FCC TEST REPORT

Product	:	HUAWEI M-Pencil
Trade mark	:	HUAWEI
Model/Type reference	:	CD52
Serial Number	:	N/A
Report Number	:	EED32L00291603
FCC ID	:	2ABWECD52
Date of Issue	:	Dec. 05, 2019
Test Standards	:	47 CFR Part 15 Subpart C
Test result	:	PASS

Prepared for:

Sunwoda Electronic Co., Ltd.
Floor 1,A,B,D District of Floor2 and
Floor 3 to 9 of Comprehensive Building,
No.2 Yihe Road, Shilong Community,
Shiyan Street, Bao'an District, Shenzhen City,
Guangdong Province, P.R. China

Prepared by:

Centre Testing International Group Co., Ltd.
Hongwei Industrial Zone, Bao'an 70 District,
Shenzhen, Guangdong, China
TEL: +86-755-3368 3668
FAX: +86-755-3368 3385

Tested By:	mark. chen.	Compiled by:	Sunlight Sun
	Mark chen		Sunlight Sun
Reviewed by:	Ware Xin	Approved by:	Kevin Yang
	Ware Xin		Kevin Yang
Date:	Dec. 05, 2019		Check No.:3096349668

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

2 Version

Version No.	Date	Description
00	Dec. 05, 2019	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
Spurious Emissions	47 CFR Part 15 Subpart C Section 15.209	ANSI C63.10-2013	PASS

Remark:
The tested sample(s) and the sample information are provided by the client.

4 Contents

5 General Information

5.1 Client Information

Applicant:	Sunwoda Electronic Co., Ltd.
Address of Applicant:	Floor 1, A, B, D District of Floor2 and Floor 3 to 9 of Comprehensive Building, No.2 Yihe Road, Shilong Community, Shiyan Street, Bao'an District, Shenzhen City, Guangdong Province, P.R. China
Manufacturer:	Sunwoda Electronic Co., Ltd.
Address of Manufacturer:	Floor 1, A, B, D District of Floor2 and Floor 3 to 9 of Comprehensive Building, No.2 Yihe Road, Shilong Community, Shiyan Street, Bao'an District, Shenzhen City, Guangdong Province, P.R. China
Factory:	Shenzhen Sunwoda Intelligent Hardware Co., Ltd.
Address of Factory:	101, No. 6-6, Yanshan Road, Yanchuan Community, Yanluo Street, Bao'an District, Shenzhen City, Guangdong Province, P.R. China

5.2 General Description of EUT

Product Name:	HUAWEI M-Pencil	
Model No.(EUT):	CD52	
Trade Mark:	HUAWEI	
EUT Supports Radios application:	100-400kHz	
Power Supply:	Li-ion Polymer Battery	82mAh 3.82V

5.3 Product Specification subjective to this standard

Frequency Range:	100-400kHz
Operation Frequency	175kHz
Modulation Type:	PWM
Test Power Grade:	Default
Test Software of EUT:	STM32CubeMonitor-RF
Test voltage:	DC 3.82V
Sample Received Date:	Oct. 15, 2019
Sample tested Date:	Oct. 15, 2019 to Nov. 26, 2019

5.4 Test Environment and Mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	55 % RH
Atmospheric Pressure:	1010mbar
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

