FCC TEST REPORT (15.407)

REPORT NO.:	RF140901E08-1
MODEL NO.:	EX7000
FCC ID:	PY314200280
RECEIVED:	Sep. 01, 2014
TESTED:	Sep. 09 to Oct. 30, 2014
ISSUED:	Dec. 04, 2014
APPLICANT:	NETGEAR, Inc.
ADDRESS:	350 East Plumeria Drive San Jose, CA 95134
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.
TEST LOCATION (2):	No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan, R.O.C.

This report should not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF140901E08-1	Original release	Dec. 04, 2014

1. CERTIFICATION

PRODUCT:	AC1900 WiFi Range Extender
BRAND NAME:	NETGEAR
MODEL NO.:	EX7000
TEST SAMPLE:	ENGINEERING SAMPLE
APPLICANT:	NETGEAR, Inc.
TESTED:	Sep. 09 to Oct. 30, 2014
STANDARDS:	**FCC Part 15, Subpart E (Section 15.407)**
	ANSI C63.10-2009

The above equipment (Model: EX7000) 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:** Dec. 04, 2014

(Elsie Hsu, Specialist)

Approved by : _____ , **Date:** Dec. 04, 2014

(May Chen, Manager)

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 -9.04dB at 0.38828MHz
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 5416.00MHz
15.407(a/1/2/3)	Transmit Power	PASS	Meet the requirement of limit.
15.407(a/1/2/3)	Peak Power Spectral Density	PASS	Meet the requirement of limit.
15.407(g)	Frequency Stability	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is Re-SMA not a standard connector.

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

2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

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)	5.43 dB
Radiated emissions (1GHz -6GHz)	3.65 dB
Radiated emissions (6GHz -18GHz)	3.88 dB
Radiated emissions (18GHz -40GHz)	4.11 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	AC1900 WiFi Range Extender
MODEL NO.	EX7000
POWER SUPPLY	DC 12V from adapter power
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT (20/40) mode in 2.4GHz
MODULATION TECHNOLOGY	DSSS,OFDM
TRANSFER RATE	802.11b: up to 11Mbps 802.11a / g: up to 54Mbps 802.11n: up to 450Mbps 802.11ac: up to 1300Mbps
OPERATING FREQUENCY	**For 15.407** **5GHz:** 5.18 ~ 5.24GHz
	For 15.247 **2.4GHz:** 2.412 ~ 2.462GHz **5GHz:** 5.745 ~ 5.825GHz
NUMBER OF CHANNEL	**For 15.407** 4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80)
	For 15.247 **2.4GHz:** 11 for 802.11b, 802.11g, 802.11n (HT20). VHT20 7 for 802.11n (HT40), VHT40 **5GHz:** 5 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80)

MAXIMUM OUTPUT POWER	**For 15.407** **CDD Mode:** 802.11a: 432.426mW 802.11ac (VHT20): 432.772mW 802.11ac (VHT40): 208.518mW 802.11ac (VHT80): 90.311mW **Beamforming Mode:** 802.11ac (VHT20): 432.772mW 802.11ac (VHT40): 208.518mW 802.11ac (VHT80): 90.311mW **For 15.247 (2.4GHz)** **CDD Mode:** 802.11b: 970.44mW 802.11g: 836.767mW VHT20: 911.213mW VHT40: 151.299mW **Beamforming Mode:** VHT20: 827.261mW VHT40: 151.299mW **For 15.247 (5GHz)** **CDD Mode:** 802.11a: 748.103mW 802.11ac (VHT20): 771.017mW 802.11ac (VHT40): 858.132mW 802.11ac (VHT80): 377.16mW **Beamforming Mode:** 802.11ac (VHT20): 771.017mW 802.11ac (VHT40): 819.794mW 802.11ac (VHT80): 377.16mW
ANTENNA TYPE	Please see NOTE
DATA CABLE	NA
I/O PORTS	Refer to user's manual
ASSOCIATED DEVICES	Adapter x 1

Note:

1. The EUT must be supplied with a power adapter and the following different models could be chosen:

No.	Brand	Model No.	Spec.
1	Netgear	SAS030F1 NA	AC I/P: 100-120V, 47~63Hz, 0.9A AC Input cable: 1.8m, unshielded DC O/P: 12V, 2.5A
2	Netgear	P030WF120B	AC I/P: 100-240V, 50~60Hz, 1.0A AC Input cable: 1.8m, unshielded DC O/P: 12V, 2.5A

※For radiated emission test, the EUT was pre-tested with above adapters, the worse case was found in **adapter 2**. Therefore only the test data of the adapter was recorded in this report.

※For power line conducted emission test, the EUT was tested with each adapter individually. Therefore the test data of both adapters were recorded in this report.

2. There are three antennas provided to this EUT, please refer to the following table:

Antenna No.	Brand	Model	Antenna Gain(dBi)	Frequency range (MHz ~ MHz)	Antenna Type	Connecter Type
Antenna L	Netgear	NA	2	2412~2477 5150~5250 5250~5350 5470~5725 5725~5850	Dipole	Re-SMA
Antenna M	Netgear	NA	2	2412~2477 5150~5250 5250~5350 5470~5725 5725~5850	Dipole	Re-SMA
Antenna R	Netgear	NA	2	2412~2477 5150~5250 5250~5350 5470~5725 5725~5850	Dipole	Re-SMA

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

4. The EUT incorporates a MIMO function.

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

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)

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

3.2 DESCRIPTION OF TEST MODES

Operated in 5150 ~ 5250MHz band:

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

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

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

CHANNEL	FREQUENCY
42	5210 MHz

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

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

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

2. For radiated emissions test, the Beam forming mode and CDD mode had been pre-tested. The worst case was found when CDD mode. Therefore only the test data was recorded in this report.

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)
802.11ac (VHT20)	36 to 48	40	OFDM	BPSK	6.5

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)
802.11ac (VHT20)	36 to 48	40	OFDM	BPSK	6.5

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)
802.11a	36 to 48	36, 40, 48,	OFDM	BPSK	6
802.11ac (VHT20)	36 to 48	36, 40, 48,	OFDM	BPSK	6.5
802.11ac (VHT40)	38 to 46	38, 46	OFDM	BPSK	13.5
802.11ac (VHT80)	42	42	OFDM	BPSK	29.3

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)
802.11a	36 to 48	36, 40, 48	OFDM	BPSK	6
802.11ac (VHT20)	36 to 48	36, 40, 48	OFDM	BPSK	6.5
802.11ac (VHT40)	38 to 46	38, 46	OFDM	BPSK	13.5
802.11ac (VHT80)	42	42	OFDM	BPSK	29.3

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
PLC	30deg. C, 70%RH	120Vac, 60Hz	Mike Hsieh
RE<1G	28deg. C, 74%RH	120Vac, 60Hz	Gary Cheng
RE≥1G	23deg. C, 68%RH	120Vac, 60Hz	Gary Cheng
APCM	25deg. C, 60%RH	120Vac, 60Hz	James Chan Gary Cheng

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.

Note: The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

3.4 DUTY CYCLE OF TEST SIGNAL

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

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

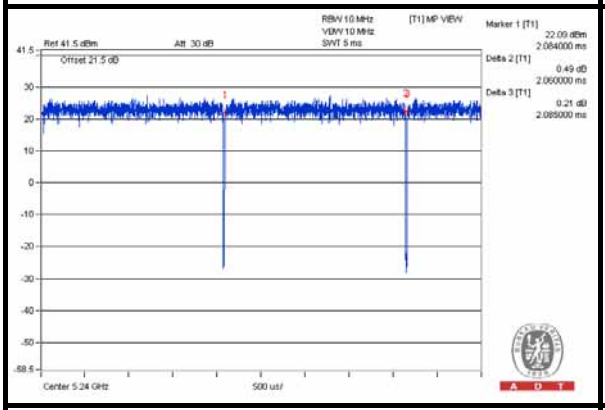
802.11a: Duty cycle = 2.06 ms/2.085 ms = 0.988

802.11ac(VHT20): Duty cycle = 1.912 ms/1.94 ms = 0.986

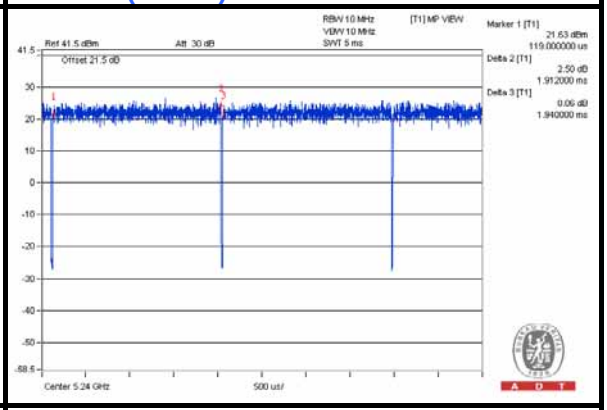
802.11ac(VHT40): Duty cycle = 0.941 ms/0.966 ms = 0.974, Duty factor = 10 * log(1/0.974) = 0.11

802.11ac(VHT80): Duty cycle = 0.456 ms/0.48 ms = 0.95, Duty factor = 10 * log(1/0.95) = 0.22

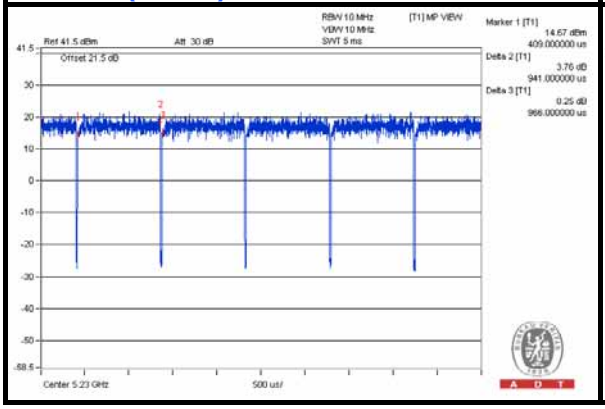
802.11a



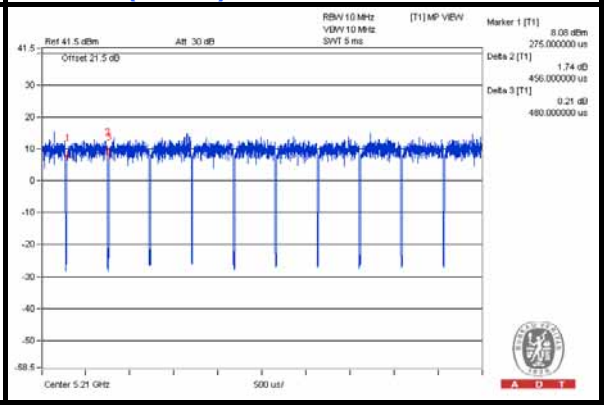
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



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.

