

Test Report

Report No.:	MTi231220017-01E1
Date of issue:	2024-01-04
Applicant:	Electronic Silk Road (Shenzhen) Tech Co., Ltd
Product:	ESR 3-in-1 Watch Wireless Charging Set (HaloLock)
Model(s):	2C566A
FCC ID:	2APEW-2C566A

Shenzhen Microtest Co., Ltd. http://www.mtitest.com

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Test Result Certification				
Applicant:	Electronic Silk Road (Shenzhen) Tech Co., Ltd			
Address: 439, Building A7, Fuhai Xinxigang, Xinhe Community, Fuhai Street Bao'an District, Shenzhen, Guangdong, China				
Manufacturer:	Electronic Silk Road (Shenzhen) Tech Co., Ltd			
Address:	439, Building A7, Fuhai Xinxigang, Xinhe Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China			
Product description				
Product name:	ESR 3-in-1 Watch Wireless Charging Set (HaloLock)			
Trademark:	ESR			
Model name: 2C566A				
Series Model(s):	N/A			
Standards:	47 CFR Part 15C			
Test Method:	ANSI C63.10-2013			
Date of Test	Date of Test			
Date of test:	2023-12-25 to 2024-01-03			
Test result:	Pass			

Test Engineer	•••	Dowid. Cee	
		(David Lee)	
Reviewed By	••	leon chen	
		(Leon Chen)	
Approved By	•	Tom Kne	
		(Tom Xue)	



1 General Description

1.1 Description of the EUT

Product name:	ESR 3-in-1 Watch Wireless Charging Set (HaloLock)				
Model name:	2C566A				
Series Model(s):	N/A				
Model difference:	N/A				
Electrical rating:	Input: DC 9V3A Wireless output for phone: 5W, 10W, 15W Max Wireless output for earphone: 5W				
Accessories:	Cable: USB-C to USB-C Cable 150cm Watch Charger Model: 2C573, FCC ID: 2APEW-2C573 Input: DC 5V1A Wireless Output: 5W Max				
Hardware version:	V3.0				
Software version:	V1.2				
Test sample(s) number:	MTi231220017-01S1001				
RF specification					
Operating frequency range:	Coil 1 (Phone): 115-205KHz(5W, 10W), 360KHz(15W) Coil 2 (Earphone): 115-205KHz				
Modulation type:	ASK				
Antenna(s) type:	Coil				



1.2 Description of test modes

No.	Emission test modes		
Mode1	Wireless Output(Phone 5W)		
Mode2	Wireless Output(Phone 10W)		
Mode3	Wireless Output(Phone 15W)		
Mode4	Wireless Output(Earphone 5W)		
Mode5	Wireless Output(Phone 5W +Earphone5W)		
Mode6	Wireless Output(Phone 10W +Earphone 5W)		
Mode7	Wireless Output(Phone 15W +Earphone 5W)		
Mode8	stand by		



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

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Support equipment list						
Description	Model	Serial No.	Manufacturer			
HUAWEI QUICK CHARGE(65W)	HW-200200ZP1 JN67LSN7N03451 HU		HUAWEI			
Air Pods	MQD83CH/A /		Apple			
Phone	iPhone 12	VY2FHQDM74	Apple			
Phone	iPhone 15	/	Apple			
Load	YBZ 1.1	/	YBZ			
Support cable list						
Description	Length (m)	From	То			
/	/	1	/			

1.5 Measurement uncertainty

Measurement	Uncertainty
Conducted emissions (AMN 150kHz~30MHz)	±3.1dB
Occupied channel bandwidth	±3 %
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 15C	47 CFR Part 15.203	Pass
2	Conducted Emission at AC power line	47 CFR Part 15C	47 CFR Part 15.207(a)	Pass
3	20dB Occupied Bandwidth	47 CFR Part 15C	47 CFR Part 15.215(c)	Pass
4	Emissions in frequency bands (below 30MHz)	47 CFR Part 15C	47 CFR Part 15.209	Pass
5	Emissions in frequency bands (30MHz - 1GHz)	47 CFR Part 15C	47 CFR Part 15.209	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 Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong,				
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 Oc	cupied Bandwid	th			
1	Wideband Radio Communication Tester	Rohde&schwarz	CMW500	149155	2023-04-26	2024-04-25	
2	ESG Series Analog Ssignal 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	
		Emissions in frequ	ency bands (bel	ow 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 freque	ency bands (30N	/Hz - 1GHz)			
1	EMI Test Receiver	Rohde&schwarz	ESCI7	101166	2023-04-26	2024-04-25	
2	TRILOG Broadband Antenna	schwarabeck	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.

