

## FCC Test Report

**Report No.:** RF151008E04

**FCC ID:** QWO-SWA51

**Test Model:** SWA51

**Received Date:** Oct. 08, 2015

**Test Date:** Oct. 14 to 27, 2015

**Issued Date:** Dec. 21, 2015

**Applicant:** Rayson Technology Co.;Ltd.

**Address:** 1F, No.9, R&D II Road, Science-Based Industrial Park, Hsin-Chu,Taiwan  
300

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

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### Release Control Record

Issue No.	Description	Date Issued
RF151008E04	Original release.	Dec. 21, 2015



# 1 Certificate of Conformity

**Product:** SWA51 5GHz Wireless Module  
**Brand:** Avnera  
**Test Model:** SWA51  
**Sample Status:** ENGINEERING SAMPLE  
**Applicant:** Rayson Technology Co.,Ltd.  
**Test Date:** Oct. 14 to 27, 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 :**  , **Date:** Dec. 21, 2015  
Lori Chung / Specialist

**Approved by :**  , **Date:** Dec. 21, 2015  
May Chen / Manager

## 2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (SECTION 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -3.68dB at 12.28906MHz.
15.407(b) (1/2/3/4/6)	Radiated Emissions & Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -1.3dB at 110.59MHz & 135.17MHz.
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	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.86 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1000MHz	5.43 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.72 dB
	6GHz ~ 18GHz	4.00 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	SWA51 5GHz Wireless Module
Brand	Avnera
Test Model	SWA51
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	3.3Vdc from host equipment
Modulation Type	$\pi/4$ -DQPSK
Modulation Technology	Digital Modulation
Transfer Rate	up to 3Mbps
Operating Frequency Band	5.15 ~ 5.25GHz, 5.725 ~ 5.850GHz
Number of Channel	For 5.15 ~ 5.25GHz: 40
	For 5.725 ~ 5.850GHz: 40
Output Power	For 5.15 ~ 5.25GHz: 2.831mW
	For 5.725 ~ 5.850GHz: 3.516mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Data Cable Supplied	NA

Note:

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

Antenna No.	Antenna Gain (dBi)	Frequency range (GHz to GHz)	Antenna Type	Connector Type
Ant. 0	4.97	5.15~5.85	PCB	NA
Ant. 1	5.08	5.15~5.85		

Note: From the above antennas, Ant. 1 was selected as representative antenna for test

2. 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 5150 ~ 5250MHz

40 channels are provided:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	5161.35	10	5181.35	20	5201.35	30	5221.35
1	5163.35	11	5183.35	21	5203.35	31	5223.35
2	5165.35	12	5185.35	22	5205.35	32	5225.35
3	5167.35	13	5187.35	23	5207.35	33	5227.35
4	5169.35	14	5189.35	24	5209.35	34	5229.35
5	5171.35	15	5191.35	25	5211.35	35	5231.35
6	5173.35	16	5193.35	26	5213.35	36	5233.35
7	5175.35	17	5195.35	27	5215.35	37	5235.35
8	5177.35	18	5197.35	28	5217.35	38	5237.35
9	5179.35	19	5199.35	29	5219.35	39	5239.35

#### FOR 5725 ~ 5850MHz

40 channels are provided:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	5736.35	10	5756.35	20	5776.35	30	5796.35
1	5738.35	11	5758.35	21	5778.35	31	5798.35
2	5740.35	12	5760.35	22	5780.35	32	5800.35
3	5742.35	13	5762.35	23	5782.35	33	5802.35
4	5744.35	14	5764.35	24	5784.35	34	5804.35
5	5746.35	15	5766.35	25	5786.35	35	5806.35
6	5748.35	16	5768.35	26	5788.35	36	5808.35
7	5750.35	17	5770.35	27	5790.35	37	5810.35
8	5752.35	18	5772.35	28	5792.35	38	5812.35
9	5754.35	19	5774.35	29	5794.35	39	5814.35



### 3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE $\geq$ 1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where **RE $\geq$ 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.

**NOTE 2**: 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.

FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
5150-5250	0 to 39	0, 20, 39	Digital Modulation
5725-5850	0 to 39	0, 20, 39	Digital Modulation

#### **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.

FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
5725-5850	0 to 39	20	Digital Modulation

#### **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.

FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
5725-5850	0 to 39	20	Digital Modulation

**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.

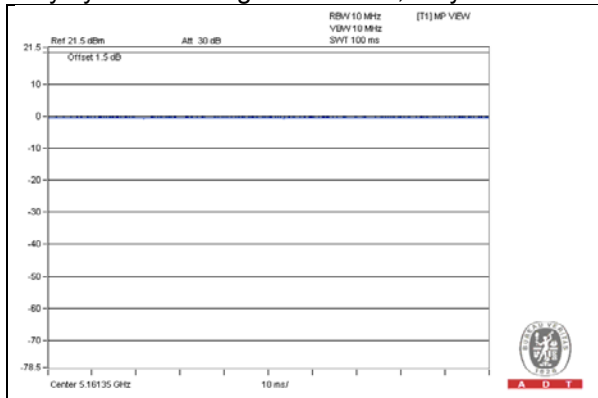
FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
5150-5250	0 to 39	0, 20, 39	Digital Modulation
5725-5850	0 to 39	0, 20, 39	Digital Modulation

**Test Condition:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (System)	TESTED BY
RE $\geq$ 1G	22deg. C, 67%RH	120Vac, 60Hz	Robert Cheng
RE $<$ 1G	23deg. C, 66%RH	120Vac, 60Hz	Robert Cheng
PLC	25deg. C, 65%RH	120Vac, 60Hz	Timmy Hu
APCM	25deg. C, 60%RH	120Vac, 60Hz	Gary Cheng

**3.3 Duty Cycle of Test Signal**

Duty cycle of test signal is 100 %, duty factor is not required.



