FCC TEST REPORT

FOR

Toren Partners LLC

SwiftHitch SH02 Digital

Model No.: SH02DT

Prepared for	:	Toren Partners LLC
Address	:	321 Walnut Street, Newton, Massachusetts, United States 02460

Prepared by	:	Shenzhen LCS Compliance Testing Laboratory Ltd
Address	:	1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong , China
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Mail	:	webmaster@LCS-cert.com

Date of receipt of test sample	:	January 06, 2015
Number of tested samples	:	1
Serial number	:	Prototype
Date of Test	:	January 06, 2015 - February 06, 2015
Date of Report	:	February 06, 2015

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FCC TEST REPORT FCC CFR 47 PART 15 C(15.249): 2014	
Report Reference No. ..... :	**LCS14009261249E**
Date of Issue ..... :	February 06, 2015
Testing Laboratory Name..... :	**Shenzhen LCS Compliance Testing Laboratory Ltd.**
Address ..... :	1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China
Testing Location/ Procedure..... :	Full application of Harmonised standards ■ Partial application of Harmonised standards □ Other standard testing method □
Applicant's Name ..... :	**Toren Partners LLC**
Address ..... :	321 Walnut Street, Newton, Massachusetts, United States 02460
Test Specification	
Standard ..... :	FCC CFR 47 PART 15 C(15.249): 2014
Test Report Form No..... :	LCSEMC-1.0
TRF Originator ..... :	Shenzhen LCS Compliance Testing Laboratory Ltd.
Master TRF..... :	Dated 2011-03

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Test Item Description..... :	**SwiftHitch SH02 Digital**
Trade Mark ..... :	SwiftHitch
Model/ Type reference..... :	SH02DT
Ratings..... :	DC 3.7V
Result ..... :	**Positive**

Compiled by:	**Supervised by:**	**Approved by:**
Jacky Li/ File administrators	Danny Huang/ Technique principal	Gavin Liang/ Manager

FCC -- TEST REPORT

Test Report No. : LCS14009261249E	February 06, 2015 Date of issue

Type / Model.....	: SH02DT
EUT.....	: SwiftHitch SH02 Digital
Applicant.....	**: Toren Partners LLC**
Address.....	: 321 Walnut Street, Newton, Massachusetts, United States 02460
Telephone.....	: /
Fax.....	: /
Manufacturer.....	**: Suntronics Tech Company Ltd**
Address.....	: 6F,Building D, HuaerTe Industry Site, Baihua Community, Guangming New District, Shenzhen City, P.R.China 518107
Telephone.....	: /
Fax.....	: /
Factory.....	**: Suntronics Tech Company Ltd**
Address.....	: 6F,Building D, HuaerTe Industry Site, Baihua Community, Guangming New District, Shenzhen City, P.R.China 518107
Telephone.....	: /
Fax.....	: /

Test Result	**Positive**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT	:	SwiftHitch SH02 Digital
Model Number	:	SH02DT
Power Supply	:	DC 3.7V
Frequency Range	:	2404.25-2480.00MHz
Channel number	:	61
Modulation Technology	:	GFSK
Antenna Type and Gain	:	Integral Antenna, 2.0dBi(Max.)

1.2. Host System Configuration List and Details

Manufacturer	Description	Model	Serial Number	Certificate
--	AC/DC Adapter	K25S120200U	--	VOC

1.3. External I/O

I/O Port Description	Quantity	Cable
DC	1	1.2m, Unshielded

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1.4. Description of Test Facility

Site Description

EMC Lab. : CNAS Registration Number. is L4595.
FCC Registration Number. is 899208.
Industry Canada Registration Number. is 9642A-1.
VCCI Registration Number. is C-4260 and R-3804.
ESMD Registration Number. is ARCB0108.
UL Registration Number. is 100571-492.
TUV SUD Registration Number. is SCN1081.
TUV RH Registration Number. is UA 50296516-001

1.5. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 – 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the LCS quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

1.6. Measurement Uncertainty

Test Item		Frequency Range	Uncertainty	Note
Radiation Uncertainty	:	9KHz~30MHz	3.10dB	(1)
		30MHz~200MHz	2.96dB	(1)
		200MHz~1000MHz	3.10dB	(1)
		1GHz~26.5GHz	4.00dB	(1)
Conduction Uncertainty	:	150kHz~30MHz	1.63dB	(1)
Power disturbance	:	30MHz~300MHz	1.60dB	(1)

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

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1.7. Description Of Test Modes

The EUT operates in the unlicensed ISM band at 2.4GHz. The following operating modes were applied for the related test items. And the new battery is used during the measurement.
The EUT received DC 3.7V power from battery which are new and full power.
All test modes were tested, only the result of the worst case was recorded in the report.

The EUT is considered a portable unit; it was pre-tested on the positioned of each 3 axis. The worst case was found positioned on X-plane. Therefore only the test data of this X-plane was used for radiated emission measurement test.

Mode of Operations	Transmitting Frequency (MHz)
GFSK	2404.25
	2440.50
	2480.00
For Conducted Emission	
Test Mode	TX Mode
For Radiated Emission	
Test Mode	TX Mode

Channel frequency (CH 1~13, MHz)	Channel frequency (CH 14~26, MHz)	Channel frequency (CH 27~39, MHz)	Channel frequency (CH 40~52, MHz)	Channel frequency (CH 53~61, MHz)
2404.25	2420.50	2438.00	2455.50	2470.00
2405.50	2421.75	2439.25	2456.75	2471.25
2406.75	2423.00	2440.50	2458.00	2472.50
2408.00	2425.50	2441.75	2459.25	2473.75
2409.25	2426.75	2443.00	2460.50	2475.00
2410.50	2428.00	2444.25	2461.75	2476.25
2411.75	2429.25	2446.75	2463.00	2477.50
2413.00	2430.50	2448.00	2464.25	2478.75
2414.25	2431.75	2449.25	2465.00	2480.00
2415.50	2433.00	2450.50	2465.50	
2416.75	2434.25	2451.75	2466.25	
2418.00	2435.50	2453.00	2467.50	
2419.25	2436.75	2454.25	2468.75	

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2. TEST METHODOLOGY

All measurements contained in this report were conducted with ANSI C63.10-2013, 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 radiated testing was performed at an antenna-to-EUT distance of 3 meters. All radiated and conducted emissions measurement was performed at Shenzhen LCS Compliance Testing Laboratory Ltd.

