

ETSI EN 300 328 RADIO TEST REPORT

for

Fortive (Shanghai) Industrial Instrumentation Technologies R&D., LTD

Battery Analyzer

Model No.: BT521

Prepared For: Fortive (Shanghai) Industrial Instrumentation Technologies
R&D., LTD

Room 101, Building 9, 518 North Fuquan Road, Changning
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Date of Test : 2021.12.11-13
Date of Report: 2021.12.28

The statement is based on a single evaluation of one sample of the above-mentioned products. It does not imply an assessment of the whole production and does not permit the use of the test lab logo.
The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

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TEST REPORT

Applicant : Fortive (Shanghai) Industrial Instrumentation Technologies R&D., LTD
 EUT Description : Battery Analyzer
 (A) Model No. : BT521
 (B) Power Supply : DC 7.4V
 (C) Test Voltage : DC 7.4V

Measurement Standards Used:

ETSI EN 300 328 V.2.2.2 (2019-07)

The device described above is tested by Audix Technology (Shanghai) Co., Ltd. The measurement results were contained in this test report and Audix Technology (Shanghai) Co., Ltd. was assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliance with the ETSI EN 300 328 requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Audix Technology (Shanghai) Co., Ltd.

The test results for EUT's BLE function are contained in No.ACI-E21122 report.

Date of Test : 2021.12.11-13 Date of Report : 2021.12.28

Producer : Huimin Yan
 HUIMIN YAN / Assistant

Reviewer : Byron Wu
 BYRON WU / Deputy Assistant Manager

 For and on behalf of
 Audix Technology (Shanghai) Co., Ltd.

Signatory : Byron Kwo
 Authorized Signature(s) BYRON KWO/Assistant General Manager

1. SUMMARY OF MEASUREMENTS AND RESULTS

1.1. Standard Description

ETSI EN 300 328 V2.2.2 (2019-07): Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband transmission systems; Data transmission equipment operating in the 2.4 GHz ISM band and using wideband modulation techniques.

1.2. Test Result

CLAUSE (ETSI 300 328 V2.2.2)		Description	Results
	4.3.2.2	RF Output Power	PASS
	4.3.2.3	Power Spectral Density	PASS
※△	4.3.2.4	Duty Cycle, Tx-sequence, Tx-gap	N/A
※△	4.3.2.5	Medium Utilization (MU) Factor	N/A
※☆	4.3.2.6	Adaptivity (adaptive equipment using modulations other than FHSS)	N/A
	4.3.2.7	Occupied Channel Bandwidth	PASS
	4.3.2.8	Transmitter Unwanted Emissions in the Out-of-Band Domain	PASS
	4.3.2.9	Transmitter Unwanted Emissions in the Spurious Domain	PASS
	4.3.2.10	Receiver Spurious Emissions	PASS
	4.3.2.11	Receiver Blocking	PASS
	4.3.2.12	Geo-Location Capability	N/A
N/A is an abbreviation for Not Applicable Remark: ※ : E.I.R.P. less than 10dBm is not applicable ; △ : Non-adaptive device only ; ☆ : Adaptive device only.			

2. GENERAL INFORMATION

2.1. Description of EUT

Description	: Battery Analyzer
Model Number	: BT521
Radio Tech	: BLE v4.0 Zigbee
Channel Freq.	: BLE: 2402MHz – 2480MHz; Zigbee: 2405MHz – 2480MHz.
Modulation	: BLE: GFSK; Zigbee: OQPSK.
Antenna Info.	: TX Type: 1T1X Antenna Type: PCB Antenna Antenna Gain: 3.0 dBi
Applicant	: Fortive (Shanghai) Industrial Instrumentation Technologies R&D., LTD Room 101, Building 9, 518 North Fuquan Road, Changning District, Shanghai, China
Manufacturer	: Same as Applicant.
Factory	: Anhui Shifu Instrument Co., Ltd No.66, Longteng Road, Wuhu, Anhui, P.R.China

2.2.EUT Specifications Assessed in Current Report

Mode	Modulation	Data Rate(kbps)
Zigbee	OQPSK	250

Channel List			
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
11	2405	19	2445
12	2410	20	2450
13	2415	21	2455
14	2420	22	2460
15	2425	23	2465
16	2430	24	2470
17	2435	25	2475
18	2440	26	2480

2.3.Test Information

The test software “SmartRF Studio 7” was used to control EUT work in TX mode, and select test channel.

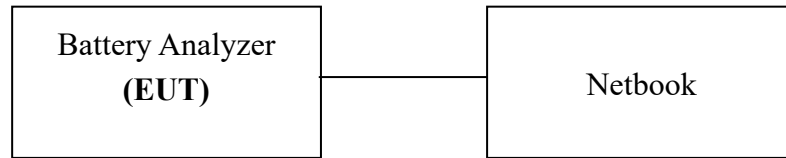
Modulation	data rate (kbps)	Test Channel		Frequency (MHz)
Zigbee	250	Low:	11	2405
		Middle:	18	2440
		High:	26	2480

2.4.Supported equipment

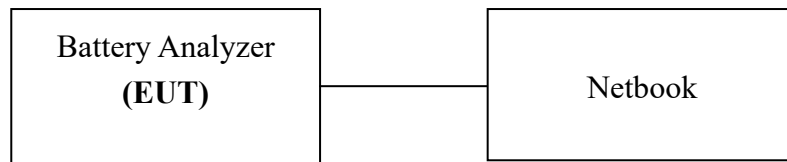
Brand	:	Acer
Product Name	:	Notebook
Model Name	:	TravelMate P238 series
Model Number	:	N15W8

