Mitech Electronics Co Limited

TEST REPORT

SCOPE OF WORK
FCC TESTING–CW14, CW06, CW08, CW10, CW11,CW12, CW13, CW15, CW16, CW17, CW18, CW19, CW20

REPORT NUMBER
230703055SZN-003

ISSUE DATE	**[REVISED DATE]**
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Mitech Electronics Co Limited

Application
For
Certification

FCC ID: 2BB4I-CW14

Wireless Charging Car Mount

Model: CW14

Additional Model:CW06, CW08, CW10, CW11,CW12, CW13, CW15, CW16, CW17, CW18, CW19, CW20

Brand name: Mitech

Transmitter

Report No.: 230703055SZN-003
Sample No.:Z230703055-001

We hereby certify that the sample of the above item is considered to comply with the requirements of FCC Part 15, Subpart C for Intentional Radiator,
mention 47 CFR [10-1-21]

Prepared and Checked by:

Bruce Zheng
Project Engineer

Approved by:

Peter Kang
Sr. Technical Supervisor
Date: 16 August 2023

MEASUREMENT/TECHNICAL REPORT

This report concerns (check one) Original Grant ___X___ Class II Change _____

Equipment Type: DCD - Part 15 Low Power Transmitter Below 1705 kHz

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? Yes_____ No __X__

If yes, defer until: _____
date

Company Name agrees to notify the Commission by: _____
date

of the intended date of announcement of the product so that the grant can be issued on that date.

Transition Rules Request per 15.37? Yes _____ No ____X_____

If no, assumed Part 15, Subpart C for intentional radiator - the new 47 CFR [10-01-21] Edition] provision.

Report prepared by:

Bruce Zheng
Intertek Testing Services Shenzhen Ltd. Longhua Branch
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Table of Contents

1.0 Summary of Test Results

Applicant: Mitech Electronics Co Limited
Applicant Address: Flat/Rm 1303, 13/F, Cheong Tai Building, No 287-289 Reclamation Street, KL, HK, China
Manufacturer: Mitech Electronics Co Limited
Manufacturer Address: 4/F, New Zhanglong High-tech Park,1st Fuxing Road, Chang'an Town, Dongguan City, Guangdong Province, China

Model: CW14, CW06, CW08, CW10, CW11,CW12, CW13, CW15, CW16, CW17, CW18, CW19, CW20
FCC ID: 2BB4I-CW14

TEST ITEM	REFERENCE	RESULTS
Transmitter Radiated Emissions	15.209	Pass
Antenna Requirement	15.203	Pass (See Notes)

Notes:

1. The EUT uses an Integral Antenna which in accordance to Section 15.203 is considered sufficient to comply with the provisions of this section.
2. Since this report and 230703055SZN-001 is the same product, all the test data in this report are quoted from 230703055SZN-001, FCC ID: 2BCBM-CW14.

2.0 General Description

2.1 Product Description

The Equipment Under Test (EUT) is a Wireless Charging Car Mount with wireless charger function which operating in 110-205 kHz. The EUT is powered by DC 9V/2A via USB Port from DC 12V/24V car charger. the output of the wireless charger is 5W/7.5W/10W/15W. For more detailed features description, please refer to the user's manual.

Antenna Type: Integral Antenna(embedded coil antenna)

For electronic filing, the brief circuit description is saved with filename: descri.pdf.

The Model: CW06, CW08, CW10, CW11,CW12, CW13, CW15, CW16, CW17, CW18, CW19, CW20 are the same as the Model: CW14 in hardware and electrical aspect. The difference in model number, production name and trade name serve as marketing strategy. Please refer to the below table.

2.2 Related Submittal(s) Grants

This is an application for certification of the Wireless Charging Car Mount with wireless charging function portion.

2.3 Test Methodology

The radiated emission measurements were performed according to the procedures in ANSI C63.10 (2013). Radiated emission measurement was performed in Semi-anechoic chamber. For radiated emission measurement, preliminary scans were performed in the semi-anechoic chamber only to determine the worst-case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "Justification Section" of this Application. All other measurements were made in accordance with the procedures in part 2 of CFR 47.

