FCC Test Report

Report No.:	RF151119D01
FCC ID:	O5PDPL24G11
Test Model:	DPL24G11
Received Date:	Nov. 19, 2015
Test Date:	Jan. 06 to 19, 2016
Issued Date:	Feb. 23, 2016
Applicant:	VIVOTEK INC.
Address:	6F, No.192, Lien-Cheng Rd., Chung-Ho , New Taipei City,235, Taiwan, R.O.C.
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 (1):	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
Test Location (2):	No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan R.O.C.

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Release Control Record

Issue No.	Description	Date Issued
RF151119D01	Original release.	Feb. 23, 2016

1 Certificate of Conformity

Product:	Low Power Radar Module
Brand:	VIVOTEK
Test Model:	DPL24G11
Sample Status:	ENGINEERING SAMPLE
Applicant:	VIVOTEK INC.
Test Date:	Jan. 06 to 19, 2016
Standards:	47 CFR FCC Part 15, Subpart C (Section 15.249) 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:** Feb. 23, 2016

Claire Kuan / Specialist

Approved by : _____ , **Date:** Feb. 23, 2016

May Chen / Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (SECTION 15.249)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -14.03dB at 0.37266MHz.
15.209 15.249 15.249 (d)	Radiated Emission Test Band Edge Measurement Limit: 50dB less than the peak value of fundamental frequency or meet radiated emission limit in section 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -2.1dB at 959.98MHz.

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) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.86 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	5.19 dB
	200MHz ~1000MHz	3.43 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	3.49 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	Low Power Radar Module
Brand	VIVOTEK
Test Model	DPL24G11
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	DC 2.5V
Modulation Type	CW, FMCW
Transfer Rate	5Mbps
Operating Frequency	24.05406~24.24656 GHz
Antenna Type	Refer to Note
Antenna Connector	NA
Accessory Device	NA
Data Cable Supplied	NA

Note:

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

Brand	Model No.	Antenna Type	Gain (dBi)	Antenna Connector
panasonic	MN87900	PCB	4	NA

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

1 channel is provided:

Channel	Frequency
1	24150.31 MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

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

Where **RE≥1G:** Radiated Emission above 1GHz & Bandedge Measurement **RE<1G:** Radiated Emission below 1GHz

PLC: Power Line Conducted Emission

NOTE: The EUT' antenna had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-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.

TESTED CHANNEL	MODULATION TYPE	DATA RATE (Mbps)
1	CW, FMCW	5

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.

TESTED CHANNEL	MODULATION TYPE	DATA RATE (Mbps)
1	CW, FMCW	5

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.

TESTED CHANNEL	MODULATION TYPE	DATA RATE (Mbps)
1	CW, FMCW	5

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60 Hz	Nelson Teng
RE<1G	21deg. C, 62%RH	120Vac, 60 Hz	Andy Ho
PLC	20deg. C, 70%RH	120Vac, 60 Hz	Eagle Chen

3.3 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.	AP ROUTER	NETGEAR	D7000	NA	NA	Supplied by client
B.	NOTEBOOK COMPUTER	DELL	E5440	6FC7F12	FCC DoC	Provided by Lab
C.	TEST TOOLS	NA	NA	NA	NA	Supplied by client
D.	DC INVERTER	NA	NA	NA	NA	Supplied by client

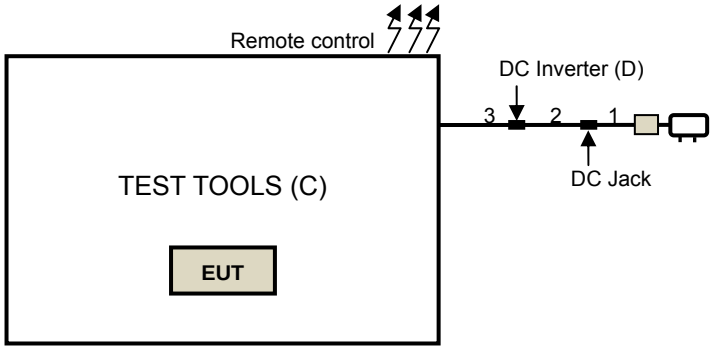
Note:

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

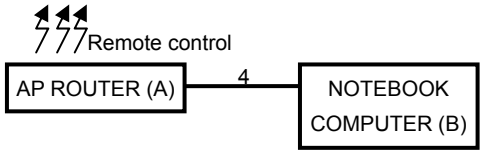
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC	1	2.3	No	1	Supplied by client
2.	DC	1	0.1	No	0	Supplied by client
3.	DC	1	0.05	No	0	Supplied by client
4.	RJ45	1	3	No	0	Provided by Lab

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

3.3.1 Configuration of System under Test



Remote site



NOTE:
1. The test Configuration was defined by the applicant requirement.
2. Support units A-C (AP ROUTER, NOTEBOOK COMPUTER & TEST TOOLS) control the EUT's operation via remote control.

