

FCC Test Report (Class II Permissive Change)

Product Name	902-928 MHZ TRANSCEIVER
Model No.	A110LR09A and A110LR09C*
FCC ID.	X7J-A11072401

Applicant	Anaren, Inc.
Address	6635 Kirkville Road, East Syracuse, NY 13057-9600

Date of Receipt	Sep. 18, 2015
Issued Date	Oct. 15, 2015
Report No.	1590563R-RFUSP02V00
Report Version	V2.0



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.

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Test Report

Issued Date: Oct. 15, 2015

Report No.: 1590563R-RFUSP02V00



Product Name	902-928 MHZ TRANSCEIVER
Applicant	Anaren, Inc.
Address	6635 Kirkville Road, East Syracuse, NY 13057-9600
Manufacturer	Anaren, Inc.
Model No.	A110LR09A and A110LR09C*
FCC ID.	X7J-A11072401
EUT Rated Voltage	DC 3.7V (By Battery)
EUT Test Voltage	DC 3.7V (By Battery)
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2014 ANSI C63.4: 2014, ANSI C63.10: 2013 KDB 558074 D01 DTS Meas Guidance v03r04
Test Result	Complied

Documented By :

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Tested By :

Jack Hsu

(Engineer / Jack Hsu)

Approved By :

Vincent Lin

(Director / Vincent Lin)

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	902-928 MHZ TRANSCEIVER
Model No.	A110LR09A and A110LR09C*
FCC ID.	X7J-A11072401
Frequency Range	902.700 – 927.377MHz
Channel Number	DSSS: 3CH
Type of Modulation	2FSK
Antenna Type	Monopole Antenna
Channel Control	Auto
Test Platform	Brand Name: TritonWear, M/N: Triton Connect
Antenna Gain	Refer to the table “Antenna List”

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain	Remark
1	Anaren, Inc.	N/A	Monopole Antenna	2.0 dBi	Original
2	Anaren, Inc.	N/A	PCB Antenna	0 dBi	Original
3	Linx.	ANT-916-CW-RAH	Monopole Antenna	2.2 dBi	New

Note:

1. The antenna of EUT is conform to FCC 15.203.

Center Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 00:	902.7 MHz	Channel 01:	914.988 MHz	Channel 02:	927.377 MHz

Note:

1. The EUT is a 902-928 MHZ TRANSCEIVER RF ID module.
2. These tests were conducted on a sample for the purpose of demonstrating compliance of 902-928 MHZ TRANSCEIVER with Part 15 Subpart C Paragraph 15.247 for spread spectrum devices.
3. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
4. This is to request an existing family approval for FCC ID: X7J-A11072401. Originally granted on 03th Nov., 2011

The major change filed under this application is:

- (1) Addition a new antenna (ANT-916-CW-RAH), the antenna gain is higher with the original application.

Test Mode	Mode 1: Transmit
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1.2. Operational Description

The EUT is a 902-928 MHZ TRANSCEIVER RF ID module, the number of the channels is 3 in DSSS mode. This device were measured for the 2FSK modulation . The antenna is Monopole Antenna and provides diversity function to improve the receiving function.

