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ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT
INTENTIONAL RADIATOR CERTIFICATION TO
FCC PART 15 SUBPART C REQUIREMENT

OF

The Console

Model No.: L61112, L61112WM

Date Code: C1015FTV04

FCC ID: BMW-L61112

Trademark: Tomy

Report No.:ED150228128E

Issue Date: March 13, 2015

Prepared for

TOMY International, Inc.
1111 W. 22nd Street Suite 320 Oak Brook, IL 60523 United States

Prepared by
DONGGUAN EMTEK CO., LTD.

No.281, Guantai Road, Nancheng District,
Shenzhen, Guangdong, China

TEL: 86-769-22807078
FAX: 86-769-22807079

VERIFICATION OF COMPLIANCE

Applicant:	TOMY International, Inc. 1111 W. 22nd Street Suite 320 Oak Brook, IL 60523 United States
Manufacturer:	Forever True Vietnam International Limited
Product Description:	The Console
Model Number:	L61112, L61112WM (Note: The samples are the same except model number. So L61112 was selected for full test.)
Trademark:	Tomy
Date of Test:	February 28, 2015 to March 12, 2015

We hereby certify that:

The above equipment was tested by DONGGUAN EMTEK CO., LTD. and SHENZHEN EMTEK CO., LTD. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2014) and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.225(2014).

Approved By

Sam Lv / Q.A. Manager
DONGGUAN EMTEK CO., LTD.

Modified Information

Version	Summary	Revision Date	Report No.
Ver.1.0	Original Report	/	ED150228128E

Table of Contents

1 GENERAL INFORMATION 5

1.1 PRODUCT DESCRIPTION 5
1.2 RELATED SUBMITTAL(S) / GRANT(S) 5
1.3 TEST METHODOLOGY 6
1.4 SPECIAL ACCESSORIES 6
1.5 EQUIPMENT MODIFICATIONS 6
1.6 TEST FACILITY 6

2 SYSTEM TEST CONFIGURATION 7

2.1 EUT CONFIGURATION 7
2.2 EUT EXERCISE 7
2.3 TEST PROCEDURE 7
2.4 CONFIGURATION OF TESTED SYSTEM 8

3 SUMMARY OF TEST RESULTS 9

4 CONDUCTED EMISSIONS TEST 10

4.1 MEASUREMENT PROCEDURE 10
4.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) 10
4.3 MEASUREMENT EQUIPMENT USED 10
4.4 CONDUCTED EMISSION LIMIT 11
4.5 MEASUREMENT RESULT 11
4.6 CONDUCTED MEASUREMENT PHOTOS: 11

5 RADIATED EMISSION TEST 12

5.1 MEASUREMENT PROCEDURE 12
5.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) 12
5.3 MEASUREMENT EQUIPMENT USED 13
5.4 RADIATED EMISSION LIMIT 13
5.5 MEASUREMENT RESULT 15
5.6 RADIATED MEASUREMENT PHOTOS: 18

6 FREQUENCY STABILITY MEASUREMENT 19

6.1 FREQUENCY STABILITY LIMITS 19
6.2 MEASUREMENT INSTRUMENTS LIST 19
6.3 TEST PROCEDURE 19
6.4 EUT OPERATING CONDITIONS 19
6.5 TEST RESULTS 20

7 EMISSION BANDWIDTH 25

7.1 EMISSION BANDWIDTH LIMIT 25
7.2 TEST INSTRUMENTS 25
7.3 TEST PROCEDURE 25
7.4 TEST SETUP 25
7.5 ANTENNA REQUIREMENT 27
7.6 RESULT 27

APPENDIX (Photos of EUT) (3 pages)

1 General Information

1.1 Product Description

A major technical descriptions of EUT is described as following:

A). Operation Frequency: 13.56MHz
B). Modulation: Unmodulated
C). Number of Channel: 1 channel
D). Power Supply: DC 4*1.5V Battery
E). Antenna Type: Internal Loop antenna
F). Antenna Gain: 0dBi

Note: for a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

1.2 Related Submittal(s) / Grant(s)

This submittal(s) (test report) is intended for FCC ID: BMW-L61112 filing to comply with Section 15.225 of the FCC Part 15, Subpart C Rules.

1.3 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4 (2014). Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4 Special Accessories

Not available for this EUT intended for grant.

1.5 Equipment Modifications

Not available for this EUT intended for grant.

1.6 Test Facility

Site Description
EMC Lab. :

Accredited by FCC, June 18, 2014
The Certificate Number is 247565.

Accredited by Industry Canada, February 19, 2014
The Certificate Registration Number. is 9444A.

Name of Firm : DONGGUAN EMTEK CO., LTD.
Site Location : No.281, Guantai Road, Nancheng District, Dongguan, Guangdong, China

2 System Test Configuration

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4-2014 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.4-2014.

2.4 Configuration of Tested System

Fig. 2-1 Configuration of Tested System

Table 2-1 Equipment Used in Tested System

Item	Equipment	Brand	Model No.	FCC ID	Series No.	Note
1	The Console	Tomy	L61112	BMW-L61112	N/A	***EUT***

Note:

(1) Unless otherwise denoted as EUT in『Remark』column, device(s) used in tested system is a support equipment.

(2) Three orthogonal panels X, Y, Z of EUT are tested. And the test results of the worst test panel(X) were recorded.

3 Summary of Test Results

FCC Rules	Description Of Test	Result
§15.207	AC Power Conducted Emission	N/A
§15.225(a)(b)(c), (d), §15.209	Radiated Emission	Compliant
§15.225(e)	Frequency Stability	Compliant
§15.203	Antenna Application	Compliant

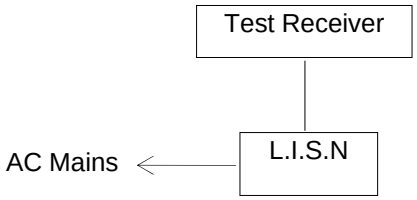
Remark: The EUT is supplied by Battery, there is no need for AC Power Conducted Emission test to be performed on this product.

4 Conducted Emissions Test

4.1 Measurement Procedure

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured was complete.

4.2 Test SET-UP (Block Diagram of Configuration)



4.3 Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**Last Cal.**	**Due date**
Test Receiver	Rohde & Schwarz	ESCS30	100018	05/16/2014	05/15/2015
L.I.S.N	Rohde & Schwarz	ENV216	100017	05/16/2014	05/15/2015
RF Switching Unit	CDS	RSU-M2	38401	05/16/2014	05/15/2015
Coaxial Cable	CDS	79254	46107086	05/16/2014	05/15/2015

4.4 Conducted Emission Limit

Conducted Emission Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.5 Measurement Result

N/A.

