

FCC Test Report

Report No.: RF150106E05 R1

FCC ID: JEH-7777-RBS

Test Model: 7777-RBS

Received Date: Jan. 06, 2015

Test Date: Jan. 07 to Feb. 26, 2015

Issued Date: Mar. 11, 2015

Applicant: NCR Corporation, RSD - Atlanta

Address: 2651 Satellite Blvd. Duluth, GA 30096 USA

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

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

Table of Contents

Release Control Record	3
1 Certificate of Conformity	4
2 Summary of Test Results	5
2.1 Measurement Uncertainty	5
2.2 Modification Record	5
3 General Information	6
3.1 General Description of EUT	6
3.2 Description of Test Modes	7
3.2.1 Test Mode Applicability and Tested Channel Detail	9
3.3 Duty Cycle of Test Signal	10
3.4 Description of Support Units	11
3.4.1 Configuration of System under Test	12
3.5 General Description of Applied Standards	14
4 Test Types and Results	15
4.1 Radiated Emission and Bandedge Measurement	15
4.1.1 Limits of Radiated Emission and Bandedge Measurement	15
4.1.2 Test Instruments	16
4.1.3 Test Procedures	17
4.1.4 Deviation from Test Standard	17
4.1.5 Test Setup	18
4.1.6 EUT Operating Conditions	19
4.1.7 Test Results	20
4.2 Conducted Emission Measurement	26
4.2.1 Limits of Conducted Emission Measurement	26
4.2.2 Test Instruments	26
4.2.3 Test Procedures	27
4.2.4 Deviation from Test Standard	27
4.2.5 Test Setup	27
4.2.6 EUT Operating Conditions	27
4.2.7 Test Results (MODE 1)	28
4.2.8 Test Results (MODE 2)	30
5 Pictures of Test Arrangements	32
Appendix – Information on the Testing Laboratories	33



A D T

Release Control Record

Issue No.	Description	Date Issued
RF150106E05	Original release.	Mar. 05, 2015
RF150106E05 R1	Revised applicant's information.	Mar. 11, 2015



A D T

1 Certificate of Conformity

Product: NCR Orderman Base Station4

Brand: Orderman

Test Model: 7777-RBS

Sample Status: ENGINEERING SAMPLE

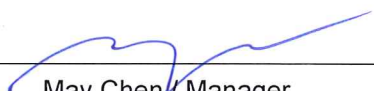
Applicant: NCR Corporation, RSD - Atlanta

Test Date: Jan. 07 to Feb. 26, 2015

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.249)
ANSI C63.10:2009

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:** Mar. 11, 2015
Elsie Hsu / Specialist

Approved by : , **Date:** Mar. 11, 2015
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 -2.99dB at 22.70703MHz.
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 -0.33dB at 915.010MHz.

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) ($\pm$)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.86 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.43 dB
	1GHz ~6GHz	3.72 dB
Radiated Emissions above 1 GHz	6GHz ~ 18GHz	4.00 dB
	18GHz ~ 40GHz	4.11 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	NCR Orderman Base Station4
Brand	Orderman
Test Model	7777-RBS
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	DC 12V from power adapter or DC 48V from POE
Modulation Type	4GFSK
Transfer Rate	64Kbit/s
Operating Frequency	902.4 ~ 927.525MHz
Number of Channel	202
Antenna Type	Please see NOTE
Antenna Connector	Please see NOTE
Accessory Device	Adapter x 1
Data Cable Supplied	NA

Note:

- The EUT must be supplied with a power adapter or POE as below table:

Adapter		
Brand	Model No.	Spec.
UMEC	UP0121J-12PA	Input: 100-240V, 0.4A, 50/60Hz Output: 12V, 1A DC output cable (1.5m unshielded)
POE (Test only, not for sale)		
Brand	Model No.	Spec.
Ruckus	GRT-480125A (740-64216-001)	Input: 100-240V, 1A, 50/60Hz Output: 48V, 1250mA
For radiated emission test, the EUT was pre-tested with above adapter & POE, the worst case was found in POE. Therefore only the test data of the POE was recorded in this report.		

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

Antenna No.	Model No.	Antenna Gain(dBi)	Frequency range (MHz ~ MHz)	Antenna Type	Connector Type
1 (Standard)	497-0503602	2.15	902 - 928	Dipole	RP-SMA
2 (Optional)	PCG-TNC-921	2	880 - 960	Dipole	RP-SMA

From the above antennas, **Antenna 1** was selected as representative model for the test.

- 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

202 channels are provided in this EUT.

