

FCC

RF

TEST REPORT

ISSUED BY
Shenzhen BALUN Technology Co., Ltd.



FOR
BODYBACK TRANSMITTER

ISSUED TO
CAD AUDIO LLC

6573 Cochran Road, Building I, Solon, Ohio, USA 44139



Tested by: *Zheng Muyi*

Zheng Muyi
(Engineer)

Date *Jul. 8, 2016*

Approved by: *Liao Jianming*

Liao Jianming
(Technical Director)

Date *Jul. 8, 2016*

Report No.: BL-SZ1650379-601

EUT Type: BODYBACK TRANSMITTER

Model Name: TX3010R

Brand Name: CAD AUDIO

Test Standard: 47 CFR Part 74 Subpart H

FCC ID: OQ5-WX3010R

Test conclusion: Pass

Test Date: Jun. 15, 2016 ~ Jun. 28, 2016

Date of Issue: Jul. 8, 2016

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Revision History

Version	Issue Date	Revisions Content
Rev. 01	Jul. 1, 2016	Initial Issue
Rev. 02	Jul. 4, 2016	Added test data of mask and max. deviation (Hz)
Rev. 03	Jul. 8, 2016	Updated the model name

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1 ADMINISTRATIVE DATA (GENERAL INFORMATION)

1.1 Identification of the Testing Laboratory

Company Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100
Fax Number	+86 755 6182 4271

1.2 Identification of the Responsible Testing Location

Test Location	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	<p>The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 11524A-1.</p> <p>The laboratory has been listed by US Federal Communications Commission to perform electromagnetic emission measurements. The recognition numbers of test site are 832625.</p> <p>The laboratory has met the requirements of the IAS Accreditation Criteria for Testing Laboratories (AC89), has demonstrated compliance with ISO/IEC Standard 17025:2005. The accreditation certificate number is TL-588.</p> <p>The laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L6791.</p>
Description	All measurement facilities used to collect the measurement data are located at Block B, FL 1, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China 518055

1.3 Laboratory Condition

Ambient Temperature	20 to 25°C
Ambient Relative Humidity	45% - 55%
Ambient Pressure	100 kPa - 102 kPa

1.4 Announce

- (1) The test report reference to the report template version v1.0.
- (2) The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
- (3) The test report is invalid if there is any evidence and/or falsification.
- (4) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.

- (5) This document may not be altered or revised in any way unless done so by BALUN and all revisions are duly noted in the revisions section.
- (6) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	CAD AUDIO LLC
Address	6573 Cochran Road, Building I, Solon, Ohio, USA 44139

2.2 Manufacturer Information

Manufacturer	CAD AUDIO LLC
Address	6573 Cochran Road, Building I, Solon, Ohio, USA 44139

2.3 Factory Information

Factory	CAD AUDIO LLC
Address	6573 Cochran Road, Building I, Solon, Ohio, USA 44139

2.4 General Description for Equipment under Test (EUT)

EUT Type	BODYBACK TRANSMITTER
Model Name	TX3010R
Series Model Name	N/A
Description of Model name differentiation	N/A
Hardware Version	N/A
Software Version	N/A
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A
Network and Wireless connectivity	FM

2.5 Ancillary Equipment

N/A

2.6 Technical Information

The requirement for the following technical information of the EUT was tested in this report:

Modulation Technology	FM
Frequency Range	580 MHz – 600 MHz
Tested Channel	Low(580 MHz), Middle (587.4 MHz), High (599.4 MHz)
Antenna Type	Dipole Antenna
Antenna Gain	2.5 dBi
About the Product	The equipment is BODYBACK TRANSMITTER, it contains FM module.

Channel list

No.	Frequency				
	Group 1	Group 2	Group 3	Group 4	Group 5
1	580.0	580.6	582.6	580.5	580.8
2	582.2	581.1	583.5	581.0	583.0
3	584.6	582.4	584.9	583.3	584.0
4	586.6	583.4	586.1	584.7	585.4
5	588.5	584.8	586.9	585.9	587.4
6	590.6	586.0	588.8	586.7	589.3
7	593.5	586.8	590.9	588.6	591.4
8	596.5	594.3	594.4	590.7	595.2
9	600.0	597.3	597.4	594.2	598.1
No.	Frequency				
	Group 6	Group 7	Group 8	Group 9	
1	581.3	581.9	582.1	583.1	
2	582.8	584.1	583.6	584.2	
3	584.5	586.5	584.3	584.4	
4	587.1	587.7	585.3	587.3	
5	587.9	591.0	591.2	589.5	
6	589.8	593.7	593.9	593.3	
7	592.7	595.8	596.0	597.5	
8	595.7	597.7	597.9	599.2	
9	598.2	599.3	599.5	599.4	

2.7 Additional Instructions

EUT Software Settings: TX LEVEL is built-in set parameters and cannot be changed and selected.

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 74, Subpart H	Part 74 – Experimental radio, auxiliary, special broadcast and other program distributional services. Subpart H – Low power auxiliary stations.
2	TIA-603-D 2010	Land Mobile FM or PM communications equipment measurement and performance standards.
3	ANSI C63.4-2014	American National Standard for Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

3.2 Verdict

No.	Description	FCC Part No.	Test Result	Verdict
1	Output Power	74.861(e)(1)	ANNEX A.1	Pass
2	Modulation Characteristics	74.861(e) (3)	ANNEX A.2	Pass
3	Emission Bandwidth and Emission Mask	74.861(e) (5) (6)	ANNEX A.3	Pass
4	Spurious Emissions at Antenna Terminals	74.861(e) (6)	ANNEX A.4	Pass
5	Field Strength of Spurious Radiation	74.861(e) (6)	ANNEX A.5	Pass
6	Frequency Stability	74.861(e) (4)	ANNEX A.6	Pass

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

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

Relative Humidity	45% - 55%	
Atmospheric Pressure	100 kPa - 102 kPa	
Temperature	NT (Normal Temperature)	+22°C to +25°C
	LT (Low Temperature)	-10°C
	HT (High Temperature)	+45°C
Working Voltage of the EUT	NV (Normal Voltage)	3.0 V

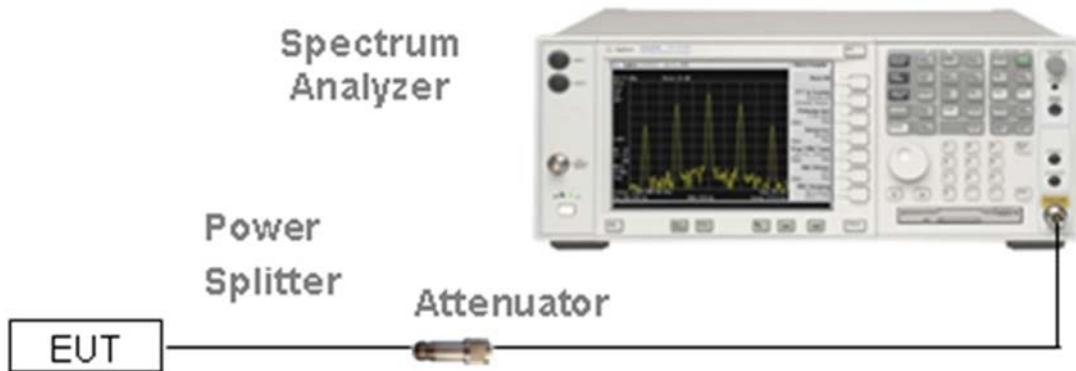
4.2 Test Equipment List

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	ROHDE&SCHWARZ	FSV-30	103118	2015.07.16	2016.07.15
Vector Signal Generator	ROHDE&SCHWARZ	SMBV100A	177746	2015.07.16	2016.07.15
Analyzer, Modulation	HP	8901A	2026A00934	2015.07.16	2016.07.15
Signal Generator	ROHDE&SCHWARZ	SMB100A	260592	2015.07.01	2016.06.30
Switch Unit with OSP-B157	ROHDE&SCHWARZ	OSP120	101270	2015.07.16	2016.07.15
Spectrum Analyzer	AGILENT	E4440A	MY45304434	2015.10.15	2016.10.14
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2015.07.14	2016.07.13
LISN	SCHWARZBECK	NSLK 8127	8127-687	2015.07.14	2016.07.13
Bluetooth Tester	ROHDE&SCHWARZ	CBT	101005	2015.07.16	2016.07.15
Power Splitter	KMW	DCPD-LDC	1305003215	2015.07.01	2016.06.30
Power Sensor	ROHDE&SCHWARZ	NRP-Z21	103971	2015.07.21	2016.07.20
Attenuator (20 dB)	KMW	ZA-S1-201	110617091	--	--
Attenuator (6 dB)	KMW	ZA-S1-61	1305003189	--	--
DC Power Supply	ROHDE&SCHWARZ	HMP2020	018141664	2015.07.17	2016.07.16
Temperature Chamber	ANGELANTIONI SCIENCE	NTH64-40A	1310	2015.08.07	2016.08.06
Test Antenna-Loop(9 kHz-30 MHz)	SCHWARZBECK	FMZB 1519	1519-037	2015.07.22	2017.07.21
Test Antenna-Bi-Log(30 MHz-3 GHz)	SCHWARZBECK	VULB 9163	9163-624	2015.07.22	2017.07.21
Test Antenna-Horn(1-18 GHz)	SCHWARZBECK	BBHA 9120D	9120D-1148	2015.07.22	2017.07.21
Test Antenna-Horn(15-26.5 GHz)	SCHWARZBECK	BBHA 9170	9170-305	2015.07.22	2017.07.21
Anechoic Chamber	RAINFORD	9m*6m*6m	N/A	2015.02.28	2017.02.27
Shielded Enclosure	ChangNing	CN-130701	130703	--	--
Audio Analyzer	Agilent	U8903B	MRTSUE061 43	2015.08.12	2016.08.11

