ETSI EN 300 440 V2.2.1

TEST REPORT

For

WIFI+BT module

MODEL NUMBER: 6233A-SRB

REPORT NUMBER: E04A24071288R00303

ISSUE DATE: September 13, 2024

Prepared for

FN-LINK TECHNOLOGY LIMITED

No.8, Litong Road, Liuyang Economic & Technical Development Zone, Changsha, Hunan, China

Prepared by

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Revision History

Rev.	Issue Date	Revisions	Revised By
V0	September 13, 2024	Initial Issue	

Summary of Test Results

Test Item	Clause	Limit/Requirement	Result
Equivalent isotropically radiated power (e.i.r.p.)	Clause 4.2.2.3	Clause 4.2.2	Pass
Permitted range of operating frequencies	Clause 4.2.3.3	Clause 4.2.3	Pass
Unwanted emissions in the spurious domain	Clause 4.2.4.3	Clause 4.2.4	Pass
Receiver Spurious radiations	Clause 4.3.5.3	Clause 4.3.5	Pass
Receiver Blocking	Clause 4.3.4.4	Clause 4.3.4	Pass

*This test report is only published to and used by the applicant, and it is not for evidence purpose in China.
*The measurement result for the sample received is <Pass> according to <ETSI EN 300 440 V2.2.1> when <Accuracy Method> decision rule is applied.

CONTENTS

1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name:	FN-LINK TECHNOLOGY LIMITED
Address:	No.8, Litong Road, Liuyang Economic & Technical Development Zone, Changsha, Hunan, China

Manufacturer Information

Company Name:	FN-LINK TECHNOLOGY LIMITED
Address:	No.8, Litong Road, Liuyang Economic & Technical Development Zone, Changsha, Hunan, China

EUT Information

Product Description:	WIFI+BT module
Model:	6233A-SRB
Brand:	FN-LINK
Sample Received Date:	August 22, 2024
Sample Status:	Normal
Sample ID:	A24071288 001
Date of Tested:	August 22, 2024 to September 13, 2024

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
ETSI EN 300 440 V2.2.1	**Pass**

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Guangdong Global Testing Technology Co., Ltd. CERTIFICATE

2. TEST METHODOLOGY

All tests were performed in accordance with the standard ETSI EN 300 440 V2.2.1 (2018-07)

3. FACILITIES AND ACCREDITATION

Accreditation Certificate	**A2LA (Certificate No.: 6947.01)** Guangdong Global Testing Technology Co., Ltd. has been assessed and proved to be in compliance with A2LA. **FCC (FCC Designation No.: CN1343)** Guangdong Global Testing Technology Co., Ltd. has been recognized to perform compliance testing on equipment subject to Supplier's Declaration of Conformity (SDoC) and Certification rules **ISED (Company No.: 30714)** Guangdong Global Testing Technology Co., Ltd. has been registered and fully described in a report filed with ISED. The Company Number is 30714 and the test lab Conformity Assessment Body Identifier (CABID) is CN0148.

Note: All tests measurement facilities use to collect the measurement data are located at Room 101-105, 203-210, Building 1, No.2, Keji 8 Road, Songshan Lake Park, Dongguan city, Guangdong, People's Republic of China, 523808

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations and is traceable to recognized national standards.

4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test Items	k	Uncertainty
Centre frequencies	1.96	± 9.0 PPM
Occupied Channel Bandwidth	1.96	± 9.0 PPM
RF output power	1.96	± 1.2 dB
Transmit Power Control (TPC)	1.96	± 1.2 dB
power density	1.96	± 2.1 dB
Conducted spurious emissions	1.96	30 MHz-1 GHz: ±1.5 dB 1 GHz-12.75 GHz: ±1.8 dB 12.75 GHz-26.5 GHz: ± 2.1dB
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.		

Test Item	Measurement Frequency Range	K	U(dB)
Radiated emissions	30 MHz ~ 1 GHz	2	3.79
Radiated emissions	1 GHz ~ 18 GHz	2	5.62
Radiated emissions	18 GHz ~ 40 GHz	2	5.54
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.			

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

EUT Name		WIFI+BT module
Model		6233A-SRB
Series Model		N/A
Hardware Version		V1.0
Software Version		V0.39
Ratings		DC 3.3V
Power Supply	DC	3.3V
	Battery	N/A

Frequency Bands:	5725 MHz to 5875 MHz
Frequency Range:	5745 MHz to 5825 MHz
Support Standards:	IEEE 802.11a/n
Type of Modulation:	IEEE 802.11a: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM(64QAM, 16QAM, QPSK, BPSK)
Channel Spacing:	IEEE 802.11a/n-HT20: 20 MHz IEEE 802.11n-HT40: 40 MHz
Data Rate:	IEEE 802.11a: Up to 54 Mbps IEEE 802.11n-HT20: Up to MCS7 IEEE 802.11n-HT40: Up to MCS7
Number of Channels:	5 for 802.11a/n-HT20 2 for 802.11n-HT40
Maximum EIRP:	IEEE 802.11a: 13.85 dBm IEEE 802.11n-HT20: 13.07 dBm IEEE 802.11n-HT40: 12.34 dBm
Antenna Type:	PIFA Antenna
Antenna Gain:	3.99 dBi
Normal Test Voltage:	3.3 Vdc
Extreme Test Voltage:	2.97 to 3.63 Vdc
Extreme Test Temperature:	General: 0 °C to 70 °C
EUT Test software:	Terminal
Note: The Antenna Gain was provided by customer, and this information may affect the validity of the results, customer should be responsible for this.	

