



FCC TEST REPORT (15.407)

REPORT NO.: RF141106E03-1

MODEL NO.: C6250

FCC ID: PY314300292

RECEIVED: Oct. 06, 2014

TESTED: Nov. 13 to 19, 2014

ISSUED: Dec. 19, 2014

APPLICANT: NETGEAR, Inc.

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

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RELEASE CONTROL RECORD

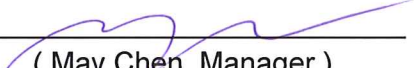
ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF141106E03-1	Original release	Dec. 19, 2014

1. CERTIFICATION

PRODUCT: Wireless Cable Gateway
BRAND NAME: NETGEAR
MODEL NO.: C6250
TEST SAMPLE: ENGINEERING SAMPLE
APPLICANT: NETGEAR, Inc.
TESTED: Nov. 13 to 19, 2014
STANDARDS: FCC Part 15, Subpart E (Section 15.407)
ANSI C63.10-2009

The above equipment (Model: C6250) 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. 19, 2014
(Claire Kuan, Specialist)

Approved by :  , **Date:** Dec. 19, 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 Under New Rule)			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
15.407(b)(6)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -5.93dB at 0.40000MHz
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 5150.00MHz & 5399.20MHz
15.407(a/1/2/3)	Transmit Power	PASS	Meet the requirement of limit.
15.407(a/1/2/3)	Peak Power Spectral Density	PASS	Meet the requirement of limit.
15.407(g)	Frequency Stability	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is i-pex(MHF) not a standard connector.

NOTE: 1. 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	Wireless Cable Gateway
MODEL NO.	C6250
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
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) 7 for 802.11n (HT40) 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: 295.272mW Beamforming Mode: 802.11ac (VHT20): 318.911mW 802.11ac (VHT40): 372.052mW 802.11ac (VHT80): 63.742mW For 15.247 (2.4GHz) 802.11b: 78.163mW 802.11g: 144.901mW 802.11n (HT20): 120.989mW 802.11n (HT40): 35.396mW For 15.247 (5GHz) CDD Mode: 802.11a: 594.541mW Beamforming Mode: 802.11ac (VHT20): 596.397mW 802.11ac (VHT40): 583.372mW 802.11ac (VHT80): 119.576mW
ANTENNA TYPE	Refer to note as below
DATA CABLE	RJ-45 cable (Unshielded or Shielded, 1.5m)
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 emission of the simultaneous operation (2.4GHz & 5GHz) has been evaluated and no non-compliance was found.
3. 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	P030WF120B	Input: 100-240V, 1.0A, 50-60Hz Output: 12V, 2.5A DC output cable (Unshielded, 1.8m)
2	NETGEAR	SAS030F1 NA	Input: 100-120V, 0.9A, 47-63Hz Output: 12V, 2.5A 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.

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

2.4GHz							
PCB Chain No.	Brand	Model	Antenna Gain(dBi) < including cable loss>	Frequency range	Antenna Type	Connector Type	Cable Length (mm)
Chain 0	Netgear	NA	3.8	2.4~2.4835 GHz	PCB	i-pex(MHF)	125
Chain 1	Netgear	NA	3.3	2.4~2.4835 GHz	PCB	i-pex(MHF)	250
5GHz							
PCB Chain No.	Brand	Model	Antenna Gain(dBi) < including cable loss>	Frequency range	Antenna Type	Connector Type	Cable Length (mm)
Chain 0	Netgear	NA	3.5	5.15~5.85 GHz	PCB	i-pex(MHF)	113
Chain 1	Netgear	NA	3.6	5.15~5.85 GHz	PCB	i-pex(MHF)	125
Chain 2	Netgear	NA	2.8	5.15~5.85 GHz	PCB	i-pex(MHF)	75

5. The EUT incorporates a MIMO function.

2.4GHz			
MODULATION MODE	DATA RATE (MCS)	TX / RX CONFIGURATION	
802.11b	1 ~ 11Mbps	1TX (Fixed Chain 1)	1RX
802.11g	6 ~ 54Mbps	2TX	2RX
802.11n (HT20) & 802.11n (HT40)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
5GHz			
MODULATION MODE	DATA RATE (MCS)	TX / RX CONFIGURATION	
802.11a	6 ~ 54Mbps	3TX	3RX
802.11n (HT20) & 802.11n (HT40)	MCS 0~7	3TX	3RX
	MCS 8~15	3TX	3RX
	MCS 16~23	3TX	3RX
802.11ac (VHT20)	MCS0~8 Nss= 1	3TX	3RX
	MCS0~8 Nss= 2	3TX	3RX
	MCS0~9 Nss= 3	3TX	3RX
802.11ac (VHT40) & 802.11ac (VHT80)	MCS0~9 Nss= 1	3TX	3RX
	MCS0~9 Nss= 2	3TX	3RX
	MCS0~9 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)

6. 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.

Beamforming MODE					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11ac (VHT40)	38 to 46	46	OFDM	BPSK	13.5

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.

Beamforming MODE					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11ac (VHT40)	38 to 46	46	OFDM	BPSK	13.5

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
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

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
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	26deg. C, 70%RH	120Vac, 60Hz	Wythe Lin
RE<1G	26deg. C, 70%RH	120Vac, 60Hz	Gary Cheng
RE≥1G	23deg. C, 66%RH	120Vac, 60Hz	Andy Ho
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.

3.4 DUTY CYCLE OF TEST SIGNAL

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

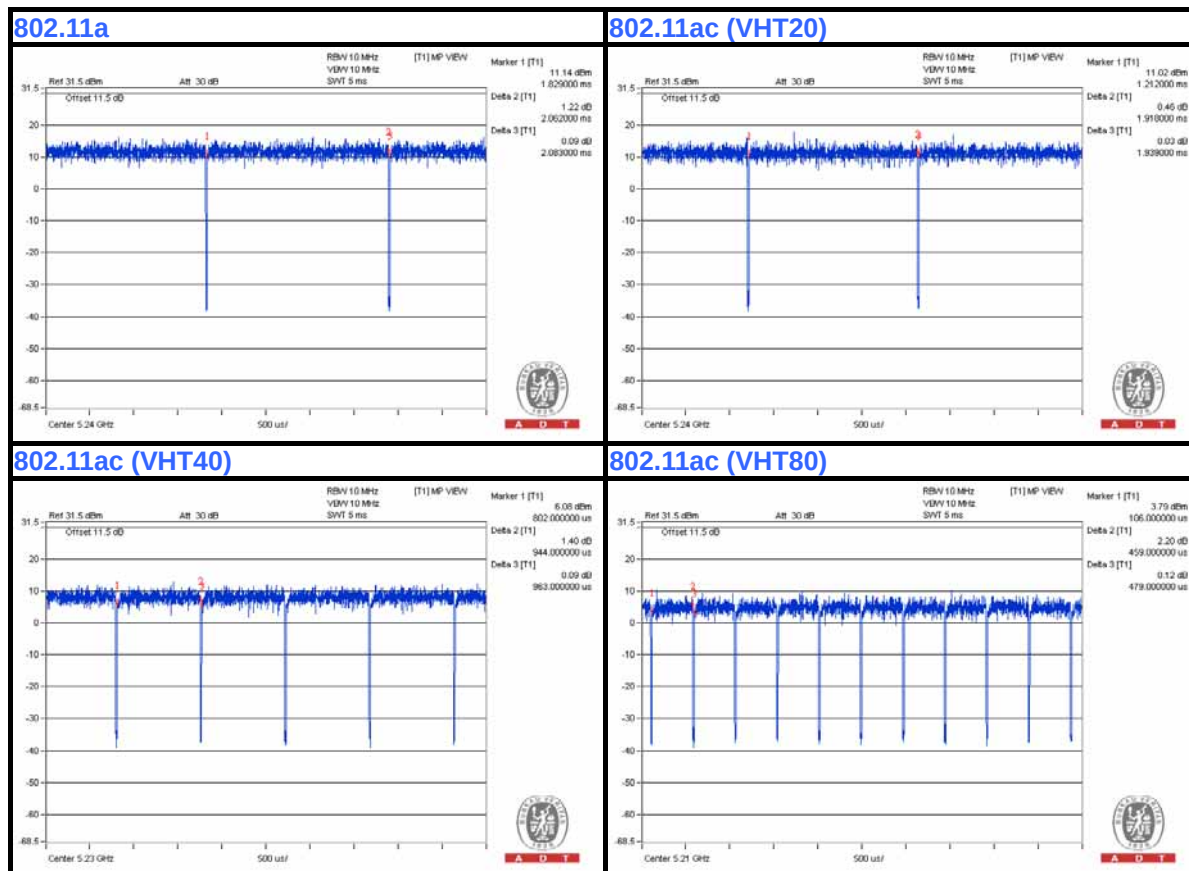
If duty cycle of test signal is $< 98\%$, duty factor shall be considered.

