



TEST REPORT

Test Report No.: 1-5083/12-01-02



Testing Laboratory

CETECOM ICT Services GmbH

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Accredited Testing Laboratory:

The testing laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025 (2005) by the Deutsche Akkreditierungsstelle GmbH (DAkKS) The accreditation is valid for the scope of testing procedures as stated in the accreditation certificate with the registration number: D-PL-12076-01-01

Applicant

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Manufacturer

Same as Applicant

Test Standard/s

47CFR15	2009-10	Subpart B - Unintentional Radiators
ICES-003, Issue 4	2004-02	Interference-Causing Equipment Standard Digital Apparatus

Test Item

Kind of test item:	Wireless Alarm Keypad
Model name:	XMA611
FCC ID:	X46XM01
IC:	8816A-XM01
S/N serial number:	4B035111811A9AAF
HW hardware status:	MD:17/12 V.04.21.94.51
SW software status:	unknown
Power Supply:	battery powered



This test report is electronically signed and valid without handwritten signature. The public keys can be requested at the test laboratory to verify the electronic signatures.

Test performed:

Test Report authorised:

Joachim Wolsdorfer
 Testing Manager

Jens Hennemann
 Testing Manager

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2 General information

2.1 Notes and disclaimer

The test results of this test report relate exclusively to the test item specified in this test report. CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item.

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This test report is electronically signed and valid without handwritten signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

2.2 Application details

Date of receipt of order: 2012-07-05
Date of receipt of test item: 2012-07-09
Start of test: 2012-07-09
End of test: 2012-07-09
Person(s) present during the test: -/-

3 Test standard/s:

Test Standard	Version	Test Standard Description
47CFR15	2009-10	Subpart B - Unintentional Radiators
ICES-003, Issue 4	2004-02	Interference-Causing Equipment Standard Digital Aparatus

4 Test Environment

Temperature: 20°C – 25°C
Relative humidity content: 30 % - 50 %
Air pressure: 1020 hPa
Power supply: 230 V / 50 Hz

5 Test Laboratories sub-contracted

6 Information about Test Conditions

6.1 Test Item

Kind of test item :	Wireless Alarm Keypad		
Type identification :	XMA611		
Equipment classification:	Equipment for fixed use		
Environment classification:	Residential, commercial and light industry		
Supply voltage :	battery powered		
Ports : (maximum cable lengths declared by manufacturer)	Description	Direction	Length
	no ports		
Is mounting position / usual operating position defined?			wall mounted
Additional information:			
- the built in radio part of the device is not part of this test report and already tested (FCC ID: X46XM01 and IC ID: 8816A-XM01)			

6.2 EUT: Type, S/N etc. and Short Descriptions Used in this Test Report

short description*)	EUT	Type	S/N serial number	HW hardware status	SW software status
EUT A	alarm equipment	XMA 611	4B03511811A9AAF	MD:17/12 V.04.21.94.51	unknown

*) EUT short description is used to simplify the identification of the EUT in this test report.

6.3 EUT Set-up(s)

EUT set-up no.*)	Combination of EUT and AE	Remarks
set. 1	EUT A	battery powered

*) EUT set-up no. is used to simplify the identification of the EUT set-up in this test report.

6.4 EUT Operating Modes

EUT operating mode no.*)	Description of operating modes	Additional information
op. 1	active	status after battery insertion, enclosure closed

*) EUT operating mode no. is used to simplify the test report.

7 Summary of Test Results

- No deviations from the technical specifications were ascertained
 There were deviations from the technical specifications ascertained

7.1 Emission

7.1.1 Enclosure

EMI Phenomenon	Frequency range	Basic standard	Result
Radiated Interference Field Strength	30 - 1000 MHz	FCC Part 15 Class B	passed
Radiated Interference Field Strength	> 1 GHz	FCC Part 15 Class B	passed

7.1.2 AC Mains Power Input/Output Ports

EMI Phenomenon	Frequency range	Basic standard	Result
Conducted interference voltage	0,15– 30 MHz	FCC Part 15 Class B	NA2

Remarks:

NA1	Not tested because not required by used standard
NA2	Test not applicable because port does not exists
NA3	Test not applicable because port only for services
NA4	Test not applicable because port lengths not longer than 3m
NA5	Not tested because not required by customer
NA6	Not tested because used frequency < 108 MHz

7.2 Measurement and Test Set-up

Note: The test configuration is in accordance with the requirements given in the standards in point 3

7.3 Measurement uncertainty

The uncertainty of the measurement equipment fulfils CISPR 16 and the related European and national standards.

The semi anechoic chamber fulfils the requirements of CISPR 16-1 (ANSI C63.4) for a test volume of 3m Ø.

The uncertainty of the measurement equipment fulfils CISPR 16 and the related European and national standards.

The semi anechoic chamber fulfils the requirements of CISPR 16-1 (ANSI C63.4) for a test volume of 3m Ø.

The table below shows the measurement uncertainties for each measurement method. The expanded uncertainty (k=2 or 95%) was calculated with worst case values.