5.2. MAXIMUM EIRP

Frequency Range (MHz)	Max Number of Transmit chains (NTX)	IEE Std. 802.11	Maximum EIRP (dBm)
5745-5825	1	a	13.76
5745-5825	1	n HT20	12.22
5745-5825	1	n HT40	11.30

5.3. RECEIVER CATEGORY

The product family of short range radio devices is divided into three receiver categories, each having a set of relevant receiver requirements and minimum performance criteria. The set of receiver requirements depends on the choice of receiver category by the equipment provider.

EUT belong to	Receiver category	Relevant receiver clauses	Risk assessment of receiver performance
☐	1	Adjacent channel selectivity Blocking or desensitization Spurious radiations	Highly reliable SRD communication media; e.g. serving human life inherent systems (may result in a physical risk to a person).
☒	2	Blocking or desensitization Spurious radiations	Medium reliable SRD communication media e.g. causing Inconvenience to persons, which cannot simply be overcome by other means.
☐	3	Spurious radiations	Standard reliable SRD communication media e.g. Inconvenience to persons, which can simply be overcome by other means (e.g. manual).

5.4. CHANNEL LIST

(BW 20MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	153	5765	157	5785	161	5805
165	5825	/	/	/	/	/	/

(BW 40MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
151	5755	159	5795	/	/	/	/

5.5. TEST CHANNEL CONFIGURATION

Test Mode	Test Channel	Frequency
IEEE 802.11a	Low	5745MHz
	Middle	5785MHz
	High	5825MHz
IEEE 802.11n HT20	Low	5745MHz
	Middle	5785MHz
	High	5825MHz
IEEE 802.11n HT40	Low	5755MHz
	High	5795MHz

5.6. THE WORSE CASE POWER SETTING PARAMETER

The Worse Case Power Setting Parameter Under Lower Sub-Band								
Test Software					Terminal			
Test Software Version		Test Channel						
IEEE Std. 802.11	Transmit Antenna Number	NCB: 20 MHz			NCB: 40 MHz		NCB: 80 MHz	
		CH 149	CH 157	CH 165	CH 151	CH 159	CH 155	
a	1	72	72	71	/			
n HT20	1	70	70	68	/			
n HT40	1	/			63	62	/	

Note: NCB means nominal channel bandwidth.

The EUT was tested in the following configuration(s):

Controlled in test mode using a software application on the EUT supplied by customer. The application was used to enable a continuous transmission and to select the mode, test channels, bandwidth, data rates as required.

Test channels referring to section 5.5.

Maximum power setting referring to section 5.6.

Worst-case data rates as provided by the client were:

802.11a mode: 6 Mbps
802.11n HT20 mode: MCS0
802.11n HT40 mode: MCS0

5.7. DESCRIPTION OF AVAILABLE ANTENNAS

Antenna	Frequency (MHz)	Antenna Type	Maximum Antenna Gain (dBi)
1	5745-5825	PIFA	3.99

IEEE Std. 802.11	Transmit and Receive Mode	Description
802.11a	☒TX, RX	ANT 1 can be used as transmitting/receiving antenna.
802.11n HT20	☒TX, RX	ANT 1 can be used as transmitting/receiving antenna.
802.11n HT40	☒TX, RX	ANT 1 can be used as transmitting/receiving antenna.

5.8. ENVIROMENTAL CONDITIONS FOR TESTING

Environment Parameter	Selected Values During Tests
Test Condition	Ambient

	Temperature (°C)	Voltage	Relative Humidity (%)
NVNT	0 to 70	3.3 V	20 to 75
NVLT	0	3.3 V	20 to 75
NVHT	70	3.3 V	20 to 75
LVNT	0 to 70	2.97 V	20 to 75
HVNT	0 to 70	3.63 V	20 to 75
Remark: 1) NV: Normal Voltage; NT: Normal Temperature			

5.9. SUPPORT UNITS FOR SYSTEM TEST

The following support units or accessories were used to form a representative test configuration during the tests.

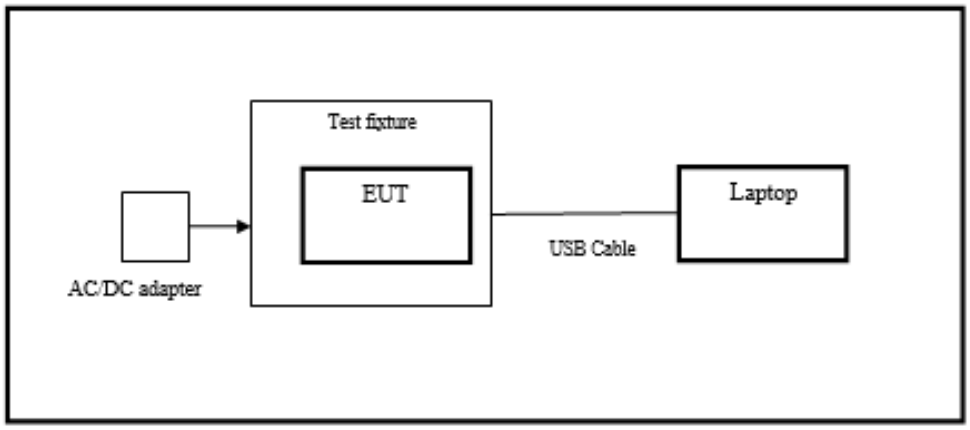
Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	Laptop	Lenovo	Thinkpad T14	PF-3EAKYR	GTG Support
E-2	Adapter	Xingyuan	JYSY1580-0501000E	N/A	GTG Support

The following cables were used to form a representative test configuration during the tests.

