

FCC 47 CFR PART 15 SUBPART C

TEST REPORT

For

**Smart Home Gateway, Z-Wave Tool Box,
Nexia Bridge, Smart Home Controller**

Model:

NA301-ZWxxxxxxxx (the 1st x should be "blank" or "-"; the rest x could be 0 to 9, A to Z, "blank" or "-", for marking purpose); BR200NX; ZWP-TBX; TGFX-HUB1; G150xxxxxxxx (the 1st x should be ""blank"" or ""-"" ; the rest x could be 0 to 9, A to Z, ""blank"" or ""-"" , for marking purpose); VeraEdgexxxxxxxx (the 1st x should be ""blank"" or ""-"" ; the rest x could be 0 to 9, A to Z, ""blank"" or ""-"" , for marking purpose); TRF-ZW2xxxxxxxx (the 1st x should be "blank" or "-"; the rest x could be 0 to 9, A to Z, "blank" or "-", for marking purpose)

Trade Name:

Sercomm; MiOS Limited; Accenture; Amdocs;
Intamac; NorthQ; Vera Control, Ltd.; URC; Telguard; Zwaveproducts.com; NEXIA

Issued to

Sercomm Corporation
8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan, R.O.C.

Issued by

Compliance Certification Services Inc.
Wugu Laboratory
No.11, Wugong 6th Rd., Wugu Dist.,
New Taipei City 24891, Taiwan. (R.O.C.)
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Issued Date: December 13, 2017



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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	December 13, 2017	Initial Issue	ALL	Allison Chen
01	January 4, 2018	Rev. (01)	P.22, P.31	Allison Chen

Rev. (01)

1. Added field strength of fundamental frequency with AVG limit.
2. Modify setup photo below 1GHz.

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1. TEST RESULT CERTIFICATION

Applicant: Sercomm Corporation
8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan,
R.O.C.

Manufacturer: Sercomm Corporation
8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan,
R.O.C.

Equipment Under Test: Smart Home Gateway; Z-Wave Tool Box; Nexia Bridge;
Smart Home Controller

Model Number: NA301-ZWxxxxxxxx (the 1st x should be "blank" or "-"; the
rest x could be 0 to 9, A to Z, "blank" or "-", for marking
purpose); BR200NX; ZWP-TBX; TGFX-HUB1;
G150xxxxxxxx (the 1st x should be "blank" or "-"; the rest
x could be 0 to 9, A to Z, "blank" or "-", for marking
purpose); VeraEdgexxxxxxxxx (the 1st x should be "blank"
or "-"; the rest x could be 0 to 9, A to Z, "blank" or "-", for
marking purpose); TRF-ZW2xxxxxxxx (the 1st x should be
"blank" or "-"; the rest x could be 0 to 9, A to Z, "blank" or "-",
for marking purpose)

Trade Name: Sercomm; MiOS Limited; Accenture; Amdocs; Intamac;
NorthQ; Vera Control, Ltd.; URC; Telguard;
Zwaveproducts.com; NEXIA

Date of Test: December 5 ~ December 12, 2017

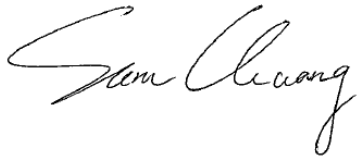
APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 15 Subpart C	No non-compliance noted

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 emission limits of FCC Rules Part 15.107, 15.109, 15.207, 15.209 and 15.249.

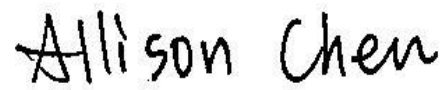
The test results of this report relate only to the tested sample EUT identified in this report.

Approved by:



Sam Chuang
Manager
Compliance Certification Services Inc.

Tested by:



Allison Chen
Assistant
Compliance Certification Services Inc.

2. EUT DESCRIPTION

Product	Smart Home Gateway; Z-Wave Tool Box; Nexia Bridge; Smart Home Controller																																						
Model Number	NA301-ZWxxxxxxxx (the 1st x should be "blank" or "-"; the rest x could be 0 to 9, A to Z, "blank" or "- ", for marking purpose)																																						
Trade Name	Sercomm; MiOS Limited; Accenture; Amdocs; Intamac; NorthQ; Vera Control, Ltd.; URC; Telguard; Zwaveproducts.com; NEXIA																																						
Model Discrepancy	1. All the model numbers (list on this report) are identical, just for marketing purpose only except Brand. 2. The means of "x" (The "x" in model name can be 0 to 9, A to Z, blank or "- ", for marking purpose) on model number are identical, just for marketing purpose only. 3. Client consigns only one model sample (Model number: NA301-ZW-US) to test. Therefore testing Lab. just guarantees the units, which have been tested. <table><tr><td></td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr><tr><td>Product</td><td>Nexia Bridge</td><td>Z-Wave Tool Box</td><td>Smart Home Gateway</td><td>Smart Home Gateway</td><td>Smart Home Controller</td><td>Smart Home Gateway</td><td>Smart Home Gateway</td></tr><tr><td>Model Number</td><td>BR200NX</td><td>ZWP-TBX</td><td>NA301-ZWxxxxxxxx</td><td>G150xxxxxxxx</td><td>VeraEdgexxxx xxxx</td><td>TGFX-HUB1</td><td>TRF-ZW2xxxxxxxx x</td></tr><tr><td>Trade Name</td><td>NEXIA</td><td>Zwaveproducts.com</td><td>Sercomm</td><td>MiOS Limited</td><td>Vera Control, Ltd.</td><td>Telguard</td><td>URC</td></tr></table> Note : for Model (the 1st x should be "blank" or "-"; the rest x could be 0 to 9, A to Z, "blank" or "- ", for marking purpose)								1	2	3	4	5	6	7	Product	Nexia Bridge	Z-Wave Tool Box	Smart Home Gateway	Smart Home Gateway	Smart Home Controller	Smart Home Gateway	Smart Home Gateway	Model Number	BR200NX	ZWP-TBX	NA301-ZWxxxxxxxx	G150xxxxxxxx	VeraEdgexxxx xxxx	TGFX-HUB1	TRF-ZW2xxxxxxxx x	Trade Name	NEXIA	Zwaveproducts.com	Sercomm	MiOS Limited	Vera Control, Ltd.	Telguard	URC
	1	2	3	4	5	6	7																																
Product	Nexia Bridge	Z-Wave Tool Box	Smart Home Gateway	Smart Home Gateway	Smart Home Controller	Smart Home Gateway	Smart Home Gateway																																
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Trade Name	NEXIA	Zwaveproducts.com	Sercomm	MiOS Limited	Vera Control, Ltd.	Telguard	URC																																
Received Date	November 30, 2017																																						
Power Supply	Vdc from Power Adapter 1. APD / WA-12M12FU(V) I/P: 100-240VAC, 50/60HZ, 0.5A O/P: 12VDC, 1.0A 2. Sunny / SYS-1381-1212-W2 I/P: 100-240VAC, 50/60HZ, 0.5A O/P: 12VDC, 1.0A 3. Leader / MU12AR120100-A1 (VI) I/P: 100-240VAC, 50/60HZ, 0.3A O/P: 12VDC, 1.0A 4. APD / WA-12M12FU (VI) I/P: 100-240VAC, 50/60HZ, 0.5A O/P: 12VDC, 1.0A																																						
RF Module Manufacturer			Model	SD3502A-CNE3																																			
Operating Frequency	916 MHz																																						
Modulation Technique	FSK																																						
Transfer Rate	9.6/40/100kbps																																						

