

FCC PART 15 SUBPART B
MEASUREMENT AND TEST REPORT

For

SBW (Hangzhou) MGF Co., LTD

Product description: **RECEIVER**
Model No.: **R2011-11**
Supplementary Model: **N/A**
FCC ID: **A2N-R2011-11**

Prepared for: **SBW (Hangzhou) MGF Co., LTD**

218 Hongxing Road, Qiaonan, Xiaoshan Development Zone,
Hangzhou, Zhejiang, CN, 311251

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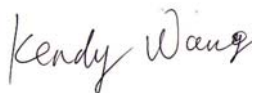
Report No.: BCT11KR-1866E

Issue Date: December 16, 2011

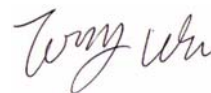
Test Date: November 21–December 16, 2011

Test by:

Reviewed By:



Kendy Wang



Tony Wu

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1 - GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: **SBW (Hangzhou) MGF Co., LTD**
Address of applicant: # 218 Hongxing Road, Qiaonan, Xiaoshan Development Zone, Hangzhou, Zhejiang, CN, 311251
Manufacturer: **SBW (Hangzhou) MGF Co., LTD**
Address of manufacturer: # 218 Hongxing Road, Qiaonan, Xiaoshan Development Zone, Hangzhou, Zhejiang, CN, 311251

General Description of E.U.T

EUT Description: **RECEIVER**
Test Model No.: **R2011-11**
Trade Mark: **N/A**
Power Rating: Input: DC 12V from battery

Remark: * *The test data gathered are from the production sample provided by the manufacturer.*

1.2 Test Standards

The following Declaration of Conformity report of EUT is prepared in accordance with FCC Rules and Regulations Part 15 Subpart B 2006

The objective of the manufacturer is to demonstrate compliance with the described above standards.

1.3 Test Summary

For the EUT described above. The standards used were FCC Part 15 Subpart B for Emissions

Table 1 : Tests Carried Out Under FCC Part 15 Subpart B

Standard	Test Items	Status
FCC Part 15 Subpart B	Conduction Emission, 0.15MHz to 30MHz	√
FCC Part 15 Subpart B	Radiation Emission, 30MHz to 1000MHz	√

- √ Indicates that the test is applicable
× Indicates that the test is not applicable

1.4 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, 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.

The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

The maximum emission levels emanating from the device are compared to the FCC Part 15 Subpart B limits for radiation emissions and the measurement results contained in this test report show that EUT is to be technically compliant with FCC requirements.

All measurement required was performed at SHENZHEN BONTEK ELECTRONIC TECHNOLOGY CO., LTD. at 1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China

1.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC – Registration No.: 338263

SHENZHEN BONTEK ELECTRONIC TECHNOLOGY CO., LTD. , EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 338263, March, 2008.

IC Registration No.: 7631A

The 3m alternate test site of SHENZHEN BONTEK ELECTRONIC TECHNOLOGY CO., LTD. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 7631A on August 2009.

CNAS - Registration No.: L3923

SHENZHEN BONTEK ELECTRONIC TECHNOLOGY CO., LTD. to ISO/IEC 17025:25 General Requirements for the Competence of Testing and Calibration Laboratories(CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

The acceptance letter from the CNAS is maintained in our files: Registration:L3923,February,2009.

TUV - Registration No.: UA 50203122-0001

SHENZHEN BONTEK ELECTRONIC TECHNOLOGY CO., LTD. An assessment of the laboratory was conducted according to the"Procedures and Conditions for EMC Test Laboratories"with reference to EN ISO/IEC 17025 by a TUV Rheinland auditor. Audit Report NO. 17010783-002.

1.6 Test Equipment List and Details

Test equipments list of SHENZHEN BONTEK ELECTRONIC TECHNOLOGY CO., LTD. .