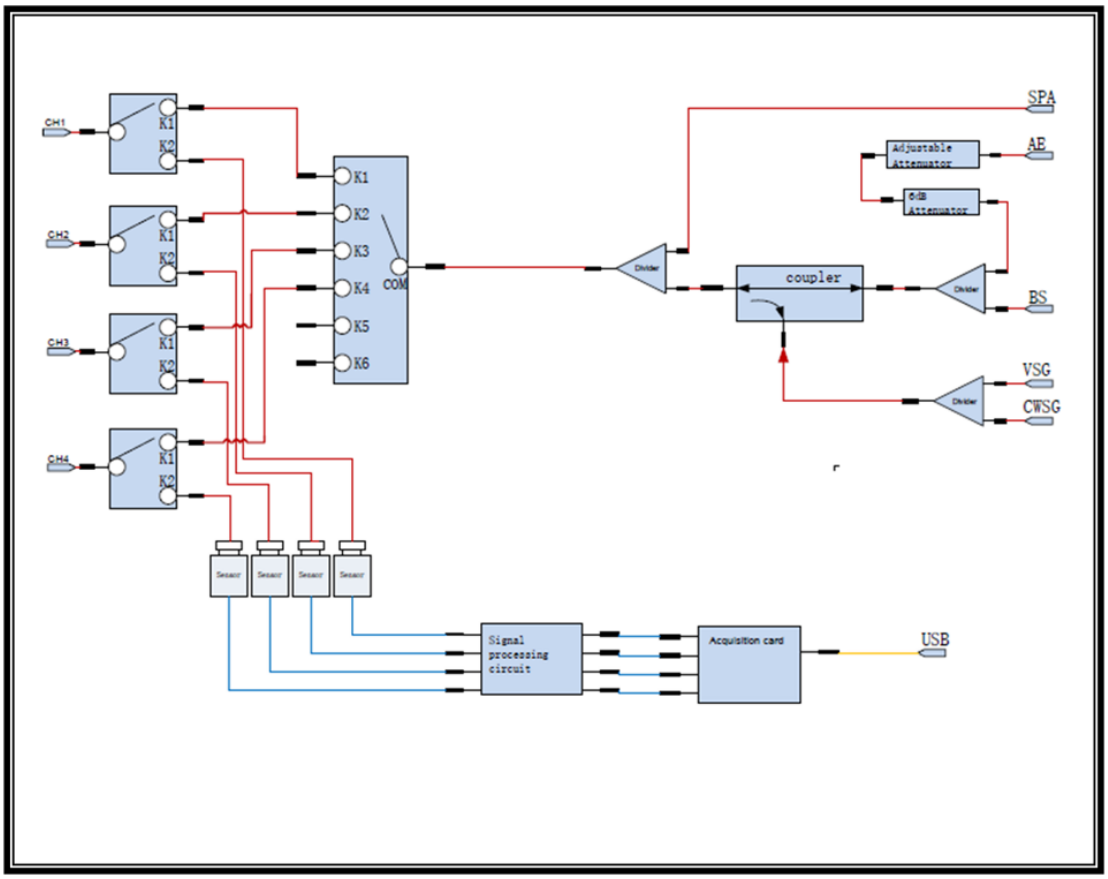
Item	Type of cable	Shielded Type	Ferrite Core	Length
C-1	USB cable	Unshielded	without ferrite	1.23 m

5.10. SETUP DIAGRAM

Radiated emissions:



5.11. TEST SYSTEM CONFIGURATION



6. MEASURING EQUIPMENT AND SOFTWARE USED

Test Equipment of Conducted RF					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Due Date**
Spectrum Analyzer	Rohde & Schwarz	FSV40	102257	2023/09/18	2024/09/17
Spectrum Analyzer	KEYSIGHT	N9020A	MY51285127	2023/09/18	2024/09/17
EXG Analog Signal Generator	KEYSIGHT	N5173B	MY61253075	2023/09/18	2024/09/17
Vector Signal Generator	Rohde & Schwarz	SMM100A	101899	2023/09/18	2024/09/17
RF Control box	MWRF-test	MW100-RFCB	MW220926GTG	2023/09/18	2024/09/17
Wideband Radio Communication Tester	Rohde & Schwarz	CMW270	102792	2023/09/18	2024/09/17
Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	103235	2023/09/18	2024/09/17
temperature humidity chamber	Espec	SH-241	SH-241-2014	2023/09/18	2024/09/17
RF Test Software	MWRF-test	MTS8310E (Ver. V2/0)	N/A	N/A	N/A

Test Equipment of Radiated emissions below 1GHz					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Due Date**
3m Semi-anechoic Chamber	ETS	9m*6m*6m	Q2146	2022/08/30	2025/08/29
EMI Test Receiver	Rohde & Schwarz	ESCI3	101409	2023/09/18	2024/09/17
Spectrum Analyzer	KEYSIGHT	N9020A	MY51283932	2023/09/18	2024/09/17
Pre-Amplifier	HzEMC	HPA-9K0130	HYPA21001	2023/09/18	2024/09/17
Biconilog Antenna	Schwarzbeck	VULB 9168	01315	2022/10/10	2025/10/09
Biconilog Antenna	ETS	3142E	00243646	2022/03/23	2025/03/22
Loop Antenna	ETS	6502	243668	2022/03/30	2025/03/29
Test Software	Farad	EZ-EMC (Ver.FA-03A2 RE)	N/A	N/A	N/A