RF Field Strength	99.52dBuV/m @peak
Antenna Gain	0.56dBi
Antenna Specification	PIFA Antenna

Remark:

1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.
2. This submittal(s) (test report) is intended for FCC ID: **P27NA301ZW** filing to comply with Section 15.207, 15.209, 15.249.

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10: 2013 and FCC Part 15.205, Part 15.207, Part 15.209

3.1 EUT CONFIGURATION

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

3.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 15.107 and 15.109 under the FCC Rules Part 15 Subpart B and Section 15.207, 15.209,15.249 under the FCC Rules Part 15 Subpart C.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in ANSI C63.10: 2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 1.5 m above ground plane. The turntable 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 maximum emissions, exploratory radiated emission measurements were made according to the requirements in ANSI C63.10: 2013.

3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

- (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

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 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	(²)
13.36 - 13.41	322 - 335.4		

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

- (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

3.5 DESCRIPTION OF TEST MODES

The EUT (model: NA301-ZW-US) comes with four types of power adapter (model: WA-12M12FU(V) / SYS-1381-1212-W2 / MU12AR120100-A1 (VI) / WA-12M12FU (VI)) for sale. After the preliminary test, the power adapter WA-12M12FU was found to emit the worst emissions and therefore 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.

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.

RF Conducted Test Site					
Name of Equipment	Manufacturer	Model	Serial Number	Cal. Date	Cal. Due
Power Meter	Anritsu	ML2495A	1033009	04/11/2017	04/10/2018
Power Sensor	Anritsu	MA2411B	917072	07/03/2017	07/02/2018
Spectrum Analyzer	R&S	FSV 40	101073	10/02/2017	10/01/2018
Thermostatic/Hrgrosatic Chamber	GWINSTEK	GTC-288MH-CC	TH160402	05/23/2017	05/22/2018
Directional Coupler	Agilent	87301D	MY44350252	07/25/2017	07/24/2018
SUCOFLEX Cable	HUBER SUHNER	SUCOFLEX 104PEA	25157	07/31/2017	07/30/2018
Divider	Solvang Technology	2-18GHz 4Way	STI08-0015	07/26/2017	07/25/2018

Wugu 966 Chamber A					
Name of Equipment	Manufacturer	Model	Serial Number	Cal. Date	Cal. Due
Bilog Antenna	Sunol Sciences	JB3	A030105	06/20/2017	06/19/2018
Pre-Amplifier	EMEC	EM330	060609	06/07/2017	06/06/2018
Spectrum Analyzer	Agilent	E4446A	US42510252	11/27/2017	11/26/2018
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R
Pre-Amplifier	HP	8449B	3008A00965	06/27/2017	06/26/2018
Software	EZ-EMC (CCS-3A1RE)				

Remark:

- Each piece of equipment is scheduled for calibration once a year and Precision Dipole is scheduled for calibration once three years.
- N.C.R. = No Calibration Request.

Conducted Emissions Test Site#B					
Name of Equipment	Manufacturer	Model	Serial Number	Cal. Date	Cal. Due
LISN	R&S	ENV216	101054	05/18/2017	05/17/2018
LISN	SCHWARZBECK	NSLK 8127	8127-541	02/14/2017	02/13/2018
EMI Test Receiver	R&S	ESCI	100064	05/17/2017	05/16/2018
SUCOFLEX Cable	HUBER SUHNER	SUCOFLEX 104PEA	25157	07/31/2017	07/30/2018
EMCI	CABLE	CFD300-NL	FERF	07/03/2017	07/02/2018
Digital Thermo-Hygro Meter	WISEWIND	1110	D03	02/24/2017	07/23/2018

Remark:

1. Each piece of equipment is scheduled for calibration once a year and Precision Dipole is scheduled for calibration once three years.
2. 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

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, biconical, 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."

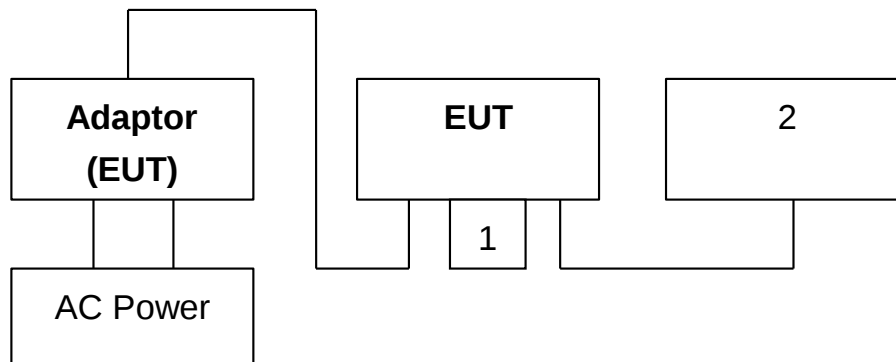
6. SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT

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

6.2 SUPPORT EQUIPMENT

No	Equipment	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
1.	USB 2.0 Storage Media	SDCZ52-016G	N/A	D33724	SanDisk	N/A	N/A
2.	NB(G)	IBM 1951	N/A	N/A	PD9LEN3945ABG	Unshielded, 20m	Unshielded, 1.8m



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.