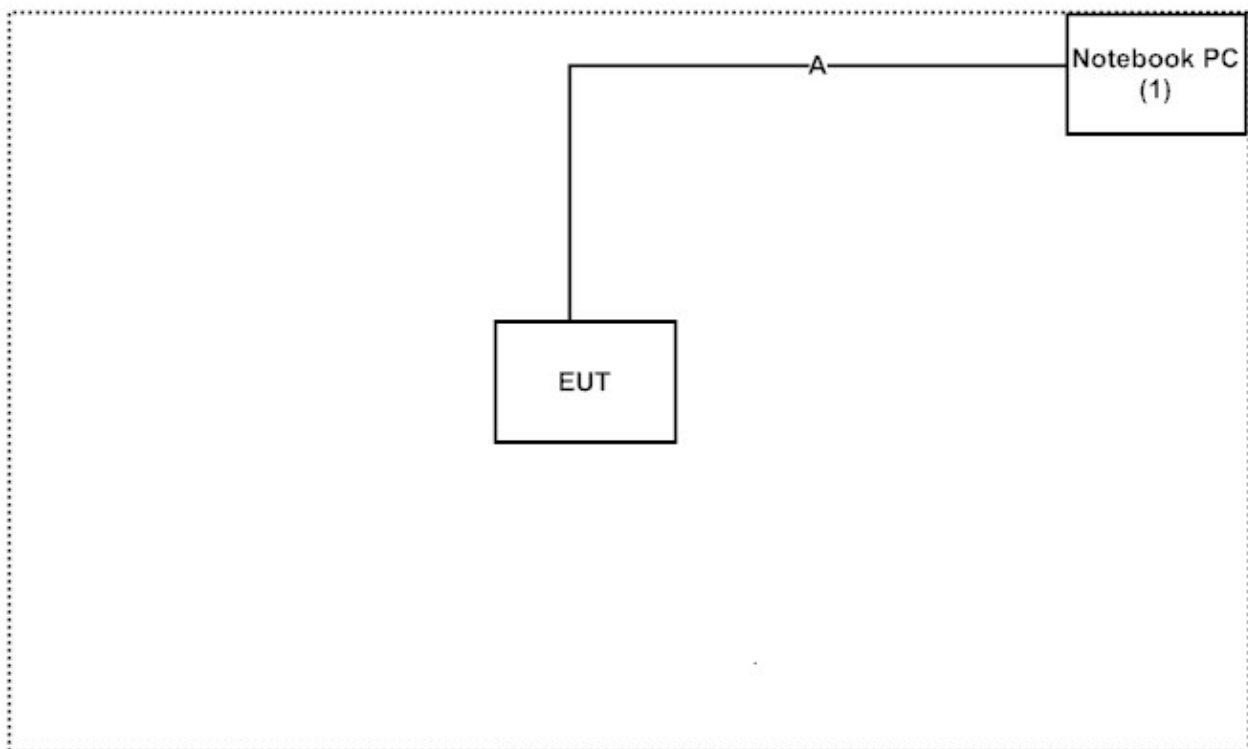
1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	Power Cord	
1	Notebook PC	DELL	Latitude E7440	2BMFTY1	Non-Shielded, 0.8m

Signal Cable Type	Signal cable Description	
A	USB Cable	Non-Shielded, 1.0m

1.4. Configuration of Tested System



1.5. EUT Exercise Software

1. Setup the EUT as shown in Section 1.4.
2. Execute software “Cool Term V1.4.5 ” on the EUT.
3. Configure the test mode, the test channel, and the data rate.
4. Press “OK” to start the continuous Transmit.
5. Verify that the EUT works properly.

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	30-65
Barometric pressure (mbar)	860-1060	950-1000

The related certificate for our laboratories about the test site and management system can be downloaded from Quietek Corporation's Web Site: <http://www.quietek.com/chinese/about/certificates.aspx?bval=5>

The address and introduction of Quietek Corporation's laboratories can be founded in our Web site: <http://www.quietek.com/>

Site Description: File on
 Federal Communications Commission
 FCC Engineering Laboratory
 7435 Oakland Mills Road
 Columbia, MD 21046
 Registration Number: 92195

Site Name: Quietek Corporation
 Site Address: No.5-22, Ruishukeng,
 Linkou Dist. New Taipei City 24451,
 Taiwan, R.O.C.
 TEL: 886-2-8601-3788 / FAX : 886-2-8601-3789
 E-Mail : service@quietek.com

FCC Accreditation Number: TW1014

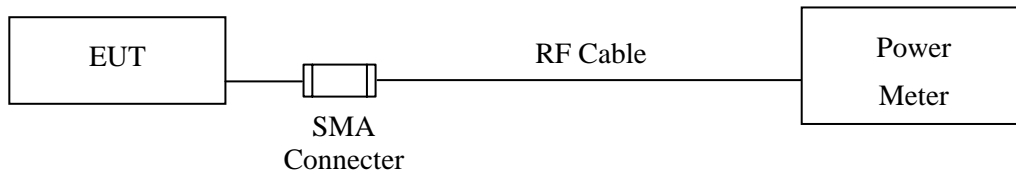
2. Peak Power Output

2.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Power Meter	Anritsu	ML2495A/6K00003357	May, 2015
X	Power Sensor	Anritsu	MA2411B/0738448	Jun., 2015

Note: 1. All equipments are calibrated every one year.
2. The test instruments marked by “X” are used to measure the final test results.

