

Test Report

Report No.: MTi240120009-01E2

Date of issue: 2024-01-22

Applicant: Guangdong World Precision Technology Co., Ltd.

Product: DCRF (Device Charge & Recognition Fixture)

Model(s): TE-072-A808-00000

FCC ID: 2BD9P-TE072A808

Shenzhen Microtest Co., Ltd.

<http://www.mtitest.com>

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Test Result Certification	
Applicant:	Guangdong World Precision Technology Co., Ltd.
Address:	No. 6 Wanjiang Section, Gangkou Avenue, Wanjiang Subdistrict, Dongguan City, Guangdong Province, China.523061
Manufacturer:	Guangdong World Precision Technology Co., Ltd.
Address:	No. 6 Wanjiang Section, Gangkou Avenue, Wanjiang Subdistrict, Dongguan City, Guangdong Province, China.523061
Product description	
Product name:	DCRF (Device Charge & Recognition Fixture)
Trade mark:	N/A
Model name:	TE-072-A808-00000
Series Model:	N/A
Standards:	47 CFR Part 15.225
Test Method:	ANSI C63.10-2013
Date of Test	
Date of test:	2023-08-23 to 2023-09-14 2023-12-25 to 2024-01-10
Test result:	Pass

Note: The report changes the fixture back plate with heat dissipation hole, plastic shell material ABS changed to flame-retardant PC. Only low-frequency radiation was tested for difference, the rest of the data is cited in the report MTi230810014-03E2 (date 2023-11-06).

Test Engineer	:	 (Maleah Deng)
Reviewed By	:	 (Leon Chen)
Approved By	:	 (Tom Xue)

1 General Description

1.1 Description of the EUT

Product name:	DCRF (Device Charge & Recognition Fixture)
Model name:	TE-072-A808-00000
Series Model:	N/A
Model difference:	N/A
Electrical rating:	Input: AC 100-240 V Wireless Output: 5W, 7.5W
Accessories:	N/A
Hardware version:	V1.0
Software version:	V1.0
Test sample(s) number:	MTi230810014-03S1001 MTi240120009-01S1001
RF specification	
Operating frequency range:	Transmitter 1: 13.56MHz Transmitter 2: 13.56MHz Transmitter 3: 13.56MHz Transmitter 4: 13.56MHz Transmitter 5: 13.56MHz Transmitter 6: 13.56MHz
Modulation type:	ASK
Antenna type:	PCB Antenna

1.2 Description of test modes

No.	Emission test modes
Mode1	NFC(1#)
Mode2	NFC(1#+2#)
Mode3	NFC(1#+3#)
Mode4	NFC(1#+4#)
Mode5	NFC(1#+5#)
Mode6	NFC(1#+6#)
Mode7	NFC(1#+2#+3#)
Mode8	NFC(1#+2#+4#)
Mode9	NFC(1#+2#+5#)
Mode10	NFC(1#+2#+6#)
Mode11	NFC(1#+2#+3#+4#)
Mode12	NFC(1#+2#+3#+5#)
Mode13	NFC(1#+2#+3#+6#)
Mode14	NFC(1#+2#+3#+4#+5#)
Mode15	NFC(1#+2#+3#+4#+6#)
Mode16	NFC(1#+2#+3#+4#+5#+6#)

Mode17	NFC(2#)
Mode18	NFC(2#+3#)
Mode19	NFC(2#+4#)
Mode20	NFC(2#+5#)
Mode21	NFC(2#+6#)
Mode22	NFC(2#+3#+4#)
Mode23	NFC(2#+3#+5#)
Mode24	NFC(2#+3#+6#)
Mode25	NFC(2#+3#+4#+5#)
Mode26	NFC(2#+3#+4#+6#)
Mode27	NFC(2#+3#+4#+5#+6#)
Mode28	NFC(3#)
Mode29	NFC(3#+4#)
Mode30	NFC(3#+5#)
Mode31	NFC(3#+6#)
Mode32	NFC(3#+4#+5#)
Mode33	NFC(3#+4#+6#)
Mode34	NFC(3#+4#+5#+6#)
Mode35	NFC(4#)
Mode36	NFC(4#+5#)
Mode37	NFC(4#+6#)
Mode38	NFC(4#+5#+6#)
Mode39	NFC(5#)
Mode40	NFC(5#+6#)
Mode41	NFC(6#)

1.3 Environmental Conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15°C ~ 35°C
Humidity:	20% RH ~ 75% RH
Atmospheric pressure:	98 kPa ~ 101 kPa

1.4 Description of support units

Support equipment list			
Description	Model	Serial No.	Manufacturer
Smartphone	iPhone 13	/	Apple
Notebook	Macbook air 2104	/	Apple
Support cable list			
Description	Length (m)	From	To
/	/	/	/

1.5 Measurement uncertainty

Measurement	Uncertainty
Conducted emissions (AMN 150kHz~30MHz)	±3.1dB
Occupied channel bandwidth	±3 %
Time	±1 %
Radiated spurious emissions (9kHz~30MHz)	±4.3dB
Radiated spurious emissions (30MHz~1GHz)	±4.7dB
Temperature	±1 °C
Humidity	± 5 %

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

2 Summary of Test Result

No.	Item	Standard	Requirement	Result
1	Antenna requirement	47 CFR Part 15.225	47 CFR 15.203	Pass
2	Conducted Emission at AC power line	47 CFR Part 15.225	47 CFR 15.207(a)	Pass
3	20dB Bandwidth	47 CFR Part 15.225	47 CFR 15.215(c)	Pass
4	Frequency Tolerance	47 CFR Part 15.225	47 CFR 15.225(e)	Pass
5	Emission Mask	47 CFR Part 15.225	47 CFR 15.225(a), 15.225(b), 15.225(c)	Pass
6	Emissions in frequency bands (below 30MHz)	47 CFR Part 15.225	47 CFR 15.225(d)	Pass
7	Emissions in frequency bands (30M-1GHz)	47 CFR Part 15.225	47 CFR 15.225(d)	Pass

3 Test Facilities and accreditations

3.1 Test laboratory

Test laboratory:	Shenzhen Microtest Co., Ltd.
Test site location:	101, No.7, Zone 2, Xinxing Industrial Park, Fuhai Avenue, Xinhe Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Telephone:	(86-755)88850135
Fax:	(86-755)88850136
CNAS Registration No.:	CNAS L5868
FCC Registration No.:	448573
IC Registration No.:	21760
CABID:	CN0093



4 List of test equipment

No.	Equipment	Manufacturer	Model	Serial No.	Cal. date	Cal. Due
Conducted Emission at AC power line						
1	EMI Test Receiver	Rohde&schwarz	ESCI3	101368	2023-04-26	2024-04-25
2	Artificial mains network	Schwarzbeck	NSLK 8127	183	2023-05-05	2024-05-04
3	Artificial Mains Network	Rohde & Schwarz	ESH2-Z5	100263	2023-06-03	2024-06-02
20dB Bandwidth Frequency Tolerance						
1	Wideband Radio Communication Tester	Rohde&schwarz	CMW500	149155	2023-04-26	2024-04-25
2	ESG Series Analog Signal Generator	Agilent	E4421B	GB40051240	2023-04-25	2024-04-24
3	PXA Signal Analyzer	Agilent	N9030A	MY51350296	2023-04-25	2024-04-24
4	Synthesized Sweeper	Agilent	83752A	3610A01957	2023-04-25	2024-04-24
5	MXA Signal Analyzer	Agilent	N9020A	MY50143483	2023-04-26	2024-04-25
6	RF Control Unit	Tonscend	JS0806-1	19D8060152	2023-04-26	2024-04-25
7	Band Reject Filter Group	Tonscend	JS0806-F	19D8060160	2023-05-05	2024-05-04
8	ESG Vector Signal Generator	Agilent	N5182A	MY50143762	2023-04-25	2024-04-24
9	DC Power Supply	Agilent	E3632A	MY40027695	2023-05-05	2024-05-04
Emission Mask Emissions in frequency bands (below 30MHz)						
1	EMI Test Receiver	Rohde&schwarz	ESCI7	101166	2023-04-26	2024-04-25
2	Active Loop Antenna	Schwarzbeck	FMZB 1519 B	00066	2023-06-11	2025-06-10
3	Amplifier	Hewlett-Packard	8447F	3113A06184	2023-06-26	2024-06-25
Emissions in frequency bands (30M-1GHz)						
1	EMI Test Receiver	Rohde&schwarz	ESCI7	101166	2023-04-26	2024-04-25
2	TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	9163-1338	2023-06-11	2025-06-10
3	Active Loop Antenna	Schwarzbeck	FMZB 1519 B	00066	2023-06-11	2025-06-10
4	Amplifier	Hewlett-Packard	8447F	3113A06184	2023-06-26	2024-06-25
5	Multi-device Controller	TuoPu	TPMDC	/	2023-05-04	2024-05-03

