INDUSTRY CANADA RSS-247

TEST REPORT

For

7”Touchscreen Controller

Model: Galaxy

Trade Name: Zykronix

Issued to

Zykronix Inc. Taiwan Branch
6F-1., No.496, Bannan Rd., Jhonghe Dist, New Taipei City, Taiwan, R.O.C. 23556

Issued by

Compliance Certification Services Inc.
No.11, Wugong 6th Rd., Wugu Dist.,
New Taipei City 24891, Taiwan. (R.O.C.)
http://www.ccsrf.com
service@ccsrf.com
Issued Date: November 17, 2015

Revision History

Rev.		Issue Date		Revisions	Effect Page	Revised By
00		November 17, 2015		Initial Issue	ALL	Kelly Cheng

TABLE OF CONTENTS

1. TEST RESULT CERTIFICATION

Applicant:	Zykronix Inc. Taiwan Branch 6F-1., No.496, Bannan Rd., Jhonghe Dist, New Taipei City, Taiwan, R.O.C. 23556
Manufacturer:	Zykronix Inc. Taiwan Branch 6F-1., No.496, Bannan Rd., Jhonghe Dist, New Taipei City, Taiwan, R.O.C. 23556
Equipment Under Test:	7”Touchscreen Controller
Trade Name:	Zykronix
Model:	Galaxy
Date of Test:	October 15~ November 13, 2015

APPLICABLE STANDARDS	
STANDARD	**TEST RESULT**
Industry Canada RSS-247 Issue 1	No non-compliance noted
Deviation from Applicable Standard	
N/A	

We hereby certify that:

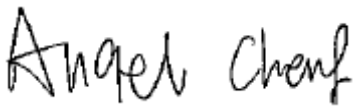
The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10: 2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements set forth in the above standards.

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

Approved by:

Miller Lee
Manager
Compliance Certification Services Inc.

Reviewed by:



Angel Cheng
Section Manager
Compliance Certification Services Inc.

2. EUT DESCRIPTION

Product	7”Touchscreen Controller
Trade Name	Zykronix
Model Number	Galaxy
Model Discrepancy	N/A
Received Date	October 19, 2015
Power Rating	VDC from Power Adapter LIEN ELECTRONICS, INC. / LE-0309BDSP12V I/P: 100-240Vac, 50-60Hz, 1.4A O/P: 12Vdc, 3.5A, Max.42W
Frequency Range	2402MHz ～ 2480MHz
Transmit Power	-1.75 dBm
Modulation Technique	BT 4.0 LE mode, GFSK (1Mbps)
Number of Channels	40 Channels
Antenna Specification	PIFA Antenna / ARISTOTLE RFA-25-G159-70B-70 / 3.93 dBi

Remark:

1. *The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.*

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with IC RSS-247 IC RSS-Gen, and ANSI C63.10: 2013.

This submittal(s) (test report) is intended for IC Certification with Industry Canada RSS-247

3.1 DESCRIPTION OF TEST MODES

The EUT (model: Galaxy) had been tested under operating condition.

Software used to control the EUT for staying in continuous transmitting mode was programmed.

After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz and power line conducted emissions below 30MHz, which worst case was in normal link mode only.

BT 4.0

Tested Channel	Frequency (MHz)
Low	2402
Mid	2440
High	2480

For Radiated Emissions

The field strength of spurious emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis) and laptop mode. The worst emission was found in stand-up position (X axis) and the worst case was recorded.

For Conducted Emissions & Powerline conducted emissions

The field strength of spurious emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis) and laptop mode. The worst emission was found in stand-up position (Z axis) and the worst case was recorded.

4 INSTRUMENT CALIBRATION

4.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

4.2 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

Remark: *Each piece of equipment is scheduled for calibration once a year and Loop Antenna is scheduled for calibration once three years.*

Conducted Emissions Test Site				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Spectrum Analyzer	Agilent	E4446A	US42510252	11/23/2015
Thermostatic/Humidity Chamber	TAICHY	MHG-150LF	930619	10/07/2016
AC Power Source	EXTECH	6205	1140845	N.C.R
DC Power Supply	ABM	8301HD	D011531	N.C.R
Power Meter	Anritsu	ML2495A	1012009	07/07/2016
Power Sensor	Anritsu	MA2411A	0917072	07/07/2016
Spectrum Analyzer	ROHDE&SCHWARZ	FSV40	101073	07/19/2016
Test S/W	EZ-EMC (CCS-3A1RE)			

Wugu 966 Chamber A				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Spectrum Analyzer	Agilent	E4446A	US42510268	01/25/2016
EMI Test Receiver	R&S	ESCI	100064	06/03/2016
Bilog Antenna	Sunol Sciences	JB3	A030105	08/05/2016
Horn Antenna	EMCO	3117	00055165	01/26/2016
Horn Antenna	EMCO	3116	26370	12/25/2015
Turn Table	CCS	CC-T-1F	N/A	N.C.R
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R
Pre-Amplifier	MITEQ	1652-3000	1490939	08/09/2016
Pre-Amplifier	EMC	EMC 01265	4035	06/04/2016
Pre-Amplifier	MITEQ	AMF-6F-260400-40-8P	985646	12/25/2015
Coaxial Cable	Huber+Suhner	102	29212/2	12/25/2015
Coaxial Cable	Huber+Suhner	102	29406/2	12/25/2015
Test S/W	EZ-EMC (CCS-3A1RE)			

Conducted Emission Room #B				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
EMI Test Receiver	R&S	ESCI	101073	09/08/2016
LISN	R&S	ENV216	101054	06/06/2016
LISN	SCHWARZBECK	NSLK 8127	8127-541	11/25/2015
Capacitive Voltage Probe	FCC	F-CVP-1	100185	03/12/2016
Test S/W	CCS-3A1-CE			

NOTE: *N.C.R = No Calibration Request.*

4.3 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
Powerline Conducted Emission	+/- 1.2575
3M Semi Anechoic Chamber / 30M~200M	+/- 4.0138
3M Semi Anechoic Chamber / 200M~1000M	+/- 3.9483
3M Semi Anechoic Chamber / 1G~8G	+/- 2.5975
3M Semi Anechoic Chamber / 8G~18G	+/- 2.6112
3M Semi Anechoic Chamber / 18G~26G	+/- 2.7389
3M Semi Anechoic Chamber / 26G~40G	+/- 2.9683

***Remark**: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.*

5 FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

☐ No.199, Chunghsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.
Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029

☒ No.11, Wugong 6th Rd., Wugu Dist., New Taipei City 24891, Taiwan. (R.O.C.)
Tel: 886-2-2299-9720 / Fax: 886-2-2298-4045

☐ No.81-1, Lane 210, Bade 2nd Rd., Lujhu Township, Taoyuan County 33841, TAIWAN, R.O.C.
Tel: 886-3-324-0332 / Fax: 886-3-324-5235

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10: 2013 and CISPR Publication 22.

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, bucolical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

5.3 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3M Semi Anechoic Chamber (FCC MRA: TW1039) to perform FCC Part 15 measurements	FCC MRA: TW1039
Taiwan	TAF	LP0002, RTTE01, FCC Method-47 CFR Part 15 Subpart C, D, E, RSS-310 IDA TS SRD, AS/NZS 4268, AS/NZS 4771, TS 12.1 & 12,2, ETSI EN 300 440-1, ETSI EN 300 440-2, ETSI EN 300 328, ETSI EN 300 220-1, ETSI EN 300 220-2, ETSI EN 301 893, ETSI EN 301 489-1/3/7/17 FCC OET Bulletin 65 + Supplement C, EN 50360, EN 50361, EN 50371, RSS 102, EN 50383, EN 50385, EN 50392, IEC 62209, CNS 14958-1, CNS 14959 FCC Method –47 CFR Part 15 Subpart B IEC / EN 61000-3-2, IEC / EN 61000-3-3, IEC / EN 61000-4-2/3/4/5/6/8/11	TAF Testing Laboratory 1309
Canada	Industry Canada	3M Semi Anechoic Chamber (IC 2324G-1 / IC 2324G-2) to perform	Canada IC 2324G-1 IC 2324G-2

** No part of this report may be used to claim or imply product endorsement by A2LA or any agency of the US Government.*

6 SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT

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

6.2 SUPPORT EQUIPMENT

No.	Device Type	Brand	Model	Rating
1	Adapter	LIEN ELECTRONICS, INC.	LE-0309BDSP12V	I/P: 100-240Vac, 50-60Hz, 1.4A O/P: 12Vdc, 3.5A, Max.42W

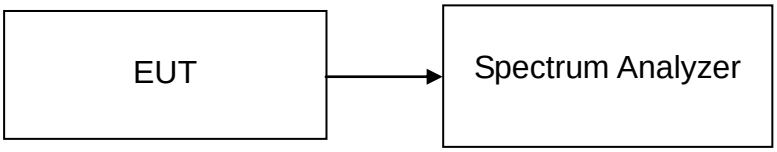
Remark:

1. *All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.*
2. *Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*

7 RSS 247 REQUIREMENTS

7.1 99% BANDWIDTH

Test Configuration



TEST PROCEDURE

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 since a peak or, peak hold.

TEST RESULTS

No non-compliance noted.

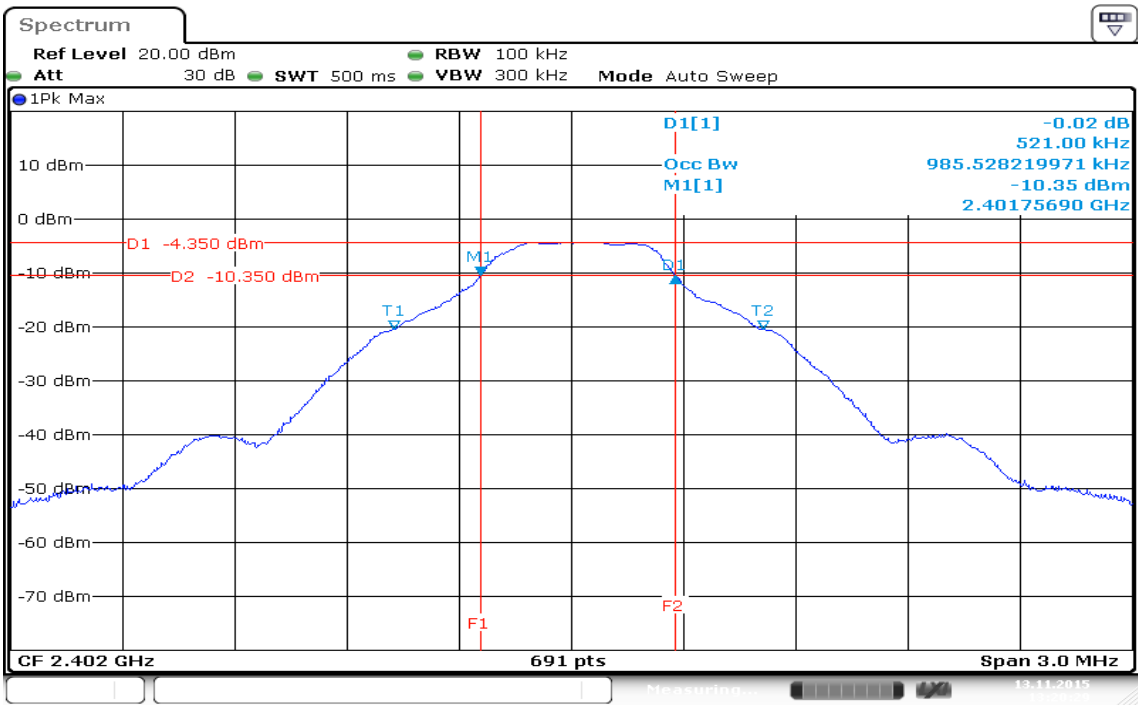
Test Data

For GFSK

Channel	Frequency (MHz)	99% Bandwidth (kHz)
Low	2402	985.528
Mid	2440	981.186
High	2480	981.186

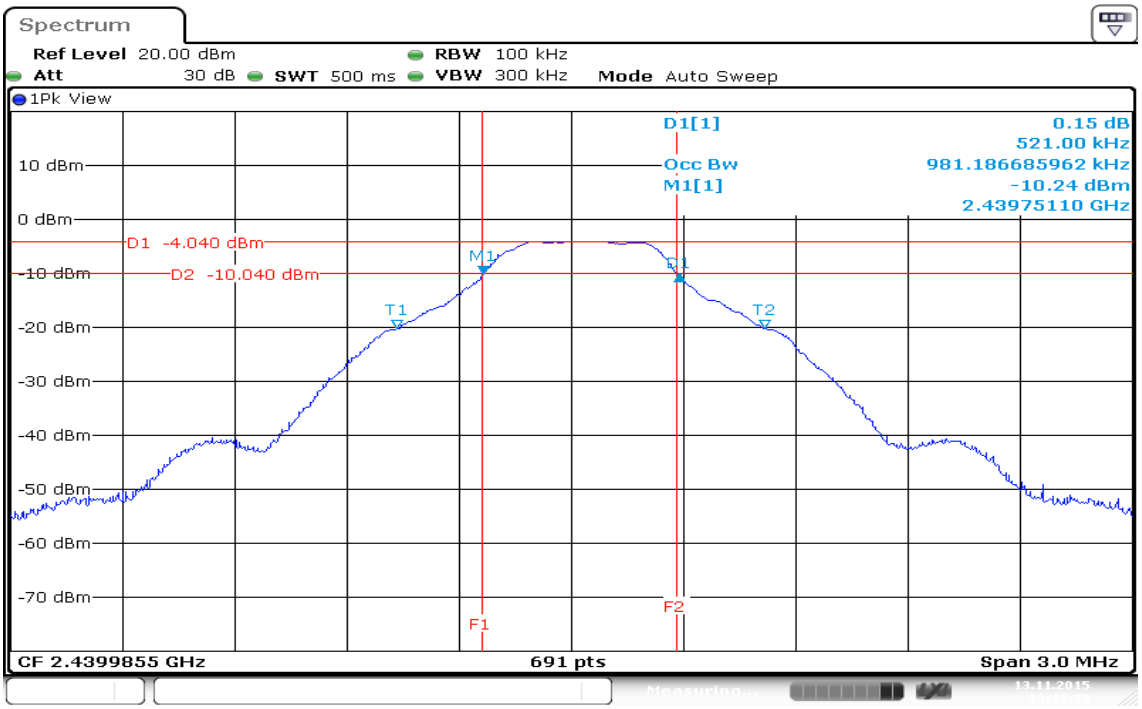
Test Plot

99% Bandwidth (CH Low)



