

FCC Test Report (WLAN)

Report No.: RF150107E07-1 R1

FCC ID: PPD-QCNFA364A

Test Model: QCNFA364A

Received Date: Jan. 07, 2015

Test Date: Feb. 06 to 11, 2015

Issued Date: Mar. 18, 2015

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

Issue No.	Description	Date Issued
RF150107E07-1	Original release.	Mar. 04, 2015
RF150107E07-1 R1	Modified the description on section 4.2.1.	Mar. 18, 2015



1 Certificate of Conformity

Product: 802.11a/b/g/n/ac + BT 4.1 M.2 2230 Type Card
Brand: Qualcomm Atheros
Test Model: QCNFA364A
Sample Status: ENGINEERING SAMPLE
Applicant: Qualcomm Atheros, Inc.
Test Date: Feb. 06 to 11, 2015
Standards: 47 CFR FCC Part 15, Subpart E (Section 15.407)
ANSI C63.10:2009

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

Prepared by : Phoenix Huang , **Date:** Mar. 18, 2015
Phoenix Huang / Specialist

Approved by : May Chen , **Date:** Mar. 18, 2015
May Chen / Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (SECTION 15.407 Under New Rule)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -16.90dB at 1.94141MHz.
15.407(b)(1/2/3/4/6)	Radiated Emissions & Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -4.6dB at 499.53MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	PASS	Meet the requirement of limit.
15.407(a)(1/2/3)	Peak Power Spectral Density	PASS	Meet the requirement of limit.
15.407(e)	6dB bandwidth	PASS	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is IPEX not a standard connector.

NOTE: 1. For WLAN: The EUT was operating in 2400 ~ 2483.5MHz, 5.15~5.35GHz, 5.47~5.725GHz and 5.725~5.850GHz frequencies band. This report was recorded the RF parameters including 5.15~5.35GHz, 5.47~5.725GHz and 5.725~5.850GHz. For the 2400 ~ 2483.5MHz RF parameters was recorded in another test report.

2. The DFS report 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	Expanded Uncertainty (k=2) (\pm)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.86 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.43 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 (WLAN)

Product	802.11a/b/g/n/ac + BT 4.1 M.2 2230 Type Card
Brand	Qualcomm Atheros
Test Model	QCNFA364A
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	3.3Vdc form host equipment
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT (20/40) mode in 2.4GHz
Modulation Technology	DSSS,OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n : up to 300Mbps 802.11ac: up to 866.7Mbps
Operating Frequency	For 15.407 5.18 ~ 5.24GHz, 5.26 ~ 5.32GHz, 5.50 ~ 5.72GHz, 5.745 ~ 5.825GHz For 15.247 2.412 ~ 2.472GHz
Number of Channel	For 15.407 25 for 802.11a, 802.11ac (VHT20), 802.11ac (VHT20) 12 for 802.11ac (VHT40), 802.11ac (VHT40) 6 for 802.11ac (VHT80) For 15.247 13 for 802.11b/g, 802.11ac (VHT20), VHT20 9 for 802.11ac (VHT40), VHT40
Output Power	For 15.407 802.11a: 106.283 mW 802.11ac (VHT20): 114.377mW 802.11ac (VHT40): 108.465mW 802.11ac (VHT80): 86.25mW For 15.247 802.11b: 273.536mW 802.11g: 509.97mW VHT20: 503.893mW VHT40: 422.516mW
Antenna Type	See item 3.2
Antenna Connector	See item 3.2
Accessory Device	NA
Data Cable Supplied	NA

Note:

1. There are Bluetooth technology and WLAN technology used for the EUT.
2. The EUT incorporates a 2T2R function.

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

Note: 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 3.3.1)

3. The EUT was pre-tested under the following modes:

Test Mode	Data rate
Mode A	400ns GI
Mode B	800ns GI

From the above modes, the worst case was found in **Mode B**. Therefore only the test data of the mode was recorded in this report.

4. WLAN/BT coexistence mode:

- ◆ 2x2 WLAN + BT:
 - 5GHz 802.11a/an (or 11ac) transmit concurrent with BT.
 - 2.4GHz: timely shared coexistence.

5. The emission (conducted & radiated emission) of the simultaneous operation (WiFi <5GHz> & Bluetooth) have been evaluated and no non-compliance found. The detail combinations of transmitters / frequencies / modes as below table

Mode	Available Channel	Tested Channel	Modulation Technology
5 GHz (802.11ac (VHT40))	38 to 159	159	OFDM
+ Bluetooth (LE)	0 to 39	0	GFSK

6. 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 Antenna

The antenna gain was declared by client; please refer to the following table:

Transmitter Circuit	Brand	Model	Ant. Type	2.4GHz Gain with cable loss (dBi)	5GHz Gain with cable loss (dBi)	2.4GHz Cable Loss (dBi)	5G Cable Loss (dBi)	Connector Type	Cable Length (mm)
Chain (0)	WNC	81-EBJ15.005	PIFA	3.00	Band 1&2: 2.56	1.15	Band 1&2: 1.70	IPEX	300
					Band 3: 4.76		Band 3: 1.74		
					Band 4: 4.76		Band 4: 1.79		
Chain (1)	WNC	81-EBJ15.005	PIFA	3.62	Band 1&2: 3.08	1.15	Band 1&2: 1.70	IPEX	300
					Band 3: 3.31		Band 3: 1.74		
					Band 4: 2.42		Band 4: 1.79		

Note: 1. Above antenna gains of antenna are Total (H+V).

3.3 Description of Test Modes

FOR 5180 ~ 5240MHz

4 channels are provided for 802.11a, 802.11ac (VHT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

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

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210MHz

FOR 5260 ~ 5320MHz

4 channels are provided for 802.11a, 802.11ac (VHT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
52	5260 MHz	60	5300 MHz
56	5280 MHz	64	5320 MHz

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

Channel	Frequency	Channel	Frequency
54	5270 MHz	62	5310 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
58	5290MHz

FOR 5500 ~ 5720MHz

12 channels are provided for 802.11a, 802.11ac (VHT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
100	5500 MHz	124	5620 MHz
104	5520 MHz	128	5640 MHz
108	5540 MHz	132	5660 MHz
112	5560 MHz	136	5680 MHz
116	5580 MHz	140	5700 MHz
120	5600 MHz	144	5720 MHz

6 channels are provided for 802.11ac (VHT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
102	5510 MHz	126	5630 MHz
110	5550 MHz	134	5670 MHz
118	5590 MHz	142	5710 MHz

3 channels are provided for 802.11ac (VHT80):

Channel	Frequency	Channel	Frequency
106	5530MHz	138	5690 MHz
122	5610 MHz		

Note : The listed channels in the DFS band (5250~5350MHz and 5470~5725MHz) are passive scan only.

FOR 5745 ~ 5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

3.3.1 Test Mode Applicability and Tested Channel Detail

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

Where **UE≥1G**: Unwanted Emission above 1GHz **UE<1G**: Unwanted Emission below 1GHz
PLC: Power Line Conducted Emission **APCM**: Antenna Port Conducted Measurement

Unwanted 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.

MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	DATA RATE (Mbps)
802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6
802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	6.5
802.11ac (VHT40)		38 to 46	38, 46	OFDM	13.5
802.11ac (VHT80)		42	42	OFDM	29.3
802.11a	5260-5320	52 to 64	52, 60, 64	OFDM	6
802.11ac (VHT20)		52 to 64	52, 60, 64	OFDM	6.5
802.11ac (VHT40)		54 to 62	54, 62	OFDM	13.5
802.11ac (VHT80)		58	58	OFDM	29.3
802.11a	5500-5720	100 to 144	100, 120, 140, 144	OFDM	6
802.11ac (VHT20)		100 to 144	100, 120, 140, 144	OFDM	6.5
802.11ac (VHT40)		102 to 142	102, 118, 134, 142	OFDM	13.5
802.11ac (VHT80)		106 to 138	106, 122, 138	OFDM	29.3
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6
802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	6.5
802.11ac (VHT40)		151 to 159	151, 159	OFDM	13.5
802.11ac (VHT80)		155	155	OFDM	29.3

Unwanted 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.

MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	DATA RATE (Mbps)
802.11ac (VHT40)	5745-5825	151 to 159	159	OFDM	13.5

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.

MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	DATA RATE (Mbps)
802.11ac (VHT40)	5745-5825	151 to 159	159	OFDM	13.5

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.

MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	DATA RATE (Mbps)
802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6
802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	6.5
802.11ac (VHT40)		38 to 46	38, 46	OFDM	13.5
802.11ac (VHT80)		42	42	OFDM	29.3
802.11a	5260-5320	52 to 64	52, 60, 64	OFDM	6
802.11ac (VHT20)		52 to 64	52, 60, 64	OFDM	6.5
802.11ac (VHT40)		54 to 62	54, 62	OFDM	13.5
802.11ac (VHT80)		58	58	OFDM	29.3
802.11a	5500-5720	100 to 144	100, 120, 140, 144	OFDM	6
802.11ac (VHT20)		100 to 144	100, 120, 140, 144	OFDM	6.5
802.11ac (VHT40)		102 to 142	102, 118, 134, 142	OFDM	13.5
802.11ac (VHT80)		106 to 138	106, 122, 138	OFDM	29.3
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6
802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	6.5
802.11ac (VHT40)		151 to 159	151, 159	OFDM	13.5
802.11ac (VHT80)		155	155	OFDM	29.3

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
UE≥1G	22deg. C, 67%RH	120Vac, 60Hz	Robert Cheng
	24deg. C, 67%RH	120Vac, 60Hz	Gary Cheng
UE<1G	24deg. C, 68%RH	120Vac, 60Hz	Tim Ho
PLC	20deg. C, 60%RH	120Vac, 60Hz	Barry Lee
APCM	15deg. C, 57%RH	120Vac, 60Hz	Anderson Chen

3.4 Duty Cycle of Test Signal

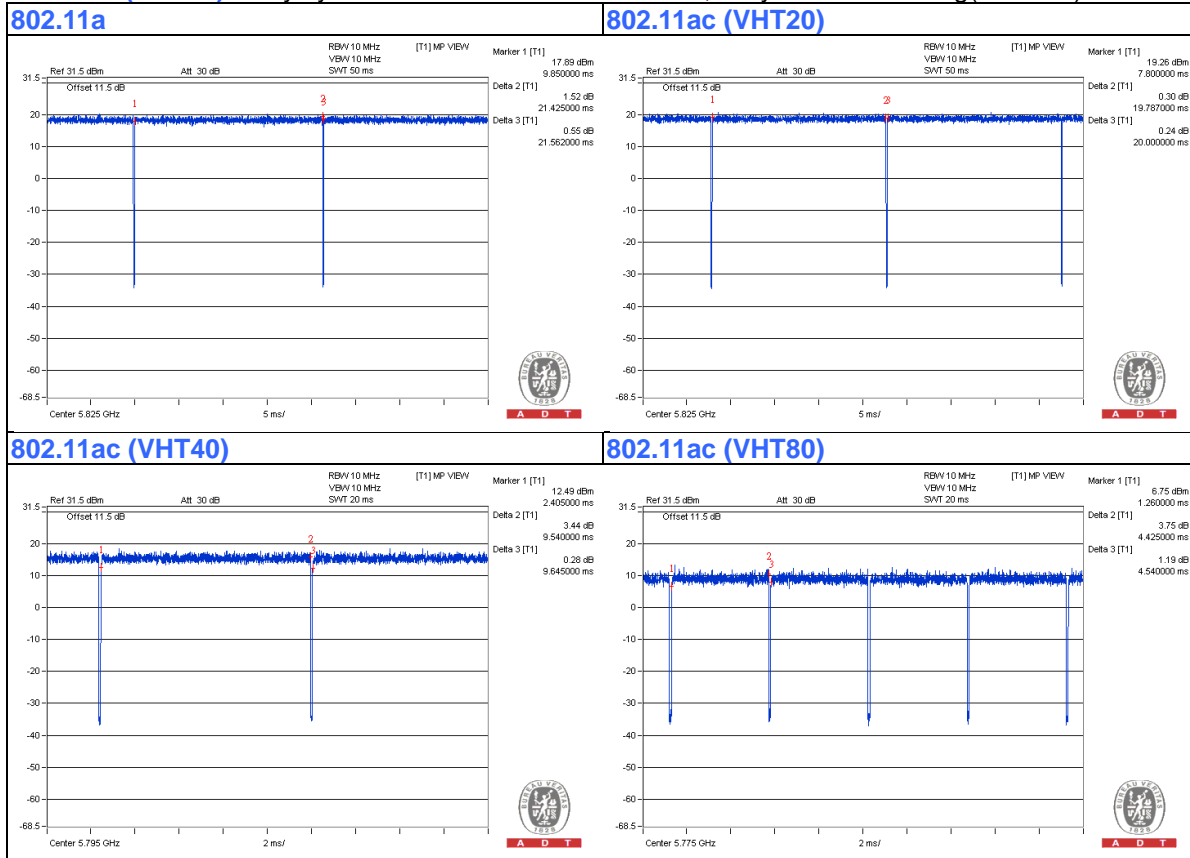
If duty cycle of test signal is $\geq 98\%$, duty factor is not required.
 If duty cycle of test signal is $< 98\%$, duty factor shall be considered.

802.11a: Duty cycle = 21.425 ms/21.562 ms = 0.994

802.11ac (VHT20): Duty cycle = 19.787 ms/20 ms = 0.989

802.11ac (VHT40): Duty cycle = 9.54 ms/9.645 ms = 0.989

802.11ac (VHT80): Duty cycle = 4.425 ms/4.54 ms = 0.975, Duty factor = $10 * \log(1/0.975) = 0.11$



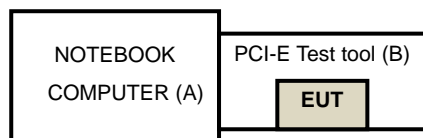
3.5 Description of Support Units

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

No.	Product	Brand	Model No.	Serial No.	FCC ID	Remark
A	NOTEBOOK COMPUTER	DELL	E5430	4YV4VY1	FCC DoC	Provided by Lab
B	PCI-E Test tool	Qualcomm Atheros	NA	NA	NA	Supplied by Client

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

3.5.1 Configuration of System under Test





3.6 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 E (15.407)

789033 D02 General UNII Test Procedures New Rules v01

662911 D01 Multiple Transmitter Output v02r01

644545 D03 Guidance for IEEE 802.11ac v01

ANSI C63.10-2009

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

4 Test Types and Results

4.1 Transmit Power Measurement

4.1.1 Limits of Transmit Power Measurement

Operation Band	EUT Category		LIMIT
U-NII-1		Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p \leq 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
		Fixed point-to-point Access Point	1 Watt (30 dBm)
		Indoor Access Point	1 Watt (30 dBm)
	√	Mobile and Portable client device	250mW (24 dBm)
U-NII-2A		√	250mW (24 dBm) or 11 dBm+10 log B*
U-NII-2C		√	250mW (24 dBm) or 11 dBm+10 log B*
U-NII-3		√	1 Watt (30 dBm)

Note: *B is the 26 dB emission bandwidth in megahertz

Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

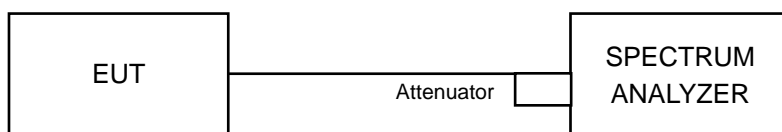
Array Gain = $5 \log(N_{ANT}/N_{SS})$ dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

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

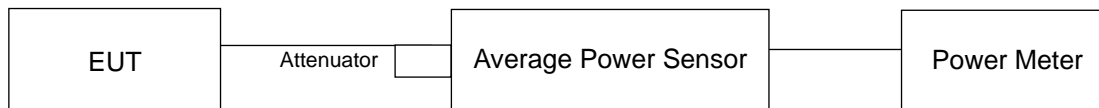
4.1.2 Test Setup

FOR POWER OUTPUT MEASUREMENT

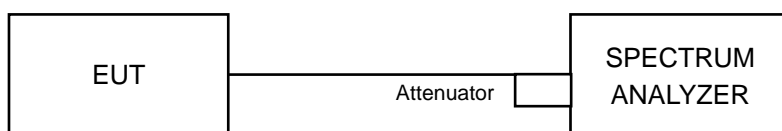
For channel straddling 5725MHz:



For other channels:



FOR 26dB OCCUPIED BANDWIDTH



4.1.3 Test Instruments

FOR POWER OUTPUT MEASUREMENT

For channel straddling 5725MHz:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSP 40	100060	May 08, 2014	May 07, 2015

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date :Feb. 09, 2015

For other channels:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power Meter Anritsu	ML2495A	1014008	Apr. 30, 2014	Apr. 29, 2015
Power Sensor Anritsu	MA2411B	0917122	Apr. 30, 2014	Apr. 29, 2015

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Feb. 09, 2015

FOR 26dB OCCUPIED BANDWIDTH

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSP 40	100060	May 08, 2014	May 07, 2015

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date :Feb. 09, 2015

4.1.4 Test Procedures

FOR AVERAGE POWER MEASUREMENT

For channel straddling 5725MHz:

Follow FCC KDB 789033 UNII test procedure:

802.11ac (VHT80)

Method SA-2

1. Set span to encompass the emission bandwidth (EBW) of the signal.
2. Set RBW =1MHz.
3. Set the VBW $\geq 3 \times$ RBW.
4. Number of points in sweep ≥ 2 Span / RBW.
5. Sweep time = auto.
6. Detector = RMS.
7. Trace average at least 100 traces in power averaging mode
8. Compute power by integrating the spectrum across the 26 dB EBW of the signal.
9. Duty factor need added to measured value (duty cycle < 98 percent).

Other Modulation mode

Method SA-1

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW =1MHz.
3. Set the VBW $\geq 3 \times$ RBW.
4. Number of points in sweep ≥ 2 Span / RBW.
5. Sweep time = auto.
6. Set trigger to free run (duty cycle ≥ 98 percent) ; Set video trigger (duty cycle < 98 percent)
7. Detector = RMS.
8. Trace average at least 100 traces in power averaging mode
9. Compute power by integrating the spectrum across the 26 dB EBW of the signal.

For other channels:

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

FOR 26dB OCCUPIED BANDWIDTH

1. Set RBW = approximately 1% of the emission bandwidth.
2. Set the VBW > RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

4.1.5 Deviation from Test Standard

No deviation.

4.1.6 EUT Operating Conditions

The software (QCART Version: 3.0.33.0) provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.1.7 Test Results

802.11a

POWER OUTPUT

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	17.53	16.51	101.395	20.06	23.91	Pass
40	5200	17.51	16.59	101.968	20.08	23.91	Pass
48	5240	17.69	16.77	106.283	20.26	23.91	Pass
52	5260	17.28	16.61	99.27	19.97	23.91	Pass
60	5300	17.35	16.49	98.891	19.95	23.91	Pass
64	5320	15.72	14.66	66.567	18.23	23.81	Pass
100	5500	15.40	14.16	60.736	17.83	22.07	Pass
120	5600	17.22	16.23	94.699	19.76	22.15	Pass
140	5700	14.63	14.05	54.45	17.36	22.11	Pass
*144 (UNII-2c Band)	5720	12.95	12.51	37.548	15.75	21.25	Pass
*144 (UNII-3 Band)	5720	5.79	5.22	7.12	8.52	28.23	Pass
149	5745	16.44	15.43	78.969	18.97	28.23	Pass
157	5785	17.11	16.36	94.655	19.76	28.23	Pass
165	5825	17.20	16.27	94.845	19.77	28.23	Pass

* Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-1 and use spectrum analyzer test.

The Total Power for the straddle channel:

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
*144	5720	44.668	16.50

Note: The total power was calculated through formula and record the value for reference only.

Note:

5150~5250MHz: Directional gain = $3.08\text{dBi} + 10\log(2) = 6.09\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $24-(6.09-6)$.

5250~5350MHz: Directional gain = $3.08\text{dBi} + 10\log(2) = 6.09\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to "Determined Conducted Limit-(6.09-6)".

5470~5725MHz: Directional gain = $4.76\text{dBi} + 10\log(2) = 7.77\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to "Determined Conducted Limit-(7.77-6)".

5725~5850MHz: Directional gain = $4.76\text{dBi} + 10\log(2) = 7.77\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to "Determined Conducted Limit-(7.77-6)".

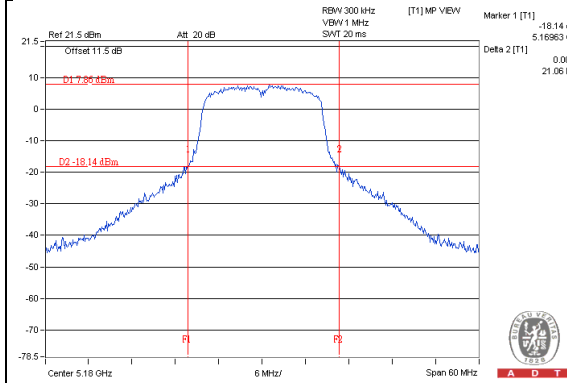
26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	21.06	20.13
40	5200	21.85	20.11
48	5240	20.63	20.64
52	5260	20.27	20.71
60	5300	20.46	20.96
64	5320	19.85	19.52
100	5500	20.05	19.25
120	5600	21.33	19.60
140	5700	19.69	19.43
144 (UNII-2c Band)	5720	16.49	15.93

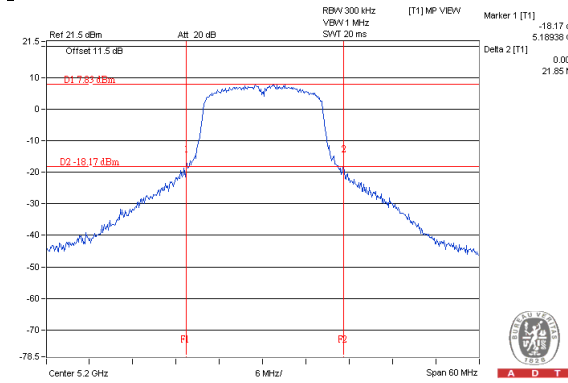
Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
52	5260	20.27	24.06 > 24
60	5300	20.46	24.1 > 24
64	5320	19.52	23.9 < 24
100	5500	19.25	23.84 < 24
120	5600	19.60	23.92 < 24
140	5700	19.43	23.88 < 24
144 (UNII-2c Band)	5720	15.93	23.02 < 24

