FCC TEST REPORT (15.407)

REPORT NO.:	RF141013E03-1
MODEL NO.:	C7000
FCC ID:	PY314300285
RECEIVED:	Oct. 13, 2014
TESTED:	Oct. 21 to Nov. 14, 2014
ISSUED:	Dec. 12, 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
RF141013E03-1	Original release	Dec. 12, 2014

1. CERTIFICATION

PRODUCT:	AC1900 WiFi Cable Modem Router
BRAND NAME:	NETGEAR
MODEL NO.:	C7000
TEST SAMPLE:	ENGINEERING SAMPLE
APPLICANT:	NETGEAR, Inc.
TESTED:	Oct. 21 to Nov. 14, 2014
STANDARDS:	**FCC Part 15, Subpart E (Section 15.407)**
	ANSI C63.10-2009

The above equipment (Model: C7000) 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. 12, 2014

(Midoli Peng, Specialist)

Approved by : _____ , **Date:** Dec. 12, 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 -8.80dB at 0.15781MHz
15.407 (b)(1/2/3/4/6)	Radiated Emissions & Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.6dB at 5148.00MHz
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 i-Pex 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 Cable Modem Router
MODEL NO.	C7000
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: 326.992mW 802.11ac (VHT20): 345.639mW 802.11ac (VHT40): 276.987mW 802.11ac (VHT80): 93.76mW **Beamforming Mode:** 802.11ac (VHT20): 345.639mW 802.11ac (VHT40): 276.987mW 802.11ac (VHT80): 93.76mW **For 15.247 (2.4GHz)** **CDD Mode:** 802.11b: 736.543mW 802.11g: 987.667mW VHT20: 996.326mW VHT40: 224.324mW **Beamforming Mode:** VHT20: 786.891mW VHT40: 224.324mW **For 15.247 (5GHz)** **CDD Mode:** 802.11a: 970.815mW 802.11ac (VHT20): 959.983mW 802.11ac (VHT40): 887.886mW 802.11ac (VHT80): 353.759mW **Beamforming Mode:** 802.11ac (VHT20): 687.638mW 802.11ac (VHT40): 665.617mW 802.11ac (VHT80): 353.759mW
ANTENNA TYPE	Refer to note as below
DATA CABLE	RJ-45 cable (Unshielded or Shielded, 1.5m) Coaxial cable (Shielded, 3m)
I/O PORTS	Refer to user's manual
ASSOCIATED DEVICES	Adapter x 1

Note:

1. 2.4GHz and 5GHz technology can transmit at same time.
2. The EUT must be supplied with a adapter, there are two different models could be chosen as following table:

No	Brand	Model No.	Spec.
1	NETGEAR	AD898F20	Input: 100-240V, 1.0A, 50-60Hz Output: 12V, 3.5A DC output cable (Unshielded, 1.8m)
2	NETGEAR	2AAF042F NA	Input: 100-240V, 1.5A, 50-60Hz Output: 12V, 3.5A DC output cable (Unshielded, 1.8m)

For radiated test, the EUT was pre-tested with above adapters, the worse case was found in **adapter 1**. Therefore only the test data of the adapter was recorded in this report.

3. The antennas provided to the EUT, please refer to the following table:

PCB Chain No.	Brand	Model	Antenna Gain(dBi) < including cable loss>	Frequency range (MHz ~ MHz)	Antenna Type	Connecter Type
Chain 0	Netgear	NA	2.0 2.8	2400~2483.5 5150~5850	Dipole	i-Pex
Chain 1	Netgear	NA	2.0 2.8	2400~2483.5 5150~5850	Dipole	i-Pex
Chain 2	Netgear	NA	2.0 2.8	2400~2483.5 5150~5850	Dipole	i-Pex

4. The EUT incorporates a MIMO function.

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

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.

CDD MODE					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11ac (VHT20)	36 to 48	36	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.

CDD MODE					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11ac (VHT20)	36 to 48	36	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.

CDD MODE					
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.

CDD MODE					
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
Beamforming MODE					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
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	23deg. C, 68%RH	120Vac, 60Hz	Tim Ho
RE≥1G	25deg. C, 70%RH	120Vac, 60Hz	Gary Cheng
APCM	25deg. C, 60%RH	120Vac, 60Hz	Anderson Chen

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.

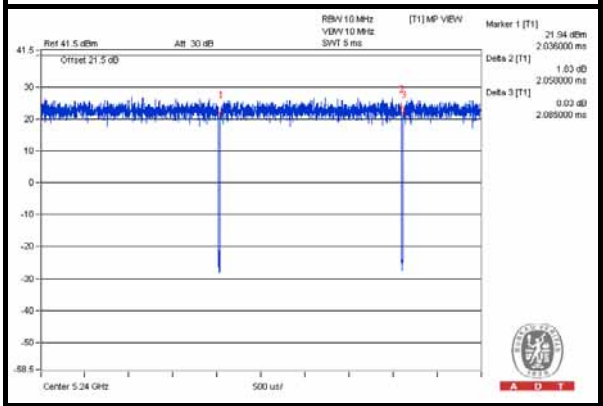
802.11a: Duty cycle = 2.058 ms/2.085 ms = 0.987

802.11ac(VHT20): Duty cycle = 1.914 ms/1.94 ms = 0.987

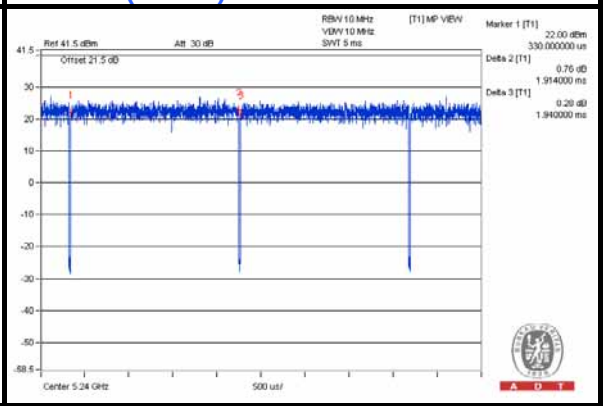
802.11ac(VHT40): Duty cycle = 0.938 ms/0.963 ms = 0.974, Duty factor = 10 * log(1/0.974) = 0.11

802.11ac(VHT80): Duty cycle = 0.451 ms/0.479 ms = 0.942, Duty factor = 10 * log(1/0.942) = 0.26

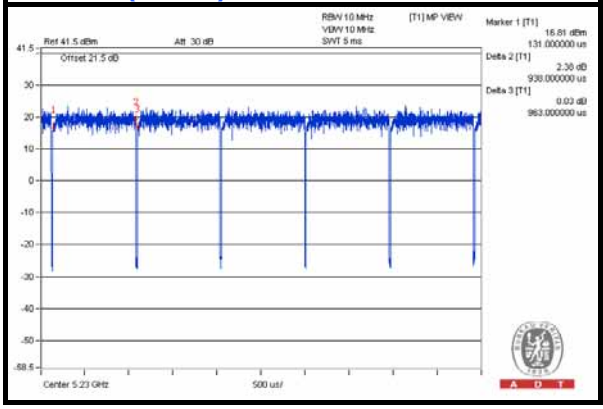
802.11a



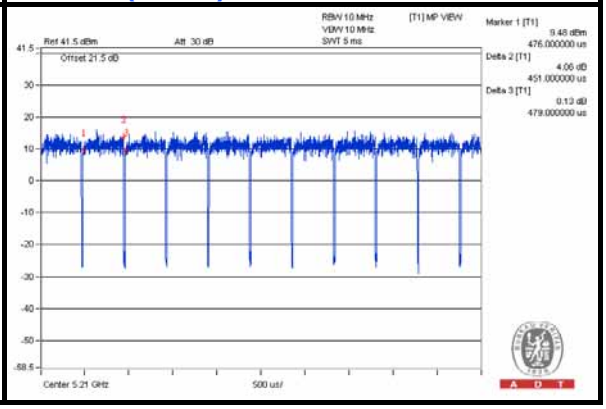
802.11ac (VHT20)



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.