### 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.	Test Tool	NA	NA	NA	NA	Supplied by Client
B.	DC power supply	Topward	6603D	795558	NA	Provided by Lab

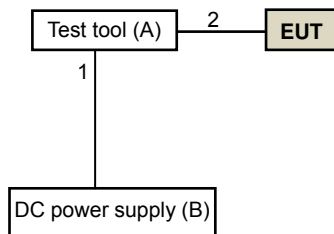
Note:

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

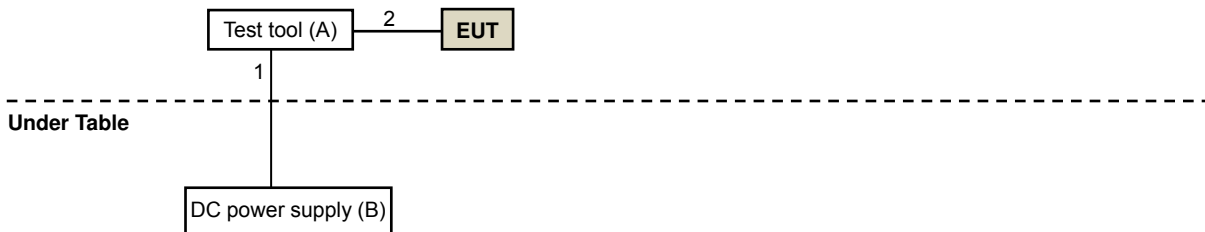
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC	1	1.8	No	0	Provided by Lab
2.	Data	1	0.1	No	0	Supplied by Client

#### 3.4.1 Configuration of System under Test

##### For Conducted emission test



##### For Other test items



### 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)**  
**KDB789033 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.

## 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) <sup>*1</sup> PK:-17 (dBm/MHz) <sup>*2</sup>	PK: 68.2(dBuV/m) <sup>*1</sup> PK:78.2 (dBuV/m) <sup>*2</sup>

**NOTE:** <sup>\*1</sup> beyond 10MHz of the band edge <sup>\*2</sup> 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**

<b>DESCRIPTION &amp; MANUFACTURER</b>	<b>MODEL NO.</b>	<b>SERIAL NO.</b>	<b>CALIBRATED DATE</b>	<b>CALIBRATED UNTIL</b>
Test Receiver Agilent	N9038A	MY51210202	Dec. 12, 2014	Dec. 11, 2015
Pre-Amplifier(*) EMCI	EMC001340	980142	Jan. 13, 2014	Jan. 12, 2016
Loop Antenna(*) Electro-Metrics	EM-6879	264	Dec. 16, 2014	Dec. 15, 2016
RF Cable	NA	LOOPCAB-001 LOOPCAB-002	Jan. 18, 2015	Jan. 17, 2016
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-04	Nov. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Feb. 09, 2015	Feb. 08, 2016
RF Cable	8D-FB	CHHCAB-001-1 CHHCAB-001-2	Oct. 04, 2015	Oct. 03, 2016
	RF-141	CHHCAB-004	Oct. 04, 2015	Oct. 03, 2016
Horn_Antenna AISI	AIH.8018	0000220091110	Feb. 06, 2015	Feb. 05, 2016
Pre-Amplifier Agilent	8449B	3008A01923	Oct. 29, 2014	Oct. 28, 2015
RF Cable	NA	131206 131213 131215 SNMY23685/4	Jan. 16, 2015	Jan. 15, 2016
Spectrum Analyzer R&S	FSV40	100964	Jun. 26, 2015	Jun 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
Power Meter Anritsu	ML2495A	1014008	Apr. 28, 2015	Apr. 27, 2016
Power Sensor Anritsu	MA2411B	0917122	Apr. 28, 2015	Apr. 27, 2016
Spectrum Analyzer R&S	FSP40	100060	May 08, 2015	May 07, 2016
Temperature & Humidity Chamber GIANTFORCE	GTH-150-40-S P-AR	MAA0812-008	Jan. 12, 2015	Jan. 11, 2016

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. \*The calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. Loop antenna was used for all emissions below 30 MHz.
4. The test was performed in 966 Chamber No. H.
5. The FCC Site Registration No. is 797305.
- 6 The CANADA Site Registration No. is IC 7450H-3.
- 7 Tested Date: Oct. 14 to 27, 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.

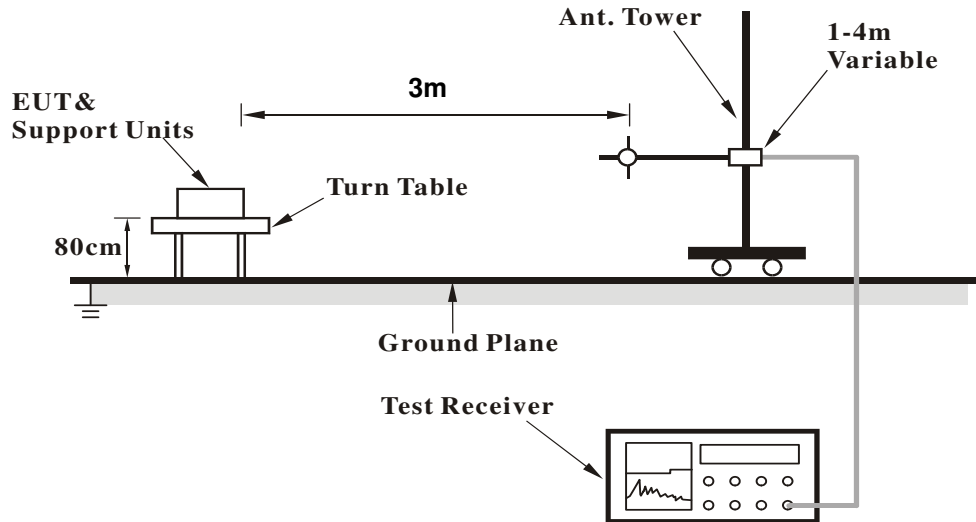
#### 4.1.4 Deviation from Test Standard

No deviation.

