



FCC TEST REPORT (Z-Wave)

REPORT NO.: RF130927E08E-2

MODEL NO.: FiOS-G1100

FCC ID: 2ABTEG1100

RECEIVED: Sep. 27, 2013

TESTED: Oct. 07 to Dec. 06, 2013

ISSUED: Mar. 21, 2014

APPLICANT: Verizon Online LLC

ADDRESS: 1300 I Street NW, Room 400W, Washington, District of Columbia, 20005 United State

ISSUED BY: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

LAB ADDRESS : No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan, R.O.C.

TEST LOCATION (1): No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, 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.

This report should not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification



Table of Contents

RELEASE CONTROL RECORD	3
1. CERTIFICATION	4
2. SUMMARY OF TEST RESULTS.....	5
2.1 MEASUREMENT UNCERTAINTY	5
3. GENERAL INFORMATION	6
3.1 GENERAL DESCRIPTION OF EUT	6
3.2 DESCRIPTION OF TEST MODES.....	7
3.3 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL.....	8
3.4 DESCRIPTION OF SUPPORT UNITS	10
3.4.1 CONFIGURATION OF SYSTEM UNDER TEST.....	11
3.5 GENERAL DESCRIPTION OF APPLIED STANDARDS	13
4. TEST TYPES AND RESULTS.....	14
4.1 CONDUCTED EMISSION MEASUREMENT.....	14
4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT.....	14
4.1.2 TEST INSTRUMENTS.....	14
4.1.3 TEST PROCEDURES	15
4.1.4 DEVIATION FROM TEST STANDARD.....	15
4.1.5 TEST SETUP	15
4.1.6 EUT OPERATING CONDITIONS.....	16
4.1.7 TEST RESULTS	17
4.2 RADIATED EMISSION AND BAND EDGE MEASUREMENT.....	21
4.2.1 LIMITS OF RADIATED EMISSION AND BAND EDGE MEASUREMENT	21
4.2.2 TEST INSTRUMENTS.....	22
4.2.3 TEST PROCEDURES	24
4.2.4 DEVIATION FROM TEST STANDARD.....	24
4.2.5 TEST SETUP	25
4.2.6 EUT OPERATING CONDITIONS.....	25
4.2.7 TEST RESULTS	26
5. PHOTOGRAPHS OF THE TEST CONFIGURATION.....	32
6. INFORMATION ON THE TESTING LABORATORIES	33
7. APPENDIX A – MODIFICATION RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB.....	34



A D T

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF130927E08E-2	Original release	Mar. 21, 2014



A D T

1. CERTIFICATION

PRODUCT : FiOS Quantum Gateway
BRAND NAME : Verizon
MODEL NO. : FiOS-G1100
TEST SAMPLE : ENGINEERING SAMPLE
APPLICANT : Verizon Online LLC
TESTED : Oct. 07 to Dec. 06, 2013
STANDARDS : **FCC Part 15, Subpart C (Section 15.249)**
ANSI C63.10-2009

The above equipment (Model: FiOS-G1100) 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:** Mar. 21, 2014
(Elsie Hsu, Specialist)

APPROVED BY :  , **DATE:** Mar. 21, 2014
(May Chen, Manager)

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C (Section 15.249)			
STANDARD PARAGRAPH	TEST TYPE	RESULT	REMARK
15.207	Conducted Emission Test	PASS	Meet the requirement of limit. Minimum passing margin is -14.75dB at .15000MHz.
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 -0.1dB at 908.42MHz & 928.00MHz

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:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	150kHz ~ 30MHz	2.98dB
	30MHz ~ 1GHz	5.37 dB
Radiated emission	1GHz ~6GHz	3.72 dB
	6GHz ~ 18GHz	4.00 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	FiOS Quantum Gateway
MODEL NO.	FiOS-G1100
POWER SUPPLY	DC 12V from power adapter
MODULATION TYPE	FSK
CARRIER FREQUENCY OF EACH CHANNEL	908.4MHz ~ 916.0MHz
NUMBER OF CHANNEL	2
ANTENNA TYPE	Please see NOTE
DATA CABLE	NA
I/O PORTS	Refer to user's manual
ASSOCIATED DEVICES	Adapter x1 Zigbee module (option) x1

NOTE:

1. There are Z-Wave technology and WLAN (2.4GHz & 5GHz) technology used for the EUT.
2. The EUT inside has one Zigbee technology module (option).

Zigbee module (test only)		
Product Name	Brand	FCC ID
Zigbee Wireless Module	GreenWave Reality	Z3M-ZBMOD1

3. The emission of the simultaneous operation (Z-Wave, Zigbee & WLAN) has been evaluated and no non-compliance was found.

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

WLAN Antenna Spec.				
Transmitter Circuit	Gain (dBi) (Include cable loss)	Antenna Type	Connector Type	Frequency range (GHz to GHz)
Chain (0)	-0.4	Metal	NA	2.4~2.4835
	3.56			5.15~5.25
	4.05			5.725~5.85
Chain (1)	4.1	Metal	NA	2.4~2.4835
	5.3			5.15~5.25
	5.71			5.725~5.85
Chain (2)	3.36	Metal	NA	2.4~2.4835
	4.6			5.15~5.25
	4.21			5.725~5.85
Z-Wave Antenna Spec.				
Gain (dBi) (Include cable loss)	Antenna Type	Connector Type	Frequency range (MHz to MHz)	
1.73	Metal	NA	902~928	
Note: 1. For 1Tx mode will fix transmission on Chain (0). 2. For 2Tx mode will fix transmission on Chain (0) and Chain (1)				

5. The EUT must be supplied with a power adapter and following two different model names could be chosen:

No.	Brand	Model No.	Spec.
1	Ktec	KSAS0361200300HU	AC Input : 100-240V, 1.0A, 50/60Hz DC Output : 12V, 3.0A DC output cable(unshielded ,1.8m)
2	LEI	MU36-8120300-A1	AC Input : 100-240V, 1.0A, 50/60Hz DC Output : 12V, 3.0A DC output cable(unshielded ,1.8m)
From the above adapters, the worst radiated emission was found in Adapter 1 . Therefore only the test data of the modes were recorded in this report.			

