FCC TEST REPORT
(15.407)

REPORT NO.:	RF140714E01A-1 R2
MODEL NO.:	AT-TQ4600
FCC ID:	RSL-TQ4600
RECEIVED:	July 24, 2014
TESTED:	July 29 to Sep. 16, 2014
ISSUED:	Dec. 19, 2014
APPLICANT:	Allied Telesis R&D Center K.K.
ADDRESS:	2nd TOC Bldg. 7-21-11 Nishi-Gotanda, Shinagawa-ku, Tokyo 141-0031, Japan
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
RF140714E01A-1	Original release	Nov. 06, 2014
RF140714E01A-1 R1	Modified Table of Contents	Nov. 25, 2014
RF140714E01A-1 R2	Removed 5.26 ~ 5.32GHz, 5.50 ~ 5.58GHz & 5.66GHz ~ 5.70GHz data.	Dec. 19, 2014

1. CERTIFICATION

PRODUCT:	Access Point
BRAND NAME:	Allied Telesis
MODEL NO.:	AT-TQ4600
TEST SAMPLE:	ENGINEERING SAMPLE
APPLICANT:	Allied Telesis R&D Center K.K.
TESTED:	July 29 to Sep. 16, 2014
STANDARDS:	**FCC Part 15, Subpart E (Section 15.407)**
	ANSI C63.10-2009

The above equipment (Model: AT-TQ4600) 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
(Elsie Hsu, 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)			
STANDARD SECTION	**TEST TYPE**	**RESULT**	**REMARK**
15.407(b)(6)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -7.19dB at 0.31797MHz
15.407 (b)(1/2/3/4/6)	Radiated Emissions & Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -1.0dB at 5101.00MHz and 5715.00MHz
15.407(a/1/2/3)	Transmit Power	PASS	Meet the requirement of limit.
15.407(a/1/2/3)	Peak Power Spectral Density	PASS	Meet the requirement of limit.
15.407(e)	6dB bandwidth	PASS	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is i-pex(MHF) not a standard connector.

NOTE: 1. For WLAN: The EUT was operating in 2400 ~ 2483.5MHz, 5.15~5.25GHz and 5.725~5.850GHz frequencies band. This report was recorded the RF parameters including 5.15~5.25GHz and 5.725~5.850GHz. For the 2400 ~ 2483.5MHz 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)	5.37 dB
Radiated emissions (1GHz -6GHz)	3.72 dB
Radiated emissions (6GHz -18GHz)	4.00 dB
Radiated emissions (18GHz -40GHz)	4.11 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Access Point
MODEL NO.	AT-TQ4600
POWER SUPPLY	DC12V from power adapter or DC 48V from PoE
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** 5.18 ~ 5.24GHz, 5.745 ~ 5.825GHz
	For 15.247 2.412 ~ 2.462GHz
NUMBER OF CHANNEL	**For 15.407** 9 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 4 for 802.11n (HT40), 802.11ac (VHT40) 2 for 802.11ac (VHT80)
	For 15.247 11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
MAXIMUM OUTPUT POWER	**For 15.407** 802.11a: 220.019mW 802.11ac (VHT20): 175.42mW 802.11ac (VHT40): 132.953mW 802.11ac (VHT80): 58.791mW **For 15.247** 802.11b: 126.474mW 802.11g: 362.092mW 802.11n (HT20): 275.13mW 802.11n (HT40): 118.624mW

ANTENNA TYPE	Please see NOTE
DATA CABLE	NA
I/O PORTS	Refer to user's manual
ASSOCIATED DEVICES	Adapter x 1 (Option)

NOTE:

1. 2.4GHz and 5GHz technology can transmit at same time.
2. The EUT could be supplied with a power adapter as following table:

Brand	Model No.	Spec.
Elementech	AU12412030	Input: 100-240V, 0.6A, 50/60Hz Output: 12.0V, 2A DC output cable(1.8m, unshielded)

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

For 2.4GHz used						
No.	Transmitter Circuit	Brand	Model	Antenna Type	Antenna Gain(dBi) Including cable loss	Connector type
1	Chain (0)	Aristotle	RFA-02-G133-70B-110R	PIFA	3.1	i-pex(MHF)
2	Chain (1)		RFA-02-G133-70B-58		3.17	
3	Chain (2)		RFA-02-G133-70B-180		1.75	
For 5GHz used						
No.	Transmitter Circuit	Brand	Model	Antenna Type	Antenna Gain(dBi) Including cable loss	Connector type
1	Chain (0)	Aristotle	RFA-05-G134-70-230C	PIFA	2.65	i-pex(MHF)
2	Chain (1)		RFA-05-G134-70-105C		4.15	
3	Chain (2)		RFA-05-G134-70-75C		4.04	

4. The EUT incorporates a MIMO function without beamforming.

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

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 EUT was pre-tested in chamber under the following modes:

Test Mode	Description
Mode A	Adapter mode
Mode B	**PoE mode**

From the above modes, the spurious emission worse case was found in **Mode B**. Therefore only the test data of the mode was recorded in this report.

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

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

3.2 DESCRIPTION OF TEST MODES

Operated in 5150 ~ 5250MHz band:

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

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

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

CHANNEL	FREQUENCY
42	5210 MHz

Operated in 5725 ~ 5850MHz band:

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

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

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

CHANNEL	FREQUENCY
151	5755 MHz
159	5795 MHz

1 channel is provided for 802.11ac (VHT80):

CHANNEL	FREQUENCY
155	5775 MHz

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	PLC	RE < 1G	RE ³ 1G	APCM	
1	√	√	√	√	PoE Mode
2	√	-	-	-	Adapter Mode

Where **PLC:** Power Line Conducted Emission **RE < 1G:** Radiated Emission below 1GHz

RE ³ 1G: Radiated Emission above 1GHz **APCM:** Antenna Port Conducted Measurement

NOTE: The EUT had been pre-tested on the positioned of each 2 axis. The worst case was found when positioned on **Y-plane**.

POWER LINE CONDUCTED EMISSION TEST:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (MBPS)
802.11a	36 to 48 & 149 to 165	165	OFDM	BPSK	6.5

RADIATED EMISSION TEST (BELOW 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	36 to 48 & 149 to 165	165	OFDM	BPSK	6.5

RADIATED EMISSION TEST (ABOVE 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

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

ANTENNA PORT CONDUCTED MEASUREMENT:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	36 to 48 & 149 to 165	36, 40, 48, 149, 157, 165	OFDM	BPSK	6
802.11ac (VHT20)	36 to 48 & 149 to 165	36, 40, 48, 149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)	38 to 46 & 151 to 159	38, 46, 151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)	42 & 155	42, 155	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	22deg. C, 72%RH	120Vac, 60Hz (SYSTEM)	Andy Ho
RE≥1G	20deg. C, 60%RH 22deg. C, 66%RH 21deg. C, 66%RH 23deg. C, 69%RH	120Vac, 60Hz (SYSTEM)	Robert Cheng
APCM	25deg. C, 60%RH	120Vac, 60Hz (SYSTEM)	James Chan

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart E (15.407)

789033 D02 General UNII Test Procedures New Rules v01

662911 D01 Multiple Transmitter Output v02r01

ANSI C63.10-2009

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

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.

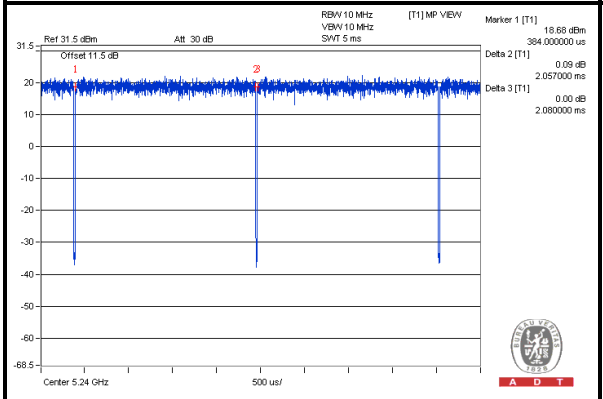
802.11a: Duty cycle = 2.057 ms/2.08 ms = 0.989

802.11ac (VHT20): Duty cycle = 1.919 ms/1.938 ms = 0.99

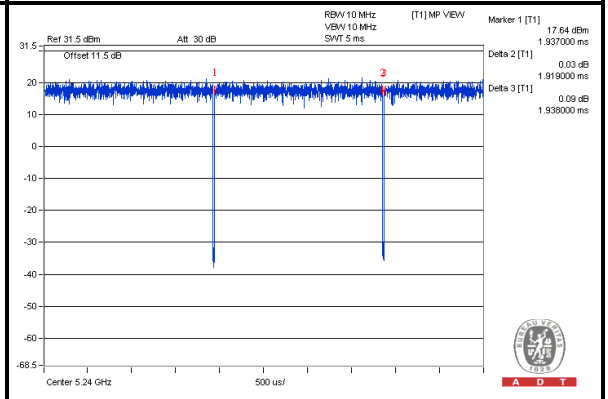
802.11ac (VHT40): Duty cycle = 0.941 ms/0.963 ms = 0.977, Duty factor = 10 * log(1/0.977) = 0.10

802.11ac (VHT80): Duty cycle = 0.457 ms/0.477 ms = 0.958, Duty factor = 10 * log(1/0.958) = 0.19

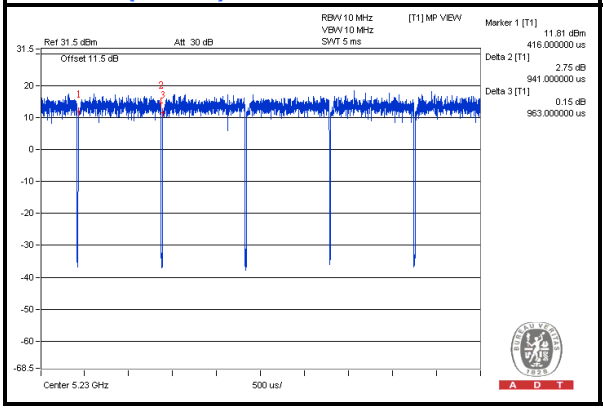
802.11a



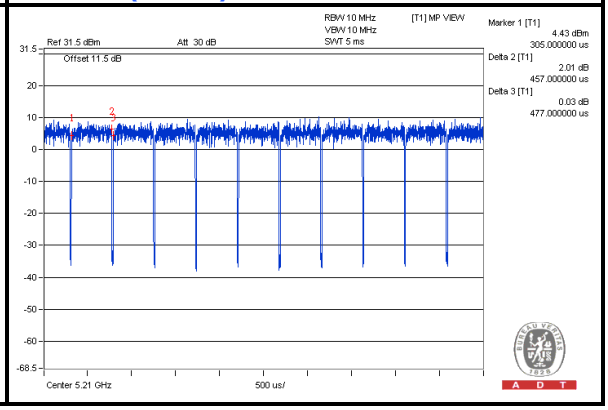
802.11ac (VHT20)



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	E5430	HYV4VY1	FCC DoC	Provided by Lab
B	PoE	Power Dsine	PD-3501G/ AC	NA	NA	Supplied by Client

