.77	-0.37	7.64	Pass
	11	2462	-12.64	4.77	-7.87	7.64	Pass
2	1	2412	-13.46	4.77	-8.69	7.64	Pass
	6	2437	-4.11	4.77	0.66	7.64	Pass
	11	2462	-11.80	4.77	-7.03	7.64	Pass

Note: 1. Directional gain = 1.59dBi + 10log(3) = 6.36dBi > 6dBi , so the power density limit shall be reduced to 8-(6.36-6) = 7.64dBm.

802.11n (HT20)

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=3) dB	Total PSD (dBm)	Limit (dBm)	Pass /Fail
0	1	2412	-15.00	4.77	-10.23	7.64	Pass
	6	2437	-4.77	4.77	0.00	7.64	Pass
	11	2462	-14.44	4.77	-9.67	7.64	Pass
1	1	2412	-14.25	4.77	-9.48	7.64	Pass
	6	2437	-5.97	4.77	-1.20	7.64	Pass
	11	2462	-15.49	4.77	-10.72	7.64	Pass
2	1	2412	-15.35	4.77	-10.58	7.64	Pass
	6	2437	-5.64	4.77	-0.87	7.64	Pass
	11	2462	-15.55	4.77	-10.78	7.64	Pass

Note: 1. Directional gain = 1.59dBi + 10log(3) = 6.36dBi > 6dBi , so the power density limit shall be reduced to 8-(6.36-6) = 7.64dBm.

802.11n (HT40)

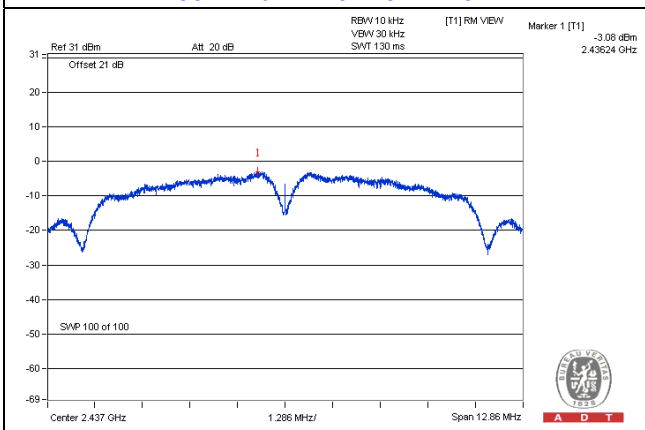
TX chain	Channel	Freq. (MHz)	PSD w/o Duty Factor (dBm)	10 log (N=3) dB	Duty Factor (dB)	Total PSD with Duty Factor (dBm)	Limit (dBm)	Pass /Fail
802.11n (HT40)								
0	3	2422	-17.92	4.77	0.13	-13.02	7.64	Pass
	6	2437	-14.55	4.77	0.13	-9.65	7.64	Pass
	9	2452	-18.57	4.77	0.13	-13.67	7.64	Pass
1	3	2422	-19.19	4.77	0.13	-14.29	7.64	Pass
	6	2437	-15.17	4.77	0.13	-10.27	7.64	Pass
	9	2452	-19.59	4.77	0.13	-14.69	7.64	Pass
2	3	2422	-19.94	4.77	0.13	-15.04	7.64	Pass
	6	2437	-15.22	4.77	0.13	-10.32	7.64	Pass
	9	2452	-19.69	4.77	0.13	-14.79	7.64	Pass

Note: 1. Directional gain = 1.59dBi + 10log(3) = 6.36dBi > 6dBi , so the power density limit shall be reduced to 8-(6.36-6) = 7.64dBm.

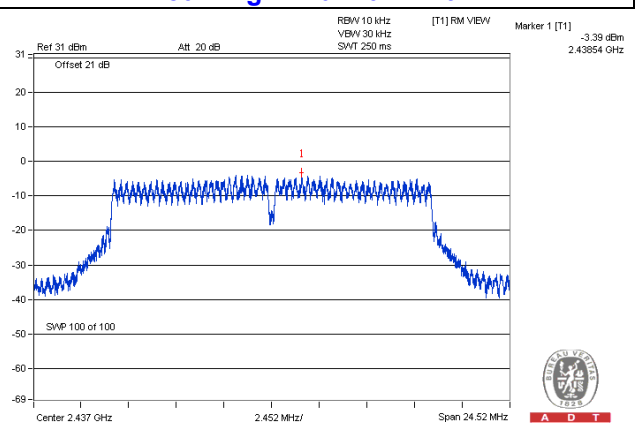
2. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

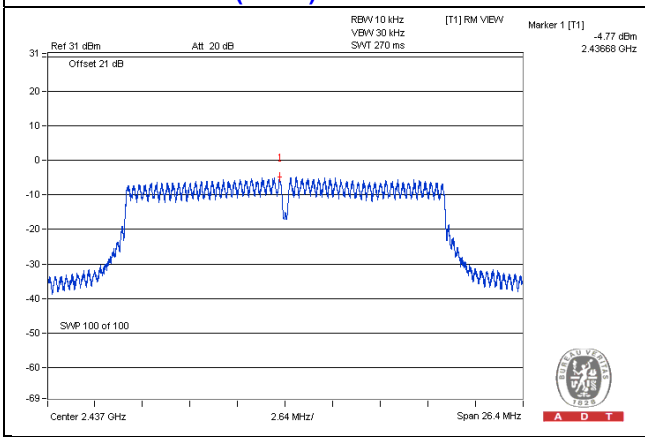
802.11b – Chain 0: CH 6



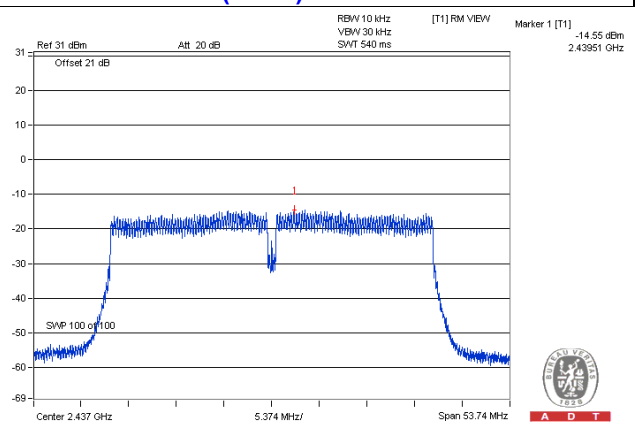
802.11g– Chain 0: CH 6



802.11n (HT20) – Chain 0: CH 6



802.11n (HT40) – Chain 0: CH 6

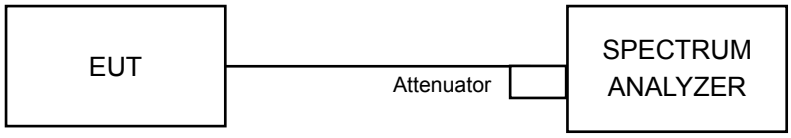


4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

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

MEASUREMENT PROCEDURE OOBE

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

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

Same as Item 4.3.6

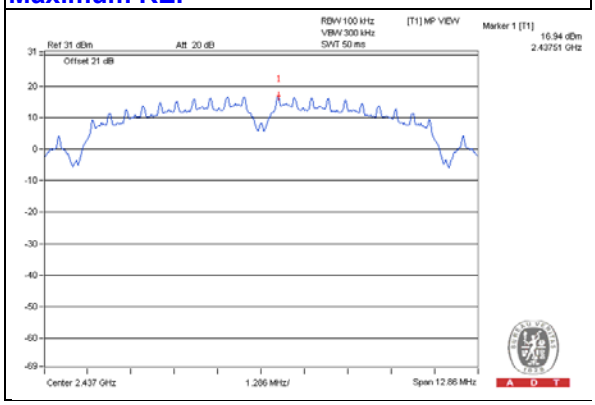
4.6.7 Test Results

The 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

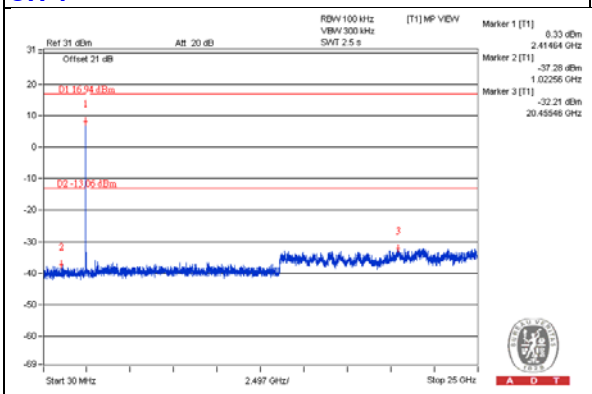
802.11b

Maximum REF

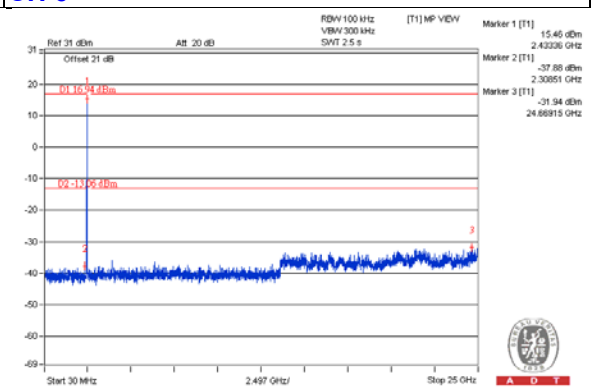


Chain 0

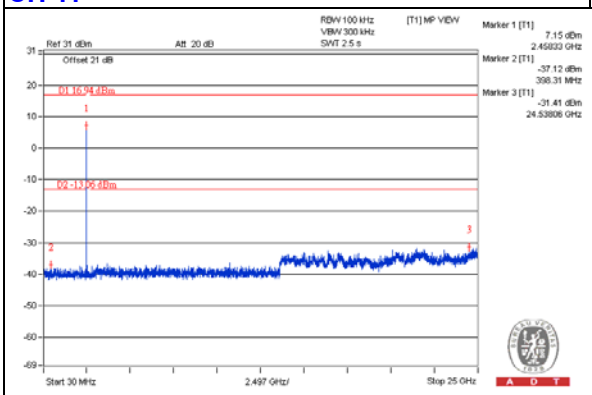
CH 1



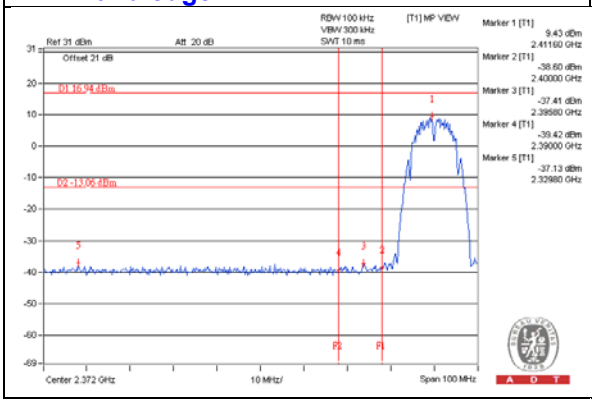
CH 6



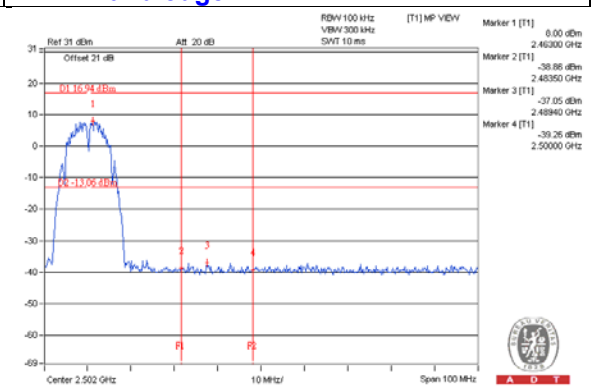
CH 11



CH 1 Band edge

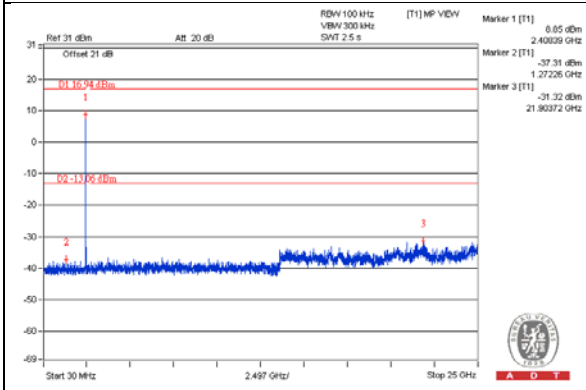


CH 11 Band edge

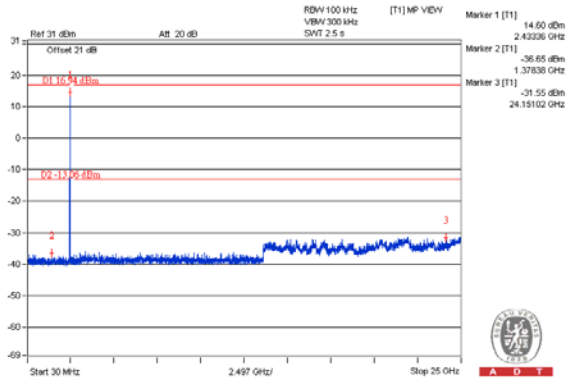


Chain 1

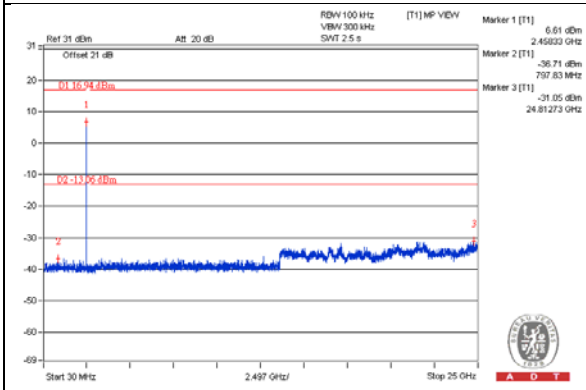
CH 1



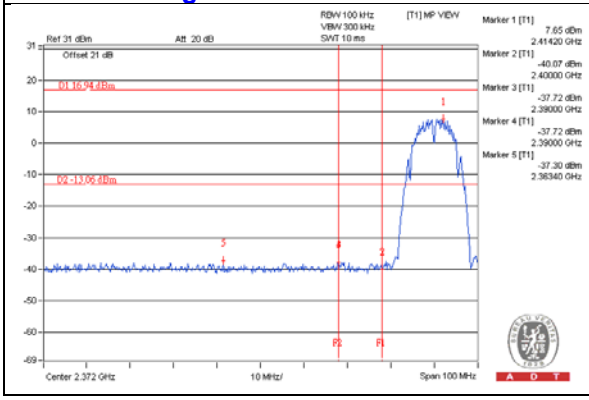
CH 6



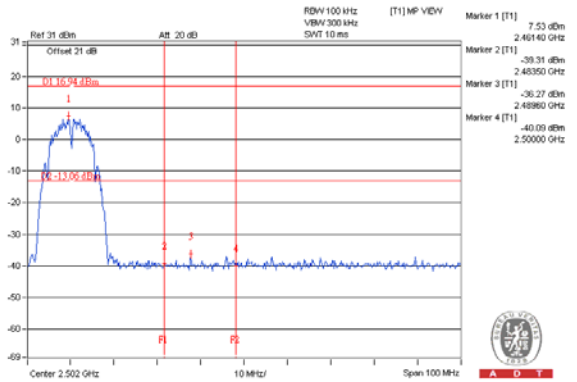
CH 11



CH 1 Band edge

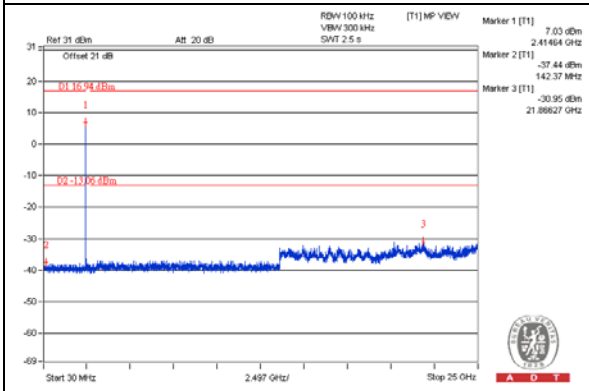


CH 11 Band edge

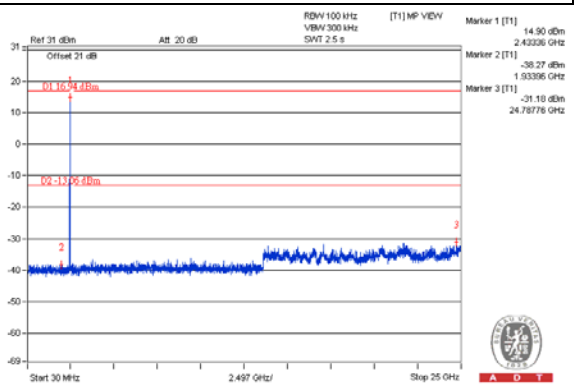


Chain 2

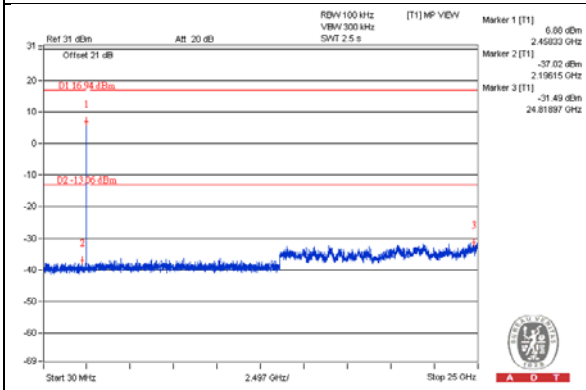
CH 1



CH 6



CH 11



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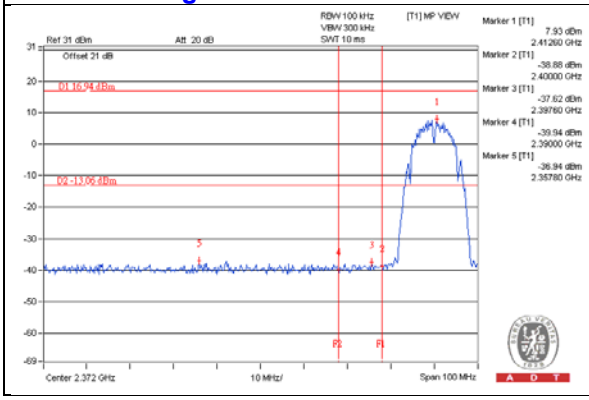
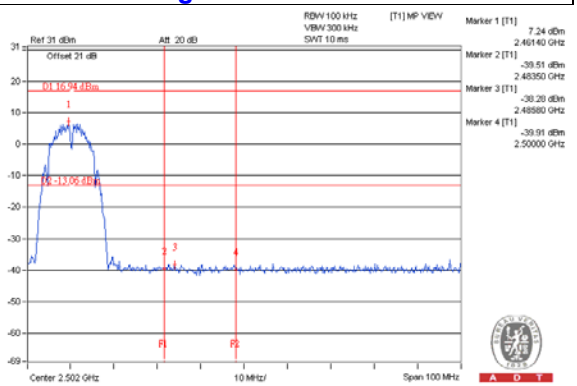
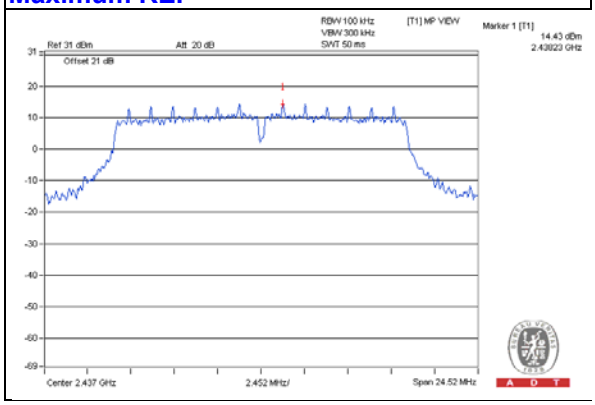


