

TEST REPORT

FCC ID: Y44-S4

IC: 9932A-S4

Applicant : Stonex Europe Srl
Address : Via Zucchi 1, 20900 Monza(MB), Italy

Equipment Under Test (EUT):

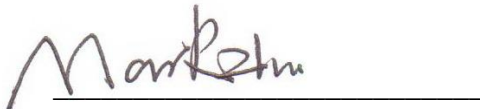
Name : S4 Handheld
Model : S4H, S4C

In Accordance with: FCC PART 15, SUBPART C: 2013 (Section 15.247)
IC RSS-210 ISSUE 8 with amendment June 2010

Report No : CST-TCB140729047-2
Date of Test : August 09- September 4, 2014
Date of Issue : September 5, 2014
Test Result: **PASS**

In the configuration tested, the EUT complied with the standards specified above

Authorized Signature



(Mark Zhu)

General Manager

The manufacture should ensure that all the products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

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1. General Information

1.1. Description of Device (EUT)

EUT	: S4 Handheld
Model No.	: S4H, S4C (S4H and S4C are electrically identical, the only difference is Model Number, S4H was tested for representative)
Power supply	: DC 7.4V Supply by battery
Adapter	: Manufacturer: NIL Model No.: PSA15R-150P
Radio Technology	: Bluetooth 2.0, IEEE 802.11b/g GSM/GPRS 850/1900
Operation frequency	: IEEE 802.11b: 2412 MHz – 2462 MHz IEEE 802.11g: 2412 MHz - 2462MHz Bluetooth 2.0: 2402 – 2480 MHz GSM/GPRS 850: 824.2 MHz – 848.8 MHz GSM/GPRS 1900: 1850.2 MHz – 1909.8 MHz
Modulation	: IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK), IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK), Bluetooth 2.0: GFSK GSM/GPRS: GMSK
Antenna Type	: PCB Antenna, max gain -3 dBi for WIFI, PCB Antenna, max gain -3 dBi for BT. PCB Antenna, max gain -3 dBi for GSM/GPRS
Applicant Address	: Stonex Europe Srl Via Zucchi 1, 20900 Monza(MB), Italy
Manufacturer Address	: Stonex Europe Srl Via Zucchi 1, 20900 Monza(MB), Italy

Note: This report is only test for Bluetooth part, for other radio test see other test report.

1.2. Accessories of device (EUT)

Accessories 1	: Adapter
Type	: PSA15R-150P

1.3. Test Lab information

Alpha Product Testing Laboratory
Building B, East Area of Nanchang Second, Industrial Zone, Gushu 2nd Road
Bao'an, Shenzhen, China
FCC Registered No.:197647
IC Registration Number: 12135A

2. Summary of test

2.1. Summary of test result

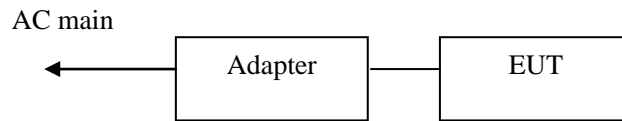
Description of Test Item	Standard	Results
Maximum Peak Output Power	FCC Part 15: 15.247(b)(1) ANSI C63.4 :2003 IC RSS-210	PASS
Bandwidth	FCC Part 15: 15.215 ANSI C63.4 :2003 IC RSS-210 IC RSS Gen	PASS
Carrier Frequency Separation	FCC Part 15: 15.247(a)(1) ANSI C63.4 :2003 IC RSS-210	PASS
Number Of Hopping Channel	FCC Part 15: 15.247(a)(1)(iii) ANSI C63.4 :2003 IC RSS-210	PASS
Dwell Time	FCC Part 15: 15.247(a)(1)(iii) ANSI C63.4 :2003 IC RSS-210	PASS
Radiated Emission	FCC Part 15: 15.209 FCC Part 15: 15.247(d) ANSI C63.4 :2003 IC RSS-210 IC RSS Gen	PASS
Band Edge Compliance	FCC Part 15: 15.247(d) ANSI C63.4 :2003 IC RSS-210	PASS
Power Line Conducted Emissions	FCC Part 15: 15.207 ANSI C63.4 :2003 IC RSS-210	PASS
Antenna requirement	FCC Part 15: 15.203 IC RSS Gen	PASS
Note: N/A		

2.2. Assistant equipment used for test

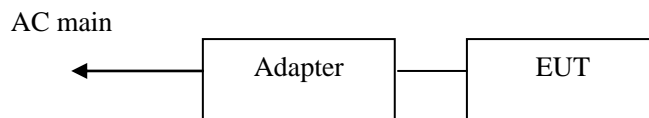
Description	:	Adapter
Manufacturer	:	NIL
Model No.	:	PSA15R-150P
Input	:	AC 100-240V 50-60Hz
Output	:	DC 15V, 1.0A

2.3. Block Diagram

1, for radiated emissions test: EUT was placed on a turn table, which is 0.8 meter high above ground. EUT was set into BT test mode by adb.exe software before test.



2, For Power Line Conducted Emissions Test: EUT was connected to power adapter by 1m USB line



2.4. Test mode

The test software “adb.exe” was used to control EUT work in Continuous TX mode, and select test channel, wireless mode

Tested mode, channel, and data rate information		
Mode	Channel	Frequency (MHz)
BDR:GFSK	Low :CH1	2402
	Middle: CH40	2441
	High: CH79	2480

2.5. Test Conditions

Temperature range	21-25°C
Humidity range	40-75%
Pressure range	86-106kPa

2.6. Measurement Uncertainty (95% confidence levels, k=2)

Item	MU	Remark
Uncertainty for Power point Conducted Emissions Test	2.42dB	
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	2.13 dB	Polarize: V
	2.57dB	Polarize: H
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.54dB	Polarize: V
	4.1dB	Polarize: H
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	2.08dB	Polarize: H
	2.56dB	Polarize: V
Uncertainty for radio frequency	1×10^{-9}	
Uncertainty for conducted RF Power	0.65dB	
Uncertainty for temperature	0.2°C	
Uncertainty for humidity	1%	
Uncertainty for DC and low frequency voltages	0.06%	

2.7. Test Equipment

Equipment	Manufacture	Model No.	Serial No.	Last cal.	Cal Interval
3m Semi-Anechoic	ETS-LINDGREN	N/A	SEL0017	Nov. 16, 13	1 Year
Spectrum analyzer	Agilent	E4407B	MY49510055	Oct. 30, 13	1 Year
Receiver	R&S	ESCI	101165	Oct. 30, 13	1 Year
Receiver	R&S	ESCI	101202	Oct. 30, 13	1 Year
Bilog Antenna	SCHWARZBECK	VULB 9168	9168-438	Mar.11, 14	1 Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D(1201)	Mar.11, 14	1 Year
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA 9170 D(1432)	Mar.11, 14	1 Year
Active Loop Antenna	Beijing Daze	ZN30900A	SEL0097	Mar.12, 13	1 Year
L.I.S.N.	SCHWARZBECK	NSLK8126	8126466	Oct. 30, 13	1 Year
Cable	Resenberger	SUCOFLEX 104	MY6562/4	Oct. 30, 13	1 Year
Cable	Resenberger	SUCOFLEX 104	309972/4	Oct. 30, 13	1 Year
Cable	Resenberger	SUCOFLEX 104	329112/4	Oct. 30, 13	1 Year
Power Meter	Anritsu	ML2487A	6K00001491	Oct. 30, 13	1 Year
Power sensor	Anritsu	ML2491A	32516	Oct. 30, 13	1 Year
Pre-amplifier	SCHWARZBECK	BBV9743	9743-019	Oct. 30, 13	1 Year
Pre-amplifier	Quietek	AP-180C	CHM-0602012	Oct. 30, 13	1 Year
Base station	Agilent	E5515C	GB44300243	Oct. 30, 13	1 Year
Temperature controller	Terchy	MHQ	120	Oct. 30, 13	1 Year
Power divider	Anritsu	K240C	020346	Oct. 30, 13	1 Year
Signal Generator	ROHDE&SCHWARZ	CMU200	116785	Oct. 30, 13	1 Year
Attenuator	Agilent	8491B	MY39262165	Oct. 30, 13	1 Year
X-series USB Peak and Average Power	Agilent	U2021XA	MY54080020	2014.01.19	1 Year

Sensor					
X-series USB Peak and Average Power Sensor	Agilent	U2021XA	MY54110001	2014.01.19	1 Year
4 Ch.Simultaneous Sampling 14 Bits 2 MS/s	Agilent	U2531A	TW54063507	2014.01.19	1 Year

3. Maximum Peak Output power

3.1. Limit

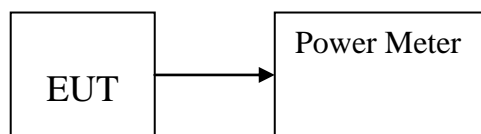
Please refer section 15.247.

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts, the e.i.r.p shall not exceed 4W

3.2. Test Procedure

The transmitter output is connected to the RF Power Meter. The RF Power Meter is set to the peak power detection.