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Modulation Analyzer	HP	8901A	MRTSUE062 10	2015.12.09	2016.12.08
Temperature/Humidity Meter	Yuhuaze	HTC-2	MRTSUE061 80	2015.12.21	2016.12.20

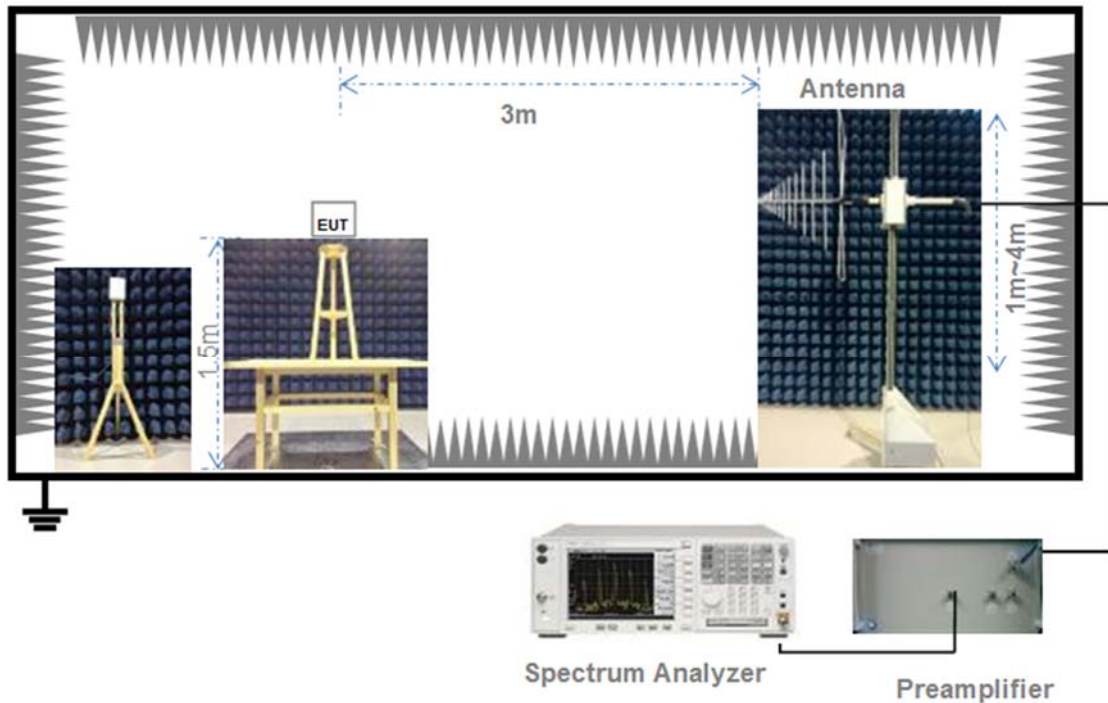
4.3 Description of Test Setup

4.3.1 For Antenna Port Test



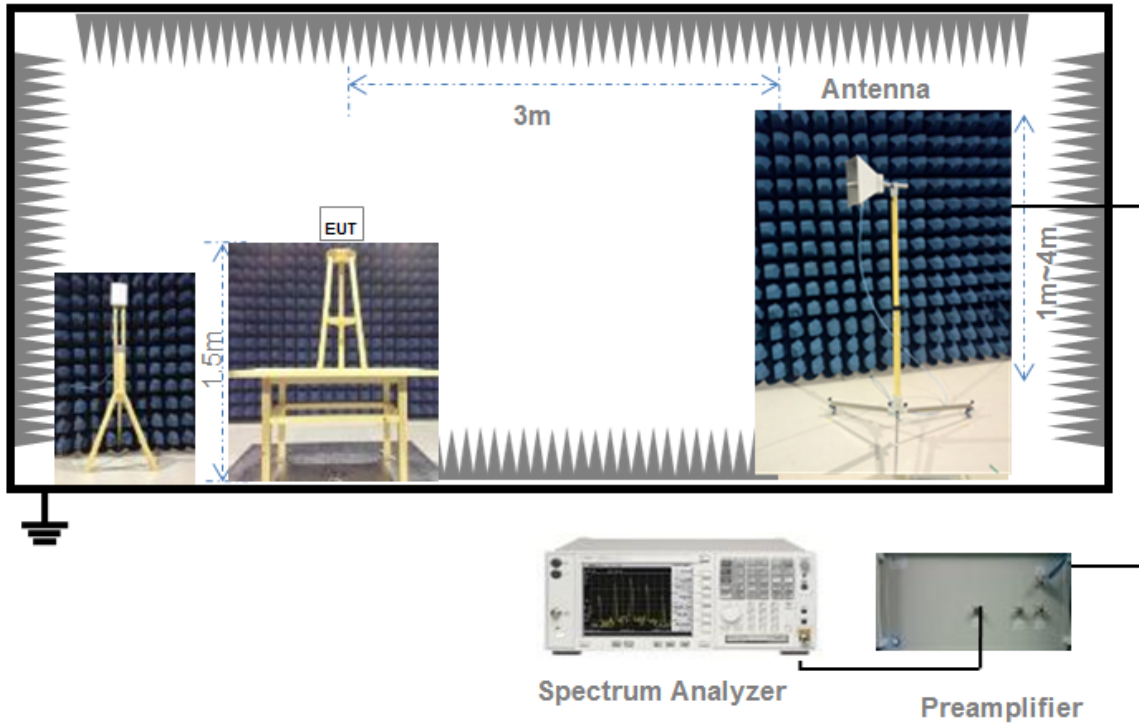
(Diagram 1)

4.3.2 For Radiated Test (30 MHz-1 GHz)



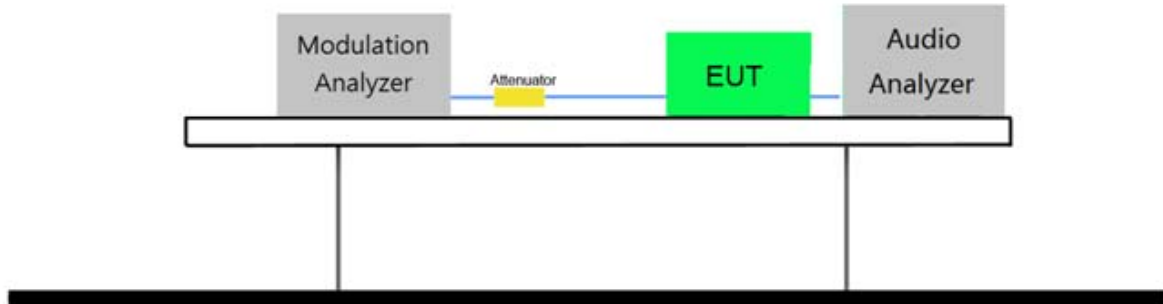
(Diagram 2)

4.3.3 For Radiated Test (Above 1 GHz)



(Diagram 3)

4.3.4 Modulation Characteristics



(Diagram 4)

5 TEST ITEMS

5.1 Output Power

5.1.1 Test Limit

FCC §74.861(e) (1)

The power of the measured unmodulated carrier power at the output of the transmitter power amplifier (antenna input power) may not exceed the following:

Frequency Band (MHz)	Limit
54-72,76-88, and 174-216 MHz	50 mW EIRP
470-608 and 614-698 MHz	250 mW conducted power
600 MHz duplex gap	20 mW EIRP

5.1.2 Test Setup

See section 4.3.1 (Diagram 1) for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.1.3 Test Procedure

Connect the EUT to spectrum analyzer and set the spectrum analyzer as following:

Center frequency: channel frequency under test;

RBW: 100 kHz;

VBW: 300 kHz;

Detector mode: peak;

Span: 1MHz

Max-hold the trace and record the peak value once the trace stabilized.

In many cases, the RF output power limits for licensed digital transmission devices is specified in terms of effective radiated power (ERP) or equivalent isotropic radiated power (EIRP). Typically, ERP is specified when the operating frequency is less than or equal to 1 GHz and EIRP is specified when the operating frequency is greater than 1 GHz. Both are determined by adding the transmit antenna gain to the conducted RF output power with the primary difference between the two being that when determining the ERP, the transmit antenna gain is referenced to a dipole antenna (i.e., dBd) whereas when determining the EIRP, the transmit antenna gain is referenced to an isotropic antenna (dBi).

The relevant equation for determining the ERP or EIRP from the conducted RF output power measured using the guidance provided above is:

$$\text{ERP/EIRP} = \text{PMeas} + \text{GT} - \text{LC}$$

where:

ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as PMeas, typically dBW or dBm);

PMeas = measured transmitter output power or PSD, in dBm or dBW;

GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

$\text{dBd (ERP)} = \text{dBi} - 2.15$

LC = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

5.1.4 Test Result

Please refer to ANNEX A.1.

5.2 Modulation Characteristics

5.2.1 Limit

FCC §2.1047(a) & 74.861(e) (3)

For Voice Modulation Communication Equipment, the frequency response of the audio modulation circuit over a range of 100 to 5000Hz shall be measured.

