FCC Test Report

Report No.: AGC06856170801FE02

FCC ID	:	2AJFWSP001
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	SPRINT
BRAND NAME	:	XOSS
MODEL NAME	:	SP001
CLIENT	:	Shanghai Dabuziduo Information and Technology Co., Ltd.
DATE OF ISSUE	:	Jan. 10, 2017
STANDARD(S) **TEST PROCEDURE(S)**	:	FCC Part 15 Rules
REPORT VERSION	:	V1.0

Attestation of Global Compliance (shenzhen) Co., Ltd

Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Jan. 10, 2018	Valid	Initial Release

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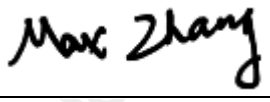
1. VERIFICATION OF CONFORMITY

Applicant	Shanghai Dabuziduo Information and Technology Co., Ltd.
Address	B1, No.270, Songhu Road, Yangpu District, Shanghai, China
Manufacturer	Shanghai Dabuziduo Information and Technology Co., Ltd.
Address	B1, No.270, Songhu Road, Yangpu District, Shanghai, China
Product Designation	SPRINT
Brand Name	XOSS
Test Model	SP001
Date of test	Jan. 03, 2018 to Jan. 10, 2018
Deviation	None
Condition of Test Sample	Normal
Test Result	Pass
Report Template	AGCRT-US-BR/RF

We hereby certify that:
The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC Rules Part 15.249.

Tested By 

Max Zhang(Zhang Yi) Jan. 10, 2018

Reviewed By 

Bart Xie(Xie Xiaobin) Jan. 10, 2018

2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

A major technical description of EUT is described as following

Operation Frequency(BT)	2.402 GHz to 2.480GHz
Maximum field strength(BT)	87.27dBuV/m(AV)@3m; 94.41dBuV/m (PK)@3m
Bluetooth Version(BT)	V4.0
Modulation(BT)	GFSK
Number of channels(BT)	40 for BLE
Operation Frequency(ANT+)	2.457GHz
Maximum field strength(ANT+)	71.08dBuV/m(AV)@3m; 77.41dBuV/m (PK)@3m
Modulation(ANT+)	GFSK
Antenna Gain	0.5dBi
Antenna Designation	PCB Antenna (Met 15.203 Antenna requirement)
Hardware Version	0.5
Software Version	0.5
Power Supply	DC3.7V by battery or DC 5V by Micro-USB

2.2. TABLE OF CARRIER FREQUENCY

BLE channel List

Frequency Band	Channel Number	Frequency
2400~2483.5MHZ	0	2402MHZ
	1	2404MHZ
	:	:
	18	2438 MHZ
	19	2440 MHZ
	:	:
	38	2478 MHZ
	39	2480 MHZ

3. MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the “Guide to the Expression of Uncertainty in measurement” (GUM) published by CISPR and ANSI.

- Uncertainty of Conducted Emission, Uc = ±3.2 dB
- Uncertainty of Radiated Emission below 1GHz, Uc = ±3.9 dB
- Uncertainty of Radiated Emission above 1GHz, Uc = ±4.8 dB

4. DESCRIPTION OF TEST MODES

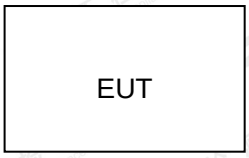
NO.	TEST MODE DESCRIPTION
1	BLE Low channel
2	BLE Middle channel
3	BLE High channel
4	ANT+ channel

Note:
1. All the test modes can be supply by battery, only the result of the worst case was recorded in the report, if no other cases.
2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.

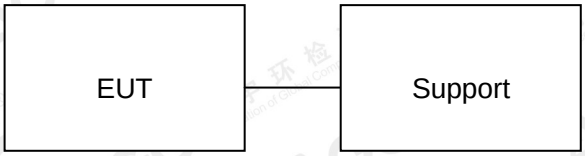
5. SYSTEM TEST CONFIGURATION

5.1. CONFIGURATION OF EUT SYSTEM

Radiated Emission Configure :



Conducted Emission Configure :



5.2. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	SPRINT	SP001	2AJFWSP001	EUT
2	Adapter	HW-050100C2W	DC 5V/1A	Support

5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.249&15.209	Radiated Emission	Compliant
§15.249	Band Edges	Compliant
§15.215	20dB bandwidth	Compliant
§15.207	Conducted Emission	Compliant

6. TEST FACILITY

Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	1-2F., Bldg.2, No.1-4, Chaxi Sanwei Technical Industrial Park, Gushu, Xixiang, Bao'an District B112-B113, Bldg.12, Baoan Bldg Materials Center, No.1 of Xixiang Inner Ring Road, Baoan District, Shenzhen 518012
NVLAP LAB CODE	600153-0
Designation Number	CN5028
Description	Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by National Voluntary Laboratory Accreditation program, NVLAP Code 600153-0

TEST EQUIPMENT OF CONDUCTED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESPI	101206	Jun.20, 2017	Jun.19, 2018
LISN	R&S	ESH2-Z5	100086	Aug.21, 2017	Aug.20, 2018

TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	Jun.20, 2017	Jun.19, 2018
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec.08, 2017	Dec.07, 2018
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Sep.20, 2017	Sep.19, 2018
preamplifier	ChengYi	EMC184045SE	980508	Sep.15, 2017	Sep.14, 2018
Active loop antenna (9K-30MHz)	SCHWARZBECK	FMZB1519	1519-038	Sep.28, 2017	Sep.27, 2018
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May.18, 2017	May.17, 2019
Broadband Preamplifier	SCHWARZBECK	BBV 9718	9718-205	Jun.20, 2017	Jun.19, 2018
ANTENNA	SCHWARZBECK	VULB9168	D69250	Sep.28, 2017	Sep.27, 2018

7. RADIATED EMISSION

7.1TEST LIMIT

Standard FCC15.249

Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (microvolts/meter)
900-928MHz	50	500
2400-2483.5MHz	50	500
5725-5875MHz	50	500
24.0-24.25GHz	250	2500

Standard FCC 15.209

Frequency (MHz)	Distance Meters	Field Strengths Limit	
		μ V/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	---
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	Other:74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

Remark： (1) Emission level dBμ V = 20 log Emission level μ V/m

(2) The smaller limit shall apply at the cross point between two frequency bands.

(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

7.2. MEASUREMENT PROCEDURE

1. The EUT was placed on the top of the turntable 0.8 or 1.5 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 minimum resolution bandwidth of 1 MHz. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
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 values.
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.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

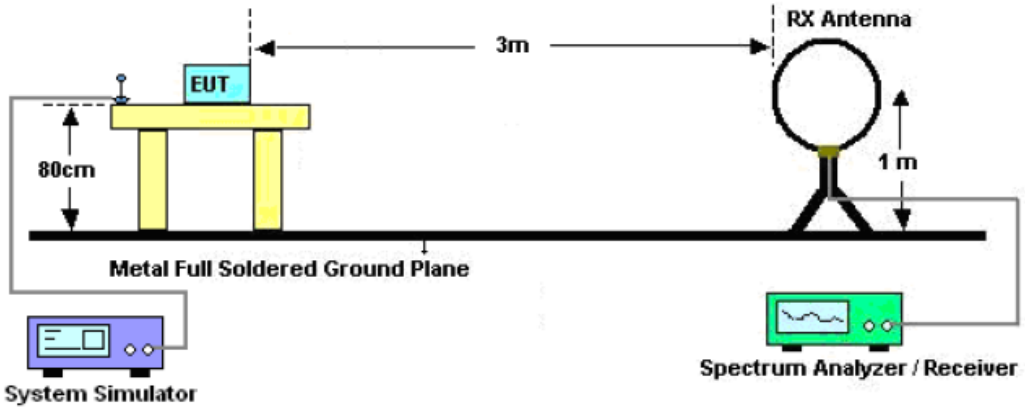
The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
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
Start ~Stop Frequency	1GHz~26.5GHz RBW 1.5MHz/ VBW 5MHz for Peak, RBW 1.5MHz/10Hz for Average

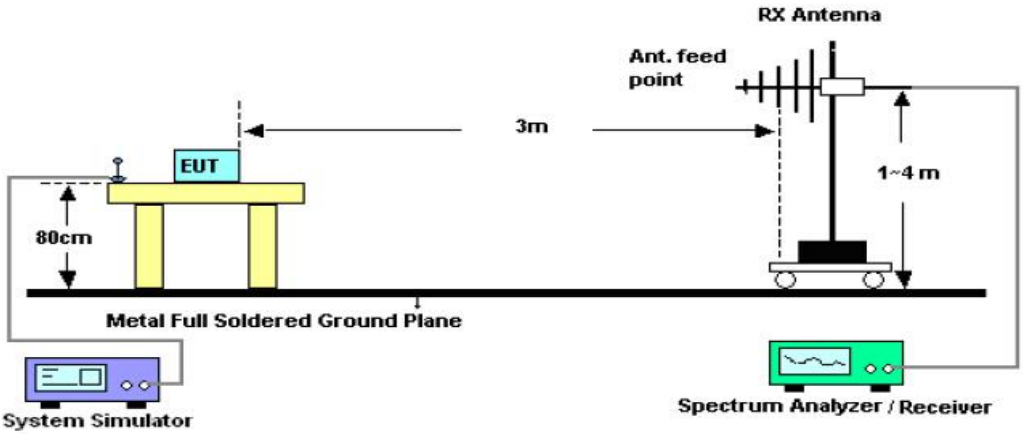
Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

7.3. TEST SETUP

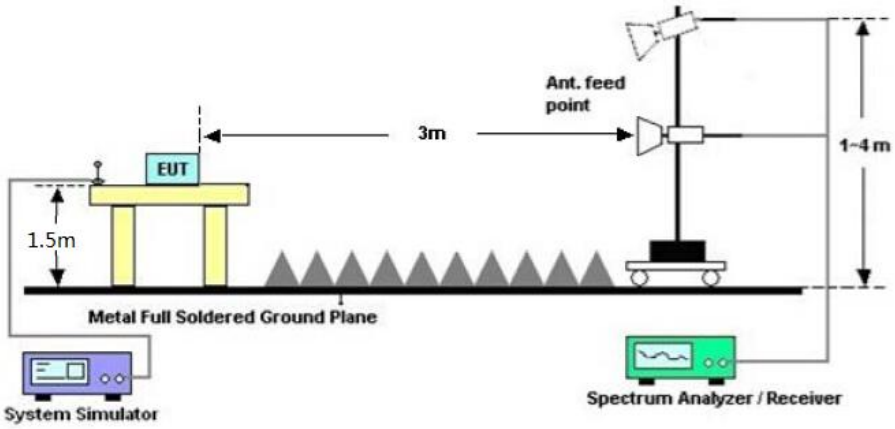
Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



