

FCC Test Report

Report No.: RF160323C19-1

FCC ID: GZ5NVG37XXR2

Test Model: NVG378QR2

Series Model: NVG373QR2

Received Date: Mar. 22, 2016

Test Date: May 09 ~ May 18, 2016

Issued Date: May 23, 2016

Applicant: ARRIS Group, Inc.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

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Test Location: No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)



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Release Control Record

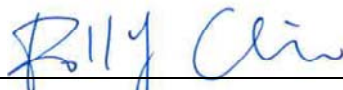
Issue No.	Description	Date Issued
RF160323C19-1	Original release	May 23, 2016

1 Certificate of Conformity

Product: ARRIS FTTH
Brand: ARRIS
Test Model: NVG378QR2
Series Model: NVG373QR2
Sample Status: Engineering sample
Applicant: ARRIS Group, Inc.
Test Date: May 09 ~ May 18, 2016
Standards: 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 :



Polly Chien / Specialist

Date:

May 23, 2016

Approved by :



Ken Liu / Senior Manager

Date:

May 23, 2016

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 -17.97dB at 0.37322MHz.
15.407(b) (1/2/3/4(i/ii)/6)	Radiated Emissions & Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.5dB at 5145.00MHz.
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	Antenna connector is i-pex(MHF) not a standard connector.

*For U-NII-3 band compliance with rule part 15.407(b)(i), the OOB test plots were recorded in Annex A.

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	Expanded Uncertainty (k=2) ($\pm$)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.44 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.59 dB
	200MHz ~ 1000MHz	3.60 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	ARRIS FTTH
Brand	ARRIS
Test Model	NVG378QR2
Series Model	NVG373QR2
Model Difference	Refer to Note
Status of EUT	Engineering sample
Power Supply Rating	12Vdc from adapter
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	OFDM
Transfer Rate	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 600.0Mbps 802.11ac: up to 1733.3Mbps
Operating Frequency	5180 ~ 5240MHz, 5745 ~ 5825MHz
Number of Channel	5180 ~ 5240MHz: 4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80) 5745 ~ 5825MHz: 5 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80)
Output Power	CDD Mode: 5180 ~ 5240MHz: 206.897mW 5745 ~ 5825MHz: 246.223mW Beamforming Mode: 5180 ~ 5240MHz: 203.592mW 5745 ~ 5825MHz: 246.156mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter
Data Cable Supplied	0.3m non-shielded RJ11 to RJ14 Y-cable without core 2m non-shielded RJ11 cable without core 2m non-shielded RJ45 cable without core

Note:

1. All models are listed as below. Model name NVG378QR2 is the representative for final test.

Brand	Model	Optional function
ARRIS	NVG378QR2	With VoIP
	NVG373QR2	Without VoIP

2. The EUT incorporates a MIMO function. Physically, the EUT provides 4 completed transmitters and 4 receivers.

Modulation Mode	TX FUNCTION	Beamforming mode
802.11a	4TX	Not support
802.11n (HT20)	4TX	Support
802.11n (HT40)	4TX	Support
802.11ac (VHT20)	4TX	Support
802.11ac (VHT40)	4TX	Support
802.11ac (VHT80)	4TX	Support

* 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)

* For 802.11n and 802.11ac, CDD mode is the worst case for final radiated emission and power line conducted emission tests after pretesting CDD mode and beamforming mode.

3. The EUT consumes power from the following adapters.

Adapter 1 (US)	
Brand	HOIOTO
Model	ADS-25S-12 12024EPCU-L
Input Power	120Vac, 60Hz max., 0.7A
Output Power	12Vdc, 2.0A
Power Line	2m cable without core attached on adapter

Adapter 2 (US)	
Brand	Ktec
Model	KSASB0241200200VU
Input Power	100-120Vac, 50/60Hz, 0.6A
Output Power	12Vdc, 2.0A
Power Line	2m cable without core attached on adapter

4. The following antennas were provided to the EUT.

Antenna Type	Dipole	
Antenna Connector	i-pex (MHF)	
Gain (dBi)	Frequency (MHz)	
	2400-2500	5150-5850
Ant. 1	5.06	-
Ant. 2	4.32	-
Ant. 3		6.08
Ant. 4	-	5.1
Ant. 5	-	6.19
Ant. 6	-	5.86

5. 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 $\geq$ 1G	RE<1G	PLC	APCM	
A	√	√	√	√	EUT + adapter 1
B	-	√	√	-	EUT + adapter 2

Where **RE $\geq$ 1G**: Radiated Emission above 1GHz & Bandedge Measurement
RE<1G: Radiated Emission below 1GHz
PLC: Power Line Conducted Emission
APCM: Antenna Port Conducted Measurement

Note:

1. The EUT was positioned on the z-plane during testing.
2. "-" means no effect.

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.

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.0
A	802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	BPSK	7.2
A	802.11ac (VHT40)		38 to 46	38, 46	OFDM	BPSK	15.0
A	802.11ac (VHT80)		42	42	OFDM	BPSK	130.0
A	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0
A	802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	BPSK	7.2
A	802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	15.0
A	802.11ac (VHT80)		155	155	OFDM	BPSK	130.0

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.

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A, B	802.11a	5180-5240	36 to 48	36	OFDM	BPSK	6.0
	802.11a	5745-5825	149 to 165		OFDM	BPSK	6.0

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.

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A, B	802.11a	5180-5240	36 to 48	36	OFDM	BPSK	6.0
	802.11a	5745-5825	149 to 165		OFDM	BPSK	6.0

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.

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.0
A	802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	BPSK	7.2
A	802.11ac (VHT40)		38 to 46	38, 46	OFDM	BPSK	15.0
A	802.11ac (VHT80)		42	42	OFDM	BPSK	130.0
A	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0
A	802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	BPSK	7.2
A	802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	15.0
A	802.11ac (VHT80)		155	155	OFDM	BPSK	130.0

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE $\geq$ 1G	24deg. C, 66%RH	120Vac, 60Hz	Alan Wu
RE $<$ 1G	20deg. C, 69%RH	120Vac, 60Hz	Bayu Chen
PLC	20deg. C, 69%RH	120Vac, 60Hz	Bayu Chen
APCM	25deg. C, 60%RH	120Vac, 60Hz	Leo Tsai

3.3 Duty Cycle of Test Signal

CDD Mode

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

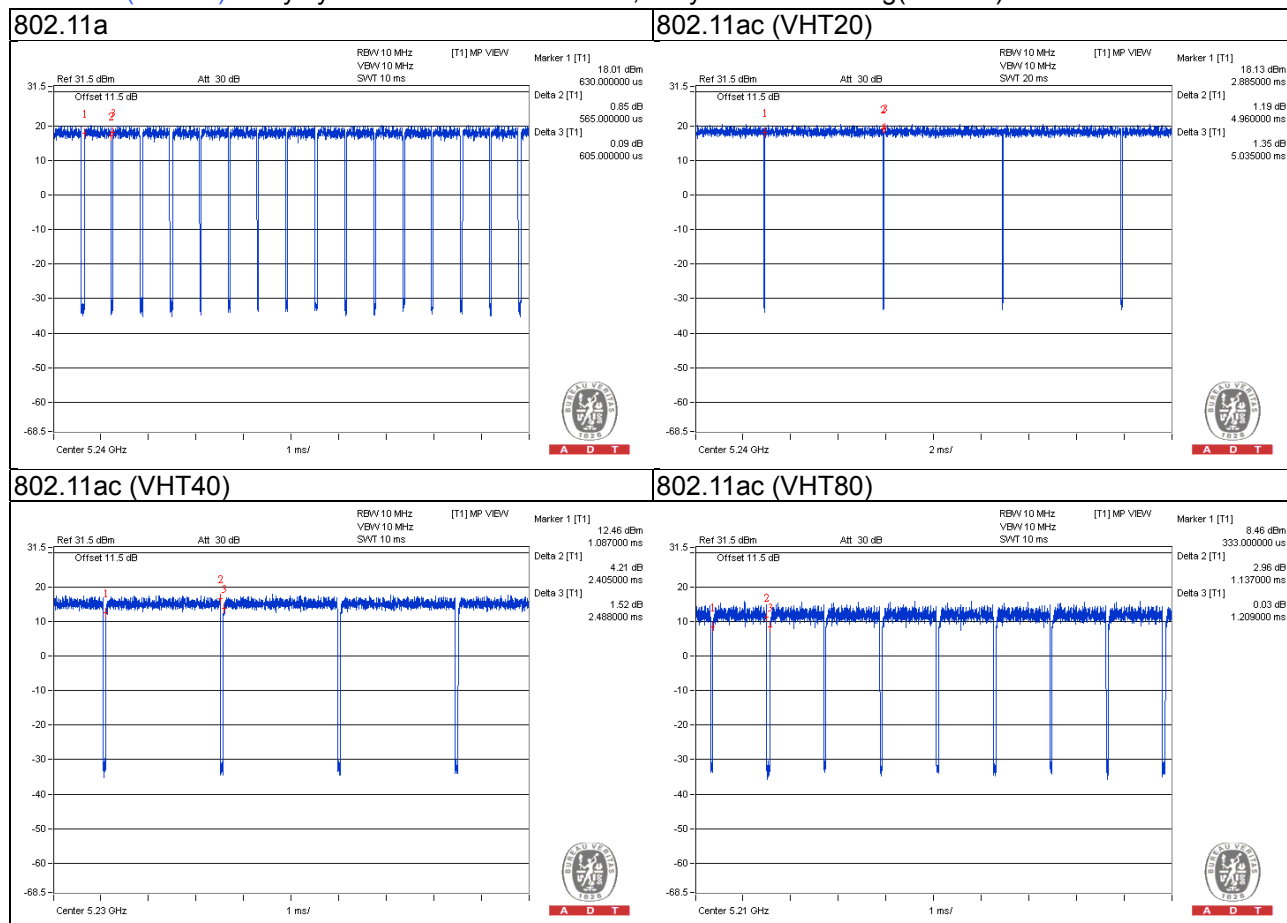
Duty cycle of test signal is $< 98\%$, duty factor shall be considered.

802.11a: Duty cycle = $0.565/0.605 = 0.934$, Duty factor = $10 * \log(1/0.934) = 0.30$

802.11ac (VHT20): Duty cycle = $4.960/5.035 = 0.985$

802.11ac (VHT40): Duty cycle = $2.405/2.488 = 0.967$, Duty factor = $10 * \log(1/0.967) = 0.15$

802.11ac (VHT80): Duty cycle = $1.137/1.209 = 0.940$, Duty factor = $10 * \log(1/0.940) = 0.27$



Beamforming Mode

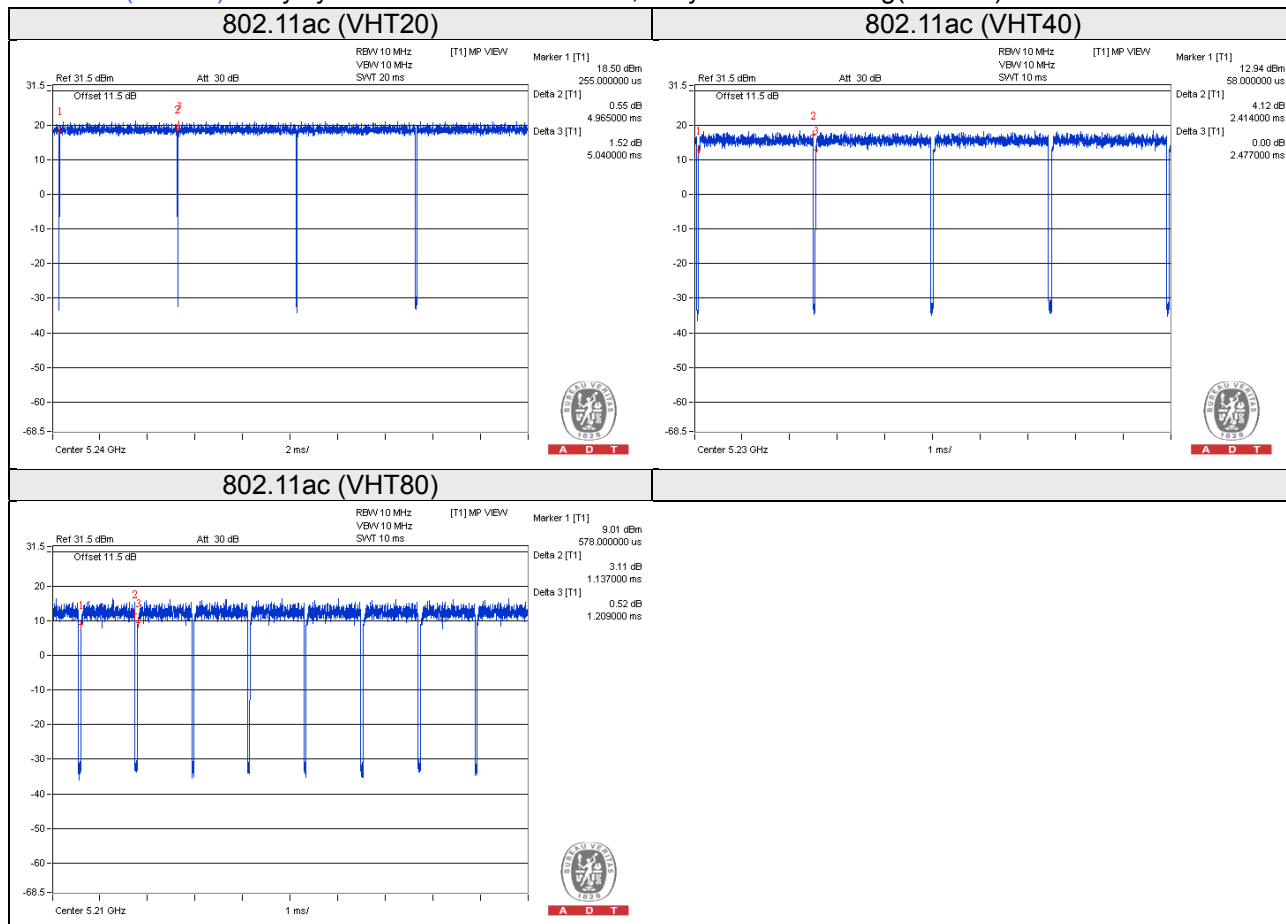
Duty cycle of test signal is $\geq 98\%$, duty factor is not required.

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

802.11ac (VHT20): Duty cycle = $4.965/5.040 = 0.985$

802.11ac (VHT40): Duty cycle = $2.414/2.477 = 0.975$, Duty factor = $10 * \log(1/0.975) = 0.11$

802.11ac (VHT80): Duty cycle = $1.137/1.209 = 0.940$, Duty factor = $10 * \log(1/0.940) = 0.27$



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.