No.	Equipment	Manufacturer	Model No.	S/N	alibration Date	alibration Due Date
1	EMI Test Receiver	R&S	ESCI	100687	2011-4-07	2012-4-06
2	EMI Test Receiver	R&S	ESPI	100097	2011-4-07	2012-4-06
3	Amplifier	HP	8447D	1937A02492	2011-4-07	2012-4-06
4	Single Power Conductor Module	FCC	FCC-LISN-5-50-1-01-CISPR25	7101	2011-4-07	2012-4-06
5	Single Power Conductor Module	FCC	FCC-LISN-5-50-1-01-CISPR25	7102	2011-4-07	2012-4-06
6	Power Clamp	SCHWARZBECK	MDS-21	3812	2011-4-07	2012-4-06
7	Positioning Controller	C&C	CC-C-1F	MF7802113	N/A	N/A
8	Electrostatic Discharge Simulator	TESEQ	NSG437	125	2011-4-07	2012-4-06
9	Fast Transient Burst Generator	SCHAFFNER	MODULA6150	34572	2011-4-07	2012-4-06
10	Fast Transient Noise Simulator	Noiseken	FNS-105AX	31485	2011-4-07	2012-4-06
11	Color TV Pattern Genenerator	PHILIPS	PM5418	TM209947	N/A	N/A
12	Power Frequency Magnetic Field Generator	EVERFINE	EMS61000-8K	608002	2011-4-07	2012-4-06
14	Capacitive Coupling Clamp	TESEQ	CDN8014	25096	2011-4-07	2012-4-06
15	High Field Biconical Antenna	ELECTRO-METRICS	EM-6913	166	2010-4-14	2012-4-13
16	Log Periodic Antenna	ELECTRO-METRICS	EM-6950	811	2010-4-14	2012-4-13
17	Remote Active Vertical Antenna	ELECTRO-METRICS	EM-6892	304	2010-4-14	2012-4-13
18	TRILOG Broadband Test-Antenna	SCHWARZBECK	VULB9163	9163-324	2010-4-14	2012-4-13
19	Horn Antenna	SCHWARZBECK	BBHA9120A	B08000991-0001	2010-4-14	2012-4-13
20	Teo Line Single Phase Module	SCHWARZBECK	NSLK8128	D-69250	2011-4-07	2012-4-06
21	10dB attenuator	SCHWARZBECK	MTAIMP-136	R65.90.0001#06	2011-4-07	2012-4-06
22	Electric bridge	Zentech	100 LCR METER	803024	N/A	N/A
23	RF Current Probe	FCC	F-33-4	80	2011-4-07	2012-4-06
24	Triple-Loop Antenna	EVERFINE	LLA-2	607004	2011-4-07	2012-4-06

25	CDN	FRANKONIA	M2+M3	A3027019	2011-4-07	2012-4-06
26	6dB Attenuator	FRANKONIA	75-A-FFN-06	1001698	2011-4-07	2012-4-06
27	EMV-Mess-Systeme GMBH	FRANKONIA	FLL-75	1020A1109	2011-4-07	2012-4-06
28	EM Injection Clamp	FCC	F-203I-13mm	91536	2011-4-07	2012-4-06
29	9KHz-2.4GHz Signal generator	MARCONI INSTRUMENTS	2024	112260/042	2011-4-07	2012-4-06
30	Broadband Preamplifier	SCHWARZBECK	BBV 9718	9718-182	2011-4-07	2012-4-06
31	Harmonics& Flicker Analyser	Voltech	PM6000	AFC-150	2011-4-07	2012-4-06
32	Spectrum Analyzer	R&S	FSP30	1093.4495.30	2011-4-07	2012-4-06
33	Temperature & Humidity Chamber	TOPSTAT	TOS-831A	3438A05208	2011-4-07	2012-4-06

2 - SYSTEM TEST CONFIGURATION

2.1 Justification

The system was configured for testing in a typical fashion (as only used by a typical user).

2.2 EUT Exercise Software

The EUT exercising program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The software offered by manufacture, can let the EUT being ON operation.

