Supplemental “Transmit Simultaneously” Test Report

Report No.:	RF180803E05A-5
FCC ID:	YAW529027
Test Model:	PVS6
Received Date:	Oct. 04, 2018
Test Date:	Oct. 25 to Nov. 12, 2018
Issued Date:	Dec. 10, 2018
Applicant:	SunPower Corporation
Address:	1414 Harbour Way South Suite 1901, Richmond, CA 94804, USA
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
FCC Registration / Designation Number:	723255 / TW2022

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Release Control Record

Issue No.	Description	Date Issued
RF180803E05A-5	Original release.	Dec. 10, 2018

1 Certificate of Conformity

Product:	SunPower Monitoring System with PVS6
Brand:	SUNPOWER
Test Model:	PVS6
Sample Status:	ENGINEERING SAMPLE
Applicant:	SunPower Corporation
Test Date:	Oct. 25 to Nov. 12, 2018
Standards:	47 CFR FCC Part 15, Subpart C (Section 15.247) 47 CFR FCC Part 15, Subpart E (Section 15.407) FCC Part 27 Subpart H FCC Part 2 ANSI C63.10: 2013 ANSI 63.26-2015

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. 10, 2018

Claire Kuan / Specialist

Approved by : _____ , **Date:** Dec. 10, 2018

May Chen / Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C, E (SECTION 15.247, 15.407)			
FCC Clause	Test Item	Result	Remarks
15.207 15.407(b)(6)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -4.75dB at 4.42969MHz.
15.205 / 15.209 / 15.247(d) 15.407(b) (1/2/3/4(i/ii)/6)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.5dB at 247.50MHz.
2.1053 27.53(m)(4)(6)	Radiated Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -26.11dB at 5660MHz.
15.247(b)	Conducted Output Power	PASS	Meet the requirement of limit.

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	1.84 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.53 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.08 dB
	6GHz ~ 18GHz	4.98 dB
	18GHz ~ 40GHz	5.19 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	SunPower Monitoring System with PVS6
Brand	SUNPOWER
Test Model	PVS6
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	AC100-240V, 0.75A , 50/60Hz
Modulation Type	**WLAN:** CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode only **BT-EDR:** GFSK, π/4-DQPSK, 8DPSK **BT-LE:** GFSK **Zigbee:** O-QPSK
Modulation Technology	**WLAN:** DSSS, OFDM **BT-EDR:** FHSS **BT-LE:** DTS **Zigbee:** DSSS
Transfer Rate	**WLAN:** 802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 300Mbps 802.11ac: up to 866.7Mbps **BT-EDR:** Up to 3Mbps **BT-LE:** Up to 2Mbps **Zigbee:** 250kbps
Operating Frequency	**WLAN:** **2.4GHz:** 2.412 ~ 2.462GHz **5GHz:** 5.18~ 5.24GHz, 5.745 ~ 5.825GHz **BT-EDR:** 2402MHz ~ 2480MHz **BT-LE:** 2402MHz ~ 2480MHz **Zigbee:** 2.405 ~ 2.480GHz
Number of Channel	**WLAN:** **2.4GHz:** 802.11b, 802.11g, 802.11n (HT20): 11 **5GHz:** 802.11a, 802.11n (HT20), 802.11ac (VHT20): 9 802.11n (HT40), 802.11ac (VHT40): 4 802.11ac (VHT80): 2 **BT-EDR:** 79 **BT-LE:** 40 **Zigbee:** 16
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Hole Plugs x 2 Bracket
Data Cable Supplied	Ethernet cable (Unshielded, 1.5m)

Note:

1. There are WLAN, Bluetooth, Zigbee and WWAN technology used for the EUT. The EUT has four radios as following table:

Radio 1	Radio 2	Radio 3	Radio 4
WLAN (2.4GHz+5GHz)	Zigbee	BT	WWAN (LTE+GSM)

2. Simultaneously transmission condition.

Condition	Technology			
1	WLAN(2.4GHz)	BT	Zigbee	WWAN
2	WLAN(5GHz)	BT	Zigbee	WWAN
Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.				

3. The EUT needs to be supplied from an Internal power supply, the information is as below table:

Brand	Model No.	Spec.
WLAN WELL	IRM-30-12	AC Input: 100-240V, 0.75A , 50/60Hz DC Output: 12V, 2.5A

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

WLAN

Ant No.	Chain No.	Brand	Model	Antenna Net Gain (dBi)	Frequency rang (GHz)	Antenna type	Connector type
1	Chain 0 (Including BT)	airgain	65-031-212002B	2.2	2.4~2.4835	PCB	I-PEX
				3.8	5.15~5.25		
				4.2	5.725~5.85		
2	Chain 1 (WLAN use only)	airgain	65-031-212003B	4.2	2.4~2.4835	PCB	I-PEX
				4.1	5.15~5.25		
				4.8	5.725~5.85		

Zigbee

Ant No.	Brand	Model	Antenna Gain (dBi)	Frequency rang (GHz)	Antenna type	Connector type
3	airgain	65-031-212004B	4.8	2.4~2.4835	PCB	I-PEX

LTE

Ant No.	Brand	Model	Antenna Gain (dBi)	Frequency rang (MHz)	Antenna type	Connector type
4	airgain	65-031-212001B	2.7	1920~1980	PCB	I-PEX
				1850~1910		
				1710~1785		
				1710~1755		
				824 ~ 849		
				880~915		
				698~716		
				777~787		
				815 ~ 830		
				830 ~ 845		
				832 ~ 862		
				814 ~ 849		
				703 ~ 748		
				1880 ~ 1920		

5. The EUT incorporates a MIMO function.

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

6. This device can support different category application which switched by access point mode and client mode by software.
7. The EUT will install at outdoor area, for U-NII-1 the highest antenna gain is 1.49dBi from the horizon above 30 degrees, for more detail information please refer to antenna specification and user manual.
8. 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.

3.1.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO					DESCRIPTION
	RE≥1G	RE<1G	PLC	COP	OB	
1	√	√	√	√	√	As below
2	√	√	√	√	√	As below

Where **RE≥1G:** Radiated Emission above 1GHz **RE<1G:** Radiated Emission below 1GHz
PLC: Power Line Conducted Emission **COP:** Conducted Output Power Simultaneously in same band
OB: Conducted Out-Band Emission Measurement

Radiated Emission Test (Above 1GHz):

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
1	802.11g + BT-LE + Zigbee + LTE	1 to 11	6	OFDM	BPSK
		0 to 39	19	DTS	GFSK
		11 to 26	11	DSSS	O-QPSK
		23017 to 23173	23095	QPSK	-
2	802.11ac (VHT20) + BT-LE + Zigbee + LTE	36 to 48 149 to 165	149	OFDM	BPSK
		0 to 39	19	DTS	GFSK
		11 to 26	11	DSSS	O-QPSK
		23017 to 23173	23095	QPSK	-

Radiated Emission Test (Below 1GHz):

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
1	802.11g + BT-LE + Zigbee + LTE	1 to 11	6	OFDM	BPSK
		0 to 39	19	DTS	GFSK
		11 to 26	11	DSSS	O-QPSK
		23017 to 23173	23095	QPSK	-
2	802.11ac (VHT20) + BT-LE + Zigbee + LTE	36 to 48 149 to 165	149	OFDM	BPSK
		0 to 39	19	DTS	GFSK
		11 to 26	11	DSSS	O-QPSK
		23017 to 23173	23095	QPSK	-

