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TEST REPORT

ETSI EN 300 220-1 V2.4.1 (2012-05)

&

ETSI EN 300 220-2 V2.4.1 (2012-05)

Report Reference No......: **CTL1308301368-WR**

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Date of issue.....: Oct. 08, 2013

Testing Laboratory Name: **Shenzhen CTL Electromagnetic Technology Co., Ltd.**

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Nanshan District, Shenzhen, China 518055

Applicant's name.....: **Da Ying Electronics Technology Co., Limited**

Address.....: 2nd Floor, Block D, Quanyuanfa Industrial Area, Zhucun, Guanlan
Town, Shenzhen City, Guangdong, China

Test specification:

Standard: **ETSI EN 300 220-1 V2.4.1: 2012-05**

ETSI EN 300 220-2 V2.4.1: 2012-05

TRF Originator.....: Shenzhen CTL Electromagnetic Technology Co., Ltd.

Master TRF.....: Dated 2011-01

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Test item description: GSM Alarm system/ GSM+PSTN Alarm system

Trade Mark: DYGSM

Model/Type reference.....: DY-10B, DY-10A, DY-30A, DY-40A, DY-40B, DY-50A, DY-50B,
DY-60A, DY-60B, DY-G66

Modulation.....: ASK

Ratings.....: DC 12V from battery for Transmitter 1

DC 9V from battery for Transmitter 2

DC 3V (CR2016) from battery for Transmitter 3

DC 7.2V from battery DC 12V from adapter input AC230V/50Hz for
Receiver

Operating Frequency Range.....: 433.92 MHz

Maximum Transmitter Power(ERP)....:	Transmitter 1: -1.60 dBm
	Transmitter 2: -3.36 dBm
	Transmitter 3: -5.28 dBm
Antenna Gain.....:	1.0dBi
Receiver Category.....:	3
Channel Spacing.....:	Less than 25.0KHz
Result.....:	Positive



TEST REPORT

Test Report No. : CTL1308301368-WR	Oct. 08, 2013
	Date of issue

Equipment under Test : GSM Alarm system/ GSM+PSTN Alarm system

Model /Type : DY-10B

Listed Models : DY-10A , DY-30A, DY-40A, DY-40B, DY-50A, DY-50B, DY-60A, DY-60B, DY-G66

Applicant : **Da Ying Electronics Technology Co., Limited**

Address : 2nd Floor, Block D, Quanyuanfa Industrial Area, Zhucun, Guanlan Town, Shenzhen City, Guangdong, China

Manufacturer : **Da Ying Electronics Technology Co., Limited**

Address : 2nd Floor, Block D, Quanyuanfa Industrial Area, Zhucun, Guanlan Town, Shenzhen City, Guangdong, China

Test Result according to the standards on page 4:

Positive

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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1. TEST STANDARDS

The tests were performed according to following standards:

[ETSI EN 300 220-1 V2.4.1 \(2012-05\)](#)—Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment to be used in the 25 MHz to 1 000 MHz frequency range with power levels ranging up to 500 mW; Part 1: Technical characteristics and test methods

[ETSI EN 300 220-2 V2.4.1 \(2012-05\)](#)—Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment to be used in the 25 MHz to 1 000 MHz frequency range with power levels ranging up to 500 mW; Part 2: Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive



2. SUMMARY

2.1. General Remarks

Date of receipt of test sample : Sept. 03, 2013

Testing commenced on : Sept. 03, 2013

Testing concluded on : Sept. 30, 2013

2.2. Equipment Under Test

Power supply system utilised

Power supply voltage : ☐ 230V / 50 Hz ☐ 115V / 60Hz
☐ 12 V DC ☐ 24 V DC
☒ Other (specified in blank below)

DC 12V from battery for Transmitter 1/DC 9V from battery for Transmitter 2/DC 3V from battery for Transmitter 3/DC 7.2V from battery or DC 12V from adapter input AC230V/50Hz for Receiver

2.3. Short description of the Equipment under Test (EUT)

For more details, refer to the user's manual of the EUT.

Serial number: Prototype

2.4. EUT operation mode

The EUT has been tested under typical operating condition. No software used to control the EUT for staying in transmitting and receiving mode for testing.

2.5. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

- ☐ - supplied by the manufacturer
- ☐ - supplied by the lab

2.6. Performance level

The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test relative to a performance criteria defined by its manufacturer or the requestor of the test, or agreed between the manufacturer and the purchaser of the product. Examples of functions defined by the manufacturer to be evaluated during testing include, but are not limited to, the following:

- essential operational modes and states;
- tests of all peripheral access(hard disks, floppy disks, printers, keyboard, mouse, etc.);
- quality of software execution
- quality of data display and transmission
- quality of speech transmission



3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Shenzhen CTL Electromagnetic Technology Co., Ltd.
Floor 1-A, Baisha Technology Park, No.3011, Shaheji Road, Nanshan District, Shenzhen, China 518055

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2003) and CISPR Publication 22.

3.2. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

IC Registration No.: 9618A

The 3m alternate test site of Shenzhen CTL Electromagnetic Technology Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 7618A on May, 2011.

FCC-Registration No.: 807767

Shenzhen CTL Electromagnetic Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 807767, June 27, 2011.

3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

3.4. Test Description

ETSI EN 300 220-1 V2.4.1 (2012-05) / ETSI EN 300 220-2 V2.4.1 (2012-05)			
Clause	Test Parameter	Remarks	Result
TRANSMITTER REQUIREMENTS			
7.1	Frequency error	Applicable	Pass
7.3	Effective radiated power	Applicable	Pass
7.5	Transient power	Applicable	Pass
7.6	Adjacent channel power	Applicable	Pass
7.8	Unwanted emissions in the spurious domain	Applicable	Pass
7.9	Frequency stability under low voltage conditions	Applicable	Pass
7.10	Duty Cycle	Applicable	Pass
RECEIVER REQUIREMENTS			
8.6	Receiver spurious radiation	Applicable	Pass

Remark: The measurement uncertainty is not included in the test result.

3.5. Statement of the measurement uncertainty

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 acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen CTL Electromagnetic Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. 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.

Hereafter the best measurement capability for CTL laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10dB	(1)
Radiated Emission	1~12.75GHz	4.32dB	(1)

- (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3.6. Equipments Used during the Test

Frequency Range					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Receiver	Rohde&Schwarz	ESI 26	100032	2013/04
2	Climate Chamber	ESPEC	EL-10KA	05107008	2013/04

Spurious Emissions					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	ULTRA-BROADBAND ANTENNA	ROHDE & SCHWARZ	HL562	100045	2013/04
2	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESI 26	100032	2013/04
3	RF TEST PANEL	ROHDE & SCHWARZ	TS / RSP	335021/ 0025	2013/04
4	TURNTABLE	ETS	2088	2151	2013/04
5	ANTENNA MAST	ETS	2075	2387	2013/04
6	HORN ANTENNA	ROHDE & SCHWARZ	HF906	100067	2013/04
6	EMI TEST SOFTWARE	ROHDE & SCHWARZ	ESK1	N/A	2013/04

ERP/Average Power					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Power Meter	AR	PM2002	304249	2013/04
2	Power Head	AR	PH2000	302541	2013/04
3	Climate Chamber	ESPEC	EL-10KA	06127003	2013/04
4	RF Cable	/	/	/	/

Mark: The cal due is one year.

4. TEST CONDITIONS AND RESULTS

4.1. ETSI EN 300 220-1/-2 REQUIREMENTS

4.1.1. Frequency error

LIMIT

The frequency error shall not exceed the values given in table 4a for systems with channel spacing of less or equal to 25 kHz, or table 4b for all other systems, under normal and extreme conditions (see specific bands in clause 7.2.3, table 5).

Table 4a: Frequency error for systems with channel spacings of less than or equal to 25 kHz

Channelization	Frequency error limit (kHz)				
	< 47 MHz	47 MHz to 137 MHz	> 137 MHz to 300 MHz	> 300 MHz to 500 MHz	> 500 MHz to 1 000 MHz
Channelized systems	±10,0	±10,0	±10,0	±12,0	±12,5
NOTE 1: Adjacent channel power as defined in clause 7.6.1 shall not exceed the limit in clause 7.6.3.					
NOTE 2: For equipment having a channel spacing of 12,5 kHz or less, the frequency error limit shall not exceed 50 % of the channel spacing.					

Table 4b: Frequency error for all other systems

Operating frequency	Frequency error limit (ppm), see note
≤ 1 000 MHz	±100
NOTE: The frequency error measured shall not exceed the designated frequency band.	

TEST CONFIGURATION



TEST PROCEDURE

The provider shall state whether the frequency error or adjacent channel power measurement is applicable, see clause 7.1.