2.5.Lock Diagram of Test Setup

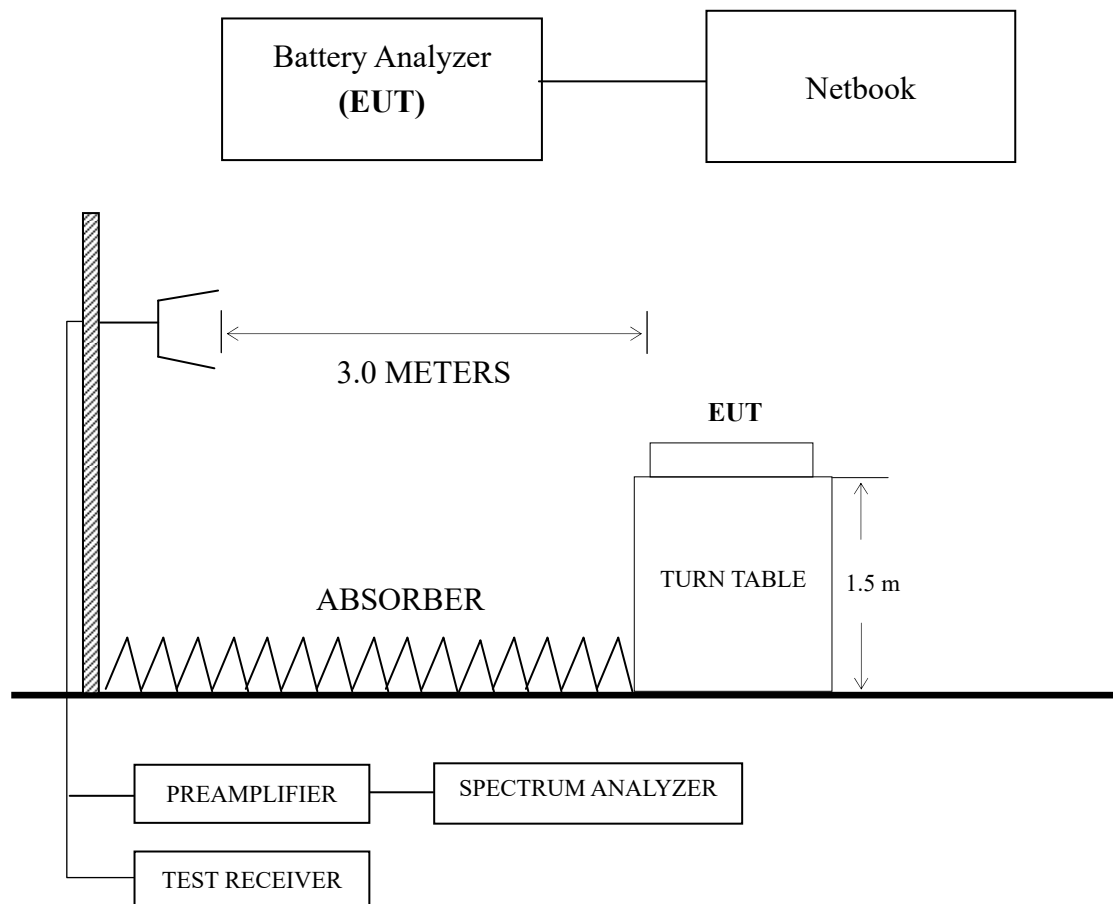
2.5.1.RF Output Power

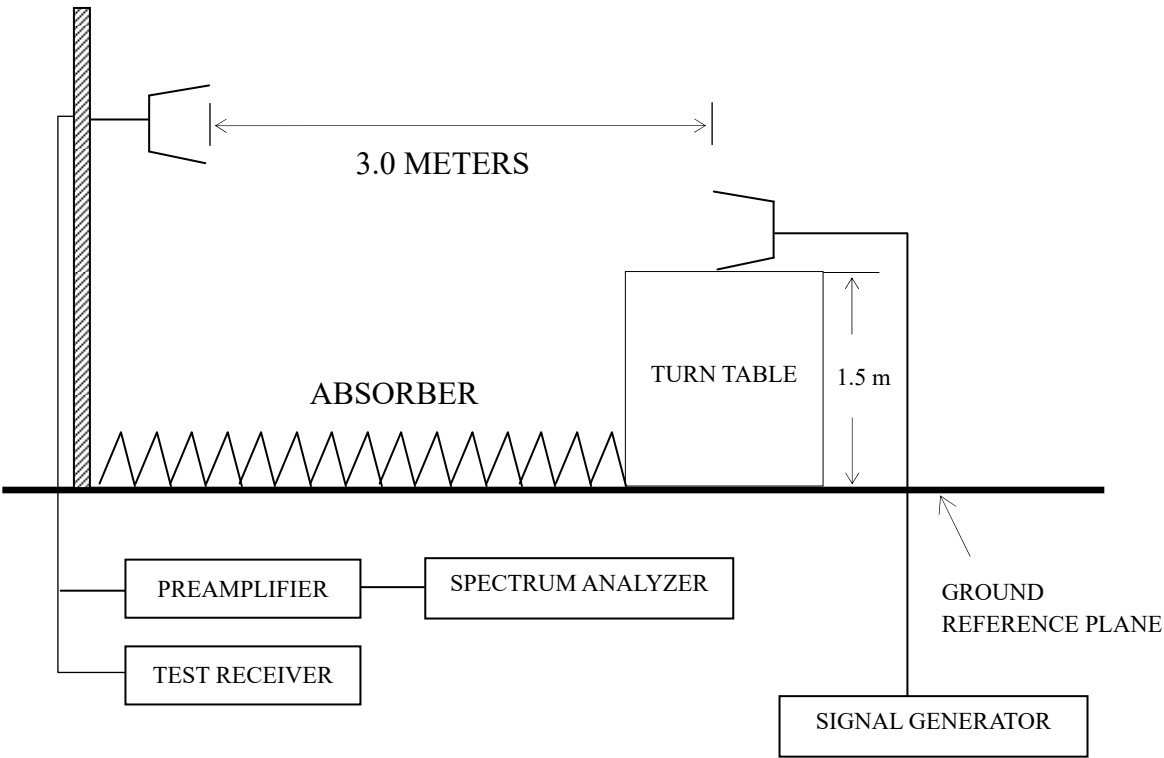


2.5.2.Power Spectral Density and Occupied Channel Bandwidth



2.5.3.Spurious Emission (Radiated)





2.6. Description of Test Facility

Name of Firm	: Audix Technology (Shanghai) Co., Ltd.
Site Location	: 3F 34Bldg 680 Guiping Rd, Caohejing Hi-Tech Park, Shanghai 200233, China
Accredited by NVLAP, Lab Code	: 200371-0

3. MEASUREMENTS OF PARAMETERS (ETSI EN 300 328)

3.1.RF Output Power

3.1.1.Test Equipment

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	USB Wideband Power Sensor	KEYSIGHT	U2021XA	MY55360003	2021.08.23	1 Year
2.	Temperature and Humidity Test Chamber	TECRCHY	MHU-150L	850811	2021.05.20	1 Year

3.1.2.Specification Limit

For adaptive equipment using wide band modulations other than FHSS, the maximum RF output power shall be 20 dBm.

The maximum RF output power for non-adaptive equipment shall be declared by the manufacturer and shall not exceed 20 dBm. For non-adaptive equipment using wide band modulations other than FHSS, the maximum RF output power shall be equal to or less than the value declared by the manufacturer.

This limit shall apply for any combination of power level and intended antenna assembly.

3.1.3.Test Procedure

The procedure is reference to clause 5.4.2.2.1.2 of ETSI EN 300 328 V.2.2.2

3.1.4.Test Information

EUT:	Battery Analyzer
M/N:	BT521
Test Date:	2021.12.11
Ambient Temperature:	22°C
Relative Humidity:	51%
Antenna Gain:	3 dBi
Test by:	Jarey Lu

3.1.5.Test Results

<PASS>

All the test results are attached in next pages

Zigbee:

Test Condition	Output Power reading (dBm)			Ant. Gain (dBi)	Output Power e.i.r.p. (dBm)		
Temperature (°C)	CH 2405MHz	CH 2440MHz	CH 2480MHz		CH 2405MHz	CH 2440MHz	CH 2480MHz
Normal	-0.32	-1.21	-1.92	3	2.68	1.79	1.08
Min	-0.22	-1.19	-1.99		2.78	1.81	1.01
Max	-0.45	-1.28	-1.96		2.55	1.72	1.04

3.2.Power Spectral Density

3.2.1.Test Equipment

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	2021.09.16	1 Year

3.2.2.Specification Limit

For equipment using wide band modulations other than FHSS, the maximum Power Spectral Density is limited to 10 dBm per MHz

3.2.3.Test Procedure

The procedure is reference to clause 5.4.3.2.1 of ETSI EN 300 328 V.2.2.2

3.2.4.Test Information

EUT:	Battery Analyzer
M/N:	BT521
Test Date:	2021.12.11
Ambient Temperature:	22℃
Relative Humidity:	51%
Test by:	Jarey Lu

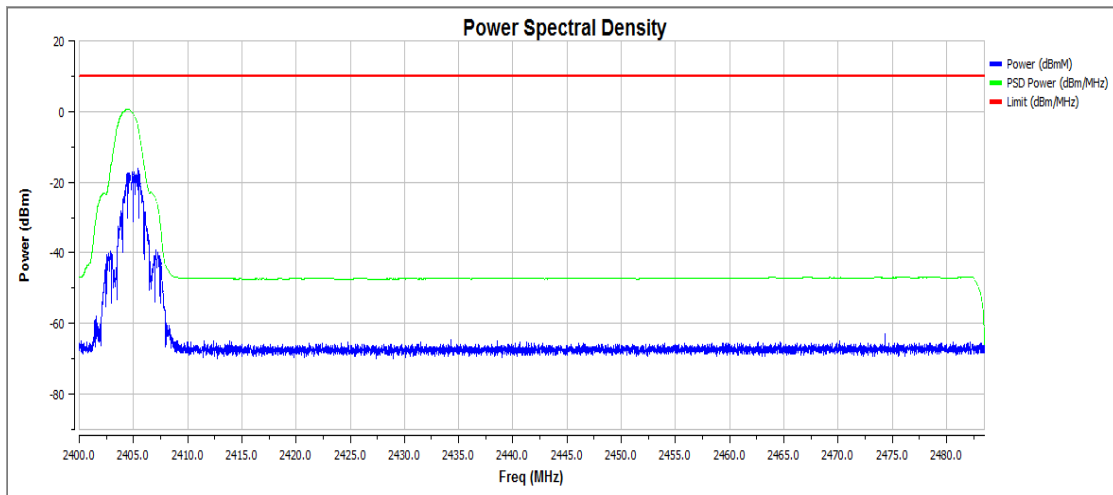
3.2.5.Test Results

<PASS>

All the test results are attached in next pages

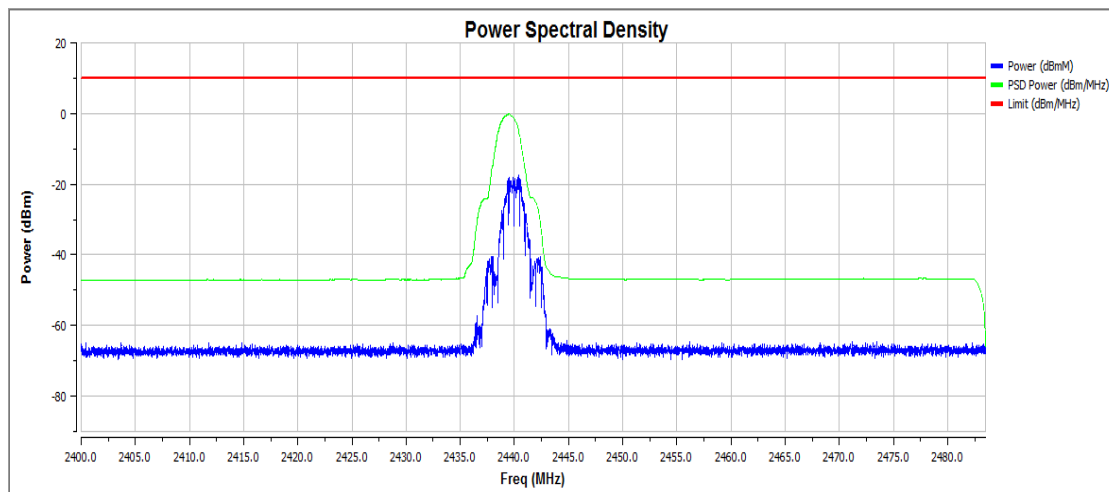
Modulation	Test Freq (MHz)	Max Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)	Status
2.4G Modulation	2405	0.75	< 10	Pass

MIMO Power Spectral Density



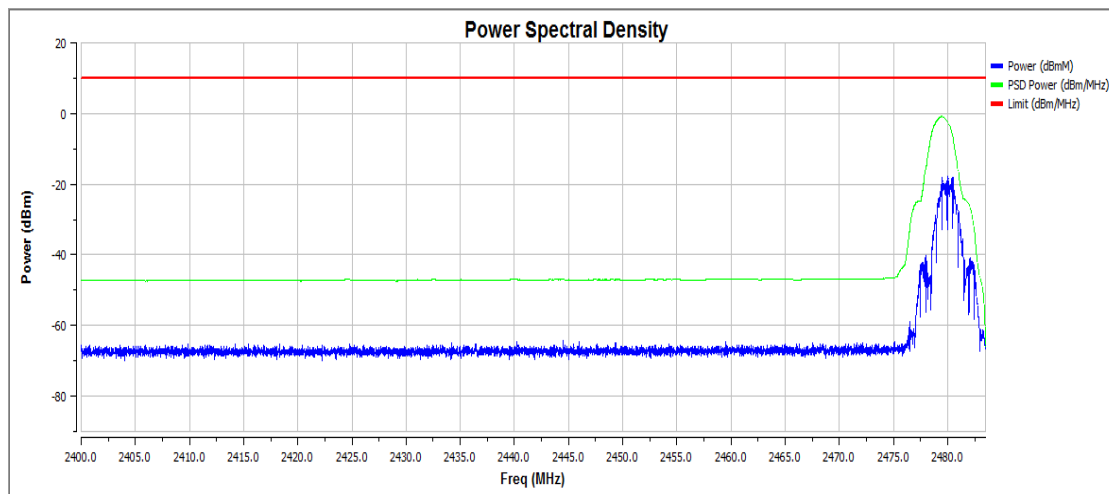
Modulation	Test Freq (MHz)	Max Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)	Status
2.4G Modulation	2440	-0.16	< 10	Pass

MIMO Power Spectral Density



Modulation	Test Freq (MHz)	Max Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)	Status
2.4G Modulation	2480	-0.86	< 10	Pass

MIMO Power Spectral Density



3.3.Occupied Channel Bandwidth

3.3.1.Test Equipment

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	2021.09.16	1 Year

3.3.2.Specification Limit

The Occupied Channel Bandwidth shall fall completely within the band 2.4 GHz to 2.4835 GHz.