Measurement Method	Frequency area Impulse duration time	Description	Expanded uncertainty (k=2 or 95%)
Radiated Emission FCC part 15 B, ANSI C63.4	30 MHz – 18 GHz	- / -	± 4.28 dB
Conducted Emission FCC part 15 B, ANSI C63.4	9 kHz – 30 MHz	- / -	± 3.49 dB

8 Detailed test results - Emission

8.1 Electromagnetic Radiated Emissions (Distance 10 m)

8.1.1 Instrumentation for Test (see equipment list)

F 1	F 2	F 4b	F 5	F 6	F 7	F 8					
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8.1.2 Test Plan

EUT set-up	set 1		
Operating mode	Application	Limit	Result
op 1	Enclosure	FCC part 15 B Class B	passed

Remarks: battery powered

8.1.3 Radiated Limits

Frequency- range	FCC part 15 B Class B	FCC part 15 B Class A
30 MHz – 88 MHz	30 dB μ V/m	39,1 dB μ V/m
88 MHz – 216 MHz	33,5 dB μ V/m	43,5 dB μ V/m
216 MHz – 960 MHz	36 dB μ V/m	46,4 dB μ V/m
960 MHz – 40000 MHz	44 dB μ V/m	49,5 dB μ V/m
	* This values are recalculated from the class B limits at 3 m antenna distance in §15.109 (g 2) of the FCC rules	

8.1.4 Calibration Information

Device	Serial number	ICT Number	Calibration valid until	Calibration interval
ESCI 3 Receiver	100083/003	300003312	03/2013	12 month
Trilog Antenna	9163-295	300003787	05/2014	24 month

Remarks:

System check of all relevant devices and the chamber (weekly)

Cable loss: 0.5 to 4.2 dB (30 MHz to 2 GHz); the cable and connectors loss is re-measured every 3 month

8.1.5 Test Results

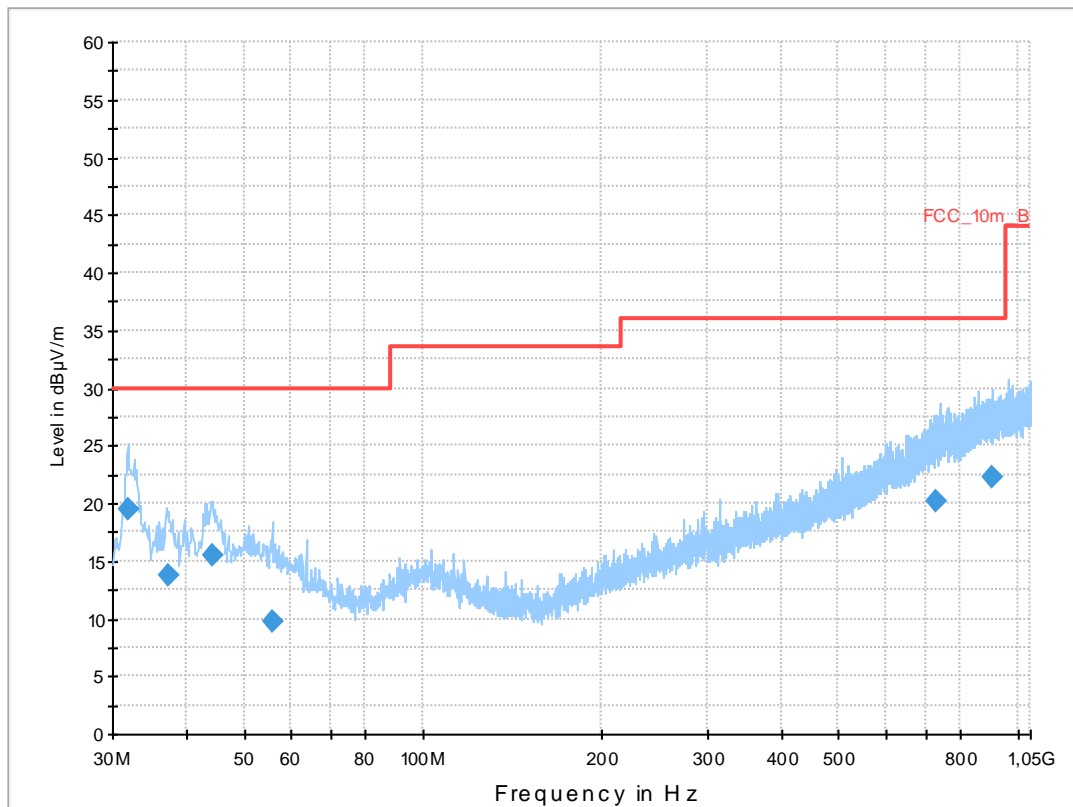
Common Information

EUT: XMA611
 Serial Number: 4B035111811A9AAB
 Test Description: FCC part 15 B class B @ 10 m
 Operating Conditions: active
 Operator Name: Hennemann
 Comment: battery powered

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)
 Receiver: [ESCI 3]
 Level Unit: dBµV/m

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
31.867350	19.4	1000.0	120.000	200.0	V	3.0	12.7	10.6	30.0	
37.208250	13.7	1000.0	120.000	189.0	V	86.0	13.2	16.3	30.0	
44.104950	15.6	1000.0	120.000	106.0	V	39.0	13.3	14.4	30.0	
55.643250	9.7	1000.0	120.000	100.0	V	312.0	12.7	20.3	30.0	
728.367900	20.2	1000.0	120.000	400.0	V	130.0	23.2	15.8	36.0	
905.813700	22.2	1000.0	120.000	200.0	H	68.0	25.2	13.8	36.0	

8.1.6 Hardware Set-up

Subrange 1
Frequency Range: 30 MHz - 2 GHz

Receiver: Receiver [ESCI 3]
@ GPIB0 (ADR 20), SN 100083/003, FW 4.42

Signal Path: without Notch
FW 1.0

Antenna: VULB 9163
SN 9163-295, FW ---
Correction Table (vertical): VULP6113
Correction Table (horizontal): VULP6113
Correction Table (vertical): Cable_EN_1GHz (1005)
Correction Table (horizontal): Cable_EN_1GHz (1005)

Antenna Tower: Tower [EMCO 2090 Antenna Tower]
@ GPIB0 (ADR 8), FW REV 3.12

Turntable: Turntable [EMCO Turntable]
@ GPIB0 (ADR 9), FW REV 3.12

EMC 32 Version 8.52

8.1.7 Signal strength calculation

Calculation formula:

$$SS = U_R + CL + AF$$

List of abbreviations:

SS	▶	signal strength
U_R	▶	voltage at the receiver
CL	▶	loss of the cable
AF	▶	antenna factor

List with correction factors:

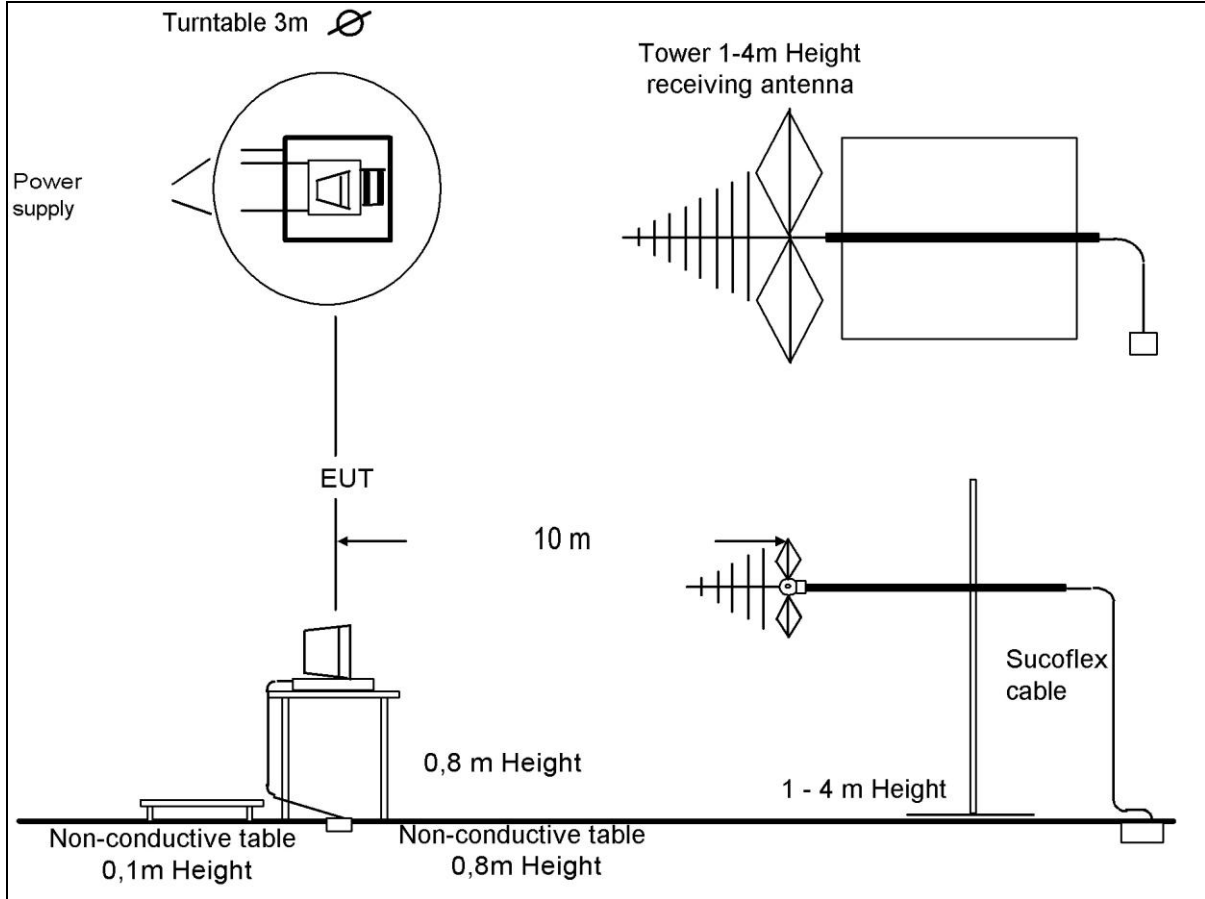
Frequency [MHz]	CL [dB]	AF [dB μ V/m]
30,000	0,20	12,30
100,000	0,60	11,30
200,000	1,10	10,60
300,000	1,30	13,20
400,000	1,60	15,30
500,000	1,90	16,80
600,000	2,00	18,80
700,000	2,20	20,30
800,000	2,30	21,50
900,000	2,40	22,80
1000,000	2,50	23,30

Example calculation:

For example at 500,000 000 MHz the measured Voltage (U_R) is 12,35 dB μ V/m, the loss of the cable (CL) is 1,90 dB and the antenna factor (AF) is 16,80 dB μ V/m the final result will be calculated:

$$SS \text{ [dB}\mu\text{V]} = 12,35 \text{ [dB}\mu\text{V/m]} + 1,90 \text{ [dB]} + 16,80 \text{ [dB}\mu\text{V/m]} = \underline{31,05 \text{ [dB}\mu\text{V/m]}} \text{ (35,69 } \mu\text{V/m)}$$

8.1.8 Test Set-up



8.2 Electromagnetic Radiated Emissions (Distance 5 m)

8.2.1 Instrumentation for Test (see equipment list)

F 1	F 6	F 29	F 30	F 33						
-----	-----	------	------	------	--	--	--	--	--	--

8.2.2 Test Plan

EUT set-up	set 1		
Operating mode	Application	Limit	Result
op 1	Enclosure	FCC Part15 B class B	passed

Remarks:

- The measured values are recalculated from 5m to 3m distance
- battery powered

8.2.3 Radiated Limits

Frequency- range	47CFR15: (FCC part 15 B) Class B	47CFR15: (FCC part 15 B) Class A *
30 MHz – 88 MHz	40 dB μ V/m	49,1 dB μ V/m
88 MHz – 216 MHz	43,5 dB μ V/m	53,5 dB μ V/m
216 MHz – 960 MHz	46 dB μ V/m	56,4 dB μ V/m
960 MHz – 18000 MHz	54 dB μ V/m	59,5 dB μ V/m
		* This values are recalculated from the class A limits at 10 m antenna distance in §15.109 (g 2) of the FCC rules.