2.1. EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

2.2. EUT Exercise

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 15.203, 15.205, 15.207, 15.209 and 15.249 under the FCC Rules Part 15 Subpart C.

2.3. General Test Procedures

2.3.1 Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2.1 of ANSI C63.10 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using Quasi-peak and average detector modes.

2.3.2 Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m 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 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 maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 6.3 of ANSI C63.10

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2.4. Test Equipment

Item	Manufacturer	Description	Model	Serial Number	Cal. Date	Due Date
1	EMC Receiver	Rohde & Schwarz	ESCS30	100174	2014-06-18	2015-06-17
2	L.I.S.N	MESS Tec	NNB-2/16Z	99079	2014-06-18	2015-06-17
3	50ΩCoaxial Switch	R&S	MP59B	M20531	2014-06-18	2015-06-17
4	Pulse Limiter	Anritsu	ESH3-Z2	100006	2014-06-18	2015-06-17
5	Voltage Probe	Rohde & Schwarz	TK9416	N/A	2014-06-18	2015-06-17
6	Spectrum Analyzer	Agilent	N9020A	MY50510140	2014-10-27	2015-10-26
7	Test Receiver	Rohde & Schwarz	ESCI	101142	2014-06-18	2015-06-17
8	Log per Antenna	Schwarzbeck	VULB9163	9163-470	2014-06-10	2015-06-09
9	Horn-antenna	ETS.LINDGREN	3115	00034771	2014-06-10	2015-06-09
10	Horn-antenna	SCHWARZBECK	BBHA9170	BBHA9170154	2014-06-10	2015-06-09
11	Test Receiver	Rohde & Schwarz	ESCI	101142	2014-06-18	2015-06-17
12	Test Receiver	Rohde & Schwarz	ESPI	101840	2014-06-18	2015-06-17
13	Loop antenna	EMCO	6502	0042963	2014-06-18	2015-06-17
14	DC Filter	MPE	23872C	N/A	2014-06-10	2015-06-09

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3. CONNECTION DIAGRAM OF TEST SYSTEM

3.1. Justification

The system was configured for testing in a continuous transmit condition.

3.2. EUT Exercise Software

N/A

3.3. Special Accessories

N/A

3.4. Block Diagram/Schematics

Please refer to the related document

3.5. Equipment Modifications

Shenzhen LCS Compliance Testing Laboratory Ltd. has not done any modification on the EUT.

3.6. Test Setup

Please refer to the test setup photo.

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4. SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§15.203	Antenna Requirement	Compliant
§15.207(a)	Conduction Emissions	Compliant
§15.205(a), §15.209(a), §15.249(a), §15.249(c)	Radiated Emissions Measurement	Compliant
§15.249	Band Edges Measurement	Compliant
§15.249, §15.215	20 dB Bandwidth	Compliant

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5. ANTENNA REQUIREMENT

5.1. Standard Applicable

According to §15.203, Antenna requirement.

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be re-placed by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

5.2. Antenna Connected Construction

The directional gains of antenna used for transmitting is 2.0dBi(Max.), and EUT is equipped with an integral antenna and no consideration of replacement. Please see EUT photo for details.

Result: Compliance.

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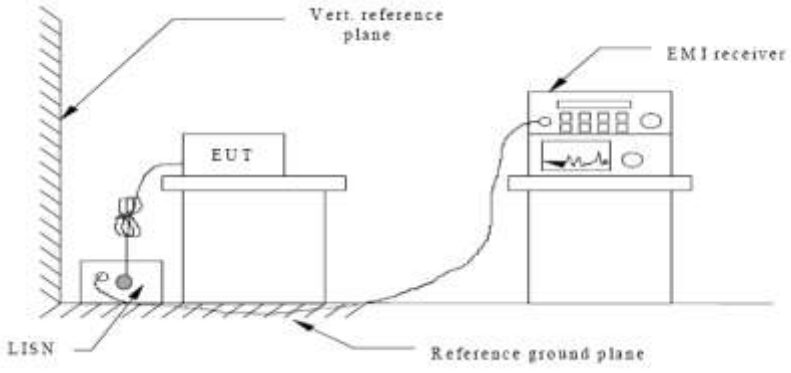
6. LINE CONDUCTED EMISSIONS

6.1 Standard Applicable

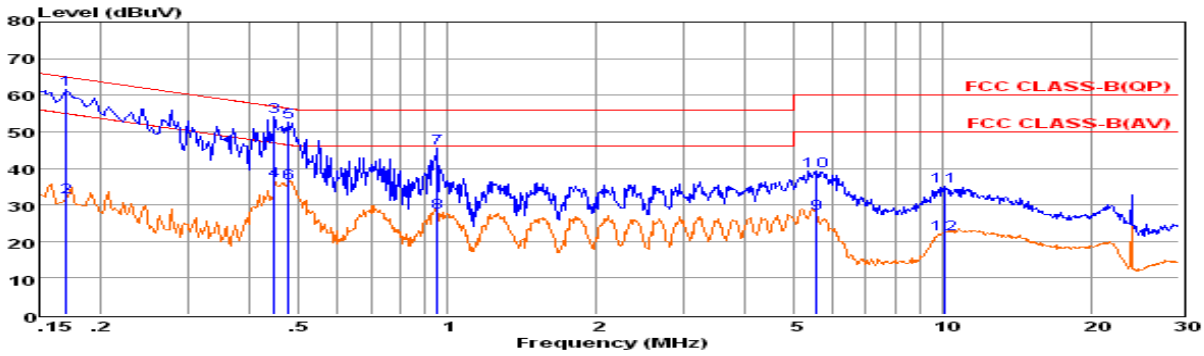
According to §15.207 (a): For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolt (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range are listed as follows:

Frequency Range(MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

6.2 Block Diagram of Test Setup



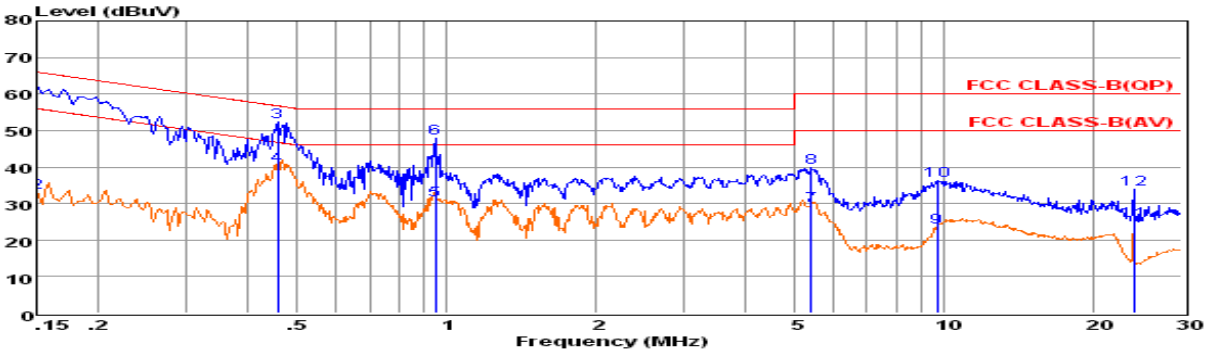
6.3 Test Results



Env. Ins: 24*/56%
EUT: SwiftHitch SH02 Digital
M/N: SH02DT
Power Rating: AC 120V/60Hz
Test Mode: TX-2404.25MHz
Operator: Jacky
Memo:
Pol: LINE

	Freq	Reading	LisnFac	CabLos	Atten_Fac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dB	
1	0.17034	41.92	9.60	0.02	10.00	61.54	64.94	-3.40	QP
2	0.17035	12.58	9.60	0.02	10.00	32.20	54.94	-22.74	Average
3	0.44679	34.39	9.62	0.04	10.00	54.05	56.93	-2.88	QP
4	0.44689	16.83	9.62	0.04	10.00	36.49	46.93	-10.44	Average
5	0.47865	33.10	9.62	0.04	10.00	52.76	56.36	-3.60	QP
6	0.47866	16.32	9.62	0.04	10.00	35.98	46.36	-10.38	Average
7	0.95313	25.91	9.63	0.05	10.00	45.59	56.00	-10.41	QP
8	0.95323	8.29	9.63	0.05	10.00	27.97	46.00	-18.03	Average
9	5.56410	7.84	9.66	0.06	10.00	27.56	50.00	-22.44	Average
10	5.56409	19.68	9.66	0.06	10.00	39.40	60.00	-20.60	QP
11	10.07185	15.20	9.69	0.08	10.00	34.97	60.00	-25.03	QP
12	10.07285	2.38	9.69	0.08	10.00	22.15	50.00	-27.85	Average

Remarks: 1. Measured = Reading + Lisn Factor +Cable Loss+Atten_Fac.
2. The emission levels that are 20dB below the official limit are not reported.



Env. Ins: 24*/56%
EUT: SwiftHitch SH02 Digital
M/N: SH02DT
Power Rating: AC 120V/60Hz
Test Mode: TX-2404.25MHz
Operator: Jacky
Memo:
Pol: NEUTRAL

	Freq	Reading	LisnFac	CabLos	Atten_Fac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dB	
1	0.15000	42.52	9.70	0.02	10.00	62.24	66.00	-3.76	QP
2	0.15001	13.26	9.70	0.02	10.00	32.98	56.00	-23.02	Average
3	0.45878	32.78	9.62	0.04	10.00	52.44	56.71	-4.27	QP
4	0.45879	20.65	9.62	0.04	10.00	40.31	46.71	-6.40	Average
5	0.94809	11.30	9.63	0.05	10.00	30.98	46.00	-15.02	Average
6	0.94809	28.24	9.63	0.05	10.00	47.92	56.00	-8.08	QP
7	5.41863	9.73	9.67	0.06	10.00	29.46	50.00	-20.54	Average
8	5.41862	20.20	9.67	0.06	10.00	39.93	60.00	-20.07	QP
9	9.70524	3.63	9.72	0.08	10.00	23.43	50.00	-26.57	Average
10	9.70514	16.35	9.72	0.08	10.00	36.15	60.00	-23.85	QP
11	24.01485	5.27	9.82	0.13	10.00	25.22	50.00	-24.78	Average
12	24.01475	14.00	9.82	0.13	10.00	33.95	60.00	-26.05	QP

Remarks: 1. Measured = Reading + Lisn Factor +Cable Loss+Atten_Fac.
2. The emission levels that are 20dB below the official limit are not reported.

Note: Pre-scan all modes and recorded the worst case results in this report(TX-2402.25MHz).

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7. RADIATED EMISSION MEASUREMENT

7.1. Standard Applicable

1. 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 §15.209, whichever is the lesser attenuation.
2. 20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) and 15.249 limit in the table below has to be followed.

