

TEST REPORT

N°: 821760-R3-E

JDE : 133546

Subject

Electromagnetic compatibility and Radio spectrum Matters
(ERM) tests according to standards:
ETSI EN 300 330-1 (V1.7.1-2010/02)
ETSI EN 300 330-2 (V1.5.1-2010/02)

Issued to

LEGRAND
128 Avenue de Lattre de Tassigny
87045 LIMOGES

Apparatus under test

↳ Product

Dalle tactile KNX / KNX Touch Command

↳ Trade mark

LEGRAND

↳ Manufacturer

LEGRAND

↳ Model under test

Touch Command KNX (6 Touch)

↳ Serial number

#2

Test date

Du 16 au 17 Février 2015 / February 16th au 17th, 2015

Test location

Moirans

Test performed by

Jonathan PAUC

Composition of document

23 pages

Modification of the last version

None

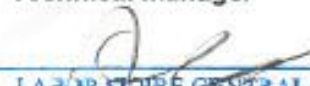
Document issued on

March 20th, 2015

Written by :
Jonathan PAUC
Tests operator



Approved by :
Anthony MERLIN
Technical manager



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LCIE

33, av du Général Leclerc
BP 8
92206 Fontenay-aux-Roses cedex
France

Tél : +33 1 40 95 60 60
Fax : +33 1 40 95 86 56
contact@lcie.fr
www.lcie.fr

Société par Actions Simplifiée
au capital de 15 745 984 €
RCS Nanterre B 408 363 174
www.lcie.com



SUMMARY

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1. TEST PROGRAM

References

- ETSI EN 300 330-1 (V1.7.1-2010/02)
- ETSI EN 300 330-2 (V1.5.1-2010/02)
- ERC Recommendation 70-03

Transmitter requirement:

Clause (ETSI EN 300 330-1 / ETSI EN 300 330-2) Test Description	Test result - Comments			
§ 7.2 – Transmitter carrier output levels	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> NP
§ 7.3 - Permitted frequency range of operating frequencies	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> NP
§ 7.4 - Permitted frequency range of the modulation bandwidth	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> NP
§ 7.5 – Transmitter spurious emissions	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> NP
§ 7.5 – Duty cycle	<input type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input checked="" type="checkbox"/> NA	<input type="checkbox"/> DP
This table is a summary of test report, see conclusion of each clause of this test report for detail.				

Receiver requirement:

Clause (ETSI EN 300 330-1 / ETSI EN 300 330-2) Test Description	Test result - Comments			
§ 8.1 – Adjacent channel selectivity – in band	<input type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input checked="" type="checkbox"/> NA	<input type="checkbox"/> NP
§ 8.2 – Blocking or desensitization	<input type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input checked="" type="checkbox"/> NA	<input type="checkbox"/> NP
§ 8.3 – Receiver spurious radiation	<input type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input checked="" type="checkbox"/> NA	<input type="checkbox"/> NP
This table is a summary of test report, see conclusion of each clause of this test report for detail.				

NA: Not Applicable

PASS: EUT complies with standard's requirement

FAIL: EUT does not comply with standard's requirement

NP: Test Not Performed

DP: Declaration of provider

Note1: The test can't be performed because the transmitter and receiver are operating at the same frequency and the transmitter cannot be switched off as the carrier is used as receiver injection signal



2. EQUIPMENT UNDER TEST: CONFIGURATION (DECLARED BY PROVIDER)

2.1. HARDWARE IDENTIFICATION (EUT AND AUXILIARIES):

Equipment under test (EUT):

Touch Command KNX (6 Touch)

Serial Number: #2

B002375AA PCBA TACTILES 6 TOUCHES PCB : HS01181AC
B002374AA PCBA NOEUD KNX 6T PCB : HS01180AB



Equipment Under Test

Power supply:

During all the tests, EUT is supplied by through NFC field provided by Tagsys
For measurement with different voltage, it will be presented in test method.

Name	Type	Rating	Reference / Sn	Comments
Supply NFC	NFC power supply	NFC power supply From TAGSYS NFC Reader	/	/
Supply KNX	<input type="checkbox"/> AC <input checked="" type="checkbox"/> DC <input type="checkbox"/> Battery	29Vdc	/	/

Inputs/outputs - Cable:

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
Supply KNX	KNX bus connector (power & data)	2m	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Shield not connected (both side)
Maintenance Access	Maintenance Factory connector	/	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	/

Auxiliary equipment used during test:

Type	Reference	Sn	Comments
RFID NFC reader	TAGSYS MEDIO P213	M1442055B0	/

Equipment information:

RF module:	None		
Frequency band:	[13.554–13.567] MHz		
Sub-band REC7003:	Annex 9 (f)		
RF mode:	<input type="checkbox"/> Transmitter	<input checked="" type="checkbox"/> Transceiver	<input type="checkbox"/> Receiver <input type="checkbox"/> Standby
Product class § 7.1.4	<input checked="" type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Receiver classification § 4.1.1	<input type="checkbox"/> 1	<input checked="" type="checkbox"/> 2	<input type="checkbox"/> 3
Antenna type:	<input type="checkbox"/> External:		<input checked="" type="checkbox"/> Internal:
Antenna gain:	NC		
Extreme temperature range:	<input type="checkbox"/> Category I (General) -20°C to +55°C	<input type="checkbox"/> Category II (Portable) -10°C to +55°C	<input checked="" type="checkbox"/> Category III (Indoor) +5°C to +35°C
Extreme test source voltage:	NA		

NC : Not communicated by customer

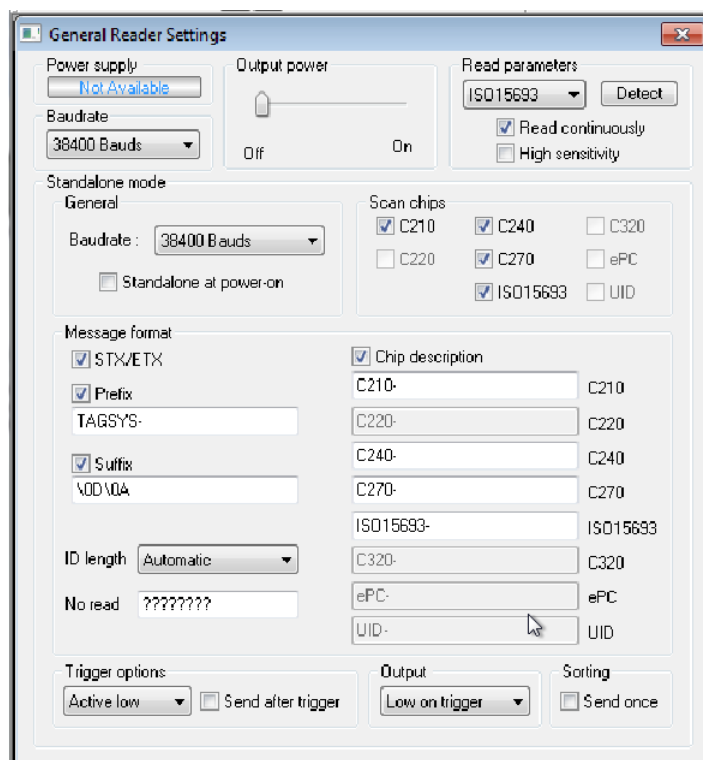
NA : Not applicable

2.2. EUT CONFIGURATION

Firmware / Software version of EUT: 1.4

RFID Reader software : Px Explorer 2.1.0

RFID reader is set on EUT (RF power set as 10dBm), a continuous reading of data from EUT to RFID reader is performed.



