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ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

Channel Well Technology Co., Ltd

Applicant: No.222, Sec. 2, Nankan Rd., Lujhu Township, Taoyuan

County 338, Taiwan, R. O. C

Product Name: Wireless Charger

Brand Name: CWT

Model No.: WTM1B15

Model Difference: N/A

FCC ID: 2AC3UWTM1B15

Report Number: ER/2020/30155

FCC Rule Part Part 15C

Issue Date: Oct. 23, 2020

Date of Test: Jun. 17, 2020 ~ Jul. 17, 2020, Oct. 23, 2020

Date of EUT Received: Apr. 23, 2020

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Central RF Lab .The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10:2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15C.

The test results of this report relate only to the tested sample identified in this report.

Approved By:

Jazz Huang / Asst. Supervisor





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Revision History							
Report Number Revision Description Issue Date Remark							
ER/2020/30155	Rev.00	Original.	Oct. 23, 2020	Revised By: Violetta Tang			

Note:

1 · Disclaimer

Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.

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1 GENERAL INFORMATION

1.1 Product Description

- reader Becompach					
Product Name:	Wireless Charger				
Brand Name:	CWT	CWT			
Model No.:	WTM1B15	WTM1B15			
Model Difference:	N/A				
Hardware Version:	N/A				
Software Version:	N/A				
Dawar Cumhu	19V from A	AC/DC Adapter			
Power Supply:	Adapter:	Model No.: HKA12019063-6C, Supplier: HuntKey.			

WPC

_		
	Operating Frequency	127kHz
	Transmit Power	< 80.11dBuV/m at 3m.
	Number of Channels	1
	Antenna Type	Coil Antenna
	Modulation Type	ASK

This report complies with FCC regulatory radio rule with respect to WPC that operates on 127 kHz.

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1.2 Test Methodology

FCC Part 15, Subpart C

ANSI C63.10:2013

Note: All test items have been performed and record as per the above standards.

1.3 Test Facility

SGS Taiwan Ltd. Central RF Lab (TAF code 3702)

No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803

FCC Designation number: TW0027

1.4 Special Accessories

There is no special accessory used while test was conducted.

1.5 Equipment Modifications

There was no modification incorporated into the EUT.

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SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The Transmitter was operated in the normal operating mode. The Tx frequency was fixed which was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on a table which is 0.8 m above ground plane. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz. The CISPR Quasi-Peak and Average detector mode is employed. The two LISNs provide 50uH/50 ohm of coupling impedance for the measuring instrument. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

2.3.2 Radiated Emissions

The EUT is a placed on a turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.

2.3.3 Radiated Emission Test Sites For Measurements From 9 kHz To 30 MHz

Radiated emission below 30MHz is measured in a 9m*9m*6m semi-anechoic chamber, the measurements correspond to those obtained at an open-field test site. There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

- 1. Emission level in dBuV/m=20 log (uV/m)
- 2. Measurement was performed at an antenna to the closed point of EUT distance
- 3. Distance extrapolation factor = 40 log (required distance/ test distance) (dB);
- 4. The measurement was undertaken in closer distance at 3m, where extrapolation factor is offset to convert the limit of the measurement. Ex.20*log(30)+40*log(30/3) = 69.54dBuV/m
- 5. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of §15.205.
- 6. The general radiated emission limits in §15.209 apply for the spurious emission generate from UE, except for the fundamental emission where the respective section specifies otherwise.

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2.4 Configuration of Tested System

Fig. 2-1 Conduction & Radiated Emission Test Setup Configuration

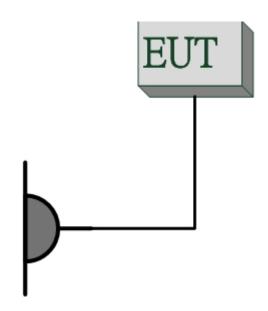


Table 2-1 Equipment Used in Tested System

Ite m	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	WPC Test Software	N/A	N/A	N/A	N/A	N/A

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3 SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§15.207	AC Power Line Conducted Emission	Compliant
§15.209	Radiated Emission Limits, general requirement	Compliant
§15.215 (c)	20 dB OCCUPIED BANDWIDTH	Compliant
§15.203 Antenna Requirement		Compliant

4 DESCRIPTION OF TEST MODES

The EUT stay in continuous transmitting mode. The frequency 127 kHz is the default channel to test, where it is the only manipulative channel as this application supports.

