



# FCC TEST REPORT (15.407)

**REPORT NO.:** RF140828E03-1

**MODEL NO.:** D5001, D3001, D3003

**FCC ID:** NQ8D5001

**RECEIVED:** Aug. 28, 2014

**TESTED:** Sep. 10 to 23, 2014

**ISSUED:** Oct. 03, 2014

**APPLICANT:** Pace Micro Technology plc

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**ISSUED BY:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory

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## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF140828E03-1	Original release	Oct. 03, 2014



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## 1. CERTIFICATION

**PRODUCT:** DOCSIS 3.0 Wireless Gateway Router with MOCA 2.0  
**BRAND NAME:** Pace  
**MODEL NO.:** D5001, D3001, D3003  
**TEST SAMPLE:** ENGINEERING SAMPLE  
**APPLICANT:** Pace Micro Technology plc  
**TESTED:** Sep. 10 to 23, 2014  
**STANDARDS:** **FCC Part 15, Subpart E (Section 15.407)**  
ANSI C63.10-2009

The above equipment (Model: D5001) 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 : Midoli Peng , Date: Oct. 03, 2014  
( Midoli Peng, Specialist )

Approved by : May Chen , Date: Oct. 03, 2014  
( May Chen, Manager )



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## 2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART E (SECTION 15.407)			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
15.407(b)(6)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -15.62dB at 0.18125MHz
15.407 (b)(1/2/3/4/6)	Radiated Emissions & Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.1dB at 5020.00MHz, 5366.00MHz, 5400.00MHz, 5061.00MHz, 5358.00MHz, 5150.00MHz & 5860.00MHz & 5715.00MHz..
15.407(a/1/2/3)	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 i-pex(MHF) not a standard connector.

**NOTE:** 1. The EUT was operating in 2.400 ~ 2.4835GHz, 5.15~5.25GHz and 5.725~5.850GHz frequencies band. This report was recorded the RF parameters including 5.15~5.25GHz and 5.725~5.850GHz. For the 2.400 ~ 2.4835GHz RF parameters was recorded in another test report.



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## 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:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .

<b>Measurement</b>	<b>Value</b>
Conducted emissions	2.86 dB
Radiated emissions (30MHz-1GHz)	5.37 dB
Radiated emissions (1GHz -6GHz)	3.65 dB
Radiated emissions (6GHz -18GHz)	3.88 dB
Radiated emissions (18GHz -40GHz)	4.11 dB



### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	DOCSIS 3.0 Wireless Gateway Router with MOCA 2.0
<b>MODEL NO.</b>	D5001, D3001, D3003
<b>POWER SUPPLY</b>	DC 12V from internal power supply
<b>MODULATION TYPE</b>	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode only
<b>MODULATION TECHNOLOGY</b>	DSSS,OFDM
<b>TRANSFER RATE</b>	802.11b: up to 11Mbps 802.11a / g: up to 54Mbps 802.11n: up to 450Mbps 802.11ac: up to 1300Mbps
<b>OPERATING FREQUENCY</b>	<b>For 15.407</b> 5.18 ~ 5.24GHz, 5.745 ~ 5.825GHz
	<b>For 15.247</b> 2.412 ~ 2.462GHz
<b>NUMBER OF CHANNEL</b>	<b>For 15.407</b> 9 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 4 for 802.11n (HT40), 802.11ac (VHT40) 2 for 802.11ac (VHT80)
	<b>For 15.247</b> 11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
<b>MAXIMUM OUTPUT POWER</b>	Please see NOTE
<b>ANTENNA TYPE</b>	Please see NOTE
<b>DATA CABLE</b>	NA
<b>I/O PORTS</b>	Refer to user's manual
<b>ASSOCIATED DEVICES</b>	NA



**Note:**

1. The EUT has three model names which are identical to each other in all aspects except for the following table:

Model Name	D5001	D3001	D3003	Remark
DSxUS	24x8	16x4	16x4	Remove BCM3184 wide band tuner for E469&E470
Wifi function	2.4G / 5G 11n & ac concurrent	2.4G / 5G 11n & ac concurrent	2.4G / 5G 11n & ac concurrent	-
With Moca	Yes	Yes	NA	Remove BCM6803 for E470
Wide band tuner	BCM3184	NA	NA	Remove BCM3184 wide band tuner for E469&E470
MoCA Chip	BCM6803KFSBG+ BCM3451KMLG	BCM6803KFSBG+ BCM3451KMLG	NA	Remove BCM6803 for E470

In general, these 3 models share the same main board PCB but with different component mounting. Two WiFi boards, enclosures, antennas, PSU are all the same without any changing.

From the above models, model: **D5001** was selected as representative model for the test and its data was recorded in this report.

2. The maximum output power(mW) table as below table:

<b>2.4GHz</b>				
Test Mode	802.11b	802.11g	802.11n (HT20)	802.11n (HT40)
3TX / CDD Mode	808.083	986.932	995.844	254.792
3TX / Beamforming Mode	NA	NA	531.12	254.792
<b>5GHz</b>				
Test Mode	802.11a	802.11ac (VHT20)	802.11ac (VHT40)	802.11ac (VHT80)
3TX / CDD Mode	678.435	704.784	630.307	171.995
3TX / Beamforming Mode	NA	398.179	359.682	171.995

3. The EUT must be supplied with an internal power supply:

Brand	Model No.	Spec.
AMPOWER	E12B001.00	AC I/P: 100~240V, 50/60Hz, 1.3A AC Input cable: 1.8m, unshielded DC O/P: 12V, 4A



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4. There are six antennas provided to this EUT, please refer to the following table:

Antenna No.	Transmitter Circuit	Brand	Model	Gain (dBi) (Include cable loss)	Frequency range (GHz to GHz)	Antenna Type	Connector Type	Cable Length (mm)
LB1	2	Galtronics	02102073-05762B1	2.84	2.4~2.4835	Dipole	i-pex(MHF)	310
LB2	0	Galtronics	02102073-05762C1	3.8	2.4~2.4835	PCB	i-pex(MHF)	161
LB3	1	Galtronics	02102073-05762A1	4.87	2.4~2.4835	PCB	i-pex(MHF)	66
HB1	0	Galtronics	02102142-05762B2	5.50 5.27	5.15~5.35 5.47~5.85	Dipole	i-pex(MHF)	130
HB2	2	Galtronics	02102142-05762B1	4.75 5.68	5.15~5.35 5.47~5.85	Dipole	i-pex(MHF)	80
HB3	1	Galtronics	02102142-05762B3	4.03 5.74	5.15~5.35 5.47~5.85	Dipole	i-pex(MHF)	170

5. The EUT incorporates a MIMO function.

MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
<b>802.11a</b>	6 ~ 54Mbps	1TX	3RX
		2TX CDD	
		3TX CDD	
<b>802.11b</b>	1 ~ 11Mbps	1TX	3RX
		2TX CDD	
		3TX CDD	
<b>802.11g</b>	6 ~ 54Mbps	1TX	3RX
		2TX CDD	
		3TX CDD	
<b>802.11n (HT20) &amp; 802.11n (HT40)</b>	MCS 0~7	1TX 2TX CDD / beamforming 3TX CDD / beamforming	3RX
	MCS 8~15	2TX beamforming 3TX CDD / beamforming	
	MCS 16~23	3TX / beamforming	
<b>802.11ac (VHT20)</b>	MCS0~8 Nss= 1	1TX 2Tx CDD / beamforming 3TX CDD / beamforming	3RX
	MCS0~8 Nss= 2	2TX beamforming 3TX CDD / beamforming	
	MCS0~9 Nss= 3	3TX / beamforming	
<b>802.11ac (VHT40) &amp; 802.11ac (VHT80)</b>	MCS0~9 Nss= 1	1TX 2Tx CDD / beamforming 3TX CDD / beamforming	3RX
	MCS0~9 Nss= 2	2TX CDD / beamforming 3TX CDD / beamforming	
	MCS0~9 Nss= 3	3TX / beamforming	

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 3.2.1)



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6. The emission of the simultaneous operation (2.4GHz & 5GHz) has been evaluated and no non-compliance was found.
7. The above EUT information was declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

### 3.2 DESCRIPTION OF TEST MODES

#### Operated in 5150 ~ 5250MHz band:

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

CHANNEL	FREQUENCY
42	5210 MHz

#### Operated in 5725 ~ 5850MHz band:

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
149	5745 MHz	161	5805 MHz
153	5765 MHz	165	5825 MHz
157	5785 MHz		

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

CHANNEL	FREQUENCY
151	5755 MHz
159	5795 MHz

1 channel is provided for 802.11ac (VHT80):

CHANNEL	FREQUENCY
155	5775 MHz

### 3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	PLC	RE < 1G	RE ≥ 1G	APCM	
1	√	√	√	√	3TX / CDD Mode
2	-	-	-	√	3TX / Beamforming Mode

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

#### **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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (MBPS)	EUT CONFIGURE MOD
802.11ac (VHT20)	38 to 46 & 151 to 159	157	OFDM	BPSK	13.5	1

#### **RADIATED EMISSION TEST (BELOW 1 GHz):**

- 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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (MBPS)	EUT CONFIGURE MOD
802.11ac (VHT20)	38 to 46 & 151 to 159	157	OFDM	BPSK	13.5	1



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**RADIATED EMISSION TEST (ABOVE 1 GHz):**

- 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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (MBPS)	EUT CONFIGURE MOD
802.11a	36 to 48 & 149 to 165	36, 40, 48, 149, 157, 165	OFDM	BPSK	6	1
802.11ac (VHT20)	36 to 48 & 149 to 165	36, 40, 48, 149, 157, 165	OFDM	BPSK	6.5	1
802.11ac (VHT40)	38 to 46 & 151 to 159	38, 46, 151, 159	OFDM	BPSK	13.5	1
802.11ac (VHT80)	42 & 155	42, 155	OFDM	BPSK	29.3	1

**ANTENNA PORT CONDUCTED MEASUREMENT:**

- 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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (MBPS)	EUT CONFIGURE MOD
802.11a	36 to 48 & 149 to 165	36, 40, 48, 149, 157, 165	OFDM	BPSK	6	1
802.11ac (VHT20)	36 to 48 & 149 to 165	36, 40, 48, 149, 157, 165	OFDM	BPSK	6.5	1, 2
802.11ac (VHT40)	38 to 46 & 151 to 159	38, 46, 151, 159	OFDM	BPSK	13.5	1, 2
802.11ac (VHT80)	42 & 155	42, 155	OFDM	BPSK	29.3	1, 2



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**TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
PLC	30deg. C, 70%RH	120Vac, 60Hz	Mike Hsieh
RE<1G	23deg. C, 68%RH	120Vac, 60Hz	Robert Cheng
RE≥1G	23deg. C, 69%RH	120Vac, 60Hz	Robert Cheng
APCM	25deg. C, 60%RH	120Vac, 60Hz	James Chan



### **3.3 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**

ANSI C63.10-2009

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

### 3.4 DUTY CYCLE OF TEST SIGNAL

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

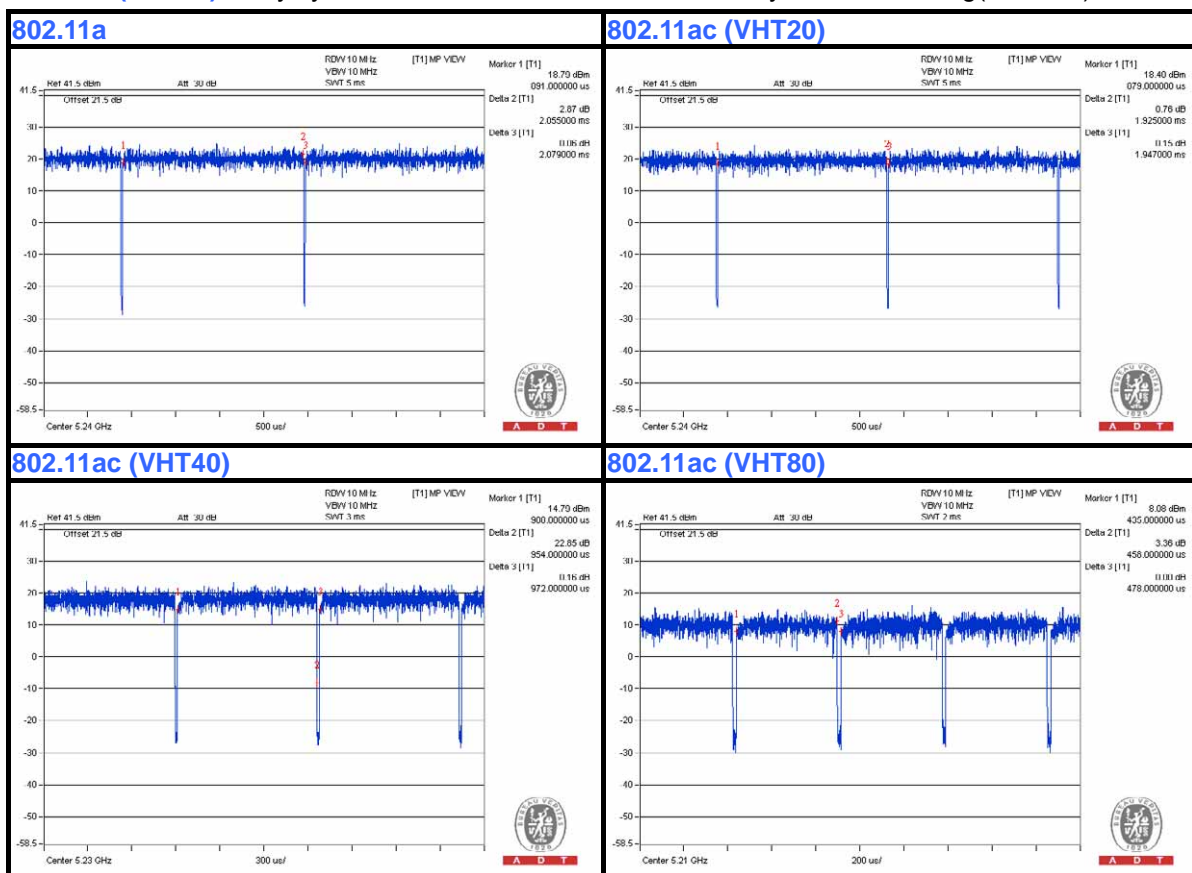
If duty cycle of test signal is  $< 98\%$ , duty factor shall be considered.

**802.11a:** Duty cycle = 2.055 ms/2.079 ms = 0.988

**802.11ac(VHT20):** Duty cycle = 1.925 ms/1.947 ms = 0.989

**802.11ac(VHT40):** Duty cycle = 0.954 ms/0.972 ms = 0.981

**802.11ac(VHT80):** Duty cycle = 0.458 ms/0.478 ms = 0.958, Duty factor =  $10 * \log(1/0.958) = 0.19$





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### 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.

