

KOKKIA, Inc

Application For Certification

FCC ID: XWA-I10XL-X

i10L Bluetooth splitter Transmitter

Model: i10L

2.4GHz Transceiver

Report No.: 170703141GZU-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 [10-1-15]

Prepared and Checked by:	Approved by:
Sign on file	
Harry wu	Kidd Yang
Project Engineer	Senior Project Engineer
	Date: 03 July 2017

- The test results reported in this test report shall refer only to the sample actually tested and shall not refer or be deemed to refer to bulk from which such a sample
 may be said to have been obtained.
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TRF No.: FCC 15C_TX_b

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MEASUREMENT/TECHNICAL REPORT

KOKKIA, Inc MODEL:i10L

FCC ID: XWA-I10XL-X

This report concerns (check one:)	Original Grant <u>X</u>	Class II Change
Equipment Type: DXX - Part 15 Low Pow	rer Communication Devic	e Transmitter
Deferred grant requested per 47 CFR 0.4	57(d)(1)(ii)? Yes	No _X_
	If yes, defer until:	date
Company Name agrees to notify the Com	nmission by:	date
of the intended date of announcement of date.	the product so that the g	rant can be issued on that
Transition Rules Request per 15.37?	Yes	No _X_
If no, assumed Part 15, Subpart C for Edition] provision.	intentional radiator - th	ne new 47 CFR [10-1-15
Report prepared by:		
	Harry wu Intertek Testing Service Guangzhou Branch Block E, No.7-2 Guang Park, Caipin Road, Gua GETDD Guangzhou, C Phone: 86-20-8213 96 Fax: 86-20-3205 75	Dong Software Science angzhou Science City, hina 888

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List of attached file

Exhibit type	File Description	Filename
Test Report	Test Report	report.pdf
Test Setup Photo	Radiated Emission	radiated photos.pdf
Test Report	Bandedge Plot	bandedge.pdf
Test Report	20dB BW Plot	bw.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

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EXHIBIT 1 GENERAL DESCRIPTION

TRF No.: FCC 15C_TX_b FCC ID: XWA-I10XL-X

1.0 **General Description**

1.1 Product Description

The equipment under test (EUT) is an i10L Bluetooth splitter Transmitter which has Bluetooth function. The EUT was powered by Lightning port. For more detail information pls. refer to the user manual.

Bluetooth Version: 4.1(With BLE) Antenna Type: Integral antenna

Modulation Type: GFSK, π/4DQPSK, 8DPSK

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

1.2 Related Submittal(s) Grants

This is an application for certification of a transceiver for the i10L Bluetooth splitter Transmitter BT 4.1 and there is no corresponding unit for certification.

1.3 Test Methodology

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.

1.4 Test Facility

The Semi-Anechoic chamber used to collect the radiated data is **EMTEK** (**Shenzhen**) **Co.**, **Ltd.** and located at Bldg. 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, 518052, China. This test facility and site measurement data have been fully placed on file with File Number: 4480A.

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EXHIBIT 2 SYSTEM TEST CONFIGURATION

TRF No.: FCC 15C_TX_b FCC ID: XWA-I10XL-X

2.0 **System Test Configuration**

2.1 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 Lightning port through iPod during the test. Only the worst data was reported in this report.

For maximizing emissions, 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 reported in Exhibit 3.

The unit was operated standalone and placed at the center of table.

The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). The EUT was placed on a turn table, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

2.2 EUT Exercising Software

The EUT exercise program (provided by client) used during testing was designed to exercise the various system components in a manner similar to a typical use.

2.3 Special Accessories

No special accessories used.

2.4 Equipment Modification

Any modifications installed previous to testing by KOKKIA, Inc will be incorporated in each production model sold / leased in the United States.

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

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2.5 Measurement Uncertainty

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

2.6 Support Equipment List and Description

Description	Manufacturer	Model No.
iPod	Apple	A1367
2 x Bluetooth Speaker	N/A	BT001

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EXHIBIT 3 EMISSION RESULTS

TRF No.: FCC 15C_TX_b FCC ID: XWA-I10XL-X

3.0 **Emission Results**

Data is included worst-case configuration (the configuration which resulted in the highest emission levels).

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3.1 Radiated Test Results

A sample calculation, configuration photographs and data tables of the emissions are included.

3.1.1 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.