3.4 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 C (15.249)
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

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following

Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (microvolts/meter)
24 ~ 24.25 GHz	250	2500

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits as below table, whichever is the lesser attenuation

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.

4.1.2 Test Instruments

For below 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY54450088	July 24, 2015	July 23, 2016
Pre-Amplifier(*) EMCI	EMC001340	980201	Aug. 13, 2015	Aug. 12, 2017
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-1000VH2B	AMP-ZFL-06	Nov. 11, 2015	Nov. 10, 2016
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Feb. 03, 2015	Feb. 02, 2016
RF Cable	8D	966-4-1 966-4-2 966-4-3	Apr. 03, 2015	Apr. 02, 2016
Software	ADT_Radiated_V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	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 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. 4.
4. The FCC Site Registration No. is 292998
5. The CANADA Site Registration No. is 20331-2
6. Tested Date: Jan. 13, 2016

For above 1GHz~40GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY54450088	July 24, 2015	July 23, 2016
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Feb. 06, 2015	Feb. 05, 2016
Pre-Amplifier Agilent	8449B	3008A01922	Sep. 19, 2015	Sep. 18, 2016
RF Cable	EMC104-SM-SM-2000 EMC104-SM-SM-5000 EMC104-SM-SM-5000	150318 150323 150324	Mar. 31, 2015	Mar. 30, 2016
Pre-Amplifier EMCI	EMC184045	980143	Jan. 16, 2015	Jan. 15, 2016
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Feb. 05, 2015	Feb. 04, 2016
RF Cable	SUCOFLEX 102	36432/2 36441/2	Jan. 17, 2015	Jan. 16, 2016
Software	ADT_Radiated_V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	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 966 Chamber No. 4.
3. The FCC Site Registration No. is 292998
4. The CANADA Site Registration No. is 20331-2
5. Tested Date: Jan. 13, 2016

For above 40GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer Agilent	E4446A	MY48250253	Dec. 22, 2015	Dec. 21, 2016
*Harmonic Mixer (33~55GHz) OML	M22HWD	110215-1	Apr. 07, 2015	Apr. 06, 2017
*Horn Antenna (33~55GHz) OML	M22RH	110215-1	Apr. 07, 2015	Apr. 06, 2017
*Harmonic Mixer (50~75GHz) OML	M15RH	110215-1	Apr. 09, 2015	Apr. 08, 2017
*Horn Antenna (50~75GHz) OML	M15HWD	110215-1	Apr. 09, 2015	Apr. 08, 2017
*Harmonic Mixer (75~110GHz) OML	M10HWD	110215-1	Apr. 14, 2015	Apr. 13, 2017
*Horn Antenna (75~110GHz) OML	M10RH	110215-1	Apr. 14, 2015	Apr. 13, 2017
*Diplexer EMCI	DPL26	DPL26_01	Apr. 06, 2015	Apr. 05, 2017
*Diplexer EMCI	DPL26	DPL26_02	Apr. 06, 2015	Apr. 05, 2017
CT Antenna Tower & Turn Table	NA	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 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. G.
4. The FCC Site Registration No. is 966073.
5. The VCCI Site Registration No. is G-137.
6. The CANADA Site Registration No. is IC 7450H-2.
7. Test Date: Jan. 13, 2016

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 suitable distance 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.