6. The above EUT information was declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

2 channels are provided in this EUT.

Channel	Freq. (MHz)
1	908.4
2	916.0



3.3 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO			DESCRIPTION
	PLC	RE<1G	RE ³ 1G	
1	√	√	√	With adapter 1
2	√	-	-	With adapter 2

Where **RE<1G**: Radiated Emission below 1GHz **RE³1G**: Radiated Emission above 1GHz
PLC: Power Line Conducted Emission

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.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1 to 2	2	FSK

RADIATED EMISSION TEST (BELOW 1 GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations axis and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1 to 2	1, 2	FSK

RADIATED EMISSION TEST (ABOVE 1 GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations axis and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1 to 2	1, 2	FSK

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
PLC	26deg. C, 66%RH	120Vac, 60Hz	Sean Huang
	27deg. C, 62%RH	120Vac, 60Hz	Sean Huang
RE ³ 1G	30deg. C, 70%RH	120Vac, 60Hz	Tim Ho
RE<1G	21deg. C, 69%RH	120Vac, 60Hz	Nelson Teng

3.4 DESCRIPTION OF SUPPORT UNITS

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

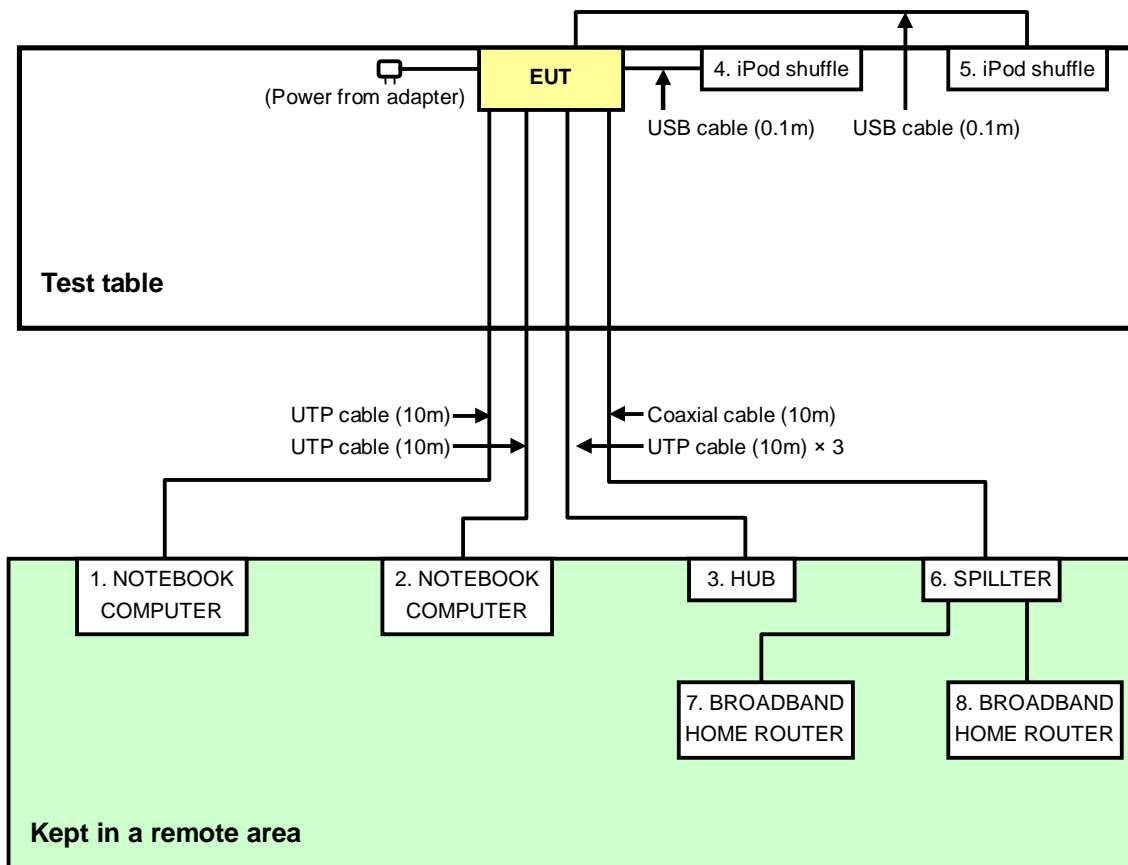
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP32LA	FSLB32S	FCC DoC
2	NOTEBOOK COMPUTER	DELL	PP32LA	HSLB32S	FCC DoC
3	HUB	Linksys	SD028	NA	NA
4	USB FLASH DISK (for other test items)	SanDisk	SDCZ33	NA	FCC DoC
	iPod shuffle (for conducted test)	Apple	MC749TA/A	CC4DMFJUDFDM	NA
5	USB FLASH DISK (for other test items)	SanDisk	SDCZ33	NA	FCC DoC
	iPod shuffle (for conducted test)	Apple	MC749TA/A	CC4DN25WDFDM	NA
6	SPILLTER	DIRECTV	SWS-2-WNC	NA	NA
7	BROADBAND HOME ROUTER	NA	JG101	NA	NA
8	BROADBAND HOME ROUTER	NA	JG101	NA	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	UTP Cable, 10m
2	UTP Cable, 10m
3	UTP Cable, 10m
4	NA (for other test items)
	USB Cable, 0.1m (for Conducted test)
5	NA (for other test items)
	USB Cable, 0.1m (for Conducted test)
6	Coaxial Cable, 10m
7	Coaxial Cable, 3m
8	Coaxial Cable, 3m