CH 11 Band edge



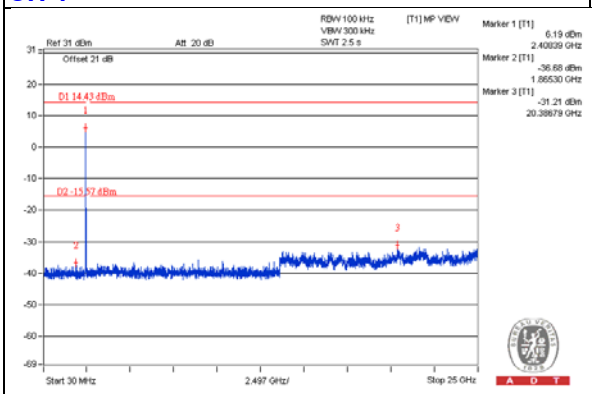
802.11g

Maximum REF

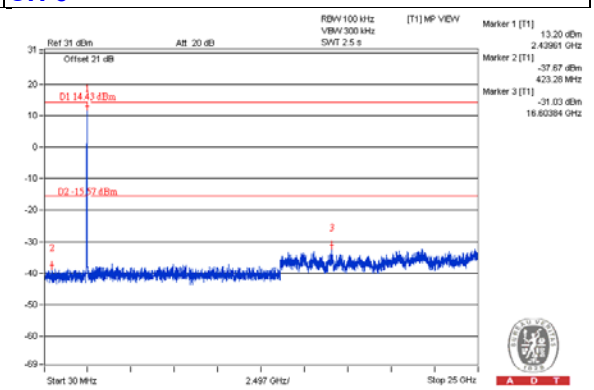


Chain 0

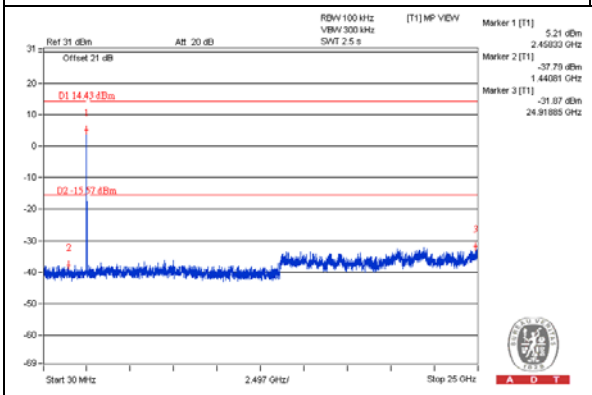
CH 1



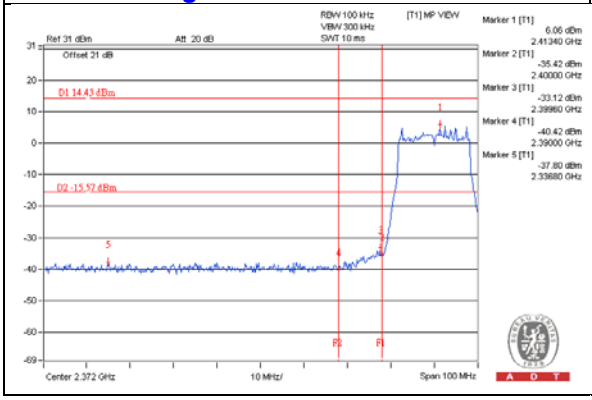
CH 6



CH 11



CH 1 Band edge



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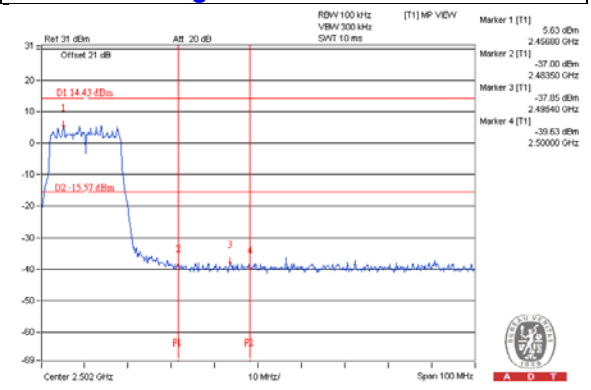
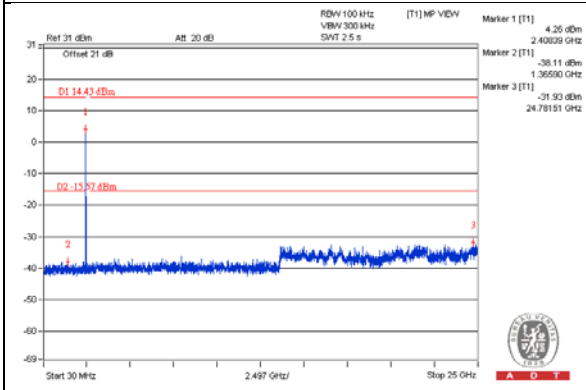


Chain 1

CH 1



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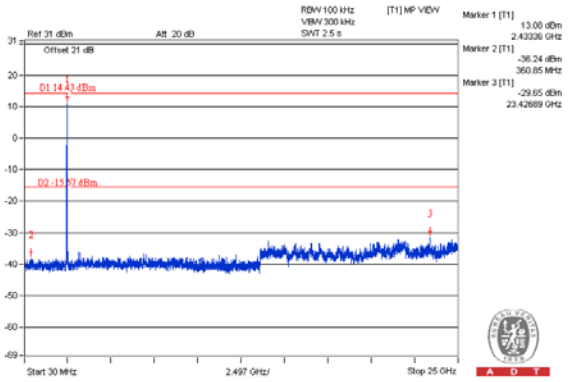

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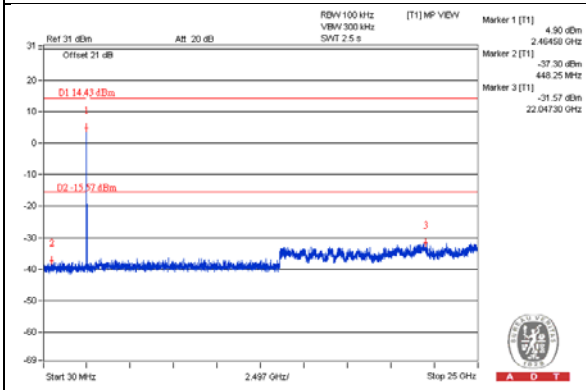

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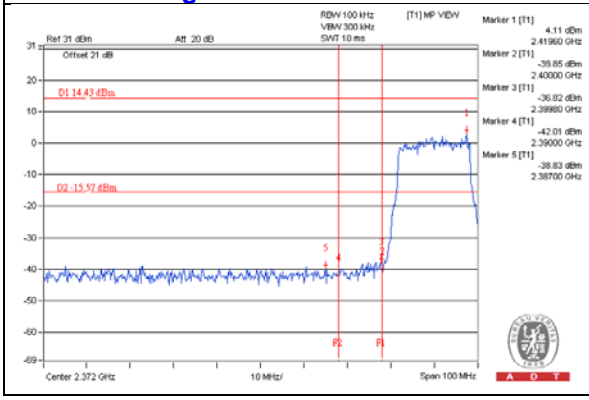

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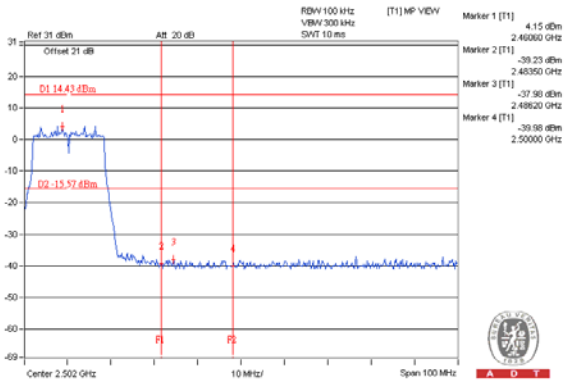
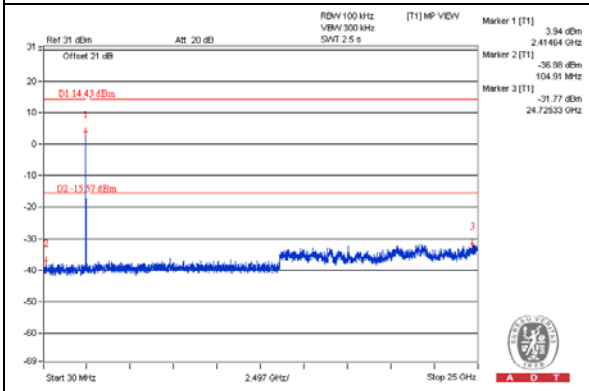


Chain 2

CH 1



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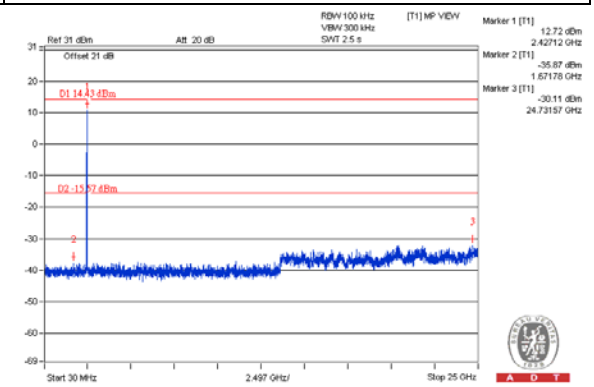
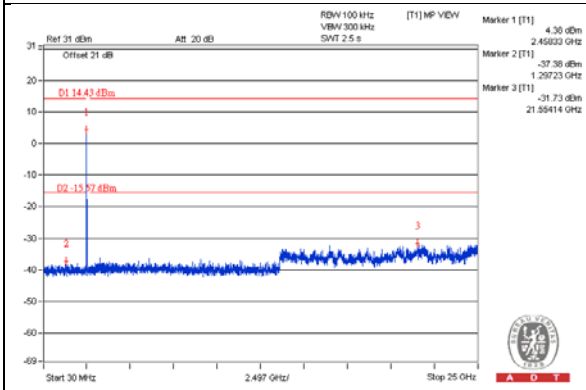
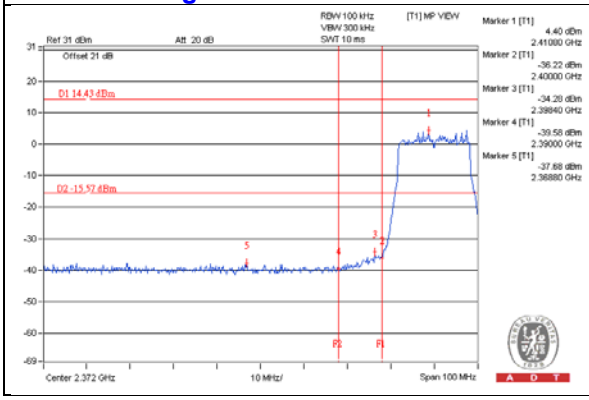


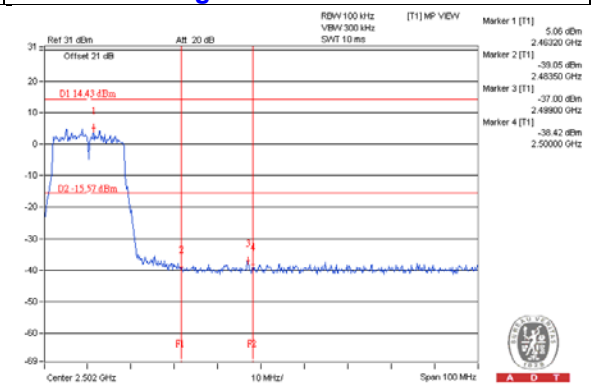
CH 11



CH 1 Band edge

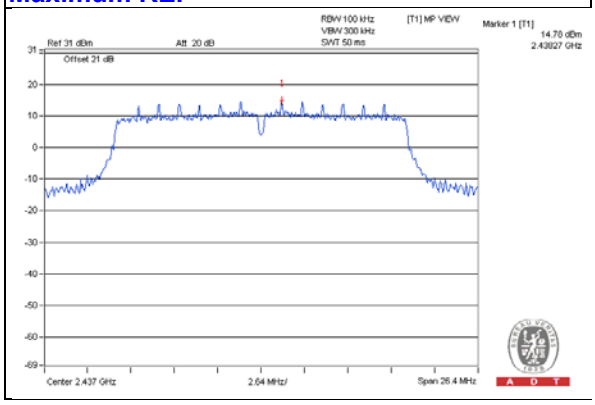


CH 11 Band edge



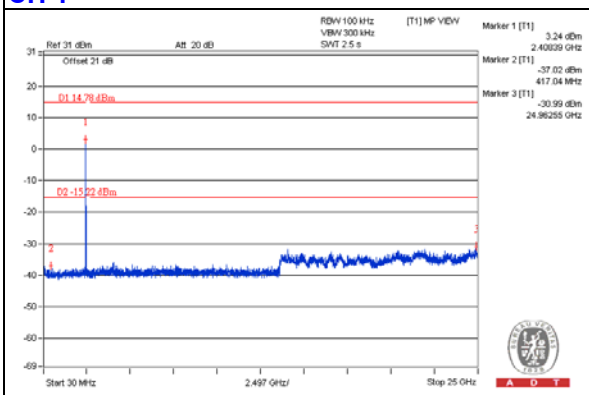
802.11n (HT20)

Maximum REF

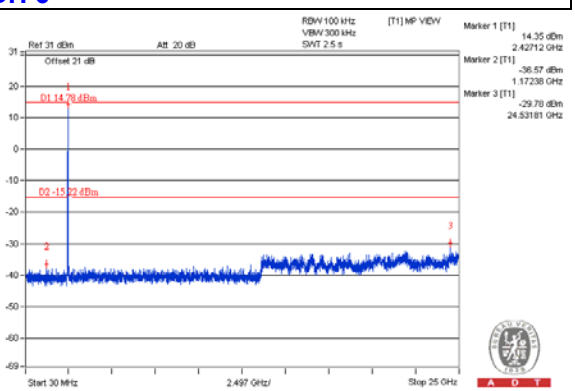


Chain 0

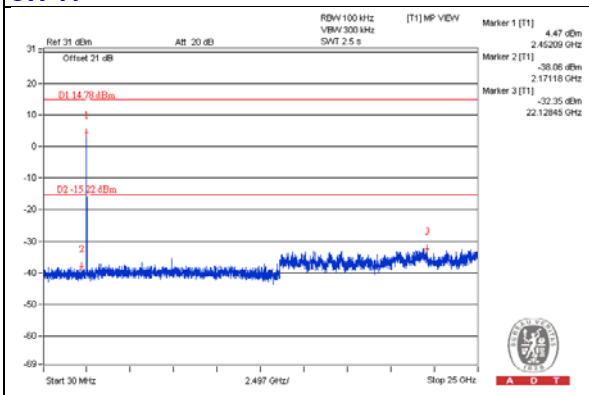
CH 1



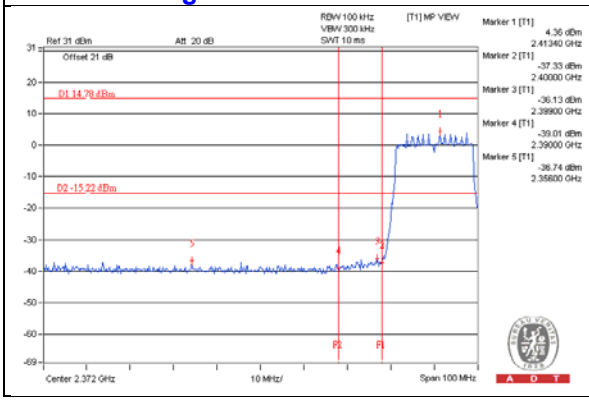
CH 6



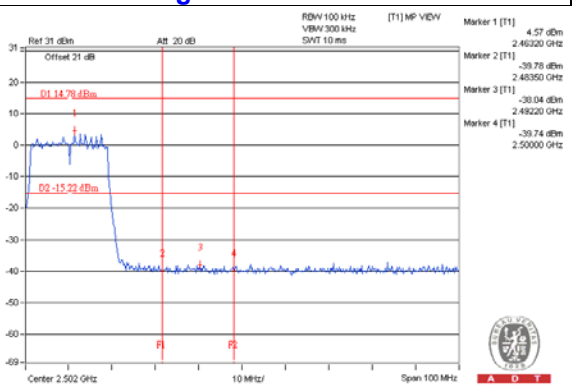
CH 11



CH 1 Band edge

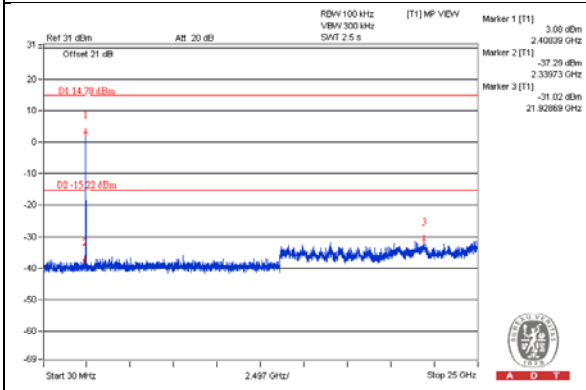


CH 11 Band edge

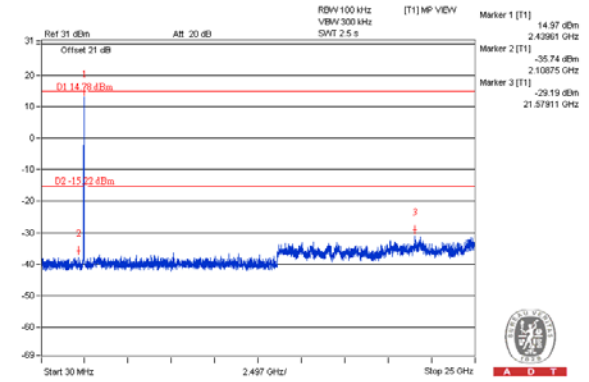


Chain 1

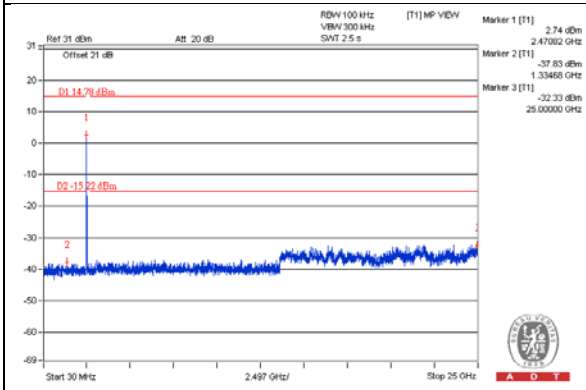
CH 1



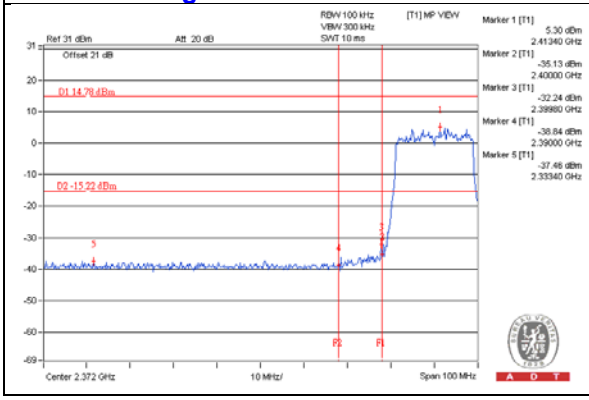
CH 6



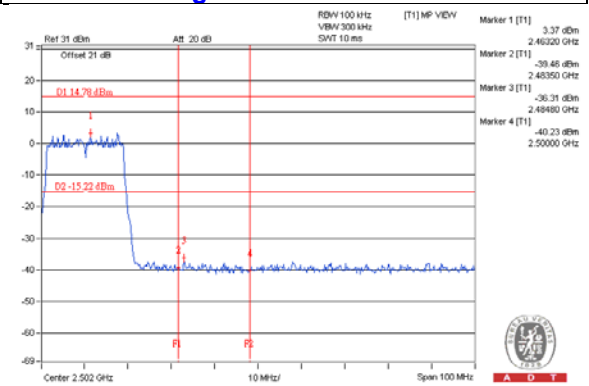
CH 11



CH 1 Band edge

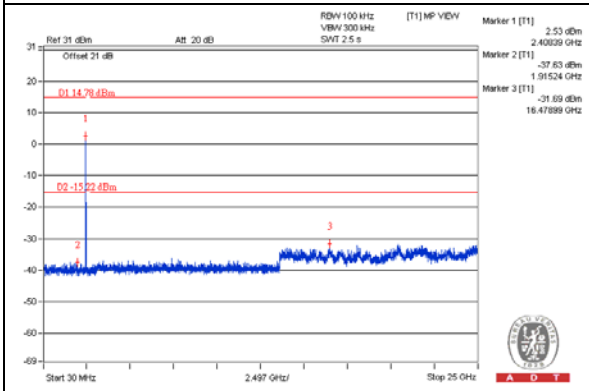


CH 11 Band edge

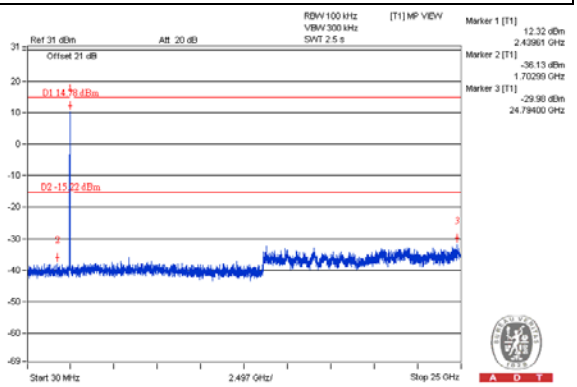


Chain 2

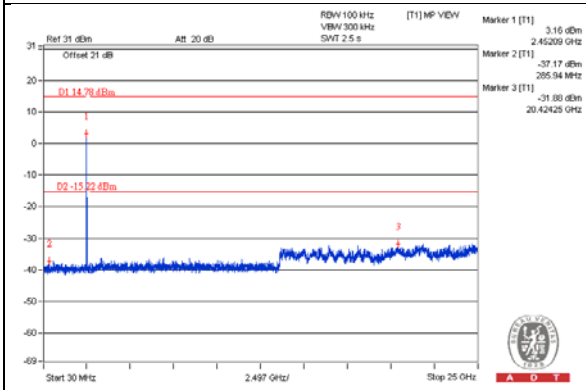
CH 1



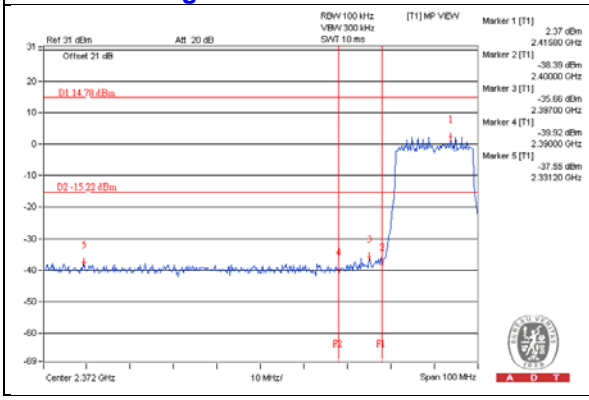
CH 6



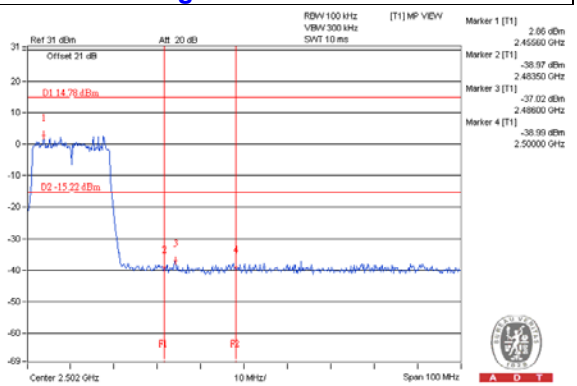
CH 11



CH 1 Band edge

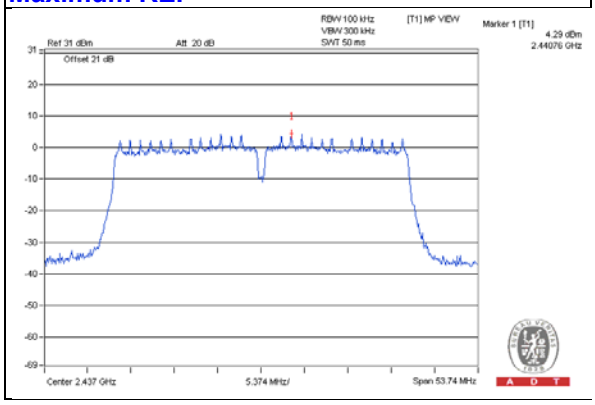


CH 11 Band edge



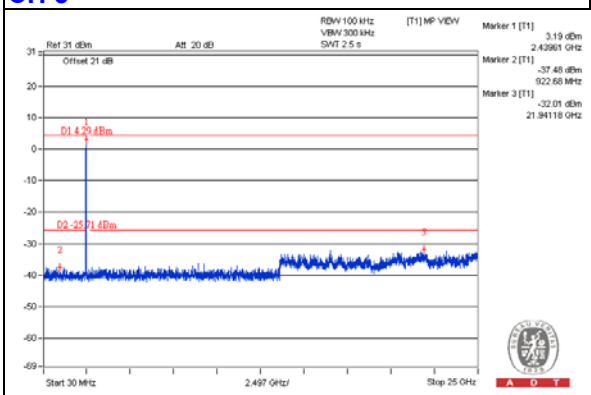
802.11n (HT40)