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	12-21-2018	12-20-2019
TRILOG Broadband Antenna	Schwarzbeck	VULB9163	9163-618	07-26-2019	07-25-2020
Microwave Preamplifier	Agilent	8449B	3008A02425	07-12-2019	07-11-2020
Microwave Preamplifier	Tonscend	EMC051845SE	980380	01-16-2019	01-15-2020
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	07-26-2019	07-25-2020
Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-076	04-25-2018	04-24-2021
Spectrum Analyzer	R&S	FSP40	100416	04-28-2019	04-27-2020
Receiver	R&S	ESCI	100435	05-20-2019	05-19-2020
Receiver	R&S	ESCI7	100938-003	10-21-2019	10-20-2020
Multi device Controller	maturo	NCD/070/10711112	---	01-09-2019	01-08-2020
Signal Generator	Agilent	E4438C	MY45095744	03-01-2019	02-29-2020
Signal Generator	Keysight	E8257D	MY53401106	03-01-2019	02-29-2020
Temperature/ Humidity Indicator	Shanghai qixiang	HM10	1804298	07-26-2019	07-25-2020
Communication test set	Agilent	E5515C	GB47050534	03-01-2019	02-28-2022
Cable line	Fulai(7M)	SF106	5219/6A	01-09-2019	01-08-2020
Cable line	Fulai(6M)	SF106	5220/6A	01-09-2019	01-08-2020
Cable line	Fulai(3M)	SF106	5216/6A	01-09-2019	01-08-2020
Cable line	Fulai(3M)	SF106	5217/6A	01-09-2019	01-08-2020
High-pass filter	Sinoscite	FL3CX03WG18NM12-0398-002	---	01-09-2019	01-08-2020
High-pass filter	MICRO-TRONICS	SPA-F-63029-4	---	01-09-2019	01-08-2020
band rejection filter	Sinoscite	FL5CX01CA09CL12-0395-001	---	01-09-2019	01-08-2020
band rejection filter	Sinoscite	FL5CX01CA08CL12-0393-001	---	01-09-2019	01-08-2020
band rejection filter	Sinoscite	FL5CX02CA04CL12-0396-002	---	01-09-2019	01-08-2020
band rejection filter	Sinoscite	FL5CX02CA03CL12-0394-001	---	01-09-2019	01-08-2020

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 integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is -2.3 dBi.	

7.2 Radiated Spurious Emissions

Test Requirement: 47 CFR Part 15C Section 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:

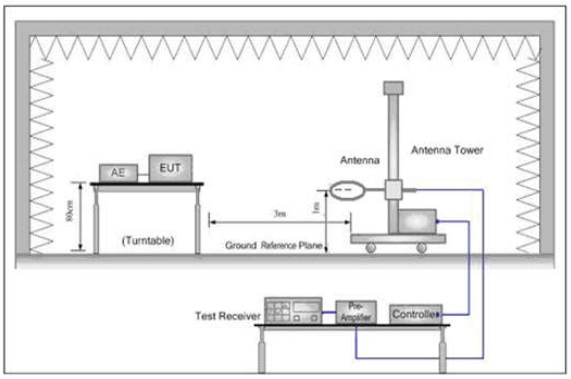


Figure 1. Below 30MHz

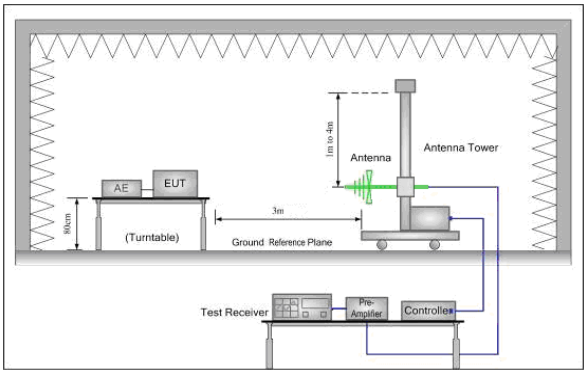


Figure 2. 30MHz to 1GHz

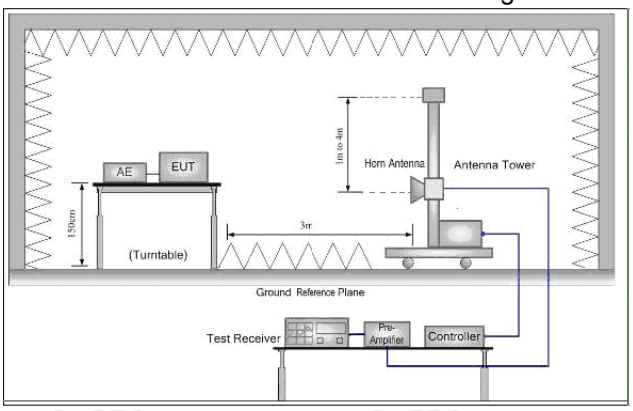


Figure 3. Above 1GHz

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 metre to 1.5 metre(Above 18GHz the distance is 1 meter and table is 1.5 metre).

