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Compliance test report ID **231409TRFWL**

Date of issue
August 05, 2013

FCC 47 CFR Part 15, Subpart C, Chapter 15.231

Periodic operation in the band 40.66–40.70 MHz and above 70 MHz

Applicant	SEAV S.r.l
Product	BeSmart New
Model	BeSmart New
FCC ID	QUS-BESMARTNEW

Test location

Nemko Spa a Socio Unico
Via del Carroccio, 4 20853 Biassono (MB) Italy
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FCC test site registration number: 481407 (10m semi anechoic chamber)

Telephone	+39 039 220 12 01
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Website	www.Nemko.com/it

Tested by	Daniele Guarnone		
Reviewed by	Gabriele Curioni		August 05, 2013
			Date

Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.
This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contain in this report are within Nemko Italy's ISO/IEC 17025 accreditation.

Copyright notification

Table of Contents

Section 1 Report summary

1.1 Applicant

SEAV s.r.l.Via Oriana Fallaci 4/6, Osimo, AN60027 Italy

1.2 Manufacturer

SEAV s.r.l. Via Oriana Fallaci 4/6, Osimo, AN 60027 Italy

1.3 Test specifications

FCC 47 CFR Part 15, Subpart C, Chapter 15.231

Periodic operation in the band 40.66–40.70 MHz and above 70 MHz

1.4 Statement of compliance

In the configuration tested, the EUT was found Choose an item.

Testing was completed against all relevant requirements of the test standard. Results obtained indicate that the product under test complies in full with the requirements tested. The test results relate only to the items tested.

See “Summary of test results” for full details.

1.5 Exclusions

None

1.6 Test report revision history

Revision #	Details of changes made to test report
TRF	Original report issued
R1TRF	XXX

Section 2 Summary of test results

2.1 FCC Part 15 Subpart C – Intentional Radiators, test results

Part	Test description	Verdict
§15.207(a)	Conducted limits	Not applicable
§15.231(a)	Conditions for intentional radiators to comply with periodic operation	Pass
§15.231(b)	Field strength of emissions	Pass
§15.231(c)	Emission bandwidth	Pass
§15.231(d)	Requirements for devices operating within 40.66–40.70 MHz band	Not applicable
§15.231(e)	Conditions for intentional radiators to comply with periodic operation	Not applicable
Notes: None		

Section 3 Equipment under test (EUT) details

3.1 Sample information

Receipt date	June 5, 2013
Nemko sample ID number	QUS-BESMARTNEW

3.2 EUT information

Product name	BeSmart New
Model	BeSmart New
Serial number	--
Part number	--

3.3 Technical information

Operating band	433.5 – 434.5 MHz
Operating frequency	433.92 MHz
Modulation type	OOK modulation.
Occupied bandwidth	8.8 kHz
Emission designator	8K8P1D
Power requirements	12 Vdc (All tests were performed with new battery.)
Antenna information	Antenna type and gain The EUT uses a unique antenna coupling/ non-detachable antenna to the intentional radiator.

3.4 Product description and theory of operation

Remote control of electric and electronic equipment, and they are used for automatic entry control (swinging and sliding gates and garage door), where remote control via a radio coded command is required.

3.5 EUT exercise details

Maximum power, OOK modulation, 66 bit rolling code

3.6 EUT setup diagram

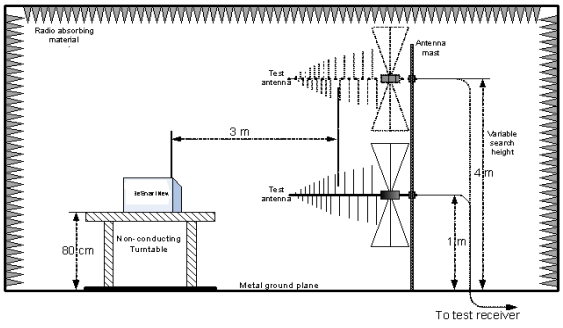

Diagram 3.6-1: Setup diagram

3.7 EUT sub assemblies

Description	Brand name	Model/Part number	Serial number	Rev.
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3.8 Support equipment

Description	Brand name	Model/Part number	Serial number	Rev.
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Section 4 Engineering considerations

4.1 Modifications incorporated in the EUT

There were no modifications performed to the EUT during this assessment.

4.2 Technical judgment

None

4.3 Deviations from laboratory tests procedures

No deviations were made from laboratory procedures.

Section 5 Test conditions

5.1 Atmospheric conditions

Temperature: 15–30 ℃
Relative humidity: 20–75 %
Air pressure: 86–106 kPa

When it is impracticable to carry out tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests shall be recorded and stated.