8.2.4 Calibration Information

Device	Serial number	ICT Number	Calibration valid until	Calibration interval
ESU 26	100037	300003555	01/2013	12 month
Horn Antenna	9120B188	300003896	04/2014	24 month

Remarks:

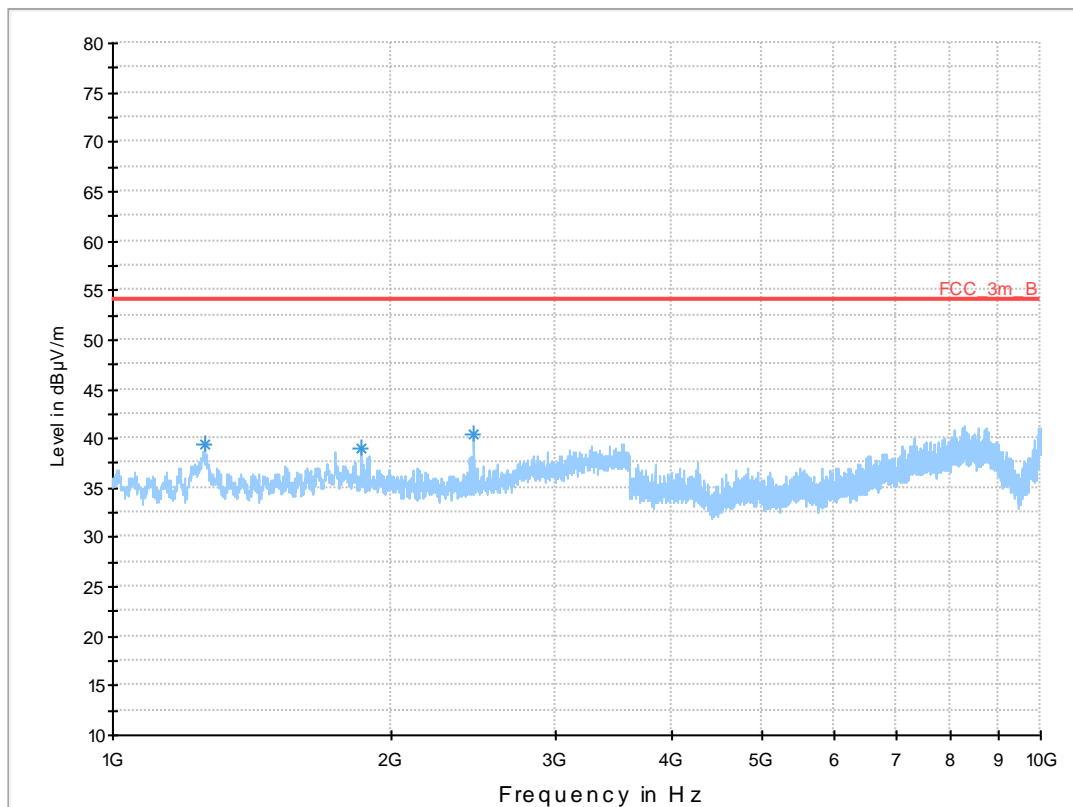
System check of all relevant devices and the chamber (weekly)

Cable loss: 0.5 to 4.2 dB (30 MHz to 2 GHz); the cable and connectors loss is re-measured every 3 month

8.2.5 Test Results

Common Information

EUT: XMA611
 Serial Number: 4B035111811A9AAB
 Test Description: FCC part 15 B class B
 Operating Conditions: active
 Operator Name: Hennemann
 Comment: battery powered



Data Reduction Result 1 [1]

Frequency (MHz)	MaxPeak-MaxHold (dBµV/m)	Height (cm)	Polarization	Azimuth	Corr. (dB)	Comment
1256.500000	39.4	100.0	V	118.0	-2.6	
1849.600000	39.0	100.0	H	36.0	-4.1	
2451.700000	40.4	100.0	V	162.0	-4.1	

8.2.6 Hardware Set-up

Subrange 1
Frequency Range: 1 GHz - 10 GHz

Receiver: ESU [ESU 26]
@ GPIB0 (ADR 17), SN 100037/026, FW 4.43

Signal Path: 1_6_EN
FW 1.0
Correction Table: 3_5m
Correction Table: LNA_EN (matix)

Antenna: BBHA 9120 B
Correction Table (vertical): BBHA9120
Correction Table (horizontal): BBHA9120
Correction Table (vertical): Cable_Horn_EN (1103)
Correction Table (horizontal): Cable_Horn_EN (1103)

Antenna Tower: Generic Tripod [Generic Tripod]
@ GPIB0 (ADR 19), SN ?

Turntable: Turntable [EMCO Turntable]
@ GPIB0 (ADR 9), FW REV 3.12

8.2.7 Signal strength calculation

Calculation formula:

$$SS = U_R + CL + AF + PA + DC$$

List of abbreviations:

SS	▶	signal strength
U_R	▶	voltage at the receiver
CL	▶	loss of the cable and gain of the preamp
AF	▶	antenna factor
DC	▶	distance correction (results measured on 5 m calculated to 3 m)

List with correction factors:

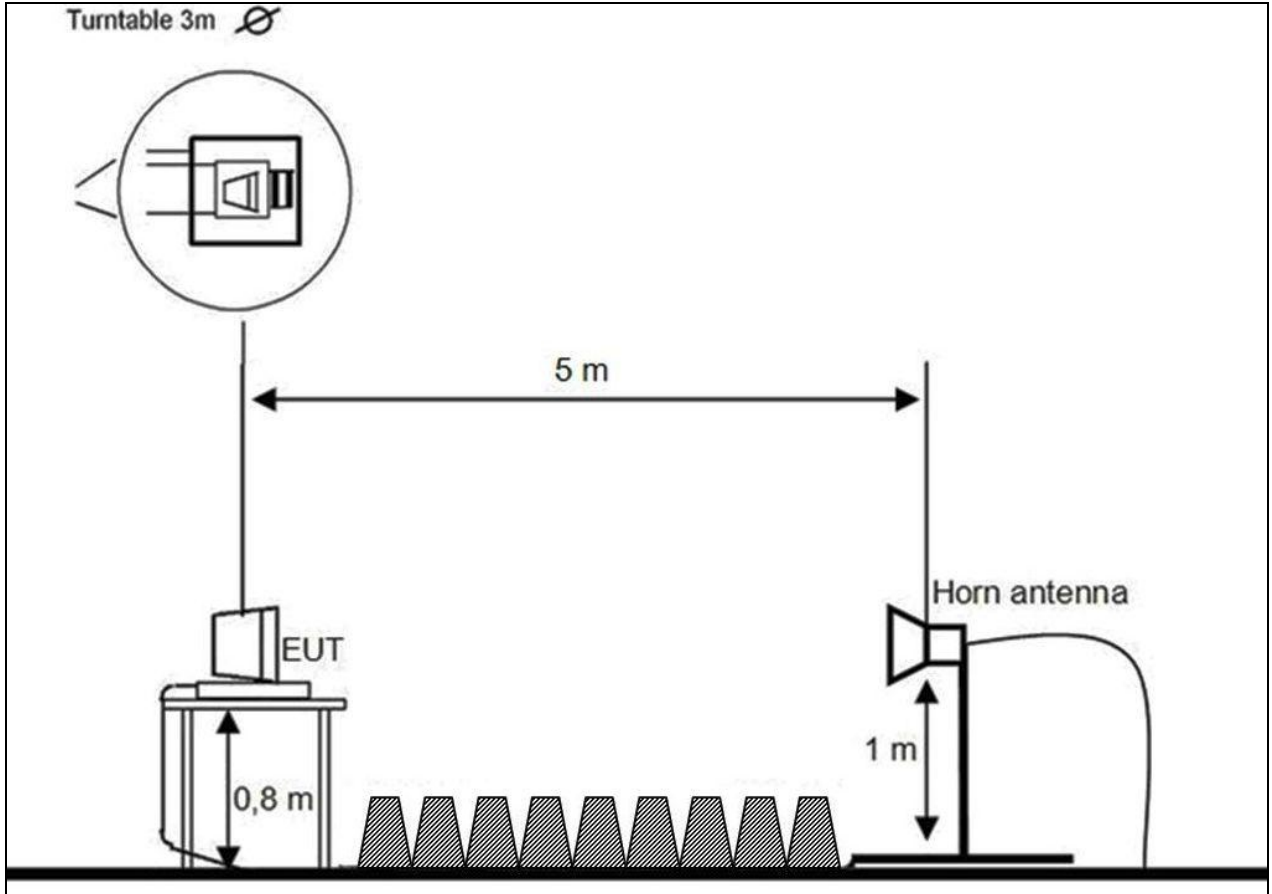
Frequency [GHz]	CL [dB]	AF [dB μ V/m]	DC [dB]
1,000	-35,50	26,20	4,40
1,500	-35,20	26,10	4,40
2,000	-35,10	26,70	4,40
2,500	-35,00	26,50	4,40
3,000	-34,70	27,60	4,40
3,500	-34,80	28,40	4,40
4,000	-35,00	28,60	4,40
4,500	-34,90	28,90	4,40
5,000	-34,80	29,30	4,40
5,500	-34,35	29,80	4,40
6,000	-34,00	30,30	4,40
6,500	-33,50	31,20	4,40
7,000	-33,10	31,20	4,40
7,500	-33,40	31,70	4,40
8,000	-33,80	32,10	4,40
8,500	-33,75	32,30	4,40
9,000	-33,70	31,70	4,40
9,500	-33,50	29,40	4,40
10,000	-33,40	33,00	4,40

Example calculation:

For example at 4,000 000 000 GHz the measured Voltage (U_R) is 46,13 dB μ V/m, the loss of the cable (CL) is -35,00 dB, the antenna factor (AF) is 28,60 dB μ V/m and the distance correction (DC) is 4,40 dB the final result will be calculated:

$$SS \text{ [dB}\mu\text{V]} = 46,13 \text{ [dB}\mu\text{V/m]} + (-35,00) \text{ [dB]} + 28,60 \text{ [dB}\mu\text{V/m]} + 4,4 \text{ [dB]} = \underline{44,13 \text{ [dB}\mu\text{V/m]}} \text{ (160,88 } \mu\text{V/m)}$$

8.2.8 Test Set-up



9 Test equipment and ancillaries used for tests

To simplify the identification of the test equipment and/or ancillaries which were used, the reporting of the relevant test cases only refer to the test item number as specified in the table below.

