Supplemental “Transmit Simultaneously” Test Report

Report No.:	RF160120E04-2
FCC ID:	HDC434RG
Test Model:	434RG
Received Date:	Jan. 20, 2016
Test Date:	Jan. 28 to Feb. 01, 2016
Issued Date:	Mar. 16, 2016
Applicant:	Adtran
Address:	901 Explorer Boulevard, Huntsville Alabama, United States, 35806-2807
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
RF160120E04-2	Original release.	Mar. 16, 2016

1 Certificate of Conformity

Product:	Indoor GPON HGU
Brand:	ADTRAN
Test Model:	434RG
Sample Status:	ENGINEERING SAMPLE
Applicant:	Adtran
Test Date:	Jan. 28 to Feb. 01, 2016
Standards:	47 CFR FCC Part 15, Subpart C (Section 15.247) 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 : Wendy Wu , **Date:** Mar. 16, 2016

Wendy Wu / Specialist

Approved by : , **Date:** Mar. 16, 2016

May Chen / Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (SECTION 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -9.81dB at 0.21250MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.3dB at 10460.00MHz.

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 ~ 1GHz	5.31 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.40 dB
	6GHz ~ 18GHz	3.73 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	Indoor GPON HGU
Brand	ADTRAN
Test Model	434RG
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	DC 12V from adapter or UPS
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode
Modulation Technology	DSSS,OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11g/a: up to 54Mbps 802.11n: up to 300Mbps 802.11ac: up to 1300Mbps
Operating Frequency	**For 15.407** 5.18 ~ 5.24GHz, 5.26 ~ 5.32GHz, 5.50GHz ~ 5.72GHz, 5.745 ~ 5.825GHz
	For 15.247 2.412 ~ 2.462GHz
Number of Channel	**For 15.407** 22 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 10 for 802.11n (HT40), 802.11ac (VHT40) 6 for 802.11ac (VHT80)
	For 15.247 11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
Output Power	**For 15.407** 5.18 ~ 5.24GHz 802.11a: 146.893mW 802.11ac (VHT20): 192.527mW 802.11ac (VHT40): 260.004mW 802.11ac (VHT80): 172.055mW 5.26 ~ 5.32GHz 802.11a: 153.462mW 802.11ac (VHT20): 147.164mW 802.11ac (VHT40): 227.658mW 802.11ac (VHT80): 225.256mW 5.50GHz ~ 5.72GHz 802.11a: 150.314mW 802.11ac (VHT20): 151.891mW 802.11ac (VHT40): 221.135mW 802.11ac (VHT80): 224.689Mw 5.745 ~ 5.825GHz 802.11a: 152.757mW 802.11ac (VHT20): 159.055mW 802.11ac (VHT40): 161.693mW 802.11ac (VHT80): 155.069mW
	For 15.247 802.11b: 338.065mW 802.11g: 311.889mW 802.11n (HT20): 573.758mW 802.11n (HT40): 165.018mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x1
Data Cable Supplied	NA

Note:

1. 2.4GHz and 5GHz technology can transmit at same time.
2. The antennas provided to the EUT, please refer to the following table:

For 2.4GHz						
Antenna No.	Brand	Part No.	Antenna Type	Connector	Gain (dBi)	Cable(mm)
Ant 1	WHAYU	C1597-510085-A	PCB	Soldering	2.8	47.7
Ant 2	WHAYU	C1597-510083-A	PCB	Soldering	2.4	98.7
For 5GHz						
Antenna No.	Brand	Part No.	Antenna Type	Connector	Gain (dBi)	Cable(mm)
Ant 3	WHAYU	C1597-510086-A	PCB	I-PEX	3.3	84.8
Ant 4	WHAYU	C1597-510084-A	PCB	I-PEX	3.4	74.8
Ant 5	WHAYU	C1597-510082-A	PCB	I-PEX	3.5	186.8

3. The EUT power needs to be supplied from one power adapter, the information is as below table:

Brand	Model No.	Spec.
UMEC	UP0301A-12PA	Input: 100-240V, 0.8A, 50/60Hz Output: 12V, 2.5A DC output cable(1.4m, unshielded)

4. The EUT was pre-tested under the following test modes :

Mode	Power
A	**with adapter**
B	with UPS
Note: The worst radiated emissions was found in **Mode A**. Therefore only the test data of the modes were recorded in this report.	

5. The EUT incorporates a MIMO function.

2.4GHz Band			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11b	1 ~ 11Mbps	1TX (Fixed Chain 0)	1RX
802.11g	6 ~ 54Mbps	1TX (Fixed Chain 0)	1RX
802.11n (HT20)	MCS 0~7	2TX (CDD Mode)	2RX
	MCS 8~15	2TX	2RX
802.11n (HT40)	MCS 0~7	2TX (CDD Mode)	2RX
	MCS 8~15	2TX	2RX
5GHz Band			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11a	6 ~ 54Mbps	1TX (Fixed Chain 0)	3RX
802.11n (HT20)	MCS 0~7	3TX	3RX
	MCS 8~15	3TX	3RX
	MCS 16~23	3TX	3RX
802.11n (HT40)	MCS 0~7	3TX	3RX
	MCS 8~15	3TX	3RX
	MCS 16~23	3TX	3RX
802.11ac (VHT20)	MCS0~8 Nss=1	3TX	3RX
	MCS0~8 Nss=2	3TX	3RX
	MCS0~9 Nss=3	3TX	3RX
802.11ac (VHT40)	MCS0~9 Nss=1	3TX	2RX
	MCS0~9 Nss=2	3TX	3RX
	MCS0~9 Nss=3	3TX	3RX
802.11ac (VHT80)	MCS0~9 Nss=1	3TX	2RX
	MCS0~9 Nss=2	3TX	3RX
	MCS0~9 Nss=3	3TX	3RX
Note: 1. The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz) and 802.11ac mode for 20MHz (40MHz), therefore investigated worst case to representative mode in test report.			