The carrier frequency shall be measured in the absence of modulation with the transmitter connected to an artificial antenna. A transmitter without a 50 Ω output connector may be placed in the test fixture (see clause 6.3) connected to a frequency measuring device via an artificial antenna.

The measurement shall be made under normal test conditions (see clause 5.3) and extreme test conditions (see clauses 5.4.1 and 5.4.2) For the latter, the worst case combination of extreme temperature (see clause 5.4.1) and extreme supply voltage (see clause 5.4.2) are applied simultaneously.

TEST RESULTSTransmitter 1:

Test Condition		Nominal Frequency (MHz)	Measurement Frequency (MHz)	Frequency Error (MHz)
Temperature (°C)	Voltage (V)			
Nor(25℃)	Nor(12.0 V)	433.920	433.9199	0.0001
Min(-20℃)	Min (10.8V)	433.920	433.9194	0.0006
	Nor(12.0 V)	433.920	433.9195	0.0005
Max(55℃)	Min (10.8V)	433.920	433.9192	0.0008
	Nor(12.0V)	433.920	433.9190	0.0010
Limit		±12KHz		
Result		PASS		
Note: The EUT belong to category I(General), and extreme temperatures range is -20℃ to 55℃. The manufacturer declare that the low power is 9.6V.				

Transmitter 2:

Test Condition		Nominal Frequency (MHz)	Measurement Frequency (MHz)	Frequency Error (MHz)
Temperature (°C)	Voltage (V)			
Nor(25℃)	Nor(9.0 V)	433.920	433.9200	0.0000
Min(-20℃)	Min (8.1V)	433.920	433.9189	0.0011
	Nor(9.0 V)	433.920	433.9191	0.0009
Max(55℃)	Min (8.1V)	433.920	433.9194	0.0006
	Nor(9.0 V)	433.920	433.9195	0.0005
Limit		±12KHz		
Result		PASS		
Note: The EUT belong to category I(General), and extreme temperatures range is -20℃ to 55℃. The manufacturer declare that the low power is 7.6V.				

Transmitter 3:

Test Condition		Nominal Frequency (MHz)	Measurement Frequency (MHz)	Frequency Error (MHz)
Temperature (°C)	Voltage (V)			
Nor(25℃)	Nor(3.0 V)	433.920	433.9195	0.0005
Min(-20℃)	Min (2.7V)	433.920	433.9192	0.0008
	Nor(3.0 V)	433.920	433.9191	0.0009
Max(55℃)	Min (2.7V)	433.920	433.9187	0.0013
	Nor(3.0 V)	433.920	433.9192	0.0008
Limit		±12KHz		
Result		PASS		
Note: The EUT belong to category I(General), and extreme temperatures range is -20℃ to 55℃. The manufacturer declare that the low power is 2.5V.				

4.1.2. Effective radiated power

LIMIT

The permitted carrier powers in different SRD frequency bands are given in table 5; as implemented through National Radio Interfaces (NRI) and additional NRI as relevant.

Table 5: Radiated average power limit, e.r.p. and channel spacing

Table 5: Maximum radiated power limit, e.r.p., channel spacing, spectrum access and mitigation requirements

Frequency Bands/frequencies	Applications	Maximum radiated power, e.r.p. / power spectral density	Channel spacing	Spectrum access and mitigation requirement (e.g. Duty cycle or LBT + AFA)
26,995 MHz, 27,045 MHz, 27,095 MHz, 27,145 MHz, 27,195 MHz 34,995 MHz to 35,225 MHz 40,665 MHz, 40,675 MHz, 40,685 MHz, 40,695 MHz	Model control	100 mW	10 kHz 10 kHz 10 kHz	No restriction
26,957 MHz to 27,283 MHz	Non-specific use	10 mW	No requirement	No restriction
40,660 MHz to 40,700 MHz	Non-specific use	10 mW	No requirement	No restriction
138,200 MHz to 138,450 MHz	Non-specific use	10 mW	No requirement	1 % (see note 3)
169,400 MHz to 169,475 MHz	Tracking and tracing	500 mW	≤50 kHz	1 % (see note 3)
169,400 MHz to 169,475 MHz	Meter Reading	500 mW	≤50 kHz	10 %
169,475 MHz to 169,4875 MHz	Social alarms	10 mW	12,5 kHz	0,1 %
169,5875 MHz to 169,6000 MHz	Social alarms	10 mW	12,5 kHz	0,1 %
433,050 MHz to 434,790 MHz (see note 4)	Non-specific use	10 mW	No requirement	10 % (see note 3)
433,050 MHz to 434,790 MHz (see note 5)	Non-specific use	1 mW For bandwidth greater than 250 kHz the power density is limited to -13 dBm/ 10 kHz	No requirement	100 %
434,040 MHz to 434,790 MHz (see note 5)	Non-specific use	10 mW	≤25 kHz	100 %
863,000 MHz to 870,000 MHz (see note 4) Modulation bandwidth up to 300 kHz is allowed (see clause 7.7.3)	Non-specific use (Narrow/wideband modulation)	25 mW	≤100 kHz (see note 6)	0,1 % or LBT + AFA (see notes 2, 3 and 9)
863,000 MHz to 870,000 MHz (see note 4)	Non-specific use (DSSS and other wideband modulation other than FHSS)	25 mW Power density is limited to -4,5 dBm/ 100 kHz (see notes 1 and 7)	No requirement	0,1 % or LBT + AFA (see notes 3, 8 and 9)
863,000 MHz to 870,000 MHz (see note 4)	Non-specific use (FHSS modulation)	25 mW (see note 1)	≤100 kHz (see table 6) (see note 6)	0,1 % or LBT (see notes 2 and 9)
864,800 MHz to 865,000 MHz	Wireless audio applications	10 mW	50 kHz	No restriction

