

FCC PART 15 SUBPART B
MEASUREMENT AND TEST REPORT

For

Shenzhen SQT Electronics CO.,Ltd

ZhengChengFeng TechnologyZone Xinsha Road,ShaYi Village, Sha jing Town, Baoan
Area, Shenzhen, China

Model: S-1396

March 11, 2013

This Report Concerns: <input checked="" type="checkbox"/> Original Report	Equipment Type: 2.4GHz Receiver
Test By:	Lion Cai/ <i>Lion Cai</i>
Report Number:	BCT12LR-2289E-1
Test Date:	February 21, 2013~March 11, 2013
Reviewed By:	Kendy Wang/ <i>Kendy Wang</i>
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1 - GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: **Shenzhen SQT Electronics CO.,Ltd**
Address of applicant: ZhengChengFeng TechnologyZone Xinsha Road,ShaYi Village, Sha jing Town, Baoan Area, Shenzhen, China
Manufacturer: **Shenzhen SQT Electronics CO.,Ltd**
Address of manufacturer: ZhengChengFeng TechnologyZone Xinsha Road,ShaYi Village, Sha jing Town, Baoan Area, Shenzhen, China

General Description of E.U.T

EUT Description: 2.4GHz Receiver
Trademark: N/A
Model No.: S-1396
Power Rating: DC 5V from PC

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

General Description of Test Auxiliary

AUX Description:	Manufacturer	Model No.	Certificate	CABLE
Host Computer	Dell	78MD82X	CE, FCC	1.5m Unshielded Power Cord
Monitor	Dell	E178Pc	CE, FCC	1.5m Unshielded Power Cord 1.8m shielded data Cable with core
Printer	EPSON	P330A	CE, FCC	1.2m Unshielded Power Cord 1.5m shielded data Cable
Wireless Keyboard	SQT	SK-078AG	CE, FCC	N/A
Wireless Mouse	SQT	SM-507AG	CE, FCC	N/A

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

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, 2008.

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 August 2009.

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,February,2009.

TUV - Registration No.: UA 50242657-0001

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. 17010783-003

1.6 Test Equipment List and Details

Test equipments list of Shenzhen Bontek Compliance Testing Laboratory Co., Ltd.

No.	Instrument no.	Equipment	Manufacturer	Model No.	S/N	Last Calculator	Due Calculator
1	BCT-EMC001	EMI Test Receiver	R&S	ESCI	100687	2012-4-17	2013-4-16
2	BCT-EMC002	EMI Test Receiver	R&S	ESPI	100097	2012-11-1	2013-10-31
3	BCT-EMC003	Amplifier	HP	8447D	1937A02492	2012-4-20	2013-4-19
4	BCT-EMC004	Single Power Conductor Module	R&S	NNBM 8124	242	2012-4-20	2013-4-19
5	BCT-EMC005	Single Power Conductor Module	R&S	NNBM 8124	243	2012-4-20	2013-4-19
6	BCT-EMC006	Power Clamp	SCHWARZBECK	MDS-21	3812	2012-11-5	2013-11-4
7	BCT-EMC007	Positioning Controller	C&C	CC-C-1F	MF7802113	N/A	N/A
8	BCT-EMC008	Electrostatic Discharge Simulator	TESEQ	NSG437	125	2012-11-2	2013-11-1
9	BCT-EMC009	Fast Transient Burst Generator	SCHAFFNER	MODULA6150	34572	2012-4-17	2013-4-16
10	BCT-EMC010	Fast Transient Noise Simulator	Noiseken	FNS-105AX	10501	2012-6-26	2013-6-25
11	BCT-EMC011	Color TV Pattern Generator	PHILIPS	PM5418	TM209947	N/A	N/A
12	BCT-EMC012	Power Frequency Magnetic Field Generator	EVERFINE	EMS61000-8K	608002	2012-4-17	2013-4-16
14	BCT-EMC014	Capacitive Coupling Clamp	TESEQ	CDN8014	25096	2012-4-17	2013-4-16
15	BCT-EMC015	High Field Biconical Antenna	ELECTRO-METRICS	EM-6913	166	2011-11-28	2013-11-27
16	BCT-EMC016	Log Periodic Antenna	ELECTRO-METRICS	EM-6950	811	2011-11-28	2013-11-27
17	BCT-EMC017	Remote Active Vertical Antenna	ELECTRO-METRICS	EM-6892	304	2011-11-28	2013-11-27
18	BCT-EMC018	TRILOG Broadband Test-Antenna	SCHWARZBECK	VULB9163	9163-324	2012-5-19	2014-5-18
19	BCT-EMC019	Horn Antenna	SCHWARZBECK	BBHA9120A	0499	2011-11-28	2013-11-27
20	BCT-EMC020	Teo Line Single Phase Module	SCHWARZBECK	NSLK8128	8128247	2012-11-1	2013-10-31
21	BCT-EMC021	Triple-Loop Antenna	EVERFINE	LLA-2	711002	2012-11-15	2013-11-14
22	BCT-EMC022	Electric bridge	Jhai	JK2812C	803024	N/A	N/A
23	BCT-EMC026	RF POWER AMPLIFIER	FRANKONIA	FLL-75	1020A1109	2012-4-17	2013-4-16
24	BCT-EMC027	CDN	FRANKONIA	CDN M2+M3	A3027019	2012-4-17	2013-4-16
25	BCT-EMC029	6DB Attenuator	FRANKONIA	N/A	1001698	2012-4-17	2013-4-16