6. 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	OB	
1	√	√	√	-	3TX, Adapter Mode
2	-	-	√	-	3TX, UPS Mode

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

PLC: Power Line Conducted Emission **OB:** Conducted Out-Band Emission Measurement

NOTE: "-"means no effect.

Radiated Emission Test (Above 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
2.4GHz (802.11n(HT20)) + 5GHz (802.11ac(VHT40))	1 to 11	6	DSSS	DBPSK	6.5
	38 to 46	46	OFDM	BPSK	13.5

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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
2.4GHz (802.11n(HT20)) + 5GHz (802.11ac(VHT40))	1 to 11	6	DSSS	DBPSK	6.5
	38 to 46	46	OFDM	BPSK	13.5

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.

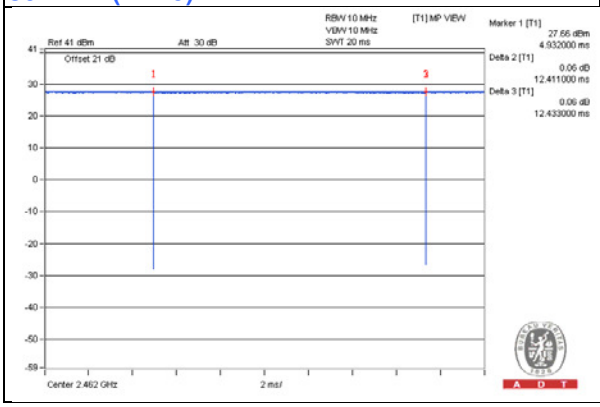
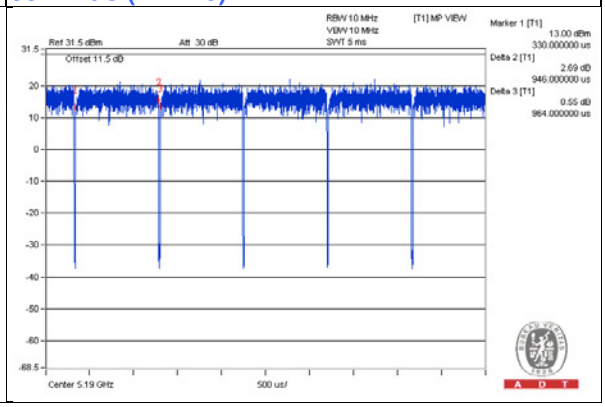
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
2.4GHz (802.11n(HT20)) + 5GHz (802.11ac(VHT40))	1 to 11	6	DSSS	DBPSK	6.5
	38 to 46	46	OFDM	BPSK	13.5

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	23deg. C, 66%RH	120Vac, 60Hz	Tim Ho
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Tim Ho
PLC	20deg. C, 59%RH	120Vac, 60Hz	Jason Huang

3.2 Duty Cycle of Test Signal

802.11n (HT20): Duty cycle = 1.918/1.942 = 0.988
802.11ac (VHT40): Duty cycle = 0.946 ms/0.964 ms = 0.981

802.11n (HT20)	802.11ac (VHT40)
	

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.	USB 3.0 HDD	WD	WDBACW0010HBK-SESN	WCAZAL625787	FCC DoC	Provided by Lab.
B.	NOTEBOOK COMPUTER	DELL	E5430	4YV4VY1	FCC DoC	Provided by Lab
C.	HUB	ZyXEL	ES-116P	S060H02000215	FCC DoC	Provided by Lab
D.	TELEPHONE	WONDER	WD-303	7C17KA05211	NA	Provided by Lab
	TELEPHONE	WONDER	WD-303	7C17KA04011	NA	Provided by Lab
E.	UPS POWER	Cyber Power	CSN27U12V3	NA	NA	Supplied by Client.

