

FCC Test Report

Report No.: RF150708E07A-1

FCC ID: PY315200307

Test Model: R7300

Received Date: July 08, 2015

Test Date: July 21 to Aug. 04, 2015

Issued Date: Oct. 06, 2015

Applicant: NETGEAR, Inc.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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Test Location (3): E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City, Taiwan
R.O.C.



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A D T

Release Control Record

Issue No.	Description	Date Issued
RF150708E07A-1	Original release.	Oct. 06, 2015



A D T

1 Certificate of Conformity

Product: Nighthawk AC1900 DST Router

Brand: NETGEAR

Test Model: R7300

Sample Status: ENGINEERING SAMPLE

Applicant: NETGEAR, Inc.

Test Date: July 21 to Aug. 04, 2015

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

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by : Midoli Peng , **Date:** Oct. 06, 2015
Midoli Peng / Specialist

Approved by : May Chen , **Date:** Oct. 06, 2015
May Chen / Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (SECTION 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b) (1/2/3/4/6)	Radiated Emissions & Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.1dB at 5947.00MHz, 5853.00MHz & 5714.00MHz.
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 Re-SMA not a standard connector.

Note: This report is prepared for FCC Class II change. (U-NII-3 band: upgrade the standard to section 15.407)

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) (±)
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.37 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.65 dB
	6GHz ~ 18GHz	3.88 dB
	18GHz ~ 40GHz	4.11 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Nighthawk AC1900 DST Router
Brand	NETGEAR
Test Model	R7300
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	AC 100-240V, 1.3A, 50/60Hz
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT (20/40) mode in 2.4GHz
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11a: up to 54Mbps 802.11n: up to 450Mbps 802.11ac: up to 1300Mbps
Operating Frequency	For 15.407 5.18 ~ 5.24GHz, 5.745 ~ 5.825GHz
	For 15.247 2.412 ~ 2.462GHz
Number of Channel	For 15.407 9 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 4 for 802.11n (HT40), 802.11ac (VHT40) 2 for 802.11ac (VHT80)
	For 15.247 11 for 802.11b, 802.11g, 802.11n (HT20), VHT20 7 for 802.11n (HT40), VHT40
Output Power	For 15.407 (U-NII-3 band) CDD Mode: 802.11a: 932.093mW 802.11ac (VHT20): 931.687mW 802.11ac (VHT40): 534.412mW 802.11ac (VHT80): 145.481mW Beamforming Mode: 802.11ac (VHT20): 931.687mW 802.11ac (VHT40): 485.043mW 802.11ac (VHT80): 112.903mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Data Cable Supplied	NA

Note:

1. This report is prepared for FCC Class II change. The difference compared with the Report No.: RF150708E07-1 design is as the following:
 - ◆ Upgrade the standard to section 15.407 under new rule for U-NII-3 band
2. According to above conditions, all test items of U-NII-3 band test item need to be performed, except for AC power conducted emission test item. And all data was verified to meet the requirements.
3. The EUT must be supplied with internal power supply as following spec:
 - ◆ AC 100-240V, 1.3A, 50/60Hz
4. The antennas provided to the EUT, please refer to the following table:

Antenna No.	Ant. Gain(dBi)	Frequency range (GHz to GHz)	Antenna Type	Connector Type
1	0.5	2.4~2.4835	Dipole	Re-SMA
	0.9	5.15~5.25	Dipole	Re-SMA
	0.4	5.725~5.85	Dipole	Re-SMA
2	0.5	2.4~2.4835	Dipole	Re-SMA
	0.9	5.15~5.25	Dipole	Re-SMA
	0.4	5.725~5.85	Dipole	Re-SMA
3	0.5	2.4~2.4835	Dipole	Re-SMA
	0.9	5.15~5.25	Dipole	Re-SMA
	0.4	5.725~5.85	Dipole	Re-SMA

5. The EUT incorporates a MIMO function with beamforming.(Except for 802.11a/b/g)

For 2.4GHz Band			
MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11b	1 ~ 11Mbps	3TX	3RX
802.11g	1 ~ 11Mbps	3TX	3RX
802.11n (HT20)	MCS 0~7	3TX	3RX
	MCS 8~15	3TX	3RX
	MCS 16~23	3TX	3RX
802.11n (HT40)	MCS 0~7	3TX	3RX
	MCS 8~15	3TX	3RX
	MCS 16~23	3TX	3RX
VHT20	MCS0~8 Nss=1	3TX	3RX
	MCS0~8 Nss=2	3TX	3RX
	MCS0~9 Nss=3	3TX	3RX
VHT40	MCS0~9 Nss=1	3TX	3RX
	MCS0~9 Nss=2	3TX	3RX
	MCS0~9 Nss=3	3TX	3RX
For 5GHz Band			
MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11a	6 ~ 54Mbps	3TX	3RX
802.11n (HT20)	MCS 0~7	3TX	3RX
	MCS 8~15	3TX	3RX
	MCS 16~23	3TX	3RX
802.11n (HT40)	MCS 0~7	3TX	3RX
	MCS 8~15	3TX	3RX
	MCS 16~23	3TX	3RX
802.11ac (VHT20)	MCS 0~8, Nss=1	3TX	3RX
	MCS 0~8, Nss=2	3TX	3RX
	MCS 0~9, Nss=3	3TX	3RX
802.11ac (VHT40)	MCS 0~9, Nss=1	3TX	3RX
	MCS 0~9, Nss=2	3TX	3RX
	MCS 0~9, Nss=3	3TX	3RX
	MCS 0~9, Nss=4	3TX	3RX
802.11ac (VHT80)	MCS 0~9, Nss=1	3TX	3RX
	MCS 0~9, Nss=2	3TX	3RX
	MCS 0~9, Nss=3	3TX	3RX

Note: The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz) and 802.11ac mode for 20MHz (40MHz), therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

6. The emission of the simultaneous operation (2.4GHz & 5GHz) has been evaluated and no non-compliance was found.
7. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Description of Test Modes

FOR 5745 ~ 5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
-	√	√	-	√	With adapter 1 / EUT (Y-plane)

Where **RE≥1G**: Radiated Emission above 1GHz **RE<1G**: Radiated Emission below 1GHz
PLC: Power Line Conducted Emission **APCM**: Antenna Port Conducted Measurement

NOTE: 1. "-" 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.

