

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT



Applicant: SUPER POWER TOOLS CO., LTD.
NO.62, LN. 5, SHENAN ST., SHENGANG DIST. TAICHUNG
CITY, TAIWAN 42944

Manufacturer: SUPER POWER TOOLS CO., LTD.
NO.62, LN. 5, SHENAN ST., SHENGANG DIST. TAICHUNG
CITY, TAIWAN 42944

Product Name: Transmitter for Remote Control Starter Switch

Brand Name: O'SKOOOL

Model No.: PTA09-A

Model Difference: N/A

Report Number: TERF2205000630ER

FCC ID 2A7E6PTA2201

Date of EUT Received: May 13, 2022

Date of Test: June 6, 2022 ~ June 20, 2022

Issue Date: July 22, 2022

Approved By


Jim Chang

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 comply with FCC rule part §15.231.

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

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Revision History

Report Number	Revision	Description	Issue Date	Revised By	Remark
TERF2205000630ER	00	Original	July 8, 2022	Yuri Tsai	
TERF2205000630ER	01	Updated duty cycle & radiated test result	July 22, 2022	Yuri Tsai	*

Note:

- 1、The remark "*" indicates modification of the report upon requests from certification body.

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1 GENERAL INFORMATION

1.1 Product Description

Product Name:	Transmitter for Remote Control Starter Switch
Brand Name:	O'SKOO
Model No.:	PTA09-A
Model Difference:	N/A
Hardware Version:	N/A
Firmware Version:	N/A
EUT Series No.:	PTA09-A0001
Power Supply:	3Vdc
Test Software (Name/Version)	N/A

1.2 RF specification

Radio Technology:	Short Range Radio
Operating Frequency	433.9MHz
Transmit Power	≤ 81.46 dBuV/m Max.
Modulation Technique	ASK
Number of Channels	1 Channel
Antenna Type	PCB

Note: Antenna information is provided by the applicant.

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1.3 Test Methodology

FCC Part 15, Subpart C §15.231
ANSI C63.10:2013

1.4 Test Facility

Laboratory	Test Site Address	Test Site Name	FCC Designation number	IC CAB identifier
SGS Taiwan Ltd. Central RF Lab. (TAF code 3702)	No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan.	SAC 1 SAC 3 Conduction 1 Conducted 1 Conducted 2 Conducted 3 Conducted 4 Conducted 5 Conducted 6	TW0027	
	No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333	Conduction C SAC C SAC D SAC G Conducted A Conducted B Conducted C Conducted D Conducted E Conducted F Conducted G	TW3702 TW0028	

Note: Test site name is remarked on the equipment list in each section of this report as an indication where measurements occurred in specific test site and address.

1.5 Special Accessories

There are no special accessories used while test was conducted.

1.6 Equipment Modifications

There was no modification incorporated into the EUT.

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2 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 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 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.

2.4 Measurement Results Explanation Example

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

Radiated emission below 30MHz is measured in a 9m*6m*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.

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2.4.2 For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuation factor between EUT conducted port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly EUT RF output level.

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2.5 Test Configuration

Conducted Setup	Radiated Setup
	

2.6 Control Unit(s)

Conducted Emission Test Site: Conducted 2					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
H-Loop Near Field Antenna	EMCI	LF-R 400	02-1637	N/A	N/A
Radiated Emission Test Site: SAC 3					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Test Software	audix	e3	Ver. 9 210322	N.C.R	N.C.R

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3 SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§15.207	AC Power Line Conducted Emission	N/A
§15.231(e)	Radiated Emission	Compliant
§15.231(c)	Emission Bandwidth	Compliant
§15.35 (c)	Duty Cycle Test (Determining average factor from a complete pulse train)	Compliant
§15.231(a)(1)	Transmission Ceased Time	Compliant
§15.203	Antenna Requirement	Compliant

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4 DESCRIPTION OF TEST MODES

4.1 Operating Frequencies

FREQUENCY
433.9MHZ

4.2 The Worst Test Modes and Channel Details

The field strength of radiated emission was measured as the EUT positioned in different orthogonal planes (E1/E2/H) based on actual usage of the EUT to pre-scan the emissions for determining the worst case scenario.

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5 MEASUREMENT UNCERTAINTY

Test Items	Uncertainty		
AC Power Line Conducted Emission	+/-	2.34	dB
Frequency Stability	+/-	1.53	Hz
Emission Bandwidth	+/-	1.53	Hz
Temperature	+/-	0.4	°C
Humidity	+/-	3.5	%
DC / AC Power Source	+/-	1	%

Radiated Spurious Emission Measurement Uncertainty		
Polarization: Vertical	+/- 2.57 dB	9kHz~30MHz
	+/- 4.85 dB	30MHz - 1000MHz
	+/- 4.45 dB	1GHz - 18GHz
	+/- 4.24 dB	18GHz - 40GHz
Polarization: Horizontal	+/- 2.57 dB	9kHz~30MHz
	+/- 4.37 dB	30MHz - 1000MHz
	+/- 4.45 dB	1GHz - 18GHz
	+/- 4.24 dB	18GHz - 40GHz

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 MEASUREMENT EQUIPMENT USED

6.1 Emission from AC power line

N/A

6.2 Radio Emissions Measurement

Conducted Emission Test Site: Conducted 2					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EXA Spectrum Analyzer	KEYSIGHT	N9010B	MY60242081	09/30/2021	09/29/2022