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

Where $FS = Field Strength in dB\mu V/m$

RA = Receiver Amplitude (including preamplifier) in dBµV

CF = Cable Attenuation Factor in dB

AF = Antenna Factor in dB AG = Amplifier Gain 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:

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

Assume a receiver reading of 62.0 dB μ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted. The net field strength for comparison to the appropriate emission limit is 42 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

 $RA = 62.0 dB\mu V$

AF = 7.4 dB

CF = 1.6 dB

 $AG = 29.0 \, dB$

 $FS = 62 + 7.4 + 1.6 - 29 + 0 = 42 \, dB\mu V/m$

Level in $\mu V/m = Common Antilogarithm [(42 dB<math>\mu V/m)/20] = 125.9 \mu V/m$

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3.1.2 Radiated Emission Configuration Photograph

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

3.1.3 Radiated Emissions

The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Worst Case Radiated Emission at 701.70 MHz

Judgement: Passed by 14.7 dB

TEST PERSONNEL:

Sign on file

Harry wu Project Engineer
Typed/Printed Name

03 July 2017 Date

TRF No.: FCC 15C_TX_b FCC ID: XWA-I10XL-X

Applicant: KOKKIA, Inc Date of Test: 03 July 2017

Worst Case Operating Mode: BT Link

Table 1

Radiated Emissions

Polarization	Frequency	Reading	Pre-	Antenna	Net	Limit	Margin
	(MHz)	(dBµV)	Amp	Factor	at 3m	at 3m	(dB)
			Gain	(dB)	(dBµV/m)	(dBµV/m)	
			(dB)				
Horizontal	170.640	32.3	20.0	10.7	23.0	43.5	-20.5
Horizontal	288.000	32.8	20.0	15.0	27.8	46.0	-18.2
Horizontal	393.240	30.8	20.0	18.5	29.3	46.0	-16.7
Vertical	44.040	30.2	20.0	11.1	21.3	40.0	-18.7
Vertical	194.400	29.2	20.0	11.3	20.5	43.5	-23.0
Vertical	701.700	26.0	20.0	25.3	31.3	46.0	-14.7

NOTES: 1. Quasi-Peak detector is used except for others stated.

- 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.

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3.1.4 Transmitter Spurious Emissions (Radiated)

Worst Case Radiated Emission at 9760.000 MHz

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

The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Judgement: Passed by 6.1 dB

TEST PERSONNEL:

Sign on file

<u>Harry wu Project Engineer</u> Typed/Printed Name

03 July 2017 Date

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Applicant: KOKKIA, Inc Date of Test: 03 July 2017

Worst Case Operating Mode: Transmitting

Table 2

Radiated Emissions

(2402MHz)

Polarization	Frequency	Reading	Pre-	Antenna	Net	Peak Limit	Margin
	(MHz)	(dBµV)	Amp	Factor	at 3m	at 3m	(dB)
			Gain	(dB)	(dBµV/m)	(dBµV/m)	
			(dB)				
Horizontal	2402.000	96.6	36.7	28.1	88.0	114.0	-26.0
Horizontal	4804.000	52.8	36.7	35.5	51.6	74.0	-22.4
Horizontal	7206.000	56.6	36.1	36.5	57.0	74.0	-17.0
Horizontal	9608.000	61.1	36.2	37.0	61.9	74.0	-12.1

Polarization	Frequency	Reading	Pre-	Antenna	Net	Average Limit	Margin
	(MHz)	(dBµV)	Amp	Factor	at 3m	at 3m	(dB)
			Gain	(dB)	(dBµV/m)	(dBµV/m)	
			(dB)				
Horizontal	2402.000	80.2	36.7	28.1	71.6	94.0	-22.4
Horizontal	4804.000	38.9	36.7	35.5	37.7	54.0	-16.3
Horizontal	7206.000	43.2	36.1	36.5	43.6	54.0	-10.4
Horizontal	9608.000	46.1	36.2	37.0	46.9	54.0	-7.1

Notes: 1. Peak detector is used for the emission measurement (RBW=1MHz / VBW=3MHz for Peak value, and RBW=1MHz / VBW=10Hz for Average value; RBW=3MHz is used for fundamental emission measurement).

- 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. Horn antenna is used for the emission over 1000MHz.