Fundamental Frequency	Field Strength of fundamental (millivolts/meter)	Field Strength of harmonics (microvolts/meter)
902-928MHz	50	500
2400-2483.5MHz	50	500
5725-5875MHz	50	500
24.0-24.25GHz	250	2500

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

7.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

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Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (Emission in non-restricted band)	1000KHz / 1000KHz for peak

7.3. Test Procedure

1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase 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 supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.

3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.

4. For each suspected emissions, the antenna tower was scan (from 1 m to 4 m) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.

5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.

6. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.

7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.

8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.

9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

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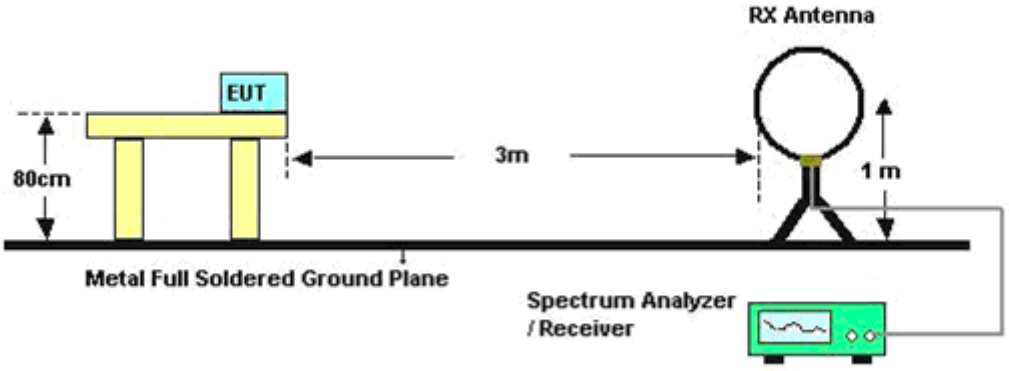
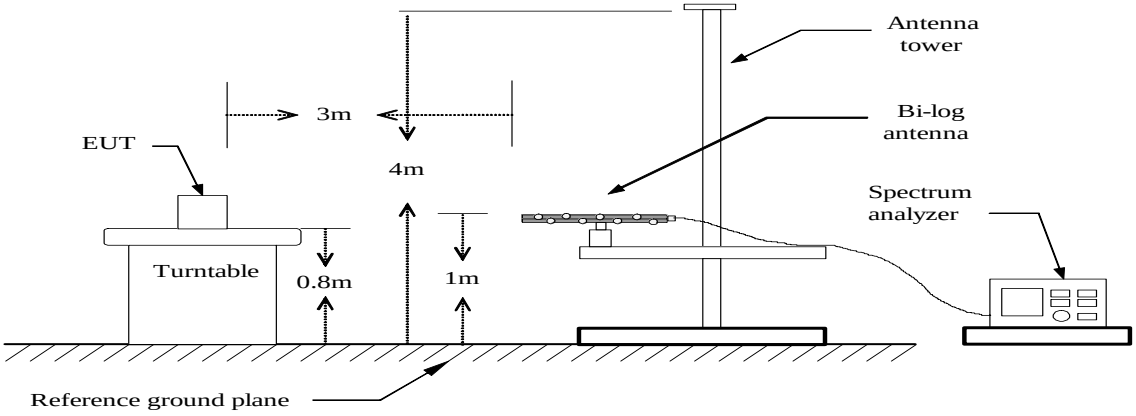
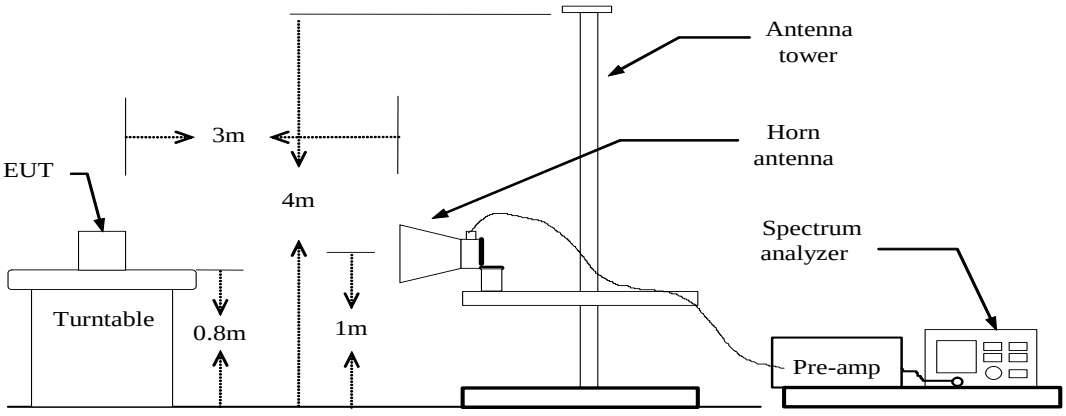
7.4. Block Diagram of Test Setup

For radiated emissions below 30MHz



For radiated emissions above 30MHz





Above 10 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade form 3m to 1.5m.

Distance extrapolation factor = 20 log (specific distanc [3m] / test distance [1.5m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [6 dB].

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7.5. Test Results

Results of Radiated Emissions (9kHz~30MHz)

Frequency (MHz)	Level (dBuV)	Over Limit (dB)	Over Limit (dBuV)	Remark
				See Note

Note:

The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

Distance extrapolation factor = 40 log (specific distance / test distance) (dB);
Limit line = specific limits (dBuV) + distance extrapolation factor.