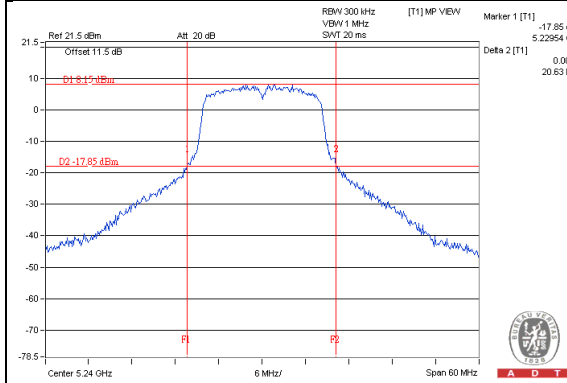
Chain 0 / CH36



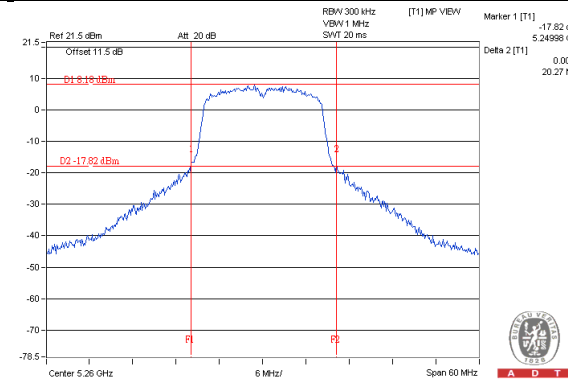
Chain 0 / CH40



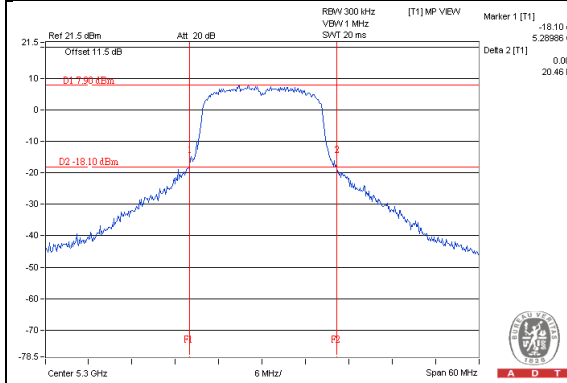
Chain 0 / CH48



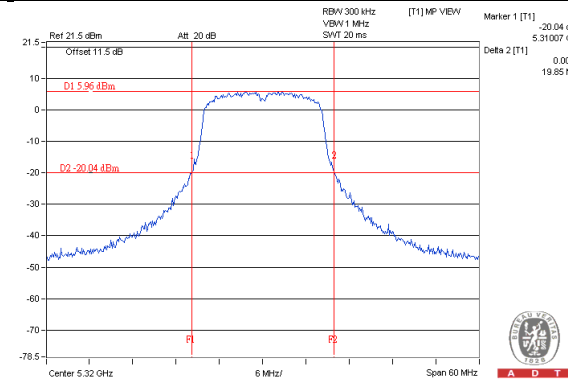
Chain 0 / CH52



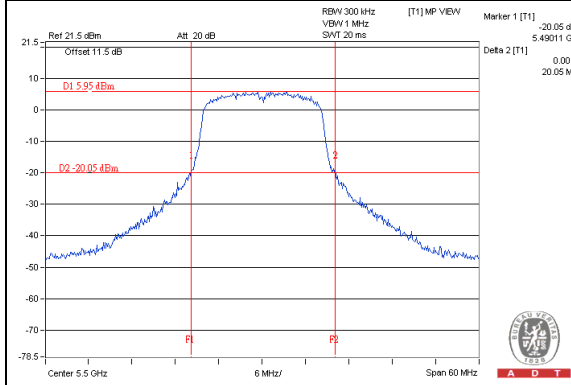
Chain 0 / CH60



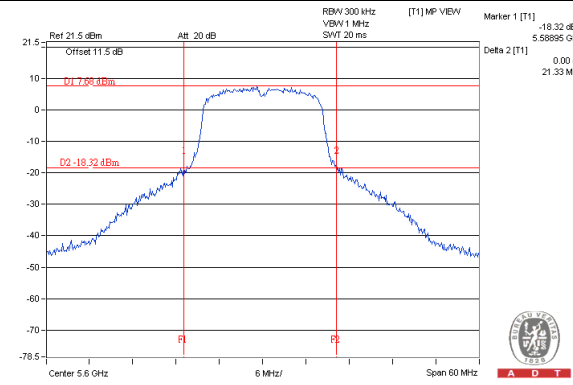
Chain 0 / CH64



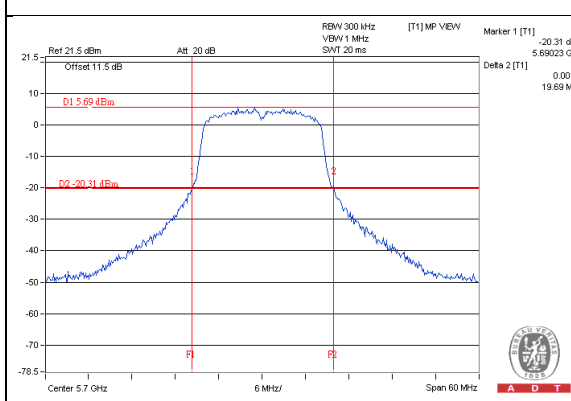
Chain 0 / CH100



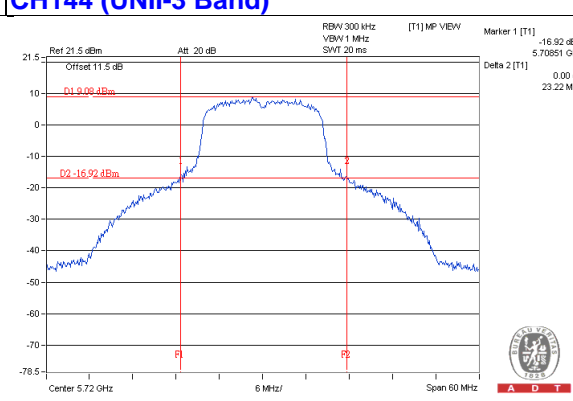
Chain 0 / CH120



Chain 0 / CH140



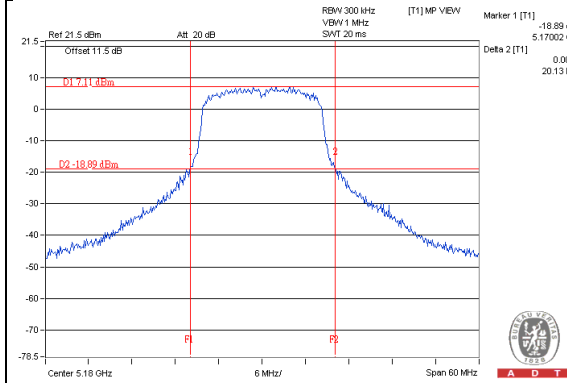
Chain 0 / CH144 (UNII-2c Band) / Chain 0 / CH144 (UNII-3 Band)



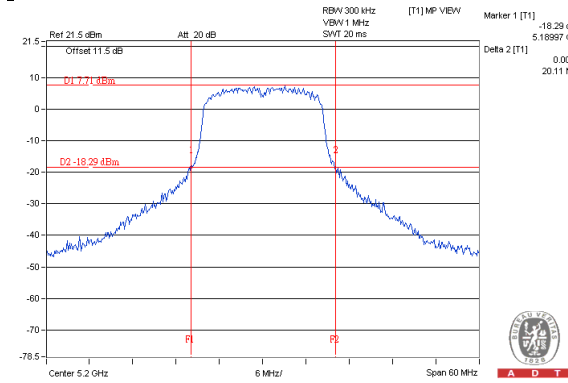
NOTE:

For CH144 (UNII-2c Band) = 5725MHz - Marker 1

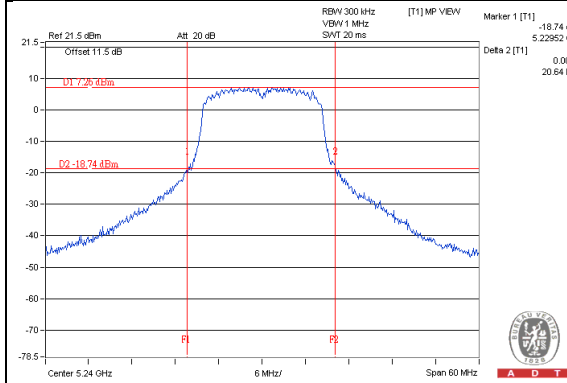
Chain 1 / CH36



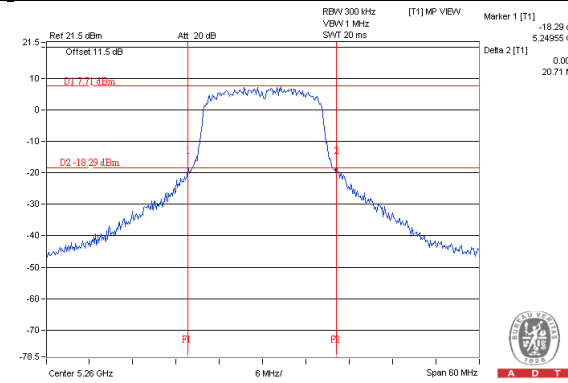
Chain 1 / CH40



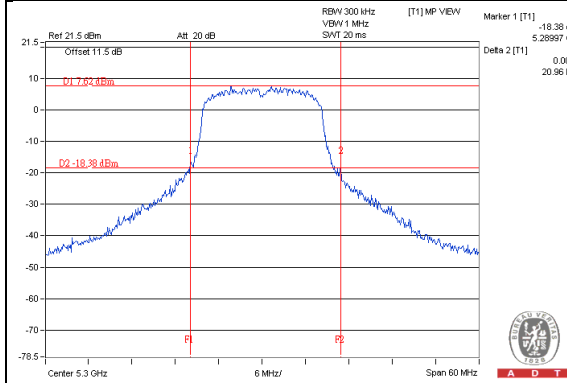
Chain 1 / CH48



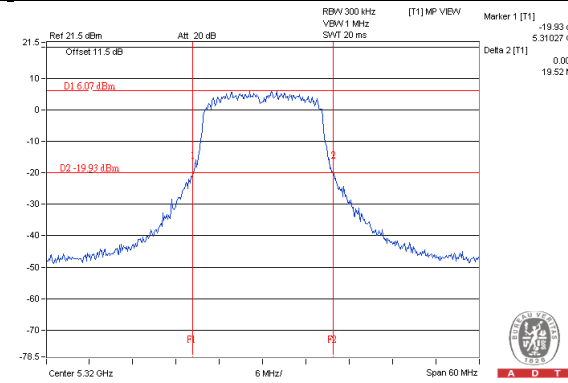
Chain 1 / CH52



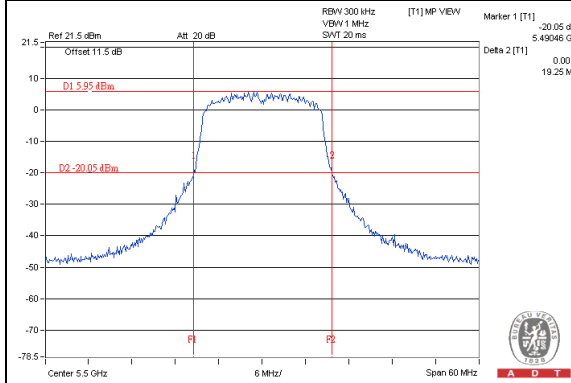
Chain 1 / CH60



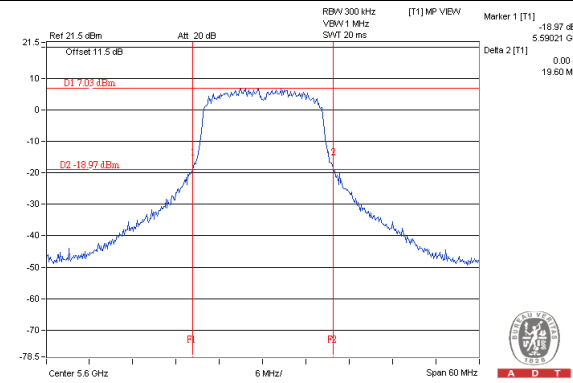
Chain 1 / CH64



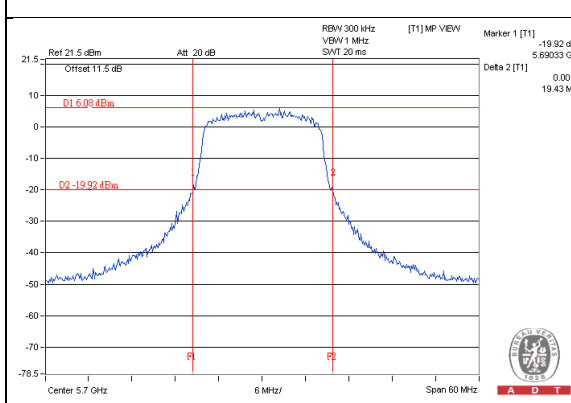
Chain 1 / CH100



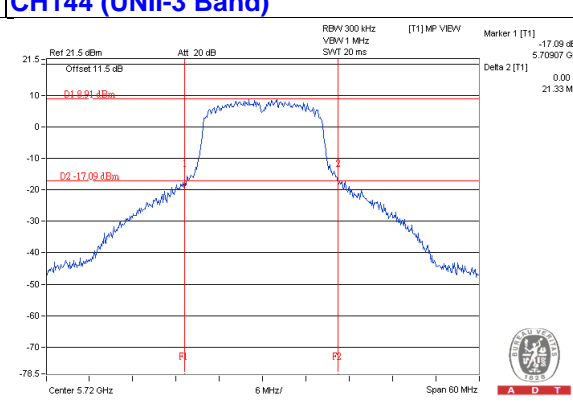
Chain 1 / CH120



Chain 1 / CH140



Chain 1 / CH144 (UNII-2c Band) / Chain 1 / CH144 (UNII-3 Band)



NOTE:

For CH144 (UNII-2c Band) = 5725MHz - Marker 1



For Reference only – Power meter value

The power value was measured by power meter with average sensor.

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
144	5720	17.89	17.40	116.472	20.66

Note: The total power was calculated through formula and record the value for reference only.

802.11ac (VHT20)
POWER OUTPUT

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	17.14	17.02	102.111	20.09	23.91	Pass
40	5200	17.85	17.11	112.358	20.51	23.91	Pass
48	5240	17.83	17.30	114.377	20.58	23.91	Pass
52	5260	17.77	17.16	111.841	20.49	23.91	Pass
60	5300	17.88	17.14	113.137	20.54	23.91	Pass
64	5320	15.33	14.42	61.788	17.91	23.91	Pass
100	5500	15.89	14.95	70.076	18.46	22.23	Pass
120	5600	17.62	16.61	103.624	20.15	22.23	Pass
140	5700	14.47	13.91	52.594	17.21	22.23	Pass
*144 (UNII-2c Band)	5720	12.72	12.37	35.965	15.56	21.24	Pass
*144 (UNII-3 Band)	5720	5.93	5.44	7.416	8.70	28.23	Pass
149	5745	15.89	15.45	73.89	18.69	28.23	Pass
157	5785	17.44	16.95	105.008	20.21	28.23	Pass
165	5825	17.54	16.65	102.992	20.13	28.23	Pass

* Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-1 and use spectrum analyzer test.

The Total Power for the straddle channel:

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
*144	5720	43.381	16.37

Note: The total power was calculated through formula and record the value for reference only.

Note:

- 5150~5250MHz: Directional gain = $3.08\text{dBi} + 10\log(2) = 6.09\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $24-(6.09-6)$.
- 5250~5350MHz: Directional gain = $3.08\text{dBi} + 10\log(2) = 6.09\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to "Determined Conducted Limit-(6.09-6)".
- 5470~5725MHz: Directional gain = $4.76\text{dBi} + 10\log(2) = 7.77\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to "Determined Conducted Limit-(7.77-6)".
- 5725~5850MHz: Directional gain = $4.76\text{dBi} + 10\log(2) = 7.77\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to "Determined Conducted Limit-(7.77-6)".

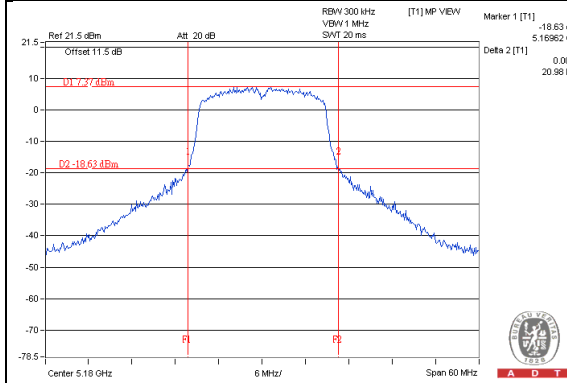
26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	20.98	20.92
40	5200	21.77	22.04
48	5240	21.90	21.74
52	5260	22.72	21.34
60	5300	22.08	21.41
64	5320	20.51	20.20
100	5500	21.34	20.30
120	5600	23.58	20.85
140	5700	20.61	20.71
144 (UNII-2c Band)	5720	17.73	15.90

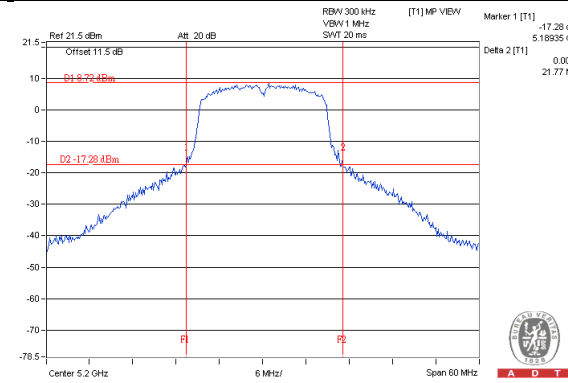
Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
52	5260	21.34	24.29 > 24
60	5300	21.41	24.3 > 24
64	5320	20.20	24.05 > 24
100	5500	20.30	24.07 > 24
120	5600	20.85	24.19 > 24
140	5700	20.61	24.14 > 24
144 (UNII-2c Band)	5720	15.90	23.01 < 24

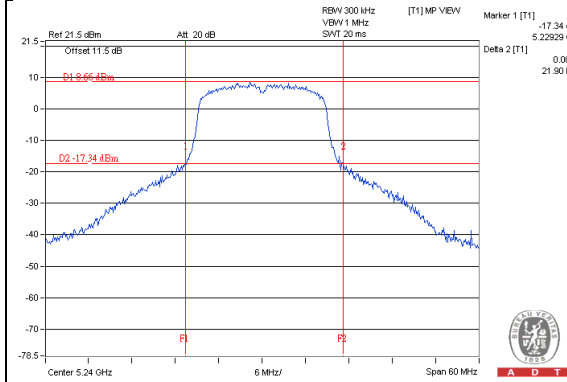
Chain 0 / CH36



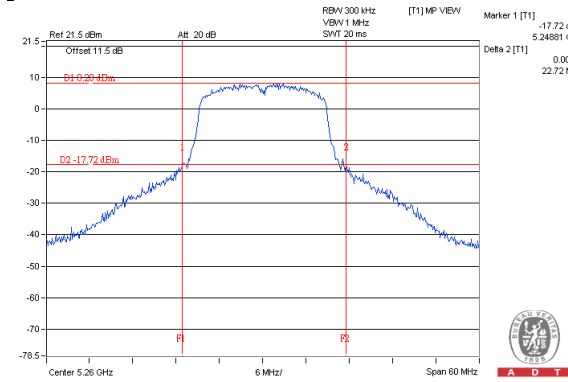
Chain 0 / CH40



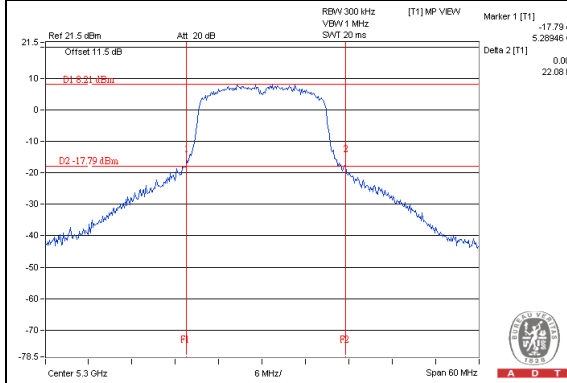
Chain 0 / CH48



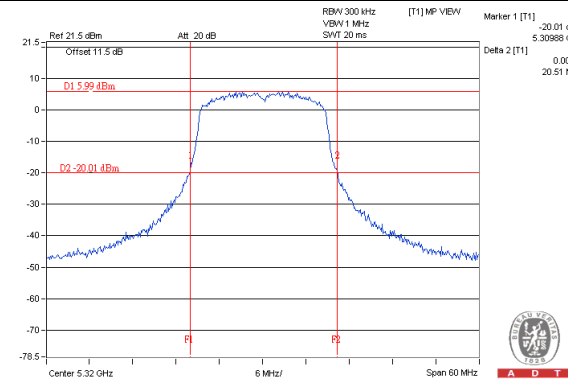
Chain 0 / CH52



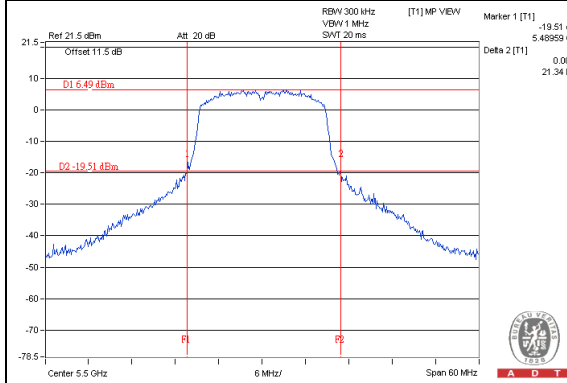
Chain 0 / CH60



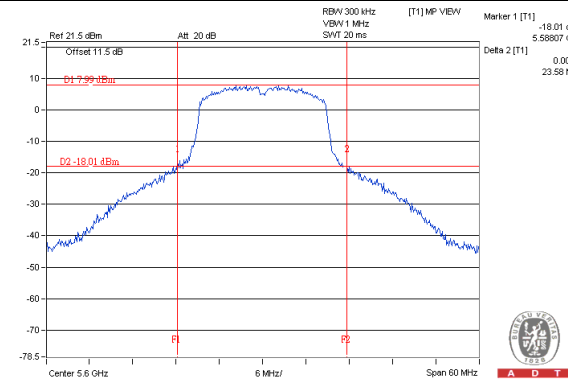
Chain 0 / CH64



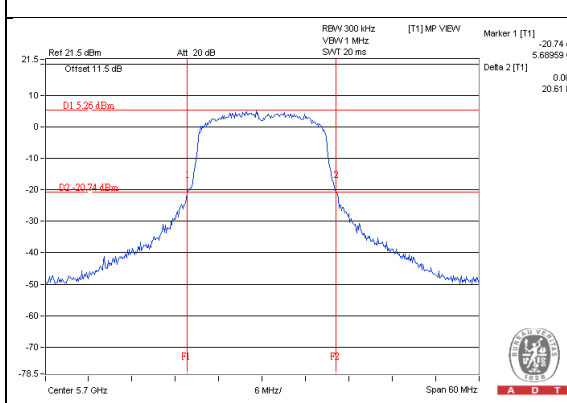
Chain 0 / CH100



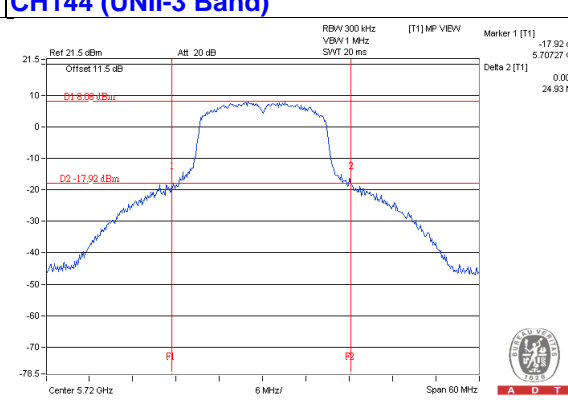
Chain 0 / CH120



Chain 0 / CH140



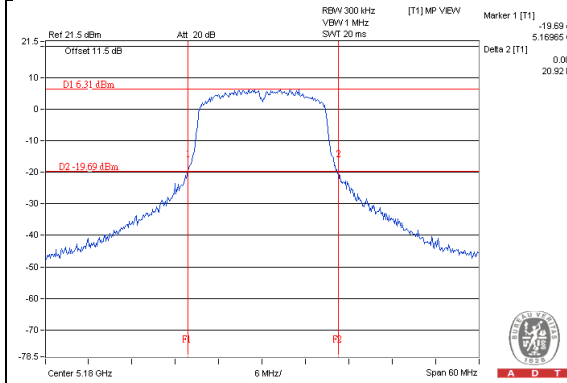
Chain 0 / CH144 (UNII-2c Band) / Chain 0 / CH144 (UNII-3 Band)



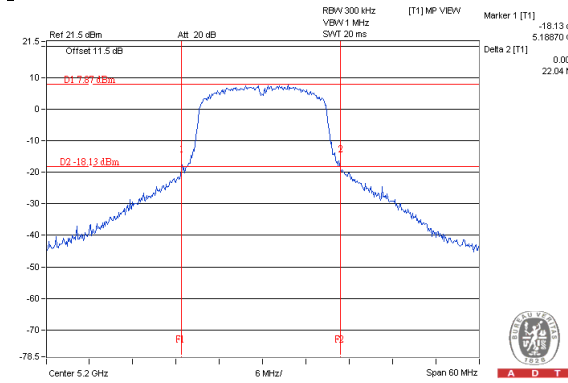
NOTE:

For CH144 (UNII-2c Band) = 5725MHz - Marker 1

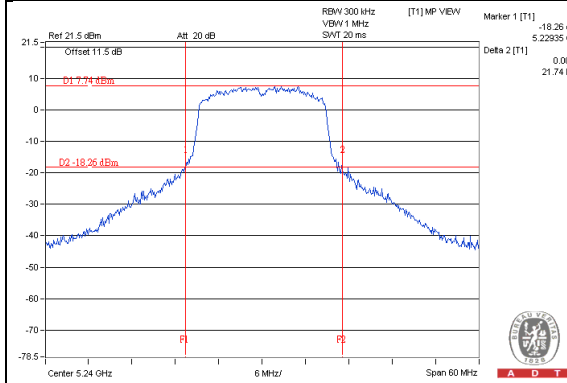
Chain 1 / CH36



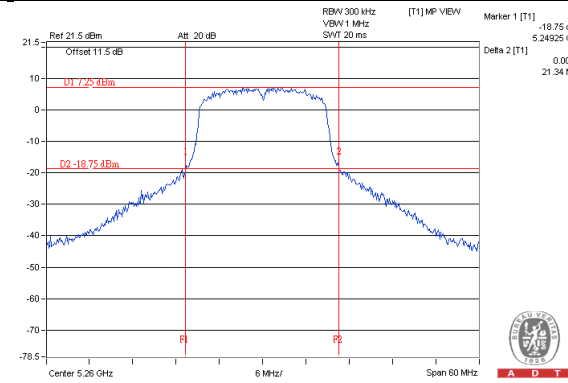
Chain 1 / CH40



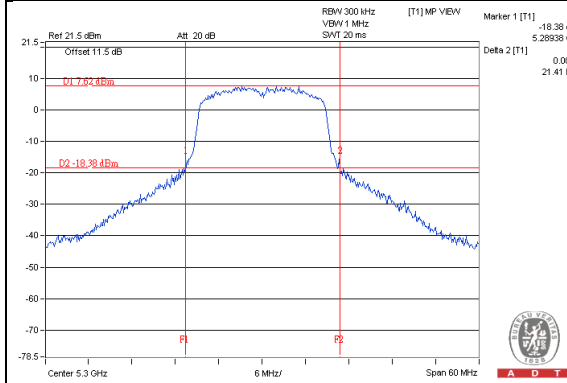
Chain 1 / CH48



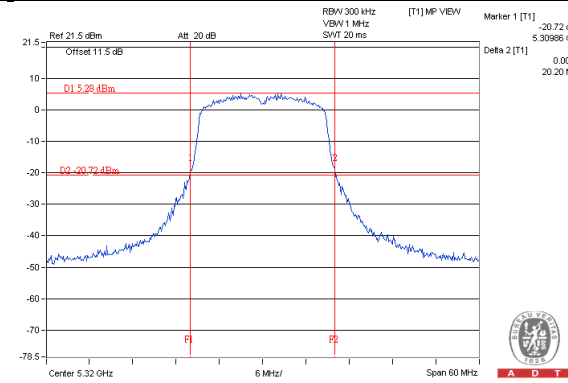
Chain 1 / CH52



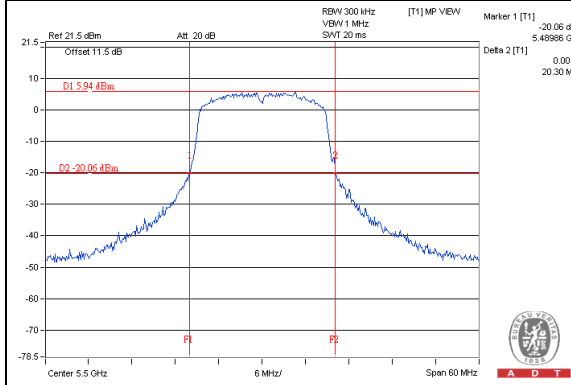
Chain 1 / CH60



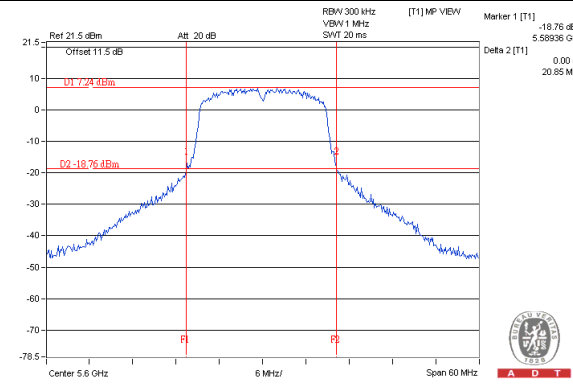
Chain 1 / CH64



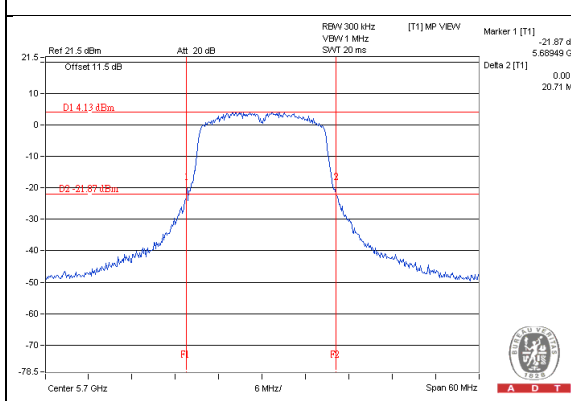
Chain 1 / CH100



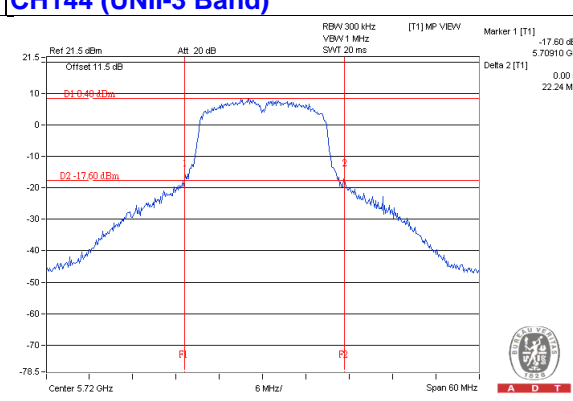
Chain 1 / CH120



Chain 1 / CH140



Chain 1 / CH144 (UNII-2c Band) / Chain 1 / CH144 (UNII-3 Band)



NOTE:

For CH144 (UNII-2c Band) = 5725MHz - Marker 1



For Reference only – Power meter value

The power value was measured by power meter with average sensor.

