



TEST REPORT

For

Applicant : XIAMEN LEELEN TECHNOLOGY CO.,LTD

Address : 65 Sunban South Road, Jimei Industrial Zone,
Xiamen, China

**Product
Name :** Villa Door Station

Model Name : JB-304MGCQ-S15

**Series Model
Name :** JB-304MGCW-S15,JB-304MGCQ-S18A,JB-304MCQ-S18A,
JB-304MNCQ-S15, JB-304MNCW-S15

Remark : Only difference in the model name.

Brand Name : **LEELEN**

FCC ID : 2AFVB-JB304S15

Report No. : MTE/DYY/A15091138

**Date of
Issue :** Sept. 07, 2015

Issued by : Most Technology Service Co., Ltd.

Address : No.5, 2nd Langshan Road, North District, Hi-tech Industrial
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1. VERIFICATION OF CONFORMITY

Equipment Under Test: Villa Door Station
Brand Name: **LEELEN**
Model Number: JB-304MGCQ-S15
FCC ID: 2AFVB-JB304S15
Applicant: XIAMEN LEELEN TECHNOLOGY CO.,LTD
 65 Sunban South Road,Jimei Industrial Zone,Xiamen,China
Manufacturer: XIAMEN LEELEN TECHNOLOGY CO.,LTD
 65 Sunban South Road,Jimei Industrial Zone,Xiamen,China
Technical Standards: 47 CFR Part 15 Subpart C section 15.225
File Number: MTE/DYY/A15091138
Date of test: Aug. 12-Sept. 07, 2015
Deviation: None
Condition of Test Sample: Normal
Test Result: PASS

The above equipment was tested by Most Technology Service Co., Ltd. for compliance with the requirements set forth in FCC rules and the Technical Standards mentioned above. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment and the level of the immunity endurance of the equipment are within the compliance requirements.

The test results of this report relate only to the tested sample identified in this report.

Tested by (+ signature):

Daisy

Daisy Yu

Aug. 12-Sept. 07, 2015

Review by (+ signature):

Henry

Henry Chen



Approved by (+ signature):

Yvette Zhou

Yvette Zhou(Manager)

Sept . 07, 2015

2. GENERAL INFORMATION

2.1 Product Information

Product	Villa Door Station
Brand Name	LEELLEN
Model Number	JB-304MGCQ-S15
Series Model Name:	JB-304MGCW-S15, JB-304MGCQ-S18A, JB-304MCQ-S18A, JB-304MNCQ-S15, JB-304MNCW-S15
Series Model Difference description:	Only difference in the model name.
Power Supply	DC18V by DC Source
Frequency Range	13.56MHz
Modulation Type:	ASK
Channel Number	1
Antenna Type	Loop antenna
Temperature Range	-40°C ~ +45°C

NOTE:

1. For a more detailed features description about the EUT, please refer to User's Manual.

2.2 Objective

The objective of the report is to perform tests according to FCC Part 15 Subpart C for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 15	Radio Frequency Devices
2	ANSI C63.10	American National Standard for Testing Unlicensed Wireless Devices

2.3 Test Standards and Results

No.	Section	Test Items	Result	Date of Test
1	FCC 15.203	Antenna Requirement	PASS	2015.09.01
2	FCC 15.207 (a)	AC Power Line Conducted Emission	N/A	---
3	FCC 15.209, FCC 15.225 (a)-(d)	Radiated Emission	PASS	2015.09.01
4	FCC 15.225 (e)	Frequency Stability	PASS	2015.09.01
5	FCC 15.215 (c)	20dB Emission Bandwidth	PASS	2015.09.01
Remark: N/A means not applicable				

Note: 1. The test result judgment is decided by the limit of measurement standard
 2. The information of measurement uncertainty is available upon the customer's request.

2.4 Environmental Conditions

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

- Temperature: 15-35°C
- Humidity: 30-60 %
- Atmospheric pressure: 86-106 kPa

3. TEST METHODOLOGY

3.1 TEST FACILITY

Test Site:	Most Technology Service Co., Ltd
Location:	No.5, Langshan 2nd Rd., North Hi-Tech Industrial park, Nanshan, Shenzhen, Guangdong, China
Description:	There is one 3m semi-anechoic an area test sites and two line conducted labs for final test. The Open Area Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4:2009 and CISPR 16 requirements. The FCC Registration Number is 490827. The IC Registration Number is 7103A-1.
Site Filing:	The site description is on file with the Federal Communications Commission, 7435 Oakland Mills Road, Columbia, MD 21046.
Instrument	All measuring equipment is in accord with ANSI C63.4:2009 and CISPR 16
Tolerance:	requirements that meet industry regulatory agency and accreditation agency requirement.
Ground Plane:	Two conductive reference ground planes were used during the Line Conducted Emission, one in vertical and the other in horizontal. The dimensions of these ground planes are as below. The vertical ground plane was placed distancing 40 cm to the rear of the wooden test table on where the EUT and the support equipment were placed during test. The horizontal ground plane projected 50 cm beyond the footprint of the EUT system and distanced 80 cm to the wooden test table. For Radiated Emission Test, one horizontal conductive ground plane extended at least 1m beyond the periphery of the EUT and the largest measuring antenna, and covered the entire area between the EUT and the antenna.