Any form of modulation may be used. A maximum deviation of ± 75 kHz is permitted when frequency modulation is employed.

5.2.2 Test Setup

See section 4.3.4 (Diagram 4) for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.2.3 Test Procedure

Modulation Limit

- (i) Configure the EUT as shown in next figure, adjust the audio input for 60% of rated system deviation at 1KHz using this level as a reference (0dB) and vary the input level from -20 to $+20$ dB. Record the frequency deviation obtained as a function of the input level.
- (ii) Repeat step (i) with input frequency changing to 100, 500, 2500 and 10000 Hz in sequence.

Audio Frequency Response

- (i) Configure the EUT as shown in next figure.
- (ii) Adjust the audio input for 20% of rated system deviation at 1 KHz using this level as a reference (0 dB).
- (iii) Vary the Audio frequency from 100 Hz to 30 KHz and record the frequency deviation.
- (iv) Audio Frequency Response = $20\log_{10}$ (Deviation of test frequency/Deviation of 1 KHz reference).

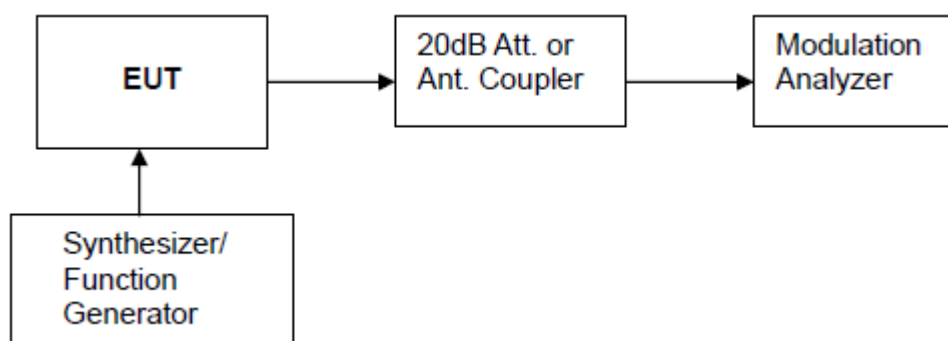


Figure: Modulation Characteristic Measurement Configuration

5.2.4 Test Result

Please refer to ANNEX A.2.

5.3 Emission Bandwidth and Emission Mask

5.3.1 Limit

FCC §74.861(e) (5) (6)

The operating bandwidth shall not exceed 200 kHz.

The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

- (i) On any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth : at least 25 dB;
- (ii) On any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth : at least 35 dB;
- (iii) On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth : at least $43+10\log(\text{mean output power in watts})$ dB;

5.3.2 Test Setup

See section 4.3.1 (Diagram 1) for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.3.3 Test Procedure

The transmitter shall be operated at its maximum carrier power measured under normal test condition. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used given that a peak or peak hold may produce a wider bandwidth than actual.

The trace data points are recovered and directly summed in linear terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points. This frequency is recorded. The span between two recorded frequencies is the occupied bandwidth.

5.3.4 Test Result

Please refer to ANNEX A.2.

5.4 Spurious Emissions at Antenna Terminals

5.4.1 Limit

FCC §74.861(e) (6) (iii)

On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least $43+10\log$ (mean output power in watts) dB;

5.4.2 Test Setup

See section 4.3.2 (Diagram 2) for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.4.3 Test Procedure

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log(P)$ dB. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

5.4.4 Test Result

Please refer to ANNEX A.5.

5.5 Field Strength of Spurious Radiation

5.5.1 Limit

FCC §2.1055(a)(1) & 2.1055(d)(2) & 74.861(e) (6) (iii)

The frequency stability shall be measured with variation of ambient temperature from -30°C to $+50^{\circ}\text{C}$ centigrade.

For hand carried battery powered equipment, the frequency stability shall be measured with reducing primary supply voltage to the battery operating end point, which is specified by the manufacture.

On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least $43+10\log$ (mean output power in watts) dB;

5.5.2 Test Setup

See section 4.3.2, 4.3.3 (Diagram 2, 3) for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.5.3 Test Procedure

On a test site, the EUT shall be placed at 150cm height on a turn table, and in the position close to normal use as declared by the applicant.

2. The test antenna shall be oriented initially for vertical polarization located 3 m from EUT to correspond to the fundamental frequency of the transmitter.
3. The output of the test antenna shall be connected to the measuring receiver and the peak detector is used for the measurement.
4. During the measurement of the EUT, the resolution bandwidth was to 1 MHz and the average bandwidth was set to 1 MHz.
5. The transmitter shall be switched on; the measuring receiver shall be tuned to the frequency of the transmitter under test.
6. The test antenna shall be raised and lowered through the specified range of height until the maximum signal level is detected by the measuring receiver.
7. The transmitter shall be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
8. The test antenna shall be raised and lowered again through the specified range of height until the maximum signal level is detected by the measuring receiver.
9. The maximum signal level detected by the measuring receiver shall be noted.

5.5.4 Test Result

Please refer to ANNEX A.6.

5.6 Frequency Stability

5.6.1 Limit

FCC §74.861(e) (4)

The frequency tolerance of the transmitter shall be 0.005 percent.

5.6.2 Test Setup

See section 4.3.1 (Diagram 1) for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.6.3 Test Procedure

FREQUENCY STABILITY VERSUS ENVIRONMENTAL TEMPERATURE

- (i) Setup the configuration for frequencies measurement inside an environment chamber.
- (ii) Turn on EUT and set SA center frequency to the EUT radiated frequency. Set SA Resolution Bandwidth to 1 KHz and Video Resolution Bandwidth to 1 KHz and Frequency Span to 50KHz. Record this frequency as reference frequency.
- (iii) Set the temperature of chamber to 50°C. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize. While maintaining a constant temperature inside the chamber, turn the EUT on and measure the EUT operating frequency.
- (iv) Repeat step (ii) with a 10°C decreased per stage until the lowest temperature -30°C is measured, record all measured frequencies on each temperature step.

FREQUENCY STABILITY VERSUS INPUT VOLTAGE

- (i) Setup the configuration for frequencies measured at temperature if it is within 15°C to 25°C. Otherwise, an environment chamber set for a temperature of 20°C shall be used.
- (ii) Set SA center frequency to the EUT radiated frequency. Set SA Resolution Bandwidth to 1 KHz and Video Resolution Bandwidth to 1KHz. Record this frequency as reference frequency.
- (iii) For battery operated only device, supply the EUT primary voltage at the operating end point which is specified by manufacturer and record the frequency.

5.6.4 Test Result

Please refer to ANNEX A.7.

ANNEX A TEST RESULT

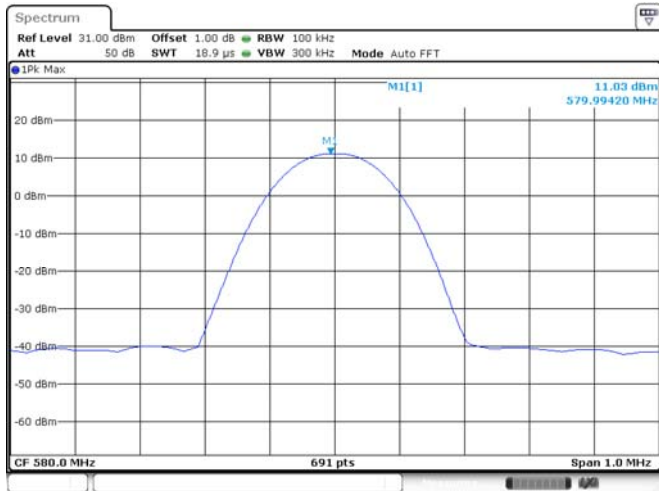
A.1 Output Power

Peak Power Test Data

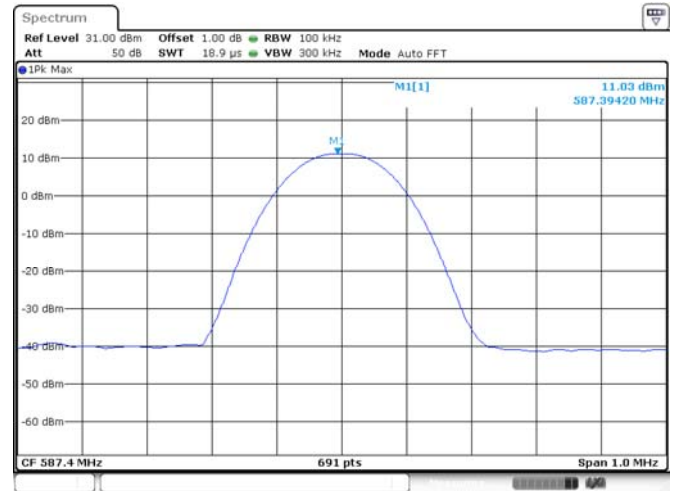
Channel	Output Peak Power dBm	Limit		Verdict
		dBm	mW	
Low	11.03	24	250	Pass
Middle	11.03			Pass
High	11.25			Pass