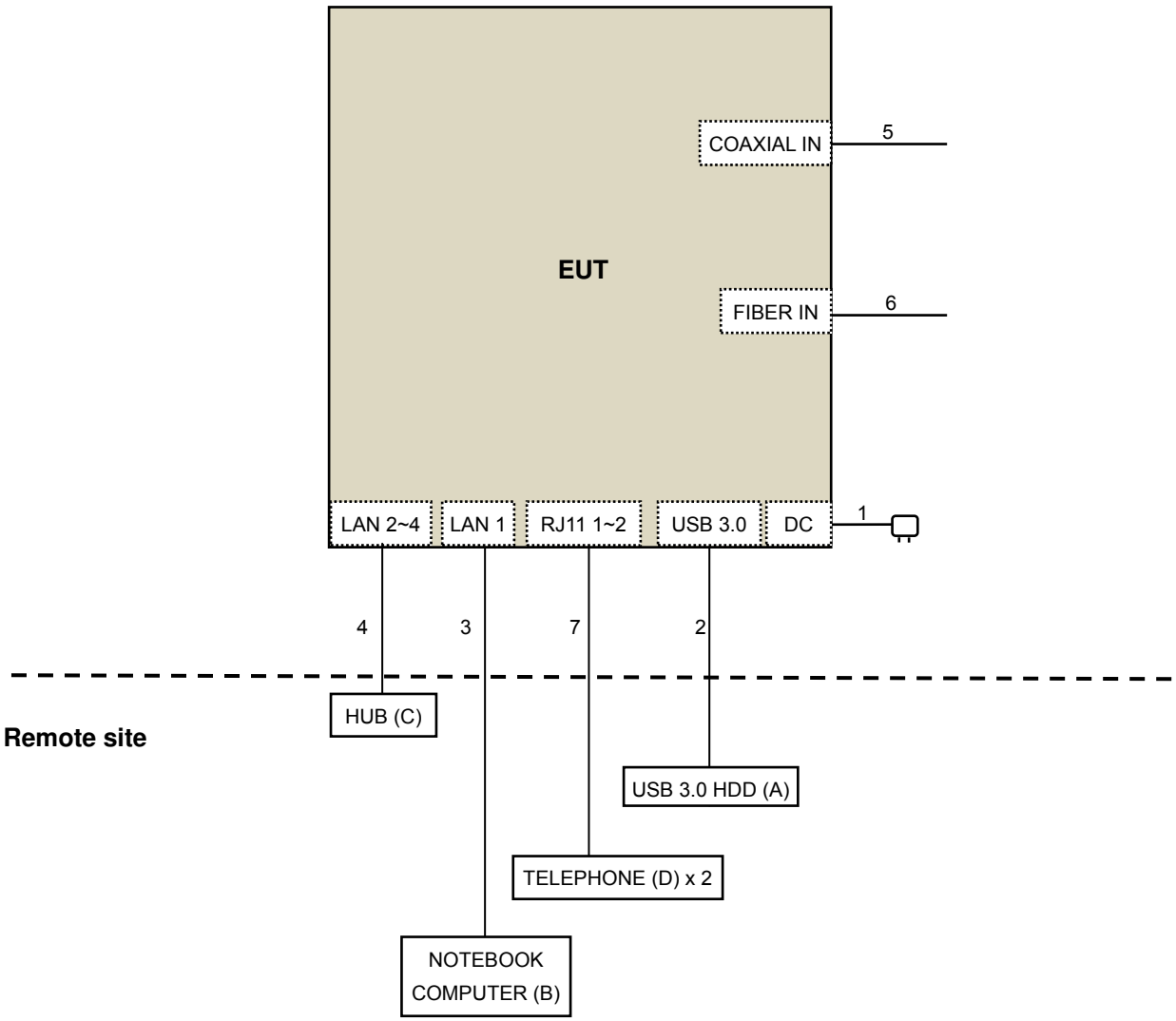
Note:

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

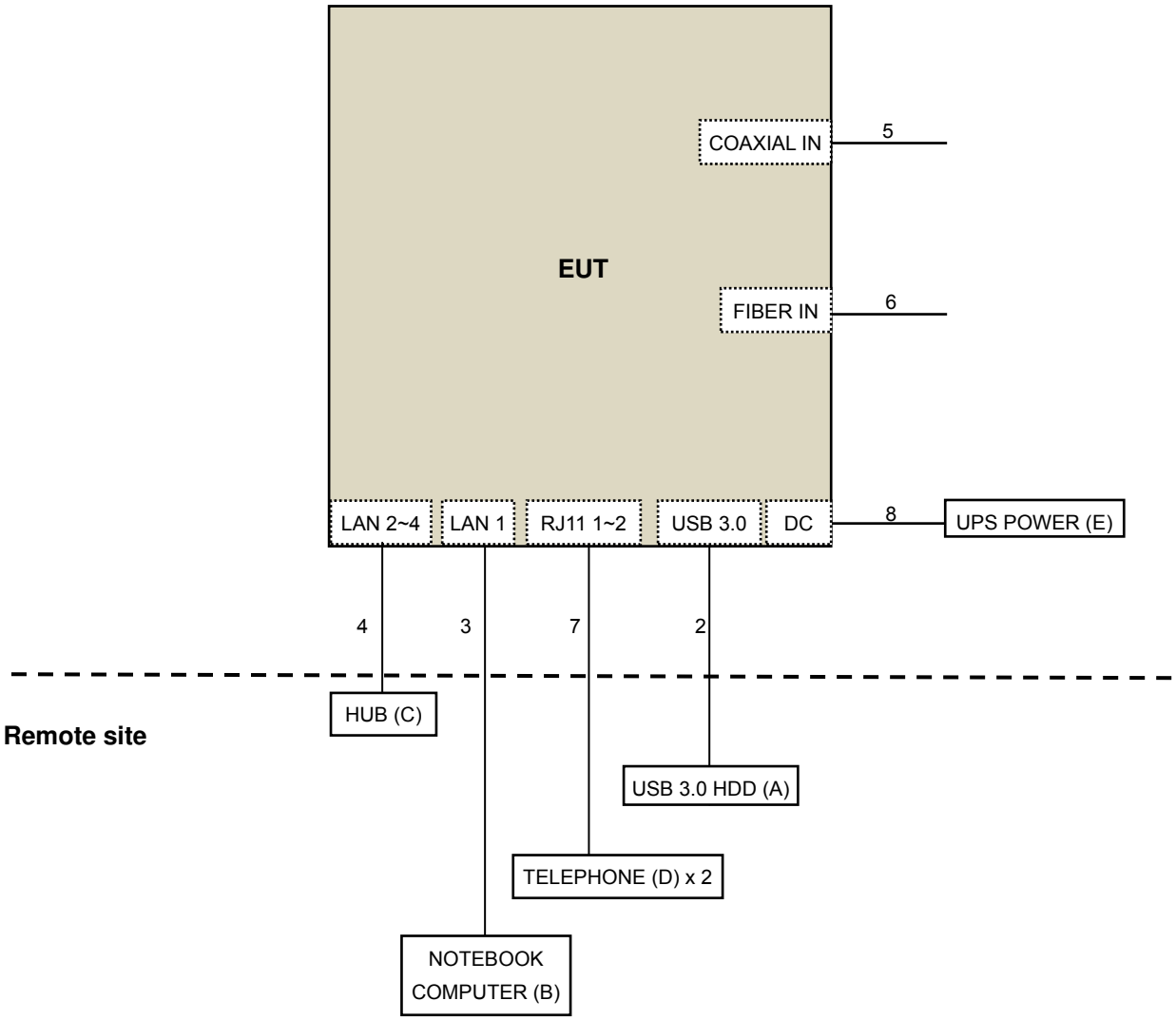
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC	1	1.4	No	0	Supplied by Client.
2.	USB	1	0.45	Yes	0	Provided by Lab
3.	RJ45	1	10	No	0	Provided by Lab
4.	RJ45	3	10	No	0	Provided by Lab
5.	COAXIAL	1	4	No	0	Provided by Lab
6.	FIBER	1	5	No	0	Supplied by Client.
7.	RJ11	2	10	No	0	Provided by Lab
8.	UPS	1	1	No	0	Provided by Lab