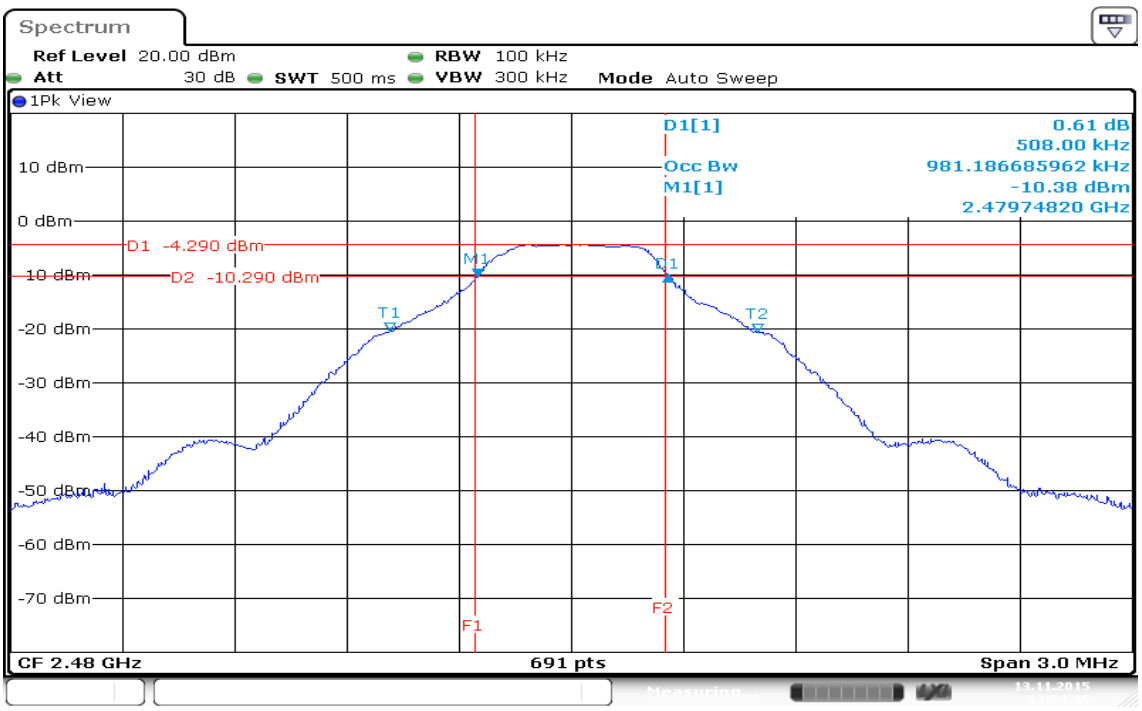
Date: 13.NOV.2015 13:20:29

99% Bandwidth (CH Mid)



Date: 13.NOV.2015 13:45:11

99% Bandwidth (CH High)



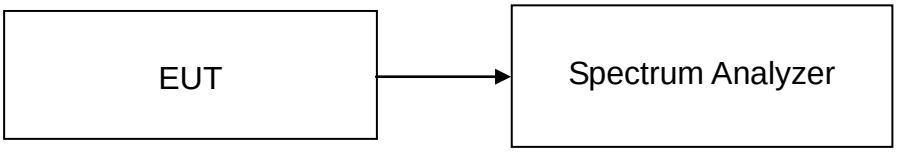
Date: 13.NOV.2015 13:54:55

7.2 6DB BANDWIDTH

LIMIT

According to RSS-247 §A5.2(1), the minimum -6 dB bandwidth shall be at least 500 kHz.

Test Configuration



TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. Set the RBW = 1%-5% of the emission bandwidth, VBW ≥ 3 x RBW, Detector = Peak, Trace mode = max hold, Sweep = auto couple. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6dB relative to the maximum level measured in the fundamental emission.

TEST RESULTS

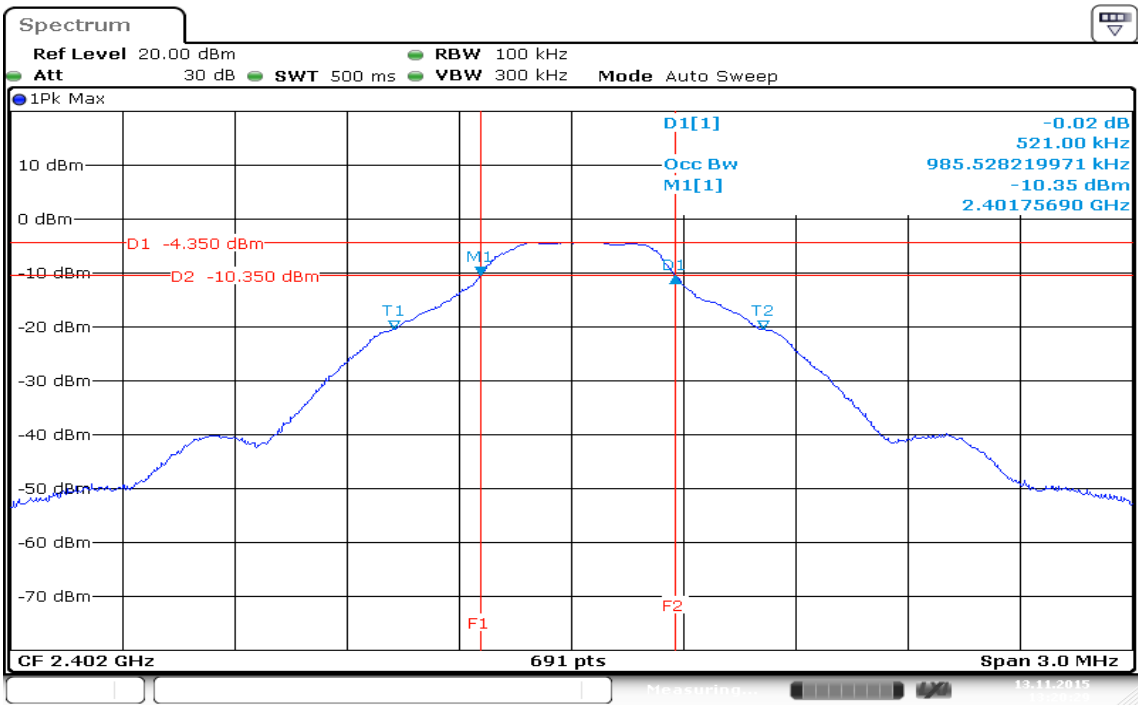
No non-compliance noted

Test Data

Channel	Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2402	521.00	>500	PASS
Mid	2440	521.00		PASS
High	2480	508.00		PASS

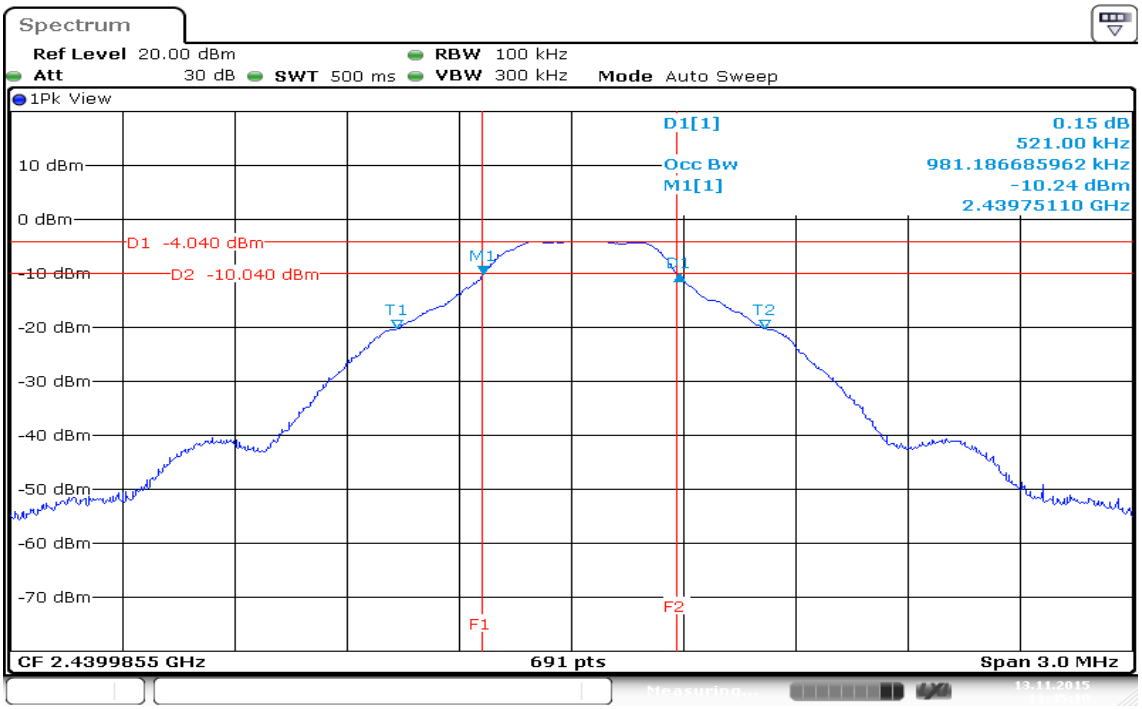
Test Plot

6dB Bandwidth (CH Low)



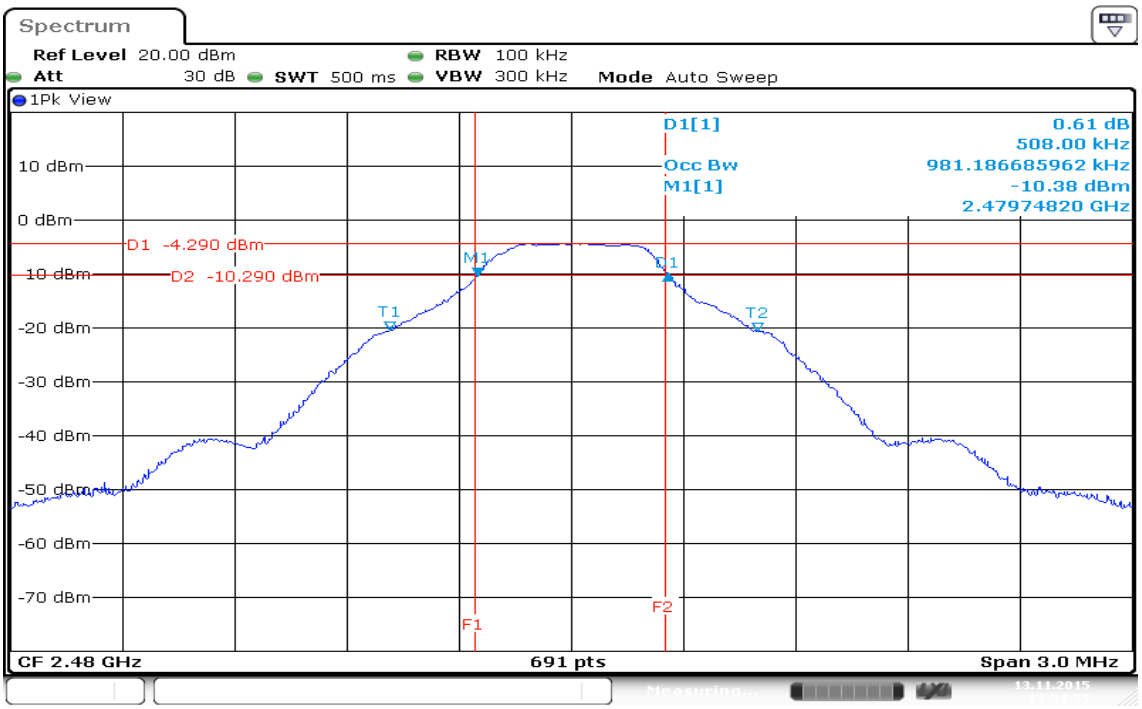
Date: 13.NOV.2015 13:20:29

6dB Bandwidth (CH Mid)



Date: 13.NOV.2015 13:45:11

6dB Bandwidth (CH High)



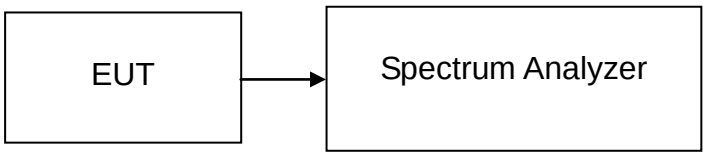
Date: 13.NOV.2015 13:54:55

7.3 PEAK POWER

LIMIT

According to RSS-247 §5.4(4), for systems employing digital modulation techniques operating in the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz, the maximum peak conducted output power shall not exceed 1 W.

Test Configuration



TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. Set the RBW = 1MHz , VBW = 3MHz, Detector = Peak, Trace mode = max hold, Sweep = auto couple. Record the max reading.
Repeat the above procedure until the measurements for all frequencies are completed.

TEST RESULTS

No non-compliance noted

Test Data

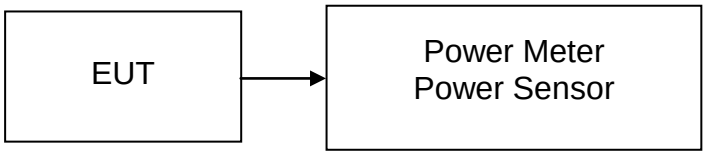
Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Test Result
Low	2402	-1.98	0.0006	1	PASS
Mid	2440	**-1.75**	0.0007		PASS
High	2480	-2.11	0.0006		PASS

7.4 AVERAGE POWER

LIMIT

None; for reporting purposes only.

Test Configuration



TEST PROCEDURE

The transmitter output is connected to the Power Meter. The Power Meter is set to the avg power detection.

TEST RESULTS

No non-compliance noted

Test Data

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	2402	-2.22	0.0006
Mid	2440	-1.98	0.0006
High	2480	-2.34	0.0006

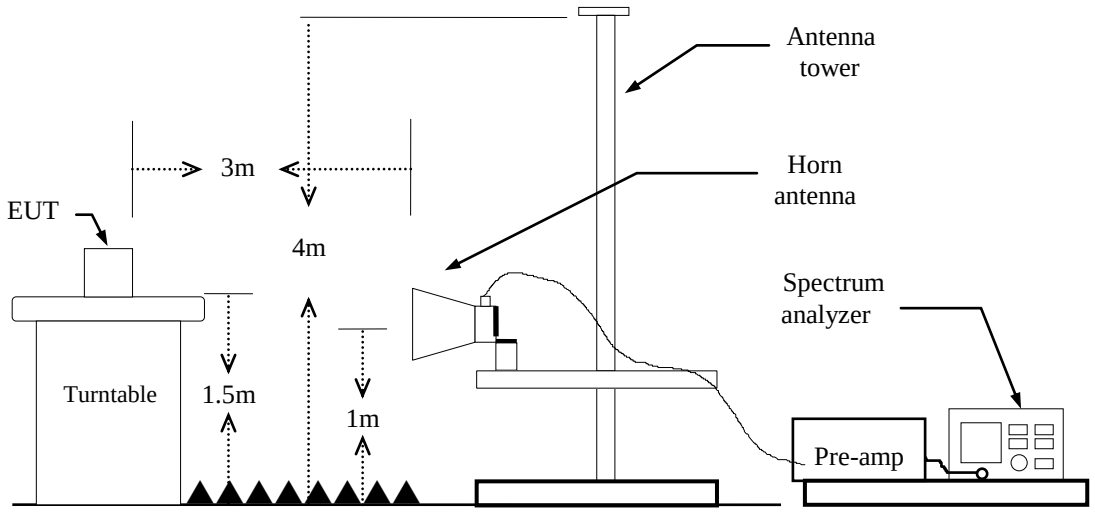
7.5 BAND EDGES MEASUREMENT

LIMIT

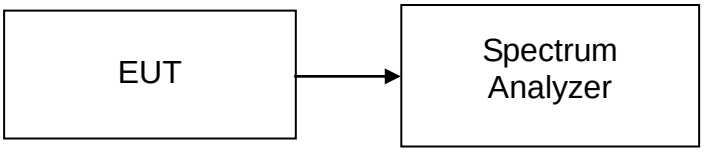
According to RSS-247, in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Tables 2 and 3 is not required. In addition, radiated emissions which fall in the restricted bands of Table 1 must also comply with the radiated emission limits specified in Tables 2 and 3.