4. SETUP OF EQUIPMENT UNDER TEST

4.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

4.2 TEST EQUIPMENT LIST

Instrumentation: The following list contains equipment used at Most for testing. The equipment conforms to the CISPR 16-1 / ANSI C63.2 Specifications for Electromagnetic Interference and Field Strength Instrumentation from 10 kHz to 1.0 GHz or above.

No.	Equipment	Manufacturer	Model No.	S/N	Calibration date	Calibration Interval
1	Test Receiver	Rohde & Schwarz	ESCI	100492	2015/03/10	1 Year
2	Spectrum Analyzer	Agilent	E7405A	US44210471	2015/03/14	1 Year
3	L.I.S.N.	Rohde & Schwarz	ENV216	100093	2015/03/10	1 Year
4	Coaxial Switch	Anritsu Corp	MP59B	6200283933	2015/03/07	1 Year
5	Terminator	Hubersuhner	50Ω	No.1	2015/03/07	1 Year
6	RF Cable	SchwarzBeck	N/A	No.1	2015/03/07	1 Year
7	Test Receiver	Rohde & Schwarz	ESPI	101202	2015/03/10	1 Year
8	Bilog Antenna	Sunol	JB3	A121206	2015/03/14	1 Year
9	Horn Antenna	SCHWARZBECK	BBHA9120D	756	2015/03/14	1 Year
10	Horn Antenna	Penn Engineering	9034	8376	2015/03/14	1 Year
11	Cable	Resenberger	N/A	NO.1	2015/03/07	1 Year
12	Cable	SchwarzBeck	N/A	NO.2	2015/03/07	1 Year
13	Cable	SchwarzBeck	N/A	NO.3	2015/03/07	1 Year
14	Single Phase Power Line Filter	DuoJi	FNF 202B30	N/A	2015/03/07	1 Year
15	Test Receiver	Rohde & Schwarz	ESCI	100492	2015/03/10	1 Year
16	Loop antenna	ARA	PLA-1030/B	1039	2015/03/14	1 Year
17	Climate Chamber	ESPEC	EL-10KA	A20120523	2015/07/05	1 Year

NOTE: Equipments listed above have been calibrated and are in the period of validation.

5. 47 CFR Part 15 C Requirements

5.1 ANTENNA REQUIREMENT

5.1.1 Applicable Standard

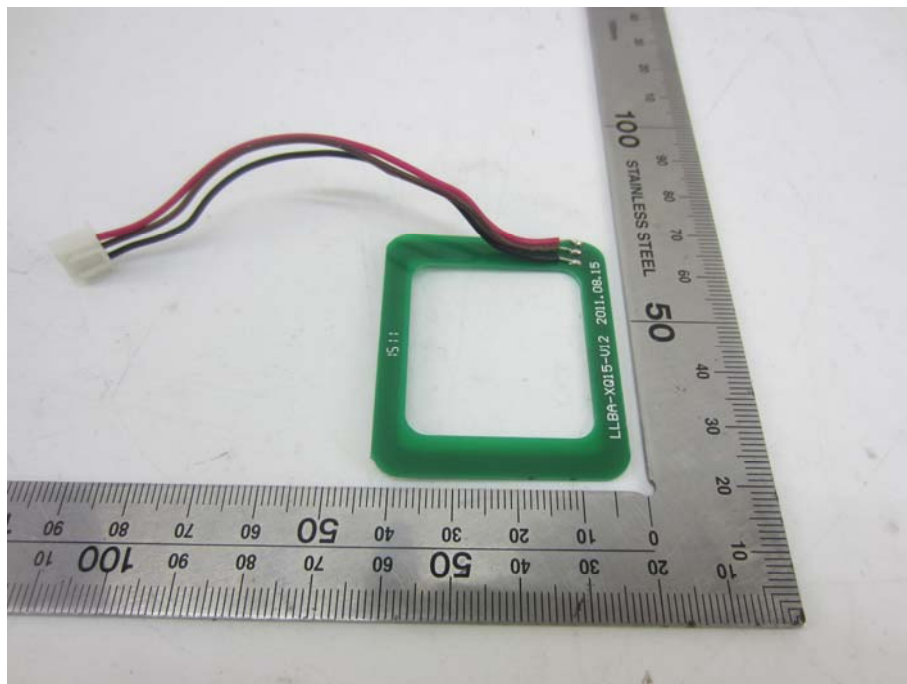
According to FCC § 15.203 , An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