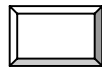
2.3 Special Accessories

As shown in section 2.5, interface cable used for compliance testing is shielded as normally supplied by **SBW (Hangzhou) MGF Co., LTD** and its respective support equipment manufacturers.

2.4 Equipment Modifications

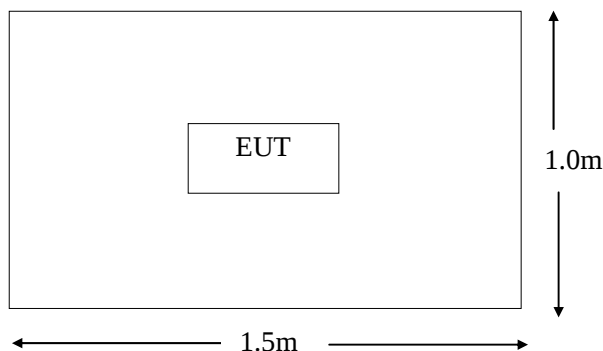
The EUT tested was not modified by BCT.

2.5 Configuration of Test System



EUT

2.6 Test Setup Diagram



3 - DISTURBANCE VOLTAGE AT THE MAINS TERMINALS

3.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is 3.4 dB.

3.2 Limit of Disturbance Voltage at The Mains Terminals

Frequency Range (MHz)	Limits (dBuV)	
	Quasi-Peak	Average
0.150~0.500	66~56	56~46
0.500~5.000	56	46
5.000~30.00	60	50

Note: (1)The tighter limit shall apply at the edge between two frequency bands.

3.3 EUT Setup

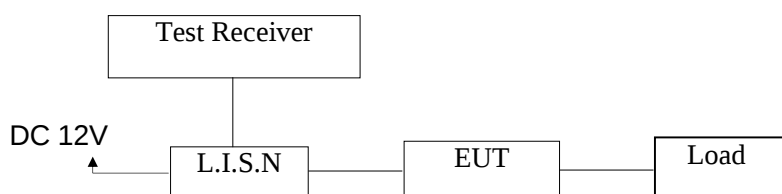
The setup of EUT is according with ANSI C63.4-2009 measurement procedure. The specification used was the FCC Rules and Regulations Part 15 Subpart B limits.

The EUT was placed center and the back edge of the test table.

The AV cables were draped along the test table and bundled to 30-40cm in the middle.

The spacing between the peripherals was 10 cm.

Maximum emission emitted from EUT was determined by manipulating the EUT, support equipment, interconnecting cables and varying the mode of operation and the levels in the final result of the test were recorded with the EUT running in the operating mode that maximum emission was emitted.



3.4 Instrument Setup

The test receiver was set with the following configurations:

Test Receiver Setting:

Frequency Range.....150 KHz to 30 MHz
Detector.....Peak & Quasi-Peak & Average
Sweep Speed.....Auto
IF Band Width.....9 KHz

3.5 Test Procedure

During the conducted emission test, the EUT power cord was connected to the auxiliary outlet of the first Artificial Mains.

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance using all installation combination.

All data was recorded in the peak detection mode. Quasi-peak and Average readings were only performed when an emission was found to be marginal (within -10 dB μ V of specification limits). Quasi-peak readings are distinguished with a "QP". Average readings are distinguished with a "AV".

3.6 Summary of Test Results

According to the data in section 3.6, the EUT complied with the FCC Part 15 B Conducted margin, with the *worst* margin reading of:

3.7 Disturbance Voltage Test Data

Temperature (°C)	22~25
Humidity (%RH)	50~55
Barometric Pressure (mbar)	950~1000
EUT	RECEIVER
M/N	R2011-11
Operating Mode	ON

Test data see following pages

Remark: (1) When PK reading is less than relevant limit 20dB, the QP reading and AV reading will not be recorded.
(2) Where QP reading is less than relevant AV limit, the AV reading will not be measured