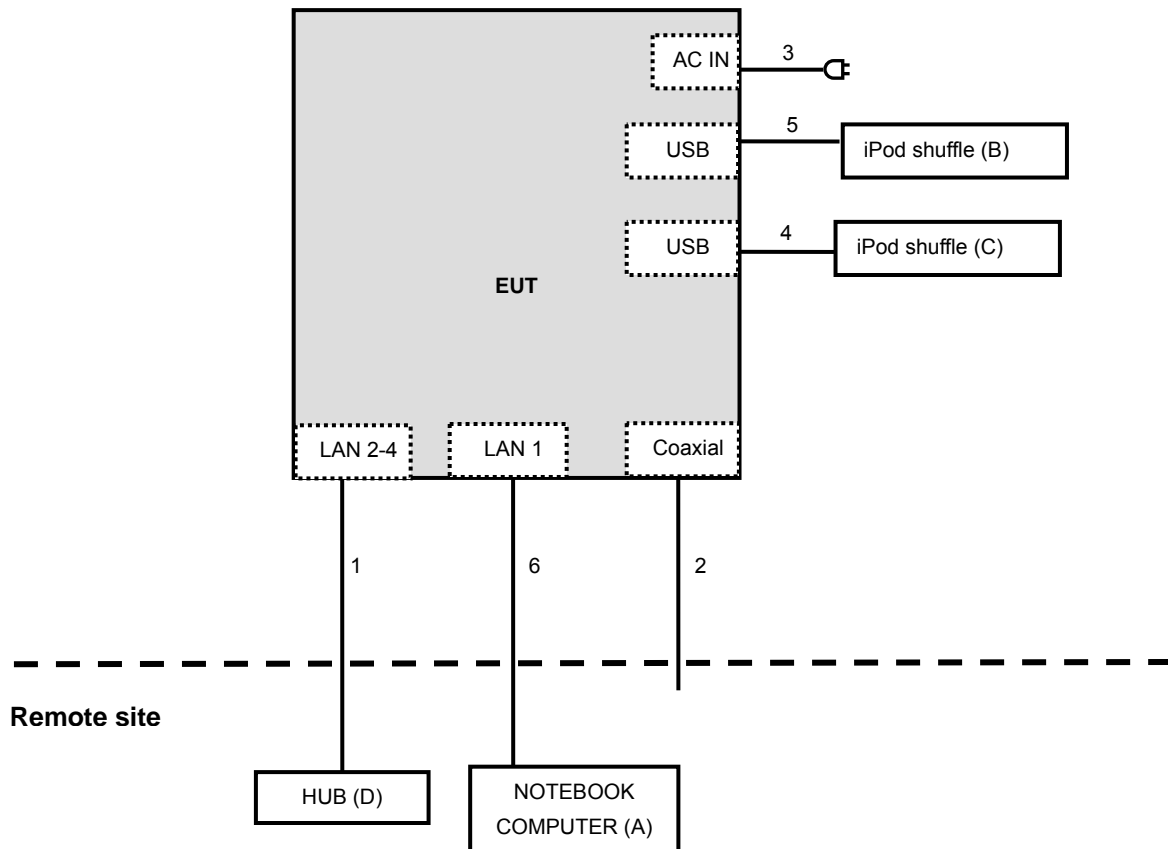
No.	Product	Brand	Model No.	Serial No.	FCC ID	Remark
A	NOTEBOOK COMPUTER	DELL	E5430	7YV4VY1	FCC DoC	Provided by Lab
B	iPod shuffle (For other test items)	Apple	MC749TA/A	CC4DN25WDFDM	NA	Provided by Lab
	iPod shuffle (For conducted emission test)	Apple	MD778TA/A	CC4JMCXF4T1	NA	Provided by Lab
C	iPod shuffle (For other test items)	Apple	MC749TA/A	CC4DMFKUDFDM	NA	Provided by Lab
	iPod shuffle (For conducted emission test)	Apple	MD778TA/A	CC4JMH7LF4T1	NA	Provided by Lab
D	HUB	ZyXEL	ES-116P	S060H02000215	FCC DoC	Provided by Lab

**NOTE:**

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

No.	Cable	Qty.	Length (m)	Shielded (Yes/ No)	Cores (Number)	Remark
1.	RJ-45	3	10	No	0	Provided by Lab
2.	Coaxial	1	10	Yes	0	Provided by Lab
3.	AC	1	1.8	No	0	Supplied by client
4.	USB	1	0.1	Yes	0	Provided by Lab
5.	USB	1	0.1	Yes	0	Provided by Lab
6.	RJ-45	1	10	No	0	Provided by Lab

### 3.6 CONFIGURATION OF SYSTEM UNDER TEST





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## 4. TEST TYPES AND RESULTS

### 4.1 CONDUCTED EMISSION MEASUREMENT

#### 4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBµV)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

- NOTE:**
- The lower limit shall apply at the transition frequencies.
  - The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

#### 4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS 30	100375	Apr. 29, 2014	Apr. 28, 2015
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK8127	8127-522	Sep. 12, 2013	Sep. 11, 2014
Line-Impedance Stabilization Network (for Peripheral) ROHDE & SCHWARZ	ENV216	100071	Nov. 13, 2013	Nov. 12, 2014
RF Cable (JYEBAO)	5DFB	COCCAB-001	Mar. 10, 2014	Mar. 09, 2015
50 ohms Terminator	N/A	EMC-03	Sep. 24, 2013	Sep. 23, 2014
50 ohms Terminator	N/A	EMC-02	Oct. 01, 2013	Sep. 30, 2014
Software ADT	BV ADT_Cond_V7.3.7. 3	NA	NA	NA

**Note:**

- The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
- The test was performed in Shielded Room No. C.
- The VCCI Con C Registration No. is C-3611.
- Tested Date: Sep. 10, 2014

### 4.1.3 TEST PROCEDURES

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN.
- b. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- c. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- d. The frequency range from 150kHz to 30MHz was searched. Emission level under (Limit – 20dB) was not recorded.

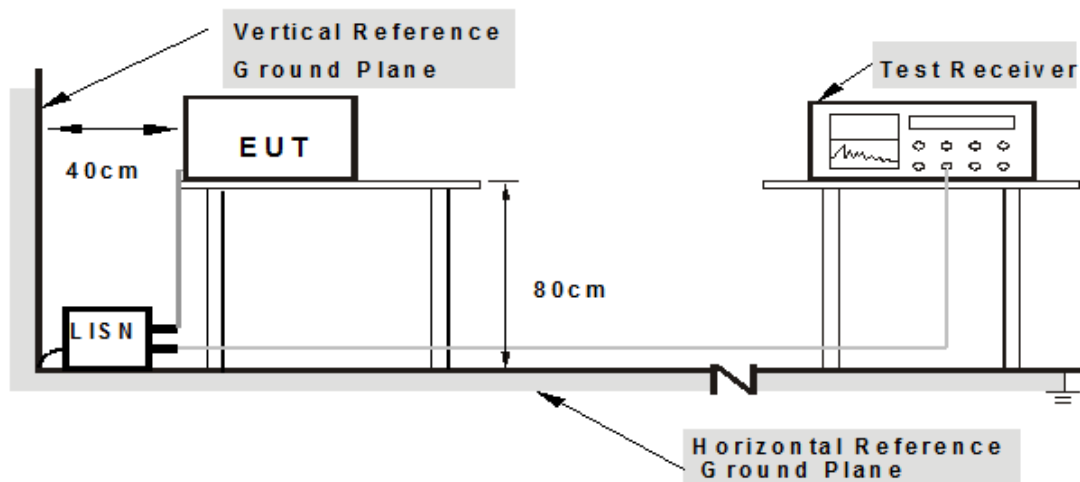
#### NOTE:

1. The resolution bandwidth of test receiver is 9kHz for Quasi-peak detection (QP) & Average detection (AV).

### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation

### 4.1.5 TEST SETUP



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

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

#### 4.1.6 EUT OPERATING CONDITIONS

1. Placed the EUT on testing table.
2. Prepared computer system (support unit A) to act as communication partner.
3. The communication partner ran test program “Mtool.exe[2.0.1.1]” to enable EUT under transmission/receiving condition continuously.

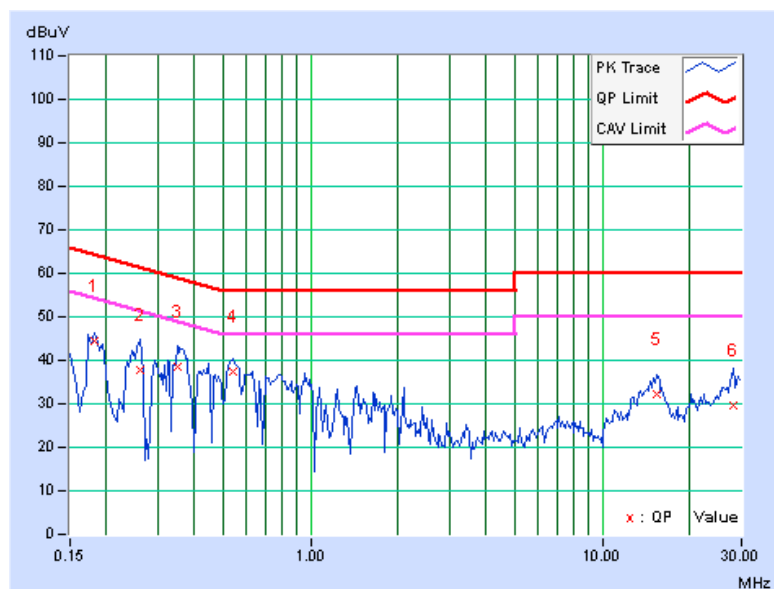
### 4.1.7 TEST RESULTS

<b>PHASE</b>	Line (L)	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18125	0.07	44.20	38.74	44.27	38.81	64.43	54.43	-20.16	-15.62
2	0.25938	0.08	37.84	20.49	37.92	20.57	61.45	51.45	-23.54	-30.89
3	0.34922	0.08	38.43	21.21	38.51	21.29	58.98	48.98	-20.47	-27.69
4	0.54453	0.10	37.21	27.11	37.31	27.21	56.00	46.00	-18.69	-18.79
5	15.39844	0.60	31.57	25.68	32.17	26.28	60.00	50.00	-27.83	-23.72
6	28.07422	0.94	28.82	23.17	29.76	24.11	60.00	50.00	-30.24	-25.89

#### REMARKS:

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



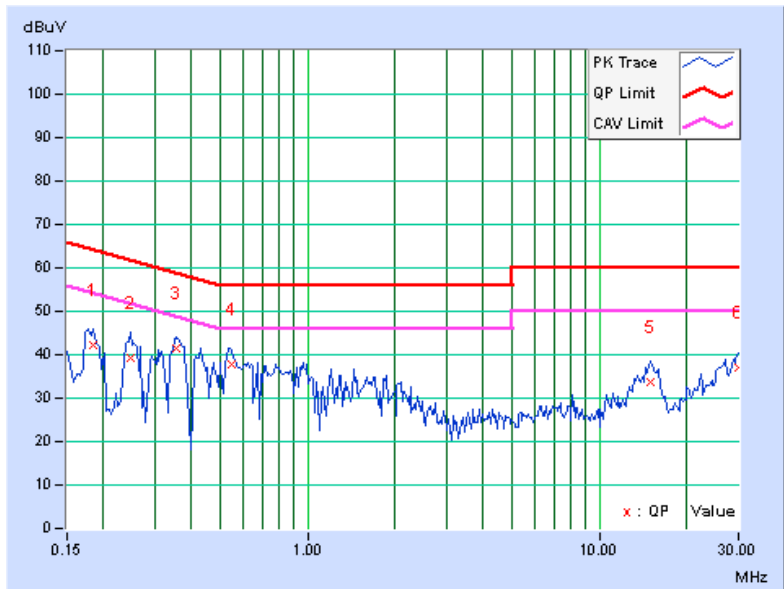


<b>PHASE</b>	Neutral (N)	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP) / Average (AV)
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No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18516	0.07	42.05	35.49	42.12	35.56	64.25	54.25	-22.13	-18.69
2	0.24766	0.07	39.13	31.87	39.20	31.94	61.84	51.84	-22.63	-19.89
3	0.35313	0.09	41.40	26.77	41.49	26.86	58.89	48.89	-17.40	-22.03
4	0.54844	0.10	37.86	28.10	37.96	28.20	56.00	46.00	-18.04	-17.80
5	14.93359	0.58	33.17	26.76	33.75	27.34	60.00	50.00	-26.25	-22.66
6	29.96094	0.99	35.93	31.09	36.92	32.08	60.00	50.00	-23.08	-17.92

**REMARKS:**

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





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## 4.2 RADIATED EMISSION AND BANDEDGE MEASUREMENT

### 4.2.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

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

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

**NOTE:**

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



#### 4.2.2 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) <sup>*1</sup> PK:-17 (dBm/MHz) <sup>*2</sup>	PK: 68.2(dBµV/m) <sup>*1</sup> PK:78.2 (dBµV/m) <sup>*2</sup>

**NOTE:** <sup>\*1</sup> beyond 10MHz of the band edge    <sup>\*2</sup> within 10 MHz of band edge

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

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



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### 4.2.3 TEST INSTRUMENTS

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. 13, 2013	Nov. 12, 2014
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Feb. 26, 2014	Feb. 25, 2015
RF Cable	NA	CHGCAB_001	Oct. 05, 2013	Oct. 04, 2014
Spectrum Analyzer R&S	FSV40	100964	July 05, 2014	July 04, 2015
Horn_Antenna AISI	AIH.8018	0000320091110	Nov. 18, 2013	Nov. 17, 2014
Pre-Amplifier Agilent	8449B	3008A02578	June 24, 2014	June 23, 2015
RF Cable	NA	RF104-201 RF104-203 RF104-204	Dec. 12, 2013	Dec. 11, 2014
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 13, 2013	Nov. 12, 2014
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 08, 2013	Oct. 07, 2014
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.
- 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: Sep. 18 to 19, 2014

#### 4.2.4 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

**Note:**

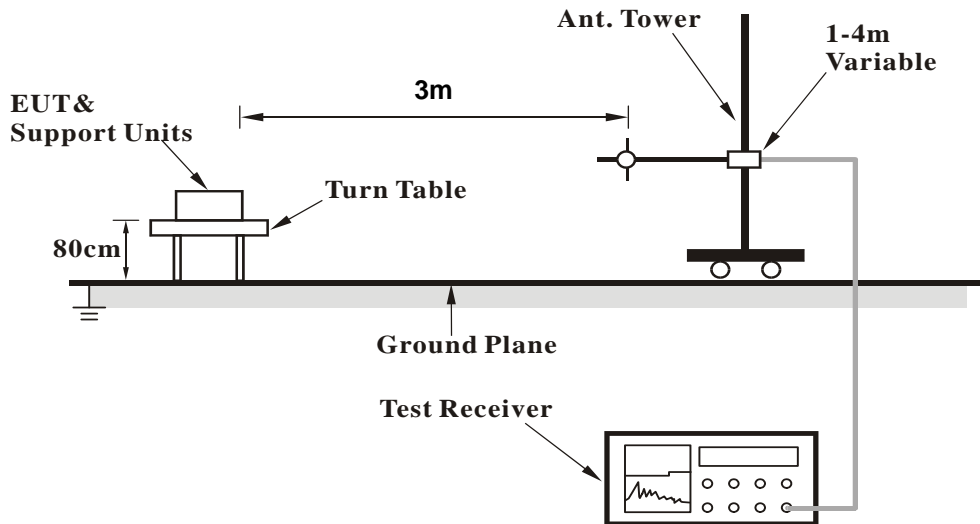
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

#### 4.2.5 DEVIATION FROM TEST STANDARD

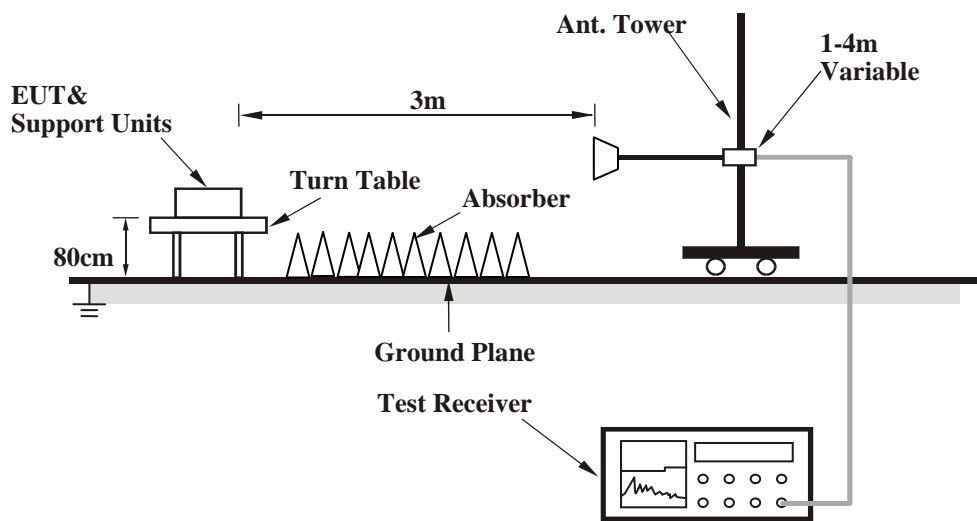
No deviation

#### 4.2.6 TEST SETUP

##### <Frequency Range below 1GHz>



##### <Frequency Range above 1GHz>



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

#### 4.2.7 EUT OPERATING CONDITION

Same as 4.1.6



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## 4.2.8 TEST RESULTS

### BELOW 1GHz WORST-CASE DATA

#### 802.11ac(VHT20)

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

#### ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	108.64	28.7 QP	43.5	-14.8	1.75 H	144	45.18	-16.46
2	125.11	31.0 QP	43.5	-12.5	1.64 H	142	45.94	-14.92
3	249.75	32.5 QP	46.0	-13.5	1.34 H	251	46.87	-14.33
4	500.10	34.3 QP	46.0	-11.7	1.24 H	304	41.67	-7.36
5	624.75	40.1 QP	46.0	-5.9	1.64 H	304	44.52	-4.41
6	651.75	33.8 QP	46.0	-12.2	1.45 H	302	37.90	-4.08