Maximum REF

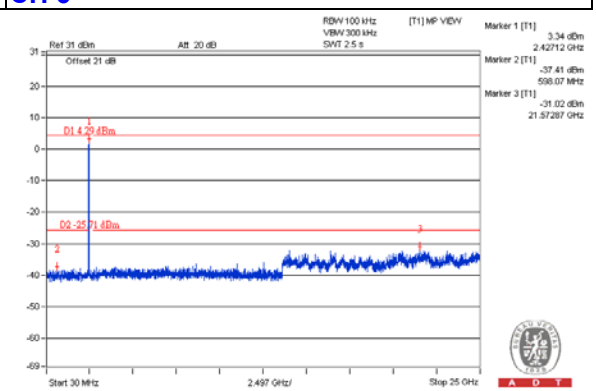


Chain 0

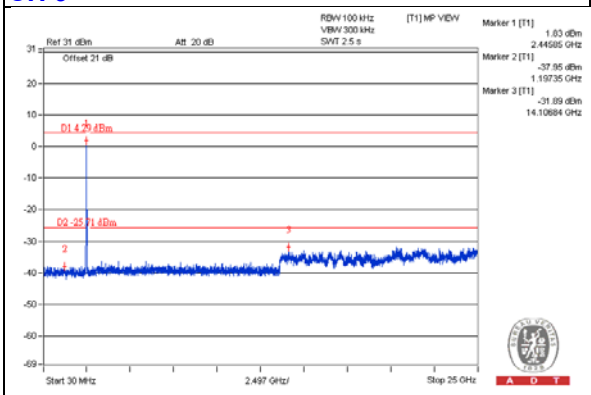
CH 3



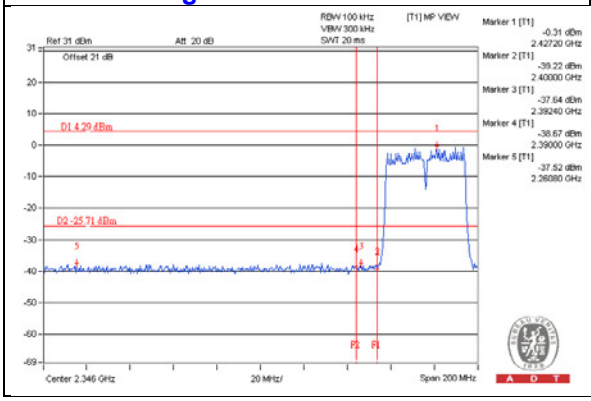
CH 6



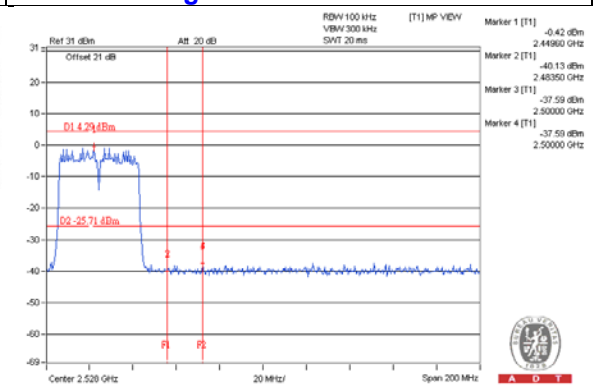
CH 9



CH 3 Band edge

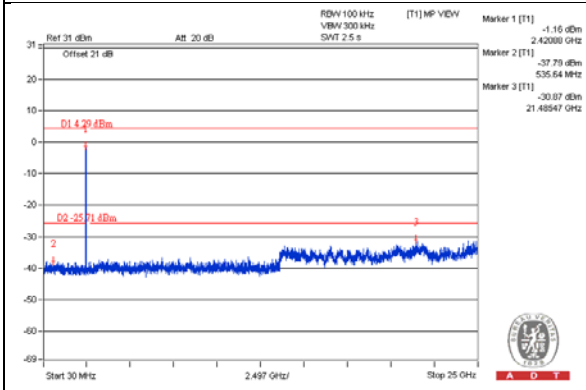


CH 9 Band edge

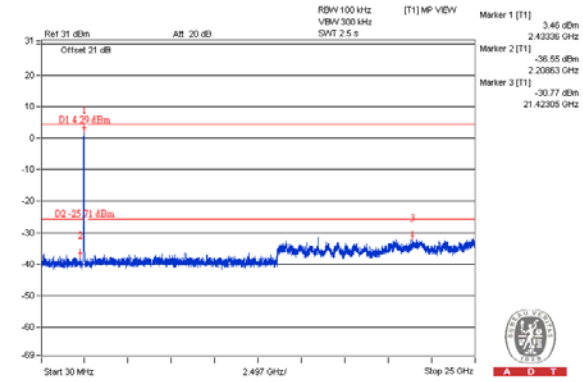


Chain 1

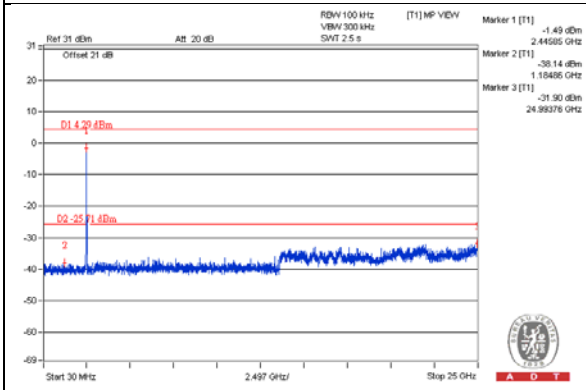
CH 3



CH 6



CH 9



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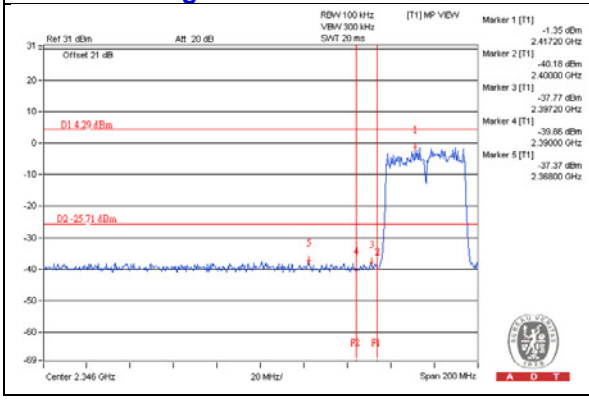
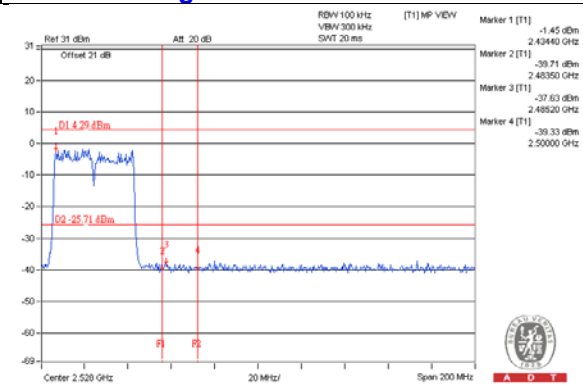
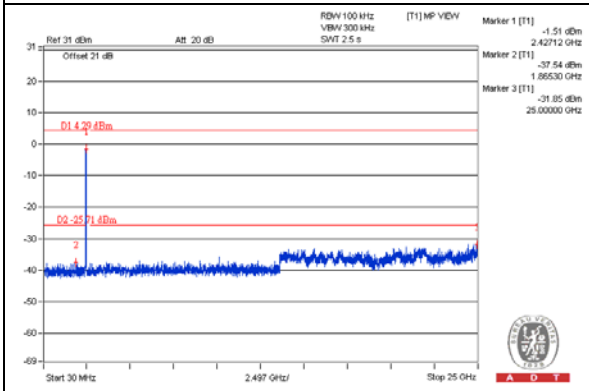


CH 9 Band edge

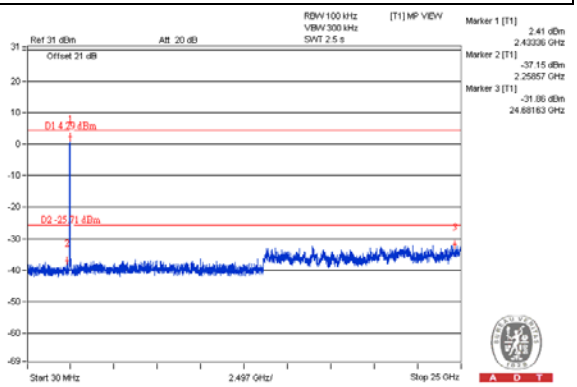


Chain 2

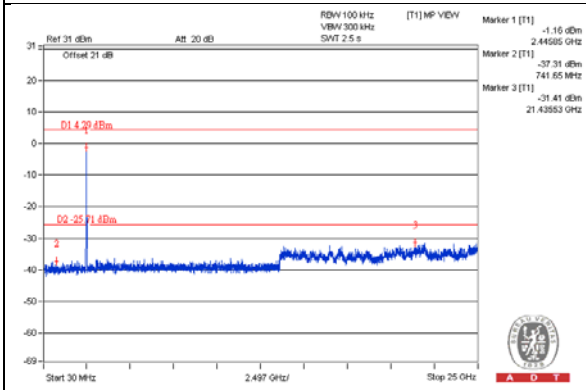
CH 3



CH 6



CH 9



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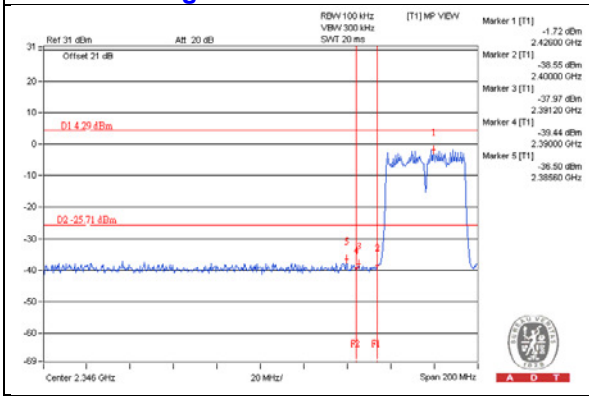
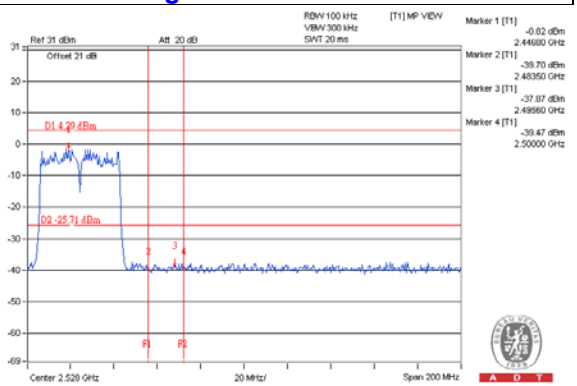


CH 9 Band edge



5 Test Types and Results (for 5GHz 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 20dB 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

CDD Mode

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	*5745.00	113.7 PK			1.72 H	177	102.07	11.63
2	*5745.00	103.4 AV			1.72 H	177	91.77	11.63
3	11490.00	57.3 PK	74.0	-16.7	1.40 H	259	40.00	17.30
4	11490.00	47.1 AV	54.0	-6.9	1.40 H	259	29.80	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	*5745.00	123.6 PK			2.31 V	49	111.97	11.63
2	*5745.00	113.5 AV			2.31 V	49	101.87	11.63
3	11490.00	59.0 PK	74.0	-15.0	1.87 V	152	41.70	17.30
4	11490.00	49.2 AV	54.0	-4.8	1.87 V	152	31.90	17.30

REMARKS:

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

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	114.0 PK			1.74 H	168	102.26	11.74
2	*5785.00	102.9 AV			1.74 H	168	91.16	11.74
3	11570.00	57.6 PK	74.0	-16.4	1.39 H	243	39.69	17.91
4	11570.00	47.4 AV	54.0	-6.6	1.39 H	243	29.49	17.91
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	123.1 PK			2.30 V	40	111.36	11.74
2	*5785.00	113.2 AV			2.30 V	40	101.46	11.74
3	11570.00	59.5 PK	74.0	-14.5	1.83 V	142	41.59	17.91
4	11570.00	49.5 AV	54.0	-4.5	1.83 V	142	31.59	17.91

REMARKS:

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

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	114.6 PK			1.76 H	155	102.82	11.78
2	*5825.00	103.4 AV			1.76 H	155	91.62	11.78
3	11650.00	57.6 PK	74.0	-16.4	1.34 H	242	39.44	18.16
4	11650.00	47.1 AV	54.0	-6.9	1.34 H	242	28.94	18.16
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			2.25 V	55	111.52	11.78
2	*5825.00	113.6 AV			2.25 V	55	101.82	11.78
3	11650.00	59.1 PK	74.0	-14.9	1.87 V	126	40.94	18.16
4	11650.00	49.2 AV	54.0	-4.8	1.87 V	126	31.04	18.16

REMARKS:

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

802.11ac (VHT20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5745.00	114.1 PK			1.77 H	161	102.47	11.63
2	*5745.00	103.0 AV			1.77 H	161	91.37	11.63
3	11490.00	48.1 PK	74.0	-25.9	1.36 H	236	30.80	17.30
4	11490.00	47.4 AV	54.0	-6.6	1.36 H	236	30.10	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	*5745.00	123.0 PK			2.30 V	28	111.37	11.63
2	*5745.00	113.3 AV			2.30 V	28	101.67	11.63
3	11490.00	59.5 PK	74.0	-14.5	1.85 V	156	42.20	17.30
4	11490.00	49.7 AV	54.0	-4.3	1.85 V	156	32.40	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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

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	114.0 PK			1.82 H	153	102.26	11.74
2	*5785.00	102.7 AV			1.82 H	153	90.96	11.74
3	11570.00	57.9 PK	74.0	-16.1	1.36 H	221	39.99	17.91
4	11570.00	47.2 AV	54.0	-6.8	1.36 H	221	29.29	17.91
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	122.9 PK			2.28 V	52	111.16	11.74
2	*5785.00	113.1 AV			2.28 V	52	101.36	11.74
3	11570.00	59.6 PK	74.0	-14.4	1.80 V	158	41.69	17.91
4	11570.00	49.8 AV	54.0	-4.2	1.80 V	158	31.89	17.91

REMARKS:

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

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	114.3 PK			1.84 H	153	102.52	11.78
2	*5825.00	102.9 AV			1.84 H	153	91.12	11.78
3	11650.00	58.1 PK	74.0	-15.9	1.41 H	234	39.94	18.16
4	11650.00	47.6 AV	54.0	-6.4	1.41 H	234	29.44	18.16
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	122.5 PK			2.33 V	32	110.72	11.78
2	*5825.00	113.4 AV			2.33 V	32	101.62	11.78
3	11650.00	58.8 PK	74.0	-15.2	1.86 V	153	40.64	18.16
4	11650.00	49.1 AV	54.0	-4.9	1.86 V	153	30.94	18.16

REMARKS:

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

802.11ac (VHT40)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5755.00	111.3 PK			1.89 H	140	99.66	11.64
2	*5755.00	100.2 AV			1.89 H	140	88.56	11.64
3	11510.00	56.5 PK	74.0	-17.5	1.43 H	249	39.20	17.30
4	11510.00	47.4 AV	54.0	-6.6	1.43 H	249	30.10	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	*5755.00	120.4 PK			1.93 V	360	108.76	11.64
2	*5755.00	110.2 AV			1.93 V	360	98.56	11.64
3	11510.00	58.6 PK	74.0	-15.4	1.89 V	139	41.30	17.30
4	11510.00	49.4 AV	54.0	-4.6	1.89 V	139	32.10	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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

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	111.7 PK			1.85 H	136	99.92	11.78
2	*5795.00	100.5 AV			1.85 H	136	88.72	11.78
3	11590.00	53.6 PK	74.0	-20.4	1.41 H	250	35.49	18.11
4	11590.00	44.4 AV	54.0	-9.6	1.41 H	250	26.29	18.11
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	121.8 PK			1.93 V	360	110.02	11.78
2	*5795.00	110.8 AV			1.93 V	360	99.02	11.78
3	11590.00	55.5 PK	74.0	-18.5	1.95 V	124	37.39	18.11
4	11590.00	46.4 AV	54.0	-7.6	1.95 V	124	28.29	18.11

REMARKS:

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

802.11ac (VHT80)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5133.00	57.1 PK	74.0	-16.9	1.85 H	118	47.23	9.87
2	5133.00	49.4 AV	54.0	-4.6	1.85 H	118	39.53	9.87
3	*5775.00	104.7 PK			1.91 H	123	92.98	11.72
4	*5775.00	93.5 AV			1.91 H	123	81.78	11.72
5	11550.00	56.4 PK	74.0	-17.6	1.45 H	237	38.69	17.71
6	11550.00	47.2 AV	54.0	-6.8	1.45 H	237	29.49	17.71
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	5133.00	59.2 PK	74.0	-14.8	1.70 V	47	49.33	9.87
2	5133.00	52.6 AV	54.0	-1.4	1.70 V	47	42.73	9.87
3	*5775.00	114.6 PK			1.96 V	360	102.88	11.72
4	*5775.00	103.8 AV			1.96 V	360	92.08	11.72
5	11550.00	58.5 PK	74.0	-15.5	1.89 V	110	40.79	17.71
6	11550.00	49.1 AV	54.0	-4.9	1.89 V	110	31.39	17.71

REMARKS:

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

Below 1GHz Data:

802.11a

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	Below 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	40.04	26.4 QP	40.0	-13.6	1.00 H	249	39.93	-13.50
2	98.62	28.3 QP	43.5	-15.2	1.50 H	149	46.26	-17.95
3	192.15	36.6 QP	43.5	-7.0	1.20 H	228	52.34	-15.79
4	263.20	36.8 QP	46.0	-9.2	1.38 H	277	50.29	-13.49
5	498.80	26.7 QP	46.0	-19.3	1.32 H	298	33.54	-6.86
6	940.25	29.7 QP	46.0	-16.4	1.50 H	228	28.18	1.47
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	40.04	35.7 QP	40.0	-4.3	1.50 V	213	49.22	-13.50
2	63.84	35.8 QP	40.0	-4.2	1.42 V	223	50.00	-14.16
3	193.01	33.6 QP	43.5	-9.9	1.25 V	138	49.37	-15.81
4	279.55	34.2 QP	46.0	-11.8	1.46 V	279	46.88	-12.65
5	608.46	29.0 QP	46.0	-17.0	1.68 V	223	32.91	-3.94
6	940.20	30.5 QP	46.0	-15.6	1.28 V	360	28.98	1.47

REMARKS:

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

Beamforming Mode

Above 1GHz Data:

802.11ac (VHT20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	*5745.00	113.9 PK			1.73 H	149	104.14	9.76
2	*5745.00	102.7 AV			1.73 H	149	92.94	9.76
3	11490.00	48.8 PK	74.0	-25.2	1.35 H	231	33.94	14.86
4	11490.00	47.9 AV	54.0	-6.1	1.35 H	231	33.04	14.86
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	*5745.00	123.1 PK			2.36 V	31	113.34	9.76
2	*5745.00	113.7 AV			2.36 V	31	103.94	9.76
3	11490.00	59.4 PK	74.0	-14.6	1.79 V	146	44.54	14.86
4	11490.00	49.8 AV	54.0	-4.2	1.79 V	146	34.94	14.86

REMARKS:

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

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	113.9 PK			1.77 H	145	104.05	9.85
2	*5785.00	102.4 AV			1.77 H	145	92.55	9.85
3	11570.00	58.7 PK	74.0	-15.3	1.39 H	231	43.50	15.20
4	11570.00	47.7 AV	54.0	-6.3	1.39 H	231	32.50	15.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	122.6 PK			2.30 V	64	112.75	9.85
2	*5785.00	112.9 AV			2.30 V	64	103.05	9.85
3	11570.00	59.7 PK	74.0	-14.3	1.77 V	173	44.50	15.20
4	11570.00	50.2 AV	54.0	-3.8	1.77 V	173	35.00	15.20

REMARKS:

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

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	114.4 PK			1.81 H	151	104.49	9.91
2	*5825.00	103.2 AV			1.81 H	151	93.29	9.91
3	11650.00	58.3 PK	74.0	-15.7	1.46 H	247	42.90	15.40
4	11650.00	47.6 AV	54.0	-6.4	1.46 H	247	32.20	15.40
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	122.9 PK			2.35 V	24	112.99	9.91
2	*5825.00	113.6 AV			2.35 V	24	103.69	9.91
3	11650.00	58.0 PK	74.0	-16.0	1.89 V	165	42.60	15.40
4	11650.00	48.6 AV	54.0	-5.4	1.89 V	165	33.20	15.40

REMARKS:

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

802.11ac (VHT40)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5755.00	110.9 PK			1.88 H	149	101.13	9.77
2	*5755.00	99.9 AV			1.88 H	149	90.13	9.77
3	11510.00	56.4 PK	74.0	-17.6	1.39 H	244	41.55	14.85
4	11510.00	47.5 AV	54.0	-6.5	1.39 H	244	32.65	14.85
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	*5755.00	119.9 PK			1.98 V	360	110.13	9.77
2	*5755.00	110.0 AV			1.98 V	360	100.23	9.77
3	11510.00	58.0 PK	74.0	-16.0	1.84 V	153	43.15	14.85
4	11510.00	49.0 AV	54.0	-5.0	1.84 V	153	34.15	14.85

REMARKS:

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

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	112.4 PK			1.84 H	149	102.52	9.88
2	*5795.00	101.0 AV			1.84 H	149	91.12	9.88
3	11590.00	53.0 PK	74.0	-21.0	1.41 H	251	37.69	15.31
4	11590.00	44.0 AV	54.0	-10.0	1.41 H	251	28.69	15.31
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	121.8 PK			1.96 V	360	111.92	9.88
2	*5795.00	110.7 AV			1.96 V	360	100.82	9.88
3	11590.00	55.8 PK	74.0	-18.2	1.94 V	122	40.49	15.31
4	11590.00	46.8 AV	54.0	-7.2	1.94 V	122	31.49	15.31

REMARKS:

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

802.11ac (VHT80)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5133.00	56.1 PK	74.0	-17.9	1.55 H	214	47.84	8.26
2	5133.00	49.2 AV	54.0	-4.8	1.55 H	214	40.94	8.26
3	*5775.00	104.8 PK			1.93 H	116	94.97	9.83
4	*5775.00	93.3 AV			1.93 H	116	83.47	9.83
5	11550.00	56.5 PK	74.0	-17.5	1.49 H	242	41.41	15.09
6	11550.00	47.5 AV	54.0	-6.5	1.49 H	242	32.41	15.09
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	5133.00	59.3 PK	74.0	-14.7	1.68 V	37	51.04	8.26
2	5133.00	52.5 AV	54.0	-1.5	1.68 V	37	44.24	8.26
3	*5775.00	114.4 PK			1.95 V	360	104.57	9.83
4	*5775.00	103.7 AV			1.95 V	360	93.87	9.83
5	11550.00	58.9 PK	74.0	-15.1	1.86 V	113	43.81	15.09
6	11550.00	49.5 AV	54.0	-4.5	1.86 V	113	34.41	15.09

REMARKS:

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

5.2 Conducted Emission Measurement

5.2.1 Limits of Conducted Emission Measurement

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

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

5.2.2 Test Instruments

Same as item 4.2.2.

5.2.3 Test Procedures

Same as item 4.2.3.

5.2.4 Deviation from Test Standard

No deviation.

5.2.5 Test Setup

Same as item 4.2.5.

5.2.6 Eut Operating Conditions

Same as item 4.1.6.

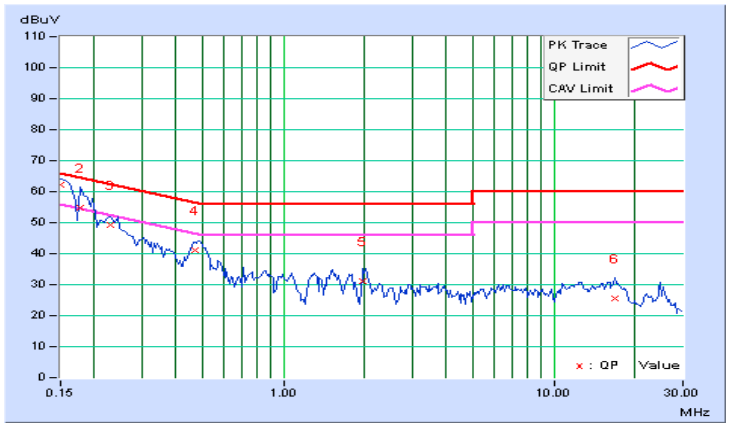
5.2.7 Test Results

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

No	Freq.	Corr. Factor	Reading Value [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	0.15000	0.08	61.98	48.56	62.06	48.64	66.00	56.00	-3.94	-7.36
2	0.17734	0.09	54.63	32.55	54.72	32.64	64.61	54.61	-9.89	-21.97
3	0.22812	0.09	49.04	37.46	49.13	37.55	62.52	52.52	-13.39	-14.97
4	0.47031	0.10	41.12	32.78	41.22	32.88	56.51	46.51	-15.28	-13.62
5	1.97266	0.17	30.99	22.89	31.16	23.06	56.00	46.00	-24.84	-22.94
6	16.76953	0.62	25.09	19.98	25.71	20.60	60.00	50.00	-34.29	-29.40

REMARKS:

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

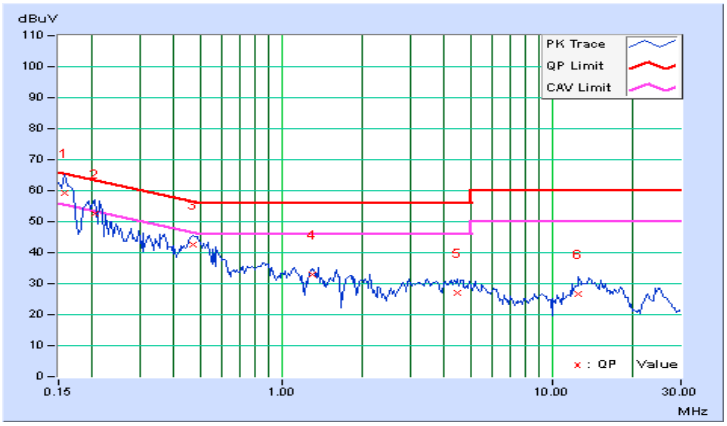


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	0.08	59.06	45.34	59.14	45.42	65.58	55.58	-6.44	-10.16
2	0.20469	0.08	52.54	42.27	52.62	42.35	63.42	53.42	-10.80	-11.07
3	0.47031	0.10	42.62	34.06	42.72	34.16	56.51	46.51	-13.78	-12.34
4	1.29688	0.14	32.94	24.47	33.08	24.61	56.00	46.00	-22.92	-21.39
5	4.47266	0.25	26.92	20.39	27.17	20.64	56.00	46.00	-28.83	-25.36
6	12.55469	0.53	26.25	20.39	26.78	20.92	60.00	50.00	-33.22	-29.08

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.



5.3 6dB Bandwidth Measurement

5.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

5.3.2 Test Setup

Same as item 4.3.2.

5.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

5.3.4 Test Procedure

Same as item 4.3.4.

5.3.5 Deviation from Test Standard

No deviation.

5.3.6 EUT Operating Conditions

Same as item 4.3.6.

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		
149	5745	16.40	16.40	16.44	0.5	Pass
157	5785	16.43	16.43	16.42	0.5	Pass
165	5825	16.41	16.40	16.43	0.5	Pass

802.11ac (VHT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
149	5745	17.66	17.65	17.66	0.5	Pass
157	5785	17.70	17.69	17.67	0.5	Pass
165	5825	17.64	17.66	17.65	0.5	Pass

802.11ac (VHT40)

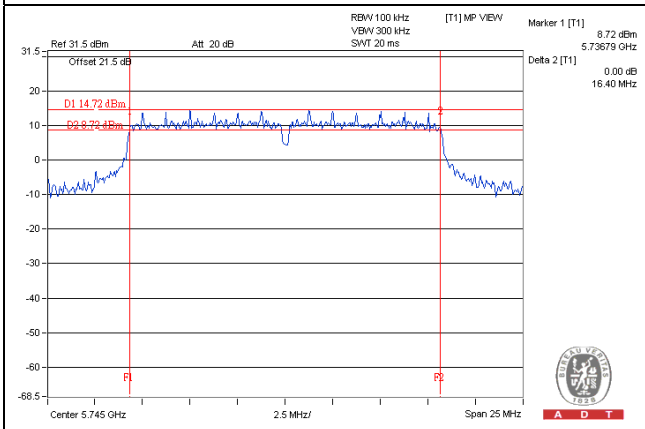
Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
151	5755	36.42	36.47	36.46	0.5	Pass
159	5795	36.47	36.47	36.46	0.5	Pass

802.11ac (VHT80)

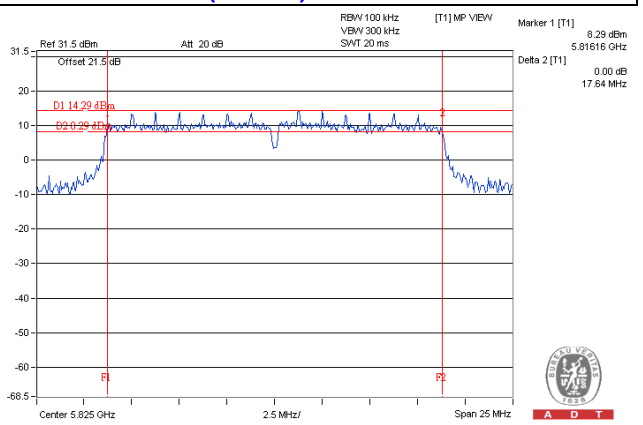
Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
155	5775	76.08	76.01	76.29	0.5	Pass

Spectrum Plot of Worst Value

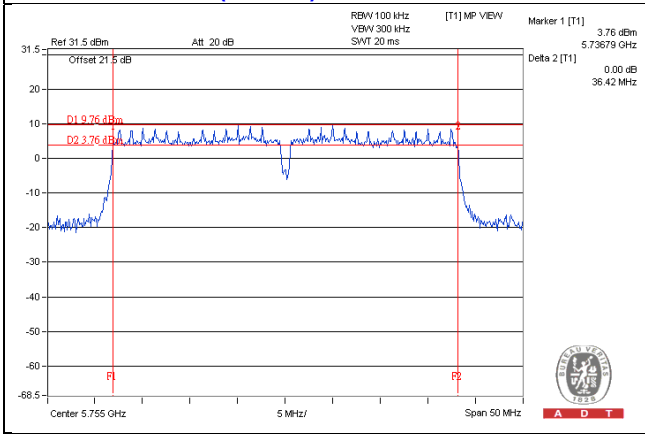
802.11a – Chain 0: CH 149



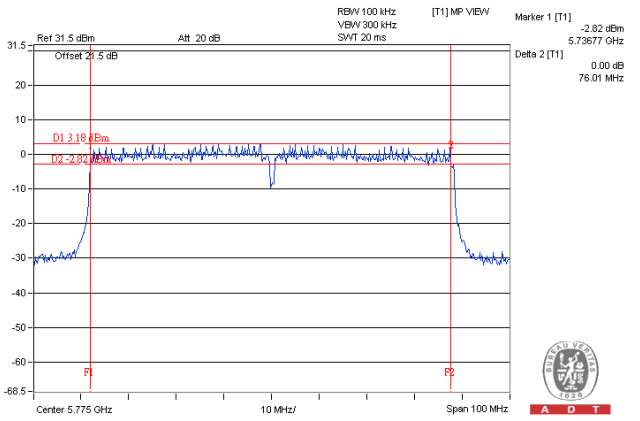
802.11ac (VHT20) – Chain 0: CH 165



802.11ac (VHT40) – Chain 0: CH 151



802.11ac (VHT80) – Chain 1: CH 155



Beamforming Mode

802.11ac (VHT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
149	5745	17.67	17.68	17.66	0.5	Pass
157	5785	17.65	17.66	17.67	0.5	Pass
165	5825	17.64	17.67	17.65	0.5	Pass

802.11ac (VHT40)

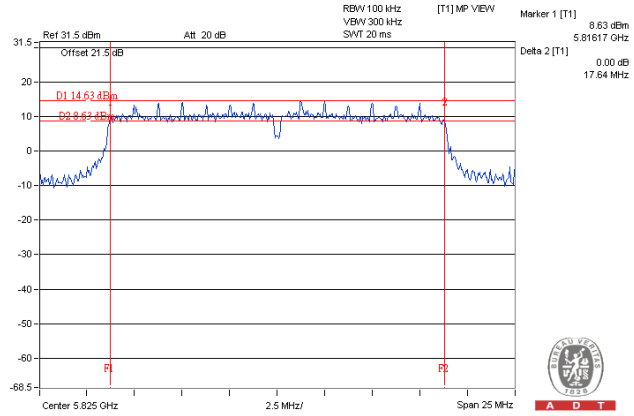
Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
151	5755	36.20	36.46	36.47	0.5	Pass
159	5795	36.45	36.46	36.48	0.5	Pass

802.11ac (VHT80)

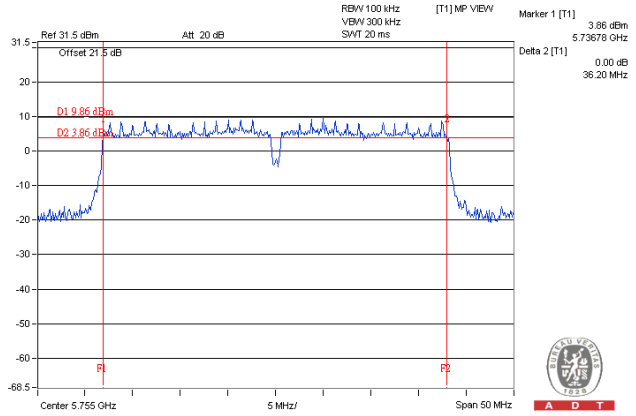
Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
155	5775	75.69	76.43	76.37	0.5	Pass

Spectrum Plot of Worst Value

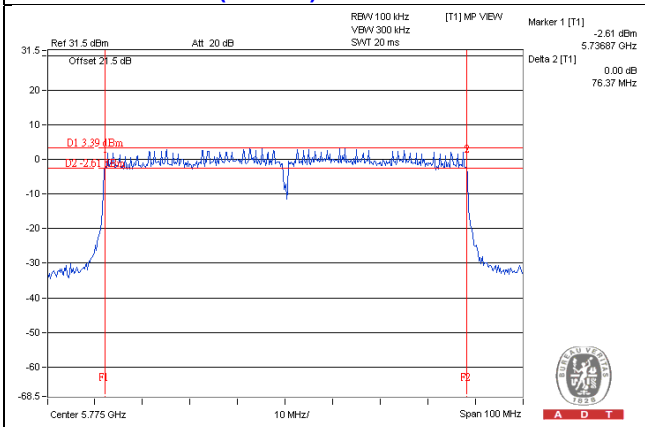
802.11ac (VHT20) – Chain 0: CH 165



802.11ac (VHT40) – Chain 0: CH 151



802.11ac (VHT80) – Chain 2: CH 155



5.4 Conducted Output Power

5.4.1 Limits of Conducted Output Power Measurement

For systems using digital modulation in the 5725 –5850 MHz bands: 1 Watt (30dBm)

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

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

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

5.4.2 Test Setup

Same as Item 4.5.2.

5.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

5.4.4 Test Procedures

Same as Item 4.5.4.

5.4.5 Deviation from Test Standard

No deviation.

5.4.6 EUT Operating Conditions

Same as Item 4.5.6.

5.4.7 Test Results

CDD Mode

802.11a

Channel	Frequency (MHz)	Average Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
149	5745	24.88	25.31	24.62	936.969	29.72	30	Pass
157	5785	24.81	25.44	24.61	941.704	29.74	30	Pass
165	5825	24.81	25.41	24.47	930.125	29.69	30	Pass

802.11ac (VHT20)

Channel	Frequency (MHz)	Average Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
149	5745	24.79	25.48	24.37	928.011	29.68	30	Pass
157	5785	24.63	25.38	24.42	912.24	29.60	30	Pass
165	5825	24.71	25.53	24.41	929.132	29.68	30	Pass

802.11ac (VHT40)

Channel	Frequency (MHz)	Average Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
151	5755	23.27	23.16	22.30	589.162	27.70	30	Pass
159	5795	24.90	25.31	24.64	939.727	29.73	30	Pass

802.11ac (VHT80)

Channel	Frequency (MHz)	Average Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
155	5775	20.61	20.07	20.37	325.598	25.13	30	Pass

Beamforming Mode

802.11ac (VHT20)

Channel	Frequency (MHz)	Average Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
149	5745	24.73	25.42	24.31	915.278	29.62	29.80	Pass
157	5785	24.68	25.43	24.47	922.803	29.65	29.80	Pass
165	5825	24.67	25.49	24.02	899.434	29.54	29.80	Pass

Note: Directional gain = 1.43dBi + 10log(3) = 6.20dBi > 6dBi, so the power limit shall be reduced to 30-(6.20-6) = 29.80dBm.

802.11ac (VHT40)

Channel	Frequency (MHz)	Average Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
151	5755	23.30	23.19	22.33	593.247	27.73	29.80	Pass
159	5795	24.77	25.32	24.45	918.936	29.63	29.80	Pass

Note: Directional gain = 1.43dBi + 10log(3) = 6.20dBi > 6dBi, so the power limit shall be reduced to 30-(6.20-6) = 29.80dBm.

802.11ac (VHT80)

Channel	Frequency (MHz)	Average Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
155	5775	20.54	20.11	20.46	326.978	25.15	29.80	Pass

Note: Directional gain = 1.43dBi + 10log(3) = 6.20dBi > 6dBi, so the power limit shall be reduced to 30-(6.20-6) = 29.80dBm.

5.5 Power Spectral Density Measurement

5.5.1 Limits of Power Spectral Density Measurement

Same as item 4.6.1.

5.5.2 Test Setup

Same as item 4.6.2.

5.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

5.5.4 Test Procedure

Same as item 4.6.4.

5.5.5 Deviation from Test Standard

No deviation.

5.5.6 EUT Operating Condition

Same as Item 4.3.6

5.5.7 Test Results

CDD Mode

802.11a

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=3) dB	Total PSD (dBm)	Limit (dBm)	Pass /Fail
0	149	5745	-3.55	4.77	1.22	7.80	Pass
	157	5785	-3.54	4.77	1.23	7.80	Pass
	165	5825	-4.13	4.77	0.64	7.80	Pass
1	149	5745	-2.90	4.77	1.87	7.80	Pass
	157	5785	-2.28	4.77	2.49	7.80	Pass
	165	5825	-3.14	4.77	1.63	7.80	Pass
2	149	5745	-3.33	4.77	1.44	7.80	Pass
	157	5785	-2.35	4.77	2.42	7.80	Pass
	165	5825	-2.65	4.77	2.12	7.80	Pass

Note: 1. Directional gain = 1.43dBi + 10log(3) = 6.20dBi > 6dBi , so the power density limit shall be reduced to 8-(6.20-6) = 7.80dBm.

802.11ac (VHT20)

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=3) dB	Total PSD (dBm)	Limit (dBm)	Pass /Fail
0	149	5745	-4.43	4.77	0.34	7.80	Pass
	157	5785	-4.88	4.77	-0.11	7.80	Pass
	165	5825	-4.74	4.77	0.03	7.80	Pass
1	149	5745	-3.62	4.77	1.15	7.80	Pass
	157	5785	-4.21	4.77	0.56	7.80	Pass
	165	5825	-4.12	4.77	0.65	7.80	Pass
2	149	5745	-4.24	4.77	0.53	7.80	Pass
	157	5785	-4.43	4.77	0.34	7.80	Pass
	165	5825	-5.03	4.77	-0.26	7.80	Pass

Note: 1. Directional gain = 1.43dBi + 10log(3) = 6.20dBi > 6dBi , so the power density limit shall be reduced to 8-(6.20-6) = 7.80dBm.

