FCC PART 15 SUBPART B

MEASUREMENT AND TEST REPORT

For

Robbe Modellsport GmBH

Product description:	**TELEMETRY SYSTEM**
Model No.:	**TELEMETRY BOX 2.4GHZ**
Supplementary Model:	**N/A**
FCC ID:	**PZX-TELEBOX**

Prepared for: **Robbe Modellsport GmBH**

Postfach 1108 36352,Grebenhain GERMANY

Prepared by: **Bontek Compliance Laboratory Ltd**

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Report No.:	BCT12HR-1302E
Issue Date:	September 28, 2012
Test Date:	September 17~28, 2012

Test by: **Reviewed By:**

Vincent Jiang

Kevin Chi

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1 - GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant:	**Robbe Modellsport GmBH**
Address of applicant:	Postfach 1108 36352,Grebenhain GERMANY
Manufacturer:	**SAMSHIN TECHNOLOGY(HK)CO.,LIMITED**
Address of manufacturer:	Unit 1617-18, 16/F Corporation Park, 11 On Lai Street,

General Description of E.U.T

EUT Description:	**TELEMETRY SYSTEM**
Model No.:	**TELEMETRY BOX 2.4GHZ**
Supplementary Model:	**N/A**
Trade Mark:	**Robbe Modellsport GmBH**
Power Supply:	Input: USB 5V or DC 4.2V for built-in Battery

Remark: ** The test data gathered are from the production sample provided by the manufacturer.*
** Supplementary models have same circuit and appearance, Just sales for different customers.*

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 Compliance Testing Laboratory 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 Compliance Testing Laboratory 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 03, 2011.

IC Registration No.: 7631A

The 3m alternate test site of Shenzhen Bontek Compliance Testing Laboratory Co., Ltd EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 7631A on January 25,2011.

CNAS - Registration No.: L3923

Shenzhen Bontek Compliance Testing Laboratory 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, March 22, 2012.

TUV - Registration No.: UA 50203122-0001

Shenzhen Bontek Compliance Testing Laboratory 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 Compliance Testing Laboratory Co., Ltd .

No.	Equipment	Manufacturer	Model No.	S/N	Calculator date	Calculator due date
1	EMI Test Receiver	R&S	ESCI	100687	2012-4-6	2013-4-5
2	EMI Test Receiver	R&S	ESPI	100097	2012-7-25	2013-7-24
3	Amplifier	HP	8447D	1937A02492	2012-4-6	2013-4-5
4	Single Power Conductor Module	FCC	FCC-LISN-5-50-1-01-CISPR25	07101	2012-4-6	2013-4-5
5	Single Power Conductor Module	FCC	FCC-LISN-5-50-1-01-CISPR25	07102	2012-4-6	2013-4-5
6	Power Clamp	SCHWARZBECK	MDS-21	3812	2012-4-6	2013-4-5
7	Positioning Controller	C&C	CC-C-1F	MF7802113	N/A	N/A
8	`Electrostatic Discharge Simulator	TESEQ	NSG437	125	2012-4-11	2013-4-10
9	Fast Transient Burst Generator	SCHAFFNER	MODULA6150	34572	2012-4-6	2013-4-5
10	Fast Transient Noise Simulator	Noiseken	FNS-105AX	10501	2012-6-16	2013-6-15
11	Color TV Pattern Genenator	PHILIPS	PM5418	TM209947	N/A	N/A
12	Power Frequency Magnetic Field Generator	EVERFINE	EMS61000-8K	608002	2012-4-6	2013-4-5
14	Capacitive Coupling Clamp	TESEQ	CDN8014	25096	2012-4-6	2013-4-5
15	High Field Biconical Antenna	ELECTRO-METRICS	EM-6913	166	2011-11-28	2012-11-27
16	Log Periodic Antenna	ELECTRO-METRICS	EM-6950	811	2011-11-28	2012-11-27
17	Remote Active Vertical Antenna	ELECTRO-METRICS	EM-6892	304	2011-11-28	2012-11-27
18	TRILOG Broadband Test-Antenna	SCHWARZBECK	VULB9163	9163-324	N/A	N/A
19	Horn Antenna	SCHWARZBECK	BBHA9120A	0499	2011-11-28	2012-11-27
20	Teo Line Single Phase Module	SCHWARZBECK	NSLK8128	8128247	2011-10-24	2012-10-23
21	Triple-Loop Antenna	EVERFINE	LLA-2	711002	2012-4-6	2013-4-5
22	Electric bridge	Jhai	JK2812C	803024	N/A	N/A
23	RF POWER AMPLIFIER	FRANKONIA	FLL-75	1020A1109	2012-4-6	2013-4-5
24	CDN	FRANKONIA	CDN M2+M3	A3027019	2012-4-6	2013-4-5
25	6DB Attenuator	FRANKONIA	N/A	1001698	2012-4-6	2013-4-5
26	EM Injection clamp	FCC	F-203I-23mm	091536	2012-4-6	2013-4-5
27	9kHz-2.4GHz signal generator 2024	MARCONI	10S/6625-99-457-8730	112260/042	2012-4-6	2013-4-5
28	10dB attenuator	ELECTRO-	EM-7600	836	2012-4-6	2013-4-5

