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ETSI EN 302 208 V3.1.1 (2016-11)

TEST REPORT

FOR

RFID Reader module

Model No.: CL7206A5

Trademark: Hopeland

Report No.: ES180728001W02

Issue Date: October 18, 2018

Prepared for

SHENZHEN HOPELAND TECHNOLOGIES CO., LTD.

17/F, Block A, Clou Bldg, Baoshen Road, Hitech Industrial Park North, Nanshan District,518007, Shenzhen, China

Prepared by

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1. TEST RESULT CERTIFICATION

Applicant	:	SHENZHEN HOPELAND TECHNOLOGIES CO., LTD. 17/F, Block A, Clou Bldg, Baoshen Road, Hitech Industrial Park North, Nanshan District,518007, Shenzhen, China
Manufacturer	:	SHENZHEN HOPELAND TECHNOLOGIES CO., LTD. 17/F, Block A, Clou Bldg, Baoshen Road, Hitech Industrial Park North, Nanshan District,518007, Shenzhen, China
EUT	:	RFID Reader module
Model Name	:	CL7206A5
Trademark	:	Hopeland

Measurement Procedure Used:

APPLICABLE STANDARDS	
STANDARD	**TEST RESULT**
ETSI EN 302 208 V3.1.1 (2016-11)	PASS

The device described above is tested by SHENZHEN EMTEK CO., LTD. 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 EMTEK CO., LTD. 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 302 208 V3.1.1 (2016-11) requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of SHENZHEN EMTEK CO., LTD.

Date of Test : July 29, 2018 to October 18, 2018

Prepared by : Sevin Li/Editor

Reviewer : Joe Xia/Supervisor

Approve & Authorized Signer : Lisa Wang/Manager

2. EUT DESCRIPTION

Equipment Style	Fixed Interrogators
Product Name	RFID Reader module
Model Number	CL7206A5
Power Supply	DC 24V from adapter
Adapter	Model: FSP060-DAAN2 Input: 100-240V~, 1.5A, 50-60Hz Output: DC 24V, 2.5 Max
Operating Frequency	865.7MHz – 867.5MHz
Modulation	ASK
Transmit Power Max	26.24dBm
Number of Channels	4
Antenna Type	Panel Antenna
Max Antenna Gain	9 dBi
Temperature Range	-20°C ~ +70°C

Note: *for more details, please refer to the User's manual of the EUT.*

Modified History

Rev.	Summary	Date of Rev.	Report No.
V1.0	Original Report	/	ES180728001W02

3. SUMMARY OF TEST RESULT

Clause (EN 300 328)	Test Parameter	Verdict	Remark
4.3.1	Frequency Error	PASS	Note1
4.3.2	Frequency Stability Under Low Voltage Conditions	N/A	Note2
4.3.3	Effective Radiated Power	PASS	Note1
4.3.4	Transmitter Antenna Beam-Width	PASS	Note3
4.3.5	Transmission Spectrum Masks	PASS	Note1
4.3.6	Transmitter Spurious Emissions	PASS	Note1
4.3.7	Transmission Times	PASS	Note4
4.3.8	Mitigation Using DAA	N/A	Note5
4.4.1	Receiver Selectivity	Pass	Note1
4.4.2	Receiver Blocking	Pass	Note1
4.4.3	Receiver Spurious Emissions	Pass	Note1
4.5.1	Tag Radiated Power	N/A	Note6
4.5.2	Tag Unwanted Emissions	N/A	Note6

NOTE1: Applies to interrogators
NOTE2: Applies to battery powered interrogators
NOTE3: Applies to antennas [in both lower and upper bands
NOTE4: Applies to interrogators in the lower band
NOTE5: Applies to interrogators in the upper band
NOTE6: Applies to tags

4. TEST METHODOLOGY

4.1 GENERAL DESCRIPTION OF APPLIED STANDARDS

According to its specifications, the EUT must comply with the requirements of the following standards: ETSI EN 302 208 –Radio Frequency Identification Equipment operating in the band 865 MHz to 868 MHz with power levels up to 2 W and in the band 915 MHz to 921 MHz with power levels up to 4 W; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU

4.2 MEASUREMENT EQUIPMENT USED

For Spurious Emissions Test

Equipment Type	Manufacturer	Model No.	Serial Number	Last Cal.
EMI Test Receiver	Rohde & Schwarz	ESCI	101414	May 19, 2018
EMI Test Receiver	Rohde & Schwarz	FSV40	132.1-3008K39-100967-AP	May 19, 2018
Pre-Amplifier	LUNAR-EM	LNA30M3G-25	J10100000071	May 19, 2018
Pre-Amplifier	Lunar EM	LNA1G18-48	J1011131010001	May 19, 2018
Bilog Antenna	Schwarzbeck	VULB9163	660	May 20, 2018
Horn Antenna	Schwarzbeck	BBHA 9120	1178	May 20, 2018
Cable	H+B	NmSm-05-C15052	N/A	May 20, 2018
Cable	H+B	NmSm-2-C15201	N/A	May 20, 2018
Cable	H+B	NmNm-7-C15702	N/A	May 20, 2018
Cable	H+B	SAC-40G-1	414	May 20, 2018
Cable	H+B	SUCOFLEX104	MY14871/4	May 20, 2018
Cable	H+B	BLU18A-NmSm-6500	D8501	May 20, 2018
Band reject Filter(50dB)	WI/DE	WRCGV-2400(2400-2485MHz)	2	May 20, 2018
Remark: *Each piece of equipment is scheduled for calibration once a year.*				

For other test items:

Equipment Type	Manufacturer	Model No.	Serial Number	Last Cal.
Vector Signal Generater	Agilent	N5182B	My53050553	May 19, 2018
Analog Signal Generator	Agilent	N5171B	My53050878	May 19, 2018
Signal Analyzer	Agilent	N9010A	My53470879	May 19, 2018
Power Analyzer	Agilent	PS-X10-200	N/A	May 19, 2018
Wideband Radio Communication Tester	R&S	CMW500	1201.0002K50-140822zk	May 20, 2018
Test Accessories	Agilent	PS-X10-100	N/A	May 19, 2018
Temperature&Humidity test chamber	ESPEC	EL-02KA	12107166	May 19, 2018
Blocking Box	Agilent	AD211	N/A	June 20, 2018
Remark: *Each piece of equipment is scheduled for calibration once a year.*				

4.3 DESCRIPTION OF TEST MODES

The EUT has been tested under its typical operating condition.
The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.
The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

Test of channel included the lowest and middle and highest frequency to perform the test, then record on this report.

Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

According to the manufacturer, the test power setting: 26 level

Frequency and Channel list:

☒Lower band					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
4	865.70	7	866.30	10	866.90
13	867.50				

Test Frequency and channel:

☒Lower band					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
4	865.70	7	866.30	10	866.90
13	867.50				

Test Environment

Environment Parameter	Selected Values During Tests	
Relative humidity content:	55 %	
Temperature:	TL	-20 °C
	TN	25 °C
	TH	70 °C
Power supply:	VL	AC 207V
	VN	AC 230V
	VH	AC 253V

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

Bldg 69, Majialong Industry Zone District, Nanshan District, Shenzhen, China
The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with preselectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

5.3 LABORATORY ACCREDITATIONS AND LISTINGS

Site Description		
EMC Lab.	:	Accredited by CNAS,2016.10.24 The certificate is valid until 2022.10.28 The Laboratory has been assessed and proved to be in compliance with CNAS-CL01:2006 (identical to ISO/IEC 17025:2005) The Certificate Registration Number is L2291. Accredited by TUV Rheinland Shenzhen 2016.5.19 The Laboratory has been assessed according to the requirements ISO/IEC 17025. Accredited by FCC, August 06, 2018 The certificate is valid until August 07, 2020 Designation Number: CN1204 Test Firm Registration Number: 882943 Accredited by Industry Canada, November 24, 2015 The Certificate Registration Number is 4480A
Name of Firm	:	EMTEK(SHENZHEN) CO., LTD.
Site Location	:	Bldg 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China

6. TEST SYSTEM UNCERTAINTY

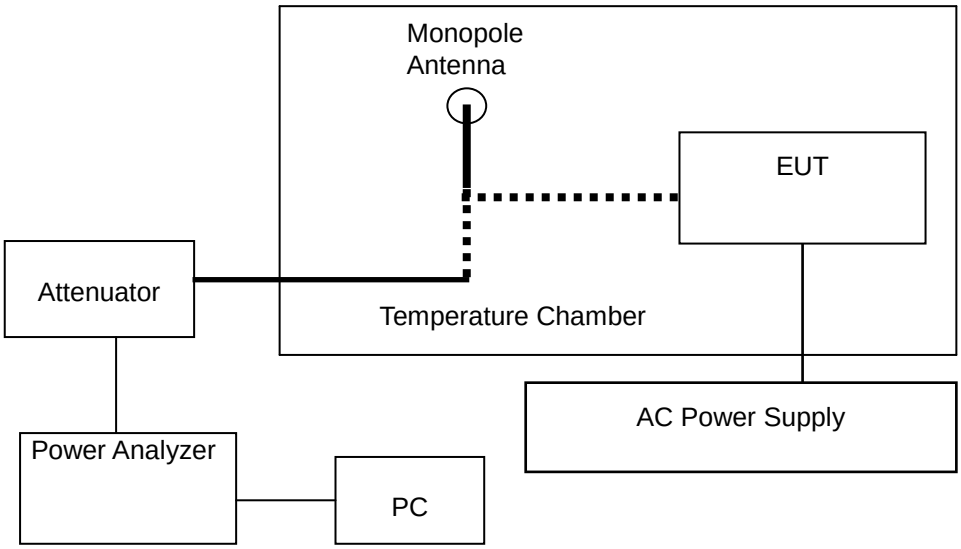
Maximum measurement uncertainty of the test system