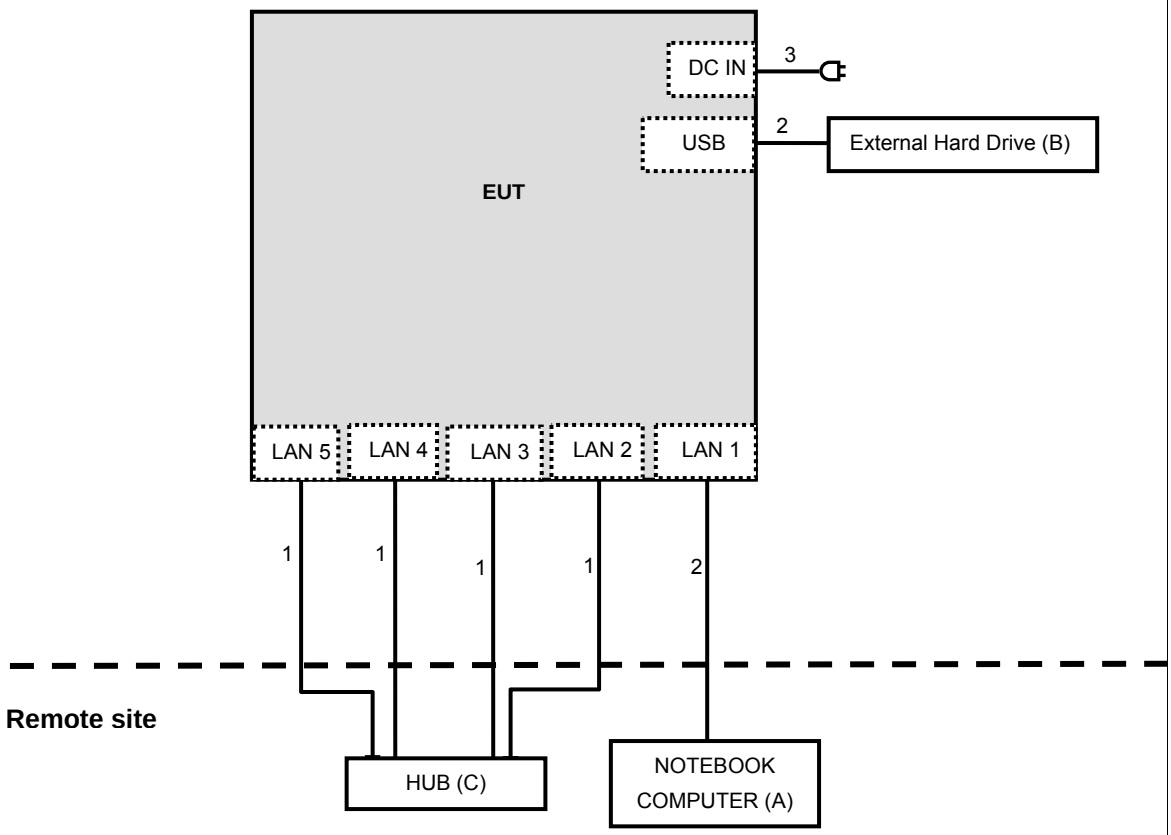
No.	Product	Brand	Model No.	Serial No.	FCC ID	Remark
A	NOTEBOOK COMPUTER	DELL	E6400	D814C A00 APCC	N/A	Provided by Lab
B	External Hard Drive	WD	WDBACW0010H BK-SESN	WCAZAL625787	FCC DoC	Provided by Lab
C	HUB	ZyXEL	ES-116P	S060H02000215	FCC DoC	Provided by Lab

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	1	10	No	0	Provided by Lab
2.	USB	1	0.45	Yes	0	Provided by Lab
3.	DC	1	1.8	No	0	Supplied by client

3.6 CONFIGURATION OF SYSTEM UNDER TEST



4. TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15-0.5 0.5-5 5-30	66 to 56 56 60	56 to 46 46 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	NSLK8127	8127-522	Sep. 15, 2014	Sep. 14, 2015
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. 22, 2014

4.1.3 TEST PROCEDURES

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN.

b. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

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

d. The frequency range from 150kHz to 30MHz was searched. Emission level under (Limit – 20dB) was not recorded.

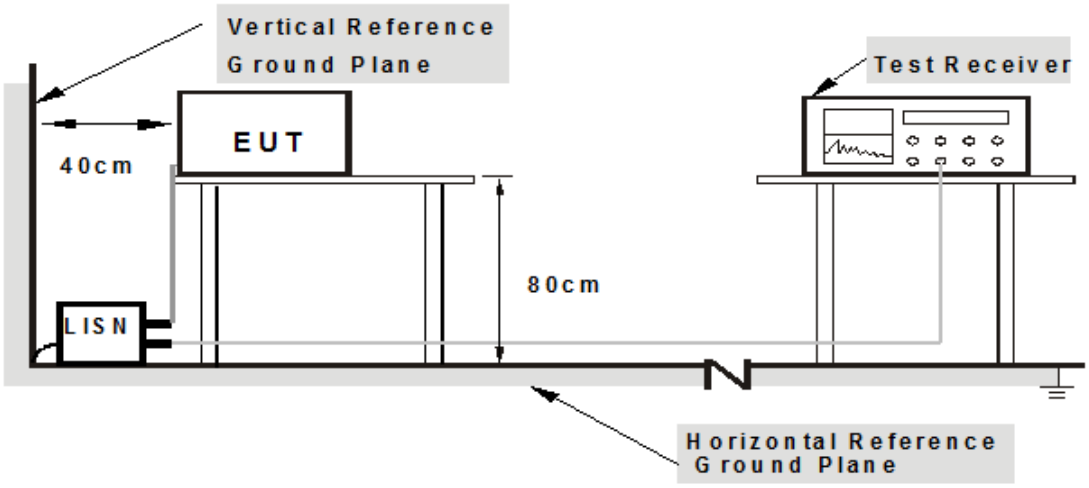
NOTE:

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

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



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

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

4.1.6 EUT OPERATING CONDITIONS

1. Placed the EUT on testing table.
2. Prepared computer system (support unit A) to act as communication partner.
3. The communication partner ran test program “Mtool.exe[2.0.1.8]” to enable EUT under transmission/receiving condition continuously.

4.1.7 TEST RESULTS

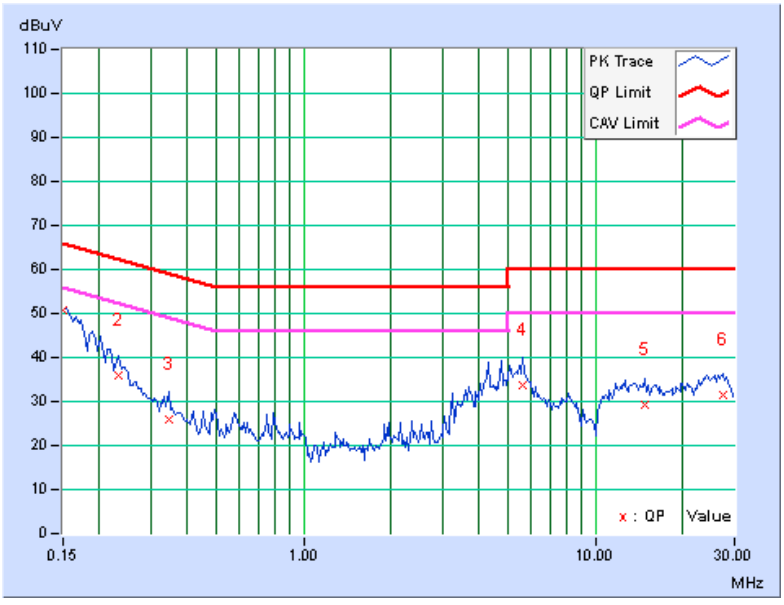
For Adapter 1:

PHASE	Line (L)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.07	50.49	35.90	50.56	35.97	66.00	56.00	-15.44	-20.03
2	0.23203	0.07	35.86	25.56	35.93	25.63	62.38	52.38	-26.44	-26.74
3	0.34531	0.08	25.72	16.93	25.80	17.01	59.07	49.07	-33.27	-32.06
4	5.64063	0.31	33.28	28.58	33.59	28.89	60.00	50.00	-26.41	-21.11
5	14.80469	0.58	28.85	23.60	29.43	24.18	60.00	50.00	-30.57	-25.82
6	27.37891	0.92	30.74	25.51	31.66	26.43	60.00	50.00	-28.34	-23.57

REMARKS:

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

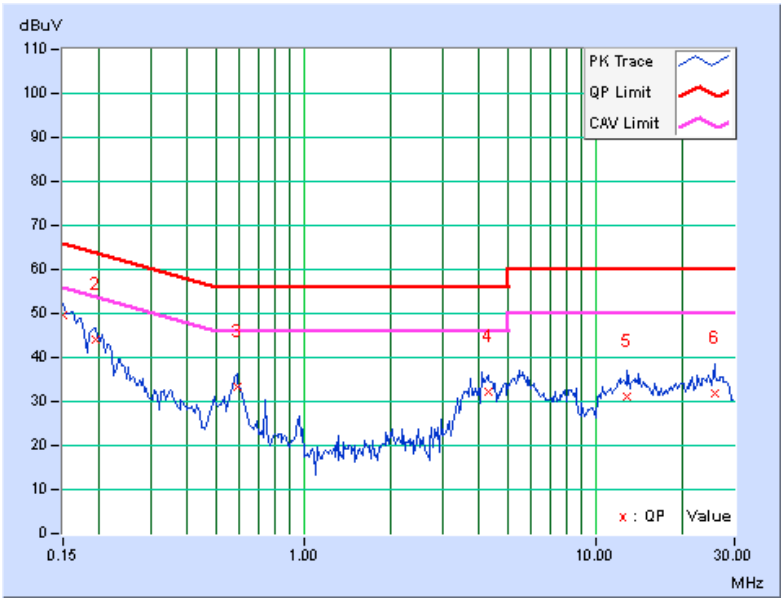


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.08	49.40	35.70	49.48	35.78	66.00	56.00	-16.52	-20.22
2	0.19297	0.07	43.84	29.86	43.91	29.93	63.91	53.91	-20.00	-23.98
3	0.59141	0.10	33.29	26.28	33.39	26.38	56.00	46.00	-22.61	-19.62
4	4.27734	0.27	32.04	25.77	32.31	26.04	56.00	46.00	-23.69	-19.96
5	12.87109	0.53	30.62	25.45	31.15	25.98	60.00	50.00	-28.85	-24.02
6	25.54688	0.86	30.89	25.55	31.75	26.41	60.00	50.00	-28.25	-23.59

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



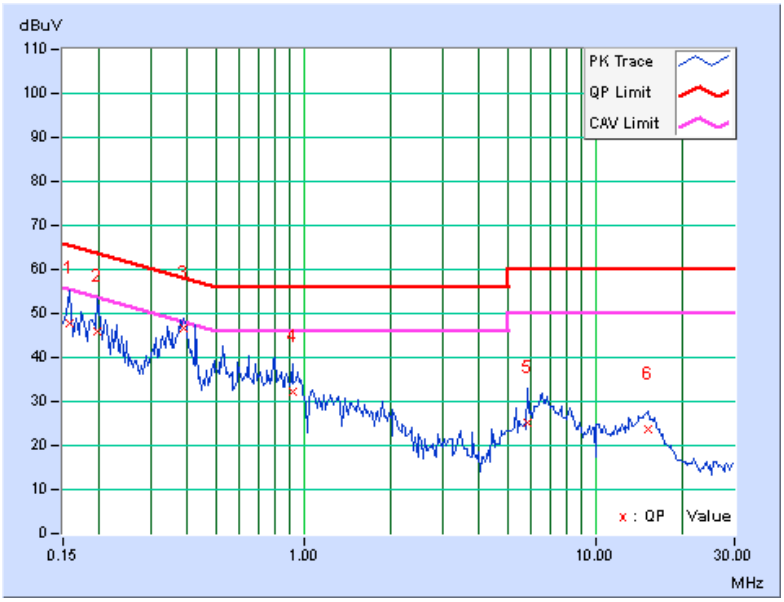
For Adapter 2:

PHASE	Line (L)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	0.07	47.85	31.63	47.92	31.70	65.58	55.58	-17.66	-23.88
2	0.19687	0.07	45.75	32.35	45.82	32.42	63.74	53.74	-17.92	-21.32
3	**0.38828**	**0.09**	**46.40**	**38.97**	**46.49**	**39.06**	**58.10**	**48.10**	**-11.61**	**-9.04**
4	0.91563	0.12	32.15	28.16	32.27	28.28	56.00	46.00	-23.73	-17.72
5	5.87109	0.32	24.80	19.00	25.12	19.32	60.00	50.00	-34.88	-30.68
6	15.25000	0.60	23.12	18.10	23.72	18.70	60.00	50.00	-36.28	-31.30

REMARKS:

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

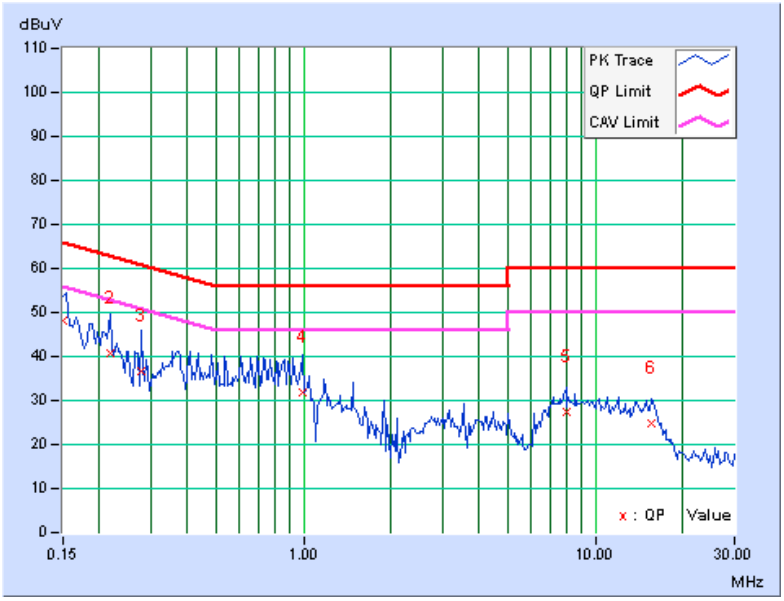


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.08	48.03	36.41	48.11	36.49	66.00	56.00	-17.89	-19.51
2	0.21641	0.07	40.72	27.49	40.79	27.56	62.96	52.96	-22.16	-25.39
3	0.27891	0.08	36.41	24.97	36.49	25.05	60.85	50.85	-24.36	-25.80
4	0.99766	0.13	31.58	26.93	31.71	27.06	56.00	46.00	-24.29	-18.94
5	7.94141	0.38	27.01	21.88	27.39	22.26	60.00	50.00	-32.61	-27.74
6	15.60156	0.60	24.21	20.46	24.81	21.06	60.00	50.00	-35.19	-28.94

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) *1 PK:-17 (dBm/MHz) *2	PK: 68.2(dBμV/m) *1 PK:78.2 (dBμV/m) *2

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

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

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

4.2.3 TEST INSTRUMENTS

For below 1GHz test

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY50010156	Aug. 11, 2014	Aug. 10, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-04	Nov. 13, 2013	Nov. 12, 2014
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Feb. 27, 2014	Feb. 26, 2015
RF Cable	NA	CHHCAB_001	Oct. 06, 2013	Oct. 05, 2014
Horn_Antenna AISI	AIH.8018	0000220091110	Aug. 26, 2014	Aug. 25, 2015
Pre-Amplifier Agilent	8449B	300801923	Oct. 29, 2013	Oct. 28, 2014
RF Cable	NA	131206 131215 SNMY23685/4	Jan. 17, 2014	Jan. 16, 2015
Spectrum Analyzer R&S	FSV40	100964	July 05, 2014	July 04, 2015
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 13, 2013	Nov. 12, 2014
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Aug. 26, 2014	Aug. 25, 2015
RF Cable	NA	RF104-121 RF104-204	Dec. 12, 2013	Dec. 11, 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.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3 The test was performed in 966 Chamber No. H.
4. The FCC Site Registration No. is 797305.
5 The CANADA Site Registration No. is IC 7450H-3.
6 Tested Date: Sep. 09, 2014

For above 1GHz test

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. 04, 2014	Oct. 03, 2015
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	Aug. 26, 2014	Aug. 25, 2015
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
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: Oct. 30, 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:

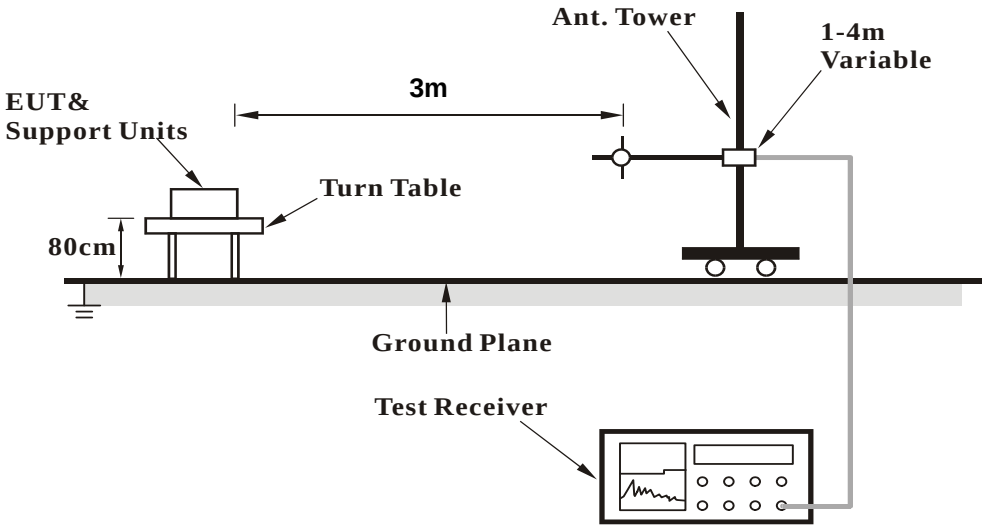
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.2.5 DEVIATION FROM TEST STANDARD

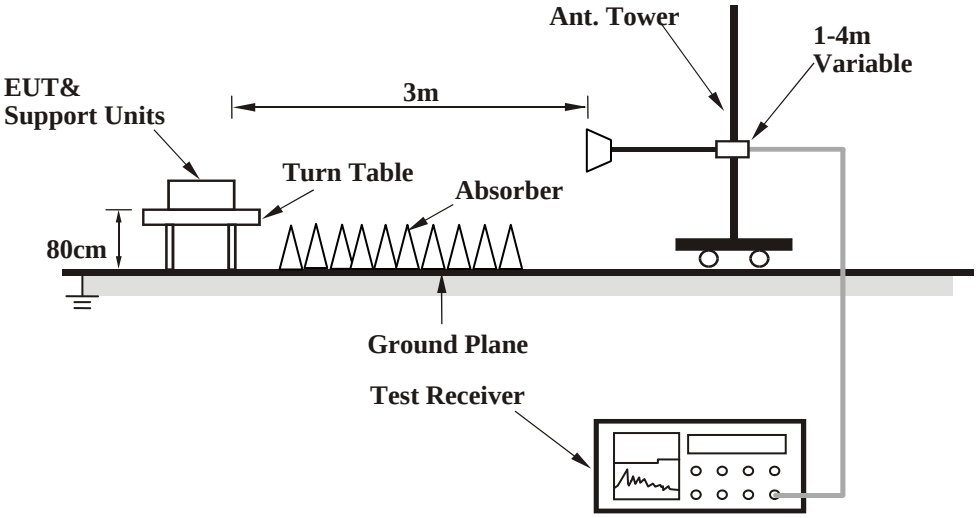
No deviation

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

4.2.8 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

802.11ac(VHT20)

CHANNEL	TX Channel 40	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 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	89.74	36.3 QP	43.5	-7.2	2.00 H	76	54.81	-18.49
2	124.96	31.0 QP	43.5	-12.5	2.00 H	75	45.24	-14.26
3	160.47	35.4 QP	43.5	-8.1	1.00 H	262	47.89	-12.51
4	199.99	26.6 QP	43.5	-16.9	1.50 H	90	42.37	-15.73
5	474.99	26.3 QP	46.0	-19.7	2.00 H	0	33.75	-7.45
6	940.59	30.4 QP	46.0	-15.6	2.00 H	360	29.05	1.37
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	47.22	33.4 QP	40.0	-6.6	1.00 V	53	46.38	-12.96
2	82.01	34.1 QP	40.0	-6.0	1.00 V	90	52.05	-18.00
3	88.49	39.4 QP	43.5	-4.1	1.50 V	91	57.87	-18.45
4	89.89	37.3 QP	43.5	-6.2	1.00 V	111	55.82	-18.50
5	159.83	29.6 QP	43.5	-13.9	1.00 V	277	42.07	-12.44
6	956.98	34.7 QP	46.0	-11.4	1.00 V	257	33.08	1.57

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

ABOVE 1GHz DATA

802.11a

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	5021.00	56.4 PK	74.0	-17.6	1.00 H	181	49.96	6.44
2	5021.00	47.8 AV	54.0	-6.2	1.00 H	181	41.36	6.44
3	5150.00	53.4 PK	74.0	-20.6	1.00 H	181	46.60	6.80
4	5150.00	46.1 AV	54.0	-7.9	1.00 H	181	39.30	6.80
5	*5180.00	113.4 PK			1.00 H	267	106.45	6.95
6	*5180.00	102.5 AV			1.00 H	267	95.55	6.95
7	#10360.00	62.1 PK	74.0	-11.9	1.06 H	201	48.99	13.11
8	#10360.00	47.9 AV	54.0	-6.1	1.06 H	201	34.79	13.11
9	15540.00	62.2 PK	74.0	-11.8	1.04 H	195	43.51	18.69
10	15540.00	49.5 AV	54.0	-4.5	1.04 H	195	30.81	18.69
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	5021.00	62.1 PK	74.0	-11.9	1.31 V	18	55.66	6.44
2	5021.00	51.5 AV	54.0	-2.5	1.31 V	18	45.06	6.44
3	5150.00	71.4 PK	74.0	-2.6	1.08 V	36	64.60	6.80
4	5150.00	53.8 AV	54.0	-0.2	1.08 V	36	47.00	6.80
5	*5180.00	122.3 PK			1.08 V	36	115.35	6.95
6	*5180.00	113.3 AV			1.08 V	36	106.35	6.95
7	5396.00	60.5 PK	74.0	-13.5	1.00 V	283	52.80	7.70
8	5396.00	53.2 AV	54.0	-0.8	1.00 V	283	45.50	7.70
9	#5611.00	58.8 PK	74.0	-15.2	1.00 V	288	50.57	8.23
10	#5611.00	53.4 AV	54.0	-0.6	1.00 V	288	45.17	8.23
11	#10360.00	63.3 PK	74.0	-10.7	1.39 V	71	50.19	13.11
12	#10360.00	50.1 AV	54.0	-3.9	1.39 V	71	36.99	13.11
13	15540.00	62.5 PK	74.0	-11.5	1.14 V	215	43.81	18.69
14	15540.00	49.9 AV	54.0	-4.1	1.14 V	215	31.21	18.69