		METRICS				
29	ISN	TESEQ	ISN-T800	30301	2012-6-23	2013-6-22
30	10KV surge generator	SANKI	SKS-0510M	048110003E 321	2011-11-14	2012-11-13
31	HRMONICS&FLICK RE ANALYSER	VOLTECH	PM6000	200006700433	2011-6-27	2012-6-26
32	Spectrum Analyzer	R&S	FSP	100397	2011-11-2	2012-11-1
33	Broadband preamplifier	SCH WARZBECK	BBV9718	9718-182	2012-4-6	2013-4-5
34	Temperature & Humidity Chamber	TOPSTAT	TOS-831A	3438A05208	2012-4-6	2013-4-5

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.

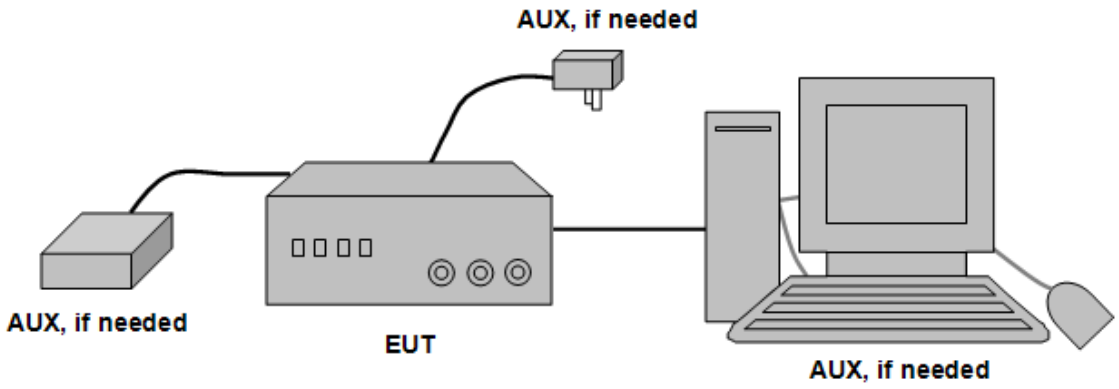
2.3 Special Accessories

As shown in section 2.5, interface cable used for compliance testing is shielded as normally supplied by **Robbe Modellsport GmBH**and its respective support equipment manufacturers.

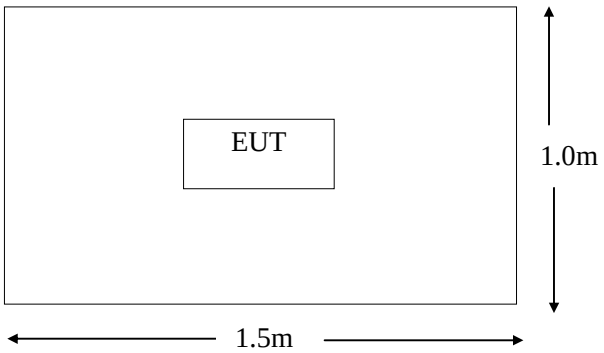
2.4 Equipment Modifications

The EUT tested was not modified by BCT.