3.3. Test Setup



3.4. Test Result

EUT: S4 Handheld		M/N: S4H			
Test date: 2014-08-12		Test site: RF site		Tested by: Peter Kang	
Mode	Freq (MHz)	PK Output Power (dBm)	PK Output Power (mW)	Limit (dBm)	Margin (dB)
GFSK	2402	-0.58	0.87	30	30.58
	2441	-0.62	0.87	30	30.62
	2480	-0.57	0.88	30	30.57
Conclusion: PASS					

4. Bandwidth

4.1. Limit

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

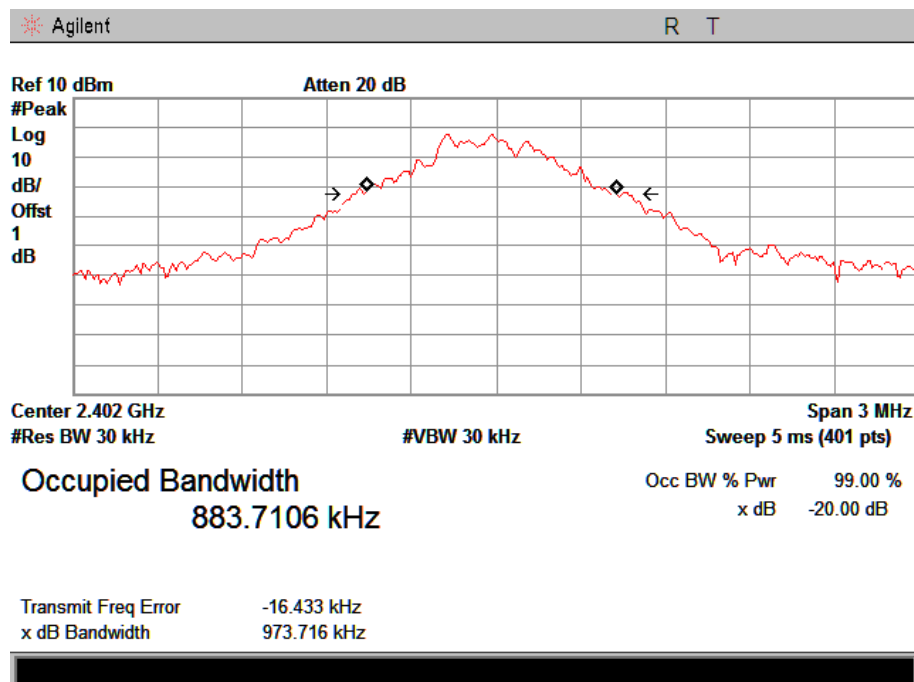
4.2. Test Procedure

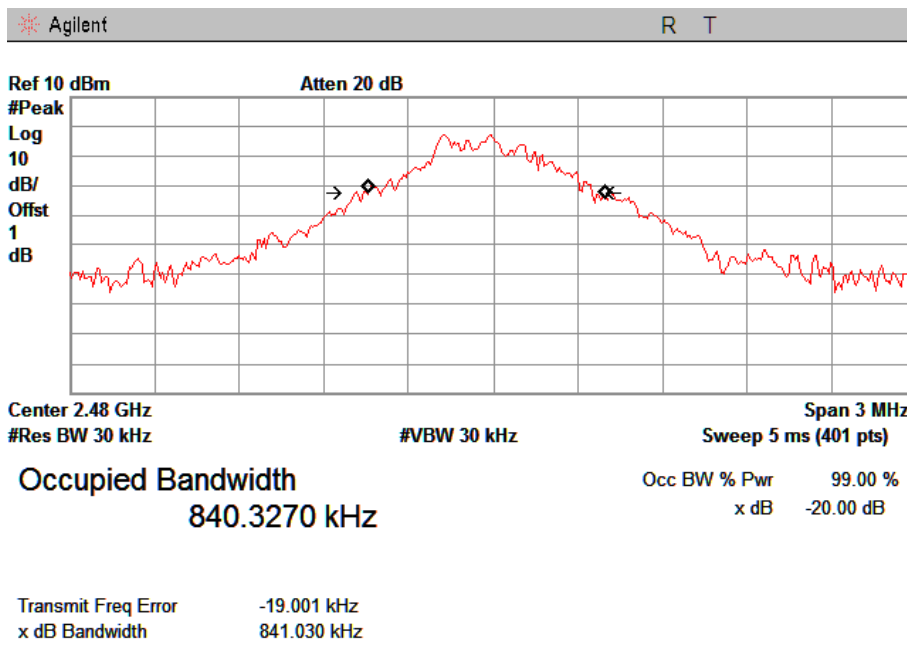
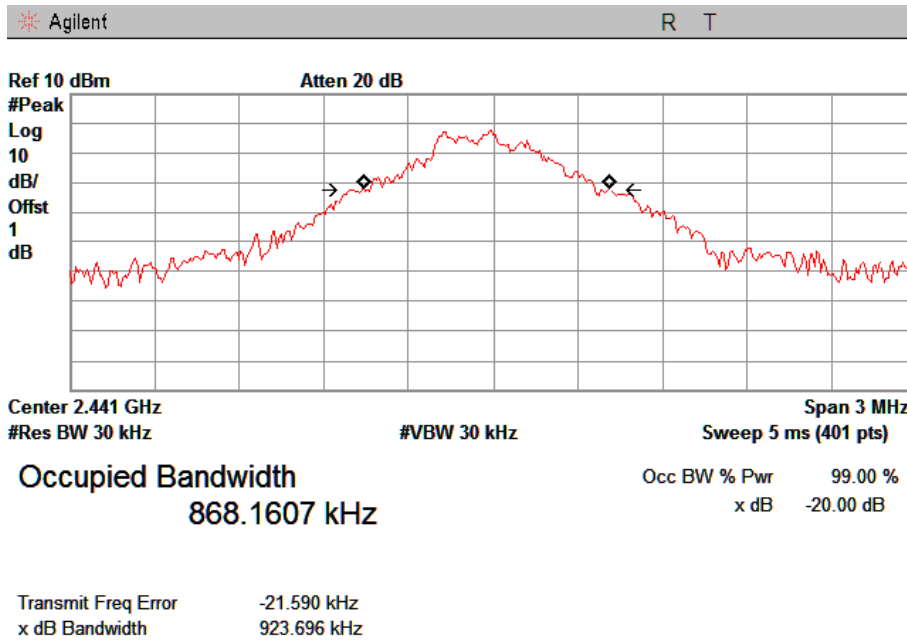
The transmitter output was coupled to a spectrum analyzer via an antenna. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30 kHz RBW and 30kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

4.3. Test Result

EUT: S4 Handheld		M/N: S4H		
Test date: 2014-08-12		Test site: RF site		Tested by: Peter Kang
Mode	Freq (MHz)	20dB Bandwidth (MHz)	Limit (kHz)	Conclusion
GFSK	2402	973.716	/	PASS
	2441	923.696	/	PASS
	2480	841.030	/	PASS

Original Test data For 20dB bandwidth
GFSK





5. Carrier Frequency Separation

5.1. Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

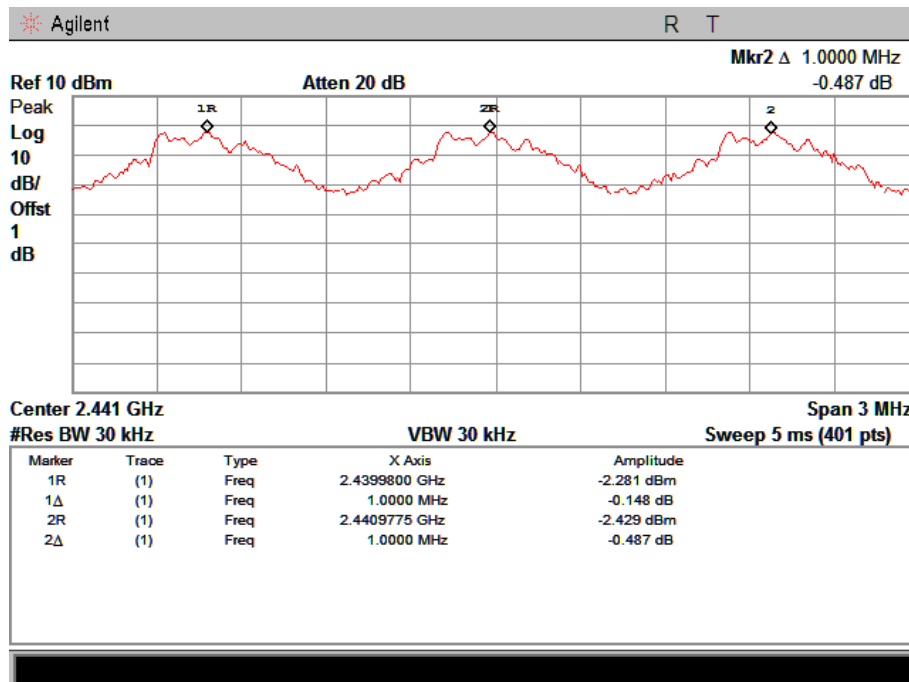
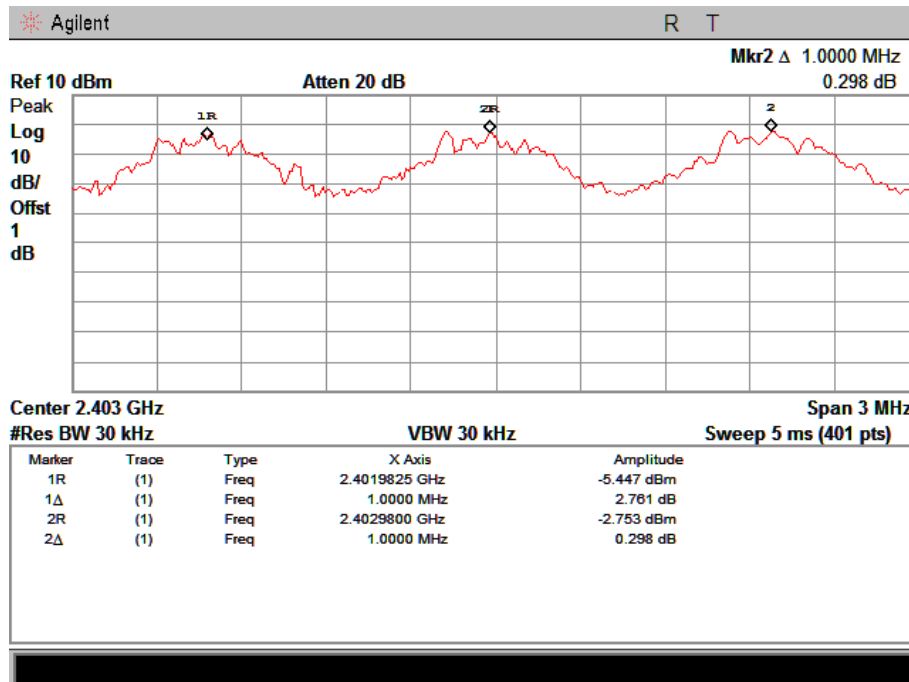
5.2. Test Procedure

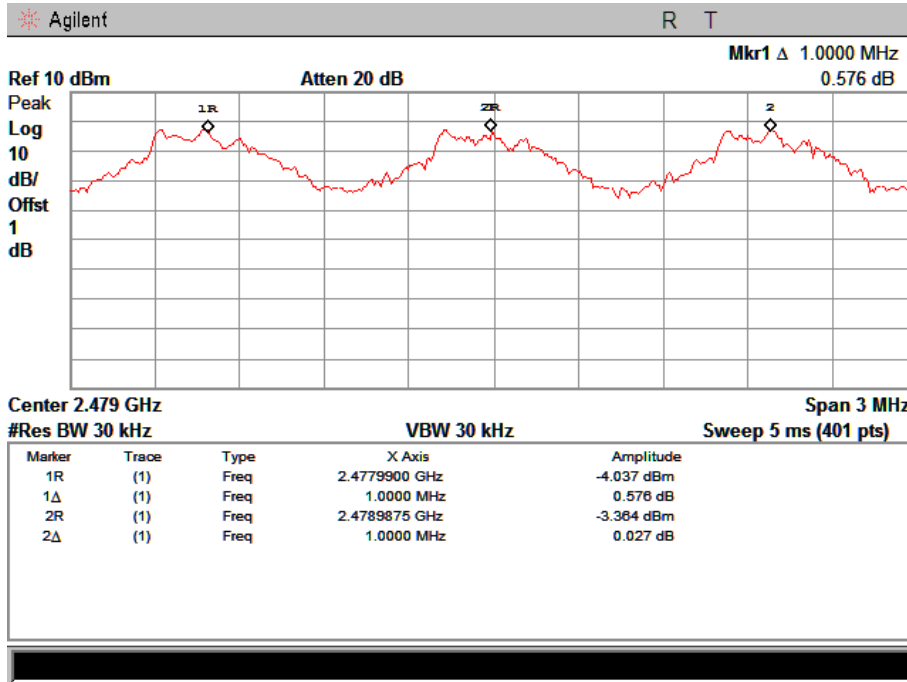
The transmitter output was coupled to a spectrum analyzer via a antenna. The carrier frequency was measured by spectrum analyzer with 30 kHz RBW and 30 kHz VBW.