5.2 Power supply range

The normal test voltage for equipment to be connected to the mains shall be the nominal mains voltage. For the purpose of the present document, the nominal voltage shall be the declared voltage, or any of the declared voltages ±5 %, for which the equipment was designed.

Section 6 Measurement uncertainty

6.1 Uncertainty of measurement

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report according to CISPR 16-4-2 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4-2: Uncertainties, statistics and limit modelling – Uncertainty in EMC measurements“ and is documented in the Nemko Spa Technical Procedure WML1002. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Section 7 Test equipment

7.1 Test equipment list

Equipment	Manufacturer	Model no.	Asset no.	Cal cycle	Next cal.
Emi Test Receiver	R&S	ESU8	100202	1 year	2014/02
Trilog Broadband Antenna	Schwarzbeck	VULB 9162	9162-025	1 year	2015/05
Semi-anechoic chamber	Nemko	10m semi-anechoic chamber	530	2 year	2014/08
Antenna mast	R&S	HCM	836 529/05	NCR	NCR
Controller	R&S	HCC	836 620/7	NCR	NCR
Bilog antenna 1 ÷ 18 GHz	Schwarzbeck	STLP 9148-123	123	1 Year	2015/02
Broadband preamplifier	Schwarzbeck	BBV 9718	9718-137	1 Year	2013/09
Note: Choose an item.					

Section 8 Testing data

8.1 Clause 15.231(a) Conditions for intentional radiators to comply with periodic operation

8.1.1 Definitions and limits

The provisions of this section are restricted to periodic operation within the band 40.66–40.70 MHz and above 70 MHz. Except as shown in paragraph (e) of this section, the intentional radiator is restricted to the transmission of a control signal such as those used with alarm systems, door openers, remote switches, etc. Continuous transmissions, voice, video and the radio control of toys are not permitted. Data is permitted to be sent with a control signal. The following conditions shall be met to comply with the provisions for this periodic operation:

1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.

3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.

4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition

5) Transmission of set-up information for security systems may exceed the transmission duration limits in paragraphs (a)(1) and (a)(2) of this section, provided such transmissions are under the control of a professional installer and do not exceed ten seconds after a manually operated switch is released or a transmitter is activated automatically. Such set-up information may include data.

8.1.2 Test summary

Test date	July 29, 2013	**Test engineer**	Daniele Guarnone	**Verdict**	Pass
Temperature	26 ℃	**Air pressure**	990 mbar	**Relative humidity**	56 %

8.1.3 Observations/special notes

None

8.1.4 Test data

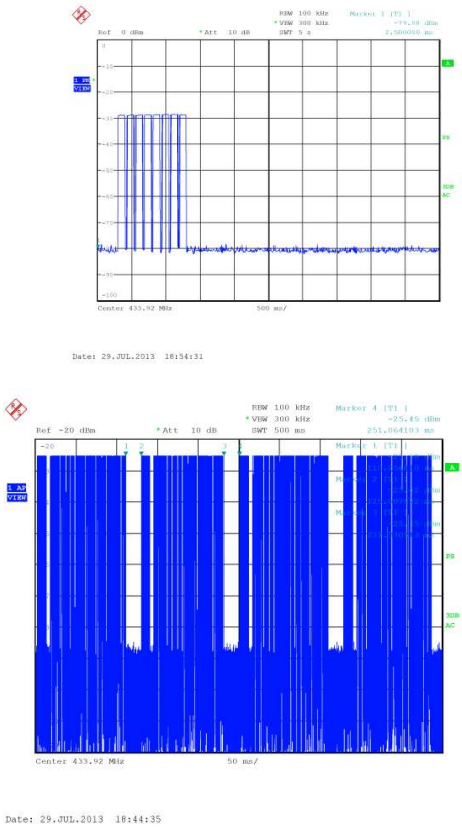
1) The EUT is manually triggered.
   See attached plot for the timing of a manually trigger event.

2) The EUT is not activated automatically.
   See attached plot for the timing of an automatically trigger event. (NA)

3) The EUT is not a periodic transmitter.

