

# RED-Radio Test Report

Client Name : KS Energy Holdings (UK) Limited  
Address : Endeavour House, 31 Endeavour Place,  
Stourport-on-Severn, Worcestershire DY13 9RL, United Kingdom  
Product Name : Lithium iron phosphate battery pack  
Date : Jun. 10, 2021



**Shenzhen Anbotek Compliance Laboratory Limited**

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# TEST REPORT

Applicant : KS Energy Holdings (UK) Limited

Manufacturer : KS Energy Holdings (UK) Limited

Product Name : Lithium iron phosphate battery pack

Model No. : 12V300AH (KS-C300B), 12V100AH (KS-C100B), 12V125AH (KS-C125B),  
12V155AH (KS-C155B), 12V200AH (KS-SB200B), 12V200AH (KS-C200B),  
KS-LP120B

Trade Mark : KS Energy UK

Rating(s) : Input: DC 14.4V, 150A, 2160W  
Output: DC 12.8V, 150A, 1920W

**Test Standard(s) : ETSI EN 300 328 V2.2.2 (2019-07)**

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the ETSI EN 300 328 V2.2.2 requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Receipt

May 18, 2021

Date of Test

May 18~31, 2021

Prepared By

*Ella Liang*

(Ella Liang)

Approved & Authorized Signer

*Kingkong Jin*

(Kingkong Jin)

## Shenzhen Anbotek Compliance Laboratory Limited

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## 1. General Information

### 1.1. Client Information

Applicant	:	KS Energy Holdings (UK) Limited
Address	:	Endeavour House, 31 Endeavour Place, Stourport-on-Severn, Worcestershire DY13 9RL, United Kingdom
Manufacturer	:	KS Energy Holdings (UK) Limited
Address	:	Endeavour House, 31 Endeavour Place, Stourport-on-Severn, Worcestershire DY13 9RL, United Kingdom
Factory	:	KS Energy Holdings (UK) Limited
Address	:	Endeavour House, 31 Endeavour Place, Stourport-on-Severn, Worcestershire DY13 9RL, United Kingdom

### 1.2. Description of Device (EUT)

Product Name	:	Lithium iron phosphate battery pack
Model No.	:	12V300AH (KS-C300B), 12V100AH (KS-C100B), 12V125AH (KS-C125B), 12V155AH (KS-C155B), 12V200AH (KS-SB200B), 12V200AH (KS-C200B), KS-LP120B (Note: All samples are the same except the model number and battery capacity, so we prepare "12V300AH (KS-C300B)" for test only.)
Trade Mark	:	KS Energy UK
Test Power Supply	:	DC 14.4V
Test Sample No.	:	1-2-1(Normal Sample), 1-2-2(Engineering Sample)
Product Description	:	Operation Frequency: 2402~2480MHz
	:	Transfer Rate: 1Mbits/s
	:	Number of Channel: 40 Channels
	:	Modulation Type: GFSK
	:	Antenna Type: PCB Antenna
	:	Antenna Gain(Peak): 1.5dBi
<p><b>Remark:</b> 1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual. 2) This report is for BLE module.</p>		

### 1.3. Auxiliary Equipment Used During Test

N/A	
-----	--

### 1.4. Description of Test Modes

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Following channel(s) was (were) selected for the final test as listed below.

#### RF Output Power Test

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
BT-LE	0 to 39	0,19, 39	DSSS	GFSK	1

#### Power Spectral Density Test

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
BT-LE	0 to 39	0,19, 39	DSSS	GFSK	1

#### Occupied Channel Bandwidth Test

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
BT-LE	0 to 39	0, 39	DSSS	GFSK	1

#### Transmitter unwanted emission in the out-of-band domain Test

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
BT-LE	0 to 39	0, 39	DSSS	GFSK	1

#### Spurious Emissions Test:

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
BT-LE	0 to 39	39	DSSS	GFSK	1



**1.5. List of channels**

Forty channels are provided for BT-BLE:

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
00	2402	09	2420	18	2438	27	2456	36	2474
01	2404	10	2422	19	2440	28	2458	37	2476
02	2406	11	2424	20	2442	29	2460	38	2478
03	2408	12	2426	21	2444	30	2462	39	2480
04	2410	13	2428	22	2446	31	2464		
05	2412	14	2430	23	2448	32	2466		
06	2414	15	2432	24	2450	33	2468		
07	2416	16	2434	25	2452	34	2470		
08	2418	17	2436	26	2454	35	2472		

**1.6. Test Conditions**

	Normal Test Conditions	Extreme Test Conditions
Temperature	15°C - 35°C	-10° C ~ 40° C Note: (1)
Relative Humidity	20% - 75%	N/A
Supply Voltage	DC 14.4V	N/A
Note: (1) The HT 40°C and LT-10°C was declared by manufacturer		