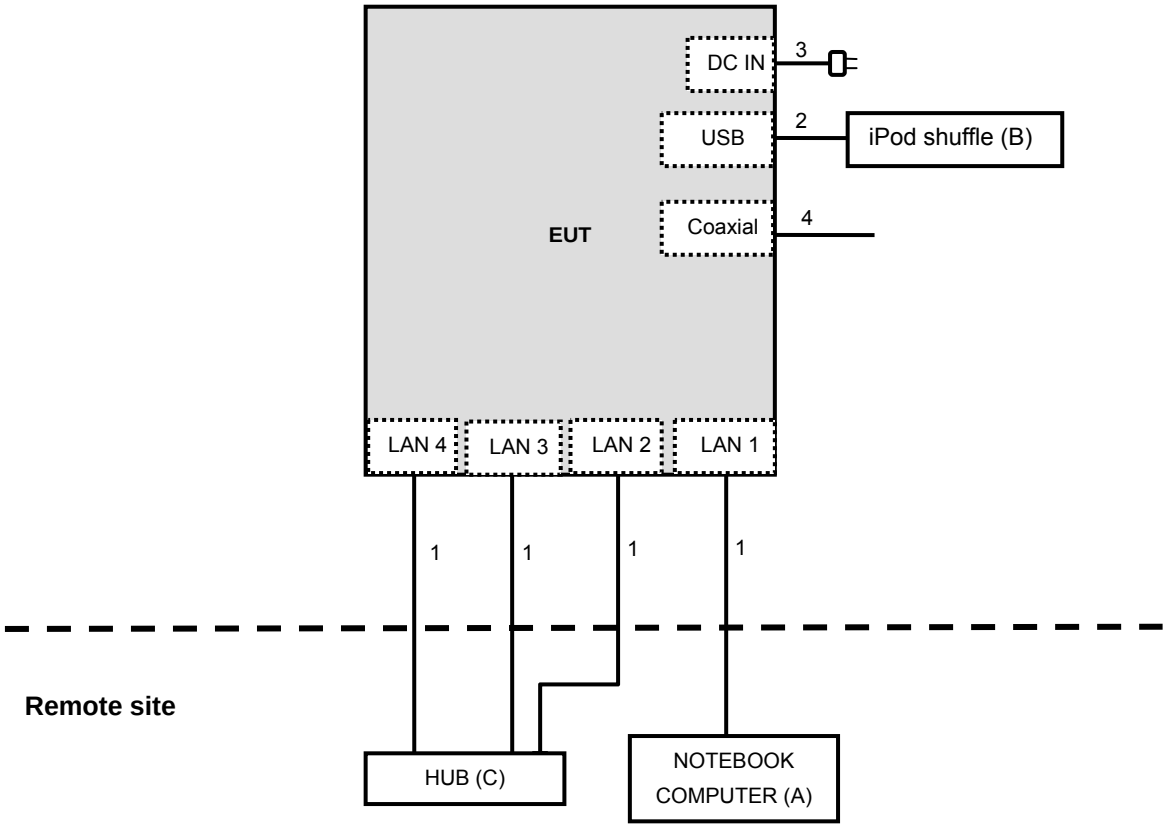
No.	Product	Brand	Model No.	Serial No.	FCC ID	Remark
A	NOTEBOOK COMPUTER	DELL	E6400	D814C A00 APCC	NA	Provided by Lab
B	iPod shuffle	Apple	MD778TA/A	CC4JMCMXF4T1	NA	Provided by Lab
C	HUB	ZyXEL	ES-116P	S060H02000215	FCC DoC	Provided by Lab

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	0.1	No	0	Provided by Lab
3	DC	1	1.8	No	0	Supplied by client
4	Coaxial	1	10	No	0	Provided by Lab

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

For mode 1 test

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	8127-522	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. 22, 2014	Sep. 21, 2015
50 ohms Terminator	N/A	EMC-02	Sep. 30, 2014	Sep. 29, 2015
Software ADT	BV ADT_Cond_V7.3.7.3	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
3 The VCCI Con C Registration No. is C-3611.
4 Tested Date: Oct. 21, 2014

For mode 2 test

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	8127-522	Sep. 15, 2014	Sep. 14, 2015
Line-Impedance Stabilization Network (for Peripheral) ROHDE & SCHWARZ	ENV216	100071	Nov. 11, 2014	Nov. 10, 2015
RF Cable (JYEBAO)	5DFB	COCCAB-001	Mar. 10 , 2014	Mar. 09, 2015
50 ohms Terminator	N/A	EMC-03	Sep. 22, 2014	Sep. 21, 2015
50 ohms Terminator	N/A	EMC-02	Sep. 30, 2014	Sep. 29, 2015
Software ADT	BV ADT_Cond_V7.3.7.3	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
3 The VCCI Con C Registration No. is C-3611.
4 Tested Date: Nov. 14, 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.

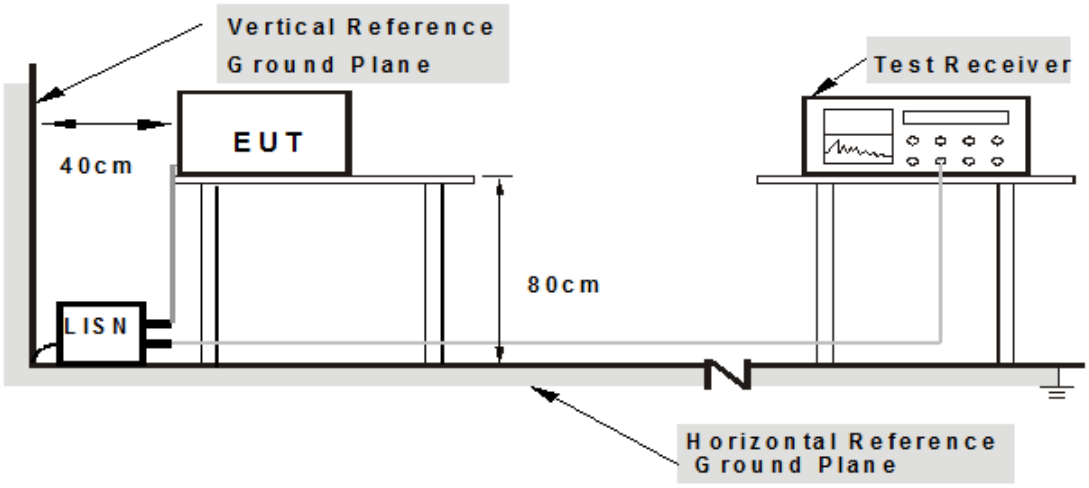
NOTE:

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 [2.0.1.0])” to enable EUT under transmission/receiving condition continuously.

4.1.7 TEST RESULTS (MODE 1)

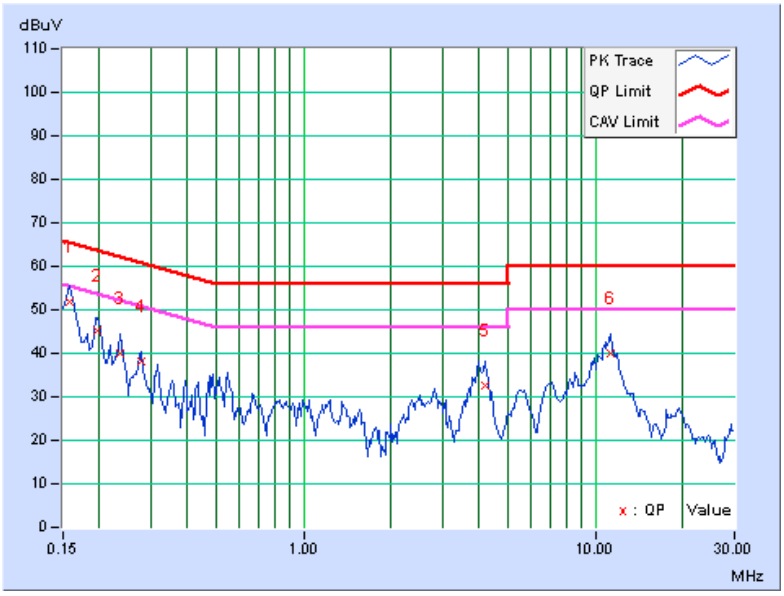
CDD MODE

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	51.61	45.81	51.68	45.88	65.58	55.58	-13.90	-9.70
2	0.19687	0.07	44.99	38.70	45.06	38.77	63.74	53.74	-18.68	-14.97
3	0.23594	0.07	39.81	33.64	39.88	33.71	62.24	52.24	-22.35	-18.52
4	0.27891	0.08	37.96	32.88	38.04	32.96	60.85	50.85	-22.81	-17.89
5	4.21875	0.26	32.40	24.53	32.66	24.79	56.00	46.00	-23.34	-21.21
6	11.30469	0.49	39.62	34.58	40.11	35.07	60.00	50.00	-19.89	-14.93