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
1	902,400	46	908,025	90	913,525
2	902,525	47	908,150	91	913,650
4	902,650	48	908,275	92	913,775
5	902,775	49	908,400	93	913,900
6	902,900	50	908,525	94	914,025
7	903,025	51	908,650	95	914,150
8	903,150	52	908,775	96	914,275
9	903,275	53	908,900	97	914,400
10	903,400	54	909,025	98	914,525
11	903,525	55	909,150	99	914,650
12	903,650	56	909,275	100	914,775
13	903,775	57	909,400	101	914,900
14	903,900	58	909,525	102	915,025
15	904,025	59	909,650	103	915,150
16	904,150	60	909,775	104	915,275
17	904,275	61	909,900	105	915,400
18	904,400	62	910,025	106	915,525
19	904,525	63	910,150	107	915,650
20	904,650	64	910,275	108	915,775
21	904,775	65	910,400	109	915,900
22	904,900	66	910,525	110	916,025
23	905,025	67	910,650	111	916,150
24	905,150	68	910,775	112	916,275
25	905,275	69	910,900	113	916,400
26	905,400	70	911,025	114	916,525
27	905,525	71	911,150	115	916,650
28	905,650	72	911,275	116	916,775
29	905,775	73	911,400	117	916,900
30	905,900	74	911,525	118	917,025
31	906,025	75	911,650	119	917,150
32	906,150	76	911,775	120	917,275
33	906,275	77	911,900	121	917,400
34	906,400	78	912,025	122	917,525
35	906,525	79	912,150	123	917,650
36	906,650	80	912,275	124	917,775
37	906,775	81	912,400	125	917,900
38	906,900	82	912,525	126	918,025
39	907,025	83	912,650	127	918,150
40	907,150	84	912,775	128	918,275
41	907,275	85	912,900	129	918,400
42	907,400	86	913,025	130	918,525
43	907,525	87	913,150	131	918,650
44	907,650	88	913,275	132	918,775
45	907,775	89	913,400	133	918,900

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
134	919,025	157	921,900	180	924,775
135	919,150	158	922,025	181	924,900
136	919,275	159	922,150	182	925,025
137	919,400	160	922,275	183	925,150
138	919,525	161	922,400	184	925,275
139	919,650	162	922,525	185	925,400
140	919,775	163	922,650	186	925,525
141	919,900	164	922,775	187	925,650
142	920,025	165	922,900	188	925,775
143	920,150	166	923,025	189	925,900
144	920,275	167	923,150	190	926,025
145	920,400	168	923,275	191	926,150
146	920,525	169	923,400	192	926,275
147	920,650	170	923,525	193	926,400
148	920,775	171	923,650	194	926,525
149	920,900	172	923,775	195	926,650
150	921,025	173	923,900	196	926,775
151	921,150	174	924,025	197	926,900
152	921,275	175	924,150	198	927,025
153	921,400	176	924,275	199	927,150
154	921,525	177	924,400	200	927,275
155	921,650	178	924,525	201	927,400
156	921,775	179	924,650	202	927,525

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO			DESCRIPTION
	RE $\geq$ 1G	RE<1G	PLC	
1	√	√	√	With POE
2	-	-	√	With Adapter

Where RE $\geq$ 1G: Radiated Emission above 1GHz & Bandedge Measurement
 RE<1G: Radiated Emission below 1GHz
 PLC: Power Line Conducted Emission

NOTE: The EUT's antenna had been pre-tested on the positioned of each 2 axis. The worst case was found when positioned on **X-plane**.

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.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1 to 202	1, 102, 202	4GFSK

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.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1 to 202	1, 102, 202	4GFSK

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.

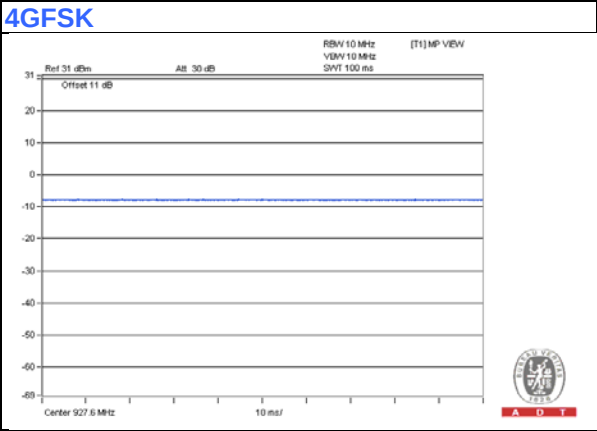
AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1 to 202	102	4GFSK

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE $\geq$ 1G	24deg. C, 70%RH	120Vac, 60Hz	Tim Ho
RE<1G	23deg. C, 70%RH	120Vac, 60Hz	Gary Cheng
	25deg. C, 69%RH		
PLC	24deg. C, 55%RH	120Vac, 60Hz	Barry Lee

3.3 Duty Cycle of Test Signal

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



3.4 Description of Support Units

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

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	POE	NA	GRT-480125A	NA	NA	Supplied by Client
B.	NOTEBOOK COMPUTER	DELL	E5430	GM1SKV1	FCC DoC	Provided by Lab
C.	NOTEBOOK COMPUTER	DELL	PP32LA	GSLB32S	FCC DoC	Provided by Lab