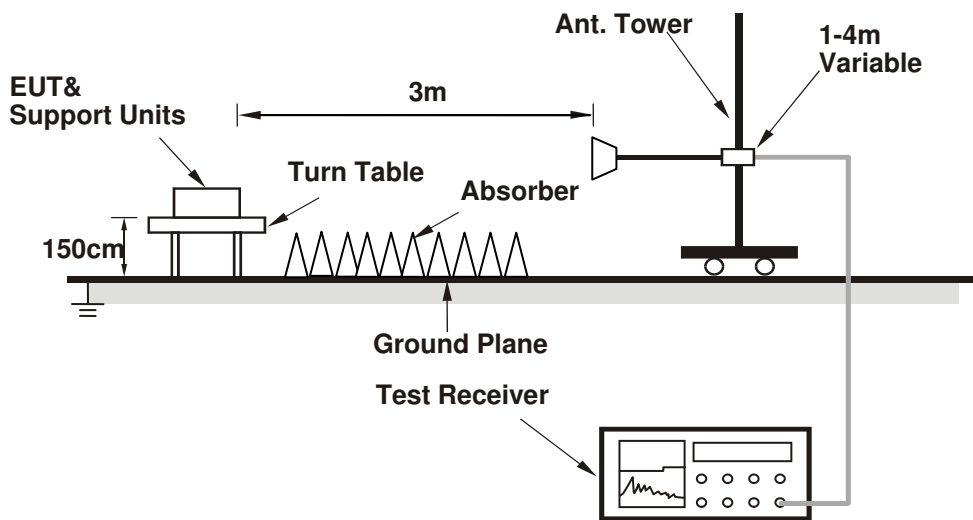


#### 4.1.5 Test Setup

##### <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. Controlling software (vmxui\_2.1\_VMX.exe) has been activated to set the EUT on specific status.

#### 4.1.7 Test Results

##### Above 1GHz Data:

<b>CHANNEL</b>	TX Channel 0	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	51.2 PK	74.0	-22.8	1.14 H	120	44.73	6.47
2	5150.00	40.5 AV	54.0	-13.5	1.14 H	120	34.03	6.47
3	*5161.35	103.4 PK			1.14 H	120	96.86	6.54
4	*5161.35	98.0 AV			1.14 H	120	91.46	6.54
5	#10322.70	55.1 PK	74.0	-18.9	1.08 H	51	40.91	14.19
6	#10322.70	45.8 AV	54.0	-8.2	1.08 H	51	31.61	14.19
7	15484.05	60.5 PK	74.0	-13.5	1.24 H	100	41.57	18.93
8	15484.05	48.5 AV	54.0	-5.5	1.24 H	100	29.57	18.93

##### ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	50.9 PK	74.0	-23.1	1.00 V	91	44.43	6.47
2	5150.00	40.1 AV	54.0	-13.9	1.00 V	91	33.63	6.47
3	*5161.35	98.1 PK			1.00 V	91	91.56	6.54
4	*5161.35	91.7 AV			1.00 V	91	85.16	6.54
5	#10322.70	53.7 PK	74.0	-20.3	1.24 V	100	39.51	14.19
6	#10322.70	43.2 AV	54.0	-10.8	1.24 V	100	29.01	14.19
7	15484.05	60.2 PK	74.0	-13.8	1.20 V	100	41.27	18.93
8	15484.05	49.0 AV	54.0	-5.0	1.20 V	100	30.07	18.93

##### REMARKS:

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

<b>CHANNEL</b>	TX Channel 20	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	*5201.35	103.2 PK			1.23 H	124	96.43	6.77
2	*5201.35	97.8 AV			1.23 H	124	91.03	6.77
3	#10402.70	54.3 PK	74.0	-19.7	1.05 H	45	40.09	14.21
4	#10402.70	45.4 AV	54.0	-8.6	1.05 H	45	31.19	14.21
5	15604.05	60.3 PK	74.0	-13.7	1.30 H	93	41.95	18.35
6	15604.05	48.4 AV	54.0	-5.6	1.30 H	93	30.05	18.35

**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	*5201.35	97.8 PK			1.00 V	84	91.03	6.77
2	*5201.35	91.6 AV			1.00 V	84	84.83	6.77
3	#10402.70	53.6 PK	74.0	-20.4	1.23 V	92	39.39	14.21
4	#10402.70	43.0 AV	54.0	-11.0	1.23 V	92	28.79	14.21
5	15604.05	60.2 PK	74.0	-13.8	1.22 V	105	41.85	18.35
6	15604.05	48.8 AV	54.0	-5.2	1.22 V	105	30.45	18.35

**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.

<b>CHANNEL</b>	TX Channel 39	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	*5239.35	103.6 PK			1.28 H	121	96.78	6.82
2	*5239.35	98.0 AV			1.28 H	121	91.18	6.82
3	5350.00	51.5 PK	74.0	-22.5	1.28 H	121	44.46	7.04
4	5350.00	40.9 AV	54.0	-13.1	1.28 H	121	33.86	7.04
5	#10478.70	55.5 PK	74.0	-18.5	1.05 H	20	41.52	13.98
6	#10478.70	46.2 AV	54.0	-7.8	1.05 H	20	32.22	13.98
7	15718.05	60.2 PK	74.0	-13.8	1.28 H	96	41.18	19.02
8	15718.05	48.8 AV	54.0	-5.2	1.28 H	96	29.78	19.02