5 Evaluation Results (Evaluation)

5.1 Antenna requirement

Test Requirement:	Refer to 47 CFR Part 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.
Description of the antenna of EUT:	The antenna of the EUT is permanently attached.
Conclusion:	The EUT complies with the requirement of FCC PART 15.203.

6 Radio Spectrum Matter Test Results (RF)

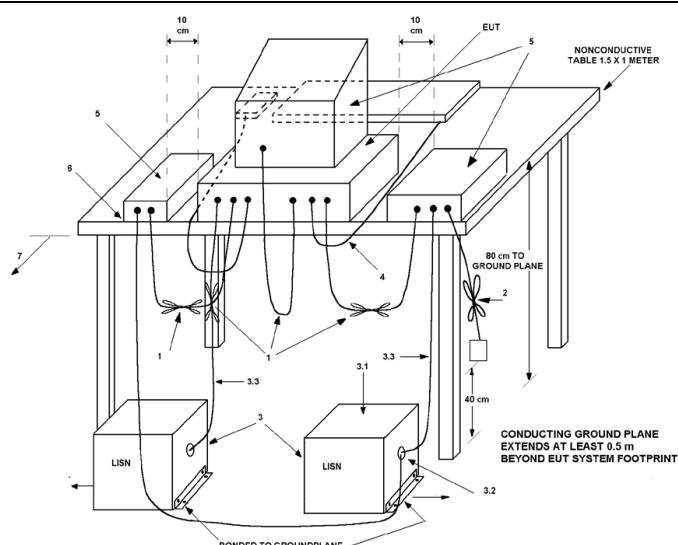
6.1 Conducted Emission at AC power line

Test Requirement:	<p>Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN).</p>		
Test Limit:	Frequency of emission (MHz)	Conducted limit (dB μ V)	
		Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
<p>*Decreases with the logarithm of the frequency.</p>			
Test Method:	ANSI C63.10-2013 section 6.2		
Procedure:	Refer to ANSI C63.10-2013 section 6.2, standard test method for ac power-line conducted emissions from unlicensed wireless devices		

6.1.1 E.U.T. Operation:

Operating Environment:					
Temperature:	19.4 °C	Humidity:	55.3 %	Atmospheric Pressure:	99 kPa
Pre test mode:	Mode1-41				
Final test mode:	All of the listed pre-test mode were tested, only the data of the worst mode (Mode16) is recorded in the report				

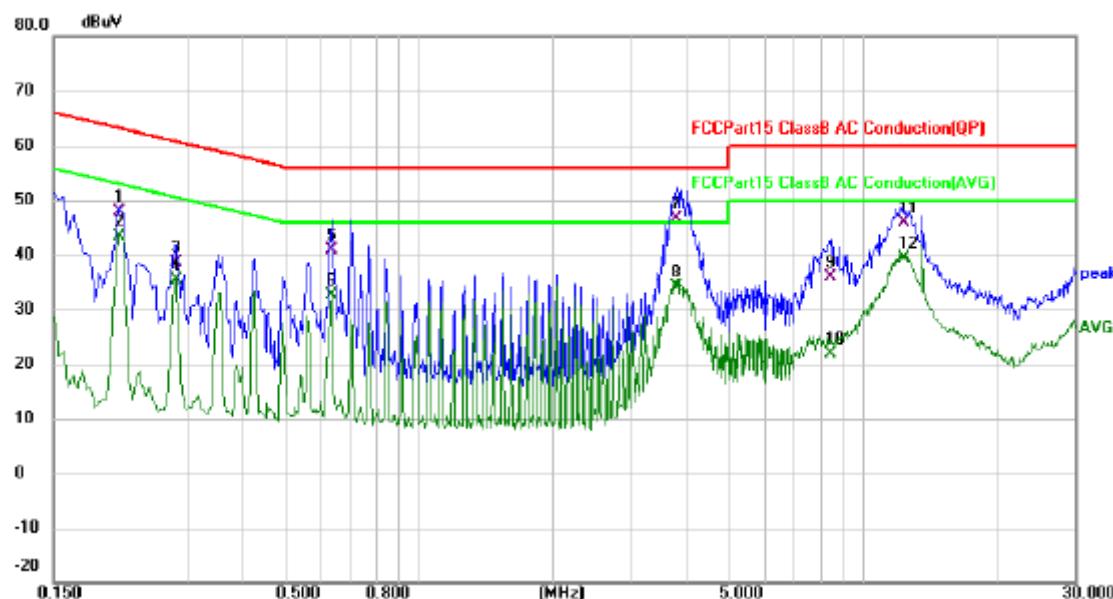
6.1.2 Test Setup Diagram:





6.1.3 Test Data:

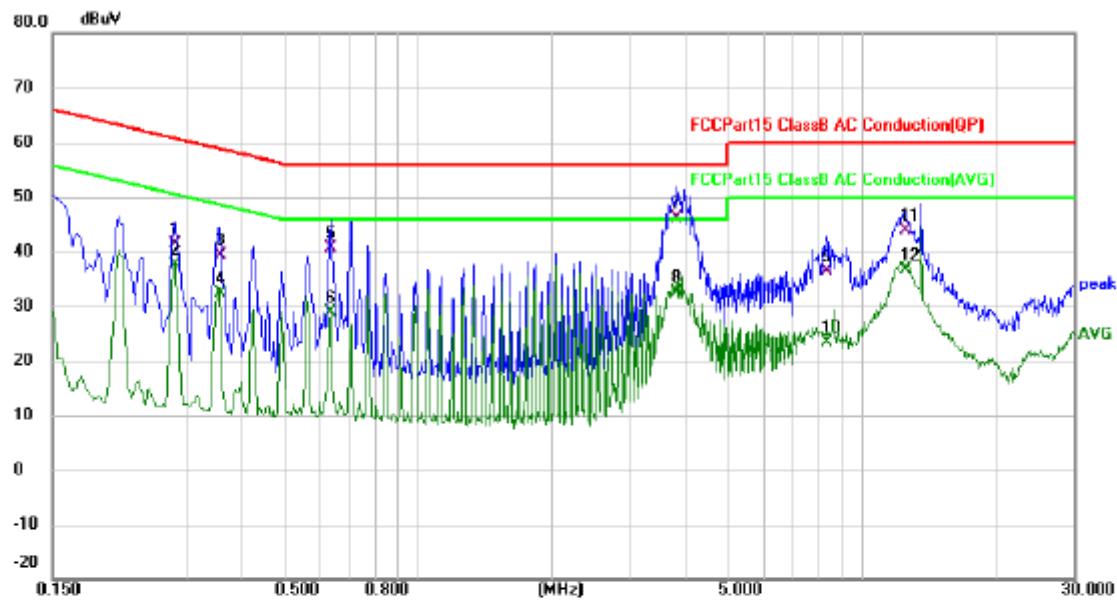
Mode16(AC 120V/60Hz) / Line: Line



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.2100	37.70	10.16	47.86	63.21	-15.35	QP	
2		0.2100	33.11	10.16	43.27	53.21	-9.94	AVG	
3		0.2819	28.48	10.14	38.62	60.76	-22.14	QP	
4		0.2819	25.12	10.14	35.26	50.76	-15.50	AVG	
5		0.6340	30.64	10.19	40.83	56.00	-15.17	QP	
6		0.6340	22.38	10.19	32.57	46.00	-13.43	AVG	
7	*	3.8020	36.06	10.50	46.56	56.00	-9.44	QP	
8		3.8020	23.66	10.50	34.16	46.00	-11.84	AVG	
9		8.4220	25.06	10.79	35.85	60.00	-24.15	QP	
10		8.4220	11.06	10.79	21.85	50.00	-28.15	AVG	
11		12.3260	35.12	10.69	45.81	60.00	-14.19	QP	
12		12.3260	28.72	10.69	39.41	50.00	-10.59	AVG	



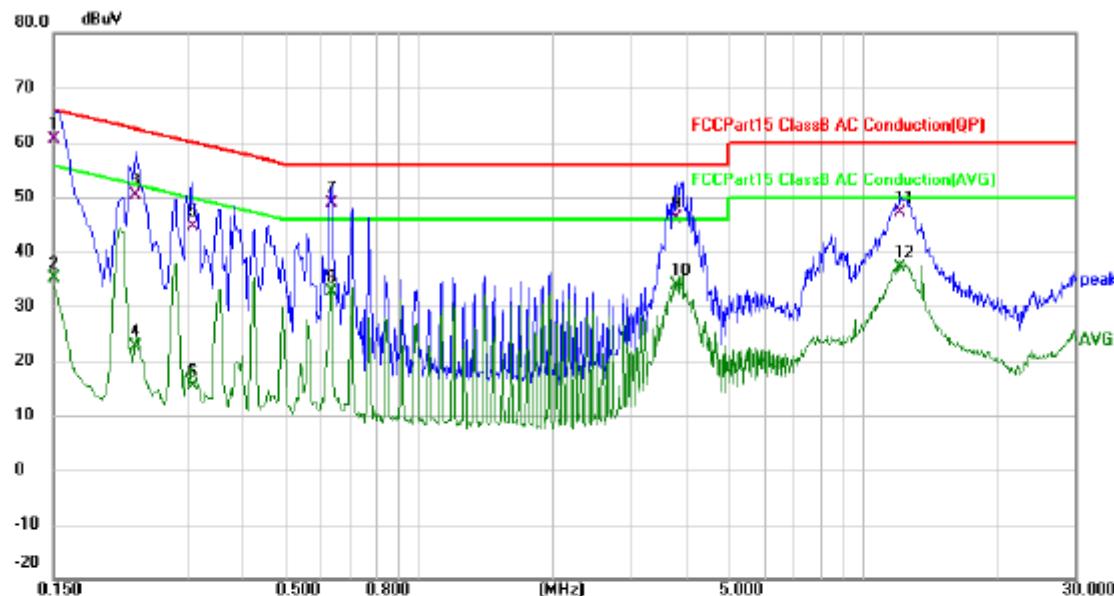
Mode16(AC 120V/60Hz) / Line: Neutral



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.2819	31.43	10.04	41.47	60.76	-19.29	QP	
2		0.2819	27.70	10.04	37.74	50.76	-13.02	AVG	
3		0.3540	29.32	10.04	39.36	58.87	-19.51	QP	
4		0.3540	22.27	10.04	32.31	48.87	-16.56	AVG	
5		0.6340	30.63	10.10	40.73	56.00	-15.27	QP	
6		0.6340	18.84	10.10	28.94	46.00	-17.06	AVG	
7	*	3.8340	35.52	10.49	46.01	56.00	-9.99	QP	
8		3.8340	22.26	10.49	32.75	46.00	-13.25	AVG	
9		8.3500	25.74	10.69	36.43	60.00	-23.57	QP	
10		8.3500	12.77	10.69	23.46	50.00	-26.54	AVG	
11		12.4660	33.17	10.68	43.85	60.00	-16.15	QP	
12		12.4660	25.83	10.68	36.51	50.00	-13.49	AVG	



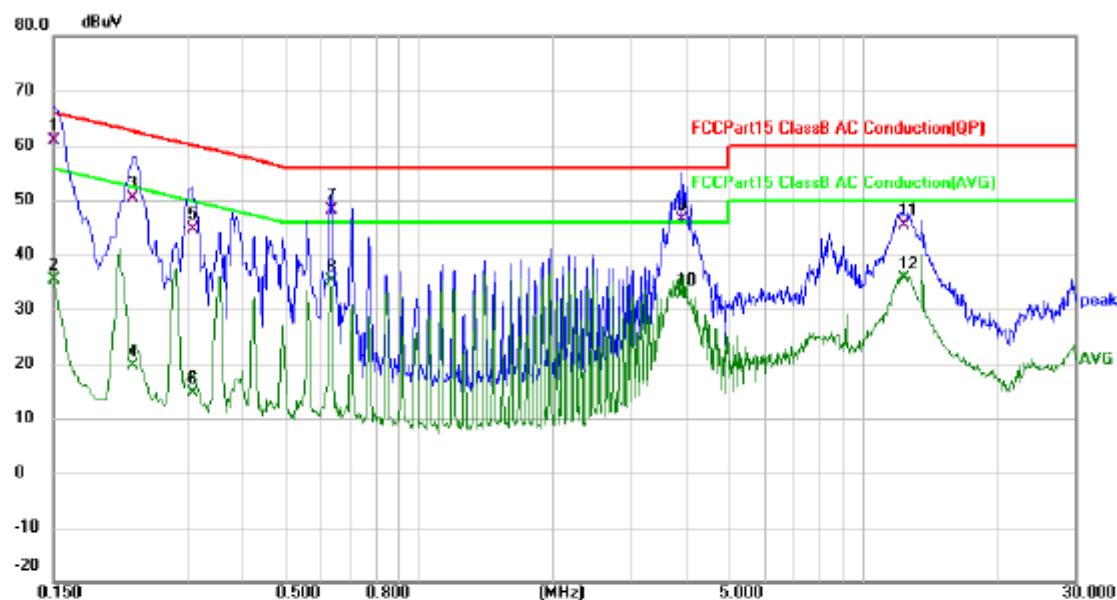
Mode16(AC 240V/60Hz) / Line: Line



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
1	*	0.1500	50.52	10.19	60.71	66.00	-5.29	QP	
2		0.1500	24.92	10.19	35.11	56.00	-20.89	AVG	
3		0.2300	40.34	10.15	50.49	62.45	-11.96	QP	
4		0.2300	12.36	10.15	22.51	52.45	-29.94	AVG	
5		0.3060	34.56	10.14	44.70	60.08	-15.38	QP	
6		0.3060	5.21	10.14	15.35	50.08	-34.73	AVG	
7		0.6340	38.58	10.19	48.77	56.00	-7.23	QP	
8		0.6340	22.43	10.19	32.62	46.00	-13.38	AVG	
9		3.8020	35.65	10.50	46.15	56.00	-9.85	QP	
10		3.8020	23.27	10.50	33.77	46.00	-12.23	AVG	
11		12.1220	36.37	10.69	47.06	60.00	-12.94	QP	
12		12.1220	26.55	10.69	37.24	50.00	-12.76	AVG	