3.8 Test Result

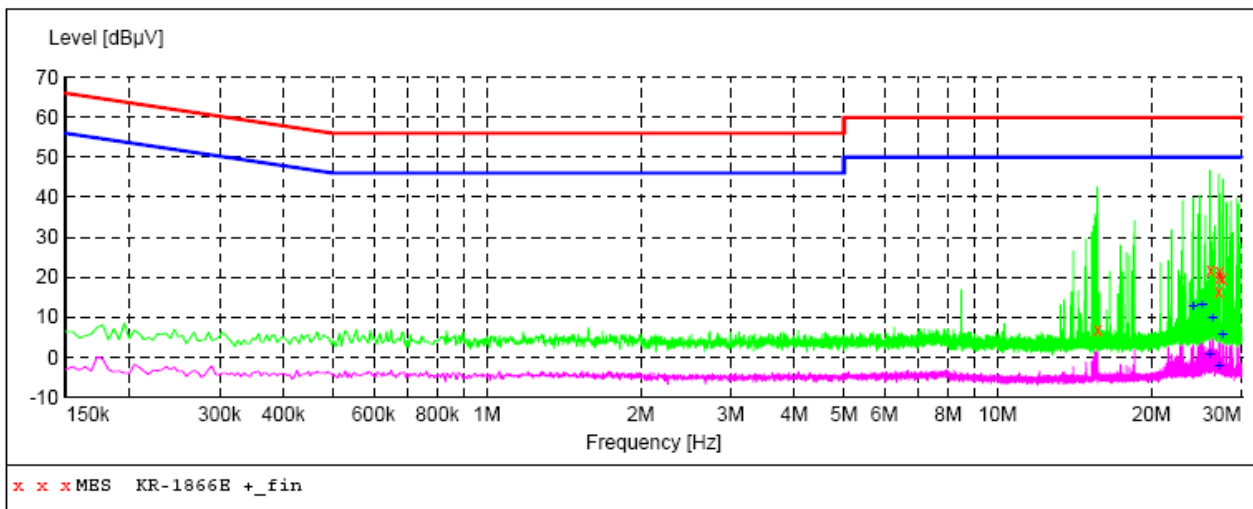
PASS

Conducted Emission Test Data

EUT: RECEIVER
M/N: R2011-11
Operating Condition: ON
Test Site: Shielded Room
Operator: Yang
Test Specification: DC 12V from battery
Comment: + Line

SCAN TABLE: "Voltage (9K-30M) FIN"

Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "KR-1866E+_fin"

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Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
15.715500	7.10	10.5	60	52.9	QP	+	GND
26.070000	21.70	10.8	60	38.3	QP	+	GND
27.046500	16.60	10.8	60	43.4	QP	+	GND
27.195000	20.00	10.8	60	40.0	QP	+	GND
27.204000	21.30	10.8	60	38.7	QP	+	GND
27.537000	19.80	10.9	60	40.2	QP	+	GND

MEASUREMENT RESULT: "KR-1866E L_fin2"