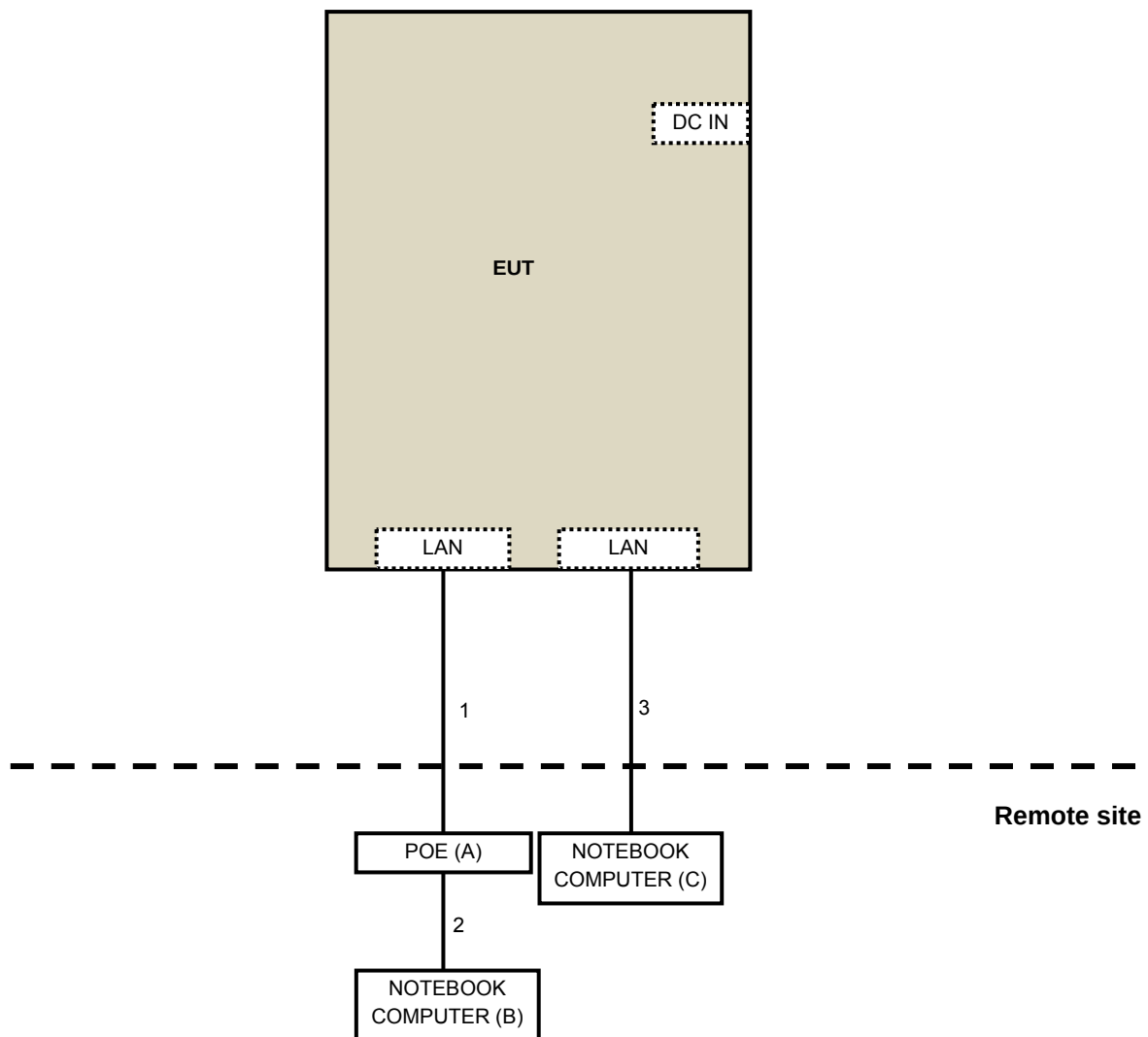
Note:

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

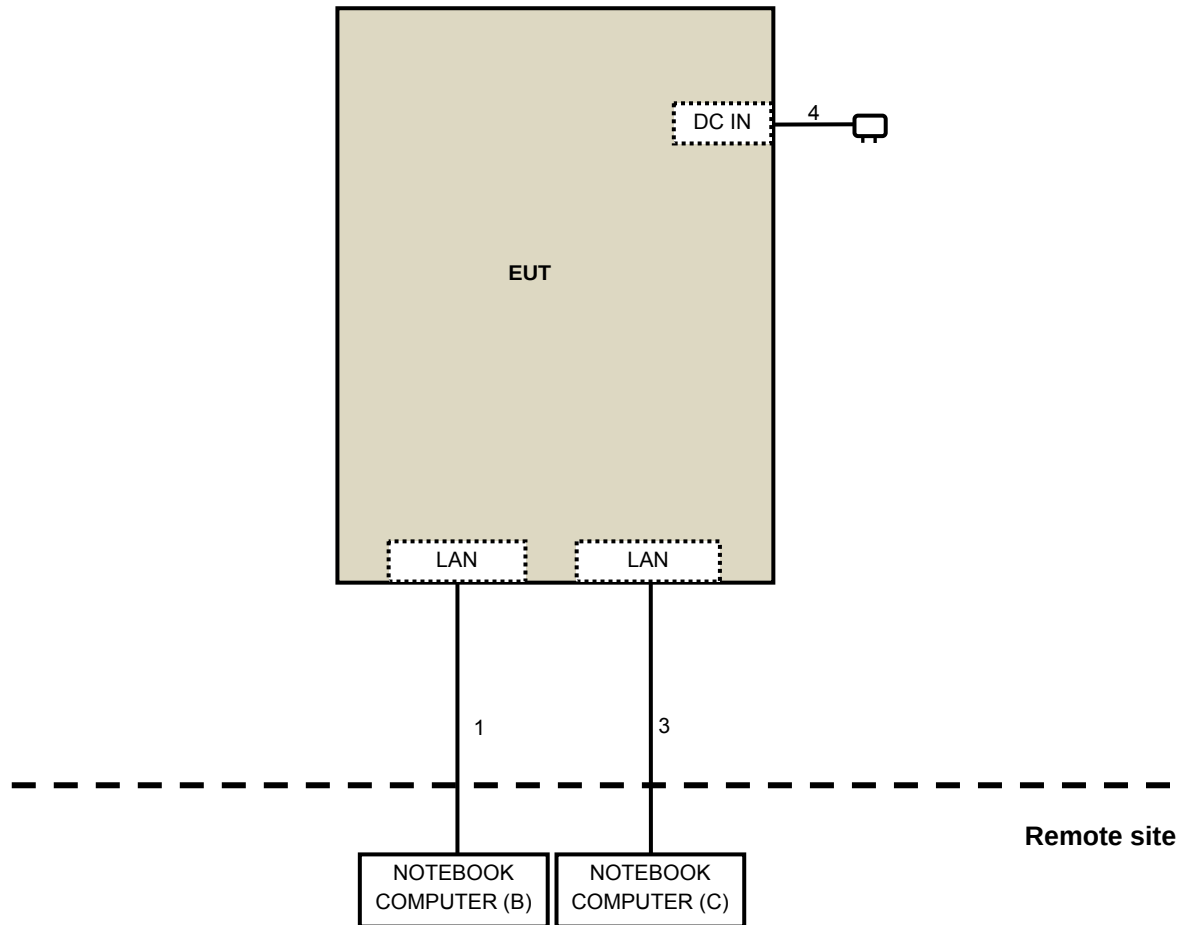
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	UTP	1	10	No	0	Provided by Lab
2.	UTP	1	1.5	No	0	Provided by Lab
3.	UTP	1	10	No	0	Provided by Lab
4.	DC	1	1.5	No	0	Supplied by Client