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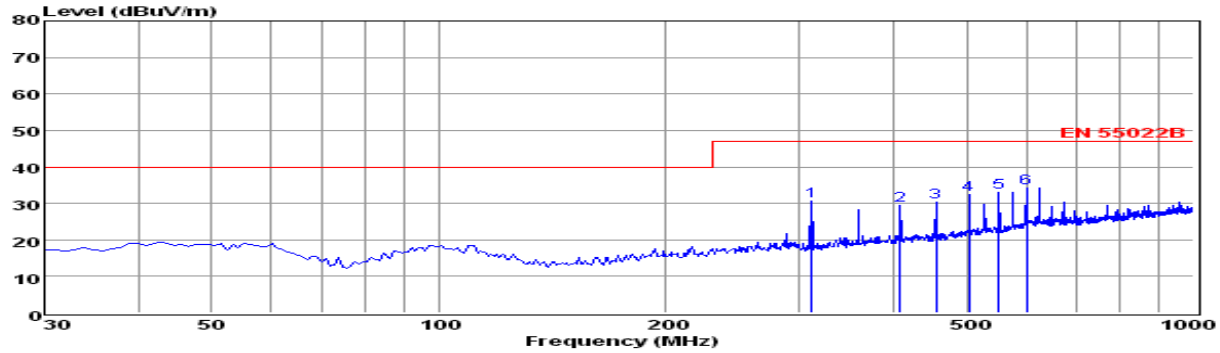
Results of Radiated Emissions (30MHz~1000MHz)

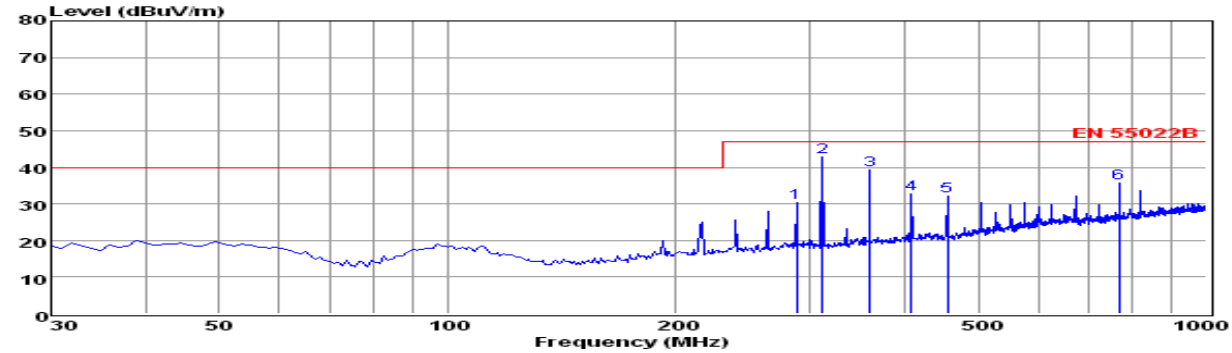
Test Mode (Low channel, 2404.25MHz)



Env. /Ins: 24℃/56%
EUT: SwiftHitch SH02 Digital
M/N: SH02DT
Power Rating: AC 120V/60Hz
Test Mode: TX-2404.25MHz
Operator: Jacky
Memo:
pol: VERTICAL

	Freq	Reading	CabLos	AntFac	PreFac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	312.27	16.36	1.09	13.23	0.00	30.68	47.00	-16.32	QP
2	408.30	13.06	1.17	15.23	0.00	29.46	47.00	-17.54	QP
3	455.83	13.36	1.39	15.58	0.00	30.33	47.00	-16.67	QP
4	504.33	14.43	1.29	16.66	0.00	32.38	47.00	-14.62	QP
5	551.86	13.90	1.46	17.55	0.00	32.91	47.00	-14.09	QP
6	600.36	14.27	1.43	18.45	0.00	34.15	47.00	-12.85	QP

Note: 1. All readings are Quasi-peak values.
2.Measured = Reading + Antenna Factor + Cable Loss - Amp Factor.
3.The emission levels that ate 20dB below the official limit are not reported.



Env. /Ins: 24℃/56%
EUT: SwiftHitch SH02 Digital
M/N: SH02DT
Power Rating: AC 120V/60Hz
Test Mode: TX-2404.25MHz
Operator: Jacky
Memo:
pol: HORIZONTAL

	Freq	Reading	CabLos	AntFac	PreFac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	288.02	16.55	1.05	12.83	0.00	30.43	47.00	-16.57	QP
2	312.27	28.60	1.09	13.23	0.00	42.92	47.00	-4.08	QP
3	359.80	23.75	1.18	14.43	0.00	39.36	47.00	-7.64	QP
4	408.30	16.28	1.17	15.23	0.00	32.68	47.00	-14.32	QP
5	455.83	15.25	1.39	15.58	0.00	32.22	47.00	-14.78	QP
6	768.17	14.24	1.76	19.66	0.00	35.66	47.00	-11.34	QP

Note: 1. All readings are Quasi-peak values.
2.Measured = Reading + Antenna Factor + Cable Loss - Amp Factor.
3.The emission levels that ate 20dB below the official limit are not reported.

