TEST REPORT

Reference No.	:	WTS16S0961813E
FCC ID	:	2AJYRPOWERPACK
Applicant	:	Nomad Goods, Inc.
Address	:	1187 Coast Village Rd. #638, Santa Barbara, California 93108 United States
Manufacturer	:	BCD China Electronics Manufacturing (Shenzhen) Ltd
Address	:	3/F&5/F, Bldg B2, Xin An No. 3 Industrial Park, Hang Cheng Industrial Zone, Qian Jin Road, Xi Xiang, Bao An District, Shenzhen, Guangdong, China
Product Name	:	POWERPACK
Model No.	:	powerpack-tile
Standards	:	FCC CFR47 Part 15 Section 15.247:2016
Date of Receipt sample	:	Sep. 28, 2016
Date of Test	:	Oct. 19 – Nov. 20, 2016
Date of Issue	:	Dec. 05, 2016
Test Result	:	**Pass**

Remarks:
The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

Prepared By:
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Tested by:

Zero Zhou / Tested Engineer

Approved by:

Philo Zhong / Manager

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3 Revision History

Test report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTS16S0961813E	Sep. 28, 2016	Oct. 19 – Nov. 20, 2016	Nov. 23, 2016	original	-	Replaced
WTS16S0961813E	Sep. 28, 2016	Oct. 19 – Nov. 20, 2016	Dec. 05, 2016	Revision1	Updated Test Report	Valid

4 General Information

4.1 General Description of E.U.T.

Product Name:	POWERPACK
Model No.:	powerpack-tile
Model Difference:	N/A
Operation Frequency:	2402MHz ~ 2480MHz, separated by 2MHz,40 channels in total
The lowest oscillator:	32.768KHz
Type of modulation:	GFSK(BLE only)
Test software:	Prodtest.exe
Test firmware:	DA1458x_SDK_3.0.6
Test software date:	20-Jun-2014
Test software version number:	P_04
Test software storage location:	\Windows\System32

4.2 Details of E.U.T.

Technical Data:	Input: DC 5V ⎓ 3.0A, Out 1: DC 5V ⎓ 3.0A | 9V ⎓ 2.0A | 12V ⎓ 2.0A Out 2: DC 5V ⎓ 2.4A, Total Output: 27W Max Capacity 3.7V 9000mAh Li-ion (33.3Wh)

4.3 Channel List

BLE mode

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
0	2402	1	2404	2	2406	3	2408
4	2410	5	2412	6	2414	7	2416
8	2418	9	2420	10	2422	11	2424
12	2426	13	2428	14	2430	15	2432
16	2434	17	2436	18	2438	19	2440
20	2442	21	2444	22	2446	23	2448
24	2450	25	2452	26	2454	27	2456
28	2458	29	2460	30	2462	31	2464
32	2466	33	2468	34	2470	35	2472
36	2474	37	2476	38	2478	39	2480

4.4 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Table 1 Tests carried out under FCC part 15.247

Test mode	Low channel	Middle channel	High channel
Transmitting	2402MHz	2440MHz	2480MHz

Table 2 Tests carried out under FCC part 15.207&15.209

Test Item	Test Mode1	Test Mode2	Test Mode3*
Conducted Emissions	Charging under BLE mode	Discharging under BLE mode	Charging + Discharging under BLE mode
Radiated Emissions	Charging under BLE mode	Discharging under BLE mode	Charging + Discharging under BLE mode
Note: "*" show the worst case mode, all test mode were tested and passed, only the worst case mode which were recorded in this report. The Bluetooth (BLE) is only use to tracking your POWERPACK anywhere, no other function.			

4.5 Test Facility

The test facility has a test site registered with the following organizations:

- **IC – Registration No.: 7760A-1**

  Waltek Services (Shenzhen) Co., Ltd. has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration 7760A-1, Oct. 15, 2015.

- **FCC Test Site 1#– Registration No.: 880581**

  Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory `has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 880581, April 29, 2014.

- **FCC Test Site 2#– Registration No.: 328995**

  Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory `has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 328995, December 3, 2014.

5 Equipment Used during Test

5.1 Equipments List

Conducted Emissions at Mains Terminals Disturbance Voltage(1#)						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1	EMI Test Receiver	R&S	ESCI	100947	Sep.12, 2016	Sep.11, 2017
2	LISN	R&S	ENV216	100115	Sep.12, 2016	Sep.11, 2017
3	Cable	Top	TYPE16(3.5M)	-	Sep.12, 2016	Sep.11, 2017
Conducted Emissions at Mains Terminals Disturbance Voltage(2#)						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1	EMI Test Receiver	R&S	ESCI	101155	Sep.12, 2016	Sep.11, 2017
2	LISN	SCHWARZBECK	NSLK 8128	8128-289	Sep.12, 2016	Sep.11, 2017
3	Limiter	York	MTS-IMP-136	261115-001-0024	Sep.12, 2016	Sep.11, 2017
4	Cable	**Laplace**	RF300	-	Sep.12, 2016	Sep.11, 2017
3m Semi-anechoic Chamber for Radiation(1#)						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1	Spectrum Analyzer	R&S	FSP	100091	Apr.29, 2016	Apr.28, 2017
2	Amplifier	Agilent	8447D	2944A10178	Jan.13, 2016	Jan.12, 2017
3	Active Loop Antenna	Beijing Dazhi	ZN30900A	0703	Oct.17, 2016	Oct.16, 2017
4	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	33 6	Apr.09, 2016	Apr.08, 2017
5	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	Sep.12, 2016	Sep.11, 2017
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	Apr.09, 2016	Apr.08, 2017
7	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	Apr.09, 2016	Apr.08, 2017
8	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	Apr.13, 2016	Apr.12, 2017
9	Coaxial Cable (above 1GHz)	Top	1GHz-18GHz	EW02014-7	Apr.13, 2016	Apr.12, 2017
3m Semi-anechoic Chamber for Radiation(2#)						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1	Test Receiver	R&S	ESCI	101296	Apr.13, 2016	Apr.12, 2017
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	Apr.09, 2016	Apr.08, 2017
3	Amplifier	ANRITSU	MH648A	M43381	Apr.13, 2016	Apr.12, 2017

4	Cable	HUBER+SUHNER	CBL2	525178	Apr.13, 2016	Apr.12, 2017

5.2 Description of Support Units

Equipment	Manufacturer	Model No.
AC Adapter	BCD China Electronics Manufacturing (Shenzhen) Ltd	LY04
Type C USB Line	BCD China Electronics Manufacturing (Shenzhen) Ltd	N/A
Resistive Load	Waltek Services (Shenzhen) Co., Ltd.	1R7J 50W
Resistive Load	Waltek Services (Shenzhen) Co., Ltd.	4R5J 50W
Resistive Load	Waltek Services (Shenzhen) Co., Ltd.	6R 50W
Resistive Load	Waltek Services (Shenzhen) Co., Ltd.	2R1 50W
Note: the Bluetooth (BLE) is only use to tracking your POWERPACK anywhere, no other function.		

5.3 Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	± 1 x 10^{-6}
RF Power	± 1.0 dB
RF Power Density	± 2.2 dB
Radiated Spurious Emissions test	± 5.03 dB (Bilog antenna 30M~1000MHz)
	± 4.74 dB (Horn antenna 1000M~25000MHz)
Conducted Spurious Emissions test	± 3.64 dB (AC mains 150KHz~30MHz)

5.4 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.

6 Test Summary

Test Items	Test Requirement	Result
Radiated Emissions	15.205(a) 15.209(a)	C
Conducted Emissions	15.207(a)	C
Bandwidth	15.247(a)(2)	C
Maximum Peak Output Power	15.247(b)(3),(4)	C
Power Spectral Density	15.247(e)	C
Band Edge	15.247(d)	C
Antenna Requirement	15.203	C
SAR	1.1307(b)(1)	C
Note: C=Compliance; NC=Not Compliance; NT=Not Tested; N/A=Not Applicable.		

7 Conducted Emission

Test Requirement:	FCC CFR 47 Part 15 Section 15.207
Test Method:	ANSI C63.10:2013;ANSI C63.4:2014
Test Result:	PASS
Frequency Range:	150kHz to 30MHz
Class/Severity:	Class B
Limit:	66-56 dBμV between 0.15MHz & 0.5MHz
	56 dBμV between 0.5MHz & 5MHz
	60 dBμV between 5MHz & 30MHz
Detector:	Peak for pre-scan (9kHz Resolution Bandwidth)

7.1 E.U.T. Operation

Operating Environment **:**

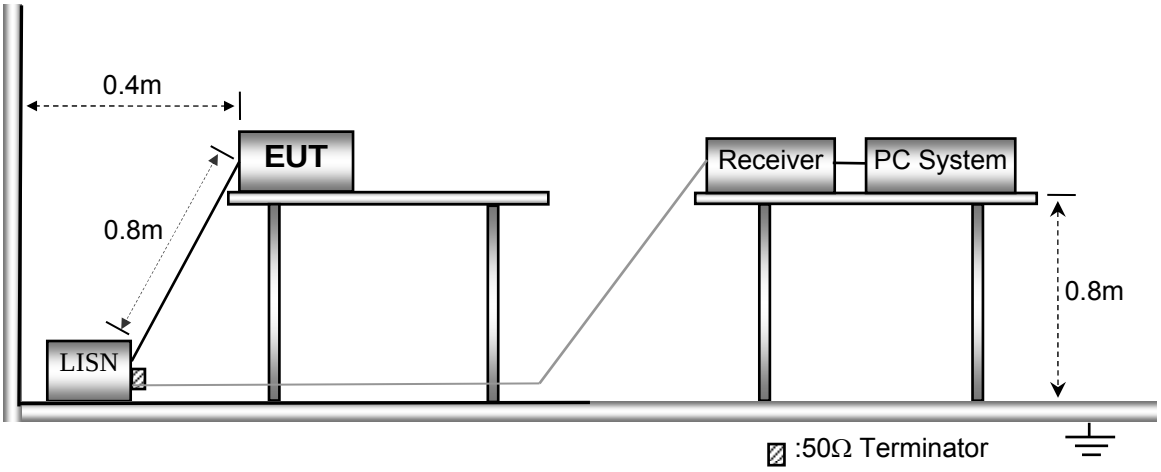
Temperature:	25.5 °C
Humidity:	51 % RH
Atmospheric Pressure:	101.2kPa

EUT Operation **:**

The test was performed in transmitting mode, the test data were shown in the report.