3.4.1 Configuration of System under Test

With POE



With Adapter



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 (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 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)
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	$2400/F(\text{kHz})$	300
0.490 ~ 1.705	$24000/F(\text{kHz})$	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
MXE EMI Receiver Agilent	N9038A	MY50010156	Aug. 11, 2014	Aug. 10, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-04	Nov. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Feb. 27, 2014	Feb. 26, 2015
RF Cable	NA	CHHCAB_001	Oct. 05, 2014	Oct. 04, 2015
Horn_Antenna AISI	AIH.8018	0000220091110	Aug. 26, 2014	Aug. 25, 2015
Pre-Amplifier Agilent	8449B	300801923	Oct. 28, 2014	Oct. 27, 2015
RF Cable	NA	131206 131215 SNMY23685/4	Jan. 16, 2015	Jan. 15, 2016
Spectrum Analyzer R&S	FSV40	100964	July 05, 2014	July 04, 2015
Pre-Amplifier EMCI	EMC184045	980143	Jan. 16, 2015	Jan. 15, 2016
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Aug. 26, 2014	Aug. 25, 2015
RF Cable	NA	RF104-121 RF104-204	Dec. 11, 2014	Dec. 10, 2015
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA
Power meter Anritsu	ML2495A	1014008	Apr. 30, 2014	Apr. 29, 2015
Power sensor Anritsu	MA2411B	0917122	Apr. 30, 2014	Apr. 29, 2015

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: Jan. 07 to Feb. 04, 2015

4.1.3 Test Procedures

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

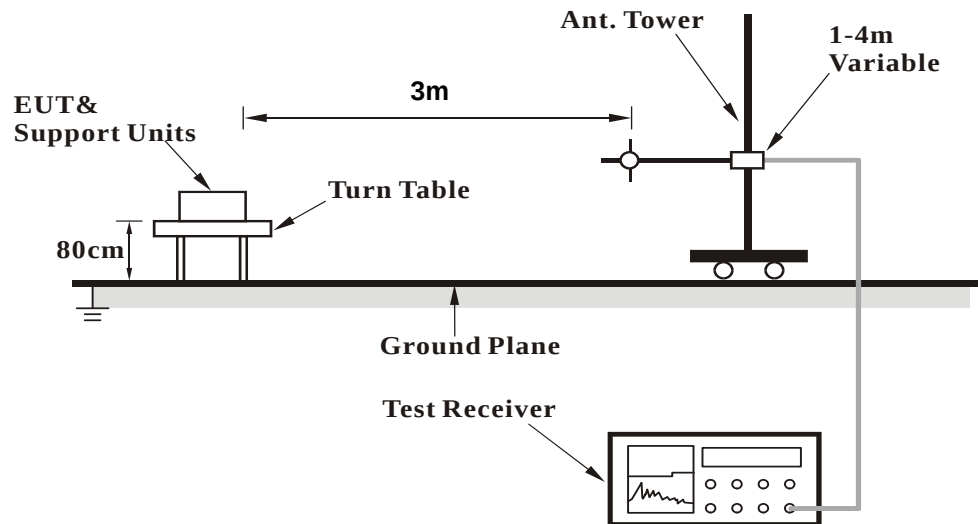
1. For emission measurements above 1 GHz, the EUT shall be placed at a height of 1.5 m above the ground at 3 meter chamber room for test
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (Duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor ($10 \log(1/\text{duty cycle})$).
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
6. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