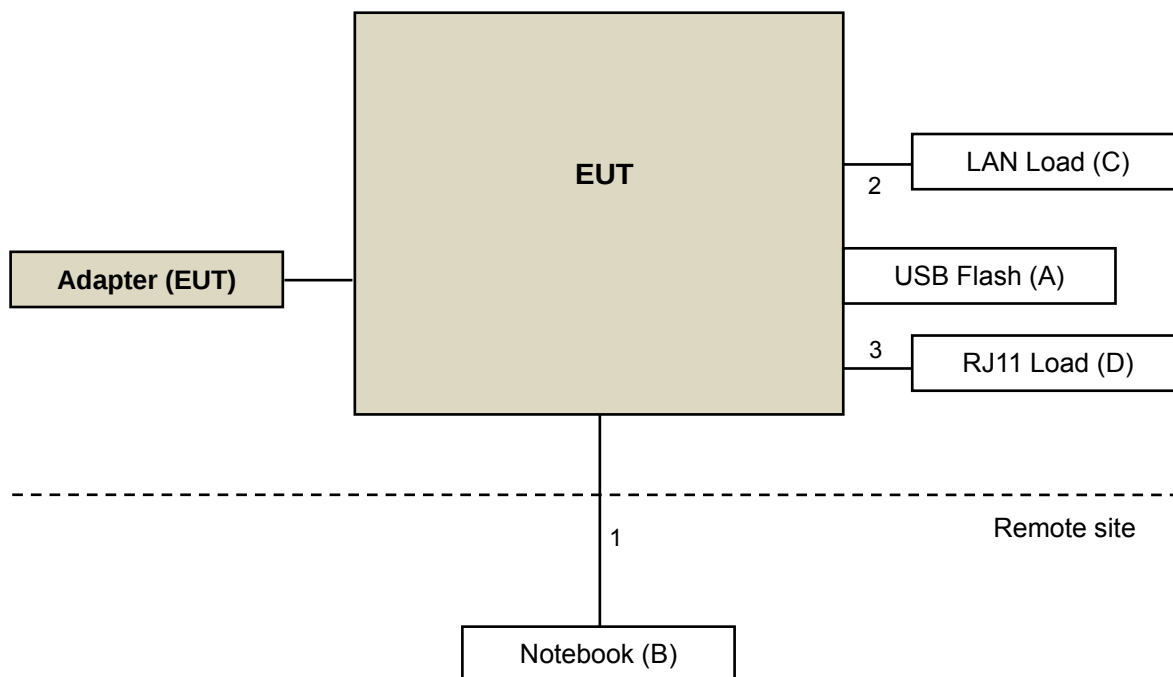
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	USB Flash	HP	v250W	01	NA	-
B.	Notebook	DELL	E5410	1HC2XM1	FCC DoC Approved	-
C.	LAN Load	NA	NA	NA	NA	-
D.	RJ11 Load	NA	NA	NA	NA	-

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Items B acted as communication partners to transfer data.

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ45 cable	1	10	N	0	-
2.	RJ45 cable	4	1.8	N	0	-
3.	RJ11 cable	1	1.8	N	0	-

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards

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

FCC Part 15, Subpart E (15.407)

KDB 789033 D02 General UNII Test Procedures New Rules v01r02

KDB 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:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

APPLICABLE TO	LIMIT	
789033 D02 General UNII Test Procedures New Rules v01r02	FIELD STRENGTH AT 3m	
	PK:74 (dBμV/m)	AV:54 (dBμV/m)
APPLICABLE TO	EIRP LIMIT	EQUIVALENT FIELD STRENGTH AT 3m
15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBμV/m)
15.407(b)(2)		
15.407(b)(3)		
15.407(b)(4)(i)	PK:-27 (dBm/MHz) ^{*1} PK:10 (dBm/MHz) ^{*2} PK:15.6 (dBm/MHz) ^{*3} PK:27 (dBm/MHz) ^{*4}	PK: 68.2(dBμV/m) ^{*1} PK:105.2 (dBμV/m) ^{*2} PK: 110.8(dBμV/m) ^{*3} PK:122.2 (dBμV/m) ^{*4}
15.407(b)(4)(ii)	FIELD STRENGTH at 3m / § 15.247(d),	
	PK:74 (dBμV/m)	AV:54 (dBμV/m)
^{*1} beyond 75 MHz or more above of the band edge. ^{*2} below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.		
^{*3} below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above. ^{*4} from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.		

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

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

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Oct. 12, 2015	Oct. 11, 2016
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Jul. 08, 2015	Jul. 07, 2016
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Jan. 07, 2016	Jan. 06, 2017
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-1170	Jan. 08, 2016	Jan. 07, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Jan. 18, 2016	Jan. 17, 2017
Preamplifier Agilent	8449B	3008A01960	Aug. 09, 2015	Aug. 08, 2016
Preamplifier Agilent	8447D	2944A10631	Aug. 09, 2015	Aug. 08, 2016
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH4-02(295012+309220)	Aug. 09, 2015	Aug. 08, 2016
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH4-03(250724)	Aug. 09, 2015	Aug. 08, 2016
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021703	NA	NA
Turn Table BV ADT	TT100	TT93021703	NA	NA
Turn Table Controller BV ADT	SC100.	SC93021703	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 18, 2015	Oct. 17, 2016
High Speed Peak Power Meter	ML2495A	0824011	Jul. 09, 2015	Jul. 08, 2016
Power Sensor	MA2411B	0738171	Jul. 09, 2015	Jul. 08, 2016
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 08, 2015	Jun. 07, 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 HwaYa Chamber 4.
3. The horn antenna and preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 460141.
5. The IC Site Registration No. is IC7450F-4.

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:

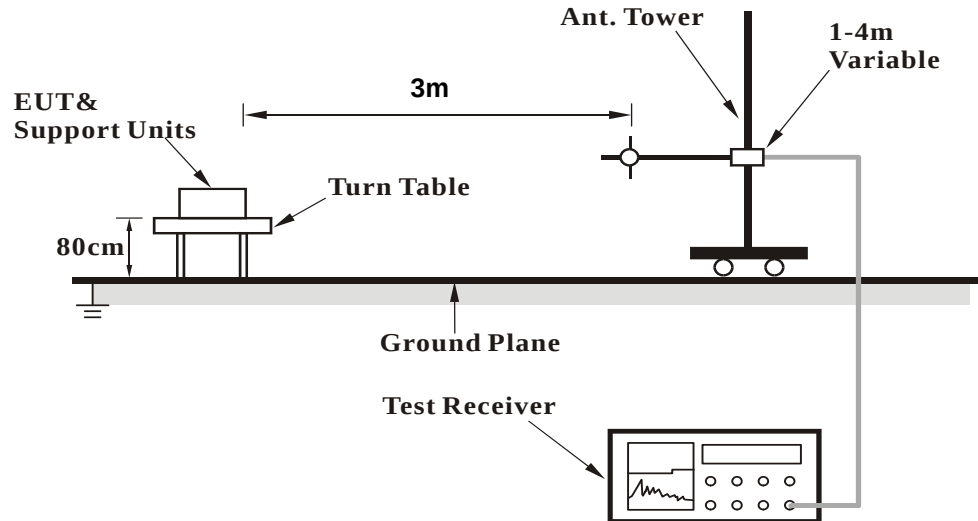
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

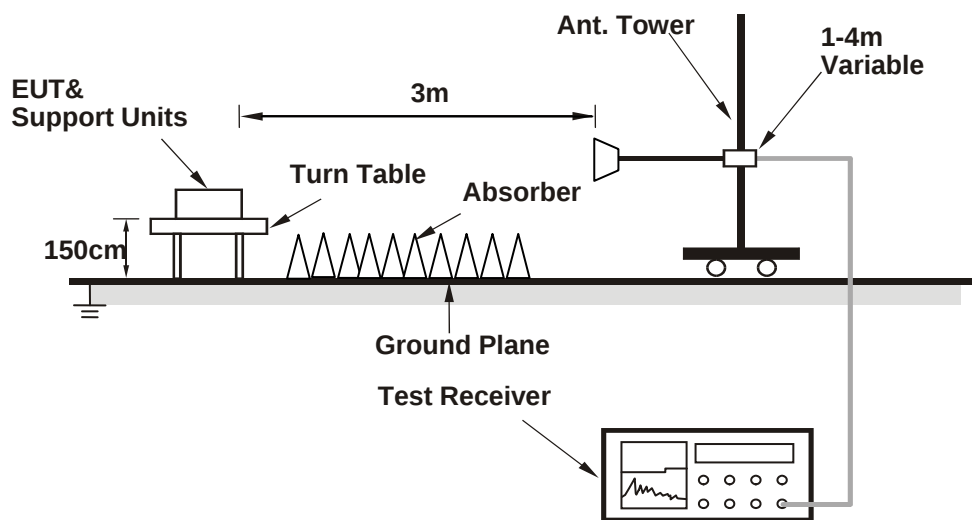
No deviation.

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

- Placed the EUT on the testing table.
- Prepared notebook to act as communication partner and placed it outside of testing area.
- The communication partner connected with EUT via a RJ45 cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
- The communication partner sent data to EUT by command "PING".

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	5150.00	63.3 PK	74.0	-10.7	1.81 H	218	57.80	5.50
2	5150.00	47.9 AV	54.0	-6.1	1.81 H	218	42.40	5.50
3	*5180.00	114.1 PK			1.79 H	7	74.60	39.50
4	*5180.00	104.4 AV			1.79 H	7	64.90	39.50
5	#10360.00	60.0 PK	74.0	-14.0	1.00 H	130	42.50	17.50
6	#10360.00	48.3 AV	54.0	-5.7	1.00 H	130	30.80	17.50
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	62.7 PK	74.0	-11.3	1.83 V	148	57.20	5.50
2	5150.00	46.3 AV	54.0	-7.7	1.83 V	148	40.80	5.50
3	*5180.00	111.4 PK			1.84 V	141	71.90	39.50
4	*5180.00	101.4 AV			1.84 V	141	61.90	39.50
5	#10360.00	59.5 PK	74.0	-14.5	1.00 V	165	42.00	17.50
6	#10360.00	47.0 AV	54.0	-7.0	1.00 V	165	29.50	17.50

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	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz	FUNCTION	Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	112.9 PK			1.94 H	3	73.30	39.60
2	*5200.00	103.5 AV			1.94 H	3	63.90	39.60
3	#10400.00	60.4 PK	74.0	-13.6	1.00 H	135	42.40	18.00
4	#10400.00	48.5 AV	54.0	-5.5	1.00 H	135	30.50	18.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	112.2 PK			2.00 V	146	72.60	39.60
2	*5200.00	102.4 AV			2.00 V	146	62.80	39.60
3	#10400.00	59.8 PK	74.0	-14.2	1.00 V	162	41.80	18.00
4	#10400.00	47.3 AV	54.0	-6.7	1.00 V	162	29.30	18.00

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	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz	FUNCTION	Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	113.2 PK			1.80 H	3	73.60	39.60
2	*5240.00	103.4 AV			1.80 H	3	63.80	39.60
3	5350.00	58.9 PK	74.0	-15.1	1.79 H	3	53.20	5.70
4	5350.00	46.2 AV	54.0	-7.8	1.79 H	3	40.50	5.70
5	#10480.00	59.9 PK	74.0	-14.1	1.00 H	132	41.90	18.00
6	#10480.00	48.2 AV	54.0	-5.8	1.00 H	132	30.20	18.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	111.7 PK			1.15 V	221	72.10	39.60
2	*5240.00	101.9 AV			1.15 V	221	62.30	39.60
3	5350.00	58.7 PK	74.0	-15.3	1.17 V	221	53.00	5.70
4	5350.00	45.8 AV	54.0	-8.2	1.17 V	221	40.10	5.70
5	#10480.00	59.3 PK	74.0	-14.7	1.00 V	168	41.30	18.00
6	#10480.00	47.0 AV	54.0	-7.0	1.00 V	168	29.00	18.00

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	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz	FUNCTION	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	#5634.40	57.9 PK	68.2	-10.3	1.85 H	1	51.80	6.10
2	*5745.00	115.9 PK			1.85 H	1	75.50	40.40
3	*5745.00	105.6 AV			1.85 H	1	65.20	40.40
4	#5949.60	59.4 PK	68.2	-8.8	1.85 H	1	52.60	6.80
5	11490.00	61.0 PK	74.0	-13.0	1.07 H	243	41.70	19.30
6	11490.00	48.1 AV	54.0	-5.9	1.07 H	243	28.80	19.30
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	#5624.80	59.2 PK	68.2	-9.0	1.96 V	161	53.10	6.10
2	*5745.00	111.5 PK			1.96 V	161	71.10	40.40
3	*5745.00	102.0 AV			1.96 V	161	61.60	40.40
4	#5947.20	58.3 PK	68.2	-9.9	1.96 V	161	51.50	6.80
5	11490.00	60.2 PK	74.0	-13.8	1.00 V	165	40.90	19.30
6	11490.00	47.7 AV	54.0	-6.3	1.00 V	165	28.40	19.30

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	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz	FUNCTION	Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	115.7 PK			1.84 H	2	75.20	40.50
2	*5785.00	105.6 AV			1.84 H	2	65.10	40.50
3	11570.00	61.8 PK	74.0	-12.2	1.00 H	244	42.80	19.00
4	11570.00	48.6 AV	54.0	-5.4	1.00 H	244	29.60	19.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	112.2 PK			1.82 V	157	71.70	40.50
2	*5785.00	102.5 AV			1.82 V	157	62.00	40.50
3	11570.00	60.4 PK	74.0	-13.6	1.00 V	160	41.40	19.00
4	11570.00	48.2 AV	54.0	-5.8	1.00 V	160	29.20	19.00

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.

CHANNEL	TX Channel 165	DETECTOR	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz	FUNCTION	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	#5647.20	58.6 PK	68.2	-9.6	2.02 H	4	52.50	6.10
2	*5825.00	115.5 PK			2.02 H	4	74.90	40.60
3	*5825.00	105.4 AV			2.02 H	4	64.80	40.60
4	#5976.00	60.0 PK	68.2	-8.2	2.02 H	4	53.30	6.70
5	11650.00	61.4 PK	74.0	-12.6	1.01 H	247	42.90	18.50
6	11650.00	48.2 AV	54.0	-5.8	1.01 H	247	29.70	18.50
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	#5620.00	58.6 PK	68.2	-9.6	1.86 V	159	52.50	6.10
2	*5825.00	111.9 PK			1.86 V	159	71.30	40.60
3	*5825.00	102.1 AV			1.86 V	159	61.50	40.60
4	#5964.00	59.3 PK	68.2	-8.9	1.86 V	159	52.60	6.70
5	11650.00	60.2 PK	74.0	-13.8	1.00 V	161	41.70	18.50
6	11650.00	47.6 AV	54.0	-6.4	1.00 V	161	29.10	18.50

Remarks:

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

802.11ac (VHT20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	64.7 PK	74.0	-9.3	1.01 H	9	59.20	5.50
2	5150.00	47.2 AV	54.0	-6.8	1.01 H	9	41.70	5.50
3	*5180.00	113.9 PK			1.02 H	2	74.40	39.50
4	*5180.00	103.8 AV			1.02 H	2	64.30	39.50
5	#10360.00	59.8 PK	74.0	-14.2	1.00 H	138	42.30	17.50
6	#10360.00	48.1 AV	54.0	-5.9	1.00 H	138	30.60	17.50
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	63.1 PK	74.0	-10.9	1.04 V	292	57.60	5.50
2	5150.00	46.8 AV	54.0	-7.2	1.04 V	292	41.30	5.50
3	*5180.00	112.5 PK			1.08 V	298	73.00	39.50
4	*5180.00	101.7 AV			1.08 V	298	62.20	39.50
5	#10360.00	59.3 PK	74.0	-14.7	1.00 V	162	41.80	17.50
6	#10360.00	46.9 AV	54.0	-7.1	1.00 V	162	29.40	17.50

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	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz	FUNCTION	Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	113.9 PK			1.00 H	357	74.30	39.60
2	*5200.00	103.3 AV			1.00 H	357	63.70	39.60
3	#10400.00	59.7 PK	74.0	-14.3	1.00 H	130	41.70	18.00
4	#10400.00	48.0 AV	54.0	-6.0	1.00 H	130	30.00	18.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	112.3 PK			1.14 V	299	72.70	39.60
2	*5200.00	101.4 AV			1.14 V	299	61.80	39.60
3	#10400.00	59.5 PK	74.0	-14.5	1.00 V	165	41.50	18.00
4	#10400.00	47.2 AV	54.0	-6.8	1.00 V	165	29.20	18.00