6.3 Radiated Measurement

Radiated Emission Test Site: SAC 3					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Horn Antenna	SCHWARZBECK	BBHA9170	184	12/16/2021	12/15/2022
Horn Antenna	SCHWARZBECK	BBHA9120D	1441	09/27/2021	09/26/2022
Bi-log Antenna	SCHWARZBECK	VULB9168	378	08/20/2021	08/19/2022
Loop Antenna	ETS.LINDGREN	6502	148045	09/29/2021	09/28/2022
PXA Spectrum Analyzer	Agilent	N9030A	MY53120760	04/27/2022	04/26/2023
EMI Test Receiver	R&S	ESCI 7	100759	08/26/2021	08/25/2022
Pre-Amplifier	HP	8449B	3008A00578	12/16/2021	12/15/2022
Pre-Amplifier	EMC Instruments	EMC184045B	980135	10/27/2021	10/26/2022
Pre-Amplifier	HP	8447D	2944A07676	12/16/2021	12/15/2022
Attenuator	Mini-Circuit	BW-S10W2+	4	12/14/2021	12/13/2022
Bandreject Filter 430-436	Titan	T04H86002600060S01	210619-2-6	12/14/2021	12/13/2022
Coaxial Cable	Huber Suhner	SUCOFLEX 102	MY2636/2	12/16/2021	12/15/2022
Coaxial Cable	Huber Suhner	SUCOFLEX 104	340057/4	12/16/2021	12/15/2022
Coaxial Cable	Huber Suhner	SUCOFLEX 104PEA	800052/2	12/16/2021	12/15/2022
Coaxial Cable	Huber Suhner	SUCOFLEX 102	MY2621/2	12/16/2021	12/15/2022
Coaxial Cable	Huber Suhner	SUCOFLEX 102	MY2617/2	12/16/2021	12/15/2022
Site Cal	SGS	SAC 3	N/A	01/01/2022	12/31/2022

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7 CONDUCTED EMISSIONS TEST

7.1 Standard Applicable

According to §15.207, frequency within 150 kHz to 30MHz shall not exceed the limit table as below.

Frequency range MHz	Limits (dBuV)	
	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

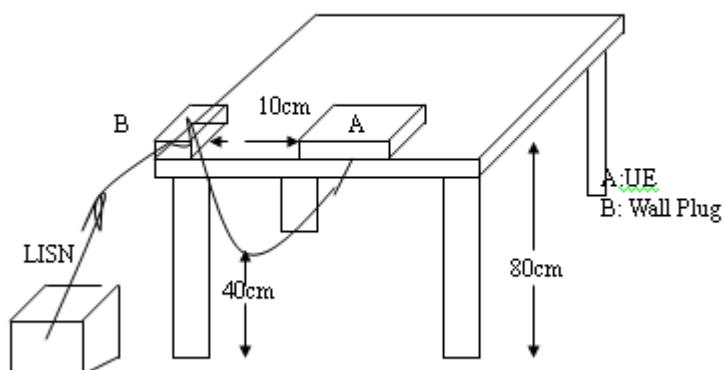
1. The lower limit shall apply at the transition frequencies

2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

7.2 EUT Setup

1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.10:2013.
2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
3. The LISN was connected with 120Vac/60Hz power source.

7.3 Test Set-up:



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7.4 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. Repeat above procedures until all frequency measured were complete.

7.5 Measurement Result

N/A; Powered from battery.

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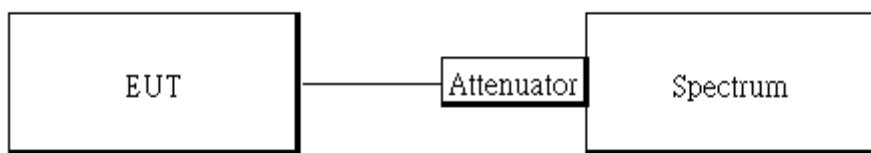
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8 DUTY CYCLE MEASUREMENT

8.1 Applicable Standard

According to 15.35(c), the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification.

8.2 Test Setup



8.3 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set EUT normal operating mode.
3. Set SPA Center Frequency = fundamental frequency, RBW, VBW= 100kHz, Span =0 Hz. Adjacent sweep.
4. Set SPA View. Mark delta.

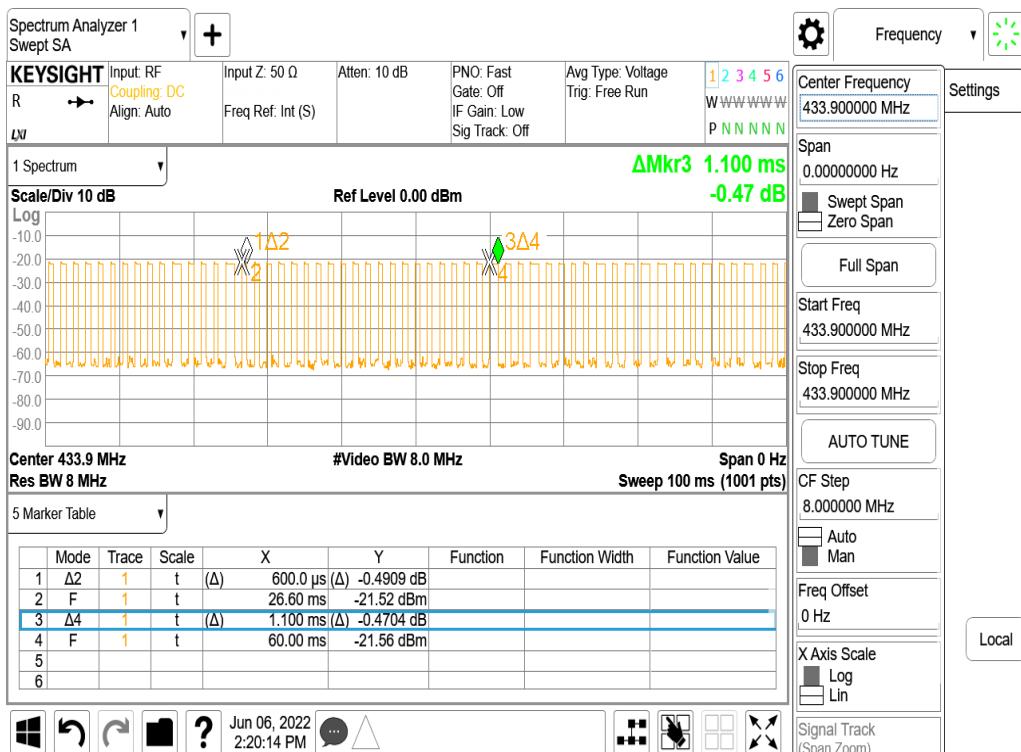
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8.4 Measurement Results:

Ton (ms)	TP=Ton+Toff (ms)	Avg correction factor(dB) = 20log(Ton/TP)
39.1	100	-8.16



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9 EMISSION BANDWIDTH

9.1 Applicable Standard

According to 15.231 (c) The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

9.2 Test Setup

Refer to section 8.2 of this report.

9.3 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set EUT as transmitting mode.
3. Set SPA Center Frequency = fundamental frequency, RBW=1% to 5% OBW, VBW= 3 x RBW, Span = large enough to capture all products of the modulation process.
4. Set SPA -20dB Occupied bandwidth.

9.4 Measurement Results

The center frequency f_c is **433.9MHz**, according to the Rules, section 15.231(C), the Bandwidth of Center Frequency at -20dB should be calculated as following:

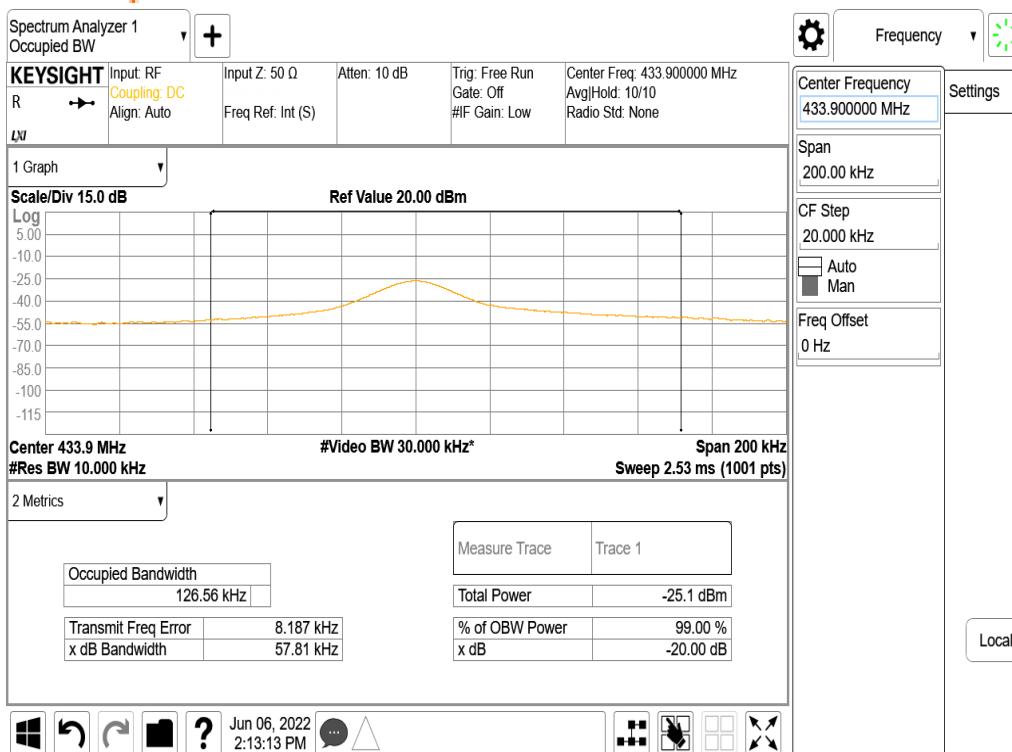
$$433.9 \times 0.0025 = 1.08475 \text{ (MHz)}$$

Frequency(MHz)	OBW (MHz)	Limit (MHz)	Result
433.9	0.12656	1.08475	Pass

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10 TRANSMISSION CEASED TIME MEASUREMENT:

15.231 (a) (1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

10.1 Test Setup

Refer to 8.2 of this report.

10.2 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set SPA Center Frequency = fundamental frequency, RBW=100kHz, VBW= 100kHz, Span =0Hz. Sweep Time= 5s.
3. Set EUT as normal operation and press Transmitter bottom for 2 s approximately,
4. Set SPA Max hold. Delta Mark.

10.3 Measurement Results

The release time is less than 5 s.



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11 RADIATED EMISSION TEST

11.1 Standard Applicable

According to 15.231(b), the field strength of emissions from Intentional Radiators operated under this section shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental		Field Strength of Spurious	
	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)
40.66 - 40.70	67.04	2,250	47	225
70 - 130	61.94	1,250	41.9	125
130 - 174	* 61.94 - 71.48	* 1,250 - 3,750	* 41.9 - 51.48	* 125 to 375
174 - 260	71.48	3,750	51.48	375
260 - 470	* 71.48 - 81.94	* 3,750 - 12,500	* 51.48 - 61.94	* 375 to 1250
above 470	81.94	12,500	61.94	1250

11.2 Remark:

1. Emission level in dBuV/m=20 log (uV/m)
2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of § 15.205
4. Emission spurious frequency which appearing within the Restricted Bands specified in provision of §15.205, then the general radiated emission limits in § 15.209 apply.
5. For the band 130-174MHz, uV/m at 3meters = 56.81818(F) – 6136.3636;
For the band 260-470MHz uV/m at 3meters = 41.6667(F) – 7083.3333;
Where F is the frequency in MHz.

