FCC / ISED Test Report

For:
Hanchett Entry Systems, Inc.

Model:
KS210

Product Description:
Server cabinet lock

FCC ID: VC3-KS210
ISED ID: 7160A-KS210

Applied Rules and Standards:
47 CFR Part 15.209 and 15.225
RSS-210 Issue 10 & RSS-Gen Issue 5

REPORT #: EMC_HANC1-005-20001_15.225_RFID_NFC_REV1

DATE: 2020-12-04

A2LA Accredited

IC recognized #
3462B-1

***CETECOM* Inc.**
411 Dixon Landing Road ◆ Milpitas, CA 95035 ◆ U.S.A.
Phone: + 1 (408) 586 6200 ◆ Fax: + 1 (408) 586 6299 ◆ E-mail: info@cetecom.com ◆ http://www.cetecom.com
CETECOM Inc. is a Delaware Corporation with Corporation number: 2905571

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1 Assessment

The following device was evaluated against the applicable radiated emissions criteria specified in FCC rules Parts 15.209, and 15.225 of Title 47 of the Code of Federal Regulations and the relevant ISED Canada standard RSS-210 Issue 10, and RSS-Gen Issue 5.

The data for evaluating the performance according to RSS-210 other than the radiated spurious emissions, is taken from SIEMIC, Inc. modular report # RF_SL12062001-HID-019_SE3200_FCC-IC rev1.1" from Apr 28th 2014. The test results in this report were evaluated and found to comply with the requirements in RSS-210 Issue 10.
No deviations were ascertained.

Company	Description	Model #
Hanchett Entry Systems, Inc.	Server cabinet lock	KS210

Responsible for Testing Laboratory:

Date	Section	Name	Signature
2020-12-04	Compliance	Cindy Li (EMC Lab Manager)	Cindy Li Digitally signed by cindy.li@cetecom.com DN: CN=cindy.li@cetecom.com Reason: I have reviewed this document Location: Date: 2020-12-04 21:09:58

Responsible for the Report:

Date	Section	Name	Signature
2020-12-04	Compliance	Kris Lazarov (EMC Engineer)	

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the EMC Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
Street Address:	411 Dixon Landing Road
City/Zip Code	Milpitas, CA 95035
Country	USA
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
EMC Lab Manager:	Cindy Li
Responsible Project Leader:	Palacios, Cathy

2.2 Identification of the Client

Client's Name:	Hanchett Entry Systems, Inc.
Street Address:	10027 S. 51st St., Suite 102
City/Zip Code	Phoenix, AZ 85044
Country	USA

2.3 Identification of the Manufacturer

Manufacturer's Name:	Same as Client
Manufacturers Address:	
City/Zip Code	
Country	

3 Equipment Under Test (EUT)

3.1 EUT Specifications

Model No:	KS200 / KS210
HW Version :	Rev. X02.; SE32 RFID Module: Rev. B; BTSmart BLE Module: Rev. H
SW Version :	N/A.; SE32 RFID Module: 8.2.1.1; BTSmart BLE Module: 2.22
FCC-ID :	VC3-KS210
ISED-ID:	7160A-KS210
FVIN:	N/A
HVIN:	KS210
PMN:	KS210
Product Description:	Server cabinet lock
Frequency Range / number of channels:	RFID 125 kHz / NFC 13.56 MHz
Radio Information:	Module Name: HID Global Module Number: SE3200BP0
Modes of Operation:	13.56 MHz & 125 kHz
Power Supply/ Rated Operating Voltage Range:	12 VDC (min) / 24 VDC (max)
Operating Temperature Range	Tmin: 20 ºC / Tmax: 27 ºC
Other Radios included in the device:	Bluetooth version 4.0, Low Energy
Sample Revision	☐Prototype Unit; ☐Production Unit; ■Pre-Production

3.2 EUT Sample details

EUT #	Serial Number	HW Version	SW Version	Notes/Comments
1	BLE Engineering Sample	Rev. X02	N/A	

3.3 Support Equipment (SE) details

SE #	Type	Model	Manufacturer	Serial Number
1	12 V Battery	24-72J	Ozark Automotive Distributors	N/A

3.4 Test Sample Configuration

EUT Set-up #	EUT / AE used for set-up	Comments
1	EUT#1 + SE#1	

3.5 Mode of Operation details

Mode of Operation	Description	Details
Op. 1	NFC + RFID	The 125 KHz and 13.56 MHz NFC and RFID transmit continuously

3.6 Justification for Worst Case Mode of Operation

During the testing process, the EUT was tested with transmitter sets on low, mid and high channels, and highest possible duty cycle possible. For radiated measurements, all data in this report shows the worst case between horizontal and vertical antenna polarizations and for all orientations of the EUT.

