



TEST REPORT



Report No. : KES-RF260275

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KES Co., Ltd.

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■ FCC TEST REPORT

1. Client

- Name : HUMANINTECH
- Address : 2236, Yonggu-daero, Giheung-gu Yongin-si, Gyeonggi-do South Korea

2. Sample Description

- Product item : Access Control Terminal
- Model name : PV700S
- Manufacturer etc. : HUMANINTECH

3. Date of test : 2026.05.27 ~ 2026.05.28

4. Location of Test : ☒ Permanent Testing Lab ☐ On Site Testing

- Address : 473-21, Gayeo-ro, Yeoju-si, Gyeonggi-do, 12658, Rep. of Korea

5. Test method used : Part 15.225

6. Test result : PASS

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

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This test report is not related to KOLAS accreditation.

Affirmation	Tested by	Technical Manager
	Name : Myeong-Ho, Lee (Signature)	Name : Yeong-Jun Cho (Signature)

2026. 06. 11.

KES Co., Ltd.



REPORT REVISION HISTORY

Date	Test Report No.	Revision History
2026.06.11	KES-RF260275	Initial

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1. General information

Applicant HUMANINTECH
Applicant address 2236, Yonggu-daero, Giheung-gu Yongin-si, Gyeonggi-do South Korea
Test site KES Co., Ltd.
Test site address ☐ #3002, #3503, #3701, 40, Simin-daero365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Rep. of Korea
☒ 473-21, Gayeo-ro, Yeoju-si, Gyeonggi-do, 12658, Rep. of Korea
Test Facility FCC Accreditation Designation No.: KR0100, Registration No.: 444148
FCC rule part(s): 15.225
FCC ID: 2BV8SPV700S
Test device serial No. ☒ Production ☐ Pre-production ☐ Engineering

1.1. EUT description

Equipment under test Access Control Terminal
Frequency range & Number of channels 2 402 MHz ~ 2 480 MHz (LE 1/2 Mbps) : 40 ch
13.560 5 MHz (NFC) : 1 ch
Model PV700S
Modulation technique GFSK, ASK
Antenna specification ANT1 : Chip Antenna (LE 1/2 Mbps) // Peak gain : 1.39 dBi
ANT2 : Loop antenna (NFC)
Power source DC 12 V
H/W version V0.9
S/W version V1.0.1.53

1.2. Test configuration

The **HUMANINTECH // Access Control Terminal // PV700S // FCC ID: 2BV8SPV700S** was tested according to the specification of EUT, the EUT must comply with following standards

FCC Part 15.225
FCC Part 2
KDB 558074 D01 v05 r02
ANSI C63.10-2020

1.3. Information about derivative model

N/A

**1.4. Accessory information**

Equipment	Manufacturer	Model	Serial No.	Power source
-	-	-	-	-

1.5. Sample calculation

Where relevant, the following sample calculation is provided

For Radiation test :

Field strength level (dB μ V/m) = Measured level (dB μ V) + Antenna factor (dB) + Cable loss (dB) – Amplifier gain (dB)

1.6. Measurement Uncertainty

Test Item		Uncertainty
Uncertainty for Radiation emission test (include Fundamental emission)	Below 1GHz	4.04 dB (SAC #6)
	Above 1GHz	5.32 dB (SAC #5)
Note. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.		

1.7. Frequency/channel operations

Ch.	Frequency (MHz)	Mode
00	2 402	LE 1/2 Mbps
.	.	.
20	2 442	LE 1/2 Mbps
.	.	.
39	2 480	LE 1/2 Mbps

Ch.	Frequency (MHz)	Mode
01	13.560 5	NFC



2. Summary of tests

Section in FCC Part 15 & 2	Parameter	Test results
-	99% Occupied Bandwidth	Pass
15.225(a)	The field strength of fundamental	Pass
15.225(b)(c)	The field strength of spurious emission(In-band)	Pass
15.225(d) 15.209	The field strength of spurious emission(Out-band)	Pass
2.1049	20 dB bandwidth	Pass
15.225(e)	Frequency stability	Pass
15.203	Antenna Requirement	Pass