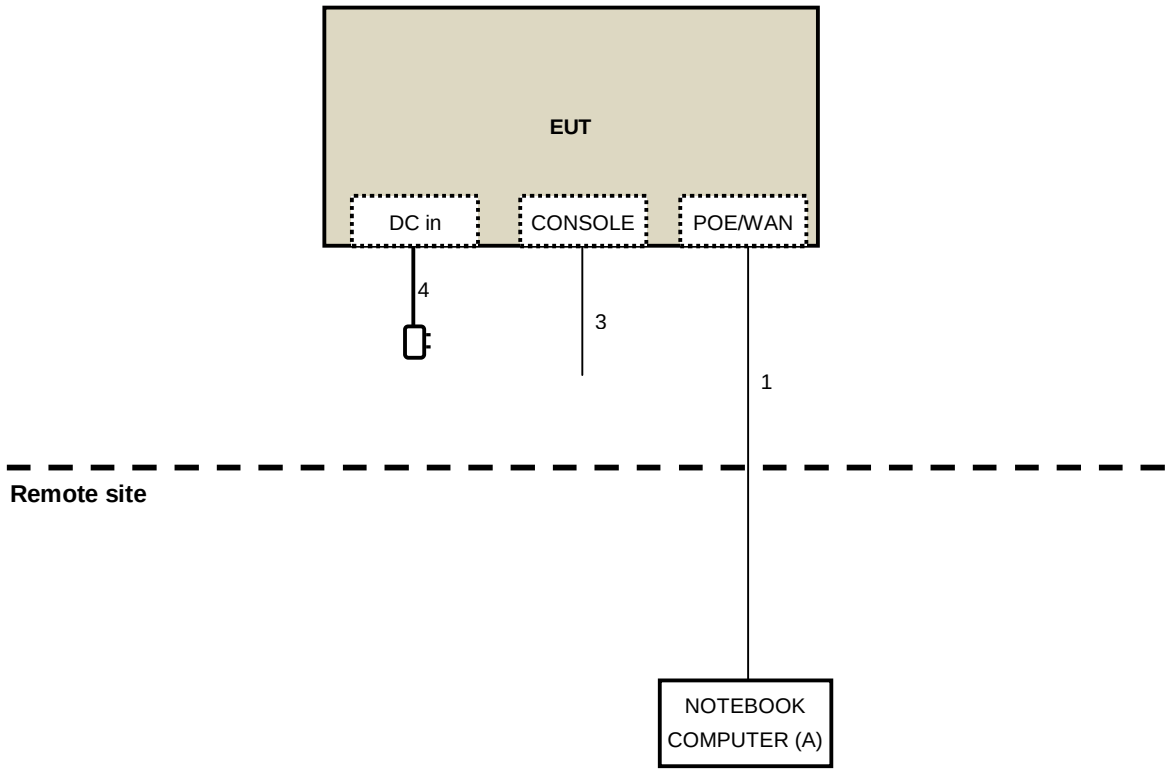
NOTE:

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

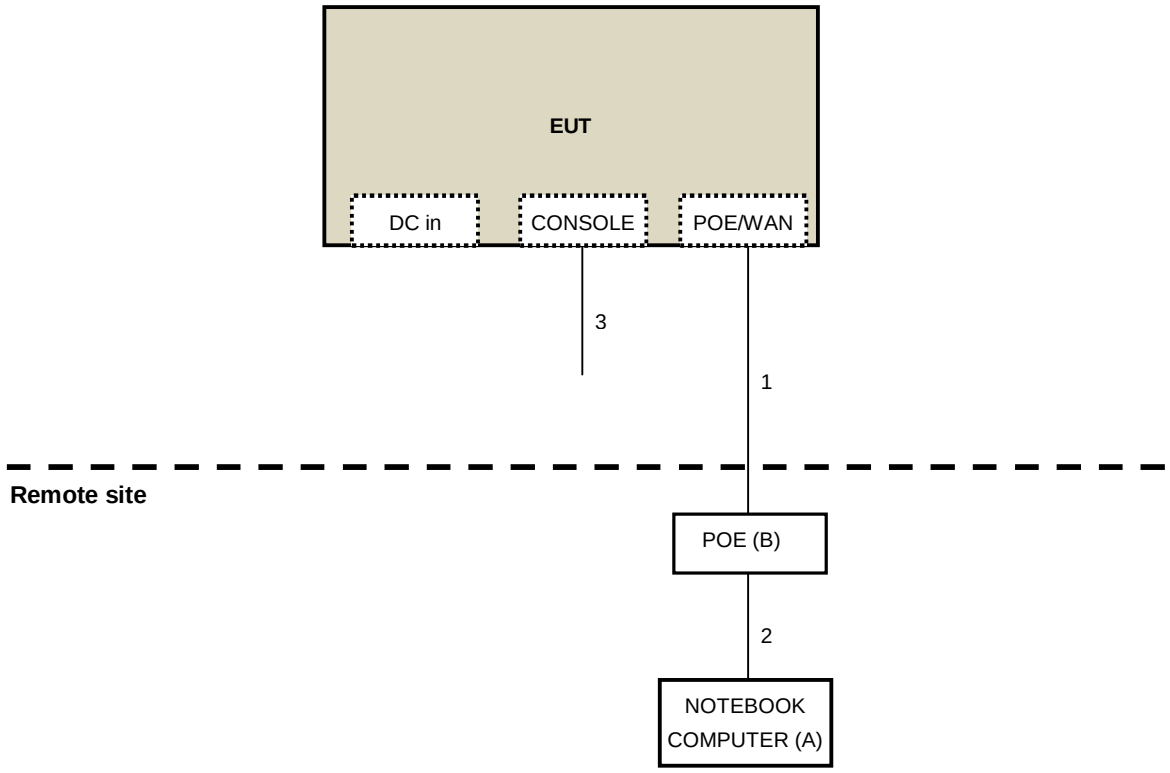
No.	Cable	Qty.	Length (m)	Shielded (Yes/ No)	Cores (Number)	Remark
1.	RJ45	1	10	No	0	Provided by Lab
2.	RJ45	1	3	No	0	Provided by Lab
3.	RJ45 to RS-232	1	1.5	No	0	Provided by Lab
4.	DC	1	1.8	No	0	Supplied by Client

3.6 CONFIGURATION OF SYSTEM UNDER TEST

For Adapter Mode:



For PoE Mode:


EUT
DC in
CONSOLE
POE/WAN
3
1
Remote site
POE (B)
2
NOTEBOOK
COMPUTER (A)

4. TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

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

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS 30	100375	Apr. 29, 2014	Apr. 28, 2015
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK8127	8127-522	Sep. 12, 2013	Sep. 11, 2014
Line-Impedance Stabilization Network (for Peripheral) ROHDE & SCHWARZ	ENV216	100071	Nov. 13, 2013	Nov. 12, 2014
RF Cable (JYEBAO)	5DFB	COCCAB-001	Mar. 10 , 2014	Mar. 09, 2015
50 ohms Terminator	N/A	EMC-03	Sep. 24, 2013	Sep. 23, 2014
50 ohms Terminator	N/A	EMC-02	Oct. 01, 2013	Sep. 30, 2014
Software ADT	BV ADT_Cond_V7.3.7.3	NA	NA	NA

Note:

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: Aug. 05, 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.

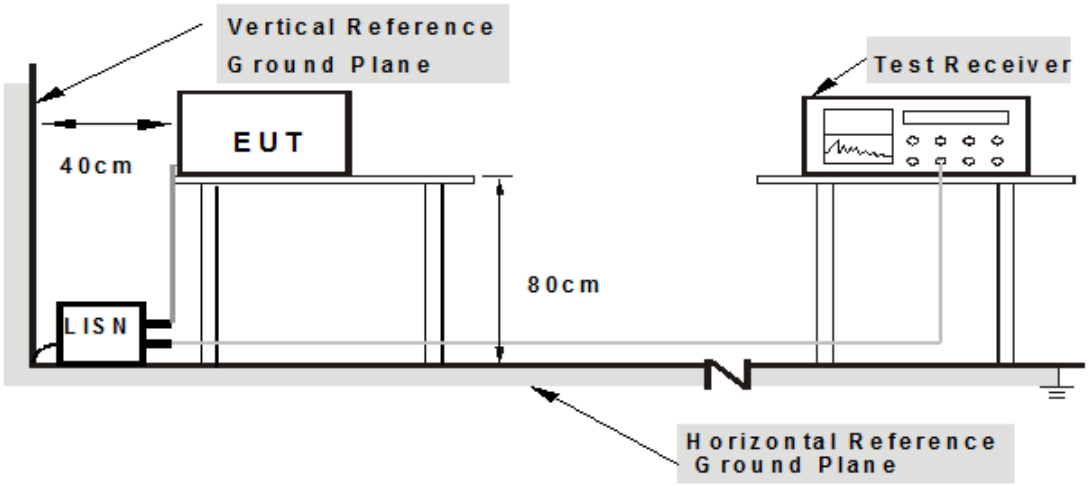
NOTE:

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. Turn on the power of all equipment.
2. The support unit A (Notebook Computer) runs “Mtool.exe [V1.0.0.10]” program to enable EUT under transmission/receiving condition continuously at specific channel frequency.

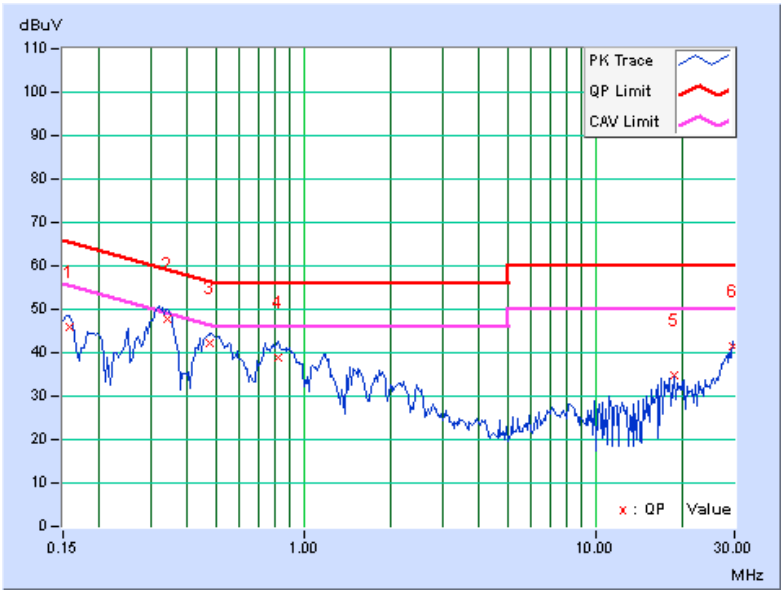
4.1.7 TEST RESULTS (MODE 1)

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

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	0.07	46.00	40.26	46.07	40.33	65.58	55.58	-19.51	-15.25
2	0.34141	0.08	47.78	38.74	47.86	38.82	59.17	49.17	-11.30	-10.34
3	0.47422	0.09	42.15	35.77	42.24	35.86	56.44	46.44	-14.19	-10.57
4	0.81406	0.12	38.80	30.13	38.92	30.25	56.00	46.00	-17.08	-15.75
5	18.52344	0.67	34.13	34.01	34.80	34.68	60.00	50.00	-25.20	-15.32
6	29.63672	0.99	40.40	40.17	41.39	41.16	60.00	50.00	-18.61	-8.84

REMARKS:

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

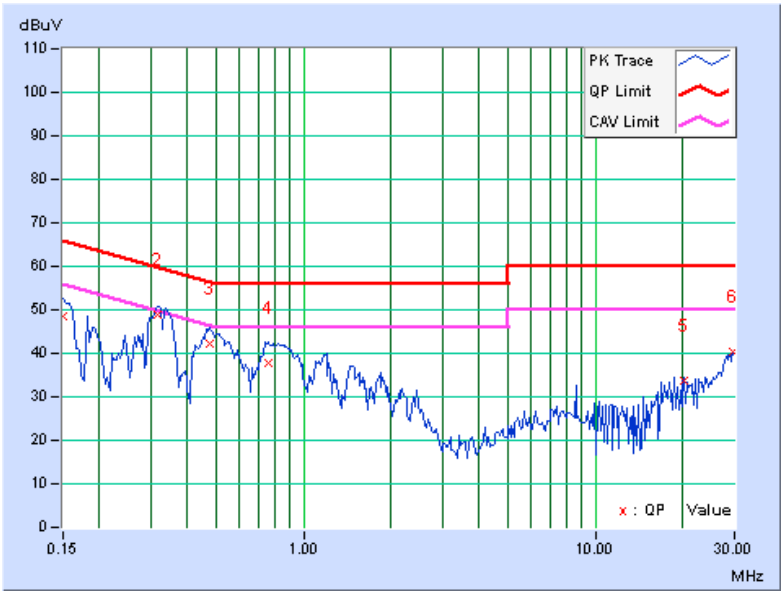


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.08	48.61	37.30	48.69	37.38	66.00	56.00	-17.31	-18.62
2	**0.31797**	**0.08**	**48.97**	**42.49**	**49.05**	**42.57**	**59.76**	**49.76**	**-10.71**	**-7.19**
3	0.47813	0.10	42.13	33.43	42.23	33.53	56.37	46.37	-14.15	-12.85
4	0.75547	0.11	37.82	30.16	37.93	30.27	56.00	46.00	-18.07	-15.73
5	20.25391	0.71	32.83	32.83	33.54	33.54	60.00	50.00	-26.46	-16.46
6	29.63672	0.98	39.32	39.32	40.30	40.30	60.00	50.00	-19.70	-9.70

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



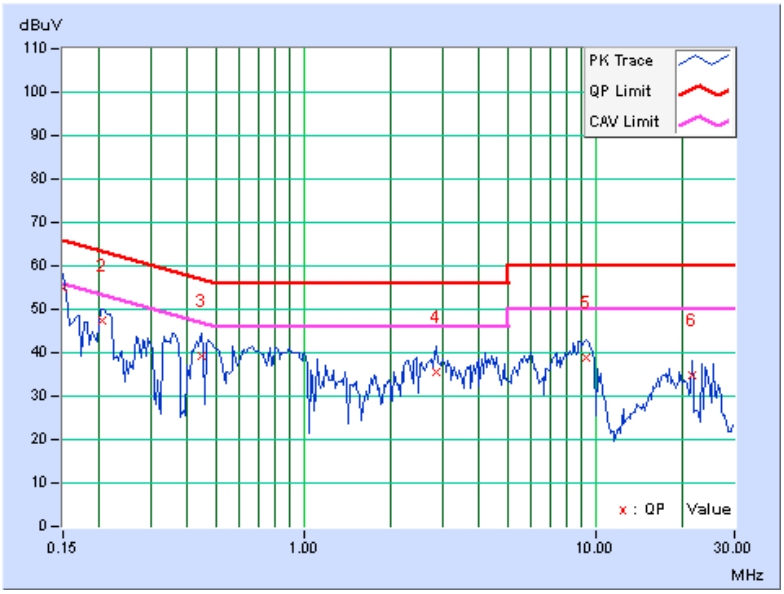
4.1.8 TEST RESULTS (MODE 2)

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

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.07	54.89	38.91	54.96	38.98	66.00	56.00	-11.04	-17.02
2	0.20469	0.07	47.52	35.47	47.59	35.54	63.42	53.42	-15.83	-17.88
3	0.44688	0.09	38.99	23.05	39.08	23.14	56.93	46.93	-17.85	-23.79
4	2.86328	0.21	35.30	24.24	35.51	24.45	56.00	46.00	-20.49	-21.55
5	9.30469	0.43	38.53	29.88	38.96	30.31	60.00	50.00	-21.04	-19.69
6	21.34766	0.75	34.22	27.22	34.97	27.97	60.00	50.00	-25.03	-22.03

REMARKS:

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

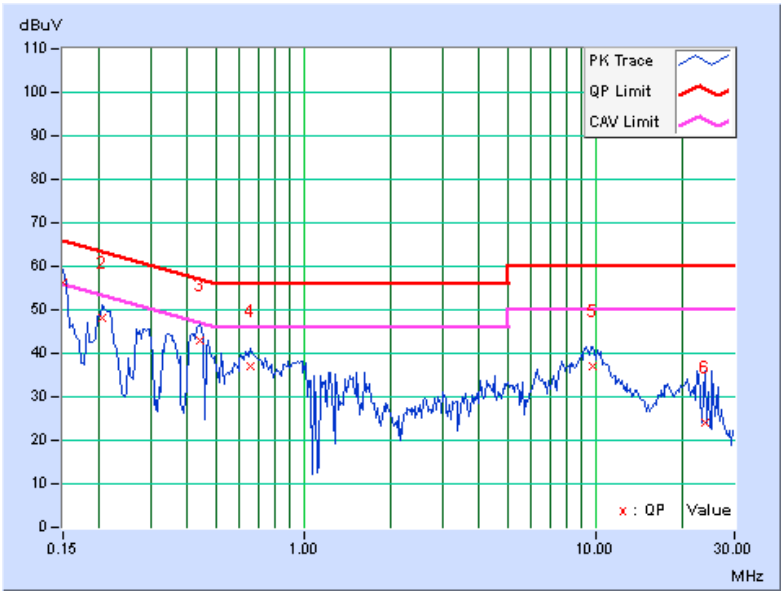


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.08	56.26	39.88	56.34	39.96	66.00	56.00	-9.66	-16.04
2	0.20469	0.07	48.16	36.14	48.23	36.21	63.42	53.42	-15.19	-17.21
3	0.44297	0.09	42.87	29.74	42.96	29.83	57.01	47.01	-14.04	-17.17
4	0.66172	0.11	37.03	23.42	37.14	23.53	56.00	46.00	-18.86	-22.47
5	9.75781	0.44	36.77	27.46	37.21	27.90	60.00	50.00	-22.79	-22.10
6	23.65625	0.80	23.43	11.23	24.23	12.03	60.00	50.00	-35.77	-37.97

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	MY51210105	July 21, 2014	July 20, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 13, 2013	Nov. 12, 2014
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Feb. 26, 2014	Feb. 25, 2015
RF Cable	NA	CHGCAB_001	Oct. 05, 2013	Oct. 04, 2014
Spectrum Analyzer R&S	FSV40	100964	July 05, 2014	July 04, 2015
Horn_Antenna AISI	AIH.8018	0000320091110	Nov. 18, 2013	Nov. 17, 2014
Pre-Amplifier Agilent	8449B	3008A02578	June 24, 2014	June 23, 2015
RF Cable	NA	RF104-201 RF104-203 RF104-204	Dec. 12, 2013	Dec. 11, 2014
Spectrum Analyzer Agilent	E4446A	MY48250253	Aug. 28, 2013	Aug. 27, 2014
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 13, 2013	Nov. 12, 2014
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 08, 2013	Oct. 07, 2014
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
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: July 29, 2014

For Above 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. 13, 2013	Nov. 12, 2014
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Feb. 27, 2014	Feb. 26, 2015
RF Cable	NA	CHHCAB_001	Oct. 06, 2013	Oct. 05, 2014
Horn_Antenna AISI	AIH.8018	0000220091110	Aug. 26, 2014	Aug. 25, 2015
Pre-Amplifier Agilent	8449B	3008A01923	Oct. 29, 2013	Oct. 28, 2014
RF Cable	NA	131206 131215 SNMY23685/4	Jan. 17, 2014	Jan. 16, 2015
Spectrum Analyzer R&S	FSV40	100964	July 05, 2014	July 04, 2015
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 13, 2013	Nov. 12, 2014
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Aug. 26, 2014	Aug. 25, 2015
RF Cable	NA	RF104-121 RF104-204	Dec. 12, 2013	Dec. 11, 2014
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3 The test was performed in 966 Chamber No. H.
4. The FCC Site Registration No. is 797305.
5 The CANADA Site Registration No. is IC 7450H-3.
6 Tested Date: Sep. 10, 2014

4.2.4 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

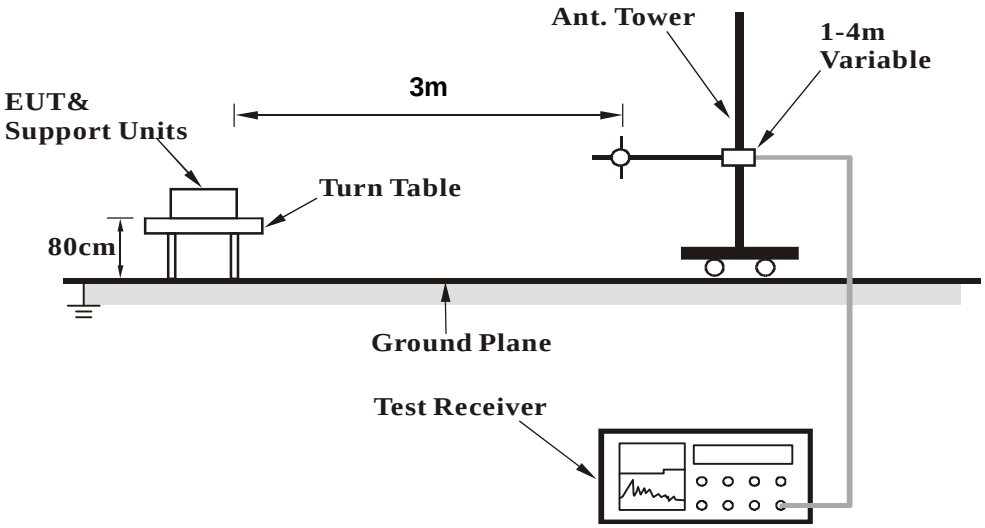
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.2.5 DEVIATION FROM TEST STANDARD