5.1.1 Conclusion:

The antenna of the EUT is permanently attached. The EUT complies with the requirement of FCC PART 15.203.



6 Radio Spectrum Matter Test Results (RF)

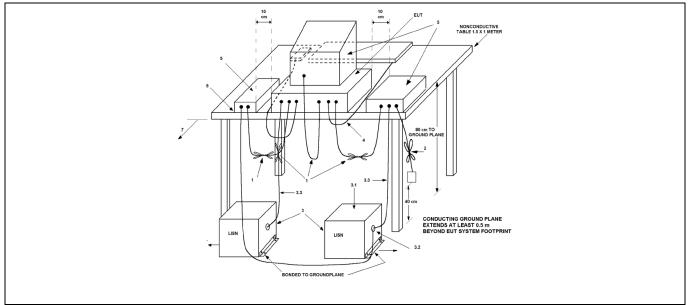
6.1 Conducted Emission at AC power line

Test Requirement:	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).						
Test Limit:	Frequency of emission (MHz)	Conducted limit (dB)	JV)				
		Quasi-peak	Average				
	0.15-0.5	66 to 56*	56 to 46*				
	0.5-5	56	46				
	5-30	60	50				
	*Decreases with the logarithm of the frequency.						
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:

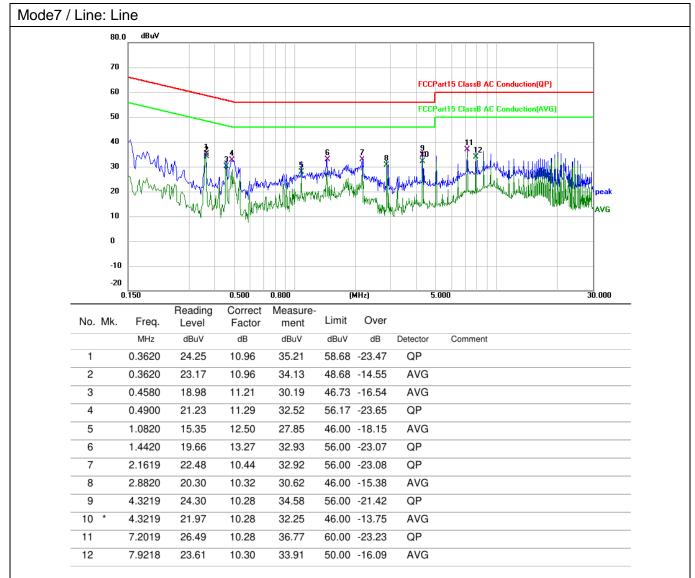
Operating Environment:								
Temperature:	e: 17.9 °C Humidity: 73.6 % Atmospheric Pressure: 100 kPa							
Pre test mode:	Pre test mode: Mode1-Mode8							
Final test mode: All of the listed pre-test mode were tested, only the data of the worst mode (Mode7) is recorded in the report					of the worst mode			

