

FCC Test Report

Report No.: RF150814C23-1

FCC ID: C3K1733

Test Model: 1733

Received Date: Aug. 14, 2015

Test Date: Nov. 03 ~ Nov. 06, 2015

Issued Date: Nov. 23, 2015

Applicant: Microsoft Corporation

Address: One Microsoft Way, Redmond WA 98052-6399, U.S.A

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

Lab Address: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan, R.O.C.

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
RF150814C23-1	Original release	Nov. 23, 2015

1 Certificate of Conformity

Product: Wireless Display Adapter

Brand: Microsoft®

Test Model: 1733

Sample Status: Engineering sample

Applicant: Microsoft Corporation

Test Date: Nov. 03 ~ Nov. 06, 2015

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 : , **Date:** Nov. 23, 2015
Pettie Chen / Senior Specialist

Approved by : , **Date:** Nov. 23, 2015
Ken Liu / Senior Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.207 15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -7.02dB at 0.50190MHz.
15.407(b) (1/2/3/4/6)	Radiated Emissions & Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -1.0dB at 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	No antenna connector is used.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expended Uncertainty (k=2) ($\pm$)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.44 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.63 dB
	200MHz ~1000MHz	3.64 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	Wireless Display Adapter
Brand	Microsoft®
Test Model	1733
Sample Status	Engineering sample
Power Supply Rating	5Vdc (host)
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK
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 135Mbps 802.11ac: up to 390Mbps
Operating Frequency	5180 ~ 5240MHz, 5745 ~ 5825MHz
Number of Channel	5180MHz ~ 5240MHz 802.11a, 802.11n (HT20), 802.11ac (VHT20): 4 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1 5745MHz ~ 5825MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 5 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1
Output Power	5180MHz ~ 5240MHz: 32.584mW 5745MHz ~ 5825MHz: 31.769mW
Antenna Type	5GHz Band: Chip antenna with 2.25dBi gain
Antenna Connector	NA
Accessory Device	NA
Data Cable Supplied	0.3m non-shielded HDMI cable 0.1m non-shielded USB cable

Note:

1. The EUT provides 1 completed transmitter and 1 receiver.

Modulation Mode	TX Function
802.11a	1TX
802.11n (HT20)	1TX
802.11n (HT40)	1TX
802.11ac (VHT80)	1TX

* The modulation and bandwidth are similar for 802.11n mode for HT20 / HT40 and 802.11ac mode for VHT20 / VHT40, therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

3.2 Description of Test Modes

For 5180 ~ 5240MHz

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

Channel	Frequency	Channel	Frequency
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

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

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210MHz

For 5745 ~ 5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

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

Note: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.

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)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.0
-	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
-	802.11n (HT40)		38 to 46	38, 46	OFDM	BPSK	13.5
-	802.11ac (VHT80)		42	42	OFDM	BPSK	29.3
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
-	802.11n (HT40)		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.

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	5180-5240	36 to 48	40	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)
-	802.11a	5180-5240	36 to 48	40	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)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.0
-	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
-	802.11n (HT40)		38 to 46	38, 46	OFDM	BPSK	13.5
-	802.11ac (VHT80)		42	42	OFDM	BPSK	29.3
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
-	802.11n (HT40)		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 (SYSTEM)	TESTED BY
RE $\geq$ 1G	25deg. C, 63%RH	120Vac, 60Hz	Jones Chang
RE $<$ 1G	25deg. C, 63%RH	120Vac, 60Hz	Jones Chang
PLC	24deg. C, 70%RH	120Vac, 60Hz	Jones Chang
APCM	25deg. C, 60%RH	120Vac, 60Hz	Leo Tsai

3.3 Duty Cycle of Test Signal

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

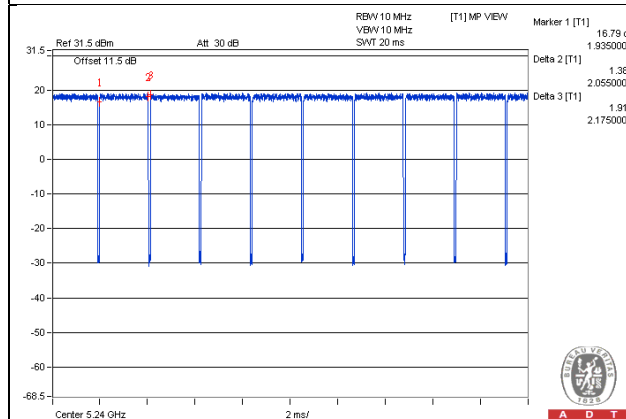
802.11a: Duty cycle = $2.055/2.175 = 0.945$, Duty factor = $10 * \log(1/0.945) = 0.25$

802.11n (HT20): Duty cycle = $1.923/2.033 = 0.946$, Duty factor = $10 * \log(1/0.946) = 0.24$

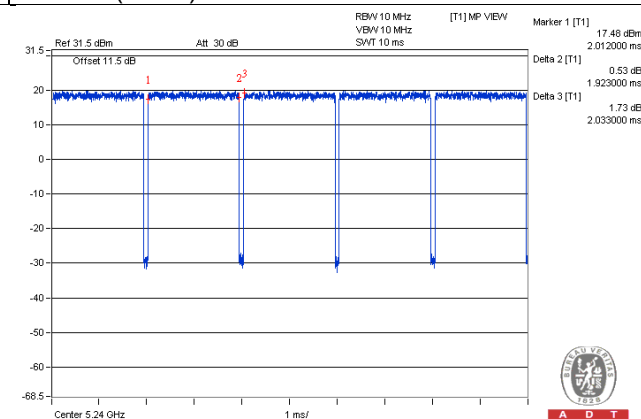
802.11n (HT40): Duty cycle = $0.947/1.047 = 0.904$, Duty factor = $10 * \log(1/0.904) = 0.44$

802.11ac (VHT80): Duty cycle = $0.458/0.547 = 0.837$, Duty factor = $10 * \log(1/0.837) = 0.77$

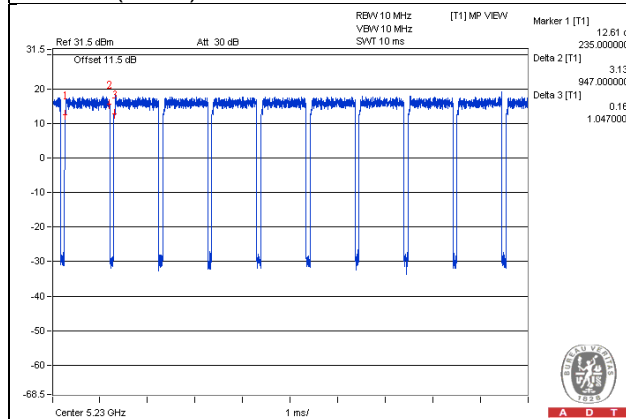
802.11a



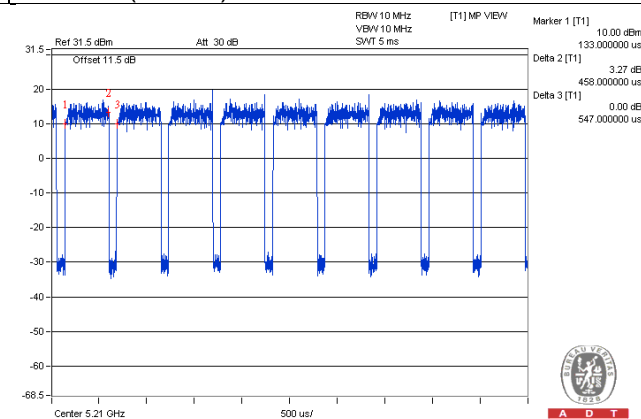
802.11n (HT20)



802.11n (HT40)



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.