Note:

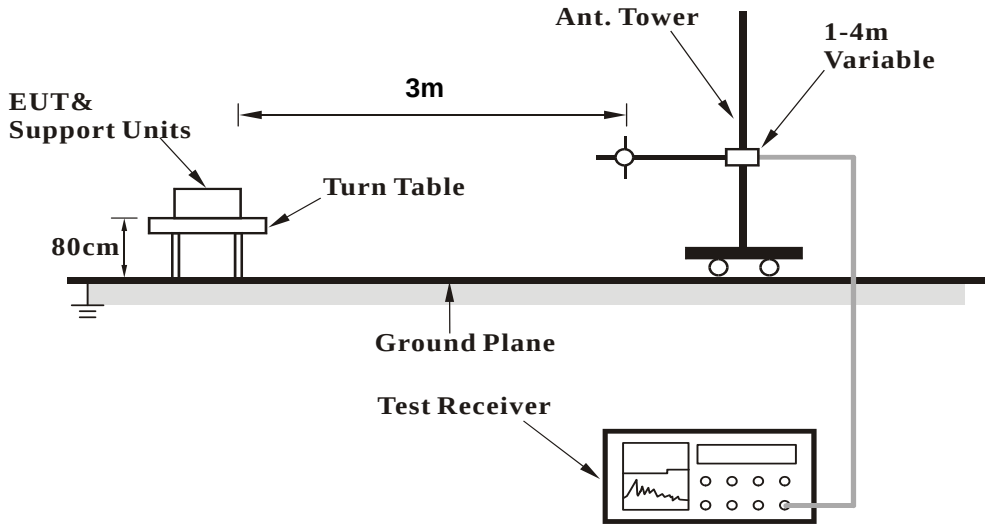
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

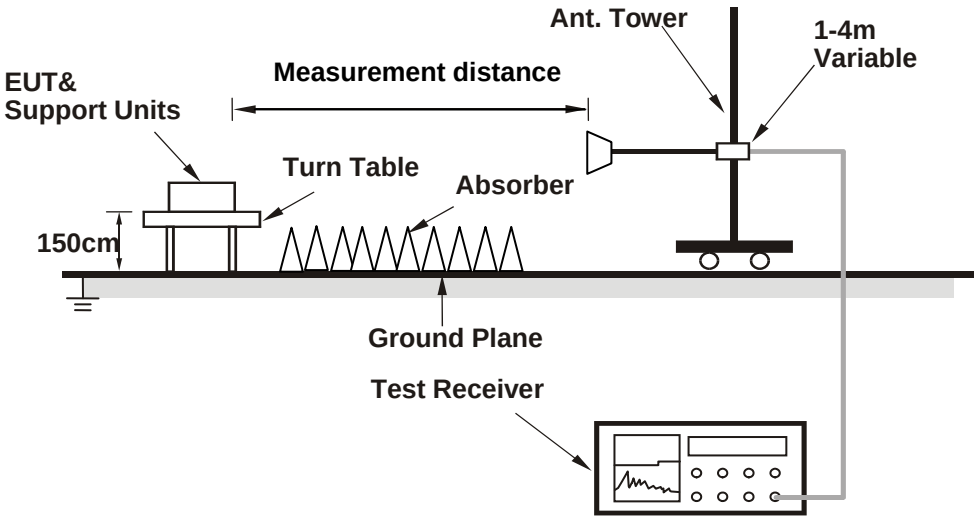
No deviation.

4.1.5 Test Setup

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



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

4.1.6 EUT Operating Conditions

The communication partner run test program “RunIW2 (Ver 1.1.0.23)” and “Telnet paste command” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1GHz Data：

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 18GHz		

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	8050.10	57.8 PK	74.0	-16.2	2.41 H	151	50.16	7.64
2	8050.10	39.3 AV	54.0	-14.7	2.41 H	151	31.70	7.64
3	16100.09	62.8 PK	74.0	-11.2	1.28 H	11	49.82	12.98
4	16100.09	44.8 AV	54.0	-9.2	1.28 H	11	31.86	12.98
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	8050.10	57.4 PK	74.0	-16.6	1.55 V	213	49.76	7.64
2	8050.10	39.0 AV	54.0	-15.0	1.55 V	213	31.35	7.64
3	16100.09	62.7 PK	74.0	-11.3	1.51 V	128	49.72	12.98
4	16100.09	47.5 AV	54.0	-6.5	1.51 V	128	34.52	12.98

REMARKS:

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

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	18GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 1 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	20717.00	71.6 PK	83.5	-11.9	1.00 H	160	79.52	-7.92
2	20717.00	56.6 AV	63.5	-6.9	1.00 H	157	64.52	-7.92
3	24000.00	58.5 PK	83.5	-25.0	1.00 H	157	64.63	-6.13
4	24000.00	46.6 AV	63.5	-16.9	1.00 H	157	52.71	-6.13
5	*24150.31	98.2 PK	137.5	-39.3	1.00 H	157	103.38	-5.15
6	*24150.31	79.1 AV	117.5	-38.4	1.00 H	157	84.27	-5.15
7	24250.00	56.9 PK	83.5	-26.6	1.00 H	157	62.06	-5.16
8	24250.00	46.5 AV	63.5	-17.1	1.00 H	157	51.61	-5.16
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 1 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	20779.15	68.8 PK	83.5	-14.7	1.00 V	134	76.67	-7.88
2	20779.15	51.3 AV	63.5	-12.2	1.00 V	134	59.22	-7.88
3	24000.00	57.1 PK	83.5	-26.4	1.00 V	129	63.23	-6.13
4	24000.00	47.9 AV	63.5	-15.6	1.00 V	129	54.02	-6.13
5	*24150.31	89.7 PK	137.5	-47.8	1.00 V	129	94.85	-5.15
6	*24150.31	73.0 AV	117.5	-44.5	1.00 V	129	78.17	-5.15
7	24250.00	56.8 PK	83.5	-26.7	1.00 V	129	61.96	-5.16
8	24250.00	51.3 AV	63.5	-12.2	1.00 V	129	56.43	-5.16

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. Shorter measurement distances may be used to improve the measurement system's noise floor. As Subpart C description is based on the measurement in distance of 3 meters, the data obtained at 1-meter distance was compared to the calculate limit for 1-m distance:
   Limit at 1-meter distance (dBuV)
   = Limit at 3 meter distance (dBuV) -20log(1/3)(dB)
   = Limit at 3 meter distance (dBuV)+9.5(dB).

※Measurements made at 1 meter distance and Limit converted to account for 1-meter measurement distance.

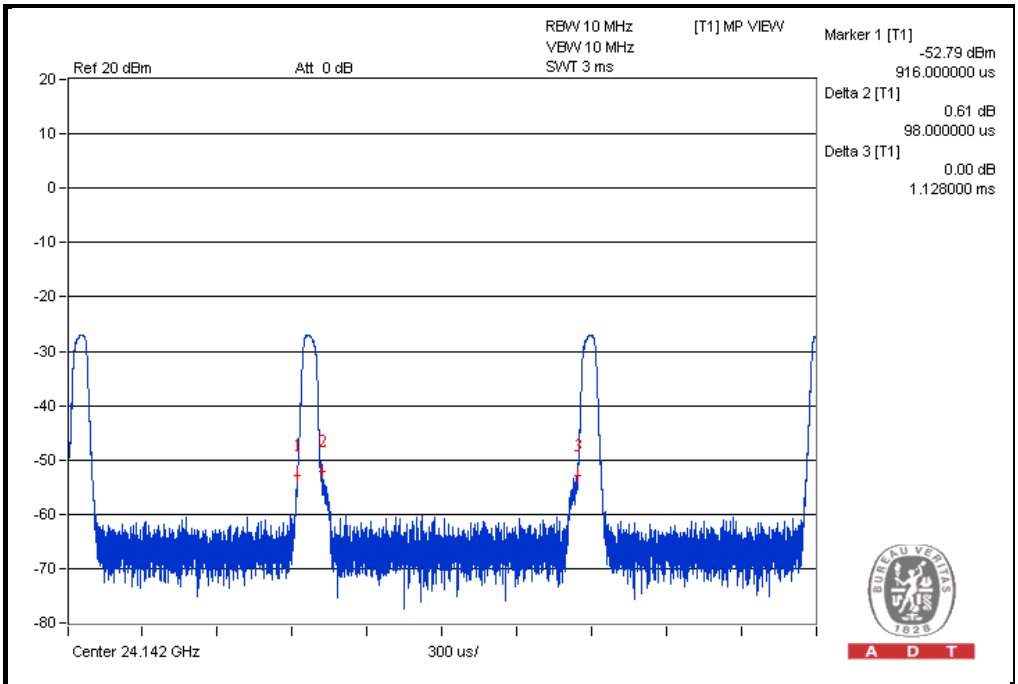
CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	40GHz ~ 100GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 0.8 M							
NO.	FREQ. (GHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	EIRP Level (dBm)	Measured Power (dBm)	Receiver Antenna Gain (dBi)
1	48.30062 PK	87.5	99.4	-11.9	-19.2	-59.5	23.9
2	48.30062 AV	72.7	79.4	-6.7	-34.0	-74.3	23.9
3	72.45093 PK	88.8	99.4	-10.6	-17.9	-61.7	23.9
4	72.45093 AV	74.2	79.4	-5.2	-32.5	-76.3	23.9
5	96.60124	-	-	-	-	-	-
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 0.8 M							
NO.	FREQ. (GHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	EIRP Level (dBm)	Measured Power (dBm)	Receiver Antenna Gain (dBi)
1	48.30062 PK	87.6	99.4	-11.8	-19.1	-59.4	23.9
2	48.30062 AV	73.3	79.4	-6.1	-33.4	-73.7	23.9
3	72.45093 PK	87.2	99.4	-12.2	-19.5	-63.3	23.9
4	72.45093 AV	75.1	79.4	-4.3	-31.6	-75.4	23.9
5	96.60124	-	-	-	-	-	-