Power Line Conducted Emission Test:

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
1	802.11g + BT-LE + Zigbee + LTE	1 to 11	6	OFDM	BPSK
		0 to 39	19	DTS	GFSK
		11 to 26	11	DSSS	O-QPSK
		23017 to 23173	23095	QPSK	-
2	802.11ac (VHT20) + BT-LE + Zigbee + LTE	36 to 48 149 to 165	149	OFDM	BPSK
		0 to 39	19	DTS	GFSK
		11 to 26	11	DSSS	O-QPSK
		23017 to 23173	23095	QPSK	-

Conducted Output Power Simultaneously in same band

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
1	802.11g + BT-LE + Zigbee	1 to 11	6	OFDM	BPSK
		0 to 39	19	DTS	GFSK
		11 to 26	11	DSSS	O-QPSK

Conducted Out-Band Emission Measurement:

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
1	802.11g + BT-LE	1 to 11	6	OFDM	BPSK
		0 to 39	19	DTS	GFSK
2	802.11ac (VHT20) + BT-LE	36 to 48 149 to 165	149	OFDM	BPSK
		0 to 39	19	DTS	GFSK

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	22deg. C, 66%RH	120Vac, 60Hz	Frank Chuang
RE<1G	23deg. C, 67%RH	120Vac, 60Hz	Frank Chuang
PLC	25deg. C, 75%RH	120Vac, 60Hz	Andy Ho
COP	25deg. C, 60%RH	120Vac, 60Hz	Jyunchun Lin
OB	25deg. C, 60%RH	120Vac, 60Hz	Jyunchun Lin

3.2 Description of Support Units

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

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	iPod	Apple	MC749TA/A	CC4DMFJUDFDM	NA	Provided by Lab
B.	Laptop	Lenovo	81A4	YD02YN22	NA	Provided by Lab
C.	Simulator	Keysight	E7515A	MY56030229	NA	Provided by Lab

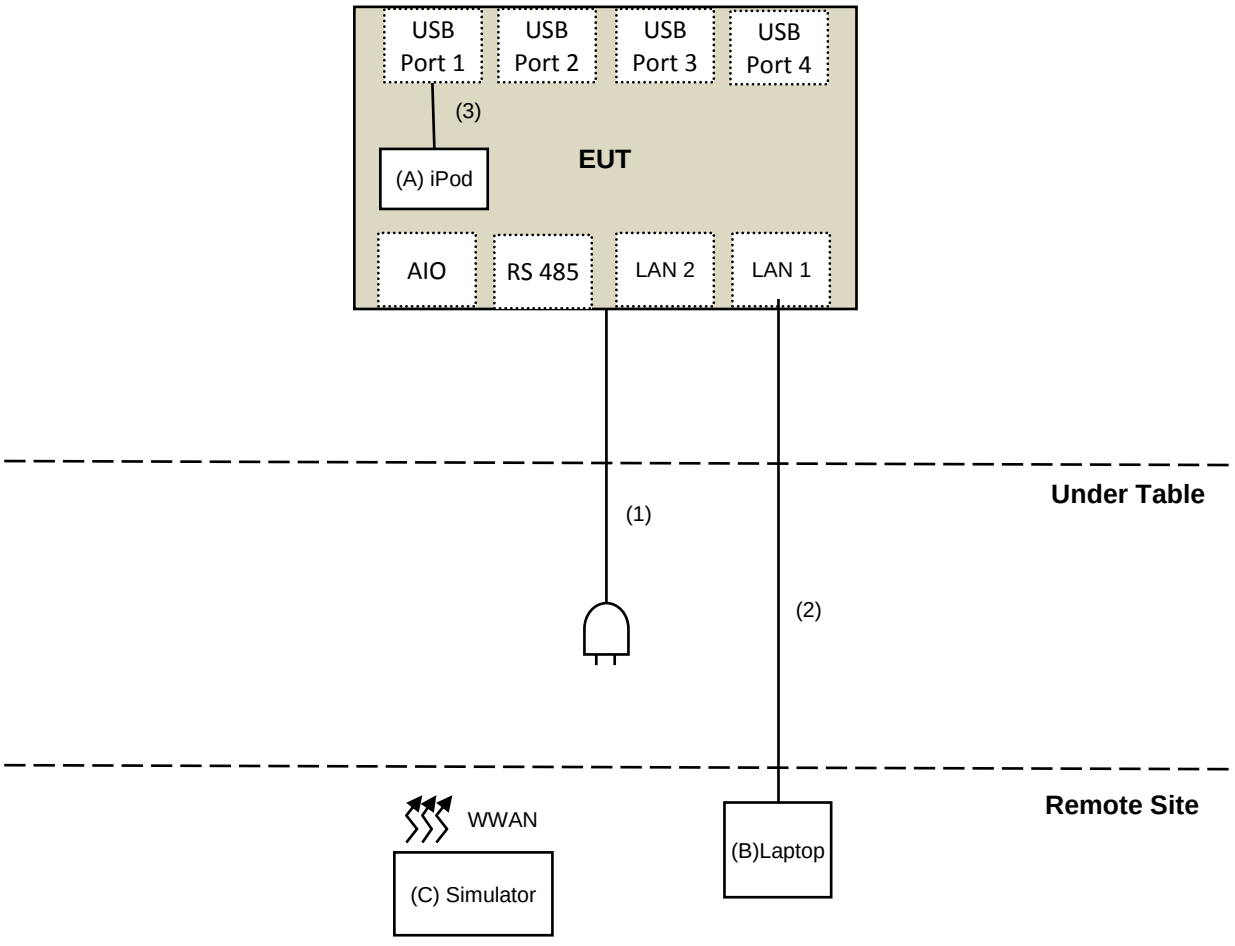
Note:

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.	AC Cable	1	1.8	No	0	Supplied by client
2.	RJ-45 Cable	1	10	No	0	Provided by Lab
3.	USB Cable	1	0.1	Yes	0	Provided by Lab

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

3.2.1 Configuration of System under Test



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

<table>
<tr><td colspan="3">Applicable To</td><td colspan="2">Limit</td></tr>
<tr><td colspan="3" rowspan="2">789033 D02 General UNII Test Procedure New Rules v02r01</td><td colspan="2">Field Strength at 3m</td></tr>
<tr><td>PK:74 (dBµV/m)</td><td>AV:54 (dBµV/m)</td></tr>
<tr><td>Frequency Band</td><td colspan="2">Applicable To</td><td>EIRP Limit</td><td>Equivalent Field Strength at 3m</td></tr>
<tr><td>5150~5250 MHz</td><td colspan="2">15.407(b)(1)</td><td rowspan="3">PK:-27 (dBm/MHz)</td><td rowspan="3">PK:68.2(dBµV/m)</td></tr>
<tr><td>5250~5350 MHz</td><td colspan="2">15.407(b)(2)</td></tr>
<tr><td>5470~5725 MHz</td><td colspan="2">15.407(b)(3)</td></tr>
<tr><td rowspan="2">5725~5850 MHz</td><td>☒</td><td>15.407(b)(4)(i)</td><td>PK:-27 (dBm/MHz) *1
PK:10 (dBm/MHz) *2
PK:15.6 (dBm/MHz) *3
PK:27 (dBm/MHz) *4</td><td>PK: 68.2(dBµV/m) *1
PK:105.2 (dBµV/m) *2
PK: 110.8(dBµV/m) *3
PK:122.2 (dBµV/m) *4</td></tr>
<tr><td>☐</td><td>15.407(b)(4)(ii)</td><td colspan="2">Emission limits in section 15.247(d)</td></tr>
<tr><td colspan="5">*1 beyond 75 MHz or more above of the band edge.
*2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.
*3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.
*4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.</td></tr>
</table>

Note:

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

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

FCC Part 27:
The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB.