3.3.1 Configuration of System under Test

For mode 1



For mode 2


EUT
COAXIAL IN
5
FIBER IN
6
LAN 2~4
LAN 1
RJ11 1~2
USB 3.0
DC
8
UPS POWER (E)
4
3
7
2
HUB (C)
Remote site
USB 3.0 HDD (A)
TELEPHONE (D) x 2
NOTEBOOK
COMPUTER (B)

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 (15.247)
ANSI C63.10-2013

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

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 30dB below the highest level of the desired power:

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

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY50010156	Aug. 12, 2015	Aug. 11, 2016
Pre-Amplifier(*) EMCI	EMC001340	980142	Jan. 20, 2016	Jan. 19, 2018
Loop Antenna(*) Electro-Metrics	EM-6879	264	Dec. 16, 2014	Dec. 15, 2016
RF Cable	NA	LOOPCAB-001 LOOPCAB-002	Jan. 18, 2016	Jan. 17, 2017
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-07	May 08, 2015	May 07, 2016
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	138	Jan. 18, 2016	Jan. 17, 2017
RF Cable	8D	966-3-1 966-3-2 966-3-3	Apr. 03, 2015	Apr. 02, 2016
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Jan. 20, 2016	Jan. 19, 2017
Pre-Amplifier Agilent	8449B	3008A02465	Apr. 06, 2015	Apr. 05, 2016
RF Cable	EMC104-SM-SM-2000 EMC104-SM-SM-5000 EMC104-SM-SM-5000	150317 150321 150322	Mar. 31, 2015	Mar. 30, 2016
Spectrum Analyzer Keysight	N9030A	MY54490520	July 26, 2015	July 25, 2016
Pre-Amplifier EMCI	EMC184045	980143	Jan. 15, 2016	Jan. 14, 2017
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Jan. 08, 2016	Jan. 07, 2017
RF Cable	SUCOFLEX 102	36432/2 36441/2	Jan. 16, 2016	Jan. 15, 2017
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 Loop antenna was used for all emissions below 30 MHz.
4. The test was performed in 966 Chamber No. 3.
5. The FCC Site Registration No. is 147459
6. The CANADA Site Registration No. is 20331-1
7. Tested Date: Jan. 28 to Feb. 01, 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 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:

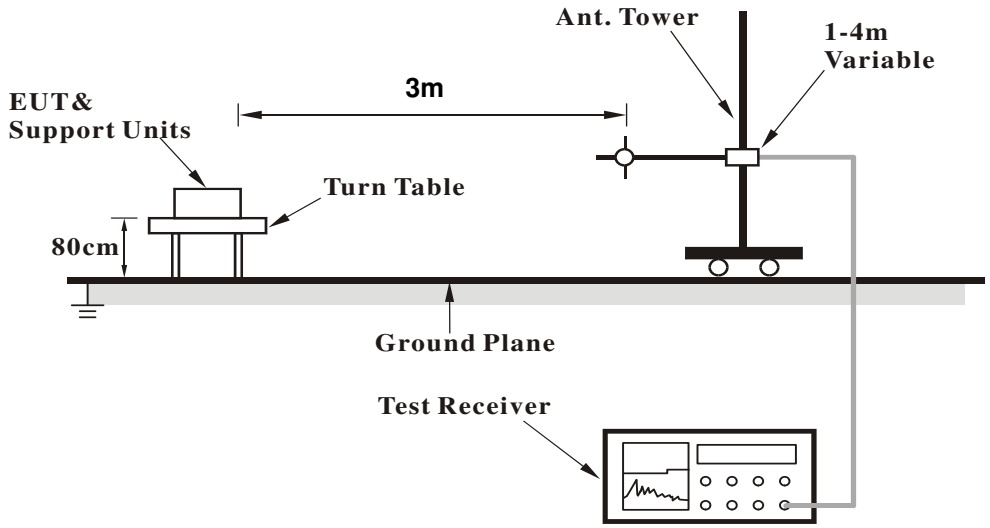
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
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/duty cycle)).
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle ≥ 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