Test Equipment of Radiated emissions above 1GHz					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Due Date**
3m Semi-anechoic Chamber	ETS	9m*6m*6m	Q2149	2022/08/30	2025/08/29
Spectrum Analyzer	Rohde & Schwarz	FSV40	101413	2023/09/18	2024/09/17
Spectrum Analyzer	KEYSIGHT	N9020A	MY51283932	2023/09/18	2024/09/17
Pre-Amplifier	A-INFO	HPA-1G1850	HYPA21003	2023/09/18	2024/09/17
Horn antenna	A-INFO	3117	246069	2022/03/11	2025/03/10
Pre-Amplifier	ZKJC	HPA-184057	HYPA21004	2023/09/18	2024/09/17

Horn antenna	ZKJC	3116C	246265	2022/03/29	2025/03/28
Test Software	Farad	EZ-EMC (Ver.FA-03A2 RE+)	N/A	N/A	N/A

7. TEST PROCEDURES AND RESULTS

7.1. EQUIVALENT ISOTROPICALLY RADIATED POWER (E.I.R.P.)

LIMITS

Please refer to ETSI EN 300 440 V2.2.1 (2018-07) Clause 4.2.2.4
The transmitter maximum e.i.r.p. under normal and extreme test conditions is provided in table 2.

Table 2: Maximum radiated peak power (e.i.r.p.)

Frequency Bands	Power	Application	Notes
2 400 MHz to 2 483,5 MHz	10 mW e.i.r.p.	Non-specific short range devices	
2 400 MHz to 2 483,5 MHz	25 mW e.i.r.p.	Radio determination devices	
(a) 2 446 MHz to 2 454 MHz	500 mW e.i.r.p.	Radio Frequency Identification (RFID) devices	See also table 4 and annex D
(b) 2 446 MHz to 2 454 MHz	4 W e.i.r.p.	Radio Frequency Identification (RFID) devices	See also table 4 and annex D
5 725 MHz to 5 875 MHz	25 mW e.i.r.p.	Non-specific short range devices	
9 200 MHz to 9 500 MHz	25 mW e.i.r.p.	Radio determination devices	
9 500 MHz to 9 975 MHz	25 mW e.i.r.p.	Radio determination devices	
10,5 GHz to 10,6 GHz	500 mW e.i.r.p.	Radio determination devices	
13,4 GHz to 14,0 GHz	25 mW e.i.r.p.	Radio determination devices	
17,1 GHz to 17,3 GHz	400 mW e.i.r.p.	Radio determination devices	See annex F
24,00 GHz to 24,25 GHz	100 mW e.i.r.p.	Non-specific short range devices and Radio determination devices	

TEST PROCEDURE

Refer to ETSI EN 300 440 V2.2.1 (2018-07) Clause 4.2.2.3

Measurement	
☒Conducted measurement	☐Radiated measurement

This method of measurement shall be used for:
a) equipment with a -6 dB bandwidth greater than 20 MHz, and equipment with a duty cycle below 50 %; or for
b) spread spectrum equipment with a channel bandwidth above 1MHz.

The equivalent isotropically radiated power shall be determined and recorded.
In case of radiated measurements on smart antenna systems using symmetrical power distribution across the available transmit chains, the EUT should, where possible, be configured so that only one transmit chain (antenna) is activated while the other transmit chains are disabled. Where this is not possible, the method used shall be documented in the test report. If only one transmit chain was tested, the result for the active transmit chain shall be corrected to be valid for the whole system (all transmit chains).
NOTE: The power (in mW) for one transmit chain needs to be multiplied with the number of transmit chains to obtain the total power for the system.
The measurement shall be performed using normal operation of the equipment with the test modulation applied (see clause 5.8.1).
The test procedure shall be as follows:
Step 1:
• using a suitable means, the output of the transmitter shall be coupled to a matched diode detector; • the output of the diode detector shall be connected to the vertical channel of an oscilloscope; • the combination of the diode detector and the oscilloscope shall be capable of faithfully reproducing the envelope peaks and the duty cycle of the transmitter output signal; • the

observed duty cycle of the transmitter (Tx on/(Tx on + Tx off)) shall be noted as x, (0 < x < 1) and recorded.
Step 2:
• the average output power of the transmitter shall be determined using a wideband, calibrated RF power meter with a matched thermocouple detector or an equivalent thereof and, where applicable, with an integration period that exceeds the repetition period of the transmitter by a factor 5 or more. The observed value shall be recorded as "A" (in dBm); • the e.i.r.p. shall be calculated from the above measured power output A, the observed duty cycle x, and the applicable antenna assembly gain "G" in dBi, according to the formula:
- P = A + G + 10 log (1/x);
- P shall not exceed the value specified in clause 4.2.2.4.
The measurement shall be repeated at the lowest, the middle, and the highest frequency of the stated frequency range. These frequencies shall be recorded. FHSS equipment shall be made to hop continuously to each of these three frequencies separately.

TEST ENVIRONMENT

Temperature	22.6℃	Relative Humidity	51%
Atmosphere Pressure	101kPa		

TEST RESULTS

Please refer to section "Test Data" - Appendix B

7.2. PERMITTED RANGE OF OPERATING FREQUENCIES

LIMIT

The width of the power spectrum envelope is f_H -f_L for a given operating frequency. In equipment that allows adjustment or selection of different operating frequencies, the power envelope takes up different positions in the allowed band. The frequency range is determined by the lowest value of fL and the highest value of fH resulting from the adjustment of the equipment to the lowest and highest operating frequencies.
The occupied bandwidth (i.e. the bandwidth in which 99 % of the wanted emission is contained) of the transmitter shall fall within the assigned frequency band.
For all equipment the frequency range shall lie within the frequency band given by clause 4.2.2.4, table 2. For non-harmonized frequency bands the available frequency range may differ between national administrations.