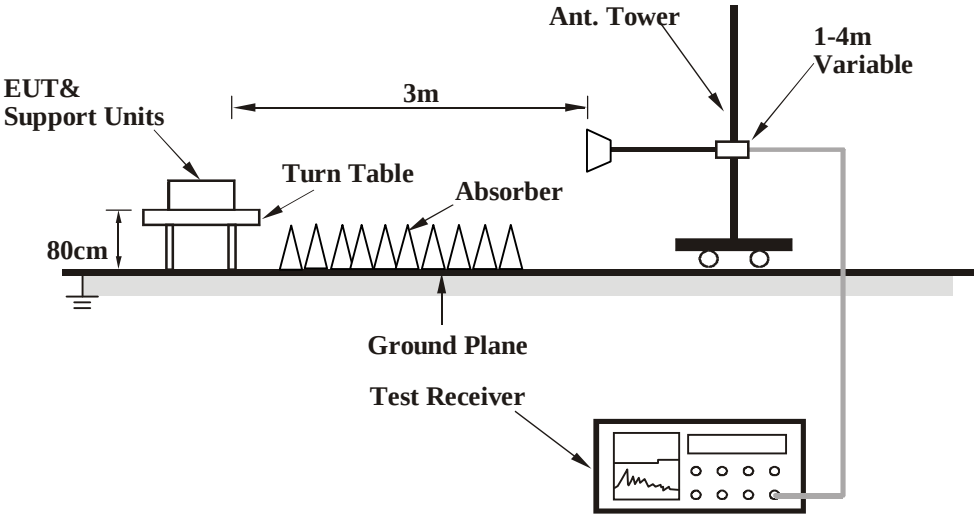
No deviation

4.2.6 TEST SETUP

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



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

4.2.7 EUT OPERATING CONDITION

Same as 4.1.6

4.2.8 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

802.11a

CHANNEL	TX Channel 165	**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	69.87	33.0 QP	40.0	-7.0	2.00 H	306	48.45	-15.48
2	104.98	36.4 QP	43.5	-7.1	2.00 H	82	53.38	-16.99
3	227.49	35.5 QP	46.0	-10.5	1.50 H	278	51.54	-16.05
4	258.58	36.7 QP	46.0	-9.3	1.50 H	131	50.71	-13.99
5	800.08	35.8 QP	46.0	-10.2	1.00 H	0	37.20	-1.41
6	860.85	34.7 QP	46.0	-11.3	1.50 H	360	35.43	-0.69
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	38.05	34.5 QP	40.0	-5.5	1.00 V	178	48.40	-13.92
2	69.89	34.9 QP	40.0	-5.1	1.00 V	157	50.42	-15.48
3	107.94	32.9 QP	43.5	-10.6	2.00 V	244	49.44	-16.51
4	200.04	33.6 QP	43.5	-9.9	1.00 V	253	49.94	-16.30
5	266.05	37.6 QP	46.0	-8.4	2.00 V	360	51.22	-13.63
6	644.54	37.3 QP	46.0	-8.7	1.50 V	174	41.37	-4.08

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	5101.00	59.1 PK	74.0	-14.9	1.00 H	223	54.97	4.13
2	5101.00	48.5 AV	54.0	-5.5	1.00 H	223	44.37	4.13
3	*5180.00	109.8 PK			1.00 H	140	105.41	4.39
4	*5180.00	100.2 AV			1.00 H	140	95.81	4.39
5	#10360.00	54.4 PK	74.0	-19.6	1.02 H	41	44.34	10.06
6	#10360.00	41.0 AV	54.0	-13.0	1.02 H	41	30.94	10.06
7	15540.00	60.3 PK	74.0	-13.7	1.16 H	108	45.46	14.84
8	15540.00	48.0 AV	54.0	-6.0	1.16 H	108	33.16	14.84
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	5101.00	62.9 PK	74.0	-11.1	1.16 V	158	58.77	4.13
2	**5101.00**	**53.0 AV**	**54.0**	**-1.0**	**1.16 V**	**158**	**48.87**	**4.13**
3	*5180.00	114.7 PK			1.09 V	211	110.31	4.39
4	*5180.00	105.5 AV			1.09 V	211	101.11	4.39
5	#10360.00	58.1 PK	74.0	-15.9	1.23 V	167	48.04	10.06
6	#10360.00	43.6 AV	54.0	-10.4	1.23 V	167	33.54	10.06
7	15540.00	60.7 PK	74.0	-13.3	1.11 V	333	45.86	14.84
8	15540.00	48.1 AV	54.0	-5.9	1.11 V	333	33.26	14.84

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	5121.88	59.5 PK	74.0	-14.5	1.00 H	216	55.29	4.21
2	5121.88	49.2 AV	54.0	-4.8	1.00 H	216	44.99	4.21
3	*5200.00	109.2 PK			1.02 H	153	104.76	4.44
4	*5200.00	100.8 AV			1.02 H	153	96.36	4.44
5	#10400.00	55.1 PK	74.0	-18.9	1.00 H	51	45.03	10.07
6	#10400.00	41.4 AV	54.0	-12.6	1.00 H	51	31.33	10.07
7	15600.00	60.4 PK	74.0	-13.6	1.16 H	116	45.34	15.06
8	15600.00	48.0 AV	54.0	-6.0	1.16 H	116	32.94	15.06
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	5121.88	63.1 PK	74.0	-10.9	1.16 V	160	58.89	4.21
2	5121.88	52.6 AV	54.0	-1.4	1.16 V	160	48.39	4.21
3	*5200.00	115.4 PK			1.03 V	200	110.96	4.44
4	*5200.00	106.1 AV			1.03 V	200	101.66	4.44
5	#10400.00	57.9 PK	74.0	-16.1	1.21 V	170	47.83	10.07
6	#10400.00	43.7 AV	54.0	-10.3	1.21 V	170	33.63	10.07
7	15600.00	60.7 PK	74.0	-13.3	1.11 V	346	45.64	15.06
8	15600.00	48.1 AV	54.0	-5.9	1.11 V	346	33.04	15.06

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5021.60	54.4 PK	74.0	-19.6	1.06 H	229	50.47	3.93
2	5021.60	47.1 AV	54.0	-6.9	1.06 H	229	43.17	3.93
3	*5240.00	112.2 PK			1.00 H	141	107.79	4.41
4	*5240.00	102.8 AV			1.00 H	141	98.39	4.41
5	5350.00	51.3 PK	74.0	-22.7	1.00 H	141	46.79	4.51
6	5350.00	39.5 AV	54.0	-14.5	1.00 H	141	34.99	4.51
7	#10480.00	55.5 PK	74.0	-18.5	1.02 H	65	45.24	10.26
8	#10480.00	41.6 AV	54.0	-12.4	1.02 H	65	31.34	10.26
9	15720.00	60.1 PK	74.0	-13.9	1.21 H	111	45.43	14.67
10	15720.00	47.9 AV	54.0	-6.1	1.21 H	111	33.23	14.67
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5021.60	58.0 PK	74.0	-16.0	1.20 V	193	54.07	3.93
2	5021.60	50.9 AV	54.0	-3.1	1.20 V	193	46.97	3.93
3	*5240.00	118.5 PK			1.15 V	198	114.09	4.41
4	*5240.00	108.1 AV			1.15 V	198	103.69	4.41
5	5350.00	54.0 PK	74.0	-20.0	1.15 V	198	49.49	4.51
6	5350.00	42.4 AV	54.0	-11.6	1.15 V	198	37.89	4.51
7	#10480.00	57.8 PK	74.0	-16.2	1.20 V	178	47.54	10.26
8	#10480.00	43.7 AV	54.0	-10.3	1.20 V	178	33.44	10.26
9	15720.00	60.6 PK	74.0	-13.4	1.10 V	352	45.93	14.67
10	15720.00	48.0 AV	54.0	-6.0	1.10 V	352	33.33	14.67

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 149	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	#5715.00	60.2 PK	74.0	-13.8	1.05 H	61	55.30	4.90
2	#5715.00	44.2 AV	54.0	-9.8	1.05 H	61	39.30	4.90
3	#5725.00	75.3 PK	78.2	-2.9	1.05 H	61	70.37	4.93
4	*5745.00	109.8 PK			1.05 H	61	104.88	4.92
5	*5745.00	101.3 AV			1.05 H	61	96.38	4.92
6	11490.00	53.8 PK	74.0	-20.2	1.06 H	33	43.15	10.65
7	11490.00	40.6 AV	54.0	-13.4	1.06 H	33	29.95	10.65
8	#17235.00	60.3 PK	74.0	-13.7	1.16 H	94	40.85	19.45
9	#17235.00	48.2 AV	54.0	-5.8	1.16 H	94	28.75	19.45
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5715.00	61.8 PK	74.0	-12.2	1.03 V	201	56.90	4.90
2	#5715.00	45.7 AV	54.0	-8.3	1.03 V	201	40.80	4.90
3	#5725.00	76.7 PK	78.2	-1.5	1.03 V	201	71.77	4.93
4	*5745.00	116.1 PK			1.03 V	201	111.18	4.92
5	*5745.00	106.6 AV			1.03 V	201	101.68	4.92
6	11490.00	58.4 PK	74.0	-15.6	1.26 V	156	47.75	10.65
7	11490.00	44.0 AV	54.0	-10.0	1.26 V	156	33.35	10.65
8	#17235.00	60.6 PK	74.0	-13.4	1.15 V	343	41.15	19.45
9	#17235.00	47.9 AV	54.0	-6.1	1.15 V	343	28.45	19.45

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 157	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	*5785.00	107.6 PK			1.01 H	75	102.65	4.95
2	*5785.00	100.2 AV			1.01 H	75	95.25	4.95
3	#5857.10	57.8 PK	78.2	-20.4	1.01 H	75	52.77	5.03
4	#5866.40	58.2 PK	74.0	-15.8	1.03 H	80	53.16	5.04
5	#5866.40	49.4 AV	54.0	-4.6	1.03 H	80	44.36	5.04
6	11570.00	53.9 PK	74.0	-20.1	1.09 H	19	43.22	10.68
7	11570.00	40.9 AV	54.0	-13.1	1.09 H	19	30.22	10.68
8	#17355.00	61.1 PK	74.0	-12.9	1.14 H	96	41.34	19.76
9	#17355.00	48.7 AV	54.0	-5.3	1.14 H	96	28.94	19.76
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	114.0 PK			1.03 V	202	109.05	4.95
2	*5785.00	105.3 AV			1.03 V	202	100.35	4.95
3	#5857.10	59.2 PK	78.2	-19.0	1.03 V	202	54.17	5.03
4	#5866.40	59.8 PK	74.0	-14.2	1.02 V	202	54.76	5.04
5	#5866.40	51.0 AV	54.0	-3.0	1.02 V	202	45.96	5.04
6	11570.00	58.5 PK	74.0	-15.5	1.30 V	156	47.82	10.68
7	11570.00	44.3 AV	54.0	-9.7	1.30 V	156	33.62	10.68
8	#17355.00	60.3 PK	74.0	-13.7	1.13 V	353	40.54	19.76
9	#17355.00	47.5 AV	54.0	-6.5	1.13 V	353	27.74	19.76

REMARKS:

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

CHANNEL	TX Channel 165	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	*5825.00	108.8 PK			1.04 H	60	103.82	4.98
2	*5825.00	100.6 AV			1.04 H	60	95.62	4.98
3	#5850.00	56.2 PK	78.2	-22.0	1.04 H	60	51.18	5.02
4	#5906.40	59.4 PK	74.0	-14.6	1.10 H	52	54.29	5.11
5	#5906.40	49.8 AV	54.0	-4.2	1.10 H	52	44.69	5.11
6	11650.00	53.3 PK	74.0	-20.7	1.11 H	5	42.71	10.59
7	11650.00	40.5 AV	54.0	-13.5	1.11 H	5	29.91	10.59
8	#17475.00	61.0 PK	74.0	-13.0	1.08 H	82	41.05	19.95
9	#17475.00	48.5 AV	54.0	-5.5	1.08 H	82	28.55	19.95
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	114.1 PK			1.02 V	202	109.12	4.98
2	*5825.00	105.3 AV			1.02 V	202	100.32	4.98
3	#5850.00	57.3 PK	78.2	-20.9	1.02 V	202	52.28	5.02
4	#5906.40	61.0 PK	74.0	-13.0	1.00 V	203	55.89	5.11
5	#5906.40	51.4 AV	54.0	-2.6	1.00 V	203	46.29	5.11
6	11650.00	58.2 PK	74.0	-15.8	1.27 V	163	47.61	10.59
7	11650.00	44.2 AV	54.0	-9.8	1.27 V	163	33.61	10.59
8	#17475.00	60.5 PK	74.0	-13.5	1.19 V	360	40.55	19.95
9	#17475.00	47.6 AV	54.0	-6.4	1.19 V	360	27.65	19.95