Test Parameter	measurement uncertainty
Frequency error	±1.0%
Frequency stability under low voltage conditions	±0.9%
Effective radiated power	±2.7%
Transmitter spectrum mask	±1.5%
Transmitter spurious emissions	±2.7%
Transmission times	±1.2%
Receiver spurious radiations	±2.7%
Temperature	±3.2%
Humidity	±2.5%

7. SETUP OF EQUIPMENT UNDER TEST

7.1 SETUP CONFIGURATION OF EUT

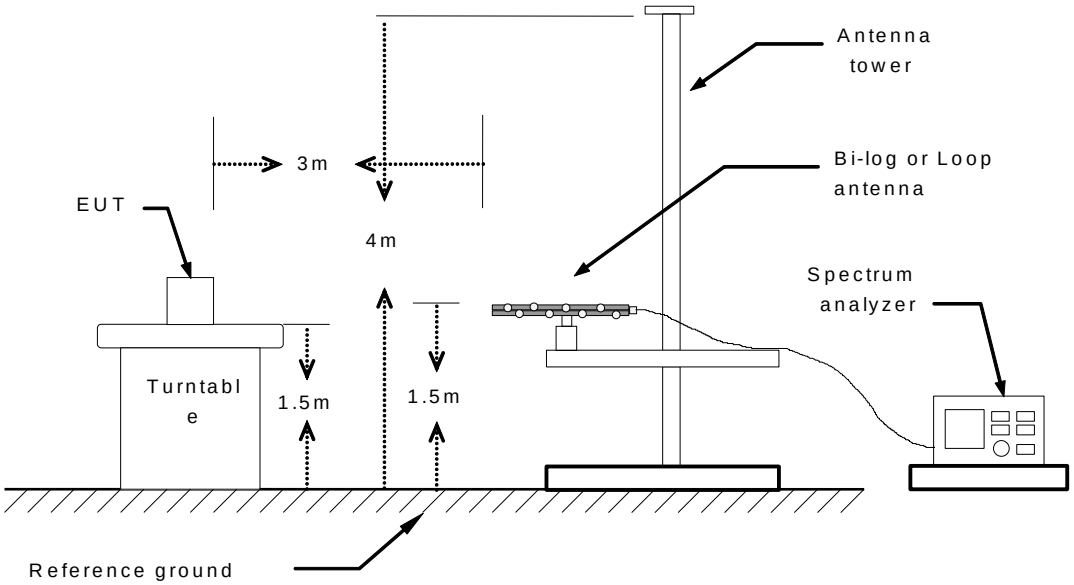
Conducted measurements configuration of EUT shall be as follows:



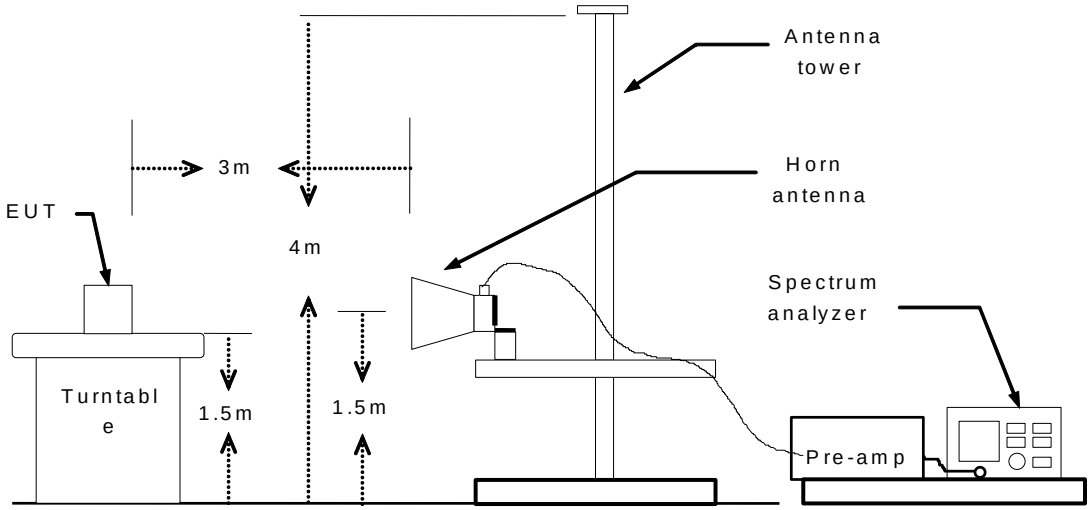
***Remarks**:*
The Signal Analyzer could be connected to a monopole antenna or directly connected to the EUT, if the EUT has already employing an antenna connector.

Radiated measurements configuration of EUT shall be as follows:

Below 1GHz



Above 1GHz



7.2 SUPPORT EQUIPMENT

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
1	Notebook	Lenovo	WB0205140E	WB06355728	CE,FCC

Notes:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

8. ETSI EN 302 208 REQUIREMENTS

8.1 FREQUENCY ERROR

8.1.1 Applicable standard

EN 302 208 Subclasses4.3.1

8.1.2 Conformance Limit

The maximum permitted frequency error, defined as the absolute value of fe-f, shall not exceed ±10 ppm relative to the nominal center frequency of each of the applicable channels, where:

• f = the frequency measured under normal test conditions (see clause 5.1.1.1).

• fe = the maximum frequency drift as measured in clause 5.1.1.2.

NOTE: Where multiple interrogators are co-located, tighter limits may be necessary to avoid unacceptable beat tones.

8.1.3 Test Configuration

Please refer to clause 5.5.1.

8.1.4 Test Procedure

1. Please refer to ETSI EN 302 208 clause 5.5.1 for the test conditions.
2. Please refer to ETSI EN 302 208 clause 5.5.1 for the measurement method.

The measurements shall be made with the interrogator set to transmit a continuous un-modulated carrier and performed at each of the applicable frequencies specified in clause 4.2.3:

a) Under normal test conditions:

- The signal transmitted by the interrogator shall be connected by suitable means to the input of a frequency counter. The frequency displayed on the frequency counter shall be recorded.

b) Under extreme test conditions:

- For each combination of extreme voltage and temperature (see clause 5.1.3) the frequency displayed on the frequency counter shall be recorded. Four values shall be measured.

  The results from the measurements shall be recorded in the test report.

8.1.5 Test Results

Operation Mode:	☒ Un-Modulated Carrier		
Temperature:	--	Tested by:	King Kong
Humidity:	53% RH		

Test Conditions		Measured Value	Frequency Error		Limit
		MHz	kHz	ppm	ppm
Channel 865.7MHz					
f	Normal	865.7000	/	/	/
fe	LTLV	865.7010	-1	-1.16	≤±10
	LTHV	865.7000	0	0.00	≤±10
	HTHV	865.7010	-1	-1.16	≤±10
	HTLV	865.7000	0	0.00	≤±10
Channel 866.3MHz					
f	Normal	866.3010	/	/	/
fe	LTLV	866.3010	-0.3	-0.35	≤±10
	LTHV	866.3013	-0.3	-0.35	≤±10
	HTHV	866.3010	0	0.00	≤±10
	HTLV	866.3013	-0.3	-0.35	≤±10
Channel 866.9MHz					
f	Normal	866.9010	/	/	/
fe	LTLV	866.9010	0	0.00	≤±10
	LTHV	866.9010	0	0.00	≤±10
	HTHV	866.9010	0	0.00	≤±10
	HTLV	866.9010	0	0.00	≤±10
Channel 867.5MHz					
f	Normal	867.5000	/	/	/
fe	LTLV	867.5010	-1	-1.15	≤±10
	LTHV	867.5010	-1	-1.15	≤±10
	HTHV	867.5010	-1	-1.15	≤±10
	HTLV	867.5010	-1	-1.15	≤±10
Note: frequency error (kHz)=fe-f					

8.2 FREQUENCY STABILITY UNDER LOW VOLTAGE CONDITIONS

8.2.1 Applicable standard

ETSI EN 300 328 clause 4.3.2

8.2.2 Conformance Limit

The equipment shall either:
• transmit with a carrier frequency within the limits of ±10 ppm whilst the radiated or conducted power is below the spurious emission limits; or
• automatically cease to function below the provider's declared operating voltage.
NOTE: Where multiple interrogators are co-located, tighter limits may be necessary to avoid unacceptable beat tones.

8.2.3 Test Configuration

The measurements for frequency stability under low voltage conditions shall be performed at both normal environmental conditions and the lowest extreme voltage level.

Conducted measurements shall be used for antenna equipment provided a temporary antenna connector(s).

8.2.4 Test Procedure

1. Please refer to ETSI EN 302 208 (V3.1.1) clause 5.1 for the test conditions.
2. Please refer to ETSI EN 302 208 (V3.1.1) clause 5.5.2 for the measurement method.
The test procedure shall be as follows:
This test is for battery operated equipment.
Step 1: An interrogator shall be set up to transmit a continuous un-modulated carrier. The signal transmitted by the interrogator shall be connected by suitable means to the input of a frequency counter.
Step 2: The frequency displayed on the frequency counter shall be recorded.
Step 3: The voltage from the test power source shall be reduced below the lower extreme test voltage limit towards zero. Whilst the voltage is reduced the carrier frequency shall be monitored.
The results from the measurements shall be recorded in the test report.