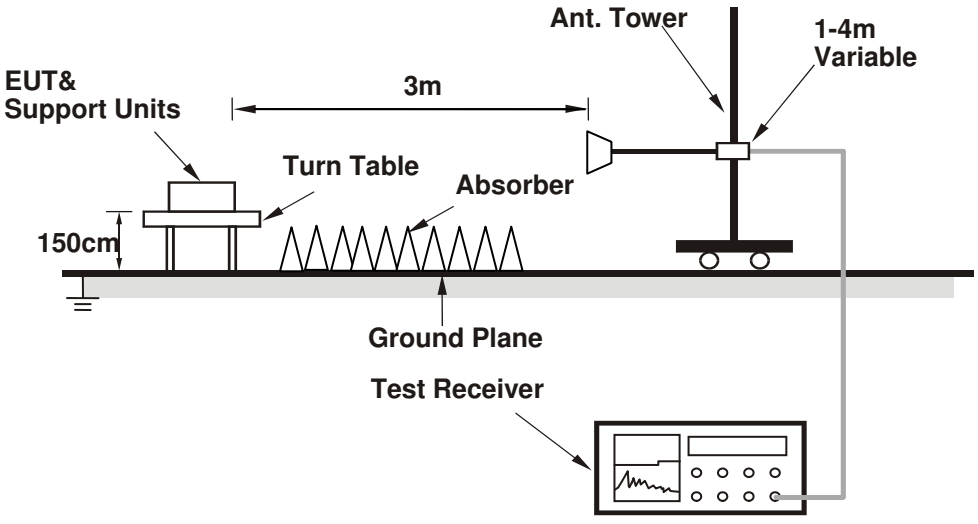
No deviation.

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 Conditions

a. Connected the EUT with the support unit B (Notebook Computer) which is placed on remote site.
b. Contorlling software (MTool.exe [2.0.0.7]) has been activated to set the EUT on specific status.

4.1.7 Test Results

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	4874.00	49.0 PK	74.0	-25.0	2.59 H	232	47.49	1.51
2	4874.00	35.7 AV	54.0	-18.3	2.59 H	232	34.19	1.51
3	7311.00	57.3 PK	74.0	-16.7	2.06 H	305	49.23	8.07
4	7311.00	43.5 AV	54.0	-10.5	2.06 H	305	35.43	8.07
5	#10460.00	61.8 PK	74.0	-12.2	1.06 H	201	48.69	13.11
6	#10460.00	50.4 AV	54.0	-3.6	1.06 H	201	37.29	13.11
7	15690.00	62.4 PK	74.0	-11.6	1.19 H	269	48.03	14.37
8	15690.00	48.4 AV	54.0	-5.6	1.19 H	269	34.03	14.37
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	4874.00	50.8 PK	74.0	-23.2	3.30 V	302	49.29	1.51
2	4874.00	37.9 AV	54.0	-16.1	3.30 V	302	36.39	1.51
3	7311.00	62.6 PK	74.0	-11.4	1.31 V	261	54.53	8.07
4	7311.00	47.6 AV	54.0	-6.4	1.31 V	261	39.53	8.07
5	#10460.00	68.4 PK	74.0	-5.6	1.26 V	310	55.29	13.11
6	**#10460.00**	**53.7 AV**	**54.0**	**-0.3**	**1.26 V**	**310**	**40.59**	**13.11**
7	15690.00	65.8 PK	74.0	-8.2	1.61 V	279	51.43	14.37
8	15690.00	50.6 AV	54.0	-3.4	1.61 V	279	36.23	14.37

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. " # ": The radiated frequency is out of the restricted band.

Below 1GHz Data:

FREQUENCY RANGE	Below 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	33.57	33.3 QP	40.0	-6.8	1.00 H	262	42.83	-9.58
2	189.26	30.3 QP	43.5	-13.2	1.50 H	283	41.24	-10.97
3	219.66	33.4 QP	46.0	-12.6	1.00 H	252	44.51	-11.15
4	403.27	41.2 QP	46.0	-4.8	1.00 H	323	46.14	-4.96
5	625.18	31.6 QP	46.0	-14.4	1.00 H	235	31.31	0.25
6	800.23	34.2 QP	46.0	-11.8	1.50 H	115	31.16	3.05
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	33.35	33.7 QP	40.0	-6.4	1.00 V	68	43.27	-9.62
2	85.76	31.6 QP	40.0	-8.4	1.00 V	174	45.53	-13.89
3	218.65	35.8 QP	46.0	-10.2	1.00 V	27	47.07	-11.23
4	351.14	39.3 QP	46.0	-6.8	1.00 V	351	45.52	-6.27
5	400.12	39.2 QP	46.0	-6.8	1.00 V	37	44.19	-5.02
6	625.14	34.8 QP	46.0	-11.2	1.50 V	232	34.52	0.25

REMARKS:

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

4.2 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. 28, 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.