CDD MODE						
MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6
802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)		155	155	OFDM	BPSK	29.3

Radiated Emission Test (Below 1GHz):

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

CDD MODE						
MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	5745-5825	149 to 165	157	OFDM	BPSK	6

Antenna Port Conducted Measurement:

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

CDD MODE						
For Transmit Power / Power Spectral Density / 6dB Bandwidth Measurement						
MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6
802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)		155	155	OFDM	BPSK	29.3
Beamforming MODE						
For Peak Transmit Power Measurement						
MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11ac (VHT20)	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)		155	155	OFDM	BPSK	29.3

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	22deg. C, 66%RH	120Vac, 60Hz	Andy Ho
RE<1G	20deg. C, 66%RH	120Vac, 60Hz	Weiwei Lo
APCM	25deg. C, 60%RH	120Vac, 60Hz	Gary Cheng

3.3 Duty Cycle of Test Signal

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

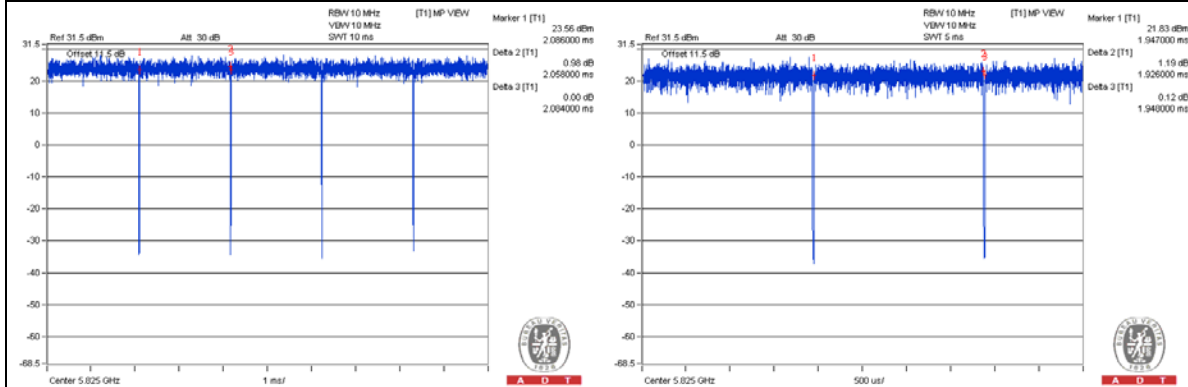
802.11a: Duty cycle = $2.058 \text{ ms} / 2.084 \text{ ms} = 0.988$

802.11ac (VHT20): Duty cycle = $1.926 \text{ ms} / 1.948 \text{ ms} = 0.989$

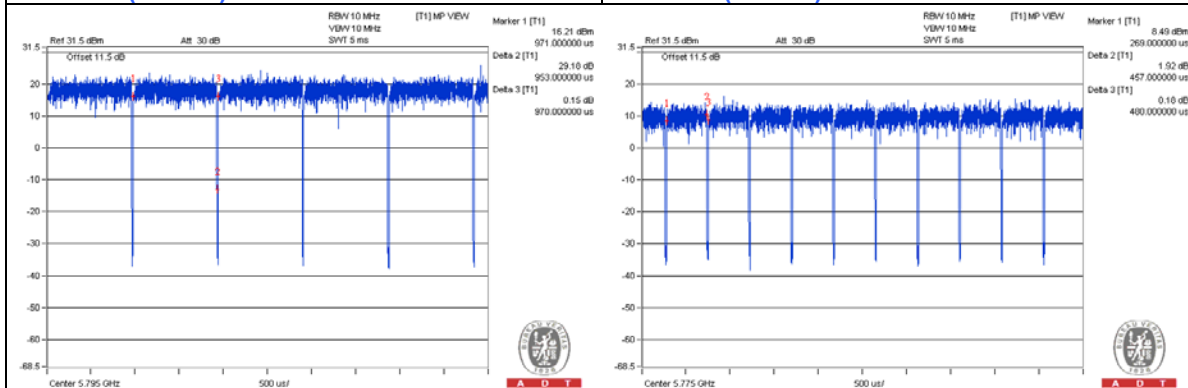
802.11ac (VHT40): Duty cycle = $0.953 \text{ ms} / 0.970 \text{ ms} = 0.982$

802.11ac (VHT80): Duty cycle = $0.457 \text{ ms} / 0.48 \text{ ms} = 0.952$, Duty factor = $10 * \log(1/0.952) = 0.21$

802.11a **802.11ac (VHT20)**



802.11ac (VHT40) **802.11ac (VHT80)**



3.4 Description of Support Units

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

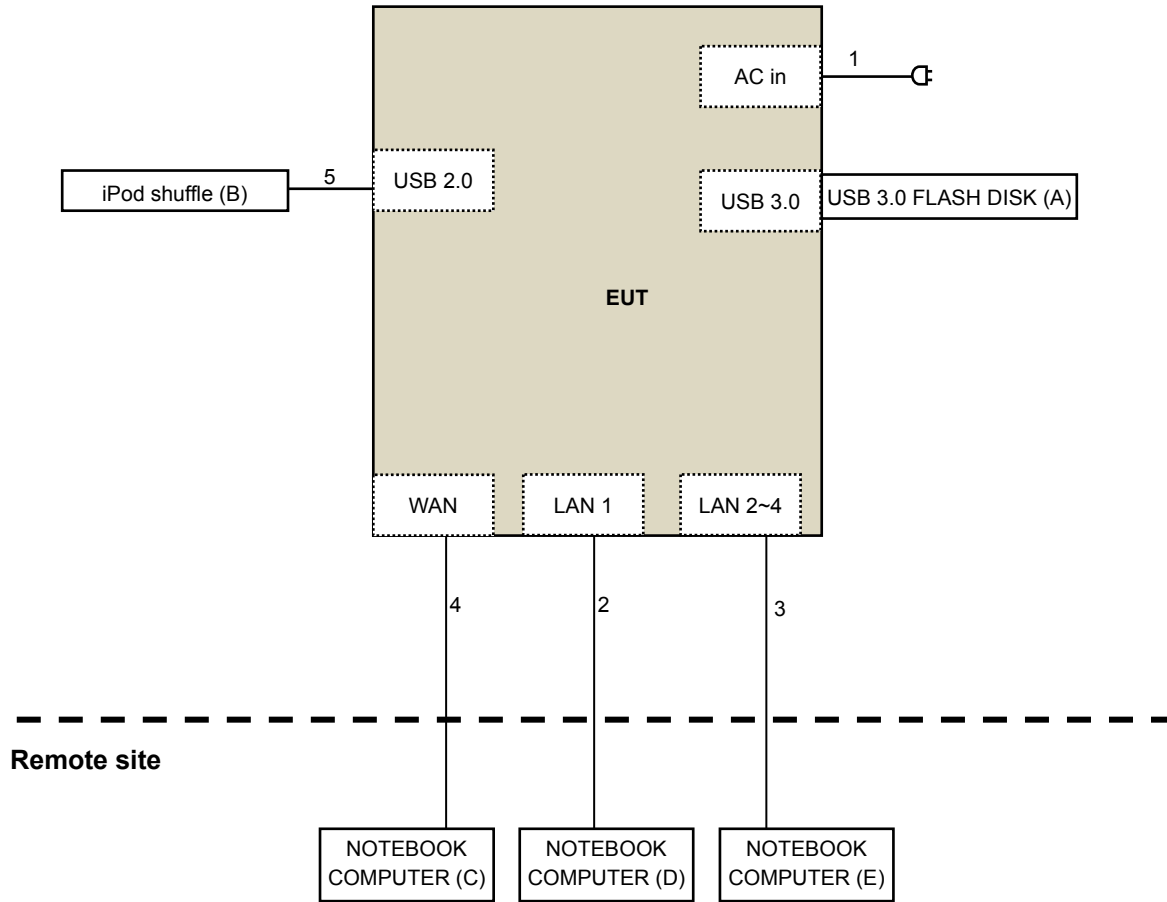
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	USB 3.0 FLASH DISK	Transcend	NA	NA	NA	Provided by Lab
B.	iPod shuffle	Apple	MC749TA/A	CC4DMFJUDFDM	NA	Provided by Lab
C.	NOTEBOOK COMPUTER	DELL	PP27L	6YLB32S	FCC DoC	Provided by Lab
D.	NOTEBOOK COMPUTER	DELL	PP27L	7YLB32S	FCC DoC	Provided by Lab
E.	HUB	ZyXEL	ES-116P	S060H02000215	FCC DoC	Provided by Lab

