RF TEST REPORT

Report No.:	SET2015-11556
Product Name:	Backup Belt
FCC ID:	2AI3A20258002FCC
IC:	21685-20258002IC
Model No. :	002
Applicant:	EXPAIN AS
Applicant Address:	Karl Johans gate 13 0154 Oslo Norway Oslo Norway
Dates of Testing:	08/10/2015 — 08/20/2015
Issued by:	CCIC-SET
Lab Location:	Electronic Testing Building, Shahe Road, Xili, Nanshan District, Shenzhen, 518055, P. R. China **Tel:** 86 755 26627338 **Fax:** 86 755 26627238

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Test Report

Product Name.....:	Backup Belt
Brand Name.....:	EXPAIN
Trade Name.....:	EXPAIN
Applicant.....:	EXPAIN AS
Applicant Address.....:	Karl Johans gate 13 0154 Oslo Norway Oslo Norway
Manufacturer .....:	Shenzhen Kenvox Technology Co., Ltd..
Manufacturer Address .....:	Bldg 3, Shangwei Industrial Zone, Zhangkengjing, Guanlan, Shenzhen, China.
Test Standards.....:	47 CFR Part 15 Subpart C Section 15.231 RSS-210 Issue 8 2010
Test Result.....:	PASS

Tested by .....:

2015.08.14

Lu Lei， Test Engineer

Reviewed by .....:

2015.08.14

Zhu Qi, Senior Engineer

Approved by .....:

2015.08.14

Wu Li'an, Manager

Table of contents

Change History		
Issue	Date	Reason for change
1.0	2015.08.14	First edition

1. General Information

1.1. EUT Description

EUT Type	Backup Belt
Hardware Version	002
Software Version	N/A
Power Supply	DC 3.0V supplied by the battery
Operation Frequency	433.92MHz
Channel Number	1 channel
Modulation Type	ASK
Antenna Type	PCB Antenna
Antenna Gain	0dBi

1.2. Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart C Section 15.231 for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 15 Subpart C 2015	Radio Frequency Devices
2	RSS-210 Issue 8 2010	License - exempt Radio Apparatus (All Frequency Bands): Category I Equipment
3	ANSI C63.10 2013	American National Standard for Testing Unlicensed Wireless Devices

Test detailed items/section required by FCC rules and results are as below:

No.	FCC Rules	IC Rules	Description	Result
1	§ 15.207	RSS-Gen § 8.8	Conducted Emissions	N/A
2	§ 15.231	RSS-210 A1.1	Radiated Spurious Emissions	PASS
3	§ 15.231(c)	RSS-210 A1.1.3	20dB & 99% Occupied Bandwidth	PASS
4	§ 15.231	RSS-Gen § 6.10	Duty Cycle	PASS
5	§ 15.231(a)	RSS-210 A1.1.1(b)	Deactivation Time	PASS

1.3. EUT operation mode

The EUT has been tested under typical operating condition. The Applicant provides software to control the EUT for staying in continuous transmitting mode for testing.

1.4. 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.

Test Items	Measurement Uncertainty	Notes
Transmitter power conducted	0.57 dB	(1)
Transmitter power Radiated	2.20 dB	(1)
Conducted spurious emission 9KHz-40 GHz	1.60 dB	(1)
Radiated spurious emission 9KHz-40 GHz	2.20 dB	(1)
Conducted Emission 9KHz-30MHz	3.39 dB	(1)
Radiated Emission 30~1000MHz	4.24 dB	(1)
Radiated Emission 1~18GHz	5.16 dB	(1)
Occupied Bandwidth	---------	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

1.5. Facilities and Accreditations

1.5.1. Facilities

CNAS-Lab Code: L1659

CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd. CCIC is a third party testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L1659. A 12.8*6.8*6.4 (m) fully anechoic chamber was used for the radiated spurious emissions test.

FCC-Registration No.: 406086

CCIC Southern Electronic Product Testing (Shenzhen) 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 406086, valid time is until October 28, 2017.

IC-Registration No.: 11185A-1

CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd. EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 11185A-1 on Aug. 04, 2016, valid time is until Aug. 03, 2019.

1.5.2. Test Environment Conditions

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

Temperature (°C):	15 - 35
Relative Humidity (%):	30 -60
Atmospheric Pressure (kPa):	86KPa-106KPa

2. 47 CFR Part 15C Requirements

2.1. Antenna requirement

2.1.1. Applicable Standard

FCC CFR Title 47 Part 15 Subpart C Section 15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

Refer to statement below for compliance:

The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requireme nt does not apply to intentional radiators that must be professionally installed.

2.1.2. Antenna Information

Antenna Category: integral antenna

An integral antenna was placed on PCB, can't be removed.

Antenna General Information:

No.	EUT	Ant. Cat.	Ant. Type	Gain(dBi)
1	Backup Belt	integral	PCB	0

2.1.3. Result: comply

The EUT has a permanently and irreplaceable attached antenna. Please refer to the EUT internal photos.

2.2. Conducted Emission

2.2.1. Limit of Conducted Emission

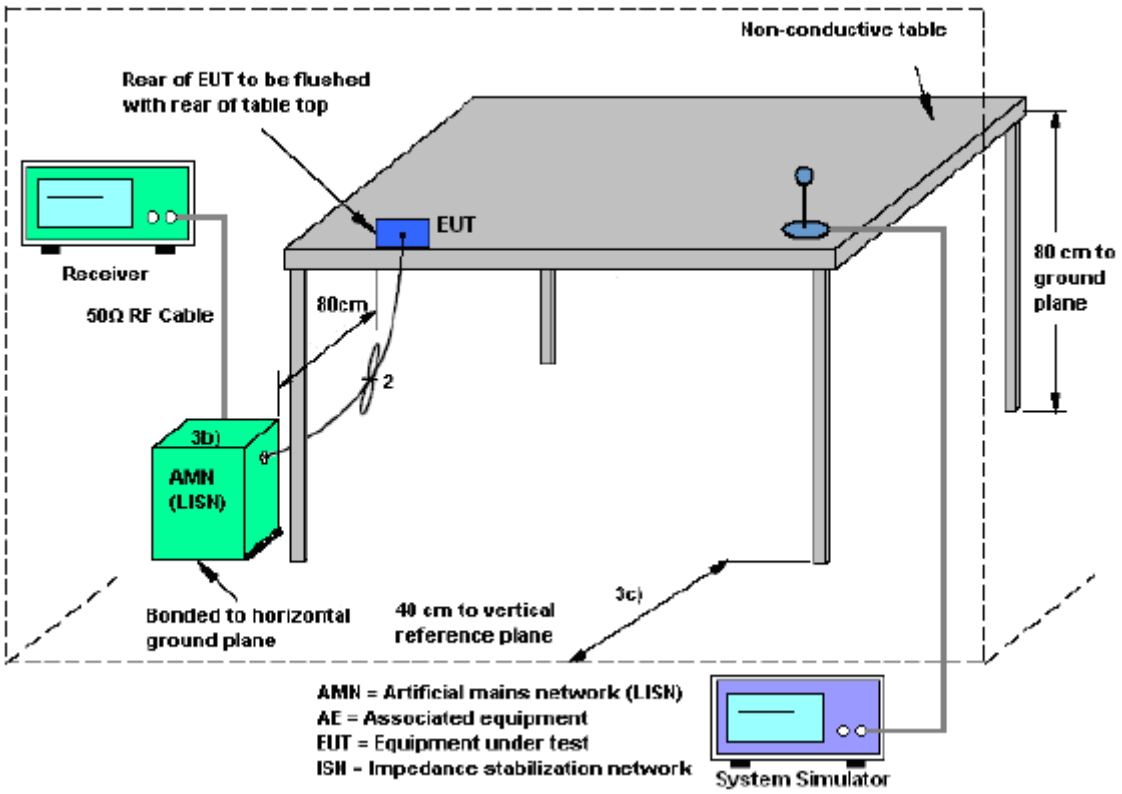
For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency range (MHz)	Conducted Limit (dBμV)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
0.50 - 30	60	50

2.2.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.2.3. Test Setup



2.2.4. Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 micrometry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

2.9.3. Test Results of Conducted Emission

Not applicable to this device.

2.3. Radiated Spurious Emission

2.3.1. Limit of Radiated Spurious Emission

According to 15.231 the field strength of emissions from intentional radiators operated under these frequencies bands shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental		Field Strength of Spurious	
	μV/m	dBμV/m	μV/m	dBμV/m
40.66 ~ 40.70	2250	67.04	225	48.04
70 ~ 130	1250	61.94	125	41.94
130 ~ 174	1250 ~ 3750	61.94 ~ 71.48	125 ~ 375	41.94 ~ 51.48
174 ~ 260	3750	71.48	75	37.50
260 ~ 470	3750 ~ 12500	71.48 ~ 71.94	375 ~ 1250	51.48 ~ 61.94
Above 470	12500	81.94	1250	61.94

Emission radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

Note:

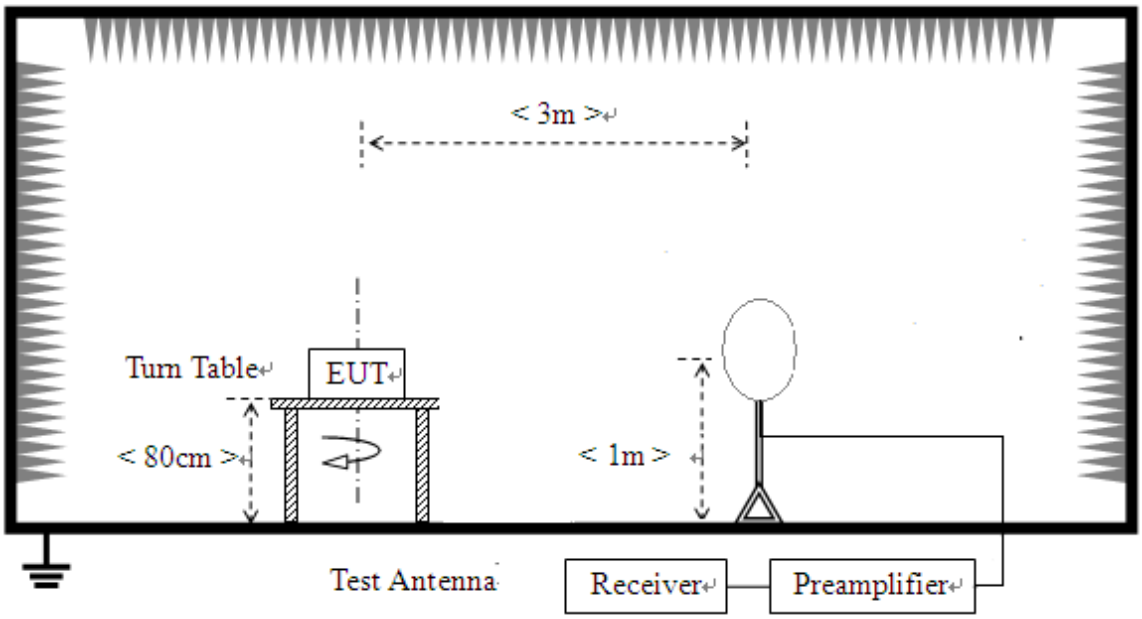
1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBμV/m) = 20 log Emission lever (μV/m)
3. As shown in 15.35(b), for frequencies above 1GHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

2.3.2. Measuring Instruments

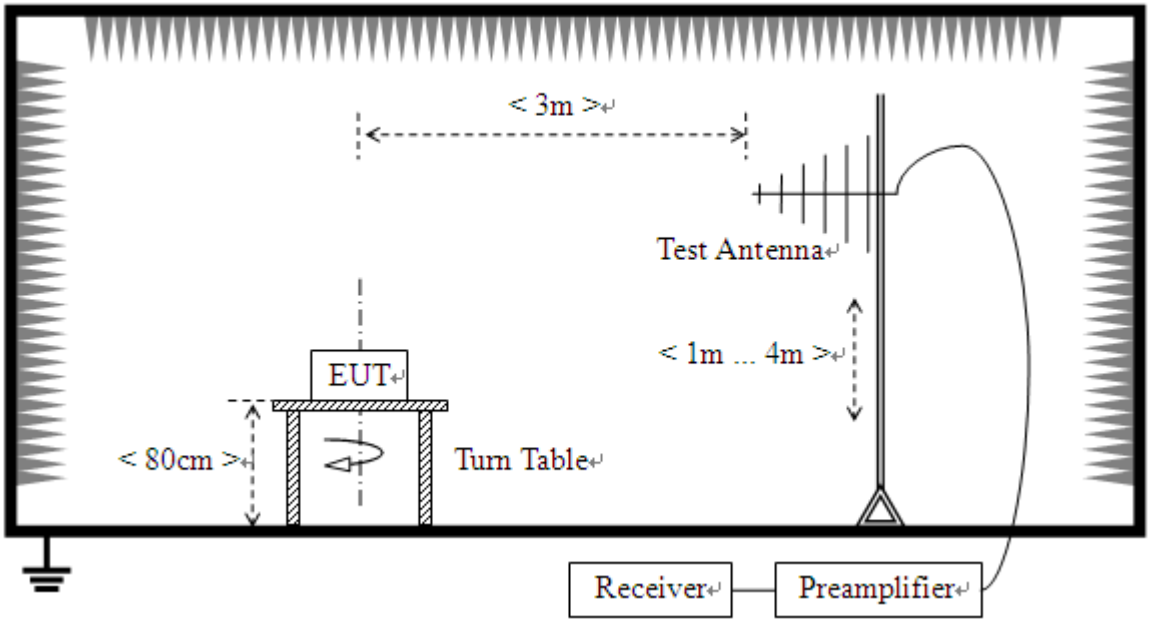
The measuring equipment is listed in the section 3 of this test report.

2.3.3. Test Setup

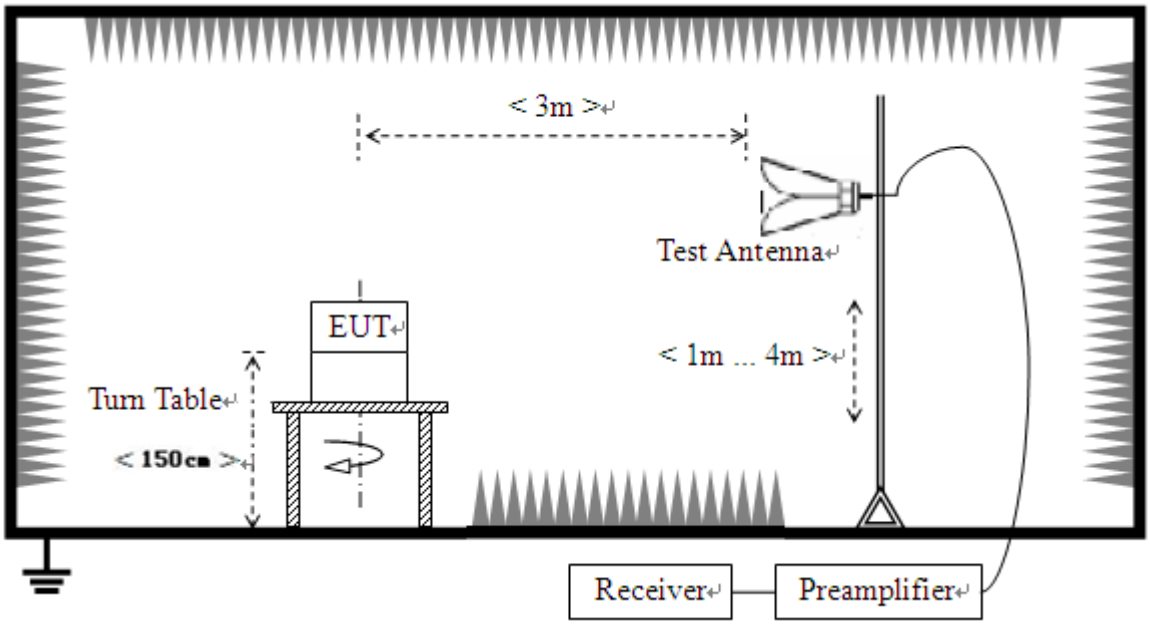
For radiated emissions from 9kHz to 30MHz



For radiated emissions from 30MHz to1GHz



For radiated emissions above 1GHz



2.3.4. Test Procedure

1. The EUT was placed on the top of a rotating table 0.8m/1.5m above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

3. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

5. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using the quasi-peak method or average method as specified and then reported in Data sheet peak mode and QP mode.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection at frequency below 1 GHz.

2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.

3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is ≥ 1/T (Duty cycle＜98%) or 10Hz (Duty cycle＞98%) for Average detection (AV) at frequency above 1GHz.

4. All radiated emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

2.3.5. Test Results of Radiated Spurious Emission

For 9 kHz to 30MHz

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

For 30MHz to 5GHz

Frequency (MHz)	Average Factor (dB)	Field Strength dBμV/m (PK)	Field Strength dBμV/m (AV)	Limit dBμV/m (PK)	Limit dBμV/m (AV)	Polarization
433.92	-8.20	82.87	74.67	100.83	80.83	Horizontal
433.92	-8.20	80.75	72.55	100.83	80.83	Vertical
867.74	-8.20	60.35	52.15	80.83	60.83	Horizontal
867.74	-8.20	57.78	49.58	80.83	60.83	Vertical
1301.76	-8.20	53.47	45.27	74.00	54.00	Horizontal
1301.76	-8.20	51.58	43.38	74.00	54.00	Vertical
1745.23	-8.20	48.69	40.49	74.00	54.00	Horizontal
1745.23	-8.20	46.87	38.67	74.00	54.00	Vertical
2159.67	-8.20	45.76	37.56	74.00	54.00	Horizontal
2159.67	-8.20	44.38	36.18	74.00	54.00	Vertical

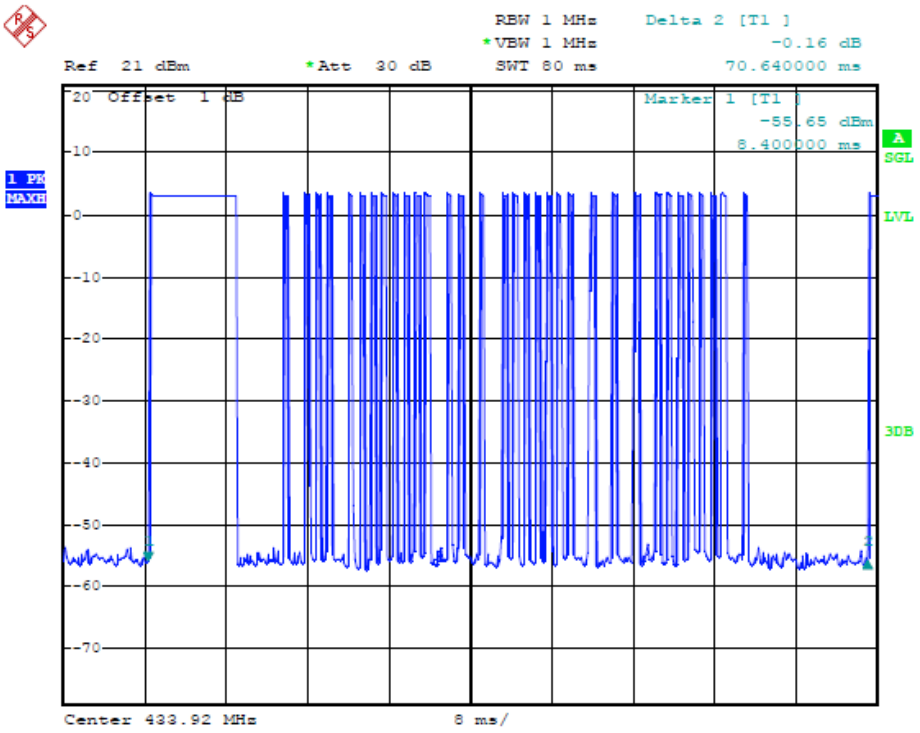
Note:

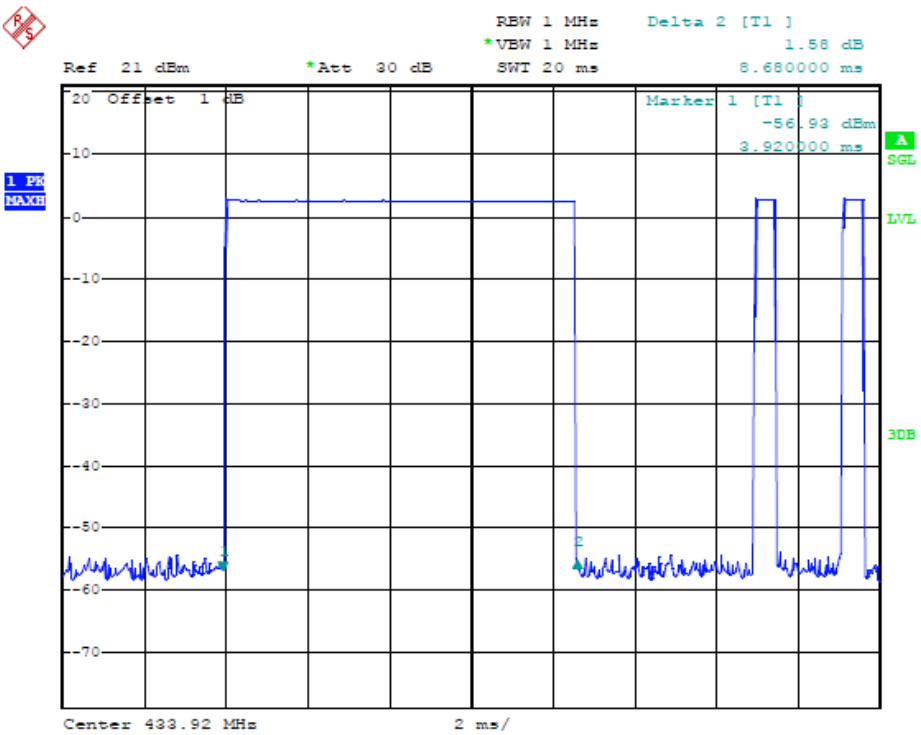
1. EUT Pre-scan X/Y/Z orientation, only worst case is presented in the report (Y orientation).
2. Calculate Average value based on Duty Cycle correction factor:

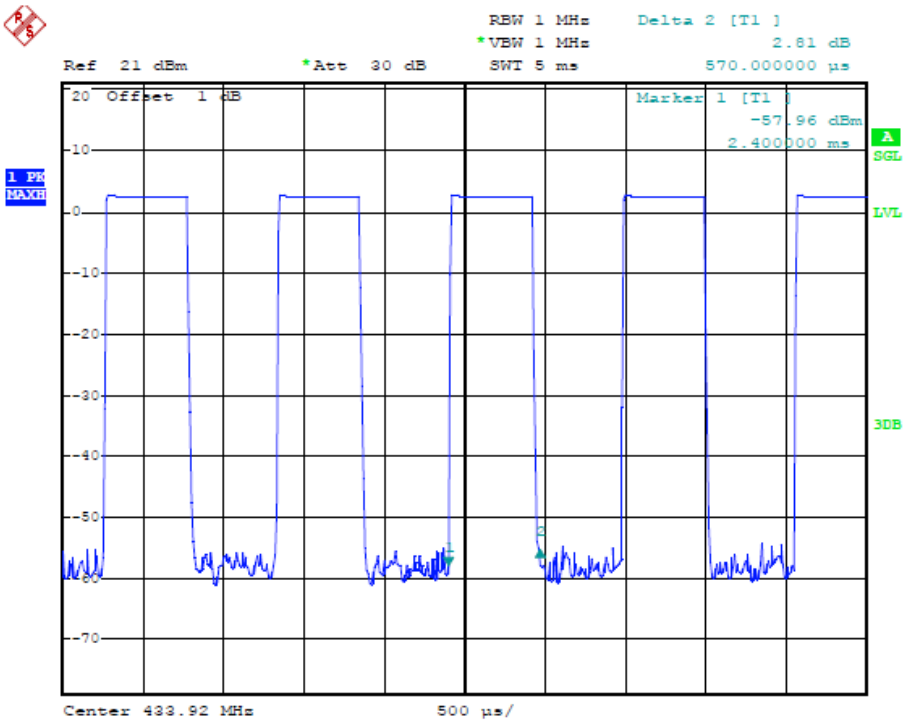
   Average Field Strength = Peak Field Strength + Duty Cycle Correction Factor

   Duty Cycle = Ton / (Ton+Toff) X 100% = (8.68ms+0.57ms X 33)/70.64ms X 100% =38.91%

   Duty Cycle Correction Factor = 20log (Duty Cycle) = -8.20


RBW 1 MHz
*VBW 1 MHz
SWT 60 ms
Delta 2 [T1]
-0.16 dB
70.640000 ms
Ref 21 dBm
*Att 30 dB
Offset 1 dB
Marker 1 [T1]
-55.65 dBm
8.400000 ms
1 PK
MAXH
A
SGL
LVL
3DB
Center 433.92 MHz
8 ms/


RBW 1 MHz
*VBW 1 MHz
SWT 20 ms
Delta 2 [T1]
1.58 dB
8.680000 ms
Ref 21 dBm
*Att 30 dB
Offset 1 dB
Marker 1 [T1]
-56.93 dBm
3.920000 ms
1 PK
MAXH
A
SGL
LVL
3DB
Center 433.92 MHz
2 ms/


RBW 1 MHz
*VBW 1 MHz
SWT 5 ms
Delta 2 [T1]
2.81 dB
570.000000 µs
Ref 21 dBm
*Att 30 dB
Offset 1 dB
Marker 1 [T1]
-57.96 dBm
2.400000 ms
1 PK
MAXH
A
SGL
LVL
3DB
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 433.92 MHz
500 µs/

2.4. 20dB & 99% Occupied Bandwidth

2.4.1. Limit of Occupied Bandwidth

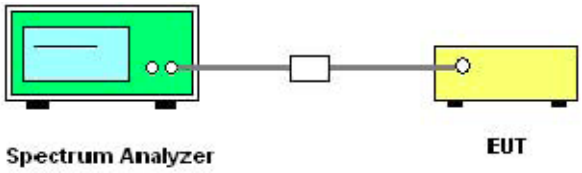
The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70MHz and below 900MHz. For devices operating above 900MHz, the emission shall no wider than 0.5% of the center frequency.

Limit: 433.92MHz * 0.25% = 1084.8kHz

2.4.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.4.3. Test Setup



2.4.4. Test Procedure

1. Customer provided a test mode internal to the EUT to control the RF modulation.

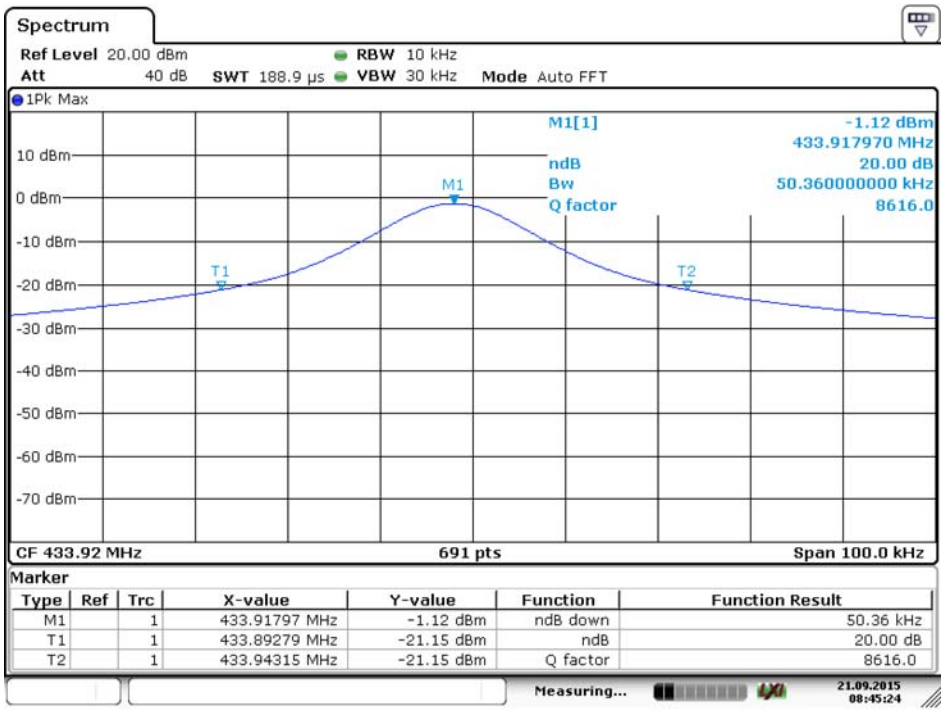
2. The EUT antenna was attached and the waveform was receiver by the test antenna which was connected to the spectrum analyzer was operated in linear scale and zero span mode after tuning to the transmitter carrier frequency.

3. Bandwidth is determined at the points 20 dB down from the modulated carrier.

4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 10 kHz. Set the Video bandwidth (VBW) = 30 kHz. Span=100kHz

2.4.5. Test Results of Occupied Bandwidth

Channel Frequency(MHz)	20dB Bandwidth(kHz)	Limit (kHz)	Result
433.92	50.36	1084.8	PASS



Date: 21.SEP.2015 08:45:23

Channel Frequency(MHz)	99% Bandwidth(kHz)	Limit (kHz)	Result
433.92	65.4	1084.8	PASS

Date: 21.SEP.2015 08:49:15

2.5. Deactivation Time

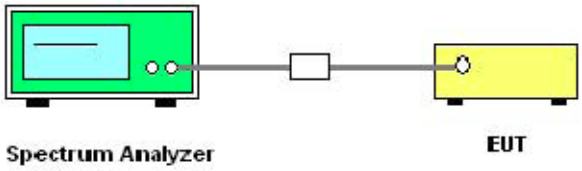
2.5.1. Limit of Deactivation Time

According to 15.231, a manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

2.5.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.5.3. Test Setup



2.5.4. Test Procedure

1. The EUT was placed on the turning table.

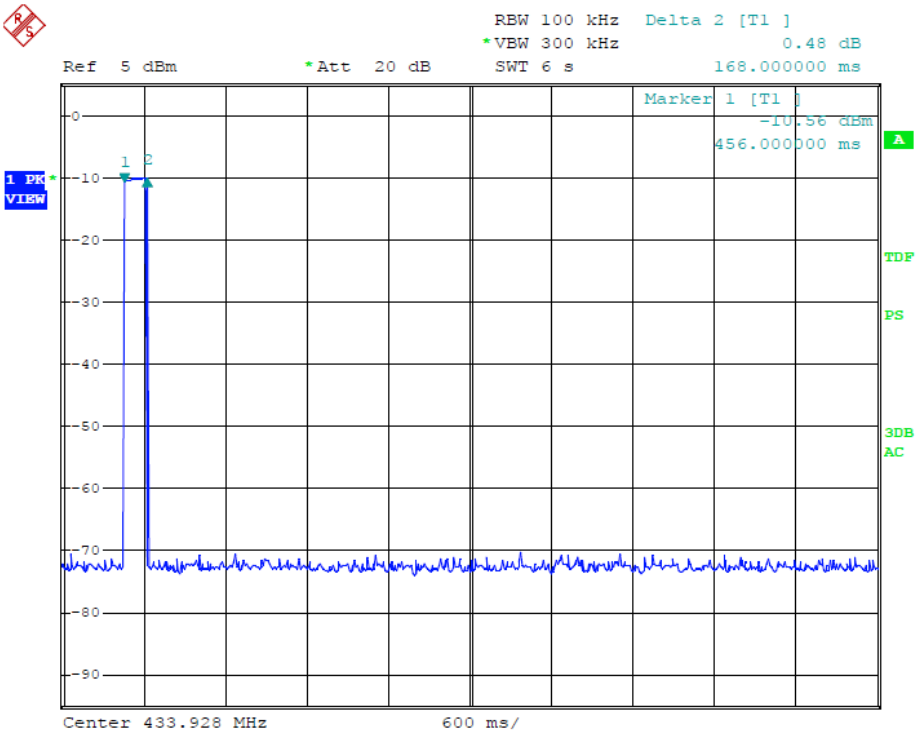
2. The signal was coupled to the spectrum analyzer through an antenna.

3. Set the resolution bandwidth to 100 kHz and video bandwidth to 300 kHz. The spectrum analyzer was turned to the centre frequency of the transmitters and the analyzers marker function was used to determine the duration of transmission.

4. The transmission duration was measured and recorded.

2.5.5. Test Results of Transmitter Timeout

Frequency (MHz)	One transmission time (s)	Limit (s)	Result
433.92	0.168	5	PASS


RBW 100 kHz
*VBW 300 kHz
SWT 6 s
Delta 2 [T1]
0.48 dB
168.000000 ms
Ref 5 dBm
*Att 20 dB
Marker 1 [T1]
-10.56 dBm
456.000000 ms
1 PK
VIEW
A
TDF
PS
3DB
AC
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 433.928 MHz
600 ms/

3. List of measuring equipment

Description	Manufacturer	Model	Serial No.	Test Date	Due Date	Remark
EMI Test Receiver	R&S	ESIB26	A0304218	2015.06.02	2016.06.01	Radiation
Full-Anechoic Chamber	Albatross	12.8m*6.8m*6.4m	A0412372	2015.01.05	2016.01.04	Radiation
Loop Antenna	Schwarz beck	HFH2-Z2	100047	2015.06.02	2016.06.01	Radiation
Bilog Antenna	Schwarzbeck	VULB 9163	9163-274	2015.06.02	2016.06.01	Radiation
Double ridge horn antenna	R&S	HF960	100150	2015.06.02	2016.06.01	Radiation
Ultra-wideband antenna	R&S	HL562	100089	2015.06.02	2016.06.01	Radiation
Test Antenna – Horn (18-25GHz)	ETS	UG-596A/U	A0902607	2015.06.02	2016.06.01	Radiation
Amplifier 20M~3GHz	R&S	PAP-0203H	22018	2015.06.02	2016.06.01	Radiation
Ampilier 1G~18GHz	R&S	MITEQ AFS42-00101800	25-S-42	2015.06.02	2016.06.01	Radiation
Ampilier 18G~40GHz	R&S	JS42-18002600-28-5A	12111.0980.00	2015.06.02	2016.06.01	Radiation
Spectrum Analyzer	R&S	FSP40	1164.4391.40	2015.07.07	2016.07.06	Conducted
Power Meter	R&S	NRVS	1020.1809.02	2015.06.02	2016.06.01	Conducted
Power Sensor	R&S	NRV-Z4	823.3618.03	2015.06.02	2016.06.01	Conducted
LISN	ROHDE&SCHWARZ	ESH2-Z5	A0304221	2015.06.02	2016.06.01	Conducted
Test Receiver	R&S	ESCS30	A0304260	2015.06.02	2016.06.01	Conducted
Cable	SUNHNER	SUCOFLEX 100	/	2015.06.02	2016.06.01	Radiation
Cable	SUNHNER	SUCOFLEX 104	/	2015.06.02	2016.06.01	Radiation

** END OF REPORT **