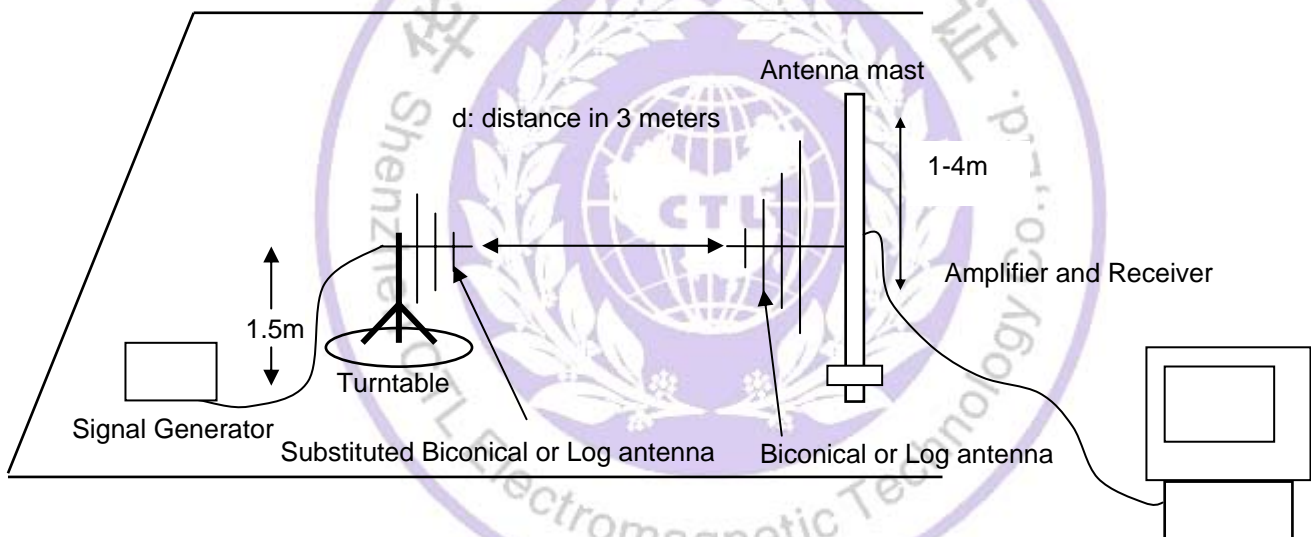
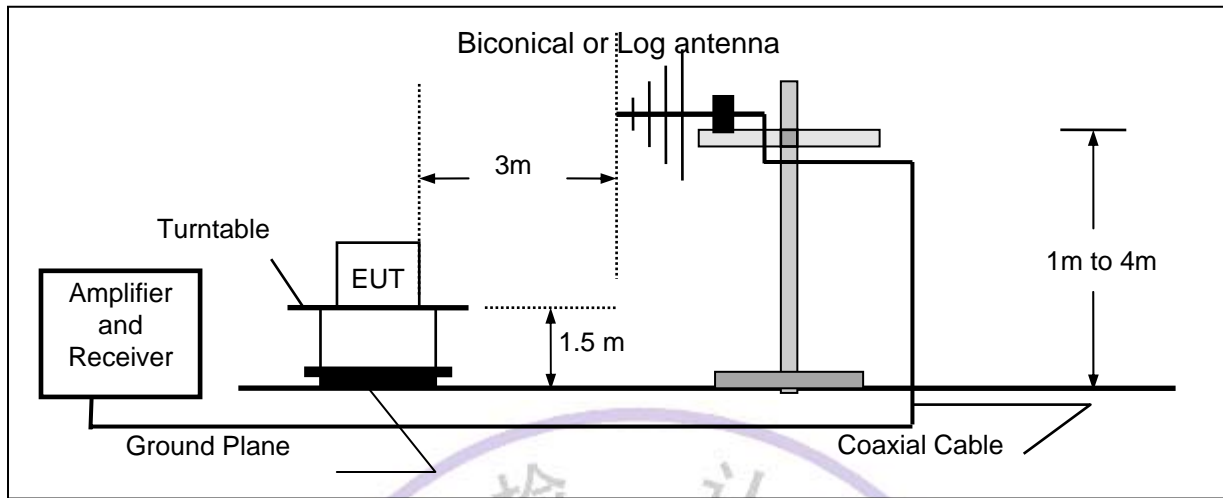
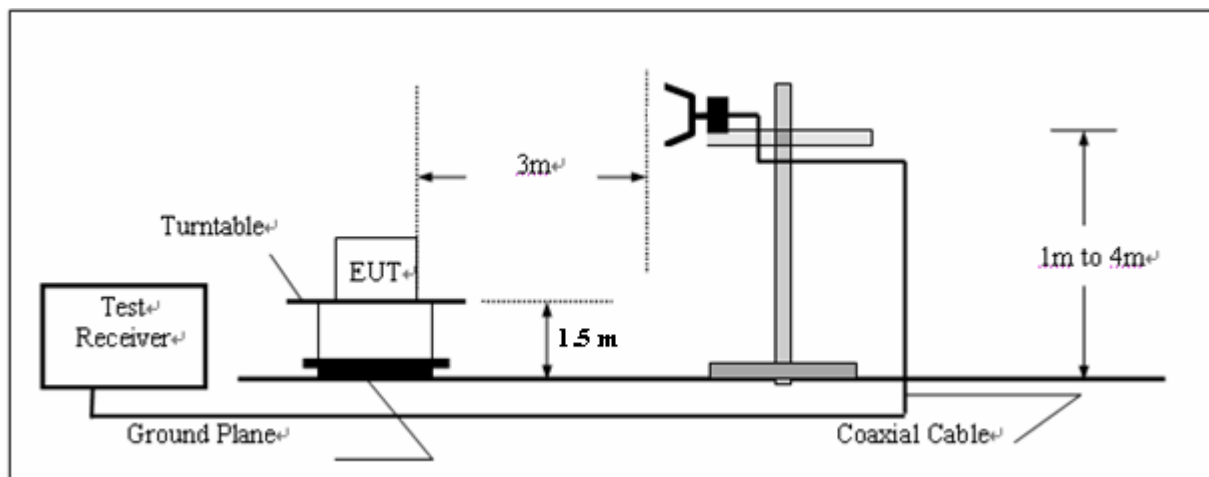
Frequency Bands/frequencies	Applications	Maximum radiated power, e.r.p. / power spectral density	Channel spacing	Spectrum access and mitigation requirement (e.g. Duty cycle or LBT + AFA)
868,000 MHz to 868,600 MHz (see note 4)	Non-specific use	25 mW	No requirement (see note 6)	1 % or LBT + AFA (see note 3)
868,600 MHz to 868,700 MHz	Alarms	10 mW	25 kHz The whole stated frequency band may be used as 1 wideband channel for high speed data transmission	1 %
868,700 MHz to 869,200 MHz (see note 4)	Non-specific use	25 mW	No requirement (see note 6)	0,1 % or LBT + AFA (see note 3)
869,200 MHz to 869,250 MHz	Social alarms	10 mW	25 kHz	0,1 %
869,250 MHz to 869,300 MHz	Alarms	10 mW	25 kHz	0,1 %
869,300 MHz to 869,400 MHz	Alarms	10 mW	25 kHz	1 %
869,400 MHz to 869,650 MHz	Non-specific use	500 mW	≤25 kHz The whole stated frequency band may be used as 1 wideband channel for high speed data transmission	10 % or LBT + AFA (see note 3)
869,650 MHz to 869,700 MHz	Alarms	25 mW	25 kHz	10 %
869,700 MHz to 870,000 MHz (see note 5)	Non-specific use	25 mW	No requirement	1 % or LBT+AFA (see notes 2 and 3)
869,700 MHz to 870,000 MHz (see note 5)	Non-specific use	5 mW	No requirement	No restriction
<p>NOTE 1: The power limits, channel arrangement and duty cycle for FHSS equipment are given in clause 7.4.1.2; for DSSS and other non-FHSS spread spectrum equipment are given in clause 7.4.1.3.</p> <p>NOTE 2: For frequency agile devices without LBT (or equivalent techniques) operating in the frequency range 863 MHz to 870 MHz, the duty cycle limit applies to the total transmission unless specifically stated otherwise (e.g. clause 7.10.3).</p> <p>NOTE 3: When either a duty cycle, Listen Before Talk (LBT) or equivalent technique applies then it shall not be user dependent/adjustable and shall be guaranteed by appropriate technical means. For LBT devices without Adaptive Frequency Agility (AFA) or equivalent techniques, the duty cycle limit applies.</p> <p>NOTE 4: Devices supporting audio and video applications shall use a digital modulation method with a maximum bandwidth of 300 kHz. Devices supporting analogue and/or digital voice shall have a maximum bandwidth not exceeding 25 kHz.</p> <p>NOTE 5: Devices shall not support audio and/or video applications. Devices supporting voice applications shall not exceed 25 kHz bandwidth and shall use spectrum access technique such as LBT or equivalent; the transmitter shall include a power output sensor controlling the transmitter to a maximum transmit period of 1 minute for each transmission.</p> <p>NOTE 6: The preferred channel spacing is 100 kHz allowing for subdivision into 50 kHz or 25 kHz.</p> <p>NOTE 7: The power density can be increased to +6,2 dBm/100 kHz and -0,8 dBm/100 kHz, if the band is limited to 865 MHz to 868 MHz and 865 MHz to 870 MHz respectively.</p> <p>NOTE 8: For wideband modulation other than FHSS and DSSS with a bandwidth of 200 kHz to 3 MHz, duty cycle can be increased to 1 % if the band is limited to 865 MHz to 868 MHz and power to ≤10 mW e.r.p.</p> <p>NOTE 9: Duty cycle may be increased to 1 % if the band is limited to 865 MHz to 868 MHz.</p>				

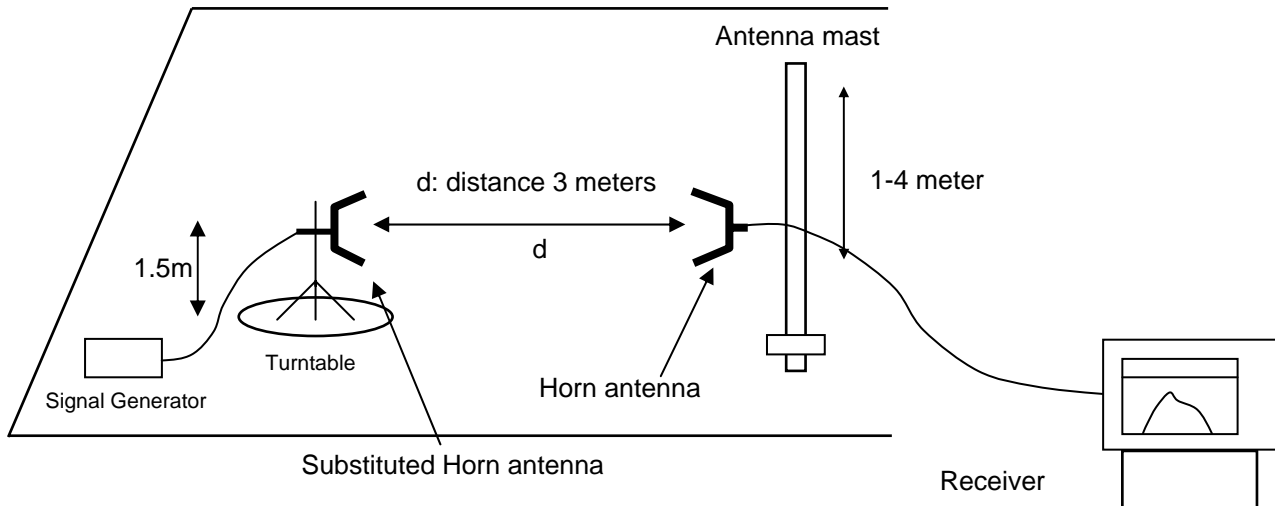
NOTE 1: It should be noted that table 1 represents the most widely implemented position within the European Union and the CEPT countries, but it should not be assumed that all designated bands are available in all countries.

