FCC 47 CFR PART 15 SUBPART C
CERTIFICATION TEST REPORT

FOR

SWING CADDIE

MODEL NUMBER: SC100

FCC ID: 2ABTKSC100

REPORT NUMBER: 14U17188-3 Revision B

ISSUE DATE: MARCH 17, 2014

Prepared for
UCOMM TECHNOLOGY CO., LTD.
#401 GWANYANG DOOSAN VENTURE DIGM 1307-37 GWANYANG2-DONG,
DONGAN-GU, ANYANG-SI, GYEONGGI-DO, 431-810
SOUTH KOREA

Prepared by
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	3/10/2014	Initial Issue	F. de Anda
A	3/17/2014	Update to BW and Power tables to reflect actual measured Frequencies.	F. de Anda
B	03/19/2014	Update the freq. range, the measured freq., and add the limit and procedure for spurious emission tests	M. Mekuria

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: UCOMM TECHNOLOGY CO., LTD.
#401 GWANYANG DOOSAN VENTURE DIGM 1307-37
GWANYANG2-DONG,
DONGAN-GU, ANYANG-SI, GYEONGGI-DO, 431-810,
SOUTH KOREA

EUT DESCRIPTION: SWING CADDIE

MODEL: SC100

SERIAL NUMBER: 1819105

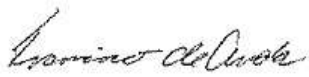
DATE TESTED: FEBRUARY 21, 2014 - MARCH 02, 2014

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 15 SUBPART C	Pass

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For
UL Verification Services Inc. By:



FRANCISCO DE ANDA
EMC SUPERVISOR
UL Verification Services Inc.

Tested By:

TINA CHU
WiSE Laboratory Technician
UL Verification Services Inc.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street
☐ Chamber A	☐ Chamber D
☒ Chamber B	☒ Chamber E
☐ Chamber C	☐ Chamber F

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://ts.nist.gov/standards/scopes/2000650.htm.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	±3.52 dB
Radiated Disturbance, 30 to 1000 MHz	±4.94 dB

Uncertainty figures are valid to a confidence level of 95%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a battery operated transmitter swing caddie for golfers.

Manufactured by KH Tech Co. Ltd.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak EIRP output power @3m distance as follows:

Frequency Range (GHz)	Mode	Output Power (dBuV/m)
24.075 -24.175	Modulator	114.10

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes integral antenna with a maximum gain of 8 dBi.

5.4. SOFTWARE AND FIRMWARE

The firmware and software installed in the EUT during testing was Ver1.05.