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	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz	FUNCTION	Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	114.1 PK			1.92 H	359	74.50	39.60
2	*5240.00	103.6 AV			1.92 H	359	64.00	39.60
3	5350.00	58.6 PK	74.0	-15.4	1.96 H	355	52.90	5.70
4	5350.00	45.6 AV	54.0	-8.4	1.96 H	355	39.90	5.70
5	#10480.00	59.6 PK	74.0	-14.4	1.00 H	131	41.60	18.00
6	#10480.00	48.1 AV	54.0	-5.9	1.00 H	131	30.10	18.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	112.1 PK			1.64 V	173	72.50	39.60
2	*5240.00	101.5 AV			1.64 V	173	61.90	39.60
3	5350.00	58.4 PK	74.0	-15.6	1.63 V	175	52.70	5.70
4	5350.00	45.1 AV	54.0	-8.9	1.63 V	175	39.40	5.70
5	#10480.00	58.7 PK	74.0	-15.3	1.00 V	168	40.70	18.00
6	#10480.00	46.6 AV	54.0	-7.4	1.00 V	168	28.60	18.00

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	#5639.20	59.3 PK	68.2	-8.9	2.12 H	359	53.20	6.10
2	*5745.00	115.7 PK			2.12 H	359	75.30	40.40
3	*5745.00	105.8 AV			2.12 H	359	65.40	40.40
4	#5960.80	59.9 PK	68.2	-8.3	2.12 H	359	53.20	6.70
5	11490.00	60.8 PK	74.0	-13.2	1.08 H	240	41.50	19.30
6	11490.00	47.9 AV	54.0	-6.1	1.08 H	240	28.60	19.30
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	#5628.80	58.7 PK	68.2	-9.5	1.97 V	159	52.60	6.10
2	*5745.00	112.1 PK			1.97 V	159	71.70	40.40
3	*5745.00	101.9 AV			1.97 V	159	61.50	40.40
4	#5943.20	59.0 PK	68.2	-9.2	1.97 V	159	52.30	6.70
5	11490.00	59.8 PK	74.0	-14.2	1.00 V	161	40.50	19.30
6	11490.00	47.6 AV	54.0	-6.4	1.00 V	161	28.30	19.30

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	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz	FUNCTION	Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	116.2 PK			1.86 H	8	75.70	40.50
2	*5785.00	106.0 AV			1.86 H	8	65.50	40.50
3	11570.00	61.2 PK	74.0	-12.8	1.02 H	244	42.20	19.00
4	11570.00	48.5 AV	54.0	-5.5	1.02 H	244	29.50	19.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	112.2 PK			1.82 V	158	71.70	40.50
2	*5785.00	102.0 AV			1.82 V	158	61.50	40.50
3	11570.00	59.9 PK	74.0	-14.1	1.00 V	164	40.90	19.00
4	11570.00	47.6 AV	54.0	-6.4	1.00 V	164	28.60	19.00

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	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz	FUNCTION	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	#5640.00	58.4 PK	68.2	-9.8	2.29 H	8	52.30	6.10
2	*5825.00	114.7 PK			2.29 H	8	74.10	40.60
3	*5825.00	104.8 AV			2.29 H	8	64.20	40.60
4	#5975.20	58.8 PK	68.2	-9.4	2.29 H	8	52.10	6.70
5	11650.00	60.5 PK	74.0	-13.5	1.02 H	242	42.00	18.50
6	11650.00	47.6 AV	54.0	-6.4	1.02 H	242	29.10	18.50
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	#5612.00	58.6 PK	68.2	-9.6	1.52 V	155	52.60	6.00
2	*5825.00	112.0 PK			1.52 V	155	71.40	40.60
3	*5825.00	101.5 AV			1.52 V	155	60.90	40.60
4	#5949.60	58.7 PK	68.2	-9.5	1.52 V	155	51.90	6.80
5	11650.00	59.5 PK	74.0	-14.5	1.00 V	169	41.00	18.50
6	11650.00	47.4 AV	54.0	-6.6	1.00 V	169	28.90	18.50

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	73.3 PK	74.0	-0.7	1.69 H	223	67.80	5.50
2	5150.00	50.6 AV	54.0	-3.4	1.69 H	223	45.10	5.50
3	*5190.00	111.1 PK			1.83 H	1	71.60	39.50
4	*5190.00	100.9 AV			1.83 H	1	61.40	39.50
5	#10380.00	58.7 PK	74.0	-15.3	1.00 H	134	40.90	17.80
6	#10380.00	47.5 AV	54.0	-6.5	1.00 H	134	29.70	17.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	68.1 PK	74.0	-5.9	1.07 V	213	62.60	5.50
2	5150.00	48.4 AV	54.0	-5.6	1.07 V	213	42.90	5.50
3	*5190.00	108.3 PK			1.09 V	214	68.80	39.50
4	*5190.00	98.1 AV			1.09 V	214	58.60	39.50
5	#10380.00	58.1 PK	74.0	-15.9	1.00 V	164	40.30	17.80
6	#10380.00	45.9 AV	54.0	-8.1	1.00 V	164	28.10	17.80

Remarks:

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

CHANNEL	TX Channel 46	DETECTOR	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz	FUNCTION	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	*5230.00	111.1 PK			1.92 H	359	71.50	39.60
2	*5230.00	101.3 AV			1.92 H	359	61.70	39.60
3	5350.00	61.9 PK	74.0	-12.1	1.90 H	8	56.20	5.70
4	5350.00	45.5 AV	54.0	-8.5	1.90 H	8	39.80	5.70
5	#10460.00	59.2 PK	74.0	-14.8	1.00 H	138	41.20	18.00
6	#10460.00	48.0 AV	54.0	-6.0	1.00 H	138	30.00	18.00
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	*5230.00	109.6 PK			1.80 V	174	70.00	39.60
2	*5230.00	99.1 AV			1.80 V	174	59.50	39.60
3	5350.00	61.1 PK	74.0	-12.9	1.80 V	173	55.40	5.70
4	5350.00	45.3 AV	54.0	-8.7	1.80 V	173	39.60	5.70
5	#10460.00	58.6 PK	74.0	-15.4	1.00 V	163	40.60	18.00
6	#10460.00	46.4 AV	54.0	-7.6	1.00 V	163	28.40	18.00

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	#5647.20	59.1 PK	68.2	-9.1	1.62 H	4	53.00	6.10
2	*5755.00	113.3 PK			1.62 H	4	72.80	40.50
3	*5755.00	103.3 AV			1.62 H	4	62.80	40.50
4	#5952.80	59.4 PK	68.2	-8.8	1.62 H	4	52.70	6.70
5	11510.00	60.1 PK	74.0	-13.9	1.06 H	240	41.00	19.10
6	11510.00	47.0 AV	54.0	-7.0	1.06 H	240	27.90	19.10
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	#5611.20	59.1 PK	68.2	-9.1	1.74 V	155	53.10	6.00
2	*5755.00	109.6 PK			1.74 V	155	69.10	40.50
3	*5755.00	99.8 AV			1.74 V	155	59.30	40.50
4	#5934.40	58.6 PK	68.2	-9.6	1.74 V	155	51.90	6.70
5	11510.00	59.0 PK	74.0	-15.0	1.00 V	162	39.90	19.10
6	11510.00	46.7 AV	54.0	-7.3	1.00 V	162	27.60	19.10

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 159	DETECTOR	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz	FUNCTION	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	#5607.20	58.1 PK	68.2	-10.1	1.96 H	1	52.10	6.00
2	*5795.00	112.9 PK			1.96 H	1	72.40	40.50
3	*5795.00	102.6 AV			1.96 H	1	62.10	40.50
4	#5944.00	58.3 PK	68.2	-9.9	1.96 H	1	51.60	6.70
5	11590.00	60.3 PK	74.0	-13.7	1.02 H	240	41.60	18.70
6	11590.00	47.3 AV	54.0	-6.7	1.02 H	240	28.60	18.70
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5624.80	58.5 PK	68.2	-9.7	1.96 V	1	52.40	6.10
2	*5795.00	109.0 PK			2.10 V	161	68.50	40.50
3	*5795.00	99.2 AV			2.10 V	161	58.70	40.50
4	#5984.00	58.7 PK	68.2	-9.5	1.96 V	1	52.00	6.70
5	11590.00	59.3 PK	74.0	-14.7	1.00 V	165	40.60	18.70
6	11590.00	47.1 AV	54.0	-6.9	1.00 V	165	28.40	18.70

Remarks:

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

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	5145.00	73.5 PK	74.0	-0.5	1.88 H	4	68.00	5.50
2	5145.00	53.4 AV	54.0	-0.6	1.88 H	4	47.90	5.50
3	*5210.00	107.0 PK			1.91 H	359	67.40	39.60
4	*5210.00	97.2 AV			1.91 H	359	57.60	39.60
5	#10420.00	58.4 PK	74.0	-15.6	1.00 H	133	40.40	18.00
6	#10420.00	47.3 AV	54.0	-6.7	1.00 H	133	29.30	18.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5145.00	68.5 PK	74.0	-5.5	1.83 V	173	63.00	5.50
2	5145.00	49.6 AV	54.0	-4.4	1.83 V	173	44.10	5.50
3	*5210.00	105.5 PK			1.80 V	178	65.90	39.60
4	*5210.00	95.7 AV			1.80 V	178	56.10	39.60
5	#10420.00	58.0 PK	74.0	-16.0	1.00 V	166	40.00	18.00
6	#10420.00	45.8 AV	54.0	-8.2	1.00 V	166	27.80	18.00

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	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz	FUNCTION	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	#5639.20	60.4 PK	68.2	-7.8	1.54 H	5	54.30	6.10
2	*5775.00	109.4 PK			1.54 H	5	68.90	40.50
3	*5775.00	99.4 AV			1.54 H	5	58.90	40.50
4	#5933.60	62.0 PK	68.2	-6.2	1.54 H	5	55.30	6.70
5	11550.00	59.7 PK	74.0	-14.3	1.03 H	245	40.70	19.00
6	11550.00	46.7 AV	54.0	-7.3	1.03 H	245	27.70	19.00
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	#5644.80	58.9 PK	68.2	-9.3	1.70 V	155	52.80	6.10
2	*5775.00	106.2 PK			1.70 V	155	65.70	40.50
3	*5775.00	95.8 AV			1.70 V	155	55.30	40.50
4	#5931.20	58.7 PK	68.2	-9.5	1.70 V	155	52.00	6.70
5	11550.00	58.8 PK	74.0	-15.2	1.00 V	169	39.80	19.00
6	11550.00	46.3 AV	54.0	-7.7	1.00 V	169	27.30	19.00

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 Worst-Case Data:

802.11a

CHANNEL	TX Channel 36	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz	TEST MODE	A

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	30.00	29.1 QP	40.0	-10.9	1.26 H	205	44.70	-15.60
2	103.72	25.3 QP	43.5	-18.2	2.00 H	71	43.60	-18.30
3	125.06	31.7 QP	43.5	-11.8	1.51 H	269	47.70	-16.00
4	375.32	39.2 QP	46.0	-6.8	1.00 H	128	49.90	-10.70
5	625.58	37.0 QP	46.0	-9.0	1.26 H	165	42.80	-5.80
6	875.84	34.6 QP	46.0	-11.4	1.51 H	317	36.00	-1.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	36.16	32.9 QP	40.0	-7.1	1.26 V	318	48.30	-15.40
2	61.04	34.4 QP	40.0	-5.6	1.51 V	104	49.40	-15.00
3	103.72	28.5 QP	43.5	-15.0	1.00 V	151	46.80	-18.30
4	125.06	28.1 QP	43.5	-15.4	1.26 V	52	44.10	-16.00
5	625.58	37.2 QP	46.0	-8.8	1.51 V	308	43.00	-5.80
6	875.84	37.8 QP	46.0	-8.2	1.00 V	311	39.20	-1.40

Remarks:

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

CHANNEL	TX Channel 36	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz	TEST MODE	B

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	30.00	33.0 QP	40.0	-7.0	1.24 H	10	48.60	-15.60
2	125.06	31.9 QP	43.5	-11.6	1.49 H	272	47.90	-16.00
3	138.64	24.9 QP	43.5	-18.6	1.99 H	99	39.50	-14.60
4	375.32	39.2 QP	46.0	-6.8	1.00 H	141	49.90	-10.70
5	625.58	36.1 QP	46.0	-9.9	1.24 H	154	41.90	-5.80
6	875.84	36.7 QP	46.0	-9.3	1.49 H	315	38.10	-1.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	34.61	26.9 QP	40.0	-13.1	1.51 V	310	42.30	-15.40
2	43.58	32.6 QP	40.0	-7.4	1.00 V	295	46.90	-14.30
3	125.06	26.7 QP	43.5	-16.8	1.51 V	47	42.70	-16.00
4	375.32	36.2 QP	46.0	-9.8	1.51 V	63	46.90	-10.70
5	625.58	37.1 QP	46.0	-8.9	1.51 V	250	42.90	-5.80
6	875.84	37.8 QP	46.0	-8.2	1.00 V	257	39.20	-1.40

Remarks:

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

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.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Oct. 12, 2015	Oct. 11, 2016
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond2-01	Dec. 26, 2015	Dec. 25, 2016
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Jan. 11, 2016	Jan. 10, 2017
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Jul. 21, 2015	Jul. 20, 2016
Software ADT	BV ADT_Conf_ V7.3.7.3	NA	NA	NA

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

2. The test was performed in HwaYa Shielded Room 2.

3. The VCCI Site Registration No. is C-2047.

4.2.3 Test Procedures

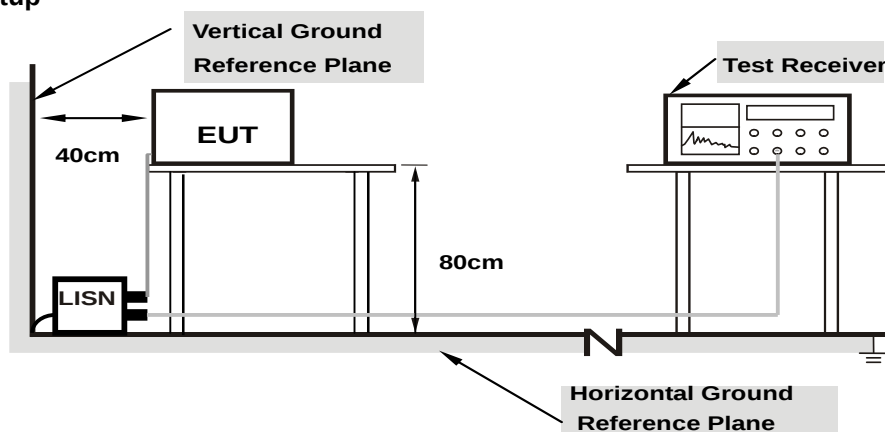
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance 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: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

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.