6.1.2 Test Setup Diagram:

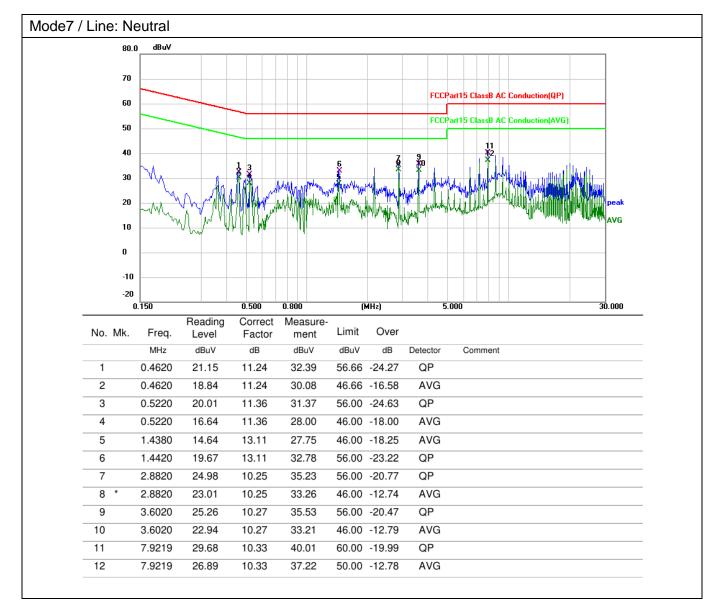




6.1.3 Test Data:









6.2 20dB Occupied Bandwidth

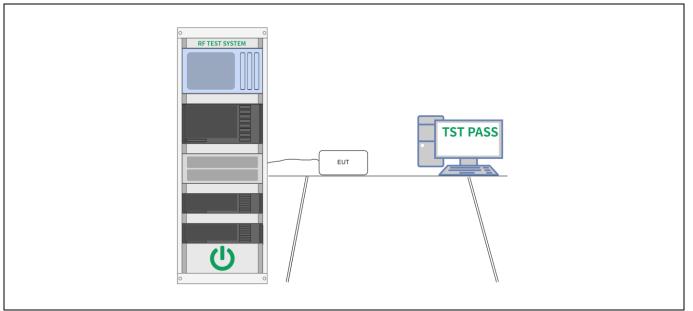
Test Requirement:	47 CFR Part 15.215(c)
Test Limit:	Refer to 47 CFR 15.215(c), intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of 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:	 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. 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. 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 (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2. d) Steps a) through c) might require iteration to adjust within the specified tolerances. 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. f) Set detection mode to peak and trace mode to max hold. 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). h) Determine the "-xx dB down amplitude" using [(reference value) - xx]. Alternatively, this calculation may be made by using the marker-delta function of the instrument. 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 marker and allow the new trace to stabilize. Otherwise, the trace from step g) shall be used for step]). j) Place two markers, one at the lowest frequency and the other at the highest frequency of t



6.2.1 E.U.T. Operation:

Operating Environment:								
Temperature:	Temperature: 25 °C Humidity: 58 % Atmospheric Pressure: 100 kPa							
Pre test mode:	Pre test mode: Mode1-Mode8							
Final test mode: All of the listed pre-test mode were tested, only the data of the worst mode (Mode6, Mode7) is recorded in the report						of the worst mode		

6.2.2 Test Setup Diagram:





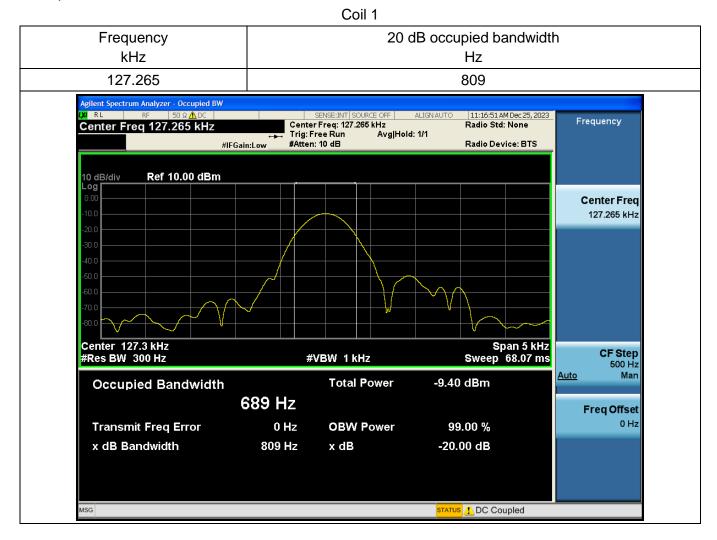
6.2.3 Test Data:

Note: Because the measured signal is CW-like, adjusting the RBW per C63.10 would not be practical since measurement bandwidth will always follow the RBW. The RBW is set to 300 Hz to perform the occupied bandwidth test.

		Coil 2				
Frequency		20 dB occupied bandwidth				
kHz			Hz			
128.575			811			
Agilent Spectrum Analyzer - Occupied BW X RL RF 50 Ω ▲ DC Center Freq 128.575 kHz #IF	Cente	SENSE:INT SOURCE OFF A F Freq: 128.575 kHz ree Run Avg Hold: ′ : 10 dB	LIGNAUTO 10:13:14 AM Dec 25, 20; Radio Std: None 10/10 Radio Device: BTS	²³ Frequency		
10 dB/div Ref -10.00 dBm						
-20.0 -30.0 -40.0				Center Freq 128.575 kHz		
-40.0 -50.0 -60.0						
-70.0			·/			
Center 128.6 kHz #Res BW 300 Hz	#	VBW 1 kHz	Span 5 kH Sweep 68.07 m			
Occupied Bandwidth	689 Hz	Total Power	-28.6 dBm	Auto Man Freq Offset		
Transmit Freq Error	-1 Hz	OBW Power	99.00 %	0 Hz		
x dB Bandwidth	811 Hz	x dB	-20.00 dB			
MSG			STATUS 1 DC Coupled			