8.2.5 Test Results

Not applicable.

8.3 EFFECTIVE RADIATED POWER AND TRANSMITTER ANTENNA BEAM-WIDTH

8.3.1 Applicable standard

EN 302 208 Subclasses4.3.3

8.3.2 Conformance Limit

The effective radiated power on each of the four high power channels specified in figure 3 shall not exceed 33 dBm e.r.p. specified in a bandwidth of 200 kHz.

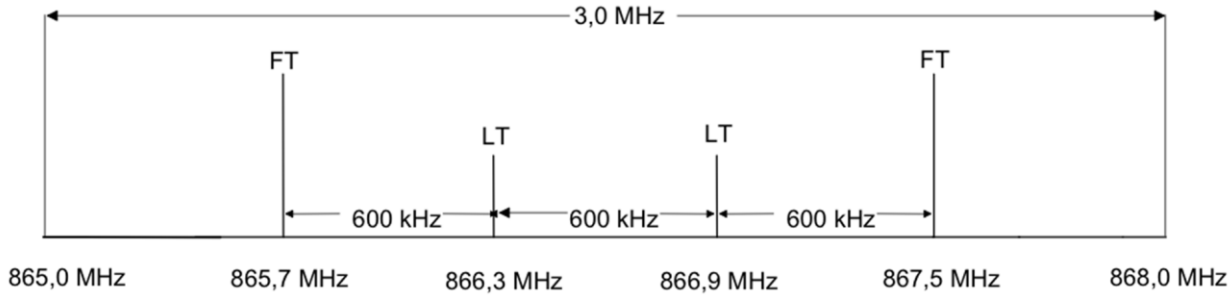


Figure 3: Tests on a single sample for equipment in the lower band

8.3.3 Test Configuration

Please refer to clause 5.5.3.

8.3.4 TEST PROCEDURE

1. Please refer to ETSI EN 302 208 clause 5.5.3 for the measurement method.

The test procedure shall be as follows:

Radiated measurement
This measurement shall be carried out under normal test conditions only (see clause 5.1.1.1). The following steps shall be carried out in each of the bands specified in figures 1 and 2 in which the interrogator is designed to operate.
Step 1: On a test site, selected from annex B, the interrogator shall be placed at the specified height on a support, as specified in annex B, and in the position closest to normal use as declared by the provider.
Step 2: The interrogator shall be set to transmit continuously, with an unmodulated carrier, on one of the high power channels in the selected band. Alternatively if the interrogator is tested in its normal operational mode, it shall transmit repeatedly on the selected channel in accordance with the normal test signals for data specified in clause 5.3.2.2. The measuring receiver shall be positioned in the far field as defined in annex B and tuned to the frequency of the transmission under test.
Step 3: A test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the carrier frequency of the interrogator. The output of the test antenna shall be connected to a measuring receiver.
Step 4: The measuring receiver shall be set to the following values:
a) Resolution bandwidth: 300 kHz.
b) Video bandwidth: Equal to the RBW.
c) Sweep Time: Auto.
d) Span: 1 MHz.
e) Trace mode: Max. Hold sufficient to capture all emissions.
f) Detection mode: RMS.
For measurements in the upper band of an interrogator in its normal operational mode, the RBW shall be set to 1 MHz.
Step 5: The test antenna shall be raised and lowered through the specified heights until the maximum signal level is detected by the measuring receiver.
Step 6: The interrogator shall then be rotated through 360º in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
Step 7: The test antenna shall be raised and lowered again through the specified heights until the

maximum signal level is detected by the measuring receiver. The maximum signal level detected by the measuring receiver shall be noted.
Step 8: The interrogator shall be replaced by a substitution antenna as defined in clause B.1.6. The substitution antenna shall be connected to a calibrated signal generator. The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of transmission of the interrogator. If necessary, the setting of the input attenuator of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
Step 9: The test antenna shall be raised and lowered through the specified heights to ensure that the maximum signal is received.
Step 10: The input signal to the substitution antenna shall be adjusted to give a level at the measuring receiver that is equal to the radiated power previously measured from the interrogator, corrected for any change to the setting of the input attenuator to the measuring receiver.
Step 11: The input level to the substitution antenna shall be recorded as the power level, corrected for any change of input attenuator setting of the measuring receiver.
Step 12: The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.
Step 13: The measure of the effective radiated power is the larger of the two levels recorded at the input to the substitution antenna, corrected if necessary for the gain of the substitution antenna.
Step 14: With the interrogator fitted into a suitable test fixture, the relative change of the effective radiated power between normal and extreme test conditions (see clauses 5.1.1.1 and 5.1.1.2 applied simultaneously) shall be compared. Any increase in the radiated power under extreme test conditions shall not cause the level to exceed the limits specified in clause 4.3.3.

Conducted measurement
Where an interrogator is fitted with an external antenna connector it is permissible to measure the conducted power. In this case the provider shall declare the maximum gain and beam-width(s) of the external antenna(s) at the time that the equipment is presented for test. The following steps shall be carried out in each of the bands specified in figures 1 and 2 in which the interrogator is designed to operate.
Step 1: The transmitter shall be configured to operate on one of the high power channels in the selected band and shall be connected to an artificial antenna (see clause 5.3.2.3). The carrier or mean power delivered to the artificial antenna shall be measured under normal test conditions (see clause 5.1.1.1).
Step 2: The measurement shall be repeated under extreme test conditions (see clauses 5.1.1.2 and 5.1.2.3 applied simultaneously).
Step 3: The recorded value shall be corrected for each of the antenna gains and be stated in e.r.p. To calculate the allowed conducted power with a circularly polarized antenna, formula (1) shall be used:

$$P_C = P_{erp} - G_{IC} + 5{,}15 + C_L \quad \text{dBm}$$

Where:
PC = interrogator conducted transmit power in dBm;
GIC = antenna gain of a circular antenna in dBic;
CL = total cable loss in dB.
Step 4: Where the interrogator switches between multiple transmitter outputs, the power level shall be measured at each output.
The results from the measurements shall be recorded in the test report.

8.3.5 Test Results

Test Conditions	ERP (dBm)				Limit
					dBm
Channel	865.7MHz	866.3MHz	866.9MHz	867.5MHz	/
Normal	25.90	25.71	25.44	26.24	33
LTLV	25.95	25.66	25.42	26.16	33
LTHV	25.89	25.72	25.47	26.18	33
HTHV	25.80	25.72	25.51	26.21	33
HTLV	25.80	25.73	25.51	26.17	33
The manufacturer declare the antenna beam-width of external antenna is 70°					

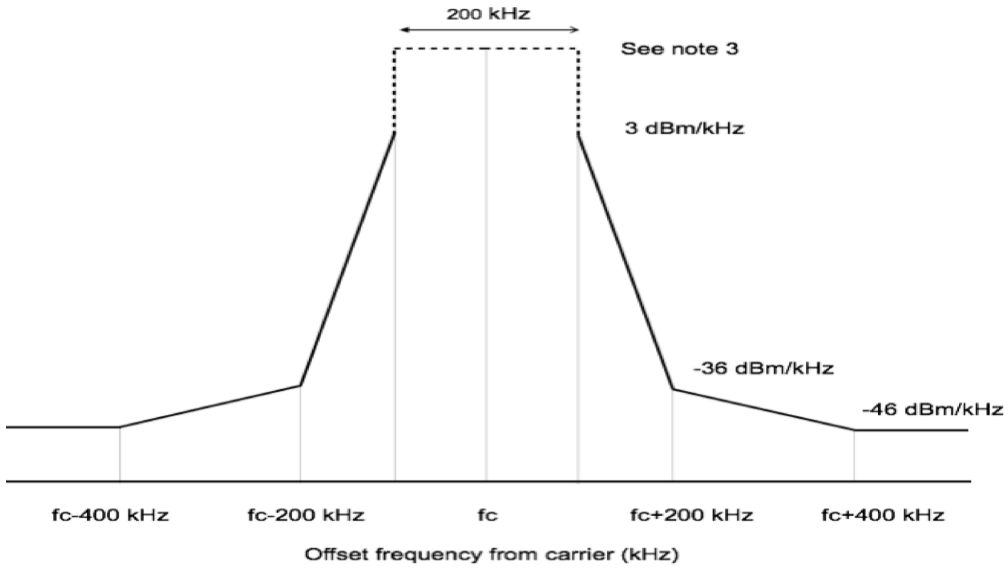
8.4 TRANSMITTER SPECTRUM MASK

8.4.1 Applicable standard

EN 302 208 Subclasses4.3.5

8.4.2 Conformance Limit

For measurements performed in the lower band, the absolute levels of RF power at any frequency shall not exceed the limits defined by the envelope in the spectrum mask at figure 5 in which the Y axis is scaled in dBm e.r.p. and referenced to 1 kHz resolution bandwidth.



NOTE 1: Where fc is the centre frequency of the carrier transmitted by the interrogator applicable over the frequency range fc ± 500 kHz.

NOTE 2: All limits are shown with reference to a resolution bandwidth of 1 kHz

NOTE 3: Measurements in the frequency range fc ± 100 kHz shall be made in accordance with clauses 4.3.3 and 5.5.3.