7.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.10:2013.

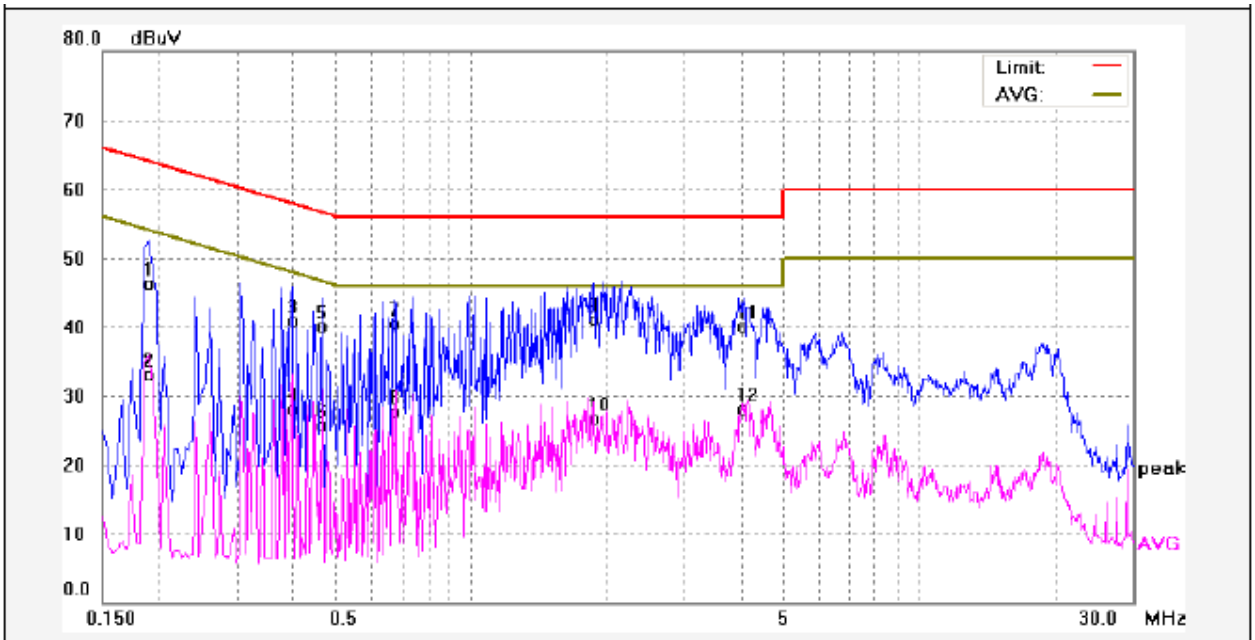


7.3 Measurement Description

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

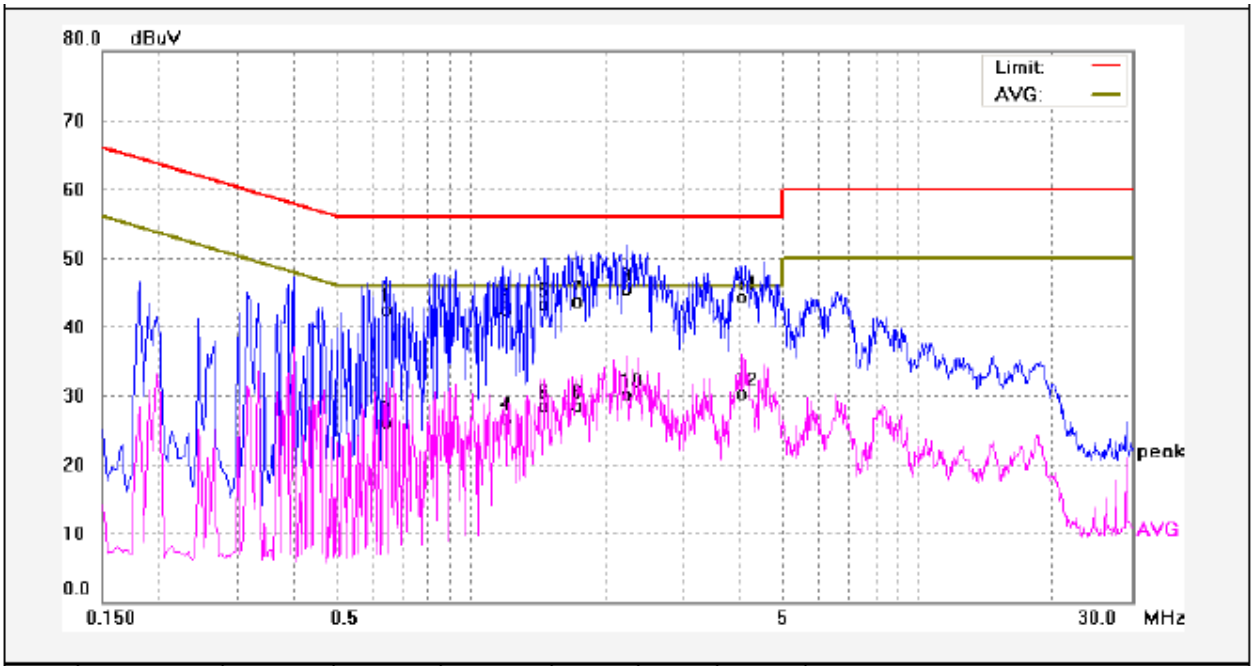
7.4 Conducted Emission Test Result

Live line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1900	36.57	9.75	46.32	64.03	-17.71	QP	
2	0.1900	23.33	9.75	33.08	54.03	-20.95	AVG	
3	0.3980	31.16	9.75	40.91	57.89	-16.98	QP	
4	0.3980	18.37	9.75	28.12	47.89	-19.77	AVG	
5	0.4660	30.32	9.76	40.08	56.58	-16.50	QP	
6	0.4660	15.99	9.76	25.75	46.58	-20.83	AVG	
7	0.6740	30.71	9.77	40.48	56.00	-15.52	QP	
8	0.6740	18.00	9.77	27.77	46.00	-18.23	AVG	
9	1.8740	31.23	9.87	41.10	56.00	-14.90	QP	
10	1.8740	16.79	9.87	26.66	46.00	-19.34	AVG	
11	4.0500	30.12	9.91	40.03	56.00	-15.97	QP	
12	4.0500	18.14	9.91	28.05	46.00	-17.95	AVG	

Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.6460	32.78	9.76	42.54	56.00	-13.46	QP	
2	0.6460	16.25	9.76	26.01	46.00	-19.99	AVG	
3	1.1820	32.77	9.82	42.59	56.00	-13.41	QP	
4	1.1820	16.84	9.82	26.66	46.00	-19.34	AVG	
5	1.4580	33.52	9.83	43.35	56.00	-12.65	QP	
6	1.4580	18.62	9.83	28.45	46.00	-17.55	AVG	
7	1.7300	33.92	9.86	43.78	56.00	-12.22	QP	
8	1.7300	18.65	9.86	28.51	46.00	-17.49	AVG	
9	2.2260	35.57	9.90	45.47	56.00	-10.53	QP	
10	2.2260	20.16	9.90	30.06	46.00	-15.94	AVG	
11	3.9660	34.41	9.91	44.32	56.00	-11.68	QP	
12	3.9660	20.35	9.91	30.26	46.00	-15.74	AVG	

8 Radiated Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.209 & 15.247

Test Method: ANSI C63.10:2013;ANSI C63.4:2014

Test Result: PASS

Measurement Distance: 3m

Limit:

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	$20\log^{(2400/F(kHz))} + 80$
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	$20\log^{(24000/F(kHz))} + 40$
1.705 ~ 30	30	30	100 * 30	$20\log^{(30)} + 40$
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

8.1 EUT Operation

Operating Environment:

Temperature: 25.5 °C

Humidity: 51 % RH

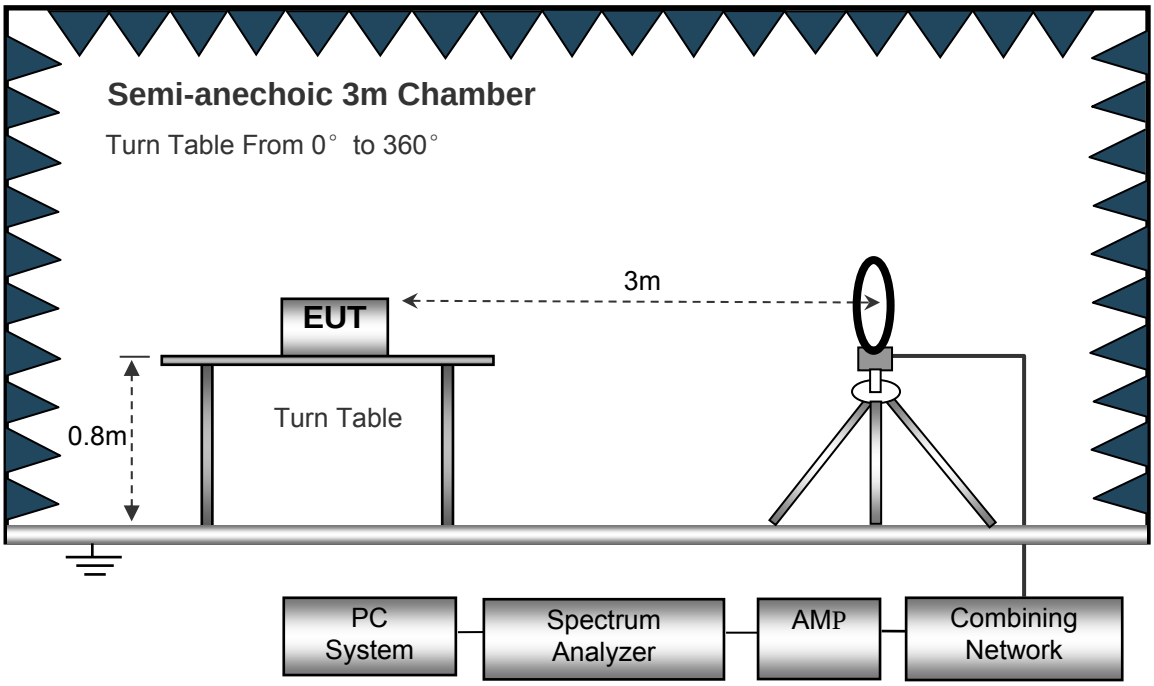
Atmospheric Pressure: 1016 mbar

EUT Operation:

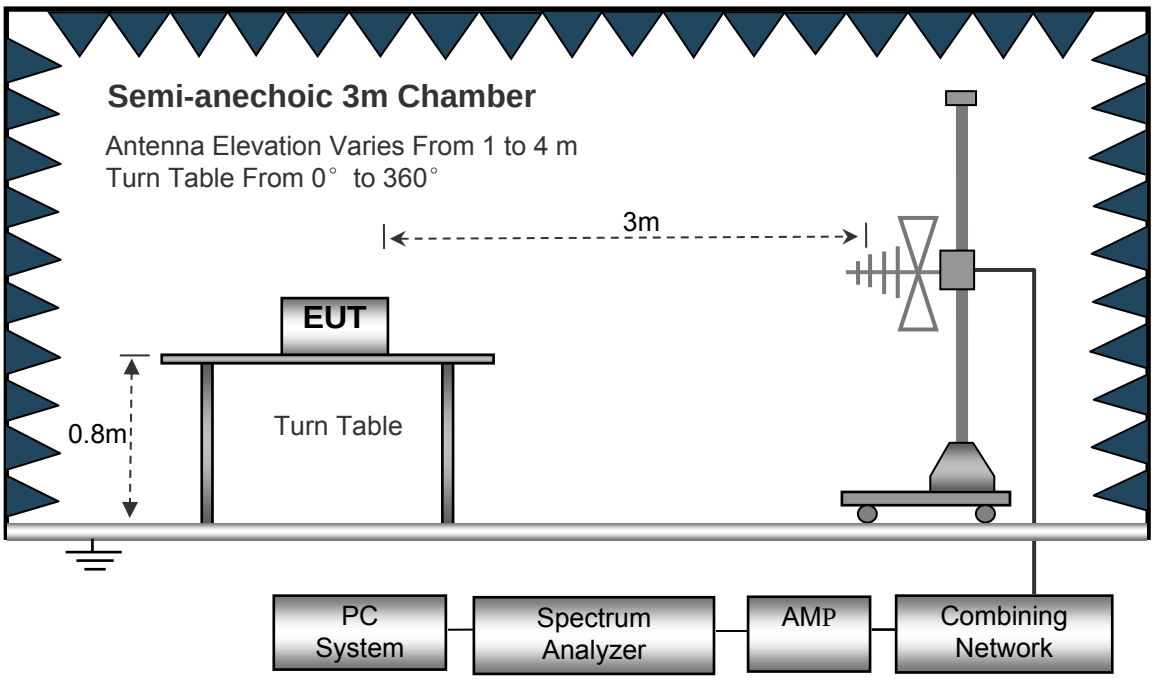
The test was performed in transmitting mode, the test data were shown in the report.

8.2 Test Setup

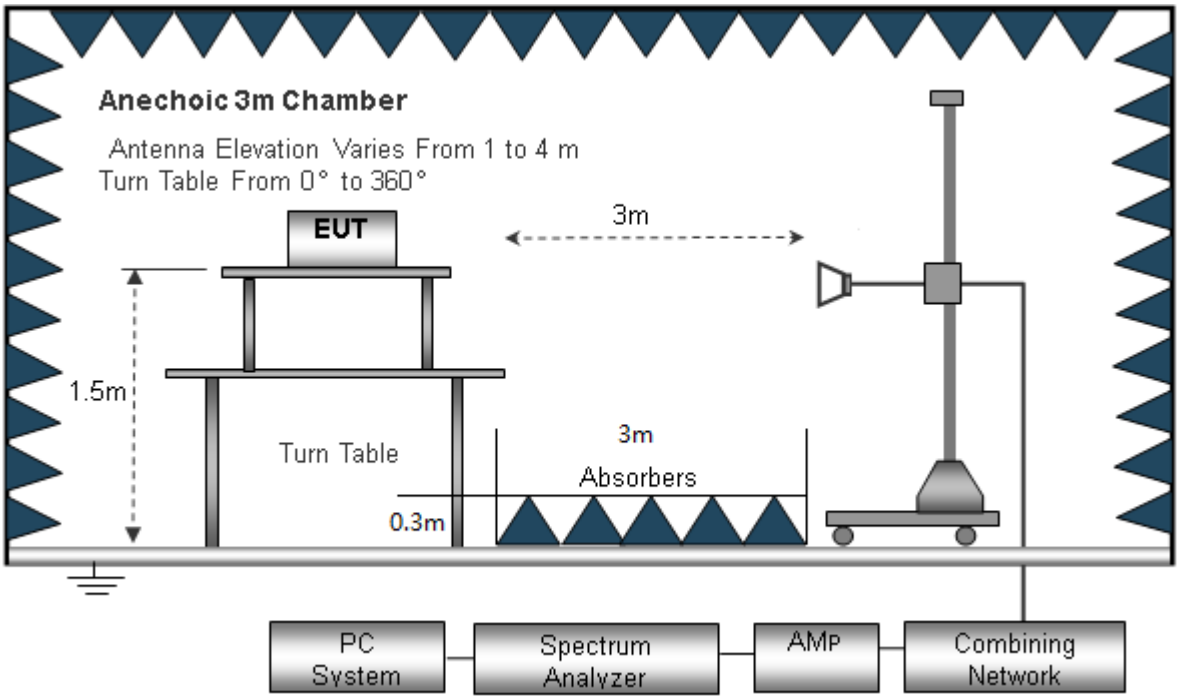
The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.10:2013.
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.

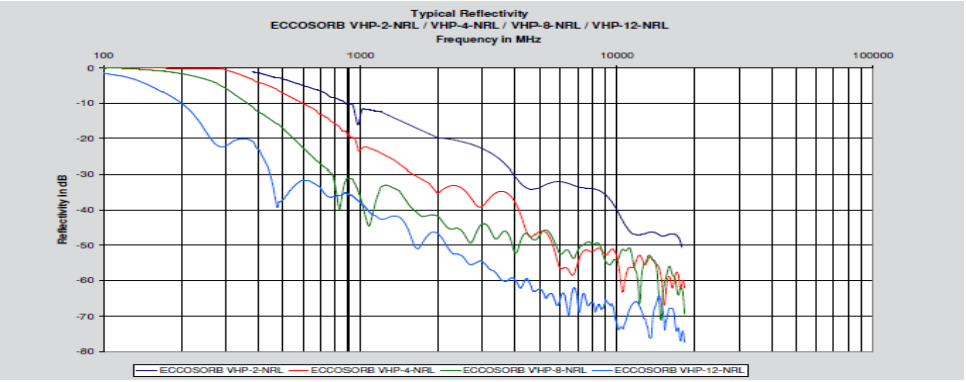


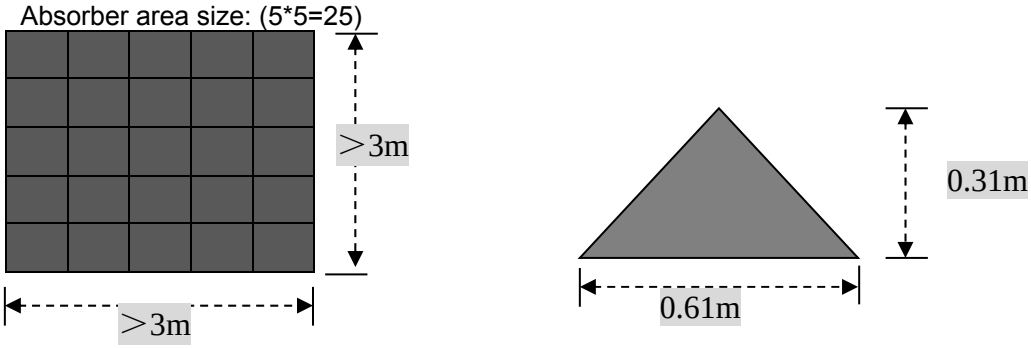
Description of the absorber: (Meet the requirements of ANSI C63.4:2014 Section 5.5.1(a) 2: Alternative site validation without SVSWR measurements)

Name: Absorber
Manufacturer: ECCOSORB
Model number: VHP-12
Size: 61cm (L)*61cm (W)*31cm (H)

Electromagnetic properties

	120 MHz	200 MHz	300 MHz	500 MHz	1 GHz	3 GHz	5 GHz	10 GHz	15 GHz	24 GHz
ECCOSORB VHP-2							-30	-40	-45	-50
ECCOSORB VHP-4						-30	-40	-45	-50	-50
ECCOSORB VHP-8					-30	-40	-50	-50	-50	-50
ECCOSORB VHP-12				-25	-35	-40	-50	-50	-50	-50
ECCOSORB VHP-18				-30	-40	-45	-50	-50	-50	-50
ECCOSORB VHP-26			-25	-35	-40	-50	-50	-50	-50	-50
ECCOSORB VHP-36		-20	-30	-35	-45	-50	-50	-50	-50	-50
ECCOSORB VHP-45	-20	-25	-35	-40	-45	-50	-50	-50	-50	-50





8.3 Spectrum Analyzer Setup

Below 30MHz

Sweep Speed	Auto
IF Bandwidth	10 kHz
Video Bandwidth	10 kHz
Resolution Bandwidth	10 kHz

30MHz ~ 1GHz

Sweep Speed	Auto
Detector	PK
Resolution Bandwidth	100 kHz
Video Bandwidth	300 kHz

Above 1GHz

Sweep Speed	Auto
Detector	PK
Resolution Bandwidth	1MHz
Video Bandwidth	3MHz
Detector	Ave.
Resolution Bandwidth	1MHz
Video Bandwidth	10Hz

8.4 Test Procedure

1. The EUT is placed on a turntable, which is above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The radiation measurements are performed in X, Y and Z axis positioning(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), the worst condition was tested putting the eut in X axis, so the worst data were shown as follow.
8. New battery was used during test.

