CFR 47 FCC Part 15.249

Industry Canada RSS-210

TEST REPORT

Product ： **Transmitter**

Trade Name ： N/A

Model Number ： 7645A

FCC ID ： EZSDEI7645

IC ID ： 1513A-7645

Prepared for

DEI Headquarters, Inc.

One Viper Way, Vista CA 92081

Prepared by

Interocean EMC Technology Corp.
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Remark：

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The test results in the report only to the tested sample.

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Statement of Compliance

Applicant:	DEI Headquarters, Inc.
Manufacturer:	Nutek Corporation
Product:	Transmitter
Model No.:	7645A
Tested Power Supply:	DC 3V
Date of Final Test:	Sep. 11, 2012
Revision of Report:	Rev. 02

Configuration of Measurements and Standards Used：

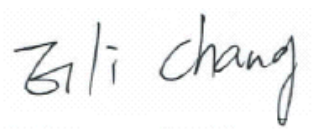
FCC Rules and Regulations Part 15 Subpart C
Industry Canada RSS-Gen Issue 3
Industry Canada RSS-210 Issue 8

I HEREBY CERTIFY THAT: The data shown in this report were made in accordance with the procedures given in ANSI C63.4, and the energy emitted by the device was founded to be within the limits applicable. I assume full responsibility for accuracy and completeness of these data.

Note: 1. The result of the testing report relate only to the item tested.

2. The testing report shall not be reproduced expect in full, without the written approval of IETC

Report Issued: 2012/12/05

Project Engineer:  Approved: 

Elli Chang Jerry Liu

1 General Information

1.1 Description of Equipment Under Test

Product	:	Transmitter
Model Number	:	7645A
Applicant	:	**DEI Headquarters, Inc.** One Viper Way, Vista CA 92081
Manufacturer	:	**Nutek Corporation** No.167, Lane 235, Bauchiau Rd., Xindian District, New Taipei City 23145, Taiwan
Operating Frequency	:	909.44MHz ~ 918.5MHz
Channel Number	:	Refer to section 1.2
Type of Modulation	:	FSK
Antenna description	:	N/A
Date of Test	:	Jul. 18 ~Sep. 11, 2012
Additional Description	:	1. The model **7645A** is representative selected in the test and included in this report. 2. For more detail specification about EUT, please refer to the user's manual.

1.2 Table for Carrier Frequencies

CH No.	FC (MHz)
CH0	909.4400
CH1	909.7670
CH2	910.0950
CH3	910.4520
CH4	910.8000
CH5	911.1580
CH6	911.5150
CH7	912.4570
CH8	912.8210
CH9	913.1710
CH10	913.5000
CH11	913.8290
CH12	914.1960

CH No.	FC (MHz)
CH13	914.5600
CH14	914.9090
CH15	915.2940
CH16	915.6570
CH17	916.0000
CH18	916.3640
CH19	916.7270
CH20	917.0730
CH21	917.4340
CH22	917.7870
CH23	918.1540
CH24	918.5000

1.3 Details of Tested Supporting System

N/A

1.4 Test Facility

Site Description : ☒Conduction 2 ☒OATS 2

Name of Firm : Interocean EMC Technology Corp.

Company web : http://www.ietc.com.tw

Site 1, 2, 3 Location : No.5-2, Lin 1, Tin-Fu Tsun, Lin-Kou Hsiang,
Taipei County, Taiwan, R.O.C.

Site Filing :

- Federal Communication Commissions – USA
  Registration No.: 96399 (OATS 1 & 2)
  Registration No.: 518958 (OATS 3)
  Designation No.: TW1020
- Voluntary Control Council for Interference by Information Technology Equipment (VCCI) – Japan
  Member No.: 1349
  Registration No. (Conducted Room): C-1094
  Registration No. (Conducted Room): T-1562
  Registration No. (OATS 1): R-1040; G-274
  Registration No. (OATS 2): R-1041
- Industry Canada (IC)
  OUR FILE: 46405-4437 Submission: 145171
  Registration No. (OATS 1): Site# 4437A-1
  Registration No. (OATS 2): Site# 4437A-2
  Registration No. (OATS 3): Site# 4437A-3

Site Accreditation :

- Bureau of Standards and Metrology and Inspection (BSMI) – Taiwan, R.O.C.
  Accreditation No.:
  SL2-IN-E-0026 for CNS13438 / CISPR22
  SL2-R1-E-0026 for CNS13439 / CISPR13
  SL2-R2-E-0026 for CNS13439 / CISPR13
  SL2-A1-E-0026 for CNS13783-1 / CISPR14-1
  SL2-L1-E-0026 for CNS 14115 / CISPR 15
- Taiwan Accreditation Foundation (TAF)
  Accrditation No.: 1113
- TüV NORD
  Certificate No: TNTW0801R-04

2 Test specifications

2.1 Test standard

The EUT was performed according to FCC Part 15 Subpart C Section 15.249 procedure and setup followed by ANSI C63.4, 2003 requirements.