2.3. EQUIPMENT MODIFICATIONS

☒ None ☐ Modification:



3. TRANSMITTER CARRIER OUTPUT LEVELS

3.1. ENVIRONMENTAL CONDITIONS

Date of test :February 17th , 2015
Test performed by :J.PAUC
Atmospheric pressure (hPa) :1011
Relative humidity (%) :25
Ambient temperature (°C) :23

3.2. TEST SETUP

Method of measurement

- ☒ H-Field (Radiated) § 7.2.1
☐ RF carrier current (Product class 3 only) § 7.2.2
☐ Radiated E-Field (Product Class 4) § 7.2.3

Configuration

RF field: ☐ Unmodulated
☒ Modulated

Qualification measurements on the 10 meters open site

- The Equipment under Test is installed:

☒ FAR ☐ SAR ☐ OATS

- Distance between EUT and the measuring antenna is:

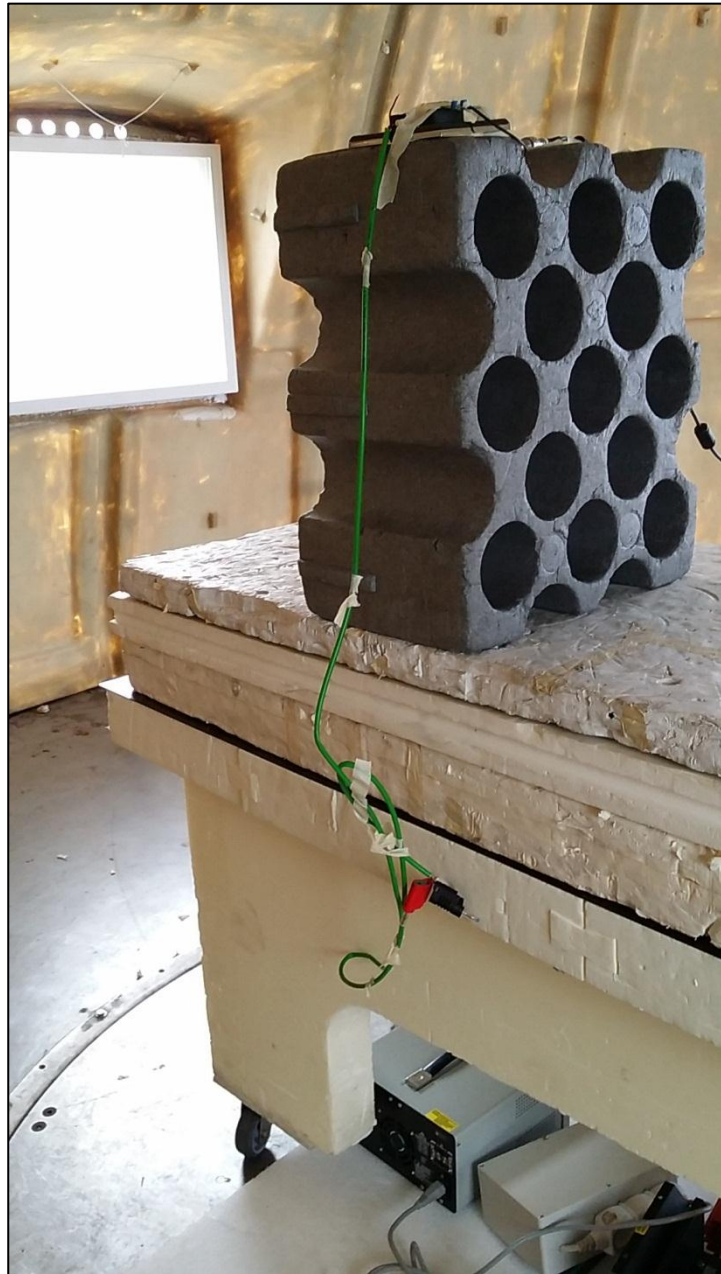
☒ 10m ☐ Other:

- Choice of measuring antenna:

☒ Loop ☐ Log periodic ☐ Biconic ☐ Dipole antenna

- Spectrum analyzer setting: QPEAK 200Hz or 9kHz.

- The setup is 1.5m above the ground reference plane on an insulating support. Test is performed in worst polarization with a measuring antenna. Continuous linear turntable azimuth search was performed with 360 degrees range. Vertical search was performed between 1m and 4m with the measuring antenna.





3.3. LIMIT

Table 5: H-field limits at 10 m

Frequency range (MHz)	H-field strength limit (H_f) dB μ A/m at 10 m
$0,009 \leq f < 0,090$	72 descending 3 dB/oct above 0,03 MHz or according to note 1 (see note 5)
$0,09 \leq f < 0,119$	42
$0,119 \leq f < 0,135$	66 descending 3 dB/oct above 0,119 MHz or according to note 1 (see notes 3 and 5)
$0,135 \leq f < 0,140$	42
$0,140 \leq f < 0,1485$	37,7
$0,1485 \leq f < 30$	-5 (see note 4)
$0,315 \leq f < 0,600$	-5
$3,155 \leq f < 3,400$	13,5
4,234	9
4,516	7
$7,400 \leq f < 8,800$	9
$10,2 \leq f < 11,00$	9
$12,5 \leq f \leq 20$	-7
$6,765 \leq f \leq 6,795$ $13,553 \leq f \leq 13,567$ $26,957 \leq f \leq 27,283$	42 (see note 3)
$13,553 \leq f \leq 13,567$	60 (see notes 2 and 3)
27,095	42

NOTE 1: For the frequency ranges 9 kHz to 135 kHz, the following additional restrictions apply to limits above 42 dB μ A/m:

- for loop coil antennas with an area $\geq 0,16 \text{ m}^2$ table 5 applies directly;
- for loop coil antennas with an area between $0,05 \text{ m}^2$ and $0,16 \text{ m}^2$ table 5 applies with a correction factor. The limit is: table value + $10 \times \log(\text{area}/0,16 \text{ m}^2)$;
- for loop coil antennas with an area $< 0,05 \text{ m}^2$ the limit is 10 dB below table 5.

NOTE 2: For RFID and EAS applications only.

NOTE 3: Spectrum mask limit, see annex G.

NOTE 4: For further information see annex H.

NOTE 5: Limit is 42 dB μ A/m for the following spot frequencies:
60 kHz \pm 250 Hz, 66,6 kHz \pm 750 Hz, 75 kHz \pm 250 Hz, 77,5 kHz \pm 250 Hz,
and 129,1 kHz \pm 500 Hz.

