

FCC Test Report

Report No.: RF150720E02-1

FCC ID: UXX-S4A542A

Test Model: S4A543A

Series Model: S4A542A

Received Date: July 20, 2015

Test Date: July 22 to Aug. 06, 2015

Issued Date: Aug. 20, 2015

Applicant: Cradlepoint, Inc

Address: 1111 W. Jefferson Street, Suite 400, Boise, ID 83702 USA

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.

Test Location (3): E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City, Taiwan
R.O.C.



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification. The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

Table of Contents

Release Control Record	4
1 Certificate of Conformity	5
2 Summary of Test Results	6
2.1 Measurement Uncertainty	6
2.2 Modification Record	6
3 General Information	7
3.1 General Description of EUT	7
3.2 Description of Test Modes	10
3.2.1 Test Mode Applicability and Tested Channel Detail	11
3.3 Duty Cycle of Test Signal	14
3.4 Description of Support Units	15
3.4.1 Configuration of System under Test	16
3.5 General Description of Applied Standard	19
4 Test Types and Results	20
4.1 Radiated Emission and Bandedge Measurement	20
4.1.1 Limits of Radiated Emission and Bandedge Measurement	20
4.1.2 Test Instruments	21
4.1.3 Test Procedures	23
4.1.4 Deviation from Test Standard	23
4.1.5 Test Setup	24
4.1.6 EUT Operating Conditions	25
4.1.7 Test Results	26
4.2 Conducted Emission Measurement	45
4.2.1 Limits of Conducted Emission Measurement	45
4.2.2 Test Instruments	45
4.2.3 Test Procedures	46
4.2.4 Deviation from Test Standard	46
4.2.5 Test Setup	46
4.2.6 EUT Operating Conditions	46
4.2.7 Test Results (Mode 1)	47
4.2.8 Test Results (Mode 2)	49
4.2.9 Test Results (Mode 3)	51
4.2.10 Test Results (Mode 4)	53
4.3 Transmit Power Measurement	55
4.3.1 Limits of Transmit Power Measurement	55
4.3.2 Test Setup	55
4.3.3 Test Instruments	56
4.3.4 Test Procedures	56
4.3.5 Deviation from Test Standard	56
4.3.6 EUT Operating Conditions	56
4.3.7 Test Results	57
4.4 Peak Power Spectral Density Measurement	60
4.4.1 Limits of Peak Power Spectral Density Measurement	60
4.4.2 Test Setup	60
4.4.3 Test Instruments	60
4.4.4 Test Procedures	61
4.4.5 Deviation from Test Standard	61
4.4.6 EUT Operating Conditions	61
4.4.7 Test Results	62
4.5 Frequency Stability Measurement	68
4.5.1 Limits of Frequency Stability Measurement	68
4.5.2 Test Setup	68
4.5.3 Test Instruments	68

4.5.4 Test Procedures.....	68
4.5.5 Deviation from Test Standard	68
4.5.6 EUT Operating Conditions.....	68
4.5.7 Test Results	69
4.6 6dB Bandwidth Measurment.....	70
4.6.1 Limits of 6dB Bandwidth Measurement.....	70
4.6.2 Test Setup.....	70
4.6.3 Test Instruments	70
4.6.4 Test Procedures.....	70
4.6.5 Deviation from Test Standard	70
4.6.6 EUT Operating Conditions.....	70
4.6.7 Test Results	71
5 Pictures of Test Arrangements.....	73
Appendix – Information on the Testing Laboratories	74



A D T

Release Control Record

Issue No.	Description	Date Issued
RF150720E02-1	Original release.	Aug. 20, 2015



A D T

1 Certificate of Conformity

Product: Advanced Edge Router

Brand: cradlepoint

Test Model: S4A543A

Series Model: S4A542A

Sample Status: ENGINEERING SAMPLE

Applicant: Cradlepoint, Inc

Test Date: July 22 to Aug. 06, 2015

Standard: 47 CFR FCC Part 15, Subpart E (Section 15.407)
ANSI C63.10: 2013

The above equipment 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 : Phoenix Huang, **Date:** Aug. 20, 2015
Phoenix Huang / Specialist

Approved by : May Chen, **Date:** Aug. 20, 2015
May Chen / Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (SECTION 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -3.46dB at 0.15781MHz.
15.407(b)(1/2/3/4/6)	Radiated Emissions & Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.1dB at 5101.00MHz, 5150.00MHz, 5715.00MHz, 5725.00MHz & 5860.00MHz.
15.407(a)(1/2/3)	Max Average 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	For WLAN: 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:

Measurement	Frequency	Expended Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.86 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.37 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.65 dB
	6GHz ~ 18GHz	3.88 dB
	18GHz ~ 40GHz	4.11 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Advanced Edge Router
Brand	cradlepoint
Test Model	S4A543A
Series Model	S4A542A
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	12Vdc from power adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode only
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 300Mbps 802.11ac: up to 866.7Mbps
Operating Frequency	2.4GHz: 2.412GHz ~ 2.462GHz 5GHz: 5.18GHz ~ 5.24GHz, 5.745GHz ~ 5.825GHz
Number of Channel	2.4GHz: 802.11b, 802.11g, 802.11n (HT20): 11 802.11n (HT40): 7 5GHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 9 802.11n (HT40), 802.11ac (VHT40): 4 802.11ac (VHT80): 2
Output Power	CDD Mode 2.4GHz: 802.11b: 710.332mW 802.11g: 643.541mW 802.11n (HT20): 636.651mW 802.11n (HT40): 195.239mW 5GHz: 802.11a: 462.954mW 802.11ac (VHT20): 414.506mW 802.11ac (VHT40): 333.183mW 802.11ac (VHT80): 53.35mW Beamforming Mode 2.4GHz: 802.11n (HT20): 636.651mW 802.11n (HT40): 195.239mW 5GHz: 802.11ac (VHT20): 414.506mW 802.11ac (VHT40): 333.183mW 802.11ac (VHT80): 53.35mW

Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	RJ45 cable (1.5m, unshielded) x 1

Note:

1. There are WLAN and 3G/LTE technology used for the EUT.

2. WLAN/3G/LTE coexistence mode:

Condition	Technology			
1	WLAN(2.4GHz)	WLAN(5GHz)	3G (Model No.: MC7354)	3G (Model No.: MC400LPE)
2	WLAN(2.4GHz)	WLAN(5GHz)	3G (Model No.: MC7354)	LTE (Model No.: MC400LPE)
3	WLAN(2.4GHz)	WLAN(5GHz)	LTE (Model No.: MC7354)	3G (Model No.: MC400LPE)
4	WLAN(2.4GHz)	WLAN(5GHz)	LTE (Model No.: MC7354)	LTE (Model No.: MC400LPE)

Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.

3. The EUT has two model names which are identical to each other in all aspects except for the following table: (USB device apply for mobile AP with 4G module, Model No.: MC400LPE test only not sale together)

Model No.	WiFi Function	3G/LTE (3G module: FCC ID: N7NMC7355, Model No.: MC7354)	3G/LTE (with optional 3G USB device: Contains FCC ID: N7NMC7355, Model no.: MC400LPE)
S4A542A	V	-	V
S4A543A	V	V	V

From the above models, model: **S4A543A** was selected as the representative model for the test and its data is recorded in this report.

4. The EUT must be supplied with a power adapter and following four different models could be chosen as following table:

No	Brand Name	Model No.	Spec.
1	Ktec	KSAS0361200300D5	Input: 100-240Vac, 50/60Hz, 1.0A Output: 12Vdc, 3000mA DC output cable: 1.8m, unshielded
2	Ktec	KSAS0501200400M2	Input: 100-240Vac, 50/60Hz, 1.2A AC output cable: 2m, unshielded Output: 12Vdc, 4000mA DC output cable: 1.2m, unshielded
3	FSP GROUP, INC.	FSP040-DHMN2	Input: 100-240Vac, 50/60Hz, 1.2A Output: 12Vdc, 3400mA DC output cable: 1.5m, unshielded
4	FSP GROUP, INC.	FSP048-RHAN2	Input: 100-240Vac, 50/60Hz, 1.5A AC output cable: 1.8m, unshielded Output: 12Vdc, 4000mA DC output cable: 1.55m, unshielded with one core

From the above adapters, the worst radiated emission test was found in **Adapter 4**. Therefore only the test data of the mode was recorded in this report.

5. The EUT incorporates a MIMO function with beamforming.

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

Note: 1. 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)
2. From the above modulation modes, the 802.11a, b, g without beamforming.

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

For WLAN used						
Antenna No.	Transmitter Circuit	Model	Antenna Gain(dBi)	Frequency range	Antenna Type	Connector Type
WIFI Antenna 1	2.4G Chain 0	RFA-25-G170-70B-154	3.5	2400~24835MHz	Dipole	i-pex(MHF)
	5G Chain 1		4.9	5150~5250MHz		
			4.9	5725~5850MHz		
WIFI Antenna 2	2.4G Chain 1	RFA-25-G170-70-64	3.5	2400~24835MHz	Dipole	
	5G Chain 0		4.9	5150~5250MHz		
			4.9	5725~5850MHz		
For LTE used						
Antenna No.		Model	Antenna Gain(dBi)	Frequency range	Antenna Type	Connector Type
LTE Antenna 1		YWX-6241SAXX-711C	2	698~960MHz	Dipole	SMA
LTE Antenna 1			3	1710~2700MHz	Dipole	SMA
LTE Antenna 2		RFA-LTE-T196-U-B70	-2	698~960MHz	Dipole	SMA
LTE Antenna 2			1	1710~2700MHz	Dipole	SMA
Note: 1. For LTE: Antenna No.: 1 was selected as representative antenna for the test.						

7. The above EUT information is 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

FOR 5180 ~ 5240MHz

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	5210MHz

FOR 5745 ~ 5825MHz:

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

Channel	Frequency	Channel	Frequency
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz		

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

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
1	√	√	√	√	With Adapter 4
2	-	-	√	-	With Adapter 1
3	-	-	√	-	With Adapter 2
4	-	-	√	-	With Adapter 3

Where **RE≥1G**: Radiated Emission above 1GHz

RE<1G: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

Radiated Emission Test (Above 1GHz):

- ☒ 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	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6
802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
802.11ac (VHT40)		38 to 46	38, 46	OFDM	BPSK	13.5
802.11ac (VHT80)		42	42	OFDM	BPSK	29.3
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6
802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)		155	155	OFDM	BPSK	29.3

Radiated Emission Test (Below 1GHz):

- ☒ 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	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	5180-5240, 5745-5825	36 to 48, 149 to 165	48	OFDM	BPSK	6

Power Line Conducted Emission Test:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

CDD Mode						
MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	5180-5240, 5745-5825	36 to 48, 149 to 165	48	OFDM	BPSK	6

Antenna Port Conducted Measurement:

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ 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						
For Max Average Transmit Power, Peak Power Spectral Density & 6dB bandwidth						
MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6
802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
802.11ac (VHT40)		38 to 46	38, 46	OFDM	BPSK	13.5
802.11ac (VHT80)		42	42	OFDM	BPSK	29.3
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6
802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)		155	155	OFDM	BPSK	29.3
Beamforming Mode						
For Max Average Transmit Power						
MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11ac (VHT20)	5180-5240	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
802.11ac (VHT20)	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)		155	155	OFDM	BPSK	29.3

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE $\geq$ 1G	25deg. C, 68%RH	120Vac, 60Hz	Weiwei Lo
RE<1G	25deg. C, 60%RH	120Vac, 60Hz	Weiwei Lo
PLC	26deg. C, 54%RH	120Vac, 60Hz	Jyunchun Lin
APCM	25deg. C, 60%RH	120Vac, 60Hz	Weiwei Lo

3.3 Duty Cycle of Test Signal

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

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

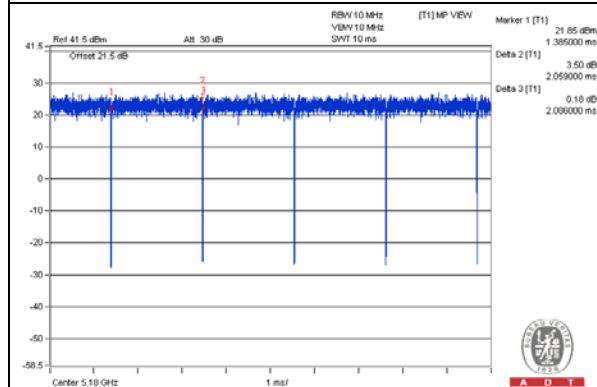
802.11a: Duty cycle = $2.059 \text{ ms} / 2.086 \text{ ms} = 0.987$

802.11ac (VHT20): Duty cycle = $1.913 \text{ ms} / 1.939 \text{ ms} = 0.987$

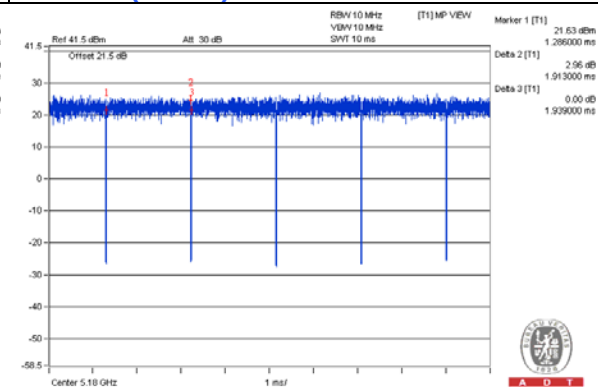
802.11ac (VHT40): Duty cycle = $0.938 \text{ ms} / 0.966 \text{ ms} = 0.971$, Duty factor = $10 * \log(1/0.971) = 0.13$