The field strength of spurious radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode), the worst case H position was reported.

The data rate as the lowest supported is selected while tests are conducted.

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MEASUREMENT UNCERTAINTY

Test Items	Uncertainty	
AC Power Line Conducted Emission	+/- 2.586 dB	
Frequency Stability	+/- 123.36 Hz	
20 dB OCCUPIED BANDWIDTH	+/- 123.36 Hz	
Temperature	+/- 0.8 °C	
Humidity	+/- 4.7 %	
DC / AC Power Source	DC= +/- 1%, AC=+/- 0.2%	

Radiated Spurious Emission	Measurement Uncertainty	
	9kHz~30MHz: +-2.3dB	
	30MHz - 180MHz: +/- 3.37dB	
Polarization: Vertical	180MHz -417MHz: +/- 3.19dB	
Polarization. Vertical	0.417GHz-1GHz: +/- 3.19dB	
	1GHz - 18GHz: +/- 4.04dB	
	18GHz - 40GHz: +/- 4.04dB	
	9kHz~30MHz: +-2.3dB	
	30MHz - 167MHz: +/- 4.22dB	
Polarization: Horizontal	167MHz -500MHz: +/- 3.44dB	
Polarization. Horizontal	0.5GHz-1GHz: +/- 3.39dB	
	1GHz - 18GHz: +/- 4.08dB	
	18GHz - 40GHz: +/- 4.08dB	

Note:

- 1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
- 2. The conformity assessment statement in this report is based solely on the test results, measurement uncertainty is excluded.

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6 CONDUCTED EMISSIONS TEST

6.1 Limitation

Conducted Emission

According to section 15.207(a) Conducted Emission Limits is as following.

Frequency range	Limits dB (uV)			
MHz	Quasi-peak	Average		
0.15 to 0.50	66 to 56	56 to 46		
0.50 to 5	56	46		
5 to 30	60	50		

Note

^{2.} The limit decreases linearly with the logarithm of the frequency in the range $0.15\,\mathrm{MHz}$ to $0.50\,\mathrm{MHz}$.

Frequency range	Limits dB (uV)			
MHz	Quasi-peak	Average		
0.009 to 0.050	110			
0.050 to 0.1485	90 Decreasing linearly with logarithm of frequency to 80			
0.1485 to 0.5	66 Decreasing linearly with logarithm of frequency to 56	56 Decreasing linearly with logarithm of frequency to 46		
0.50 to 5	56	46		
5 to 30	60	50		
Note The mains terminal dis	sturbance limits for a 100/110 V rate	ed system are under consideration		

6.2 Measurement Procedure:

- 1. The EUT was placed on a table which is 0.8m above ground plane.
- 2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 3. Sweep frequency starting from 150 kHz to 30 MHz for phase L1.
- 4. Repeating the measurement as lists above for phase neutral.

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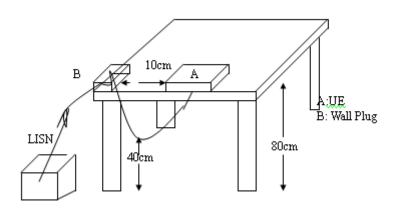
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^{1.} The lower limit shall apply at the transition frequencies



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6.3 Test SET-UP (Block Diagram of Configuration)



6.4 Measurement Equipment Used:

Conducted Emission Test Site								
EQUIPMENT	LAST	CAL DUE.						
TYPE		NUMBER	NUMBER	CAL.				
EMI Test Receiver	R&S	ESCI 7	100759	07/04/2019	07/03/2020			
LISN	SCHWARZBECK	NSLK 8127	8127-465	04/09/2020	04/08/2021			
Coaxial Cables	N/A	Coaxial Cable	161207	12/07/2019	12/06/2020			
Test Software	audix	e3	Ver. 6.11-20180413	N.C.R	N.C.R			

Note: N.C.R refers to Not Calibrated Required.

6.5 Measurement Result:

Note: Refer to next page for measurement data and plots.

Note2: The * reveals the worst-case results that closet to the limit.