4) The EUT usage is not for radio control purposes during emergencies.
   The EUT operates as in 15.231(a)(2) during an alarm state. (NA)

5) The EUT does not transmit set-up information



Plot 8.1-1: Timing measurement

8.2 Clause 15.231(b) Field strength of emissions

8.2.1 Definitions and limits

In addition to the provisions of §15.205 the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Table 8.2-1: Field strength limits

Fundamental frequency (MHz)	Field strength of fundamental (µV/m)	(dBµV/m)	Field strength of spurious emissions (µV/m)	(dBµV/m)
40.66–40.70	2,250	67	225	47
70–130	1,250	61.9	125	41.9
130–174	1,250 to 3,750*	61.9 to 71.5*	125 to 375*	41.9 to 51.5*
174–260	3,750	71.5	375	51.5
260–470	3,750 to 12,500*	71.5 to 81.9*	375 to 1,250*	51.5 to 61.9*
Above 470	12,500	81.9	1,250	61.9
* Linear interpolations				

1) The above field strength limits are specified at a distance of 3 meters. The tighter limits apply at the band edges.
2) Intentional radiators operating under the provisions of this section shall demonstrate compliance with the limits on the field strength of emissions, as shown in the above table, based on the average value of the measured emissions. As an alternative, compliance with the limits in the above table may be based on the use of measurement instrumentation with a CISPR quasi-peak detector. The specific method of measurement employed shall be specified in the application for equipment authorization. If average emission measurements are employed, the provisions in §15.35 for averaging pulsed emissions and for limiting peak emissions apply. Further, compliance with the provisions of §15.205 shall be demonstrated using the measurement instrumentation specified in that section.
3) The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in §15.209, whichever limit permits a higher field strength.

8.2.2 Test summary

Test date	August 05, 2013	**Test engineer**	Daniele Guarnone	**Verdict**	Pass
Temperature	27 ℃	**Air pressure**	990 mbar	**Relative humidity**	54 %

8.2.3 Observations/special notes

Table 8.2-2: §15.209 – Radiated emission limits

Frequency (MHz)	Field strength (µV/m)	Measurement distance (dBµV/m)	(m)
0.009–0.490	2400/F	67.6−20log(F)	300
0.490–1.705	24000/F	87.6−20log(F)	30
1.705–30.0	30	29.5	30
30–88	100	40.0	3
88–216	150	43.5	3
216–960	200	46.0	3
above 960	500	54.0	3

– F = fundamental frequency in kHz
– In the emission table above, the tighter limit applies at the band edges.
– For frequencies above 1 GHz the limit on peak RF emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test.

8.2.3 Observations/special notes, continued

Table 8.2-3: §15.205 – Restricted bands of operation

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
0.495–0.505	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2690–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	Above 38.6
13.36–13.41			

- The spectrum was searched from 30 MHz to the 10thharmonic.
- The EUT was measured on three orthogonal axis.
- All measurements were performed at a distance of 3 m.
- All measurements were performed:
- within 30–1000 MHz range: using a quasi-peak detector with 120 kHz/300 kHz RBW/VBW,
- above 1 GHz: using peak detector with 1 MHz/3 MHz RBW/VBW for peak results
- and using average detector with 1 MHz/3 MHz RBW/VBW for average results.
- For battery operated equipment, the equipment tests shall be performed using a new battery.

8.2.4 Test data

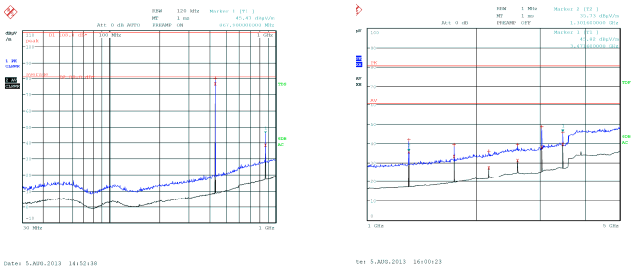
Duty cycle/average factor calculations

§15.35(c) When the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed; the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds.

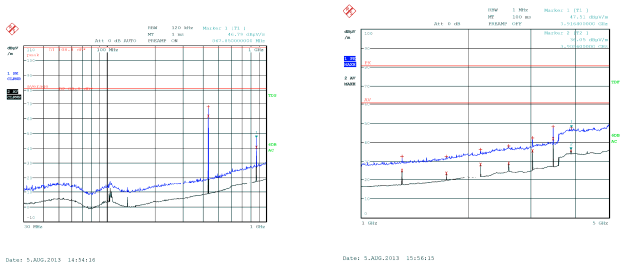
$$Duty\,cycle\,/\,average\ factor = 20 \times \log_{10}\left(\frac{Tx_{100\,ms}}{100\,ms}\right)$$: NA

8.2.4 Test data, continued

Horizontal polarization



Vertical polarization



Plot 8.2-1: Radiated emission 30 MHz to 5 GHz.

The spectral plot is a summation of a vertical and horizontal scan. The spectral scan has been corrected with transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators) for determination of compliance. Limits have been adjusted to reflect 3 m requirements.