2.4 Test Facility

The Semi-Anechoic chamber used to collect the radiated data is Intertek Testing Services Shenzhen Ltd. Longhua Branch and located at 101, 201, Building B, No. 308 Wuhe Avenue, Zhangkengjing Community, GuanHu Subdistrict, LongHua District, ShenZhen. This test facility and site measurement data have been fully placed on file with File Number: CN1188.

3.0 System Test Configuration

3.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it), and in the confines as outlined in ANSI C63.10 (2013).

The EUT was powered by DC 9V/2A via USB Port during the test. The test system was pre-scanning tested based on the consideration of following EUT operation mode. Only the worst-case data is shown in the report.

Pertest mode	Description
Mode 1	Standby mode
Mode 2	Mobile phone is charging at 1% battery power
Mode 3	Mobile phone is charging at 50% battery power
Mode 4	Mobile phone is charging at 99% battery power

For maximizing emissions below 30 MHz, the EUT was rotated through 360°, the centre of the loop antenna was placed 1 meter above the ground, and the antenna polarization was changed. For maximizing emission at and above 30 MHz, the EUT was rotated through 360°, the antenna height was varied from 1 meter to 4 meters above the ground plane, and the antenna polarization was changed. This step by step procedure for maximizing emissions led to the data report in Section 4.0.

The rear of unit shall be flushed with the rear of the table.

The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). The EUT was mounted to a plastic stand if necessary and placed on the styrene turntable, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

3.2 EUT Exercising Software

N/A

3.3 Special Accessories

There is no special accessories necessary for compliance of this product.

3.4 Equipment Modification

Any modifications installed previous to testing by Mitech Electronics Co Limited will be incorporated in each production model sold / leased in the United States.

No modifications were installed by Intertek Testing Services Shenzhen Ltd. Longhua Branch.

3.5 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

3.6 Support Equipment List and Description

This product was tested in the following configuration:

Description	Manufacturer	Detail
Mobile Phone (Provided by Intertek)	Samsung	S7
USB cable (Provided by Applicant)	Merchsource, LLC	Unshielded, without ferrite,100cm
Car Charger (Provided by Applicant)	Merchsource, LLC	Input DC 12/24V Output 3.6-6.5V/3A, 6.5-9V/2A, 9-12V/1.5A
Car Charger Adapter with DC undetachable cable (Provided by Intertek)	/	Unshielded, 70cm
VALVE REGULATED LEAD-ACID BATTERY (Provided by Intertek)	OCEAN	12V7Ah (20HR)

4.0 Measurement Results

4.1 Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

$FS = RA + AF + CF - AG + PD + AV$

where FS = Field Strength in dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB
PD = Pulse Desensitization in dB
AV = Average Factor in –dB

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

$FS = RA + AF + CF - AG + PD + AV$

Example

Assume a receiver reading of 62.0dBμV is obtained. The antenna factor of 7.4dB and cable factor of 1.6dB is added. The amplifier gain of 29dB is subtracted. The pulse desensitization factor of the spectrum analyzer was 0dB, and the resultant average factor was –10dB. The net field strength for comparison to the appropriate emission limit is 32dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 62.0dBμV
AF = 7.4dB
CF = 1.6dB
AG = 29.0dB
PD = 0dB

AV = -10dB

FS = $62 + 7.4 + 1.6 - 29 + 0 + (-10) = 32$dBμV/m

Level in μV/m = Common Antilogarithm [(32dBμV/m)/20] = 39.8μV/m

4.2 Radiated Emission Configuration Photograph

For electronic filing, the worst case radiated emission configuration photographs are saved with filename: radiated photos.pdf.

4.3 Radiated Spurious Emission

Worst Case Radiated Spurious Emission
at
161.07125MHz

Judgement: Passed by 7.6dB margin

For the electronic filing, the worst case radiated emission configuration photographs are saved with filename: radiated photos.pdf.

