Application
For
Certification

Two Way Radio with FRS

FCC ID: PQN15211462
For
Spin Master Toys Far East Ltd

IC: 4438B-15211
For
Spin Master Toys

13051670HKG-001
MN/ cl
July 2, 2013

Intertek Testing Services Hong Kong Ltd.
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INTERTEK TESTING SERVICES

MEASUREMENT/TECHNICAL REPORT

FCC Applicant : Spin Master Toys Far East Ltd.
Trade Name/Model No : 15211
1029351, 1029352, 1029851
6021820, 6021821, 6022188
Date : July 2, 2013

This report concerns (check one:)Original Grant X Class II Change _____

Equipment Type: FRF – Part 95 Family Radio Face Held Transmitter

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? Yes _____ No X
If yes, defer until: _____
date

Company Name agrees to notify the Commission by: _____
date

of the intended date of announcement of the product so that the grant can be issued on that date.

Report prepared by:

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Table of Contents

EXHIBIT 1

GENERAL DESCRIPTION

1.0 General Description

1.1 Product Description

The Equipment Under Test (EUT) is a Two Way Radio with FRS operating between 462.5625MHz and 462.6125MHz. The EUT is powered by 4.5V (3 x "AAA" size 1.5V alkaline batteries).

Transmitter Portion

(i) Type of Emission : 6K40F3E
(ii) Frequency Range : 3 Channels from 462.5625MHz to 462.6125MHz
(iii) Maximum Power Rating : 0.16W ERP
(iv) Antenna Type : Integral, vertically polarized with 0dBi gain
(v) dc voltage of radio frequency amplifying device: 3.3V
dc current of radio frequency amplifying device: 42mA

The Model: 1029351, 1029352, 1029851, 6021820, 6021821, 6022188 are the same as the Model: 15211 in electrical designs, including software & firmware, PCB layout and construction design/Physical design/Enclosure. The only differences between these models are model number and color to be sold for marketing purpose.

The brief circuit description is saved with filename: descri.pdf

1.2 Related Submittal(s) Grants

This is an Application for Certification of the transmitter portion of a FRS Transceiver. The receiver section of this Transceiver and digital device portion is subject to verification process.

1.3 Test Methodology

Radiated emission measurements were performed according to the procedures in ANSI C63.4 (2003), ANSI/TIA-603-C-2004, RSS-Gen (2010) & RSS-210 (2010). All radiated measurement was performed in Open Area Test Sites. Preliminary scans were performed in the Open Area Test Sites only to determine worst case modes. All radiated tests were performed at an antenna the EUT distance of 3 meters, unless stated otherwise in the **"Justification Section"** of this Application.

1.4 Test Facility

The open area test site used to collect the emission data is located at Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong. The test facility and site measurement data have been fully placed on file with the FCC & IC.

EXHIBIT 2

SYSTEM TEST CONFIGURATION

2.0 **System Test Configuration**

2.1 Justification

The device was configured for testing in a typical fashion (as a customer would normally use it). The device was placed on a turntable, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes. The device has been tested with headset and without headset when the radiated emissions are measured.

The device was powered by 3 x new "AAA" size 1.5V alkaline batteries.

The following are all the test modes (only the worst-case was reported):
FRS, Tx

2.2 EUT Exercising Software

There was no special software to exercise the device. Once the PTT button was pushed, a signal was transmitted.

2.3 Special Accessories

No special accessory is needed for compliance of this device.

2.4 Measurement Uncertainty

Uncertainty and Compliance - Unless the standard specifically states that measured values are to be extended by the measurement uncertainty in determining compliance, all compliance determinations are based on the actual measured value and a consideration of that the uncertainty is within reasonable limits.

2.5 Equipment Modification

No modifications by Spin Master Toys Far East Ltd. will be incorporated in each production model sold/leased in the United States.

2.6 Support Equipment

1. Operated Battery: 3 x “AAA” size 1.5V battery

Confirmed by:

Nip Ming Fung, Melvin
Assistant Manager
Intertek Testing Services Hong Kong Ltd.