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	110.3 PK			1.00 H	178	103.25	7.05
2	*5200.00	101.5 AV			1.00 H	178	94.45	7.05
3	5361.00	53.4 PK	74.0	-20.6	1.05 H	173	45.85	7.55
4	5361.00	46.1 AV	54.0	-7.9	1.05 H	173	38.55	7.55
5	5416.00	56.7 PK	74.0	-17.3	1.05 H	191	48.95	7.75
6	5416.00	48.0 AV	54.0	-6.0	1.05 H	191	40.25	7.75
7	#10400.00	62.4 PK	74.0	-11.6	1.00 H	199	49.18	13.22
8	#10400.00	48.2 AV	54.0	-5.8	1.00 H	199	34.98	13.22
9	15600.00	63.3 PK	74.0	-10.7	1.05 H	190	44.60	18.70
10	15600.00	50.4 AV	54.0	-3.6	1.05 H	190	31.70	18.70
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	4983.00	57.7 PK	74.0	-16.3	1.23 V	107	51.35	6.35
2	4983.00	50.1 AV	54.0	-3.9	1.23 V	107	43.75	6.35
3	*5200.00	120.3 PK			1.13 V	282	113.25	7.05
4	*5200.00	112.1 AV			1.13 V	282	105.05	7.05
5	5361.00	61.4 PK	74.0	-12.6	1.22 V	29	53.85	7.55
6	5361.00	51.9 AV	54.0	-2.1	1.22 V	29	44.35	7.55
7	5416.00	61.3 PK	74.0	-12.7	1.02 V	317	53.55	7.75
8	**5416.00**	**53.9 AV**	**54.0**	**-0.1**	**1.02 V**	**317**	**46.15**	**7.75**
9	#10400.00	63.3 PK	74.0	-10.7	1.39 V	71	50.08	13.22
10	#10400.00	50.1 AV	54.0	-3.9	1.39 V	71	36.88	13.22
11	15600.00	62.5 PK	74.0	-11.5	1.14 V	215	43.80	18.70
12	15600.00	49.9 AV	54.0	-4.1	1.14 V	215	31.20	18.70

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5021.00	53.5 PK	74.0	-20.5	1.00 H	171	47.06	6.44
2	5021.00	46.4 AV	54.0	-7.6	1.00 H	171	39.96	6.44
3	*5240.00	110.1 PK			1.00 H	186	102.94	7.16
4	*5240.00	101.9 AV			1.00 H	186	94.74	7.16
5	5401.00	57.0 PK	74.0	-17.0	1.08 H	181	49.29	7.71
6	5401.00	48.1 AV	54.0	-5.9	1.08 H	181	40.39	7.71
7	#10480.00	62.0 PK	74.0	-12.0	1.02 H	194	48.84	13.16
8	#10480.00	47.7 AV	54.0	-6.3	1.02 H	194	34.54	13.16
9	15720.00	62.1 PK	74.0	-11.9	1.01 H	180	43.70	18.40
10	15720.00	49.4 AV	54.0	-4.6	1.01 H	180	31.00	18.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5021.00	57.2 PK	74.0	-16.8	1.33 V	22	50.76	6.44
2	5021.00	52.9 AV	54.0	-1.1	1.33 V	22	46.46	6.44
3	*5240.00	120.9 PK			1.12 V	78	113.74	7.16
4	*5240.00	112.1 AV			1.12 V	78	104.94	7.16
5	5401.00	64.1 PK	74.0	-9.9	1.12 V	28	56.39	7.71
6	5401.00	53.8 AV	54.0	-0.2	1.12 V	28	46.09	7.71
7	#10480.00	63.3 PK	74.0	-10.7	1.39 V	71	50.14	13.16
8	#10480.00	50.1 AV	54.0	-3.9	1.39 V	71	36.94	13.16
9	15720.00	62.5 PK	74.0	-11.5	1.14 V	215	44.10	18.40
10	15720.00	49.9 AV	54.0	-4.1	1.14 V	215	31.50	18.40

REMARKS:

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

802.11ac(VHT20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	5150.00	57.7 PK	74.0	-16.3	1.00 H	194	50.90	6.80
2	5150.00	48.3 AV	54.0	-5.7	1.00 H	194	41.50	6.80
3	*5180.00	111.6 PK			1.04 H	190	104.65	6.95
4	*5180.00	102.1 AV			1.04 H	190	95.15	6.95
5	5422.16	56.6 PK	74.0	-17.4	1.03 H	179	48.82	7.78
6	5422.16	47.9 AV	54.0	-6.1	1.03 H	179	40.12	7.78
7	#10360.00	61.8 PK	74.0	-12.2	1.00 H	190	48.69	13.11
8	#10360.00	47.5 AV	54.0	-6.5	1.00 H	190	34.39	13.11
9	15540.00	62.3 PK	74.0	-11.7	1.03 H	171	43.61	18.69
10	15540.00	49.7 AV	54.0	-4.3	1.03 H	171	31.01	18.69
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	5150.00	70.6 PK	74.0	-3.4	1.06 V	40	63.80	6.80
2	5150.00	53.8 AV	54.0	-0.2	1.06 V	40	47.00	6.80
3	*5180.00	122.1 PK			1.06 V	40	115.15	6.95
4	*5180.00	112.8 AV			1.06 V	40	105.85	6.95
5	5422.16	62.7 PK	74.0	-11.3	1.01 V	38	54.92	7.78
6	5422.16	52.5 AV	54.0	-1.5	1.01 V	38	44.72	7.78
7	#10360.00	63.3 PK	74.0	-10.7	1.39 V	71	50.19	13.11
8	#10360.00	50.1 AV	54.0	-3.9	1.39 V	71	36.99	13.11
9	15540.00	62.5 PK	74.0	-11.5	1.14 V	215	43.81	18.69
10	15540.00	49.9 AV	54.0	-4.1	1.14 V	215	31.21	18.69

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	111.5 PK			1.05 H	188	104.45	7.05
2	*5200.00	103.1 AV			1.05 H	188	96.05	7.05
3	5362.30	58.1 PK	74.0	-15.9	1.00 H	197	50.55	7.55
4	5362.30	48.4 AV	54.0	-5.6	1.00 H	197	40.85	7.55
5	5416.70	56.6 PK	74.0	-17.4	1.00 H	164	48.84	7.76
6	5416.70	47.8 AV	54.0	-6.2	1.00 H	164	40.04	7.76
7	#10400.00	61.7 PK	74.0	-12.3	1.05 H	199	48.48	13.22
8	#10400.00	47.5 AV	54.0	-6.5	1.05 H	199	34.28	13.22
9	15600.00	63.1 PK	74.0	-10.9	1.00 H	198	44.40	18.70
10	15600.00	49.4 AV	54.0	-4.6	1.00 H	198	30.70	18.70
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	122.3 PK			1.06 V	36	115.25	7.05
2	*5200.00	113.6 AV			1.06 V	36	106.55	7.05
3	5362.30	62.8 PK	74.0	-11.2	1.02 V	36	55.25	7.55
4	5362.30	53.8 AV	54.0	-0.2	1.02 V	36	46.25	7.55
5	5416.70	61.3 PK	74.0	-12.7	1.01 V	38	53.54	7.76
6	5416.70	52.7 AV	54.0	-1.3	1.01 V	38	44.94	7.76
7	#10400.00	63.3 PK	74.0	-10.7	1.39 V	71	50.08	13.22
8	#10400.00	50.1 AV	54.0	-3.9	1.39 V	71	36.88	13.22
9	15600.00	62.5 PK	74.0	-11.5	1.14 V	215	43.80	18.70
10	15600.00	49.9 AV	54.0	-4.1	1.14 V	215	31.20	18.70

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	112.4 PK			1.03 H	203	105.24	7.16
2	*5240.00	102.1 AV			1.03 H	203	94.94	7.16
3	5397.70	57.7 PK	74.0	-16.3	1.03 H	185	50.00	7.70
4	5397.70	48.1 AV	54.0	-5.9	1.03 H	185	40.40	7.70
5	5459.00	56.2 PK	74.0	-17.8	1.06 H	190	48.30	7.90
6	5459.00	47.7 AV	54.0	-6.3	1.06 H	190	39.80	7.90
7	#10480.00	61.6 PK	74.0	-12.4	1.01 H	190	48.44	13.16
8	#10480.00	47.7 AV	54.0	-6.3	1.01 H	190	34.54	13.16
9	15720.00	62.3 PK	74.0	-11.7	1.00 H	200	43.90	18.40
10	15720.00	49.5 AV	54.0	-4.5	1.00 H	200	31.10	18.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5020.00	58.9 PK	74.0	-15.1	1.43 V	360	52.46	6.44
2	5020.00	52.1 AV	54.0	-1.9	1.43 V	360	45.66	6.44
3	*5240.00	122.1 PK			1.05 V	36	114.94	7.16
4	*5240.00	112.8 AV			1.05 V	36	105.64	7.16
5	5397.70	64.5 PK	74.0	-9.5	1.20 V	23	56.80	7.70
6	5397.70	53.7 AV	54.0	-0.3	1.20 V	23	46.00	7.70
7	5459.00	64.0 PK	74.0	-10.0	1.08 V	23	56.10	7.90
8	5459.00	53.3 AV	54.0	-0.7	1.08 V	23	45.40	7.90
9	#10480.00	63.3 PK	74.0	-10.7	1.39 V	71	50.14	13.16
10	#10480.00	50.1 AV	54.0	-3.9	1.39 V	71	36.94	13.16
11	15720.00	62.5 PK	74.0	-11.5	1.14 V	215	44.10	18.40
12	15720.00	49.9 AV	54.0	-4.1	1.14 V	215	31.50	18.40

REMARKS:

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

802.11ac(VHT40)

CHANNEL	TX Channel 38	**DETECTOR FUNCTION**	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	5150.00	58.4 PK	74.0	-15.6	1.05 H	172	51.60	6.80
2	5150.00	45.3 AV	54.0	-8.7	1.05 H	172	38.50	6.80
3	*5190.00	104.8 PK			1.00 H	177	97.80	7.00
4	*5190.00	94.1 AV			1.00 H	177	87.10	7.00
5	#5622.00	56.2 PK	68.2	-12.0	1.18 H	80	47.97	8.23
6	#6054.00	54.9 PK	68.2	-13.3	1.00 H	121	45.58	9.32
7	#10380.00	59.7 PK	68.2	-8.5	1.00 H	208	46.53	13.17
8	15570.00	62.7 PK	74.0	-11.3	1.03 H	198	44.01	18.69
9	15570.00	49.7 AV	54.0	-4.3	1.03 H	198	31.01	18.69
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	5150.00	72.3 PK	74.0	-1.7	1.27 V	119	65.50	6.80
2	5150.00	53.3 AV	54.0	-0.7	1.27 V	119	46.50	6.80
3	*5190.00	114.4 PK			1.27 V	119	107.40	7.00
4	*5190.00	104.1 AV			1.27 V	119	97.10	7.00
5	#5622.00	61.7 PK	68.2	-6.5	1.00 V	329	53.47	8.23
6	#6054.00	60.1 PK	68.2	-8.1	1.11 V	277	50.78	9.32
7	#10380.00	62.1 PK	68.2	-6.1	1.00 V	269	48.93	13.17
8	15570.00	62.1 PK	74.0	-11.9	1.06 V	190	43.41	18.69
9	15570.00	49.1 AV	54.0	-4.9	1.06 V	190	30.41	18.69