802.11ac (VHT80): Duty cycle = $0.452 \text{ ms} / 0.479 \text{ ms} = 0.944$, Duty factor = $10 * \log(1/0.944) = 0.25$

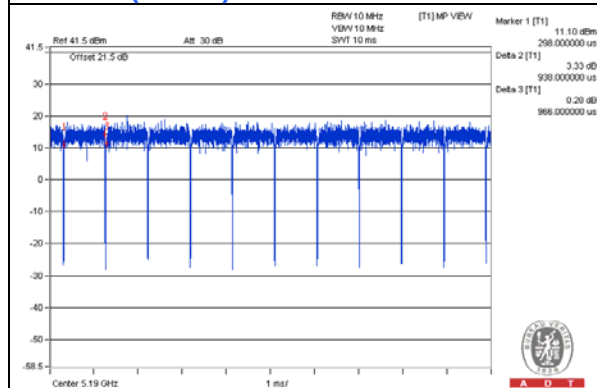
802.11a



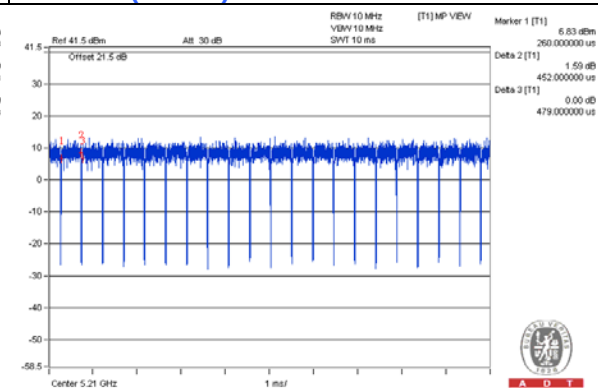
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



3.4 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.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	iPod shuffle	Apple	MC749TA/A	CC4DMFJUDFDM	NA	Provided by Lab
B.	NOTEBOOK COMPUTER	DELL	E5430	4YV4VY1	FCC DoC	Provided by Lab
C.	NOTEBOOK COMPUTER	DELL	E5430	HYV4VY1	FCC DoC	Provided by Lab
D.	HUB	ZyXEL	ES-116P	S060H02000215	FCC DoC	Provided by Lab
E.	USB device apply for mobile AP with 4G module	cradlepoint	MC400LPE	NA	N7NMC7355	Supplied by Client

Note:

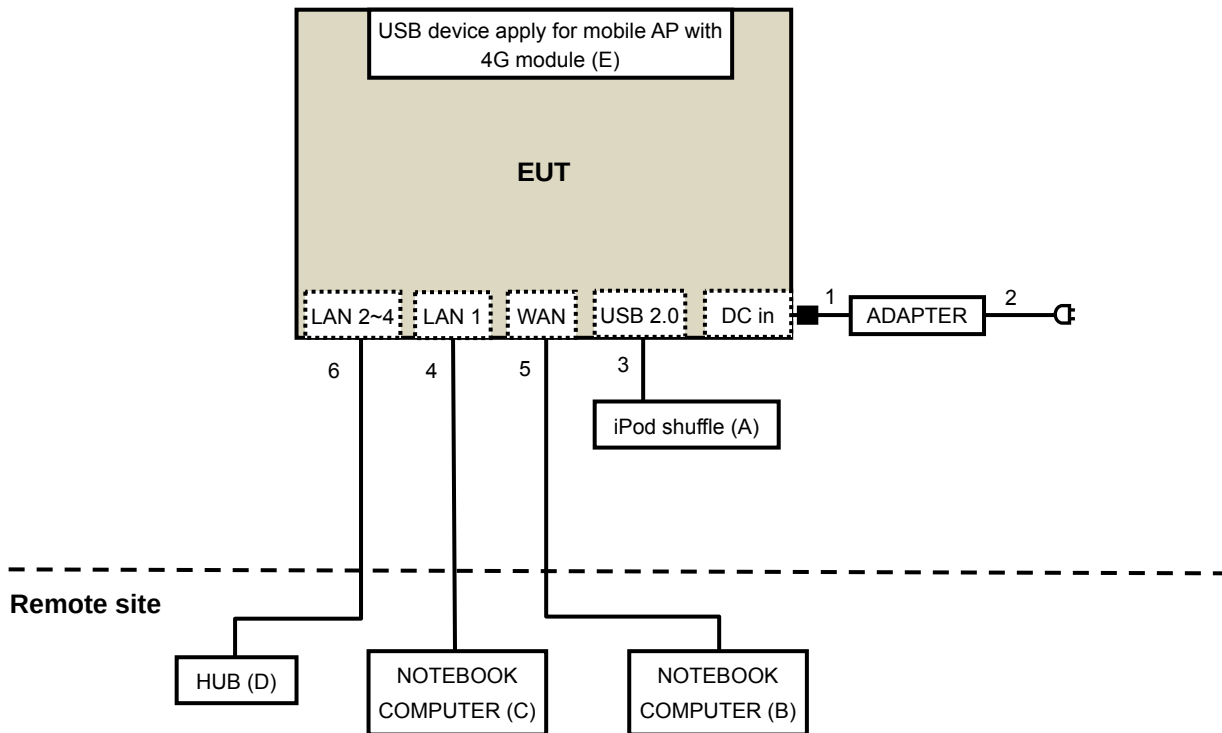
1. All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC (for Mode 1)	1	1.55	No	1	Supplied by Client
	DC (for Mode 2)	1	1.8	No	0	Supplied by Client
	DC (for Mode 3)	1	1.2	No	0	Supplied by Client
	DC (for Mode 4)	1	1.5	No	0	Supplied by Client
2.	AC (for Mode 1)	1	1.8	No	0	Supplied by Client
	AC (for Mode 3)	1	2	No	0	Supplied by Client
3.	USB	1	0.1	Yes	0	Provided by Lab
4.	RJ-45	1	10	No	0	Provided by Lab
5.	RJ-45	1	10	No	0	Provided by Lab
6.	RJ-45	3	10	No	0	Provided by Lab

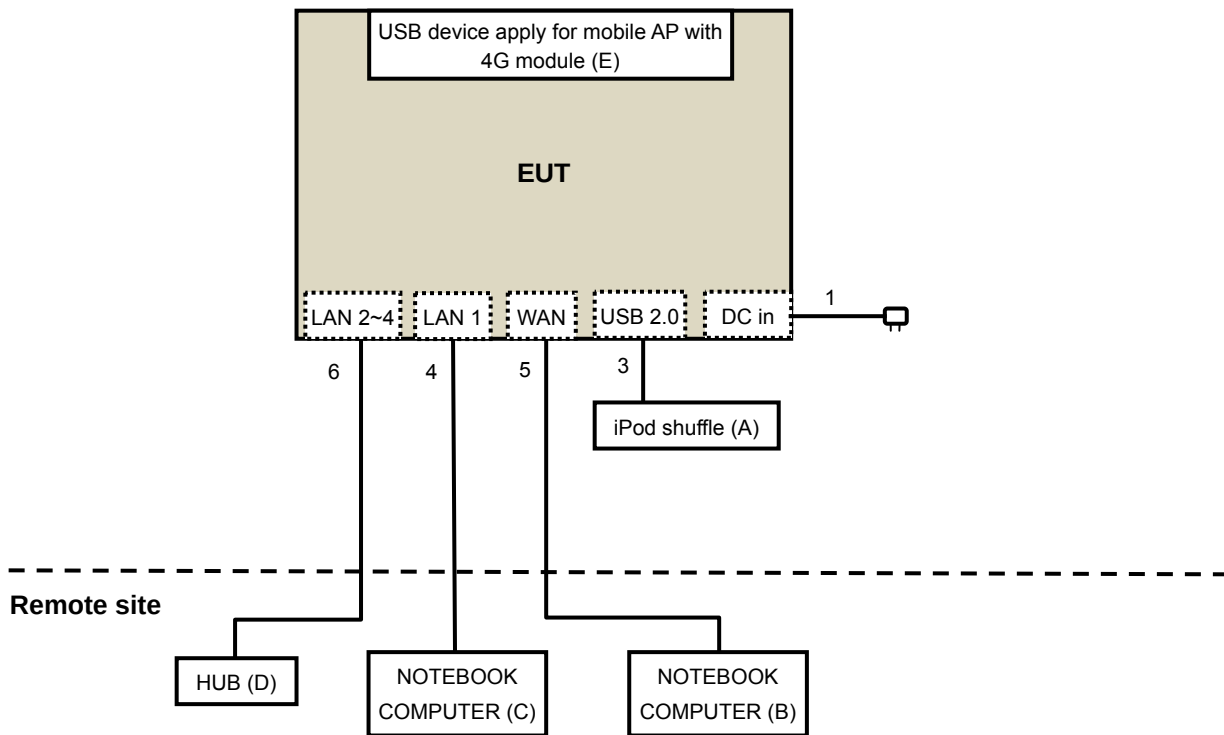
Note: The core(s) is(are) originally attached to the cable(s).

3.4.1 Configuration of System under Test

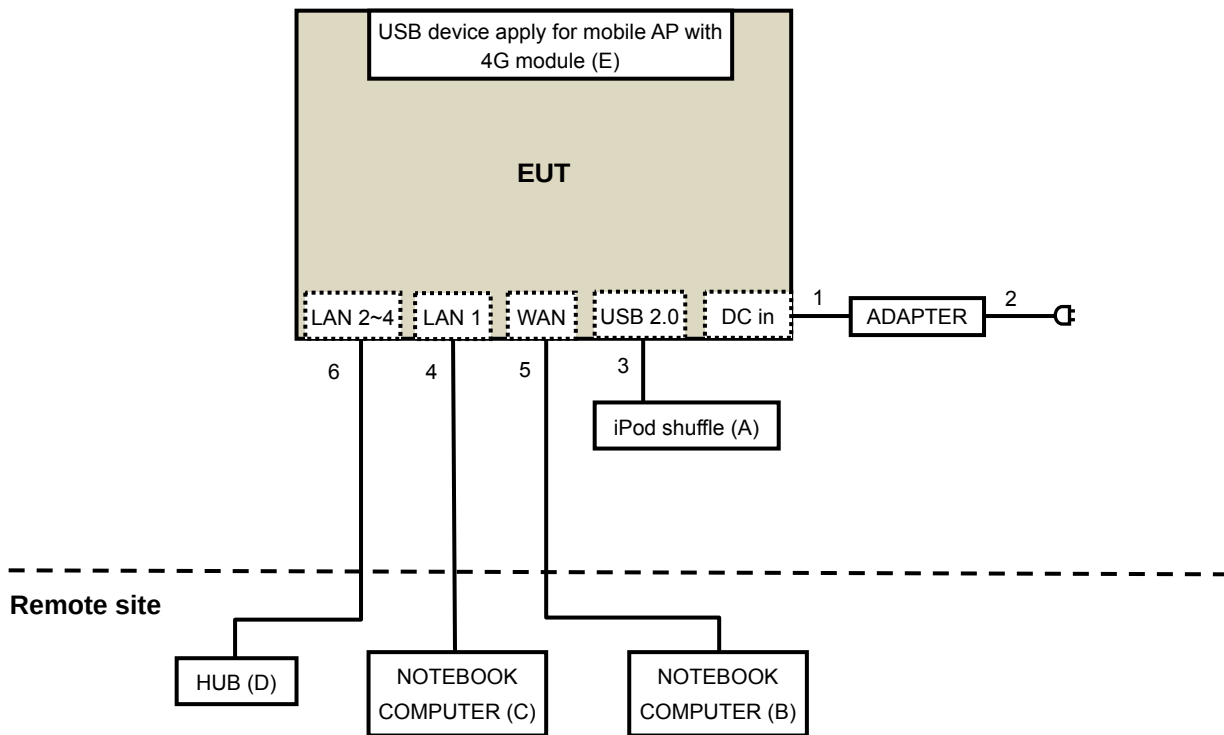
For Mode 1:



For Mode 2, 4:



For Mode 3:



3.5 General Description of Applied Standard

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 Procedure New Rules v01

662911 D01 Multiple Transmitter Output v02r01

ANSI C63.10-2013

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.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 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:

- The lower limit shall apply at the transition frequencies.
- Emission level (dBuV/m) = 20 log Emission level (uV/m).
- 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.

LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

APPLICABLE TO	LIMIT	
789033 D02 General UNII Test Procedure New Rules v01	FIELD STRENGTH AT 3m	
	PK:74 (dBuV/m)	AV:54 (dBuV/m)
APPLICABLE TO	EIRP LIMIT	EQUIVALENT FIELD STRENGTH AT 3m
15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBuV/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 (dBuV/m) ^{*1} PK:78.2 (dBuV/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:

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

4.1.2 Test Instruments

For Above 1GHz:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210105	July 24, 2015	July 23, 2016
Horn_Antenna AISI	AIH.8018	000032009111 0	Feb. 09, 2015	Feb. 08, 2016
Pre-Amplifier Agilent	8449B	3008A02578	June 23, 2015	June 22, 2016
RF Cable	NA	131205 131216 131217 SNMY23684/ 4	Jan. 16, 2015	Jan. 15, 2016
Spectrum Analyzer R&S	FSV40	100964	June 26, 2015	June 25, 2016
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Dec. 12, 2014	Dec. 11, 2015
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Feb. 05, 2015	Feb. 04, 2016
RF Cable	NA	329751/4 RF104-204	Dec. 11, 2014	Dec. 10, 2015
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA
SPECTRUM ANALYZER R&S	FSP 40	100060	May 08, 2015	May 07, 2016
Power meter Anritsu	ML2495A	1014008	Apr. 28, 2015	Apr. 27, 2016
Power sensor Anritsu	MA2411B	0917122	Apr. 28, 2015	Apr. 27, 2016
Temperature & Humidity Chamber GIANTFORCE	GTH-150-40-S P-AR	MAA0812-00 8	Jan. 12, 2015	Jan. 11, 2016

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 966 Chamber No. G.
3. The FCC Site Registration No. is 966073.
4. The VCCI Site Registration No. is G-137.
5. The CANADA Site Registration No. is IC 7450H-2.
6. Tested Date: July 24 to Aug. 06, 2015

For Below 1GHz:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210202	Dec. 12, 2014	Dec. 11, 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. 06, 2015	Feb. 05, 2016
RF Cable	8D-FB	CHGCAB-001 -1 CHGCAB-001 -2	Oct. 04, 2014	Oct. 03, 2015
	RF-141	CHGCAB-004	Oct. 04, 2014	Oct. 03, 2015
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. G.
3. The FCC Site Registration No. is 966073.
4. The CANADA Site Registration No. is IC 7450H-2.
5. Tested Date: July 22, 2015

4.1.3 Test Procedures

- a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) 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:

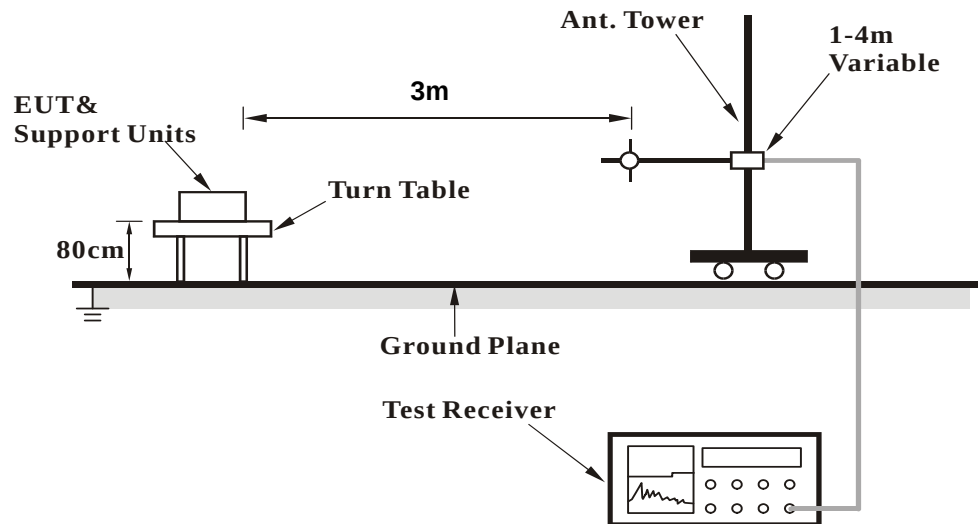
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

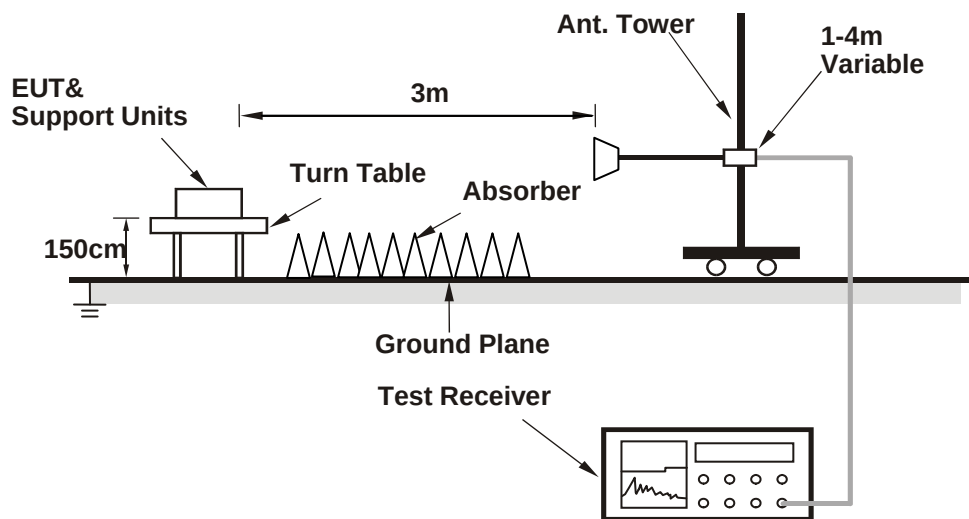
No deviation.

4.1.5 Test Setup

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT Operating Conditions

1. Placed the EUT on the testing table.
2. Connect the EUT with the support unit C (Notebook Computer) which is placed on a testing table.
3. The communication partner run test program "Mtool.exe[v2.0.1.0]" to enable EUT under transmission/receiving condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1GHz Data

802.11a

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5021.00	58.9 PK	74.0	-15.1	1.33 H	91	49.41	9.49
2	5021.00	49.2 AV	54.0	-4.8	1.33 H	91	39.71	9.49
3	5101.00	64.5 PK	74.0	-9.5	1.25 H	100	54.83	9.67
4	5101.00	53.9 AV	54.0	-0.1	1.25 H	100	44.23	9.67
5	5150.00	73.3 PK	74.0	-0.7	1.35 H	97	63.33	9.97
6	5150.00	53.2 AV	54.0	-0.8	1.35 H	97	43.23	9.97
7	*5180.00	118.8 PK			1.27 H	93	108.64	10.16
8	*5180.00	109.2 AV			1.27 H	93	99.04	10.16
9	#10360.00	54.5 PK	74.0	-19.5	1.39 H	278	37.52	16.98
10	#10360.00	43.4 AV	54.0	-10.6	1.39 H	278	26.42	16.98
11	15540.00	59.6 PK	74.0	-14.4	1.50 H	278	37.67	21.93
12	15540.00	49.5 AV	54.0	-4.5	1.50 H	278	27.57	21.93
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5021.00	53.0 PK	74.0	-21.0	1.55 V	99	43.51	9.49
2	5021.00	39.7 AV	54.0	-14.3	1.55 V	99	30.21	9.49
3	5101.00	58.1 PK	74.0	-15.9	1.22 V	211	48.43	9.67
4	5101.00	48.2 AV	54.0	-5.8	1.22 V	211	38.53	9.67
5	5150.00	66.0 PK	74.0	-8.0	1.45 V	122	56.03	9.97
6	5150.00	48.3 AV	54.0	-5.7	1.45 V	122	38.33	9.97
7	*5180.00	110.9 PK			1.55 V	295	100.74	10.16
8	*5180.00	102.3 AV			1.55 V	295	92.14	10.16
9	#10360.00	55.1 PK	74.0	-18.9	1.56 V	286	38.12	16.98
10	#10360.00	43.5 AV	54.0	-10.5	1.56 V	286	26.52	16.98
11	15540.00	60.0 PK	74.0	-14.0	1.31 V	195	38.07	21.93
12	15540.00	49.2 AV	54.0	-4.8	1.31 V	195	27.27	21.93

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	5120.00	63.9 PK	74.0	-10.1	1.89 H	294	54.12	9.78
2	5120.00	53.6 AV	54.0	-0.4	1.89 H	294	43.82	9.78
3	*5200.00	119.2 PK			1.84 H	283	108.94	10.26
4	*5200.00	108.4 AV			1.84 H	283	98.14	10.26
5	5350.00	57.7 PK	74.0	-16.3	1.64 H	271	47.15	10.55
6	5350.00	47.4 AV	54.0	-6.6	1.64 H	271	36.85	10.55
7	#10400.00	54.3 PK	74.0	-19.7	1.43 H	274	37.24	17.06
8	#10400.00	43.3 AV	54.0	-10.7	1.43 H	274	26.24	17.06
9	15600.00	59.8 PK	74.0	-14.2	1.52 H	282	37.52	22.28
10	15600.00	49.6 AV	54.0	-4.4	1.52 H	282	27.32	22.28

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	5120.00	66.5 PK	74.0	-7.5	1.19 V	212	56.72	9.78
2	5120.00	48.8 AV	54.0	-5.2	1.19 V	212	39.02	9.78
3	*5200.00	111.3 PK			1.58 V	303	101.04	10.26
4	*5200.00	101.5 AV			1.58 V	303	91.24	10.26
5	5350.00	53.0 PK	74.0	-21.0	1.49 V	125	42.45	10.55
6	5350.00	40.0 AV	54.0	-14.0	1.49 V	125	29.45	10.55
7	#10400.00	55.4 PK	74.0	-18.6	1.61 V	294	38.34	17.06
8	#10400.00	43.9 AV	54.0	-10.1	1.61 V	294	26.84	17.06
9	15600.00	59.8 PK	74.0	-14.2	1.33 V	185	37.52	22.28
10	15600.00	49.2 AV	54.0	-4.8	1.33 V	185	26.92	22.28

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	63.2 PK	74.0	-10.8	1.61 H	292	53.23	9.97
2	5150.00	52.7 AV	54.0	-1.3	1.61 H	292	42.73	9.97
3	*5240.00	122.0 PK			1.75 H	267	111.67	10.33
4	*5240.00	112.0 AV			1.75 H	267	101.67	10.33
5	5350.00	65.7 PK	74.0	-8.3	1.64 H	293	55.15	10.55
6	5350.00	53.7 AV	54.0	-0.3	1.64 H	293	43.15	10.55
7	#10480.00	54.8 PK	74.0	-19.2	1.35 H	279	38.07	16.73
8	#10480.00	43.8 AV	54.0	-10.2	1.35 H	279	27.07	16.73
9	15720.00	60.0 PK	74.0	-14.0	1.53 H	278	37.37	22.63
10	15720.00	49.5 AV	54.0	-4.5	1.53 H	278	26.87	22.63

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	52.7 PK	74.0	-21.3	1.49 V	127	42.73	9.97
2	5150.00	39.7 AV	54.0	-14.3	1.49 V	127	29.73	9.97
3	*5240.00	114.1 PK			1.65 V	249	103.77	10.33
4	*5240.00	105.1 AV			1.65 V	249	94.77	10.33
5	5350.00	66.6 PK	74.0	-7.4	1.16 V	210	56.05	10.55
6	5350.00	48.7 AV	54.0	-5.3	1.16 V	210	38.15	10.55
7	#10480.00	56.0 PK	74.0	-18.0	1.60 V	294	39.27	16.73
8	#10480.00	44.3 AV	54.0	-9.7	1.60 V	294	27.57	16.73
9	15720.00	59.8 PK	74.0	-14.2	1.16 V	210	37.17	22.63
10	15720.00	49.3 AV	54.0	-4.7	1.16 V	210	26.67	22.63

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	65.4 PK	74.0	-8.6	1.47 H	283	53.87	11.53
2	#5715.00	53.9 AV	54.0	-0.1	1.47 H	283	42.37	11.53
3	#5725.00	78.1 PK	78.2	-0.1	1.49 H	287	66.55	11.55
4	*5745.00	117.6 PK			1.66 H	290	105.97	11.63
5	*5745.00	107.6 AV			1.66 H	290	95.97	11.63
6	11490.00	54.9 PK	74.0	-19.1	1.44 H	284	37.60	17.30
7	11490.00	43.8 AV	54.0	-10.2	1.44 H	284	26.50	17.30
8	#17235.00	59.5 PK	74.0	-14.5	1.50 H	288	32.69	26.81
9	#17235.00	49.4 AV	54.0	-4.6	1.50 H	288	22.59	26.81
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5715.00	58.5 PK	74.0	-15.5	1.27 V	223	46.97	11.53
2	#5715.00	47.6 AV	54.0	-6.4	1.27 V	223	36.07	11.53
3	#5725.00	62.3 PK	78.2	-15.9	1.46 V	137	50.75	11.55
4	*5745.00	109.7 PK			1.57 V	296	98.07	11.63
5	*5745.00	100.7 AV			1.57 V	296	89.07	11.63
6	11490.00	56.0 PK	74.0	-18.0	1.61 V	299	38.70	17.30
7	11490.00	44.1 AV	54.0	-9.9	1.61 V	299	26.80	17.30
8	#17235.00	60.5 PK	74.0	-13.5	1.34 V	203	33.69	26.81
9	#17235.00	49.8 AV	54.0	-4.2	1.34 V	203	22.99	26.81