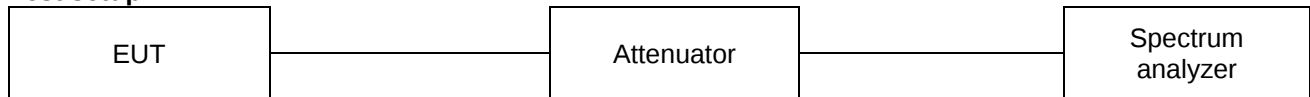
3 Test results

3.1. 99% Occupied Bandwidth

Test procedure

ANSI C63.10-2020 clause 6.9.2 and 6.9.3

Test setup



Test setting

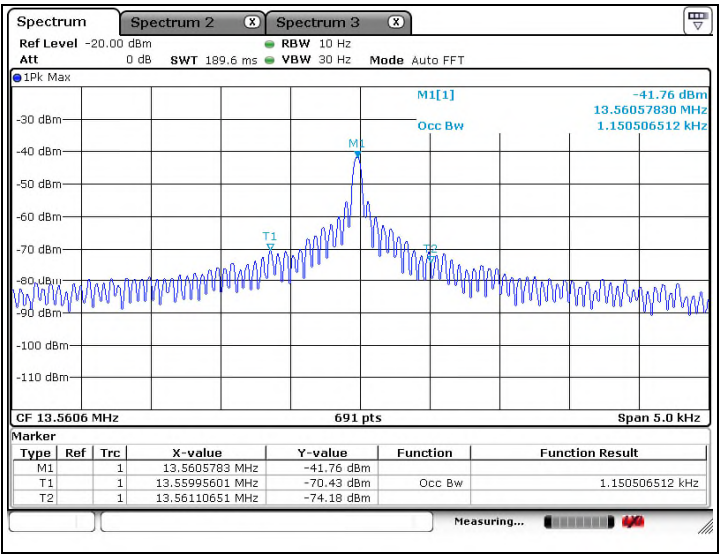
1. Span = The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW.
2. RBW = The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW
3. VBW = shall be approximately three times the RBW
4. Sweep = auto
5. Detector function = Peak
6. Trace = Max hold

Limit

None; for reporting purpose only.