#### 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	37.41	34.7 QP	40.0	-5.3	1.24 V	240	48.75	-14.03
2	98.31	25.7 QP	43.5	-17.9	1.34 V	270	43.87	-18.22
3	380.38	35.0 QP	46.0	-11.0	1.64 V	247	45.11	-10.09
4	390.52	31.4 QP	46.0	-14.6	1.34 V	345	41.32	-9.90
5	500.15	34.3 QP	46.0	-11.7	1.34 V	304	41.70	-7.36
6	628.42	34.4 QP	46.0	-11.6	1.67 V	245	38.79	-4.37

#### 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



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**TX\_High**

**802.11a**

<b>CHANNEL</b>	TX Channel 36	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	5020.00	62.5 PK	74.0	-11.5	1.50 H	281	56.06	6.44
2	5020.00	51.8 AV	54.0	-2.2	1.50 H	281	45.36	6.44
3	5150.00	64.3 PK	74.0	-9.7	1.22 H	123	57.50	6.80
4	5150.00	49.8 AV	54.0	-4.2	1.22 H	123	43.00	6.80
5	*5180.00	117.8 PK			1.22 H	123	110.85	6.95
6	*5180.00	107.5 AV			1.22 H	123	100.55	6.95
7	#10360.00	54.8 PK	74.0	-19.2	1.00 H	205	41.69	13.11
8	#10360.00	42.6 AV	54.0	-11.4	1.00 H	205	29.49	13.11
9	15540.00	60.3 PK	74.0	-13.7	1.07 H	166	41.61	18.69
10	15540.00	49.4 AV	54.0	-4.6	1.07 H	166	30.71	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	5020.00	64.2 PK	74.0	-9.8	1.06 V	111	57.76	6.44
2	<b>5020.00</b>	<b>53.9 AV</b>	<b>54.0</b>	<b>-0.1</b>	<b>1.06 V</b>	<b>111</b>	<b>47.46</b>	<b>6.44</b>
3	5150.00	68.1 PK	74.0	-5.9	1.07 V	140	61.30	6.80
4	5150.00	51.9 AV	54.0	-2.1	1.07 V	140	45.10	6.80
5	*5180.00	119.3 PK			1.07 V	140	112.35	6.95
6	*5180.00	110.1 AV			1.07 V	140	103.15	6.95
7	#10360.00	54.2 PK	74.0	-19.8	1.00 V	96	41.09	13.11
8	#10360.00	42.3 AV	54.0	-11.7	1.00 V	96	29.19	13.11
9	15540.00	60.4 PK	74.0	-13.6	1.15 V	78	41.71	18.69
10	15540.00	49.5 AV	54.0	-4.5	1.15 V	78	30.81	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. " \* ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.





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<b>CHANNEL</b>	TX Channel 40	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	5081.00	57.4 PK	74.0	-16.6	1.00 H	294	50.88	6.52
2	5081.00	49.6 AV	54.0	-4.4	1.00 H	294	43.08	6.52
3	*5200.00	113.2 PK			1.21 H	124	106.15	7.05
4	*5200.00	104.1 AV			1.21 H	124	97.05	7.05
5	5366.00	62.1 PK	74.0	-11.9	1.01 H	291	54.53	7.57
6	5366.00	51.9 AV	54.0	-2.1	1.01 H	291	44.33	7.57
7	#10400.00	54.2 PK	74.0	-19.8	1.00 H	205	40.98	13.22
8	#10400.00	42.5 AV	54.0	-11.5	1.00 H	205	29.28	13.22
9	15600.00	60.6 PK	74.0	-13.4	1.07 H	166	41.90	18.70
10	15600.00	49.7 AV	54.0	-4.3	1.07 H	166	31.00	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	4983.00	58.4 PK	74.0	-15.6	1.00 V	151	52.05	6.35
2	4983.00	50.6 AV	54.0	-3.4	1.00 V	151	44.25	6.35
3	*5200.00	115.8 PK			1.07 V	141	108.75	7.05
4	*5200.00	106.7 AV			1.07 V	141	99.65	7.05
5	5366.00	64.8 PK	74.0	-9.2	1.02 V	148	57.23	7.57
6	<b>5366.00</b>	<b>53.9 AV</b>	<b>54.0</b>	<b>-0.1</b>	<b>1.02 V</b>	<b>148</b>	<b>46.33</b>	<b>7.57</b>
7	#10400.00	54.9 PK	74.0	-19.1	1.00 V	109	41.68	13.22
8	#10400.00	42.7 AV	54.0	-11.3	1.00 V	109	29.48	13.22
9	15600.00	60.4 PK	74.0	-13.6	1.19 V	78	41.70	18.70
10	15600.00	49.5 AV	54.0	-4.5	1.19 V	78	30.80	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. " \* ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



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<b>CHANNEL</b>	TX Channel 48	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	*5240.00	113.7 PK			1.21 H	124	106.54	7.16
2	*5240.00	104.4 AV			1.21 H	124	97.24	7.16
3	5400.00	63.1 PK	74.0	-10.9	1.01 H	290	55.39	7.71
4	5400.00	52.8 AV	54.0	-1.2	1.01 H	290	45.09	7.71
5	#10480.00	53.8 PK	74.0	-20.2	1.00 H	205	40.64	13.16
6	#10480.00	42.1 AV	54.0	-11.9	1.00 H	205	28.94	13.16
7	15720.00	60.0 PK	74.0	-14.0	1.07 H	166	41.60	18.40
8	15720.00	49.1 AV	54.0	-4.9	1.07 H	166	30.70	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	*5240.00	116.3 PK			1.07 V	141	109.14	7.16
2	*5240.00	107.1 AV			1.07 V	141	99.94	7.16
3	5400.00	63.6 PK	74.0	-10.4	1.08 V	102	55.89	7.71
4	<b>5400.00</b>	<b>53.9 AV</b>	<b>54.0</b>	<b>-0.1</b>	<b>1.08 V</b>	<b>102</b>	<b>46.19</b>	<b>7.71</b>
5	#10480.00	54.5 PK	74.0	-19.5	1.04 V	99	41.34	13.16
6	#10480.00	42.5 AV	54.0	-11.5	1.04 V	99	29.34	13.16
7	15720.00	60.3 PK	74.0	-13.7	1.18 V	66	41.90	18.40
8	15720.00	49.4 AV	54.0	-4.6	1.18 V	66	31.00	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. " \* ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



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<b>CHANNEL</b>	TX Channel 149	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	#5587.00	62.4 PK	68.2	-5.8	1.00 H	328	54.21	8.19
2	#5706.00	67.7 PK	68.2	-0.5	1.78 H	329	59.34	8.36
3	#5725.00	77.9 PK	78.2	-0.3	1.78 H	329	69.51	8.39
4	*5745.00	116.6 PK			1.78 H	329	108.18	8.42
5	*5745.00	108.2 AV			1.78 H	329	99.78	8.42
6	#5906.00	67.1 PK	68.2	-1.1	1.62 H	171	58.23	8.87
7	11490.00	56.3 PK	74.0	-17.7	1.00 H	215	41.95	14.35
8	11490.00	43.8 AV	54.0	-10.2	1.00 H	215	29.45	14.35
9	#17235.00	64.1 PK	68.2	-4.1	1.10 H	178	41.66	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	#5587.00	61.4 PK	68.2	-6.8	1.00 V	68	53.21	8.19
2	#5706.00	65.7 PK	68.2	-2.5	1.00 V	74	57.34	8.36
3	#5725.00	75.8 PK	78.2	-2.4	1.00 V	98	67.41	8.39
4	*5745.00	114.6 PK			1.00 V	98	106.18	8.42
5	*5745.00	105.7 AV			1.00 V	98	97.28	8.42
6	#5906.00	62.3 PK	68.2	-5.9	1.35 V	95	53.43	8.87
7	11490.00	57.1 PK	74.0	-16.9	1.00 V	98	42.75	14.35
8	11490.00	43.5 AV	54.0	-10.5	1.00 V	98	29.15	14.35
9	#17235.00	63.9 PK	68.2	-4.3	1.24 V	67	41.46	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. " \* " : Fundamental frequency.
6. " # " : The radiated frequency is out of the restricted band.



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<b>CHANNEL</b>	TX Channel 157	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	#5626.00	67.4 PK	68.2	-0.8	1.80 H	332	59.16	8.24
2	*5785.00	121.4 PK			1.42 H	327	112.91	8.49
3	*5785.00	112.3 AV			1.42 H	327	103.81	8.49
4	#5946.00	65.4 PK	68.2	-2.8	1.20 H	327	56.41	8.99
5	11570.00	62.6 PK	74.0	-11.4	1.15 H	141	48.29	14.31
6	11570.00	49.9 AV	54.0	-4.1	1.15 H	141	35.59	14.31
7	#17355.00	65.1 PK	68.2	-3.1	1.00 H	206	42.10	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	#5626.00	65.1 PK	68.2	-3.1	1.05 V	81	56.86	8.24
2	*5785.00	118.7 PK			1.00 V	99	110.21	8.49
3	*5785.00	109.7 AV			1.00 V	99	101.21	8.49
4	#5946.00	61.1 PK	68.2	-7.1	1.30 V	87	52.11	8.99
5	11570.00	58.7 PK	74.0	-15.3	1.15 V	23	44.39	14.31
6	11570.00	46.6 AV	54.0	-7.4	1.15 V	23	32.29	14.31
7	#17355.00	64.9 PK	68.2	-3.3	1.24 V	204	41.90	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. " \* ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



A D T

<b>CHANNEL</b>	TX Channel 165	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	*5825.00	119.4 PK			1.42 H	329	110.81	8.59
2	*5825.00	110.8 AV			1.42 H	329	102.21	8.59
3	#5850.00	77.8 PK	78.2	-0.4	1.42 H	329	69.13	8.67
4	#5866.50	72.9 PK	74.0	-1.1	1.42 H	329	64.17	8.73
5	#5866.50	51.3 AV	54.0	-2.7	1.42 H	329	42.57	8.73
6	#5906.10	66.6 PK	68.2	-1.6	1.42 H	329	57.73	8.87
7	11650.00	56.6 PK	74.0	-17.4	1.00 H	205	42.22	14.38
8	11650.00	43.8 AV	54.0	-10.2	1.00 H	205	29.42	14.38
9	#17475.00	63.7 PK	68.2	-4.5	1.07 H	166	40.40	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	*5825.00	116.7 PK			1.00 V	104	108.11	8.59
2	*5825.00	108.3 AV			1.00 V	104	99.71	8.59
3	#5850.00	65.3 PK	78.2	-12.9	1.40 V	85	56.63	8.67
4	#5866.50	70.1 PK	74.0	-3.9	1.32 V	93	61.37	8.73
5	#5866.50	49.5 AV	54.0	-4.5	1.32 V	93	40.77	8.73
6	#5906.10	61.1 PK	68.2	-7.1	1.00 V	57	52.23	8.87
7	11650.00	56.7 PK	74.0	-17.3	1.00 V	100	42.32	14.38
8	11650.00	43.5 AV	54.0	-10.5	1.00 V	100	29.12	14.38
9	#17475.00	63.6 PK	68.2	-4.6	1.20 V	68	40.30	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. " \* ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



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802.11ac(VHT20)

<b>CHANNEL</b>	TX Channel 36	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	5020.00	63.1 PK	74.0	-10.9	1.51 H	295	56.66	6.44
2	5020.00	52.3 AV	54.0	-1.7	1.51 H	295	45.86	6.44
3	5061.00	60.7 PK	74.0	-13.3	1.51 H	275	54.20	6.50
4	5061.00	51.3 AV	54.0	-2.7	1.51 H	275	44.80	6.50
5	5150.00	62.2 PK	74.0	-11.8	1.52 H	271	55.40	6.80
6	5150.00	51.3 AV	54.0	-2.7	1.52 H	271	44.50	6.80
7	*5180.00	116.9 PK			1.21 H	123	109.95	6.95
8	*5180.00	107.5 AV			1.21 H	123	100.55	6.95
9	#10360.00	53.9 PK	74.0	-20.1	1.00 H	205	40.79	13.11
10	#10360.00	42.1 AV	54.0	-11.9	1.00 H	205	28.99	13.11
11	15540.00	60.3 PK	74.0	-13.7	1.07 H	166	41.61	18.69
12	15540.00	49.5 AV	54.0	-4.5	1.07 H	166	30.81	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	5020.00	63.5 PK	74.0	-10.5	1.09 V	153	57.06	6.44
2	5020.00	53.8 AV	54.0	-0.2	1.09 V	153	47.36	6.44
3	5061.00	63.3 PK	74.0	-10.7	1.09 V	152	56.80	6.50
4	<b>5061.00</b>	<b>53.9 AV</b>	<b>54.0</b>	<b>-0.1</b>	<b>1.09 V</b>	<b>152</b>	<b>47.40</b>	<b>6.50</b>
5	5150.00	63.4 PK	74.0	-10.6	1.06 V	147	56.60	6.80
6	5150.00	53.8 AV	54.0	-0.2	1.06 V	147	47.00	6.80
7	*5180.00	119.5 PK			1.08 V	142	112.55	6.95
8	*5180.00	110.2 AV			1.08 V	142	103.25	6.95
9	#10360.00	54.6 PK	74.0	-19.4	1.00 V	89	41.49	13.11
10	#10360.00	42.5 AV	54.0	-11.5	1.00 V	89	29.39	13.11
11	15540.00	60.3 PK	74.0	-13.7	1.21 V	82	41.61	18.69
12	15540.00	49.5 AV	54.0	-4.5	1.21 V	82	30.81	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. " \* ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



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<b>CHANNEL</b>	TX Channel 40	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	*5200.00	113.5 PK			1.21 H	124	106.45	7.05
2	*5200.00	104.1 AV			1.21 H	124	97.05	7.05
3	5358.00	62.0 PK	74.0	-12.0	1.46 H	262	54.46	7.54
4	5358.00	51.0 AV	54.0	-3.0	1.46 H	262	43.46	7.54
5	#10400.00	54.0 PK	74.0	-20.0	1.00 H	205	40.78	13.22
6	#10400.00	42.2 AV	54.0	-11.8	1.00 H	205	28.98	13.22
7	15600.00	59.8 PK	74.0	-14.2	1.07 H	166	41.10	18.70
8	15600.00	49.1 AV	54.0	-4.9	1.07 H	166	30.40	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	*5200.00	116.1 PK			1.08 V	143	109.05	7.05
2	*5200.00	106.7 AV			1.08 V	143	99.65	7.05
3	5358.00	64.2 PK	74.0	-9.8	1.02 V	148	56.66	7.54
4	<b>5358.00</b>	<b>53.9 AV</b>	<b>54.0</b>	<b>-0.1</b>	<b>1.02 V</b>	<b>148</b>	<b>46.36</b>	<b>7.54</b>
5	#10400.00	54.6 PK	74.0	-19.4	1.00 V	97	41.38	13.22
6	#10400.00	42.5 AV	54.0	-11.5	1.00 V	97	29.28	13.22
7	15600.00	60.2 PK	74.0	-13.8	1.24 V	78	41.50	18.70
8	15600.00	49.5 AV	54.0	-4.5	1.24 V	78	30.80	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. " \* ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



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<b>CHANNEL</b>	TX Channel 48	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	*5240.00	113.8 PK			1.22 H	120	106.64	7.16
2	*5240.00	104.5 AV			1.22 H	120	97.34	7.16
3	5400.00	62.8 PK	74.0	-11.2	1.56 H	282	55.09	7.71
4	5400.00	51.7 AV	54.0	-2.3	1.56 H	282	43.99	7.71
5	#10480.00	54.0 PK	74.0	-20.0	1.00 H	205	40.84	13.16
6	#10480.00	41.9 AV	54.0	-12.1	1.00 H	205	28.74	13.16
7	15720.00	60.6 PK	74.0	-13.4	1.07 H	166	42.20	18.40
8	15720.00	49.4 AV	54.0	-4.6	1.07 H	166	31.00	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	*5240.00	116.4 PK			1.08 V	143	109.24	7.16
2	*5240.00	107.1 AV			1.08 V	143	99.94	7.16
3	5400.00	63.8 PK	74.0	-10.2	1.02 V	148	56.09	7.71
4	5400.00	53.9 AV	54.0	-0.1	1.02 V	148	46.19	7.71
5	#10480.00	54.2 PK	74.0	-19.8	1.00 V	101	41.04	13.16
6	#10480.00	42.1 AV	54.0	-11.9	1.00 V	101	28.94	13.16
7	15720.00	60.3 PK	74.0	-13.7	1.17 V	55	41.90	18.40
8	15720.00	49.4 AV	54.0	-4.6	1.17 V	55	31.00	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. " \* ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.