Note:

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

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

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standard

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

FCC Part 15, Subpart E (15.407)
789033 D02 General UNII Test Procedure New Rules v01
662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10-2013

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

NOTE: The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE:

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 Procedure New Rules v01	FIELD STRENGTH AT 3m	
	PK:74 (dBuV/m)	AV:54 (dBuV/m)
APPLICABLE TO	EIRP LIMIT	EQUIVALENT FIELD STRENGTH AT 3m
15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBuV/m)
15.407(b)(2)		
15.407(b)(3)		
15.407(b)(4)	PK:-27 (dBm/MHz) ^{*1} PK:-17 (dBm/MHz) ^{*2}	PK: 68.2(dBuV/m) ^{*1} PK:78.2 (dBuV/m) ^{*2}

NOTE: ^{*1} beyond 10MHz of the band edge ^{*2} within 10 MHz of band edge

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

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

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210202	Dec. 12, 2014	Dec. 11, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Feb. 06, 2015	Feb. 05, 2016
RF Cable	8D-FB	CHGCAB-001-1 CHGCAB-001-2	Oct. 04, 2014	Oct. 03, 2015
	RF-141	CHGCAB-004	Oct. 04, 2014	Oct. 03, 2015
Horn_Antenna AISI	AIH.8018	0000320091110	Feb. 09, 2015	Feb. 08, 2016
Pre-Amplifier Agilent	8449B	3008A02578	June 23, 2015	June 22, 2016
RF Cable	NA	131205 131216 131217 SNMY23684/4	Jan. 16, 2015	Jan. 15, 2016
Spectrum Analyzer R&S	FSV40	100964	June 26, 2015	June 25, 2016
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Dec. 12, 2014	Dec. 11, 2015
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Feb. 05, 2015	Feb. 04, 2016
RF Cable	NA	329751/4 RF104-204	Dec. 11, 2014	Dec. 10, 2015
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA
SPECTRUM ANALYZER R&S	FSV 40	100964	June 26, 2015	June 25, 2016
Temperature & Humidity Chamber GIANTFORCE	GTH-150-40-S P-AR	MAA0812-008	Jan. 12, 2015	Jan. 11, 2016
Power Meter Anritsu	ML2495A	1014008	Apr. 28, 2015	Apr. 27, 2016
Power Sensor Anritsu	MA2411B	0917122	Apr. 28, 2015	Apr. 27, 2016

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. G.
3. The FCC Site Registration No. is 966073.
4. The VCCI Site Registration No. is G-137.
5. The CANADA Site Registration No. is IC 7450H-2.
6. Tested Date: July 21 to Aug. 04, 2015

4.1.3 Test Procedure

- 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:

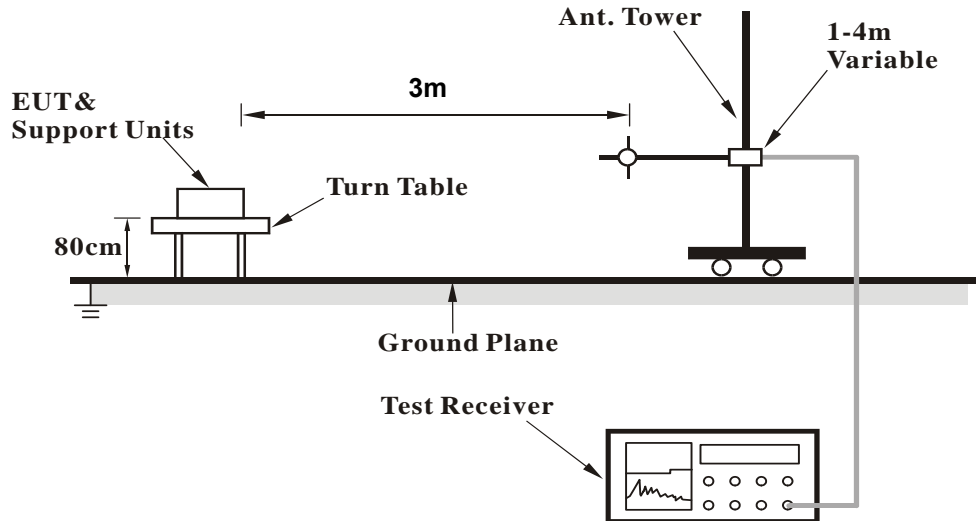
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

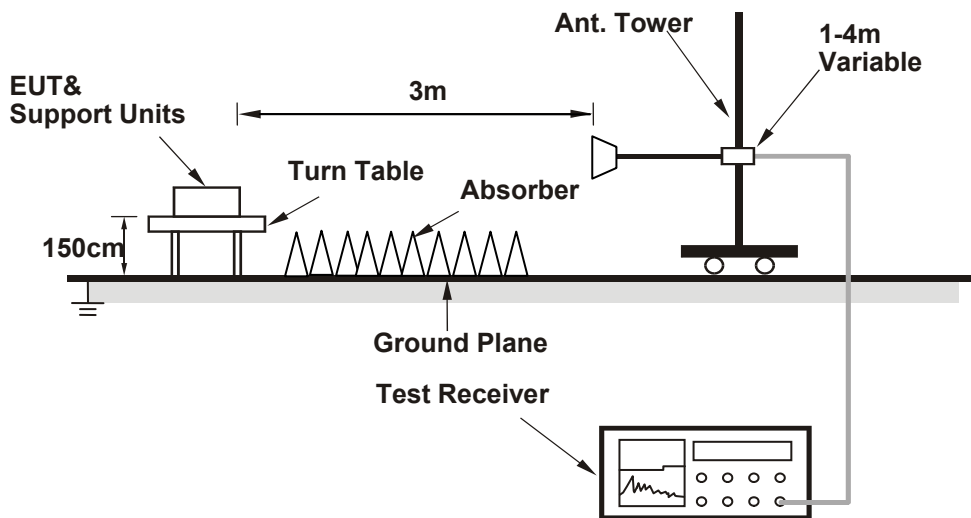
No deviation.

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 Condition

1. Connect the EUT with the support units C-E (NOTEBOOK COMPUTER) which is placed on remote site.
2. Controlling software (Mtool 2.0.1.8.msi) has been activated to set the EUT on specific status.