5.5. WORST-CASE CONFIGURATION AND MODE

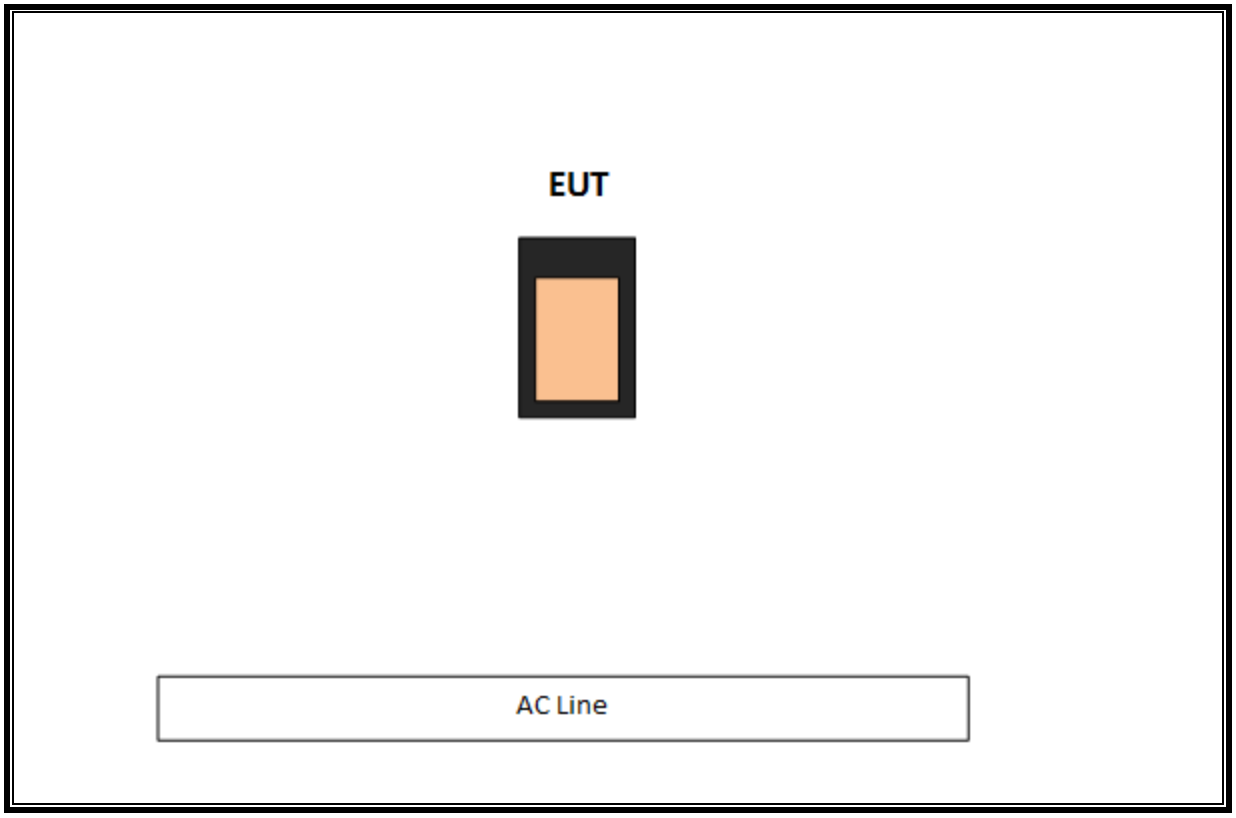
The EUT only has single channel, and it is determined as the worst case configuration and mode was in the Y orientation.

5.6. DESCRIPTION OF TEST SETUP

TEST SETUP

The EUT is placed on the table with power on and continuous Tx and Rx.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Test Equipment List				
Description	**Manufacturer**	**Model**	**Asset**	**Cal Due**
Antenna, Biconolog, 30MHz-1 GHz	Sunol Sciences	JB3	F00168	03/07/14
Antenna, Horn, 1-18GHz	ETS Lindgren	3117	F00131	02/18/15
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00980	11/26/14
Antenna, Horn, 40 GHz	ARA	MWH-2640/B	C00981	06/28/14
Harmonic Mixer, 110 GHz	Agilent	11970W	C00770	02/13/15
Harmonic Mixer, 140 to 220 GHz	OML	M05HWA	C00867	03/01/16
Harmonic Mixer, 220 to 325 GHz	OML	M03HW/A	C01153	03/01/16
Harmonic Mixer, 50 GHz	Agilent	11970Q	C00769	09/25/14
Harmonic Mixer, 75 GHz	Agilent	11970V	C00768	02/05/15
Harmonic Mixer, 90 to 140 GHz	OML	M08HWA	C00868	03/01/16
RF Amplifier	Sonoma	310	F00008	05/27/14
RF PreAmplifier, 1-18GHz	Miteq	AFS42-00101800-25-S-42	F00353	08/24/14
RF PreAmplifier, 1-26.5GHz	Agilent	8449B	F00165	08/24/14
RF PreAmplifier, 40 GHz	Miteq	NSP4000-SP2	C00990	08/20/14
Spectrum Analyzer, 40 GHz	Agilent	8564E	C00951	07/29/14
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent	N9030A	F00129	02/22/15
Spectrum Analyzer, PXA, 3Hz to 50GHz	Agilent	N9030A	F00112	01/21/15