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY50010156	July 12, 2018	July 11, 2019
Pre-Amplifier EMCI	EMC001340	980142	Feb. 09, 2018	Feb. 08, 2019
Loop Antenna(*) Electro-Metrics	EM-6879	264	Dec. 16, 2016	Dec. 15, 2018
RF Cable	NA	LOOPCAB-001	Jan. 15, 2018	Jan. 14, 2019
RF Cable	NA	LOOPCAB-002	Jan. 15, 2018	Jan. 14, 2019
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-05	May 05, 2018	May 04, 2019
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Nov. 29, 2017	Nov. 28, 2018
RF Cable	8D	966-3-1	Mar. 20, 2018	Mar. 19, 2019
RF Cable	8D	966-3-2	Mar. 20, 2018	Mar. 19, 2019
RF Cable	8D	966-3-3	Mar. 20, 2018	Mar. 19, 2019
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Sep. 27, 2018	Sep. 26, 2019
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Dec. 12, 2017	Dec. 11, 2018
Pre-Amplifier EMCI	EMC12630SE	980384	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-1200	160922	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-2000	150317	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-5000	150322	Jan. 29, 2018	Jan. 28, 2019
Spectrum Analyzer Keysight	N9030A	MY54490679	July 23, 2018	July 22, 2019
Pre-Amplifier EMCI	EMC184045SE	980386	Jan. 29, 2018	Jan. 28, 2019
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Dec. 14, 2017	Dec. 13, 2018
RF Cable	EMC102-KM-KM-1200	160924	Jan. 29, 2018	Jan. 28, 2019
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Spectrum Analyzer R&S	FSV40	100964	June 20, 2018	June 19, 2019
Power meter Anritsu	ML2495A	1014008	May 09, 2018	May 08, 2019
Power sensor Anritsu	MA2411B	0917122	May 09, 2018	May 08, 2019

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. The test was performed in 966 Chamber No. 3.
4. The CANADA Site Registration No. is 20331-1
5. Loop antenna was used for all emissions below 30 MHz.
6. Tested Date: Oct. 25 to Nov. 12, 2018

4.1.3 Test Procedures

For Radiated emission below 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. 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. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case 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.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 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:

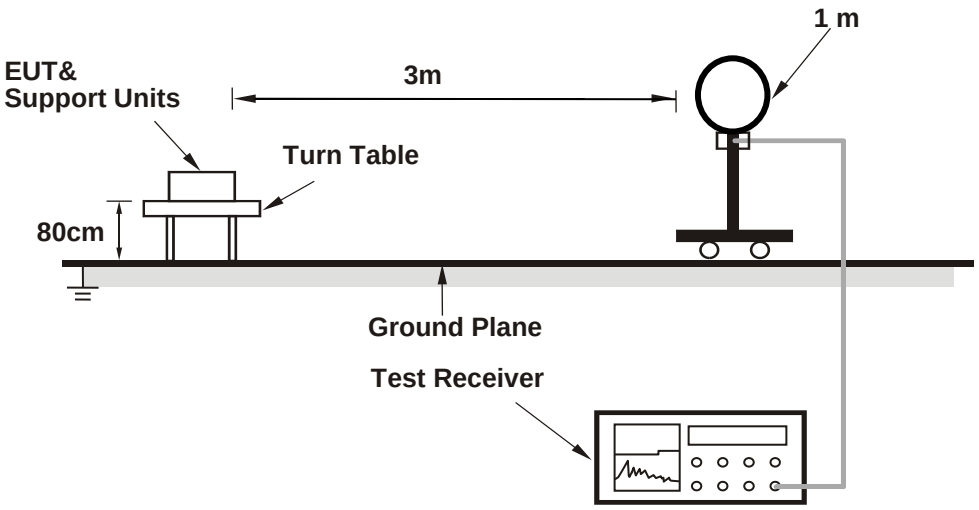
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98%) or 10Hz (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

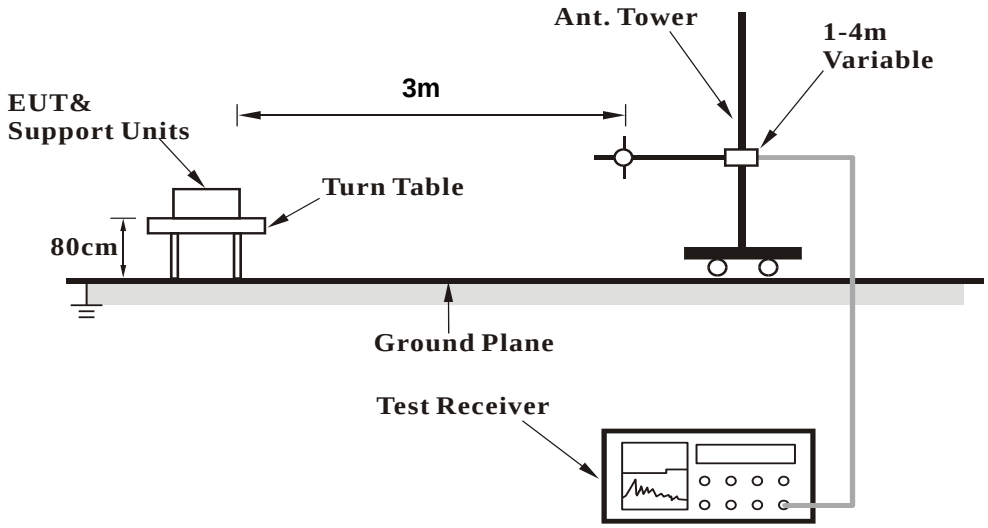
No deviation.

4.1.5 Test Setup

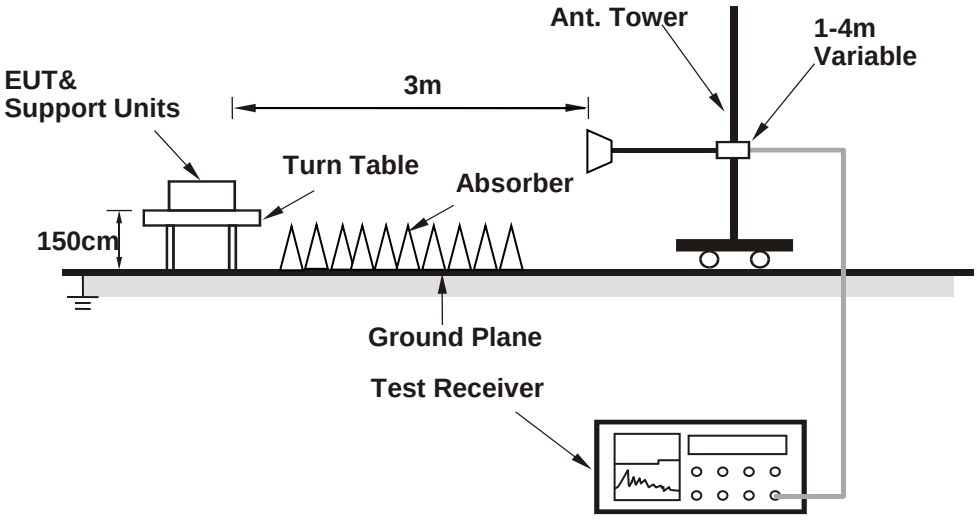
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

a. Placed the EUT on the testing table.
b. Controlling software (SSH paste PVS6_WiFi+Zigbee+BT+BLE+RB SOP.docx Command) has been activated to set the EUT on specific status.