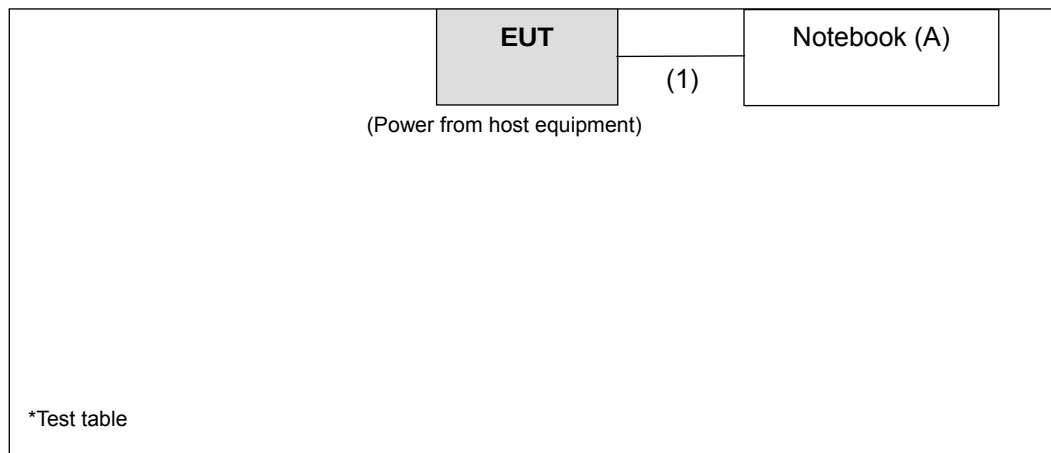
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	E5420	BPQ7MQ1	FCC DoC Approved	-

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.	USB	1	0.1	N	0	Accessory of EUT

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)

789033 D02 General UNII Test Procedure New Rules v01

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 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.	Date Of Calibration	Due Date Of Calibration
Test Receiver ROHDE & SCHWARZ	ESCS30	100289	Dec. 01, 2014	Nov. 30, 2015
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Mar. 30, 2015	Mar. 29, 2016
BILOG Antenna SCHWARZBECK	VULB9168	9168-148	Feb. 02, 2015	Feb. 01, 2016
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Feb. 09, 2015	Feb. 08, 2016
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Feb. 09, 2015	Feb. 08, 2016
Preamplifier Agilent	8449B	3008A01911	Aug. 09, 2015	Aug. 08, 2016
Preamplifier Agilent	8447D	2944A10638	Aug. 09, 2015	Aug. 08, 2016
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-02(30 9222 +248780)	Aug. 09, 2015	Aug. 08, 2016
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-03(27 4092)	Aug. 09, 2015	Aug. 08, 2016
RF signal cable Woken	8D-FB	Cable-CH9-01	Aug. 11, 2015	Aug. 10, 2016
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower & Turn BV ADT	AT100	AT93021705	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

- 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 9.
 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 215374.
 5. The IC Site Registration No. is IC 7450F-9.

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:

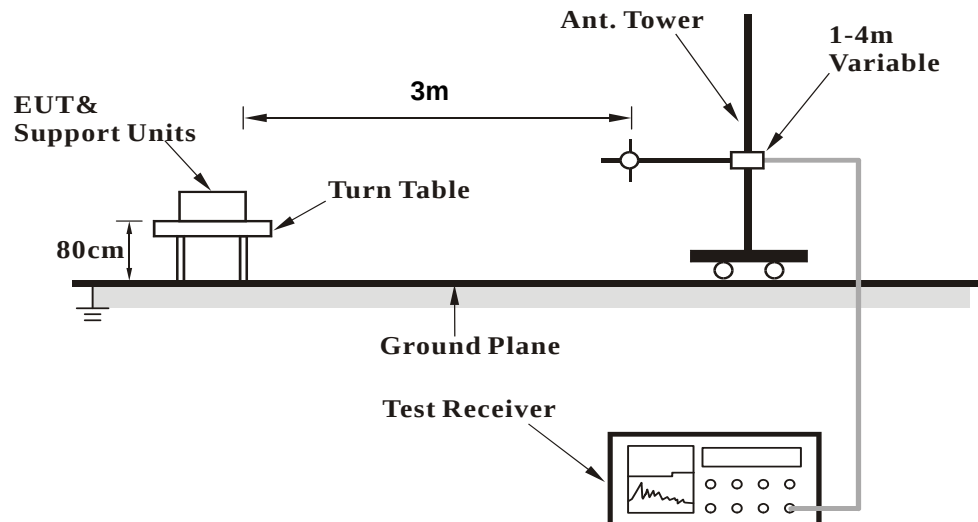
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

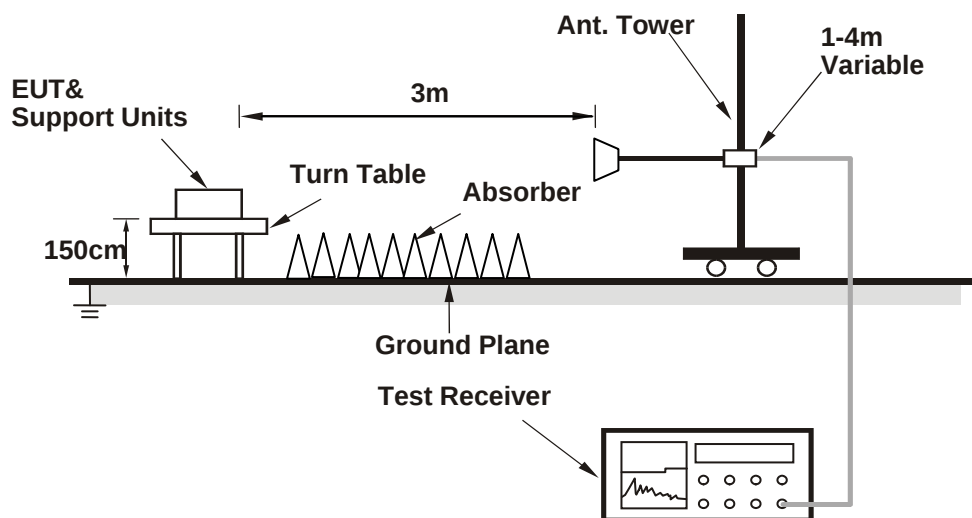
No deviation.

4.1.5 Test Set Up

<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

- Connected the EUT with the notebook via a USB cable and placed them on the testing table.
- Set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1GHz Data

802.11a

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	71.7 PK	74.0	-2.3	1.62 H	8	65.50	6.20
2	5150.00	52.6 AV	54.0	-1.4	1.62 H	8	46.40	6.20
3	*5180.00	110.0 PK			1.63 H	8	70.50	39.50
4	*5180.00	100.2 AV			1.63 H	8	60.70	39.50
5	#10360.00	60.8 PK	74.0	-13.2	1.30 H	359	43.80	17.00
6	#10360.00	47.3 AV	54.0	-6.7	1.30 H	359	30.30	17.00
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	5150.00	66.8 PK	74.0	-7.2	2.38 V	161	60.60	6.20
2	5150.00	48.5 AV	54.0	-5.5	2.38 V	161	42.30	6.20
3	*5180.00	105.4 PK			1.96 V	16	65.90	39.50
4	*5180.00	95.4 AV			1.96 V	16	55.90	39.50
5	#10360.00	59.5 PK	74.0	-14.5	1.93 V	103	42.50	17.00
6	#10360.00	46.6 AV	54.0	-7.4	1.93 V	103	29.60	17.00

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)
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	107.5 PK			2.12 H	10	67.90	39.60
2	*5200.00	97.6 AV			2.12 H	10	58.00	39.60
3	#10400.00	61.4 PK	74.0	-12.6	1.29 H	358	44.40	17.00
4	#10400.00	48.7 AV	54.0	-5.3	1.29 H	358	31.70	17.00
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	106.9 PK			1.92 V	13	67.30	39.60
2	*5200.00	96.6 AV			1.92 V	13	57.00	39.60
3	#10400.00	59.8 PK	74.0	-14.2	1.57 V	210	42.80	17.00
4	#10400.00	46.7 AV	54.0	-7.3	1.57 V	210	29.70	17.00

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)
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	107.3 PK			1.57 H	9	67.70	39.60
2	*5240.00	97.5 AV			1.57 H	9	57.90	39.60
3	5350.00	65.1 PK	74.0	-8.9	1.57 H	359	58.70	6.40
4	5350.00	48.4 AV	54.0	-5.6	1.57 H	359	42.00	6.40
5	#10480.00	62.7 PK	74.0	-11.3	1.30 H	359	44.70	18.00
6	#10480.00	49.9 AV	54.0	-4.1	1.30 H	359	31.90	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	107.1 PK			1.93 V	6	67.50	39.60
2	*5240.00	97.1 AV			1.93 V	6	57.50	39.60
3	5350.00	59.9 PK	74.0	-14.1	1.90 V	23	53.50	6.40
4	5350.00	46.7 AV	54.0	-7.3	1.90 V	23	40.30	6.40
5	#10480.00	60.7 PK	74.0	-13.3	1.66 V	226	42.70	18.00
6	#10480.00	47.5 AV	54.0	-6.5	1.66 V	226	29.50	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)
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	#5714.90	67.4 PK	74.0	-6.6	1.12 H	36	60.20	7.20
2	#5714.90	50.2 AV	54.0	-3.8	1.12 H	36	43.00	7.20
3	#5722.90	72.3 PK	78.2	-5.9	1.12 H	37	65.10	7.20
4	#5725.00	58.8 PK	78.2	-19.4	1.09 H	6	51.60	7.20
5	*5745.00	106.1 PK			1.00 H	23	65.70	40.40
6	*5745.00	97.0 AV			1.00 H	23	56.60	40.40
7	11490.00	61.0 PK	74.0	-13.0	1.31 H	179	42.70	18.30
8	11490.00	48.9 AV	54.0	-5.1	1.31 H	179	30.60	18.30
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	#5714.90	66.4 PK	74.0	-7.6	1.00 V	336	59.20	7.20
2	#5714.90	49.7 AV	54.0	-4.3	1.00 V	336	42.50	7.20
3	#5722.90	71.5 PK	78.2	-6.7	1.00 V	334	64.30	7.20
4	#5725.00	57.6 PK	78.2	-20.6	1.04 V	336	50.40	7.20
5	*5745.00	105.0 PK			2.12 V	177	64.60	40.40
6	*5745.00	95.1 AV			2.12 V	177	54.70	40.40
7	11490.00	60.9 PK	74.0	-13.1	1.00 V	69	42.60	18.30
8	11490.00	48.3 AV	54.0	-5.7	1.00 V	69	30.00	18.30