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
144	5720	17.98	17.28	116.262	20.65

Note: The total power was calculated through formula and record the value for reference only.

802.11ac (VHT40)
POWER OUTPUT

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	14.35	13.25	48.362	16.85	23.91	Pass
46	5230	17.21	16.34	95.655	19.81	23.91	Pass
54	5270	17.24	16.38	96.417	19.84	23.91	Pass
62	5310	15.21	14.37	60.542	17.82	23.91	Pass
102	5510	15.15	14.99	64.284	18.08	22.23	Pass
118	5590	17.50	16.65	102.472	20.11	22.23	Pass
134	5670	17.10	16.75	98.601	19.94	22.23	Pass
*142 (UNII-2c Band)	5710	12.88	12.78	38.376	15.84	22.23	Pass
*142 (UNII-3 Band)	5710	0.93	0.07	2.255	3.53	28.23	Pass
151	5755	14.49	13.41	50.047	16.99	28.23	Pass
159	5795	17.49	17.19	108.465	20.35	28.23	Pass

* Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-1 and use spectrum analyzer test.

The Total Power for the straddle channel:

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
*142	5710	40.631	16.09

Note: The total power was calculated through formula and record the value for reference only.

Note:

- 5150~5250MHz: Directional gain = $3.08\text{dBi} + 10\log(2) = 6.09\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $24-(6.09-6)$.
- 5250~5350MHz: Directional gain = $3.08\text{dBi} + 10\log(2) = 6.09\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to "Determined Conducted Limit-(6.09-6)".
- 5470~5725MHz: Directional gain = $4.76\text{dBi} + 10\log(2) = 7.77\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to "Determined Conducted Limit-(7.77-6)".
- 5725~5850MHz: Directional gain = $4.76\text{dBi} + 10\log(2) = 7.77\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to "Determined Conducted Limit-(7.77-6)".

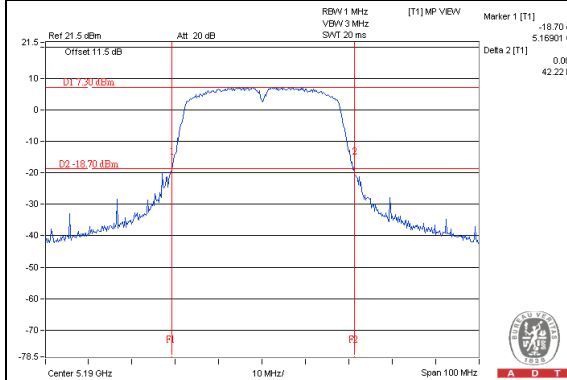
26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	42.22	42.05
46	5230	43.06	42.01
54	5270	43.34	42.44
62	5310	42.02	41.70
102	5510	42.20	41.64
118	5590	48.56	42.60
134	5670	42.99	42.37
142 (UNII-2c Band)	5710	40.20	36.74

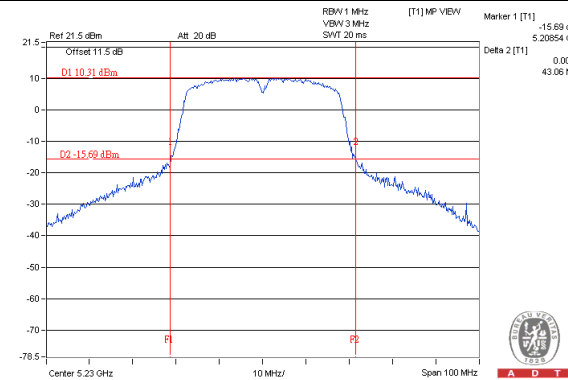
Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
54	5270	42.44	27.27 > 24
62	5310	41.70	27.2 > 24
102	5510	41.64	27.19 > 24
110	5550	42.60	27.29 > 24
134	5670	42.37	27.27 > 24
142 (UNII-2c Band)	5710	36.74	26.65 > 24

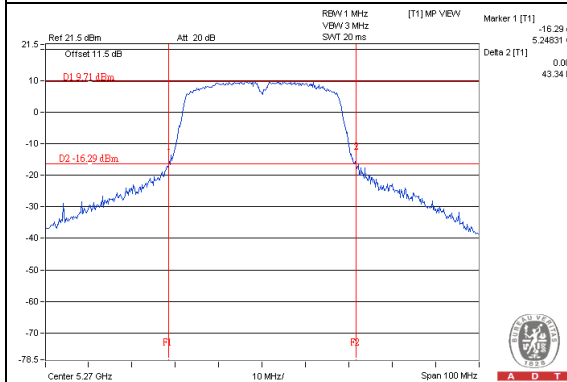
Chain 0 / CH38



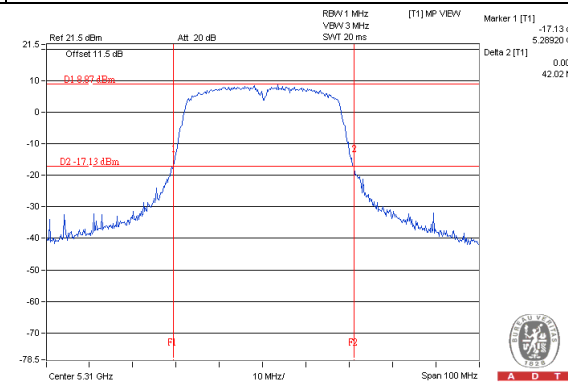
Chain 0 / CH46



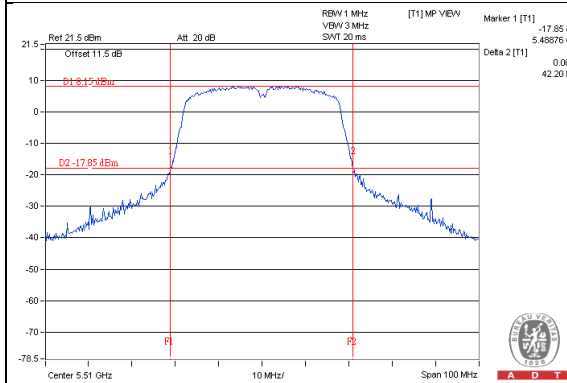
Chain 0 / CH54



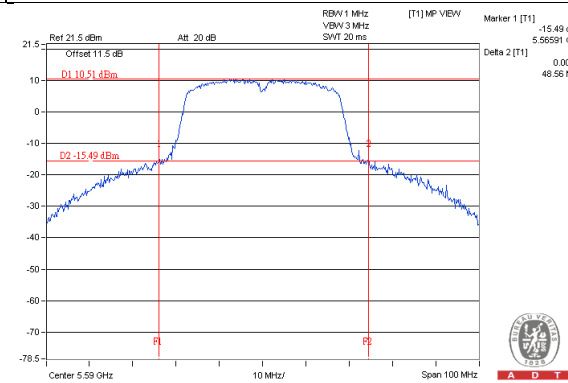
Chain 0 / CH62



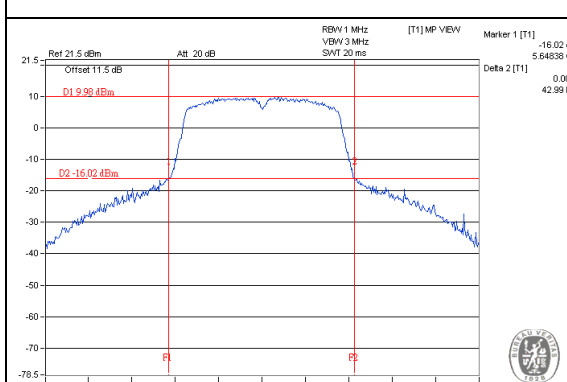
Chain 0 / CH102



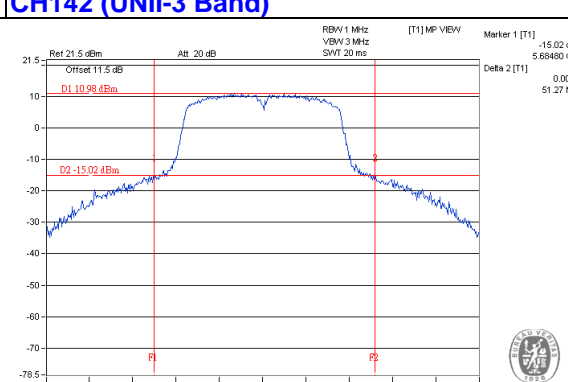
Chain 0 / CH118



Chain 0 / CH134

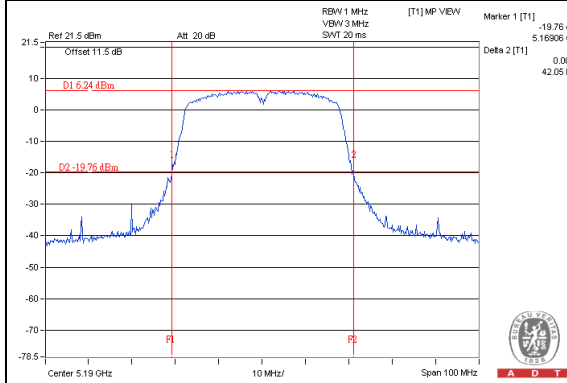
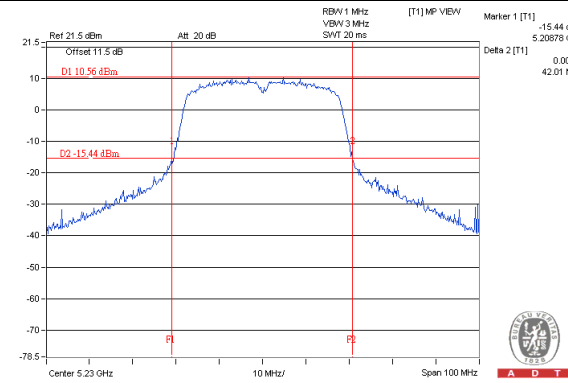
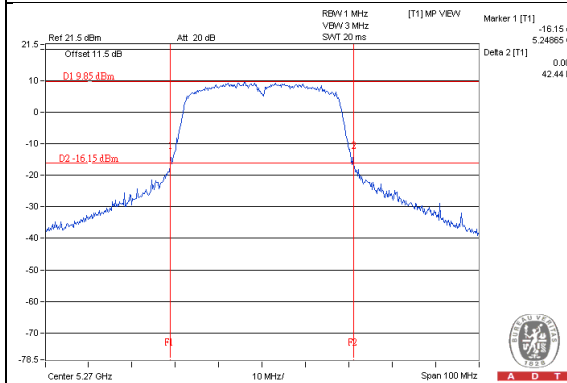
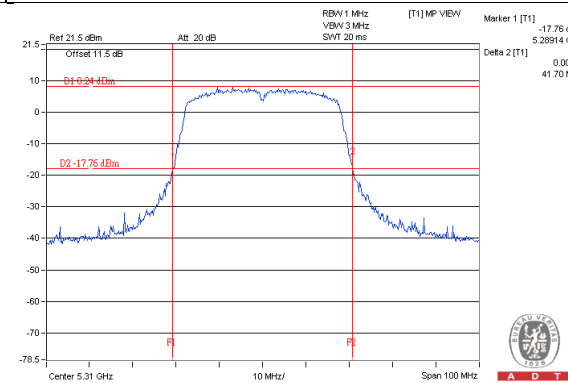
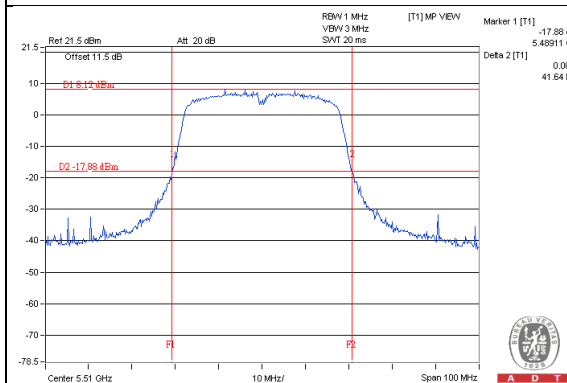
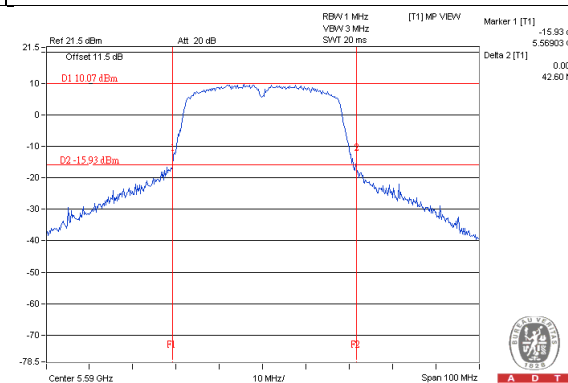
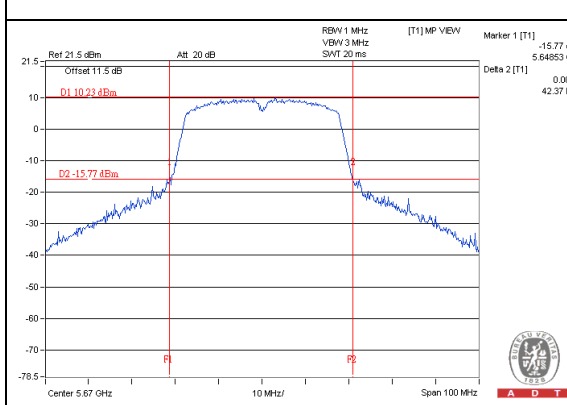
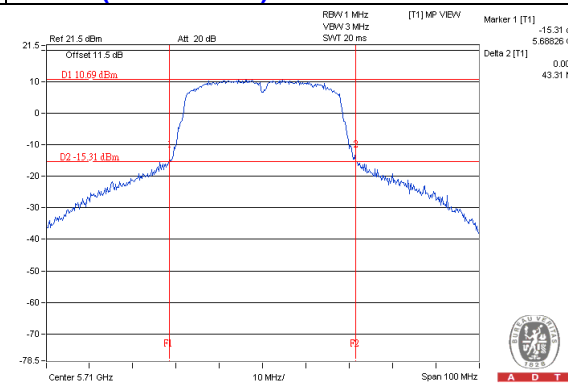


Chain 0 / CH142 (UNII-2c Band) / Chain 0 / CH142 (UNII-3 Band)



NOTE:

For CH142 (UNII-2c Band) = 5725MHz - Marker 1

Chain 1 / CH38

Chain 1 / CH46

Chain 1 / CH54

Chain 1 / CH62

Chain 1 / CH102

Chain 1 / CH118

Chain 1 / CH134

Chain 1 / CH142 (UNII-2c Band) / Chain 1 / CH142 (UNII-3 Band)

NOTE:

For CH142 (UNII-2c Band) = 5725MHz - Marker 1



For Reference only – Power meter value

The power value was measured by power meter with average sensor.

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
142	5710	17.88	17.23	114.221	20.58

Note: The total power was calculated through formula and record the value for reference only.

802.11ac (VHT80)
POWER OUTPUT

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	13.71	12.52	41.361	16.17	23.91	Pass
58	5290	12.16	11.60	30.898	14.90	23.91	Pass
106	5530	12.53	12.06	33.975	15.31	22.23	Pass
122	5610	16.88	15.74	86.25	19.36	22.23	Pass
*138 (UNII-2c Band)	5690	11.16	10.78	25.671	14.09	22.23	Pass
*138 (UNII-3 Band)	5690	-4.53	-5.79	0.632	-1.99	28.23	Pass
155	5775	14.44	13.38	49.574	16.95	28.23	Pass

* Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-2 and use spectrum analyzer test.

The Total Power for the straddle channel:

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
138	5690	26.303	14.20

Note: The total power was calculated through formula and record the value for reference only.

Note:

5150~5250MHz: Directional gain = $3.08\text{dBi} + 10\log(2) = 6.09\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $24-(6.09-6)$.

5250~5350MHz: Directional gain = $3.08\text{dBi} + 10\log(2) = 6.09\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to "Determined Conducted Limit-(6.09-6)".

5470~5725MHz: Directional gain = $4.76\text{dBi} + 10\log(2) = 7.77\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to "Determined Conducted Limit-(7.77-6)".

5725~5850MHz: Directional gain = $4.76\text{dBi} + 10\log(2) = 7.77\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to "Determined Conducted Limit-(7.77-6)".

For CH138: Total power (dBm)= Average power <Chain 0 +1>(dBm) + Duty Factor (0.11dB)

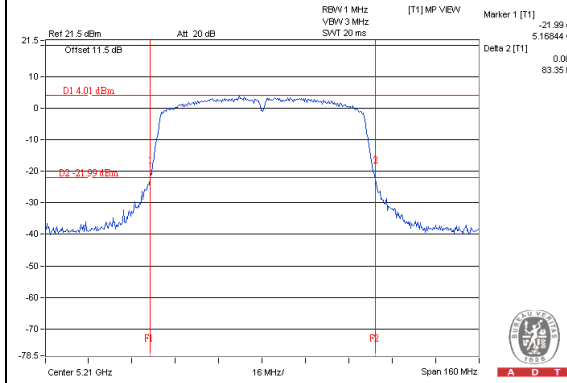
26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	83.35	82.53
58	5290	83.22	83.86
106	5530	83.39	82.55
122	5610	92.36	83.58
138 (UNII-2c Band)	5690	77.98	76.93

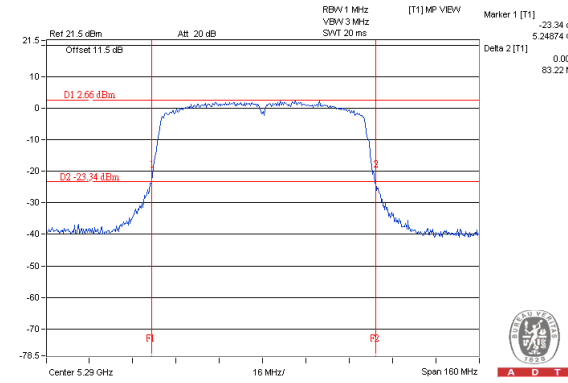
Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
58	5290	83.22	30.2 > 24
106	5530	82.55	30.16 > 24
122	5610	83.58	30.22 > 24
138 (UNII-2c Band)	5690	76.93	29.86 > 24

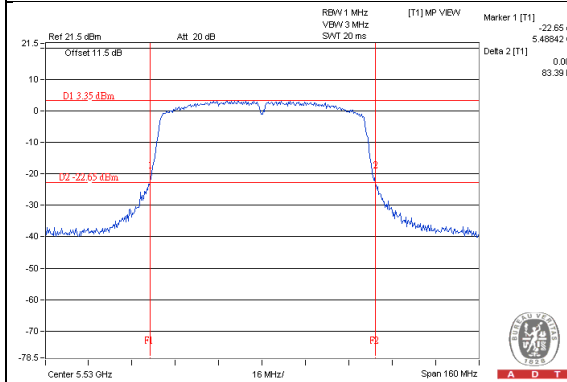
Chain 0 / CH42



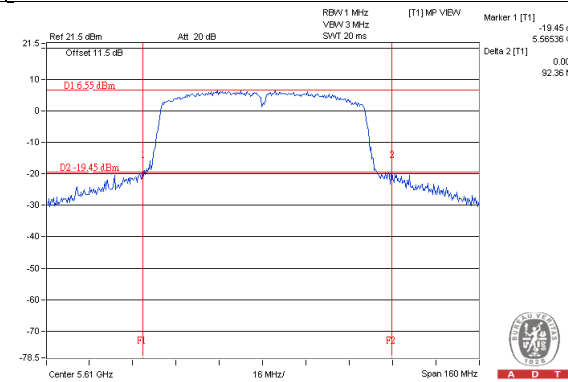
Chain 0 / CH58



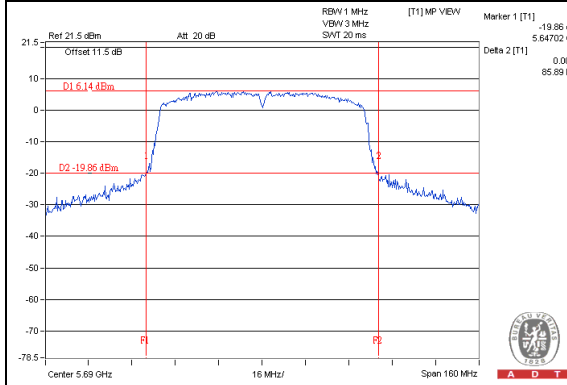
Chain 0 / CH106



Chain 0 / CH122



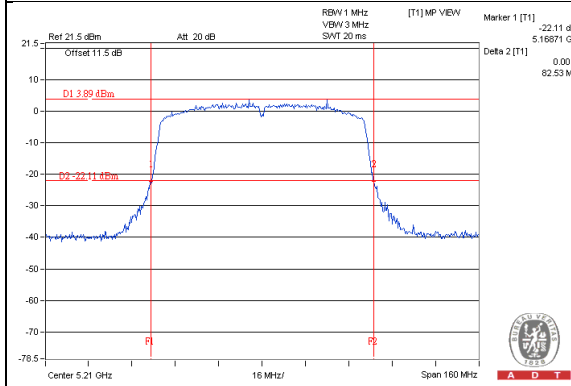
Chain 0 / CH138 (UNII-2c Band) / Chain 0 / CH138 (UNII-3 Band)



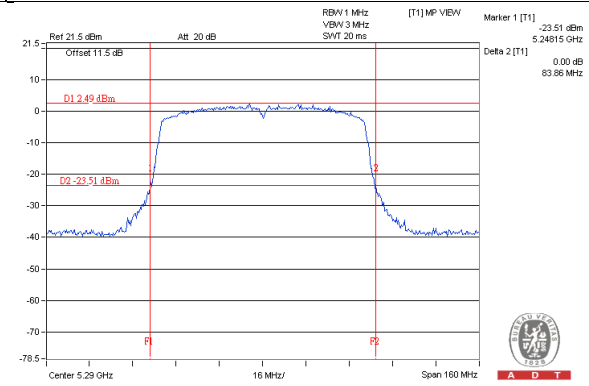
NOTE:

For CH138 (UNII-2c Band) = 5725MHz - Marker 1

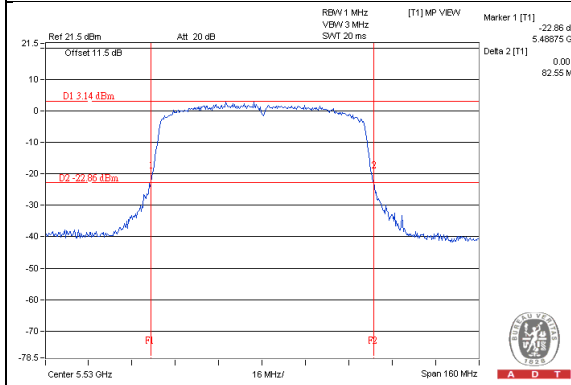
Chain 1 / CH42



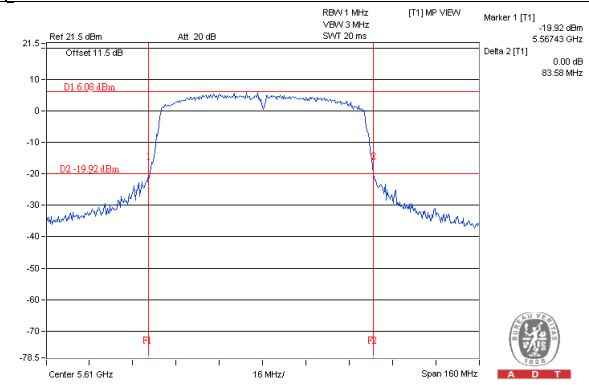
Chain 1 / CH58



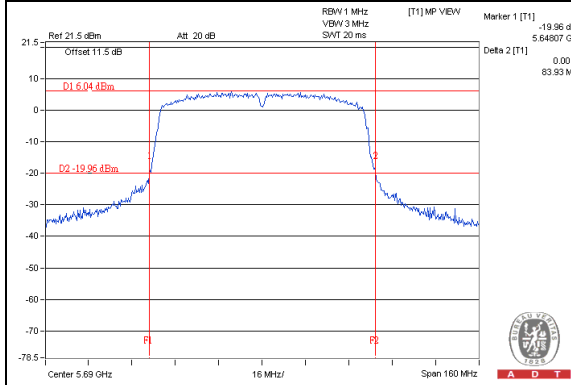
Chain 1 / CH106



Chain 1 / CH122



Chain 1 / CH138 (UNII-2c Band) / Chain 1 / CH138 (UNII-3 Band)



NOTE:

For CH138 (UNII-2c Band) = 5725MHz - Marker 1



For Reference only – Power meter value

The power value was measured by power meter with average sensor.