Signature

July 2, 2013 Date

EXHIBIT 3

RF POWER OUTPUT

3.0 **RF Power Output (Section 2.1046(a), 95.639(d) / RSS-210 A6.1.4)**

A. Equipment Used

Equipment	**Brand Name**	**Model No.**
Log Periodic Antenna	EMCO	3148
Spectrum Analyzer	AGILENTTECH	E4407B
EMI Test Receiver	ROHDESCHWARZ	ESCI
Tuned Dipole Antenna	CDI	A100
Signal Generator	AGILENTTECH	E8247C

B. Testing Procedure

1. On a test site, the EUT shall be placed at 0.8m height on a wooden turntable, and in the position closest to normal use as declared by the applicant.

2. The test antenna shall be oriented initially for vertical polarisation located 3m from EUT to correspond to the frequency of the transmitter.

3. The output of the test antenna shall be connected to the measuring receiver and the peak detector is used for the measurement.

4. The transmitter shall be switched on, if possible, without modulation and the measuring receiver shall be tuned to the frequency of the transmitter under test.

5. The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.

6. The transmitter shall then the rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.

7. The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.

8. The maximum signal level detected by the measuring receiver shall be noted.

9. The transmitter shall be replaced by a tuned dipole (substitution antenna).

10. The substitution antenna shall be orientated for vertical polarisation and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.

11. The substitution antenna shall be connected to a calibrated signal generator.

12. If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.

13. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.

14. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring received, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.

15. The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.

16. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarisation.

17. The measure of the effective radiated power is the larger of the two levels recorded, at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.

Table 1

Transmission Power

Channel	Frequency	Effective Radiated Power		FCC 95.639 Limit	Margin	RSS-210 Limit	Margin
	(MHz)	(dBm)	(W)	(W)	(W)	(W)	(W)
1	462.5625	22.0	0.16	0.5	-0.34	0.5	-0.34
2	462.5875	22.0	0.16	0.5	-0.34	0.5	-0.34
3	462.6125	22.0	0.16	0.5	-0.34	0.5	-0.34

Notes: Negative sign in the margin column shows the value below limits.

Verdict: Passed

Test Engineer: Koo Wai Ip Date of Test: June 14, 2013

EXHIBIT 4

MODULATION CHARACTERISTICS

4.0 **Modulation Characteristics (Section 2.1047(a)(b), 95.637(a))**

In order to satisfy the 95.637(a) and 2.1047(b) requirements, Modulation Frequency Response and Modulation Limiting Characteristics are attached in Exhibit 4.1 & 4.2.

In order to satisfy the 2.1047(a) requirement, Audio Low Pass Filter Response is attached in Exhibit 4.3.

For electronic filing, the modulation frequency response curve and modulation limiting characteristic curve are saved with filename: mfr.pdf and mlc.pdf respectively.

For electronic filing, the audio low pass frequency response curve is saved with filename: lpf.pdf.

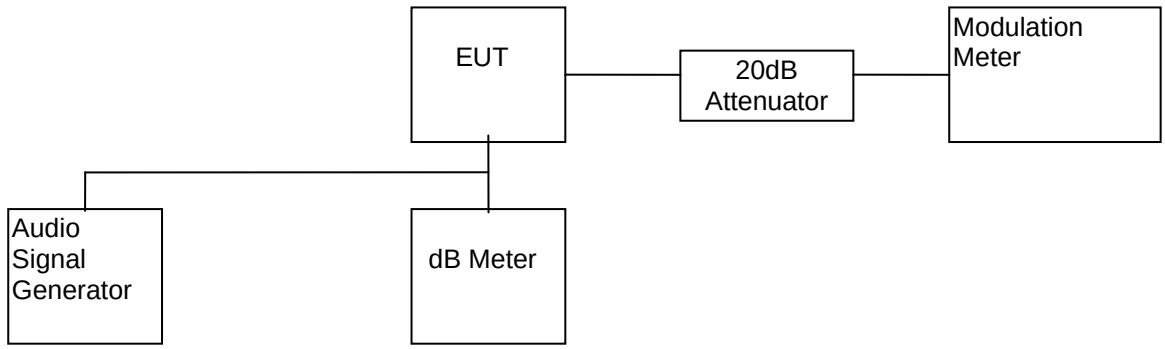
4.1 Modulation Frequency Response (Section 2.1047(a), 95.637(a))