8.5 Summary of Test Results

Test Frequency: 32.768 kHz~30MHz

The measurements were more than 20 dB below the limit and not reported.

Test Frequency: 30MHz ~ 18GHz

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
GFSK Low Channel									
268.28	36.56	QP	318	1.9	H	-13.35	23.21	46.00	-22.79
268.28	40.28	QP	221	1.9	V	-13.35	26.93	46.00	-19.07
4804.00	45.87	PK	193	2.0	V	-1.06	44.81	74.00	-29.19
4804.00	42.78	Ave	193	2.0	V	-1.06	41.72	54.00	-12.28
7206.00	40.55	PK	325	1.1	H	1.33	41.88	74.00	-32.12
7206.00	36.12	Ave	325	1.1	H	1.33	37.45	54.00	-16.55
2319.06	45.89	PK	140	1.2	V	-13.19	32.70	74.00	-41.30
2319.06	39.72	Ave	140	1.2	V	-13.19	26.53	54.00	-27.47
2389.29	42.70	PK	50	1.5	H	-13.14	29.56	74.00	-44.44
2389.29	37.98	Ave	50	1.5	H	-13.14	24.84	54.00	-29.16
2498.39	43.78	PK	280	1.6	V	-13.08	30.70	74.00	-43.30
2498.39	38.08	Ave	280	1.6	V	-13.08	25.00	54.00	-29.00

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
GFSK Middle Channel									
268.28	35.50	QP	329	1.4	H	-13.35	22.15	46.00	-23.85
268.28	39.49	QP	231	1.8	V	-13.35	26.14	46.00	-19.86
4882.00	46.83	PK	154	1.4	V	-0.62	46.21	74.00	-27.79
4882.00	42.37	Ave	154	1.4	V	-0.62	41.75	54.00	-12.25
7323.00	40.85	PK	202	1.2	H	2.21	43.06	74.00	-30.94
7323.00	37.44	Ave	202	1.2	H	2.21	39.65	54.00	-14.35
2348.47	46.44	PK	41	1.1	V	-13.19	33.25	74.00	-40.75
2348.47	39.64	Ave	41	1.1	V	-13.19	26.45	54.00	-27.55
2383.24	42.79	PK	191	1.5	H	-13.14	29.65	74.00	-44.35
2383.24	37.06	Ave	191	1.5	H	-13.14	23.92	54.00	-30.08
2483.54	44.32	PK	189	1.1	V	-13.08	31.24	74.00	-42.76
2483.54	38.73	Ave	189	1.1	V	-13.08	25.65	54.00	-28.35

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
GFSK High Channel									
268.28	34.57	QP	155	1.9	H	-13.35	21.22	46.00	-24.78
268.28	38.50	QP	104	1.7	V	-13.35	25.15	46.00	-20.85
4960.00	47.42	PK	171	1.8	V	-0.24	47.18	74.00	-26.82
4960.00	42.58	Ave	171	1.8	V	-0.24	42.34	54.00	-11.66
7440.00	42.12	PK	44	1.1	H	2.84	44.96	74.00	-29.04
7440.00	37.31	Ave	44	1.1	H	2.84	40.15	54.00	-13.85
2314.40	45.08	PK	126	1.6	V	-13.19	31.89	74.00	-42.11
2314.40	37.23	Ave	126	1.6	V	-13.19	24.04	54.00	-29.96
2361.44	44.04	PK	52	1.5	H	-13.14	30.90	74.00	-43.10
2361.44	38.73	Ave	52	1.5	H	-13.14	25.59	54.00	-28.41
2494.96	43.43	PK	350	1.6	V	-13.08	30.35	74.00	-43.65
2494.96	38.17	Ave	350	1.6	V	-13.08	25.09	54.00	-28.91

Test Frequency: 18GHz~25GHz

The measurements were more than 20 dB below the limit and not reported

9 Band Edge Measurement

Test Requirement:	Section 15.247(d) In addition, radiated emissions which fall in the restricted bands. As defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) and 15.205(c).
Test Method:	KDB558074 D01 DTS Meas Guidance v03r05
Test Mode:	Transmitting

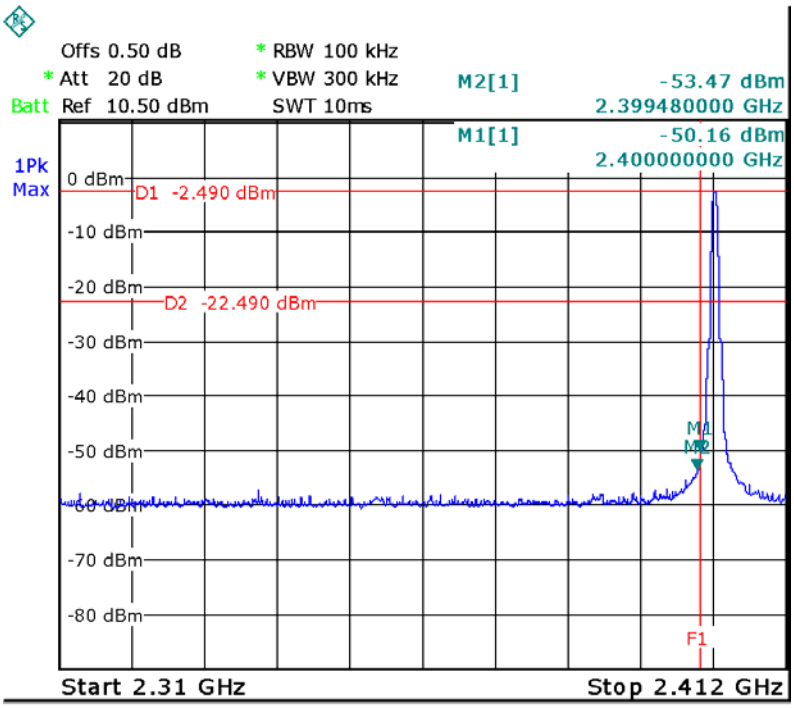
9.1 Test Produce

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set the spectrum analyser: RBW = 100 kHz, VBW = 300 kHz, Sweep = auto

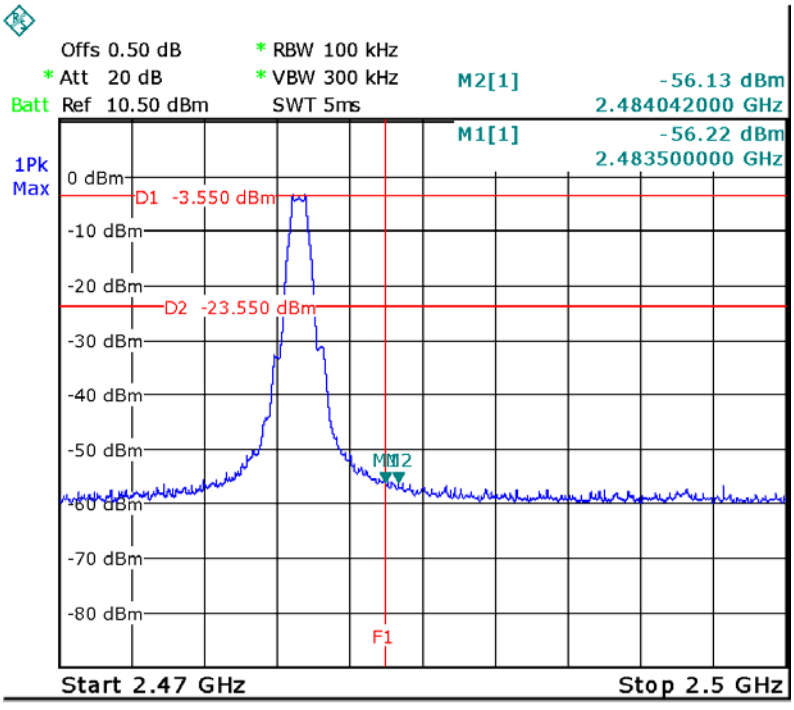
   Detector function = peak, Trace = max hold
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

9.2 Test Result

Band edge-left side



Band edge-right side



10 Bandwidth Measurement

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB558074 D01 DTS Meas Guidance v03r05

10.1 Test Procedure

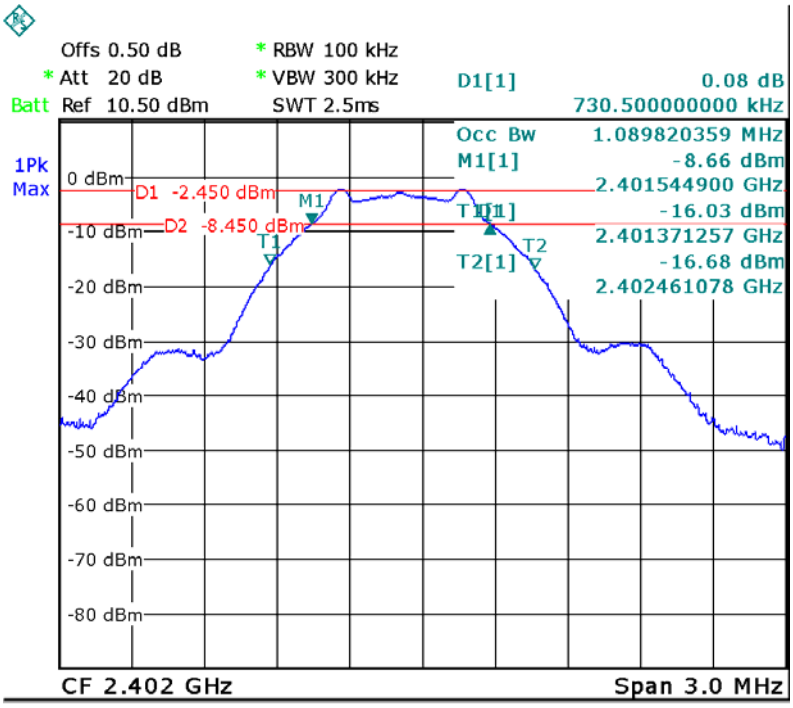
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyser: RBW = 100 kHz, VBW = 300 kHz

