Qbic technology Co., Ltd

TEST REPORT

SCOPE OF WORK
FCC TESTING–TD-1050, TD-10XXX (THE LETTERS "X" IN THE MODEL NO. CAN BE 0 TO 9, A TO Z OR BLANK, FOR MARKETING USE ONLY)

REPORT NUMBER
171020021SZN-003

ISSUE DATE **[REVISED DATE]**

24 November 2017 [----------]

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TEST REPORT

Intertek Report No.: 171020021SZN-003

Qbic technology Co., Ltd

Application
For
Certification

FCC ID: 2AF82-TD1050H

PANEL PC

Model: TD-1050

Additional Model: TD-10XXX (The letters "X" in the model No. can be 0 to 9, A to Z or blank, for marketing use only)

RFID Transceiver

Report No.: 171020021SZN-003

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 [10-1-16]

Prepared and Checked by:

Sign on File
Surel Guo
Engineer

Approved by:

Digitally signed by Kidd Yang
Location: Intertek Testing Services

Kidd Yang
Senior Project Engineer
Date: 24 November 2017

LIST OF EXHIBITS

MEASUREMENT/TECHNICAL REPORT

PANEL PC

Model: TD-1050

FCC ID: 2AF82-TD1050H

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 [10-01-16] Edition] provision.

Report prepared by:

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List of attached file

Exhibit type	File Description	Filename
Test Report	Test Report	report.pdf
Test Setup Photo	Conducted Emission	conducted photos.pdf
Test Setup Photo	Radiated Emission	radiated photos.pdf
External Photo	External Photo	external photos.pdf
Internal Photo	Internal Photo	internal photos.pdf
Block Diagram	Block Diagram	block.pdf
Schematics	Circuit Diagram	circuit.pdf
Operation Description	Technical Description	descri.pdf
ID Label/Location	Label Artwork and Location	label.pdf
User Manual	User Manual	manual.pdf
Cover Letter	Confidentiality Letter	request.pdf
Cover Letter	Letter of Agency	agency.pdf

EXHIBIT 1

SUMMARY OF TEST RESULTS

1.0 Summary of Test results

PANEL PC

Model: TD-1050

FCC ID: 2AF82-TD1050H

TEST ITEM	REFERENCE	RESULTS
Power Line Conducted Emissions	15.207	Pass
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.

EXHIBIT 2

GENERAL DESCRIPTION

2.0 General Description

2.1 Product Description

The Equipment Under Test (EUT) is a PANEL PC with RFID function operating at 125 kHz. The EUT is powered by AC/DC adaptor through AC120V/50Hz or POE. For more detailed features description, please refer to the user's manual.

Type of Modulation: ASK
Antenna Type: Integral Antenna

The Models: TD-10XXX (The letters "X" in the model No. can be 0 to 9, A to Z or blank, for marketing use only) are the same as the Model: TD-1050 in hardware and electronic aspect. The difference in model number and appearance serve as marketing strategy.

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

2.2 Related Submittal(s) Grants

This is an application for certification of: RFID transmitter portion
Remaining portions are subject to the following procedures:
1. Receiver portion of RFID: exempt from technical requirement of this Part.
2. Wifi function subject to report: 171020021SZN-001.
3. NFC function subject to report: 171020021SZN-002.
4. Other Digital Function: Subject to FCC Part 15B DoC.

2.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.10 (2013). Radiated emission measurement was performed in Semi-anechoic chamber and conducted emission measurement was performed in shield room. 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 and shield room used to collect the radiated data and conducted data are Intertek **Testing Services Shenzhen Ltd. Longhua Branch** and located at 1F/2F, Building B, QiaoAn Scientific Technology Park, Shangkeng Community, Guanhu Subdistrict, Longhua District, Shenzhen, P.R. China. This test facility and site measurement data have been fully placed on file with File Number: CN1188.

EXHIBIT 3

SYSTEM TEST CONFIGURATION

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 AC/DC adaptor through AC120V/50Hz or POE during the test. Only the worst case data was shown in the report.

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 Exhibit 3.0.

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 wooden turntable, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

3.2 EUT Exercising Software

The EUT exercise program (provided by client) used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The worst case configuration is used in all specified testing.

3.3 Special Accessories

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

3.4 Measurement Uncertainty

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

3.5 Equipment Modification

Any modifications installed previous to testing by Qbic technology Co., Ltd 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.