REMARKS:

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

CHANNEL	TX Channel 46	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	5144.90	54.5 PK	74.0	-19.5	1.03 H	181	47.73	6.77
2	5144.90	41.5 AV	54.0	-12.5	1.03 H	181	34.73	6.77
3	*5230.00	104.8 PK			1.06 H	178	97.68	7.12
4	*5230.00	94.1 AV			1.06 H	178	86.98	7.12
5	#5665.00	55.3 PK	68.2	-12.9	1.18 H	105	47.00	8.30
6	#6111.00	55.1 PK	68.2	-13.1	1.00 H	15	45.62	9.48
7	#10460.00	59.4 PK	68.2	-8.8	1.04 H	194	46.22	13.18
8	15690.00	62.7 PK	74.0	-11.3	1.00 H	186	44.32	18.38
9	15690.00	50.2 AV	54.0	-3.8	1.00 H	186	31.82	18.38
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5144.90	63.4 PK	74.0	-10.6	1.27 V	267	56.63	6.77
2	5144.90	53.5 AV	54.0	-0.5	1.27 V	267	46.73	6.77
3	*5230.00	115.2 PK			1.26 V	267	108.08	7.12
4	*5230.00	105.0 AV			1.26 V	267	97.88	7.12
5	#5665.00	60.3 PK	68.2	-7.9	1.01 V	90	52.00	8.30
6	#6111.00	60.3 PK	68.2	-7.9	1.11 V	277	50.82	9.48
7	#10460.00	61.6 PK	68.2	-6.6	1.04 V	273	48.42	13.18
8	15690.00	61.8 PK	74.0	-12.2	1.11 V	200	43.42	18.38
9	15690.00	48.8 AV	54.0	-5.2	1.11 V	200	30.42	18.38

REMARKS:

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

802.11ac(VHT80)

CHANNEL	TX Channel 42	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	5144.00	57.1 PK	74.0	-16.9	1.00 H	106	50.33	6.77
2	5144.00	45.6 AV	54.0	-8.4	1.00 H	106	38.83	6.77
3	*5210.00	103.3 PK			1.00 H	106	96.24	7.06
4	*5210.00	92.0 AV			1.00 H	106	84.94	7.06
5	#5788.00	59.6 PK	68.2	-8.6	1.19 H	91	51.10	8.50
6	#10420.00	58.6 PK	68.2	-9.6	1.05 H	213	45.40	13.20
7	15630.00	61.8 PK	74.0	-12.2	1.04 H	174	43.20	18.60
8	15630.00	49.7 AV	54.0	-4.3	1.04 H	174	31.10	18.60
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	5144.00	64.6 PK	74.0	-9.4	1.00 V	312	57.83	6.77
2	5144.00	53.4 AV	54.0	-0.6	1.00 V	312	46.63	6.77
3	*5210.00	105.6 PK			1.00 V	312	98.54	7.06
4	*5210.00	95.6 AV			1.00 V	312	88.54	7.06
5	#5788.00	64.4 PK	68.2	-3.8	1.00 V	292	55.90	8.50
6	#10420.00	61.9 PK	68.2	-6.3	1.00 V	272	48.70	13.20
7	15630.00	61.6 PK	74.0	-12.4	1.12 V	189	43.00	18.60
8	15630.00	48.6 AV	54.0	-5.4	1.12 V	189	30.00	18.60

REMARKS:

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

4.3 TRANSMIT POWER MEASUREMENT

4.3.1 LIMITS OF TRANSMIT POWER MEASUREMENT

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

Note: Where B is the 26dB emission bandwidth in MHz.

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

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

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

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

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

4.3.2 TEST INSTRUMENTS

FOR POWER OUTPUT MEASUREMENT

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

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date :Oct. 30, 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. 30, 2014

4.3.3 TEST PROCEDURE

FOR POWER OUTPUT MEASUREMENT

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

FOR 26dB OCCUPIED BANDWIDTH

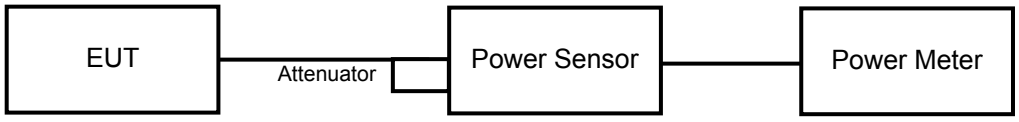
1. Set RBW = approximately 1% of the emission bandwidth.
2. Set the VBW > RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement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

4.3.4 DEVIATION FROM TEST STANDARD

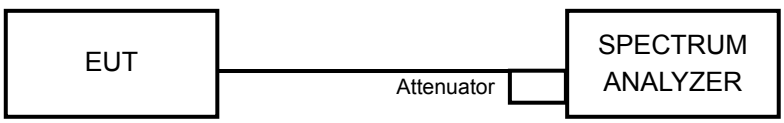
No deviation

4.3.5 TEST SETUP

FOR POWER OUTPUT MEASUREMENT



FOR 26dB OCCUPIED BANDWIDTH



4.3.6 EUT OPERATING CONDITIONS

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

4.3.7 TEST RESULTS(MODE 1)

802.11a

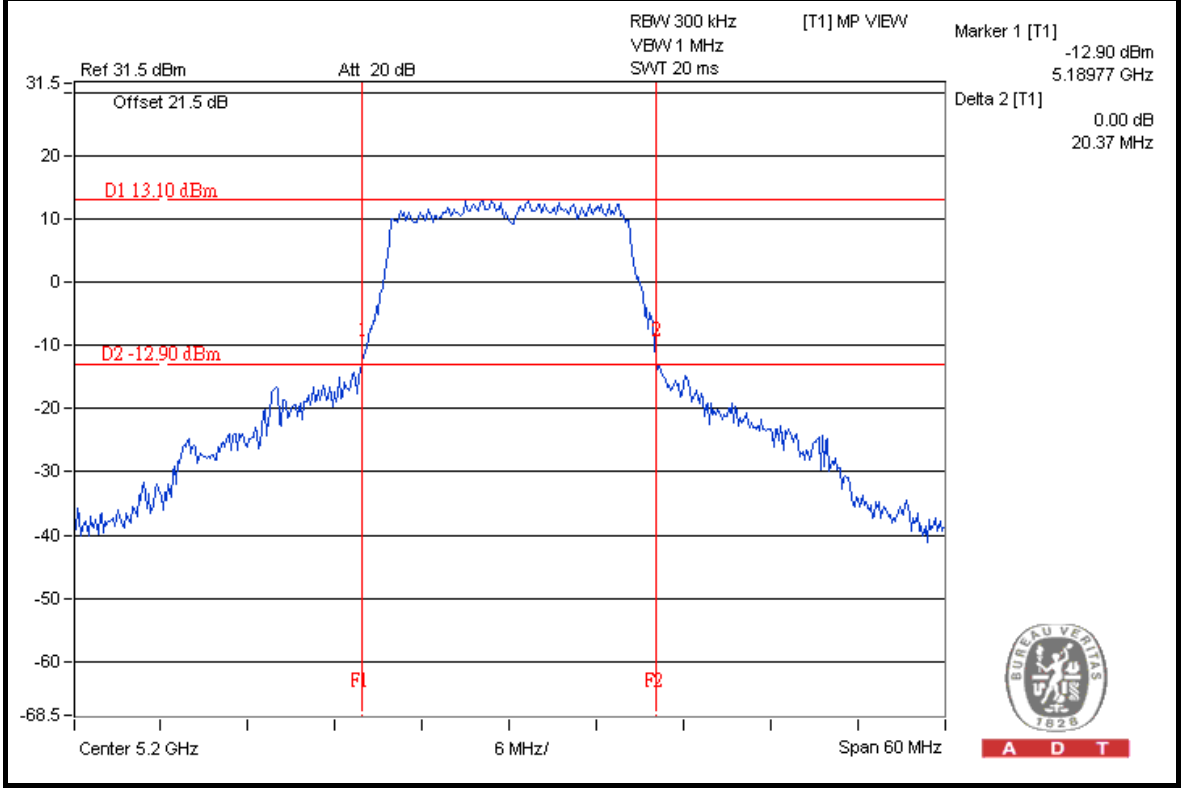
CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
36	5180	21.73	21.30	21.72	432.426	26.36	30.00	PASS
40	5200	20.89	20.54	21.18	367.204	25.65	30.00	PASS
48	5240	21.54	21.16	21.78	423.839	26.27	30.00	PASS

26dB OCCUPIED BANDWIDTH:

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		
		CHAIN 0	CHAIN 1	CHAIN 2
36	5180	20.50	20.71	20.89
40	5200	20.37	20.50	20.54
48	5240	20.49	21.06	20.77

SPECTRUM PLOT OF WORST VALUE

802.11a / Chain(0) : CH40



802.11ac (VHT20)

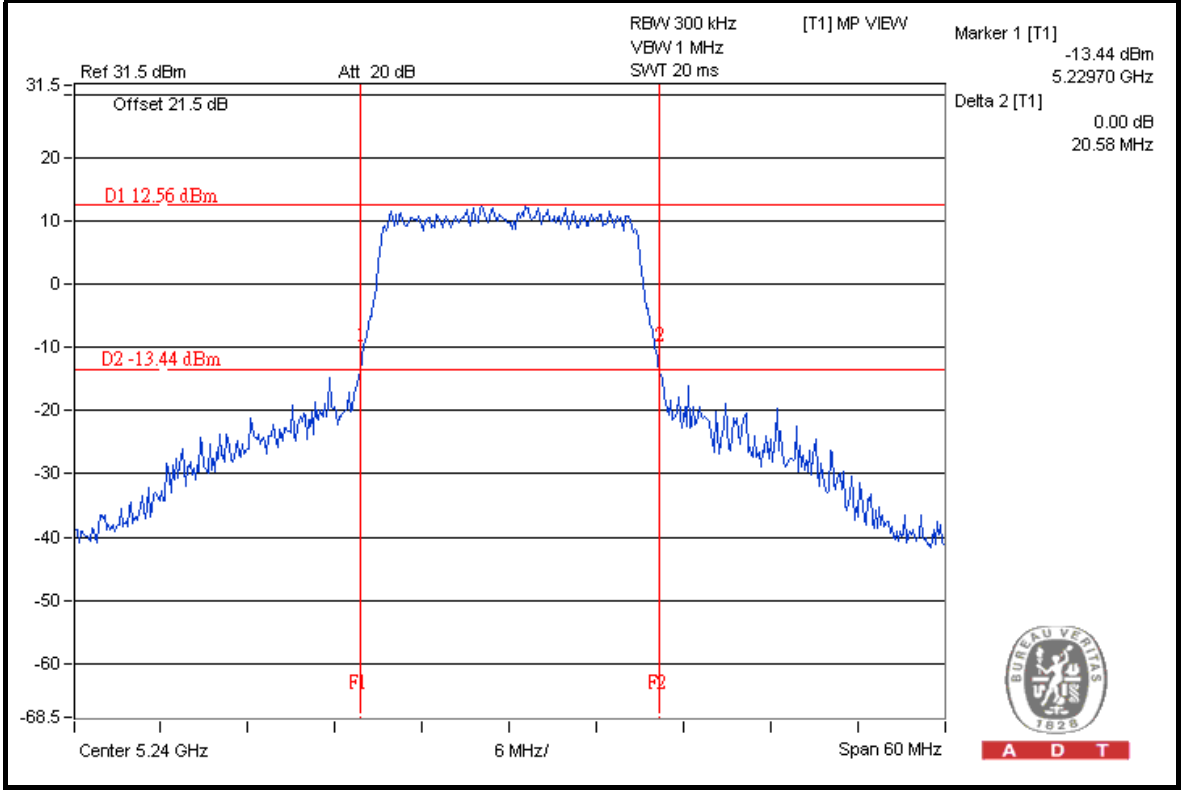
CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
36	5180	21.16	21.00	21.43	395.505	25.97	30.00	PASS
40	5200	21.71	21.30	21.75	432.772	26.36	30.00	PASS
48	5240	20.89	20.65	21.14	368.906	25.67	30.00	PASS