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
175KHz	102.69	Average Value
	122.69	Peak Value

Test Setup:

Exploratory Test Mode: Transmitting mode

Final Test Mode: Transmitting mode

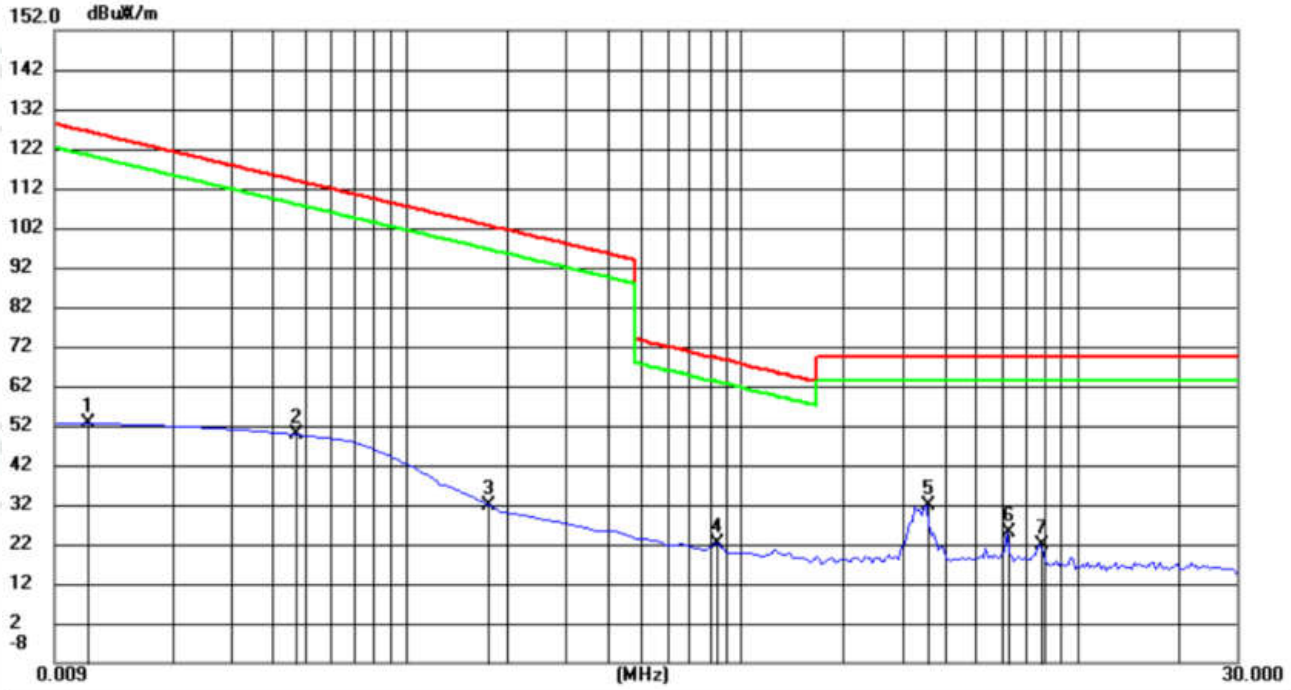
Instruments Used: Refer to section 6 for details

