



# FCC TEST REPORT (15.407)

**REPORT NO.:** RF140828E03A-1

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

**FCC ID:** NQ8D5001

**RECEIVED:** Aug. 28, 2014

**TESTED:** Sep. 10 to Oct. 08, 2014

**ISSUED:** Jan. 14, 2015

**APPLICANT:** Pace Micro Technology plc

**ADDRESS:** Saltaire, Shipley, West Yorkshire, BD18 3LF, UK

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

**LAB ADDRESS :** No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan, R.O.C.

**TEST LOCATION (1):** No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan, R.O.C.

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## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF140828E03A-1	Original release	Jan. 14, 2015



## 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 Oct. 08, 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** :  , **DATE:** Jan. 14, 2015  
( Elsie Hsu, Specialist )

**APPROVED BY** :  , **DATE:** Jan. 14, 2015  
( 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 -14.74dB 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 5418.00MHz, 5455.00MHz, 5778.00MHz, 5433.00MHz, 5747.00MHz, 5725.00MHz, 5350.00MHz, 5424.00MHz, 5454.00MHz, 5434.00MHz, 5384.00MHz, 5762.00MHz, 5861.00MHz, 5424.00MHz & 5757MHz.
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(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. This report is prepared for FCC Class II change. (Add DFS band: 5250~5350MHz & 5470~5725MHz).
2. The DFS report 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  $k=2$ .

Measurement	Value
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



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### 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>	5.26 ~ 5.32GHz, 5.5~5.72GHz
<b>NUMBER OF CHANNEL</b>	16 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 8 for 802.11n (HT40), 802.11ac (VHT40) 3 for 802.11ac (VHT80)
<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. This report is prepared for FCC Class II. The difference compared with the Report No.: RF140828E03-1 design is as the following:

◆ Add DFS band <5250~5350MHz & 5470~5725MHz>

2. According to above condition, all test items need to be performed. And all data was verified to meet the requirements.

3. 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 D3001&D3003
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 D3003
Wide band tuner	BCM3184	NA	NA	Remove BCM3184 wide band tuner for D3001&D3003
MoCA Chip	BCM6803KFSBG+ BCM3451KMLG	BCM6803KFSBG+ BCM3451KMLG	NA	Remove BCM6803 for D3003

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.

4. For 5GHz: NII band 2c and NII band 3 cannot transmit at same time.

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

Test Mode	802.11a	802.11ac (VHT20)	802.11ac (VHT40)	802.11ac (VHT80)
3TX CDD Mode	110.658	109.354	204.965	238.089
3TX Beamforming Mode	NA	109.354	108.338	108.665

6. 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

7. 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	Connecter 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

8. 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)

9. The emission of the simultaneous operation (2.4GHz & 5GHz) has been evaluated and no non-compliance was found.

10. 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 5250 ~ 5350MHz band:

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
52	5260 MHz	60	5300 MHz
56	5280 MHz	64	5320 MHz

2 channels are provided for 802.11n (HT40):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
54	5270 MHz	62	5310 MHz

#### Operated in 5470MHz ~ 5725MHz bands:

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

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

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
102	5510 MHz	126	5630 MHz
110	5550 MHz	134	5670 MHz
118	5590 MHz	142	5710 MHz

3 channels are provided for 802.11ac (VHT80):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
106	5530 MHz	138	5690 MHz
122	5610 MHz		



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### 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 MODE
802.11ac (VHT40)	54 to 142	102	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 MODE
802.11ac (VHT40)	54 to 142	102	OFDM	BPSK	13.5	1

**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 MODE
802.11a	52 to 144	52, 60, 64, 100, 120, 140, 144	OFDM	BPSK	6	1
802.11ac (VHT20)	52 to 144	52, 60, 64, 100, 120, 140, 144	OFDM	BPSK	6.5	1
802.11ac (VHT40)	54 to 142	54, 62, 102, 118, 134, 142	OFDM	BPSK	13.5	1
802.11ac (VHT80)	58 to 138	58, 106, 122, 138,	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 MODE
802.11a	52 to 144	52, 60, 64, 100, 120, 140, 144	OFDM	BPSK	6	1
802.11ac (VHT20)	52 to 144	52, 60, 64, 100, 120, 140, 144	OFDM	BPSK	6.5	1, 2
802.11ac (VHT40)	54 to 142	54, 62, 102, 118, 134, 142	OFDM	BPSK	13.5	1, 2
802.11ac (VHT80)	58 to 138	58, 106, 122, 138,	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, 66%RH	120Vac, 60Hz	Robert Cheng
RE <sup>3</sup> 1G	26deg. C, 66%RH 22deg. C, 67%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.

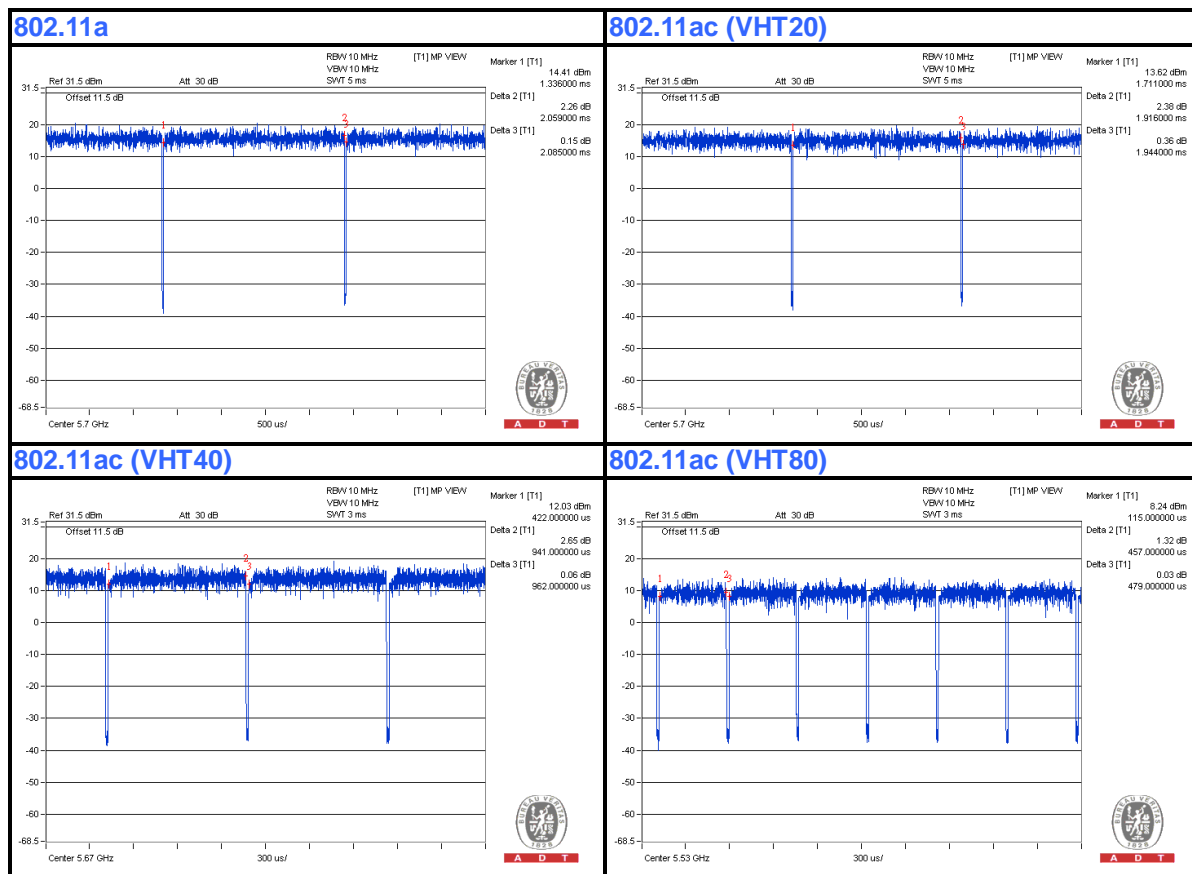
If duty cycle of test signal is  $< 98\%$ , duty factor shall be considered.

**802.11a:** Duty cycle =  $2.059 \text{ ms} / 2.085 \text{ ms} = 0.988$

**802.11ac (VHT20):** Duty cycle =  $1.916 \text{ ms} / 1.944 \text{ ms} = 0.986$

**802.11ac (VHT40):** Duty cycle =  $0.943 \text{ ms} / 0.962 \text{ ms} = 0.98$

**802.11ac (VHT80):** Duty cycle =  $0.457 \text{ ms} / 0.479 \text{ ms} = 0.954$ , Duty factor =  $10 * \log(1/0.954) = 0.2$





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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.

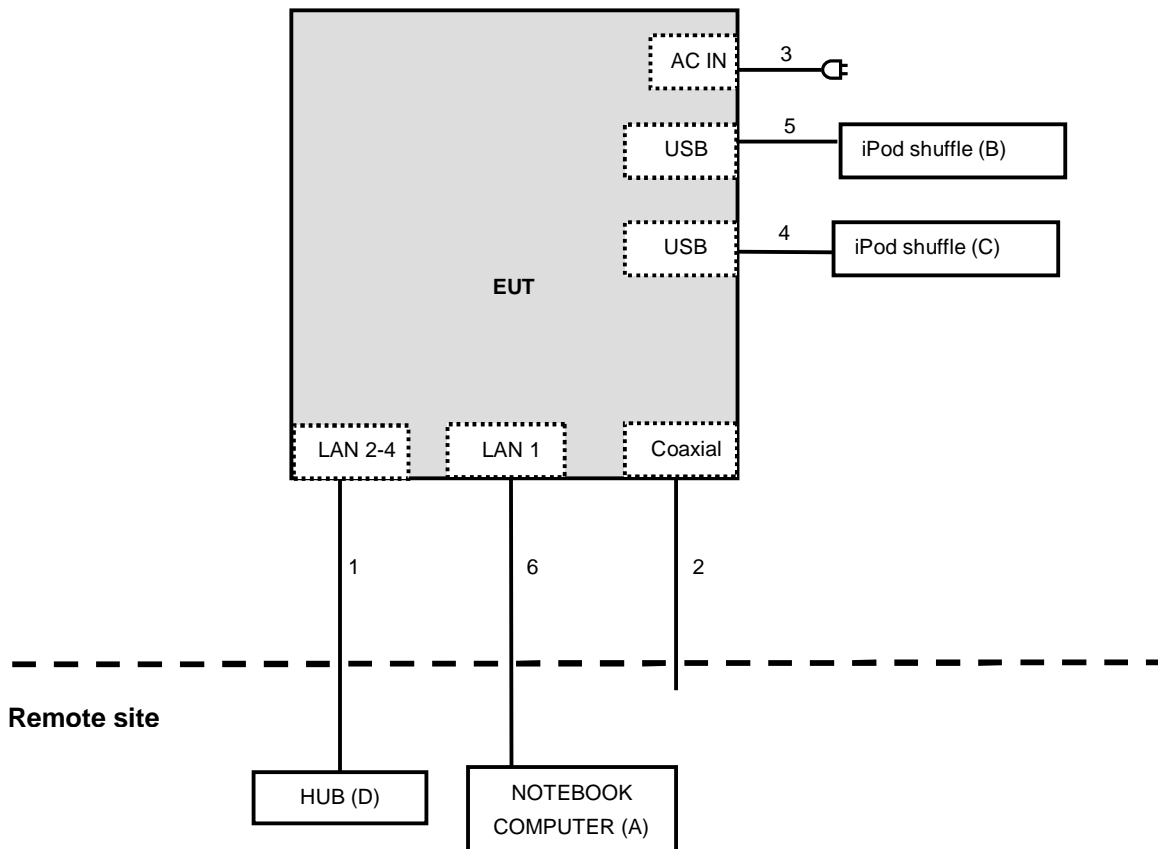
No.	Product	Brand	Model No.	Serial No.	FCC ID	Remark
A	NOTEBOOK COMPUTER	DELL	E5430	7YV4VY1	FCC DoC	Provided by Lab
B	iPod shuffle (For other test items)	Apple	MC749TA/A	CC4DN25WDFDM	NA	Provided by Lab
	iPod shuffle (For conducted emission test)	Apple	MD778TA/A	CC4JMCMXF4T1	NA	Provided by Lab
C	iPod 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 (dB $\mu$ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

- NOTE:**
1. The lower limit shall apply at the transition frequencies.
  2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 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	NSLK-8127	8127-523	Oct. 02, 2013	Oct. 01, 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:**

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

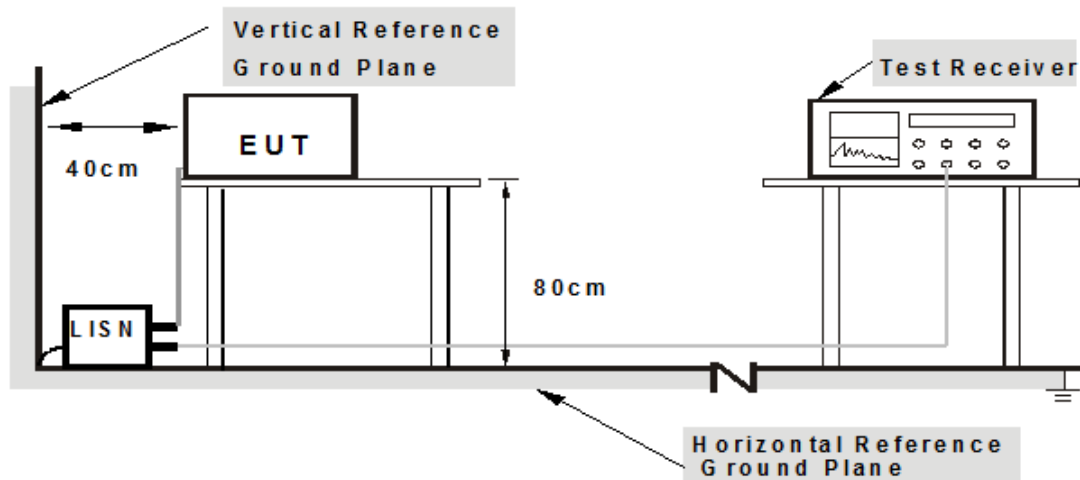
#### NOTE:

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 2.0.1.1” to enable EUT under transmission/receiving condition continuously.