In addition, for non-adaptive equipment using wide band modulations other than FHSS and with e.i.r.p greater than 10 dBm, the occupied channel bandwidth shall be less than 20 MHz.

3.3.3.Test Procedure

The procedure is reference to clause 5.4.7.2.1 of ETSI EN 300 328 V.2.2.2

3.3.4.Test Information

EUT:	Battery Analyzer
M/N:	BT521
Test Date:	2021.12.11
Ambient Temperature:	22°C
Relative Humidity:	51%
Test by:	Jarey Lu

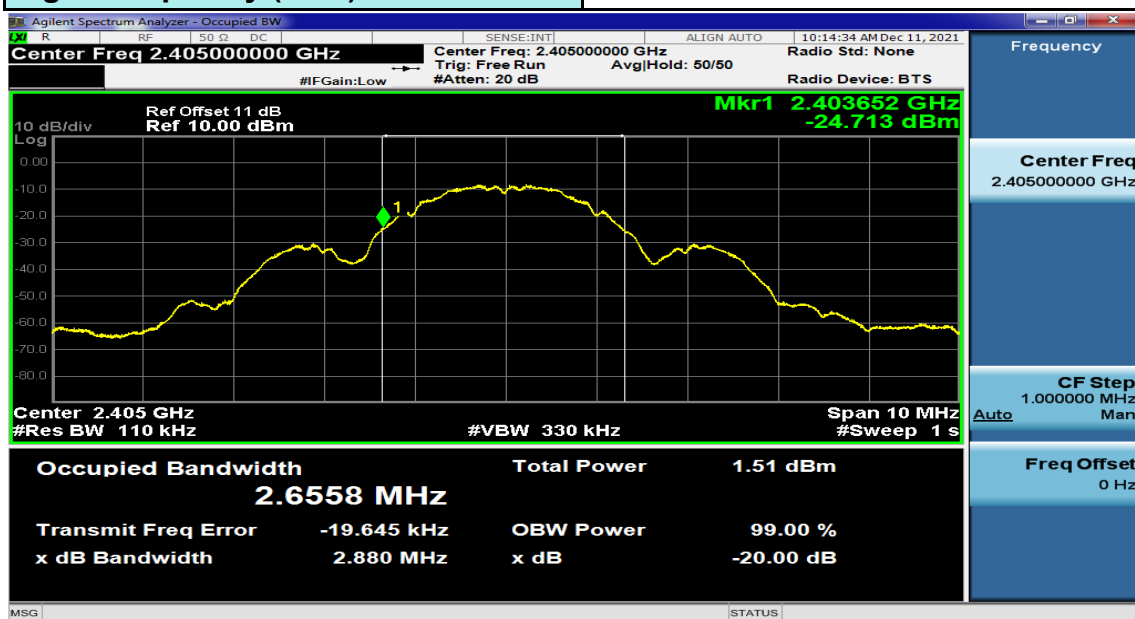
3.3.5.Test Results

<PASS>

All the test results are attached in next pages.

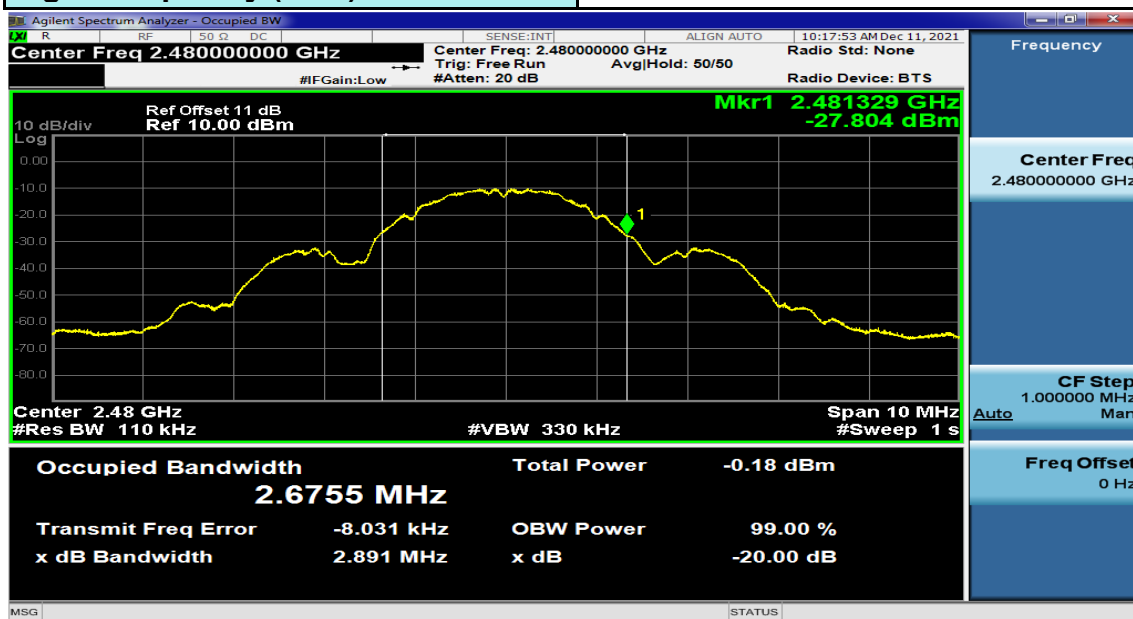
Test Ant.	Modulation	Test Freq (MHz)	Occupied BandWidth (MHz)	Limit (MHz)	Status
Antenna 1	2.4G Modulation	2405	2.656	2400	Pass

Left Frequency (MHz)	2403.652
Right Frequency (MHz)	2406.308



Test Ant.	Modulation	Test Freq (MHz)	Occupied BandWidth (MHz)	Limit (MHz)	Status
Antenna 1	2.4G Modulation	2480	2.675	2483.5	Pass

Left Frequency (MHz)	2478.654
Right Frequency (MHz)	2481.329



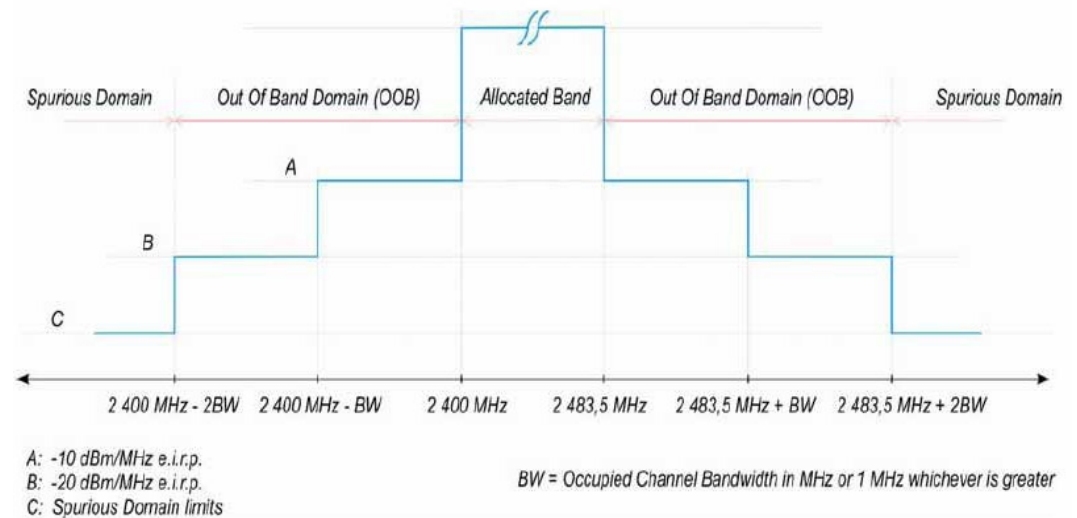
3.4. Transmitter Unwanted Emissions in the Out-of-Band Domain

3.4.1. Test Equipment

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	2021.09.16	1 Year

3.4.2. Specification Limit

The transmitter unwanted emission in the out-of-band domain but outside the allocated band, shall not exceed the values provided by the mask in blow figure.



3.4.3. Test Procedure

The procedure is reference to clause 5.4.8.2.1 of ETSI EN 300 328 V.2.2.2

3.4.4. Test Information

EUT:	Battery Analyzer
M/N:	BT521
Test Date:	2021.12.11
Ambient Temperature:	22°C
Relative Humidity:	51%
Test by:	Jarey Lu