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<b>CHANNEL</b>	TX Channel 149	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	#5715.00	65.6 PK	68.2	-2.6	1.42 H	329	57.23	8.37
2	#5725.00	77.4 PK	78.2	-0.8	1.42 H	329	69.01	8.39
3	*5745.00	118.1 PK			1.42 H	329	109.68	8.42
4	*5745.00	106.1 AV			1.42 H	329	97.68	8.42
5	#5906.00	63.2 PK	68.2	-5.0	1.59 H	173	54.33	8.87
6	11490.00	56.2 PK	74.0	-17.8	1.00 H	213	41.85	14.35
7	11490.00	43.7 AV	54.0	-10.3	1.00 H	213	29.35	14.35
8	#17235.00	64.4 PK	68.2	-3.8	1.05 H	187	41.96	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	#5715.00	64.5 PK	68.2	-3.7	1.33 V	84	56.13	8.37
2	#5725.00	75.1 PK	78.2	-3.1	1.00 V	66	66.71	8.39
3	*5745.00	115.2 PK			1.00 V	112	106.78	8.42
4	*5745.00	103.5 AV			1.00 V	112	95.08	8.42
5	#5906.00	61.4 PK	68.2	-6.8	1.00 V	70	52.53	8.87
6	11490.00	56.5 PK	74.0	-17.5	1.00 V	96	42.15	14.35
7	11490.00	43.4 AV	54.0	-10.6	1.00 V	96	29.05	14.35
8	#17235.00	63.9 PK	68.2	-4.3	1.24 V	64	41.46	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. " \* ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



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<b>CHANNEL</b>	TX Channel 157	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	#5623.00	67.5 PK	68.2	-0.7	1.80 H	334	59.26	8.24
2	*5785.00	120.1 PK			1.43 H	321	111.61	8.49
3	*5785.00	111.5 AV			1.43 H	321	103.01	8.49
4	#5864.10	65.2 PK	68.2	-3.0	1.42 H	328	56.47	8.73
5	#5943.00	67.4 PK	68.2	-0.8	1.44 H	338	58.41	8.99
6	11570.00	56.7 PK	74.0	-17.3	1.00 H	220	42.39	14.31
7	11570.00	44.0 AV	54.0	-10.0	1.00 H	220	29.69	14.31
8	#17355.00	63.9 PK	68.2	-4.3	1.11 H	183	40.90	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	#5623.00	65.1 PK	68.2	-3.1	1.00 V	65	56.86	8.24
2	*5785.00	117.5 PK			1.00 V	92	109.01	8.49
3	*5785.00	108.9 AV			1.00 V	92	100.41	8.49
4	#5864.10	64.1 PK	68.2	-4.1	1.36 V	91	55.37	8.73
5	#5943.00	66.1 PK	68.2	-2.1	1.00 V	65	57.11	8.99
6	11570.00	57.6 PK	74.0	-16.4	1.03 V	109	43.29	14.31
7	11570.00	43.0 AV	54.0	-11.0	1.03 V	109	28.69	14.31
8	#17355.00	63.8 PK	68.2	-4.4	1.21 V	57	40.80	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. " \* ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



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<b>CHANNEL</b>	TX Channel 165	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	*5825.00	118.4 PK			1.40 H	329	109.81	8.59
2	*5825.00	107.8 AV			1.40 H	329	99.21	8.59
3	#5850.00	78.0 PK	78.2	-0.2	1.65 H	173	69.33	8.67
4	#5860.00	72.6 PK	74.0	-1.4	1.37 H	328	63.89	8.71
5	#5860.00	51.4 AV	54.0	-2.6	1.37 H	328	42.69	8.71
6	#5986.00	65.1 PK	68.2	-3.1	1.59 H	171	55.99	9.11
7	11650.00	56.7 PK	74.0	-17.3	1.03 H	215	42.32	14.38
8	11650.00	43.6 AV	54.0	-10.4	1.03 H	215	29.22	14.38
9	#17475.00	63.8 PK	68.2	-4.4	1.13 H	193	40.50	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	*5825.00	115.8 PK			1.00 V	101	107.21	8.59
2	*5825.00	105.1 AV			1.00 V	101	96.51	8.59
3	#5850.00	75.4 PK	78.2	-2.8	1.00 V	72	66.73	8.67
4	#5860.00	71.4 PK	74.0	-2.6	1.38 V	105	62.69	8.71
5	#5860.00	49.6 AV	54.0	-4.4	1.38 V	105	40.89	8.71
6	#5986.00	63.5 PK	68.2	-4.7	1.01 V	64	54.39	9.11
7	11650.00	57.1 PK	74.0	-16.9	1.00 V	111	42.72	14.38
8	11650.00	43.7 AV	54.0	-10.3	1.00 V	111	29.32	14.38
9	#17475.00	64.3 PK	68.2	-3.9	1.20 V	63	41.00	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. " \* ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



A D T

802.11ac(VHT40)

CHANNEL	TX Channel 38	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	5150.00	62.7 PK	74.0	-11.3	1.52 H	284	55.90	6.80
2	5150.00	51.8 AV	54.0	-2.2	1.52 H	284	45.00	6.80
3	*5190.00	110.3 PK			1.21 H	124	103.30	7.00
4	*5190.00	100.1 AV			1.21 H	124	93.10	7.00
5	#5622.50	61.1 PK	68.2	-7.1	1.33 H	265	52.87	8.23
6	#10380.00	54.3 PK	68.2	-13.9	1.00 H	205	41.13	13.17
7	15570.00	60.2 PK	74.0	-13.8	1.07 H	166	41.51	18.69
8	15570.00	49.5 AV	54.0	-4.5	1.07 H	166	30.81	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	5150.00	68.2 PK	74.0	-5.8	1.08 V	145	61.40	6.80
2	5150.00	53.9 AV	54.0	-0.1	1.08 V	145	47.10	6.80
3	*5190.00	113.2 PK			1.07 V	139	106.20	7.00
4	*5190.00	102.7 AV			1.07 V	139	95.70	7.00
5	#5622.50	59.6 PK	68.2	-8.6	1.02 V	140	51.37	8.23
6	#10380.00	54.2 PK	68.2	-14.0	1.00 V	100	41.03	13.17
7	15570.00	60.8 PK	74.0	-13.2	1.20 V	68	42.11	18.69
8	15570.00	49.7 AV	54.0	-4.3	1.20 V	68	31.01	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. " \* ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



A D T

<b>CHANNEL</b>	TX Channel 46	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	5117.00	62.1 PK	74.0	-11.9	1.55 H	265	55.47	6.63
2	5117.00	51.0 AV	54.0	-3.0	1.55 H	265	44.37	6.63
3	*5230.00	113.6 PK			1.21 H	123	106.48	7.12
4	*5230.00	103.1 AV			1.21 H	123	95.98	7.12
5	5392.00	61.8 PK	74.0	-12.2	1.51 H	263	54.12	7.68
6	5392.00	50.9 AV	54.0	-3.1	1.51 H	263	43.22	7.68
7	#5665.80	61.0 PK	68.2	-7.2	1.34 H	280	52.70	8.30
8	#10460.00	54.3 PK	68.2	-13.9	1.00 H	205	41.12	13.18
9	15690.00	60.4 PK	74.0	-13.6	1.07 H	166	42.02	18.38
10	15690.00	49.2 AV	54.0	-4.8	1.07 H	166	30.82	18.38

**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	5117.00	62.2 PK	74.0	-11.8	1.08 V	145	55.57	6.63
2	5117.00	52.0 AV	54.0	-2.0	1.08 V	145	45.37	6.63
3	*5230.00	116.2 PK			1.07 V	140	109.08	7.12
4	*5230.00	105.7 AV			1.07 V	140	98.58	7.12
5	5392.00	64.0 PK	74.0	-10.0	1.02 V	145	56.32	7.68
6	5392.00	53.7 AV	54.0	-0.3	1.02 V	145	46.02	7.68
7	#5665.80	59.4 PK	68.2	-8.8	1.00 V	126	51.10	8.30
8	#10460.00	54.1 PK	68.2	-14.1	1.00 V	100	40.92	13.18
9	15690.00	60.6 PK	74.0	-13.4	1.20 V	68	42.22	18.38
10	15690.00	49.8 AV	54.0	-4.2	1.20 V	68	31.42	18.38

**REMARKS:**

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



A D T

<b>CHANNEL</b>	TX Channel 151	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	#5715.00	69.9 PK	74.0	-4.1	1.51 H	329	61.53	8.37
2	#5715.00	53.5 AV	54.0	-0.5	1.51 H	329	45.13	8.37
3	#5725.00	77.6 PK	78.2	-0.6	1.51 H	329	69.21	8.39
4	*5755.00	112.7 PK			1.33 H	334	104.26	8.44
5	*5755.00	102.4 AV			1.33 H	334	93.96	8.44
6	11510.00	56.6 PK	74.0	-17.4	1.04 H	203	42.26	14.34
7	11510.00	44.2 AV	54.0	-9.8	1.04 H	203	29.86	14.34
8	#17265.00	64.4 PK	74.0	-9.6	1.07 H	185	41.72	22.68
9	#17265.00	49.6 AV	54.0	-4.4	1.07 H	185	26.92	22.68

**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	#5715.00	67.6 PK	74.0	-6.4	1.38 V	104	59.23	8.37
2	#5715.00	50.4 AV	54.0	-3.6	1.38 V	104	42.03	8.37
3	#5725.00	75.4 PK	78.2	-2.8	1.00 V	78	67.01	8.39
4	*5755.00	110.1 PK			1.00 V	111	101.66	8.44
5	*5755.00	99.8 AV			1.00 V	111	91.36	8.44
6	11510.00	57.2 PK	74.0	-16.8	1.05 V	100	42.86	14.34
7	11510.00	43.1 AV	54.0	-10.9	1.05 V	100	28.76	14.34
8	#17265.00	64.1 PK	74.0	-9.9	1.21 V	79	41.42	22.68
9	#17265.00	49.5 AV	54.0	-4.5	1.21 V	79	26.82	22.68

**REMARKS:**

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



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<b>CHANNEL</b>	TX Channel 159	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	*5795.00	117.8 PK			1.50 H	331	109.30	8.50
2	*5795.00	106.6 AV			1.50 H	331	98.10	8.50
3	#5850.00	73.2 PK	78.2	-5.0	1.61 H	323	64.53	8.67
4	#5860.00	71.2 PK	74.0	-2.8	1.61 H	323	62.49	8.71
5	<b>#5860.00</b>	<b>53.9 AV</b>	<b>54.0</b>	<b>-0.1</b>	<b>1.61 H</b>	<b>323</b>	<b>45.19</b>	<b>8.71</b>
6	11590.00	57.1 PK	74.0	-16.9	1.03 H	200	42.80	14.30
7	11590.00	43.4 AV	54.0	-10.6	1.03 H	200	29.10	14.30
8	#17385.00	64.6 PK	74.0	-9.4	1.13 H	182	41.57	23.03
9	#17385.00	49.7 AV	54.0	-4.3	1.13 H	182	26.67	23.03

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5795.00	115.1 PK			1.02 V	100	106.60	8.50
2	*5795.00	103.7 AV			1.02 V	100	95.20	8.50
3	#5850.00	70.7 PK	78.2	-7.5	1.04 V	81	62.03	8.67
4	#5860.00	69.6 PK	74.0	-4.4	1.36 V	86	60.89	8.71
5	#5860.00	51.4 AV	54.0	-2.6	1.36 V	86	42.69	8.71
6	11590.00	57.1 PK	74.0	-16.9	1.00 V	103	42.80	14.30
7	11590.00	43.3 AV	54.0	-10.7	1.00 V	103	29.00	14.30
8	#17385.00	64.0 PK	74.0	-10.0	1.19 V	77	40.97	23.03
9	#17385.00	49.4 AV	54.0	-4.6	1.19 V	77	26.37	23.03

**REMARKS:**

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



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802.11ac(VHT80)

CHANNEL	TX Channel 42	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	5150.00	62.5 PK	74.0	-11.5	1.47 H	286	55.70	6.80
2	5150.00	51.6 AV	54.0	-2.4	1.47 H	286	44.80	6.80
3	*5210.00	106.1 PK			1.21 H	123	99.04	7.06
4	*5210.00	96.3 AV			1.21 H	123	89.24	7.06
5	5350.00	53.4 PK	74.0	-20.6	1.00 H	98	45.91	7.49
6	5350.00	42.4 AV	54.0	-11.6	1.00 H	98	34.91	7.49
7	#5788.00	61.0 PK	68.2	-7.2	1.33 H	265	52.50	8.50
8	#10420.00	54.4 PK	68.2	-13.8	1.00 H	205	41.20	13.20
9	15630.00	60.5 PK	74.0	-13.5	1.07 H	166	41.90	18.60
10	15630.00	49.7 AV	54.0	-4.3	1.07 H	166	31.10	18.60

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	70.2 PK	74.0	-3.8	1.19 V	141	63.40	6.80
2	5150.00	53.9 AV	54.0	-0.1	1.19 V	141	47.10	6.80
3	*5210.00	108.7 PK			1.07 V	141	101.64	7.06
4	*5210.00	99.0 AV			1.07 V	141	91.94	7.06
5	5350.00	53.9 PK	74.0	-20.1	1.07 V	140	46.41	7.49
6	5350.00	43.3 AV	54.0	-10.7	1.07 V	140	35.81	7.49
7	#5788.00	59.6 PK	68.2	-8.6	1.00 V	124	51.10	8.50
8	#10420.00	54.6 PK	68.2	-13.6	1.00 V	100	41.40	13.20
9	15630.00	59.8 PK	74.0	-14.2	1.20 V	68	41.20	18.60
10	15630.00	49.1 AV	54.0	-4.9	1.20 V	68	30.50	18.60

**REMARKS:**

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





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<b>CHANNEL</b>	TX Channel 155	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	5133.00	58.4 PK	74.0	-15.6	1.00 H	288	51.68	6.72
2	5133.00	52.9 AV	54.0	-1.1	1.00 H	288	46.18	6.72
3	#5715.00	70.8 PK	74.0	-3.2	1.53 H	333	62.43	8.37
4	#5715.00	<b>53.9 AV</b>	<b>54.0</b>	<b>-0.1</b>	<b>1.53 H</b>	<b>333</b>	<b>45.53</b>	<b>8.37</b>
5	#5725.00	72.8 PK	78.2	-5.4	1.53 H	333	64.41	8.39
6	*5775.00	110.5 PK			1.54 H	330	102.03	8.47
7	*5775.00	100.9 AV			1.54 H	330	92.43	8.47
8	#5850.00	65.0 PK	78.2	-13.2	1.53 H	333	56.33	8.67
9	#5860.00	62.7 PK	74.0	-11.3	1.53 H	333	53.99	8.71
10	#5860.00	47.5 AV	54.0	-6.5	1.53 H	333	38.79	8.71
11	11550.00	56.6 PK	74.0	-17.4	1.00 H	218	42.28	14.32
12	11550.00	43.6 AV	54.0	-10.4	1.00 H	218	29.28	14.32
13	#17325.00	64.8 PK	74.0	-9.2	1.06 H	167	41.82	22.98
14	#17325.00	49.9 AV	54.0	-4.1	1.06 H	167	26.92	22.98

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5133.00	56.3 PK	74.0	-17.7	1.00 V	57	49.58	6.72
2	5133.00	51.1 AV	54.0	-2.9	1.00 V	57	44.38	6.72
3	#5715.00	67.4 PK	74.0	-6.6	1.34 V	97	59.03	8.37
4	#5715.00	50.6 AV	54.0	-3.4	1.34 V	97	42.23	8.37
5	#5725.00	70.9 PK	78.2	-7.3	1.03 V	56	62.51	8.39
6	*5775.00	107.9 PK			1.03 V	98	99.43	8.47
7	*5775.00	98.2 AV			1.03 V	98	89.73	8.47
8	#5850.00	63.1 PK	78.2	-15.1	1.00 V	54	54.43	8.67
9	#5860.00	60.7 PK	74.0	-13.3	1.35 V	82	51.99	8.71
10	#5860.00	45.3 AV	54.0	-8.7	1.35 V	82	36.59	8.71
11	11550.00	57.5 PK	74.0	-16.5	1.03 V	88	43.18	14.32
12	11550.00	43.0 AV	54.0	-11.0	1.03 V	88	28.68	14.32
13	#17325.00	64.0 PK	74.0	-10.0	1.27 V	58	41.02	22.98
14	#17325.00	49.8 AV	54.0	-4.2	1.27 V	58	26.82	22.98

**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.

### 4.3 TRANSMIT POWER MEASUREMENT

#### 4.3.1 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 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:** Where B is the 26dB emission bandwidth in MHz.