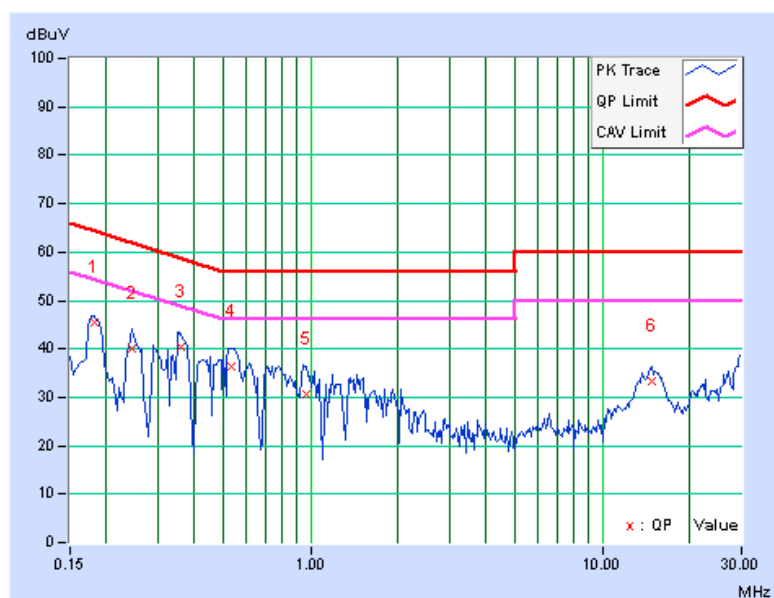
### 4.1.7 TEST RESULTS

PHASE	Line (L)	DETECTOR FUNCTION	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	45.23	39.62	45.30	39.69	64.43	54.43	-19.13
2	0.24571	0.07	40.12	30.75	40.19	30.82	61.90	51.90	-21.71	-21.08
3	0.35954	0.09	40.23	28.52	40.32	28.61	58.74	48.74	-18.42	-20.13
4	0.53886	0.10	36.32	27.51	36.42	27.61	56.00	46.00	-19.58	-18.39
5	0.96251	0.13	30.36	18.26	30.49	18.39	56.00	46.00	-25.51	-27.61
6	14.81623	0.58	32.65	27.26	33.23	27.84	60.00	50.00	-26.77	-22.16

#### 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

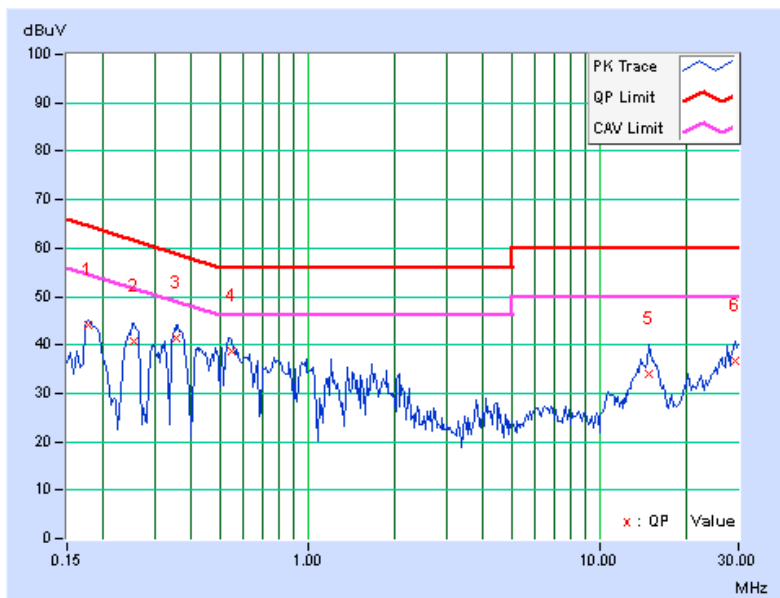


<b>PHASE</b>	Neutral (N)	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
	1	0.17799	0.07	44.18	32.56	44.25	32.63	64.58	54.58	-20.33
2	0.25468	0.08	40.63	29.55	40.71	29.63	61.60	51.60	-20.90	-21.98
3	0.35626	0.09	41.23	28.75	41.32	28.84	58.82	48.82	-17.50	-19.98
4	0.54958	0.10	38.66	28.56	38.76	28.66	56.00	46.00	-17.24	-17.34
5	14.72787	0.58	33.51	26.45	34.09	27.03	60.00	50.00	-25.91	-22.97
6	29.18883	0.97	35.78	29.02	36.75	29.99	60.00	50.00	-23.25	-20.01

**REMARKS:**

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





## 4.2 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:

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



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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 Oct 03, 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:**

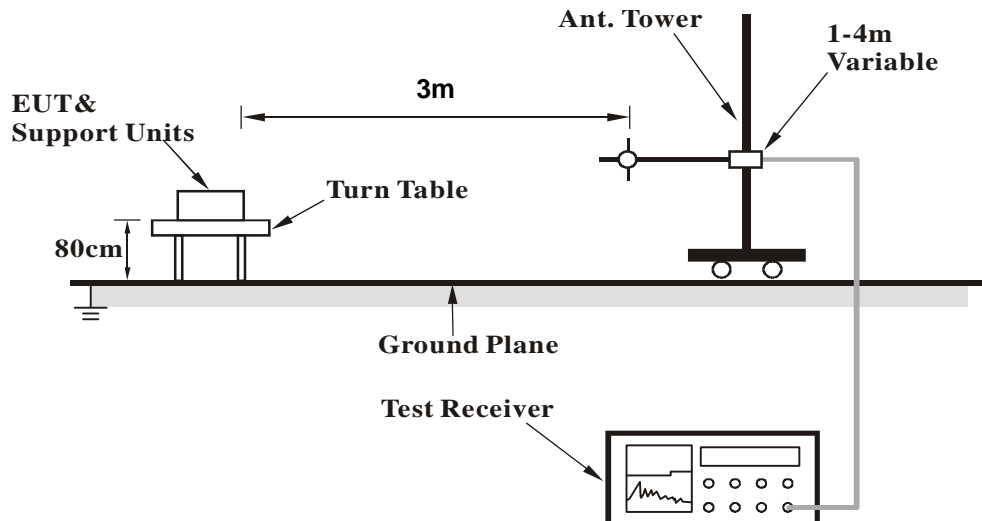
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
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

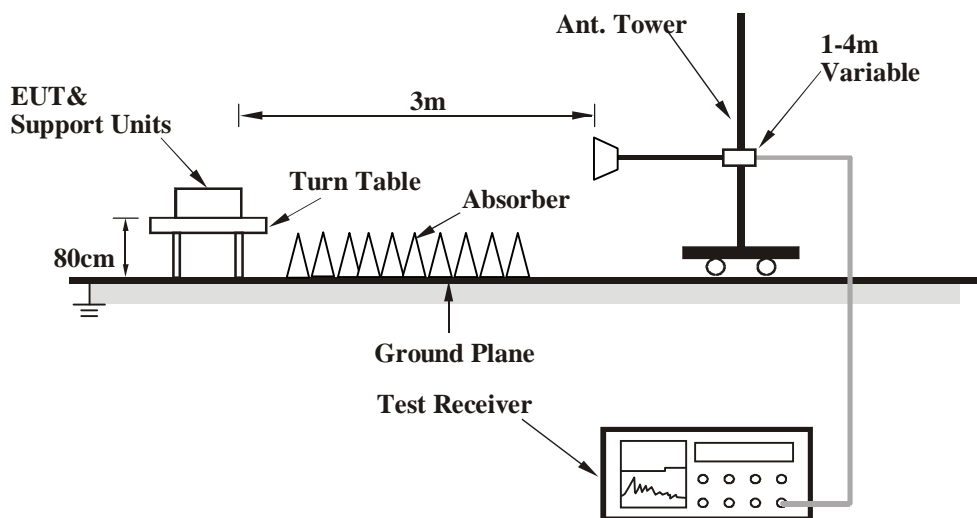
No deviation

#### 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 (VHT40)

<b>CHANNEL</b>	TX Channel 102	<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	108.60	28.4 QP	43.5	-15.1	1.45 H	99	44.86	-16.46
2	125.11	31.0 QP	43.5	-12.5	1.47 H	137	45.92	-14.92
3	249.40	32.3 QP	46.0	-13.7	1.67 H	100	46.65	-14.33
4	500.02	34.1 QP	46.0	-11.9	1.64 H	241	41.47	-7.36
5	624.24	40.2 QP	46.0	-5.8	1.38 H	211	44.62	-4.42
6	651.40	33.3 QP	46.0	-12.7	1.21 H	66	37.37	-4.09

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	37.61	34.7 QP	40.0	-5.3	1.12 V	134	48.72	-14.00
2	380.75	33.0 QP	46.0	-13.0	1.34 V	89	43.09	-10.09
3	500.12	31.4 QP	46.0	-14.6	1.34 V	234	38.78	-7.36
4	521.00	31.3 QP	46.0	-14.7	1.34 V	98	38.23	-6.90
5	607.55	25.0 QP	46.0	-21.0	1.64 V	302	29.65	-4.65
6	624.78	37.4 QP	46.0	-8.6	1.65 V	99	41.81	-4.41

#### 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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## 802.11a

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
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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	5141.00	63.2 PK	74.0	-10.8	1.00 H	287	56.88	6.32
2	5141.00	51.2 AV	54.0	-2.8	1.00 H	287	44.88	6.32
3	*5260.00	113.2 PK			1.00 H	272	106.46	6.74
4	*5260.00	104.3 AV			1.00 H	272	97.56	6.74
5	5424.00	62.4 PK	74.0	-11.6	1.03 H	294	55.07	7.33
6	5424.00	53.3 AV	54.0	-0.7	1.03 H	294	45.97	7.33
7	#10520.00	54.3 PK	68.2	-13.9	1.01 H	213	41.67	12.63
8	15780.00	60.0 PK	74.0	-14.0	1.13 H	160	42.28	17.72
9	15780.00	48.9 AV	54.0	-5.1	1.13 H	160	31.18	17.72

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
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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	5141.00	62.4 PK	74.0	-11.6	1.10 V	142	56.08	6.32
2	5141.00	51.6 AV	54.0	-2.4	1.10 V	142	45.28	6.32
3	*5260.00	115.8 PK			1.10 V	142	109.06	6.74
4	*5260.00	106.2 AV			1.10 V	142	99.46	6.74
5	5424.00	63.8 PK	74.0	-10.2	1.00 V	87	56.47	7.33
6	<b>5424.00</b>	<b>53.9 AV</b>	<b>54.0</b>	<b>-0.1</b>	<b>1.00 V</b>	<b>87</b>	<b>46.57</b>	<b>7.33</b>
7	#10520.00	54.4 PK	68.2	-13.8	1.05 V	103	41.77	12.63
8	15780.00	60.1 PK	74.0	-13.9	1.21 V	60	42.38	17.72
9	15780.00	49.3 AV	54.0	-4.7	1.21 V	60	31.58	17.72

## REMARKS:

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



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<b>CHANNEL</b>	TX Channel 60	<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	*5300.00	113.7 PK			1.24 H	270	106.83	6.87
2	*5300.00	104.7 AV			1.24 H	270	97.83	6.87
3	5454.00	63.6 PK	74.0	-10.4	1.03 H	289	56.17	7.43
4	<b>5454.00</b>	<b>53.9 AV</b>	<b>54.0</b>	<b>-0.1</b>	<b>1.03 H</b>	<b>289</b>	<b>46.47</b>	<b>7.43</b>
5	#5464.00	64.4 PK	68.2	-3.8	1.03 H	289	56.94	7.46
6	10600.00	53.6 PK	74.0	-20.4	1.00 H	206	40.68	12.92
7	10600.00	41.7 AV	54.0	-12.3	1.00 H	206	28.78	12.92
8	15900.00	60.5 PK	74.0	-13.5	1.05 H	157	42.68	17.82
9	15900.00	49.4 AV	54.0	-4.6	1.05 H	157	31.58	17.82

**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	*5300.00	115.6 PK			1.09 V	140	108.73	6.87
2	*5300.00	106.0 AV			1.09 V	140	99.13	6.87
3	5454.00	63.7 PK	74.0	-10.3	1.00 V	86	56.27	7.43
4	<b>5454.00</b>	<b>53.9 AV</b>	<b>54.0</b>	<b>-0.1</b>	<b>1.00 V</b>	<b>86</b>	<b>46.47</b>	<b>7.43</b>
5	#5464.00	64.2 PK	68.2	-4.0	1.00 V	86	56.74	7.46
6	10600.00	54.3 PK	74.0	-19.7	1.07 V	94	41.38	12.92
7	10600.00	42.1 AV	54.0	-11.9	1.07 V	94	29.18	12.92
8	15900.00	60.1 PK	74.0	-13.9	1.23 V	70	42.28	17.82
9	15900.00	49.1 AV	54.0	-4.9	1.23 V	70	31.28	17.82

**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 64	<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	*5320.00	115.6 PK			1.24 H	278	108.65	6.95
2	*5320.00	106.6 AV			1.24 H	278	99.65	6.95
3	5434.00	65.2 PK	74.0	-8.8	1.06 H	290	57.84	7.36
4	<b>5434.00</b>	<b>53.9 AV</b>	<b>54.0</b>	<b>-0.1</b>	<b>1.06 H</b>	<b>290</b>	<b>46.54</b>	<b>7.36</b>
5	#5483.00	66.1 PK	68.2	-2.1	1.01 H	291	58.57	7.53
6	10640.00	53.5 PK	74.0	-20.5	1.09 H	107	40.49	13.01
7	10640.00	41.9 AV	54.0	-12.1	1.09 H	107	28.89	13.01
8	15960.00	59.5 PK	74.0	-14.5	1.12 H	76	41.71	17.79
9	15960.00	48.7 AV	54.0	-5.3	1.12 H	76	30.91	17.79

**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	*5320.00	117.5 PK			1.02 V	108	110.55	6.95
2	*5320.00	107.9 AV			1.02 V	108	100.95	6.95
3	5434.00	64.6 PK	74.0	-9.4	1.01 V	87	57.24	7.36
4	5434.00	53.5 AV	54.0	-0.5	1.01 V	87	46.14	7.36
5	#5483.00	66.4 PK	68.2	-1.8	1.10 V	155	58.87	7.53
6	10640.00	54.7 PK	74.0	-19.3	1.05 V	202	41.69	13.01
7	10640.00	42.5 AV	54.0	-11.5	1.05 V	202	29.49	13.01
8	15960.00	60.0 PK	74.0	-14.0	1.02 V	152	42.21	17.79
9	15960.00	49.0 AV	54.0	-5.0	1.02 V	152	31.21	17.79