Mode16(AC 240V/60Hz) / Line: Neutral



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
1	*	0.1500	50.64	10.14	60.78	66.00	-5.22	QP	
2		0.1500	25.18	10.14	35.32	56.00	-20.68	AVG	
3		0.2260	40.21	10.07	50.28	62.60	-12.32	QP	
4		0.2260	9.50	10.07	19.57	52.60	-33.03	AVG	
5		0.3060	34.66	10.03	44.69	60.08	-15.39	QP	
6		0.3060	4.66	10.03	14.69	50.08	-35.39	AVG	
7		0.6340	38.12	10.10	48.22	56.00	-7.78	QP	
8		0.6340	24.93	10.10	35.03	46.00	-10.97	AVG	
9		3.9060	35.83	10.50	46.33	56.00	-9.67	QP	
10		3.9060	22.17	10.50	32.67	46.00	-13.33	AVG	
11		12.3340	34.60	10.68	45.28	60.00	-14.72	QP	
12		12.3340	25.03	10.68	35.71	50.00	-14.29	AVG	

6.2 20dB Bandwidth

Test Requirement:	47 CFR 15.215(c)
Test Limit:	Refer to 47 CFR 15.215(c), intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.
Test Method:	ANSI C63.10-2013, section 6.9.2
Procedure:	<p>a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the EMI receiver or spectrum analyzer shall be between two times and five times the OBW.</p> <p>b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW, unless otherwise specified by the applicable requirement.</p> <p>c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than $[10 \log (\text{OBW}/\text{RBW})]$ below the reference level. Specific guidance is given in 4.1.5.2.</p> <p>d) Steps a) through c) might require iteration to adjust within the specified tolerances.</p> <p>e) The dynamic range of the instrument at the selected RBW shall be more than 10 dB below the target “-xx dB down” requirement; that is, if the requirement calls for measuring the -20 dB OBW, the instrument noise floor at the selected RBW shall be at least 30 dB below the reference value.</p> <p>f) Set detection mode to peak and trace mode to max hold.</p> <p>g) Determine the reference value: Set the EUT to transmit an unmodulated carrier or modulated signal, as applicable. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value).</p> <p>h) Determine the “-xx dB down amplitude” using $[(\text{reference value}) - \text{xx}]$. Alternatively, this calculation may be made by using the marker-delta function of the instrument.</p> <p>i) If the reference value is determined by an unmodulated carrier, then turn the EUT modulation ON, and either clear the existing trace or start a new trace on the spectrum analyzer and allow the new trace to stabilize. Otherwise, the trace from step g) shall be used for step j).</p> <p>j) Place two markers, one at the lowest frequency and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the “-xx dB down</p>



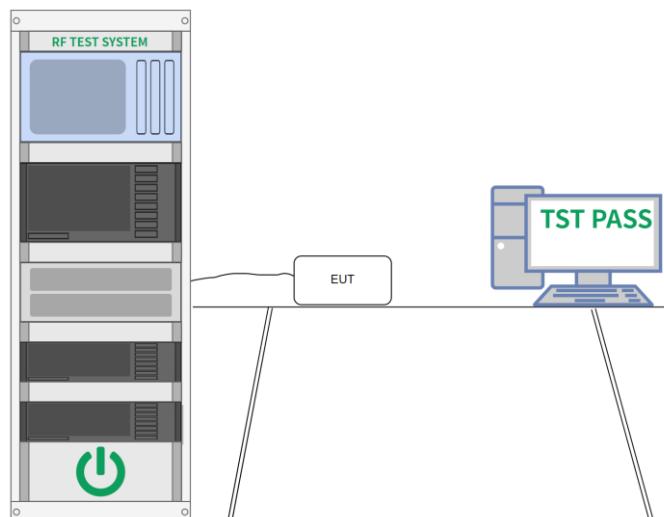
amplitude" determined in step h). If a marker is below this "-xx dB down amplitude" value, then it shall be as close as possible to this value. The occupied bandwidth is the frequency difference between the two markers. Alternatively, set a marker at the lowest frequency of the envelope of the spectral display, such that the marker is at or slightly below the "fixx dB down amplitude" determined in step h). Reset the marker-delta function and move the marker to the other side of the emission until the delta marker amplitude is at the same level as the reference marker amplitude. The marker-delta frequency reading at this point is the specified emission bandwidth.

k) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

6.2.1 E.U.T. Operation:

Operating Environment:			
Temperature:	18.2 °C	Humidity:	67.6 %
Pre test mode:	Mode1-41		
Final test mode:	All of the listed pre-test mode were tested, only the data of the worst mode (Mode1, Mode17, Mode28, Mode35, Mode39, Mode41) is recorded in the report		

6.2.2 Test Setup Diagram:





6.2.3 Test Data:

Transmitter 1:

Frequency MHz	20 dB occupied bandwidth kHz	99% occupied bandwidth kHz
13.56	26.89	22.925

Agilent Spectrum Analyzer - Occupied BW

Center Freq 13.560000 MHz

10 dB/div Ref -30.00 dBm

Log

10 dBr/div Ref -30.00 dBr

100 kHz

Center 13.56 MHz #Res BW 10 kHz #VBW 30 kHz Span 100 kHz Sweep 1.267 ms

Occupied Bandwidth 22.925 kHz

Total Power -60.5 dBm

Transmit Freq Error 150 Hz OBW Power 99.00 %

x dB Bandwidth 26.89 kHz x dB -20.00 dB

CF Step 10.000 kHz Man

Freq Offset 0 Hz

Transmitter 2:

Frequency MHz	20 dB occupied bandwidth kHz	99% occupied bandwidth kHz
13.56	26.90	22.832

Agilent Spectrum Analyzer - Occupied BW

Center Freq 13.560000 MHz

10 dB/div Ref -30.00 dBm

Log

10 dBr/div Ref -30.00 dBr

100 kHz

Center 13.56 MHz #Res BW 10 kHz #VBW 30 kHz Span 100 kHz Sweep 1.267 ms

Occupied Bandwidth 22.832 kHz

Total Power -51.0 dBm

Transmit Freq Error 126 Hz OBW Power 99.00 %

x dB Bandwidth 26.90 kHz x dB -20.00 dB

CF Step 10.000 kHz Man

Freq Offset 0 Hz



Transmitter 3:

Frequency MHz	20 dB occupied bandwidth kHz	99% occupied bandwidth kHz
13.56	26.88	22.821

Agilent Spectrum Analyzer - Occupied BW

Center Freq 13.560000 MHz

Ref -30.00 dBm

10 dB/div Log

Center 13.56 MHz #Res BW 10 kHz #VBW 30 kHz Span 100 kHz Sweep 1.267 ms

Occupied Bandwidth 22.821 kHz

Transmit Freq Error 115 Hz OBW Power 99.00 %

x dB Bandwidth 26.88 kHz x dB -20.00 dB

Transmitter 4:

Frequency MHz	20 dB occupied bandwidth kHz	99% occupied bandwidth kHz
13.56	26.87	22.828