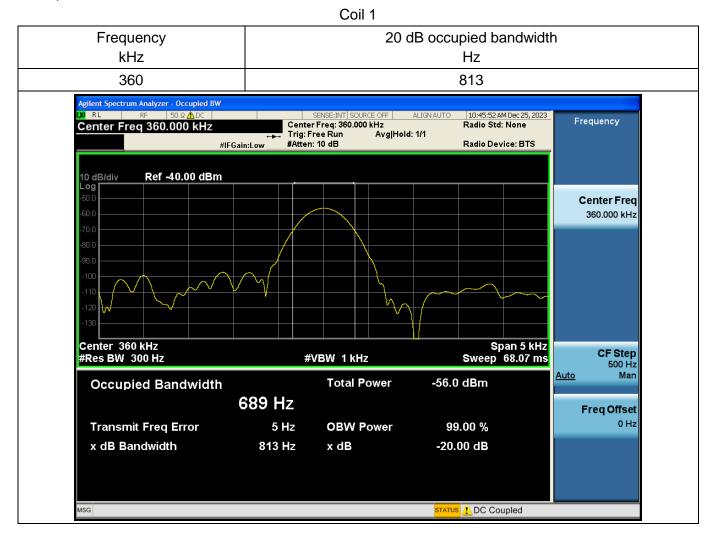


Note: Because the measured signal is CW-like, adjusting the RBW per C63.10 would not be practical since measurement bandwidth will always follow the RBW. The RBW is set to 300 Hz to perform the occupied bandwidth test.





Note: Because the measured signal is CW-like, adjusting the RBW per C63.10 would not be practical since measurement bandwidth will always follow the RBW. The RBW is set to 300 Hz to perform the occupied bandwidth test.





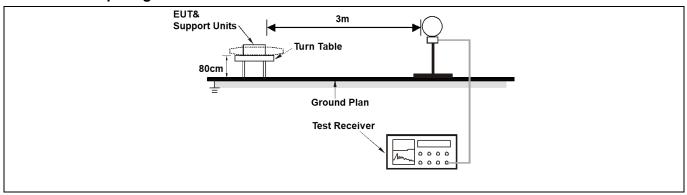
6.3 Emissions in frequency bands (below 30MHz)

Test Requirement:	47 CFR Part 15.209						
Test Limit:	Frequency (MHz)	Field strength	Measuremen				
		(microvolts/meter)	t distance				
		0.400/5/(111.)	(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				
Test Method:	 ** 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. In the emission table above, the tighter limit applies at the band edges. The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector. 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 unde 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. 						
Procedure:	ANSI C63.10-2013 section	on 6.4					

6.3.1 E.U.T. Operation:

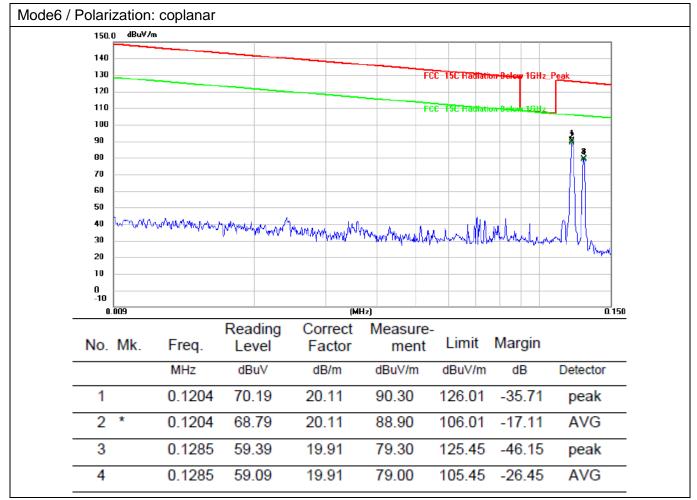
Operating Environment:							
Temperature:	26.3 °C	³ °C Humidity: 20.3 % Atmospheric Pressure: 100 kPa					
Pre test mode:	Pre test mode: Mode1-Mode8						
Final test mode:All of the listed pre-test mode were tested, only the data of the worst mode (Mode6, Mode7) is recorded in the report						of the worst mode	