Test Engineer: Harry wu

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Applicant: KOKKIA, Inc Date of Test: 03 July 2017

Worst Case Operating Mode: Transmitting

Table 3

Radiated Emissions

(2440MHz)

Polarization	Frequency	Reading	Pre-	Antenna	Net	Peak Limit	Margin
	(MHz)	(dBµV)	Amp	Factor	at 3m	at 3m	(dB)
			Gain	(dB)	(dBµV/m)	(dBµV/m)	
			(dB)				
Horizontal	2440.000	96.3	36.7	28.1	87.7	114.0	-26.3
Horizontal	4880.000	56.5	36.7	35.5	55.3	74.0	-18.7
Horizontal	7320.000	57.0	36.1	37.2	58.1	74.0	-15.9
Horizontal	9760.000	61.8	36.2	37.0	62.6	74.0	-11.4

Polarization	Frequency	Reading	Pre-	Antenna	Net	Average Limit	Margin
	(MHz)	(dBµV)	Amp	Factor	at 3m	at 3m	(dB)
			Gain	(dB)	(dBµV/m)	(dBµV/m)	
			(dB)				
Horizontal	2440.000	78.6	36.7	28.1	70.0	94.0	-24.0
Horizontal	4880.000	45.7	36.7	35.5	44.5	54.0	-9.5
Horizontal	7320.000	43.5	36.1	37.2	44.6	54.0	-9.4
Horizontal	9760.000	47.1	36.2	37.0	47.9	54.0	-6.1

- Notes: 1. Peak detector is used for the emission measurement (RBW=1MHz / VBW=3MHz for Peak value, and RBW=1MHz / VBW=10Hz for Average value; RBW=3MHz is used for fundamental emission measurement).
 - 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. Horn antenna is used for the emission over 1000MHz.

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Applicant: KOKKIA, Inc Date of Test: 03 July 2017

Worst Case Operating Mode: Transmitting

Table 4

Radiated Emissions

(2480MHz)

Polarization	Frequency	Reading	Pre-	Antenna	Net	Peak Limit	Margin
	(MHz)	(dBµV)	Amp	Factor	at 3m	at 3m	(dB)
			Gain	(dB)	(dBµV/m)	(dBµV/m)	
			(dB)				
Horizontal	2480.000	95.6	36.7	28.1	87.0	114.0	-27.0
Horizontal	4960.000	55.7	36.7	35.5	54.5	74.0	-19.5
Horizontal	7440.000	57.3	36.1	37.2	58.4	74.0	-15.6
Horizontal	9920.000	58.8	36.3	38.9	61.4	74.0	-12.6

Polarization	Frequency	Reading	Pre-	Antenna	Net	Average Limit	Margin
	(MHz)	(dBµV)	Amp	Factor	at 3m	at 3m	(dB)
			Gain	(dB)	$(dB\mu V/m)$	(dBµV/m)	
			(dB)				
Horizontal	2480.000	79.9	36.7	28.1	71.3	94.0	-22.7
Horizontal	4960.000	45.5	36.7	35.5	44.3	54.0	-9.7
Horizontal	7440.000	44.5	36.1	37.2	45.6	54.0	-8.4
Horizontal	9920.000	44.3	36.3	38.9	46.9	54.0	-7.1

Notes: 1. Peak detector is used for the emission measurement (RBW=1MHz / VBW=3MHz for Peak value, and RBW=1MHz / VBW=10Hz for Average value; RBW=3MHz is used for fundamental emission measurement).

- 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. Horn antenna is used for the emission over 1000MHz.

Test Engineer: Harry wu

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EXHIBIT 4 EQUIPMENT PHOTOGRAPHS

TRF No.: FCC 15C_TX_b FCC ID: XWA-I10XL-X

4.0 **Equipment Photographs**

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

TRF No.: FCC 15C_TX_b FCC ID: XWA-I10XL-X

EXHIBIT 5 PRODUCT LABELLING

TRF No.: FCC 15C_TX_b FCC ID: XWA-I10XL-X

5.0 **Product Labelling**

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

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EXHIBIT 6 TECHNICAL SPECIFICATIONS

TRF No.: FCC 15C_TX_b FCC ID: XWA-I10XL-X

6.0 <u>Technical Specifications</u>

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

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EXHIBIT 7 INSTRUCTION MANUAL

TRF No.: FCC 15C_TX_b FCC ID: XWA-I10XL-X

7.0 **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.

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EXHIBIT 8 MISCELLANEOUS INFORMATION

TRF No.: FCC 15C_TX_b FCC ID: XWA-I10XL-X

8.0 <u>Miscellaneous Information</u>

This miscellaneous information includes details of the measured bandedge, the test procedure and calculation of factor such as pulse desensitization.