2.2. Test Setup



2.3. Limit

The maximum peak power shall be less 1Watt.

2.4. Test Procedure

Tested according to DTS test procedure of KDB 558074 for compliance to FCC 47CFR 15.247 requirements. The maximum peak conducted output power using KDB 558074 section 9.1.2 PKPM1 Peak power meter method.

2.5. Uncertainty

± 1.27 dB

2.6. Test Result of Peak Power Output

Product : 902-928 MHZ TRANSCEIVER
Test Item : Peak Power Output
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit

Channel No.	Frequency (MHz)	Measurement (dBm)	Required Limit	Result
Channel 00	902.700	11.98	1 Watt= 30 dBm	Pass
Channel 01	914.988	11.86	1 Watt= 30 dBm	Pass
Channel 02	927.377	11.89	1 Watt= 30 dBm	Pass

3. Radiated Emission

3.1. Test Equipment

The following test equipments are used during the radiated emission test:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒ Site # 3	X	Loop Antenna	Teseq	HLA6120 / 26739	Jul., 2015
	X	Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2015
	X	Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2015
	X	Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2015
	X	Pre-Amplifier	Agilent	8447D/2944A09549	Sep., 2015
	X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2015
	X	Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2015
	X	Coaxial Cable	QuieTek	QTK-CABLE/ CAB5	Feb., 2015
	X	Controller	QuieTek	QTK-CONTROLLER/ CTRL3	N/A
X	Coaxial Switch	Anritsu	MP59B/6200265729	N/A	

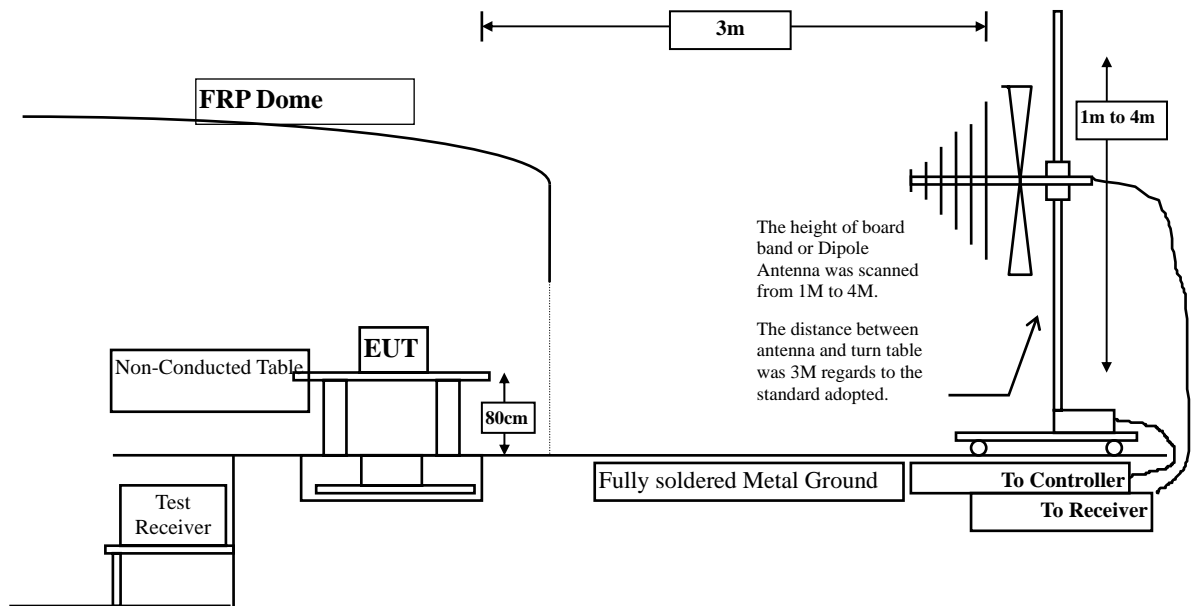
- Note: 1. All equipments are calibrated every one year.
2. The test instruments marked by “X” are used to measure the final test results.