## 1.7. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	Rohde & Schwarz	ENV216	100055	Oct. 26, 2020	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Oct. 26, 2020	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESR26	101481	Oct. 26, 2020	1 Year
4.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Oct. 26, 2020	1 Year
5.	MAX Spectrum Analysis	Agilent	N9020A	MY51170037	Oct. 26, 2020	1 Year
6.	Preamplifier	SKET Electronic	BK1G18G30 D	KD17503	Oct. 26, 2020	1 Year
7.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Nov. 02, 2020	2 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Nov. 02, 2020	2 Year
9.	Loop Antenna	Schwarzbeck	FMZB1519B	00053	Nov. 02, 2020	2 Year
10.	Horn Antenna	A-INFO	LB-180400-K F	J211060628	Nov. 02, 2020	2 Year
11.	Pre-amplifier	SONOMA	310N	186860	Oct. 26, 2020	1 Year
12.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A
13.	RF Test Control System	YIHENG	YH3000	2017430	Oct. 26, 2020	1 Year
14.	Power Sensor	DAER	RPR3006W	15I00041SN045	Oct. 26, 2020	1 Year
15.	Power Sensor	DAER	RPR3006W	15I00041SN046	Oct. 26, 2020	1 Year
16.	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	Oct. 26, 2020	1 Year
17.	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	Oct. 26, 2020	1 Year
18.	Signal Generator	Agilent	E4421B	MY41000743	Oct. 26, 2020	1 Year
19.	DC Power Supply	IVYTECH	IV3605	1804D360510	Oct. 26, 2020	1 Year
20.	Constant Temperature Humidity Chamber	ZHONGJIAN	ZJ-KHWS80 B	N/A	Oct. 26, 2020	1 Year

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## 1.8. Measurement Uncertainty

For the test methods, according to ETSI EN 300 328 standard, the measurement uncertainty figures shall be calculated in accordance with ETR 100 028-1 [4] and shall correspond to an expansion factor (coverage factor)  $k = 1,96$  or  $k = 2$  (which provide confidence levels of respectively 95 % and 95,45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)).

Maximum measurement uncertainty

Parameter	Uncertainty
Occupied Channel Bandwidth	$\pm 5$ %
RF output power, conducted	$\pm 1,5$ dB
Power Spectral Density, conducted	$\pm 3$ dB
Unwanted Emissions, conducted	$\pm 3$ dB
All emissions, radiated	$\pm 6$ dB
Temperature	$\pm 1$ °C
Humidity	$\pm 5$ %
DC and low frequency voltages	$\pm 3$ %
Time	$\pm 5$ %
Duty Cycle	$\pm 5$ %

## 1.9. Description of Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

### FCC-Registration No.: 184111

Shenzhen Anbotek Compliance Laboratory Limited, 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 No. 184111, September 30, 2020.

### ISED-Registration No.: 8058A

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A, September 30, 2020.

### Test Location

Shenzhen Anbotek Compliance Laboratory Limited.

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## 2. Summary of Test Results

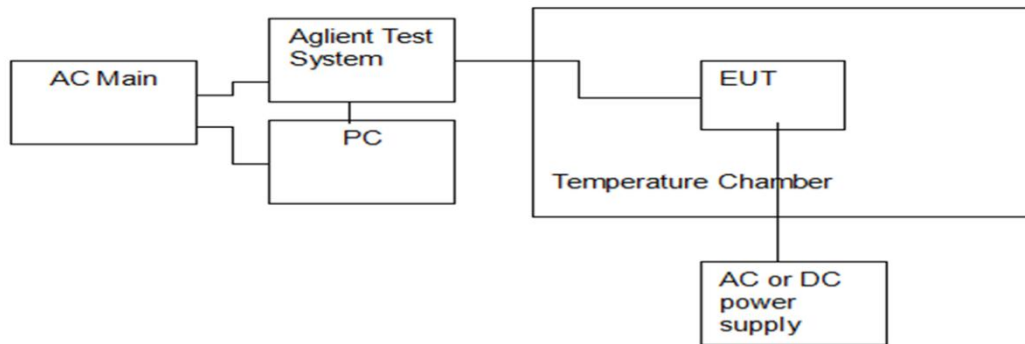
List of Measurements			
No	Test Items	Clause No.	Results
<b>Transmitter Items</b>			
1	RF Output Power	4.3.2.2	Complies
2	Power Spectral Density	4.3.2.3	Complies
3	Duty Cycle, TX-Sequence, TX-gap	4.3.2.4	N/A Note (2)(3)
4	Medium Utilization (MU) factor	4.3.2.5	N/A Note (2)(3)
5	Adaptivity	4.3.2.6	N/A
6	Occupied Channel Bandwidth	4.3.2.7	Complies
7	Transmitter Unwanted Emissions in the Out-Of-Band Domain	4.3.2.8	Complies
8	Transmitter Unwanted Emissions in the Spurious Domain	4.3.2.9	Complies
<b>Receiver Items</b>			
9	Receiver spurious emissions	4.3.1.11	Complies
10	Receiver Blocking	4.3.2.12	Complies
<p>Note:</p> <p>(1) "N/A": indicates test is not applicable in this Test Report.</p> <p>(2) This requirement does not apply for equipment with a maximum declared RF Output power level of less than 10 dBm e.i.r.p. for equipment when operating in a mode where the RF Output power is less than 10 dBm e.i.r.p.</p> <p>(3) This requirement applies to non-adaptive equipment or to adaptive equipment when operating in a non-adaptive mode.</p> <p>(4) This requirement does not apply to adaptive equipment unless operating in non-adaptive mode.</p>			