4.1.7 Test Results (Mode 1)

Above 1GHz Data

FREQUENCY RANGE	1GHz ~ 40GHz	DETECTOR FUNCTION	Peak (PK) 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	4810.00	55.0 PK	74.0	-19.0	3.16 H	314	53.4	1.6
2	4810.00	44.4 AV	54.0	-9.6	3.16 H	314	42.8	1.6
3	4834.00	40.3 PK	74.0	-33.7	1.49 H	263	38.7	1.6
4	4834.00	35.8 AV	54.0	-18.2	1.49 H	263	34.2	1.6
5	4880.00	42.4 PK	74.0	-31.6	1.49 H	232	40.7	1.7
6	4880.00	30.6 AV	54.0	-23.4	1.49 H	232	28.9	1.7
7	7251.00	49.8 PK	74.0	-24.2	2.39 H	251	42.0	7.8
8	7251.00	46.6 AV	54.0	-7.4	2.39 H	251	38.8	7.8
9	7320.00	48.6 PK	74.0	-25.4	2.03 H	88	40.8	7.8
10	7320.00	36.4 AV	54.0	-17.6	2.03 H	88	28.6	7.8
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	4810.00	56.6 PK	74.0	-17.4	1.38 V	319	55.0	1.6
2	4810.00	47.6 AV	54.0	-6.4	1.38 V	319	46.0	1.6
3	4834.00	37.5 PK	74.0	-36.5	2.33 V	166	35.9	1.6
4	4834.00	30.7 AV	54.0	-23.3	2.33 V	166	29.1	1.6
5	4880.00	43.5 PK	74.0	-30.5	3.17 V	265	41.8	1.7
6	4880.00	32.0 AV	54.0	-22.0	3.17 V	265	30.3	1.7
7	7251.00	47.9 PK	74.0	-26.1	1.16 V	201	40.1	7.8
8	7251.00	45.6 AV	54.0	-8.4	1.16 V	201	37.8	7.8
9	7320.00	50.0 PK	74.0	-24.0	1.38 V	85	42.2	7.8
10	7320.00	37.5 AV	54.0	-16.5	1.38 V	85	29.7	7.8

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

Mode	TX channel 23095	Frequency Range	Above 1000MHz

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	1415	37.76	-66.23	5.81	-60.42	-13	-47.42
2	2122.5	48.69	-51.80	6.85	-44.95	-13	-31.95
3	2830	50.11	-50.81	6.94	-43.87	-13	-30.87
4	3537.5	52.64	-50.55	7.85	-42.71	-13	-29.71
5	4245	57.40	-47.43	7.44	-39.99	-13	-26.99
6	4952.5	46.72	-57.36	6.99	-50.37	-13	-37.37
7	5660	57.87	-46.95	7.05	-39.89	-13	-26.89
8	6367.5	48.55	-55.59	6.27	-49.32	-13	-36.32
9	7075	42.89	-59.13	4.97	-54.15	-13	-41.15
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	1415	42.31	-61.68	5.81	-55.87	-13	-42.87
2	2122.5	46.75	-53.74	6.85	-46.89	-13	-33.89
3	2830	46.29	-54.63	6.94	-47.69	-13	-34.69
4	3537.5	49.25	-53.94	7.85	-46.10	-13	-33.10
5	4245	55.02	-49.81	7.44	-42.37	-13	-29.37
6	4952.5	50.16	-53.92	6.99	-46.93	-13	-33.93
7	5660	58.63	-46.19	7.05	-39.13	-13	-26.13
8	6367.5	52.07	-52.07	6.27	-45.80	-13	-32.80
9	7075	52.11	-49.91	4.97	-44.93	-13	-31.93

Remarks:
1. Emission Value (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

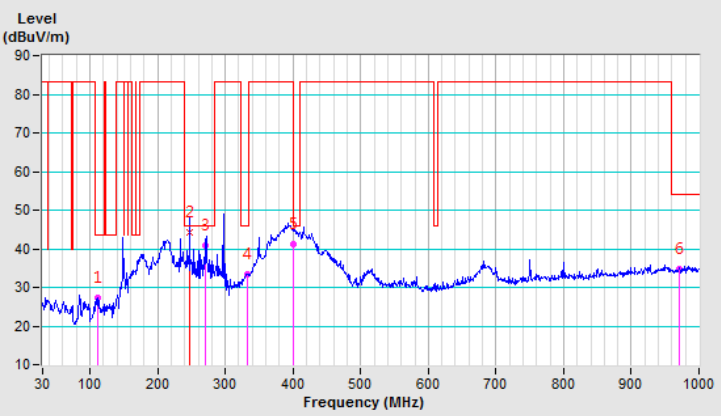
Below 1GHz Data:

FREQUENCY RANGE	9kHz ~ 1GHz	DETECTOR FUNCTION	Quasi-Peak (QP)

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	111.58	27.3 QP	43.5	-16.2	1.00 H	244	37.7	-10.4
2	247.52	44.4 QP	46.0	-1.6	1.50 H	133	53.5	-9.1
3	270.63	40.8 QP	46.0	-5.2	1.00 H	310	48.8	-8.0
4	333.34	33.4 QP	46.0	-12.6	2.00 H	89	39.2	-5.8
5	400.08	41.3 QP	46.0	-4.7	1.00 H	49	45.8	-4.5
6	970.27	34.9 QP	54.0	-19.1	1.50 H	168	29.2	5.7

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. Radiated missions which fall in the restricted bands, as defined in FCC 15.205(a), must also comply with the radiated emission limits specified in FCC 15.209(a), the other emission shall be at least 20 dB below fundamental.

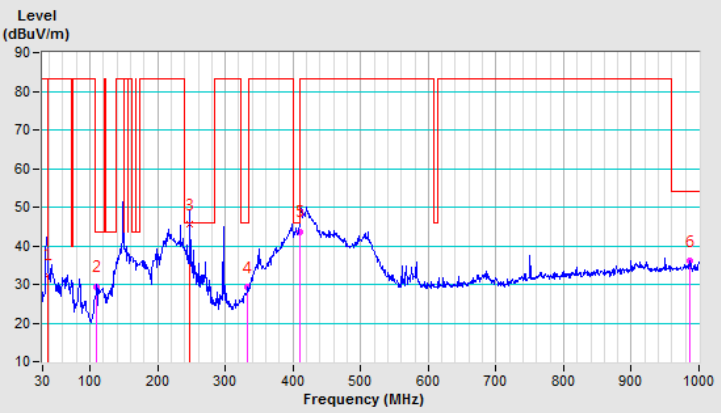


FREQUENCY RANGE	9kHz ~ 1GHz	DETECTOR FUNCTION	Quasi-Peak (QP)

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	37.50	32.5 QP	40.0	-7.5	1.00 V	151	41.2	-8.7
2	110.27	29.4 QP	43.5	-14.1	1.00 V	255	39.9	-10.5
3	247.50	45.5 QP	46.0	-0.5	1.50 V	73	54.6	-9.1
4	332.98	29.2 QP	46.0	-16.8	1.50 V	311	35.0	-5.8
5	409.90	43.6 QP	46.0	-2.4	1.50 V	55	47.8	-4.2
6	986.30	36.0 QP	54.0	-18.0	1.50 V	247	30.1	5.9

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. Radiated missions which fall in the restricted bands, as defined in FCC 15.205(a), must also comply with the radiated emission limits specified in FCC 15.209(a), the other emission shall be at least 20 dB below fundamental.