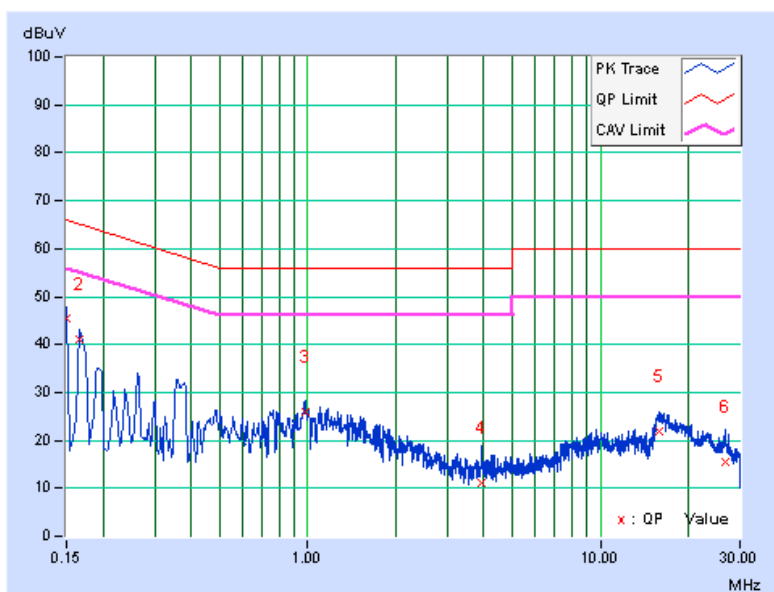
4.2.7 Test Results

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

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.12	35.44	18.84	45.56	28.96	66.00	56.00	-20.44	-27.04
2	0.16600	10.13	31.00	15.71	41.13	25.84	65.16	55.16	-24.03	-29.32
3	0.97890	10.22	15.79	10.80	26.01	21.02	56.00	46.00	-29.99	-24.98
4	3.93800	10.35	0.60	-4.22	10.95	6.13	56.00	46.00	-45.05	-39.87
5	15.88200	10.55	11.49	5.78	22.04	16.33	60.00	50.00	-37.96	-33.67
6	26.69400	10.48	4.84	-0.36	15.32	10.12	60.00	50.00	-44.68	-39.88

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.

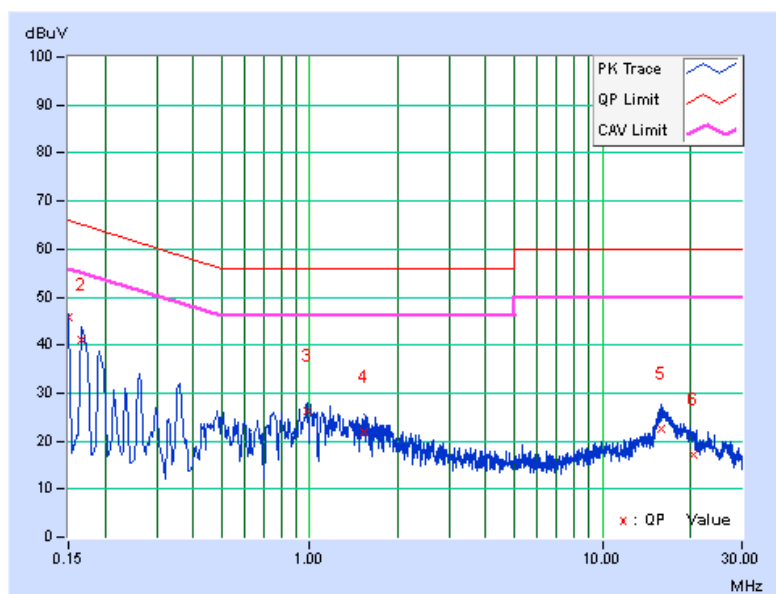


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	A		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
	[MHz]	(dB)	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.13	35.71	18.60	45.84	28.73	66.00	56.00	-20.16	-27.27
2	0.16600	10.14	31.10	15.06	41.24	25.20	65.16	55.16	-23.92	-29.96
3	0.97890	10.21	15.95	11.08	26.16	21.29	56.00	46.00	-29.84	-24.71
4	1.54200	10.26	11.48	4.66	21.74	14.92	56.00	46.00	-34.26	-31.08
5	15.97800	10.68	11.96	6.25	22.64	16.93	60.00	50.00	-37.36	-33.07
6	20.59000	10.77	6.48	1.44	17.25	12.21	60.00	50.00	-42.75	-37.79

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.

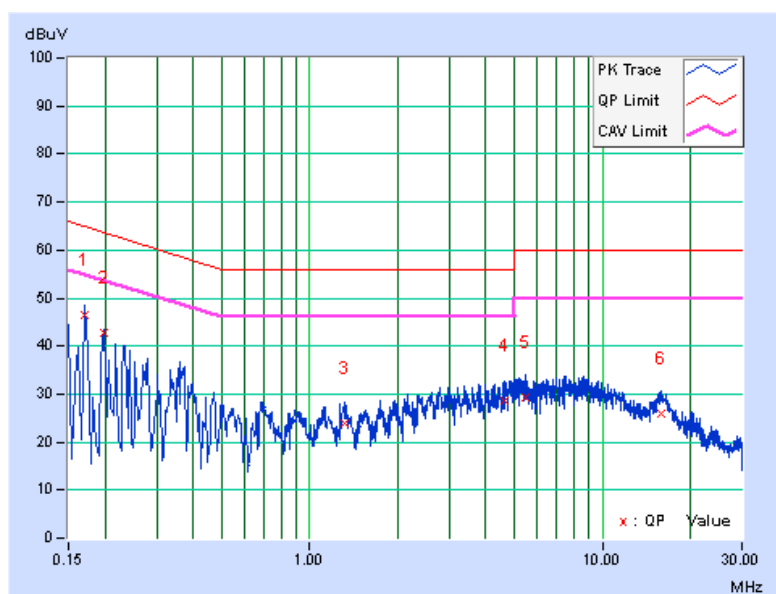


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17000	10.14	36.28	22.39	46.42	32.53	64.96	54.96	-18.54	-22.43
2	0.19800	10.16	32.50	18.17	42.66	28.33	63.69	53.69	-21.04	-25.37
3	1.31000	10.24	13.76	5.81	24.00	16.05	56.00	46.00	-32.00	-29.95
4	4.60600	10.36	18.33	10.03	28.69	20.39	56.00	46.00	-27.31	-25.61
5	5.45000	10.38	18.81	10.65	29.19	21.03	60.00	50.00	-30.81	-28.97
6	15.93000	10.55	15.34	7.67	25.89	18.22	60.00	50.00	-34.11	-31.78

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.

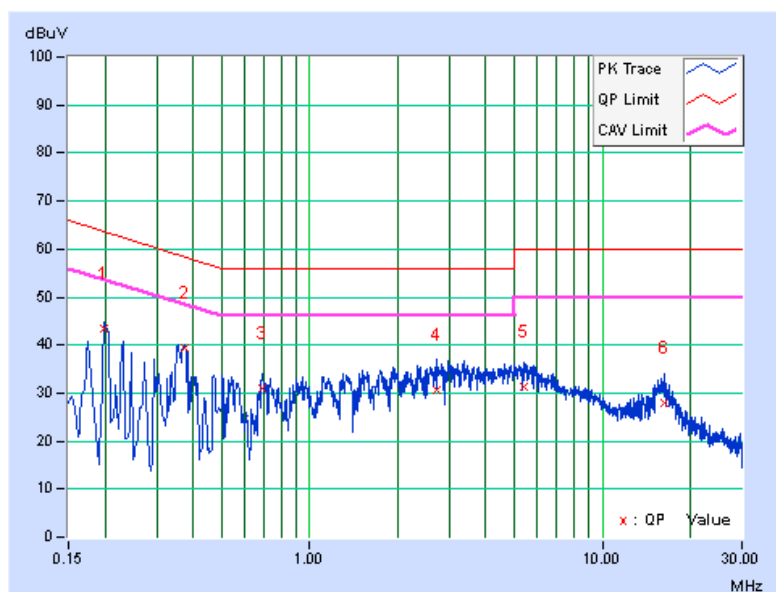


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
	[MHz]	(dB)	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.19832	10.16	33.12	19.78	43.28	29.94	63.68	53.68	-20.40	-23.74
2	0.37322	10.19	29.32	20.27	39.51	30.46	58.43	48.43	-18.92	-17.97
3	0.68592	10.20	20.75	8.43	30.95	18.63	56.00	46.00	-25.05	-27.37
4	2.71000	10.33	20.42	11.56	30.75	21.89	56.00	46.00	-25.25	-24.11
5	5.40600	10.43	20.99	13.49	31.42	23.92	60.00	50.00	-28.58	-26.08
6	16.20200	10.68	17.18	7.47	27.86	18.15	60.00	50.00	-32.14	-31.85

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

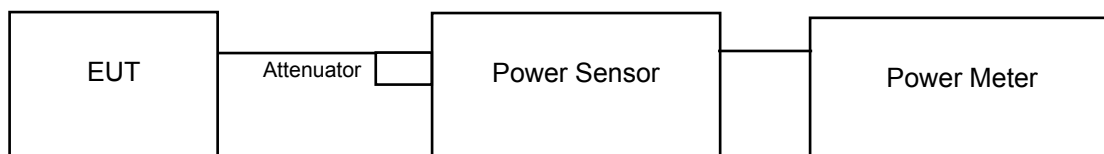
4.3.1 Limits of Transmit Power Measurement

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)

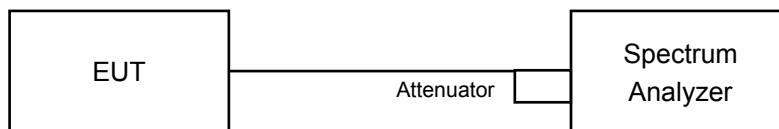
*B is the 26 dB emission bandwidth in megahertz

4.3.2 Test Setup

For 802.11a, 802.11ac (VHT20), 802.11ac (VHT40)



For 802.11ac (VHT80)



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

For Average Power Measurement

For 802.11a, 802.11ac (VHT20), 802.11ac (VHT40)

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 802.11ac (VHT80)

- a. Set span to encompass the entire 26 dB EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
- b. Set sweep trigger to “free run”.
- c. Set RBW = 1 MHz.
- d. Set VBW $\geq$ 3 MHz
- e. Number of points in sweep $\geq$ 2 Span / RBW.
- f. Sweep time $\leq$ (number of points in sweep) * T
- g. Using emission bandwidth to determine the frequency span for integration the channel bandwidth.
- h. Detector = RMS.
- i. Trace mode = max hold.
- j. Allow max hold to run for at least 60 seconds, or longer as needed to allow the trace to stabilize.
- k. Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument's band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

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 Result

Power Output:

CDD Mode

802.11a

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	17.60	17.61	17.11	16.05	206.897	23.16	29.81	Pass
40	5200	17.15	17.29	17.15	16.00	197.151	22.95	29.81	Pass
48	5240	17.25	17.18	17.20	16.05	198.081	22.97	29.81	Pass
149	5745	16.89	18.14	17.65	17.25	225.326	23.53	29.81	Pass
157	5785	16.40	18.11	17.36	17.19	215.176	23.33	29.81	Pass
165	5825	16.10	18.11	17.07	17.34	210.585	23.23	29.81	Pass

NOTE: Antenna gain = 6.19dBi > 6dBi, so the power limit shall be reduced to $30-(6.19-6) = 29.81\text{dBm}$.

802.11ac (VHT20)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	17.48	17.55	17.19	16.04	205.400	23.13	29.81	Pass
40	5200	17.00	17.31	17.25	16.04	197.213	22.95	29.81	Pass
48	5240	16.80	17.00	17.07	16.06	189.280	22.77	29.81	Pass
149	5745	16.89	18.39	17.28	17.51	227.709	23.57	29.81	Pass
157	5785	16.90	18.69	17.06	17.60	231.299	23.64	29.81	Pass
165	5825	16.77	18.19	17.02	17.49	219.906	23.42	29.81	Pass

NOTE: Antenna gain = 6.19dBi > 6dBi, so the power limit shall be reduced to $30-(6.19-6) = 29.81\text{dBm}$.

802.11ac (VHT40)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	16.71	16.74	16.56	15.05	171.366	22.34	29.81	Pass
46	5230	17.44	17.43	17.01	16.08	201.583	23.04	29.81	Pass
151	5755	17.05	18.71	17.76	17.89	246.223	23.91	29.81	Pass
159	5795	16.99	18.72	17.34	17.88	240.052	23.80	29.81	Pass

NOTE: Antenna gain = 6.19dBi > 6dBi, so the power limit shall be reduced to $30-(6.19-6) = 29.81\text{dBm}$.

802.11ac (VHT80)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	16.20	16.45	16.13	15.20	159.977	22.04	29.81	Pass
155	5775	16.58	18.25	17.34	17.62	224.343	23.51	29.81	Pass

NOTE: Antenna gain = 6.19dBi > 6dBi, so the power limit shall be reduced to $30 - (6.19 - 6) = 29.81$ dBm.

Beamforming Mode

802.11ac (VHT20)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	17.42	17.50	17.10	16.08	203.279	23.08	24.16	Pass
40	5200	17.00	17.31	17.25	16.04	197.213	22.95	24.16	Pass
48	5240	16.88	17.05	17.04	16.02	190.028	22.79	24.16	Pass
149	5745	16.97	18.32	17.20	17.56	227.191	23.56	24.16	Pass
157	5785	16.99	18.65	17.66	17.06	232.446	23.66	24.16	Pass
165	5825	16.74	18.10	17.22	17.43	219.829	23.42	24.16	Pass

NOTE: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/4] = 11.84\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (11.84 - 6) = 24.16\text{dBm}$.

802.11ac (VHT40)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	16.78	16.71	16.51	15.10	171.654	22.35	24.16	Pass
46	5230	17.48	17.47	17.11	16.06	203.592	23.09	24.16	Pass
151	5755	17.00	18.78	17.73	17.87	246.156	23.91	24.16	Pass
159	5795	16.98	18.79	17.37	17.86	241.241	23.82	24.16	Pass

NOTE: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/4] = 11.84\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (11.84 - 6) = 24.16\text{dBm}$.

802.11ac (VHT80)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	16.22	16.49	16.14	15.22	160.826	22.06	24.16	Pass
155	5775	16.53	18.27	17.30	17.68	224.438	23.51	24.16	Pass

NOTE: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/4] = 11.84\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (11.84 - 6) = 24.16\text{dBm}$.