5.1.2 Evaluation Criteria

- (a) Antenna must be permanently attached to the unit.
 - (b) Antenna must use a unique type of connector to attach to the EUT.
- Unit must be professionally installed, Installer shall be responsible for verifying that the correct antenna is employed with the unit.

5.1.3 Result: Compliance.

The antenna connector is designed with unique type RF connector and no consideration of replacement. Please see the following EUT antenna photo for details:



5.2 CONDUCTED EMISSION TEST

5.2.1 Requirement

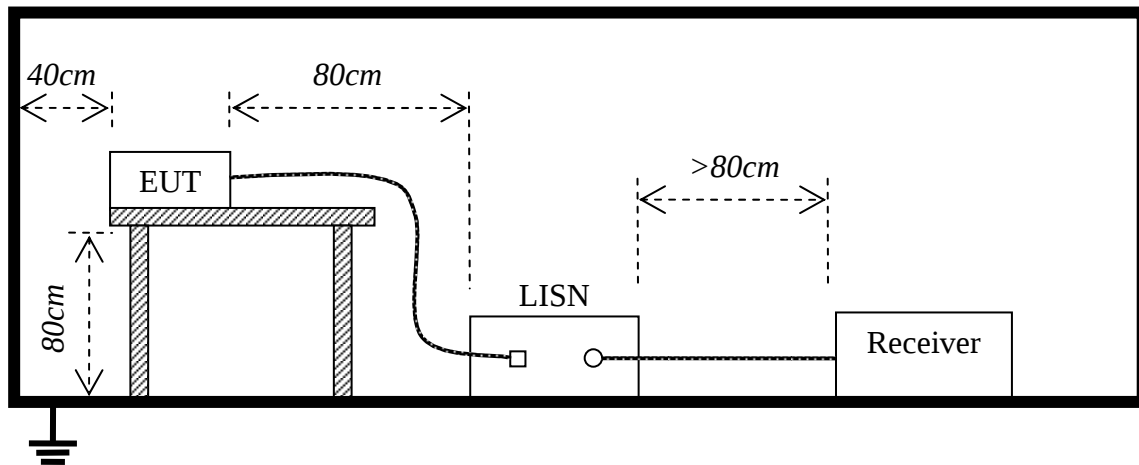
A radio apparatus that is designed to be connected to the public utility (AC) power line shall ensure that the radio frequency voltage, which is conducted back onto the AC power line on any frequency or frequencies within the and 150 kHz-30 MHz, shall not exceed the limits in the following table:

Frequency	Maximum RF Line Voltage	
	Q.P.(dBuV)	Average(dBuV)
150kHz-500kHz	66-56	56-46
500kHz-5MHz	56	46
5MHz-30MHz	60	50

****Note:** 1. the lower limit shall apply at the band edges.

2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz

5.2.2 Block Diagram of Test Setup



5.2.3 Test procedure

1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.
2. Exploratory measurements were made to identify the frequency of the emission that has the highest amplitude relative to the limit;
3. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).
4. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2009 on conducted measurement.
5. The bandwidth of test receiver (ESCI) set at 9 KHz.
6. All data was recorded in the Quasi-peak and average detection mode.

5.2.4 Test Result

Not applicable to device which is power supplied by dc source.

5.3 Radiated Emission

5.3.1 Requirement

According to FCC section 15.225:

- (a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.
- (b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.
- (c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

Rules and specifications		CFR 47 Part 15 section 15.225(a)-(d)	
Frequency of Emission (MHz)	Field Strength ($\mu\text{V/m}$) at 30m	Field Strength dB $\mu\text{V/m}$ at 30m	Field Strength (dB $\mu\text{V/m}$) at 3m
1.705~13.110	30	29.5	69.5
13.110~13.410	106	40.5	80.5
13.410~13.553	334	50.5	90.47
13.553~13.567	15848	84	123.9
13.567~13.710	334	50.5	90.47
13.710~14.010	106	40.5	80.5
14.010~30.00	30	29.5	69.5

- (d) The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in §15.209.