4.6 Conducted Measurement Photos:

N/A.

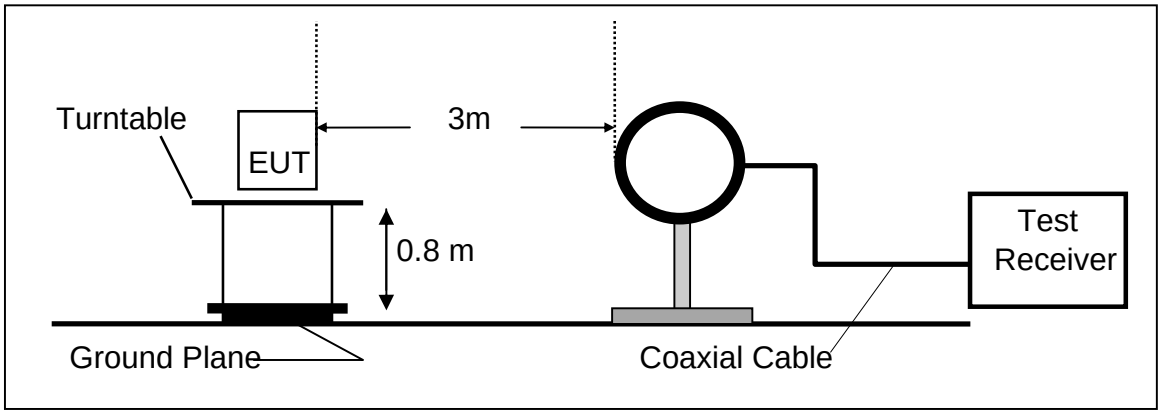
5 Radiated Emission Test

5.1 Measurement Procedure

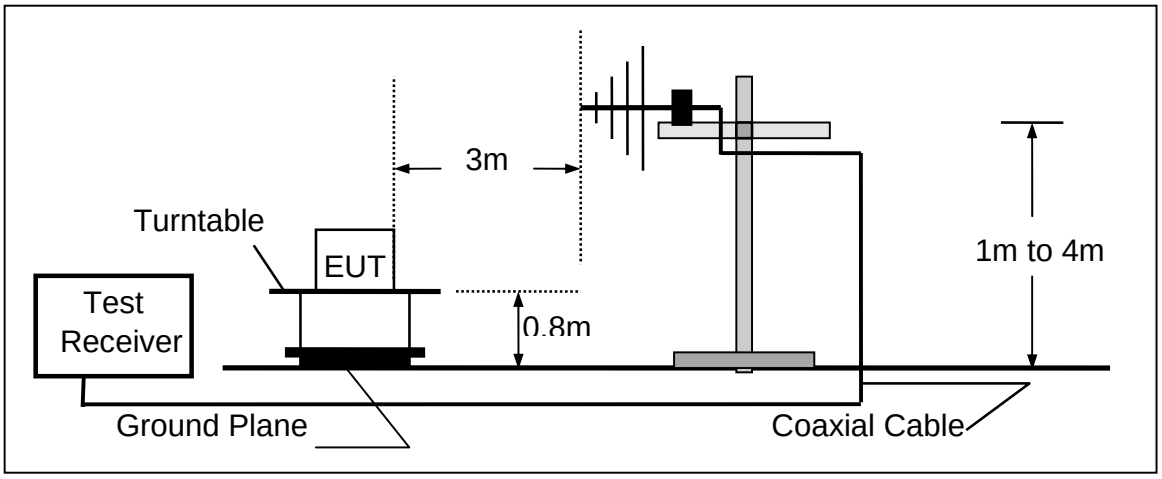
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured were complete.

5.2 Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



5.3 Measurement Equipment Used

Equipment	Serial No.	Manufacturer	Model No.	Cal. Date	Due Date
EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005.26	05/16/2014	05/15/2015
Pre-Amplifier	HP	8447D	2944A07999	05/16/2014	05/15/2015
Bilog Antenna	Schwarzbeck	VULB9163	142	05/16/2014	05/15/2015
Loop Antenna	Schwarzbeck	FMZB 1519	012	05/16/2014	05/15/2015
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170399	05/16/2014	05/15/2015
Horn Antenna	Schwarzbeck	BBHA9120D	D143	05/16/2014	05/15/2015
Cable	Schwarzbeck	AK9513	ACRX1	05/19/2014	05/18/2015
Cable	Rosenberger	N/A	FP2RX2	05/19/2014	05/18/2015
Cable	Schwarzbeck	AK9513	CRPX1	05/19/2014	05/18/2015
Cable	Schwarzbeck	AK9513	CRRX2	05/19/2014	05/18/2015
Pre-Amplifier	A.H.	PAM-0126	1415261	05/19/2014	05/18/2015

5.4 Radiated Emission Limit

The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table 15.209(a):

FCC Part 15.209				
Frequency (MHz)	Field Strength Limitation		Field Strength Limitation Frequency tion at 3m Measurement Dist	
	(uV/m)	Dist	(uV/m)	(dBuV/m)
0.009 – 0.490	2400 / F(KHz)	300m	10000 * 2400/F(KHz)	20log 2400/F(KHz) + 80
0.490 – 1.705	24000 / F(KHz)	30m	100 * 24000/F(KHz)	20log 24000/F(KHz) + 40
1.705 – 30.00	30	30m	100* 30	20log 30 + 40
30.0 – 88.0	100	3m	100	20log 100
88.0 – 216.0	150	3m	150	20log 150
216.0 – 960.0	200	3m	200	20log 200
Above 960.0	500	3m	500	20log 500

FCC Part 15.225(a)/(b)/(c)				
Frequency (MHz)	Field Strength Limitation		Field Strength Limitation Frequency tion at 3m Measurement Dist	
	(uV/m)	Dist	(uV/m)	(dBuV/m)
13.110 – 13.410	106	30 m	106*100	80.5
13.410 – 13.553	334	30 m	334*100	90.5
13.553 – 13.567	15,848	30 m	15,848*100	124
13.567 – 13.710	334	30 m	334*100	90.5
13.710 – 14.010	106	30 m	106*100	80.5

15.205 Restricted bands of operation

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])

Remark : 1. Emission level in dBuV/m=20 log (uV/m)
2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of ξ 15.205, and the emissions located in restricted bands also comply with 15.209 limit.