NOTE 2: In addition, it should be noted that other frequency bands may be available in a country within the frequency range 25 MHz to 1 000 MHz covered by the present document. See European Commission Decisions on Short Range Devices [i.4] and [i.5] and CEPT/ERC/REC 70-03 [i.1] as implemented through National Radio Interfaces (NRI) or additional NRI as relevant.

NOTE 3: On non-harmonized parameters, national administrations may impose certain conditions such as the type of modulation, frequency, channel/frequency separations, maximum transmitter radiated power, duty cycle, and the inclusion of an automatic transmitter shut-off facility, as a condition for the issue of Individual Rights for use of spectrum or General Authorization, or as a condition for use under "licence exemption" as it is in most cases for Short Range Devices.

Note: The device power class is 9.

TEST CONFIGURATION**Below 1GHz****Above 1GHz**



TEST PROCEDURE

1. Please refer to ETSI EN 300 220-1 (V2.4.1) clause 5 for the test conditions.
2. Please refer to ETSI EN 300 220-1 (V2.4.1) clause 7.3.2 for the measurement method.

TEST RESULTS

Transmitter 1:

Frequency	Antenna Position	Read Value (dBm)	Limit (mW/dBm)	ERP(dBm)	Result
433.92MHz	H	-7.83	10/10	-1.83	PASS
433.92MHz	V	-7.60	10/10	-1.60	PASS

Transmitter 2:

Frequency	Antenna Position	Read Value (dBm)	Limit (mW/dBm)	ERP(dBm)	Result
433.92MHz	H	-9.36	10/10	-3.36	PASS
433.92MHz	V	-10.02	10/10	-4.02	PASS

Transmitter 3:

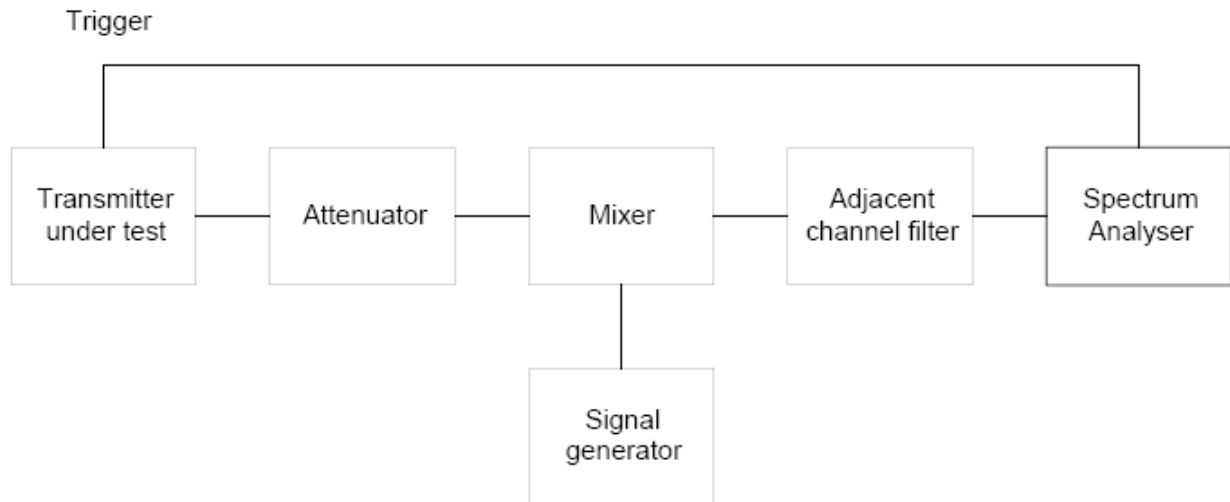
Frequency	Antenna Position	Read Value (dBm)	Limit (mW/dBm)	ERP(dBm)	Result
433.92MHz	H	-11.28	10/10	-5.28	PASS
433.92MHz	V	-12.63	10/10	-6.63	PASS

4.1.3. Transient power

LIMIT

At all frequencies where the emission levels measured in step 1 exceed the modulation bandwidth spectrum mask limits (see clause 7.7.3) for wideband equipments or the spurious domain limits (clause 7.8.3) for narrowband equipments, the power level measured in step 1 shall not exceed the power level measured in step 2 by more than 3 dB.

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 300 220-1 (V2.4.1) clause 5 for the test conditions.
2. Please refer to ETSI EN 3 00 220-1 (V2.4.1) clause 7.5.2 for the measurement method.

TEST RESULTS

Transmitter 1:

Channel Spacing	Transient Power(dBm)	Limit(dBm)
Alternate channel	-28.8	-27
Alternate channel (4 times the channel spacing)	-40.1	-36
Alternate channel (10 times the channel spacing)	-45.7	-36
Test result	PASS	

Transmitter 2:

Channel Spacing	Transient Power(dBm)	Limit(dBm)
Alternate channel	-28.3	-27
Alternate channel (4 times the channel spacing)	-41.6	-36
Alternate channel (10 times the channel spacing)	-44.8	-36
Test result	PASS	

Transmitter 3:

Channel Spacing	Transient Power(dBm)	Limit(dBm)
Alternate channel	-29.3	-27
Alternate channel (4 times the channel spacing)	-43.7	-36
Alternate channel (10 times the channel spacing)	-46.2	-36
Test result	PASS	

4.1.4. Adjacent channel power

LIMIT

The power in the adjacent channel shall not exceed the maximum values given in table 9.

Table 9: Adjacent channel power limits applicable to narrowband systems

	Channel separation < 20 kHz	Channel separation ≥ 20 kHz
Normal test conditions	10 μW	200 nW
Extreme test conditions	32 μW	640 nW
NOTE: These limits also apply to spread spectrum equipment.		

TEST CONFIGURATION

Please see the clause 4.1.1

TEST PROCEDURE

1. Please refer to ETSI EN 300 220-1 (V.2.4.1) Sub-clause 5.3 for the test conditions.
2. Please refer to ETSI EN 300 220-1 (V2.4.1) Sub-clause 7.6.2 for the measurement method.

TEST RESULTS

Transmitter 1:

Test conditions		Limit (dBm)	ACP Measured (dBm)	
			-1 Channel	+1 Channel
T _{nor} (20°C)	V _{nor} (12.0V)	-37 (200nW)	-47.92	-45.85
T _{min} (-20°C)	V _{min} (10.8V)	-32 (640nW)	-42.75	-42.63
	V _{nor} (12.0V)		-41.07	-41.99
T _{max} (55°)	V _{min} (10.8V)	-32 (640nW)	-40.84	-41.07
	V _{nor} (12.0V)		-40.01	-40.54
Measurement uncertainty			±0.5dB	

Transmitter 2:

Test conditions		Limit (dBm)	ACP Measured (dBm)	
			-1 Channel	+1 Channel
T _{nor} (20°C)	V _{nor} (9.0V)	-37 (200nW)	-48.75	-47.32
T _{min} (-20°C)	V _{min} (8.1V)	-32 (640nW)	-41.05	-40.99
	V _{nor} (9.0V)		-42.42	-41.76
T _{max} (55°)	V _{min} (8.1V)	-32 (640nW)	-40.66	-40.74
	V _{nor} (9.0V)		-41.19	-41.23
Measurement uncertainty		±0.5dB		

Transmitter 3:

Test conditions		Limit (dBm)	ACP Measured (dBm)	
			-1 Channel	+1 Channel
T _{nor} (20°C)	V _{nor} (3.0V)	-37 (200nW)	-48.34	-48.22
T _{min} (-20°C)	V _{min} (2.7V)	-32 (640nW)	-41.07	-41.63
	V _{nor} (3.0V)		-42.88	-42.41
T _{max} (55°)	V _{min} (2.7V)	-32 (640nW)	-40.28	-40.68
	V _{nor} (3.0V)		-41.44	-41.83
Measurement uncertainty		±0.5dB		