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
138	5690	16.37	15.93	82.525	19.17

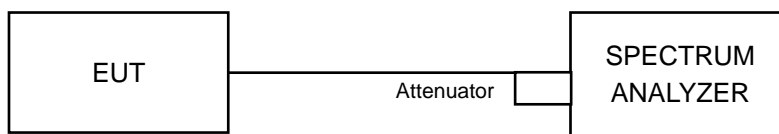
Note: The total power was calculated through formula and record the value for reference only.

4.2 Peak Power Spectral Density Measurement

4.2.1 Limits of Peak Power Spectral Density Measurement

Operation Band	EUT Category		LIMIT
U-NII-1		Outdoor Access Point	17dBm/ MHz
		Fixed point-to-point Access Point	
		Indoor Access Point	
	√	Mobile and Portable client device	11dBm/ MHz
U-NII-2A		√	11dBm/ MHz
U-NII-2C		√	11dBm/ MHz
U-NII-3		√	30dBm/ 500kHz

4.2.2 Test Setup



4.2.3 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSP 40	100060	May 08, 2014	May 07, 2015

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date :Feb. 09, 2015

4.2.4 Test Procedures

For U-NII-1, U-NII-2A & U-NII-2C:

- a. Set span to encompass the entire emission bandwidth (EBW) of the signal.
- b. Set RBW = 1 MHz, Set VBW \geq 3 MHz, Detector = RMS
- c. Sweep time = auto, trigger set to "free run".
- d. Trace average at least 100 traces in power averaging mode.
- e. Record the max value and for duty cycle of test signal is $<$ 98% add 10 log (1/duty cycle)
- f. Record the max value

For U-NII-3:

- a. Set span to encompass the entire emission bandwidth (EBW) of the signal.
- b. Set RBW = 300 kHz, Set VBW \geq 1 MHz, Detector = RMS
- c. Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
- d. Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where $BWCF = 10\log(500 \text{ kHz}/300\text{kHz})$
- e. Sweep time = auto, trigger set to "free run".
- f. Trace average at least 100 traces in power averaging mode.
- g. Record the max value and for duty cycle of test signal is $<$ 98% add 10 log (1/duty cycle)

4.2.5 Deviation from Test Standard

No deviation.

4.2.6 EUT Operating Conditions

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

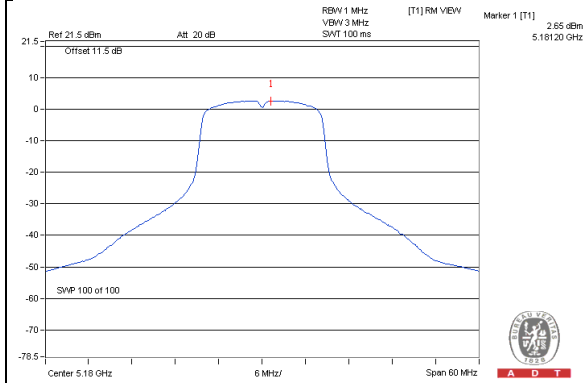
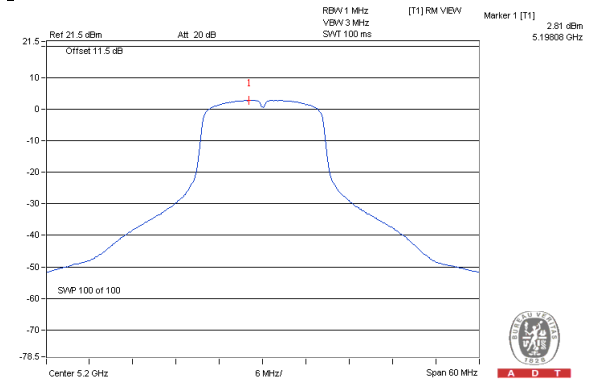
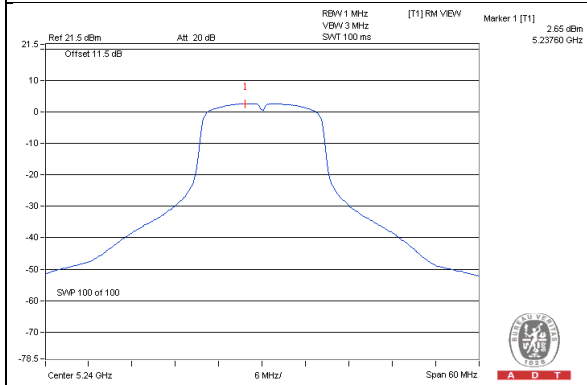
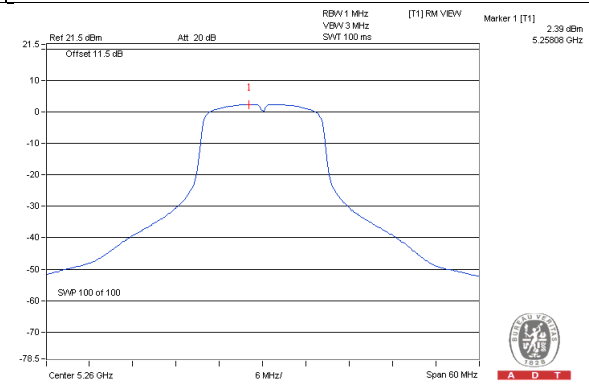
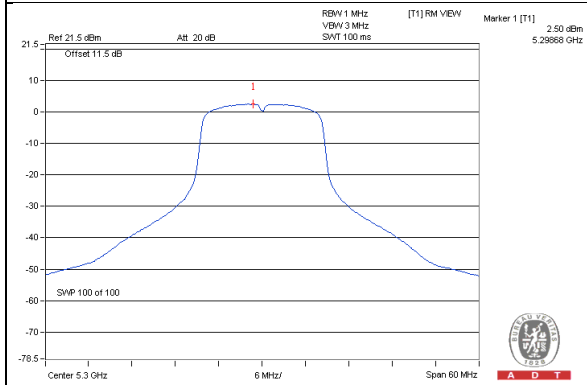
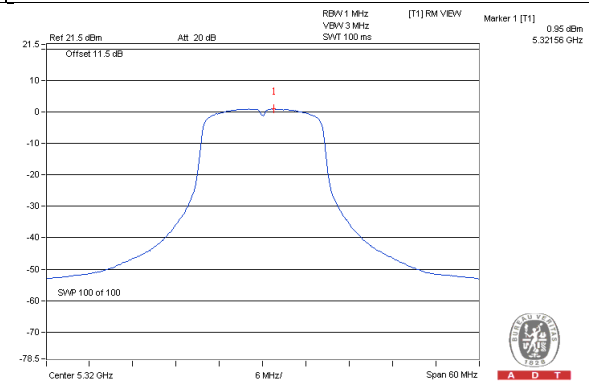
4.2.7 Test Results

For U-NII-1, U-NII-2A & U-NII-2C:

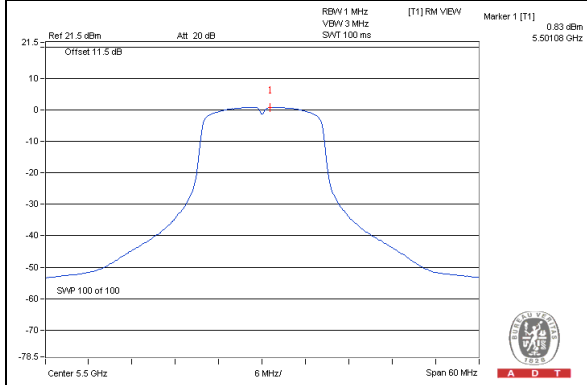
802.11a

Chan.	Chan. Freq. (MHz)	PSD (dBm)		Total Power Density (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1			
36	5180	2.62	1.69	5.19	10.91	Pass
40	5200	2.80	1.85	5.36	10.91	Pass
48	5240	2.65	1.80	5.26	10.91	Pass
52	5260	2.39	1.65	5.05	10.91	Pass
60	5300	2.49	1.70	5.12	10.91	Pass
64	5320	0.95	0.05	3.53	10.91	Pass
100	5500	0.83	-0.46	3.24	9.23	Pass
120	5600	2.24	0.99	4.67	9.23	Pass
140	5700	-0.01	-0.73	2.66	9.23	Pass
144 (UNII-2c Band)	5720	3.30	2.99	6.16	9.23	Pass

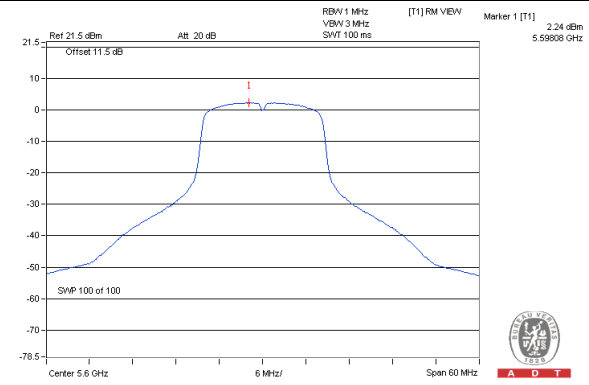
- NOTE:**
1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
 2. 5150~5250MHz: Directional gain = 3.08dBi + 10log(2) = 6.09dBi > 6dBi , so the power density limit shall be reduced to 11-(6.09-6) = 10.91dBm.
 3. 5250~5350MHz: Directional gain = 3.08dBi + 10log(2) = 6.09dBi > 6dBi, so the power density limit shall be reduced to 11-(6.09-6) = 10.91dBm.
 4. 5470~5725MHz: Directional gain = 4.76dBi + 10log(2) = 7.77dBi > 6dB, so the power density limit shall be reduced to 11-(7.77-6) = 9.23dBm.

Chain 0 / CH36**Chain 0 / CH40****Chain 0 / CH48****Chain 0 / CH52****Chain 0 / CH60****Chain 0 / CH64**

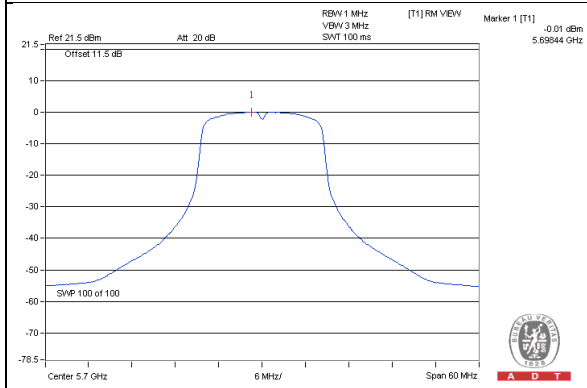
Chain 0 / CH100



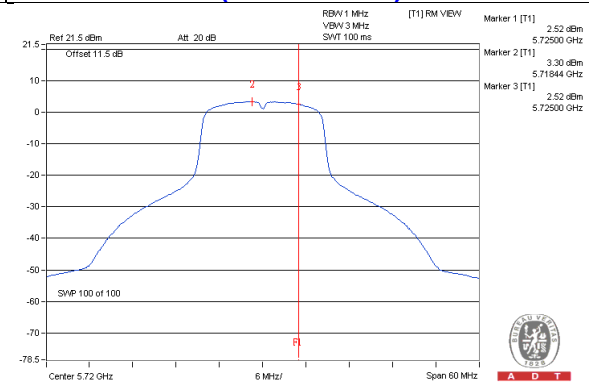
Chain 0 / CH120



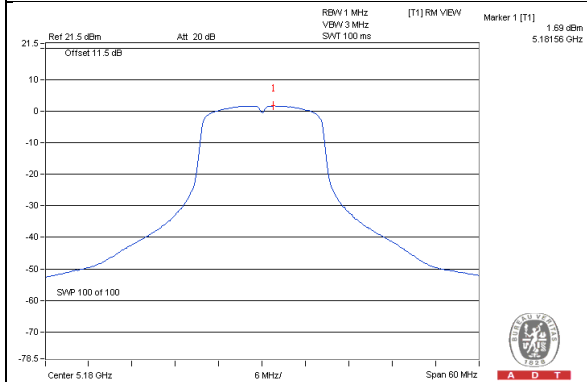
Chain 0 / CH140



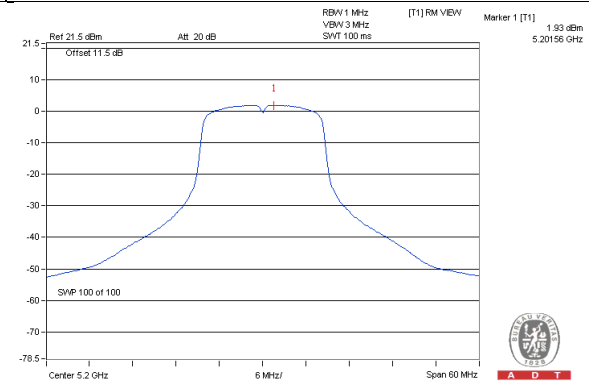
Chain 0 / CH144 (UNII-2c Band)



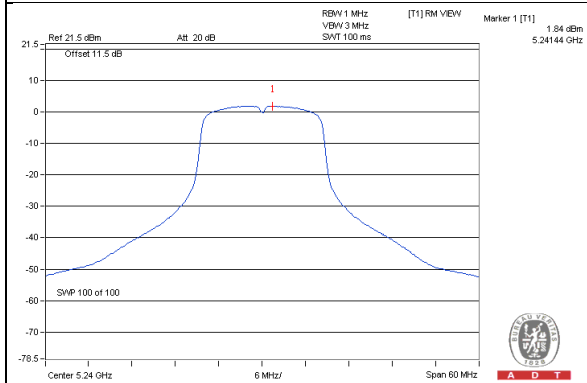
Chain 1 / CH36



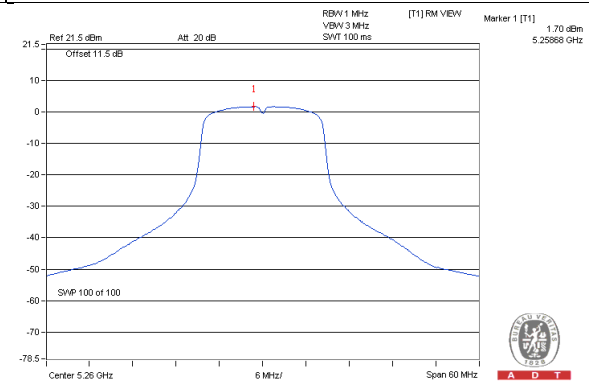
Chain 1 / CH40



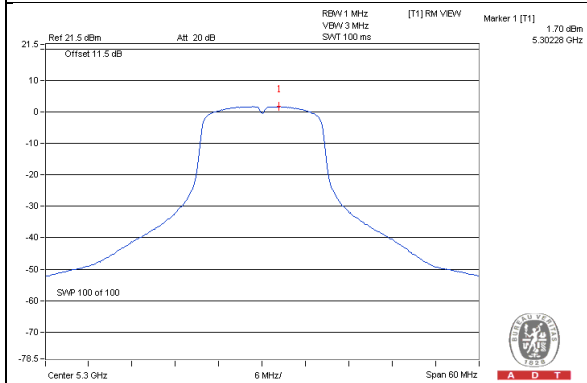
Chain 1 / CH48



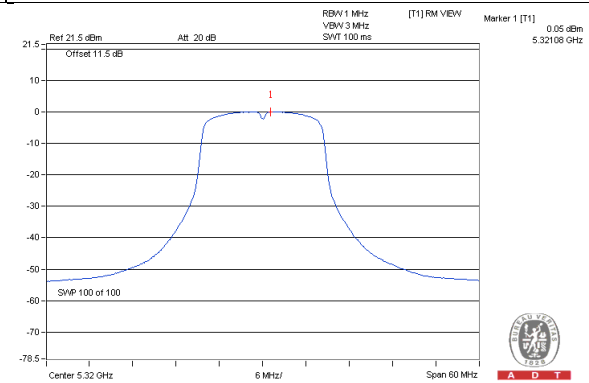
Chain 1 / CH52



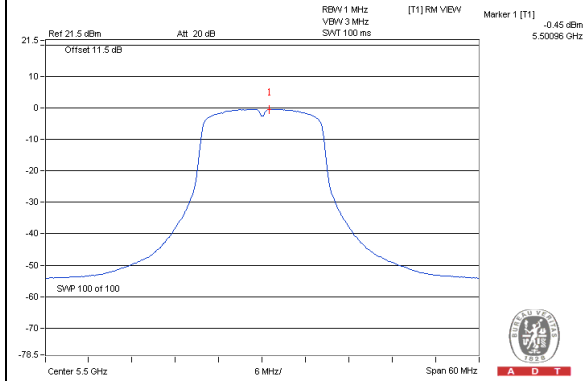
Chain 1 / CH60



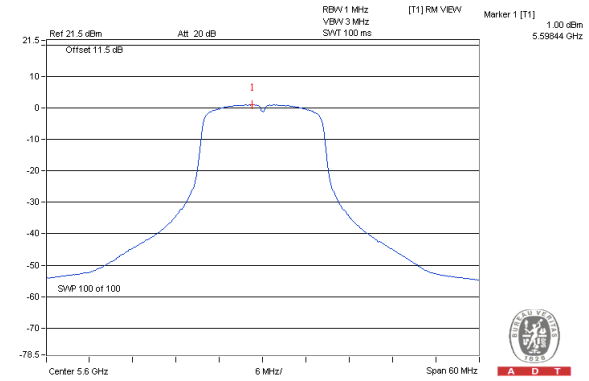
Chain 1 / CH64



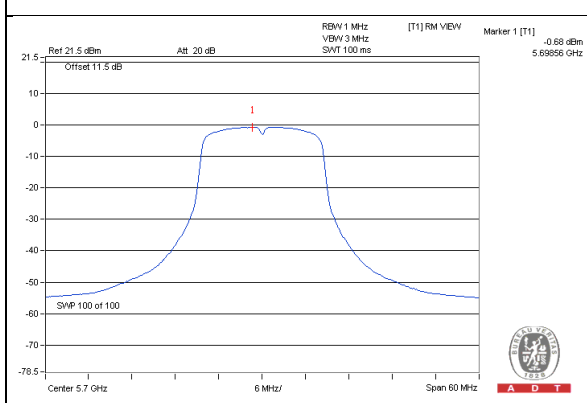
Chain 1 / CH100



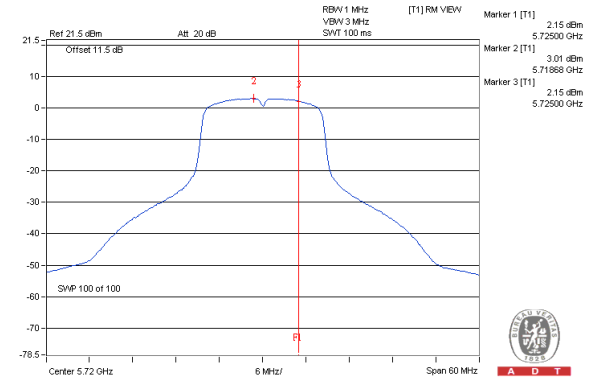
Chain 1 / CH120



Chain 1 / CH140



Chain 1 / CH144 (UNII-2c Band) / Chain 1 / CH144 (UNII-3 Band)

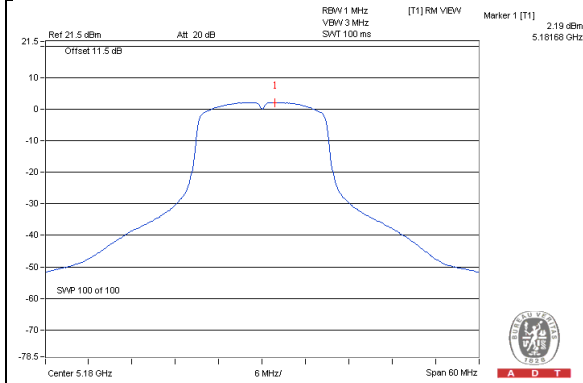


802.11ac (VHT20)

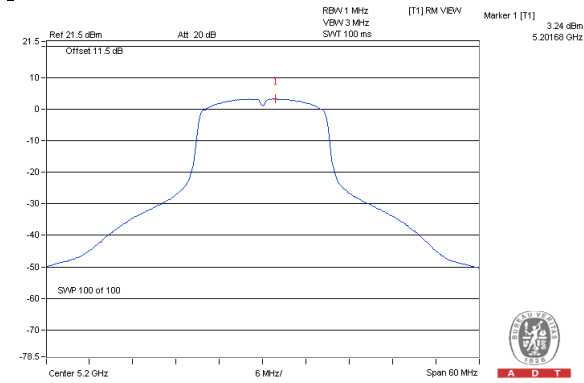
Chan.	Chan. Freq. (MHz)	PSD (dBm)		Total Power Density (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1			
36	5180	2.19	1.23	4.75	10.91	Pass
40	5200	3.23	2.35	5.82	10.91	Pass
48	5240	3.21	2.30	5.79	10.91	Pass
52	5260	2.89	2.15	5.55	10.91	Pass
60	5300	2.93	2.23	5.60	10.91	Pass
64	5320	0.53	-0.34	3.13	10.91	Pass
100	5500	1.30	0.38	3.87	9.23	Pass
120	5600	2.62	1.59	5.15	9.23	Pass
140	5700	-0.37	-1.02	2.33	9.23	Pass
144 (UNII-2c Band)	5720	2.94	2.72	5.84	9.23	Pass

- NOTE:**
1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
 2. 5150~5250MHz: Directional gain = 3.08dBi + 10log(2) = 6.09dBi > 6dBi , so the power density limit shall be reduced to 11-(6.09-6) = 10.91dBm.
 3. 5250~5350MHz: Directional gain = 3.08dBi + 10log(2) = 6.09dBi > 6dBi, so the power density limit shall be reduced to 11-(6.09-6) = 10.91dBm.
 4. 5470~5725MHz: Directional gain = 4.76dBi + 10log(2) = 7.77dBi > 6dB, so the power density limit shall be reduced to 11-(7.77-6) = 9.23dBm.

