FCC TEST REPORT

Product	:	Curtain rolling motor
Trade mark	:	N/A
Model/Type reference	:	M3310EIG
Serial Number	:	N/A
Report Number	:	EED32L00294201
FCC ID	:	2AU8E-M3310EIG
Date of Issue	:	Oct. 23, 2020
Test Standards	:	47 CFR Part 15 Subpart C
Test result	:	PASS

Prepared for:

Smartplus Inc

415 Steelcase Road, East Markham, Ontario Canada, L3R 1G3

Prepared by:

Centre Testing International Group Co., Ltd.
Hongwei Industrial Zone, Bao'an 70 District,
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Reviewed by: Jok Yang — Jok Yang

Approved by: Sam Chuang — Sam Chuang

Date: Oct. 23, 2020

Check No.:3096361185

CENTRE TESTING INTERNATIONAL GROUP CO.,LTD. CTI Report Seal

2 Version

Version No.	Date	Description
00	Oct. 23, 2020	Original

3 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15 Subpart C Section 15.203	ANSI C63.10-2013	PASS
AC Power Line Conducted Emission	47 CFR Part 15 Subpart C Section 15.207	ANSI C63.10-2013	N/A
Field Strength of the Fundamental Signal	47 CFR Part 15 Subpart C Section 15.249 (a)	ANSI C63.10-2013	PASS
Spurious Emissions	47 CFR Part 15 Subpart C Section 15.249 (a)/15.209	ANSI C63.10-2013	PASS
20dB Occupied Bandwidth	47 CFR Part 15 Subpart C Section 15.215 (c)	ANSI C63.10-2013	PASS

Remark:
Company Name and Address shown on Report, the sample(s) and sample Information was/ were provided by the applicant who should be responsible for the authenticity which CTI hasn’t verified.

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5 General Information

5.1 Client Information

Applicant:	Smartplus Inc
Address of Applicant:	415 Steelcase Road, East Markham, Ontario Canada, L3R 1G3
Manufacturer:	DONGGUAN RIDONG INTELLIGENT EQUIPMENT CO., LTD.
Address of Manufacturer:	No.1 Shuibei Industry Estate, Fenggang Town, Dongguan City, Guangdong, China
Factory:	DONGGUAN RIDONG INTELLIGENT EQUIPMENT CO., LTD.
Address of Factory:	No.1 Shuibei Industry Estate, Fenggang Town, Dongguan City, Guangdong, China

5.2 General Description of EUT

Product Name:	Curtain rolling motor
Model No.(EUT):	M3310EIG
Trade Mark:	N/A
EUT Supports Radios application:	914MHz，915MHz，916MHz

5.3 Product Specification subjective to this standard

Frequency Range:	914MHz，915MHz，916MHz
Modulation Type:	2-GFSK
Test Power Grade:	Default
Test Software of EUT:	Default
Antenna Type:	PCB built-in antenna
Antenna Gain:	3 dBi
Power Supply:	DC 24V
Test voltage:	DC 24V
Sample Received Date:	Sep.09, 2020
Sample tested Date:	Sep.09, 2020 to Sep. 28, 2020

5.4 Test Environment and Mode

Operating Environment:	
Temperature:	24.0 ℃
Humidity:	56 % RH
Atmospheric Pressure:	1010 mbar
Test mode:	
Transmitting mode:	Keep the EUT in transmitting mode with modulation.

5.5 Description of Support Units

The EUT has been tested independently

5.6 Test Location

All tests were performed at:
Centre Testing International Group Co., Ltd
Building C, Hongwei Industrial Park Block 70, Bao'an District, Shenzhen, China
Telephone: +86 (0) 755 33683668 Fax:+86 (0) 755 33683385
No tests were sub-contracted.

FCC Designation No.: CN1164

5.7 Deviation from Standards

None.

5.8 Abnormalities from Standard Conditions

None.

5.9 Other Information Requested by the Customer

None.

5.10 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.9×10^{-8}
2	RF power, conducted	0.46dB (30MHz-1GHz)
		0.55dB (1GHz-18GHz)
3	Radiated Spurious emission test	4.3dB (30MHz-1GHz)
		4.5dB (1GHz-12.75GHz)
4	Conduction emission	3.5dB (9kHz to 150kHz)
		3.1dB (150kHz to 30MHz)
5	Temperature test	0.64°C
6	Humidity test	3.8%
7	DC power voltages	0.026%

6 Equipment List

RF test system					
Equipment	**Manufacturer**	**Mode No.**	**Serial Number**	**Cal. Date (mm-dd-yyyy)**	**Cal. Due date (mm-dd-yyyy)**
Signal Generator	Keysight	E8257D	MY53401106	02-17-2020	02-16-2021
Spectrum Analyzer	Keysight	N9010A	MY54510339	02-17-2020	02-16-2021
Signal Generator	Keysight	N5182B	MY53051549	02-17-2020	02-16-2021
Temperature/ Humidity Indicator	biaozhi	HM10	1804186	06-29-2020	06-28-2021
High-pass filter	Sinoscite	FL3CX03WG18NM 12-0398-002	---	---	---
High-pass filter	MICRO-TRONICS	SPA-F-63029-4	---	---	---
DC Power	Keysight	E3642A	MY54426035	02-17-2020	02-16-2021
PC-1	Lenovo	R4960d	---	---	---
BT&WI-FI Automatic control	R&S	OSP120	101374	02-17-2020	02-16-2021
RF control unit	JS Tonscend	JS0806-2	158060006	02-17-2020	02-16-2021
RF control unit	JS Tonscend	JS0806-1	158060004	02-17-2020	02-16-2021
RF control unit	JS Tonscend	JS0806-4	158060007	---	---
BT&WI-FI Automatic test software	JS Tonscend	JS1120-3	---	---	---

3M Semi/full-anechoic Chamber					
Equipment	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date (mm-dd-yyyy)**	**Cal. Due date (mm-dd-yyyy)**
3M Chamber & Accessory Equipment	TDK	SAC-3	---	05-24-2019	05-23-2022
TRILOG Broadband Antenna	Schwarzbeck	VULB9163	9163-401	11-18-2019	11-17-2020
TRILOG Broadband Antenna	Schwarzbeck	VULB9163	9163-618	05-16-2020	05-15-2021
Microwave Preamplifier	Agilent	8449B	3008A02425	06-24-2020	06-23-2021
Microwave Preamplifier	Tonscend	EMC051845 SE	980380	01-09-2020	01-08-2021
Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-1869	04-25-2018	04-24-2021
Horn Antenna	ETS-LINDGREN	3117	00057410	06-05-2018	06-04-2021
Double ridge horn antenna	A.H.SYSTEMS	SAS-574	374	06-05-2018	06-04-2021
Pre-amplifier	A.H.SYSTEMS	PAP-1840-60	6041.6042	06-30-2020	06-29-2021
Spectrum Analyzer	R&S	FSP40	100416	04-22-2020	04-21-2021
Receiver	R&S	ESCI	100435	04-28-2020	04-27-2021
Receiver	R&S	ESCI7	100938-003	10-21-2019	10-20-2020
Multi device Controller	maturo	NCD/070/107 11112	---	---	---
LISN	schwarzbeck	NNBM8125	81251547	04-28-2020	04-27-2021
LISN	schwarzbeck	NNBM8125	81251548	04-28-2020	04-27-2021
Signal Generator	Agilent	E4438C	MY45095744	02-17-2020	02-16-2021
Signal Generator	Keysight	E8257D	MY53401106	02-17-2020	02-16-2021
Temperature/ Humidity Indicator	Shanghai qixiang	HM10	1804298	06-29-2020	06-28-2021
Communication test set	Agilent	E5515C	GB47050534	03-01-2019	02-28-2022
Cable line	Fulai(7M)	SF106	5219/6A	---	---
Cable line	Fulai(6M)	SF106	5220/6A	---	---
Cable line	Fulai(3M)	SF106	5216/6A	---	---
Cable line	Fulai(3M)	SF106	5217/6A	---	---
Communication test set	Agilent	E4438C	104466	01-14-2020	01-13-2021
High-pass filter	Sinoscite	FL3CX03WG 18NM12-0398-002	---	---	---
High-pass filter	MICRO-TRONICS	SPA-F-63029-4	---	---	---
band rejection filter	Sinoscite	FL5CX01CA0 9CL12-0395-001	---	---	---
band rejection filter	Sinoscite	FL5CX01CA0 8CL12-0393-001	---	---	---
band rejection filter	Sinoscite	FL5CX02CA0 4CL12-0396-002	---	---	---
band rejection filter	Sinoscite	FL5CX02CA0 3CL12-0394-001	---	---	---