26dB OCCUPIED BANDWIDTH:

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		
		CHAIN 0	CHAIN 1	CHAIN 2
36	5180	21.81	21.55	22.88
40	5200	24.52	21.32	23.38
48	5240	21.73	20.58	22.39

SPECTRUM PLOT OF WORST VALUE

802.11ac (VHT20) / Chain(1) : CH48



802.11ac (VHT40)

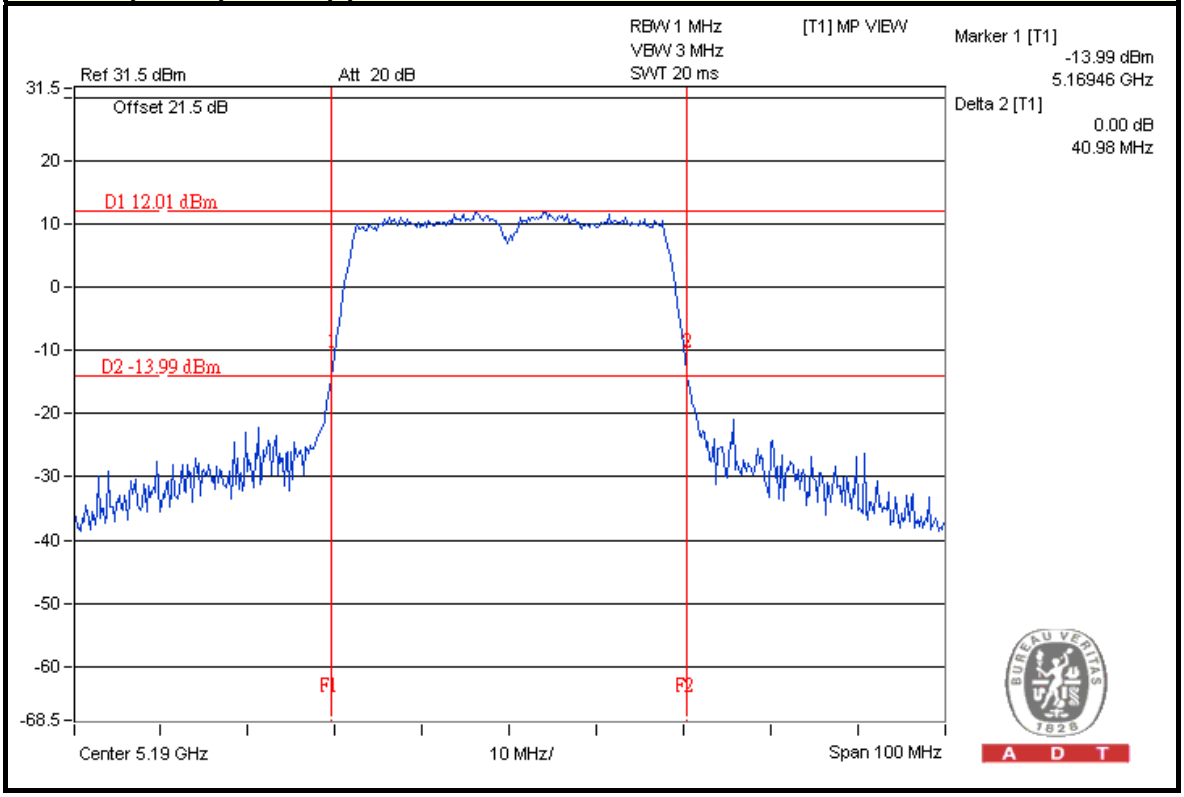
CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
38	5190	17.38	17.06	17.93	167.605	22.24	30.00	PASS
46	5230	18.31	17.94	18.95	208.518	23.19	30.00	PASS

26dB OCCUPIED BANDWIDTH:

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		
		CHAIN 0	CHAIN 1	CHAIN 2
38	5190	41.28	40.98	41.31
46	5230	41.15	41.22	41.43

SPECTRUM PLOT OF WORST VALUE

802.11ac (VHT40) / Chain(1) : CH38



802.11ac (VHT80)

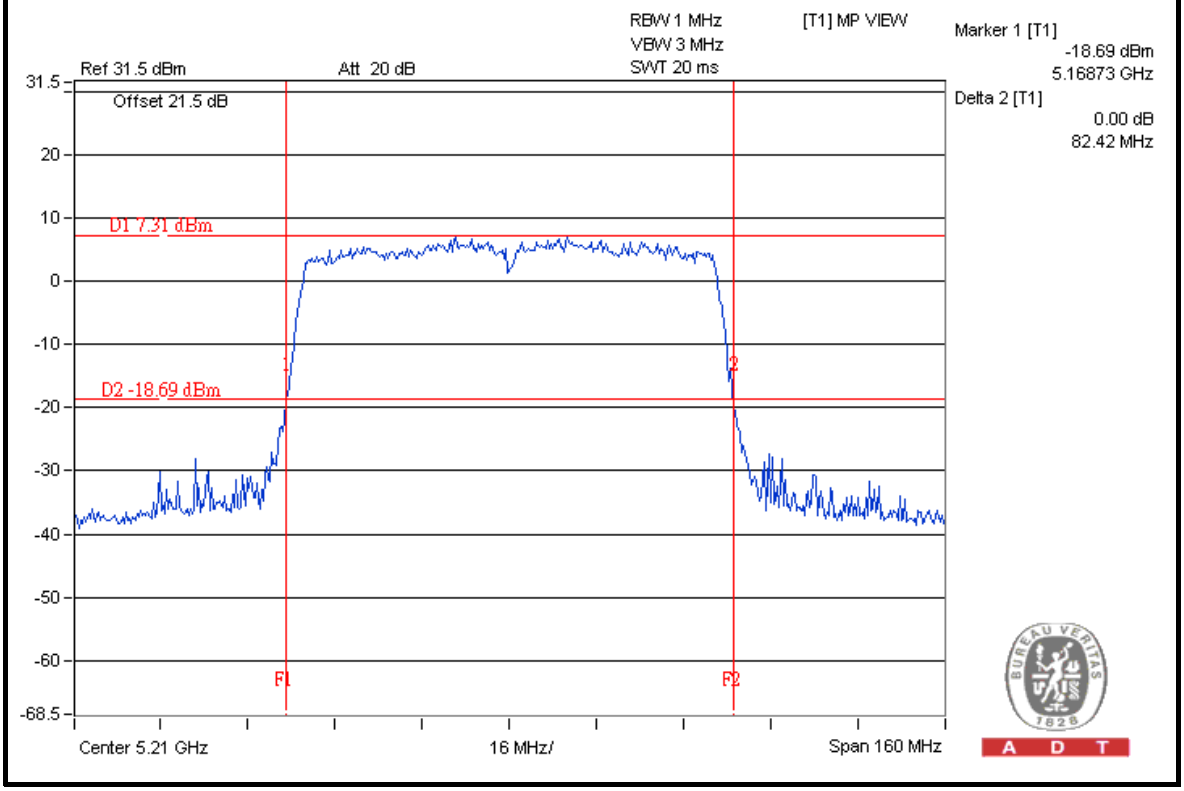
CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
42	5210	14.08	15.04	15.16	90.311	19.56	30.00	PASS

26dB OCCUPIED BANDWIDTH:

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		
		CHAIN 0	CHAIN 1	CHAIN 2
42	5210	82.42	82.61	82.70

SPECTRUM PLOT OF WORST VALUE

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



4.3.8 TEST RESULTS(MODE 2)

802.11ac (VHT20)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
36	5180	21.16	21.00	21.43	395.505	25.97	29.23	PASS
40	5200	21.71	21.30	21.75	432.772	26.36	29.23	PASS
48	5240	20.89	20.65	21.14	368.906	25.67	29.23	PASS

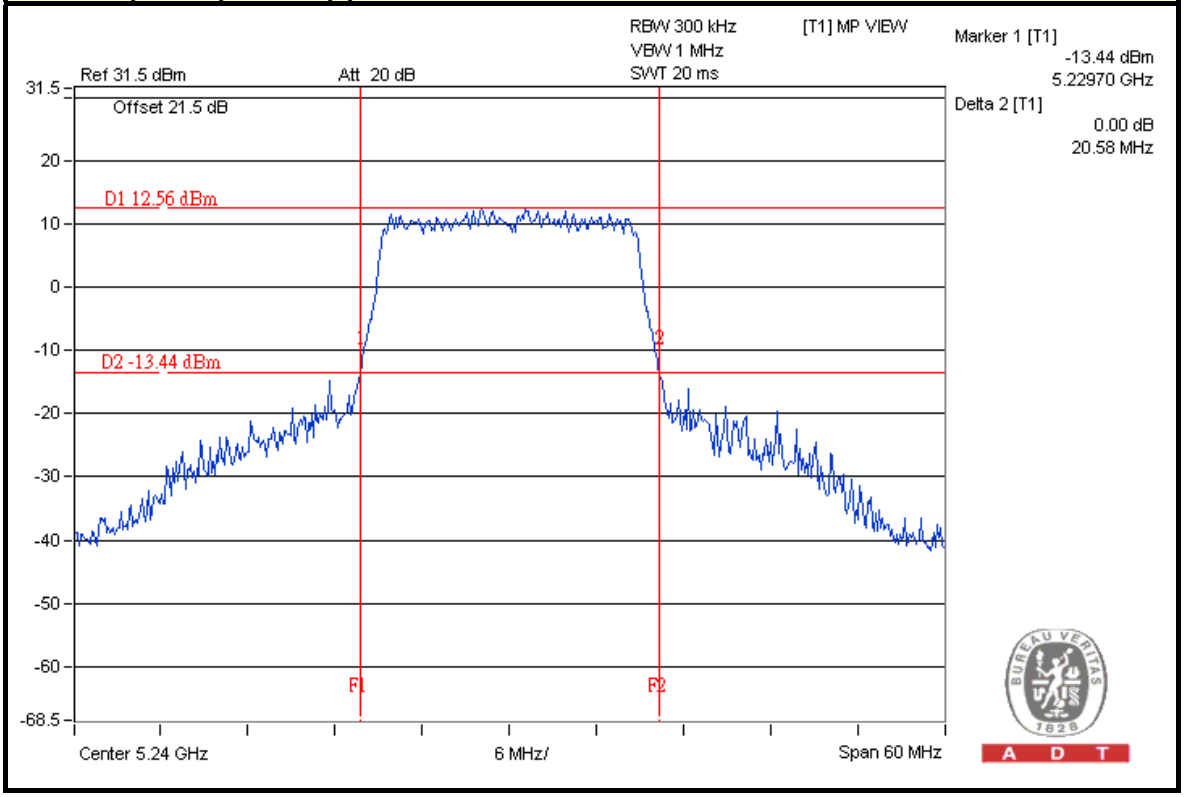
NOTE: 1. 5150~5250MHz: Directional gain = 2dBi + 10log(3) = 6.77dBi > 6dBi , so the power limit shall be reduced to 30-(6.77-6) =29.23dBm.