5.3. Test Result

EUT: S4 Handheld		M/N: S4H		
Test date: 2014-08-12		Test site: RF site		Tested by: Simple
Mode/Channel	Channel separation (MHz)	20dB Bandwidth (MHz)	Limit (MHz) 2/3 20dB bandwidth	Conclusion
GFSK/2402	1.0	973.716	0.649	PASS
GFSK/2441	1.0	923.696	0.616	PASS
GFSK/2480	1.0	841.030	0.561	PASS

Original test data for channel separation
GFSK





6. Number of Hopping Channel

6.1. Limit

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels

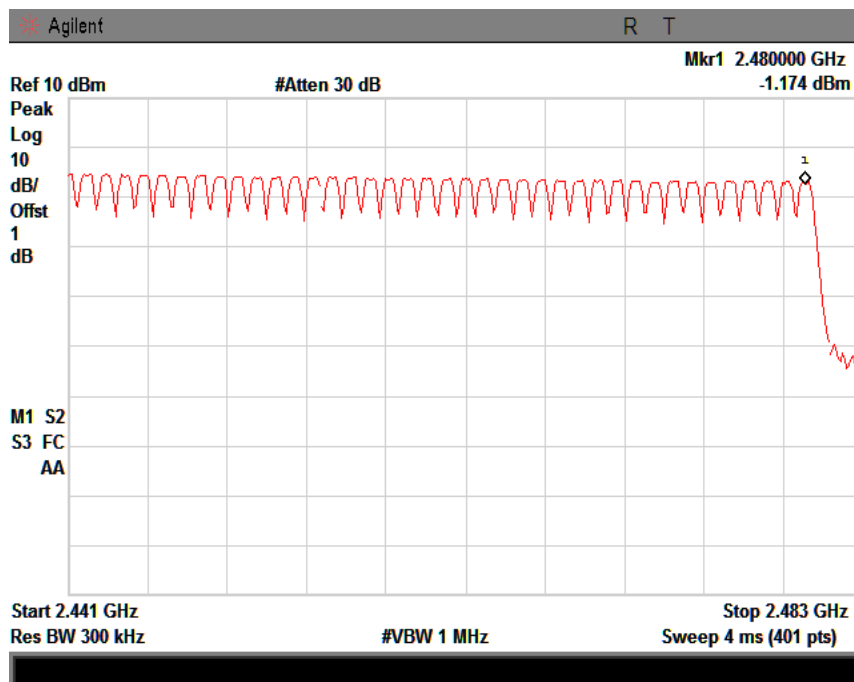
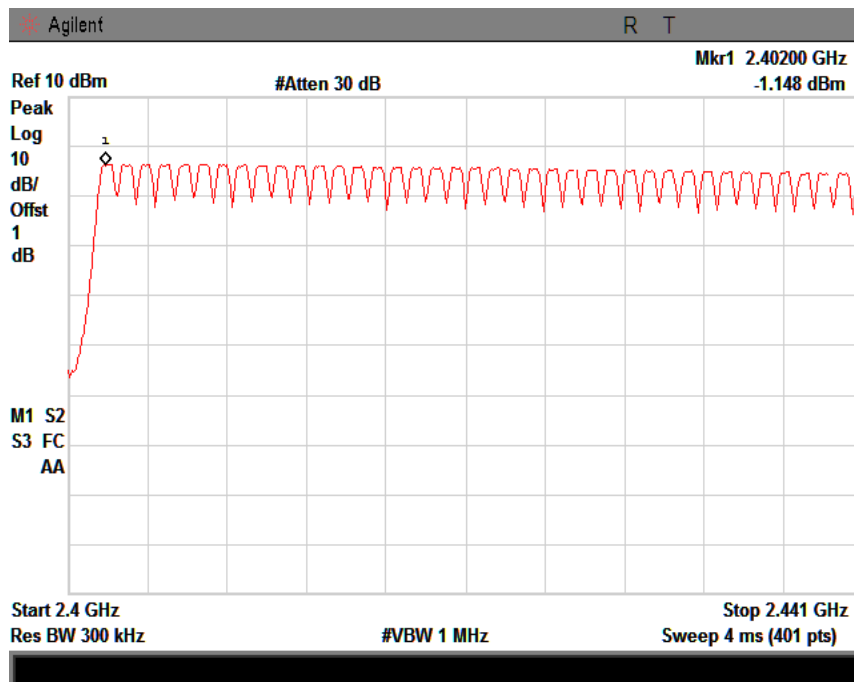
6.2. Test Procedure

The transmitter output was coupled to a spectrum analyzer via an antenna. The number of hopping channels was measured by spectrum analyzer with 300 kHz RBW and 1 MHz VBW.

6.3. Test Result

EUT: S4 Handheld		M/N: S4H	
Test date: 2014-08-12		Test site: RF site	Tested by: Peter Kang
Mode	Number of hopping channel	Limit	Conclusion
GFSK	79	>15	PASS

Original test data for hopping channel number
GFSK



7. Dwell Time

7.1. Test limit

Please refer section 15.247

According to §15.247(a) (1)(iii), Frequency hopping systems operating in the 2400MHz-2483.5 MHz. The average time of occupancy on any frequency shall not greater than 0.4 s within period of 0.4 seconds multiplied by the number of hopping channel employed.

7.2. Test Procedure

7.2.1. Place the EUT on the table and set it in transmitting mode.

7.2.2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

7.2.3. Set center frequency of spectrum analyzer = operating frequency.

7.2.4. Set the spectrum analyzer as RBW, VBW=1MHz, Span = 0Hz, Sweep = auto.

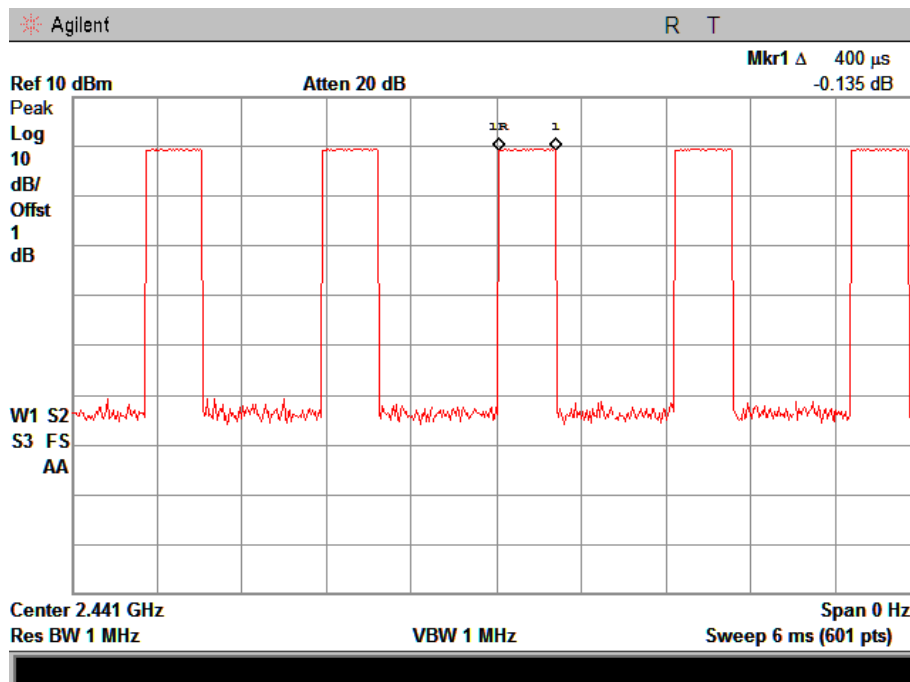
7.3. Test Results

PASS.

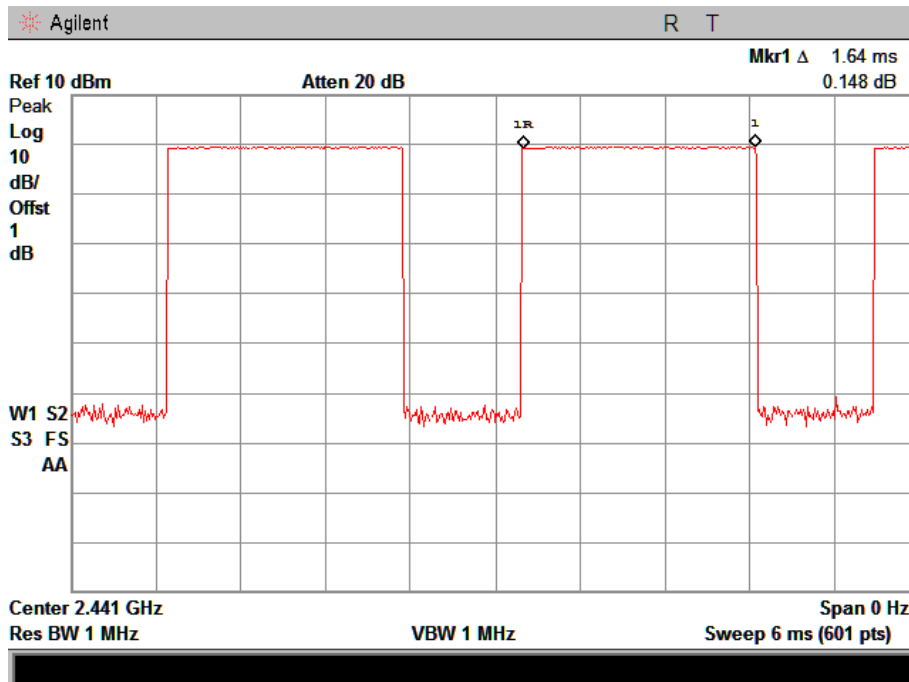
Detailed information please see the following page.