3M full-anechoic Chamber					
Equipment	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date (mm-dd-yyyy)**	**Cal. Due date (mm-dd-yyyy)**
RSE Automatic test software	JS Tonscend	JS36-RSE	10166	---	---
Receiver	Keysight	N9038A	MY57290136	03-05-2020	03-04-2021
Spectrum Analyzer	Keysight	N9020B	MY57111112	03-05-2020	03-04-2021
Spectrum Analyzer	Keysight	N9030B	MY57140871	03-05-2020	03-04-2021
Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-075	04-25-2018	04-24-2021
Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-076	04-25-2018	04-24-2021
TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	9163-1148	04-25-2018	04-24-2021
Horn Antenna	Schwarzbeck	BBHA 9170	9170-832	04-25-2018	04-24-2021
Horn Antenna	Schwarzbeck	BBHA 9170	9170-829	04-25-2018	04-24-2021
Communication Antenna	Schwarzbeck	CLSA 0110L	1014	---	---
Biconical antenna	Schwarzbeck	VUBA 9117	9117-381	04-25-2018	04-24-2021
Horn Antenna	ETS-LINDGREN	3117	00057407	07-10-2018	07-09-2021
Preamplifier	EMCI	EMC184055SE	980596	05-20-2020	05-19-2021
Communication test set	R&S	CMW500	102898	01-14-2020	01-13-2021
Preamplifier	EMCI	EMC001330	980563	04-22-2020	04-21-2021
Preamplifier	Agilent	8449B	3008A02425	06-24-2020	06-23-2021
Preamplifier	JS Tonscend	980380	EMC051845 SE	01-09-2020	01-08-2021
Temperature/ Humidity Indicator	biaozhi	GM1360	EE1186631	04-27-2020	04-26-2021
Signal Generator	KEYSIGHT	E8257D	MY53401106	02-17-2020	02-16-2021
Fully Anechoic Chamber	TDK	FAC-3	---	01-17-2018	01-16-2021
Filter bank	JS Tonscend	JS0806-F	188060094	04-10-2018	04-09-2021
Cable line	Times	SFT205-NMSM-2.50M	394812-0001	---	---
Cable line	Times	SFT205-NMSM-2.50M	394812-0002	---	---
Cable line	Times	SFT205-NMSM-2.50M	394812-0003	---	---
Cable line	Times	SFT205-NMSM-2.50M	393495-0001	---	---
Cable line	Times	EMC104-NMNM-1000	SN160710	---	---
Cable line	Times	SFT205-NMSM-3.00M	394813-0001	---	---
Cable line	Times	SFT205-NMNM-1.50M	381964-0001	---	---
Cable line	Times	SFT205-NMSM-7.00M	394815-0001	---	---
Cable line	Times	HF160-KMKM-3.00M	393493-0001	---	---

7 Test results and Measurement Data

7.1 Antenna Requirement

Standard requirement:	47 CFR Part 15C Section 15.203
15.203 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, 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.	
EUT Antenna:	
The antenna is PCB built-in antenna. The best case gain of the antenna is 3dBi.	

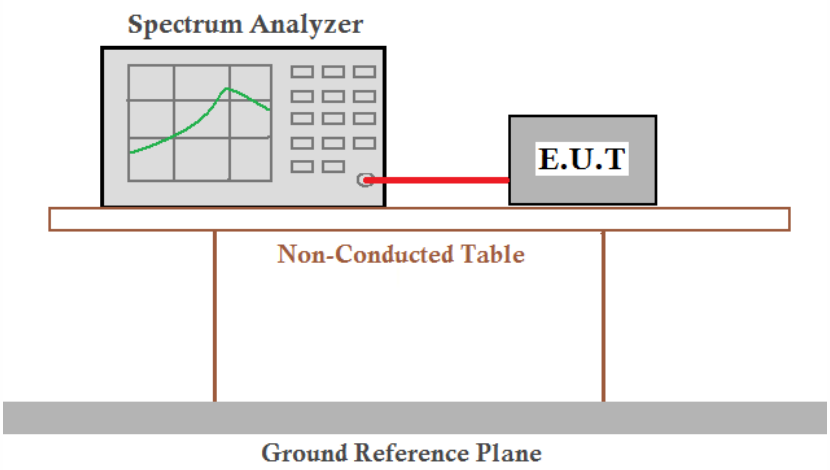
7.2 Spurious Emissions

7.2.1 Duty Cycle

Test Requirement: 47 CFR Part 15C Section 15.249

Test Method: ANSI C63.10

Test Setup:



Limit: N/A

Exploratory Test Mode: Transmitter mode

Instruments Used: Refer to section 6 for details

Test Results: Pass

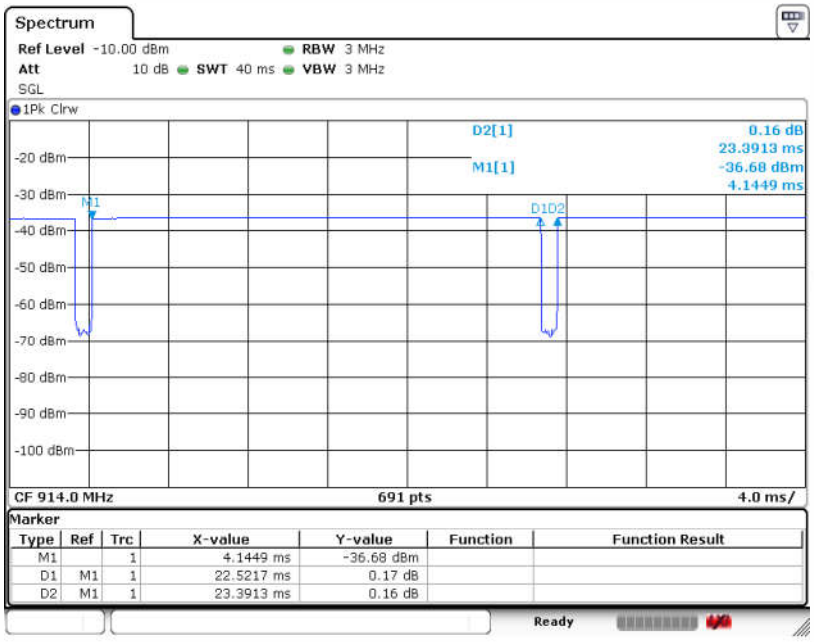
Measurement Data

Frequency (MHz)	T period (ms)	T on time (ms)	Duty cycle
914	23.3913	22.5217	0.963
915	23.4493	22.5797	0.963
916	23.4493	22.5217	0.960