26	BCT-EMC030	EM Injection clamp	FCC	F-203I-23mm	091536	2012-4-17	2013-4-16
27	BCT-EMC031	9kHz-2.4GHz signal generator 2024	MARCONI	10S/6625-99-457-8730	112260/042	2012-4-17	2013-4-16
28	BCT-EMC032	10dB attenuator	ELECTRO-METRICS	EM-7600	836	2012-4-17	2013-4-16
29	BCT-EMC033	ISN	TESEQ	ISN-T800	30301	2012-11-15	2013-11-14
30	BCT-EMC034	10KV surge generator	SANKI	SKS-0510M	048110003E321	2012-11-01	2013-10-31
31	BCT-EMC035	HRMONICS&FLICKRE ANALYSER	VOLTECH	PM6000	200006700433	2012-11-20	2013-11-19
32	BCT-EMC036	Spectrum Analyzer	R&S	FSP	100397	2012-11-1	2013-10-31
33	BCT-EMC037	Broadband preamplifier	SCHWARZBECK	BBV9718	9718-182	2012-4-20	2013-4-19

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 normal operation.

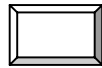
2.3 Special Accessories

As shown in section 2.5, interface cable used for compliance testing is shielded as Normally supplied by **Shenzhen SQT Electronics CO.,Ltd** and its respective support equipment manufacturers.

2.4 Equipment Modifications

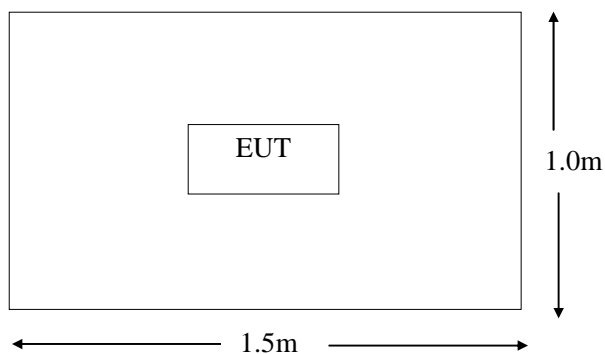
The EUT tested was not modified by BCT.

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

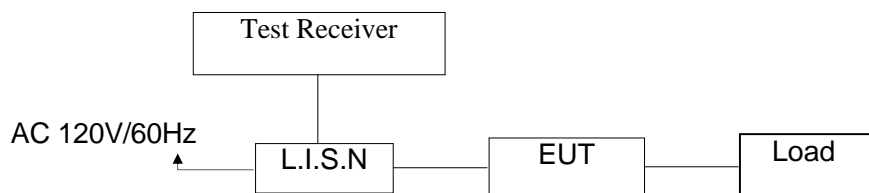
The setup of EUT is according with ANSI C63.4-2009 measurement procedure. The specification used was the FCC Rules and Regulations Part 15 Subpart B limits.

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 S-1396 was set with the following configurations:

Test S-1396 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	2.4GHz Receiver
M/N	S-1396
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