REMARKS:

1. The measured power level is converted to EIRP using the Friis equation:
   EIRP = PT * GT = (PR / GR) * (4 * Pi * D/ λ)^ 2
   where:
   PR is the power of the receive measurement
   GR is the gain of the receive measurement antenna
   D is the measurement distance
   λ is the wavelength
2. Field strength is then converted to EIRP as follows:
   EIRP = ((E*D)^2) / 30
   Working in dB units, the above equation is equivalent to:
   EIRP[dBm] = E[dBμV/m] + 20 log(D[meters]) - 104.8
   E = EIRP – 20 * log(D) + 104.8
3. " - ": The emission levels were too low to be detected.
4. Shorter measurement distances may be used to improve the measurement system's noise floor. As Subpart C description is based on the measurement in distance of 3 meters, the data obtained at 0.8-meter distance was compared to the calculate limit for 0.8-m distance:
   Limit at 0.8-meter distance (dBuV)
   = Limit at 3 meter distance (dBuV)-20log(0.8/3)(dB)
   = Limit at 3 meter distance (dBuV)+11.48(dB).

※ Measurements made at 0.8 meter distance and Limit converted to account for 0.8-meter measurement distance.



20 log (Duty cycle) = 20 log (0.098 ms / 1.128 ms) = -21.2 dB

Below 1GHz Data:

CHANNEL	TX Channel 1	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	146.35	38.5 QP	43.5	-5.0	1.25 H	289	53.82	-15.30
2	232.66	35.3 QP	46.0	-10.7	1.25 H	283	52.50	-17.19
3	480.01	33.3 QP	46.0	-12.7	2.00 H	137	42.96	-9.67
4	669.91	40.3 QP	46.0	-5.7	2.00 H	360	46.13	-5.86
5	710.12	37.5 QP	46.0	-8.5	2.00 H	22	42.96	-5.43
6	959.99	40.6 QP	46.0	-5.4	1.25 H	112	42.09	-1.49
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	45.98	30.7 QP	40.0	-9.3	1.00 V	112	46.14	-15.45
2	99.52	33.9 QP	43.5	-9.7	1.00 V	177	53.54	-19.69
3	140.73	33.1 QP	43.5	-10.4	1.00 V	299	48.50	-15.39
4	640.08	36.2 QP	46.0	-9.8	2.00 V	295	42.23	-6.06
5	710.12	35.6 QP	46.0	-10.4	1.50 V	170	41.01	-5.43
6	**959.98**	**43.9 QP**	**46.0**	**-2.1**	**1.00 V**	**110**	**45.40**	**-1.49**

REMARKS:

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

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: Jan. 19, 2016

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.