**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	*5239.35	98.8 PK			1.00 V	78	91.98	6.82
2	*5239.35	92.2 AV			1.00 V	78	85.38	6.82
3	5350.00	51.3 PK	74.0	-22.7	1.00 V	78	44.26	7.04
4	5350.00	40.7 AV	54.0	-13.3	1.00 V	78	33.66	7.04
5	#10478.70	53.2 PK	74.0	-20.8	1.23 V	76	39.22	13.98
6	#10478.70	43.4 AV	54.0	-10.6	1.23 V	76	29.42	13.98
7	15718.05	60.3 PK	74.0	-13.7	1.23 V	101	41.28	19.02
8	15718.05	49.3 AV	54.0	-4.7	1.23 V	101	30.28	19.02

**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.

<b>CHANNEL</b>	TX Channel 0	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	50.6 PK	74.0	-23.4	1.22 H	116	43.22	7.38
2	#5715.00	39.2 AV	54.0	-14.8	1.22 H	116	31.82	7.38
3	#5725.00	51.3 PK	78.2	-26.9	1.22 H	116	43.92	7.38
4	*5736.35	100.3 PK			1.22 H	116	92.92	7.38
5	*5736.35	94.7 AV			1.22 H	116	87.32	7.38
6	11472.70	55.3 PK	74.0	-18.7	1.07 H	33	40.70	14.60
7	11472.70	46.3 AV	54.0	-7.7	1.07 H	33	31.70	14.60
8	#17209.05	60.1 PK	74.0	-13.9	1.21 H	102	36.13	23.97
9	#17209.05	48.8 AV	54.0	-5.2	1.21 H	102	24.83	23.97

**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	50.7 PK	74.0	-23.3	1.01 V	79	43.32	7.38
2	#5715.00	39.2 AV	54.0	-14.8	1.01 V	79	31.82	7.38
3	#5725.00	51.6 PK	78.2	-26.6	1.01 V	79	44.22	7.38
4	*5736.35	94.5 PK			1.01 V	79	87.12	7.38
5	*5736.35	88.9 AV			1.01 V	79	81.52	7.38
6	11472.70	52.5 PK	74.0	-21.5	1.22 V	85	37.90	14.60
7	11472.70	41.9 AV	54.0	-12.1	1.22 V	85	27.30	14.60
8	#17209.05	60.2 PK	74.0	-13.8	1.19 V	111	36.23	23.97
9	#17209.05	49.4 AV	54.0	-4.6	1.19 V	111	25.43	23.97

**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.

<b>CHANNEL</b>	TX Channel 20	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	*5776.35	99.9 PK			1.18 H	119	92.52	7.38
2	*5776.35	94.3 AV			1.18 H	119	86.92	7.38
3	11552.70	55.4 PK	74.0	-18.6	1.03 H	8	40.84	14.56
4	11552.70	46.1 AV	54.0	-7.9	1.03 H	8	31.54	14.56
5	#17329.05	59.9 PK	74.0	-14.1	1.25 H	89	36.23	23.67
6	#17329.05	48.3 AV	54.0	-5.7	1.25 H	89	24.63	23.67

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5776.35	93.5 PK			1.00 V	59	86.12	7.38
2	*5776.35	88.2 AV			1.00 V	59	80.82	7.38
3	11552.70	54.3 PK	74.0	-19.7	1.16 V	109	39.74	14.56
4	11552.70	43.6 AV	54.0	-10.4	1.16 V	109	29.04	14.56
5	#17329.05	60.7 PK	74.0	-13.3	1.20 V	100	37.03	23.67
6	#17329.05	49.4 AV	54.0	-4.6	1.20 V	100	25.73	23.67

**REMARKS:**

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

<b>CHANNEL</b>	TX Channel 39	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	*5814.35	98.7 PK			1.24 H	118	91.37	7.33
2	*5814.35	93.5 AV			1.24 H	118	86.17	7.33
3	#5850.00	51.6 PK	78.2	-26.6	1.24 H	118	44.35	7.25
4	#5860.00	51.1 PK	74.0	-22.9	1.24 H	118	43.88	7.22
5	#5860.00	39.3 AV	54.0	-14.7	1.24 H	118	32.08	7.22
6	11628.70	54.9 PK	74.0	-19.1	1.07 H	8	40.25	14.65
7	11628.70	46.0 AV	54.0	-8.0	1.07 H	8	31.35	14.65
8	#17443.05	60.1 PK	74.0	-13.9	1.32 H	81	35.78	24.32
9	#17443.05	48.6 AV	54.0	-5.4	1.32 H	81	24.28	24.32

**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	*5814.35	94.6 PK			1.00 V	74	87.27	7.33
2	*5814.35	88.7 AV			1.00 V	74	81.37	7.33
3	#5850.00	51.6 PK	78.2	-26.6	1.00 V	74	44.35	7.25
4	#5860.00	50.8 PK	74.0	-23.2	1.00 V	74	43.58	7.22
5	#5860.00	39.1 AV	54.0	-14.9	1.00 V	74	31.88	7.22
6	11628.70	53.0 PK	74.0	-21.0	1.13 V	96	38.35	14.65
7	11628.70	43.0 AV	54.0	-11.0	1.13 V	96	28.35	14.65
8	#17443.05	60.0 PK	74.0	-14.0	1.16 V	93	35.68	24.32
9	#17443.05	48.9 AV	54.0	-5.1	1.16 V	93	24.58	24.32

**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:**

<b>CHANNEL</b>	TX Channel 20	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	Below 1GHz		