Test Plots

LOW CHANNEL



MIDDLE CHANNEL



HIGH CHANNEL



A.2 Modulation Characteristics

Test Data of Modulation Limit

Low Channel

Modulation Level (dB)	Peak Freq. Deviation At 100 Hz (KHz)	Peak Freq. Deviation At 500 Hz (KHz)	Peak Freq. Deviation At 2500 Hz (KHz)	Peak Freq. Deviation At 10000 Hz (KHz)	Limit (kHz)	Verdict
-20	10.03	10.44	11.79	12.89	±75	Pass
-15	10.87	11.37	13.12	14.71		
-10	11.92	12.57	14.92	17.04		
-5	12.35	14.22	17.35	20.15		
0	15.30	16.39	20.57	24.25		
+5	17.91	19.41	24.89	29.70		
+10	21.33	23.38	30.64	37.11		
+15	22.90	28.70	38.40	46.90		
+20	32.00	35.80	48.70	60.10		

Middle Channel

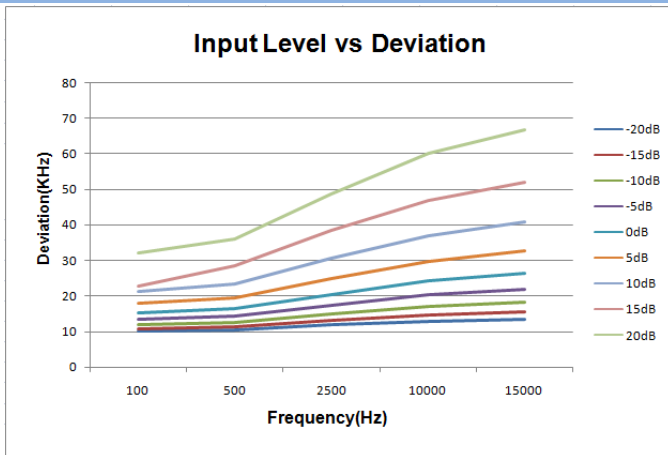
Modulation Level (dB)	Peak Freq. Deviation At 100 Hz (KHz)	Peak Freq. Deviation At 500 Hz (KHz)	Peak Freq. Deviation At 2500 Hz (KHz)	Peak Freq. Deviation At 10000 Hz (KHz)	Limit (kHz)	Verdict
-20	10.34	10.75	12.08	13.24	±75	Pass
-15	11.19	11.70	13.48	15.09		
-10	12.26	12.95	15.35	17.54		
-5	13.75	14.65	17.84	20.73		
0	15.77	16.91	21.15	24.96		
+5	18.40	19.93	25.53	30.60		
+10	22.00	24.00	31.60	38.20		
+15	26.70	29.60	39.50	48.30		
+20	33.00	36.90	50.10	61.90		

High Channel

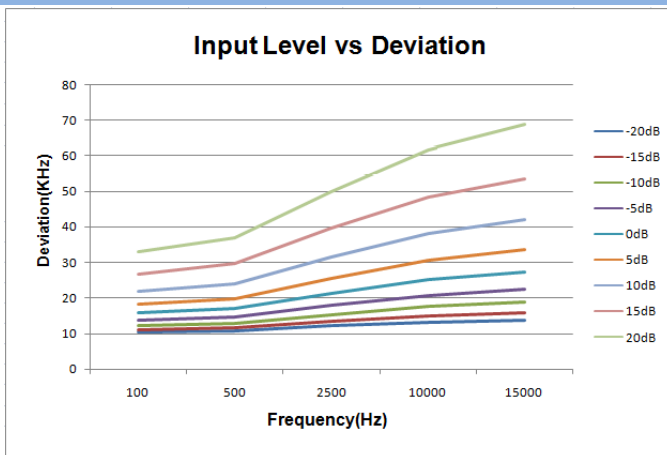
Modulation Level (dB)	Peak Freq. Deviation At 100 Hz (KHz)	Peak Freq. Deviation At 500 Hz (KHz)	Peak Freq. Deviation At 2500 Hz (KHz)	Peak Freq. Deviation At 10000 Hz (KHz)	Limit (kHz)	Verdict
-20	11.35	11.87	13.33	14.55	±75	Pass
-15	12.23	12.90	14.86	16.62		
-10	13.46	14.27	16.95	19.30		
-5	15.09	16.13	19.62	22.82		
0	17.31	18.64	23.34	27.54		
+5	20.30	21.90	28.20	33.80		
+10	24.10	26.50	34.80	42.10		
+15	29.40	32.60	43.50	53.30		
+20	36.50	40.80	55.30	68.30		

Test Plots of Modulation Limit

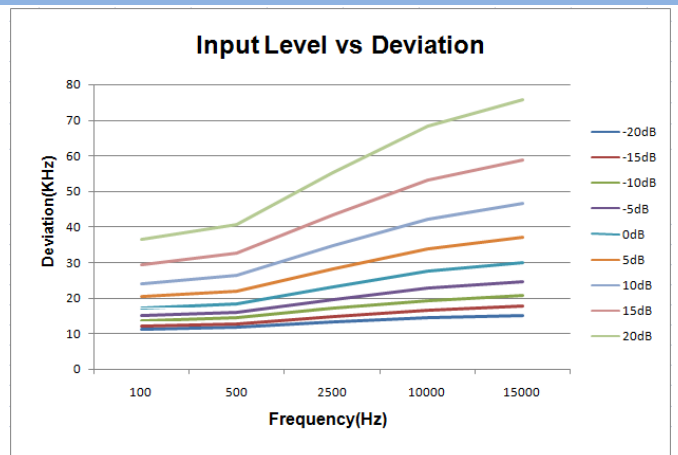
LOW CHANNEL MODULATION LIMIT



MIDDLE CHANNEL MODULATION LIMIT



HIGH CHANNEL MODULATION LIMIT



Test Data of Audio Frequency Response

Low Channel

Frequency (Hz)	Deviation (KHz)	
	+Peak	-Peak
20	8.46	8.51
30	9.43	9.76
40	11.42	11.14
50	12.71	12.88
100	15.01	14.98
200	15.74	15.76
520	16.14	16.76
1020	17.39	17.45
1520	18.82	18.68
2020	19.31	19.52
2520	20.32	20.02
3020	20.83	20.79
3520	21.52	21.57
4020	21.49	21.53
4520	21.65	21.87
5020	22.04	21.99
5520	22.30	22.33
6020	22.51	22.55
6520	22.70	22.73
7020	22.93	22.97
7520	23.15	23.16
8020	23.35	23.40
8520	23.55	23.62
9020	23.77	23.79
9520	24.01	24.02
10020	24.21	27.22
10520	24.45	24.49
11020	24.65	24.68
11520	24.87	24.91
12020	25.09	25.15
12520	25.34	25.36
13020	25.52	25.60
13520	25.76	25.79
14020	25.98	26.05
14520	26.21	26.24
15020	26.43	26.48
15520	26.69	26.71
16020	26.87	26.90
16520	27.09	27.16
17020	27.31	27.36

Frequency (Hz)	Deviation (KHz)	
	+Peak	-Peak
17520	27.53	27.56
18020	27.61	27.74
18520	29.95	27.97
19020	28.16	28.22
19520	28.37	28.40
20000	28.59	28.64

Middle Channel

Frequency (Hz)	Deviation (KHz)	
	+Peak	-Peak
20	9.27	9.25
30	10.75	10.52
40	12.32	12.06
50	13.52	13.32
100	15.53	15.38
200	15.86	15.81
520	16.86	16.94
1020	18.48	18.55
1520	19.68	19.75
2020	20.51	20.53
2520	21.05	21.15
3020	21.47	21.54
3520	21.84	21.90
4020	22.13	22.16
4520	22.39	22.43
5020	22.65	22.64
5520	22.89	22.92
6020	23.12	23.15
6520	23.33	23.38
7020	23.52	23.58
7520	23.78	22.81
8020	23.96	24.03
8520	24.20	24.23
9020	24.48	24.46
9520	24.67	24.71
10020	24.90	27.90
10520	25.09	25.15
11020	25.32	25.39
11520	25.57	25.63
12020	25.78	25.84
12520	26.03	26.09
13020	26.29	24.33

Frequency (Hz)	Deviation (KHz)	
	+Peak	-Peak
13520	26.51	26.54
14020	29.76	26.75
14520	26.96	26.98
15020	27.18	27.23
15520	27.41	27.44
16020	27.61	27.67
16520	27.89	27.91
17020	28.09	28.11
17520	28.25	28.36
18020	28.51	28.53
18520	28.72	28.82
19020	28.99	29.02
19520	29.20	29.23
20000	29.35	29.47

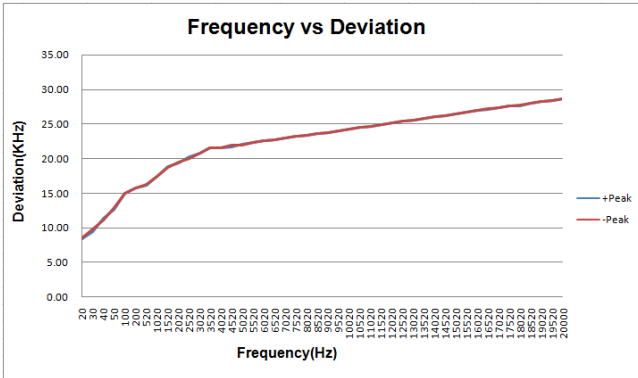
High Channel

Frequency (Hz)	Deviation (KHz)	
	+Peak	-Peak
20	10.15	10.09
30	11.76	11.45
40	13.42	13.03
50	14.89	14.40
100	17.18	16.90
200	17.59	17.54
520	18.67	18.74
1020	20.52	20.44
1520	21.81	21.83
2020	22.70	22.72
2520	23.29	23.31
3020	23.77	23.84
3520	24.15	24.15
4020	24.48	24.52
4520	24.77	24.75
5020	25.03	25.10
5520	25.25	25.31
6020	25.54	25.55
6520	25.79	25.78
7020	26.03	26.08
7520	26.23	26.29
8020	26.43	26.50
8520	26.75	26.76
9020	27.01	27.00