According to FCC section 15.209(a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength ($\mu\text{V/m}$ at 3-meter)	Test Distance (m)	Field Strength (dB $\mu\text{V/m}$ at 3-meter)
0.009 - 0.490	2400/F(kHz)	300	128.5-93.8
0.490 - 1.705	24000/F(kHz)	30	73.8-63.0
1.705-30	30	30	69.5
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
Above 960	500	3	54

Note:

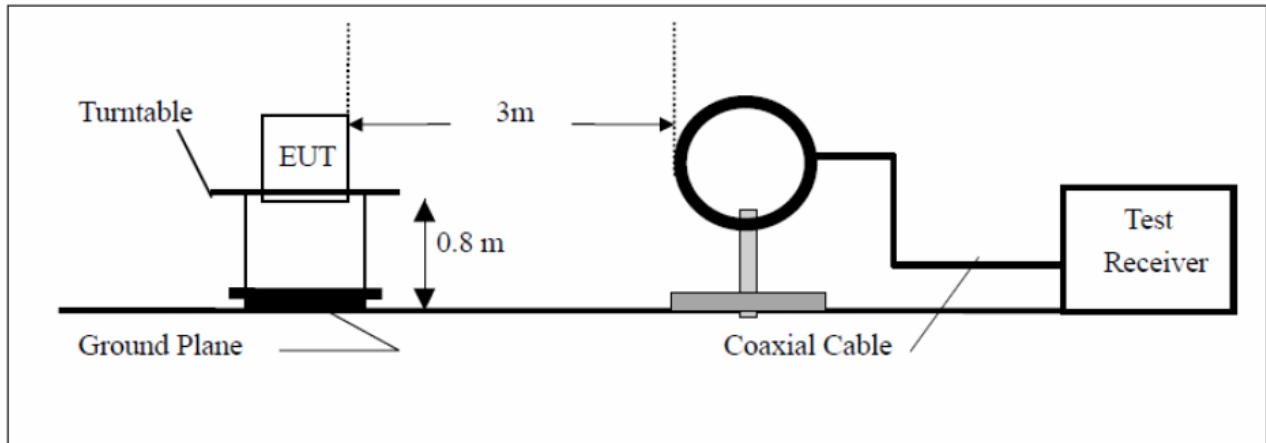
1. For Above 1000MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.

2. For above 1000MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK)

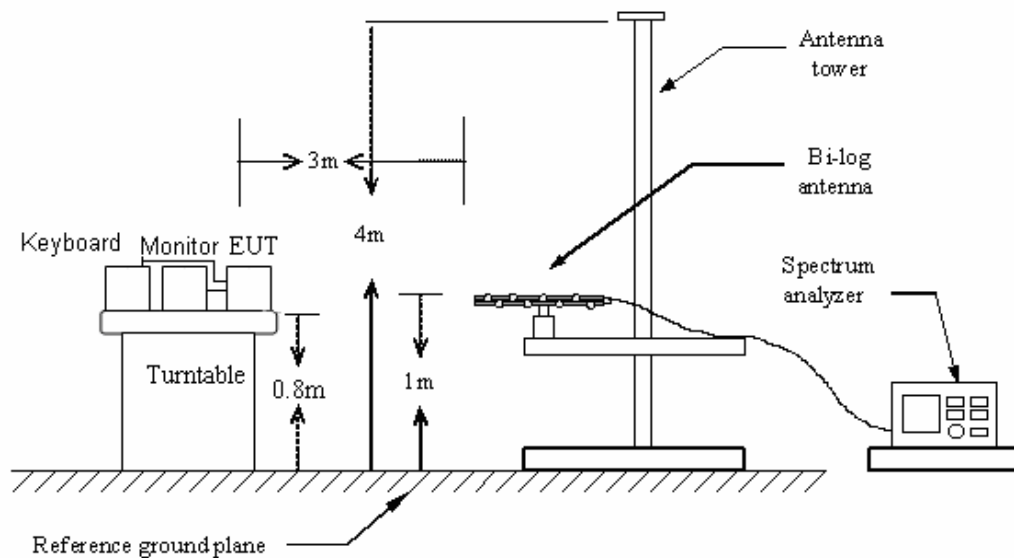
5.4.2 Test Configuration

Test Setup:

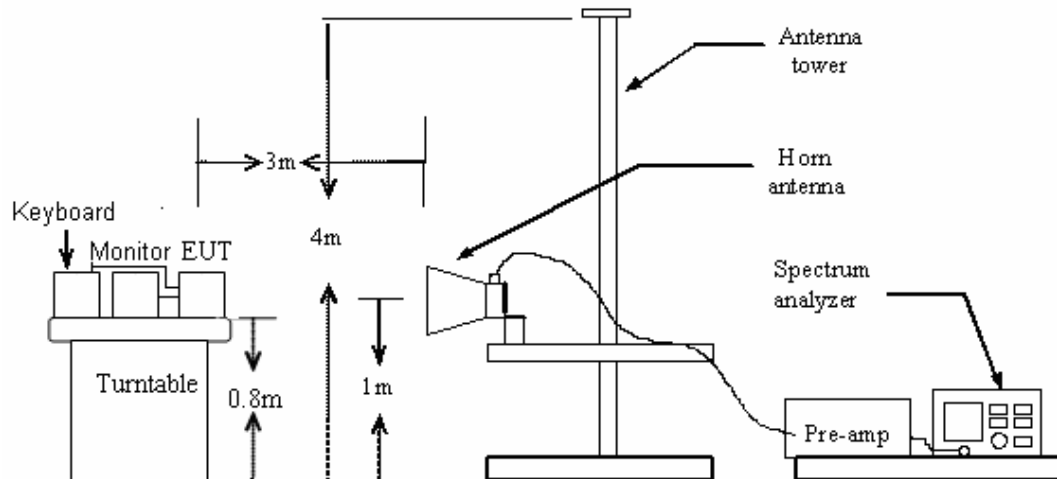
1) For radiated emissions from 9kHz to 30MHz



2) For radiated emissions from 30MHz to 1GHz



3) For radiated emissions above 1GHz



5.4.3 Test Procedure:

1. For frequencies above 1GHz, the frequencies of maximum emission was recorded by manually positioning the antenna close to the EUT and by moving the antenna over all sides of the EUT while observing a spectral display.
2. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
3. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
4. The antenna 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.
5. 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 rote table was turned from 0 degrees to 360 degrees to find the maximum reading.
6. For frequencies above 1GHz, horn antenna mouth should face to the EUT all the time when rise or fall.
7. Set the spectrum analyzer in the following setting as:

9KHz to 30MHz: PEAK: RBW=200Hz / VBW=1 kHz / Sweep=AUTO

30MHz to 1GHz: PEAK: RBW=100 kHz / VBW=300 kHz / Sweep=AUTO QP: RBW=120 kHz / Sweep=AUTO

Above 1GHz: (a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
(b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO

The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

8. If the emission level of the EUT in peak mode was 10dB 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 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

5.4.4 Test Result

Pass

Please refer the following pages.

Below 30MHz:

Intentional Emission and Spectrum Mask					
Test Frequency (MHz)	Quasi-Peak (dBμV/m)		Limits (dBμV/m)	Margin (dB)	
	Vertical	Horizontal		Vertical	Horizontal
13.110	11.5	12.5	69.5	-58.0	-57.0
13.410	15.3	15.6	80.5	-65.2	-64.9
13.553	23.8	21.8	90.5	-66.7	-68.7
13.564	38.4	38.7	124.0	-85.6	-85.3
13.567	40.8	42.1	90.5	-49.7	-48.4
13.710	12.6	14.4	80.5	-67.9	-66.1
14.010	21.3	22.9	69.5	-48.2	-46.6

Spurious Emission					
Test Frequency (MHz)	Quasi-Peak (dBμV/m)		Limits (dBμV/m)	Margin (dB)	
	Vertical	Horizontal		Vertical	Horizontal
1.907	25.6	26.3	69.5	-43.9	-43.2
2.254	25.7	26.5	69.5	-43.8	-43.0
10.247	25.5	26.4	69.5	-44.0	-43.1
12.589	25.6	26.6	69.5	-43.9	-42.9
19.364	25.7	26.5	69.5	-43.8	-43.0
27.120	25.6	26.5	69.5	-43.9	-43.0

30MHz-1GHz:

Spurious Emission					
Test Frequency (MHz)	Quasi-Peak (dBμV/m)		Limits (dBμV/m)	Margin (dB)	
	Vertical	Horizontal		Vertical	Horizontal
40.701	18.56	19.53	40.00	-21.44	-20.47
88.342	23.84	24.96	40.00	-16.16	-15.04
135.032	32.95	32.81	40.00	-7.05	-7.19
162.611	35.16	34.14	40.00	-4.84	-5.86
298.268	26.28	25.68	47.00	-20.72	-21.32
612.064	29.34	30.25	47.00	-17.66	-16.75