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒ CB # 8	X	Spectrum Analyzer	R&S	FSP40/ 100339	Oct, 2015
	X	Horn Antenna	ETS-Lindgren	3117/ 35205	Mar, 2015
	X	Horn Antenna	Schwarzbeck	BBHA9170/209	Jan, 2015
	X	Horn Antenna	TRC	AH-0801/95051	Aug, 2015
	X	Pre-Amplifier	EMCI	EMC012630SE/980210	Jan, 2015
	X	Pre-Amplifier	MITEQ	JS41-001040000-58-5P/153945	Jul, 2015
	X	Pre-Amplifier	NARDA	DBL-1840N506/013	Jul, 2015

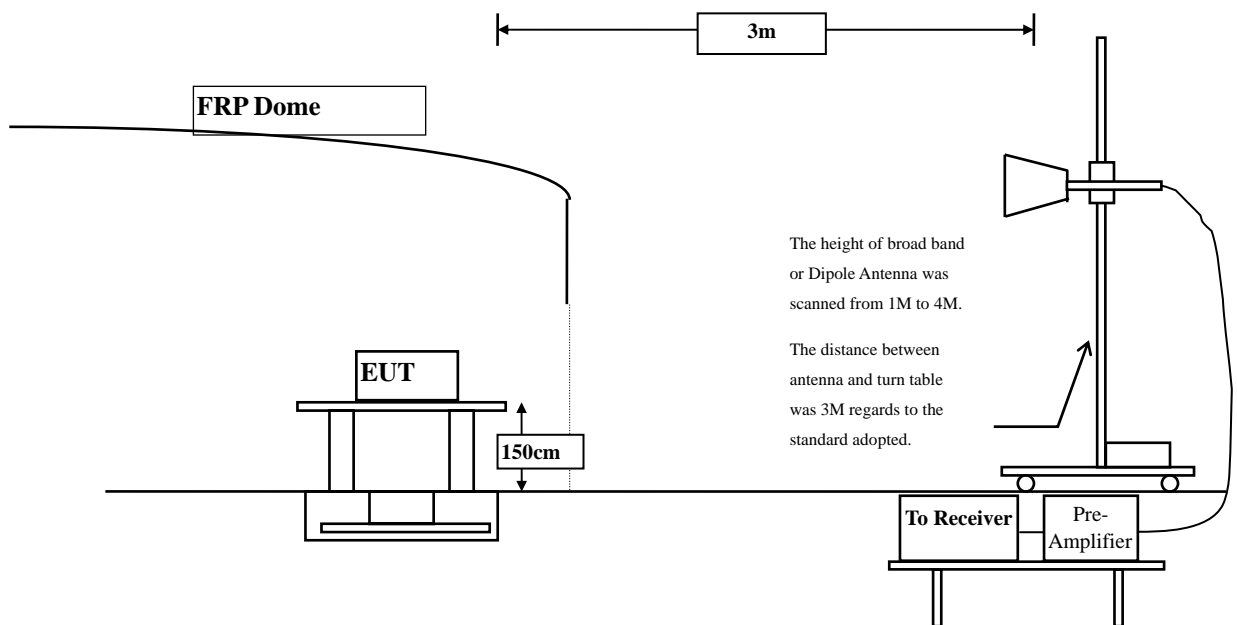
- Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
2. The test instruments marked with “X” are used to measure the final test results.

3.2. Test Setup

Below 1GHz



Above 1GHz



3.3. Limits

➤ General Radiated Emission Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209 Limits		
Frequency MHz	Field strength (microvolts/meter)	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

- Remarks:
1. RF Voltage (dB μ V) = 20 log RF Voltage (uV)
 2. In the Above Table, the tighter limit applies at the band edges.
 3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3.4. Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground, when measuring the frequency range above 1GHz, the EUT is placed on a turn table which is 1.5 meter above ground.