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M</b>								
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	135.17	37.8 QP	43.5	-5.8	1.50 H	277	46.40	-8.65
2	307.20	40.8 QP	46.0	-5.2	1.00 H	299	47.15	-6.37
3	331.79	41.7 QP	46.0	-4.3	1.00 H	39	47.19	-5.49
4	393.22	41.4 QP	46.0	-4.6	1.00 H	22	45.81	-4.39
5	614.40	42.0 QP	46.0	-4.0	1.50 H	164	40.80	1.16
6	663.56	41.6 QP	46.0	-4.4	1.50 H	360	39.86	1.72

<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M</b>								
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	110.59	42.2 QP	43.5	-1.3	1.00 V	359	53.01	-10.79
2	135.17	42.2 QP	43.5	-1.3	1.00 V	39	50.87	-8.65
3	159.74	39.8 QP	43.5	-3.7	1.00 V	252	47.57	-7.80
4	307.20	41.5 QP	46.0	-4.5	1.00 V	360	47.89	-6.37
5	479.23	41.6 QP	46.0	-4.4	2.00 V	258	43.74	-2.14
6	503.80	41.8 QP	46.0	-4.2	2.00 V	266	43.36	-1.52

**REMARKS:**

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



## 4.2 Conducted Emission Measurement

### 4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

### 4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	100375	May 06, 2015	May 05, 2016
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK-8127	8127-522	Sep. 01, 2015	Aug. 31, 2016
Line-Impedance Stabilization Network (for Peripheral ) R&S	ENV216	100072	June 11, 2015	June 10, 2016
RF Cable	5D-FB	COCCAB-001	Mar. 09, 2015	Mar. 08, 2016
50 ohms Terminator	N/A	EMC-03	Sep. 23, 2015	Sep. 22, 2016
50 ohms Terminator	N/A	EMC-02	Oct. 01, 2015	Sep. 30, 2016
Software BVADT	BVADT_Cond_ V7.3.7.3	NA	NA	NA

**Note:**

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
3. The VCCI Con C Registration No. is C-3611.
4. Tested Date: Oct. 19, 2015

#### 4.2.3 Test Procedure

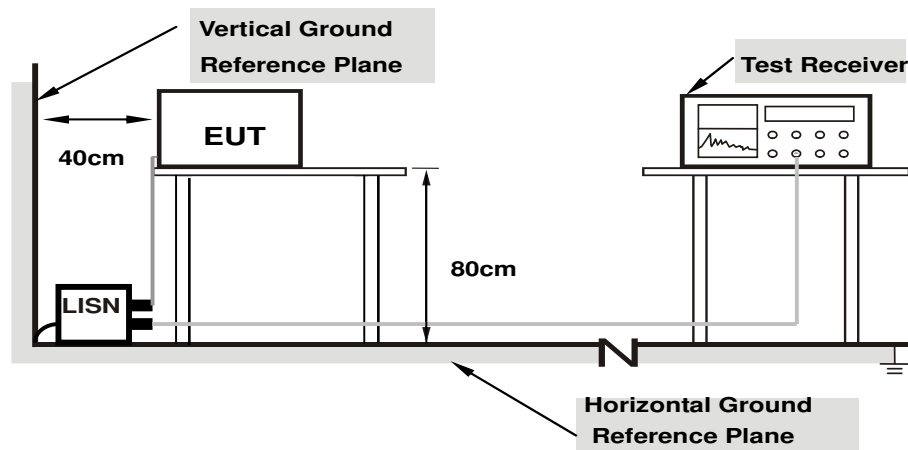
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

#### 4.2.4 Deviation from Test Standard

No deviation.

#### 4.2.5 Test Setup



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

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

#### 4.2.6 EUT Operating Condition

Same as 4.1.6.

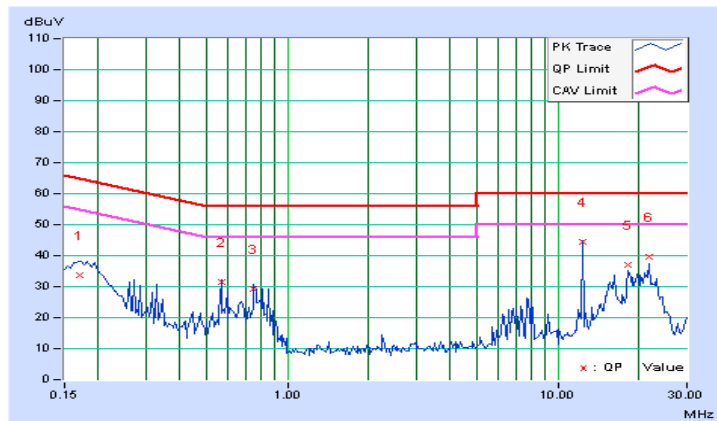
4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16953	0.11	33.58	26.83	33.69	26.94	64.98	54.98	-31.29	-28.04
2	0.56797	0.15	31.38	24.19	31.53	24.34	56.00	46.00	-24.47	-21.66
3	0.75156	0.16	28.98	20.83	29.14	20.99	56.00	46.00	-26.86	-25.01
4	12.28906	0.59	43.89	43.26	44.48	43.85	60.00	50.00	-15.52	-6.15
5	18.24219	0.77	36.34	29.58	37.11	30.35	60.00	50.00	-22.89	-19.65
6	21.66153	0.87	38.91	34.35	39.78	35.22	60.00	50.00	-20.22	-14.78

Remarks:

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

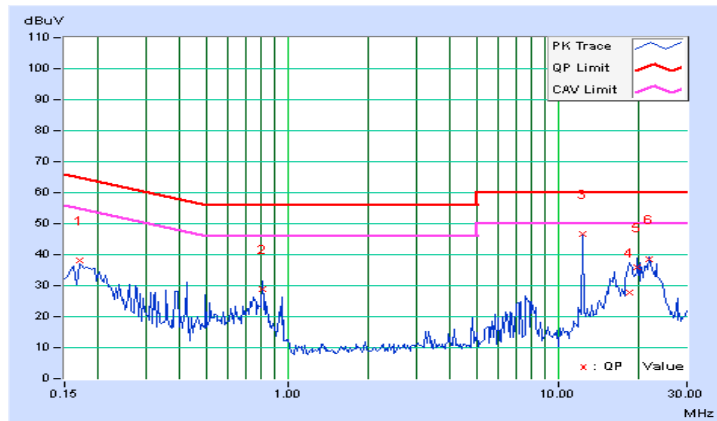


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16953	0.09	37.91	24.08	38.00	24.17	64.98	54.98	-26.98	-30.81
2	0.80625	0.15	28.86	14.46	29.01	14.61	56.00	46.00	-26.99	-31.39
<b>3</b>	<b>12.28906</b>	<b>0.60</b>	<b>46.07</b>	<b>45.72</b>	<b>46.67</b>	<b>46.32</b>	<b>60.00</b>	<b>50.00</b>	<b>-13.33</b>	<b>-3.68</b>
4	18.41406	0.80	26.96	20.07	27.76	20.87	60.00	50.00	-32.24	-29.13
5	19.70703	0.84	35.23	32.93	36.07	33.77	60.00	50.00	-23.93	-16.23
6	21.66406	0.90	37.62	35.24	38.52	36.14	60.00	50.00	-21.48	-13.86

**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

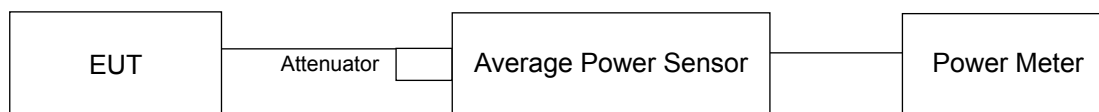
#### 4.3.1 Limits of Transmit Power Measurement

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



#### 4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

#### 4.3.4 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.

#### 4.3.5 Deviation from Test Standard

No deviation.

#### 4.3.6 EUT Operating Condition

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

## 4.3.7 Test Result

**POWER OUTPUT**

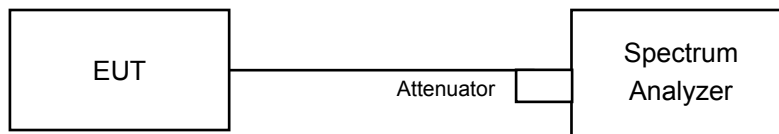
Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
0	5161.35	2.831	4.52	24	Pass
20	5201.35	2.761	4.41	24	Pass
39	5239.35	2.805	4.48	24	Pass
0	5736.35	3.499	5.44	30	Pass
20	5776.35	3.516	5.46	30	Pass
39	5814.35	3.281	5.16	30	Pass

#### 4.4 Peak Power Spectral Density Measurement

##### 4.4.1 Limits of Peak Power Spectral Density Measurement

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

##### 4.4.2 Test Setup



##### 4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

#### 4.4.4 Test Procedure

##### For U-NII-1

Using method SA-1

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

##### For U-NII-3:

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

#### 4.4.5 Deviation from Test Standard

No deviation.

#### 4.4.6 EUT Operating Condition

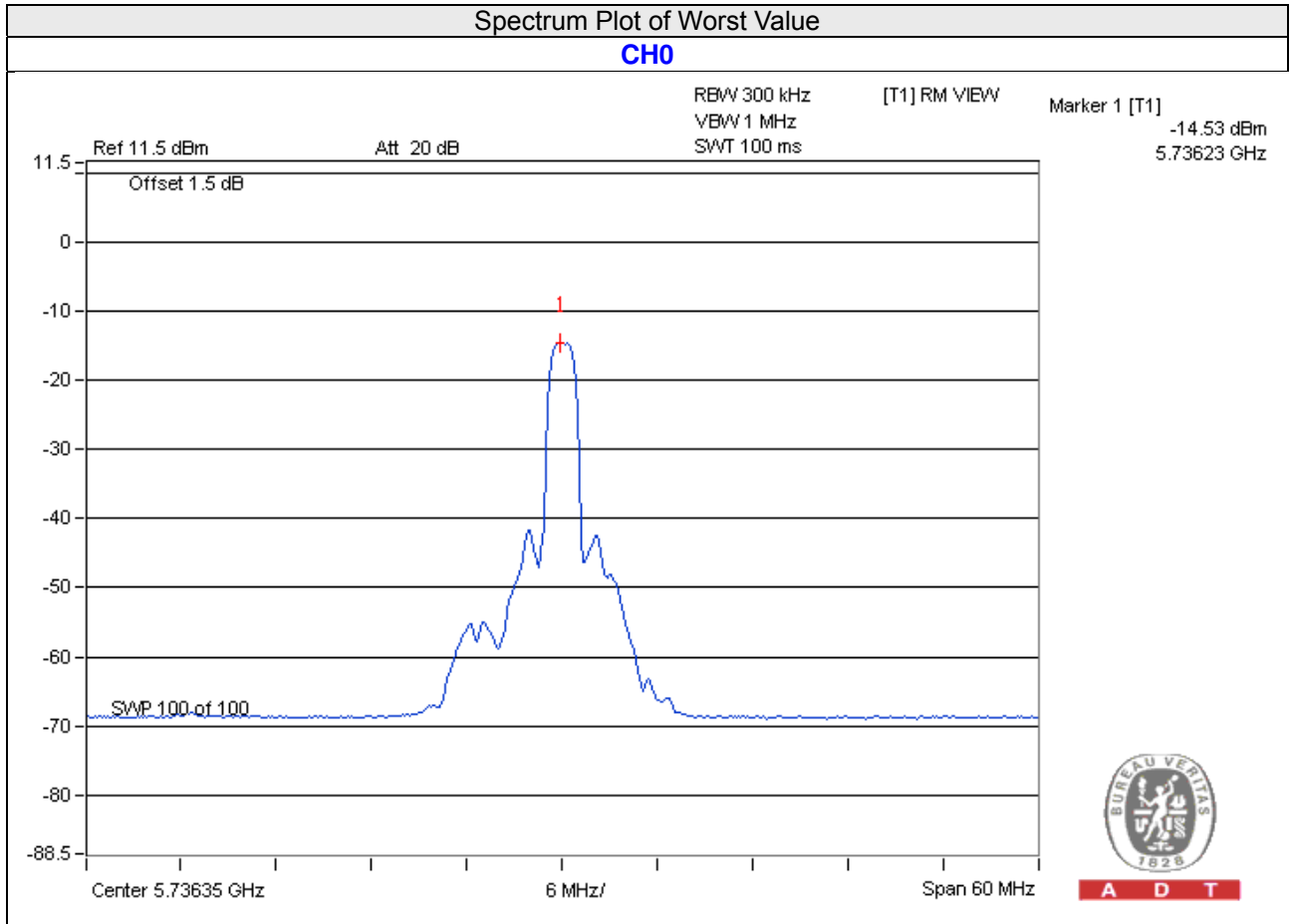
Same as Item 4.3.6.