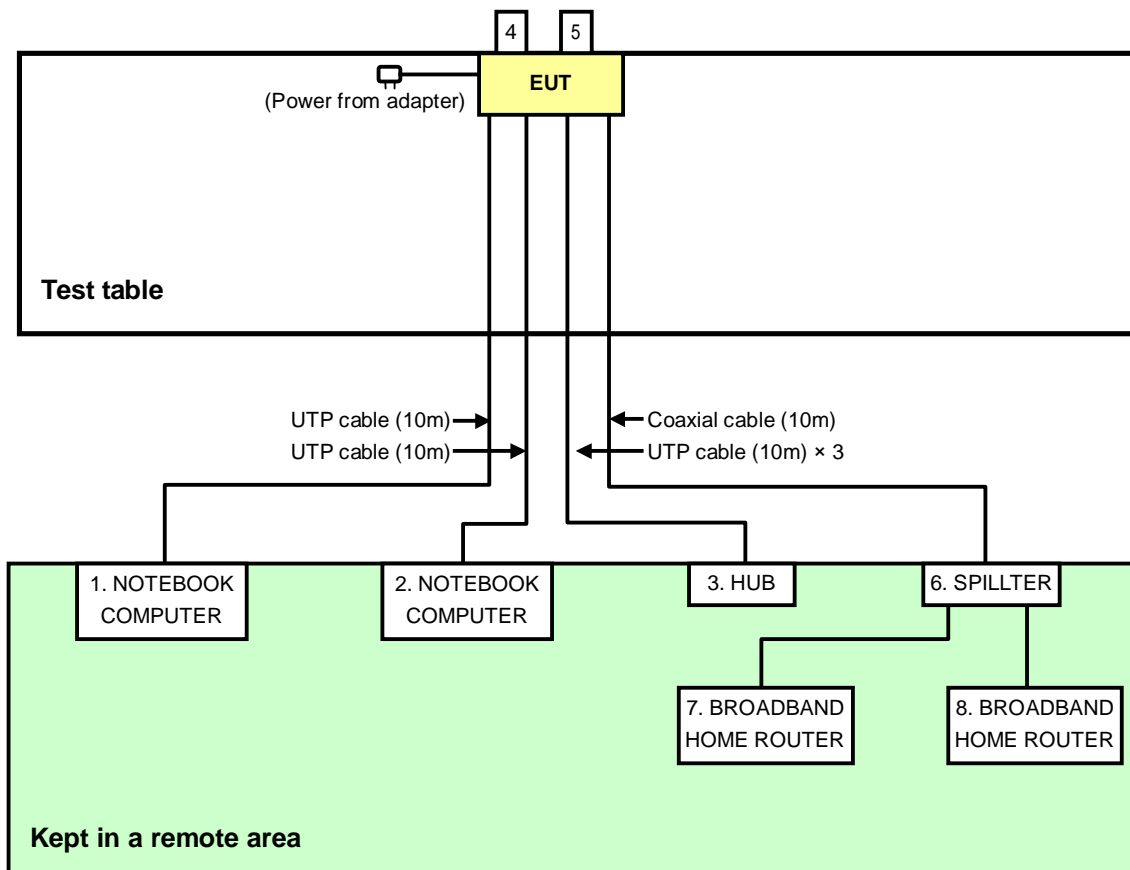
NOTE: All power cords of the above support units are non shielded (1.8m).

3.4.1 CONFIGURATION OF SYSTEM UNDER TEST

For Conducted Emission Test:



For other test items:



Note: Support unit 4 & 5 are USB FLASH DISK.



3.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C (Section 15.249)

ANSI C63.10-2009

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 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	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 0.50 MHz.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS 30	100375	Mar. 08, 2013	Mar. 07, 2014
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK8127	8127-522	Sep. 05, 2013	Sep. 04, 2014
Line-Impedance Stabilization Network (for Peripheral)	ENV216	100072	June 06, 2013	June 05, 2014
RF Cable (JYEBAO)	5DFB	COCCAB-001	Mar. 11, 2013	Mar. 10, 2014
50 ohms Terminator	50	EMC-03	Sep. 24, 2013	Sep. 23, 2014
Software ADT	BV ADT_Cond_V7.3.7. 3	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
3. The VCCI Con C Registration No. is C-3611.
4. Tested Date: Oct. 07 to 22, 2013

4.1.3 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) were not recorded.

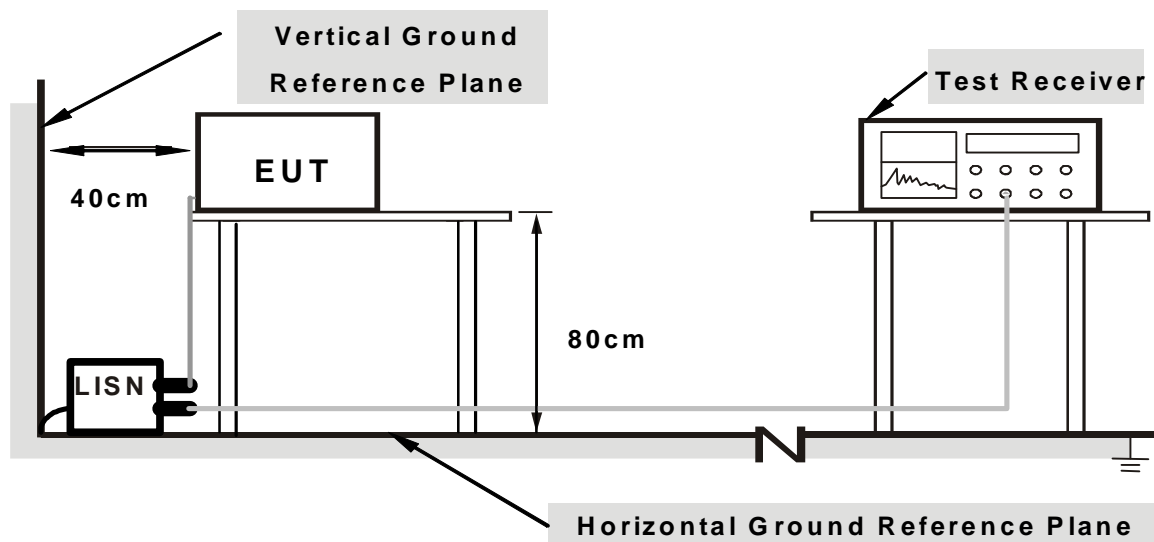
NOTE:

1. The resolution bandwidth of test receiver is 9kHz for Quasi-peak detection (QP) & Average detection (AV).

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



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

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.1.6 EUT OPERATING CONDITIONS

1. Placed the EUT on testing table.
2. Prepared computer system (support units 1) to act as communication partner.
3. The communication partner ran test program “Teraterm command” to enable EUT under transmission/receiving condition continuously.

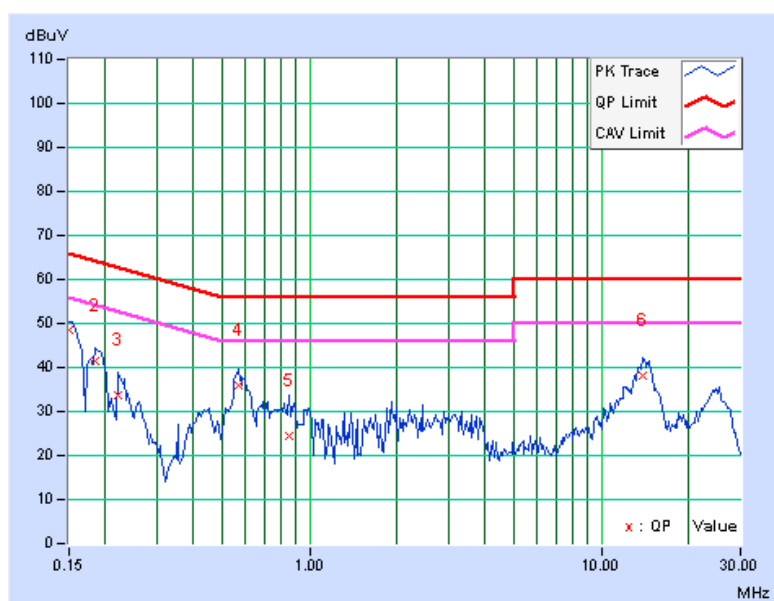
4.1.7 TEST RESULTS (MODE 1)

PHASE	Line (L)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
--------------	----------	--------------------------	--------------------------------

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.08	48.55	34.10	48.63	34.18	66.00	56.00	-17.37	-21.82
2	0.18516	0.09	41.30	26.26	41.39	26.35	64.25	54.25	-22.86	-27.90
3	0.22031	0.10	33.66	18.45	33.76	18.55	62.81	52.81	-29.04	-34.25
4	0.56797	0.15	35.81	29.18	35.96	29.33	56.00	46.00	-20.04	-16.67
5	0.84922	0.16	24.31	16.06	24.47	16.22	56.00	46.00	-31.53	-29.78
6	13.84375	0.59	37.49	29.03	38.08	29.62	60.00	50.00	-21.92	-20.38

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





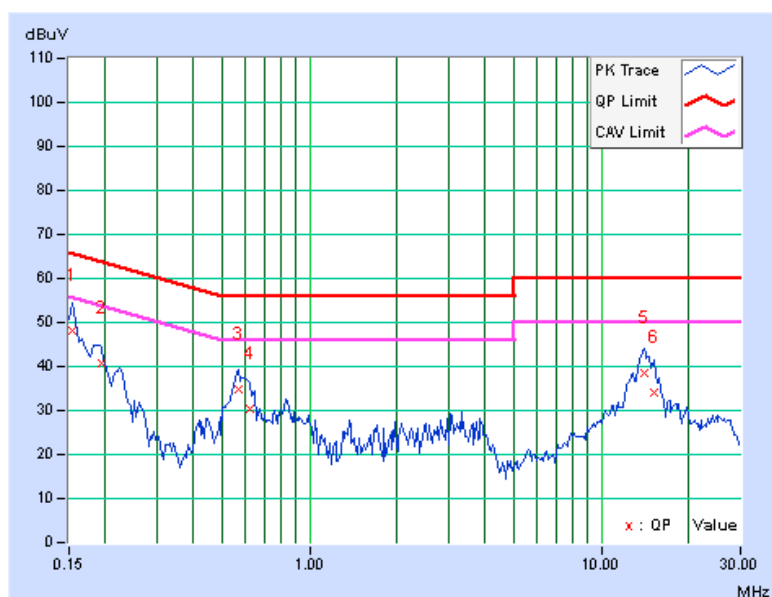
A D T

PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
--------------	-------------	--------------------------	--------------------------------

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	(dB)	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	0.09	48.19	33.30	48.28	33.39	65.79	55.79	-17.51	-22.40
2	0.19297	0.10	40.71	26.22	40.81	26.32	63.91	53.91	-23.10	-27.59
3	0.56797	0.15	34.84	27.57	34.99	27.72	56.00	46.00	-21.01	-18.28
4	0.62656	0.15	30.25	21.34	30.40	21.49	56.00	46.00	-25.60	-24.51
5	14.03125	0.59	38.00	31.32	38.59	31.91	60.00	50.00	-21.41	-18.09
6	15.14844	0.62	33.61	25.91	34.23	26.53	60.00	50.00	-25.77	-23.47