EUT: S4 Handheld		M/N: FLAIR6.0				
Test date: 2014-08-12		Test site: RF site		Tested by: Peter Kang		
Mode	Data Packet	Frequency (MHz)	Pulse Duration (ms)	Dwell Time (s)	Limit (s)	Conclusion
GFSK	DH1	2441	0.4	0.026	<0.4	PASS
	DH3	2441	1.64	0.035	<0.4	PASS
	DH5	2441	2.9	0.037	<0.4	PASS
<p>Note: 1 A period time = 0.4 (s) * 79 = 31.6(s)</p> <p>2 DH1 time slot = Pulse Duration * (1600/(1*79)) * A period time</p> <p>DH3 time slot = Pulse Duration * (1600/(3*79)) * A period time</p> <p>DH5 time slot = Pulse Duration * (1600/(5*79)) * A period time</p>						

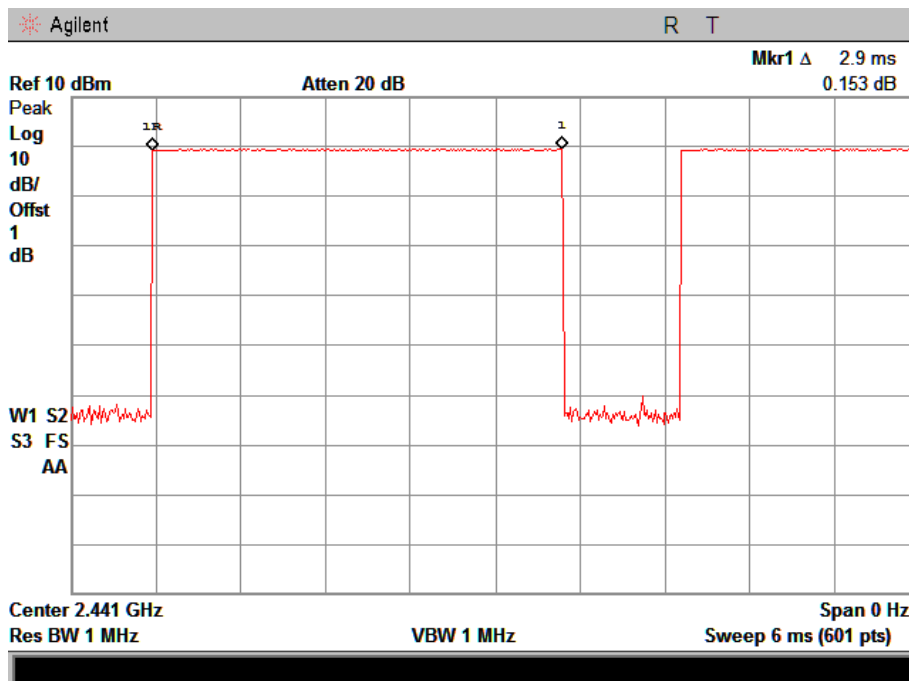
DH1:



DH3:



DH5



8. Radiated emissions

8.1. Limit

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

15.205 Restricted frequency band

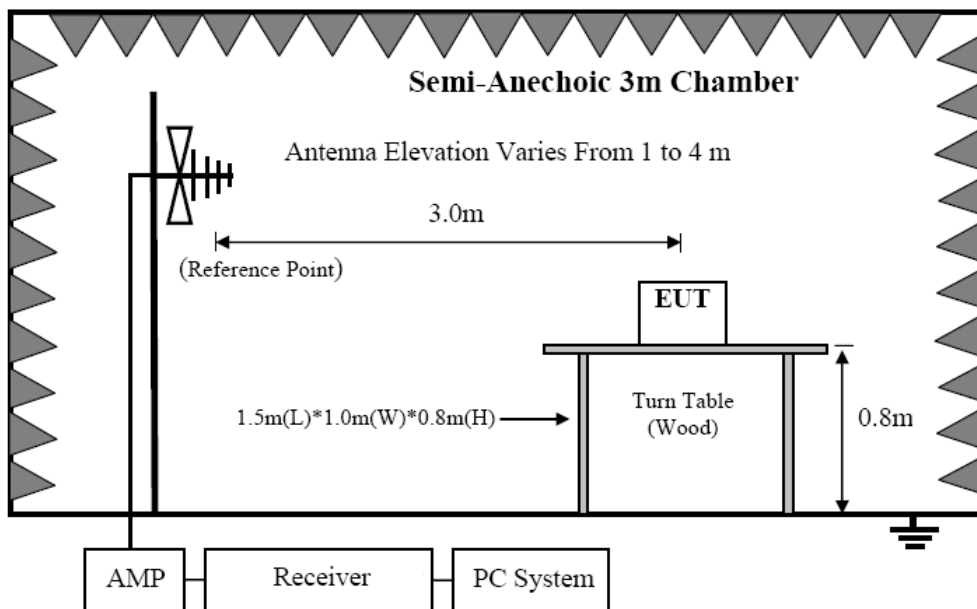
MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)

15.209 Limit

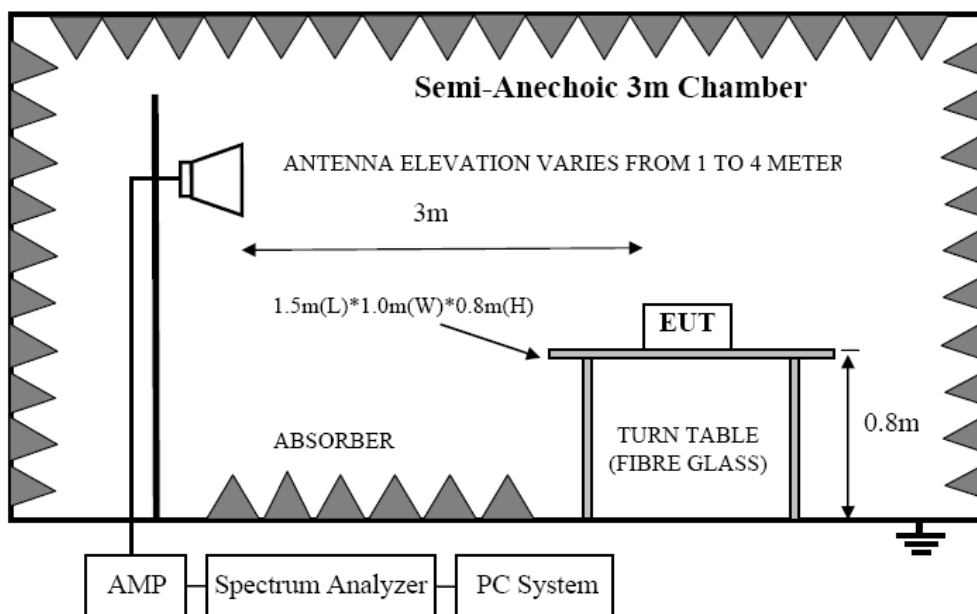
FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
0.009-0.490	300	2400/F(KHz)	/
0.490-1.705	30	24000/F(KHz)	/
1.705-30	30	30	29.5
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

8.2. Block Diagram of Test setup

8.2.1. In 3m Anechoic Chamber Test Setup Diagram for below 1GHz



8.2.2. In 3m Anechoic Chamber Test Setup Diagram for frequency above 1GHz



Note: For harmonic emissions test a appropriate high pass filter was inserted in the input port of AMP.

8.3. Test Procedure

- (1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber.
- (2) Setup EUT and simulator as shown in section 1.4 and 6.1
- (3) Test antenna was located 3m from the EUT on an adjustable mast. Below pre-scan procedure was first performed in order to find prominent radiated emissions.
 - (a) Change work frequency or channel of device if practicable.
 - (b) Change modulation type of device if practicable.
 - (c) Change power supply range from 85% to 115% of the rated supply voltage for AC power supply.
 - (d) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produce highest emissions
- (4) Spectrum frequency from 9 kHz to 25GHz (tenth harmonic of fundamental frequency) was investigated
- (5) For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.4 2003 on Radiated Emission test.
- (6) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz, VBW is set at 3MHz for Peak measure; RBW is set at 1MHz, VBW is set at 10Hz for Average measure.