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)
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	106.6 PK			1.12 H	20	66.10	40.50
2	*5785.00	96.6 AV			1.12 H	20	56.10	40.50
3	11570.00	62.1 PK	74.0	-11.9	1.00 H	174	43.90	18.20
4	11570.00	49.2 AV	54.0	-4.8	1.00 H	174	31.00	18.20
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	105.6 PK			1.00 V	70	65.10	40.50
2	*5785.00	95.7 AV			1.00 V	70	55.20	40.50
3	11570.00	62.9 PK	74.0	-11.1	1.04 V	68	44.70	18.20
4	11570.00	49.6 AV	54.0	-4.4	1.04 V	68	31.40	18.20

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)
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	*5825.00	106.0 PK			1.95 H	19	65.50	40.50
2	*5825.00	97.0 AV			1.95 H	19	56.50	40.50
3	#5850.00	51.2 PK	78.2	-27.0	1.95 H	17	43.70	7.50
4	#5852.10	70.3 PK	78.2	-7.9	1.83 H	25	62.70	7.60
5	#5860.10	65.3 PK	74.0	-8.7	1.66 H	13	57.70	7.60
6	#5860.10	46.3 AV	54.0	-7.7	1.66 H	13	38.70	7.60
7	11650.00	61.9 PK	74.0	-12.1	1.21 H	9	43.20	18.70
8	11650.00	49.3 AV	54.0	-4.7	1.21 H	9	30.60	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	*5825.00	105.5 PK			2.31 V	177	65.00	40.50
2	*5825.00	95.6 AV			2.31 V	177	55.10	40.50
3	#5850.00	51.1 PK	78.2	-27.1	2.36 V	186	43.60	7.50
4	#5852.10	68.5 PK	78.2	-9.7	2.16 V	176	60.90	7.60
5	#5860.10	63.7 PK	74.0	-10.3	2.10 V	176	56.10	7.60
6	#5860.10	46.3 AV	54.0	-7.7	2.10 V	176	38.70	7.60
7	11650.00	62.4 PK	74.0	-11.6	2.20 V	173	43.70	18.70
8	11650.00	49.0 AV	54.0	-5.0	2.20 V	173	30.30	18.70

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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.

802.11n (HT20)

CHANNEL	TX Channel 36	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	5150.00	72.3 PK	74.0	-1.7	1.56 H	6	66.10	6.20
2	5150.00	50.0 AV	54.0	-4.0	1.56 H	6	43.80	6.20
3	*5180.00	108.6 PK			1.66 H	10	69.10	39.50
4	*5180.00	99.1 AV			1.66 H	10	59.60	39.50
5	#10360.00	60.5 PK	74.0	-13.5	1.31 H	0	43.50	17.00
6	#10360.00	47.1 AV	54.0	-6.9	1.31 H	0	30.10	17.00
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	5150.00	65.0 PK	74.0	-9.0	2.40 V	162	58.80	6.20
2	5150.00	49.1 AV	54.0	-4.9	2.40 V	162	42.90	6.20
3	*5180.00	102.7 PK			2.39 V	162	63.20	39.50
4	*5180.00	92.7 AV			2.39 V	162	53.20	39.50
5	#10360.00	58.8 PK	74.0	-15.2	1.80 V	101	41.80	17.00
6	#10360.00	45.7 AV	54.0	-8.3	1.80 V	101	28.70	17.00

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	63.9 PK	74.0	-10.1	1.68 H	9	57.70	6.20
2	5150.00	48.7 AV	54.0	-5.3	1.68 H	9	42.50	6.20
3	*5200.00	109.5 PK			1.64 H	8	69.90	39.60
4	*5200.00	99.5 AV			1.64 H	8	59.90	39.60
5	#10400.00	62.0 PK	74.0	-12.0	1.33 H	0	45.00	17.00
6	#10400.00	47.7 AV	54.0	-6.3	1.33 H	0	30.70	17.00
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	5150.00	57.8 PK	74.0	-16.2	2.00 V	347	51.60	6.20
2	5150.00	46.7 AV	54.0	-7.3	2.00 V	347	40.50	6.20
3	*5200.00	103.2 PK			2.36 V	151	63.60	39.60
4	*5200.00	93.3 AV			2.36 V	151	53.70	39.60
5	#10400.00	59.0 PK	74.0	-15.0	1.80 V	288	42.00	17.00
6	#10400.00	45.8 AV	54.0	-8.2	1.80 V	288	28.80	17.00

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)
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	106.1 PK			1.65 H	20	66.50	39.60
2	*5240.00	97.3 AV			1.65 H	20	57.70	39.60
3	5400.00	59.7 PK	74.0	-14.3	1.69 H	33	53.00	6.70
4	5400.00	48.1 AV	54.0	-5.9	1.69 H	33	41.40	6.70
5	#10480.00	61.0 PK	74.0	-13.0	1.26 H	345	43.00	18.00
6	#10480.00	47.9 AV	54.0	-6.1	1.26 H	345	29.90	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	105.2 PK			2.44 V	150	65.60	39.60
2	*5240.00	95.2 AV			2.44 V	150	55.60	39.60
3	5400.00	57.5 PK	74.0	-16.5	1.51 V	166	50.80	6.70
4	5400.00	46.4 AV	54.0	-7.6	1.51 V	166	39.70	6.70
5	#10480.00	60.0 PK	74.0	-14.0	1.89 V	111	42.00	18.00
6	#10480.00	47.1 AV	54.0	-6.9	1.89 V	111	29.10	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)
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	#5714.00	67.6 PK	74.0	-6.4	1.62 H	34	60.40	7.20
2	#5714.00	52.1 AV	54.0	-1.9	1.62 H	34	44.90	7.20
3	#5722.00	74.7 PK	78.2	-3.5	1.70 H	20	67.50	7.20
4	#5725.00	64.2 PK	78.2	-14.0	1.70 H	20	57.00	7.20
5	*5745.00	106.4 PK			1.63 H	8	66.00	40.40
6	*5745.00	97.0 AV			1.63 H	8	56.60	40.40
7	11490.00	63.5 PK	74.0	-10.5	1.23 H	175	45.20	18.30
8	11490.00	49.6 AV	54.0	-4.4	1.23 H	175	31.30	18.30
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	#5714.00	65.9 PK	74.0	-8.1	2.01 V	174	58.70	7.20
2	#5714.00	49.3 AV	54.0	-4.7	2.01 V	174	42.10	7.20
3	#5722.00	72.7 PK	78.2	-5.5	2.00 V	175	65.50	7.20
4	#5725.00	62.6 PK	78.2	-15.6	2.00 V	175	55.40	7.20
5	*5745.00	103.8 PK			2.30 V	174	63.40	40.40
6	*5745.00	93.7 AV			2.30 V	174	53.30	40.40
7	11490.00	61.9 PK	74.0	-12.1	1.00 V	68	43.60	18.30
8	11490.00	49.0 AV	54.0	-5.0	1.00 V	68	30.70	18.30

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)
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	109.4 PK			1.52 H	20	68.90	40.50
2	*5785.00	99.1 AV			1.52 H	20	58.60	40.50
3	11570.00	64.0 PK	74.0	-10.0	1.29 H	172	45.80	18.20
4	11570.00	50.9 AV	54.0	-3.1	1.29 H	172	32.70	18.20
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	107.8 PK			2.30 V	175	67.30	40.50
2	*5785.00	97.7 AV			2.30 V	175	57.20	40.50
3	11570.00	64.3 PK	74.0	-9.7	1.00 V	75	46.10	18.20
4	11570.00	49.2 AV	54.0	-4.8	1.00 V	75	31.00	18.20

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	108.0 PK			1.99 H	10	67.50	40.50
2	*5825.00	98.0 AV			1.99 H	10	57.50	40.50
3	#5850.00	60.9 PK	78.2	-17.3	1.62 H	10	53.40	7.50
4	#5852.00	71.2 PK	78.2	-7.0	1.62 H	10	63.60	7.60
5	#5861.00	69.9 PK	74.0	-4.1	1.59 H	26	62.30	7.60
6	#5861.00	52.1 AV	54.0	-1.9	1.59 H	26	44.50	7.60
7	11650.00	64.2 PK	74.0	-9.8	1.28 H	179	45.50	18.70
8	11650.00	49.9 AV	54.0	-4.1	1.28 H	179	31.20	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	*5825.00	106.2 PK			2.37 V	175	65.70	40.50
2	*5825.00	96.1 AV			2.37 V	175	55.60	40.50
3	#5850.00	59.0 PK	78.2	-19.2	2.15 V	175	51.50	7.50
4	#5853.00	71.1 PK	78.2	-7.1	2.15 V	175	63.50	7.60
5	#5861.00	64.2 PK	74.0	-9.8	2.14 V	174	56.60	7.60
6	#5861.00	49.6 AV	54.0	-4.4	2.14 V	174	42.00	7.60
7	11650.00	64.1 PK	74.0	-9.9	1.00 V	69	45.40	18.70
8	11650.00	49.9 AV	54.0	-4.1	1.00 V	69	31.20	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)
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.