For U-NII-3:

Chan.	Chan. Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
0	5736.35	-14.53	-12.31	30	Pass
20	5776.35	-15.26	-13.04	30	Pass
39	5814.35	-15.46	-13.24	30	Pass

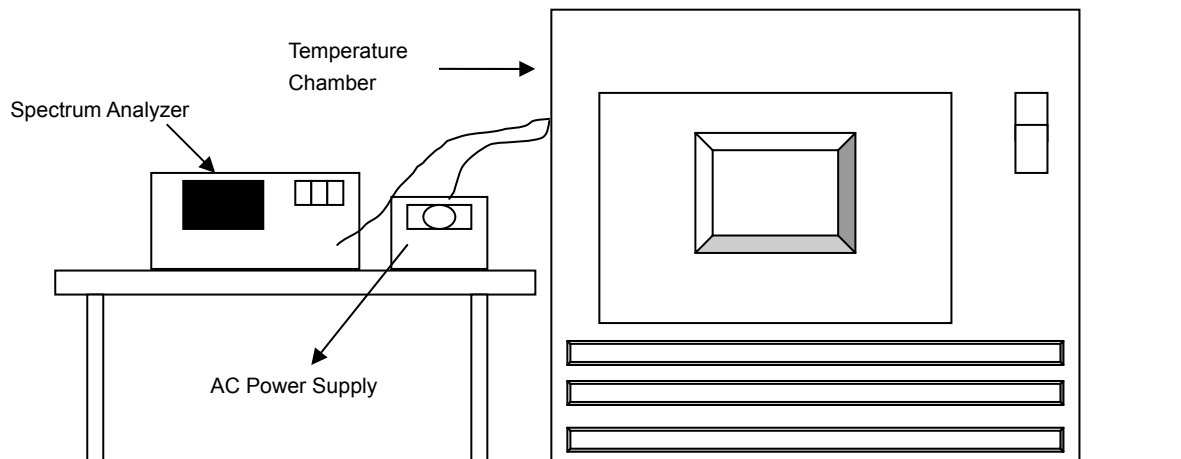


## 4.5 Frequency Stability Measurement

### 4.5.1 Limits of Frequency Stability Measurement

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

### 4.5.2 Test Setup



### 4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.5.4 Test 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**

<b>FREQUENCY STABILITY VERSUS TEMP.</b>									
<b>OPERATING FREQUENCY: 5161.35MHz</b>									
<b>TEMP. (°C)</b>	<b>POWER SUPPLY (Vac)</b>	<b>0 MINUTE</b>		<b>2 MINUTE</b>		<b>5 MINUTE</b>		<b>10 MINUTE</b>	
		<b>Measured Frequency (MHz)</b>	<b>Frequency Drift (%)</b>	<b>Measured Frequency (MHz)</b>	<b>Frequency Drift (%)</b>	<b>Measured Frequency (MHz)</b>	<b>Frequency Drift (%)</b>	<b>Measured Frequency (MHz)</b>	<b>Frequency Drift (%)</b>
50	120	5161.3457	-0.00008	5161.342	-0.00015	5161.3438	-0.00012	5161.3436	-0.00012
40	120	5161.3457	-0.00008	5161.3428	-0.00014	5161.342	-0.00015	5161.3416	-0.00016
30	120	5161.3339	-0.00031	5161.3361	-0.00027	5161.333	-0.00033	5161.3332	-0.00033
20	120	5161.3745	0.00047	5161.3722	0.00043	5161.3703	0.00039	5161.3733	0.00045
10	120	5161.333	-0.00033	5161.3298	-0.00039	5161.3331	-0.00033	5161.3303	-0.00038
0	120	5161.3562	0.00012	5161.3524	0.00005	5161.3564	0.00012	5161.3561	0.00012
-10	120	5161.3539	0.00008	5161.3556	0.00011	5161.351	0.00002	5161.3544	0.00009
-20	120	5161.3348	-0.00029	5161.3387	-0.00022	5161.3373	-0.00025	5161.3388	-0.00022
-30	120	5161.339	-0.00021	5161.3362	-0.00027	5161.338	-0.00023	5161.3349	-0.00029