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AC POWER LINE CONDUCTED EMISSION TEST DATA

Report Number **Test Date** :2020-06-17 :ER-2020-30155

Test Mode :WPC Temp./Humi. :26.0/58

:AC 120V/60Hz Power Engineer :Nick

Probe :L

> 80 Level (dBuV) 70 60 30 20 10 0.15 0.2 20 Frequency (MHz)

		quency (mile)			
Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit	Margin
PK/QP/AV	dΒμ̈V	dB	dΒμV	dΒμV	dB
Average	37.20	2.14	39.34	55.52	-16.18
QP	47.70	2.14	49.84	65.52	-15.68
Average	21.34	2.14	23.48	52.39	-28.91
QP	35.60	2.14	37.74	62.39	-24.65
Average	16.30	2.15	18.45	50.54	-32.09
QP	39.40	2.15	41.55	60.54	-18.99
Average	23.80	2.15	25.95	48.25	-22.30
QP	40.50	2.15	42.65	58.25	-15.60
Average	18.00	2.16	20.16	46.00	-25.84
QP	41.70	2.16	43.86	56.00	-12.14
Average	13.70	2.17	15.87	46.00	-30.13
QP	37.30	2.17	39.47	56.00	-16.53
Average	15.20	2.26	17.46	46.00	-28.54
QP	37.00	2.26	39.26	56.00	-16.74
Average	26.90	3.16	30.06	50.00	-19.94
	Mode PK/QP/AV Average QP Average	Mode PK/QP/AV Reading Level dBμV Average QP 47.70 37.20 Average 21.34 20 QP 35.60 35.60 Average 16.30 39.40 Average 23.80 20 QP 40.50 40.50 Average 18.00 37.00 QP 37.30 37.30 Average 15.20 37.00	Mode PK/QP/AV Reading Level dBμV dB Average 37.20 2.14 QP 47.70 2.14 Average 21.34 2.14 QP 35.60 2.14 Average 16.30 2.15 QP 39.40 2.15 Average 23.80 2.15 QP 40.50 2.15 Average 18.00 2.16 QP 41.70 2.16 Average 13.70 2.17 QP 37.30 2.17 Average 15.20 2.26 QP 37.00 2.26	Mode PK/QP/AV Reading Level dBμV FS dBμV Average 37.20 2.14 39.34 QP 47.70 2.14 49.84 Average 21.34 2.14 23.48 QP 35.60 2.14 37.74 Average 16.30 2.15 18.45 QP 39.40 2.15 41.55 Average 23.80 2.15 25.95 QP 40.50 2.15 42.65 Average 18.00 2.16 20.16 QP 41.70 2.16 43.86 Average 13.70 2.17 15.87 QP 37.30 2.17 39.47 Average 15.20 2.26 17.46 QP 37.00 2.26 39.26	Mode PK/QP/AV Reading Level dB μV FS dB μV dBμV dBμV dBμV dBμV Average QP 37.20 2.14 39.34 55.52 52.39 55.52 65.39 65.39 62.39 60.54 62.39 60.54 62.39 60.54

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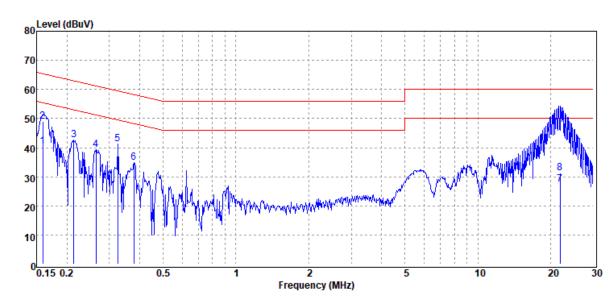
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Report Number **Test Date** :2020-06-17 :ER-2020-30155

Test Mode :WPC Temp./Humi. :26.0/58

:AC 120V/60Hz Power Engineer :Nick

Probe :N



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit	Margin
MHz	PK/QP/AV	dΒμV	dB	dΒμV	dΒμV	dB
0.16	Average	38.10	2.21	40.31	55.52	-15.21
0.16	QP	46.80	2.21	49.01	65.52	-16.51
0.21	Peak	40.42	2.21	42.63	63.05	-20.42
0.26	Peak	37.12	2.21	39.33	61.29	-21.96
0.33	Peak	39.03	2.21	41.24	59.57	-18.33
0.38	Peak	32.71	2.21	34.92	58.30	-23.38
21.83	Average	24.20	3.12	27.32	50.00	-22.68
21.83	QP	28.10	3.12	31.22	60.00	-28.78