The turn table is rotated 360 degrees to determine the position of the maximum emission level.

The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2013 on radiated measurement.

The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.

Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

The worst radiated emission is measured in the Open Area Test Site on the Final Measurement.

The measurement frequency range from 9kHz - 10th Harmonic of fundamental was investigated.

3.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

3.6. Test Result of Radiated Emission

Product : 902-928 MHZ TRANSCEIVER
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (902.7MHz)

Frequency MHz	Correct Factor dB	Reading Level dB μ V	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m
Horizontal					
Peak Detector:					
1805.200	-4.447	39.930	35.483	-38.517	74.000
2707.800	-1.191	40.060	38.869	-35.131	74.000
3610.400	-0.157	41.020	40.863	-33.137	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
1805.200	-2.487	39.590	37.103	-36.897	74.000
2707.800	-1.332	40.390	39.058	-34.942	74.000
3610.400	0.466	40.260	40.726	-33.274	74.000
Average Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : 902-928 MHZ TRANSCEIVER
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (914.988MHz)

Frequency MHz	Correct Factor dB	Reading Level dB μ V	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m
Horizontal					
Peak Detector:					
1830.000	-4.316	39.910	35.593	-38.407	74.000
2745.000	-0.944	38.290	37.345	-36.655	74.000
3660.000	-0.665	38.330	37.664	-36.336	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
1830.000	-2.761	40.630	37.869	-36.131	74.000
2745.000	-1.110	37.760	36.649	-37.351	74.000
3660.000	0.279	41.860	42.139	-31.861	74.000
Average Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : 902-928 MHZ TRANSCEIVER
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (927.377MHz)

Frequency MHz	Correct Factor dB	Reading Level dB μ V	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m
Horizontal					
Peak Detector:					
1854.000	-4.186	39.540	35.354	-38.646	74.000
2781.000	-0.705	39.680	38.974	-35.026	74.000
3708.000	-0.982	40.490	39.508	-34.492	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
1854.000	-3.031	40.430	37.399	-36.601	74.000
2781.000	-0.897	40.190	39.293	-34.707	74.000
3708.000	0.210	41.240	41.450	-32.550	74.000
Average Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : 902-928 MHZ TRANSCEIVER
 Test Item : General Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (902.7MHz)

Frequency MHz	Correct Factor dB	Reading Level dB μ V	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m
Horizontal					
105.660	-3.862	29.402	25.540	-48.460	74.000
336.520	-3.440	31.785	28.345	-45.655	74.000
431.580	-3.291	33.294	30.003	-43.997	74.000
606.180	-3.084	33.041	29.957	-44.043	74.000
720.640	-2.949	39.002	36.053	-37.947	74.000
961.200	-2.710	40.328	37.618	-36.382	74.000
Vertical					
227.880	-8.519	28.032	19.514	-26.486	46.000
373.380	-2.373	28.749	26.376	-19.624	46.000
528.580	-0.462	29.329	28.867	-17.133	46.000
623.640	-2.631	31.731	29.100	-16.900	46.000
817.640	3.272	27.903	31.175	-14.825	46.000
961.200	7.260	31.111	38.371	-15.629	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

Product : 902-928 MHZ TRANSCEIVER
 Test Item : General Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (914.988MHz)

Frequency MHz	Correct Factor dB	Reading Level dBμV	Measurement Level dBμV/m	Margin dB	Limit dBμV/m
Horizontal					
122.783	-9.884	47.632	37.748	-5.752	43.500
212.754	-10.863	48.915	38.053	-5.447	43.500
312.565	-4.081	40.151	36.070	-9.930	46.000
336.464	-3.859	38.359	34.500	-11.500	46.000
664.014	2.066	36.590	38.656	-7.344	46.000
803.188	5.066	39.060	44.125	-1.875	46.000
Vertical					
98.884	-0.706	26.853	26.147	-17.353	43.500
371.609	-2.706	26.883	24.178	-21.822	46.000
541.710	-0.172	24.634	24.462	-21.538	46.000
687.913	2.458	24.366	26.824	-19.176	46.000
768.043	2.727	24.596	27.322	-18.678	46.000
888.942	2.528	28.880	31.408	-14.592	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