Note：Duty cycle=T on time / T period

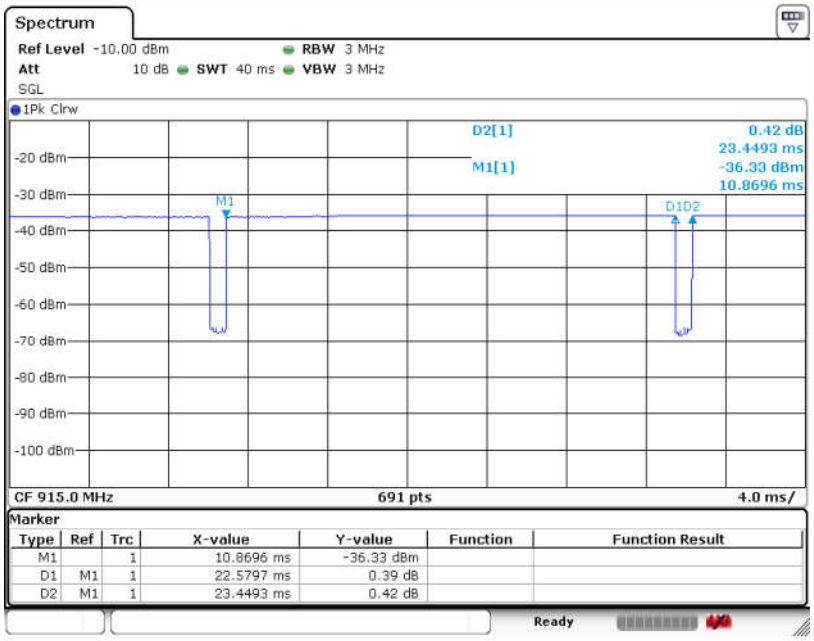
Test plot as follows:

914MHz:



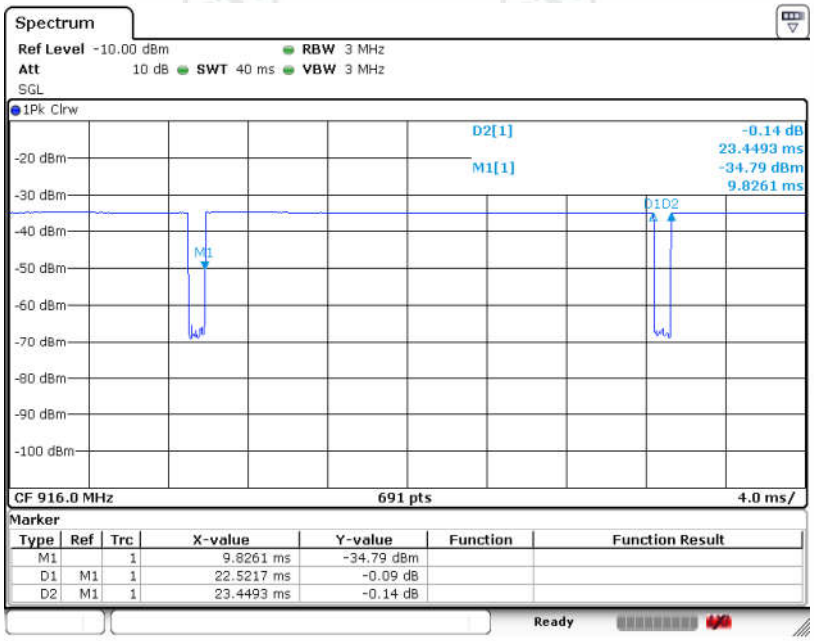
Date: 27.SEP.2020 18:28:13

915MHz:



Date: 27.SEP.2020 18:30:01

916MHz:


Spectrum
Ref Level -10.00 dBm RBW 3 MHz
Att 10 dB SWT 40 ms VBW 3 MHz
SGL
1Pk Clrw
D2[1] -0.14 dB
23.4493 ms
M1[1] -34.79 dBm
9.8261 ms
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
-100 dBm
M1
D1D2
CF 916.0 MHz
691 pts
4.0 ms/
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 9.8261 ms -34.79 dBm
D1 M1 1 22.5217 ms -0.09 dB
D2 M1 1 23.4493 ms -0.14 dB
Ready
Date: 27.SEP.2020 17:53:08

7.2.2 Spurious Emissions

Test Requirement: 47 CFR Part 15C Section 15.249 and 15.209

Test Method: ANSI C63.10

Test Site: Measurement Distance: 3m (Semi-Anechoic Chamber)

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
0.009MHz-0.090MHz	Peak	10kHz	30KHz	Peak
0.009MHz-0.090MHz	Average	10kHz	30KHz	Average
0.090MHz-0.110MHz	Quasi-peak	10kHz	30KHz	Quasi-peak
0.110MHz-0.490MHz	Peak	10kHz	30KHz	Peak
0.110MHz-0.490MHz	Average	10kHz	30KHz	Average
0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
30MHz-1GHz	Quasi-peak	120kHz	300KHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

Test Setup:

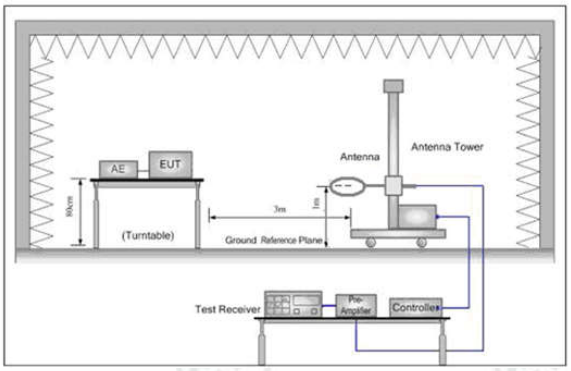


Figure 1. Below 30MHz

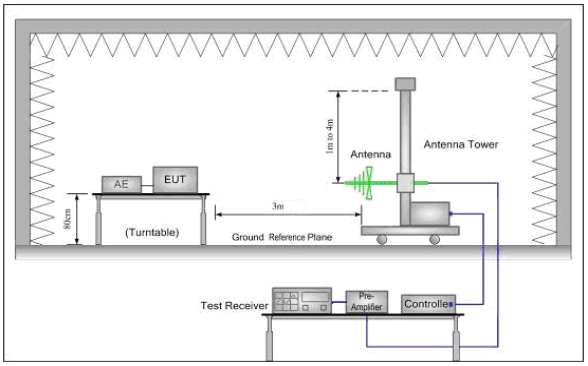


Figure 2. 30MHz to 1GHz

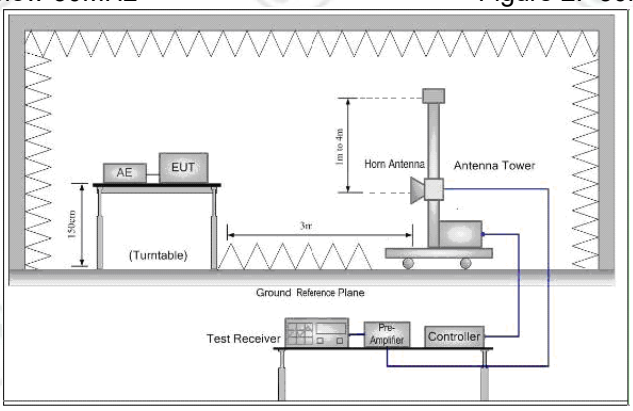


Figure 3. Above 1GHz

Test Procedure: **Below 1GHz test procedure as below:**

The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.

The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

For each suspected emission, the EUT was arranged to its worst case and then the

antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rota table table was turned from 0 degrees to 360 degrees to find the maximum reading.
The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
Above 1GHz test procedure as below:
Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter(Above 18GHz the distance is 1 meter and table is 1.5 meter).
Test the EUT in the lowest channel ,middle channel, the Highest channel
The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.
Repeat above procedures until all frequencies measured was complete.

Limit:
(Spurious Emissions)

Frequency	Field strength (microvolt/meter)	Limit (dBμV/m)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	2400/F (kHz)	-	-	300
0.490MHz-1.705MHz	24000/F (kHz)	-	-	30
1.705MHz-30MHz	30	-	-	30
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	54.0	Average	3

Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

Limit:
(Field strength of the fundamental signal)

Frequency	Limit (dBμV/m @3m)	Remark
2400MHz-2483.5MHz	94.0	Average Value
	114.0	Peak Value

Instruments Used: Refer to section 6 for details

Exploratory Test Mode: Transmitting mode,Charge +Transmitting mode

Final Test Mode: Pretest the EUT at Transmitting mode and Charge +Transmitting mode, found the Charge +Transmitting mode which it is worse case
Only the worst case is recorded in the report.