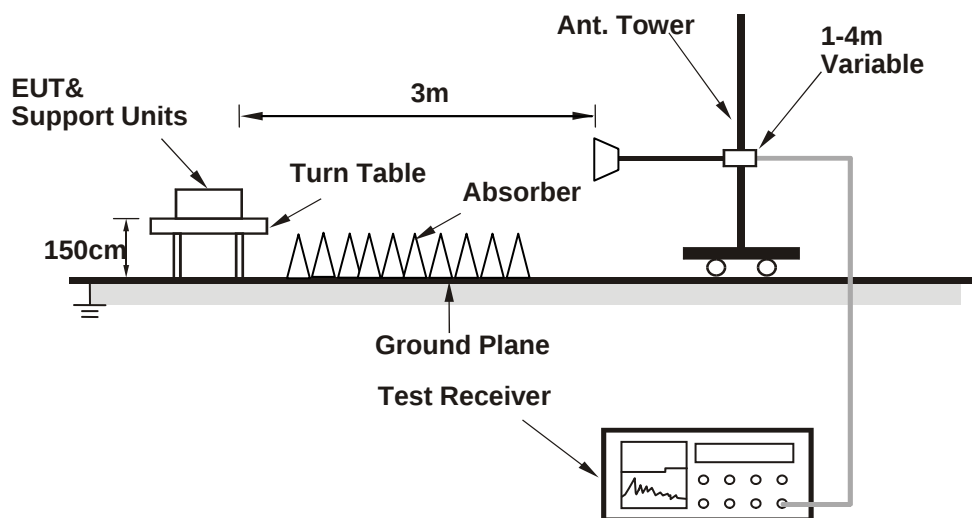
No deviation.

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

1. Placed the EUT on testing table.
2. Prepared computer system (support units B~C) to act as communication partner.
3. The communication partner ran test program "putty.exe Paster Radio test comment" to enable EUT under transmission/receiving condition continuously.

4.1.7 Test Results

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	2707.20	46.9 PK	74.0	-27.1	1.11 H	141	51.61	-4.71
2	2707.20	34.6 AV	54.0	-19.4	1.11 H	141	39.31	-4.71
3	3609.60	46.3 PK	74.0	-27.7	1.35 H	145	48.44	-2.14
4	3609.60	34.0 AV	54.0	-20.0	1.35 H	145	36.14	-2.14
5	4512.00	46.5 PK	74.0	-27.5	1.21 H	133	42.78	3.72
6	4512.00	34.4 AV	54.0	-19.6	1.21 H	133	30.68	3.72
7	5414.40	46.2 PK	74.0	-27.8	1.02 H	145	41.55	4.65
8	5414.40	33.6 AV	54.0	-20.4	1.02 H	145	28.95	4.65
9	8121.60	49.9 PK	74.0	-24.1	1.00 H	141	40.03	9.87
10	8121.60	39.2 AV	54.0	-14.8	1.00 H	141	29.33	9.87
11	9024.00	53.0 PK	74.0	-21.0	1.25 H	134	43.42	9.58
12	9024.00	40.2 AV	54.0	-13.8	1.25 H	134	30.62	9.58

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	2707.20	48.0 PK	74.0	-26.0	2.48 V	45	52.71	-4.71
2	2707.20	35.6 AV	54.0	-18.4	2.48 V	45	40.31	-4.71
3	3609.60	48.2 PK	74.0	-25.8	1.03 V	339	50.34	-2.14
4	3609.60	36.1 AV	54.0	-17.9	1.03 V	339	38.24	-2.14
5	4512.00	47.8 PK	74.0	-26.2	1.00 V	135	44.08	3.72
6	4512.00	35.2 AV	54.0	-18.8	1.00 V	135	31.48	3.72
7	5414.40	47.7 PK	74.0	-26.3	1.03 V	145	43.05	4.65
8	5414.40	35.8 AV	54.0	-18.2	1.03 V	145	31.15	4.65
9	8121.60	52.2 PK	74.0	-21.8	1.35 V	141	42.33	9.87
10	8121.60	40.0 AV	54.0	-14.0	1.35 V	141	30.13	9.87
11	9024.00	53.1 PK	74.0	-20.9	1.42 V	135	43.52	9.58
12	9024.00	41.4 AV	54.0	-12.6	1.42 V	135	31.82	9.58

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 102	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	2745.08	46.2 PK	74.0	-27.8	1.08 H	150	50.80	-4.60
2	2745.08	34.0 AV	54.0	-20.0	1.08 H	150	38.60	-4.60
3	3660.10	46.0 PK	74.0	-28.0	1.37 H	137	47.89	-1.89
4	3660.10	33.3 AV	54.0	-20.7	1.37 H	137	35.19	-1.89
5	4575.13	47.0 PK	74.0	-27.0	1.21 H	145	43.17	3.83
6	4575.13	34.8 AV	54.0	-19.2	1.21 H	145	30.97	3.83
7	7320.20	49.6 PK	74.0	-24.4	1.27 H	137	41.33	8.27
8	7320.20	39.2 AV	54.0	-14.8	1.27 H	137	30.93	8.27
9	8235.23	49.8 PK	74.0	-24.2	1.01 H	137	40.06	9.74
10	8235.23	39.3 AV	54.0	-14.7	1.01 H	137	29.56	9.74
11	9150.25	52.8 PK	74.0	-21.2	1.23 H	139	43.44	9.36
12	9150.25	39.9 AV	54.0	-14.1	1.23 H	139	30.54	9.36

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	2745.08	48.0 PK	74.0	-26.0	2.48 V	46	52.60	-4.60
2	2745.08	35.3 AV	54.0	-18.7	2.48 V	46	39.90	-4.60
3	3660.10	48.3 PK	74.0	-25.7	1.20 V	336	50.19	-1.89
4	3660.10	36.1 AV	54.0	-17.9	1.20 V	336	37.99	-1.89
5	4575.13	47.3 PK	74.0	-26.7	1.00 V	121	43.47	3.83
6	4575.13	35.0 AV	54.0	-19.0	1.00 V	121	31.17	3.83
7	7320.20	50.9 PK	74.0	-23.1	1.68 V	238	42.63	8.27
8	7320.20	39.8 AV	54.0	-14.2	1.68 V	238	31.53	8.27
9	8235.23	51.8 PK	74.0	-22.2	1.36 V	143	42.06	9.74
10	8235.23	39.7 AV	54.0	-14.3	1.36 V	143	29.96	9.74
11	9150.25	52.9 PK	74.0	-21.1	1.38 V	124	43.54	9.36
12	9150.25	41.3 AV	54.0	-12.7	1.38 V	124	31.94	9.36