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
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	#5715.00	67.9 PK	68.2	-0.3	1.54 H	289	56.37	11.53
2	*5785.00	118.3 PK			1.52 H	289	106.56	11.74
3	*5785.00	108.8 AV			1.52 H	289	97.06	11.74
4	#5860.00	62.6 PK	74.0	-11.4	1.51 H	289	50.85	11.75
5	#5860.00	52.7 AV	54.0	-1.3	1.51 H	289	40.95	11.75
6	11570.00	55.0 PK	74.0	-19.0	1.45 H	277	37.09	17.91
7	11570.00	43.7 AV	54.0	-10.3	1.45 H	277	25.79	17.91
8	#17355.00	60.2 PK	74.0	-13.8	1.48 H	302	33.06	27.14
9	#17355.00	49.8 AV	54.0	-4.2	1.48 H	302	22.66	27.14
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	63.1 PK	68.2	-5.1	1.20 V	202	51.57	11.53
2	*5785.00	110.4 PK			1.56 V	304	98.66	11.74
3	*5785.00	101.9 AV			1.56 V	304	90.16	11.74
4	#5860.00	59.0 PK	74.0	-15.0	1.40 V	111	47.25	11.75
5	#5860.00	46.5 AV	54.0	-7.5	1.40 V	111	34.75	11.75
6	11570.00	56.0 PK	74.0	-18.0	1.54 V	303	38.09	17.91
7	11570.00	44.1 AV	54.0	-9.9	1.54 V	303	26.19	17.91
8	#17355.00	60.0 PK	74.0	-14.0	1.30 V	199	32.86	27.14
9	#17355.00	49.3 AV	54.0	-4.7	1.30 V	199	22.16	27.14

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	117.9 PK			1.47 H	280	106.12	11.78
2	*5825.00	108.7 AV			1.47 H	280	96.92	11.78
3	#5850.00	75.0 PK	78.2	-3.2	1.43 H	283	63.25	11.75
4	#5860.00	67.8 PK	68.2	-0.4	1.44 H	288	56.05	11.75
5	11650.00	54.8 PK	74.0	-19.2	1.41 H	295	36.64	18.16
6	11650.00	43.6 AV	54.0	-10.4	1.41 H	295	25.44	18.16
7	#17475.00	59.9 PK	74.0	-14.1	1.53 H	272	31.98	27.92
8	#17475.00	49.8 AV	54.0	-4.2	1.53 H	272	21.88	27.92
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	110.0 PK			1.59 V	307	98.22	11.78
2	*5825.00	101.8 AV			1.59 V	307	90.02	11.78
3	#5850.00	64.0 PK	78.2	-14.2	1.21 V	210	52.25	11.75
4	#5860.00	58.8 PK	68.2	-9.4	1.43 V	126	47.05	11.75
5	11650.00	55.7 PK	74.0	-18.3	1.57 V	300	37.54	18.16
6	11650.00	43.6 AV	54.0	-10.4	1.57 V	300	25.44	18.16
7	#17475.00	60.1 PK	74.0	-13.9	1.36 V	191	32.18	27.92
8	#17475.00	49.7 AV	54.0	-4.3	1.36 V	191	21.78	27.92

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	5021.00	58.8 PK	74.0	-15.2	1.36 H	84	49.31	9.49
2	5021.00	48.9 AV	54.0	-5.1	1.36 H	84	39.41	9.49
3	5101.00	64.7 PK	74.0	-9.3	1.24 H	86	55.03	9.67
4	5101.00	53.7 AV	54.0	-0.3	1.24 H	86	44.03	9.67
5	5150.00	73.2 PK	74.0	-0.8	1.35 H	106	63.23	9.97
6	5150.00	53.2 AV	54.0	-0.8	1.35 H	106	43.23	9.97
7	*5180.00	118.7 PK			1.21 H	95	108.54	10.16
8	*5180.00	108.7 AV			1.21 H	95	98.54	10.16
9	#10360.00	54.4 PK	74.0	-19.6	1.40 H	290	37.42	16.98
10	#10360.00	43.3 AV	54.0	-10.7	1.40 H	290	26.32	16.98
11	15540.00	60.5 PK	74.0	-13.5	1.50 H	275	38.57	21.93
12	15540.00	49.9 AV	54.0	-4.1	1.50 H	275	27.97	21.93
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5021.00	52.8 PK	74.0	-21.2	1.59 V	105	43.31	9.49
2	5021.00	39.7 AV	54.0	-14.3	1.59 V	105	30.21	9.49
3	5101.00	57.8 PK	74.0	-16.2	1.21 V	207	48.13	9.67
4	5101.00	48.2 AV	54.0	-5.8	1.21 V	207	38.53	9.67
5	5150.00	66.5 PK	74.0	-7.5	1.50 V	116	56.53	9.97
6	5150.00	48.7 AV	54.0	-5.3	1.50 V	116	38.73	9.97
7	*5180.00	110.7 PK			1.62 V	306	100.54	10.16
8	*5180.00	101.8 AV			1.62 V	306	91.64	10.16
9	#10360.00	55.7 PK	74.0	-18.3	1.59 V	295	38.72	16.98
10	#10360.00	44.0 AV	54.0	-10.0	1.59 V	295	27.02	16.98
11	15540.00	60.7 PK	74.0	-13.3	1.33 V	211	38.77	21.93
12	15540.00	49.9 AV	54.0	-4.1	1.33 V	211	27.97	21.93

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	5120.00	63.5 PK	74.0	-10.5	1.83 H	280	53.72	9.78
2	5120.00	53.5 AV	54.0	-0.5	1.83 H	280	43.72	9.78
3	*5200.00	118.9 PK			1.81 H	281	108.64	10.26
4	*5200.00	108.2 AV			1.81 H	281	97.94	10.26
5	5350.00	57.3 PK	74.0	-16.7	1.61 H	280	46.75	10.55
6	5350.00	46.9 AV	54.0	-7.1	1.61 H	280	36.35	10.55
7	#10400.00	54.9 PK	74.0	-19.1	1.41 H	278	37.84	17.06
8	#10400.00	43.8 AV	54.0	-10.2	1.41 H	278	26.74	17.06
9	15600.00	59.9 PK	74.0	-14.1	1.45 H	275	37.62	22.28
10	15600.00	49.4 AV	54.0	-4.6	1.45 H	275	27.12	22.28

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	5120.00	66.7 PK	74.0	-7.3	1.17 V	222	56.92	9.78
2	5120.00	49.1 AV	54.0	-4.9	1.17 V	222	39.32	9.78
3	*5200.00	110.9 PK			1.56 V	301	100.64	10.26
4	*5200.00	101.3 AV			1.56 V	301	91.04	10.26
5	5350.00	52.7 PK	74.0	-21.3	1.49 V	131	42.15	10.55
6	5350.00	39.8 AV	54.0	-14.2	1.49 V	131	29.25	10.55
7	#10400.00	55.5 PK	74.0	-18.5	1.58 V	297	38.44	17.06
8	#10400.00	44.1 AV	54.0	-9.9	1.58 V	297	27.04	17.06
9	15600.00	59.9 PK	74.0	-14.1	1.36 V	204	37.62	22.28
10	15600.00	49.4 AV	54.0	-4.6	1.36 V	204	27.12	22.28

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	63.2 PK	74.0	-10.8	1.65 H	290	53.23	9.97
2	5150.00	53.9 AV	54.0	-0.1	1.65 H	290	43.93	9.97
3	*5240.00	121.8 PK			1.78 H	281	111.47	10.33
4	*5240.00	111.6 AV			1.78 H	281	101.27	10.33
5	5350.00	65.3 PK	74.0	-8.7	1.62 H	286	54.75	10.55
6	5350.00	53.8 AV	54.0	-0.2	1.62 H	286	43.25	10.55
7	#10480.00	55.2 PK	74.0	-18.8	1.41 H	290	38.47	16.73
8	#10480.00	44.2 AV	54.0	-9.8	1.41 H	290	27.47	16.73
9	15720.00	60.7 PK	74.0	-13.3	1.47 H	285	38.07	22.63
10	15720.00	50.2 AV	54.0	-3.8	1.47 H	285	27.57	22.63

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	52.7 PK	74.0	-21.3	1.48 V	119	42.73	9.97
2	5150.00	39.6 AV	54.0	-14.4	1.48 V	119	29.63	9.97
3	*5240.00	113.5 PK			1.65 V	300	103.17	10.33
4	*5240.00	104.8 AV			1.65 V	300	94.47	10.33
5	5350.00	65.9 PK	74.0	-8.1	1.27 V	210	55.35	10.55
6	5350.00	48.2 AV	54.0	-5.8	1.27 V	210	37.65	10.55
7	#10480.00	55.9 PK	74.0	-18.1	1.59 V	299	39.17	16.73
8	#10480.00	44.4 AV	54.0	-9.6	1.59 V	299	27.67	16.73
9	15720.00	60.3 PK	74.0	-13.7	1.32 V	207	37.67	22.63
10	15720.00	49.7 AV	54.0	-4.3	1.32 V	207	27.07	22.63

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	62.3 PK	74.0	-11.7	1.59 H	283	50.77	11.53
2	#5715.00	52.4 AV	54.0	-1.6	1.59 H	283	40.87	11.53
3	#5725.00	78.1 PK	78.2	-0.1	1.51 H	286	66.55	11.55
4	*5745.00	115.5 PK			1.44 H	284	103.87	11.63
5	*5745.00	105.3 AV			1.44 H	284	93.67	11.63
6	11490.00	54.9 PK	74.0	-19.1	1.38 H	288	37.60	17.30
7	11490.00	43.7 AV	54.0	-10.3	1.38 H	288	26.40	17.30
8	#17235.00	60.0 PK	74.0	-14.0	1.50 H	290	33.19	26.81
9	#17235.00	49.8 AV	54.0	-4.2	1.50 H	290	22.99	26.81
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5715.00	58.3 PK	74.0	-15.7	1.18 V	197	46.77	11.53
2	#5715.00	47.3 AV	54.0	-6.7	1.18 V	197	35.77	11.53
3	#5725.00	62.3 PK	78.2	-15.9	1.48 V	120	50.75	11.55
4	*5745.00	107.7 PK			1.60 V	295	96.07	11.63
5	*5745.00	98.3 AV			1.60 V	295	86.67	11.63
6	11490.00	55.4 PK	74.0	-18.6	1.49 V	303	38.10	17.30
7	11490.00	43.8 AV	54.0	-10.2	1.49 V	303	26.50	17.30
8	#17235.00	60.8 PK	74.0	-13.2	1.33 V	209	33.99	26.81
9	#17235.00	50.1 AV	54.0	-3.9	1.33 V	209	23.29	26.81

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
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	#5715.00	67.9 PK	68.2	-0.3	1.54 H	299	56.37	11.53
2	*5785.00	117.9 PK			1.47 H	304	106.16	11.74
3	*5785.00	107.6 AV			1.47 H	304	95.86	11.74
4	#5860.00	62.9 PK	68.2	-5.3	1.52 H	299	51.15	11.75
5	11570.00	54.9 PK	74.0	-19.1	1.38 H	294	36.99	17.91
6	11570.00	43.7 AV	54.0	-10.3	1.38 H	294	25.79	17.91
7	#17355.00	60.1 PK	74.0	-13.9	1.49 H	276	32.96	27.14
8	#17355.00	50.0 AV	54.0	-4.0	1.49 H	276	22.86	27.14
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	63.2 PK	68.2	-5.0	1.19 V	202	51.67	11.53
2	*5785.00	109.6 PK			1.56 V	287	97.86	11.74
3	*5785.00	100.9 AV			1.56 V	287	89.16	11.74
4	#5860.00	58.6 PK	68.2	-9.6	1.39 V	127	46.85	11.75
5	11570.00	55.7 PK	74.0	-18.3	1.60 V	294	37.79	17.91
6	11570.00	43.8 AV	54.0	-10.2	1.60 V	294	25.89	17.91
7	#17355.00	60.5 PK	74.0	-13.5	1.34 V	204	33.36	27.14
8	#17355.00	50.2 AV	54.0	-3.8	1.34 V	204	23.06	27.14

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	117.8 PK			1.46 H	282	106.02	11.78
2	*5825.00	107.9 AV			1.46 H	282	96.12	11.78
3	#5850.00	75.2 PK	78.2	-3.0	1.45 H	283	63.45	11.75
4	#5860.00	68.1 PK	68.2	-0.1	1.42 H	301	56.35	11.75
5	11650.00	55.3 PK	74.0	-18.7	1.36 H	268	37.14	18.16
6	11650.00	43.9 AV	54.0	-10.1	1.36 H	268	25.74	18.16
7	#17475.00	60.1 PK	74.0	-13.9	1.50 H	285	32.18	27.92
8	#17475.00	49.6 AV	54.0	-4.4	1.50 H	285	21.68	27.92
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	110.1 PK			1.60 V	295	98.32	11.78
2	*5825.00	101.2 AV			1.60 V	295	89.42	11.78
3	#5850.00	64.0 PK	78.2	-14.2	1.22 V	222	52.25	11.75
4	#5860.00	58.7 PK	68.2	-9.5	1.48 V	137	46.95	11.75
5	11650.00	55.9 PK	74.0	-18.1	1.54 V	303	37.74	18.16
6	11650.00	44.0 AV	54.0	-10.0	1.54 V	303	25.84	18.16
7	#17475.00	60.2 PK	74.0	-13.8	1.29 V	203	32.28	27.92
8	#17475.00	49.9 AV	54.0	-4.1	1.29 V	203	21.98	27.92