A. Test Equipment

Equipment	Brand Name	Model No.
Function Generator	GRUNDIG	FG100
AC Millivoltmeter	Leader	LMV-182A
20 dB RF Attenuator	Bird	8304-200-N
Radiocommunication Service Monitor	R&S	CMS54

B. Testing Procedure

1) Set-up the test equipment in the following configuration:



2) Set the audio signal generator frequency to the sound pressure level 127dBSPL at the microphone of the EUT.
3) The frequency of the audio signal generator is changed from 100Hz to 5kHz.
4) Record the frequency deviation.
5) The peak frequency deviation must not exceed:

FRS : ±2.5kHz

6) Calculate the audio frequency response at each frequency as:

response = 20 $\log_{10}$(DEV_{FREQ}/ DEV_{REF});

DEV_{REF} = Frequency deviation at 1000Hz ;
DEV_{FREQ} = Frequency deviation at 100 - 5000Hz ;

7) From the plot, audio frequency response rolls off before 3.125kHz.

C. Test Result

Table 2

Modulation Frequency Response

Test Channel : 2
Input level = 117 dBSPL

Modulation Frequency(Hz)	Frequency Deviation(kHz)	Audio Frequency Response
100	0.479	-13.38
200	0.519	-12.69
300	1.078	-6.34
400	1.238	-5.14
500	1.198	-5.42
600	1.557	-3.14
700	1.876	-1.52
800	2.156	-0.32
900	2.196	-0.16
1000	2.236	0.00
1250	2.215	-0.08
1500	1.956	-1.16
1750	2.395	0.60
2000	2.435	0.74
2250	2.475	0.88
2500	2.395	0.60
2750	0.878	-8.12
3000	0.519	-12.69
3125	0.479	-13.38
3250	0.479	-13.38
3500	0.519	-12.69
4000	0.599	-11.44
5000	0.439	-14.14

Verdict: Passed

Test Engineer: Koo Wai Ip Date of Test: June 21, 2013

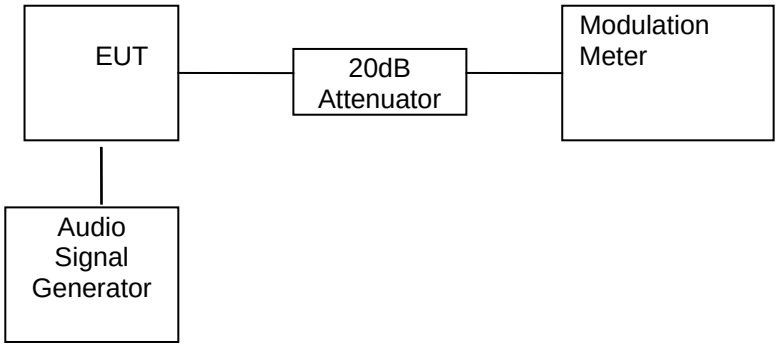
4.2 Modulation Limiting Characteristics (Section 2.1047(b), 95.637(a))

A. Test Equipment

Equipment	Brand Name	Model No.
Function Generator	GRUNDIG	FG100
20 dB RF Attenuator	Bird	8304-200-N
Radiocommunication Service Monitor	R&S	CMS54

B. Testing Procedure

1) Set-up the test equipment in the following configuration:



2) Set the frequency of the audio signal generator to 500Hz and adjust the level from 47dBSPL to 137dBSPL.
3) Record the maximum value of plus or minus peak frequency deviation.
4) Repeat the above procedure with frequency 1000Hz, 2500Hz & 3125Hz.
5) The peak frequency deviation must not exceed:

   FRS: ±2.5kHz

C. Test Result

Table 3

Modulation Limiting Characteristics

Test Channel : 2

Modulation Input (dBSPL)	Peak Frequency Deviation (kHz) at 500Hz	Peak Frequency Deviation (kHz) at 1000Hz	Peak Frequency Deviation (kHz) at 2500Hz	Peak Frequency Deviation (kHz) at 3125Hz
47	0.056	0.056	0.056	0.056
57	0.056	0.056	0.056	0.056
67	0.460	0.766	0.744	0.458
77	0.465	0.786	0.786	0.466
87	0.611	0.996	0.951	0.569
97	0.614	1.185	1.119	0.439
107	0.782	1.942	1.734	0.614
117	1.162	2.223	2.355	0.519
127	1.629	2.211	2.486	0.487
137	1.557	2.196	2.491	0.439

Verdict: Passed

Test Engineer: Koo Wai Ip Date of Test: June 21, 2013

4.3 Audio Low Pass Filter Response (Section 2.1047(a), 95.637(b))

A. Test Equipment

Equipment	Brand Name	Model No.
Function Generator	GRUNDIG	FG100
Radiocommunication Service Monitor	R&S	CMS54

B. Testing Procedure

1) Connect the audio signal generator to the input of the post limiter low pass filter and the dB meter to the output of the post limiter low pass filter.
2) Apply a 1000 Hz tone from the audio signal generator and adjust the level per manufacturer's specifications. Record the dB level of the 1000 Hz tone as LEV_{REF}.
3) Set the audio signal generator to the desired test frequency between 3000 Hz and the upper low pass filter limit. Record the dB level at the test frequency as LEV_{FREQ}.
4) Calculate the audio frequency response at the test frequency as:

   low pass filter response = LEV_{FREQ} - LEV_{REF}

5) Repeat the above procedure for all the desired test frequencies.

C. Test Result

Table 4

Low-Pass Filter Response

Test Channel : 2

Audio Input Strength = 500mVrms

Frequency (kHz)	dB relative to 1 kHz	TIA/EIA-603C
1	0.0	0.0
3	-6.0	0.0
4	-11.0	-7.5
5	-18.0	-13.3
6	-20.5	-18.1
8	-34.0	-25.6
10	-44.0	-31.4
15	-52.0	-41.9
20	-53.0	-50.0
30	-56.0	-50.0
40	-56.0	-50.0
50	-56.0	-50.0
60	-58.0	-50.0
70	-58.0	-50.0
80	-58.0	-50.0
90	-58.0	-50.0
100	-58.0	-50.0

Audio Output at 1kHz: -5.2dBV

Verdict: Passed

Test Engineer: Koo Wai Ip Date of Test: June 21, 2013

EXHIBIT 5

OCCUPIED BANDWIDTH

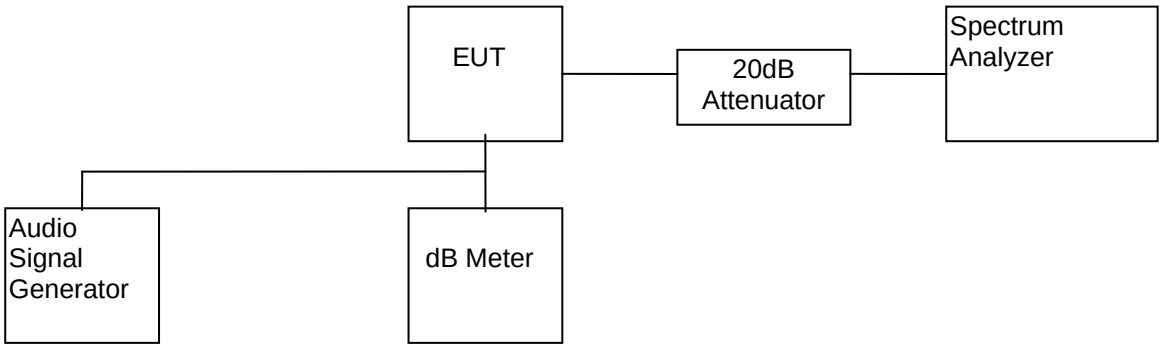
5.0 Occupied Bandwidth (Section 2.1049, 95.633(c) / RSS-210 A6.1.3)

A. Test Equipment

Equipment	Brand Name	Model No.
Function Generator	GRUNDIG	FG100
AC Millivoltmeter	Leader	LMV-182A
20 dB RF Attenuator	Bird	8304-200-N
Spectrum Analyzer	ROHDESCHWARZ	FSP30

B. Testing Procedure

1) Set-up the test equipment in the following configuration:



2) Set the level of audio signal generator to obtain 16 dB greater than required for 50% modulation.
3) The occupied bandwidth is measured with the spectrum analyzer set at 2kHz/div scan and 10dB/div.