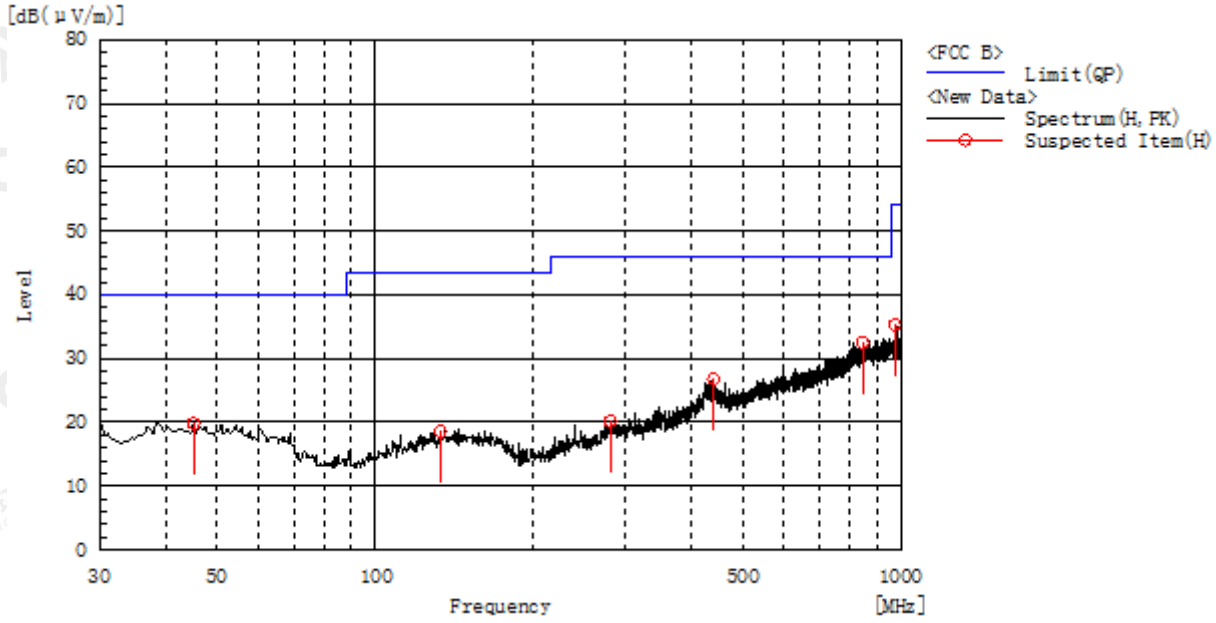
7.4. TEST RESULT

RADIATED EMISSION BELOW 30MHZ

No emission found between lowest internal used/generated frequencies to 30MHz.

RADIATED EMISSION 30MHz- 1GHZ FOR BLE

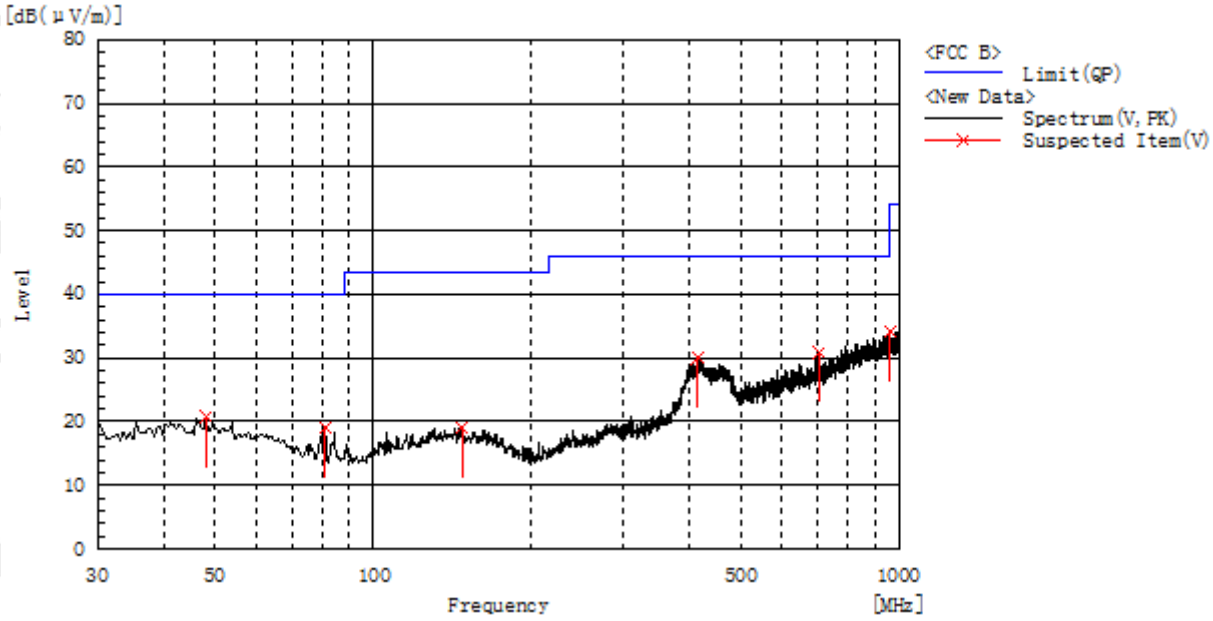
EUT：	SPRINT	Model Name. ：	SP001
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC3.7V
Test Mode ：	Mode 1	Polarization :	Horizontal



Frequency MHz	Polarization	Reading dB(uV)	Factor dB (1/m)	Level dB(uV/m) PK	Limit dB(uV/m) QP	Margin dB	Pass/Fail	Height cm	Angle deg
974.295	H	7.4	27.9	35.3	54.0	18.7	Pass	200.0	36.3
45.035	H	5.5	14.3	19.8	40.0	20.2	Pass	100.0	267.3
132.820	H	5.2	13.4	18.6	43.5	24.9	Pass	100.0	267.3
439.825	H	7.9	18.9	26.8	46.0	19.2	Pass	100.0	123.6
845.770	H	6.0	26.5	32.5	46.0	13.5	Pass	100.0	267.3
279.775	H	5.5	14.7	20.2	46.0	25.8	Pass	200.0	72.7

RESULT: PASS

EUT：	SPRINT	Model Name. ：	SP001
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC3.7V
Test Mode ：	Mode 1	Polarization :	Vertical



Frequency MHz	Polarization	Reading dB(uV)	Factor dB (1/m)	Level dB(uV/m) PK	Limit dB(uV/m) QP	Margin dB	Pass/Fail	Height cm	Angle deg
47.945	V	6.6	14.2	20.8	40.0	19.2	Pass	100.0	195.6
413.635	V	11.8	18.2	30.0	46.0	16.0	Pass	100.0	268.0
962.655	V	6.4	27.8	34.2	54.0	19.8	Pass	100.0	339.2
80.925	V	9.7	9.3	19.0	40.0	21.0	Pass	100.0	195.6
147.370	V	5.5	13.6	19.1	43.5	24.4	Pass	200.0	182.7
705.605	V	7.4	23.5	30.9	46.0	15.1	Pass	100.0	303.8

RESULT: PASS

Note:

Factor=Antenna Factor + Cable loss, Margin=Result-Limit.

The “Factor” value can be calculated automatically by software of measurement system.

The mode 1 is the worst case, and only the data of the worst case recorded in this test report.

FIELD STRENGTH OF FUNDAMENTAL FOR BLE

EUT：	SPRINT	Model Name. ：	SP001
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC3.7V
Test Modulation ：	GFSK	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
2402.013	99.51	-9.37	90.14	114	-23.86	peak
2402.013	92.74	-9.37	83.37	94	-10.63	AVG
2440.016	101.42	-9.63	91.79	114	-22.21	peak
2440.016	94.67	-9.63	85.04	94	-8.96	AVG
2480.021	104.02	-9.61	94.41	114	-19.59	peak
2480.021	96.88	-9.61	87.27	94	-6.73	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT：	SPRINT	Model Name. ：	SP001
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC3.7V
Test Modulation ：	GFSK	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
2402.013	97.33	-9.37	87.96	114	-26.04	peak
2402.013	90.51	-9.37	81.14	94	-12.86	AVG
2440.016	99.44	-9.63	89.81	114	-24.19	peak
2440.016	92.69	-9.63	83.06	94	-10.94	AVG
2480.021	101.85	-9.61	92.24	114	-21.76	peak
2480.021	94.73	-9.61	85.12	94	-8.88	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

RADIATED EMISSION ABOVE 1GHZ FOR BLE

EUT：	SPRINT	Model Name. ：	SP001
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC3.7V
Test Mode ：	Mode 1	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4804.026	49.38	3.74	53.12	74	-20.88	peak
4804.026	42.71	3.74	46.45	54	-7.55	AVG
7206.039	44.55	8.14	52.69	74	-21.31	peak
7206.039	36.84	8.14	44.98	54	-9.02	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT：	SPRINT	Model Name. ：	SP001
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC3.7V
Test Mode ：	Mode 1	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4804.026	49.21	3.74	52.95	74	-21.05	peak
4804.026	42.38	3.74	46.12	54	-7.88	AVG
7206.039	43.44	8.14	51.58	74	-22.42	peak
7206.039	35.72	8.14	43.86	54	-10.14	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT：	SPRINT	Model Name. ：	SP001
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC3.7V
Test Mode ：	Mode 2	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4880.032	50.24	3.76	54	74	-20	peak
4880.032	43.39	3.76	47.15	54	-6.85	AVG
7320.048	46.25	8.17	54.42	74	-19.58	peak
7320.048	37.94	8.17	46.11	54	-7.89	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT：	SPRINT	Model Name. ：	SP001
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC3.7V
Test Mode ：	Mode 2	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4880.032	49.18	3.76	52.94	74	-21.06	peak
4880.032	42.42	3.76	46.18	54	-7.82	AVG
7320.048	45.33	8.17	53.5	74	-20.5	peak
7320.048	36.59	8.17	44.76	54	-9.24	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT：	SPRINT	Model Name. ：	SP001
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC3.7V
Test Mode ：	Mode 3	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4960.042	51.84	3.83	55.67	74	-18.33	peak
4960.042	44.21	3.83	48.04	54	-5.96	AVG
7440.063	47.33	8.21	55.54	74	-18.46	peak
7440.063	40.04	8.21	48.25	54	-5.75	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

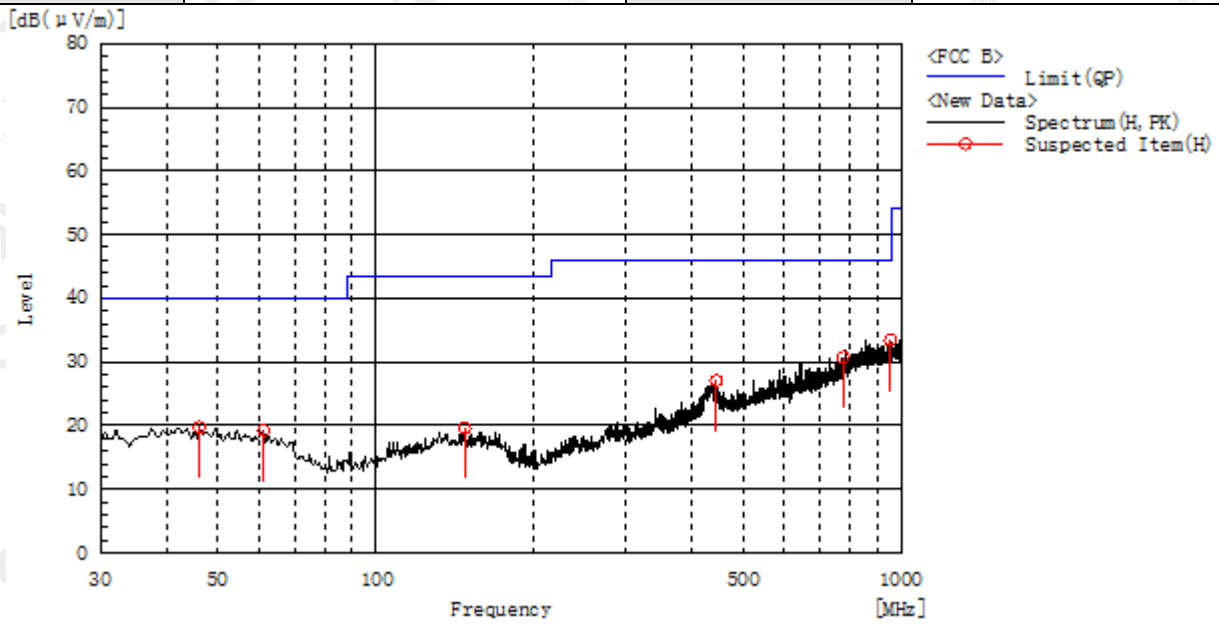
EUT：	SPRINT	Model Name. ：	SP001
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC3.7V
Test Mode ：	Mode 3	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4960.042	50.33	3.83	54.16	74	-19.84	peak
4960.042	42.84	3.83	46.67	54	-7.33	AVG
7440.063	46.78	8.21	54.99	74	-19.01	peak
7440.063	39.52	8.21	47.73	54	-6.27	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Note: Other emissions from 8G to 25 GHz are considered as ambient noise. No recording in the test report.
Factor=Antenna Factor + Cable loss - Amplifier gain, Margin=Measurement-Limit.
The “Factor” value can be calculated automatically by software of measurement system.