2.2 Operation mode

By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that “X axis” position was the worst, then the final test was executed the worst condition and test data were recorded in this report

The EUT was operated in continuous transmission mode during all of the tests.

X axis mode

Y axis mode

Z axis mode

2.3 Test Equipment

Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
Spectrum Analyzer	R&S	FSP40	100478	2013/05/29
EMI Test Receiver	R&S	ESCS30	830245/027	2012/10/05
Preamplifier	Agilent	8449B	3008A01434	2013/05/02
Preamplifier	Agilent	83050A	3950A00225	2013/08/28
Horn Antenna	Schwarzbeck	BBHA 9120	9120D-583	2013/05/01
Biconical Antenna	Schwarzbeck	BBA 9106	VHA 9103-2419	2013/03/28
Log Antenna	Schwarzbeck	UHALP 9108 A	0739	2013/03/28
RF Cable	IETC	8DFB	CBL14	2013/07/12
RF Cable	HARBOUR	27478LL142	CBL22	2012/09/28

Note: The above equipments are within the valid calibration period.

2.4 Summary of Measurement

Clause	Test Parameter	Reference Document		Results
3	20dB Bandwidth	FCC 15.215		Pass
4	99% Occupied Bandwidth		RSS-Gen 4.3	Pass
5	RF Radiated spurious emissions	FCC 15.249(a)(c)(d)	RSS-210 Annex 2.9	Pass

2.5 Justification

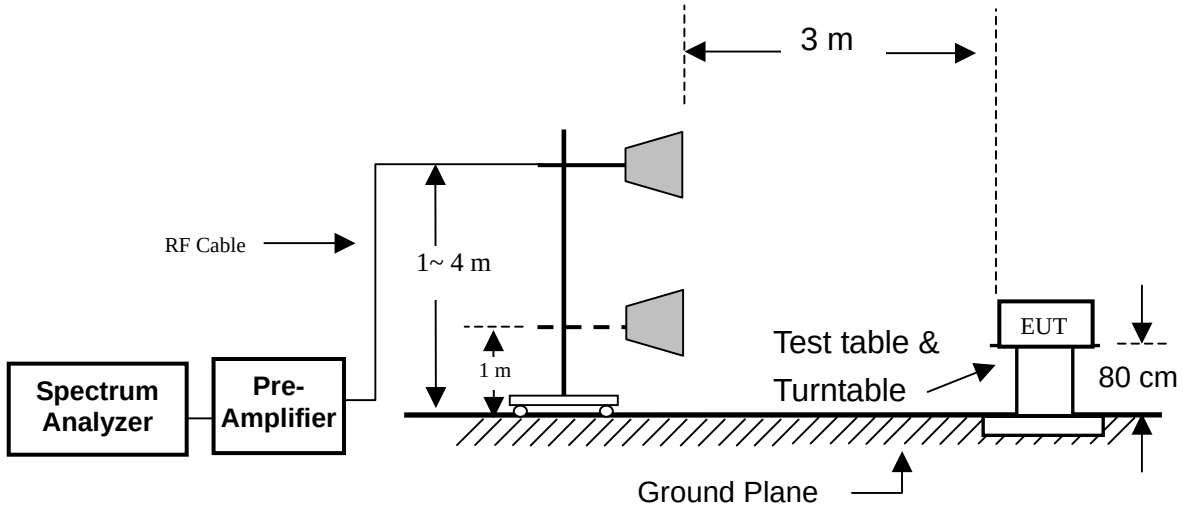
The test of radiated measurements according to FCC Part15 Section 15.33(a) & RSS-Gen had been conducted and the field strength of the frequency band were all arrive limit requirement, thus we evaluate the EUT pass the specified test.

3 20dB Bandwidth

3.1 Limit

According to FCC 15.215 requirement, there was no regulation limit and for reference purpose.

3.2 Configuration of Measurement



3.3 Test Procedure

The 20dB bandwidth per FCC §15.215 was measured using spectrum analyzer with the resolutions bandwidth set at 100 kHz, the video bandwidth≧RBW, and the SPAN may equal to approximately 2 to 3 time the 20dB bandwidth.