Test Configuration

For Radiated



For Conducted



TEST PROCEDURE

For Radiated

1. The EUT is placed on a turntable, which is 1.5m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
   (a) PEAK: RBW=1MHz / VBW=3MHz / Sweep=AUTO
   (b) AVERAGE: RBW=1MHz,
   if duty cycle≧98%, VBW=10Hz.
   if duty cycle<98% VBW=1/T.
   BT4.0=≧98%, VBW=10Hz
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

For Conducted

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

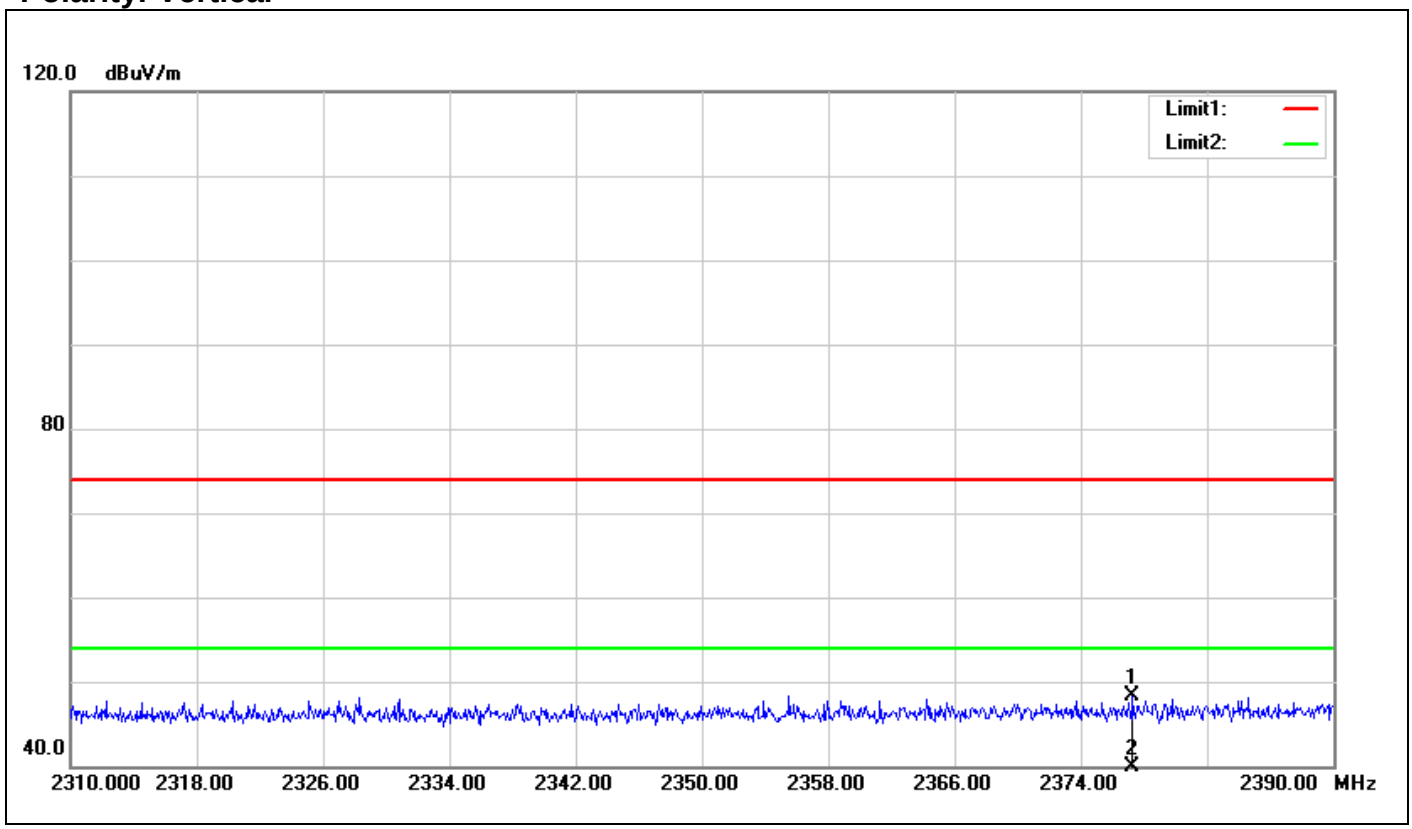
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

TEST RESULTS

Refer to attach spectrum analyzer data chart.

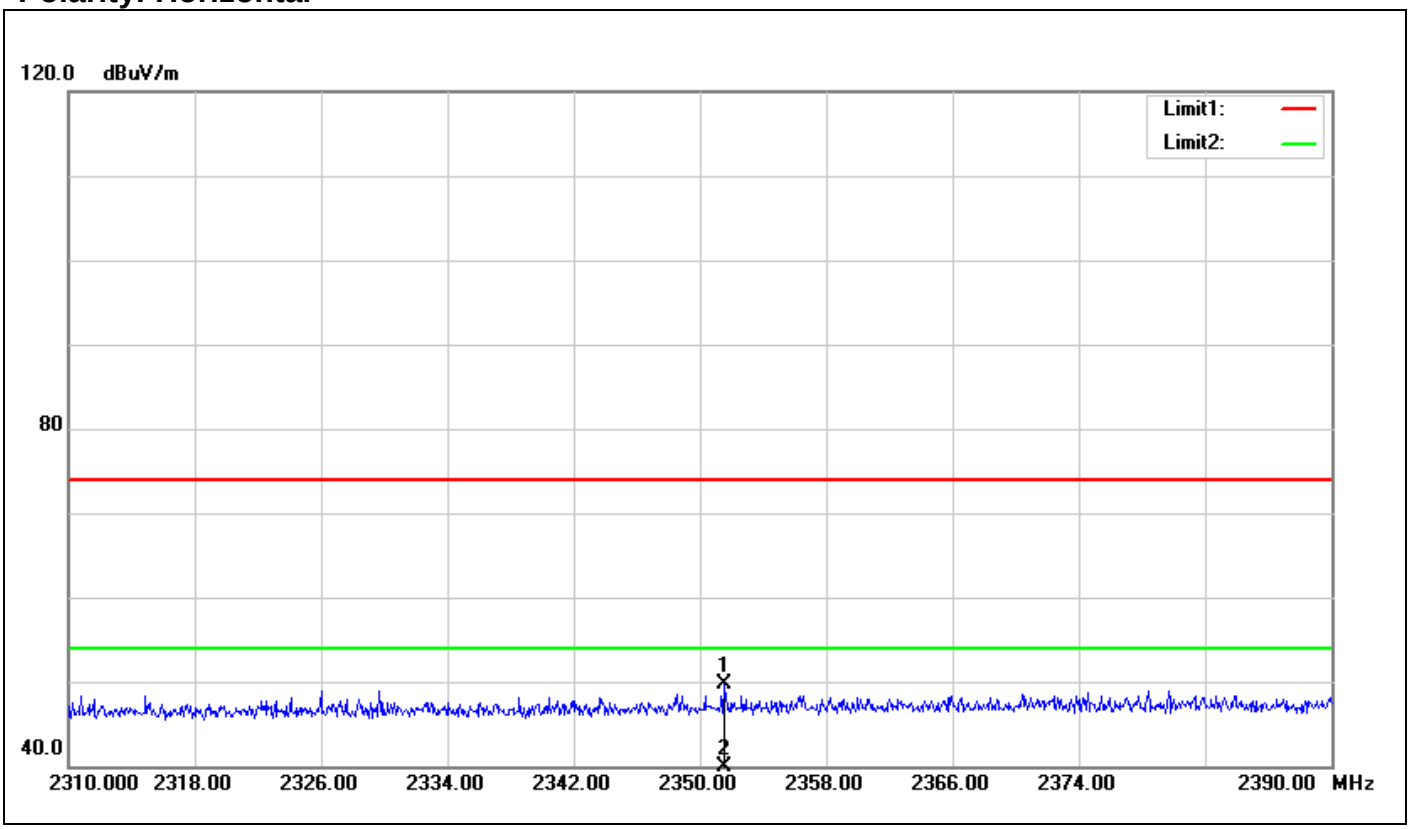
Band Edges (CH Low)

Polarity: Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)	
1	2377.280	51.00	-2.60	48.40	74.00	-25.60	150	241	peak
2	2377.280	37.54	-2.60	34.94	54.00	-19.06	150	241	AVG

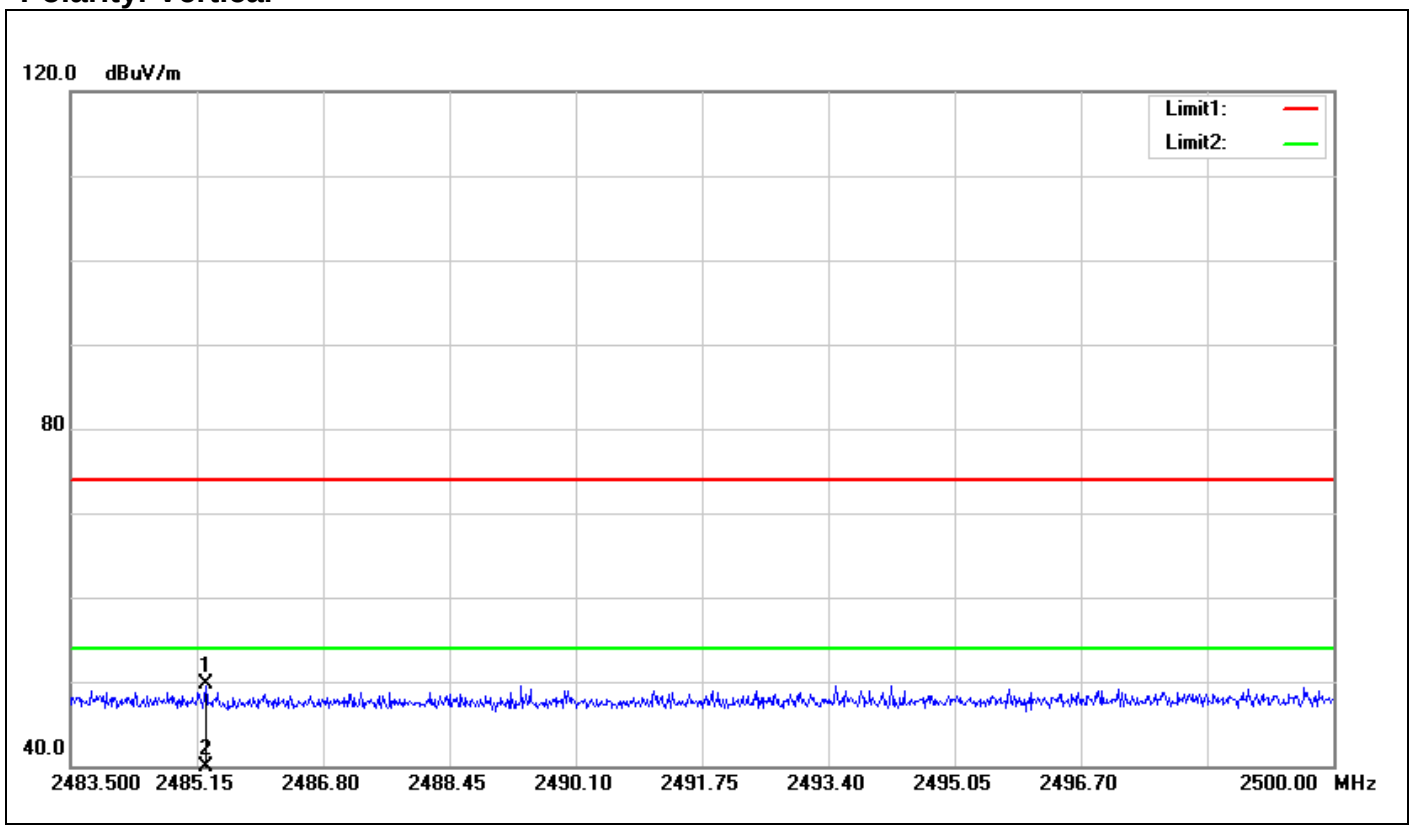
Polarity: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)	
1	2351.520	52.56	-2.80	49.76	74.00	-24.24	150	222	peak
2	2351.520	38.11	-2.80	35.31	54.00	-18.69	150	222	AVG