For calculation rules for limits at other measurement distances, see annex F.

Note: Additional information is available in CEPT/ERC Recommendation 70-03 [1] or ERC Decisions



3.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE
Antenna Loop	ELECTRO-METRICS	EM-6879	C2040052
Cable	SUCOFLEX	106G	A5329061
Cable (OATS)	-	-	A5329623
HF Radiated emission comb generator	LCIE SUD EST	-	A3169088
OATS	-	-	F2000409
Receiver 20Hz – 8GHz	ROHDE & SCHWARZ	ESU8	A2642019
Thermo-hygrometer (PM2)	OREGON	BAR916HG-G	B4206011
Antenna mast (OATS)	LCIE	-	F2000288
Turntable / Mast controller (OATS)	ETS Lindgren	Model 2066	F2000372
Antenna mast (OATS)	ETS Lindgren	2071-2	F2000392
Turntable (OATS)	ETS Lindgren	Model 2187	F2000403
Table	MATURO Gmbh	-	F2000437

3.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☒ None ☐ Divergence:

3.6. TEST SEQUENCE AND RESULTS

Normal test condition:

Frequency (MHz)	Measure (dBμV)	Corresponding field (dBμA/m)	Limit (dBμA/m)	Margin (dB)	Table Angle (deg)	Antenna Orientation (deg)	Total Corr Factor (dB)
13.56	62.5	11.0	42	-31	90	90	35.1

3.7. CONCLUSION

Measures for transmitter carrier output levels, performed on the sample of the product Touch Command KNX (6 Touch), SN: #2, in configuration and description presented in this test report, show levels below the ETSI EN 300 330-1 and ETSI EN 300 330-2 limits.



4. PERMITTED RANGE OF OPERATING FREQUENCIES

4.1. ENVIRONMENTAL CONDITIONS

Date of test :February 16th, 2015
Test performed by :J.PAUC
Atmospheric pressure (hPa) :1004
Relative humidity (%) :27
Ambient temperature (°C) :22

4.2. TEST SETUP

Configuration

RF field: ☐ Unmodulated
☒ Modulated

The permitted range of operating frequencies is the frequency range over which the equipment is authorized to operate.

The occupied bandwidth of the EUT, e.g. the minimum and maximum output frequencies at which the permitted spurious and out-of-band emission levels are exceeded due to intentional emission from the radio transmitter shall be measured. If more than one modulation scheme can be generated by the EUT, then for each modulation scheme and one typical set of modulation parameters the maximum and minimum frequencies shall be measured and recorded separately.

The measuring receiver may be a spectrum analyzer, oscilloscope, selective power meter or any measuring receiver which is appropriate to perform the intended measurement of the EUT.

See photo setup in §3 Transmitter carrier output levels and §6 Spurious domain emission limits.

4.3. LIMIT

The permitted range of operating frequency for intentional emissions shall be from 9 kHz to 30 MHz. Outside the permitted range of operating frequencies the unintentional emissions shall be reduced to the limits of spurious.

4.4. TEST SEQUENCE AND RESULTS

Operating frequencies: 13.56 MHz
See test results in §3 (Transmitter carrier output levels) and §6 (Spurious domain emission limits).

4.5. CONCLUSION

Measures for permitted range of operating frequencies, performed on the sample of the product Touch Command KNX (6 Touch), SN: #2, in configuration and description presented in this test report, show levels below the ETSI EN 300 330-1 and ETSI EN 300 330-2 limits.



5. PERMITTED FREQUENCY RANGE OF THE MODULATION BANDWIDTH

5.1. ENVIRONMENTAL CONDITIONS

Date of test : February 17th, 2015
Test performed by : J. PAUC
Atmospheric pressure (hPa) : 1011
Relative humidity (%) : 25
Ambient temperature (°C) : 23

5.2. TEST SETUP

Configuration

RF field: ☐ Unmodulated
☒ Modulated

The frequency range of the modulation bandwidth contains all associated side bands above the following level:

a) For carrier frequencies below 135 kHz:

- 23 dB below the carrier, for RFID within the transmitter emission boundary of figure G.1 (ETSI 300 330-1), and for RFID and EAS systems within the transmitter mask of figure G.2 (ETSI 300 330-1) or the appropriate spurious limit.

b) For carrier frequencies in the range 135 kHz to 30 MHz:

- 15 dB below the carrier or the appropriate spurious limit.

Where the assigned frequency band has been divided into sub-bands by the regulatory body, the above measuring levels and bandwidths apply inside these sub-bands.

For the modulation products of RFID and EAS systems, see annex G. (ETSI 300 330-1)

The output of the transmitter, with or without test fixture, shall be measured by using a spectrum analyzer with a resolution bandwidth appropriate to accept all major side bands. The power level calibration of the spectrum analyzer shall then be related to the power level or field strength measured. The calculation will be used to calculate the absolute level of the sideband power.

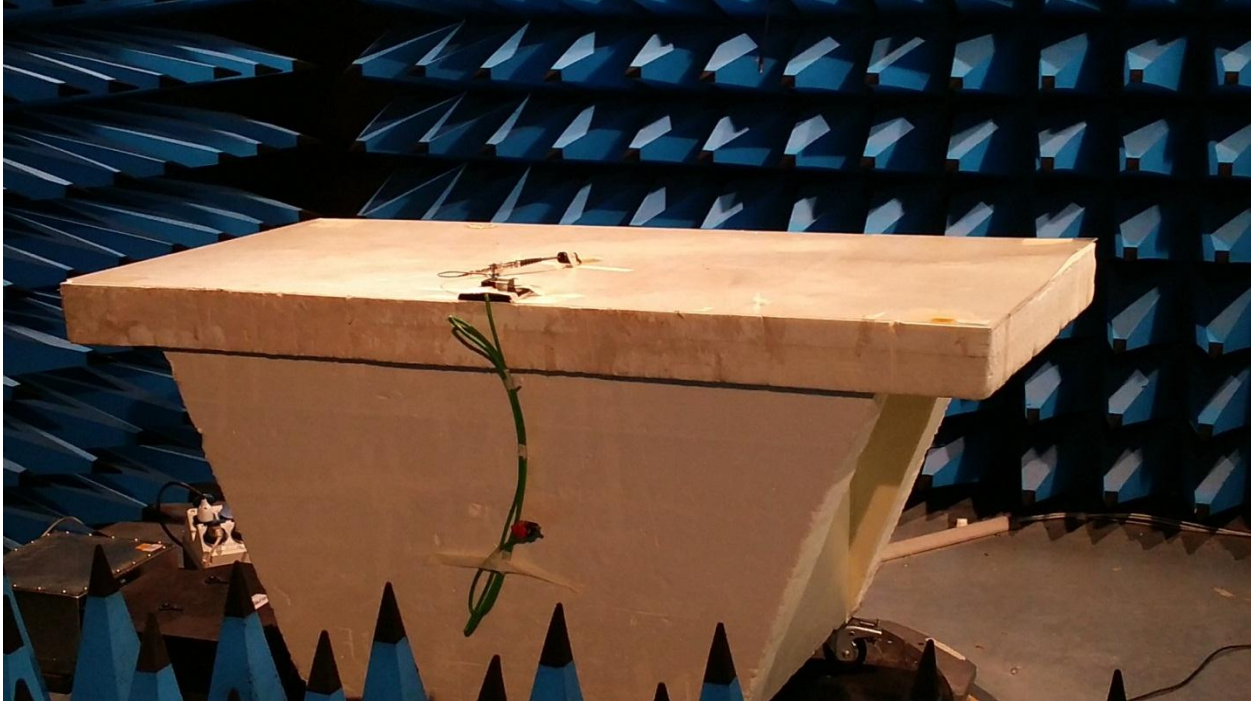
The spectrum analyser's span is sufficiently wide enough to ensure that the carrier and all its major side bands are captured.