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 202	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	2782.58	46.0 PK	74.0	-28.0	1.08 H	130	50.50	-4.50
2	2782.58	34.0 AV	54.0	-20.0	1.08 H	130	38.50	-4.50
3	3710.10	46.0 PK	74.0	-28.0	1.33 H	142	47.66	-1.66
4	3710.10	33.7 AV	54.0	-20.3	1.33 H	142	35.36	-1.66
5	4637.63	46.1 PK	74.0	-27.9	1.26 H	118	42.31	3.79
6	4637.63	33.9 AV	54.0	-20.1	1.26 H	118	30.11	3.79
7	5565.15	45.8 PK	74.0	-28.2	1.05 H	141	40.98	4.82
8	5565.15	33.4 AV	54.0	-20.6	1.05 H	141	28.58	4.82
9	6492.68	50.8 PK	74.0	-23.2	1.08 H	129	44.91	5.89
10	6492.68	41.2 AV	54.0	-12.8	1.08 H	129	35.31	5.89
11	7420.20	49.7 PK	74.0	-24.3	1.18 H	152	41.05	8.65
12	7420.20	39.8 AV	54.0	-14.2	1.18 H	152	31.15	8.65

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	2782.58	47.4 PK	74.0	-26.6	2.07 V	34	51.90	-4.50
2	2782.58	35.0 AV	54.0	-19.0	2.07 V	34	39.50	-4.50
3	3710.10	47.3 PK	74.0	-26.7	1.00 V	346	48.96	-1.66
4	3710.10	35.5 AV	54.0	-18.5	1.00 V	346	37.16	-1.66
5	4637.63	48.1 PK	74.0	-25.9	1.02 V	148	44.31	3.79
6	4637.63	35.2 AV	54.0	-18.8	1.02 V	148	31.41	3.79
7	5565.15	47.1 PK	74.0	-26.9	1.01 V	160	42.28	4.82
8	5565.15	35.3 AV	54.0	-18.7	1.01 V	160	30.48	4.82
9	6492.68	51.0 PK	74.0	-23.0	1.58 V	303	45.11	5.89
10	6492.68	42.4 AV	54.0	-11.6	1.58 V	303	36.51	5.89
11	7420.20	51.7 PK	74.0	-22.3	1.68 V	229	43.05	8.65
12	7420.20	40.5 AV	54.0	-13.5	1.68 V	229	31.85	8.65

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

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	33.64	24.2 QP	40.0	-15.9	1.00 H	264	40.74	-16.59
2	62.54	21.3 QP	40.0	-18.7	1.00 H	7	44.38	-23.10
3	164.44	24.9 QP	43.5	-18.6	2.00 H	269	46.93	-22.07
4	250.00	27.0 QP	46.0	-19.0	1.50 H	43	48.08	-21.05
5	500.01	28.8 QP	46.0	-17.2	2.00 H	360	41.80	-12.96
6	625.02	32.0 QP	46.0	-14.0	1.50 H	50	42.02	-10.06
7	902.00	31.7 QP	46.0	-14.32	1.00 H	344	4.11	27.57
8	*902.40	82.7 QP	94.0	-11.35	1.00 H	353	55.07	27.58
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	35.23	20.6 QP	40.0	-19.4	1.00 V	360	40.07	-19.45
2	62.48	29.1 QP	40.0	-10.9	1.00 V	297	50.70	-21.56
3	97.14	28.1 QP	43.5	-15.4	1.31 V	360	48.38	-20.29
4	166.24	28.3 QP	43.5	-15.2	1.00 V	319	46.13	-17.79
5	250.01	35.0 QP	46.0	-11.0	1.00 V	145	50.06	-15.10
6	625.01	32.4 QP	46.0	-13.6	1.00 V	360	42.26	-9.84
7	902.00	38.0 QP	46.0	-8.04	1.06 V	250	10.39	27.57
8	*902.40	93.6 QP	94.0	-0.44	1.08 V	250	65.98	27.58

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.

CHANNEL	TX Channel 102	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	33.60	24.0 QP	40.0	-16.0	1.00 H	272	40.61	-16.59
2	62.50	21.3 QP	40.0	-18.7	1.00 H	17	44.41	-23.09
3	164.40	24.9 QP	43.5	-18.6	1.80 H	272	46.99	-22.07
4	249.90	27.3 QP	46.0	-18.8	1.50 H	152	48.30	-21.05
5	500.00	28.7 QP	46.0	-17.3	1.50 H	270	41.68	-12.96
6	625.00	31.7 QP	46.0	-14.3	1.50 H	150	41.78	-10.06
7	*915.03	82.8 QP	94.0	-11.23	1.00 H	342	54.86	27.91
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	35.20	20.6 QP	40.0	-19.5	1.20 V	340	40.00	-19.45
2	62.40	29.0 QP	40.0	-11.0	1.00 V	272	50.57	-21.55
3	97.10	28.2 QP	43.5	-15.4	1.31 V	300	48.45	-20.30
4	166.20	28.2 QP	43.5	-15.3	1.00 V	320	46.01	-17.79
5	250.00	34.9 QP	46.0	-11.1	1.00 V	162	49.98	-15.11
6	625.00	32.3 QP	46.0	-13.7	1.00 V	340	42.17	-9.84
7	*915.03	93.67 QP	94.0	-0.33	1.00 V	256	65.75	27.92