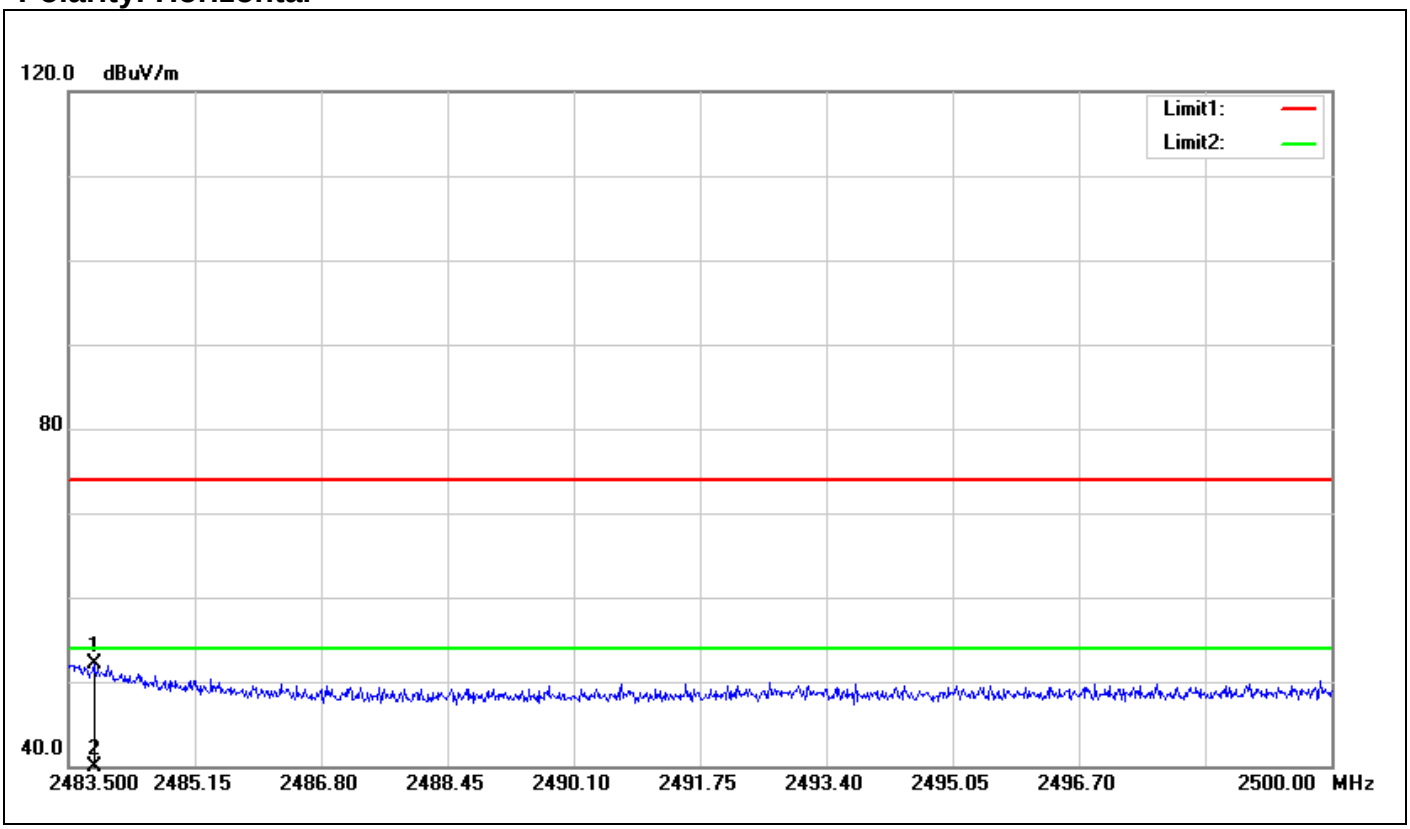
Band Edges (CH High)

Polarity: Vertical



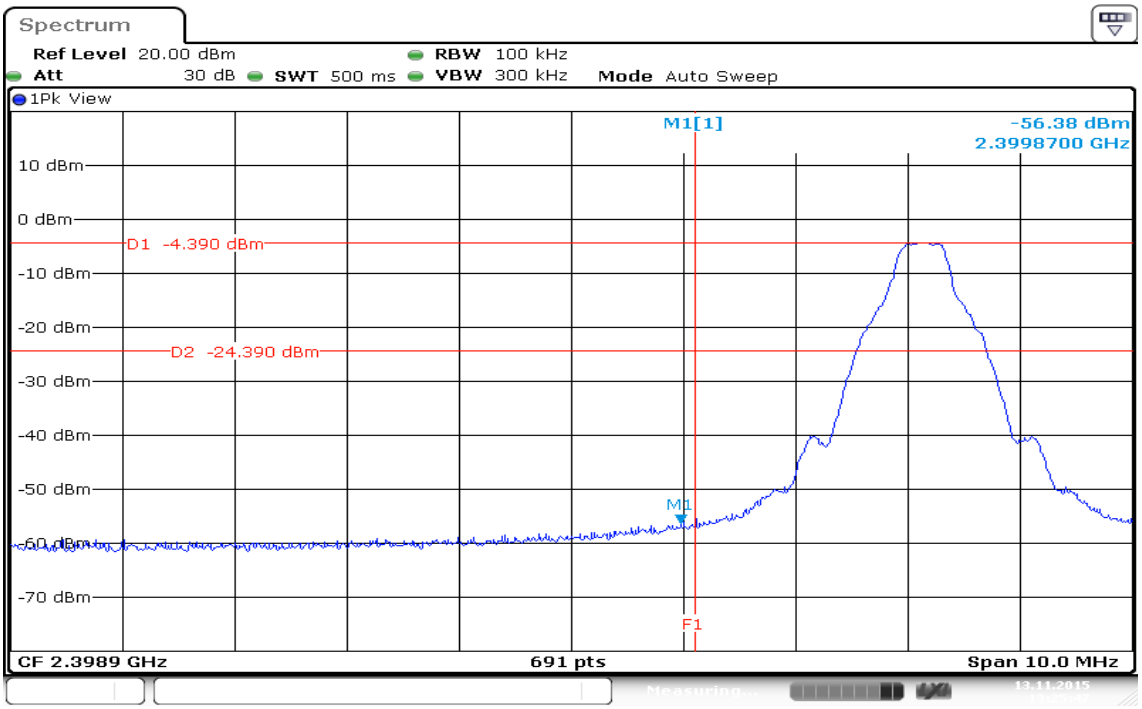
No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)	
1	2485.265	51.58	-1.98	49.60	74.00	-24.40	150	85	peak
2	2485.265	37.64	-1.98	35.66	54.00	-18.34	150	85	AVG

Polarity: Horizontal



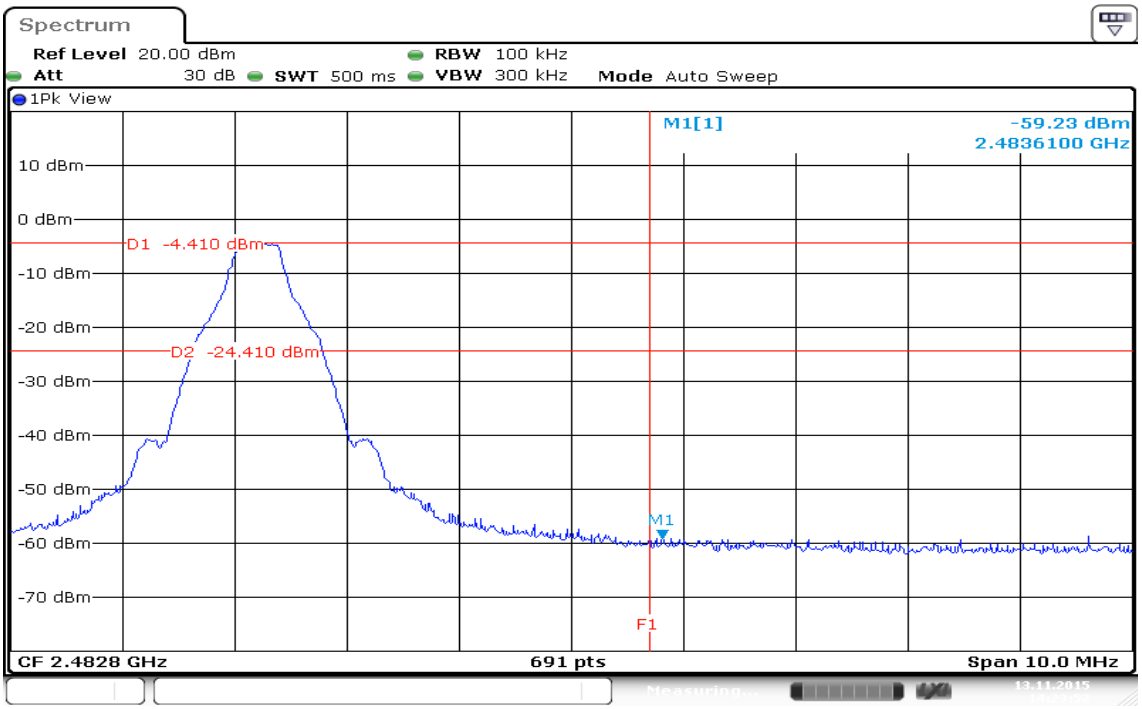
No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)	
1	2483.830	54.04	-1.99	52.05	74.00	-21.95	150	258	peak
2	2483.830	39.38	-1.99	37.39	54.00	-16.61	150	258	AVG

Conducted Band Edges (CH Low)



Date: 13.NOV.2015 13:25:48

Conducted Band Edges (CH High)



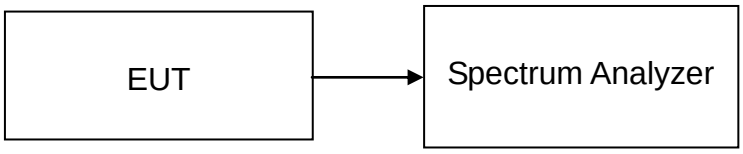
Date: 13.NOV.2015 14:23:53

7.6 PEAK POWER SPECTRAL DENSITY

LIMIT

According to RSS-247, the transmitter power spectral density (into the antenna) shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission or over 1.0 second if the transmission exceeds 1.0-second duration. This power spectral density shall be determined in accordance with the provisions of Section A8.4 below. The same method of determining the conducted output power shall be used to determine the power spectral density.

Test Configuration



TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. Set the RBW = 100 kHz, VBW 300 kHz, span 5-30% greater than EBW, Detector = peak, Trace mode = max hold, Sweep =
auto couple. Scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where BWCF = 10log
(3 kHz/100 kHz = -15.2 dB). Record the maximum reading. Repeat the above procedure until the
measurements for all frequencies are completed.

TEST RESULTS

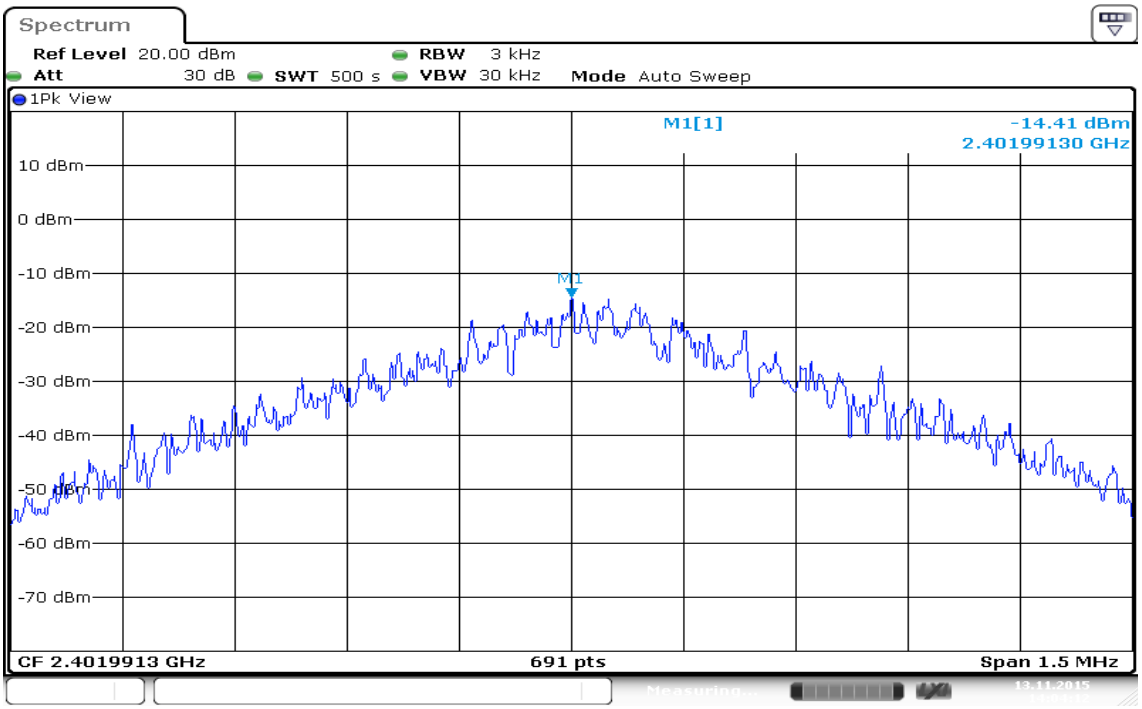
No non-compliance noted

Test Data

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2402	-14.41	8	PASS
Mid	2440	-13.99		PASS
High	2480	-14.81		PASS

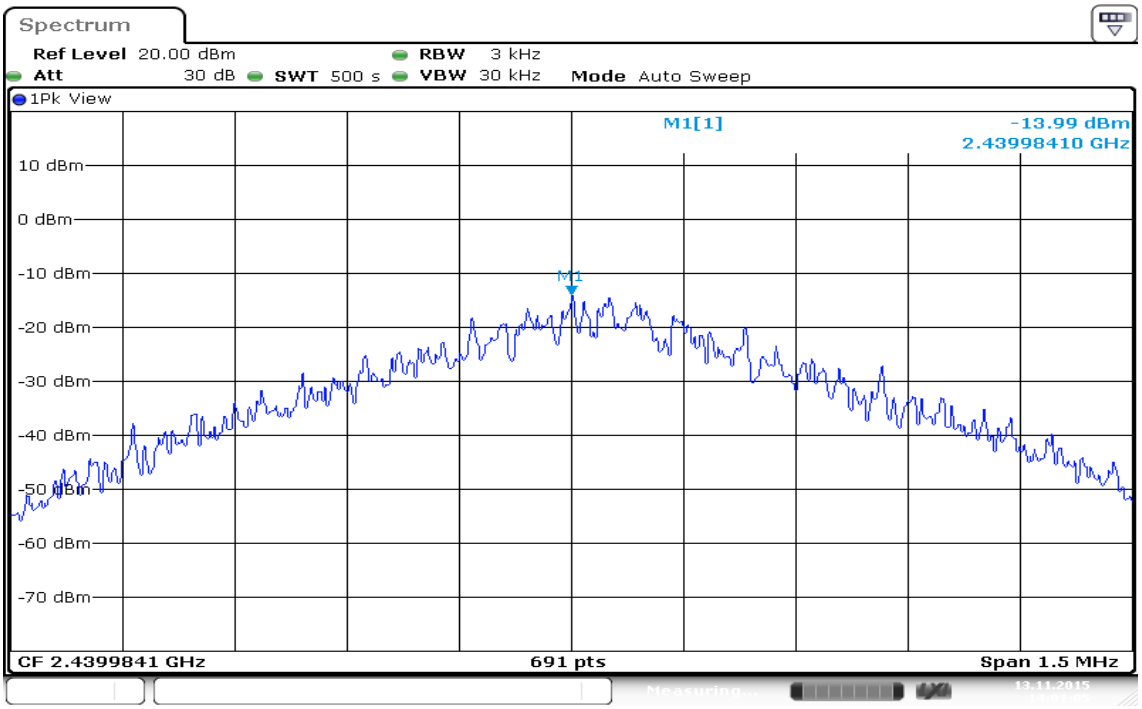
Test Plot

PPSD (CH Low)