5.5 Measurement Result

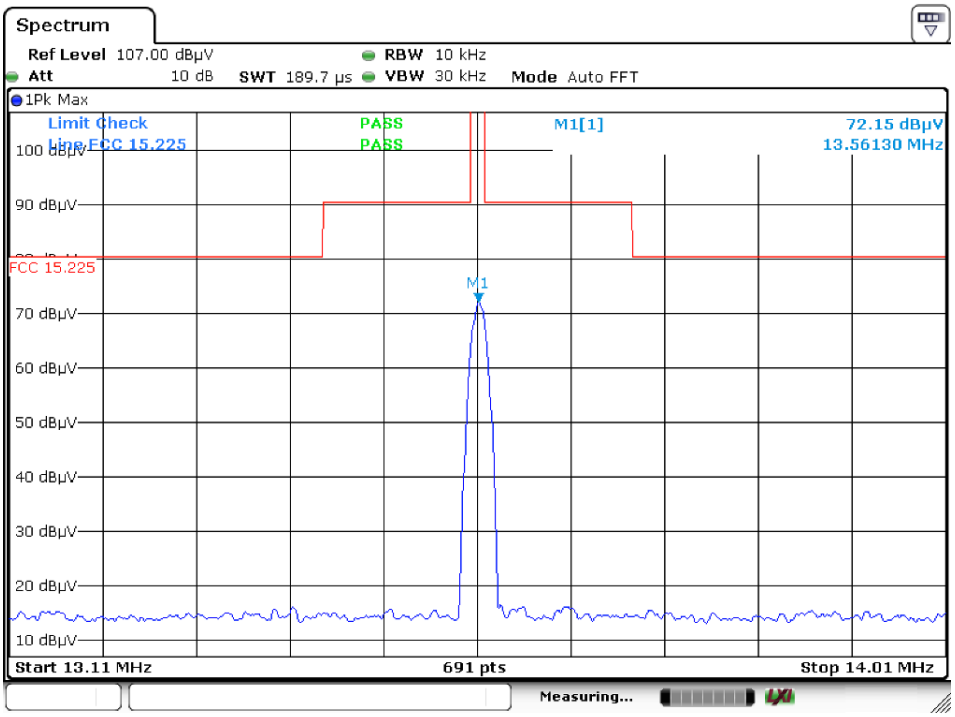
Operation Mode:	TX Mode	Test Date :	March 03, 2015
Frequency Range:	9KHz~30MHz	Temperature :	28℃
Test Result:	PASS	Humidity :	65 %
Measured Distance:	3m	Test By:	KYO

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Over (dB)	Note
8.53	V	30.33	69.54	-39.21	QP
11.31	V	31.56	69.54	-37.98	QP
14.46	V	32.74	69.54	-36.8	QP
17.36	V	33.55	69.54	-35.99	QP
27.66	V	34.57	69.54	-34.97	QP
28.45	V	35.11	69.54	-34.43	QP
6.67	H	30.76	69.54	-38.78	QP
11.32	H	31.23	69.54	-38.31	QP
15.66	H	32.09	69.54	-37.45	QP
23.82	H	32.81	69.54	-36.73	QP
25.56	H	33.26	69.54	-36.28	QP
27.28	H	34.57	69.54	-34.97	QP
Remark: These test result outsourced to SHENZHEN EMTEK CO., LTD.					

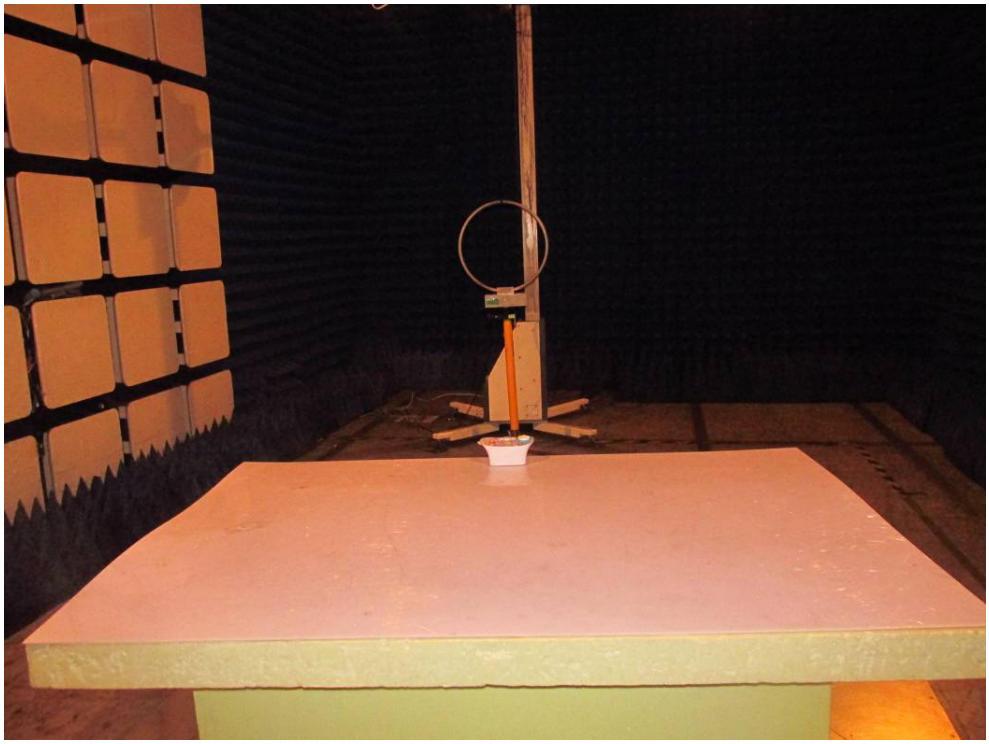
Operation Mode:	TX Mode	Test Date :	March 03, 2015
Frequency Range:	30~1000MHz	Temperature :	28℃
Test Result:	PASS	Humidity :	65 %
Measured Distance:	3m	Test By:	KYO