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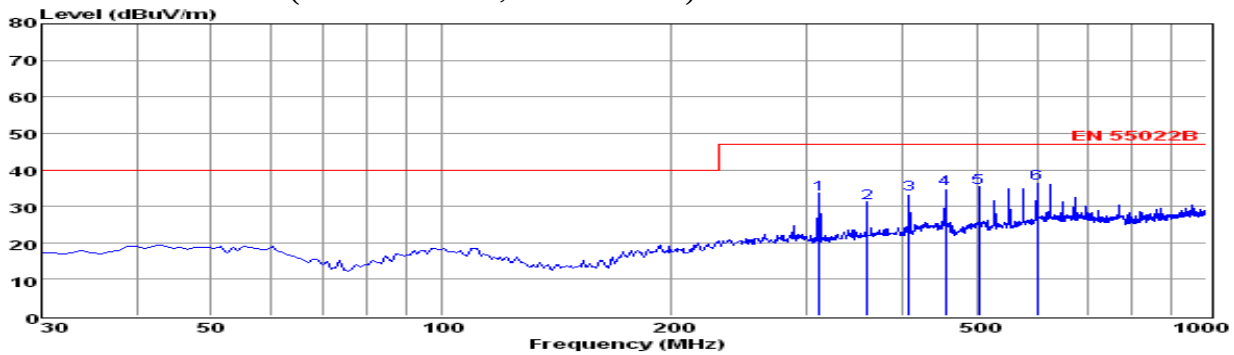
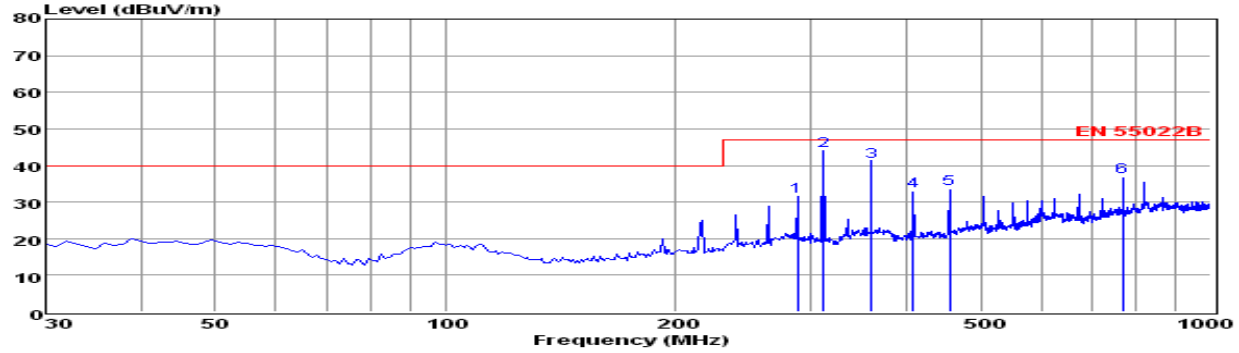
Test Mode (Middle channel, 2440.50MHz)



Env. /Ins: 24℃/56%
EUT: SwiftHitch SH02 Digital
M/N: SH02DT
Power Rating: AC 120V/60Hz
Test Mode: TX-2440.50MHz
Operator: Jacky
Memo:
pol: VERTICAL

	Freq	Reading	CabLos	AntFac	PreFac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	312.27	19.08	1.09	13.23	0.00	33.40	47.00	-13.60	QP
2	359.80	15.44	1.18	14.43	0.00	31.05	47.00	-15.95	QP
3	408.30	16.98	1.17	15.23	0.00	33.38	47.00	-13.62	QP
4	455.83	17.75	1.39	15.58	0.00	34.72	47.00	-12.28	QP
5	504.33	17.19	1.29	16.66	0.00	35.14	47.00	-11.86	QP
6	600.36	16.39	1.43	18.45	0.00	36.27	47.00	-10.73	QP

Note: 1. All readings are Quasi-peak values.
2.Measured = Reading + Antenna Factor + Cable Loss - Amp Factor.
3.The emission levels that ate 20dB below the official limit are not reported.



Env. /Ins: 24℃/56%
EUT: SwiftHitch SH02 Digital
M/N: SH02DT
Power Rating: AC 120V/60Hz
Test Mode: TX-2440.50MHz
Operator: Jacky
Memo: 李诗龙
pol: HORIZONTAL

	Freq	Reading	CabLos	AntFac	PreFac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	288.02	17.67	1.05	12.83	0.00	31.55	47.00	-15.45	QP
2	312.27	29.81	1.09	13.23	0.00	44.13	47.00	-2.87	QP
3	359.80	25.54	1.18	14.43	0.00	41.15	47.00	-5.85	QP
4	408.30	16.59	1.17	15.23	0.00	32.99	47.00	-14.01	QP
5	455.83	16.52	1.39	15.58	0.00	33.49	47.00	-13.51	QP
6	768.17	15.40	1.76	19.66	0.00	36.82	47.00	-10.18	QP

Note: 1. All readings are Quasi-peak values.
2.Measured = Reading + Antenna Factor + Cable Loss - Amp Factor.
3.The emission levels that ate 20dB below the official limit are not reported.

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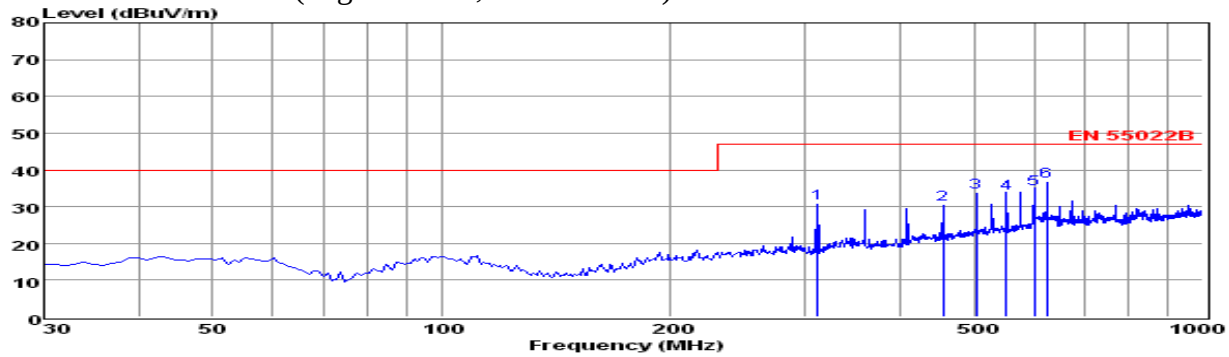
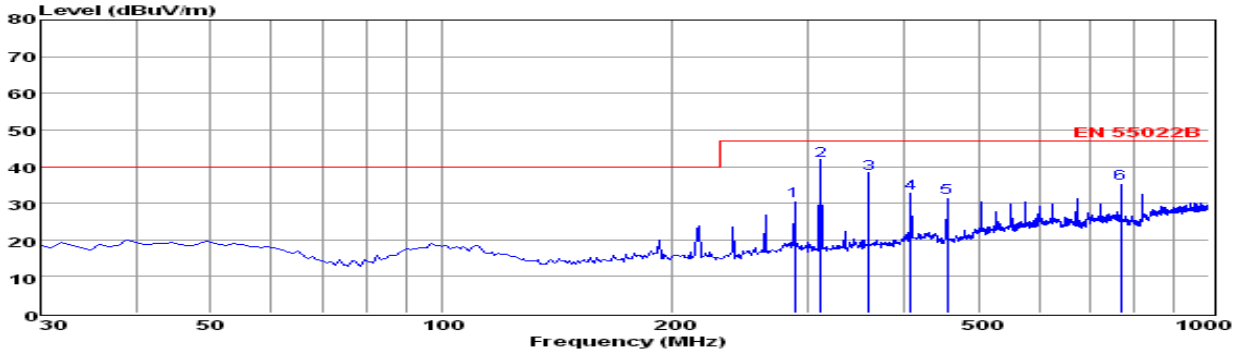
Test Mode (High channel, 2480.00MHz)