802.11ac (VHT40)

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=3) dB	Total PSD (dBm)	Limit (dBm)	Pass /Fail
0	151	5755	-8.82	4.77	-4.05	7.80	Pass
	159	5795	-6.65	4.77	-1.88	7.80	Pass
1	151	5755	-8.13	4.77	-3.36	7.80	Pass
	159	5795	-6.27	4.77	-1.50	7.80	Pass
2	151	5755	-8.84	4.77	-4.07	7.80	Pass
	159	5795	-6.73	4.77	-1.96	7.80	Pass

Note: 1. Directional gain = 1.43dBi + 10log(3) = 6.20dBi > 6dBi , so the power density limit shall be reduced to 8-(6.20-6) = 7.80dBm.

802.11ac (VHT80)

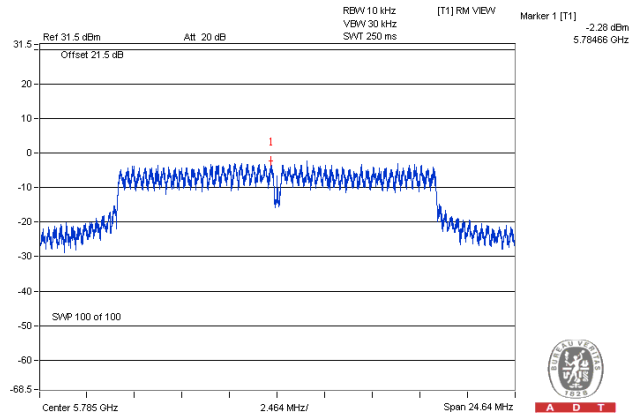
TX chain	Channel	Freq. (MHz)	PSD w/o Duty Factor (dBm)	10 log (N=3) dB	Duty Factor (dB)	Total PSD with Duty Factor (dBm)	Limit (dBm)	Pass /Fail
0	155	5775	-13.98	4.77	0.19	-9.02	7.80	Pass
1	155	5775	-13.75	4.77	0.19	-8.79	7.80	Pass
2	155	5775	-13.81	4.77	0.19	-8.85	7.80	Pass

Note: 1. Directional gain = 1.43dBi + 10log(3) = 6.20dBi > 6dBi , so the power density limit shall be reduced to 8-(6.20-6) = 7.80dBm.

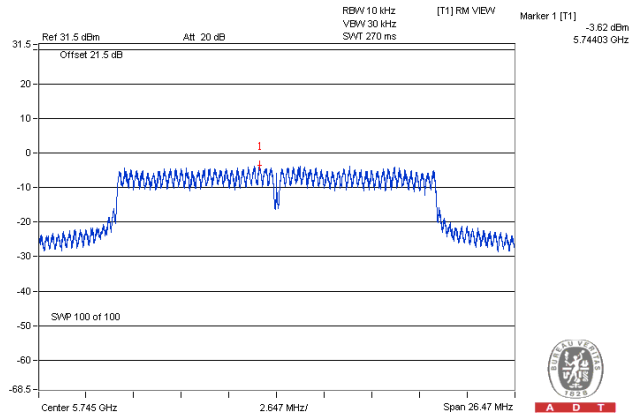
2. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

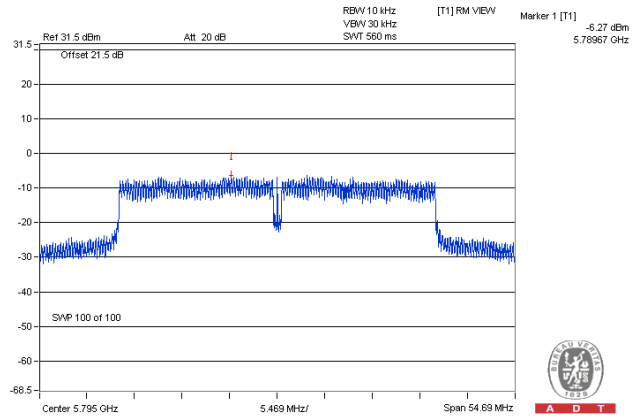
802.11a – Chain 1: CH 157



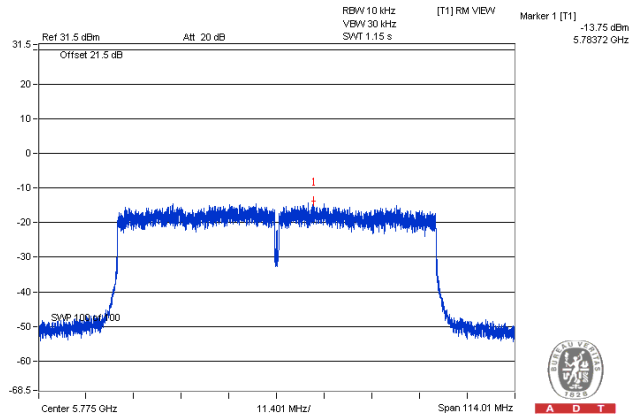
802.11ac (VHT20) – Chain 1: CH 149



802.11ac (VHT40) – Chain 1: CH 159



802.11ac (VHT80) – Chain 1: CH 155



Beamforming Mode

802.11ac (VHT20)

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=3) dB	Total PSD (dBm)	Limit (dBm)	Pass /Fail
0	149	5745	-4.46	4.77	0.31	7.80	Pass
	157	5785	-4.55	4.77	0.22	7.80	Pass
	165	5825	-5.08	4.77	-0.31	7.80	Pass
1	149	5745	-2.96	4.77	1.81	7.80	Pass
	157	5785	-3.56	4.77	1.21	7.80	Pass
	165	5825	-4.63	4.77	0.14	7.80	Pass
2	149	5745	-4.25	4.77	0.52	7.80	Pass
	157	5785	-4.70	4.77	0.07	7.80	Pass
	165	5825	-4.99	4.77	-0.22	7.80	Pass

Note: 1. Directional gain = 1.43dBi + 10log(3) = 6.20dBi > 6dBi , so the power density limit shall be reduced to 8-(6.20-6) = 7.80dBm.

802.11ac (VHT40)

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=3) dB	Total PSD (dBm)	Limit (dBm)	Pass /Fail
0	151	5755	-8.61	4.77	-3.84	7.80	Pass
	159	5795	-6.93	4.77	-2.16	7.80	Pass
1	151	5755	-8.79	4.77	-4.02	7.80	Pass
	159	5795	-6.00	4.77	-1.23	7.80	Pass
2	151	5755	-8.67	4.77	-3.90	7.80	Pass
	159	5795	-5.45	4.77	-0.68	7.80	Pass

Note: 1. Directional gain = 1.43dBi + 10log(3) = 6.20dBi > 6dBi , so the power density limit shall be reduced to 8-(6.20-6) = 7.80dBm.

802.11ac (VHT80)

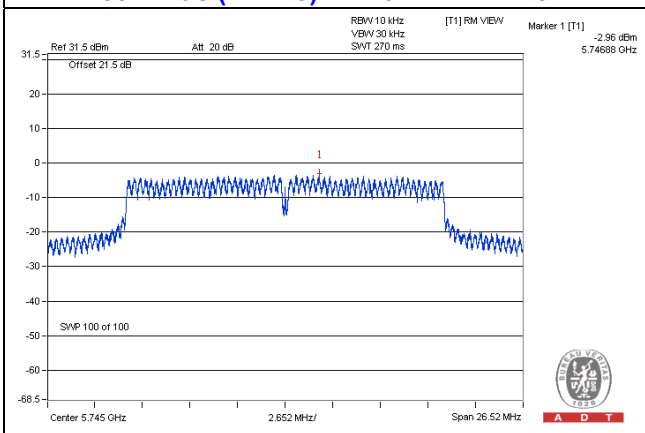
TX chain	Channel	Freq. (MHz)	PSD w/o Duty Factor (dBm)	10 log (N=3) dB	Duty Factor (dB)	Total PSD with Duty Factor (dBm)	Limit (dBm)	Pass /Fail
0	155	5775	-13.44	4.77	0.18	-8.49	7.80	Pass
1	155	5775	-13.75	4.77	0.18	-8.80	7.80	Pass
2	155	5775	-14.51	4.77	0.18	-9.56	7.80	Pass

Note: 1. Directional gain = 1.43dBi + 10log(3) = 6.20dBi > 6dBi , so the power density limit shall be reduced to 8-(6.20-6) = 7.80dBm.

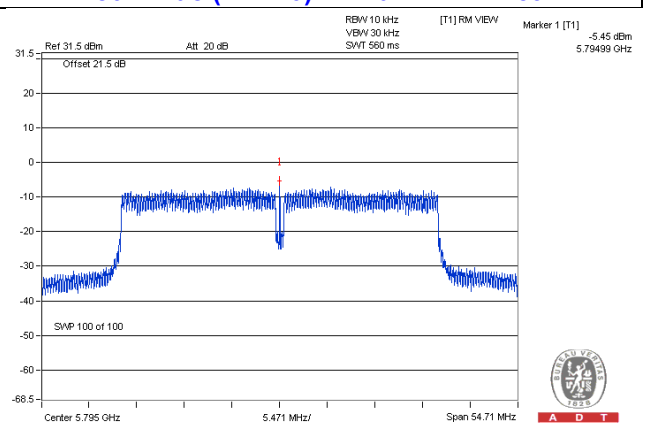
2. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

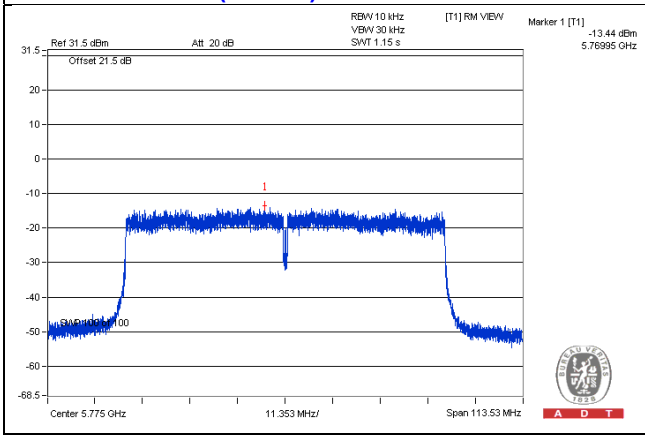
802.11ac (VHT20) – Chain 1: CH 149



802.11ac (VHT40) – Chain 2: CH 159



802.11ac (VHT80) – Chain 0: CH 155



5.6 Conducted Out of Band Emission Measurement

5.6.1 Limits of Conducted Out of Band Emission Measurement

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

5.6.2 Test Setup

Same as Item 4.7.2

5.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

5.6.4 Test Procedure

Same as Item 4.7.4

5.6.5 Deviation from Test Standard

No deviation.

5.6.6 EUT Operating Condition

Same as Item 4.3.6

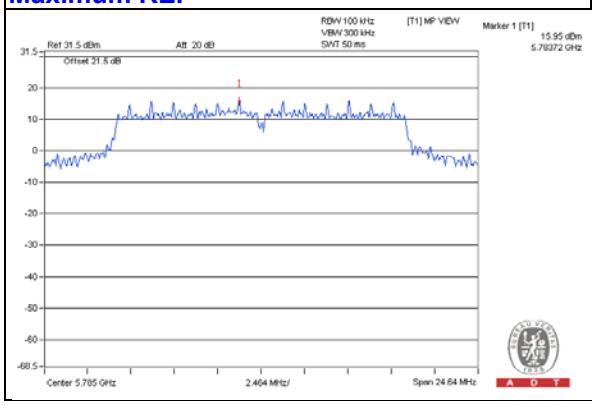
5.6.7 Test Results

The 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

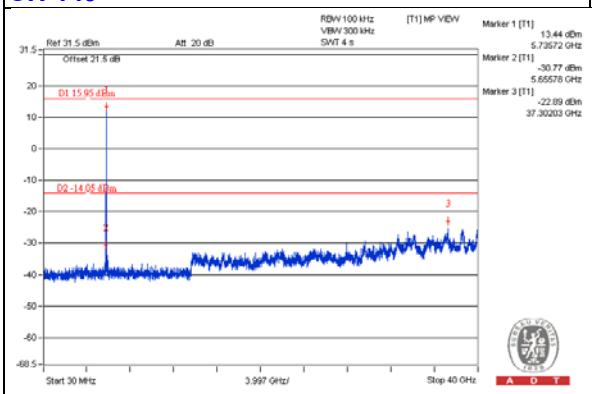
802.11a

Maximum REF

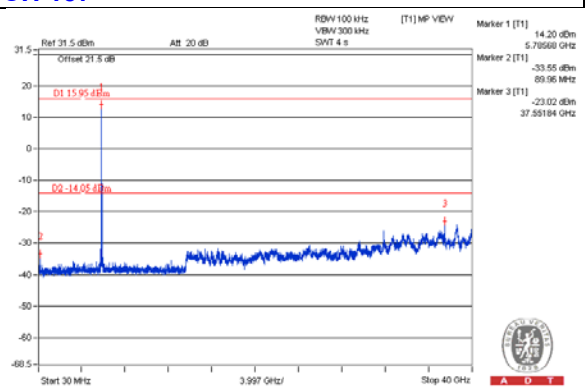


Chain 0

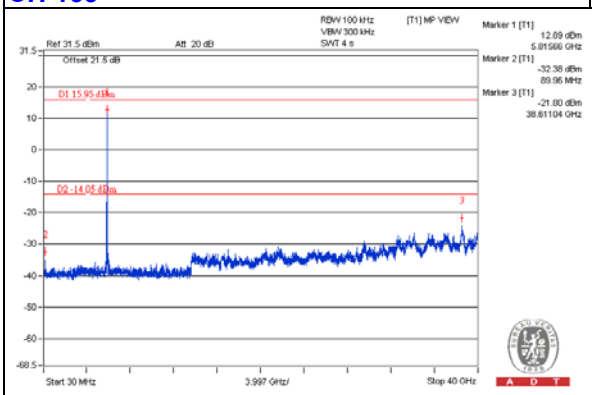
CH 149



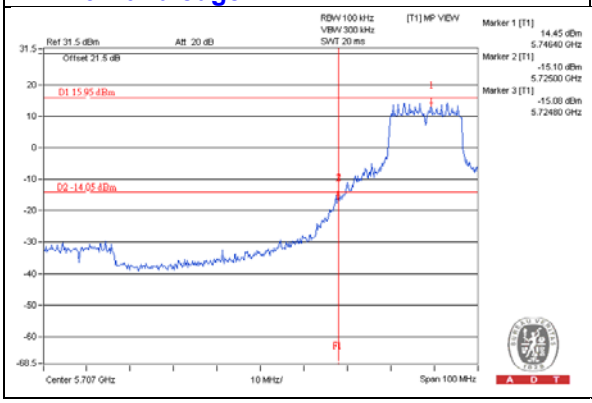
CH 157



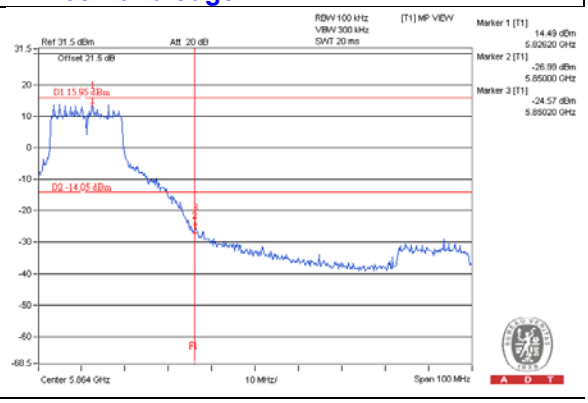
CH 165



CH 149 Band edge

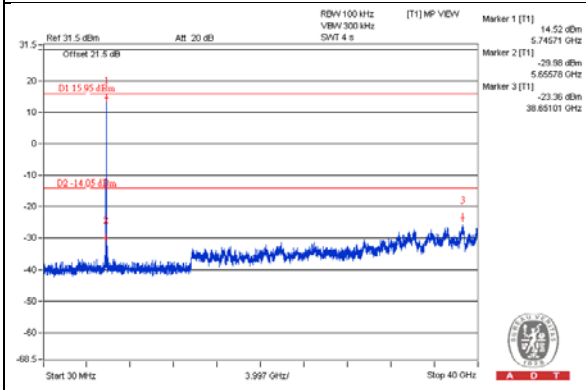


CH 165 Band edge

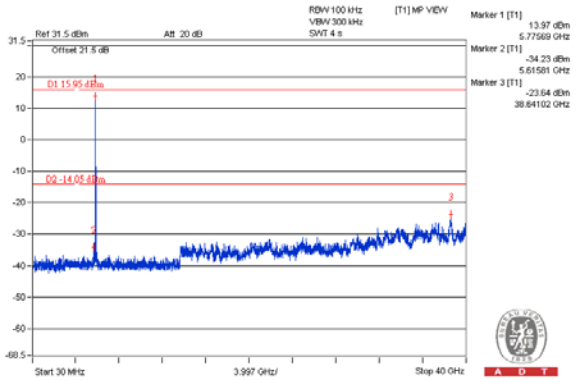


Chain 1

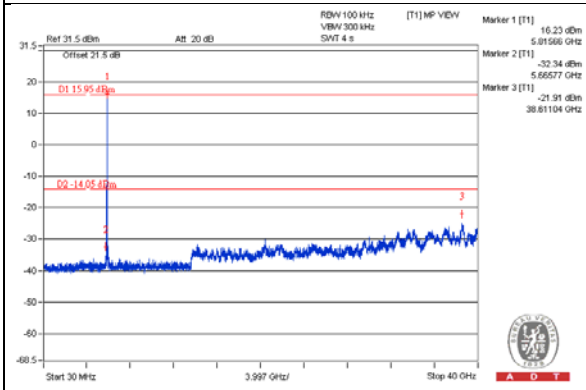
CH 149



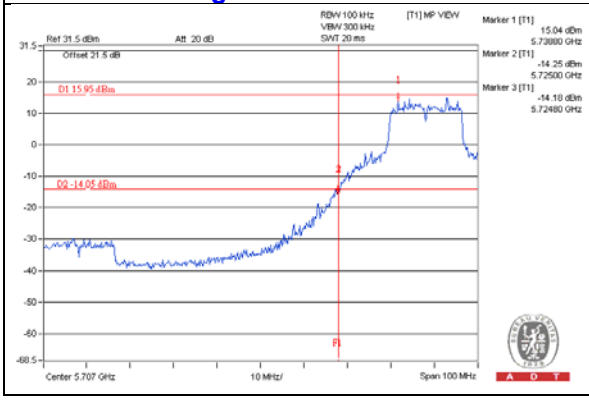
CH 157



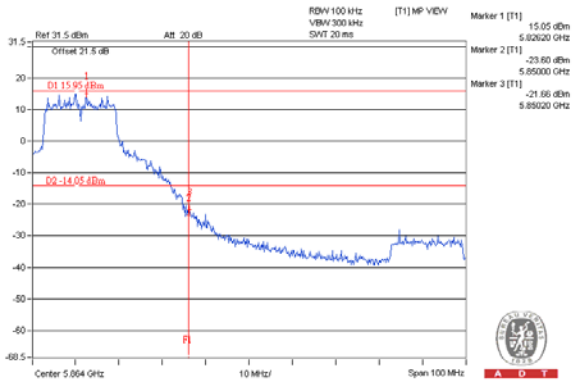
CH 165



CH 149 Band edge

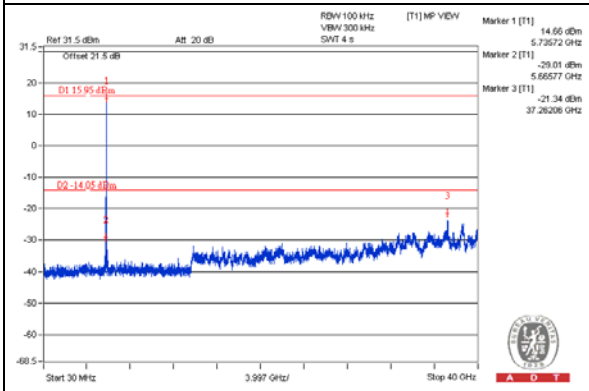


CH 165 Band edge

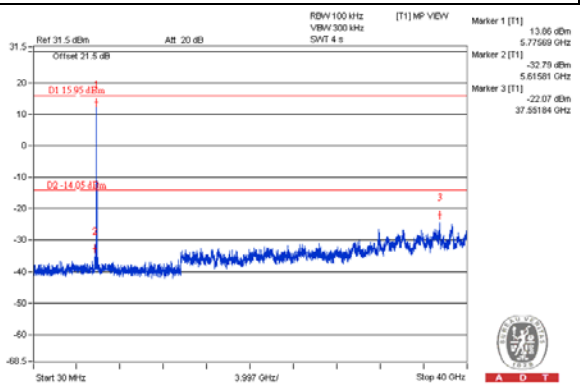


Chain 2

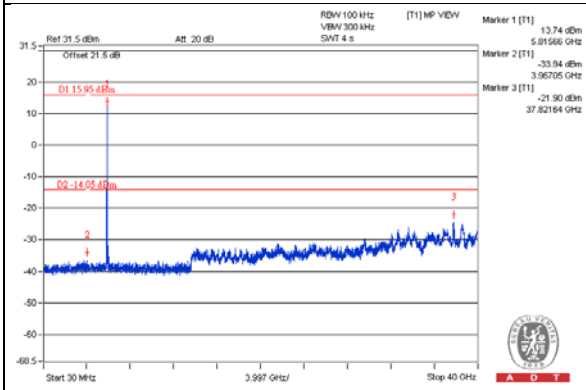
CH 149



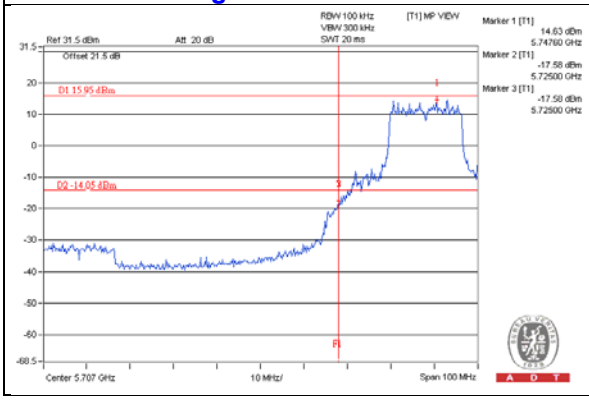
CH 157



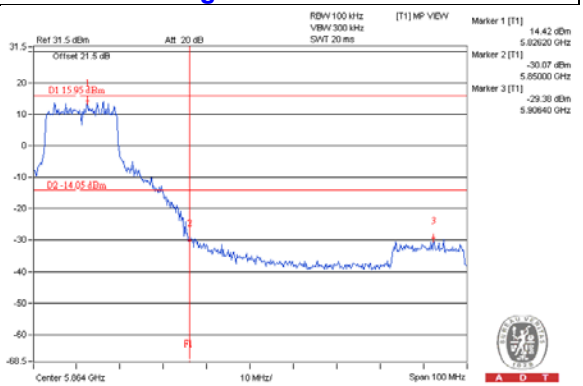
CH 165



CH 149 Band edge

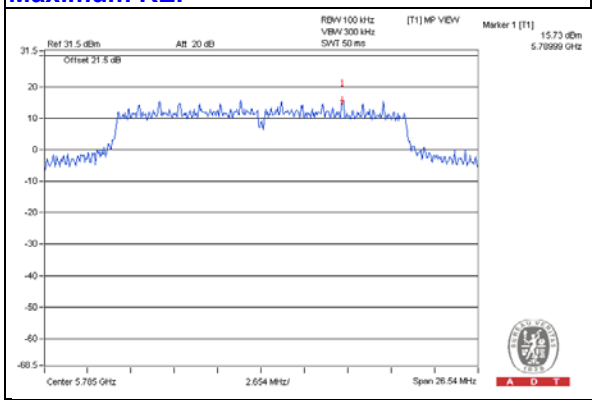


CH 165 Band edge



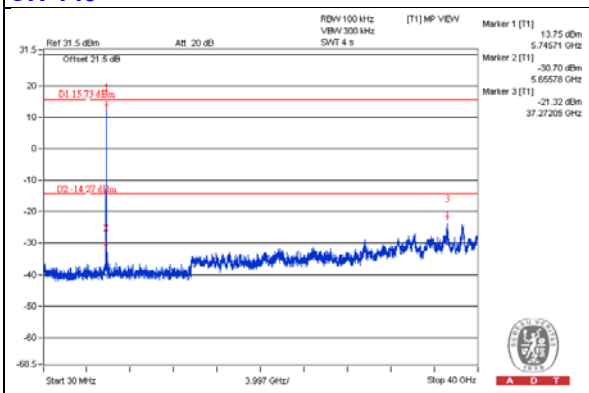
802.11ac (VHT20)