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





A D T

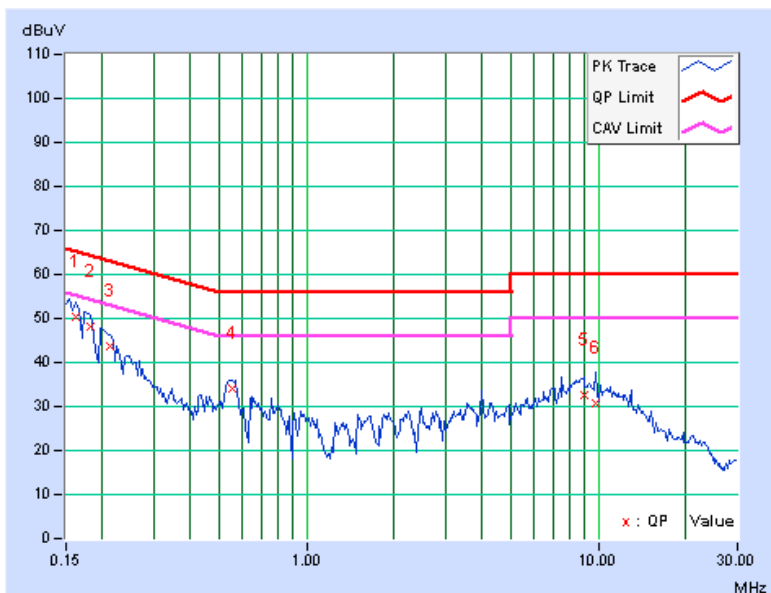
4.1.8 TEST RESULTS (MODE 2)

PHASE	Line (L)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
--------------	----------	--------------------------	--------------------------------

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor (dB)	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16172	0.08	50.29	33.86	50.37	33.94	65.38	55.38	-15.00	-21.43
2	0.18125	0.09	48.07	34.23	48.16	34.32	64.43	54.43	-16.27	-20.11
3	0.21250	0.10	43.50	30.27	43.60	30.37	63.11	53.11	-19.50	-22.73
4	0.55625	0.15	34.10	28.50	34.25	28.65	56.00	46.00	-21.75	-17.35
5	8.91797	0.44	32.31	27.29	32.75	27.73	60.00	50.00	-27.25	-22.27
6	9.81641	0.46	30.36	25.39	30.82	25.85	60.00	50.00	-29.18	-24.15

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





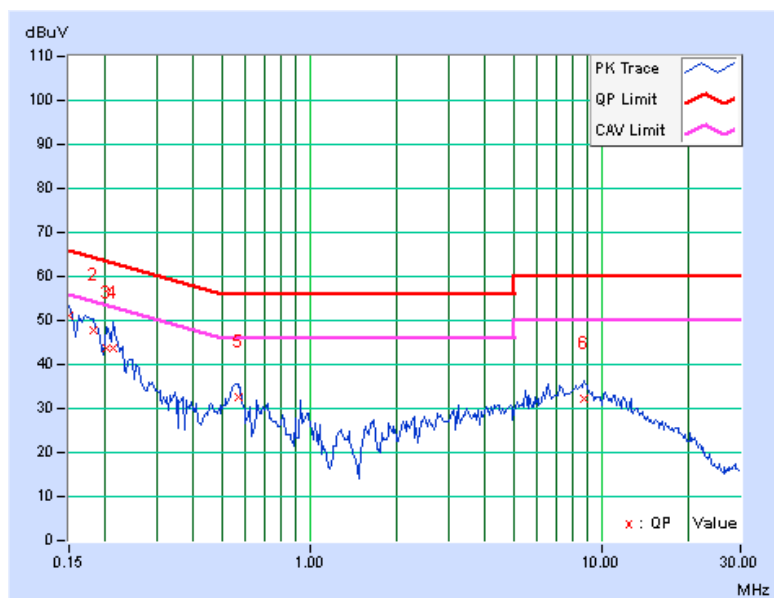
A D T

PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.09	51.16	38.54	51.25	38.63	66.00	56.00	-14.75	-17.37
2	0.18125	0.10	47.60	34.19	47.70	34.29	64.43	54.43	-16.73	-20.14
3	0.20078	0.10	43.50	27.84	43.60	27.94	63.58	53.58	-19.98	-25.64
4	0.21250	0.10	43.58	28.48	43.68	28.58	63.11	53.11	-19.42	-24.52
5	0.56797	0.15	32.62	27.42	32.77	27.57	56.00	46.00	-23.23	-18.43
6	8.71094	0.43	31.61	26.77	32.04	27.20	60.00	50.00	-27.96	-22.80

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



4.2 RADIATED EMISSION AND BAND EDGE MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION AND BAND EDGE 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)
902 ~ 928 MHz	50	500
2400 ~ 2483.5 MHz	50	500
5725 ~ 5875 MHz	50	500
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.