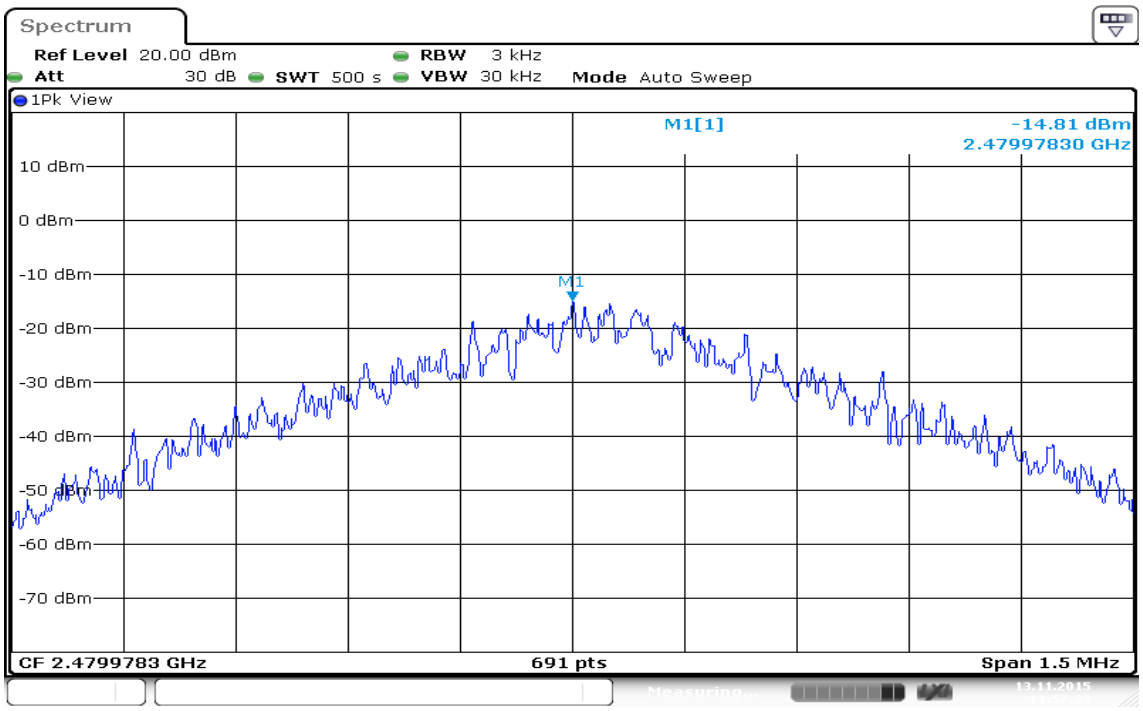
Date: 13.NOV.2015 14:04:12

PPSD (CH Mid)



Date: 13.NOV.2015 14:01:05

PPSD (CH High)



Date: 13.NOV.2015 13:57:23

7.7 RADIATED EMISSIONS

LIMIT

All spurious emissions shall comply with the limits of RSS-Gen Table 2 & Table 5.

RSS-Gen Table 2 & Table 5: General Field Strength Limits for Transmitters and Receivers at Frequencies Above 30 MHz (Note)

Frequency (MHz)	Field Strength microvolts/m at 3 metres (watts, e.i.r.p.)	
	Transmitters	Receivers
30-88	100 (3 nW)	100 (3 nW)
88-216	150 (6.8 nW)	150 (6.8 nW)
216-960	200 (12 nW)	200 (12 nW)
Above 960	500 (75 nW)	500 (75 nW)

Note: *Measurements for compliance with limits in the above table may be performed at distances other than 3 metres, in accordance with Section 7.2.7.
Transmitting devices are not permitted in Table 1 bands or, unless stated otherwise, in TV bands (54-72 MHz, 76-88 MHz, 174-216 MHz, 470-608 MHz and 614-806 MHz).

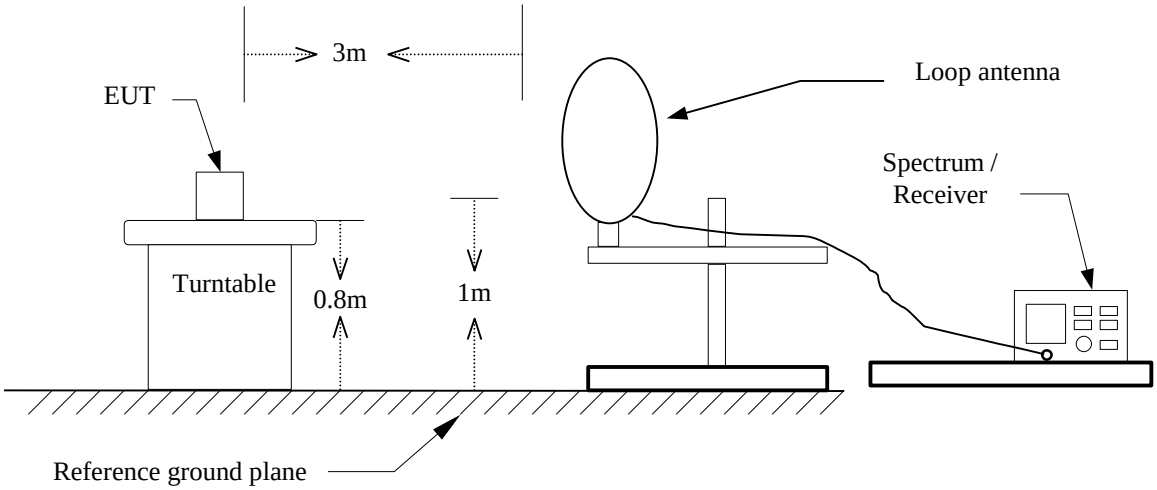
RSS-Gen Table 6: General Field Strength Limits for Transmitters at Frequencies Below 30 MHz (Transmit)

Frequency	Field Strength (microvolts/m)	Magnetic H-Field (microamperes/m)	Measurement Distance (metres)
9-490 kHz	2,400/F (F in kHz)	2,400/377F (F in kHz)	3000
490-1,705 kHz	24,000/F (F in kHz)	24,000/377F (F in kHz)	30
1.705-30 MHz	30	N/A	30

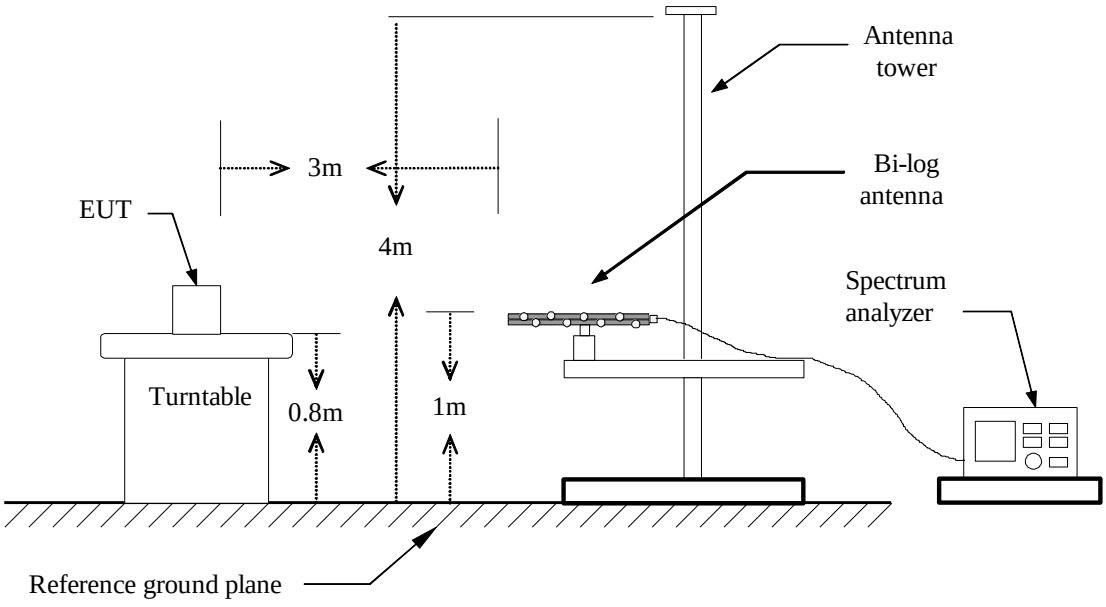
Note: The emission limits for the bands 9-90 kHz and 110-490 kHz are based on measurements employing an average detector.

Test Configuration

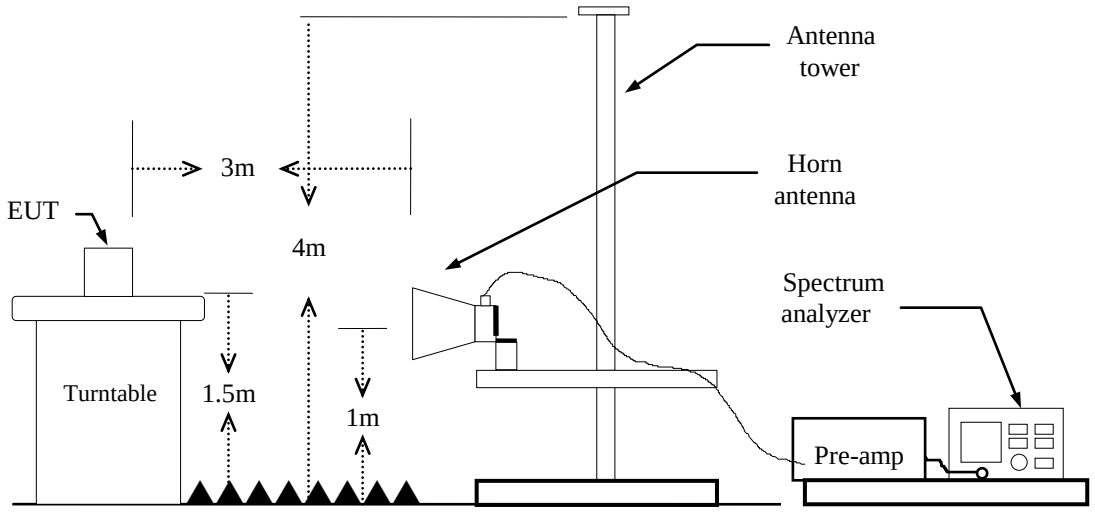
9kHz ~ 30MHz



30MHz ~ 1GHz



Above 1 GHz



TEST PROCEDURE

1. The EUT is placed on a turntable, Above 1 GHz is 1.5m high and below 1 GHz is 0.8m high above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:

   Below 1GHz:

   RBW=100kHz / VBW=300kHz / Sweep=AUTO

   Above 1GHz:

   (a) PEAK: RBW=VBW=1MHz / Sweep=AUTO

   (b) AVERAGE: RBW=1MHz / VBW=300Hz / Sweep=AUTO

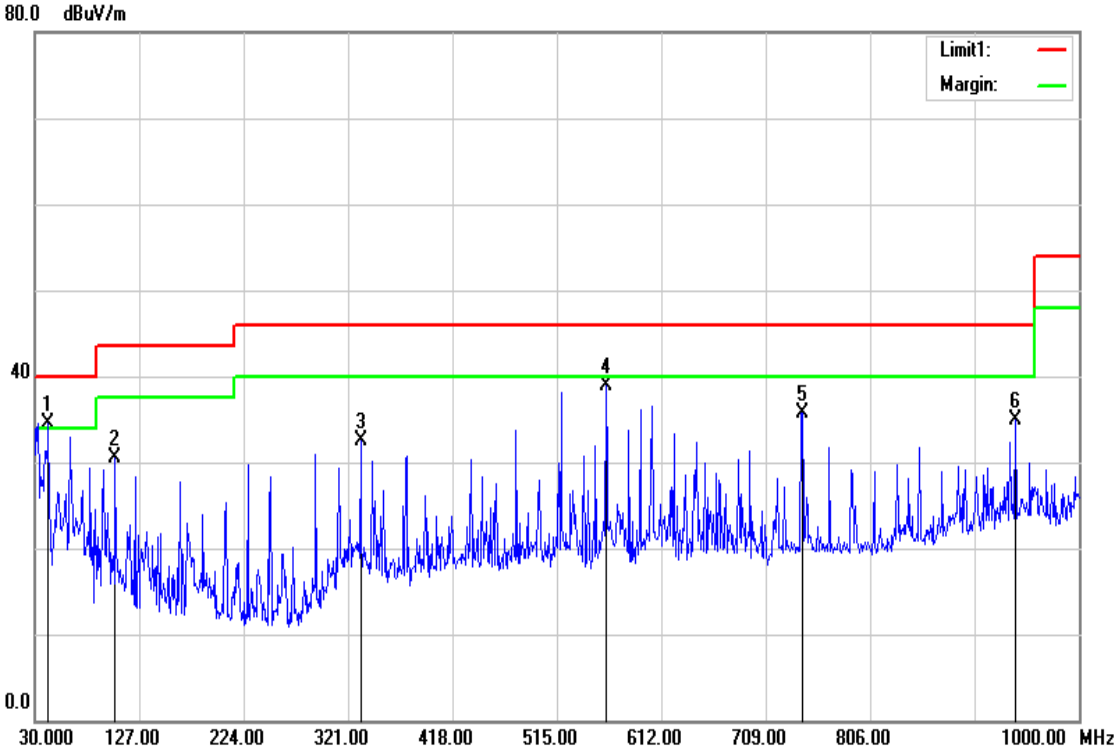
   (c) if duty cycle ≧ 98%, VBW=10Hz.

   if duty cycle<98% VBW=1/T.

   BT4.0 ≧ 98%, VBW= 10Hz
7. Repeat above procedures until the measurements for all frequencies are complete.
8. Result = Spectrum Reading + cable loss(spectrum to Amp) - Amp Gain + Cable loss(Amp to receive Ant)+ Receive Ant.

Below 1 GHz

Operation Mode:	Normal Link	**Test Date:**	October 15, 2015
Temperature:	27°C	**Tested by:**	Jason Lu
Humidity:	53% RH	**Polarity:**	Ver.