2.5 Configuration of Test System



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

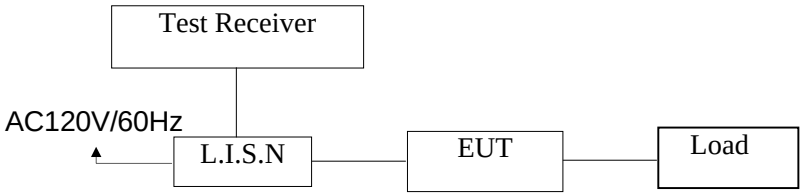
The setup of EUT is according with ANSI C63.4-2009 measurement procedure. The specification used was the FCC Rules and Regulations Part 15 Subpart B limits.

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 dBμV 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 (℃)	22~25
Humidity (%RH)	50~55
Barometric Pressure (mbar)	950~1000
EUT	TELEMETRY SYSTEM
M/N	TELEMETRY BOX 2.4GHZ
Operating Mode	Connect to PC

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

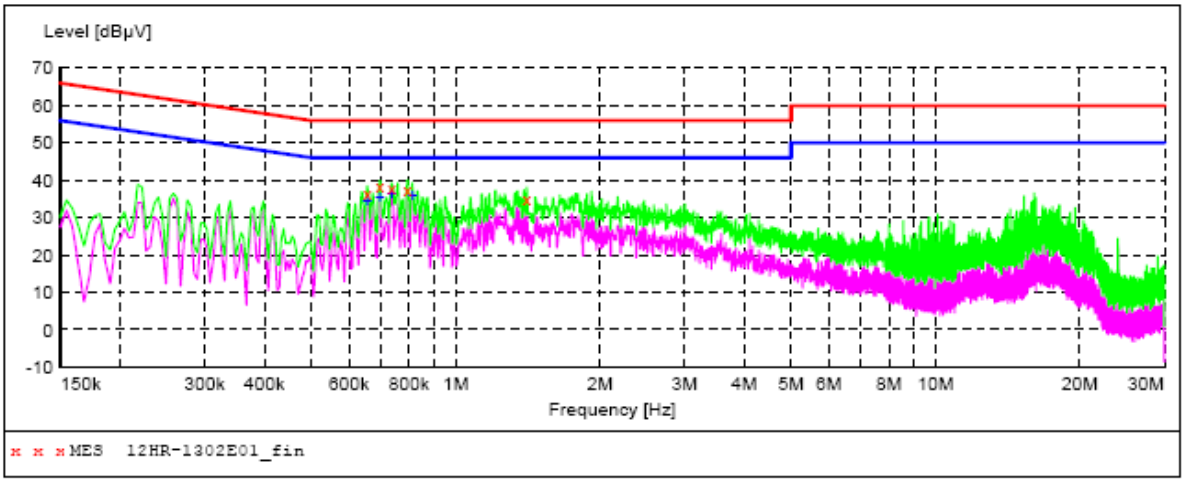
3.8 Test Result

PASS

Conducted Emission:

EUT:	TELEMETRY SYSTEM
M/N:	TELEMETRY BOX 2.4GHZ
Operating Condition:	Connect to PC
Test Site:	Shielded Room
Operator:	Yang
Test Specification:	AC 120V/60Hz for adapter
Comment:	L Line

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



MEASUREMENT RESULT: "12HR-1302E01_fin"

9/20/2012 7:38PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.654000	36.60	10.2	56	19.4	QP	L1	GND
0.694500	38.60	10.2	56	17.4	QP	L1	GND
0.735000	38.00	10.2	56	18.0	QP	L1	GND
0.793500	37.50	10.2	56	18.5	QP	L1	GND
1.405500	35.10	10.2	56	20.9	QP	L1	GND

MEASUREMENT RESULT: "12HR-1302E01_fin2"