A D T

4.2.2 TEST INSTRUMENTS

For Below 1GHz:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY51210105	Jan. 29,2013	Jan. 28,2014
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 14, 2012	Nov. 13, 2013
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Mar. 19, 2013	Mar. 18, 2014
RF Cable	NA	CHGCAB_001	Oct. 05, 2013	Oct. 04, 2014
Horn_Antenna AISI	AIH.8018	0000320091110	Nov. 19, 2012	Nov. 18, 2013
Pre-Amplifier Agilent	8449B	3008A02578	June 25, 2013	June 24, 2014
RF Cable	NA	RF104-201 RF104-203 RF104-204	Dec. 25, 2012	Dec. 24, 2013
Spectrum Analyzer Agilent	E4446A	MY48250253	Aug. 28, 2013	Aug. 27, 2014
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 14, 2012	Nov. 13, 2013
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 08, 2013	Oct. 07, 2014
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 horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
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. Tested Date: Oct. 16, 2013



A D T

For Above 1GHz:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY50010156	Jan. 16, 2013	Jan. 15, 2014
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-04	Nov. 13, 2013	Nov. 12, 2014
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Mar. 25, 2013	Mar. 24, 2014
RF Cable	NA	CHHCAB_001	Oct. 06, 2013	Oct. 05, 2014
Horn_Antenna AISI	AIH.8018	0000320091110	Nov. 13, 2013	Nov. 12, 2014
Pre-Amplifier Agilent	8449B	3008A02578	June 25, 2013	June 24, 2014
RF Cable	NA	RF104-205 RF104-207 RF104-202	Dec. 26, 2012	Dec. 25, 2013
Spectrum Analyzer Agilent	E4446A	MY48250253	Aug. 28, 2013	Aug. 27, 2014
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 13, 2013	Nov. 12, 2014
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 08, 2013	Oct. 07, 2014
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 horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in 966 Chamber No. H.
4. The FCC Site Registration No. is 797305.
5. The CANADA Site Registration No. is IC 7450H-3.
6. Tested Date: Dec. 03, 2013

4.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters 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. 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:

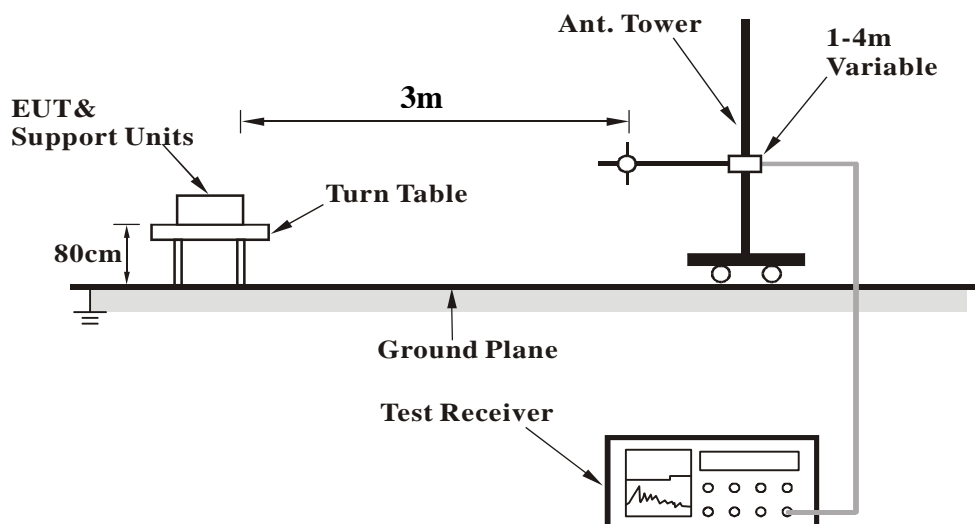
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP), Peak detection (PK) and Average detection (AV) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz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

4.2.4 DEVIATION FROM TEST STANDARD

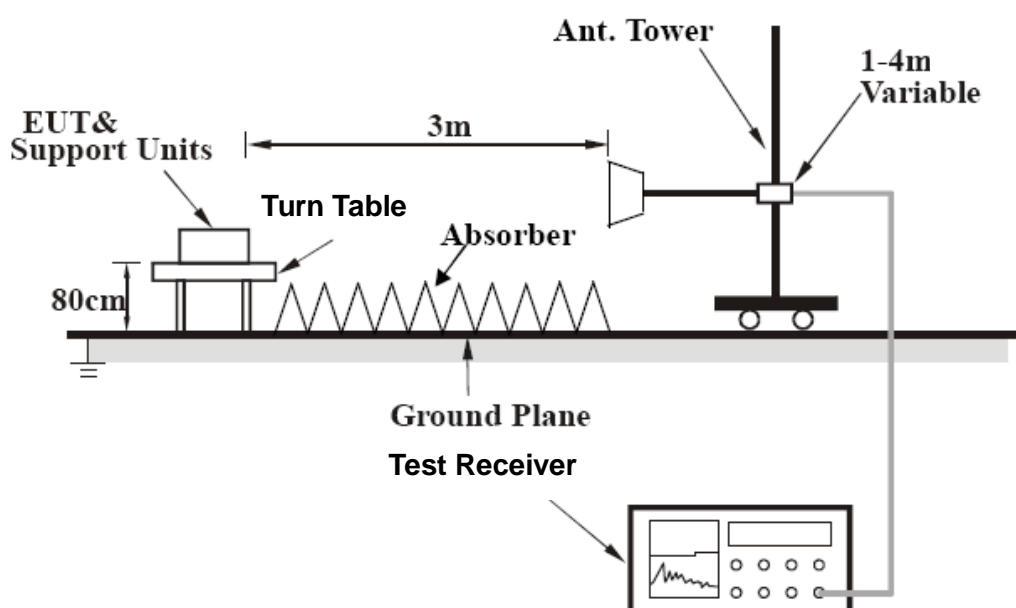
No deviation.

4.2.5 TEST SETUP

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.2.6 EUT OPERATING CONDITIONS

Set the EUT under transmission condition continuously at specific channel frequency.