26dB Bandwidth:

CDD Mode

802.11a

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)				Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3	
36	5180	36.06	23.86	23.19	23.55	Pass
40	5200	36.13	23.89	23.23	23.47	Pass
48	5240	36.03	23.72	23.25	23.38	Pass

802.11ac (VHT20)

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)				Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3	
36	5180	37.81	25.12	24.22	23.64	Pass
40	5200	39.77	25.19	24.30	24.31	Pass
48	5240	38.22	25.06	24.51	23.79	Pass

802.11ac (VHT40)

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)				Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3	
38	5190	73.62	44.12	44.29	44.25	Pass
46	5230	78.32	44.24	44.45	44.06	Pass

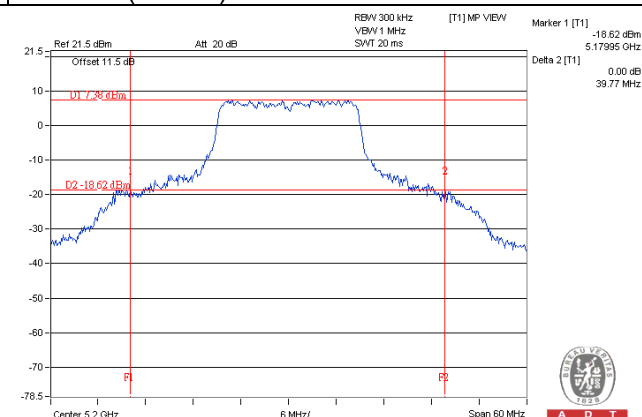
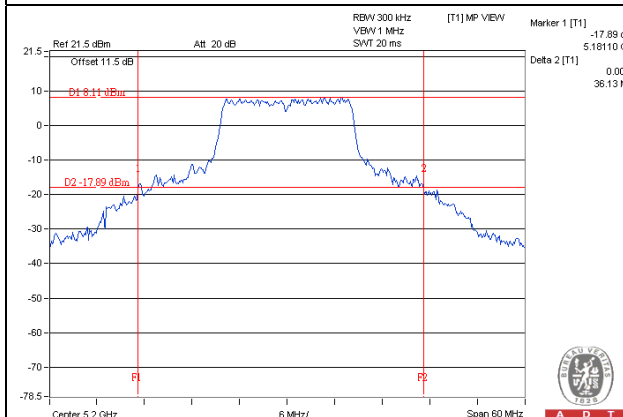
802.11ac (VHT80)

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)				Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3	
42	5210	121.16	82.33	97.28	82.98	Pass

Spectrum Plot of Worst Value

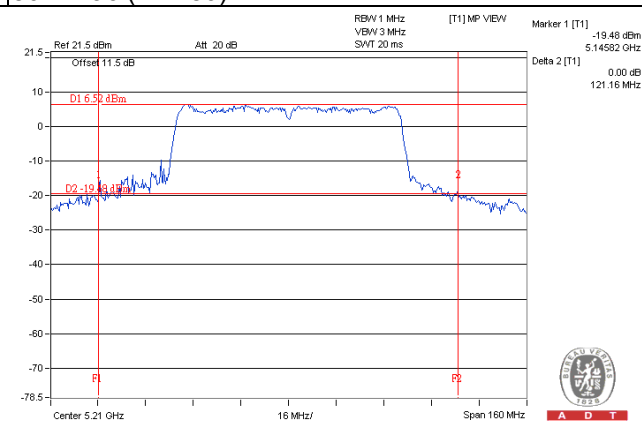
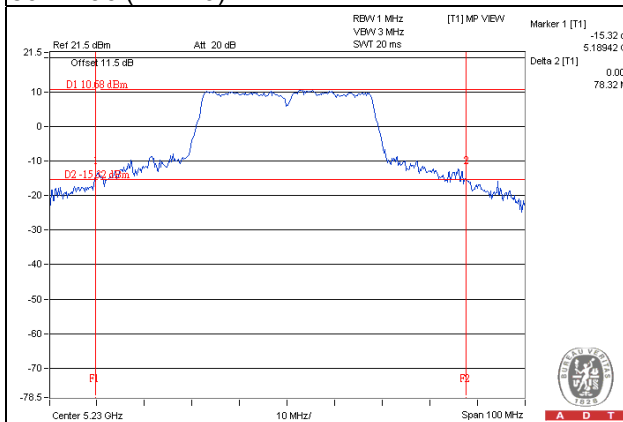
802.11a

802.11ac (VHT20)



802.11ac (VHT40)

802.11ac (VHT80)



Beamforming Mode

802.11ac (VHT20)

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)				Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3	
36	5180	36.12	25.07	24.45	24.60	Pass
40	5200	34.70	25.24	24.55	24.56	Pass
48	5240	34.83	25.02	24.55	24.57	Pass

802.11ac (VHT40)

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)				Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3	
38	5190	44.43	43.99	44.25	44.21	Pass
46	5230	76.93	44.81	44.51	44.19	Pass

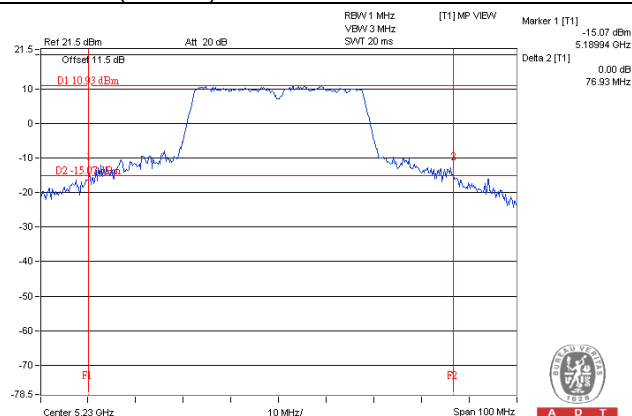
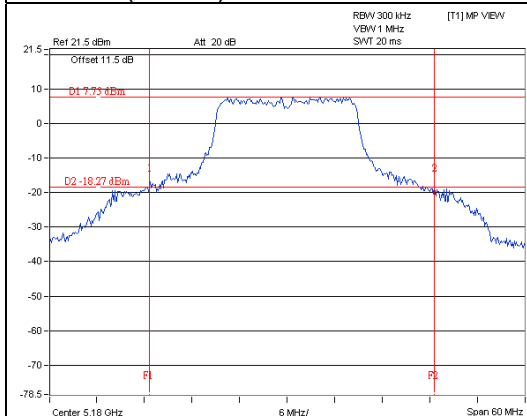
802.11ac (VHT80)

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)				Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3	
42	5210	116.13	82.84	96.93	96.36	Pass

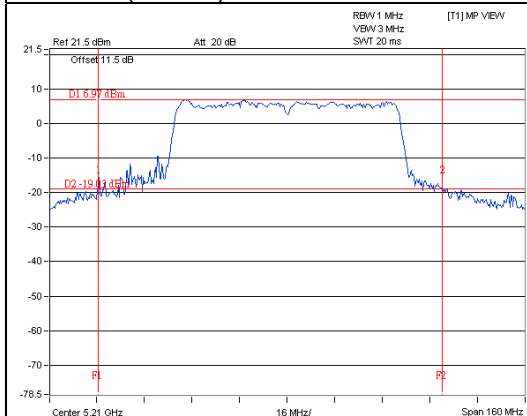
Spectrum Plot of Worst Value

802.11ac (VHT20)

802.11ac (VHT40)



802.11ac (VHT80)



Occupied Bandwidth:

CDD Mode

802.11a

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	17.28	16.92	16.92	16.92
40	5200	17.40	17.04	16.68	17.16
48	5240	17.64	16.92	16.92	16.92
149	5745	16.92	17.04	16.92	16.80
157	5785	17.04	17.04	16.92	16.80
165	5825	16.92	17.16	16.92	16.92

802.11ac (VHT20)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	18.72	18.12	18.12	18.12
40	5200	18.48	18.36	18.12	18.12
48	5240	18.72	18.12	18.12	18.00
149	5745	18.00	18.24	18.12	18.00
157	5785	18.12	18.36	18.12	18.00
165	5825	18.00	18.48	18.24	18.00

802.11ac (VHT40)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
38	5190	37.08	36.84	36.84	36.84
46	5230	37.20	36.72	36.84	36.72
151	5755	36.84	36.60	36.72	36.96
159	5795	36.84	36.60	36.84	36.84

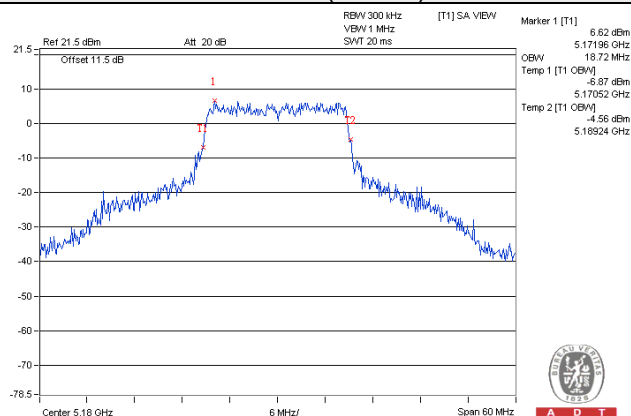
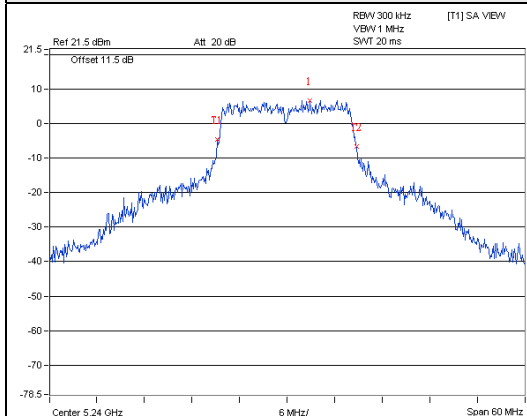
802.11ac (VHT80)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
42	5210	75.88	75.32	75.88	75.88
155	5775	75.32	75.32	75.88	75.88

Spectrum Plot of Worst Value

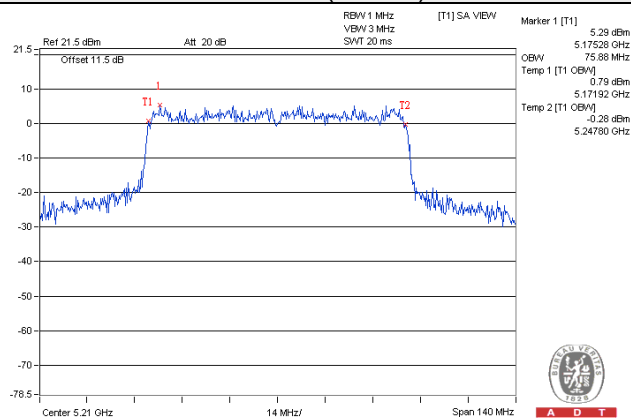
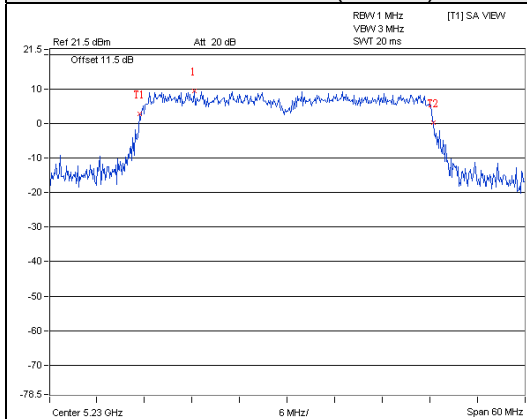
802.11a

802.11ac (VHT20)



802.11ac (VHT40)

802.11ac (VHT80)



Beamforming Mode

802.11ac (VHT20)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	18.60	18.12	18.12	18.24
40	5200	18.48	18.00	18.12	18.12
48	5240	18.48	18.12	18.12	18.12
149	5745	18.12	18.24	18.12	17.88
157	5785	18.24	18.24	18.24	18.00
165	5825	18.12	18.24	18.00	18.00

802.11ac (VHT40)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
38	5190	36.84	36.72	36.84	36.84
46	5230	36.96	36.72	36.84	36.84
151	5755	36.84	36.60	36.72	36.84
159	5795	36.72	36.48	36.72	36.84

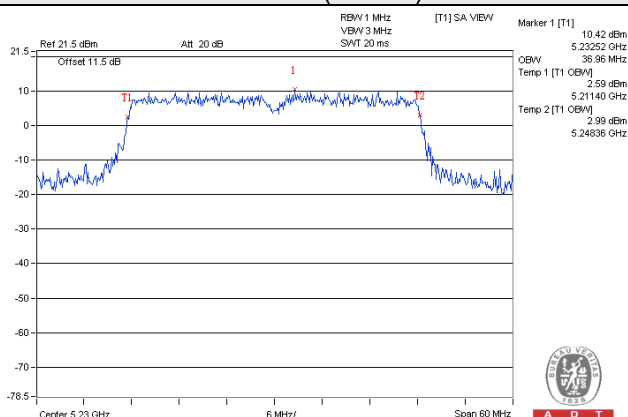
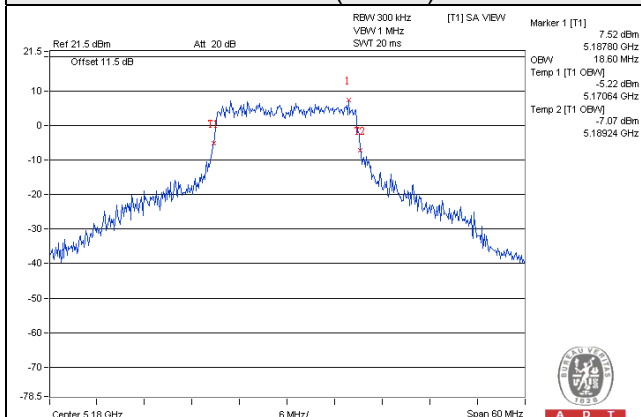
802.11ac (VHT80)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
42	5210	75.88	75.32	75.60	75.32
155	5775	75.60	75.32	75.60	75.88

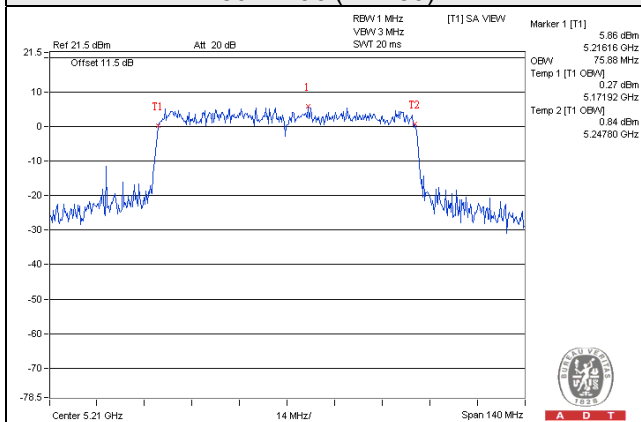
Spectrum Plot of Worst Value

802.11ac (VHT20)

802.11ac (VHT40)



802.11ac (VHT80)

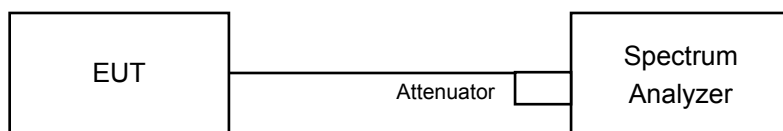


4.4 Peak Power Spectral Density Measurement

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	11dBm/ MHz
		Mobile and Portable client device	
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 U-NII-1 band:

Duty cycle of test signal is > 98 %

Using method SA-1

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

Duty cycle of test signal is < 98 %

Using method SA-2

- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 1 MHz, Set VBW ≥ 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/duty cycle)

For U-NII-3 band:

Duty cycle of test signal is > 98 %

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

Duty cycle of test signal is < 98 %

- a. Set span to encompass the entire emission bandwidth (EBW) of the signal.
- b. Set RBW = 300 kHz, Set VBW $\geq$ 1 MHz, Detector = RMS
- c. Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
- d. 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 $BWCF = 10\log(500 \text{ kHz}/300\text{kHz})$
- e. Sweep time = auto, trigger set to "free run".
- f. Trace average at least 100 traces in power averaging mode.
- g. 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 Band

CDD Mode

802.11a

Chan.	Freq. (MHz)	PSD (dBm)				Total PSD w/o duty factor (dBm)	Duty factor	Total PSD with duty factor (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3					
36	5180	3.09	3.36	4.12	1.60	9.15	0.30	9.45	11.16	Pass
40	5200	2.69	3.12	3.83	1.46	8.88	0.30	9.18	11.16	Pass
48	5240	2.18	3.22	4.04	1.35	8.83	0.30	9.13	11.16	Pass

Note:

- Method 1 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.
- Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/4] = 11.84\text{dBi} > 6\text{dBi}$, therefore the limit shall be reduced to $17-(11.84-6) = 11.16\text{dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT20)

Chan.	Freq. (MHz)	PSD (dBm)				Total PSD (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3			
36	5180	2.54	3.24	4.12	1.42	8.96	11.16	Pass
40	5200	2.56	3.17	4.20	1.91	9.06	11.16	Pass
48	5240	2.24	3.02	3.94	1.32	8.76	11.16	Pass

Note:

- Method 1 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.
- Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/4] = 11.84\text{dBi} > 6\text{dBi}$, therefore the limit shall be reduced to $17-(11.84-6) = 11.16\text{dBm}$.