3.6 Support Equipment List and Description

This product was tested in the following configuration:

Refer List:

Description	Manufacturer	Detail
Adapter	KUANTECH	Model: KSASB0241200150D5 Input: AC 100-240V, 50/60Hz, 0.6A Output: DC 12V, 1.5A for main unit
Network cable (RJ45)	N/A	unshielded, Length 500cm
RJ45 Terminal	N/A	N/A
USB Cable	N/A	unshielded, Length 150cm
Earphone	N/A	unshielded, Length 150cm
USB Disk	SanDisk	4GB
USB Disk	SanDisk	4GB
Mini SD Card	SanDisk	1GB
Laptop	HP	Model: 430
Hard Disk	Smart.drive	HD-001
USB Cable	Smart.drive	unshielded, Length 155cm

EXHIBIT 4

MEASUREMENT RESULTS

4.0 Measurement Results

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included. (The simultaneous transmission was considered).

4.1 Field Strength Calculation

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

FS = RA + AF + CF - AG - 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
AV = Average Factor in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows:

FS = RR + LF

where FS = Field Strength in dBµV/m
RR = RA - AG - AV in dBµV
LF = CF + AF in dB

Assume a receiver reading of 52.0 dBµV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB are added. The amplifier gain of 29 dB and average factor of 5 dB are subtracted, giving a field strength of 27 dBµV/m. This value in dBµV/m was converted to its corresponding level in µV/m.

RA = 52.0 dBµV/m
AF = 7.4 dB
CF = 1.6 dB
AG = 29.0 dB
AV = 5.0 dB
RR = 18.0 dBµV
LF = 9.0 dB
FS = RR + LF
FS = 18 + 9 = 27 dBµV/m

Level in µV/m = Common Antilogarithm [(27 dBµV/m)/20] = 22.4 µV/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
336.065MHz

Judgement: Passed by 3.0dB margin

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

Applicant: Qbic technology Co., Ltd
Date of Test: October 30, 2016 Model: TD-1050
Worst Case Operating Mode: Transmitting

Radiated Emissions (30MHz – 1000MHz)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	191.999	43.5	20.0	11.3	34.8	43.5	-8.7
Horizontal	336.035	46.2	20.0	16.8	43.0	46.0	-3.0
Horizontal	720.155	34.5	20.0	24.9	39.4	46.0	-6.6
Vertical	30.485	38.0	20.0	10.0	28.0	40.0	-12.0
Vertical	191.990	37.5	20.0	11.3	28.8	43.5	-14.7
Vertical	624.125	28.7	20.0	24.1	32.8	46.0	-13.2

NOTES:
1. Quasi-Peak detector is used for frequency below 1GHz.
2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances 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. All emissions are below the QP limit.

Applicant: Qbic technology Co., Ltd
Date of Test: October 30, 2016 Model: TD-1050
Operating Mode: Transmitting

Fundamental & Spurious Emission Below 30MHz

Polarization	Frequency (MHz)	Net at 3m (dBµV/m)	Distance Factor (-dB)	Calulated at 300m (dBµV/m)	Limit at 300m (dBµV/m)	Margin (dB)
Horizontal	0.125	70.1	80	-9.9	25.7	-35.6
Horizontal	0.250	38.4	80	-41.6	19.6	-61.2
Horizontal	0.375	34.1	80	-45.9	16.1	-62.0

Polarization	Frequency (MHz)	Net at 3m (dBµV/m)	Distance Factor (-dB)	Calulated at 30m (dBµV/m)	Limit at 30m (dBµV/m)	Margin (dB)
Horizontal	0.500	35.2	40	-4.8	33.6	-38.4
Horizontal	0.625	30.4	40	-9.6	31.7	-41.3

Notes:
1. Peak Detector Data unless otherwise stated.
2. All measurements were made at 3 meter. 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.

4.4 Conducted Emission Configuration Photograph

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

4.5 Conducted Emission

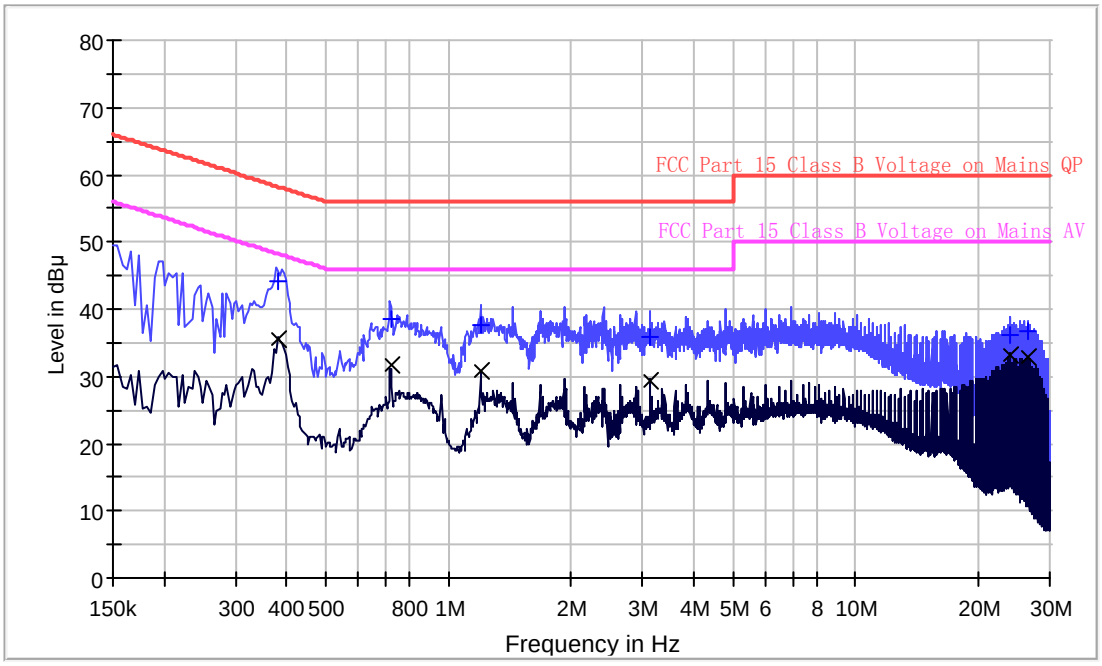
Worst Case Conducted Configuration
at
0.382MHz