**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 100	<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	#5345.00	65.1 PK	68.2	-3.1	1.04 H	292	58.06	7.04
2	5384.00	63.2 PK	74.0	-10.8	1.04 H	292	56.02	7.18
3	5384.00	53.2 AV	54.0	-0.8	1.04 H	292	46.02	7.18
4	#5464.00	67.1 PK	68.2	-1.1	1.03 H	289	59.64	7.46
5	*5500.00	117.6 PK			1.03 H	289	110.01	7.59
6	*5500.00	109.2 AV			1.03 H	289	101.61	7.59
7	#5735.00	66.4 PK	68.2	-1.8	1.10 H	329	58.42	7.98
8	11000.00	53.8 PK	74.0	-20.2	1.00 H	105	40.00	13.80
9	11000.00	42.1 AV	54.0	-11.9	1.00 H	105	28.30	13.80
10	#16500.00	60.3 PK	68.2	-7.9	1.20 H	81	40.15	20.15

**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	#5345.00	66.3 PK	68.2	-1.9	1.02 V	99	59.26	7.04
2	5384.00	64.7 PK	74.0	-9.3	1.02 V	88	57.52	7.18
<b>3</b>	<b>5384.00</b>	<b>53.9 AV</b>	<b>54.0</b>	<b>-0.1</b>	<b>1.02 V</b>	<b>88</b>	<b>46.72</b>	<b>7.18</b>
4	#5464.00	68.0 PK	68.2	-0.2	1.02 V	88	60.54	7.46
5	*5500.00	119.6 PK			1.02 V	99	112.01	7.59
6	*5500.00	110.3 AV			1.02 V	99	102.71	7.59
7	#5735.00	66.4 PK	68.2	-1.8	1.06 V	153	58.42	7.98
8	11000.00	55.0 PK	74.0	-19.0	1.05 V	197	41.20	13.80
9	11000.00	43.0 AV	54.0	-11.0	1.05 V	197	29.20	13.80
10	#16500.00	60.3 PK	68.2	-7.9	1.02 V	145	40.15	20.15

**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 120	<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	5134.00	61.8 PK	74.0	-12.2	1.24 H	286	55.51	6.29
2	5134.00	52.3 AV	54.0	-1.7	1.24 H	286	46.01	6.29
3	5442.00	61.9 PK	74.0	-12.1	1.23 H	285	54.52	7.38
4	5442.00	52.6 AV	54.0	-1.4	1.23 H	285	45.22	7.38
5	*5600.00	116.5 PK			1.40 H	283	108.74	7.76
6	*5600.00	107.2 AV			1.40 H	283	99.44	7.76
7	#5762.00	67.1 PK	68.2	-1.1	1.36 H	281	59.09	8.01
8	#5833.00	63.8 PK	68.2	-4.4	1.33 H	287	55.62	8.18
9	11200.00	53.5 PK	74.0	-20.5	1.06 H	120	39.85	13.65
10	11200.00	41.6 AV	54.0	-12.4	1.06 H	120	27.95	13.65
11	#16800.00	60.2 PK	68.2	-8.0	1.29 H	76	39.70	20.50

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5134.00	63.5 PK	74.0	-10.5	1.20 V	154	57.21	6.29
2	5134.00	53.8 AV	54.0	-0.2	1.20 V	154	47.51	6.29
3	5442.00	63.3 PK	74.0	-10.7	1.02 V	141	55.92	7.38
4	5442.00	53.6 AV	54.0	-0.4	1.02 V	141	46.22	7.38
5	*5600.00	118.3 PK			1.15 V	92	110.54	7.76
6	*5600.00	108.7 AV			1.15 V	92	100.94	7.76
7	#5762.00	<b>68.1 PK</b>	<b>68.2</b>	<b>-0.1</b>	<b>1.03 V</b>	<b>145</b>	<b>60.09</b>	<b>8.01</b>
8	#5833.00	64.3 PK	68.2	-3.9	1.02 V	155	56.12	8.18
9	11200.00	54.2 PK	74.0	-19.8	1.01 V	112	40.55	13.65
10	11200.00	41.8 AV	54.0	-12.2	1.01 V	112	28.15	13.65
11	#16800.00	60.4 PK	68.2	-7.8	1.22 V	82	39.90	20.50

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – 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 140	<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	*5700.00	116.1 PK			1.54 H	333	108.17	7.93
2	*5700.00	107.2 AV			1.54 H	333	99.27	7.93
3	#5725.00	69.8 PK	74.0	-4.2	1.54 H	333	61.84	7.96
4	#5725.00	51.6 AV	54.0	-2.4	1.54 H	333	43.64	7.96
5	#5781.00	65.7 PK	68.2	-2.5	1.38 H	328	57.67	8.03
6	#5821.00	66.5 PK	68.2	-1.7	1.36 H	326	58.37	8.13
7	#5861.00	66.5 PK	68.2	-1.7	1.47 H	328	58.24	8.26
8	11400.00	53.6 PK	74.0	-20.4	1.02 H	115	39.84	13.76
9	11400.00	41.9 AV	54.0	-12.1	1.02 H	115	28.14	13.76
10	#17100.00	59.8 PK	68.2	-8.4	1.34 H	84	38.86	20.94

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5700.00	120.2 PK			1.37 V	140	112.27	7.93
2	*5700.00	110.5 AV			1.37 V	140	102.57	7.93
3	#5725.00	71.1 PK	74.0	-2.9	1.37 V	140	63.14	7.96
4	#5725.00	53.3 AV	54.0	-0.7	1.37 V	140	45.34	7.96
5	#5781.00	67.9 PK	68.2	-0.3	1.41 V	102	59.87	8.03
6	#5821.00	67.4 PK	68.2	-0.8	1.40 V	102	59.27	8.13
7	#5861.00	<b>68.1 PK</b>	<b>68.2</b>	<b>-0.1</b>	<b>1.38 V</b>	<b>101</b>	<b>59.84</b>	<b>8.26</b>
8	11400.00	53.8 PK	74.0	-20.2	1.00 V	111	40.04	13.76
9	11400.00	41.5 AV	54.0	-12.5	1.00 V	111	27.74	13.76
10	#17100.00	60.6 PK	68.2	-7.6	1.23 V	79	39.66	20.94

**REMARKS:**

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



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<b>CHANNEL</b>	TX Channel 144	<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	*5720.00	118.5 PK			1.17 H	142	110.11	8.39
2	*5720.00	108.8 AV			1.17 H	142	100.41	8.39
3	#5850.00	56.2 PK	68.2	-12.0	1.17 H	142	47.53	8.67
4	#5872.80	66.6 PK	68.2	-1.6	1.13 H	141	57.84	8.76
5	11440.00	53.1 PK	74.0	-20.9	1.00 H	122	38.71	14.39
6	11440.00	41.4 AV	54.0	-12.6	1.00 H	122	27.01	14.39
7	#17160.00	59.5 PK	68.2	-8.7	1.38 H	73	37.49	22.01

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5720.00	122.3 PK			1.78 V	328	113.91	8.39
2	*5720.00	112.5 AV			1.78 V	328	104.11	8.39
3	#5850.00	60.3 PK	68.2	-7.9	1.78 V	328	51.63	8.67
4	#5872.80	68.0 PK	68.2	-0.2	1.34 V	323	59.24	8.76
5	11440.00	53.6 PK	74.0	-20.4	1.03 V	111	39.21	14.39
6	11440.00	41.6 AV	54.0	-12.4	1.03 V	111	27.21	14.39
7	#17160.00	60.8 PK	68.2	-7.4	1.27 V	73	38.79	22.01

**REMARKS:**

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



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802.11ac(VHT20)

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

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5260.00	113.5 PK			1.00 H	261	106.76	6.74
2	*5260.00	104.7 AV			1.00 H	261	97.96	6.74
3	5418.00	62.8 PK	74.0	-11.2	1.05 H	296	55.50	7.30
4	5418.00	52.3 AV	54.0	-1.7	1.05 H	296	45.00	7.30
5	#10520.00	54.8 PK	68.2	-13.4	1.06 H	218	42.17	12.63
6	15780.00	60.6 PK	74.0	-13.4	1.10 H	148	42.88	17.72
7	15780.00	49.3 AV	54.0	-4.7	1.10 H	148	31.58	17.72

**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	*5260.00	115.4 PK			1.08 V	150	108.66	6.74
2	*5260.00	105.8 AV			1.08 V	150	99.06	6.74
3	5418.00	62.9 PK	74.0	-11.1	1.11 V	91	55.60	7.30
4	<b>5418.00</b>	<b>53.9 AV</b>	<b>54.0</b>	<b>-0.1</b>	<b>1.11 V</b>	<b>91</b>	<b>46.60</b>	<b>7.30</b>
5	#10520.00	53.7 PK	68.2	-14.5	1.08 V	90	41.07	12.63
6	15780.00	60.1 PK	74.0	-13.9	1.24 V	56	42.38	17.72
7	15780.00	49.4 AV	54.0	-4.6	1.24 V	56	31.68	17.72

**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 60	<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	*5300.00	113.2 PK			1.00 H	271	106.33	6.87
2	*5300.00	104.5 AV			1.00 H	271	97.63	6.87
3	5455.00	62.5 PK	74.0	-11.5	1.03 H	298	55.07	7.43
4	5455.00	52.5 AV	54.0	-1.5	1.03 H	298	45.07	7.43
5	#5461.00	62.1 PK	74.0	-11.9	1.03 H	298	54.64	7.46
6	#5461.00	53.0 AV	54.0	-1.0	1.03 H	298	45.54	7.46
7	10600.00	54.4 PK	74.0	-19.6	1.01 H	212	41.48	12.92
8	10600.00	42.9 AV	54.0	-11.1	1.01 H	212	29.98	12.92
9	15900.00	60.3 PK	74.0	-13.7	1.09 H	157	42.48	17.82
10	15900.00	49.3 AV	54.0	-4.7	1.09 H	157	31.48	17.82

**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	*5300.00	115.7 PK			1.04 V	158	108.83	6.87
2	*5300.00	106.0 AV			1.04 V	158	99.13	6.87
3	5455.00	63.8 PK	74.0	-10.2	1.10 V	91	56.37	7.43
4	<b>5455.00</b>	<b>53.9 AV</b>	<b>54.0</b>	<b>-0.1</b>	<b>1.10 V</b>	<b>91</b>	<b>46.47</b>	<b>7.43</b>
5	#5461.00	63.2 PK	74.0	-10.8	1.10 V	91	55.74	7.46
6	#5461.00	53.2 AV	54.0	-0.8	1.10 V	91	45.74	7.46
7	10600.00	53.9 PK	74.0	-20.1	1.02 V	75	40.98	12.92
8	10600.00	42.0 AV	54.0	-12.0	1.02 V	75	29.08	12.92
9	15900.00	59.6 PK	74.0	-14.4	1.24 V	65	41.78	17.82
10	15900.00	49.1 AV	54.0	-4.9	1.24 V	65	31.28	17.82

**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 64	<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	*5320.00	115.6 PK			1.30 H	276	108.65	6.95
2	*5320.00	106.9 AV			1.30 H	276	99.95	6.95
3	5438.00	64.9 PK	74.0	-9.1	1.04 H	285	57.53	7.37
4	5438.00	53.2 AV	54.0	-0.8	1.04 H	285	45.83	7.37
5	#5483.00	66.1 PK	68.2	-2.1	1.04 H	284	58.57	7.53
6	10640.00	53.8 PK	74.0	-20.2	1.08 H	109	40.79	13.01
7	10640.00	42.1 AV	54.0	-11.9	1.08 H	109	29.09	13.01
8	15960.00	59.1 PK	74.0	-14.9	1.15 H	61	41.31	17.79
9	15960.00	48.5 AV	54.0	-5.5	1.15 H	61	30.71	17.79

**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	*5320.00	118.0 PK			1.00 V	96	111.05	6.95
2	*5320.00	108.3 AV			1.00 V	96	101.35	6.95
3	5438.00	64.8 PK	74.0	-9.2	1.01 V	87	57.43	7.37
4	5438.00	53.7 AV	54.0	-0.3	1.01 V	87	46.33	7.37
5	#5483.00	66.4 PK	68.2	-1.8	1.02 V	140	58.87	7.53
6	10640.00	54.7 PK	74.0	-19.3	1.02 V	216	41.69	13.01
7	10640.00	42.2 AV	54.0	-11.8	1.02 V	216	29.19	13.01
8	15960.00	60.0 PK	74.0	-14.0	1.00 V	155	42.21	17.79
9	15960.00	48.9 AV	54.0	-5.1	1.00 V	155	31.11	17.79

**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 100	<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	#5340.00	66.7 PK	68.2	-1.5	1.04 H	292	59.68	7.02
2	5384.00	64.1 PK	74.0	-9.9	1.04 H	286	56.92	7.18
3	5384.00	53.7 AV	54.0	-0.3	1.04 H	286	46.52	7.18
4	*5500.00	117.6 PK			1.05 H	302	110.01	7.59
5	*5500.00	109.5 AV			1.05 H	302	101.91	7.59
6	#5742.00	65.9 PK	68.2	-2.3	1.10 H	329	57.92	7.98
7	11000.00	53.2 PK	74.0	-20.8	1.00 H	117	39.40	13.80
8	11000.00	41.6 AV	54.0	-12.4	1.00 H	117	27.80	13.80
9	#16500.00	60.1 PK	68.2	-8.1	1.17 H	88	39.95	20.15

**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	#5340.00	64.5 PK	68.2	-3.7	1.02 V	99	57.48	7.02
2	5384.00	64.7 PK	74.0	-9.3	1.01 V	114	57.52	7.18
3	5384.00	53.3 AV	54.0	-0.7	1.01 V	114	46.12	7.18
4	*5500.00	121.0 PK			1.07 V	96	113.41	7.59
5	*5500.00	110.9 AV			1.07 V	96	103.31	7.59
6	#5742.00	66.4 PK	68.2	-1.8	1.06 V	153	58.42	7.98
7	11000.00	54.6 PK	74.0	-19.4	1.01 V	191	40.80	13.80
8	11000.00	42.5 AV	54.0	-11.5	1.01 V	191	28.70	13.80
9	#16500.00	60.8 PK	68.2	-7.4	1.02 V	152	40.65	20.15