4.1.5. Spurious emissions

LIMIT

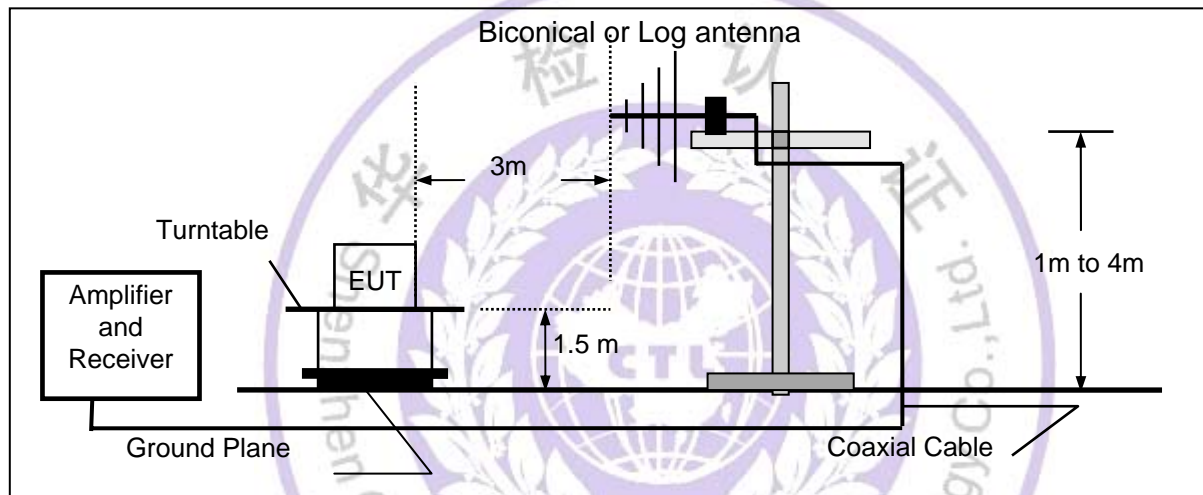
The power of any unwanted emission in the spurious domain shall not exceed the values given in table 11.

Table 11: Spurious domain emission limits

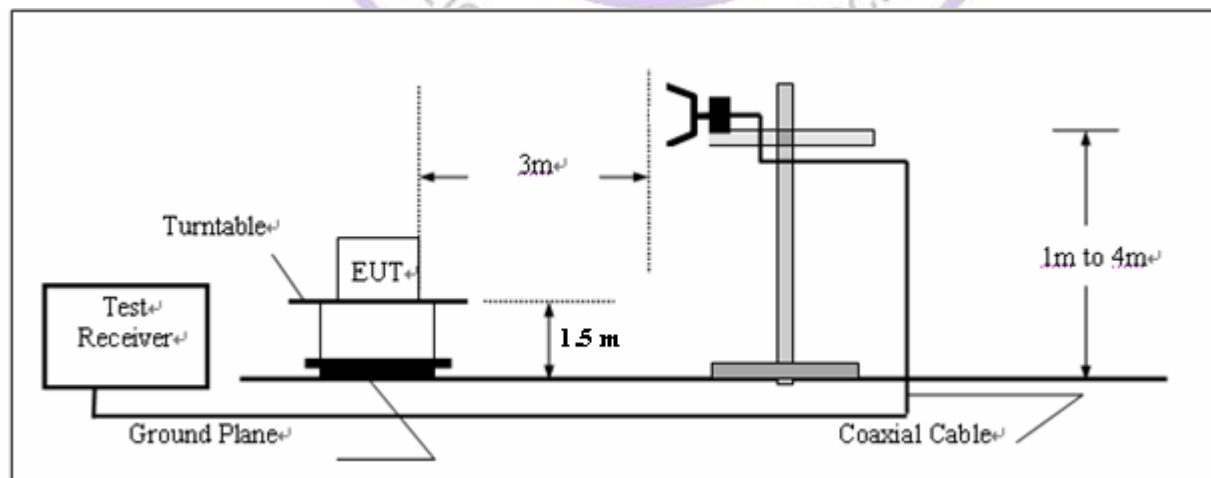
Frequency State	47 MHz to 74 MHz 87,5 MHz to 118 MHz 174 MHz to 230 MHz 470 MHz to 862 MHz	Other frequencies below 1 000 MHz	Frequencies above 1 000 MHz
Operating	4 nW	250 nW	1 μ W
Standby	2 nW	2 nW	20 nW

TEST CONFIGURATION

Below 1GHz



Above 1GHz



TEST PROCEDURE

1. Please refer to ETSI EN 300 220-1 V 2.4.1 (2012-05) Sub-clause 5 for the test conditions.
2. Please refer to ETSI EN 300 220-1 V 2.4.1 (2012-05) Sub-clause 7.8.2 for the measurement method.

TEST RESULTSTransmitter 1:

Frequency (MHz)	Pol./Ant	Measurement ERP (dBm)	Limit (dBm)	Margin (dB)
108.00	H	-58.02	-54	4.02
325.00	H	-44.05	-36	8.05
867.84	H	-45.29	-36	9.29
1301.76	H	-50.33	-30	20.33
1735.68	H	-51.19	-30	21.19
2169.60	H	-52.61	-30	22.61
2603.52	H	-55.94	-30	25.94
108.00	V	-56.71	-54	2.71
325.00	V	-43.82	-36	7.82
867.84	V	-44.09	-36	8.09
1306.30	V	-48.42	-30	28.42
1734.51	V	-50.14	-30	20.14
3038.40	V	-54.47	-30	24.47
Result		Pass		

- Remark: (1),With the result above,the effective radiated power was calculated on the basis of the reference vallue.
 (2),Data of measurement within this frequency range shown “ -- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
 (3), For standby mode is not applicable.

Transmitter 2:

Frequency (MHz)	Pol./Ant	Measurement ERP (dBm)	Limit (dBm)	Margin (dB)
108.00	H	-59.62	-54	5.62
325.00	H	-47.14	-36	11.14
867.84	H	-44.20	-36	8.20
1301.76	H	-56.10	-30	26.10
1735.68	H	-57.20	-30	27.20
2169.60	H	-58.83	-30	28.83
2603.52	H	-60.12	-30	30.12
108.00	V	-58.37	-54	4.37
325.00	V	-46.52	-36	6.52
867.84	V	-43.20	-36	7.20
1306.30	V	-55.03	-30	25.03
1734.51	V	-56.98	-30	26.98
3038.40	V	-60.43	-30	30.43
Result		Pass		

- Remark: (1),With the result above,the effective radiated power was calculated on the basis of the reference vallue.
 (2),Data of measurement within this frequency range shown “ -- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
 (3), For standby mode is not applicable.

Transmitter 3:

Frequency (MHz)	Pol./Ant	Measurement ERP (dBm)	Limit (dBm)	Margin (dB)
108.00	H	-61.28	-54	7.28
325.00	H	-48.24	-36	12.24
867.84	H	-46.30	-36	10.30
1301.76	H	-51.28	-30	21.28
1735.68	H	-53.41	-30	23.41
2169.60	H	-56.07	-30	26.07
2603.52	H	-59.45	-30	29.45
108.00	V	-60.74	-54	6.74
325.00	V	-47.85	-36	11.85
867.84	V	-45.03	-36	9.03
1306.30	V	-49.92	-30	19.92
1734.51	V	-50.50	-30	20.50
3038.40	V	-55.13	-30	25.13
Result		Pass		

- Remark: (1), With the result above, the effective radiated power was calculated on the basis of the reference value.
- (2), Data of measurement within this frequency range shown "--" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3), For standby mode is not applicable.



4.1.6. Frequency stability under low voltage conditions

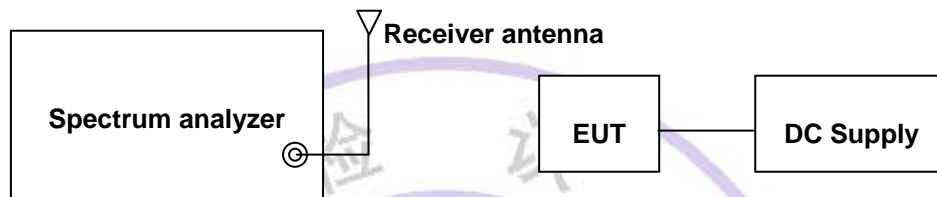
LIMIT

ETSI EN 300 220-1 V 2.4.1 (2012-05) Sub-clause 7.9.3

The equipment shall either:

- a) remain on channel, for channelized equipment within the limits stated in clause 7.1.3, or within the assigned operating frequency band, for non-channelized equipment, whilst the radiated or conducted power is greater than the spurious emission limits; or
- b) the equipment cease to function below the providers declared operating voltage.