802.11ac (VHT40)

Chan.	Freq. (MHz)	PSD (dBm)				Total PSD w/o duty factor (dBm)	Duty factor	Total PSD with duty factor (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3					
38	5190	-1.21	-0.54	0.58	-2.11	5.31	0.15	5.46	11.16	Pass
46	5230	-0.43	0.38	1.20	-1.17	6.10	0.15	6.25	11.16	Pass

Note:

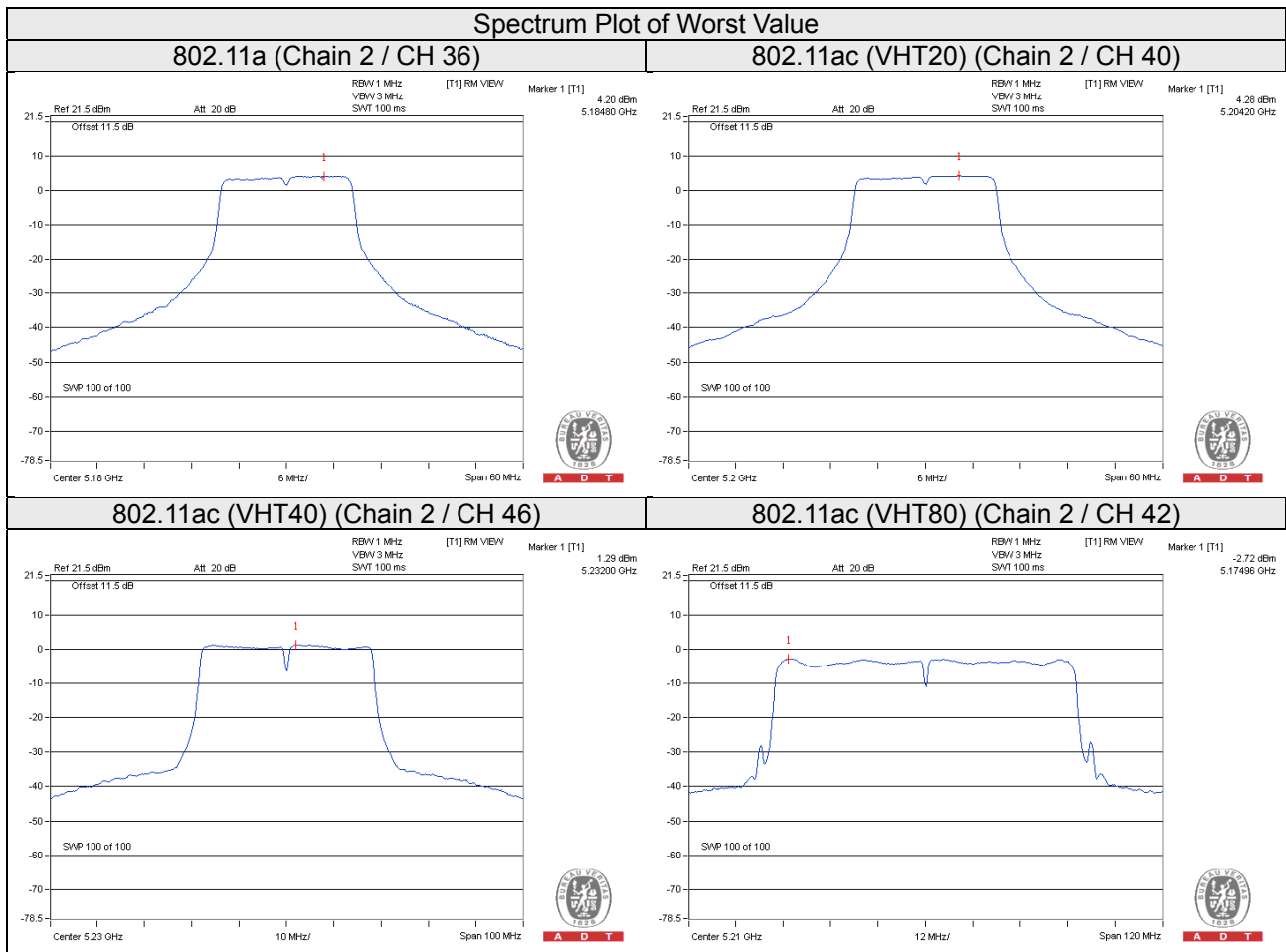
- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/4] = 11.84\text{dBi} > 6\text{dBi}$, therefore the limit shall be reduced to $17-(11.84-6) = 11.16\text{dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

Chan.	Freq. (MHz)	PSD (dBm)				Total PSD w/o duty factor (dBm)	Duty factor	Total PSD with duty factor (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3					
42	5210	-4.23	-3.75	-2.73	-5.29	2.11	0.27	2.38	11.16	Pass

Note:

- Method 1 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.
- Directional gain = $10 \log[(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_N/20})^2/4] = 11.84\text{dBi} > 6\text{dBi}$, therefore the limit shall be reduced to $17 - (11.84 - 6) = 11.16\text{dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.



Beamforming Mode

802.11ac (VHT20)

Chan.	Freq. (MHz)	PSD (dBm)				Total PSD (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3			
36	5180	2.74	3.40	4.31	4.19	9.73	11.16	Pass
40	5200	2.48	3.52	4.46	4.22	9.76	11.16	Pass
48	5240	2.57	3.49	4.34	4.31	9.76	11.16	Pass

Note:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/4] = 11.84\text{dBi} > 6\text{dBi}$, therefore the limit shall be reduced to $17-(11.84-6) = 11.16\text{dBm}$.

802.11ac (VHT40)

Chan.	Freq. (MHz)	PSD (dBm)				Total PSD w/o duty factor (dBm)	Duty factor	Total PSD with duty factor (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3					
38	5190	0.58	-0.87	0.66	0.52	6.29	0.11	6.40	11.16	Pass
46	5230	-0.17	0.39	1.29	1.15	6.73	0.11	6.84	11.16	Pass

Note:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/4] = 11.84\text{dBi} > 6\text{dBi}$, therefore the limit shall be reduced to $17-(11.84-6) = 11.16\text{dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

Chan.	Freq. (MHz)	PSD (dBm)				Total PSD w/o duty factor (dBm)	Duty factor	Total PSD with duty factor (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3					
42	5210	-3.92	-3.69	-2.56	-2.93	2.78	0.27	3.05	11.16	Pass

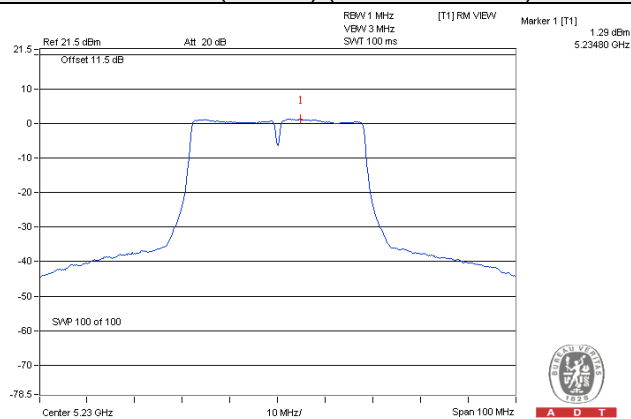
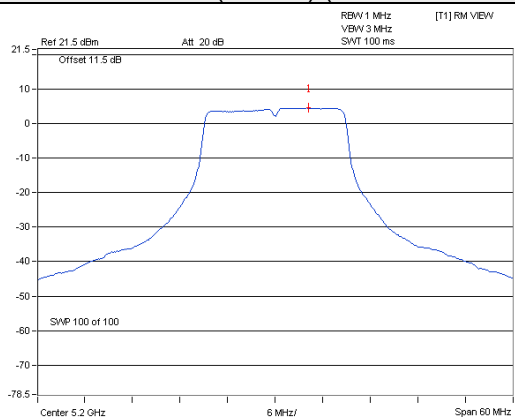
Note:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/4] = 11.84\text{dBi} > 6\text{dBi}$, therefore the limit shall be reduced to $17-(11.84-6) = 11.16\text{dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

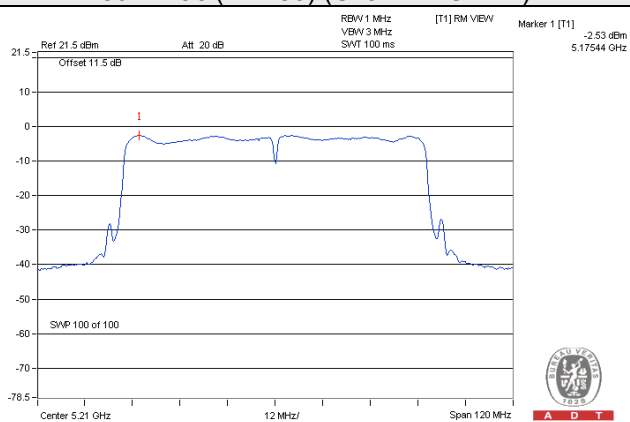
Spectrum Plot of Worst Value

802.11ac (VHT20) (Chain 2 / CH 40)

802.11ac (VHT40) (Chain 2 / CH 46)



802.11ac (VHT80) (Chain 2 / CH 42)



For U-NII-3 Band

CDD Mode

802.11a

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Duty factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
0	149	5745	-4.49	-2.27	6.02	0.30	4.05	24.16	Pass
	157	5785	-4.70	-2.48	6.02	0.30	3.84	24.16	Pass
	165	5825	-5.14	-2.92	6.02	0.30	3.40	24.16	Pass
1	149	5745	-3.47	-1.25	6.02	0.30	5.07	24.16	Pass
	157	5785	-3.73	-1.51	6.02	0.30	4.81	24.16	Pass
	165	5825	-4.08	-1.86	6.02	0.30	4.46	24.16	Pass
2	149	5745	-3.02	-0.80	6.02	0.30	5.52	24.16	Pass
	157	5785	-3.24	-1.02	6.02	0.30	5.30	24.16	Pass
	165	5825	-3.76	-1.54	6.02	0.30	4.78	24.16	Pass
3	149	5745	-4.01	-1.79	6.02	0.30	4.53	24.16	Pass
	157	5785	-4.21	-1.99	6.02	0.30	4.33	24.16	Pass
	165	5825	-4.98	-2.76	6.02	0.30	3.56	24.16	Pass

Note:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/4] = 11.84\text{dBi} > 6\text{dBi}$, therefore the limit shall be reduced to $30 - (11.84 - 6) = 24.16\text{dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT20)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
0	149	5745	-4.53	-2.31	6.02	3.71	24.16	Pass
	157	5785	-5.07	-2.85	6.02	3.17	24.16	Pass
	165	5825	-5.13	-2.91	6.02	3.11	24.16	Pass
1	149	5745	-3.36	-1.14	6.02	4.88	24.16	Pass
	157	5785	-3.56	-1.34	6.02	4.68	24.16	Pass
	165	5825	-3.56	-1.34	6.02	4.68	24.16	Pass
2	149	5745	-3.04	-0.82	6.02	5.20	24.16	Pass
	157	5785	-3.17	-0.95	6.02	5.07	24.16	Pass
	165	5825	-3.51	-1.29	6.02	4.73	24.16	Pass
3	149	5745	-3.69	-1.47	6.02	4.55	24.16	Pass
	157	5785	-4.27	-2.05	6.02	3.97	24.16	Pass
	165	5825	-4.46	-2.24	6.02	3.78	24.16	Pass

Note:

- Method 1 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.
- Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/4] = 11.84\text{dBi} > 6\text{dBi}$, therefore the limit shall be reduced to $30 - (11.84 - 6) = 24.16\text{dBm}$.

802.11ac (VHT40)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Duty factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
0	151	5755	-6.70	-4.48	6.02	0.15	1.69	24.16	Pass
	159	5795	-7.29	-5.07	6.02	0.15	1.10	24.16	Pass
1	151	5755	-7.04	-4.82	6.02	0.15	1.35	24.16	Pass
	159	5795	-7.34	-5.12	6.02	0.15	1.05	24.16	Pass
2	151	5755	-6.29	-4.07	6.02	0.15	2.10	24.16	Pass
	159	5795	-6.86	-4.64	6.02	0.15	1.53	24.16	Pass
3	151	5755	-6.76	-4.54	6.02	0.15	1.63	24.16	Pass
	159	5795	-7.28	-5.06	6.02	0.15	1.11	24.16	Pass

Note:

- Method 1 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.
- Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/4] = 11.84\text{dBi} > 6\text{dBi}$, therefore the limit shall be reduced to $30 - (11.84 - 6) = 24.16\text{dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

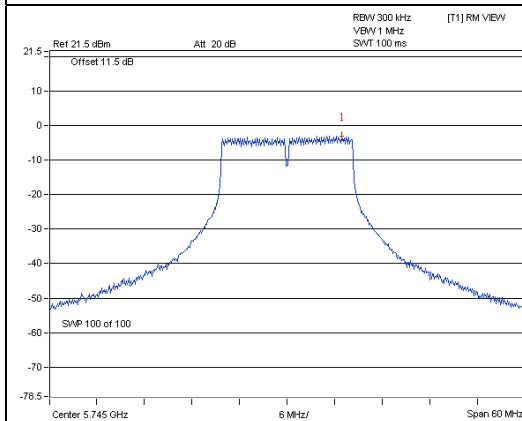
TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Duty factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
0	155	5775	-8.25	-6.03	6.02	0.27	0.26	24.16	Pass
1	155	5775	-10.46	-8.24	6.02	0.27	-1.95	24.16	Pass
2	155	5775	-9.78	-7.56	6.02	0.27	-1.27	24.16	Pass
3	155	5775	-10.31	-8.09	6.02	0.27	-1.80	24.16	Pass

Note:

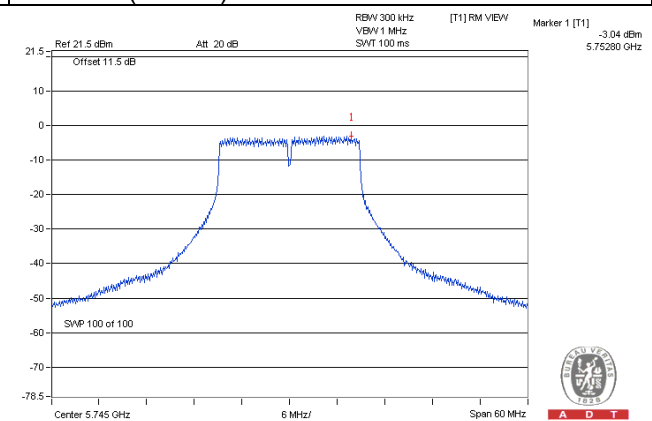
- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/4] = 11.84\text{dBi} > 6\text{dBi}$, therefore the limit shall be reduced to $30 - (11.84 - 6) = 24.16\text{dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