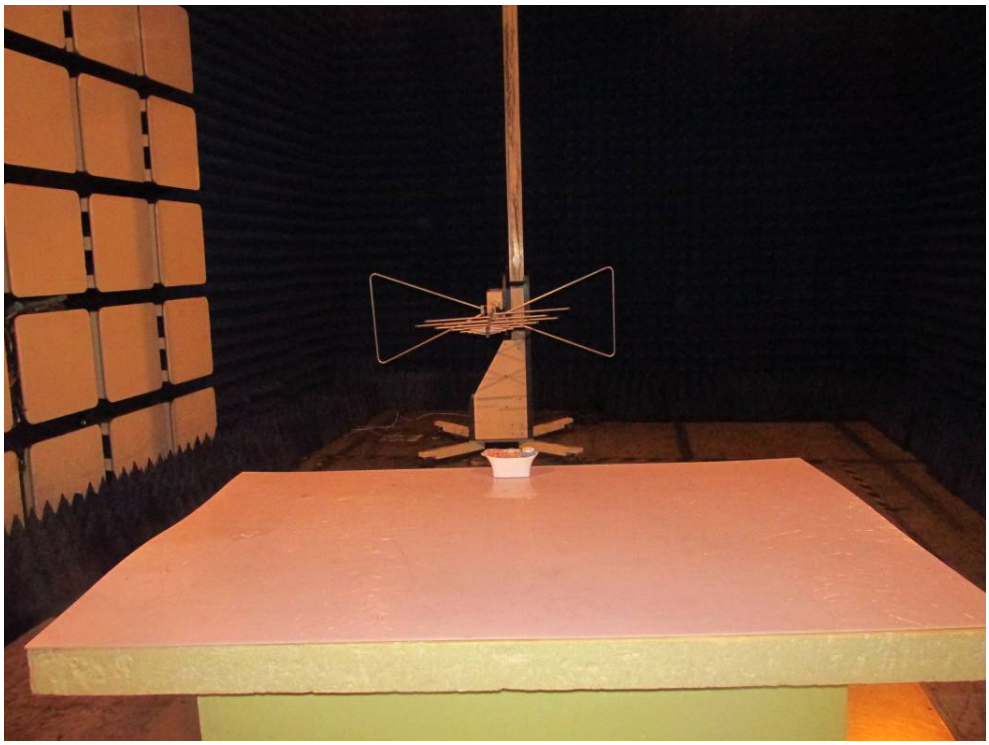
Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Over (dB)	Note
135.7300	V	36.52	43.50	-6.98	QP
149.3100	V	30.11	43.50	-13.39	QP
162.8900	V	34.90	43.50	-8.60	QP
176.4700	V	31.67	43.50	-11.83	QP
419.9400	V	34.07	46.00	-11.93	QP
623.6400	V	35.60	46.00	-10.40	QP
135.7300	H	34.32	43.50	-9.18	QP
162.8900	H	33.63	43.50	-9.87	QP
217.2100	H	32.49	46.00	-13.51	QP
230.7900	H	33.34	46.00	-12.66	QP
393.7500	H	35.96	46.00	-10.04	QP
596.4800	H	38.09	46.00	-7.91	QP
Remark: These test result outsourced to SHENZHEN EMTEK CO., LTD.					

Operation Mode:	TX Mode	Test Date :	March 03, 2015
Frequency Range:	13.110MHz~14.010 MHz	Temperature :	28℃
Test Result:	PASS	Humidity :	65 %
Measured Distance:	3m	Test By:	KYO



5.6 Radiated Measurement Photos:





6 FREQUENCY STABILITY MEASUREMENT

6.1 FREQUENCY STABILITY LIMITS

FCC Part 15.225(e)

the frequency tolerance of the carrier signal shall be maintained within +/-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 w battery.

6.2 MEASUREMENT INSTRUMENTS LIST

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	FSV30	1321.3008K	05/16/2014	05/15/2015
Coaxial Cable	CDS	79254	46107086	05/16/2014	05/15/2015

6.3 TEST PROCEDURE

a. The equipment under test was connected to an external AC power supply and the RF output was connected to a frequency counter via feed through attenuators. The EUT was placed inside the temperature chamber. After the temperature stabilized for approximately 20 minutes, the frequency of the output signal was recorded from the counter.

b. At room temperature (25±5°C), an external variable DC power supply was connected to the EUT. The frequency of the transmitter was measured for 115%, 100% and 85% of the nominal operating input voltage.

c. For the actual test configuration, please refer to the related Item –EUT Test Photos.

6.4 EUT OPERATING CONDITIONS

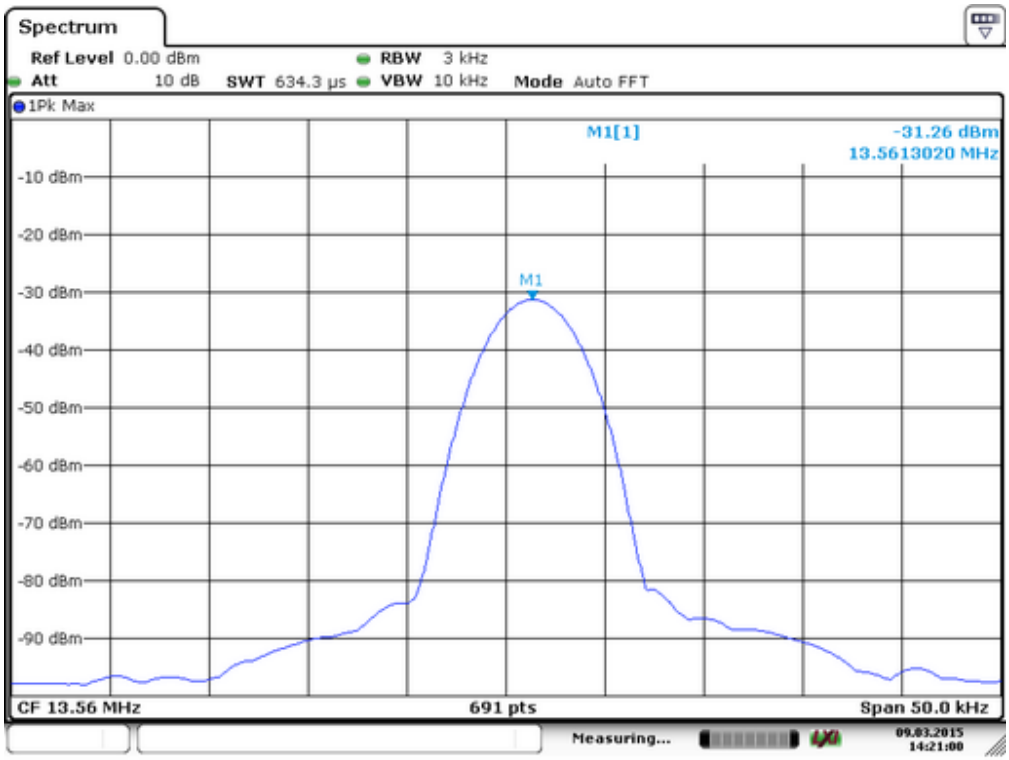
The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