10.2 Test Result

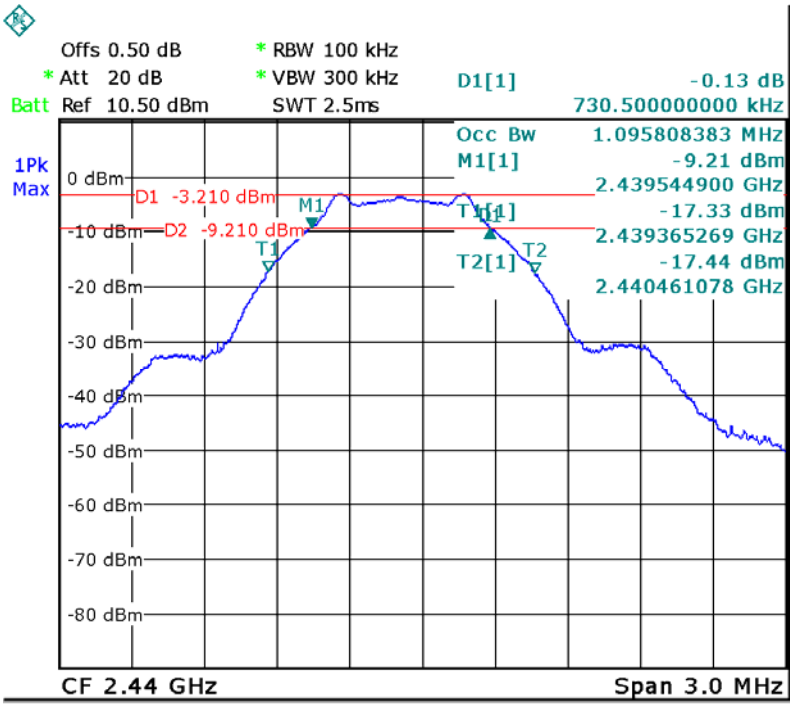
Operation mode	6dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low channel	0.731	1.090
Middle channel	0.731	1.096
High channel	0.731	1.096

Test result plot as follows:

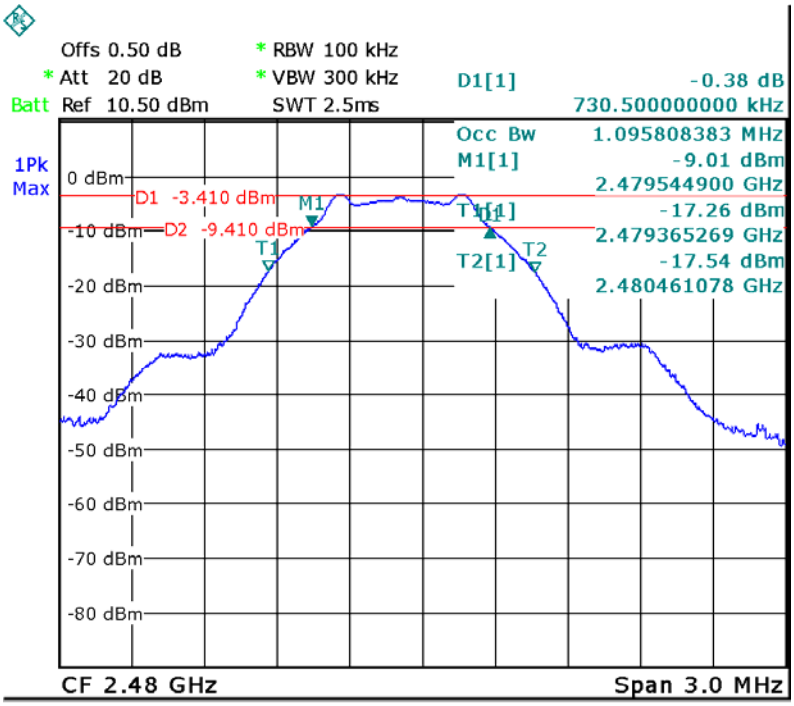
Mode: Low channel



Mode: Middle channel



Mode: High channel



11 Maximum Peak Output Power

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB558074 D01 DTS Meas Guidance v03r05

11.1 Test Procedure

KDB558074 D01 DTS Meas Guidance v03r05 section 8.1.2 Option 2

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

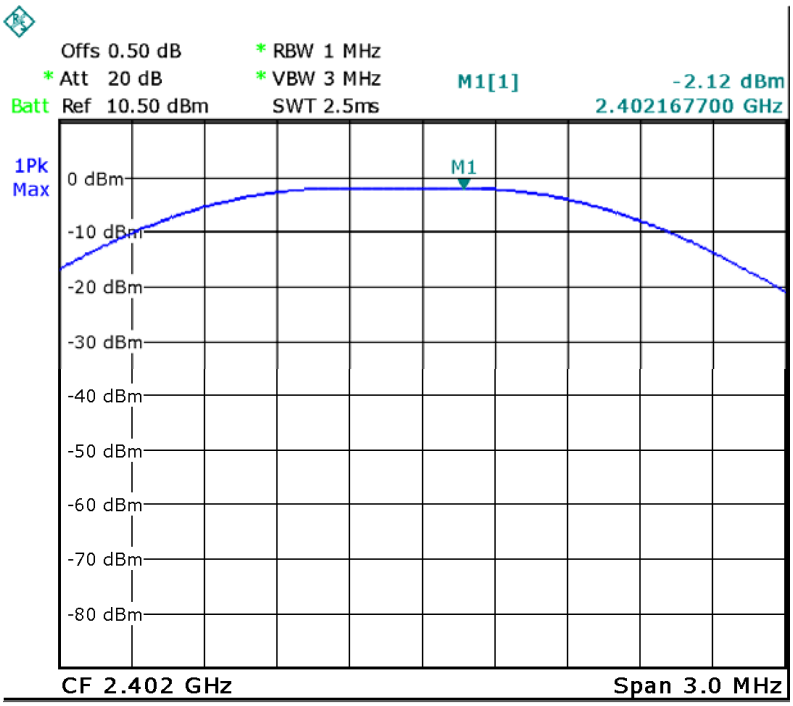
2. Set the spectrum analyzer: RBW = 1MHz. VBW = 3MHz. Sweep = auto; Detector Function = Peak, Set the span to fully encompass the DTS bandwidth.

3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

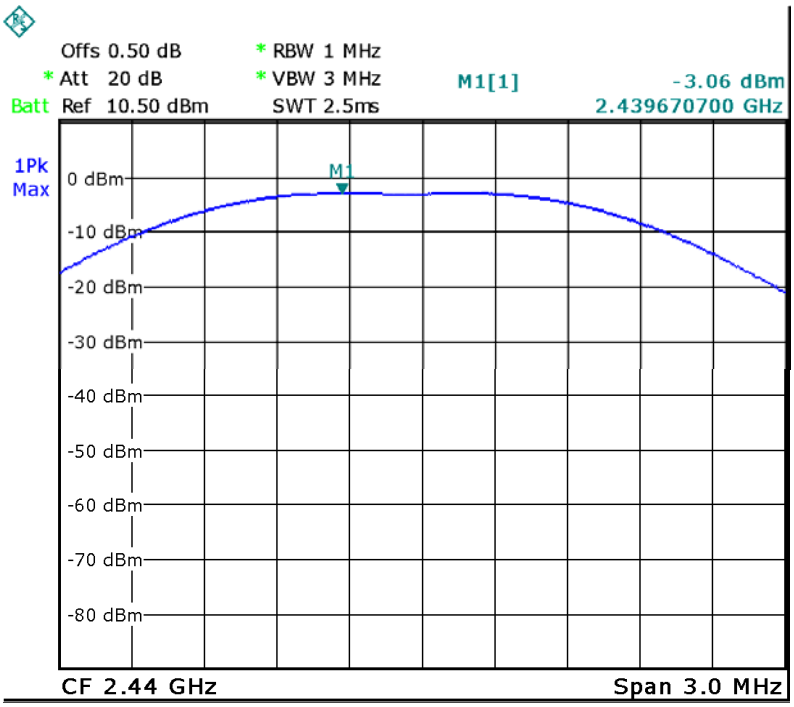
11.2 Test Result

Maximum Peak Output Power (dBm)		
Low channel	Middle channel	High channel
-2.12	-3.06	-3.25
Limit: 1W/30dBm		

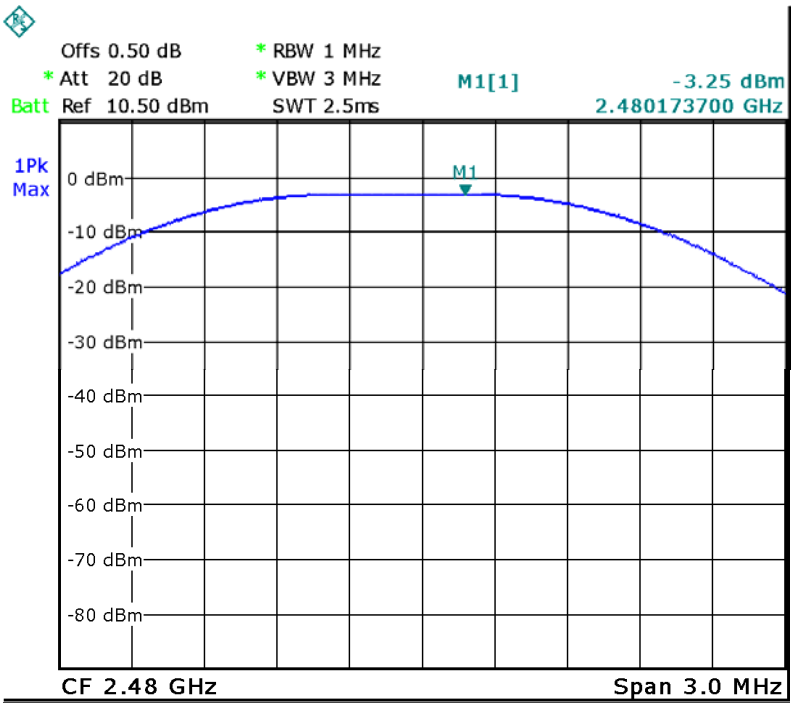
Test mode: Low channel



Test mode: Middle channel



Test mode: High channel



12 Power Spectral density

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB558074 D01 DTS Meas Guidance v03r05

12.1 Test Procedure

KDB558074 D01 DTS Meas Guidance v03r05 section 9.1 Option 1

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port To the spectrum.