C. Test Result

Table 5

System	Channel	Measured Bandwidth (kHz)	Limit (kHz)
FRS	2	6.40	≤12.5

Verdict: Passed

For the electronic filing, the bandwidth plot is saved with filename: bw.pdf

Test Engineer: Koo Wai Ip Date of Test: June 21, 2013

EXHIBIT 6

SPURIOUS EMISSION

6.0 **Spurious Emission**

In order to satisfy the FCC Section 95.635(b) & RSS-210 A6.1.5 requirements, the spurious emission from the EUT are measured and shown in the Exhibit 6.1.

6.1 Power of Spurious Radiation (Section 2.1053, 95.635(b) / RSS-210 A6.1.3)

A. Test Equipment

Equipment	Brand Name	Model No.
Antenna	EMCO	A100, 3148, 3104C, 3115
Spectrum Analyzer	AGILENTTECH	E4407B
RF Filter	Trilithic	3VF500/1000-5-50-CC
Signal Generator	AGILENTTECH	E8247C
EMI Test Receiver	ROHDESCHWARZ	ESCI

B. Testing Procedure

Radiated emission measurements were performed according to the procedures in ANSI/TIA-603-C-2004. All measurements were performed in Open Area Test Sites located at Roof Top of Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.

C. Radiated Emission Configuration Photograph

Worst Case Radiated Emission

For electronic filing, the radiated emission configurations photograph is saved with filename: config photos.pdf

C. Test Result

Table 6(a)

1) Unwanted emission from CARRIER ±6.25kHz to CARRIER ±31.25kHz

(Refer to the plots which is saved with filename: spurious.pdf)

Region	Unwanted emission
	Channel 2
CARRIER ±6.25kHz to ±12.5kHz	<25dB
CARRIER ±12.5kHz to ±31.25kHz	<35dB

Table 6(b): Channel 2

Frequency (MHz)	Effective Radiated Power (dBm)	Transmission Power (dBm)	Attenuation (dBc)	Limit (dBc)	Margin (dB)
925.124	-37.8	22.0	59.8	35.0	-24.8
1387.686	-33.7	22.0	55.7	35.0	-20.7
1850.248	-27.2	22.0	49.2	35.0	-14.2
2312.810	-26.0	22.0	48.0	35.0	-13.0
2775.372	-39.1	22.0	61.1	35.0	-26.1
3237.934	-41.0	22.0	63.0	35.0	-28.0
3700.496	-31.2	22.0	53.2	35.0	-18.2
4163.058	-37.1	22.0	59.1	35.0	-24.1
4625.620	-37.5	22.0	59.5	35.0	-24.5

Remark: 1. Transmission power is 15.8 dBm or -14.2 dB(W).

2. According to Section 95.635(b7) & RSS-210 A6.1.5, the unwanted emission should be attenuated below TP by at least 43 + 10 $\log_{10}$ (TP) dB or 28.8 dB.

3. The test is performed according to ANSI/TIA-603-C-2004.

Verdict: Passed

Test Engineer: Koo Wai Ip Date of Test: June 14, 2013

EXHIBIT 7

FREQUENCY STABILITY

7.0 **Frequency Stability (Section 2.1055(a)(b)(d), 95.627(b) / RSS-210 A6.1.6)**

The frequency tolerance was tested in normal condition & over extreme ambient conditions with respect to voltage and temperature variation.