The frequency of the upper and lower points, where the displayed power envelope of the modulation including frequency drift is equal to the appropriate level is recorded as the modulation bandwidth.

The measurements shall be made during normal and extreme test conditions. During extreme test conditions, both extreme temperature and voltage apply simultaneously.

Normal condition

- ☐ The transmitter modulation bandwidth is measured on the 10m open site. (See chapter 3 of this test report)
☒ The transmitter modulation bandwidth is measured with the power level calibration of the spectrum analyzer related to the field strength measured on the 10m open site. (See chapter 3 of this test report)



5.3. LIMIT

The permitted range of the modulation bandwidth shall be within the assigned frequency band see table 1 (ETSI300 330) or $\pm 7,5\%$ of the carrier frequency whichever is the smallest.

For RFID and EAS Systems, the permitted modulation bandwidth shall be within the transmitter emission boundary of figure G.1 (ETSI300 330), respectively the spectrum mask of figure G.2 (ETSI300 330).

Note: Additional information is available in CEPT/ERC Recommendation 70-03 [1] or ERC Decisions

5.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE
Antenna Loop	ELECTRO-METRICS	EM-6879	C2040052
Emission Cable	MICRO-COAX	6GHz	A5329654
Emission Cable	MICRO-COAX	6GHz	A5329655
Emission Cable	MICRO-COAX	6GHz	A5329656
Semi-Anechoic chamber #2	SIEPEL	-	D3044015
Spectrum Analyzer 9kHz - 6GHz	ROHDE & SCHWARZ	FSL6	A2642020
Thermo-hygrometer (PM2)	OREGON	BAR916HG-G	B4206011
Thermo-hygrometer (C2)	LACROSS Techn.	WS-2357	B4206015
Table	LCIE	-	F2000438

5.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

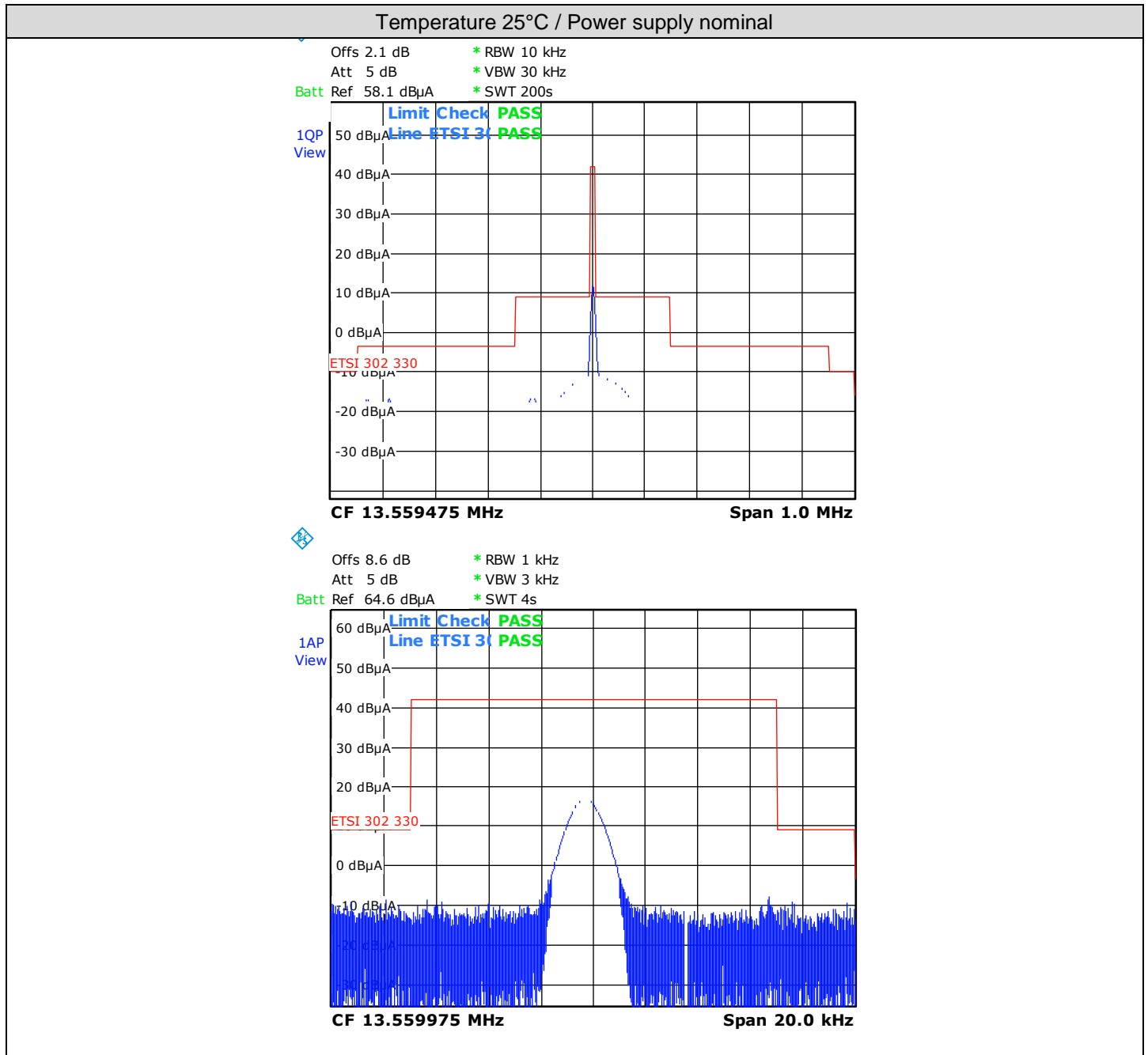
☒ None

☐ Divergence:

5.6. TEST SEQUENCE AND RESULTS

Normal test condition – Transmitter modulation bandwidth

The transmitter modulation bandwidth is measured following transmitter mask limit. EUT is emitting with normal modulation, under normal test conditions.



