EMC
TEST REPORT

Report No.: **TS13060107-EME(R3)**
Model No.: **TTD-VM2501R, TTD-VM2500R, TTD-VM2502R TTD-VMB2502R, BCM354A08R, TTD-VM2503R**
Issued Date: **Dec. 05, 2014**

Applicant: **Tranwo Technology Corp.**
No. 236, Sec. 3, Huanbei Rd., Jubei City, Hsinchu County 30265, Taiwan

Test Method/ Standard: **FCC Part 15 Subpart C Section §15.205, §15.207, §15.209, §15.247, DA 00-705 and ANSI C63.4/2003**

Test By: **Intertek Testing Services Taiwan Ltd.**
No. 11, Lane 275, Ko-Nan 1 Street, Chia-Tung Li, Shiang-Shan District, Hsinchu City, Taiwan

Testing Laboratory
0597

The test report was prepared by:

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These measurements were taken by:

Wayne Chen / Engineer

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Name Jimmy Yang
Title Engineer

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1. General information

1.1 Identification of the EUT

Product:	Wireless Video Baby Monitor
Model No.:	TTD-VM2503R
FCC ID.:	O6LTTD-VM2501R
Frequency Range:	2408MHz~2468MHz
Available Hopping Channels:	31 channels
Frequency of Each Channel:	2408+2k, k＝0~30
Type of Modulation:	GFSK, FHSS
Rated Power:	1. DC 5 V from adapter 2. DC 3.7V from battery
Power Cord:	N/A
Sample Received:	Nov. 18, 2014
Test Date(s):	Nov. 25, 2014~Dec. 03, 2014
Note 1:	This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.
Note 2:	When determining the test conclusion, the Measurement Uncertainty of test has been considered.

1.2 Adapter information

The EUT will be supplied with a power supply from below list:

No.	Model no.	Specification
Adapter 1	SSW-2256US	I/P: 100-240Vac, 50-60Hz, 0.2A O/P: 6.0V, 800mA
Adapter 2	OH-1048A0600800U2	I/P: 100-240Vac, 50/60Hz, 0.25A O/P: 6.0Vdc, 800mA
Adapter 3	TS-A005-060008A1	I/P: 100-240Vac, 50/60Hz, 0.2A O/P: 6.0Vdc, 0.8A
Adapter 4	ZZU1001-200050-2A	I/P: 100-240Vac, 47-63Hz, 0.5A Max O/P: 5Vdc, 2A
Adapter 5	TS-A010-050020AV	I/P: 100-240Vac, 50-60Hz, 0.4A O/P: 5Vdc, 2A

1.3 Additional information about the EUT

The EUT is Wireless Video Baby Monitor, and was defined as information technology equipment.

The customer confirmed TTD-VM2500R is a series model to TTD-VM2501R (EUT), the different model numbers are served as marketing strategy.

For more detail features, please refer to User's manual as file name “Installation guide.pdf”

Modification (R1) to test report No.: TS13060107-EME (Verification No.: TS13060107-EME)

The original Test Report Ref. No.: TS13060107-EME, dated Aug. 08, 2013 was modified on Feb. 11, 2014 to include the following changes and/or additions, which were considered technical modifications:

Add an identical model “TTD-VM2502R”. The different model number is served as marketing strategy.

After engineer judgment, the difference does not affect the RF characteristic; the model was evaluated and deemed as meet the standards requirement, no additional tests were considered necessary.

Modification (R2) to test report No.: TS13060107-EME (Verification No.: TS13060107-EME)

The original Test Report Ref. No.: TS13060107-EME, dated Aug. 08, 2013 was modified on Sep. 02, 2014 to include the following changes and/or additions, which were considered technical modifications:

Add model "TTD-VMB2502R" and "BCM354A08R". The different with model "TTD-VM2501R" are served as marketing strategy.

Trade Name	Model Number
TRANWO	TTD-VM2502R
TRANWO	TTD-VMB2502R
HITACHI	BCM354A08R

Add adapter 2 (model no. : OH-1048A0600800U2), adapter 3 (model no.: TS-A005-060008A1) and a battery.

No.	Model no.	Specification
Adapter 2	OH-1048A0600800U2	I/P: 100-240Vac, 50/60Hz, 0.25A O/P: 6.0Vdc, 800mA
Adapter 3	TS-A005-060008A1	I/P: 100-240Vac, 50/60Hz, 0.2A O/P: 6.0Vdc, 0.8A

After engineer judgment, the Conducted Emission test was considered necessary.

Modification (R3) to test report No.: TS13060107-EME (Verification No.: TS13060107-EME)

The original Test Report Ref. No.: TS13060107-EME, dated Aug. 08, 2013 was modified on Dec. 05, 2014 to include the following changes and/or additions, which were considered technical modifications:

Add model "TTD-VM2503R". The different with model "TTD-VM2501R" are main board.