Env. /Ins: 24℃/56%
EUT: SwiftHitch SH02 Digital
M/N: SH02DT
Power Rating: AC 120V/60Hz
Test Mode: TX-2480MHz
Operator: Jacky
Memo:
pol: VERTICAL

	Freq	Reading	CabLos	AntFac	PreFac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	312.27	16.56	1.09	13.23	0.00	30.88	47.00	-16.12	QP
2	455.83	13.76	1.39	15.58	0.00	30.73	47.00	-16.27	QP
3	504.33	15.84	1.29	16.66	0.00	33.79	47.00	-13.21	QP
4	551.86	14.63	1.46	17.55	0.00	33.64	47.00	-13.36	QP
5	600.36	15.04	1.43	18.45	0.00	34.92	47.00	-12.08	QP
6	624.61	16.90	1.49	18.54	0.00	36.93	47.00	-10.07	QP

Note: 1. All readings are Quasi-peak values.
2.Measured = Reading + Antenna Factor + Cable Loss - Amp Factor.
3.The emission levels that ate 20dB below the official limit are not reported.



Env. /Ins: 24℃/56%
EUT: SwiftHitch SH02 Digital
M/N: SH02DT
Power Rating: AC 120V/60Hz
Test Mode: TX-2480MHz
Operator: Jacky
Memo:
pol: HORIZONTAL

	Freq	Reading	CabLos	AntFac	PreFac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	288.02	16.67	1.05	12.83	0.00	30.55	47.00	-16.45	QP
2	312.27	27.37	1.09	13.23	0.00	41.69	47.00	-5.31	QP
3	359.80	22.57	1.18	14.43	0.00	38.18	47.00	-8.82	QP
4	408.30	16.39	1.17	15.23	0.00	32.79	47.00	-14.21	QP
5	455.83	14.53	1.39	15.58	0.00	31.50	47.00	-15.50	QP
6	768.17	13.85	1.76	19.66	0.00	35.27	47.00	-11.73	QP

Note: 1. All readings are Quasi-peak values.
2.Measured = Reading + Antenna Factor + Cable Loss - Amp Factor.
3.The emission levels that ate 20dB below the official limit are not reported.

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Above 1GHz

Field Strength Of Fundamental-Low channel						
Frequency (MHz)	Pol.	Measure Result (PK, dBuV/m)	Measure Result (AVG, dBuV/m)	Peak Limit (dBuV/m)	AVG Limit (dBuV/m)	Result
2404.25	H	102.35	89.47	114	94	Pass
2404.25	V	98.74	86.41	114	94	Pass

Field Strength Of Fundamental-Middle channel						
Frequency (MHz)	Pol.	Measure Result (PK, dBuV/m)	Measure Result (AVG, dBuV/m)	Peak Limit (dBuV/m)	AVG Limit (dBuV/m)	Result
2440.50	H	103.54	89.86	114	94	Pass
2440.50	V	99.41	87.05	114	94	Pass

Field Strength Of Fundamental-High channel						
Frequency (MHz)	Pol.	Measure Result (PK, dBuV/m)	Measure Result (AVG, dBuV/m)	Peak Limit (dBuV/m)	AVG Limit (dBuV/m)	Result
2480.00	H	100.41	88.92	114	94	Pass
2480.00	V	96.52	85.15	114	94	Pass

The worst test result for Tx-Low Channel:

Freq. MHz	Reading dBuv	Ant. Fac dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuv/m	Limit dBuv/m	Margin dB	Remark	Pol.
4808.56	56.91	33.06	35.04	3.94	58.87	74	-15.13	Peak	Horizontal
4808.56	40.27	33.06	35.04	3.94	42.23	54	-11.77	Average	Horizontal
4808.56	55.45	33.06	35.04	3.94	57.41	74	-16.59	Peak	Vertical
4808.56	39.62	33.06	35.04	3.94	41.58	54	-12.42	Average	Vertical

The worst test result for Tx-Middle Channel:

Freq. MHz	Reading Dbuv	Ant. Fac dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuv/m	Limit dBuv/m	Margin dB	Remark	Pol.
4881.12	56.43	33.16	35.15	3.96	58.40	74	-15.60	Peak	Horizontal
4881.12	40.78	33.16	35.15	3.96	42.75	54	-11.25	Average	Horizontal
4881.12	55.79	33.16	35.15	3.96	57.76	74	-16.24	Peak	Vertical
4881.12	40.05	33.16	35.15	3.96	42.02	54	-11.98	Average	Vertical