7. DUTY CYCLE

7.1. ON TIME AND DUTY CYCLE RESULTS

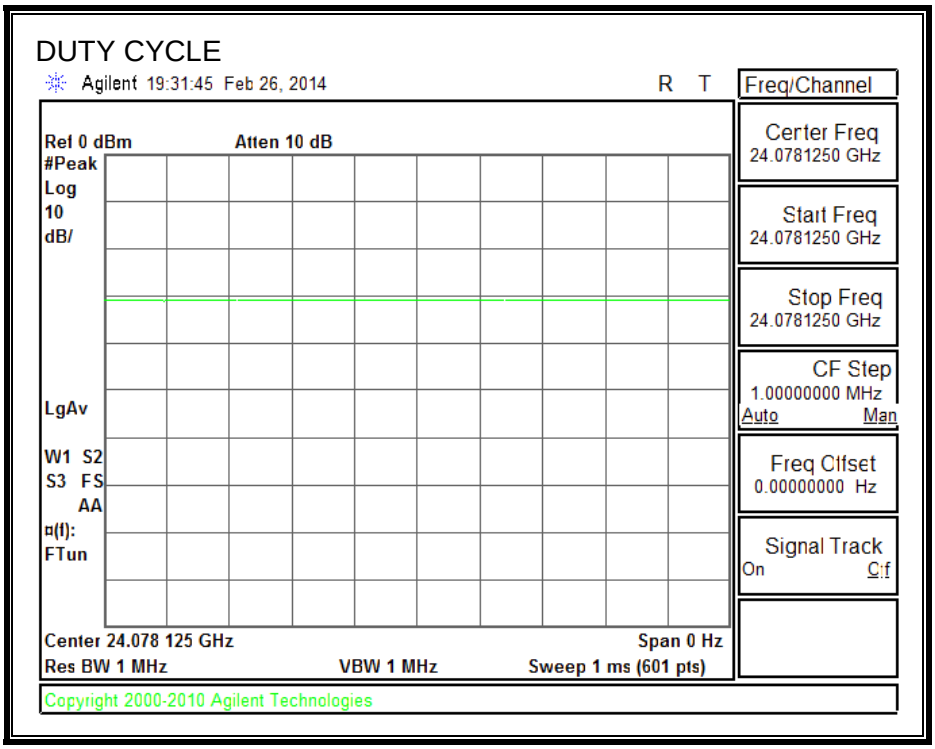
LIMITS

None; for reporting purposes only.

RESULTS

Tx on (usec)	Tx on + Tx off (usec)	Duty Cycle (%)	Correction Factor (dB)
1	1	100.00	0.00

7.2. DUTY CYCLE PLOT



8. ANTENNA PORT TEST RESULTS

8.1. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

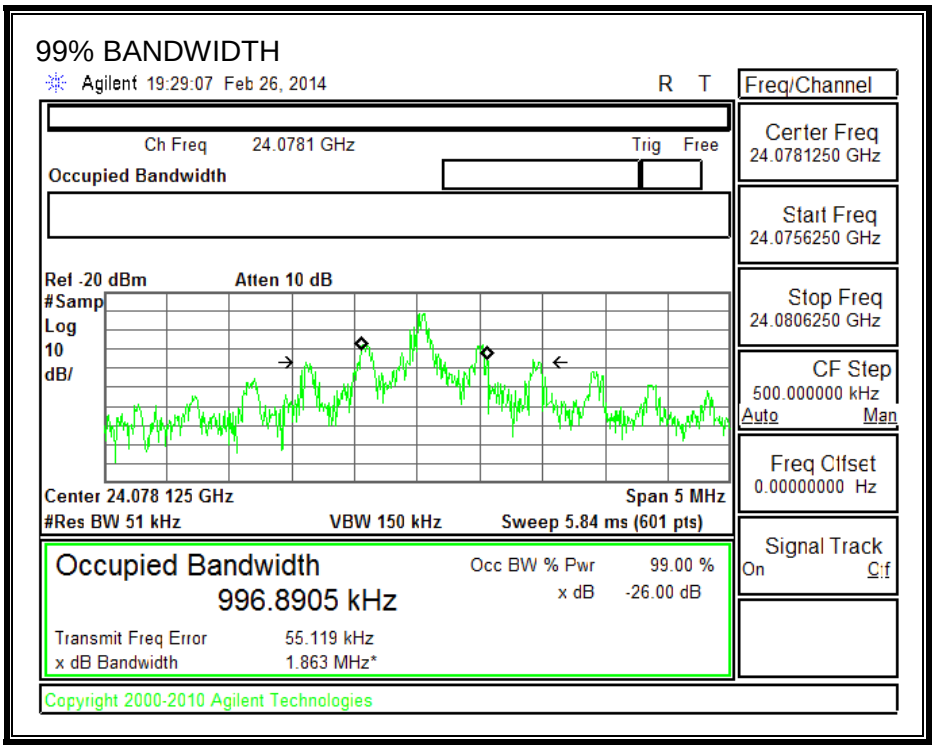
TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