Trade Name	Model Number	Different
TRANWO	TTD-VM2501R	Main model
TRANWO	TTD-VM2500R	Same as TTD-VM2501R
TRANWO	TTD-VM2502R	Same as TTD-VM2501R
TRANWO	TTD-VMB2502R	Same as TTD-VM2501R
TRANWO	TTD-VM2503R	Different main board
HITACHI	BCM354A08R	Same as TTD-VM2501R

Add adapter 4 (model no. : ZZU1001-200050-2A) and adapter 5 (model no. : TS-A010-050020AV)

No.	Model no.	Specification
Adapter 4	ZZU1001-200050-2A	I/P: 100-240Vac, 47-63Hz, 0.5A Max O/P: 5Vdc, 2A
Adapter 5	TS-A010-050020AV	I/P: 100-240Vac, 50-60Hz, 0.4A O/P: 5Vdc, 2A

After engineer judgment, the Maximum Output Power and Radiated Spurious Emission tests were considered necessary.

1.4 Antenna description

The EUT uses a permanently connected antenna.

Antenna Gain : 1.5 dBi
Antenna Type : Monopole Antenna
Connector Type : Fixed Type Antenna

1.5 Operation mode

The EUT is supplied with DC 5 V from adapter (Test voltage: 120Vac, 60Hz).

The EUT is the type of transmitter and receiver equipment and transmits RF signal.

The EUT configuration refers to the “Spurious set-up photo.pdf”.

2. Maximum Peak Conducted Output Power

2.1 Operating environment

Temperature:	25	℃
Relative Humidity:	50	%
Atmospheric Pressure	1008	hPa
Requirement & Test method	15.247(b)(1) DA 00-705	
Channel number	1、17、31	

2.2 Limit for maximum peak conducted output power

For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt(30dBm)

For all other frequency hopping systems in the 2400–2483.5 MHz band:0.125 watts (20.97dBm)

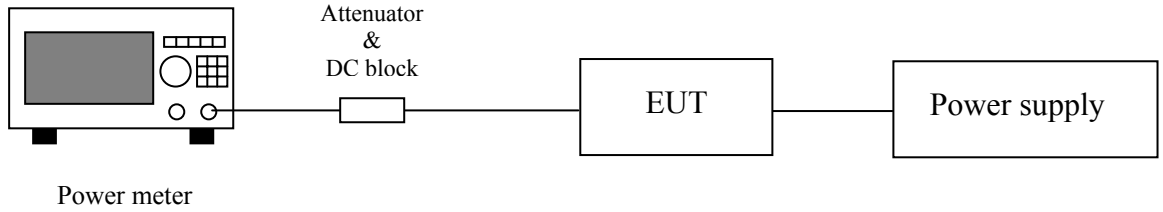
2.3 Measuring instrument setting

Power meter	
Power meter	**Setting**
Bandwidth	65MHz bandwidth is greater than the EUT emission bandwidth
Detector	Peak & Average

2.4 Test procedure

For frequency hopping systems
Test procedures refer to the peak output power method of DA 00-705.

2.5 Test diagram



2.6 Measured data of Maximum Output Power test results

Channel	Frequency (MHz)	Output Power (dBm) (PK)	Total Power (mW) (PK)	Limit (dBm)	Margin (dB)
1	2408	17.63	57.94	20.97	-3.34
17	2440	16.95	49.55	20.97	-4.02
31	2468	16.79	47.75	20.97	-4.18

3. Emissions In Restricted Frequency Bands (Radiated emission measurements)

3.1 Operating environment

Temperature:	25	℃
Relative Humidity:	50	%
Atmospheric Pressure	1008	hPa
Requirement	15.247(d), 15.205, 15.209	

3.2 Limit for emission in restricted frequency bands (Radiated emission measurement)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	2400/F(kHz)	30
1.705~30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark:

1. In the above table, the tighter limit applies at the band edges.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system

3.3 Measuring instrument setting

Below 1GHz measurement

Receiver settings	
Receiver function	**Setting**
Detector	QP
RBW	0.15-30 MHz; 9-10 kHz 30-1000 MHz; 100-120 kHz
VBW	≧3 x RBW
Sweep	Auto couple
Attenuation	Auto