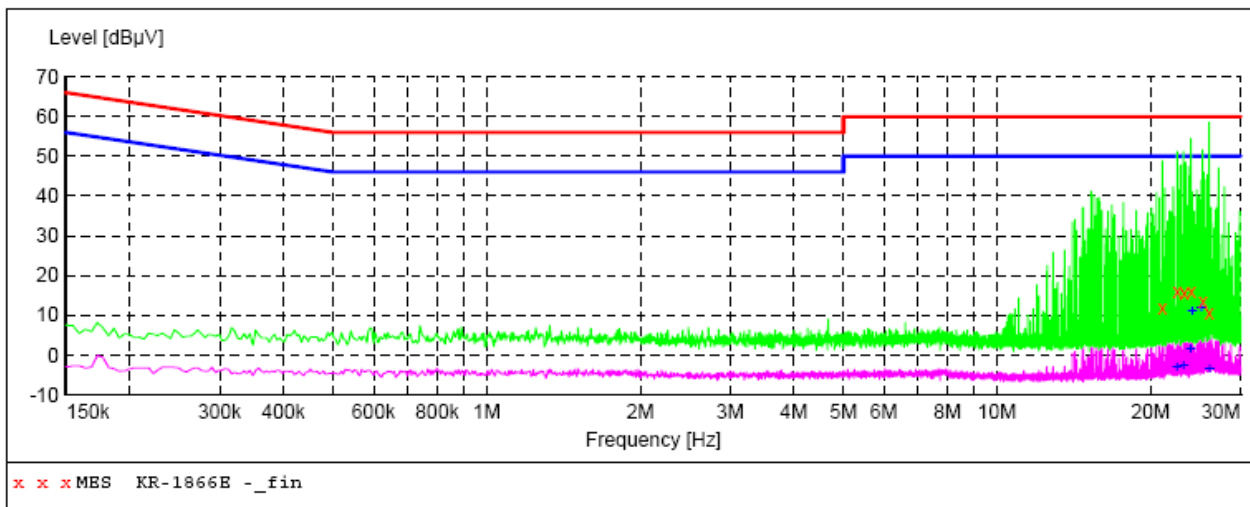
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Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
24.094500	12.90	10.8	50	37.1	AV	+	GND
25.152000	13.30	10.8	50	36.7	AV	+	GND
26.043000	0.70	10.8	50	49.3	AV	+	GND
26.349000	9.90	10.8	50	40.1	AV	+	GND
27.109500	-2.20	10.8	50	52.2	AV	+	GND
27.546000	5.70	10.9	50	44.3	AV	+	GND

Conducted Emission Test Data

EUT: RECEIVER
M/N: R2011-11
Operating Condition: ON
Test Site: Shielded Room
Operator: Yang
Test Specification: DC 12V from battery
Comment: - Line

SCAN TABLE: "Voltage (9K-30M)FIN"
Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "KR-1866E -_fin"

11/21/2011 11:38

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
21.097500	12.00	10.6	60	48.0	QP	-	GND
22.515000	16.00	10.7	60	44.0	QP	-	GND
23.244000	15.40	10.7	60	44.6	QP	-	GND
24.018000	16.00	10.8	60	44.0	QP	-	GND
25.287000	13.70	10.8	60	46.3	QP	-	GND
26.043000	10.70	10.8	60	49.3	QP	-	GND

MEASUREMENT RESULT: "KR-1866E -_fin2"

11/21/2011 11:38

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
22.537500	-3.20	10.7	50	53.2	AV	-	GND
23.163000	-2.70	10.7	50	52.7	AV	-	GND
23.955000	1.40	10.8	50	48.6	AV	-	GND
24.094500	11.20	10.8	50	38.8	AV	-	GND
25.152000	11.80	10.8	50	38.2	AV	-	GND
26.056500	-3.30	10.8	50	53.3	AV	-	GND

4 - RADIATED DISTURBANCES

4.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is 4.0 dB.

4.2 Limit of Radiated Disturbances

Frequency (MHz)	Distance (Meters)	Field Strengths Limits (dB μ V/m)
30 ~ 88	3	40
88~216	3	43.5
216 ~ 960	3	46
960 ~ 1000	3	54

Note: (1) The tighter limit shall apply at the edge between two frequency bands.
(2) Distance refers to the distance in meters between the test instrument antenna and the closest point of any part of the E.U.T.