802.11n (HT40)

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	71.2 PK	74.0	-2.8	1.61 H	7	65.00	6.20
2	5150.00	52.7 AV	54.0	-1.3	1.61 H	7	46.50	6.20
3	*5190.00	103.8 PK			1.61 H	9	64.30	39.50
4	*5190.00	93.9 AV			1.61 H	9	54.40	39.50
5	#10380.00	58.6 PK	74.0	-15.4	1.33 H	356	41.60	17.00
6	#10380.00	45.5 AV	54.0	-8.5	1.33 H	356	28.50	17.00
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	5150.00	63.1 PK	74.0	-10.9	2.40 V	159	56.90	6.20
2	5150.00	47.7 AV	54.0	-6.3	2.40 V	159	41.50	6.20
3	*5190.00	97.7 PK			2.39 V	161	58.20	39.50
4	*5190.00	88.0 AV			2.39 V	161	48.50	39.50
5	#10380.00	58.3 PK	74.0	-15.7	1.21 V	80	41.30	17.00
6	#10380.00	45.3 AV	54.0	-8.7	1.21 V	80	28.30	17.00

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 46	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	61.1 PK	74.0	-12.9	1.66 H	0	54.90	6.20
2	5150.00	47.0 AV	54.0	-7.0	1.66 H	0	40.80	6.20
3	*5230.00	106.1 PK			1.65 H	10	66.50	39.60
4	*5230.00	96.5 AV			1.65 H	10	56.90	39.60
5	#10460.00	59.7 PK	74.0	-14.3	1.29 H	11	41.90	17.80
6	#10460.00	46.8 AV	54.0	-7.2	1.29 H	11	29.00	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	56.8 PK	74.0	-17.2	2.43 V	160	50.60	6.20
2	5150.00	45.7 AV	54.0	-8.3	2.43 V	160	39.50	6.20
3	*5230.00	99.7 PK			2.45 V	163	60.10	39.60
4	*5230.00	90.1 AV			2.45 V	163	50.50	39.60
5	#10460.00	58.8 PK	74.0	-15.2	1.00 V	123	41.00	17.80
6	#10460.00	45.8 AV	54.0	-8.2	1.00 V	123	28.00	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)
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	#5714.00	70.1 PK	74.0	-3.9	1.55 H	16	62.90	7.20
2	#5714.00	53.0 AV	54.0	-1.0	1.55 H	16	45.80	7.20
3	#5722.00	72.9 PK	78.2	-5.3	1.63 H	34	65.70	7.20
4	#5725.00	63.5 PK	78.2	-14.7	1.63 H	34	56.30	7.20
5	*5755.00	103.1 PK			1.56 H	20	62.60	40.50
6	*5755.00	93.4 AV			1.56 H	20	52.90	40.50
7	11510.00	60.7 PK	74.0	-13.3	1.25 H	180	42.50	18.20
8	11510.00	47.5 AV	54.0	-6.5	1.25 H	180	29.30	18.20
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	2.12 V	175	61.70	7.20
2	#5714.00	50.8 AV	54.0	-3.2	2.12 V	175	43.60	7.20
3	#5722.00	61.9 PK	78.2	-16.3	2.10 V	178	54.70	7.20
4	#5725.00	61.6 PK	78.2	-16.6	2.10 V	178	54.40	7.20
5	*5755.00	101.4 PK			2.41 V	175	60.90	40.50
6	*5755.00	91.8 AV			2.41 V	175	51.30	40.50
7	11510.00	60.1 PK	74.0	-13.9	1.00 V	77	41.90	18.20
8	11510.00	47.2 AV	54.0	-6.8	1.00 V	77	29.00	18.20

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)
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	103.8 PK			1.63 H	21	63.30	40.50
2	*5795.00	94.5 AV			1.63 H	21	54.00	40.50
3	#5850.00	54.5 PK	78.2	-23.7	1.62 H	14	47.00	7.50
4	#5853.00	65.1 PK	78.2	-13.1	1.62 H	14	57.50	7.60
5	#5861.00	64.3 PK	74.0	-9.7	1.59 H	25	56.70	7.60
6	#5861.00	48.0 AV	54.0	-6.0	1.59 H	25	40.40	7.60
7	11590.00	61.2 PK	74.0	-12.8	1.23 H	176	42.90	18.30
8	11590.00	48.2 AV	54.0	-5.8	1.23 H	176	29.90	18.30
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	*5795.00	103.1 PK			2.29 V	175	62.60	40.50
2	*5795.00	94.2 AV			2.29 V	175	53.70	40.50
3	#5850.00	55.4 PK	78.2	-22.8	2.10 V	177	47.90	7.50
4	#5853.00	64.3 PK	78.2	-13.9	2.10 V	177	56.70	7.60
5	#5861.00	61.7 PK	74.0	-12.3	2.08 V	175	54.10	7.60
6	#5861.00	49.6 AV	54.0	-4.4	2.08 V	175	42.00	7.60
7	11590.00	60.3 PK	74.0	-13.7	1.07 V	74	42.00	18.30
8	11590.00	47.4 AV	54.0	-6.6	1.07 V	74	29.10	18.30

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

802.11ac (VHT80)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	66.0 PK	74.0	-8.0	1.58 H	7	59.80	6.20
2	5150.00	52.5 AV	54.0	-1.5	1.58 H	7	46.30	6.20
3	*5210.00	102.5 PK			1.59 H	10	62.90	39.60
4	*5210.00	90.2 AV			1.59 H	10	50.60	39.60
5	#10420.00	58.3 PK	74.0	-15.7	1.39 H	345	41.10	17.20
6	#10420.00	45.3 AV	54.0	-8.7	1.39 H	345	28.10	17.20
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	60.2 PK	74.0	-13.8	2.33 V	151	54.00	6.20
2	5150.00	46.7 AV	54.0	-7.3	2.33 V	151	40.50	6.20
3	*5210.00	96.1 PK			2.33 V	151	56.50	39.60
4	*5210.00	84.2 AV			2.33 V	151	44.60	39.60
5	#10420.00	58.0 PK	74.0	-16.0	1.73 V	103	40.80	17.20
6	#10420.00	45.0 AV	54.0	-9.0	1.73 V	103	27.80	17.20

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)
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	#5714.00	66.9 PK	74.0	-7.1	1.60 H	8	59.70	7.20
2	#5714.00	52.2 AV	54.0	-1.8	1.60 H	8	45.00	7.20
3	#5722.00	67.9 PK	78.2	-10.3	1.56 H	24	60.70	7.20
4	#5725.00	66.3 PK	78.2	-11.9	1.56 H	24	59.10	7.20
5	*5775.00	100.2 PK			1.54 H	19	59.70	40.50
6	*5775.00	89.2 AV			1.54 H	19	48.70	40.50
7	11550.00	59.8 PK	74.0	-14.2	1.34 H	169	41.60	18.20
8	11550.00	46.8 AV	54.0	-7.2	1.34 H	169	28.60	18.20
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	62.8 PK	74.0	-11.2	2.13 V	176	55.60	7.20
2	#5714.00	50.3 AV	54.0	-3.7	2.13 V	176	43.10	7.20
3	#5722.00	66.1 PK	78.2	-12.1	2.10 V	173	58.90	7.20
4	#5725.00	57.2 PK	78.2	-21.0	2.10 V	173	50.00	7.20
5	*5775.00	100.0 PK			2.40 V	174	59.50	40.50
6	*5775.00	88.0 AV			2.40 V	174	47.50	40.50
7	11550.00	59.5 PK	74.0	-14.5	1.00 V	69	41.30	18.20
8	11550.00	46.4 AV	54.0	-7.6	1.00 V	69	28.20	18.20