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

Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4;

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

Array Gain = 5 log(NANT/NSS) dB or 3 dB, whichever is less for 20-MHz channel widths with NANT ≥ 5.

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



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#### 4.3.2 TEST INSTRUMENTS

##### FOR POWER OUTPUT MEASUREMENT

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 :Sep. 23, 2014

##### FOR 26dB OCCUPIED BANDWIDTH

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSV 40	100964	July 05, 2014	July 04, 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 :Sep. 23, 2014

### 4.3.3 TEST PROCEDURE

#### FOR POWER OUTPUT MEASUREMENT

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

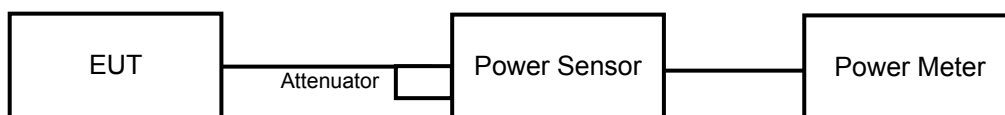
1. Set RBW = approximately 1% of the emission bandwidth.
2. Set the VBW > RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement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

### 4.3.4 DEVIATION FROM TEST STANDARD

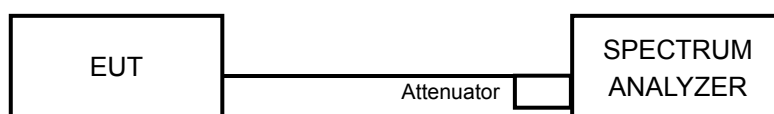
No deviation

### 4.3.5 TEST SETUP

#### FOR POWER OUTPUT MEASUREMENT



#### FOR 26dB OCCUPIED BANDWIDTH



#### 4.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.



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### 4.3.7 TEST RESULTS(MODE 1)

#### 802.11a

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
36	5180	20.85	20.89	21.07	372.301	25.71	30	PASS
40	5200	17.57	17.61	17.95	177.198	22.48	30	PASS
48	5240	17.98	18.13	18.41	197.162	22.95	30	PASS
149	5745	19.94	20.37	20.93	331.401	25.20	30	PASS
157	5785	23.50	23.64	23.49	678.435	28.32	30	PASS
165	5825	23.13	22.28	22.08	536.069	27.29	30	PASS

#### 26dB OCCUPIED BANDWIDTH:

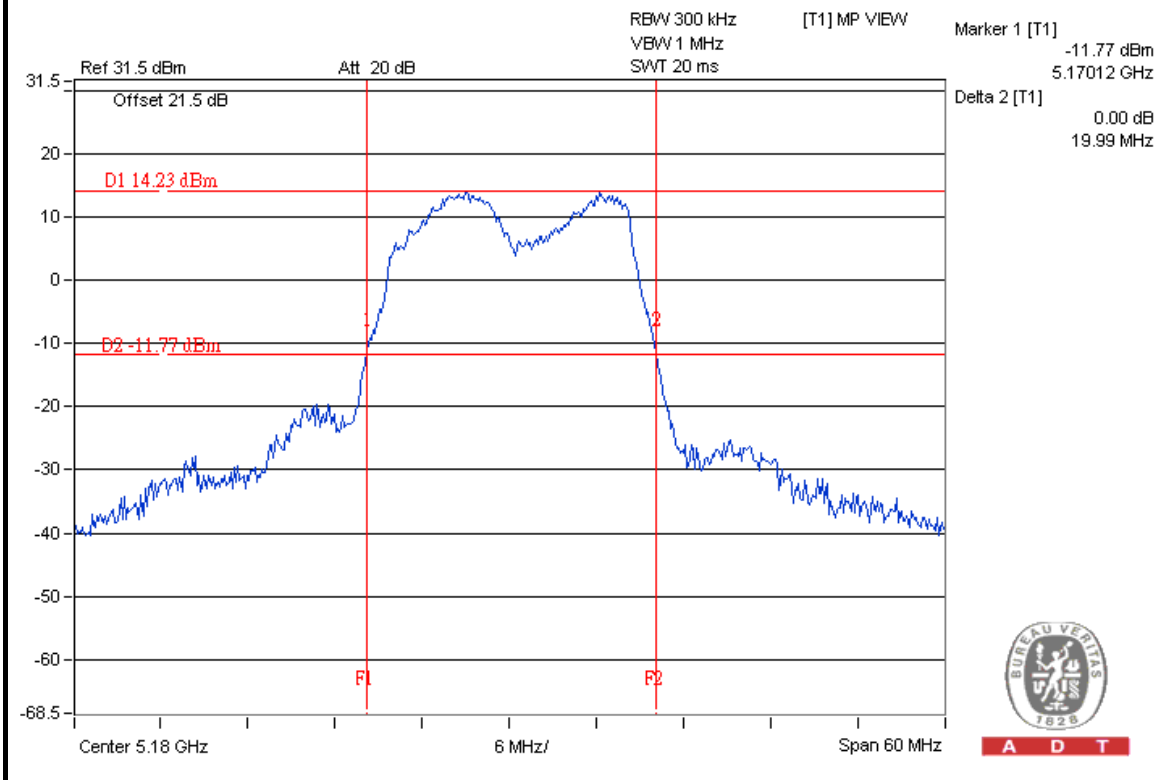
CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		
		CHAIN 0	CHAIN 1	CHAIN 2
36	5180	20.29	19.99	20.55
40	5200	20.09	20.11	20.49
48	5240	20.54	20.39	20.56



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### SPECTRUM PLOT OF WORST VALUE

802.11a / Chain(1) : CH36





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### 802.11ac (VHT20)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
36	5180	21.11	21.12	21.45	398.179	26.00	30	PASS
40	5200	17.34	17.40	17.89	170.672	22.32	30	PASS
48	5240	17.86	17.94	18.45	193.308	22.86	30	PASS
149	5745	18.96	19.67	19.83	267.549	24.27	30	PASS
157	5785	23.98	23.71	23.42	704.784	28.48	30	PASS
165	5825	21.69	21.17	21.22	410.923	26.14	30	PASS

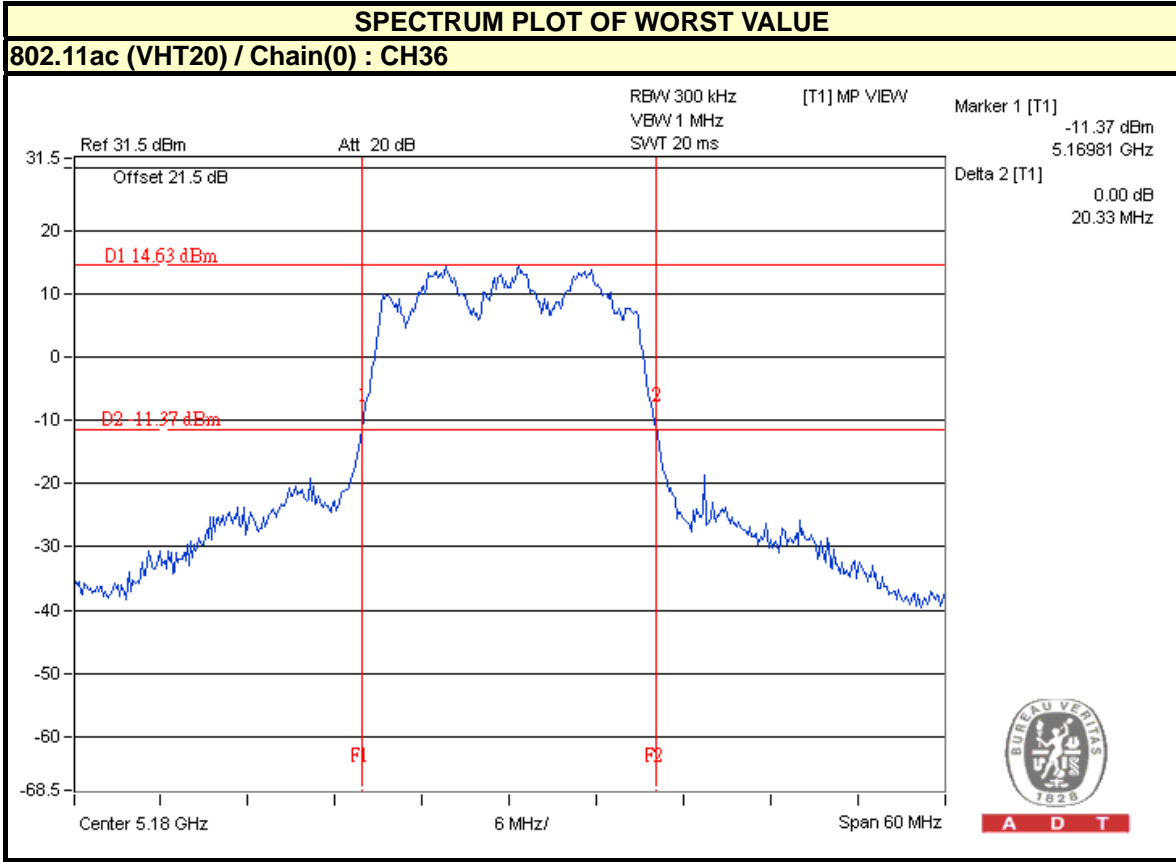
### 26dB OCCUPIED BANDWIDTH:

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		
		CHAIN 0	CHAIN 1	CHAIN 2
36	5180	20.33	20.38	20.77
40	5200	20.37	20.48	20.82
48	5240	20.60	20.49	20.91





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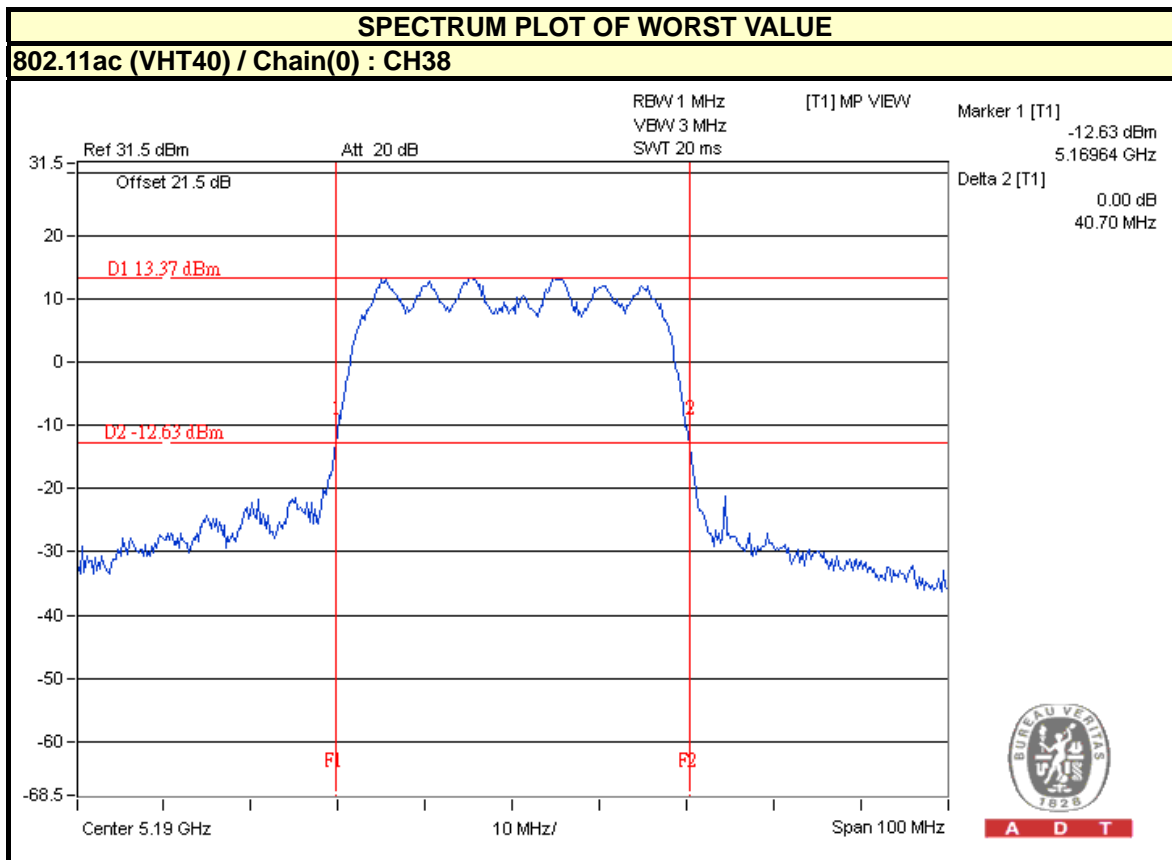
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### 802.11ac (VHT40)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
38	5190	17.28	17.45	17.59	166.458	22.21	30	PASS
46	5230	20.47	20.56	20.81	345.696	25.39	30	PASS
151	5755	17.88	18.76	18.56	208.317	23.19	30	PASS
159	5795	22.97	23.11	23.57	630.307	28.00	30	PASS

### 26dB OCCUPIED BANDWIDTH:

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		
		CHAIN 0	CHAIN 1	CHAIN 2
38	5190	40.70	40.76	41.54
46	5230	40.84	40.95	41.64





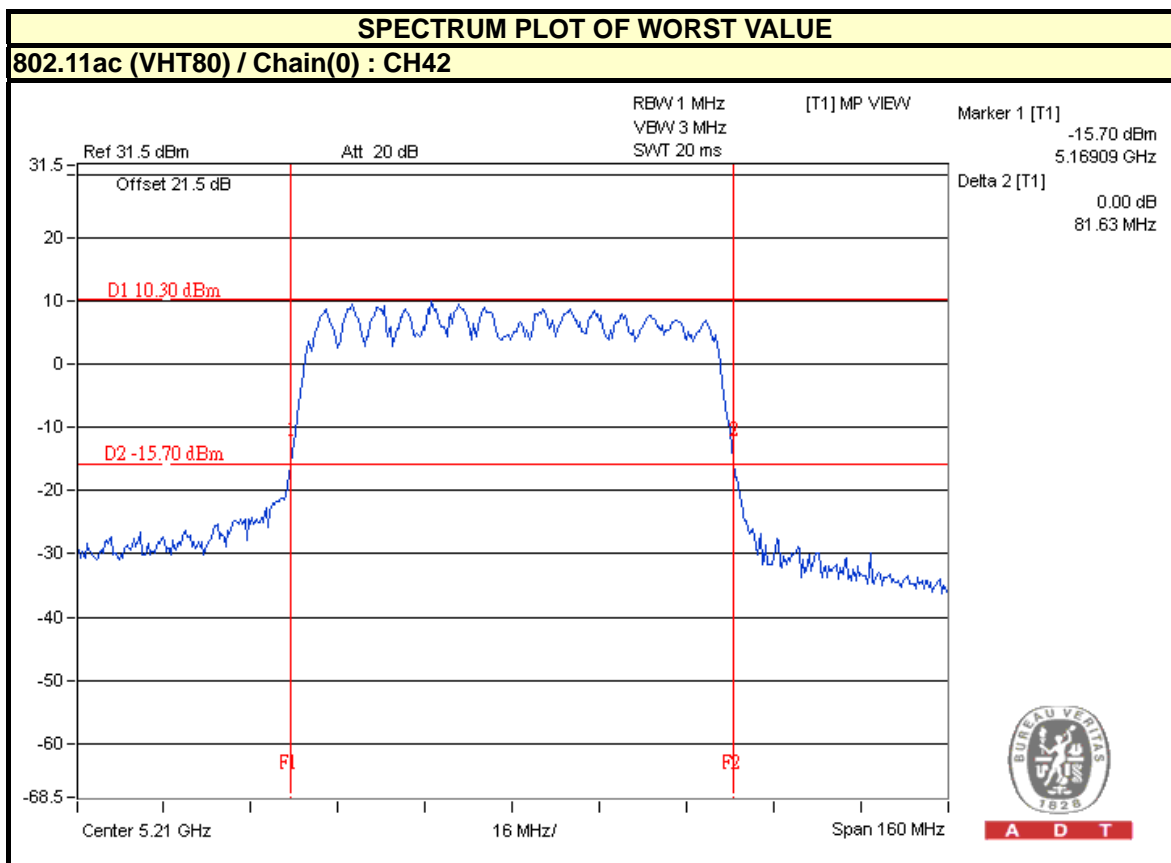
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**802.11ac (VHT80)**

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
42	5210	16.31	16.51	17.06	138.343	21.41	30	PASS
155	5775	16.91	17.94	17.83	171.995	22.36	30	PASS

**26dB OCCUPIED BANDWIDTH:**

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		
		CHAIN 0	CHAIN 1	CHAIN 2
42	5210	81.63	82.14	82.96



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### 4.3.8 TEST RESULTS(MODE 2)

#### 802.11ac (VHT20)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
36	5180	21.11	21.12	21.45	398.179	26.00	26.45	PASS
40	5200	17.34	17.40	17.89	170.672	22.32	26.45	PASS
48	5240	17.86	17.94	18.45	193.308	22.86	26.45	PASS
149	5745	18.96	19.67	19.83	267.549	24.27	25.66	PASS
157	5785	19.91	20.07	20.72	317.606	25.02	25.66	PASS
165	5825	19.93	20.02	20.69	316.083	25.00	25.66	PASS

**NOTE:** 1. 5150~5250MHz: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3]$  = 9.55dBi > 6dBi , so the power limit shall be reduced to  $30-(9.55-6) = 26.45$ dBm.