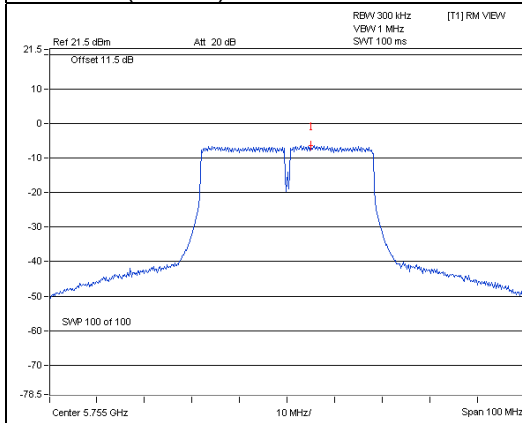
802.11a



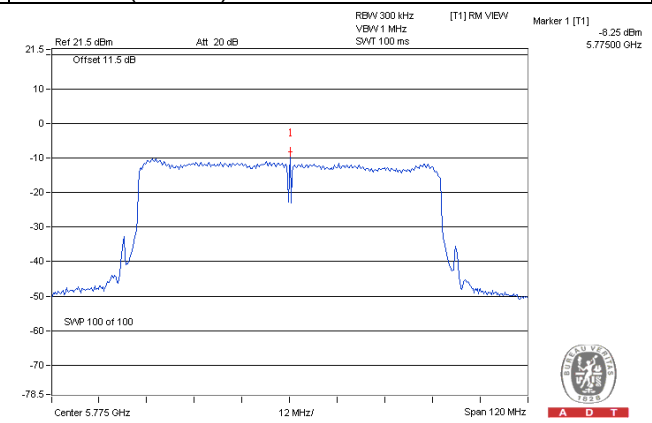
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



Beamforming Mode

802.11ac (VHT20)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
0	149	5745	-4.63	-2.41	6.02	3.61	24.16	Pass
	157	5785	-5.00	-2.78	6.02	3.24	24.16	Pass
	165	5825	-5.15	-2.93	6.02	3.09	24.16	Pass
1	149	5745	-3.38	-1.16	6.02	4.86	24.16	Pass
	157	5785	-3.54	-1.32	6.02	4.70	24.16	Pass
	165	5825	-3.68	-1.46	6.02	4.56	24.16	Pass
2	149	5745	-2.97	-0.75	6.02	5.27	24.16	Pass
	157	5785	-3.09	-0.87	6.02	5.15	24.16	Pass
	165	5825	-3.45	-1.23	6.02	4.79	24.16	Pass
3	149	5745	-3.76	-1.54	6.02	4.48	24.16	Pass
	157	5785	-4.12	-1.90	6.02	4.12	24.16	Pass
	165	5825	-4.58	-2.36	6.02	3.66	24.16	Pass

Note:

- Method 1 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.
- Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/4] = 11.84\text{dBi} > 6\text{dBi}$, therefore the limit shall be reduced to $30 - (11.84 - 6) = 24.16\text{dBm}$.

802.11ac (VHT40)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Duty factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
0	151	5755	-6.53	-4.31	6.02	0.11	1.82	24.16	Pass
	159	5795	-7.99	-5.77	6.02	0.11	0.36	24.16	Pass
1	151	5755	-7.12	-4.90	6.02	0.11	1.23	24.16	Pass
	159	5795	-7.06	-4.84	6.02	0.11	1.29	24.16	Pass
2	151	5755	-6.29	-4.07	6.02	0.11	2.06	24.16	Pass
	159	5795	-6.58	-4.36	6.02	0.11	1.77	24.16	Pass
3	151	5755	-7.03	-4.81	6.02	0.11	1.32	24.16	Pass
	159	5795	-7.36	-5.14	6.02	0.11	0.99	24.16	Pass

Note:

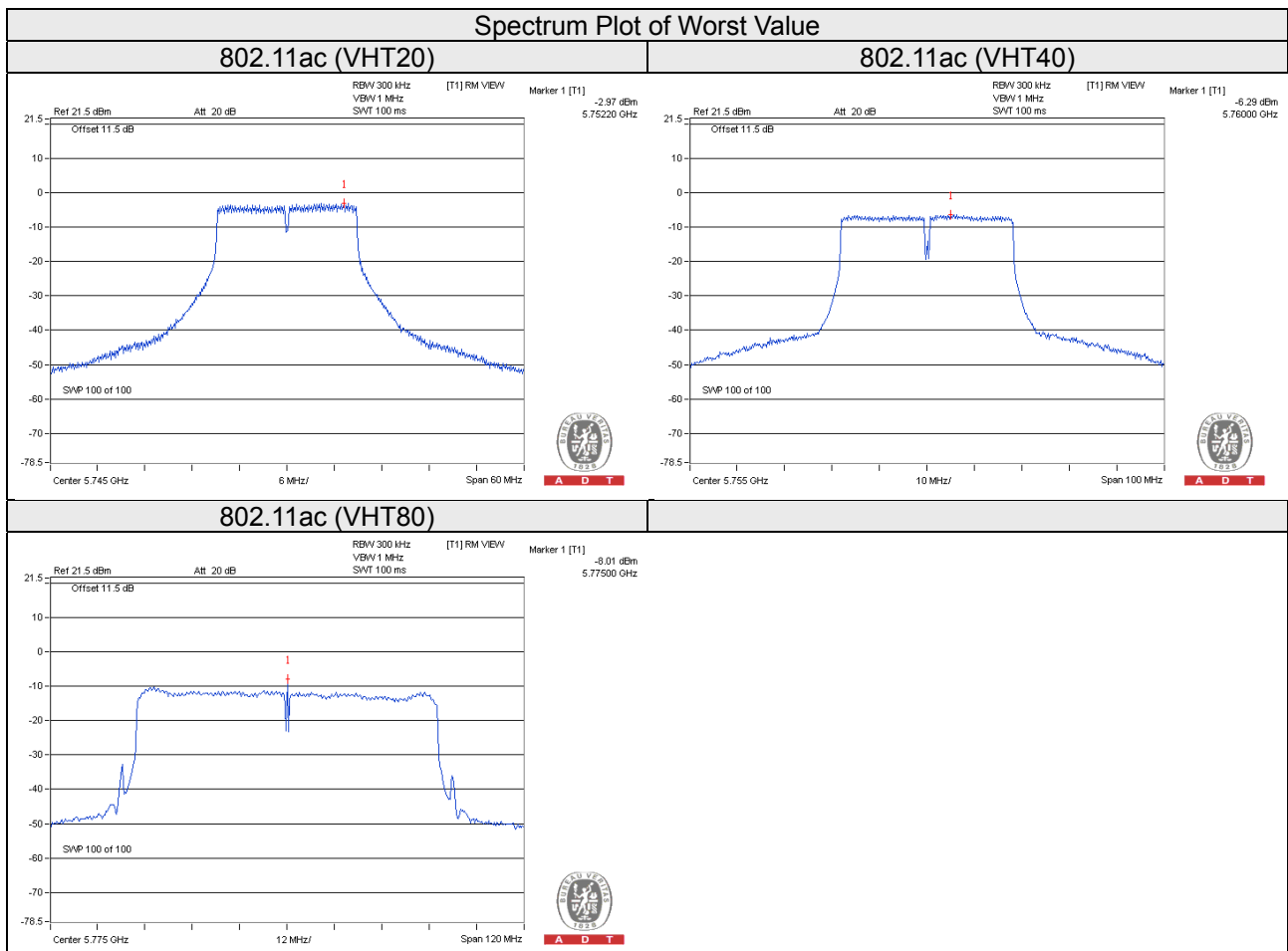
- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/4] = 11.84\text{dBi} > 6\text{dBi}$, therefore the limit shall be reduced to $30 - (11.84 - 6) = 24.16\text{dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Duty factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
0	155	5775	-8.01	-5.79	6.02	0.27	0.50	24.16	Pass
1	155	5775	-10.97	-8.75	6.02	0.27	-2.46	24.16	Pass
2	155	5775	-9.61	-7.39	6.02	0.27	-1.10	24.16	Pass
3	155	5775	-10.38	-8.16	6.02	0.27	-1.87	24.16	Pass

Note:

- Method 1 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.
- Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/4] = 11.84\text{dBi} > 6\text{dBi}$, therefore the limit shall be reduced to $30 - (11.84 - 6) = 24.16\text{dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

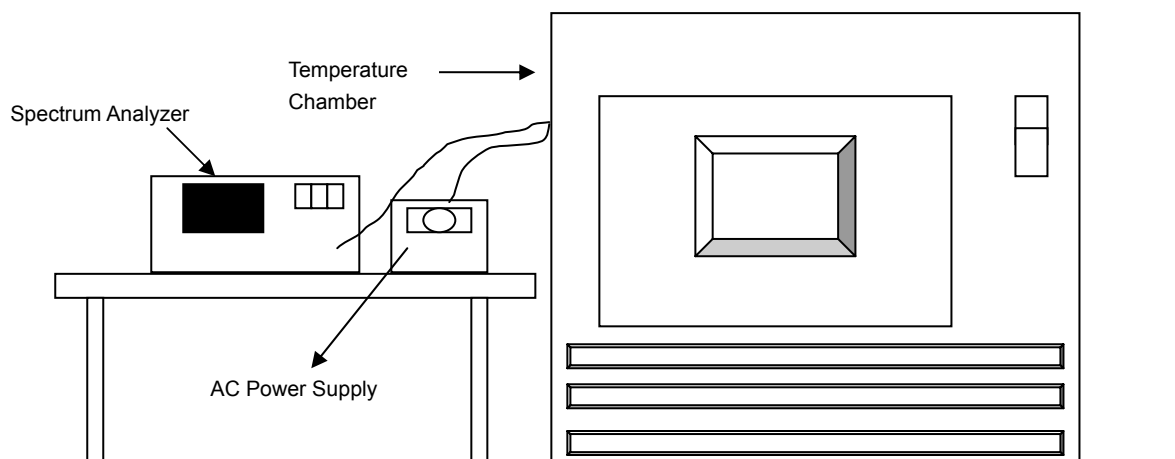


4.5 Frequency Stability

4.5.1 Limits of Frequency Stability Measurement

The frequency of the carrier signal shall be maintained within band of operation

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

- 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 Condition

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	5179.9937	-0.00012	5179.9945	-0.00011	5179.9949	-0.00010	5179.9957	-0.00008
40	120	5179.9919	-0.00016	5179.9931	-0.00013	5179.9955	-0.00009	5179.9917	-0.00016
30	120	5180.0113	0.00022	5180.0117	0.00023	5180.0110	0.00021	5180.0091	0.00018
20	120	5179.9850	-0.00029	5179.9861	-0.00027	5179.9858	-0.00027	5179.9864	-0.00026
10	120	5179.9956	-0.00008	5179.9965	-0.00007	5179.9937	-0.00012	5179.9970	-0.00006
0	120	5180.0216	0.00042	5180.0219	0.00042	5180.0229	0.00044	5180.0252	0.00049
-10	120	5179.9786	-0.00041	5179.9751	-0.00048	5179.9769	-0.00045	5179.9741	-0.00050
-20	120	5180.0134	0.00026	5180.0145	0.00028	5180.0157	0.00030	5180.0178	0.00034
-30	120	5179.9872	-0.00025	5179.9898	-0.00020	5179.9869	-0.00025	5179.9861	-0.00027

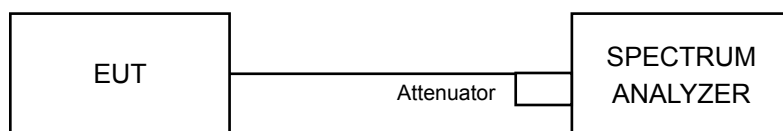
Frequency Stability Versus Voltage									
Operating Frequency: 5180MHz									
Temp. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
20	138	5179.9848	-0.00029	5179.9864	-0.00026	5179.9855	-0.00028	5179.9857	-0.00028
	120	5179.9850	-0.00029	5179.9861	-0.00027	5179.9858	-0.00027	5179.9864	-0.00026
	102	5179.9849	-0.00029	5179.9851	-0.00029	5179.9858	-0.00027	5179.9869	-0.00025

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 Procedure

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 Condition

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

CDD Mode

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	16.43	16.42	16.41	16.40	0.5	Pass
157	5785	16.43	16.42	16.43	16.43	0.5	Pass
165	5825	16.42	16.42	16.44	16.43	0.5	Pass

802.11ac (VHT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	17.65	17.67	17.67	17.64	0.5	Pass
157	5785	17.64	17.70	17.64	17.65	0.5	Pass
165	5825	17.66	17.65	17.66	17.64	0.5	Pass

802.11ac (VHT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	36.44	36.40	36.42	36.43	0.5	Pass
159	5795	36.34	35.42	36.37	36.18	0.5	Pass

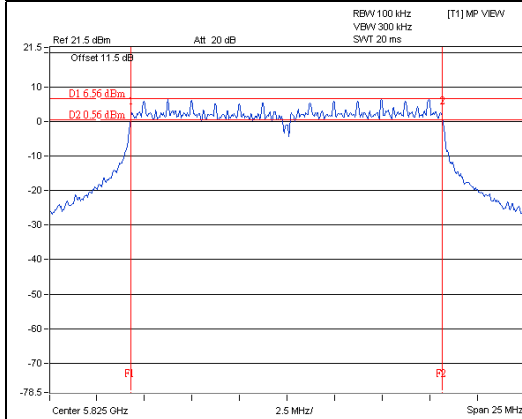
802.11ac (VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
155	5775	75.62	75.42	75.22	75.45	0.5	Pass

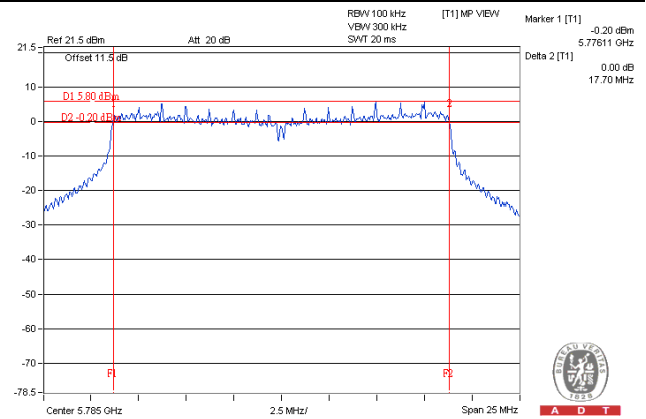
Spectrum Plot of Worst Value

802.11a

802.11ac (VHT20)



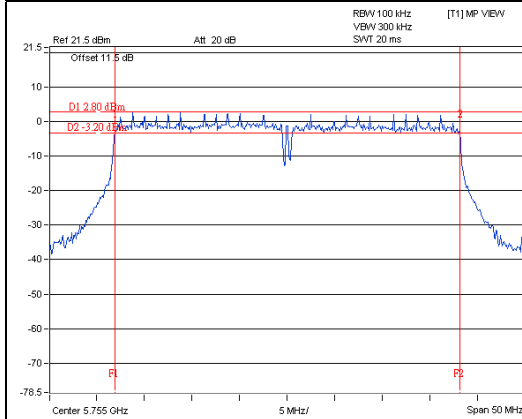
A D T



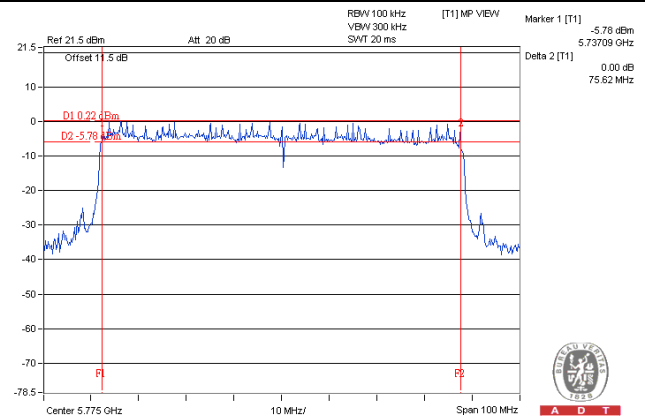
A D T

802.11ac (VHT40)