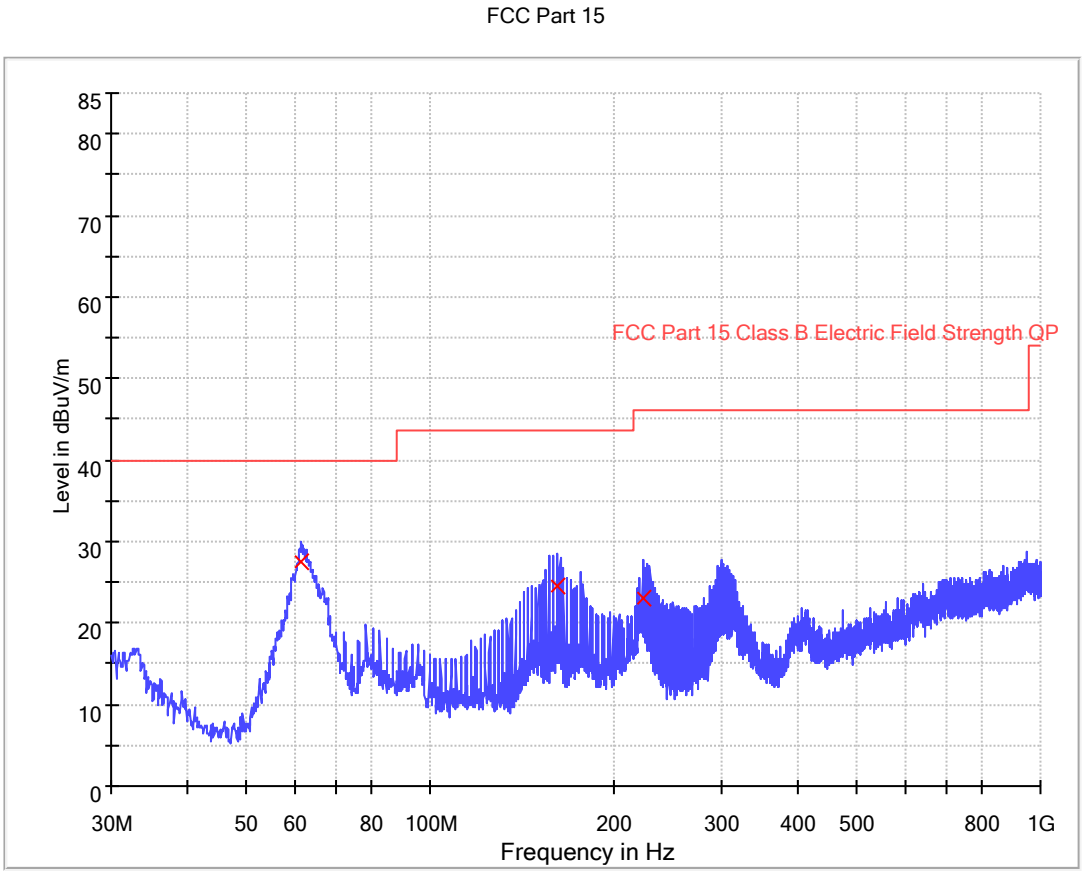
Sign on file

Bruce Zheng, Project Engineer
Typed/Printed Name

14 July 2023
Date

Radiated Emissions (30MHz – 1000MHz)