Test Results: Pass

Measurement Data

Average value:		
Calculate Formula:	Average value=Peak value + PDCF	
	PDCF=20 log(Duty cycle)	
	Duty cycle= T on time / T period	
Test data:	914MHz	T on time =22.5217ms
		T period =23.3913ms
		PDCF= -0.33
	915MHz	T on time =22.5797ms
		T period =23.4493ms
		PDCF= -0.33
	916MHz	T on time =22.5217ms
		T period =23.4493ms
		PDCF= -0.35

Field strength of the fundamental signal

Antenna polarization: Horizontal						
Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
914	91.38	22.18	85.74	114	-28.26	Peak
914	-	-	85.41	94	-8.59	Average
915	91.38	22.19	85.75	114	-28.25	Peak
915	-	-	85.42	94	-8.58	Average
916	91.36	22.20	85.75	114	-28.25	Peak
916	-	-	85.40	94	-8.60	Average

Antenna polarization: Vertical						
Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
914	91.38	22.18	85.74	114	-28.26	Peak
914	-	-	85.41	94	-8.59	Average
915	91.38	22.19	85.75	114	-28.25	Peak
915	-	-	85.42	94	-8.58	Average
916	91.36	22.20	85.75	114	-28.25	Peak
916	-	-	85.40	94	-8.60	Average

Below 1GHz:

Mode:			TX					Channel:		914	
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	36.5967	11.21	0.67	-31.38	38.39	18.89	40.00	21.11	Pass	H	PK
2	130.0170	7.70	1.33	-32.02	41.71	18.72	43.50	24.78	Pass	H	PK
3	240.0260	11.94	1.84	-31.90	40.96	22.84	46.00	23.16	Pass	H	PK
4	325.0065	13.75	2.14	-31.79	39.09	23.19	46.00	22.81	Pass	H	PK
5	457.0367	16.31	2.55	-31.85	41.59	28.60	46.00	17.40	Pass	H	PK
6	571.2171	18.42	2.81	-32.02	38.74	27.95	46.00	18.05	Pass	H	PK
7	36.5967	11.21	0.67	-31.38	40.11	20.61	40.00	19.39	Pass	V	PK
8	150.0010	7.55	1.45	-32.01	45.34	22.33	43.50	21.17	Pass	V	PK
9	189.9690	9.95	1.61	-31.97	43.44	23.03	43.50	20.47	Pass	V	PK
10	240.0260	11.94	1.84	-31.90	42.39	24.27	46.00	21.73	Pass	V	PK
11	299.9780	13.20	2.06	-31.40	40.07	23.93	46.00	22.07	Pass	V	PK
12	600.0290	19.00	2.96	-31.50	34.33	24.79	46.00	21.21	Pass	V	PK

Mode:			TX					Channel:		915	
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	36.5967	11.21	0.67	-31.38	37.89	18.39	40.00	21.61	Pass	H	PK
2	130.0170	7.70	1.33	-32.02	42.17	19.18	43.50	24.32	Pass	H	PK
3	240.0260	11.94	1.84	-31.90	41.32	23.20	46.00	22.80	Pass	H	PK
4	304.0524	13.29	2.07	-31.60	40.21	23.97	46.00	22.03	Pass	H	PK
5	457.5218	16.32	2.55	-31.85	41.95	28.97	46.00	17.03	Pass	H	PK
6	571.8962	18.44	2.81	-32.01	37.52	26.76	46.00	19.24	Pass	H	PK
7	150.0010	7.55	1.45	-32.01	43.98	20.97	43.50	22.53	Pass	V	PK
8	189.9690	9.95	1.61	-31.97	43.80	23.39	43.50	20.11	Pass	V	PK
9	240.0260	11.94	1.84	-31.90	43.13	25.01	46.00	20.99	Pass	V	PK
10	299.9780	13.20	2.06	-31.40	40.75	24.61	46.00	21.39	Pass	V	PK
11	457.5218	16.32	2.55	-31.85	37.72	24.74	46.00	21.26	Pass	V	PK
12	600.0290	19.00	2.96	-31.50	35.35	25.81	46.00	20.19	Pass	V	PK

Mode:			TX					Channel:		916	
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	130.0170	7.70	1.33	-32.02	41.91	18.92	43.50	24.58	Pass	H	PK
2	195.0135	10.43	1.64	-31.94	40.24	20.37	43.50	23.13	Pass	H	PK
3	240.0260	11.94	1.84	-31.90	40.54	22.42	46.00	23.58	Pass	H	PK
4	299.9780	13.20	2.06	-31.40	40.38	24.24	46.00	21.76	Pass	H	PK
5	458.0068	16.33	2.55	-31.84	41.18	28.22	46.00	17.78	Pass	H	PK
6	572.4782	18.45	2.82	-32.01	38.46	27.72	46.00	18.28	Pass	H	PK
7	56.4836	12.16	0.86	-31.91	38.49	19.60	40.00	20.40	Pass	V	PK
8	150.0010	7.55	1.45	-32.01	46.72	23.71	43.50	19.79	Pass	V	PK
9	195.0135	10.43	1.64	-31.94	44.58	24.71	43.50	18.79	Pass	V	PK
10	299.9780	13.20	2.06	-31.40	41.54	25.40	46.00	20.60	Pass	V	PK
11	440.0600	16.04	2.48	-31.88	36.83	23.47	46.00	22.53	Pass	V	PK
12	600.0290	19.00	2.96	-31.50	34.76	25.22	46.00	20.78	Pass	V	PK

Above 1GHz:

Mode:			TX					Channel:		914	
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1828.0385	30.57	3.06	-42.78	63.75	54.60	74.00	19.40	Pass	H	PK
2	2742.2495	32.79	3.66	-43.10	57.43	50.78	74.00	23.22	Pass	H	PK
3	5002.3168	34.50	4.74	-42.79	50.51	46.96	74.00	27.04	Pass	H	PK
4	6884.7923	36.05	5.79	-42.26	49.34	48.92	74.00	25.08	Pass	H	PK
5	8458.6139	36.58	6.40	-42.01	49.31	50.28	74.00	23.72	Pass	H	PK
6	9718.2979	37.69	6.72	-42.11	50.45	52.75	74.00	21.25	Pass	H	PK
7	1828.0385	30.57	3.06	-42.78	62.73	53.58	54.00	0.42	Pass	H	AV
8	1828.0385	30.57	3.06	-42.78	52.43	43.28	74.00	30.72	Pass	V	PK
9	2801.0034	32.88	3.67	-43.10	50.49	43.94	74.00	30.06	Pass	V	PK
10	4555.7871	34.50	4.49	-42.80	48.99	45.18	74.00	28.82	Pass	V	PK
11	5020.3347	34.52	4.76	-42.79	51.10	47.59	74.00	26.41	Pass	V	PK
12	7781.7688	36.49	6.09	-42.16	49.38	49.80	74.00	24.20	Pass	V	PK
13	9817.0045	37.73	6.78	-42.10	49.76	52.17	74.00	21.83	Pass	V	PK