5.4 FREQUENCY STABILITY

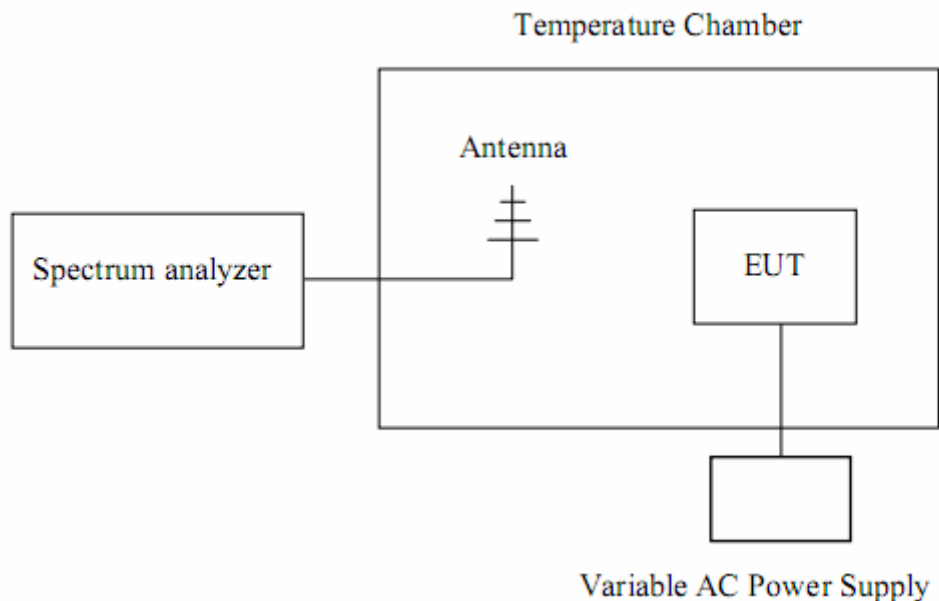
5.4.1 Requirement

According to FCC Part 15 C section 15.225 (e), the frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of -20 degrees to $+50$ degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

5.4.2 Measurement Procedure

1. The EUT was turn-up;
2. With all power removed, the temperature was decreased to -20° C and permitted to stabilize for three hours. Power was applied and the maximum change in frequency was noted within one minute. With power OFF, the temperature was raised in 10° C steps. The sample was permitted to stabilize at each step for at least one-half hour. Power was applied and the maximum frequency change was noted within one minute;
3. The temperature tests were performed for the worst case.
4. Variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20° C. The maximum frequency change was recorded.

5.4.3 Test SET-UP



5.4.5 Measurement Results

Operating Frequency: 13.56180 MHz,

Limit: total emission within +/- 1.356180 kHz (+/- 0.01% of the operating frequency)

Frequency stability vs. temperature		
Environment Temperature (°C)	Measured Frequency (MHz)	Frequency Measure with Time Elapsed Total emission within kHz
50	13.56181	+0.01
40	13.56182	+0.02
30	13.56180	0.00
20	13.56177	reference
10	13.56174	-0.06
0	13.56172	-0.08
-10	13.56173	-0.07
-20	13.56172	-0.08

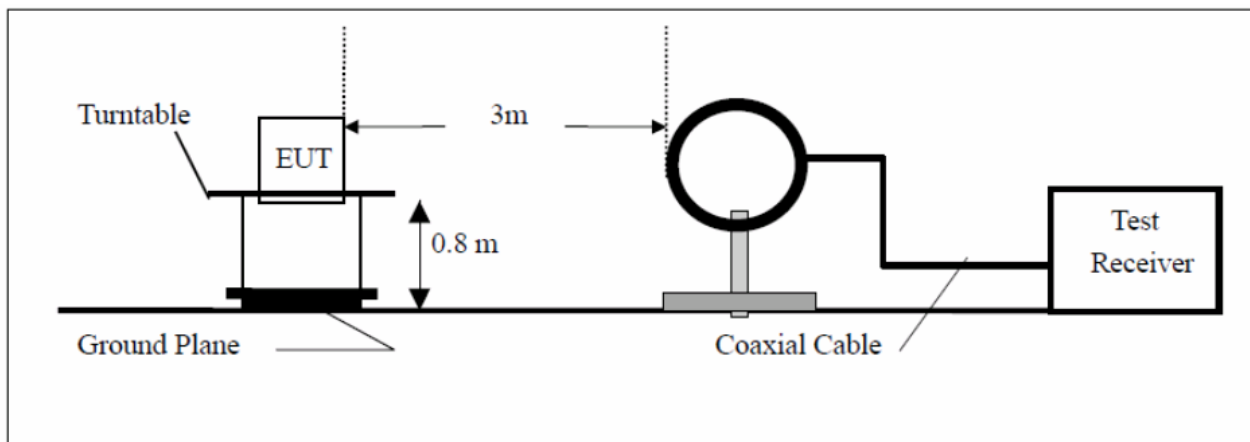
Frequency stability vs. input voltage		
Power Supplied (Vdc)	Measured Frequency (MHz)	Frequency Measure with Time Elapsed Total emission within Max kHz
15.30	13.56178	-0.02
18.00	13.56180	reference
18.50	13.56180	0.0
20.70	13.56181	+0.01