Frequency (Hz)	Deviation (KHz)	
	+Peak	-Peak
9520	27.22	27.28
10020	27.46	27.52
10520	27.72	27.73
11020	27.98	28.02
11520	28.25	28.28
12020	28.48	28.53
12520	28.74	28.77
13020	28.99	29.03
13520	29.24	29.28
14020	29.50	29.51
14520	29.74	29.79
15020	30.00	30.02
15520	30.23	230.34
16020	30.45	30.51
16520	30.72	30.81
17020	30.98	31.03
17520	31.25	31.30
18020	31.47	31.55
18520	31.74	31.78
19020	31.93	32.03
19520	32.24	32.29
20000	32.47	32.49

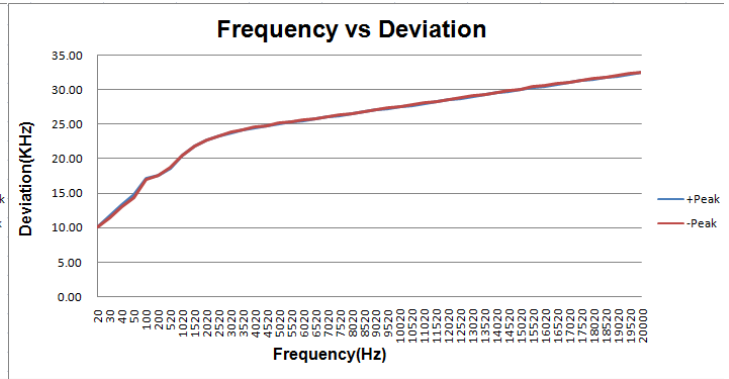
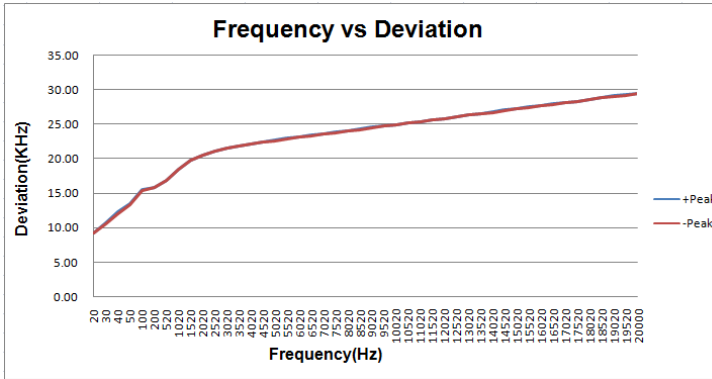
Test Plots of Audio Frequency Response

LOW CHANNEL MODULATION LIMIT



MIDDLE CHANNEL MODULATION LIMIT

HIGH CHANNEL MODULATION LIMIT



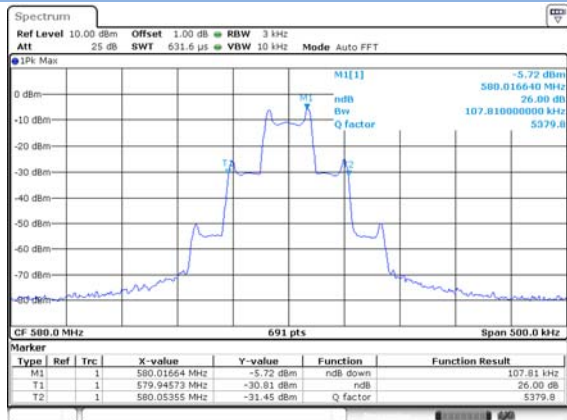
A.3 Emission Bandwidth and Emission Mask

Test Data

Channel	26 dB Bandwidth (kHz)	99% Bandwidth (kHz)	Limits (kHz)	Verdict
Low Channel	107.81	72.36	<200	PASS
Middle Channel	109.26	75.98	<200	PASS
High Channel	115.05	89.73	<200	PASS

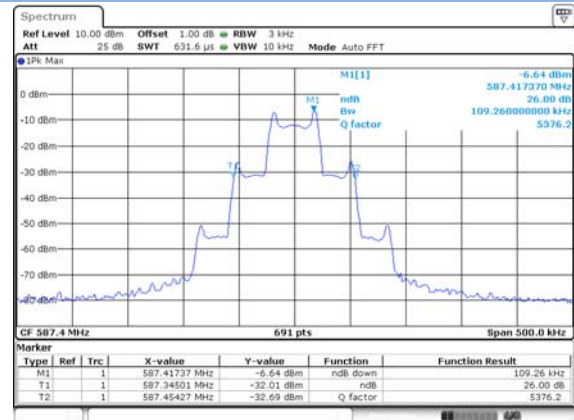
Test plots (26dB Bandwidth)

A.3.1 LOW CHANNEL



Date: 29 JUN 2016 16:47:04

A.3.2 MIDDLE CHANNEL



Date: 29 JUN 2016 16:48:27

A.3.3 HIGH CHANNEL



Date: 29 JUN 2016 16:52:40

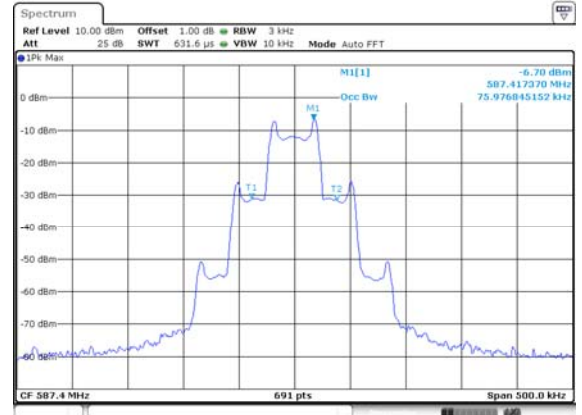
Test plots (99% Bandwidth)

A.3.4 LOW CHANNEL



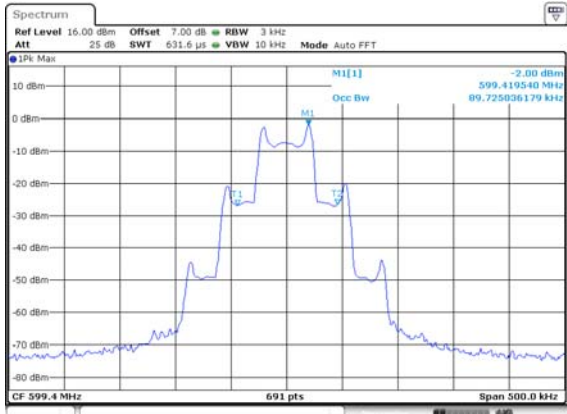
Date: 29 JUN 2016 16:46:21

A.3.5 MIDDLE CHANNEL



Date: 29 JUN 2016 16:48:46

A.3.6 HIGH CHANNEL

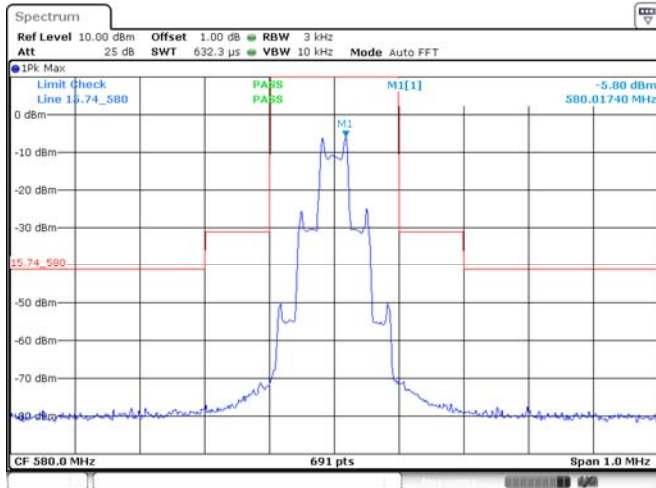


Date: 29 JUN 2016 16:53:29

Test data of Mask

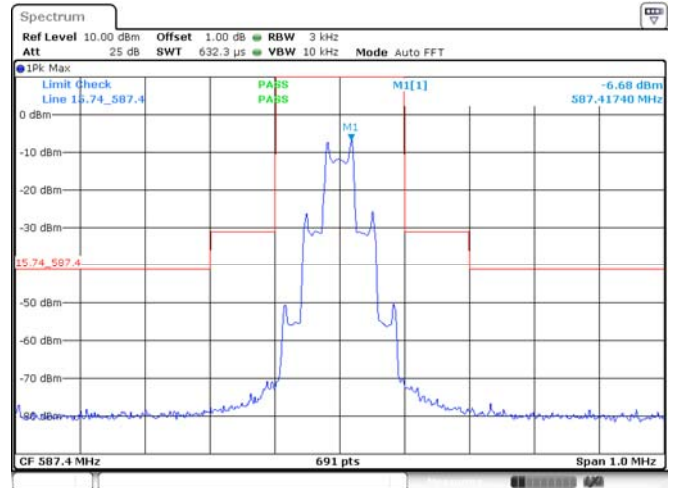
Channel	Refer to Plot	Verdict
Low Channel	A.3.7	Pass
Middle Channel	A.3.8	Pass
High Channel	A.3.9	Pass