ANT Polarity: Horizontal

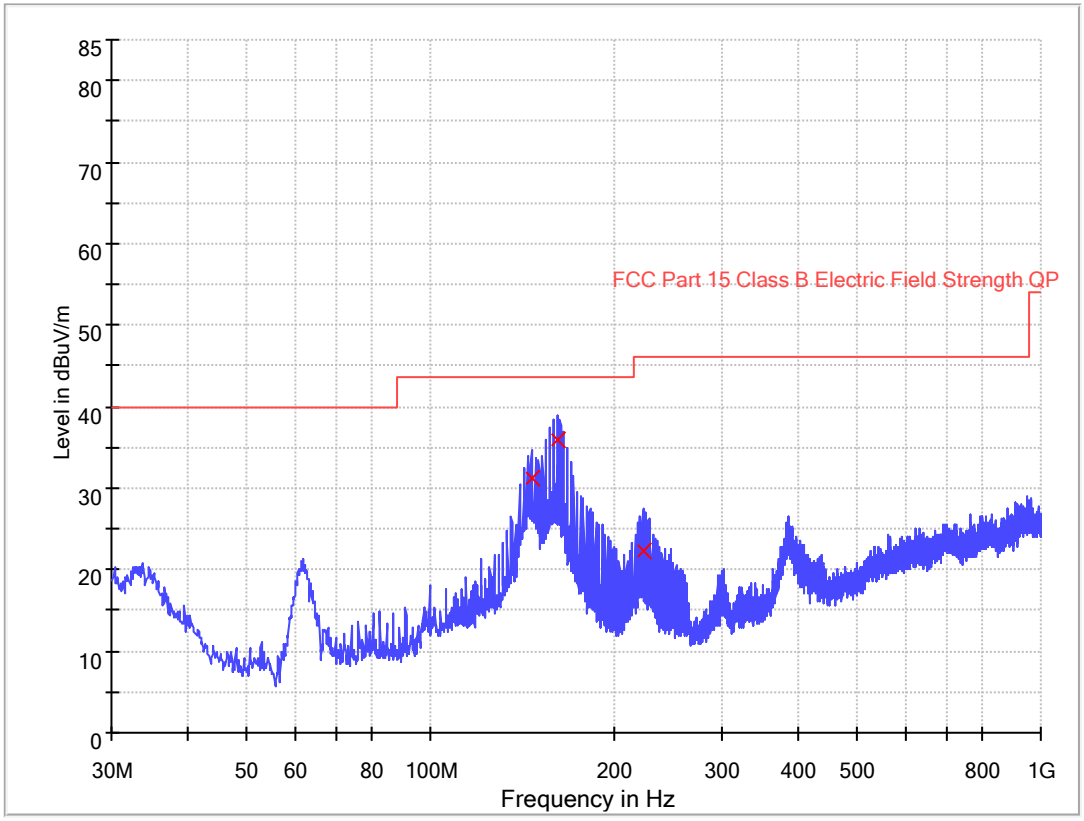


Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Polarization	Corr. (dB/m)	Margin - QPK	Limit - QPK (dBuV/m)
61.525000	27.5	1000.0	120.000	H	7.9	12.5	40.0
161.313750	24.5	1000.0	120.000	H	11.2	19.0	43.5
222.787500	23.0	1000.0	120.000	H	12.6	23.0	46.0

Remark:
1. Corr. (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB)
2. QuasiPeak (dBµV/m)= Corr. (dB/m)+ Read Level (dBµV)
3. Margin (dB) = Limit Line(dBµV/m) – Level (dBµV/m)

Applicant: Mitech Electronics Co Limited
Date of Test: 14 July 2023
Model: CW14
Worst Case Operating Mode: Mode 2

ANT Polarity: Vertical



Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Polarization	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
146.27875	31.3	1000.0	120.000	V	10.3	12.2	43.5
161.07125	35.9	1000.0	120.000	V	11.2	7.6	43.5
222.66625	22.4	1000.0	120.000	V	12.5	23.6	46.0

Remark:
1. Corr. (dB/m)= Antenna Factor (dB/m) + Cable Loss (dB)
2. QuasiPeak (dBµV/m)= Corr. (dB/m)+ Read Level (dBµV)
3. Margin (dB) = Limit Line(dBµV/m) – Level (dBµV/m)

Applicant: Mitech Electronics Co Limited
Date of Test: 14 July 2023
Model: CW14
Worst Case Operating Mode: Mode 2

Fundamental & Spurious Emission Below 30MHz

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Distance Factor (-dB)	Calulated at 300m (dBµV/m)	Limit at 300m (dBµV/m)	Margin (dB)
Horizontal	0.124174	35.8	0.0	17.0	52.8	80	-27.2	25.52	-52.72
Horizontal	0.247510	16.2	0.0	17.0	33.2	80	-46.8	19.73	-66.53
Horizontal	0.371885	17.1	0.0	17.0	34.1	80	-45.9	16.20	-62.10

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Distance Factor (-dB)	Calulated at 30m (dBµV/m)	Limit at 30m (dBµV/m)	Margin (dB)
Horizontal	3.511110	8.3	0.0	14.4	22.7	40	-17.3	29.54	-46.84

Notes:

1. The specified limits of frequency band 9~90 kHz, 110~490 kHz are in average and measurements are made with peak detectors. Quasi-Peak detector is used for other frequency band.