TEST CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 300 220-1 V 2.4.1 (2012-05) Sub-clause 5 for the test conditions.
2. Please refer to ETSI EN 300 220-1 V 2.4.1 (2012-05) Sub-clause 8.9.2 for the measurement method.

TEST RESULTS: PASS

Transmitter 1:

The equipment cease to function below the providers declared operating voltage (DC 9.6V).

Voltage Supply (Vdc)		Measurement Frequency (MHz)	ERP (dBm)	Limit (dBm)
Normal Voltage	12.0V	433.9200	-1.60	> -36
Lower Voltage	10.0V	433.9200	-4.29	
	9.8V	433.9200	-8.80	
End point	9.7V	433.9200	-14.26	
	9.6V	*	0	

Remark:

1. Where " * " marked denotes the equipment ceases to function at the supply voltage.
2. Limit was referred to subclause 7.9.3 of narrow band equipment.

Transmitter 2:

The equipment cease to function below the providers declared operating voltage (DC 7.6V).

Voltage Supply (Vdc)		Measurement Frequency (MHz)	ERP (dBm)	Limit (dBm)
Normal Voltage	9.0V	433.9200	-3.36	> -36
Lower Voltage	8.0V	433.9200	-3.42	
	7.8V	433.9200	-6.69	
End point	7.7V	433.9200	-13.04	
	7.6V	*	0	

Remark:

1. Where " * " marked denotes the equipment ceases to function at the supply voltage.
2. Limit was referred to subclause 7.9.3 of narrow band equipment.

Transmitter 3:

The equipment cease to function below the providers declared operating voltage (DC 2.5V).

Voltage Supply (Vdc)		Measurement Frequency (MHz)	ERP (dBm)	Limit (dBm)
Normal Voltage	3.0V	433.9200	-5.28	> -36
Lower Voltage	2.9V	433.9200	-5.32	
	2.7V	433.9200	-5.61	
End point	2.6V	433.9200	-8.14	
	2.5V	*	0	

Remark:

1. Where " * " marked denotes the equipment ceases to function at the supply voltage.
2. Limit was referred to subclause 7.9.3 of narrow band equipment.

4.1.7. Duty cycle

In a period of 1 hour the duty cycle shall not exceed the spectrum access and mitigation requirement values as given in table 5, clause 7.2.3.

For frequency agile devices without LBT operating in the frequency range 863 MHz to 870 MHz the duty cycle shall apply to the total transmission time as given in table 5, clause 7.2.3 or shall not exceed 0,1 % per channel in a period of 1 hour.

TEST RESULTS

The duty cycle in a period of 1 hour is < 10%, it comply with EN 300 220-1 requirement declared by provider.



4.1.8. Receiver spurious radiation

LIMIT

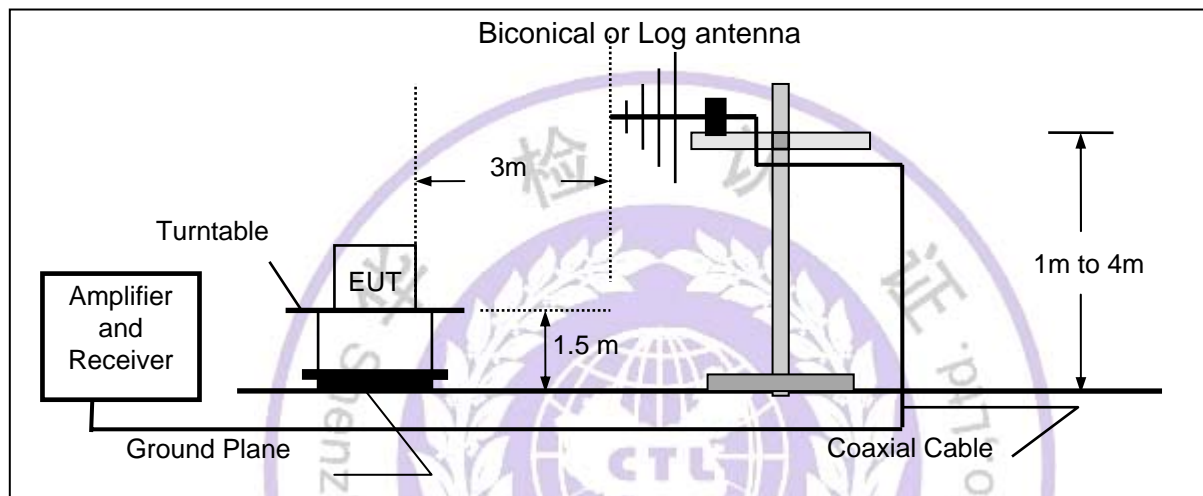
ETSI EN 300 220-1 V 2.4.1 (2012-05) Sub-clause 8.6.5

The power of any spurious emission, radiated or conducted, shall not exceed the values given below. The limits are applicable to all receiver classes:

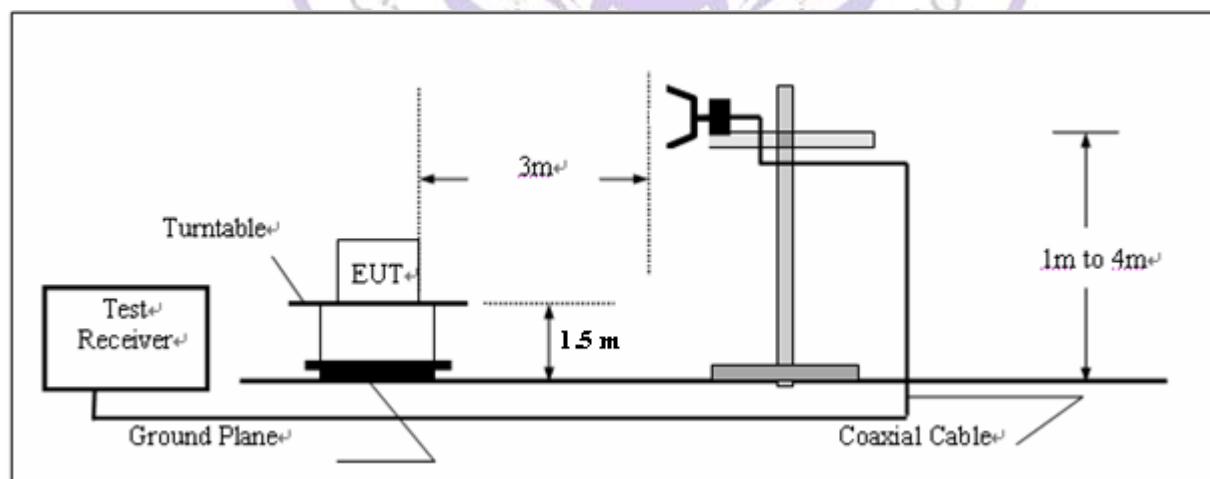
- 2 nW below 1 000 MHz;
- 20 nW above 1 000 MHz.

TEST CONFIGURATION

Below 1GHz



Above 1GHz



TEST PROCEDURE

1. Please refer to ETSI EN 300 220-1 V 2.4.1 (2012-05) Sub-clause 5 for the test conditions.
2. Please refer to ETSI EN 300 220-1 V 2.4.1 (2012-05) Sub-clause 8.6.2&8.6.3&8.6.4 for the measurement method.

TEST RESULTS

Frequency (MHz)	Pol./Ant	Measurement ERP (dBm)	Limit (dBm)	Margin (dB)
216.96	V	-66.23	-57	9.23
233.15	V	-62.21	-57	5.21
3501.44	V	-68.81	-47	21.81
216.96	H	-67.29	-57	10.29
233.15	H	-63.52	-57	6.52
3501.44	H	-67.05	-47	20.05
Result	Pass			

Remark: (1),With the result above,the effective radiated power was calculated on the basis of the reference vallue..

(2),Data of measurement within this frequency range shown “ -- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.