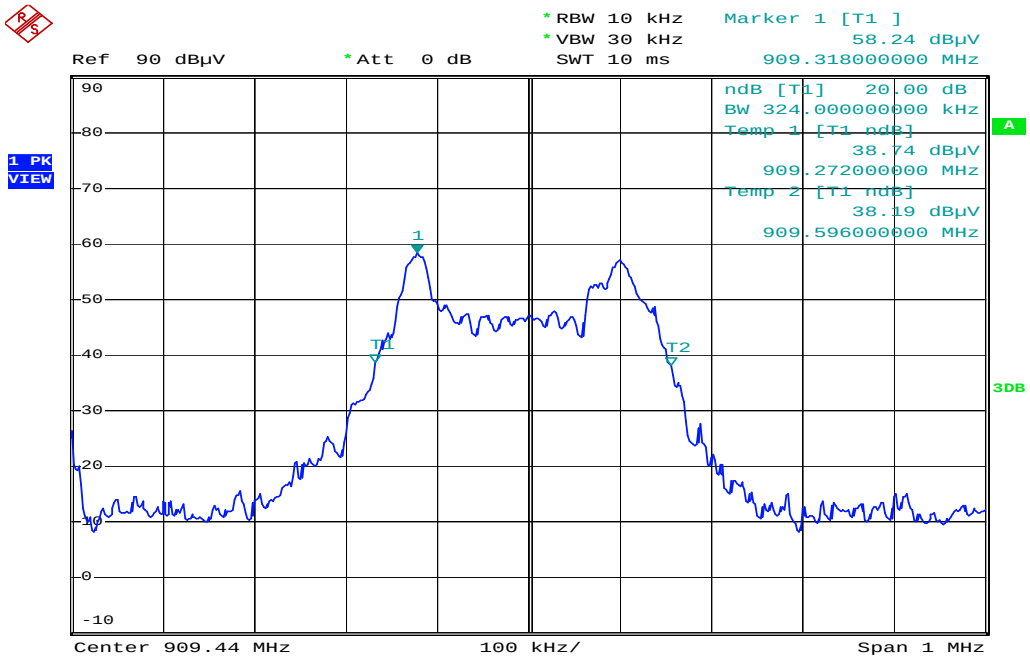
3.4 Test Result

PASS.

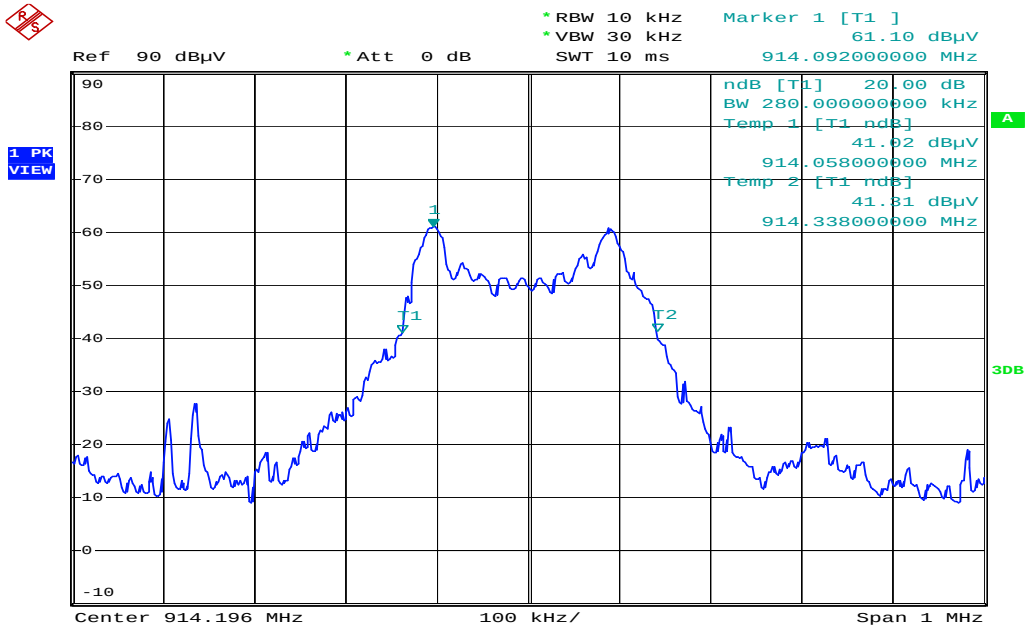
The final test data is shown as following pages.

Test CH		20dB Bandwidth (kHz)
Modulation	Frq. (MHz)	
FSK	909.440	324.00
	914.196	280.00
	918.500	280.00