TEST PROCEDURE

Refer to ETSI EN 300 440 V2.2.1 (2018-07) Clause 4.2.3.3

Measurement	
☒Conducted measurement	☐Radiated measurement

The permitted range of operating frequencies includes all frequencies on which the equipment may operate within an assigned frequency band. The operating frequency range shall be declared by the manufacturer.
The frequency range of the equipment is determined by the lowest and highest frequencies occupied by the power envelope in accordance with clause 4.2.2.4, table 2.
FH is the highest frequency of the power envelope, it is the frequency furthest above the frequency of maximum power where the output power envelope drops below the level of -75 dBm/Hz spectral power density (e.g. -30 dBm if measured in a 30 kHz reference bandwidth) e.i.r.p.
FL is the lowest frequency of the power envelope; it is the frequency furthest below the frequency of maximum power where the output power drops below the level of -75 dBm/Hz spectral power density (e.g. -30 dBm if measured in a 30 kHz reference bandwidth) e.i.r.p.
The occupied bandwidths and OCW of the transmitter shall be declared. Where differing modes of emission are available, all modes and their associated bandwidths shall be stated.
The range of frequencies, determined by clause 4.2.3, shall be specified in the test report.
The measurement procedure shall be as follows:
a) put the spectrum analyser in video averaging mode with a minimum of 50 sweeps selected;

b) select the lowest operating frequency of the equipment under test and activate the transmitter with modulation applied. The RF emission of the equipment shall be displayed on the spectrum analyser;

c) using the marker of the spectrum analyser, find the lowest frequency below the operating frequency at which the spectral power density drops below the level given in clause 4.2.3. This frequency shall be recorded in the test report;

d) select the highest operating frequency of the equipment under test and find the highest frequency at which the spectral power density drops below the value given in clause 4.2.3. This frequency shall be recorded in the test report;

e) the difference between the frequencies measured in steps c) and d) is the operating frequency range. It shall be recorded in the test report.

This measurement shall be repeated for each frequency range declared by the manufacturer.

TEST ENVIRONMENT

Temperature	22.6℃	Relative Humidity	51%
Atmosphere Pressure	101kPa		

TEST RESULTS

Please refer to section "Test Data" - Appendix B

7.3. UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN

LIMIT

The maximum power limits of any unwanted emissions in the spurious domain are given in table 3.

Table 3: Spurious emissions

Frequency ranges / State	47 MHz to 74 MHz 87,5 MHz to 108 MHz 174 MHz to 230 MHz 470 MHz to 862 MHz	Other frequencies ≤ 1 000 MHz	Frequencies > 1 000 MHz
Operating	4 nW	250 nW	1 µW
Standby	2 nW	2 nW	20 nW

TEST PROCEDURE

Please refer to ETSI EN 300 440 V2.2.1 (2018-07) Clause 4.2.4.3

Measurement	
☒Conducted measurement	☒Radiated measurement

Conducted spurious emission:

This method of measurement applies to transmitters having a permanent antenna connector.

Additional requirements for equipment employing FHSS modulation are given in clause 4.2.4.3.4.

a) The transmitter shall be connected to a measuring receiver through a test load, 50 Ω power attenuator, and if necessary, an appropriate filter to avoid overload of the measuring receiver. The bandwidth of the measuring receiver shall be adjusted until the sensitivity of the measuring receiver is at least 6 dB below the spurious emission limit given in table 3, see clause 4.2.4.4. This bandwidth shall be recorded in the test report.

For the measurement of spurious emissions below the second harmonic of the carrier frequency, the filter used shall be a high "Q" (notch) filter centred on the transmitter carrier frequency, which attenuates this signal by at least 30 dB.

For the measurement of spurious emissions at and above the second harmonic of the carrier frequency the filter used shall be a high pass filter with a stop band rejection exceeding 40 dB. The cut-off frequency of the high pass filter shall be approximately 1,5 times the transmitter carrier frequency.

Precautions may be required to ensure that the test load does not generate or that the high pass filter does not attenuate, the harmonics of the carrier.

b) The transmitter shall be unmodulated and operating at the maximum limit of its specified power range. If modulation cannot be inhibited then the test shall be carried out with modulation (see clause 5.8.1) and this fact shall be recorded in the test report.

c) For carrier frequencies in the range 1 GHz to 20 GHz the frequency of the measuring receiver shall be adjusted over the frequency range 25 MHz to 10 times the carrier frequency, not exceeding 40 GHz. For carrier frequencies above 20 GHz the measuring receiver shall be tuned over the range 25 MHz up to twice the carrier frequency, not exceeding 66 GHz. The frequency and level of every spurious emission found shall be noted. The emissions within the channel occupied by the transmitter carrier and, for channelized systems its adjacent channels, shall not be recorded.

d) If the measuring receiver has not been calibrated in terms of power level at the transmitter output, the level of any detected components shall be determined by replacing the transmitter by the signal generator and adjusting it to reproduce the frequency and level of every spurious emission noted in step c). The absolute power level of each of the emissions shall be noted.

e) The frequency and level of each spurious emission measured and the bandwidth of the measuring receiver shall be recorded in the test report.

f) If a user accessible power adjustment is provided then the tests in steps c) to e) shall be repeated at the lowest power setting available.

g) The measurement in steps c) to f) shall be repeated with the transmitter in the standby condition if this option is available.

radiated spurious emission:

This method of measurement applies to transmitters having an integral antenna. Additional requirements for equipment employing FHSS modulation are given in clause 4.2.4.3.4.

a) A test site selected from Annex E which fulfils the requirements of the specified frequency range of this measurement shall be used. The test antenna shall be oriented initially for vertical polarization and connected to a measuring receiver, through a suitable filter to avoid overloading of the measuring receiver if required. The bandwidth of the measuring receiver shall be adjusted until the sensitivity of the measuring receiver, after allowing for the coupling loss, is at least 6 dB below the spurious emission limit given in table 3, see clause 4.2.4.4. This bandwidth shall be recorded in the test report.