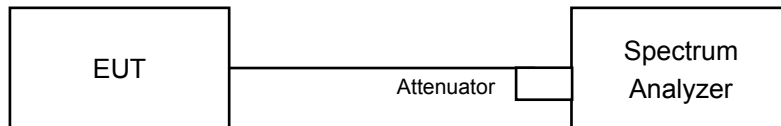
<b>FREQUENCY STABILITY VERSUS VOLTAGE</b>									
<b>OPERATING FREQUENCY: 5161.35MHz</b>									
<b>TEMP. (°C)</b>	<b>POWER SUPPLY (Vac)</b>	<b>0 MINUTE</b>		<b>2 MINUTE</b>		<b>5 MINUTE</b>		<b>10 MINUTE</b>	
		<b>Measured Frequency (MHz)</b>	<b>Frequency Drift (%)</b>	<b>Measured Frequency (MHz)</b>	<b>Frequency Drift (%)</b>	<b>Measured Frequency (MHz)</b>	<b>Frequency Drift (%)</b>	<b>Measured Frequency (MHz)</b>	<b>Frequency Drift (%)</b>
20	138	5161.3744	0.00047	5161.3714	0.00041	5161.3704	0.00040	5161.3739	0.00046
	120	5161.3745	0.00047	5161.3722	0.00043	5161.3703	0.00039	5161.3733	0.00045
	102	5161.3749	0.00048	5161.3716	0.00042	5161.3713	0.00041	5161.3732	0.00045

## 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

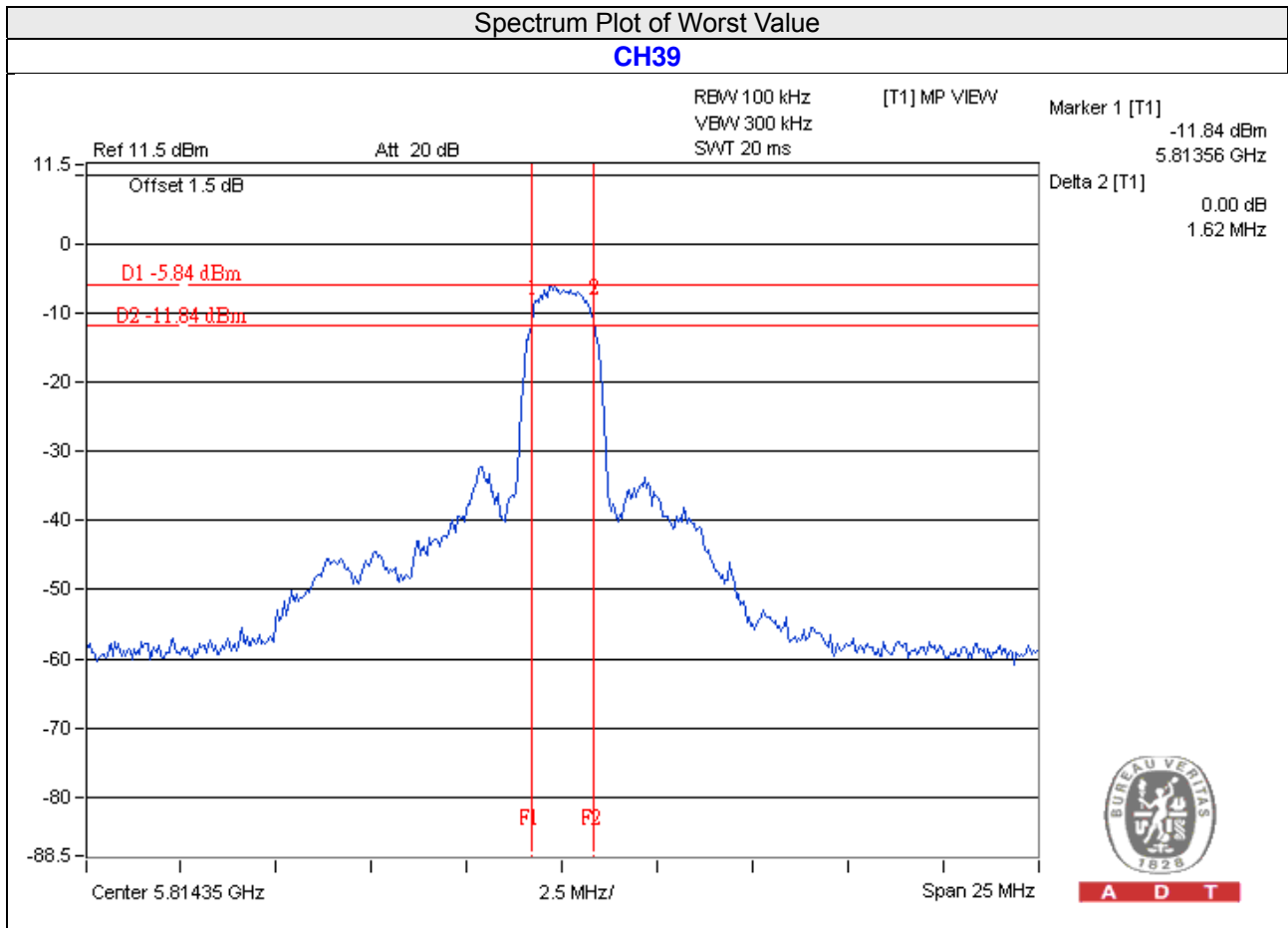
No deviation.

### 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

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
0	5736.35	1.63	0.5	Pass
20	5776.35	1.65	0.5	Pass
39	5814.35	1.62	0.5	Pass





## 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.

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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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