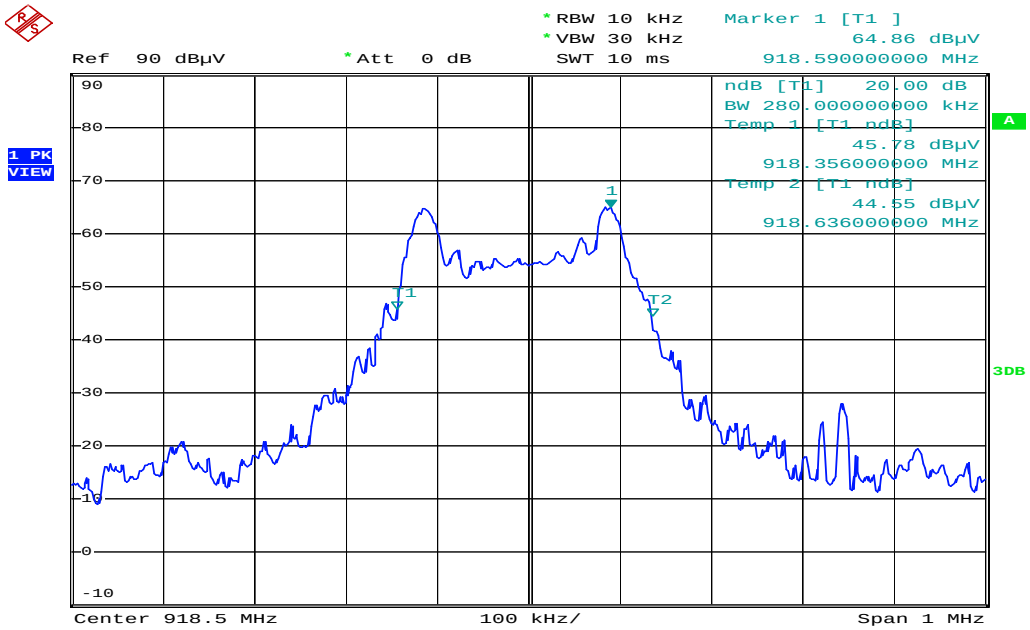
909.440 MHz 20dB BW



914.196 MHz 20dB BW



918.500 MHz 20dB BW

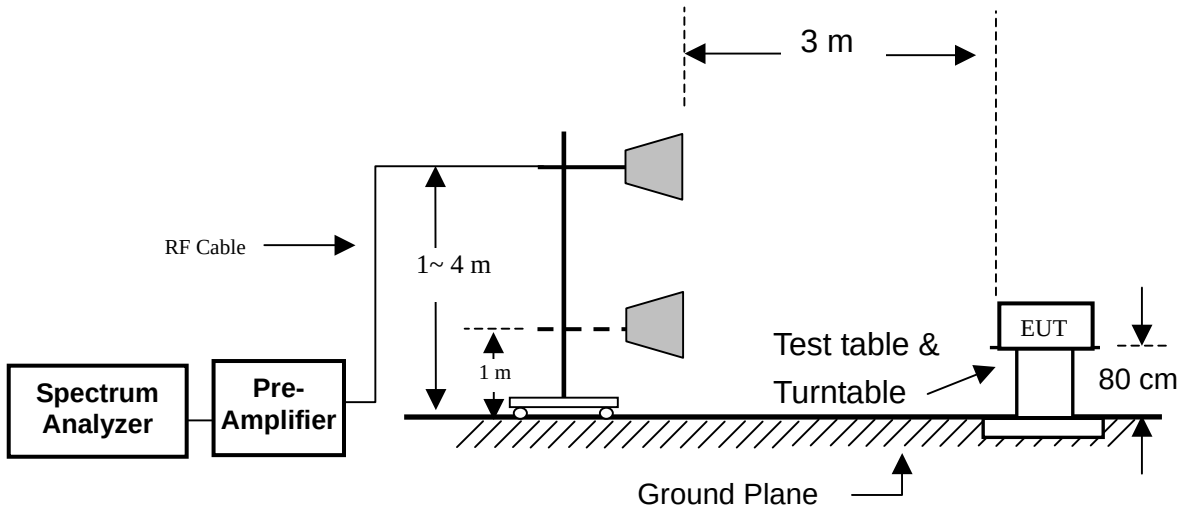


4 Occupied Bandwidth

4.1 Limit

According to RSS-Gen 4.3 & 4.6 requirement, there was no regulation limit and for reference purpose.

4.2 Configuration of Measurement



4.3 Test Procedure

The transmitter shall be operated at its maximum carrier power measured under normal test conditions. 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 the two recorded frequencies is the occupied bandwidth.