Mode:			TX					Channel:		915	
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1829.6053	30.58	3.06	-42.78	64.77	55.63	74.00	18.37	Pass	H	PK
2	2745.3830	32.79	3.66	-43.10	55.87	49.22	74.00	24.78	Pass	H	PK
3	5054.0203	34.55	4.80	-42.78	50.44	47.01	74.00	26.99	Pass	H	PK
4	6912.9942	36.07	5.85	-42.26	50.25	49.91	74.00	24.09	Pass	H	PK
5	9672.0781	37.67	6.65	-42.10	50.61	52.83	74.00	21.17	Pass	H	PK
6	11788.785	39.13	7.53	-41.94	49.76	54.48	74.00	19.52	Pass	H	PK
7	1829.6053	30.58	3.06	-42.78	61.30	52.16	54.00	1.84	Pass	H	AV
8	1387.7759	28.29	2.91	-42.69	51.03	39.54	74.00	34.46	Pass	V	PK
9	1829.6053	30.58	3.06	-42.78	52.03	42.89	74.00	31.11	Pass	V	PK
10	2676.4451	32.68	3.62	-43.10	50.59	43.79	74.00	30.21	Pass	V	PK
11	3982.3488	33.79	4.16	-43.00	49.41	44.36	74.00	29.64	Pass	V	PK
12	5584.3723	35.13	4.91	-42.59	49.62	47.07	74.00	26.93	Pass	V	PK
13	8364.6076	36.55	6.38	-42.06	49.94	50.81	74.00	23.19	Pass	V	PK

Mode:			TX					Channel:		916	
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1831.9555	30.59	3.07	-42.79	64.22	55.09	74.00	18.91	Pass	H	PK
2	2747.7332	32.80	3.65	-43.10	55.92	49.27	74.00	24.73	Pass	H	PK
3	3900.8767	33.72	4.14	-43.02	49.79	44.63	74.00	29.37	Pass	H	PK
4	4993.6996	34.50	4.73	-42.80	51.70	48.13	74.00	25.87	Pass	H	PK
5	6913.7776	36.07	5.84	-42.25	49.12	48.78	74.00	25.22	Pass	H	PK
6	10295.653	38.21	6.90	-42.03	49.39	52.47	74.00	21.53	Pass	H	PK
7	1831.9555	30.59	3.07	-42.79	62.16	53.03	54.00	0.97	Pass	H	AV
8	1831.9555	30.59	3.07	-42.79	53.17	44.04	74.00	29.96	Pass	V	PK
9	2551.8868	32.48	3.49	-43.10	50.66	43.53	74.00	30.47	Pass	V	PK
10	2747.7332	32.80	3.65	-43.10	50.99	44.34	74.00	29.66	Pass	V	PK
11	4649.0099	34.50	4.55	-42.80	49.57	45.82	74.00	28.18	Pass	V	PK
12	4993.6996	34.50	4.73	-42.80	51.32	47.75	74.00	26.25	Pass	V	PK
13	7662.6942	36.53	5.99	-42.13	49.38	49.77	74.00	24.23	Pass	V	PK

Remark:

1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
   Final Test Level =Receiver Reading - Correct Factor
   Correct Factor = Preamplifier Factor– Antenna Factor–Cable Factor
2) Scan from 9kHz to 25GHz,The disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported .

7.3 Restricted bands around fundamental frequency

Test Requirement: 47 CFR Part 15C Section 15.209 and 15.205

Test Method: ANSI C63.10

Test Site: Measurement Distance: 3m (Semi-Anechoic Chamber)

Limit(band edge): Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

Frequency	Limit (dBμV/m @3m)	Remark
30MHz-88MHz	40.0	Quasi-peak Value
88MHz-216MHz	43.5	Quasi-peak Value
216MHz-960MHz	46.0	Quasi-peak Value
960MHz-1GHz	54.0	Quasi-peak Value
Above 1GHz	54.0	Average Value
	74.0	Peak Value

Test Setup:

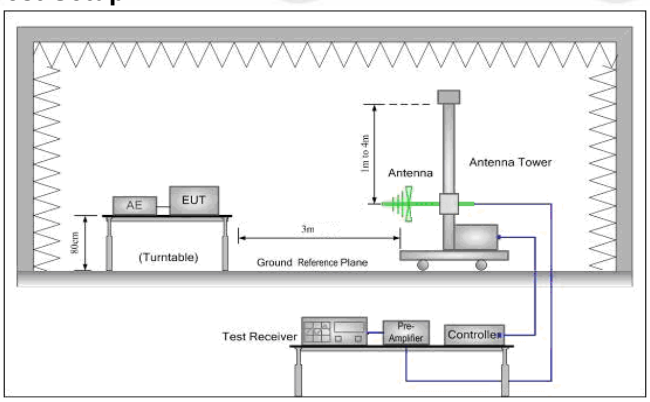


Figure 1. 30MHz to 1GHz

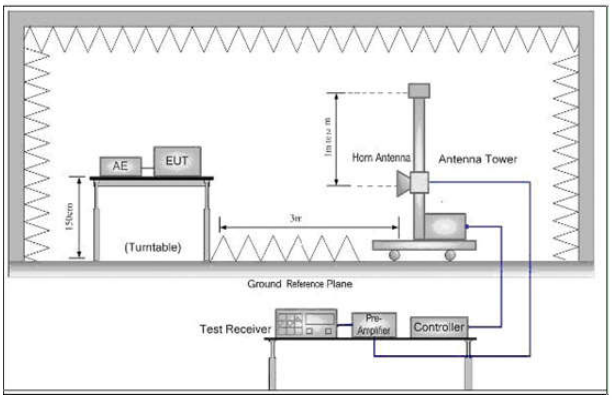


Figure 2. Above 1 GHz

Test Procedure:

Below 1GHz test procedure as below:

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Above 1GHz test procedure as below:

g. Different between above is the test site, change from Semi- Anechoic

Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter(Above 18GHz the distance is 1 meter and table is 1.5 meter).

h. Test the EUT in the lowest channel,,the Highest channel

i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.

j. Repeat above procedures until all frequencies measured was complete.

Exploratory Test Mode: Transmitting mode,Charge +Transmitting mode

Final Test Mode: Pretest the EUT at Transmitting mode and Charge +Transmitting mode, found the Charge +Transmitting mode which it is worse case
Only the worst case is recorded in the report.

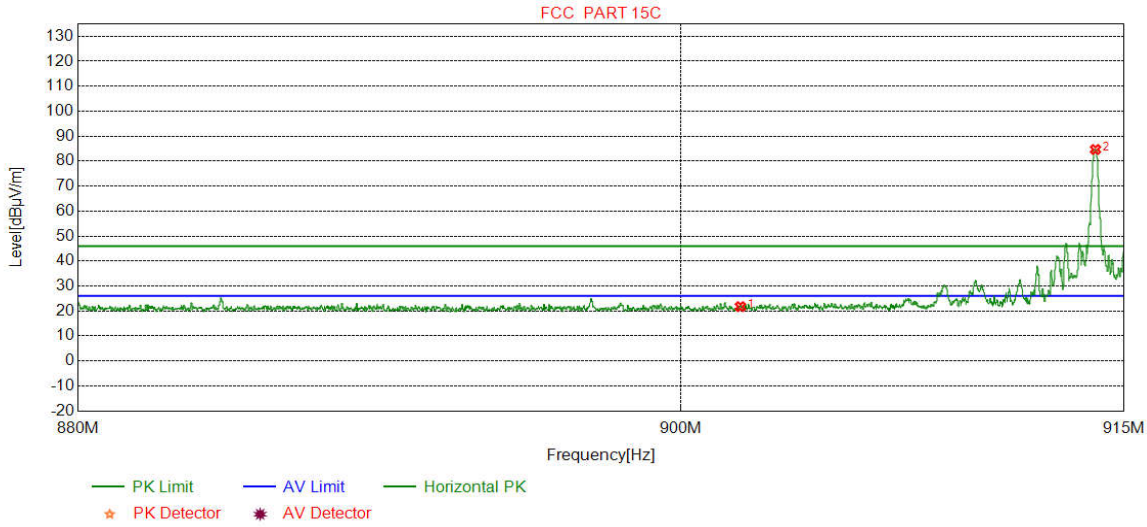
Instruments Used: Refer to section 6 for details