5.7. CONCLUSION

Measures for permitted frequency range of modulation bandwidth, performed on the sample of the product Touch Command KNX (6 Touch), SN: #2, in configuration and description presented in this test report, show levels below the ETSI EN 300 330-1 and ETSI EN 300 330-2 limits.



6. SPURIOUS DOMAIN EMISSION LIMITS

6.1. ENVIRONMENTAL CONDITIONS

Date of test : February 16th, 2015
Test performed by : J. PAUC
Atmospheric pressure (hPa) : 1004
Relative humidity (%) : 27
Ambient temperature (°C) : 22

6.2. TEST SETUP

Condition of measurement

- ☐ Conducted power
☐ Cabinet radiation
☒ Cabinet radiation and integral antenna

Method of measurement

- ☐ Conducted § 7.5.2 (Product class 3 only)
☐ Radiated field strength § 7.5.3
☒ Effective radiated power § 7.5.4

Configuration

- RF field: ☐ Unmodulated
☒ Modulated
- TAG: ☐ With
☐ Without
☒ With and without worst case presented

Pre-characterization measurement (9kHz to 30MHz):

- The Equipment under Test is installed:
☒ FAR ☐ SAR ☐ OATS

- Distance between EUT and the measuring antenna is:
☒ 3m ☐ 10m

- Choice of measuring antenna:
☒ Loop ☐ Log periodic ☐ Biconic ☐ Dipole antenna

- The setup is 1.0 m above the ground reference plane on an isolating table and the table shall turn on 360°. Test is performed in all polarization with a measuring antenna. The pre-characterization graphs are obtained in PEAK detection (worst case).

- The maximum emitted power is measured in opposite to EUT, no height variation.

Graph identifier	Polarization	Mode	EUT position	Comments
Emr# 1	0° / 90°	TX	Axis XY	See annex 1
Emr# 2	0° / 90°	TX	Axis Z	See annex 1

**Pre-characterization measurement (30MHz to 1GHz):**

- The Equipment under Test is installed:
☒ FAR ☐ SAR ☐ OATS
- Distance between EUT and the measuring antenna is:
☒ 3m ☐ 10m
- Choice of measuring antenna:
☒ Bilog ☐ Log periodic ☐ Biconic ☐ Dipole antenna
- The setup is 1.0 m above the ground reference plane on an isolating table and the table shall turn on 360°. Test is performed in horizontal (H) and vertical (V) polarization with a measuring antenna. The pre-characterization graphs are obtained in PEAK detection (worst case).
- The maximum emitted power is measured in opposite to EUT, no height variation.

Graph identifier	Polarization	Mode	EUT position	Comments
Emr# 3	H & V	TX	Axis XY	See annex 1
Emr# 4	H & V	TX	Axis Z	See annex 1

Qualification measurements on the 10 meters open site (9kHz to 30MHz):

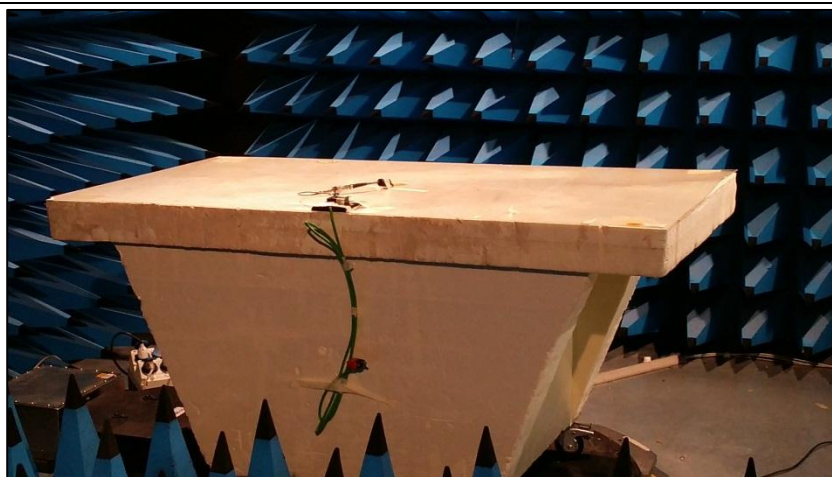
- The Equipment under Test is installed:
☐ FAR ☐ SAR ☒ OATS
- Distance between EUT and the measuring antenna is:
☐ 3m ☒ 10m
- Choice of measuring antenna:
☒ Loop ☐ Log periodic ☐ Biconic ☐ Dipole antenna
- Spectrum analyzer setting: QPEAK 200Hz or 9kHz.
- The setup is 1.5m above the ground reference plane on an insulating support. Test is performed in worst polarization with a measuring antenna. Continuous linear turntable azimuth search was performed with 360 degrees range. Vertical search was performed between 1m and 4m with the measuring antenna.

Qualification measurements on the 10 meters open site (30MHz to 1GHz):

- The Equipment under Test is installed:
☐ FAR (200MHz to 1GHz) ☐ SAR (25MHz to 1GHz) ☒ OATS (25MHz to 1GHz)
- Distance between EUT and the measuring antenna is:
☐ 3m ☒ 10m
- Choice of measuring antenna:
☒ Bilog ☐ Log periodic ☐ Biconic ☐ Dipole antenna.
- Spectrum analyzer setting: QPEAK 120 kHz.
- The setup is 1.5m above the ground reference plane on an insulating support. Test is performed in horizontal (H) and vertical (V) polarization with a measuring antenna. Continuous linear turntable azimuth search was performed with 360 degrees range. Vertical search was performed between 1m and 4m with the measuring antenna.
- Method to determinate the spurious radiated emission:
☒ NSA Method ☐ Substitution Method

Remark: The Normalized Site Attenuation (NSA) is added to the maximum values observed during the azimuth search in order to obtain the spurious radiated emission. For spurious above -6dB from the limit found with the NSA, the Substitution Method is applied.

The substitution antenna replaces the equipment under test for Effective Radiated Power (ERP) measurement. Power is measured for the same level of radiated field strength obtained on the measuring antenna.



XY Axis



Z Axis

6.3. LIMIT

State	Frequency $9\text{ kHz} \leq f < 10\text{ MHz}$	Frequency $10\text{ MHz} \leq f < 30\text{ MHz}$
Operating	27 dB μ A/m at 9 kHz descending 3 dB/oct	-3,5 dB μ A/m
Standby	5,5 dB μ A/m at 9 kHz descending 3 dB/oct	-25 dB μ A/m

State	47 MHz to 74 MHz 87,5 MHz to 118 MHz 174 MHz to 230 MHz 470 MHz to 862 MHz	Other frequencies between 30 MHz to 1 000 MHz
Operating	4 nW	250 nW
Standby	2 nW	2 nW



6.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE
Amplifier 0.1MHz – 1300 MHz	HEWLETT PACKARD	8447D	A7085008
Antenna Loop	ELECTRO-METRICS	EM-6879	C2040052
Antenna Bi-Log XWing	TESEQ	CBL6144	C2040146
Emission Cable	MICRO-COAX	6GHz	A5329654
Emission Cable	MICRO-COAX	6GHz	A5329655
Emission Cable	MICRO-COAX	6GHz	A5329656
Semi-Anechoic chamber #2	SIEPEL	-	D3044015
Radiated emission comb generator	BARDET	-	A3169050
Spectrum Analyzer 9kHz - 6GHz	ROHDE & SCHWARZ	FSL6	A2642020
Thermo-hygrometer (PM2)	OREGON	BAR916HG-G	B4206011
Thermo-hygrometer (C2)	LACROSS Techn.	WS-2357	B4206015
Table	LCIE	-	F2000438

6.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☒ None ☐ Divergence:

6.6. TEST SEQUENCE AND RESULTS

Characterization on 10 meters open site (9kHz to 30MHz):

Frequency list has been created with anechoic chamber pre-characterization results.