A.3.7 LOW CHANNEL



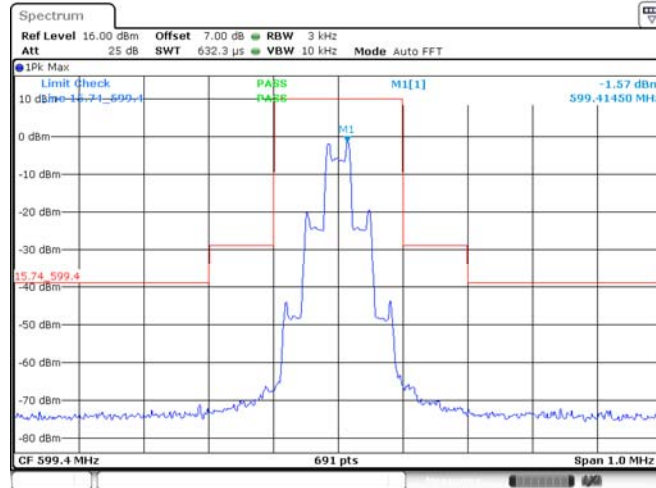
Date: 29 JUN 2016 16:47:38

A.3.8 MIDDLE CHANNEL



Date: 29 JUN 2016 16:50:16

A.3.9 HIGH CHANNEL

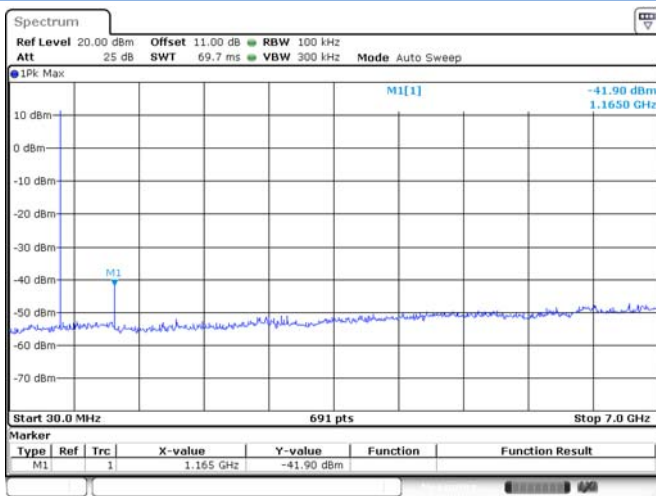


Date: 29 JUN 2016 16:43:09

A.4 Spurious Emissions at Antenna Terminals

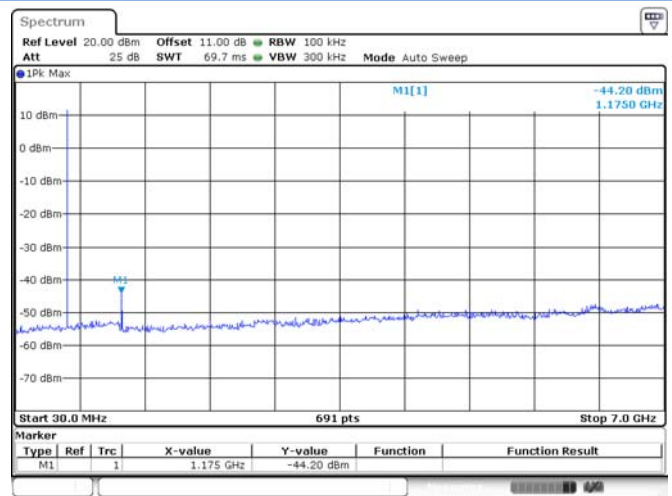
Test Channel	Max Spurious Emission (GHz)	Value(dBm)	Limits (dBm)	Verdict
Low Channel	1.165	-41.90	-13	Pass
Middle Channel	1.175	-44.20	-13	Pass
High Channel	1.195	-47.26	-13	Pass

LOW CHANNEL 30 MHz -7 GHz



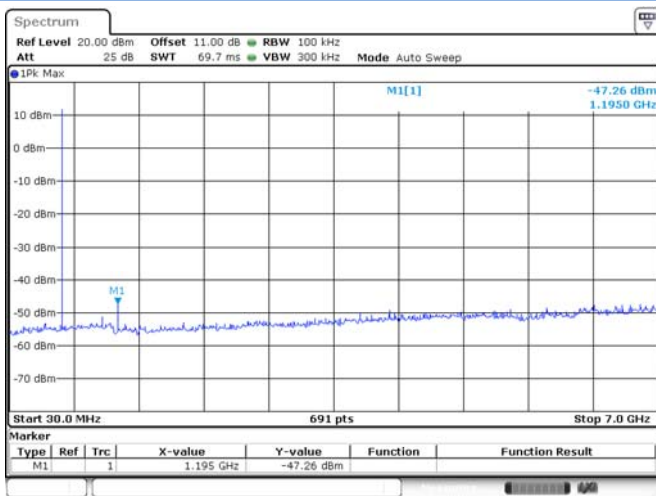
Date: 13 JUN 2016 15:13:09

MIDDLE CHANNEL 30 MHz -7 GHz



Date: 13 JUN 2016 15:11:36

High CHANNEL 30 MHz -7 GHz



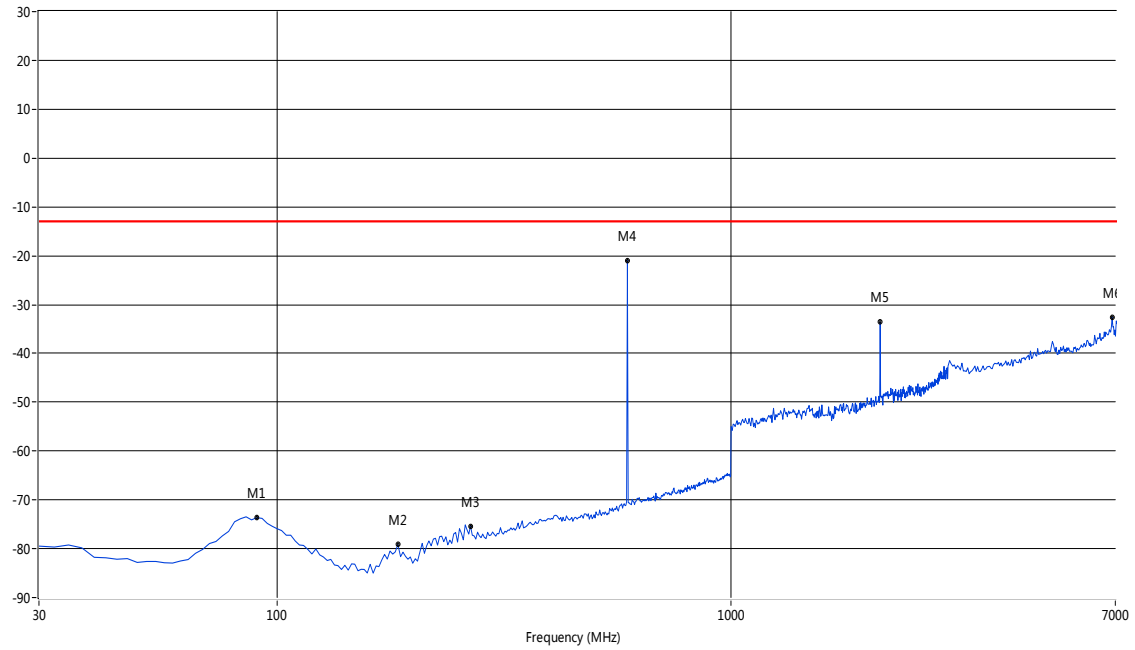
Date: 13 JUN 2016 15:12:25

A.5 Field Strength of Spurious Radiation

Note 1: The symbol of "--" in the table which means not application.