Test Results: Pass

Measurement Data

Mode:	2-GFSK	Channel:	914
Remark:	PK		

Test Graph

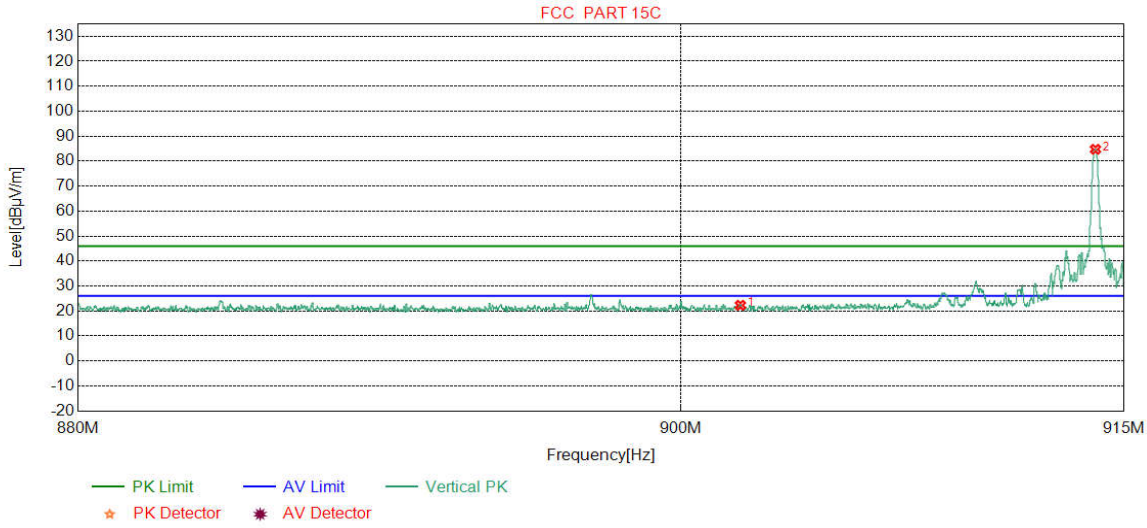


Suspected List

NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	902.0000	22.11	3.60	-31.41	27.46	21.76	26.00	4.24	Pass	Horizontal	Peak
2	914.0198	22.18	3.62	-31.44	90.31	84.67	26.00	-58.67	Pass	Horizontal	Peak

Mode:	2-GFSK	Channel:	914
Remark:	PK		

Test Graph

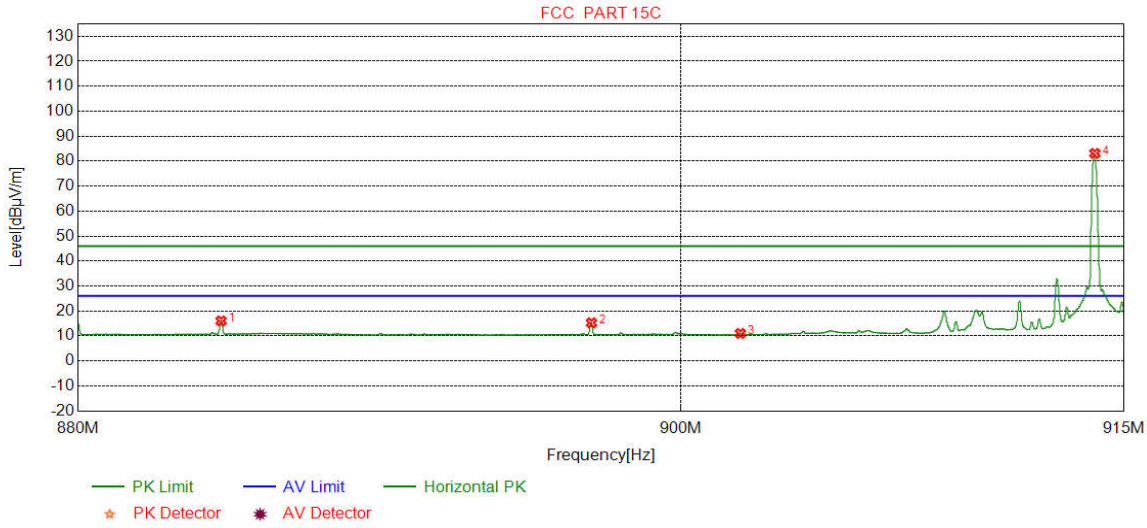


Suspected List

NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	902.0000	22.11	3.60	-31.41	27.99	22.29	26.00	3.71	Pass	Vertical	Peak
2	914.0198	22.18	3.62	-31.44	90.38	84.74	26.00	-58.74	Pass	Vertical	Peak

Mode:	2-GFSK	Channel:	914
Remark:	AV		

Test Graph

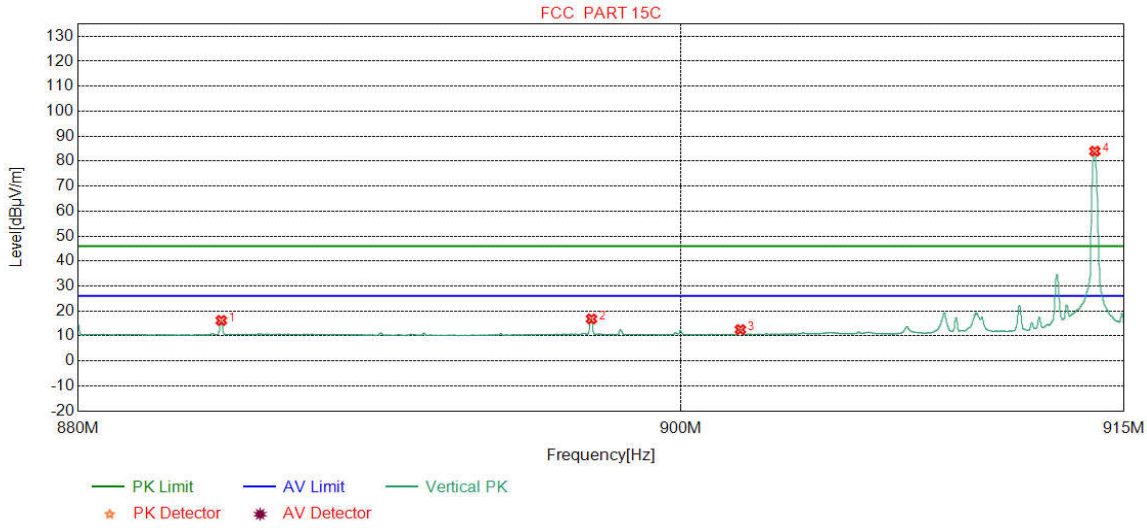


Suspected List

NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	884.7049	21.92	3.56	-31.64	22.21	16.05	26.00	9.95	Pass	Horizontal	Peak
2	897.0064	22.06	3.59	-31.46	21.07	15.26	26.00	10.74	Pass	Horizontal	Peak
3	902.0000	22.11	3.60	-31.41	16.71	11.01	26.00	14.99	Pass	Horizontal	Peak
4	913.9988	22.18	3.62	-31.44	88.75	83.11	26.00	-57.11	Pass	Horizontal	Peak