26dB OCCUPIED BANDWIDTH:

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		
		CHAIN 0	CHAIN 1	CHAIN 2
36	5180	21.81	21.55	22.88
40	5200	24.52	21.32	23.38
48	5240	21.73	20.58	22.39

SPECTRUM PLOT OF WORST VALUE

802.11ac (VHT20) / Chain(1) : CH48



802.11ac (VHT40)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
38	5190	17.38	17.06	17.93	167.605	22.24	29.23	PASS
46	5230	18.31	17.94	18.95	208.518	23.19	29.23	PASS

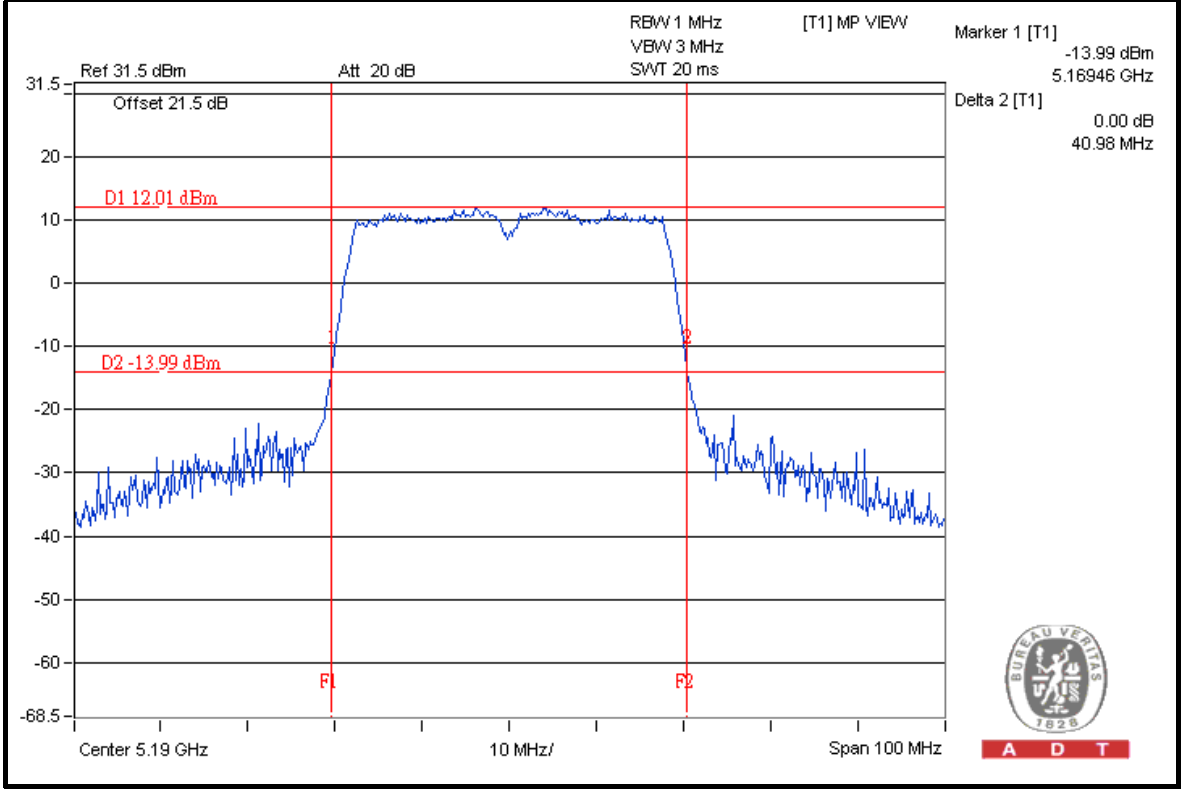
NOTE: 1. 5150~5250MHz: Directional gain = 2dBi + 10log(3) = 6.77dBi > 6dBi , so the power limit shall be reduced to 30-(6.77-6) =29.23dBm.

26dB OCCUPIED BANDWIDTH:

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		
		CHAIN 0	CHAIN 1	CHAIN 2
38	5190	41.28	40.98	41.31
46	5230	41.15	41.22	41.43

SPECTRUM PLOT OF WORST VALUE

802.11ac (VHT40) / Chain(1) : CH38



802.11ac (VHT80)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
42	5210	14.08	15.04	15.16	90.311	19.56	29.23	PASS

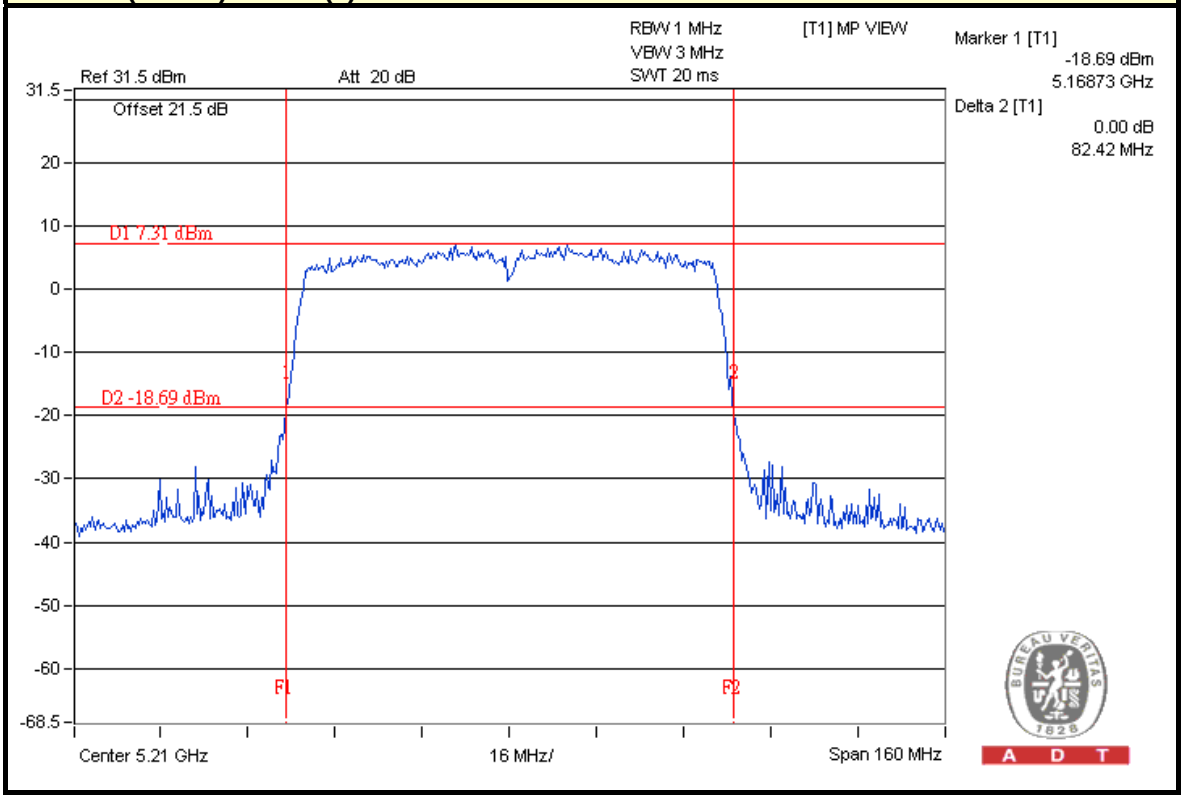
NOTE: 1. 5150~5250MHz: Directional gain = 2dBi + 10log(3) = 6.77dBi > 6dBi , so the power limit shall be reduced to 30-(6.77-6) =29.23dBm.

26dB OCCUPIED BANDWIDTH:

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		
		CHAIN 0	CHAIN 1	CHAIN 2
42	5210	82.42	82.61	82.70

SPECTRUM PLOT OF WORST VALUE

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



4.4 PEAK POWER SPECTRAL DENSITY MEASUREMENT

4.4.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT

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

4.4.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSV 40	100964	July 05, 2014	July 04, 2015

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date :Oct. 30, 2014

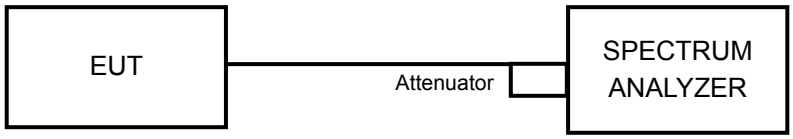
4.4.3 TEST PROCEDURES

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 1 MHz, Set VBW ≥ 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 for duty cycle of test signal is < 98% add 10 log (1/duty cycle)

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

Same as 4.3.6

4.4.7 TEST RESULTS (MODE 1)

802.11a

CHAN.	CHANNEL FREQUENCY (MHz)	PSD (dBm)			TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2			
36	5180	7.83	7.23	6.99	12.14	16.23	PASS
40	5200	7.59	6.87	6.95	11.92	16.23	PASS
48	5240	7.86	7.40	7.58	12.39	16.23	PASS

NOTE:
1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. 5150~5250MHz: Directional gain = 2dBi + 10log(3) = 6.77dBi > 6dBi , so the power density limit shall be reduced to 17-(6.77-6) =16.23dBm.

802.11ac (VHT20)

CHAN.	CHANNEL FREQUENCY (MHz)	PSD (dBm)			TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2			
36	5180	7.06	6.61	6.18	11.40	16.23	PASS
40	5200	7.69	7.25	6.80	12.03	16.23	PASS
48	5240	6.78	6.38	6.24	11.24	16.23	PASS

NOTE:
1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. 5150~5250MHz: Directional gain = 2dBi + 10log(3) = 6.77dBi > 6dBi , so the power density limit shall be reduced to 17-(6.77-6) =16.23dBm.