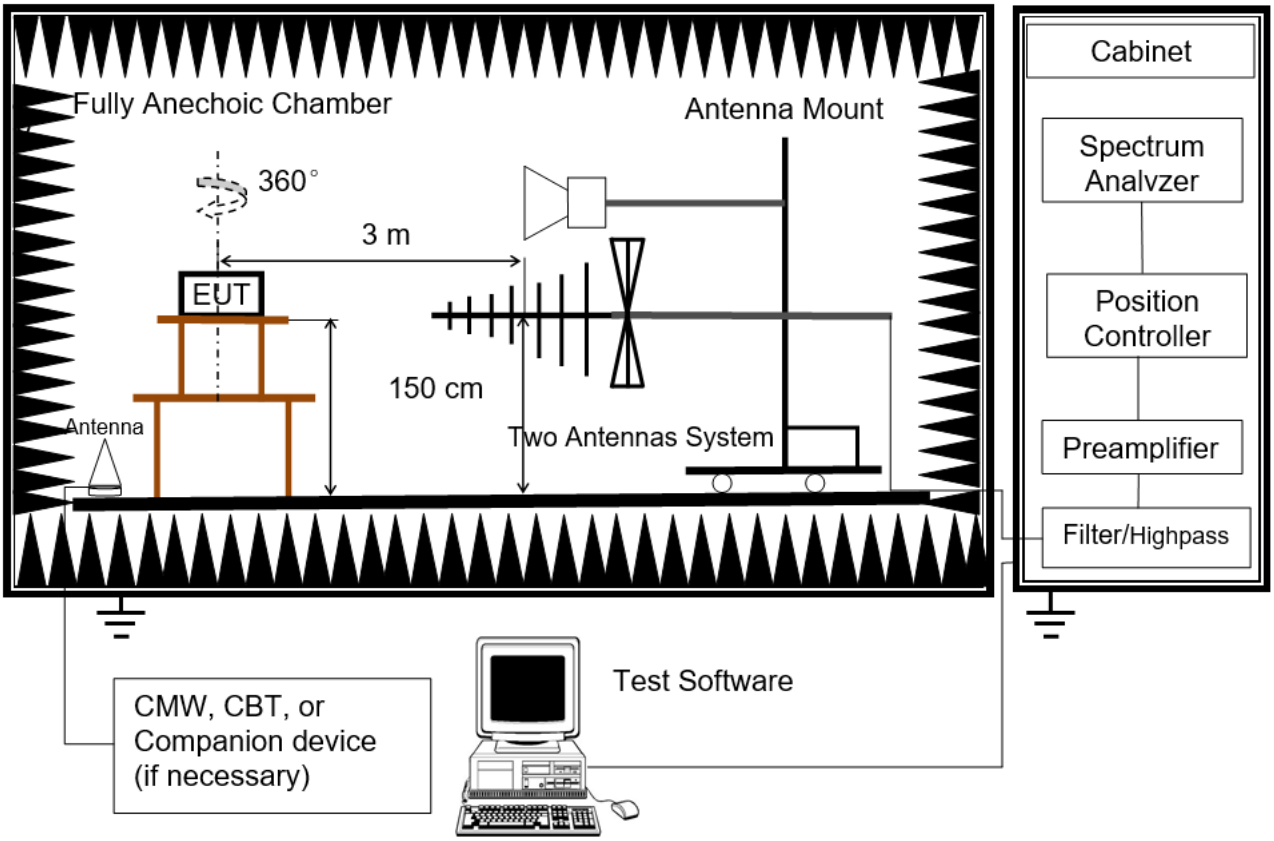
For the measurement of spurious emissions below the second harmonic of the carrier frequency the optional filter used shall be a high "Q" (notch) filter centred on the transmitter carrier frequency and attenuating this signal by at least 30 dB.

For the measurement of spurious emissions at and above the second harmonic of the carrier frequency the optional filter used shall be a high pass filter with a stop band rejection exceeding 40 dB. The cut-off frequency of the high pass filter shall be approximately 1,5 times the transmitter carrier frequency.

The transmitter under test shall be placed on the support in its standard position and shall be switched on without modulation. If modulation cannot be inhibited then the test shall be carried out with modulation (see clause 5.8.1) and this fact shall be recorded in the test report.

b) The same method of measurement as steps b) and k) of clause 4.2.4.3.2 shall be used.

TEST SETUP



TEST ENVIRONMENT

Conducted measurement:

Temperature	22.6℃	Relative Humidity	51%
Atmosphere Pressure	101kPa		

Radiated measurement:

Temperature	23.6℃	Relative Humidity	53%
Atmosphere Pressure	101kPa		

TEST RESULTS

Please refer to section "Test Data" - Appendix B

7.4. RECEIVER SPURIOUS RADIATIONS

LIMITS

The power of any spurious emission shall not exceed 2nW in the range 25 MHz to 1GHz and shall not exceed 20nW on frequencies above 1GHz.

TEST PROCEDURE

Please refer to ETSI EN 300 440 V2.2.1 (2018-07) Clause 4.3.5.3

Measurement	
☒Conducted measurement	☒Radiated measurement

Conducted Spurious Components:

This requirement applies to all receivers.