Test Results: Pass

Measurement Data

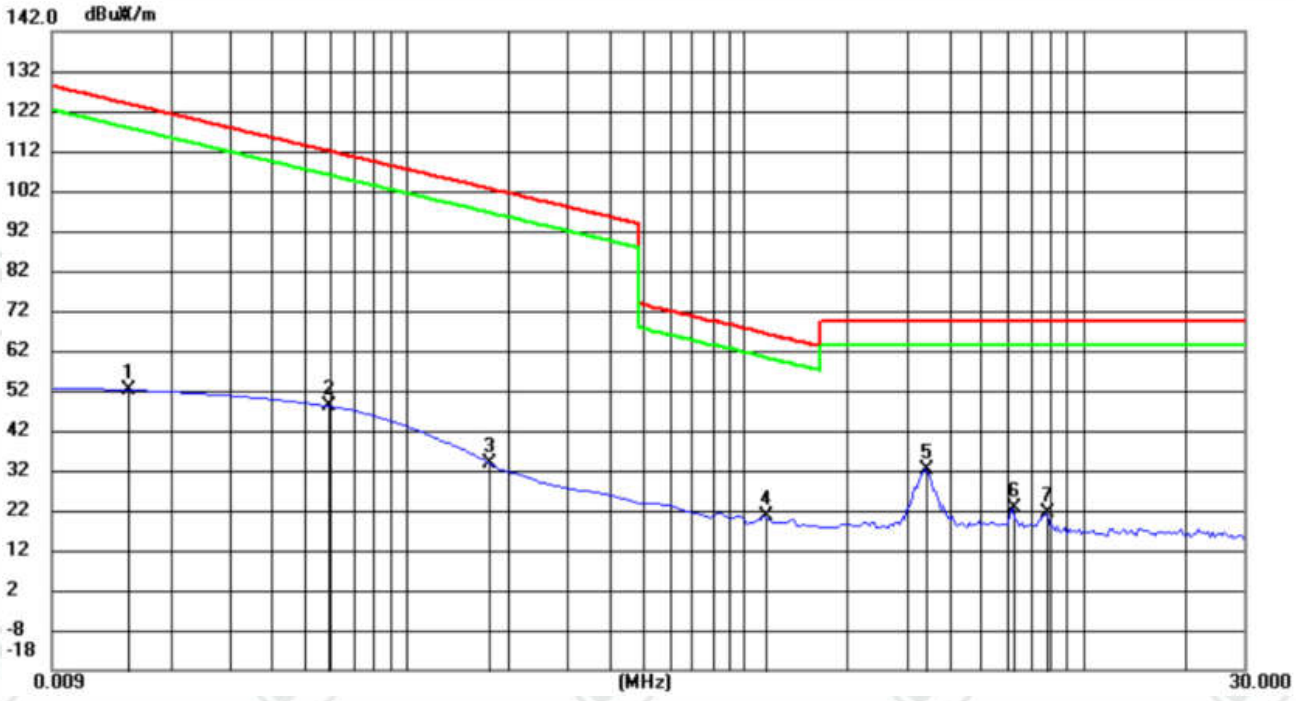
Product	:	HUAWEI M-Pencil	**Model/Type reference**	:	CD52
Temperature	:	24.0 °C	**Humidity**	:	55%