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	5035.00	57.5 PK	74.0	-16.5	1.51 H	289	47.97	9.53
2	5035.00	46.2 AV	54.0	-7.8	1.51 H	289	36.67	9.53
3	5150.00	65.7 PK	74.0	-8.3	1.43 H	284	55.73	9.97
4	5150.00	53.6 AV	54.0	-0.4	1.43 H	284	43.63	9.97
5	*5190.00	111.2 PK			1.62 H	281	101.00	10.20
6	*5190.00	100.7 AV			1.62 H	281	90.50	10.20
7	5350.00	57.3 PK	74.0	-16.7	1.54 H	279	46.75	10.55
8	5350.00	47.0 AV	54.0	-7.0	1.54 H	279	36.45	10.55
9	#10380.00	55.3 PK	74.0	-18.7	1.33 H	291	38.28	17.02
10	#10380.00	44.0 AV	54.0	-10.0	1.33 H	291	26.98	17.02
11	15570.00	59.8 PK	74.0	-14.2	1.51 H	302	37.70	22.10
12	15570.00	49.5 AV	54.0	-4.5	1.51 H	302	27.40	22.10
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	5035.00	52.4 PK	74.0	-21.6	1.58 V	107	42.87	9.53
2	5035.00	39.6 AV	54.0	-14.4	1.58 V	107	30.07	9.53
3	5150.00	58.4 PK	74.0	-15.6	1.21 V	206	48.43	9.97
4	5150.00	48.6 AV	54.0	-5.4	1.21 V	206	38.63	9.97
5	*5190.00	104.2 PK			1.58 V	290	94.00	10.20
6	*5190.00	93.7 AV			1.58 V	290	83.50	10.20
7	5350.00	66.8 PK	74.0	-7.2	1.41 V	118	56.25	10.55
8	5350.00	48.7 AV	54.0	-5.3	1.41 V	118	38.15	10.55
9	#10380.00	56.0 PK	74.0	-18.0	1.50 V	298	38.98	17.02
10	#10380.00	44.0 AV	54.0	-10.0	1.50 V	298	26.98	17.02
11	15570.00	60.8 PK	74.0	-13.2	1.28 V	190	38.70	22.10
12	15570.00	50.1 AV	54.0	-3.9	1.28 V	190	28.00	22.10

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	5000.00	56.7 PK	74.0	-17.3	1.65 H	296	47.25	9.45
2	5000.00	47.6 AV	54.0	-6.4	1.65 H	296	38.15	9.45
3	5146.00	65.5 PK	74.0	-8.5	1.65 H	285	55.56	9.94
4	5146.00	53.2 AV	54.0	-0.8	1.65 H	285	43.26	9.94
5	*5230.00	117.0 PK			1.57 H	283	106.68	10.32
6	*5230.00	106.4 AV			1.57 H	283	96.08	10.32
7	5350.00	58.6 PK	74.0	-15.4	1.55 H	279	48.05	10.55
8	5350.00	46.5 AV	54.0	-7.5	1.55 H	279	35.95	10.55
9	#10460.00	54.9 PK	74.0	-19.1	1.39 H	281	38.08	16.82
10	#10460.00	43.8 AV	54.0	-10.2	1.39 H	281	26.98	16.82
11	15690.00	60.1 PK	74.0	-13.9	1.50 H	288	37.58	22.52
12	15690.00	49.8 AV	54.0	-4.2	1.50 H	288	27.28	22.52

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	5000.00	52.8 PK	74.0	-21.2	1.58 V	100	43.35	9.45
2	5000.00	39.6 AV	54.0	-14.4	1.58 V	100	30.15	9.45
3	5146.00	66.3 PK	74.0	-7.7	1.48 V	108	56.36	9.94
4	5146.00	48.7 AV	54.0	-5.3	1.48 V	108	38.76	9.94
5	*5230.00	110.3 PK			1.60 V	309	99.98	10.32
6	*5230.00	99.3 AV			1.60 V	309	88.98	10.32
7	5350.00	57.6 PK	74.0	-16.4	1.18 V	212	47.05	10.55
8	5350.00	47.7 AV	54.0	-6.3	1.18 V	212	37.15	10.55
9	#10460.00	55.7 PK	74.0	-18.3	1.55 V	290	38.88	16.82
10	#10460.00	43.9 AV	54.0	-10.1	1.55 V	290	27.08	16.82
11	15690.00	60.2 PK	74.0	-13.8	1.33 V	200	37.68	22.52
12	15690.00	49.7 AV	54.0	-4.3	1.33 V	200	27.18	22.52

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 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	#5692.00	58.0 PK	74.0	-16.0	1.53 H	284	46.56	11.44
2	#5692.00	48.4 AV	54.0	-5.6	1.53 H	284	36.96	11.44
3	#5715.00	69.3 PK	74.0	-4.7	1.34 H	278	57.77	11.53
4	#5715.00	53.6 AV	54.0	-0.4	1.34 H	278	42.07	11.53
5	#5725.00	71.2 PK	78.2	-7.0	1.26 H	278	59.65	11.55
6	*5755.00	110.9 PK			1.48 H	279	99.26	11.64
7	*5755.00	100.3 AV			1.48 H	279	88.66	11.64
8	11510.00	55.1 PK	74.0	-18.9	1.41 H	284	37.80	17.30
9	11510.00	43.8 AV	54.0	-10.2	1.41 H	284	26.50	17.30
10	#17265.00	59.7 PK	74.0	-14.3	1.45 H	283	32.99	26.71
11	#17265.00	49.4 AV	54.0	-4.6	1.45 H	283	22.69	26.71
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	#5692.00	52.4 PK	74.0	-21.6	1.59 V	101	40.96	11.44
2	#5692.00	39.4 AV	54.0	-14.6	1.59 V	101	27.96	11.44
3	#5715.00	57.0 PK	74.0	-17.0	1.18 V	222	45.47	11.53
4	#5715.00	47.7 AV	54.0	-6.3	1.18 V	222	36.17	11.53
5	#5725.00	66.5 PK	78.2	-11.7	1.48 V	112	54.95	11.55
6	*5755.00	103.9 PK			1.64 V	306	92.26	11.64
7	*5755.00	93.9 AV			1.64 V	306	82.26	11.64
8	11510.00	55.1 PK	74.0	-18.9	1.60 V	300	37.80	17.30
9	11510.00	43.5 AV	54.0	-10.5	1.60 V	300	26.20	17.30
10	#17265.00	60.1 PK	74.0	-13.9	1.33 V	200	33.39	26.71
11	#17265.00	49.8 AV	54.0	-4.2	1.33 V	200	23.09	26.71

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	#5709.00	68.3 PK	74.0	-5.7	1.45 H	282	56.79	11.51
2	#5709.00	53.3 AV	54.0	-0.7	1.45 H	282	41.79	11.51
3	*5795.00	115.2 PK			1.62 H	278	103.42	11.78
4	*5795.00	105.5 AV			1.62 H	278	93.72	11.78
5	#5850.00	72.3 PK	78.2	-5.9	1.46 H	283	60.55	11.75
6	#5860.00	69.0 PK	74.0	-5.0	1.53 H	282	57.25	11.75
7	#5860.00	53.9 AV	54.0	-0.1	1.53 H	282	42.15	11.75
8	11590.00	54.5 PK	74.0	-19.5	1.38 H	269	36.39	18.11
9	11590.00	43.6 AV	54.0	-10.4	1.38 H	269	25.49	18.11
10	#17385.00	59.7 PK	74.0	-14.3	1.44 H	287	32.25	27.45
11	#17385.00	49.3 AV	54.0	-4.7	1.44 H	287	21.85	27.45

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	#5709.00	53.3 PK	74.0	-20.7	1.59 V	93	41.79	11.51
2	#5709.00	40.1 AV	54.0	-13.9	1.59 V	93	28.59	11.51
3	*5795.00	107.9 PK			1.61 V	283	96.12	11.78
4	*5795.00	99.2 AV			1.61 V	283	87.42	11.78
5	#5850.00	57.7 PK	78.2	-20.5	1.26 V	199	45.95	11.75
6	#5860.00	66.2 PK	74.0	-7.8	1.50 V	127	54.45	11.75
7	#5860.00	48.5 AV	54.0	-5.5	1.50 V	127	36.75	11.75
8	11590.00	55.9 PK	74.0	-18.1	1.54 V	299	37.79	18.11
9	11590.00	43.9 AV	54.0	-10.1	1.54 V	299	25.79	18.11
10	#17385.00	60.6 PK	74.0	-13.4	1.37 V	187	33.15	27.45
11	#17385.00	49.9 AV	54.0	-4.1	1.37 V	187	22.45	27.45

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.

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	5000.00	55.5 PK	74.0	-18.5	1.38 H	291	46.05	9.45
2	5000.00	47.2 AV	54.0	-6.8	1.38 H	291	37.75	9.45
3	5150.00	66.4 PK	74.0	-7.6	1.52 H	283	56.43	9.97
4	5150.00	53.3 AV	54.0	-0.7	1.52 H	283	43.33	9.97
5	*5210.00	105.9 PK			1.53 H	280	95.63	10.27
6	*5210.00	95.8 AV			1.53 H	280	85.53	10.27
7	5350.00	53.8 PK	74.0	-20.2	1.38 H	291	43.25	10.55
8	5350.00	42.8 AV	54.0	-11.2	1.38 H	291	32.25	10.55
9	#10420.00	55.2 PK	74.0	-18.8	1.38 H	278	38.22	16.98
10	#10420.00	43.8 AV	54.0	-10.2	1.38 H	278	26.82	16.98
11	15630.00	60.0 PK	74.0	-14.0	1.47 H	290	37.63	22.37
12	15630.00	49.8 AV	54.0	-4.2	1.47 H	290	27.43	22.37
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5000.00	52.9 PK	74.0	-21.1	1.51 V	114	43.45	9.45
2	5000.00	39.9 AV	54.0	-14.1	1.51 V	114	30.45	9.45
3	5150.00	58.1 PK	74.0	-15.9	1.22 V	217	48.13	9.97
4	5150.00	48.2 AV	54.0	-5.8	1.22 V	217	38.23	9.97
5	*5210.00	98.6 PK			1.63 V	300	88.33	10.27
6	*5210.00	89.5 AV			1.63 V	300	79.23	10.27
7	5350.00	66.0 PK	74.0	-8.0	1.40 V	134	55.45	10.55
8	5350.00	48.5 AV	54.0	-5.5	1.40 V	134	37.95	10.55
9	#10420.00	56.0 PK	74.0	-18.0	1.56 V	283	39.02	16.98
10	#10420.00	44.1 AV	54.0	-9.9	1.56 V	283	27.12	16.98
11	15630.00	60.5 PK	74.0	-13.5	1.29 V	215	38.13	22.37
12	15630.00	50.0 AV	54.0	-4.0	1.29 V	215	27.63	22.37

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	70.0 PK	74.0	-4.0	1.59 H	282	58.47	11.53
2	#5715.00	53.6 AV	54.0	-0.4	1.59 H	282	42.07	11.53
3	#5725.00	72.4 PK	78.2	-5.8	1.42 H	282	60.85	11.55
4	*5775.00	106.8 PK			1.46 H	281	95.08	11.72
5	*5775.00	96.2 AV			1.46 H	281	84.48	11.72
6	#5850.00	63.3 PK	78.2	-14.9	1.29 H	282	51.55	11.75
7	#5860.00	62.3 PK	74.0	-11.7	1.47 H	277	50.55	11.75
8	#5860.00	50.7 AV	54.0	-3.3	1.47 H	277	38.95	11.75
9	11550.00	54.5 PK	74.0	-19.5	1.43 H	277	36.79	17.71
10	11550.00	43.6 AV	54.0	-10.4	1.43 H	277	25.89	17.71
11	#17325.00	59.5 PK	74.0	-14.5	1.52 H	303	32.65	26.85
12	#17325.00	49.3 AV	54.0	-4.7	1.52 H	303	22.45	26.85

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	58.3 PK	74.0	-15.7	1.24 V	226	46.77	11.53
2	#5715.00	48.5 AV	54.0	-5.5	1.24 V	226	36.97	11.53
3	#5725.00	67.0 PK	78.2	-11.2	1.47 V	113	55.45	11.55
4	*5775.00	99.5 PK			1.57 V	304	87.78	11.72
5	*5775.00	89.9 AV			1.57 V	304	78.18	11.72
6	#5850.00	53.0 PK	78.2	-25.2	1.60 V	84	41.25	11.75
7	#5860.00	55.0 PK	74.0	-19.0	1.55 V	121	43.25	11.75
8	#5860.00	43.2 AV	54.0	-10.8	1.55 V	121	31.45	11.75
9	11550.00	55.5 PK	74.0	-18.5	1.50 V	299	37.79	17.71
10	11550.00	43.6 AV	54.0	-10.4	1.50 V	299	25.89	17.71
11	#17325.00	60.1 PK	74.0	-13.9	1.32 V	216	33.25	26.85
12	#17325.00	49.4 AV	54.0	-4.6	1.32 V	216	22.55	26.85

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.