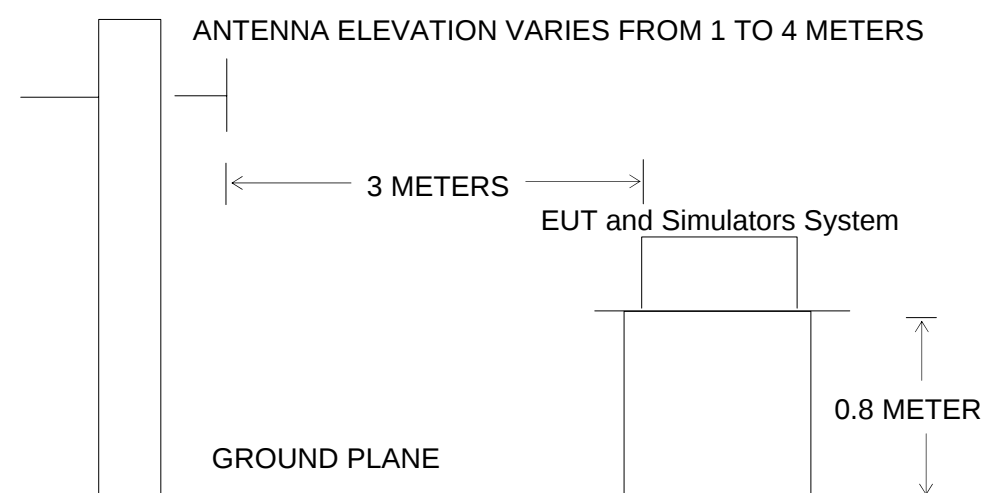
4.3 EUT Setup

The radiated emission tests were performed in the in the 3-meter anechoic chamber, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC Part 15 Subpart B limits.

The EUT was placed on the center of the test table.

Maximum emission emitted from EUT was determined by manipulating the EUT, support equipment, interconnecting cables and varying the mode of operation and the levels in the final result of the test were recorded with the EUT running in the operating mode that maximum emission was emitted.

Block diagram of test setup (In chamber)



4.4 Test Receiver Setup

According to FCC Part 15 rule, the frequency was investigated from 30 to 1000 MHz. During the radiated emission test, the test receiver was set with the following configurations:

Test Receiver Setting:

Detector.....Peak & Quasi-Peak
IF Band Width.....120KHz
Frequency Range.....30MHz to 1000MHz
Turntable Rotated.....0 to 360 degrees

Antenna Position:

Height.....1m to 4m
Polarity.....Horizontal and Vertical

4.5 Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the peak detection mode. Quasi-peak readings performed only when an emission was found to be marginal (within -10 dB μ V of specification limits), and are distinguished with a "QP" in the data table.

4.6 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB μ V means the emission is 7dB μ V below the maximum limit for Subpart B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corr. Ampl.}$$

4.7 Radiated Emissions Test Result

Temperature (°C)	22~25
Humidity (%RH)	50~54
Barometric Pressure (mbar)	950~1000
EUT	RECEIVER
M/N	R2011-11
Operating Mode	ON

Test data see following pages

Remark: (1) When PK reading is less than relevant limit 20dB, the QP reading and AV reading will not be recorded.
(2) Where QP reading is less than relevant AV limit, the AV reading will not be measured