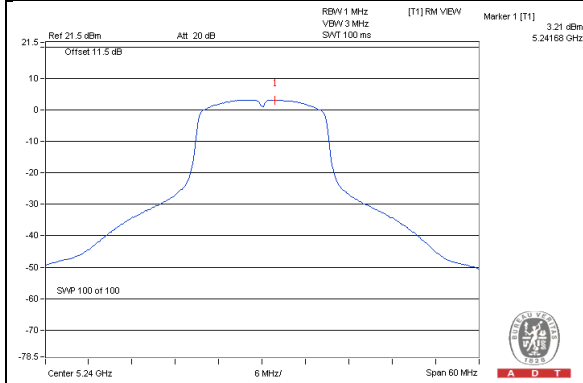
Chain 0 / CH36



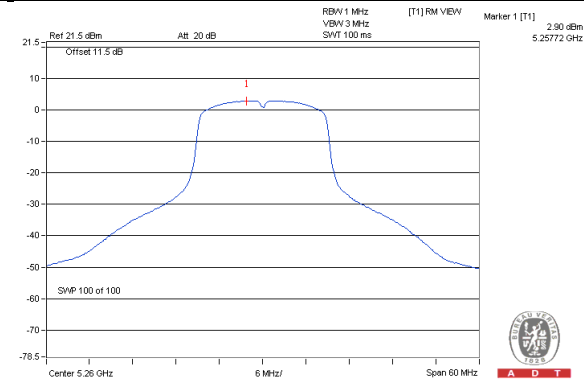
Chain 0 / CH40



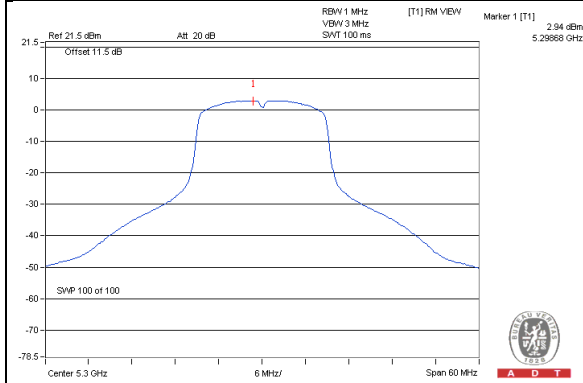
Chain 0 / CH48



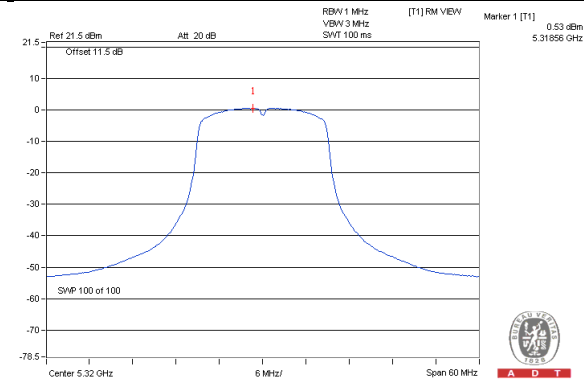
Chain 0 / CH52



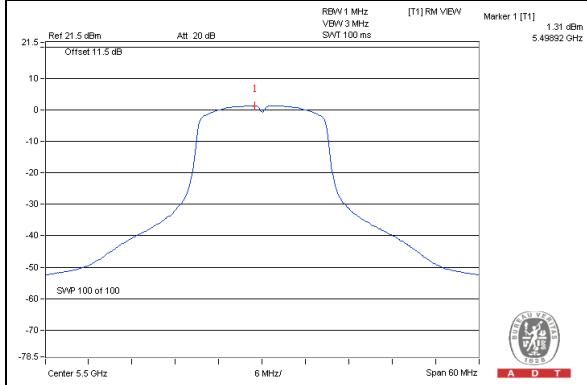
Chain 0 / CH60



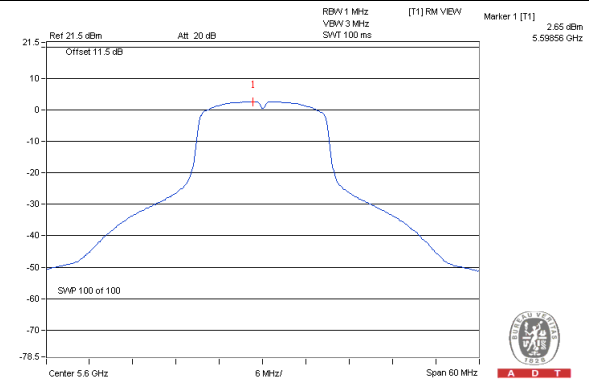
Chain 0 / CH64



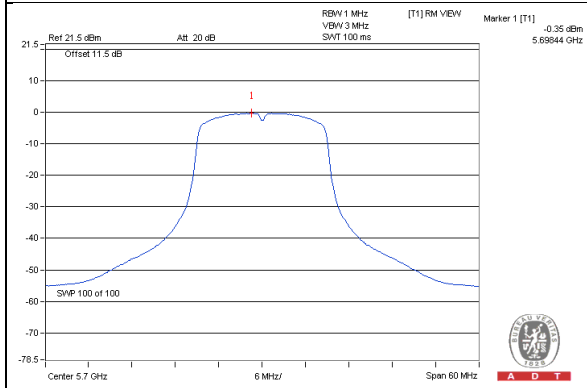
Chain 0 / CH100



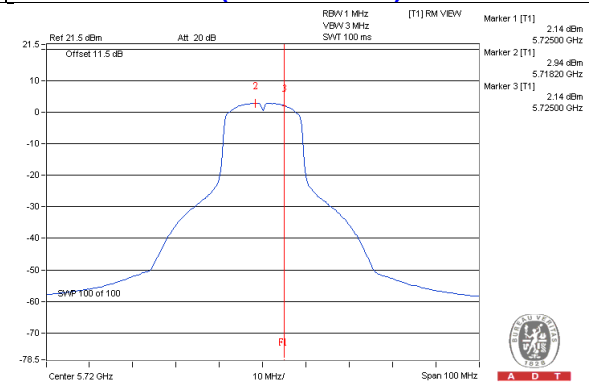
Chain 0 / CH120



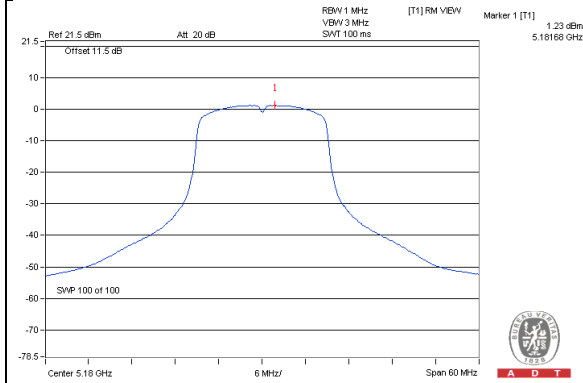
Chain 0 / CH140



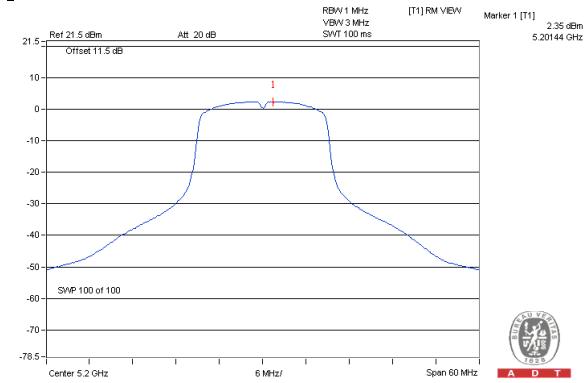
Chain 0 / CH144 (UNII-2c Band)



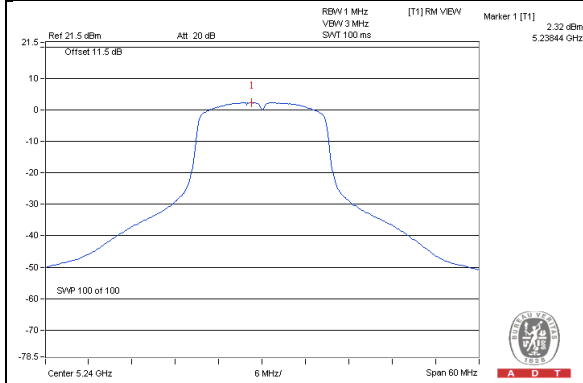
Chain 1 / CH36



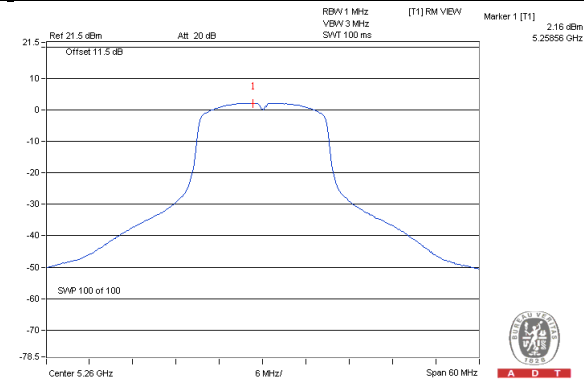
Chain 1 / CH40



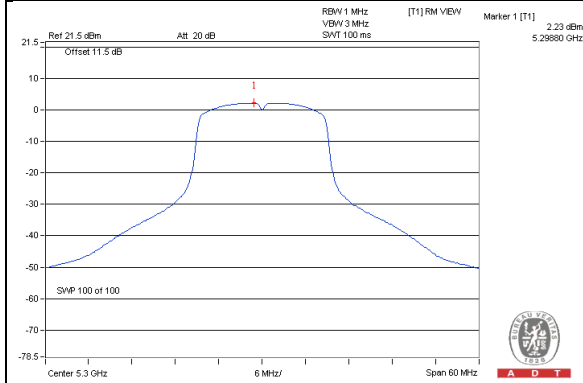
Chain 1 / CH48



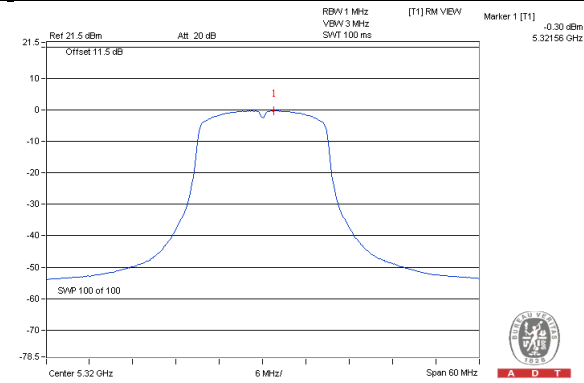
Chain 1 / CH52

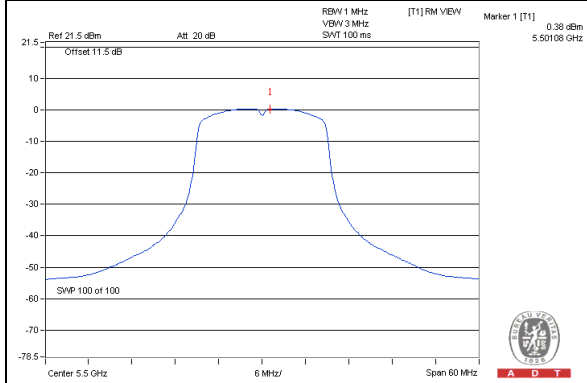
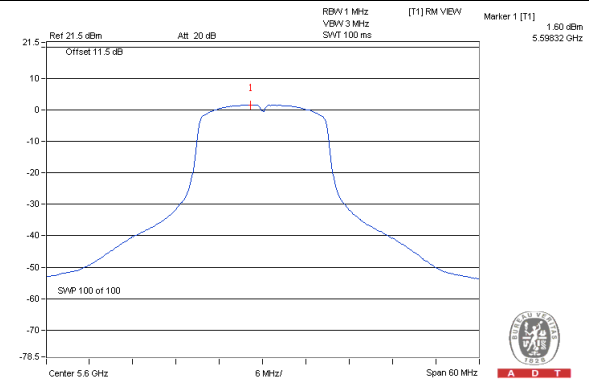
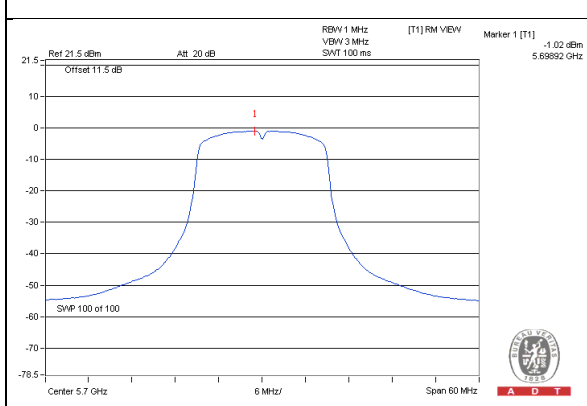
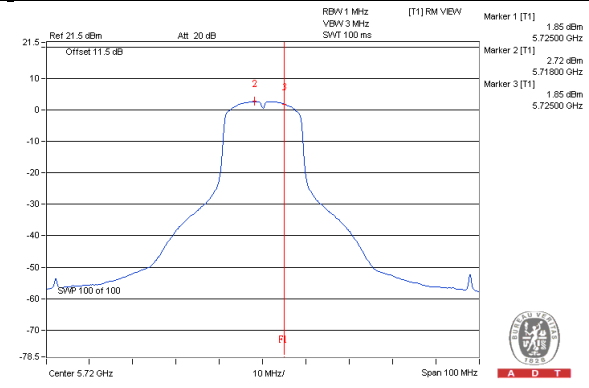


Chain 1 / CH60



Chain 1 / CH64

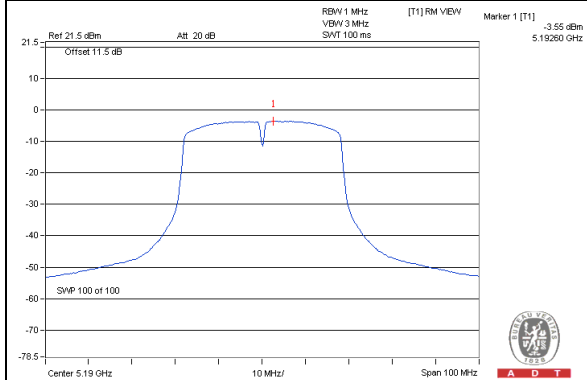
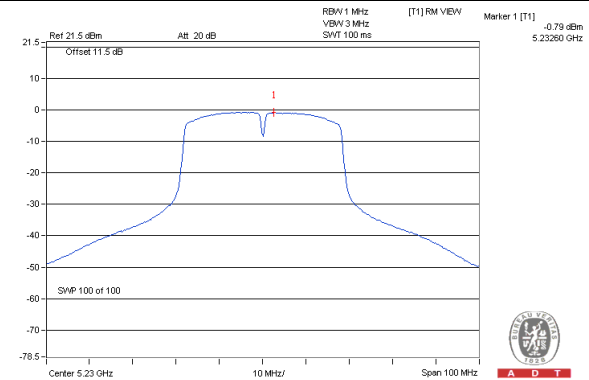
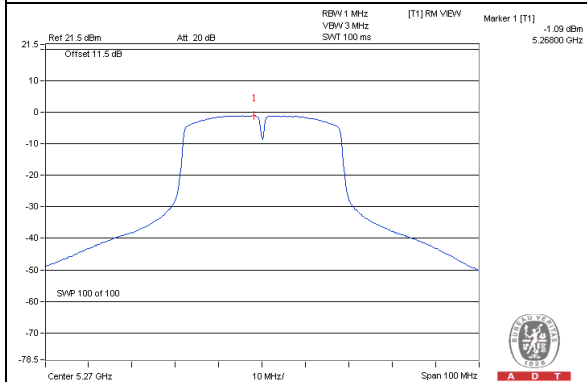
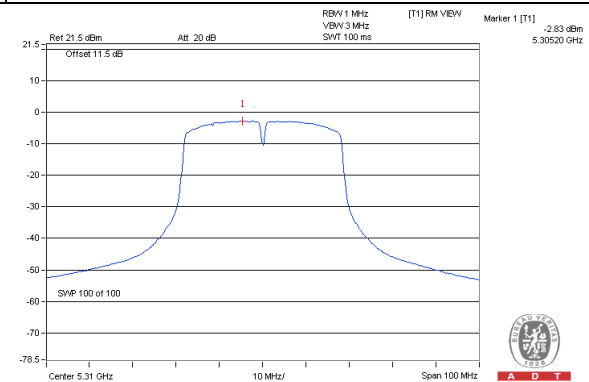
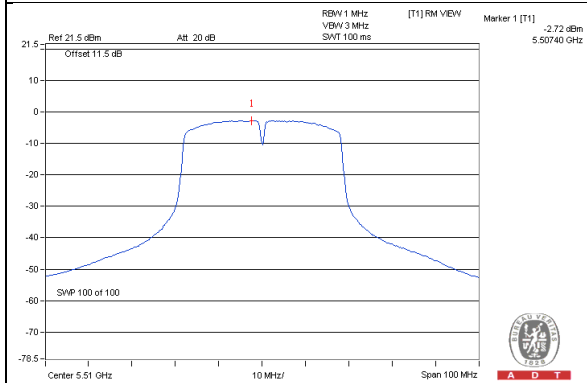
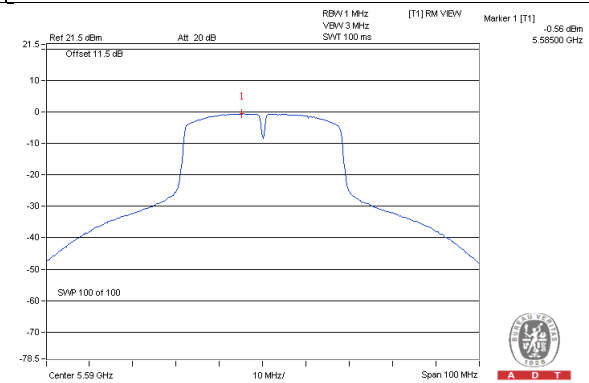
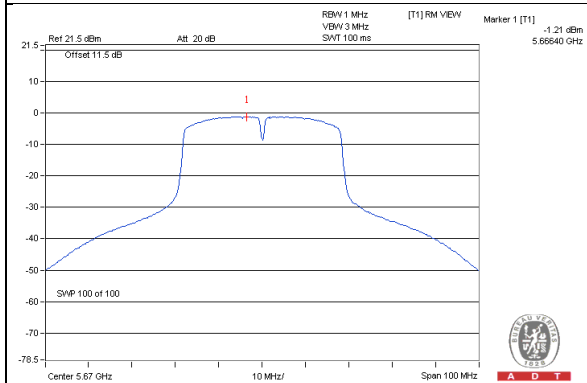
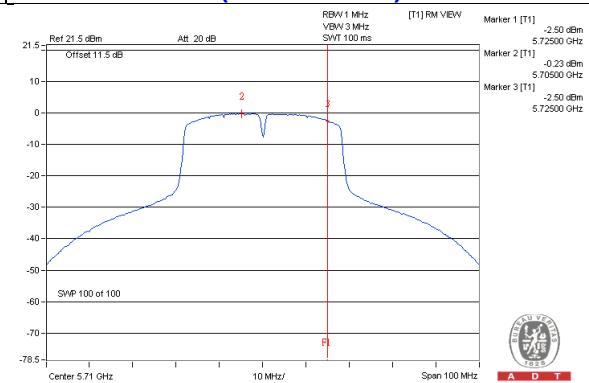


Chain 1 / CH100

Chain 1 / CH120

Chain 1 / CH140

Chain 1 / CH144 (UNII-2c Band) / Chain 1 / CH144 (UNII-3 Band)


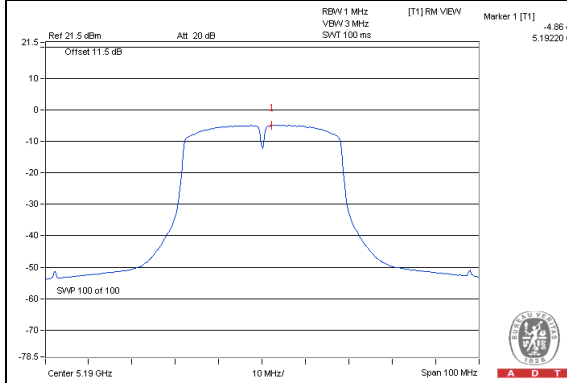
802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	PSD (dBm)		Total Power Density (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1			
38	5190	-3.59	-4.86	-1.17	10.91	Pass
46	5230	-0.80	-1.74	1.77	10.91	Pass
54	5270	-1.13	-1.87	1.53	10.91	Pass
62	5310	-2.83	-3.81	-0.28	10.91	Pass
102	5510	-2.72	-3.82	-0.22	9.23	Pass
118	5590	-0.56	-1.47	2.02	9.23	Pass
134	5670	-1.21	-1.61	1.60	9.23	Pass
142 (UNII-2c Band)	5710	-0.23	-0.59	2.60	9.23	Pass

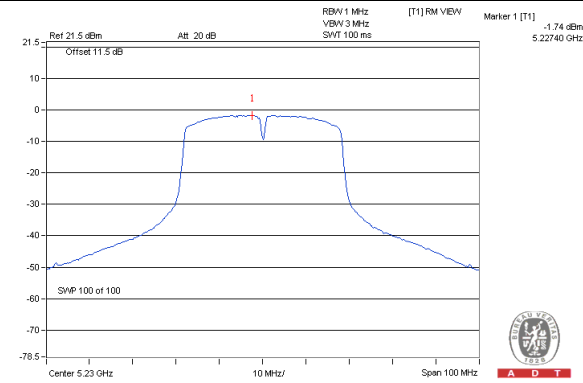
- NOTE:**
1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
 2. 5150~5250MHz: Directional gain = 3.08dBi + 10log(2) = 6.09dBi > 6dBi , so the power density limit shall be reduced to 11-(6.09-6) = 10.91dBm.
 3. 5250~5350MHz: Directional gain = 3.08dBi + 10log(2) = 6.09dBi > 6dBi, so the power density limit shall be reduced to 11-(6.09-6) = 10.91dBm.
 4. 5470~5725MHz: Directional gain = 4.76dBi + 10log(2) = 7.77dBi > 6dB, so the power density limit shall be reduced to 11-(7.77-6) = 9.23dBm.

Chain 0 / CH38

Chain 0 / CH46

Chain 0 / CH54

Chain 0 / CH62

Chain 0 / CH102

Chain 0 / CH118

Chain 0 / CH134

Chain 0 / CH142 (UNII-2c Band)


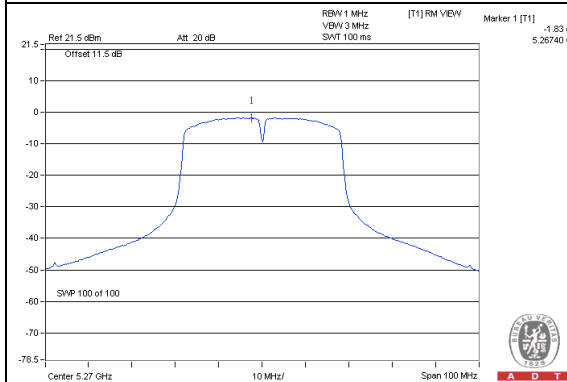
Chain 1 / CH38



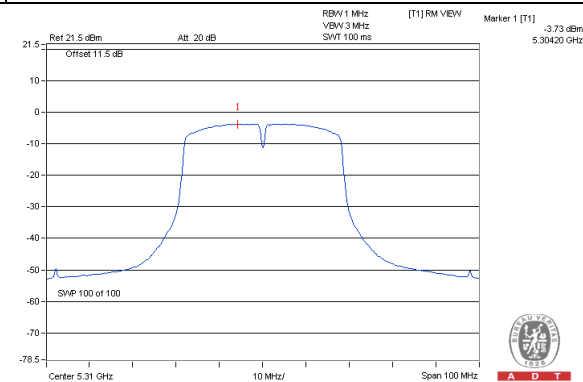
Chain 1 / CH46



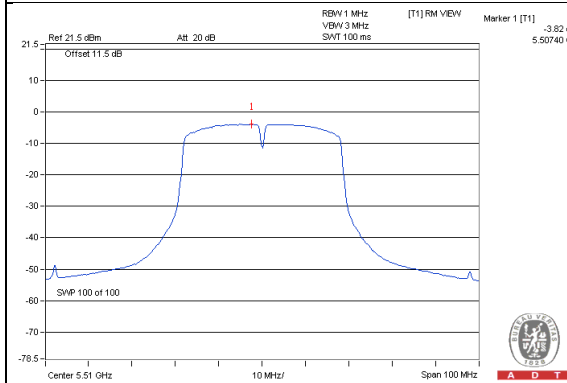
Chain 1 / CH54



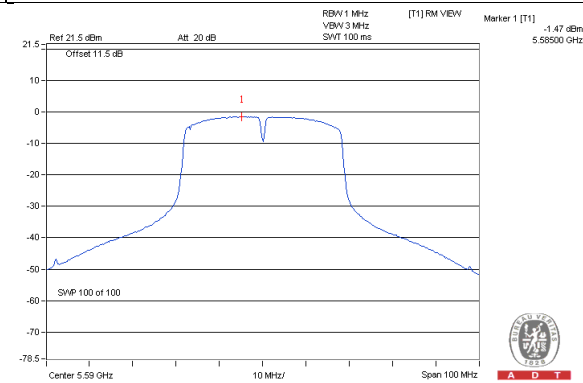
Chain 1 / CH62



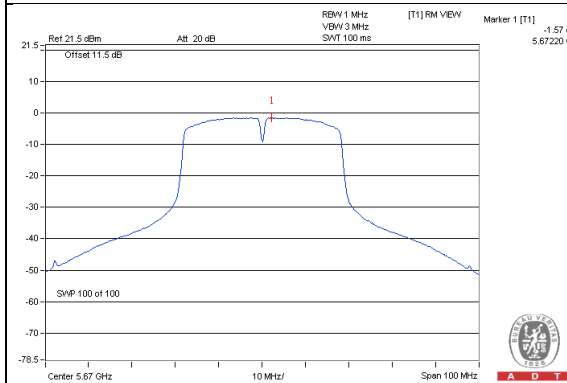
Chain 1 / CH102



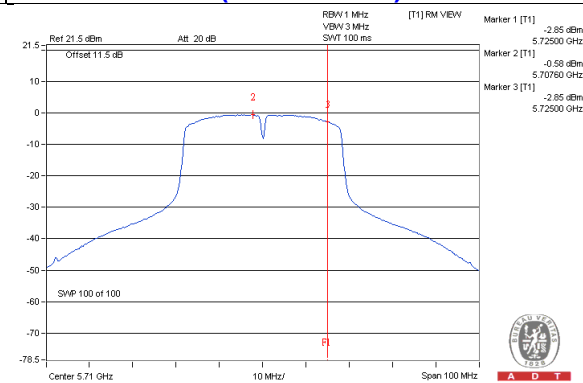
Chain 1 / CH118



Chain 1 / CH134



Chain 1 / CH142 (UNII-2c Band)

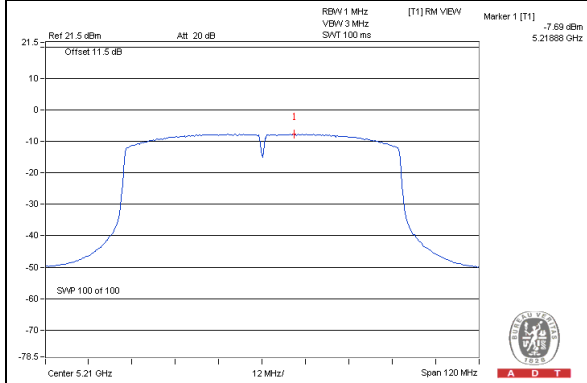


802.11ac (VHT80):

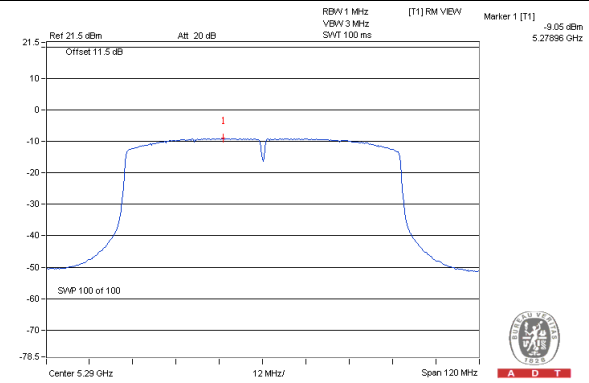
Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm)		Duty Factor (dB)	Total PSD With Duty Factor (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	-7.72	-8.71	0.11	-5.07	10.91	Pass
58	5290	-9.05	-9.98	0.11	-6.37	10.91	Pass
106	5530	-8.15	-9.11	0.11	-5.48	9.23	Pass
122	5610	-4.60	-5.81	0.11	-2.04	9.23	Pass
138 (UNII-2c Band)	5690	-5.16	-5.73	0.11	-2.32	9.23	Pass

- NOTE:**
- Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
 - 5150~5250MHz: Directional gain = 3.08dBi + 10log(2) = 6.09dBi > 6dBi , so the power density limit shall be reduced to 11-(6.09-6) = 10.91dBm.
 - 5250~5350MHz: Directional gain = 3.08dBi + 10log(2) = 6.09dBi > 6dBi, so the power density limit shall be reduced to 11-(6.09-6) = 10.91dBm.
 - 5470~5725MHz: Directional gain = 4.76dBi + 10log(2) = 7.77dBi > 6dB, so the power density limit shall be reduced to 11-(7.77-6) = 9.23dBm.
 - Refer to section 3.4 for duty cycle spectrum plot.