Above 1GHz measurement

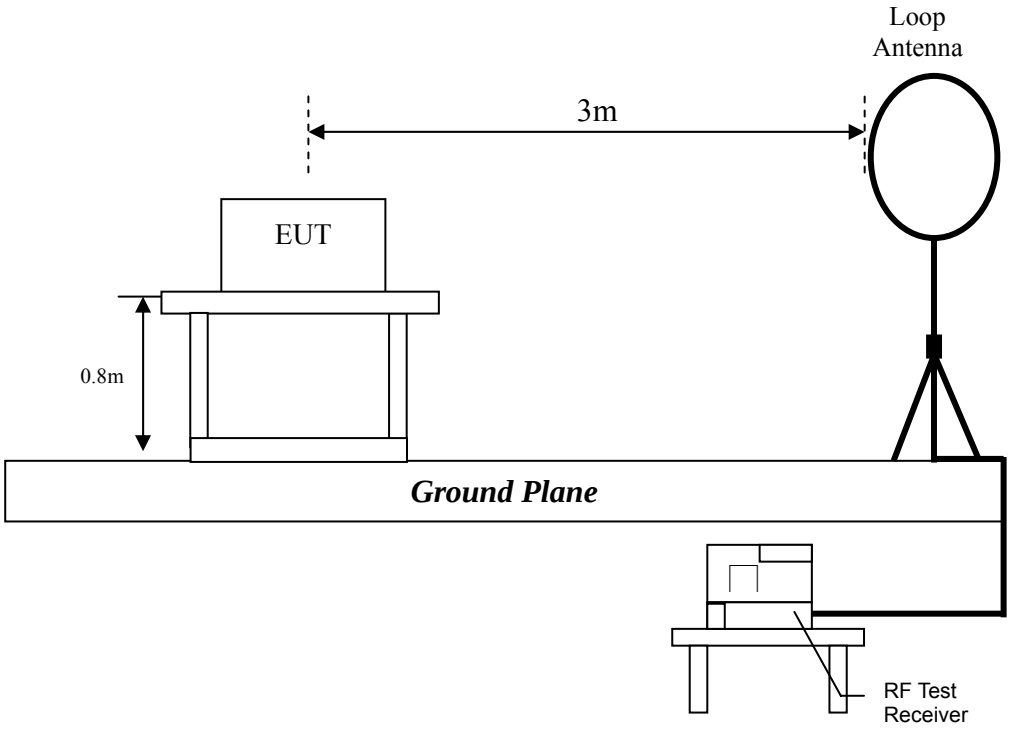
Spectrum analyzer settings	
Spectrum Analyzer function	**Setting**
Detector	Peak
RBW	1MHz
VBW	3MHz for Peak; 10Hz for Average
Sweep	Auto couple
Start Frequency	1GHz
Stop Frequency	Tenth harmonic
Attenuation	Auto

3.4 Test procedure

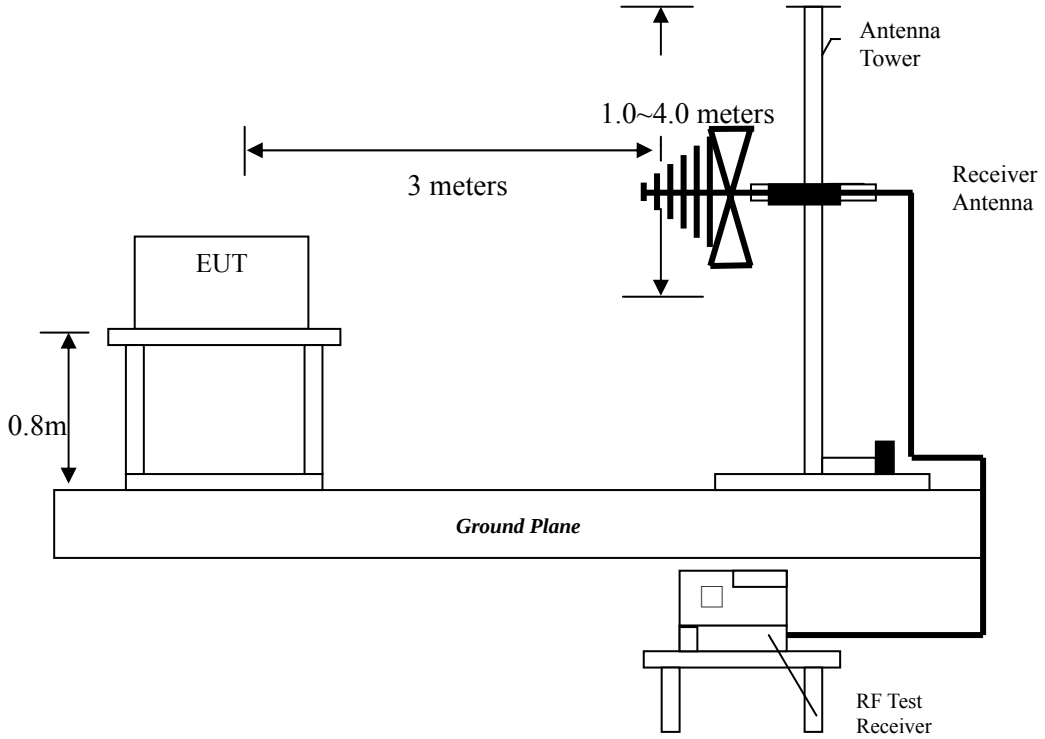
1. The EUT was placed on the top of the turntable 0.8 meter above ground. The center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the companion devices. The turntable was rotated by 360 degree to find the position of the maximum emission level.
3. The height of the receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of the both horizontal and vertical polarization
4. If find the frequencies above the limit or below within 3dB, the antenna tower was scan (from 1m to 4m) and then the turntable was rotated to find the maximum reading.
5. Set the test-receiver system to peak or CISPR quasi-peak detector with specified bandwidth under maximum hold mode.
6. For emissions above 1GHz, use 1MHz VBW and 3MHz RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
7. If the emissions level of the EUT in peak mode was 3dB lower than the average limit specified then testing will be stopped and peak values of the EUT will be reported. Otherwise, the emissions which do not have 3dB margin will be measured using the quasi-peak method for below 1GHz.
8. For testing above 1GHz, The emissions level of the EUT in peak mode was lower than average limit, then testing will be stopped and peak values of the EUT will be reported, otherwise, the emission will be measured in average mode again and reported.