3.4.5. Test Results

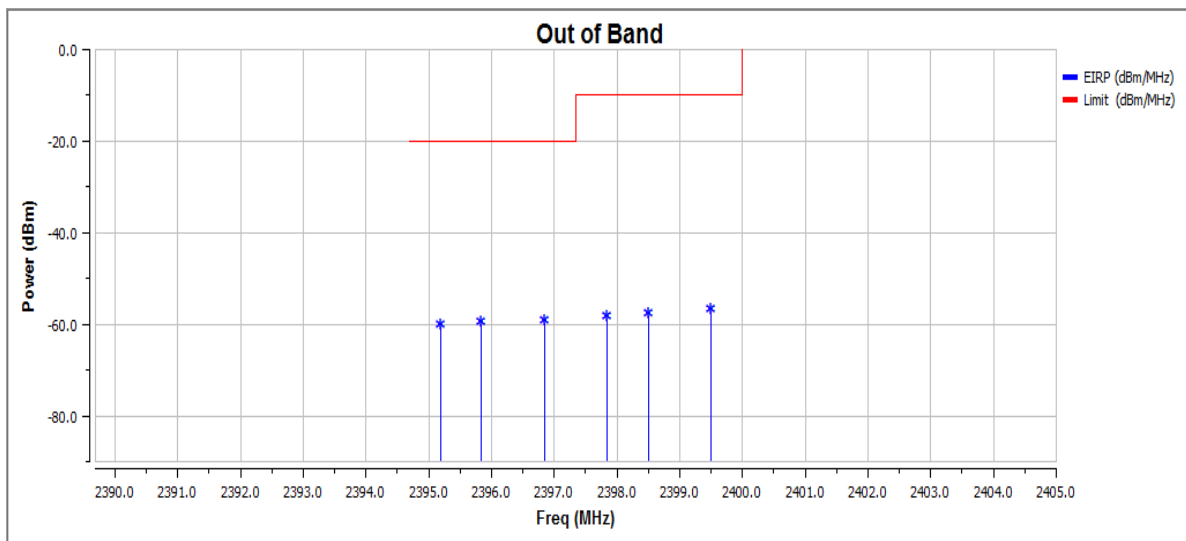
<PASS>

All the test results are attached in next pages

Test Modulation

2.4G Modulation

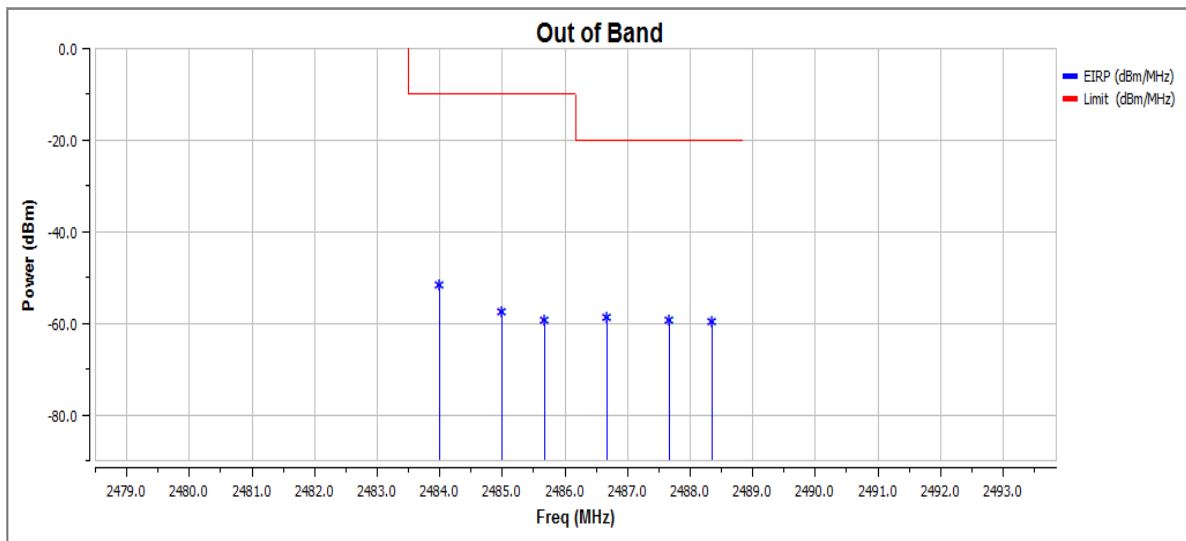
	Antenna	Freq(MHz)	Level	Limit
1	SISO Antenna	2399.5	-57.23	-10
2	SISO Antenna	2398.5	-58.28	-10
3	SISO Antenna	2397.844	-58.81	-10
4	SISO Antenna	2396.844	-59.8	-20
5	SISO Antenna	2395.844	-60.16	-20
6	SISO Antenna	2395.188	-60.72	-20



Test Modulation

2.4G Modulation

	Antenna	Freq(MHz)	Level	Limit
1	SISO Antenna	2484	-52.26	-10
2	SISO Antenna	2485	-58.22	-10
3	SISO Antenna	2485.675	-60.13	-10
4	SISO Antenna	2486.675	-59.35	-20
5	SISO Antenna	2487.675	-60.15	-20
6	SISO Antenna	2488.35	-60.43	-20



3.5. Transmitter Unwanted Emissions in the Spurious Domain

3.5.1. Test Equipment

3.5.1.1. For Radiated Spurious Emissions (for 30MHz-1GHz)

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	2021.09.16	1 Year
2.	Preamplifier	Agilent	8447D	2944A10548	2021.04.26	1 Year
3.	Bilog Antenna+6dB Attenuator	Schwarz beck	VULB 9168+EMCI -N-6-06	707+AT-N06 37	2021.07.06	1 Year
4.	Bilog Antenna+6dB Attenuator	Schwarz beck	VULB 9168+EMCI -N-6-06	708+AT-N06 38	2021.07.06	1 Year
5.	Signal Generator	HP	E8257D	MY46130042	2021.01.05	1 Year

3.5.1.2. For Radiated Spurious Emissions (for 1GHz-12.75GHz)

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	2021.09.16	1 Year
2.	Preamplifier	HP	8449B	3008A00864	2021.03.08	1 Year
3.	Cavity Band Rejection Filter	WT	WT-A3882-R10	WT200312-1 -1	2021.07.07	1 Year
4.	Horn Antenna	EMCO	3115	62960	2021.05.20	1 Year
5.	Horn Antenna	EMCO	3115	62961	2021.05.20	1 Year
6.	Horn Antenna	EMCO	3115	96074878	2021.07.20	1 Year
7.	Signal Generator	HP	E8257D	MY46130042	2021.01.05	1 Year

3.5.2.Specification Limit

In case of equipment with antenna connectors, these limits apply to emissions at the antenna port (conducted). For emissions radiated by the cabinet or emissions radiated by integral antenna equipment (without antenna connectors), these limits are e.r.p. for emissions up to 1 GHz and as e.i.r.p. for emissions above 1 GHz

Frequency Range	Maximum power,	Bandwidth
30MHz to 47MHz	-36dBm	100kHz
47MHz to 74MHz	-54dBm	100kHz
74MHz to 87.5MHz	-36dBm	100kHz
87.5MHz to 118MHz	-54dBm	100kHz
118MHz to 174MHz	-36dBm	100kHz
174MHz to 230MHz	-54dBm	100kHz
230MHz to 470MHz	-36dBm	100kHz
470MHz to 694MHz	-54dBm	100kHz
694MHz to 1GHz	-36dBm	100kHz
1GHz to 12.75GHz	-30dBm	1MHz

3.5.3.Test Procedure

The procedure is reference to clause 5.4.9.2 of ETSI EN 300 328 V.2.2.2

3.5.4.Test Information

EUT:	Battery Analyzer
M/N:	BT521
Test Date:	2021.12.13
Ambient Temperature:	22°C
Relative Humidity:	51%
Test by:	Jarey Lu

3.5.5.Test Results

<PASS>

All the test results are attached in next pages.

Note: If the peak emissions measured that fall within the 6dB range below the applicable limit or above, the rms emissions shall be recorded and compared to limits.

3.5.5.1. Radiated Spurious Emissions

30MHz – 1GHz					
Mode: Zigbee CH2405MHz					
Frequency (MHz)	Peak Emission Level (dBm)	RMS Emission Level (dBm)	Limit (dBm)	Status	Antenna Polarization
50.37	-62.15	--	-54	Pass	Horizontal
105.66	-52.52	-63	-54	Pass	
191.02	-48.85	-58.64	-54	Pass	
503.36	-47.99	-58.14	-54	Pass	
50.37	-74.99	--	-54	Pass	Vertical
110.51	-67.15	--	-54	Pass	
192.96	-58.17	-67.92	-54	Pass	
599.39	-56.82	-66.67	-54	Pass	

30MHz – 1GHz					
Mode: Zigbee CH2480MHz					
Frequency (MHz)	Peak Emission Level (dBm)	RMS Emission Level (dBm)	Limit (dBm)	Status	Antenna Polarization
50.37	-62.75	--	-54	Pass	Horizontal
105.66	-52.85	-63.13	-54	Pass	
187.14	-49.87	-59.51	-54	Pass	
503.36	-49.07	-59.55	-54	Pass	
50.37	-73.84	--	-54	Pass	Vertical
101.78	-67.56	--	-54	Pass	
192.96	-57.03	-67.11	-54	Pass	
599.39	-56.12	-66.6	-54	Pass	

1G-12.75GHz					
Mode: Zigbee CH2405MHz					
Frequency (MHz)	Peak Emission Level (dBm)	RMS Emission Level (dBm)	Limit (dBm)	Status	Antenna Polarization
3376	-43.54	--	-30	Pass	Horizontal
4951	-41.67	--	-30	Pass	
6823	-39.19	--	-30	Pass	
8461	-32.69	-44.97	-30	Pass	
3034	-49.37	--	-30	Pass	Vertical
4159	-48.18	--	-30	Pass	
6256	-47.09	--	-30	Pass	
8281	-38.54	--	-30	Pass	

1G-12.75GHz					
Mode: Zigbee CH2480MHz					
Frequency (MHz)	Peak Emission Level (dBm)	RMS Emission Level (dBm)	Limit (dBm)	Status	Antenna Polarization
3187	-43.9	--	-30	Pass	Horizontal
4708	-42.81	--	-30	Pass	
6796	-40.13	--	-30	Pass	
8569	-32.56	-44.66	-30	Pass	
3061	-49.72	--	-30	Pass	Vertical
4744	-48.8	--	-30	Pass	
6256	-47.88	--	-30	Pass	
8236	-38.64	--	-30	Pass	

3.6.Receiver Spurious Emissions

3.6.1.Test Equipment

3.6.1.1.For Radiated Spurious Emissions (for 30MHz-1GHz)

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	2021.09.16	1 Year
2.	Preamplifier	Agilent	8447D	2944A10548	2021.04.26	1 Year
3.	Bilog Antenna+6dB Attenuator	Schwarz beck	VULB 9168+EMCI -N-6-06	707+AT-N06 37	2021.07.06	1 Year
4.	Bilog Antenna+6dB Attenuator	Schwarz beck	VULB 9168+EMCI -N-6-06	708+AT-N06 38	2021.07.06	1 Year
5.	Signal Generator	HP	E8257D	MY46130042	2021.01.05	1 Year

3.6.1.2.For Radiated Spurious Emissions (for 1GHz-12.75GHz)

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	2021.09.16	1 Year
2.	Preamplifier	HP	8449B	3008A00864	2021.03.08	1 Year
3.	Cavity Band Rejection Filter	WT	WT-A3882-R10	WT200312-1 -1	2021.07.07	1 Year
4.	Horn Antenna	EMCO	3115	62960	2021.05.20	1 Year
5.	Horn Antenna	EMCO	3115	62961	2021.05.20	1 Year
6.	Horn Antenna	EMCO	3115	96074878	2021.07.20	1 Year
7.	Signal Generator	HP	E8257D	MY46130042	2021.01.05	1 Year

3.6.2.Specification Limit

In case of equipment with antenna connectors, these limits apply to emissions at the antenna port (conducted). For emissions radiated by the cabinet or for emissions radiated by integral antenna equipment (without antenna connectors), these limits are e.r.p. for emissions up to 1 GHz and e.i.r.p. for emissions above 1 GHz.