Frequency (MHz)	Measure (dBμV Q-Peak)	Corresponding field (dBμA/m)	Limit (dBμA/m)	Margin (dB)	Table Angle (deg)	Antenna Orientation (deg)	Total Corr Factor (dB)
27.12	37.5	-14.0	-3.5	-10.5	47	90	44.7

Characterization on 10 meters open site (30MHz to 1GHz):

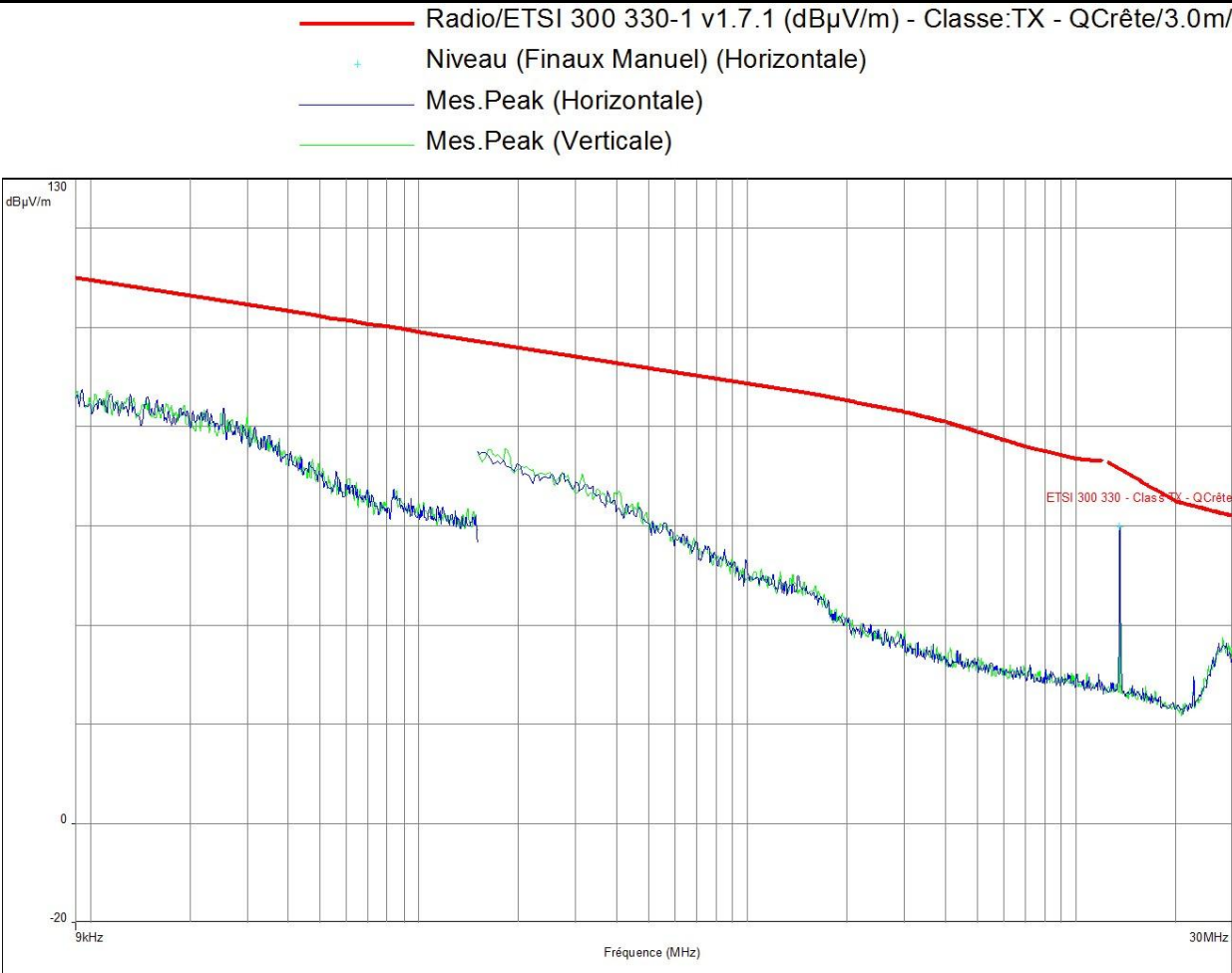
Frequency list has been created with anechoic chamber pre-characterization results.



6.7. GRAPHS

RADIATED EMISSIONS

Graph name:	Emr#1	Test configuration:
Limit:	ETSI 300 330-1 v1.7.1 (dBµV/m)	(0° 90) - (DALE KNX 6 touches) - Position XY
Class:	TX	
Frequency range: [9kHz - 30MHz]		
Antenna polarization:	0 & 90	RBW : 100kHz
Azimuth:	0° - 360°	VBW : 300kHz