No.	Instrument/Ancillary	Manufacturer	Type	Serial-No.	Internal identification
Radiated emission in chamber F					
F-1	Control Computer	F+W		FW0502032	300003303
F-2	Trilog-Antenna	Schwarzbeck	VULB 9163	9163-295	---
F-3a	Amplifier	Veritech Microwave Inc.	0518C-138	- / -	- / -
F-4b	Switch	HP	3488A	- / -	300000368
F-5	EMI Test receiver	R&S	ESCI	100083	300003312
F-6	Turntable Interface-Box	EMCO / ETS-LINDGREN	Model 105637	44583	300003747
F-7	Tower/Turntable Controller	EMCO / ETS-LINDGREN	Model 2090	64672	300003746
F-8	Tower	EMCO / ETS-LINDGREN	Model 2175	64762	300003745
F-9	Ultra Notch-Filter Rejected band Ch. 62	WRCD		9	
Radiated immunity in chamber F					
F-10	Control Computer	F+W		FW0502032	300003303
F-11	Signal Generator	HP	8665A	2833A00112	300001373
F-12	RF-Amplifier	ar	100W1000 M1	12951	300000529
F-13	Directional Coupler	ar	DC 3010	12708	300001428
F-14	Stacked Logper Antenna	Schwarzbeck	STLP9128 E	9128 E 013	300003408
F-15	RF-Amplifier	ar	60S1G3	313649	300003410
F-15b	RF-Amplifier 0.8 – 4 GHz	BONN	BLMA 0840-2000/100D	076820B	300003783
F-16	Directional Coupler	ar	DC7144A	312786	300003411
F-17	Horn Antenna	ar	AT 4002	19739	300000633
F-18	Power Meter	R&S	NRV	860327/024	F033
F-19	Power sensor	R&S	URV5-Z2	839080/005	300002844.02
F-20	Power sensor	R&S	URV5-Z2	830755/057	F032
Harmonics and flicker in front of chamber F					
F-21	Flicker and Harmonics Test System	Spitzenberger & Spies	PHE4500/B I PHE4500/B II	B5983 B5984	300000210
F-28	Power Supply	Hewlett Packard	6032 A	2920 A 04466	300000580
Radiated emission in chamber F > 1GHz					
F-29	Horn antenna	Schwarzbeck	BBHA 9120 B	9120B188	300003896
F-30	Amplifier	ProNova	0518C-138	005	F 024
F-31	Amplifier	Miteq	42-00502650-28-5A	1103782	300003379
F-32	Horn antenna	Emco	3115	9709-5289	300000213
F-33	Spectrum Analyzer	R&S	ESU26	100037	300003555
F-34	Loop antenna	EMCO	6502	8905-2342	300000256

10 Observations

No observations, exceeding those reported with the single test cases, have been made.

Annex A: Photographs of the test set-up

Photo 1: radiated emission < 1GHz

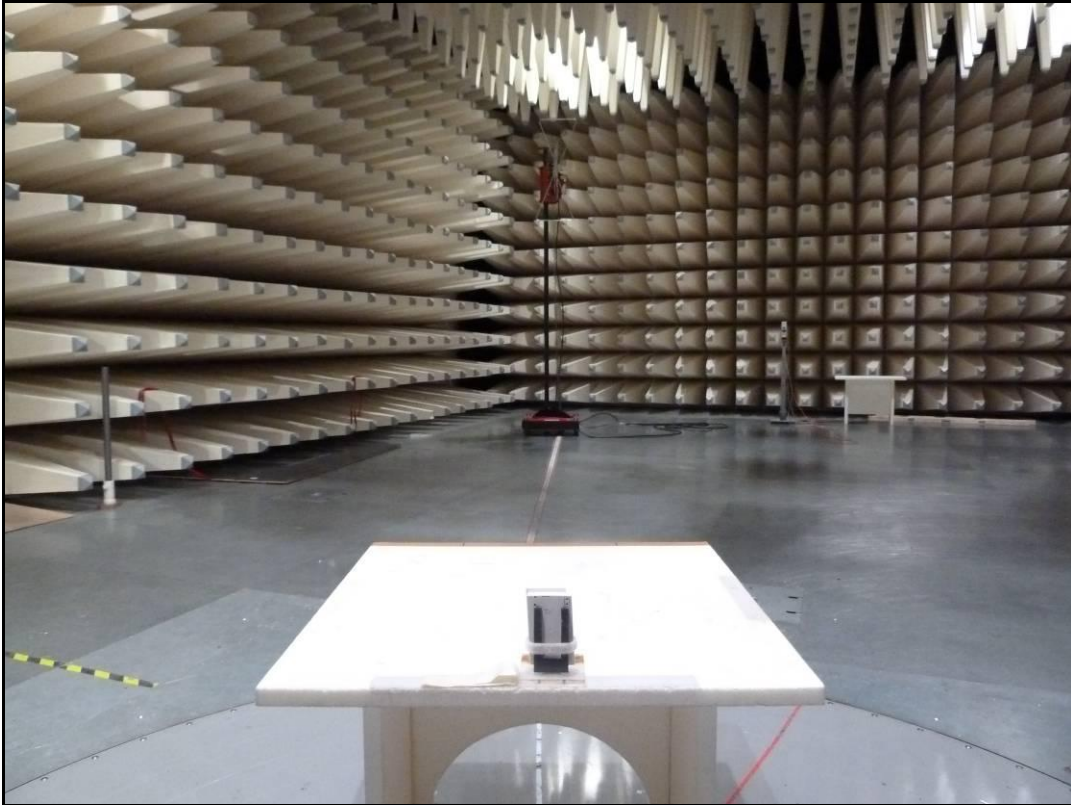
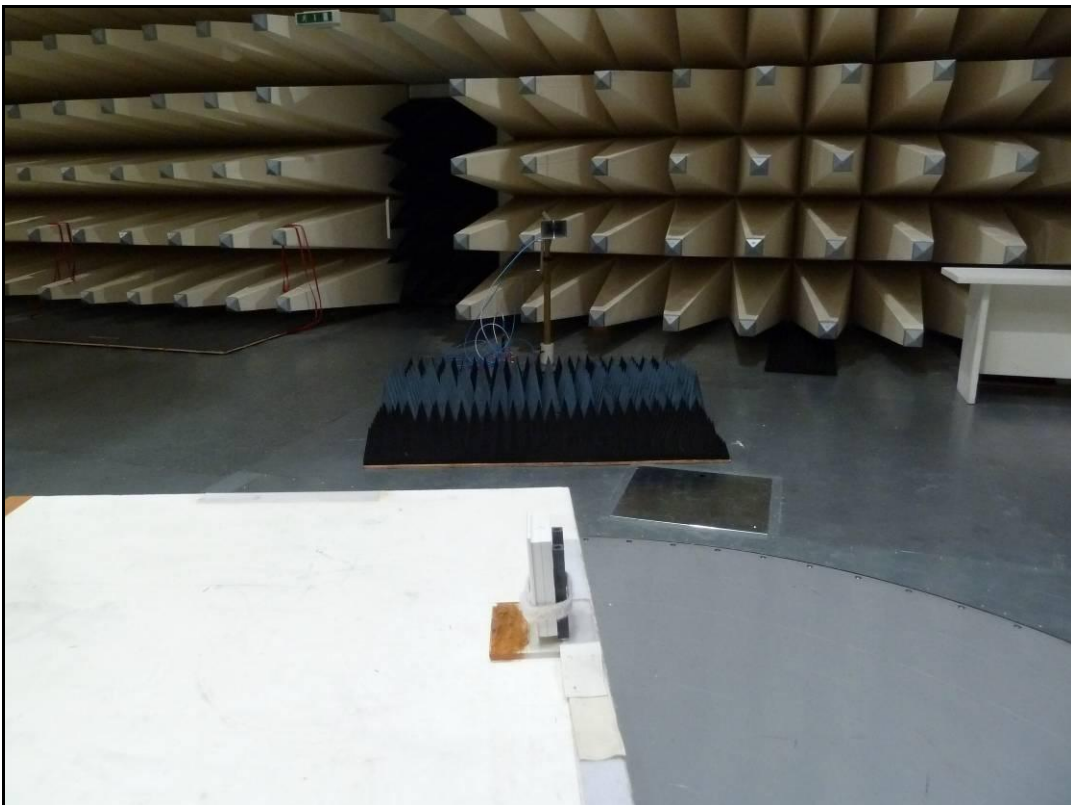