802.11ac (VHT40)

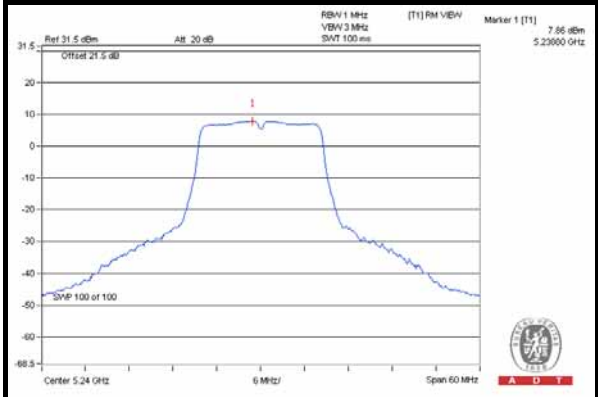
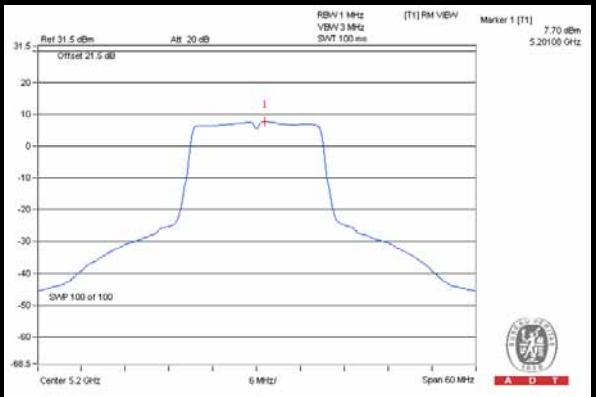
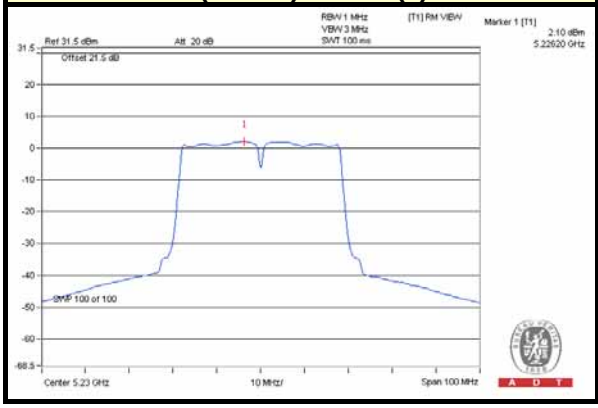
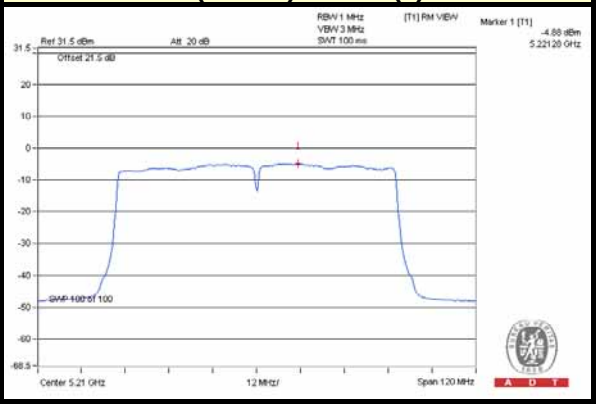
CHANNEL	CHANNEL FREQUENCY (MHz)	PSD W/O DUTY FACTOR (dBm)			DUTY FACTOR (dB)	TOTAL PSD WITH DUTY FACTOR (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
38	5190	1.02	0.53	0.27	0.11	5.50	16.23	PASS
46	5230	1.99	1.48	1.34	0.11	6.50	16.23	PASS

NOTE:
1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. 5150~5250MHz: Directional gain = 2dBi + 10log(3) = 6.77dBi > 6dBi , so the power density limit shall be reduced to 17-(6.77-6) =16.23dBm.
3. Refer to section 3.4 for duty cycle spectrum plot.

802.11ac (VHT80)

CHANNEL	CHANNEL FREQUENCY (MHz)	PSD W/O DUTY FACTOR (dBm)			DUTY FACTOR (dB)	TOTAL PSD WITH DUTY FACTOR (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
42	5210	-5.04	-5.66	-5.75	0.22	-0.48	16.23	PASS

NOTE:
1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. 5150~5250MHz: Directional gain = 2dBi + 10log(3) = 6.77dBi > 6dBi , so the power density limit shall be reduced to 17-(6.77-6) =16.23dBm.
3. Refer to section 3.4 for duty cycle spectrum plot.

SPECTRUM PLOT OF WORST VALUE	
802.11a / Chain(0) : CH48	**802.11ac (VHT20) / Chain(0) : CH40**
	
802.11ac (VHT40) / Chain(0) : CH46	**802.11ac (VHT80) / Chain(0) : CH42**
	

4.4.8 TEST RESULTS (MODE 2)

802.11ac (VHT20)

CHAN.	CHANNEL FREQUENCY (MHz)	PSD (dBm)			TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2			
36	5180	7.06	6.61	6.18	11.40	16.23	PASS
40	5200	7.69	7.25	6.80	12.03	16.23	PASS
48	5240	6.78	6.38	6.24	11.24	16.23	PASS

NOTE:
1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. 5150~5250MHz: Directional gain = 2dBi + 10log(3) = 6.77dBi > 6dBi , so the power density limit shall be reduced to 17-(6.77-6) =16.23dBm.

802.11ac (VHT40)

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				
38	5190	1.02	0.53	0.27	0.11	5.50	16.23	PASS
46	5230	1.99	1.48	1.34	0.11	6.50	16.23	

NOTE:
1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. 5150~5250MHz: Directional gain = 2dBi + 10log(3) = 6.77dBi > 6dBi , so the power density limit shall be reduced to 17-(6.77-6) =16.23dBm.
3. Refer to section 3.4 for duty cycle spectrum plot.

802.11ac (VHT80)

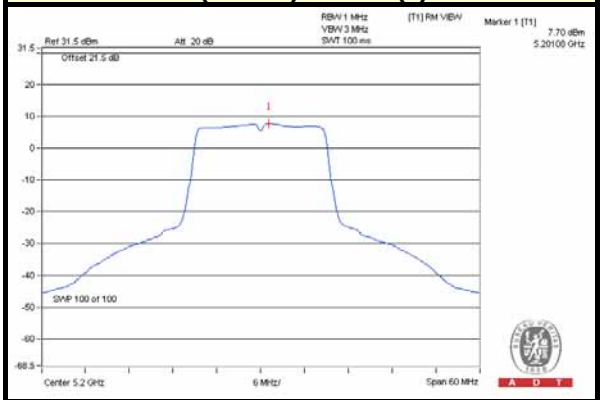
CHANNEL	CHANNEL FREQUENCY (MHz)	PSD W/O DUTY FACTOR (dBm)			DUTY FACTOR (dB)	TOTAL PSD WITH DUTY FACTOR (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
42	5210	-5.04	-5.66	-5.75	0.22	-0.48	16.23	PASS

NOTE:

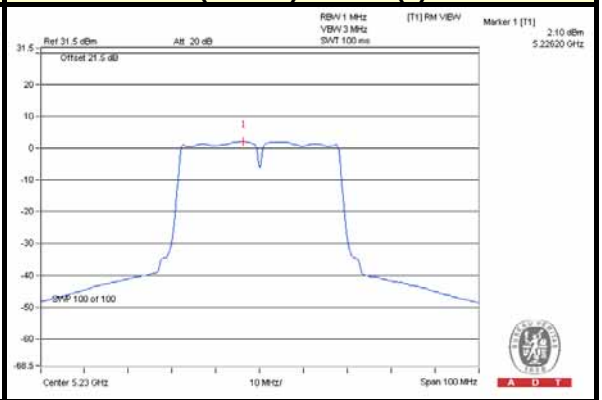
1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. 5150~5250MHz: Directional gain = 2dBi + 10log(3) = 6.77dBi > 6dBi , so the power density limit shall be reduced to 17-(6.77-6) =16.23dBm.
3. Refer to section 3.4 for duty cycle spectrum plot.

SPECTRUM PLOT OF WORST VALUE

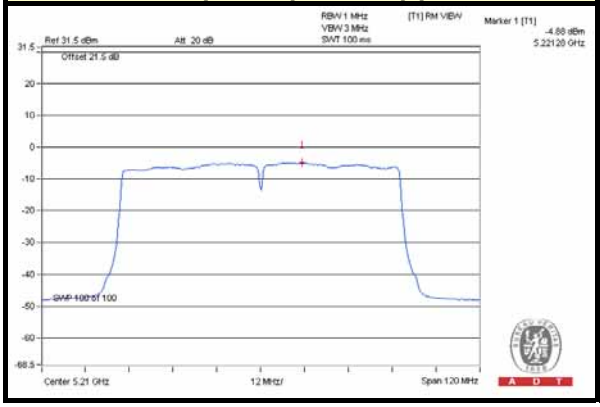
802.11ac (VHT20) / Chain(0) : CH40



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



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



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. 30, 2014

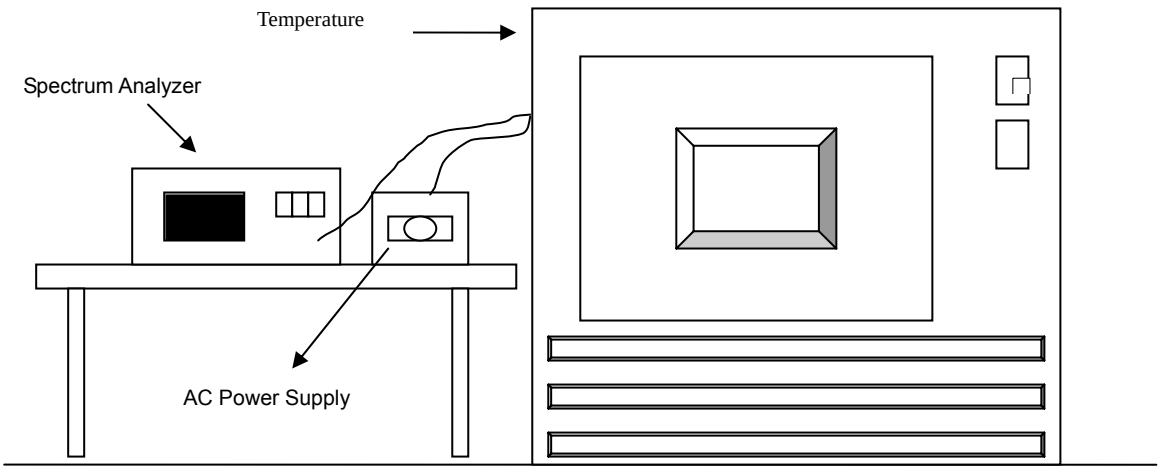
4.5.3 TEST PROCEDURE

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

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITION

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

4.5.7 TEST RESULTS

FREQUEMCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5240MHz									
TEMP. (℃)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	%	(MHz)	%	(MHz)	%	(MHz)	%
50	120	5240.017	0.00032	5240.0193	0.00037	5240.0184	0.00035	5240.0179	0.00034
40	120	5239.9987	-0.00002	5240.0005	0.00001	5239.998	-0.00004	5240.0017	0.00003
30	120	5240.0248	0.00047	5240.0251	0.00048	5240.0268	0.00051	5240.0251	0.00048
20	120	5240.017	0.00032	5240.0194	0.00037	5240.0212	0.00040	5240.0175	0.00033
10	120	5240.0248	0.00047	5240.0257	0.00049	5240.0265	0.00051	5240.0228	0.00044
0	120	5239.9786	-0.00041	5239.9794	-0.00039	5239.9765	-0.00045	5239.9754	-0.00047
-10	120	5240.0048	0.00009	5240.0076	0.00015	5240.0092	0.00018	5240.0064	0.00012
-20	120	5239.9922	-0.00015	5239.9955	-0.00009	5239.9927	-0.00014	5239.9923	-0.00015
-30	120	5239.9785	-0.00041	5239.9818	-0.00035	5239.9805	-0.00037	5239.9783	-0.00041

FREQUEMCY STABILITY VERSUS VOLTAGE									
OPERATING FREQUENCY: 5240MHz									
TEMP. (℃)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	%	(MHz)	%	(MHz)	%	(MHz)	%
20	138	5240.0176	0.00034	5240.0188	0.00036	5240.0207	0.00040	5240.0177	0.00034
	120	5240.017	0.00032	5240.0194	0.00037	5240.0212	0.00040	5240.0175	0.00033
	102	5240.017	0.00032	5240.0203	0.00039	5240.0204	0.00039	5240.0176	0.00034

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:

Linko EMC/RF Lab:
Tel: 886-2-26052180
Fax: 886-2-26052943

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

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

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

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

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

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

--- END ---