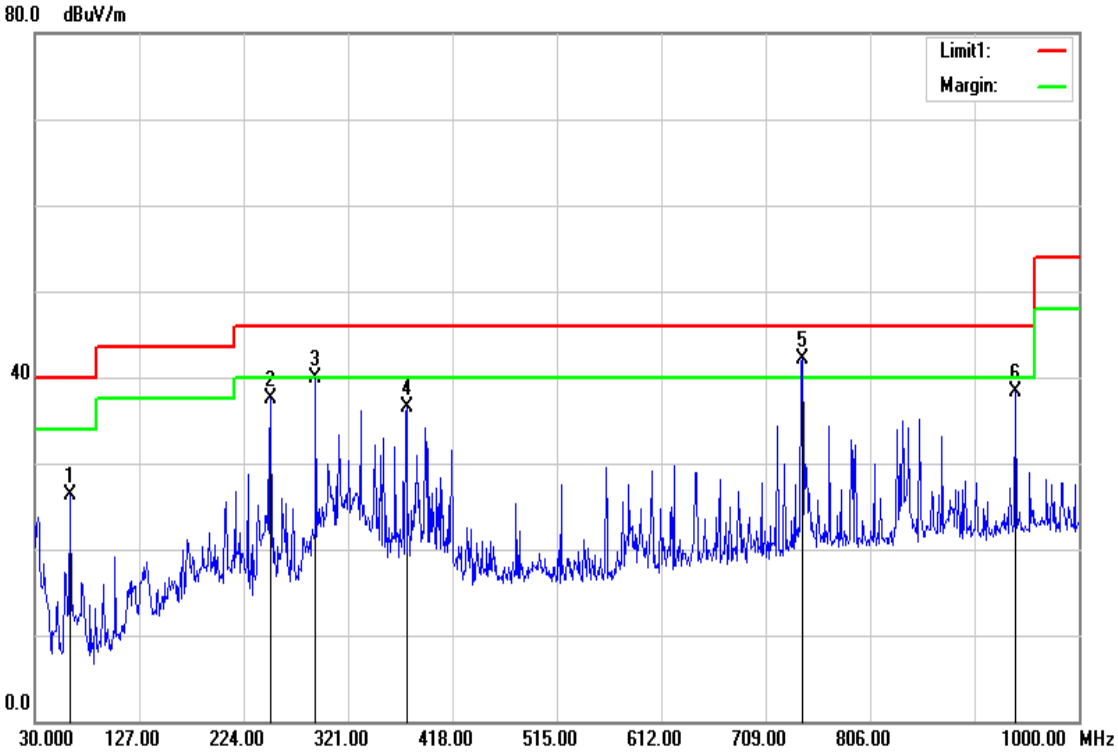


Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
42.6100	51.41	-16.84	34.57	40.00	-5.43	Peak	V
104.6900	48.72	-18.20	30.52	43.50	-12.98	Peak	V
332.6400	45.84	-13.36	32.48	46.00	-13.52	Peak	V
560.5900	47.17	-8.34	38.83	46.00	-7.17	Peak	V
742.9500	40.76	-5.08	35.68	46.00	-10.32	Peak	V
940.8300	37.45	-2.54	34.91	46.00	-11.09	Peak	V

Remark:

1. *No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz)*
2. *Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using peak/quasi-peak detector mode.*
3. *Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.*
4. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
5. *Margin (dB) = Remark result (dBuV/m) – Quasi-peak limit (dBuV/m).*

Operation Mode:	Normal Link	**Test Date:**	October 15, 2015
Temperature:	27°C	**Tested by:**	Jason Lu
Humidity:	53% RH	**Polarity:**	Hor.



Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
62.9800	47.94	-21.70	26.24	40.00	-13.76	peak	H
249.2200	53.73	-16.30	37.43	46.00	-8.57	peak	H
290.9300	54.28	-14.41	39.87	46.00	-6.13	peak	H
375.3200	48.75	-12.29	36.46	46.00	-9.54	peak	H
742.9500	47.21	-5.08	42.13	46.00	-3.87	peak	H
940.8300	40.92	-2.54	38.38	46.00	-7.62	peak	H

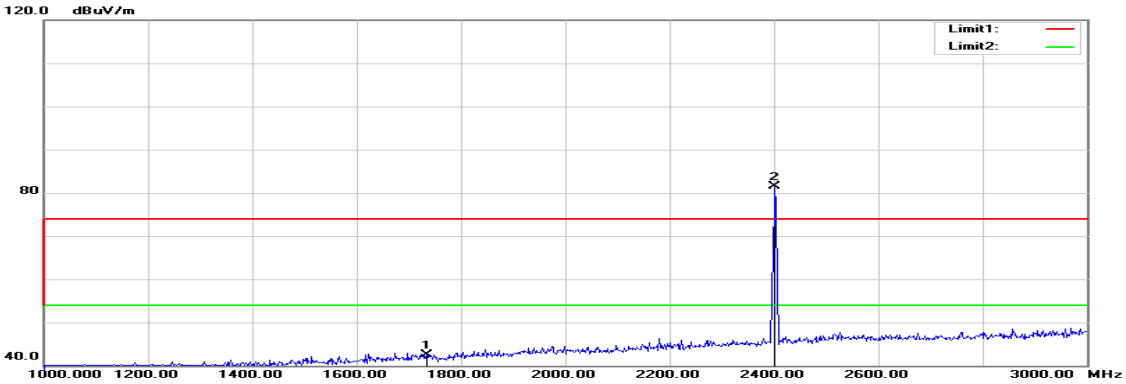
Remark:

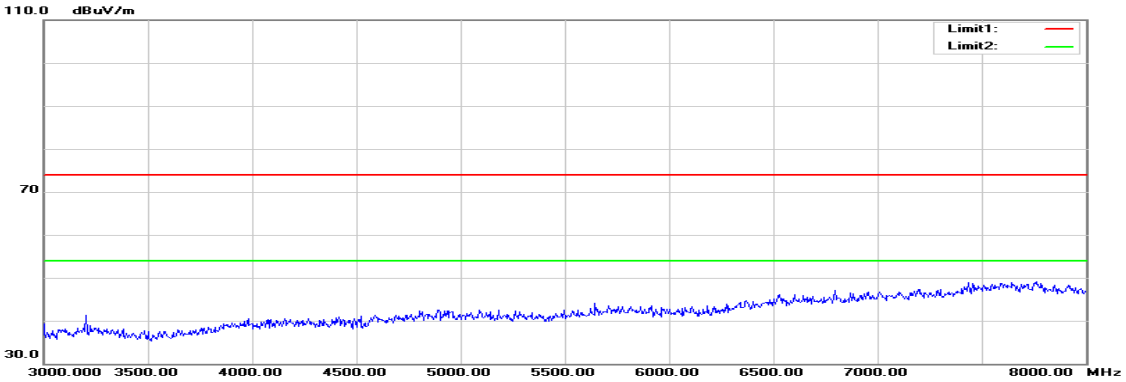
1. *No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz)*
2. *Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using peak/quasi-peak detector mode.*
3. *Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.*
4. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
5. *Margin (dB) = Remark result (dBuV/m) – Quasi-peak limit (dBuV/m).*

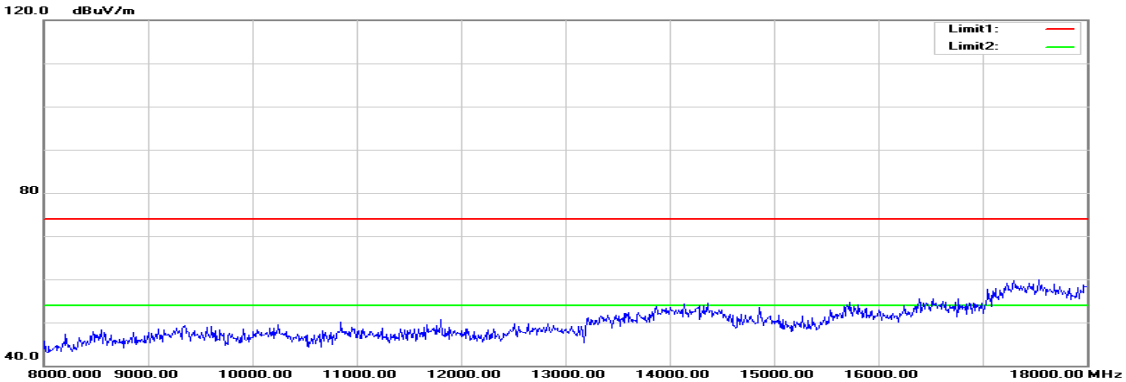
Above 1 GHz

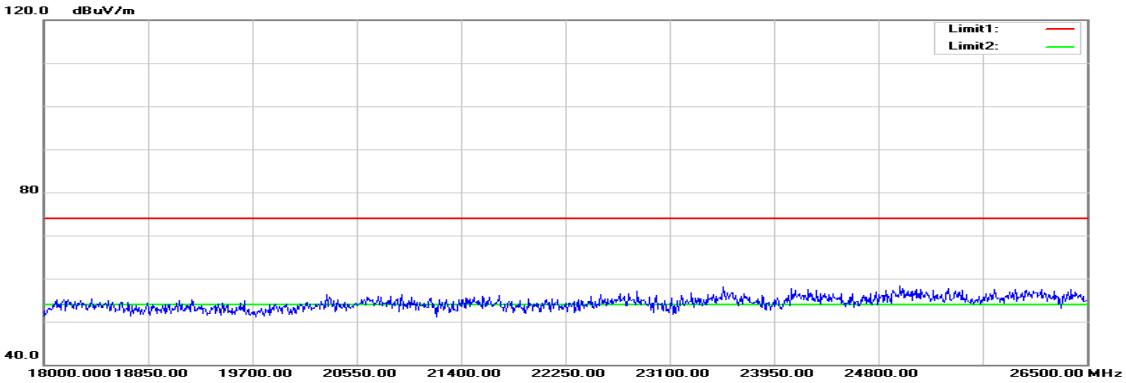
GFSK / TX / CH Low

Polarity: Vertical

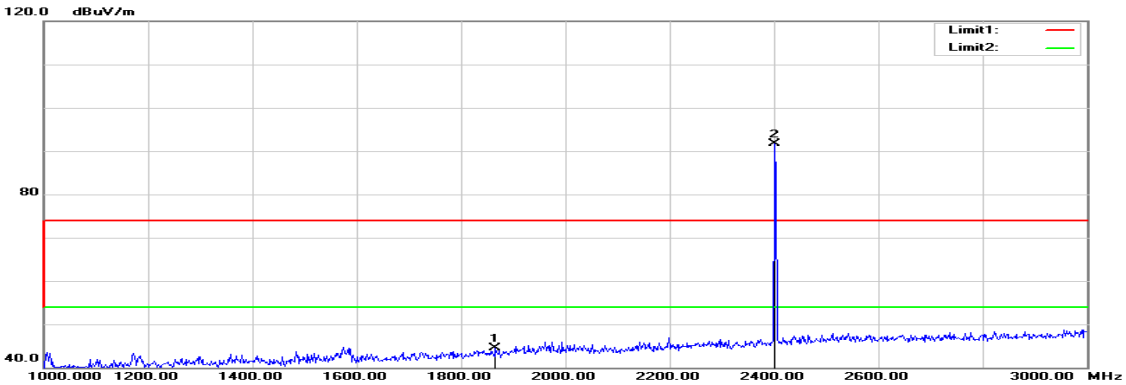


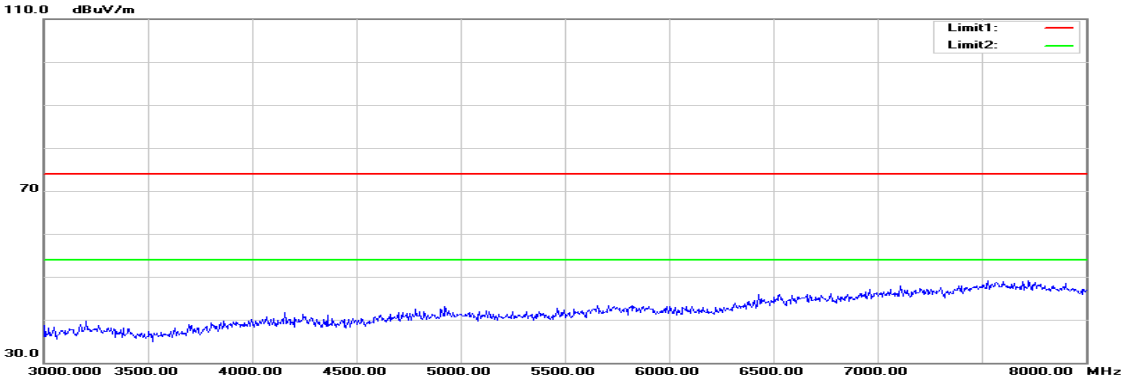


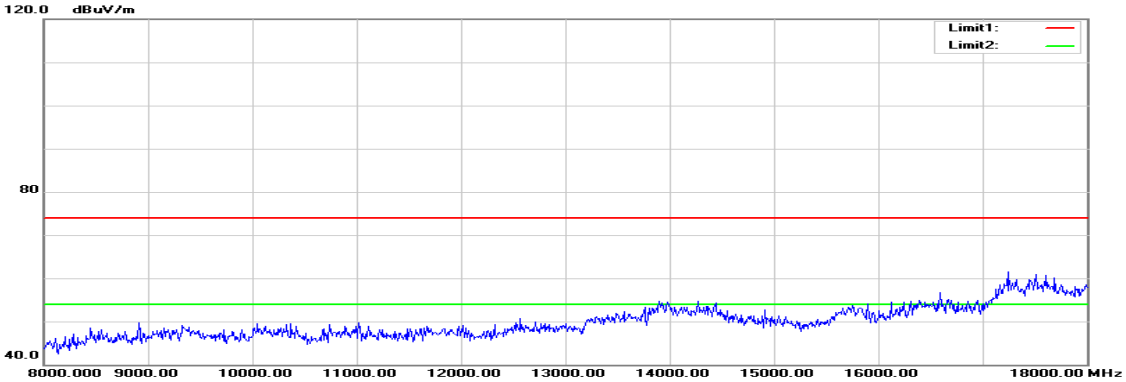


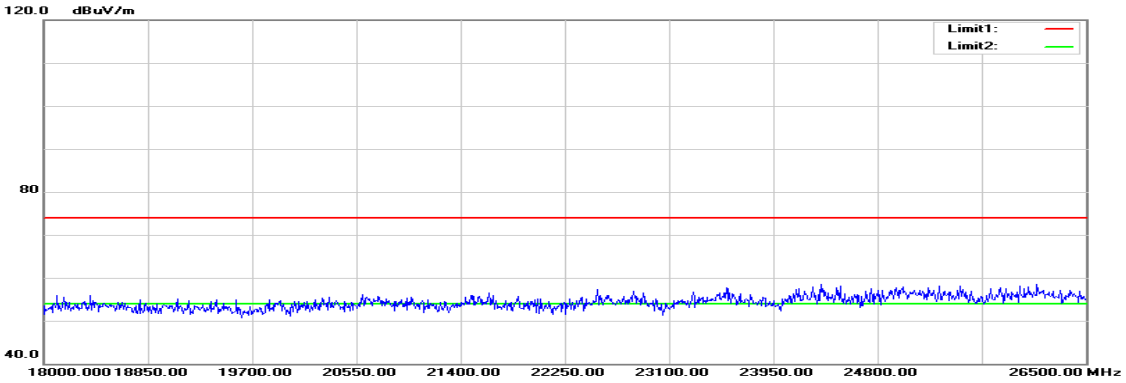


Polarity: Horizontal









Operation Mode:	GFSK / TX / CH Low	**Test Date:**	November 13, 2015
Temperature:	27°C	**Tested by:**	Jason Lu
Humidity:	53 % RH	**Polarity:**	Ver. / Hor.