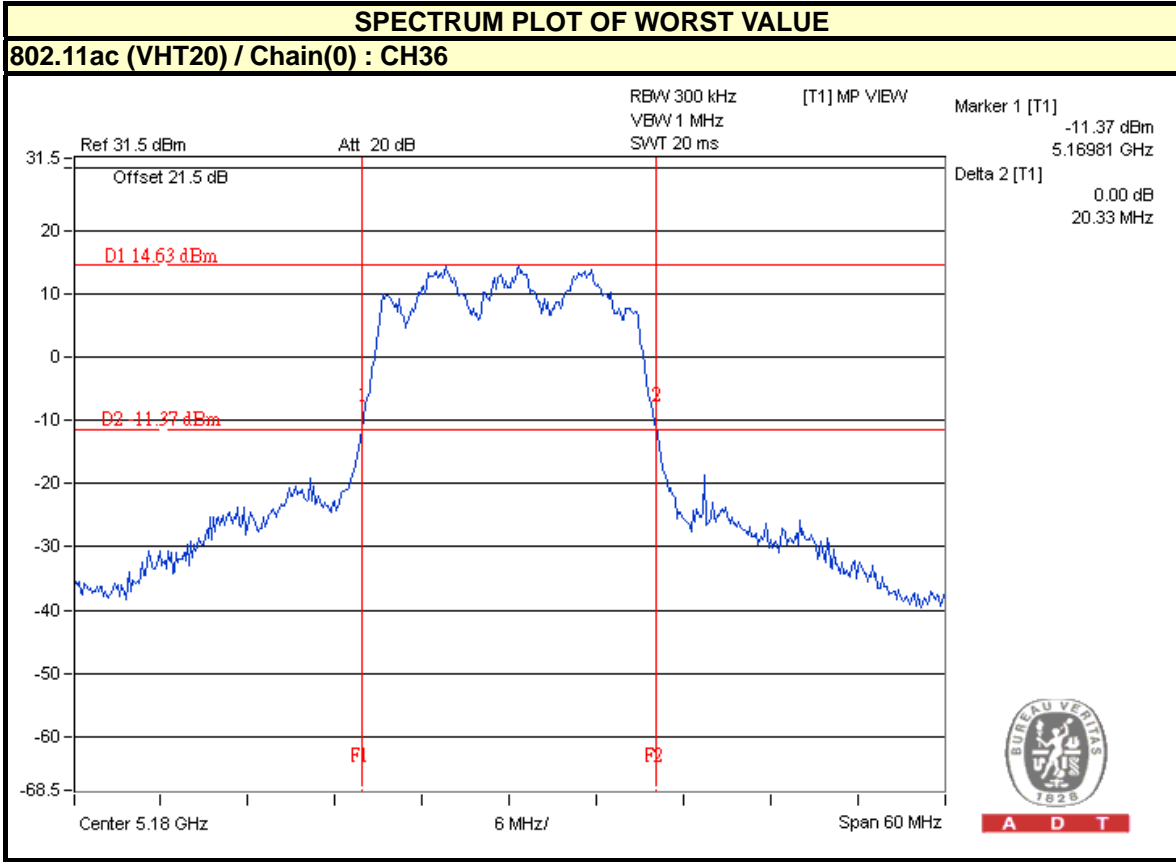
2. 5725~5850MHz: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3]$  = 10.34dBi > 6dBi , so the power limit shall be reduced to  $30-(10.34-6) = 25.66$ dBm.

#### 26dB OCCUPIED BANDWIDTH:

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		
		CHAIN 0	CHAIN 1	CHAIN 2
36	5180	20.33	20.38	20.77
40	5200	20.37	20.48	20.82
48	5240	20.60	20.49	20.91



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**802.11ac (VHT40)**

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
38	5190	17.28	17.45	17.59	166.458	22.21	26.45	PASS
46	5230	20.47	20.56	20.81	345.696	25.39	26.45	PASS
151	5755	17.88	18.76	18.56	208.317	23.19	25.66	PASS
159	5795	20.64	20.83	20.89	359.682	25.56	25.66	PASS

**NOTE:** 1. 5150~5250MHz: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3]$  = 9.55dBi > 6dBi , so the power limit shall be reduced to 30-(9.55-6) =26.45dBm.

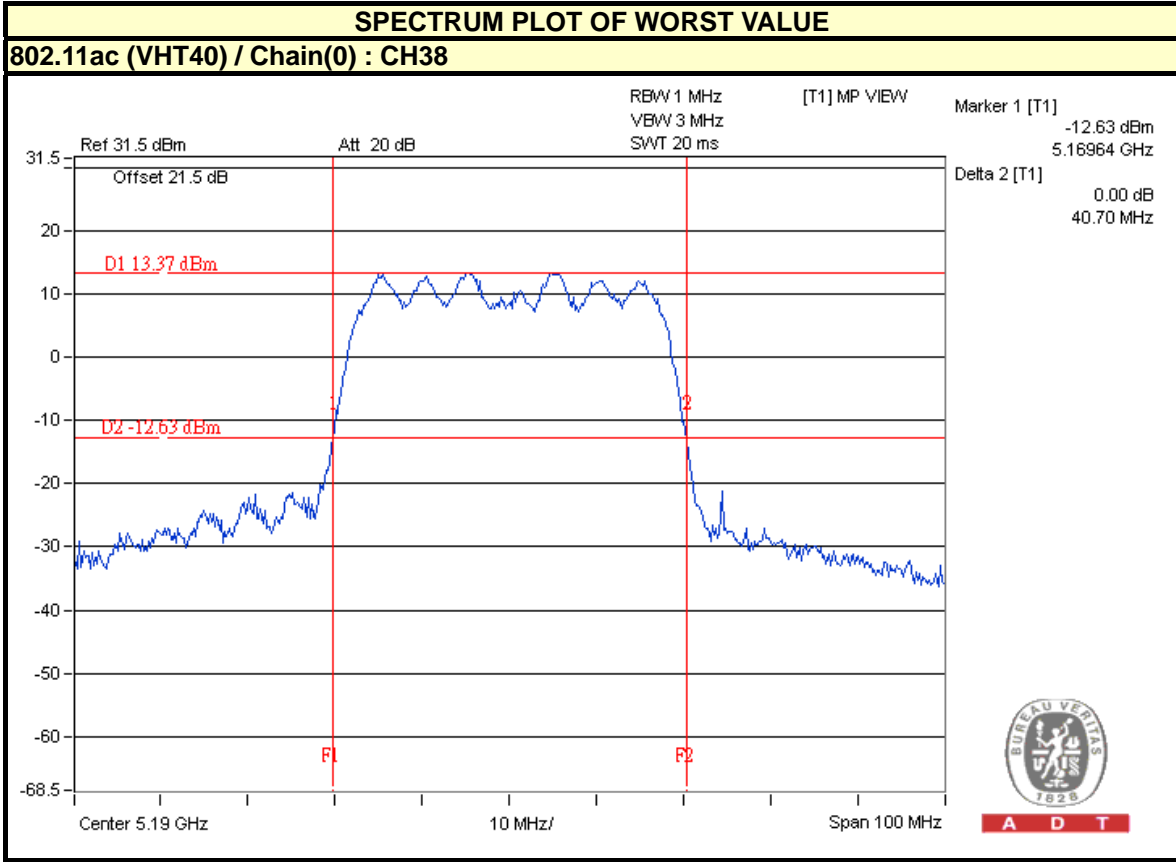
2. 5725~5850MHz: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3]$  = 10.34dBi > 6dBi , so the power limit shall be reduced to 30-(10.34-6) =25.66dBm.

**26dB OCCUPIED BANDWIDTH:**

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		
		CHAIN 0	CHAIN 1	CHAIN 2
38	5190	40.70	40.76	41.54
46	5230	40.84	40.95	41.64



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**802.11ac (VHT80)**

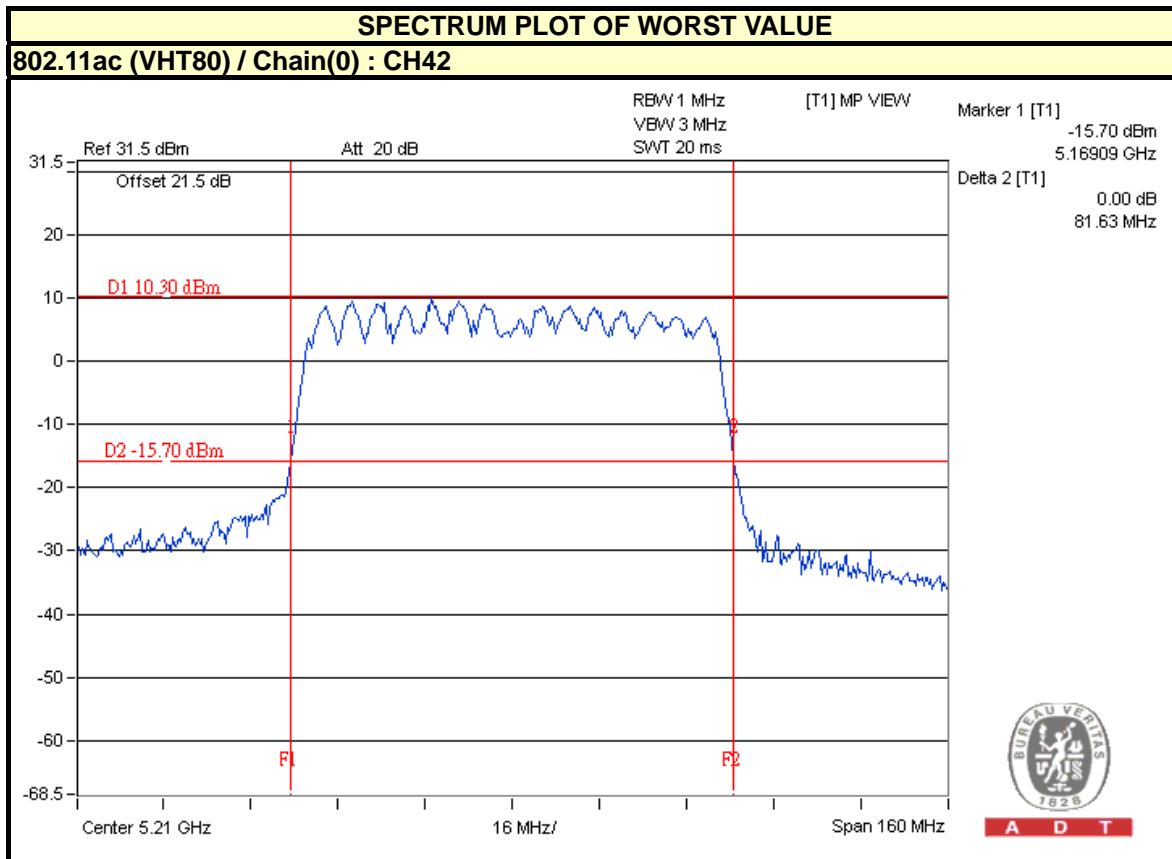
CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
42	5210	16.31	16.51	17.06	138.343	21.41	26.45	PASS
155	5775	16.91	17.94	17.83	171.995	22.36	25.66	PASS

**NOTE:** 1. 5150~5250MHz: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 9.55\text{dBi} > 6\text{dBi}$  , so the power limit shall be reduced to  $30-(9.55-6) = 26.45\text{dBm}$ .

2. 5725~5850MHz: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 10.34\text{dBi} > 6\text{dBi}$  , so the power limit shall be reduced to  $30-(10.34-6) = 25.66\text{dBm}$ .

**26dB OCCUPIED BANDWIDTH:**

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		
		CHAIN 0	CHAIN 1	CHAIN 2
42	5210	81.63	82.14	82.96







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#### 4.4 PEAK POWER SPECTRAL DENSITY MEASUREMENT

##### 4.4.1 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

##### 4.4.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSV 40	100964	July 05, 2014	July 04, 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 :Sep. 23, 2014



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### 4.4.3 TEST PROCEDURES

Using method SA-1

**For U-NII-1:**

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 1 MHz, Set VBW  $\geq$  3 MHz, Detector = RMS
3. Sweep time = auto, trigger set to “free run”.
4. Trace average at least 100 traces in power averaging mode.
5. Record the max value

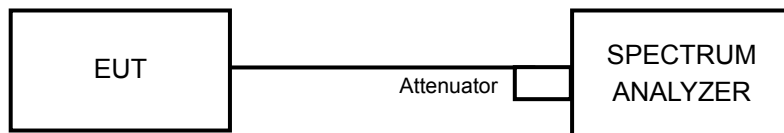
**For U-NII-3:**

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 300 kHz, Set VBW  $\geq$  1 MHz, Detector = RMS
3. Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
4. 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  $BWCF = 10\log(500 \text{ kHz}/300\text{kHz})$
5. Sweep time = auto, trigger set to “free run”.
6. Trace average at least 100 traces in power averaging mode.
7. Record the max value

### 4.4.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.4.5 TEST SETUP



#### 4.4.6 EUT OPERATING CONDITIONS

Same as 4.3.6

#### 4.4.7 TEST RESULTS(MODE 1)

For U-NII-1:

##### 802.11a

CHAN.	CHANNEL FREQUENCY (MHz)	PSD (dBm)			TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2			
36	5180	9.13	5.70	7.14	12.32	13.45	PASS
40	5200	5.81	3.37	4.14	9.33	13.45	PASS
48	5240	6.28	3.79	4.46	9.75	13.45	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 =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 9.55\text{dBi} > 6\text{dBi}$  , so the power density limit shall be reduced to  $17-(9.55-6) = 13.45\text{dBm}$ .

##### 802.11ac (VHT20)

CHAN.	CHANNEL FREQUENCY (MHz)	PSD (dBm)			TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2			
36	5180	8.73	8.84	6.73	12.97	13.45	PASS
40	5200	5.28	5.64	3.69	9.72	13.45	PASS
48	5240	5.62	5.80	3.93	9.97	13.45	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 =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 9.55\text{dBi} > 6\text{dBi}$  , so the power density limit shall be reduced to  $17-(9.55-6) = 13.45\text{dBm}$ .