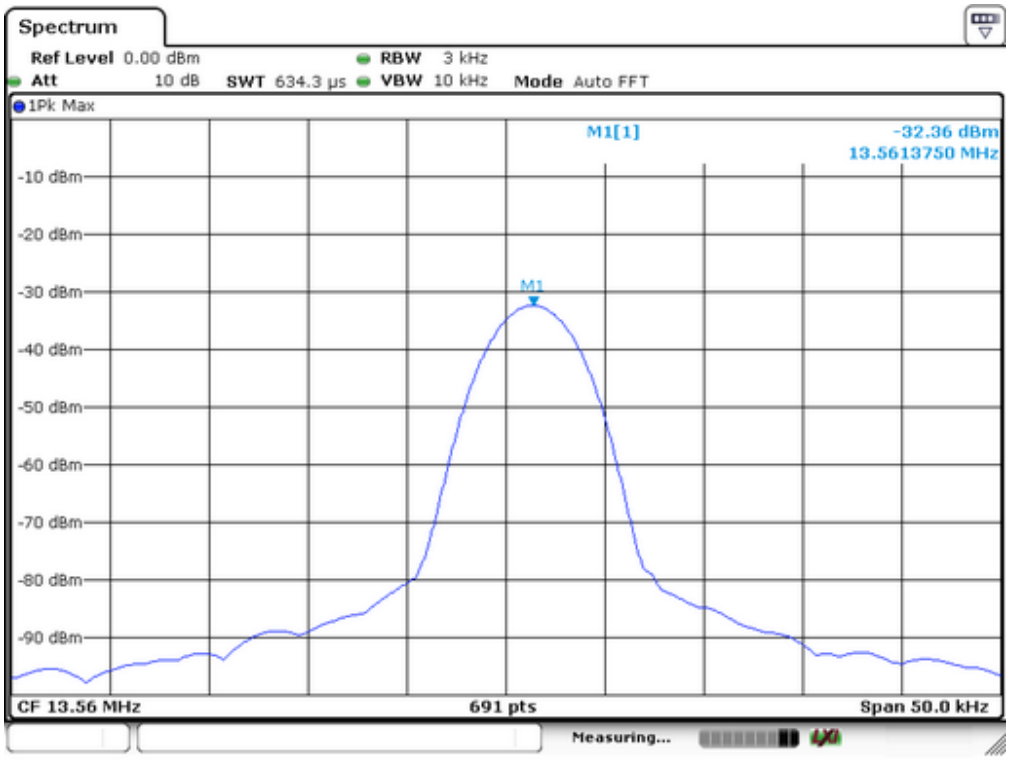
6.5 TEST RESULTS

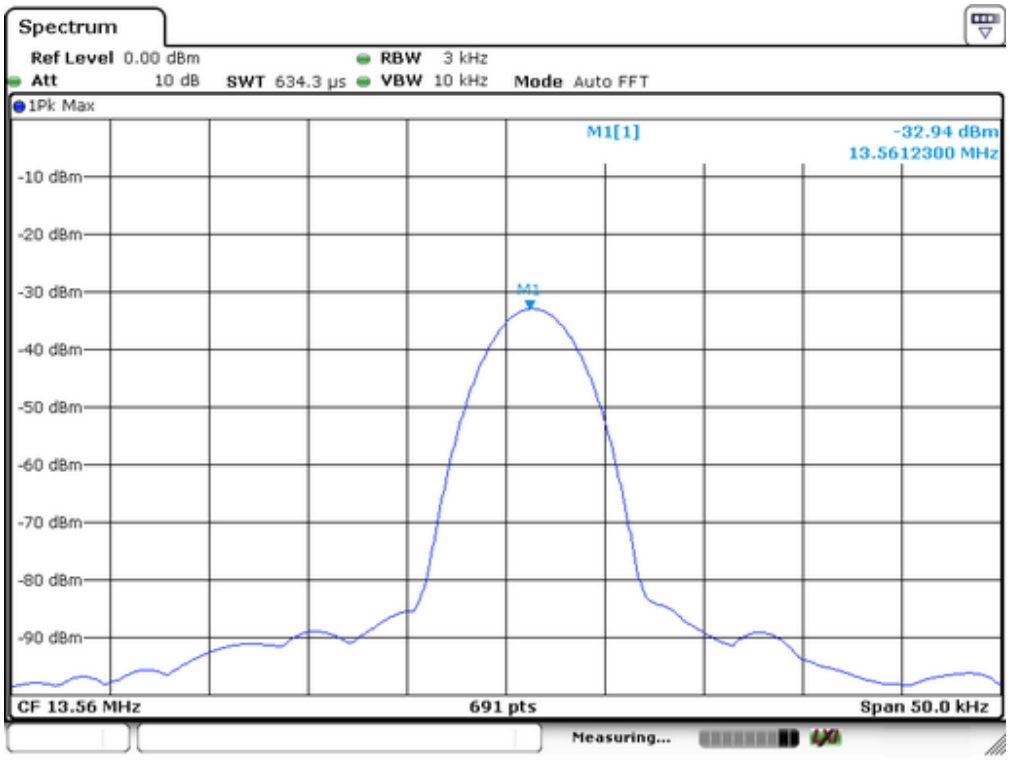
E.U.T :	The Console	Test Mode :	TX Mode
Test Voltage :	DC 4*1.5V Battery		