Frequency (GHz)	99% Bandwidth (kHz)
24.078	996.89

99% BANDWIDTH



9. RADIATED EMISSION TEST RESULTS

9.1. LIMITS AND PROCEDURE

LIMIT

§15.245

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Limits for radiated disturbance of an intentional radiator		
Fundamental Frequency (MHz)	Field Strength of fundamental (millivolts / meter)	Field Strength of harmonic (millivolts / meter)
902-928	500	1.6
2435-2465	500	1.6
5785-5815	500	1.6
10500-10550	2500	25
24075-24175	2500	25

§15.245 (1) Radiated emissions in the restricted bands below 17.7 GHz, as specified in §15.205, shall not exceed the general limits in §15.209.

§15.245 (1) (ii) The second and third harmonics emissions shall not be exceed 7.5mV/m equivalent to 77.5dBuV/m at a distance of 3 meters.

§15.245 (3) Radiated emissions 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 limit in §15.209,whichever is the lesser attenuation.

TEST PROCEDURE

ANSI C63.4

The EUT is an intentional radiator that incorporates a digital device, the highest fundamental frequency generated or used in the device is 24.080 GHz; therefore, the frequency range was investigated from 30 MHz to the 10th harmonic of the highest fundamental frequency, or 240GHz, whichever is greater.

PROCEDURE FOR 30 MHz TO 40 GHz

Measurements are made with the antenna feeding a spectrum analyzer via a preamplifier and cables.

PROCEDURE FOR 40 TO 240 GHz

External harmonic mixers are utilized.

The antenna is scanned around the entire perimeter surface of the EUT, in both horizontal and vertical polarizations, at a maximum distance of 5 cm from the EUT.

A final test is made at any frequencies at which emissions are found. During this final scan, the antenna is kept no further from the EUT than the maximum distance calculated for each mixer band that yields a minimum system noise floor at least 6 dB below the spurious emissions limit.