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	5100.90	58.9 PK	74.0	-15.1	1.04 H	217	54.77	4.13
2	5100.90	48.2 AV	54.0	-5.8	1.04 H	217	44.07	4.13
3	*5180.00	108.1 PK			1.01 H	139	103.71	4.39
4	*5180.00	100.4 AV			1.01 H	139	96.01	4.39
5	#10360.00	56.1 PK	74.0	-17.9	1.03 H	78	46.04	10.06
6	#10360.00	41.9 AV	54.0	-12.1	1.03 H	78	31.84	10.06
7	15540.00	60.3 PK	74.0	-13.7	1.18 H	106	45.46	14.84
8	15540.00	48.2 AV	54.0	-5.8	1.18 H	106	33.36	14.84
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	5100.90	63.2 PK	74.0	-10.8	1.05 V	197	59.07	4.13
2	5100.90	52.8 AV	54.0	-1.2	1.05 V	197	48.67	4.13
3	*5180.00	114.4 PK			1.04 V	195	110.01	4.39
4	*5180.00	105.7 AV			1.04 V	195	101.31	4.39
5	#10360.00	57.2 PK	74.0	-16.8	1.22 V	185	47.14	10.06
6	#10360.00	43.4 AV	54.0	-10.6	1.22 V	185	33.34	10.06
7	15540.00	60.4 PK	74.0	-13.6	1.07 V	350	45.56	14.84
8	15540.00	47.8 AV	54.0	-6.2	1.07 V	350	32.96	14.84

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	5121.10	58.9 PK	74.0	-15.1	1.03 H	206	54.70	4.20
2	5121.10	48.0 AV	54.0	-6.0	1.03 H	206	43.80	4.20
3	*5200.00	108.4 PK			1.02 H	144	103.96	4.44
4	*5200.00	100.8 AV			1.02 H	144	96.36	4.44
5	#10400.00	56.6 PK	74.0	-17.4	1.06 H	88	46.53	10.07
6	#10400.00	42.3 AV	54.0	-11.7	1.06 H	88	32.23	10.07
7	15600.00	59.5 PK	74.0	-14.5	1.20 H	98	44.44	15.06
8	15600.00	47.7 AV	54.0	-6.3	1.20 H	98	32.64	15.06
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	5121.10	62.8 PK	74.0	-11.2	1.04 V	196	58.60	4.20
2	5121.10	52.0 AV	54.0	-2.0	1.04 V	196	47.80	4.20
3	*5200.00	114.3 PK			1.04 V	196	109.86	4.44
4	*5200.00	105.3 AV			1.04 V	196	100.86	4.44
5	#10400.00	57.9 PK	74.0	-16.1	1.27 V	175	47.83	10.07
6	#10400.00	43.9 AV	54.0	-10.1	1.27 V	175	33.83	10.07
7	15600.00	60.6 PK	74.0	-13.4	1.08 V	335	45.54	15.06
8	15600.00	48.1 AV	54.0	-5.9	1.08 V	335	33.04	15.06

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5021.60	54.1 PK	74.0	-19.9	1.01 H	243	50.17	3.93
2	5021.60	46.9 AV	54.0	-7.1	1.01 H	243	42.97	3.93
3	*5240.00	111.8 PK			1.01 H	157	107.39	4.41
4	*5240.00	102.7 AV			1.01 H	157	98.29	4.41
5	5350.00	51.0 PK	74.0	-23.0	1.03 H	143	46.49	4.51
6	5350.00	39.4 AV	54.0	-14.6	1.03 H	143	34.89	4.51
7	#10480.00	56.0 PK	74.0	-18.0	1.09 H	94	45.74	10.26
8	#10480.00	41.8 AV	54.0	-12.2	1.09 H	94	31.54	10.26
9	15720.00	59.4 PK	74.0	-14.6	1.20 H	89	44.73	14.67
10	15720.00	47.5 AV	54.0	-6.5	1.20 H	89	32.83	14.67
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5021.60	56.7 PK	74.0	-17.3	1.20 V	194	52.77	3.93
2	5021.60	49.9 AV	54.0	-4.1	1.20 V	194	45.97	3.93
3	*5240.00	117.3 PK			1.02 V	197	112.89	4.41
4	*5240.00	107.7 AV			1.02 V	197	103.29	4.41
5	5350.00	54.6 PK	74.0	-19.4	1.02 V	197	50.09	4.51
6	5350.00	42.7 AV	54.0	-11.3	1.02 V	197	38.19	4.51
7	#10480.00	57.7 PK	74.0	-16.3	1.21 V	160	47.44	10.26
8	#10480.00	43.6 AV	54.0	-10.4	1.21 V	160	33.34	10.26
9	15720.00	60.9 PK	74.0	-13.1	1.12 V	324	46.23	14.67
10	15720.00	48.5 AV	54.0	-5.5	1.12 V	324	33.83	14.67

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 149	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	#5715.00	63.2 PK	74.0	-10.8	1.05 H	77	58.30	4.90
2	#5715.00	42.5 AV	54.0	-11.5	1.05 H	77	37.60	4.90
3	#5725.00	76.0 PK	78.2	-2.2	1.05 H	77	71.07	4.93
4	*5745.00	106.7 PK			1.05 H	77	101.78	4.92
5	*5745.00	97.8 AV			1.05 H	77	92.88	4.92
6	11490.00	53.8 PK	74.0	-20.2	1.10 H	7	43.15	10.65
7	11490.00	40.8 AV	54.0	-13.2	1.10 H	7	30.15	10.65
8	#17235.00	61.1 PK	74.0	-12.9	1.10 H	97	41.65	19.45
9	#17235.00	48.3 AV	54.0	-5.7	1.10 H	97	28.85	19.45
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5715.00	64.1 PK	74.0	-9.9	1.03 V	201	59.20	4.90
2	#5715.00	44.1 AV	54.0	-9.9	1.03 V	201	39.20	4.90
3	#5725.00	77.1 PK	78.2	-1.1	1.03 V	201	72.17	4.93
4	*5745.00	113.0 PK			1.03 V	201	108.08	4.92
5	*5745.00	103.1 AV			1.03 V	201	98.18	4.92
6	11490.00	58.3 PK	74.0	-15.7	1.31 V	166	47.65	10.65
7	11490.00	44.5 AV	54.0	-9.5	1.31 V	166	33.85	10.65
8	#17235.00	60.9 PK	74.0	-13.1	1.22 V	346	41.45	19.45
9	#17235.00	48.0 AV	54.0	-6.0	1.22 V	346	28.55	19.45

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 157	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	*5785.00	109.2 PK			1.09 H	70	104.25	4.95
2	*5785.00	100.1 AV			1.09 H	70	95.15	4.95
3	#5850.00	61.4 PK	89.2	-27.8	1.09 H	70	56.38	5.02
4	#5863.40	64.3 PK	89.2	-24.9	1.05 H	85	59.26	5.04
5	11570.00	53.3 PK	74.0	-20.7	1.05 H	4	42.62	10.68
6	11570.00	40.5 AV	54.0	-13.5	1.05 H	4	29.82	10.68
7	#17355.00	60.8 PK	89.2	-28.4	1.06 H	88	41.04	19.76
8	#17355.00	48.1 AV	80.1	-32.0	1.06 H	88	28.34	19.76
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	115.4 PK			1.03 V	202	110.45	4.95
2	*5785.00	104.4 AV			1.03 V	202	99.45	4.95
3	#5850.00	62.9 PK	95.4	-32.5	1.03 V	202	57.88	5.02
4	#5863.40	65.5 PK	95.4	-29.9	1.01 V	208	60.46	5.04
5	11570.00	57.8 PK	74.0	-16.2	1.33 V	162	47.12	10.68
6	11570.00	44.3 AV	54.0	-9.7	1.33 V	162	33.62	10.68
7	#17355.00	61.3 PK	95.4	-34.1	1.26 V	357	41.54	19.76
8	#17355.00	48.4 AV	84.4	-36.0	1.26 V	357	28.64	19.76

REMARKS:

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

CHANNEL	TX Channel 165	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	*5825.00	108.2 PK			1.09 H	78	103.22	4.98
2	*5825.00	98.6 AV			1.09 H	78	93.62	4.98
3	#5850.00	66.4 PK	88.2	-21.8	1.09 H	78	61.38	5.02
4	#5903.50	64.1 PK	88.2	-24.1	1.07 H	91	59.01	5.09
5	11650.00	53.0 PK	74.0	-21.0	1.08 H	11	42.41	10.59
6	11650.00	40.4 AV	54.0	-13.6	1.08 H	11	29.81	10.59
7	#17475.00	61.1 PK	88.2	-27.1	1.07 H	77	41.15	19.95
8	#17475.00	48.5 AV	78.6	-30.1	1.07 H	77	28.55	19.95
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	114.5 PK			1.02 V	201	109.52	4.98
2	*5825.00	103.8 AV			1.02 V	201	98.82	4.98
3	#5850.00	67.7 PK	94.5	-26.8	1.02 V	201	62.68	5.02
4	#5903.50	65.4 PK	94.5	-29.1	1.01 V	210	60.31	5.09
5	11650.00	58.5 PK	74.0	-15.5	1.34 V	162	47.91	10.59
6	**11650.00**	**44.7 AV**	**54.0**	**-9.3**	**1.34 V**	**162**	**34.11**	**10.59**
7	#17475.00	61.5 PK	94.5	-33.0	1.32 V	350	41.55	19.95
8	#17475.00	48.6 AV	83.8	-35.2	1.32 V	350	28.65	19.95

REMARKS:

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

802.11ac (VHT40)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	63.6 PK	74.0	-10.4	1.06 H	156	59.32	4.28
2	5150.00	49.1 AV	54.0	-4.9	1.06 H	156	44.82	4.28
3	*5190.00	103.3 PK			1.06 H	156	98.89	4.41
4	*5190.00	94.6 AV			1.06 H	156	90.19	4.41
5	#10380.00	56.5 PK	74.0	-17.5	1.10 H	93	46.43	10.07
6	#10380.00	42.1 AV	54.0	-11.9	1.10 H	93	32.03	10.07
7	15570.00	59.3 PK	74.0	-14.7	1.21 H	91	44.35	14.95
8	15570.00	47.2 AV	54.0	-6.8	1.21 H	91	32.25	14.95
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	66.2 PK	74.0	-7.8	1.03 V	197	61.92	4.28
2	5150.00	52.8 AV	54.0	-1.2	1.03 V	197	48.52	4.28
3	*5190.00	109.6 PK			1.03 V	197	105.19	4.41
4	*5190.00	99.9 AV			1.03 V	197	95.49	4.41
5	#10380.00	58.2 PK	74.0	-15.8	1.22 V	159	48.13	10.07
6	#10380.00	43.8 AV	54.0	-10.2	1.22 V	159	33.73	10.07
7	15570.00	61.2 PK	74.0	-12.8	1.14 V	313	46.25	14.95
8	15570.00	48.7 AV	54.0	-5.3	1.14 V	313	33.75	14.95