A D T

4.2.7 TEST RESULTS

BELOW 1GHz DATA

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		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	163.13	34.0 QP	43.5	-9.5	2.00 H	100	47.55	-13.51
2	375.03	40.8 QP	46.0	-5.2	1.00 H	55	51.39	-10.62
3	625.00	42.0 QP	46.0	-4.0	1.00 H	217	46.62	-4.58
4	750.03	40.4 QP	46.0	-5.6	1.00 H	245	42.59	-2.17
5	875.02	45.5 QP	46.0	-0.6	1.00 H	211	46.14	-0.69
6	902.00	40.3 QP	46.0	-5.7	1.00 H	109	40.37	-0.04
7	*908.42	98.8 PK	114.0	-15.2	1.00 H	109	98.66	0.15
8	*908.42	93.4 AV	94.0	-0.6	1.00 H	109	93.24	0.15
9	928.00	39.8 QP	46.0	-6.2	1.00 H	109	39.21	0.56
10	959.94	41.2 QP	46.0	-4.8	2.00 H	117	40.43	0.81
11	1000.00	42.0 QP	54.0	-12.0	1.00 H	255	40.85	1.18

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	47.95	36.0 QP	40.0	-4.0	1.00 V	42	49.71	-13.68
2	81.22	35.4 QP	40.0	-4.6	1.00 V	93	53.82	-18.41
3	396.18	38.3 QP	46.0	-7.7	1.50 V	225	48.46	-10.12
4	500.01	42.7 QP	46.0	-3.3	1.00 V	71	50.20	-7.53
5	625.00	43.1 QP	46.0	-2.9	1.00 V	334	47.72	-4.58
6	875.02	41.4 QP	46.0	-4.7	1.00 V	53	42.04	-0.69
7	902.00	41.9 QP	46.0	-4.1	1.27 V	197	41.93	-0.04
8	*908.42	100.3 PK	114.0	-13.7	1.27 V	197	100.15	0.15
9	*908.42	93.9 AV	94.0	-0.1	1.27 V	197	93.73	0.15
10	928.00	42.0 QP	46.0	-4.0	1.27 V	197	41.40	0.56
11	959.94	43.5 QP	46.0	-2.5	1.00 V	286	42.68	0.81

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.



A D T

CHANNEL	TX Channel 2	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		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	163.13	34.2 QP	43.5	-9.3	1.00 H	92	47.68	-13.51
2	375.03	39.5 QP	46.0	-6.5	1.00 H	45	50.13	-10.62
3	500.01	40.1 QP	46.0	-5.9	1.50 H	330	47.64	-7.53
4	625.00	42.9 QP	46.0	-3.1	1.00 H	129	47.52	-4.58
5	750.03	39.7 QP	46.0	-6.4	1.00 H	237	41.82	-2.17
6	875.00	45.4 QP	46.0	-0.6	1.39 H	299	46.12	-0.70
7	902.00	41.2 QP	46.0	-4.8	1.00 H	79	41.25	-0.04
8	*916.00	99.1 PK	114.0	-14.9	1.00 H	79	98.78	0.34
9	*916.00	81.4 AV	94.0	-12.6	1.00 H	79	81.04	0.34
10	928.00	43.4 QP	46.0	-2.7	1.00 H	79	42.79	0.56

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	47.85	38.1 QP	40.0	-1.9	1.00 V	152	51.76	-13.67
2	80.68	35.6 QP	40.0	-4.5	1.00 V	6	53.77	-18.22
3	375.03	38.3 QP	46.0	-7.7	1.50 V	255	48.91	-10.62
4	500.01	43.0 QP	46.0	-3.0	1.00 V	81	50.52	-7.53
5	625.00	42.5 QP	46.0	-3.5	1.00 V	295	47.10	-4.58
6	875.02	41.6 QP	46.0	-4.4	1.00 V	112	42.29	-0.69
7	902.00	42.1 QP	46.0	-4.0	1.24 V	196	42.09	-0.04
8	*916.00	100.9 PK	114.0	-13.1	1.24 V	196	100.53	0.34
9	*916.00	83.1 AV	94.0	-10.9	1.24 V	196	82.79	0.34
10	928.00	45.9 QP	46.0	-0.1	1.24 V	196	45.31	0.56

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.



A D T

ABOVE 1GHz DATA

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 10GHz		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	1816.80	40.0 PK	74.0	-34.0	1.00 H	90	45.78	-5.78
2	1816.80	33.6 AV	54.0	-20.4	1.00 H	90	39.38	-5.78
3	2725.20	50.0 PK	74.0	-24.0	1.00 H	90	52.64	-2.64
4	2725.20	43.6 AV	54.0	-10.4	1.00 H	90	46.24	-2.64
5	3633.60	46.9 PK	74.0	-27.1	1.00 H	95	46.30	0.60
6	3633.60	40.5 AV	54.0	-13.5	1.00 H	95	39.90	0.60
7	4542.00	51.8 PK	74.0	-22.2	1.10 H	143	45.73	6.07
8	4542.00	45.4 AV	54.0	-8.6	1.10 H	143	39.33	6.07
9	5450.40	50.1 PK	74.0	-23.9	1.13 H	92	42.62	7.48
10	5450.40	43.7 AV	54.0	-10.3	1.13 H	92	36.22	7.48
11	6358.80	56.3 PK	74.0	-17.7	1.08 H	32	47.36	8.94
12	6358.80	49.9 AV	54.0	-4.1	1.08 H	32	40.96	8.94
13	7267.20	55.9 PK	74.0	-18.1	1.18 H	15	44.92	10.98
14	7267.20	49.5 AV	54.0	-4.5	1.18 H	15	38.52	10.98
15	8175.60	57.5 PK	74.0	-16.5	1.58 H	169	44.46	13.04
16	8175.60	51.1 AV	54.0	-2.9	1.58 H	169	38.06	13.04
17	9084.00	57.7 PK	74.0	-16.3	1.55 H	157	44.59	13.11
18	9084.00	51.3 AV	54.0	-2.7	1.55 H	157	38.19	13.11