Maximum REF

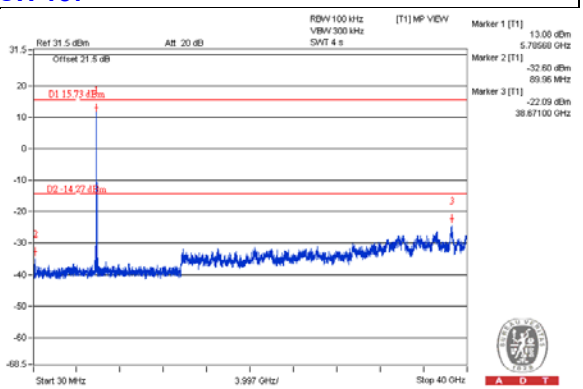


Chain 0

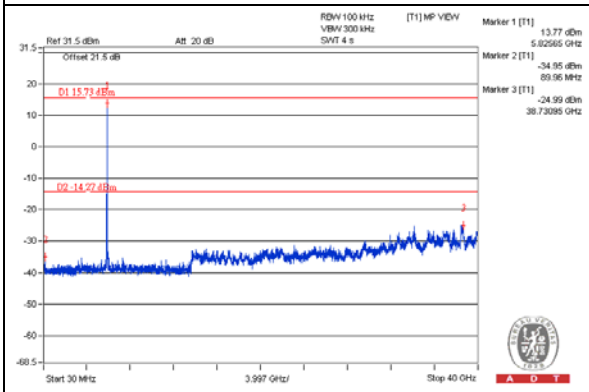
CH 149



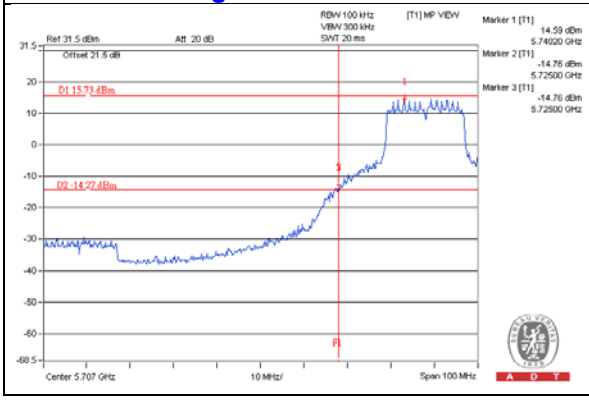
CH 157



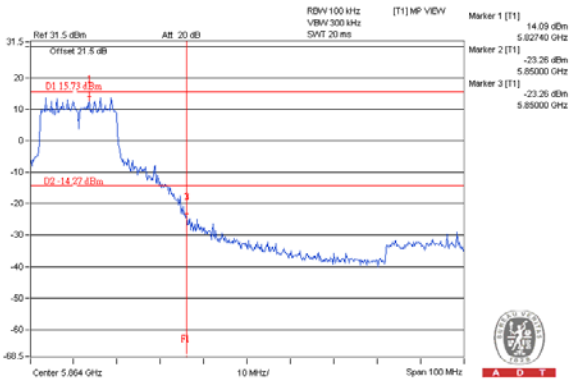
CH 165



CH 149 Band edge

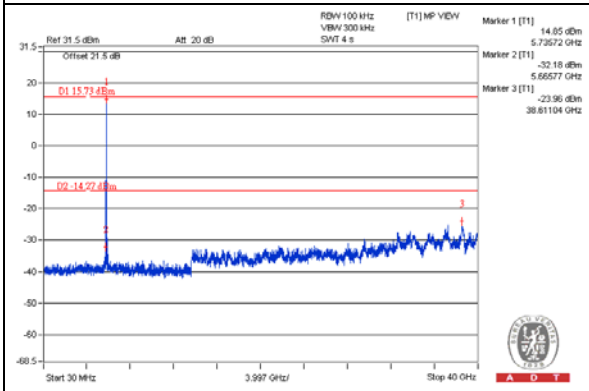


CH 165 Band edge

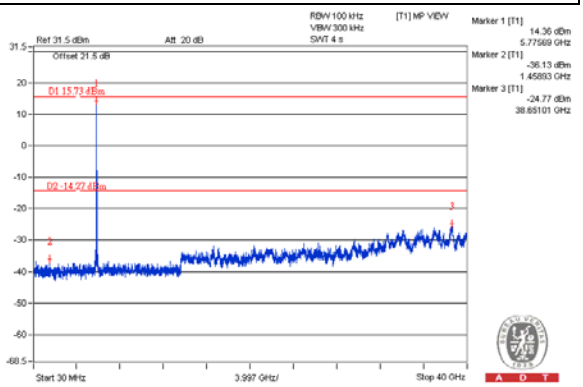


Chain 1

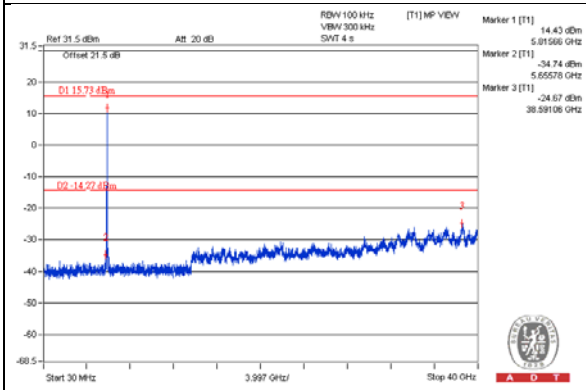
CH 149



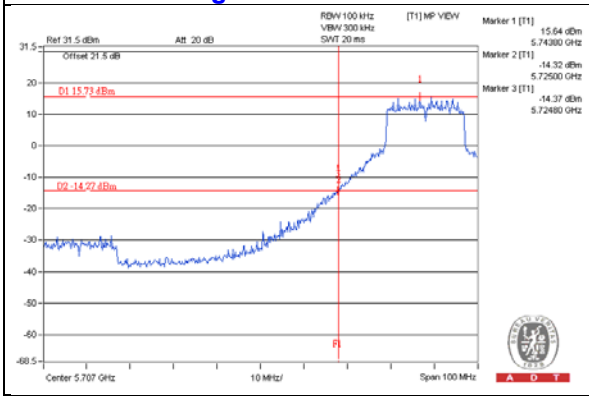
CH 157



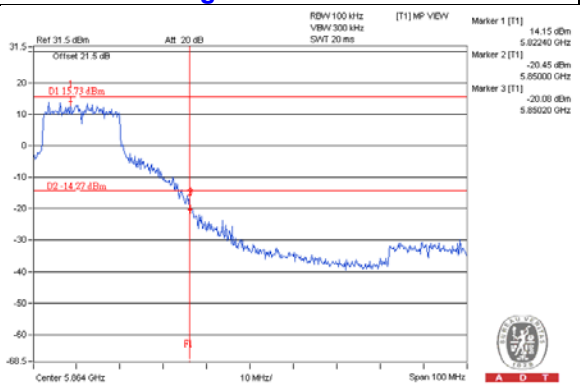
CH 165



CH 149 Band edge

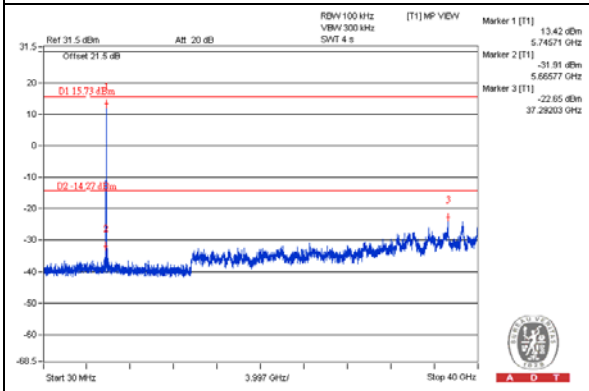


CH 165 Band edge

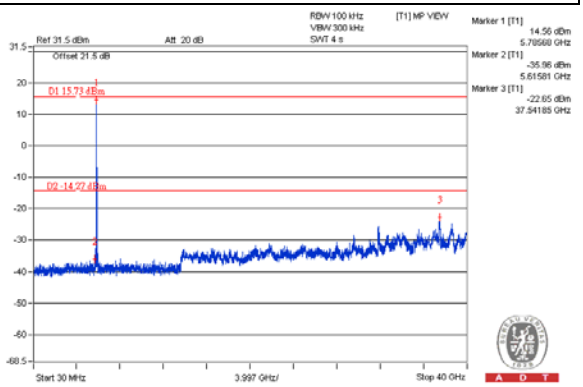


Chain 2

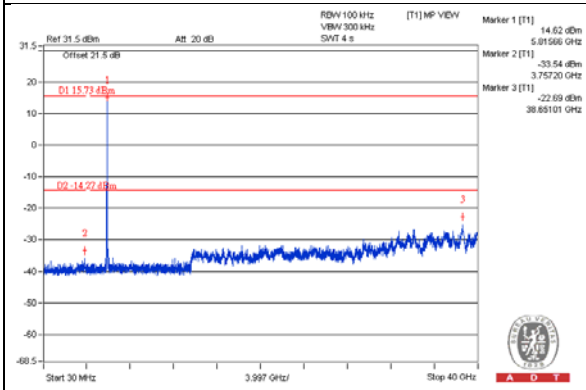
CH 149



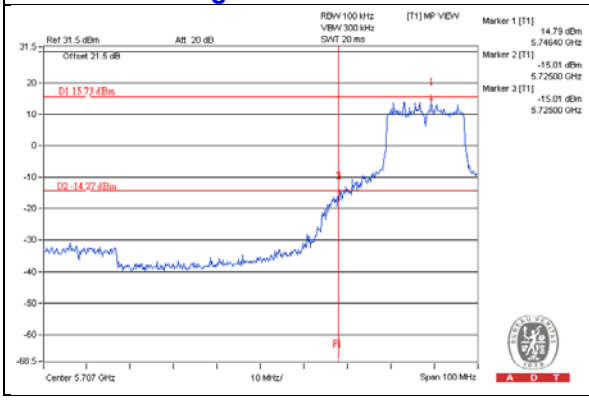
CH 157



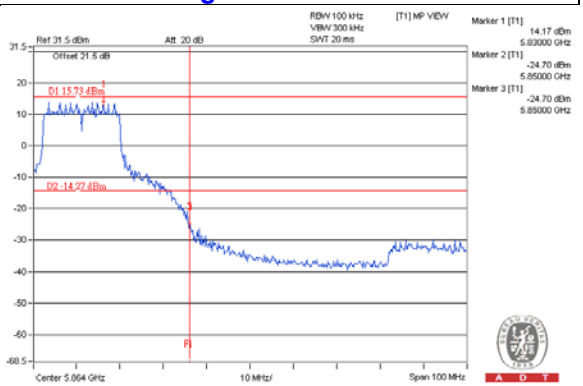
CH 165



CH 149 Band edge

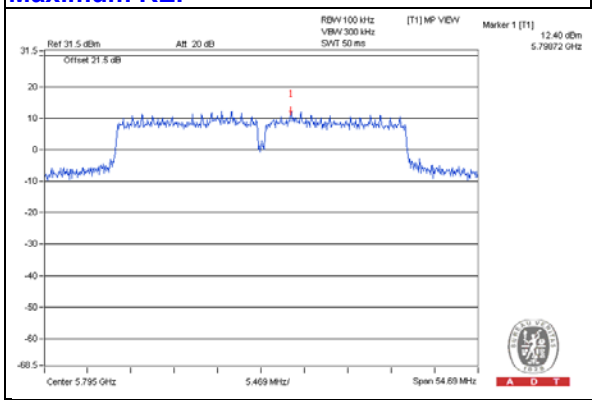


CH 165 Band edge



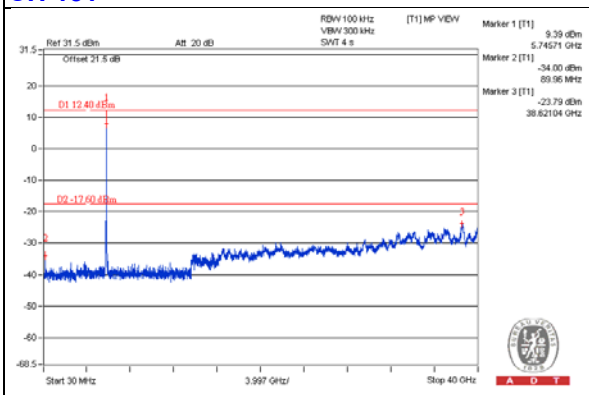
802.11ac (VHT40)