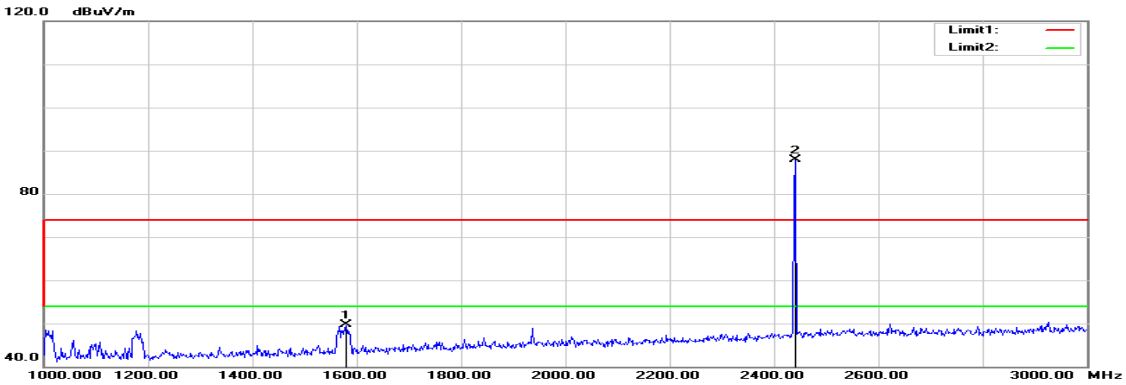
Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
1734.000	47.54	-4.98	42.56	74.00	-31.44	peak	V
N/A							
1866.000	48.88	-4.29	44.59	74.00	-29.41	peak	H
N/A							

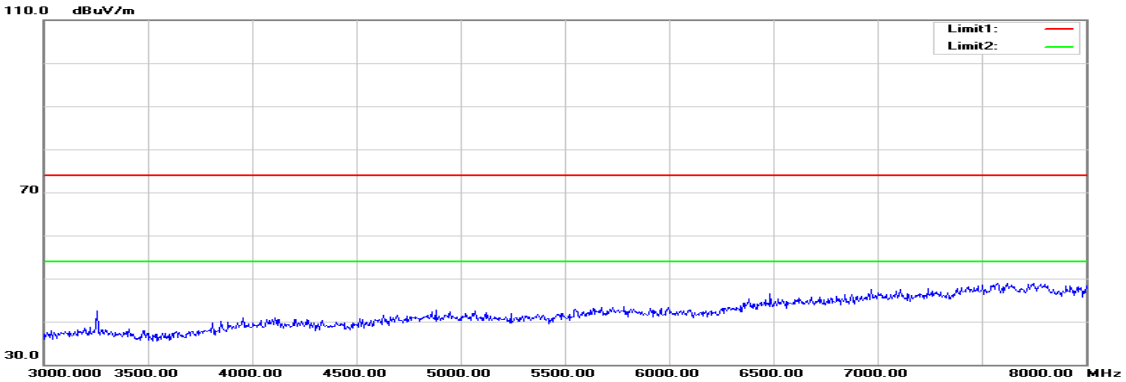
Remark:

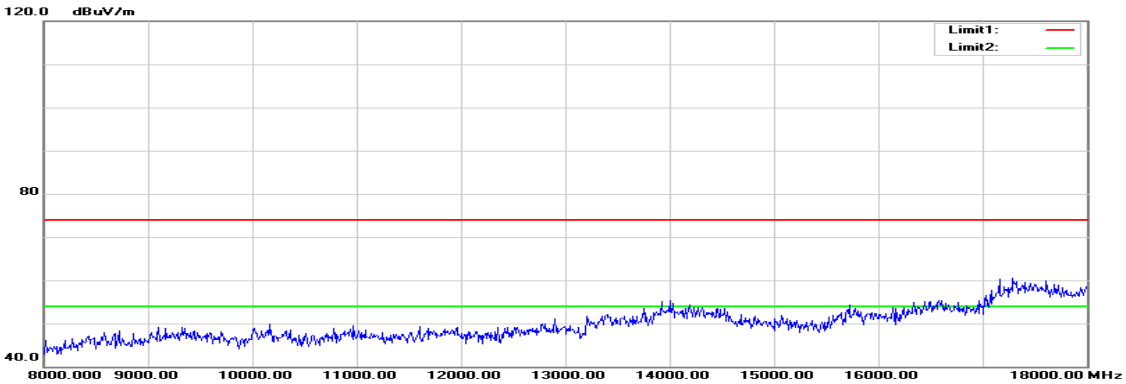
1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

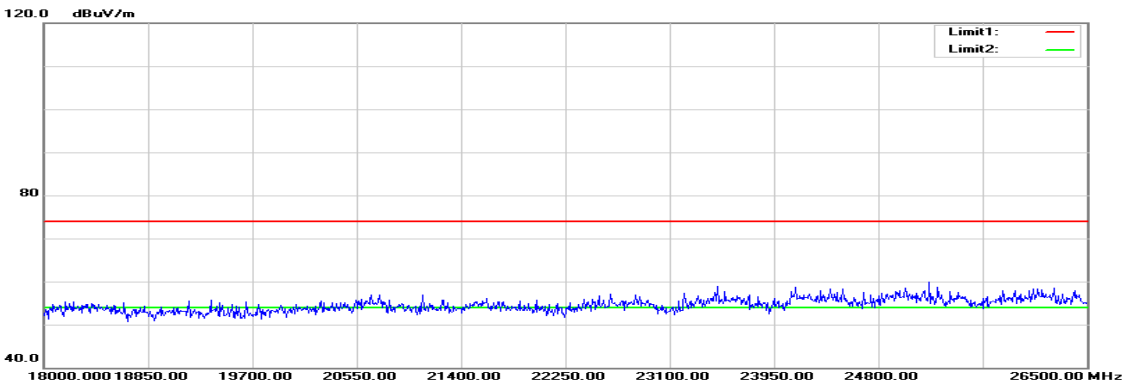
GFSK / TX / CH Mid

Polarity: Vertical

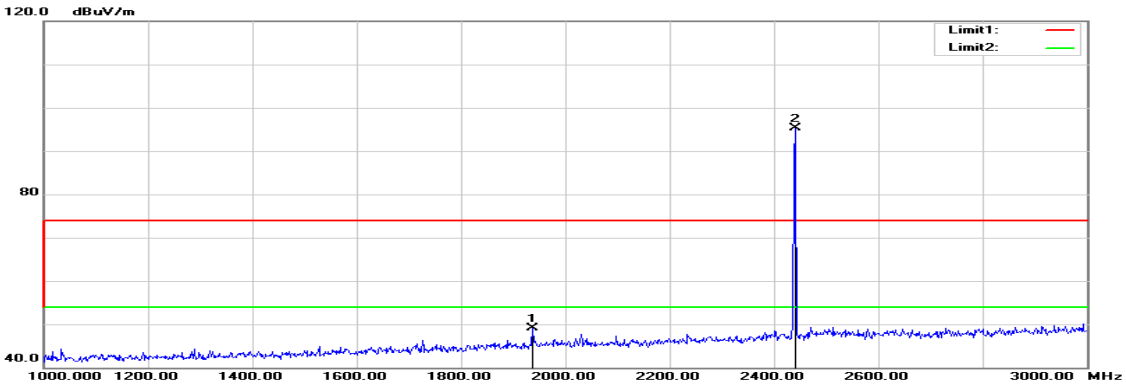


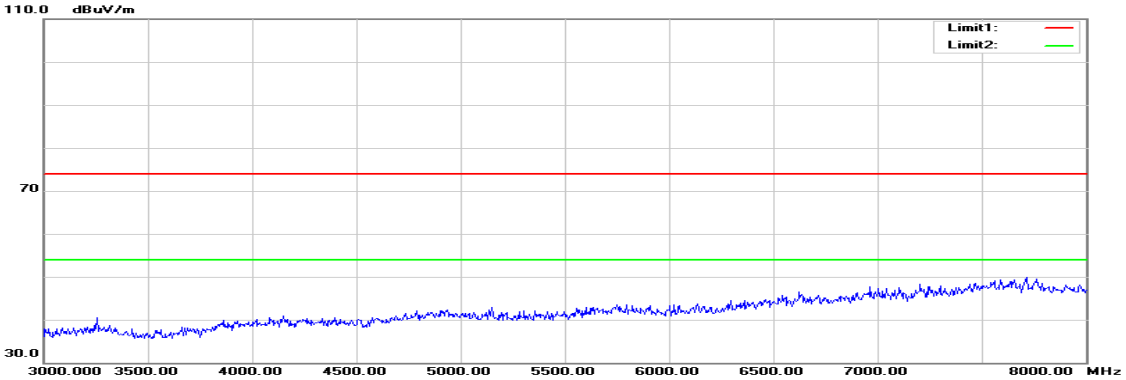


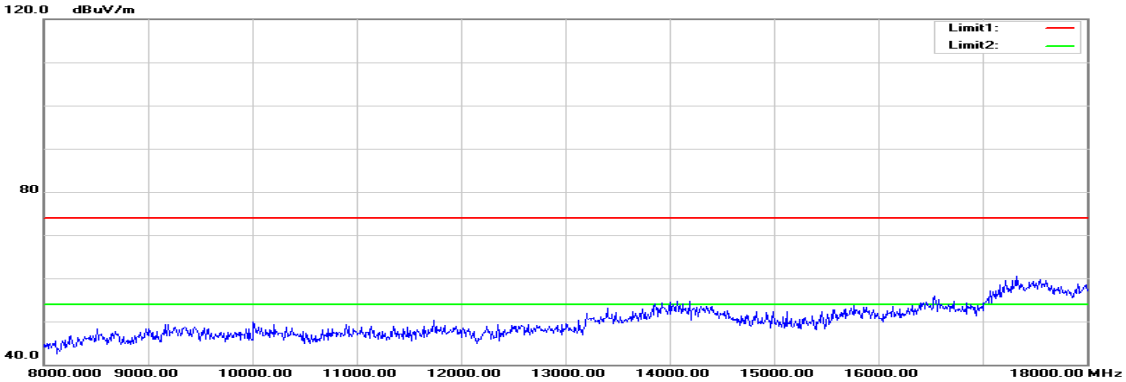


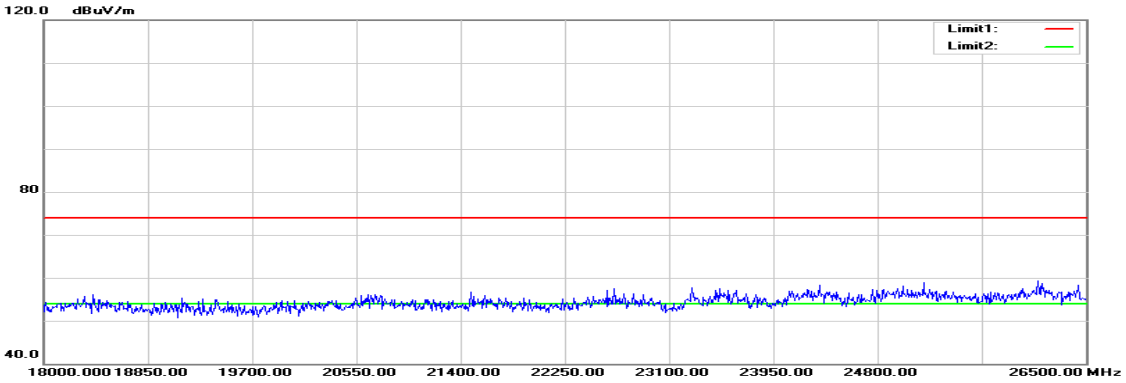


Polarity: Horizontal









Operation Mode:	GFSK / TX / CH Mid	**Test Date:**	November 13, 2015
Temperature:	27°C	**Tested by:**	Jason Lu
Humidity:	53 % RH	**Polarity:**	Ver. / Hor.

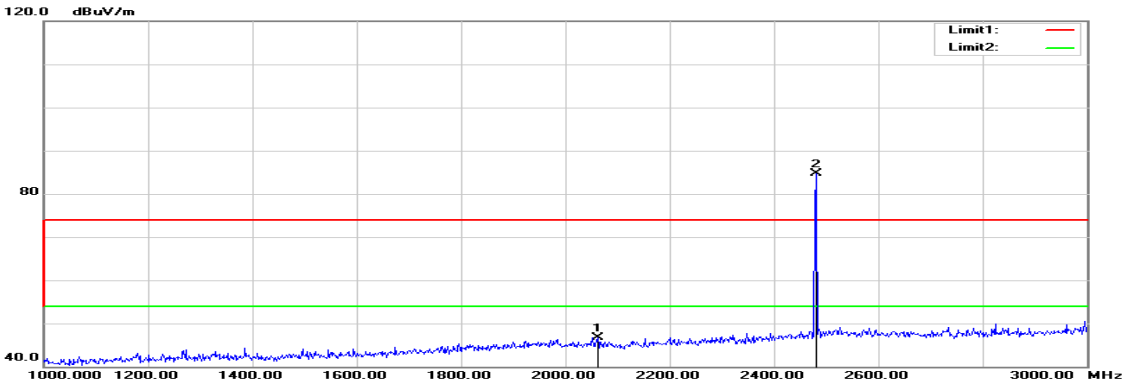
Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
1580.000	55.38	-5.78	49.60	74.00	-24.40	peak	V
N/A							
1936.000	52.96	-3.93	49.03	74.00	-24.97	peak	H
N/A							

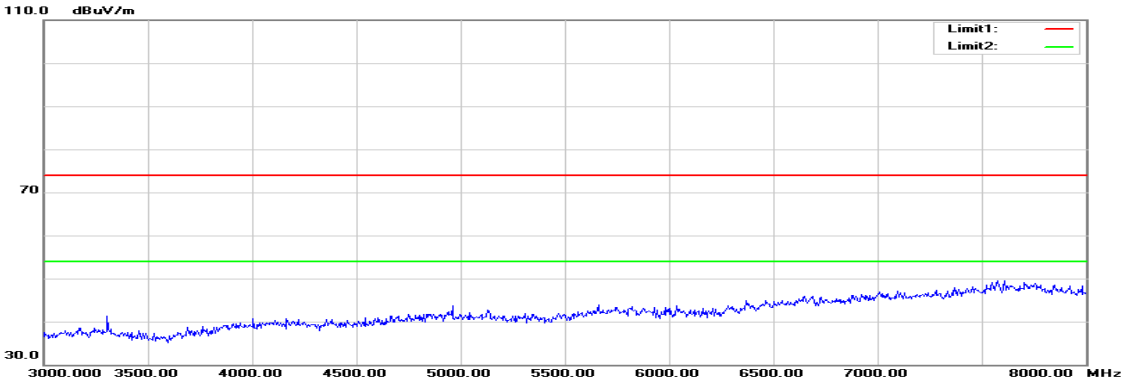
Remark:

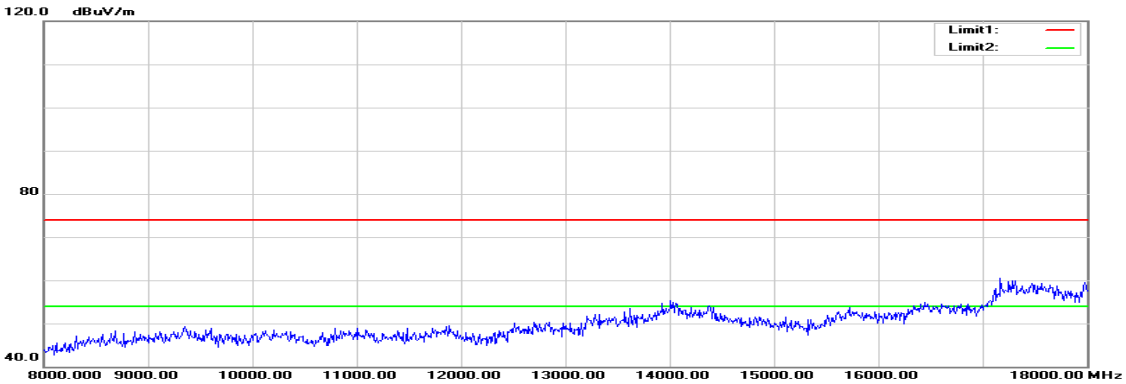
1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

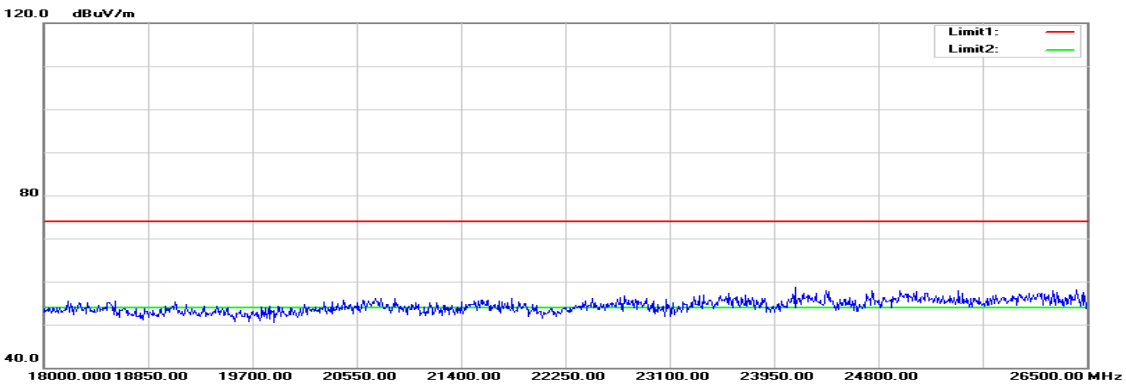
GFSK / TX / CH High

Polarity: Vertical

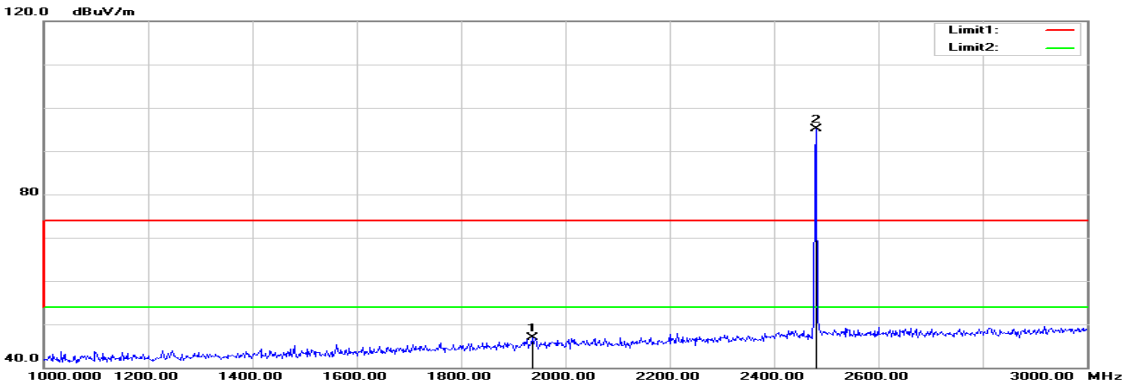


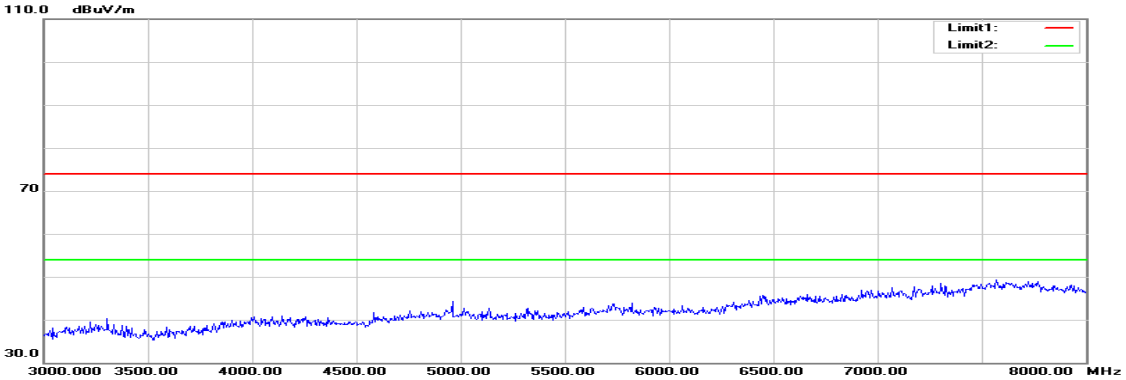


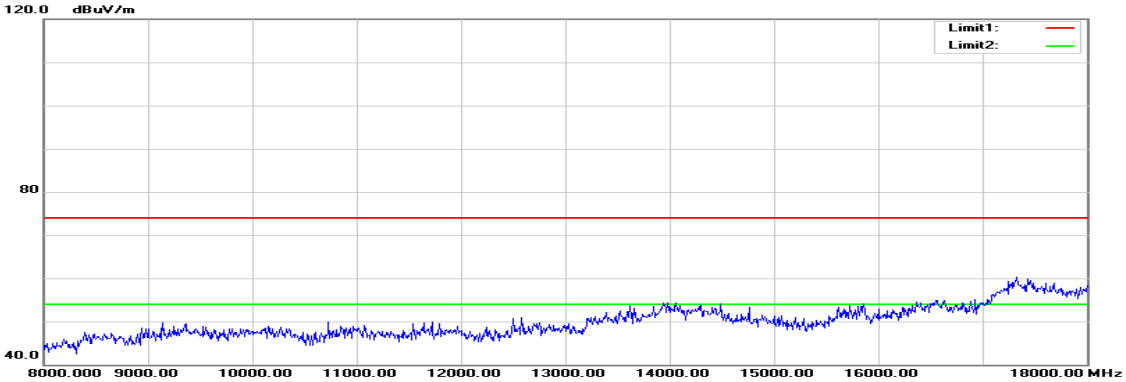


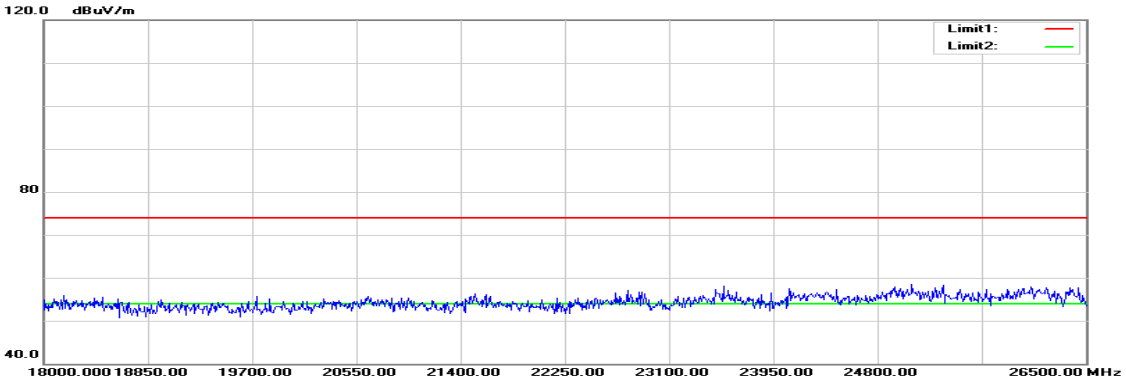


Polarity: Horizontal









Operation Mode:	GFSK / TX / CH High	**Test Date:**	November 13, 2015
Temperature:	27°C	**Tested by:**	Jason Lu
Humidity:	53 % RH	**Polarity:**	Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
2062.000	50.43	-3.66	46.77	74.00	-27.23	peak	V
N/A							
1936.000	50.79	-3.93	46.86	74.00	-27.14	peak	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

7.8 POWERLINE CONDUCTED EMISSIONS

LIMIT

According to RSS-Gen §7.2.4, except as shown in paragraphs (b) and (c) of this section, for an intentional radiator 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, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency Range (MHz)	Limits (dBµV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

Test Configuration

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

TEST 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 were complete.

TEST RESULTS

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Test Data

Operation Mode:	Normal Link	**Test Date:**	November 3, 2015
Temperature:	24°C	**Tested by:**	Jason Lu
Humidity:	50% RH		

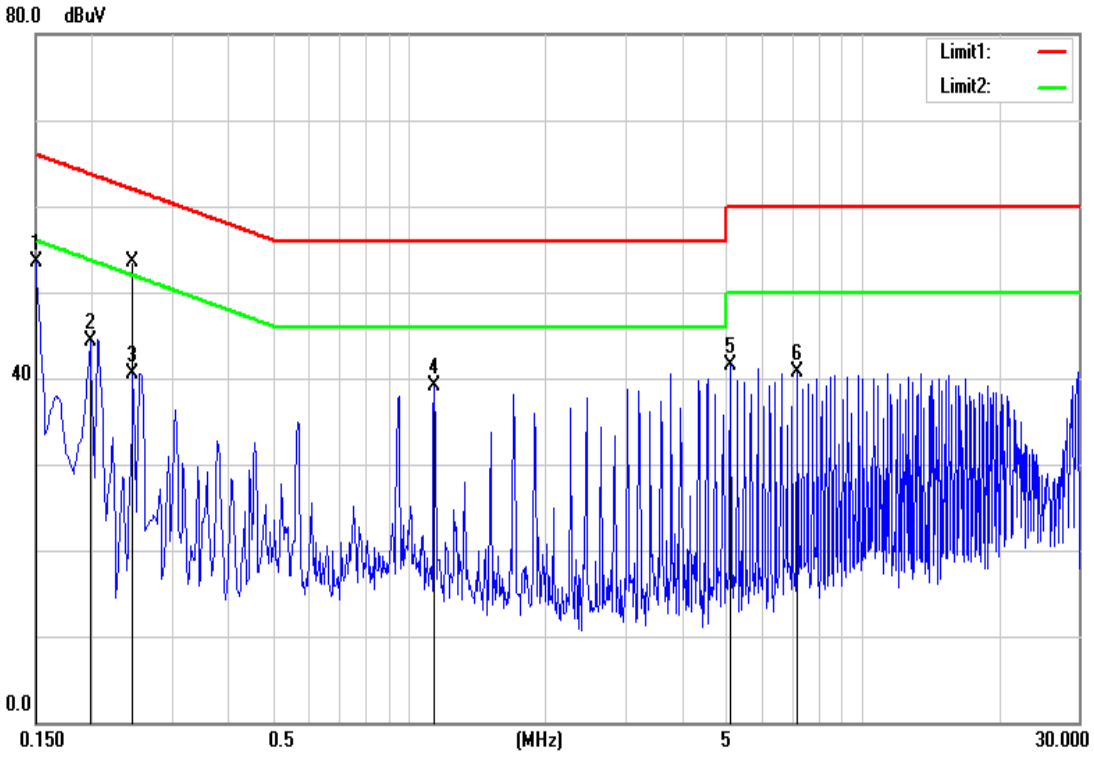
Freq. (MHz)	QP Reading (dBuV)	AV Reading (dBuV)	Corr. factor (dB/m)	QP Result (dBuV/m)	AV Result (dBuV/m)	QP Limit (dBuV)	AV Limit (dBuV)	QP Margin (dB)	AV Margin (dB)	Note
0.1539	44.37	42.64	9.64	54.01	52.28	65.78	55.79	-11.77	-3.51	L1
0.2020	37.13	35.41	9.64	46.77	45.05	63.52	53.53	-16.75	-8.48	L1
0.4580	27.16	24.57	9.73	36.89	34.30	56.73	46.73	-19.84	-12.43	L1
0.9460	27.81	26.21	10.41	38.22	36.62	56.00	46.00	-17.78	-9.38	L1
1.1380	28.31	24.58	10.37	38.68	34.95	56.00	46.00	-17.32	-11.05	L1
5.8700	31.00	28.94	9.83	40.83	38.77	60.00	50.00	-19.17	-11.23	L1
0.1500	43.79	41.85	9.69	53.48	51.54	66.00	56.00	-12.52	-4.46	L2
0.1980	34.70	32.41	9.68	44.38	42.09	63.69	53.69	-19.31	-11.60	L2
0.2460	43.80	38.82	9.68	53.48	48.50	61.89	51.89	-8.41	-3.39	L2
1.1380	28.79	26.84	10.41	39.20	37.25	56.00	46.00	-16.80	-8.75	L2
5.1180	31.61	29.11	9.85	41.46	38.96	60.00	50.00	-18.54	-11.04	L2
7.2020	30.86	27.94	9.88	40.74	37.82	60.00	50.00	-19.26	-12.18	L2

Remark:

1. *Measuring frequencies from 0.15 MHz to 30MHz.*
2. *The emissions measured in frequency range from 0.15 MHz to 30MHz were made with an instrument using Quasi-peak detector and average detector.*
3. *The IF bandwidth of SPA between 0.15MHz to 30MHz was 10kHz; the IF bandwidth of Test Receiver between 0.15MHz to 30MHz was 9kHz;*
4. *L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)*

Test Plots

Conducted emissions (Line 1)



Conducted emissions (Line 2)