2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. Loop antenna is used for the emission under 30MHz.

5. Horizontal and Vertical polarization were tested and only the worst case data is shown.

5.0 Equipment Photographs

For electronic filing, the photographs are saved with filename: external photos.pdf & internal photos.pdf.

6.0 Product Labeling

For electronic filing, the FCC ID label artwork and location is saved with filename: label.pdf.

7.0 Technical Specifications

For electronic filing, the block diagram and circuit diagram are saved with filename: block.pdf and circuit.pdf respectively.

8.0 Instruction Manual

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual.pdf.

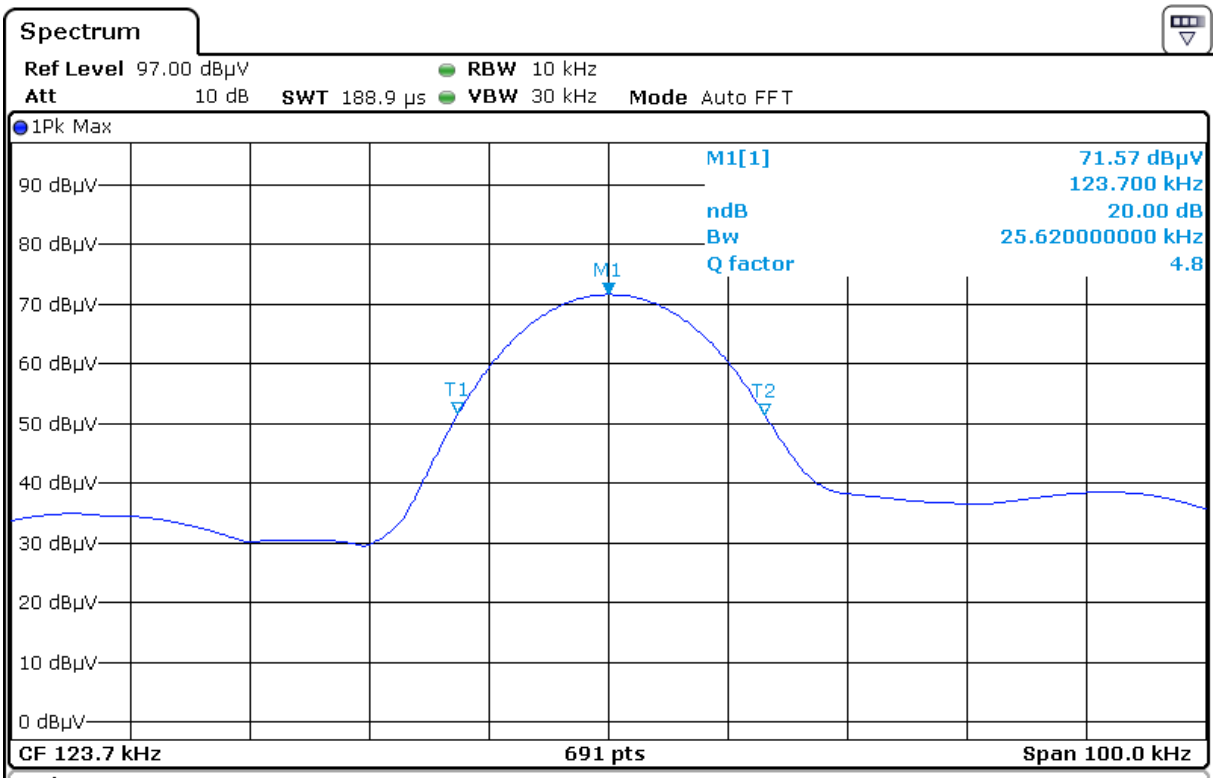
This manual will be provided to the end-user with each unit sold/leased in the United States.