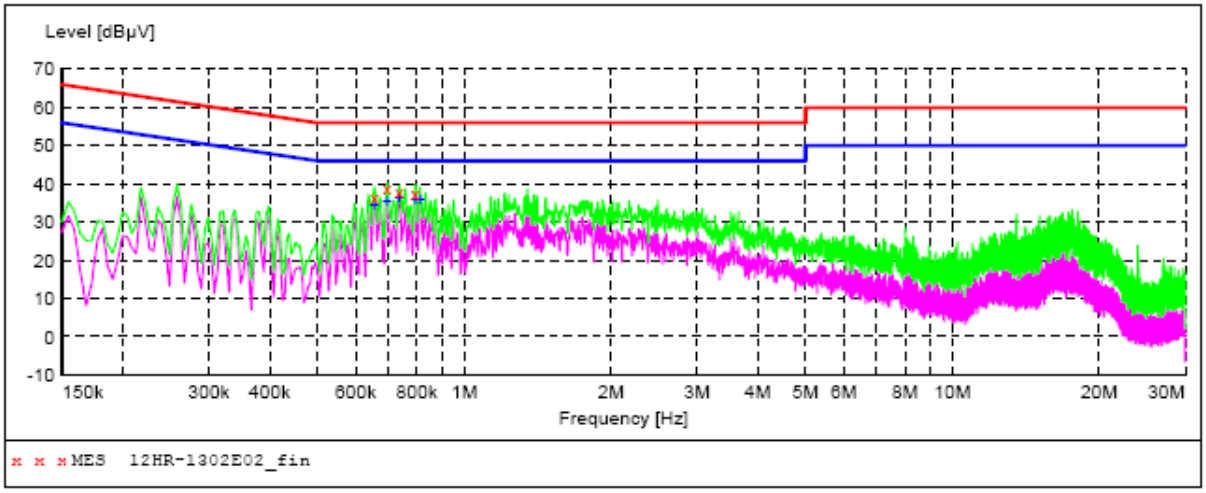
9/20/2012 7:38PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.654000	34.30	10.2	46	11.7	AV	L1	GND
0.694500	35.60	10.2	46	10.4	AV	L1	GND
0.735000	36.30	10.2	46	9.7	AV	L1	GND
0.811500	35.80	10.2	46	10.2	AV	L1	GND

Conducted Emission:

EUT:	TELEMETRY SYSTEM
M/N:	TELEMETRY BOX 2.4GHZ
Operating Condition:	Connect to PC
Test Site:	Shielded Room
Operator:	Yang
Test Specification:	AC 120V/60Hz for adapter
Comment:	N Line

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



MEASUREMENT RESULT: "12HR-1302E02_fin"

9/20/2012 7:42PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.654000	36.40	10.2	56	19.6	QP	N	GND
0.694500	38.80	10.2	56	17.2	QP	N	GND
0.735000	37.90	10.2	56	18.1	QP	N	GND
0.793500	37.60	10.2	56	18.4	QP	N	GND

MEASUREMENT RESULT: "12HR-1302E02_fin2"

9/20/2012 7:42PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.654000	34.30	10.2	46	11.7	AV	N	GND
0.694500	35.40	10.2	46	10.6	AV	N	GND
0.735000	36.40	10.2	46	9.6	AV	N	GND
0.793500	35.90	10.2	46	10.1	AV	N	GND
0.811500	35.80	10.2	46	10.2	AV	N	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 (dBμV/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

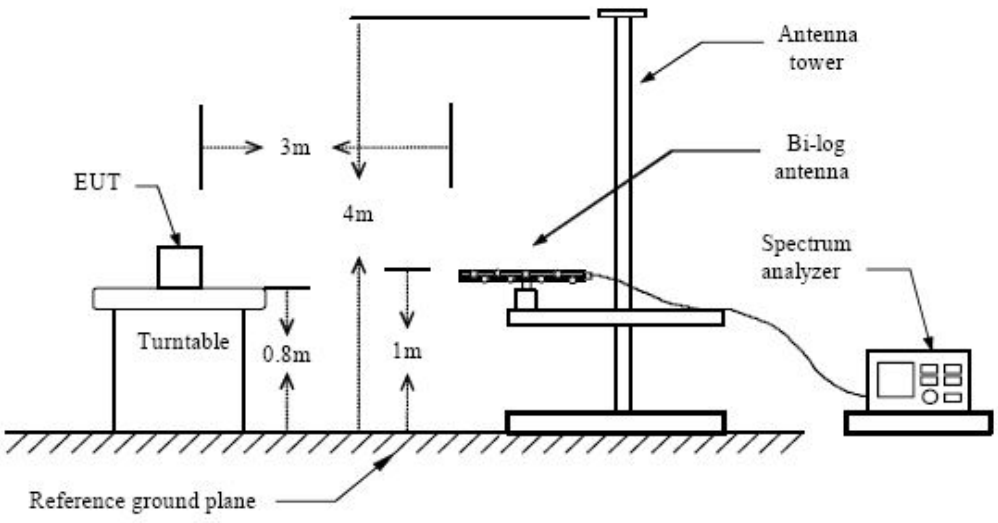
The radiated emission tests were performed in the in the 3-meter anechoic chamber, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC Part 15 Subpart B limits.

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)

Below 1 GHz



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 dBμV 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:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

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

Margin = Limit – Corr. Ampl.

4.7 Radiated Emissions Test Result

Temperature (℃)	22~25
Humidity (%RH)	50~54
Barometric Pressure (mbar)	950~1000
EUT	TELEMETRY SYSTEM
M/N	TELEMETRY BOX 2.4GHZ
Operating Mode	Connect to PC

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

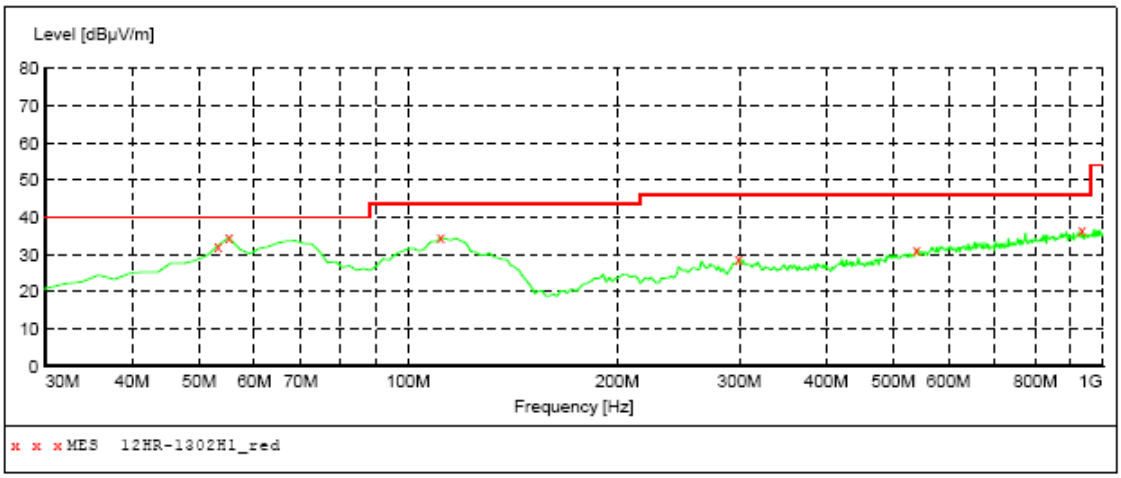
PASS

Radiated Emission Test Data:

EUT:	TELEMETRY SYSTEM
M/N:	TELEMETRY BOX 2.4GHZ
Operating Condition:	Connect to PC
Test Site:	3m CHAMBER
Operator:	Chen
Test Specification:	AC 120V/60Hz for adapter
Comment:	Polarization: Horizontal

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

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



MEASUREMENT RESULT: "12HR-1302EH1_red"

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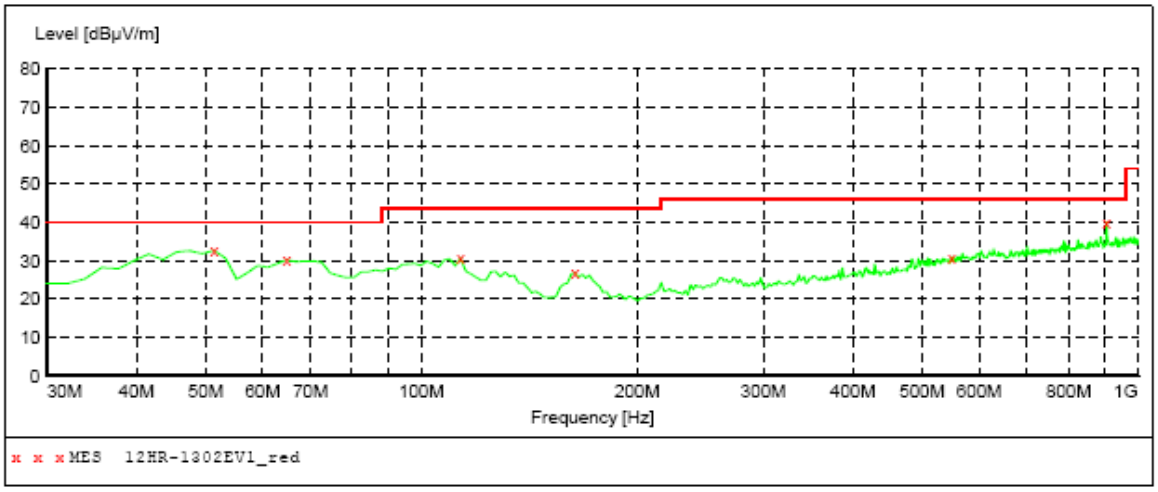
Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
53.280000	32.50	15.7	40.0	7.5	QP	300.0	0.00	HORIZONTAL
55.220000	34.60	15.6	40.0	5.4	QP	300.0	0.00	HORIZONTAL
111.480000	34.50	16.2	43.5	9.0	QP	300.0	0.00	HORIZONTAL
299.660000	28.70	18.7	46.0	17.3	QP	100.0	0.00	HORIZONTAL
540.220000	31.30	24.8	46.0	14.7	QP	300.0	0.00	HORIZONTAL
935.980000	36.40	29.5	46.0	9.6	QP	100.0	0.00	HORIZONTAL

Radiated Emission Test Data:

EUT:	TELEMETRY SYSTEM
M/N:	TELEMETRY BOX 2.4GHZ
Operating Condition:	Connect to PC
Test Site:	3m CHAMBER
Operator:	Chen
Test Specification:	AC 120V/60Hz for adapter
Comment:	Polarization: Vertical

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

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



MEASUREMENT RESULT: "12HR-1302EV1_red"

9/20/2012 20:53

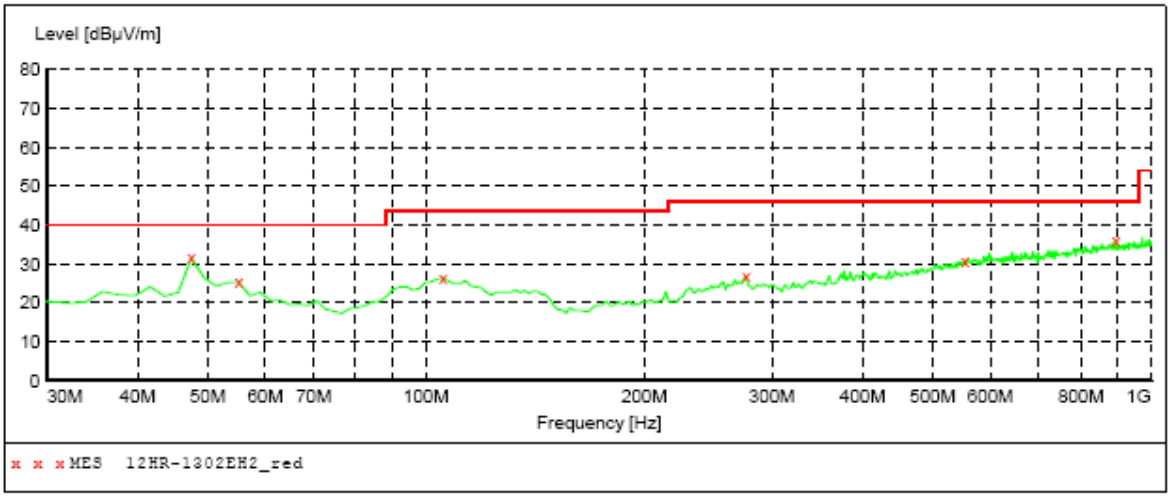
Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
51.340000	32.60	15.7	40.0	7.4	QP	100.0	0.00	VERTICAL
64.920000	30.20	13.5	40.0	9.8	QP	100.0	0.00	VERTICAL
113.420000	30.70	15.9	43.5	12.8	QP	100.0	0.00	VERTICAL
163.860000	26.80	12.9	43.5	16.7	QP	100.0	0.00	VERTICAL
549.920000	30.90	25.0	46.0	15.1	QP	100.0	0.00	VERTICAL
904.940000	40.00	29.2	46.0	7.0	QP	100.0	0.00	VERTICAL

Radiated Emission Test Data:

EUT:	TELEMETRY SYSTEM
M/N:	TELEMETRY BOX 2.4GHZ
Operating Condition:	Normal Operation
Test Site:	3m CHAMBER
Operator:	Chen
Test Specification:	DC 4.2V For built-in Battery
Comment:	Polarization: Horizontal

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

Short Description:		Field Strength			
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	5.0 ms	100 kHz	VULB9163 NEW



MEASUREMENT RESULT: "12HR-1302EH2_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	31.50	15.8	40.0	8.5	QP	300.0	0.00	HORIZONTAL
55.220000	25.30	15.6	40.0	14.7	QP	300.0	0.00	HORIZONTAL
105.660000	26.30	16.9	43.5	17.2	QP	300.0	0.00	HORIZONTAL
276.380000	26.90	18.0	46.0	19.1	QP	100.0	0.00	HORIZONTAL
553.800000	30.70	25.1	46.0	15.3	QP	100.0	0.00	HORIZONTAL
895.240000	36.00	29.1	46.0	10.0	QP	100.0	0.00	HORIZONTAL

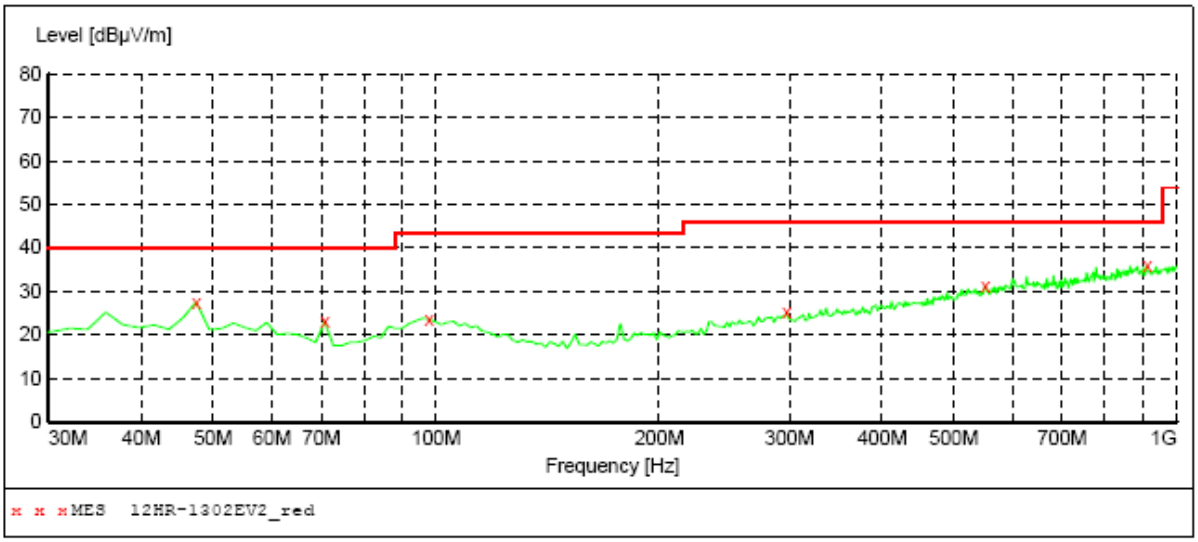
Radiated Emission Test Data:

EUT:	TELEMETRY SYSTEM
M/N:	TELEMETRY BOX 2.4GHZ
Operating Condition:	Normal Operation
Test Site:	3m CHAMBER
Operator:	Chen
Test Specification:	DC 4.2V For built-in Battery
Comment:	Polarization: Vertical

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

Short Description: Field Strength

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



MEASUREMENT RESULT: "12HR-1302EV2_red"

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Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
47.560000	27.50	15.8	40.0	12.5	QP	100.0	0.00	VERTICAL
70.740000	23.20	12.4	40.0	16.8	QP	100.0	0.00	VERTICAL
97.650000	23.60	17.4	43.5	19.9	QP	100.0	0.00	VERTICAL
297.720000	25.20	18.7	46.0	20.8	QP	100.0	0.00	VERTICAL
551.860000	31.30	25.0	46.0	14.7	QP	100.0	0.00	VERTICAL
912.700000	35.90	29.3	46.0	10.1	QP	100.0	0.00	VERTICAL