Spurious emission levels from a transmitter and receiver of full duplex equipment using a common port are measured simultaneously and the test only needs to be conducted once (see clause 4.2.4)."A test load, 50 Ω power attenuator, may be used to protect the measuring receiver (see clause 5.8.5) against damage when testing a receiver combined in one unit with a transmitter.

The measuring receiver used shall have sufficient dynamic range and sensitivity to achieve the required measurement accuracy at the specified limit. The bandwidth of the measuring receiver shall be adjusted until the sensitivity of the measuring receiver is at least 6 dB below the spurious emission limit given in clause 4.3.5.4. This bandwidth shall be recorded in the test report:

a) The receiver input terminals shall be connected to a measuring receiver having an input impedance of 50 Ω and the receiver is switched on.

b) For carrier frequencies in the range 1 GHz to 20 GHz the frequency of the measuring receiver shall be adjusted over the frequency range 25 MHz to 10 times the carrier frequency, not exceeding 40 GHz. For carrier frequencies above 20 GHz the measuring receiver shall be tuned over the range 25 MHz up to twice the carrier frequency not exceeding 66 GHz. The frequency and the absolute power level of each of the spurious components found shall be noted.

c) If the detecting device is not calibrated in terms of power input, the level of any detected components shall be determined by replacing the receiver by the signal generator and adjusting it to reproduce the frequency and level of every spurious component noted in step b). The absolute power level of each spurious component shall be noted.

d) The frequency and level of each spurious emission measured and the bandwidth of the measuring receiver shall be recorded in the test report.

Radiated Spurious Components:

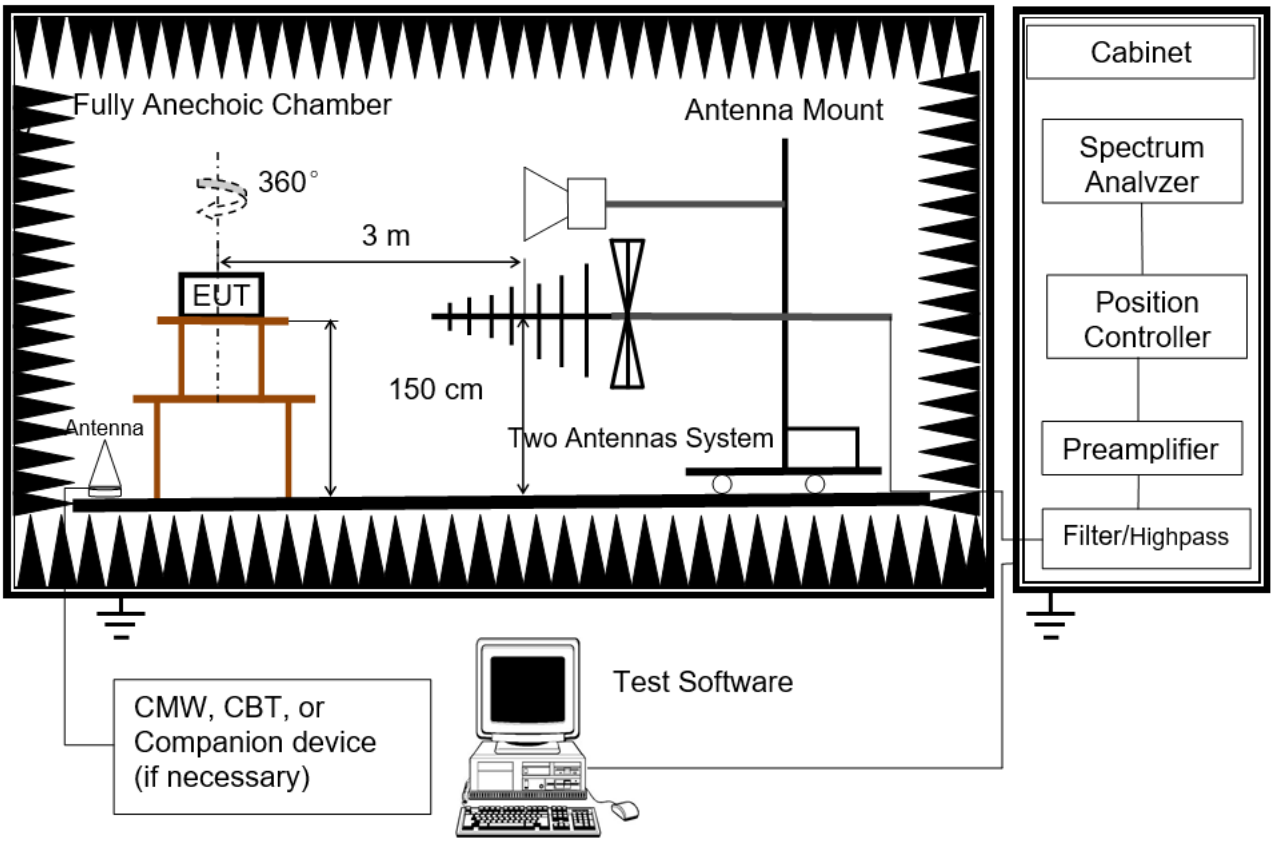
This method of measurement applies to receivers having an integral antenna.

a) A test site selected from Annex E which fulfils the requirements of the specified frequency range of this measurement shall be used. The test antenna shall be oriented initially for vertical polarization and connected to a measuring receiver. The bandwidth of the measuring receiver

shall be adjusted until the sensitivity of the measuring receiver is at least 6 dB below the spurious emission limit given in clause 4.3.5.4. This bandwidth shall be recorded in the test report.
The receiver under test shall be placed on the support in its standard position.

b) The same method of measurement as items b) to i) of clause 4.3.5.3.2 shall apply.