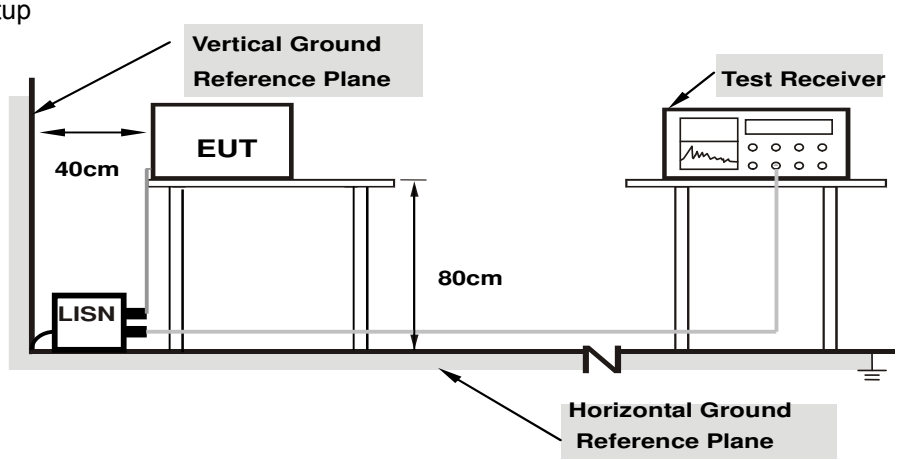
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

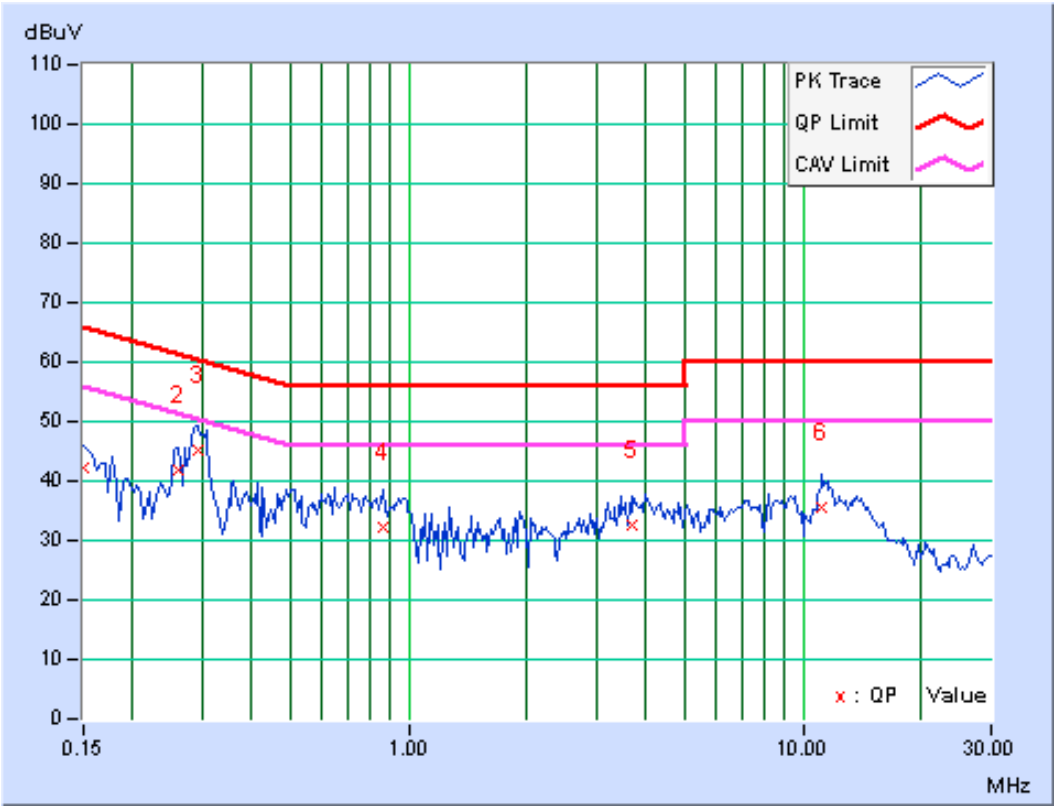
4.2.7 Test Results (Mode 1)

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	0.15000	10.38	31.73	20.73	42.11	31.11	66.00	56.00	-23.89	-24.89
2	0.25938	10.35	31.48	24.16	41.83	34.51	61.45	51.45	-19.62	-16.94
3	0.29453	10.35	35.00	25.44	45.35	35.79	60.40	50.40	-15.04	-14.60
4	0.85703	10.33	21.88	13.84	32.21	24.17	56.00	46.00	-23.79	-21.83
5	3.66797	10.55	22.15	15.60	32.70	26.15	56.00	46.00	-23.30	-19.85
6	11.19141	10.98	24.50	19.90	35.48	30.88	60.00	50.00	-24.52	-19.12

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.