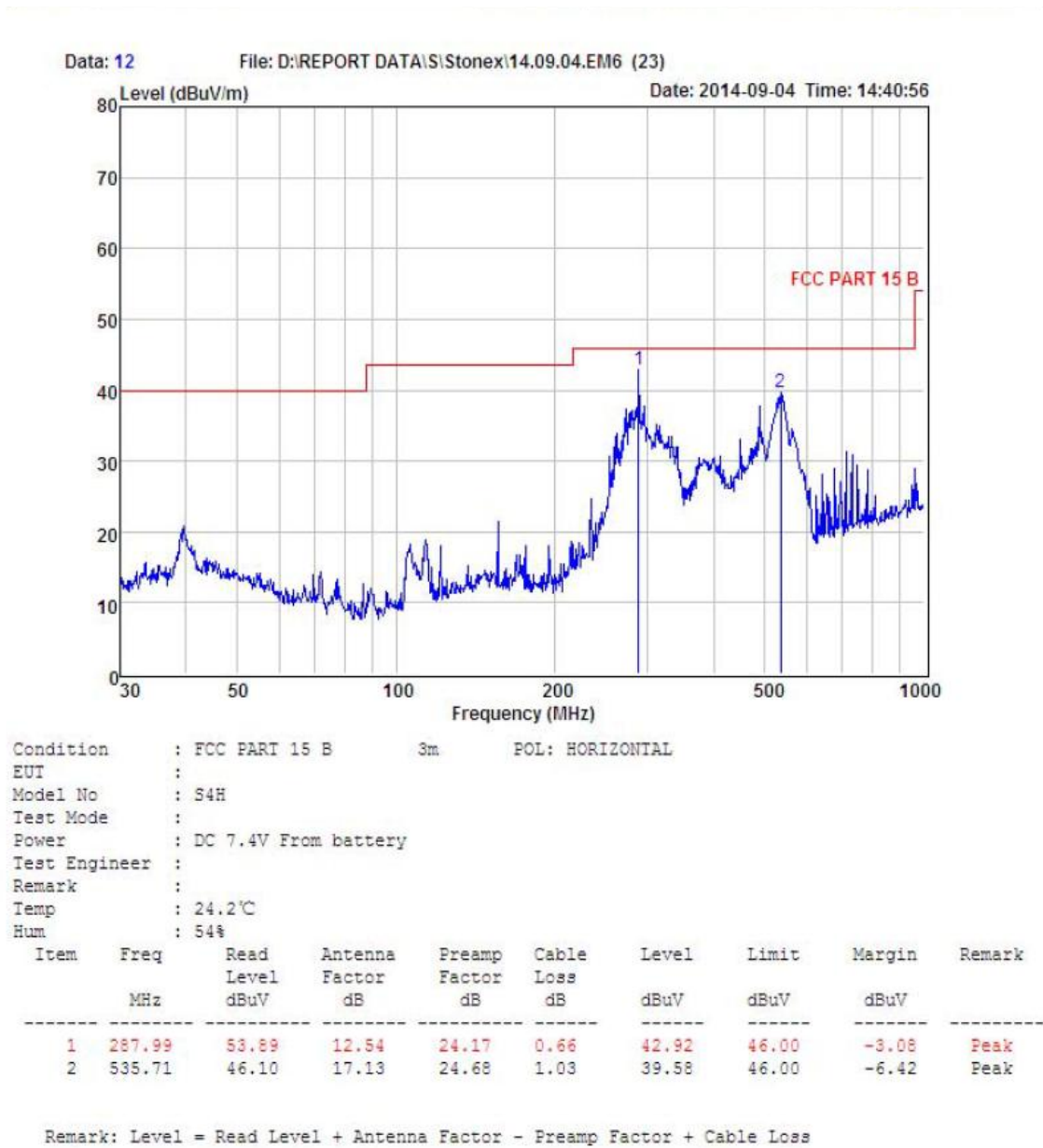
8.4. Test Result

We have scanned from 9 kHz to 10th harmonic.
Detailed information please see the following page.

From 9 kHz to 30MHz: Conclusion: PASS

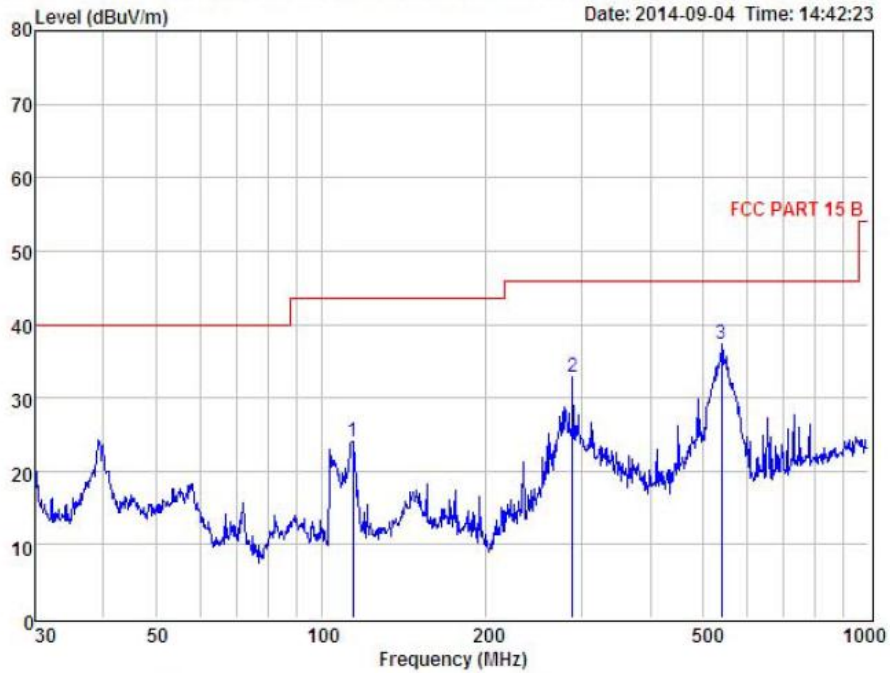
Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value, and no need to be reported.

From 30 MHz to 1000 MHz: Conclusion: PASS



Data: 13

File: D:\REPORT DATA\S\Stonex\14.09.04.EM6 (23)



Condition : FCC PART 15 B 3m POL: VERTICAL
EUT :
Model No : S4H
Test Mode :
Power : DC 7.4V From battery
Test Engineer :
Remark :
Temp : 24.2°C
Hum : 54%

Item	Freq MHz	Read Level dBuV	Antenna Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
1	114.11	38.76	11.68	26.87	0.41	23.98	43.50	-19.52	Peak
2	287.99	43.72	12.54	24.17	0.66	32.75	46.00	-13.25	Peak
3	539.48	43.77	17.19	24.69	0.99	37.26	46.00	-8.74	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

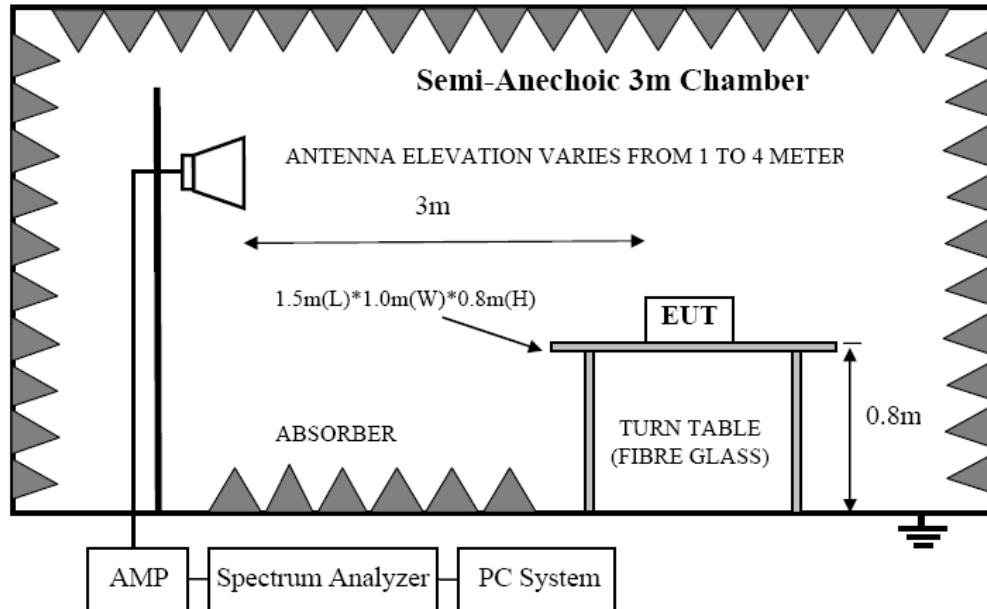
1GHz—25GHz Radiated Emission Test result									
EUT: S4 Handheld					M/N: S4H				
Power: DC 7.4V From battery									
Test date: 2014-08-15 Test site: 3m Chamber Tested by: Peter Kang									
Test mode: GFSK Tx CH1 2402MHz									
Antenna polarity: Vertical									
No	Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804	46.24	33.95	10.18	34.26	56.11	74.00	17.89	PK
2	4804	33.59	33.95	10.18	34.26	43.46	54.00	10.54	AV
3	7206	/							
4	9608	/							
5	12010	/							
Antenna Polarity: Horizontal									
1	4804	42.28	33.95	10.18	34.26	52.15	74.00	21.85	PK
2	4804	33.56	33.95	10.18	34.26	43.43	54.00	10.57	AV
3	7206	/							
4	9608	/							
5	12010	/							
Note:									
1, Measuring frequency from 1GHz to 25GHz									
2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK									
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK									
3, Result = Read level + Antenna factor + cable loss-Amp factor									
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.									

1GHz—25GHz Radiated emission Test result									
EUT: S4 Handheld					M/N: S4H				
Power: DC 7.4V From battery									
Test date: 2014-08-15 Test site: 3m Chamber Tested by: Peter Kang									
Test mode: GFSK Tx CH40 2441MHz									
Antenna polarity: Vertical									
No	Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4882	43.59	33.93	10.20	34.29	53.43	74.00	20.57	PK
2	4882	32.06	33.93	10.20	34.29	41.90	54.00	12.10	AV
3	7323	/							
4	9764	/							
5	12205	/							
Antenna Polarity: Horizontal									
1	4882	41.89	33.93	10.20	34.29	51.73	74.00	22.27	PK
2	4882	33.06	33.93	10.20	34.29	42.90	54.00	11.10	AV
3	7323	/							
4	9764	/							
5	12205	/							
Note:									
1, Measuring frequency from 1GHz to 25GHz									
2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK									
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK									
3, Result = Read level + Antenna factor + cable loss-Amp factor									
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.									

1GHz—25GHz Radiated emission Test result									
EUT: S4 Handheld					M/N: S4H				
Power: DC 7.4V From battery									
Test date: 2014-08-15 Test site: 3m Chamber Tested by: Peter Kang									
Test mode: GFSK Tx CH79 2480MHz									
Antenna polarity: Vertical									
No	Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960	43.46	33.98	10.22	34.25	53.41	74.00	20.59	PK
2	4960	31.82	33.98	10.22	34.25	41.77	54.00	12.23	AV
3	7440	/							
4	9920	/							
5	12400	/							
Antenna Polarity: Horizontal									
1	4960	43.54	33.98	10.22	34.25	53.49	74.00	20.51	PK
2	4960	33.12	33.98	10.22	34.25	43.07	54.00	10.93	AV
3	7440	/							
4	9920	/							
5	12400	/							
Note:									
1, Measuring frequency from 1GHz to 25GHz									
2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK									
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK									
3, Result = Read level + Antenna factor + cable loss-Amp factor									
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.									