Test results

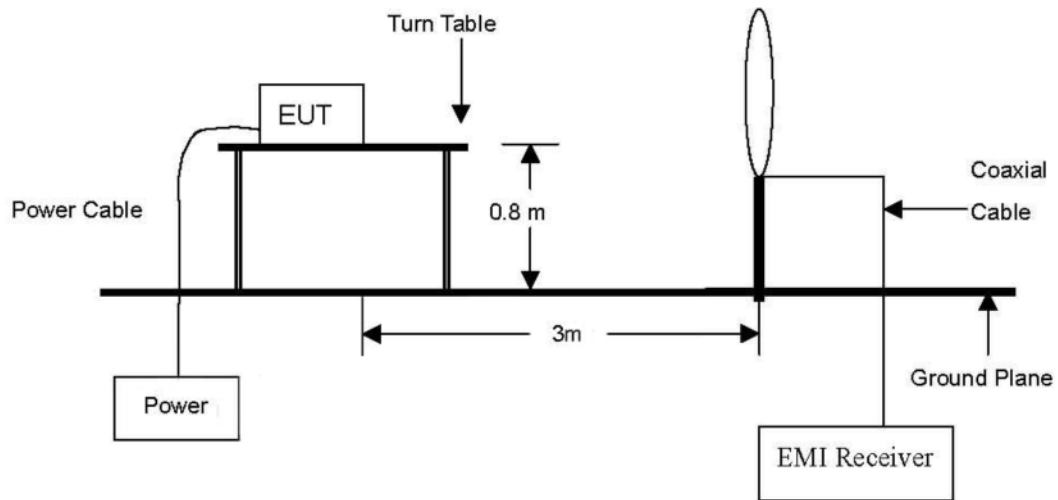




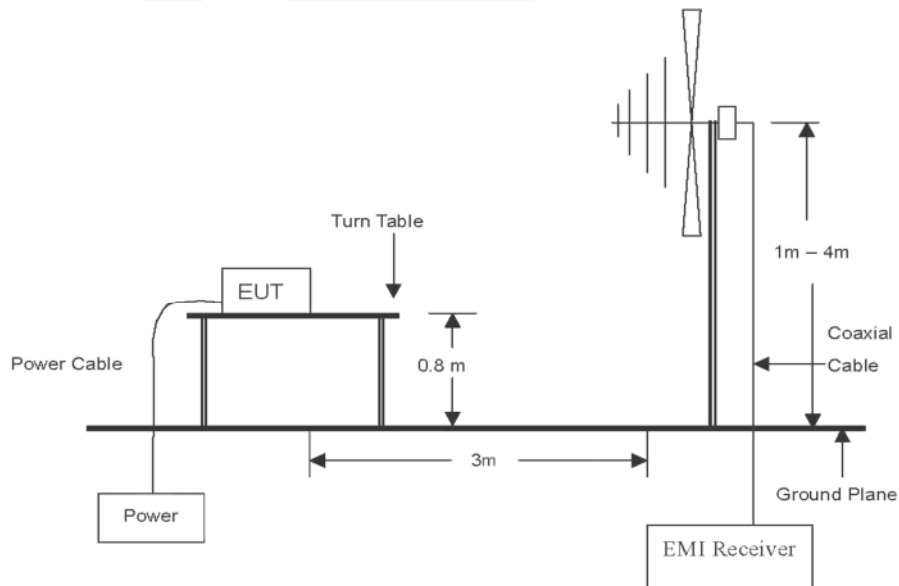
3.2. Radiated spurious emissions

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.





Test procedure

[9 kHz to 30 MHz]

The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. Then antenna is a loop antenna is fixed at one meter above the ground to determine the maximum value of the field strength. Both parallel and perpendicular of the antenna are set to make the measurement. For each suspected emission, the EUT was arranged to its worst case and then the table was turned from 0 degrees to 360 degrees to find the maximum reading. The test-receiver system was set to Quasi-peak function and specified bandwidth with maximum hold mode.

The spectrum analyzer is set to:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer 200 Hz for Quasi-peak detection (QP) at frequency below 9 kHz~ 150 kHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer 9 kHz for Quasi-peak detection (QP) at frequency below 150 kHz~ 30 MHz.

[30 MHz to 1 GHz]

The height of the measuring antenna was varied between 1 to 4 m and the table was rotated a full revolution in order to obtain maximum values of the electric field intensity.

The measurement was made in both the vertical and horizontal polarization, and the maximum value is presented in the report.

The spectrum analyzer is set to:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Peak detection (PK) or Quasi-peak detection (QP) at frequency below 1 GHz.

Note.

According to exploratory test no any obvious emission except for fundamental 13.56 MHz were detected from 9 kHz to 30 MHz. Although these test were performed other than open field test 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.

**FCC Limit**

According to 15.209(a), for an intentional radiator devices, the general required of field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values :

Frequency (MHz)	Distance (Meters)	Radiated ($\mu V/m$)
0.009 ~ 0.490	300	2400/F(kHz)
0.490 ~ 1.705	30	24000/F(kHz)
1.705 ~ 30.0	30	30
30 ~ 88	3	100**
88 ~ 216	3	150**
216 ~ 960	3	200**
Above 960	3	500

**Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54 ~ 72 MHz, 76 ~ 88 MHz, 174 ~ 216 MHz or 470 ~ 806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

In the section 15.225:

- (a) The field strength of any emissions within the band 13.553 ~ 13.567 MHz shall not exceed 15,848 microvolts/meter (= 84 dB $\mu V/m$) at 30 meters.
- (b) 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 (=50.5 dB $\mu V/m$) at 30 meters.
- (c) 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 (=40.5 dB $\mu V/m$) at 30 meters.
- (d) 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.



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Test results for fundamental

Operating frequency: 13.560 5 MHz
Distance of measurement: 3 meter

Radiated emissions		Ant.	Total factors		Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Pol.	Correction factor (dB/m)	Distance factor (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
13.560 5	26.26	H	22.25	40.00	8.51	84.00	75.49
13.560 5	27.15	V	22.25	40.00	9.40	84.00	74.60