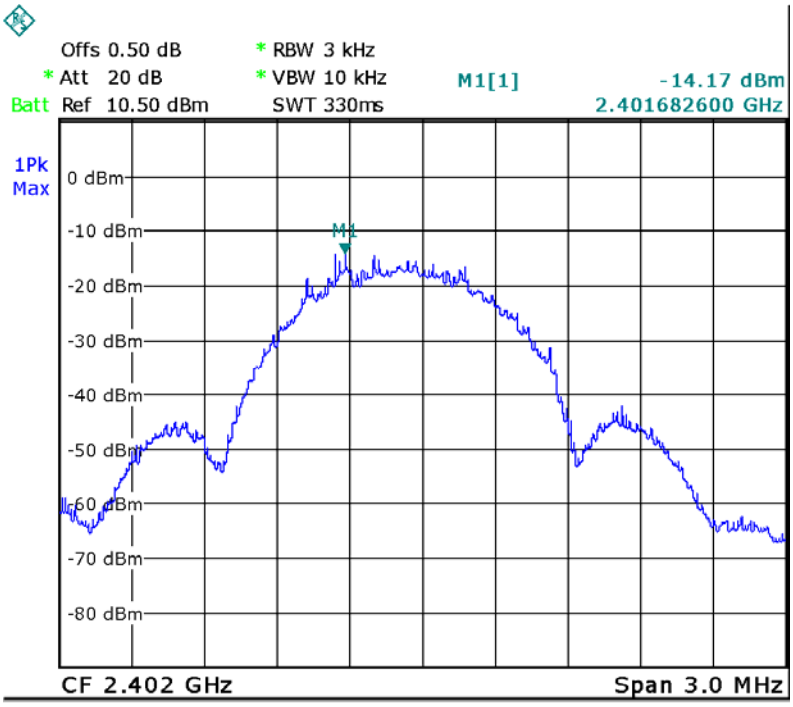
2. Set the spectrum analyzer: RBW = 3 kHz. VBW = 10 kHz, Span = 1.5 times the DTS channel bandwidth. Sweep = auto; Detector Function = Peak. Trace = Max hold.

3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section Submit this plot.

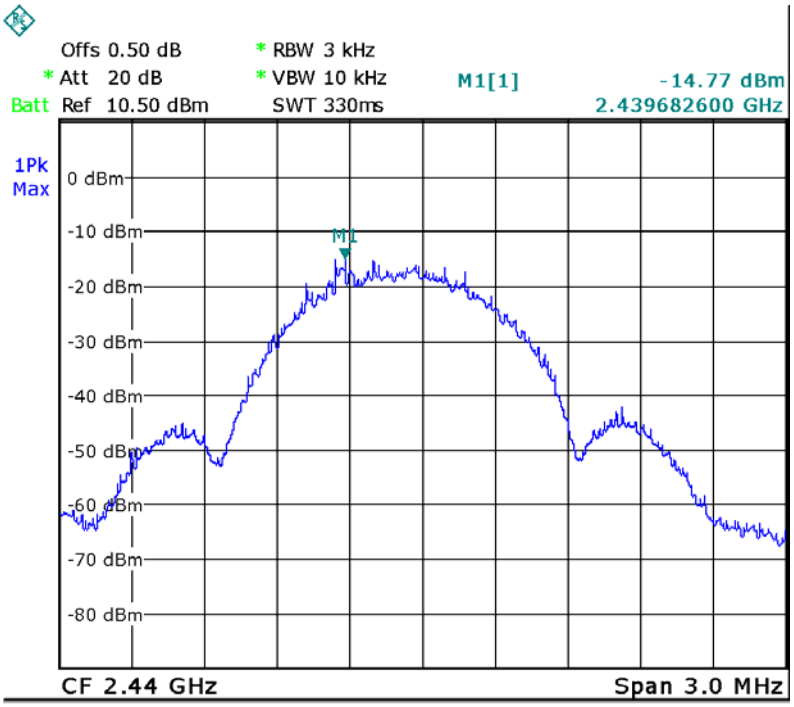
12.2 Test Result

Power Spectral Density		
Low channel	Middle channel	High channel
-14.17	-14.77	-14.41
Limit: 8dBm per 3kHz		

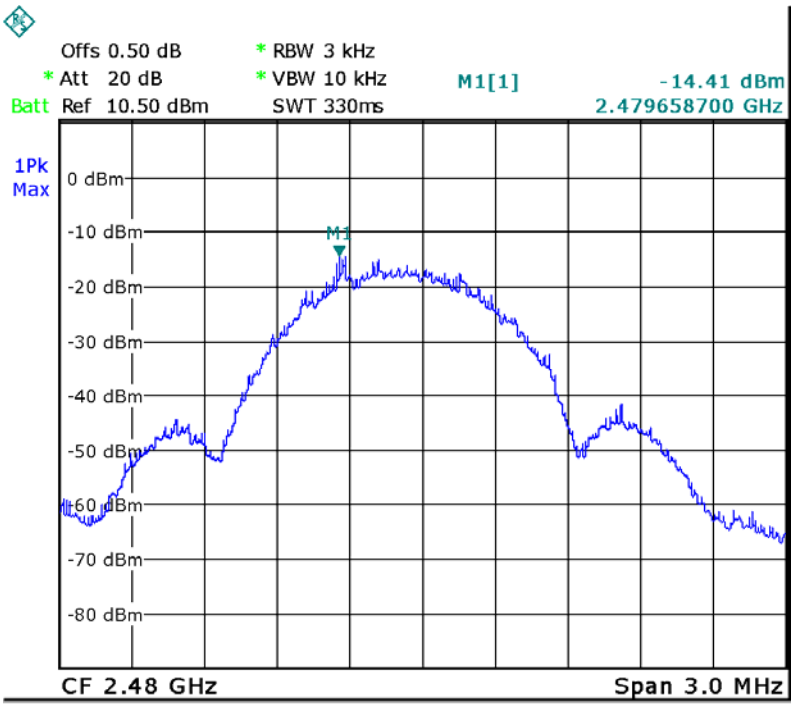
Test mode: Low channel



Test mode: Middle channel



Test mode: High channel



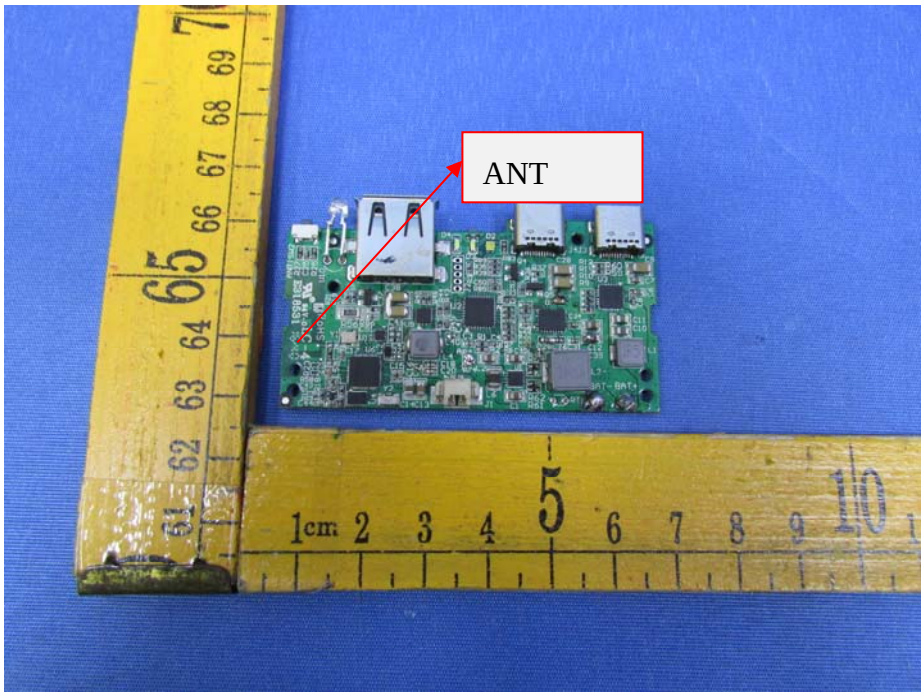
13 Antenna Requirement

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 replaced 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 §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 §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.

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.

Result:

The EUT has one PCB printed antenna, the gain is 0dBi. Meets the requirements of FCC 15.203.