Photo 2: radiated emission 1-10GHz



Annex B: Photographs of the EUT

Photo 3: EUT A front view



Photo 4: EUT A label



Photo 5: EUT A side view

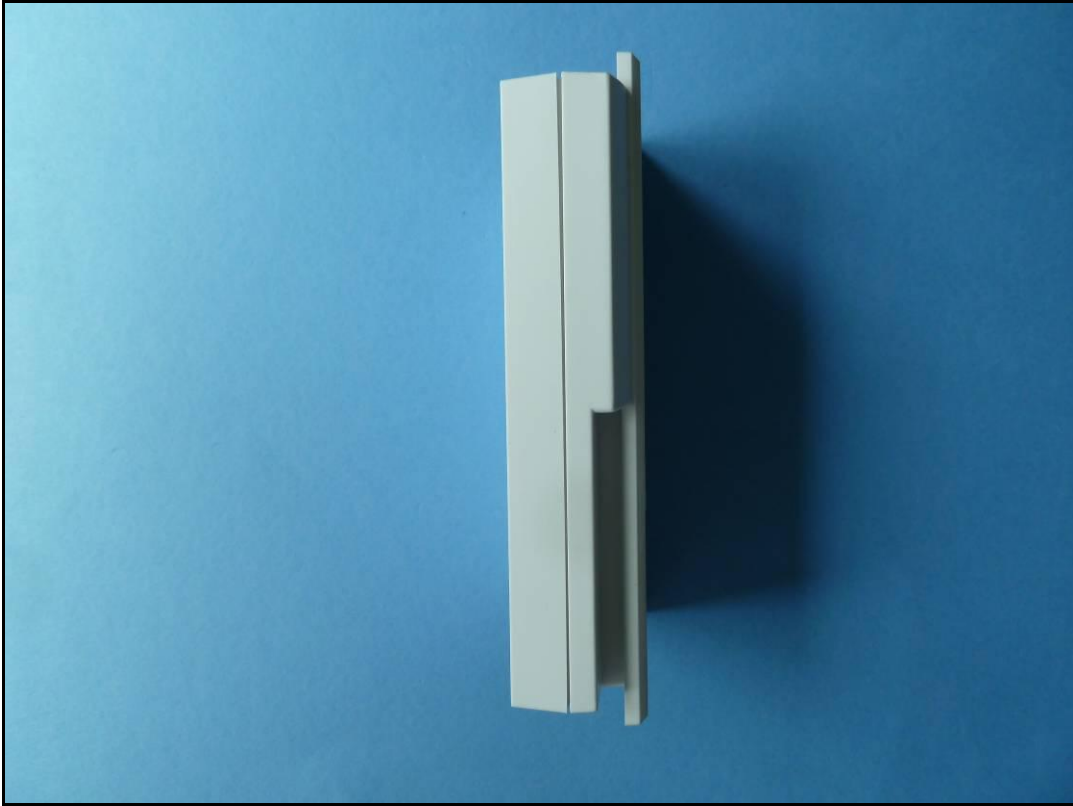


Photo 6: EUT A rear view



Photo 7: EUT A side view



Photo 8: EUT A enclosure opened



Photo 9: EUT A pcb label

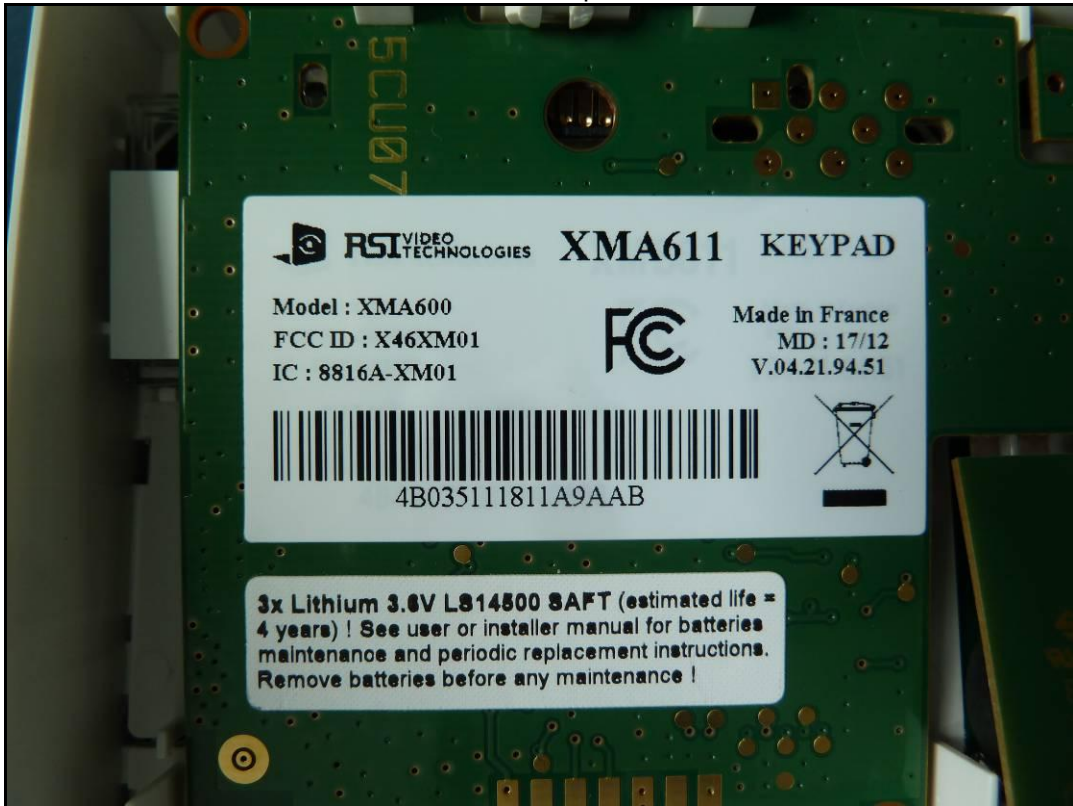


Photo 10: EUT A main pcb bottom side



Photo 11: EUT A main pcb top side



Photo 12: EUT A display + keypad unit