The worst test result for Tx-High Channel:

Freq. MHz	Reading DBuv	Ant. Fac dB/m	Pre. Fac dB	Cab. Los dB	Measured dBuv/m	Limit dBuv/m	Margin dB	Remark	Pol.
4960.07	55.13	33.26	35.14	3.98	57.23	74	-16.77	Peak	Horizontal
4960.07	39.76	33.26	35.14	3.98	41.86	54	-12.14	Average	Horizontal
4960.07	54.59	33.26	35.14	3.98	56.69	74	-17.31	Peak	Vertical
4960.07	38.91	33.26	35.14	3.98	41.01	54	-12.99	Average	Vertical

Notes:

1. Measuring frequencies from 9k~10th harmonic (ex. 26GHz), No emission found between lowest internal used/generated frequency to 30 MHz.

2. Radiated emissions measured in frequency range from 9k~10th harmonic (ex. 26GHz) were made with an instrument using Peak detector mode.

3. 18~25GHz at least have 20dB margin. No recording in the test report.

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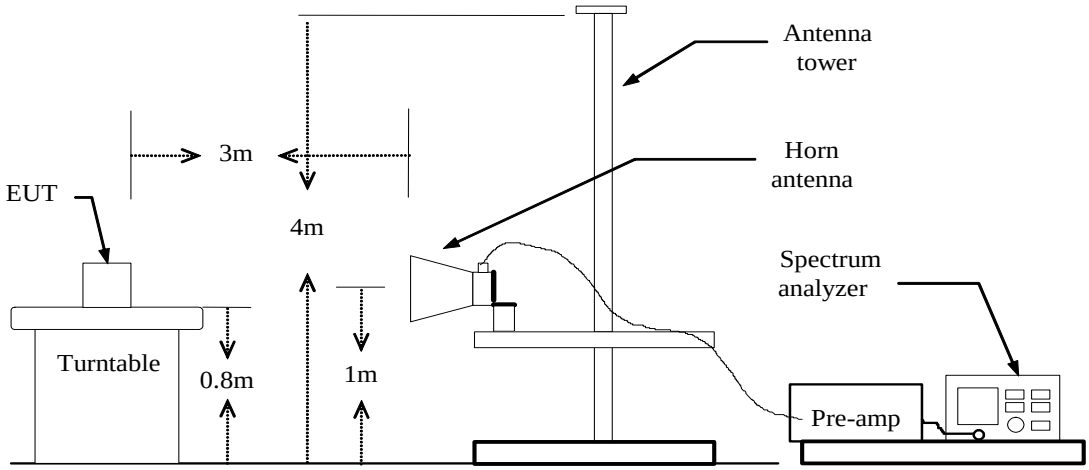
8. BANDEDGES MEASUREMENT

8.1. Standard Applicable

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.

8.2. Block Diagram of Test Setup



8.3. Test Procedure

The EUT is placed on a turntable, which is 0.8m above the ground plane. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:

Peak: RBW=VBW=1MHz / Sweep=AUTO

Repeat the procedures until the peak versus polarization are measured.

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8.4. Test Results

Only record the worst test case as following:

Tx-2404.25MHz

Freq. MHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
2390.00	49.34	32.89	35.16	3.51	50.58	74	-23.42	Peak	Horizontal
2390.00	35.81	32.89	35.16	3.51	37.05	54	-16.95	Average	Horizontal
2400.00	51.15	32.92	35.16	3.54	52.45	74	-21.55	Peak	Horizontal
2400.00	37.41	32.92	35.16	3.54	38.71	54	-15.29	Average	Horizontal
2390.00	49.12	32.89	35.16	3.51	50.36	74	-23.64	Peak	Vertical
2390.00	34.88	32.89	35.16	3.51	36.12	54	-17.88	Average	Vertical
2400.00	50.44	32.92	35.16	3.54	51.74	74	-22.26	Peak	Vertical
2400.00	36.56	32.92	35.16	3.54	37.86	54	-16.14	Average	Vertical

Tx-2480.00MHz

Freq. MHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
2483.50	51.39	33.06	35.18	3.60	52.87	74	-21.13	Peak	Horizontal
2483.50	38.86	33.06	35.18	3.60	40.34	54	-13.66	Average	Horizontal
2483.50	50.26	33.06	35.18	3.60	51.74	74	-22.26	Peak	Vertical
2483.50	37.97	33.06	35.18	3.60	39.45	54	-14.55	Average	Vertical

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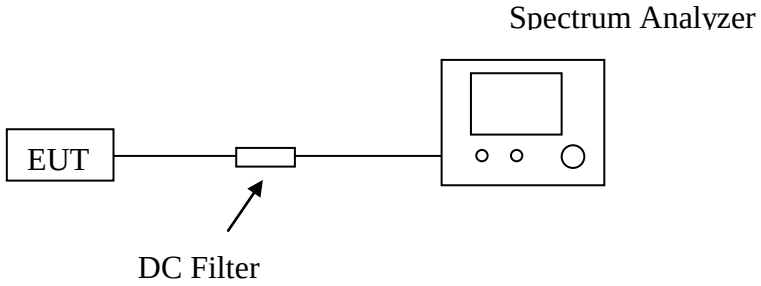
9. 20 DB BANDWIDTH MEASUREMENT

9.1. Standard Applicable

According to §15.215.

9.2. Block Diagram of Test Setup



9.3. Test Procedure

Use the following spectrum analyzer settings:

Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel

RBW ≥ 1% of the 20 dB bandwidth

VBW ≥ RBW

Sweep = auto

Detector function = peak

Trace = max hold

The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth of the emission. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s).

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9.4. Test Results

----------THE END OF TEST REPORT----------