9.0 Miscellaneous Information

This miscellaneous information includes 20dB bandwidth and emission measuring procedure.

9.1 20dB bandwidth

Pursuant to FCC part 15 Section 15.215(c), the 20dB bandwidth of the emission was contained within the frequency band designated (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over excepted variations in temperature and supply voltage were considered. The test plots are reported as below.



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	123.7 kHz	71.57 dBµV	ndB down	25.62 kHz
T1		1	111.11 kHz	51.67 dBµV	ndB	20.00 dB
T2		1	136.72 kHz	51.51 dBµV	Q factor	4.8

9.2 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services in the measurements of transmitters operating under Part 15, Subpart C rules.

The test set-up and procedures described below are designed to meet the requirements of ANSI C63.10 - 2013.

The transmitting equipment under test (EUT) is placed on a styrene turntable which is four feet in diameter and approximately 0.8 meter in height above the ground plane. During the radiated emissions test, the turntable is rotated and any cables leaving the EUT are manipulated to find the configuration resulting in maximum emissions. The EUT is adjusted through all three orthogonal axes to obtain maximum emission levels. The antenna height and polarization are varied during the testing to search for maximum signal levels.

Average detector is used for 9–90 kHz, 110–490 kHz and Quasi-Peak detector is used for other frequency band. The IF bandwidth used for measurement of radiated signal strength was 10 kHz for emission below 30 MHz and 120 kHz for emission from 30 MHz to 1000 MHz.

The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz up to the 1GHz.

9.3 Emissions Test Procedures (cont'd)

The EUT is warmed up for 15 minutes prior to the test.

AC power to the unit is varied from 85% to 115% nominal and variation in the fundamental emission field strength is recorded. If battery powered, a new, fully charged battery is used.

The IF bandwidth used for measurement of radiated signal strength was 10kHz for emission below 30MHz and 120kHz for emission from 30MHz to 1000MHz. Where pulsed transmissions of short enough pulse duration warrant, a greater bandwidth is selected according to the recommendations of Hewlett Packard Application Note 150-2. A discussion of whether pulse desensitivity is applicable to this unit is included in this report.

Transmitter measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the restricted bands, signals are acquired at a distance of one meter or less. All measurements are extrapolated to three meters using inverse scaling, but those measurements taken at a closer distance are so marked.

10.0 Test Equipment List

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
SZ061-12	BiConiLog Antenna	ETS	3142E	00166158	2021-08-04	2024-08-04
SZ185-02	EMI Receiver	R&S	ESCI	101975	2023-07-11	2024-07-11
SZ061-06	Active Loop Antenna	Electro-Metrics	EM-6876	217	2021-05-18	2024-05-18
SZ056-03	Spectrum Analyzer	R&S	FSP 30	101148	2023-04-27	2024-04-27
SZ056-06	Signal Analyzer	R&S	FSV 40	101101	2022-12-19	2023-12-19
SZ188-01	Anechoic Chamber	ETS	RFD-F/A-100	4102	2021-12-12	2024-12-12
SZ062-02	RF Cable	RADIALL	RG 213U	--	2023-05-01	2024-11-01
SZ062-05	RF Cable	RADIALL	0.04-26.5GHz	--	2023-05-01	2024-11-01
SZ062-12	RF Cable	RADIALL	0.04-26.5GHz	--	2023-05-01	2024-11-01
SZ187-02	Two-Line V-Network	R&S	ENV216	100073	2023-04-27	2024-04-27
SZ188-03	Shielding Room	ETS	RFD-100	4100	2022-12-20	2025-12-20
SZ062-16	RF Cable	HUBER+SUHNER	CBL2-BN-1m	110127-2231000	2023-05-01	2024-11-01

C

**********End of Report**********