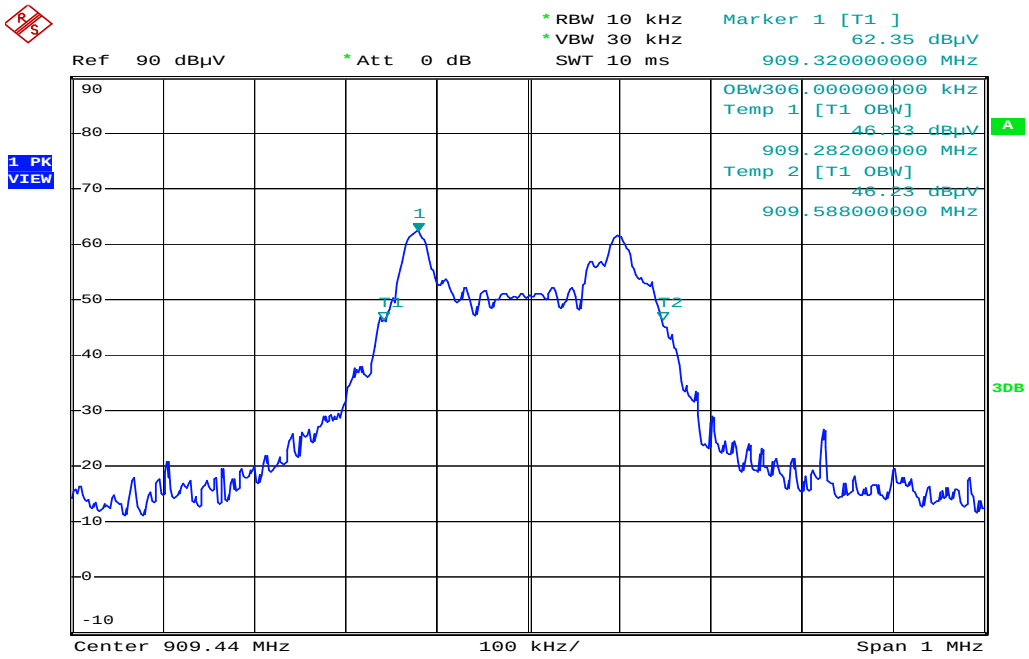
4.4 Test Result

PASS.

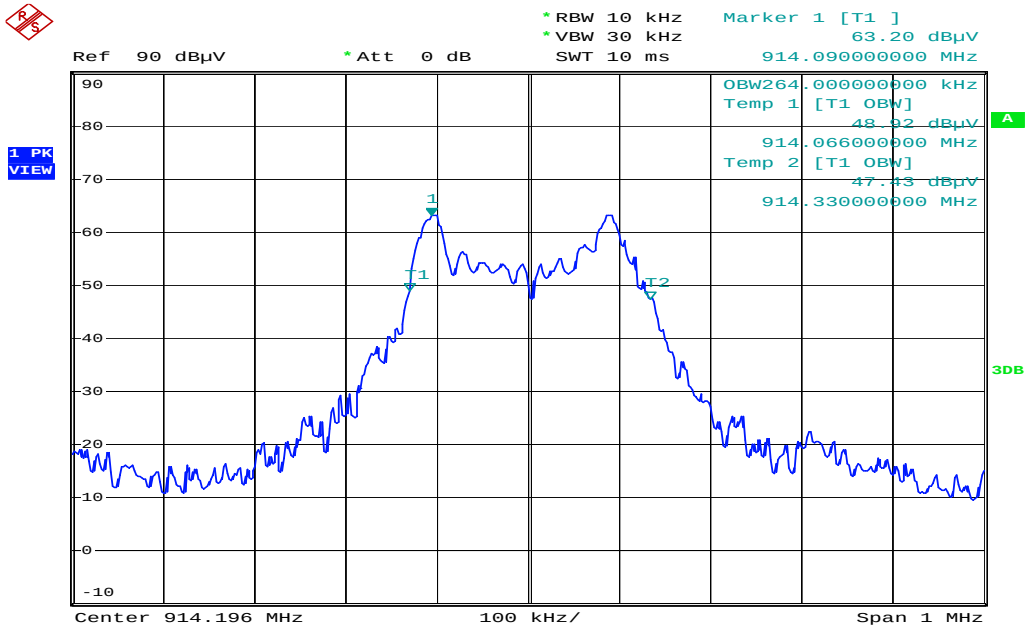
The final test data is shown as following pages.

Test CH		99% Occupied Bandwidth (kHz)
Modulation	Frq. (MHz)	
FSK	909.440	306.00
	914.196	264.00
	918.500	272.00