9. Band Edge Compliance

9.1. Block Diagram of Test Setup



9.2. Limit

All the lower and upper band-edges emissions appearing within 2310MHz to 2390MHz and 2483.5MHz to 2500MHz restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions outside operation frequency band 2400MHz to 2483.5MHz shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

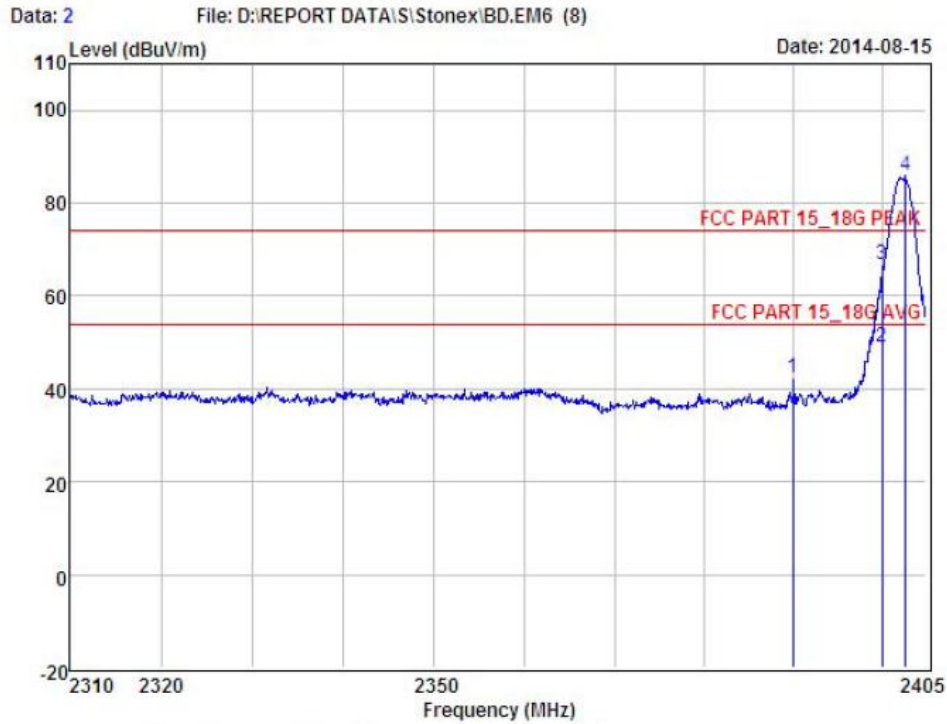
9.3. Test Procedure

Same with clause 6.3 except change investigated frequency range from 2310MHz to 2415MHz, 2475MHz to 2500MHz.

9.4. Test Result

PASS. (See below detailed test data)

GFSK
 Unhoping
 CH LOW:



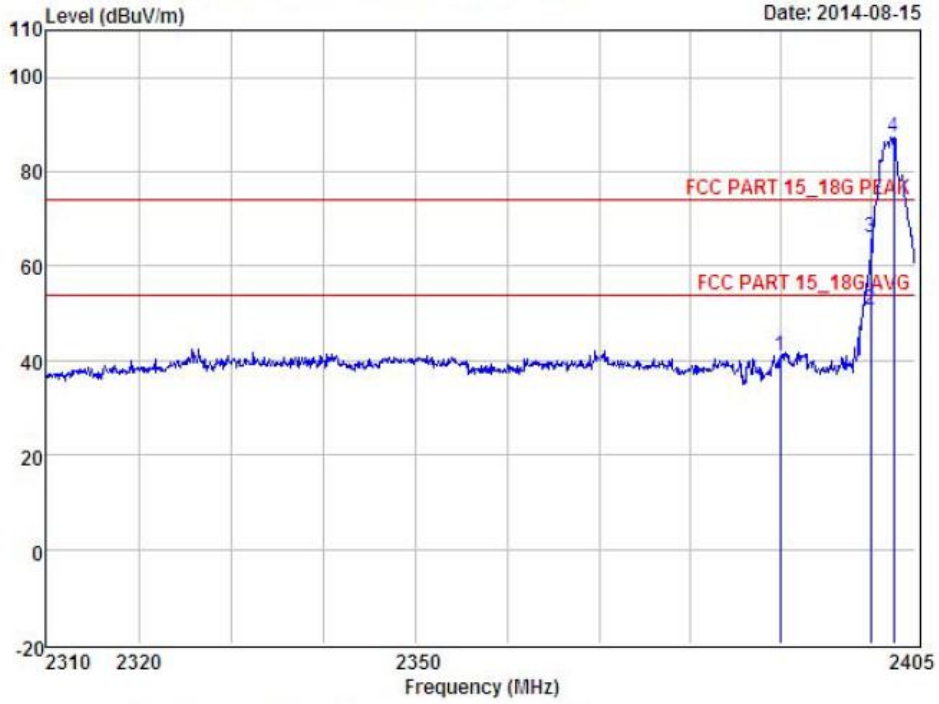
Condition : FCC PART 15_18G PEAK 3m POL: HORIZONTAL
 EUT : S4 Handheld
 Model No : S4H
 Test Mode : GFSK TX Low CH0
 Power : DC 7.4V From Battery
 Test Engineer : Peter
 Remark :
 Temp : 24.2°C
 Hum : 54%

Item	Freq MHz	Read Level dBuV	Antenna Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
1	2390.00	45.83	27.62	34.97	3.92	42.40	74.00	-31.60	Peak
2	2400.00	52.44	27.62	34.97	3.94	49.03	54.00	-4.97	Average
3	2400.00	70.09	27.62	34.97	3.94	66.68	74.00	-7.32	Peak
4	2402.68	89.23	27.61	34.97	3.94	85.81	74.00	11.81	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

Data: 1 File: D:\REPORT DATA\S\Stonex\BD.EM6 (8)

Date: 2014-08-15

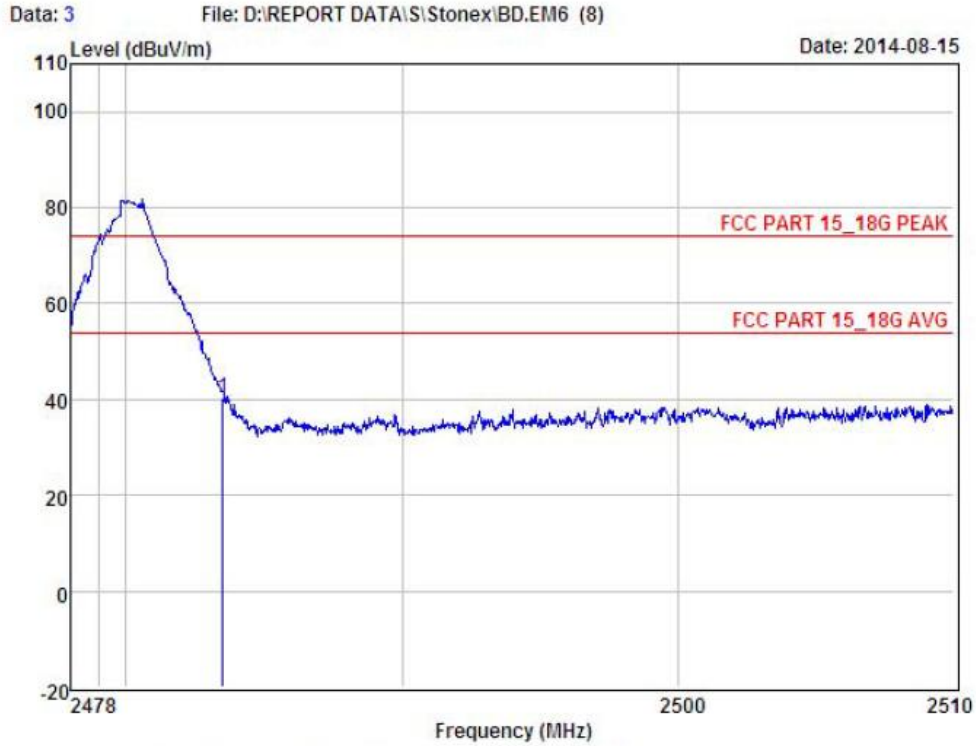


Condition : FCC PART 15_18G PEAK 3m POL: VERTICAL
 EUI : S4 Handheld
 Model No : S4H
 Test Mode : GFSK TX Low CH0
 Power : DC 7.4V From Battery
 Test Engineer : Peter
 Remark :
 Temp : 24.2°C
 Hum : 54%

Item	Freq MHz	Read Level dBuV	Antenna Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
1	2390.00	44.50	27.62	34.97	3.92	41.07	74.00	-32.93	Peak
2	2400.00	54.30	27.62	34.97	3.94	50.89	54.00	-3.11	Average
3	2400.00	69.63	27.62	34.97	3.94	66.22	74.00	-7.78	Peak
4	2402.58	90.92	27.61	34.97	3.94	87.50	74.00	13.50	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

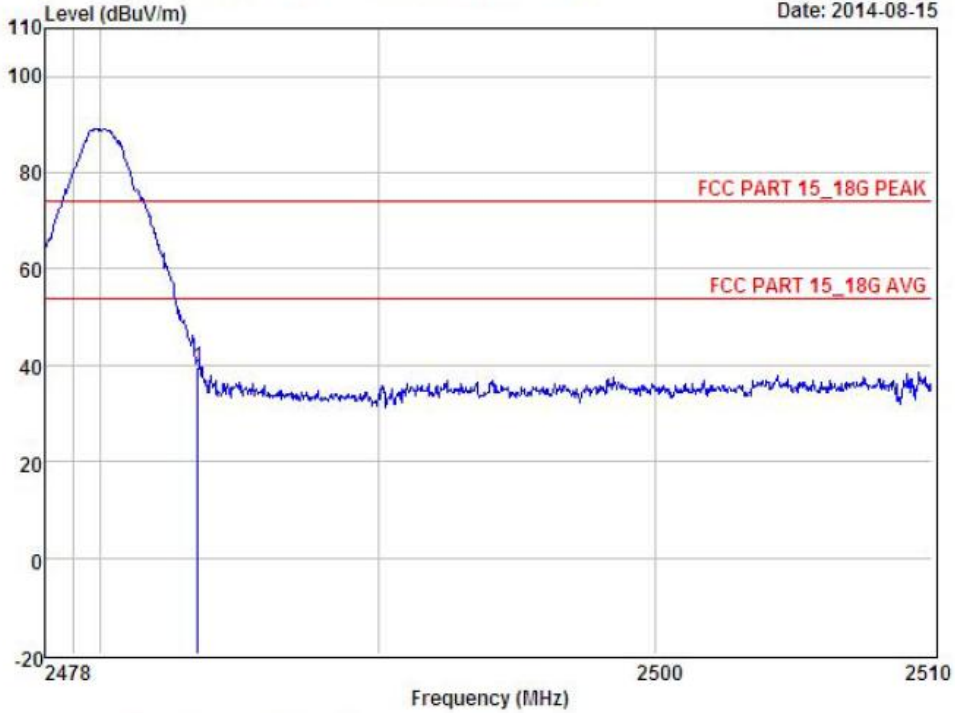
CH High:



Condition : FCC PART 15_18G PEAK 3m POL: HORIZONTAL
 EUT : S4 Handheld
 Model No : S4H
 Test Mode : GFSK TX High CH78
 Power : DC 7.4V From Battery
 Test Engineer : Peter
 Remark :
 Temp : 24.2°C
 Hum : 54%

Item	Freq MHz	Read Level dBuV	Antenna Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
1	2483.50	43.84	27.59	34.97	4.00	40.46	74.00	-33.54	