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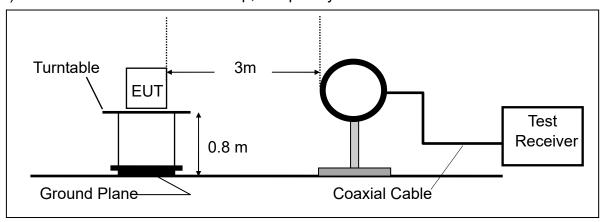
RADIATED EMISSION TEST

7.1 Measurement Procedure

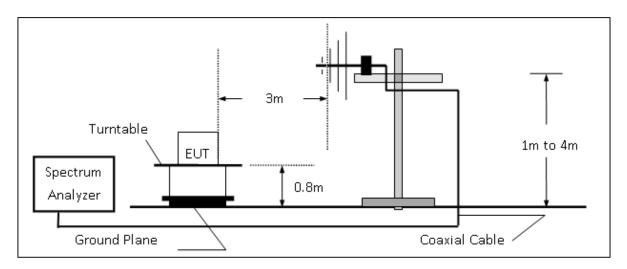
- The EUT was placed on a turn table which is 0.8m above ground plane.
- Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

7.2 Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



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7.3 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Bi-log Antenna	SCHWAZBECK	VULB9168	378	01/03/2020	01/02/2021
3m Site NSA	SGS	966 chamber	N/A	01/02/2020	01/01/2021
Loop Antenna	ETS.LINDGREN	6502	148045	10/15/2019	10/14/2020
PXA Spectrum Analyzer	Agilent	N9030A	MY53120760	04/21/2020	04/20/2021
EMI Test Receiver	R&S	ESCI 7	1166.5950.07	07/04/2019	07/03/2020
Pre-Amplifier	HP	8447D	2944A07676	01/02/2020	01/01/2021
Low Loss Cable	Huber Suhner	966_RX	9	01/02/2020	01/01/2021

7.4 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

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7.5 Field Strength of Fundamental Emission 7.5.1 Limit **Below 30MHz**

Frequency (MHz)	Limit (µV/m)	Measurement distance (meters)	Remark
0.009-0.490	2400/F(kHz)	300	Quasi-Peak Value
0.490-1.705	24000/F(kHz)	30	Quasi-Peak Value
1.705-30.0	30	30	Quasi-Peak Value

Above 30MHz

Frequency (MHz)	Limit (dBµV/m @3m)	Remark
30-88	40	Quasi-Peak Value
88-216	43.5	Quasi-Peak Value
216-960	46	Quasi-Peak Value
Above 960	54	Quasi-Peak Value
	54	Average Value
Above 1GHz	74	Peak Value

Note:

- The measurement was undertaken in closer distance at 3m, where extrapolation factor is offset to convert the limit of the measurement. Ex.20*log(30)+40*log(30/3) = 69.54dBuV/m
- 2. The emission limits shown in the above table are based on measurements employing a CISPR guasi-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.
- 3. Actual FS(dBµV/m) = Spectrum. Reading level(dBµV) + Factor(dB) Factor(dB) = Antenna Factor(dB μ V/m) + Cable Loss(dB) – Pre Amplifier Gain(dB)

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7.5.2 Below 30 MHz test result

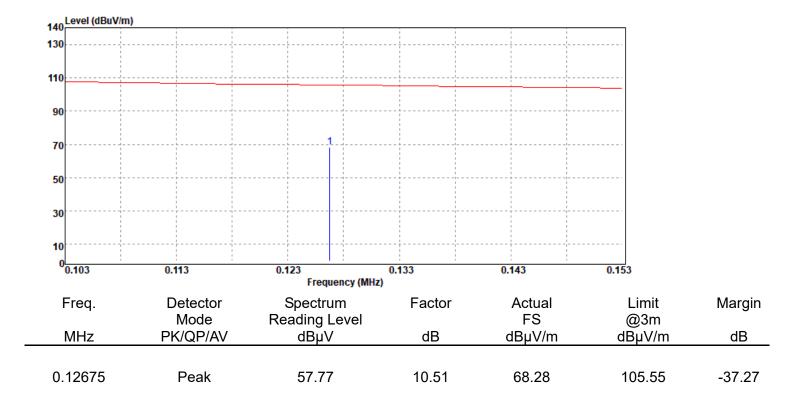
Report Number :ER-2020-30155 Test Date :2020-06-17