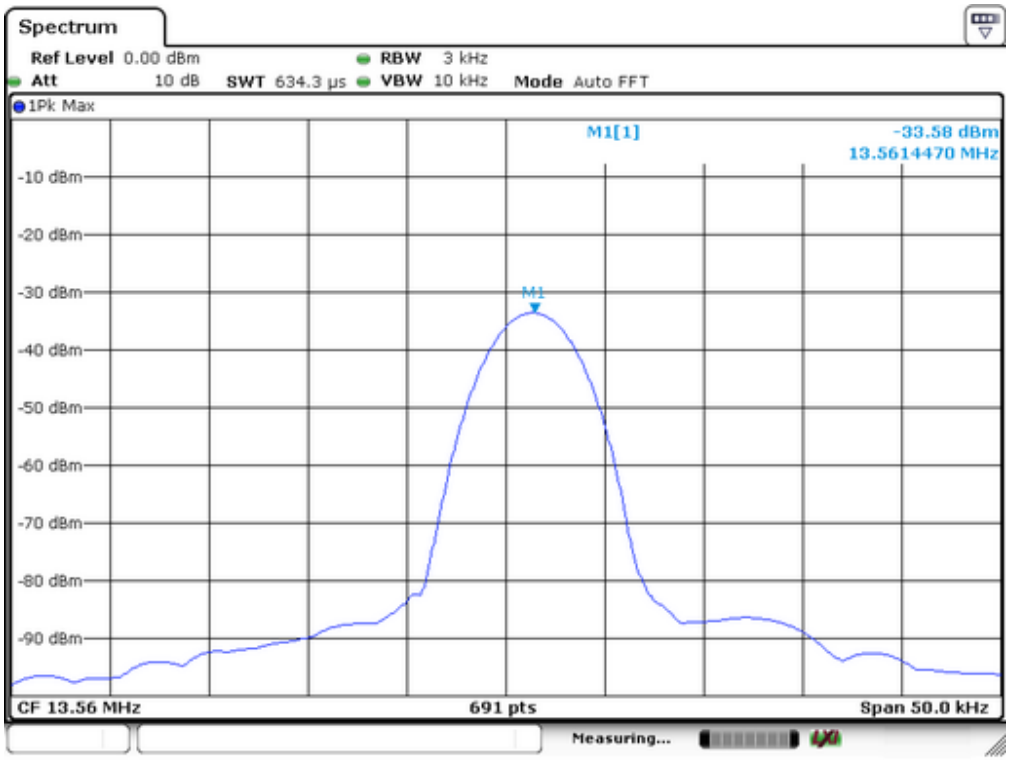
Frequency Stability Versus Environmental Temperature					
Temperature (℃)	**Voltage (Vdc)**	**Frequency (MHz)**	**Freq Error (ppm)**	**Limit (ppm)**	**Results**
-20	6V	13.561302	9.60	100	PASS
-10	6V	13.561375	10.14	100	PASS
0	6V	13.561230	9.07	100	PASS
10	6V	13.561447	10.67	100	PASS
20	6V	13.561158	8.54	100	PASS
30	6V	13.561375	10.14	100	PASS
40	6V	13.561447	10.67	100	PASS
50	6V	13.561230	9.07	100	PASS

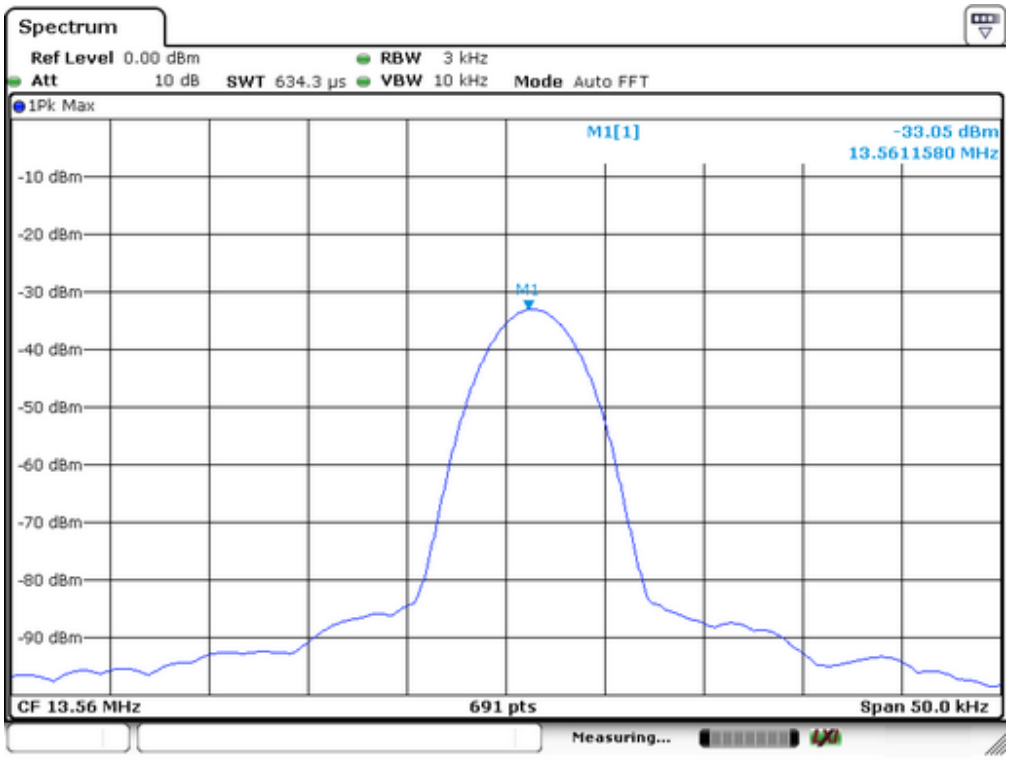
Frequency Stability Versus Environmental Temperature