TEST SETUP



TEST ENVIRONMENT

Conducted measurement:

Temperature	22.6℃	Relative Humidity	51%
Atmosphere Pressure	101kPa		

Radiated measurement:

Temperature	23.6℃	Relative Humidity	53%
Atmosphere Pressure	101kPa		

TEST RESULTS

Please refer to section "Test Data" - Appendix B

7.5. Receiver Blocking

LIMITS

While maintaining the minimum performance criteria as defined in clause 4.2.8.3, the blocking levels at specified frequency offsets shall be equal to or greater than the limits defined in table 9.

Table 9: Receiver Blocking parameters

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 2)		Type of blocking signal
		Master or Slave with radar detection (see table D.2, note 2)	Slave without radar detection (see table D.2, note 2)	
Pmin + 6 dB	5 100	-53	-59	Continuous Wave
Pmin + 6 dB	4 900 5 000 5 975	-47	-53	Continuous Wave
NOTE 1: P_{min} is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined clause 4.2.8.3 in the absence of any blocking signal. NOTE 2: The levels specified are levels in front of the UUT antenna. In case of conducted measurements, the same levels should be used at the antenna connector irrespective of antenna gain.				

Performance Criteria
The minimum performance criterion shall be a PER of less than or equal to 10 %. The manufacturer may declare alternative performance criteria as long as that is appropriate for the intended use of the equipment (see clause 5.4.1, item t)).

TEST PROCEDURE

Please refer to ETSI EN 301 893 V2.1.1 (2017-05) Clause 5.4.10.2

Measurement	
☒Conducted measurement	☐Radiated measurement

Step 1:
• The UUT shall be set to the first operating frequency to be tested (see clause 5.3.2).

Step 2:
• The blocking signal generator is set to the first frequency as defined in table 9.

Step 3:
• With the blocking signal generator switched off a communication link is set up between the UUT and the associated companion device using the test setup shown in figure 18. The attenuation of the variable attenuator shall be increased in 1 dB steps to a value at which the minimum performance criteria as specified in clause 4.2.8.3 is still met. The resulting level for the wanted signal at the input of the UUT is Pmin.

• This signal level (Pmin) is increased by 6 dB resulting in a new level (Pmin + 6 dB) of the wanted signal at the UUT receiver input.

Step 4:
• The level of the blocking signal at the UUT input is set to the level provided in table 9. It shall be verified and recorded in the test report that the performance criteria as specified in clause 4.2.8.3 are met.

• If the performance criteria as specified in clause 4.2.8.3 are met, the level of the blocking signal at the UUT may be further increased (e.g. in steps of 1 dB) until the level whereby the performance criteria as specified in clause 4.2.8.3 are no longer met. The highest level at which the performance criteria are met is recorded in the test report.

Step 5:
• Repeat step 4 for each remaining combination of frequency and level as specified in table 9. Direct. Coupler Splitter/ UUT Combiner Performance Monitoring Device Optional ATT. Spectrum Analyzer Signalling Unit or Companion Device Variable attenuator step size ≤ 1 dB Shielding or Shielded Room Blocking Signal Generator.

Step 6:
• Repeat step 2 to step 5 with the UUT operating at the other operating frequencies at which the blocking test has to be performed. See clause 5.3.2.

TEST SETUP

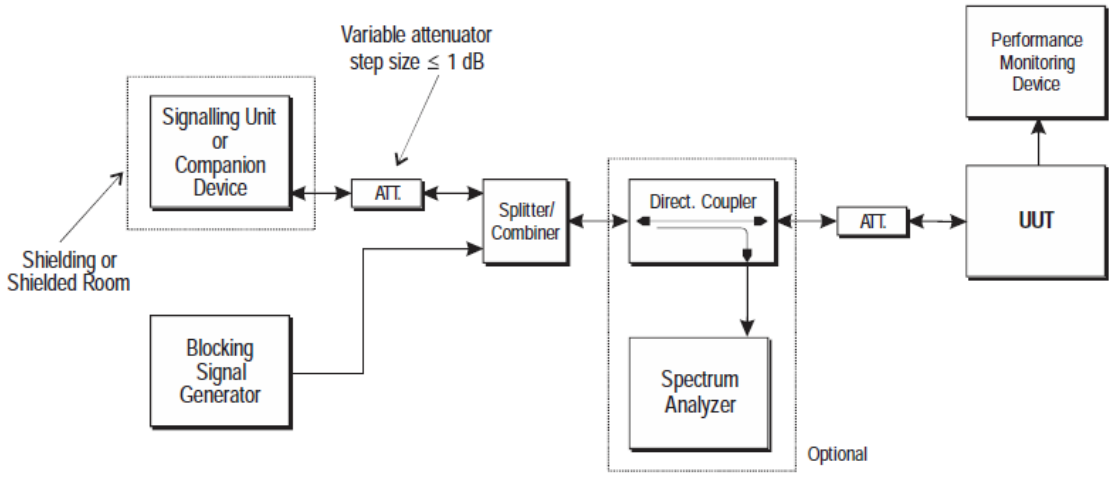


Figure 18: Test Set-up for receiver blocking

TEST ENVIRONMENT

Temperature	22.6℃	Relative Humidity	51%
Atmosphere Pressure	101kPa		

TEST RESULTS

Please refer to section "Test Data" - Appendix B

8. TEST DATA

Please refer to section "Test Data" - Appendix B

APPENDIX: PHOTOGRAPHS OF TEST CONFIGURATION

Please refer to the report: E04A24071288R00302.

APPENDIX: PHOTOGRAPHS OF THE EUT

Please refer to the report: E04A24071288E00301.

END OF REPORT