802.11ac (VHT80)



A D T



A D T

Beamforming Mode

802.11ac (VHT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	17.65	17.68	17.66	17.64	0.5	Pass
157	5785	17.65	17.65	17.65	17.64	0.5	Pass
165	5825	17.63	17.70	17.65	17.64	0.5	Pass

802.11ac (VHT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	36.40	35.88	36.42	36.47	0.5	Pass
159	5795	36.39	35.37	36.43	36.44	0.5	Pass

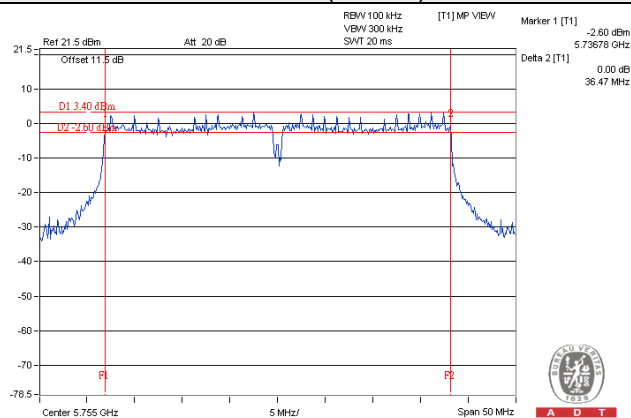
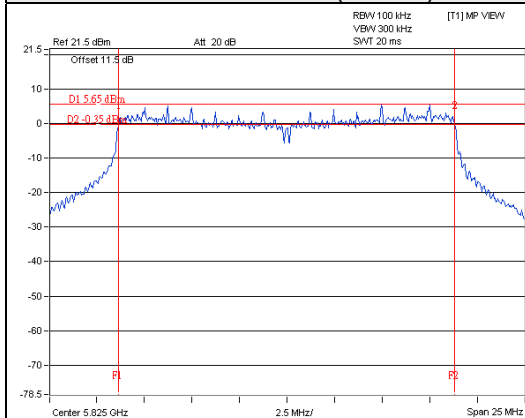
802.11ac (VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
155	5775	75.48	75.43	75.43	75.49	0.5	Pass

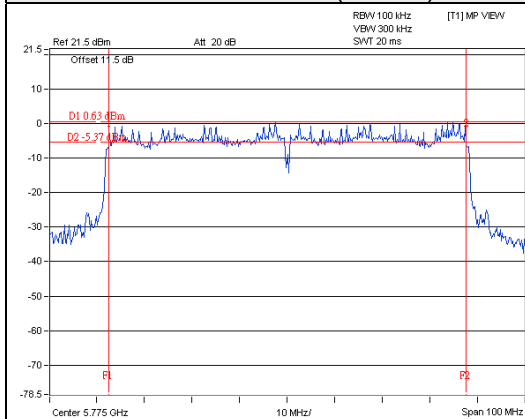
Spectrum Plot of Worst Value

802.11ac (VHT20)

802.11ac (VHT40)



802.11ac (VHT80)

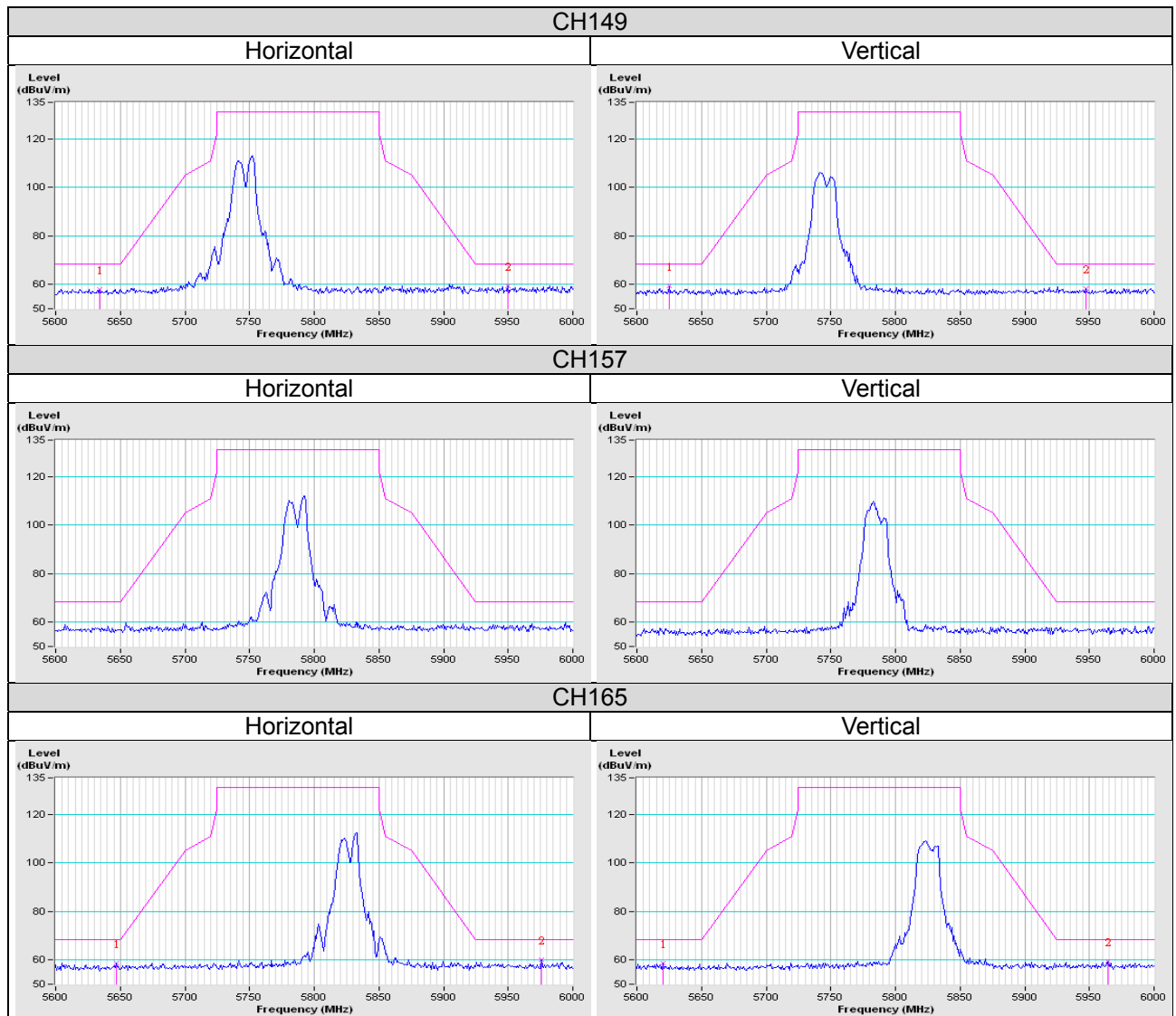


5 Pictures of Test Arrangements

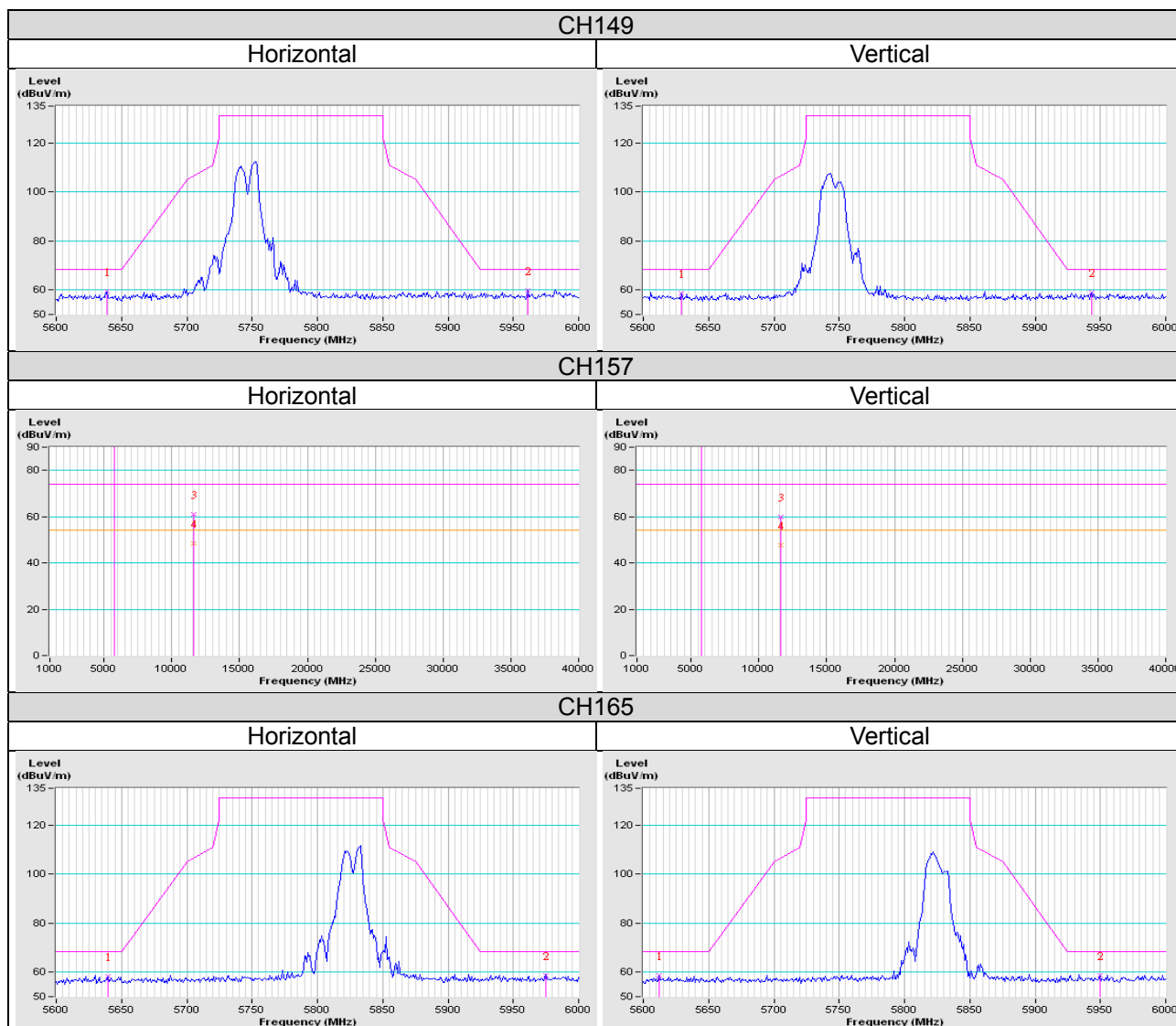
Please refer to the attached file (Test Setup Photo).

Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

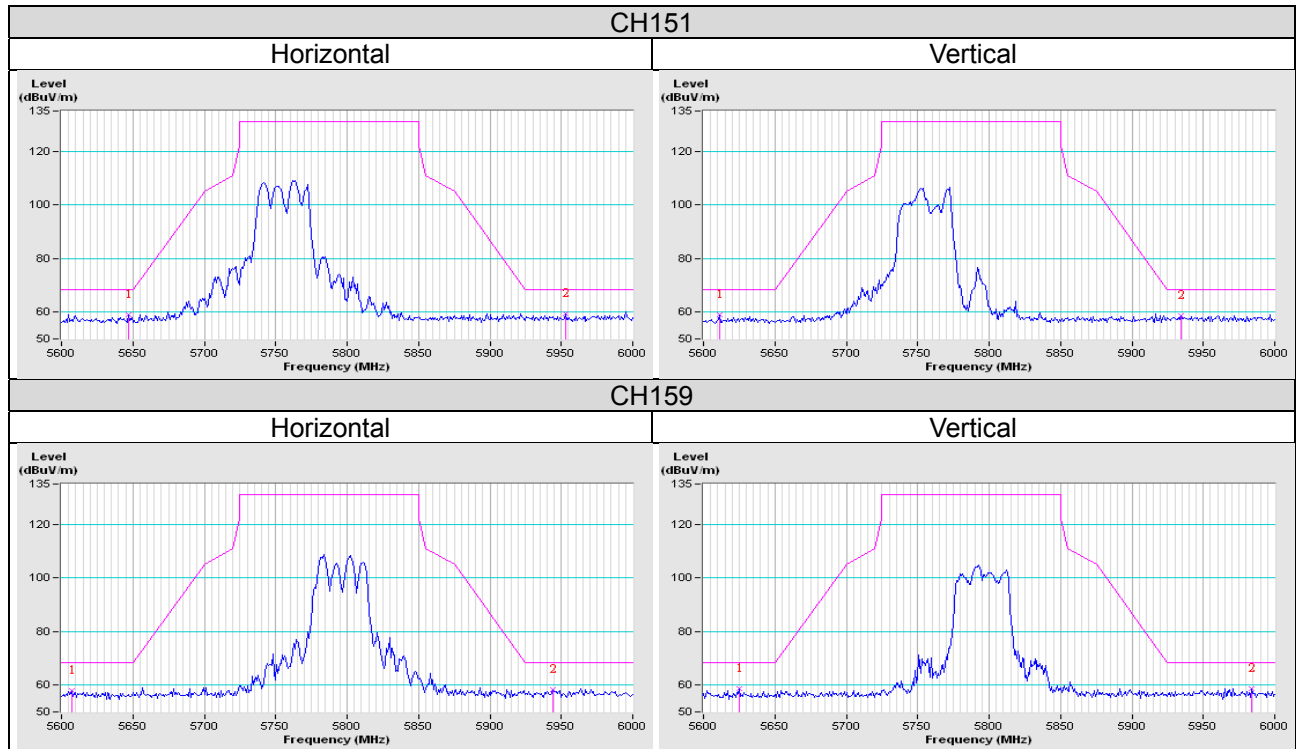
802.11a



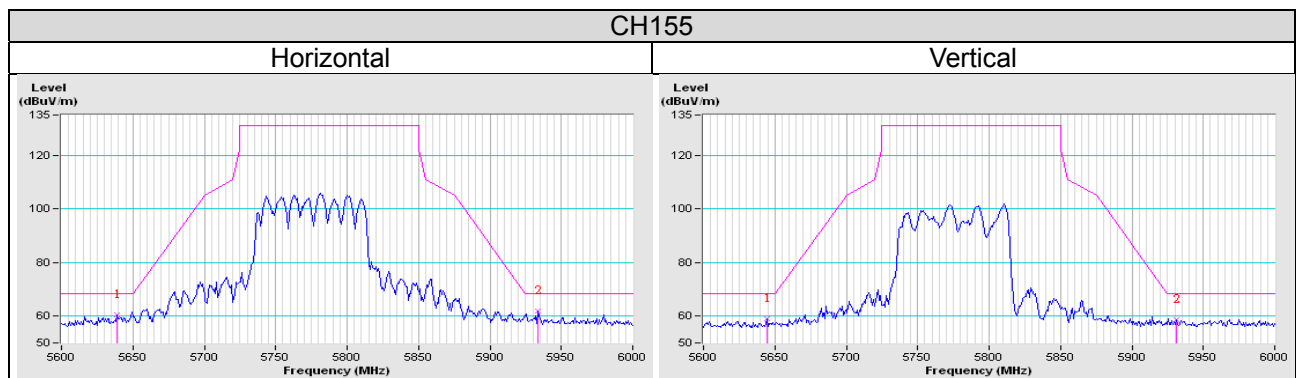
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



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:

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Web Site: www.bureauveritas-adt.com

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

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