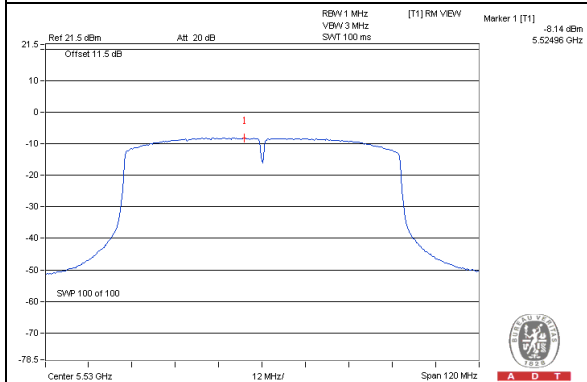
Chain 0 / CH42



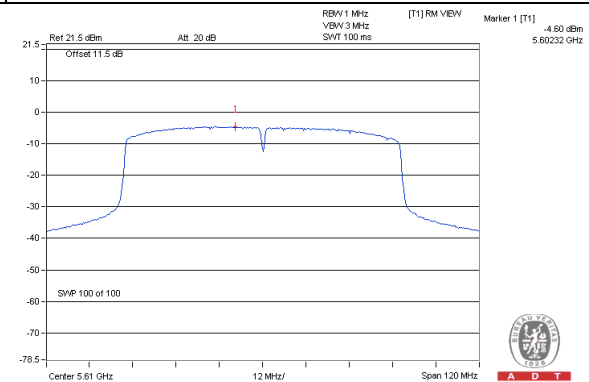
Chain 0 / CH58



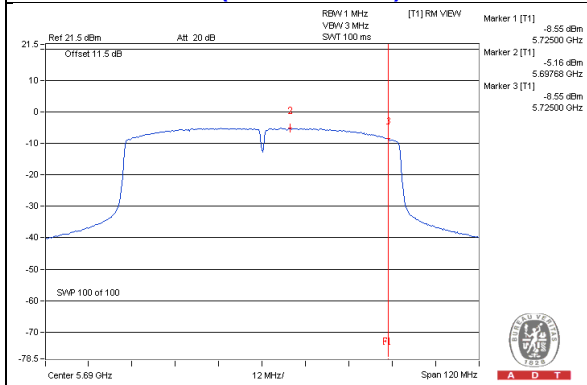
Chain 0 / CH106



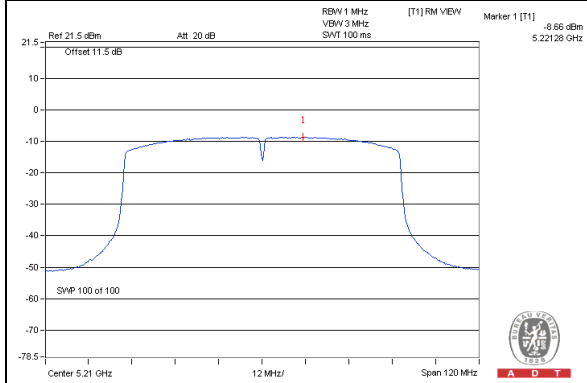
Chain 0 / CH122



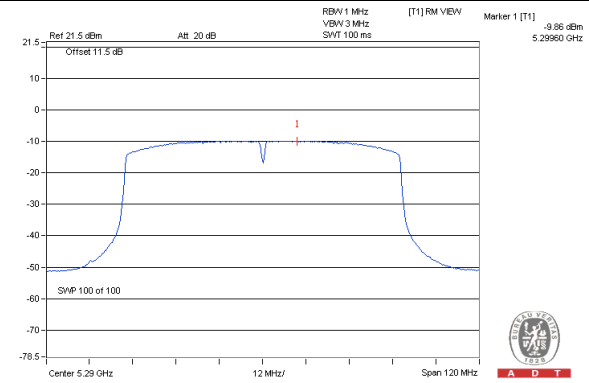
Chain 0 / CH138 (UNII-2c Band)



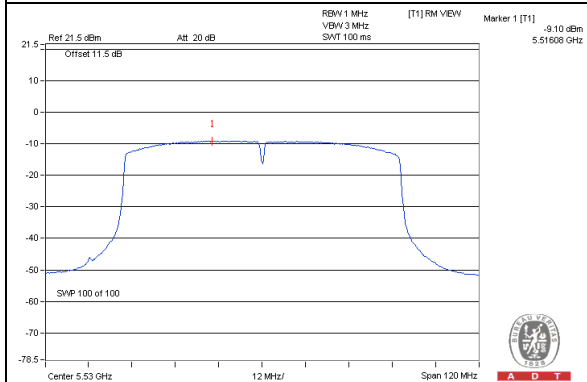
Chain 1 / CH42



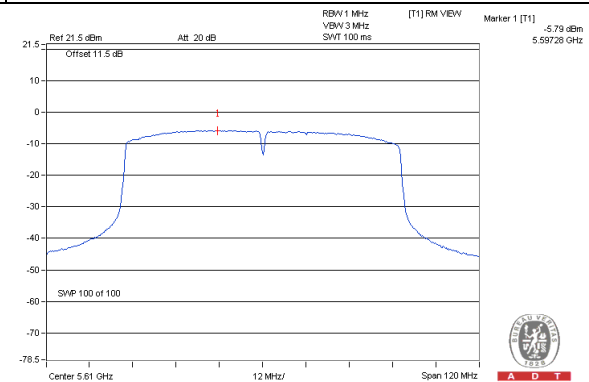
Chain 1 / CH58



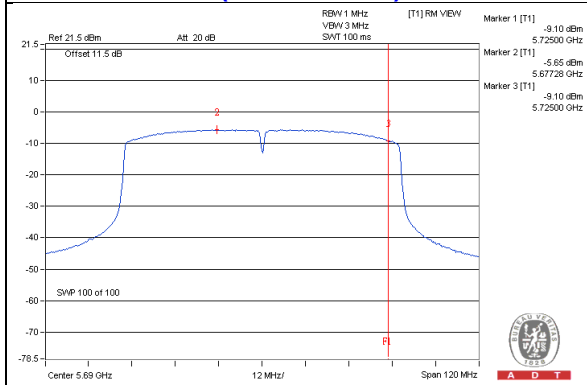
Chain 1 / CH106



Chain 1 / CH122



Chain 1 / CH138 (UNII-2c Band)

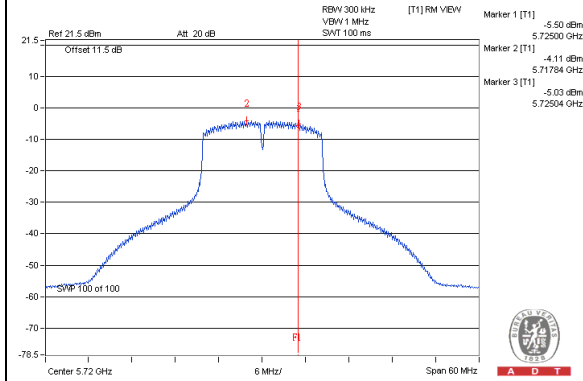


For U-NII-3:
802.11a

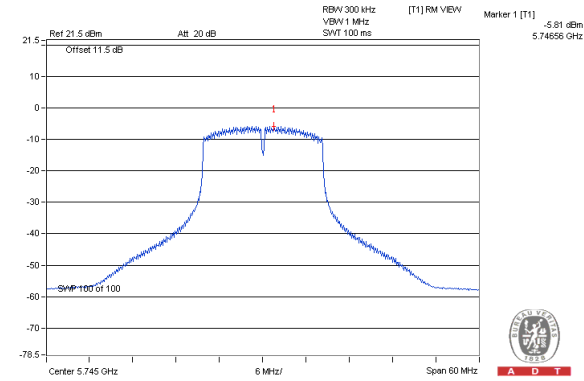
TX chain	Chan.	Chan. Freq. (MHz)	PSD		10 log (N=2) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)				
0	144 (UNII-3 Band)	5720	-5.50	-3.28	3.01	-0.27	28.23	Pass
	149	5745	-5.81	-3.59	3.01	-0.58	28.23	Pass
	157	5785	-5.34	-3.12	3.01	-0.11	28.23	Pass
	165	5825	-5.31	-3.09	3.01	-0.08	28.23	Pass
1	144 (UNII-3 Band)	5720	-5.86	-3.64	3.01	-0.63	28.23	Pass
	149	5745	-7.35	-5.13	3.01	-2.12	28.23	Pass
	157	5785	-5.72	-3.50	3.01	-0.49	28.23	Pass
	165	5825	-5.89	-3.67	3.01	-0.66	28.23	Pass

NOTE: 1. 5725~5850MHz: Directional gain = $4.76\text{dBi} + 10\log(2) = 7.77\text{dBi} > 6\text{dB}$, so the power density limit shall be reduced to $30 - (7.77 - 6) = 28.23\text{dBm}$.

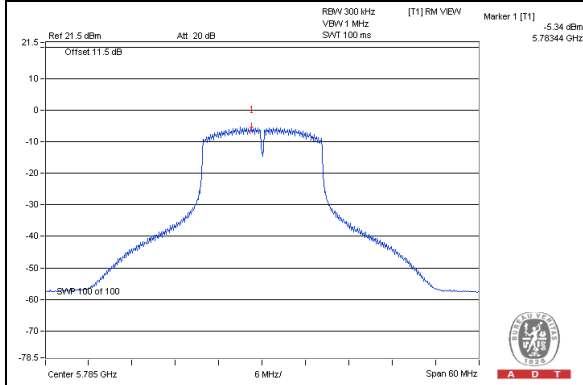
Chain 0 / CH144 (UNII-3 Band)



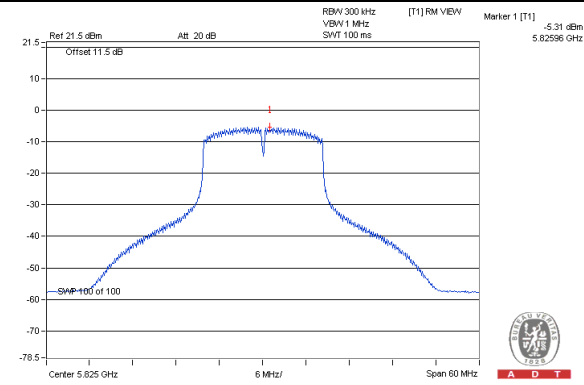
Chain 0 / CH149



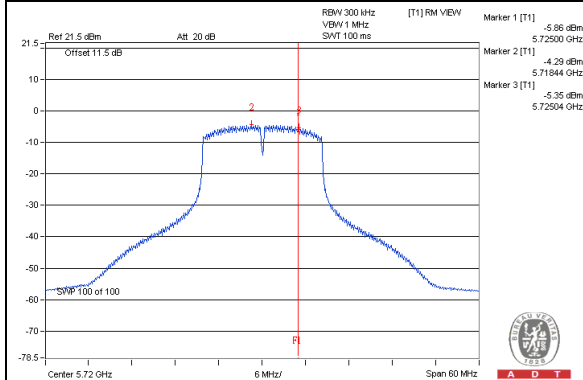
Chain 0 / CH157



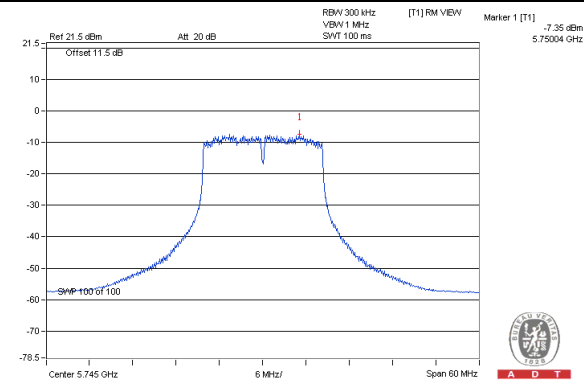
Chain 0 / CH165



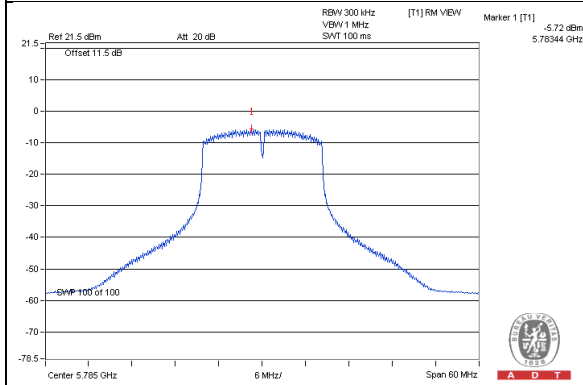
Chain 1 / CH144 (UNII-3 Band)



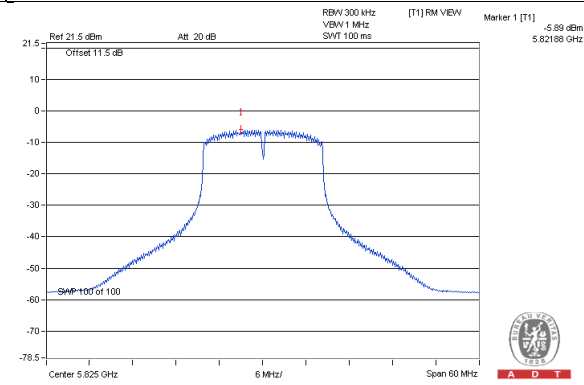
Chain 1 / CH149



Chain 1 / CH157



Chain 1 / CH165

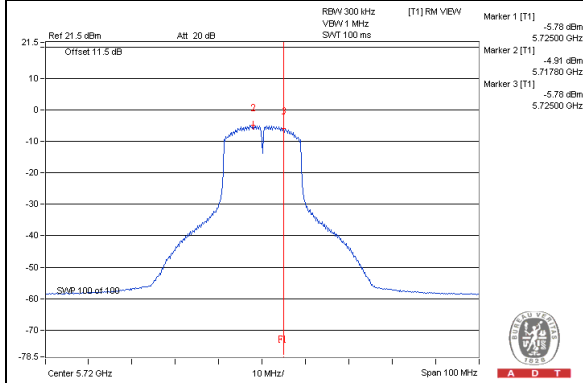


802.11ac (VHT20)

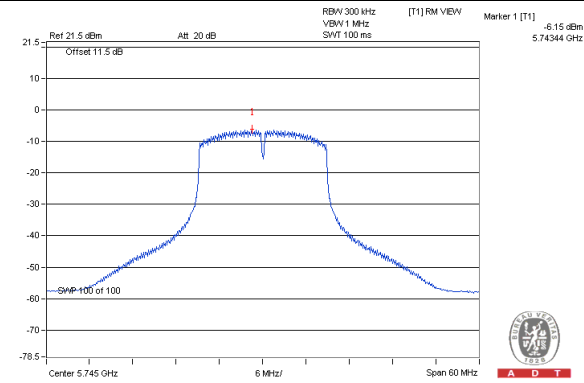
TX chain	Chan.	Chan. Freq. (MHz)	PSD		10 log (N=2) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)				
0	144 (UNII-3 Band)	5720	-5.78	-3.56	3.01	-0.55	28.23	Pass
	149	5745	-6.15	-3.93	3.01	-0.92	28.23	Pass
	157	5785	-4.98	-2.76	3.01	0.25	28.23	Pass
	165	5825	-4.94	-2.72	3.01	0.29	28.23	Pass
1	144 (UNII-3 Band)	5720	-5.85	-3.63	3.01	-0.62	28.23	Pass
	149	5745	-6.83	-4.61	3.01	-1.60	28.23	Pass
	157	5785	-5.36	-3.14	3.01	-0.13	28.23	Pass
	165	5825	-5.42	-3.20	3.01	-0.19	28.23	Pass

NOTE: 1. 5725~5850MHz: Directional gain = 4.76dBi + 10log(2) = 7.77dBi > 6dB, so the power density limit shall be reduced to 30-(7.77-6) = 28.23dBm.

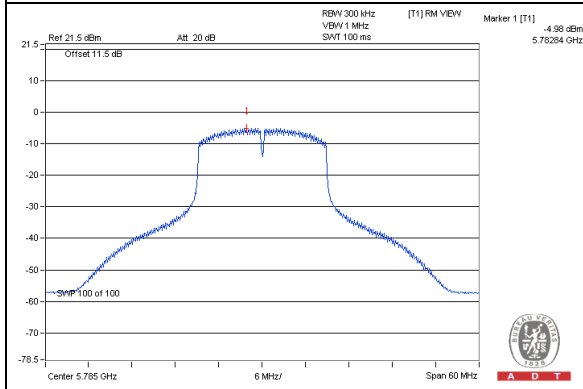
Chain 0 / CH144 (UNII-3 Band)



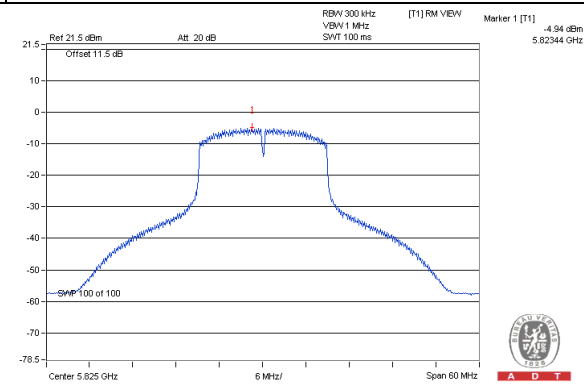
Chain 0 / CH149



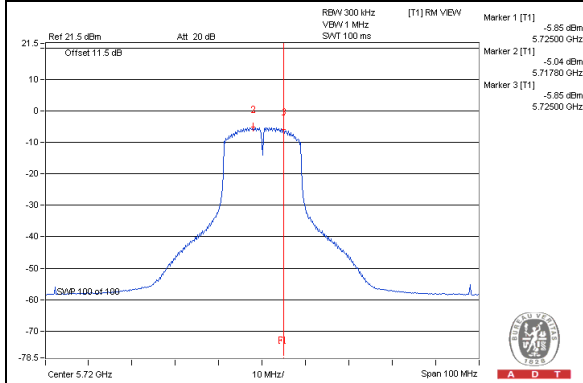
Chain 0 / CH157



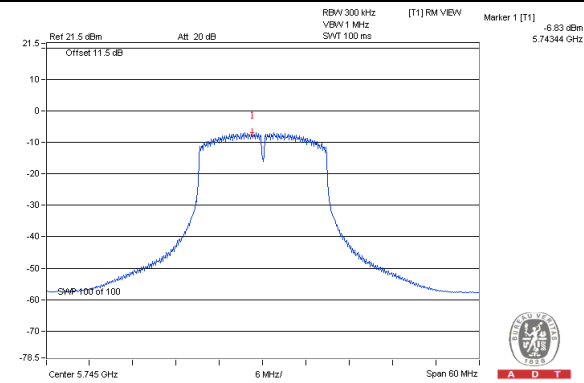
Chain 0 / CH165



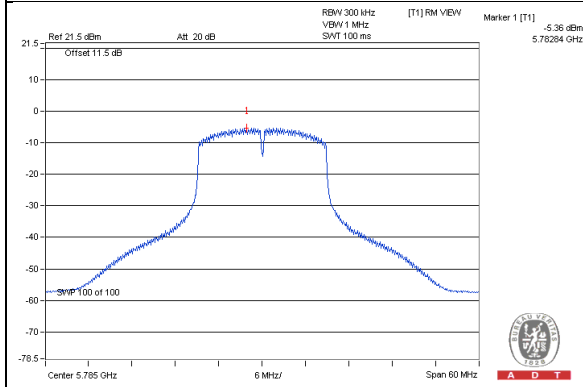
Chain 1 / CH144 (UNII-3 Band)



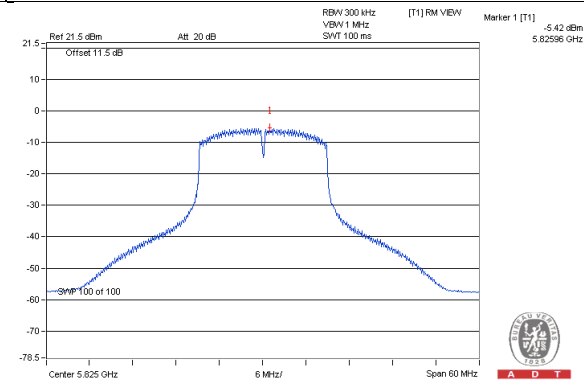
Chain 1 / CH149



Chain 1 / CH157



Chain 1 / CH165

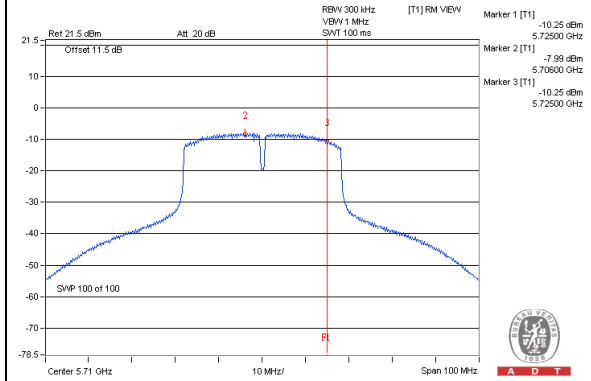


802.11ac (VHT40)

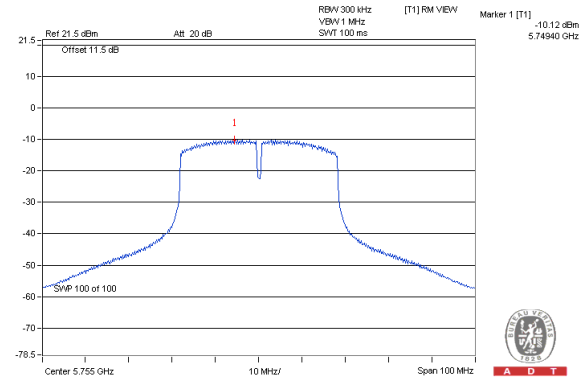
TX chain	Chan.	Chan. Freq. (MHz)	PSD		10 log (N=2) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)				
0	142 (UNII-3 Band)	5710	-10.25	-8.03	3.01	-5.02	28.23	Pass
	151	5755	-10.12	-7.90	3.01	-4.89	28.23	Pass
	159	5795	-8.67	-6.45	3.01	-3.44	28.23	Pass
1	142 (UNII-3 Band)	5710	-10.65	-8.43	3.01	-5.42	28.23	Pass
	151	5755	-10.54	-8.32	3.01	-5.31	28.23	Pass
	159	5795	-8.76	-6.54	3.01	-3.53	28.23	Pass

NOTE: 1. 5725~5850MHz: Directional gain = 4.76dBi + 10log(2) = 7.77dBi > 6dB, so the power density limit shall be reduced to 30-(7.77-6) = 28.23dBm.