14 RF Exposure

Test Requirement: FCC Part 1.1307

Evaluation Method: FCC Part2.1093 & KDB 447498 D01 General RF Exposure Guidance v06

14.1 Requirements

1) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤50 mm are determined by:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] • [√f(GHz)] ≤3.0 for 1-g SAR and ≤7.5 for 10-g extremity SAR where

1. f(GHz) is the RF channel transmit frequency in GHz
2. Power and distance are rounded to the nearest mW and mm before calculation
3. The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is ≤50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

14.2 The procedures / limit

Conducted Peak power(dBm)	Conducted Peak power(mW)	Source-based time-averaged maximum conducted output power(mW)	Minimum test separation distance required for the exposure conditions (mm)	SAR Test Exclusion Thresholds(mW)	Result
-2.12	0.614	0.614	5	10	Compliance

Remark: Max. duty factor is 100%

Calculation formula: Source-based time-averaged maximum conducted output power (mW) =Conducted peak power (mW)*Duty factor

For frequency in 2.402GHz: SAR Test Exlusion Thresholds≤3.0 / [√f(GHz)] *(min. test separation distance, mm)=3.0/(√2.402) *5=9.679 mW≈10mW

For frequency in 2.480GHz: SAR Test Exlusion Thresholds≤3.0 / [√f(GHz)] *(min. test separation distance, mm)=3.0/(√2.480) *5=9.525 mW≈10mW

5.2 **Result:** Compliance

No SAR measurement is required.

15 Photographs –Model powerpack-tile Test Setup

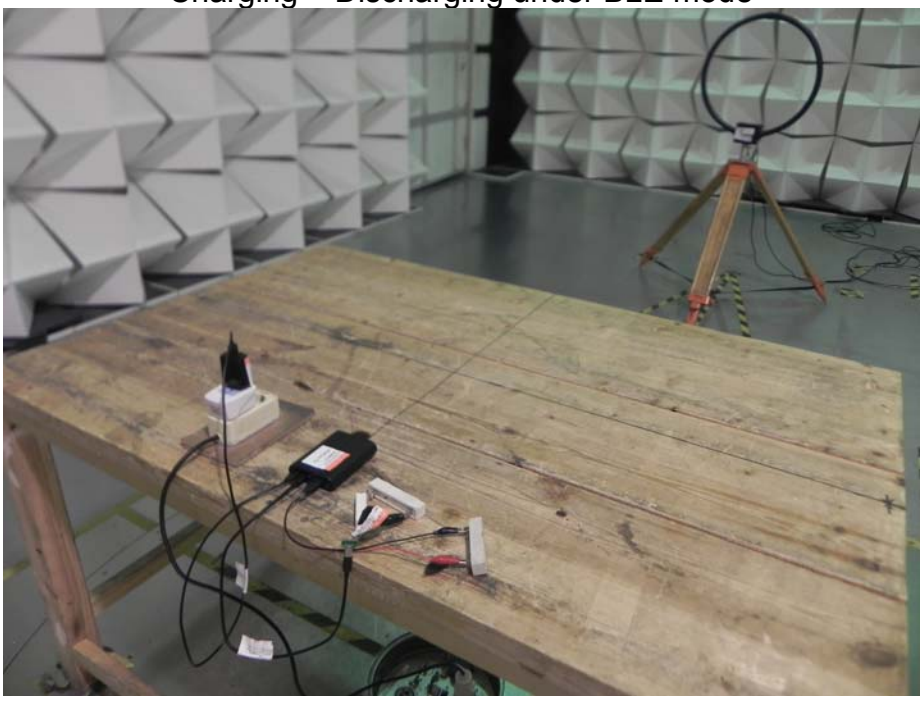
15.1 Photograph – Conducted Emission Test Setup at Test Site 1#

Charging + Discharging under BLE mode

15.2 Photograph - Radiated Emission

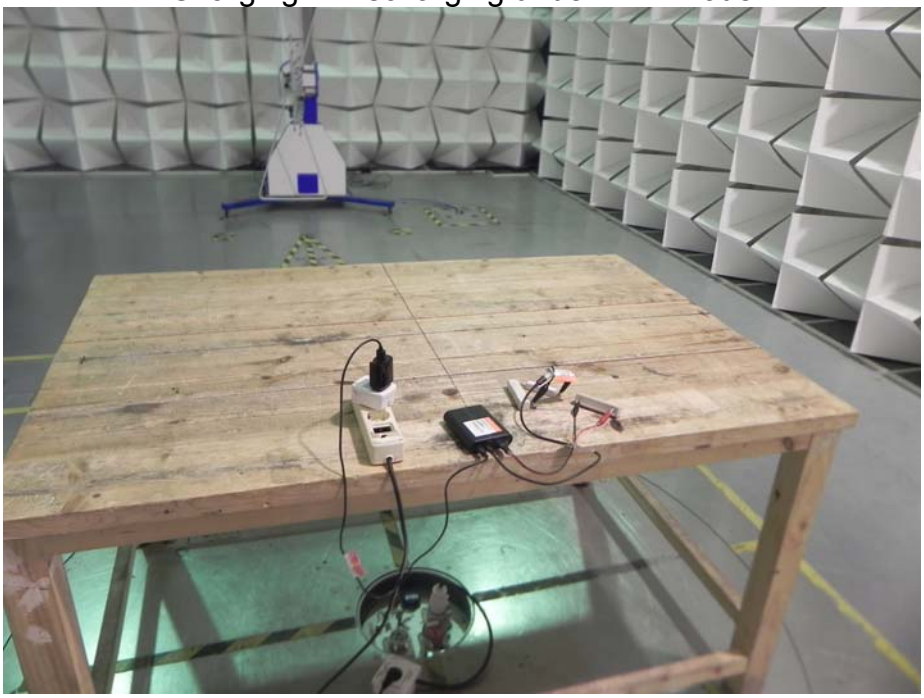
Test frequency 32.768 KHz to 30MHz Test Site 2#