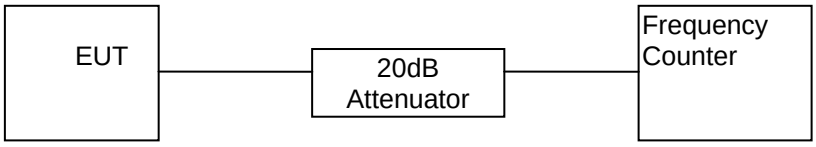
7.1 Frequency Tolerance (Section 95.627(b) / RSS-210 A6.1.6)

A. Test Equipment

Equipment	Brand Name	Model No.
20 dB RF Attenuator	Bird	8304-200-N
Frequency Counter	OPTOELECTRONICS	3000A

B. Testing Procedure

1) Set-up the test equipment in the following configuration:



2) Measure all transmit channel frequencies in MHz.

C. Test Result

Table 7

Frequency Tolerance

Channel	Frequency (MHz)	Measured Frequency (MHz)	Tolerance (%)
1	462.5625	462.56294	0.000095
2	462.5875	462.58791	0.000089
3	462.6125	462.61292	0.000091

FCC Limit for FRS (95.627(b)): ≤±0.00025%
IC Limit for FRS (RSS-210 A6.1.6): ≤±0.0005%

Verdict: Passed

Test Engineer: Koo Wai Ip Date of Test: June 21, 2013

7.2 Frequency Stability - Temperature (Section 2.1055(a)(b), 95.627(b) / RSS-210 A6.1.6 for FRS)

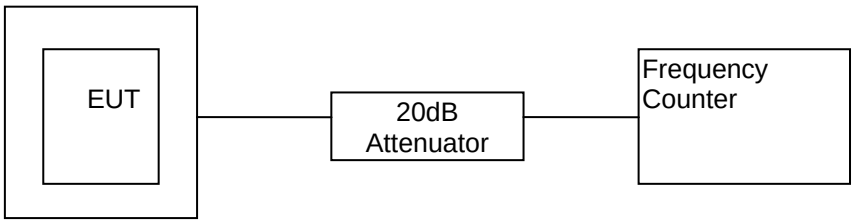
A. Test Equipment

Equipment	Brand Name	Model No.
20 dB RF Attenuator	Bird	8304-200-N
Frequency Counter	OPTOELECTRONICS	3000A

B. Testing Procedure

1) Set-up the test equipment in the following configuration:

Temperature Chamber



2) Set the Temperature Chamber to 20°C and stabilize the EUT temperature for one hour. Set transmitter ON for two minutes.
3) Measure the channel frequency of channel 4 in MHz.
4) Turn the EUT OFF.
5) Repeat the above procedure from -20°C to 50°C with 10°C increment for FRS.

C. Test Result

Table 8(a)

Frequency Tolerance with Temperature Variation

Channel : 2

Temperature (°C)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Tolerance (%)	*Frequency Tolerance with reference to its value at +20°C (ppm)
-20	462.58750	462.58839	0.000192	1.0
-10	462.58750	462.58818	0.000147	0.6
0	462.58750	462.58845	0.000205	1.2
10	462.58750	462.58826	0.000164	0.8
20	462.58750	462.58791	0.000089	0.0
30	462.58750	462.58773	0.000050	-0.4
40	462.58750	462.58777	0.000058	-0.3
50	462.58750	462.58801	0.000110	0.2

Remark: 1) For FRS, frequency tolerance must be maintained within a frequency tolerance of 0.00025% & 0.0005% for FCC & IC respectively.

