TEST REPORT

of

FCC Part 15 Subpart C AND CANADA RSS-210
Full Modular Approval

☒ New Application; ☐ Class I PC; ☐ Class II PC

Product :	**915MHz radio module**
Brand:	**Datalogic ADC**
Model:	**MIZAR RADIO MODULE 915MHz**
Model Difference:	**N/A**
FCC ID:	**U4F0022**
IC:	**3862D-006**
FCC Rule Part:	**§15.247, Cat: DTS**
IC Rule Part:	**RSS-210 issue 8:2010, Annex 8**
Applicant:	**Datalogic ADC S.r.l.**
Address:	**Via San Vitalino 13 – 40012 Lippo di Calderara di Reno (BO) - Italy**

Test Performed by:
International Standards Laboratory
<Lung-Tan LAB>
*Site Registration No.
BSMI: SL2-IN-E-0013; MRA TW1036; TAF: 0997; IC: IC4067B-3;

*Address:
No. 120, Lane 180, San Ho Tsuen, Hsin Ho Rd.
Lung-Tan Hsiang, Tao Yuan County 325, Taiwan
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Report No.: **ISL-13LR276FCW**
Issue Date : **2014/02/06**

VERIFICATION OF COMPLIANCE

Applicant:	Datalogic ADC S.r.l.
Product Description:	915MHz radio module
Brand Name:	Datalogic ADC
Model No.:	MIZAR RADIO MODULE 915MHz
Model Difference:	N/A
FCC ID:	U4F0022
IC:	3862D-006
Date of test:	2013/12/19 ~ 2014/01/29
Date of EUT Received:	2013/12/18

We hereby certify that:

All the tests in this report have been performed and recorded in accordance with the standards described above and performed by an independent electromagnetic compatibility consultant, International Standards Laboratory.

The test results contained in this report accurately represent the measurements of the characteristics and the energy generated by sample equipment under test at the time of the test. The sample equipment tested as described in this report is in compliance with the limits of above standards.

Test By:	Dino Chen	***Date:***	2014/02/06
	Dion Chang / Engineer		
Prepared By:	Gigi yeh	***Date:***	2014/02/06
	Gigi Yeh / Specialist		
Approved By:	Vincent Su	***Date:***	2014/02/06
	Vincent Su / Technical Manager		

Version

Version No.	Date	Description
00	2014/02/06	Initial creation of document

Table of Contents

1 GENERAL INFORMATION

General:

Product Name	915MHz radio module
Brand Name	Datalogic ADC
Model Name	MIZAR RADIO MODULE 915MHz
Model Difference	N/A
Power Supply	3.3Vdc
Antenna Designation:	Printing Antenna: 1. 1 dBi,P/N: 663316020 with I-PEX type connector Rubber Antenna(Dipole): 1. 1dBi, P/N: G-RA0K14155047-BON with revised SMA connector 2. 3dBi, P/N: ANT-916-CW-QW with revised SMA connector

High Speed mode (DTS):

Frequency Range:	903.64900 MHz ~ 926.93600 MHz
Channel number:	12 channels
Transmit Power:	14.64 dBm Peak
Modulation type:	NRZ
Transition Rate:	500000 bit/s
Type of Emission:	1M1G1D

Low Speed High Power mode (DSS) : Frequency Hopping

Frequency Range:	902.80050 MHz ~ 927.48450 MHz
Channel number:	25 channels
Modulation type:	RZ Manchester
Data rate:	36864 bit/s
Transmit Power:	16.60 dBm Peak
Dwell Time:	<= 0.4s
Type of Emission:	388KF1D

Low Speed low Power mode (DXX) :

Frequency Range:	902.80050 MHz ~ 927.48450 MHz
Channel number:	25 channels
Modulation type:	RZ Manchester
Data rate:	36864 bit/s
Transmit Power:	93.35 dBuV/m
Type of Emission:	388KF1D

Remark: The above DUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

The test report is for High Speed Mode.

1.1 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: U4F0022** filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules and **IC: 3862D-006** filing to comply with Industry Canada RSS-210 issue 8: 2010 Annex 8.

1.2 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4-2009 and RSS-Gen: 2010. Radiated testing was performed at an antenna to EUT distance 3 meters.

D01 DTS Meas Guidance v03r01

1.3 Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of **International Standards Laboratory** <Lung-Tan LAB> No. 120, Lane 180, San Ho Tsuen, Hsin Ho Rd., Lung-Tan Hsiang, Tao Yuan County 325, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4-2009. FCC Registration Number is: TW1036, Canada Registration Number: 4067B-3.

1.4 Special Accessories

Not available for this EUT intended for grant.

1.5 Equipment Modifications

Not available for this EUT intended for grant.

2 SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

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

2.2 EUT Exercise

The EUT (Transmitter) was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 7 and 13 of ANSI C63.4-2009.Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and Average detector mode.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table 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 max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 8 and 13 of ANSI C63.4-2009.

2.4 Configuration of Tested System

Fig. 2-1 Configuration

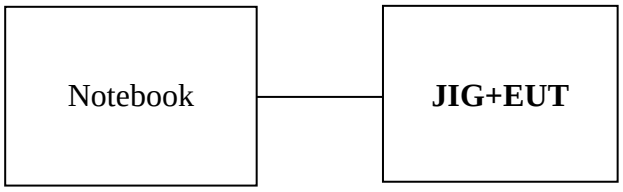


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1	Notebook	Lenovo	X220i	N/A	Shield	Non-shield

3 SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§15.207(a) RSS-Gen §7.2.4	AC Power Line Conducted Emission	Compliant
§15.247(b) (3),(4) RSS-210 issue 8,§A8.4(4)	Peak Output Power	Compliant
§15.247(a)(2) RSS-210 issue 8,§A8.2(a) RSS-Gen §4.6.1	6dB Bandwidth & 99% Power Bandwidth	Compliant
§15.247(d) RSS-210 issue 8,§A8.5	100 KHz Bandwidth Of Frequency Band Edges	Compliant
§15.247(d) RSS-210 issue 8,§A8.5	Spurious Emission	Compliant
§15.247(e) RSS-210 issue 8,§A8.2(b)	Peak Power Density	Compliant
§15.203 RSS-GEN 7.1.2, RSS-210 issue 8,§A8.4	Antenna Requirement	Compliant

4 DESCRIPTION OF TEST MODES

The EUT has been tested under engineering operating condition.
Test program used to control the EUT for staying in continuous transmitting mode is programmed.

High Speed Mode: Channel lowest (903.64900MHz)、mid (910MHz) and highest (926.93600MHz). For Radiated emission, both dipole and printing antenna were tested.

5 CONDUCTED EMISSION TEST

5.1 Standard Applicable:

According to §15.207 and RSS-Gen §7.2.4, frequency range within 150KHz to 30MHz shall not exceed the Limit table as below.

Frequency range MHz	Limits dB(uV)	
	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
Note 1.The lower limit shall apply at the transition frequencies 2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

5.2 Measurement Equipment Used:

AC Power Line Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Conduction 04-1 Cable	WOKEN	CFD 300-NL	Conduction 04 -1	09/24/2013	09/23/2014
EMI Receiver 16	Rohde & Schwarz	ESCI	101221	06/13/2013	06/12/2014
LISN 18	ROHDE & SCHWARZ	ENV216	101424	03/13/2013	03/12/2014
LISN 19	ROHDE & SCHWARZ	ENV216	101425	03/13/2013	03/12/2014

5.3 EUT Setup:

1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.4-2009.
2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
3. The LISN was connected with 120Vac/60Hz power source.

5.4 Measurement 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.

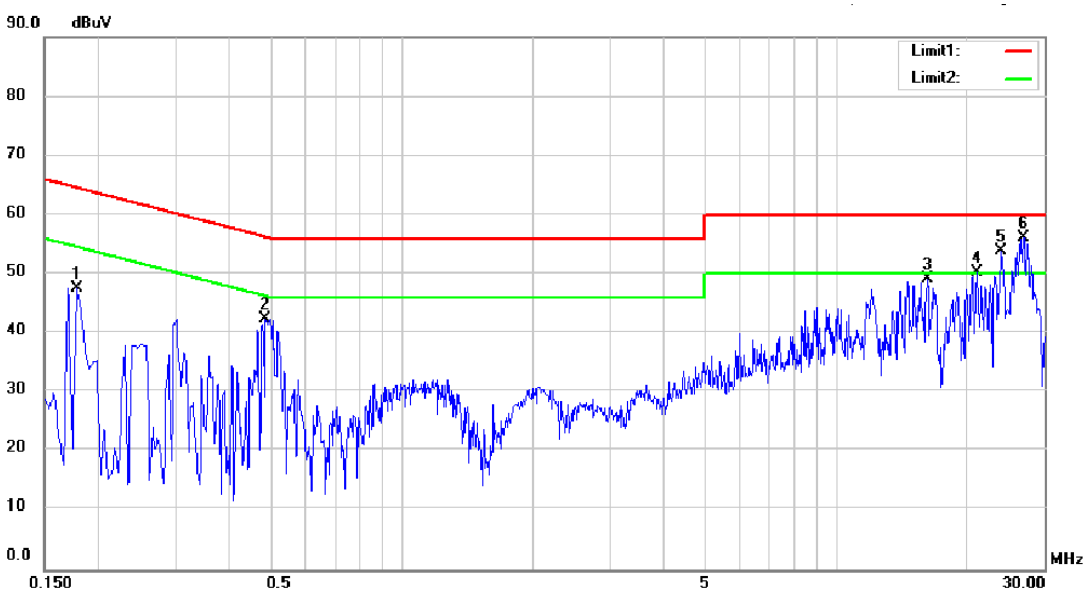
5.5 Measurement Result:

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.

Note: Refer to next page for measurement data and plots.

AC POWER LINE CONDUCTED EMISSION TEST DATA

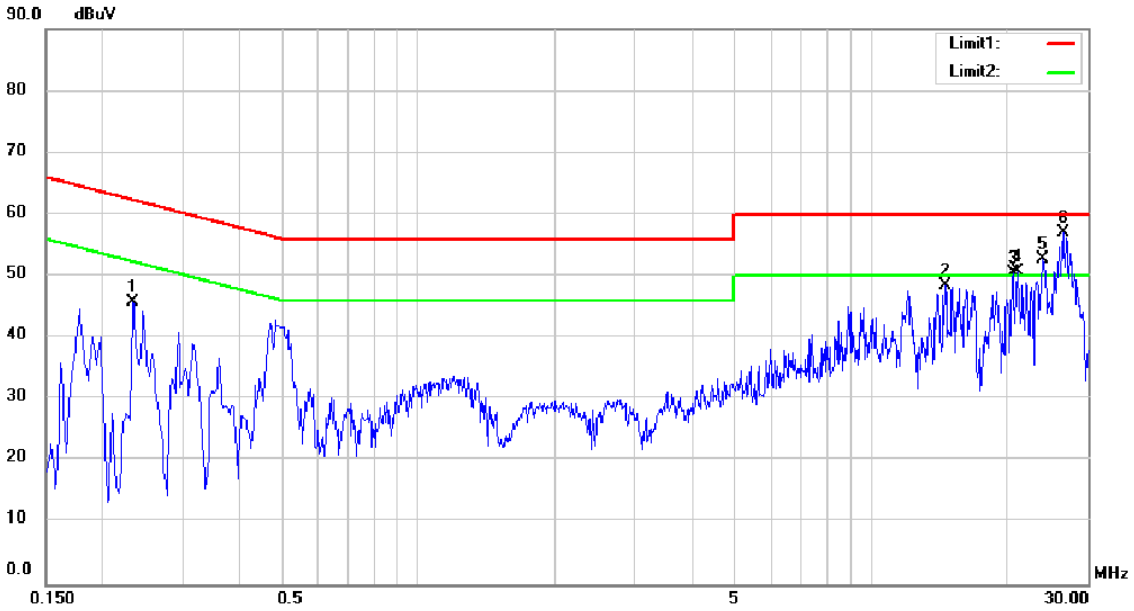
Operation Mode:	Operation Mode	Test Date:	2014/01/27
Test By:	Dino		
Antenna type:	Dipole Antenna		



Site Conduction 04 Phase: L1 Temperature: 26 ℃

Condition : Conduction Humidity: 54 %

No.	Freq.	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		
	MHz	Peak	QP	AVG	(dB)	peak	QP	AVG	P/Q	AVG	P/Q	AVG	P/F Comment
1	0.1780	38.07	36.27	20.33	9.62	47.69	45.89	29.95	64.58	54.58	-18.69	-24.63	
2	0.4860	32.70	31.23	19.19	9.63	42.33	40.86	28.82	56.24	46.24	-15.38	-17.42	
3	16.1740	39.25	37.56	32.82	9.81	49.06	47.37	42.63	60.00	50.00	-12.63	-7.37	
4	20.9780	40.57	39.28	34.05	9.81	50.38	49.09	43.86	60.00	50.00	-10.91	-6.14	
5	24.0100	44.02	39.76	32.51	9.81	53.83	49.57	42.32	60.00	50.00	-10.43	-7.68	
6 *	26.9540	46.29	44.34	37.58	9.81	56.10	54.15	47.39	60.00	50.00	-5.85	-2.61	



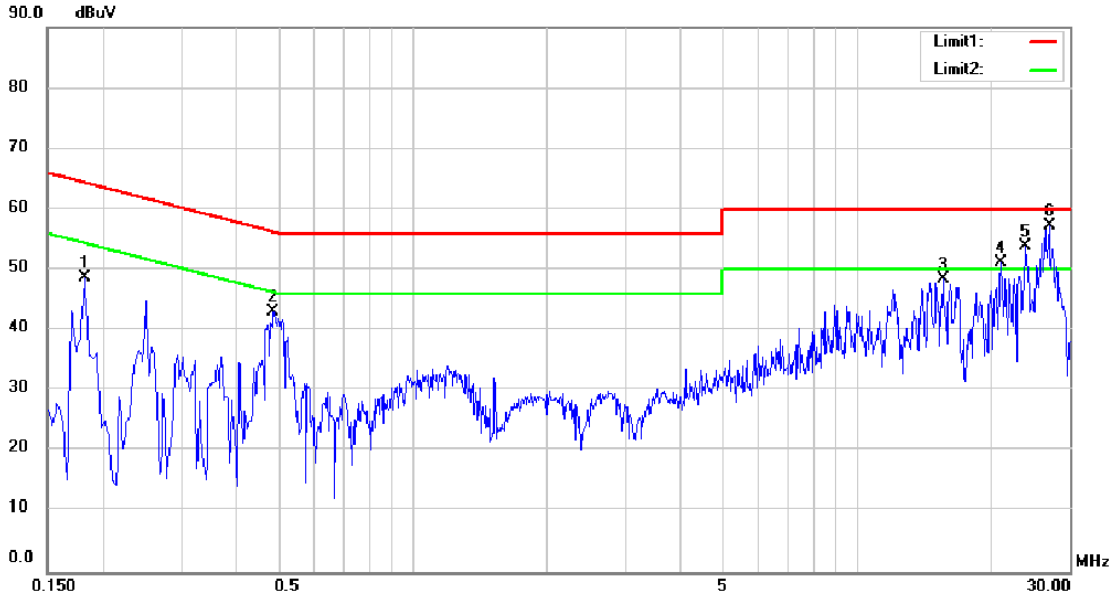
Site Conduction 04 Phase: *N* Temperature: 26 ℃

Condition : Conduction Humidity: 54 %

No.	Freq.	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		
	MHz	Peak	QP	AVG	(dB)	peak	QP	AVG	P/Q	AVG	P/Q	AVG	P/F Comment
1	0.2340	36.30	30.87	14.15	9.59	45.89	40.46	23.74	62.31	52.31	-21.85	-28.57	
2	14.5340	38.55	37.40	32.80	9.86	48.41	47.26	42.66	60.00	50.00	-12.74	-7.34	
3	20.5060	40.66	39.12	33.58	9.92	50.58	49.04	43.50	60.00	50.00	-10.96	-6.50	
4	20.9740	40.80	40.17	34.73	9.92	50.72	50.09	44.65	60.00	50.00	-9.91	-5.35	
5	23.9060	42.79	38.22	31.92	9.93	52.72	48.15	41.85	60.00	50.00	-11.85	-8.15	
6 *	26.4860	47.20	40.33	34.96	9.94	57.14	50.27	44.90	60.00	50.00	-9.73	-5.10	

AC POWER LINE CONDUCTED EMISSION TEST DATA

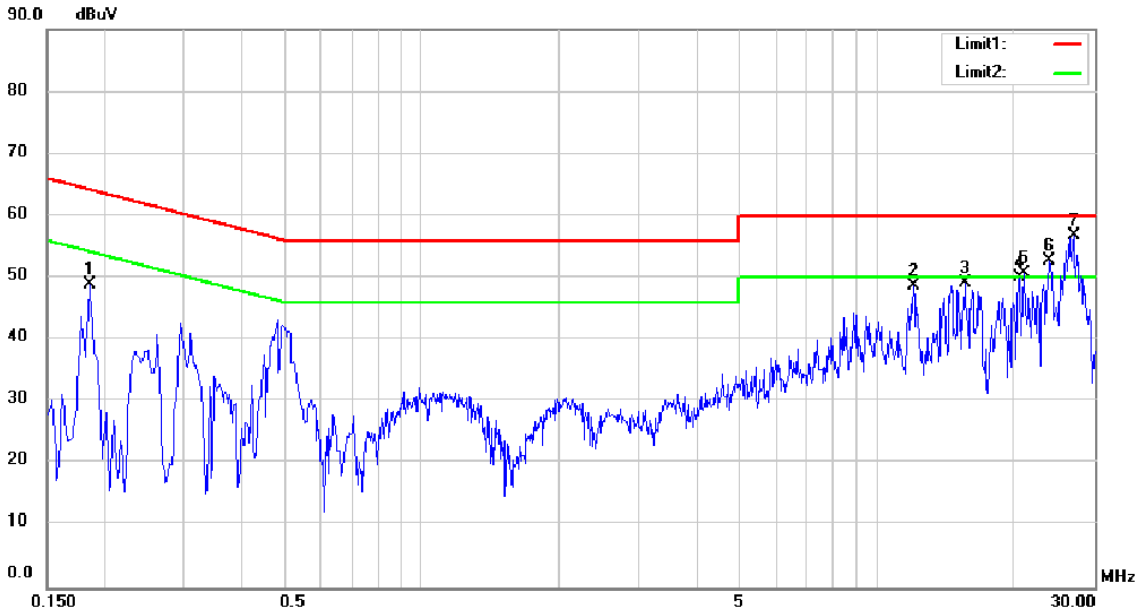
Operation Mode:	Operation Mode	Test Date:	2014/01/27
Test By:	Dino		
Antenna type:	Printing Antenna		



Site Conduction 04 Phase: L1 Temperature: 26 ℃

Condition : Conduction Humidity: 54 %

No.	Freq.	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		
	MHz	Peak	QP	AVG	(dB)	peak	QP	AVG	P/Q	AVG	P/Q	AVG	P/F Comment
1	0.1820	39.03	35.73	19.32	9.62	48.65	45.35	28.94	64.39	54.39	-19.04	-25.45	
2	0.4860	33.47	31.20	18.58	9.63	43.10	40.83	28.21	56.24	46.24	-15.41	-18.03	
3	15.5860	38.67	36.10	27.39	9.81	48.48	45.91	37.20	60.00	50.00	-14.09	-12.80	
4	20.9820	41.35	39.07	31.57	9.81	51.16	48.88	41.38	60.00	50.00	-11.12	-8.62	
5	23.8900	44.11	39.75	34.49	9.81	53.92	49.56	44.30	60.00	50.00	-10.44	-5.70	
6 *	27.0700	47.54	42.82	35.19	9.81	57.35	52.63	45.00	60.00	50.00	-7.37	-5.00	



Site Conduction 04 Phase: N Temperature: 26 ℃

Condition : Conduction Humidity: 54 %

No.	Freq.	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		
	MHz	Peak	QP	AVG	(dB)	peak	QP	AVG	P/Q	AVG	P/Q	AVG	P/F Comment
1	0.1860	39.33	35.33	19.97	9.59	48.92	44.92	29.56	64.21	54.21	-19.29	-24.65	
2	12.0060	38.81	36.68	33.96	9.80	48.61	46.48	43.76	60.00	50.00	-13.52	-6.24	
3	15.5860	39.18	33.42	28.21	9.88	49.06	43.30	38.09	60.00	50.00	-16.70	-11.91	
4	20.5100	40.07	35.94	30.85	9.92	49.99	45.86	40.77	60.00	50.00	-14.14	-9.23	
5	20.9780	40.77	38.60	32.57	9.92	50.69	48.52	42.49	60.00	50.00	-11.48	-7.51	
6	23.9060	42.86	38.97	32.87	9.93	52.79	48.90	42.80	60.00	50.00	-11.10	-7.20	
7 *	27.0700	46.91	41.87	34.18	9.94	56.85	51.81	44.12	60.00	50.00	-8.19	-5.88	

6 PEAK OUTPUT POWER MEASUREMENT

6.1 Standard Applicable:

According to §15.247(b)(3),(4)(b)

(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(c) Operation with directional antenna gains greater than 6 dBi.

(1) Fixed point-to-point operation:

(i) Systems operating in the 2400-2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

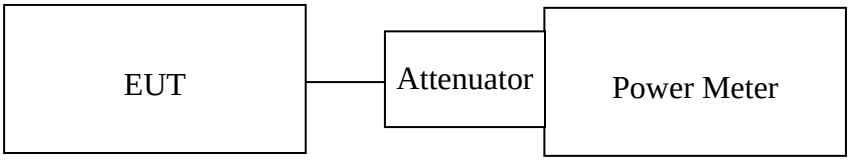
(ii) Systems operating in the 5725-5850 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted output power.

According to RSS-210 issue 8,§A8.4(4), For systems employing digital modulation techniques operating in the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz, the maximum peak conducted output power shall not exceed 1 W. Except as provided in Section A8.4(5), the e.i.r.p. shall not exceed 4 W.

6.2 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Power Meter 05	Anritsu	ML2495A	1116010	04/19/2013	04/18/2014
Power Sensor 05	Anritsu	MA2411B	34NKF50	04/19/2013	04/18/2014
Power Sensor 06	DARE	RPR3006W	13I00030SNO33	10/18/2013	10/17/2014
Power Meter 07	DARE	RPR3006W	13I00030SNO34	10/18/2013	10/17/2014
Temperature Chamber	KSON	THS-B4H100	2287	03/15/2013	03/14/2014
DC Power supply	ABM	51850	N/A	08/16/2013	08/15/2014
AC Power supply	EXTECH	CFC105W	NA	12/19/2013	12/18/2014
Attenuator	Woken	Watt-65m3502	11051601	NA	NA
Splitter	MCLI	PS4-199	12465	12/27/2013	12/26/2014
Spectrum analyzer	Agilent	N9030A	MY51360021	03/29/2013	03/28/2014

6.3 Test Set-up:



6.4 Measurement Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter
3. Record the max. reading.
4. Repeat above procedures until all frequency measured were complete.

6.5 Measurement Result:

High Speed

Cable loss = 0	Output Power		Limit (dBm)
Frequency (MHz)	Detector		
	PK (dBm)	AV (dBm)	
903.64900	14.51	14.48	30
910.0	14.64	14.60	
926.93600	14.64	14.60	

7 6dB Bandwidth & 99% Bandwidth

7.1 Standard Applicable:

According to §15.247(a)(2), Systems using digital modulation techniques may operate in the 902 - 928 MHz,2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500kHz.

According to RSS 210 issue 8, §8.2(a) Systems employing digital modulation techniques (which includes direct sequence) can now be certified under RSS-210 provided they comply with the following requirements: The minimum -6 dB bandwidth shall be at least 500 kHz.

7.2 Measurement Equipment Used:

Refer to section 6.2 for details.

7.3 Test Set-up:

Refer to section 6.3 for details.

7.4 Measurement Procedure:

1. Place the EUT on the table and set it in 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 = 3*RBW, Span= cover the complete power envelope of the signal of the UUT Sweep=auto
4. Mark the peak frequency and –6dB (upper and lower) frequency.
5. Repeat above procedures until all frequency measured were complete.

7.5 Measurement Result:

For FCC

High Speed

Frequency (MHz)	6dB Bandwidth (MHz)	Bandwidth (KHz)	Result	
903.64900	0.6751	> 500	PASS	
910.0	0.6711	> 500	PASS	
926.93600	0.6721	> 500	PASS	

For IC

High Speed

Frequency (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Bandwidth (KHz)	Result
903.64900	0.5517	1.1725	> 500	PASS
910.0	0.5503	1.1315	> 500	PASS
926.93600	0.5466	1.1563	> 500	PASS

Note: Refer to next page for plots.

High Speed

6dB Band Width Test Data CH-Low

6dB Band Width Test Data CH-Mid

6dB Band Width Test Data CH-High

High Speed

99% Band Width Test Data CH-Low

99% Band Width Test Data CH-Mid

99% Band Width Test Data CH-High

8 100KHz BANDWIDTH OF BAND EDGES MEASUREMENT

8.1 Standard Applicable:

According to §15.247(c), in any 100 KHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100KHz bandwidth within the band that contains the highest level of the desired power, In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in15.209(a).

According to RSS-210 issue 8, §A8.5, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Tables 2 and 3 is not required. In addition, radiated emissions which fall in the restricted bands of Table 1 must also comply with the radiated emission limits specified in Tables 2 and 3.

8.2 Measurement Equipment Used:

8.2.1 Conducted Emission at antenna port:

Refer to section 6.2 for details.

8.2.2 Radiated emission:

Chamber 14(966)					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Spectrum Analyzer 21(26.5GHz)	Agilent	N9010A	MY49060537	07/18/2013	07/17/2014
Spectrum Analyzer 20(6.5GHz)	Agilent	E4443A	MY48250315	05/26/2013	05/25/2014
Spectrum Analyzer 22(43GHz)	R&S	FSU43	100143	05/03/2013	05/02/2014
Dipole antenna	SCHWARZBECK	VHAP,30-300	919	12/03/2013	12/02/2014
Dipole antenna	SCHWARZBECK	UHAP,300-1000	1195	12/03/2013	12/02/2014
Loop Antenna9K-30M	A.H.SYSTEM	SAS-564	294	03/07/2013	03/06/2015
Bilog Antenna30-1G	Schaffner	CBL 6112B	2756	01/15/2014	01/14/2015
Horn antenna1-18G(06)	EMCO	3117	0006665	11/04/2013	11/03/2014
Horn antenna26-40G(05)	Com-power	AH-640	100A	01/09/2013	01/08/2015
Horn antenna18-26G(04)	Com-power	AH-826	081001	05/15/2013	05/14/2015
Preamplifier9-1000M	HP	8447D	NA	02/19/2013	02/18/2014
Preamplifier1-18G	MITEQ	AFS44-00101800-25-10P-44	1329256	07/18/2013	07/17/2014
Preamplifier1-26G	EM	EM01M26G	NA	02/26/2013	02/25/2014
Preamplifier26-40G	MITEQ	JS-26004000-27-5A	818471	05/08/2013	05/07/2015
Cable1-18G	HUBER SUHNER	Sucoflex 106	NA	02/06/2013	02/05/2014
Cable UP to 1G	HUBER SUHNER	RG 214/U	NA	10/08/2013	10/07/2014
SUCOFLEX 1GHz~40GHz cable	HUBER SUHNER	Sucoflex 102	27963/2&37421/2	10/03/2013	10/02/2015
Signal Generator	R&S	SMU200A	102330	02/19/2013	02/18/2014
Signal Generator	Anritsu	MG3692A	20311	10/30/2013	10/29/2014
2.4G Filter	Micro-Tronics	Brm50702	76	12/27/2013	12/26/2014

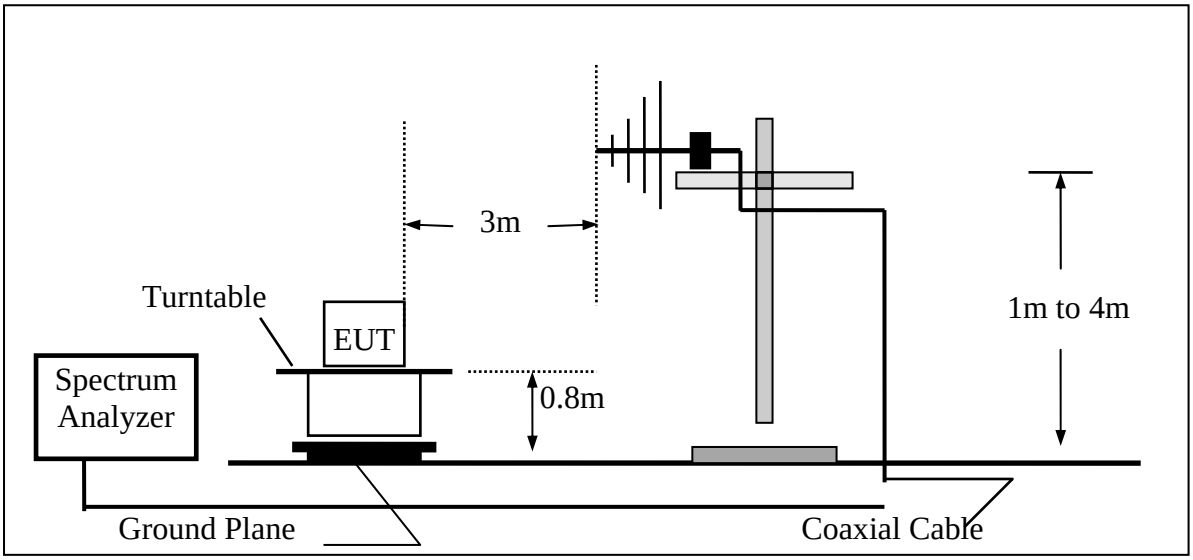
8.3 Test SET-UP:

8.3.1 Conducted Emission at antenna port:

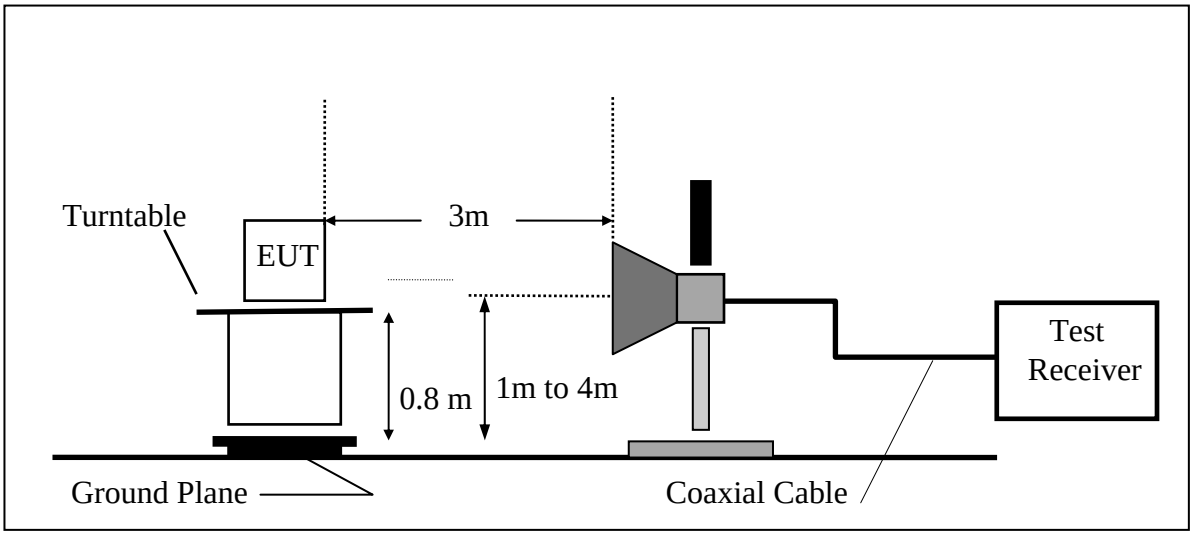
Refer to section 6.3 for details.

8.3.2 Radiated emission:

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(B) Radiated Emission Test Set-UP Frequency Over 1 GHz



8.4 Measurement Procedure:

1. Place the EUT on the table and set it in 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 center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW, VBW=100KHz, Span=25MHz, Sweep = auto
5. Mark Peak, 902MHz and 928MHz and record the max. level.
6. Repeat above procedures until all frequency measured were complete.

8.5 Field Strength Calculation:

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

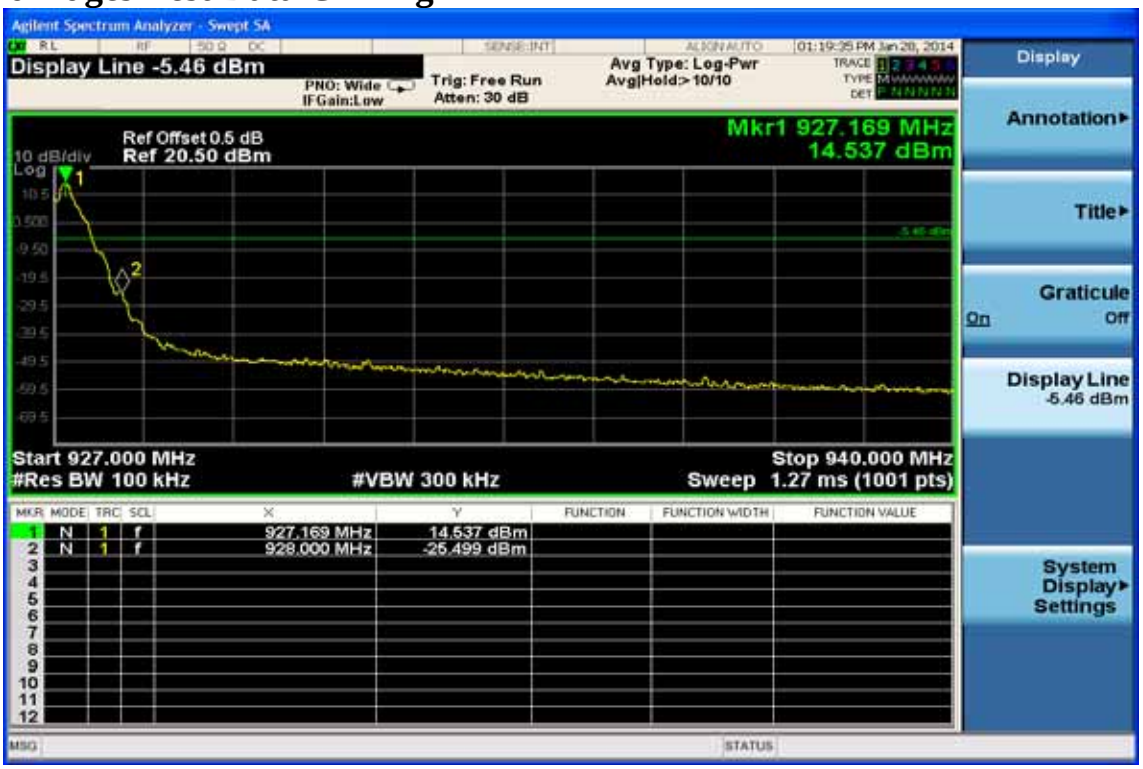
8.6 Measurement Result:

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

High Speed

Band Edges Test Data CH-Low

Band Edges Test Data CH-High



Radiated Emission: (Dipole Antenna)

Operation Mode	TX CH Low	Test Date	2014/01/24
Fundamental Frequency	903.649 MHz	Test By	Lake
Temperature	25 ℃	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	902.00	43.74	-0.74	43.00	81.41	-38.41	Peak	VERTICAL
1	894.14	40.50	-0.88	39.62	74.56	-34.94	Peak	HORIZONTAL
2	902.00	39.77	-0.74	39.03	74.56	-35.53	Peak	HORIZONTAL

Operation Mode	TX CH High	Test Date	2014/01/24
Fundamental Frequency	926.936 MHz	Test By	Lake
Temperature	25 ℃	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	928.00	67.70	-0.24	67.46	84.96	-17.5	Peak	VERTICAL
1	928.00	59.79	-0.24	59.55	77.27	-17.72	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

3 Measurement of data 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.

4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

6 Limit = Measured Peak field strength – 20dB

Radiated Emission: (Printing Antenna)

Operation Mode	TX CH Low	Test Date	2014/01/24
Fundamental Frequency	903.649 MHz	Test By	Lake
Temperature	25 ℃	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	902.00	43.74	-0.74	43.00	81.41	-38.41	Peak	VERTICAL
1	894.14	40.50	-0.88	39.62	74.56	-34.94	Peak	HORIZONTAL
2	902.00	39.77	-0.74	39.03	74.56	-35.53	Peak	HORIZONTAL

Operation Mode	TX CH High	Test Date	2014/01/24
Fundamental Frequency	926.936 MHz	Test By	Lake
Temperature	25 ℃	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	928.00	76.15	-0.24	75.91	93.06	-17.15	Peak	VERTICAL
1	928.00	67.55	-0.24	67.31	85.38	-18.07	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

3 Measurement of data 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.

4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

6 Limit = Measured Peak field strength – 20dB

9 SPURIOUS RADIATED EMISSION TEST

9.1 Standard Applicable

According to §15.247(c), all other emissions outside these bands shall not exceed the general radiated emission limits specified in §15.209(a). And according to §15.33(a)(1), for an intentional radiator operates below 10GHz, the frequency range of measurements: to the tenth harmonic of the highest fundamental frequency or to 40GHz, whichever is lower.

According to RSS-210 issue 8, §A8.5, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Tables 2 and 3 is not required. In addition, radiated emissions which fall in the restricted bands of Table 1 must also comply with the radiated emission limits specified in Tables 2 and 3.

9.2 Measurement Equipment Used:

9.2.1 Conducted Emission at antenna port:

Refer to section 6.2 for details.

9.2.2 Radiated emission:

Refer to section 7.2 for details.

9.3 Test SET-UP:

9.3.1 Conducted Emission at antenna port:

Refer to section 6.3 for details.

9.3.2 Radiated emission:

Refer to section 7.3 for details.

9.4 Measurement Procedure:

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
4. When measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. Repeat above procedures until all frequency measured were complete.

9.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

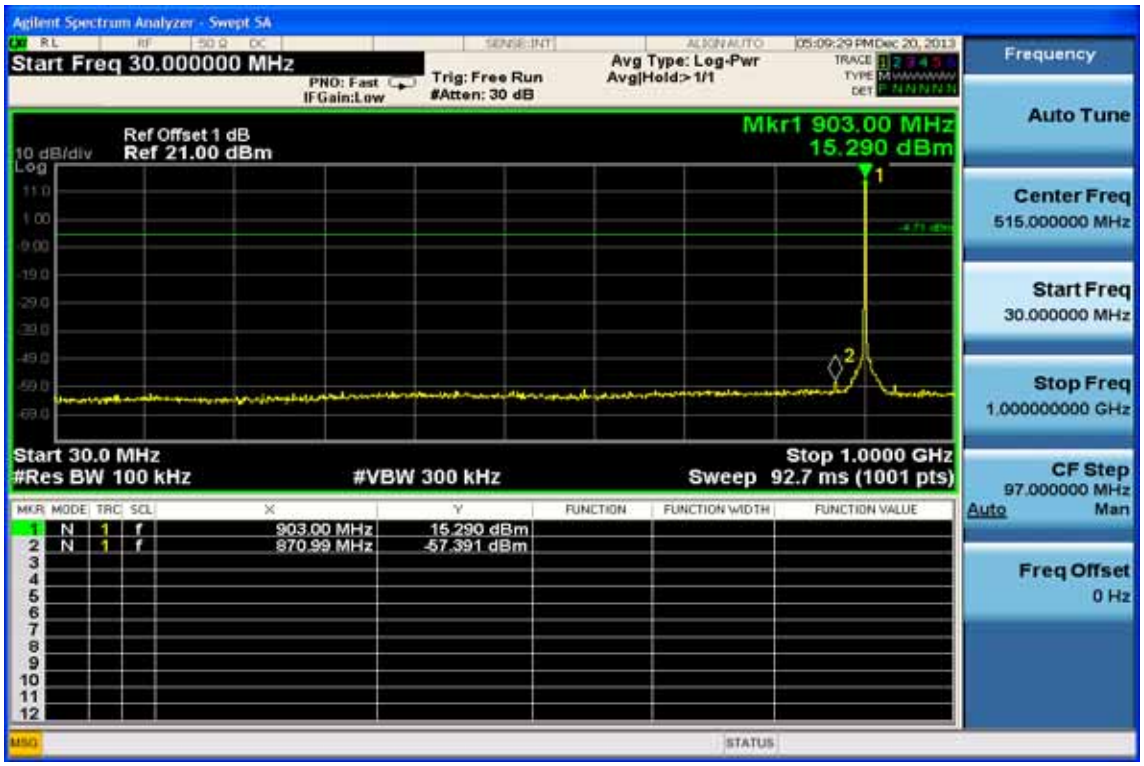
FS = RA + AF + CL - AG

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

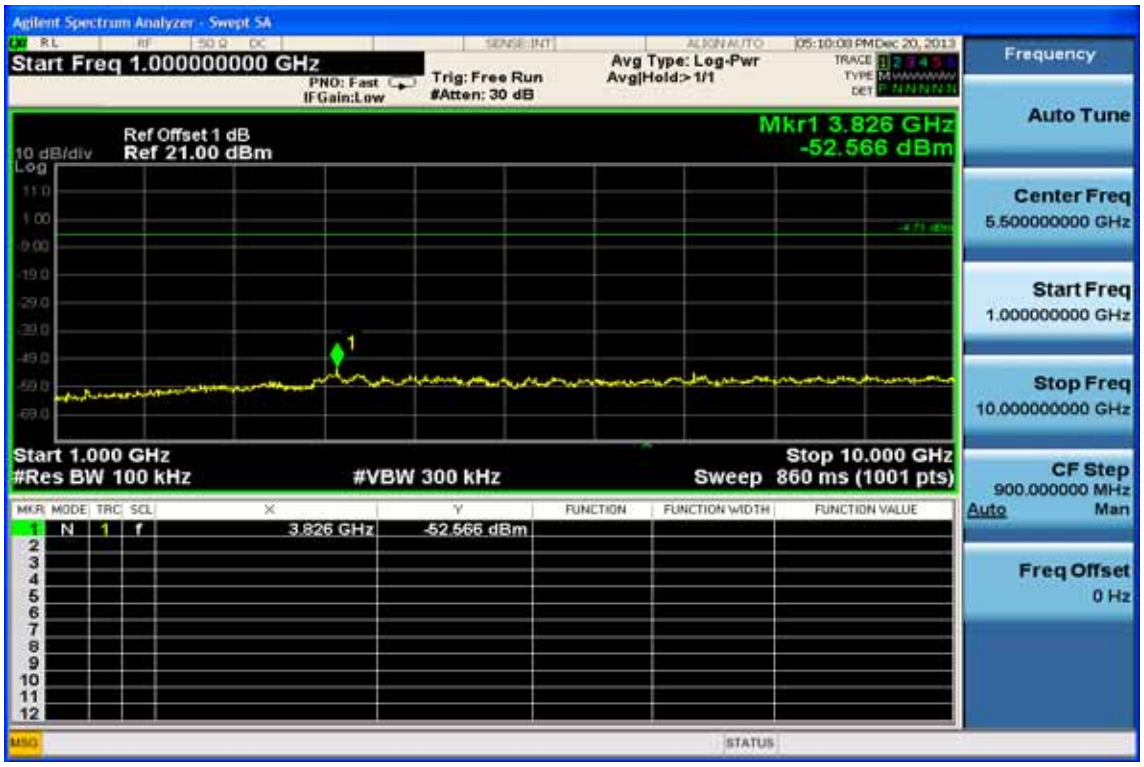
9.6 Measurement Result:

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

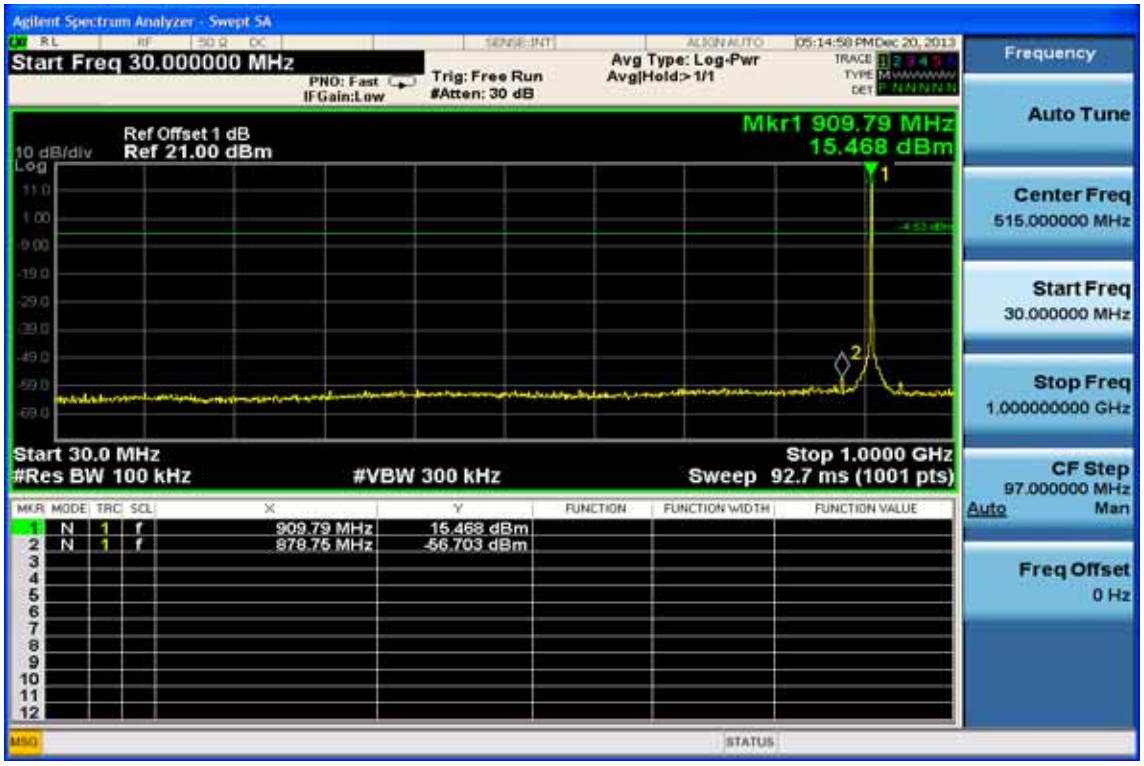
Conducted Spurious Emission Measurement Result (High Speed)
Ch Low 30MHz – 3GHz



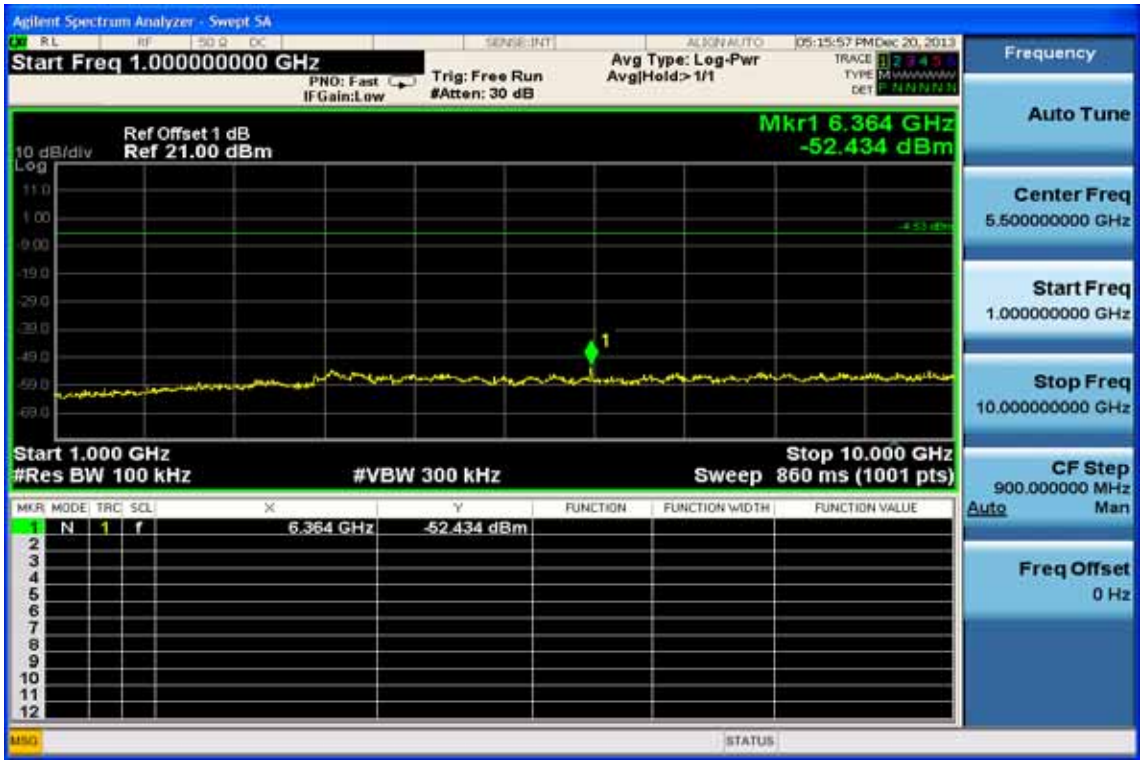
Ch Low 3GHz – 26.5GHz



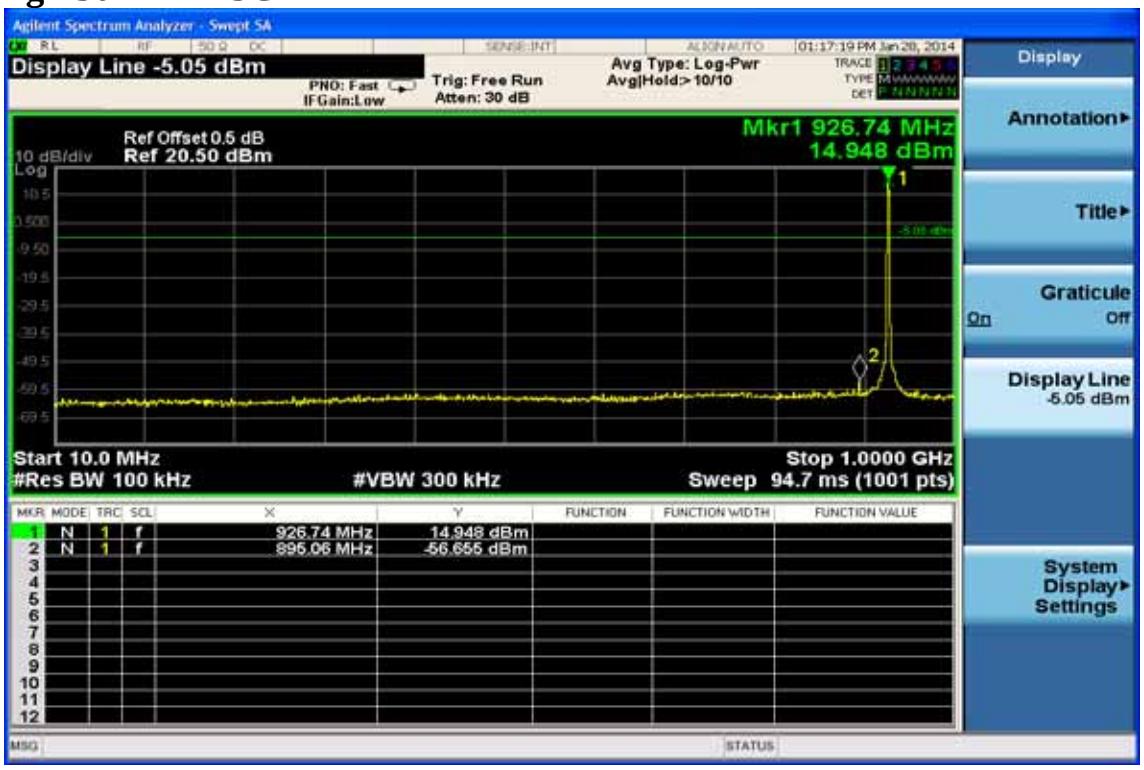
Ch Mid 30MHz – 3GHz



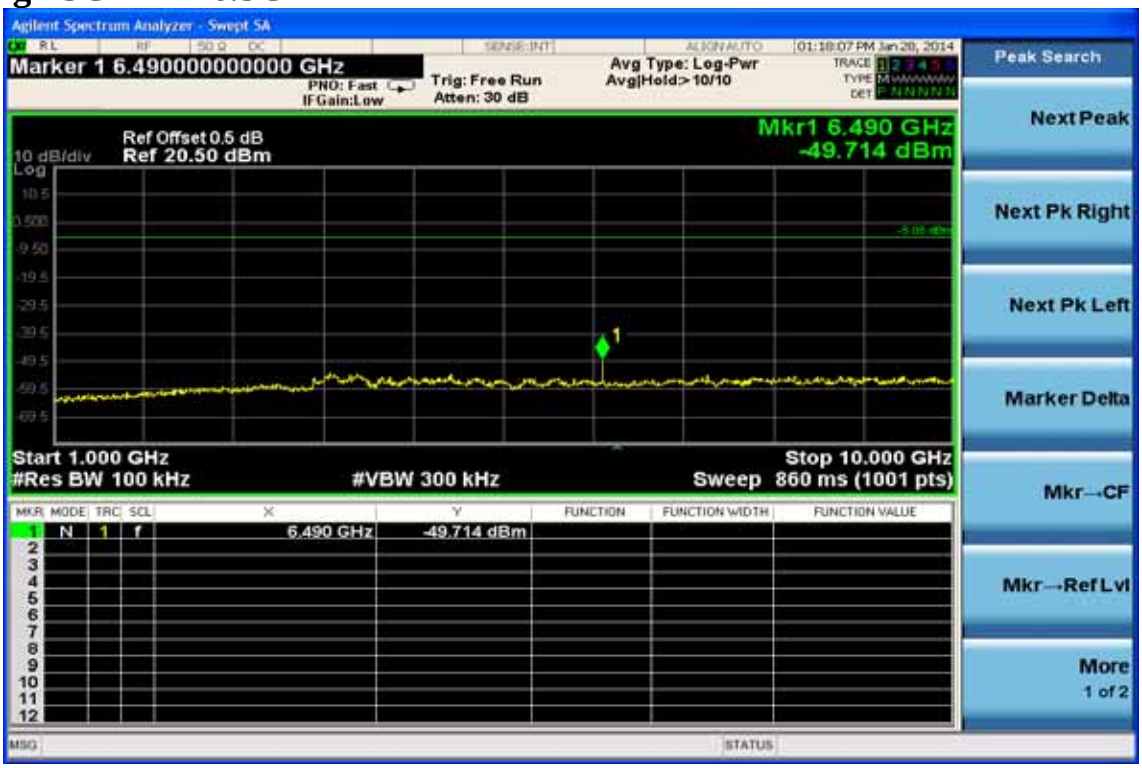
Ch Mid 3GHz – 26.5GHz



Ch High 30MHz – 3GHz



Ch High 3GHz – 26.5GHz



Radiated Spurious Emission Measurement Result (below 1GHz) (Dipole Antenna)

Operation Mode	TX CH Low	Test Date	2014/01/24
Fundamental Frequency	903.649MHz	Test By	Lake
Temperature	25 ℃	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	66.86	47.59	-14.08	33.51	40.00	-6.49	Peak	VERTICAL
2	130.88	46.64	-13.56	33.08	43.50	-10.42	Peak	VERTICAL
3	161.92	51.22	-12.19	39.03	43.50	-4.47	Peak	VERTICAL
4	299.66	48.82	-11.06	37.76	46.00	-8.24	Peak	VERTICAL
5	650.80	39.64	-4.96	34.68	46.00	-11.32	Peak	VERTICAL
6	828.31	43.27	-2.05	41.22	46.00	-4.78	Peak	VERTICAL
1	121.18	44.96	-14.43	30.53	43.50	-12.97	Peak	HORIZONTAL
2	167.74	45.08	-12.50	32.58	43.50	-10.92	Peak	HORIZONTAL
3	288.02	41.79	-11.45	30.34	46.00	-15.66	Peak	HORIZONTAL
4	379.20	41.89	-9.63	32.26	46.00	-13.74	Peak	HORIZONTAL
5	450.01	37.77	-8.17	29.60	46.00	-16.40	Peak	HORIZONTAL
6	495.60	39.95	-7.67	32.28	46.00	-13.72	Peak	HORIZONTAL

Remark:

1 No further spurious emissions detected from the lowest internal frequency and 30MHz.

2 Measuring frequencies from the lowest internal frequency to the 1GHz.

3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90KHz/110-490KHz using PK/AV and other Frequency Band using PK/QP

4 Measurement result 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 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100KHz, VBW=300KHz.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	TX CH Mid	Test Date	2014/01/24
Fundamental Frequency	910MHz	Test By	Lake
Temperature	25 ℃	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	57.16	37.40	-12.52	24.88	40.00	-15.12	Peak	VERTICAL
2	132.82	45.36	-13.33	32.03	43.50	-11.47	Peak	VERTICAL
3	162.89	49.25	-12.24	37.01	43.50	-6.49	Peak	VERTICAL
4	303.54	45.52	-10.99	34.53	46.00	-11.47	Peak	VERTICAL
5	384.05	38.81	-9.52	29.29	46.00	-16.71	Peak	VERTICAL
6	828.31	36.13	-2.05	34.08	46.00	-11.92	Peak	VERTICAL
1	121.18	42.48	-14.43	28.05	43.50	-15.45	Peak	HORIZONTAL
2	167.74	45.36	-12.50	32.86	43.50	-10.64	Peak	HORIZONTAL
3	288.02	42.11	-11.45	30.66	46.00	-15.34	Peak	HORIZONTAL
4	380.17	42.75	-9.60	33.15	46.00	-12.85	Peak	HORIZONTAL
5	495.60	41.06	-7.67	33.39	46.00	-12.61	Peak	HORIZONTAL
6	864.20	32.26	-1.45	30.81	46.00	-15.19	Peak	HORIZONTAL

Remark:

1 No further spurious emissions detected from the lowest internal frequency and 30MHz.

2 Measuring frequencies from the lowest internal frequency to the 1GHz.

3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90KHz/110-490KHz using PK/AV and other Frequency Band using PK/QP

4 Measurement result 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 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100KHz, VBW=300KHz.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	TX CH High	Test Date	2014/01/24
Fundamental Frequency	926.936MHz	Test By	Lake
Temperature	25 ℃	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	58.13	37.40	-12.59	24.81	40.00	-15.19	Peak	VERTICAL
2	131.85	45.61	-13.45	32.16	43.50	-11.34	Peak	VERTICAL
3	161.92	46.73	-12.19	34.54	43.50	-8.96	Peak	VERTICAL
4	312.27	43.11	-10.85	32.26	46.00	-13.74	Peak	VERTICAL
5	380.17	41.48	-9.60	31.88	46.00	-14.12	Peak	VERTICAL
6	830.25	36.22	-2.02	34.20	46.00	-11.80	Peak	VERTICAL
1	119.24	45.18	-14.61	30.57	43.50	-12.93	Peak	HORIZONTAL
2	167.74	44.88	-12.50	32.38	43.50	-11.12	Peak	HORIZONTAL
3	265.71	43.60	-12.28	31.32	46.00	-14.68	Peak	HORIZONTAL
4	353.98	43.96	-10.11	33.85	46.00	-12.15	Peak	HORIZONTAL
5	495.60	41.64	-7.67	33.97	46.00	-12.03	Peak	HORIZONTAL
6	864.20	31.41	-1.45	29.96	46.00	-16.04	Peak	HORIZONTAL

Remark:

1 No further spurious emissions detected from the lowest internal frequency and 30MHz.

2 Measuring frequencies from the lowest internal frequency to the 1GHz.

3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90KHz/110-490KHz using PK/AV and other Frequency Band using PK/QP

4 Measurement result 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 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100KHz, VBW=300KHz.

Radiated Spurious Emission Measurement Result (above 1GHz) (Dipole Antenna)

Operation Mode	TX CH Low	Test Date	2014/01/24
Fundamental Frequency	903.649MHz	Test By	Lake
Temperature	25 ℃	Pol	Ver.
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	1807.40	59.83	-9.05	50.78	54.00	-3.22	Average	VERTICAL
2	1807.40	63.87	-9.05	54.82	74.00	-19.18	Peak	VERTICAL
3	6325.90	35.50	5.76	41.26	54.00	-12.74	Average	VERTICAL
4	6325.90	46.73	5.76	52.49	74.00	-21.51	Peak	VERTICAL
5	7229.60	43.27	8.25	51.52	74.00	-22.48	Peak	VERTICAL
6	8133.30	34.56	9.77	44.33	54.00	-9.67	Average	VERTICAL
7	8133.30	47.59	9.77	57.36	74.00	-16.64	Peak	VERTICAL
1	1807.40	58.97	-9.05	49.92	54.00	-4.08	Average	HORIZONTAL
2	1807.40	62.55	-9.05	53.50	74.00	-20.50	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

3 Measurement of data 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.

4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	TX CH Mid	Test Date	2014/01/24
Fundamental Frequency	910MHz	Test By	Lake
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	1820.00	60.79	-8.97	51.82	54.00	-2.18	Average	VERTICAL
2	1820.00	65.59	-8.97	56.62	74.00	-17.38	Peak	VERTICAL
3	6370.00	36.53	5.92	42.45	54.00	-11.55	Average	VERTICAL
4	6370.00	48.47	5.92	54.39	74.00	-19.61	Peak	VERTICAL
5	7280.00	33.06	8.28	41.34	54.00	-12.66	Average	VERTICAL
6	7280.00	43.16	8.28	51.44	74.00	-22.56	Peak	VERTICAL
7	8190.00	34.72	9.95	44.67	54.00	-9.33	Average	VERTICAL
8	8190.00	46.73	9.95	56.68	74.00	-17.32	Peak	VERTICAL
1	1820.00	59.86	-8.97	50.89	54.00	-3.11	Average	HORIZONTAL
2	1820.00	62.82	-8.97	53.85	74.00	-20.15	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

3 Measurement of data 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.

4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	TX CH High	Test Date	2014/01/24
Fundamental Frequency	926.936MHz	Test By	Lake
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq	Reading	Factor	Level	Limit	Over Limit	Remark	Pol
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB		V/H
1	1853.80	58.62	-8.78	49.84	54.00	-4.16	Average	VERTICAL
2	1853.80	63.14	-8.78	54.36	74.00	-19.64	Peak	VERTICAL
3	6488.30	35.35	6.36	41.71	54.00	-12.29	Average	VERTICAL
4	6488.30	46.67	6.36	53.03	74.00	-20.97	Peak	VERTICAL
1	1853.80	59.34	-8.78	50.56	54.00	-3.44	Average	HORIZONTAL
2	1853.80	63.54	-8.78	54.76	74.00	-19.24	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

3 Measurement of data 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.

4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (below 1GHz) (Printing Antenna)

Operation Mode	TX CH Low	Test Date	2014/01/24
Fundamental Frequency	903.649MHz	Test By	Lake
Temperature	25 ℃	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	131.85	45.79	-13.45	32.34	43.50	-11.16	Peak	VERTICAL
2	161.92	47.10	-12.19	34.91	43.50	-8.59	Peak	VERTICAL
3	298.69	45.29	-11.10	34.19	46.00	-11.81	Peak	VERTICAL
4	379.20	40.42	-9.63	30.79	46.00	-15.21	Peak	VERTICAL
5	650.80	34.72	-4.96	29.76	46.00	-16.24	Peak	VERTICAL
6	831.22	39.10	-2.01	37.09	46.00	-8.91	Peak	VERTICAL
1	121.18	43.65	-14.43	29.22	43.50	-14.28	Peak	HORIZONTAL
2	167.74	45.07	-12.50	32.57	43.50	-10.93	Peak	HORIZONTAL
3	288.02	40.27	-11.45	28.82	46.00	-17.18	Peak	HORIZONTAL
4	378.23	40.82	-9.64	31.18	46.00	-14.82	Peak	HORIZONTAL
5	495.60	41.19	-7.67	33.52	46.00	-12.48	Peak	HORIZONTAL
6	864.20	32.08	-1.45	30.63	46.00	-15.37	Peak	HORIZONTAL

Remark:

1 No further spurious emissions detected from the lowest internal frequency and 30MHz.

2 Measuring frequencies from the lowest internal frequency to the 1GHz.

3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90KHz/110-490KHz using PK/AV and other Frequency Band using PK/QP

4 Measurement result 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 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100KHz, VBW=300KHz.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	TX CH Mid	Test Date	2014/01/24
Fundamental Frequency	910MHz	Test By	Lake
Temperature	25 ℃	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	129.91	45.68	-13.67	32.01	43.50	-11.49	Peak	VERTICAL
2	162.89	49.13	-12.24	36.89	43.50	-6.61	Peak	VERTICAL
3	312.27	43.64	-10.85	32.79	46.00	-13.21	Peak	VERTICAL
4	378.23	40.99	-9.64	31.35	46.00	-14.65	Peak	VERTICAL
5	663.41	29.56	-4.77	24.79	46.00	-21.21	Peak	VERTICAL
6	828.31	36.32	-2.05	34.27	46.00	-11.73	Peak	VERTICAL
1	118.27	45.56	-14.70	30.86	43.50	-12.64	Peak	HORIZONTAL
2	167.74	44.74	-12.50	32.24	43.50	-11.26	Peak	HORIZONTAL
3	299.66	40.67	-11.06	29.61	46.00	-16.39	Peak	HORIZONTAL
4	378.23	43.29	-9.64	33.65	46.00	-12.35	Peak	HORIZONTAL
5	495.60	41.80	-7.67	34.13	46.00	-11.87	Peak	HORIZONTAL
6	718.70	35.83	-3.72	32.11	46.00	-13.89	Peak	HORIZONTAL

Remark:

1 No further spurious emissions detected from the lowest internal frequency and 30MHz.

2 Measuring frequencies from the lowest internal frequency to the 1GHz.

3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90KHz/110-490KHz using PK/AV and other Frequency Band using PK/QP

4 Measurement result 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 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100KHz, VBW=300KHz.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	TX CH High	Test Date	2014/01/24
Fundamental Frequency	926.936MHz	Test By	Lake
Temperature	25 ℃	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	130.88	45.78	-13.56	32.22	43.50	-11.28	Peak	VERTICAL
2	161.92	49.01	-12.19	36.82	43.50	-6.68	Peak	VERTICAL
3	302.57	45.84	-11.00	34.84	46.00	-11.16	Peak	VERTICAL
4	377.26	42.75	-9.66	33.09	46.00	-12.91	Peak	VERTICAL
5	597.45	32.51	-5.71	26.80	46.00	-19.20	Peak	VERTICAL
6	828.31	36.49	-2.05	34.44	46.00	-11.56	Peak	VERTICAL
1	120.21	45.37	-14.51	30.86	43.50	-12.64	Peak	HORIZONTAL
2	167.74	44.95	-12.50	32.45	43.50	-11.05	Peak	HORIZONTAL
3	299.66	42.48	-11.06	31.42	46.00	-14.58	Peak	HORIZONTAL
4	380.17	41.02	-9.60	31.42	46.00	-14.58	Peak	HORIZONTAL
5	495.60	40.74	-7.67	33.07	46.00	-12.93	Peak	HORIZONTAL
6	720.64	33.60	-3.66	29.94	46.00	-16.06	Peak	HORIZONTAL

Remark:

1 No further spurious emissions detected from the lowest internal frequency and 30MHz.

2 Measuring frequencies from the lowest internal frequency to the 1GHz.

3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90KHz/110-490KHz using PK/AV and other Frequency Band using PK/QP

4 Measurement result 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 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100KHz, VBW=300KHz.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	TX CH Low	Test Date	2014/01/24
Fundamental Frequency	903.649MHz	Test By	Lake
Temperature	25 ℃	Pol	Ver.
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	1807.40	48.84	-9.05	39.79	74.00	-34.21	Peak	VERTICAL
2	6325.90	39.01	5.76	44.77	54.00	-9.23	Average	VERTICAL
3	6325.90	53.41	5.76	59.17	74.00	-14.83	Peak	VERTICAL
4	7229.60	34.96	8.25	43.21	54.00	-10.79	Average	VERTICAL
5	7229.60	46.55	8.25	54.80	74.00	-19.20	Peak	VERTICAL
6	8133.30	35.90	9.77	45.67	54.00	-8.33	Average	VERTICAL
7	8133.30	49.95	9.77	59.72	74.00	-14.28	Peak	VERTICAL
1	1807.40	47.61	-9.05	38.56	74.00	-35.44	Peak	HORIZONTAL
2	8133.30	32.62	9.77	42.39	54.00	-11.61	Average	HORIZONTAL
3	8133.30	46.17	9.77	55.94	74.00	-18.06	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

3 Measurement of data 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.

4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	TX CH Mid	Test Date	2014/01/24
Fundamental Frequency	910MHz	Test By	Lake
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	1820.00	48.59	-8.97	39.62	74.00	-34.38	Peak	VERTICAL
2	6370.00	40.80	5.92	46.72	54.00	-7.28	Average	VERTICAL
3	6370.00	55.03	5.92	60.95	74.00	-13.05	Peak	VERTICAL
4	7280.00	35.35	8.28	43.63	54.00	-10.37	Average	VERTICAL
5	7280.00	46.38	8.28	54.66	74.00	-19.34	Peak	VERTICAL
6	8190.00	35.45	9.95	45.40	54.00	-8.60	Average	VERTICAL
7	8190.00	48.22	9.95	58.17	74.00	-15.83	Peak	VERTICAL
1	1820.00	46.06	-8.97	37.09	74.00	-36.91	Peak	HORIZONTAL
2	8190.00	32.66	9.95	42.61	54.00	-11.39	Average	HORIZONTAL
3	8190.00	43.57	9.95	53.52	74.00	-20.48	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

3 Measurement of data 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.

4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	TX CH High	Test Date	2014/01/24
Fundamental Frequency	926.936MHz	Test By	Lake
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq	Reading	Factor	Level	Limit	Over Limit	Remark	Pol
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB		V/H
1	1853.80	51.31	-8.78	42.53	74.00	-31.47	Peak	VERTICAL
2	6488.30	40.01	6.36	46.37	54.00	-7.63	Average	VERTICAL
3	6488.30	54.31	6.36	60.67	74.00	-13.33	Peak	VERTICAL
4	7415.20	34.64	8.35	42.99	54.00	-11.01	Average	VERTICAL
5	7415.20	45.95	8.35	54.30	74.00	-19.70	Peak	VERTICAL
1	1540.00	57.80	-10.69	47.11	74.00	-26.89	Peak	HORIZONTAL
2	1853.80	47.03	-8.78	38.25	74.00	-35.75	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

3 Measurement of data 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.

4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	802.11g RX CH Low	Test Date	2014/01/24
Fundamental Frequency	2412MHz	Test By	Lake
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	2561.00	40.96	-11.00	29.96	74.00	-44.04	Peak	VERTICAL
2	4724.00	41.62	-2.92	38.70	74.00	-35.30	Peak	VERTICAL
1	2603.00	40.06	-10.86	29.20	74.00	-44.80	Peak	HORIZONTAL
2	4633.00	38.62	-3.24	35.38	74.00	-38.62	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

3 Measurement of data 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.

4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	802.11g RX CH Mid	Test Date	2014/01/24
Fundamental Frequency	2437MHz	Test By	Lake
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	2596.00	40.70	-10.89	29.81	74.00	-44.19	Peak	VERTICAL
2	5445.00	36.43	-0.85	35.58	74.00	-38.42	Peak	VERTICAL
1	2498.00	40.12	-11.21	28.91	74.00	-45.09	Peak	HORIZONTAL
2	5172.00	38.96	-1.55	37.41	74.00	-36.59	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

3 Measurement of data 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.

4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

10 Peak Power Spectral Density

10.1 Standard Applicable:

According to §15.247(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

According to RSS-210 issue 8, §A8.2(b) The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of Section A8.4 (4), (i.e. the power spectral density shall be determined using the same method as is used to determine the conducted output power).

10.2 Measurement Equipment Used:

Refer to section 6.2 for details.

10.3 Test Set-up:

Refer to section 6.3 for details.

10.4 Measurement Procedure:

1. Place the EUT on the table and set it in 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 =5 to 30% greater than emission BW, Sweep=Auto
4. Record the max. reading.
5. Repeat above procedures until all frequency measured were complete.

10.5 Measurement Result:

High Speed

Frequency MHz	Power Density Reading (dBm)/3KHz	Maximum Limit (dBm)
903.649	6.493	8
910.0	6.701	8
926.936	7.251	8

High Speed
Power Spectral Density Test Plot (CH-Low)

Power Spectral Density Test Plot (CH-Mid)

Power Spectral Density Test Plot (CH-High)

11 ANTENNA REQUIREMENT

11.1 Standard Applicable:

According to §15.203, Antenna requirement.

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

According to RSS-GEN 7.1.2, a transmitter can only be sold or operated with antennas with which it was certified. A transmitter may be certified with multiple antenna types. An antenna type comprises antennas having similar in-band and out-of-band radiation patterns. Testing shall be performed using the highest-gain antenna of each combination of transmitter and antenna type for which certification is being sought, with the transmitter output power set at the maximum level. Any antenna of the same type and having equal or lesser gain as an antenna that had been successfully tested for certification with the transmitter, will also be considered certified with the transmitter, and may be used and marketed with the transmitter. The manufacturer shall include with the application for certification a list of acceptable antenna types to be used with the transmitter.

When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacturer. Any antenna gain in excess of 6 dBi (6 dB above isotropic gain) shall be added to the measured RF output power before using the power limits specified in RSS-210 or RSS-310 for devices of RF output powers of 10 milliwatts or less. For devices of output powers greater than 10 milliwatts, except devices subject to RSS-210 Annex 8 (Frequency Hopping and Digital Modulation Systems Operating in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz Bands) or RSS-210 Annex 9 (Local Area Network Devices), the total antenna gain shall be added to the measured RF output power before using the specified power limits. For devices subject to RSS-210 Annex 8 or Annex 9, the antenna gain shall not be added.

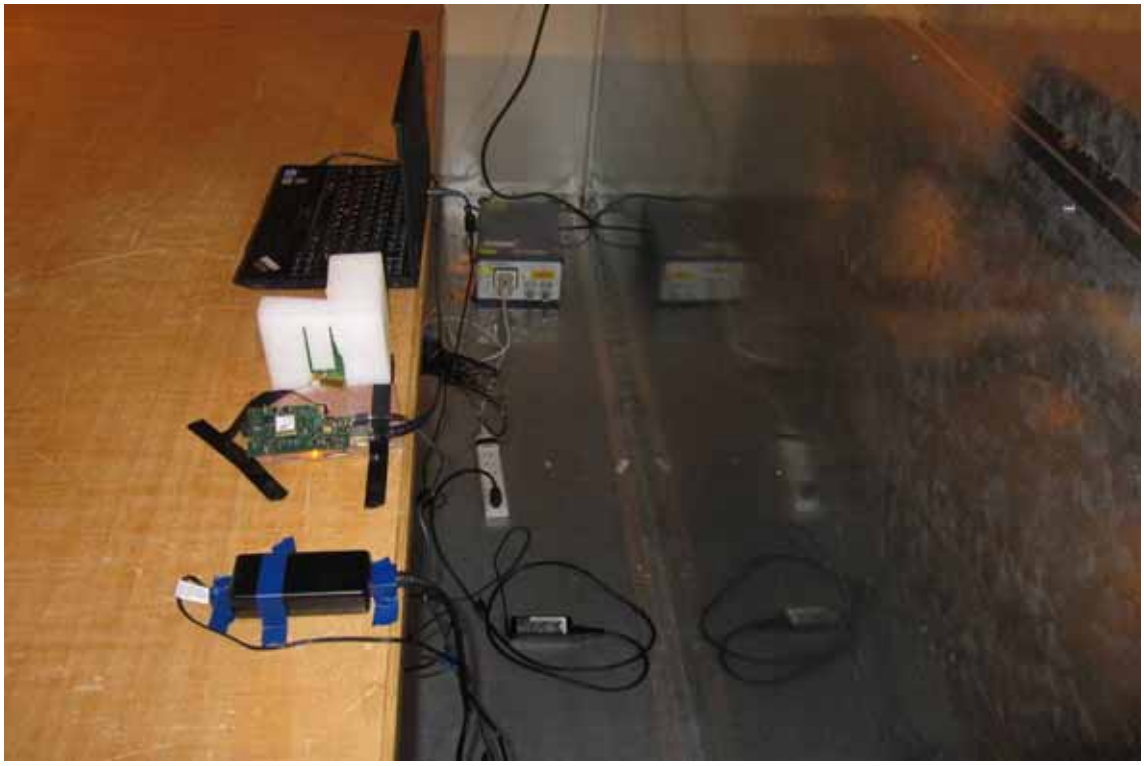
11.2 Antenna Connected Construction:

The directional gins of antenna used for transmitting is Printing antenna: 1dBi, Dipole antenna : 3dBi and the antenna connector is designed with unique type RF connector. Please see EUT photo and antenna spec. for details.

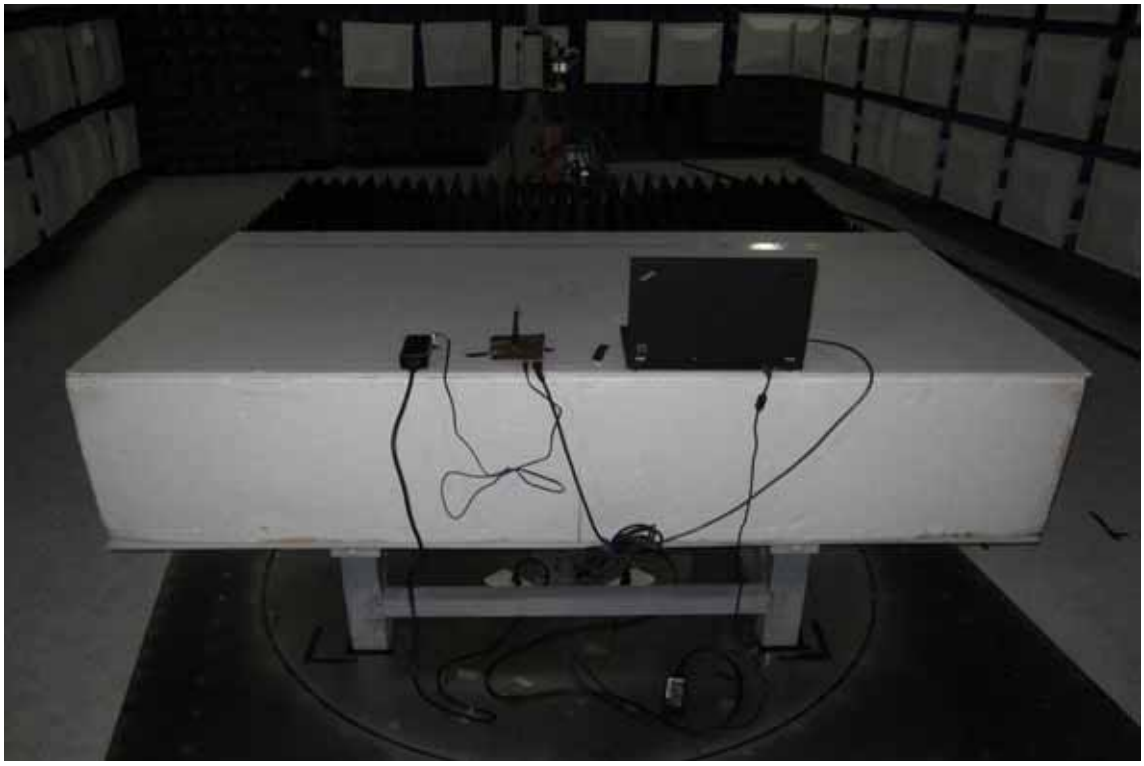
APPENDIX 1
PHOTOGRAPHS OF SET UP

Conducted Emission Setup Photos (Dipole Antenna)

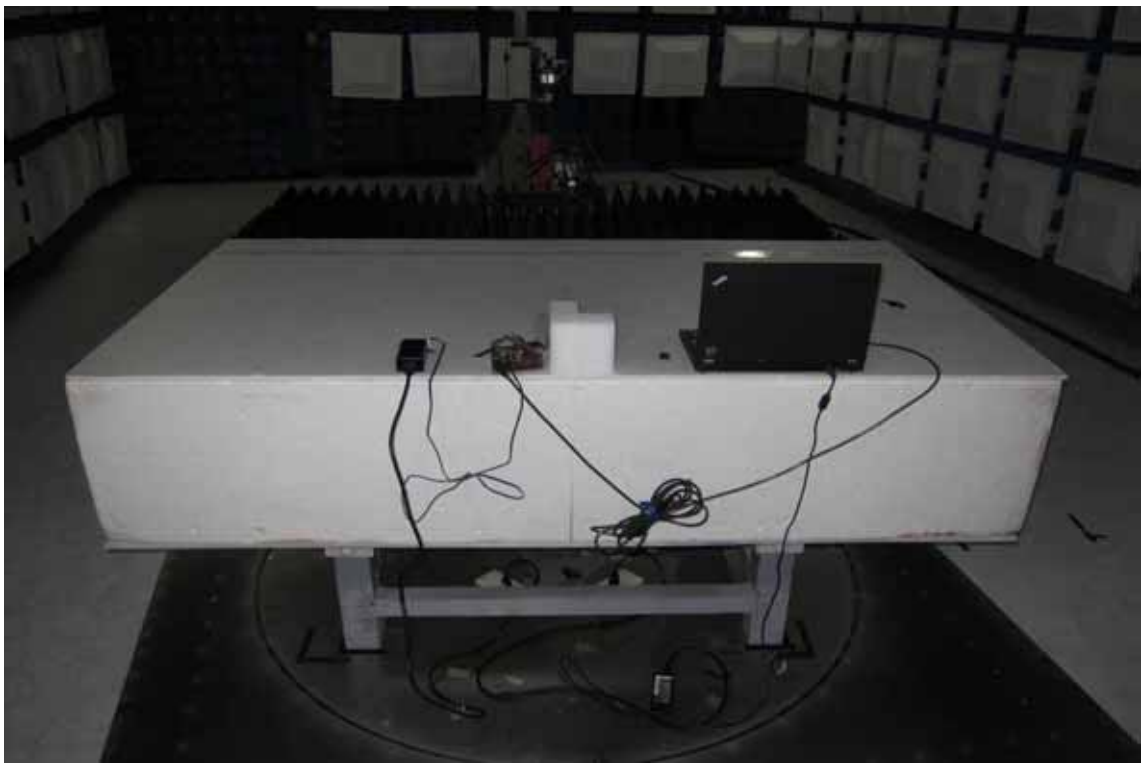
Conducted Emission Setup Photos (Printing Antenna)



Radiated Emission Setup Photos (Dipole Antenna)

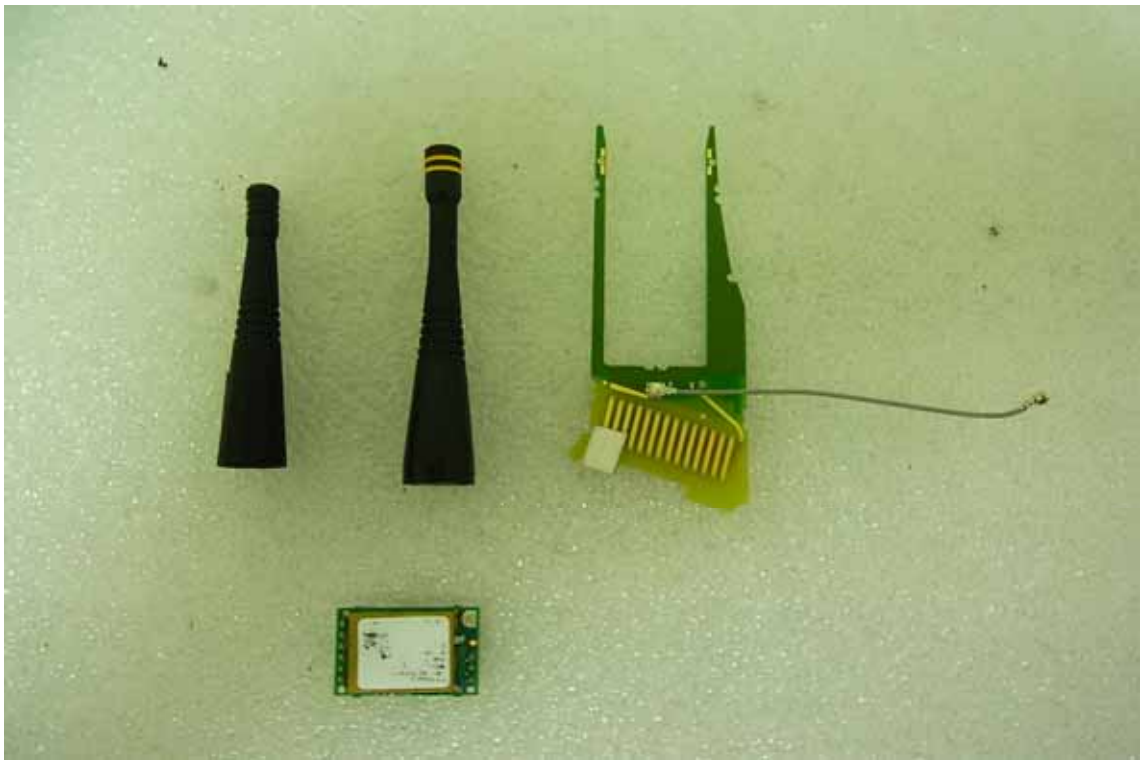


Radiated Emission Setup Photos (Printing Antenna)

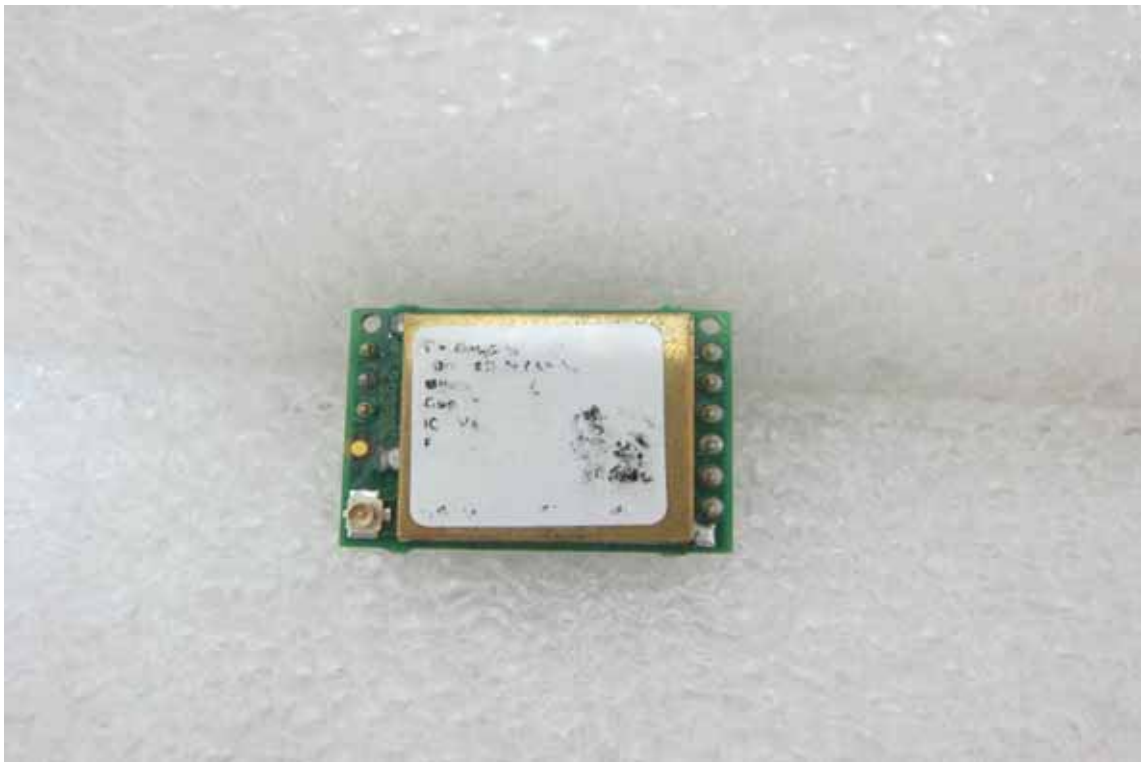


APPENDIX 2
PHOTOGRAPHS OF EUT

EUT – 1



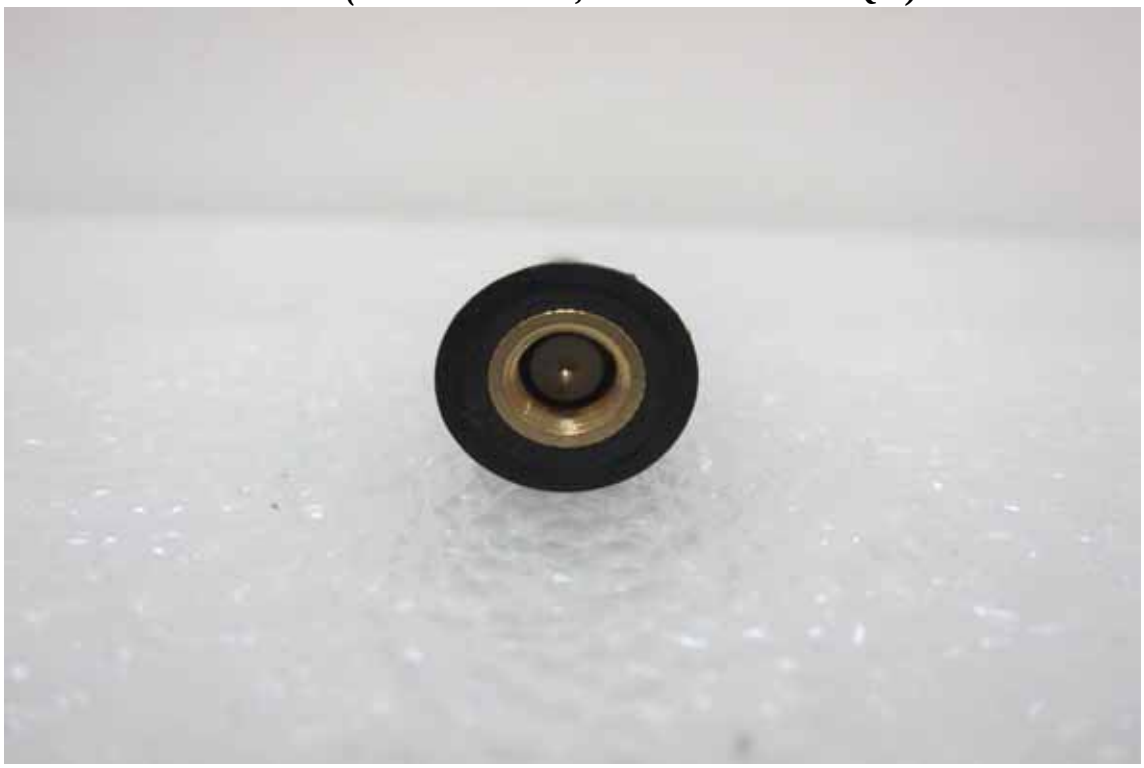
EUT – 2



EUT – 3

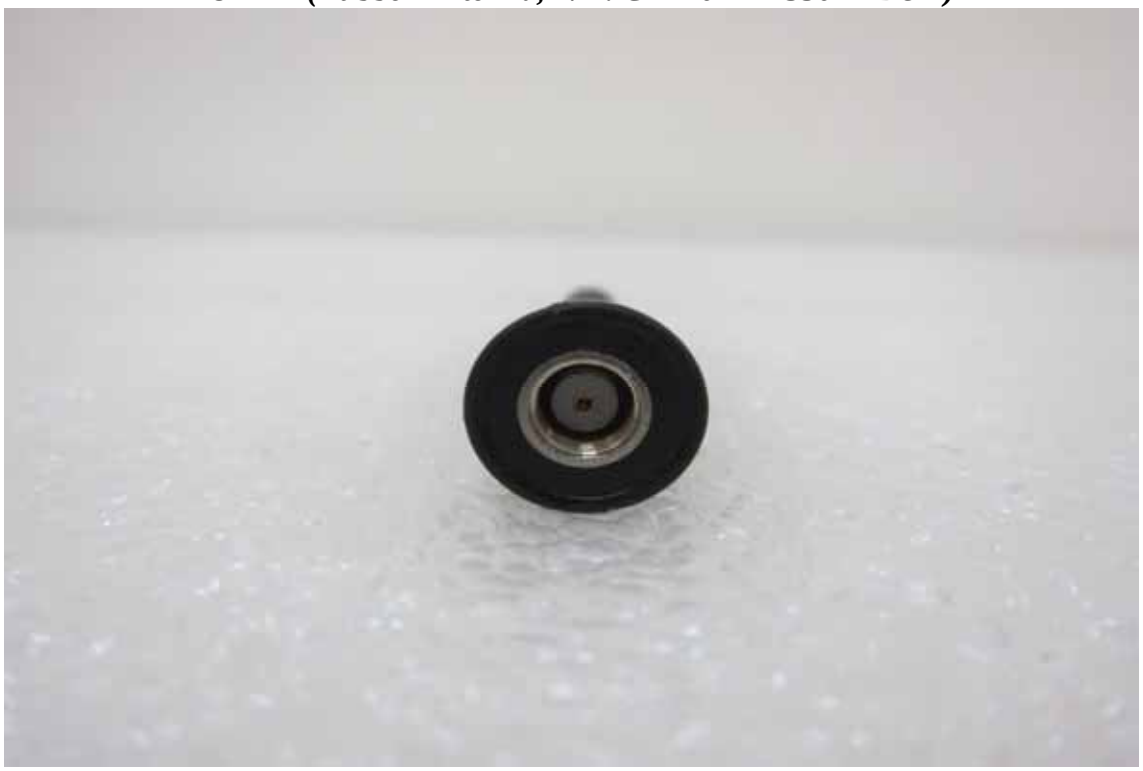
EUT – 4 (Rubber Antenna, P/N: ANT-916-CW-QW)

EUT – 5 (Rubber Antenna, P/N: ANT-916-CW-QW)

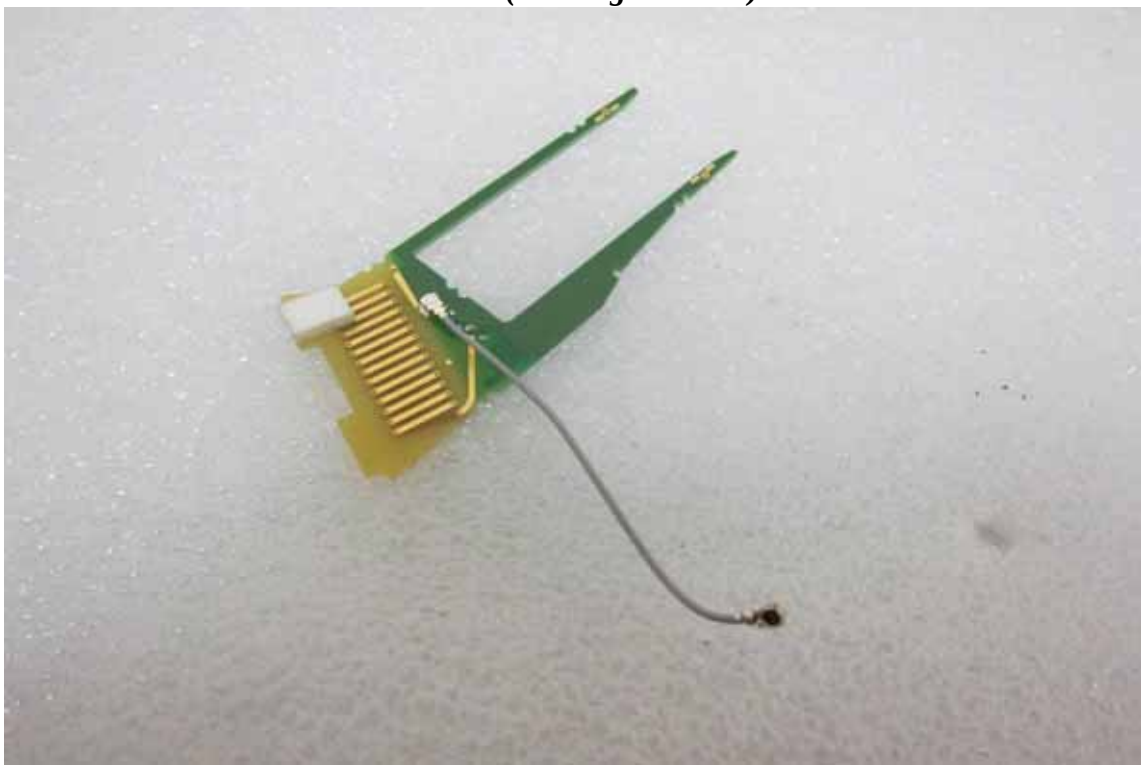


EUT – 6 (Rubber Antenna, P/N: G-RA0K14155047-BON)

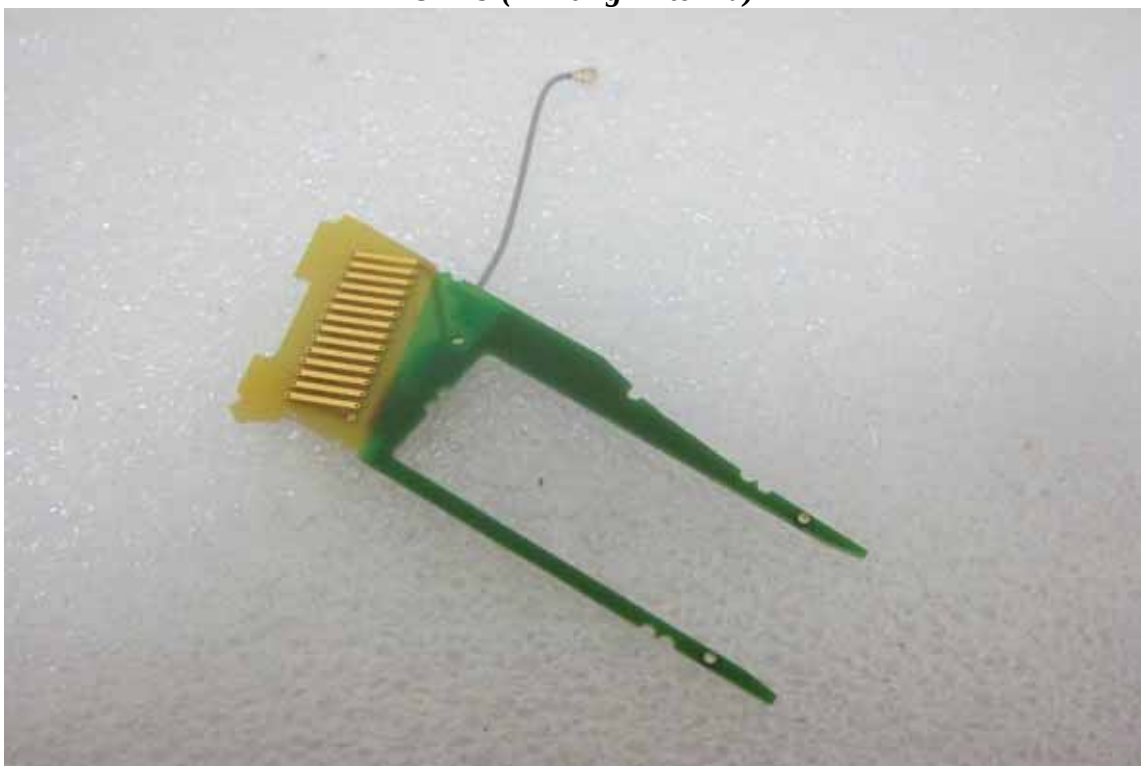
EUT – 7 (Rubber Antenna, P/N: G-RA0K14155047-BON)



EUT – 8 (Printing Antenna)



EUT –9 (Printing Antenna)



~ End of Report ~