Mode:	2-GFSK	Channel:	914
Remark:	AV		

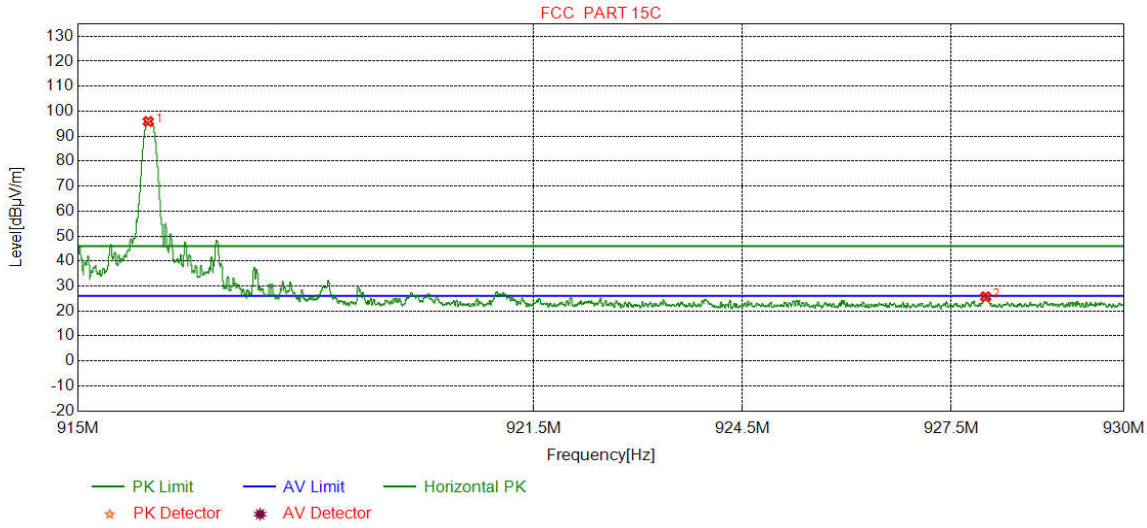
Test Graph



Suspected List											
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	884.7119	21.92	3.56	-31.64	22.36	16.20	26.00	9.80	Pass	Vertical	Peak
2	897.0064	22.06	3.59	-31.46	22.64	16.83	26.00	9.17	Pass	Vertical	Peak
3	902.0000	22.11	3.60	-31.41	18.24	12.54	26.00	13.46	Pass	Vertical	Peak
4	913.9988	22.18	3.62	-31.44	89.62	83.98	26.00	-57.98	Pass	Vertical	Peak

Mode:	2-GFSK	Channel:	916
Remark:	PK		

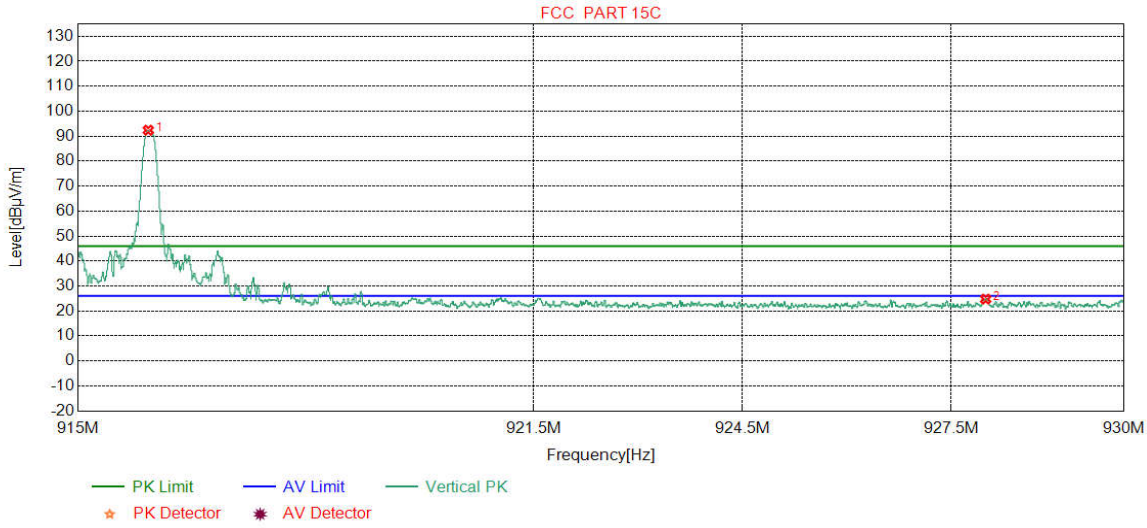
Test Graph



Suspected List											
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	915.9981	22.20	3.63	-31.44	101.49	95.88	46.00	-49.88	Pass	Horizontal	Peak
2	928.0000	22.27	3.65	-31.37	31.15	25.70	46.00	20.30	Pass	Horizontal	Peak

Mode:	2-GFSK	Channel:	916
Remark:	PK		

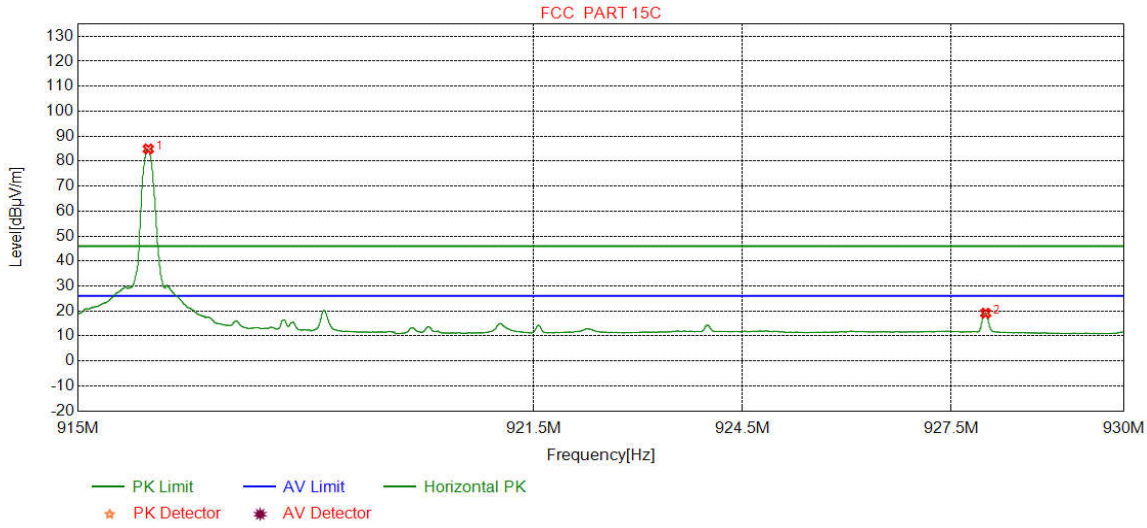
Test Graph



Suspected List											
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	915.9981	22.20	3.63	-31.44	98.00	92.39	46.00	-46.39	Pass	Vertical	Peak
2	928.0000	22.27	3.65	-31.37	30.21	24.76	46.00	21.24	Pass	Vertical	Peak

Mode:	2-GFSK	Channel:	916
Remark:	AV		

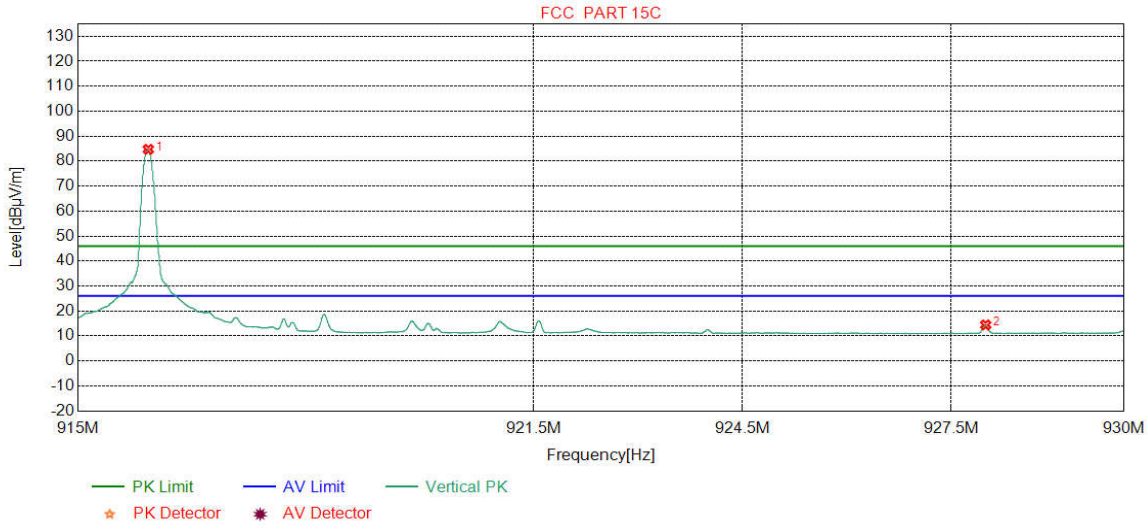
Test Graph



Suspected List											
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	915.9992	22.20	3.63	-31.44	90.49	84.88	26.00	-58.88	Pass	Horizontal	Peak
2	928.0000	22.27	3.65	-31.37	24.58	19.13	26.00	6.87	Pass	Horizontal	Peak