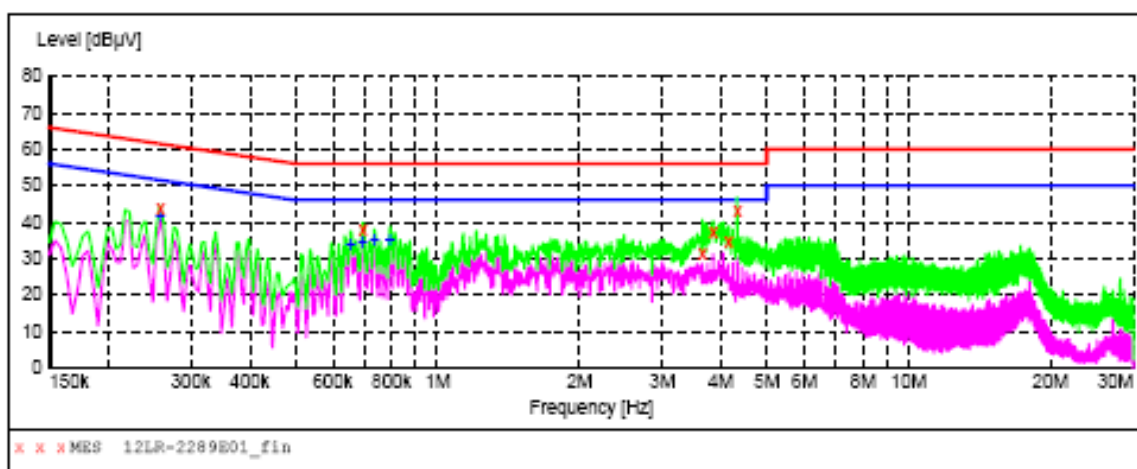
3.8 Test Result

PASS

Conducted Emission Test Data :

EUT: 2.4GHz Receiver
M/N: S-1396
Operating Condition: CONNECT TO PC
Test Site: Shielded Room
Operator: Cheng
Test Specification: AC 120V/60Hz for PC
Comment: Live Line
Start of Test: 2/21/2013 Tem:25°C Hum:50%

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



MEASUREMENT RESULT: "12LR-2289E01_fin"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.258000	43.90	10.7	62	17.6	QP	L1	GND
0.694500	38.10	10.2	56	17.9	QP	L1	GND
3.651000	31.50	10.3	56	24.5	QP	L1	GND
3.849000	36.90	10.3	56	19.1	QP	L1	GND
4.146000	34.50	10.3	56	21.5	QP	L1	GND
4.330500	42.80	10.3	56	13.2	QP	L1	GND

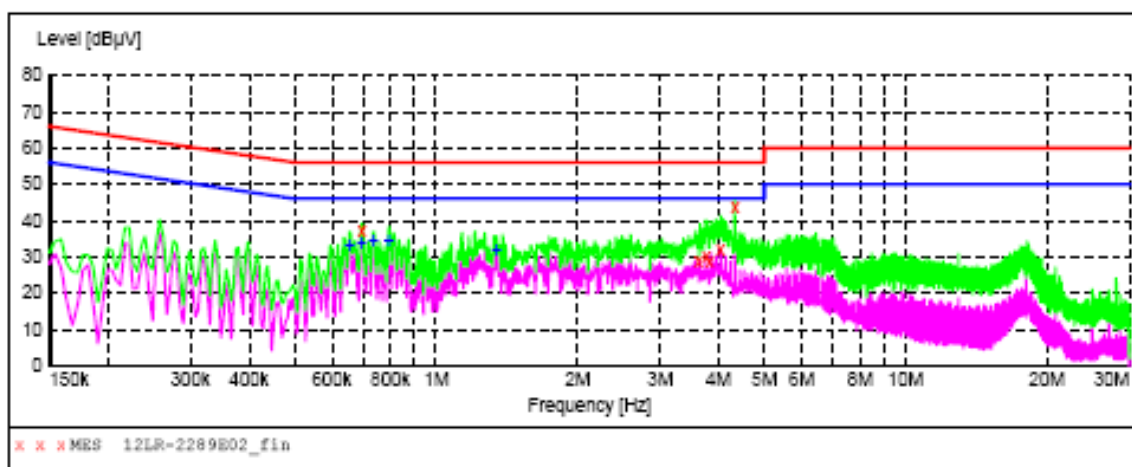
MEASUREMENT RESULT: "12LR-2289E01_fin2"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.258000	41.50	10.7	52	10.0	AV	L1	GND
0.654000	34.00	10.2	46	12.0	AV	L1	GND
0.694500	34.80	10.2	46	11.2	AV	L1	GND
0.735000	35.50	10.2	46	10.5	AV	L1	GND
0.793500	35.00	10.2	46	11.0	AV	L1	GND

Conducted Emission Test Data:

EUT: 2.4GHz Receiver
M/N: S-1396
Operating Condition: CONNECT TO PC
Test Site: Shielded Room
Operator: Cheng
Test Specification: AC 120V/60Hz for PC
Comment: Neutral Line
Start of Test: 2/21/2013 Tem:25°C Hum:50%