Mode	TX channel 23095	Frequency Range	Below 1000 MHz

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	43.35	19.66	-67.97	-4.91	-72.88	-13	-59.88
2	92.84	21.37	-70.43	-1.00	-71.44	-13	-58.44
3	132.45	12.85	-78.50	-1.23	-79.74	-13	-66.74
4	238.19	18.09	-77.27	3.82	-73.45	-13	-60.45
5	509.98	21.33	-74.06	2.81	-71.25	-13	-58.25
6	612.76	20.76	-73.93	1.78	-72.15	-13	-59.15
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	86.16	23.78	-68.13	-1.04	-69.18	-13	-56.18
2	139.65	23.19	-72.17	3.84	-68.33	-13	-55.33
3	284.67	23.91	-71.56	3.78	-67.77	-13	-54.77
4	347.91	20.84	-76.85	3.61	-73.24	-13	-60.24
5	470.34	24.90	-72.28	2.84	-69.44	-13	-56.44
6	738.07	18.69	-77.68	1.02	-76.65	-13	-63.65

Remarks:
1. Emission Value (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

4.1.8 Test Results (Mode 2)

Above 1GHz Data

FREQUENCY RANGE	1GHz ~ 40GHz	DETECTOR FUNCTION	Peak (PK) 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	4810.00	55.2 PK	74.0	-18.8	3.22 H	321	53.6	1.6
2	4810.00	44.8 AV	54.0	-9.2	3.22 H	321	43.2	1.6
3	4880.00	41.4 PK	74.0	-32.6	1.48 H	225	39.7	1.7
4	4880.00	29.7 AV	54.0	-24.3	1.48 H	225	28.0	1.7
5	7320.00	49.0 PK	74.0	-25.0	2.00 H	87	41.2	7.8
6	7320.00	36.8 AV	54.0	-17.2	2.00 H	87	29.0	7.8
7	11490.00	51.5 PK	74.0	-22.5	1.28 H	282	39.2	12.3
8	11490.00	46.7 AV	54.0	-7.3	1.28 H	282	34.4	12.3
9	17235.00	48.1 PK	68.2	-20.1	1.60 H	206	32.8	15.3
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	4810.00	56.5 PK	74.0	-17.5	1.39 V	324	54.9	1.6
2	4810.00	47.6 AV	54.0	-6.4	1.39 V	324	46.0	1.6
3	4880.00	42.9 PK	74.0	-31.1	3.14 V	249	41.2	1.7
4	4880.00	31.5 AV	54.0	-22.5	3.14 V	249	29.8	1.7
5	7320.00	49.5 PK	74.0	-24.5	1.34 V	62	41.7	7.8
6	7320.00	37.4 AV	54.0	-16.6	1.34 V	62	29.6	7.8
7	11490.00	50.3 PK	74.0	-23.7	1.26 V	158	38.0	12.3
8	11490.00	45.0 AV	54.0	-9.0	1.26 V	158	32.7	12.3
9	17235.00	47.1 PK	68.2	-21.1	1.57 V	290	31.8	15.3

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

Mode	TX channel 23095	Frequency Range	Above 1000MHz

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	1415	38.66	-65.33	5.81	-59.52	-13	-46.52
2	2122.5	48.30	-52.19	6.85	-45.34	-13	-32.34
3	2830	50.65	-50.27	6.94	-43.33	-13	-30.33
4	3537.5	52.47	-50.72	7.85	-42.88	-13	-29.88
5	4245	56.73	-48.10	7.44	-40.66	-13	-27.66
6	4952.5	47.04	-57.04	6.99	-50.05	-13	-37.05
7	5660	58.53	-46.29	7.05	-39.23	-13	-26.23
8	6367.5	47.79	-56.35	6.27	-50.08	-13	-37.08
9	7075	42.66	-59.36	4.97	-54.38	-13	-41.38
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	1415	41.54	-62.45	5.81	-56.64	-13	-43.64
2	2122.5	45.93	-54.56	6.85	-47.71	-13	-34.71
3	2830	45.98	-54.94	6.94	-48.00	-13	-35.00
4	3537.5	49.75	-53.44	7.85	-45.60	-13	-32.60
5	4245	55.40	-49.43	7.44	-41.99	-13	-28.99
6	4952.5	49.40	-54.68	6.99	-47.69	-13	-34.69
7	**5660**	**58.65**	**-46.17**	**7.05**	**-39.11**	**-13**	**-26.11**
8	6367.5	52.98	-51.16	6.27	-44.89	-13	-31.89
9	7075	51.32	-50.70	4.97	-45.72	-13	-32.72

Remarks:
1. Emission Value (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

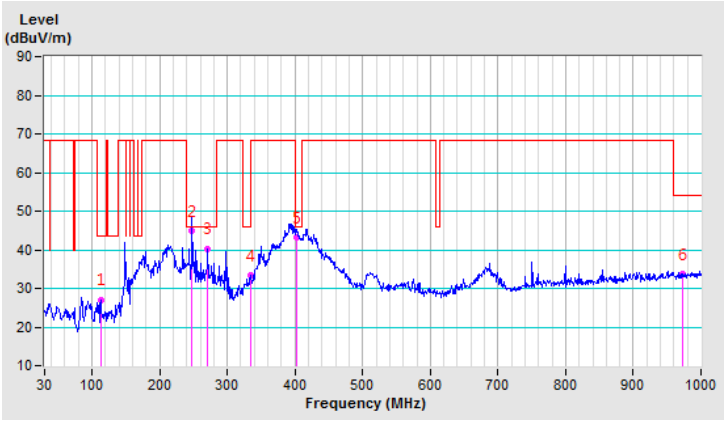
Below 1GHz Data:

FREQUENCY RANGE	9kHz ~ 1GHz	DETECTOR FUNCTION	Quasi-Peak (QP)

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	113.06	27.1 QP	43.5	-16.4	1.00 H	279	37.4	-10.3
2	247.50	44.8 QP	46.0	-1.2	1.00 H	131	53.9	-9.1
3	270.68	40.1 QP	46.0	-5.9	1.50 H	325	48.1	-8.0
4	334.56	33.3 QP	46.0	-12.7	1.00 H	26	39.1	-5.8
5	402.58	43.1 QP	46.0	-2.9	1.50 H	36	47.5	-4.4
6	972.91	33.6 QP	54.0	-20.4	1.00 H	205	27.7	5.9

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. Margin value = Emission Level – Limit value
4. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.
5. Radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a), must also comply with the radiated emission limits specified in FCC 15.209(a), the other emission shall be below -27dBm/MHz.