**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 120	<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	5132.00	61.2 PK	74.0	-12.8	1.12 H	289	54.92	6.28
2	5132.00	51.2 AV	54.0	-2.8	1.12 H	289	44.92	6.28
3	5442.00	63.3 PK	74.0	-10.7	1.04 H	287	55.92	7.38
4	5442.00	53.1 AV	54.0	-0.9	1.04 H	287	45.72	7.38
5	*5600.00	116.7 PK			1.39 H	272	108.94	7.76
6	*5600.00	107.3 AV			1.39 H	272	99.54	7.76
7	#5757.00	68.1 PK	68.2	-0.1	1.18 H	289	60.10	8.00
8	11200.00	53.0 PK	74.0	-21.0	1.04 H	109	39.35	13.65
9	11200.00	41.3 AV	54.0	-12.7	1.04 H	109	27.65	13.65
10	#16800.00	60.3 PK	68.2	-7.9	1.29 H	70	39.80	20.50

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5132.00	60.8 PK	74.0	-13.2	1.18 V	144	54.52	6.28
2	5132.00	50.9 AV	54.0	-3.1	1.18 V	144	44.62	6.28
3	5442.00	62.4 PK	74.0	-11.6	1.00 V	127	55.02	7.38
4	5442.00	52.2 AV	54.0	-1.8	1.00 V	127	44.82	7.38
5	*5600.00	118.5 PK			1.15 V	102	110.74	7.76
6	*5600.00	108.6 AV			1.15 V	102	100.84	7.76
7	#5757.00	67.5 PK	68.2	-0.7	1.00 V	138	59.50	8.00
8	11200.00	54.2 PK	74.0	-19.8	1.00 V	97	40.55	13.65
9	11200.00	41.8 AV	54.0	-12.2	1.00 V	97	28.15	13.65
10	#16800.00	59.9 PK	68.2	-8.3	1.18 V	76	39.40	20.50

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – 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 140	<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	*5700.00	118.8 PK			1.38 H	289	110.87	7.93
2	*5700.00	108.4 AV			1.38 H	289	100.47	7.93
3	#5725.00	73.3 PK	74.0	-0.7	1.38 H	289	65.34	7.96
4	#5725.00	53.7 AV	54.0	-0.3	1.38 H	289	45.74	7.96
5	#5778.00	64.8 PK	68.2	-3.4	1.21 H	336	56.76	8.04
6	#5821.00	65.2 PK	68.2	-3.0	1.32 H	333	57.07	8.13
7	#5859.00	67.2 PK	68.2	-1.0	1.02 H	333	58.94	8.26
8	11400.00	53.4 PK	74.0	-20.6	1.05 H	131	39.64	13.76
9	11400.00	41.7 AV	54.0	-12.3	1.05 H	131	27.94	13.76
10	#17100.00	60.1 PK	68.2	-8.1	1.30 H	99	39.16	20.94

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5700.00	120.6 PK			1.37 V	143	112.67	7.93
2	*5700.00	110.8 AV			1.37 V	143	102.87	7.93
3	#5725.00	71.5 PK	74.0	-2.5	1.32 V	138	63.54	7.96
4	#5725.00	53.7 AV	54.0	-0.3	1.32 V	138	45.74	7.96
5	#5778.00	<b>68.1 PK</b>	<b>68.2</b>	<b>-0.1</b>	<b>1.46 V</b>	<b>108</b>	<b>60.06</b>	<b>8.04</b>
6	#5821.00	67.3 PK	68.2	-0.9	1.32 V	138	59.17	8.13
7	#5859.00	67.7 PK	68.2	-0.5	1.36 V	113	59.44	8.26
8	11400.00	54.0 PK	74.0	-20.0	1.02 V	105	40.24	13.76
9	11400.00	42.0 AV	54.0	-12.0	1.02 V	105	28.24	13.76
10	#17100.00	60.9 PK	68.2	-7.3	1.25 V	77	39.96	20.94

**REMARKS:**

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



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<b>CHANNEL</b>	TX Channel 144	<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	*5720.00	117.0 PK			1.16 H	142	108.61	8.39
2	*5720.00	108.0 AV			1.16 H	142	99.61	8.39
3	#5850.00	58.3 PK	68.2	-9.9	1.16 H	142	49.63	8.67
4	#5872.80	66.5 PK	68.2	-1.7	1.04 H	145	57.74	8.76
5	11440.00	53.9 PK	74.0	-20.1	1.01 H	127	39.51	14.39
6	11440.00	41.9 AV	54.0	-12.1	1.01 H	127	27.51	14.39
7	#17160.00	60.4 PK	68.2	-7.8	1.32 H	93	38.39	22.01

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5720.00	121.1 PK			1.85 V	339	112.71	8.39
2	*5720.00	109.5 AV			1.85 V	339	101.11	8.39
3	#5850.00	59.0 PK	68.2	-9.2	1.85 V	339	50.33	8.67
4	#5872.80	67.7 PK	68.2	-0.5	1.28 V	327	58.94	8.76
5	11440.00	54.3 PK	74.0	-19.7	1.01 V	91	39.91	14.39
6	11440.00	42.2 AV	54.0	-11.8	1.01 V	91	27.81	14.39
7	#17160.00	61.0 PK	68.2	-7.2	1.24 V	64	38.99	22.01

**REMARKS:**

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



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802.11ac(VHT40)

<b>CHANNEL</b>	TX Channel 54	<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	*5270.00	113.2 PK			1.05 H	297	106.42	6.78
2	*5270.00	103.5 AV			1.05 H	297	96.72	6.78
3	5425.00	62.8 PK	74.0	-11.2	1.05 H	297	55.47	7.33
4	5425.00	52.9 AV	54.0	-1.1	1.05 H	297	45.57	7.33
5	#5907.00	61.6 PK	68.2	-6.6	1.38 H	288	53.18	8.42
6	#10540.00	53.7 PK	68.2	-14.5	1.01 H	220	41.00	12.70
7	15810.00	60.0 PK	74.0	-14.0	1.03 H	157	42.23	17.77
8	15810.00	49.3 AV	54.0	-4.7	1.03 H	157	31.53	17.77

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5270.00	115.4 PK			1.04 V	137	108.62	6.78
2	*5270.00	105.3 AV			1.04 V	137	98.52	6.78
3	5433.00	64.5 PK	74.0	-9.5	1.11 V	145	57.14	7.36
4	<b>5433.00</b>	<b>53.9 AV</b>	<b>54.0</b>	<b>-0.1</b>	<b>1.11 V</b>	<b>145</b>	<b>46.54</b>	<b>7.36</b>
5	#5907.00	62.2 PK	68.2	-6.0	1.11 V	147	53.78	8.42
6	#10540.00	53.8 PK	68.2	-14.4	1.02 V	97	41.10	12.70
7	15810.00	61.0 PK	74.0	-13.0	1.20 V	69	43.23	17.77
8	15810.00	50.2 AV	54.0	-3.8	1.20 V	69	32.43	17.77

**REMARKS:**

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



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<b>CHANNEL</b>	TX Channel 62	<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	*5310.00	111.4 PK			1.25 H	277	104.50	6.90
2	*5310.00	101.6 AV			1.25 H	277	94.70	6.90
3	5352.00	70.5 PK	74.0	-3.5	1.25 H	276	63.44	7.06
4	5352.00	53.8 AV	54.0	-0.2	1.25 H	276	46.74	7.06
5	5427.00	62.5 PK	74.0	-11.5	1.25 H	277	55.17	7.33
6	5427.00	53.1 AV	54.0	-0.9	1.25 H	277	45.77	7.33
7	10620.00	54.3 PK	74.0	-19.7	1.00 H	204	41.33	12.97
8	10620.00	41.8 AV	54.0	-12.2	1.00 H	204	28.83	12.97
9	15930.00	60.1 PK	74.0	-13.9	1.09 H	162	42.29	17.81
10	15930.00	49.1 AV	54.0	-4.9	1.09 H	162	31.29	17.81

**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	*5310.00	113.4 PK			1.15 V	147	106.50	6.90
2	*5310.00	103.0 AV			1.15 V	147	96.10	6.90
3	5352.00	69.2 PK	74.0	-4.8	1.15 V	147	62.14	7.06
4	5352.00	53.1 AV	54.0	-0.9	1.15 V	147	46.04	7.06
5	5427.00	62.2 PK	74.0	-11.8	1.21 V	144	54.87	7.33
6	5427.00	52.6 AV	54.0	-1.4	1.21 V	144	45.27	7.33
7	10620.00	53.9 PK	74.0	-20.1	1.00 V	95	40.93	12.97
8	10620.00	41.9 AV	54.0	-12.1	1.00 V	95	28.93	12.97
9	15930.00	61.0 PK	74.0	-13.0	1.17 V	60	43.19	17.81
10	15930.00	49.8 AV	54.0	-4.2	1.17 V	60	31.99	17.81

**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.

<b>CHANNEL</b>	TX Channel 102	<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	#5470.00	69.9 PK	74.0	-4.1	1.25 H	276	62.41	7.49
2	#5470.00	53.4 AV	54.0	-0.6	1.25 H	276	45.91	7.49
3	*5510.00	112.4 PK			1.25 H	276	104.79	7.61
4	*5510.00	101.0 AV			1.25 H	276	93.39	7.61
5	11020.00	54.3 PK	74.0	-19.7	1.00 H	209	40.55	13.75
6	11020.00	41.8 AV	54.0	-12.2	1.00 H	209	28.05	13.75
7	#16530.00	60.1 PK	68.2	-8.1	1.03 H	146	39.95	20.15

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	#5470.00	70.4 PK	74.0	-3.6	1.15 V	146	62.91	7.49
2	#5470.00	53.8 AV	54.0	-0.2	1.15 V	146	46.31	7.49
3	*5510.00	113.1 PK			1.15 V	146	105.49	7.61
4	*5510.00	102.7 AV			1.15 V	146	95.09	7.61
5	11020.00	54.8 PK	74.0	-19.2	1.00 V	93	41.05	13.75
6	11020.00	42.5 AV	54.0	-11.5	1.00 V	93	28.75	13.75
7	#16530.00	61.3 PK	68.2	-6.9	1.25 V	74	41.15	20.15

**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 118	<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	5458.00	62.5 PK	74.0	-11.5	1.03 H	290	55.05	7.45
2	5458.00	51.7 AV	54.0	-2.3	1.03 H	290	44.25	7.45
3	*5590.00	114.2 PK			1.24 H	137	106.46	7.74
4	*5590.00	103.9 AV			1.24 H	137	96.16	7.74
<b>5</b>	<b>#5747.00</b>	<b>68.1 PK</b>	<b>68.2</b>	<b>-0.1</b>	<b>1.37 H</b>	<b>288</b>	<b>60.11</b>	<b>7.99</b>
6	11180.00	54.3 PK	74.0	-19.7	1.04 H	202	40.66	13.64
7	11180.00	42.1 AV	54.0	-11.9	1.04 H	202	28.46	13.64
8	#16770.00	60.6 PK	68.2	-7.6	1.06 H	177	40.18	20.42

**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	5458.00	62.1 PK	74.0	-11.9	1.15 V	147	54.65	7.45
2	5458.00	51.3 AV	54.0	-2.7	1.15 V	147	43.85	7.45
3	*5590.00	116.8 PK			1.05 V	104	109.06	7.74
4	*5590.00	106.6 AV			1.05 V	104	98.86	7.74
5	#5747.00	67.4 PK	68.2	-0.8	1.05 V	144	59.41	7.99
6	11180.00	53.4 PK	74.0	-20.6	1.02 V	105	39.76	13.64
7	11180.00	41.2 AV	54.0	-12.8	1.02 V	105	27.56	13.64
8	#16770.00	60.8 PK	68.2	-7.4	1.19 V	49	40.38	20.42

**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 134	<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	*5670.00	116.2 PK			1.11 H	334	108.32	7.88
2	*5670.00	105.0 AV			1.11 H	334	97.12	7.88
3	#5725.00	70.2 PK	74.0	-3.8	1.11 H	334	62.24	7.96
4	#5725.00	<b>53.9 AV</b>	<b>54.0</b>	<b>-0.1</b>	<b>1.11 H</b>	<b>334</b>	<b>45.94</b>	<b>7.96</b>
5	#5834.00	67.5 PK	68.2	-0.7	1.20 H	334	59.32	8.18
6	11340.00	54.2 PK	74.0	-19.8	1.00 H	212	40.54	13.66
7	11340.00	42.1 AV	54.0	-11.9	1.00 H	212	28.44	13.66
8	#17010.00	59.7 PK	68.2	-8.5	1.08 H	165	38.94	20.76

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5670.00	115.8 PK			1.06 V	144	107.92	7.88
2	*5670.00	104.5 AV			1.06 V	144	96.62	7.88
3	#5725.00	68.9 PK	74.0	-5.1	1.06 V	144	60.94	7.96
4	#5725.00	53.0 AV	54.0	-1.0	1.06 V	144	45.04	7.96
5	#5834.00	66.3 PK	68.2	-1.9	1.02 V	132	58.12	8.18
6	11340.00	52.6 PK	74.0	-21.4	1.02 V	90	38.94	13.66
7	11340.00	40.8 AV	54.0	-13.2	1.02 V	90	27.14	13.66
8	#17010.00	60.3 PK	68.2	-7.9	1.14 V	43	39.54	20.76

**REMARKS:**

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



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<b>CHANNEL</b>	TX Channel 142	<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	*5710.00	116.2 PK			1.16 H	143	107.84	8.36
2	*5710.00	106.2 AV			1.16 H	143	97.84	8.36
3	#5866.70	66.4 PK	68.2	-1.8	1.32 H	162	57.67	8.73
4	11420.00	54.4 PK	74.0	-19.6	1.00 H	215	39.99	14.41
5	11420.00	42.3 AV	54.0	-11.7	1.00 H	215	27.89	14.41
6	#17130.00	59.4 PK	68.2	-8.8	1.03 H	159	37.51	21.89

**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	*5710.00	118.4 PK			1.51 V	335	110.04	8.36
2	*5710.00	108.0 AV			1.51 V	335	99.64	8.36
3	#5866.70	67.9 PK	68.2	-0.3	1.62 V	167	59.17	8.73
4	11420.00	53.0 PK	74.0	-21.0	1.07 V	105	38.59	14.41
5	11420.00	41.0 AV	54.0	-13.0	1.07 V	105	26.59	14.41
6	#17130.00	60.3 PK	68.2	-7.9	1.19 V	38	38.41	21.89