Fundamental Frequency (MHz)	41.6667(F) – 7083.3333 (uV/m)	Limit (dBuV/m)
433.9	10995.8478	80.82

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11.3 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
4. When 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.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. Repeat above procedures until all frequency of the interest measured were complete.

11.4 Auxiliary Procedure (Setting on Spectrum to capture the reading of emission level):

- (1) Span = wide enough to fully capture the emission being measured
- (2) RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz, VBW \geq RBW, Sweep = auto, Detector function = peak, Trace = max hold
- (3) For average measurement: use duty cycle correction factor method per 15.35(c)
Duty Cycle = On time/100 milliseconds
On time = $N1 \cdot L1 + N2 \cdot L2 + \dots + N(n-1) \cdot L(n-1) + N(n) \cdot L(n)$
Where $N1$ is number of type 1 pulses, $L1$ is length of type 1 pulses, etc.
Average Emission Level = Peak Emission Level + $20 \cdot \log_{10}$ (duty Cycle)

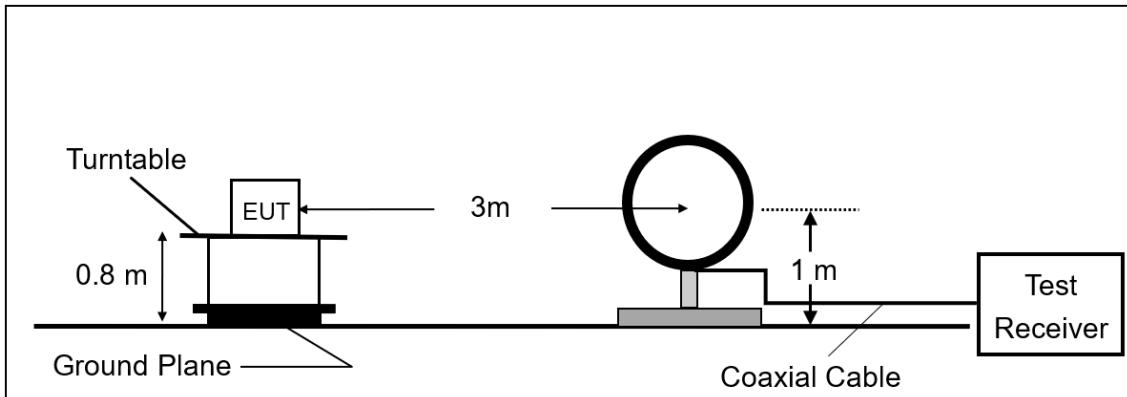
Test was measured starting from 9kHz to 10th harmonic of the fundamental frequency, and data containing the worst result above 30MHz are shown on the test report.

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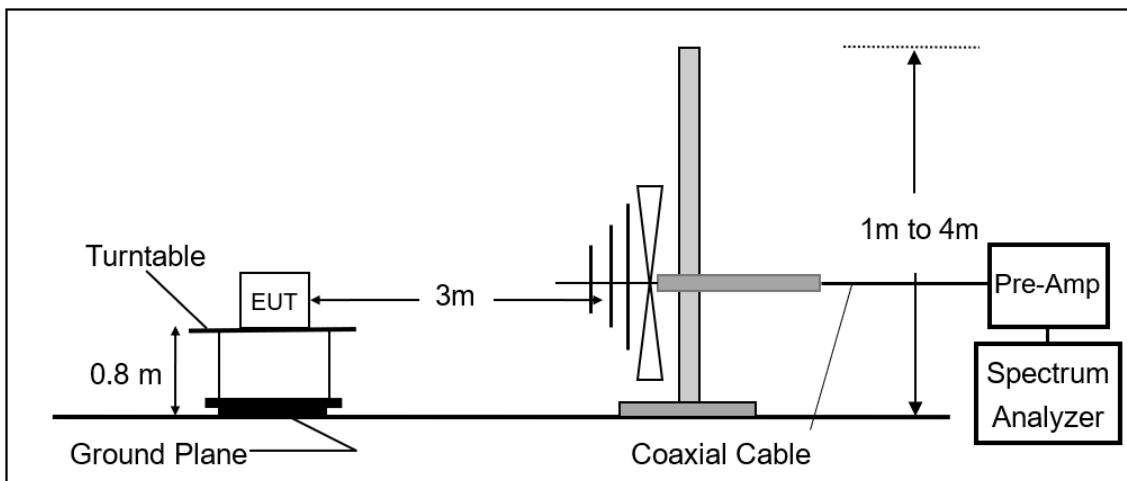
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11.5 Test Setup

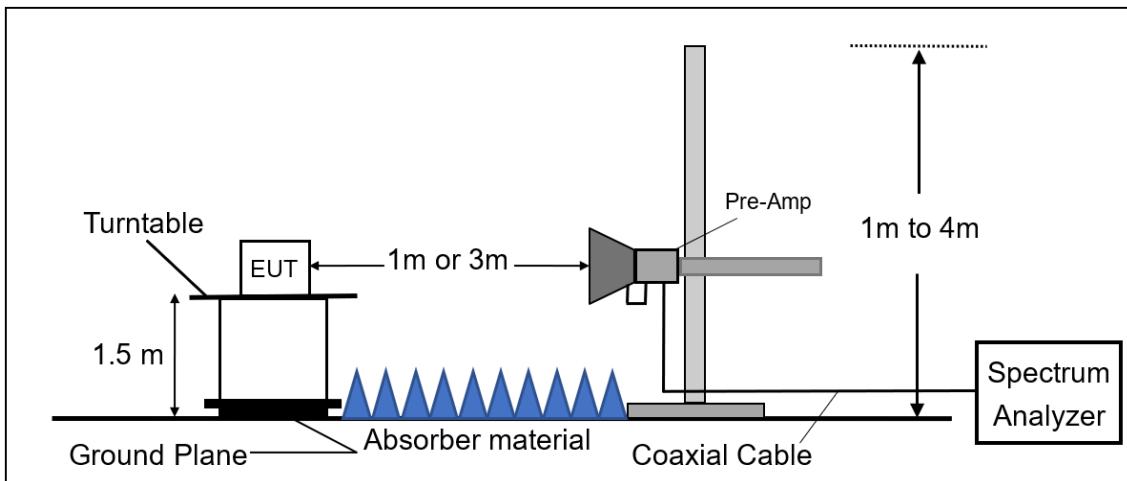
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz.