##### 802.11ac (VHT40)

CHAN.	CHANNEL FREQUENCY (MHz)	PSD (dBm)			TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2			
38	5190	1.88	2.62	0.68	6.57	13.45	PASS
46	5230	5.72	5.43	3.88	9.85	13.45	PASS

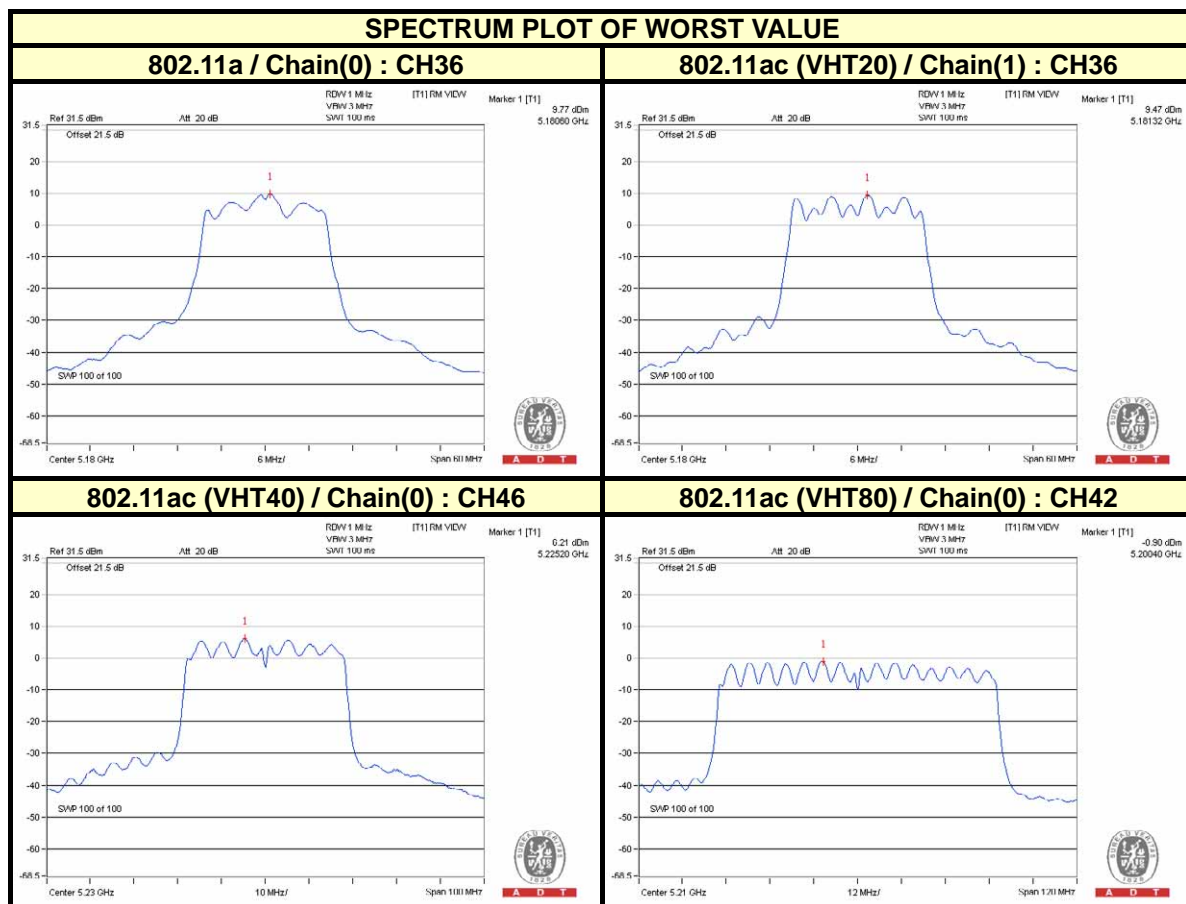
**NOTE:** 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.

2. 5150~5250MHz: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 9.55\text{dBi} > 6\text{dBi}$  , so the power density limit shall be reduced to  $17-(9.55-6) = 13.45\text{dBm}$ .

802.11ac (VHT80)

CHANNEL	CHANNEL FREQUENCY (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	CHAIN 2				
42	5210	-1.65	-1.65	-2.88	0.19	2.93	13.45	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 =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 9.55\text{dBi} > 6\text{dBi}$ , so the power density limit shall be reduced to  $17-(9.55-6) = 13.45\text{dBm}$ .
  - Refer to section 3.4 for duty cycle spectrum plot.





For U-NII-3:

802.11a

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=3) dB	TOTAL PSD WITH DUTY FACTOR (dBm/500kHz)	LIMIT (dBm/500kHz)	PASS /FAIL
0	149	5745	-1.02	1.20	4.77	5.97	25.66	PASS
	157	5785	3.72	5.94	4.77	10.71	25.66	PASS
	165	5825	2.37	4.59	4.77	9.36	25.66	PASS
1	149	5745	-0.86	1.36	4.77	6.13	25.66	PASS
	157	5785	2.09	4.31	4.77	9.08	25.66	PASS
	165	5825	0.45	2.67	4.77	7.44	25.66	PASS
2	149	5745	-0.36	1.86	4.77	6.63	25.66	PASS
	157	5785	1.88	4.10	4.77	8.87	25.66	PASS
	165	5825	0.70	2.92	4.77	7.69	25.66	PASS

**NOTE:** 1. 5725~5850MHz: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 10.34\text{dBi} > 6\text{dBi}$  , so the power density limit shall be reduced to  $30-(10.34-6) = 25.66\text{dBm}$ .

802.11ac (VHT20)

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=3) dB	TOTAL PSD WITH DUTY FACTOR (dBm/500kHz)	LIMIT (dBm/500kHz)	PASS /FAIL
0	149	5745	-2.16	0.06	4.77	4.83	25.66	PASS
	157	5785	2.15	4.37	4.77	9.14	25.66	PASS
	165	5825	0.65	2.87	4.77	7.64	25.66	PASS
1	149	5745	-2.18	0.04	4.77	4.81	25.66	PASS
	157	5785	1.85	4.07	4.77	8.84	25.66	PASS
	165	5825	-0.43	1.79	4.77	6.56	25.66	PASS
2	149	5745	-1.56	0.66	4.77	5.43	25.66	PASS
	157	5785	1.52	3.74	4.77	8.51	25.66	PASS
	165	5825	-0.64	1.58	4.77	6.35	25.66	PASS

**NOTE:** 1. 5725~5850MHz: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 10.34\text{dBi} > 6\text{dBi}$  , so the power density limit shall be reduced to  $30-(10.34-6) = 25.66\text{dBm}$ .



**802.11ac (VHT40)**

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=3) dB	TOTAL PSD WITH DUTY FACTOR (dBm/500kHz)	LIMIT (dBm/500kHz)	PASS /FAIL
0	151	5755	-5.76	-3.54	4.77	1.23	25.66	PASS
	159	5795	-2.36	-0.14	4.77	4.63	25.66	PASS
1	151	5755	-5.69	-3.47	4.77	1.30	25.66	PASS
	159	5795	-2.22	0.00	4.77	4.77	25.66	PASS
2	151	5755	-5.50	-3.28	4.77	1.49	25.66	PASS
	159	5795	-2.44	-0.22	4.77	4.55	25.66	PASS

**NOTE:** 1. 5725~5850MHz: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 10.34\text{dBi} > 6\text{dBi}$  , so the power density limit shall be reduced to  $30-(10.34-6) = 25.66\text{dBm}$ .

**802.11ac (VHT80)**

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD W/O DUTY FACTOR		10 log (N=3) dB	DUTY FACTOR (dB)	TOTAL PSD WITH DUTY FACTOR (dBm/500kHz)	LIMIT (dBm/500kHz)	PASS /FAIL
			(dBm/300kHz)	(dBm/500kHz)					
0	155	5745	-10.45	-8.23	4.77	0.19	-3.27	25.66	PASS
1	155	5745	-10.36	-8.14	4.77	0.19	-3.18	25.66	PASS
2	155	5745	-10.12	-7.90	4.77	0.19	-2.94	25.66	PASS

**NOTE:** 1. 5725~5850MHz: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 10.34\text{dBi} > 6\text{dBi}$  , so the power density limit shall be reduced to  $30-(10.34-6) = 25.66\text{dBm}$ .

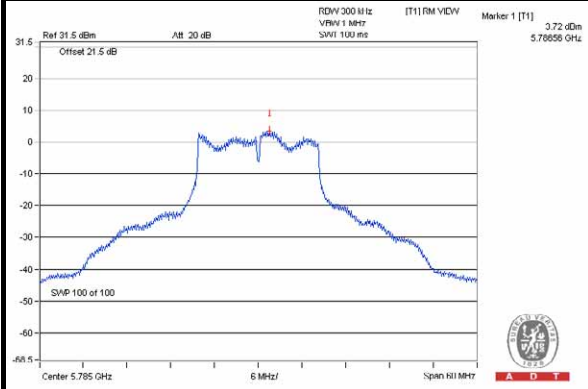
2. Refer to section 3.4 for duty cycle spectrum plot.



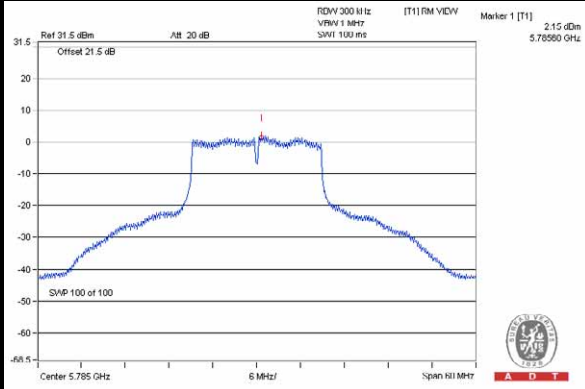
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### SPECTRUM PLOT OF WORST VALUE

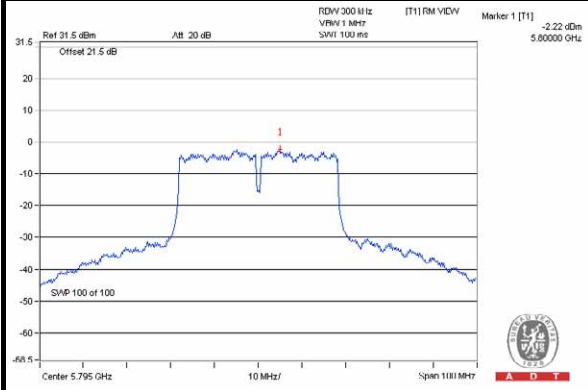
**802.11a / Chain(0) : CH157**



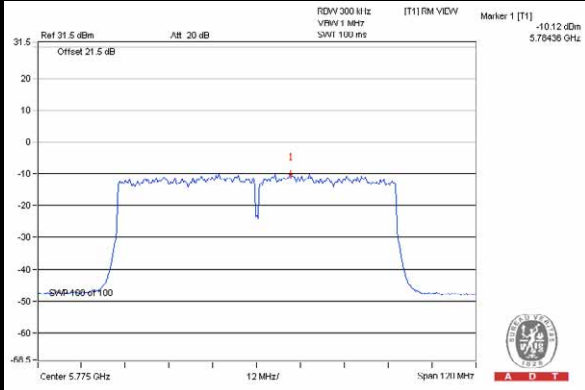
**802.11ac (VHT20) / Chain(0) : CH157**



**802.11ac (VHT40) / Chain(1) : CH159**



**802.11ac (VHT80) / Chain(2) : CH155**





#### 4.4.8 TEST RESULTS(MODE 2)

For U-NII-1:

##### 802.11ac (VHT20)

CHAN.	CHANNEL FREQUENCY (MHz)	PSD (dBm)			TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2			
36	5180	8.73	8.84	6.73	12.97	13.45	PASS
40	5200	5.28	5.64	3.69	9.72	13.45	PASS
48	5240	5.62	5.80	3.93	9.97	13.45	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 =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 9.55\text{dBi} > 6\text{dBi}$ , so the power density limit shall be reduced to  $17 - (9.55 - 6) = 13.45\text{dBm}$ .

##### 802.11ac (VHT40)

CHAN.	CHANNEL FREQUENCY (MHz)	PSD (dBm)			TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2			
38	5190	1.88	2.62	0.68	6.57	13.45	PASS
46	5230	5.72	5.43	3.88	9.85	13.45	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 =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 9.55\text{dBi} > 6\text{dBi}$ , so the power density limit shall be reduced to  $17 - (9.55 - 6) = 13.45\text{dBm}$ .

##### 802.11ac (VHT80)

CHANNEL	CHANNEL FREQUENCY (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	CHAIN 2				
42	5210	-1.65	-1.65	-2.88	0.19	2.93	13.45	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 =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 9.55\text{dBi} > 6\text{dBi}$ , so the power density limit shall be reduced to  $17 - (9.55 - 6) = 13.45\text{dBm}$ .

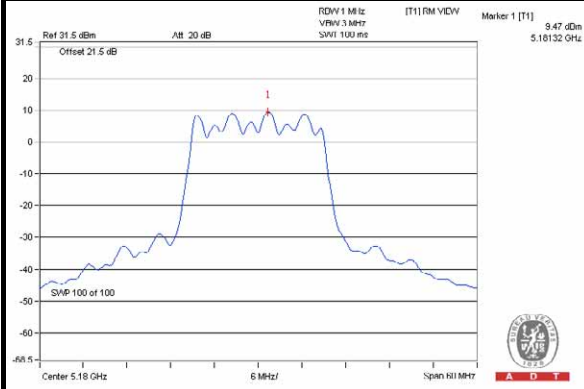
3. Refer to section 3.4 for duty cycle spectrum plot.



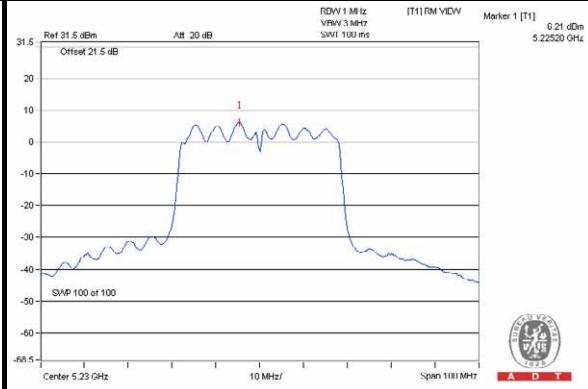
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### SPECTRUM PLOT OF WORST VALUE

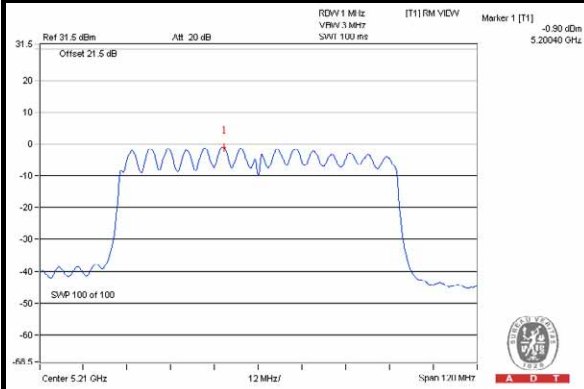
**802.11ac (VHT20) / Chain(1) : CH36**



**802.11ac (VHT40) / Chain(0) : CH46**



**802.11ac (VHT80) / Chain(0) : CH42**





For U-NII-3:

802.11ac (VHT20)

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD		10 log (N=3) dB	TOTAL PSD WITH DUTY FACTOR (dBm/500kHz)	LIMIT (dBm/500kHz)	PASS /FAIL
			(dBm/300kHz)	(dBm/500kHz)				
0	149	5745	-2.16	0.06	4.77	4.83	25.66	PASS
	157	5785	-1.57	0.65	4.77	5.42	25.66	PASS
	165	5825	-1.97	0.25	4.77	5.02	25.66	PASS
1	149	5745	-2.18	0.04	4.77	4.81	25.66	PASS
	157	5785	-1.53	0.69	4.77	5.46	25.66	PASS
	165	5825	-1.61	0.61	4.77	5.38	25.66	PASS
2	149	5745	-1.56	0.66	4.77	5.43	25.66	PASS
	157	5785	-1.24	0.98	4.77	5.75	25.66	PASS
	165	5825	-1.44	0.78	4.77	5.55	25.66	PASS

**NOTE:** 1. 5725~5850MHz: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3]$  = 10.34dBi > 6dBi , so the power density limit shall be reduced to  $30-(10.34-6)$  =25.66dBm.