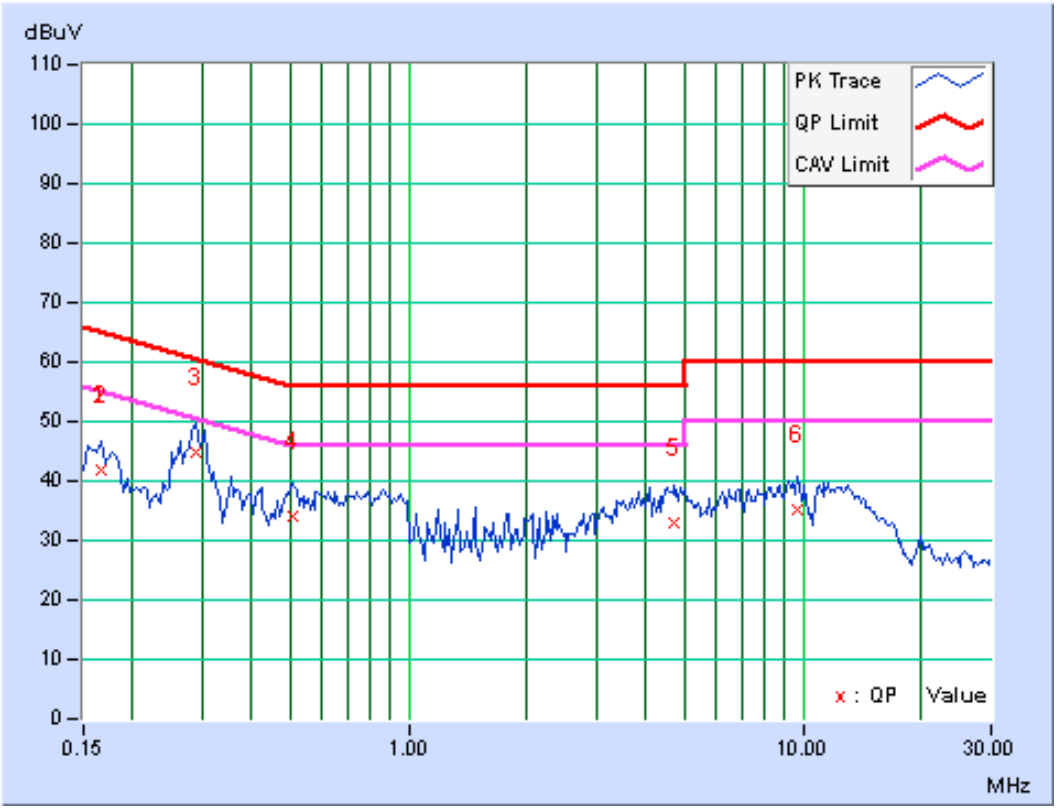


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	0.16562	10.38	31.31	21.17	41.69	31.55	65.18	55.18	-23.48	-23.62
2	0.16562	10.38	31.31	20.95	41.69	31.33	65.18	55.18	-23.48	-23.84
3	0.29063	10.40	34.42	23.92	44.82	34.32	60.51	50.51	-15.68	-16.18
4	0.50938	10.41	23.70	14.44	34.11	24.85	56.00	46.00	-21.89	-21.15
5	4.70703	10.71	22.27	16.16	32.98	26.87	56.00	46.00	-23.02	-19.13
6	9.63281	10.91	24.10	19.69	35.01	30.60	60.00	50.00	-24.99	-19.40

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.



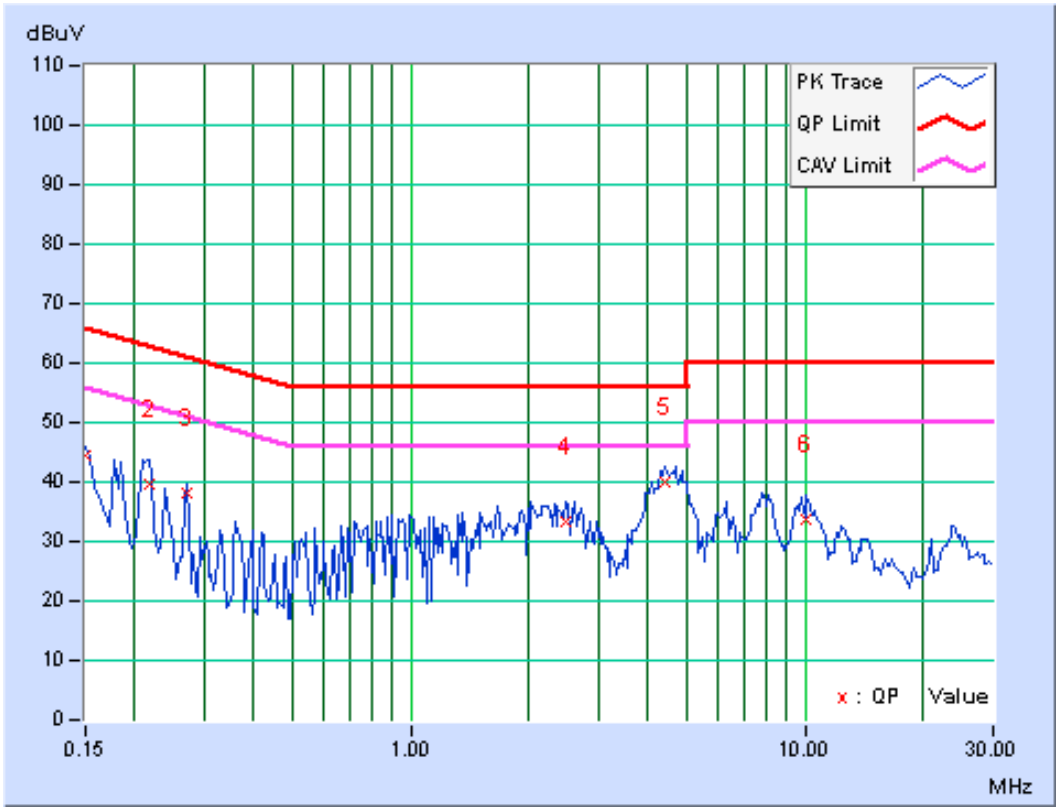
4.2.8 Test Results (Mode 2)