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

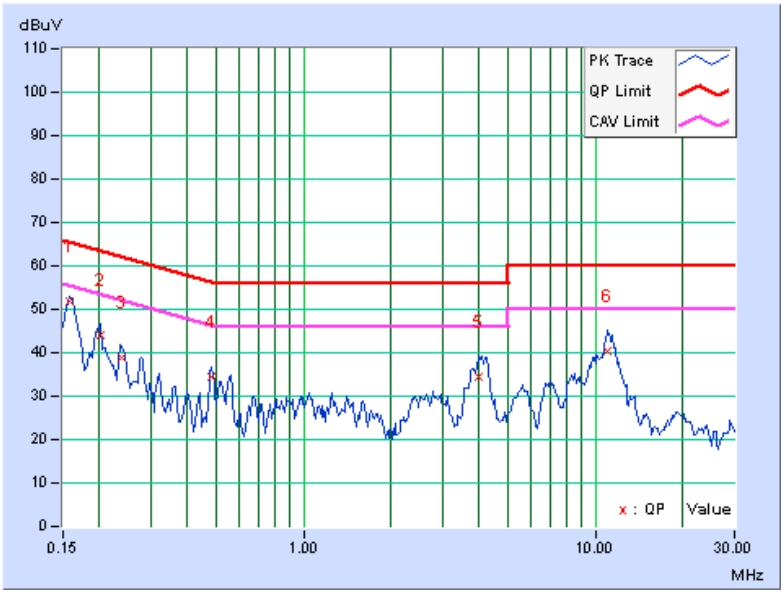


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

	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	0.15781	0.06	51.61	45.02	51.67	45.08	65.58	55.58	-13.90	-10.49
2	0.20078	0.06	43.94	37.96	44.00	38.02	63.58	53.58	-19.58	-15.56
3	0.23984	0.07	38.93	33.64	39.00	33.71	62.10	52.10	-23.11	-18.40
4	0.48203	0.10	34.22	30.97	34.32	31.07	56.30	46.30	-21.99	-15.24
5	3.98047	0.26	34.00	26.00	34.26	26.26	56.00	46.00	-21.74	-19.74
6	11.06250	0.49	39.76	34.87	40.25	35.36	60.00	50.00	-19.75	-14.64

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



4.1.8 TEST RESULTS (MODE 2)

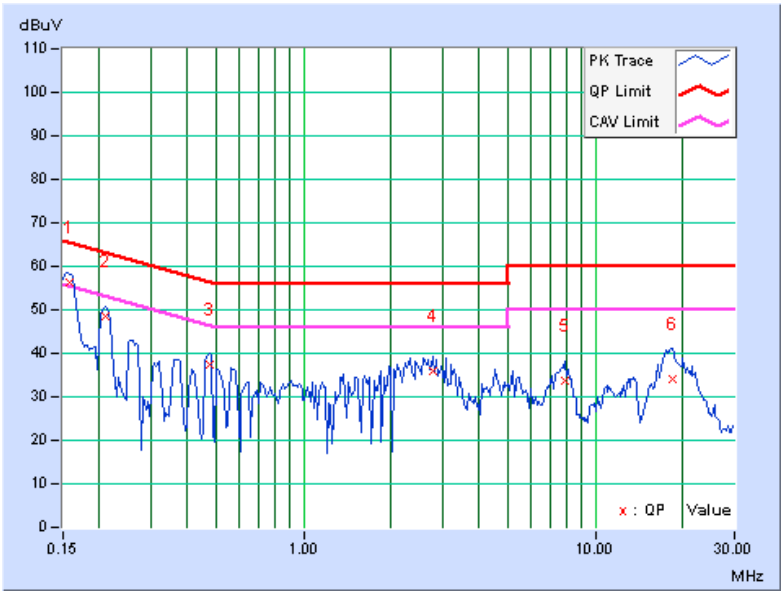
CDD MODE

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**	**56.12**	**46.71**	**56.19**	**46.78**	**65.58**	**55.58**	**-9.39**	**-8.80**
2	0.20859	0.07	48.31	39.87	48.38	39.94	63.26	53.26	-14.88	-13.32
3	0.47813	0.10	37.40	32.76	37.50	32.86	56.37	46.37	-18.88	-13.52
4	2.77344	0.21	35.55	25.59	35.76	25.80	56.00	46.00	-20.24	-20.20
5	7.86719	0.38	33.24	25.99	33.62	26.37	60.00	50.00	-26.38	-23.63
6	18.35547	0.66	33.41	25.53	34.07	26.19	60.00	50.00	-25.93	-23.81

REMARKS:

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

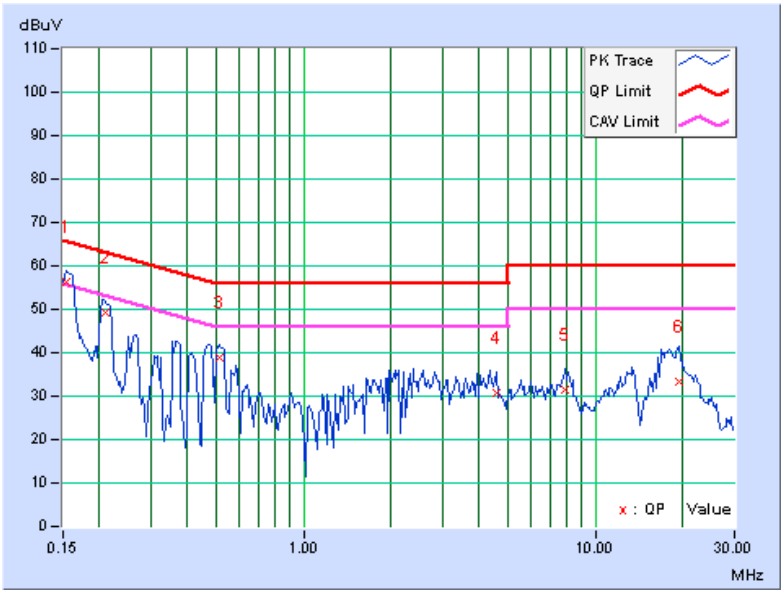


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

	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	0.15391	0.06	56.16	44.25	56.22	44.31	65.79	55.79	-9.56	-11.47
2	0.20859	0.06	49.10	40.40	49.16	40.46	63.26	53.26	-14.10	-12.80
3	0.51328	0.10	38.62	27.57	38.72	27.67	56.00	46.00	-17.28	-18.33
4	4.57031	0.28	30.53	19.34	30.81	19.62	56.00	46.00	-25.19	-26.38
5	7.89844	0.39	31.24	23.99	31.63	24.38	60.00	50.00	-28.37	-25.62
6	19.26172	0.72	32.53	23.63	33.25	24.35	60.00	50.00	-26.75	-25.65

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:

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. 05, 2014	Oct. 04, 2015
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: Oct. 22, 2014

For Above 1GHz:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY51210105	July 21, 2014	July 20, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 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
Horn_Antenna AISI	AIH.8018	0000320091110	Aug. 27, 2014	Aug. 26, 2015
Pre-Amplifier Agilent	8449B	3008A02578	June 24, 2014	June 23, 2015
RF Cable	NA	131205 131214 SNMY23684/4	Jan. 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
Antenna Tower & Turn Table CT	NA	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3 The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
5 The VCCI Site Registration No. is G-137.
6 The CANADA Site Registration No. is IC 7450H-2.
7 Tested Date: Nov. 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:

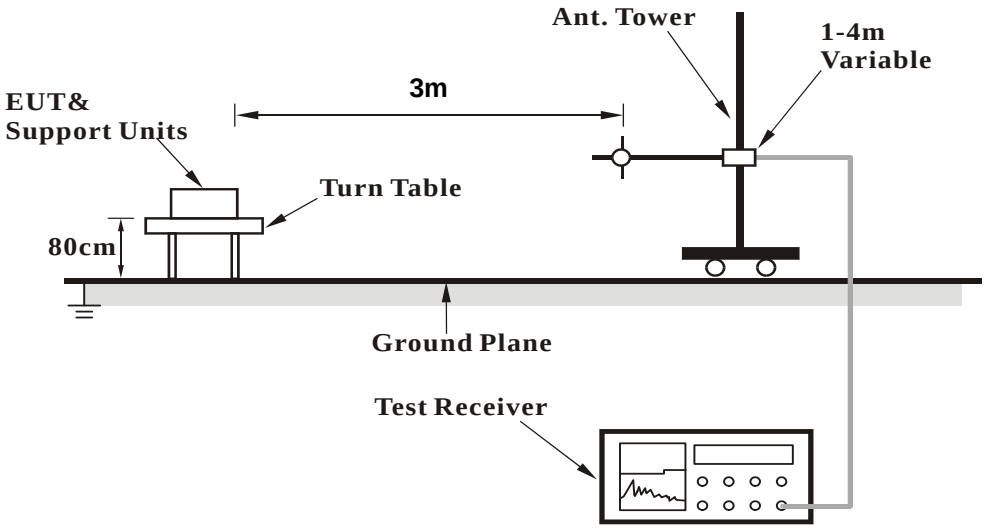
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

