EMC TEST REPORT

No. JSH006020568-002

Applicant	:Top Way Intelligent Science & Technology CO.,LTD. Qianting, Qingrong Road, Rongqiao Industrial Area, FuqingFujian, China.
Manufacturer :	Top Way Intelligent Science & Technology CO.,LTD. Qianting, Qingrong Road, Rongqiao Industrial Area, FuqingFujian, China.
Equipment	:Wireless Video Door Phone
Type/Model	:Indoor series: KW-V4HP/C, KW-V120/C, KW-V4MT/C, KW-V123; Outdoor series: KW-V135/C

Summary

The test report is to certify that the tested equipment properly complies with the requirements of:

FCC Rules and Regulations: 47CFR Part 15: Radio Frequency Devices: 2006
ANSIC63.4 (2003): American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

Description

The appliances were tested by Intertek Testing Services Limited Shanghai and found compliance with relevant requirements described in FCC Part 15: Radio Frequency Devices.

Test results are contained in this test report and Intertek Testing Services Limited Shanghai is assumed full responsibility for the accuracy and completeness of these measurements.

Date of issue: July 10, 2006

Prepared by: Approved by:

Daniel Zhao(*Project engineer*) Steve Li (*Reviewer*)

Description of Test Facility

Name: Intertek Testing Services Limited Shanghai

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Content

1.Applicant Information

Applicant	:Top Way Intelligent Science & Technology CO.,LTD. Qianting, Qingrong Road, Rongqiao Industrial Area, FuqingFujian, China.
Name of contact	: Mr. Wen Lin
Telephone	: 86 591 85167515
Telefax	: 86 591 85287130
Manufacture	: Top Way Intelligent Science & Technology CO.,LTD. Qianting, Qingrong Road, Rongqiao Industrial Area, FuqingFujian, China.
Country of origin	: P.R. China

2.Information of Equipment Under Test (EUT)

2.1 Identification of the EUT

Equipment	: Wireless Video Door Phone
Type/model	: Indoor series: KW-V4HP/C, KW-V120/C, KW-V4MT/C, KW-V123; Outdoor series: KW-V135/C
FCC ID	: UNC2BWVDP
Date of sample receipt	: June 8, 2006
Date of test	: June 15 - 29, 2006

2.2 Technical specification

Operation Frequency	: 902 MHz ~ 928MHz; 2400 ~ 2483MHz
Modulation	: Frequency Modulation(FM)
Antenna Designation	: Non-User Replaceable(Fixed)
Rating	: Indoor series: KW-V4HP/C, KW-V120/C, KW-V4MT/C, KW-V123: ⎓13.5V 900mA Outdoor series: KW-V135/C: ⎓ 12V 450mA

Description of EUT : KW –4HP/C, KW-V120/C, KW-V4MT/C and KW-V123 have the same schematic diagram, PCB layout and component, only the external appearance is different. So, KW-4HP/C is chosen to test as representative.

2.3 Mode of operation during the test / Test peripherals used

The compliance tests were performed under the following operation mode.
The EUT was operated in the transmitting picture and sound mode.

2.4 Related Grant and test Standard

This product is complying with section 15.249 of FCC Part 15, Subpart C Rules.

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4(2003). Radiated testing was performed at an antenna to EUT distance 3 meters.

2.5 Instrument list

Equipment	Type	Manu.	Serials number	Cal. Date	Cal. Interval
Test receiver	ESCS 30	R&S	835418/003	2006-3-14	1 Year
Passive voltage probe	ESH2-Z3	R&S	100009	2006-3-14	2 Years
Artificial mains network	ESH3-Z5	R&S	835239/008	2006-3-14	1 Year
Absorbing Clamp	MDS 21	R&S	831676/016	2006-3-15	1 Year
Oscilloscope	TDS430A	TEK	B061847	2005-11-20	1 Year
Harmonic & Flicker test system	500lix-CTS-400	California Instruments	HK53885	2006-3-15	1 Year
Signal generator	SML03	R & S	838503/018	2006-3-14	1 Year
Log-periodic Antenna	HL046	R & S	100001	2005-10-10	1 Year
Horn Antenna	AT4002A	AR	302196	2005-10-10	1 Year
Power Amplifier	500W1000A	AR	302108	2005-8-16	1 Year
Power Amplifier	30S1G3	AR	302240	2005-9-6	1 Year
Field Monitor Mainframe 4 slors	FM5004	AR	300546	2005-8-2	1 Year