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

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	10.26	34.20	28.19	44.46	38.45	66.00	56.00	-21.54	-17.55
2	0.21641	10.22	29.54	26.60	39.76	36.82	62.96	52.96	-23.19	-16.13
3	0.27109	10.23	27.89	25.53	38.12	35.76	61.08	51.08	-22.97	-15.33
4	2.48047	10.25	23.21	18.10	33.46	28.35	56.00	46.00	-22.54	-17.65
5	4.43750	10.39	29.44	24.81	39.83	35.20	56.00	46.00	-16.17	-10.80
6	10.02344	10.52	23.22	18.75	33.74	29.27	60.00	50.00	-26.26	-20.73

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.

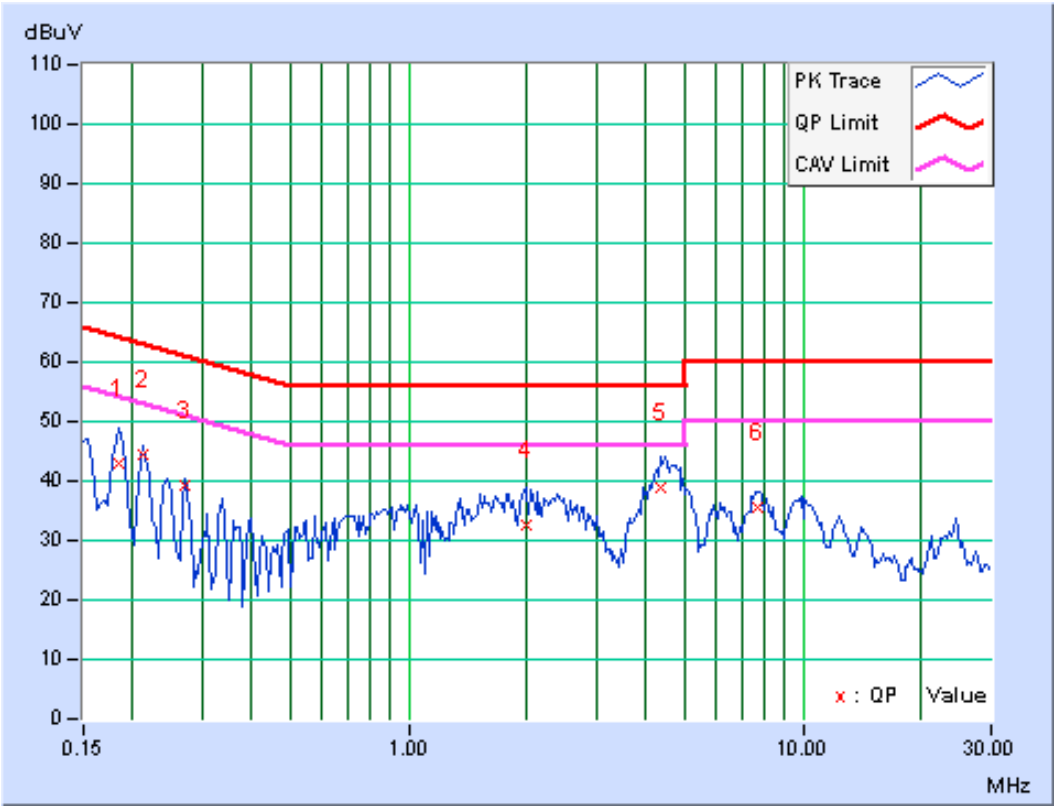


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	0.18516	10.21	32.58	26.86	42.79	37.07	64.25	54.25	-21.46	-17.18
2	**0.21250**	**10.20**	**34.26**	**33.10**	**44.46**	**43.30**	**63.11**	**53.11**	**-18.65**	**-9.81**
3	0.27109	10.21	28.91	26.86	39.12	37.07	61.08	51.08	-21.97	-14.02
4	1.97656	10.21	22.21	14.01	32.42	24.22	56.00	46.00	-23.58	-21.78
5	4.33984	10.40	28.56	20.35	38.96	30.75	56.00	46.00	-17.04	-15.25
6	7.72266	10.48	24.95	20.30	35.43	30.78	60.00	50.00	-24.57	-19.22

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:

Linko EMC/RF Lab
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab
Tel: 886-3-6668565
Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab
Tel: 886-3-3183232
Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

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

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