**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)

<b>CHANNEL</b>	TX Channel 58	<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	*5290.00	109.9 PK			1.27 H	277	103.05	6.85
2	*5290.00	99.2 AV			1.27 H	277	92.35	6.85
3	5350.00	69.9 PK	74.0	-4.1	1.27 H	277	62.85	7.05
4	5350.00	53.6 AV	54.0	-0.4	1.27 H	277	46.55	7.05
5	#5877.00	60.6 PK	68.2	-7.6	1.12 H	287	52.28	8.32
6	#10580.00	53.6 PK	68.2	-14.6	1.00 H	178	40.75	12.85
7	15870.00	60.2 PK	74.0	-13.8	1.02 H	154	42.40	17.80
8	15870.00	49.5 AV	54.0	-4.5	1.02 H	154	31.70	17.80

**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	*5290.00	110.5 PK			1.05 V	138	103.65	6.85
2	*5290.00	100.5 AV			1.05 V	138	93.65	6.85
3	5350.00	71.1 PK	74.0	-2.9	1.05 V	138	64.05	7.05
4	<b>5350.00</b>	<b>53.9 AV</b>	<b>54.0</b>	<b>-0.1</b>	<b>1.05 V</b>	<b>138</b>	<b>46.85</b>	<b>7.05</b>
5	#5877.00	57.4 PK	68.2	-10.8	1.05 V	138	49.08	8.32
6	#10580.00	54.9 PK	68.2	-13.3	1.02 V	109	42.05	12.85
7	15870.00	58.5 PK	74.0	-15.5	1.18 V	61	40.70	17.80
8	15870.00	48.1 AV	54.0	-5.9	1.18 V	61	30.30	17.80

**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 106	<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	5460.00	68.2 PK	74.0	-5.8	1.01 H	288	60.75	7.45
2	5460.00	52.8 AV	54.0	-1.2	1.01 H	288	45.35	7.45
3	#5468.00	72.9 PK	74.0	-1.1	1.01 H	288	65.43	7.47
4	#5468.00	53.9 AV	54.0	-0.1	1.01 H	288	46.43	7.47
5	*5530.00	109.5 PK			1.01 H	288	101.86	7.64
6	*5530.00	98.8 AV			1.01 H	288	91.16	7.64
7	#6144.00	60.9 PK	68.2	-7.3	1.26 H	324	51.79	9.11
8	11060.00	52.9 PK	74.0	-21.1	1.00 H	152	39.22	13.68
9	11060.00	41.5 AV	54.0	-12.5	1.00 H	152	27.82	13.68
10	#16590.00	59.1 PK	68.2	-9.1	1.00 H	137	38.94	20.16

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

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5460.00	66.4 PK	74.0	-7.6	1.02 V	149	58.95	7.45
2	5460.00	50.1 AV	54.0	-3.9	1.02 V	149	42.65	7.45
3	#5468.00	70.3 PK	74.0	-3.7	1.21 V	101	62.83	7.47
4	#5468.00	51.4 AV	54.0	-2.6	1.21 V	101	43.93	7.47
5	*5530.00	111.1 PK			1.02 V	149	103.46	7.64
6	*5530.00	100.1 AV			1.02 V	149	92.46	7.64
7	#6144.00	58.3 PK	68.2	-9.9	1.00 V	135	49.19	9.11
8	11060.00	54.9 PK	74.0	-19.1	1.07 V	99	41.22	13.68
9	11060.00	42.8 AV	54.0	-11.2	1.07 V	99	29.12	13.68
10	#16590.00	58.5 PK	68.2	-9.7	1.15 V	29	38.34	20.16

**REMARKS:**

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



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<b>CHANNEL</b>	TX Channel 122	<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	5458.00	64.4 PK	74.0	-9.6	1.04 H	288	56.95	7.45
2	5458.00	51.8 AV	54.0	-2.2	1.04 H	288	44.35	7.45
3	#5463.00	65.7 PK	74.0	-8.3	1.04 H	288	58.24	7.46
4	#5463.00	52.0 AV	54.0	-2.0	1.04 H	288	44.54	7.46
5	*5610.00	112.7 PK			1.01 H	288	104.92	7.78
6	*5610.00	101.9 AV			1.01 H	288	94.12	7.78
7	#5732.00	67.8 PK	68.2	-0.4	1.38 H	288	59.83	7.97
8	#6233.00	59.9 PK	68.2	-8.3	1.26 H	324	50.56	9.34
9	11220.00	53.3 PK	74.0	-20.7	1.00 H	146	39.66	13.64
10	11220.00	41.3 AV	54.0	-12.7	1.00 H	146	27.66	13.64
11	#16830.00	60.5 PK	68.2	-7.7	1.00 H	140	39.93	20.57

**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	5458.00	63.2 PK	74.0	-10.8	1.02 V	140	55.75	7.45
2	5458.00	50.2 AV	54.0	-3.8	1.02 V	140	42.75	7.45
3	#5463.00	64.3 PK	74.0	-9.7	1.04 V	38	56.84	7.46
4	#5463.00	51.0 AV	54.0	-3.0	1.04 V	38	43.54	7.46
5	*5610.00	114.3 PK			1.07 V	146	106.52	7.78
6	*5610.00	103.2 AV			1.07 V	146	95.42	7.78
7	#5732.00	68.0 PK	68.2	-0.2	1.00 V	135	60.03	7.97
8	#6233.00	58.3 PK	68.2	-9.9	1.05 V	57	48.96	9.34
9	11220.00	54.5 PK	74.0	-19.5	1.04 V	87	40.86	13.64
10	11220.00	42.9 AV	54.0	-11.1	1.04 V	87	29.26	13.64
11	#16830.00	59.1 PK	68.2	-9.1	1.18 V	67	38.53	20.57

**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 138	<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	*5690.00	113.3 PK			1.08 H	149	104.97	8.33
2	*5690.00	103.0 AV			1.08 H	149	94.67	8.33
3	#5854.80	67.4 PK	68.2	-0.8	1.04 H	145	58.71	8.69
4	11380.00	53.1 PK	74.0	-20.9	1.02 H	156	38.71	14.39
5	11380.00	41.4 AV	54.0	-12.6	1.02 H	156	27.01	14.39
6	#17070.00	60.2 PK	68.2	-8.0	1.00 H	143	38.51	21.69

**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	*5690.00	115.8 PK			1.83 V	322	107.47	8.33
2	*5690.00	103.3 AV			1.83 V	322	94.97	8.33
3	#5854.80	67.7 PK	68.2	-0.5	1.78 V	327	59.01	8.69
4	11380.00	54.6 PK	74.0	-19.4	1.02 V	101	40.21	14.39
5	11380.00	42.7 AV	54.0	-11.3	1.02 V	101	28.31	14.39
6	#17070.00	59.2 PK	68.2	-9.0	1.18 V	76	37.51	21.69

**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.

### 4.3 TRANSMIT POWER MEASUREMENT

#### 4.3.1 LIMITS OF TRANSMIT POWER MEASUREMENT

Operation Band	LIMIT
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  $\leq$  4;

Array Gain = 0 dB (i.e., no array gain) for channel widths  $\geq$  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  $\geq$  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

For channel straddling 5725MHz:

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

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Oct. 08, 2014

For other channels:

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

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Oct. 08, 2014

#### FOR 26dB OCCUPIED BANDWIDTH

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

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Oct. 08, 2014



### 4.3.3 TEST PROCEDURE

#### FOR POWER OUTPUT MEASUREMENT

##### For channel straddling 5725MHz:

Follow FCC KDB 789033 UNII test procedure:

Method SA-1

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

##### For other channels:

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

#### FOR 26dB 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%.

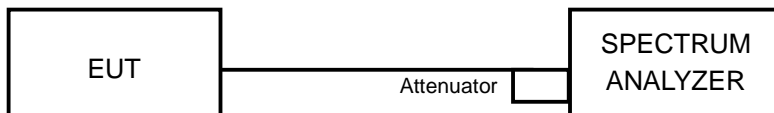
### 4.3.4 DEVIATION FROM TEST STANDARD

No deviation

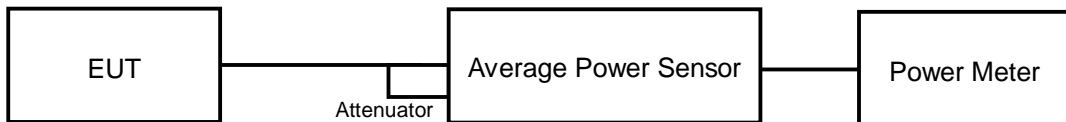
### 4.3.5 TEST SETUP

#### FOR POWER OUTPUT MEASUREMENT

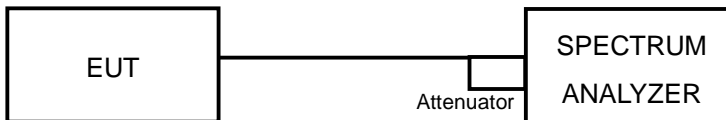
**For channel straddling 5725MHz:**



**For other channels:**



#### 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				
52	5260	15.87	15.18	15.42	106.432	20.27	24.00	PASS
60	5300	15.98	15.34	15.62	110.301	20.43	24.00	PASS
64	5320	16.04	15.42	15.52	110.658	20.44	24.00	PASS
100	5500	15.49	14.71	14.25	91.587	19.62	24.00	PASS
120	5600	15.59	14.62	14.25	91.804	19.63	24.00	PASS
140	5700	15.01	14.54	14.27	86.871	19.39	24.00	PASS
144 (UNII-2c Band)	5720	9.40	10.02	9.67	28.024	14.48	22.80	PASS
144 (UNII-3 Band)	5720	3.40	2.69	3.43	6.249	7.96	30.00	PASS



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**26dB OCCUPIED BANDWIDTH:**

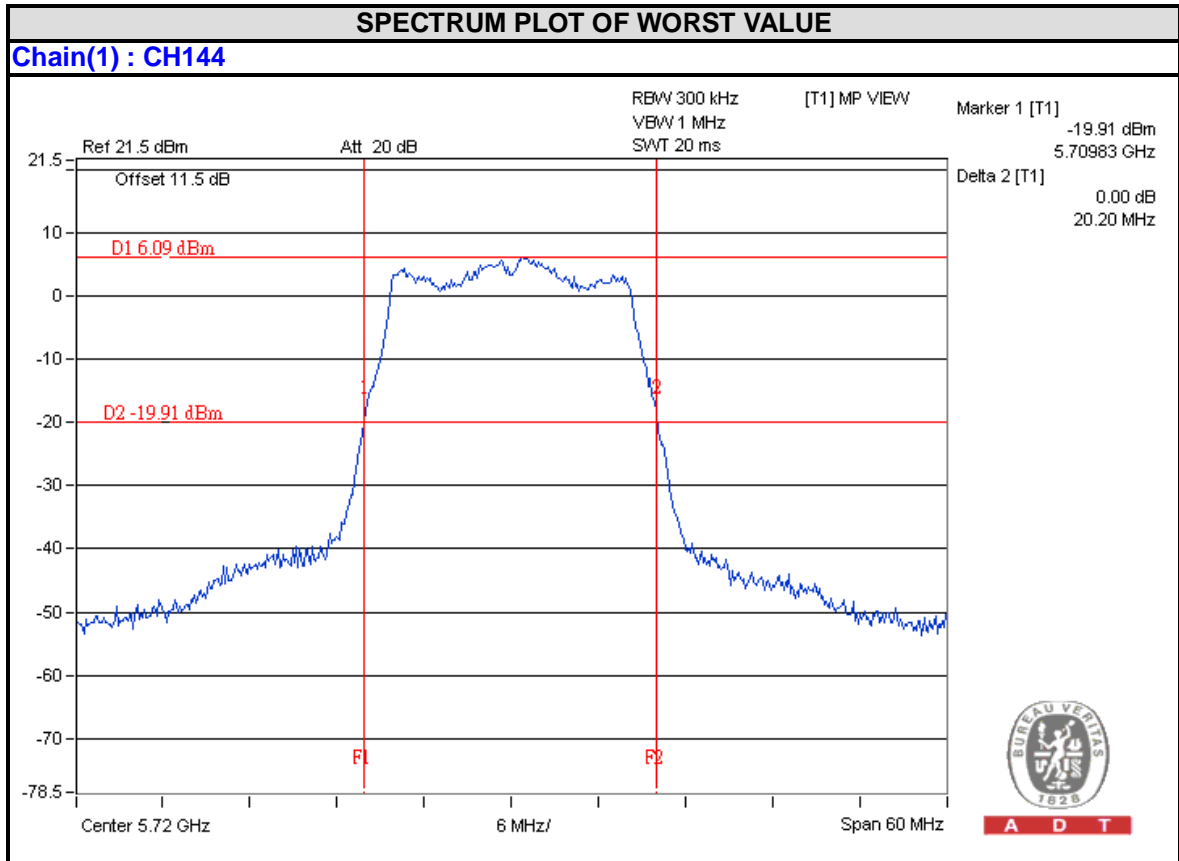
CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		
		CHAIN 0	CHAIN 1	CHAIN 2
52	5260	20.39	20.30	20.14
60	5300	20.47	20.27	20.23
64	5320	20.44	20.28	20.03
100	5500	20.57	20.24	20.02
120	5600	20.46	20.00	20.34
140	5700	20.43	20.41	20.31
144 (UNII-2c Band)	5720	15.30	15.17	15.18

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

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
52	5260	20.14	24.04 > 24
60	5300	20.23	24.05 > 24
64	5320	20.03	24.01 > 24
100	5500	20.02	24.01 > 24
120	5600	20.00	24.01 > 24
140	5700	20.31	24.07 > 24
144 (UNII-2c Band)	5720	15.17	22.8 < 24



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**NOTE:**

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



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**802.11ac (VHT20)  
POWER OUTPUT**

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
52	5260	15.63	15.44	15.73	108.965	20.37	24.00	PASS
60	5300	15.86	15.43	15.55	109.354	20.39	24.00	PASS
64	5320	15.81	15.43	15.53	108.748	20.36	24.00	PASS
100	5500	15.25	14.73	14.13	89.096	19.50	24.00	PASS
120	5600	15.31	14.71	14.31	90.52	19.57	24.00	PASS
140	5700	15.02	15.05	14.41	91.364	19.61	24.00	PASS
144 (UNII-2c Band)	5720	9.35	9.79	9.39	26.828	14.29	22.85	PASS
144 (UNII-3 Band)	5720	3.45	3.71	3.99	7.069	8.49	30.00	PASS