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
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 202	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	33.62	24.2 QP	40.0	-15.8	1.00 H	246	40.81	-16.59
2	62.50	21.3 QP	40.0	-18.7	1.00 H	17	44.41	-23.09
3	164.40	24.8 QP	43.5	-18.7	2.00 H	277	46.85	-22.07
4	250.00	27.1 QP	46.0	-18.9	1.50 H	143	48.19	-21.05
5	500.00	28.8 QP	46.0	-17.2	2.00 H	320	41.74	-12.96
6	625.00	31.9 QP	46.0	-14.1	1.50 H	150	41.94	-10.06
7	*927.53	82.5 QP	94.0	-11.48	1.00 H	360	54.4	28.12
8	928.00	32.4 QP	46.0	-13.60	1.00 H	232	4.28	28.12
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	35.15	20.6 QP	40.0	-19.4	1.12 V	324	40.07	-19.45
2	62.42	29.2 QP	40.0	-10.8	1.20 V	238	50.77	-21.55
3	97.15	28.0 QP	43.5	-15.5	1.25 V	342	48.31	-20.29
4	166.21	28.3 QP	43.5	-15.2	1.00 V	300	46.12	-17.79
5	250.00	34.9 QP	46.0	-11.1	1.00 V	162	49.98	-15.11
6	625.15	32.4 QP	46.0	-13.6	1.00 V	300	42.27	-9.84
7	*927.53	93.6 QP	94.0	-0.39	1.00 V	291	65.49	28.12
8	928.00	38.4 QP	46.0	-7.60	1.00 V	291	10.28	28.12

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.

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 ROHDE & SCHWARZ	ESCS 30	100375	Apr. 29, 2014	Apr. 28, 2015
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK-8127	8127-522	Sep. 15, 2014	Sep. 14, 2015
Line-Impedance Stabilization Network (for Peripheral) ROHDE & SCHWARZ	ENV216	100071	Nov. 10, 2014	Nov. 09, 2015
RF Cable (JYEBAO)	5DFB	COCCAB-001	Mar. 10, 2014	Mar. 09, 2015
50 ohms Terminator	N/A	EMC-03	Sep. 22, 2014	Sep. 21, 2015
50 ohms Terminator	N/A	EMC-02	Sep. 30, 2014	Sep. 29, 2015
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: Jan. 20, 2015

4.2.3 Test Procedures

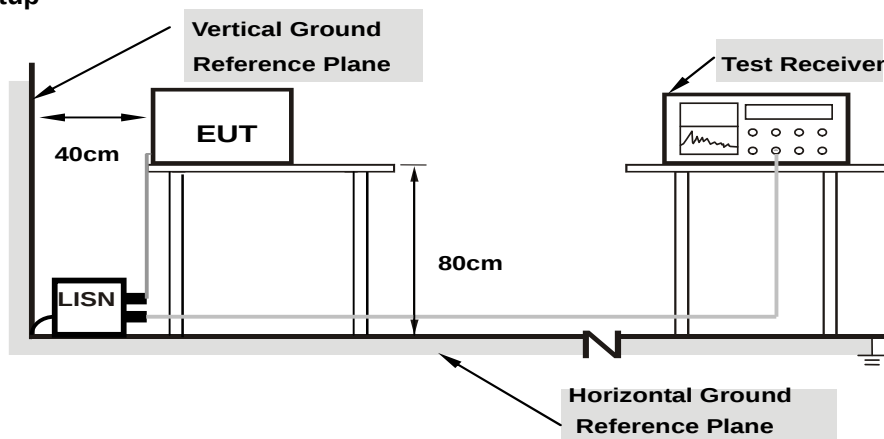
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

NOTE: 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.

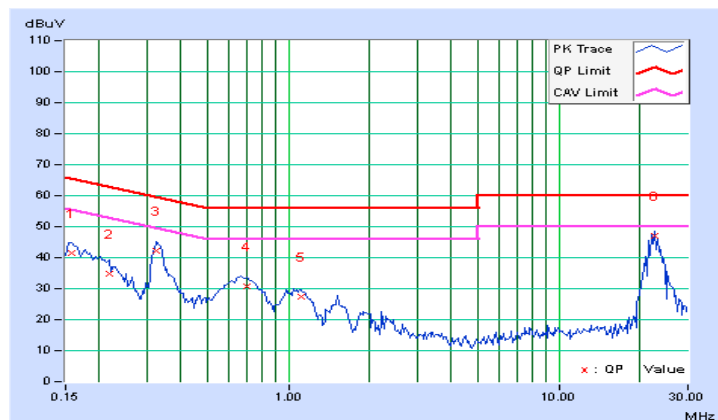
4.2.7 Test Results (MODE 1)

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	0.15781	0.07	41.49	31.20	41.56	31.27	65.58	55.58	-24.02	-24.31
2	0.21641	0.07	34.88	28.22	34.95	28.29	62.96	52.96	-28.00	-24.66
3	0.32578	0.08	42.00	34.75	42.08	34.83	59.56	49.56	-17.48	-14.73
4	0.70078	0.11	30.48	25.29	30.59	25.40	56.00	46.00	-25.41	-20.60
5	1.11328	0.14	27.21	22.80	27.35	22.94	56.00	46.00	-28.65	-23.06
6	22.70703	0.75	46.28	45.58	47.03	46.33	60.00	50.00	-12.97	-3.67