802.11a: Duty cycle = $2.062 \text{ ms} / 2.083 \text{ ms} = 0.99$

802.11ac(VHT20): Duty cycle = $1.918 \text{ ms} / 1.939 \text{ ms} = 0.989$

802.11ac(VHT40): Duty cycle = $0.944 \text{ ms} / 0.963 \text{ ms} = 0.98$

802.11ac(VHT80): Duty cycle = $0.459 \text{ ms} / 0.479 \text{ ms} = 0.958$, Duty factor = $10 * \log(1/0.958) = 0.19$



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3.5 DESCRIPTION OF SUPPORT UNITS

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

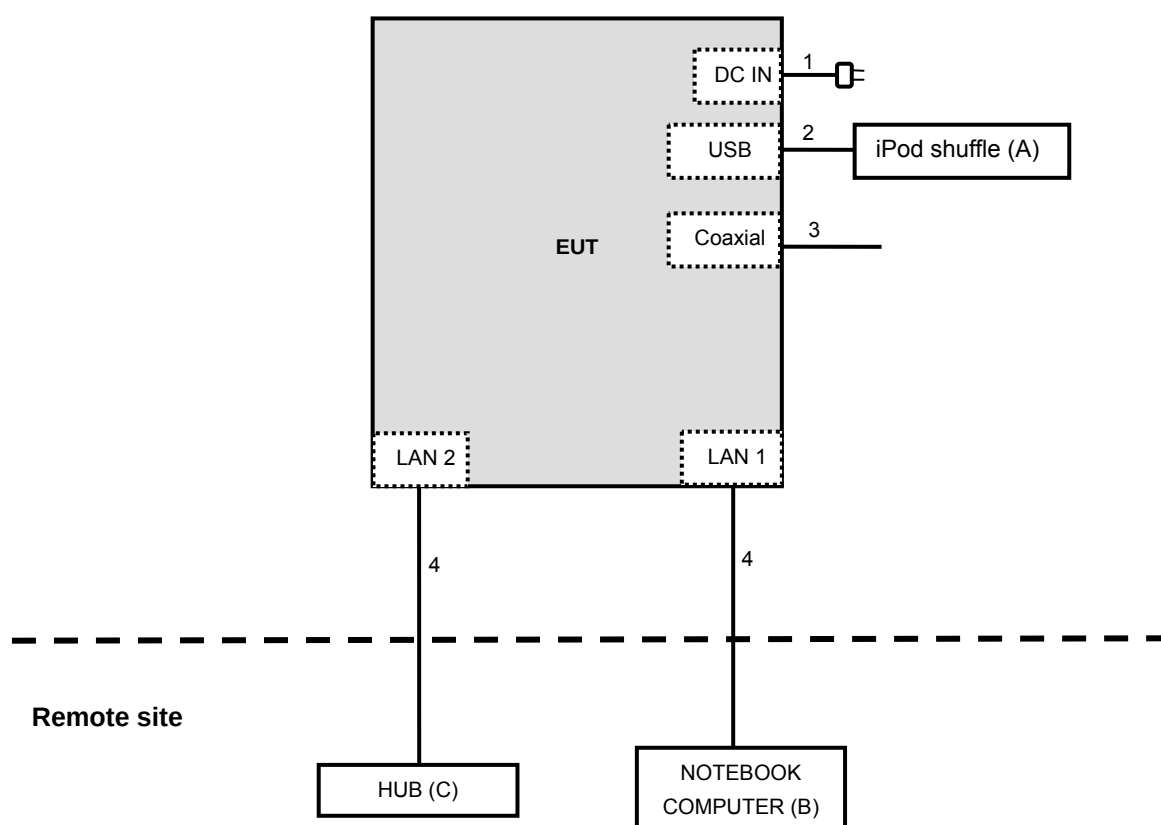
No.	Product	Brand	Model No.	Serial No.	FCC ID	Remark
A	iPod shuffle	Apple	MC749TA/A	CC4DN25WDFD M	NA	Provided by Lab
B	NOTEBOOK COMPUTER	DELL	PP32LA	HSLB32S	FCC DoC	Provided by Lab
C	HUB	ZyXEL	ES-116P	S060H02000215	FCC DoC	Provided by Lab

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	DC	1	1.8	No	0	Supplied by client
2	USB	1	0.1	Yes	0	Provided by Lab
3	Coaxial	1	10	No	0	Provided by Lab
4	RJ-45	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 (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

NOTE: 1. The lower limit shall apply at the transition frequencies.
 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS 30	100375	Apr. 29, 2014	Apr. 28, 2015
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK-8127	8127-522	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. 17, 2014

4.1.3 TEST PROCEDURES

- 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.
- The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission level under (Limit – 20dB) was not recorded.

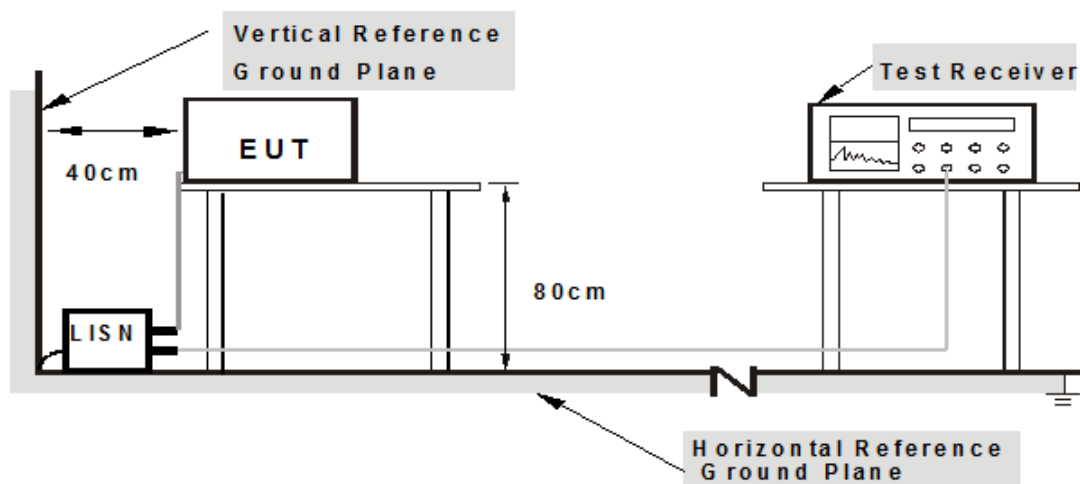
NOTE:

- 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 B) to act as communication partner.
3. The communication partner ran test program “(MTool.exe [2.0.1.1])” to enable EUT under transmission/receiving condition continuously.