4.1.7 Test Results

Above 1GHz Data

CDD Mode

802.11a

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5715.00	61.9 PK	68.2	-6.3	2.26 H	128	58.68	3.22
2	#5722.00	72.3 PK	78.2	-5.9	2.26 H	128	69.08	3.22
3	*5745.00	119.0 PK			2.26 H	128	115.77	3.23
4	*5745.00	108.7 AV			2.26 H	128	105.47	3.23
5	11490.00	47.8 PK	74.0	-26.2	1.53 H	206	33.01	14.79
6	11490.00	36.1 AV	54.0	-17.9	1.53 H	206	21.31	14.79
7	#17235.00	49.0 PK	74.0	-25.0	1.16 H	199	29.53	19.47
8	#17235.00	36.8 AV	54.0	-17.2	1.16 H	199	17.33	19.47

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5715.00	67.2 PK	68.2	-1.0	1.78 V	202	63.98	3.22
2	#5722.00	77.6 PK	78.2	-0.6	1.78 V	202	74.38	3.22
3	*5745.00	122.7 PK			1.78 V	202	119.47	3.23
4	*5745.00	112.4 AV			1.78 V	202	109.17	3.23
5	11490.00	45.9 PK	74.0	-28.1	1.58 V	200	31.11	14.79
6	11490.00	33.9 AV	54.0	-20.1	1.58 V	200	19.11	14.79
7	#17235.00	49.5 PK	74.0	-24.5	1.56 V	290	30.03	19.47
8	#17235.00	36.4 AV	54.0	-17.6	1.56 V	290	16.93	19.47

REMARKS:

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

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5624.00	61.9 PK	68.2	-6.3	2.25 H	140	58.81	3.09
2	#5725.00	60.1 PK	78.2	-18.1	2.22 H	139	56.88	3.22
3	*5785.00	120.3 PK			2.22 H	139	117.07	3.23
4	*5785.00	109.6 AV			2.22 H	139	106.37	3.23
5	#5850.00	60.0 PK	78.2	-18.2	2.22 H	139	56.78	3.22
6	#5946.00	62.6 PK	68.2	-5.6	1.98 H	95	59.29	3.31
7	11570.00	47.6 PK	74.0	-26.4	1.53 H	210	33.11	14.49
8	11570.00	36.2 AV	54.0	-17.8	1.53 H	210	21.71	14.49
9	#17355.00	48.7 PK	74.0	-25.3	1.14 H	199	28.80	19.90
10	#17355.00	36.8 AV	54.0	-17.2	1.14 H	199	16.90	19.90

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	#5624.00	67.1 PK	68.2	-1.1	1.85 V	203	64.01	3.09
2	#5725.00	68.4 PK	78.2	-9.8	1.82 V	205	65.18	3.22
3	*5785.00	124.1 PK			1.82 V	205	120.87	3.23
4	*5785.00	113.5 AV			1.82 V	205	110.27	3.23
5	#5850.00	65.3 PK	78.2	-12.9	1.82 V	205	62.08	3.22
6	#5946.00	68.0 PK	68.2	-0.2	1.63 V	199	64.69	3.31
7	11570.00	46.3 PK	74.0	-27.7	1.64 V	214	31.81	14.49
8	11570.00	34.1 AV	54.0	-19.9	1.64 V	214	19.61	14.49
9	#17355.00	49.3 PK	74.0	-24.7	1.56 V	286	29.40	19.90
10	#17355.00	36.2 AV	54.0	-17.8	1.56 V	286	16.30	19.90

REMARKS:

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

CHANNEL	TX Channel 165	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5664.00	61.4 PK	68.2	-6.8	2.26 H	146	58.24	3.16
2	*5825.00	118.5 PK			2.27 H	146	115.27	3.23
3	*5825.00	107.4 AV			2.27 H	146	104.17	3.23
4	#5850.00	71.0 PK	78.2	-7.2	2.27 H	146	67.78	3.22
5	#5861.00	62.3 PK	68.2	-5.9	2.15 H	138	59.08	3.22
6	11650.00	47.2 PK	74.0	-26.8	1.49 H	216	32.91	14.29
7	11650.00	36.0 AV	54.0	-18.0	1.49 H	216	21.71	14.29
8	#17475.00	48.6 PK	74.0	-25.4	1.13 H	194	27.77	20.83
9	#17475.00	36.6 AV	54.0	-17.4	1.13 H	194	15.77	20.83

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	#5664.00	66.6 PK	68.2	-1.6	1.83 V	203	63.44	3.16
2	*5825.00	122.0 PK			1.83 V	204	118.77	3.23
3	*5825.00	111.5 AV			1.83 V	204	108.27	3.23
4	#5850.00	76.5 PK	78.2	-1.7	1.83 V	204	73.28	3.22
5	#5861.00	67.7 PK	68.2	-0.5	1.61 V	209	64.48	3.22
6	11650.00	47.0 PK	74.0	-27.0	1.69 V	201	32.71	14.29
7	11650.00	34.6 AV	54.0	-19.4	1.69 V	201	20.31	14.29
8	#17475.00	49.0 PK	74.0	-25.0	1.50 V	277	28.17	20.83
9	#17475.00	35.9 AV	54.0	-18.1	1.50 V	277	15.07	20.83

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 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	#5584.00	60.2 PK	74.0	-13.8	2.35 H	192	57.18	3.02
2	#5584.00	47.6 AV	54.0	-6.4	2.35 H	192	44.58	3.02
3	#5715.00	61.5 PK	68.2	-6.7	2.31 H	156	58.28	3.22
4	#5722.00	72.5 PK	78.2	-5.7	2.31 H	156	69.28	3.22
5	*5745.00	118.1 PK			2.31 H	156	114.87	3.23
6	*5745.00	106.8 AV			2.31 H	156	103.57	3.23
7	11490.00	47.5 PK	74.0	-26.5	1.56 H	215	32.71	14.79
8	11490.00	35.3 AV	54.0	-18.7	1.56 H	215	20.51	14.79
9	#17235.00	47.1 PK	74.0	-26.9	1.20 H	205	27.63	19.47
10	#17235.00	35.4 AV	54.0	-18.6	1.20 H	205	15.93	19.47

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	#5584.00	65.8 PK	74.0	-8.2	1.73 V	189	62.78	3.02
2	#5584.00	53.2 AV	54.0	-0.8	1.73 V	189	50.18	3.02
3	#5715.00	67.0 PK	68.2	-1.2	1.74 V	207	63.78	3.22
4	#5722.00	78.0 PK	78.2	-0.2	1.74 V	207	74.78	3.22
5	*5745.00	122.1 PK			1.74 V	207	118.87	3.23
6	*5745.00	110.6 AV			1.74 V	207	107.37	3.23
7	11490.00	46.4 PK	74.0	-27.6	1.61 V	193	31.61	14.79
8	11490.00	33.9 AV	54.0	-20.1	1.61 V	193	19.11	14.79
9	#17235.00	48.6 PK	74.0	-25.4	1.54 V	271	29.13	19.47
10	#17235.00	36.1 AV	54.0	-17.9	1.54 V	271	16.63	19.47

REMARKS:

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

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5627.00	61.7 PK	68.2	-6.5	2.41 H	150	58.60	3.10
2	*5785.00	120.8 PK			2.37 H	146	117.57	3.23
3	*5785.00	109.3 AV			2.37 H	146	106.07	3.23
4	#5850.00	62.3 PK	78.2	-15.9	2.37 H	146	59.08	3.22
5	#5947.00	62.6 PK	68.2	-5.6	2.37 H	146	59.29	3.31
6	11570.00	48.0 PK	74.0	-26.0	1.59 H	214	33.51	14.49
7	11570.00	35.6 AV	54.0	-18.4	1.59 H	214	21.11	14.49
8	#17355.00	47.0 PK	74.0	-27.0	1.21 H	214	27.10	19.90
9	#17355.00	35.4 AV	54.0	-18.6	1.21 H	214	15.50	19.90