Low Channel 30 MHz to 7 GHz, ANT V

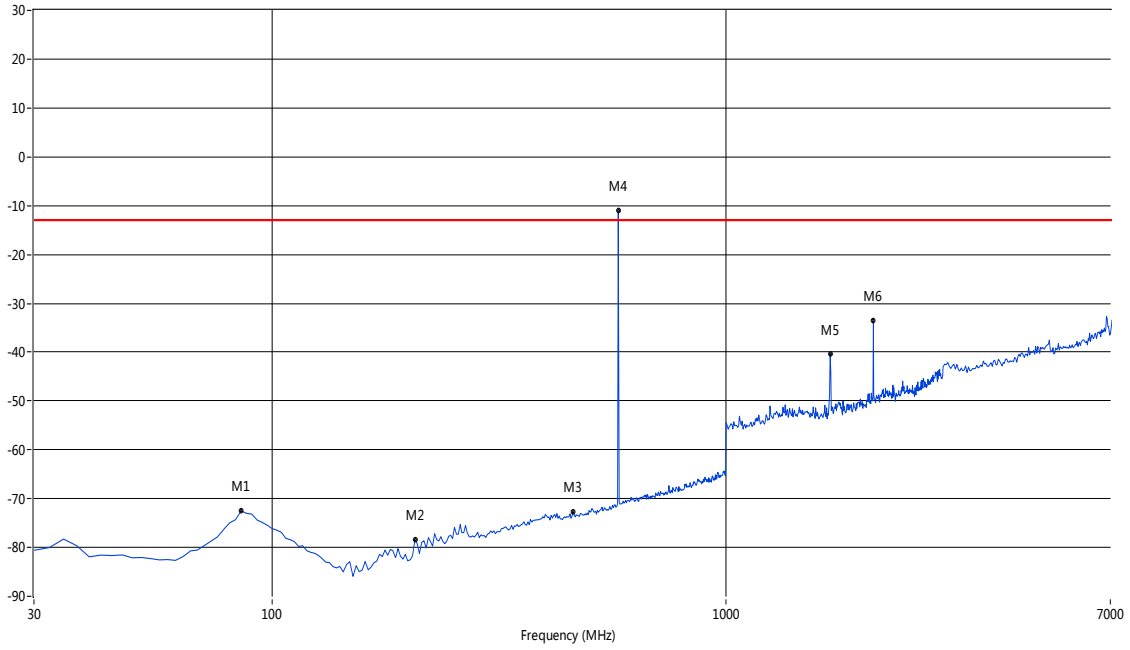
RSE Test case_FCC_FCC PART 74



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
90.47	-73.65	-2.24	-13.0	60.65	342.00	Vertical	Vertical	Pass
184.81	-79.16	-11.71	-13.0	66.16	20.00	Vertical	Vertical	Pass
267.06	-75.36	-7.87	-13.0	62.36	272.00	Vertical	Vertical	Pass
580.20	-21.01	0.33	-13.0	8.01	108.00	Vertical	Vertical	N/A
2127.18	-33.58	11.61	-13.0	20.58	120.00	Vertical	Vertical	Pass
6890.27	-32.62	32.92	-13.0	19.62	28.00	Vertical	Vertical	Pass

Low Channel 30 MHz to 7 GHz, ANT H

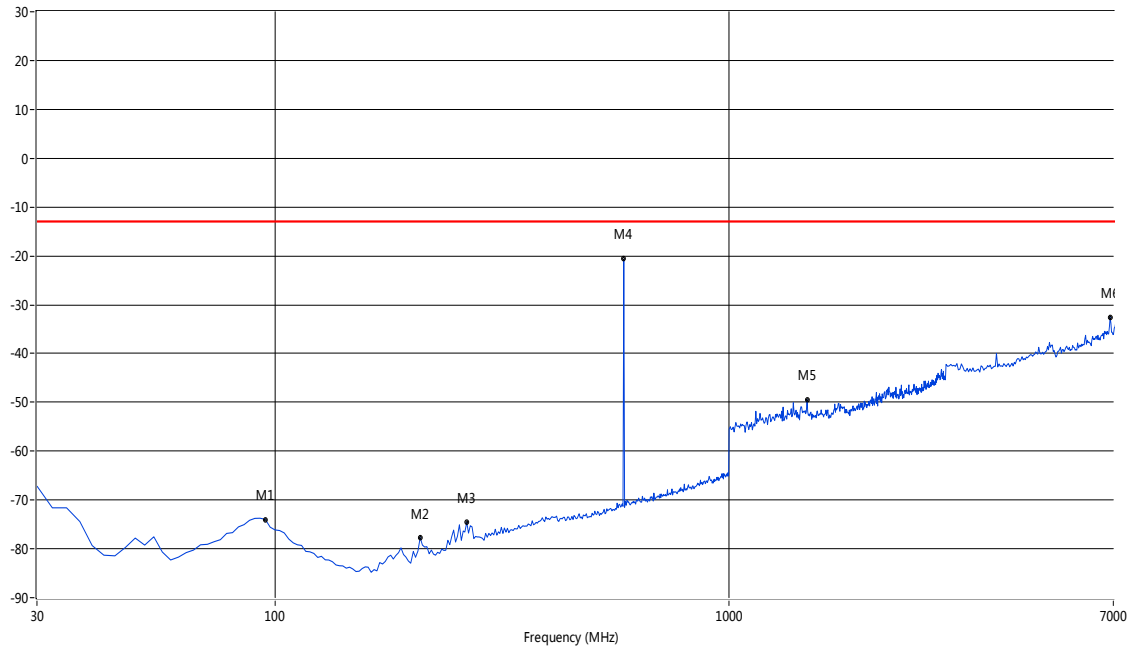
RSE Test case_FCC_FCC PART 74



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
85.64	-72.54	-3.64	-13.0	59.54	152.00	Horizontal	Vertical	Pass
206.58	-78.43	-11.87	-13.0	65.43	258.00	Horizontal	Vertical	Pass
460.57	-72.72	-2.52	-13.0	59.72	91.00	Horizontal	Vertical	Pass
580.10	-11.08	0.15	-13.0	-1.92	153.00	Horizontal	Vertical	Fail
1693.27	-40.35	9.45	-13.0	27.35	102.00	Horizontal	Vertical	Pass
2107.23	-33.63	11.54	-13.0	20.63	354.00	Horizontal	Vertical	Pass

Middle Channel 30 MHz to 7 GHz, ANT V

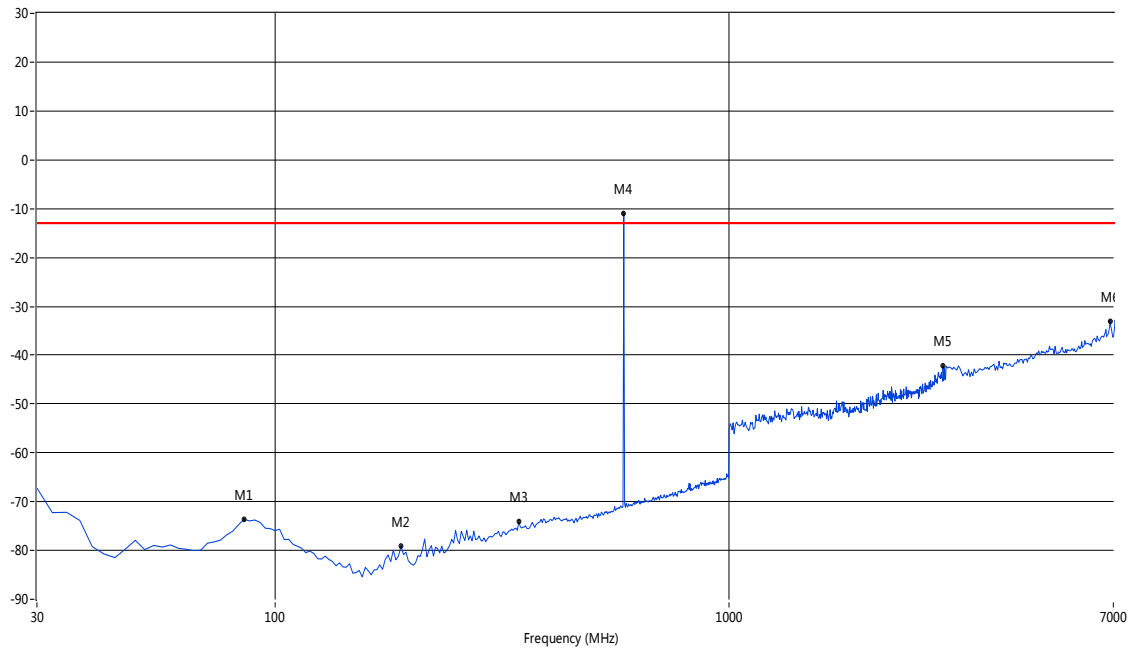
RSE Test case_FCC_FCC PART 74



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
95.31	-73.98	-3.46	-13.0	60.98	84.00	Vertical	Vertical	Pass
209.00	-77.70	-11.68	-13.0	64.70	90.00	Vertical	Vertical	Pass
264.64	-74.61	-7.97	-13.0	61.61	141.00	Vertical	Vertical	Pass
587.36	-20.66	0.28	-13.0	7.66	227.00	Vertical	Vertical	Pass
1483.79	-49.47	9.25	-13.0	36.47	155.00	Vertical	Vertical	Pass
6890.27	-32.59	32.92	-13.0	19.59	244.00	Vertical	Vertical	Pass