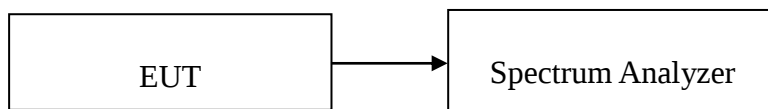
7. FCC PART 15.249 REQUIREMENTS

7.1 OCCUPIED BANDWIDTH(99%) AND 6DB BANDWIDTH

TEST LIMIT

None; for reporting purposes only.

Test Configuration



TEST PROCEDURE

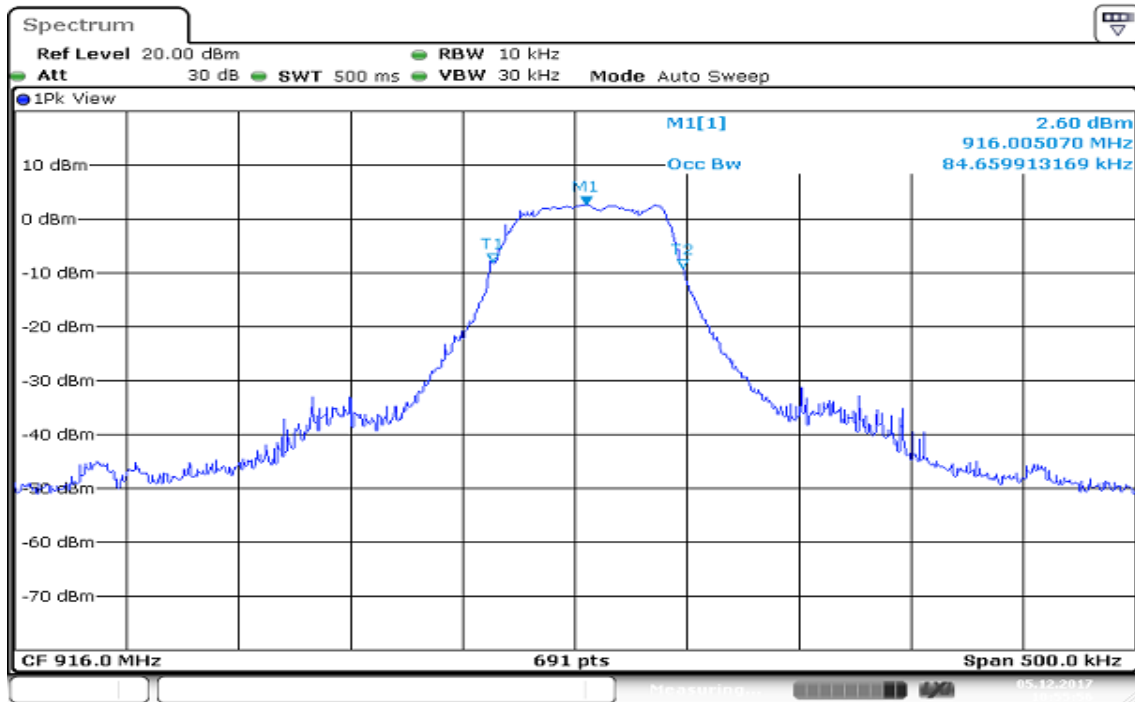
1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW=100kHz, VBW = 300kHz, Span = 1MHz, Sweep = auto.
4. Set the spectrum analyzer as OBW(99%) function
5. Mark the peak frequency and 6dB frequency.
6. Repeat until all the rest channels are investigated.

TEST RESULTS

Frequency (MHz)	99% Bandwidth (MHz)	6dB Bandwidth (MHz)
916.0	0.0846	0.2055

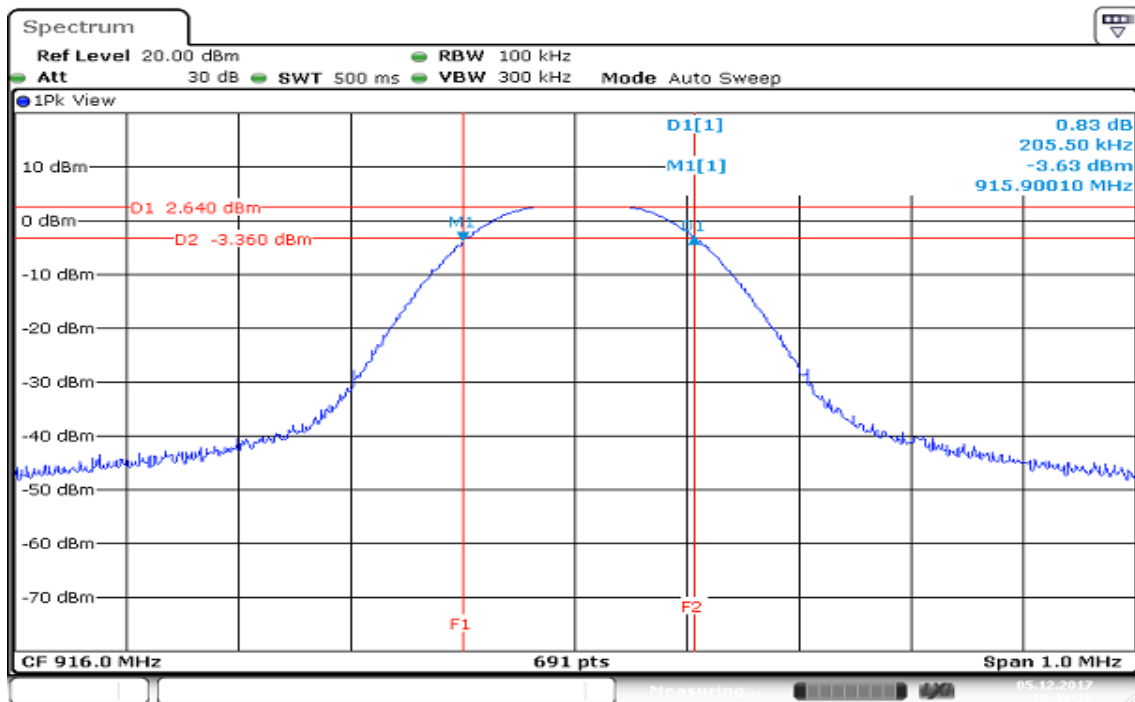
Test Plot

99% Bandwidth



Date: 5.DEC.2017 10:55:57

6dB Bandwidth



Date: 5.DEC.2017 10:49:26

7.2 SPURIOUS EMISSION

1. In the section 15.249(a):

Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental Field Strength (mV/m)	Field Strength of Harmonics (μV/m)
902-928 MHz	50	500
2400 - 2483.5 MHz	50	500
5725 - 5875 MHz	50	500
24.0 - 24.25 GHz	250	2500

2. Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500	3

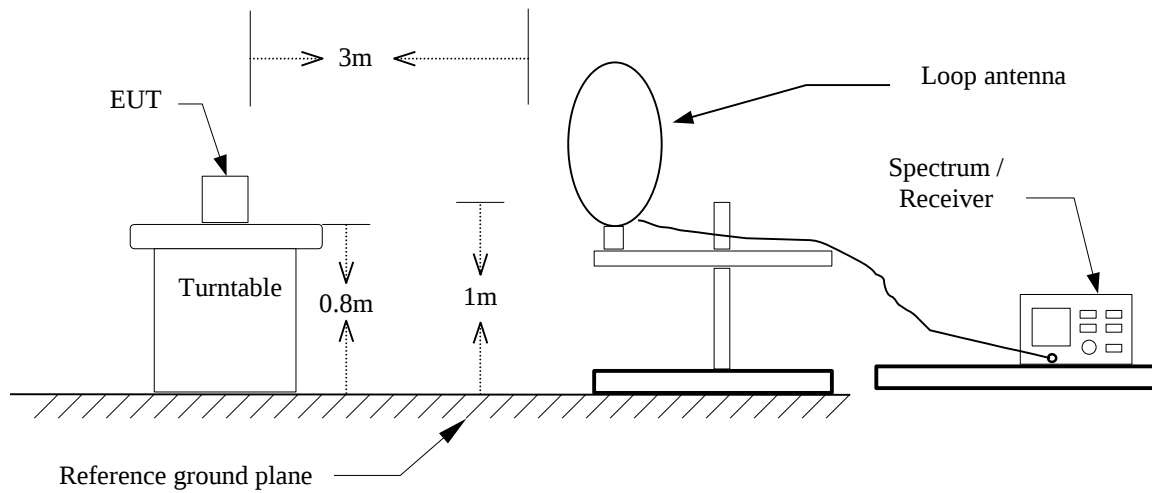
Remark: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

3. In the above emission table, the tighter limit applies at the band edges.

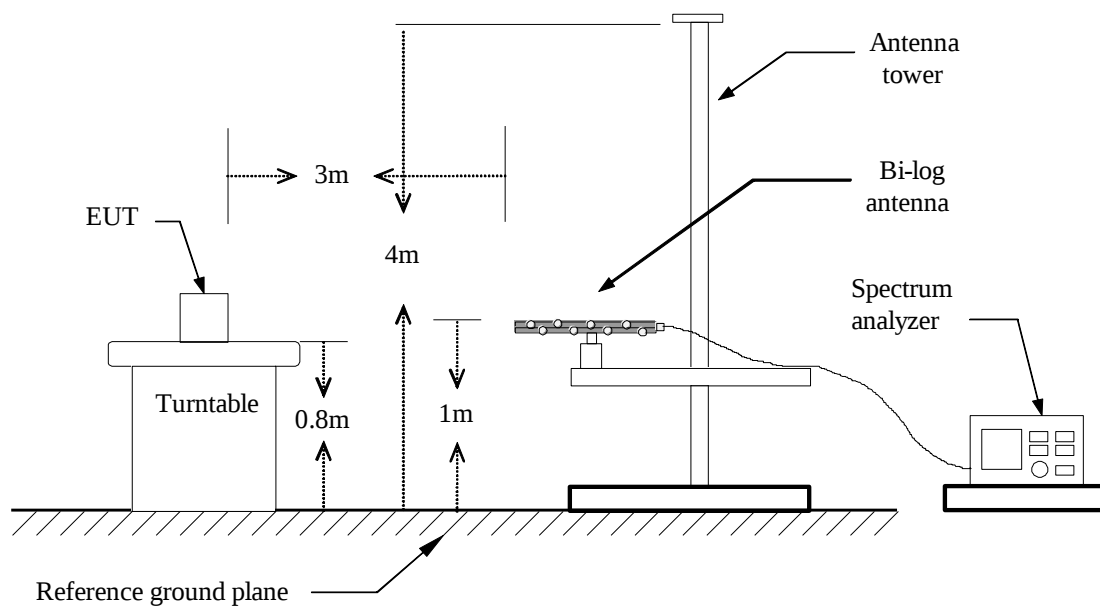
Frequency (MHz)	Field Strength (μV/m at 3-meter)	Field Strength (dBμV/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Test Configuration

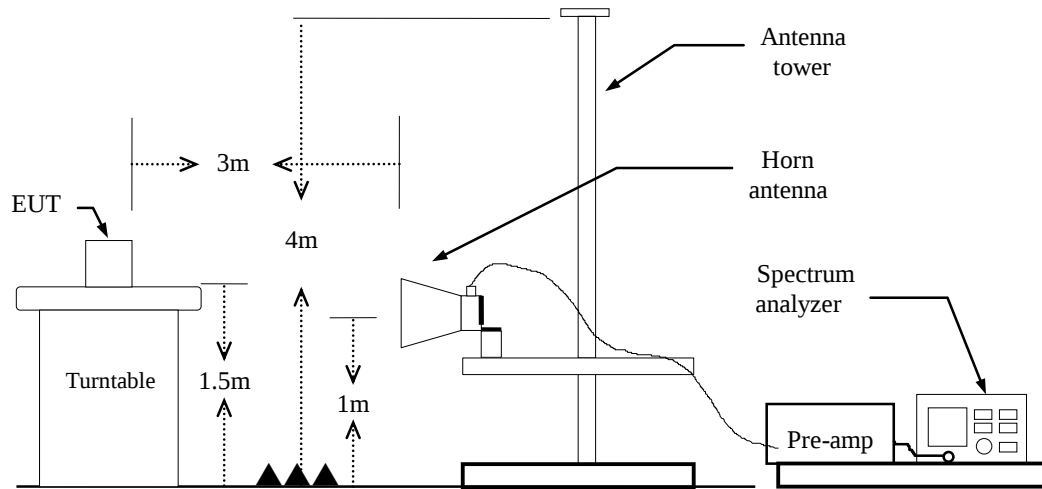
9kHz ~ 30MHz



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 30MHz

RBW=10kHz / VBW=30kHz / Sweep=AUTO

30 ~ 1000MHz:

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

Above 1GHz:

a) PEAK: RBW=1MHz / VBW=3MHz / Sweep=AUTO

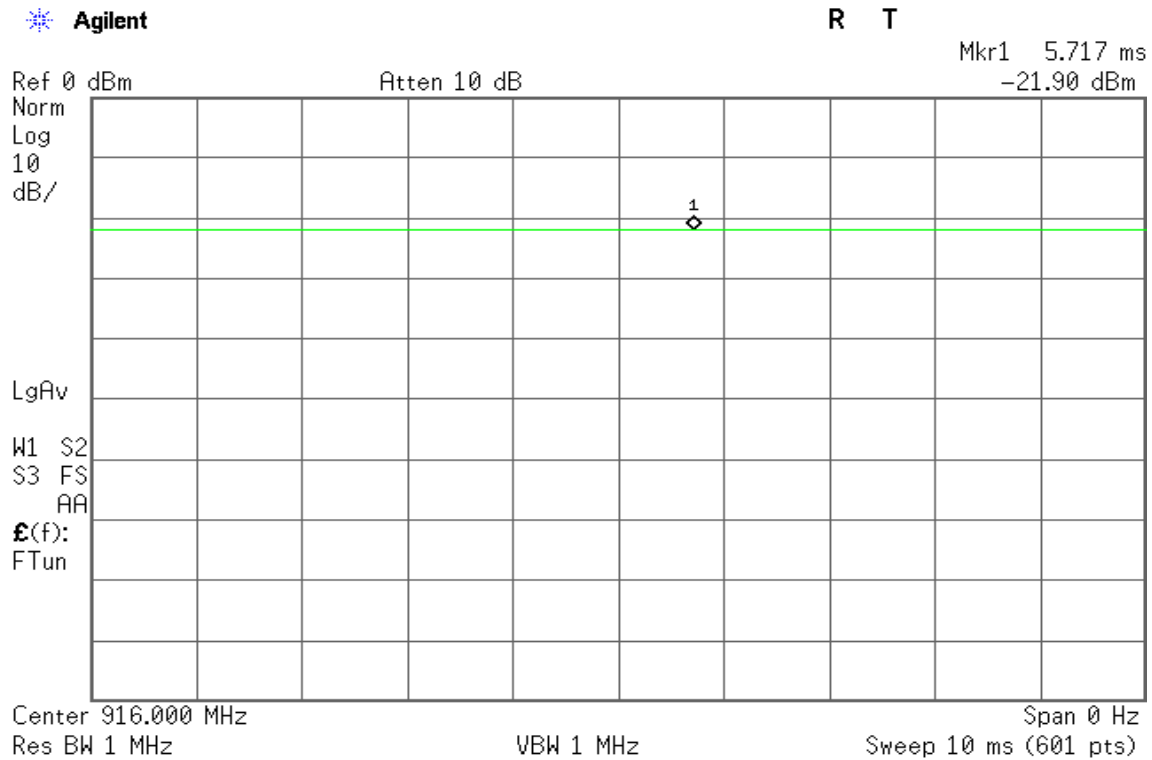
b) AVERAGE: RBW=1MHz / VBW=300Hz / Sweep=AUTO

7. Repeat above procedures until the measurements for all frequencies are complete.

TEST RESULTS

No non-compliance noted.