4.8 Test Result

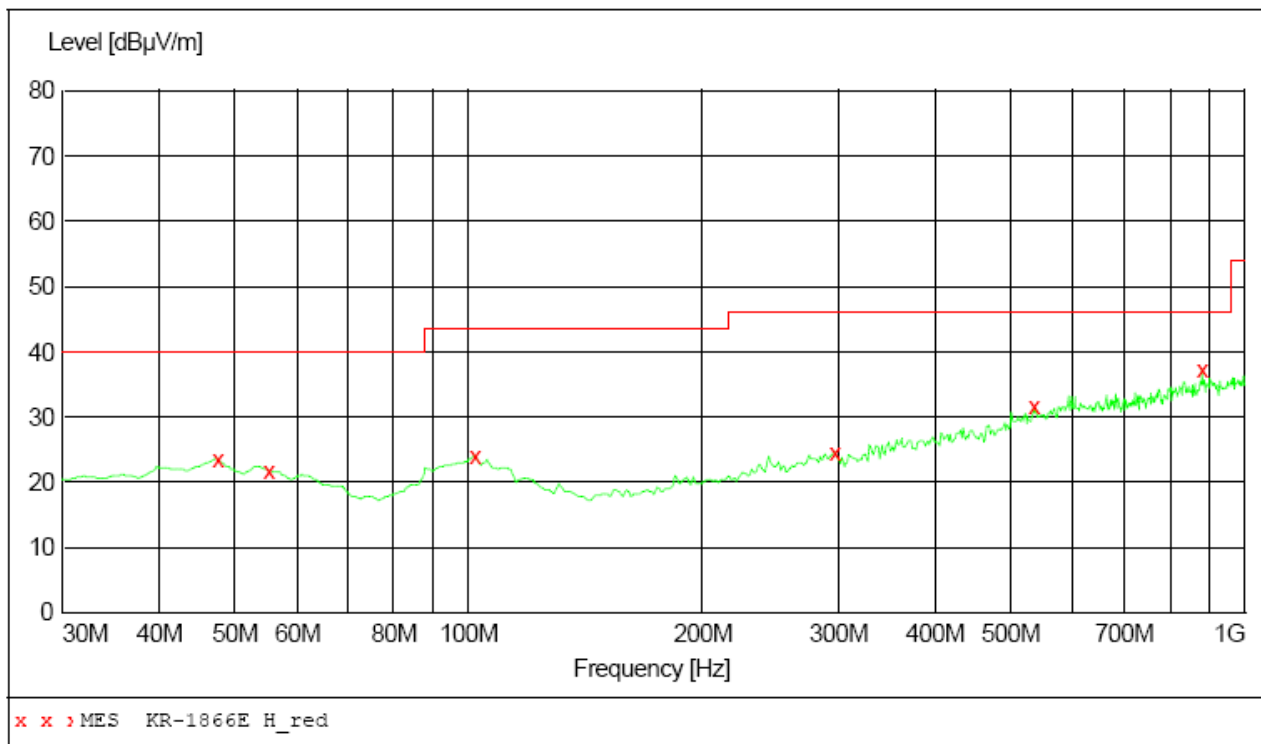
PASS

Radiated Emission Test Data:

EUT: RECEIVER
M/N: R2011-11
Operating Condition: ON
Test Site: 3m CHAMBER
Operator: Chen
Test Specification: DC 12V from battery
Comment: Polarization: Horizontal

SWEEP TABLE: "test (30M-1G)"

Short Description:		Field Strength			
Start	Stop	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency				
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	VULB9163 NEW



MEASUREMENT RESULT: "KR-1866E H_red"