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**802.11ac (VHT20)  
26dB OCCUPIED BANDWIDTH**

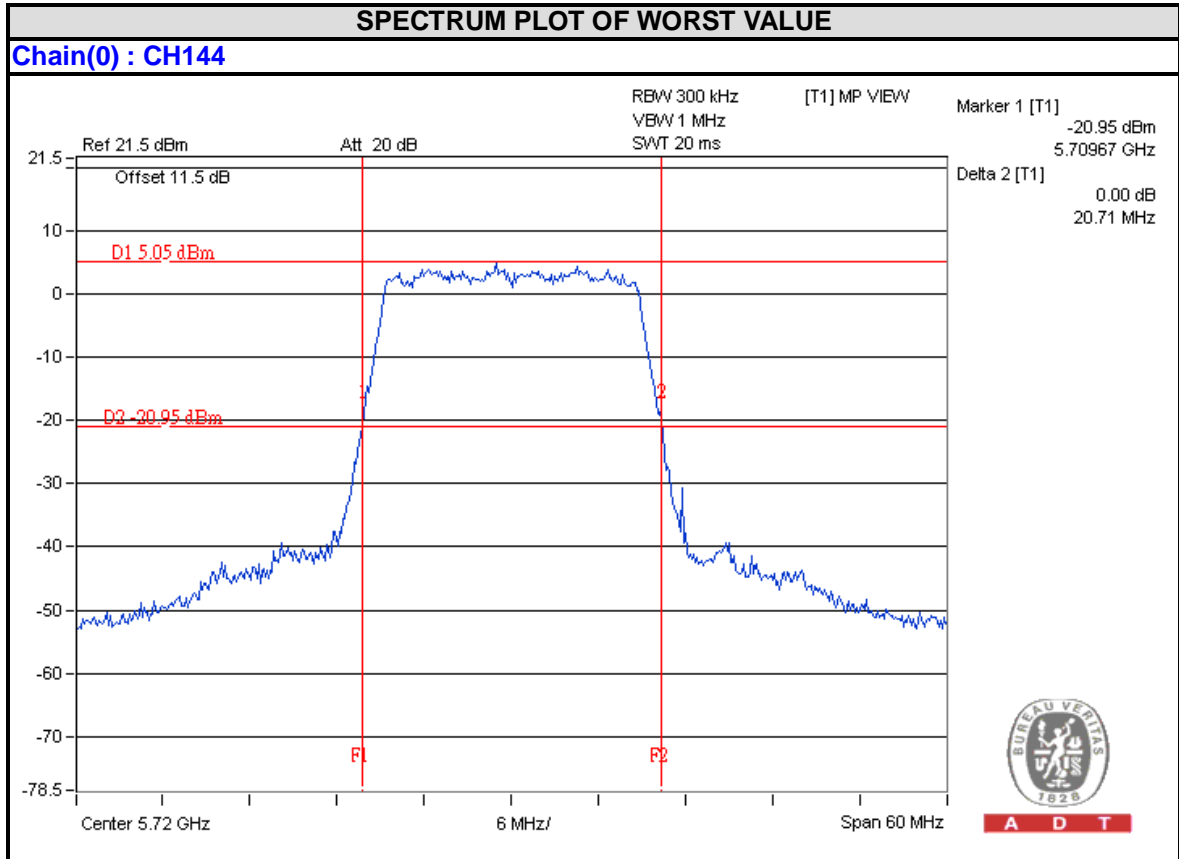
CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		
		CHAIN 0	CHAIN 1	CHAIN 2
52	5260	20.96	20.49	20.76
60	5300	20.76	20.53	20.60
64	5320	20.69	20.51	20.44
100	5500	20.79	20.47	20.60
120	5600	20.88	20.50	20.54
140	5700	20.64	20.55	20.68
144 (UNII-2c Band)	5720	15.33	15.35	15.40

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

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
52	5260	20.49	24.11 > 24
60	5300	20.53	24.12 > 24
64	5320	20.44	24.1 > 24
100	5500	20.47	24.11 > 24
120	5600	20.50	24.11 > 24
140	5700	20.55	24.12 > 24
144 (UNII-2c Band)	5720	15.33	22.85 < 24



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**NOTE:**

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





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**802.11ac (VHT40)  
POWER OUTPUT**

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
54	5270	18.65	17.88	18.47	204.965	23.12	24.00	PASS
62	5310	18.21	17.06	17.64	175.114	22.43	24.00	PASS
102	5510	18.13	18.12	17.22	182.599	22.61	24.00	PASS
118	5590	18.25	18.16	17.11	183.702	22.64	24.00	PASS
134	5670	17.96	18.21	17.22	181.462	22.59	24.00	PASS
142 (UNII-2c Band)	5710	12.92	13.61	12.87	61.913	17.92	24.00	PASS
142 (UNII-3 Band)	5710	2.49	2.93	3.16	5.807	7.64	30.00	PASS



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**802.11ac (VHT40)**

**26dB OCCUPIED BANDWIDTH**

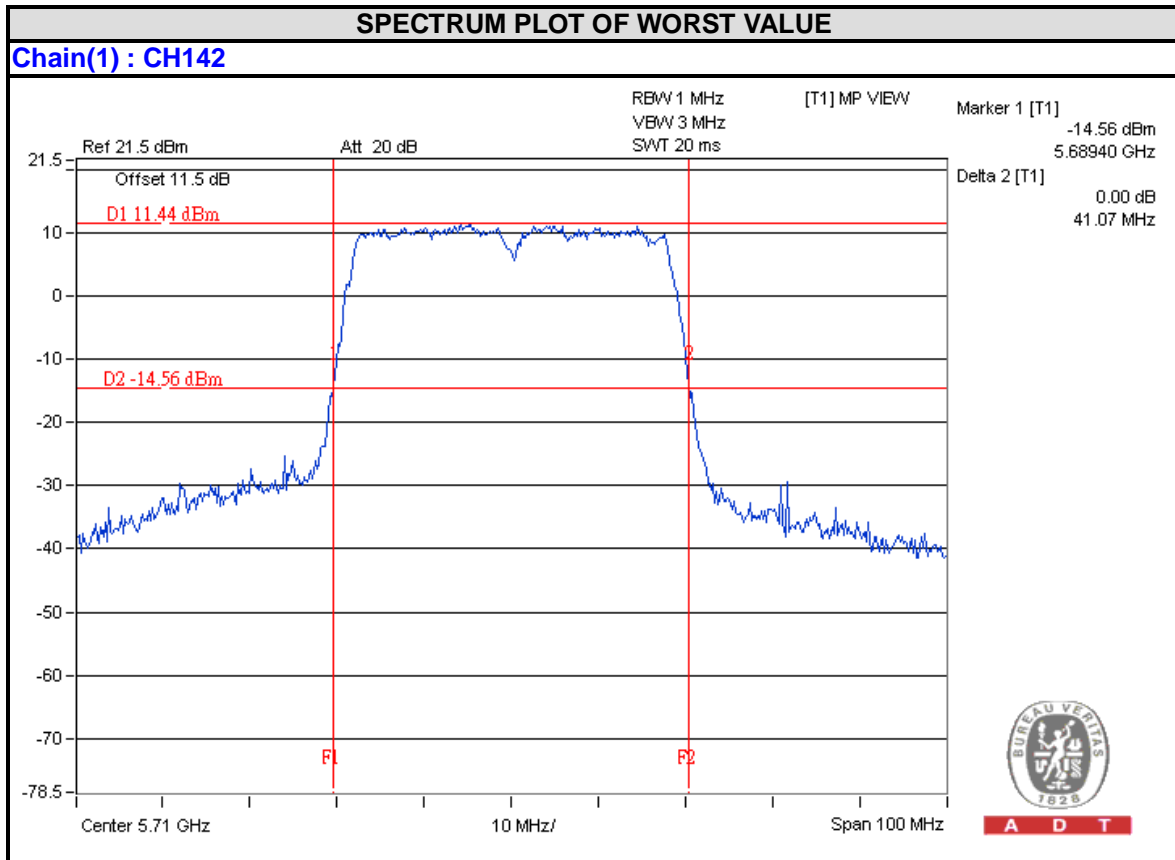
CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		
		CHAIN 0	CHAIN 1	CHAIN 2
54	5270	41.74	41.12	40.70
62	5310	41.41	41.08	40.55
102	5510	41.71	40.82	40.75
118	5590	41.36	41.24	41.07
134	5670	41.36	41.45	41.25
142 (UNII-2c Band)	5710	35.85	35.60	35.66

**Note: For FCC output power limitation is determined based on 26dB bandwidth.**

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
54	5270	40.70	27.09 > 24
62	5310	40.55	27.07 > 24
102	5510	40.75	27.1 > 24
110	5550	41.07	27.13 > 24
134	5670	41.25	27.15 > 24
142 (UNII-2c Band)	5710	35.60	26.51 > 24



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**NOTE:**

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



A D T

**802.11ac (VHT80)**  
**POWER OUTPUT**

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
58	5290	17.52	16.28	16.74	146.162	21.65	24.00	PASS
106	5530	16.61	16.44	15.39	124.463	20.95	24.00	PASS
122	5610	19.59	19.07	18.22	238.089	23.77	24.00	PASS
138 (UNII-2c Band)	5690	14.26	15.34	14.72	94.879	19.77	24.00	PASS
138 (UNII-3 Band)	5690	0.46	1.03	0.50	3.671	5.65	30.00	PASS



A D T

### 802.11ac (VHT80)

#### 26dB OCCUPIED BANDWIDTH

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		
		CHAIN 0	CHAIN 1	CHAIN 2
58	5290	83.13	82.44	82.09
106	5530	83.02	81.58	82.07
122	5610	82.85	82.44	82.04
138 (UNII-2c Band)	5690	76.14	76.16	76.27

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

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
58	5290	82.09	30.14 > 24
106	5530	81.58	30.11 > 24
122	5610	82.04	30.14 > 24
138 (UNII-2c Band)	5690	76.14	29.81 > 24





A D T

### 4.3.8 TEST RESULTS(MODE 2)

#### 802.11ac (VHT20) POWER OUTPUT

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
52	5260	15.63	15.44	15.73	108.965	20.37	20.45	PASS
60	5300	15.86	15.43	15.55	109.354	20.39	20.45	PASS
64	5320	15.81	15.43	15.53	108.748	20.36	20.45	PASS
100	5500	15.25	14.73	14.13	89.096	19.50	19.66	PASS
120	5600	15.31	14.71	14.31	90.52	19.57	19.66	PASS
140	5700	15.02	15.05	14.41	91.364	19.61	19.66	PASS
144 (UNII-2c Band)	5720	9.35	9.79	9.39	26.828	14.29	18.51	PASS
144 (UNII-3 Band)	5720	3.45	3.71	3.99	7.069	8.49	25.66	PASS

**Note:**

5250~5350MHz: The directional gain is 9.55dBi > 6dBi, therefore the limit needs to reduce, so the power limit shall be reduced to "Determined Conducted Limit-(9.55-6)".

5470~5725MHz: The directional gain is 10.34dBi > 6dBi, therefore the limit needs to reduce, so the power limit shall be reduced to "Determined Conducted Limit-(10.34-6)".

5725~5825MHz: The directional gain is 10.34dBi > 6dBi, , therefore the limit needs to reduce, so the power limit shall be reduced to  $30-(10.34-6) = 25.66$ dBm.



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**802.11ac (VHT20)  
26dB OCCUPIED BANDWIDTH**

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		
		CHAIN 0	CHAIN 1	CHAIN 2
52	5260	20.96	20.49	20.76
60	5300	20.76	20.53	20.60
64	5320	20.69	20.51	20.44
100	5500	20.79	20.47	20.60
120	5600	20.88	20.50	20.54
140	5700	20.64	20.55	20.68
144 (UNII-2c Band)	5720	15.33	15.35	15.40

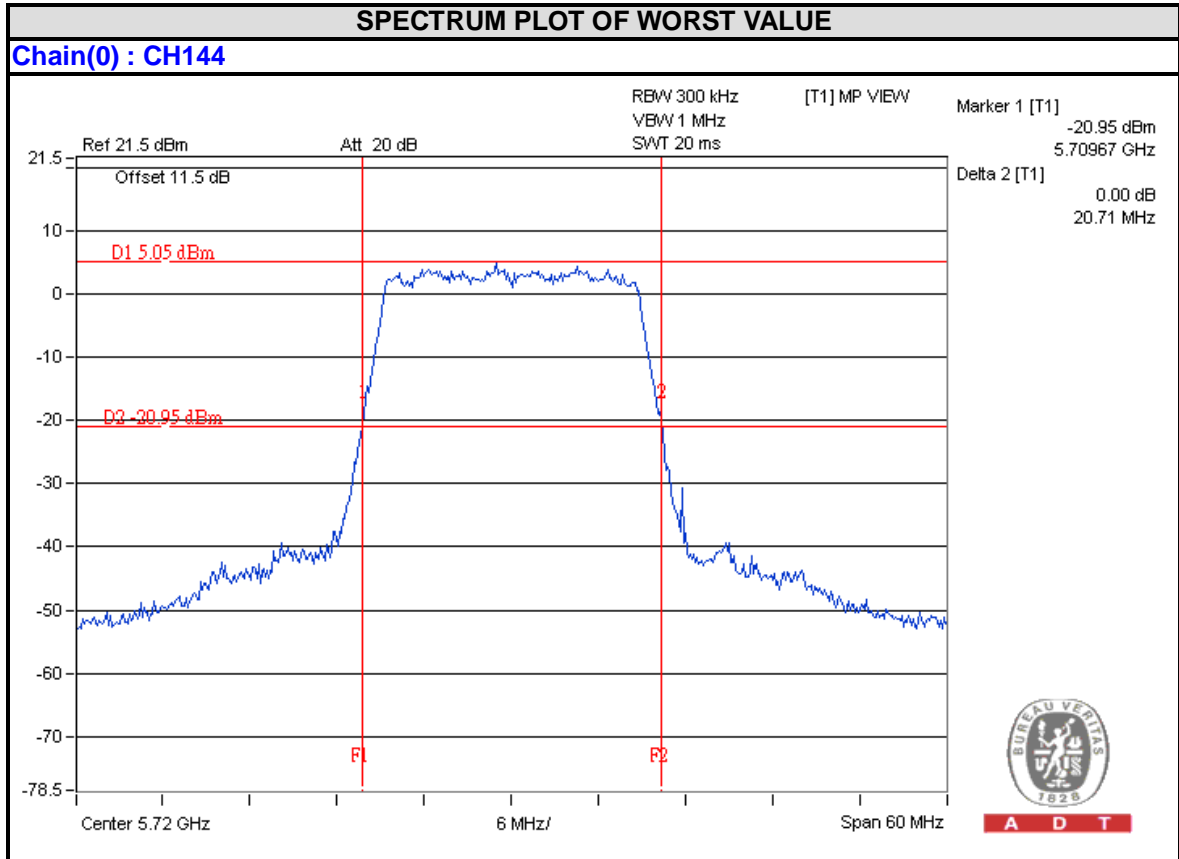
**Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth.**