RADIATED EMISSION 30MHz- 1GHZ FOR ANT+

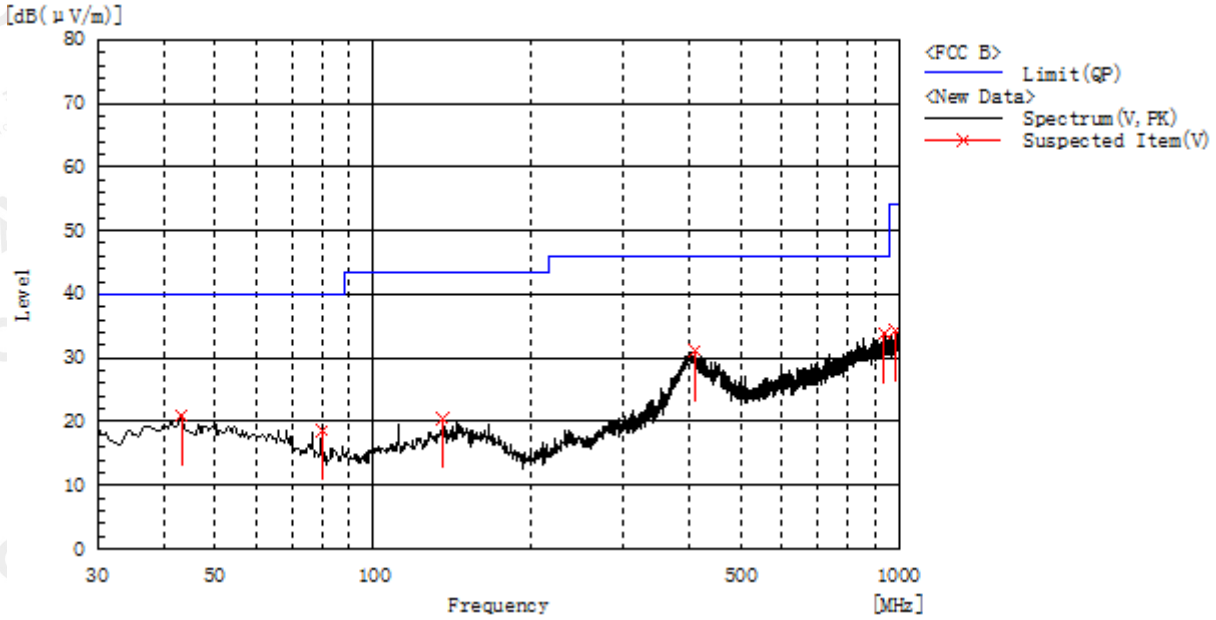
EUT：	SPRINT	Model Name. ：	SP001
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC3.7V
Test Mode ：	Mode 4	Polarization :	Horizontal



Frequency MHz	Polarization	Reading dB(uV)	Factor dB (1/m)	Level dB(uV/m) PK	Limit dB(uV/m) QP	Margin dB	Pass/Fail	Height cm	Angle deg
954.895	H	5.7	27.7	33.4	46.0	12.6	Pass	100.0	72.2
444.675	H	8.1	19.0	27.1	46.0	18.9	Pass	100.0	284.8
775.445	H	5.6	25.2	30.8	46.0	15.2	Pass	200.0	346.8
147.370	H	6.0	13.6	19.6	43.5	23.9	Pass	100.0	72.2
61.040	H	6.1	13.1	19.2	40.0	20.8	Pass	200.0	269.3
46.005	H	5.4	14.3	19.7	40.0	20.3	Pass	100.0	72.2

RESULT: PASS

EUT：	SPRINT	Model Name. ：	SP001
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC3.7V
Test Mode ：	Mode 4	Polarization :	Vertical



Frequency MHz	Polarization	Reading dB(uV)	Factor dB (1/m)	Level dB(uV/m) PK	Limit dB(uV/m) QP	Margin dB	Pass/Fail	Height cm	Angle deg
43.095	V	6.6	14.4	21.0	40.0	19.0	Pass	100.0	252.2
408.785	V	13.1	18.1	31.2	46.0	14.8	Pass	200.0	303.6
983.510	V	6.4	28.0	34.4	54.0	19.6	Pass	200.0	267.4
79.955	V	9.3	9.3	18.6	40.0	21.4	Pass	200.0	126.8
135.730	V	6.9	13.6	20.5	43.5	23.0	Pass	200.0	303.2
937.435	V	6.3	27.5	33.8	46.0	12.2	Pass	200.0	89.6

RESULT: PASS

Note:

Factor=Antenna Factor + Cable loss, Margin=Result-Limit.

The “Factor” value can be calculated automatically by software of measurement system.

FIELD STRENGTH OF FUNDAMENTAL FOR ANT+

EUT：	SPRINT	Model Name. ：	SP001
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC3.7V
Test Modulation ：	GFSK	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
2457.013	86.78	-9.37	77.41	114	-36.59	peak
2457.013	80.45	-9.37	71.08	94	-22.92	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT：	SPRINT	Model Name. ：	SP001
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC3.7V
Test Modulation ：	GFSK	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
2457.013	84.79	-9.37	75.42	114	-38.58	peak
2457.013	78.39	-9.37	69.02	94	-24.98	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

RADIATED EMISSION ABOVE 1GHZ FOR ANT+

EUT：	SPRINT	Model Name. ：	SP001
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC3.7V
Test Mode ：	Mode 4	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4914.026	49.35	3.74	53.09	74	-20.91	peak
4914.026	43.18	3.74	46.92	54	-7.08	AVG
7371.039	42.42	8.14	50.56	74	-23.44	peak
7371.039	37.34	8.14	45.48	54	-8.52	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT：	SPRINT	Model Name. ：	SP001
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC3.7V
Test Mode ：	Mode 4	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4914.026	47.77	3.74	51.51	74	-22.49	peak
4914.026	42.68	3.74	46.42	54	-7.58	AVG
7371.039	40.54	8.14	48.68	74	-25.32	peak
7371.039	34.71	8.14	42.85	54	-11.15	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Note: Other emissions from 8G to 25 GHz are considered as ambient noise. No recording in the test report.
Factor=Antenna Factor + Cable loss - Amplifier gain, Margin=Measurement-Limit.
The “Factor” value can be calculated automatically by software of measurement system.

8. BAND EDGE EMISSION

8.1. MEASUREMENT PROCEDURE

1. The EUT operates at transmitting mode. The operate channel is tested to verify the largest transmission and spurious emissions power at the continuous transmission mode.

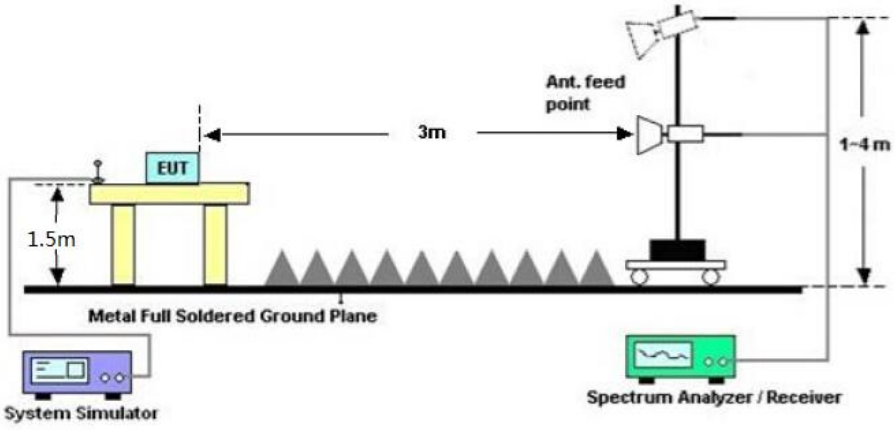
2. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission: (a) PEAK: RBW=1MHz VBW=3MHz / Sweep=AUTO

(b) AVERAGE: RBW=1MHz ; VBW=1/on time(1KHz) / Sweep=AUTO

3. Other procedures refer to clause 7.2.

8.2 TEST SETUP

RADIATED EMISSION TEST SETUP



8.3 RADIATED TEST RESULT

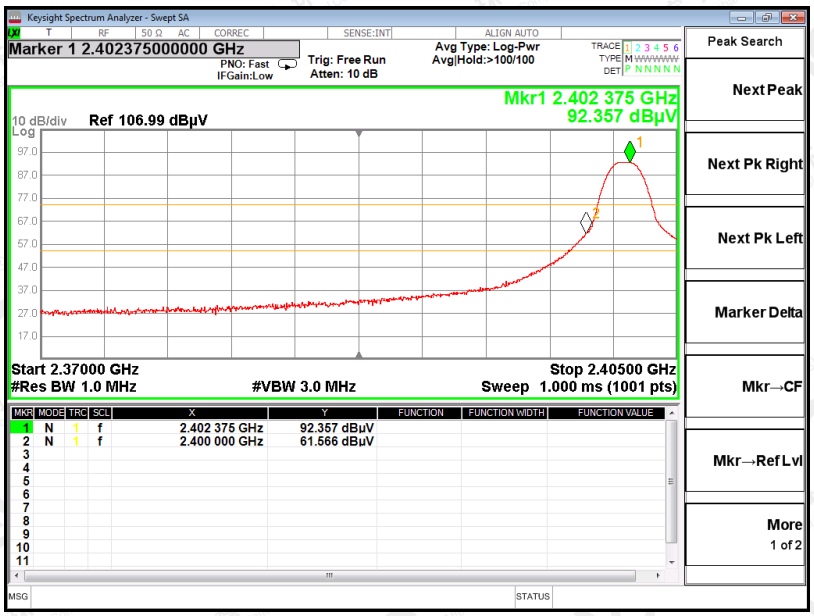
Note:

1. Factor=Antenna Factor + Cable loss - Amplifier gain. Field Strength=Factor + Reading level
2. The factor had been edited in the “Input Correction” of the Spectrum Analyzer. So the Amplitude of test plots is equal to Reading level plus the Factor in dB. Use the A dB(μV) to represent the Amplitude. Use the F dB(μV/m) to represent the Field Strength. So A=F.