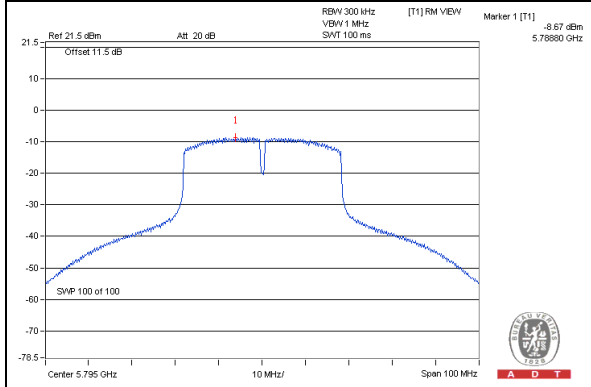
Chain 0 / CH142 (UNII-3 Band)



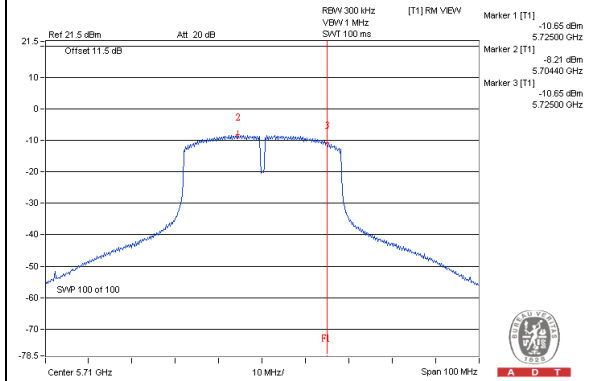
Chain 0 / CH151



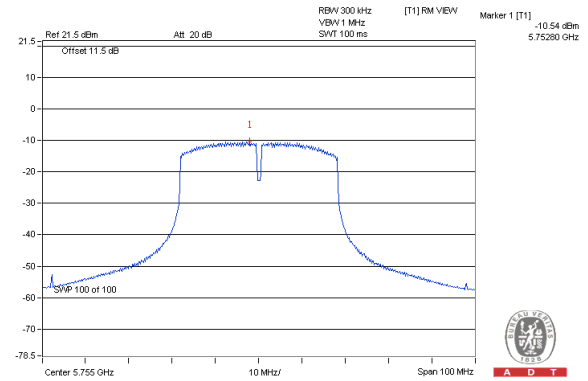
Chain 0 / CH159



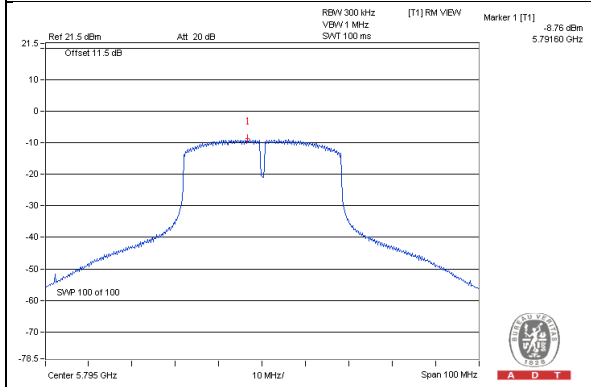
Chain 1 / CH142 (UNII-3 Band)



Chain 1 / CH151



Chain 1 / CH159

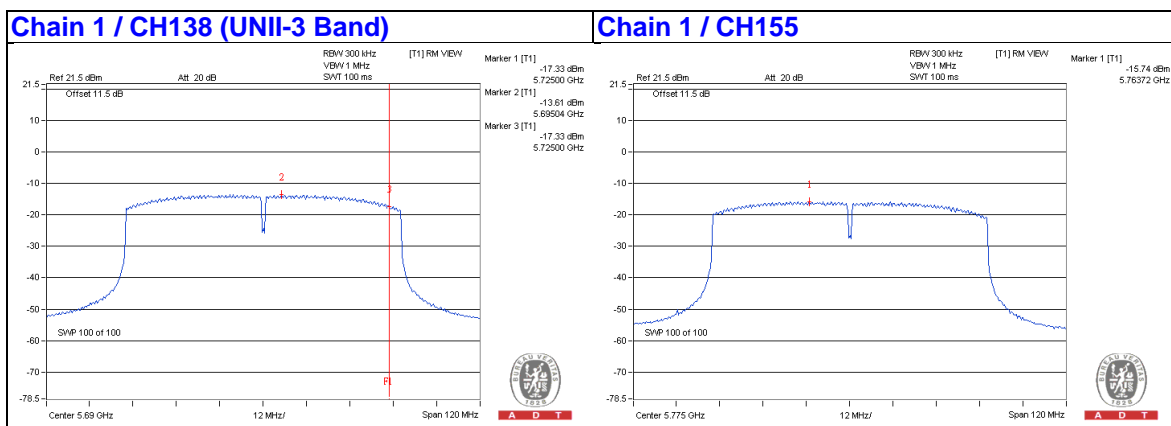
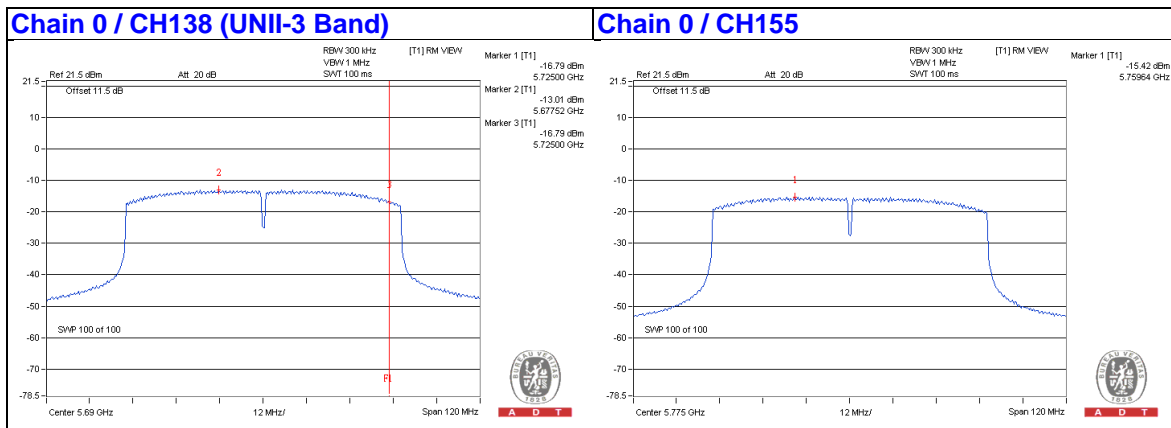


802.11ac (VHT80)

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	138 (UNII-3 Band)	5690	-16.79	-14.57	3.01	0.11	-11.45	28.23	Pass
	155	5775	-15.42	-13.20	3.01	0.11	-10.08	28.23	Pass
1	138 (UNII-3 Band)	5690	-17.33	-15.11	3.01	0.11	-11.99	28.23	Pass
	155	5775	-15.74	-13.52	3.01	0.11	-10.40	28.23	Pass

NOTE: 1. 5725–5850MHz: Directional gain = 4.76dBi + 10log(2) = 7.77dBi > 6dB, so the power density limit shall be reduced to 30-(7.77-6) = 28.23dBm.

2. Refer to section 3.4 for duty cycle spectrum plot.

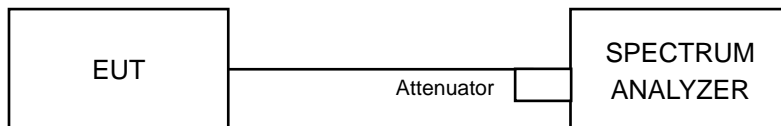


4.3 6dB Bandwidth Measurement

4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.3 to get information of above instrument.

4.3.4 Test Procedures

MEASUREMENT PROCEDURE REF

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

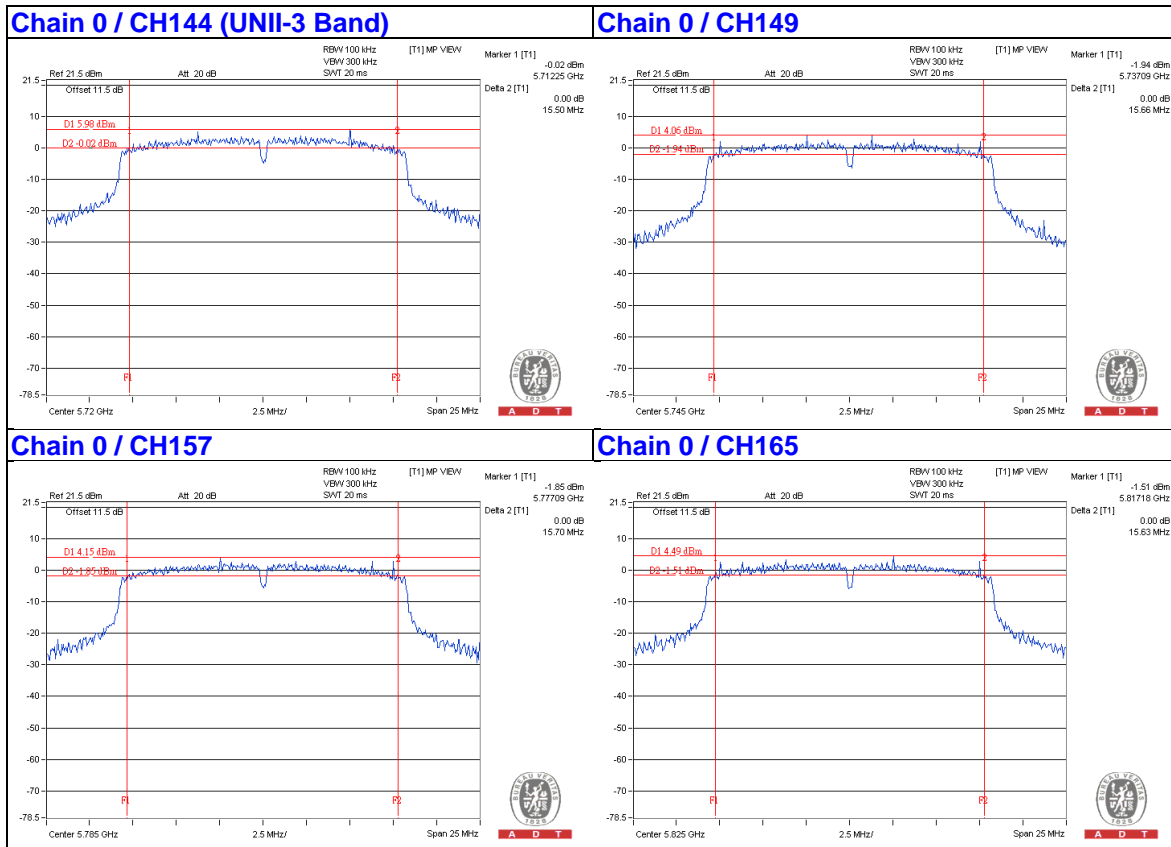
4.3.7 Test Results

802.11a

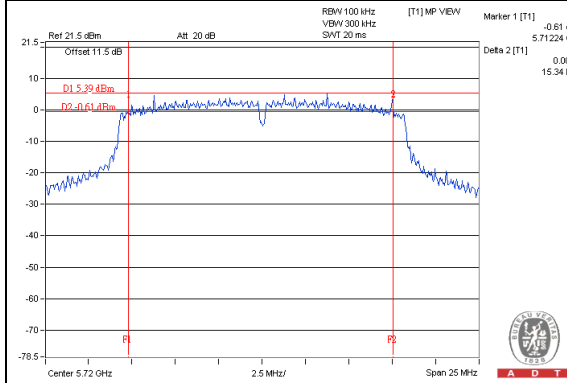
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
144 (UNII-3 Band)	5720	2.75	2.58	0.5	Pass
149	5745	15.66	15.73	0.5	Pass
157	5785	15.70	16.33	0.5	Pass
165	5825	15.63	15.75	0.5	Pass

NOTE:

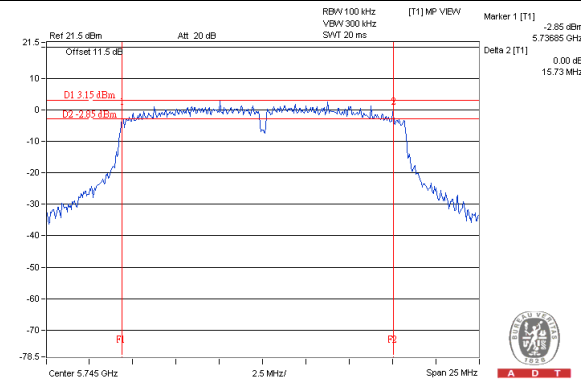
The 6dB bandwidth above 5725MHz = Marker 1 + Delta 2 - 5725MHz



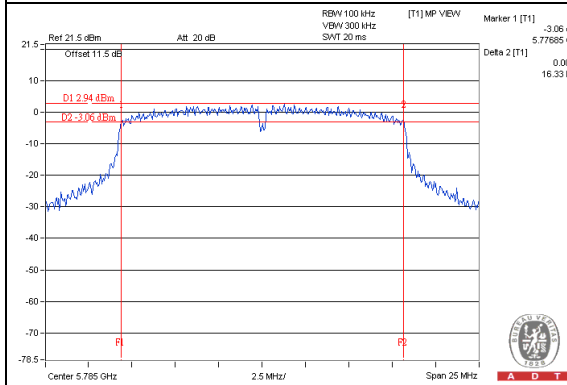
Chain 1 / CH144 (UNII-3 Band)



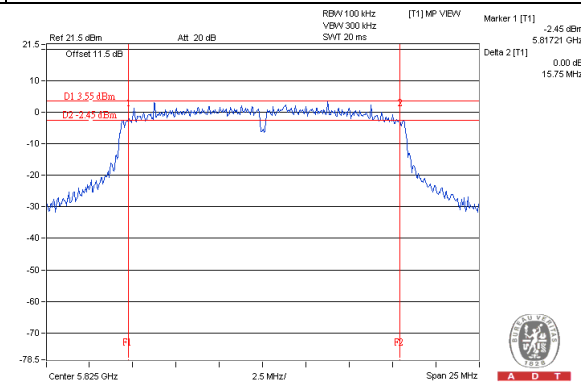
Chain 1 / CH149



Chain 1 / CH157



Chain 1 / CH165



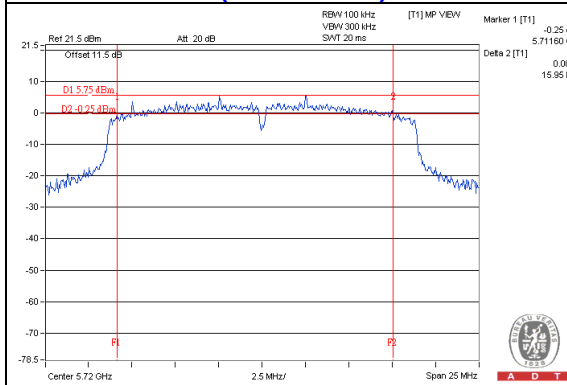
802.11ac (VHT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
144 (UNII-3 Band)	5720	2.55	2.56	0.5	Pass
149	5745	15.17	14.45	0.5	Pass
157	5785	17.12	16.05	0.5	Pass
165	5825	14.66	15.29	0.5	Pass

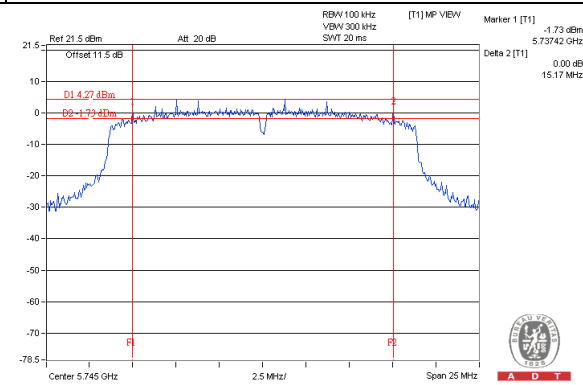
NOTE:

The 6dB bandwidth above 5725MHz = Marker 1 + Delta 2 - 5725MHz

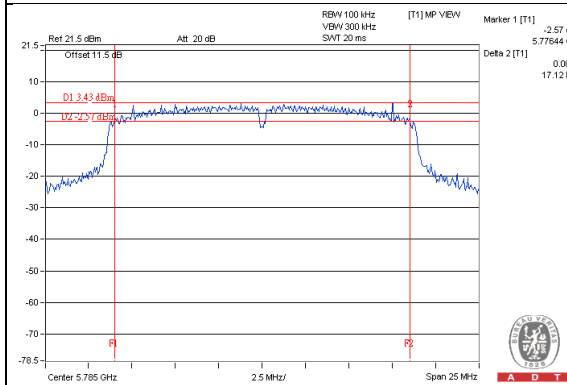
Chain 0 / CH144 (UNII-3 Band)



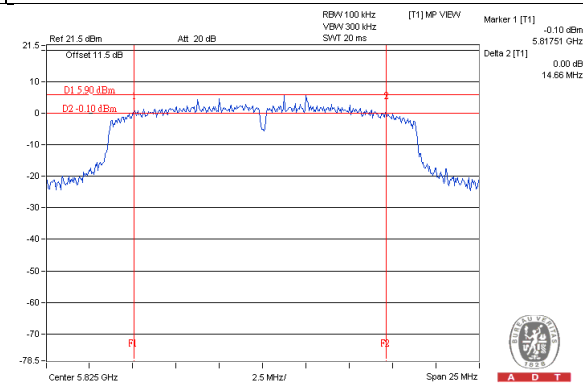
Chain 0 / CH149



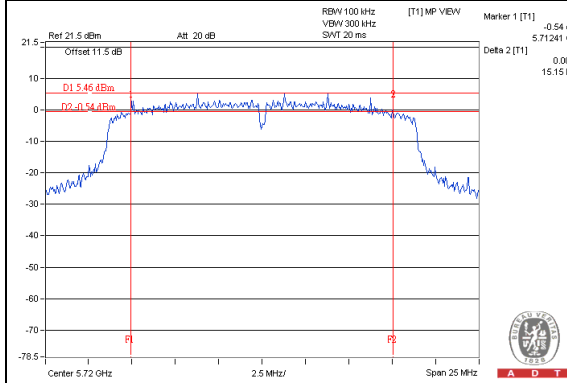
Chain 0 / CH157



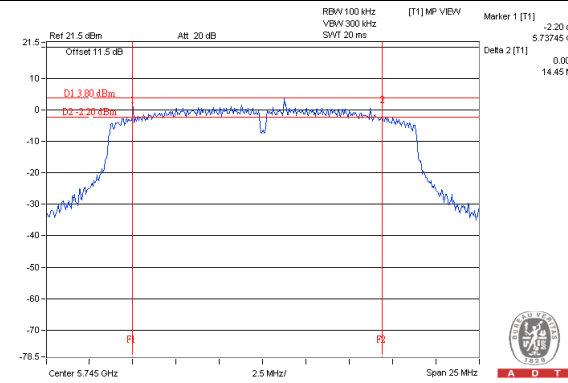
Chain 0 / CH165



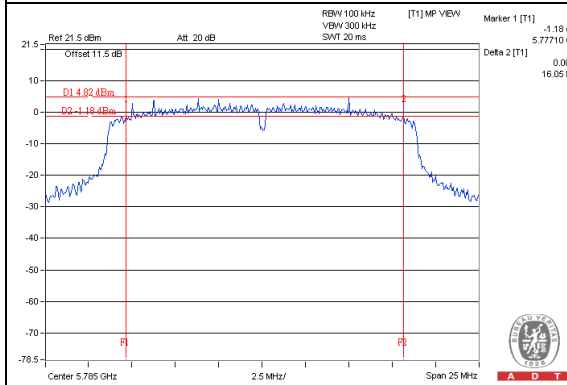
Chain 1 / CH144 (UNII-3 Band)



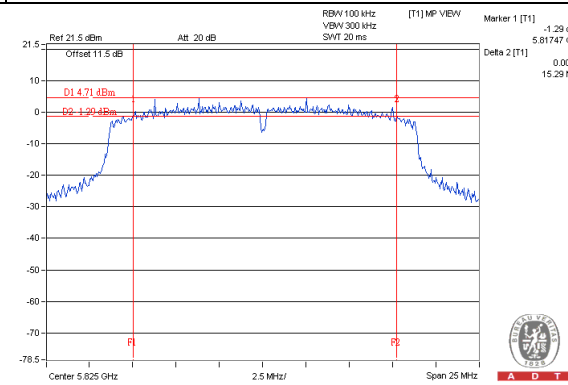
Chain 1 / CH149



Chain 1 / CH157



Chain 1 / CH165



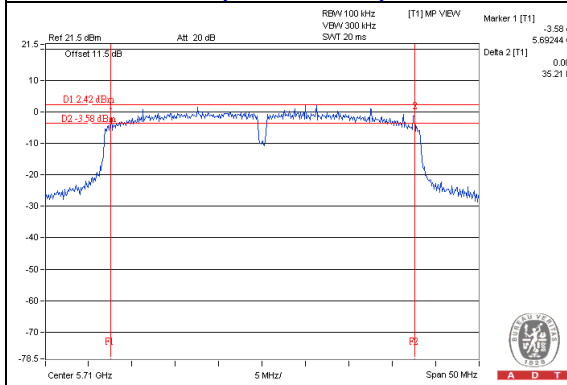
802.11ac (VHT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
142 (UNII-3 Band)	5710	2.65	2.51	0.5	Pass
151	5755	35.08	33.63	0.5	Pass
159	5795	35.17	34.09	0.5	Pass

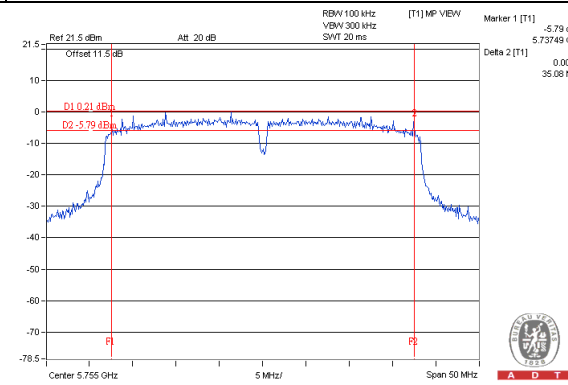
NOTE:

The 6dB bandwidth above 5725MHz = Marker 1 + Delta 2 - 5725MHz

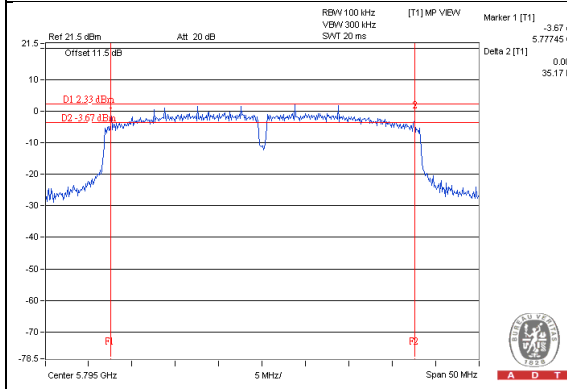
Chain 0 / CH142 (UNII-3 Band)



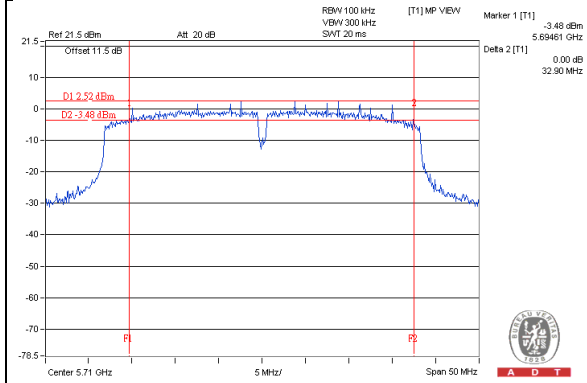
Chain 0 / CH151



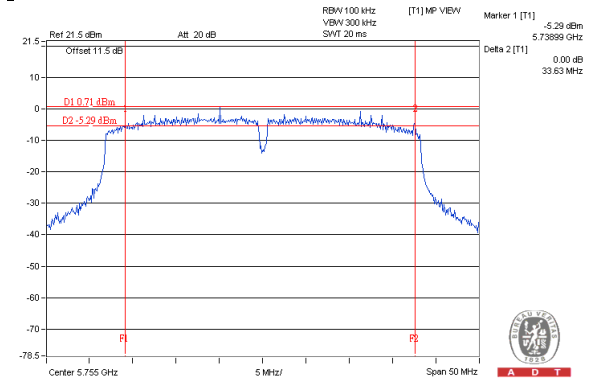
Chain 0 / CH159



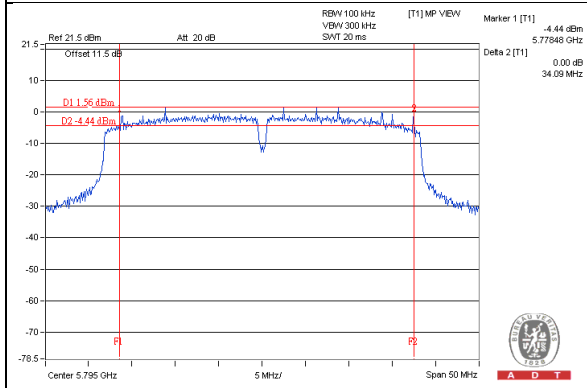
Chain 1 / CH142 (UNII-3 Band)



Chain 1 / CH151



Chain 1 / CH159

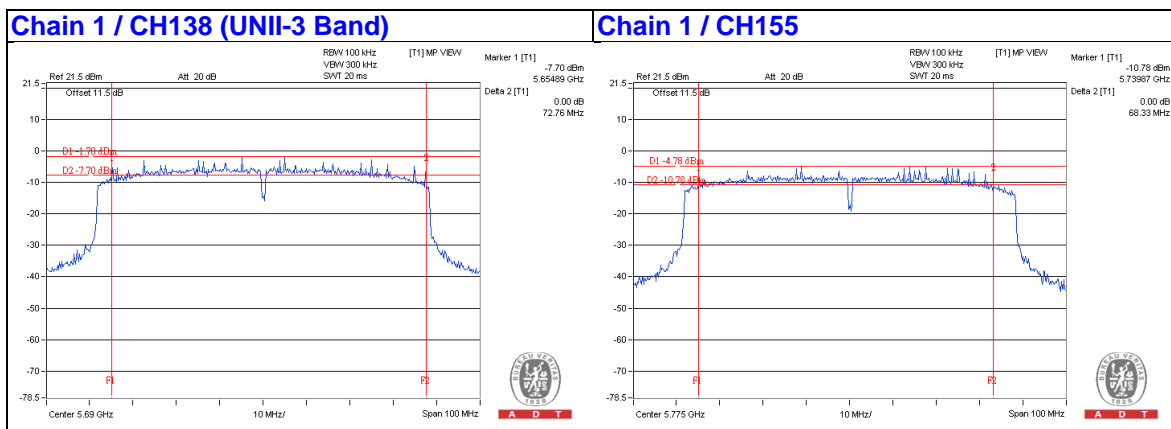
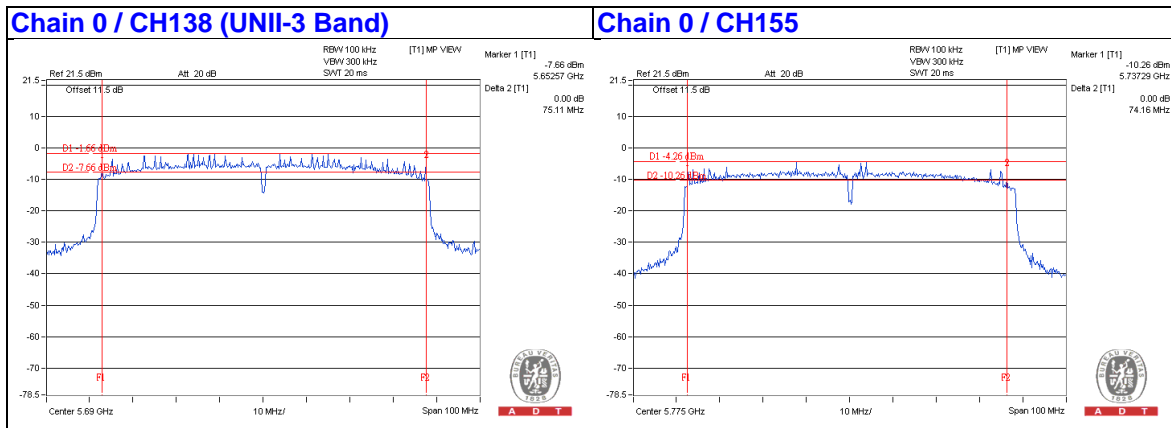


802.11ac (VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
138 (UNII-3 Band)	5690	2.68	2.65	0.5	Pass
155	5775	74.16	68.33	0.5	Pass

NOTE:

The 6dB bandwidth above 5725MHz = Marker 1 + Delta 2 - 5725MHz



4.4 Unwanted Emission (Radiated Versus Conducted)

4.4.1 Limits of Unwanted Emission Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

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.