Frequency Range	Maximum power,	Bandwidth
30MHz to 1GHz	-57dBm	100kHz
1GHz to 12.75GHz	-47dBm	1MHz

3.6.3.Test Procedure

The procedure is reference to clause 5.4.10.2 of ETSI EN 300 328 V.2.2.2

3.6.4.Test Information

EUT:	Battery Analyzer
M/N:	BT521
Test Date:	2021.12.13
Ambient Temperature:	23°C
Relative Humidity:	53%
Test by:	Jarey Lu

3.6.5.Test Results

<PASS>

All the test results are attached in next pages

Note: If the peak emissions measured that fall within the 6dB range below the applicable limit or above, the rms emissions shall be recorded and compared to limits.

3.6.5.1.Radiated Spurious Emission

30MHz – 1GHz					
Mode: RX CH2405					
Frequency (MHz)	Peak Emission Level (dBm)	RMS Emission Level (dBm)	Limit (dBm)	Status	Antenna Polarization
107.6	-52.34	-63.62	-57	Pass	Horizontal
189.08	-53.97	-65.06	-57	Pass	
455.83	-49.91	-60.78	-57	Pass	
503.36	-50.26	-60.47	-57	Pass	
195.87	-62.25	-73.59	-57	Pass	Vertical
455.83	-59.19	-68.54	-57	Pass	
480.08	-58.18	-67.59	-57	Pass	
634.31	-59.87	-68.71	-57	Pass	

30MHz – 1GHz					
Mode: RX CH2480					
Frequency (MHz)	Peak Emission Level (dBm)	RMS Emission Level (dBm)	Limit (dBm)	Status	Antenna Polarization
107.6	-54.21	-65.51	-57	Pass	Horizontal
195.87	-53.24	-64.02	-57	Pass	
455.83	-50.27	-60.02	-57	Pass	
503.36	-49.93	-60.04	-57	Pass	
192.96	-62.14	-73.33	-57	Pass	Vertical
455.83	-58.83	-67.51	-57	Pass	
480.08	-59.72	-68.25	-57	Pass	
634.31	-60.5	-68.97	-57	Pass	

1GHz – 12.75GHz					
Mode: RX CH2405					
Frequency (MHz)	Peak Emission Level (dBm)	RMS Emission Level (dBm)	Limit (dBm)	Status	Antenna Polarization
2386	-47.69	-60.05	-47	Pass	Horizontal
4123	-41.86	-54.41	-47	Pass	
6076	-42.5	-56.05	-47	Pass	
7570	-35.81	-50.91	-47	Pass	
1873	-54.79	--	-47	Pass	Vertical
3853	-45.87	-57.47	-47	Pass	
5626	-46.71	-58.62	-47	Pass	
7471	-38.63	-51.46	-47	Pass	

1GHz – 12.75GHz					
Mode: RX CH2480					
Frequency (MHz)	Peak Emission Level (dBm)	RMS Emission Level (dBm)	Limit (dBm)	Status	Antenna Polarization
2710	-47.89	-59.18	-47	Pass	Horizontal
4303	-43.03	-55.91	-47	Pass	
6157	-42.44	-55.34	-47	Pass	
7660	-37.35	-51.88	-47	Pass	
2233	-55.59	--	-47	Pass	Vertical
3916	-46.41	-57.49	-47	Pass	
5491	-47.68	-59.47	-47	Pass	
7417	-39.28	-52.52	-47	Pass	

3.7.Receiver Blocking

3.7.1.Test Equipment

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	2021.09.16	1 Year
2.	EXG Analog Signal Generator	Keysight	N5171B	MY53051438	2021.03.07	1 Year
3.	Rx PER Monitoring Unit	Keysight	N/A	11607310019	NCR	NCR
4.	Test Software	Keysight	N/A	V1.04.03	NCR	NCR

3.7.2.Specification Limit

While maintaining the minimum performance criteria, the blocking levels at specified frequency offsets shall be equal to or greater than the limits defined for the applicable receiver category provided in below table.

Receiver Blocking parameters for Receiver Category equipment				
Category	Wanted signal mean power from companion device (dBm) (see notes 1 and 3)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 3)	Type of blocking signal
1	$(-133 \text{ dBm} + 10 \cdot \log_{10}(\text{OCBW}))$ or -68 dBm whichever is less (see note 2a)	2380, 2504	-34	CW
	$(-139 \text{ dBm} + 10 \cdot \log_{10}(\text{OCBW}))$ or -74 dBm whichever is less (see note 2b)	2300, 2330 2360, 2524 2584, 2674		
2	$(-139 \text{ dBm} + 10 \cdot \log_{10}(\text{OCBW}) + 10 \text{ dB})$ or $(-74 \text{ dBm} + 10 \text{ dB})$ whichever is less (see note 2a)	2380, 2504 2300, 2584	-34	CW
3	$(-139 \text{ dBm} + 10 \cdot \log_{10}(\text{OCBW}) + 20 \text{ dB})$ or $(-74 \text{ dBm} + 20 \text{ dB})$ whichever is less (see note 2c)	2380, 2504 2300, 2584	-34	CW

Note 1: OCBW is in Hz.

Note 2a: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to $P_{\min} + 26$ dB where $P_{\min}$ is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.

Note 2b: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to $P_{\min} + 20$ dB where $P_{\min}$ is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.

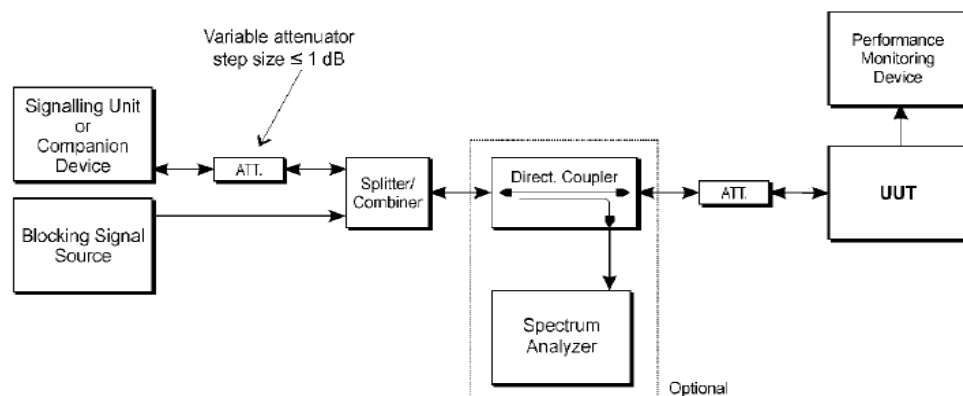
Note 2c: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to $P_{\min} + 30$ dB where $P_{\min}$ is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.

Note 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.

3.7.3. Test Procedure

The procedure is reference to clause 5.3.11.2.2 of ETSI EN 300 328 V.2.2.2

3.7.4. Block Diagram of Test Setup



3.7.5. Test Information

EUT:	Battery Analyzer
M/N:	BT521
Test Date:	2021.12.11
Ambient Temperature:	23°C
Relative Humidity:	52%
Test by:	Jarey Lu

3.7.6. Test Result

<PASS>

All the test results are attached in next pages

Test Channel Frequency (MHz)	Blocking Freq (MHz)	Unwanted Level (dBm)	Total Packet	Lost Packet	PER (%)	Limit (%)	Status
2405	2300	-34	100	0	0	10	Pass
	2380	-34	100	0	0	10	Pass
	2504	-34	100	0	0	10	Pass
	2584	-34	100	0	0	10	Pass
2480	2300	-34	100	0	0	10	Pass
	2380	-34	100	0	0	10	Pass
	2504	-34	100	0	0	10	Pass
	2584	-34	100	0	0	10	Pass

4. MEASUREMENT UNCERTAINTY LIST

The measurement uncertainty was estimated for test on the EUT according to CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage of K=2.

The uncertainties value is not used in determining the PASS/FAIL results.

Test Items/Facilities	Frequency/Equipment/Unit	Uncertainty
Conducted Emission No.1 Shielded Room	9kHz~150kHz	±3.2 dB
	150kHz~30MHz	±3.1 dB
Conducted Emission No.3 Shielded Room	150kHz~30MHz	±3.1 dB
Radiated Emission	30MHz~200MHz, Horizontal	±3.4 dB
	30MHz~200MHz, Vertical	±4.0 dB
	200MHz~1000MHz, Horizontal	±3.7 dB
	200MHz~1000MHz, Vertical	±5.1 dB
	1GHz~6GHz	±5.7 dB
	6GHz~18GHz	±4.7 dB
Output Power Test	50MHz~18GHz	0.77 dB
Power Density Test	9kHz~6GHz	1.08 dB
RF Frequency Test	9kHz~40GHz	6×10^{-4}
Bandwidth Test	9kHz~6GHz	1.5×10^{-3}
RF Radiated Power Test	30MHz~1000MHz	3.06 dB
Conducted Output Power Test	50MHz~18GHz	0.83 dB
AC Voltage(<10kHz) Test	120V~230V	0.04 %
DC Power Test	0V~30V	0.4 %
Temperature	-40°C~+100°C	0.52 °C
Humidity	30%~95%	2.6 %