RESULTS

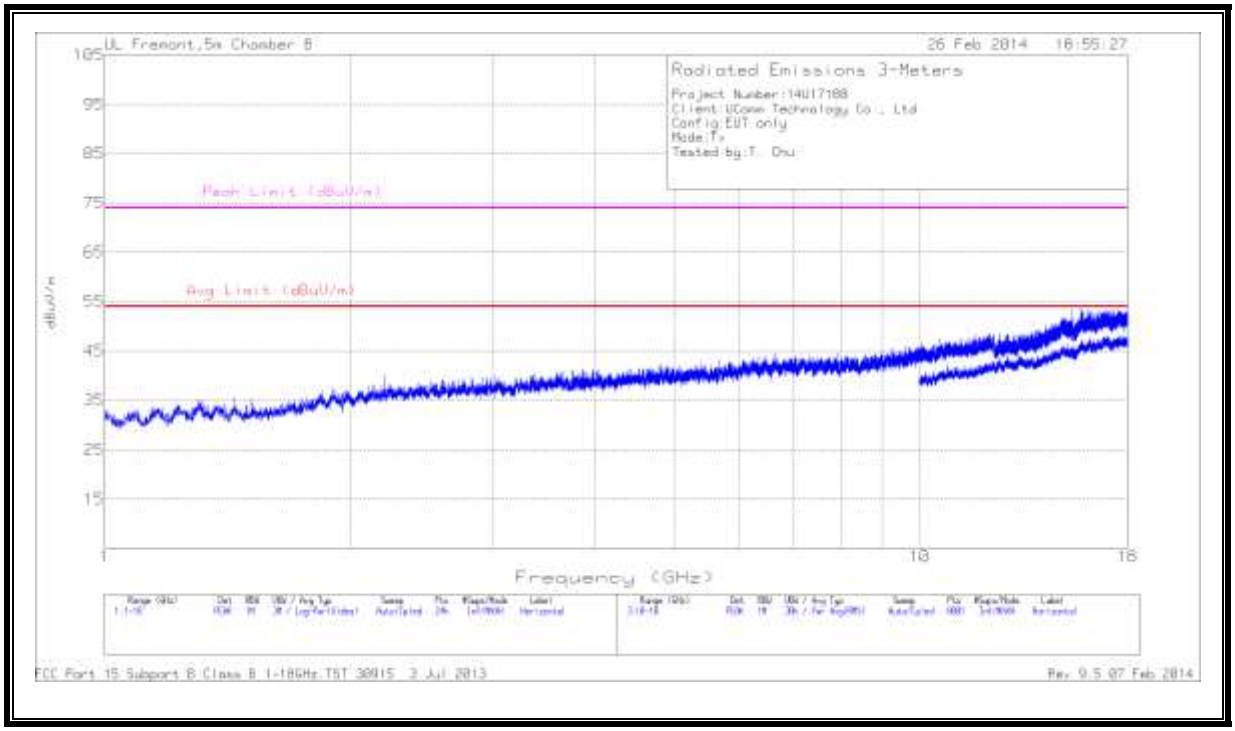
9.2. FUNDAMENTAL RADIATED EMISSION

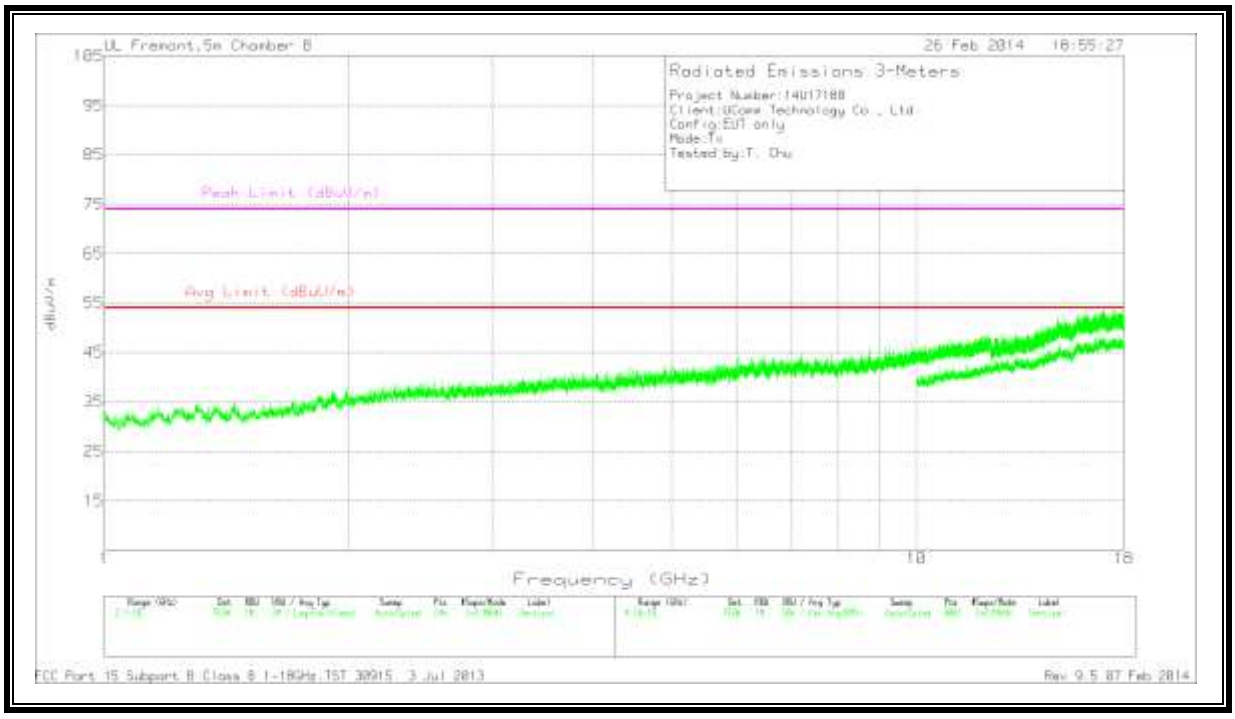
Company:	HCT
Project #:	14U17188
Date:	2/28/2014
Test Engineer:	F. Guarnero
Configuration:	EUT Alone
Mode:	TX and RX Mode