5. Test Setup Photos of the EUT

Transmitter 1



Transmitter 2



Transmitter 3



Receiver



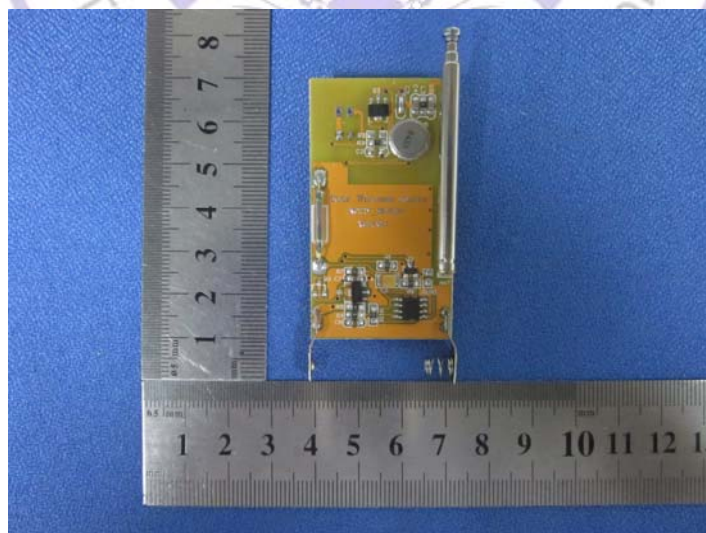
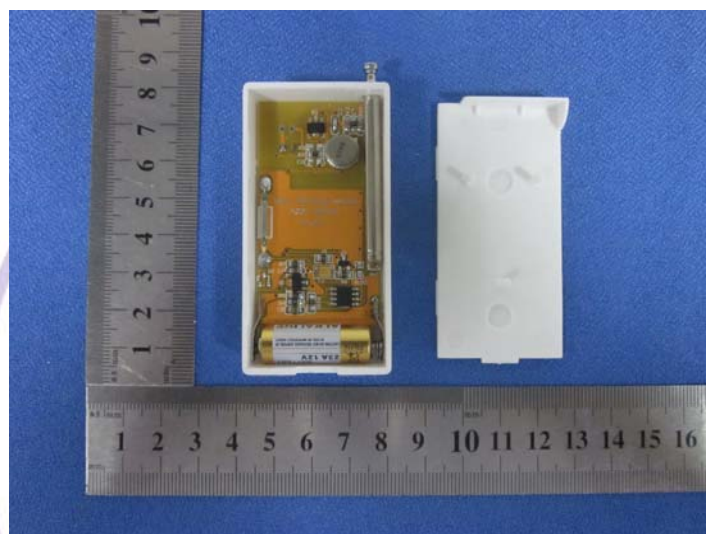
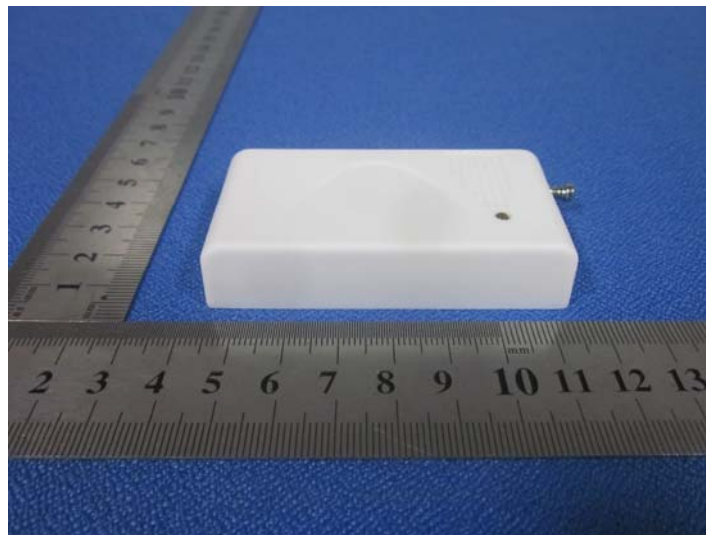
6. Photos of the EUT