APPENDIX I

PHOTOGRAPHS OF TEST

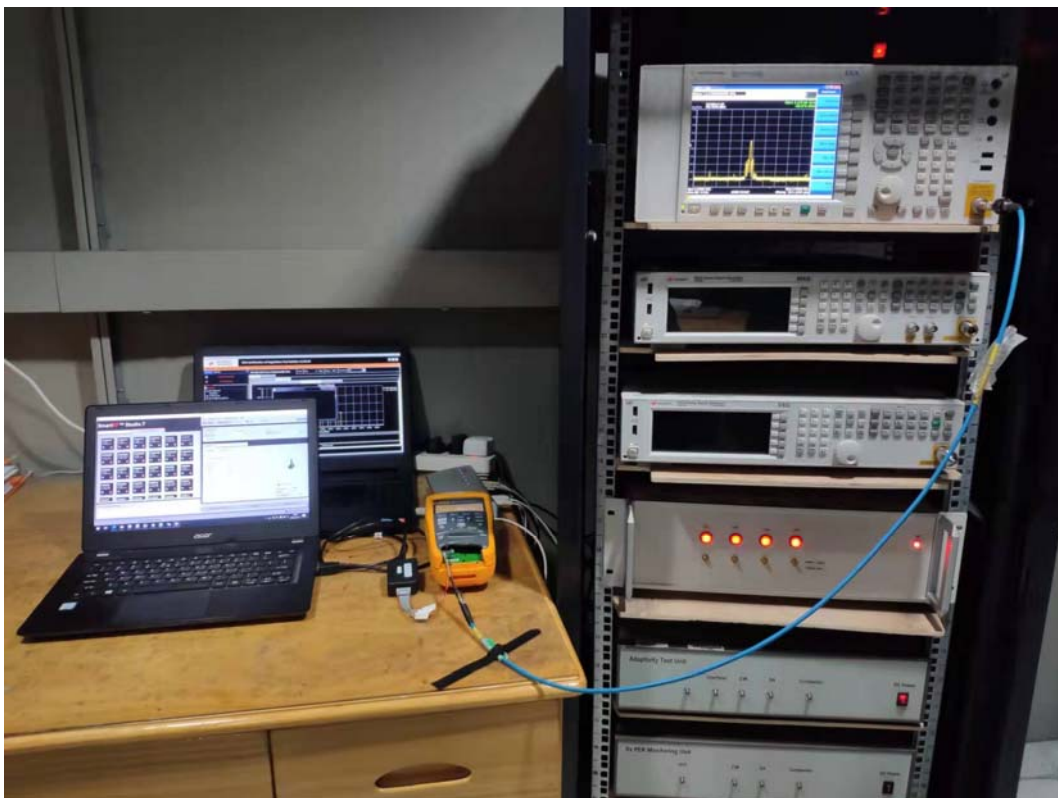
Test Set-Up Photos

1. RF Test (Conducted)

For Output Power

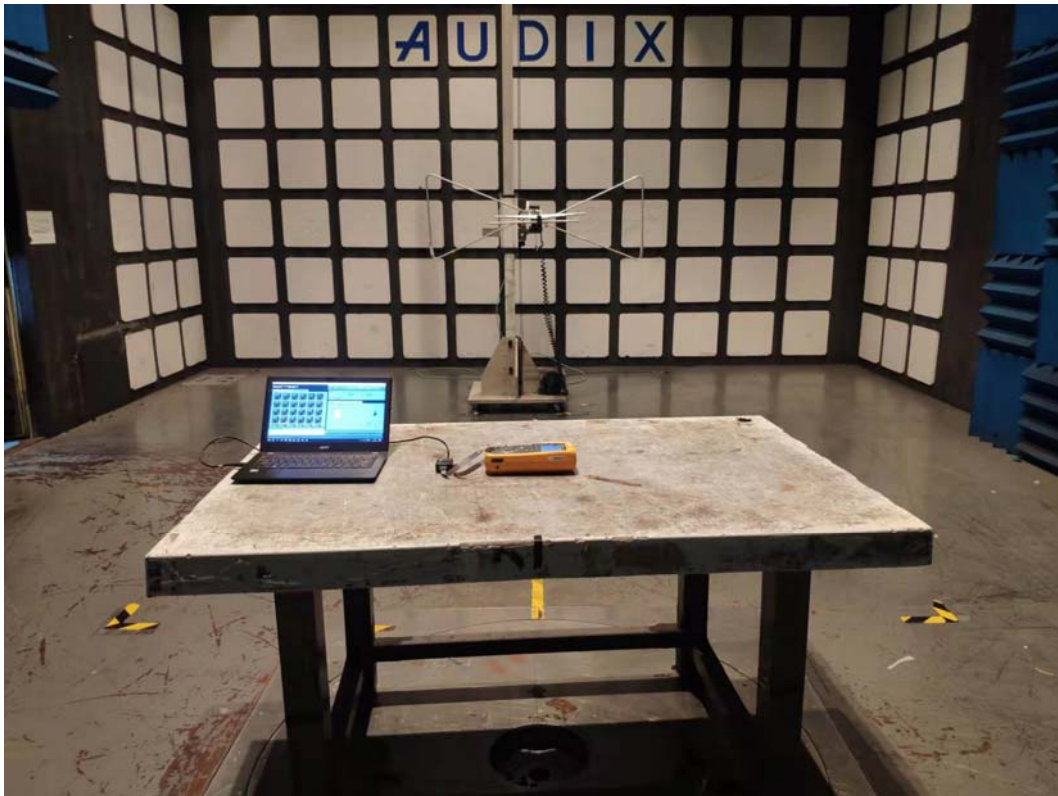


For Other



2. Spurious Emission (Radiated)

FOR 30MHz-1GHz



ABOVE 1GHz



3. Receiver Blocking



APPENDIX II

PHOTOGRAPHS OF EUT

FIGURE 1
BATTERY ANALYZER (M/N: BT521)
GENERAL APPEARANCE FRONT VIEW



FIGURE 2
BATTERY ANALYZER (M/N: BT521)
GENERAL APPEARANCE BACK VIEW



FIGURE 3
BATTERY ANALYZER (M/N: BT521)
COVER REMOVED



FIGURE 4
BATTERY ANALYZER (M/N: BT521)
MAINBOARD FRONT



FIGURE 5
BATTERY ANALYZER (M/N: BT521)
MAIN BOARD BACK