5.5 20 dB OCCUPIED BANDWIDTH MEASUREMENT

5.5.1 Requirement

According to 15.215(c), Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the 20 dB bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

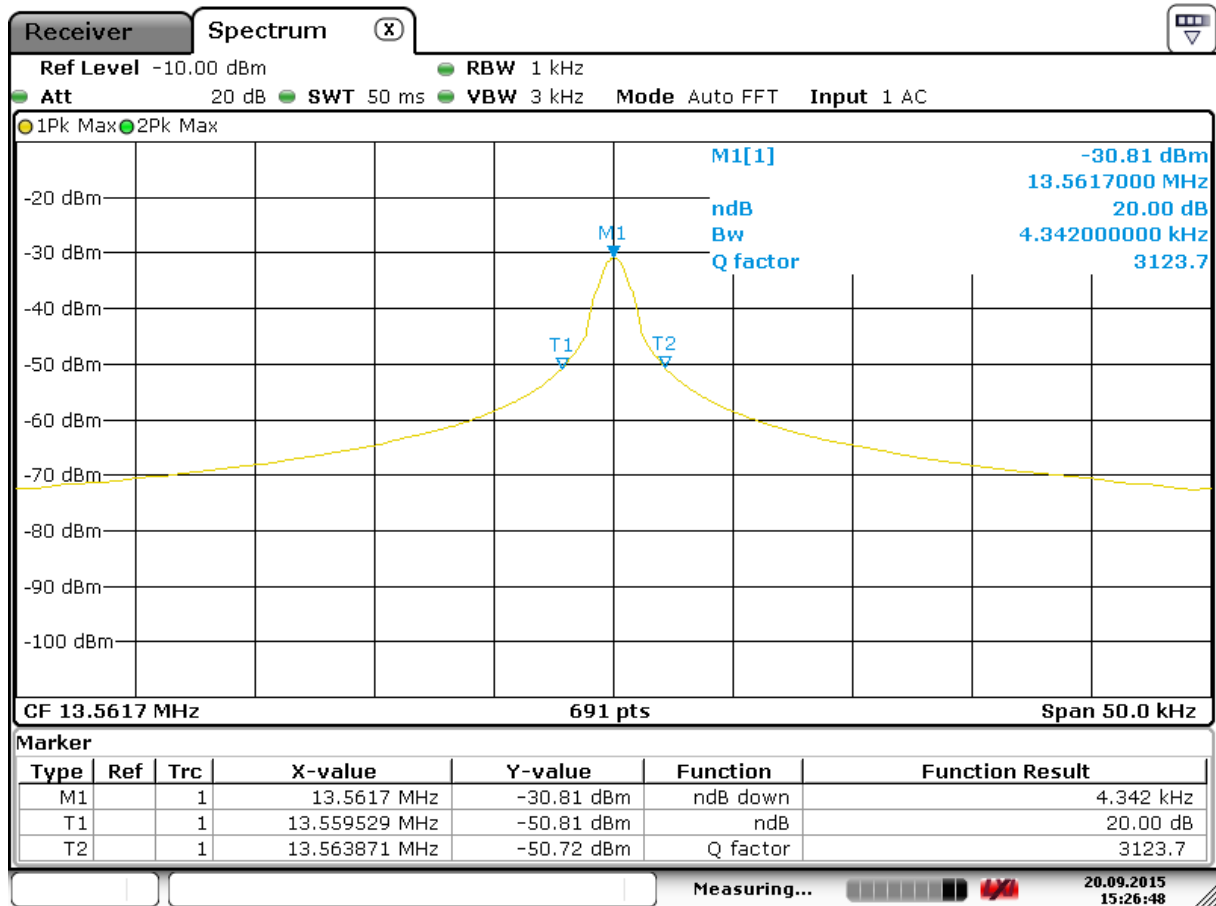
5.5.2 Test Set-up



5.5.3 Measurement Procedure

1. The useful radiated emission from the EUT was detected by the spectrum analyzer with peak detector. Record the 20 dB bandwidth of the carrier.
2. The useful radiated emission from the EUT was detected by the spectrum analyser with peak detector. The vertical Scale is set to 10dB per division. The horizontal scale is set to 20 kHz per division. Read the down 20dB bandwidth of the carrier.
3. Set the spectrum analyzer: Span = 50 kHz
4. Set the spectrum analyzer: RBW = 1 kHz, VBW = 3 kHz
5. Sweep = auto; Detector Function = Peak. Trace = Max Hold.
6. Mark the peak frequency and -20dB points bandwidth.