Limits of Unwanted Emission out of the Restricted Bands

APPLICABLE TO	LIMIT	
789033 D02 General UNII Test Procedures New Rules v01	FIELD STRENGTH AT 3m	
	PK:74 (dBµV/m)	AV:54 (dBµV/m)
APPLICABLE TO	EIRP LIMIT	EQUIVALENT FIELD STRENGTH AT 3m
15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBµV/m)
15.407(b)(2)		
15.407(b)(3)		
15.407(b)(4)	PK:-27 (dBm/MHz) ^{*1} PK:-17 (dBm/MHz) ^{*2}	PK: 68.2(dBµV/m) ^{*1} PK:78.2 (dBµV/m) ^{*2}

NOTE: ^{*1} beyond 10MHz of the band edge ^{*2} within 10 MHz of band edge

The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3} \mu\text{V/m, where P is the eirp (Watts).$$



4.4.2 Test Instruments

For Above 1GHz:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI 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. 26, 2014	Feb. 25, 2015
RF Cable	NA	CHGCAB_001	Oct. 04, 2014	Oct. 03, 2015
Horn_Antenna AISI	AIH.8018	0000320091110	Aug. 27, 2014	Aug. 26, 2015
Pre-Amplifier Agilent	8449B	3008A02578	June 24, 2014	June 23, 2015
RF Cable	NA	131205 131214 SNMY23684/4	Jan. 16, 2015	Jan. 15, 2016
Spectrum Analyzer R&S	FSV40	100964	July 05, 2014	July 04, 2015
Pre-Amplifier EMCI	EMC184045	980143	Jan. 16, 2015	Jan. 15, 2016
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Aug. 26, 2014	Aug. 25, 2015
RF Cable	NA	RF104-121 RF104-204	Dec. 11, 2014	Dec. 10, 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: Feb. 06 to 11, 2015

**For Below 1GHz:**

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY50010156	Aug. 11, 2014	Aug. 10, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-04	Nov. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Feb. 27, 2014	Feb. 26, 2015
RF Cable	NA	CHHCAB_001	Oct. 05, 2014	Oct. 04, 2015
Horn_Antenna AISI	AIH.8018	0000220091110	Aug. 26, 2014	Aug. 25, 2015
Pre-Amplifier Agilent	8449B	300801923	Oct. 28, 2014	Oct. 27, 2015
RF Cable	NA	131206 131215 SNMY23685/4	Jan. 16, 2015	Jan. 15, 2016
Spectrum Analyzer R&S	FSV40	100964	July 05, 2014	July 04, 2015
Pre-Amplifier EMCI	EMC184045	980143	Jan. 16, 2015	Jan. 15, 2016
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Aug. 26, 2014	Aug. 25, 2015
RF Cable	NA	RF104-121 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

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. H.
4. The FCC Site Registration No. is 797305.
5. The CANADA Site Registration No. is IC 7450H-3.
6. Tested Date: Feb. 09, 2015

4.4.3 Test Procedures

Following FCC KDB 789033 D02 General UNII Test Procedures:
Radiated versus Conducted Measurements.

The unwanted emission limits in both the restricted and non-restricted bands are based on antenna-port conducted measurements in conjunction with cabinet emissions tests are permitted to demonstrate compliance.

The following steps was performed:

- a. Cabinet emissions measurements. Radiated measurement was performed to ensure that cabinet emissions are below the emission limits. For the cabinet-emission measurements the antenna was replaced by a termination matching the nominal impedance of the antenna.
- b. Conducted tests was performed using equipment that matches the nominal impedance of the antenna assembly used with the EUT
- c. EIRP calculation. A value representative of an upper bound on out-of-band antenna gain (in dBi) shall be added to the measured antenna-port conducted emission power to compute EIRP within the specified measurement bandwidth. (For emissions in the restricted bands, additional calculations are required to convert EIRP to field strength at the specified distance.) The upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands or 2 dBi, whichever is greater
- d. EIRP adjustments for multiple outputs. (Follow the procedures specified in FCC KDB Publication 662911)
- e. For all of Radiation emission test
 - e-1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
 - e-2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
 - e-3. 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.
 - e-4. 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-5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
 - e-6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE:

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

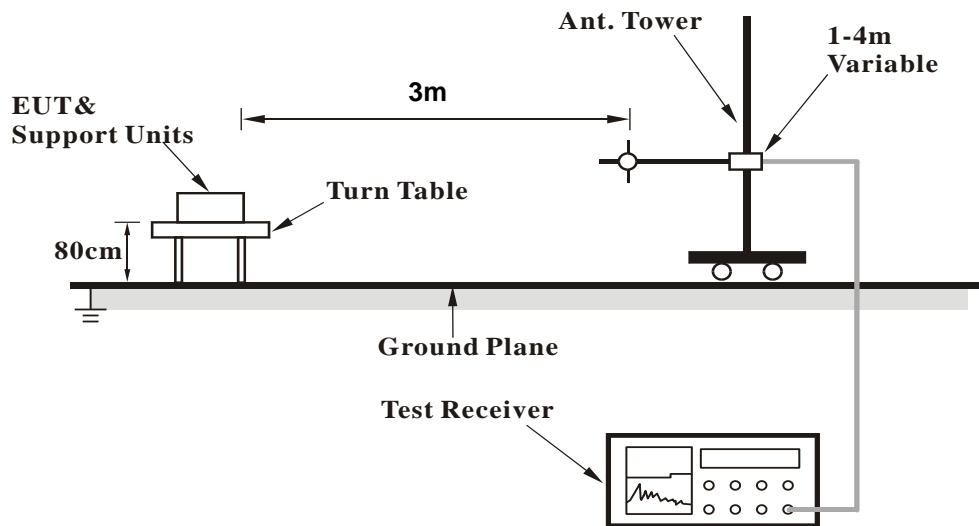
4.4.4 Deviation from Test Standard

No deviation.

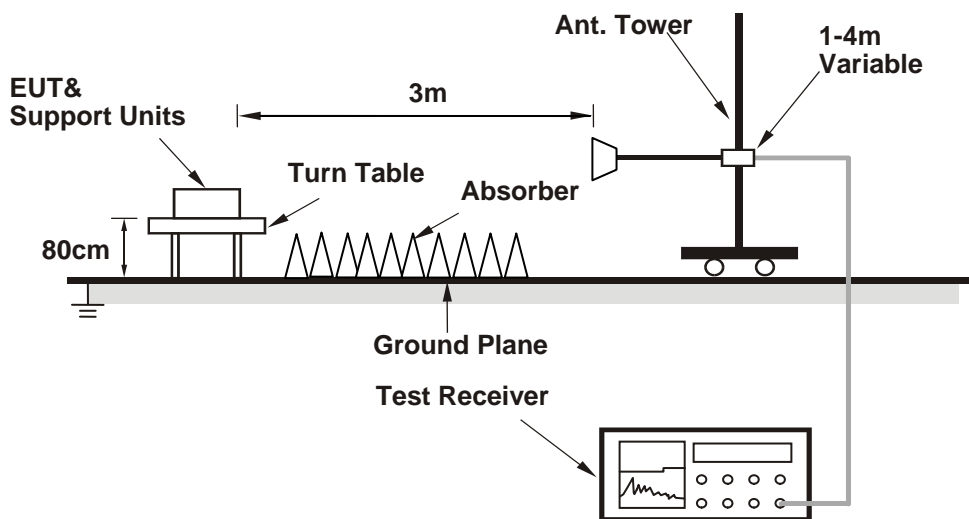
4.4.5 Test Setup

For radiated configuration:

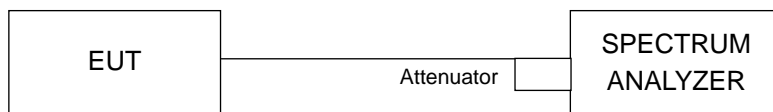
<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



For conducted configuration:



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

4.4.6 EUT Operating Conditions

1. Connect the EUT with the support unit A (Notebook Computer) which is placed on a testing table.
2. The communication partner run test program "QCART Version: 3.0.33.0" to enable EUT under transmission/receiving condition continuously at specific channel frequency.

4.4.7 Test Results (Radiated Measurement)

Radiated versus Conducted Measurement	
<input type="checkbox"/> Conducted measurement	<input checked="" type="checkbox"/> Radiated measurement
<u>For Radiated measurement:</u> The level of unwanted emissions was measured when radiated by the cabinet or structure of the equipment with the antenna connector(s) terminated by a specified load (cabinet radiation)	
<u>For Conducted measurement:</u> The level of unwanted emissions was measured as their power in a specified load (conducted spurious emissions).	

Radiated test was done with 50ohm terminator on antenna port

Above 1GHz Data :

802.11a

CHANNEL	TX Channel 36	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	#10360.00	56.7 PK	74.0	-17.3	1.00 H	215	43.59	13.11
2	#10360.00	42.7 AV	54.0	-11.3	1.00 H	215	29.59	13.11
3	15540.00	60.8 PK	74.0	-13.2	1.00 H	65	42.11	18.69
4	15540.00	47.8 AV	54.0	-6.2	1.00 H	65	29.11	18.69

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	#10360.00	55.8 PK	74.0	-18.2	1.00 V	98	42.69	13.11
2	#10360.00	42.5 AV	54.0	-11.5	1.00 V	98	29.39	13.11
3	15540.00	61.2 PK	74.0	-12.8	1.00 V	100	42.51	18.69
4	15540.00	47.8 AV	54.0	-6.2	1.00 V	100	29.11	18.69

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



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

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	#10400.00	57.1 PK	74.0	-16.9	1.00 H	206	43.88	13.22
2	#10400.00	42.8 AV	54.0	-11.2	1.00 H	206	29.58	13.22
3	15600.00	60.3 PK	74.0	-13.7	1.02 H	55	41.60	18.70
4	15600.00	47.5 AV	54.0	-6.5	1.02 H	55	28.80	18.70

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#10400.00	56.0 PK	74.0	-18.0	1.00 V	87	42.78	13.22
2	#10400.00	42.6 AV	54.0	-11.4	1.00 V	87	29.38	13.22
3	15600.00	61.1 PK	74.0	-12.9	1.00 V	87	42.40	18.70
4	15600.00	47.6 AV	54.0	-6.4	1.00 V	87	28.90	18.70

REMARKS:

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

CHANNEL	TX Channel 48	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	#10480.00	56.3 PK	74.0	-17.7	1.00 H	213	43.14	13.16
2	#10480.00	42.5 AV	54.0	-11.5	1.00 H	213	29.34	13.16
3	15720.00	60.8 PK	74.0	-13.2	1.00 H	50	42.40	18.40
4	15720.00	47.5 AV	54.0	-6.5	1.00 H	50	29.10	18.40

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	#10480.00	55.7 PK	74.0	-18.3	1.05 V	111	42.54	13.16
2	#10480.00	42.7 AV	54.0	-11.3	1.05 V	111	29.54	13.16
3	15720.00	61.3 PK	74.0	-12.7	1.04 V	99	42.90	18.40
4	15720.00	48.2 AV	54.0	-5.8	1.04 V	99	29.80	18.40

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



CHANNEL	TX Channel 52	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	#10520.00	56.3 PK	74.0	-17.7	1.04 H	228	43.08	13.22
2	#10520.00	42.3 AV	54.0	-11.7	1.04 H	228	29.08	13.22
3	15780.00	60.7 PK	74.0	-13.3	1.02 H	56	42.19	18.51
4	15780.00	47.9 AV	54.0	-6.1	1.02 H	56	29.39	18.51

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	#10520.00	56.1 PK	74.0	-17.9	1.05 V	95	42.88	13.22
2	#10520.00	42.9 AV	54.0	-11.1	1.05 V	95	29.68	13.22
3	15780.00	61.6 PK	74.0	-12.4	1.04 V	97	43.09	18.51
4	15780.00	48.3 AV	54.0	-5.7	1.04 V	97	29.79	18.51

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



CHANNEL	TX Channel 60	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	10600.00	56.4 PK	74.0	-17.6	1.00 H	221	42.87	13.53
2	10600.00	42.4 AV	54.0	-11.6	1.00 H	221	28.87	13.53
3	15900.00	61.0 PK	74.0	-13.0	1.03 H	51	42.35	18.65
4	15900.00	48.3 AV	54.0	-5.7	1.03 H	51	29.65	18.65

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	10600.00	55.6 PK	74.0	-18.4	1.00 V	110	42.07	13.53
2	10600.00	42.3 AV	54.0	-11.7	1.00 V	110	28.77	13.53
3	15900.00	61.6 PK	74.0	-12.4	1.00 V	109	42.95	18.65
4	15900.00	48.2 AV	54.0	-5.8	1.00 V	109	29.55	18.65

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

CHANNEL	TX Channel 64	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	10640.00	56.7 PK	74.0	-17.3	1.01 H	219	43.07	13.63
2	10640.00	42.8 AV	54.0	-11.2	1.01 H	219	29.17	13.63
3	15960.00	60.8 PK	74.0	-13.2	1.04 H	80	42.19	18.61
4	15960.00	47.7 AV	54.0	-6.3	1.04 H	80	29.09	18.61

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	10640.00	56.3 PK	74.0	-17.7	1.00 V	91	42.67	13.63
2	10640.00	42.9 AV	54.0	-11.1	1.00 V	91	29.27	13.63
3	15960.00	61.2 PK	74.0	-12.8	1.00 V	91	42.59	18.61
4	15960.00	47.7 AV	54.0	-6.3	1.00 V	91	29.09	18.61

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



CHANNEL	TX Channel 100	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	11000.00	56.1 PK	74.0	-17.9	1.00 H	217	41.68	14.42
2	11000.00	42.3 AV	54.0	-11.7	1.00 H	217	27.88	14.42
3	#16500.00	60.2 PK	74.0	-13.8	1.00 H	75	39.26	20.94
4	#16500.00	47.3 AV	54.0	-6.7	1.00 H	75	26.36	20.94

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	11000.00	55.8 PK	74.0	-18.2	1.05 V	100	41.38	14.42
2	11000.00	42.2 AV	54.0	-11.8	1.05 V	100	27.78	14.42
3	#16500.00	60.6 PK	74.0	-13.4	1.00 V	105	39.66	20.94
4	#16500.00	47.3 AV	54.0	-6.7	1.00 V	105	26.36	20.94

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



CHANNEL	TX Channel 120	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	11200.00	57.2 PK	74.0	-16.8	1.02 H	218	42.94	14.26
2	11200.00	43.0 AV	54.0	-11.0	1.02 H	218	28.74	14.26
3	#16800.00	61.0 PK	74.0	-13.0	1.00 H	61	39.70	21.30
4	#16800.00	48.1 AV	54.0	-5.9	1.00 H	61	26.80	21.30

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	11200.00	55.8 PK	74.0	-18.2	1.05 V	101	41.54	14.26
2	11200.00	42.8 AV	54.0	-11.2	1.05 V	101	28.54	14.26
3	#16800.00	61.4 PK	74.0	-12.6	1.00 V	115	40.10	21.30
4	#16800.00	47.9 AV	54.0	-6.1	1.00 V	115	26.60	21.30

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



CHANNEL	TX Channel 140	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	11400.00	56.8 PK	74.0	-17.2	1.00 H	228	42.38	14.42
2	11400.00	42.7 AV	54.0	-11.3	1.00 H	228	28.28	14.42
3	#17100.00	60.5 PK	74.0	-13.5	1.05 H	78	38.73	21.77
4	#17100.00	47.7 AV	54.0	-6.3	1.05 H	78	25.93	21.77

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	11400.00	55.8 PK	74.0	-18.2	1.03 V	97	41.38	14.42
2	11400.00	42.8 AV	54.0	-11.2	1.03 V	97	28.38	14.42
3	#17100.00	61.7 PK	74.0	-12.3	1.00 V	114	39.93	21.77
4	#17100.00	48.1 AV	54.0	-5.9	1.00 V	114	26.33	21.77

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



A D T

CHANNEL	TX Channel 144	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	11440.00	56.3 PK	74.0	-17.7	1.00 H	207	41.91	14.39
2	11440.00	42.4 AV	54.0	-11.6	1.00 H	207	28.01	14.39
3	#17160.00	60.7 PK	74.0	-13.3	1.00 H	56	38.69	22.01
4	#17160.00	47.9 AV	54.0	-6.1	1.00 H	56	25.89	22.01

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	11440.00	56.1 PK	74.0	-17.9	1.04 V	83	41.71	14.39
2	11440.00	42.5 AV	54.0	-11.5	1.04 V	83	28.11	14.39
3	#17160.00	61.1 PK	74.0	-12.9	1.00 V	98	39.09	22.01
4	#17160.00	47.5 AV	54.0	-6.5	1.00 V	98	25.49	22.01

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



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

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	11490.00	56.6 PK	74.0	-17.4	1.01 H	203	42.25	14.35
2	11490.00	42.8 AV	54.0	-11.2	1.01 H	203	28.45	14.35
3	#17235.00	60.4 PK	74.0	-13.6	1.02 H	64	37.96	22.44
4	#17235.00	47.6 AV	54.0	-6.4	1.02 H	64	25.16	22.44

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	11490.00	56.0 PK	74.0	-18.0	1.00 V	89	41.65	14.35
2	11490.00	42.6 AV	54.0	-11.4	1.00 V	89	28.25	14.35
3	#17235.00	61.3 PK	74.0	-12.7	1.06 V	113	38.86	22.44
4	#17235.00	47.8 AV	54.0	-6.2	1.06 V	113	25.36	22.44

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



A D T

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

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	11570.00	57.3 PK	74.0	-16.7	1.02 H	216	42.99	14.31
2	11570.00	43.0 AV	54.0	-11.0	1.02 H	216	28.69	14.31
3	#17355.00	60.9 PK	74.0	-13.1	1.05 H	55	37.90	23.00
4	#17355.00	48.0 AV	54.0	-6.0	1.05 H	55	25.00	23.00

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	11570.00	56.2 PK	74.0	-17.8	1.05 V	98	41.89	14.31
2	11570.00	42.8 AV	54.0	-11.2	1.05 V	98	28.49	14.31
3	#17355.00	61.4 PK	74.0	-12.6	1.04 V	105	38.40	23.00
4	#17355.00	47.9 AV	54.0	-6.1	1.04 V	105	24.90	23.00

REMARKS:

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



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

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	11650.00	56.8 PK	74.0	-17.2	1.01 H	217	42.42	14.38
2	11650.00	42.9 AV	54.0	-11.1	1.01 H	217	28.52	14.38
3	#17475.00	60.5 PK	74.0	-13.5	1.00 H	50	37.20	23.30
4	#17475.00	47.7 AV	54.0	-6.3	1.00 H	50	24.40	23.30

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	11650.00	55.4 PK	74.0	-18.6	1.03 V	113	41.02	14.38
2	11650.00	42.2 AV	54.0	-11.8	1.03 V	113	27.82	14.38
3	#17475.00	61.6 PK	74.0	-12.4	1.03 V	94	38.30	23.30
4	#17475.00	48.0 AV	54.0	-6.0	1.03 V	94	24.70	23.30

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

802.11ac (VHT20)

CHANNEL	TX Channel 36	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	#10360.00	56.9 PK	74.0	-17.1	1.05 H	225	43.79	13.11
2	#10360.00	43.1 AV	54.0	-10.9	1.05 H	225	29.99	13.11
3	15540.00	61.3 PK	74.0	-12.7	1.00 H	67	42.61	18.69
4	15540.00	48.1 AV	54.0	-5.9	1.00 H	67	29.41	18.69

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	#10360.00	55.9 PK	74.0	-18.1	1.00 V	107	42.79	13.11
2	#10360.00	42.5 AV	54.0	-11.5	1.00 V	107	29.39	13.11
3	15540.00	61.1 PK	74.0	-12.9	1.02 V	91	42.41	18.69
4	15540.00	47.8 AV	54.0	-6.2	1.02 V	91	29.11	18.69

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



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

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	#10400.00	56.8 PK	74.0	-17.2	1.06 H	226	43.58	13.22
2	#10400.00	42.7 AV	54.0	-11.3	1.06 H	226	29.48	13.22
3	15600.00	61.2 PK	74.0	-12.8	1.00 H	61	42.50	18.70
4	15600.00	48.1 AV	54.0	-5.9	1.00 H	61	29.40	18.70

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#10400.00	56.3 PK	74.0	-17.7	1.00 V	98	43.08	13.22
2	#10400.00	42.8 AV	54.0	-11.2	1.00 V	98	29.58	13.22
3	15600.00	61.0 PK	74.0	-13.0	1.01 V	116	42.30	18.70
4	15600.00	47.5 AV	54.0	-6.5	1.01 V	116	28.80	18.70

REMARKS:

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



CHANNEL	TX Channel 48	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	#10480.00	56.7 PK	74.0	-17.3	1.01 H	212	43.54	13.16
2	#10480.00	42.8 AV	54.0	-11.2	1.01 H	212	29.64	13.16
3	15720.00	60.7 PK	74.0	-13.3	1.00 H	72	42.30	18.40
4	15720.00	47.7 AV	54.0	-6.3	1.00 H	72	29.30	18.40

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	#10480.00	56.0 PK	74.0	-18.0	1.00 V	90	42.84	13.16
2	#10480.00	42.6 AV	54.0	-11.4	1.00 V	90	29.44	13.16
3	15720.00	61.1 PK	74.0	-12.9	1.01 V	102	42.70	18.40
4	15720.00	47.6 AV	54.0	-6.4	1.01 V	102	29.20	18.40

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



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CHANNEL	TX Channel 52	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	#10520.00	56.8 PK	74.0	-17.2	1.00 H	221	43.58	13.22
2	#10520.00	42.8 AV	54.0	-11.2	1.00 H	221	29.58	13.22
3	15780.00	60.8 PK	74.0	-13.2	1.00 H	65	42.29	18.51
4	15780.00	47.7 AV	54.0	-6.3	1.00 H	65	29.19	18.51

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	#10520.00	55.9 PK	74.0	-18.1	1.01 V	108	42.68	13.22
2	#10520.00	42.7 AV	54.0	-11.3	1.01 V	108	29.48	13.22
3	15780.00	61.8 PK	74.0	-12.2	1.00 V	93	43.29	18.51
4	15780.00	48.2 AV	54.0	-5.8	1.00 V	93	29.69	18.51

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