Operation Mode :WPC Temp./Humi. :25.2/63

Test Frequency :127 KHz Antenna Pol. :VERTICAL

Test Mode :Main Engineer :Nick

EUT Pol :H Plane



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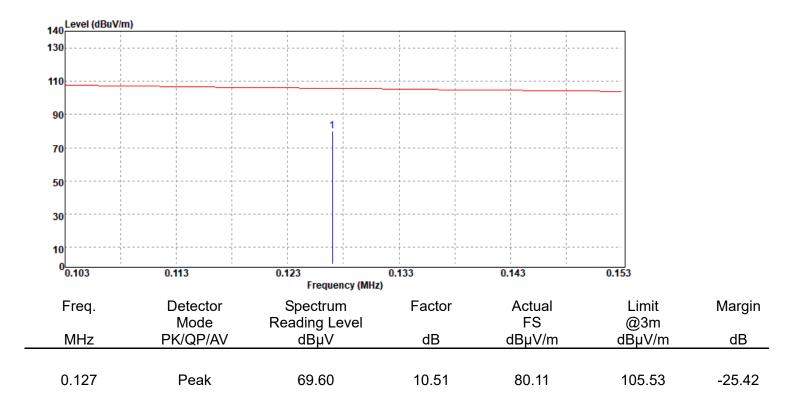
Report Number **Test Date** :2020-06-17 :ER-2020-30155

Operation Mode :WPC Temp./Humi. :25.2/63

Antenna Pol. **Test Frequency** :127 KHz :HORIZONTAL

Test Mode :Main Engineer :Nick

EUT Pol :H Plane



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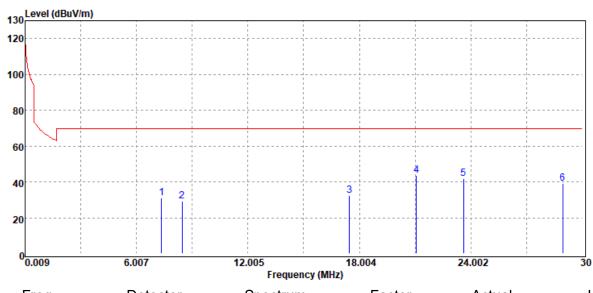
Report Number **Test Date** :ER-2020-30155 :2020-06-17

Operation Mode :WPC Temp./Humi. :25.2/63

Test Frequency :127 KHz Antenna Pol. :VERTICAL

Test Mode :Tx Engineer :Nick

EUT Pol :H Plane



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
7.36	Peak	19.28	11.67	30.95	69.54	-38.59
8.47	Peak	17.40	11.84	29.24	69.54	-40.30
17.46	Peak	21.42	11.10	32.52	69.54	-37.02
21.06	Peak	33.18	10.60	43.78	69.54	-25.76
23.61	Peak	31.71	9.99	41.70	69.54	-27.84
28.95	Peak	30.43	8.89	39.32	69.54	-30.22

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:H Plane

EUT Pol

Report No: ER/2020/30155

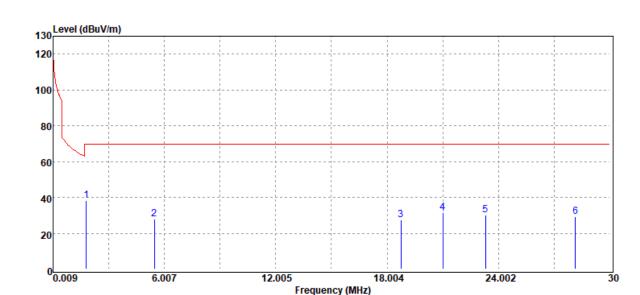
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Report Number **Test Date** :2020-06-17 :ER-2020-30155

Operation Mode :WPC :25.2/63 Temp./Humi.