### 3. RF Output Power

#### 3.1. RF Output Power Limit

Condition	Limit
<input type="checkbox"/> Non-adaptive frequency hopping systems	Equal to or less than the value declared by the manufacturer. This declared value shall be equal to or less than 20 dBm.
<input checked="" type="checkbox"/> Adaptive frequency hopping systems	20dBm

#### 3.2. Test Setup



#### 3.3. Test Procedure

Refer to chapter 5.4.2.2.1 of ETSI EN 300 328 V2.2.2.

1. Run a test program to control EUT transmitting at specific channel
2. Connect the power sensor to the transmit port
3. Power Meter was setting as below:  
Sample speed: 1 MS/s  
Number of bursts: at least 10bursts  
Detector: RMS
4. A power meter was used to read the response of the power sensor
5. Define Start time and Stop time of a burst by 30dB below the highest value of the stores samples.
6. Find the highest burst value
7. Record the power level
8. EIRP = antenna gain + power level of step 7.

#### 3.4. Test Data

Please to see the following pages



Temperature:	See below	Relative Humidity:	60 %
Pressure:	1012 hPa	Test Voltage:	DC 14.4V

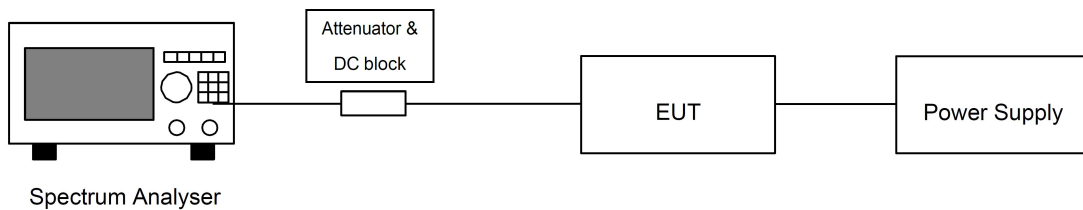
Test Mode:		GFSK				
TEST CONDITIONS				Total e.i.r.p ( dBm )		
				CH00	CH19	CH39
T nom (°C)	25.00	V nom (V)	DC 14.4V	-0.41	0.39	0.04
T min (°C)	-10.00	V nom (V)	DC 14.4V	-0.50	0.26	-0.10
T max (°C)	10.00	V nom (V)	DC 14.4V	-0.53	0.29	0.03
Max RF Power				0.39		
Limits				20dBm		
Result				Complies		

## 4. Power Spectral Density

### 4.1. Test Limit

Condition	Frequency BAND	Limit (e.i.r.p.)
Under normal conditions	2400 ~ 2483.5 MHz	10dBm / 1MHz

### 4.2. Test Setup



### 4.3. Test Procedure

Refer to ETSI EN 300 328 V2.2.2 Clause 5.4.3.

Connect the UUT to the spectrum analyzer and use the following settings:

Frequency range	2400MHz-2483.5MHz
RBW/VBW	10kHz/30kHz
Sweep points/time	>8350 / 10S
Detector	RMS
Trace	Max hold

### 4.4. Test Data

Temperature:	25°C	Relative Humidity:	60 %
Pressure:	1012 hPa	Test Voltage:	DC 14.4V

Channel	Channel Frequency (MHz)	Power Density (dBm/1MHz) (E.I.R.P)	Limit (dBm/1MHz) (E.I.R.P)	Test Result
00	2402.00	-0.46	10	PASS
19	2440.00	-0.46	10	PASS
39	2480.00	-0.01	10	PASS

## 5. Adaptivity

### 5.1. Test Limit

See clause 5.1 for the test conditions. These measurements shall only be performed at normal test conditions.

When supported by the operating frequency range of the equipment, this test shall be performed on two operating (hopping) frequencies randomly selected from the operating frequencies used by the equipment. The first (lower) frequency shall be randomly selected within the range 2 400 MHz to 2 442 MHz while the second (higher) frequency shall be randomly selected within the range 2 442 MHz to 2 483,5 MHz. The equipment shall be in a normal operating (hopping) mode.

For equipment which can operate in an adaptive and a non-adaptive mode, it shall be verified that prior to the test, the equipment is operating in the adaptive mode.

The equipment shall be configured in a mode that results in the longest Channel Occupancy Time.