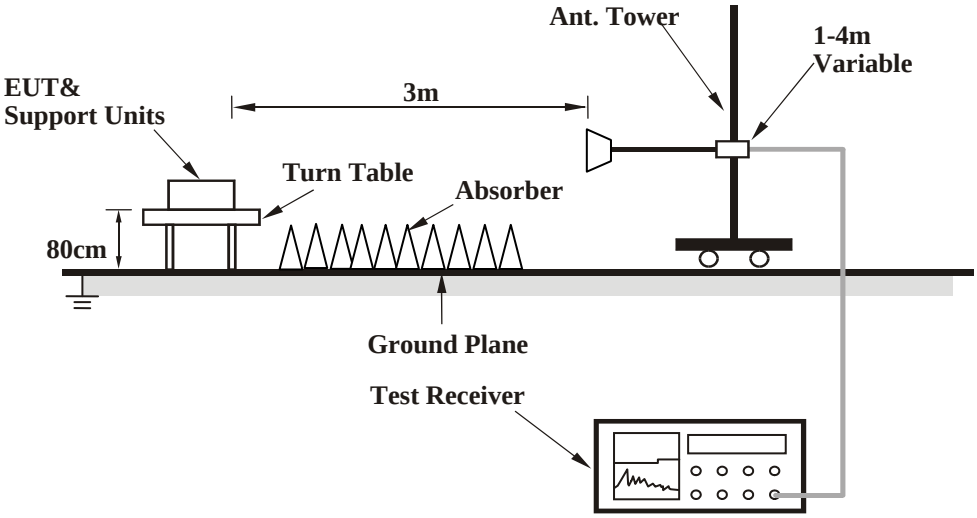
No deviation

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

CDD MODE

BELOW 1GHz WORST-CASE DATA

802.11ac (VHT20)

CHANNEL	TX Channel 36	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	Below 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	374.98	36.4 QP	46.0	-9.6	1.00 H	29	46.54	-10.15
2	500.01	36.5 QP	46.0	-9.5	2.00 H	345	43.73	-7.19
3	625.00	41.4 QP	46.0	-4.7	1.00 H	104	45.65	-4.30
4	749.98	39.7 QP	46.0	-6.3	1.00 H	102	41.69	-1.97
5	875.02	41.4 QP	46.0	-4.6	1.50 H	342	41.79	-0.36
6	1000.00	40.8 QP	54.0	-13.2	1.50 H	360	39.12	1.65
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	33.98	33.2 QP	40.0	-6.8	1.00 V	360	47.43	-14.25
2	51.17	32.5 QP	40.0	-7.5	1.50 V	0	45.95	-13.42
3	375.03	37.2 QP	46.0	-8.8	1.50 V	13	47.36	-10.15
4	500.01	37.6 QP	46.0	-8.4	1.00 V	210	44.80	-7.19
5	625.00	39.2 QP	46.0	-6.8	1.50 V	111	43.54	-4.30
6	875.02	40.7 QP	46.0	-5.3	2.00 V	174	41.03	-0.36

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) 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	3670.50	51.3 PK	74.0	-22.7	1.02 H	13	49.96	1.34
2	3670.50	47.3 AV	54.0	-6.7	1.02 H	13	45.96	1.34
3	5000.00	51.3 PK	74.0	-22.7	1.10 H	69	44.88	6.42
4	5000.00	42.4 AV	54.0	-11.6	1.10 H	69	35.98	6.42
5	5103.00	59.3 PK	74.0	-14.7	1.04 H	100	52.74	6.56
6	5103.00	50.3 AV	54.0	-3.7	1.04 H	100	43.74	6.56
7	5105.00	67.2 PK	74.0	-6.8	1.06 H	38	60.63	6.57
8	5105.00	51.4 AV	54.0	-2.6	1.06 H	38	44.83	6.57
9	*5180.00	119.0 PK			1.04 H	108	112.05	6.95
10	*5180.00	109.7 AV			1.04 H	108	102.75	6.95
11	5419.00	54.6 PK	74.0	-19.4	1.32 H	321	46.82	7.78
12	5419.00	46.2 AV	54.0	-7.8	1.32 H	321	38.42	7.78
13	#10360.00	54.8 PK	74.0	-19.2	1.11 H	100	41.69	13.11
14	#10360.00	42.8 AV	54.0	-11.2	1.11 H	100	29.69	13.11
15	15540.00	60.0 PK	74.0	-14.0	1.00 H	95	41.31	18.69
16	15540.00	47.9 AV	54.0	-6.1	1.00 H	95	29.21	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	3670.50	52.5 PK	74.0	-21.5	1.13 V	261	51.16	1.34
2	3670.50	48.2 AV	54.0	-5.8	1.13 V	261	46.86	1.34
3	5000.00	52.6 PK	74.0	-21.4	1.13 V	280	46.18	6.42
4	5000.00	43.5 AV	54.0	-10.5	1.13 V	280	37.08	6.42
5	5103.00	60.4 PK	74.0	-13.6	1.14 V	251	53.84	6.56
6	5103.00	51.1 AV	54.0	-2.9	1.14 V	251	44.54	6.56
7	5105.00	68.5 PK	74.0	-5.5	1.12 V	77	61.93	6.57
8	5105.00	52.7 AV	54.0	-1.3	1.12 V	77	46.13	6.57
9	*5180.00	120.1 PK			1.12 V	77	113.15	6.95
10	*5180.00	111.2 AV			1.12 V	77	104.25	6.95
11	5419.00	55.3 PK	74.0	-18.7	1.46 V	276	47.52	7.78
12	5419.00	47.7 AV	54.0	-6.3	1.46 V	276	39.92	7.78
13	#10360.00	53.5 PK	74.0	-20.5	1.09 V	77	40.39	13.11
14	#10360.00	41.9 AV	54.0	-12.1	1.09 V	77	28.79	13.11
15	15540.00	58.7 PK	74.0	-15.3	1.00 V	125	40.01	18.69
16	15540.00	47.4 AV	54.0	-6.6	1.00 V	125	28.71	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	3670.50	51.3 PK	74.0	-22.7	1.02 H	63	49.96	1.34
2	3670.50	46.4 AV	54.0	-7.6	1.02 H	63	45.06	1.34
3	5000.00	54.2 PK	74.0	-19.8	1.10 H	104	47.78	6.42
4	5000.00	45.2 AV	54.0	-8.8	1.10 H	104	38.78	6.42
5	5122.60	57.9 PK	74.0	-16.1	1.07 H	103	51.24	6.66
6	5122.60	48.1 AV	54.0	-5.9	1.07 H	103	41.44	6.66
7	*5200.00	117.2 PK			1.07 H	99	110.15	7.05
8	*5200.00	108.1 AV			1.07 H	99	101.05	7.05
9	5416.70	59.1 PK	74.0	-14.9	1.00 H	90	51.34	7.76
10	5416.70	49.8 AV	54.0	-4.2	1.00 H	90	42.04	7.76
11	#10400.00	56.8 PK	74.0	-17.2	1.08 H	90	43.58	13.22
12	#10400.00	45.0 AV	54.0	-9.0	1.08 H	90	31.78	13.22
13	15600.00	61.2 PK	74.0	-12.8	1.00 H	105	42.50	18.70
14	15600.00	50.1 AV	54.0	-3.9	1.00 H	105	31.40	18.70

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	3670.50	52.1 PK	74.0	-21.9	1.12 V	262	50.76	1.34
2	3670.50	47.3 AV	54.0	-6.7	1.12 V	262	45.96	1.34
3	5000.00	57.4 PK	74.0	-16.6	1.17 V	282	50.98	6.42
4	5000.00	50.1 AV	54.0	-3.9	1.17 V	282	43.68	6.42
5	5122.60	59.5 PK	74.0	-14.5	1.02 V	249	52.84	6.66
6	5122.60	49.8 AV	54.0	-4.2	1.02 V	249	43.14	6.66
7	*5200.00	118.7 PK			1.02 V	242	111.65	7.05
8	*5200.00	109.8 AV			1.02 V	242	102.75	7.05
9	5416.70	58.2 PK	74.0	-15.8	1.00 V	360	50.44	7.76
10	5416.70	48.7 AV	54.0	-5.3	1.00 V	360	40.94	7.76
11	#10400.00	55.4 PK	74.0	-18.6	1.10 V	62	42.18	13.22
12	#10400.00	43.6 AV	54.0	-10.4	1.10 V	62	30.38	13.22
13	15600.00	61.3 PK	74.0	-12.7	1.00 V	126	42.60	18.70
14	15600.00	49.6 AV	54.0	-4.4	1.00 V	126	30.90	18.70