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	#5627.00	67.2 PK	68.2	-1.0	1.77 V	209	64.10	3.10
2	*5785.00	124.6 PK			1.74 V	208	121.37	3.23
3	*5785.00	113.1 AV			1.74 V	208	109.87	3.23
4	#5850.00	67.9 PK	78.2	-10.3	1.74 V	208	64.68	3.22
5	#5947.00	68.1 PK	68.2	-0.1	1.74 V	212	64.79	3.31
6	11570.00	45.9 PK	74.0	-28.1	1.56 V	189	31.41	14.49
7	11570.00	33.7 AV	54.0	-20.3	1.56 V	189	19.21	14.49
8	#17355.00	48.7 PK	74.0	-25.3	1.54 V	259	28.80	19.90
9	#17355.00	36.0 AV	54.0	-18.0	1.54 V	259	16.10	19.90

REMARKS:

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

CHANNEL	TX Channel 165	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5667.00	60.9 PK	68.2	-7.3	2.40 H	138	57.74	3.16
2	*5825.00	118.2 PK			2.35 H	149	114.97	3.23
3	*5825.00	106.6 AV			2.35 H	149	103.37	3.23
4	#5853.00	73.6 PK	78.2	-4.6	2.35 H	149	70.39	3.21
5	#5987.00	62.0 PK	68.2	-6.2	2.15 H	156	58.61	3.39
6	11650.00	48.3 PK	74.0	-25.7	1.54 H	206	34.01	14.29
7	11650.00	36.0 AV	54.0	-18.0	1.54 H	206	21.71	14.29
8	#17475.00	47.1 PK	74.0	-26.9	1.21 H	202	26.27	20.83
9	#17475.00	35.5 AV	54.0	-18.5	1.21 H	202	14.67	20.83

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	#5667.00	66.5 PK	68.2	-1.7	1.78 V	205	63.34	3.16
2	*5825.00	122.0 PK			1.75 V	210	118.77	3.23
3	*5825.00	110.4 AV			1.75 V	210	107.17	3.23
4	#5853.00	78.1 PK	78.2	-0.1	1.75 V	210	74.89	3.21
5	#5987.00	67.5 PK	68.2	-0.7	1.55 V	211	64.11	3.39
6	11650.00	45.3 PK	74.0	-28.7	1.55 V	200	31.01	14.29
7	11650.00	33.3 AV	54.0	-20.7	1.55 V	200	19.01	14.29
8	#17475.00	48.8 PK	74.0	-25.2	1.49 V	244	27.97	20.83
9	#17475.00	36.3 AV	54.0	-17.7	1.49 V	244	15.47	20.83

REMARKS:

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

802.11ac (VHT40)

CHANNEL	TX Channel 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	#5714.00	64.6 PK	74.0	-9.4	2.35 H	162	61.38	3.22
2	#5714.00	48.3 AV	54.0	-5.7	2.35 H	162	45.08	3.22
3	#5725.00	71.8 PK	78.2	-6.4	2.35 H	162	68.58	3.22
4	*5755.00	111.7 PK			2.35 H	162	108.48	3.22
5	*5755.00	99.6 AV			2.35 H	162	96.38	3.22
6	11510.00	48.4 PK	74.0	-25.6	1.53 H	222	33.67	14.73
7	11510.00	35.9 AV	54.0	-18.1	1.53 H	222	21.17	14.73
8	#17265.00	48.4 PK	74.0	-25.6	1.15 H	203	28.91	19.49
9	#17265.00	36.4 AV	54.0	-17.6	1.15 H	203	16.91	19.49

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	#5714.00	70.2 PK	74.0	-3.8	1.73 V	190	66.98	3.22
2	#5714.00	53.9 AV	54.0	-0.1	1.73 V	190	50.68	3.22
3	#5725.00	77.3 PK	78.2	-0.9	1.73 V	190	74.08	3.22
4	*5755.00	115.6 PK			1.73 V	190	112.38	3.22
5	*5755.00	103.5 AV			1.73 V	190	100.28	3.22
6	11510.00	46.7 PK	74.0	-27.3	1.75 V	204	31.97	14.73
7	11510.00	34.3 AV	54.0	-19.7	1.75 V	204	19.57	14.73
8	#17265.00	48.8 PK	74.0	-25.2	1.46 V	294	29.31	19.49
9	#17265.00	36.0 AV	54.0	-18.0	1.46 V	294	16.51	19.49

REMARKS:

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

CHANNEL	TX Channel 159	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5795.00	116.4 PK			2.37 H	173	113.17	3.23
2	*5795.00	104.4 AV			2.37 H	173	101.17	3.23
3	#5850.00	70.7 PK	78.2	-7.5	2.37 H	173	67.48	3.22
4	#5861.00	64.2 PK	74.0	-9.8	2.37 H	173	60.98	3.22
5	#5861.00	47.8 AV	54.0	-6.2	2.37 H	173	44.58	3.22
6	#5957.00	60.2 PK	74.0	-13.8	2.31 H	174	56.87	3.33
7	#5957.00	47.3 AV	54.0	-6.7	2.31 H	174	43.97	3.33
8	11590.00	48.4 PK	74.0	-25.6	1.56 H	218	34.01	14.39
9	11590.00	35.8 AV	54.0	-18.2	1.56 H	218	21.41	14.39
10	#17385.00	48.9 PK	74.0	-25.1	1.17 H	215	28.81	20.09
11	#17385.00	36.9 AV	54.0	-17.1	1.17 H	215	16.81	20.09

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5795.00	120.1 PK			1.70 V	209	116.87	3.23
2	*5795.00	108.1 AV			1.70 V	209	104.87	3.23
3	#5850.00	76.2 PK	78.2	-2.0	1.70 V	209	72.98	3.22
4	#5861.00	69.7 PK	74.0	-4.3	1.70 V	209	66.48	3.22
5	#5861.00	53.3 AV	54.0	-0.7	1.70 V	209	50.08	3.22
6	#5957.00	65.7 PK	74.0	-8.3	1.66 V	210	62.37	3.33
7	#5957.00	52.8 AV	54.0	-1.2	1.66 V	210	49.47	3.33
8	11590.00	46.4 PK	74.0	-27.6	1.80 V	204	32.01	14.39
9	11590.00	33.9 AV	54.0	-20.1	1.80 V	204	19.51	14.39
10	#17385.00	49.5 PK	74.0	-24.5	1.44 V	299	29.41	20.09
11	#17385.00	36.4 AV	54.0	-17.6	1.44 V	299	16.31	20.09

REMARKS:

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

802.11ac (VHT80)

CHANNEL	TX Channel 155	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5714.00	63.3 PK	74.0	-10.7	2.40 H	157	60.08	3.22
2	#5714.00	47.6 AV	54.0	-6.4	2.40 H	157	44.38	3.22
3	#5725.00	71.8 PK	78.2	-6.4	2.40 H	157	68.58	3.22
4	*5775.00	106.9 PK			2.40 H	157	103.67	3.23
5	*5775.00	94.6 AV			2.40 H	157	91.37	3.23
6	#5850.00	62.3 PK	78.2	-15.9	2.40 H	157	59.08	3.22
7	#5860.00	59.3 PK	74.0	-14.7	2.40 H	157	56.08	3.22
8	#5860.00	45.8 AV	54.0	-8.2	2.40 H	157	42.58	3.22
9	11550.00	48.4 PK	74.0	-25.6	1.52 H	211	33.84	14.56
10	11550.00	36.0 AV	54.0	-18.0	1.52 H	211	21.44	14.56
11	#17325.00	48.1 PK	74.0	-25.9	1.23 H	214	28.41	19.69
12	#17325.00	36.2 AV	54.0	-17.8	1.23 H	214	16.51	19.69