Product : 902-928 MHZ TRANSCEIVER
 Test Item : General Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (927.377MHz)

Frequency MHz	Correct Factor dB	Reading Level dB μ V	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m
Horizontal					
103.720	-6.751	33.624	26.872	-16.628	43.500
239.520	-6.851	29.391	22.541	-23.459	46.000
431.580	-2.099	32.011	29.912	-16.088	46.000
573.200	2.537	26.764	29.301	-16.699	46.000
745.860	3.308	27.359	30.667	-15.333	46.000
912.700	6.132	26.953	33.085	-12.915	46.000
Vertical					
57.160	-4.403	27.549	23.146	-16.854	40.000
161.920	-6.696	29.884	23.189	-20.311	43.500
386.960	-3.064	29.633	26.569	-19.431	46.000
623.640	-2.631	32.656	30.025	-15.975	46.000
817.640	3.272	28.057	31.329	-14.671	46.000
912.700	1.762	27.251	29.013	-16.987	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

Product : 902-928 MHZ TRANSCEIVER
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (BLE -2402MHz + RF ID-902.7MHz)

Frequency MHz	Correct Factor dB	Reading Level dBμV	Measurement Level dBμV/m	Margin dB	Limit dBμV/m
Horizontal					
Peak Detector:					
1805.000	0.900	33.995	34.895	-39.105	74.000
2708.000	-3.125	43.313	40.188	-33.812	74.000
3610.000	-1.079	43.962	42.883	-31.117	74.000
4804.000	2.511	46.111	48.621	-25.379	74.000
7206.000	9.511	42.788	52.299	-21.701	74.000
9608.000	10.394	43.494	53.888	-20.112	74.000
Average					
Detector:					
--					
Vertical					
Peak Detector:					
1805.000	1.374	34.116	35.489	-38.511	74.000
2708.000	2.100	36.397	38.496	-35.504	74.000
3610.000	-0.736	43.618	42.882	-31.118	74.000
4804.000	2.923	45.800	48.722	-25.278	74.000
7206.000	9.988	42.859	52.848	-21.152	74.000
9608.000	10.847	43.146	53.993	-20.007	74.000
Average					
Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : 902-928 MHZ TRANSCEIVER
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (BLE-2440MHz + RF ID-914.988MHz)

Frequency MHz	Correct Factor dB	Reading Level dB μ V	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m
Horizontal					
Peak Detector:					
1829.000	-0.612	36.940	36.328	-37.672	74.000
2744.000	0.823	35.370	36.192	-37.808	74.000
3659.000	-1.466	40.437	38.971	-35.029	74.000
4880.000	2.038	48.712	50.750	-23.250	74.000
7320.000	9.699	42.473	52.172	-21.828	74.000
9760.000	9.665	44.175	53.840	-20.160	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
1829.000	0.049	39.404	39.453	-34.547	74.000
2744.000	-0.049	34.949	34.899	-39.101	74.000
3659.000	-1.265	41.081	39.817	-34.183	74.000
4880.000	2.499	48.138	50.637	-23.363	74.000
7320.000	10.303	42.789	53.092	-20.908	74.000
9760.000	10.299	44.505	54.805	-19.195	74.000
Average Detector:					
9760.000	10.299	29.884	40.184	-13.816	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : 902-928 MHZ TRANSCEIVER
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (BLE-2480MHz + RF ID-927.377MHz)