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

Radiated emissions		Ant.	Total factors		Total	Limit	
Frequency (MHz)	Reading (dB μ V)	Pol.	Correction factor (dB/m)	Distance factor (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
12.775 1	13.89	H	22.22	40.00	-3.89	29.50	33.39
13.107 6	15.87	V	22.22	40.00	-1.91	29.50	31.41
13.140 6	16.37	V	22.22	40.00	-1.41	40.50	41.91
13.237 0	13.08	H	22.23	40.00	-4.69	40.50	45.19
13.552 9	23.18	H	22.25	40.00	5.43	50.50	45.07
13.552 9	23.95	V	22.25	40.00	6.20	50.50	44.30
13.567 1	24.65	H	22.25	40.00	6.90	50.50	43.60
13.567 1	26.19	V	22.25	40.00	8.44	50.50	42.06
13.852 6	14.12	V	22.26	40.00	-3.62	40.50	44.12
13.964 6	14.49	H	22.26	40.00	-3.25	40.50	43.75
14.020 4	13.91	H	22.23	40.00	-3.86	29.50	33.36
15.111 2	15.38	V	22.26	40.00	-2.36	29.50	31.86



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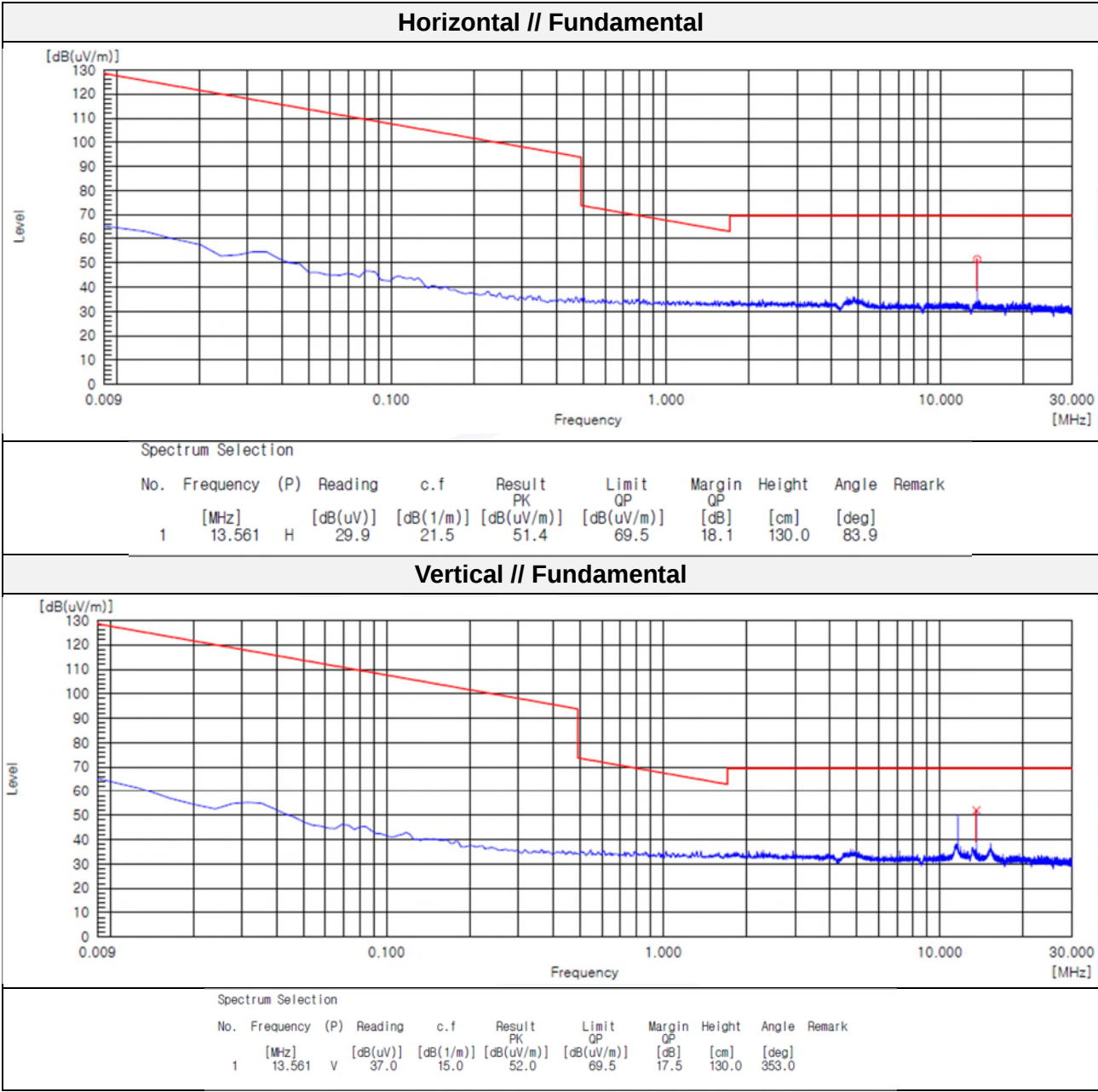
Note.

1. All measurements were performed using a loop antenna. The antenna was investigated with three polarizations, and horizontal and vertical polarizations were reported as the worst case.
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 = $20 \log_{10}(30/3)^2 = 40$ dB.
3. The spectrum was investigated from 9 kHz up to 30 MHz using the loop antenna. Only the emissions shown in the table above were found to be significant.
4. All measurements were recorded using a spectrum analyzer employing a quasi-peak detector.
5. Actual = Reading + Correction factors(Ant. factor + Cable loss) - Distance factor
6. Margin [dB] = Limit [dBμV/m] - Field Strength Level [dBμV/m]
7. All modes (e.g. with and without a tag) were investigated. Only the radiated emissions of the configuration (with a tag) that produced the worst case emissions are reported in this section.





Test results (9 kHz to 30 MHz)

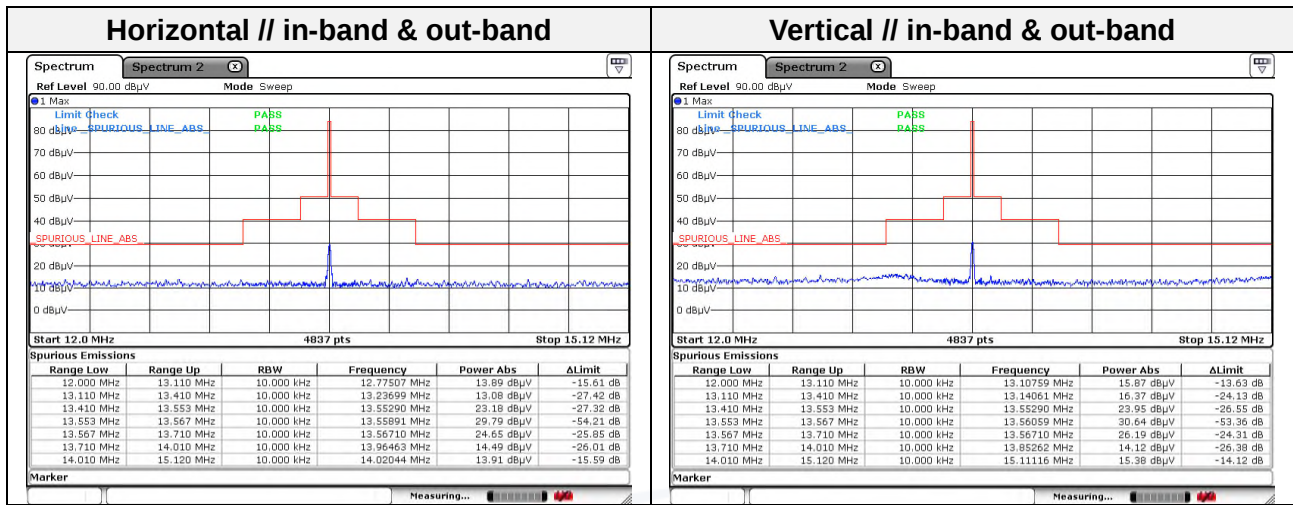


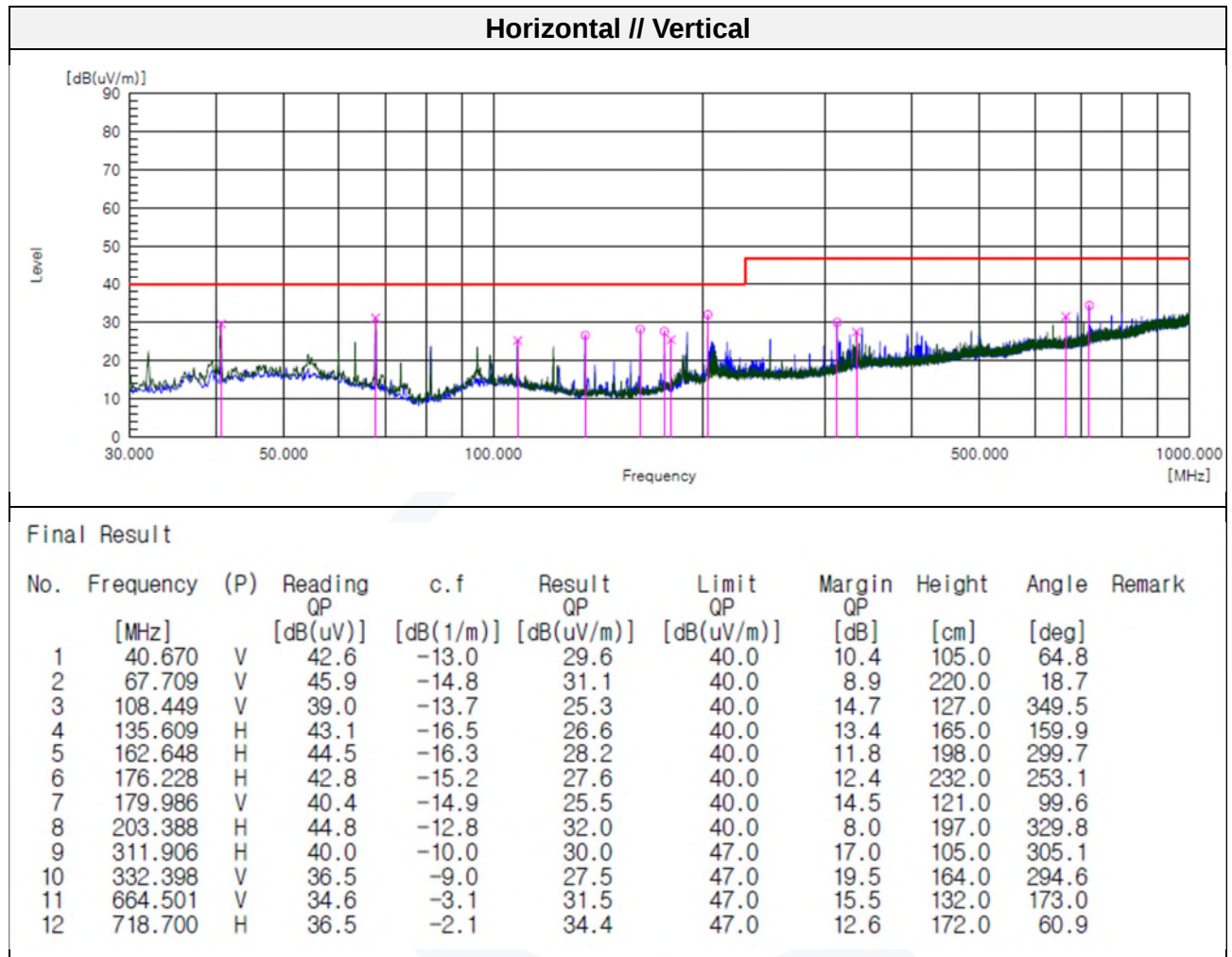
Note.

1. above data is peak result



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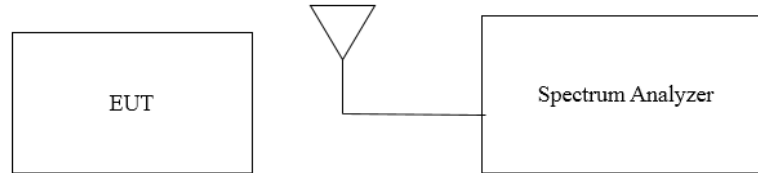
**Test results (Below 1 000 MHz)****Note.**

1. All measurements were recorded using a spectrum analyzer employing a quasi-peak detector for emissions below 960 MHz.
2. Both Vertical and Horizontal polarities of the receive antenna were evaluated with the worst case emissions being reported. Below 30 MHz the loop antenna was positioned in 3 orthogonal planes (X Front, Y side, Z top) to determine the orientation resulting in the worst case emissions.
3. The EUT was positioned in three orthogonal planes to determine the orientation resulting in the worst case emissions.



3.3 20 dB bandwidth

Test setup



Test procedure

ANSI C63.10-2020 – Section 6.9.2

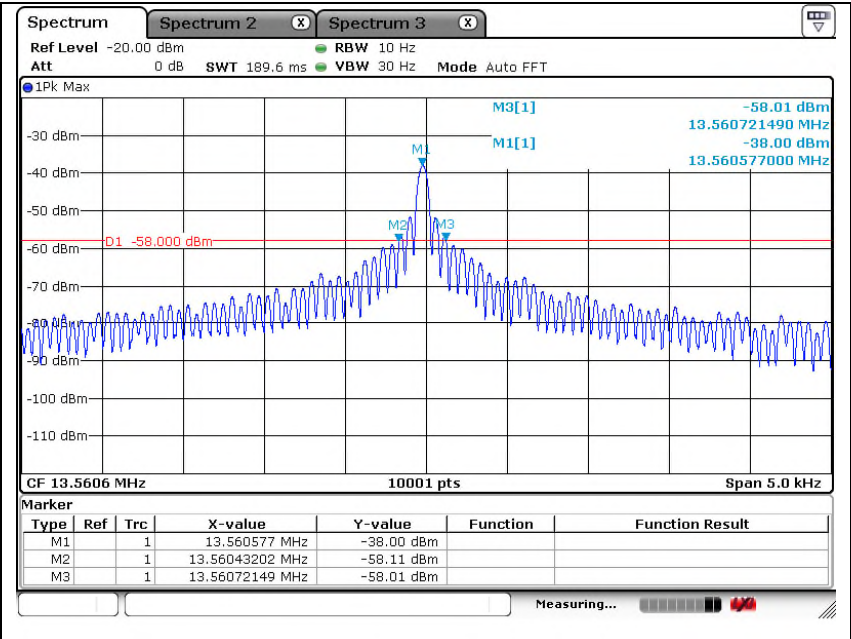
1. Spectrum analyzer frequency is set to the nominal EUT channel center frequency.
2. RBW = 1~5% OBW
3. VBW $\geq 3 \times$ RBW
4. Reference level set to keep signal from exceeding maximum input mixer for linear operation.
5. Detector = Peak
6. Trace mode = Max hold
7. Sweep = Auto couple
8. The trace was allowed to stabilize
9. Using the marker-delta function, determine the “-20 dB down amplitude” using [(highest in band spectral density) – 20 dB]
10. Set a marker at the lowest frequency of the envelope of the spectral density, such that the marker is at or slightly below the “-20 dB down amplitude” determined in Step 9.
11. Reset Marker-delta function and move the marker to other side of the emission until the delta marker amplitude is the same level as reference amplitude. The marker delta frequency reading at this point is the specified emission bandwidth.

Limit

None; for reporting purpose only.



Test results



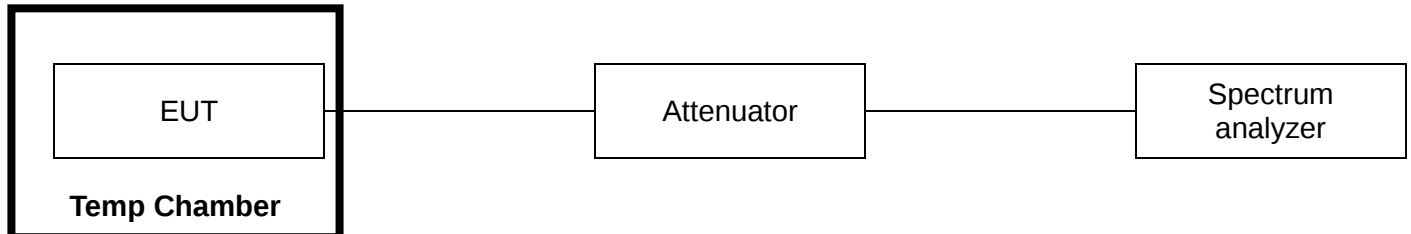


3.4. Frequency Stability

Test procedure

ANSI C63.10-2020, clause 6.8.1

Test setup



1. The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
2. Turn the EUT on and couple its output to a spectrum analyzer.
3. Turn the EUT off and set the chamber to the highest temperature specified.
4. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency.
5. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
6. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.
7. While maintaining a constant temperature inside the environmental chamber, turn the EUT on and record the operating frequency at startup, and at 2 minutes, 5 minutes, and 10 minutes after the EUT is energized. Four measurements in total are made.

FCC Limit

According to §15.225 (e), the frequency tolerance of the carrier signal shall be maintained within ± 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 results

Test voltage (%)	Test voltage (V)	Temperature (°C)	Maintaining time	Measure frequency (MHz)	Frequency deviation (Hz)	Deviation (%)
100 %	DC 12.0 V	-20	Startup	13.560 560	60	0.000 004
			2 minutes	13.560 541	41	0.000 003
			5 minutes	13.560 530	30	0.000 002
			10 minutes	13.560 521	21	0.000 002
		-10	Startup	13.560 571	71	0.000 005
			2 minutes	13.560 557	57	0.000 004
			5 minutes	13.560 577	77	0.000 006
			10 minutes	13.560 580	80	0.000 006
		0	Startup	13.560 553	53	0.000 004
			2 minutes	13.560 568	68	0.000 005
			5 minutes	13.560 571	71	0.000 005
			10 minutes	13.560 583	83	0.000 006
		10	Startup	13.560 584	84	0.000 006
			2 minutes	13.560 574	74	0.000 005
			5 minutes	13.560 579	79	0.000 006
			10 minutes	13.560 563	63	0.000 005
		20	Startup	13.560 562	62	0.000 005
			2 minutes	13.560 556	56	0.000 004
			5 minutes	13.560 554	54	0.000 004
			10 minutes	13.560 567	67	0.000 005
		30	Startup	13.560 591	91	0.000 007
			2 minutes	13.560 592	92	0.000 007
			5 minutes	13.560 555	55	0.000 004
			10 minutes	13.560 553	53	0.000 004
		40	Startup	13.560 580	80	0.000 006
			2 minutes	13.560 576	76	0.000 006
			5 minutes	13.560 582	82	0.000 006
			10 minutes	13.560 574	74	0.000 005
		50	Startup	13.560 558	58	0.000 004
			2 minutes	13.560 543	43	0.000 003
			5 minutes	13.560 531	31	0.000 002
			10 minutes	13.560 521	21	0.000 002
85 %	DC 10.2 V	24.5	Startup	13.560 574	74	0.000 005
			2 minutes	13.560 566	66	0.000 005
			5 minutes	13.560 589	89	0.000 007
			10 minutes	13.560 590	90	0.000 007
115 %	DC 13.8 V	24.5	Startup	13.560 593	93	0.000 007
			2 minutes	13.560 554	54	0.000 004
			5 minutes	13.560 572	72	0.000 005
			10 minutes	13.560 581	81	0.000 006



3.5. Antenna Requirement

According to 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. 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 Sections 15.211, 15.213, 15.217, 15.219, or 15.221. 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 Section 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.



**Appendix A. Measurement equipment**

Equipment	Manufacturer	Model	Serial No.	Calibration interval	Calibration due.
SPECTRUM ANALYZER	R&S	FSV40-N	102194	1 year	2026.07.31
SPECTRUM ANALYZER	R&S	FSV40	101002	1 year	2027.01.06
SIGNAL GENERATOR	KEYSIGHT	N5182B	MY59100115	1 year	2027.04.02
SIGNAL GENERATOR	Anritsu	68369B	002118	1 year	2027.04.02
LOOP ANTENNA	TESEQ	HLA6121	66547	2 years	2028.01.13
TRILOG-BROADBAND ANTENNA	Schwarzbeck	VULB 9163	714	2 years	2028.04.16
Amplifier	SONOMA INSTRUMENT	310N	401123	1 year	2027.02.12
DC POWER SUPPLY	AGILENT	6632B	MY43004090	1 year	2026.06.12 2027.06.08
Temperature & Humidity Chamber	ESPEC	SH-642	93012658	1 year	2026.06.10 2027.06.08
Cable (SAC #6)	TCLH21D-SMSM-2.5M 0222	OSI Cable	-	0.5 year	2026.07.25
	TCLH21D-NMNM-10.0M 0222	OSI Cable	-	0.5 year	2026.07.25
	TCLH21D-SMSM-7.0M 0222	OSI Cable	-	0.5 year	2026.07.25

* Statement of Traceability: KES Co., Ltd. attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Peripheral device

Device	Manufacturer	Model No.	Serial No.
Notebook computer	Lenovo PC HK Limited	80XL	PF12GP

The End.