802.11ac (VHT40)

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD W/O DUTY FACTOR		10 log (N=3) dB	TOTAL PSD WITH DUTY FACTOR (dBm/500kHz)	LIMIT (dBm/500kHz)	PASS /FAIL
			(dBm/300kHz)	(dBm/500kHz)				
0	151	5755	-5.76	-3.54	4.77	1.23	25.66	PASS
	159	5795	-4.16	-1.94	4.77	2.83	25.66	PASS
1	151	5755	-5.69	-3.47	4.77	1.30	25.66	PASS
	159	5795	-4.70	-2.48	4.77	2.29	25.66	PASS
2	151	5755	-5.50	-3.28	4.77	1.49	25.66	PASS
	159	5795	-4.95	-2.73	4.77	2.04	25.66	PASS

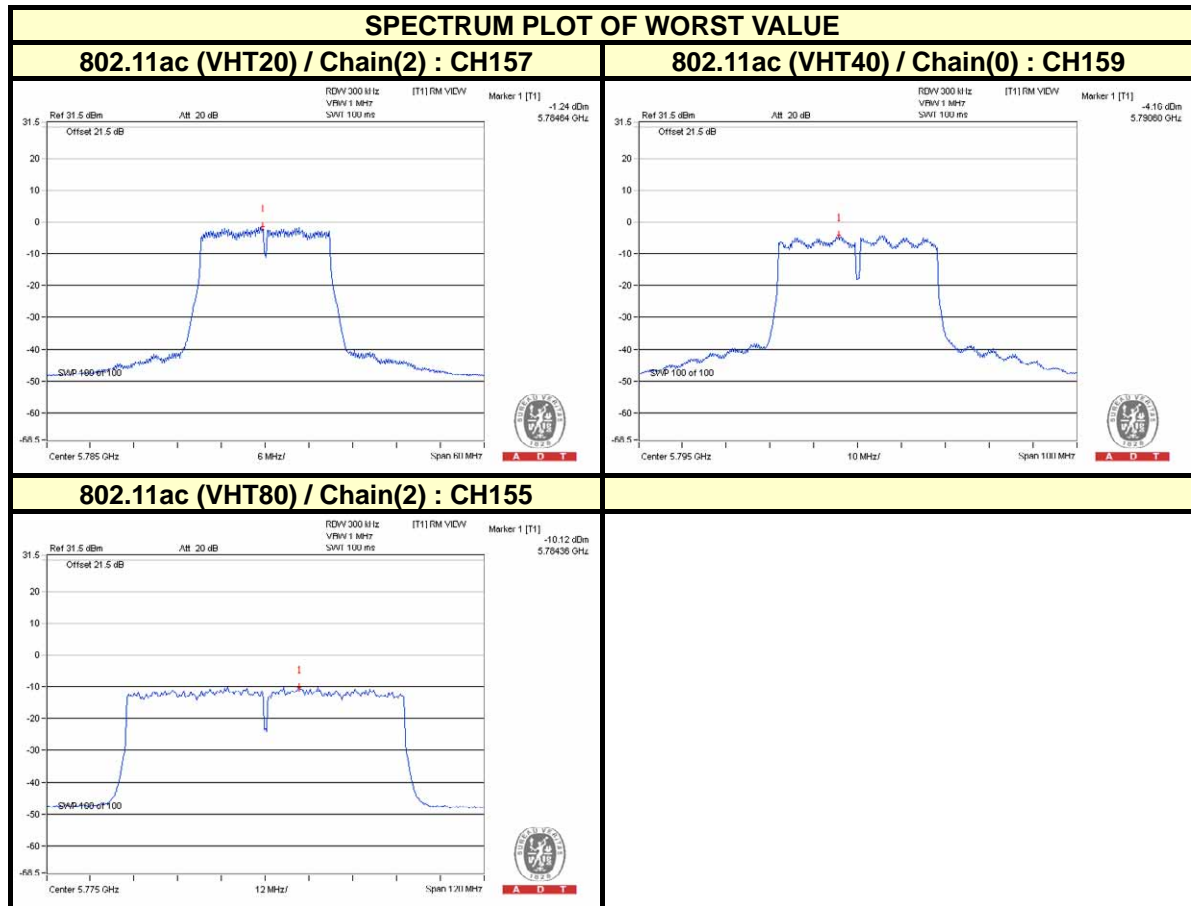
**NOTE:** 1. 5725~5850MHz: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3]$  = 10.34dBi > 6dBi , so the power density limit shall be reduced to  $30-(10.34-6)$  =25.66dBm.

802.11ac (VHT80)

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD W/O DUTY FACTOR		10 log (N=3) dB	DUTY FACTOR (dB)	TOTAL PSD WITH DUTY FACTOR (dBm/500kHz)	LIMIT (dBm/500kHz)	PASS /FAIL
			(dBm/300kHz)	(dBm/500kHz)					
0	155	5745	-10.45	-8.23	4.77	0.19	-3.27	25.66	PASS
1	155	5745	-10.36	-8.14	4.77	0.19	-3.18	25.66	PASS
2	155	5745	-10.12	-7.90	4.77	0.19	-2.94	25.66	PASS

**NOTE:** 1. 5725~5850MHz: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 10.34\text{dBi} > 6\text{dBi}$ , so the power density limit shall be reduced to  $30-(10.34-6) = 25.66\text{dBm}$ .

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





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## 4.5 FREQUENCY STABILITY

### 4.5.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

The frequency of the carrier signal shall be maintained within band of operation

### 4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSV 40	100964	July 05, 2014	July 04, 2015
Temperature Humidity Chamber GIANTFORCE &	GTH-150-40-SP -AR	MAA0812-008	Jan. 13, 2014	Jan. 12, 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 :Sep. 23, 2014

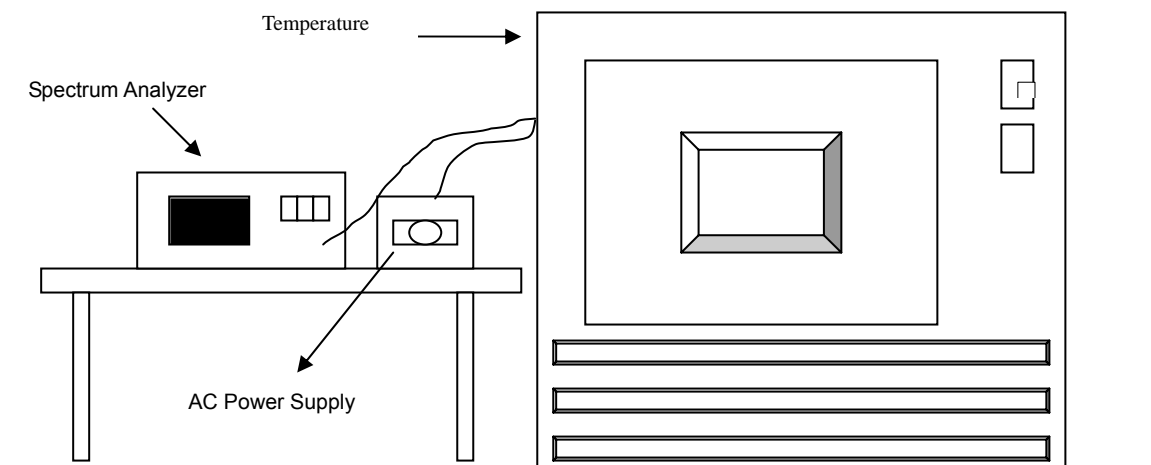
### 4.5.3 TEST PROCEDURE

1. The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
2. Turn the EUT on and couple its output to a spectrum analyzer.
3. Turn the EUT off and set the chamber to the highest temperature specified.
4. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
5. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
6. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

#### 4.5.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.5.5 TEST SETUP



#### 4.5.6 EUT OPERATING CONDITION

Set the EUT transmit at un-modulation mode to test frequency stability.



### 4.5.7 TEST RESULTS

FREQUENCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5240MHz									
TEMP. ( )	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	%	(MHz)	%	(MHz)	%	(MHz)	%
50	120	5239.9919	-0.00015	5239.9874	-0.00024	5239.9889	-0.00021	5239.9923	-0.00015
40	120	5239.9943	-0.00011	5239.9965	-0.00007	5239.9986	-0.00003	5239.9971	-0.00006
30	120	5240.0186	0.00035	5240.0212	0.00040	5240.0194	0.00037	5240.0181	0.00035
20	120	5239.9851	-0.00028	5239.9874	-0.00024	5239.9848	-0.00029	5239.9871	-0.00025
10	120	5239.9847	-0.00029	5239.9851	-0.00028	5239.9852	-0.00028	5239.9843	-0.00030
0	120	5239.9815	-0.00035	5239.9831	-0.00032	5239.9785	-0.00041	5239.9805	-0.00037
-10	120	5239.9893	-0.00020	5239.991	-0.00017	5239.9891	-0.00021	5239.9921	-0.00015
-20	120	5239.9733	-0.00051	5239.9759	-0.00046	5239.9757	-0.00046	5239.9761	-0.00046
-30	120	5239.986	-0.00027	5239.9842	-0.00030	5239.9858	-0.00027	5239.9859	-0.00027

FREQUENCY STABILITY VERSUS VOLTAGE									
OPERATING FREQUENCY: 5240MHz									
TEMP. ( )	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	%	(MHz)	%	(MHz)	%	(MHz)	%
20	138	5239.9859	-0.00027	5239.9875	-0.00024	5239.9856	-0.00027	5239.9876	-0.00024
	120	5239.9851	-0.00028	5239.9874	-0.00024	5239.9848	-0.00029	5239.9871	-0.00025
	102	5239.9858	-0.00027	5239.9872	-0.00024	5239.9844	-0.00030	5239.988	-0.00023



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## 4.6 6dB BANDWIDTH MEASUREMENT

### 4.6.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

### 4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSV 40	100964	July 05, 2014	July 04, 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 :Sep. 23, 2014

### 4.6.3 TEST PROCEDURE

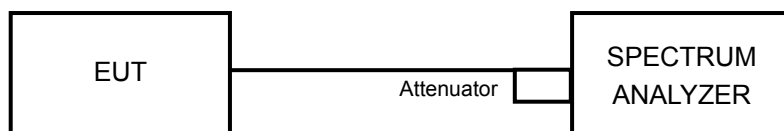
1. Set resolution bandwidth (RBW) = 100kHz.
2. Set the video bandwidth (VBW)  $\geq 3 \times$  RBW, Detector = Peak.
3. Trace mode = max hold.
4. Sweep = auto couple.
5. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and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

### 4.6.4 DEVIATION FROM TEST STANDARD

No deviation



#### 4.6.5 TEST SETUP



#### 4.6.6 EUT OPERATING CONDITIONS

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



## 4.6.7 TEST RESULTS(MODE 1)

## 802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
149	5745	16.41	16.39	16.43	0.5	PASS
157	5785	15.81	16.42	16.40	0.5	PASS
165	5825	16.34	16.41	16.40	0.5	PASS

## 802.11ac (VHT20)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
149	5745	17.66	17.65	17.67	0.5	PASS
157	5785	17.58	17.66	17.63	0.5	PASS
165	5825	16.98	17.68	17.34	0.5	PASS

## 802.11ac (VHT40)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
151	5755	36.21	36.20	36.51	0.5	PASS
159	5795	36.45	36.45	36.50	0.5	PASS

## 802.11ac (VHT80)

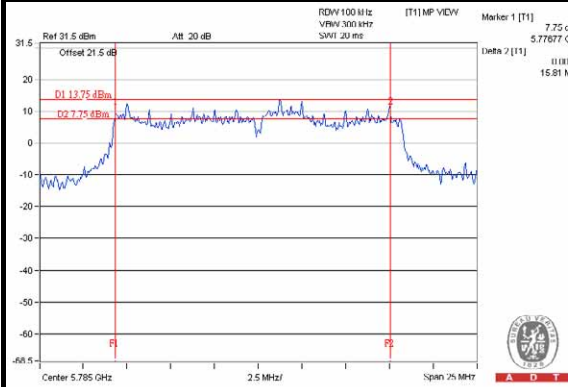
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
155	5775	75.90	75.88	76.38	0.5	PASS



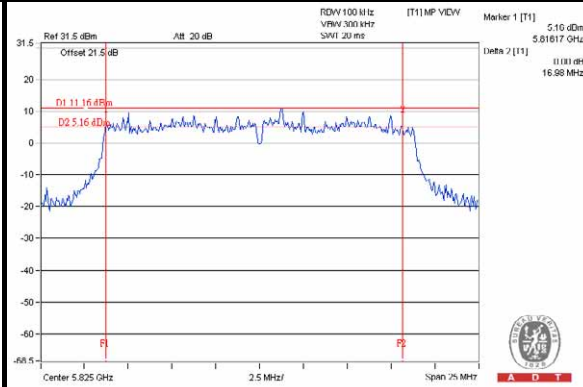
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### SPECTRUM PLOT OF WORST VALUE

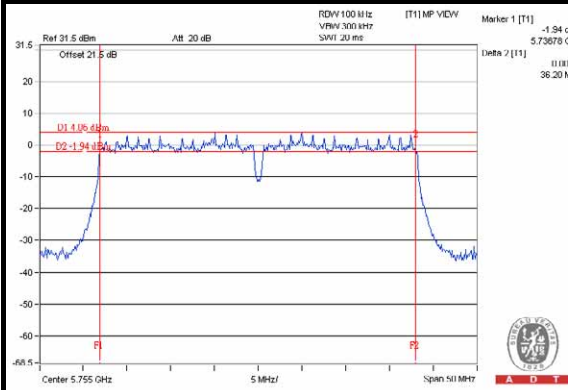
#### 802.11a / Chain(0) : CH157



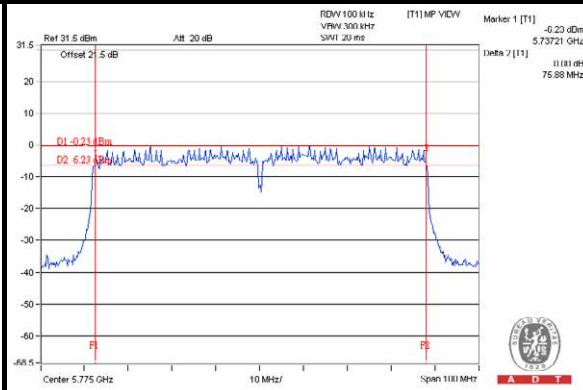
#### 802.11ac (VHT20) / Chain(0) : CH165



#### 802.11ac (VHT40) / Chain(1) : CH151



#### 802.11ac (VHT80) / Chain(1) : CH155





#### 4.6.8 TEST RESULTS(MODE 2)

##### 802.11ac (VHT20)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
149	5745	17.66	17.65	17.67	0.5	PASS
157	5785	17.64	17.67	17.68	0.5	PASS
165	5825	17.60	17.63	17.66	0.5	PASS

##### 802.11ac (VHT40)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
151	5755	36.21	36.20	36.51	0.5	PASS
159	5795	36.43	36.51	36.19	0.5	PASS

##### 802.11ac (VHT80)

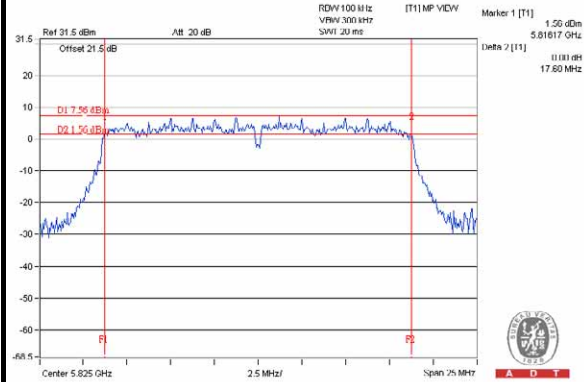
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
155	5775	75.90	75.88	76.38	0.5	PASS



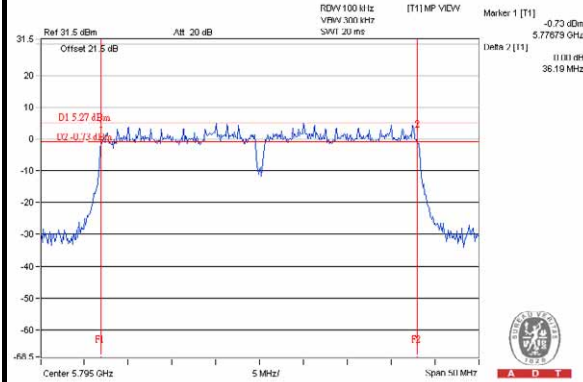
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### SPECTRUM PLOT OF WORST VALUE

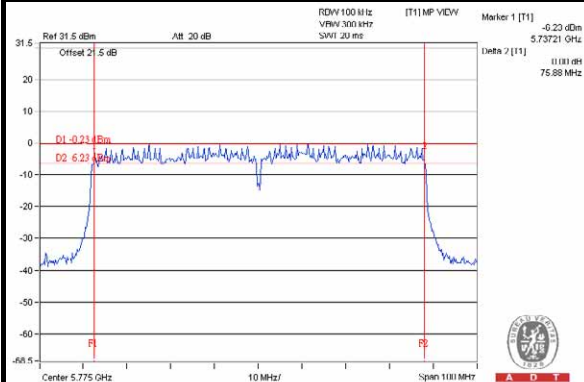
**802.11ac (VHT20) / Chain(0) : CH165**



**802.11ac (VHT40) / Chain(2) : CH159**



**802.11ac (VHT80) / Chain(1) : CH155**



## 5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



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## 6. INFORMATION ON THE TESTING LABORATORIES

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

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

**Linko EMC/RF Lab:**

Tel: 886-2-26052180

Fax: 886-2-26052943

**Hsin Chu EMC/RF/Telecom Lab:**

Tel: 886-3-5935343

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**Web Site:** [www.bureauveritas-adt.com](http://www.bureauveritas-adt.com)

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



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## **7. APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB**

No modifications were made to the EUT by the lab during the test.

**--- END ---**