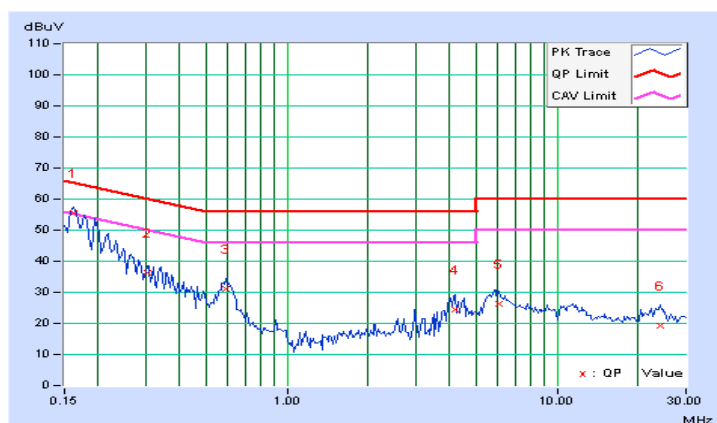
4.1.7 TEST RESULTS (With adapter 1)

PHASE	Line (L)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
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No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor [dB]	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16172	0.07	55.41	45.38	55.48	45.45	65.38	55.38	-9.90	-9.93
2	0.30234	0.08	36.09	26.31	36.17	26.39	60.18	50.18	-24.01	-23.79
3	0.59141	0.10	30.94	24.33	31.04	24.43	56.00	46.00	-24.96	-21.57
4	4.19922	0.26	24.31	12.84	24.57	13.10	56.00	46.00	-31.43	-32.90
5	6.11328	0.32	25.81	21.11	26.13	21.43	60.00	50.00	-33.87	-28.57
6	24.08984	0.78	18.33	11.76	19.11	12.54	60.00	50.00	-40.89	-37.46

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

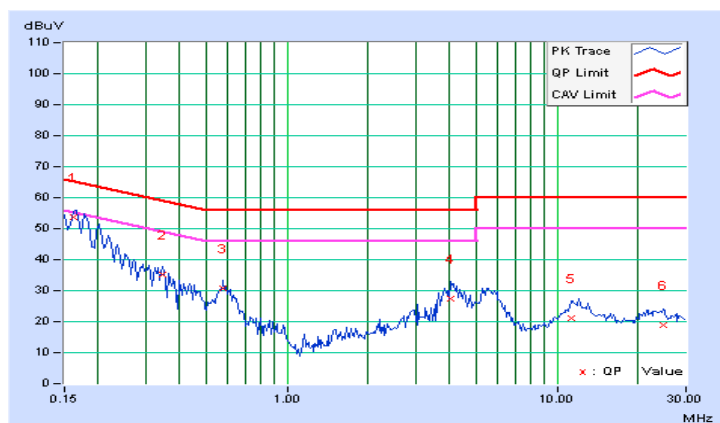


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
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	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16172	0.06	53.46	44.31	53.52	44.37	65.38	55.38	-11.85	-11.00
2	0.34531	0.08	35.15	25.60	35.23	25.68	59.07	49.07	-23.84	-23.39
3	0.57969	0.10	30.67	25.50	30.77	25.60	56.00	46.00	-25.23	-20.40
4	4.02734	0.26	27.31	16.63	27.57	16.89	56.00	46.00	-28.43	-29.11
5	11.35547	0.50	20.73	15.82	21.23	16.32	60.00	50.00	-38.77	-33.68
6	24.68750	0.84	18.05	11.52	18.89	12.36	60.00	50.00	-41.11	-37.64

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



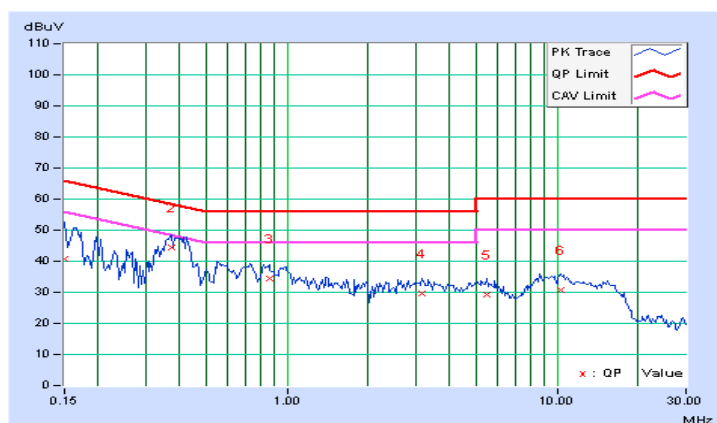
4.1.8 TEST RESULTS (With adapter 2)

PHASE	Line (L)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
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No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.07	40.59	27.99	40.66	28.06	66.00	56.00	-25.34	-27.94
2	0.37266	0.09	44.36	36.25	44.45	36.34	58.44	48.44	-13.99	-12.10
3	0.85703	0.12	34.33	29.61	34.45	29.73	56.00	46.00	-21.55	-16.27
4	3.17969	0.22	29.45	24.21	29.67	24.43	56.00	46.00	-26.33	-21.57
5	5.49219	0.30	29.03	23.37	29.33	23.67	60.00	50.00	-30.67	-26.33
6	10.35547	0.46	30.35	25.87	30.81	26.33	60.00	50.00	-29.19	-23.67

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

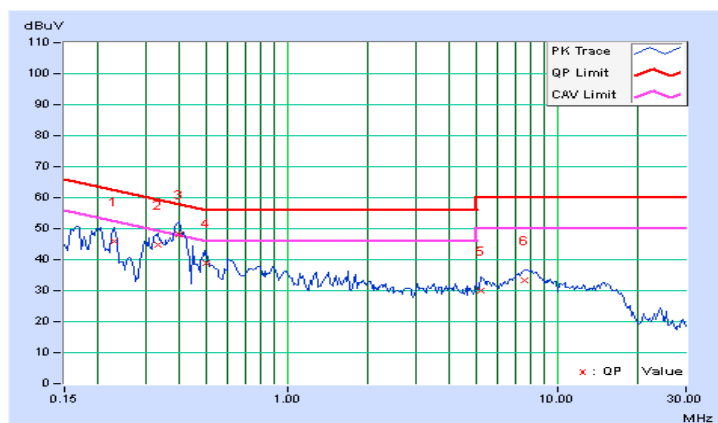


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
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	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.22812	0.06	45.81	38.85	45.87	38.91	62.52	52.52	-16.64	-13.60
2	0.33359	0.08	44.64	37.19	44.72	37.27	59.36	49.36	-14.64	-12.09
3	0.40000	0.09	48.11	41.83	48.20	41.92	57.85	47.85	-9.65	-5.93
4	0.50000	0.10	38.62	32.99	38.72	33.09	56.00	46.00	-17.28	-12.91
5	5.22656	0.30	29.53	23.49	29.83	23.79	60.00	50.00	-30.17	-26.21
6	7.53906	0.38	32.91	28.71	33.29	29.09	60.00	50.00	-26.71	-20.91

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:

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



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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-1000VH2 B	AMP-ZFL-04	Nov. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Feb. 27, 2014	Feb. 26, 2015
RF Cable	NA	CHHCAB_001	Oct. 05, 2014	Oct. 04, 2015
Horn_Antenna AISi	AIH.8018	0000220091110	Aug. 26, 2014	Aug. 25, 2015
Pre-Amplifier Agilent	8449B	300801923	Oct. 28, 2014	Oct. 27, 2015
RF Cable	NA	131206 131215 SNMY23685/4	Jan. 17, 2014	Jan. 16, 2015
Spectrum Analyzer R&S	FSV40	100964	July 05, 2014	July 04, 2015
Pre-Amplifier EMCI	EMC184045	980143	Jan. 17, 2014	Jan. 16, 2015
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: Nov. 14, 2014



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For Above 1GHz:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY51210105	July 21, 2014	July 20, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Feb. 26, 2014	Feb. 25, 2015
RF Cable	NA	CHGCAB_001	Oct. 04, 2014	Oct. 03, 2015
Horn_Antenna AISL	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 EMCI	EMC184045	980143	Jan. 17, 2014	Jan. 16, 2015
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. 13, 2014

4.2.4 TEST PROCEDURES

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

Note:

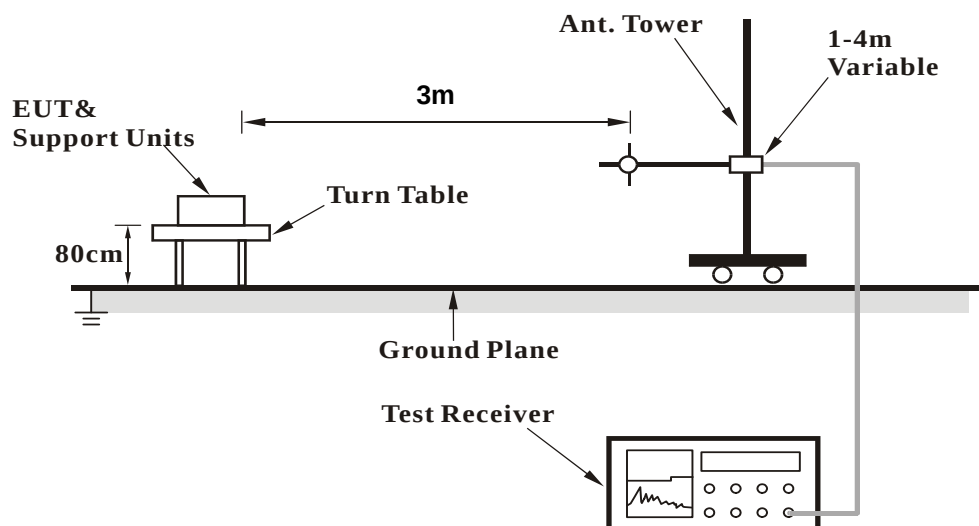
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.2.5 DEVIATION FROM TEST STANDARD

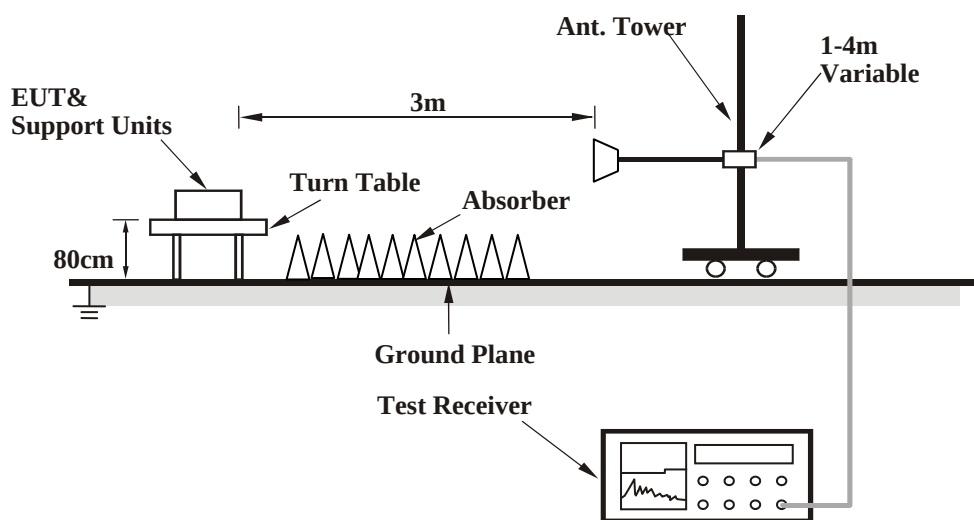
No deviation

4.2.6 TEST SETUP

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



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

4.2.7 EUT OPERATING CONDITION

Same as 4.1.6

4.2.8 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

Beamforming MODE

802.11ac (VHT40)

CHANNEL	TX Channel 46	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	109.12	37.3 QP	43.5	-6.2	1.52 H	90	53.40	-16.08
2	117.59	35.4 QP	43.5	-8.1	2.00 H	115	50.61	-15.18
3	163.30	33.7 QP	43.5	-9.8	1.00 H	92	46.80	-13.10
4	174.20	33.7 QP	43.5	-9.8	1.00 H	115	47.47	-13.77
5	250.00	38.5 QP	46.0	-7.5	1.00 H	281	52.38	-13.91
6	290.50	38.3 QP	46.0	-7.7	1.12 H	52	50.60	-12.28
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	38.40	36.4 QP	40.0	-3.6	1.00 V	235	50.36	-13.94
2	75.28	36.7 QP	40.0	-3.3	1.00 V	145	53.36	-16.63
3	108.37	37.7 QP	43.5	-5.8	1.00 V	96	53.87	-16.15
4	250.00	35.5 QP	46.0	-10.5	1.48 V	330	49.43	-13.91
5	256.54	35.7 QP	46.0	-10.3	2.00 V	0	49.46	-13.73
6	332.10	33.1 QP	46.0	-12.9	1.43 V	320	43.92	-10.80

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value



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ABOVE 1GHz DATA

CDD_MODE

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	5100.00	57.7 PK	74.0	-16.3	1.09 H	152	51.15	6.55
2	5100.00	46.4 AV	54.0	-7.6	1.09 H	152	39.85	6.55
3	5150.00	65.6 PK	74.0	-8.4	1.02 H	187	58.80	6.80
4	5150.00	49.5 AV	54.0	-4.5	1.02 H	187	42.70	6.80
5	*5180.00	116.1 PK			1.02 H	148	109.15	6.95
6	*5180.00	106.4 AV			1.02 H	148	99.45	6.95
7	5420.00	57.2 PK	74.0	-16.8	1.15 H	215	49.42	7.78
8	5420.00	47.9 AV	54.0	-6.1	1.15 H	215	40.12	7.78
9	#10360.00	60.6 PK	74.0	-13.4	1.10 H	28	47.49	13.11
10	#10360.00	47.9 AV	54.0	-6.1	1.10 H	28	34.79	13.11
11	15540.00	64.5 PK	74.0	-9.5	1.08 H	140	45.81	18.69
12	15540.00	51.5 AV	54.0	-2.5	1.08 H	140	32.81	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	5100.00	61.9 PK	74.0	-12.1	1.18 V	344	55.35	6.55
2	5100.00	50.6 AV	54.0	-3.4	1.18 V	344	44.05	6.55
3	5150.00	69.7 PK	74.0	-4.3	1.04 V	344	62.90	6.80
4	5150.00	53.8 AV	54.0	-0.2	1.04 V	344	47.00	6.80
5	*5180.00	120.4 PK			1.04 V	344	113.45	6.95
6	*5180.00	110.8 AV			1.04 V	344	103.85	6.95
7	5420.00	61.3 PK	74.0	-12.7	1.00 V	345	53.52	7.78
8	5420.00	51.7 AV	54.0	-2.3	1.00 V	345	43.92	7.78
9	#10360.00	58.2 PK	74.0	-15.8	1.06 V	342	45.09	13.11
10	#10360.00	44.9 AV	54.0	-9.1	1.06 V	342	31.79	13.11
11	15540.00	64.1 PK	74.0	-9.9	1.16 V	343	45.41	18.69
12	15540.00	51.4 AV	54.0	-2.6	1.16 V	343	32.71	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.



A D T

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	5040.80	53.6 PK	74.0	-20.4	1.20 H	200	47.12	6.48
2	5040.80	43.7 AV	54.0	-10.3	1.20 H	200	37.22	6.48
3	5123.00	56.5 PK	74.0	-17.5	1.11 H	147	49.83	6.67
4	5123.00	45.0 AV	54.0	-9.0	1.11 H	147	38.33	6.67
5	*5200.00	113.5 PK			1.06 H	151	106.45	7.05
6	*5200.00	104.3 AV			1.06 H	151	97.25	7.05
7	5360.90	58.3 PK	74.0	-15.7	1.04 H	188	50.75	7.55
8	5360.90	49.7 AV	54.0	-4.3	1.04 H	188	42.15	7.55
9	#10400.00	60.4 PK	74.0	-13.6	1.14 H	42	47.18	13.22
10	#10400.00	47.8 AV	54.0	-6.2	1.14 H	42	34.58	13.22
11	15600.00	64.7 PK	74.0	-9.3	1.10 H	153	46.00	18.70
12	15600.00	51.4 AV	54.0	-2.6	1.10 H	153	32.70	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	5040.80	58.2 PK	74.0	-15.8	1.18 V	344	51.72	6.48
2	5040.80	48.1 AV	54.0	-5.9	1.18 V	344	41.62	6.48
3	5123.00	60.0 PK	74.0	-14.0	1.05 V	342	53.33	6.67
4	5123.00	48.8 AV	54.0	-5.2	1.05 V	342	42.13	6.67
5	*5200.00	117.5 PK			1.03 V	344	110.45	7.05
6	*5200.00	108.4 AV			1.03 V	344	101.35	7.05
7	5360.90	62.3 PK	74.0	-11.7	1.01 V	344	54.75	7.55
8	5360.90	53.8 AV	54.0	-0.2	1.01 V	344	46.25	7.55
9	#10400.00	58.2 PK	74.0	-15.8	1.11 V	334	44.98	13.22
10	#10400.00	44.8 AV	54.0	-9.2	1.11 V	334	31.58	13.22
11	15600.00	64.2 PK	74.0	-9.8	1.19 V	336	45.50	18.70
12	15600.00	51.6 AV	54.0	-2.4	1.19 V	336	32.90	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.