Maximum REF

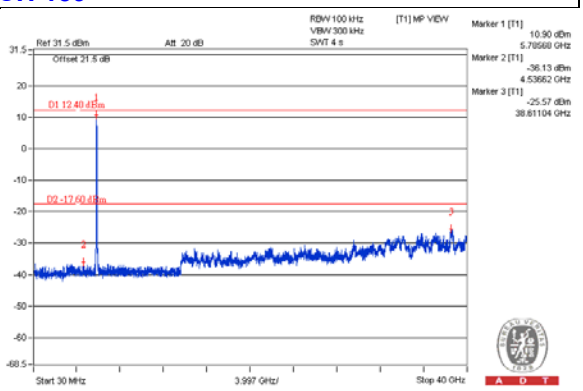


Chain 0

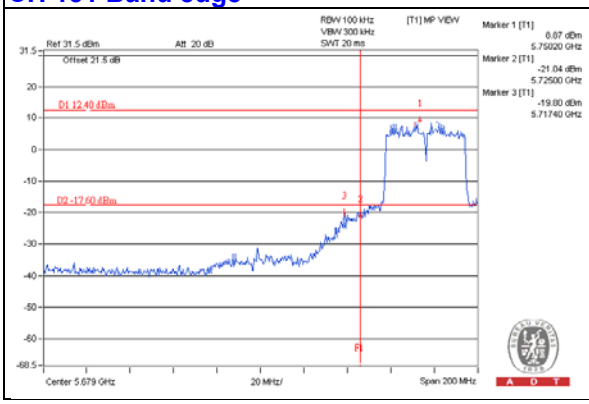
CH 151



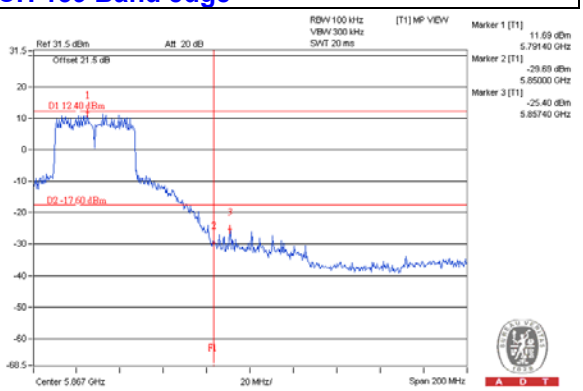
CH 159



CH 151 Band edge

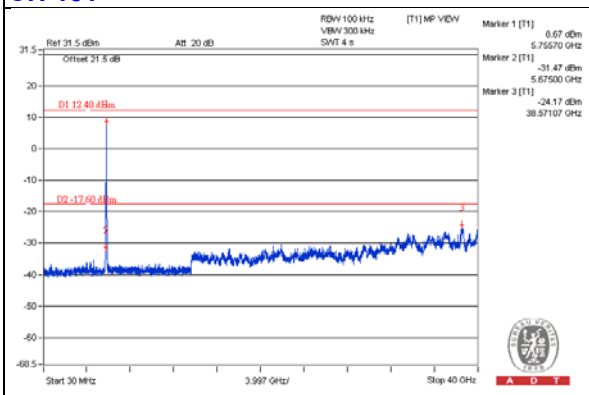


CH 159 Band edge

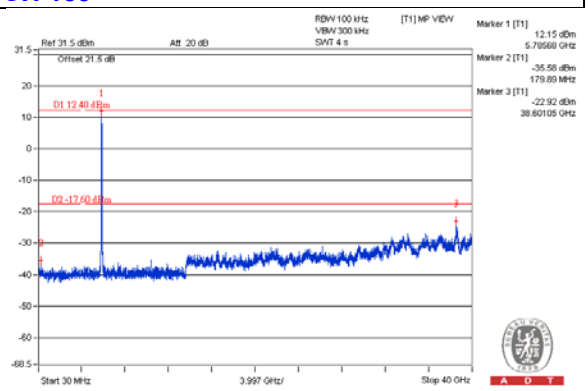


Chain 1

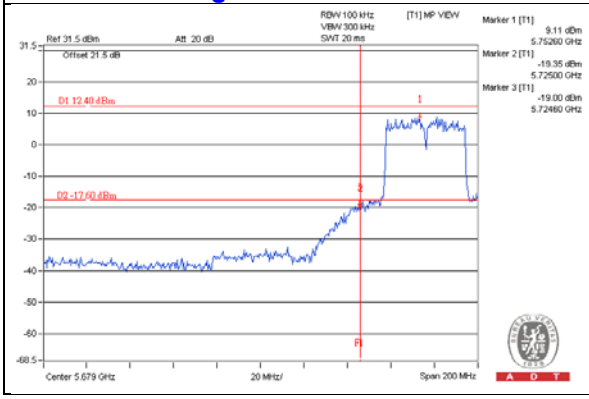
CH 151



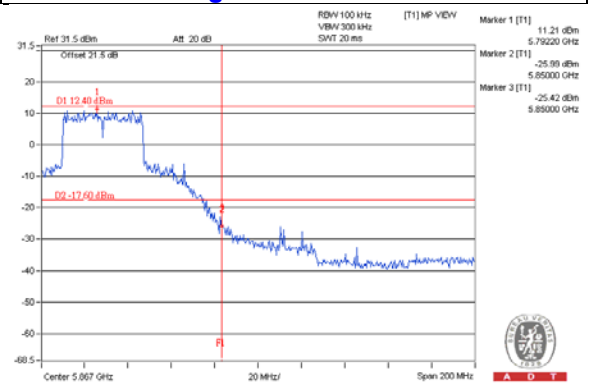
CH 159



CH 151 Band edge

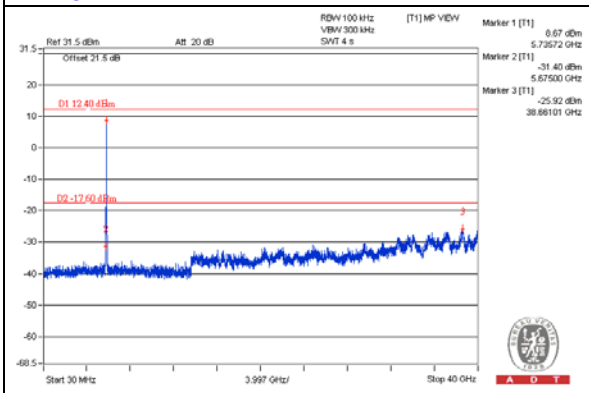


CH 159 Band edge

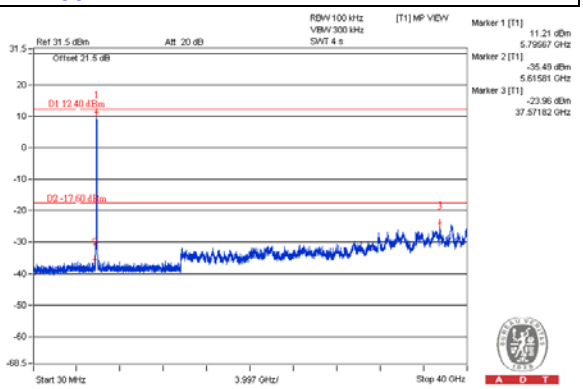


Chain 2

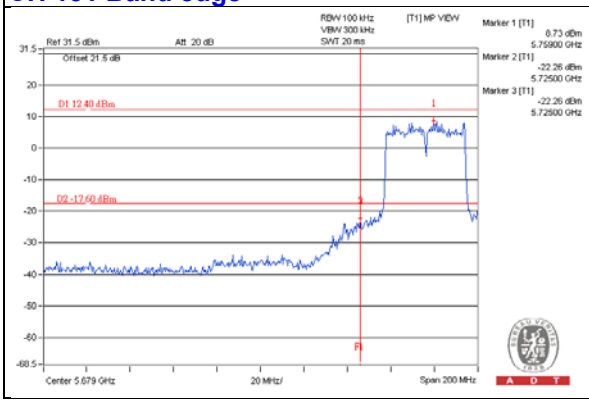
CH 151



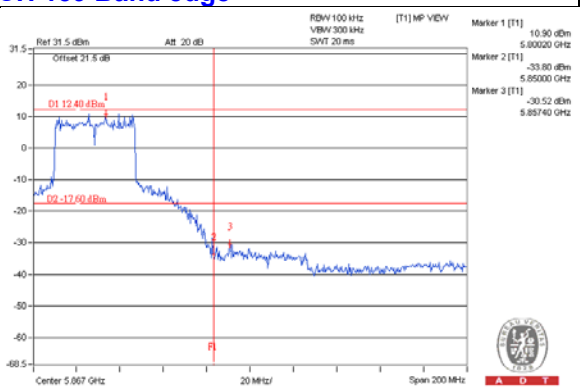
CH 159



CH 151 Band edge

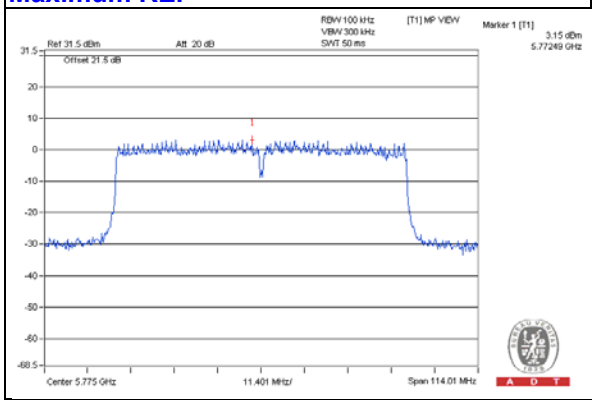


CH 159 Band edge



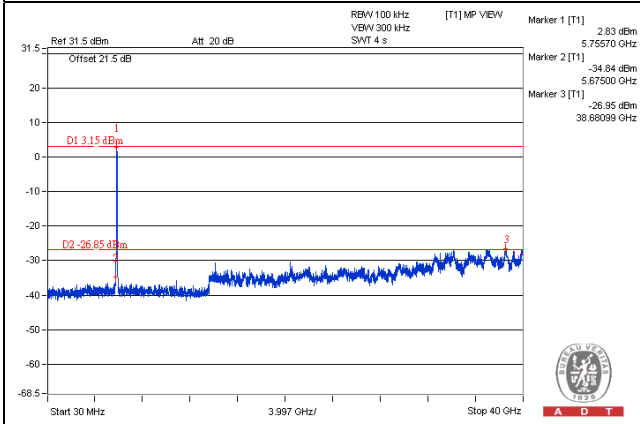
802.11ac (VHT80)

Maximum REF

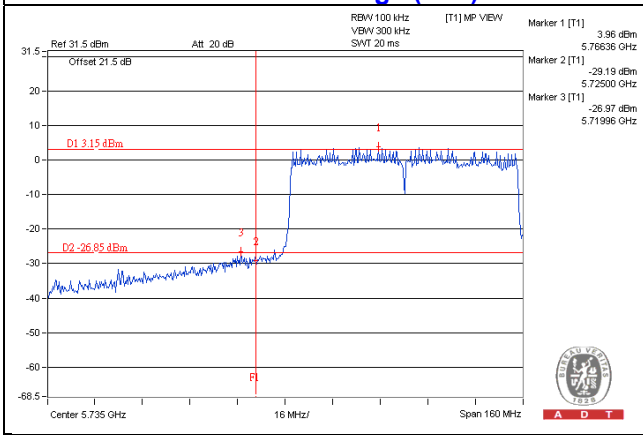


Chain (0)

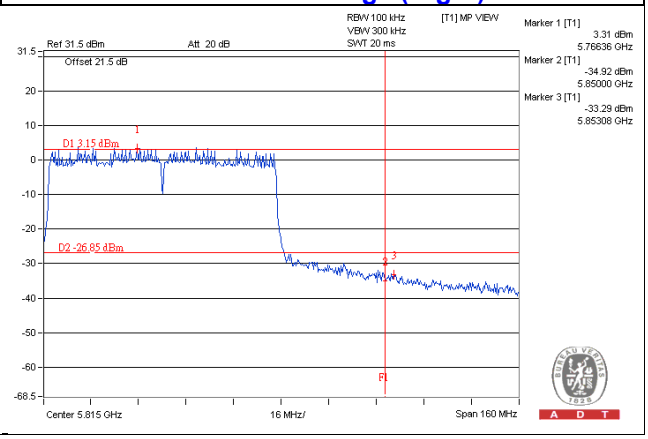
CH 155



CH 155 Band edge (Left)

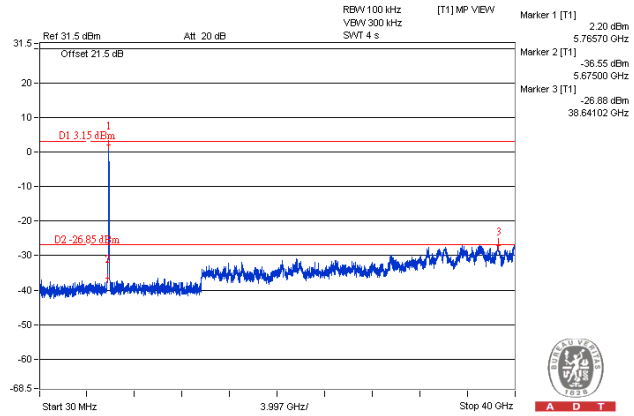


CH 155 Band edge (Right)

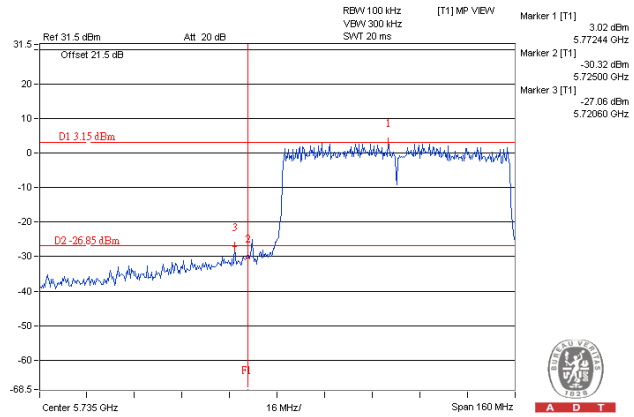


Chain (1)

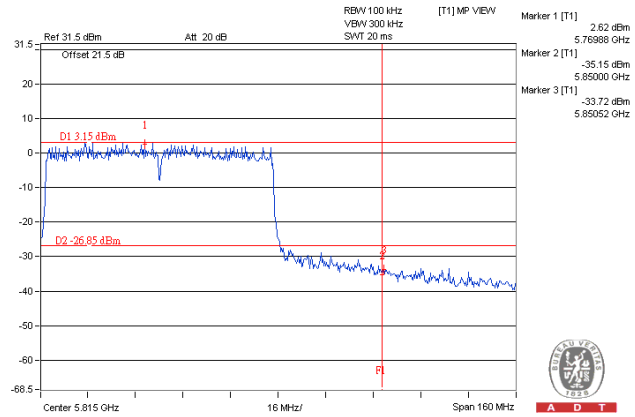
CH 155



CH 155 Band edge (Left)

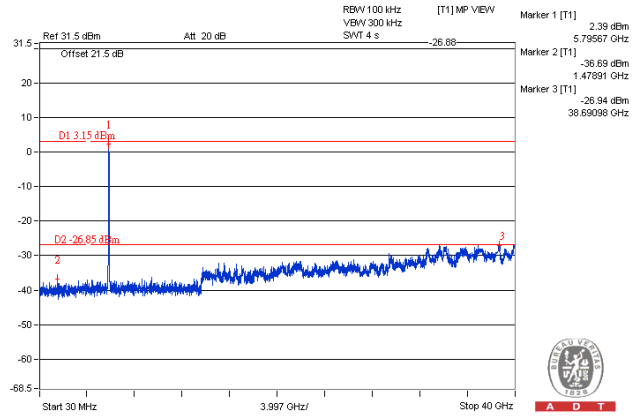


CH 155 Band edge (Right)

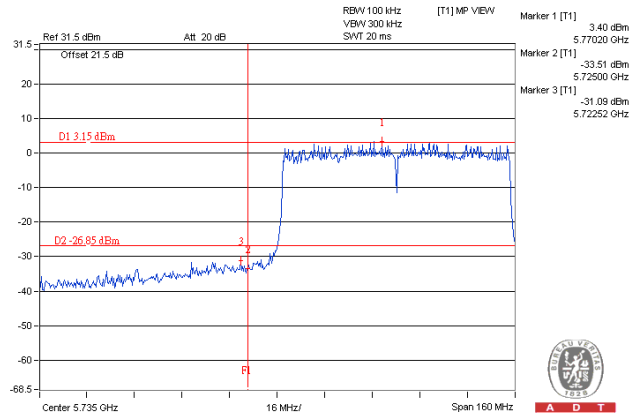


Chain (2)

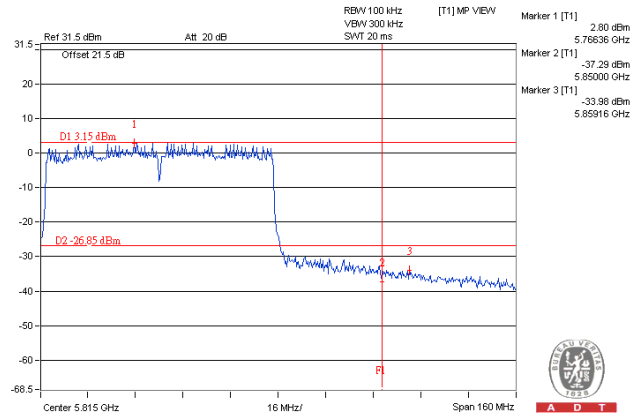
CH 155



CH 155 Band edge (Left)

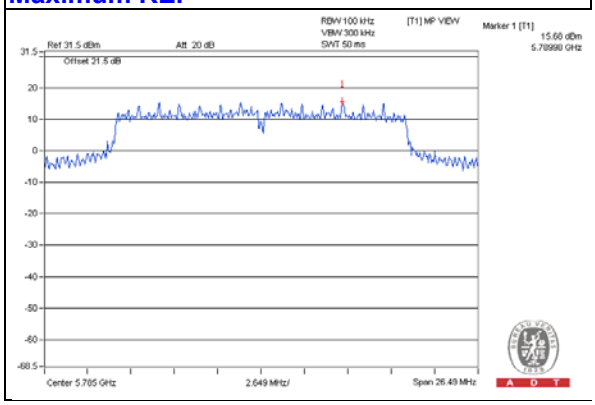


CH 155 Band edge (Right)



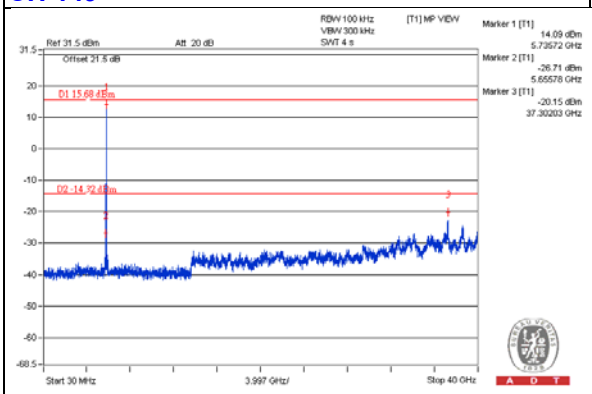
Beamforming Mode
802.11ac (VHT20)