3.5 Test configuration

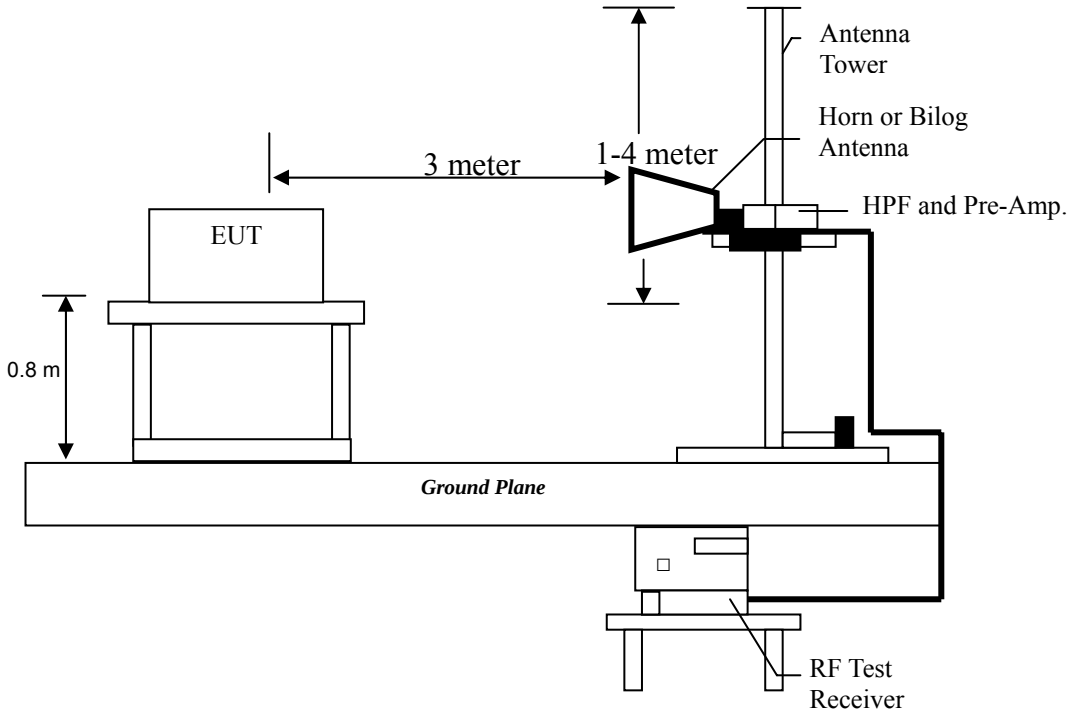
3.5.1 Radiated emission from 9kHz to 30MHz uses Loop Antenna:



3.5.2 Radiated emission below 1GHz using Bilog Antenna



3.5.3 Radiated emission above 1GHz using Horn Antenna



3.6 Test result

3.6.1Measurement results: frequency range from 9 kHz to 30MHz

Frequency (kHz)	Detector	Corrected Factor (dB/m)	Reading (dBuV)	Emission (dBuV)	Limit (dBuV)	Margin (dB)
25	AV	-31.20	23.49	54.69	119.65	-64.96
75	AV	-36.70	1.75	38.45	110.01	-71.56
225	AV	-37.70	-8.24	29.46	100.50	-71.04

Note: Extrapolation Factor@ 3m :80dB

3.6.2 Measurement results: frequencies below 1 GHz

The test was performed on EUT under Channel 1, Channel 17 and Channel 31. The worst case occurred at Channel 31.

EUT : TTD-VM2503R
Worst Case : TX mode at Channel 31

Antenna Polariz. (V/H)	Freq. (MHz)	Receiver Detector	Corr. Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
V	239.52	QP	12.18	13.36	25.54	46.00	-20.46
V	317.12	QP	14.10	11.92	26.02	46.00	-19.98
V	336.52	QP	14.98	13.88	28.86	46.00	-17.14
V	383.08	QP	16.40	11.85	28.25	46.00	-17.75
V	431.58	QP	17.64	11.33	28.97	46.00	-17.03
V	623.64	QP	20.75	14.88	35.63	46.00	-10.37
H	191.02	QP	11.27	12.79	24.05	43.50	-19.45
H	336.52	QP	14.40	12.52	26.91	46.00	-19.09
H	383.08	QP	16.74	10.72	27.46	46.00	-18.54
H	431.58	QP	18.12	11.66	29.78	46.00	-16.22
H	480.08	QP	18.64	13.62	32.26	46.00	-13.74
H	623.64	QP	20.88	13.99	34.86	46.00	-11.14

Remark:1. Corr. Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Corr. Factor
Note: The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