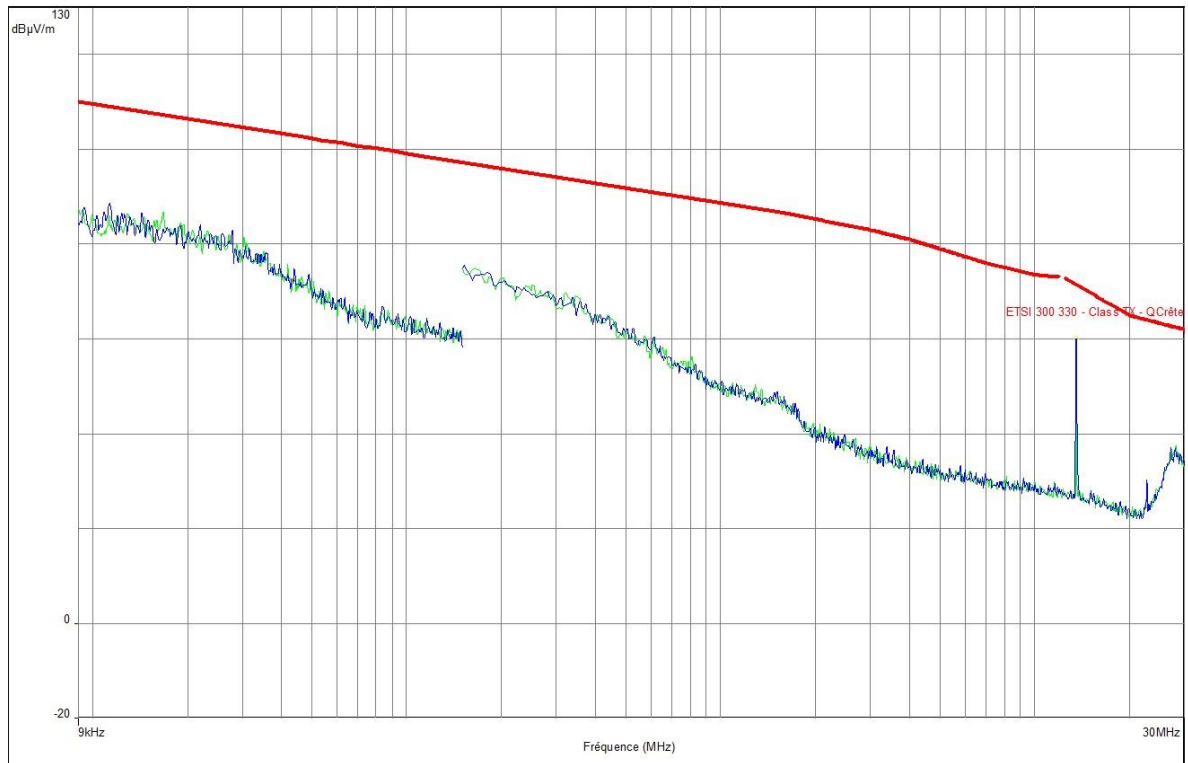
Frequency (MHz)	Peak Level (dBµV/m)
13.561605	59.89



RADIATED EMISSIONS

Graph name:	Emr#2	Test configuration:
Limit:	ETSI 300 330-1 v1.7.1 (dBµV/m)	(0° 90°) - (DALE KNX 6 touches) - Position Z
Class:	TX	
Frequency range: [9kHz - 30MHz]		
Antenna polarization:	0 & 90	RBW : 100kHz
Azimuth:	0° - 360°	VBW : 300kHz

- Radio/ETSI 300 330-1 v1.7.1 (dBµV/m) - Classe:TX - QCrête/3.0m/
- Mes.Peak (Horizontale)
- Mes.Peak (Verticale)
- Peak (Peak/LimQ-Peak) (Horizontale)

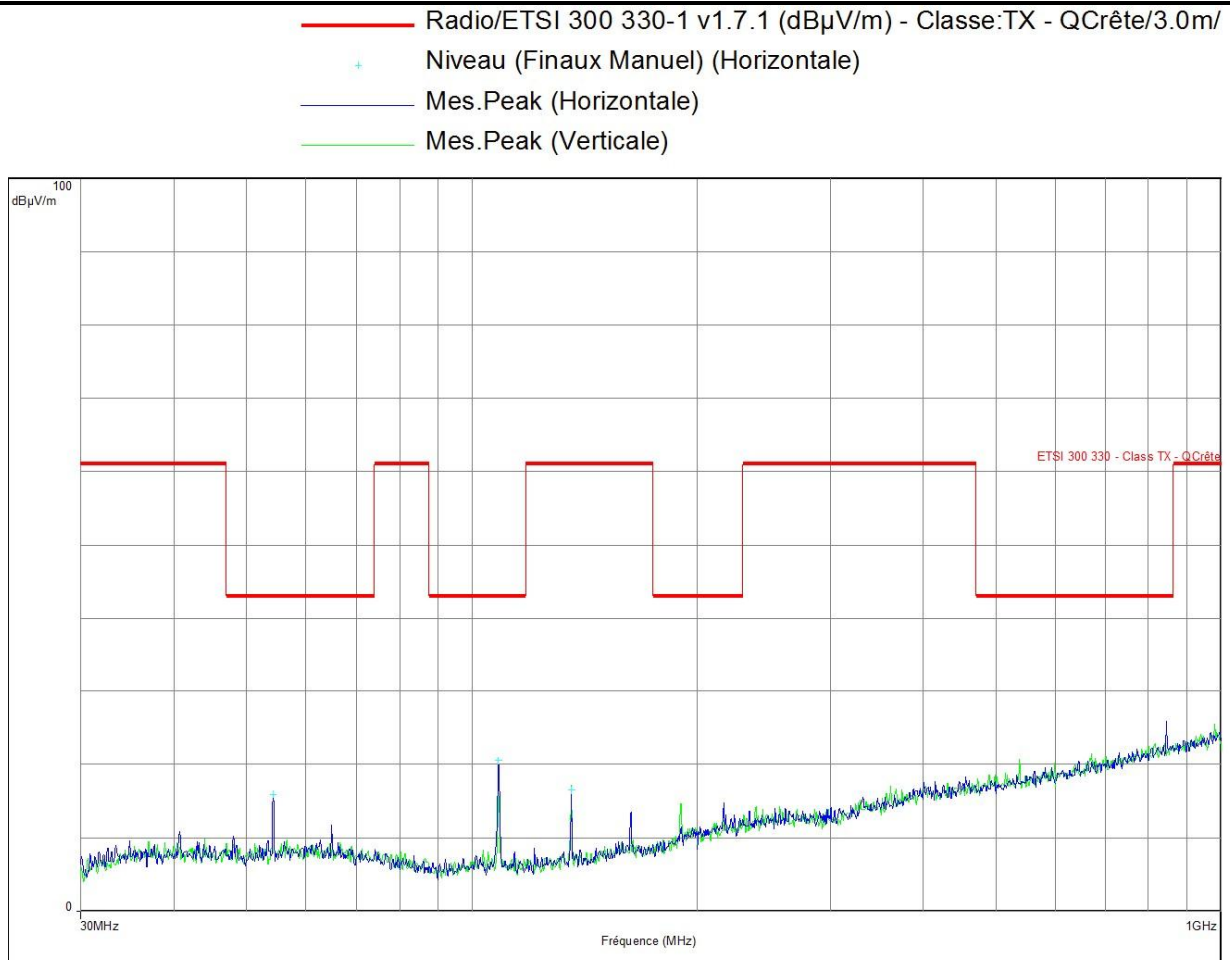


Frequency (MHz)	Peak (dBµV/m)
13.561605	60.05



RADIATED EMISSIONS

Graph name:	Emr#3	Test configuration:	
Limit:	ETSI 300 330-1 v1.7.1 (dBμV/m)	(H V) - (DALE KNX 6 touch) - Position XY	
Class:	TX		
Frequency range: [30MHz - 1GHz]			
Antenna polarization:	Horizontal & Vertical	RBW :	100kHz
Azimuth:	0° - 360°	VBW :	300kHz