(B) Radiated Emission Test Set-Up, Frequency From 30MHz to 1000MHz.



(C) Radiated Emission Test Set-Up, Frequency Above 1GHz.



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11.6 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:

$$FS = RA + AF + CL - AG$$

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

Remark:

The limit of the emission level is expressed in dB μ V/m, which converts $20 * \log(\mu\text{V}/\text{m})$

Actual FS(dB μ V/m) = SPA. Reading level(dB μ V) + Factor(dB)

Factor(dB) = Antenna Factor(dB μ V/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

11.7 Measurement Results of Radiated Spurious Emissions from 9 kHz to 30 MHz

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit per 15.31(o) was not reported.

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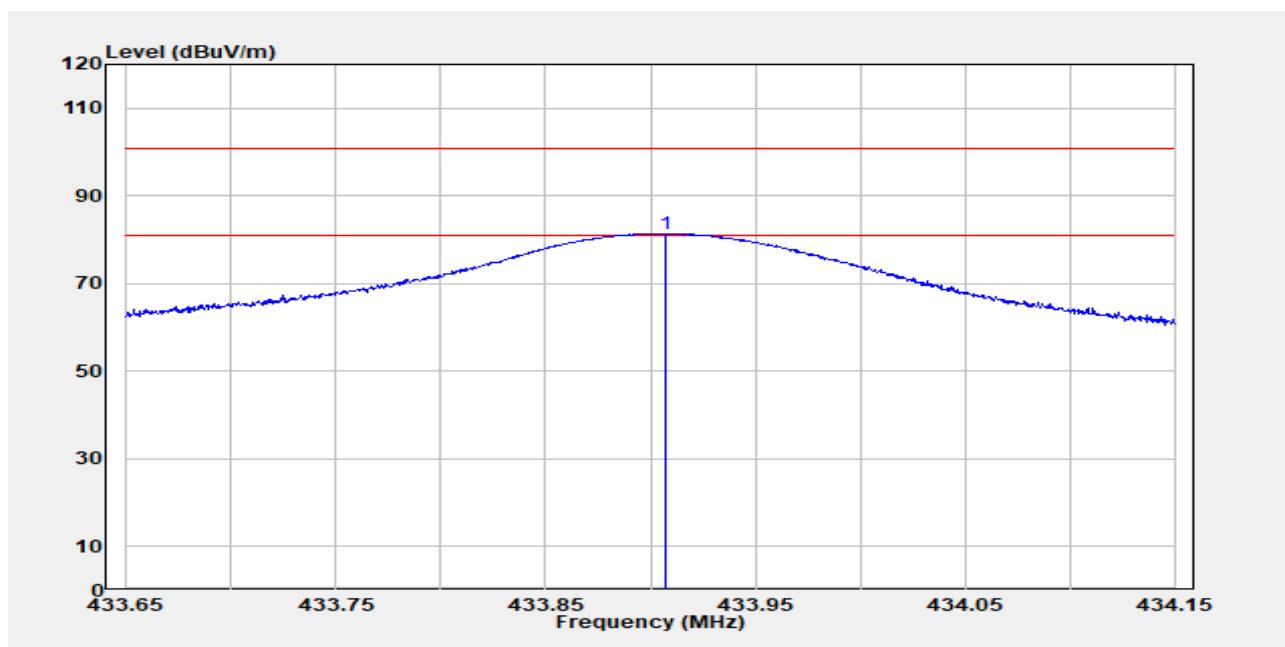
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11.8 Measurement Result

11.8.1 Field Strength of Fundamental

Report Number	:TERF2205000630ER	Test Site	:SAC 3
Operation Mode	:433M	Test Date	:2022-06-20
Test Frequency	:433.9 MHz	Temp./Humi.	:24.5/65
Test Mode	:Main	Antenna Pol.	:VERTICAL
EUT Pol	:H Plane	Engineer	:Nick Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
433.907	Peak	84.75	-3.29	81.46	100.82	-19.36
433.907	Average	---	-8.16	73.30	80.82	-7.52