**Non-LBT based Detect and Avoid:**

- 1 The frequency shall remain unavailable for a minimum time equal to 1 second after which the channel maybe considered again as an 'available' channel;
- 2 COT  $\leq$  40 ms;
- 3 Idle Period = 5% of COT;
- 4 Detection threshold level =  $-70\text{dBm/MHz} + 10 \cdot \log(100\text{mW/Pout})$  (Pout in mW E.I.R.P)

**LBT based Detect and Avoid (Frame Based Equipment):**

- 1 Minimum Clear Channel Assessment (CCA) time  $\leq$  18 us;
- 2 CCA observation time declared by the supplier;
- 3 COT = 1~10 ms;
- 4 Idle Period  $\geq$  5% of COT;
- 5 Detection threshold level =  $-70\text{dBm/MHz} + 10 \cdot \log(100\text{mW/Pout})$  (Pout in mW E.I.R.P)

**LBT based Detect and Avoid (Load Based Equipment):**

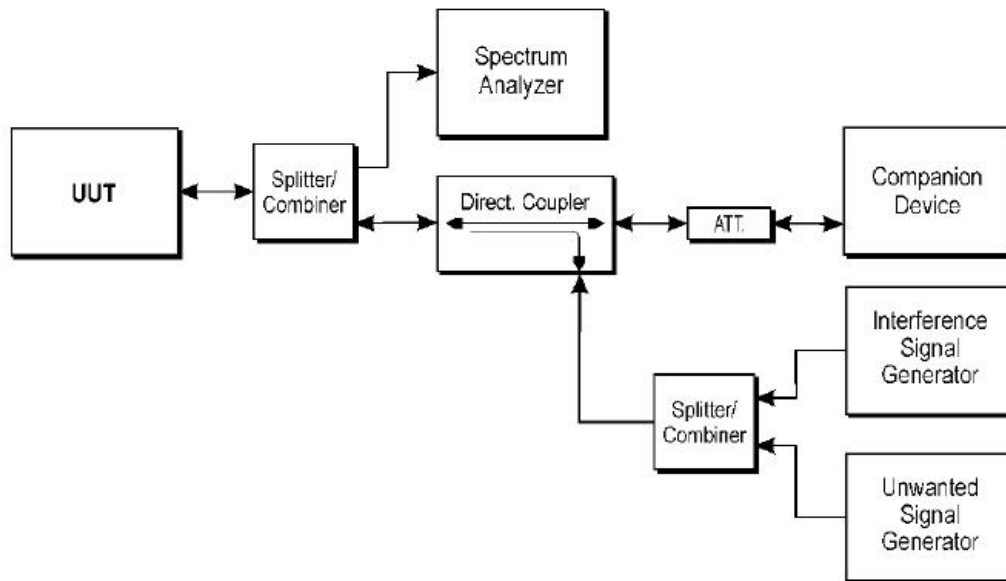
- 1 Minimum Clear Channel Assessment (CCA) time  $\geq$  18 us;
- 2 CCA declared by the manufacturer;
- 3 Detection threshold level =  $-70\text{dBm/MHz} + 10 \cdot \log(100\text{mW/Pout})$  (Pout in mW E.I.R.P)

**Short Control Signalling Transmissions:**

Short Control Signalling Transmissions shall have a maximum duty cycle of 10% within any observation period of 50ms.



## 5.2. Test Setup



## 5.3. Test Procedure

Refer to ETSI EN 300 328 V2.2.2 Clause 5.4.6

## 5.4. Test Data

Not applicable

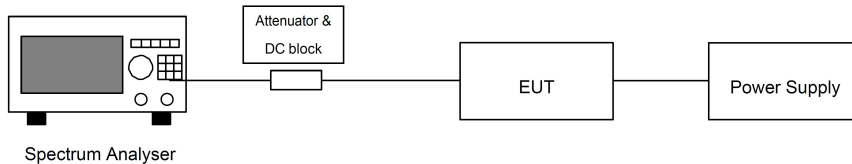
Note : The maximum output power of EUT less than 10dBm, so not applicable.

## 6. Occupied Channel Bandwidth

### 6.1. Test Limit

Condition		Limit
All types of equipment		Shall fall completely within the band 2400 to 2483.5 MHz.
Additional requirement	For non-adaptive using wide band modulations other than FHSS system and e.i.r.p >10dBm.	Less than 20MHz
	For non-adaptive Frequency Hopping system and e.i.r.p >10dBm.	Less than 5MHz

### 6.2. Test Setup



### 6.3. Test Procedure

Refer to ETSI EN 300 328 V2.2.2, clause 5.4.7 for the test conditions and the measurement method.