Agilent Spectrum Analyzer - Occupied BW

Center Freq 13.560000 MHz

Ref -30.00 dBm

10 dB/div Log

Center 13.56 MHz #Res BW 10 kHz #VBW 30 kHz Span 100 kHz Sweep 1.267 ms

Occupied Bandwidth 22.828 kHz

Transmit Freq Error 109 Hz OBW Power 99.00 %

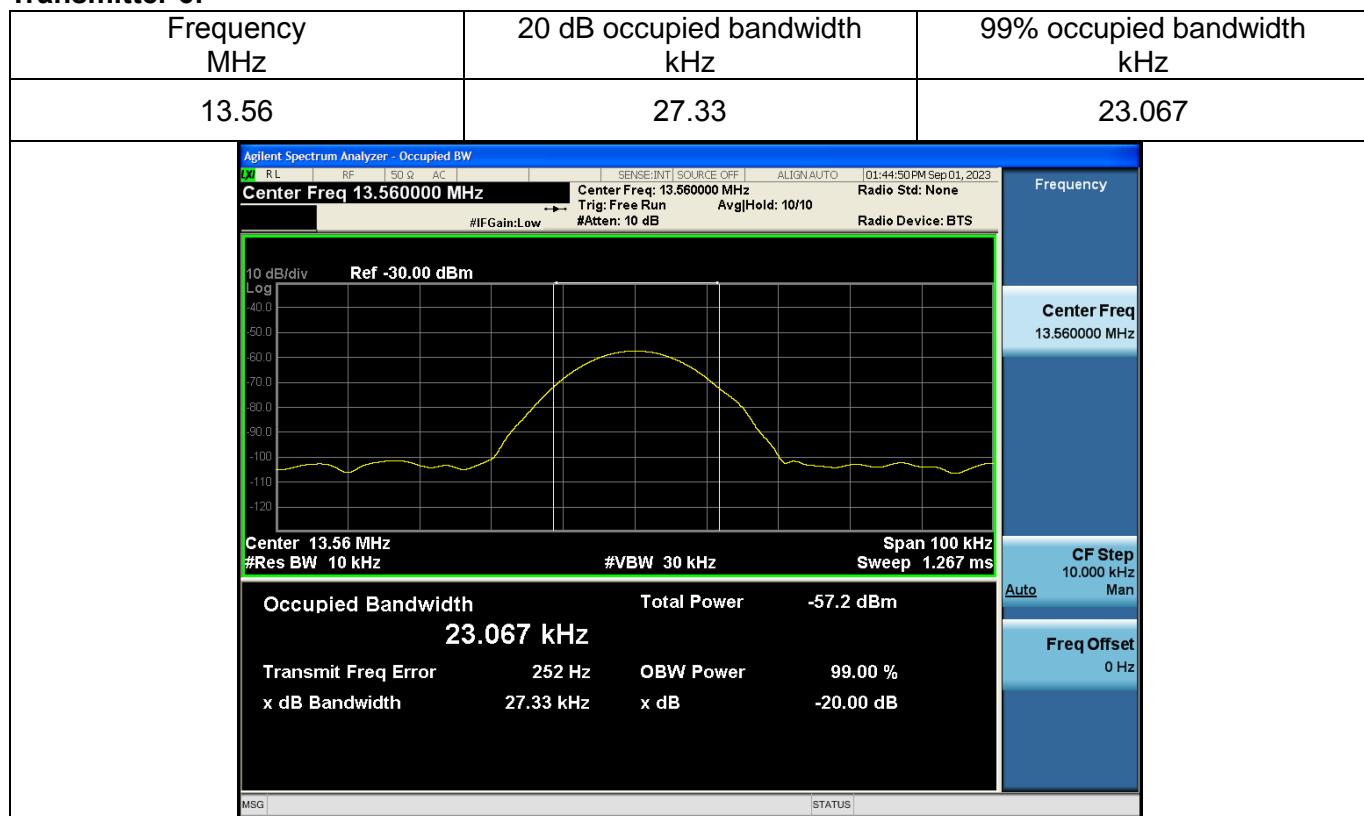
x dB Bandwidth 26.87 kHz x dB -20.00 dB



Transmitter 5:



Transmitter 6:



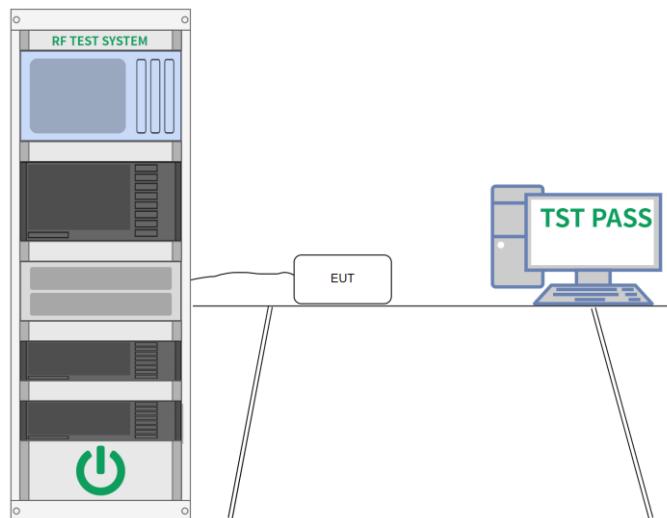
6.3 Frequency Tolerance

Test Requirement:	47 CFR 15.231(e)
Test Limit:	The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of -20 degrees to + 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.
Test Method:	ANSI C63.10-2013, Section 6.8
Procedure:	Refer to ANSI C63.10-2013, Section 6.8

6.3.1 E.U.T. Operation:

Operating Environment:			
Temperature:	23.2 °C	Humidity:	51.8 %
Pre test mode:	Mode1-41		
Final test mode:	All of the listed pre-test mode were tested, only the data of the worst mode (Mode1) is recorded in the report		

6.3.2 Test Setup Diagram:



6.3.3 Test Data:

Power Supply (VAC)	Temperature (°C)	Measured Frequency (MHz)	Frequency Deviation	Limit
120	-20	13.560566	0.0042%	+/-0.01%
	-10	13.560476	0.0035%	
	0	13.560425	0.0031%	
	10	13.560441	0.0033%	
	20	13.560364	0.0027%	
	30	13.560351	0.0026%	
	40	13.560386	0.0028%	
	50	13.560353	0.0026%	
102	20	13.560440	0.0032%	
138	20	13.560366	0.0027%	

Note: All of the listed pre-test mode were tested, only the data of the worst mode is recorded in the report

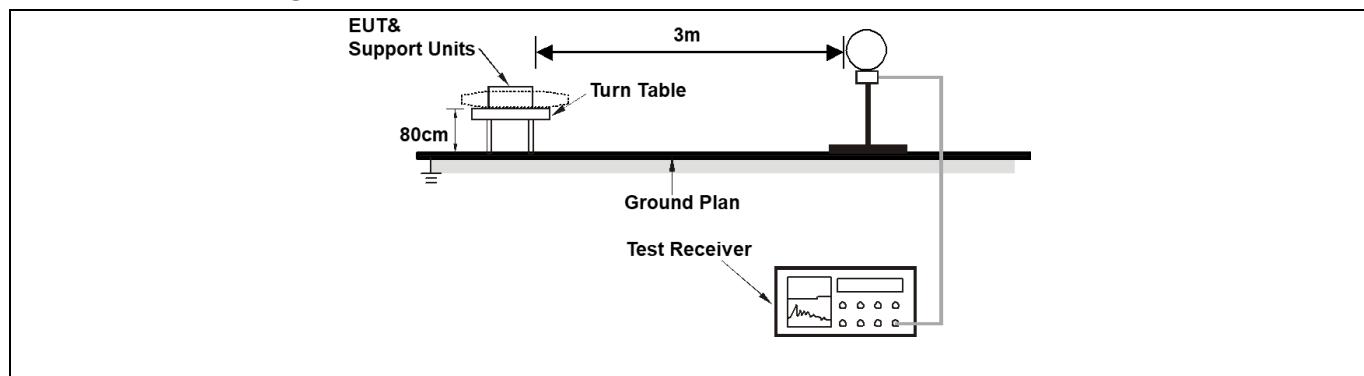
6.4 Emission Mask

Test Requirement:	47 CFR 15.225(b), 15.225(c)
Test Limit:	(b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters. (c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.
Test Method:	ANSI C63.10-2013, Section 6.4
Procedure:	Refer to ANSI C63.10-2013, Section 6.4