Note: Average Actual = Peak Actual + Average Factor

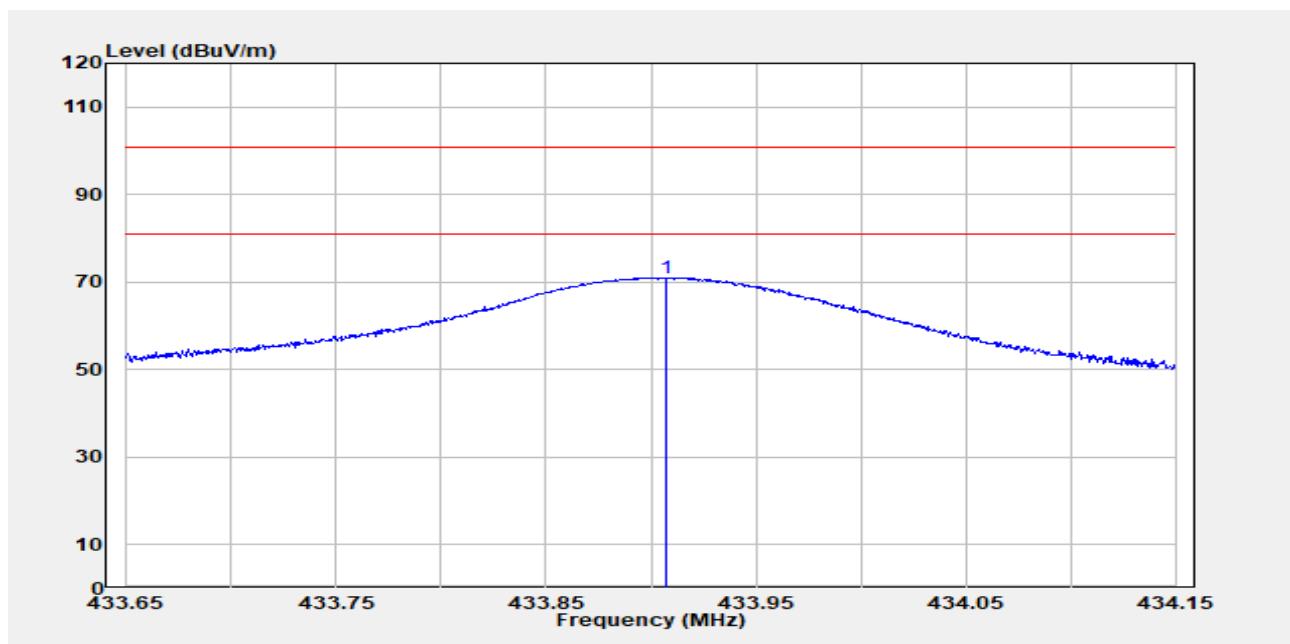
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Report Number :TERF2205000630ER
 Operation Mode :433M
 Test Frequency :433.9 MHz
 Test Mode :Main
 EUT Pol :H Plane

Test Site :SAC 3
 Test Date :2022-06-20
 Temp./Humi. :24.5/65
 Antenna Pol. :Horizontal
 Engineer :Nick Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
433.907	Peak	74.27	-3.29	70.98	100.82	-29.84
433.907	Average	---	-8.16	62.82	80.82	-18.00

Note: Average Actual = Peak Actual + Average Factor

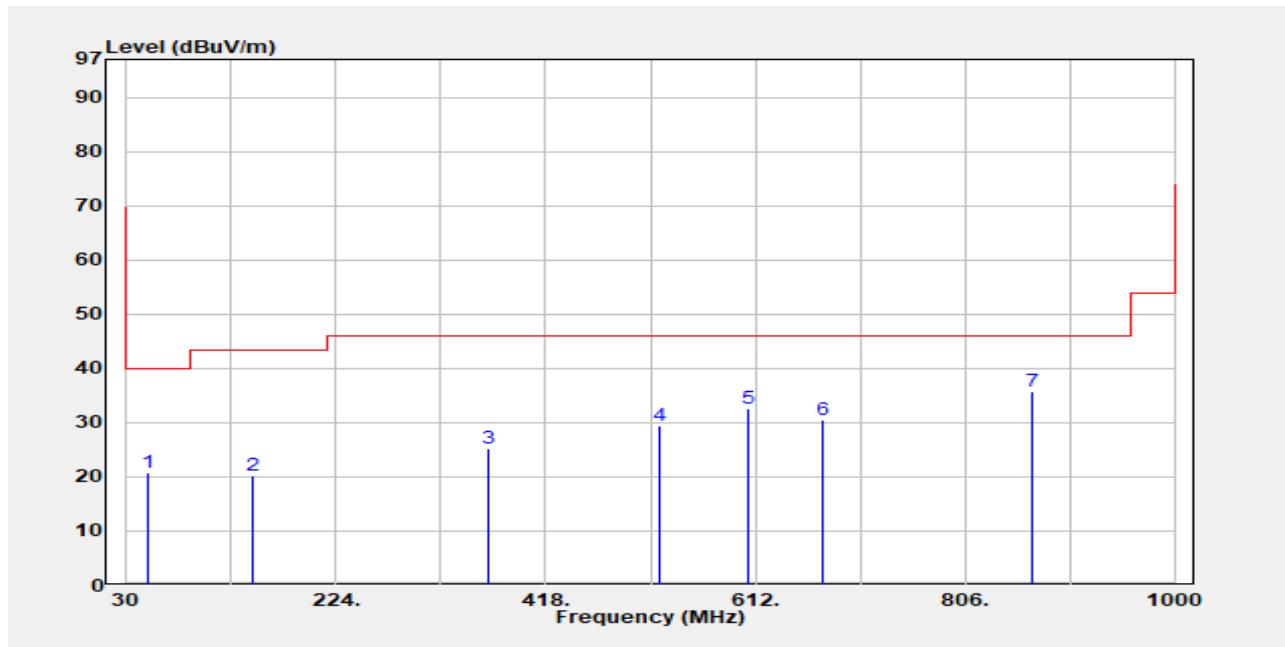
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11.8.2 Field Strength of Spurious Emission

Report Number	:TERF2205000630ER	Test Site	:SAC 3
Operation Mode	:433M	Test Date	:2022-06-20
Test Frequency	:433.9 MHz	Temp./Humi.	:24.5/65
Test Mode	:Tx	Antenna Pol.	:Vertical
EUT Pol	:H Plane	Engineer	:Nick Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
50.370	Peak	28.93	-8.04	20.89	40.00	-19.11
147.370	Peak	27.34	-7.02	20.32	43.50	-23.18
365.620	Peak	27.72	-2.55	25.18	46.00	-20.82
523.730	Peak	28.88	0.57	29.45	46.00	-16.55
605.210	Peak	30.99	1.58	32.58	46.00	-13.42
674.080	Peak	28.67	1.86	30.53	46.00	-15.47
867.800	QP	32.15	3.64	35.79	46.00	-10.21