8.4.3 Test Configuration

Please refer to clause 5.5.5

8.4.4 Test Procedure

1. Please refer to ETSI EN 302 208 clause 5.5.5 for the measurement method.

The test procedure shall be as follows:

The following steps shall be carried out in each of the bands specified in figures 1 and 2 in which the interrogator is designed to operate.

The RF output of the equipment shall be connected to a spectrum analyser via a 50 Ω connector. In the case of equipment with an integral antenna, the equipment shall be placed in the test fixture (see clause 5.4.5) and the test fixture shall be connected to the spectrum analyser. Measurements shall be made on the declared channels of operation of the interrogator on those channels requiring full tests as defined in

figures 3 and 4.

Step 1: The interrogator shall be operated at the carrier power measured under normal test conditions in clause 5.1.1.1. The attenuator shall be adjusted to give an appropriate display on the spectrum analyser screen.

Step 2: The interrogator shall be configured to generate a succession of modulated transmit pulses. Each transmit pulse shall be modulated by the normal test signal (see clause 5.3.2.2). The length of each transmit pulse shall be not less than 10 ms and not greater than 50 ms. The interval between successive transmit pulses shall be not less than 1 ms and shall not exceed 10 ms.

Step 3: The output power of the interrogator, with or without a test fixture, shall be measured using a spectrum analyser, which shall be set to the following values:

a) Resolution bandwidth: 1 kHz.

b) Video bandwidth: Equal to the RBW.

c) Sweep Time: Auto.

d) Span: 1 MHz.

e) Trace mode: Max. Hold sufficient to capture all emissions.

f) Detection mode: Average.

Step 4: For frequencies inside fc ± 500 kHz in the lower band and for frequencies inside fc ± 1 000 kHz in the upper band, the measured values are the absolute values. The absolute levels of RF power shall be compared to the spectrum mask at figures 5 and 6. (See notes 1 and 2).

Step 5: Where the interrogator includes multiple transmitter outputs, all of the outputs shall be connected via a suitable combiner network to the spectrum analyser. With the interrogator set up as in step 1 and configured to transmit the test signal described in step 2 while in its operational mode, the spectrum mask shall be measured at the spectrum analyser. The measured values shall be adjusted to compensate for the attenuation of the combiners and compared to the spectrum mask at figures 5 and 6.

NOTE: If for any reason the spectrum is measured with a resolution bandwidth other than 1 kHz, the measured values may be converted to the absolute values using the formula:

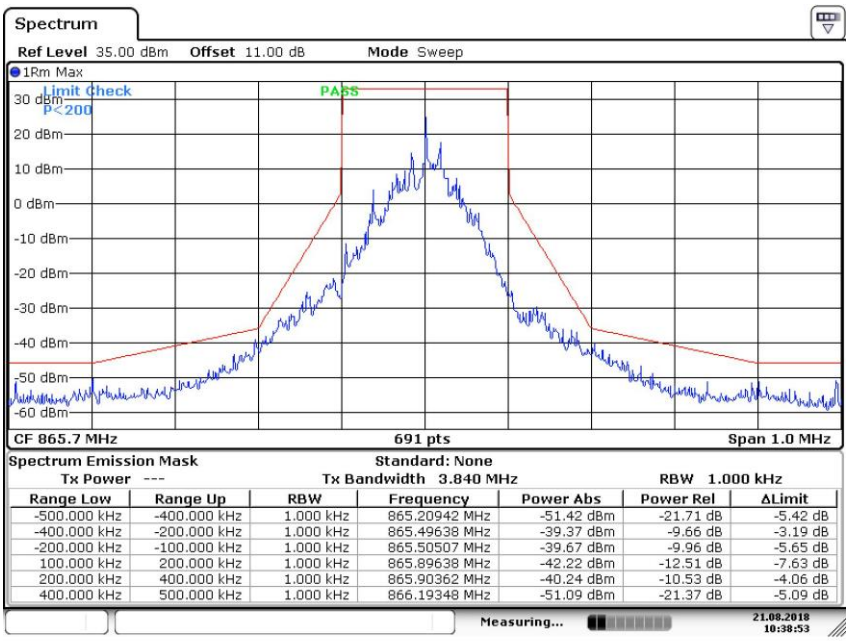
$$B = A + 10 \log \frac{1kHz}{BW_{MEASURED}}$$

Where:

1) A is the value at the measured resolution bandwidth;
2) B is the absolute value referred to a 1 kHz reference bandwidth; or
3) Use the measured value, A, directly if the measured spectrum is a discrete spectral line (a discrete spectrum line is defined as a narrow peak with a level of at least 6 dB above the average level inside the measurement bandwidth).

8.4.5 Test Results

Channel	865.7MHz



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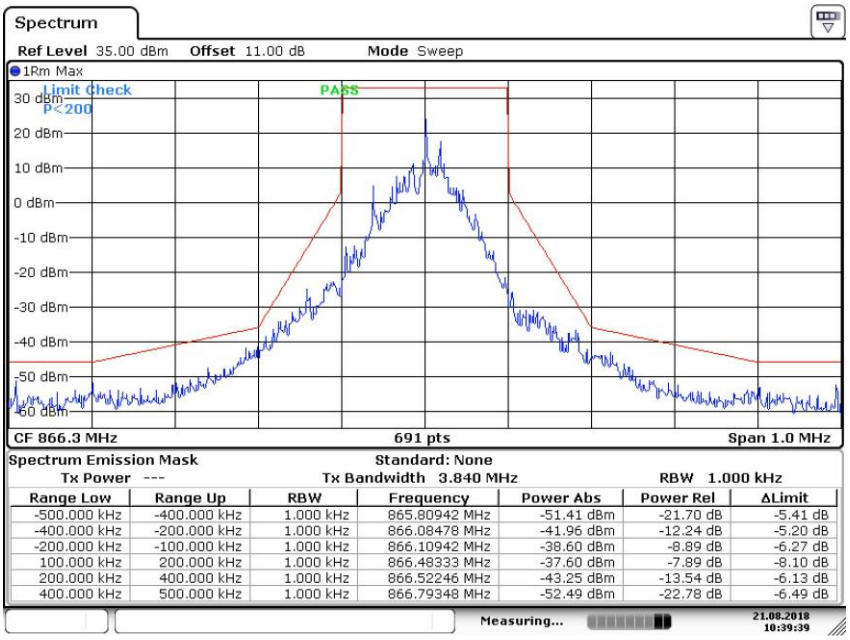
Channel	866.3MHz



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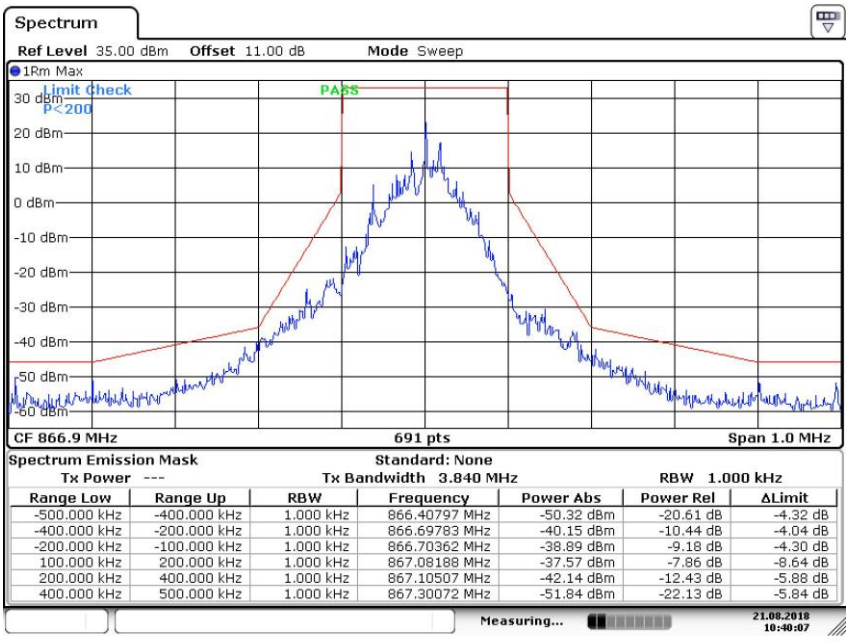
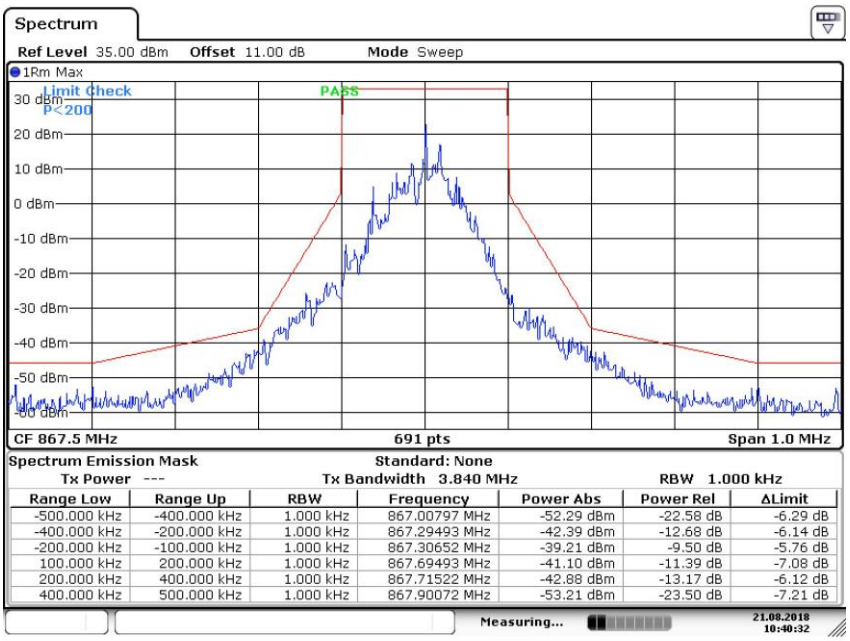
Channel	866.9MHz



Date: 21.AUG.2018 10:40:07

Channel	867.5MHz



Date: 21.AUG.2018 10:40:31

8.5 TRANSMITTER SPURIOUS EMISSIONS

8.5.1 Applicable standard

EN 302 208 Subclasses4.3.6

8.5.2 Conformance Limit

The level of any spurious emission, conducted or radiated, outside the relevant necessary bands shall not exceed the values given in table 2.