Judgement: Passed by 12.5dB margin

Applicant: Qbic technology Co., Ltd
Date of Test: October 30, 2016 Model: TD-1050
Worst Case Operating Mode: Transmitting
Phase: Live

Graphic / Data Table

Conducted Emissions
Pursuant to FCC 15.207: Emissions Requirement



Limit and Margin QP

Frequency (MHz)	QuasiPeak (dB¦ìV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB¦ìV)
0.382000	44.0	9.000	L1	9.7	14.2	58.2
0.722000	38.4	9.000	L1	9.7	17.6	56.0
1.202000	37.5	9.000	L1	9.7	18.5	56.0
3.122000	36.0	9.000	L1	9.8	20.0	56.0
24.006000	36.2	9.000	L1	10.6	23.8	60.0
26.650000	36.8	9.000	L1	10.7	23.2	60.0

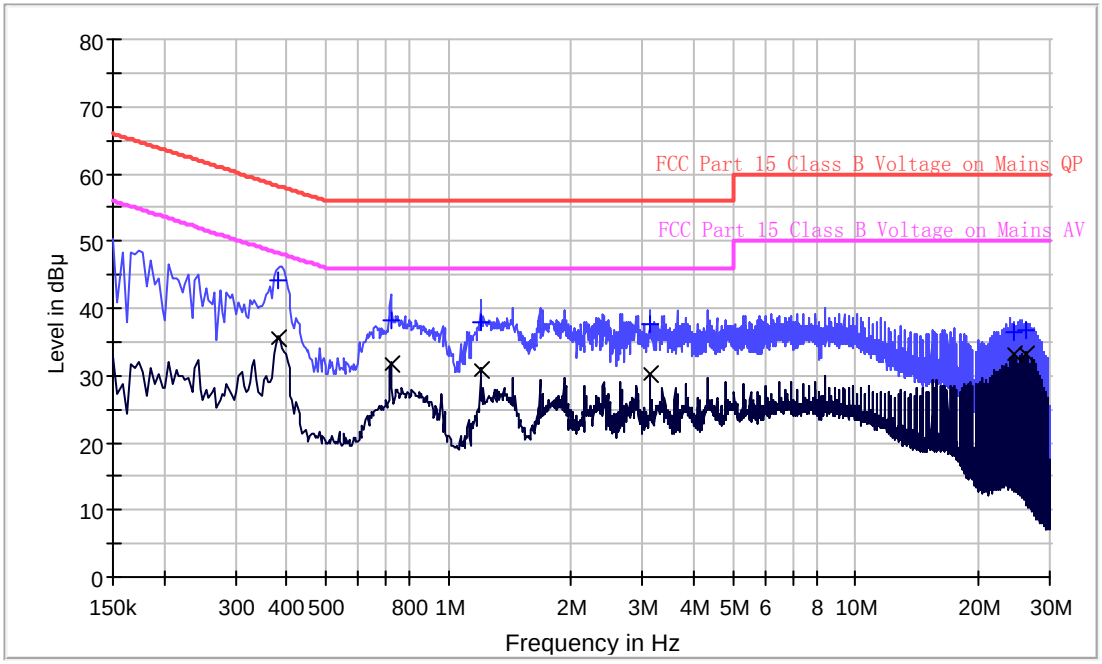
Limit and Margin AV

Frequency (MHz)	Average (dB¦ìV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB¦ìV)
0.382000	35.6	9.000	L1	9.7	12.6	48.2
0.722000	31.7	9.000	L1	9.7	14.3	46.0
1.202000	30.7	9.000	L1	9.7	15.3	46.0
3.122000	29.3	9.000	L1	9.8	16.7	46.0
24.006000	33.1	9.000	L1	10.6	16.9	50.0
26.650000	33.0	9.000	L1	10.7	17.0	50.0