Maximum REF

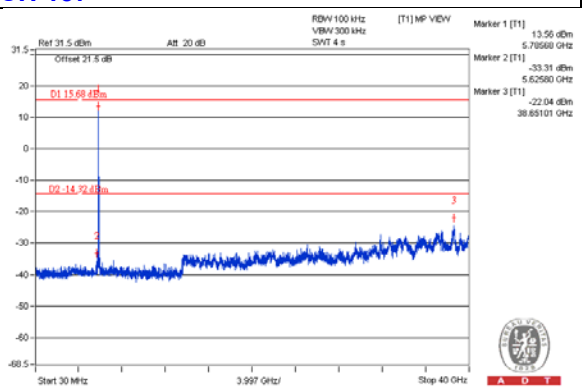


Chain 0

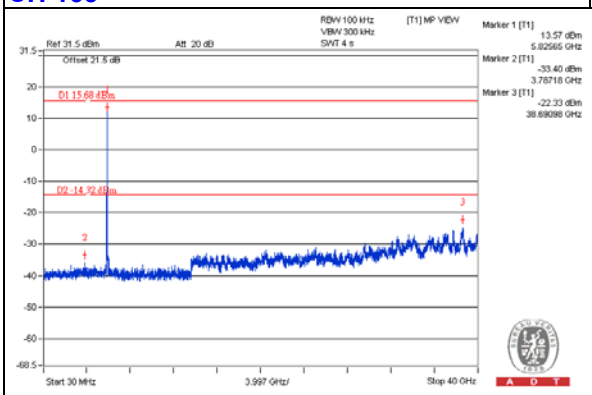
CH 149



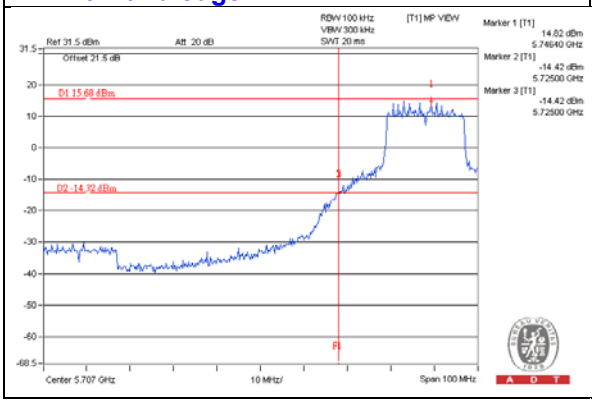
CH 157



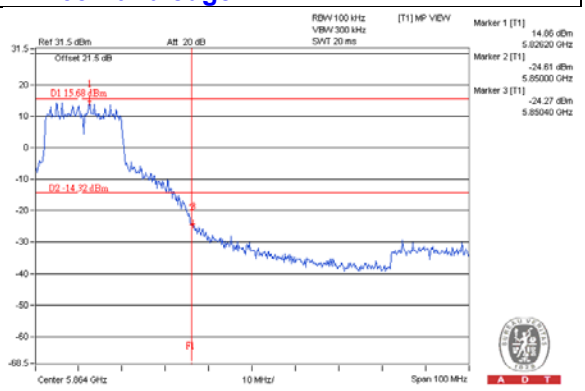
CH 165



CH 149 Band edge

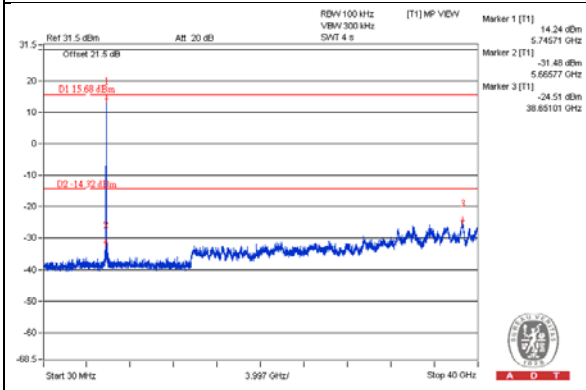


CH 165 Band edge

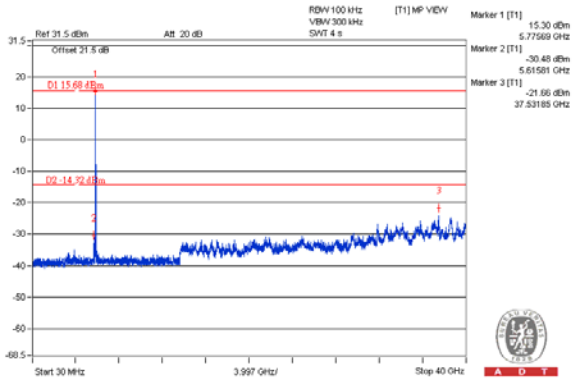


Chain 1

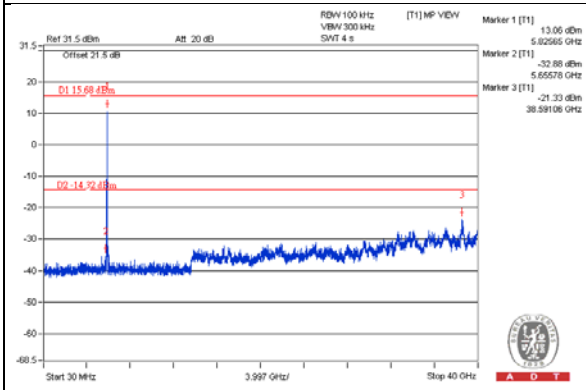
CH 149



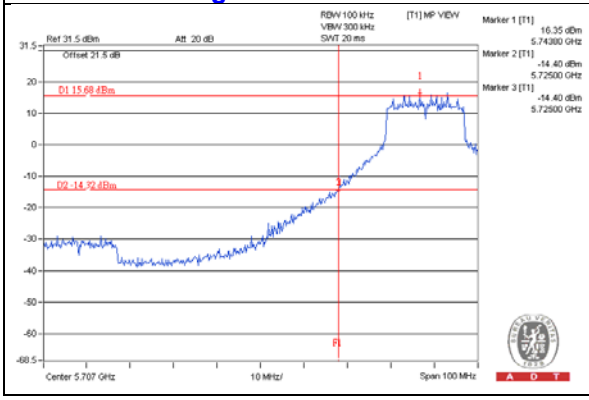
CH 157



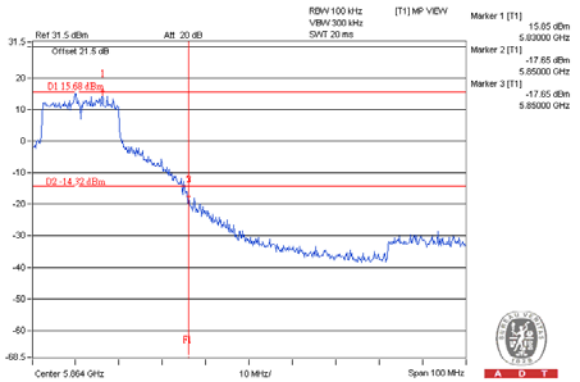
CH 165



CH 149 Band edge

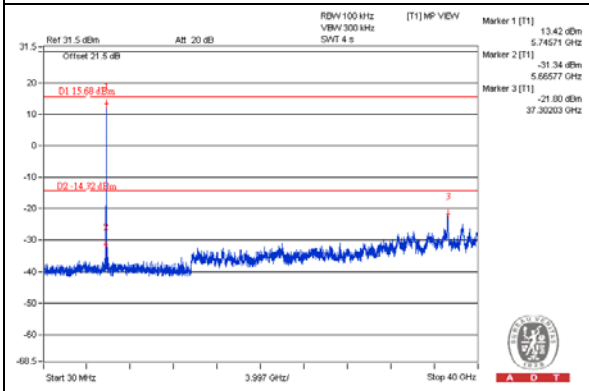


CH 165 Band edge

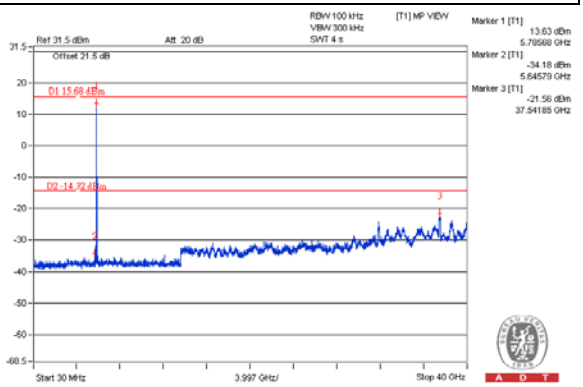


Chain 2

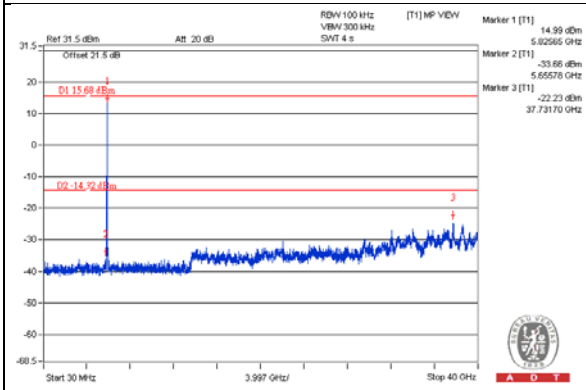
CH 149



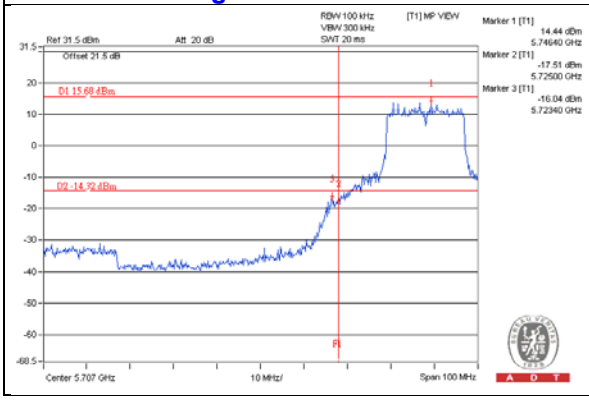
CH 157



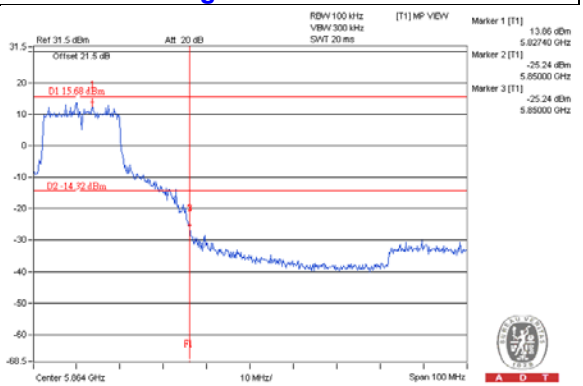
CH 165



CH 149 Band edge

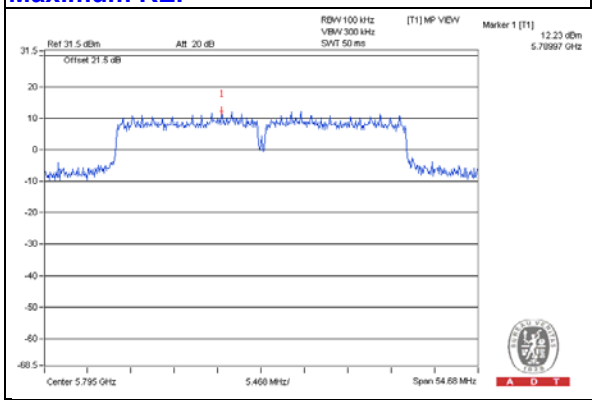


CH 165 Band edge



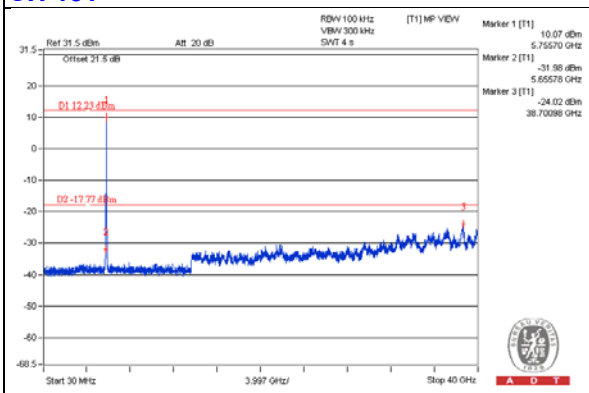
802.11ac (VHT40)

Maximum REF

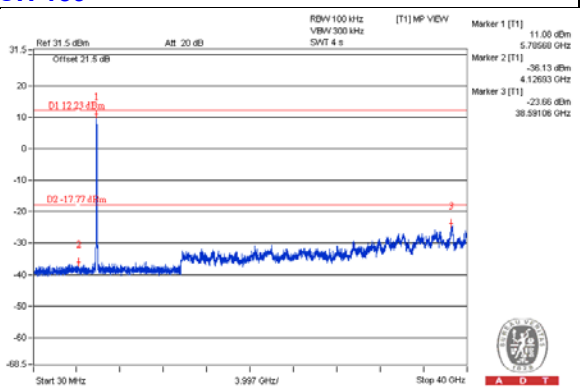


Chain 0

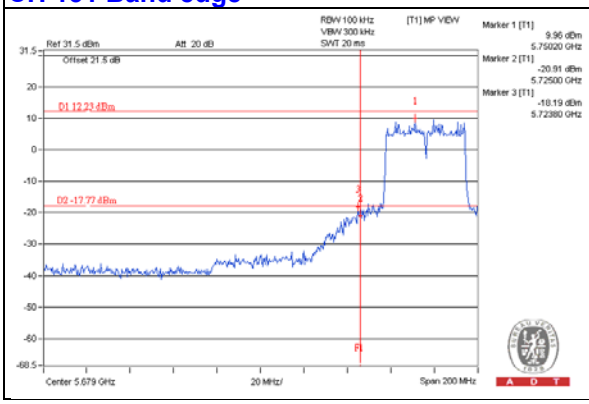
CH 151



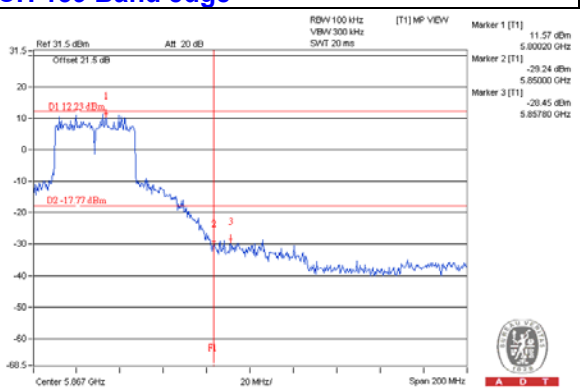
CH 159



CH 151 Band edge

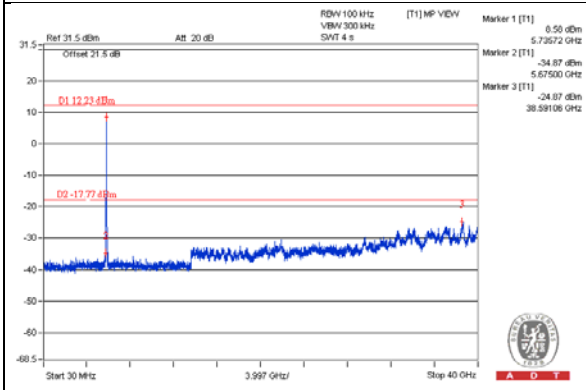


CH 159 Band edge

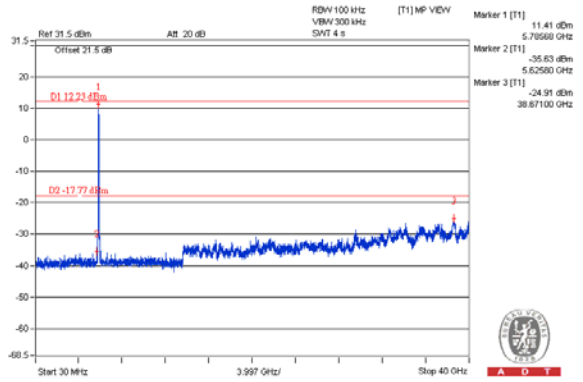


Chain 1

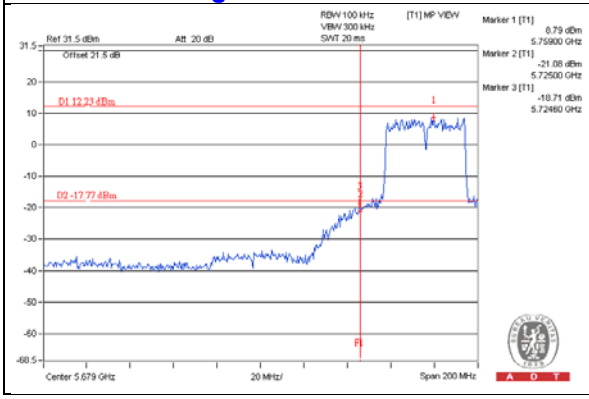
CH 151



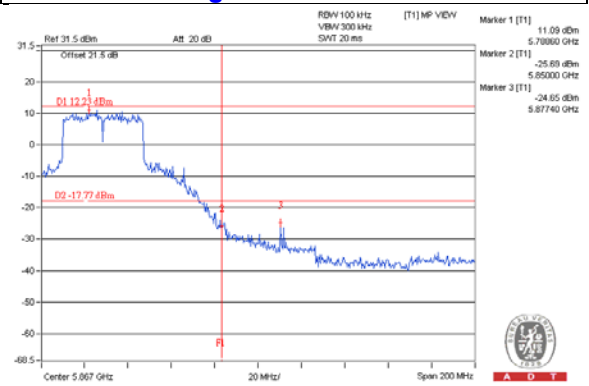
CH 159



CH 151 Band edge

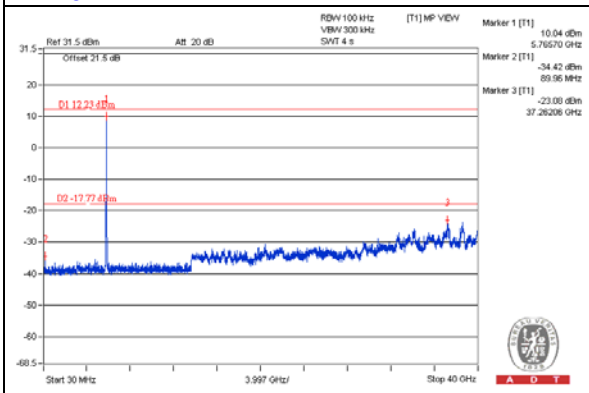


CH 159 Band edge

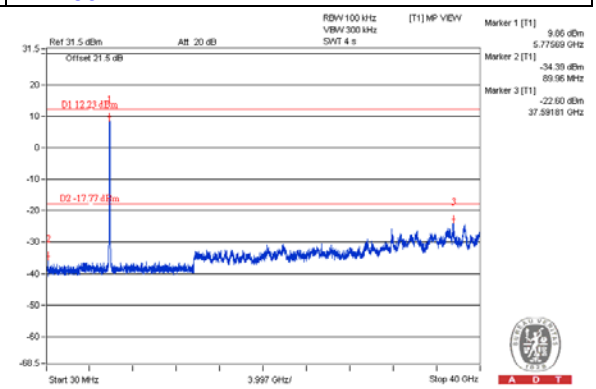


Chain 2

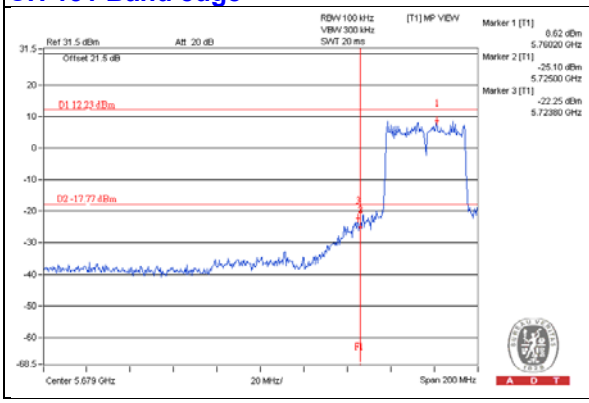
CH 151



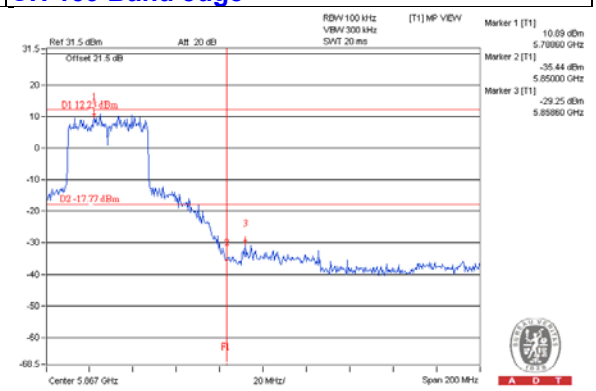
CH 159



CH 151 Band edge

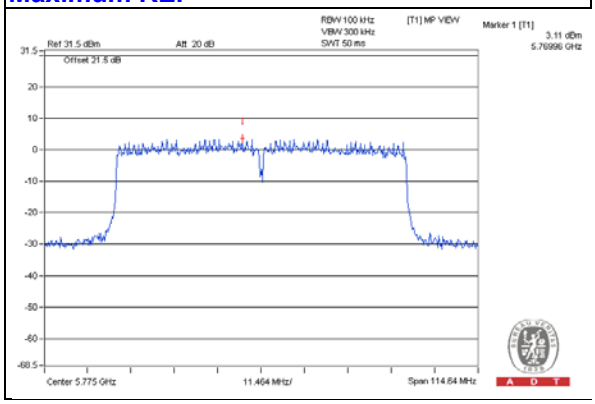


CH 159 Band edge



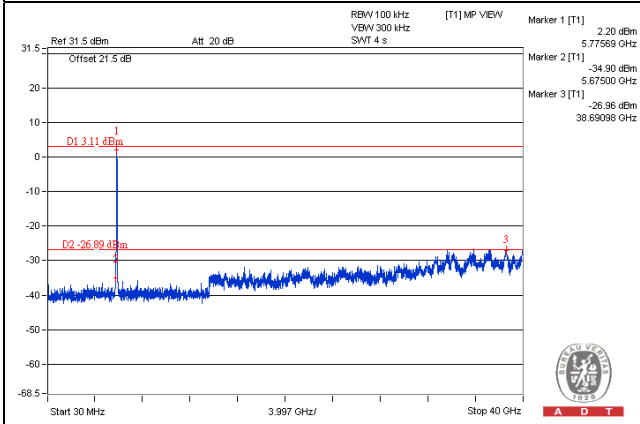
802.11ac (VHT80)

Maximum REF

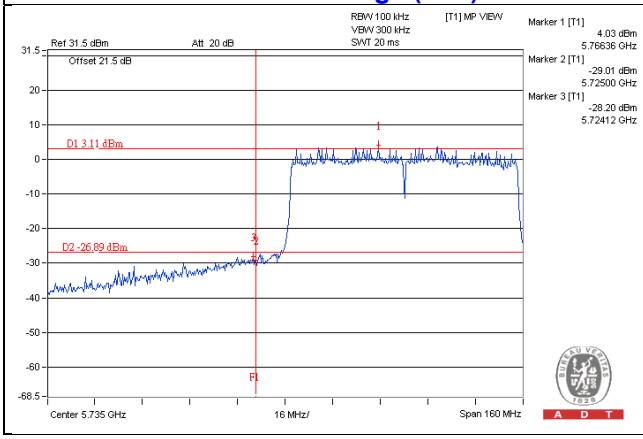


Chain (0)

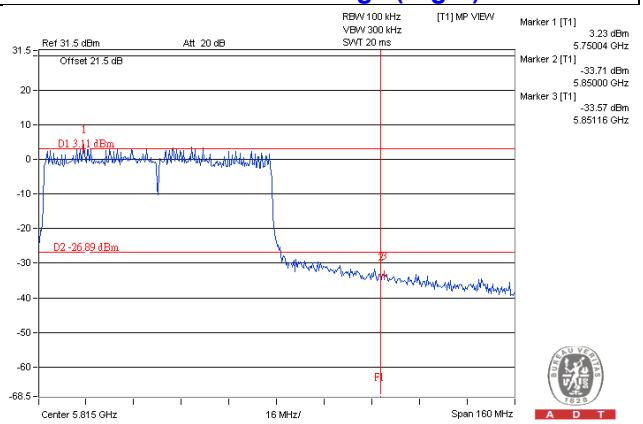
CH 155



CH 155 Band edge (Left)

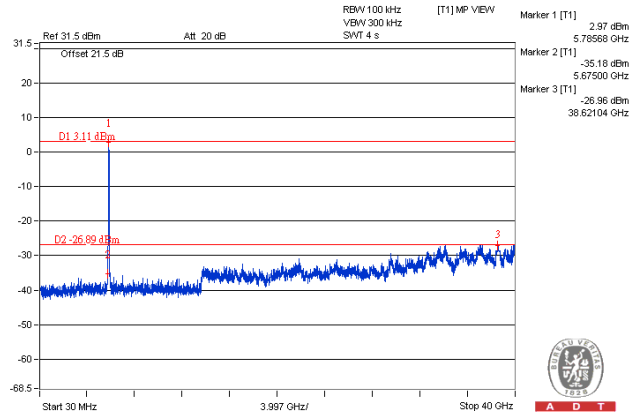


CH 155 Band edge (Right)

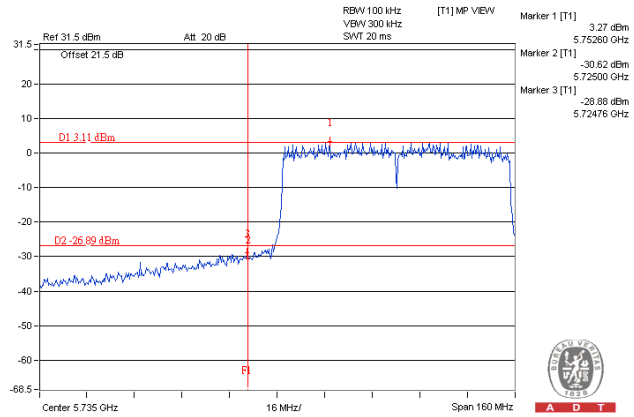


Chain (1)

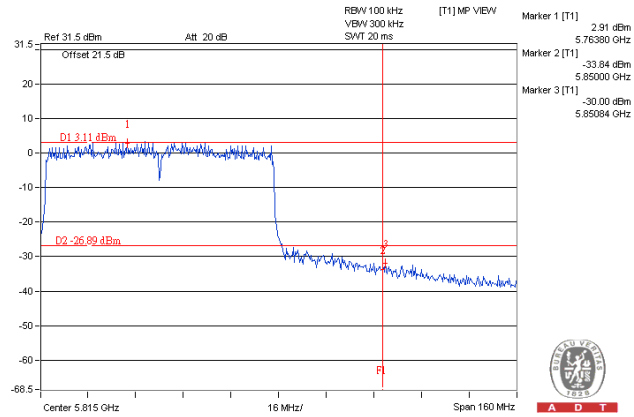
CH 155



CH 155 Band edge (Left)

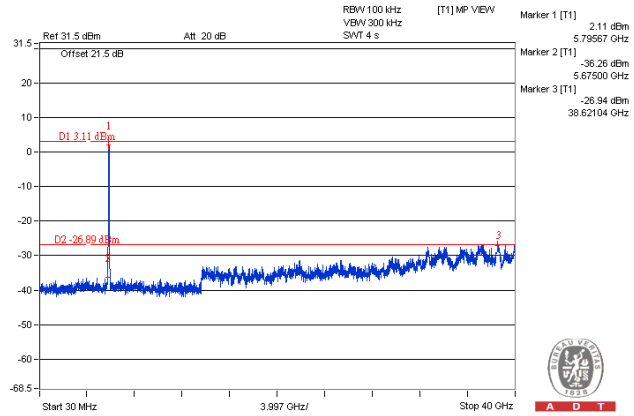


CH 155 Band edge (Right)

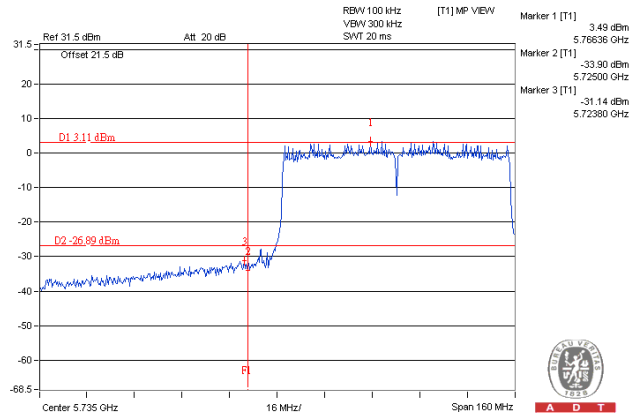


Chain (2)

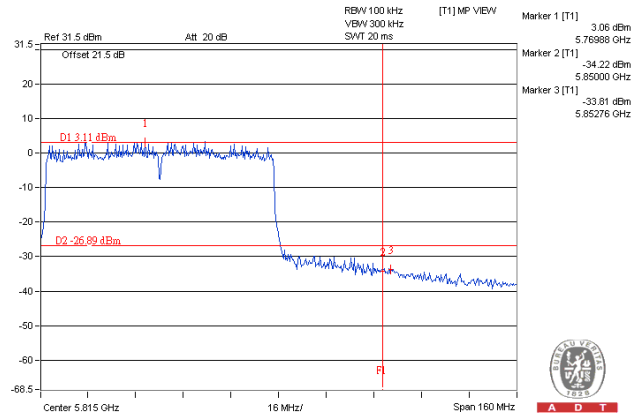
CH 155



CH 155 Band edge (Left)



CH 155 Band edge (Right)



6 Pictures of Test Arrangements

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

Appendix – Information on the Testing Laboratories

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

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

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

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

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