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

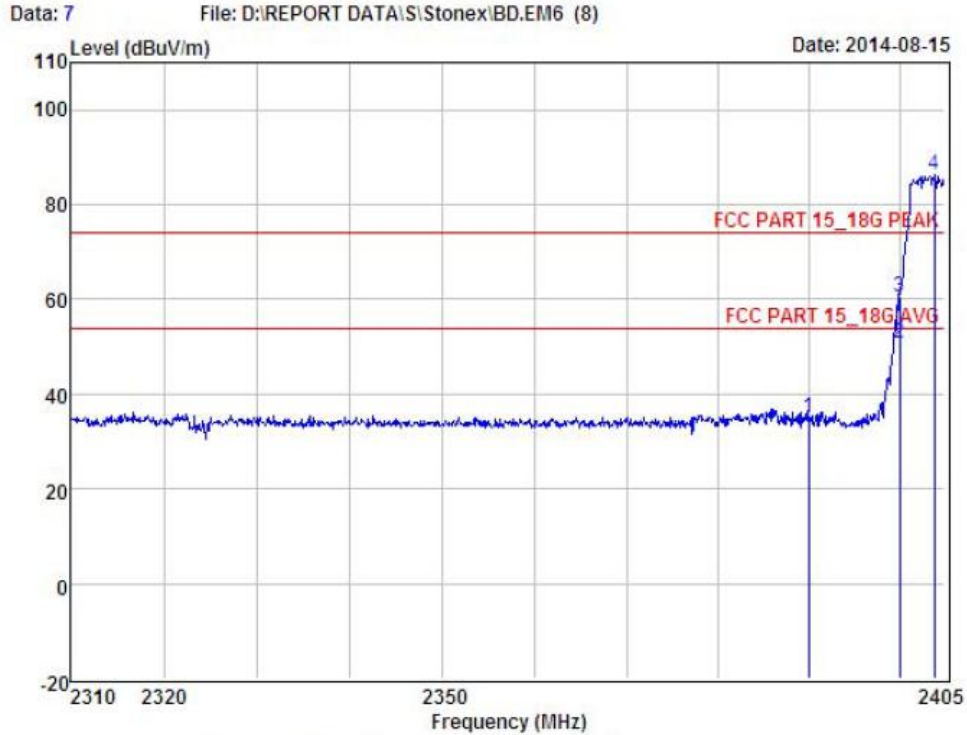


Condition : FCC PART 15_18G PEAK 3m POL: VERTICAL
 EUI : S4 Handheld
 Model No : S4H
 Test Mode : GFSK TX High CH78
 Power : DC 7.4V From Battery
 Test Engineer : Peter
 Remark :
 Temp : 24.2°C
 Hum : 54%

Item	Freq MHz	Read Level dBuV	Antenna Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
1	2483.50	42.86	27.59	34.97	4.00	39.48	74.00	-34.52	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

Hopping



Condition : FCC PART 15_18G PEAK 3m POL: HORIZONTAL
 EUI : S4 Handheld
 Model No : S4H
 Test Mode : Hopping mode (GFSK) CH0
 Power : DC 7.4V From Battery
 Test Engineer : Peter
 Remark :
 Temp : 24.2°C
 Hum : 54%

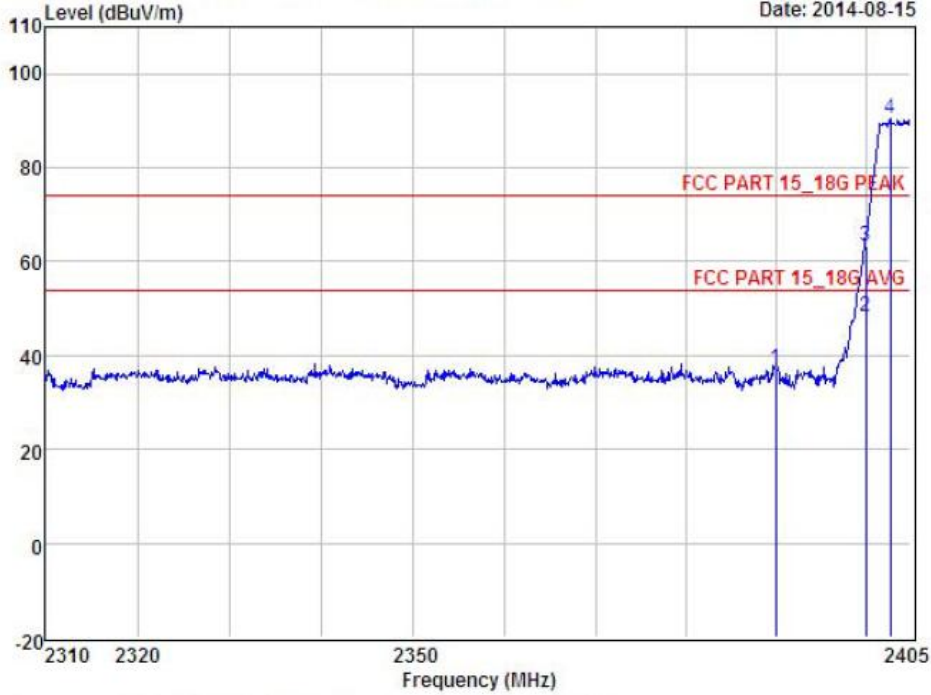
Item	Freq MHz	Read Level dBuV	Antenna Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
1	2390.00	38.42	27.62	34.97	3.92	34.99	74.00	-39.01	Peak
2	2400.00	54.27	27.62	34.97	3.94	50.86	54.00	-3.14	Average
3	2400.00	63.77	27.62	34.97	3.94	60.36	74.00	-13.64	Peak
4	2403.84	89.68	27.61	34.97	3.94	86.26	74.00	12.26	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

Data: 8

File: D:\REPORT DATA\S\Stonex\BD.EM6 (8)

Date: 2014-08-15



Condition : FCC PART 15_18G PEAK 3m POL: VERTICAL
 EUI : S4 Handheld
 Model No : S4H
 Test Mode : Hopping mode (GFSK) CH0
 Power : DC 7.4V From Battery
 Test Engineer : Peter
 Remark :
 Temp : 24.2°C
 Hum : 54%

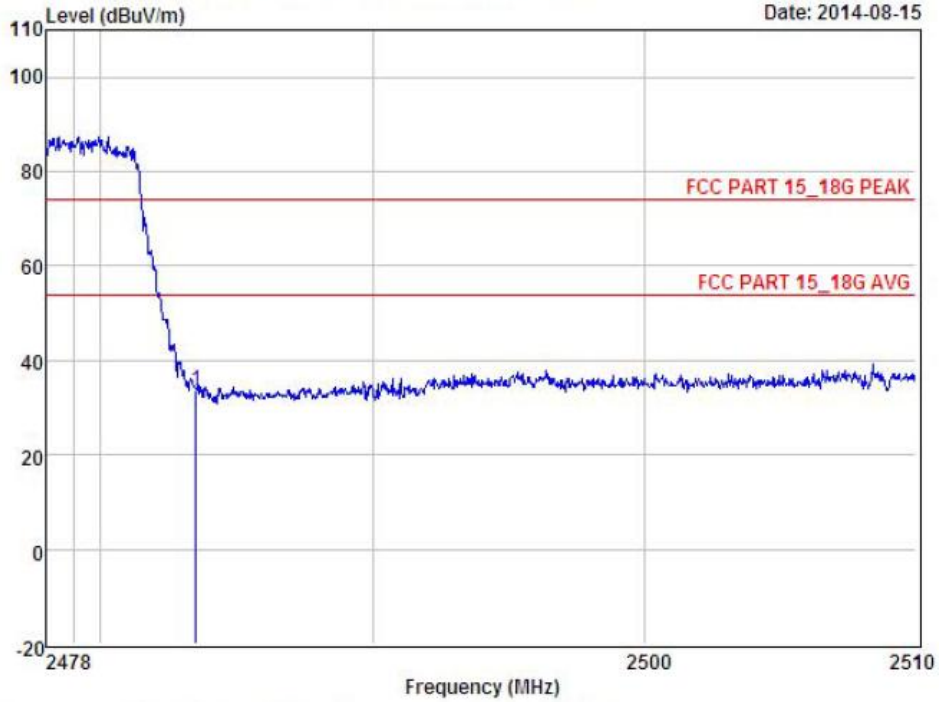
Item	Freq MHz	Read Level dBuV	Antenna Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
1	2390.00	40.62	27.62	34.97	3.92	37.19	74.00	-36.81	Peak
2	2400.00	51.76	27.62	34.97	3.94	48.35	54.00	-5.65	Average
3	2400.00	66.76	27.62	34.97	3.94	63.35	74.00	-10.65	Peak
4	2402.77	93.76	27.61	34.97	3.94	90.34	74.00	16.34	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

Data: 6

File: D:\REPORT DATA\S\Stonex\BD.EM6 (8)

Date: 2014-08-15



Condition : FCC PART 15_18G PEAK 3m POL: HORIZONTAL
EUT : S4 Handheld
Model No : S4H
Test Mode : Hopping Mode (GFSK) CH78
Power : DC 7.4V From Battery
Test Engineer : Peter
Remark :
Temp : 24.2°C
Hum : 54%

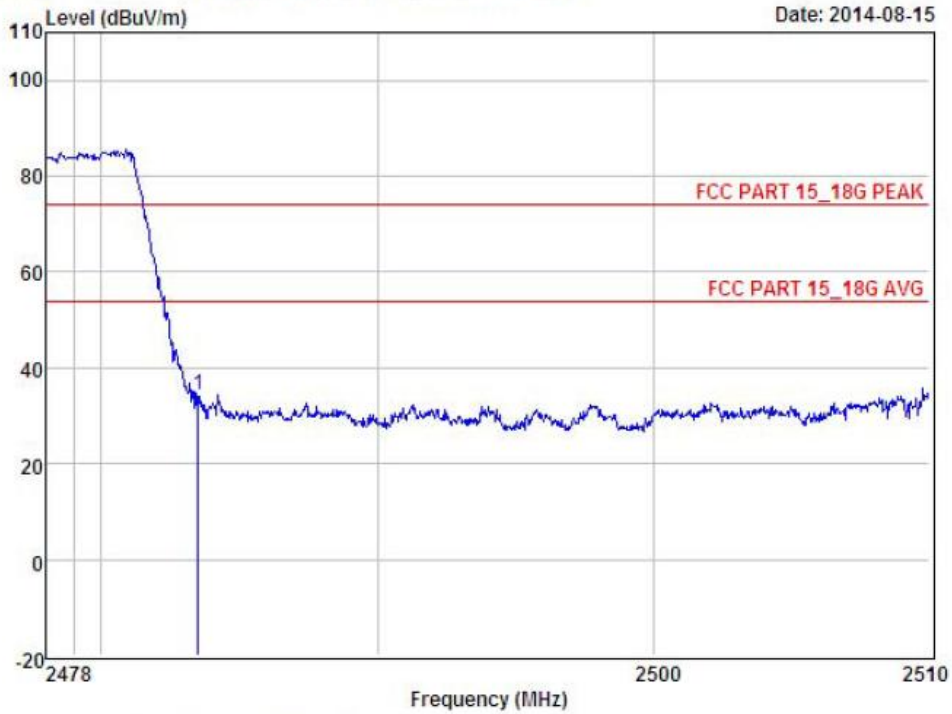
Item	Freq MHz	Read Level dBuV	Antenna Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
1	2483.50	37.08	27.59	34.97	4.00	33.70	74.00	-40.30	