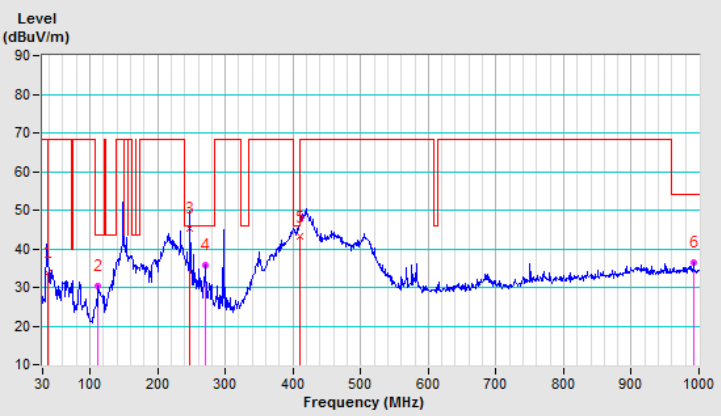


FREQUENCY RANGE	9kHz ~ 1GHz	DETECTOR FUNCTION	Quasi-Peak (QP)

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	37.50	33.8 QP	40.0	-6.2	1.00 V	2	42.5	-8.7
2	111.63	30.3 QP	43.5	-13.2	1.00 V	165	40.7	-10.4
3	247.51	45.4 QP	46.0	-0.6	1.50 V	68	54.5	-9.1
4	270.63	35.7 QP	46.0	-10.3	1.50 V	277	43.7	-8.0
5	409.80	43.1 QP	46.0	-2.9	1.00 V	225	47.3	-4.2
6	991.29	36.4 QP	54.0	-17.6	1.00 V	341	30.5	5.9

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. Margin value = Emission Level – Limit value
4. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.
5. Radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a), must also comply with the radiated emission limits specified in FCC 15.209(a), the other emission shall be below -27dBm/MHz.



Mode	TX channel 23095	Frequency Range	Below 1000 MHz

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	43.22	20.49	-67.14	-4.91	-72.05	-13	-59.05
2	92.04	21.62	-70.18	-1.00	-71.19	-13	-58.19
3	133.23	13.34	-78.01	-1.23	-79.25	-13	-66.25
4	237.21	18.60	-76.76	3.82	-72.94	-13	-59.94
5	509.47	22.50	-72.89	2.81	-70.08	-13	-57.08
6	612.36	22.18	-72.51	1.78	-70.73	-13	-57.73
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	86.3	24.35	-67.56	-1.04	-68.61	-13	-55.61
2	138.99	24.15	-71.21	3.84	-67.37	-13	-54.37
3	285.14	25.14	-70.33	3.78	-66.54	-13	-53.54
4	347.42	21.28	-76.41	3.61	-72.80	-13	-59.80
5	470.41	25.03	-72.15	2.84	-69.31	-13	-56.31
6	737.9	19.84	-76.53	1.02	-75.50	-13	-62.50

Remarks:
1. Emission Value (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

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	847124/029	Nov. 01, 2017	Oct. 31, 2018
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Nov. 15, 2017	Nov. 14, 2018
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 04, 2018	June 03, 2019
50 ohms Terminator	N/A	EMC-04	Nov. 01, 2017	Oct. 31, 2018
RF Cable	5D-FB	COCCAB-001	Sep. 28, 2018	Sep. 27, 2019
Fixed attenuator EMCI	STI02-2200-10	003	Mar. 16, 2018	Mar. 15, 2019
Software BVADT	BVADT_Cond_ V7.3.7.4	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 Conduction 1.
3. Tested Date: Oct. 26, 2018

4.2.3 Test Procedures

a. 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.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

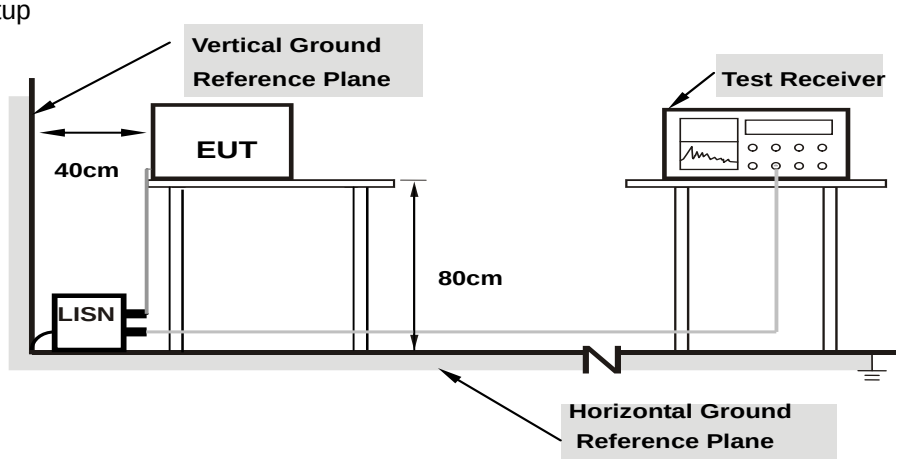
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

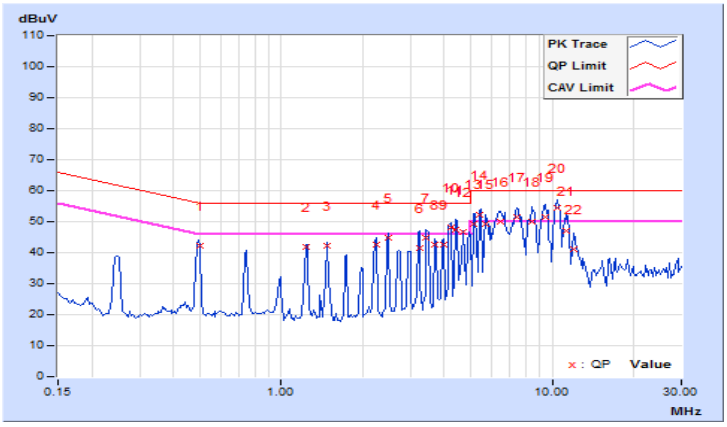
4.2.7 Test Results (Mode 1)

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

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	0.50000	10.08	32.12	25.26	42.20	35.34	56.00	46.00	-13.80	-10.66
2	1.23047	10.12	31.58	25.90	41.70	36.02	56.00	46.00	-14.30	-9.98
3	1.47266	10.13	32.15	25.25	42.28	35.38	56.00	46.00	-13.72	-10.62
4	2.24609	10.17	32.25	19.64	42.42	29.81	56.00	46.00	-13.58	-16.19
5	2.47656	10.18	34.68	26.79	44.86	36.97	56.00	46.00	-11.14	-9.03
6	3.23047	10.22	31.12	20.20	41.34	30.42	56.00	46.00	-14.66	-15.58
7	3.41797	10.22	34.67	21.82	44.89	32.04	56.00	46.00	-11.11	-13.96
8	3.68750	10.24	32.29	23.12	42.53	33.36	56.00	46.00	-13.47	-12.64
9	3.96094	10.25	32.48	23.70	42.73	33.95	56.00	46.00	-13.27	-12.05
10	4.23047	10.26	37.96	27.37	48.22	37.63	56.00	46.00	-7.78	-8.37
11	4.41797	10.27	37.21	26.84	47.48	37.11	56.00	46.00	-8.52	-8.89
12	4.67969	10.28	36.31	26.79	46.59	37.07	56.00	46.00	-9.41	-8.93
13	5.16016	10.30	39.01	29.77	49.31	40.07	60.00	50.00	-10.69	-9.93
14	5.41406	10.32	41.76	32.35	52.08	42.67	60.00	50.00	-7.92	-7.33
15	5.65234	10.33	38.94	28.89	49.27	39.22	60.00	50.00	-10.73	-10.78
16	6.46875	10.37	39.80	29.27	50.17	39.64	60.00	50.00	-9.83	-10.36
17	7.38672	10.41	41.01	31.13	51.42	41.54	60.00	50.00	-8.58	-8.46
18	8.37500	10.45	39.63	29.86	50.08	40.31	60.00	50.00	-9.92	-9.69
19	9.39063	10.50	40.90	30.46	51.40	40.96	60.00	50.00	-8.60	-9.04
20	10.39453	10.55	43.90	34.59	54.45	45.14	60.00	50.00	-5.55	-4.86
21	11.21484	10.60	36.30	26.40	46.90	37.00	60.00	50.00	-13.10	-13.00
22	11.95313	10.64	30.39	24.27	41.03	34.91	60.00	50.00	-18.97	-15.09