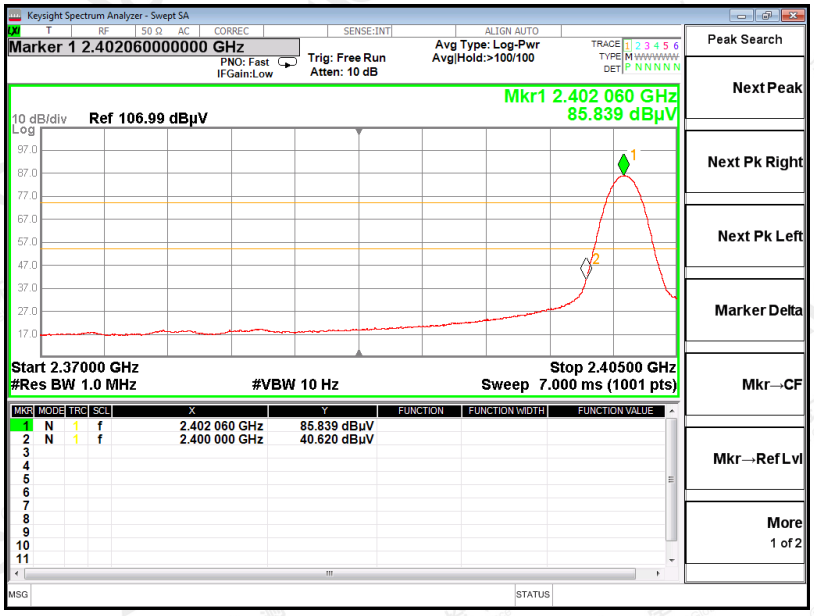
BLE:

EUT：	SPRINT	Model Name. ：	SP001
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC3.7V
Test Mode ：	Mode 1	Polarization :	Horizontal

PK Value

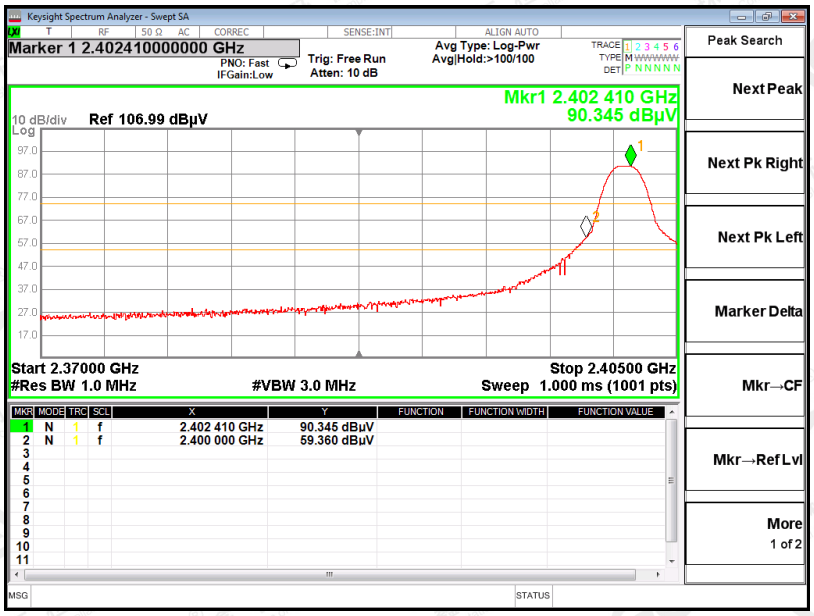


AV Value

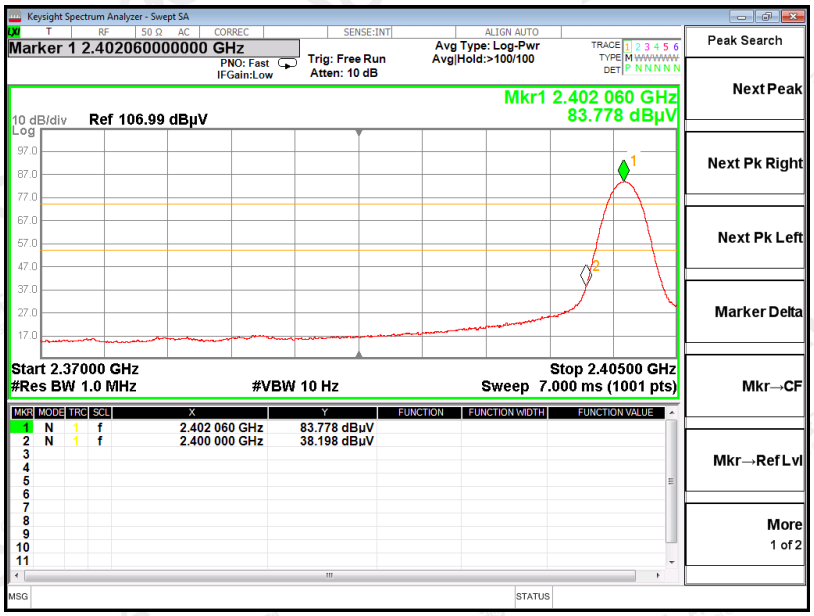


EUT：	SPRINT	Model Name. ：	SP001
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC3.7V
Test Mode ：	Mode 1	Polarization :	Vertical

PK Value

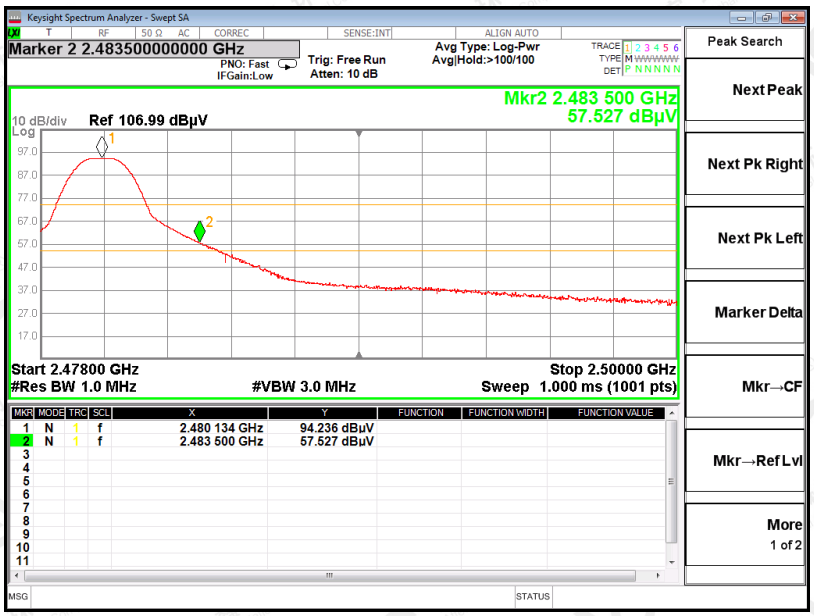


AV Value

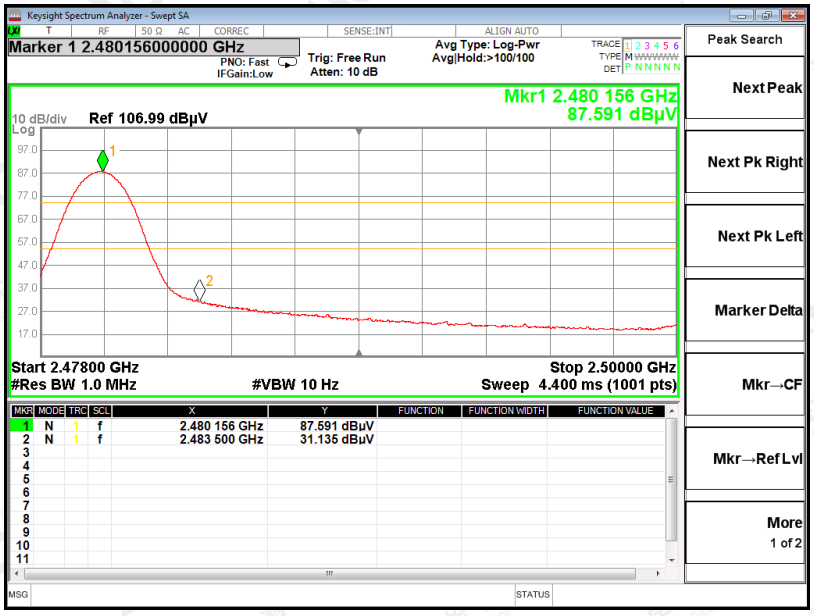


EUT：	SPRINT	Model Name. ：	SP001
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC3.7V
Test Mode ：	Mode 3	Polarization：	Horizontal

PK Value

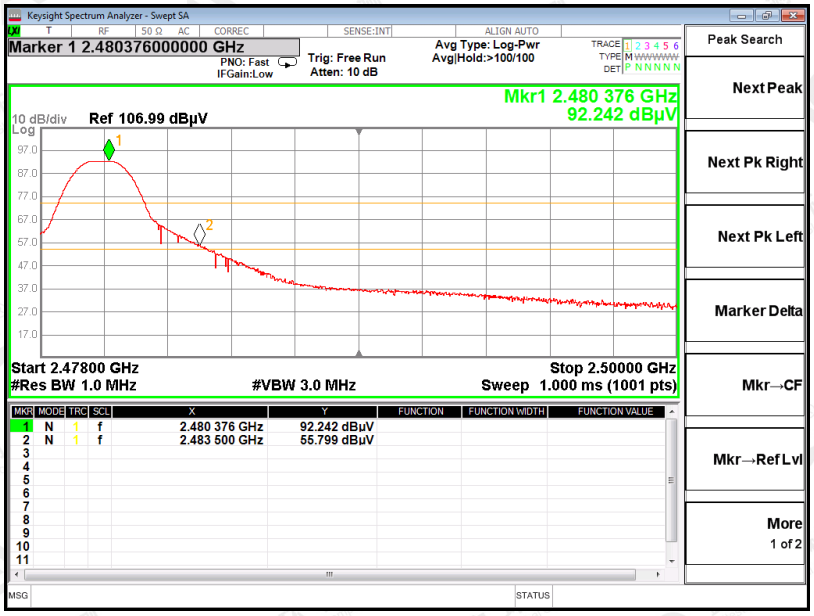


AV Value

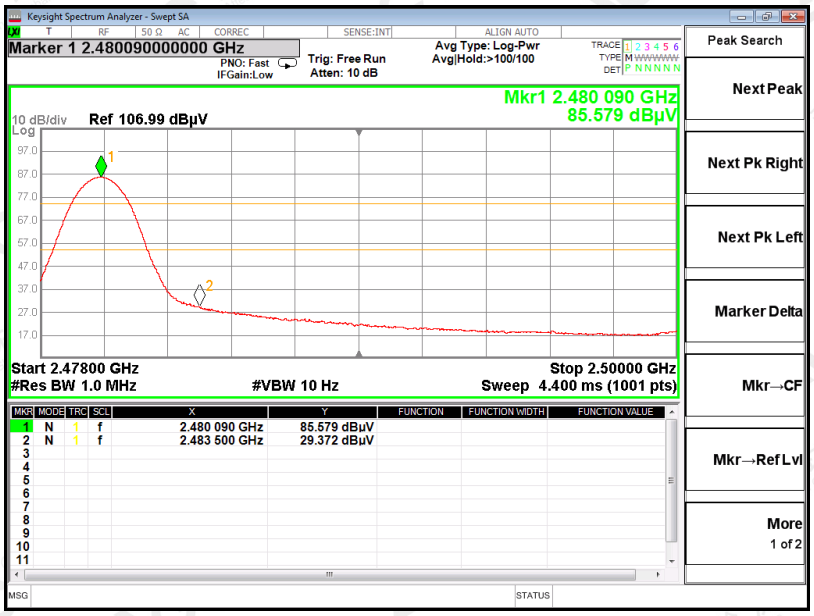


EUT：	SPRINT	Model Name. ：	SP001
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC3.7V
Test Mode ：	Mode 3	Polarization :	Vertical