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

Data: 5

File: D:\REPORT DATA\S\Stonex\BD.EM6 (8)

Date: 2014-08-15



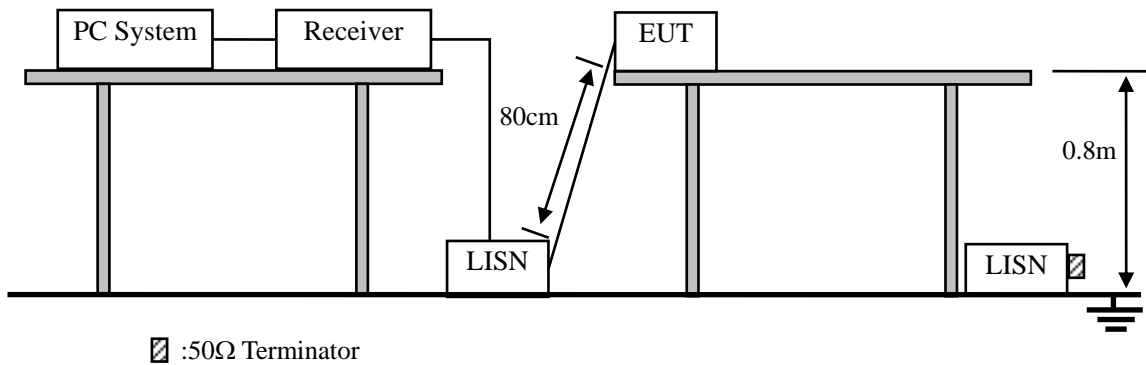
Condition : FCC PART 15_18G PEAK 3m POL: VERTICAL
EUT : S4 Handheld
Model No : S4H
Test Mode : Hopping Mode (GFSK) CH78
Power : DC 7.4V From Battery
Test Engineer : Peter
Remark :
Temp : 24.2°C
Hum : 54%

Item	Freq MHz	Read Level dBuV	Antenna Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
1	2483.50	37.82	27.59	34.97	4.00	34.44	74.00	-39.56	

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

10. Power Line Conducted Emissions

10.1. Block Diagram of Test Setup



10.2. Limit

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μ V)	Average Level dB(μ V)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Notes: 1. * Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

10.3. Test Procedure

- (1) The EUT was placed on a non-metallic table, 80cm above the ground plane.
- (2) Setup the EUT and simulator as shown in 10.1
- (3) The EUT Power connected to the power mains through a power adapter and a line impedance stabilization network (L.I.S.N1). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N2), this provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). Both sides of power line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.4 2003 on conducted Emission test.
- (4) The bandwidth of test receiver is set at 10 kHz.
- (5) The frequency range from 150 KHz to 30MHz is checked.

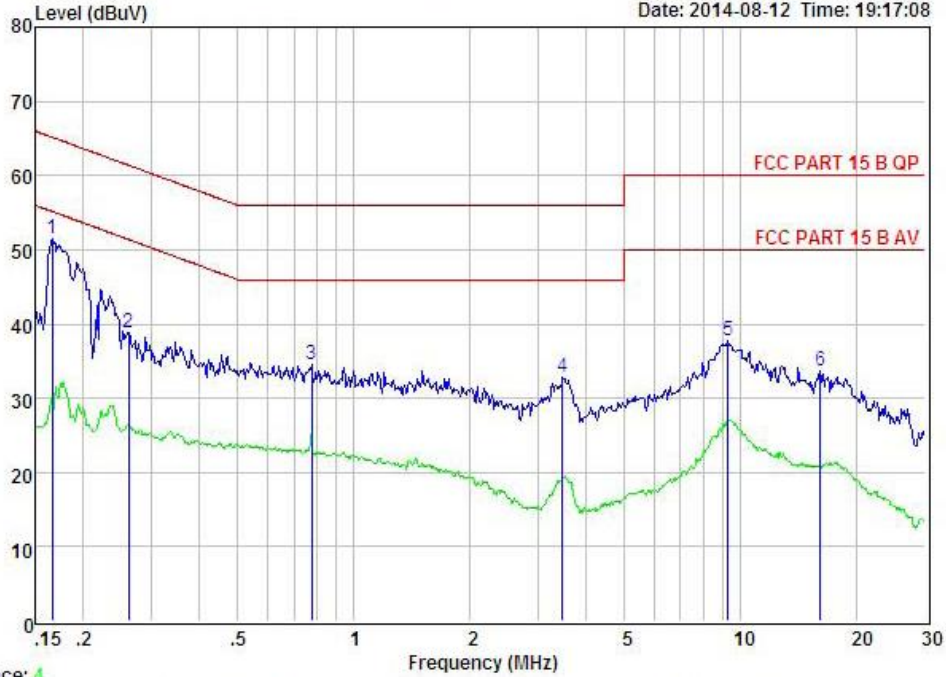
10.4. Test Result

PASS. (See below detailed test data)

Data: 3

File: E:\TEST DATA\DI\Deliberant\08.12.EM6 (4)

Date: 2014-08-12 Time: 19:17:08

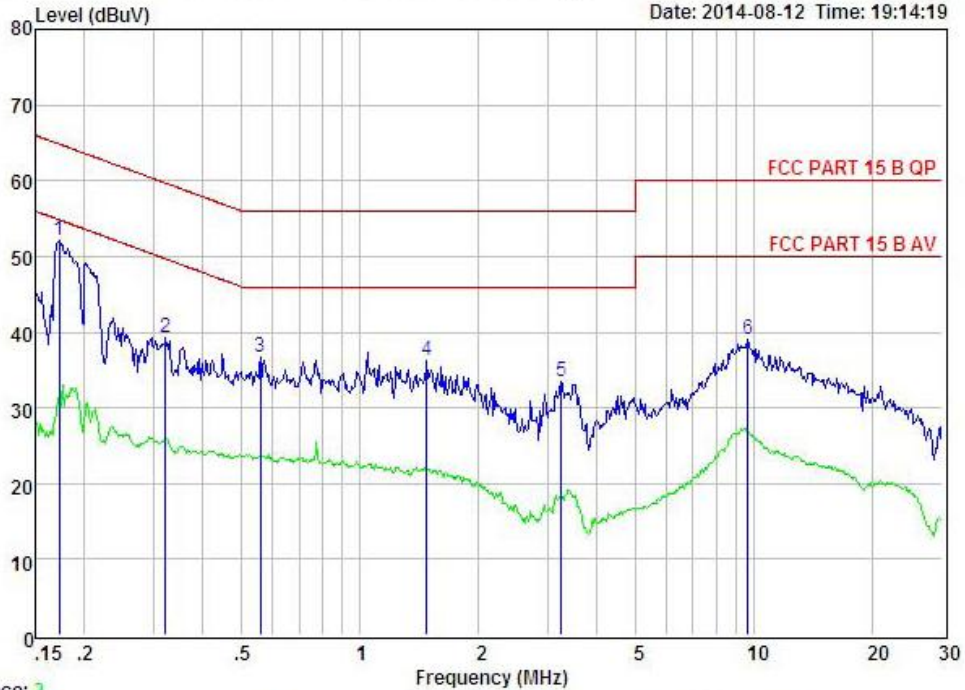


Trace: 4

Condition : FCC PART 15 B QP POL: LINE Temp:24 °C Hum:56 %
 EUT :
 Model No : S4H
 Test Mode : Normal Working
 Power : AC 120V/60Hz
 Test Engineer:
 Remark :

Item	Freq MHz	Read dBuV	LISN Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
1	0.166	41.67	0.03	-9.72	0.10	51.52	65.16	-13.64	Peak
2	0.262	28.95	0.03	-9.72	0.10	38.80	61.38	-22.58	Peak
3	0.779	24.63	0.00	-9.71	0.10	34.44	56.00	-21.56	Peak
4	3.472	22.89	0.08	-9.69	0.12	32.78	56.00	-23.22	Peak
5	9.302	28.08	0.17	-9.39	0.19	37.83	60.00	-22.17	Peak
6	16.055	23.70	0.25	-9.40	0.27	33.62	60.00	-26.38	Peak

Remarks: Level = Read + LISN Factor - Preamp Factor + Cable loss



Trace: 2
 Condition : FCC PART 15 B QP POL: NEUTRAL Temp:24 °C Hum:56 %
 EUT :
 Model No : S4H
 Test Mode : Normal Working
 Power : AC 120V/60Hz
 Test Engineer:
 Remark :

Item	Freq MHz	Read dBuV	LISN Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
1	0.172	42.31	0.03	-9.72	0.10	52.16	64.86	-12.70	Peak
2	0.322	29.30	0.03	-9.72	0.10	39.15	59.66	-20.51	Peak
3	0.558	26.90	0.03	-9.72	0.10	36.75	56.00	-19.25	Peak
4	1.480	26.43	0.05	-9.71	0.10	36.29	56.00	-19.71	Peak
5	3.241	23.65	0.07	-9.69	0.12	33.53	56.00	-22.47	Peak
6	9.654	29.32	0.17	-9.36	0.20	39.05	60.00	-20.95	Peak

Remarks: Level = Read + LISN Factor - Preamp Factor + Cable loss

Note: If QP Result comply with AV limit, AV Result is deemed to comply with AV limit

11. Antenna Requirements

11.1. Limit

For intentional device, according to FCC 47 CFR Section 15.203, 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. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

11.2. Result

The antennas used for this product are PIFA Antenna for Bluetooth/WIFI, PIFA Antenna For GSM, no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is only -3dBi for Bluetooth/WIFI and -3dBi for GSM .

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