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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	5082.80	56.3 PK	74.0	-17.7	1.01 H	144	49.77	6.53
2	5082.80	46.2 AV	54.0	-7.8	1.01 H	144	39.67	6.53
3	*5240.00	115.1 PK			1.00 H	144	107.94	7.16
4	*5240.00	105.2 AV			1.00 H	144	98.04	7.16
5	5399.20	58.9 PK	74.0	-15.1	1.16 H	207	51.19	7.71
6	5399.20	48.6 AV	54.0	-5.4	1.16 H	207	40.89	7.71
7	#5480.00	57.1 PK	74.0	-16.9	1.01 H	196	49.15	7.95
8	#5480.00	46.6 AV	54.0	-7.4	1.01 H	196	38.65	7.95
9	#10480.00	60.3 PK	74.0	-13.7	1.14 H	21	47.14	13.16
10	#10480.00	47.8 AV	54.0	-6.2	1.14 H	21	34.64	13.16
11	15720.00	64.7 PK	74.0	-9.3	1.07 H	135	46.30	18.40
12	15720.00	51.9 AV	54.0	-2.1	1.07 H	135	33.50	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	5082.80	58.4 PK	74.0	-15.6	1.18 V	270	51.87	6.53
2	5082.80	48.6 AV	54.0	-5.4	1.18 V	270	42.07	6.53
3	*5240.00	119.6 PK			1.02 V	343	112.44	7.16
4	*5240.00	109.8 AV			1.02 V	343	102.64	7.16
5	5399.20	63.7 PK	74.0	-10.3	1.10 V	342	55.99	7.71
6	5399.20	53.9 AV	54.0	-0.1	1.10 V	342	46.19	7.71
7	#5481.00	60.2 PK	74.0	-13.8	1.08 V	342	52.25	7.95
8	#5481.00	49.8 AV	54.0	-4.2	1.08 V	342	41.85	7.95
9	#10480.00	57.8 PK	74.0	-16.2	1.04 V	335	44.64	13.16
10	#10480.00	44.7 AV	54.0	-9.3	1.04 V	335	31.54	13.16
11	15720.00	64.7 PK	74.0	-9.3	1.13 V	355	46.30	18.40
12	15720.00	51.8 AV	54.0	-2.2	1.13 V	355	33.40	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.



A D T

Beamforming_MODE

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	5103.10	57.5 PK	74.0	-16.5	1.00 H	194	50.94	6.56
2	5103.10	47.3 AV	54.0	-6.7	1.00 H	194	40.74	6.56
3	5150.00	65.8 PK	74.0	-8.2	1.04 H	144	59.00	6.80
4	5150.00	49.9 AV	54.0	-4.1	1.04 H	144	43.10	6.80
5	*5180.00	115.7 PK			1.04 H	143	108.75	6.95
6	*5180.00	105.0 AV			1.04 H	143	98.05	6.95
7	5418.30	56.0 PK	74.0	-18.0	1.18 H	207	48.24	7.76
8	5418.30	45.5 AV	54.0	-8.5	1.18 H	207	37.74	7.76
9	#10360.00	60.8 PK	74.0	-13.2	1.12 H	15	47.69	13.11
10	#10360.00	48.3 AV	54.0	-5.7	1.12 H	15	35.19	13.11
11	15540.00	64.5 PK	74.0	-9.5	1.13 H	155	45.81	18.69
12	15540.00	51.7 AV	54.0	-2.3	1.13 H	155	33.01	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	5103.10	61.3 PK	74.0	-12.7	1.18 V	259	54.74	6.56
2	5103.10	50.9 AV	54.0	-3.1	1.18 V	259	44.34	6.56
3	5150.00	70.1 PK	74.0	-3.9	1.18 V	270	63.30	6.80
4	5150.00	53.9 AV	54.0	-0.1	1.18 V	270	47.10	6.80
5	*5180.00	120.0 PK			1.18 V	270	113.05	6.95
6	*5180.00	109.3 AV			1.18 V	270	102.35	6.95
7	5418.30	59.7 PK	74.0	-14.3	1.30 V	258	51.94	7.76
8	5418.30	49.2 AV	54.0	-4.8	1.30 V	258	41.44	7.76
9	#10360.00	58.5 PK	74.0	-15.5	1.12 V	347	45.39	13.11
10	#10360.00	45.1 AV	54.0	-8.9	1.12 V	347	31.99	13.11
11	15540.00	63.9 PK	74.0	-10.1	1.11 V	337	45.21	18.69
12	15540.00	51.0 AV	54.0	-3.0	1.11 V	337	32.31	18.69

REMARKS:

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



A D T

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	5117.80	54.7 PK	74.0	-19.3	1.11 H	137	48.07	6.63
2	5117.80	44.2 AV	54.0	-9.8	1.11 H	137	37.57	6.63
3	*5200.00	114.9 PK			1.01 H	161	107.85	7.05
4	*5200.00	104.9 AV			1.01 H	161	97.85	7.05
5	5359.28	60.1 PK	74.0	-13.9	1.03 H	200	52.56	7.54
6	5359.28	49.6 AV	54.0	-4.4	1.03 H	200	42.06	7.54
7	#10400.00	60.8 PK	74.0	-13.2	1.09 H	37	47.58	13.22
8	#10400.00	48.0 AV	54.0	-6.0	1.09 H	37	34.78	13.22
9	15600.00	64.1 PK	74.0	-9.9	1.10 H	140	45.40	18.70
10	15600.00	51.0 AV	54.0	-3.0	1.10 H	140	32.30	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	5117.80	59.2 PK	74.0	-14.8	1.19 V	259	52.57	6.63
2	5117.80	48.7 AV	54.0	-5.3	1.19 V	259	42.07	6.63
3	*5200.00	118.6 PK			1.05 V	348	111.55	7.05
4	*5200.00	108.5 AV			1.05 V	348	101.45	7.05
5	5359.28	64.4 PK	74.0	-9.6	1.12 V	346	56.86	7.54
6	5359.28	53.8 AV	54.0	-0.2	1.12 V	346	46.26	7.54
7	#10400.00	57.7 PK	74.0	-16.3	1.00 V	349	44.48	13.22
8	#10400.00	44.7 AV	54.0	-9.3	1.00 V	349	31.48	13.22
9	15600.00	63.6 PK	74.0	-10.4	1.13 V	350	44.90	18.70
10	15600.00	51.0 AV	54.0	-3.0	1.13 V	350	32.30	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.