Frequency MHz	Correct Factor dB	Reading Level dB μ V	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m
Horizontal					
Peak Detector:					
1854.000	-1.771	38.060	36.288	-37.712	74.000
2781.000	0.150	37.289	37.439	-36.561	74.000
3708.000	-2.045	42.603	40.557	-33.443	74.000
4960.000	2.582	49.962	52.544	-21.456	74.000
7440.000	10.555	42.315	52.870	-21.130	74.000
9920.000	10.206	43.509	53.715	-20.285	74.000
Average					
Detector:					
--					
Vertical					
Peak Detector:					
1854.000	-1.401	39.515	38.114	-35.886	74.000
2781.000	-0.769	40.124	39.355	-34.645	74.000
3708.000	-1.687	40.963	39.275	-34.725	74.000
4960.000	3.398	49.316	52.715	-21.285	74.000
7440.000	11.214	42.446	53.660	-20.340	74.000
9920.000	11.245	43.252	54.497	-19.503	74.000
Average					
Detector:					
9920.000	11.245	29.368	40.613	-13.387	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : 902-928 MHZ TRANSCEIVER
 Test Item : General Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (BLE-2402MHz + RF ID-902.7MHz)

Frequency MHz	Correct Factor dB	Reading Level dB μ V	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m
Horizontal					
62.980	-12.319	42.583	30.264	-9.736	40.000
224.000	-10.069	50.308	40.239	-5.761	46.000
352.040	-1.282	37.508	36.226	-9.774	46.000
547.980	4.028	23.187	27.215	-18.785	46.000
786.600	5.824	24.763	30.588	-15.412	46.000
974.780	7.039	23.581	30.620	-23.380	54.000
Vertical					
61.040	-11.587	47.246	35.659	-4.341	40.000
224.000	-6.379	42.702	36.323	-9.677	46.000
352.040	-1.292	32.025	30.733	-15.267	46.000
596.480	0.907	27.128	28.035	-17.965	46.000
823.460	3.081	23.598	26.679	-19.321	46.000
965.080	3.832	21.472	25.304	-28.696	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

Product : 902-928 MHZ TRANSCEIVER
 Test Item : General Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (BLE-2440MHz + RF ID-914.988MHz)

Frequency MHz	Correct Factor dB	Reading Level dB μ V	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m
Horizontal					
120.210	-7.275	33.198	25.923	-17.577	43.500
281.230	-6.210	37.868	31.658	-14.342	46.000
351.070	-1.296	40.397	39.101	-6.899	46.000
420.910	-0.262	38.667	38.405	-7.595	46.000
631.400	1.266	33.986	35.252	-10.748	46.000
842.860	6.248	31.003	37.251	-8.749	46.000
Vertical					
164.830	-4.737	31.260	26.523	-16.977	43.500
281.230	-5.940	34.247	28.307	-17.693	46.000
350.100	-1.278	30.025	28.747	-17.253	46.000
599.390	1.198	29.715	30.913	-15.087	46.000
686.690	2.277	29.036	31.313	-14.687	46.000
794.360	2.657	34.961	37.618	-8.382	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

Product : 902-928 MHZ TRANSCEIVER
 Test Item : General Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (BLE-2480MHz + RF ID-927.377MHz)

Frequency MHz	Correct Factor dB	Reading Level dB μ V	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m
Horizontal					
82.380	-13.063	42.300	29.237	-10.763	40.000
303.540	-4.068	37.912	33.844	-12.156	46.000
462.620	3.589	24.636	28.225	-17.775	46.000
604.240	4.289	24.635	28.925	-17.075	46.000
825.400	7.346	24.616	31.962	-14.038	46.000
903.000	5.938	26.015	31.953	-14.047	46.000
Vertical					
70.740	-11.568	47.506	35.938	-4.062	40.000
239.520	-6.138	33.249	27.111	-18.889	46.000
375.320	0.388	25.648	26.036	-19.964	46.000
596.480	0.907	27.293	28.200	-17.800	46.000
757.500	2.487	24.413	26.900	-19.100	46.000
903.000	1.418	26.774	28.192	-17.808	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

4. Band Edge

4.1. Test Equipment

The following test equipments are used during the band edge tests:

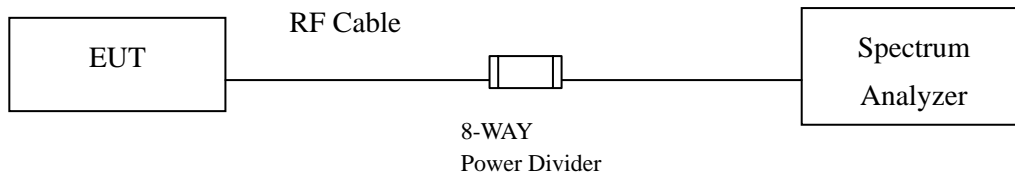
	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2015
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2015
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2015
X	8-WAY Power Divider	JFW	50PD-647 / 526770 0916	Apr., 2015

Note:

1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
2. The test instruments marked with “X” are used to measure the final test results.