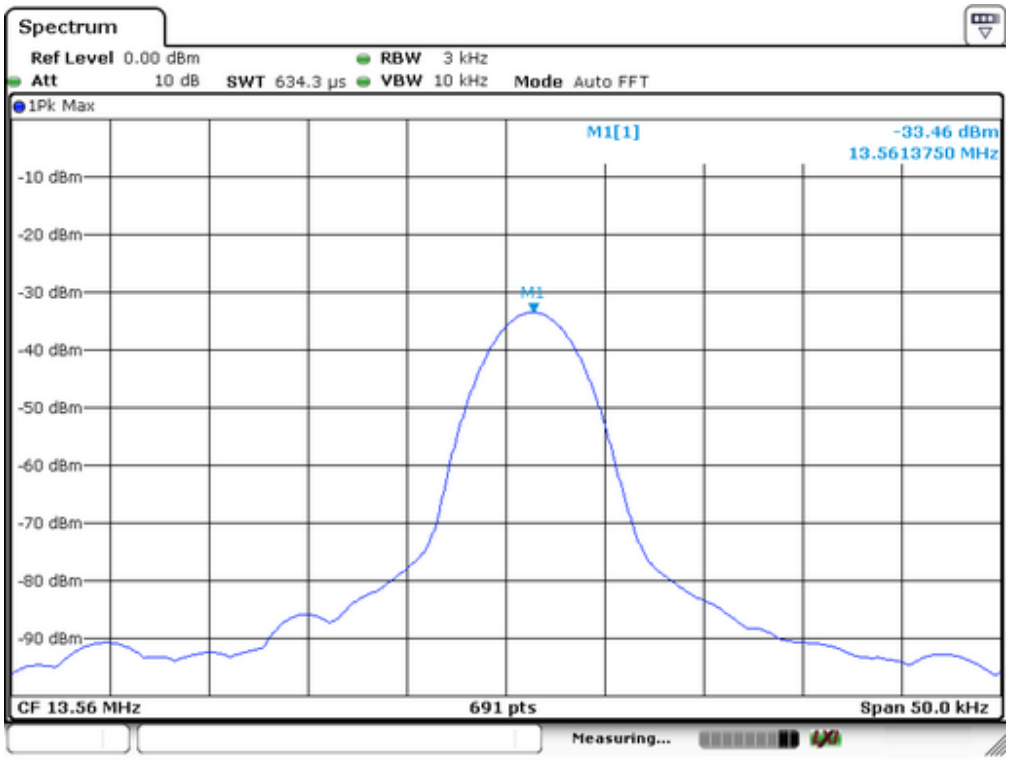


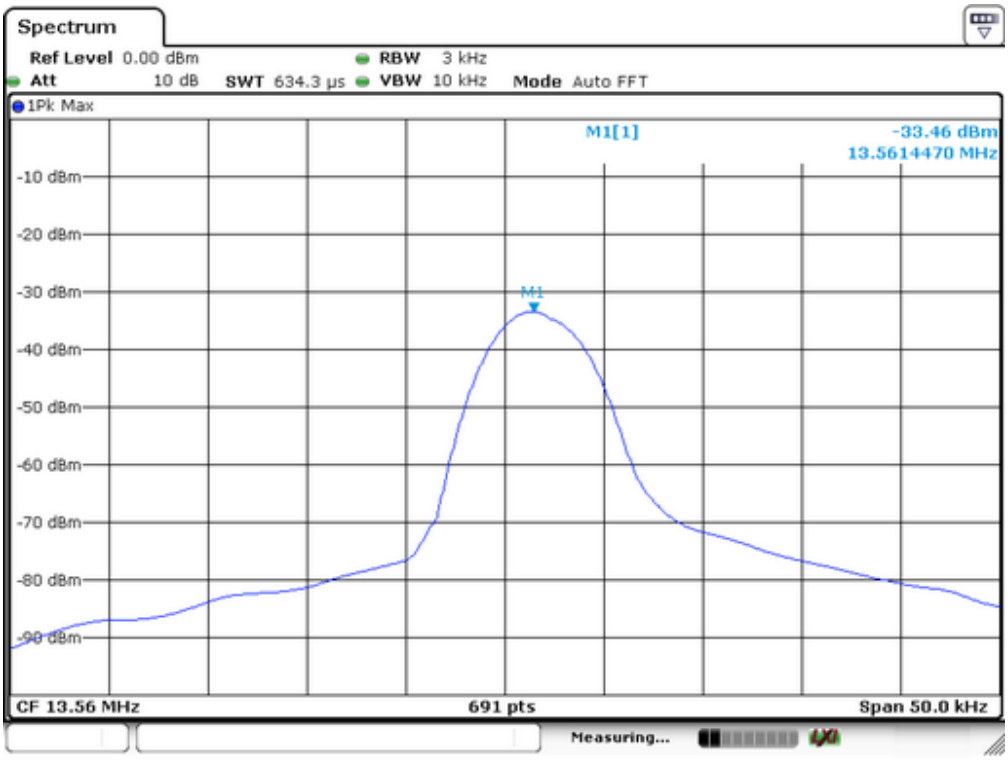


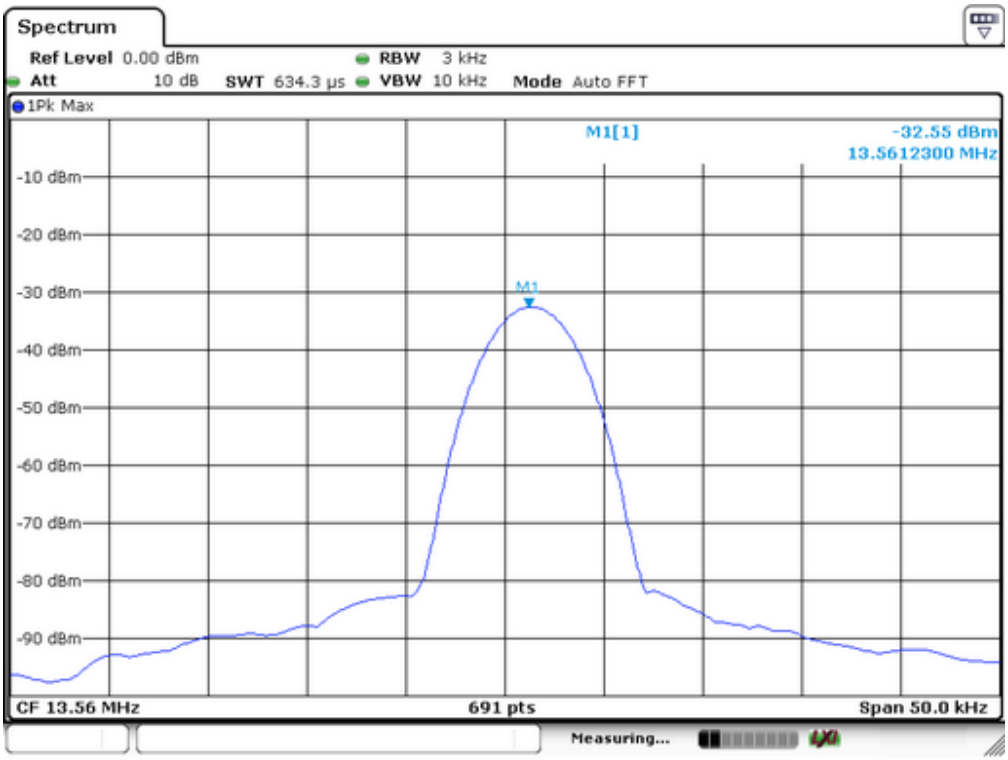

Spectrum
Ref Level 0.00 dBm
RBW 3 kHz
Att 10 dB
SWT 634.3 µs
VBW 10 kHz
Mode Auto FFT
1Pk Max
M1[1]
-32.94 dBm
13.5612300 MHz
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
M1
CF 13.56 MHz
691 pts
Span 50.0 kHz
Measuring...