A D T

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	5080.00	55.2 PK	74.0	-18.8	1.09 H	204	48.67	6.53
2	5080.00	45.0 AV	54.0	-9.0	1.09 H	204	38.47	6.53
3	*5240.00	115.4 PK			1.08 H	156	108.24	7.16
4	*5240.00	105.0 AV			1.08 H	156	97.84	7.16
5	5399.20	58.4 PK	74.0	-15.6	1.05 H	144	50.69	7.71
6	5399.20	49.5 AV	54.0	-4.5	1.05 H	144	41.79	7.71
7	#5479.10	56.5 PK	74.0	-17.5	1.05 H	187	48.55	7.95
8	#5479.10	46.0 AV	54.0	-8.0	1.05 H	187	38.05	7.95
9	#10480.00	60.8 PK	74.0	-13.2	1.05 H	41	47.64	13.16
10	#10480.00	48.1 AV	54.0	-5.9	1.05 H	41	34.94	13.16
11	15720.00	63.9 PK	74.0	-10.1	1.11 H	132	45.50	18.40
12	15720.00	51.0 AV	54.0	-3.0	1.11 H	132	32.60	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	5080.00	58.7 PK	74.0	-15.3	1.06 V	344	52.17	6.53
2	5080.00	48.8 AV	54.0	-5.2	1.06 V	344	42.27	6.53
3	*5240.00	118.8 PK			1.03 V	346	111.64	7.16
4	*5240.00	108.6 AV			1.03 V	346	101.44	7.16
5	5399.20	62.7 PK	74.0	-11.3	1.00 V	194	54.99	7.71
6	5399.20	53.7 AV	54.0	-0.3	1.00 V	194	45.99	7.71
7	#5479.10	60.4 PK	74.0	-13.6	1.08 V	348	52.45	7.95
8	#5479.10	49.7 AV	54.0	-4.3	1.08 V	348	41.75	7.95
9	#10480.00	58.9 PK	74.0	-15.1	1.03 V	357	45.74	13.16
10	#10480.00	45.3 AV	54.0	-8.7	1.03 V	357	32.14	13.16
11	15720.00	64.3 PK	74.0	-9.7	1.17 V	352	45.90	18.40
12	15720.00	51.8 AV	54.0	-2.2	1.17 V	352	33.40	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.



A D T

802.11ac (VHT40)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	63.8 PK	74.0	-10.2	1.10 H	163	57.00	6.80
2	5150.00	49.5 AV	54.0	-4.5	1.10 H	163	42.70	6.80
3	*5190.00	107.4 PK			1.07 H	157	100.40	7.00
4	*5190.00	96.6 AV			1.07 H	157	89.60	7.00
5	5354.00	53.9 PK	74.0	-20.1	1.07 H	183	46.38	7.52
6	5354.00	43.9 AV	54.0	-10.1	1.07 H	183	36.38	7.52
7	#10380.00	60.2 PK	74.0	-13.8	1.11 H	12	47.03	13.17
8	#10380.00	47.6 AV	54.0	-6.4	1.11 H	12	34.43	13.17
9	15570.00	64.1 PK	74.0	-9.9	1.11 H	140	45.41	18.69
10	15570.00	51.4 AV	54.0	-2.6	1.11 H	140	32.71	18.69
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	68.2 PK	74.0	-5.8	1.14 V	346	61.40	6.80
2	5150.00	53.9 AV	54.0	-0.1	1.14 V	346	47.10	6.80
3	*5190.00	111.6 PK			1.14 V	346	104.60	7.00
4	*5190.00	100.9 AV			1.14 V	346	93.90	7.00
5	5354.00	58.1 PK	74.0	-15.9	1.14 V	346	50.58	7.52
6	5354.00	48.3 AV	54.0	-5.7	1.14 V	346	40.78	7.52
7	#10380.00	57.8 PK	74.0	-16.2	1.07 V	337	44.63	13.17
8	#10380.00	44.4 AV	54.0	-9.6	1.07 V	337	31.23	13.17
9	15570.00	64.6 PK	74.0	-9.4	1.21 V	343	45.91	18.69
10	15570.00	51.8 AV	54.0	-2.2	1.21 V	343	33.11	18.69

REMARKS:

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



A D T

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	5149.00	59.3 PK	74.0	-14.7	1.07 H	136	52.51	6.79
2	5149.00	46.6 AV	54.0	-7.4	1.07 H	136	39.81	6.79
3	*5230.00	115.2 PK			1.07 H	134	108.08	7.12
4	*5230.00	104.0 AV			1.07 H	134	96.88	7.12
5	5384.30	60.3 PK	74.0	-13.7	1.01 H	199	52.66	7.64
6	5384.30	49.3 AV	54.0	-4.7	1.01 H	199	41.66	7.64
7	#5474.50	55.6 PK	74.0	-18.4	1.18 H	227	47.66	7.94
8	#5474.50	45.2 AV	54.0	-8.8	1.18 H	227	37.26	7.94
9	#10460.00	60.7 PK	74.0	-13.3	1.11 H	33	47.52	13.18
10	#10460.00	48.1 AV	54.0	-5.9	1.11 H	33	34.92	13.18
11	15690.00	64.5 PK	74.0	-9.5	1.09 H	144	46.12	18.38
12	15690.00	51.6 AV	54.0	-2.4	1.09 H	144	33.22	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	5149.00	63.4 PK	74.0	-10.6	1.04 V	345	56.61	6.79
2	5149.00	50.5 AV	54.0	-3.5	1.04 V	345	43.71	6.79
3	*5230.00	118.5 PK			1.04 V	345	111.38	7.12
4	*5230.00	107.6 AV			1.04 V	345	100.48	7.12
5	5384.30	64.5 PK	74.0	-9.5	1.01 V	347	56.86	7.64
6	5384.30	53.6 AV	54.0	-0.4	1.01 V	347	45.96	7.64
7	#5474.50	59.2 PK	74.0	-14.8	1.09 V	348	51.26	7.94
8	#5474.50	48.9 AV	54.0	-5.1	1.09 V	348	40.96	7.94
9	#10460.00	58.5 PK	74.0	-15.5	1.01 V	338	45.32	13.18
10	#10460.00	45.4 AV	54.0	-8.6	1.01 V	338	32.22	13.18
11	15690.00	64.2 PK	74.0	-9.8	1.15 V	328	45.82	18.38
12	15690.00	51.3 AV	54.0	-2.7	1.15 V	328	32.92	18.38

REMARKS:

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



A D T

802.11ac (VHT80)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	64.6 PK	74.0	-9.4	1.12 H	163	57.80	6.80
2	5150.00	49.9 AV	54.0	-4.1	1.12 H	163	43.10	6.80
3	*5210.00	105.3 PK			1.02 H	157	98.24	7.06
4	*5210.00	94.1 AV			1.02 H	157	87.04	7.06
5	5379.40	53.2 PK	74.0	-20.8	1.00 H	186	45.58	7.62
6	5379.40	41.5 AV	54.0	-12.5	1.00 H	186	33.88	7.62
7	#5788.90	57.8 PK	68.2	-10.4	1.12 H	228	49.30	8.50
8	#10420.00	60.3 PK	68.2	-7.9	1.07 H	26	47.10	13.20
9	15630.00	64.4 PK	74.0	-9.6	1.12 H	125	45.80	18.60
10	15630.00	51.3 AV	54.0	-2.7	1.12 H	125	32.70	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	5150.00	68.7 PK	74.0	-5.3	1.03 V	345	61.90	6.80
2	5150.00	53.8 AV	54.0	-0.2	1.03 V	345	47.00	6.80
3	*5210.00	109.2 PK			1.03 V	345	102.14	7.06
4	*5210.00	97.8 AV			1.03 V	345	90.74	7.06
5	5379.40	57.0 PK	74.0	-17.0	1.03 V	345	49.38	7.62
6	5379.40	45.5 AV	54.0	-8.5	1.03 V	345	37.88	7.62
7	#5788.90	61.8 PK	68.2	-6.4	1.03 V	355	53.30	8.50
8	#10420.00	58.5 PK	68.2	-9.7	1.08 V	333	45.30	13.20
9	15630.00	64.3 PK	74.0	-9.7	1.22 V	346	45.70	18.60
10	15630.00	51.8 AV	54.0	-2.2	1.22 V	346	33.20	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 $\leq$ 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
		Fixed point-to-point Access Point	1 Watt (30 dBm)
	√	Indoor Access Point	1 Watt (30 dBm)
		Mobile and Portable client device	250mW (24 dBm)
U-NII-2A	---		250mW (24 dBm) or 11 dBm+10 log B*
U-NII-2C	---		250mW (24 dBm) or 11 dBm+10 log B*
U-NII-3	---		1 Watt (30 dBm)

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

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

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

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

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

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

**A D T**

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. 19, 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. 19, 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

