FCC Test Report

Product Name	Snap-on module
Model No.	SN201-GN01
FCC ID	ZWMGN01

Applicant	Ubiqconn Technology,Inc.
Address	No. 300 Yang Guang St., NeiHu, Taipei, Taiwan 114

Date of Receipt	Dec. 02, 2013
Issued Date	Dec. 24, 2013
Report No.	13C0152R-RFUSP17V00
Report Version	V1.0

Testing Laboratory
0914

The test results relate only to the samples tested.
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This report must not be used to claim product endorsement by TAF or any agency of the U.S. Government

Test Report Certification

Issued Date: Dec. 24, 2013
Report No.: 13C0152R-RFUSP17V00

Product Name	Snap-on module
Applicant	Ubiqconn Technology,Inc.
Address	No. 300 Yang Guang St., NeiHu, Taipei, Taiwan 114
Manufacturer	Ubiqconn Technology,Inc.
Model No.	SN201-GN01
FCC ID.	ZWMGN01
EUT Test Voltage	AC 120V/60Hz
Trade Name	Ubiqconn, UTI
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2012 ANSI C63.4: 2003, ANSI C63.10: 2009
Test Result	Complied

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Documented By : Leven Huang

(Senior Adm. Specialist / Leven Huang)

Tested By : Andy Lin

(Engineer / Andy Lin)

Approved By :

(Director / Vincent Lin)

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Snap-on module
Trade Name	Ubiqconn, UTI
Model No.	SN201-GN01
FCC ID	ZWMGN01
Frequency Range	13.56MHz
Modulation	ASK
Antenna Type	Loop Antenna

Frequency of Each Channel:

Channel	Frequency
Channel 1:	13.56 MHz

Note:

1. This device is a Snap-on module with a built-in 13.56MHz transceiver.
2. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.225
3. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

Test Mode	Mode 1: Transmit mode

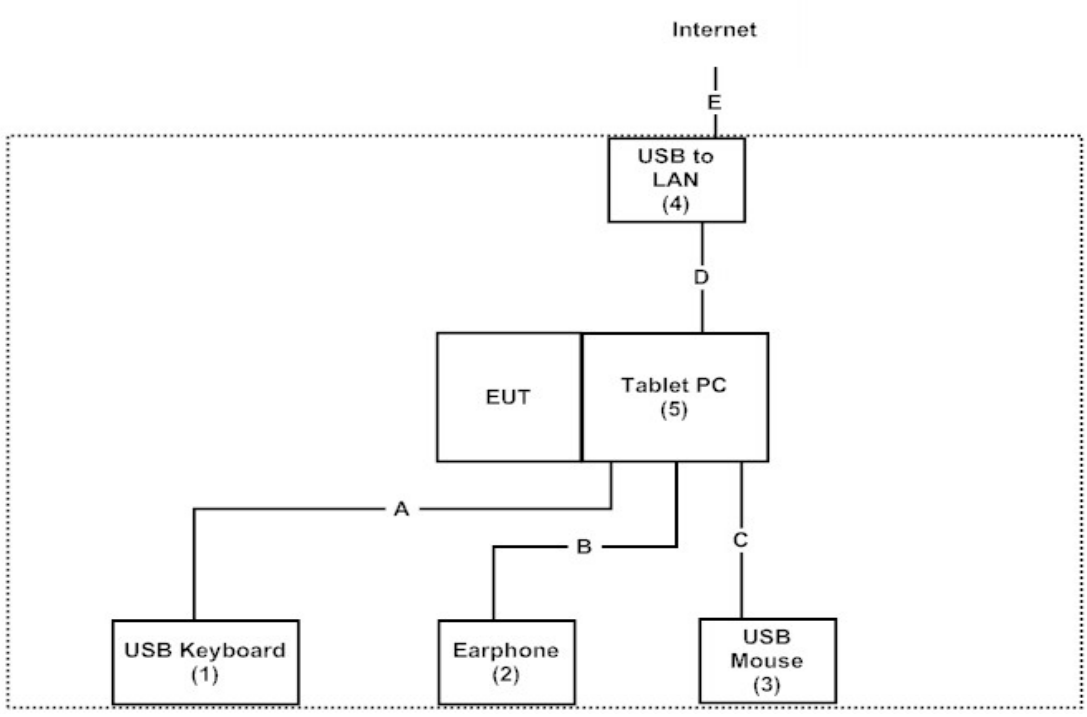
1.3. Tested System Datails

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)	USB Keyboard	Logitech	Y-U0009	LZ027HU	N/A
(2)	Earphone	PCHOME	N/A	N/A	N/A
(3)	USB Mouse	Logitech	M-UAG96B	HC8330D	N/A
(4)	USB to LAN	TekRepublic	TUN 300	N/A	N/A
(5)	Tablet PC	Ubiqconn	T10C	N/A	N/A

Signal Cable Type		Signal cable Description
A	USB Keyboard Cable	Non-Shielded, 1.7m
B	Earphone Cable	Non-Shielded, 1.5m
C	USB Mouse Cable	Non-Shielded, 1.7m
D	USB Cable	Non-Shielded, 0.2m
E	LAN Cable	Non-Shielded, 2.0m

1.4. Configuration of tested System



1.5. EUT Exercise Software

(1) Setup the EUT as shown in Section 1.4

(2) Execute Software " NFC.exe V.2013/09/14" on the Tablet PC.

(3) Start the continuous transmitter.

(4) 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	50-65
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/tw/ctg/cts/accreditations.htm

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. Conducted Emission

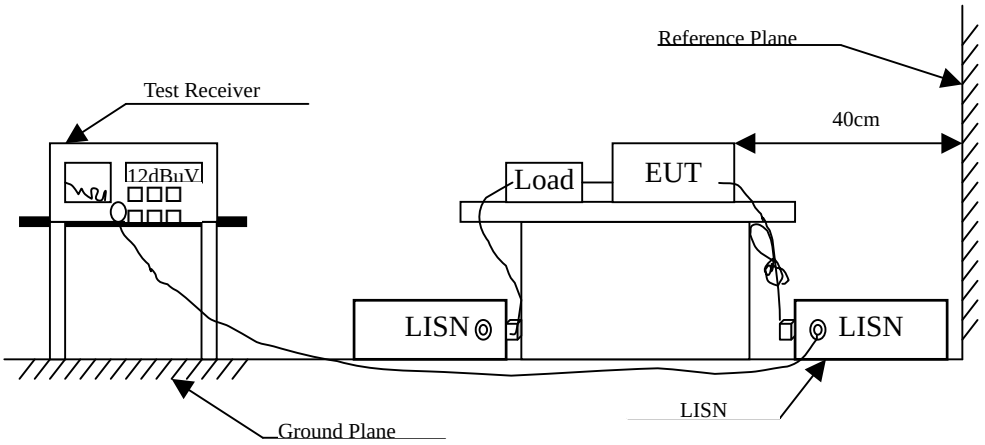
2.1. Test Equipment

	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.	Remark
X	Test Receiver	R & S	ESCS 30 / 825442/018	Sep., 2013	
X	Artificial Mains Network	R & S	ENV4200 / 848411/10	Feb., 2013	Peripherals
X	LISN	R & S	ESH3-Z5 / 825562/002	Feb., 2013	EUT
	DC LISN	Schwarzbeck	8226 / 176	Mar, 2013	EUT
X	Pulse Limiter	R & S	ESH3-Z2 / 357.8810.52	Feb., 2013	
	No.1 Shielded Room				

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. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit		
Frequency MHz	Limits	
	QP	AV
0.15 - 0.50	66-56(※)	56-46(※)
0.50-5.0	56	46
5.0 - 30	60	50

2.4. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2009 on conducted measurement.

Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.5. Uncertainty

± 2.26 dB

2.6. Test Result of Conducted Emission

Product : Snap-on module
Test Item : Conducted Emission Test
Power Line : Line 1
Test Mode : Mode 1: Transmit mode

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV	dB	dBuV
LINE 1					
Quasi-Peak					
0.201	9.699	33.710	43.409	-21.134	64.543
0.291	9.703	24.730	34.433	-27.538	61.971
0.689	9.721	35.590	45.311	-10.689	56.000
1.060	9.738	29.680	39.418	-16.582	56.000
2.146	9.807	24.650	34.457	-21.543	56.000
27.119	10.096	23.110	33.206	-26.794	60.000
Average					
0.201	9.699	23.460	33.159	-21.384	54.543
0.291	9.703	14.200	23.903	-28.068	51.971
0.689	9.721	27.650	37.371	-8.629	46.000
1.060	9.738	14.930	24.668	-21.332	46.000
2.146	9.807	13.550	23.357	-22.643	46.000
27.119	10.096	16.600	26.696	-23.304	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " " means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Snap-on module
Test Item : Conducted Emission Test
Power Line : Line 2
Test Mode : Mode 1: Transmit mode

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV	dB	dBuV
LINE 2					
Quasi-Peak					
0.197	9.679	35.790	45.469	-19.188	64.657
0.306	9.684	25.640	35.324	-26.219	61.543
0.509	9.693	27.810	37.503	-18.497	56.000
0.670	9.700	36.340	46.040	-9.960	56.000
1.060	9.728	29.880	39.608	-16.392	56.000
2.228	9.790	25.500	35.290	-20.710	56.000
Average					
0.197	9.679	24.970	34.649	-20.008	54.657
0.306	9.684	14.340	24.024	-27.519	51.543
0.509	9.693	17.340	27.033	-18.967	46.000
0.670	9.700	24.640	34.340	-11.660	46.000
1.060	9.728	10.700	20.428	-25.572	46.000
2.228	9.790	13.950	23.740	-22.260	46.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “ “ means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

3. Radiated Emission

3.1. Test Equipment

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

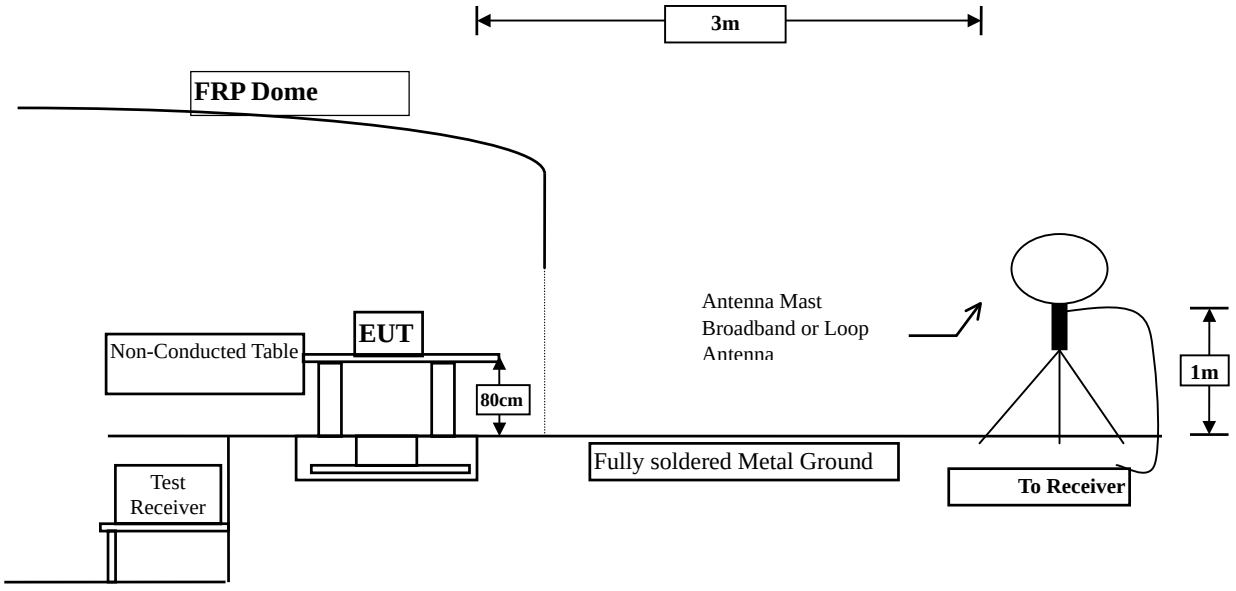
Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒Site # 3	X	Loop Antenna	Teseq	HLA6120 / 26739	Jul., 2013
	X	Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2013
	X	Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2013
		Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2013
	X	Pre-Amplifier	Agilent	8447D/2944A09549	Sep., 2013
	X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2013
	X	Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2013
	X	Coaxial Cable	QuieTek	QTK-CABLE/ CAB5	Feb., 2013
	X	Controller	QuieTek	QTK-CONTROLLER/ CTRL3	N/A
	X	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

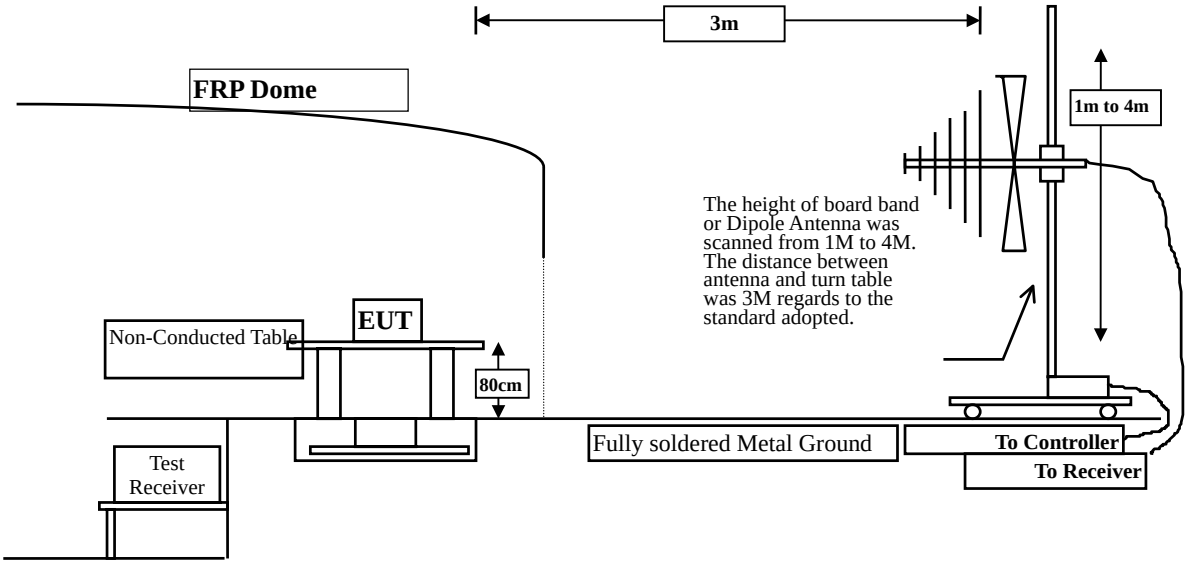
2. The test instruments marked with "X" are used to measure the final test results.

3.2. Test Setup

9kHz~30MHz



30MHz~1GHz



3.3. Limits

➢ Fundamental electric field strength Limit

FCC Part 15 Subpart C Paragraph 15.225 Limits				
Fundamental Frequency MHz	Field strength of fundamental			
	uV/m	Distance (meter)	dBuV/m	Distance (meter)
13.553 – 13.567	15848	30	124	3
13.410 – 13.553 and 13.567 – 13.710	334	30	90.47	3
13.110 – 13.410 and 13.710 – 14.010	106	30	80.50	3
Outside of the 13.110 – 14.010	See 15.209 Limits			

Remarks : 1. RF Voltage (dBuV) = 20 log RF Voltage (uV)

2. 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. The emission limit in this paragraph is based on measurement instrumentation employing an average detector.

➢ Spurious electric field strength Limit

FCC Part 15 Subpart C Paragraph 15.209 Limits			
Frequency MHz	uV/m	dBuV/m	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	See Remark[1]	300
0.490-1.705	24000/F(kHz)	See Remark[1]	30
1.705-30	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Remarks : 1. RF Voltage (dBuV) = 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

Fundamental electric field strength:

The EUT and its simulators are placed on a turn table which is 1 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum electric field strength. The EUT was positioned such that the distance from antenna to the EUT was 3 meters. The antenna which is 1 meter above ground. All X-axis, Y-axis and Z-axis polarization of the antenna are set on measurement.

Spurious electric field strength:

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4 on radiated measurement.

On any frequency the radiated limits shown are based upon the use of measurement instrumentation employing an average detector function. When average radiated emission measurement are included

emission measurement below 1000 MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.

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

The frequency range from 9kHz to 10th harmonics is checked.

3.5. Uncertainty

± 2.6 dB below 30MHz

± 3.8 dB above 30MHz

3.6. Test Result of Radiated Emission

Product : Snap-on module
Test Item : Fundamental Radiated Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit mode

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
X-axis					
Quasi-Peak					
Horizontal					
13.560	21.158	42.500	63.658	-60.342	124.000
Vertical					
13.560	21.158	41.300	62.458	-61.542	124.000
Y-axis					
Quasi-Peak					
Horizontal					
13.560	21.158	41.600	62.758	-61.242	124.000
Vertical					
13.560	21.158	40.200	61.358	-62.642	124.000
Z-axis					
Quasi-Peak					
Horizontal					
13.560	21.158	35.200	56.358	-67.642	124.000
Vertical					
13.560	21.158	38.000	59.158	-64.842	124.000

Note:

1. Limit=84dBuV/m + 40*Log (30(m)/3(m))=124dBuV/m
2. All Readings below 1GHz are Quasi-Peak, above are average value.
3. Measurement Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Snap-on module
Test Item : General Radiated Emission Data (below 30MHz)
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit mode

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
27.120	20.560	0.100	20.660	-48.880	69.540
Vertical					
27.120	20.560	0.800	21.360	-48.180	69.540

Note:

1. Limit=29.54dBuV/m + 40*Log (30(m)/3(m))=69.54dBuV/m
2. All Readings below 1GHz are Quasi-Peak, above are average value.
3. “ ” means the worst emission level.
4. Measurement Level = Reading Level + Correct Factor.

Product : Snap-on module
Test Item : General Radiated Emission Data (above 30MHz)
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit mode

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
QP Detector					
239.520	-6.851	37.214	30.364	-15.636	46.000
381.140	-0.988	32.826	31.838	-14.162	46.000
516.940	1.654	31.058	32.712	-13.288	46.000
580.960	3.505	29.867	33.372	-12.628	46.000
718.700	3.537	28.629	32.166	-13.834	46.000
881.660	6.307	28.248	34.555	-11.445	46.000
Vertical					
QP Detector					
55.220	-4.699	37.138	32.439	-7.561	40.000
105.660	-0.253	25.899	25.646	-17.854	43.500
544.100	-0.688	24.689	24.001	-21.999	46.000
683.780	1.968	22.602	24.570	-21.430	46.000
807.940	3.586	23.378	26.963	-19.037	46.000
968.960	8.191	23.103	31.294	-22.706	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. “ ” means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

4. Band Edge

4.1. Test Equipment

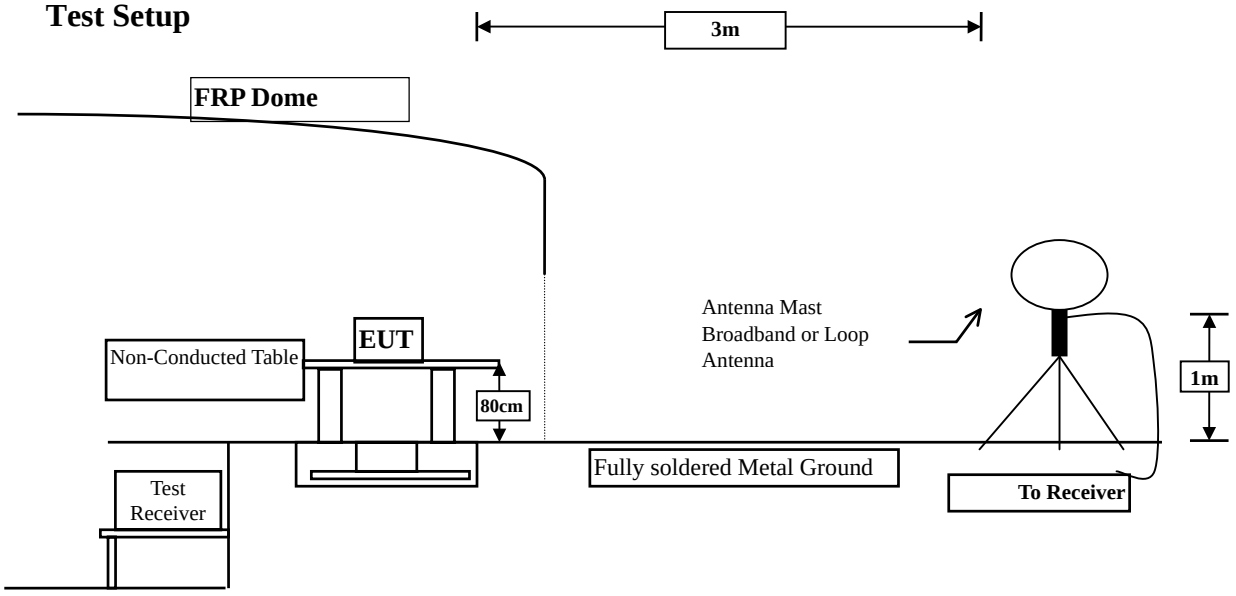
The following test equipments are used during the band edge tests:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒Site # 3	X	Loop Antenna	Teseq	HLA6120 / 26739	Jul., 2013
		Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2013
		Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2013
		Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2013
		Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2013
		Pre-Amplifier	QTK	AP-180C / CHM_0906076	Sep., 2013
		Pre-Amplifier	MITEQ	AMF-4D-180400-45-6P/ 925975	Mar, 2013
	X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2013
	X	Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2013
	X	Coaxial Cable	QuieTek	QTK-CABLE/ CAB5	Feb., 2013
	X	Controller	QuieTek	QTK-CONTROLLER/ CTRL3	N/A
	X	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

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



4.3. Limits

In any 9 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 50 dB below that in the 9 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

4.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 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 can move up and down between 1 meter and 4 meters to find out the maximum emission level.
Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10 on radiated measurement.
The bandwidth below 30MHz setting on the field strength meter is 9kHz and above 30MHz is 120kHz.

4.5. Uncertainty

Radiated is ± 2.6 dB

4.6. Test Result of Band Edge

Product : Snap-on module
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit mode

RF Radiated Measurement

(Horizontal)

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	QP Limit (dBuV/m)	Result
13.110	21.110	2.000	23.110	69.540	Pass
13.360	21.140	2.300	23.440	69.540	Pass
13.410	21.140	2.800	23.940	69.540	Pass
14.010	21.200	1.800	23.000	69.540	Pass

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. " " means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

(Vertical)

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	QP Limit (dBuV/m)	Result
13.110	21.110	2.100	23.210	69.540	Pass
13.360	21.140	2.300	23.440	69.540	Pass
13.410	21.140	2.500	23.640	69.540	Pass
14.010	21.200	1.800	23.000	69.540	Pass

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. " " means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

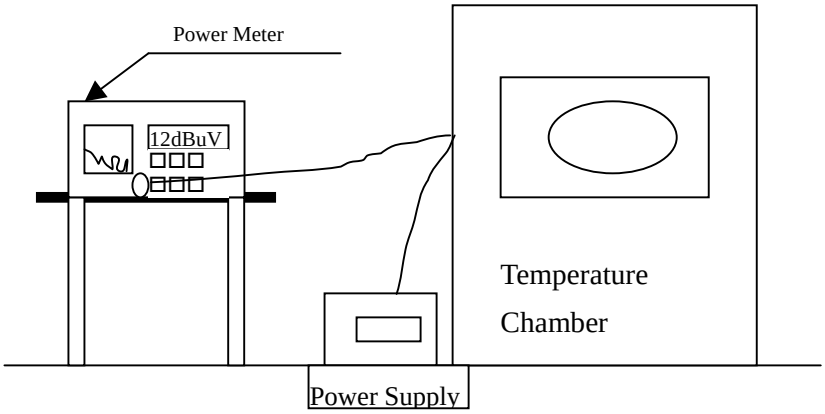
5. Frequency Tolerance

5.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2013
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2013
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2013
X	Temperature Chamber	TDE	CHM 150CT	March, 2013

Note: All equipments are calibrated every one year.

5.2. Test Setup



5.3. Limits

The frequency tolerance of the carrier signal shall be maintained within ±0.01% of the operating frequency.

5.4. Test Procedure

The over operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

5.5. Uncertainty

± 150 Hz

5.6. Test Result of Frequency Stability

Product : Snap-on module
Test Item : Frequency Tolerance
Test Site : Temperature Chamber
Test Mode : Mode 1: Transmit mode

Temperature (℃)	Voltage (V)	Observe Time	Declared Frequency (MHz)	Read Frequency (MHz)	Tolerance (%)	Limit (%)
20	120	start	13.56	13.56050	0.003687	± 0.01 %
		2mins	13.56	13.56050	0.003687	
		5mins	13.56	13.56050	0.003687	
		10mins	13.56	13.56050	0.003687	
20	138	start	13.56	13.56101	0.007448	± 0.01 %
		2mins	13.56	13.56101	0.007448	
		5mins	13.56	13.56101	0.007448	
		10mins	13.56	13.56101	0.007448	
20	102	start	13.56	13.56050	0.003687	± 0.01 %
		2mins	13.56	13.56050	0.003687	
		5mins	13.56	13.56050	0.003687	
		10mins	13.56	13.56050	0.003687	
50	120	start	13.56	13.56065	0.004794	± 0.01 %
		2mins	13.56	13.56065	0.004794	
		5mins	13.56	13.56065	0.004794	
		10mins	13.56	13.56065	0.004794	
40	120	start	13.56	13.56066	0.004867	± 0.01 %
		2mins	13.56	13.56066	0.004867	
		5mins	13.56	13.56066	0.004867	
		10mins	13.56	13.56066	0.004867	
30	120	start	13.56	13.56067	0.004941	± 0.01 %
		2mins	13.56	13.56067	0.004941	
		5mins	13.56	13.56067	0.004941	
		10mins	13.56	13.56067	0.004941	

10	120	start	13.56	13.56069	0.005088	± 0.01 %
		2mins	13.56	13.56069	0.005088	
		5mins	13.56	13.56069	0.005088	
		10mins	13.56	13.56069	0.005088	
0	120	start	13.56	13.56072	0.005310	± 0.01 %
		2mins	13.56	13.56072	0.005310	
		5mins	13.56	13.56072	0.005310	
		10mins	13.56	13.56072	0.005310	
-10	120	start	13.56	13.56070	0.005162	± 0.01 %
		2mins	13.56	13.56070	0.005162	
		5mins	13.56	13.56070	0.005162	
		10mins	13.56	13.56070	0.005162	
-20	120	start	13.56	13.56071	0.005236	± 0.01 %
		2mins	13.56	13.56071	0.005236	
		5mins	13.56	13.56071	0.005236	
		10mins	13.56	13.56071	0.005236	

6. EMI Reduction Method During Compliance Testing

No modification was made during testing.