PK Value



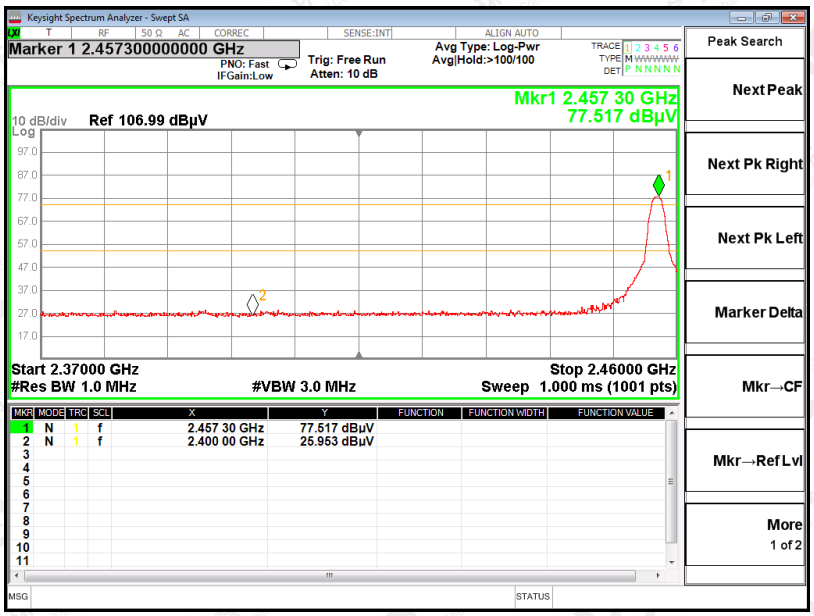
AV Value



ANT+:

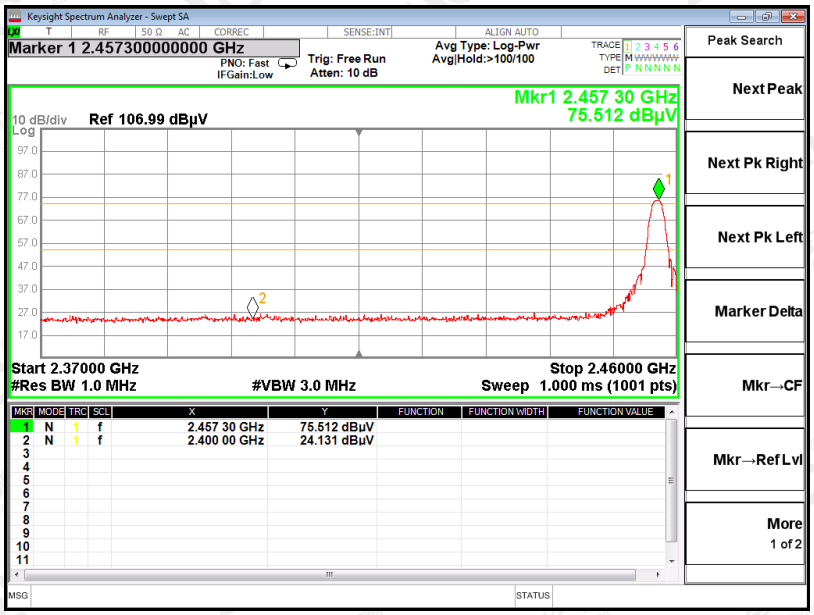
EUT：	SPRINT	Model Name. ：	SP001
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC3.7V
Test Mode ：	Mode 1	Polarization :	Horizontal

PK Value



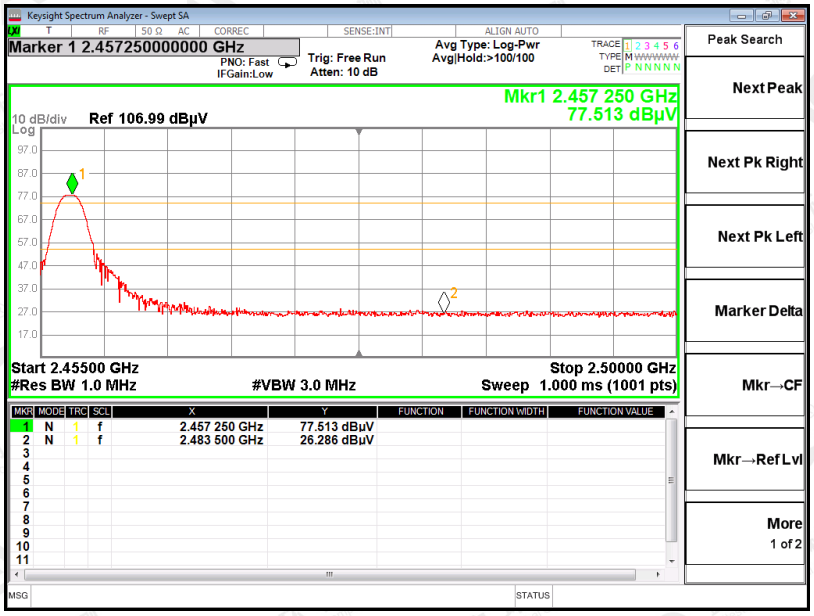
EUT：	SPRINT	Model Name. ：	SP001
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC3.7V
Test Mode ：	Mode 1	Polarization :	Vertical

PK Value



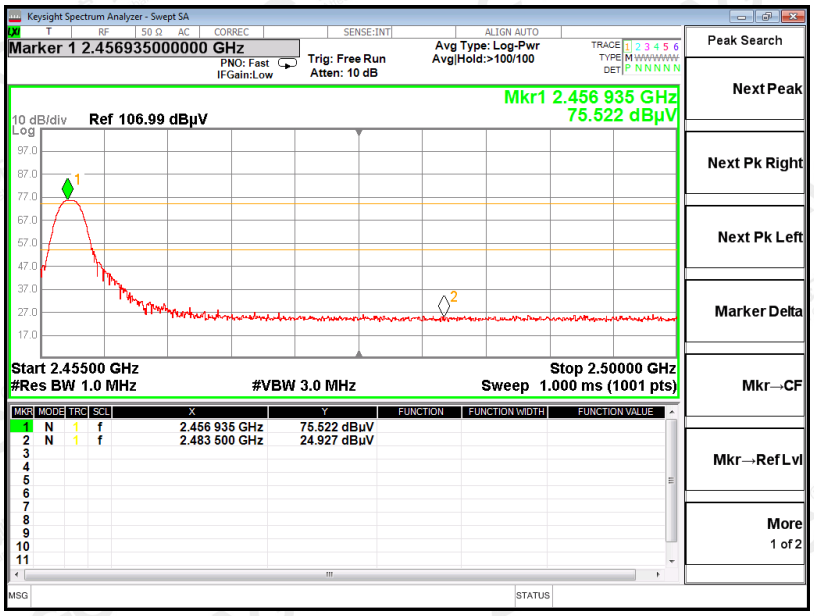
EUT：	SPRINT	Model Name. ：	SP001
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC3.7V
Test Mode ：	Mode 3	Polarization：	Horizontal

PK Value



EUT：	SPRINT	Model Name. ：	SP001
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC3.7V
Test Mode ：	Mode 3	Polarization：	Vertical

PK Value

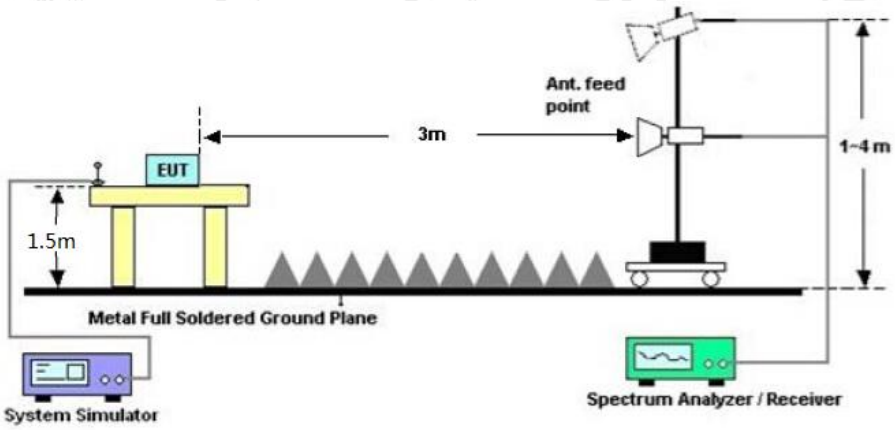


9. 20DB BANDWIDTH

9.1. MEASUREMENT PROCEDURE

1 Set the EUT Work on the top, the middle and the bottom operation frequency individually.
2. Set SPA Centre Frequency = Operation Frequency, RBW= 30 KHz, VBW≥3×RBW.
3. Set SPA Trace 1 Max hold, then View.

9.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

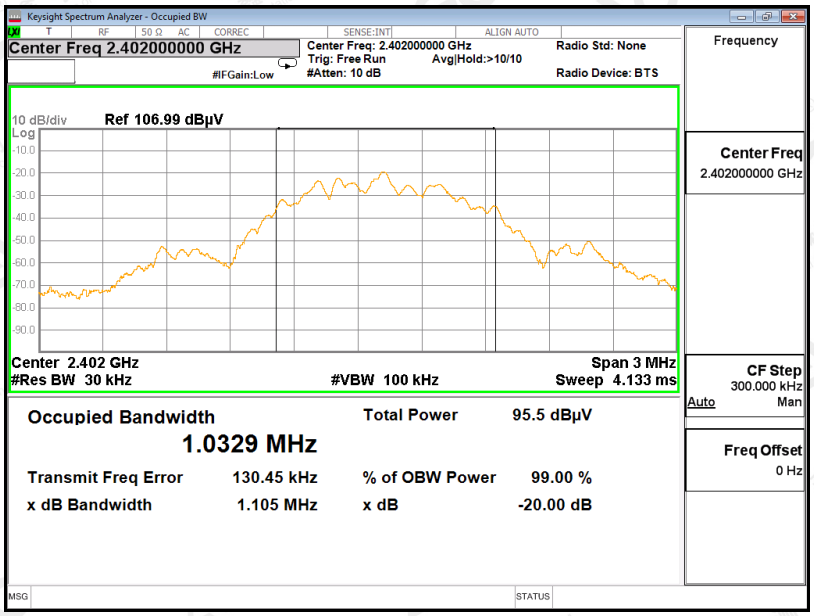


9.3. MEASUREMENT RESULTS

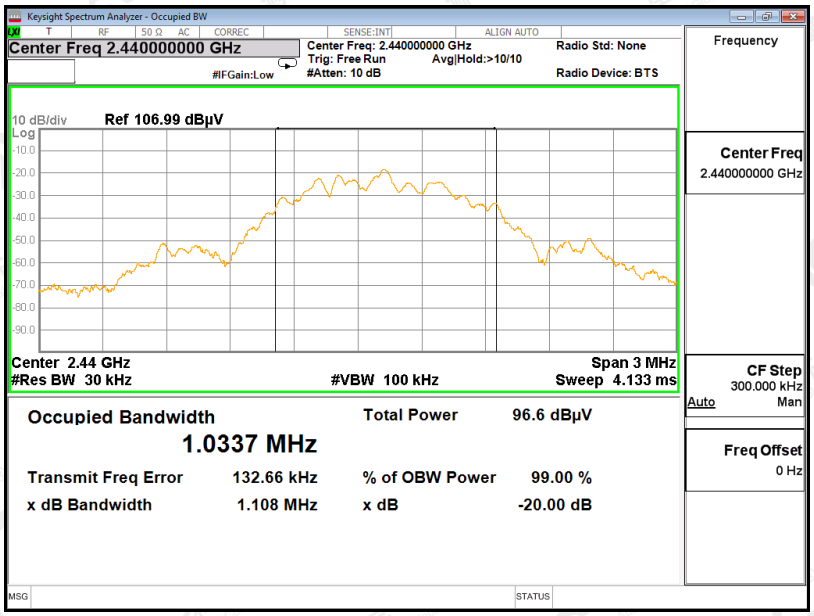
TEST ITEM	20DB BANDWIDTH
TEST MODULATION	GFSK for BLE