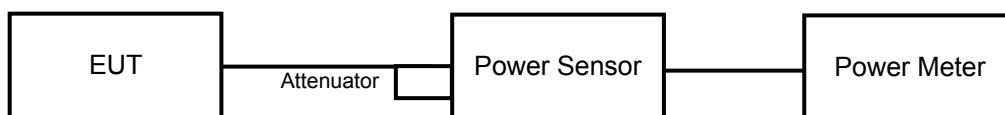
1. Set RBW = approximately 1% of the emission bandwidth.
2. Set the VBW > RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement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

4.3.4 DEVIATION FROM TEST STANDARD

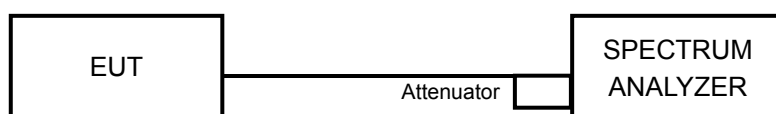
No deviation

4.3.5 TEST SETUP

FOR POWER OUTPUT MEASUREMENT



FOR 26dB OCCUPIED BANDWIDTH





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4.3.6 EUT OPERATING CONDITIONS

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

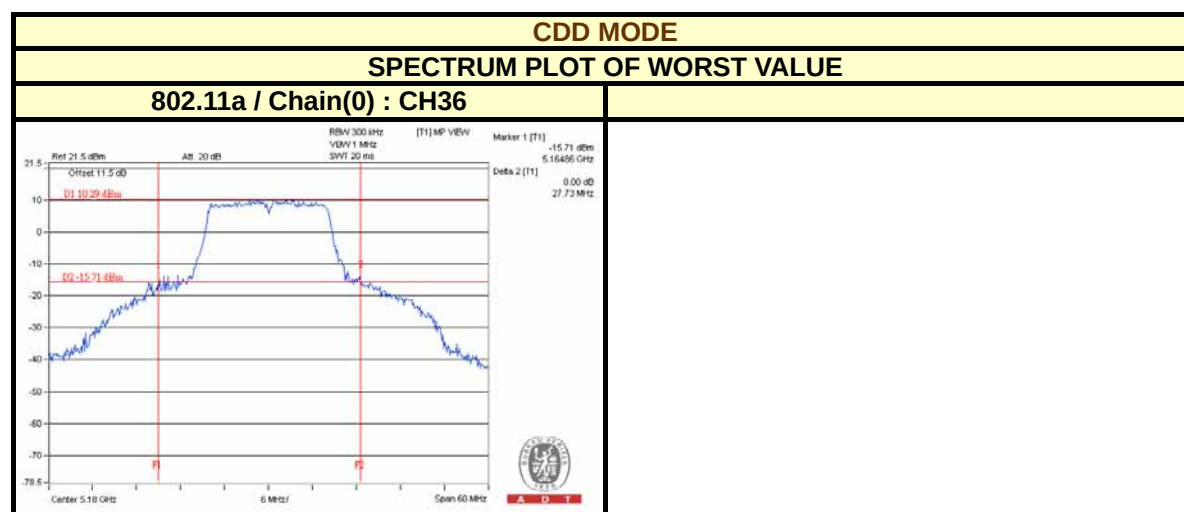
4.3.7 TEST RESULTS

POWER OUT PUT:

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	20.20	19.78	19.80	295.272	24.70	30.00	PASS
40	5200	17.36	16.91	16.97	153.315	21.86	30.00	PASS
48	5240	18.63	18.23	17.93	201.56	23.04	30.00	PASS

26dB OCCUPIED BANDWIDTH:

CDD MODE				
CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		
		CHAIN 0	CHAIN 1	CHAIN 2
36	5180	27.73	23.49	22.19
40	5200	20.64	20.46	20.43
48	5240	20.69	20.47	20.42



POWER OUT PUT:

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	20.64	20.12	20.01	318.911	25.04	27.92	PASS
40	5200	18.28	17.64	17.56	182.39	22.61	27.92	PASS
48	5240	18.62	18.22	18.01	202.393	23.06	27.92	PASS
802.11ac (VHT40)								
38	5190	14.60	14.30	14.04	81.106	19.09	27.92	PASS
46	5230	21.10	21.43	20.18	372.052	25.71	27.92	PASS
802.11ac (VHT80)								
42	5210	13.50	13.17	13.14	63.742	18.04	27.92	PASS

NOTE: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 8.08\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30-(8.08-6) = 27.92\text{dBm}$.