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": 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	117.8 PK			1.06 H	102	110.64	7.16
2	*5240.00	108.6 AV			1.06 H	102	101.44	7.16
3	5458.30	56.3 PK	74.0	-17.7	1.06 H	106	48.40	7.90
4	5458.30	49.3 AV	54.0	-4.7	1.06 H	106	41.40	7.90
5	#5895.10	54.4 PK	74.0	-19.6	1.06 H	132	45.57	8.83
6	#5895.10	47.3 AV	54.0	-6.7	1.06 H	132	38.47	8.83
7	#10480.00	56.5 PK	74.0	-17.5	1.04 H	88	43.34	13.16
8	#10480.00	44.7 AV	54.0	-9.3	1.04 H	88	31.54	13.16
9	15720.00	60.6 PK	74.0	-13.4	1.03 H	114	42.20	18.40
10	15720.00	49.6 AV	54.0	-4.4	1.03 H	114	31.20	18.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	119.7 PK			1.00 V	249	112.54	7.16
2	*5240.00	110.3 AV			1.00 V	249	103.14	7.16
3	5458.30	57.9 PK	74.0	-16.1	1.00 V	241	50.00	7.90
4	5458.30	50.6 AV	54.0	-3.4	1.00 V	241	42.70	7.90
5	#5895.10	55.3 PK	74.0	-18.7	1.08 V	71	46.47	8.83
6	#5895.10	48.6 AV	54.0	-5.4	1.08 V	71	39.77	8.83
7	#10480.00	55.3 PK	74.0	-18.7	1.14 V	68	42.14	13.16
8	#10480.00	43.5 AV	54.0	-10.5	1.14 V	68	30.34	13.16
9	15720.00	61.7 PK	74.0	-12.3	1.00 V	122	43.30	18.40
10	15720.00	49.8 AV	54.0	-4.2	1.00 V	122	31.40	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	5098.40	58.3 PK	74.0	-15.7	1.08 H	126	51.75	6.55
2	5098.40	48.3 AV	54.0	-5.7	1.08 H	126	41.75	6.55
3	5150.00	66.5 PK	74.0	-7.5	1.06 H	121	59.70	6.80
4	5150.00	51.4 AV	54.0	-2.6	1.06 H	121	44.60	6.80
5	*5180.00	116.4 PK			1.06 H	121	109.45	6.95
6	*5180.00	106.2 AV			1.06 H	121	99.25	6.95
7	#10360.00	53.3 PK	74.0	-20.7	1.17 H	114	40.19	13.11
8	#10360.00	41.0 AV	54.0	-13.0	1.17 H	114	27.89	13.11
9	15540.00	59.3 PK	74.0	-14.7	1.02 H	153	40.61	18.69
10	15540.00	47.8 AV	54.0	-6.2	1.02 H	153	29.11	18.69
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5098.40	60.2 PK	74.0	-13.8	1.13 V	253	53.65	6.55
2	5098.40	50.3 AV	54.0	-3.7	1.13 V	253	43.75	6.55
3	5150.00	67.3 PK	74.0	-6.7	1.11 V	254	60.50	6.80
4	5150.00	53.0 AV	54.0	-1.0	1.11 V	254	46.20	6.80
5	*5180.00	119.8 PK			1.11 V	254	112.85	6.95
6	*5180.00	109.9 AV			1.11 V	254	102.95	6.95
7	#10360.00	53.3 PK	74.0	-20.7	1.02 V	101	40.19	13.11
8	#10360.00	40.1 AV	54.0	-13.9	1.02 V	101	26.99	13.11
9	15540.00	60.0 PK	74.0	-14.0	1.00 V	99	41.31	18.69
10	15540.00	48.2 AV	54.0	-5.8	1.00 V	99	29.51	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	3618.00	50.3 PK	74.0	-23.7	1.02 H	62	49.22	1.08
2	3618.00	45.3 AV	54.0	-8.7	1.02 H	62	44.22	1.08
3	5119.00	57.6 PK	74.0	-16.4	1.02 H	100	50.95	6.65
4	5119.00	47.6 AV	54.0	-6.4	1.02 H	100	40.95	6.65
5	*5200.00	115.9 PK			1.09 H	112	108.85	7.05
6	*5200.00	106.0 AV			1.09 H	112	98.95	7.05
7	#10400.00	53.4 PK	74.0	-20.6	1.14 H	98	40.18	13.22
8	#10400.00	41.0 AV	54.0	-13.0	1.14 H	98	27.78	13.22
9	15600.00	59.2 PK	74.0	-14.8	1.00 H	143	40.50	18.70
10	15600.00	47.9 AV	54.0	-6.1	1.00 H	143	29.20	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	3618.00	52.0 PK	74.0	-22.0	1.13 V	255	50.92	1.08
2	3618.00	46.9 AV	54.0	-7.1	1.13 V	255	45.82	1.08
3	5119.00	58.8 PK	74.0	-15.2	1.13 V	254	52.15	6.65
4	5119.00	49.2 AV	54.0	-4.8	1.13 V	254	42.55	6.65
5	*5200.00	119.7 PK			1.10 V	254	112.65	7.05
6	*5200.00	109.9 AV			1.10 V	254	102.85	7.05
7	#10400.00	53.2 PK	74.0	-20.8	1.05 V	93	39.98	13.22
8	#10400.00	39.9 AV	54.0	-14.1	1.05 V	93	26.68	13.22
9	15600.00	59.2 PK	74.0	-14.8	1.05 V	97	40.50	18.70
10	15600.00	47.7 AV	54.0	-6.3	1.05 V	97	29.00	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	5150.00	54.0 PK	74.0	-20.0	1.03 H	146	47.20	6.80
2	5150.00	47.0 AV	54.0	-7.0	1.03 H	146	40.20	6.80
3	*5240.00	115.5 PK			1.13 H	97	108.34	7.16
4	*5240.00	105.5 AV			1.13 H	97	98.34	7.16
5	5358.20	59.2 PK	74.0	-14.8	1.02 H	85	51.66	7.54
6	5358.20	48.2 AV	54.0	-5.8	1.02 H	85	40.66	7.54
7	5458.40	55.9 PK	74.0	-18.1	1.10 H	94	48.00	7.90
8	5458.40	48.8 AV	54.0	-5.2	1.10 H	94	40.90	7.90
9	#5895.10	53.8 PK	74.0	-20.2	1.07 H	147	44.97	8.83
10	#5895.10	46.9 AV	54.0	-7.1	1.07 H	147	38.07	8.83
11	#10480.00	53.5 PK	74.0	-20.5	1.16 H	92	40.34	13.16
12	#10480.00	41.0 AV	54.0	-13.0	1.16 H	92	27.84	13.16
13	15720.00	59.2 PK	74.0	-14.8	1.00 H	159	40.80	18.40
14	15720.00	47.8 AV	54.0	-6.2	1.00 H	159	29.40	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	5150.00	55.6 PK	74.0	-18.4	1.05 V	69	48.80	6.80
2	5150.00	48.5 AV	54.0	-5.5	1.05 V	69	41.70	6.80
3	*5240.00	120.6 PK			1.09 V	254	113.44	7.16
4	*5240.00	109.9 AV			1.09 V	254	102.74	7.16
5	5358.20	61.5 PK	74.0	-12.5	1.07 V	250	53.96	7.54
6	5358.20	49.6 AV	54.0	-4.4	1.07 V	250	42.06	7.54
7	5458.40	58.5 PK	74.0	-15.5	1.07 V	240	50.60	7.90
8	5458.40	51.6 AV	54.0	-2.4	1.07 V	240	43.70	7.90
9	#5895.10	55.9 PK	74.0	-18.1	1.06 V	72	47.07	8.83
10	#5895.10	48.9 AV	54.0	-5.1	1.06 V	72	40.07	8.83
11	#10480.00	52.8 PK	74.0	-21.2	1.08 V	81	39.64	13.16
12	#10480.00	39.4 AV	54.0	-14.6	1.08 V	81	26.24	13.16
13	15720.00	59.8 PK	74.0	-14.2	1.06 V	101	41.40	18.40
14	15720.00	48.1 AV	54.0	-5.9	1.06 V	101	29.70	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) 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	5148.00	68.4 PK	74.0	-5.6	1.01 H	113	61.61	6.79
2	5148.00	51.4 AV	54.0	-2.6	1.01 H	113	44.61	6.79
3	*5190.00	107.2 PK			1.01 H	113	100.20	7.00
4	*5190.00	100.6 AV			1.01 H	113	93.60	7.00
5	#10380.00	53.1 PK	74.0	-20.9	1.23 H	95	39.93	13.17
6	#10380.00	41.7 AV	54.0	-12.3	1.23 H	95	28.53	13.17
7	15570.00	58.9 PK	74.0	-15.1	1.16 H	154	40.21	18.69
8	15570.00	47.5 AV	54.0	-6.5	1.16 H	154	28.81	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	5148.00	70.1 PK	74.0	-3.9	1.11 V	253	63.31	6.79
2	**5148.00**	**53.4 AV**	**54.0**	**-0.6**	**1.11 V**	**253**	**46.61**	**6.79**
3	*5190.00	111.2 PK			1.00 V	248	104.20	7.00
4	*5190.00	104.5 AV			1.00 V	248	97.50	7.00
5	#10380.00	53.1 PK	74.0	-20.9	1.01 V	143	39.93	13.17
6	#10380.00	39.4 AV	54.0	-14.6	1.01 V	143	26.23	13.17
7	15570.00	58.9 PK	74.0	-15.1	1.01 V	111	40.21	18.69
8	15570.00	47.3 AV	54.0	-6.7	1.01 V	111	28.61	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	5150.00	58.2 PK	74.0	-15.8	1.02 H	114	51.40	6.80
2	5150.00	46.3 AV	54.0	-7.7	1.02 H	114	39.50	6.80
3	*5230.00	113.2 PK			1.02 H	114	106.08	7.12
4	*5230.00	104.2 AV			1.02 H	114	97.08	7.12
5	5350.00	55.4 PK	74.0	-18.6	1.02 H	114	47.91	7.49
6	5350.00	44.3 AV	54.0	-9.7	1.02 H	114	36.81	7.49
7	#10460.00	52.8 PK	74.0	-21.2	1.20 H	91	39.62	13.18
8	#10460.00	41.3 AV	54.0	-12.7	1.20 H	91	28.12	13.18
9	15690.00	58.5 PK	74.0	-15.5	1.11 H	170	40.12	18.38
10	15690.00	47.4 AV	54.0	-6.6	1.11 H	170	29.02	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	5150.00	60.1 PK	74.0	-13.9	1.00 V	250	53.30	6.80
2	5150.00	47.6 AV	54.0	-6.4	1.00 V	250	40.80	6.80
3	*5230.00	117.1 PK			1.00 V	250	109.98	7.12
4	*5230.00	108.6 AV			1.00 V	250	101.48	7.12
5	5350.00	57.0 PK	74.0	-17.0	1.00 V	250	49.51	7.49
6	5350.00	46.1 AV	54.0	-7.9	1.00 V	250	38.61	7.49
7	#10460.00	53.6 PK	74.0	-20.4	1.03 V	127	40.42	13.18
8	#10460.00	39.7 AV	54.0	-14.3	1.03 V	127	26.52	13.18
9	15690.00	59.3 PK	74.0	-14.7	1.02 V	118	40.92	18.38
10	15690.00	47.6 AV	54.0	-6.4	1.02 V	118	29.22	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	5148.00	68.6 PK	74.0	-5.4	1.06 H	200	61.81	6.79
2	5148.00	51.3 AV	54.0	-2.7	1.06 H	200	44.51	6.79
3	*5210.00	112.6 PK			1.04 H	276	105.54	7.06
4	*5210.00	102.9 AV			1.04 H	276	95.84	7.06
5	5350.00	54.7 PK	74.0	-19.3	1.06 H	160	47.21	7.49
6	5350.00	47.4 AV	54.0	-6.6	1.06 H	160	39.91	7.49
7	#10420.00	52.3 PK	74.0	-21.7	1.19 H	114	39.10	13.20
8	#10420.00	40.7 AV	54.0	-13.3	1.19 H	114	27.50	13.20
9	15630.00	58.5 PK	74.0	-15.5	1.09 H	195	39.90	18.60
10	15630.00	47.3 AV	54.0	-6.7	1.09 H	195	28.70	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	5148.00	70.0 PK	74.0	-4.0	1.12 V	253	63.21	6.79
2	5148.00	53.0 AV	54.0	-1.0	1.12 V	253	46.21	6.79
3	*5210.00	108.5 PK			1.00 V	250	101.44	7.06
4	*5210.00	103.1 AV			1.00 V	250	96.04	7.06
5	5350.00	55.4 PK	74.0	-18.6	1.11 V	81	47.91	7.49
6	5350.00	48.2 AV	54.0	-5.8	1.11 V	81	40.71	7.49
7	#10420.00	53.6 PK	74.0	-20.4	1.06 V	133	40.40	13.20
8	#10420.00	39.8 AV	54.0	-14.2	1.06 V	133	26.60	13.20
9	15630.00	59.6 PK	74.0	-14.4	1.02 V	126	41.00	18.60
10	15630.00	48.1 AV	54.0	-5.9	1.02 V	126	29.50	18.60