Freq. GHz	Distance (m)	Read Pk dBuV	Ant factor	CL dB	Amp dB	Peak dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Pol (V/H)
X Position											
24.08	3.0	84.0	33.6	18.2	-31.9	103.9	148.0	128.0	-44.1	-24.1	H
24.08	3.0	85.4	33.6	18.2	-31.9	105.3	148.0	128.0	-42.7	-22.7	V
Y Position											
24.08	3.0	84.4	33.6	18.2	-31.9	104.3	148.0	128.0	-43.7	-23.7	H
24.08	3.0	94.2	33.6	18.2	-31.9	114.1	148.0	128.0	-33.9	-13.9	V

9.3. TX SPURIOUS RADIATED EMISSIONS ABOVE 1GHz

EMISSIONS FROM 1 TO 18GHz





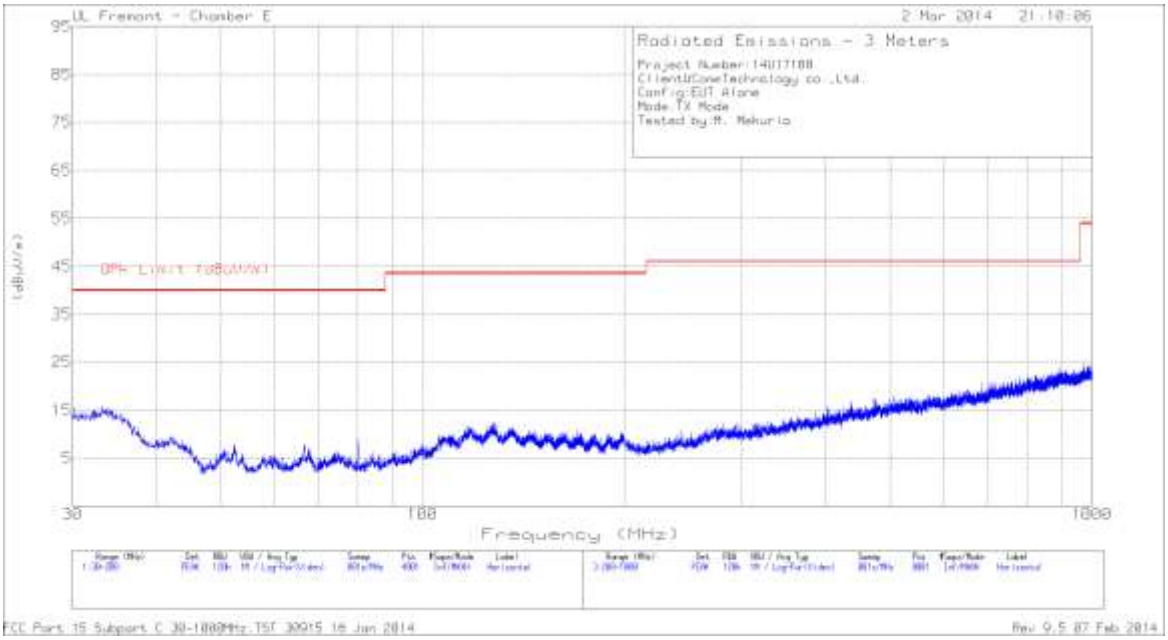
NOTE: there are no emissions found from EUT above the system noise floor level from 1GHz to 18GHz.