Below 1GHz Data

802.11a

CHANNEL	TX Channel 48	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	63.51	28.8 QP	40.0	-11.2	1.15 H	281	42.97	-14.20
2	145.58	35.3 QP	43.5	-8.2	1.15 H	85	48.27	-12.96
3	225.07	35.0 QP	46.0	-11.0	1.15 H	271	50.65	-15.69
4	339.87	28.2 QP	46.0	-17.8	1.00 H	33	39.07	-10.88
5	426.97	28.5 QP	46.0	-17.5	1.00 H	11	36.76	-8.27
6	499.97	25.8 QP	46.0	-20.3	1.00 H	59	32.50	-6.75
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	76.61	36.1 QP	40.0	-3.9	1.00 V	271	52.93	-16.83
2	106.10	32.6 QP	43.5	-10.9	1.00 V	318	49.09	-16.47
3	146.11	31.1 QP	43.5	-12.4	1.00 V	307	44.07	-12.95
4	223.71	30.5 QP	46.0	-15.5	1.00 V	112	46.23	-15.73
5	400.01	27.1 QP	46.0	-18.9	1.00 V	360	36.36	-9.27
6	594.01	24.5 QP	46.0	-21.6	1.50 V	222	28.86	-4.41

REMARKS:

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

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	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 0.50MHz.

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	100375	May 06, 2015	May 05, 2016
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK-8127	8127-522	Sep. 15, 2014	Sep. 14, 2015
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 11, 2015	June 10, 2016
RF Cable	5D-FB	COCCAB-001	Mar. 09, 2015	Mar. 08, 2016
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 BVADT	BVADT_Cond_ V7.3.7.3	NA	NA	NA

Note:

1. The calibration interval of the above test instruments are 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: July 24 to 27, 2015

4.2.3 Test Procedures

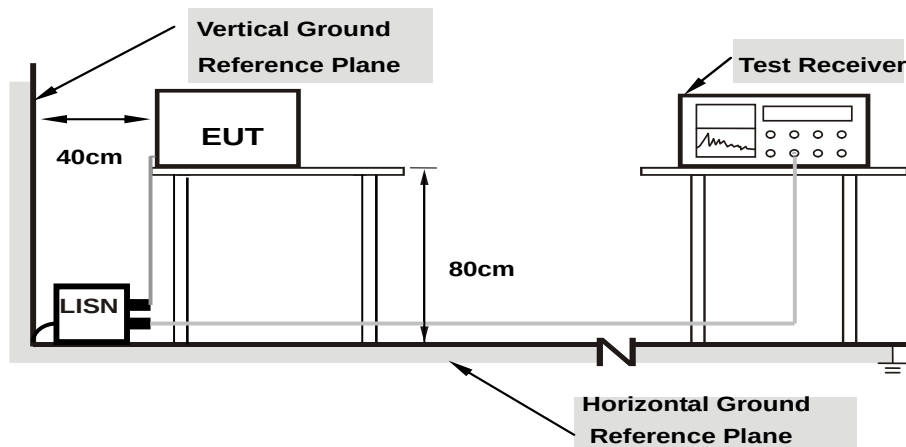
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance 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 levels under (Limit - 20dB) was not recorded.

NOTE: All modes of operation were investigated and the worst-case emissions are reported.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.2.6 EUT Operating Conditions

Same as 4.1.6.

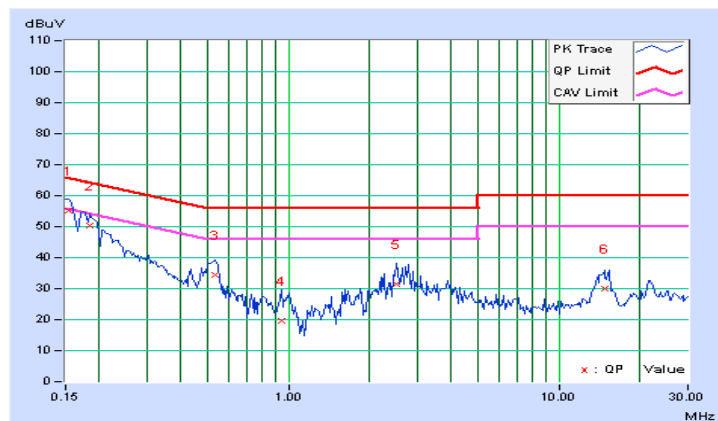
4.2.7 Test Results (Mode 1)

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	----------	-------------------	--------------------------------

No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	0.08	55.03	35.81	55.11	35.89	65.79	55.79	-10.68	-19.90
2	0.18516	0.09	50.35	34.20	50.44	34.29	64.25	54.25	-13.81	-19.96
3	0.53281	0.11	34.37	24.30	34.48	24.41	56.00	46.00	-21.52	-21.59
4	0.94297	0.13	19.66	11.02	19.79	11.15	56.00	46.00	-36.21	-34.85
5	2.51953	0.18	31.35	20.55	31.53	20.73	56.00	46.00	-24.47	-25.27
6	14.71875	0.57	29.61	22.02	30.18	22.59	60.00	50.00	-29.82	-27.41

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

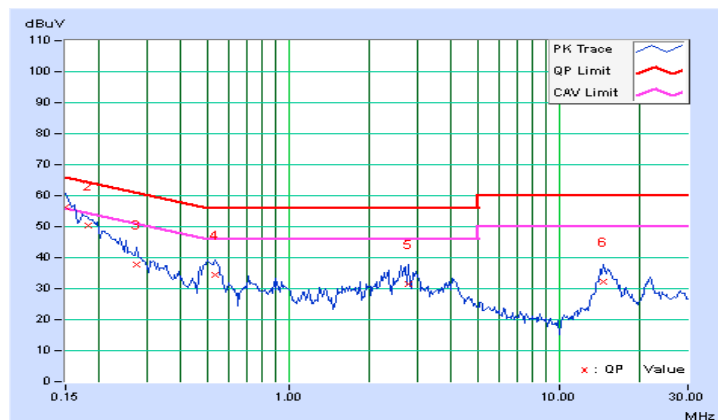


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.08	56.22	39.90	56.30	39.98	66.00	56.00	-9.70	-16.02
2	0.18125	0.08	50.39	36.12	50.47	36.20	64.43	54.43	-13.96	-18.23
3	0.27500	0.09	37.57	24.49	37.66	24.58	60.97	50.97	-23.31	-26.39
4	0.53672	0.11	34.19	22.58	34.30	22.69	56.00	46.00	-21.70	-23.31
5	2.79688	0.19	31.24	21.75	31.43	21.94	56.00	46.00	-24.57	-24.06
6	14.66797	0.59	31.62	23.58	32.21	24.17	60.00	50.00	-27.79	-25.83

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



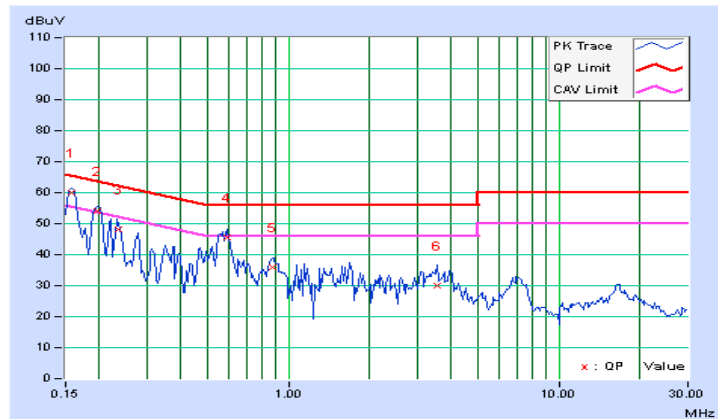
4.2.8 Test Results (Mode 2)

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	----------	-------------------	--------------------------------

No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	0.14	59.89	51.72	60.03	51.86	65.58	55.58	-5.55	-3.72
2	0.19687	0.15	53.82	45.86	53.97	46.01	63.74	53.74	-9.77	-7.73
3	0.23653	0.15	47.83	39.55	47.98	39.70	62.22	52.22	-14.23	-12.51
4	0.59141	0.18	45.24	41.05	45.42	41.23	56.00	46.00	-10.58	-4.77
5	0.87359	0.19	35.59	27.46	35.78	27.65	56.00	46.00	-20.22	-18.35
6	3.53125	0.35	29.82	22.97	30.17	23.32	56.00	46.00	-25.83	-22.68

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

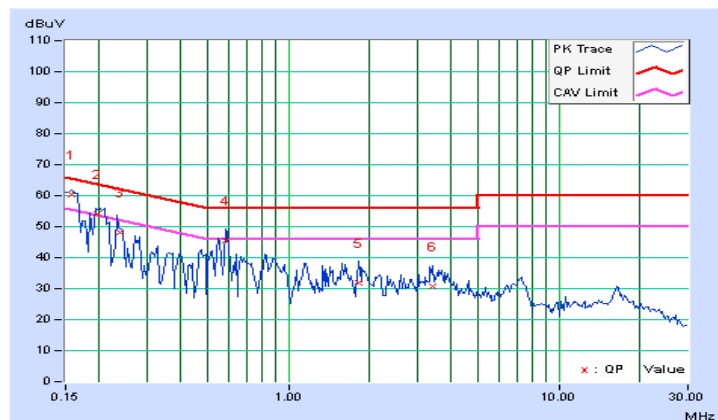


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	0.14	60.11	51.98	60.25	52.12	65.58	55.58	-5.33	-3.46
2	0.19722	0.15	53.96	45.80	54.11	45.95	63.73	53.73	-9.62	-7.78
3	0.23703	0.16	47.93	39.87	48.09	40.03	62.20	52.20	-14.11	-12.17
4	0.58947	0.21	45.24	40.64	45.45	40.85	56.00	46.00	-10.55	-5.15
5	1.82031	0.29	31.64	23.36	31.93	23.65	56.00	46.00	-24.07	-22.35
6	3.42969	0.39	30.40	24.46	30.79	24.85	56.00	46.00	-25.21	-21.15

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



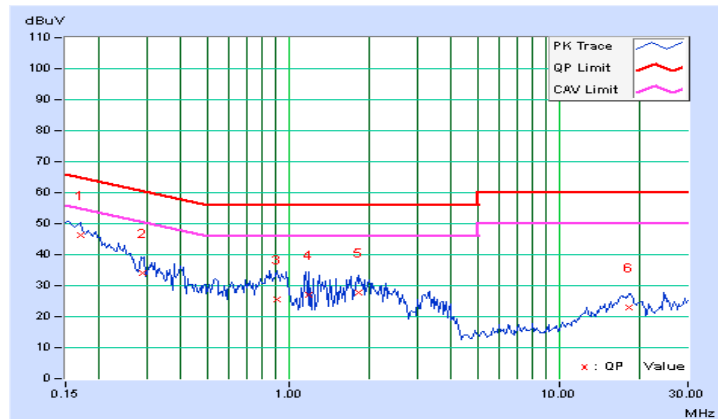
4.2.9 Test Results (Mode 3)

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	----------	-------------------	--------------------------------

No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16953	0.08	46.38	32.80	46.46	32.88	64.98	54.98	-18.52	-22.10
2	0.28728	0.09	33.85	24.61	33.94	24.70	60.60	50.60	-26.66	-25.90
3	0.90391	0.13	25.28	14.45	25.41	14.58	56.00	46.00	-30.59	-31.42
4	1.18750	0.14	26.78	16.99	26.92	17.13	56.00	46.00	-29.08	-28.87
5	1.80859	0.16	27.44	18.52	27.60	18.68	56.00	46.00	-28.40	-27.32
6	18.19141	0.65	22.32	17.61	22.97	18.26	60.00	50.00	-37.03	-31.74

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

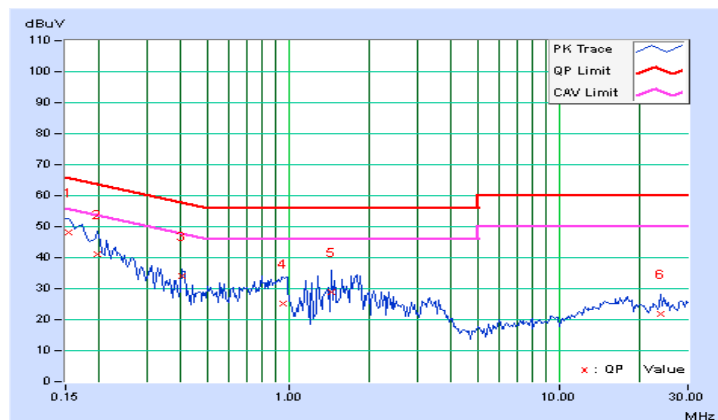


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	0.08	48.08	34.72	48.16	34.80	65.79	55.79	-17.63	-20.99
2	0.19687	0.08	41.10	29.61	41.18	29.69	63.74	53.74	-22.56	-24.05
3	0.40391	0.10	33.93	26.35	34.03	26.45	57.77	47.77	-23.74	-21.32
4	0.95859	0.13	25.18	18.36	25.31	18.49	56.00	46.00	-30.69	-27.51
5	1.44141	0.15	28.71	18.36	28.86	18.51	56.00	46.00	-27.14	-27.49
6	23.80078	0.83	21.07	13.09	21.90	13.92	60.00	50.00	-38.10	-36.08

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



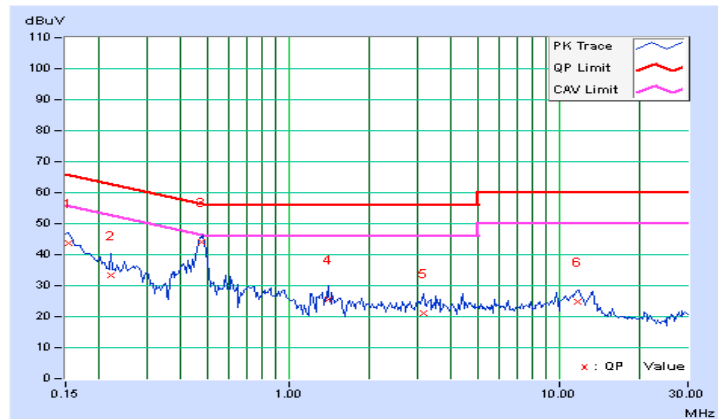
4.2.10 Test Results (Mode 4)