REMARKS:

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

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 :Nov. 12 to 14, 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 :Nov. 12 to 14, 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

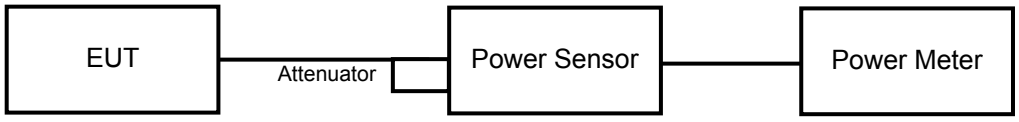
1. Set RBW = approximately 1% of the emission bandwidth.
2. Set the VBW > RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement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

4.3.4 DEVIATION FROM TEST STANDARD

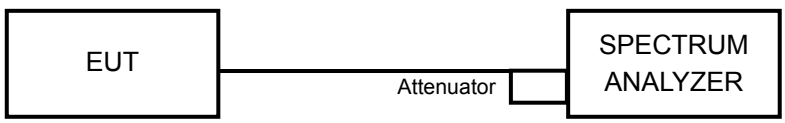
No deviation

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.

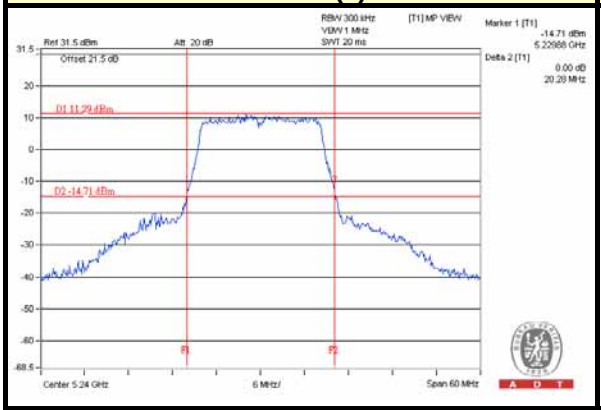
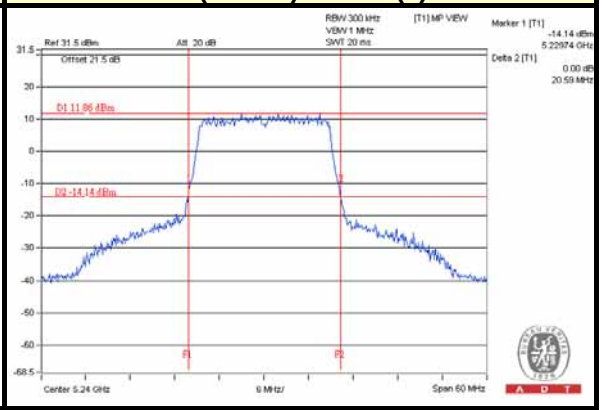
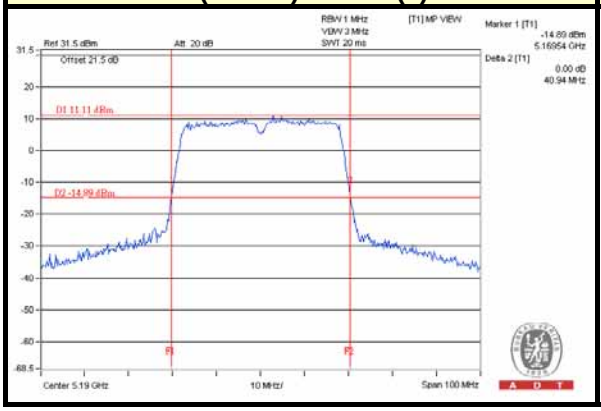
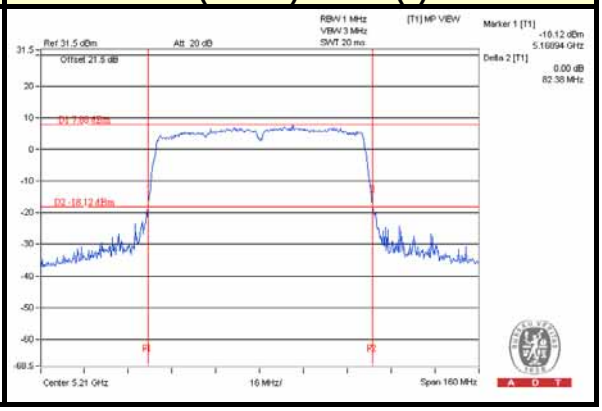
4.3.7 TEST RESULTS