3.6.3 Measurement results: frequency above 1GHz

Mode	Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Reading (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
ch1	4816.00	PK	V	35.1	38.54	47.37	50.81	74	-23.19
	7224.00	PK	V	33	44.6	35.69	47.29	74	-26.71
	9632.00	PK	V	32.7	49.3	40.21	56.81	74	-17.19
	9632.00	AV	V	32.7	49.3	37.09	53.69	54	-0.31
	12040.00	PK	V	31.6	50.87	32.95	52.22	74	-21.78
	4816.00	PK	H	35.1	38.54	45.77	49.21	74	-24.79
	7224.00	PK	H	33	44.6	35.15	46.75	74	-27.25
	9632.00	PK	H	32.7	49.3	34.73	51.33	74	-22.67
	12040.00	PK	H	31.6	50.87	32.39	51.66	74	-22.34
ch17	4880.00	PK	V	35.1	38.54	48.89	52.33	74	-21.67
	7320.00	PK	V	33	44.6	34.88	46.48	74	-27.52
	9760.00	PK	V	32.7	49.3	35.24	51.84	74	-22.16
	12200.00	PK	V	31.6	50.87	30.07	49.34	74	-24.66
	4880.00	PK	H	35.1	38.54	49.32	52.76	74	-21.24
	7320.00	PK	H	33	44.6	34.49	46.09	74	-27.91
	9760.00	PK	H	32.7	49.3	32.73	49.33	74	-24.67
	12200.00	PK	H	31.6	50.87	29.7	48.97	54	-5.03
ch31	4936.00	PK	V	35.1	38.54	52.18	55.62	74	-18.38
	4936.00	AV	V	35.1	38.54	50.43	53.87	54	-0.13
	7404.00	PK	V	33	44.6	36.73	48.33	74	-25.67
	9872.00	PK	V	33	49.3	44.4	60.70	74	-13.30
	9872.00	AV	V	33	49.3	37.45	53.75	54	-0.25
	12340.00	PK	V	33	50.87	31.13	49.00	54	-5.00
	4936.00	PK	H	35.1	38.54	51.48	54.92	74	-19.08
	4936.00	AV	H	35.1	38.54	48.26	51.70	54	-2.30
	7404.00	PK	H	33	44.6	36.45	48.05	74	-25.95
	9872.00	PK	H	33	49.3	38.83	55.13	74	-18.87
	9872.00	AV	H	33	49.3	32.45	48.75	54	-5.25
	12340.00	PK	H	33	50.87	34.1	51.97	74	-22.03

4. AC Power Line Conducted Emission

4.1 Operating environment

Temperature:	20	℃
Relative Humidity:	55	%
Atmospheric Pressure	1008	hPa
Requirement	15.207	
Channel number	1	

4.2 Limit for AC power line conducted emission

Freq. (MHz)	Conducted Limit (dBuV)	
	Q.P.	Ave.
0.15~0.50	66 – 56*	56 – 46*
0.50~5.00	56	46
5.00~30.0	60	50

4.3 Measuring instrument setting

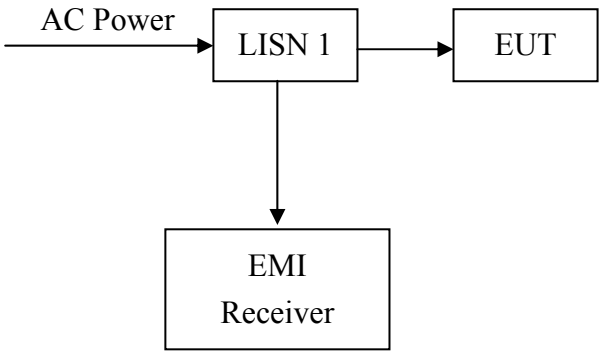
Receiver settings	
Receiver function	**Setting**
Detector	QP
Start frequency	0.15MHz
Stop frequency	30MHz
IF bandwidth	9 kHz
Attenuation	10dB

4.4 Test procedure

1. The EUT or host of EHT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT or host of EUT to the power mains through a line impedance stabilization network.
3. All the companion devices are connected to the other LISN. The LISN should provide 50Uh/50ohms coupling impedance.
4. The frequency range from 150 kHz to 30MHz was searched

5. Set the test-receiver system to peak detector and specified bandwidth with maximum hold mode.
6. The measurement has to be done between each power line and ground at the power terminal.

4.5 Test diagram



Note: The EUT was tested while in normal communication mode.