Table 2: Spurious emission limits in e.r.p.

State	47 MHz to 74 MHz 87,5 MHz to 118 MHz 174 MHz to 230 MHz 470 MHz to 862 MHz	Other frequencies below 1 000 MHz	Frequencies above 1 000 MHz
Operating	4 nW (-54 dBm)	250 nW (-36 dBm)	1 µW (-30 dBm)
Standby	2 nW (-57 dBm)	2 nW (-57 dBm)	20 nW (-47 dBm)

NOTE: For frequencies below 1 000 MHz limits are specified for a RBW of 100 kHz. Above 1 000 MHz a RBW of 1 MHz applies.

8.5.3 Test Configuration

Please refer to clause 5.5.6.

8.5.4 Test Procedure

1. Please refer to ETSI EN 302 208 clause 5.5.6 for the measurement method.

The test procedure shall be as follows:

Tx was placed on a nonmetal table which is 1.5 meter above the grounded reference plane and set to work in normal operation mode. Details refer to ETSI EN 302 208 V3.1.1 subclause 4.3.6.

The EUT was operating at normal to represent worst case during final qualification test.

8.5.5 Test Results

Test Frequency: ☒865.7MHz

Temperature: 25°C Tested by: KK

Humidity: 55 % RH

Frequency (MHz)	Antenna Polarization		Emission level (dBm)	Limit (dBm)	Verdict
170.65	☒V	☐conducted	-60.25	-36.00	PASS
350.10			-60.12	-36.00	PASS
850.62			-60.22	-54.00	PASS
1731.40			-39.46	-30.00	PASS
2597.10			-49.84	-30.00	PASS
3462.80			-32.84	-30.00	PASS
171.23	☒H		-61.24	-36.00	PASS
350.42			-60.25	-36.00	PASS
850.17			-60.37	-54.00	PASS
1731.40			-51.54	-30.00	PASS
2597.10			-53.19	-30.00	PASS
3462.80			-43.91	-30.00	PASS

Test Frequency: ☒866.3MHz

Temperature: 25°C Tested by: KK

Humidity: 55 % RH

Frequency (MHz)	Antenna Polarization		Emission level (dBm)	Limit (dBm)	Verdict
170.29	☒V	☐conducted	-60.61	-36.00	PASS
349.70			-60.44	-36.00	PASS
850.46			-60.62	-54.00	PASS
1732.6			-39.89	-30.00	PASS
2598.9			-49.99	-30.00	PASS
3465.2			-33.11	-30.00	PASS
171.02	☒H		-61.42	-36.00	PASS
350.36			-60.51	-36.00	PASS
849.79			-60.65	-54.00	PASS
1732.6			-51.56	-30.00	PASS
2598.9			-53.47	-30.00	PASS
3465.2			-43.94	-30.00	PASS

Test Frequency: ☒866.9MHz

Temperature: 25°C Tested by: KK

Humidity: 55 % RH

Frequency (MHz)	Antenna Polarization		Emission level (dBm)	Limit (dBm)	Verdict
170.26	☒V	☐conducted	-60.74	-36.00	PASS
349.74			-60.33	-36.00	PASS
850.39			-60.56	-54.00	PASS
1733.80			-40.38	-30.00	PASS
2600.70			-50.05	-30.00	PASS
3467.60			-33.33	-30.00	PASS
171.03	☒H		-61.43	-36.00	PASS
350.29			-60.66	-36.00	PASS
850.06			-60.64	-54.00	PASS
1733.80			-51.84	-30.00	PASS
2600.70			-53.74	-30.00	PASS
3467.60			-44.05	-30.00	PASS

Test Frequency: ☒867.5MHz

Temperature: 25°C Tested by: KK

Humidity: 55 % RH

Frequency (MHz)	Antenna Polarization		Emission level (dBm)	Limit (dBm)	Verdict
170.47	☒V	☐conducted	-60.56	-36.00	PASS
349.76			-60.41	-36.00	PASS
850.61			-60.50	-54.00	PASS
1735.00			-34.64	-30.00	PASS
2602.50			-49.73	-30.00	PASS
3470.00			-32.53	-30.00	PASS
170.81	☒H		-61.54	-36.00	PASS
349.99			-60.39	-36.00	PASS
849.97			-60.69	-54.00	PASS
1735.00			-51.01	-30.00	PASS
2602.50			-53.22	-30.00	PASS
3470.00			-42.70	-30.00	PASS

Emissions above 5th harmonic are close to the base noise, Standby mode does not cause any spurious emissions and no peak detected.

8.6 TRANSMISSION TIMES

8.6.1 Applicable standard

EN 302 208 Subclasses4.3.7

8.6.2 Conformance Limit

For interrogators designed of operate in the lower band the manufacturer shall declare that the measured length of transmission at step 3 of clause 5.5.7.1 is no greater than is required to read the tags present in the field and to verify that there are no additional tags present.
In addition, the maximum length of continuous transmission and the interval between repeated transmissions measured at step 6 of clause 5.5.7.1 shall comply with the two limits in figure 7.

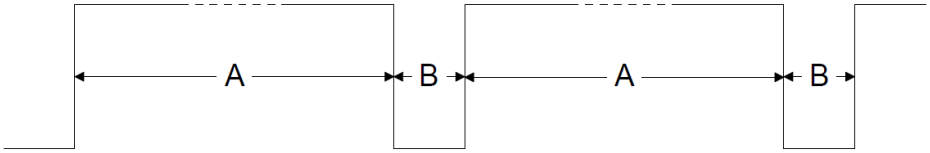


Figure 7: Repeated transmissions on the same channel

Where:

- the on-duration of A shall not exceed 4 s;
- the off-duration of B shall be not less than 100 ms.

In some applications (i.e. conveyor systems) it may be necessary for interrogators to transmit while tags are not present. To accommodate such requirements, manufacturers shall include within interrogators a means to minimize the overall length of transmission commensurate with the application. This may include the provision of trigger mechanisms within interrogators to initiate transmissions.
It is permitted for an interrogator to switch its transmission repeatedly between channels at intervals not exceeding 4 s. An interrogator shall not return to a previous channel within a period of less than 100 ms.
There is no specific limit to the length of transmission for interrogators when transmitting in the upper band. However interrogators shall transmit for no longer than is necessary to perform the intended operation.

8.6.3 Test Configuration

Please refer to clause 5.5.7.

8.6.4 Test Procedure

1. Please refer to ETSI EN 302 208 clause 5.5.7 for the measurement method.

The test procedure shall be as follows:

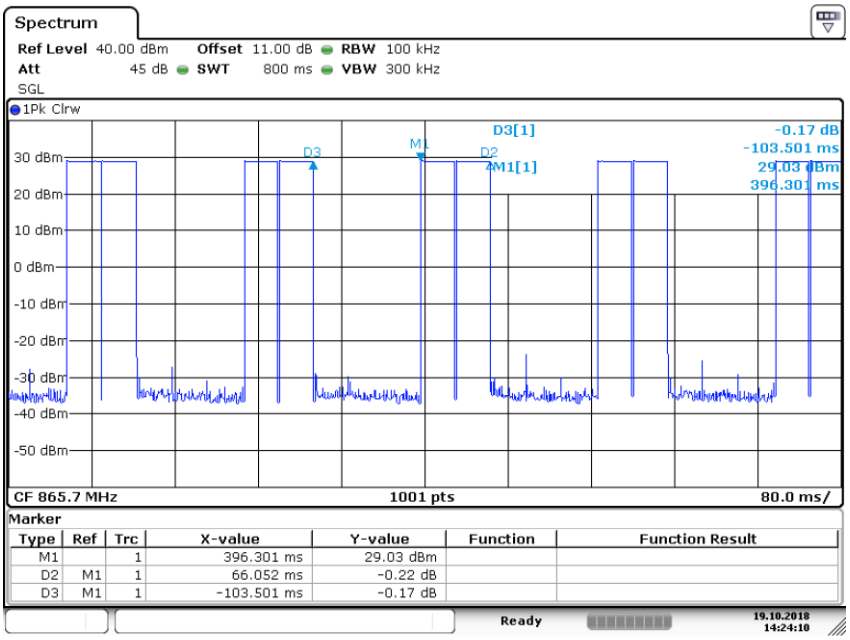
This test shall apply to interrogators intended for operation in the lower band and is designed to verify that the interrogator shall transmit no longer than is necessary to perform the intended operation.
Step 1: On a test site, selected from annex B, the equipment shall be placed at the specified height on a non-conducting support and in the position closest to normal use as declared by the provider. The interrogator shall be configured to operate on one of the high power channels shown in figure 1.
A small quantity of tags (typically up to 3) shall be positioned within the interrogation field of the interrogator.
Step 2: A probe shall be positioned close to the antenna of the interrogator and arranged such that it will trigger a digital storage oscilloscope.
Step 3: The interrogator shall initiate an interrogation sequence and the trace generated by the transmission shall be recorded on the digital storage scope. The length of the transmission shall be measured.
Step 4: The interrogator shall then be configured to demonstrate reading an unlimited number of tags in the interrogation field. This may be achieved either by setting the interrogator to its "global scroll" mode

with a single tag in the field or by replacing the tags with a test fixture that simulates an infinite number of tags.
Step 5: The transmission from the interrogator shall be monitored on a digital storage oscilloscope using a probe positioned close to the antenna of the interrogator.
Step 6: The maximum length of continuous transmission and the interval between repeated transmissions recorded on the digital storage oscilloscope shall comply with the permitted limits.