POWER OUTPUT:

CDD MODE								
CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
802.11a								
36	5180	20.79	20.10	20.20	326.992	25.15	30.00	PASS
40	5200	20.00	19.83	19.72	289.917	24.62	30.00	PASS
48	5240	20.08	20.17	19.82	301.791	24.80	30.00	PASS
802.11ac (VHT20)								
36	5180	20.50	20.78	20.56	345.639	25.39	30.00	PASS
40	5200	20.16	20.25	20.18	313.91	24.97	30.00	PASS
48	5240	19.85	19.95	19.87	292.511	24.66	30.00	PASS
802.11ac (VHT40)								
38	5190	17.40	15.95	16.03	134.396	21.28	30.00	PASS
46	5230	19.65	19.68	19.63	276.987	24.42	30.00	PASS
802.11ac (VHT80)								
42	5210	15.14	14.89	14.81	93.76	19.72	30.00	PASS

26dB OCCUPIED BANDWIDTH:

CDD MODE				
CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		
		CHAIN 0	CHAIN 1	CHAIN 2
802.11a				
36	5180	20.56	20.58	20.58
40	5200	20.60	20.68	20.60
48	5240	20.63	20.28	20.51
802.11ac (VHT20)				
36	5180	21.04	20.61	20.66
40	5200	20.91	20.69	20.77
48	5240	20.80	20.59	20.84
802.11ac (VHT40)				
38	5190	41.35	40.95	40.94
46	5230	41.48	41.25	41.08
802.11ac (VHT80)				
42	5210	82.38	82.47	82.38

CDD MODE	
SPECTRUM PLOT OF WORST VALUE	
802.11a / Chain(1) : CH48	802.11ac (VHT20) / Chain(1) : CH48
	
802.11ac (VHT40) / Chain(2) : CH38	802.11ac (VHT80) / Chain(0) : CH42
	

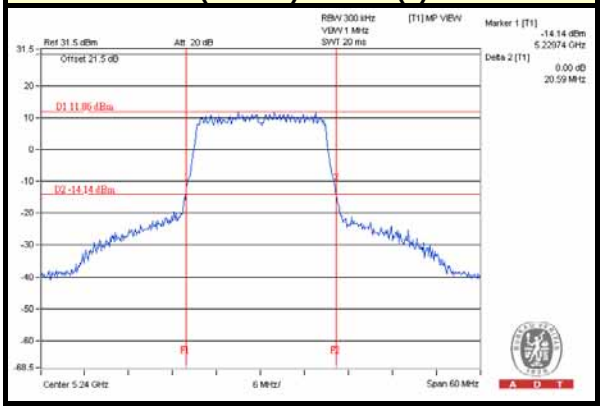
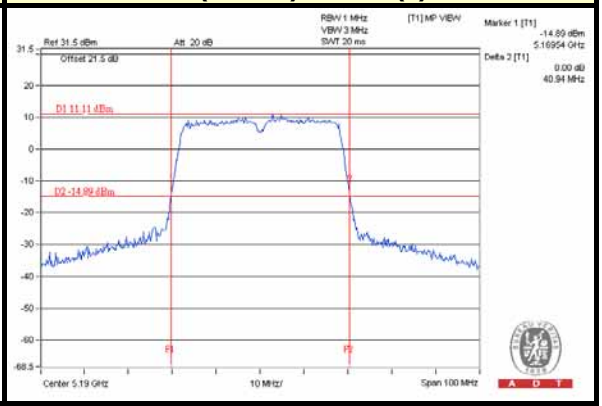
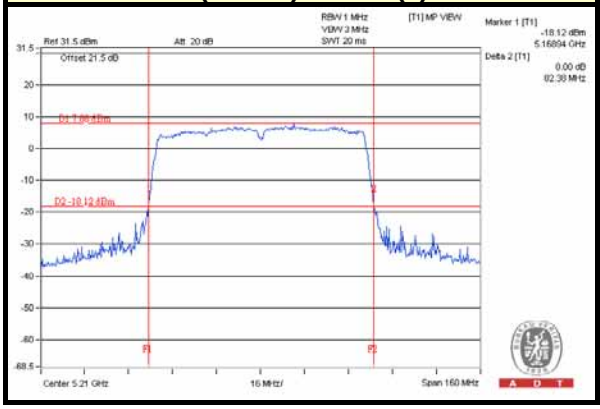
POWER OUTPUT:

Beamforming MODE								
CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
802.11ac (VHT20)								
36	5180	20.50	20.78	20.56	345.639	25.39	28.43	PASS
40	5200	20.16	20.25	20.18	313.91	24.97	28.43	PASS
48	5240	19.85	19.95	19.87	292.511	24.66	28.43	PASS
802.11ac (VHT40)								
38	5190	17.40	15.95	16.03	134.396	21.28	28.43	PASS
46	5230	19.65	19.68	19.63	276.987	24.42	28.43	PASS
802.11ac (VHT80)								
42	5210	15.14	14.89	14.81	93.76	19.72	28.43	PASS

Note : 1. Directional gain = 2.8dBi + 10log(3) = 7.57dBi > 6dBi , so the power limit shall be reduced to 30-(7.57-6) = 28.43dBm.

26dB OCCUPIED BANDWIDTH:

Beamforming MODE				
CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		
		CHAIN 0	CHAIN 1	CHAIN 2
802.11ac (VHT20)				
36	5180	21.04	20.61	20.66
40	5200	20.91	20.69	20.77
48	5240	20.80	20.59	20.84
802.11ac (VHT40)				
38	5190	41.35	40.95	40.94
46	5230	41.48	41.25	41.08
802.11ac (VHT80)				
42	5210	82.38	82.47	82.38

Beamforming MODE	
SPECTRUM PLOT OF WORST VALUE	
802.11ac (VHT20) / Chain(1) : CH48	802.11ac (VHT40) / Chain(2) : CH38
	
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 :Nov. 12 to 14, 2014

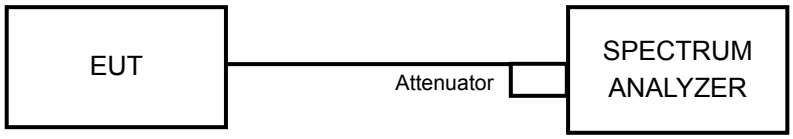
4.4.3 TEST PROCEDURES

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

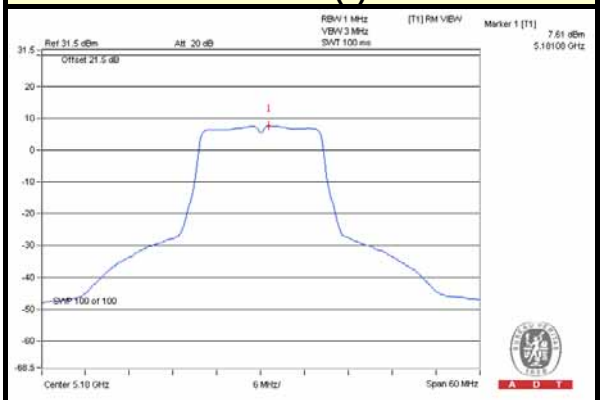
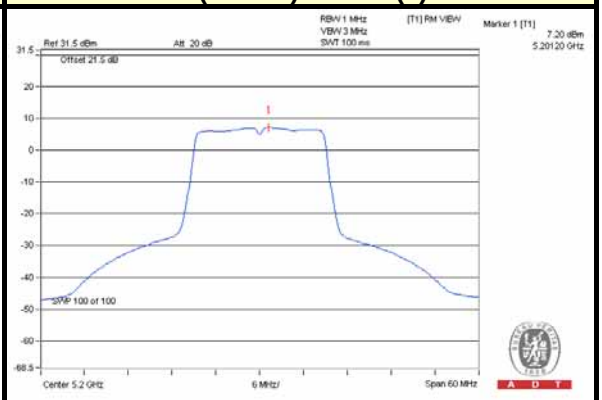
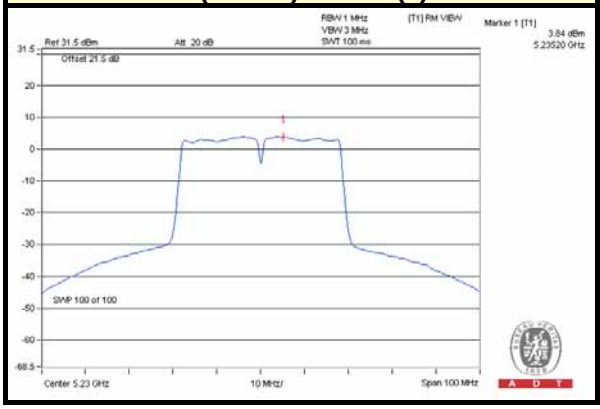
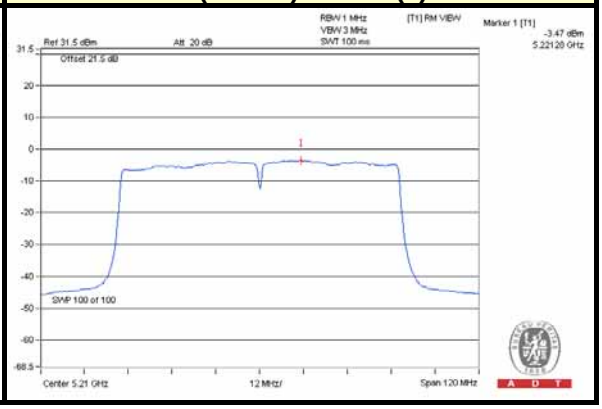
4.4.7 TEST RESULTS