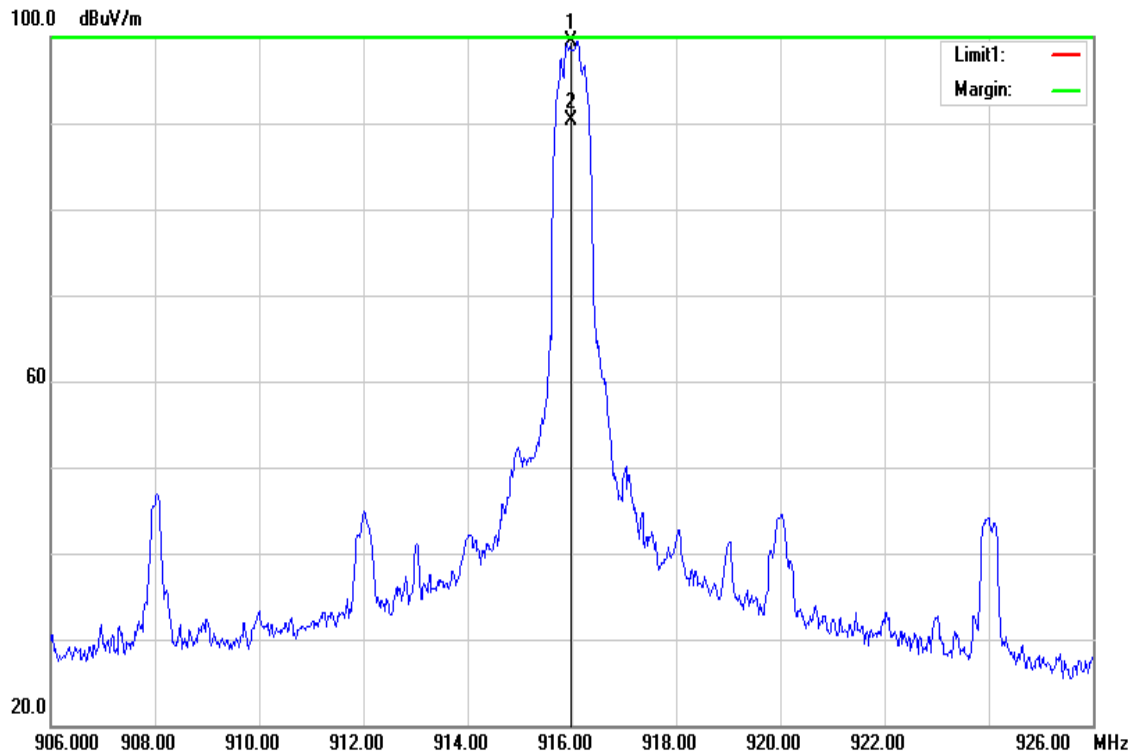
Duty Cycle



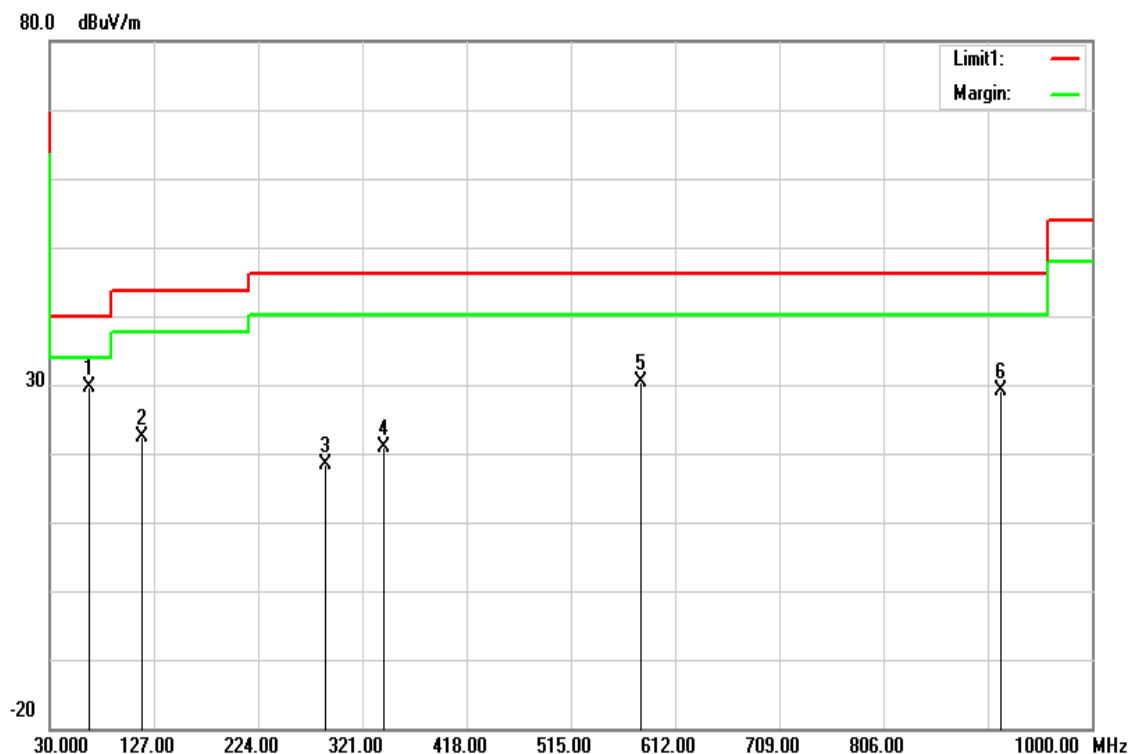
Duty Cycle (%)	TX ON (ms)	1/T(KHz)	VBW
100%	1.0000	-	300Hz

Notes: Duty cycle = TXon/TXall

Field strength of fundamental frequency



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	915.9800	101.27	-1.75	99.52	114.00	-14.48	peak
2	915.9800	91.96	-1.75	90.21	94.00	-3.79	AVG

TEST DATA**Below 1GHz****Operation Mode:** 916 MHz**Test Date:** December 6, 2017**Temperature:** 24°C**Tested by:** Kevin Kuo**Humidity:** 33% RH**Polarity:** Ver.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
66.8600	50.98	-21.42	29.56	40.00	-10.44	peak	V
115.3600	38.17	-15.82	22.35	43.52	-21.17	peak	V
286.0800	32.53	-14.21	18.32	46.02	-27.70	peak	V
341.3700	34.08	-13.17	20.91	46.02	-25.11	peak	V
579.9900	37.47	-7.18	30.29	46.02	-15.73	peak	V
915.6100	30.79	-1.75	29.04	46.02	-16.98	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: 916MHz