A D T

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 10GHz		Average (AV)

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	1816.80	56.4 PK	74.0	-17.6	1.36 V	110	62.18	-5.78
2	1816.80	50.0 AV	54.0	-4.0	1.36 V	110	55.78	-5.78
3	2725.20	56.4 PK	74.0	-17.6	1.13 V	81	59.04	-2.64
4	2725.20	50.0 AV	54.0	-4.0	1.13 V	81	52.64	-2.64
5	3633.60	50.7 PK	74.0	-23.3	1.15 V	88	50.10	0.60
6	3633.60	44.3 AV	54.0	-9.7	1.15 V	88	43.70	0.60
7	4542.00	52.9 PK	74.0	-21.1	1.12 V	91	46.83	6.07
8	4542.00	46.5 AV	54.0	-7.5	1.12 V	91	40.43	6.07
9	5450.40	50.3 PK	74.0	-23.7	1.00 V	138	42.82	7.48
10	5450.40	43.9 AV	54.0	-10.1	1.00 V	138	36.42	7.48
11	6358.80	58.7 PK	74.0	-15.3	1.57 V	87	49.76	8.94
12	6358.80	52.3 AV	54.0	-1.7	1.57 V	87	43.36	8.94
13	7267.20	57.9 PK	74.0	-16.1	1.00 V	140	46.92	10.98
14	7267.20	51.5 AV	54.0	-2.5	1.00 V	140	40.52	10.98
15	8175.60	58.7 PK	74.0	-15.3	1.29 V	83	45.66	13.04
16	8175.60	52.3 AV	54.0	-1.7	1.29 V	83	39.26	13.04
17	9084.00	57.7 PK	74.0	-16.3	1.42 V	119	44.59	13.11
18	9084.00	51.3 AV	54.0	-2.7	1.42 V	119	38.19	13.11

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



A D T

CHANNEL	TX Channel 2	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 10GHz		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	1832.00	40.2 PK	74.0	-33.8	1.06 H	104	45.87	-5.67
2	1832.00	22.5 AV	54.0	-31.5	1.06 H	104	28.17	-5.67
3	2748.00	50.1 PK	74.0	-23.9	1.04 H	91	52.68	-2.58
4	2748.00	32.4 AV	54.0	-21.6	1.04 H	91	34.98	-2.58
5	3664.00	46.5 PK	74.0	-27.5	1.00 H	96	45.75	0.75
6	3664.00	28.8 AV	54.0	-25.2	1.00 H	96	28.05	0.75
7	4580.00	51.0 PK	74.0	-23.0	1.07 H	131	44.86	6.14
8	4580.00	33.3 AV	54.0	-20.7	1.07 H	131	27.16	6.14
9	5496.00	50.0 PK	74.0	-24.0	1.09 H	87	42.47	7.53
10	5496.00	32.3 AV	54.0	-21.7	1.09 H	87	24.77	7.53
11	6412.00	56.7 PK	74.0	-17.3	1.11 H	29	47.70	9.00
12	6412.00	39.0 AV	54.0	-15.0	1.11 H	29	30.00	9.00
13	7328.00	55.9 PK	74.0	-18.1	1.21 H	1	44.74	11.16
14	7328.00	38.2 AV	54.0	-15.8	1.21 H	1	27.04	11.16
15	8244.00	57.2 PK	74.0	-16.8	1.60 H	171	44.23	12.97
16	8244.00	39.5 AV	54.0	-14.5	1.60 H	171	26.53	12.97
17	9160.00	58.0 PK	74.0	-16.0	1.59 H	150	45.08	12.92
18	9160.00	40.3 AV	54.0	-13.7	1.59 H	150	27.38	12.92



A D T

CHANNEL	TX Channel 2	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 10GHz		Average (AV)

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	1832.00	56.7 PK	74.0	-17.3	1.31 V	102	62.37	-5.67
2	1832.00	39.0 AV	54.0	-15.0	1.31 V	102	44.67	-5.67
3	2748.00	57.1 PK	74.0	-16.9	1.15 V	83	59.68	-2.58
4	2748.00	39.4 AV	54.0	-14.6	1.15 V	83	41.98	-2.58
5	3664.00	50.6 PK	74.0	-23.4	1.10 V	81	49.85	0.75
6	3664.00	32.9 AV	54.0	-21.1	1.10 V	81	32.15	0.75
7	4580.00	53.6 PK	74.0	-20.4	1.16 V	102	47.46	6.14
8	4580.00	35.9 AV	54.0	-18.1	1.16 V	102	29.76	6.14
9	5496.00	50.4 PK	74.0	-23.6	1.00 V	123	42.87	7.53
10	5496.00	32.7 AV	54.0	-21.3	1.00 V	123	25.17	7.53
11	6412.00	59.3 PK	74.0	-14.7	1.56 V	80	50.30	9.00
12	6412.00	41.6 AV	54.0	-12.4	1.56 V	80	32.60	9.00
13	7328.00	57.5 PK	74.0	-16.5	1.06 V	124	46.34	11.16
14	7328.00	39.8 AV	54.0	-14.2	1.06 V	124	28.64	11.16
15	8244.00	59.0 PK	74.0	-15.0	1.28 V	92	46.03	12.97
16	8244.00	41.3 AV	54.0	-12.7	1.28 V	92	28.33	12.97
17	9160.00	57.7 PK	74.0	-16.3	1.46 V	115	44.78	12.92
18	9160.00	40.0 AV	54.0	-14.0	1.46 V	115	27.08	12.92

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



A D T

5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



6. 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 Lab

Tel: 886-3-5935343

Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety/Telecom 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.

7. APPENDIX A – MODIFICATION RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

---END---