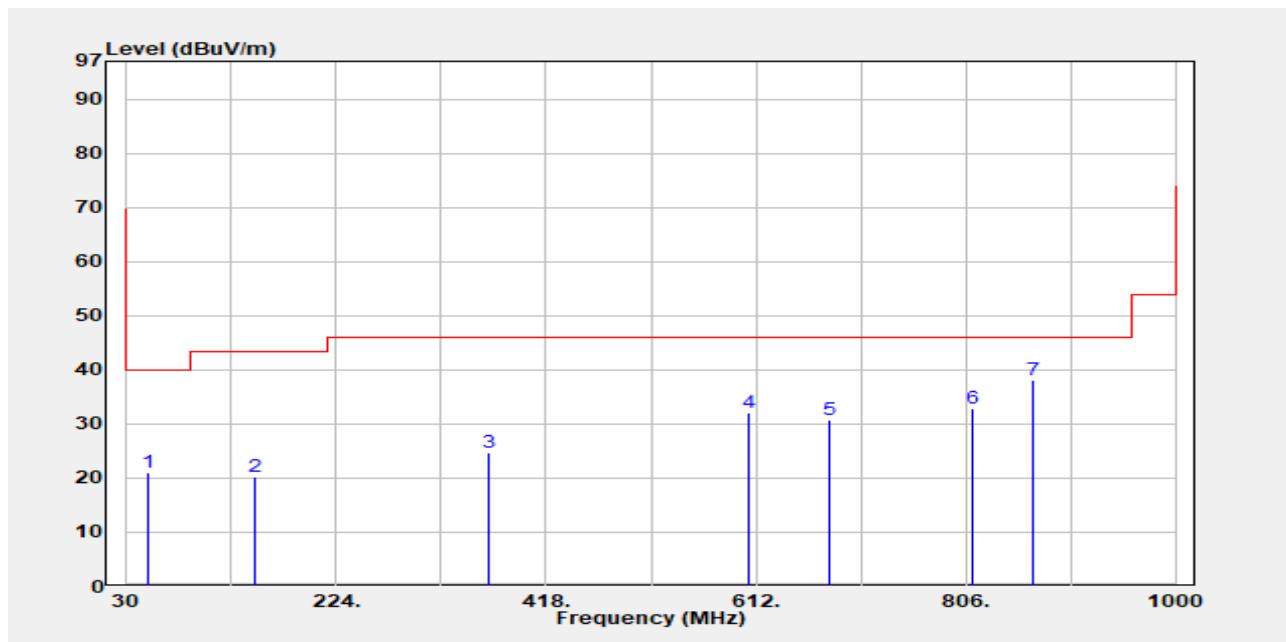
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Report Number :TERF2205000630ER
 Operation Mode :433M
 Test Frequency :433.9 MHz
 Test Mode :Tx
 EUT Pol :H Plane

Test Site :SAC 3
 Test Date :2022-06-20
 Temp./Humi. :24.5/65
 Antenna Pol. :Horizontal
 Engineer :Nick Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
50.370	Peak	29.02	-8.04	20.98	40.00	-19.02
148.340	Peak	27.28	-6.96	20.32	43.50	-23.18
365.620	Peak	27.24	-2.55	24.70	46.00	-21.30
605.210	Peak	30.56	1.58	32.14	46.00	-13.86
679.900	Peak	28.70	1.96	30.66	46.00	-15.34
811.820	Peak	28.45	4.36	32.81	46.00	-13.19
867.800	QP	34.40	3.64	38.04	46.00	-7.96

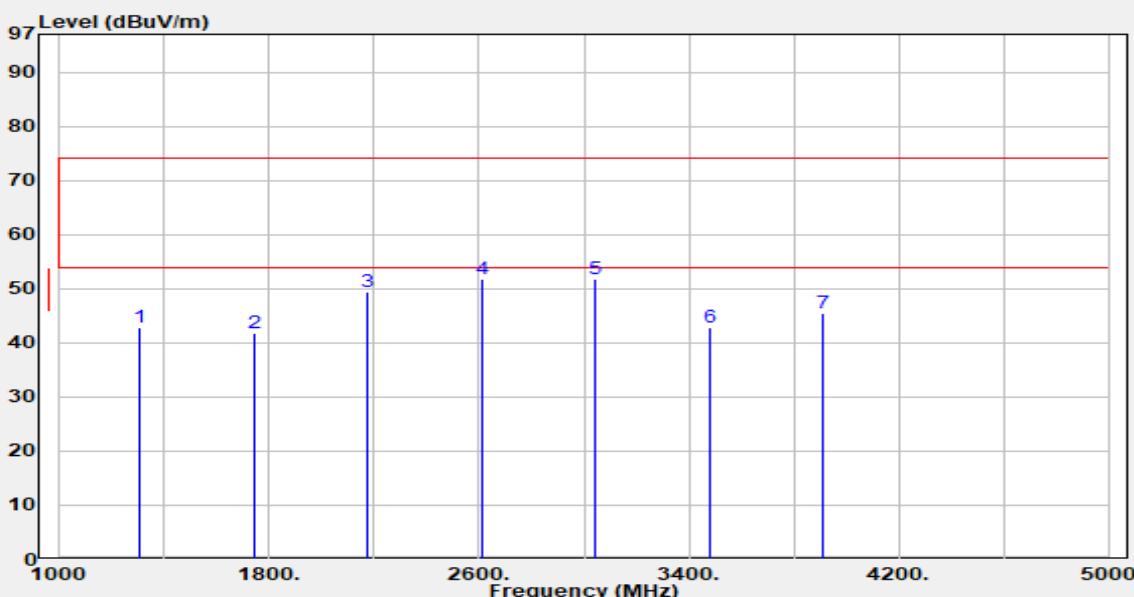
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Test Frequency :433.9 MHz
Test Mode :Tx
EUT Pol :H Plane