Isotropic "E" field probe	FP6001	AR	300540	2005-9-4	1 Year
RF generator with amplifier	NSG-2070	SCHAFFNER	1013	2006-8-2	2 Years
CDN	CDN M216	SCHAFFNER	15609	2004-8-2	2 Years
CDN	CDN M316	SCHAFFNER	15128	2004-8-2	2 Years
Attenuator	INA2070-1	SCHAFFNER	2013	2004-8-2	2 Years
EMC immunity system	BEST EMC	SCHAFFNER	200024-001SC	2005-8-2	1 Year
EMI test receiver	ESI 26	R&S	838687/011	2005-8-13	1 Year
Broadband antenna	HL562	R&S	100019	2005-10-10	1 Year
Horn antenna	HF906	R&S	100023	2006-6-24	1 Year
Horn antenna	K638A	Microlab/FXR	-	2006-3-4	1 Year
3m anechoic chamber	-	Franconia	-	2006-3-6	Half year

2.4 Test software

Test software	Type	Manu.	Version	Cal. Date	Due date
Software of disturbance voltage	EsxS-K1	R&S	Version 2.10	2006-2-9	2007-2-8
Software of Radiated emission	ES-K1	R&S	Version 1.71	2005-7-1	2006-6-30

3. Test Summary

This report applies to tested sample only. This report shall not be reproduced in part without written approval of Intertek Testing Service Shanghai Limited.

TEST ITEM	RESULT	NOTE
Conducted Emission	Pass	
Radiation Emission	Pass	
Band edges measurement	Pass	

Notes: 1: NA =Not Applicable

4. Conducted Emissions Test (Not applicable in this report)

4.1 Limits

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

4.2 Test Procedure

The EUT was set to achieve the maximum emission level.
The mains terminal disturbance voltage was measured with the EUT in a shielded room.
The EUT was connected to AC power source through an Artificial Mains Network which provide a 50Ω linear impedance Artificial hand is used if appropriate.

For Table top equipment ■

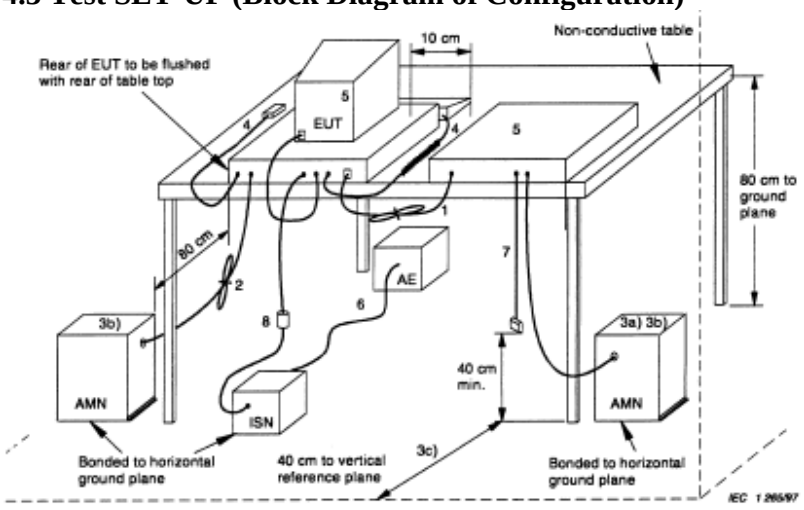
The EUT was placed on a 0.8m high non-metallic table above a metallic plane, The wall of shielded room used as Ground Reference Plane (GRP)

For Floor standing equipment □

The EUT was placed on a 0.1m high non-metallic support above a metallic plane, The wall of shielded room used as Ground Reference Plane (GRP)

The bandwidth of test receiver ESCS 30 was set at 9kHz.
The frequency range from 150kHz to 30MHz was checked.

4.3 Test SET-UP (Block Diagram of Configuration)



4.4 Test Result

Temperature : 23 °C

Relative Humidity : 40 %

Indoor unit:

Frequency (MHz)	Line (L/N)	Factor (dB)	Quasi-peak		Average	
			Disturbance level dB(uV)	Permitted limit dB(uV)	Disturbance level dB(uV)	Permitted limit dB(uV)
0.15	L	1.39	55.79	66.00	29.52	56.00
0.27	L	0.78	59.51	61.06	43.96	51.06
0.40	L	0.82	47.25	57.74	31.13	47.74
0.55	N	0.80	41.03	56.00	32.35	46.00
0.64	L	0.68	45.40	56.00	43.98	46.00
1.83	N	0.58	41.74	56.00	35.82	46.00
29.73	N	1.05	35.69	60.00	28.70	50.00

Note: Since the test software will automatically add the LISN transducer and cable loss to the reading level, only the emission level was listed in the test report.