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

Below 1GHz Data: 802.11a

CHANNEL	TX Channel 40	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	57.12	38.0 QP	40.0	-2.0	2.00 H	6	52.80	-14.80
2	99.89	37.0 QP	43.5	-6.5	2.00 H	66	55.90	-18.90
3	166.00	39.5 QP	43.5	-4.0	1.50 H	237	53.70	-14.20
4	191.28	40.5 QP	43.5	-3.0	1.50 H	72	56.70	-16.20
5	239.88	44.4 QP	46.0	-1.6	1.50 H	278	59.30	-14.90
6	527.64	44.0 QP	46.0	-2.0	1.50 H	218	51.90	-7.90
7	891.22	34.9 QP	46.0	-11.1	1.00 H	130	35.80	-0.90
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	45.45	35.1 QP	40.0	-4.9	1.00 V	159	49.90	-14.80
2	78.51	36.1 QP	40.0	-3.9	1.00 V	265	54.70	-18.60
3	99.89	39.1 QP	43.5	-4.4	1.00 V	61	58.00	-18.90
4	142.67	35.0 QP	43.5	-8.5	1.00 V	271	49.40	-14.40
5	166.00	36.7 QP	43.5	-6.8	1.00 V	13	50.90	-14.20
6	535.42	39.5 QP	46.0	-6.5	1.50 V	207	47.40	-7.90

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)
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.	Date Of Calibration	Due Date Of Calibration
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 16, 2015	Nov. 15, 2016
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Dec. 26, 2014	Dec. 25, 2015
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 26, 2015	Feb. 25, 2016
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 24, 2015	Jul. 23, 2016
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

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

2. The test was performed in HwaYa Shielded Room 1.

3. The VCCI Site Registration No. is C-2040.

4.2.3 Test Procedures

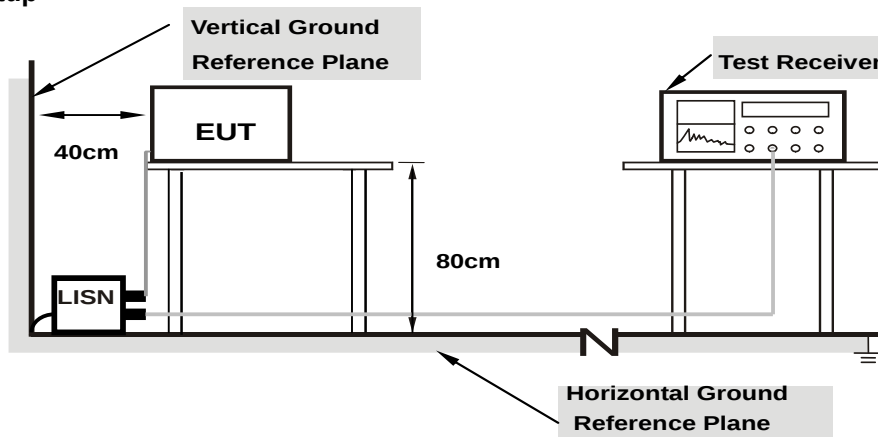
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance 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.

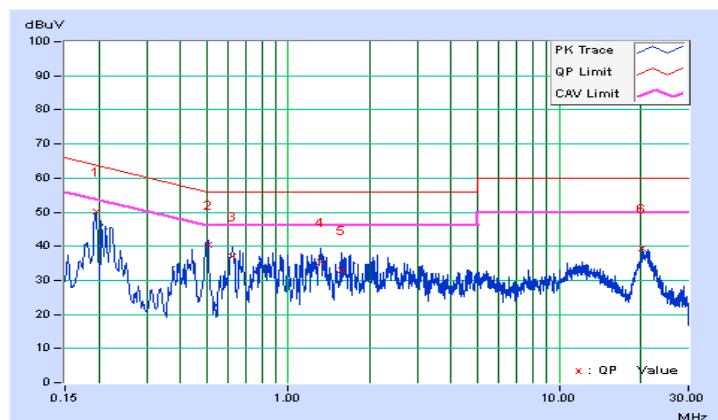
4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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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	0.19510	9.84	40.39	30.88	50.23	40.72	63.82	53.82	-13.59	-13.10
2	0.50581	9.89	30.57	24.44	40.46	34.33	56.00	46.00	-15.54	-11.67
3	0.61920	9.90	27.22	22.88	37.12	32.78	56.00	46.00	-18.88	-13.22
4	1.31518	9.95	25.35	19.66	35.30	29.61	56.00	46.00	-20.70	-16.39
5	1.56542	9.97	22.89	19.34	32.86	29.31	56.00	46.00	-23.14	-16.69
6	20.34124	11.10	28.17	22.92	39.27	34.02	60.00	50.00	-20.73	-15.98

Remarks:

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

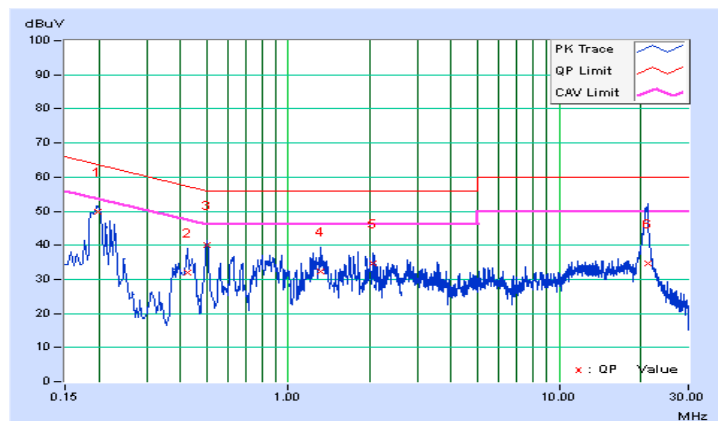


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.19717	9.83	40.14	30.32	49.97	40.15	63.73	53.73	-13.76	-13.58
2	0.42370	9.88	22.16	10.92	32.04	20.80	57.38	47.38	-25.33	-26.57
3	0.50190	9.89	30.25	29.09	40.14	38.98	56.00	46.00	-15.86	-7.02
4	1.32300	9.95	22.49	13.62	32.44	23.57	56.00	46.00	-23.56	-22.43
5	2.06199	9.99	24.65	19.38	34.64	29.37	56.00	46.00	-21.36	-16.63
6	21.17798	10.95	23.75	18.16	34.70	29.11	60.00	50.00	-25.30	-20.89

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

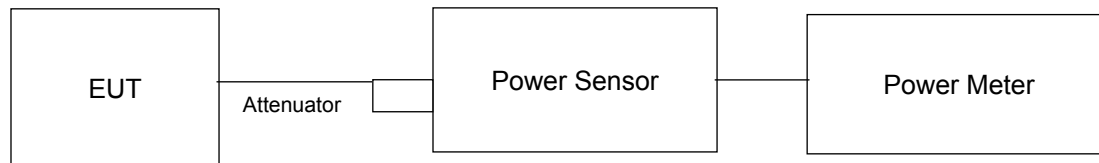
4.3.1 Limits of Transmit Power Measurement

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)

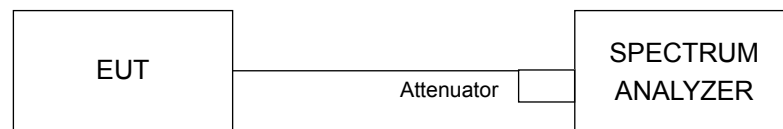
*B is the 26 dB emission bandwidth in megahertz

4.3.2 Test Setup

For Power Output Measurement



For 26dB and Occupied Bandwidth



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, 802.11n (HT20), 802.11n (HT40)

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.