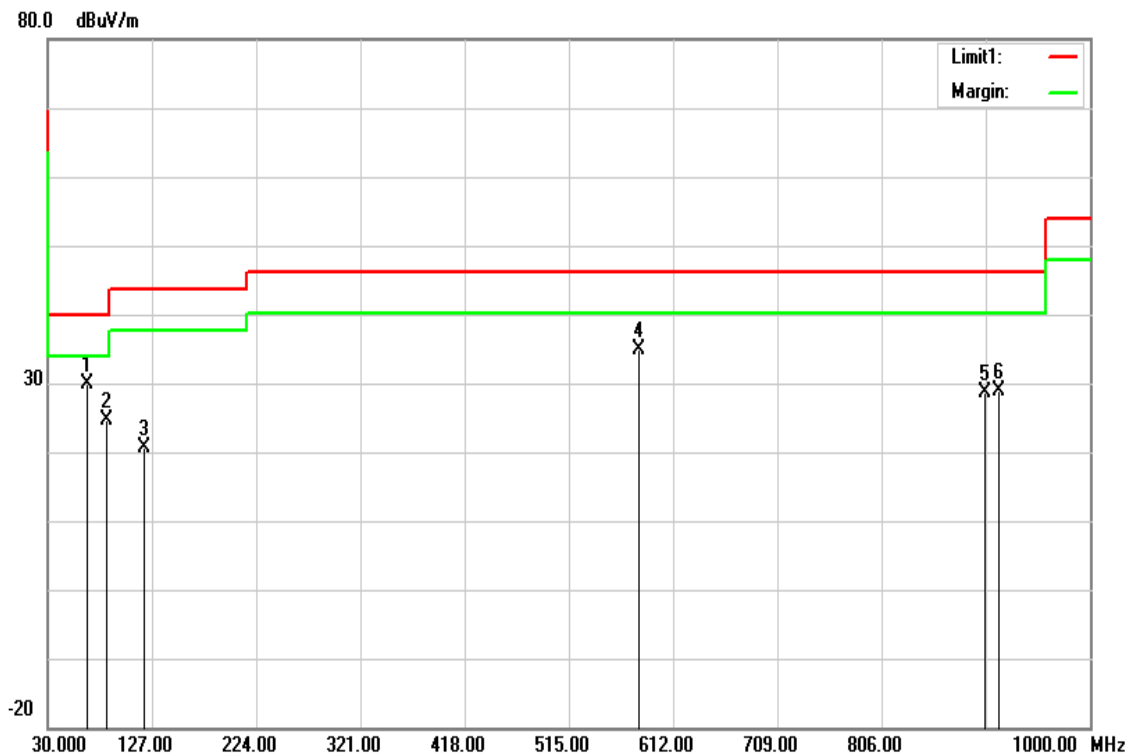
Test Date: December 6, 2017

Temperature: 24°C

Tested by: Kevin Kuo

Humidity: 33 % RH

Polarity: Hor.



Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
66.8600	51.28	-21.42	29.86	40.00	-10.14	peak	H
85.2900	46.00	-21.37	24.63	40.00	-15.37	peak	H
120.2100	35.74	-15.01	20.73	43.52	-22.79	peak	H
579.9900	41.94	-7.18	34.76	46.02	-11.26	peak	H
902.0300	30.63	-1.98	28.65	46.02	-17.37	peak	H
915.6100	30.57	-1.75	28.82	46.02	-17.20	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**Operation Mode:**

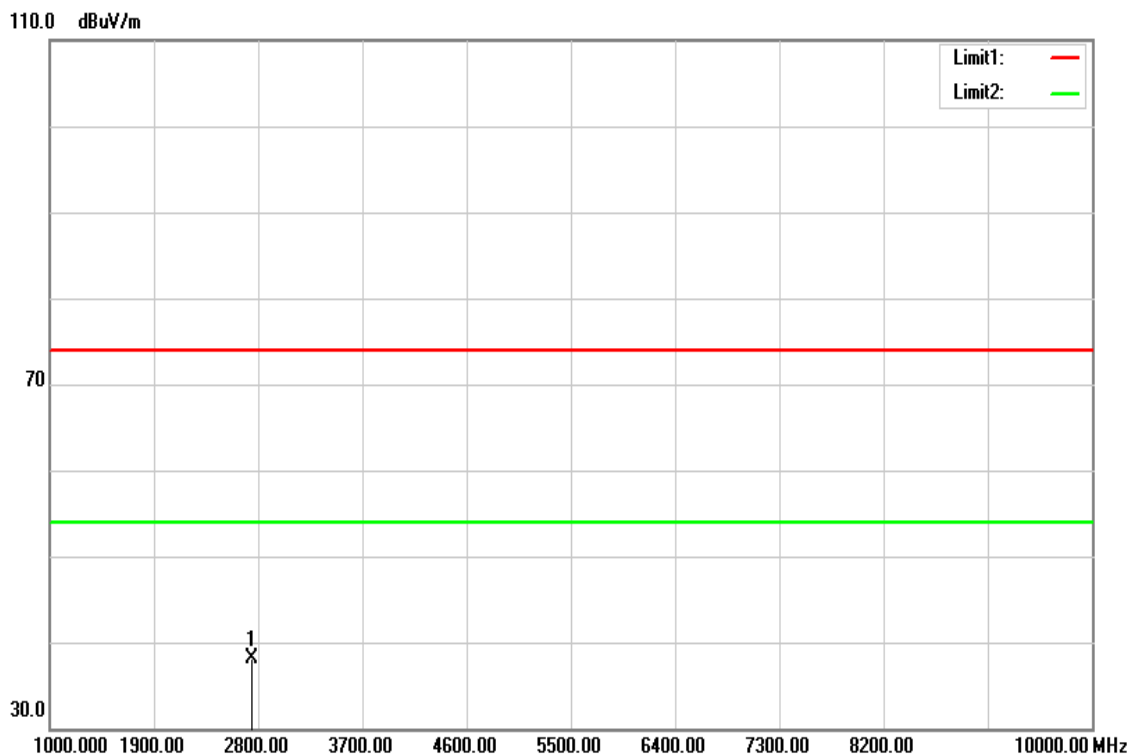
TX / 916MHz / 1G-10G

Test Date: December 11, 2017**Temperature:**

24°C

Tested by: Kevin Kuo**Humidity:**

33 % RH

Polarity: Ver.

No	Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
1	2748.000	40.29	-2.14	38.15	74.00	-35.85	peak	V

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 .
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).