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	----------	-------------------	--------------------------------

No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	0.14	43.52	32.11	43.66	32.25	65.79	55.79	-22.13	-23.54
2	0.22031	0.15	33.36	26.01	33.51	26.16	62.81	52.81	-29.30	-26.65
3	0.47653	0.17	43.72	38.69	43.89	38.86	56.40	46.40	-12.51	-7.54
4	1.39844	0.22	25.43	20.06	25.65	20.28	56.00	46.00	-30.35	-25.72
5	3.15234	0.33	20.91	15.87	21.24	16.20	56.00	46.00	-34.76	-29.80
6	11.78516	0.81	24.11	19.90	24.92	20.71	60.00	50.00	-35.08	-29.29

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

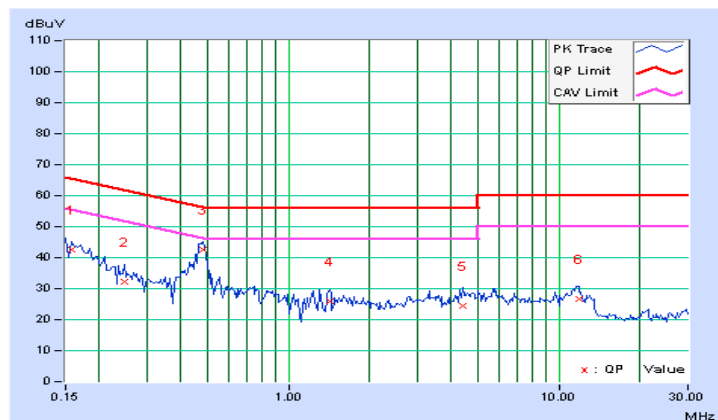


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	0.14	42.55	30.58	42.69	30.72	65.58	55.58	-22.89	-24.86
2	0.24766	0.16	32.16	24.27	32.32	24.43	61.84	51.84	-29.52	-27.41
3	0.48203	0.20	42.23	37.27	42.43	37.47	56.30	46.30	-13.88	-8.84
4	1.42188	0.27	25.72	18.53	25.99	18.80	56.00	46.00	-30.01	-27.20
5	4.40625	0.45	24.07	19.05	24.52	19.50	56.00	46.00	-31.48	-26.50
6	11.81250	0.87	25.73	21.45	26.60	22.32	60.00	50.00	-33.40	-27.68

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



4.3 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)

*B is the 26 dB emission bandwidth in megahertz

Per KDB 662911 D01 Multiple Transmitter Output v02r01 Method of conducted output power measurement on IEEE 802.11 devices,

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

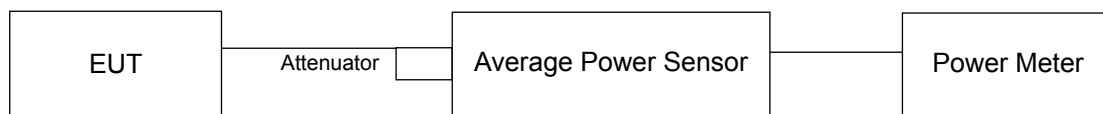
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

Array Gain = $5 \log(N_{ANT}/N_{SS})$ dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

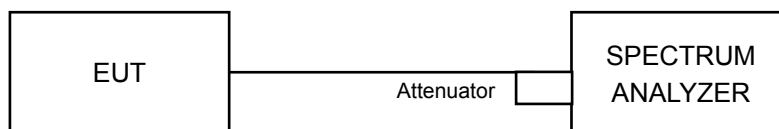
For power measurements on all other devices: Array Gain = $10 \log(N_{ANT}/N_{SS})$ dB.

4.3.2 Test Setup

FOR POWER OUTPUT MEASUREMENT



FOR 26dB OCCUPIED BANDWIDTH



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedures

FOR AVERAGE POWER 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%.

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Results

CDD Mode

POWER OUTPUT

802.11a

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	22.30	21.82	321.879	25.08	30	Pass
40	5200	20.65	20.18	220.377	23.43	30	Pass
48	5240	23.85	23.43	462.954	26.66	30	Pass
149	5745	18.40	18.06	133.156	21.24	30	Pass
157	5785	20.09	19.69	195.205	22.90	30	Pass
165	5825	20.08	19.64	193.904	22.88	30	Pass

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	21.86	21.63	299.008	24.76	30	Pass
40	5200	19.80	19.76	190.123	22.79	30	Pass
48	5240	23.45	22.86	414.506	26.18	30	Pass
149	5745	17.32	16.91	103.042	20.13	30	Pass
157	5785	20.08	19.66	194.329	22.89	30	Pass
165	5825	20.07	19.62	193.247	22.86	30	Pass

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	16.52	16.01	84.777	19.28	30	Pass
46	5230	22.33	22.10	333.183	25.23	30	Pass
151	5755	14.84	14.68	59.855	17.77	30	Pass
159	5795	20.65	20.41	226.046	23.54	30	Pass

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	14.56	13.94	53.35	17.27	30	Pass
155	5775	13.63	13.82	47.166	16.74	30	Pass

Beamforming Mode

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	21.86	21.63	299.008	24.76	28.09	Pass
40	5200	19.80	19.76	190.123	22.79	28.09	Pass
48	5240	23.45	22.86	414.506	26.18	28.09	Pass
149	5745	17.32	16.91	103.042	20.13	28.09	Pass
157	5785	20.08	19.66	194.329	22.89	28.09	Pass
165	5825	20.07	19.62	193.247	22.86	28.09	Pass

Note: Directional gain = $4.9\text{dBi} + 10\log(2) = 7.91\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30-(7.91-6) = 28.09\text{dBm}$.

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	16.52	16.01	84.777	19.28	28.09	Pass
46	5230	22.33	22.10	333.183	25.23	28.09	Pass
151	5755	14.84	14.68	59.855	17.77	28.09	Pass
159	5795	20.65	20.41	226.046	23.54	28.09	Pass

Note: Directional gain = $4.9\text{dBi} + 10\log(2) = 7.91\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30-(7.91-6) = 28.09\text{dBm}$.

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	14.56	13.94	53.35	17.27	28.09	Pass
155	5775	13.63	13.82	47.166	16.74	28.09	Pass

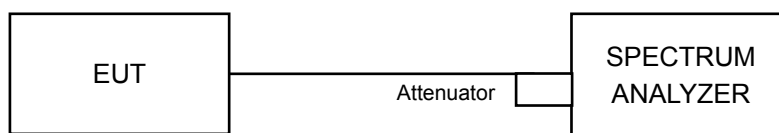
Note: Directional gain = $4.9\text{dBi} + 10\log(2) = 7.91\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30-(7.91-6) = 28.09\text{dBm}$.

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 Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

For 802.11a & 802.11ac (VHT20):

For U-NII-1

Using method SA-1

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

For U-NII-3:

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

For 802.11ac (VHT40) & 802.11ac (VHT80):

For U-NII-1

Using method SA-2

- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 1 MHz, Set VBW $\geq$ 3 MHz, Detector = RMS
- Sweep time = auto, trigger set to "free run".
- Trace average at least 100 traces in power averaging mode.
- Record the max value and add $10 \log (1/\text{duty cycle})$

For U-NII-3:

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

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as Item 4.3.6.

4.4.7 Test Results

For U-NII-1:

802.11a

Chan.	Chan. Freq. (MHz)	PSD (dBm)		Total Power Density (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1			
36	5180	7.92	7.57	10.76	15.09	Pass
40	5200	6.48	5.89	9.21	15.09	Pass
48	5240	9.52	9.31	12.43	15.09	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 = $4.9\text{dBi} + 10\log(2) = 7.91\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $17-(7.91-6) = 15.09\text{dBm}$.

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	PSD (dBm)		Total Power Density (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1			
36	5180	7.28	7.62	10.46	15.09	Pass
40	5200	5.61	5.85	8.74	15.09	Pass
48	5240	8.97	8.96	11.98	15.09	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 = $4.9\text{dBi} + 10\log(2) = 7.91\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $17-(7.91-6) = 15.09\text{dBm}$.

802.11ac (VHT40)

Chan.	Chan. Freq. (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				
38	5190	-1.11	-0.81	0.13	2.18	15.09	Pass
46	5230	5.15	5.14	0.13	8.28	15.09	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 = $4.9\text{dBi} + 10\log(2) = 7.91\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $17-(7.91-6) = 15.09\text{dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

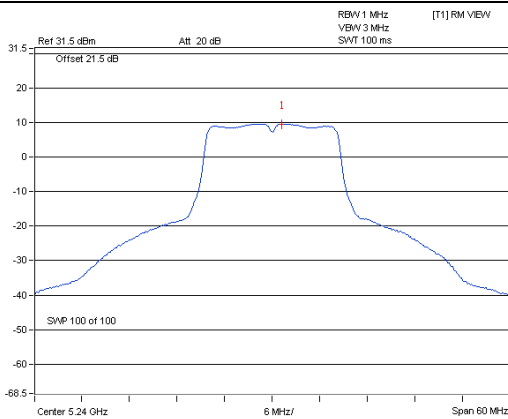
Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm)		Duty Factor (dB)	Total PSD With Duty Factor (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	-6.01	-6.26	0.25	-2.87	15.09	Pass

- 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 = $4.9\text{dBi} + 10\log(2) = 7.91\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $17-(7.91-6) = 15.09\text{dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

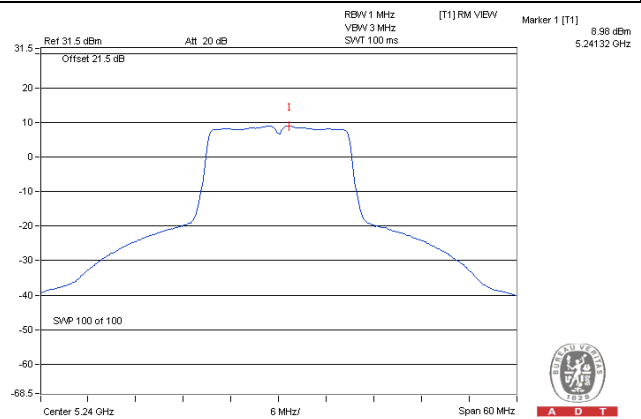
Spectrum Plot of Worst Value

802.11a_Chain 0 / CH36

802.11ac (VHT20)_Chain 0 / CH48



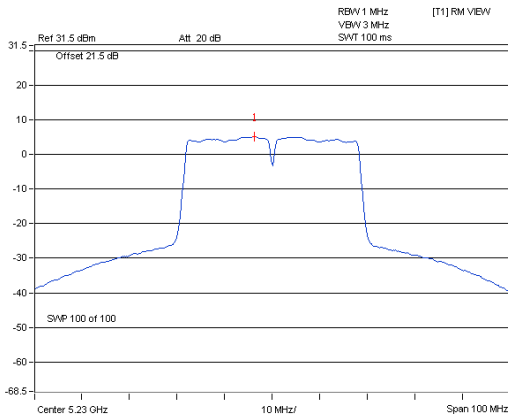
A D T



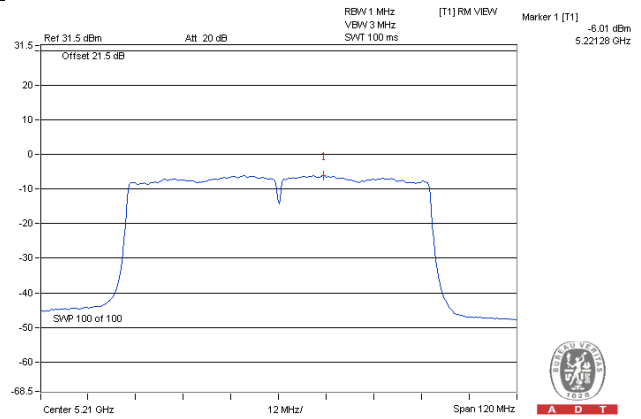
A D T

8802.11ac (VHT40)_Chain 0 / CH46

802.11ac (VHT80)_Chain 0 / CH42



A D T



A D T

For U-NII-3:

802.11a

TX chain	Chan.	Chan. Freq. (MHz)	PSD		10 log (N=2) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)				
0	149	5745	-3.48	-1.26	3.01	1.75	28.09	Pass
	157	5785	-1.75	0.47	3.01	3.48	28.09	Pass
	165	5825	-1.23	0.99	3.01	4.00	28.09	Pass
1	149	5745	-4.23	-2.01	3.01	1.00	28.09	Pass
	157	5785	-2.37	-0.15	3.01	2.86	28.09	Pass
	165	5825	-1.82	0.40	3.01	3.41	28.09	Pass

NOTE: 1. Directional gain = 4.9dBi + 10log(2) = 7.91dBi > 6dBi , so the power density limit shall be reduced to 30-(7.91-6) = 28.09dBm.