Spectrum
Ref Level 0.00 dBm
RBW 3 kHz
Att 10 dB
SWT 634.3 µs
VBW 10 kHz
Mode Auto FFT
1Pk Max
M1[1]
-33.58 dBm
13.5614470 MHz
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
M1
CF 13.56 MHz
691 pts
Span 50.0 kHz
Measuring...


Spectrum
Ref Level 0.00 dBm
RBW 3 kHz
Att 10 dB
SWT 634.3 µs
VBW 10 kHz
Mode Auto FFT
1Pk Max
M1[1]
-33.05 dBm
13.5611580 MHz
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
M1
CF 13.56 MHz
691 pts
Span 50.0 kHz
Measuring...


Spectrum
Ref Level 0.00 dBm
RBW 3 kHz
Att 10 dB
SWT 634.3 µs
VBW 10 kHz
Mode Auto FFT
1Pk Max
M1[1]
-33.46 dBm
13.5613750 MHz
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
M1
CF 13.56 MHz
691 pts
Span 50.0 kHz
Measuring...


Spectrum
Ref Level 0.00 dBm
RBW 3 kHz
Att 10 dB
SWT 634.3 µs
VBW 10 kHz
Mode Auto FFT
1Pk Max
M1[1]
-33.46 dBm
13.5614470 MHz
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
M1
CF 13.56 MHz
691 pts
Span 50.0 kHz
Measuring...


Spectrum
Ref Level 0.00 dBm
RBW 3 kHz
Att 10 dB
SWT 634.3 µs
VBW 10 kHz
Mode Auto FFT
1Pk Max
M1[1]
-32.55 dBm
13.5612300 MHz
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
M1
CF 13.56 MHz
691 pts
Span 50.0 kHz
Measuring...

7 EMISSION BANDWIDTH

7.1 Emission Bandwidth Limit

Intentional radiators must be designed to ensure that the 20 dB bandwidth of the emissions in the specific band (13.553 – 13.567 MHz).

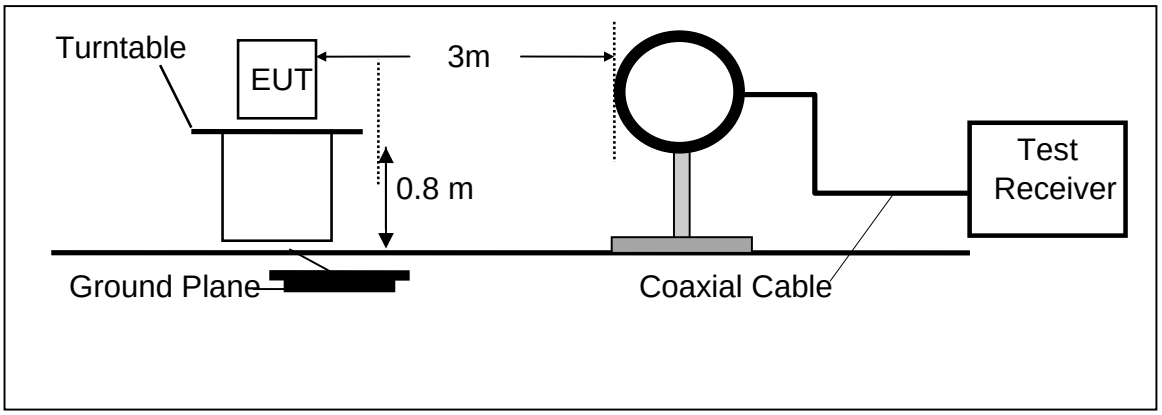
7.2 TEST INSTRUMENTS

Refer a test equipment and calibration data table in this test report.

7.3 TEST PROCEDURE

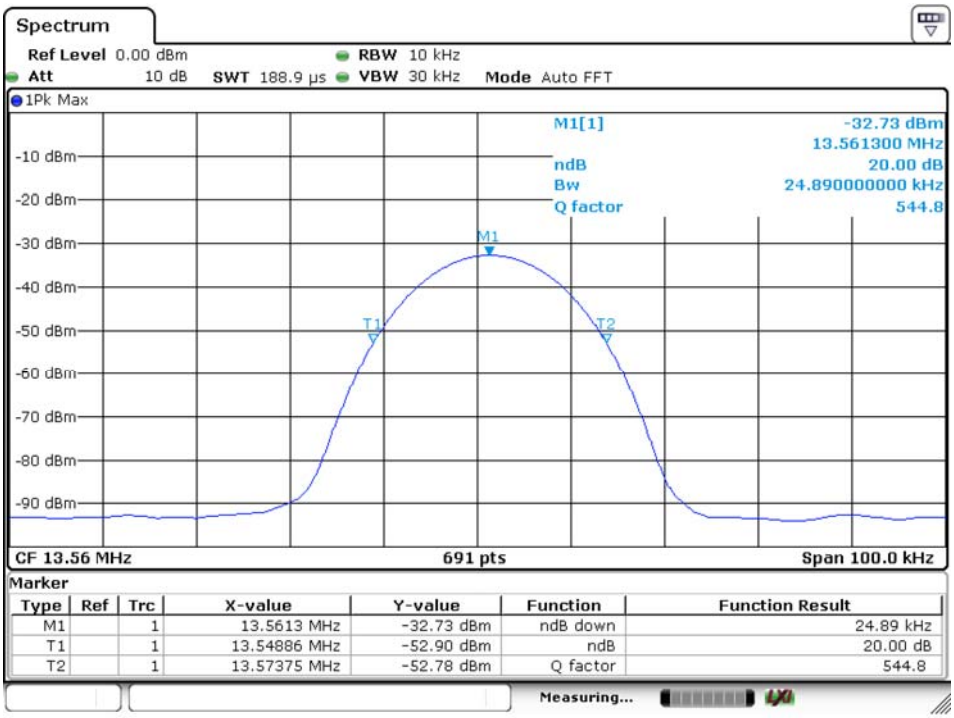
The bandwidth of the fundamental frequency was measured by spectrum analyzer with 10kHz RBW and 30kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

7.4 Test Setup



Frequency (MHz)	20dB Bandwidth (kHz)	Results
13.56	24.89	PASS

BANDWIDTH TEST PLOT



7.5 Antenna requirement

The EUT'S antenna is met the requirement of FCC part 15C section 15.203 and 15.247.

FCC part 15C section 15.247 requirements:
Systems operating in the 2402-2480MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum peak output power of the intentional radiator is reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

7.6 Result

The EUT's antenna used an inter Loop Antenna and integral on the PCB.

APPENDIX I
(Photos of EUT)