8.6.5 Test Results

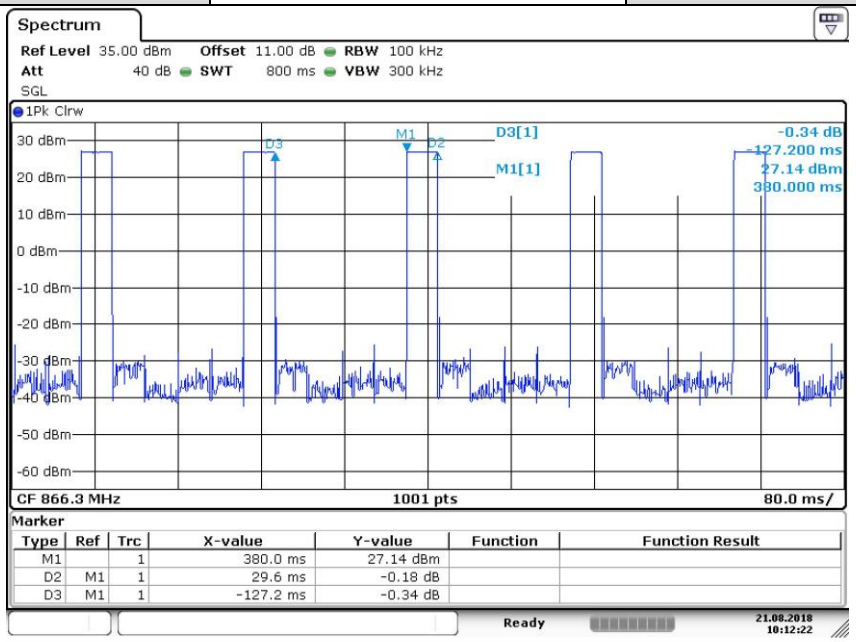
Pass
Test data see the following Page

Test Channel: 865.7MHz	Test Result	Limit
on-duration	0.0661	≤4s
off-duration	0.1035	≥0.1s



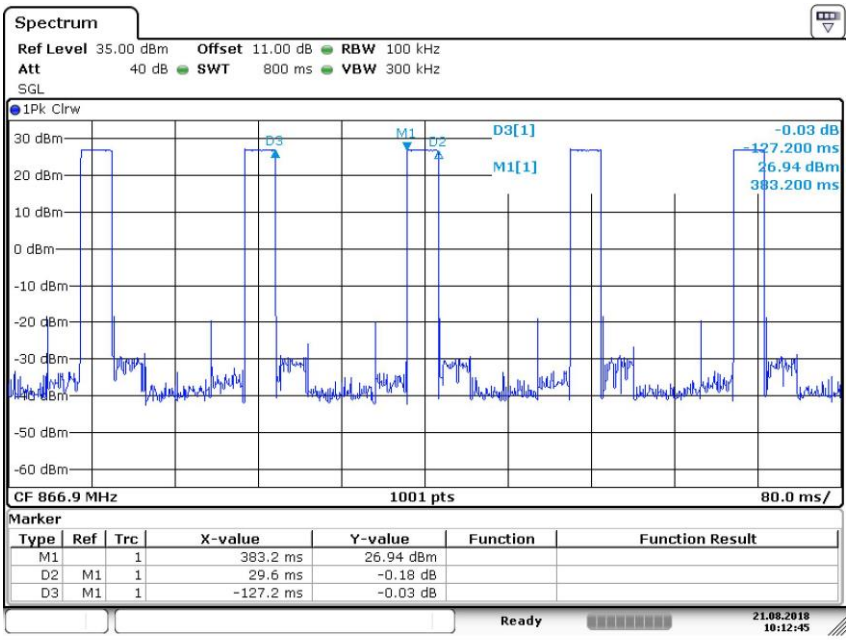
Date: 19.OCT.2018 14:24:09

Test Channel: 866.3MHz	Test Result	Limit
on-duration	0.0296	≤4s
off-duration	0.1272	≥0.1s



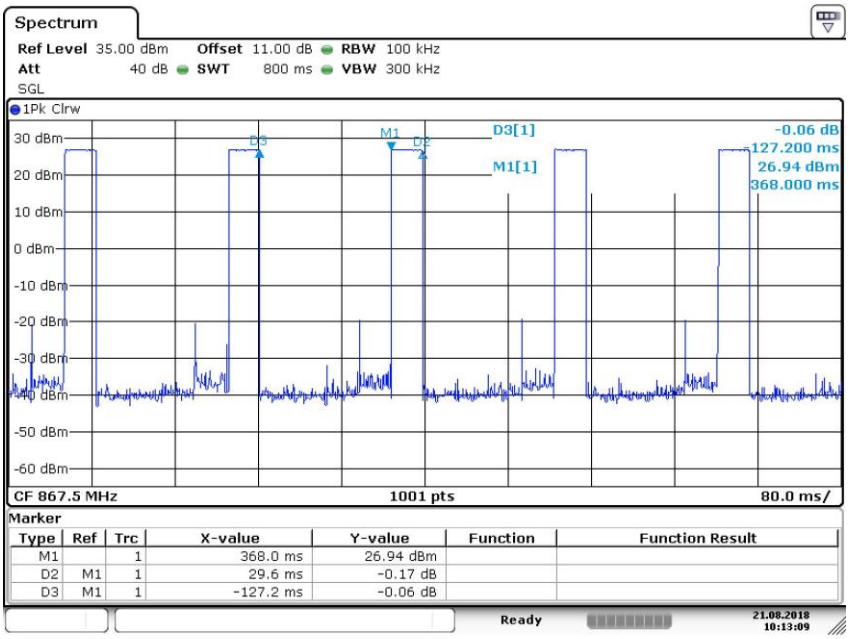
Date: 21.AUG.2018 10:12:21

Test Channel: 866.9MHz	Test Result	Limit
on-duration	0.0296	≤4s
off-duration	0.1272	≥0.1s



Date: 21.AUG.2018 10:12:44

Test Channel: 867.5MHz	Test Result	Limit
on-duration	0.0296	≤4s
off-duration	0.1272	≥0.1s



Date: 21.AUG.2018 10:13:09

8.7 RECEIVER SPURIOUS EMISSIONS

8.7.1 Applicable standard

EN 302 208 Subclasses4.4.3

8.7.2 Conformance Limit

The power of any spurious emission, radiated or conducted, shall not exceed the values given below:

a) 2 nW e.r.p. below 1 000 MHz;

b) 20 nW e.r.p. above 1 000 MHz.

8.7.3 Test Configuration

Please refer to clause 5.5.6

8.7.4 Test Procedure

1. Please refer to ETSI EN 302 208 clause 5.5.6 for the measurement method.

The test procedure shall be as follows:

Tx was placed on a nonmetal table which is 1.5 meter above the grounded reference plane and set to work in normal operation mode. Details refer to ETSI EN 302 208 V3.1.1 subclause 4.4.3.

The EUT was operating at normal to represent worst case during final qualification test.

8.7.5 Test Results

Pass
See the following Page

Test Frequency: ☒865.7MHz

Temperature: 25°C Tested by: KK

Humidity: 55 % RH

Frequency (MHz)	Antenna Polarization		Emission level (dBm)	Limit (dBm)	Verdict
170.90	☒V	☐conducted	-60.03	-57.00	PASS
349.04			-60.16	-57.00	PASS
849.99			-60.13	-57.00	PASS
1761.00			-61.98	-47.00	PASS
2681.00			-59.58	-47.00	PASS
3525.00			-57.60	-47.00	PASS
170.56	☒H		-60.97	-57.00	PASS
349.18			-60.05	-57.00	PASS
849.53			-60.11	-57.00	PASS
1829.00			-61.94	-47.00	PASS
2663.00			-59.98	-47.00	PASS
3546.00			-58.80	-47.00	PASS

Test Frequency: ☒866.3MHz

Temperature: 25°C Tested by: KK

Humidity: 55 % RH

Frequency (MHz)	Antenna Polarization		Emission level (dBm)	Limit (dBm)	Verdict
171.53	☒V	☐conducted	-59.92	-57.00	PASS
349.21			-60.39	-57.00	PASS
850.48			-60.23	-57.00	PASS
1804.00			-62.38	-47.00	PASS
2673.00			-60.14	-47.00	PASS
3483.00			-57.93	-47.00	PASS
170.24	☒H		-61.40	-57.00	PASS
350.26			-60.57	-57.00	PASS
849.63			-60.54	-57.00	PASS
1791.00			-62.36	-47.00	PASS
2604.00			-59.61	-47.00	PASS
3534.00			-58.37	-47.00	PASS