A preview measurement was generated with receiver in continuous scan or sweep mode while the EUT was rotated and antenna adjusted to maximize radiated emission. Emissions detected within 6 dB or above limit were re-measured with the appropriate detector against the correlating limit and recorded as the final measurement.

Table 8.2-4: Field strength measurement results

Frequency (MHz)	Polarization V/H	Peak Field strength (dBµV/m)	Peak limit (dBµV/m)	Margin (dB)	Duty cycle factor (dB)	Average Field strength (dBµV/m)	Avg. limit (dBµV/m)	Margin (dB)
Fundamental								
433.92500	h	80.1	108.8	-28.7	--	76.6	80.8	-4.2
433.9500	v	68.1	108.8	-40.7	--	61.6	80.8	-19.2
Harmonics								
867.85	h	46.1	80.8	-34.7	--	38.2	60.8	-22.6
867.85	v	45.4	80.8	-35.4	--	45.5	60.8	-15.3
1301.6	h	41.9	80.8	-38.9	--	35.7	60.8	-25.7
1735.6	h	39.4	80.8	-41.4	--	33.3	60.8	-27.5
2169.6	h	36	80.8	-44.8	--	27.5	60.8	-33.3
2603.6	h	39.5	80.8	-41.3	--	31.2	60.8	-29.6
3037.2	h	48.6	80.8	-32.2	--	38.2	60.8	-22.6
3471.6	h	45.8	80.8	-35	--	39.6	60.8	-21.2
Note: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.								

Table 8.2-5: Field strength measurement results, continuee

Frequency (MHz)	Polarization V/H	Peak Field strength (dBµV/m)	Peak limit (dBµV/m)	Margin (dB)	Duty cycle factor (dB)	Average Field strength (dBµV/m)	Avg. limit (dBµV/m)	Margin (dB)
Harmonics								
1302.0000	v	32.7	80.8	-48.1	--	25.3	60.8	-35.5
1735.6000	v	32.8	80.8	-48.0	--	23.8	60.8	-37.0
2169.6000	v	36.2	80.8	-44.6	--	28.6	60.8	-32.2
2603.6000	v	38.1	80.8	-42.7	--	29.2	60.8	-31.6
3037.6000	v	42.3	80.8	-38.5	--	35.5	60.8	-25.3
3471.6000	v	48.3	80.8	-32.5	--	41.8	60.8	-19.0
3916.4000	v	47.5	80.8	-33.3	--	36.0	60.8	-24.8
--	--	--	--	--	--	--	--	--

Note: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.

8.3 Clause 15.231(c) Emission bandwidth

8.3.1 Definitions and limits

The bandwidth of the emission shall be no wider than 0.25 % of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5 % of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

8.3.2 Test summary

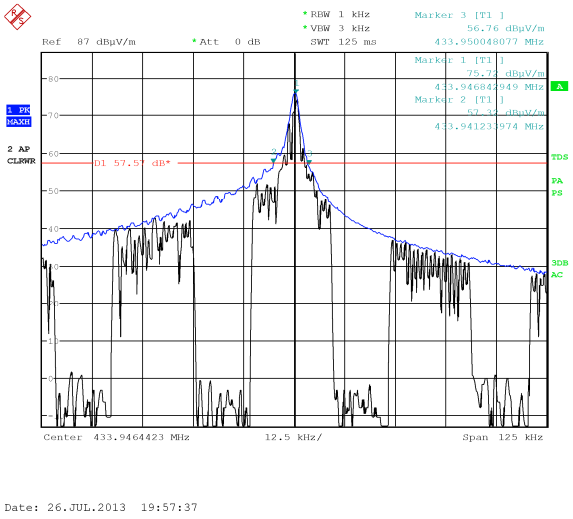
Test date	July 26, 2013	**Test engineer**	Daniele Guarnone	**Verdict**	Pass
Temperature	26 ℃	**Air pressure**	990 mbar	**Relative humidity**	55 %

8.3.3 Observations/special notes

The test was performed using peak detector of the spectrum analyzer with RBW no narrower than 1 % of the emission bandwidth.