6.3.2 Test Setup Diagram:

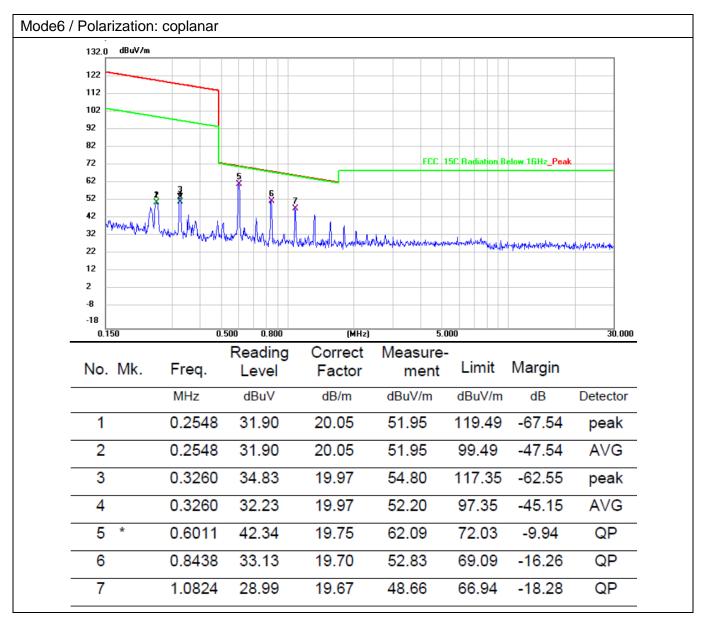




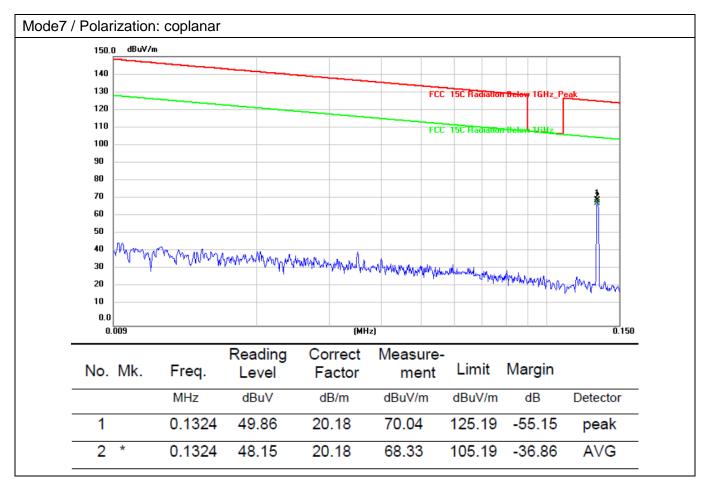
6.3.3 Test Data:



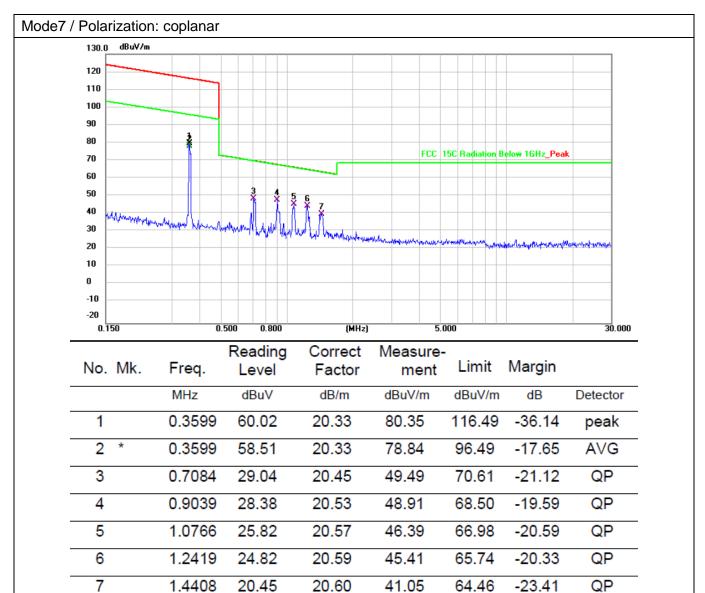














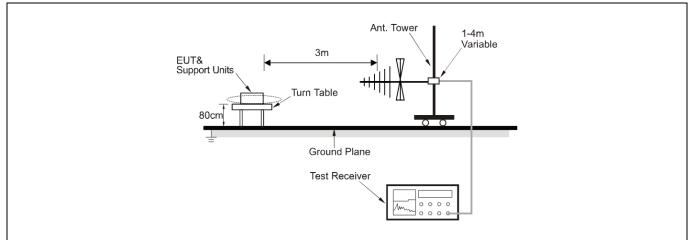
6.4 Emissions in frequency bands (30MHz - 1GHz)