Test Frequency Antenna Pol. :HORIZONTAL :127 KHz

Test Mode :Tx Engineer :Nick



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
1.81	Peak	26.80	11.28	38.08	69.54	-31.46
5.47	Peak	16.66	11.30	27.96	69.54	-41.58
18.75	Peak	16.28	10.98	27.26	69.54	-42.28
21.00	Peak	20.67	10.61	31.28	69.54	-38.26
23.31	Peak	20.16	10.06	30.22	69.54	-39.32
28.14	Peak	20.04	9.05	29.09	69.54	-40.45

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7.5.3 Above 30MHz test result

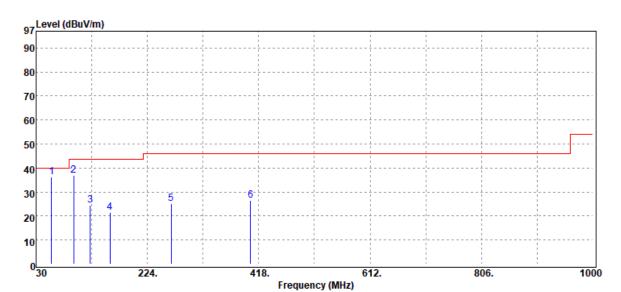
Test Date Report Number :ER-2020-30155 :2020-06-17

:WPC **Operation Mode** Temp./Humi. :25.2/63

Test Frequency :127 KHz Antenna Pol. :VERTICAL

Test Mode :Tx Engineer :Nick

EUT Pol :H Plane



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
57.16	Peak	44.91	-8.53	36.38	40.00	-3.62
95.96	Peak	50.69	-13.72	36.97	43.50	-6.53
124.09	Peak	33.84	-9.30	24.54	43.50	-18.96
159.01	Peak	28.94	-7.34	21.60	43.50	-21.90
265.71	Peak	32.59	-7.25	25.34	46.00	-20.66
403.45	Peak	30.85	-4.37	26.48	46.00	-19.52

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Report Number :ER-2020-30155

Operation Mode :WPC

Test Frequency :127 KHz

Test Mode :Tx

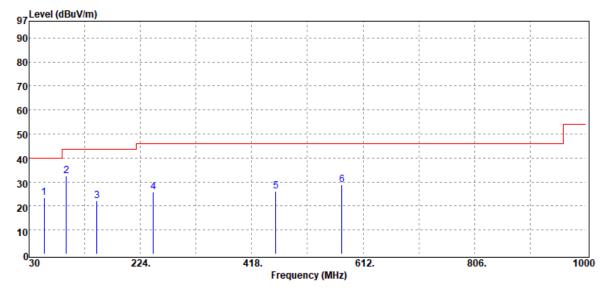
EUT Pol :H Plane

Test Date :2020-06-17

Temp./Humi. :25.2/63

Antenna Pol. :HORIZONTAL

Engineer :Nick



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
56.19	Peak	31.96	-8.51	23.45	40.00	-16.55
94.99	Peak	46.35	-13.83	32.52	43.50	-10.98
148.34	Peak	29.62	-7.41	22.21	43.50	-21.29
246.31	Peak	33.91	-7.99	25.92	46.00	-20.08
459.71	Peak	28.62	-2.39	26.23	46.00	-19.77
575.14	Peak	29.18	-0.47	28.71	46.00	-17.29

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20 dB OCCUPIED BANDWIDTH MEASUREMENT

8.1 Standard Applicable:

§2.1049 & §15.215 (c)

8.2 Limit:

None

8.3 Test Set-up

Refer to section 7.2 in this report

8.4 Measurement Procedure

20dB bandwidth

- 1. The EUT was placed on a turn table which is 0.8m above ground plane.
- 2. Set the EUT stay in continuous transmitting mode.
- 3. Set Span = approximately 2 to 5 times the 20 dB bandwidth, centered on a channel The domain al IF filter bandwidth (3dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW; Sweep = auto; Detector function = peak
- 4. Set SPA trace 1 Max hold, then view.

8.5 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Loop Antenna	ETS.LINDGREN	6502	143303	04/28/2020	04/27/2021
EXA Spectrum Analyzer	Agilent	N9010A	MY50420195	05/06/2020	05/05/2021
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2020	01/01/2021

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8.6 Measurement Result -20dB Bandwidth



20dB Bandwidth	Limit
810 Hz	No requirement

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9 ANTENNA REQUIREMENT

9.1 Standard Applicable:

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than furnished by the responsible party shall be used with the device.

9.2 Antenna Connected Construction:

The antenna is designed as permanently attached and no consideration of replacement. Please see EUT photo and antenna spec. for details.

~ End of Report ~

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