8.3.4 Test data

Limit: 0.25 % of 433.9468429 MHz is 1084.867107 kHz



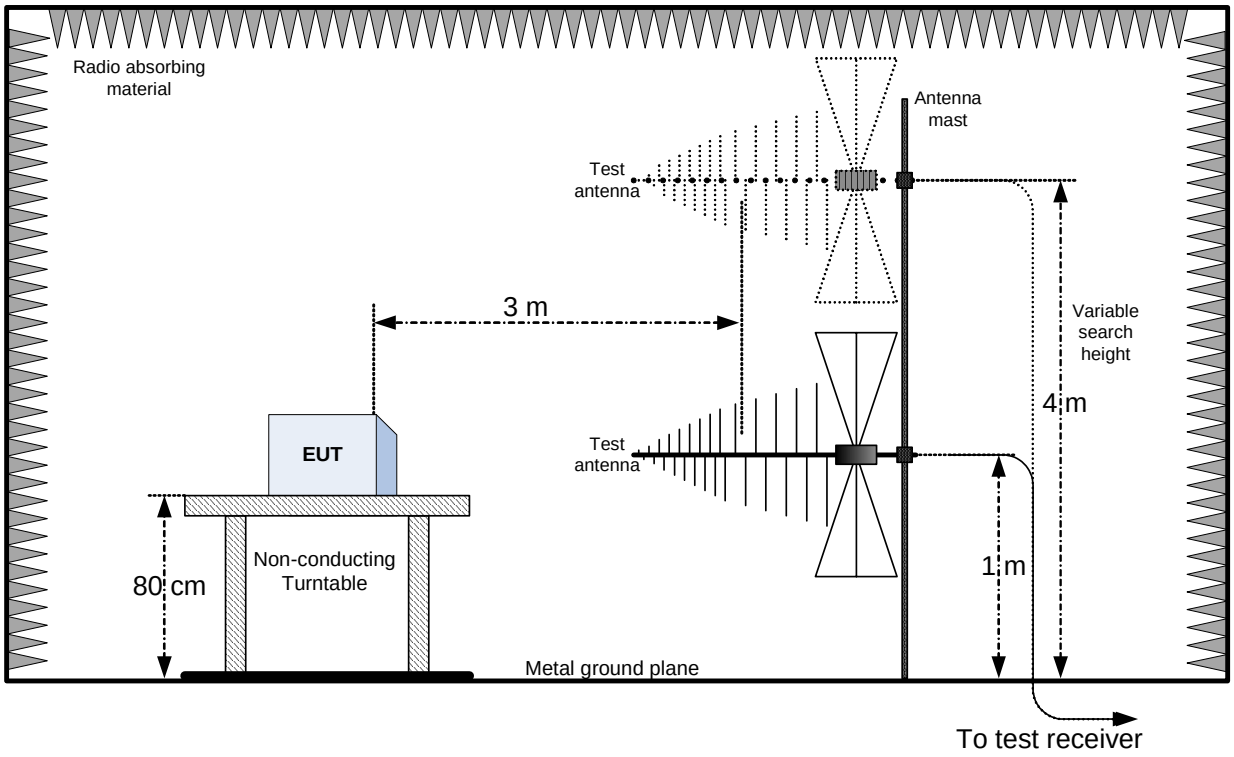
Plot 8.3-1: 20 dB bandwidth

Table 8.3-1: 20 dB bandwidth

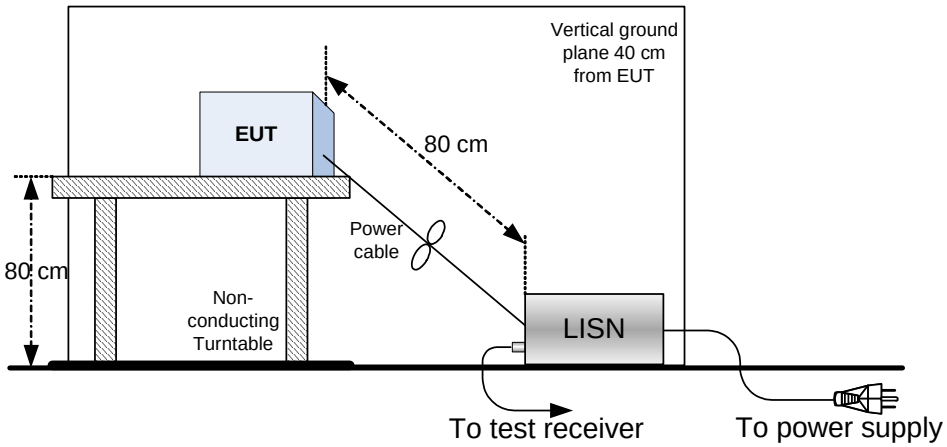
20 dB bandwidth (kHz)	Limit (kHz)	Margin (kHz)
8.814103	1084.867	-1076.053004

Section 9 Block diagrams of test set-ups

9.1 Radiated emissions set-up



9.2 Conducted emissions set-up



Section 10 EUT photos

10.1 External photos

10.1.1 EUT front view

10.1.2 EUT rear view