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5714.00	68.9 PK	74.0	-5.1	1.62 V	208	65.68	3.22
2	#5714.00	53.2 AV	54.0	-0.8	1.62 V	208	49.98	3.22
3	#5725.00	77.0 PK	78.2	-1.2	1.62 V	208	73.78	3.22
4	*5775.00	110.8 PK			1.62 V	208	107.57	3.23
5	*5775.00	98.6 AV			1.62 V	208	95.37	3.23
6	#5850.00	67.5 PK	78.2	-10.7	1.62 V	208	64.28	3.22
7	#5860.00	64.7 PK	74.0	-9.3	1.62 V	208	61.48	3.22
8	#5860.00	51.2 AV	54.0	-2.8	1.62 V	208	47.98	3.22
9	11550.00	46.0 PK	74.0	-28.0	1.66 V	192	31.44	14.56
10	11550.00	33.8 AV	54.0	-20.2	1.66 V	192	19.24	14.56
11	#17325.00	48.8 PK	74.0	-25.2	1.52 V	305	29.11	19.69
12	#17325.00	36.0 AV	54.0	-18.0	1.52 V	305	16.31	19.69

REMARKS:

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

Below 1GHz Data

CDD Mode

802.11a

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	Below 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	147.03	32.7 QP	43.5	-10.8	1.50 H	224	45.74	-13.02
2	187.72	34.8 QP	43.5	-8.7	1.13 H	227	50.22	-15.39
3	240.84	33.2 QP	46.0	-12.9	1.00 H	241	47.53	-14.38
4	404.99	29.1 QP	46.0	-17.0	1.50 H	233	38.35	-9.30
5	519.94	30.8 QP	46.0	-15.2	1.50 H	306	37.17	-6.36
6	753.02	35.7 QP	46.0	-10.3	1.52 H	227	36.83	-1.15

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	189.25	31.7 QP	43.5	-11.8	1.43 V	220	47.22	-15.53
2	232.30	30.9 QP	46.0	-15.1	2.50 V	187	46.12	-15.24
3	296.46	25.8 QP	46.0	-20.2	1.00 V	360	38.00	-12.17
4	404.97	25.3 QP	46.0	-20.7	1.45 V	254	34.60	-9.30
5	487.02	25.2 QP	46.0	-20.8	1.50 V	223	32.39	-7.15
6	747.96	33.8 QP	46.0	-12.2	1.00 V	223	35.01	-1.25

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 Transmit Power Measurement

4.2.1 Limits of Transmit Power Measurement

Operation Band	EUT Category		Limit
U-NII-1		Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p \leq 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
		Fixed point-to-point Access Point	1 Watt (30 dBm)
		Indoor Access Point	1 Watt (30 dBm)
		Mobile and Portable client device	250mW (24 dBm)
U-NII-2A			250mW (24 dBm) or 11 dBm+10 log B*
U-NII-2C			250mW (24 dBm) or 11 dBm+10 log B*
U-NII-3	√		1 Watt (30 dBm)

*B is the 26 dB emission bandwidth in megahertz

Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,

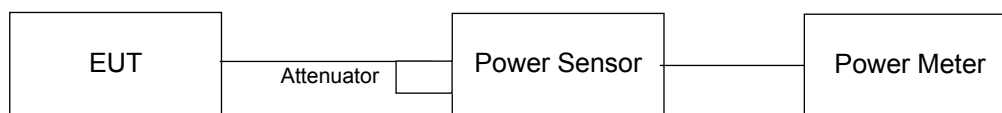
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

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

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

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

4.2.2 Test Setup



4.2.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.2.4 Test Procedure

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

4.2.5 Deviation from Test Standard

No deviation.

4.2.6 EUT Operating Condition

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

4.2.7 Test Result

CDD Mode

POWER OUTPUT:

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
802.11a								
149	5745	22.12	23.71	23.32	612.676	27.87	30	Pass
157	5785	24.00	25.25	25.39	932.093	29.69	30	Pass
165	5825	22.78	24.27	23.92	703.576	28.47	30	Pass
802.11ac (VHT20)								
149	5745	21.24	21.35	21.74	418.782	26.22	30	Pass
157	5785	24.02	25.24	25.38	931.687	29.69	30	Pass
165	5825	21.52	23.35	22.79	548.286	27.39	30	Pass
802.11ac (VHT40)								
151	5755	17.17	18.41	18.37	190.169	22.79	30	Pass
159	5795	21.14	23.21	22.90	534.412	27.28	30	Pass
802.11ac (VHT80)								
155	5775	16.24	17.09	17.18	145.481	21.63	30	Pass

Beamforming Mode

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
802.11ac (VHT20)								
149	5745	19.88	19.85	20.34	302.023	24.80	30	Pass
157	5785	24.02	25.24	25.38	931.687	29.69	30	Pass
165	5825	20.42	22.20	21.69	423.684	26.27	30	Pass
802.11ac (VHT40)								
151	5755	15.88	17.15	17.07	141.539	21.51	30	Pass
159	5795	20.75	22.75	22.50	485.043	26.86	30	Pass
802.11ac (VHT80)								
155	5775	15.10	16.05	16.05	112.903	20.53	30	Pass

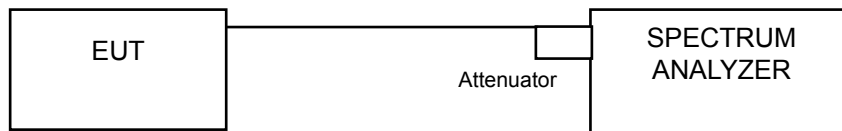
Note: 1. Directional gain = $0.4\text{dBi} + 10\log(3) = 5.17\text{dBi} < 6\text{dBi}$, so the power limit shall be not reduced.

4.3 Peak Power Spectral Density Measurement

4.3.1 Limits of Peak Power Spectral Density Measurement

Operation Band	EUT Category		Limit
U-NII-1		Outdoor Access Point	17dBm/ MHz
		Fixed point-to-point Access Point	
		Indoor Access Point	
		Mobile and Portable client device	11dBm/ MHz
U-NII-2A			11dBm/ MHz
U-NII-2C			11dBm/ MHz
U-NII-3		√	30dBm/ 500kHz

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

For AVG. power (duty cycle ≥ 98%)

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

For AVG. power (duty cycle < 98%)

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Condition

Same as Item 4.2.6.