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

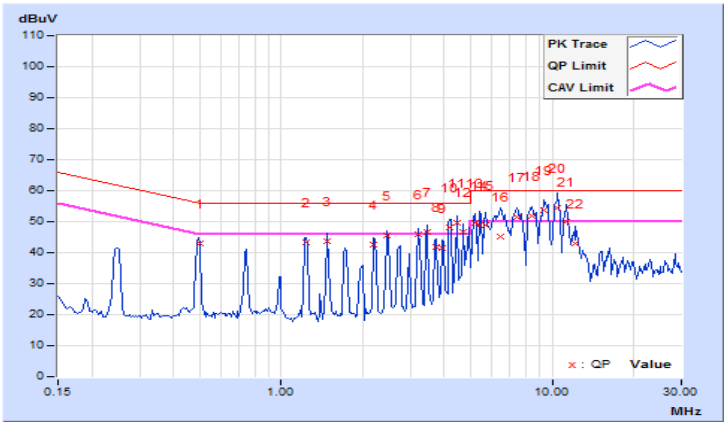


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	0.50000	9.97	33.02	26.13	42.99	36.10	56.00	46.00	-13.01	-9.90
2	1.23828	10.00	33.23	26.89	43.23	36.89	56.00	46.00	-12.77	-9.11
3	1.48047	10.01	33.71	28.84	43.72	38.85	56.00	46.00	-12.28	-7.15
4	2.19922	10.05	32.68	21.01	42.73	31.06	56.00	46.00	-13.27	-14.94
5	2.46094	10.06	35.49	27.46	45.55	37.52	56.00	46.00	-10.45	-8.48
6	3.19531	10.09	35.89	27.25	45.98	37.34	56.00	46.00	-10.02	-8.66
7	3.44141	10.10	36.51	27.77	46.61	37.87	56.00	46.00	-9.39	-8.13
8	3.71875	10.11	31.67	23.77	41.78	33.88	56.00	46.00	-14.22	-12.12
9	3.95313	10.12	31.33	22.00	41.45	32.12	56.00	46.00	-14.55	-13.88
10	4.20703	10.13	37.87	29.92	48.00	40.05	56.00	46.00	-8.00	-5.95
11	4.45703	10.14	39.60	31.10	49.74	41.24	56.00	46.00	-6.26	-4.76
12	4.67969	10.15	36.68	27.20	46.83	37.35	56.00	46.00	-9.17	-8.65
13	5.16797	10.17	39.48	30.20	49.65	40.37	60.00	50.00	-10.35	-9.63
14	5.38672	10.18	38.77	26.90	48.95	37.08	60.00	50.00	-11.05	-12.92
15	5.66406	10.19	38.64	29.10	48.83	39.29	60.00	50.00	-11.17	-10.71
16	6.41016	10.22	35.11	26.44	45.33	36.66	60.00	50.00	-14.67	-13.34
17	7.38672	10.27	41.27	30.61	51.54	40.88	60.00	50.00	-8.46	-9.12
18	8.41797	10.31	41.72	32.71	52.03	43.02	60.00	50.00	-7.97	-6.98
19	9.34375	10.35	43.39	32.87	53.74	43.22	60.00	50.00	-6.26	-6.78
20	10.46094	10.40	44.22	32.81	54.62	43.21	60.00	50.00	-5.38	-6.79
21	11.30859	10.44	39.67	29.78	50.11	40.22	60.00	50.00	-9.89	-9.78
22	12.19531	10.49	32.33	23.69	42.82	34.18	60.00	50.00	-17.18	-15.82

Remarks:

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



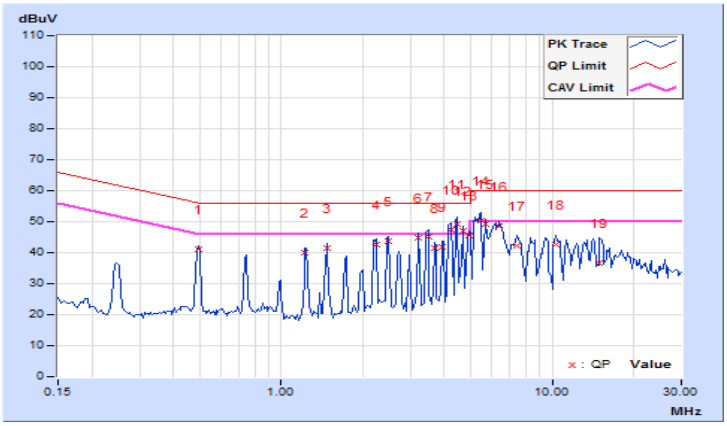
4.2.8 Test Results (Mode 2)

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

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	0.49375	10.08	30.90	29.79	40.98	39.87	56.10	46.10	-15.12	-6.23
2	1.22656	10.12	30.00	23.55	40.12	33.67	56.00	46.00	-15.88	-12.33
3	1.48438	10.13	31.42	24.48	41.55	34.61	56.00	46.00	-14.45	-11.39
4	2.24219	10.17	32.41	20.77	42.58	30.94	56.00	46.00	-13.42	-15.06
5	2.48828	10.18	33.70	22.67	43.88	32.85	56.00	46.00	-12.12	-13.15
6	3.21484	10.21	34.67	27.09	44.88	37.30	56.00	46.00	-11.12	-8.70
7	3.48828	10.23	35.04	22.34	45.27	32.57	56.00	46.00	-10.73	-13.43
8	3.68359	10.24	31.42	21.90	41.66	32.14	56.00	46.00	-14.34	-13.86
9	3.93359	10.25	31.73	22.53	41.98	32.78	56.00	46.00	-14.02	-13.22
10	4.23438	10.26	37.09	24.76	47.35	35.02	56.00	46.00	-8.65	-10.98
11	4.48047	10.27	38.92	27.05	49.19	37.32	56.00	46.00	-6.81	-8.68
12	4.67578	10.28	36.94	27.12	47.22	37.40	56.00	46.00	-8.78	-8.60
13	4.91797	10.29	35.14	25.39	45.43	35.68	56.00	46.00	-10.57	-10.32
14	5.43750	10.32	39.92	30.92	50.24	41.24	60.00	50.00	-9.76	-8.76
15	5.65625	10.33	38.90	29.24	49.23	39.57	60.00	50.00	-10.77	-10.43
16	6.39453	10.36	38.16	28.08	48.52	38.44	60.00	50.00	-11.48	-11.56
17	7.41797	10.41	31.80	22.85	42.21	33.26	60.00	50.00	-17.79	-16.74
18	10.33203	10.55	31.95	21.64	42.50	32.19	60.00	50.00	-17.50	-17.81
19	14.94922	10.80	25.92	16.87	36.72	27.67	60.00	50.00	-23.28	-22.33