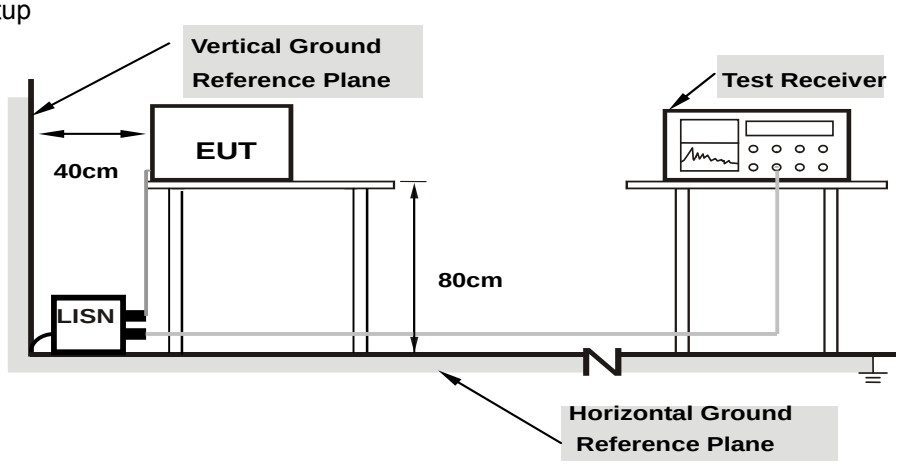
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

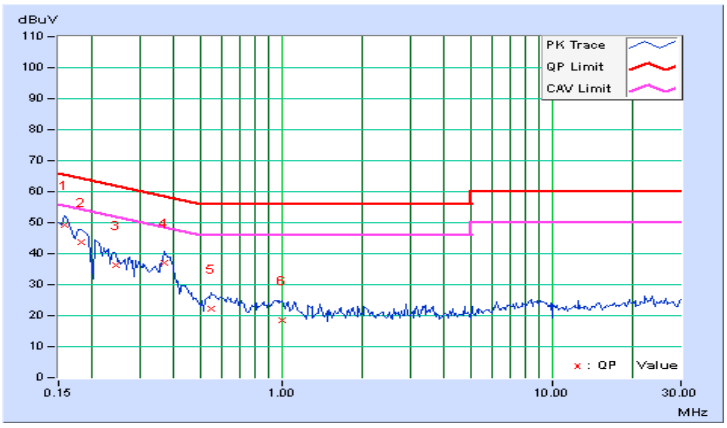
4.2.7 Test Results

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	10.25	38.96	22.69	49.21	32.94	65.58	55.58	-16.36	-22.63
2	0.18125	10.24	33.33	16.36	43.57	26.60	64.43	54.43	-20.86	-27.83
3	0.24375	10.22	26.24	11.58	36.46	21.80	61.97	51.97	-25.50	-30.16
4	0.36875	10.24	26.83	18.53	37.07	28.77	58.53	48.53	-21.46	-19.76
5	0.55234	10.22	12.02	1.97	22.24	12.19	56.00	46.00	-33.76	-33.81
6	1.00781	10.17	8.47	-0.33	18.64	9.84	56.00	46.00	-37.36	-36.16

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.

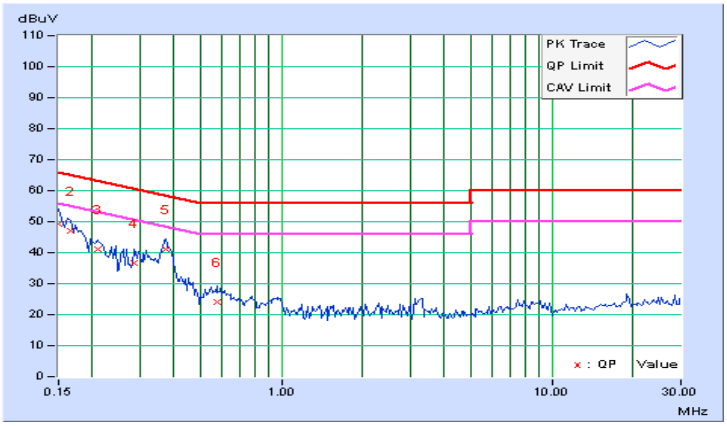


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.24	38.93	26.06	49.17	36.30	66.00	56.00	-16.83	-19.70
2	0.16562	10.23	36.91	22.08	47.14	32.31	65.18	55.18	-18.04	-22.87
3	0.20859	10.20	31.00	17.28	41.20	27.48	63.26	53.26	-22.06	-25.78
4	0.28672	10.21	26.63	19.01	36.84	29.22	60.62	50.62	-23.78	-21.40
5	**0.37266**	**10.22**	**30.90**	**24.19**	**41.12**	**34.41**	**58.44**	**48.44**	**-17.32**	**-14.03**
6	0.57578	10.20	13.98	4.80	24.18	15.00	56.00	46.00	-31.82	-31.00

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.



5 Pictures of Test Arrangements

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

Appendix – Information on the Testing Laboratories

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

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

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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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