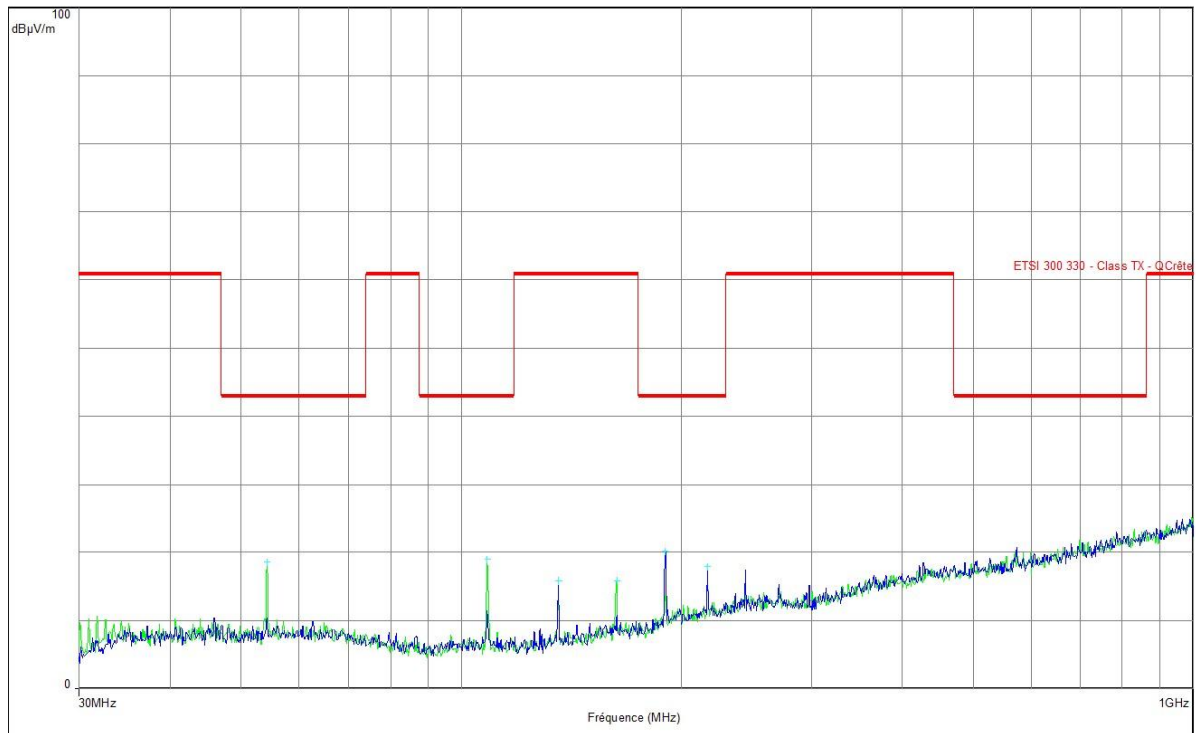
Spurious emissions

Frequency (MHz)	Peak Level (dBμV/m)
54.242	15.94
108.472	20.61
135.587	16.47

RADIATED EMISSIONS

Graph name:	Emr#4	Test configuration:
Limit:	ETSI 300 330-1 v1.7.1 (dBµV/m)	(H V) - (KNX 6 touch) - Position Z
Class:	TX	
Frequency range: [30MHz - 1GHz]		
Antenna polarization:	Horizontal & Vertical	RBW : 100kHz
Azimuth:	0° - 360°	VBW : 300kHz

— Radio/ETSI 300 330-1 v1.7.1 (dBµV/m) - Classe:TX - QCrête/3.0m/
+ Niveau (Finaux Manuel) (Horizontale)
+ Niveau (Finaux Manuel) (Verticale)
— Mes.Peak (Horizontale)
— Mes.Peak (Verticale)



Frequency (MHz)	Peak Level (dBµV/m)
135.604	15.89
189.851	20.16
216.96	17.86
54.225	18.47
108.489	18.97
162.736	15.86

6.8. CONCLUSION

Measures for spurious domain emission limits, performed on the sample of the product Touch Command KNX (6 Touch), SN: #2, in configuration and description presented in this test report, show levels below ETSI EN 300 330-1 and ETSI EN 300 330-2 limits.



7. UNCERTAINTIES CHART

ETSI EN 300 330-1 & 2 Type de l'essai / Kind of test	Incertitude élargie laboratoire / Wide uncertainty laboratory (k=2) $\pm x(\text{dB}) / (\text{Hz})$	Incertitude limite / uncertainty limit $\pm y(\text{dB}) / (\text{Hz})$
Mesures de température en °C <i>Temperature measurement in °C</i>	$\pm 1^\circ\text{C}$	$\pm 1^\circ\text{C}$
Mesure d'humidité / Humidity measurements De 30%RH à 60%RH / From 30%RH to 60%RH	$\pm 5\%$	$\pm 5\%$
EXIGENCES DE L'EMETTEUR / TRANSMITTER REQUIREMENTS		
Mesure de champ H (en rayonné) <i>H field measurement</i>	$\pm 4.75 \text{ dB}$	$\pm 6 \text{ dB}$
Mesure de champ E (en rayonné) <i>E field measurement</i>	$\pm 4.75 \text{ dB}$	$\pm 6 \text{ dB}$
Mesure de la largeur de bande de modulation allouée <i>Permitted range of operating frequencies</i>	$\pm 2 \cdot 10^{-8} \text{ Hz}$	$\pm 1 \cdot 10^{-7} \text{ Hz}$
Emissions non-essentiels / Spurious emissions Fréquence < 30 MHz / Frequency < 30 MHz Fréquence > 30 MHz - <200MHz / Frequency > 30 MHz - <200MHz Fréquence >200MHz / Frequency > 200MHz	$\pm 5.48 \text{ dB (f < 1 GHz)}$	$\pm 6 \text{ dB}$
Cycle de fonctionnement <i>Duty cycle</i>	--	--
EXIGENCES DU RECEPTEUR / RECEIVER REQUIREMENTS		
Sélectivité du canal adjacent dans la bande <i>Adjacent channel selectivity-in band</i>	--	--
Blocage ou désensibilisation <i>Blocking or desensitization</i>	--	--
Emissions non-essentiels Fréquence < 30 MHz / Frequency < 30 MHz Fréquence > 30 MHz - <200MHz / Frequency > 30 MHz - <200MHz Fréquence >200MHz / Frequency > 200MHz	$\pm 5.48 \text{ dB (f < 1 GHz)}$	$\pm 6 \text{ dB}$

Les valeurs d'incertitudes calculées du laboratoire étant inférieures aux valeurs d'incertitudes limites établies par le CISPR, la conformité de l'échantillon est établie directement par les niveaux limites applicables. Ce tableau regroupe l'ensemble des incertitudes maximales pour les essais réalisables dans le laboratoire, qu'ils aient été ou non réalisés dans le cadre du présent rapport / The uncertainty values calculated by the laboratory are lower than limit uncertainty values defined by the CISPR. The conformity of the sample is directly established by the applicable limits values. This table includes all uncertainties maximum feasible for testing in the laboratory, whether or not made in this report

9. ANNEX 1 – PHOTOS OF EQUIPMENT