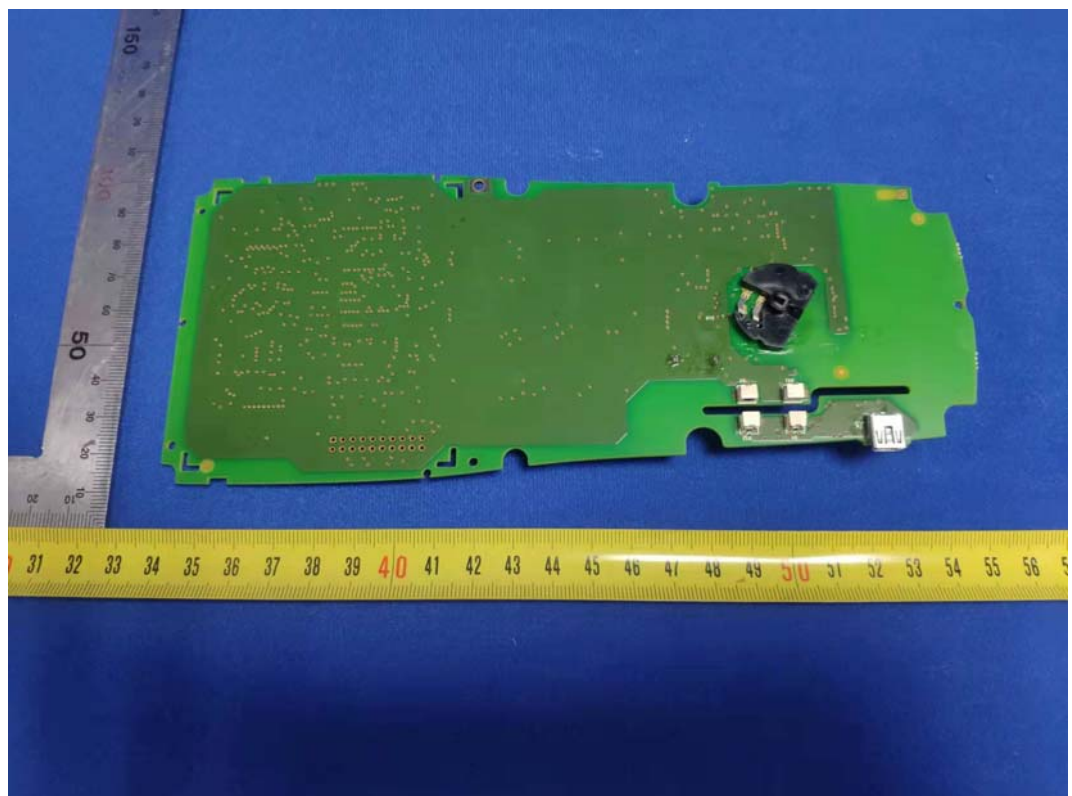


FIGURE 6
BATTERY ANALYZER (M/N: BT521)
HIP & CRYSTAL ON MAINBOARD

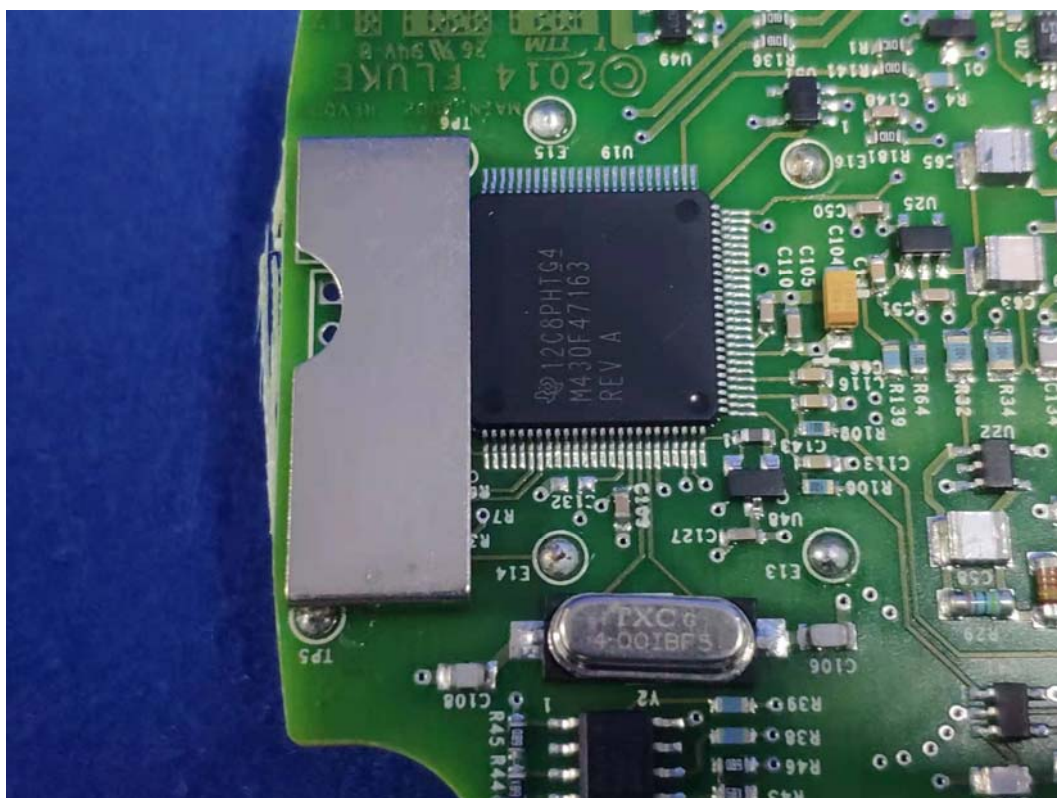


FIGURE 7
BATTERY ANALYZER (M/N: BT521)
MAINBOARD FRONT



FIGURE 8
BATTERY ANALYZER (M/N: BT521)
MAIN BOARD BACK

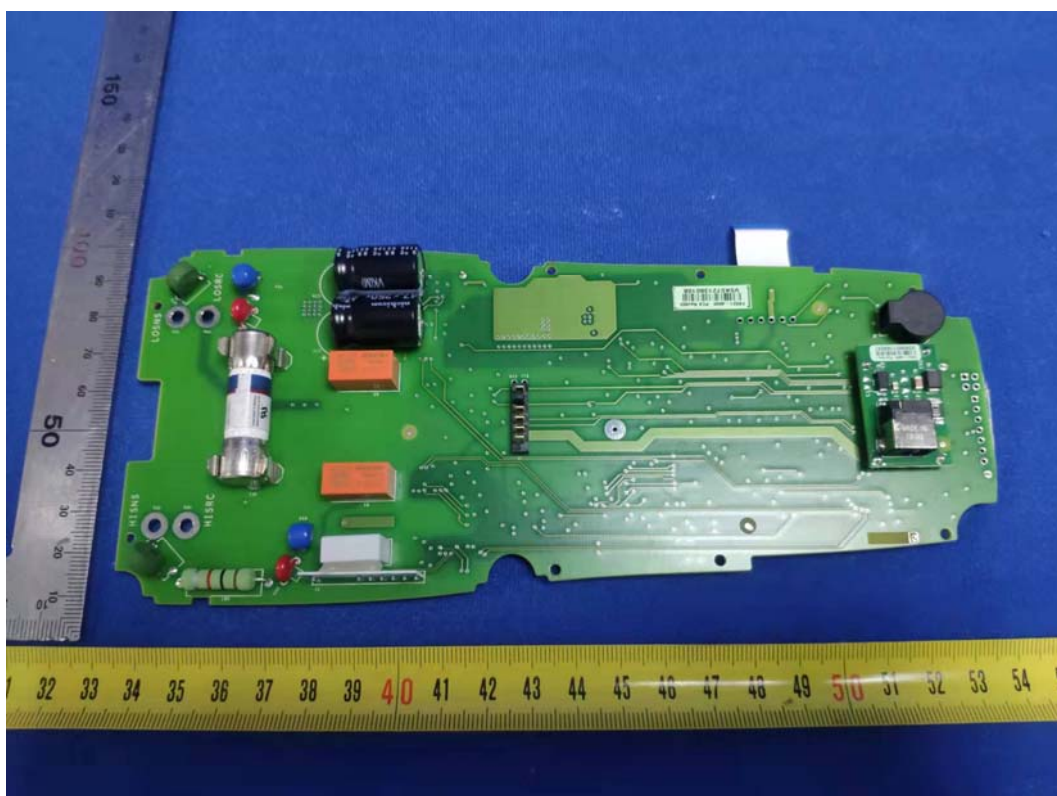


FIGURE 9
BATTERY ANALYZER (M/N: BT521)
HIP & CRYSTAL ON MAINBOARD



FIGURE 10
BATTERY ANALYZER (M/N: BT521)
HIP & CRYSTAL ON MAINBOARD

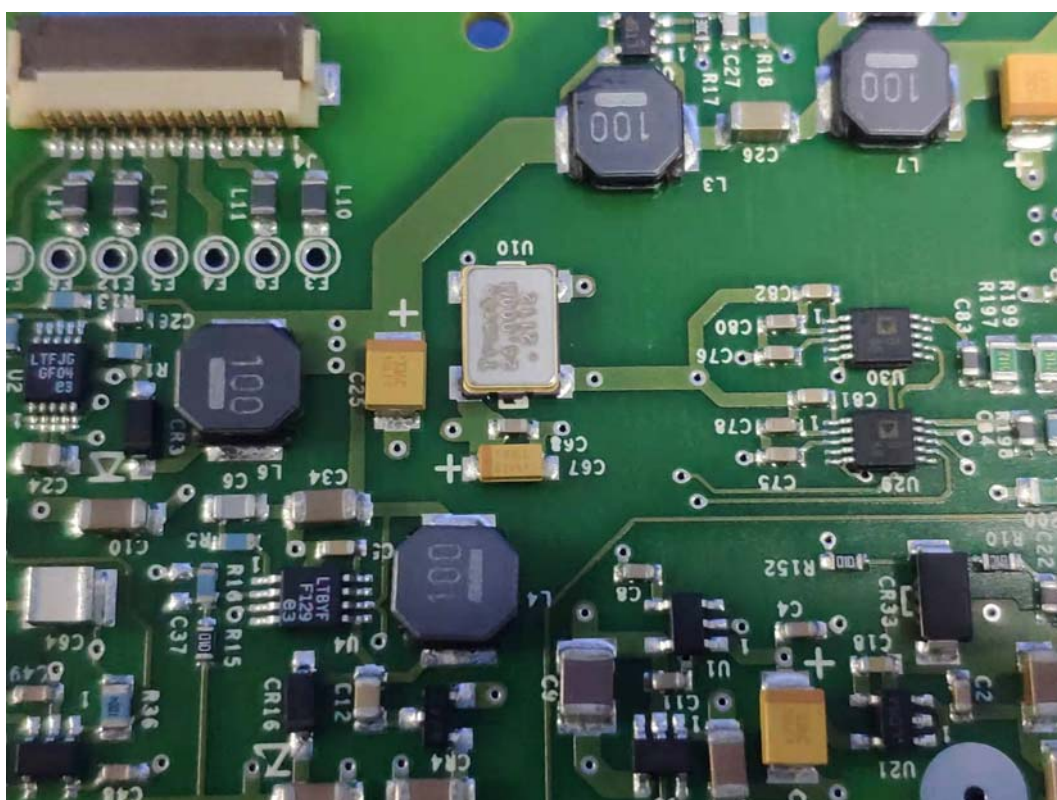


FIGURE 11
BATTERY ANALYZER (M/N: BT521)
RF MODULE (COMPONENT SIDE)

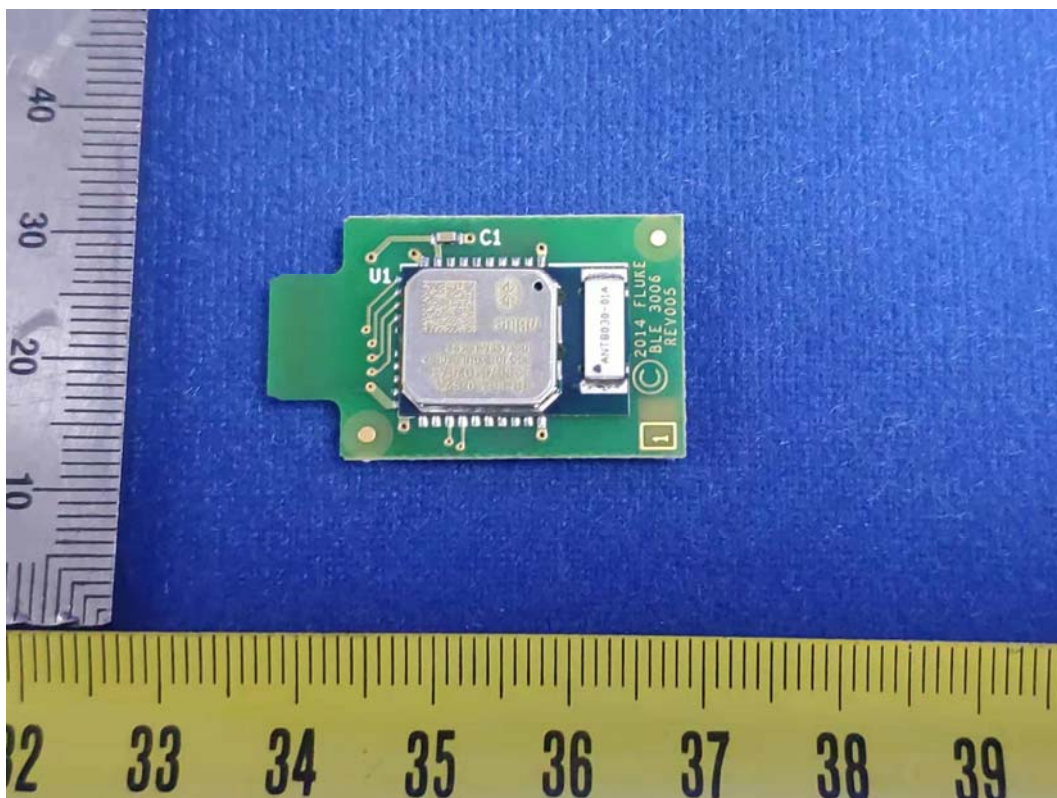


FIGURE 12
BATTERY ANALYZER (M/N: BT521)
RF MODULE (SOLDERED SIDE)