The setting of the Spectrum Analyzer

Center Frequency	The centre frequency of the channel under test
Frequency Span	2 × Nominal Channel Bandwidth (e.g. 2MHz for BT)
Detector	RMS
RBW	~ 1 % of the span without going below 1 %
VBW	3 × RBW
Trace	Max hold
Sweep time	1S

### 6.4. Test Data

Temperature:	25°C	Relative Humidity:	60 %
Pressure:	1012 hPa	Test Voltage:	DC 14.4V

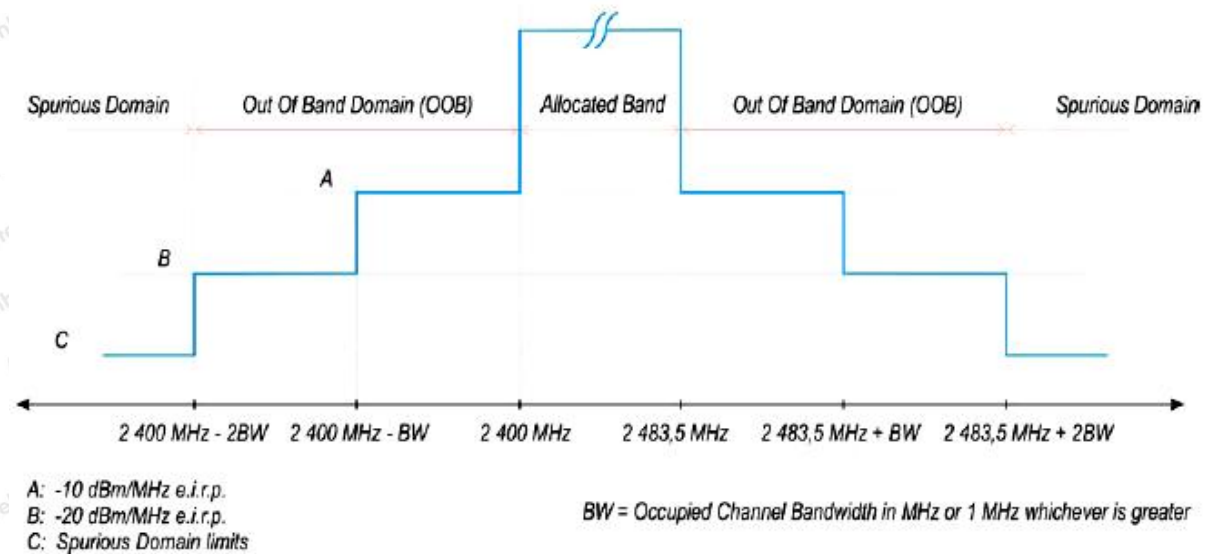
Test Channel	99% Bandwidth (MHz)	FL/FH (MHz)	Limit	Result
Lowest	1.023	2401.495	2400MHz ~ 2483.5MHz	PASS
Highest	1.019	2480.517		PASS

## 7. Transmitter Unwanted Emissions in the out-of-band Domain

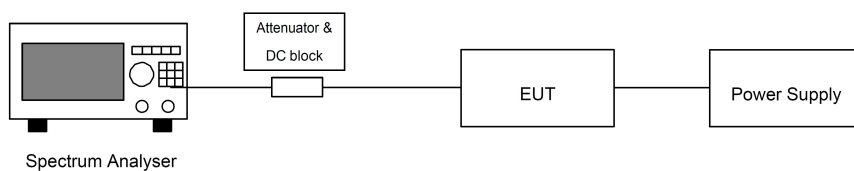
### 7.1. Test Limit

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

Note: Within the 2400MHz to 2483.5MHz band, the Out-of band emissions are fulfilled by compliance with the Occupied Channel Bandwidth requirement in clause 4.3.2.6.



### 7.2. Test Setup



### 7.3. Test Procedure

Refer as ETSI EN 300 328 V2.2.2, clause 5.4.8 for the test conditions and the measurement method.

The setting of the Spectrum Analyzer

RBW/ VBW	1MHz/3MHz
Span	0Hz
Filter mode	Channel filter
Sweep mode	Continuous
Sweep Points	Sweep Time[s]/(1us) or 5000 points, whichever is greater
Detector	RMS
Trace mode	Max Hold
Trigger Mode	Video trigger



**7.4. Test Data**

Temperature:	25°C	Relative Humidity:	60 %
Pressure:	1012 hPa	Test Voltage:	DC 14.4V

Mode	Frequency (MHz)	OOB Frequency (MHz)	Level (dBm/MHz)	Limit (dBm/MHz)	Verdict
BLE	2402	2399.5	-60.19	-10	Pass
BLE	2402	2398.5	-69.62	-20	Pass
BLE	2480	2484	-69.93	-10	Pass
BLE	2480	2484.019	-71.98	-10	Pass
BLE	2480	2485.019	-70.98	-20	Pass
BLE	2480	2485.038	-73.77	-20	Pass