Test Data (MHz)		Criteria
Low Channel	1.105	PASS
Middle Channel	1.108	PASS
High Channel	1.107	PASS

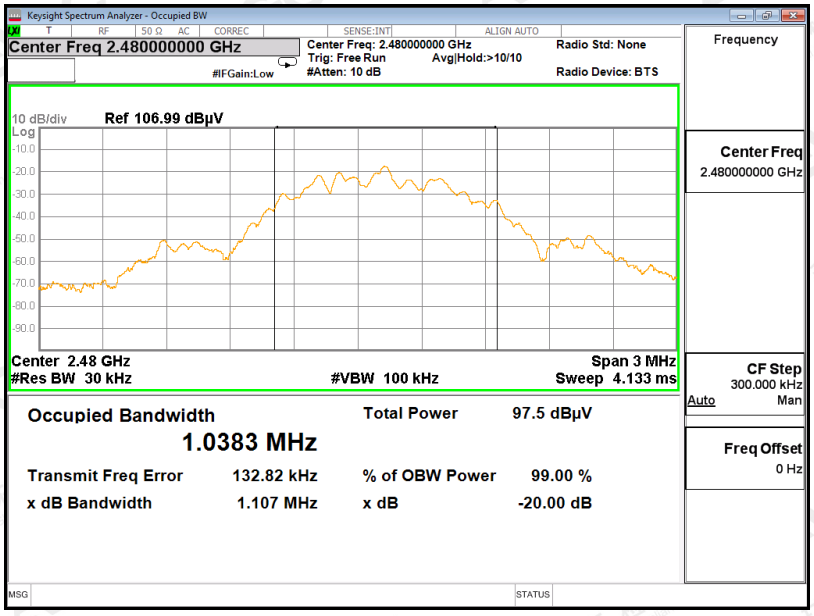
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



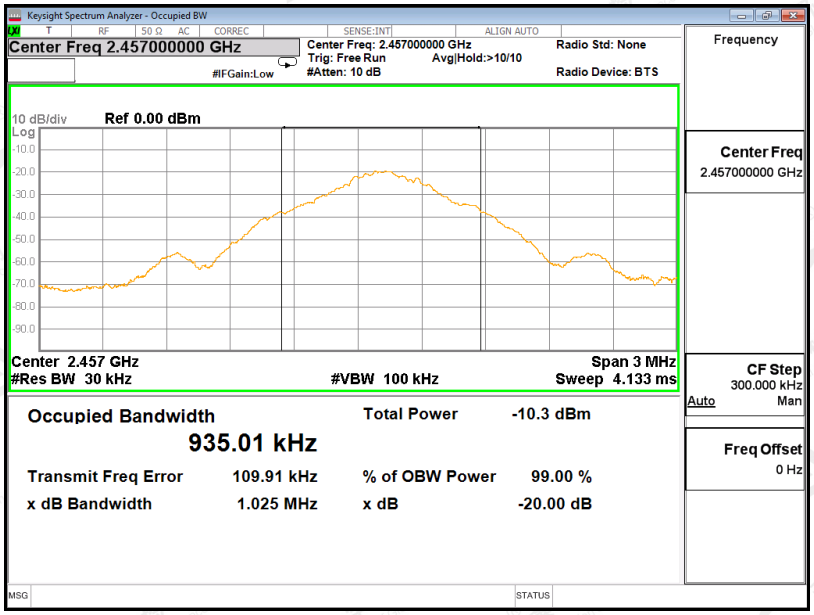
TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



TEST ITEM	20DB BANDWIDTH
TEST MODULATION	GFSK for ANT+

Test Data (MHz)		Criteria
Operate Channel	1.025	PASS

TEST PLOT OF BANDWIDTH



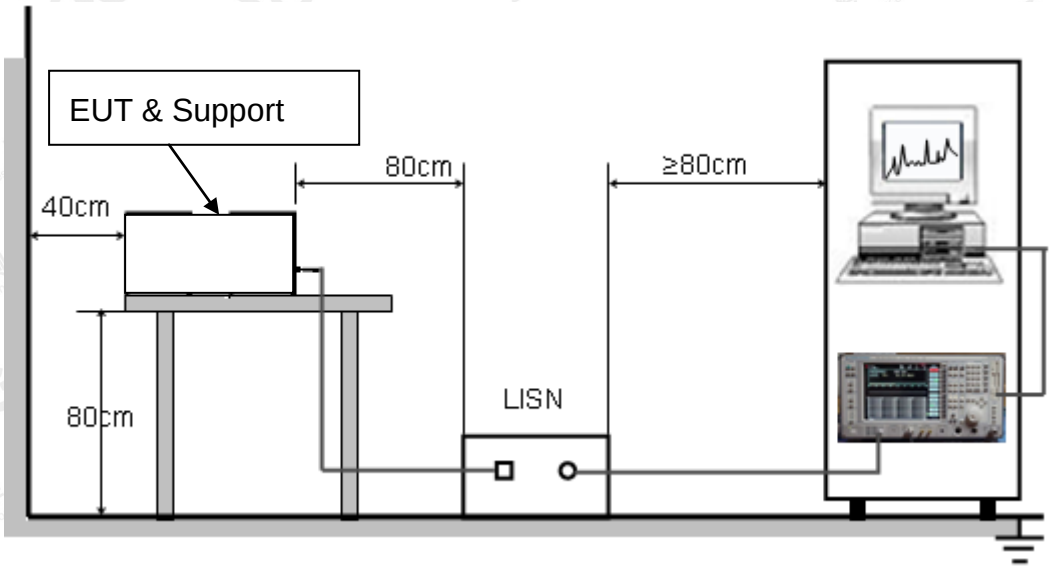
10. FCC LINE CONDUCTED EMISSION TEST

10.1. LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P.(dBuV)	Average(dBuV)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Note:
1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50MHz.

10.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



10.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. All support equipments received AC120VV/60Hz power from a LISN, if any.
5. The EUT received charging voltage by adapter which received 120V/60Hzpower by a LISN..
6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.
9. The test mode(s) were scanned during the preliminary test.

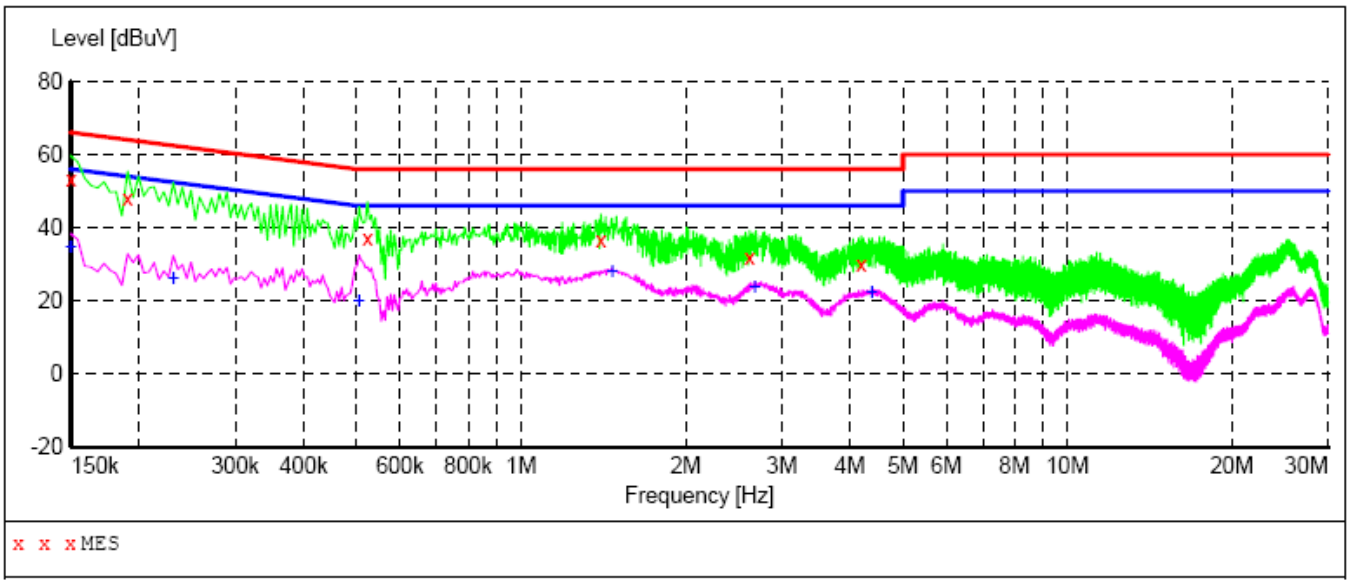
Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

10.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less –2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3. The test data of the worst case condition(s) was reported on the Summary Data page.

10.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

LINE CONDUCTED EMISSION TEST-L



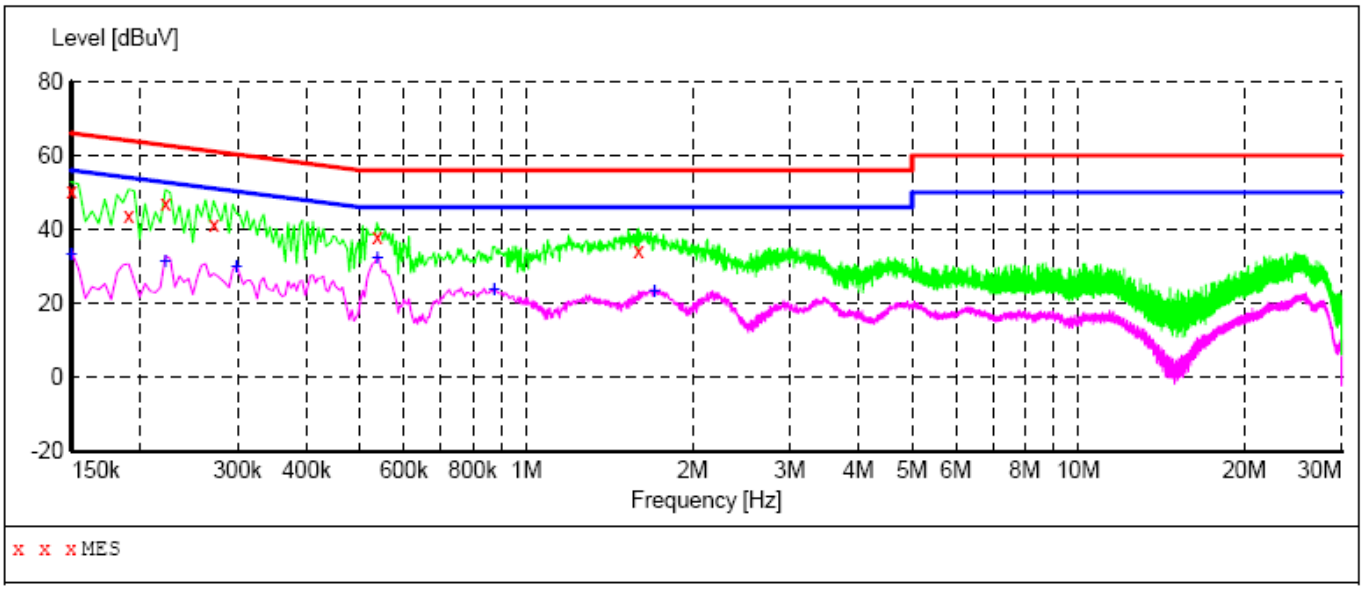
MEASUREMENT RESULT:

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.150000	53.20	11.4	66	12.8	QP	L1	FLO
0.190500	48.10	11.4	64	15.9	QP	L1	FLO
0.523500	36.90	11.4	56	19.1	QP	L1	FLO
1.401000	36.50	11.3	56	19.5	QP	L1	FLO
2.620500	31.80	11.4	56	24.2	QP	L1	FLO
4.195500	30.10	11.4	56	25.9	QP	L1	FLO

MEASUREMENT RESULT:

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.150000	34.50	11.4	56	21.5	AV	L1	FLO
0.231000	26.00	11.3	52	26.4	AV	L1	FLO
0.505500	20.00	11.4	46	26.0	AV	L1	FLO
1.468500	28.00	11.3	46	18.0	AV	L1	FLO
2.679000	23.70	11.4	46	22.3	AV	L1	FLO
4.389000	22.30	11.4	46	23.7	AV	L1	FLO

LINE CONDUCTED EMISSION TEST-N



MEASUREMENT RESULT:

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.150000	50.10	11.4	66	15.9	QP	N	FLO
0.190500	43.90	11.4	64	20.1	QP	N	FLO
0.222000	47.00	11.4	63	15.7	QP	N	FLO
0.271500	41.20	11.3	61	19.9	QP	N	FLO
0.537000	37.80	11.4	56	18.2	QP	N	FLO
1.599000	34.40	11.3	56	21.6	QP	N	FLO

MEASUREMENT RESULT:

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.150000	33.40	11.4	56	22.6	AV	N	FLO
0.222000	31.40	11.4	53	21.3	AV	N	FLO
0.298500	29.90	11.3	50	20.4	AV	N	FLO
0.537000	32.10	11.4	46	13.9	AV	N	FLO
0.874500	23.70	11.3	46	22.3	AV	N	FLO
1.707000	23.30	11.3	46	22.7	AV	N	FLO

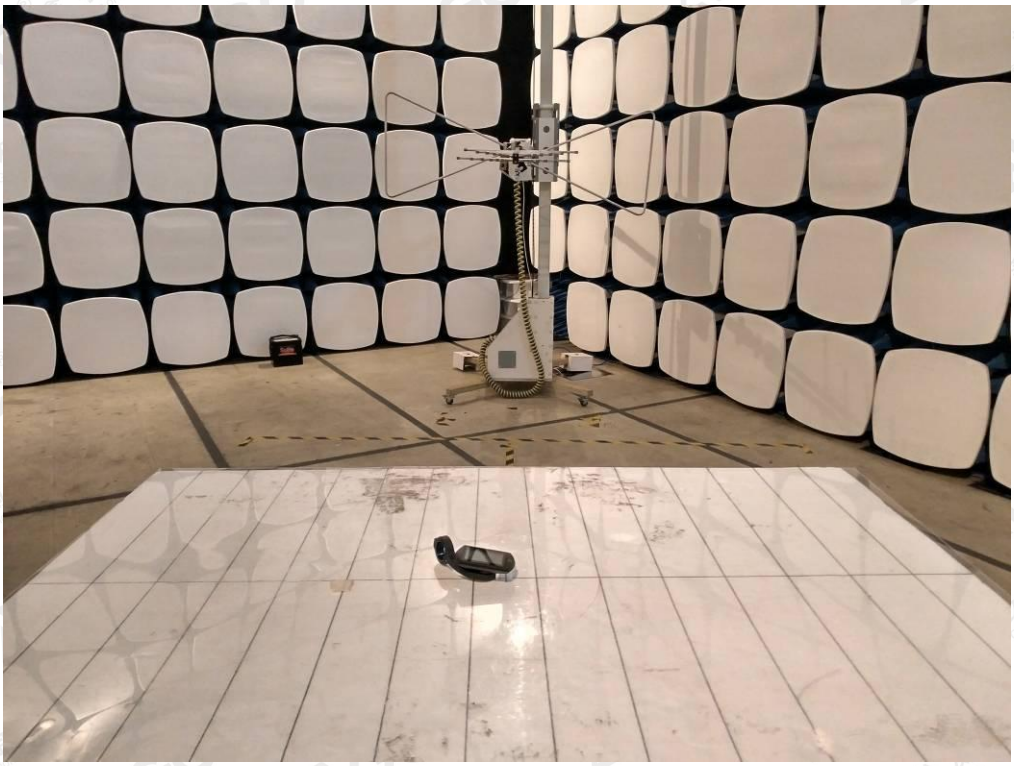
RESULT: PASS

Note: The mode 1 is the worst case, and only the data of the worst case recorded in this test report.

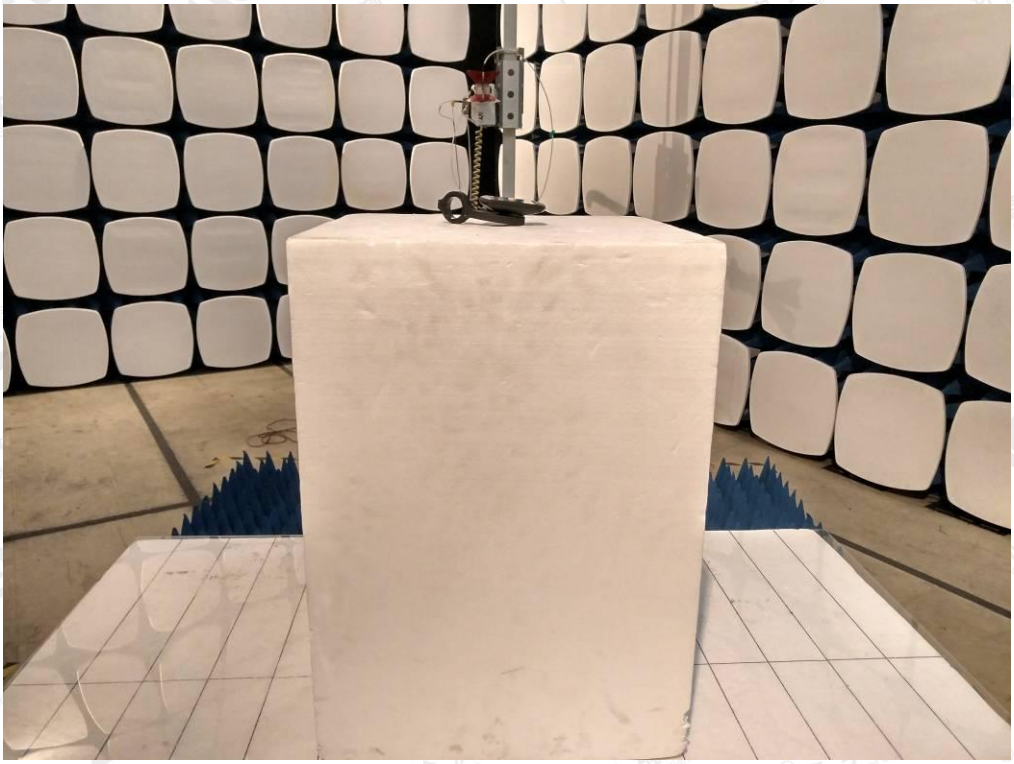
APPENDIX A: PHOTOGRAPHS OF TEST SETUP

FCC LINE CONDUCTED EMISSION TEST SETUP

FCC RADIATED EMISSION TEST SETUP BELOW 1GHZ



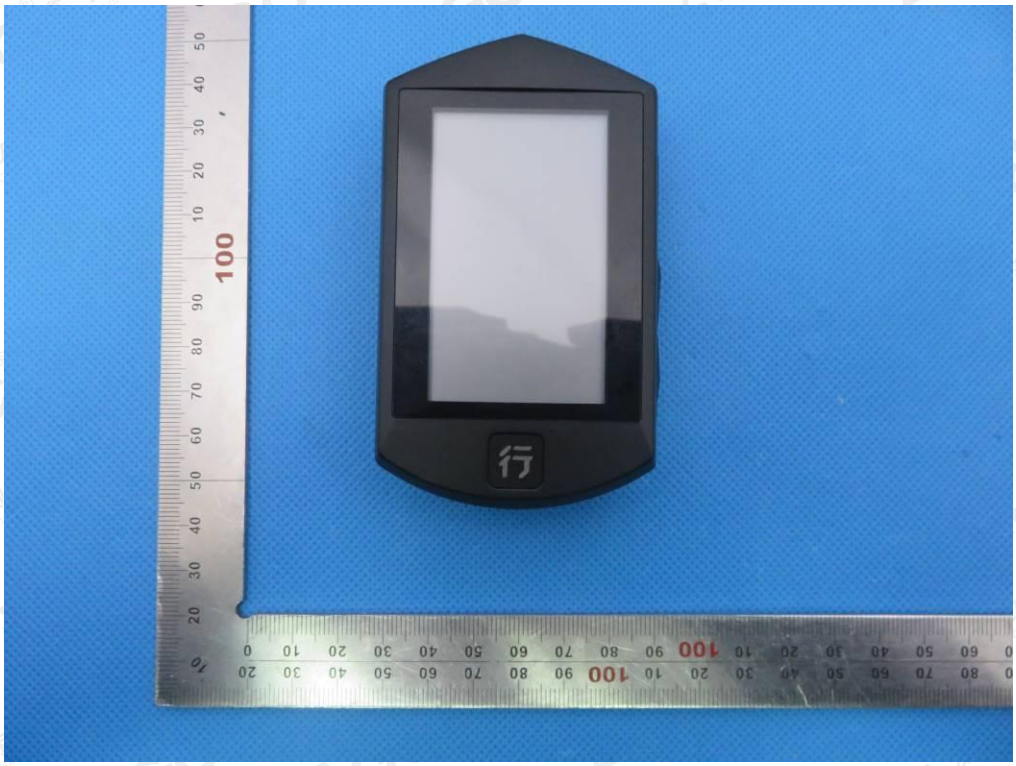
FCC RADIATED EMISSION TEST SETUP ABOVE 1GHZ