4.3.7 Test Results

CDD Mode

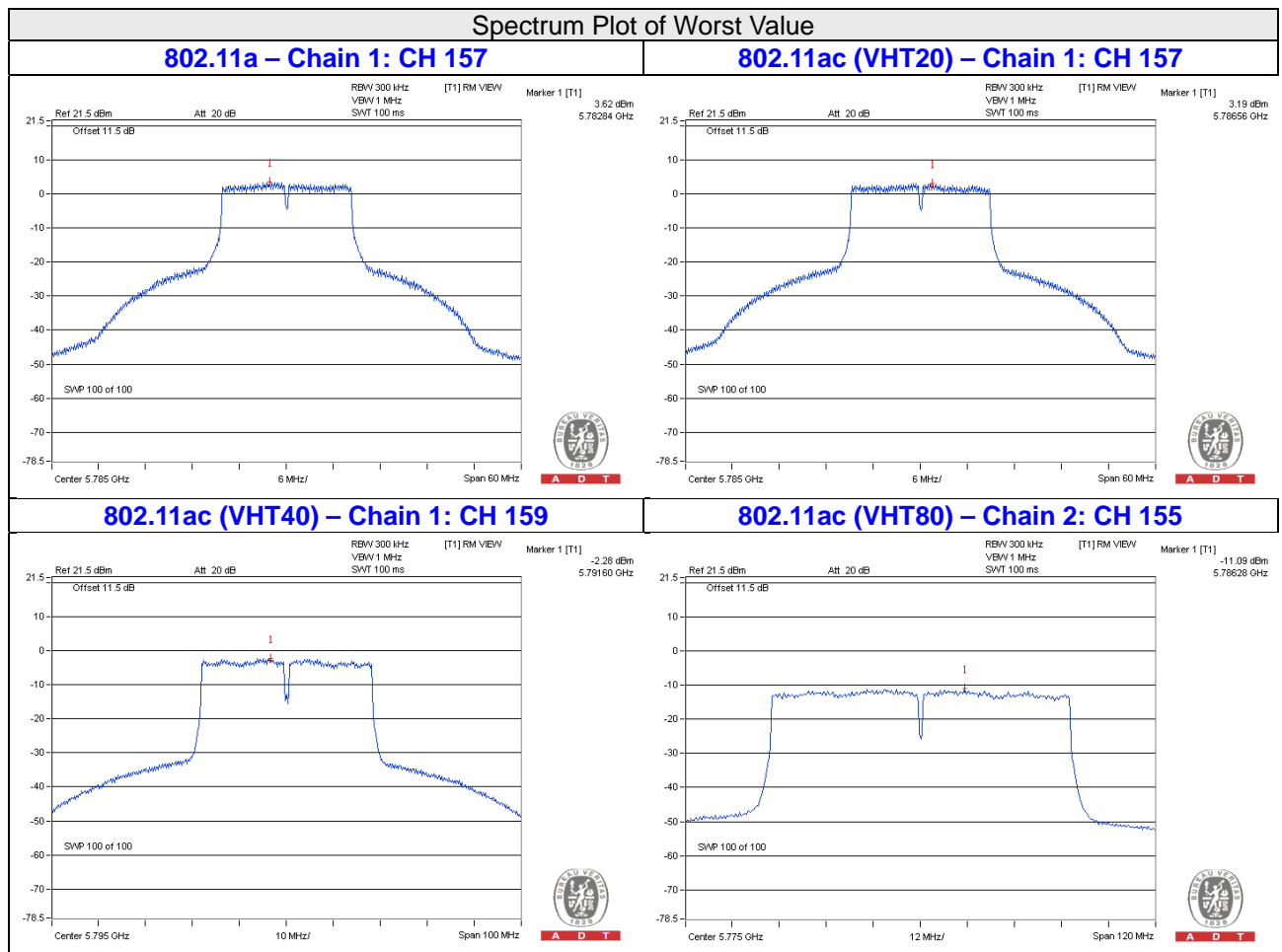
TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=3) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
802.11a								
0	149	5745	0.52	2.74	4.77	7.51	30	Pass
	157	5785	2.61	4.83	4.77	9.60	30	Pass
	165	5825	1.08	3.30	4.77	8.07	30	Pass
1	149	5745	1.76	3.98	4.77	8.75	30	Pass
	157	5785	3.62	5.84	4.77	10.61	30	Pass
	165	5825	2.30	4.52	4.77	9.29	30	Pass
2	149	5745	1.51	3.73	4.77	8.50	30	Pass
	157	5785	3.26	5.48	4.77	10.25	30	Pass
	165	5825	2.04	4.26	4.77	9.03	30	Pass
802.11ac (VHT20)								
0	149	5745	-0.58	1.64	4.77	6.41	30	Pass
	157	5785	2.59	4.81	4.77	9.58	30	Pass
	165	5825	-0.13	2.09	4.77	6.86	30	Pass
1	149	5745	-0.47	1.75	4.77	6.52	30	Pass
	157	5785	3.19	5.41	4.77	10.18	30	Pass
	165	5825	1.39	3.61	4.77	8.38	30	Pass
2	149	5745	-0.54	1.68	4.77	6.45	30	Pass
	157	5785	3.12	5.34	4.77	10.11	30	Pass
	165	5825	0.65	2.87	4.77	7.64	30	Pass
802.11ac (VHT40)								
0	151	5755	-7.55	-5.33	4.77	-0.56	30	Pass
	159	5795	-3.85	-1.63	4.77	3.14	30	Pass
1	151	5755	-6.82	-4.60	4.77	0.17	30	Pass
	159	5795	-2.28	-0.06	4.77	4.71	30	Pass
2	151	5755	-6.61	-4.39	4.77	0.38	30	Pass
	159	5795	-2.37	-0.15	4.77	4.62	30	Pass

Note: 1. Directional gain = $0.4\text{dBi} + 10\log(3) = 5.17\text{dBi} < 6\text{dBi}$, so the power density limit shall not be reduced.

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=3) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
802.11ac (VHT80)									
0	155	5775	-12.03	-9.81	4.77	0.21	-4.83	30	Pass
1	155	5775	-11.13	-8.91	4.77	0.21	-3.93	30	Pass
2	155	5775	-11.09	-8.87	4.77	0.21	-3.89	30	Pass

Note: 1. Directional gain = 0.4dBi + 10log(3) = 5.17dBi < 6dBi , so the power density limit shall not be reduced.