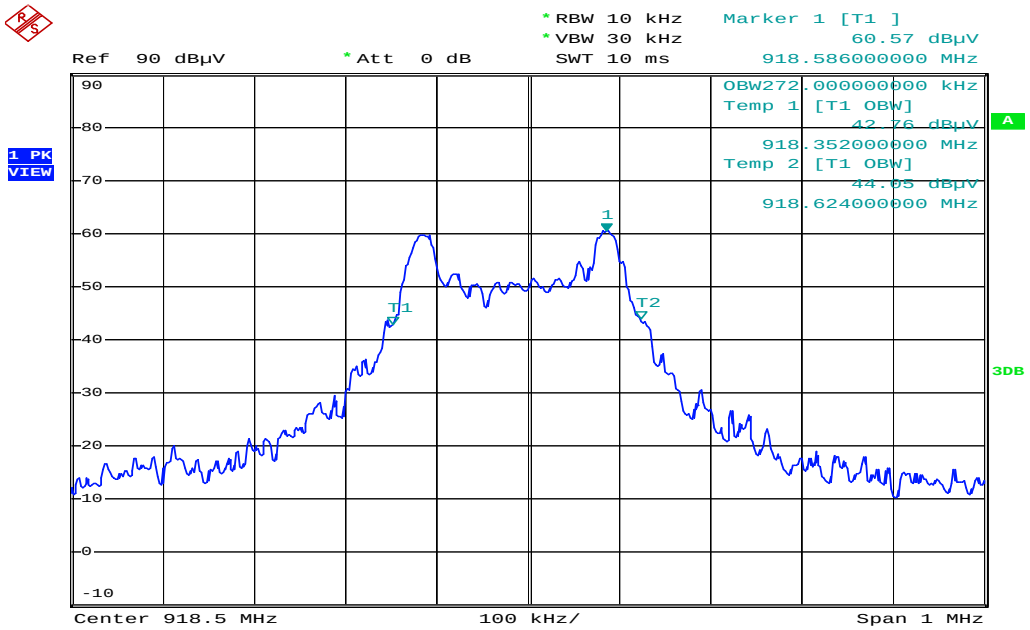
909.440 MHz 99% Occupied Bandwidth



914.196 MHz 99% Occupied Bandwidth



918.500 MHz 99% Occupied Bandwidth



5 RF Radiated spurious emissions

5.1 Limit

According to §15.249 (a) & RSS-210 Annex 2.9, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

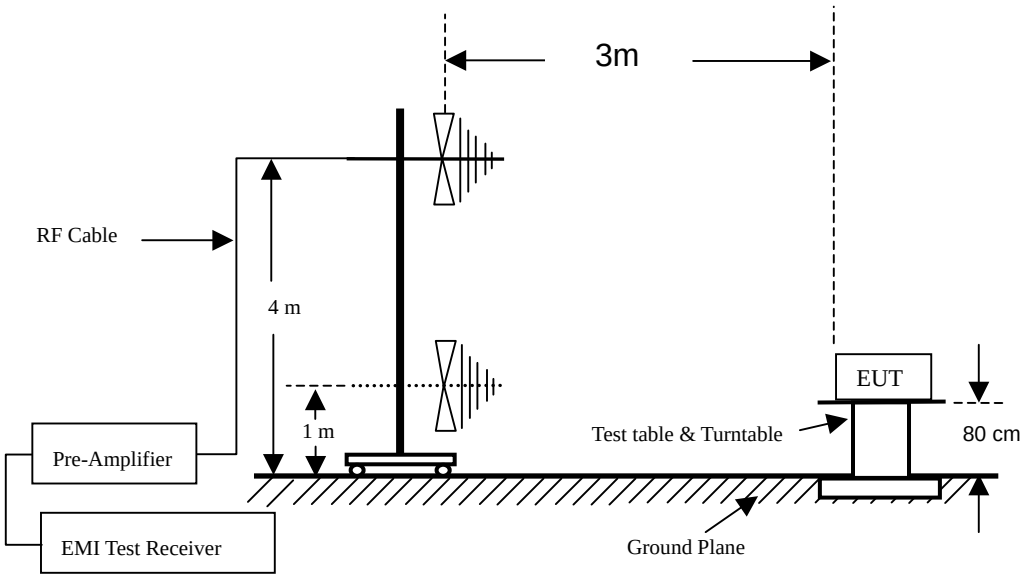
Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

For intentional radiator, the radiated emission shall comply with FCC 15.209(a) & RSS-Gen 7.2.5.

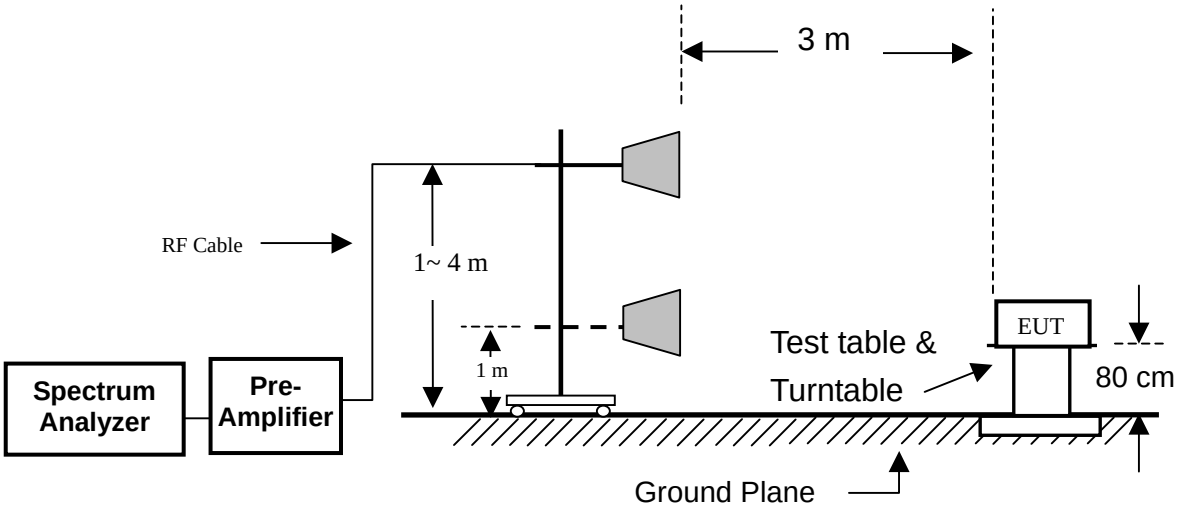
Frequency (MHz)	Field strength dB(μV/m)	Measurement distance (meters)
30 ~ 88	40	3
88~216	43.5	3
216~960	46	3
Above 960	54	3

5.2 Configuration of Measurement

Measurement Frequency under 1GHz



Measurement Frequency above 1GHz



5.3 Test Procedure

The EUT was setup to ANSI C63.4, 2003.