4.2. Test Setup

RF Conducted Measurement



4.3. Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator 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.

4.4. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

4.5. Uncertainty

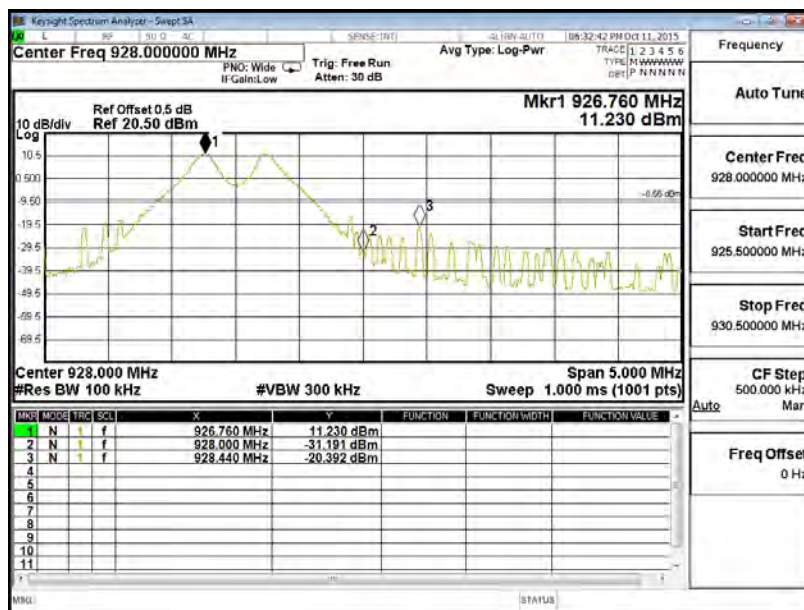
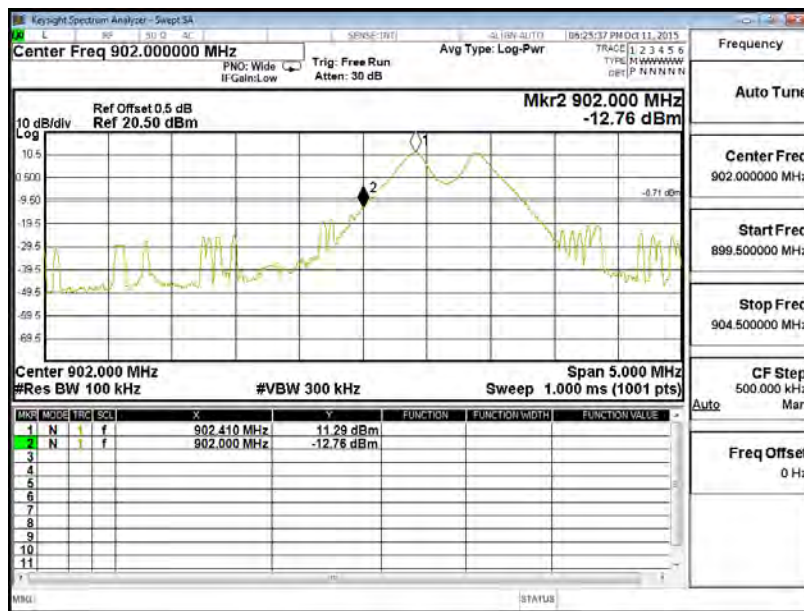
± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

4.6. Test Result of Band Edge

Product : 902-928 MHZ TRANSCEIVER
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit

Test Frequency (MHz)	Measurement Level (20dB BW) (MHz)	Limit (MHz)	Result
902.7	24.05	>20	PASS
927.377	31.62	>20	PASS



5. EMI Reduction Method During Compliance Testing

No modification was made during testing.

Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs