ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

OF

Product Name:	**Wireless IR Controller**
Brand Name:	**Everspring**
Model No.:	**AC134-2**
Model Difference:	**N/A**
FCC ID:	**FU5AC134-2**
Report No.:	**E2/2017/70042**
Issue Date:	**Jul. 31, 2017**
FCC Rule Part:	**§15.247, Cat: DTS**
Prepared for:	**Everspring Industry Co.,Ltd. 3F., No.50, Sec. 1, Zhonghua Rd., Tucheng District, 236 New Taipei City, TAIWAN**
Prepared by:	**SGS Taiwan Ltd. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333**

VERIFICATION OF COMPLIANCE

Applicant for:	Everspring Industry Co.,Ltd. 3F., No.50, Sec. 1, Zhonghua Rd., Tucheng District, 236 New Taipei City, TAIWAN
Product Name:	Wireless IR Controller
Brand Name:	Everspring
Model No.:	AC134-2
Model Difference:	N/A
FCC ID:	FU5AC134-2
Report Number:	E2/2017/70042
Date of Test:	Jul. 12, 2017 ~ Jul. 26, 2017
Date of EUT Received:	Jul. 12, 2017

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10:2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits.
The test results of this report relate only to the tested sample identified in this report.

Test By:	Jazz Huang	***Date:***	Jul. 31, 2017
	Jazz Huang / Sr. Supervisor		
Prepared By:	Tiffany Kao	***Date:***	Jul. 31, 2017
	Tiffany Kao / Clerk		
Approved By:	Jim Chang	***Date:***	Jul. 31, 2017
	Jim Chang / Asst. Manager		

Revision History

Report Number	Revision	Description	Issue Date
E2/2017/70042	Rev.00	Initial creation of document	Jul. 31, 2017

Contents

1. GENERAL INFORMATION

1.1 Product Description

General:

Product Name:	Wireless IR Controller	
Brand Name:	Everspring	
Model No.:	AC134-2	
Model Difference:	N/A	
Hardware Version:	N/A	
Software Version:	N/A	
USB Cable:	Model: N/A, Supplier: N/A	
Power Supply:	4.5Vdc from AAA battery or DC 5V from USB adapter	
	Adapter	Model: S005AYU0500100, Supplier: TEN PAO INTERNATIONAL LTD.

Frequency Range:	923MHz
Channel Number:	1 channel
Modulation Type:	FSK
Transmit Power:	7.78dBm (Peak)
Antenna Designation:	Integral (monopole) Antenna, Gain: -2dBi

1.2 Test Methodology of Applied Standards

FCC Part 15, Subpart C §15.247

FCC KDB 558074 D01 DTS Meas. Guidance

ANSI C63.10:2013

Note: All test items have been performed and record as per the above standards.

1.3 Test Facility

SGS Taiwan Ltd. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333 (TAF code 0513)

FCC Registration Numbers are: 735305

1.4 Special Accessories

There are no special accessories used while test was conducted.

1.5 Equipment Modifications

There was no modification incorporated into the EUT.

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

An engineering test mode (software/firmware) that applicant provided was utilized to manipulate the EUT into transmit, selection of the test channel, and modulation scheme.

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 plan. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz,. The CISPR Quasi-Peak and Average detector mode is employed according to §15.207. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plan. For emission measurements above 1 GHz, the table height shall be 1.5 m. 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 one orthogonal axes and 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.

2.4 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuation factor between EUT conducted port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly EUT RF output level.

Note:

The spectrum analyzer offset is derived from RF cable loss 1dB.

2.5 Configuration of Tested System

Fig. 2-1 Radiated & & Conducted (Antenna Port) Emission Configuration

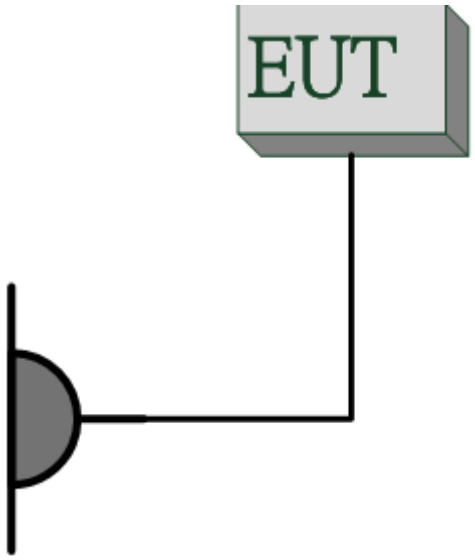


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	Test Software	N/A	N/A	N/A	N/A	N/A

3. SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§15.207(a)	AC Power Line Conducted Emission	Compliant
§15.247(b) (3)	Peak Output Power	Compliant
§15.247(a)(2)	6dB Bandwidth	Compliant
§15.247(d)	Conducted Band Edge and Spurious Emission	Compliant
§15.247(d)	Radiated Band Edge and Spurious Emission	Compliant
§15.247(e)	Peak Power Density	Compliant
§15.203 §15.247(b)	Antenna Requirement	Compliant

4. DESCRIPTION OF TEST MODES

4.1 Operated in 923MHz Band

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

4.2 The Worst Test Modes and Channel Details

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

RADIATED EMISSION TEST:

RADIATED EMISSION TEST (BELOW 1 GHz)			
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION
923MHz	1	1	FSK
RADIATED EMISSION TEST (ABOVE 1 GHz)			
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION
923MHz	1	1	FSK

Note:

The field strength of radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for Transmitter for channel Low, Mid and High, the worst case H position was reported.

ANTENNA PORT CONDUCTED MEASUREMENT:

CONDUCTED TEST				
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
923MHz	1	1	FSK	1

5. MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.586 dB
Peak Output Power	+/- 0.84 dB
6dB Bandwidth	+/- 51.33 Hz
100 KHz Bandwidth Of Frequency Band Edges	+/- 0.84 dB
Peak Power Density	+/- 1.3 dB
Temperature	+/- 0.65 °C
Humidity	+/- 4.6 %
DC / AC Power Source	DC= +/- 0.13%, AC= +/- 0.2%

Radiated Spurious Emission:

Measurement uncertainty (Polarization : **Vertical**)	9kHz – 30MHz: +/- 2.87 dB
	30MHz - 180MHz: +/- 3.37dB
	180MHz -417MHz: +/- 3.19dB
	0.417GHz-1GHz: +/- 3.19dB
	1GHz - 18GHz: +/- 4.04dB
	18GHz - 40GHz: +/- 4.04dB

Measurement uncertainty (Polarization : **Horizontal**)	9kHz – 30MHz: +/- 2.87 dB
	30MHz - 167MHz: +/- 4.22dB
	167MHz -500MHz: +/- 3.44dB
	0.5GHz-1GHz: +/- 3.39dB
	1GHz - 18GHz: +/- 4.08dB
	18GHz - 40GHz: +/- 4.08dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

6. CONDUCTED EMISSION TEST

6.1 Standard Applicable:

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.		

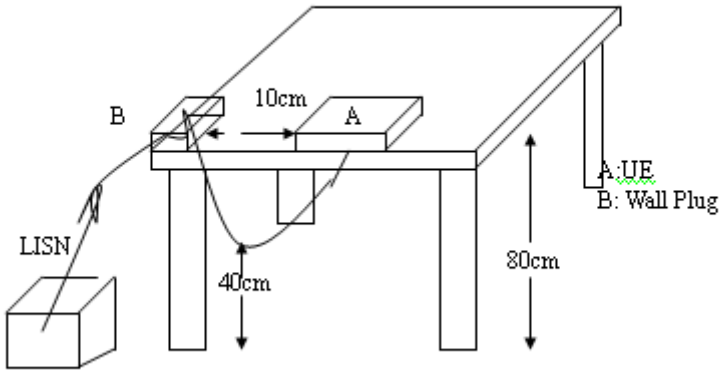
6.2 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
EMI Test Receiver	R&S	ESCI 7	100950	12/12/2016	12/11/2017
Coaxial Cables	N/A	N30N30-1042-150cm	N/A	08/30/2016	08/29/2017
LISN	Schwarzbeck	NSLK 8127	8127-648	06/18/2017	06/17/2018
Test Software	Farad	EZ-EMC	Ver. SGS-03A2	N.C.R.	N.C.R.

6.3 EUT Setup:

1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.10:2013.
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.

6.4 Test SET-UP (Block Diagram of Configuration)



6.5 Measurement Procedure:

1. The EUT was placed on a table which is 0.8m above ground plan.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all phases of power being supplied by given UE are completed

6.6 Measurement Result:

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

Note2: The * reveals the worst-case results that closet to the limit

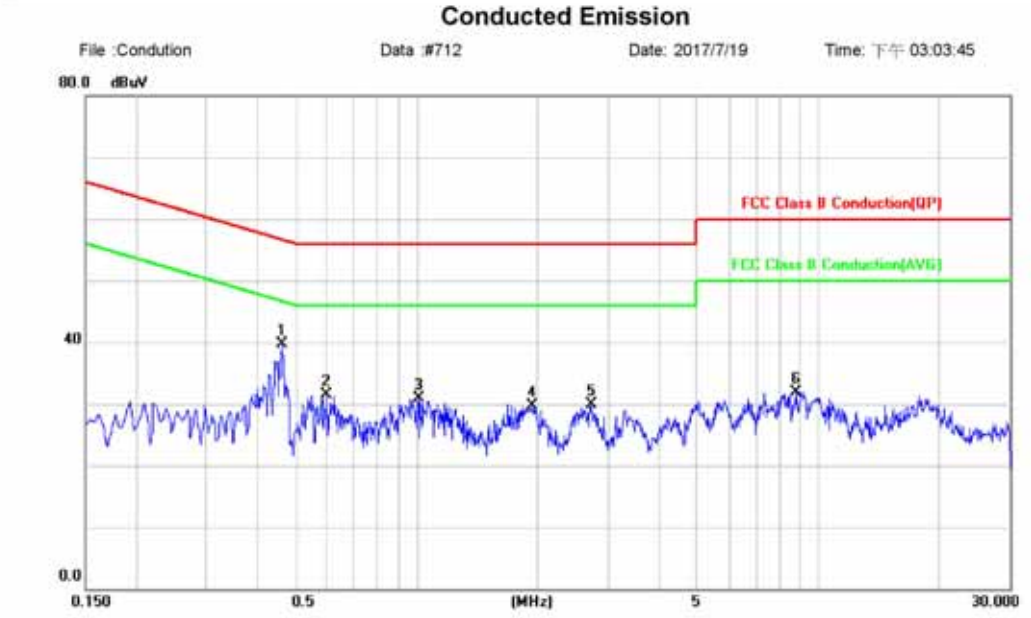
AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Operation mode			Test Date:	Jul. 19, 2017
Temperature:	20 ℃	Humidity:	58 %	Test By:	Aken
				Phase:	L1

Site : Conduction Room
Limit: FCC Class B Conduction(QP)
Mode:
Note:

Phase: L1
Power: AC 120V/60Hz

Temperature: 23 ℃
Humidity: 68 %

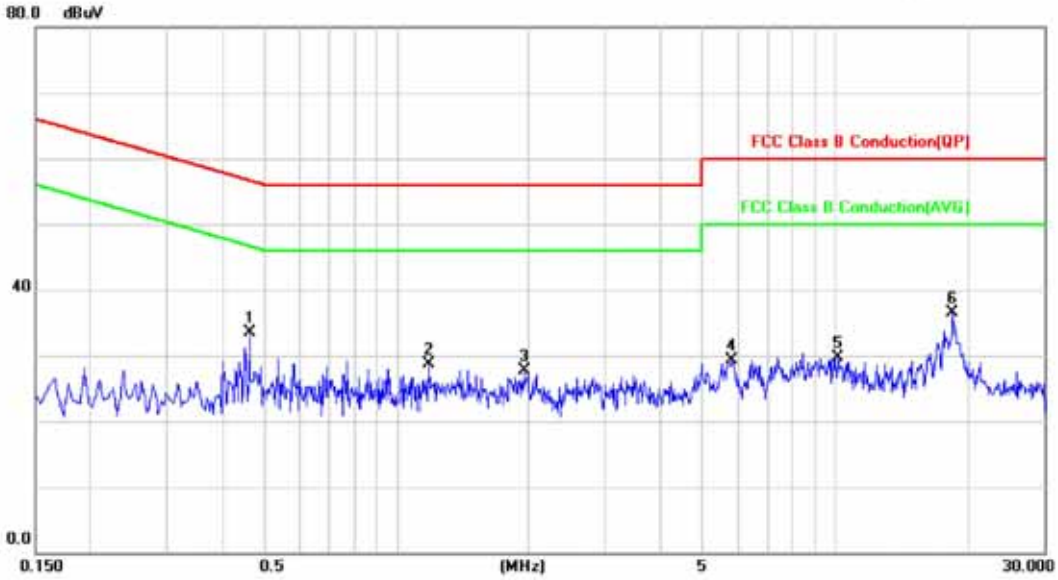


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.4620	19.65	20.07	39.72	56.66	-16.94	peak	
2		0.5980	11.38	20.08	31.46	56.00	-24.54	peak	
3		1.0140	11.11	19.86	30.97	56.00	-25.03	peak	
4		1.9460	9.18	20.52	29.70	56.00	-26.30	peak	
5		2.7260	9.47	20.44	29.91	56.00	-26.09	peak	
6		8.8300	11.89	20.07	31.96	60.00	-28.04	peak	

Site :	Conduction Room	Phase:	N	Temperature:	23 ℃
Limit:	FCC Class B Conduction(QP)	Power:	AC 120V/60Hz	Humidity:	68 %
Mode:					
Note:					

Conducted Emission

File :Condution Data :#713 Date: 2017/7/19 Time: 下午 03:04:31



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.4620	13.64	19.93	33.57	56.66	-23.09	peak	
2		1.1900	8.77	19.84	28.61	56.00	-27.39	peak	
3		1.9580	7.36	20.39	27.75	56.00	-28.25	peak	
4		5.8060	9.27	19.95	29.22	60.00	-30.78	peak	
5		10.1420	9.81	19.94	29.75	60.00	-30.25	peak	
6		18.6100	16.50	20.04	36.54	60.00	-23.46	peak	

7. PEAK OUTPUT POWER MEASUREMENT

7.1 Standard Applicable:

For systems using digital modulation in the 902~928MHz bands, the limit for peak output power is 1Watt.

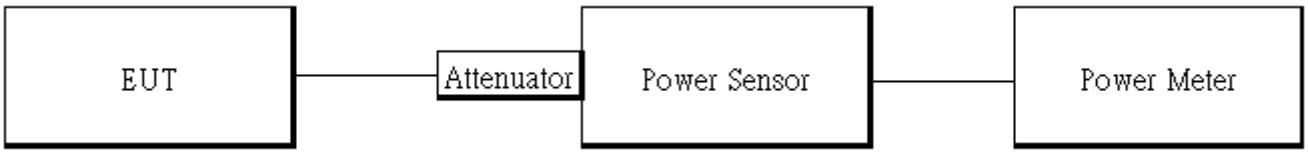
If the transmitting antenna of directional gain greater than 6dBi are used the peak output power form the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the Antenna exceeds 6dBi.

In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of Antenna exceeds 6dBi.

7.2 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	KEYSIGHT	N9010A	MY51440113	06/20/2017	06/19/2018
Power Meter	Anritsu	ML2496A	1326001	06/23/2017	06/22/2018
Power Sensor	Anritsu	MA2411B	1315048	06/23/2017	06/22/2018
Power Sensor	Anritsu	MA2411B	1315049	06/23/2017	06/22/2018
Coaxial Cable 30cm	WOKEN	00100A1F1A195C	RF01	12/12/2016	12/11/2017
DC Block	PASTERNACK	PE8210	RF29	12/12/2016	12/11/2017
Splitter	RF-LAMBAD	RFLT2W1G18G	RF35	12/12/2016	12/11/2017
Attenuator	WOKEN	218FS-10	RF23	12/12/2016	12/11/2017
DC Power Supply	Agilent	E3640A	MY53140006	05/02/2017	05/01/2018

7.3 Test Set-up:



7.4 Measurement Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter.

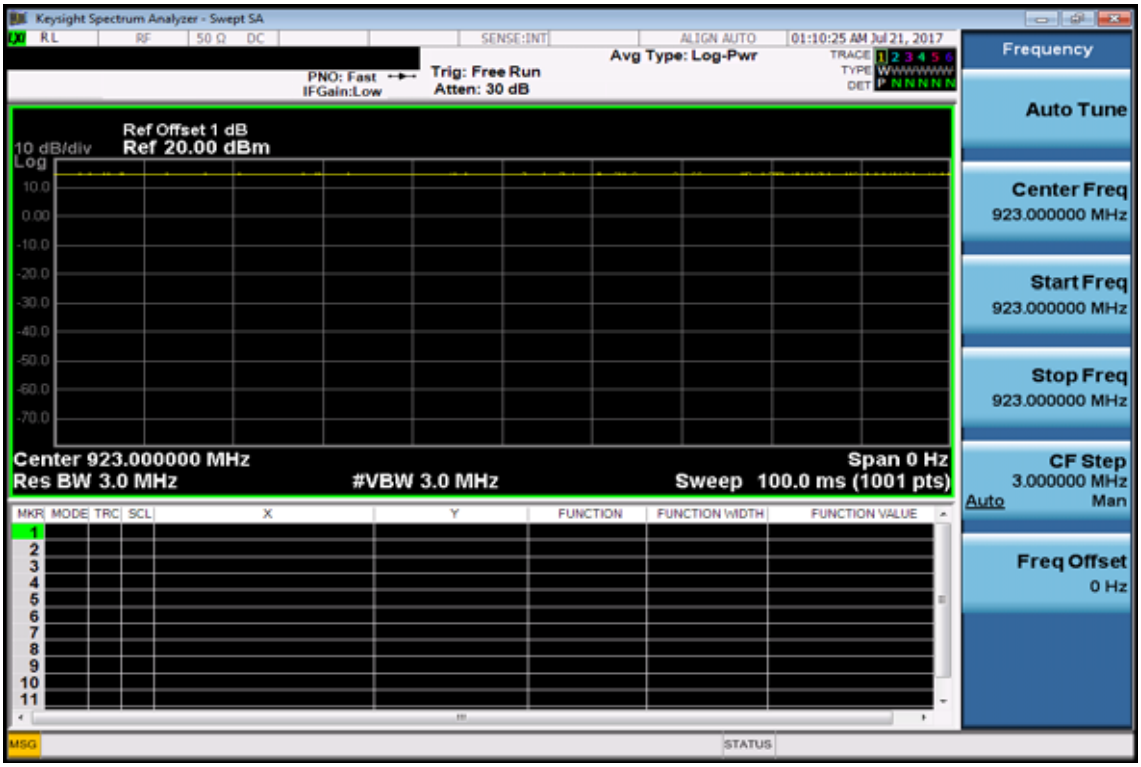
Power Meter:

It is used as the auxiliary test equipment to conduct the output power measurement.

4. Record the max. Reading as observed from Power Meter.
5. Repeat above procedures until all test default channel measured was complete.

Duty Factor:

Frequency	Duty Cycle (%)	Duty Factor (dB)
923MHz	100.00	0.00



Duty Cycle Factor: 10*log(1/100/100)=0

7.5 Measurement Result:

CH	**Freq. (MHz)**	**Peak Output Power (dBm)**	**Peak Output Power (mW)**	**Limit**	**RESULT**
1	923	7.78	6.00	1 Watt = 30.00 dBm	PASS
CH	**Freq. (MHz)**	**Avg. Output Power (dBm)**	**Avg. Output Power (mW)**	**Limit**	**RESULT**
1	923	6.87	4.86	1 Watt = 30.00 dBm	PASS

8. 6DB BANDWIDTH MEASUREMENT

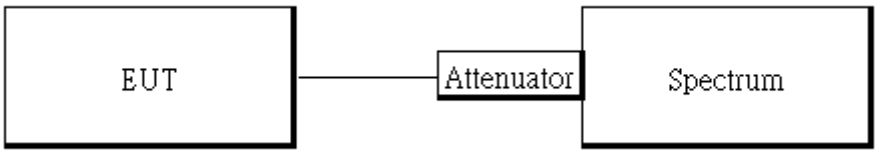
8.1 Standard Applicable

The minimum 6 dB bandwidth shall be at least 500 kHz .

8.2 Measurement Equipment Used

Refer to section 7.2 for the plot.

8.3 Test Set-up:



8.4 Measurement Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
4. For 6dB Bandwidth:

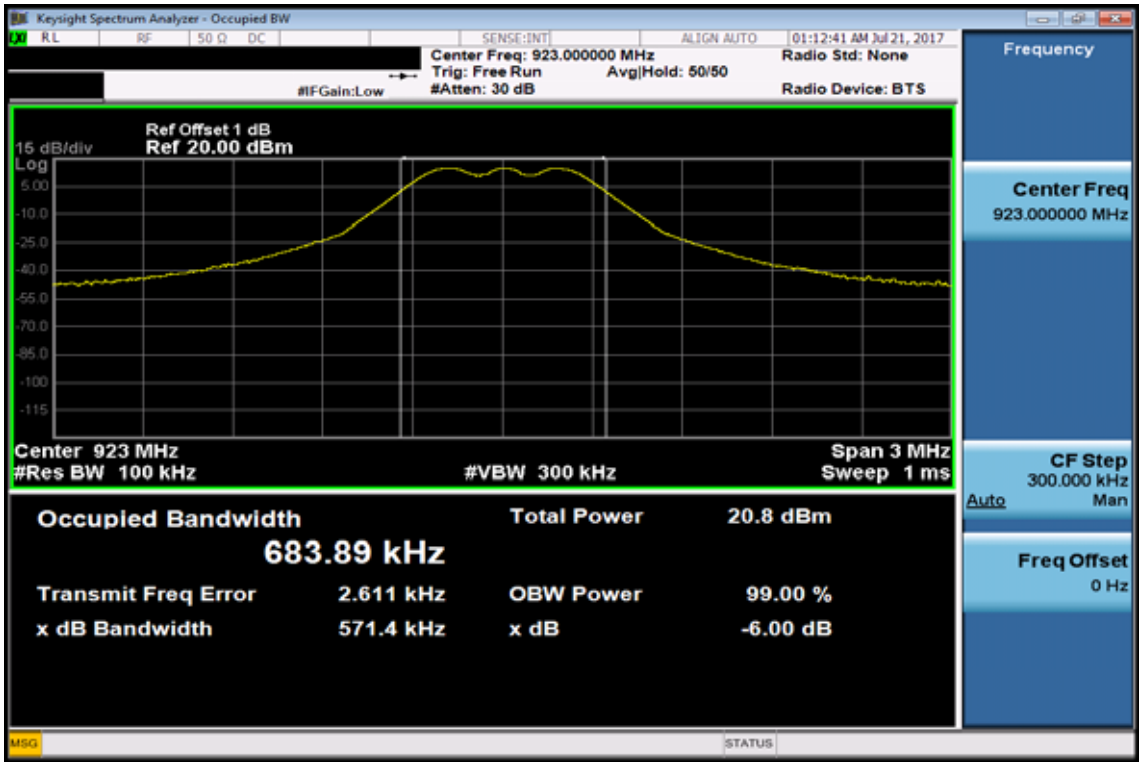
   Set the spectrum analyzer as RBW=100 kHz, VBW= 3*RBW, Span = 3MHz, Detector=Peak, Sweep=auto.
5. Mark the peak frequency and –6dB (upper and lower) frequency.
6. For 99% Bandwidth:

   Set the spectrum analyzer as RBW=1%, VBW=3*RBW, Span = 2MHz, Detector=Sample, Sweep=auto.
7. Turn on the 99% bandwidth function, max reading.
8. Repeat above procedures until all test default channel is completed.

8.5 Measurement Result:

Freq. (MHz)	6dB BW (kHz)	BW (MHz)	Result
923	571.4	> 0.5	PASS

6dB Band Width Test Data



9. CONDUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT

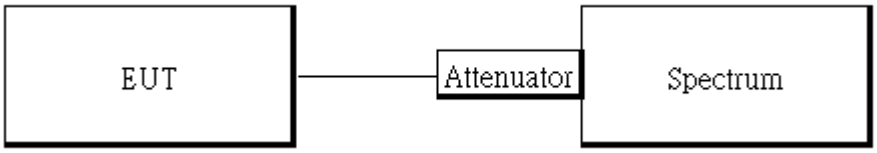
9.1 Standard Applicable

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, provided the transmitter demonstrates compliance with the peak conducted power limits. 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 in §15.209(a).

9.2 Measurement Equipment Used:

Refer to section 7.2 for the plot.

9.3 Test SET-UP:



9.4 Measurement Procedure

Conducted Band Edge:

1. To connect Antenna Port of EUT to Spectrum.
2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
4. Set start to edge frequency, and stop frequency of spectrum analyzer so as to encompass the spectrum to be examined.
5. Set the spectrum analyzer as RBW=100 kHz, VBW=300 kHz, Detector = Peak, Sweep = auto
6. Mark the highest reading of the emission as the reference level measurement.
7. Set DL as the limit = reading on marker 1 – 20dBm
8. Marker on frequency, 0.902GHz and 1.00448GHz, and examine shall 100 kHz immediately outside the authorized (902~928) be attenuated by 20dB at least relative to the maximum emission of power.

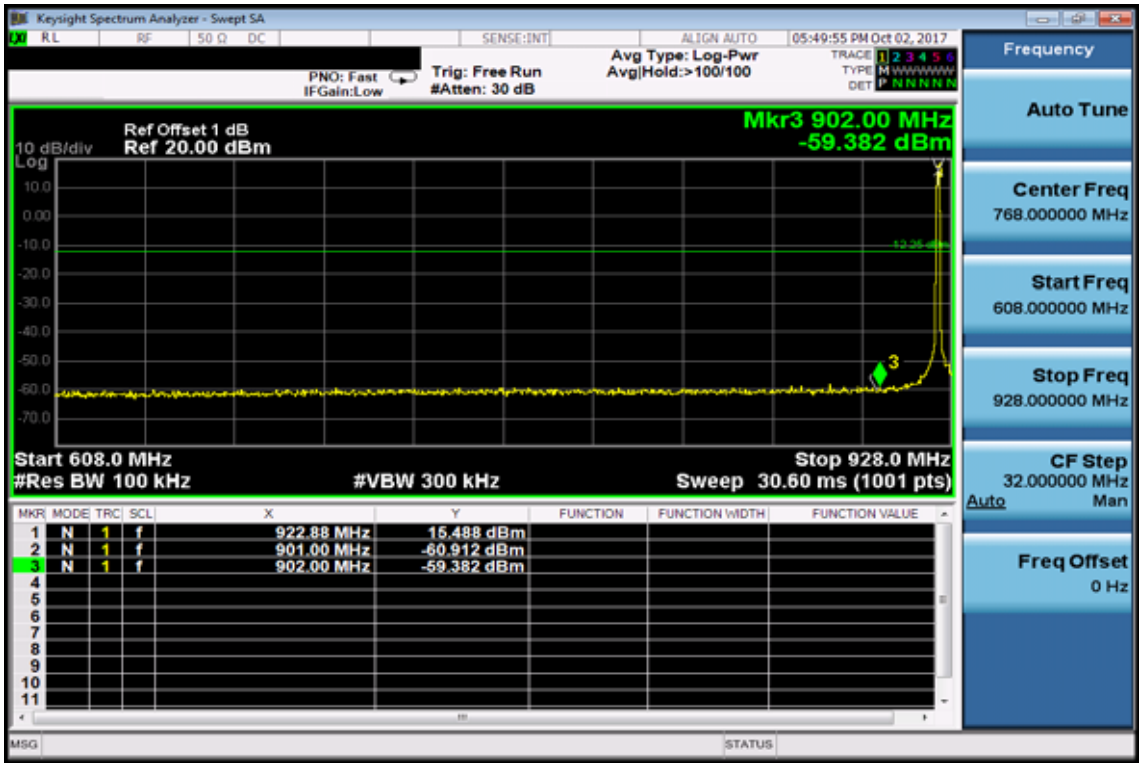
Conducted Spurious Emission:

1. To connect Antenna Port of EUT to Spectrum.
2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
3. Set RBW = 100 kHz & VBW=300 kHz, Detector =Peak, Sweep = Auto
4. Allow trace to fully stabilize.
5. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
6. Repeat above procedures until all default test channel measured were complete.

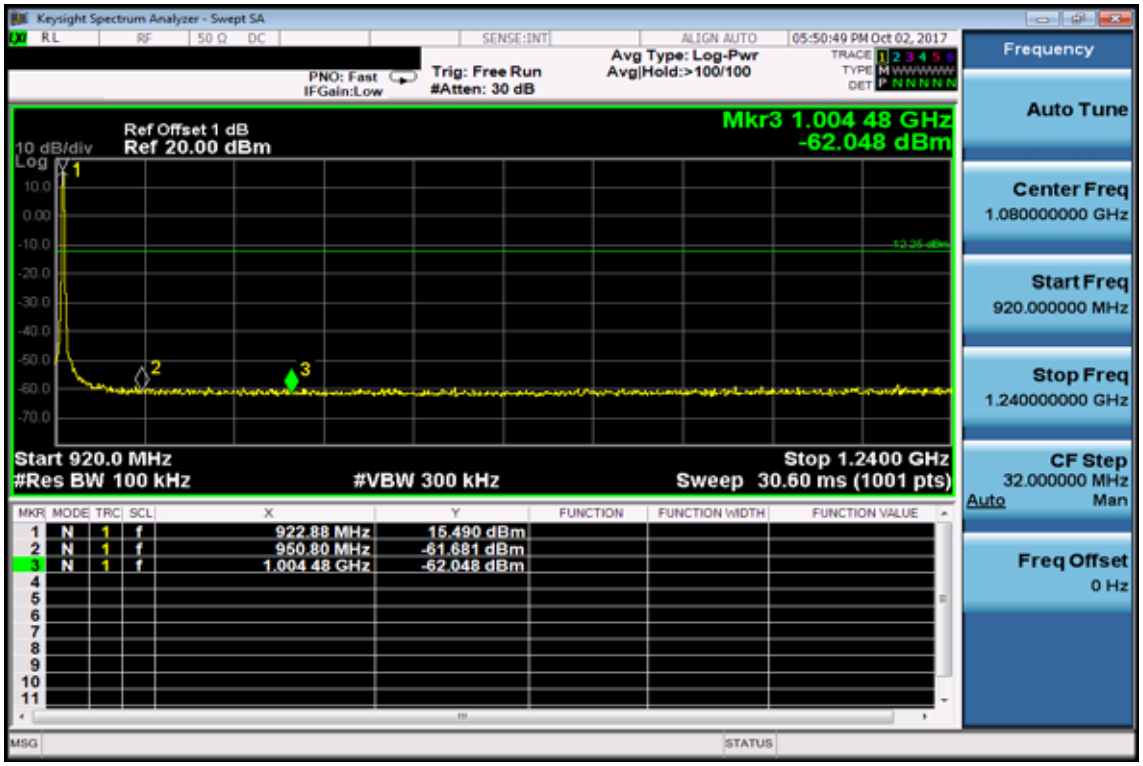
9.5 Measurement Result

1. *Refer to next page spectrum analyzer data chart and tabular data sheets.*
2. *For restricted Band Edge Limit, please refer to section 11.5 of this report for measurement result.*

Band Edges Test Data

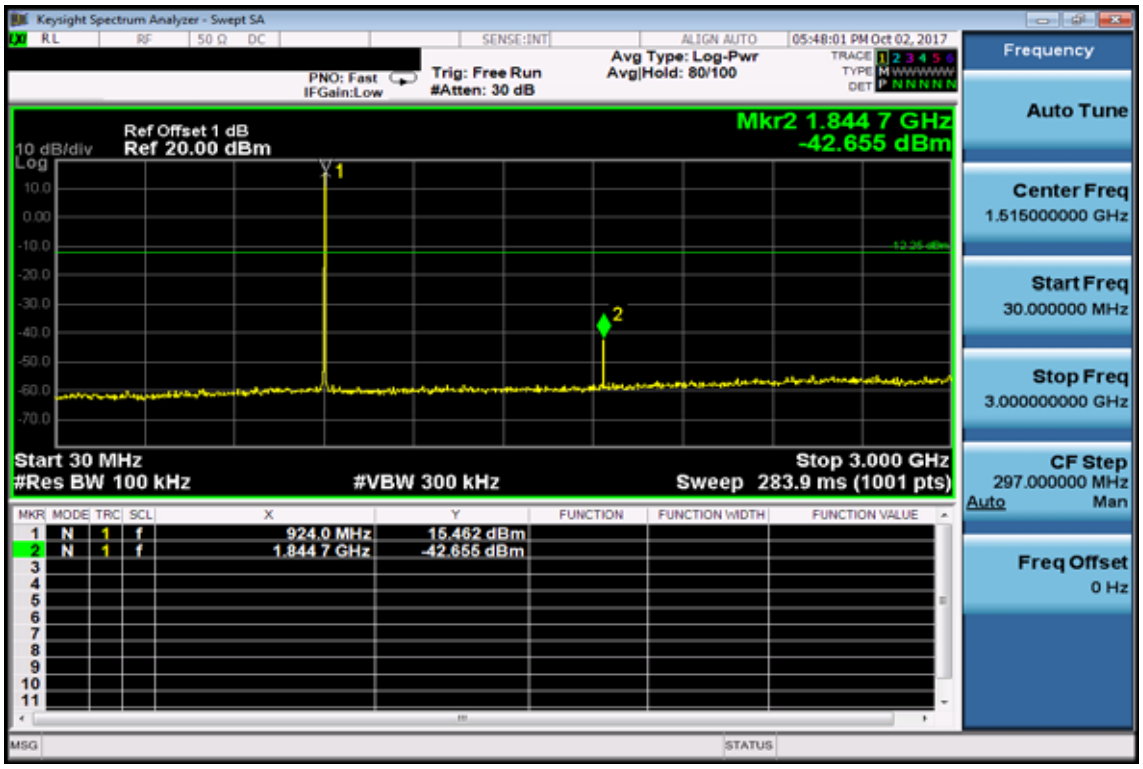


Band Edges Test Data

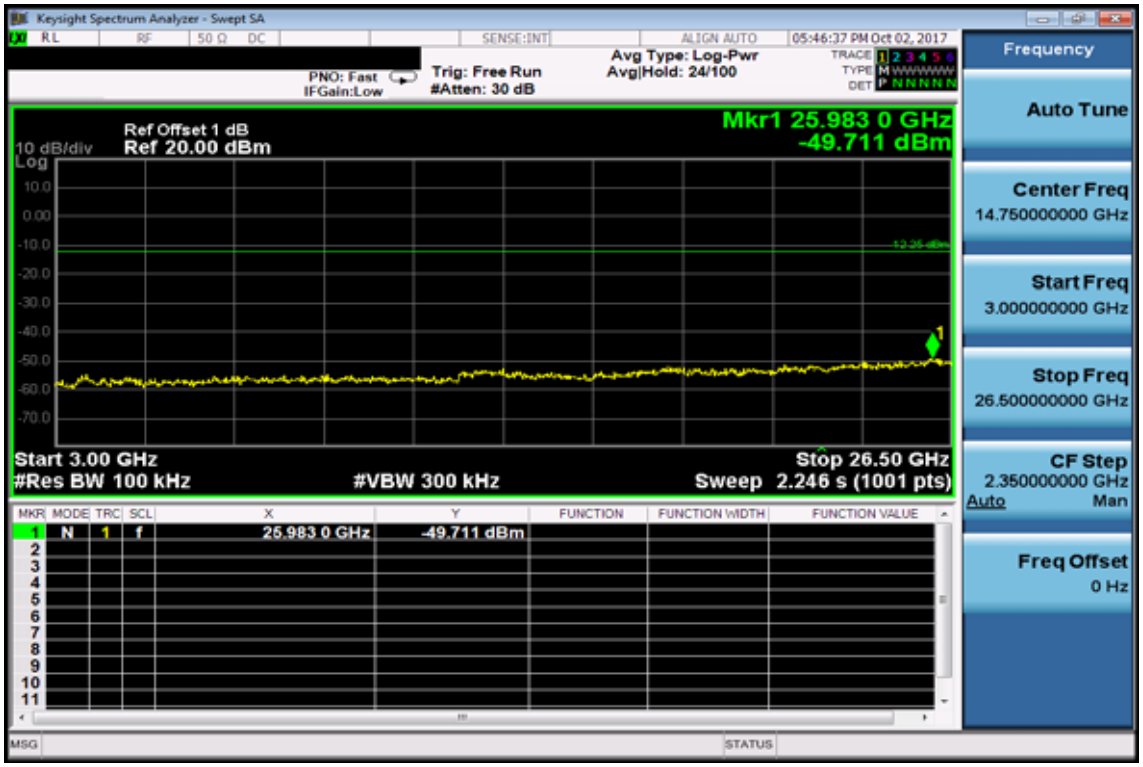


Conducted Spurious Emission Measurement Result

30MHz – 3GHz



3GHz – 26.5GHz



10. RADIATED BANDEDGE AND SPURIOUS EMISSION MEASUREMENT

10.1 Standard Applicable

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands must also comply with the §15.209 limit as below.

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.

Frequency (MHz)	Field strength (microvolts/meter)	Distance (meters)
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

Note:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBμV/m) = 20 log Emission level (dBμV/m)

10.2 Measurement Equipment Used

SGS 966 Chamber No.C					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
EMI Test Receiver	R&S	ESU 40	100363	04/18/2017	04/17/2018
Loop Antenna	ETS-Lindgren	6502	00143303	12/23/2016	12/22/2017
Broadband Antenna	TESEQ	CBL 6112D	35240	11/03/2016	11/02/2017
Horn Antenna	ETS-Lindgren	3117	00143272	12/15/2016	12/16/2017
Horn Antenna	Schwarzbeck	BBHA9170	185	07/24/2016	07/23/2017
Pre Amplifier	EMC Instruments	EMC330	980096	12/12/2016	12/11/2017
Pre Amplifier	EMC Instruments	EMC0011830	980199	12/12/2016	12/11/2017
Pre Amplifier	R&S	SCU-18	10204	12/12/2016	12/11/2017
Pre Amplifier	R&S	SCU-26	100780	12/12/2016	12/11/2017
Coaxial Cable	Huber+Suhner	RG 214/U	966Rx 9K-30M	12/12/2016	12/11/2017
Coaxial Cable	Huber+Suhner	RG 214/U SUCOFLEX 104	966Rx 30M-3G	12/12/2016	12/11/2017
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Rx 1G-18G	12/12/2016	12/11/2017
Coaxial Cable	Huber+Suhner	mini 141-12 SUCOFLEX 104	966Rx 18G-40G	12/12/2016	12/11/2017
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Tx 30M-18G	12/12/2016	12/11/2017
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	966Tx 18G-40G	12/12/2016	12/11/2017
Attenuator	WOKEN	218FS-10	RF27	12/12/2016	12/11/2017
Site NSA	SGS	966 Chamber C	SAC-C	03/02/2017	03/01/2018
Site VSWR	SGS	966 Chamber C	SAC-C	03/02/2017	03/01/2018
DC Power Supply	HOLA	DP-3003	D7070035	05/04/2017	05/03/2018
Controller	MF	MF-7802	N/A	N.C.R.	N.C.R.
Antenna Master	MF	N/A	N/A	N.C.R.	N.C.R.
Turn Table	MF	N/A	N/A	N.C.R.	N.C.R.
Test Software	World-Pallas	Dr. E	V 3.0 Lite	N.C.R.	N.C.R.

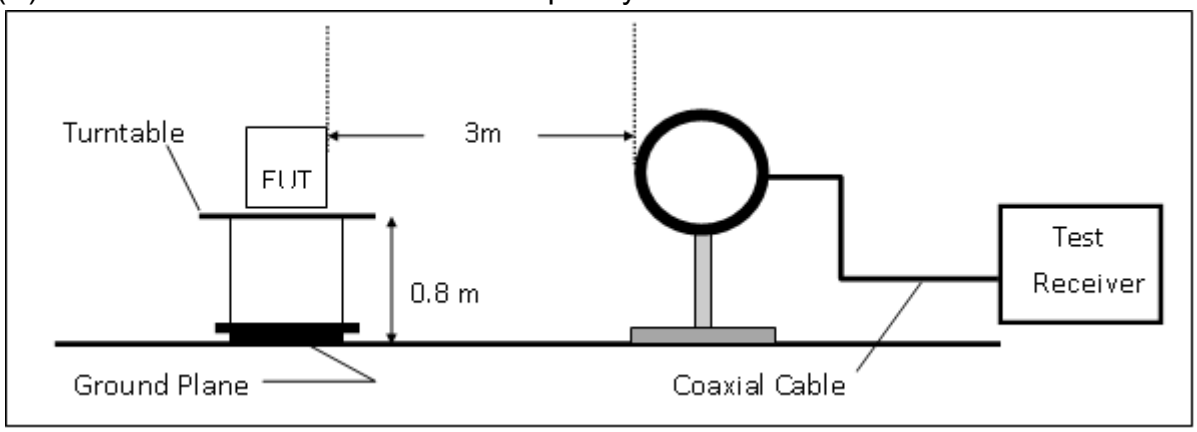
Note: N.C.R refers to Not Calibrated Required.

SGS 966 Chamber No.C					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Horn Antenna	Schwarzbeck	BBHA9170	185	07/24/2017	07/23/2018

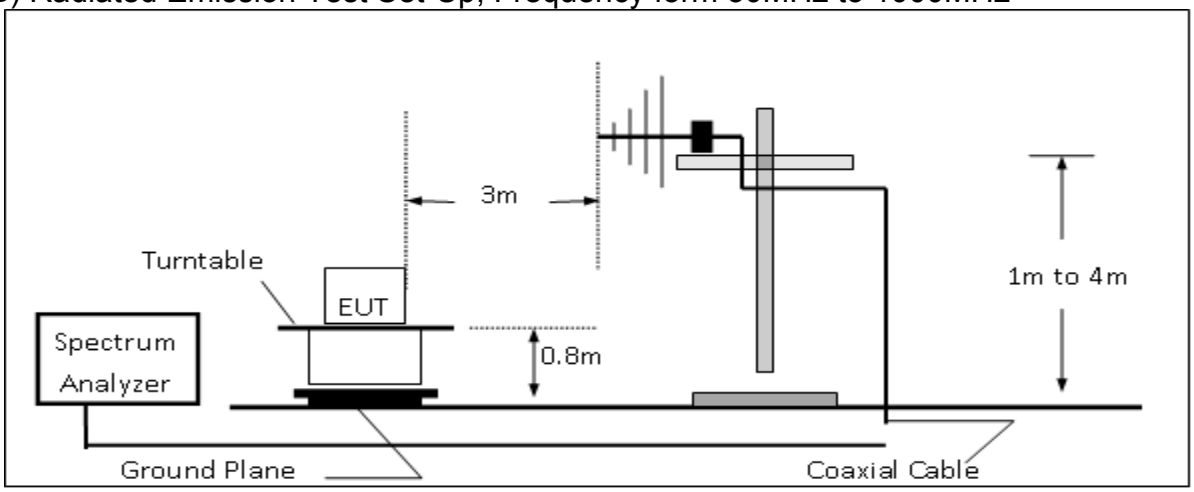
Remark: Please note that the duration to conduct the test took place in the mean time when the calibration for several equipment is due, and therefore extra tables of equipment calibration is constructed to indicate the calibration work is still maintained.

10.3 Test SET-UP

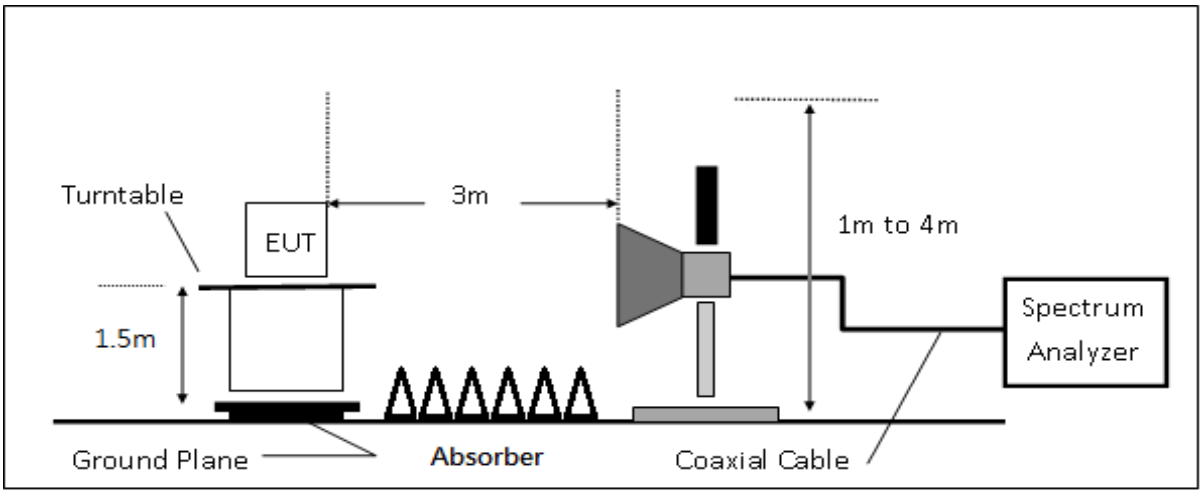
(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



(B) Radiated Emission Test Set-Up, Frequency form 30MHz to 1000MHz



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



10.4 Measurement Procedure

1. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
2. The EUT was placed on a turn table with 0.8m for frequency< 1GHz and 0.8m for frequency> 1GHz above ground plan.
3. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
4. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
5. Set the spectrum analyzer as RBW=120 kHz and VBW=300 kHz for Peak Detector (PK) and Quasi-peak (QP) at frequency below 1 GHz.
6. Set the spectrum analyzer as RBW=1 MHz, VBW=3 MHz for Peak Detector at frequency above 1 GHz.
7. Set the spectrum analyzer as RBW=1 MHz, VBW=10 Hz (Duty cycle > 98%) or VBW ≥ 1/T (Duty cycle < 98%) for Average Detector at frequency above 1 GHz.
8. 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.
9. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
10. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. On spectrum, change spectrum mode in linear display mode, and reduce VBW = 10Hz if average reading is measured.
11. Repeat above procedures until all default test channel measured were complete.

10.5 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	

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note :

"**F**" : denotes Fundamental Frequency. ; "**H**" : denotes Harmonic Frequency.

"**E**" : denotes Band Edge Frequency. ; "**S**" : denotes Spurious Frequency.

10.6 Test Results of Radiated Spurious Emissions form 9 kHz to 30 MHz

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit per 15.31(o) was not reported.

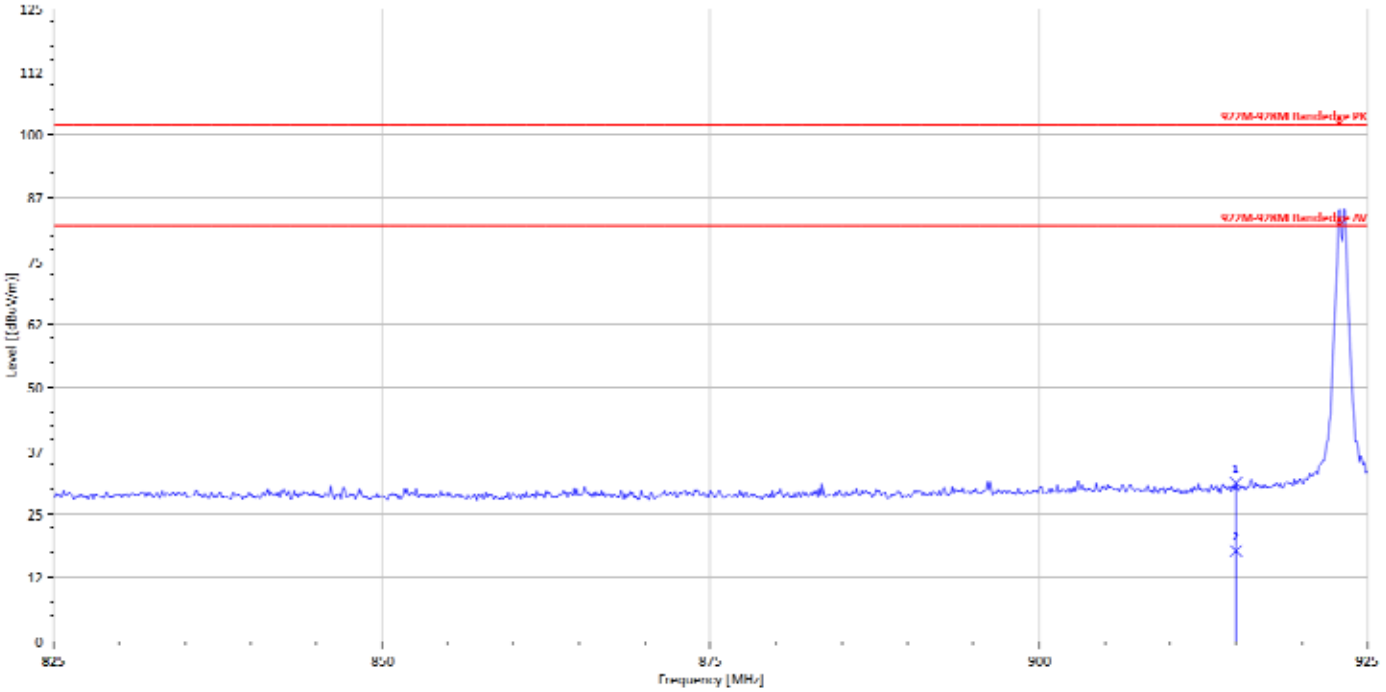
10.7 Measurement Result:

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

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

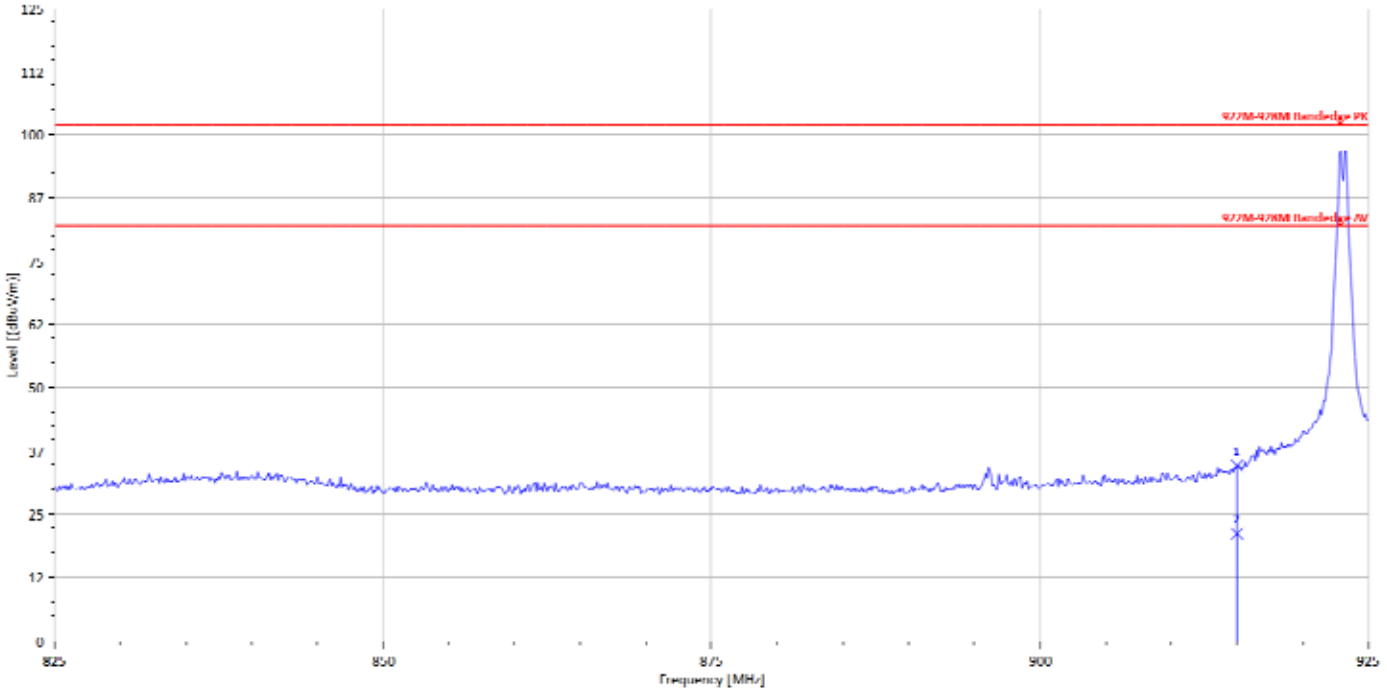
Radiated Band Edge Measurement Result

Operation Mode :	RFID	Test Date :	2017/9/30
Fundamental Frequency :	923 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	BE CH Low	Test Engineer :	Ashton
EUT Pol. :	H	Measurement Antenna Pol. :	Vertical



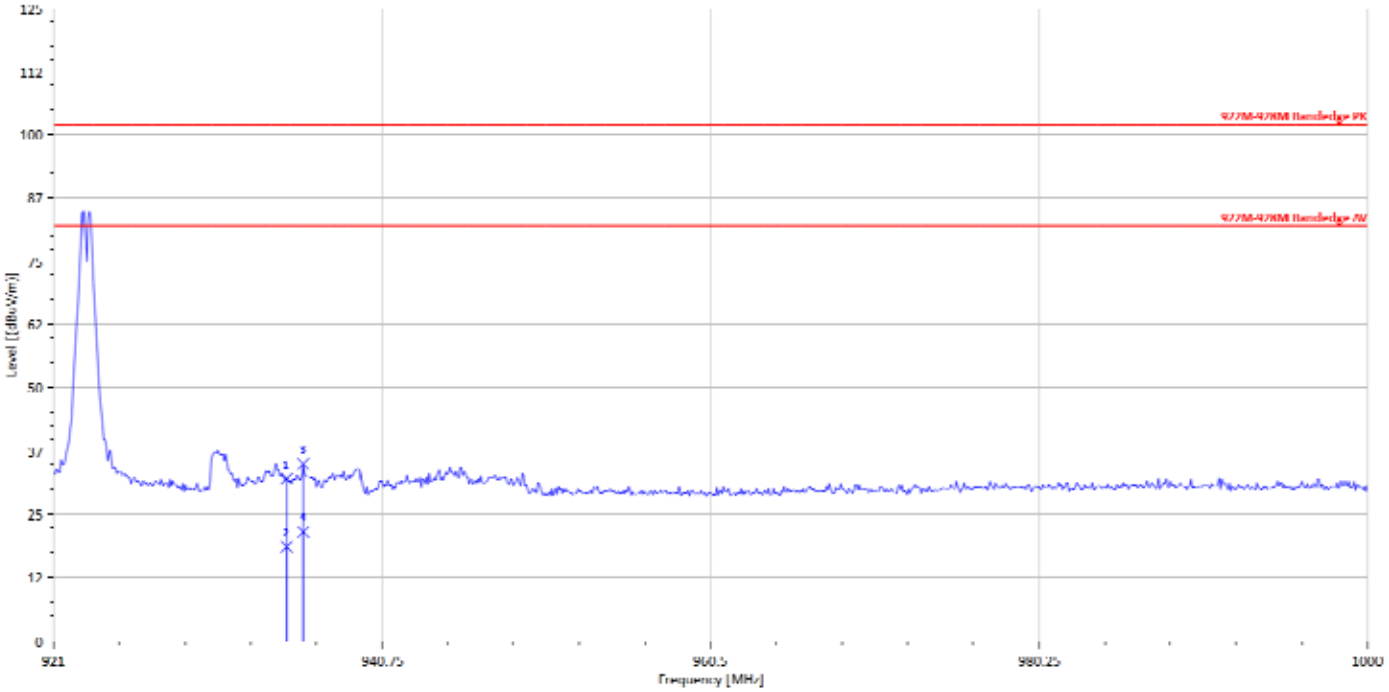
Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
914.40	S	Peak	39.33	1.47	40.80	74	-33.20
914.40	S	Average	26.05	1.47	27.52	54	-26.48
915.00	E	Peak	38.00	1.48	39.47	74	-34.53
915.00	E	Average	27.60	1.48	29.08	54	-24.93

Operation Mode :	RFID	Test Date :	2017/9/30
Fundamental Frequency :	923 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	BE CH Low	Test Engineer :	Ashton
EUT Pol. :	H	Measurement Antenna Pol. :	Horizontal



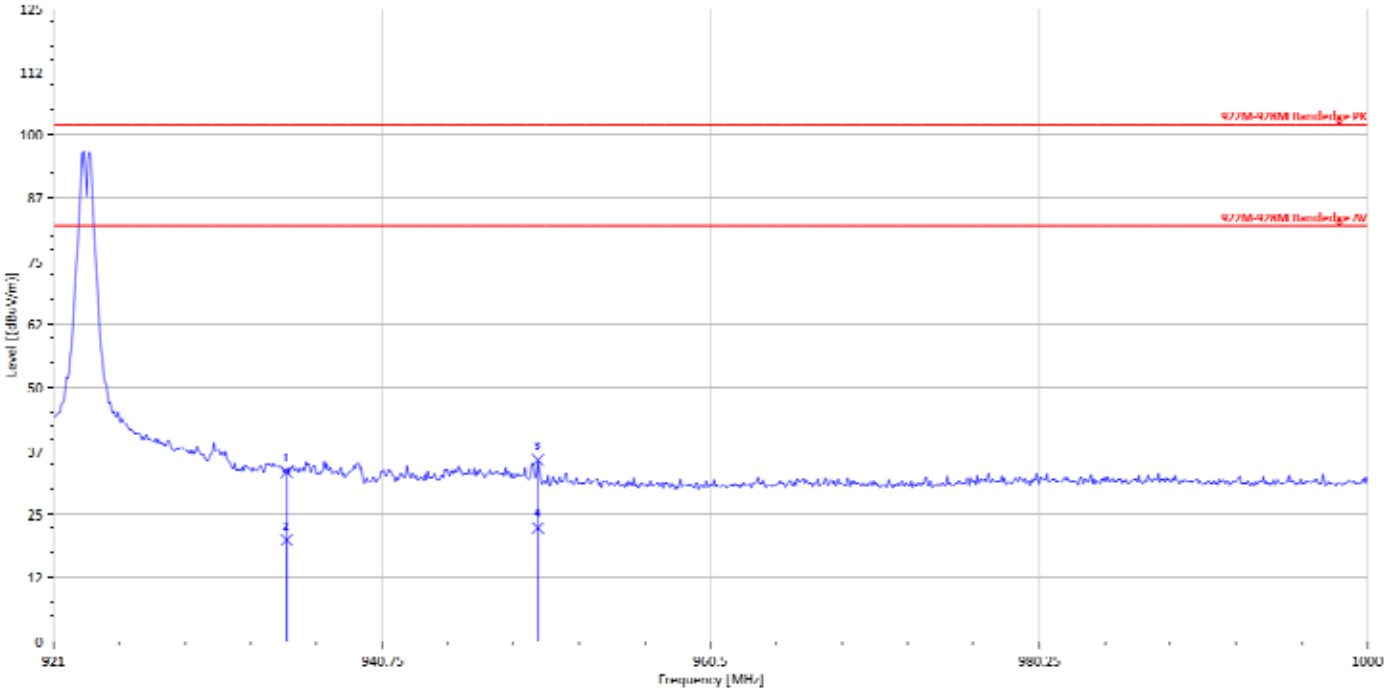
Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
911.30	S	Peak	39.57	1.43	41.01	74	-32.99
911.30	S	Average	27.72	1.43	29.15	54	-24.85
915.00	E	Peak	37.76	1.48	39.24	74	-34.76
915.00	E	Average	28.29	1.48	29.77	54	-24.24

Operation Mode :	RFID	Test Date :	2017/9/30
Fundamental Frequency :	923 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	BE CH High	Test Engineer :	Ashton
EUT Pol. :	H	Measurement Antenna Pol. :	Vertical



Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
935.00	E	Peak	37.50	1.77	39.27	74	-34.73
935.00	E	Average	26.76	1.77	28.53	54	-25.47
938.85	S	Peak	39.31	1.84	41.15	74	-32.85
938.85	S	Average	29.68	1.84	31.52	54	-22.48

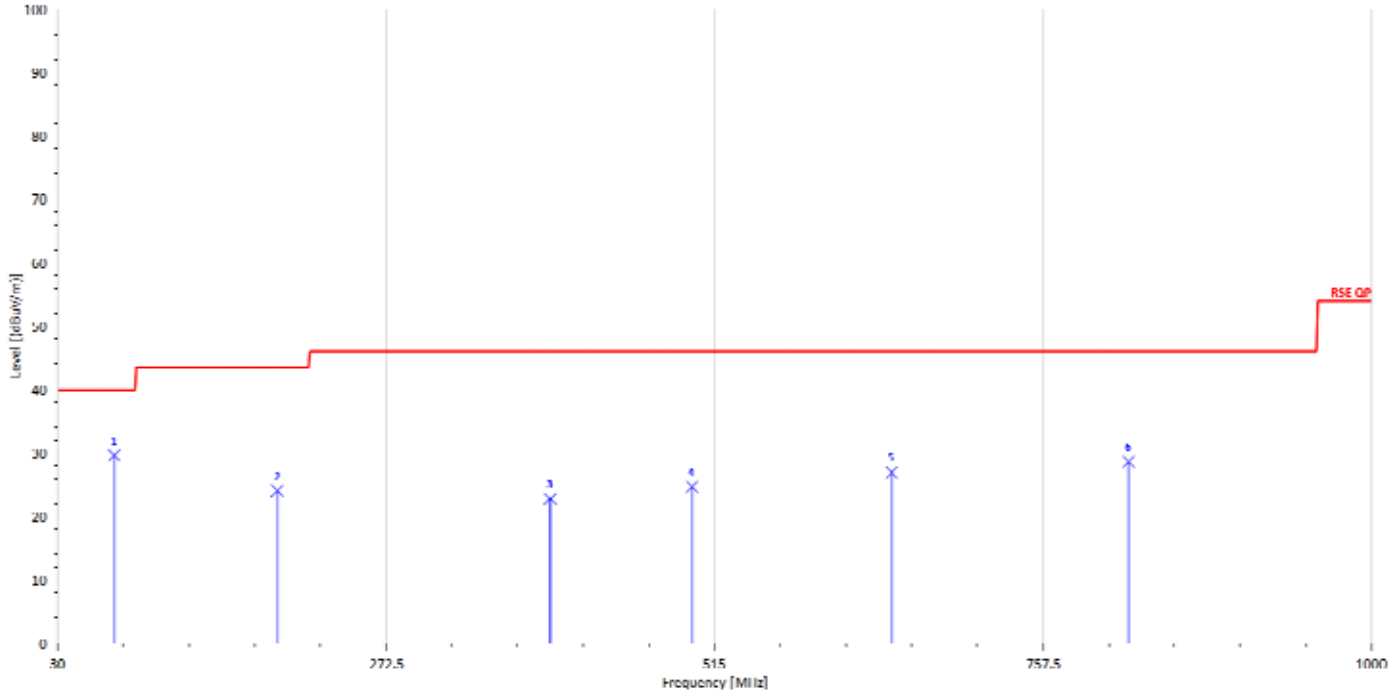
Operation Mode :	RFID	Test Date :	2017/9/30
Fundamental Frequency :	923 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	BE CH High	Test Engineer :	Ashton
EUT Pol. :	H	Measurement Antenna Pol. :	Horizontal



Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
935.00	E	Peak	38.03	1.77	39.80	74	-34.20
935.00	E	Average	28.46	1.77	30.23	54	-23.77
938.46	S	Peak	39.33	1.83	41.17	74	-32.83
938.46	S	Average	29.38	1.83	31.21	54	-22.79

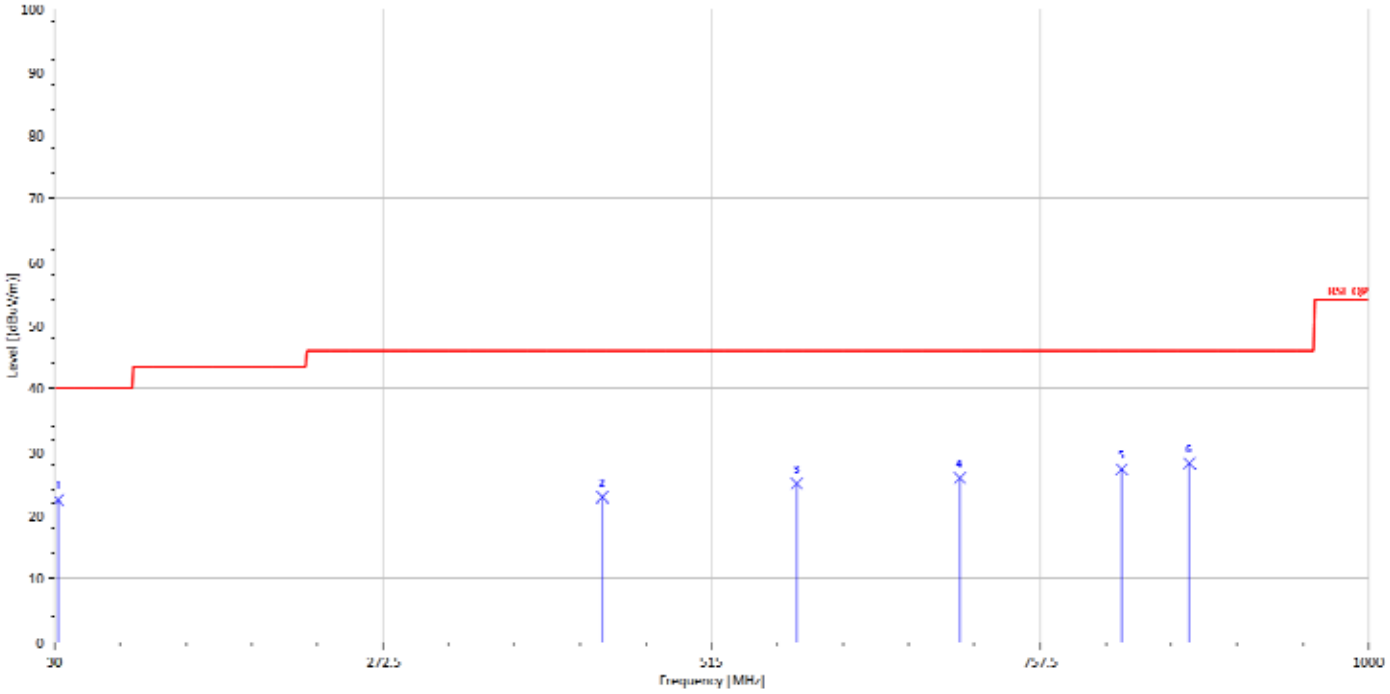
Radiated Spurious Emission Measurement Result
For Frequency form 30MHz to 1000MHz

Operation Mode :	RFID	Test Date :	2017/7/19
Fundamental Frequency :	923 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx	Test Engineer :	Ashton
EUT Pol. :	H	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
71.71	S	Peak	51.20	-21.65	29.56	40	-10.44
191.99	S	Peak	42.22	-18.13	24.09	43.5	-19.41
393.75	S	Peak	32.71	-9.91	22.80	46	-23.20
498.51	S	Peak	32.45	-7.73	24.72	46	-21.28
645.95	S	Peak	31.70	-4.79	26.92	46	-19.08
820.55	S	Peak	31.43	-2.87	28.56	46	-17.44

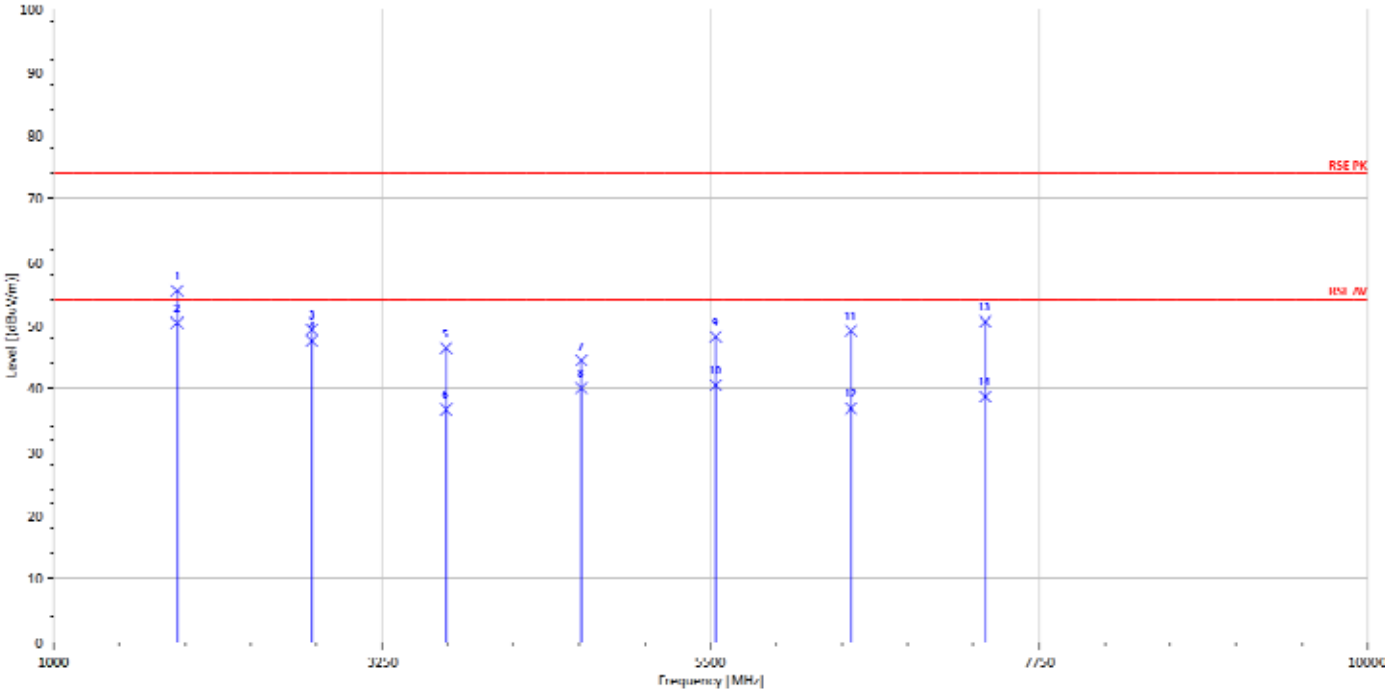
Operation Mode :	RFID	Test Date :	2017/7/19
Fundamental Frequency :	923 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx	Test Engineer :	Ashton
EUT Pol. :	H	Measurement Antenna Pol. :	Horizontal



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
32.91	S	Peak	31.14	-8.75	22.39	40	-17.61
434.49	S	Peak	32.23	-9.41	22.83	46	-23.17
578.05	S	Peak	31.41	-6.45	24.96	46	-21.04
698.33	S	Peak	30.96	-5.10	25.86	46	-20.14
817.64	S	Peak	30.35	-3.10	27.24	46	-18.76
868.08	S	Peak	31.27	-3.07	28.21	46	-17.79

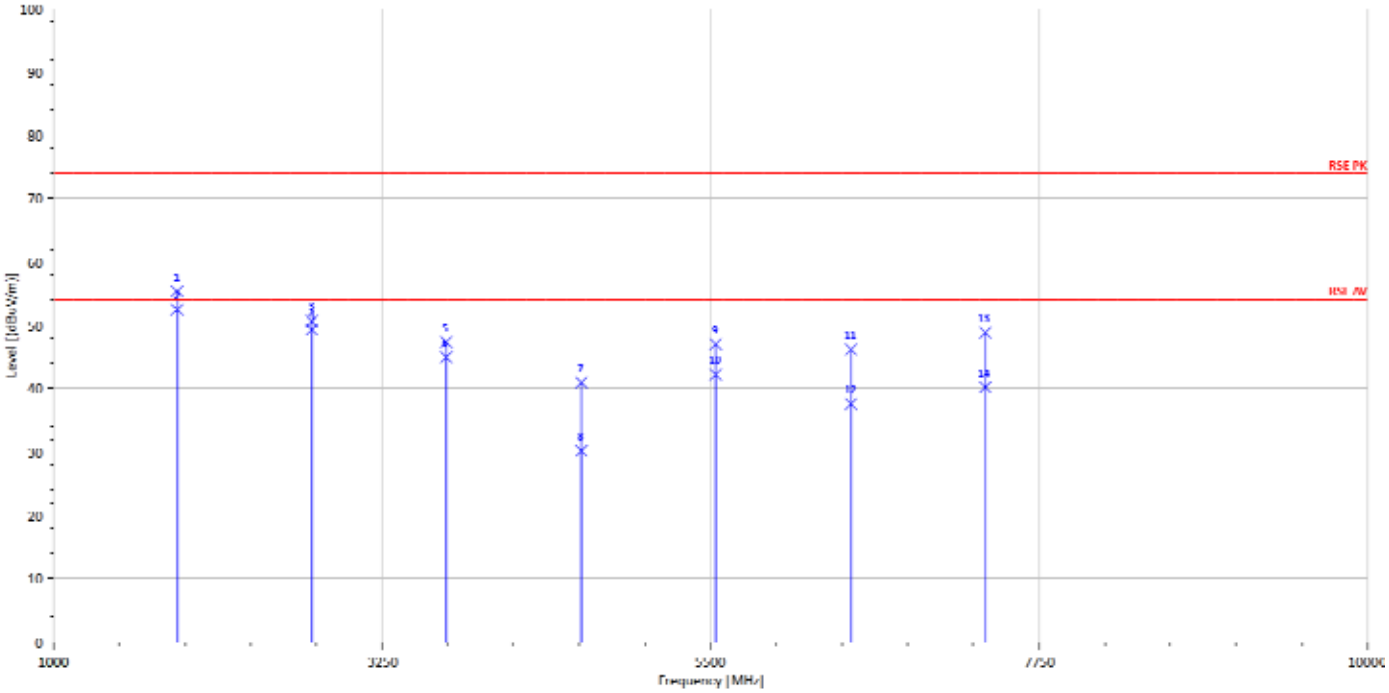
For Frequency above 1GHz

Operation Mode :	RFID	Test Date :	2017/7/19
Fundamental Frequency :	923 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx	Test Engineer :	Ashton
EUT Pol. :	H	Measurement Antenna Pol. :	Vertical



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
1846.00	H	Peak	56.55	-1.10	55.44	74	-18.56
1846.00	H	Average	51.53	-1.10	50.43	54	-3.57
2769.00	H	Peak	46.81	2.55	49.36	74	-24.64
2769.00	H	Average	45.02	2.55	47.57	54	-6.43
3692.00	H	Peak	41.65	4.79	46.44	74	-27.56
3692.00	H	Average	31.91	4.79	36.70	54	-17.30
4615.00	H	Peak	37.43	7.03	44.46	74	-29.54
4615.00	H	Average	33.03	7.03	40.06	54	-13.94
5538.00	H	Peak	39.46	8.79	48.25	74	-25.75
5538.00	H	Average	31.72	8.79	40.51	54	-13.49
6461.00	H	Peak	37.55	11.65	49.21	74	-24.79
6461.00	H	Average	25.23	11.65	36.88	54	-17.12
7384.00	H	Peak	35.58	15.01	50.59	74	-23.41
7384.00	H	Average	23.66	15.01	38.67	54	-15.33

Operation Mode :	RFID	Test Date :	2017/7/19
Fundamental Frequency :	923 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx	Test Engineer :	Ashton
EUT Pol. :	H	Measurement Antenna Pol. :	Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
1846.00	H	Peak	56.44	-1.10	55.34	74	-18.66
1846.00	H	Average	53.52	-1.10	52.42	54	-1.58
2769.00	H	Peak	48.09	2.55	50.64	74	-23.36
2769.00	H	Average	46.82	2.55	49.37	54	-4.63
3692.00	H	Peak	42.60	4.79	47.39	74	-26.61
3692.00	H	Average	40.18	4.79	44.97	54	-9.03
4615.00	H	Peak	33.90	7.03	40.93	74	-33.07
4615.00	H	Average	23.16	7.03	30.19	54	-23.81
5538.00	H	Peak	38.26	8.79	47.05	74	-26.95
5538.00	H	Average	33.41	8.79	42.20	54	-11.80
6461.00	H	Peak	34.55	11.65	46.20	74	-27.80
6461.00	H	Average	25.88	11.65	37.53	54	-16.47
7384.00	H	Peak	33.89	15.01	48.90	74	-25.10
7384.00	H	Average	25.16	15.01	40.17	54	-13.83

11. PEAK POWER SPECTRAL DENSITY

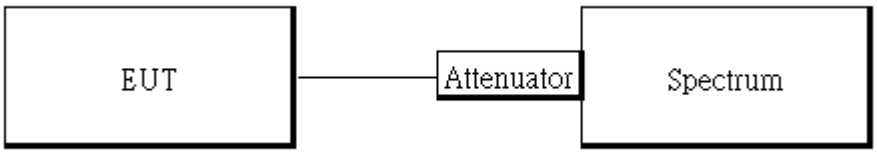
11.1 Standard Applicable:

The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

11.2 Measurement Equipment Used:

Refer to section 7.2 for the plot.

11.3 Test Set-up:



11.4 Measurement Procedure:

1. Set analyzer center frequency to DTS channel center frequency.
2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
3. Set the span to 1.5 times the DTS channel bandwidth.
4. Set the RBW = 3 kHz & VBW = 10 kHz.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.

Band Edge Limit Calculation:

1. Set analyzer center frequency to DTS channel center frequency.
2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
3. Set the span to 1.5 times the DTS channel bandwidth.
4. Set the RBW = 100kHz & VBW = 300 kHz.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.

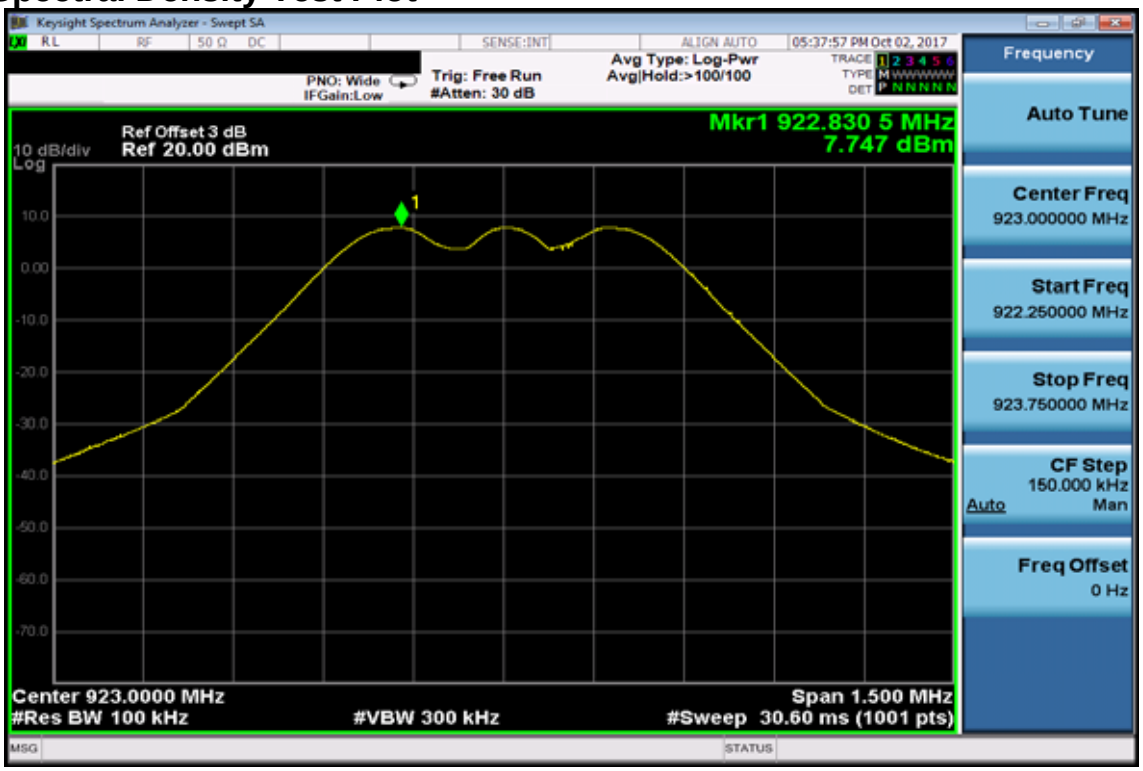
11.5 Measurement Result:

Frequency (MHz)	RF Power Density (dBm)	Maximum Limit (dBm)	Result
923	7.747	8	PASS

Band Edge Limit

Frequency (MHz)	RF Power Density (dBm)	Maximum Limit (dBm)
923	7.747	-12.253

Power Spectral Density for Conducted Spurious Emission Limit / Power Spectral Density Test Plot



12. ANTENNA REQUIREMENT

12.1 Standard Applicable:

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than furnished by the responsible party shall be used with the device.

If the transmitting antenna is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi.

In case of point-to-point operation, the power shall be reduced by the one dB for every 3 dB that the directional gain of antenna exceeds 6dBi.

12.2 Antenna Connected Construction:

An embedded-in antenna design is used.

The antenna is designed as permanently attached and no consideration of replacement. Please see EUT photo and antenna spec. for details.

The antenna gain is less than 6dBi. Therefore, it is not necessary to reduce maximum output power limit.

13. MAXIMUM PERMISSIBLE EXPOSURE (MPE)

13.1 Standard Applicable

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

This is a Mobile device, the MPE is required.

According to §1.1310 and §2.1093 RF exposure is calculated.

Limits for Maximum Permissive Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minute)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	F/1500	30
1500-15000	/	/	1.0	30

F = frequency in MHz

* = Plane-wave equipment power density

13.2 Measurement Result:

CH	Freq. (MHz)	Avg. Output Power (dBm)	Avg. Output Power (mW)	Limit	RESULT
1	923	6.87	4.86	1 Watt = 30.00 dBm	PASS

MPE Prediction

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$S=PG/4\pi R^2$

Where: S = Power density

P = Power input to antenna

G = Power gain of the antenna in the direction of interest relative to an isotropic radiator

R = Distance to the center of radiation of the antenna

Max. output power including tune-up tolerancel:	6.87	(dBm)
Max. output power including tune-up tolerancel:	4.8640721	(mW)
Duty cycle:	100	(%)
Maximum Pav :	4.8640721	(mW)
Peak Antenna gain (Maximum):	-2	(dBi)
Peak Antenna gain (linear):	0.6309573	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	923	(MHz)
MPE limit for uncontrolled exposure at prediction	0.6153333	(mW/cm2)
Power density at predication frequency at 20 (cm)	0.001	(mW/cm^2)

Measurement Result

The predicted power density level at 20 cm is 0.001 mW/cm2.

This is below the uncontrolled exposure limit of 0.60183 mW/cm2 at 923MHz.