Verdict: Passed

Test Engineer: Koo Wai Ip Date of Test: June 21, 2013

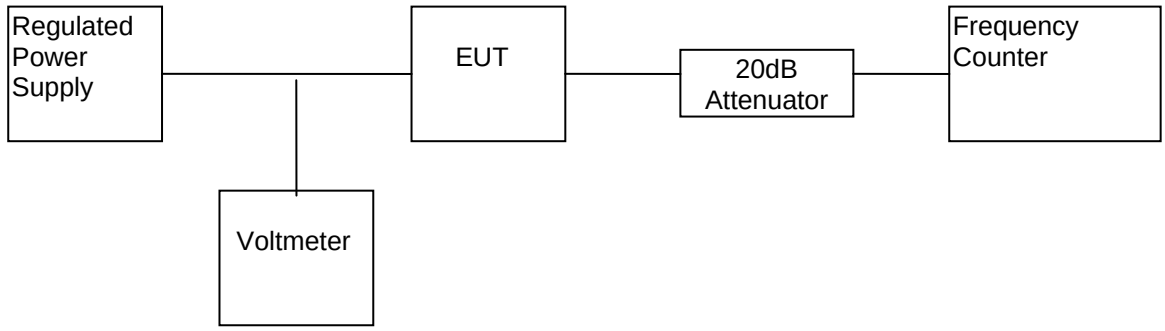
7.3 Frequency Stability - Voltage (Section 2.1055(d), 95.627(b) / RSS-210 A6.1.6)

A. Test Equipment

Equipment	Brand Name	Model No.
Regulated Power Supply	PAD	30-35L
20 dB RF Attenuator	Bird	8304-200-N
Voltage meter	Fluke	87
Frequency Counter	OPTOELECTRONICS	3000A

B. Testing Procedure

1) Set-up the test equipment in the following configuration:



2) Vary the level of regulated power supply to the manufacturer specified battery end point of the EUT.
3) Measure the channel frequency of channel 4 in MHz.

C. Test Result

Table 9

Frequency Deviation with Voltage Variation

The manufacturer specified battery end point 2.7V

Channel	Frequency (MHz)	Measured Frequency (MHz)	Tolerance (%)
2	462.58750	462.58807	0.000123

Remark: 1) For FRS, frequency tolerance must be maintained within a frequency tolerance of 0.00025% and 0.0005% for FCC & IC respectively.
2) The test voltage is from primary supply voltage to 2.7V

Test Engineer: Koo Wai Ip Date of Test: June 21, 2013

8.0 **Equipment List**

1) Radiated Emissions Test

Equipment	EMI Test Receiver	Spectrum Analyzer (9kHz to 26.5GHz)	Biconical Antenna
Registration No.	EW-2500	EW-2188	EW-0571
Manufacturer	ROHDESCHWARZ	AGILENTTECH	EMCO
Model No.	ESCI	E4407B	3104C
Calibration Date	Mar. 22, 2013	Nov. 05, 2012	Apr. 05, 2012
Calibration Due Date	Feb. 28, 2014	Nov. 05, 2013	Oct. 05, 2013

Equipment	Log Periodic Antenna	Roberts Antennas	Roberts Antennas
Registration No.	EW-1042	EW-0159	EW-0160
Manufacturer	EMCO	CDI	CDI
Model No.	3148	A100	A100
Calibration Date	Apr. 25, 2012	Sep. 25, 2012	Sep. 25, 2012
Calibration Due Date	Oct. 25, 2013	Mar. 25, 2014	Mar. 25, 2014

Equipment	Double Ridged Guide Antenna (1GHz - 18GHz)	Signal Generator (250kHz to 40GHz)
Registration No.	EW-1133	EW-1983
Manufacturer	EMCO	AGILENTTECH
Model No.	3115	E8247C
Calibration Date	Oct. 05, 2012	Apr. 12, 2013
Calibration Due Date	Apr. 05, 2014	Apr. 12, 2015

2) Other RF Measurement Test

Equipment	Communication Service Monitor (Radio)	Frequency Counter	Function Generator
Registration No.	EW-1775	EW-1069	EW-2775
Manufacturer	ROHDESCHWARZ	OPTOELECTRON	AGILENTTECH
Model No.	CMS54	3000A/TCXO	33210A
Calibration Date	Nov. 23, 2012	Apr. 22, 2013	Aug. 28, 2012
Calibration Due Date	Nov. 22, 2013	Apr. 22, 2014	Sep. 28, 2013

Equipment	Spectrum Analyzer
Registration No.	EW-2253
Manufacturer	ROHDESCHWARZ
Model No.	FSP40
Calibration Date	Apr. 24, 2013
Calibration Due Date	Apr. 24, 2014

APPENDIX

EXHIBITS OF APPLICATION FOR CERTIFICATION