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



MEASUREMENT RESULT: "12LR-2289E02_fin"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.694500	37.40	10.2	56	18.6	QP	N	GND
3.624000	28.70	10.3	56	27.3	QP	N	GND
3.754500	29.90	10.3	56	26.1	QP	N	GND
3.826500	28.50	10.3	56	27.5	QP	N	GND
4.033500	32.10	10.3	56	23.9	QP	N	GND
4.330500	43.90	10.3	56	12.1	QP	N	GND

MEASUREMENT RESULT: "12LR-2289E02_fin2"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.654000	33.40	10.2	46	12.6	AV	N	GND
0.694500	34.10	10.2	46	11.9	AV	N	GND
0.735000	34.90	10.2	46	11.1	AV	N	GND
0.793500	34.60	10.2	46	11.4	AV	N	GND
1.347000	32.20	10.2	46	13.8	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 (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.

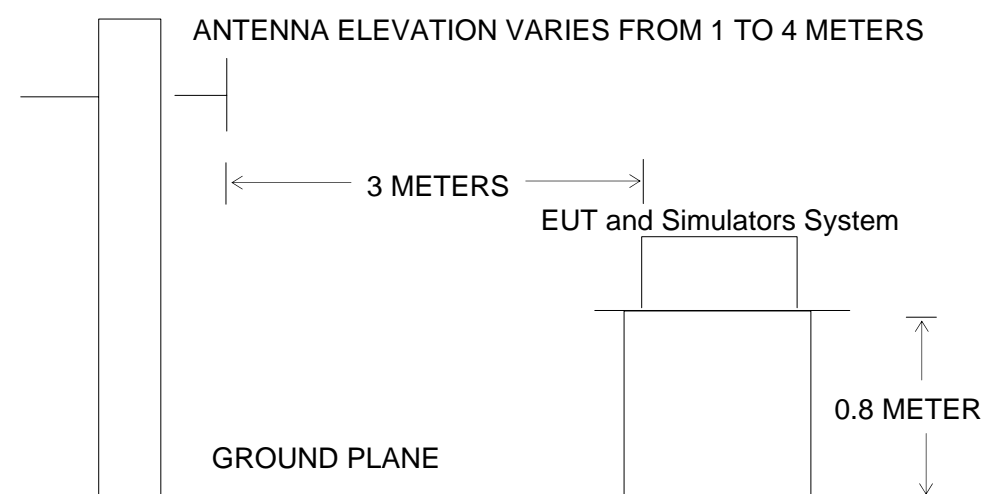
4.3 EUT Setup

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 S-1396 Setup

According to FCC Part 15 rule, the frequency was investigated from 30 to 1000 MHz. During the radiated emission test, the test S-1396 was set with the following configurations:

Test S-1396 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	2.4GHz Receiver
M/N	S-1396
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

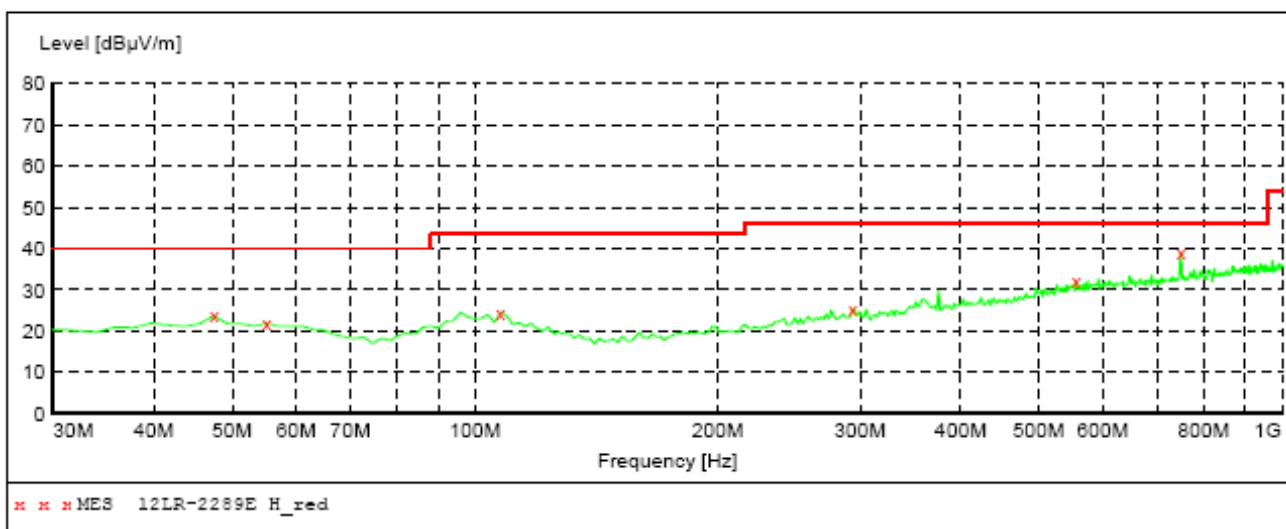
PASS

Radiated Emission Test Data:

EUT: 2.4GHz Receiver
M/N: S-1396
Operating Condition: CONNECT TO PC
Test Site: CHAMBER
Operator: Lai
Test Specification: AC 120V/60Hz for PC
Comment: Polarization: Horizontal
Start of Test: 2/22/2013 Tem:25°C Hum:50%

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: "12LR-2289E H_red"

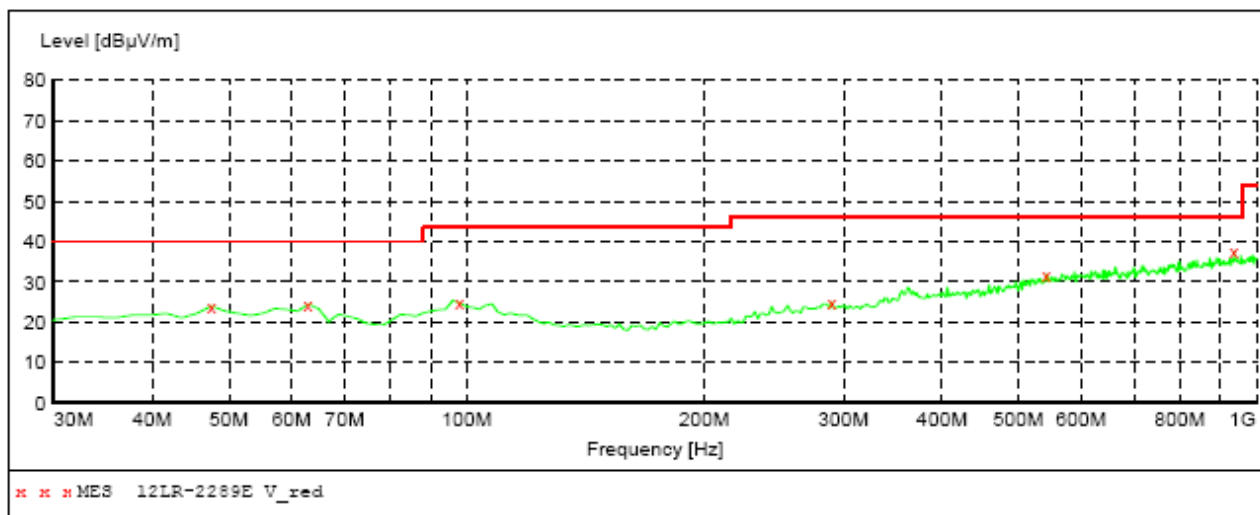
Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
47.460000	23.70	15.8	40.0	16.3	QP	100.0	0.00	HORIZONTAL
55.220000	21.90	15.6	40.0	18.1	QP	100.0	0.00	HORIZONTAL
107.600000	24.60	16.8	43.5	18.9	QP	100.0	0.00	HORIZONTAL
293.840000	25.50	18.6	46.0	20.5	QP	100.0	0.00	HORIZONTAL
555.740000	32.20	25.1	46.0	13.8	QP	100.0	0.00	HORIZONTAL
749.740000	39.10	27.3	46.0	6.9	QP	100.0	0.00	HORIZONTAL

Radiated Emission Test Data:

EUT: 2.4GHz Receiver
M/N: S-1396
Operating Condition: CONNECT TO PC
Test Site: CHAMBER
Operator: Lai
Test Specification: AC 120V/60Hz for PC
Comment: Polarization: Vertical
Start of Test: 2/22/2013 Tem:25°C Hum:50%

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: "12LR-2289E V_red"

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
47.460000	24.00	15.8	40.0	16.0	QP	100.0	0.00	VERTICAL
62.980000	24.50	13.9	40.0	15.5	QP	100.0	0.00	VERTICAL
97.900000	24.80	17.4	43.5	18.7	QP	100.0	0.00	VERTICAL
289.960000	25.10	18.4	46.0	20.9	QP	100.0	0.00	VERTICAL
542.160000	31.90	24.8	46.0	14.1	QP	100.0	0.00	VERTICAL
937.920000	37.50	29.5	46.0	8.5	QP	100.0	0.00	VERTICAL