## 8. Transmitter Unwanted Emissions in the Spurious Domain

### 8.1. Test Limit

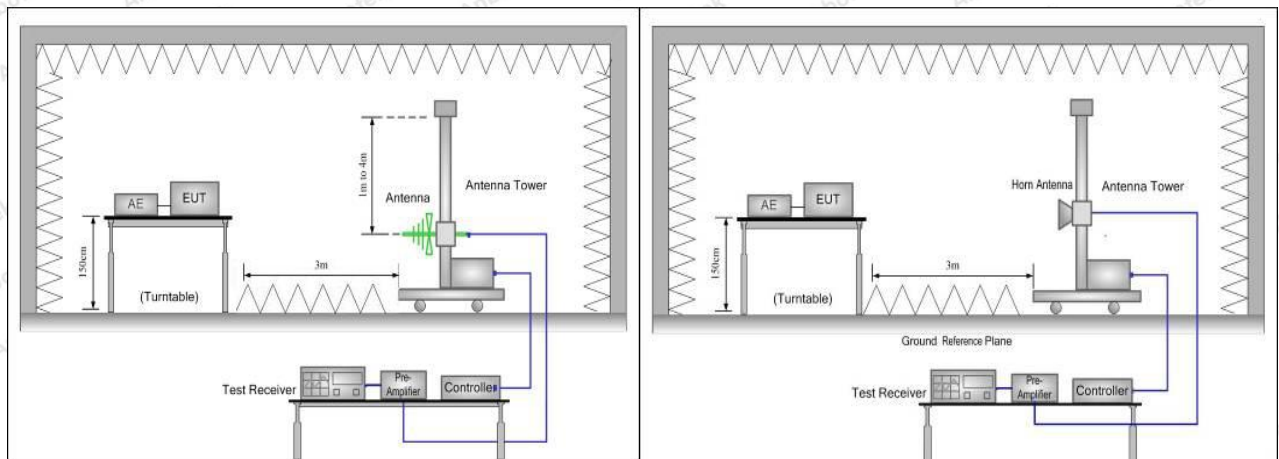
Frequency Range	Maximum Power	Bandwidth
30 MHz to 47 MHz	-36dBm	100kHz
47 MHz to 74 MHz	-54dBm	100kHz
74 MHz to 87,5 MHz	-36dBm	100kHz
87,5 MHz to 118 MHz	-54dBm	100kHz
118 MHz to 174 MHz	-36dBm	100kHz
174 MHz to 230 MHz	-54dBm	100kHz
230 MHz to 470 MHz	-36dBm	100kHz
470 MHz to 694 MHz	-54dBm	100kHz
694 MHz to 1 GHz	-36dBm	100kHz
1 GHz to 12,75 GHz	-30dBm	1MHz

### 8.2. Test Setup

(A) Radiated Emission Test Set-Up Frequency Bellow 1 GHz.

(B) Radiated Emission Test Set-Up Frequency Above 1 GHz

GHz



### 8.3. Test Procedure

Refer to chapter 5.4.9.2.2 of ETSI EN 300 328 V2.2.2 for radiated measurement.

1. For the actual test configuration, please refer to the related Item in this test report (Photographs of the Test Configuration).
2. The measurements were performed when normal hopping was disabled. In this case measurements were performed when operating at the lowest and the highest hopping frequency.
3. The equipment was configured to operate under its worst case situation with respect to output power.
4. The test setup has been constructed as the normal use condition. Controlling software has been activated to set the EUT on specific status.

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**8.4. Test Data**


Temperature:	25°C	Relative Humidity:	60 %
Pressure:	1012 hPa	Test Voltage:	DC 14.4V

The low channel					
Frequency (MHz)	Level(dBm)	Limit (dBm)	Margin(dB)	Polarization	Test Result
67.79	-69.08	-54.00	-15.08	H	PASS
146.01	-67.44	-36.00	-31.44	H	
350.66	-70.01	-36.00	-34.01	H	
590.39	-66.82	-54.00	-12.82	H	
4804.08	-64.51	-30.00	-34.51	H	
7206.49	-63.15	-30.00	-33.15	H	
51.05	-65.44	-54.00	-11.44	V	
136.73	-65.79	-36.00	-29.79	V	
360.05	-68.24	-36.00	-32.24	V	
641.74	-72.32	-54.00	-18.32	V	
4804.65	-59.31	-30.00	-29.31	V	
7206.58	-62.87	-30.00	-32.87	V	

The high channel					
Frequency (MHz)	Level(dBm)	Limit (dBm)	Margin(dB)	Polarization	Test Result
71.04	-73.74	-54.00	-19.74	H	PASS
154.23	-66.26	-36.00	-30.26	H	
272.32	-67.63	-36.00	-31.63	H	
608.53	-66.53	-54.00	-12.53	H	
4960.09	-61.82	-30.00	-31.82	H	
7440.04	-63.36	-30.00	-33.36	H	
62.34	-69.19	-54.00	-15.19	V	
142.72	-67.59	-36.00	-31.59	V	
443.74	-69.97	-36.00	-33.97	V	
504.37	-67.79	-54.00	-13.79	V	
4960.65	-61.79	-30.00	-31.79	V	
7440.99	-60.63	-30.00	-30.63	V	

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## 9. Receiver Spurious Emissions

### 9.1. Test Limit

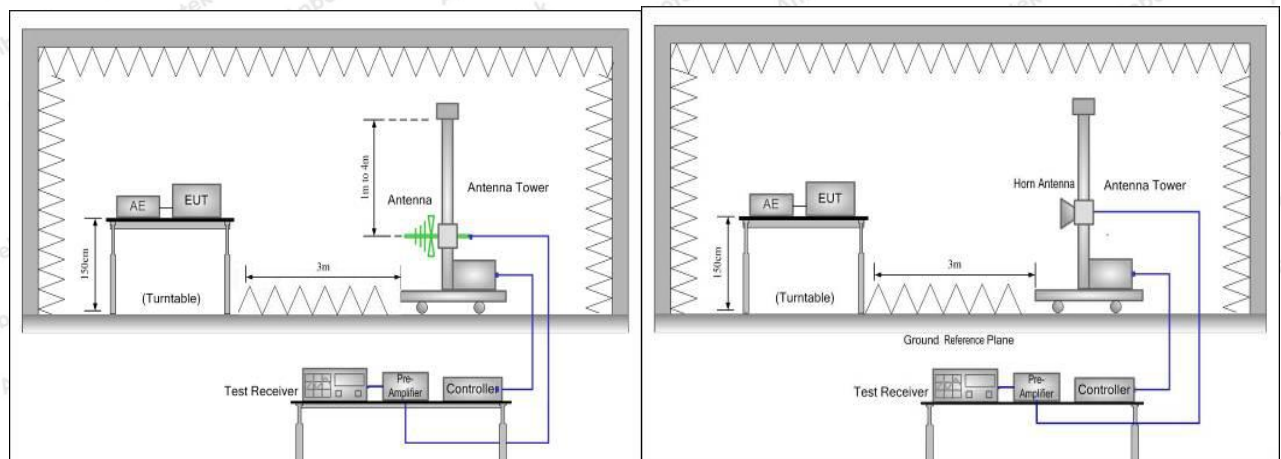
The spurious emissions of the receiver shall not exceed the values given in table.

Frequency Range	Maximum Power
30MHz ~ 1GHz	-57dBm
1GHz ~ 12.75GHz	-47dBm

### 9.2. Test Setup

(A) Radiated Emission Test Set-Up Frequency Bellow 1 GHz.

(B) Radiated Emission Test Set-Up Frequency Above 1 GHz



### 9.3. Test Procedure

Refer as ETSI EN 300 328 V2.2.2, Refer to chapter 5.4.10.2.2 for radiated measurement.

1. For the actual test configuration, please refer to the related Item in this test report (Photographs of the Test Configuration).
2. Testing was performed when the equipment was in a receive-only mode.
3. The measurements were performed when normal hopping was disabled. In this case measurements were performed when operating at the lowest and the highest hopping frequency.
4. The test setup has been constructed as the normal use condition. Controlling software has been activated to set the EUT on specific status.

**9.4. Test Data**

Temperature:	25°C	Relative Humidity:	60 %
Pressure:	1012 hPa	Test Voltage:	DC 14.4V

The low channel					
Frequency (MHz)	Level(dBm)	Limit (dBm)	Margin(dB)	Polarization	Test Result
48.10	-66.70	-57.00	-9.70	H	PASS
160.56	-65.30	-57.00	-8.30	H	
451.53	-70.75	-57.00	-13.75	H	
829.49	-66.51	-57.00	-9.51	H	
3206.10	-55.83	-47.00	-8.83	H	
5995.24	-63.91	-47.00	-16.91	H	
61.01	-72.08	-57.00	-15.08	V	
134.04	-69.01	-57.00	-12.01	V	
437.54	-66.56	-57.00	-9.56	V	
566.39	-69.85	-57.00	-12.85	V	
3132.74	-58.26	-47.00	-11.26	V	
6408.84	-63.39	-47.00	-16.39	V	

The high channel					
Frequency (MHz)	Level(dBm)	Limit (dBm)	Margin(dB)	Polarization	Test Result
69.11	-72.77	-57.00	-15.77	H	PASS
142.68	-66.14	-57.00	-9.14	H	
309.53	-71.09	-57.00	-14.09	H	
488.59	-70.85	-57.00	-13.85	H	
3658.94	-56.92	-47.00	-9.92	H	
6494.78	-59.97	-47.00	-12.97	H	
62.25	-72.64	-57.00	-15.64	V	
138.87	-67.46	-57.00	-10.46	V	
319.40	-69.50	-57.00	-12.50	V	
856.70	-67.75	-57.00	-10.75	V	
3847.70	-58.36	-47.00	-11.36	V	
6344.27	-65.68	-47.00	-18.68	H	

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## 10. Receiver Blocking

### 10.1. Test Limit

This requirement applies to all receiver categories.

RECEIVER CATEGORY		
Category 1 <input type="checkbox"/>	Category 2 <input checked="" type="checkbox"/>	Category 3 <input type="checkbox"/>
Minimum performance criterion	PER $\leq 10\%$	
	Alternative performance criteria	

### Receiver Blocking parameters for Receiver Category 1 equipment

Wanted signal mean power from companion device (dBm) (see notes 1 and 4)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 4)	Type of blocking signal
(-133 dBm + 10 × log <sub>10</sub> (OCBW)) or -68 dBm whichever is less (see note 2)	2 380	-34	CW
	2 504		
(-139 dBm + 10 × log <sub>10</sub> (OCBW)) or -74 dBm whichever is less (see note 3)	2 300		
	2 330		
	2 360		
	2 524		
	2 584		
	2 674		

NOTE 1: OCBW is in Hz.

NOTE 2: 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 3: 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 4: 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.



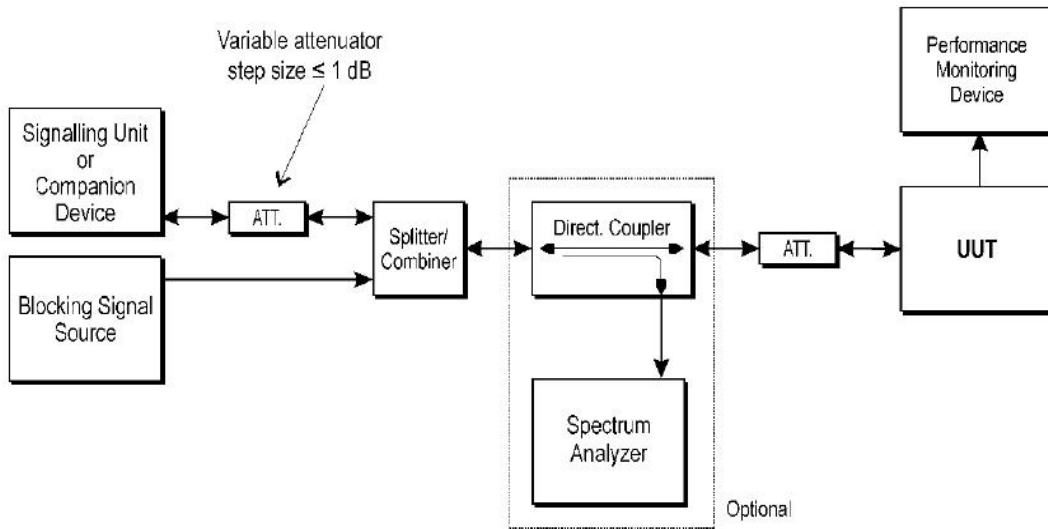
### Receiver Blocking parameters receiver Category 2 equipment

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
(-139 dBm + 10 × log <sub>10</sub> (OCBW) + 10 dB) or (-74 dBm + 10 dB) whichever is less (see note 2)	2 380 2 504 2 300 2 584	-34	CW
<p>NOTE 1: OCBW is in Hz.</p> <p>NOTE 2: 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<sub>min</sub> + 26 dB where P<sub>min</sub> 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.</p> <p>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.</p>			

### Receiver Blocking parameters receiver Category 3 equipment

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
(-139 dBm + 10 × log <sub>10</sub> (OCBW) + 20 dB) or (-74 dBm + 20 dB) whichever is less (see note 2)	2 380 2 504 2 300 2 584	-34	CW
<p>NOTE 1: OCBW is in Hz.</p> <p>NOTE 2: 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<sub>min</sub> + 30 dB where P<sub>min</sub> 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.</p> <p>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.</p>			

### 10.2. Test Setup



### 10.3. Test Procedure

Refer to chapter 5.4.11.2.1 of ETSI EN 300 328 V2.2.2

### 10.4. Minimum Performance Declaration

	CH	Pmin (dBm)	PER ( $\leq 10\%$ )
GFSK	00	-91	Pass
	39	-91	Pass

Note: Pmin is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria.



**10.5. Test Data**

Temperature:	25°C	Relative Humidity:	60 %
Pressure:	1012 hPa	Test Voltage:	DC 14.4V

**CH00**

Wanted Signal Mean Power from Companion Device (dBm/MHz)	Blocking Signal Frequency (MHz)	Blocking Signal Power (dBm)	Type of Blocking Signal	Pass / Fail
-68.90	2380	-34	CW	PASS
	2504			PASS
	2300	-34	CW	PASS
	2584			PASS

**CH39**

Wanted Signal Mean Power from Companion Device (dBm/MHz)	Blocking Signal Frequency (MHz)	Blocking Signal Power (dBm)	Type of Blocking Signal	Pass / Fail
-68.90	2380	-34	CW	PASS
	2504			PASS
	2300	-34	CW	PASS
	2584			PASS

Note: Antenna Gain(Peak) is 1.5dBi, so the above table is given with the calculated levels.



## APPENDIX I -- TEST SETUP PHOTOGRAPH

Photo of Radiation Emission Test



----- End of Report -----