5.5.4 20dB Bandwidth Measurement Result



Date: 20.SEP.2015 15:26:48

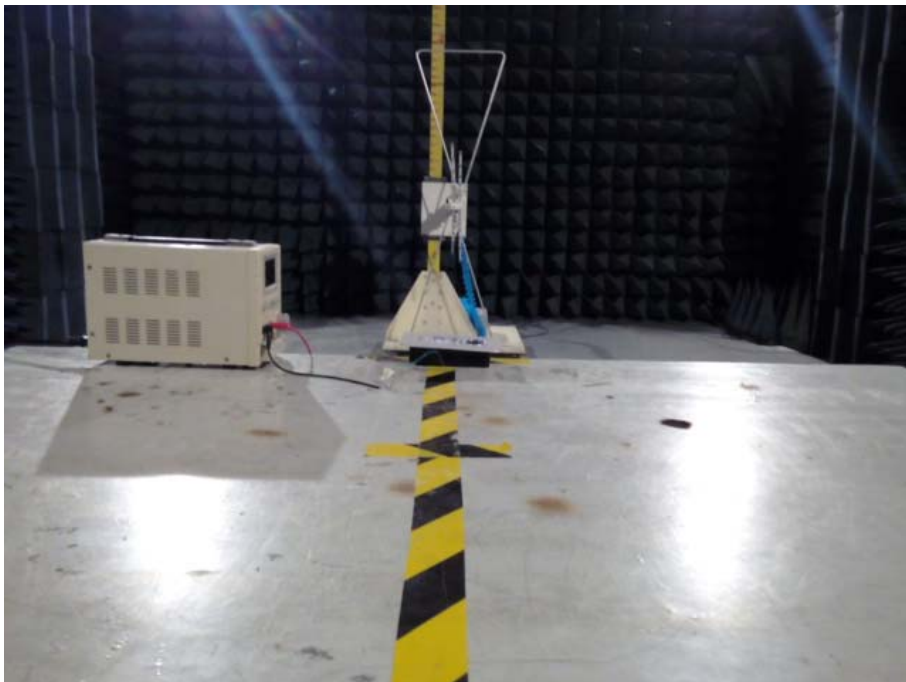
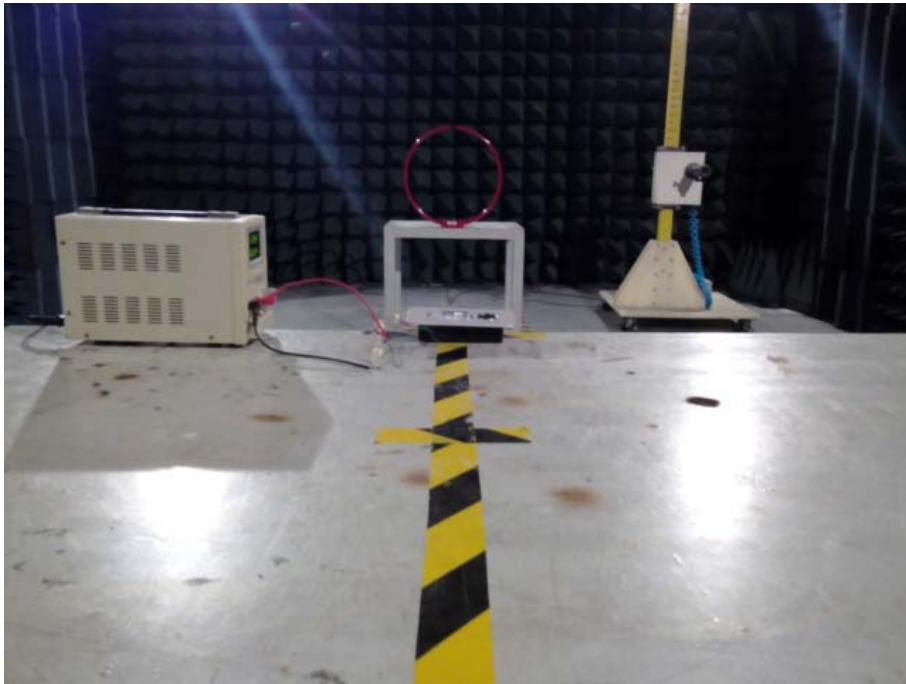
20dB bandwidth lower frequency: 13.5595 MHz

20dB bandwidth upper frequency: 13.5638 MHz

APPENDIX 1

PHOTOGRPHS OF TEST SET

Radiated Emissions Test Setup



End of Report