Outdoor unit:

Frequency (MHz)	Line (L/N)	Factor (dB)	Quasi-peak		Average	
			Disturbance level dB(uV)	Permitted limit dB(uV)	Disturbance level dB(uV)	Permitted limit dB(uV)
0.17	N	1.21	50.05	64.97	42.30	54.97
0.23	N	0.77	43.83	62.55	39.78	52.55
0.45	N	0.82	40.81	56.85	39.22	46.85
0.56	N	0.80	38.11	56.00	35.70	46.00
3.96	N	0.56	39.71	56.00	35.62	46.00
5.09	N	0.55	41.32	60.00	35.26	50.00
12.16	N	0.86	38.11	60.00	33.73	50.00

Note: Since the test software will automatically add the LISN transducer and cable loss to the reading level, only the emission level was listed in the test report.

4.5 Measurement Uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.

Measurement uncertainty is calculated in accordance with CISPR 16-4-2: 2003.

Measurement uncertainty of mains terminal disturbance voltage : ± 3.6dB

The measurement uncertainty is given with a confidence of 95%, k=2.

4.6 Additions, Deviations and Exclusions from Standards

None.

5. Radiated Emission Test

5.1 Limits

According to 15.249, the field strength of emissions from Intentional Radiators operated under this section shall not exceed 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
24.0 - 24.25 GHz	250	2500

(d) 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 in Section 15.209, whichever is the lesser attenuation.

(e) As shown in Section 15.35(b), for frequencies above 1000 MHz, the above field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For point-to-point operation under paragraph (b) of this section, the peak field strength shall not exceed 2500 millivolts/meter at 3 meters along the antenna azimuth.

Remark: 1. Emission level in dBuV/m=20 log (uV/m)

2. Measurement was performed at an antenna to the closed point of EUT distance of 3 meters.
3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of ξ 15.205

4. Emission spurious frequency which appearing within the Restricted Bands specified in provision of ξ15.205, then the general radiated emission limits in ξ15.209 apply.

5.2 Test Procedure:

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn-table shall rotate 360 degrees to determine the position of maximum emission level.
EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the

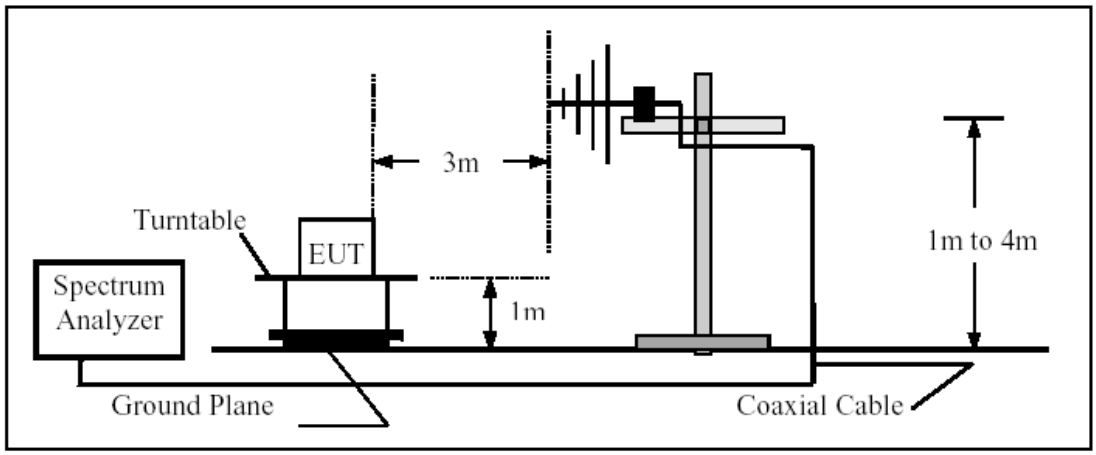
relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in ANSI C63.4-2003.