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	5145.90	53.9 PK	74.0	-20.1	1.11 H	163	49.62	4.28
2	5145.90	46.5 AV	54.0	-7.5	1.11 H	163	42.22	4.28
3	*5230.00	107.0 PK			1.11 H	163	102.58	4.42
4	*5230.00	97.5 AV			1.11 H	163	93.08	4.42
5	5350.00	50.6 PK	74.0	-23.4	1.11 H	163	46.09	4.51
6	5350.00	39.2 AV	54.0	-14.8	1.11 H	163	34.69	4.51
7	#10460.00	56.8 PK	74.0	-17.2	1.11 H	96	46.59	10.21
8	#10460.00	42.5 AV	54.0	-11.5	1.11 H	96	32.29	10.21
9	15690.00	59.8 PK	74.0	-14.2	1.18 H	94	45.12	14.68
10	15690.00	47.6 AV	54.0	-6.4	1.18 H	94	32.92	14.68
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5145.90	60.4 PK	74.0	-13.6	1.03 V	196	56.12	4.28
2	5145.90	50.4 AV	54.0	-3.6	1.03 V	196	46.12	4.28
3	*5230.00	112.6 PK			1.03 V	198	108.18	4.42
4	*5230.00	102.6 AV			1.03 V	198	98.18	4.42
5	5350.00	52.7 PK	74.0	-21.3	1.03 V	198	48.19	4.51
6	5350.00	40.3 AV	54.0	-13.7	1.03 V	198	35.79	4.51
7	#10460.00	58.6 PK	74.0	-15.4	1.20 V	150	48.39	10.21
8	#10460.00	44.1 AV	54.0	-9.9	1.20 V	150	33.89	10.21
9	15690.00	61.1 PK	74.0	-12.9	1.18 V	305	46.42	14.68
10	15690.00	48.8 AV	54.0	-5.2	1.18 V	305	34.12	14.68

REMARKS:

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

CHANNEL	TX Channel 151	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	#5715.00	67.3 PK	74.0	-6.7	1.10 H	83	62.40	4.90
2	#5715.00	51.4 AV	54.0	-2.6	1.10 H	83	46.50	4.90
3	#5725.00	70.6 PK	78.2	-7.6	1.10 H	83	65.67	4.93
4	*5755.00	102.0 PK			1.10 H	83	97.07	4.93
5	*5755.00	93.1 AV			1.10 H	83	88.17	4.93
6	11510.00	52.7 PK	74.0	-21.3	1.06 H	13	42.04	10.66
7	11510.00	40.3 AV	54.0	-13.7	1.06 H	13	29.64	10.66
8	#17265.00	61.4 PK	74.0	-12.6	1.13 H	76	41.88	19.52
9	#17265.00	48.8 AV	54.0	-5.2	1.13 H	76	29.28	19.52
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5715.00	68.7 PK	74.0	-5.3	1.02 V	200	63.80	4.90
2	#5715.00	52.8 AV	54.0	-1.2	1.02 V	200	47.90	4.90
3	#5725.00	72.5 PK	78.2	-5.7	1.02 V	200	67.57	4.93
4	*5755.00	108.3 PK			1.02 V	200	103.37	4.93
5	*5755.00	97.9 AV			1.02 V	200	92.97	4.93
6	11510.00	58.2 PK	74.0	-15.8	1.33 V	164	47.54	10.66
7	11510.00	44.6 AV	54.0	-9.4	1.33 V	164	33.94	10.66
8	#17265.00	61.9 PK	74.0	-12.1	1.33 V	344	42.38	19.52
9	#17265.00	48.9 AV	54.0	-5.1	1.33 V	344	29.38	19.52

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 159	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	*5795.00	104.5 PK			1.11 H	91	99.54	4.96
2	*5795.00	95.0 AV			1.11 H	91	90.04	4.96
3	#5850.00	61.7 PK	78.2	-16.5	1.11 H	91	56.68	5.02
4	#5870.00	60.2 PK	74.0	-13.8	1.11 H	91	55.15	5.05
5	#5870.00	49.4 AV	54.0	-4.6	1.11 H	91	44.35	5.05
6	11590.00	52.6 PK	74.0	-21.4	1.10 H	16	41.91	10.69
7	11590.00	40.3 AV	54.0	-13.7	1.10 H	16	29.61	10.69
8	#17385.00	61.5 PK	74.0	-12.5	1.11 H	83	41.64	19.86
9	#17385.00	49.2 AV	54.0	-4.8	1.11 H	83	29.34	19.86
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5795.00	110.8 PK			1.02 V	202	105.84	4.96
2	*5795.00	99.8 AV			1.02 V	202	94.84	4.96
3	#5850.00	63.0 PK	78.2	-15.2	1.02 V	202	57.98	5.02
4	#5870.00	61.5 PK	74.0	-12.5	1.02 V	202	56.45	5.05
5	#5870.00	50.6 AV	54.0	-3.4	1.02 V	202	45.55	5.05
6	11590.00	57.9 PK	74.0	-16.1	1.29 V	156	47.21	10.69
7	11590.00	44.6 AV	54.0	-9.4	1.29 V	156	33.91	10.69
8	#17385.00	62.0 PK	74.0	-12.0	1.28 V	342	42.14	19.86
9	#17385.00	49.2 AV	54.0	-4.8	1.28 V	342	29.34	19.86

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)
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	63.6 PK	74.0	-10.4	1.09 H	154	59.32	4.28
2	5150.00	49.1 AV	54.0	-4.9	1.09 H	154	44.82	4.28
3	*5210.00	100.1 PK			1.09 H	154	95.67	4.43
4	*5210.00	90.4 AV			1.09 H	154	85.97	4.43
5	5350.00	51.6 PK	74.0	-22.4	1.09 H	154	47.09	4.51
6	5350.00	38.9 AV	54.0	-15.1	1.09 H	154	34.39	4.51
7	#10420.00	56.5 PK	74.0	-17.5	1.09 H	87	46.39	10.11
8	#10420.00	42.0 AV	54.0	-12.0	1.09 H	87	31.89	10.11
9	15630.00	59.5 PK	74.0	-14.5	1.24 H	79	44.56	14.94
10	15630.00	47.2 AV	54.0	-6.8	1.24 H	79	32.26	14.94
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	65.5 PK	74.0	-8.5	1.02 V	198	61.22	4.28
2	5150.00	52.7 AV	54.0	-1.3	1.02 V	198	48.42	4.28
3	*5210.00	106.4 PK			1.02 V	198	101.97	4.43
4	*5210.00	95.7 AV			1.02 V	198	91.27	4.43
5	5350.00	52.2 PK	74.0	-21.8	1.02 V	198	47.69	4.51
6	5350.00	39.6 AV	54.0	-14.4	1.02 V	198	35.09	4.51
7	#10420.00	58.8 PK	74.0	-15.2	1.23 V	138	48.69	10.11
8	#10420.00	44.1 AV	54.0	-9.9	1.23 V	138	33.99	10.11
9	15630.00	61.1 PK	74.0	-12.9	1.20 V	313	46.16	14.94
10	15630.00	48.8 AV	54.0	-5.2	1.20 V	313	33.86	14.94

REMARKS:

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

CHANNEL	TX Channel 155	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	#5715.00	66.2 PK	74.0	-7.8	1.13 H	97	61.30	4.90
2	#5715.00	52.4 AV	54.0	-1.6	1.13 H	97	47.50	4.90
3	#5725.00	68.4 PK	78.2	-9.8	1.13 H	97	63.47	4.93
4	*5775.00	97.9 PK			1.13 H	97	92.97	4.93
5	*5775.00	89.4 AV			1.13 H	97	84.47	4.93
6	#5850.00	66.1 PK	78.2	-12.1	1.13 H	97	61.08	5.02
7	#5860.00	61.6 PK	74.0	-12.4	1.13 H	97	56.56	5.04
8	#5860.00	48.7 AV	54.0	-5.3	1.13 H	97	43.66	5.04
9	11550.00	53.2 PK	74.0	-20.8	1.15 H	15	42.53	10.67
10	11550.00	40.6 AV	54.0	-13.4	1.15 H	15	29.93	10.67
11	#17325.00	61.3 PK	74.0	-12.7	1.15 H	94	41.61	19.69
12	#17325.00	49.1 AV	54.0	-4.9	1.15 H	94	29.41	19.69
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	#5715.00	67.3 PK	74.0	-6.7	1.01 V	171	62.40	4.90
2	**#5715.00**	**53.0 AV**	**54.0**	**-1.0**	**1.01 V**	**171**	**48.10**	**4.90**
3	#5725.00	70.5 PK	78.2	-7.7	1.01 V	171	65.57	4.93
4	*5775.00	104.2 PK			1.01 V	171	99.27	4.93
5	*5775.00	93.8 AV			1.01 V	171	88.87	4.93
6	#5850.00	67.2 PK	78.2	-11.0	1.01 V	171	62.18	5.02
7	#5860.00	62.9 PK	74.0	-11.1	1.01 V	171	57.86	5.04
8	#5860.00	49.5 AV	54.0	-4.5	1.01 V	171	44.46	5.04
9	11550.00	58.4 PK	74.0	-15.6	1.34 V	171	47.73	10.67
10	11550.00	45.1 AV	54.0	-8.9	1.34 V	171	34.43	10.67
11	#17325.00	61.8 PK	74.0	-12.2	1.33 V	344	42.11	19.69
12	#17325.00	48.9 AV	54.0	-5.1	1.33 V	344	29.21	19.69

REMARKS:

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

4.3 TRANSMIT POWER MEASUREMENT

4.3.1 LIMITS OF TRANSMIT POWER MEASUREMENT

Operation Band	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 : Sep. 11, 2014

4.3.3 TEST PROCEDURE

FOR POWER OUTPUT MEASUREMENT

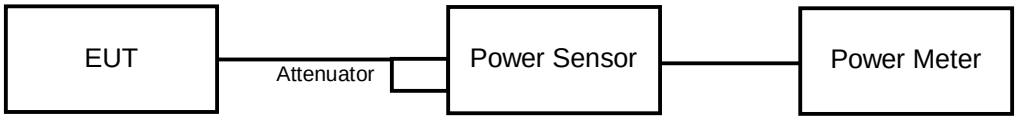
Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP

FOR POWER OUTPUT MEASUREMENT



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

802.11a

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
36	5180	17.47	18.18	17.96	184.13	22.65	30.00	PASS
40	5200	18.01	18.59	18.37	204.225	23.10	30.00	PASS
48	5240	18.13	18.27	18.11	196.87	22.94	30.00	PASS
149	5745	17.47	17.14	16.19	149.199	21.74	30.00	PASS
157	5785	18.76	19.11	18.02	220.019	23.42	30.00	PASS
165	5825	17.79	19.17	18.07	206.842	23.16	30.00	PASS

802.11ac (VHT20)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
36	5180	17.02	17.61	17.53	164.651	22.17	30.00	PASS
40	5200	17.02	17.58	17.46	163.349	22.13	30.00	PASS
48	5240	17.07	17.36	17.25	158.471	22.00	30.00	PASS
149	5745	15.93	15.45	14.77	104.241	20.18	30.00	PASS
157	5785	17.92	17.83	17.19	174.978	22.43	30.00	PASS
165	5825	17.89	17.84	17.25	175.42	22.44	30.00	PASS

802.11ac (VHT40)

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
38	5190	12.12	12.08	12.21	49.071	16.91	30.00	PASS
46	5230	16.01	16.61	16.52	130.591	21.16	30.00	PASS
151	5755	13.64	12.96	13.06	63.121	18.00	30.00	PASS
159	5795	16.91	16.17	16.28	132.953	21.24	30.00	PASS

802.11ac (VHT80)

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
42	5210	11.01	11.46	11.69	41.371	16.17	30.00	PASS
155	5775	12.76	12.93	13.07	58.791	17.69	30.00	PASS

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	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 : Sep. 11, 2014

4.4.3 TEST PROCEDURES

802.11a, 802.11ac (VHT20)

※For U-NII-1:

Using method SA-1

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

※For U-NII-3:

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 300 kHz, Set VBW ≥ 1 MHz, Detector = RMS
3. Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
4. Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where BWCF = 10log(500 kHz/300kHz)
5. Sweep time = auto, trigger set to “free run”.
6. Trace average at least 100 traces in power averaging mode.
7. Record the max value

802.11ac (VHT40), 802.11ac (VHT80)

※For U-NII-1:

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 add 10 log (1/duty cycle)

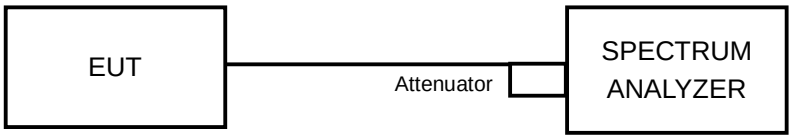
※For U-NII-3:

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 300 kHz, Set VBW ≥ 1 MHz, Detector = RMS
3. Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
4. Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where BWCF = 10log(500 kHz/300kHz)
5. Sweep time = auto, trigger set to “free run”.
6. Trace average at least 100 traces in power averaging mode.
7. Record the max value and add 10 log (1/duty cycle)

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

Same as 4.3.6

4.4.7 TEST RESULTS

For U-NII-1:
802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	PSD (dBm)			TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS/FAIL
		CHAIN 0	CHAIN 1	CHAIN 2			
36	5180	2.66	5.02	4.21	8.84	14.59	PASS
40	5200	3.55	5.85	4.14	9.40	14.59	PASS
48	5240	3.74	5.84	4.02	9.41	14.59	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] = 8.41dBi > 6dBi , so the power density limit shall be reduced to 17-(8.41-6) = 14.59dBm.

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	2.36	3.61	4.83	8.49	14.59	PASS
40	5200	2.75	3.59	4.17	8.31	14.59	PASS
48	5240	2.80	3.37	3.52	8.01	14.59	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] = 8.41dBi > 6dBi , so the power density limit shall be reduced to 17-(8.41-6) = 14.59dBm.

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	-5.04	-4.52	-3.50	0.10	0.57	14.59	PASS
46	5230	-0.97	-0.55	1.06	0.10	4.81	14.59	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.

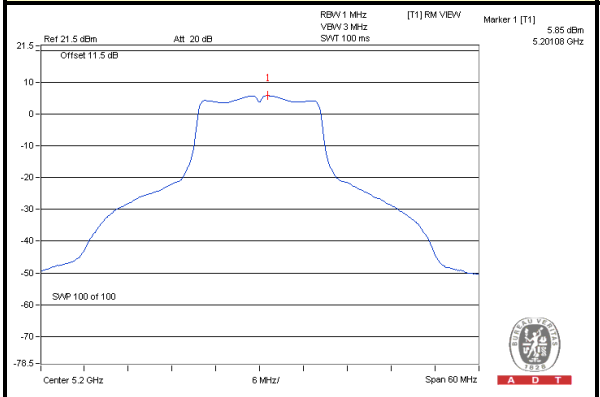
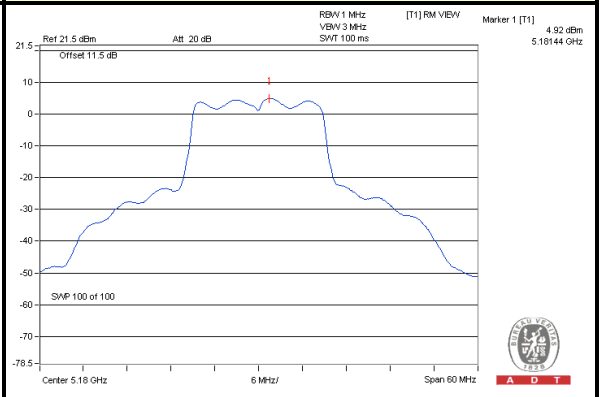
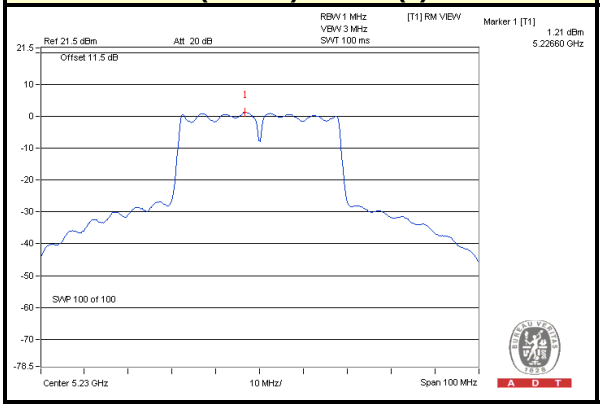
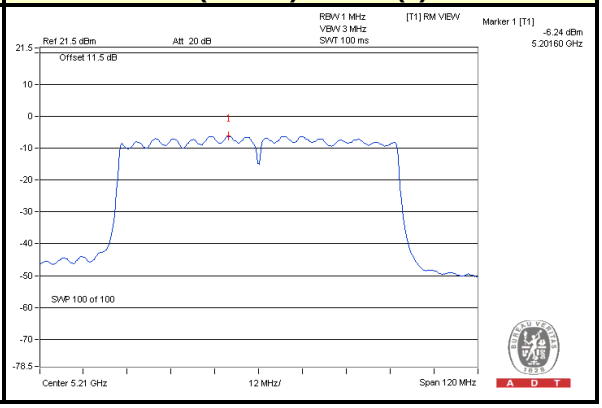
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 3] = 8.41dBi > 6dBi , so the power density limit shall be reduced to 17-(8.41-6) = 14.59dBm.

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	-8.81	-6.90	-6.37	0.19	0.57	14.59	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] = 8.41dBi > 6dBi , so the power density limit shall be reduced to 17-(8.41-6) = 14.59dBm.

SPECTRUM PLOT OF WORST VALUE	
802.11a / Chain(1) : CH40	**802.11ac (VHT20) / Chain(2) : CH36**
	
802.11ac (VHT40) / Chain(2) : CH46	**802.11ac (VHT80) / Chain(2) : CH42**
	

For U-NII-3:

802.11a

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=2) dB	TOTAL PSD (dBm/500kHz)	LIMIT (dBm/500kHz)	PASS /FAIL
0	149	5745	-4.04	-1.82	4.77	2.95	27.59	PASS
	157	5785	-3.98	-1.76	4.77	3.01	27.59	PASS
	165	5825	-3.75	-1.53	4.77	3.24	27.59	PASS
1	149	5745	-3.09	-0.87	4.77	3.90	27.59	PASS
	157	5785	-1.80	0.42	4.77	5.19	27.59	PASS
	165	5825	-1.51	0.71	4.77	5.48	27.59	PASS
2	149	5745	-4.36	-2.14	4.77	2.63	27.59	PASS
	157	5785	-2.59	-0.37	4.77	4.40	27.59	PASS
	165	5825	-2.64	-0.42	4.77	4.35	27.59	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] = 8.41dBi > 6dBi , so the power density limit shall be reduced to 30-(8.41-6) = 27.59dBm.

802.11ac (VHT20)

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=2) dB	TOTAL PSD (dBm/500kHz)	LIMIT (dBm/500kHz)	PASS /FAIL
0	149	5745	-5.71	-3.49	4.77	1.28	27.59	PASS
	157	5785	-5.46	-3.24	4.77	1.53	27.59	PASS
	165	5825	-4.50	-2.28	4.77	2.49	27.59	PASS
1	149	5745	-5.38	-3.16	4.77	1.61	27.59	PASS
	157	5785	-3.55	-1.33	4.77	3.44	27.59	PASS
	165	5825	-3.34	-1.12	4.77	3.65	27.59	PASS
2	149	5745	-5.88	-3.66	4.77	1.11	27.59	PASS
	157	5785	-3.91	-1.69	4.77	3.08	27.59	PASS
	165	5825	-3.55	-1.33	4.77	3.44	27.59	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] = 8.41dBi > 6dBi , so the power density limit shall be reduced to 30-(8.41-6) = 27.59dBm.

802.11ac (VHT40)

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD W/O DUTY FACTOR		10 log (N=3) dB	DUTY FACTOR (dB)	TOTAL PSD WITH DUTY FACTOR (dBm/500kHz)	LIMIT (dBm/500kHz)	PASS /FAIL
			(dBm/300kHz)	(dBm/500kHz)					
0	151	5745	-11.57	-9.35	4.77	0.10	-4.48	27.59	PASS
	159	5785	-9.58	-7.36	4.77	0.10	-2.49	27.59	PASS
1	151	5745	-11.38	-9.16	4.77	0.10	-4.29	27.59	PASS
	159	5785	-7.70	-5.48	4.77	0.10	-0.61	27.59	PASS
2	151	5745	-10.43	-8.21	4.77	0.10	-3.34	27.59	PASS
	159	5785	-8.04	-5.82	4.77	0.10	-0.95	27.59	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.

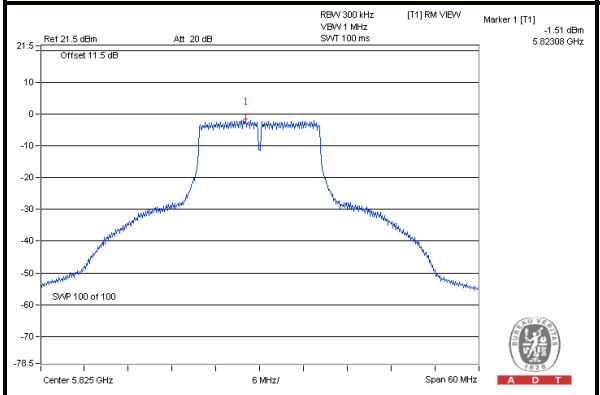
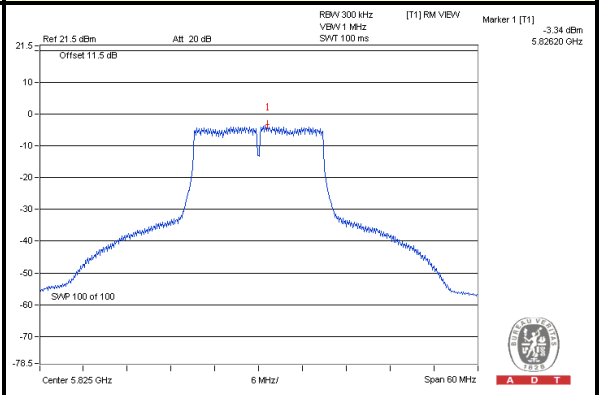
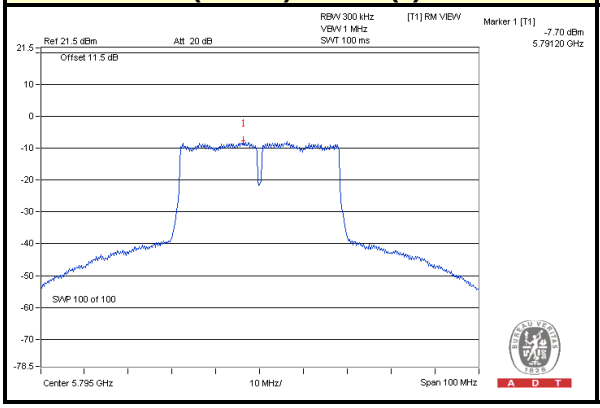
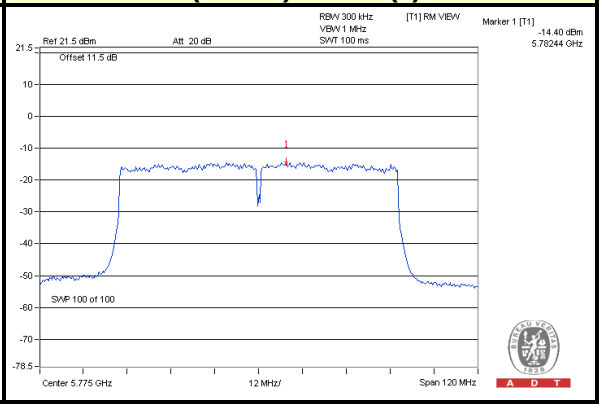
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 3] = 8.41dBi > 6dBi , so the power density limit shall be reduced to 30-(8.41-6) = 27.59dBm.