EMISSIONS FROM 18 TO 240 GHz

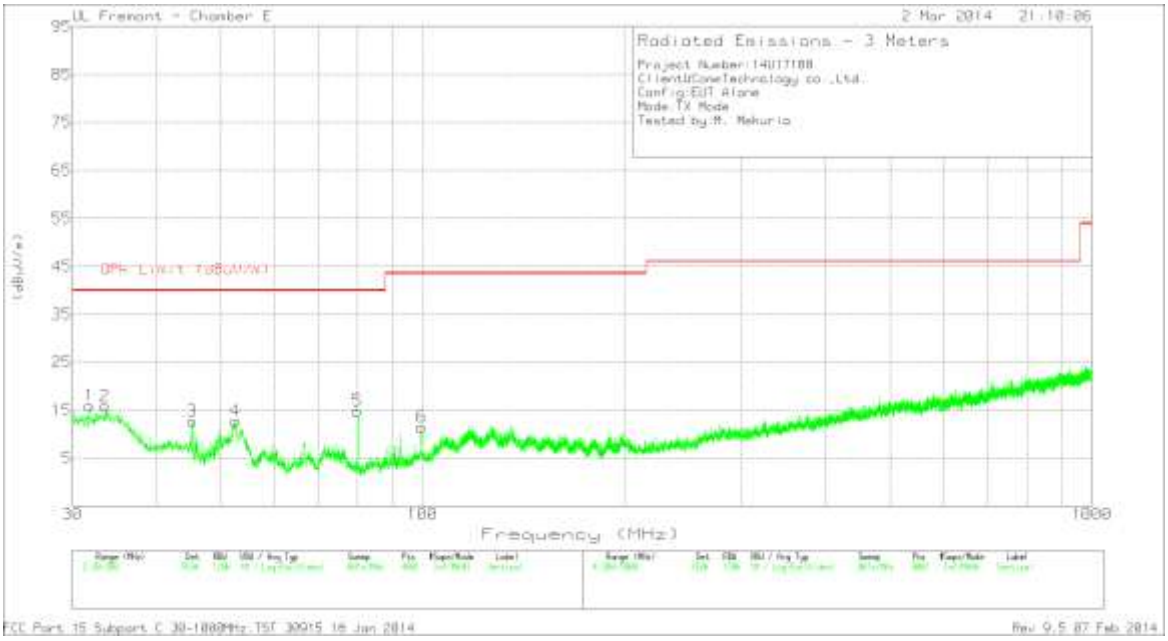
Note: there are no emissions found above the system noise floor for the frequency from 18GHz to 240GHz.

9.4. TX SPURIOUS RADIATED EMISSIONS BELOW 1 GHz

HORIZONTAL PLOT



VERTICAL PLOT



HORIZONTAL AND VERTICAL DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T408 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	31.785	28.16	PK	19.7	-31.9	15.96	40	-24.04	0-360	100	V
2	33.57	28.72	PK	18.6	-31.5	15.82	40	-24.18	0-360	100	V
3	45.3425	34.09	PK	10.2	-31.6	12.69	40	-27.31	0-360	100	V
4	52.61	37.12	PK	7.3	-31.6	12.82	40	-27.18	0-360	100	V
5	79.98	38.66	PK	7.7	-31.5	14.86	40	-25.14	0-360	100	V
6	99.615	33.14	PK	9.5	-31.1	11.54	43.52	-31.98	0-360	100	V