Operation Mode: TX / 916MHz / 1G-10G

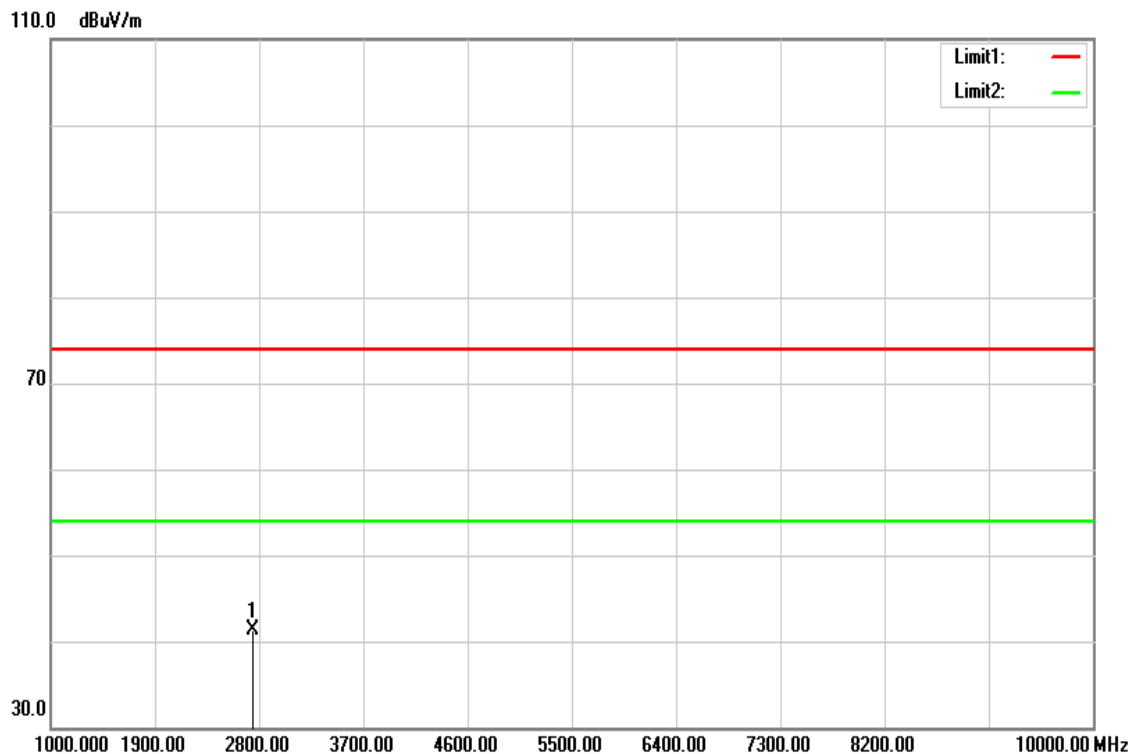
Test Date: December 11, 2017

Temperature: 24°C

Tested by: Kevin Kuo

Humidity: 33 % RH

Polarity: Hor.



No	Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
1	2748.000	43.45	-2.14	41.31	74.00	-32.69	peak	H

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 .
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).

7.3 POWERLINE CONDUCTED EMISSIONS

LIMIT

According to §15.207(a), 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 μ H/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 (dB μ V)	
	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

* Decreases with the logarithm of the frequency.

Test Configuration

See test photographs attached in Appendix I 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 RESULTS**Test Data****Operation Mode:** Normal Link**Test Date:** December 12, 2017**Temperature:** 24°C**Tested by:** Eric Lee**Humidity:** 50% RH

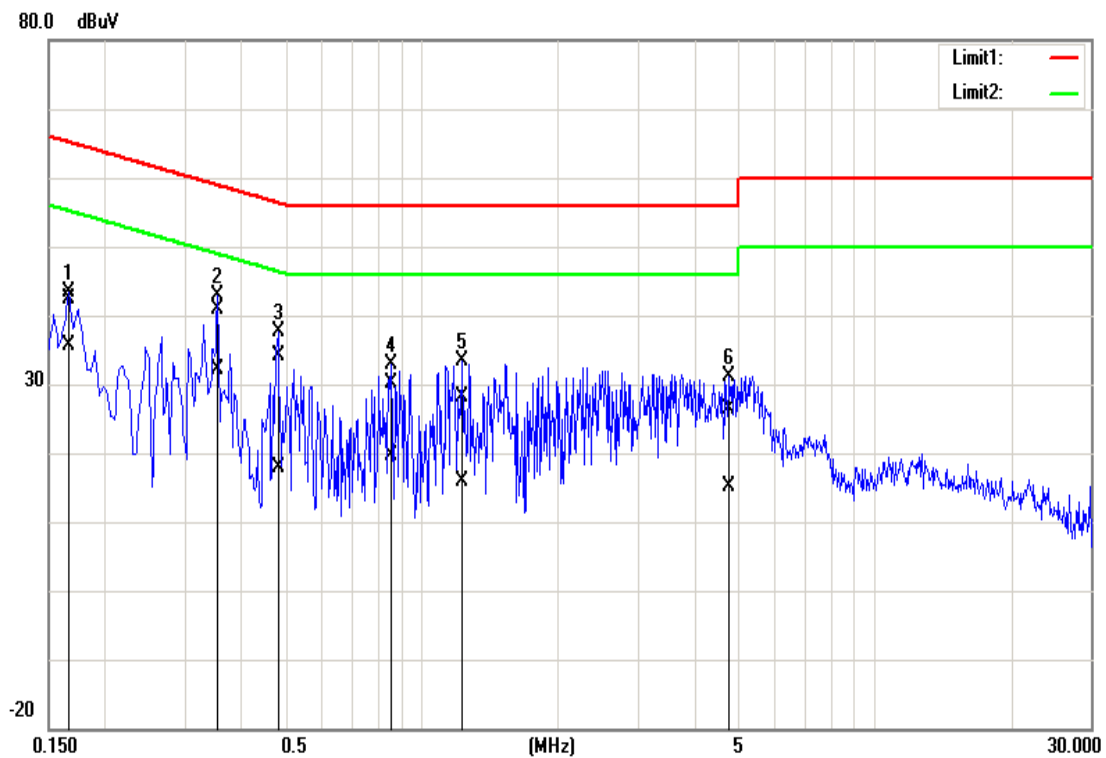
Freq. (MHz)	QP Reading (dBuV)	AV Reading (dBuV)	Corr. factor (dB/m)	QP Result (dBuV/m)	AV Result (dBuV/m)	QP Limit (dBuV)	AV Limit (dBuV)	QP Margin (dB)	AV Margin (dB)	Note
0.1660	42.41	35.48	0.05	42.46	35.53	65.16	55.16	-22.70	-19.63	L1
0.3540	40.92	32.02	0.05	40.97	32.07	58.87	48.87	-17.90	-16.80	L1
0.4820	34.09	17.91	0.05	34.14	17.96	56.30	46.30	-22.16	-28.34	L1
0.8540	30.16	19.65	0.07	30.23	19.72	56.00	46.00	-25.77	-26.28	L1
1.2300	28.06	15.79	0.07	28.13	15.86	56.00	46.00	-27.87	-30.14	L1
4.7940	26.21	14.97	0.10	26.31	15.07	56.00	46.00	-29.69	-30.93	L1
0.1580	36.02	25.98	0.12	36.14	26.10	65.57	55.57	-29.43	-29.47	L2
0.2100	32.63	18.59	0.12	32.75	18.71	63.21	53.21	-30.46	-34.50	L2
0.3500	37.34	29.97	0.13	37.47	30.10	58.96	48.96	-21.49	-18.86	L2
0.4860	27.86	14.52	0.13	27.99	14.65	56.24	46.24	-28.25	-31.59	L2
4.7660	20.84	10.18	0.23	21.07	10.41	56.00	46.00	-34.93	-35.59	L2
11.9460	15.80	11.27	0.37	16.17	11.64	60.00	50.00	-43.83	-38.36	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)