Applicant: Qbic technology Co., Ltd
Date of Test: October 30, 2016 Model: TD-1050
Worst Case Operating Mode: Transmitting
Phase: N

Graphic / Data Table

Conducted Emissions
Pursuant to FCC 15.107: Emissions Requirement



Limit and Margin QP

Frequency (MHz)	QuasiPeak (dB¦ÌV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB¦ÌV)
0.382000	44.2	9.000	N	9.7	14.0	58.2
0.722000	38.3	9.000	N	9.7	17.7	56.0
1.202000	38.0	9.000	N	9.7	18.0	56.0
3.122000	37.6	9.000	N	9.8	18.4	56.0
24.490000	36.5	9.000	N	10.6	23.5	60.0
26.170000	36.7	9.000	N	10.7	23.3	60.0

Limit and Margin AV

Frequency (MHz)	Average (dB¦ÌV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB¦ÌV)
0.382000	35.7	9.000	N	9.7	12.5	48.2
0.722000	31.6	9.000	N	9.7	14.4	46.0
1.202000	30.9	9.000	N	9.7	15.1	46.0
3.122000	30.3	9.000	N	9.8	15.7	46.0
24.490000	33.1	9.000	N	10.6	16.9	50.0
26.170000	33.3	9.000	N	10.7	16.7	50.0

EXHIBIT 5

EQUIPMENT PHOTOGRAPHS

5.0 Equipment Photographs

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

EXHIBIT 6

PRODUCT LABELLING

6.0 Product Labeling

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

EXHIBIT 7

TECHNICAL SPECIFICATIONS

7.0 Technical Specifications

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

EXHIBIT 8

INSTRUCTION MANUAL

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.

EXHIBIT 9

MISCELLANEOUS INFORMATION

9.0 Miscellaneous Information

This miscellaneous information includes details of the measured bandwidth.

9.1 Discussion of Pulse Desensitization

Pulse desensitivity is not applicable for this device. Since the transmitter transmits the RF signal continuously.

9.2 Calculation of Average Factor

The average factor is not applicable for this device as the transmitted signal is a continuously signal.

9.3 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.

Detector function for radiated emissions is in peak mode. Average readings, when required, are taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings. A detailed description for the calculation of the average factor can be found in Exhibit 9.3.

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. For line-conducted emissions, the range scanned is 150kHz to 30MHz.

9.4 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.

Conducted measurements are made as described in ANSI C63.10 - 2013.

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. 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 (See Exhibit 9.1).

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.

EXHIBIT 10

CONFIDENTIALITY REQUEST

10.0 Confidentiality Request

For electronic filing, the confidentiality request of the tested EUT is saved with filename: request.pdf.

EXHIBIT 11

TEST EQUIPMENT LIST

11.0 Test Equipment List

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
SZ061-12	BiConiLog Antenna	ETS	3142E	00166158	20-Sep-2017	20-Sep-2018
SZ185-01	EMI Receiver	R&S	ESCI	100547	9-Feb-2017	9-Feb-2018
SZ061-08	Horn Antenna	ETS	3115	00092346	20-Sep-2017	20-Sep-2018
SZ061-06	Active Loop Antenna	Electro-Metrics	EM-6876	217	26-May-2017	26-May-2018
SZ056-03	Spectrum Analyzer	R&S	FSP 30	101148	1-Jun-2017	1-Jun-2018
SZ056-06	Signal Analyzer	R&S	FSV 40	101101	7-Jul-2017	7-Jul-2018
SZ181-04	Preamplifier	Agilent	8449B	3008A02474	9-Feb-2017	9-Feb-2018
SZ188-01	Anechoic Chamber	ETS	RFD-F/A-100	4102	16-Jan-2017	16-Jan-2019
SZ062-02	RF Cable	RADIALL	RG 213U	--	8-Jul-2017	8-Jan-2018
SZ062-05	RF Cable	RADIALL	0.04-26.5GHz	--	16-Sep-2017	16-Mar-2018
SZ062-12	RF Cable	RADIALL	0.04-26.5GHz	--	16-Sep-2017	16-Mar-2018
SZ067-04	Notch Filter	Micro-Tronics	BRM50702-02	--	14-Jun-2017	14-Jun-2018
SZ185-02	EMI Test Receiver	R&S	ESCI	100692	1-Nov-2016	1-Nov-2017
SZ187-01	Two-Line V-Network	R&S	ENV216	100072	1-Nov-2016	1-Nov-2017
SZ187-02	Two-Line V-Network	R&S	ENV216	100072	12-Jul-2017	12-Jul-2018
SZ188-03	Shielding Room	ETS	RFD-100	4100	16-Jan-2017	16-Jan-2019