Test Site :SAC 3
Test Date :2022-06-20
Temp./Humi. :24.5/65
Antenna Pol. :Vertical
Engineer :Nick Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
1304.7	Peak	46.16	-3.18	42.98	74.00	-31.02
1304.7	Average	---	-8.16	34.82	54.00	-19.18
1739.6	Peak	44.55	-2.76	41.79	74.00	-32.21
1739.6	Average	---	-8.16	33.63	54.00	-20.37
2174.5	Peak	48.83	0.60	49.43	74.00	-24.57
2174.5	Average	---	-8.16	41.27	54.00	-12.73
2609.4	Peak	50.98	0.86	51.84	74.00	-22.16
2609.4	Average	---	-8.16	43.68	54.00	-10.32
3044.3	Peak	49.37	2.45	51.82	74.00	-22.18
3044.3	Average	---	-8.16	43.66	54.00	-10.34
3479.2	Peak	39.29	3.52	42.81	74.00	-31.19
3479.2	Average	---	-8.16	34.65	54.00	-19.35
3914.1	Peak	40.61	4.80	45.41	74.00	-28.59
3914.1	Average	---	-8.16	37.25	54.00	-16.75

Note: Average Actual = Peak Actual + Average Factor

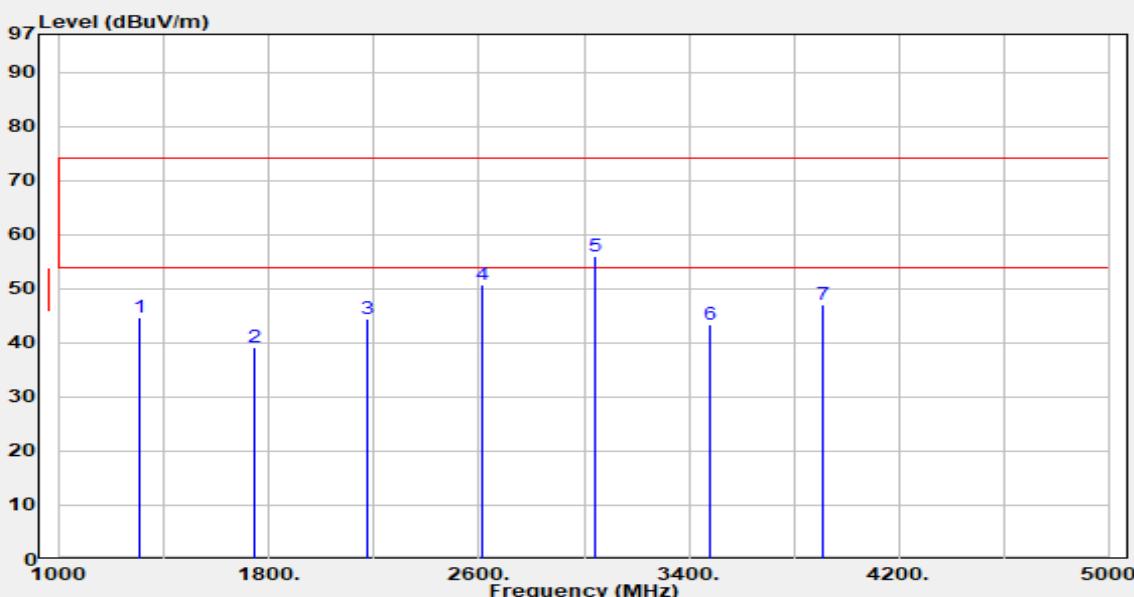
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Report Number :TERF2205000630ER
Operation Mode :433M
Test Frequency :433.9 MHz
Test Mode :Tx
EUT Pol :H Plane

Test Site :SAC 3
Test Date :2022-06-20
Temp./Humi. :24.5/65
Antenna Pol. :Horizontal
Engineer :Nick Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
1304.7	Peak	47.86	-3.18	44.68	74.00	-29.32
1304.7	Average	---	-8.16	36.52	54.00	-17.48
1739.6	Peak	41.94	-2.76	39.17	74.00	-34.83
1739.6	Average	---	-8.16	31.01	54.00	-22.99
2174.5	Peak	43.87	0.60	44.47	74.00	-29.53
2174.5	Average	---	-8.16	36.31	54.00	-17.69
2609.4	Peak	49.99	0.86	50.85	74.00	-23.15
2609.4	Average	---	-8.16	42.69	54.00	-11.31
3044.3	Peak	53.63	2.45	56.08	74.00	-17.92
3044.3	Average	---	-8.16	47.92	54.00	-6.08
3479.2	Peak	39.77	3.52	43.29	74.00	-30.71
3479.2	Average	---	-8.16	35.13	54.00	-18.87
3914.1	Peak	42.17	4.80	46.97	74.00	-27.03
3914.1	Average	---	-8.16	38.81	54.00	-15.19

Note: Average Actual = Peak Actual + Average Factor

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12 ANTENNA REQUIREMENT

12.1 Standard Applicable:

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. 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. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§ 15.211, 15.213, 15.217, 15.219, 15.221, or § 15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

12.2 Antenna Connected Construction:

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

~ End of Report ~

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