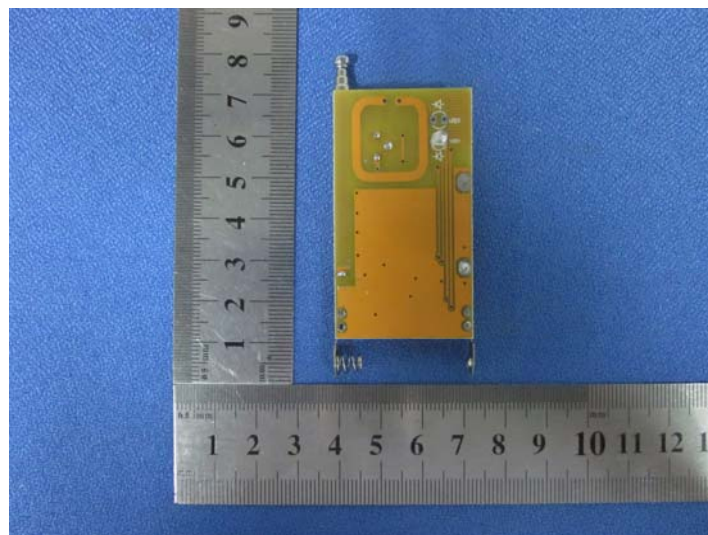


Transmitter 1





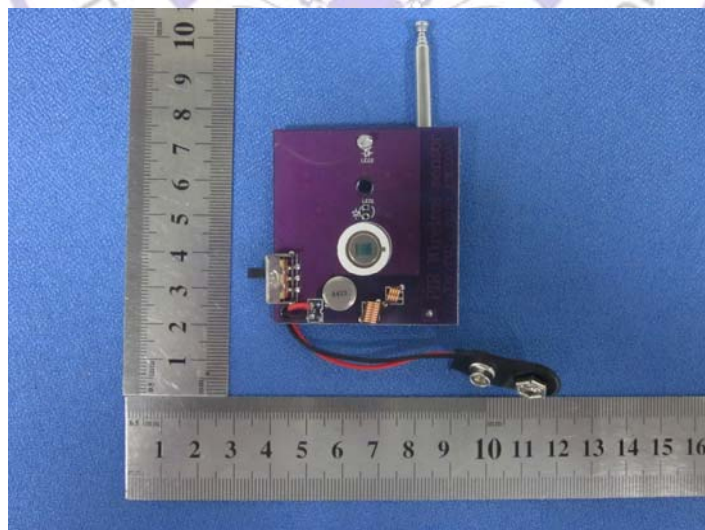


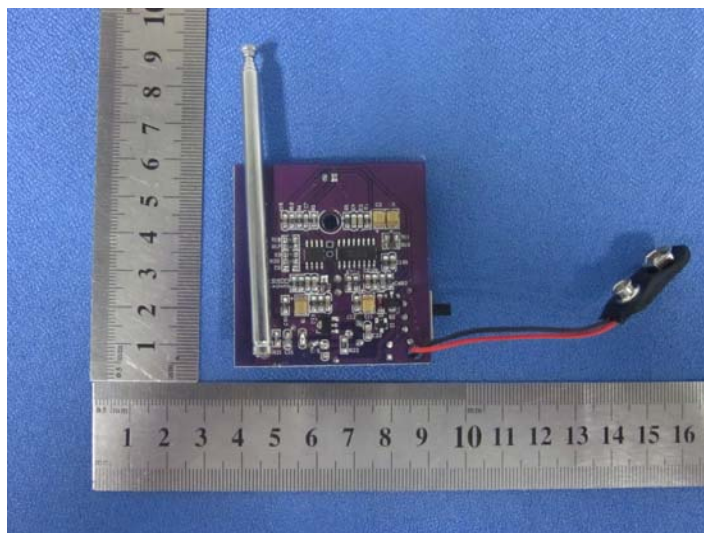


Transmitter 2







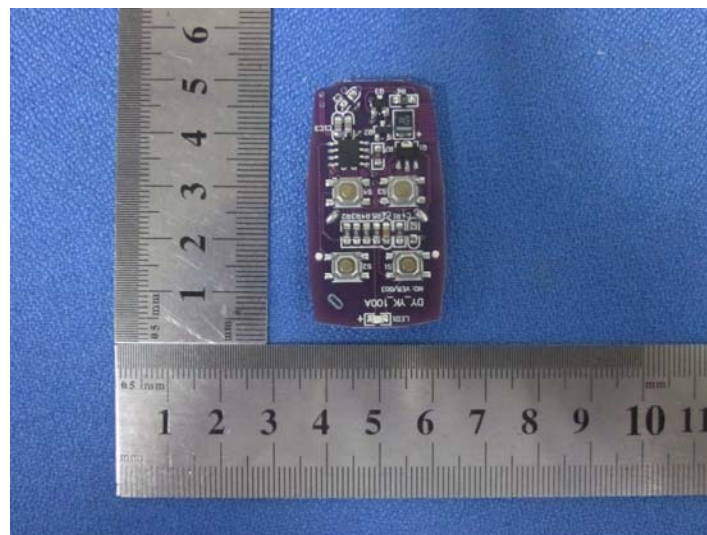


Transmitter 3

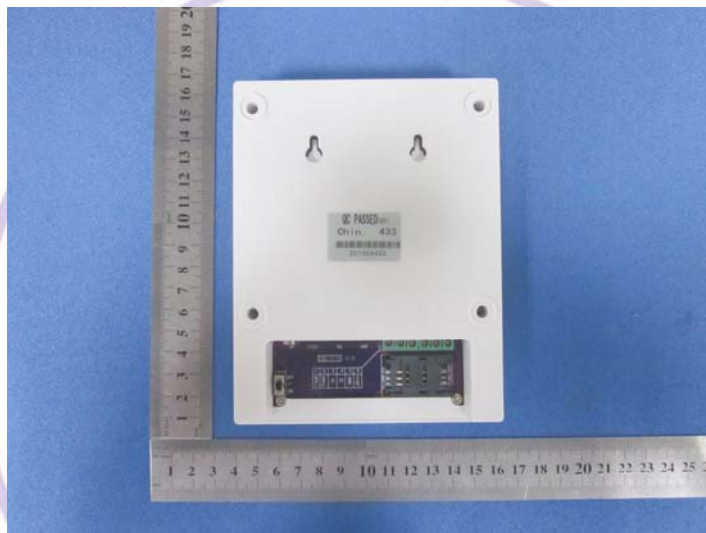


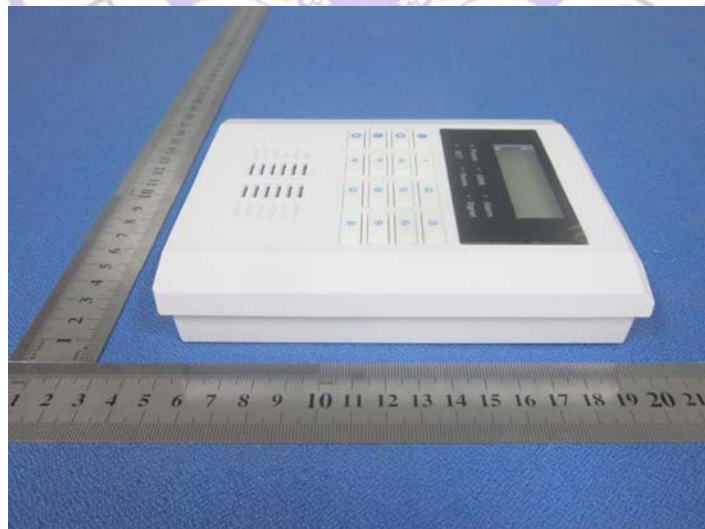


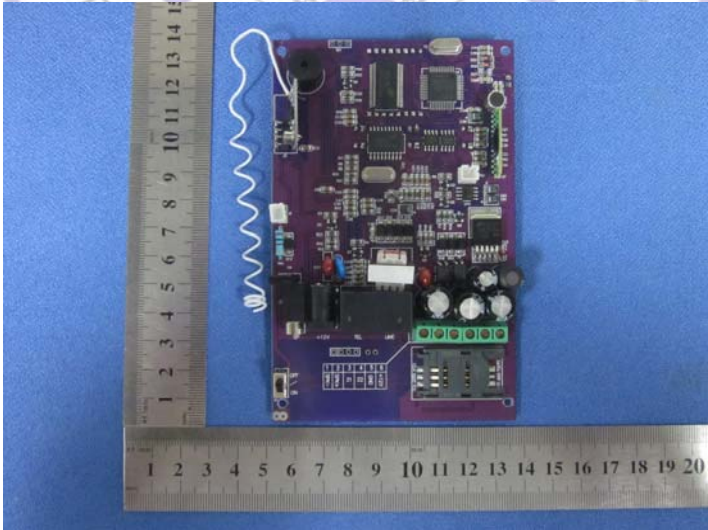
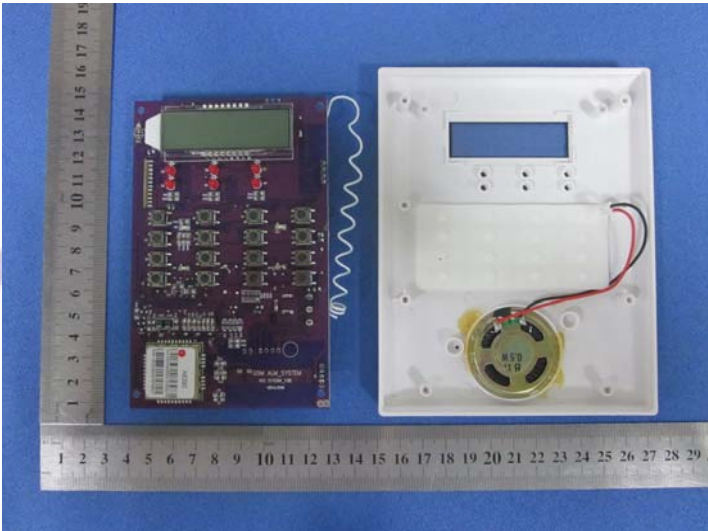
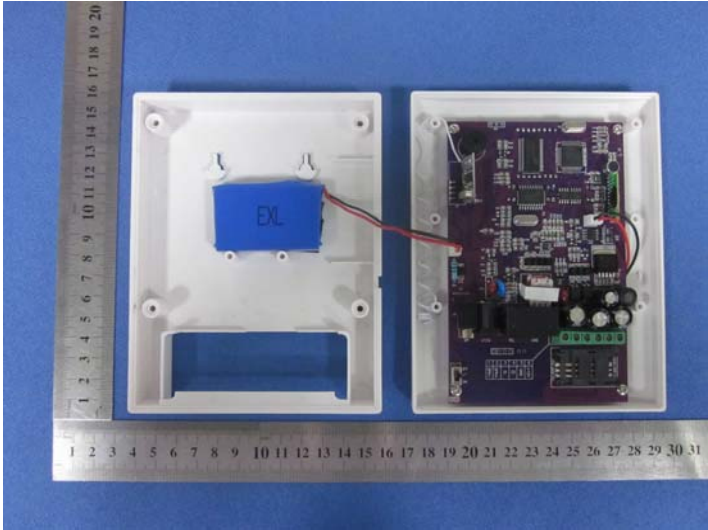


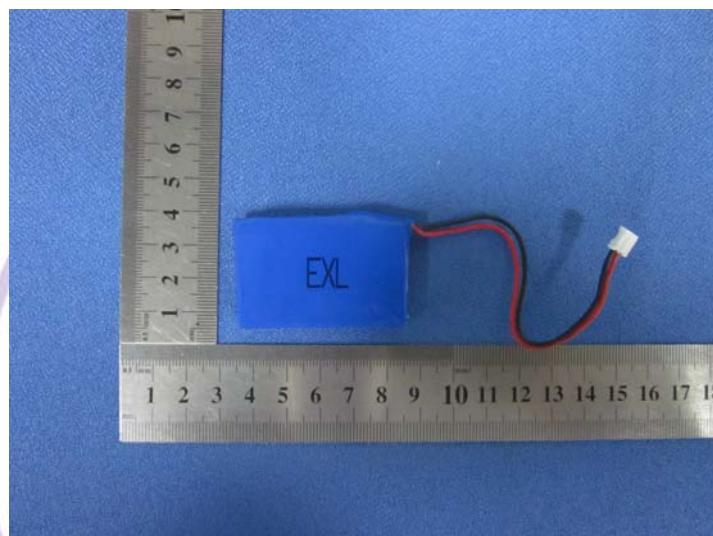
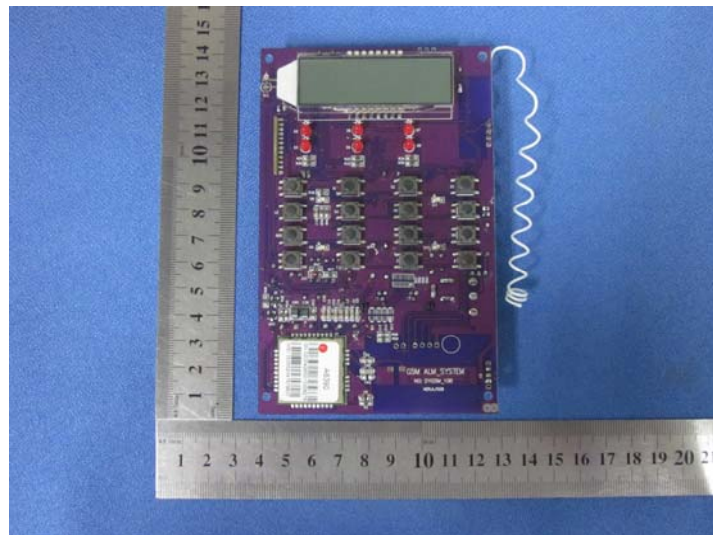


Receiver









.....End of Report.....