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

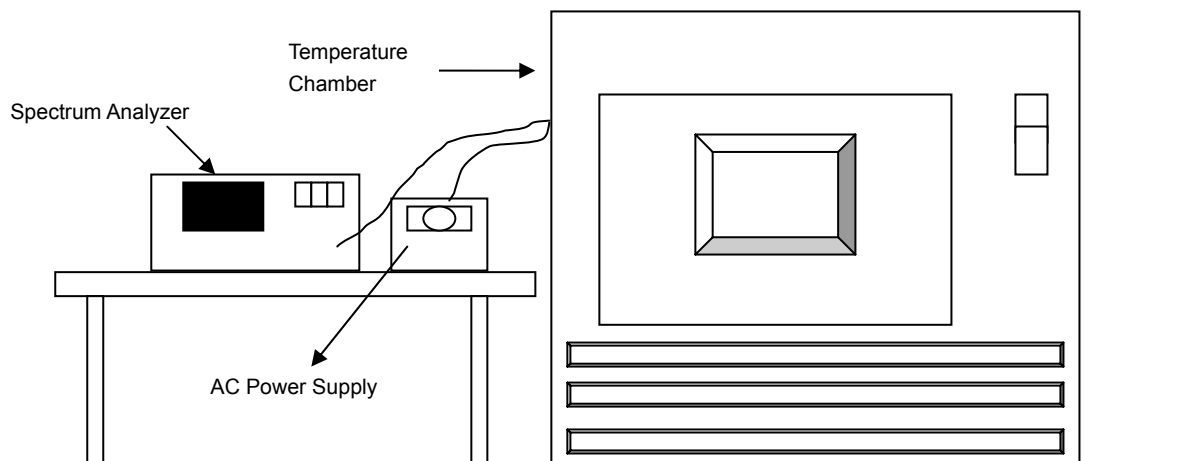


4.4 Frequency Stability Measurement

4.4.1 Limits of Frequency Stability Measurement

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

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 Procedure

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

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Condition

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

4.4.7 Test Results

FREQUENCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5825MHz									
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	5824.9856	-0.00025	5824.9819	-0.00031	5824.9852	-0.00025	5824.9812	-0.00032
40	120	5824.9843	-0.00027	5824.9818	-0.00031	5824.9823	-0.00030	5824.9855	-0.00025
30	120	5824.9816	-0.00032	5824.9827	-0.00030	5824.9807	-0.00033	5824.9798	-0.00035
20	120	5824.9773	-0.00039	5824.9769	-0.00040	5824.9791	-0.00036	5824.9787	-0.00037
10	120	5825.0051	0.00009	5825.0058	0.00010	5825.0043	0.00007	5825.0068	0.00012
0	120	5825.0031	0.00005	5825.0001	0.00000	5824.9977	-0.00004	5824.9998	0.00000
-10	120	5824.9966	-0.00006	5824.9959	-0.00007	5824.9949	-0.00009	5824.9928	-0.00012
-20	120	5825.0111	0.00019	5825.012	0.00021	5825.0122	0.00021	5825.013	0.00022
-30	120	5825.0172	0.00030	5825.0155	0.00027	5825.015	0.00026	5825.0152	0.00026

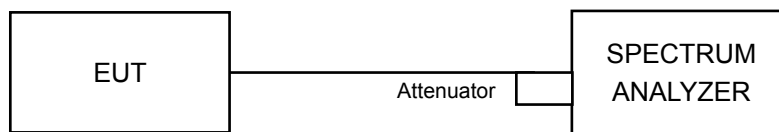
FREQUENCY STABILITY VERSUS VOLTAGE									
OPERATING FREQUENCY: 5825MHz									
TEMP. (°C)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
20	138	5824.9766	-0.00040	5824.9774	-0.00039	5824.9794	-0.00035	5824.9794	-0.00035
	120	5824.9773	-0.00039	5824.9769	-0.00040	5824.9791	-0.00036	5824.9787	-0.00037
	102	5824.9765	-0.00040	5824.977	-0.00039	5824.9783	-0.00037	5824.9778	-0.00038

4.5 6dB Bandwidth Measurement

4.5.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

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

MEASUREMENT PROCEDURE REF

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

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

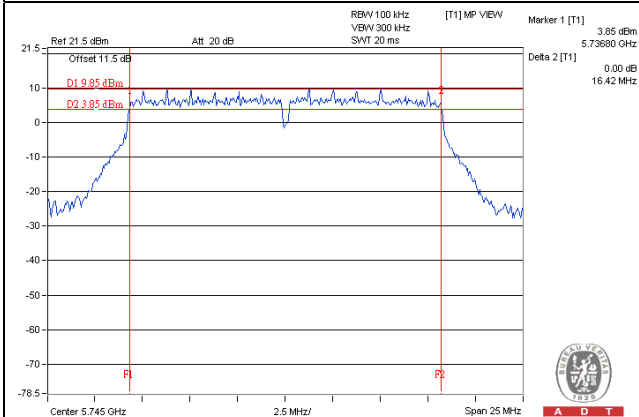
4.5.7 Test Results

CDD MODE

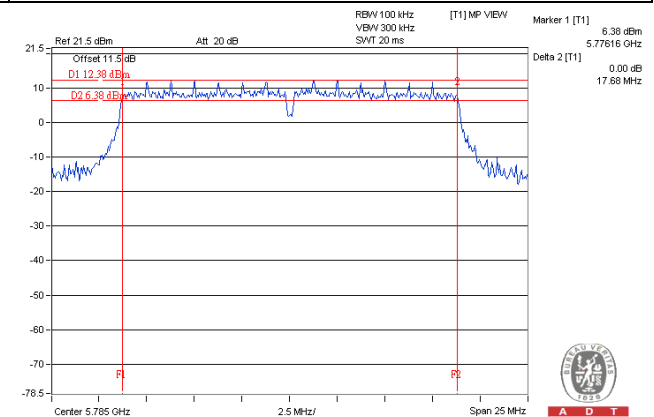
Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
802.11a						
149	5745	16.42	16.42	16.47	0.5	Pass
157	5785	16.43	16.43	16.46	0.5	Pass
165	5825	16.46	16.42	16.46	0.5	Pass
802.11ac (VHT20)						
149	5745	17.70	17.71	17.71	0.5	Pass
157	5785	17.68	17.69	17.68	0.5	Pass
165	5825	17.70	17.70	17.68	0.5	Pass
802.11ac (VHT40)						
151	5755	36.44	36.49	36.46	0.5	Pass
159	5795	36.45	36.48	36.48	0.5	Pass
802.11ac (VHT80)						
155	5775	75.90	75.88	76.08	0.5	Pass

SPECTRUM PLOT OF WORST VALUE

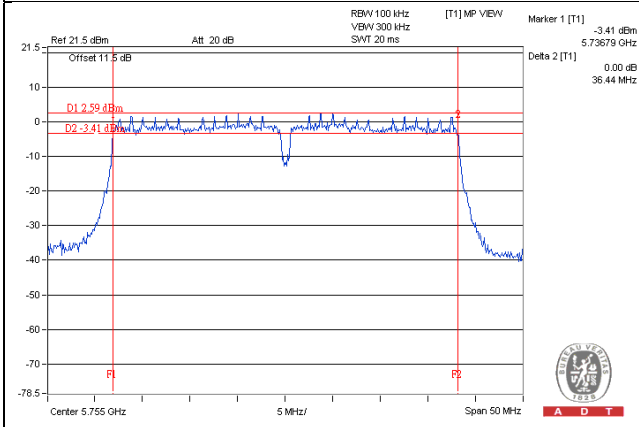
802.11a – Chain 0: CH 149



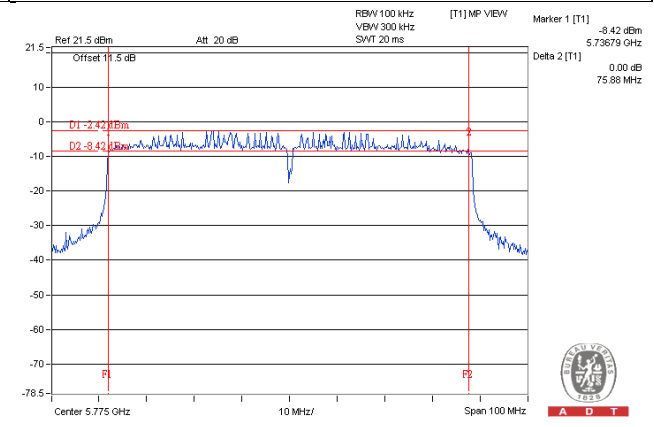
802.11ac (VHT20) – Chain 0: CH157



802.11ac (VHT40) – Chain 0: CH151



802.11ac (VHT80) – Chain 1: CH155



5 Pictures of Test Arrangements

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



Appendix – Information on the Testing Laboratories

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

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

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

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