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
52	5260	20.49	24.11 > 24
60	5300	20.53	24.12 > 24
64	5320	20.44	24.1 > 24
100	5500	20.47	24.11 > 24
120	5600	20.50	24.11 > 24
140	5700	20.55	24.12 > 24
144 (UNII-2c Band)	5720	15.33	22.85 < 24





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**NOTE:**

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



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**802.11ac (VHT40)  
POWER OUTPUT**

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
54	5270	15.82	14.92	15.47	104.477	20.19	20.45	PASS
62	5310	16.11	15.01	15.54	108.338	20.35	20.45	PASS
102	5510	15.13	15.12	14.22	91.517	19.62	19.66	PASS
118	5590	15.25	15.16	14.11	92.07	19.64	19.66	PASS
134	5670	14.96	15.21	14.22	90.946	19.59	19.66	PASS
142 (UNII-2c Band)	5710	10.33	10.51	10.45	33.127	15.20	19.66	PASS
142 (UNII-3 Band)	5710	-0.12	-0.24	0.75	3.1079	4.92	25.66	PASS

**Note:**

- 5250~5350MHz: The directional gain is 9.55dBi > 6dBi, therefore the limit needs to reduce, so the power limit shall be reduced to “Determined Conducted Limit-(9.55-6)”.
- 5470~5725MHz: The directional gain is 10.34dBi > 6dBi, therefore the limit needs to reduce, so the power limit shall be reduced to “Determined Conducted Limit-(10.34-6)”.
- 5725~5825MHz: The directional gain is 10.34dBi > 6dBi, , therefore the limit needs to reduce, so the power limit shall be reduced to  $30-(10.34-6) = 25.66\text{dBm}$ .



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**802.11ac (VHT40)**

**26dB OCCUPIED BANDWIDTH**

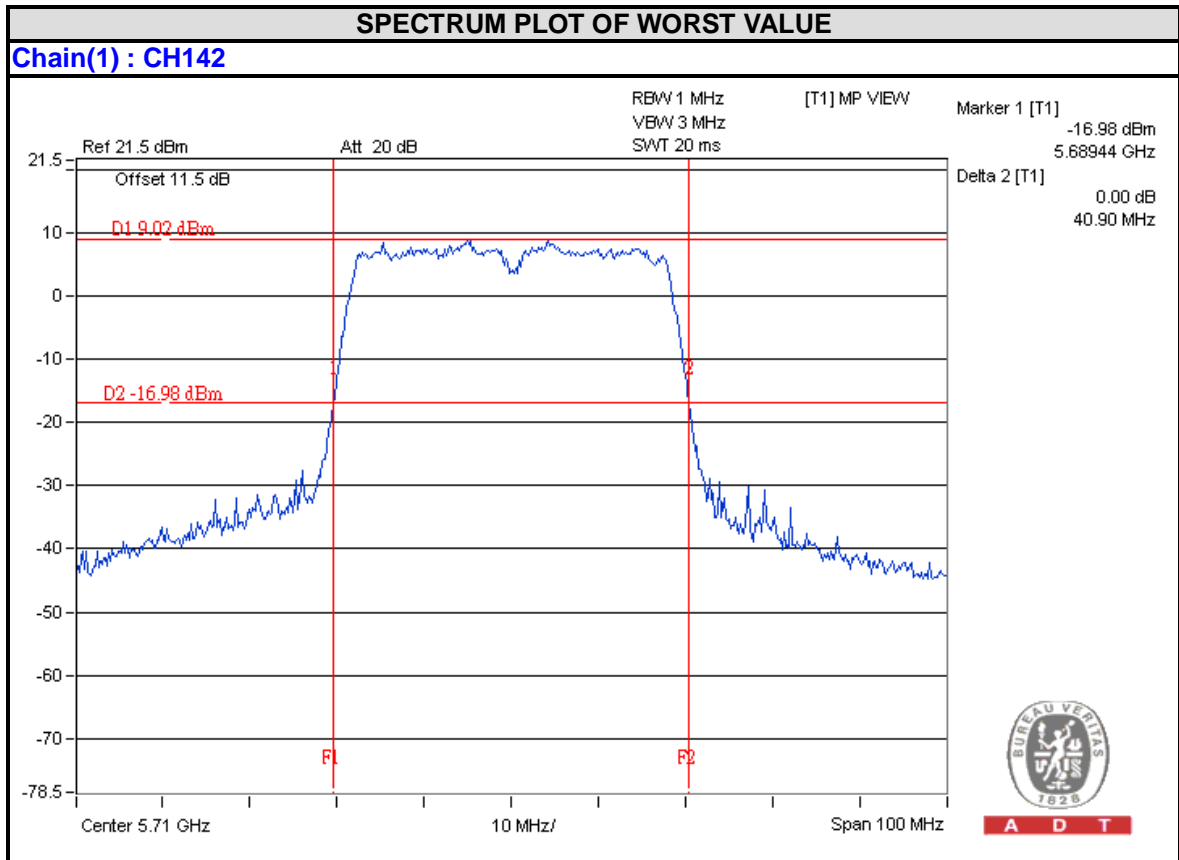
CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		
		CHAIN 0	CHAIN 1	CHAIN 2
54	5270	41.65	41.28	40.73
62	5310	41.48	41.00	40.82
102	5510	41.39	40.95	40.85
118	5590	41.32	41.29	41.13
134	5670	41.57	41.00	40.98
142 (UNII-2c Band)	5710	35.59	35.56	35.58

**Note: For FCC output power limitation is determined based on 26dB bandwidth.**

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
54	5270	40.73	27.09 > 24
62	5310	40.82	27.1 > 24
102	5510	40.85	27.11 > 24
110	5550	41.13	27.14 > 24
134	5670	40.98	27.12 > 24
142 (UNII-2c Band)	5710	35.56	26.5 > 24



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**NOTE:**

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



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**802.11ac (VHT80)  
POWER OUTPUT**

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
58	5290	16.32	15.02	15.32	108.665	20.36	20.45	PASS
106	5530	15.15	15.02	14.18	90.685	19.58	19.66	PASS
122	5610	15.11	14.98	14.14	89.853	19.54	19.66	PASS
138 (UNII-2c Band)	5690	10.31	10.60	10.53	34.844	15.42	19.66	PASS
138 (UNII-3 Band)	5690	-3.56	-3.83	-2.55	1.4662	1.66	25.66	PASS

**Note:**

- 5250~5350MHz: The directional gain is 9.55dBi > 6dBi, therefore the limit needs to reduce, so the power limit shall be reduced to "Determined Conducted Limit-(9.55-6)".
  - 5470~5725MHz: The directional gain is 10.34dBi > 6dBi, therefore the limit needs to reduce, so the power limit shall be reduced to "Determined Conducted Limit-(10.34-6)".
  - 5725~5825MHz: The directional gain is 10.34dBi > 6dBi, , therefore the limit needs to reduce, so the power limit shall be reduced to  $30-(10.34-6) = 25.66\text{dBm}$ .
- For CH138: Total power (dBm)= Average power <Chain 0 +1+2>(dBm) + Duty Factor (0.2dB)



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**802.11ac (VHT80)**

**26dB OCCUPIED BANDWIDTH**

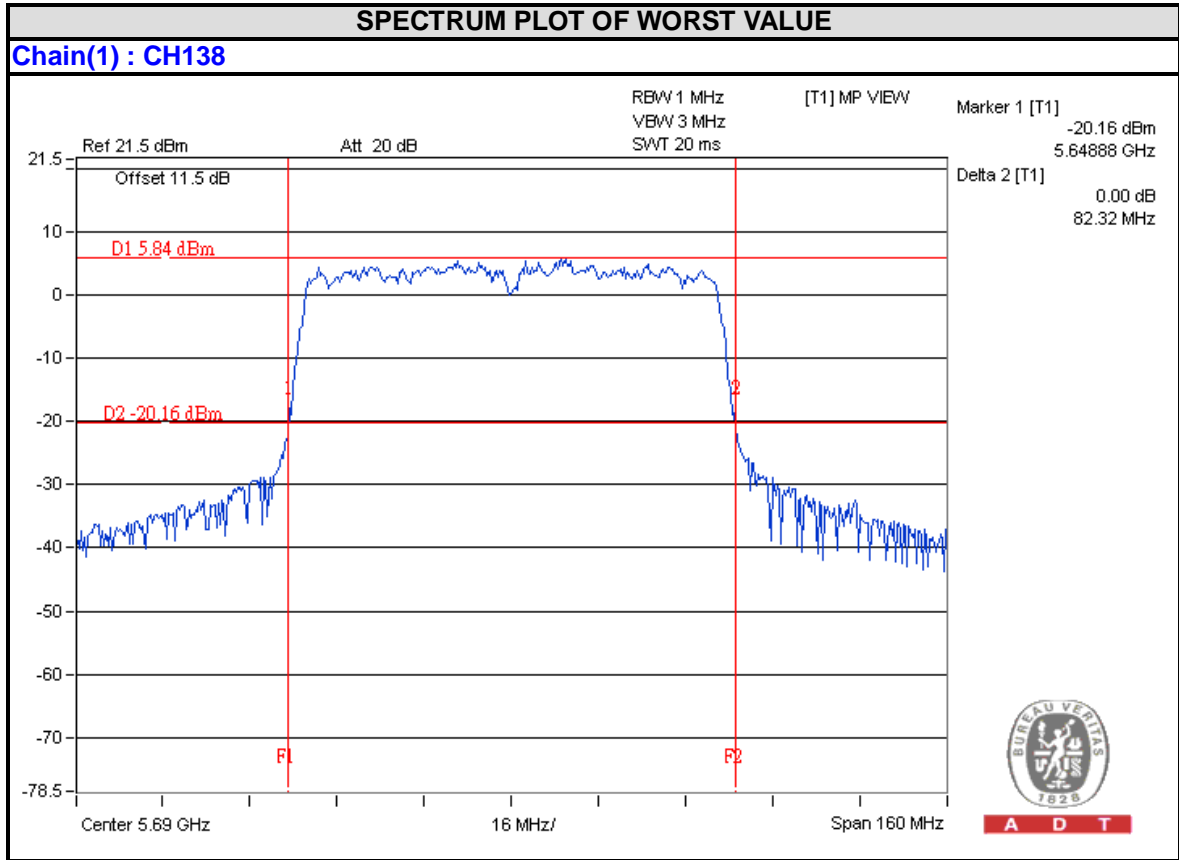
CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		
		CHAIN 0	CHAIN 1	CHAIN 2
58	5290	82.67	82.40	81.80
106	5530	82.52	81.93	82.30
122	5610	82.73	82.13	82.33
138 (UNII-2c Band)	5690	76.37	76.12	76.15

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

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
58	5290	81.80	30.12 > 24
106	5530	81.93	30.13 > 24
122	5610	82.13	30.14 > 24
138 (UNII-2c Band)	5690	76.12	29.81 > 24



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**NOTE:**

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



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#### 4.4 PEAK POWER SPECTRAL DENSITY MEASUREMENT

##### 4.4.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT

Operation Band	LIMIT
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 :Oct. 08, 2014



#### 4.4.3 TEST PROCEDURES

For 802.11a, 802.11ac (VHT20) test

Using method SA-1

✘For U-NII-2A & U-NII-2C:

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

For 802.11ac (VHT40) , 802.11ac (VHT80) test  
Using method SA-2

✘For U-NII-2A & U-NII-2C:

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 and add 10 log (1/duty cycle)

✘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 and add 10 log (1/duty cycle)

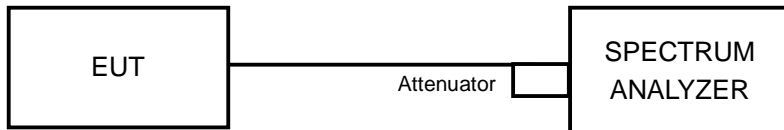
#### 4.4.4 DEVIATION FROM TEST STANDARD

No deviation



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#### 4.4.5 TEST SETUP



#### 4.4.6 EUT OPERATING CONDITIONS

Same as 4.3.6



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#### 4.4.7 TEST RESULTS(MODE 1)

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

##### 802.11a

CHAN.	CHANNEL FREQUENCY (MHz)	PSD (dBm)			TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2			
52	5260	0.43	-2.40	3.28	5.81	7.45	PASS
60	5300	0.16	-3.69	4.10	6.06	7.45	PASS
64	5320	0.44	-4.57	4.33	6.20	7.45	PASS
100	5500	0.26	1.05	2.18	6.01	6.66	PASS
120	5600	-0.45	2.16	2.90	6.53	6.66	PASS
140	5700	-0.06	1.52	2.29	6.13	6.66	PASS
144 (UNII-2c Band)	5720	-0.99	1.31	1.46	5.50	6.66	PASS

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.
- NOTE:**
- 5250~5350MHz: 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  $11 - (9.55 - 6) = 7.45\text{dBm}$ .
  - 5470~5725MHz: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 10.34\text{dBi} > 6\text{dB}$ , so the power density limit shall be reduced to  $11 - (10.34 - 6) = 6.66\text{dBm}$ .



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802.11ac (VHT20)

CHAN.	CHANNEL FREQUENCY (MHz)	PSD (dBm)			TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2			
52	5260	-0.28	0.48	0.41	4.99	7.45	PASS
60	5300	0.04	-0.08	1.93	5.50	7.45	PASS
64	5320	0.15	-0.57	2.91	5.87	7.45	PASS
100	5500	0.50	-0.53	1.83	5.48	6.66	PASS
120	5600	0.20	0.57	2.22	5.86	6.66	PASS
140	5700	-1.08	0.11	0.89	4.82	6.66	PASS
144 (UNII-2c Band)	5720	-1.47	-0.40	-0.01	4.19	6.66	PASS

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.
- NOTE:**
- 5250~5350MHz: 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  $11-(9.55-6) = 7.45\text{dBm}$ .
  - 5470~5725MHz: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 10.34\text{dBi} > 6\text{dB}$ , so the power density limit shall be reduced to  $11-(10.34-6) = 6.66\text{dBm}$ .