6.4.1 E.U.T. Operation:

Operating Environment:				
Temperature:	23.2 °C	Humidity:	51.8 %	Atmospheric Pressure:
Pre test mode:	Mode1-41			
Final test mode:	All of the listed pre-test mode were tested, only the data of the worst mode (Mode16) is recorded in the report			

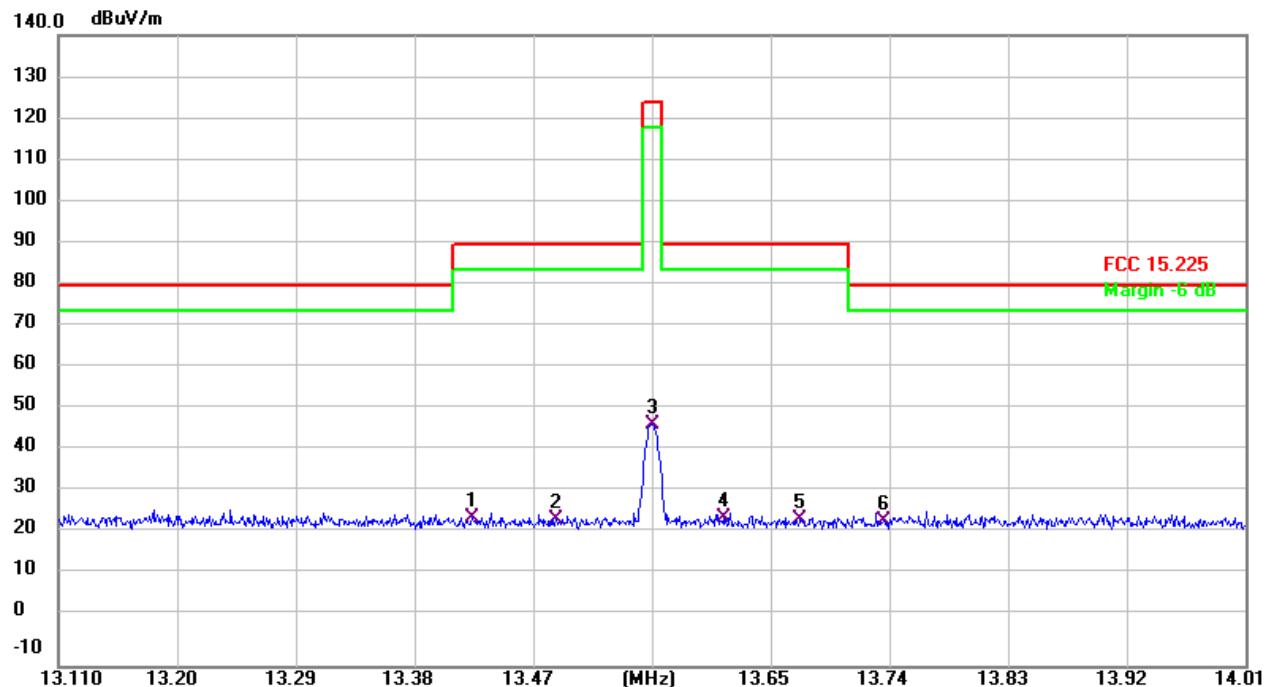
6.4.2 Test Setup Diagram:





6.4.3 Test Data:

Test mode:	Mode 16	Polarization:	Site axis
Power supply:	AC 120V/60Hz	Test site:	RE chamber 2



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	13.4230	5.88	19.38	25.26	90.50	-65.24	QP
2	13.4870	5.51	19.38	24.89	90.50	-65.61	QP
3	13.5600	28.36	19.37	47.73	124.00	-76.27	QP
4	13.6149	5.97	19.37	25.34	90.50	-65.16	QP
5	13.6722	5.84	19.37	25.21	90.50	-65.29	QP
6 *	13.7355	5.34	19.36	24.70	80.50	-55.80	QP



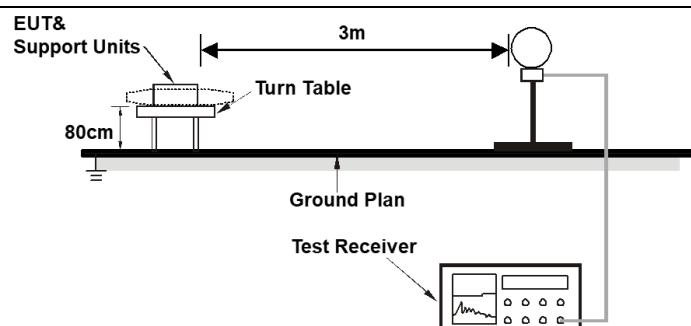
6.5 Emissions in frequency bands (below 30MHz)

Test Requirement:	47 CFR 15.225(d)																										
Test Limit:	<p>Refer to 47 CFR Part 15.225(d), The field strength of any emissions appearing outside of the 13.110–14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.</p> <p>47 CFR Part 15.209:</p>																										
<table border="1"> <thead> <tr> <th>Frequency (MHz)</th> <th>Field strength (microvolts/meter)</th> <th>Measurement distance (meters)</th> </tr> </thead> <tbody> <tr> <td>0.009-0.490</td> <td>2400/F(kHz)</td> <td>300</td> </tr> <tr> <td>0.490-1.705</td> <td>24000/F(kHz)</td> <td>30</td> </tr> <tr> <td>1.705-30.0</td> <td>30</td> <td>30</td> </tr> <tr> <td>30-88</td> <td>100 **</td> <td>3</td> </tr> <tr> <td>88-216</td> <td>150 **</td> <td>3</td> </tr> <tr> <td>216-960</td> <td>200 **</td> <td>3</td> </tr> <tr> <td>Above 960</td> <td>500</td> <td>3</td> </tr> </tbody> </table>				Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)	0.009-0.490	2400/F(kHz)	300	0.490-1.705	24000/F(kHz)	30	1.705-30.0	30	30	30-88	100 **	3	88-216	150 **	3	216-960	200 **	3	Above 960	500	3
Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)																									
0.009-0.490	2400/F(kHz)	300																									
0.490-1.705	24000/F(kHz)	30																									
1.705-30.0	30	30																									
30-88	100 **	3																									
88-216	150 **	3																									
216-960	200 **	3																									
Above 960	500	3																									
<p>** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.</p>																											
<p>As shown in § 15.35(b), for frequencies above 1000 MHz, the field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For point-to-point operation under paragraph (b) of this section, the peak field strength shall not exceed 2500 millivolts/meter at 3 meters along the antenna azimuth.</p>																											
Test Method:	ANSI C63.10-2013, Section 6.4																										
Procedure:	Refer to ANSI C63.10-2013 section 6.4																										

6.5.1 E.U.T. Operation:

Operating Environment:			
Temperature:	28.5 °C	Humidity:	30.6 %
Pre test mode:	Mode1-41		
Final test mode:	All of the listed pre-test mode were tested, only the data of the worst mode (Mode16) is recorded in the report		