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

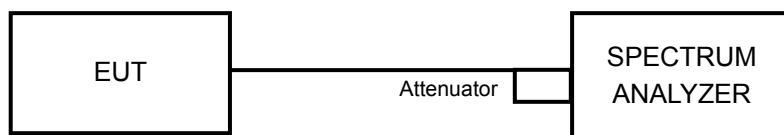
4.4.3 TEST PROCEDURES

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



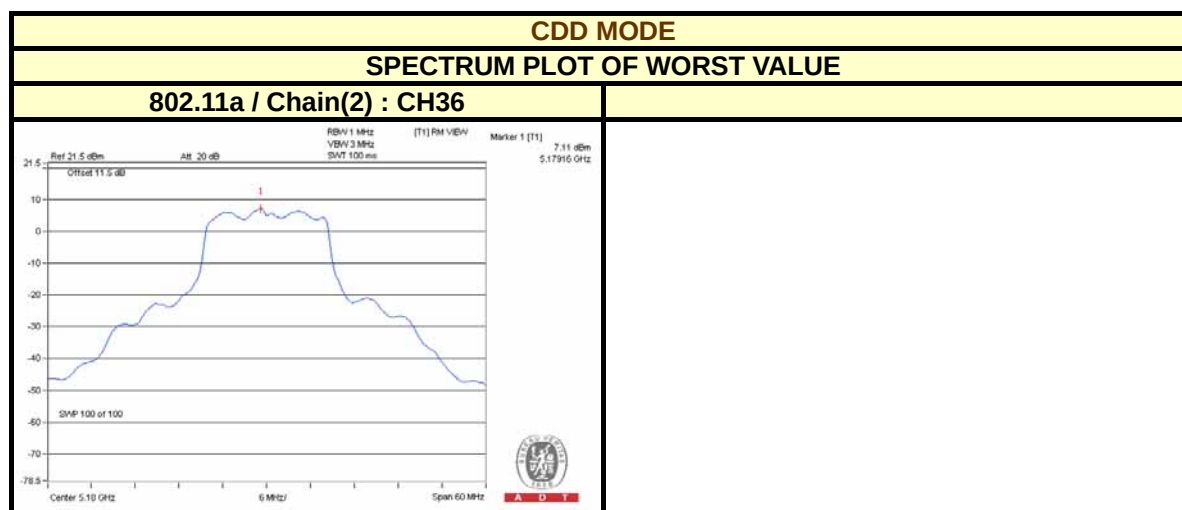
4.4.6 EUT OPERATING CONDITIONS

Same as 4.3.6

4.4.7 TEST RESULTS

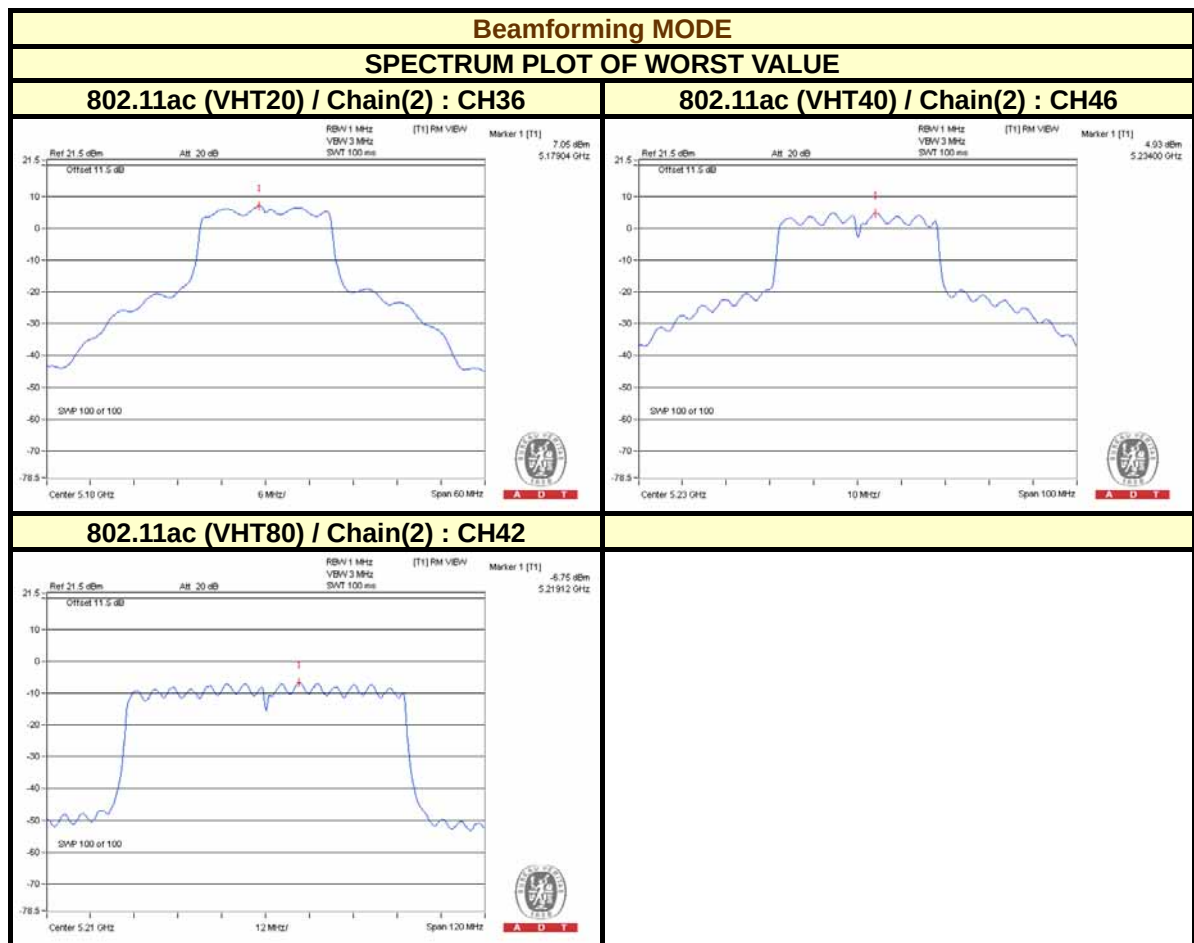
CDD MODE							
802.11a							
CHAN.	CHANNEL FREQUENCY (MHz)	PSD (dBm)			TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2			
36	5180	6.48	6.13	7.07	11.35	14.92	PASS
40	5200	3.94	3.40	4.48	8.73	14.92	PASS
48	5240	5.01	4.51	5.80	9.91	14.92	PASS

- 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 = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 8.08\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $17 - (8.08 - 6) = 14.92\text{dBm}$.



Beamforming MODE								
802.11ac (VHT20)								
CHANNEL	CHANNEL FREQUENCY (MHz)	PSD (dBm)			TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL	
		CHAIN 0	CHAIN 1	CHAIN 2				
36	5180	6.40	6.83	7.05	11.54	14.92	PASS	
40	5200	4.60	4.32	5.30	9.53	14.92	PASS	
48	5240	4.98	4.70	5.93	10.01	14.92	PASS	
802.11ac (VHT40)								
CHANNEL	CHANNEL FREQUENCY (MHz)	PSD (dBm)			TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL	
		CHAIN 0	CHAIN 1	CHAIN 2				
38	5190	-3.57	-3.34	-2.72	1.58	14.92	PASS	
46	5230	4.39	4.82	4.93	9.49	14.92	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	-7.65	-7.86	-6.79	0.19	-2.45	14.92	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 = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 8.08\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $17 - (8.08 - 6) = 14.92\text{dBm}$.
3. Refer to section 3.4 for duty cycle spectrum plot.



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. 19, 2014

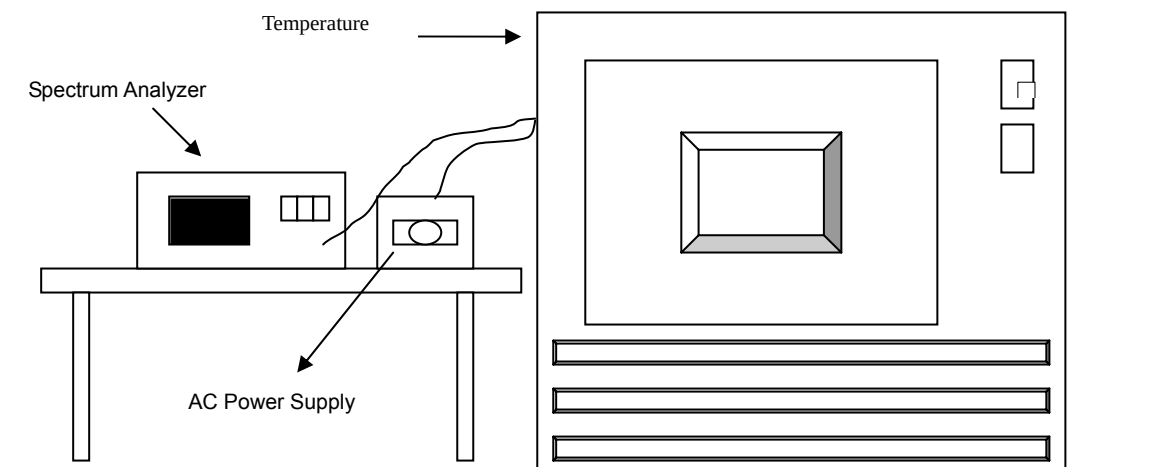
4.5.3 TEST PROCEDURE

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

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITION

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



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4.5.7 TEST RESULTS

FREQUENCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5240MHz									
TEMP. (°C)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	%	(MHz)	%	(MHz)	%	(MHz)	%
50	120	5240.0097	0.00019	5240.0097	0.00019	5240.005	0.00010	5240.0054	0.00010
40	120	5240.0084	0.00016	5240.0074	0.00014	5240.0081	0.00015	5240.0076	0.00015
30	120	5239.99	-0.00019	5239.9906	-0.00018	5239.9916	-0.00016	5239.9919	-0.00015
20	120	5240.027	0.00052	5240.0271	0.00052	5240.0253	0.00048	5240.027	0.00052
10	120	5239.9938	-0.00012	5239.996	-0.00008	5239.9927	-0.00014	5239.9961	-0.00007
0	120	5240.0003	0.00001	5240.0033	0.00006	5239.9993	-0.00001	5240.0015	0.00003
-10	120	5239.9849	-0.00029	5239.9837	-0.00031	5239.9869	-0.00025	5239.9845	-0.00030
-20	120	5240.0241	0.00046	5240.0222	0.00042	5240.0247	0.00047	5240.0241	0.00046
-30	120	5239.9959	-0.00008	5239.9989	-0.00002	5239.9984	-0.00003	5239.999	-0.00002

FREQUENCY STABILITY VERSUS VOLTAGE									
OPERATING FREQUENCY: 5240MHz									
TEMP. (°C)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	%	(MHz)	%	(MHz)	%	(MHz)	%
20	138	5240.0276	0.00053	5240.0271	0.00052	5240.0254	0.00048	5240.0265	0.00051
	120	5240.027	0.00052	5240.0271	0.00052	5240.0253	0.00048	5240.027	0.00052
	102	5240.0269	0.00051	5240.0264	0.00050	5240.0247	0.00047	5240.0272	0.00052

5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



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6. INFORMATION ON THE TESTING LABORATORIES

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

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

Linko EMC/RF Lab:

Tel: 886-2-26052180

Fax: 886-2-26052943

Hsin Chu EMC/RF/Telecom Lab:

Tel: 886-3-5935343

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Tel: 886-3-3183232

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Web Site: www.bureauveritas-adt.com

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



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

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

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