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:

802.11a

Chan.	Freq. (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
36	5180	23.388	13.69	24	Pass
40	5200	32.584	15.13	24	Pass
48	5240	29.580	14.71	24	Pass
149	5745	19.231	12.84	30	Pass
157	5785	20.230	13.06	30	Pass
165	5825	19.364	12.87	30	Pass

802.11n (HT20)

Chan.	Freq. (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
36	5180	25.527	14.07	24	Pass
40	5200	32.509	15.12	24	Pass
48	5240	31.046	14.92	24	Pass
149	5745	25.468	14.06	30	Pass
157	5785	31.769	15.02	30	Pass
165	5825	28.379	14.53	30	Pass

802.11n (HT40)

Chan.	Freq. (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
38	5190	21.727	13.37	24	Pass
46	5230	30.690	14.87	24	Pass
151	5755	19.143	12.82	30	Pass
159	5795	26.730	14.27	30	Pass

802.11ac (VHT80)

Chan.	Freq. (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
42	5210	14.223	11.53	24	Pass
155	5775	16.255	12.11	30	Pass

26dB Bandwidth:

802.11a

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)	Pass / Fail
36	5180	20.21	Pass
40	5200	32.88	Pass
48	5240	21.31	Pass

802.11n (HT20)

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)	Pass / Fail
36	5180	25.90	Pass
40	5200	32.06	Pass
48	5240	21.84	Pass

802.11n (HT40)

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)	Pass / Fail
38	5190	62.76	Pass
46	5230	66.23	Pass

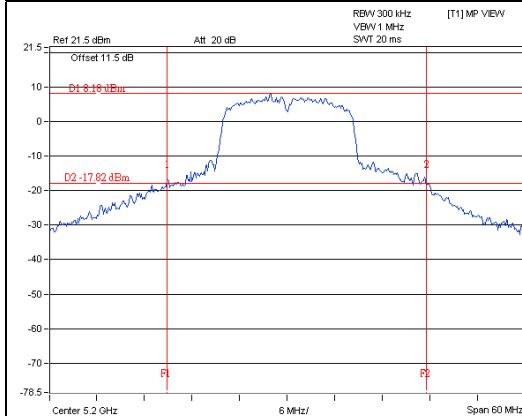
802.11ac (VHT80)

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)	Pass / Fail
42	5210	134.46	Pass

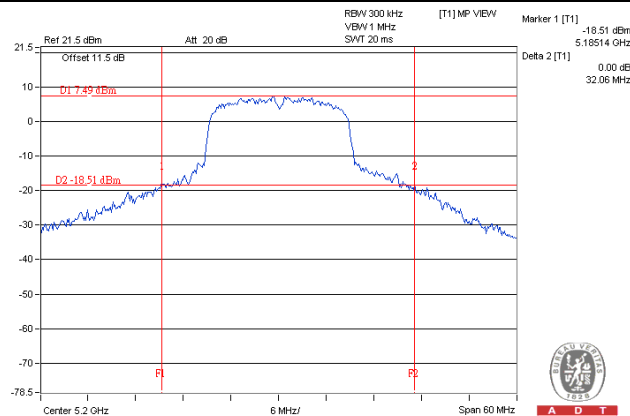
Spectrum Plot of Worst Value

802.11a

802.11n (HT20)



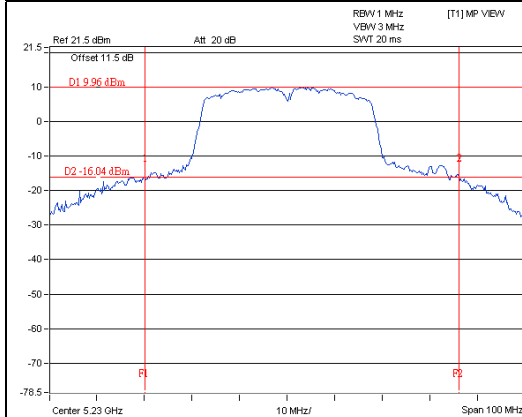
A D T



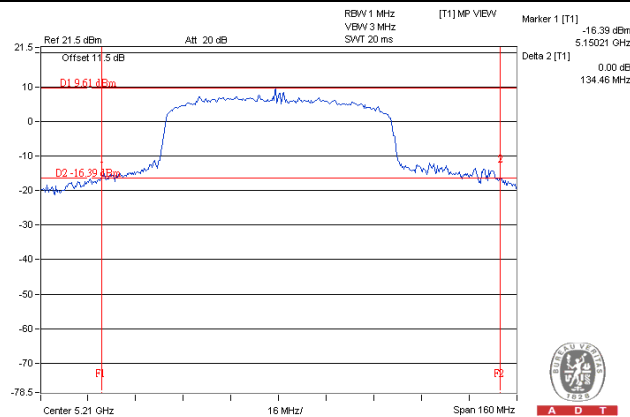
A D T

802.11n (HT40)

802.11ac (VHT80)



A D T



A D T

Occupied Bandwidth:

802.11a

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)
36	5180	16.32
40	5200	18.00
48	5240	16.44
149	5745	16.35
157	5785	16.32
165	5825	16.32

802.11n (HT20)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)
36	5180	17.64
40	5200	18.12
48	5240	17.52
149	5745	17.52
157	5785	18.72
165	5825	17.76

802.11n (HT40)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)
38	5190	36.36
46	5230	36.48
151	5755	36.00
159	5795	36.12

802.11ac (VHT80)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)
42	5210	76.80
155	5775	75.12

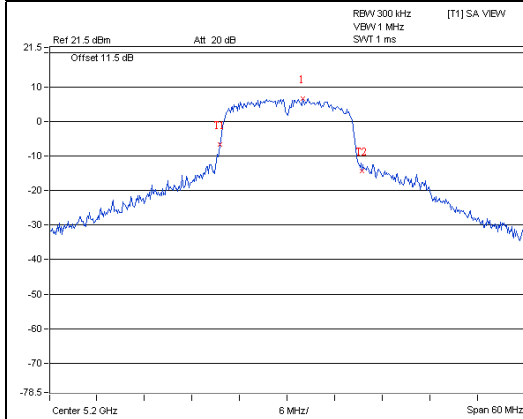


A D T

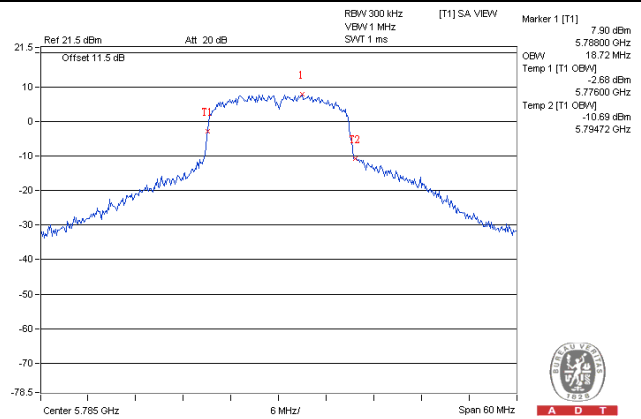
Spectrum Plot of Worst Value

802.11a

802.11n (HT20)



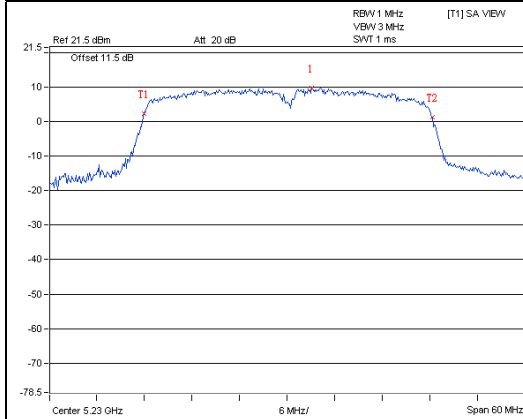
A D T



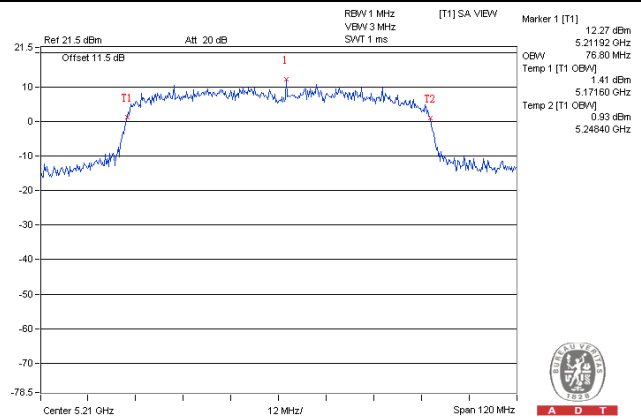
A D T

802.11n (HT40)

802.11ac (VHT80)



A D T



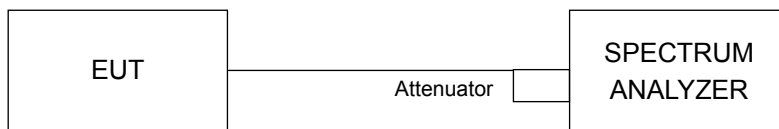
A D T

4.4 Peak Power Spectral Density Measurement

4.4.1 Limits of Peak Power Spectral Density Measurement

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

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

For U-NII-1 band:

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:

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

802.11a

Chan.	Freq. (MHz)	PSD w/o duty factor (dBm)	Duty factor	PSD with duty factor (dBm)	Max. Limit (dBm)	Pass / Fail
36	5180	2.01	0.25	2.26	11.00	Pass
40	5200	2.71	0.25	2.96	11.00	Pass
48	5240	2.40	0.25	2.65	11.00	Pass

802.11n (HT20)