Middle Channel 30 MHz to 7 GHz, ANT H

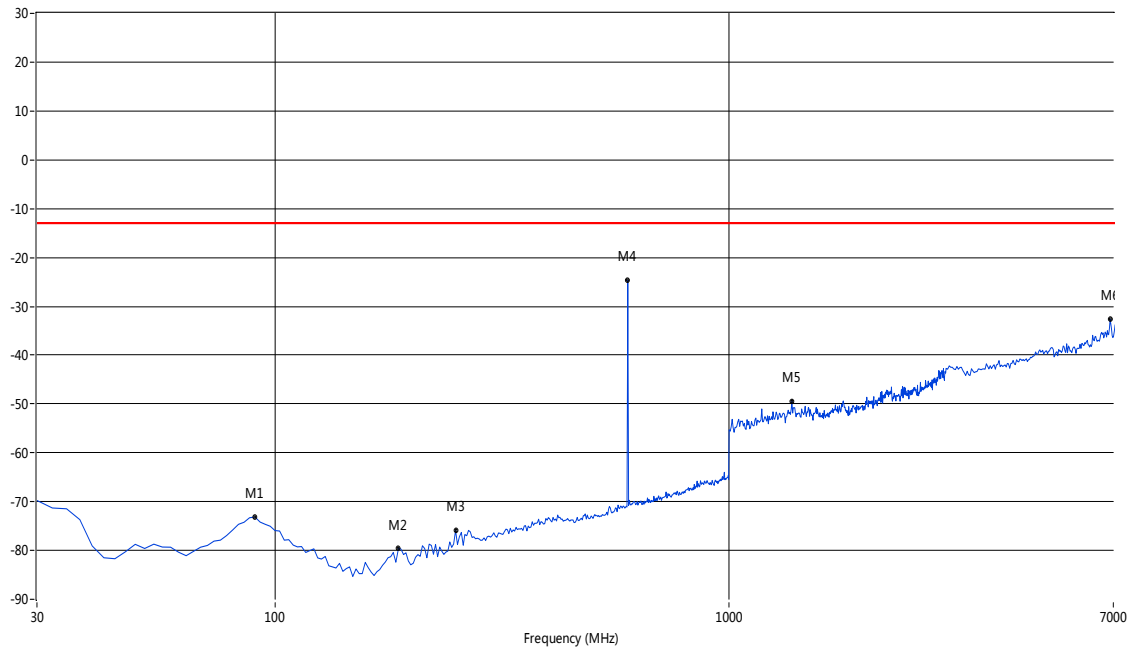
RSE Test case_FCC_FCC PART 74



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
85.64	-73.61	-3.64	-13.0	60.61	130.00	Horizontal	Vertical	Pass
189.65	-79.11	-11.71	-13.0	66.11	81.00	Horizontal	Vertical	Pass
344.46	-74.14	-4.61	-13.0	61.14	338.00	Horizontal	Vertical	Pass
587.36	-10.92	0.28	-13.0	-2.08	12.00	Horizontal	Vertical	Fail
2955.11	-42.18	15.93	-13.0	29.18	248.00	Horizontal	Vertical	Pass
6890.27	-33.09	32.92	-13.0	20.09	342.00	Horizontal	Vertical	Pass

High Channel 30 MHz to 7 GHz, ANT V

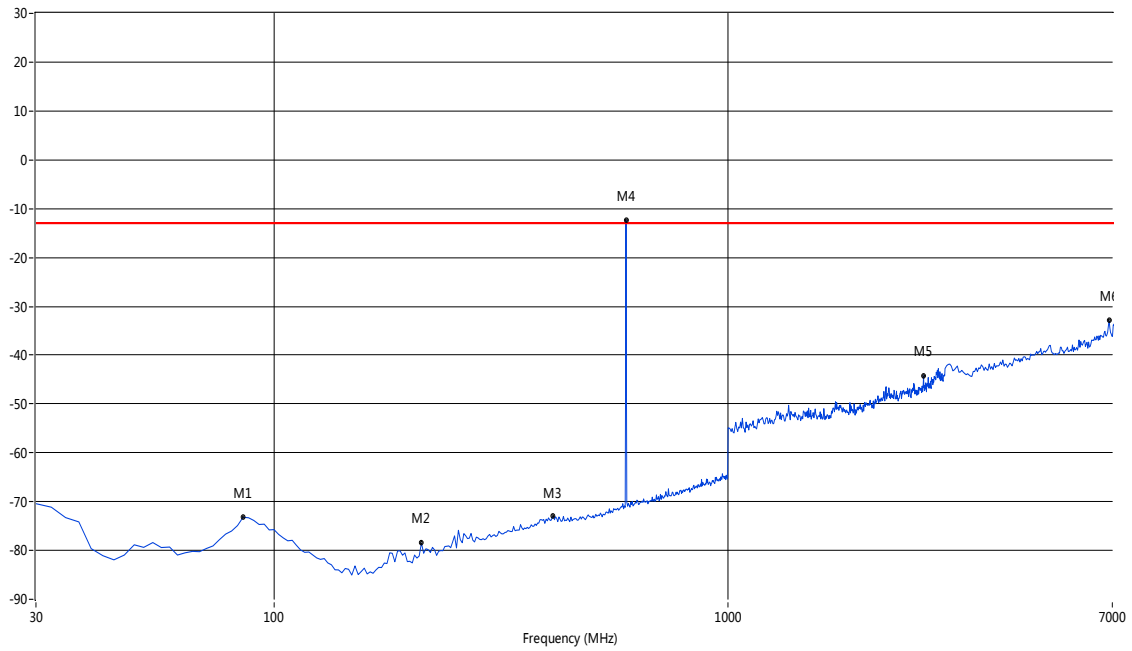
RSE Test case_FCC_FCC PART 74



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
90.47	-73.16	-2.24	-13.0	60.16	306.00	Vertical	Vertical	Pass
187.23	-79.50	-11.74	-13.0	66.50	230.00	Vertical	Vertical	Pass
250.12	-75.96	-8.89	-13.0	62.96	23.00	Vertical	Vertical	Pass
599.45	-24.66	0.60	-13.0	11.66	259.00	Vertical	Vertical	Pass
1374.07	-49.49	9.13	-13.0	36.49	264.00	Vertical	Vertical	Pass
6890.27	-32.64	32.92	-13.0	19.64	354.00	Vertical	Vertical	Pass

High Channel 30 MHz to 7 GHz, ANT H

RSE Test case_FCC_FCC PART 74



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
85.64	-73.22	-3.64	-13.0	60.22	314.00	Horizontal	Vertical	Pass
211.42	-78.50	-11.66	-13.0	65.50	210.00	Horizontal	Vertical	Pass
412.19	-72.96	-2.47	-13.0	59.96	157.00	Horizontal	Vertical	Pass
599.03	-12.30	0.56	-13.0	-0.70	127.00	Horizontal	Vertical	Fail
2690.77	-44.24	14.31	-13.0	31.24	171.00	Horizontal	Vertical	Pass
6890.27	-32.95	32.92	-13.0	19.95	81.00	Horizontal	Vertical	Pass

A.6 Frequency Stability

Voltage vs. Frequency Stability (LOW CHANNEL)

Test Conditions		Test Frequency (MHz)	Measurement Frequency (MHz)	Max. Deviation (Hz)	Max. Deviation (ppm)	Limit (ppm)
Temperature (°C)	Voltage (VDC)					
20	3.3	580	580.025313	25313	43.64	50
	3.0	580	580.003878	3878	6.69	50
	2.0	580	580.021031	21031	36.26	50

Temperature vs. Frequency Stability (LOW CHANNEL)

Test Conditions		Test Frequency (MHz)	Measurement Frequency (MHz)	Max. Deviation (Hz)	Max. Deviation (ppm)	Limit (ppm)
Voltage (VDC)	Temperature (°C)					
3.0	-10	580	579.977163	-22837	-39.37	50
	-5	580	580.021151	21151	36.47	50
	0	580	580.026469	26469	45.64	50
	10	580	580.007784	7784	13.42	50
	20	580	579.976773	-23227	-40.05	50
	30	580	580.028034	28034	48.33	50
	40	580	580.025456	25456	43.89	50
	45	580	580.018699	18699	32.24	50
	55	580	579.996400	-3600	-6.21	50

Voltage vs. Frequency Stability (MIDDLE CHANNEL)

Test Conditions		Test Frequency (MHz)	Measurement Frequency (MHz)	Max. Deviation (Hz)	Max. Deviation (ppm)	Limit (ppm)
Temperature (°C)	Voltage (VDC)					
20	3.3	587.4	587.380657	-19343	-32.93	50
	3.0	587.4	587.415315	15315	26.07	50
	2.0	587.4	587.404527	4527	7.71	50

Temperature vs. Frequency Stability (MIDDLE CHANNEL)

Test Conditions		Test Frequency (MHz)	Measurement Frequency (MHz)	Max. Deviation (Hz)	Max. Deviation (ppm)	Limit (ppm)
Voltage (VDC)	Temperature (°C)					
3.0	-10	587.4	587.398824	-1176	-2.00	50
	-5	587.4	587.404363	4363	7.43	50
	0	587.4	587.400907	907	1.54	50
	10	587.4	587.423674	23674	40.30	50
	20	587.4	587.392666	-7334	-12.49	50
	30	587.4	587.408007	8007	13.63	50
	40	587.4	587.404802	4802	8.18	50
	45	587.4	587.402457	2457	4.18	50
	55	587.4	587.411874	11874	20.21	50

Voltage vs. Frequency Stability (HIGH CHANNEL)

Test Conditions		Test Frequency (MHz)	Measurement Frequency (MHz)	Max. Deviation (Hz)	Max. Deviation (ppm)	Limit (ppm)
Temperature (°C)	Voltage (VDC)					
20	3.3	599.4	599.378879	-21121	-35.24	50
	3.0	599.4	599.417129	17129	28.58	50
	2.0	599.4	599.418413	18413	30.72	50

Temperature vs. Frequency Stability (HIGH CHANNEL)

Test Conditions		Test Frequency (MHz)	Measurement Frequency (MHz)	Max. Deviation (Hz)	Max. Deviation (ppm)	Limit (ppm)
Voltage (VDC)	Temperature (°C)					
3.0	-10	599.4	599.385902	-14098	-23.52	50
	-5	599.4	599.414547	14547	24.27	50
	0	599.4	599.400036	36	0.06	50
	10	599.4	599.41052	10520	17.55	50
	20	599.4	599.402163	2163	3.61	50
	30	599.4	599.424671	24671	41.16	50
	40	599.4	599.390959	-9041	-15.08	50
	45	599.4	599.406676	6676	11.14	50
55	599.4	599.422664	22664	37.81	50	

ANNEX B TEST SETUP PHOTOS

Please refer the document "BL-SZ1650379-AR.PDF".

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document "BL- SZ1650379-AW.PDF".

ANNEX D EUT INTERNAL PHOTOS

Please refer the document "BL- SZ1650379-AI.PDF".

--END OF REPORT--