802.11ac (VHT80)

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD W/O DUTY FACTOR		10 log (N=3) dB	DUTY FACTOR (dB)	TOTAL PSD WITH DUTY FACTOR (dBm/500kHz)	LIMIT (dBm/500kHz)	PASS /FAIL
			(dBm/300kHz)	(dBm/500kHz)					
0	155	5775	-19.00	-16.78	4.77	0.19	-11.82	27.59	PASS
1	155	5775	-14.40	-12.18	4.77	0.19	-7.22	27.59	PASS
2	155	5775	-15.11	-12.89	4.77	0.19	-7.93	27.59	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] = 8.41dBi > 6dBi , so the power density limit shall be reduced to 30-(8.41-6) = 27.59dBm.

SPECTRUM PLOT OF WORST VALUE	
802.11a / Chain(1) : CH165	**802.11ac (VHT20) / Chain(1) : CH165**
	
802.11ac (VHT40) / Chain(1) : CH159	**802.11ac (VHT80) / Chain(1) : CH155**
	

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	FSP 40	100060	May 08, 2014	May 07, 2015
Temperature & Humidity Chamber GIANTFORCE	GTH-150-40-SP-AR	MAA0812-008	Jan. 13, 2014	Jan. 12, 2015

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Sep. 11, 2014

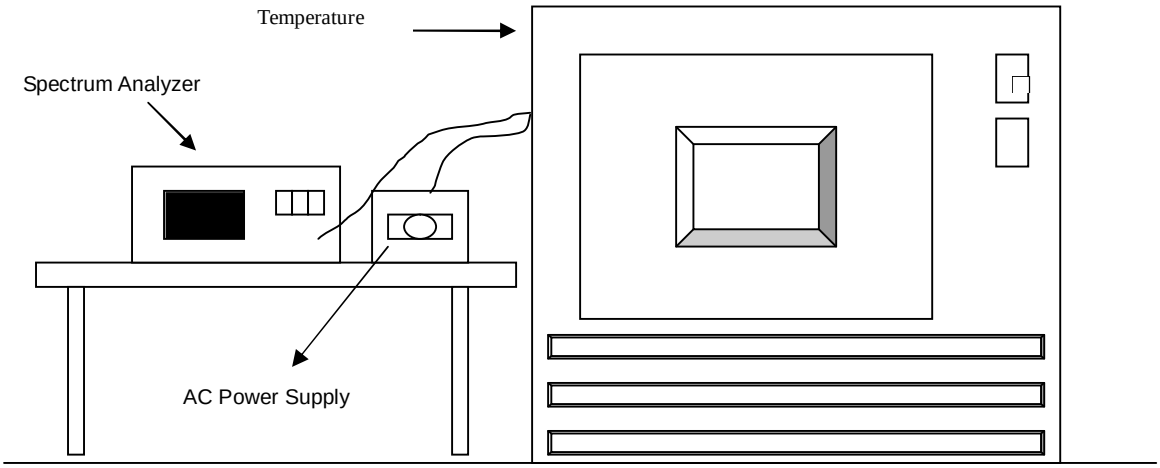
4.5.3 TEST PROCEDURE

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	5239.9862	-0.00026	5239.9872	-0.00024	5239.9885	-0.00022	5239.9907	-0.00018
40	120	5239.9813	-0.00036	5239.9814	-0.00035	5239.9827	-0.00033	5239.9843	-0.00030
30	120	5240.0104	0.00020	5240.0114	0.00022	5240.0099	0.00019	5240.0112	0.00021
20	120	5240.0006	0.00001	5240.001	0.00002	5240.0022	0.00004	5239.999	-0.00002
10	120	5239.9942	-0.00011	5239.9945	-0.00010	5239.9958	-0.00008	5239.9945	-0.00010
0	120	5240.0086	0.00016	5240.0045	0.00009	5240.0048	0.00009	5240.0086	0.00016
-10	120	5239.9899	-0.00019	5239.9872	-0.00024	5239.9884	-0.00022	5239.9907	-0.00018
-20	120	5240.0068	0.00013	5240.0066	0.00013	5240.0025	0.00005	5240.0048	0.00009
-30	120	5240.0065	0.00012	5240.0054	0.00010	5240.0053	0.00010	5240.0036	0.00007

FREQUEMCY STABILITY VERSUS VOLTAGE									
OPERATING FREQUENCY: 5240MHz									
TEMP. (℃)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	%	(MHz)	%	(MHz)	%	(MHz)	%
20	138	5240.0004	0.00001	5240	0.00000	5240.0021	0.00004	5239.9986	-0.00003
	120	5240.0006	0.00001	5240.001	0.00002	5240.0022	0.00004	5239.999	-0.00002
	102	5240.0005	0.00001	5240.0019	0.00004	5240.002	0.00004	5239.9994	-0.00001

4.6 6dB BANDWIDTH MEASUREMENT

4.6.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	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 : Sep. 11, 2014

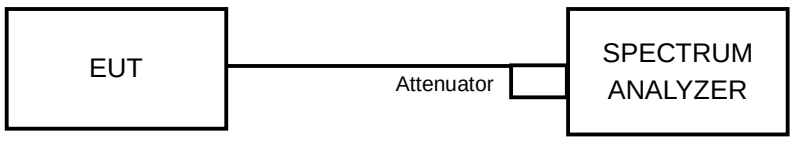
4.6.3 TEST PROCEDURE

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

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SETUP



4.6.6 EUT OPERATING CONDITIONS

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

4.6.7 TEST RESULTS

802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
149	5745	16.40	16.39	16.40	0.5	PASS
157	5785	16.38	16.40	16.36	0.5	PASS
165	5825	16.38	16.39	16.35	0.5	PASS

802.11ac (VHT20)

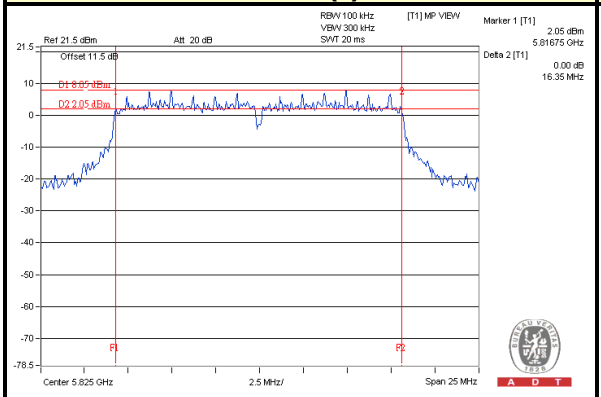
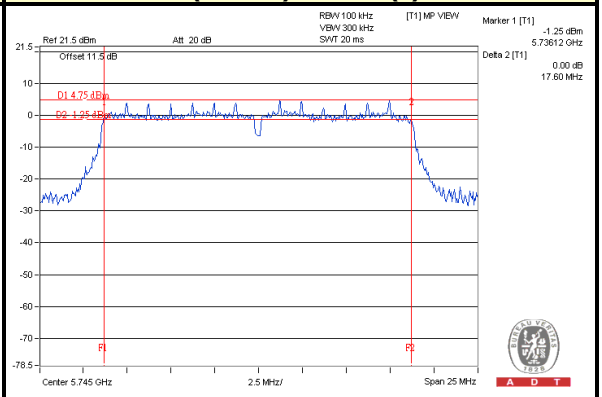
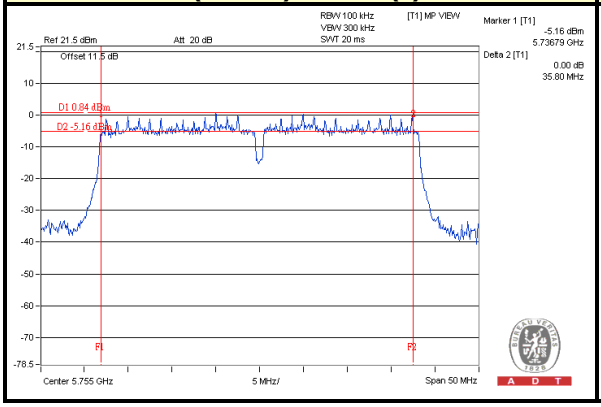
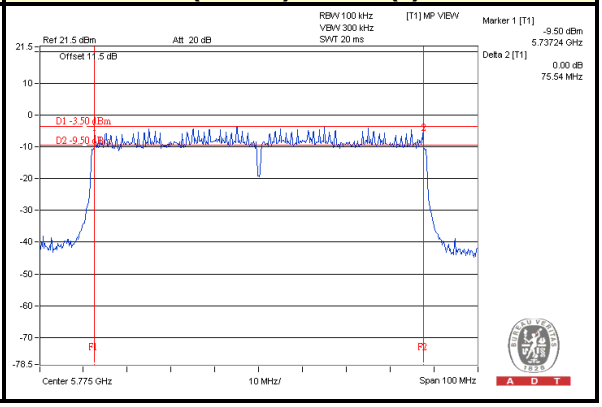
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
149	5745	17.60	17.69	17.67	0.5	PASS
157	5785	17.60	17.66	17.63	0.5	PASS
165	5825	17.61	17.68	17.64	0.5	PASS

802.11ac (VHT40)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
151	5755	36.45	36.43	35.80	0.5	PASS
159	5795	36.38	36.39	36.13	0.5	PASS

802.11ac (VHT80)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
155	5775	75.77	75.72	75.54	0.5	PASS

SPECTRUM PLOT OF WORST VALUE	
802.11a / Chain(2) : CH165	**802.11ac (VHT20) / Chain(0) : CH149**
	
802.11ac (VHT40) / Chain(2) : CH151	**802.11ac (VHT80) / Chain(2) : CH155**
	

5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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

6. INFORMATION ON THE TESTING LABORATORIES

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

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

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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.

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