Test Frequency: ☒866.9MHz

Temperature: 25°C Tested by: KK

Humidity: 55 % RH

Frequency (MHz)	Antenna Polarization		Emission level (dBm)	Limit (dBm)	Verdict
171.02	☒V	☐conducted	-60.46	-57.00	PASS
348.95			-60.38	-57.00	PASS
849.66			-60.10	-57.00	PASS
1798.00			-62.41	-47.00	PASS
2692.00			-59.58	-47.00	PASS
3480.00			-58.12	-47.00	PASS
170.29	☒H		-61.06	-57.00	PASS
349.17			-60.37	-57.00	PASS
848.88			-60.43	-57.00	PASS
1781.00			-62.53	-47.00	PASS
2612.00			-60.15	-47.00	PASS
3567.00			-58.48	-47.00	PASS

Test Frequency: ☒867.5MHz

Temperature: 25°C Tested by: KK

Humidity: 55 % RH

Frequency (MHz)	Antenna Polarization		Emission level (dBm)	Limit (dBm)	Verdict
170.96	☒V	☐conducted	-60.36	-57.00	PASS
349.09			-60.00	-57.00	PASS
850.52			-59.73	-57.00	PASS
1830.00			-62.25	-47.00	PASS
2640.00			-59.80	-47.00	PASS
3507.00			-57.96	-47.00	PASS
170.00	☒H		-61.33	-57.00	PASS
350.19			-60.21	-57.00	PASS
849.28			-60.50	-57.00	PASS
1772.00			-62.48	-47.00	PASS
2611.00			-59.91	-47.00	PASS
3554.00			-58.54	-47.00	PASS

8.8 ADJACENT CHANNEL SELECTIVITY

8.8.1 Applicable standard

ETSI EN 302 208 clause 4.4.1

8.8.2 Conformance Limit

The adjacent channel selectivity is a measure of the capability of the receiver in an interrogator to identify a tag while rejecting an unwanted signal from another device transmitting in one of the adjacent high power channels. The adjacent channel in the lower band shall be at a frequency of ±0,6 MHz from the centre frequency of the selected channel. For the upper band the adjacent channel shall be at a frequency of ±1,2 MHz from the centre frequency of the selected channel.
The adjacent channel selectivity measured at the receiver of the interrogator shall be equal to or better than -26 dBm.

8.8.3 Test Configuration

The measurements for emissions in the spurious domain shall only be performed at normal test conditions.

Radiated measurements shall only be used for integral antenna equipment that does not have a temporary antenna connector(s) provided.

Conducted measurements shall be used for antenna equipment provided a temporary antenna connector(s).

8.8.4 Test Procedure

1. Please refer to ETSI EN 302 208 (V3.1.1) clause 5.1 for the test conditions.
2. Please refer to ETSI EN 302 208 (V3.1.1) clause 5.6.1 for the measurement methods.

■ Conducted measurement

Where the interrogator is fitted with an external antenna connector, the measurement may be made using a modified tag that provides a hard-wire connection.
Step 1: An interrogator shall be configured to operate in the lower band in accordance with figure 15 below. The offset frequency shall be set to approximately 300 kHz.

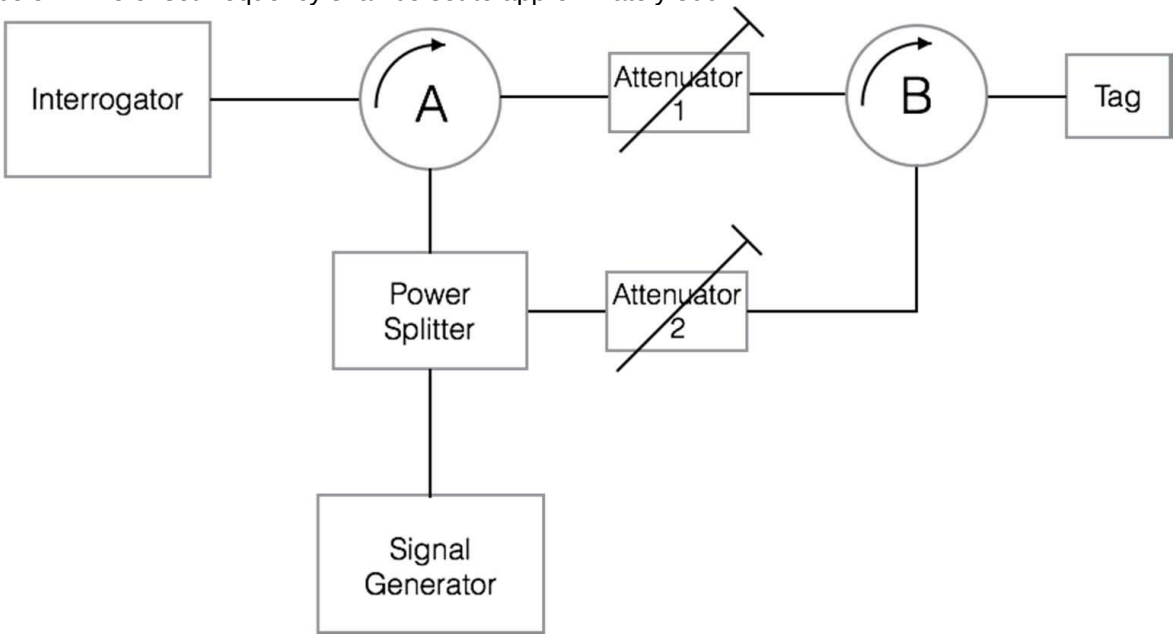


Figure 15: Conducted test set up for adjacent channel selectivity

Step 2: To check that the tag is not activated by the interrogator via attenuator 2, attenuator 1 shall be removed from the circuit. The open port of circulators A and B shall each be terminated by a 50 Ohm load resistor. With the signal generator switched off, the interrogator shall be switched on at its maximum output power on a known channel in the lower band. Attenuator 2 shall be increased until the interrogator just ceases to identify the tag. The value of attenuator 2 shall be

noted. For the remainder of the test attenuator 2 shall not be reduced below this figure.
Step 3: The 50 Ohm load resistors shall be removed from circulators A and B and replaced by attenuator 1. With the signal generator switched off, the interrogator shall be switched on again at its maximum output power. Attenuator 1 shall be increased until it is just possible for the interrogator to read the tag. The setting of the attenuator 1 shall then be reduced by 10 dB to ensure that the tag remains fully activated.
Step 4: With the signal generator switched off, attenuator 2 shall be increased until the interrogator is just able to identify the tag. Attenuator 2 shall then be reduced by 3 dB to ensure that the interrogator receives an acceptable signal level from the tag.
Step 5: The signal generator shall be adjusted to generate a signal at a test frequency that lies at the mid-point of the upper adjacent channel. The signal shall be an AM sine wave modulated to a depth of 80 % at a frequency of 40 kHz.
Step 6: The level of the signal generator shall be increased until the interrogator just ceases to identify the tag. The level of the signal generator shall then be reduced in 1 dB steps until the interrogator just identifies the tag again. The level of signal from the signal generator shall be recorded.
Step 7: The level of signal from the signal generator shall be adjusted to compensate for the losses in both circulator A and the power splitter to give the corrected signal received in dBm at the input of the interrogator.
Step 8: The measurement shall be repeated for the lower adjacent channel.
Step 9: Steps 1 to 8 shall be repeated on the upper band using an offset frequency of approximately 600 kHz.
Step 10: The absolute level of the corrected signals from the signal generator referred to the input of the interrogator in dBm shall be not less than the limit specified in clause 4.4.1.3.
The results shall be recorded in the test report.

- Radiated measurement

Step 1: An interrogator shall be set up to operate at its maximum output power on a known channel in the lower band either in an anechoic chamber or on an open air test site as specified in annex B. The offset frequency shall be set to approximately 300 kHz. The interrogator shall be connected to an antenna with combined Tx and Rx functionality.
Step 2: A tag shall be selected with an antenna gain of greater than 0 dBi and a sensitivity of better than - 15 dBm. With the tag in its preferred orientation it shall be moved slowly towards the interrogator in the direction of maximum gain of its antenna to a point where the tag is just identified. The distance d between the antenna of the interrogator and the tag shall be measured. If the distance between the tag and the interrogator is too great to fit within the anechoic chamber, an attenuator may be inserted between the interrogator and its antenna.
Step 3: The tag shall then be moved to a new position that is at a distance of 0,7 d from the interrogator in the direction of maximum gain of its antenna.
Step 4: A signal generator fitted with a horn antenna shall be set up in accordance with figure 14 and its transmission directed at the antenna of the interrogator.