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

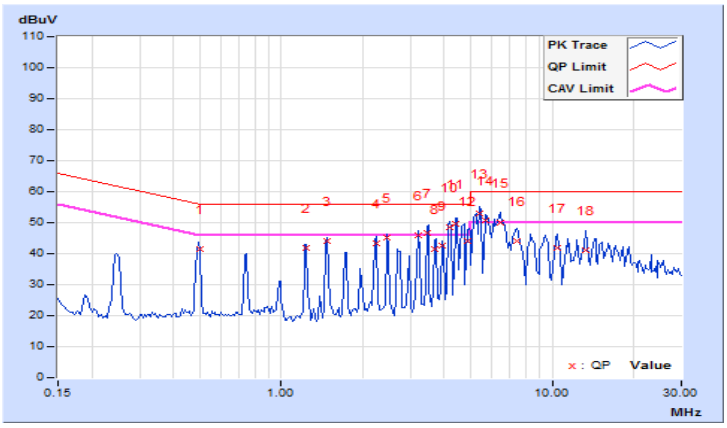


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	0.50000	9.97	31.39	24.11	41.36	34.08	56.00	46.00	-14.64	-11.92
2	1.24219	10.00	31.68	24.65	41.68	34.65	56.00	46.00	-14.32	-11.35
3	1.47656	10.01	34.24	27.85	44.25	37.86	56.00	46.00	-11.75	-8.14
4	2.23828	10.05	33.19	23.22	43.24	33.27	56.00	46.00	-12.76	-12.73
5	2.46094	10.06	35.27	27.30	45.33	37.36	56.00	46.00	-10.67	-8.64
6	3.19922	10.09	35.91	27.19	46.00	37.28	56.00	46.00	-10.00	-8.72
7	3.46094	10.10	36.47	28.48	46.57	38.58	56.00	46.00	-9.43	-7.42
8	3.66797	10.11	31.38	19.51	41.49	29.62	56.00	46.00	-14.51	-16.38
9	3.93359	10.12	32.49	23.53	42.61	33.65	56.00	46.00	-13.39	-12.35
10	4.17578	10.13	38.42	29.26	48.55	39.39	56.00	46.00	-7.45	-6.61
11	**4.42969**	**10.14**	**39.58**	**31.11**	**49.72**	**41.25**	**56.00**	**46.00**	**-6.28**	**-4.75**
12	4.87891	10.16	34.07	20.64	44.23	30.80	56.00	46.00	-11.77	-15.20
13	5.41406	10.18	42.75	33.38	52.93	43.56	60.00	50.00	-7.07	-6.44
14	5.69531	10.19	40.37	31.90	50.56	42.09	60.00	50.00	-9.44	-7.91
15	6.42969	10.23	39.73	31.26	49.96	41.49	60.00	50.00	-10.04	-8.51
16	7.41406	10.27	33.73	25.19	44.00	35.46	60.00	50.00	-16.00	-14.54
17	10.44922	10.40	31.46	19.08	41.86	29.48	60.00	50.00	-18.14	-20.52
18	13.36328	10.54	30.74	21.66	41.28	32.20	60.00	50.00	-18.72	-17.80

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

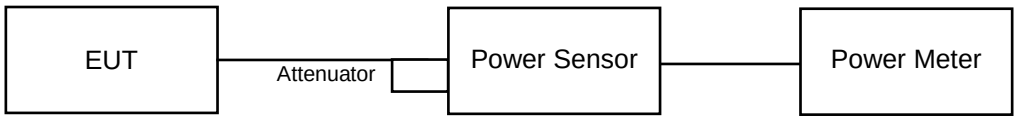


4.3 Conducted Output Power Measurement

4.3.1 Limits of Conducted Output Power Measurement

For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedures

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

Same as Item 4.1.6.

4.3.7 Test Results

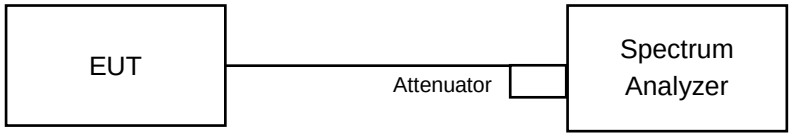
Operation Mode	The Worst Case			Total Peak. Power Output		Co-location Power Output			
	Mode	Channel Number	Freq. (MHz)	mW	dBm	mW	dBm	Limit (dBm)	Result
WiFi 2.4G	11g	6	2437	762.15	28.82	809.58	29.08	30	PASS
Bluetooth	BT-LE	19	2440	5.26	7.21				
Zigbee	Zigbee	11	2405	42.17	16.25				

4.4 Conducted Out of Band Emission Measurement

4.4.1 Limits of Conducted Out of Band Emission Measurement

Below 20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

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

MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW ≥ 300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

MEASUREMENT PROCEDURE OOBE

1. Set RBW = 100 kHz.
2. Set VBW ≥ 300 kHz.
3. Detector = peak.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

4.4.5 Deviation from Test Standard

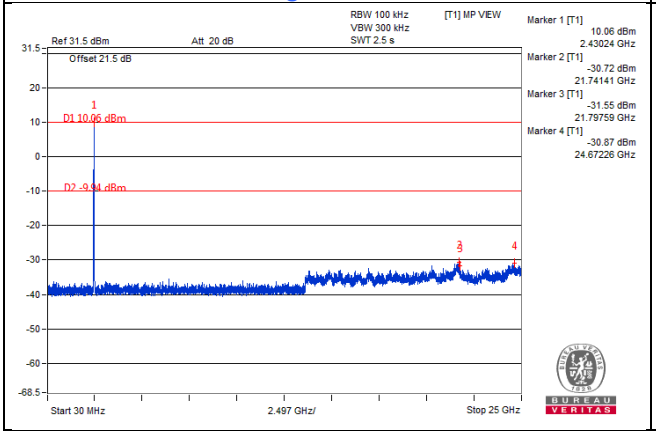
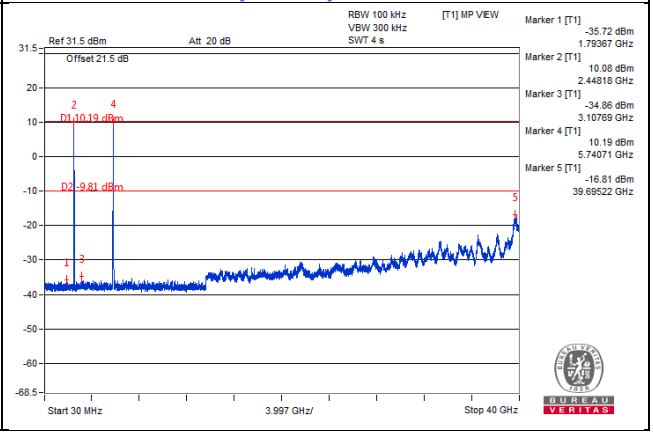
No deviation.

4.4.6 EUT Operating Conditions

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

4.4.7 Test Results

The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

2.4GHz_802.11g_CH6 + BT-LE_CH19	5GHz_802.11ac (VHT20) CH149 + BT-LE_CH19
	

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 FCC recognized accredited test firms and accredited 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: 886-3-6668565
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Hwa Ya EMC/RF/Safety Lab
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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.

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