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8.1 Bandedge Plot

For electronic filing, the plot shows the fundamental emission when modulated is saved with filename: bandedge.pdf. From the plot, the field strength of any emissions outside of the specified frequency band are attenuated to the general radiated emission limits in section 15.209. It fulfils the requirement of 15.249(d).

Peak Measurement

Bandedge compliance is determined by applying marker-delta method, i.e (Bandedge Plot).

(i) Lower channel 2402MHz:

Peak Resultant field strength = Fundamental emissions (peak value) - delta from the bandedge plot

 $= 88.0 \text{ dB}\mu\text{V/m-47.3dB}$ = 40.7 dB\mu\text{V/m}

Average Resultant field strength = Fundamental emissions (Average value) – delta from the bandedge plot

= $71.6 \text{ dB}\mu\text{V/m}$ –47.3 dB= $24.3 \text{ dB}\mu\text{V/m}$

(ii) Upper channel 2480MHz:

Peak Resultant field strength = Fundamental emissions (peak value) - delta from the bandedge plot

= $87.0 \text{ dB}\mu\text{V/m}$ -53.9 dB= $33.1 \text{ dB}\mu\text{V/m}$

Average Resultant field strength = Fundamental emissions (Average value) – delta from the bandedge plot

= 71.3 dB μ V/m–53.9dB = 17.4 dB μ V/m

The resultant field strength meets the general radiated emission limit in section 15.209, which does not exceed 74dB μ V/m (Peak Limit) and 54dB μ V/m (Average Limit).

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8.1 Bandedge Plot (cont'd)

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.

Figure 8.1 Bandwidth

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8.2 Discussion of Pulse Desensitization

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

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8.3 Transmitter Duty Cycle Calculation, FCC Rule 15.35(b, c)

The EUT antenna output port was connected to the input of the spectrum analyzer. The analyzer center frequency was set to EUT RF channel carrier. The SWEP function on the analyzer was set to ZERO SPAN. The Transmitter ON time was determined from the resultant time-amplitude display:

	See attached spectrum analyzer chart (s) for Transmitter timing
	See Transmitter timing diagram provided by manufacturer
Х	Not applicable, duty cycle was not used.

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8.4 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, up to 1GHz 0.8m and above 1GHz 1.5m 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.

The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower.

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8.4 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.

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. Above 1000 MHz, a resolution bandwidth of 1 MHz (RBW 3MHz for fundamental emission) is used.

Transmitter measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the restricted bands and above 1 GHz, 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.

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EXHIBIT 9 CONFIDENTIALITY REQUEST

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9.0 **Confidentiality Request**

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

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EXHIBIT10 TEST EQUIPMENT LIST

TRF No.: FCC 15C_TX_b FCC ID: XWA-I10XL-X

10.0 Test Equipment List

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
EE089	EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005 .26	17-May-2017	17-May-2018
EE040	Pre-Amplifier	HP	8447F	2944A079 99	17-May-2017	17-May-2018
EE043	Bilog Antenna	Schwarzbeck	VULB9163	142	17-May-2017	17-May-2018
EE147	Cable	Schwarzbeck	AK9513	ACRX1	17-May-2017	17-May-2018
EE169	Cable	Rosenberger	N/A	FP2RX2	17-May-2017	17-May-2018
EE168	Cable	Schwarzbeck	AK9513	CRPX1	29-May-2017	29-May-2018
EE170	Cable	Schwarzbeck	AK9513	CRRX2	29-May-2017	29-May-2018
EE096	Pre-Amplifier	A.H.	PAM-0126	1415261	17-May-2017	17-May-2018
EE094	Horn Antenna	Schwarzbeck	BBHA 9120	707	29-May-2017	29-May-2018
EE097	Cable	H+B	0.5M SF104- 26.5	289147/4	29-May-2017	29-May-2018
EE100	Cable	H+B	3M SF104- 26.5	295838/4	29-May-2017	29-May-2018
EE101	Cable	H+B	6M SF104- 26.5	295840/4	29-May-2017	29-May-2018
EE095	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170 399	17-May-2017	17-May-2018
EE343	EMI Test Receiver	Rohde & Schwarz	FSV40	132.1- 3008K39- 100967- AP	29-May-2017	29-May-2018
EE240	Pre-Amplifier	Lunar EM	LNA26G40 -40	J10131310 28001	17-May-2017	17-May-2018
EE234	Horn Antenna	AHS/USA	SAS-573	184	17-May-2017	17-May-2018

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