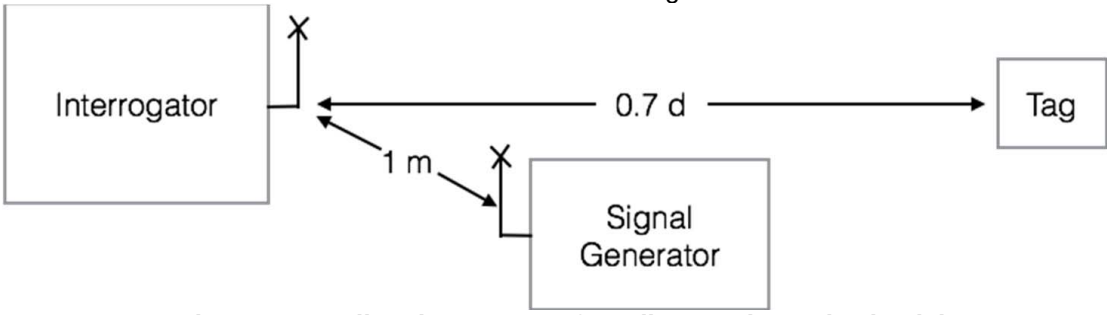


Figure 14: Radiated test set up for adjacent channel selectivity

Step 5: The signal generator shall be adjusted to radiate a signal at a test frequency that lies at the midpoint of the upper adjacent channel. The signal shall be an AM modulated sine wave to a depth of 80 % at a frequency of 40 kHz. Step 6: The level of the signal generator shall be increased until the interrogator just ceases to identify the tag. The level of the signal generator shall then be reduced in 1 dB steps until the interrogator just identifies the tag again.
Step 7: The interrogator shall be removed and replaced by a measurement antenna connected to a measurement receiver set to a resolution bandwidth of 100 kHz. The level of signal from the signal generator received at the measurement receiver shall be recorded. Step 8: The measurement shall be repeated for the lower adjacent channel.

Step 9: Steps 1 to 8 shall be repeated for the upper band using an offset frequency of approximately 600 kHz.
Step 10: The absolute levels of the signals received by the measurement receiver from the signal generator shall be corrected using formula 3.
$S_{ACH} = P_{MR} - G_{MR}$
Where:
S_{ACH} is the adjacent channel selectivity in dBm.
P_{MR} is the signal strength received at the measurement receiver.
G_{MR} is the antenna gain of the measurement receiver antenna in dBi;
The corrected power level for each measurement shall be not less than the limit specified in clause 4.4.1.3.

8.8.5 Test Results

Operation Mode:	☒ASK		
Test mode:	☐ TX Mode	☒ RX Mode	
Temperature:	25°C	Tested by:	KK
Humidity:	55 % RH		

Test Conditions		Test frequency offset (MHz)	Signal Generator Power(dBm)	Limit (dB)	Result
☒ Lower band	865.70	0.3MHz	17.5	≥-26dBm	Pass
		-0.3MHz	16.9	≥-26dBm	Pass
	866.30	0.3MHz	17.4	≥-26dBm	Pass
		-0.3MHz	16.6	≥-26dBm	Pass
	866.90	0.3MHz	17.5	≥-26dBm	Pass
		-0.3MHz	16.4	≥-26dBm	Pass
	867.50	0.3MHz	17.1	≥-26dBm	Pass
		-0.3MHz	16.7	≥-26dBm	Pass

8.9 BLOCKING OR DESENSITIZATION

8.9.1 Applicable standard

ETSI EN 302 208 clause 4.4.2

8.9.2 Conformance Limit

The blocking level measured at the receiver to the interrogator under the above specified conditions shall be equal to or better than the following limits:

For (fc ± 2MHz) -23 dBm
For (fc ± 5MHz) -14 dBm
For (fc ± 10MHz) -8 dBm

8.9.3 Test Configuration

The measurements for blocking or desensitization shall only be performed at normal test conditions.

Radiated measurements shall only be used for integral antenna equipment that does not have a temporary antenna connector(s) provided.

Conducted measurements shall be used for antenna equipment provided a temporary antenna connector(s).

8.9.4 Test Procedure

1. Please refer to ETSI EN 302 208 (V3.1.1) clause 5.1 for the test conditions.
2. Please refer to ETSI EN 302 208 (V3.1.1) clause 5.6.2 for the measurement methods.

■ Conducted measurement

Where the interrogator is fitted with an external antenna connector, the measurement may be made using a modified tag that provides a hard-wire connection.
Step 1: An interrogator shall be set up to operate in the lower band using an offset frequency of approximately 300 kHz in accordance with figure 15 shown above.
Step 2: To check that the tag is not activated by the interrogator via attenuator 2, attenuator 1 shall be removed from the circuit. The open port of circulators A and B shall each be terminated by a 50 Ohm load resistor. With the signal generator switched off, the interrogator shall be switched on at its maximum output power on a known channel in the lower band. Attenuator 2 shall be increased until the interrogator just ceases to identify the tag. The value of attenuator 2 shall be noted. For the remainder of the test attenuator 2 shall not be reduced below this figure.
Step 3: The 50 Ohm load resistors shall be removed from circulators A and B and replaced by attenuator 1. With the signal generator switched off, the interrogator shall be switched on again at its maximum output power. Attenuator 1 shall be increased until it is just possible for the interrogator to read the tag. The setting of the attenuator 1 shall then be reduced by 10 dB to ensure that the tag remains fully activated.
Step 4: With the signal generator switched off, attenuator 2 shall be increased until the interrogator is just able to identify the tag. Attenuator 2 shall then be reduced by 3 dB to ensure that the interrogator receives an acceptable signal level from the tag.
Step 5: The signal generator shall be adjusted to produce an un-modulated signal at test frequencies of approximately 2 MHz, 5 MHz and 10 MHz above the carrier frequency of the interrogator.
Step 6: At each test frequency the level of the signal generator shall be increased until the interrogator just ceases to identify the tag. The level of the signal generator shall then be reduced in 1 dB steps until the interrogator just identifies the tag again. The level of signals from the signal generator at which the interrogator just identifies the tag shall be recorded.
Step 7: The tests shall be repeated at approximately -2 MHz, -5 MHz and -10 MHz from the centre frequency of the interrogator.
Step 8: The recorded signals from the signal generator shall be corrected to compensate for any losses in both circulator A and in the power splitter to give the corrected signals received at the input to the interrogator.
Step 9: Steps 1 to 8 shall be repeated for the upper band using an offset frequency of approximately 600 kHz.
Step 10: At each test frequency the blocking or desensitization shall be recorded in the test report

as the highest corrected level in dBm of the unwanted signal at which it is just possible to identify a tag. The corrected levels shall comply with the limits specified in clause 4.4.2.3.

- Radiated measurement

Step 1: This test may be performed either in an anechoic chamber or on an open-air test site as specified in annex B. An interrogator shall be set up to operate on a known high power channel in the lower band using an offset frequency of approximately 300 kHz in accordance with figure 14.
Step 2: A tag shall be selected with an antenna gain of greater than 0 dBi and a sensitivity of better than - 15 dBm. The tag, in its preferred orientation, shall be moved slowly towards the interrogator in the direction of maximum gain of its antenna to a point where it is just identified. The distance d between the antenna of the interrogator and the tag shall be measured. If the distance between the tag and the interrogator is too great to fit within the anechoic chamber, an attenuator may be inserted between the interrogator and its antenna.
Step 3: The tag shall then be moved to a new position that is at a distance of 0,7 × d from the interrogator in the direction of maximum gain of its antenna.
Step 4: A signal generator fitted with a horn antenna shall be set up in accordance with figure 14 and its transmission directed at the antenna of the interrogator.
Step 5: The signal generator shall be adjusted to radiate an un-modulated signal at test frequencies of approximately 2 MHz, 5MHz and 10 MHz above the centre frequency of the interrogator.
Step 6: At each test frequency the level of the signal generator shall be increased until the interrogator just ceases to identify the tag. The level of the signal generator shall then be reduced in 1 dB steps until the interrogator just identifies the tag again.
Step 7: The interrogator shall be removed and replaced by a measurement antenna connected to a measuring receiver set to a resolution bandwidth of 100 kHz. At each test frequency the level of signal from the signal generator received at the measuring receiver shall be recorded.
Step 8: The tests shall be repeated at approximately, -2 MHz, -5 MHz and -10 MHz from the carrier frequency of the interrogator.
Step 9: Steps 2 to 8 shall be repeated in the upper band using an offset frequency of approximately 600 kHz.
Step 10: The blocking or desensitization shall be recorded in the test report as the highest level in dBm at the input to the interrogator of the unwanted signal at which it is just possible to identify a tag. The absolute levels of the signals received by the measurement receiver from the signal generator shall be corrected using formula (4).

$S_{BL} = P_{MR} - G_{MR}$ (4)

Where:

S_{BL} is the blocking level in dBm.
P_{MR} is the signal strength received at the measurement receiver.
G_{MR} is the antenna gain of the measurement receiver antenna in dBi.

The highest corrected power level in dBm referred to the input to the interrogator at which it is just possible to identify a tag shall be not less than the limit specified in clause 4.4.2.3.

8.9.5 Test Results

Operation Mode:	☒ASK		
Test mode:	☐ TX Mode	☒ RX Mode	
Temperature:	25°C	Tested by:	KK
Humidity:	55 % RH		

Test Conditions		Test frequency offset (MHz)	Signal Generator Power(dBm)	Limit (dB)	Result
☒ Lower band	865.70	2MHz	19.7	≥-23dBm	Pass
		-2MHz	19.3	≥-23dBm	Pass
		5MHz	23.4	≥-14dBm	Pass
		-5MHz	24.1	≥-14dBm	Pass
		10MHz	24.7	≥-8dBm	Pass
		-10MHz	24.6	≥-8dBm	Pass
	867.50	2MHz	20.0	≥-23dBm	Pass
		-2MHz	19.6	≥-23dBm	Pass
		5MHz	23.2	≥-14dBm	Pass
		-5MHz	23.9	≥-14dBm	Pass
		10MHz	24.5	≥-8dBm	Pass
		-10MHz	24.7	≥-8dBm	Pass

9. APPENDIX

Spurious Emission Test Setup (Below 1GHz)

Spurious Emission Test Setup (Above 1GHz)