APPENDIX B: PHOTOGRAPHS OF EUT

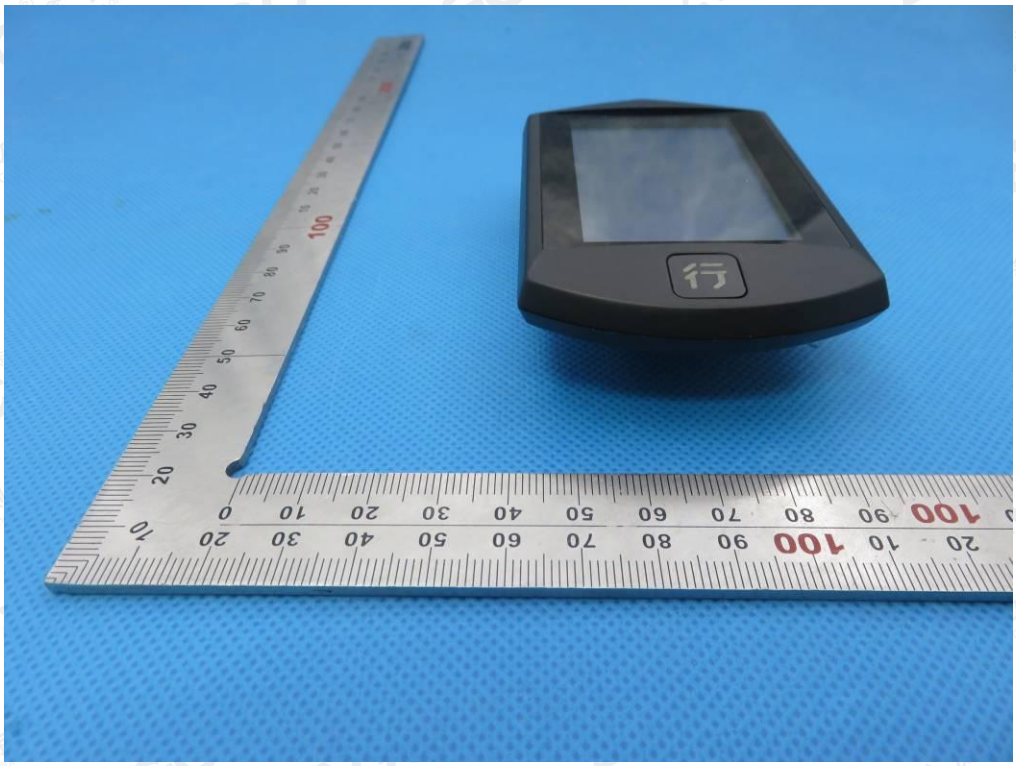
ALL VIEW OF EUT

TOP VIEW OF EUT

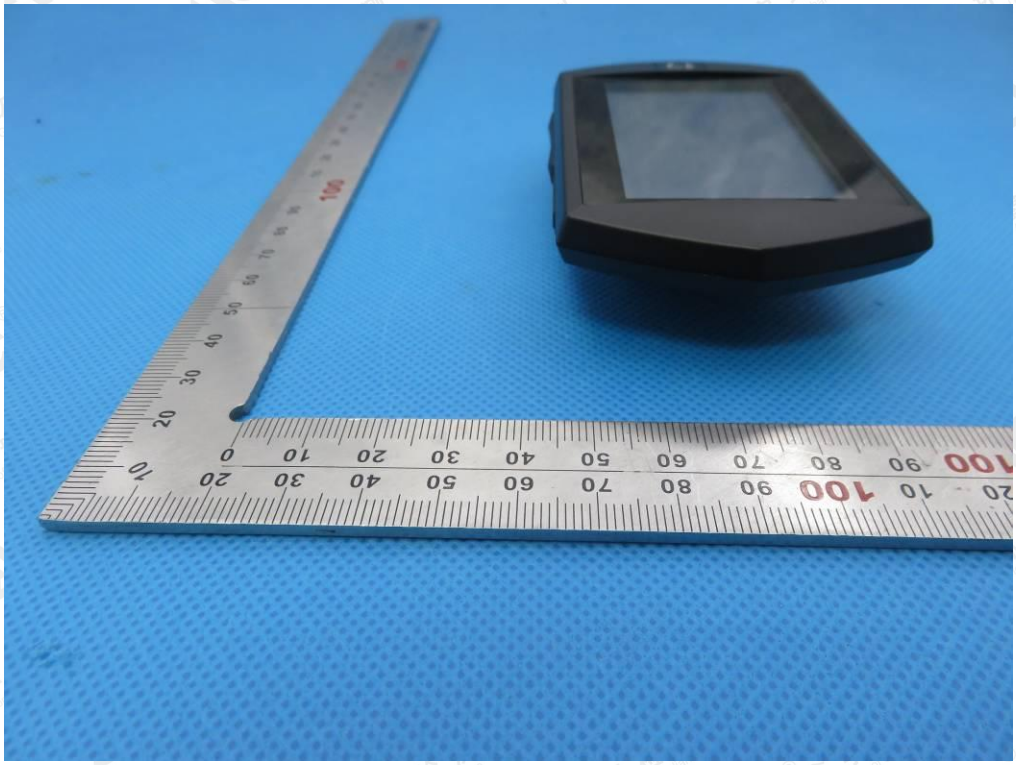


BOTTOM VIEW OF EUT

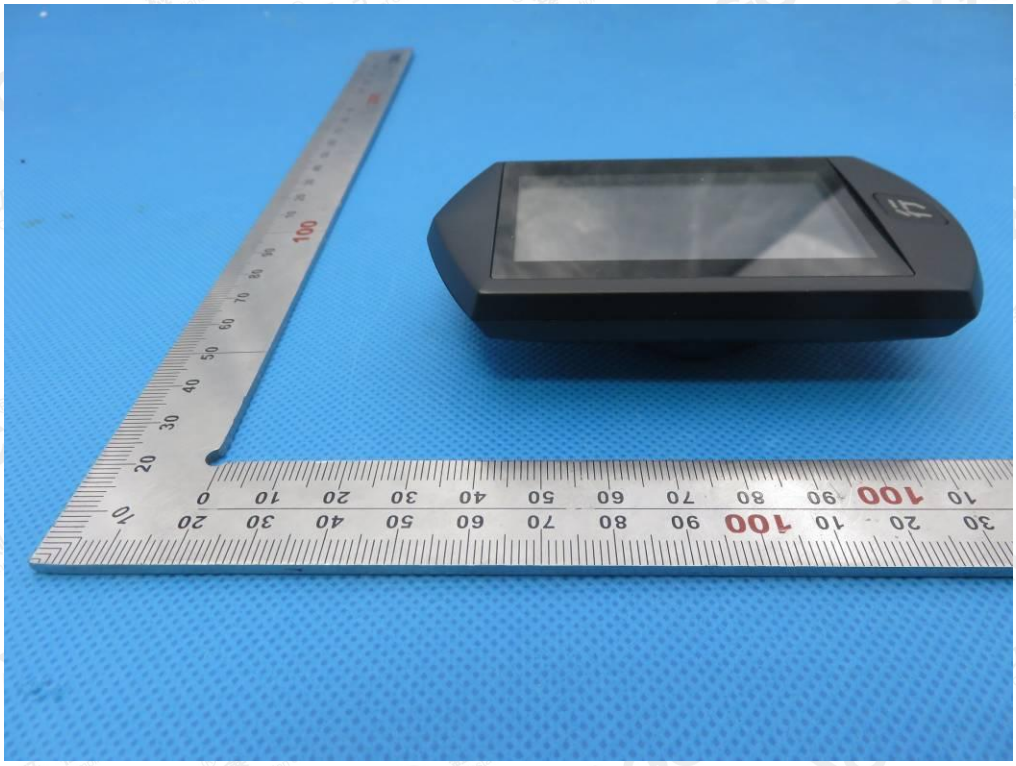
FRONT VIEW OF EUT



BACK VIEW OF EUT



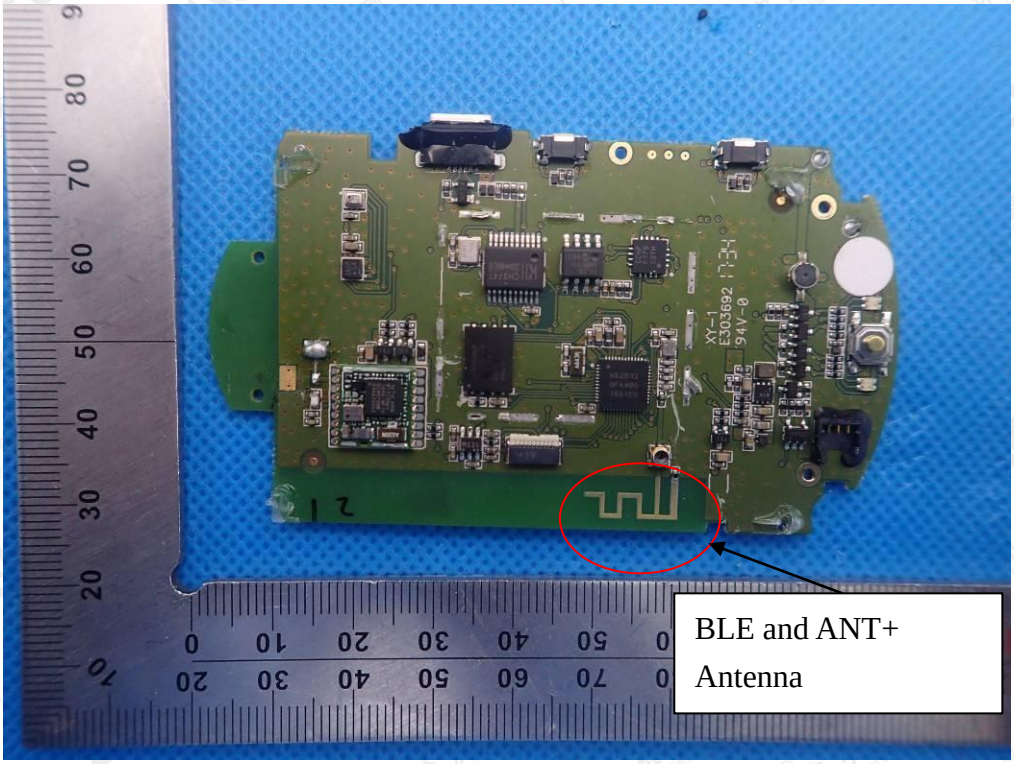
LEFT VIEW OF EUT



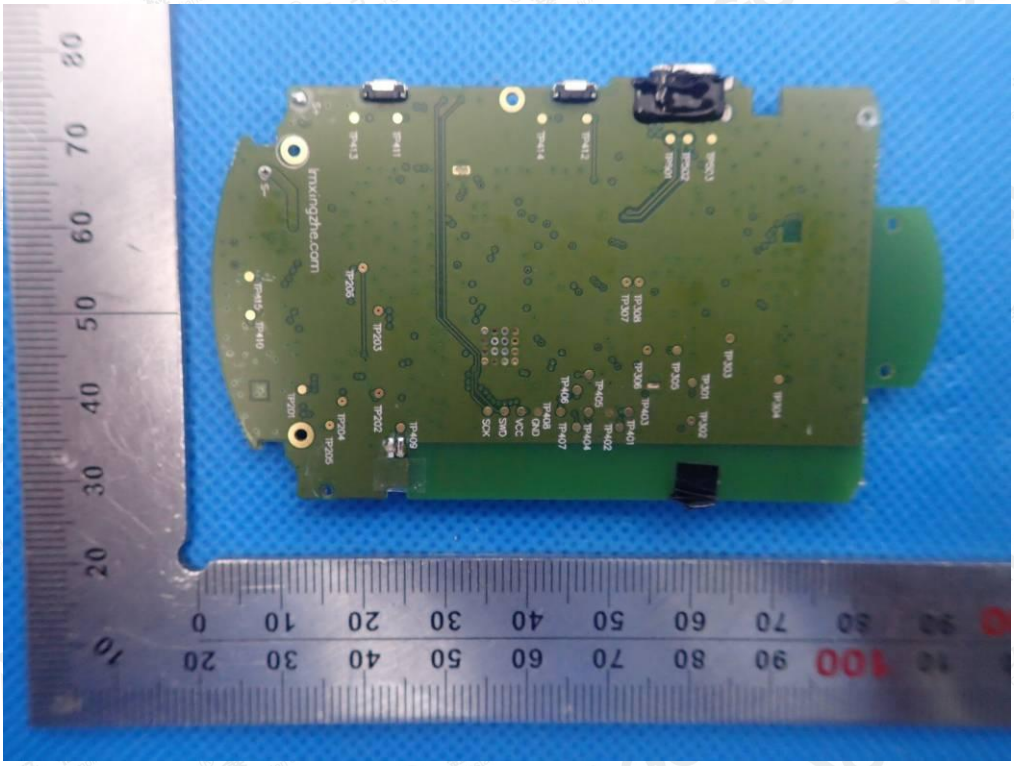
RIGHT VIEW OF EUT

OPEN VIEW OF EUT

INTERNAL VIEW OF EUT-1



INTERNAL VIEW OF EUT-2



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