Charging + Discharging under BLE mode

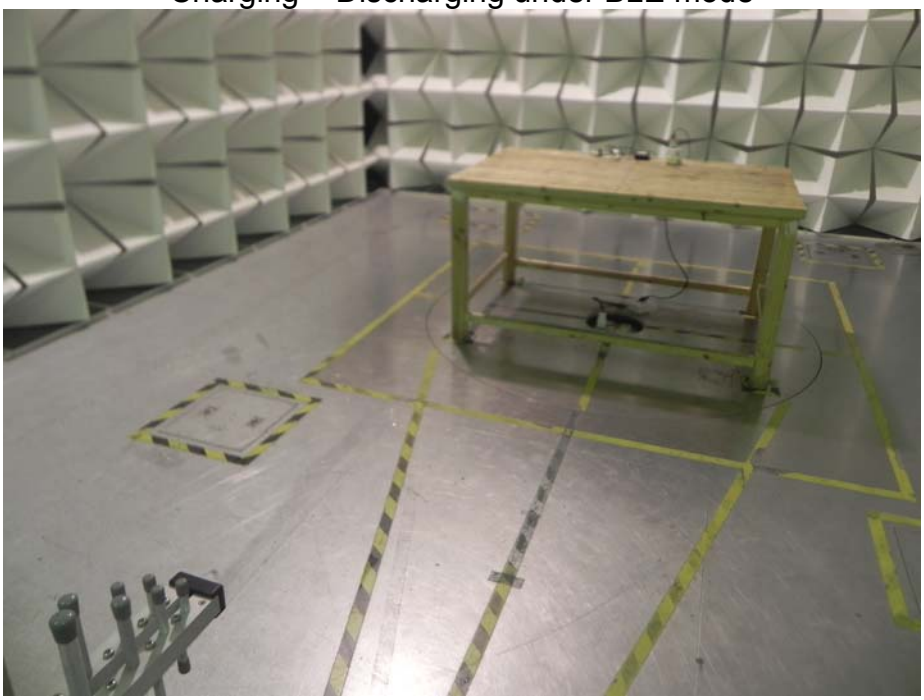


Test frequency from 30MHz to 1GHz Test Site 2#

Charging + Discharging under BLE mode

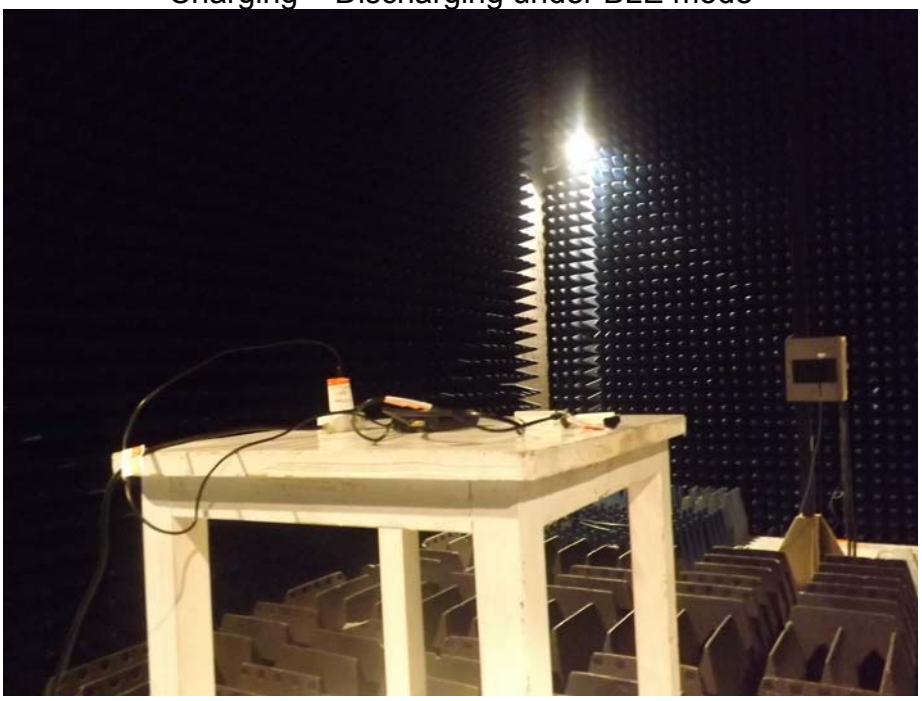


Charging + Discharging under BLE mode

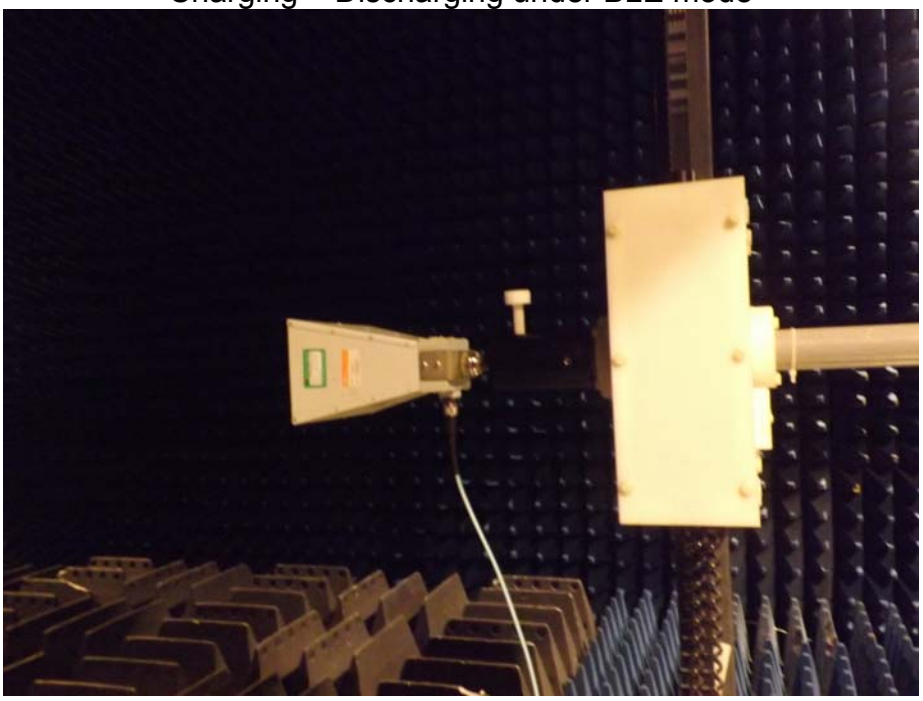


Test frequency above 1GHz Test Site 1#

Charging + Discharging under BLE mode



Charging + Discharging under BLE mode



Charging + Discharging under BLE mode

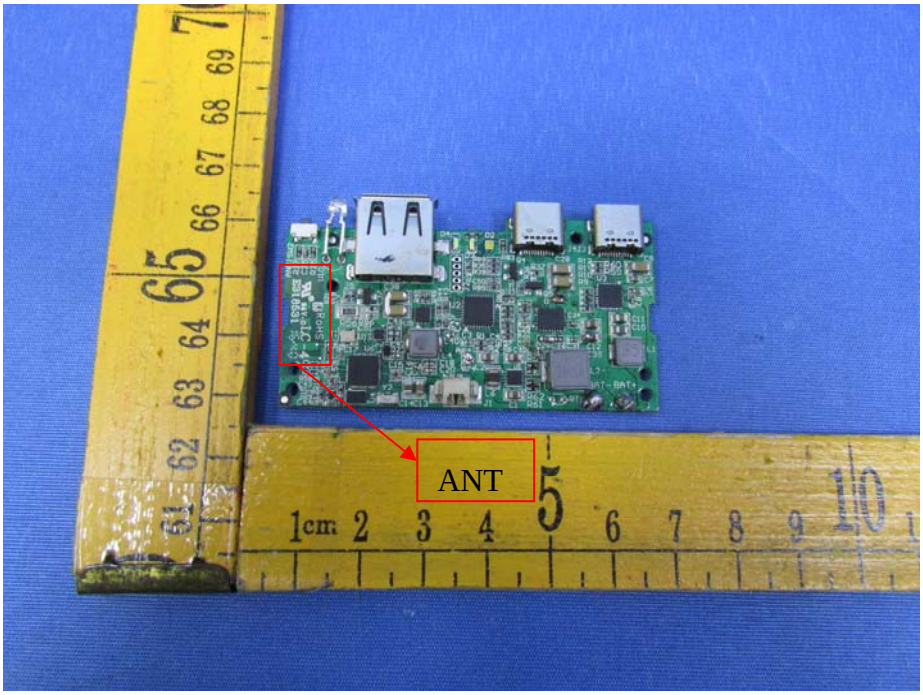
16 Photographs - Constructional Details

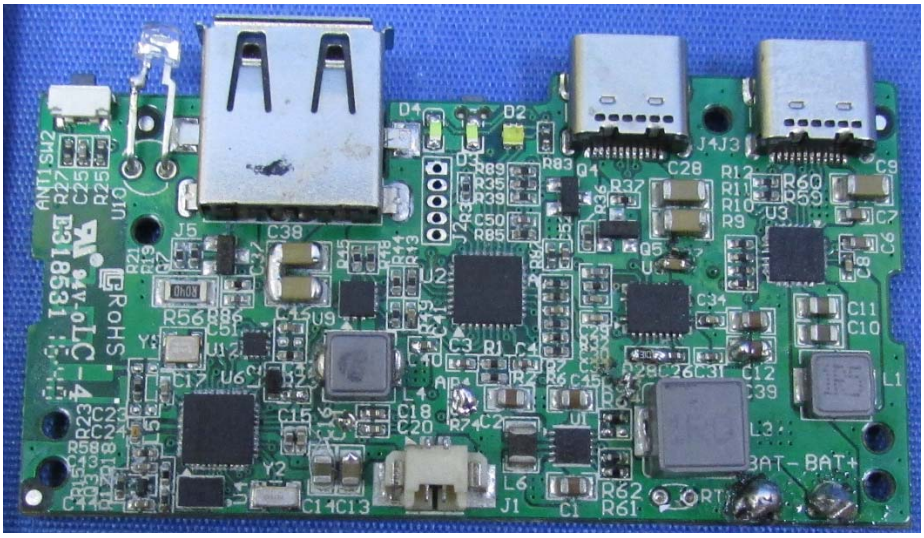
16.1 Model powerpack-tile - External Photos

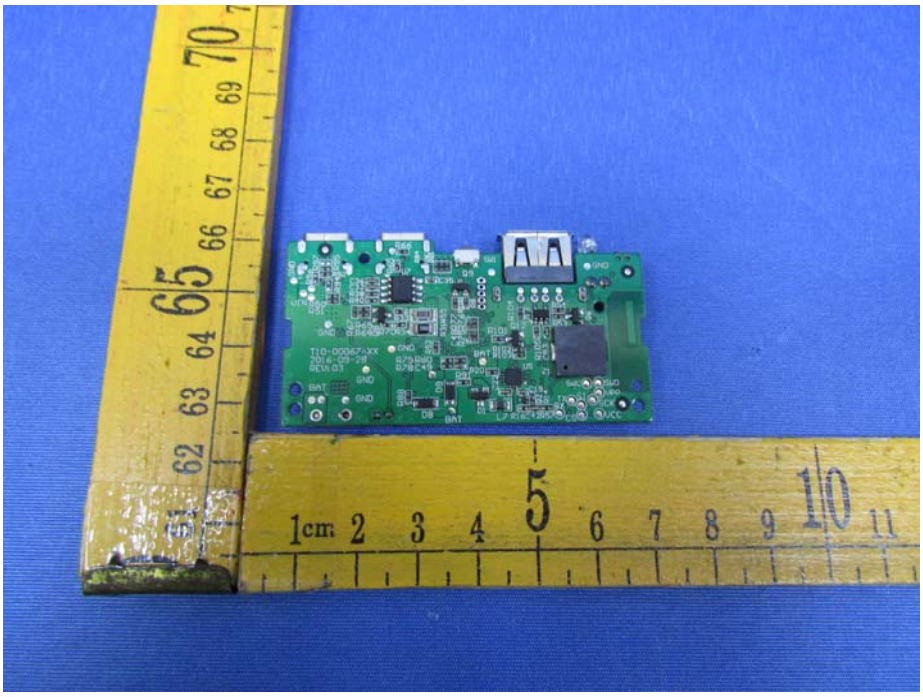

NOMAD
tile

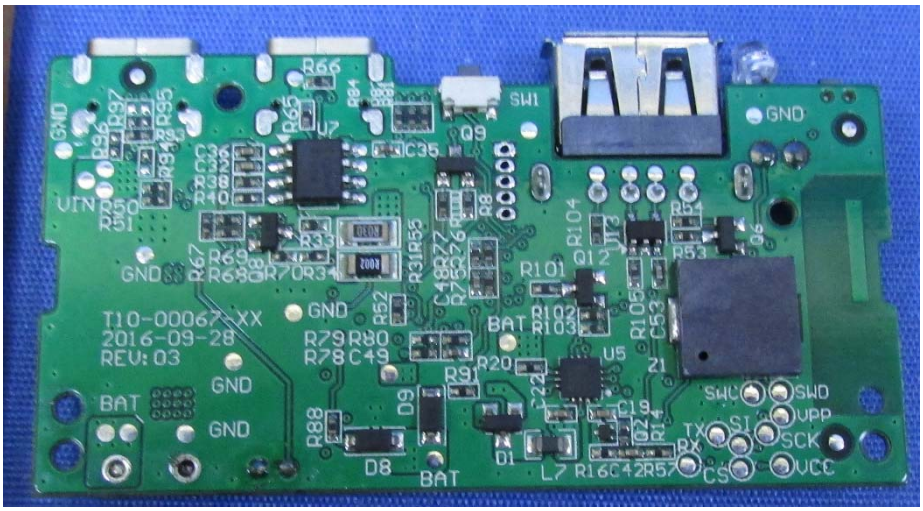

POWERPACK
tile TRACKABLE BATTERY

16.2 Model powerpack-tile - Internal Photos




BAT-
BAT+


1cm 2 3 4 5 6 7 8 9 10 11
62 63 64 65 66 67 68 69 70



======End of Report======