Test Requirement:	47 CFR Part 15.209				
Test Limit:	Frequency (MHz)	Field strength	Measuremen		
		(microvolts/meter)	t distance		
	0.009-0.490	2400/⊑(///=>)	(meters) 300		
	0.490-1.705	2400/F(kHz) 24000/F(kHz)	300		
	1.705-30.0	30	30		
	30-88	100 **	3		
	88-216	150 **	3		
	216-960	200 **	3		
	Above 960	500	3		
Test Method: Procedure:	 ** 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. In the emission table above, the tighter limit applies at the band edges. The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–9 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector. 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. 				

6.4.1 E.U.T. Operation:

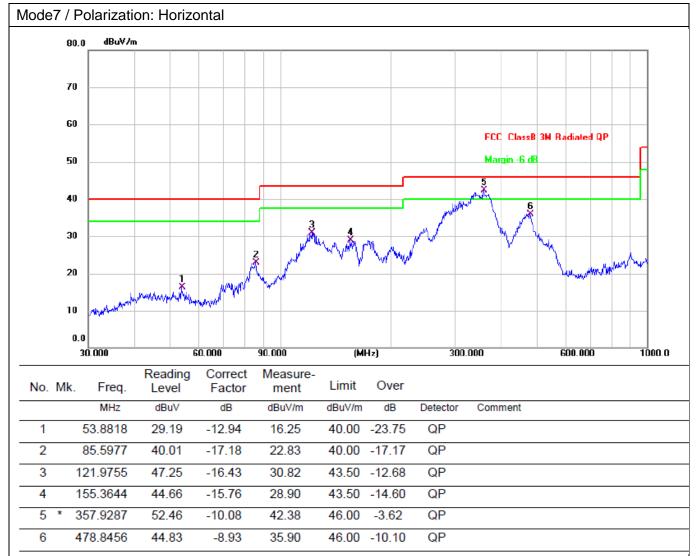
Operating Environment:							
Temperature:	perature: 22.5 °C Humidity: 43 % Atmospheric Pressure: 101 kPa						
Pre test mode: Mode1- Mode8							
Final test mode:All of the listed pre-test mode were tested, only the data of the worst mode (Mode7) is recorded in the report					of the worst mode		

6.4.2 Test Setup Diagram:

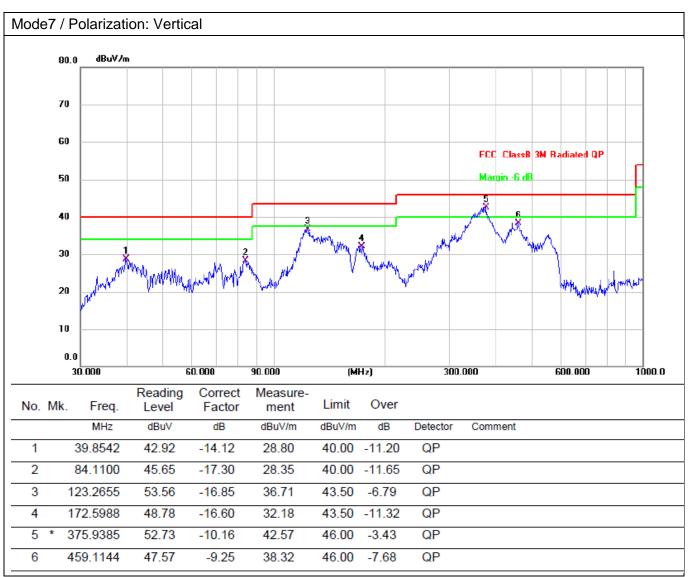




6.4.3 Test Data:









Photographs of the test setup

Refer to Appendix - Test Setup Photos



Photographs of the EUT

Refer to Appendix - EUT Photos

----End of Report----