





# TEST REPORT

<b>Eurofins KCTL Co.,Ltd.</b> 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-31-285-0894 FAX: 82-505-299-8311 <a href="http://www.kctl.co.kr">www.kctl.co.kr</a>	Report No.: KR22-SRF0134 Page (1) of (22)	 
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## 1. Client

- Name : JVM Co., Ltd.
- Address : 121, Hosandong-ro, Dalseo-gu, Daegu, Korea
- Date of Receipt : 2022-06-02

**2. Use of Report** : Certification

**3. Name of Product / Model** : U-CANISTER / 31BV3-0001

**4. Manufacturer / Country of Origin** : JVM Co., Ltd. / Korea

**5. FCC ID** : 2AF6G31BV3-0001



**6. IC Certificate No.** : 23605-31BV30001

**7. Date of Test** : 2022-06-14 to 2022-07-06

**8. Location of Test** :  Permanent Testing Lab  On Site Testing  
 (Address:65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea)

**9. Test method used** : FCC Part 15 Subpart C, 15.225  
 RSS-210 Issue 10 April 2020  
 RSS-Gen Issue 5 February 2021

**10. Test Result** : Refer to the test result in the test report

Affirmation	Tested by   Name : Euijung Kim (Signature)	Technical Manager   Name : Heesu Ahn (Signature)
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2022-09-06

**Eurofins KCTL Co.,Ltd.**

As a test result of the sample which was submitted from the client, this report does not guarantee the whole product quality. This test report should not be used and copied without a written agreement by Eurofins KCTL Co.,Ltd.

**REPORT REVISION HISTORY**

Date	Revision	Page No
2022-09-06	Originally issued	-

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**General remarks for test reports**

**Statement concerning the uncertainty of the measurement systems used for the tests**

(may be required by the product standard or client)

Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:

**Procedure number, issue date and title:**

Calculations leading to the reported values are on file with the testing laboratory that conducted the testing.

Statement not required by the standard or client used for type testing

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## 1. General information

Client : JVM Co., Ltd.  
Address : 121, Hosandong-ro, Dalseo-gu, Daegu, Korea  
Manufacturer : JVM Co., Ltd.  
Address : 121, Hosandong-ro, Dalseo-gu, Daegu, Korea  
Laboratory : KCTL Inc.  
Address : 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea  
Accreditations : FCC Site Designation No: KR0040, FCC Site Registration No: 687132  
VCCI Registration No. : R-20080, G-20078, C-20059, T-20056  
CAB Identifier: KR0040, ISED Number: 8035A  
KOLAS No.: KT231

## 2. Device information

Equipment under test : U-CANISTER  
Model : 31BV3-0001  
Frequency range : 13.56 MHz (RFID)  
Modulation technique : ASK  
Number of channels : 1ch  
Power source : DC 24 V  
Antenna type : Loop antenna  
Software version : ATDPS-Pro 3.3.6.0  
Hardware version : 31BV3-0001-01  
Test device serial No. : N/A  
Operation temperature : -20 °C ~ 50 °C

## 2.1. Accessory information

Equipment	Manufacturer	Model	Serial No.	Power source
Switching Power Adapter	FSP GROUP INC.	FSP060-DBAB2	6LL0966801GP	INPUT: 100~240V~, 1.5A, 50-60Hz OUPUT: 24.0V, 2.5A MAX

## 2.2. Frequency/channel operations

This device contains the following capabilities:  
 RFID

Frequency (MHz)
13.56

Table 2.2.1. RFID

## 3. Antenna requirement

### Requirement of FCC part section 15.203:

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.

### Requirement of RSS-Gen Section 6.8:

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below).

When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer.

The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.

Immediately following the above notice, the manufacturer shall provide a list of all antenna types which can be used with the transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna type.

-The transmitter has permanently attached Loop antenna (internal antenna) on board.

#### 4. Summary of tests

FCC Part section(s)	IC Rule reference	Parameter	Test Condition	Test results
15.225(a)	RSS-210 B.6 ( I )	In-band Fundamental Emission	Radiated	Pass
15.225(b), (c)	RSS-210 B.6 ( II ), ( III )	In-band Spurious Emission		Pass
15.225(d) 15.209	RSS-210 B.6 ( IV ) RSS-Gen Issue 5 ( 8.9 )	Out-of-band Spurious Emission		Pass
15.225(e)	RSS-210 B.6 ( b )	Frequency Stability Tolerance	Conducted	Pass
15.215(c)	-	20 dB Bandwidth		Pass
-	RSS-Gen Issue 5 ( 6.7 )	Occupied Bandwidth		Pass
15.207(a)	RSS-Gen Issue 5 ( 8.8 )	AC Conducted emissions		Pass

**Notes:** (N/T: Not Tested, N/A: Not Applicable)

- All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- These tests were performed other than open field site, adequate comparison measurements were confirmed against 30 m open field site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.
- The fundamental of the EUT was investigated in three orthogonal orientations X, Y, Z It was determined that **Z** orientation was worst-case orientation. Therefore, all final radiated testing was performed with the EUT in **Z** orientation
- The test procedure(s) in this report were performed in accordance as following.
  - ◆ ANSI C63.10-2013
- The radiated test was performed with and without passive tag. The test results shown in the following sections represent the worst case emissions.
  - ◆ Worst Case : Without passive tag

## 5. Measurement uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013.

All measurement uncertainty values are shown with a coverage factor of  $k=2$  to indicated a 95 % level of confidence. The measurement data shown herein meets or exceeds the  $U_{CISPR}$  measurement uncertainty values specified in CISPR 16-4-2 and thus, can be compared directly to specified limits to determine compliance.

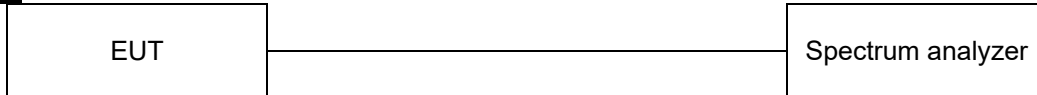
Parameter	Expanded uncertainty ( $\pm$ )	
Radiated spurious emissions	9 kHz ~ 30 MHz	2.4 dB
	30 MHz ~ 1 000 MHz	2.3 dB
	1 000 MHz ~ 18 000 MHz	5.6 dB
Conducted emissions	9 kHz ~ 150 kHz	1.6 dB
	150 kHz ~ 30 MHz	1.7 dB



## 6. Test results

### 6.1. 20 dB Bandwidth & 99% Bandwidth

#### Test setup



#### Limit

According to §15.215(c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

According to RSS-Gen Issue 5 (6.7) The emission bandwidth (x dB) is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated x dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth in the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth.

When the occupied bandwidth limit is not stated in the applicable RSS or reference measurement method, the transmitted signal bandwidth shall be reported as the 99% emission bandwidth, as calculated or measured.

#### Test procedure

ANSI C63.10-2013 - Section 6.9.2



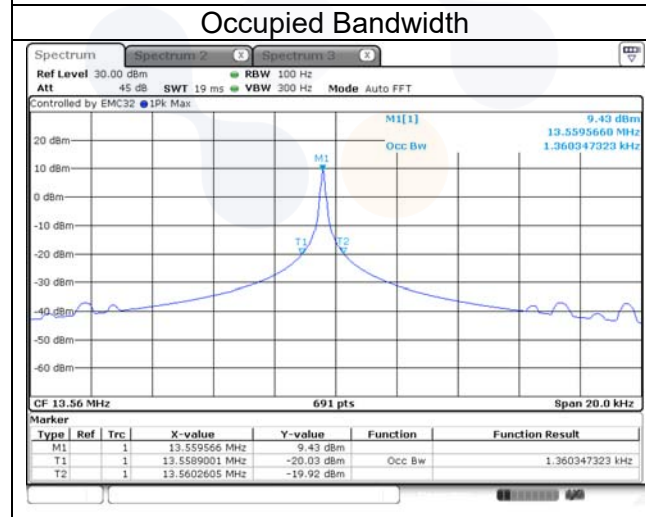
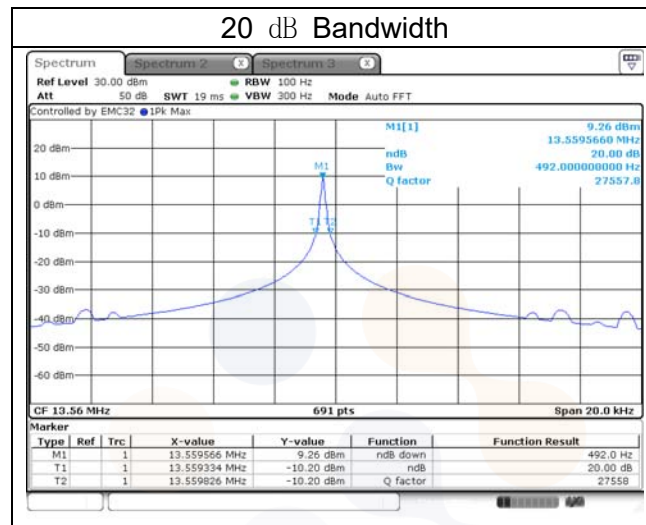
### **Test settings**

The occupied bandwidth is measured as the width of the spectral envelope of the modulated signal, at an amplitude level reduced from a reference value by a specified ratio (or in decibels, a specified number of dB down from the reference value). Typical ratios, expressed in dB, are -6 dB, -20 dB, and -26 dB, corresponding to 6 dB BW, 20 dB BW, and 26 dB BW, respectively. In this subclause, the ratio is designated by “-xx dB.” The reference value is either the level of the unmodulated carrier or the highest level of the spectral envelope of the modulated signal, as stated by the applicable requirement. Some requirements might specify a specific maximum or minimum value for the “-xx dB” bandwidth; other requirements might specify that the “-xx dB” bandwidth be entirely contained within the authorized or designated frequency band.

- a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency.
- b) Span: Two times and five times the OBW.
- c) RBW = 1 % to 5 % of the OBW and VBW  $\geq$  3 x RBW
- d) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation.
- e) The dynamic range of the instrument at the selected RBW shall be more than 10 dB below the target “-xx dB down” requirement; that is, if the requirement calls for measuring the -20 dB OBW, the instrument noise floor at the selected RBW shall be at least 30 dB below the reference value.
- f) Detector: peak
- g) Trace mode: max hold.
- h) Allow the trace to stabilize.
- i) Determine the “-xx dB down amplitude” using ((reference value) - xx). Alternatively, this calculation may be made by using the marker-delta function of the instrument.
- j) If the reference value is determined by an unmodulated carrier, then turn the EUT modulation ON, and either clear the existing trace or start a new trace on the spectrum analyzer and allow the new trace to stabilize. Otherwise, the trace from step g) shall be used for step j)
- k) Place two markers, one at the lowest frequency and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the “-xx dB down amplitude” determined in step h). If a marker is below this “-xx dB down amplitude” value, then it shall be as close as possible to this value. The occupied bandwidth is the frequency difference between the two markers. Alternatively, set a marker at the lowest frequency of the envelope of the spectral display, such that the marker is at or slightly below the “-xx dB down amplitude” determined in step h). Reset the marker-delta function and move the marker to the other side of the emission until the delta marker amplitude is at the same level as the reference marker amplitude. The marker-delta frequency reading at this point is the specified emission bandwidth.

**Test results**

Frequency [MHz]	20 dB Bandwidth [MHz]		Limit [MHz]	20 dB Bandwidth [kHz]	Occupied Bandwidth (99 % BW) [kHz]
13.56	Lowest Frequency	13.559 334	13.110 000	0.492	1.36
	Highest Frequency	13.559 826	14.010 000		

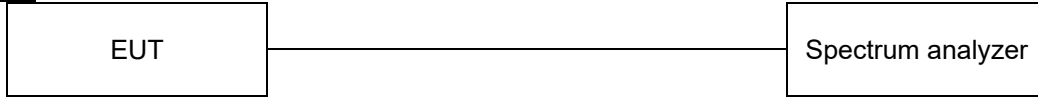


**Note:**

Because the measured signal is CW/CW-like, adjusting the RBW per C63.10 would not be practical since measured bandwidth will always follow the RBW and the result will be approximately twice the RBW

## 6.2. Frequency tolerance

### Test setup



### Limit

According to §15.225 (e), RSS-210 B.6.(b) The frequency tolerance of the carrier signal shall be maintained within  $\pm 0.01$  % of the operating frequency over a temperature variation of  $-20$  degrees to  $+50$  degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85 % to 115 % of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

### Test procedure

ANSI C63.10-2013 - Section 6.8.1



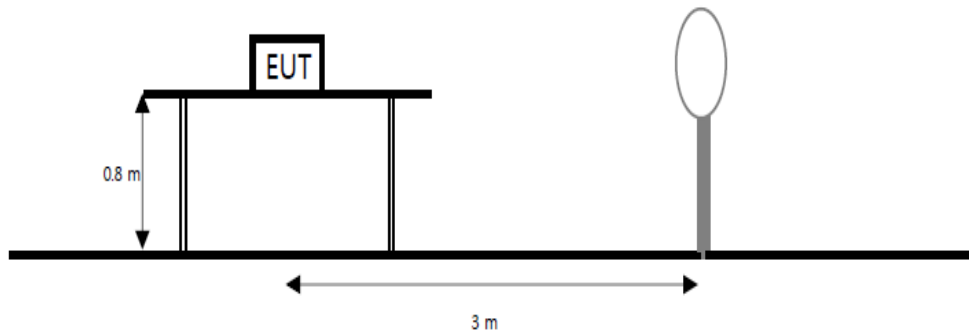
**Test results**

Voltage [%]	Voltage [V]	TEMP [°C]	Maintaining time	Measure frequency [Hz]	Frequency deviation [Hz]	Deviation [%]		
100	24.00	20	Startup	13 559 612	388.0	-0.002 86		
			2 minutes	13 559 614	386.0	-0.002 85		
			5 minutes	13 559 627	373.0	-0.002 75		
			10 minutes	13 559 628	372.0	-0.002 74		
		-20	Startup	13 559 531	469.0	-0.003 46		
			2 minutes	13 559 532	468.0	-0.003 45		
			5 minutes	13 559 543	457.0	-0.003 37		
			10 minutes	13 559 544	456.0	-0.003 36		
		-10	Startup	13 559 617	383.0	-0.002 83		
			2 minutes	13 559 622	378.0	-0.002 79		
			5 minutes	13 559 623	377.0	-0.002 78		
			10 minutes	13 559 623	377.0	-0.002 78		
		0	Startup	13 559 635	365.0	-0.002 69		
			2 minutes	13 559 638	362.0	-0.002 67		
			5 minutes	13 559 639	361.0	-0.002 66		
			10 minutes	13 559 645	355.0	-0.002 62		
		10	Startup	13 559 610	390.0	-0.002 88		
			2 minutes	13 559 612	388.0	-0.002 86		
			5 minutes	13 559 614	386.0	-0.002 85		
			10 minutes	13 559 615	385.0	-0.002 84		
		25	Startup	13 559 603	397.0	-0.002 93		
			2 minutes	13 559 604	396.0	-0.002 92		
			5 minutes	13 559 608	392.0	-0.002 89		
			10 minutes	13 559 615	385.0	-0.002 84		
		30	Startup	13 559 573	427.0	-0.003 15		
			2 minutes	13 559 575	425.0	-0.003 13		
			5 minutes	13 559 578	422.0	-0.003 11		
			10 minutes	13 559 580	420.0	-0.003 10		
		40	Startup	13 559 532	468.0	-0.003 45		
			2 minutes	13 559 534	466.0	-0.003 44		
			5 minutes	13 559 535	465.0	-0.003 43		
			10 minutes	13 559 540	460.0	-0.003 39		
		50	Startup	13 559 513	487.0	-0.003 59		
			2 minutes	13 559 519	481.0	-0.003 55		
			5 minutes	13 559 522	478.0	-0.003 53		
			10 minutes	13 559 524	476.0	-0.003 51		
		85	20.40	20	Startup	13 559 593	407.0	-0.003 00
					2 minutes	13 559 594	406.0	-0.002 99
					5 minutes	13 559 599	401.0	-0.002 96
					10 minutes	13 559 602	398.0	-0.002 94
115	27.60	20	Startup	13 559 623	377.0	-0.002 78		
			2 minutes	13 559 633	367.0	-0.002 71		
			5 minutes	13 559 634	366.0	-0.002 70		
			10 minutes	13 559 634	366.0	-0.002 70		

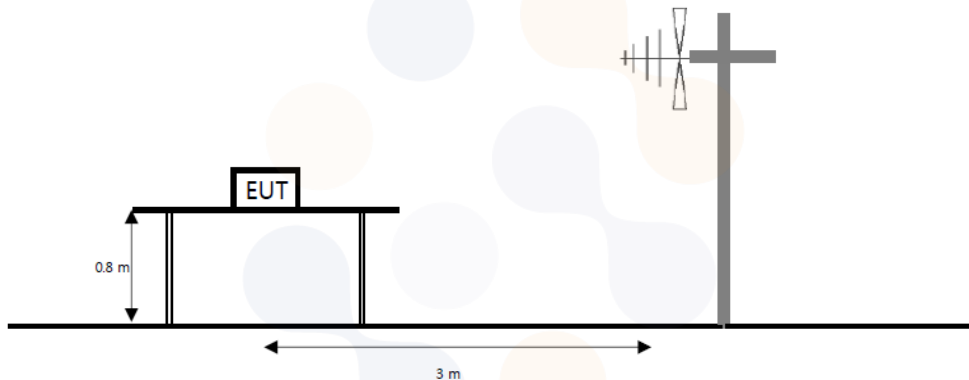
## 6.3. Radiated spurious emissions

### Test setup

The diagram below shows the test setup that is utilized to make the measurements for emission from 9 kHz to 30 MHz Emissions



The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz emissions.



### Limit

15.225 (a), RSS-210 B.6.(a).( i ) The field strength of any emission within the band 13.553-13.567 MHz shall not exceed 15, 848 microvolts/meter at 30 meters.

15.225 (b), RSS-210 B.6.(a).( ii ) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

15.225 (c), RSS-210 B.6 (a).(iii) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz, the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

15.225 (d), RSS-210 B.6.(a).(iv) RSS-Gen Issue 9 (8.9) The Field Strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in 15.209.

Frequency (MHz)	Field Strength ( $\mu\text{V/m}$ )	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30(29.54 dB $\mu\text{V/m}$ )	30
30.0-88.0	100(40 dB $\mu\text{V/m}$ )	3
88-216	150(43.5 dB $\mu\text{V/m}$ )	3
216-960	200 (46 dB $\mu\text{V/m}$ )	3
Above 960	500 (53.98 dB $\mu\text{V/m}$ )	3

**Test procedure**

ANSI C63.10-2013 - Section 6.4, 6.5

**Test settings**

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = as specified in table
3. VBW  $\geq 3 \times$  RBW
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

**Table. RBW as a function of frequency**

Frequency	RBW
9 kHz to 150 kHz	200 Hz to 300 Hz
0.15 MHz to 30 MHz	9 kHz to 10 kHz
30 MHz to 1 000 MHz	100 kHz to 120 kHz
> 1 000 MHz	1 MHz

**Notes:**

1.  $f < 30$  MHz, extrapolation factor of 40 dB/decade of distance.  $F_d = 40\log(D_m/D_s)$   
 $f \geq 30$  MHz, extrapolation factor of 20 dB/decade of distance.  $F_d = 20\log(D_m/D_s)$   
 Where:  
 $F_d$  = Distance factor in dB  
 $D_m$  = Measurement distance in meters  
 $D_s$  = Specification distance in meters
2. Measurements were performed at 3m and the data was extrapolated to the specified measurement distance of 30m using the square of an inverse linear distance extrapolation factor (40 dB/decade) as specified in § 15.31(f)(2). Extrapolation Factor =  $40 \log_{10}(30/3) = 40$  dB.
3. (dB) = Antenna factor(dB/m) + Cable loss(dB) + or Amp. gain(dB) + or  $F_d$ (dB)
4. Result = Reading + Cable loss + Amp gain + Ant. factor - Distance factor
5. The worst-case emissions are reported however emissions whose levels were not within 20 dB of respective limits were not reported.
6. All measurements were recorded using a spectrum analyzer employing a quasi-peak detector.
7. Below 30 MHz frequency range, all orientations about parallel, perpendicular, and ground-parallel were investigated then reported and the worse orientations of Face-on and Face-off were set for final test.
8. Face-on = Parallel, Face-off = Perpendicular

**Test results for fundamental**

**15.225 (a) 13.553-13.567 MHz**

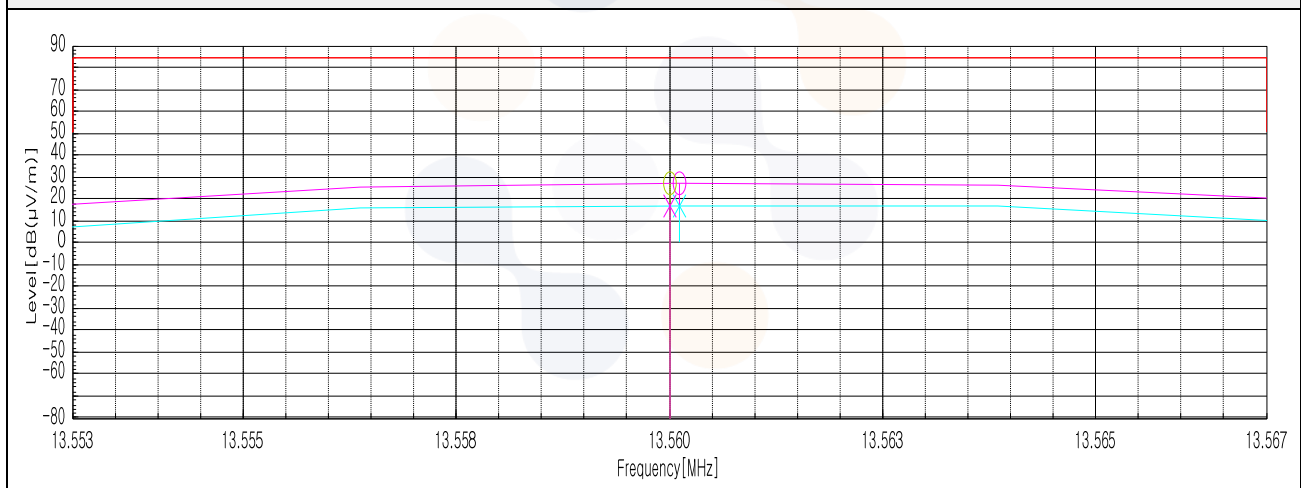
[Face-on]

Frequency	Reading	Antenna Factor	Amp. + Cable	Distance Factor	Result	Limit	Margin
(MHz)	(dB( $\mu V$ ))	(dB)	(dB)	(dB)	(dB( $\mu V/m$ ))	(dB( $\mu V/m$ ))	(dB)
<b>Quasi peak data</b>							
13.56	77.80	20.20	-31.13	40.00	26.87	84.00	57.13

[Face-off]

Frequency	Reading	Antenna Factor	Amp. + Cable	Distance Factor	Result	Limit	Margin
(MHz)	(dB( $\mu V$ ))	(dB)	(dB)	(dB)	(dB( $\mu V/m$ ))	(dB( $\mu V/m$ ))	(dB)
<b>Quasi peak data</b>							
13.56	67.40	20.20	-31.13	40.00	16.47	84.00	67.53

**Face-on/Face-off**



**Test results for in-band & out-band (9 kHz to 30 MHz)**

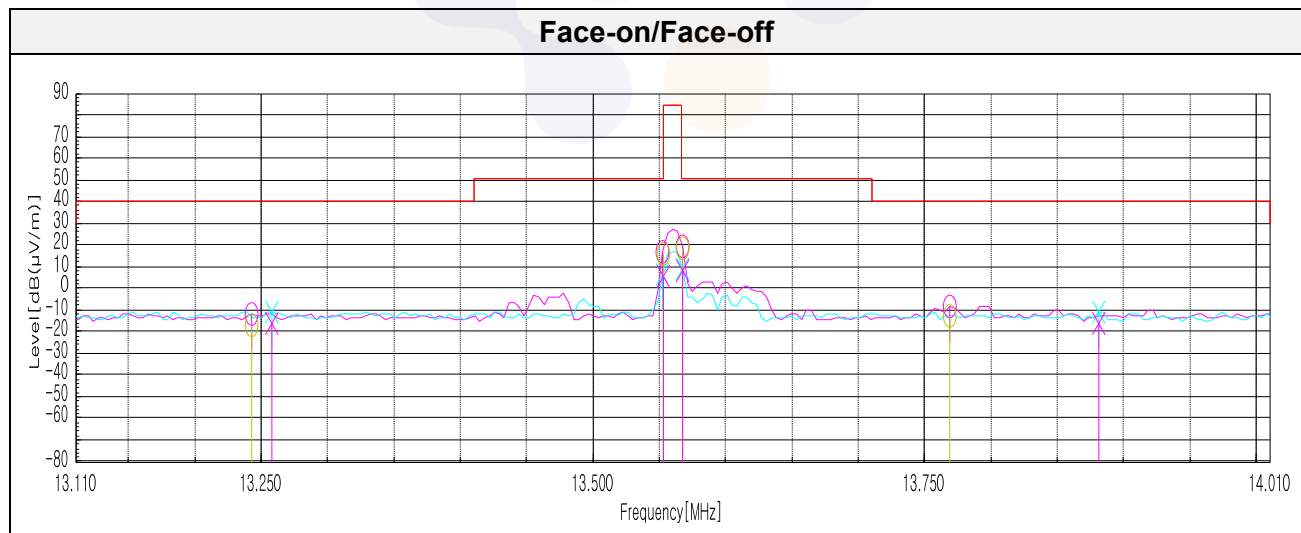
**15.225 (b,c) 13.110-14.010 MHz**

[Face-on]

Frequency	Reading	Antenna Factor	Amp. + Cable	Distance Factor	Result	Limit	Margin
(MHz)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
<b>Quasi peak data</b>							
13.24	33.70	20.20	-31.15	40.00	-17.25	40.50	57.75
13.55	66.50	20.20	-31.13	40.00	15.57	50.50	34.93
13.57	69.10	20.20	-31.13	40.00	18.17	50.50	32.33
13.77	38.10	20.20	-31.14	40.00	-12.84	40.50	53.34

[Face-off]

Frequency	Reading	Antenna Factor	Amp. + Cable	Distance Factor	Result	Limit	Margin
(MHz)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
<b>Quasi peak data</b>							
13.26	34.80	20.20	-31.15	40.00	-16.15	40.50	56.65
13.55	56.70	20.20	-31.13	40.00	5.77	50.50	44.73
13.57	58.90	20.20	-31.13	40.00	7.97	50.50	42.53
13.88	34.30	20.20	-31.14	40.00	-16.64	40.50	57.14



Note. The limits in CFR 47, Part 15, Subpart C, paragraph 15.209 (a), are identical to those in RSS-GEN Section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377Ω. For example, the measurement frequency X KHz resulted in a level of Y dBuV/m, which is equivalent to  $Y-51.5 = Z$  dBuA/m, which has the same margin, W dB, to the corresponding RSS-GEN Table 6 limit as it has to the 15.209(a) limit.



**Test results (9 kHz to 30 MHz)**

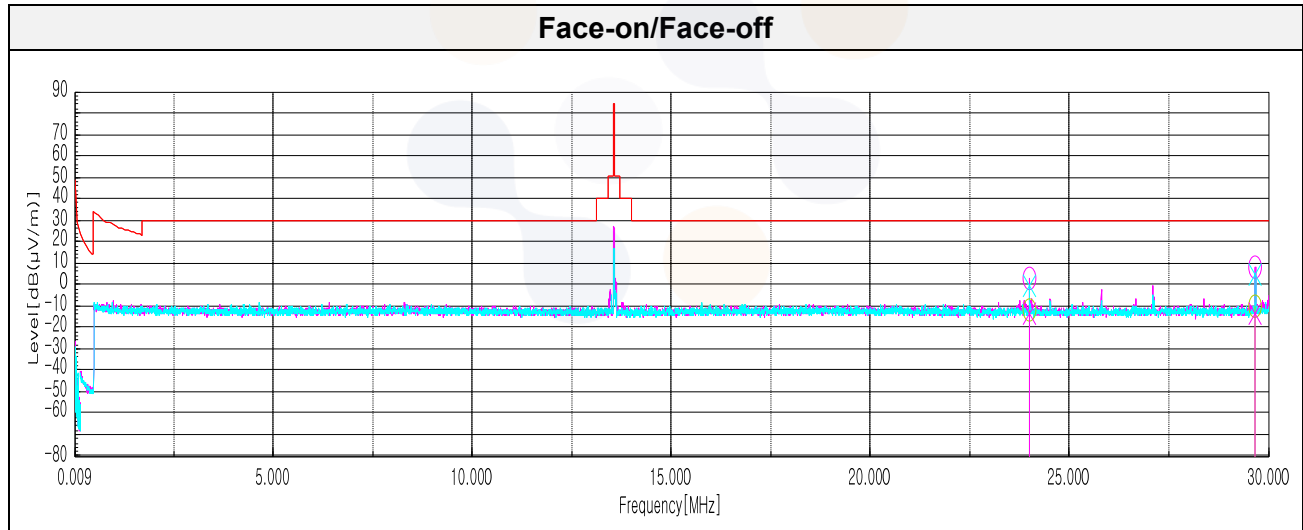
**15.225 (d) 0.009-30 MHz**

[Face-on]

Frequency	Reading	Antenna Factor	Amp. + Cable	Distance Factor	Result	Limit	Margin
(MHz)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
<b>Quasi peak data</b>							
24.00	38.10	20.76	-30.65	40.00	-11.79	29.50	41.29
29.68	39.70	20.14	-30.48	40.00	-10.64	29.50	40.14

[Face-off]

Frequency	Reading	Antenna Factor	Amp. + Cable	Distance Factor	Result	Limit	Margin
(MHz)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
<b>Quasi peak data</b>							
24.00	36.30	20.76	-30.65	40.00	-13.59	29.50	43.09
29.68	36.10	20.14	-30.48	40.00	-14.24	29.50	43.74

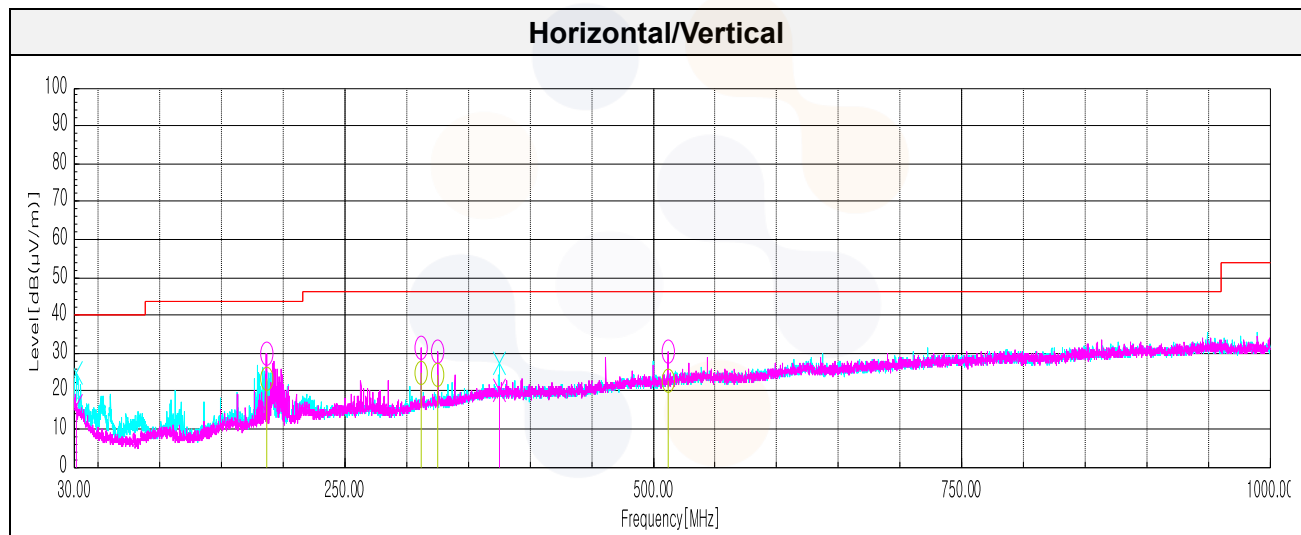


Note. The limits in CFR 47, Part 15, Subpart C, paragraph 15.209 (a), are identical to those in RSS-GEN Section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377Ω. For example, the measurement frequency X KHz resulted in a level of Y dBuV/m, which is equivalent to Y-51.5 = Z dBuA/m, which has the same margin, W dB, to the corresponding RSS-GEN Table 6 limit as it has to the 15.209(a) limit.

**Test results (Below 1 000 MHz)**

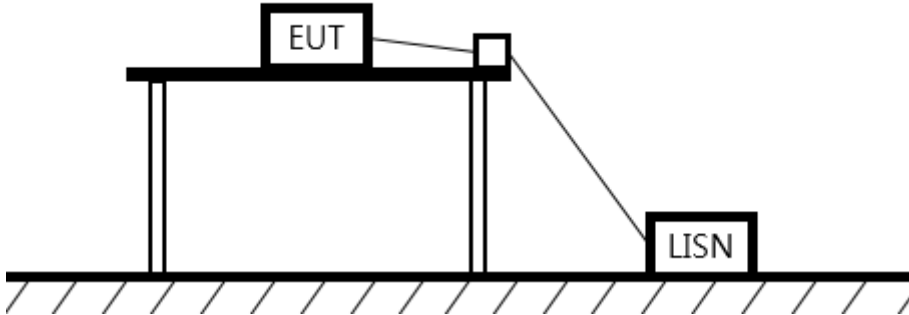
**15.225 (d) 30-1 000 MHz**

Frequency (MHz)	Pol. (V/H)	Reading (dB( $\mu V$ ))	Antenna Factor (dB)	Amp. + Cable (dB)	Distance Factor (dB)	Result (dB( $\mu V/m$ ))	Limit (dB( $\mu V/m$ ))	Margin (dB)
<b>Quasi peak data</b>								
32.30	V	24.50	21.85	-30.40	-	15.95	40.00	24.05
186.17	H	34.30	16.30	-27.28	-	23.32	43.50	20.18
311.91	H	30.20	20.20	-25.52	-	24.88	46.00	21.12
325.37 <sup>1)</sup>	H	28.90	20.60	-25.44	-	24.06	46.00	21.94
375.08	V	22.10	22.70	-24.80	-	20.00	46.00	26.00
511.85	H	21.30	24.87	-23.41	-	22.76	46.00	23.24



## 6.4. AC Conducted emission

### Test setup



### Limit

According to 15.207(a), RSS-Gen Issue 5 (8.8) for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50uH/50 ohm line impedance stabilization network (LISN). Compliance with the provision of this paragraph shall on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower applies at the boundary between the frequencies ranges.

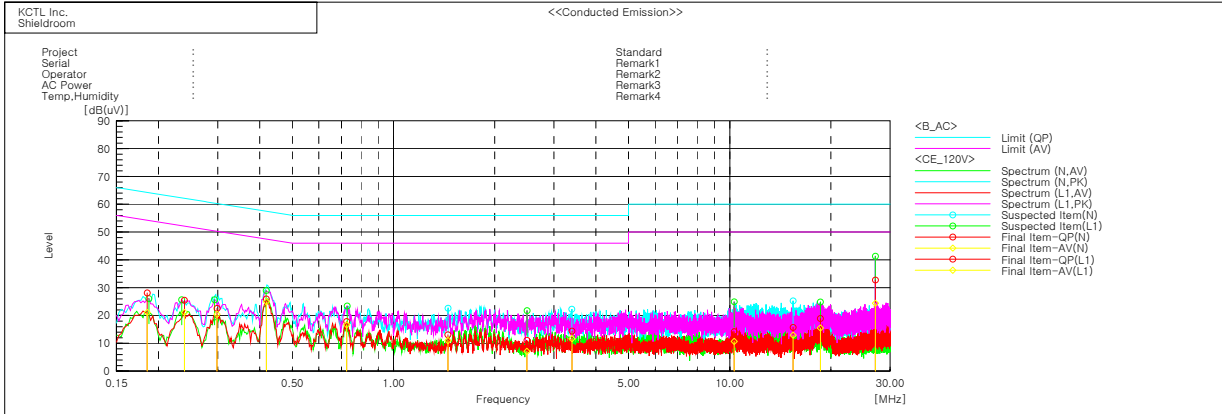
Frequency of Emission (MHz)	Conducted limit (dB $\mu$ V/m)	
	Quasi-peak	Average
0.15 – 0.50	66 - 56*	56 - 46*
0.50 – 5.00	56	46
5.00 – 30.0	60	50

### Measurement procedure

1. The EUT was placed on a wooden table of size, 1 m by 1.5 m, raised 80 cm in which is located 40 cm away from the vertical wall and 1.5m away from the side wall of the shielded room.
2. Each current-carrying conductor of the EUT power cord was individually connected through a 50 $\Omega$ /50 $\mu$ H LISN, which is an input transducer to a spectrum analyzer or an EMI/Field Intensity Meter, to the input power source.
3. Exploratory measurements were made to identify the frequency of the emission that had the highest amplitude relative to the limit by operating the EUT in a range of typical modes of operation, cable position, and with a typical system equipment configuration and arrangement. Based on the exploratory tests of the EUT, the one EUT cable configuration and arrangement and mode of operation that had produced the emission with the highest amplitude relative to the limit was selected for the final measurement.
4. The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment is the system) was then performed over the frequency range of 0.15 MHz to 30 MHz.
5. The measurements were made with the detector set to peak amplitude within a bandwidth of 10 kHz or to quasi-peak and average within a bandwidth of 9 kHz. The EUT was in transmitting mode during the measurements.

## Test results

### AC 120 V



#### Final Result

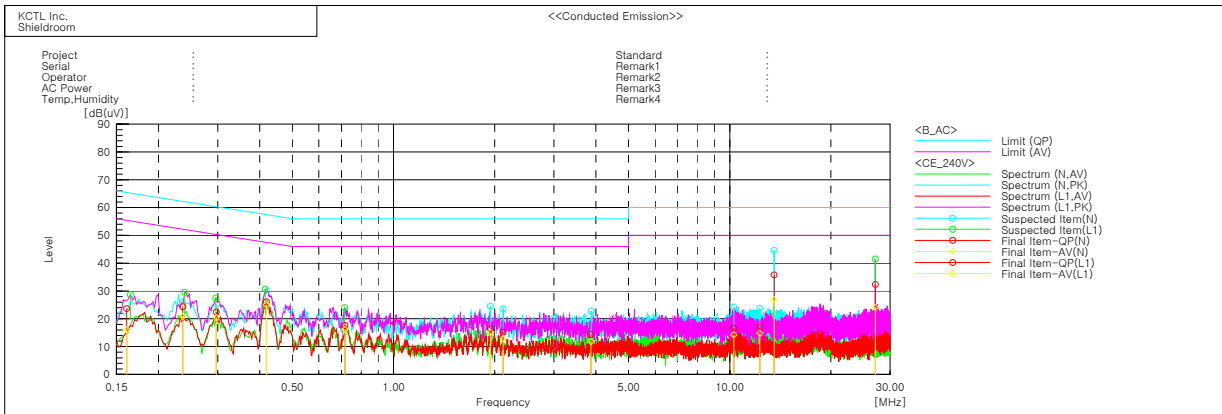
##### --- N Phase ---

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c. f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	1.45218	3.5	1.4	9.6	13.1	11.0	56.0	46.0	42.9	35.0
2	3.39367	4.8	2.1	9.6	14.4	11.7	56.0	46.0	41.6	34.3
3	15.43612	5.8	3.1	9.9	15.7	13.0	60.0	50.0	44.3	37.0

##### --- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c. f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	0.18514	18.3	11.3	9.8	28.1	21.1	64.3	54.3	36.2	33.2
2	0.23874	15.9	11.6	9.5	25.4	21.1	62.1	52.1	36.7	31.0
3	0.29866	13.0	10.8	9.6	22.6	20.4	60.3	50.3	37.7	29.9
4	0.41876	16.2	15.2	9.7	25.9	24.9	57.5	47.5	31.6	22.6
5	0.72574	8.1	6.9	9.7	17.8	16.6	56.0	46.0	38.2	29.4
6	2.49394	1.5	2.5	9.6	11.1	7.1	56.0	46.0	44.9	38.9
7	10.30726	4.3	0.8	9.9	14.2	10.7	60.0	50.0	45.8	39.3
8	18.59192	8.9	5.5	10.0	18.9	15.5	60.0	50.0	41.1	34.5
9	27.11926	22.8	14.4	10.0	32.8	24.4	60.0	50.0	27.2	25.6

**AC 240 V**



Final Result

--- N Phase ---

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c. f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	1.94137	6.8	5.4	9.6	16.4	15.0	56.0	46.0	39.6	31.0
2	2.11909	5.6	3.2	9.6	15.2	12.8	56.0	46.0	40.8	33.2
3	3.86928	4.8	2.2	9.6	14.4	11.8	56.0	46.0	41.6	34.2
4	10.28734	6.7	4.3	9.9	16.6	14.2	60.0	50.0	43.4	35.8
5	12.2883	6.9	4.9	9.9	16.8	14.8	60.0	50.0	43.2	35.2
6	13.55907	25.9	17.0	9.9	35.8	26.9	60.0	50.0	24.2	23.1

--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c. f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	0.16079	14.0	6.4	9.7	23.7	16.1	65.4	55.4	41.7	39.3
2	0.23619	14.9	11.3	9.5	24.4	20.8	62.2	52.2	37.8	31.4
3	0.29719	12.8	10.9	9.6	22.4	20.5	60.3	50.3	37.9	29.8
4	0.4185	16.4	15.4	9.7	26.1	25.1	57.5	47.5	31.4	22.4
5	0.71744	7.9	6.5	9.7	17.6	16.2	56.0	46.0	38.4	29.8
6	27.11806	22.4	14.1	10.0	32.4	24.1	60.0	50.0	27.6	25.9

## 7. Measurement equipment

Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
Vector Signal Generator	R&S	SMBV100A	257566	22.07.09
Signal Generator	R&S	SMB100A	176206	23.01.19
Spectrum Analyzer	R&S	FSV40	100988	22.07.19
DC Power Supply	AGILENT	E3632A	MY40017108	23.05.02
Temp & Humid Chamber	Myeongseong R&P	CTHC-50P-DT	20150824-3	22.07.27
Bi-Log Antenna	TESEQ	CBL 6112D	55545	24.04.27
ATTENUATOR	Agilent	8491B-003	2708A18758	24.04.27
LOOP Antenna	R&S	HFH2-Z2	100355	22.08.21
AMPLIFIER	SONOMA	310N	284608	22.08.19
Antenna Mast	Innco Systems	MA4000-EP	303	N/A
Turn Table	Innco Systems	DT2000	79	N/A
ISOLATION TRANSFORMER	ONETECH CO., LTD	OT-IT500VA	OTR1-16026	23.03.28
EMI TEST RECEIVER	R&S	ESC17	100732	23.01.19
EMI TEST RECEIVER	R&S	ESC13	101408	22.08.19
TWO-LINE-V-NETWORK	R&S	ENV216	101584	23.03.29

**End of test report**