Radiated emission measurements were performed from 30MHz to 25GHz. Spectrum Analyzer set as below: For frequency range from 30MHz to 1GHz: RBW=100kHz or greater. For frequencies above 1GHz: set RBW=VBW=1MHz for peak detector and RBW=1MHz, VBW=10Hz for average detector.

The EUT for testing is arranged on a wooden turntable. If some peripherals apply to the EUT, the peripherals will be connected to EUT and the whole system. During the test, all cables were arranged to produce worst-case emissions. The signal is maximized through rotation. The height of antenna and polarization is changing constantly for exploring for maximum signal level. The height of antenna can be up to 4 meter and down to 1 meter.

5.4 The description of operation mode

Setup EUT to continuously transmit signal with 100% duty cycle during the test period.

5.5 Test Result

PASS.

The final test data is shown on as following pages.

Fundamental Field Strength

Test Environment

Ambient temperature ： 25.5℃

Relative humidity ： 47%

Channel 0								
Frequency (MHz)	Antenna Polarization	Reading (dB μV)	Preamp (dB)	Correction Factor (dB/m)	Corrected Level (dB μV/m)	Limits (dB μV/m)	Margin (dB)	Det. Mode
909.440	H	54.98	29.55	30.00	55.43	94	-38.57	PK
909.440	V	57.17	29.55	29.31	56.93	94	-37.07	PK

Channel 12								
Frequency (MHz)	Antenna Polarization	Reading (dB μV)	Preamp (dB)	Correction Factor (dB/m)	Corrected Level (dB μV/m)	Limits (dB μV/m)	Margin (dB)	Det. Mode
914.196	H	55.69	29.63	30.04	56.10	94	-37.90	PK
914.196	V	56.97	29.63	29.38	56.72	94	-37.28	PK

Channel 24								
Frequency (MHz)	Antenna Polarization	Reading (dB μV)	Preamp (dB)	Correction Factor (dB/m)	Corrected Level (dB μV/m)	Limits (dB μV/m)	Margin (dB)	Det. Mode
918.500	H	55.56	29.70	30.06	55.92	94	-38.08	PK
918.500	V	56.31	29.70	29.45	56.06	94	-37.94	PK

Remark ：

1. Corrected Level = Reading – Preamp + Correction Factor
2. Correction Factor = Antenna Factor + Cable Loss

Radiated spurious emission

Test Environment

Ambient temperature ： 25.5℃

Relative humidity ： 47%

Radiated Emission below 1GHz

After verifying low, middle and high channel (909.440MHz, 914.196MHz and 918.500MHz), the worse case was found at low channel, the data will present on report.

Worst case: Channel 0								
Frequency (MHz)	Antenna Polarization	Reading (dB μV)	Preamp (dB)	Correction Factor (dB/m)	Corrected Level (dB μV/m)	Limits (dB μV/m)	Margin (dB)	Det. Mode
132.360	H	40.79	29.92	15.93	26.80	43.52	-16.72	QP
184.590	H	37.74	29.75	18.90	26.89	43.52	-16.63	QP
249.310	H	40.10	30.00	20.86	30.96	46.02	-15.06	QP
304.180	H	41.67	29.80	17.75	29.62	46.02	-16.40	QP
399.240	H	38.73	29.59	20.91	30.05	46.02	-15.97	QP
463.230	H	35.75	29.45	22.04	28.34	46.02	-17.68	QP
65.930	V	46.95	30.44	8.02	24.53	40.00	-15.47	QP
156.280	V	39.72	30.20	18.33	27.85	43.52	-15.67	QP
219.220	V	41.17	30.05	20.28	31.40	46.02	-14.62	QP
266.380	V	37.79	30.07	21.92	29.64	46.02	-16.38	QP
370.050	V	39.00	29.40	19.48	29.08	46.02	-16.94	QP
438.770	V	37.05	29.32	21.10	28.83	46.02	-17.19	QP

Remark ： Corrected Level = Reading + Correction Factor – Preamp
Correction Factor = Antenna Factor + Cable Loss
The present spurious only show those points are above noise level and the frequency range test from 30MHz to 1GHz.