Spurious Emissions



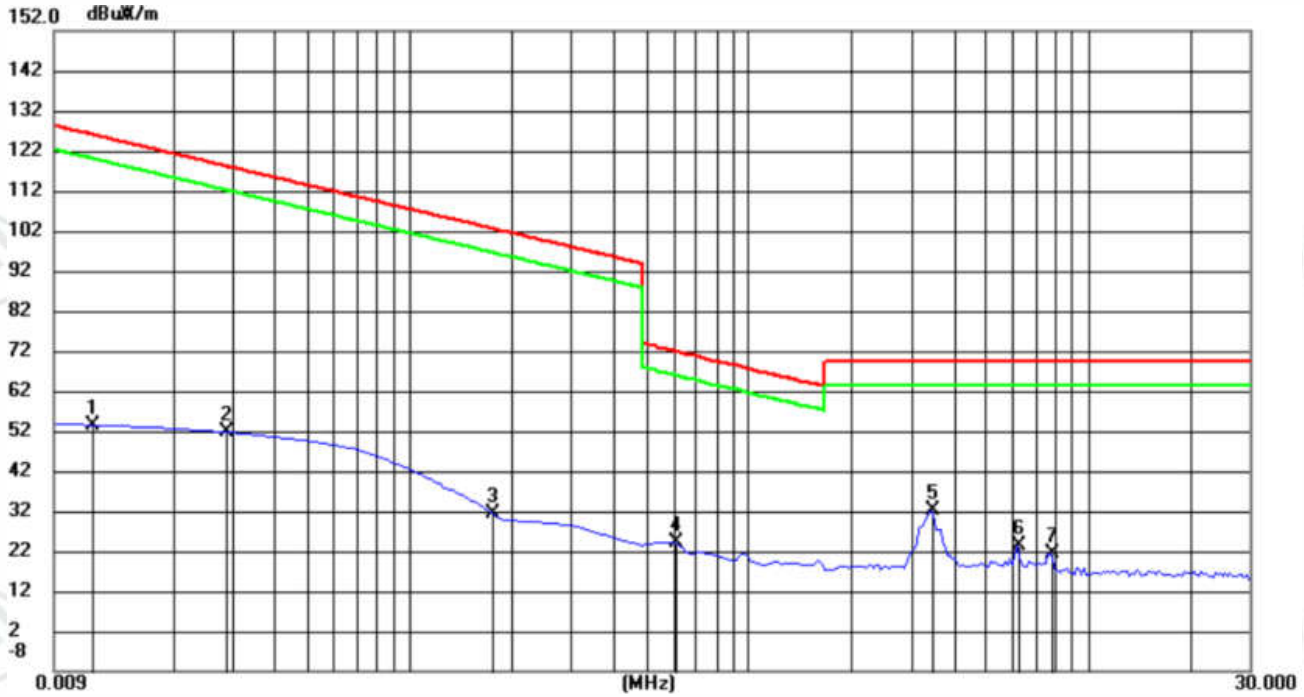
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		0.0113	31.19	21.43	52.62	126.34	-73.72	peak	100	352	
2		0.0465	29.52	20.32	49.84	114.13	-64.29	peak	100	252	
3		0.1750	11.62	20.30	31.92	102.69	-70.77	peak	100	158	
4		0.8504	1.84	20.46	22.30	69.02	-46.72	peak	100	103	
5	*	3.6151	11.33	20.56	31.89	69.50	-37.61	peak	100	5	
6		6.2596	4.23	20.72	24.95	69.50	-44.55	peak	100	5	
7		7.8223	1.05	20.76	21.81	69.50	-47.69	peak	100	53	

Note:
Polarization:X



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		0.0149	30.97	21.23	52.20	123.95	-71.75	peak	100	107	
2		0.0593	27.81	20.32	48.13	112.03	-63.90	peak	100	57	
3		0.1750	13.59	20.30	33.89	102.69	-68.80	peak	100	24	
4		1.1508	0.13	20.41	20.54	66.40	-45.86	peak	100	207	
5	*	3.4348	11.79	20.54	32.33	69.50	-37.17	peak	100	355	
6		6.1994	1.98	20.72	22.70	69.50	-46.80	peak	100	8	
7		7.8824	0.73	20.76	21.49	69.50	-48.01	peak	100	257	

Note:
Polarization:Y



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		0.0115	32.14	21.42	53.56	126.19	-72.63	peak	100	54	
2		0.0290	31.31	20.44	51.75	118.21	-66.46	peak	100	103	
3		0.1750	11.27	20.30	31.57	102.69	-71.12	peak	100	326	
4		0.6100	3.70	20.56	24.26	71.90	-47.64	peak	100	352	
5	*	3.4949	11.55	20.55	32.10	69.50	-37.40	peak	100	253	
6		6.1994	2.56	20.72	23.28	69.50	-46.22	peak	100	360	
7		7.8824	0.63	20.76	21.39	69.50	-48.11	peak	100	103	

Note:
Polarization:Z

APPENDIX 2 PHOTOGRAPHS OF EUT

Refer to Report No. EED32L00291601 for EUT external and internal photos.

*** End of Report ***