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

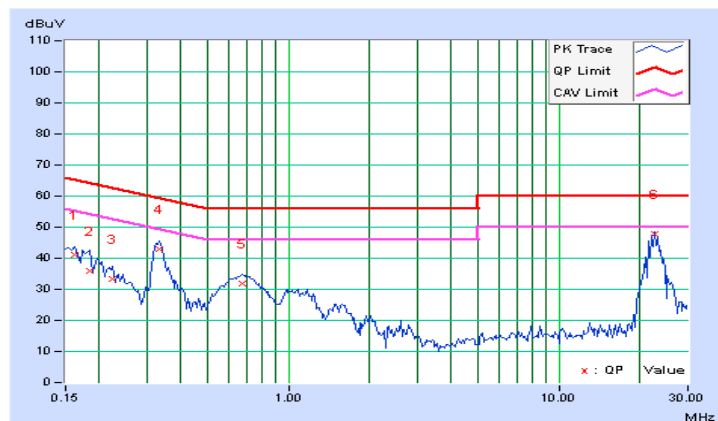


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

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	0.16172	0.06	40.96	29.16	41.02	29.22	65.38	55.38	-24.35	-26.15
2	0.18516	0.06	35.88	23.58	35.94	23.64	64.25	54.25	-28.31	-30.61
3	0.22422	0.06	33.19	24.33	33.25	24.39	62.66	52.66	-29.41	-28.27
4	0.33359	0.08	43.01	36.62	43.09	36.70	59.36	49.36	-16.27	-12.66
5	0.67734	0.11	31.78	26.34	31.89	26.45	56.00	46.00	-24.11	-19.55
6	22.70703	0.80	46.93	46.21	47.73	47.01	60.00	50.00	-12.27	-2.99

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



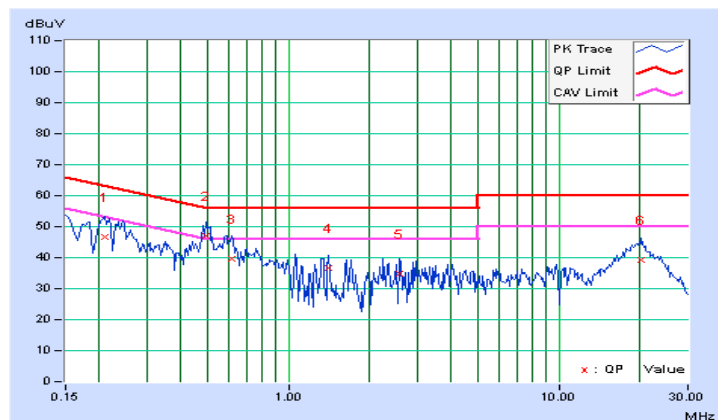
4.2.8 Test Results (MODE 2)

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	0.20859	0.07	46.57	38.82	46.64	38.89	63.26	53.26	-16.62	-14.37
2	0.49766	0.10	47.11	36.38	47.21	36.48	56.04	46.04	-8.83	-9.56
3	0.61875	0.10	39.48	26.30	39.58	26.40	56.00	46.00	-16.42	-19.60
4	1.41016	0.15	36.54	25.39	36.69	25.54	56.00	46.00	-19.31	-20.46
5	2.57813	0.20	34.49	23.23	34.69	23.43	56.00	46.00	-21.31	-22.57
6	20.23438	0.70	38.60	31.05	39.30	31.75	60.00	50.00	-20.70	-18.25

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

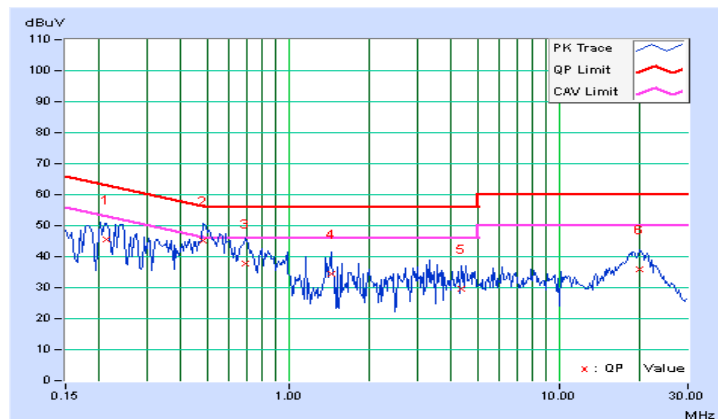


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

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	0.21250	0.06	45.64	34.76	45.70	34.82	63.11	53.11	-17.41	-18.29
2	0.48594	0.10	45.20	35.76	45.30	35.86	56.24	46.24	-10.94	-10.38
3	0.69297	0.11	37.50	24.46	37.61	24.57	56.00	46.00	-18.39	-21.43
4	1.44141	0.15	34.23	24.12	34.38	24.27	56.00	46.00	-21.62	-21.73
5	4.34375	0.27	29.19	18.87	29.46	19.14	56.00	46.00	-26.54	-26.86
6	19.97266	0.74	35.29	27.71	36.03	28.45	60.00	50.00	-23.97	-21.55

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: 886-3-5935343

Fax: 886-3-5935342

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.

--- END ---