Radiated spurious emission

Radiated Emission above 1GHz

Channel 0								
Frequency (MHz)	Antenna Polarization	Reading (dB μ V)	Preamp (dB)	Correction Factor (dB/m)	Corrected Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Det. Mode
1818.880	H	48.88	26.16	29.75	52.47	54.00	-1.53	PK
2728.320	H	42.54	26.25	32.59	48.88	54.00	-5.12	PK
3637.760	H	45.25	26.17	33.95	53.03	54.00	-0.97	PK
4547.200	H	40.80	26.09	36.53	51.24	54.00	-2.76	PK
5456.640	H	39.88	25.91	38.25	52.22	54.00	-1.78	PK
6366.080	H	37.89	25.73	40.73	52.89	54.00	-1.11	PK
*7275.520	H	35.67	25.73	43.15	53.09	54.00	-0.91	PK
1818.880	V	51.48	26.16	29.75	55.07	74.00	-18.93	PK
1818.880	V	45.88	26.16	29.75	49.47	54.00	-4.53	AV
2728.320	V	41.90	26.25	32.59	48.24	54.00	-5.76	PK
3637.760	V	47.25	26.17	33.95	55.03	74.00	-18.97	PK
3637.760	V	41.68	26.17	33.95	49.46	54.00	-4.54	AV
4547.200	V	40.50	26.09	36.53	50.94	54.00	-3.06	PK
5456.640	V	36.38	25.91	38.26	48.73	54.00	-5.27	PK
6366.080	V	34.49	25.73	40.73	49.49	54.00	-4.51	PK
*7275.520	V	35.58	25.73	43.15	53.00	54.00	-1.00	PK

Channel 12								
Frequency (MHz)	Antenna Polarization	Reading (dB μV)	Preamp (dB)	Correction Factor (dB/m)	Corrected Level (dB μV/m)	Limits (dB μV/m)	Margin (dB)	Det. Mode
1828.392	H	48.34	26.17	29.78	51.95	54.00	-2.05	PK
2742.588	H	41.18	26.25	32.62	47.55	54.00	-6.45	PK
3656.784	H	44.71	26.17	34.00	52.54	54.00	-1.46	PK
4570.980	H	41.85	26.09	36.59	52.35	54.00	-1.65	PK
5485.176	H	40.31	25.90	38.25	52.66	54.00	-1.34	PK
6399.372	H	38.78	25.72	40.73	53.79	54.00	-0.21	PK
*7313.568	H	35.56	25.71	43.26	53.11	54.00	-0.89	PK
1828.392	V	50.88	26.17	29.78	54.49	74.00	-19.51	PK
1828.392	V	44.69	26.17	29.78	48.30	54.00	-5.70	AV
2742.588	V	42.67	26.25	32.62	49.04	54.00	-4.96	PK
3656.784	V	47.21	26.17	34.00	55.04	74.00	-18.96	PK
3656.784	V	42.14	26.17	34.00	49.97	54.00	-4.03	AV
4570.980	V	40.69	26.09	36.59	51.19	54.00	-2.81	PK
5485.176	V	40.69	25.90	38.30	53.09	54.00	-0.91	PK
6399.372	V	35.87	25.72	40.83	50.98	54.00	-3.02	PK
*7313.568	V	35.65	25.71	43.26	53.20	54.00	-0.80	PK

Channel 24								
Frequency (MHz)	Antenna Polarization	Reading (dB μV)	Preamp (dB)	Correction Factor (dB/m)	Corrected Level (dB μV/m)	Limits (dB μV/m)	Margin (dB)	Det. Mode
1837.000	H	47.31	26.17	29.80	50.94	54.00	-3.06	PK
2755.500	H	41.83	26.25	32.65	48.23	54.00	-5.77	PK
3674.000	H	43.07	26.17	34.06	50.96	54.00	-3.04	PK
4592.500	H	40.80	26.08	36.65	51.37	54.00	-2.63	PK
5511.000	H	40.59	25.90	38.34	53.03	54.00	-0.97	PK
6429.500	H	37.99	25.71	40.93	53.21	54.00	-0.79	PK
*7348.000	H	35.92	25.69	43.37	53.60	54.00	-0.40	PK
1837.000	V	49.97	26.17	29.80	53.60	54.00	-0.40	PK
2755.500	V	43.87	26.25	32.65	50.27	54.00	-3.73	PK
3674.000	V	46.93	26.17	34.06	54.82	74.00	-19.18	PK
3674.000	V	40.90	26.17	34.06	48.79	54.00	-5.21	AV
4592.500	V	40.71	26.08	36.65	51.28	54.00	-2.72	PK
5511.000	V	36.11	25.90	38.34	48.55	54.00	-5.45	PK
6429.500	V	35.50	25.71	40.93	50.72	54.00	-3.28	PK
*7348.000	V	34.98	25.69	43.37	52.66	54.00	-1.34	PK
1837.000	H	47.31	26.17	29.80	50.94	54.00	-3.06	PK

Remark ： Corrected Level = Reading + Correction Factor – Preamp
Correction Factor = Antenna Factor + Cable Loss
* Mark indicated background noise level.