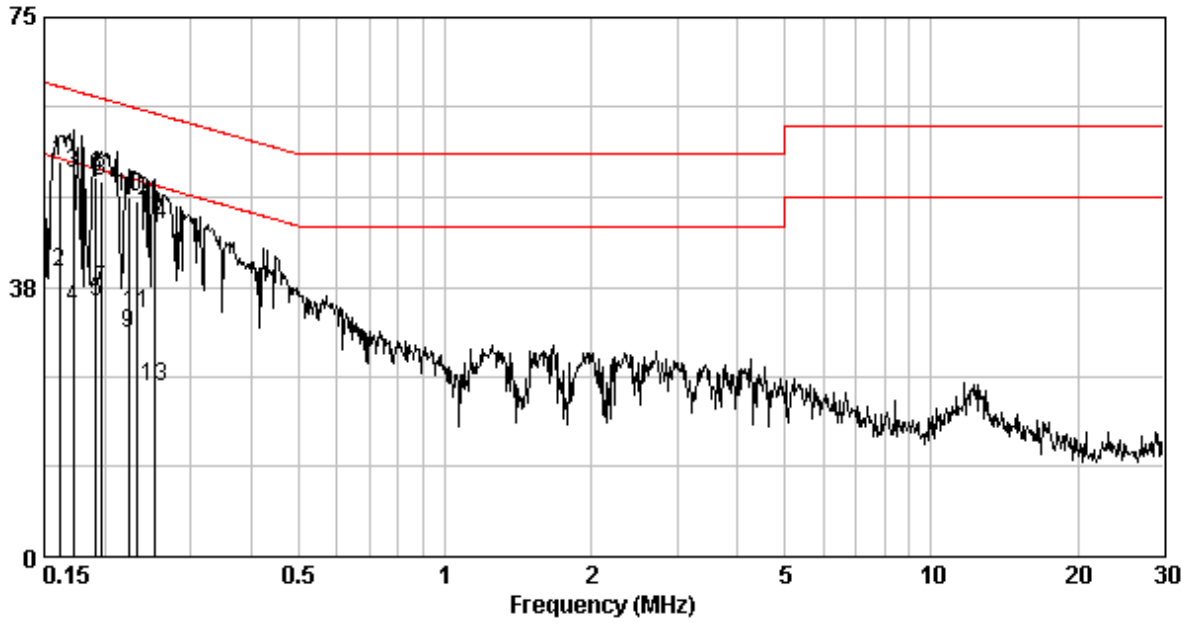
4.6 Test results

Phase : Live Line
EUT : TTD-VM2503R
Test Condition : Adapter : TS-A010-050020AV

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level Av (dBuV)	Limit Av (dBuV)	Over Limit (dB) Qp	Av
0.162	9.74	54.90	65.38	39.58	55.38	-10.48	-15.80
0.172	9.74	53.36	64.86	34.65	54.86	-11.50	-20.21
0.191	9.74	52.84	63.98	35.33	53.98	-11.14	-18.65
0.197	9.74	52.14	63.76	36.99	53.76	-11.62	-16.77
0.223	9.74	49.98	62.70	31.11	52.70	-12.72	-21.59
0.233	9.74	49.54	62.35	33.92	52.35	-12.81	-18.43
0.252	9.74	46.04	61.69	23.64	51.69	-15.65	-28.05

Remark:

1. Correction Factor (dB)= LISN Factor (dB) + Cable Loss (dB)
2. Over Limit (dB) = Level (dBuV) – Limit (dBuV)

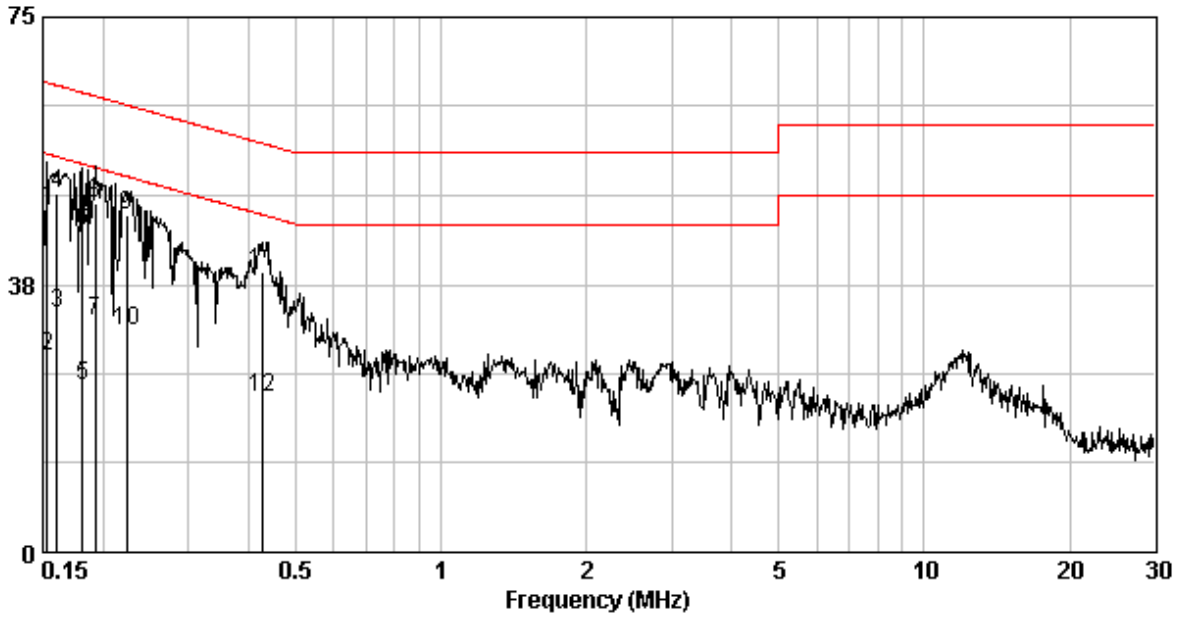


Phase	: Neutral Line
EUT	: TTD-VM2503R
Test Condition	: Adapter : TS-A010-050020AV