Chan.	Freq. (MHz)	PSD w/o duty factor (dBm)	Duty factor	PSD with duty factor (dBm)	Max. Limit (dBm)	Pass / Fail
36	5180	2.42	0.24	2.66	11.00	Pass
40	5200	2.76	0.24	3.00	11.00	Pass
48	5240	2.68	0.24	2.92	11.00	Pass

802.11n (HT40)

Chan.	Freq. (MHz)	PSD w/o duty factor (dBm)	Duty factor	PSD with duty factor (dBm)	Max. Limit (dBm)	Pass / Fail
38	5190	-0.38	0.44	0.06	11.00	Pass
46	5230	-0.48	0.44	-0.04	11.00	Pass

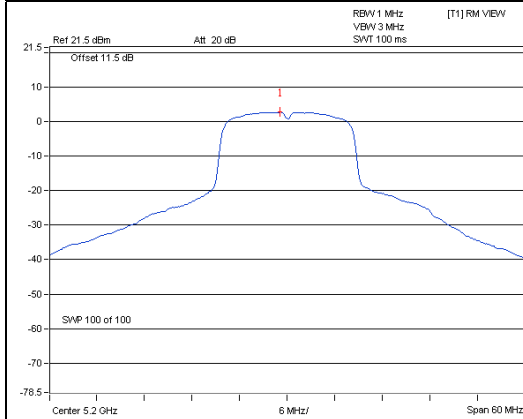
802.11ac (VHT80)

Chan.	Freq. (MHz)	PSD w/o duty factor (dBm)	Duty factor	PSD with duty factor (dBm)	Max. Limit (dBm)	Pass / Fail
42	5210	-4.02	0.77	-3.25	11.00	Pass

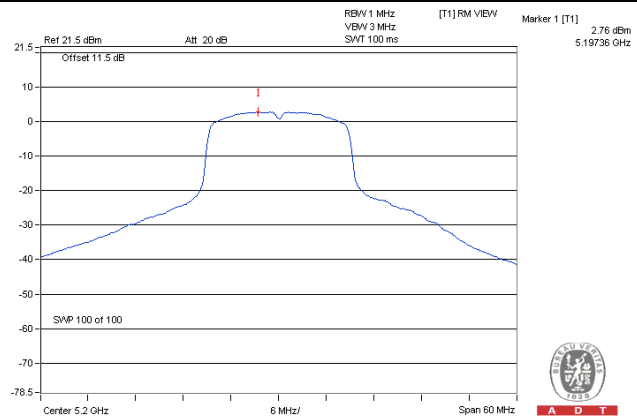
Spectrum Plot of Worst Value

802.11a

802.11n (HT20)



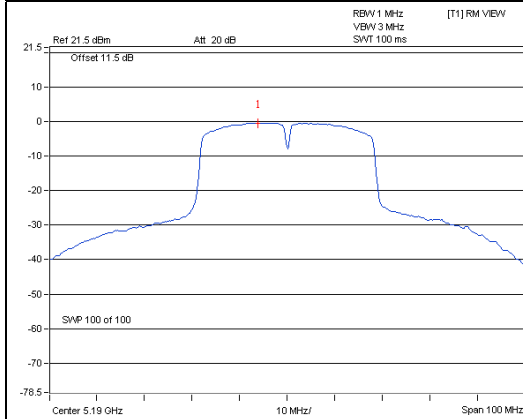
A D T



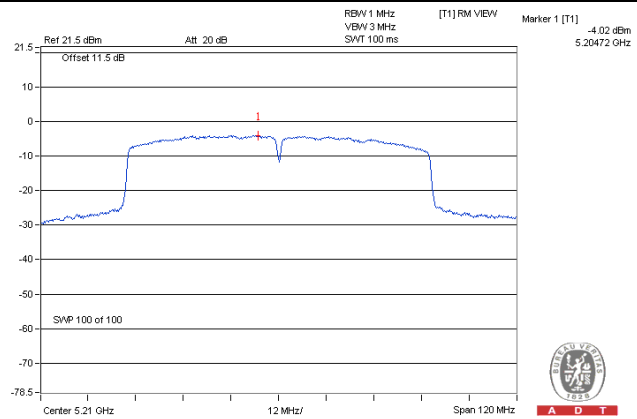
A D T

802.11n (HT40)

802.11ac (VHT80)



A D T



A D T

For U-NII-3 Band

802.11a

Chan.	Freq. (MHz)	PSD (dBm/300k Hz)	PSD (dBm/500k Hz)	Duty factor	Total PSD (dBm/500k Hz)	Limit (dBm/500k Hz)	Pass / Fail
149	5745	-7.99	-5.77	0.25	-5.52	30.00	Pass
157	5785	-7.15	-4.93	0.25	-4.68	30.00	Pass
165	5825	-6.94	-4.72	0.25	-4.47	30.00	Pass

802.11n (HT20)

Chan.	Freq. (MHz)	PSD (dBm/300k Hz)	PSD (dBm/500k Hz)	Duty factor	Total PSD (dBm/500k Hz)	Limit (dBm/500k Hz)	Pass / Fail
149	5745	-6.65	-4.43	0.24	-4.19	30.00	Pass
157	5785	-4.74	-2.52	0.24	-2.28	30.00	Pass
165	5825	-5.67	-3.45	0.24	-3.21	30.00	Pass

802.11n (HT40)

Chan.	Freq. (MHz)	PSD (dBm/300k Hz)	PSD (dBm/500k Hz)	Duty factor	Total PSD (dBm/500k Hz)	Limit (dBm/500k Hz)	Pass / Fail
151	5755	-10.37	-8.15	0.44	-7.71	30.00	Pass
159	5795	-9.88	-7.66	0.44	-7.22	30.00	Pass

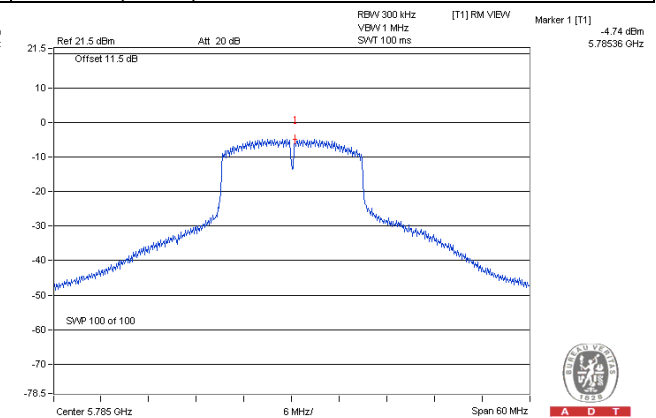
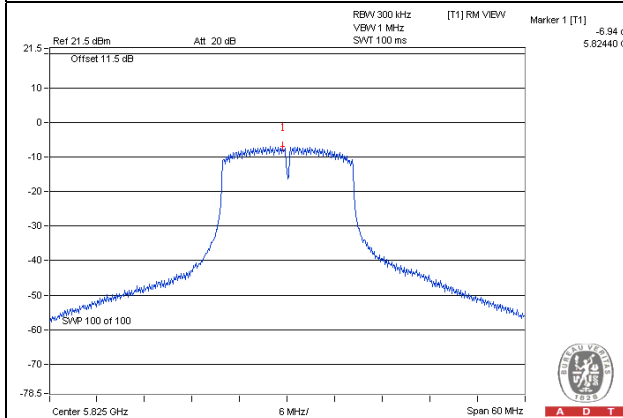
802.11ac (VHT80)

Chan.	Freq. (MHz)	PSD (dBm/300k Hz)	PSD (dBm/500k Hz)	Duty factor	Total PSD (dBm/500k Hz)	Limit (dBm/500k Hz)	Pass / Fail
155	5775	-15.78	-13.56	0.77	-12.79	30.00	Pass

Spectrum Plot of Worst Value

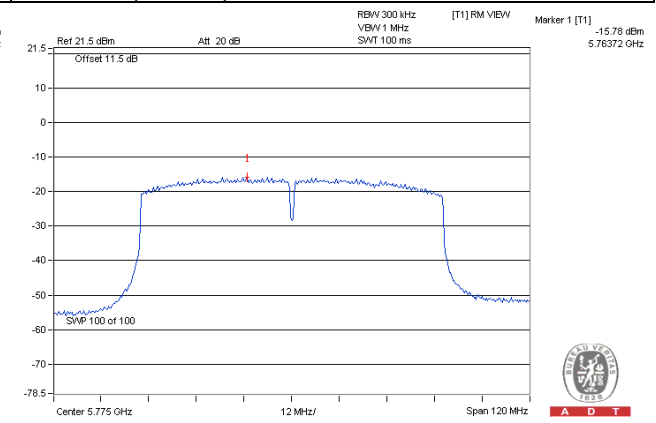
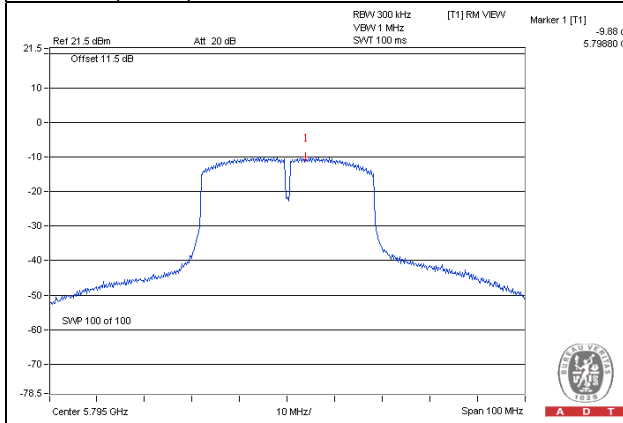
802.11a