802.11ac (VHT20)

TX chain	Chan.	Chan. Freq. (MHz)	PSD		10 log (N=2) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)				
0	149	5745	-5.12	-2.90	3.01	0.11	28.09	Pass
	157	5785	-2.16	0.06	3.01	3.07	28.09	Pass
	165	5825	-1.89	0.33	3.01	3.34	28.09	Pass
1	149	5745	-5.58	-3.36	3.01	-0.35	28.09	Pass
	157	5785	-2.64	-0.42	3.01	2.59	28.09	Pass
	165	5825	-1.96	0.26	3.01	3.27	28.09	Pass

NOTE: 1. Directional gain = 4.9dBi + 10log(2) = 7.91dBi > 6dBi , so the power density limit shall be reduced to 30-(7.91-6) = 28.09dBm.

802.11ac (VHT40)

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	155	5745	-10.76	-8.54	3.01	0.13	-5.40	28.09	Pass
	159	5785	-4.42	-2.20	3.01	0.13	0.94	28.09	Pass
1	155	5745	-11.15	-8.93	3.01	0.13	-5.79	28.09	Pass
	159	5785	-5.20	-2.98	3.01	0.13	0.16	28.09	Pass

NOTE: 1. Directional gain = 4.9dBi + 10log(2) = 7.91dBi > 6dBi , so the power density limit shall be reduced to 30-(7.91-6) = 28.09dBm.

2. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	155	5745	-15.32	-13.10	3.01	0.25	-9.84	28.09	Pass
1	155	5745	-14.87	-12.65	3.01	0.25	-9.39	28.09	Pass

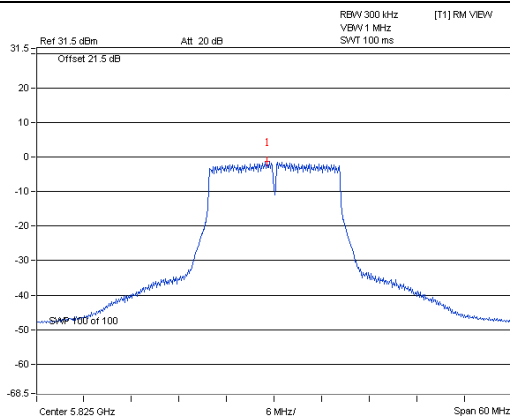
NOTE: 1. Directional gain = 4.9dBi + 10log(2) = 7.91dBi > 6dBi , so the power density limit shall be reduced to 30-(7.91-6) = 28.09dBm.

2. Refer to section 3.3 for duty cycle spectrum plot.

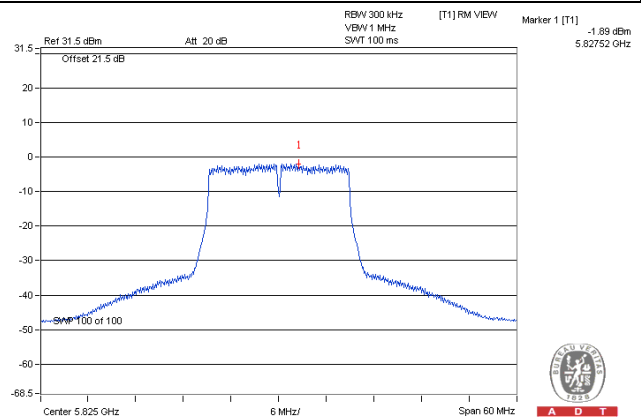
Spectrum Plot of Worst Value

802.11a_Chain 0 / CH165

802.11ac (VHT20)_Chain 0 / CH165



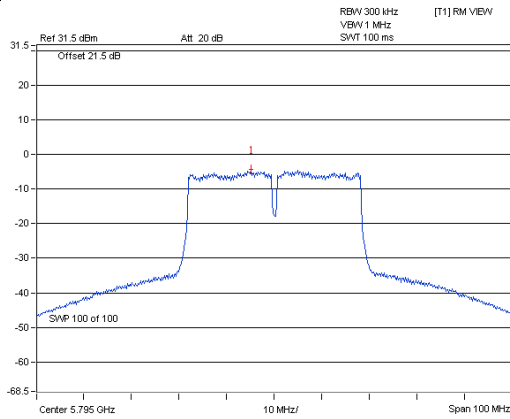
A D T



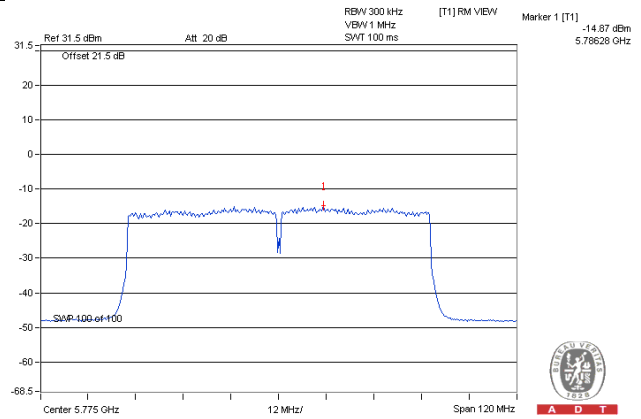
A D T

8802.11ac (VHT40)_Chain 0 / CH159

802.11ac (VHT80)_Chain 1 / CH155



A D T



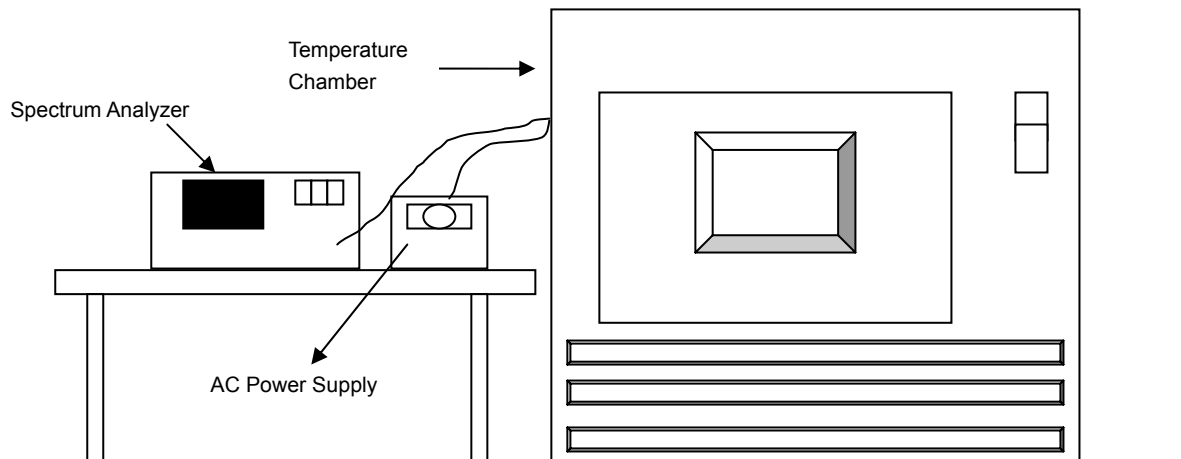
A D T

4.5 Frequency Stability Measurement

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 Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedures

- The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
- Turn the EUT on and couple its output to a spectrum analyzer.
- Turn the EUT off and set the chamber to the highest temperature specified.
- 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.
- Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
- 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.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Conditions

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

4.5.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5180MHz									
Temp. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
50	120	5179.9829	-0.00033	5179.9823	-0.00034	5179.9827	-0.00033	5179.984	-0.00031
40	120	5179.9757	-0.00047	5179.9755	-0.00047	5179.9795	-0.00040	5179.9776	-0.00043
30	120	5179.9781	-0.00042	5179.976	-0.00046	5179.9778	-0.00043	5179.9764	-0.00046
20	120	5180.0008	0.00002	5180	0.00000	5180.0013	0.00003	5180.0025	0.00005
10	120	5180.0208	0.00040	5180.0237	0.00046	5180.0215	0.00042	5180.0224	0.00043
0	120	5179.9887	-0.00022	5179.9919	-0.00016	5179.9931	-0.00013	5179.9933	-0.00013
-10	120	5180.0175	0.00034	5180.0184	0.00036	5180.0135	0.00026	5180.0151	0.00029
-20	120	5179.9914	-0.00017	5179.9949	-0.00010	5179.992	-0.00015	5179.9952	-0.00009
-30	120	5180.0102	0.00020	5180.0096	0.00019	5180.0127	0.00025	5180.0134	0.00026

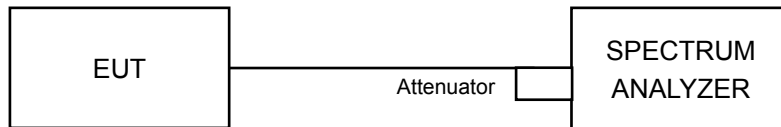
Frequency Stability Versus Temp.									
Operating Frequency: 5180MHz									
Temp. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
20	138	5180.0011	0.00002	5179.9996	-0.00001	5180.0022	0.00004	5180.0022	0.00004
	120	5180.0008	0.00002	5180	0.00000	5180.0013	0.00003	5180.0025	0.00005
	102	5180.0009	0.00002	5179.999	-0.00002	5180.0005	0.00001	5180.0018	0.00003

4.6 6dB Bandwidth Measurement

4.6.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedures

MEASUREMENT PROCEDURE REF

- Set resolution bandwidth (RBW) = 100kHz
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- 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

4.6.5 Deviation from Test Standard

No deviation.

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	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	16.42	16.45	0.5	Pass
157	5785	16.44	16.48	0.5	Pass
165	5825	16.43	16.47	0.5	Pass

802.11ac (VHT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	17.66	17.73	0.5	Pass
157	5785	17.65	17.69	0.5	Pass
165	5825	17.65	17.69	0.5	Pass

802.11ac (VHT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	36.45	36.50	0.5	Pass
159	5795	36.45	36.48	0.5	Pass

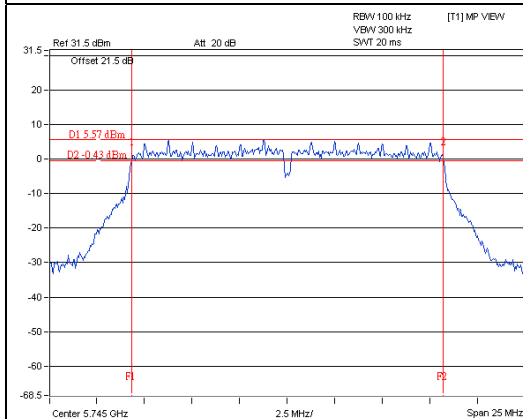
802.11ac (VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
155	5775	76.42	76.53	0.5	Pass

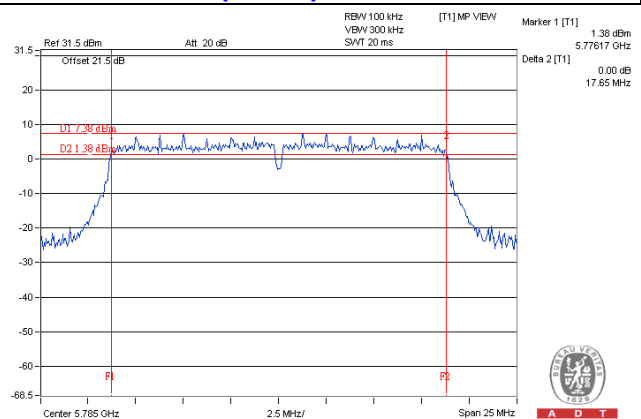
Spectrum Plot of Worst Value

802.11a_Chain 0 / CH149

802.11ac (VHT20)_Chain 0 / CH157



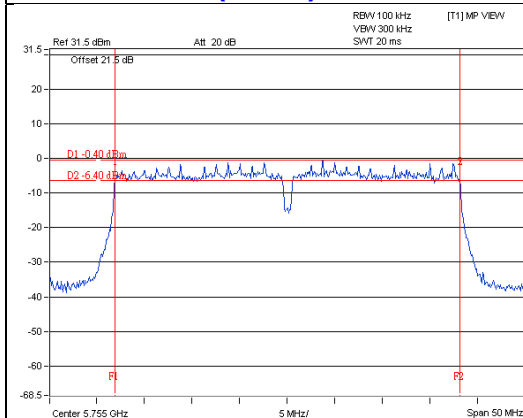
A D T



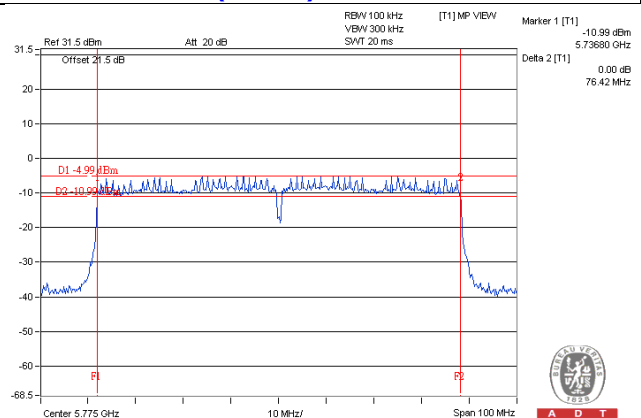
A D T

802.11ac (VHT40)_Chain 0 / CH151

802.11ac (VHT80)_Chain 0 / CH155



A D T



A D T

5 Pictures of Test Arrangements

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

Appendix – 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: 886-2-26051924

Hsin Chu EMC/RF Lab/Telecom Lab

Tel: 886-3-5935343

Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

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

--- END ---