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level Av (dBuV)	Limit Av (dBuV)	Over Limit (dB) Qp	Av
0.153	9.75	48.05	65.82	27.57	55.82	-17.77	-28.25
0.161	9.75	50.29	65.43	33.65	55.43	-15.14	-21.78
0.182	9.74	44.98	64.42	23.34	54.42	-19.43	-31.07
0.192	9.74	48.92	63.93	32.49	53.93	-15.01	-21.44
0.223	9.74	47.26	62.70	31.02	52.70	-15.44	-21.68
0.426	9.73	39.25	57.33	21.80	47.33	-18.08	-25.53

Remark:

1. Correction Factor (dB)= LISN Factor (dB) + Cable Loss (dB)
2. Over Limit (dB) = Level (dBuV) – Limit (dBuV)

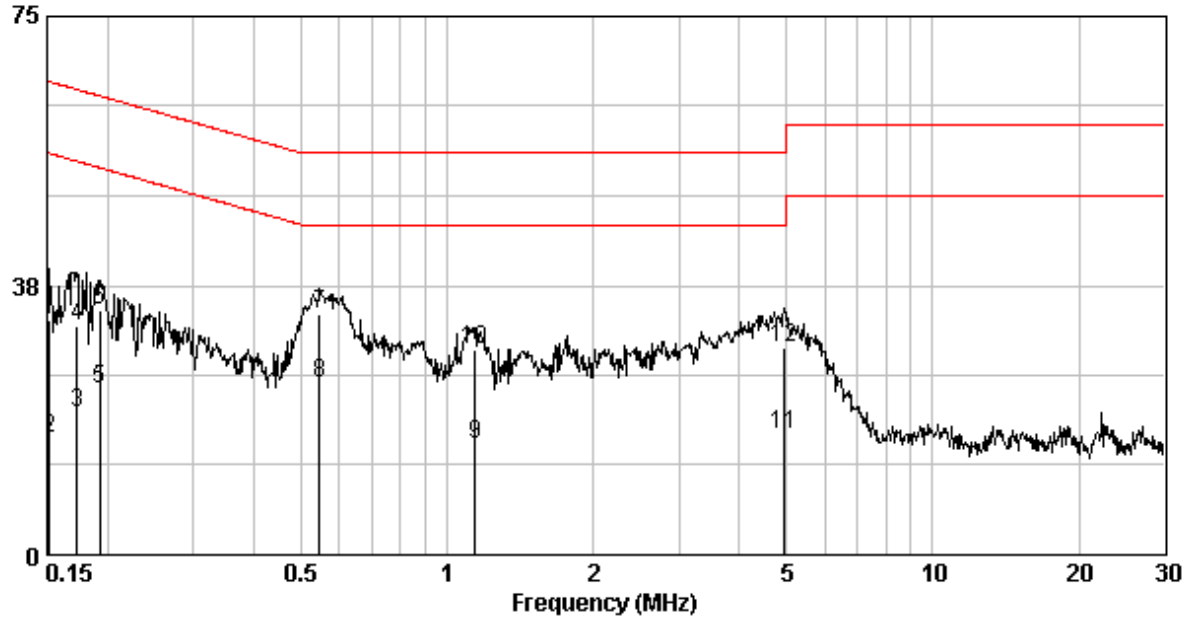


Phase	: Live Line
EUT	: TTD-VM2503R
Test Condition	: Adapter : ZZU1001-200050-2A

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level Av (dBuV)	Limit Av (dBuV)	Over Limit (dB) Qp	Av
0.152	9.74	32.82	65.91	16.22	55.91	-33.09	-39.69
0.173	9.74	32.00	64.81	19.82	54.81	-32.81	-34.99
0.192	9.74	33.96	63.93	23.19	53.93	-29.97	-30.74
0.546	9.75	33.45	56.00	23.86	46.00	-22.55	-22.14
1.141	9.84	28.66	56.00	15.48	46.00	-27.34	-30.52
4.926	9.86	28.72	56.00	16.67	46.00	-27.28	-29.33

Remark:

1. Correction Factor (dB)= LISN Factor (dB) + Cable Loss (dB)
2. Over Limit (dB) = Level (dBuV) – Limit (dBuV)

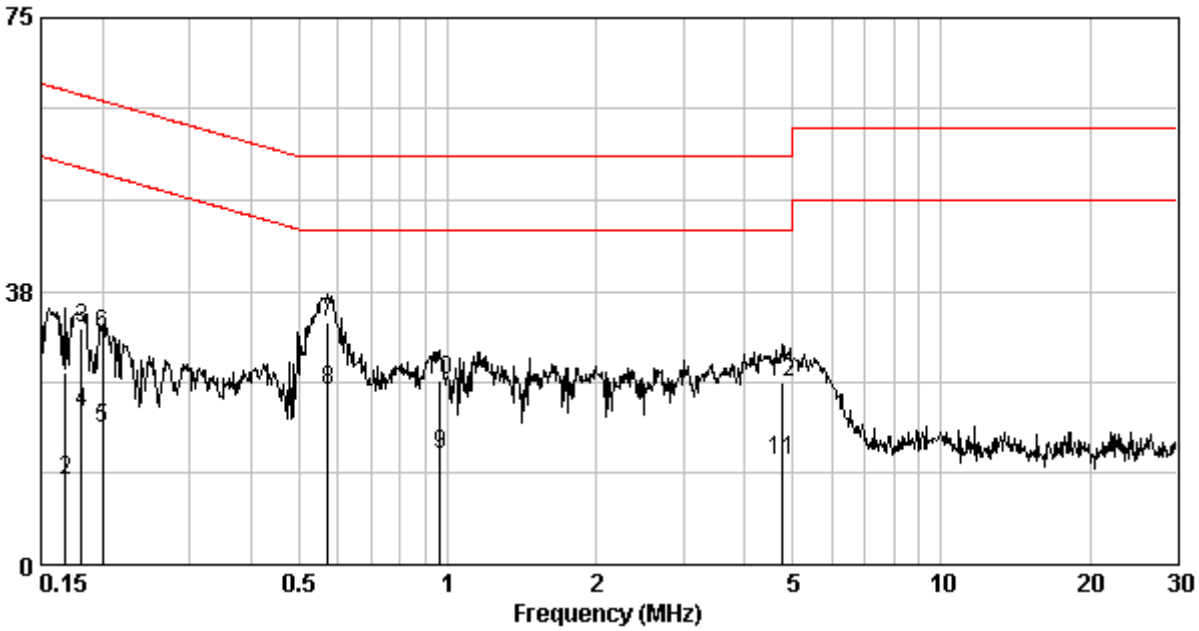


Phase	: Neutral Line Line
EUT	: TTD-VM2503R
Test Condition	: Adapter : ZZU1001-200050-2A

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level Av (dBuV)	Limit Av (dBuV)	Over Limit (dB) Qp	Av
0.169	9.75	26.45	65.03	11.53	55.03	-38.59	-43.51
0.182	9.74	32.36	64.42	20.82	54.42	-32.05	-33.59
0.200	9.74	31.46	63.62	18.69	53.62	-32.16	-34.93
0.573	9.75	33.17	56.00	23.86	46.00	-22.83	-22.14
0.963	9.83	25.19	56.00	15.09	46.00	-30.81	-30.91
4.746	9.87	24.89	56.00	14.42	46.00	-31.11	-31.58

Remark:

1. Correction Factor (dB)= LISN Factor (dB) + Cable Loss (dB)
2. Over Limit (dB) = Level (dBuV) – Limit (dBuV)



Appendix A: Test equipment list

Equipment	Brand	Model No.	Serial No.	Calibration Date	Next Calibration Date
ESCI EMI Test Receiver	Rohde & Schwarz	ESCI	100018	2013/11/29	2014/11/28
ESCI EMI Test Receiver	Rohde & Schwarz	ESCI	100018	2014/12/02	2015/12/01
Spectrum Analyzer	Rohde & Schwarz	FSP30	100137	2014/06/16	2015/06/15
Spectrum Analyzer	Rohde & Schwarz	FSEK30	100186	2014/01/20	2015/01/19
Horn Antenna (1-18G)	Schwarzbeck	BBHA 9120 D	9120D-456	2014/08/29	2017/08/27
Horn Antenna (14-42G)	SHWARZBECK	BBHA 9170	BBHA9170159	2014/09/16	2017/09/14
Broadband Antenna	Schwarzbeck	VULB 9168	9168-172	2013/08/08	2015/08/07
Loop Antenna	RolfHeine	LA-285	02/10033	2014/3/18	2016/03/16
Pre-Amplifier	MITEQ	AFS44-00102650--42-10P-44	1495287	2013/10/27	2015/10/26
Pre-Amplifier	MITEQ	JS4-26004000--27-8A	828825	2014/09/15	2015/09/14
Power Meter	Anritsu	ML2495A	0844001	2014/11/12	2015/11/11
Power Senor	Anritsu	MA2411B	0738452	2014/11/12	2015/11/11
Temperature&Humidity Test Chamber	TERCHY	MHU-225LRU (SA)	950838	2014/06/12	2015/06/11
Two-Line V-Network	Rohde & Schwarz	ESH3-Z5	838979/014	2014/10/05	2015/10/04
Singal Analyzer	Agilent	N9030A	MY51380492	2014/09/19	2015/09/18

Appendix B: Measurement Uncertainty

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

Item	Uncertainty
Vertically polarized radiated disturbances from 30MHz~1GHz in a semi-anechoic chamber at a distance of 3m	5.15 dB
Horizontally polarized radiated disturbances from 30MHz~1GHz in a semi-anechoic chamber at a distance of 3m	5.23 dB
Vertically polarized Radiated disturbances from 1GHz~18GHz in a semi-anechoic chamber at a distance of 3m	4.19 dB
Horizontally polarized Radiated disturbances from 1GHz~18GHz in a semi-anechoic chamber at a distance of 3m	4.3 dB
Vertically polarized Radiated disturbances from 18GHz~40GHz in a semi-anechoic chamber at a distance of 3m	4.19 dB
Horizontally polarized Radiated disturbances from 18GHz~40GHz in a semi-anechoic chamber at a distance of 3m	4.3 dB
Conducted Output power	0.86 dB
Radiated electromagnetic disturbances in the frequency range from 9kHz to 30MHz	2.92 dB
Conducted disturbance measurements at a mains port from 9 kHz to 30 MHz using a 50 Ω/50 μH +5Ω artificial mains network (AMN)	2.5 dB