The EUT was placed on a turntable which is 0.8m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level.
EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

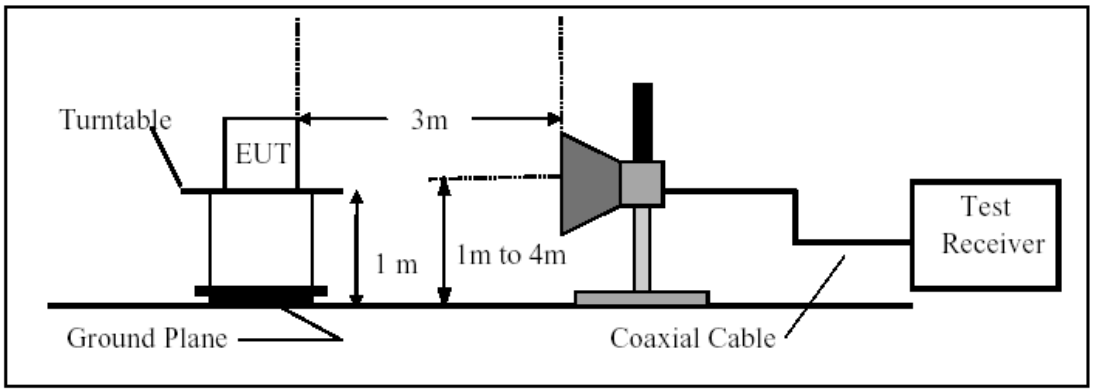
The frequency from 30MHz to 1000MHz was checked and the detector bandwidth of the test receiver was set to 120kHz; the frequency above 1GHz was checked and the detector bandwidth of the test receiver was set to 1MHz.

5.3 Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(B) Radiated Emission Test Set-UP Frequency Over 1 GHz



5.4 Test result.

Temperature: 22 °C

Humidity: 40%

5.4.1 Carrier and spurious emission of picture transmission

Outdoor unit, Channel 1:

Fund.	Har. Num.	Frequency (GHz)	Ant. Pol.(H/V)	Reading level (dBuV)		Factor (dB)	Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
				PK	AV		PK	AV	PK	AV	PK	AV
2.414	1	2.414	V	89.20	87.09	2.80	92.00	89.89	114.00	94.00	22.00	4.11
2.414	2	4.828	V	39.65	37.57	4.50	44.15	42.07	74.00	54.00	29.85	11.93
2.414	3	7.242	V	29.78	27.12	5.90	35.68	33.02	74.00	54.00	38.32	20.98
2.414	4	9.656	-	-	-	-	-	-	74.00	54.00	-	-
2.414	5	12.070	-	-	-	-	-	-	74.00	54.00	-	-
2.414	6	14.484	-	-	-	-	-	-	74.00	54.00	-	-
2.414	7	16.898	-	-	-	-	-	-	74.00	54.00	-	-
2.414	8	19.312	-	-	-	-	-	-	74.00	54.00	-	-
2.414	9	21.726	-	-	-	-	-	-	74.00	54.00	-	-
2.414	10	24.140	-	-	-	-	-	-	74.00	54.00	-	-

Outdoor unit, Channel 2:

Fund.	Har. Num.	Frequency (GHz)	Ant. Pol.(H/V)	Reading level (dBuV)		Factor (dB)	Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
				PK	AV		PK	AV	PK	AV	PK	AV
2.432	1	2.432	V	87.18	84.83	2.80	89.98	87.63	114.00	94.00	24.02	6.37
2.432	2	4.864	V	39.36	37.07	4.50	43.86	41.57	74.00	54.00	30.14	12.43
2.432	3	7.296	V	26.59	24.15	5.90	32.49	30.05	74.00	54.00	41.51	23.95
2.432	4	9.728	-	-	-	-	-	-	74.00	54.00	-	-
2.432	5	12.160	-	-	-	-	-	-	74.00	54.00	-	-
2.432	6	14.592	-	-	-	-	-	-	74.00	54.00	-	-
2.432	7	17.024	-	-	-	-	-	-	74.00	54.00	-	-
2.432	8	19.456	-	-	-	-	-	-	74.00	54.00	-	-
2.432	9	21.888	-	-	-	-	-	-	74.00	54.00	-	-
2.432	10	24.320	-	-	-	-	-	-	74.00	54.00	-	-

Outdoor unit, Channel 4:

Fund.	Har. Num.	Frequency (GHz)	Ant. Pol.(H/V)	Reading level (dBuV)		Factor (dB)	Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
				PK	AV		PK	AV	PK	AV	PK	AV
2.468	1	2.468	V	88.46	86.11	2.80	91.26	88.91	114.00	94.00	22.74	5.09
2.468	2	4.936	V	35.79	32.66	4.50	40.29	37.16	74.00	54.00	33.71	16.84
2.468	3	7.404	V	27.86	25.02	5.90	33.76	30.92	74.00	54.00	40.24	23.08
2.468	4	9.872	-	-	-	-	-	-	74.00	54.00	-	-
2.468	5	12.340	-	-	-	-	-	-	74.00	54.00	-	-
2.468	6	14.808	-	-	-	-	-	-	74.00	54.00	-	-
2.468	7	17.276	-	-	-	-	-	-	74.00	54.00	-	-
2.468	8	19.744	-	-	-	-	-	-	74.00	54.00	-	-
2.468	9	22.212	-	-	-	-	-	-	74.00	54.00	-	-
2.468	10	24.680	-	-	-	-	-	-	74.00	54.00	-	-

5.4.2 Carrier and spurious emission of sound transmission

Outdoor unit, Channel 1:

Fund.	Har. Num.	Frequency (GHz)	Ant. Pol.(H/V)	Reading level (dBuV)		Factor (dB)	Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
				PK	QP/AV		PK	QP/AV	PK	QP/AV	PK	QP/AV
902.75	1	902.75	V	63.46	62.11	24.40	87.86	86.51	114.00	94.00	26.14	7.49
902.75	2	1805.50	H	43.44	42.12	1.40	44.84	43.52	74.00	54.00	29.16	10.48
902.75	3	2708.25	V	41.93	40.27	3.00	44.93	43.27	74.00	54.00	29.07	10.73
902.75	4	3611.00	-	-	-	-	-	-	74.00	54.00	-	-
902.75	5	4513.75	-	-	-	-	-	-	74.00	54.00	-	-
902.75	6	5416.50	-	-	-	-	-	-	74.00	54.00	-	-
902.75	7	6319.25	-	-	-	-	-	-	74.00	54.00	-	-
902.75	8	7222.00	-	-	-	-	-	-	74.00	54.00	-	-
902.75	9	8124.75	-	-	-	-	-	-	74.00	54.00	-	-
902.75	10	9027.50	-	-	-	-	-	-	74.00	54.00	-	-

Outdoor unit, Channel 6:

Fund.	Har. Num.	Frequency (GHz)	Ant. Pol.(H/V)	Reading level (dBuV)		Factor (dB)	Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
				PK	QP/AV		PK	QP/AV	PK	QP/AV	PK	QP/AV
904.75	1	904.75	V	64.86	63.54	24.40	89.26	87.94	114.00	94.00	24.74	6.06
904.75	2	1809.50	H	45.50	43.73	1.40	46.90	45.13	74.00	54.00	27.10	8.87
904.75	3	2714.25	V	39.34	38.06	3.00	42.34	41.06	74.00	54.00	31.66	12.94
904.75	4	3619.00	-	-	-	-	-	-	74.00	54.00	-	-
904.75	5	4523.75	-	-	-	-	-	-	74.00	54.00	-	-
904.75	6	5428.50	-	-	-	-	-	-	74.00	54.00	-	-
904.75	7	6333.25	-	-	-	-	-	-	74.00	54.00	-	-
904.75	8	7238.00	-	-	-	-	-	-	74.00	54.00	-	-
904.75	9	8142.75	-	-	-	-	-	-	74.00	54.00	-	-
904.75	10	9047.50	-	-	-	-	-	-	74.00	54.00	-	-

Indoor unit, Channel 1:

Fund.	Har. Num.	Frequency (GHz)	Ant. Pol.(H/V)	Reading level (dBuV)		Factor (dB)	Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
				PK	QP/AV		PK	QP/AV	PK	QP/AV	PK	QP/AV
925.25	1	925.25	H	59.49	59.49	24.60	84.09	82.87	114.00	94.00	29.91	11.13
925.25	2	1850.50	H	43.09	43.09	1.40	44.49	42.86	74.00	54.00	29.51	11.14
925.25	3	2775.75	V	39.80	39.80	3.00	42.80	41.10	74.00	54.00	31.20	12.90
925.25	4	3701.00	-	-	-	-	-	-	74.00	54.00	-	-
925.25	5	4626.25	-	-	-	-	-	-	74.00	54.00	-	-
925.25	6	5551.50	-	-	-	-	-	-	74.00	54.00	-	-
925.25	7	6476.75	-	-	-	-	-	-	74.00	54.00	-	-
925.25	8	7402.00	-	-	-	-	-	-	74.00	54.00	-	-
925.25	9	8327.25	-	-	-	-	-	-	74.00	54.00	-	-
925.25	10	9252.50	-	-	-	-	-	-	74.00	54.00	-	-

Indoor unit, Channel 6:

Fund.	Har. Num.	Frequency (GHz)	Ant. Pol.(H/V)	Reading level (dBuV)		Factor (dB)	Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
				PK	QP/AV		PK	QP/AV	PK	QP/AV	PK	QP/AV
927.25	1	927.25	V	61.93	61.93	24.60	86.53	85.08	114.00	94.00	27.47	8.92
927.25	2	1854.50	H	43.68	43.68	1.40	45.08	43.62	74.00	54.00	28.92	10.38
927.25	3	2781.75	V	40.68	40.68	3.00	43.68	42.14	74.00	54.00	30.32	11.86
927.25	4	3709.00	-	-	-	-	-	-	74.00	54.00	-	-
927.25	5	4636.25	-	-	-	-	-	-	74.00	54.00	-	-
927.25	6	5563.50	-	-	-	-	-	-	74.00	54.00	-	-
927.25	7	6490.75	-	-	-	-	-	-	74.00	54.00	-	-
927.25	8	7418.00	-	-	-	-	-	-	74.00	54.00	-	-
927.25	9	8345.25	-	-	-	-	-	-	74.00	54.00	-	-
927.25	10	9272.50	-	-	-	-	-	-	74.00	54.00	-	-

5.4.2Other radiated emission

Frequency (GHz)	Ant. Pol.(H/V)	Reading level (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
34.83	V	17.00	17.50	34.50	40.00	5.50
48.49	V	20.90	11.20	32.10	40.00	7.90
77.60	V	26.30	9.10	35.40	40.00	4.60
117.47	H	25.20	10.90	36.10	43.50	7.40
197.17	H	27.40	9.70	37.10	43.50	6.40
208.84	V	30.60	10.10	40.70	43.50	2.80
218.56	H	29.40	10.50	39.90	46.00	6.10
226.33	V	31.60	10.80	42.40	46.00	3.60
238.00	H	32.60	11.10	43.70	46.00	2.30
245.77	V	30.60	11.40	42.00	46.00	4.00
265.21	V	27.40	12.00	39.40	46.00	6.60

Note:

(1) The test data in column ‘QP/AV’ is based on measuring equipment employing a CISPR quasi-peak detector if the frequency is below or equal to 1000MHz; the test data in column ‘QP/AV’ is base on measuring equipment employing an average detector if the frequency is above 1000MHz.

(2) Emission level (dBuV/m) = Reading level (dBuV) + Factor(dB)

Example: 34.83MHz(Z axis)
Reading level = 17.00 dBuV;
Factor= 17.50 dB;
Emission lvel PK(dBuV/m) = 17.00 + 17.50 = 34.50 dBuV/m

(3) Margin (dB)= Limit - Emission level

6. Band edges measurement

6.1 Limits

(d) 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 in Section 15.209, whichever is the lesser attenuation.

6.2 Test Procedure

The EUT is operating in transmit mode with modulation at the lowest and highest channel frequency. The spectrum analyzer was set to:

1. RBW=10kHz, VBW=10kHz at frequency band 30 – 1000MHz.
2. RBW=100kHz, VBW=100kHz at frequency band 1GHz – 40GHz.

The test procedure is as same as clause 5.2 of this report.

6.3 Test Configuration

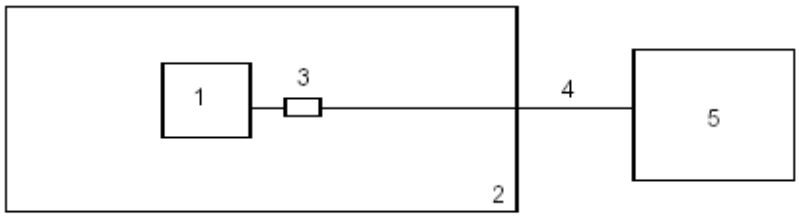


Figure 3: Measurement setup for operating bandwidth test

1 Transmitter (EUT)
2 Wooden table
3 DC-block
4 Test cable
5 Spectrum analyzer

6.4 Test Results

Frequency band 902 – 928MHz:

Frequency (GHz)	Ant. Pol.(H/V)	Reading level (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
902	V	8.46	24.40	32.86	46.00	13.14
928	V	5.94	24.60	30.54	46.00	15.46

Frequency band 2400 – 2483MHz:

Frequency (GHz)	Ant. Pol.(H/V)	Reading level (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2400	V	30.13	2.7	32.83	54.00	21.17
2483	V	29.16	2.9	32.06	54.00	21.94