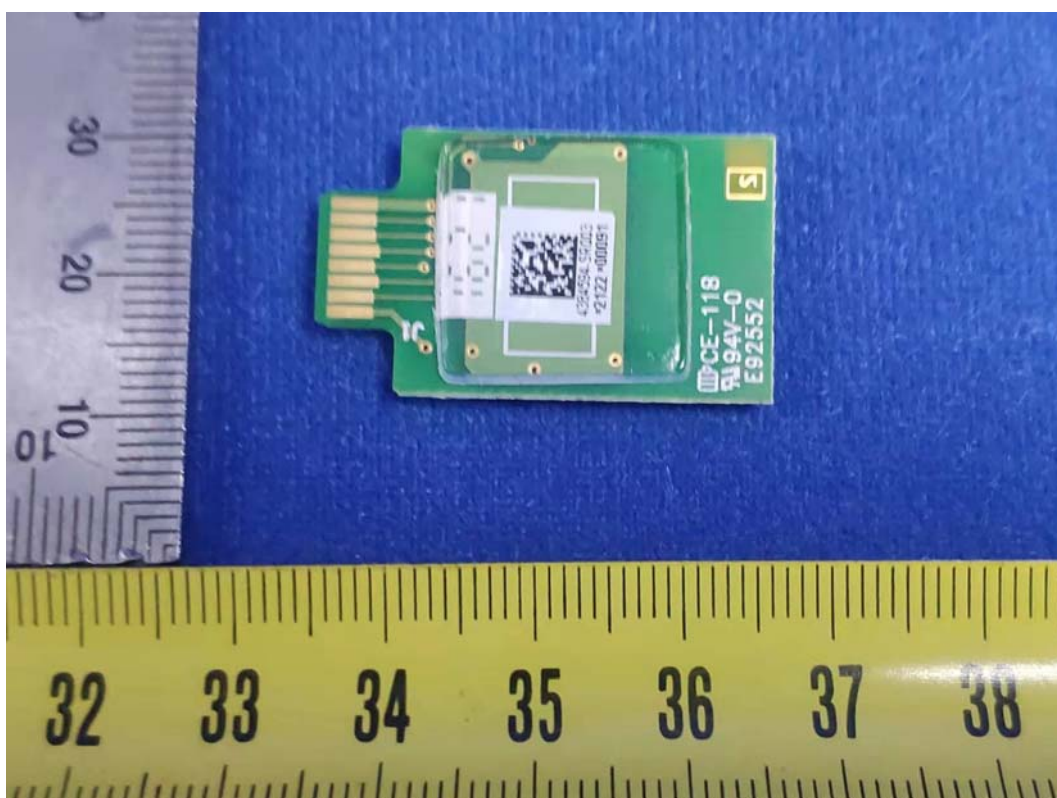


FIGURE 13
BATTERY ANALYZER (M/N: BT521)
RF MODULE (COMPONENT SIDE)

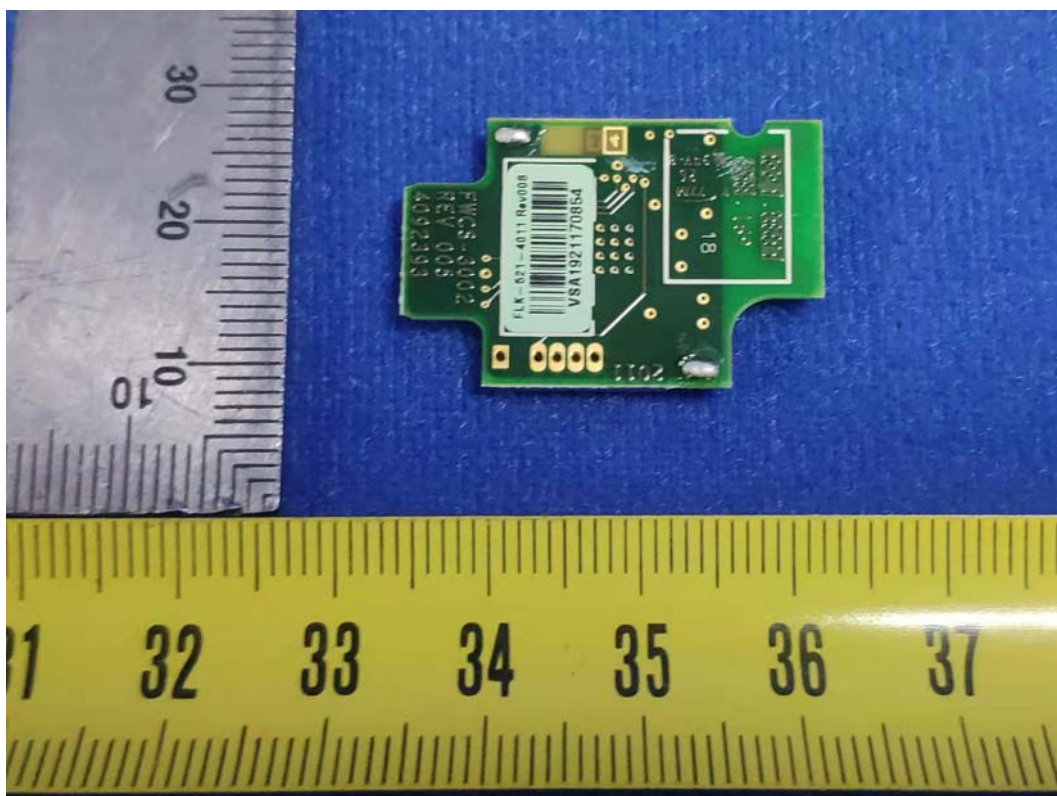


FIGURE 14
BATTERY ANALYZER (M/N: BT521)
RF MODULE (SOLDERED SIDE)

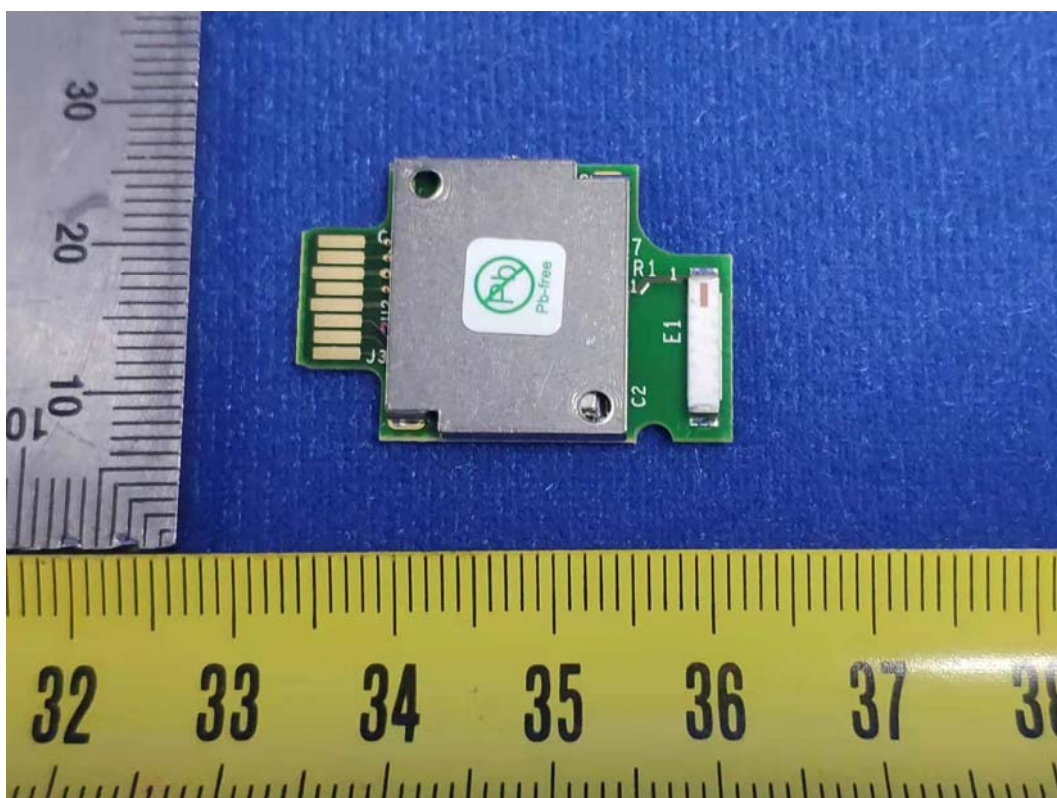


FIGURE 15
BATTERY ANALYZER (M/N: BT521)
DISPLAY FRONT

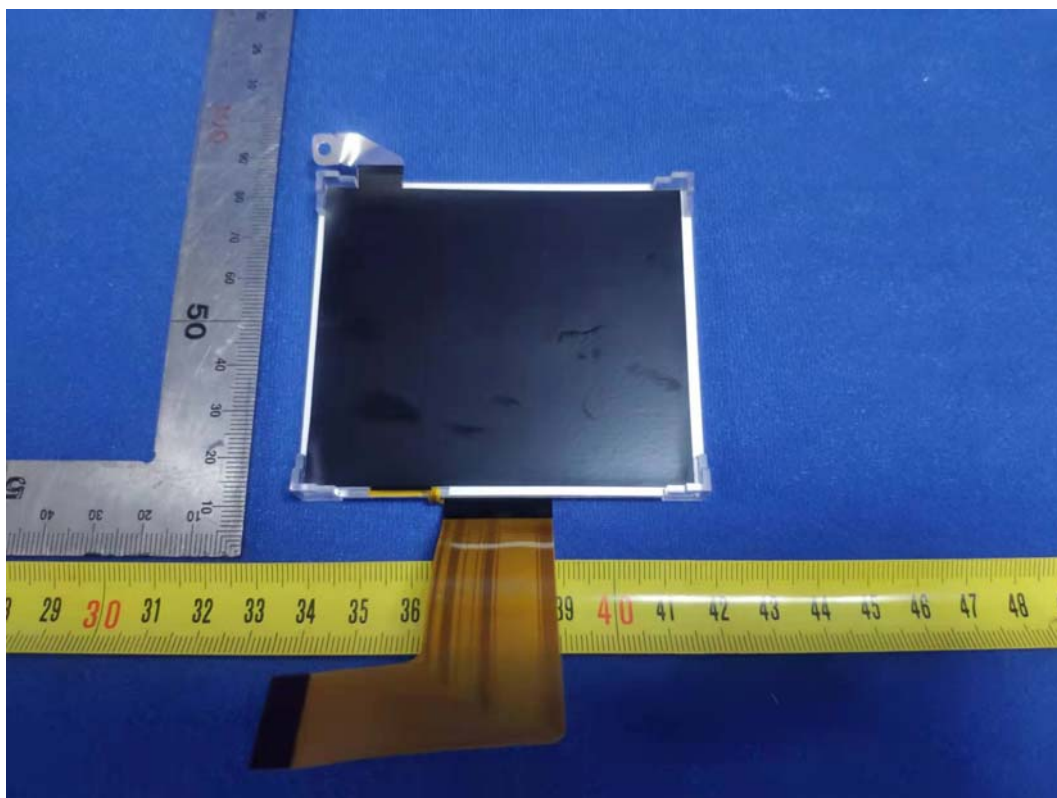


FIGURE 16
BATTERY ANALYZER (M/N: BT521)
DISPLAY BACK