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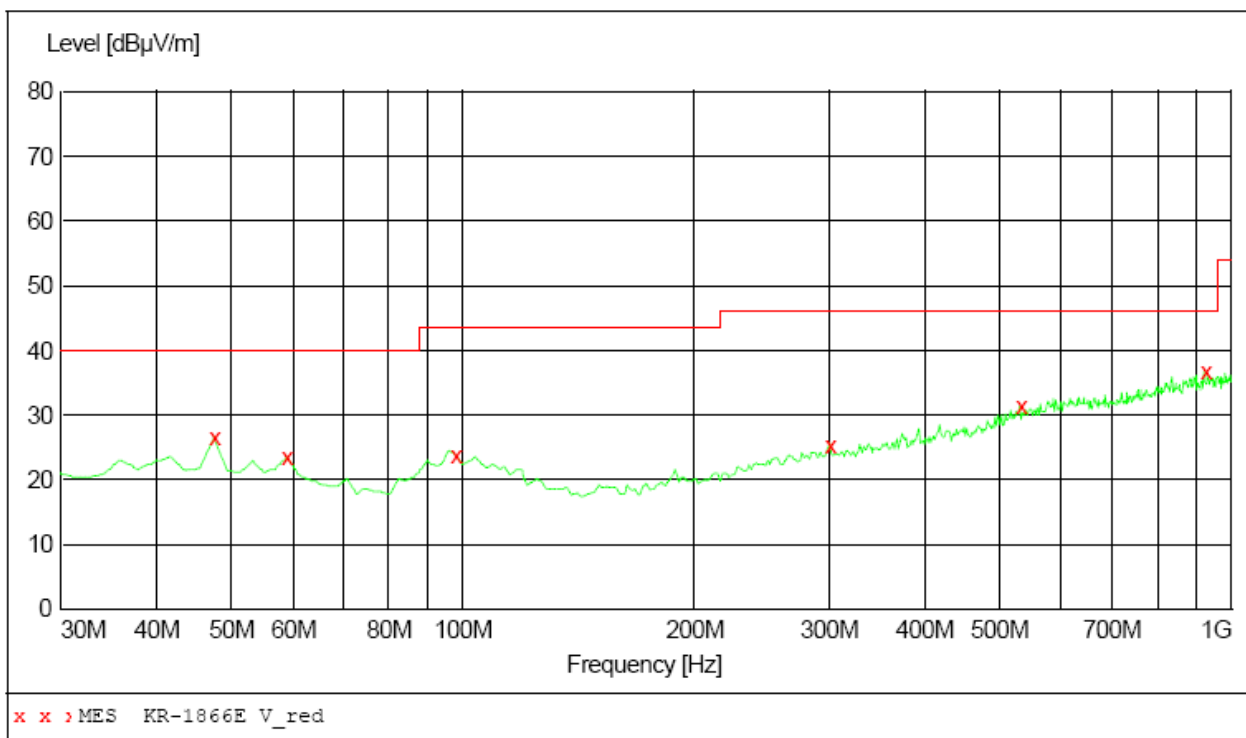
Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
47.460000	23.70	15.8	40.0	16.3	QP	100.0	0.00	HORIZONTAL
55.220000	21.90	15.6	40.0	18.1	QP	300.0	0.00	HORIZONTAL
101.780000	24.20	17.3	43.5	19.3	QP	100.0	0.00	HORIZONTAL
295.780000	24.80	18.6	46.0	21.2	QP	100.0	0.00	HORIZONTAL
534.400000	31.50	24.6	46.0	14.5	QP	300.0	0.00	HORIZONTAL
881.660000	37.30	29.0	46.0	8.7	QP	100.0	0.00	HORIZONTAL

Radiated Emission Test Data:

EUT: RECEIVER
M/N: R2011-11
Operating Condition: ON
Test Site: 3m CHAMBER
Operator: Chen
Test Specification: DC 12V from battery
Comment: Polarization: Vertical

SWEEP TABLE: "test (30M-1G)"

Short Description:		Field Strength			
Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	VULB9163 NEW



MEASUREMENT RESULT: "KR-1866E V_red"

11/21/2011 18:17

Frequency MHz	Level dB μ V/m	Transd dB	Limit dB μ V/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
47.460000	26.70	15.8	40.0	13.3	QP	100.0	0.00	VERTICAL
59.100000	23.50	14.6	40.0	16.5	QP	100.0	0.00	VERTICAL
97.900000	23.90	17.4	43.5	19.6	QP	100.0	0.00	VERTICAL
299.660000	25.50	18.7	46.0	20.5	QP	100.0	0.00	VERTICAL
530.520000	31.40	24.6	46.0	14.6	QP	100.0	0.00	VERTICAL
922.400000	36.90	29.4	46.0	9.1	QP	100.0	0.00	VERTICAL

Test data 1-2GHz

ANTENNA POLARITY & TEST DISRANCE: HORIZONTAL AT 3 M							
Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angel (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1598.00	46.46 PK	74.00	-27.54	1.59H	188	17.13	29.34
1589.00	31.11 AV	54.00	-22.89	1.59H	188	1.78	29.37

ANTENNA POLARITY & TEST DISRANCE: HORIZONTAL AT 3 M							
Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angel (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1598.00	46.46 PK	74.00	-27.54	1.59H	188	19.07	29.34
1589.00	31.11 AV	54.00	-22.89	1.59H	188	2.89	29.37

- REMARK:** 1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(Db/m)
2. Correction Factor(dB/m)=Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value=Emission level - Limit value.