CDD MODE							
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	7.61	6.11	6.74	11.64	15.43	PASS
40	5200	7.60	6.12	6.72	11.63	15.43	PASS
48	5240	7.38	5.69	6.48	11.34	15.43	PASS
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	7.10	5.41	5.93	10.98	15.43	PASS
40	5200	7.20	5.71	6.11	11.16	15.43	PASS
48	5240	6.96	5.85	5.94	11.05	15.43	PASS
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	0.24	-1.05	-1.29	0.11	4.24	15.43	PASS
46	5230	3.80	2.54	3.13	0.11	8.07	15.43	PASS
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	-3.47	-4.71	-4.88	0.26	0.72	15.43	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. Directional gain = 2.8dBi + 10log(3) = 7.57dBi > 6dBi , so the power density limit shall be reduced to 17-(7.57-6) = 15.43dBm.

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

CDD MODE	
SPECTRUM PLOT OF WORST VALUE	
802.11a / Chain(0) : CH36	802.11ac (VHT20) / Chain(0) : CH40
	
802.11ac (VHT40) / Chain(0) : CH46	802.11ac (VHT80) / Chain(0) : CH42
	

Beamforming MODE							
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	7.10	5.41	5.93	10.98	15.43	PASS
40	5200	7.20	5.71	6.11	11.16	15.43	PASS
48	5240	6.96	5.85	5.94	11.05	15.43	PASS

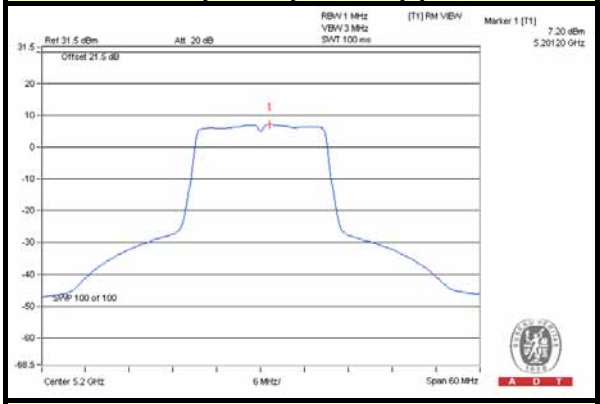
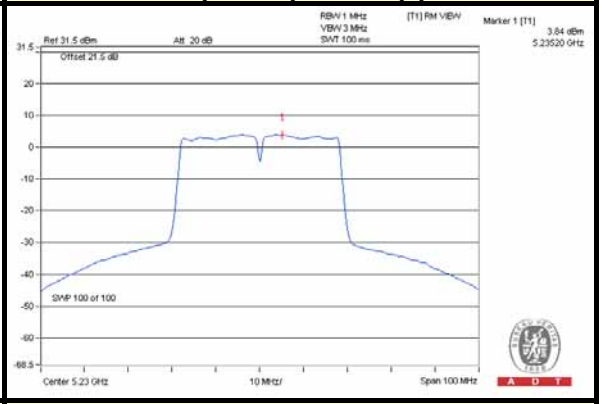
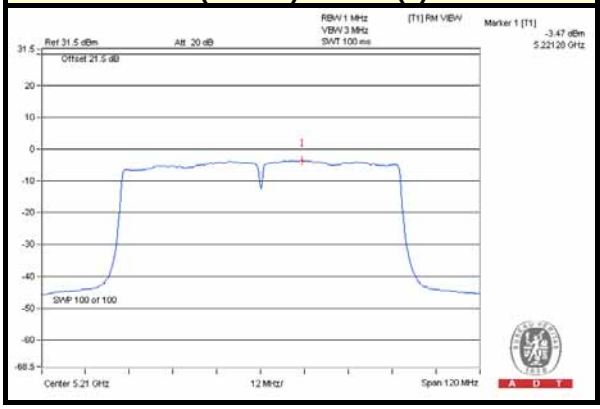
802.11ac (VHT40)								
CHANNEL	CHANNEL FREQUENCY (MHz)	PSD W/O DUTY FACTOR (dBm)			DUTY FACTOR (dB)	TOTAL PSD WITH DUTY FACTOR (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
38	5190	0.24	-1.05	-1.29	0.11	4.24	15.43	PASS
46	5230	3.80	2.54	3.13	0.11	8.07	15.43	PASS

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	-3.47	-4.71	-4.88	0.26	0.72	15.43	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. Directional gain = 2.8dBi + 10log(3) = 7.57dBi > 6dBi , so the power density limit shall be reduced to 17-(7.57-6) = 15.43dBm.

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

Beamforming MODE	
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 :Nov. 12, 2014

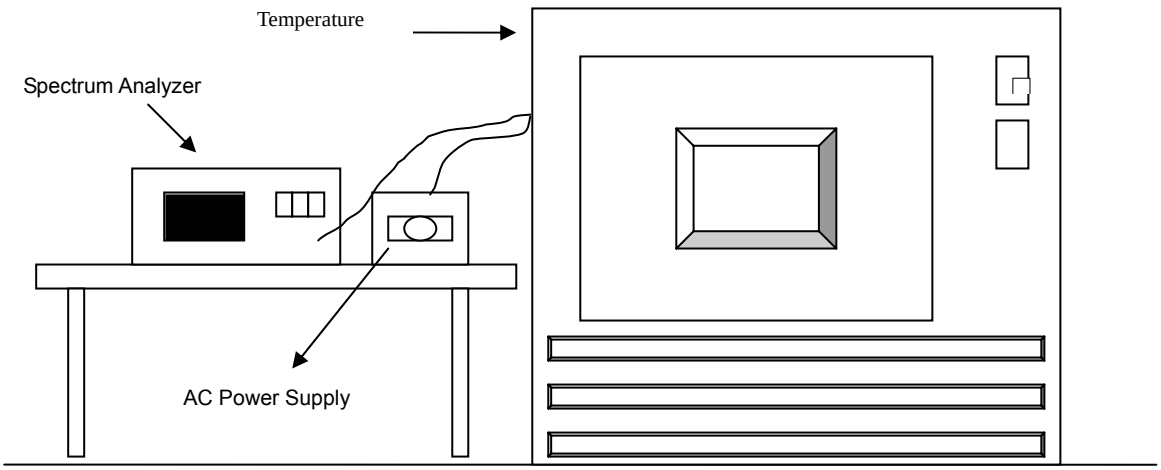
4.5.3 TEST PROCEDURE

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	5240.0004	0.00001	5240.0031	0.00006	5240.0017	0.00003	5239.9996	-0.00001
40	120	5240.0149	0.00028	5240.0158	0.00030	5240.0132	0.00025	5240.0158	0.00030
30	120	5240.0009	0.00002	5240.0015	0.00003	5240.0009	0.00002	5240.0002	0.00000
20	120	5239.9869	-0.00025	5239.9878	-0.00023	5239.9883	-0.00022	5239.9897	-0.00020
10	120	5239.9763	-0.00045	5239.977	-0.00044	5239.9741	-0.00049	5239.9732	-0.00051
0	120	5239.9744	-0.00049	5239.9773	-0.00043	5239.9758	-0.00046	5239.9739	-0.00050
-10	120	5239.9801	-0.00038	5239.9807	-0.00037	5239.982	-0.00034	5239.9799	-0.00038
-20	120	5239.9845	-0.00030	5239.9885	-0.00022	5239.9886	-0.00022	5239.9857	-0.00027
-30	120	5239.9842	-0.00030	5239.9842	-0.00030	5239.9832	-0.00032	5239.9825	-0.00033

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	5239.9871	-0.00025	5239.9878	-0.00023	5239.9886	-0.00022	5239.99	-0.00019
	120	5239.9869	-0.00025	5239.9878	-0.00023	5239.9883	-0.00022	5239.9897	-0.00020
	102	5239.9874	-0.00024	5239.9878	-0.00023	5239.989	-0.00021	5239.9889	-0.00021

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 ---