Mode:	2-GFSK	Channel:	916
Remark:	AV		

Test Graph

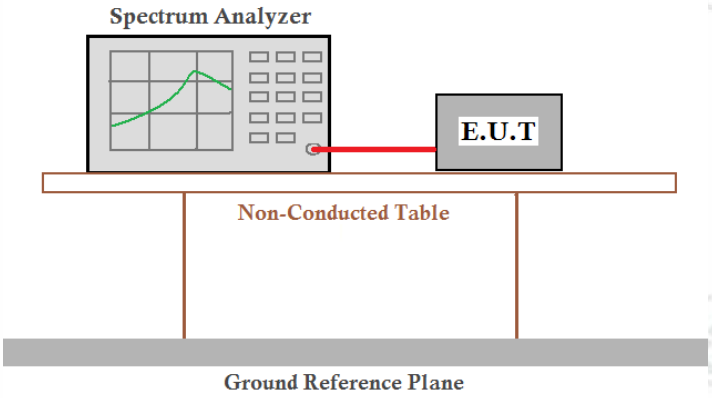


Suspected List

NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	915.9992	22.20	3.63	-31.44	90.34	84.73	26.00	-58.73	Pass	Vertical	Peak
2	928.0000	22.27	3.65	-31.37	19.88	14.43	26.00	11.57	Pass	Vertical	Peak

7.4 20dB Bandwidth

Test Requirement: 47 CFR Part 15C Section 15.215
Test Method: ANSI C63.10
Test Setup:



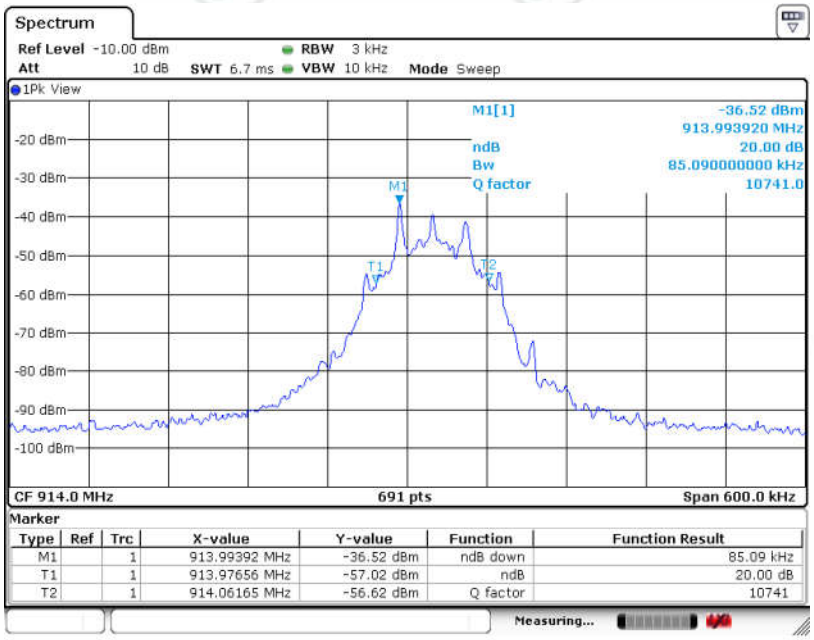
Instruments Used: Refer to section 6 for details
Test mode: Transmitting mode
Limit: N/A
Test Results: Pass

Measurement Data

Test channel	20dB bandwidth (MHz)	Results
Lowest	0.085	Pass
Middle	0.084	Pass
Highest	0.084	Pass

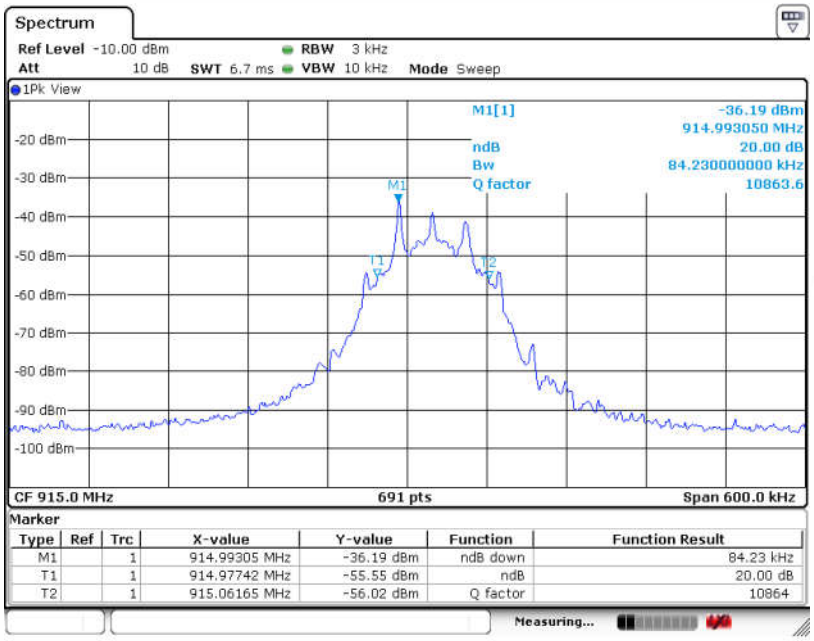
Test plot as follows:

Test channel:	Lowest



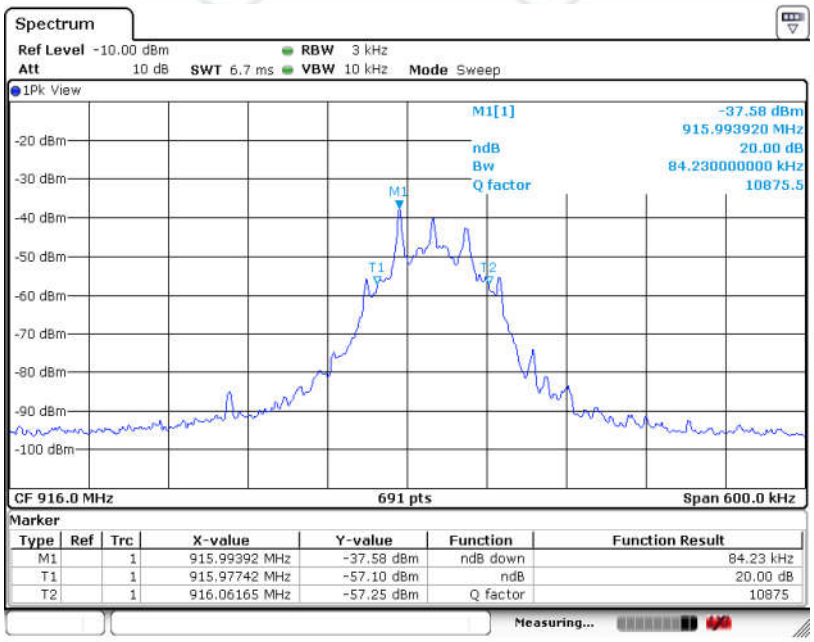
Date: 27.SEP.2020 18:25:29

Test channel:	Middle



Date: 27.SEP.2020 18:22:41

Test channel:	Highest



Date: 27.SEP.2020 18:23:55