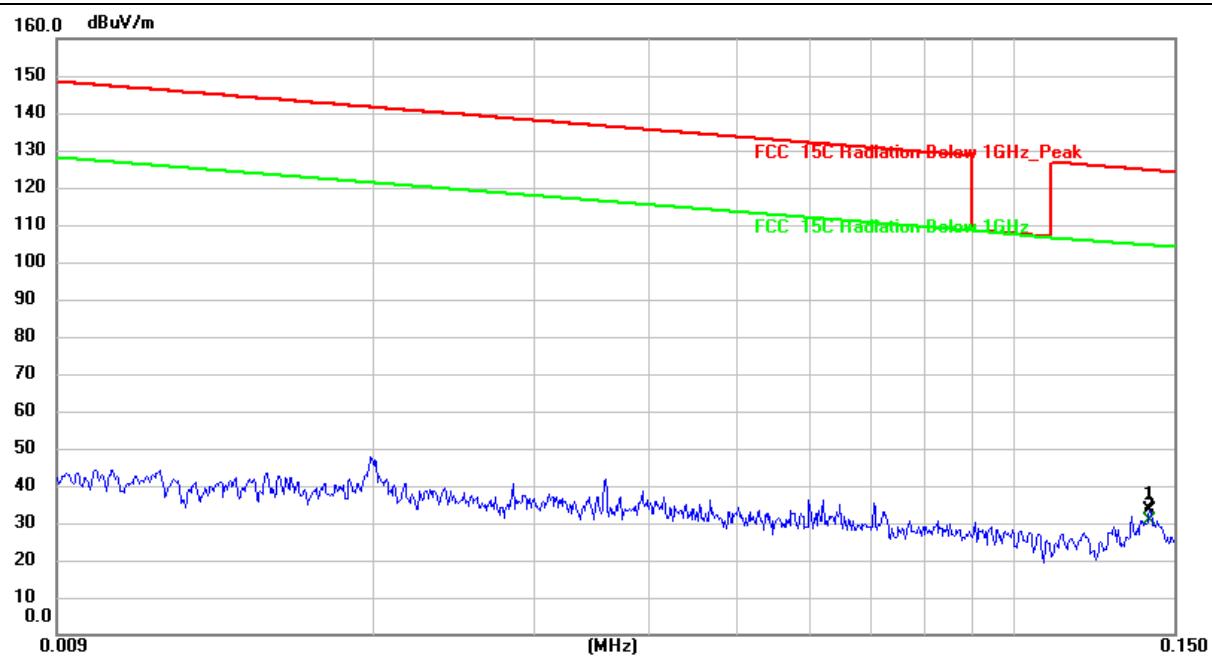
6.5.2 Test Setup Diagram:





6.5.3 Test Data:

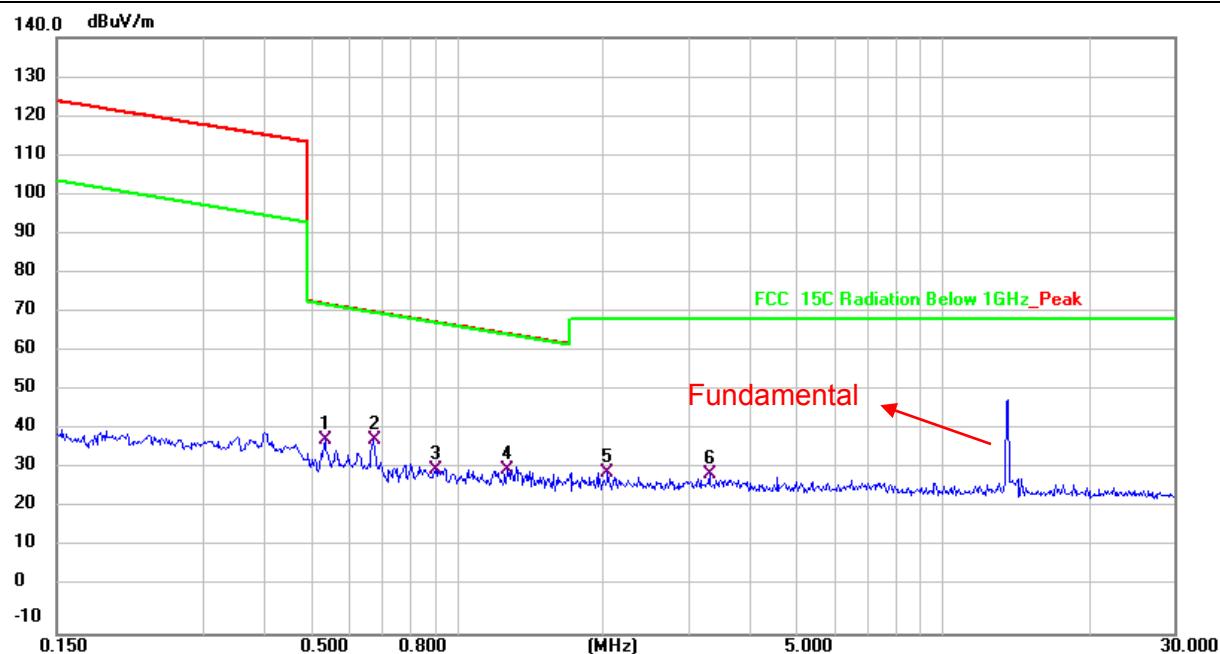
Mode16 / Polarization: Site axis



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	0.1408	13.31	20.03	33.34	124.65	-91.31	peak
2 *	0.1408	10.47	20.03	30.50	104.65	-74.15	AVG



Mode16/ Polarization: Site axis



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	0.5349	19.28	19.76	39.04	73.04	-34.00	QP
2 *	0.6715	19.04	19.74	38.78	71.07	-32.29	QP
3	0.9039	11.68	19.69	31.37	68.50	-37.13	QP
4	1.2684	11.86	19.69	31.55	65.56	-34.01	QP
5	2.0440	11.08	19.75	30.83	69.50	-38.67	QP
6	3.3104	10.57	19.80	30.37	69.50	-39.13	QP



6.6 Emissions in frequency bands (30M-1GHz)

Test Requirement:	47 CFR 15.225(d)																										
Test Limit:	<p>Refer to 47 CFR Part 15.225(d), The field strength of any emissions appearing outside of the 13.110–14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.</p> <p>47 CFR Part 15.209:</p>																										
	<table border="1"> <thead> <tr> <th>Frequency (MHz)</th> <th>Field strength (microvolts/meter)</th> <th>Measurement distance (meters)</th> </tr> </thead> <tbody> <tr> <td>0.009-0.490</td> <td>2400/F(kHz)</td> <td>300</td> </tr> <tr> <td>0.490-1.705</td> <td>24000/F(kHz)</td> <td>30</td> </tr> <tr> <td>1.705-30.0</td> <td>30</td> <td>30</td> </tr> <tr> <td>30-88</td> <td>100 **</td> <td>3</td> </tr> <tr> <td>88-216</td> <td>150 **</td> <td>3</td> </tr> <tr> <td>216-960</td> <td>200 **</td> <td>3</td> </tr> <tr> <td>Above 960</td> <td>500</td> <td>3</td> </tr> </tbody> </table>			Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)	0.009-0.490	2400/F(kHz)	300	0.490-1.705	24000/F(kHz)	30	1.705-30.0	30	30	30-88	100 **	3	88-216	150 **	3	216-960	200 **	3	Above 960	500	3
Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)																									
0.009-0.490	2400/F(kHz)	300																									
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216-960	200 **	3																									
Above 960	500	3																									
	<p>** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.</p> <p>As shown in § 15.35(b), for frequencies above 1000 MHz, the field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For point-to-point operation under paragraph (b) of this section, the peak field strength shall not exceed 2500 millivolts/meter at 3 meters along the antenna azimuth.</p>																										
Test Method:	ANSI C63.10-2013, Section 6.5																										
Procedure:	<p>a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.</p> <p>b. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</p> <p>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.</p> <p>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.</p> <p>e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>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 quasi-peak method as specified and then reported in a data sheet.</p> <p>g. Test the EUT in the lowest channel, the middle channel, the Highest channel.</p> <p>h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.</p> <p>i. Repeat above procedures until all frequencies measured was complete.</p>																										

Remark:

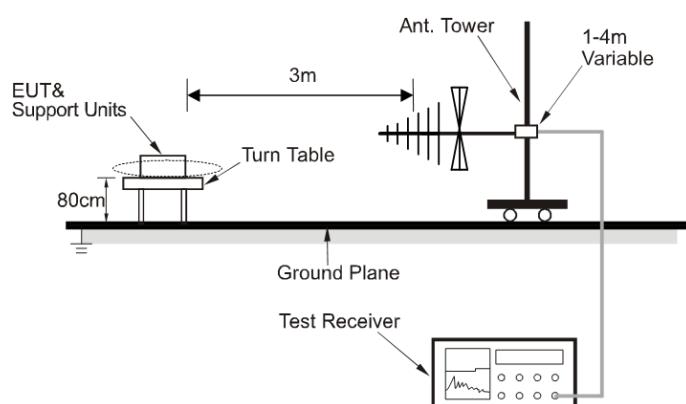
1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
2. Scan from 9kHz to 30MHz, the disturbance below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
3. The disturbance below 1GHz was very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

6.6.1 E.U.T. Operation:**Operating Environment:**

Temperature: 33.9 °C	Humidity: 62.7 %	Atmospheric Pressure: 100 kPa
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Pre test mode:	Mode 1-41
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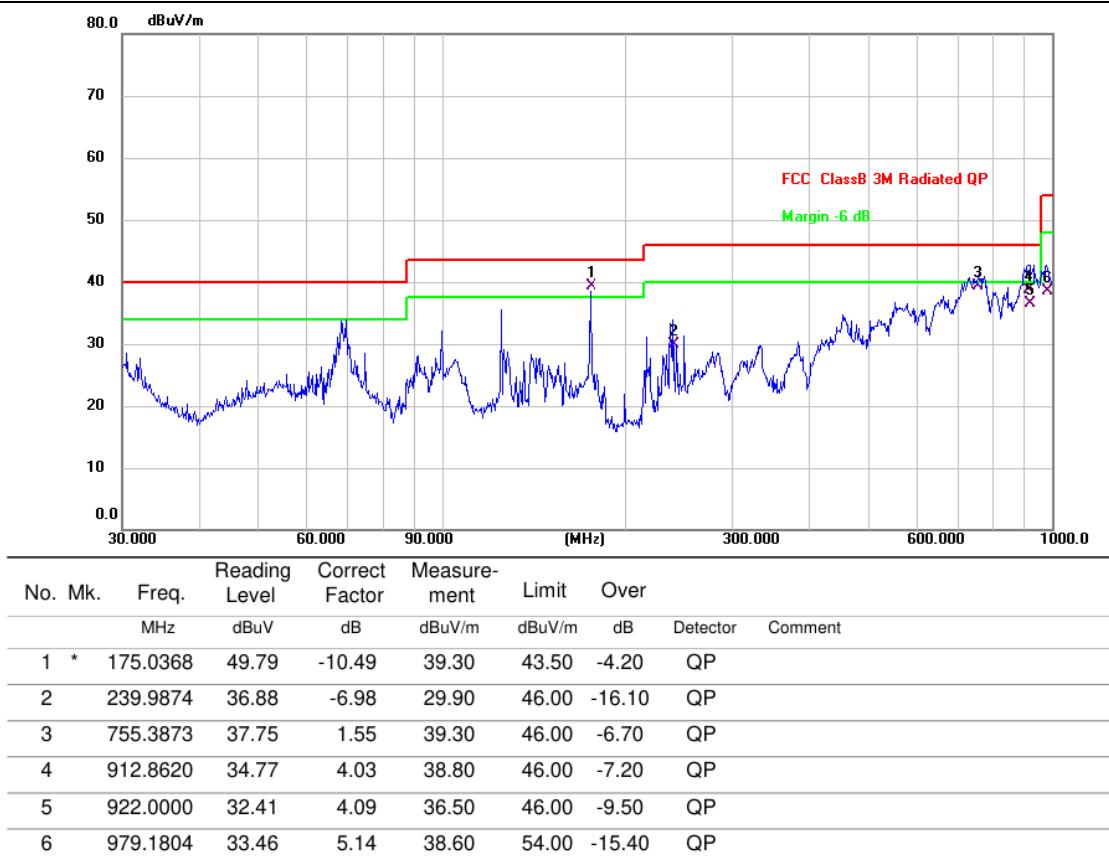
Final test mode:	All of the listed pre-test mode were tested, only the data of the worst mode (Mode 16) is recorded in the report
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6.6.2 Test Setup Diagram:

6.6.3 Test Data:
Mode16 / Polarization: Horizontal




Mode16 / Polarization: Vertical





Difference test data:

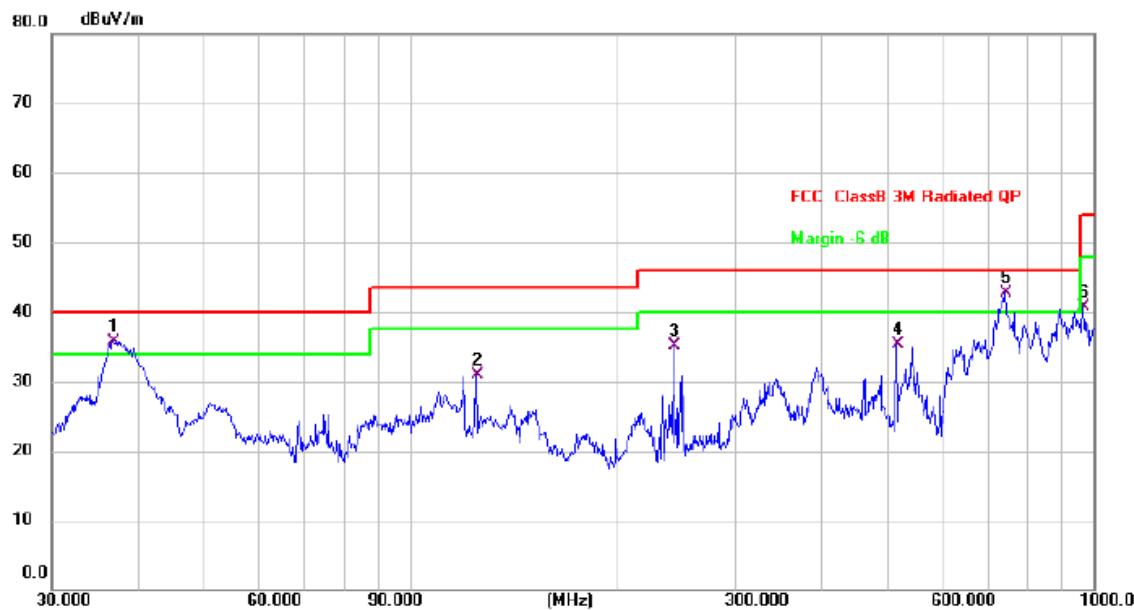
Mode16 / Polarization: Horizontal



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1		75.9773	43.76	-18.04	25.72	40.00	-14.28	QP	
2		125.0066	42.84	-17.23	25.61	43.50	-17.89	QP	
3		175.0368	46.24	-16.49	29.75	43.50	-13.75	QP	
4	*	245.9509	53.11	-12.79	40.32	46.00	-5.68	QP	
5		675.2080	45.00	-6.33	38.67	46.00	-7.33	QP	
6		734.4913	44.56	-4.76	39.80	46.00	-6.20	QP	



Mode16 / Polarization: Vertical



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	!	36.7662	50.71	-15.02	35.69	40.00	-4.31	QP	
2		125.0066	48.17	-17.23	30.94	43.50	-12.56	QP	
3		243.3772	47.87	-12.86	35.01	46.00	-10.99	QP	
4		515.4374	43.77	-8.44	35.33	46.00	-10.67	QP	
5	*	742.2587	47.33	-4.72	42.61	46.00	-3.39	QP	
6		965.5421	41.85	-1.24	40.61	54.00	-13.39	QP	

Photographs of the test setup

Refer to Appendix - Test Setup Photos

Photographs of the EUT

Refer to Appendix - EUT Photos

----End of Report----