802.11ac (VHT40)

CHAN.	CHANNEL FREQUENCY (MHz)	PSD (dBm)			TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2			
54	5270	-0.19	-2.05	2.23	5.12	7.45	PASS
62	5310	-1.09	-3.47	2.57	4.82	7.45	PASS
102	5510	0.65	0.61	2.56	6.14	6.66	PASS
118	5590	0.66	1.16	2.56	6.31	6.66	PASS
134	5670	-1.59	0.38	0.84	4.77	6.66	PASS
142 (UNII-2c Band)	5710	0.22	1.08	-2.42	4.63	6.66	PASS

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.
- NOTE:**
- 5250~5350MHz: Directional gain = 5.5dBi + 10log(3) = 9.55dBi > 6dBi, so the power density limit shall be reduced to 11-(9.55-6) = 7.45dBm.
  - 5470~5725MHz: Directional gain = 5.74dBi + 10log(3) = 10.34dBi > 6dB, so the power density limit shall be reduced to 11-(10.34-6) = 6.66dBm.

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				
58	5290	-4.92	-5.45	-2.27	0.2	1.00	7.45	PASS
106	5530	-4.20	-4.21	-1.69	0.2	1.78	6.66	PASS
122	5610	-1.36	-1.03	0.54	0.2	4.44	6.66	PASS
138 (UNII-2c Band)	5690	-1.62	-0.67	-0.96	0.2	3.91	6.66	PASS

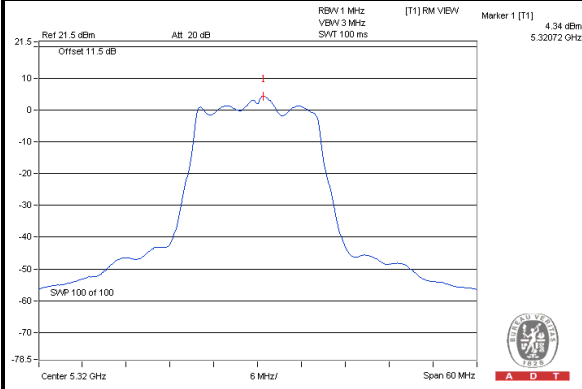
1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- NOTE:**
- 5250~5350MHz: Directional gain = 5.5dBi + 10log(3) = 9.55dBi > 6dBi, so the power density limit shall be reduced to 11-(9.55-6) = 7.45dBm.
  - 5470~5725MHz: Directional gain = 5.74dBi + 10log(3) = 10.34dBi > 6dB, so the power density limit shall be reduced to 11-(10.34-6) = 6.66dBm.
  - Refer to section 3.4 for duty cycle spectrum plot.



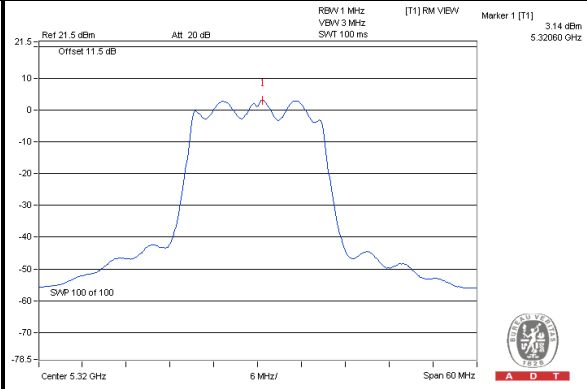
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### SPECTRUM PLOT OF WORST VALUE

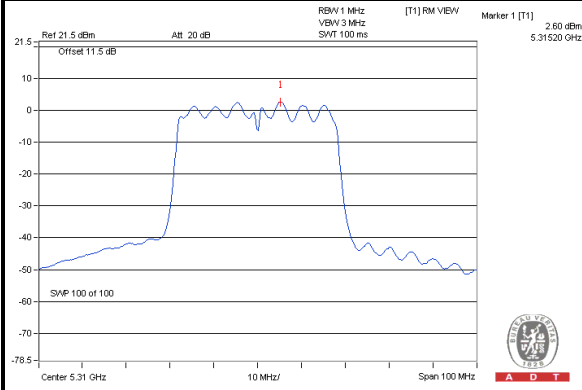
#### 802.11a / Chain(2) : CH64



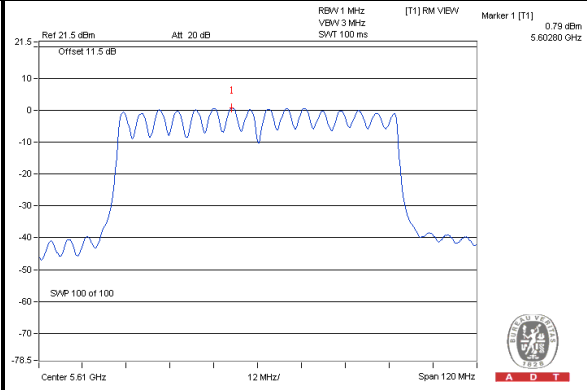
#### 802.11ac (VHT20) / Chain(2) : CH64



#### 802.11ac (VHT40) / Chain(2) : CH62



#### 802.11ac (VHT80) / Chain(2) : CH122





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#### 4.4.8 TEST RESULTS(MODE 2)

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

802.11ac (VHT20)

CHAN.	CHANNEL FREQUENCY (MHz)	PSD (dBm)			TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2			
52	5260	-0.28	0.48	0.41	4.99	7.45	PASS
60	5300	0.04	-0.08	1.93	5.50	7.45	PASS
64	5320	0.15	-0.57	2.91	5.87	7.45	PASS
100	5500	0.50	-0.53	1.83	5.48	6.66	PASS
120	5600	0.20	0.57	2.22	5.86	6.66	PASS
140	5700	-1.08	0.11	0.89	4.82	6.66	PASS
144 (UNII-2c Band)	5720	-1.47	-0.40	-0.01	4.19	6.66	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.
  - 5250~5350MHz: 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  $11 - (9.55 - 6) = 7.45\text{dBm}$ .
  - 5470~5725MHz: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 10.34\text{dBi} > 6\text{dB}$ , so the power density limit shall be reduced to  $11 - (10.34 - 6) = 6.66\text{dBm}$ .





802.11ac (VHT40)

CHAN.	CHANNEL FREQUENCY (MHz)	PSD (dBm)			TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2			
54	5270	-2.70	-4.14	-0.65	2.51	7.45	PASS
62	5310	-3.16	-3.36	0.12	2.95	7.45	PASS
102	5510	-2.44	-1.87	-0.33	3.32	6.66	PASS
118	5590	-2.64	-1.68	-0.34	3.32	6.66	PASS
134	5670	-2.70	-1.49	-5.58	1.83	6.66	PASS
142 (UNII-2c Band)	5710	-2.27	-1.95	-4.91	1.91	6.66	PASS

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.
- NOTE:**
- 5250~5350MHz: Directional gain = 5.5dBi + 10log(3) = 9.55dBi > 6dBi, so the power density limit shall be reduced to 11-(9.55-6) = 7.45dBm.
  - 5470~5725MHz: Directional gain = 5.74dBi + 10log(3) = 10.34dBi > 6dB, so the power density limit shall be reduced to 11-(10.34-6) = 6.66dBm.

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				
58	5290	-6.20	-5.85	-3.00	0.2	0.21	7.45	PASS
106	5530	-5.95	-5.45	-3.25	0.2	0.26	6.66	PASS
122	5610	-7.09	-5.86	-4.15	0.2	-0.56	6.66	PASS
138 (UNII-2c Band)	5690	-7.25	-6.13	-5.32	0.2	-1.19	6.66	PASS

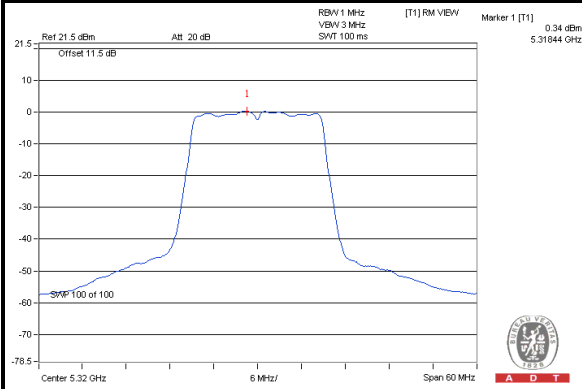
1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- NOTE:**
- 5250~5350MHz: Directional gain = 5.5dBi + 10log(3) = 9.55dBi > 6dBi, so the power density limit shall be reduced to 11-(9.55-6) = 7.45dBm.
  - 5470~5725MHz: Directional gain = 5.74dBi + 10log(3) = 10.34dBi > 6dB, so the power density limit shall be reduced to 11-(10.34-6) = 6.66dBm.
  - Refer to section 3.4 for duty cycle spectrum plot.



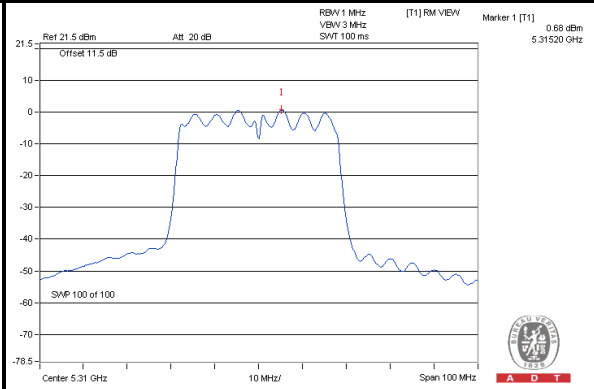
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### SPECTRUM PLOT OF WORST VALUE

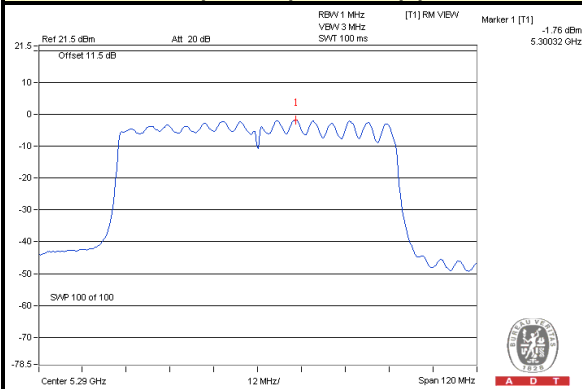
#### 802.11ac (VHT20) / Chain(2) : CH64



#### 802.11ac (VHT40) / Chain(2) : CH62



#### 802.11ac (VHT80) / Chain(2) : CH58



## 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 :Oct. 08, 2014

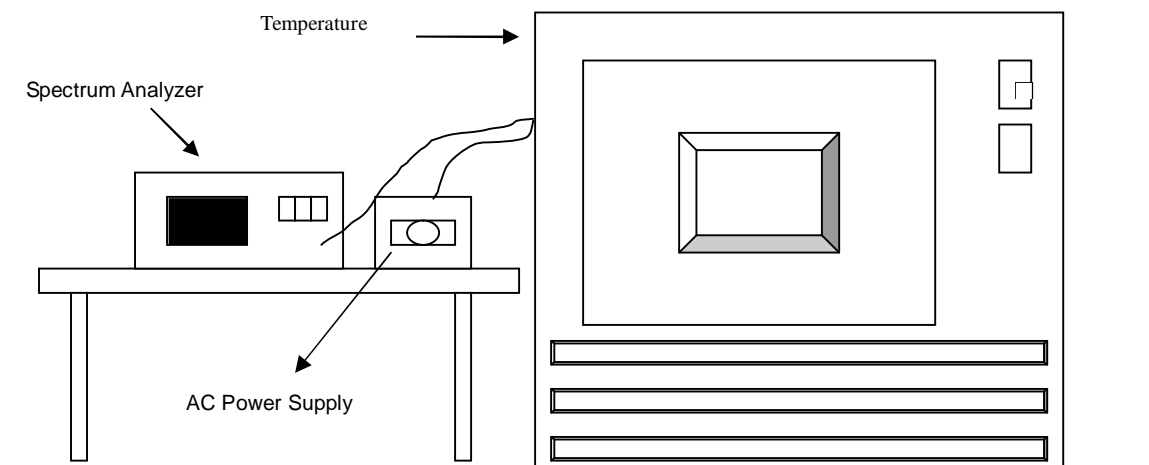
### 4.5.3 TEST PROCEDURE

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.



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### 4.5.7 TEST RESULTS

FREQUENCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5320MHz									
TEMP. (°C)	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	5320.0071	0.00013	5320.0061	0.00011	5320.0064	0.00012	5320.0075	0.00014
40	120	5319.9877	-0.00023	5319.9875	-0.00023	5319.9889	-0.00021	5319.9883	-0.00022
30	120	5319.9924	-0.00014	5319.9904	-0.00018	5319.9916	-0.00016	5319.9945	-0.00010
20	120	5319.9965	-0.00007	5319.9929	-0.00013	5319.9962	-0.00007	5319.9967	-0.00006
10	120	5320.0115	0.00022	5320.0093	0.00017	5320.0103	0.00019	5320.0127	0.00024
0	120	5320.0059	0.00011	5320.0088	0.00017	5320.0074	0.00014	5320.0063	0.00012
-10	120	5319.9852	-0.00028	5319.9885	-0.00022	5319.9856	-0.00027	5319.9864	-0.00026
-20	120	5319.9894	-0.00020	5319.9898	-0.00019	5319.9879	-0.00023	5319.9887	-0.00021
-30	120	5320.0051	0.00010	5320.0033	0.00006	5320.0029	0.00005	5320.005	0.00009

FREQUENCY STABILITY VERSUS VOLTAGE									
OPERATING FREQUENCY: 5320MHz									
TEMP. (°C)	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	5319.9974	-0.00005	5319.9925	-0.00014	5319.9961	-0.00007	5319.9976	-0.00005
	120	5319.9965	-0.00007	5319.9929	-0.00013	5319.9962	-0.00007	5319.9967	-0.00006
	102	5319.9974	-0.00005	5319.9939	-0.00011	5319.9957	-0.00008	5319.9968	-0.00006

## 5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



## 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:

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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.

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