802.11n (HT20)



802.11n (HT40)

802.11ac (VHT80)

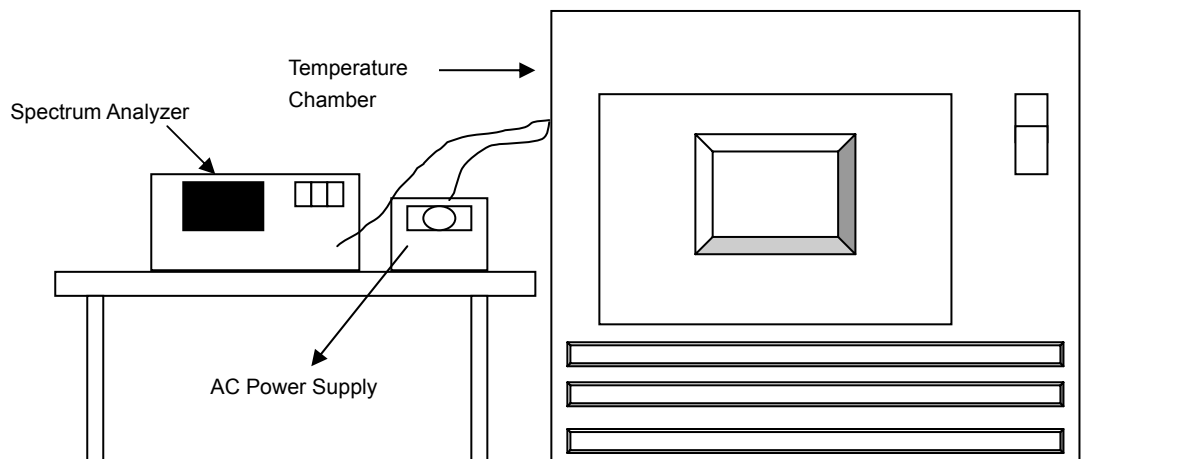


4.5 Frequency Stability

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	5180.0216	0.00042	5180.0201	0.00039	5180.0198	0.00038	5180.0191	0.00037
40	120	5180.0126	0.00024	5180.0137	0.00026	5180.0127	0.00025	5180.0144	0.00028
30	120	5180.0248	0.00048	5180.0232	0.00045	5180.0235	0.00045	5180.0280	0.00054
20	120	5180.0258	0.00050	5180.0251	0.00048	5180.0240	0.00046	5180.0249	0.00048
10	120	5180.0061	0.00012	5180.0054	0.00010	5180.0051	0.00010	5180.0075	0.00014
0	120	5179.9992	-0.00002	5179.9964	-0.00007	5179.9983	-0.00003	5179.9981	-0.00004
-10	120	5180.0225	0.00043	5180.0211	0.00041	5180.0220	0.00042	5180.0211	0.00041
-20	120	5180.0131	0.00025	5180.0126	0.00024	5180.0126	0.00024	5180.0108	0.00021
-30	120	5179.9882	-0.00023	5179.9840	-0.00031	5179.9886	-0.00022	5179.9877	-0.00024

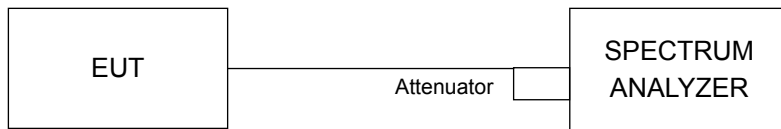
Frequency Stability Versus Temp.									
Operating Frequency: 5180MHz									
Temp. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
20	138	5180.0248	0.00048	5180.0241	0.00047	5180.0235	0.00045	5180.0246	0.00047
	120	5180.0258	0.00050	5180.0251	0.00048	5180.024	0.00046	5180.0249	0.00048
	102	5180.0258	0.00050	5180.0254	0.00049	5180.024	0.00046	5180.0252	0.00049

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

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
149	5745	15.37	0.5	Pass
157	5785	15.38	0.5	Pass
165	5825	15.38	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
149	5745	15.20	0.5	Pass
157	5785	15.17	0.5	Pass
165	5825	15.19	0.5	Pass

802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
151	5755	35.25	0.5	Pass
159	5795	35.22	0.5	Pass

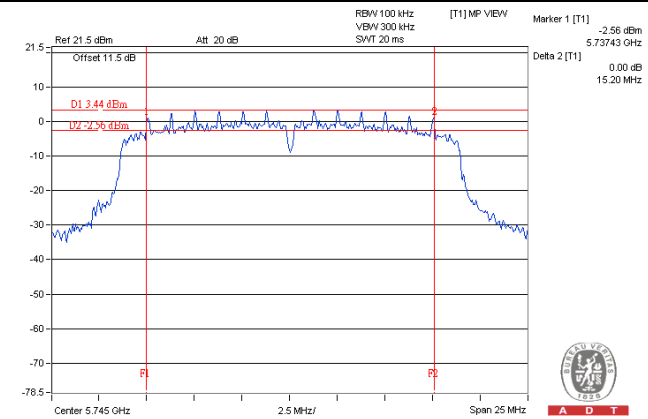
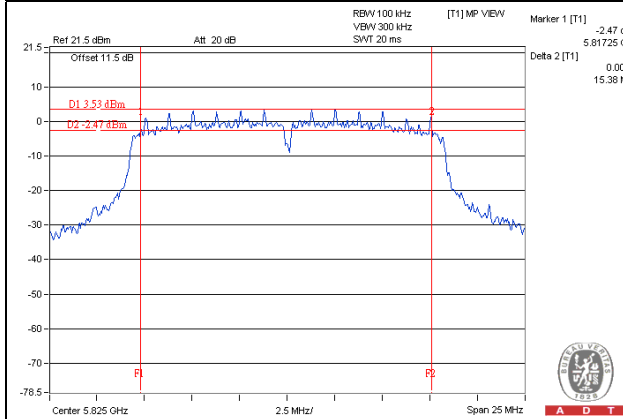
802.11ac (VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
155	5775	75.34	0.5	Pass

Spectrum Plot of Worst Value

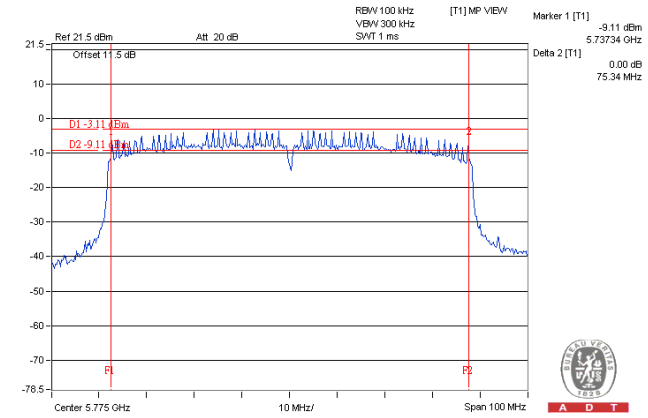
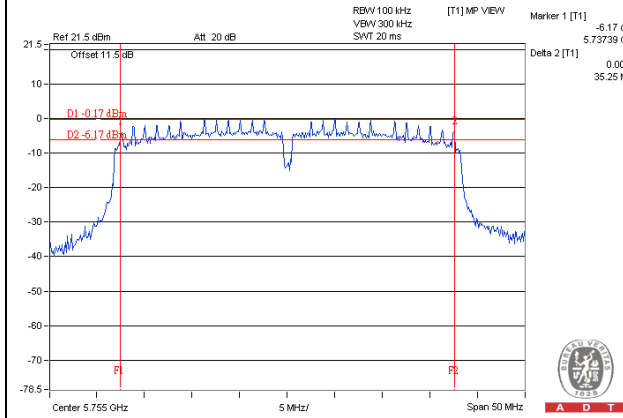
802.11a

802.11n (HT20)



802.11n (HT40)

802.11ac (VHT80)



5 Pictures of Test Arrangements

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

Appendix – Information on the Testing Laboratories

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

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

Linko EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-5935343

Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

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

--- END ---