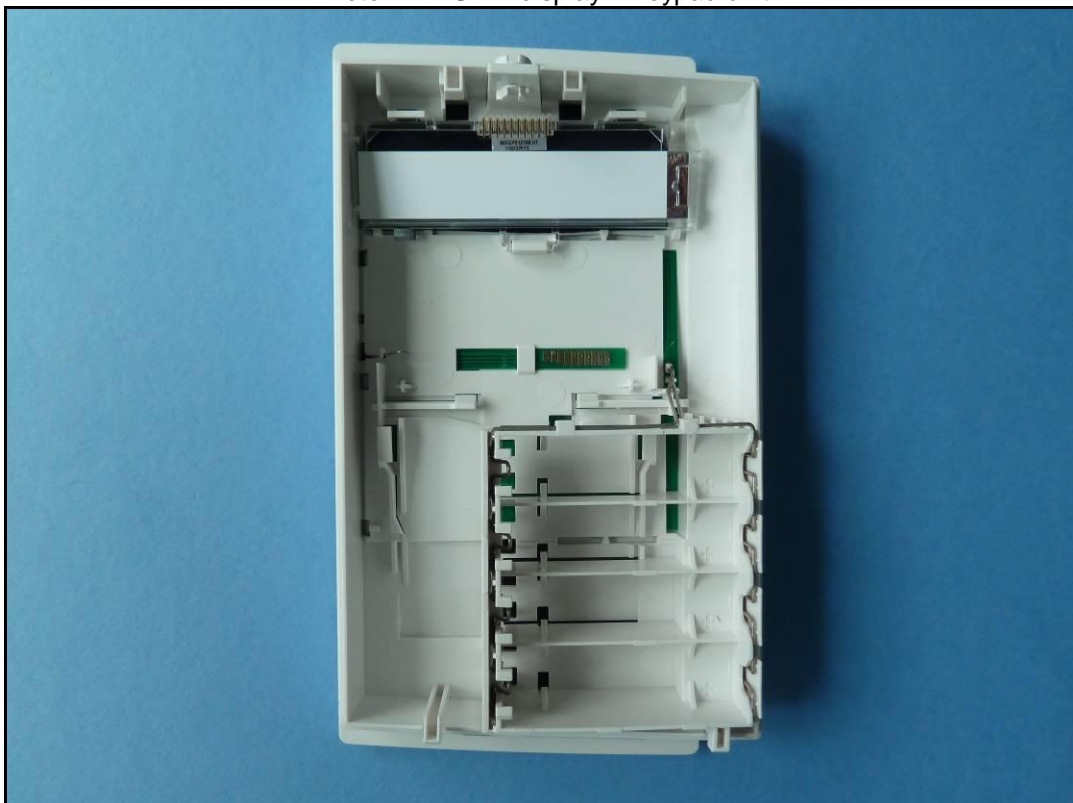


Photo 13: EUT A package label



Annex C: Document history

Version	Applied changes	Date of release
-/-	Initial release	2012-07-09

Annex D: Further information**Glossary**

DUT	-	Device under Test
EMC	-	Electromagnetic Compatibility
EUT	-	Equipment under Test
FCC	-	Federal Communication Commission
FCC ID	-	Company Identifier at FCC
HW	-	Hardware
IC	-	Industry Canada
Inv. No.	-	Inventory number
N/A	-	not applicable
S/N	-	Serial Number
SW	-	Software