4 Subject of Investigation

The objective of the measurements done by CETECOM Inc. was to assess the performance of the EUT according to the relevant radiated emissions requirements specified in FCC rules part 15.209 and 15.225 of Title 47 of the Code of Federal Regulations and Radio Standard Specification RSS-210 Issue 10 of ISED Canada.

This test report is to support a request for new equipment authorization under the FCC ID: VC3-KS210, and ISED ID: 7160A-KS210

5 Measurement Results Summary

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Limit	Measured Value with least margin	Verdict
§15.225(d); §15.209 RSS-210 I10; RSS-Gen I5 8.9	TX Spurious emissions-Radiated	Nominal	BTLE+ NFC + RFID	54 RMS, 74 PEAK in dBuV/m @ 3m	32.21 dBuV/m @3m @ 67.798 MHz with 7.79 dB margin	PASS
§15.225(a,b,c); RSS-210 I10 B6 a;	Field strength in band mask	Nominal	NFC	13.553-13.567 MHz:15,848 uV/m @ 30 m 13.410-13.553 MHz: 334 uV/m @ 30 m 13.567-13.710 MHz: 334 uV/m @ 30 m 13.110-13.410 MHz: 106 uV/m @ 30 m 13.710-14.010 MHz: 106 uV/m @ 30 m	10 dB margin*	PASS
§15.225(e); RSS-210 I10 B6 b);	Frequency stability	Nominal and Extreme Voltage and Temperature	NFC	0.01%	0.0009 %*	PASS
§15.207(a) RSS Gen I5 8.8	AC Conducted Emissions			NA	Device is not connected to AC mains.	NA

*Taken from report RF_SL12062001-HID-019_SE3200_FCC-IC rev1.1

Note 1: NA= Not Applicable; NP= Not Performed.

Note 2: The 125 KHz and 13.56 MHz NFC and RFID were set to transmit continuously

6 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus, with 95% confidence interval (in dB delta to result), based on a coverage factor k=1.

Radiated measurement

9 kHz to 30 MHz	±2.5 dB (Magnetic Loop Antenna)
30 MHz to 1000 MHz	±2.0 dB (Biconilog Antenna)

According to TR 102 273 a multiplicative propagation of error is assumed for RF measurement systems. For this reason the RMS method is applied to dB values and not to linear values as appropriate for additive propagation of error. Also used: http://physics.nist.gov/cuu/Uncertainty/typeb.html. The above calculated uncertainties apply to direct application of the Substitution method. The Substitution method is always used when the EUT comes closer than 3 dB to the limit.

6.1 Environmental Conditions During Testing:

The following environmental conditions were maintained during the course of testing:

- Ambient Temperature: 20-25° C
- Relative humidity: 40-60%

6.2 Dates of Testing:

2020-10-13 – 2020-10-15

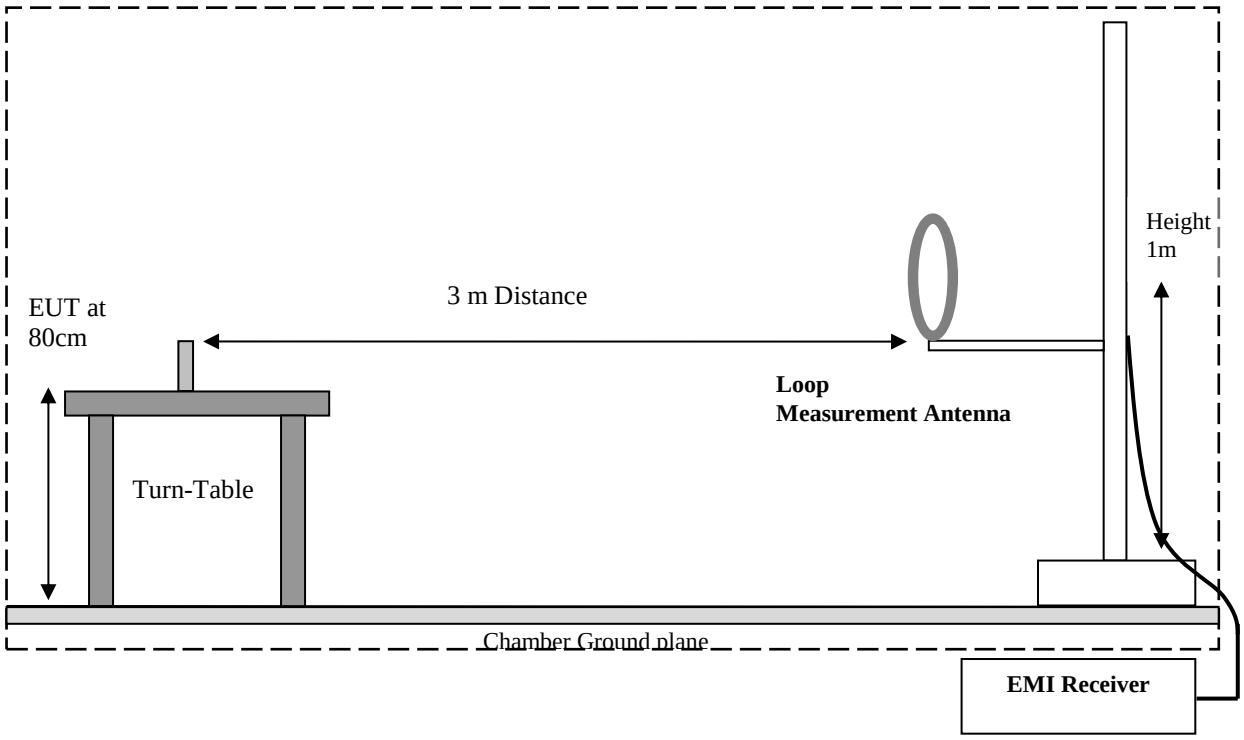
7 Measurement Procedures

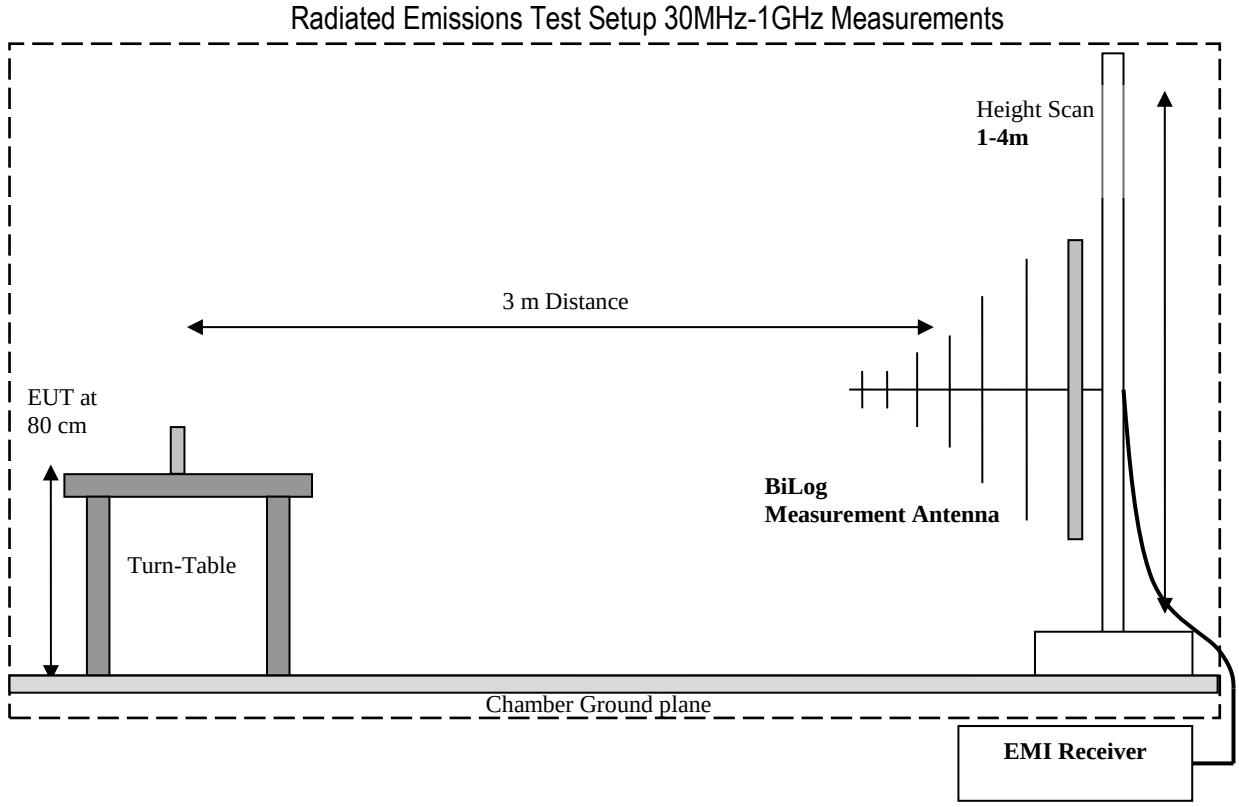
7.1 Radiated Measurement

The radiated measurement is performed according to ANSI C63.10 (2013)

- The exploratory measurement is accomplished by running a matrix of 16 sweeps over the required frequency range with R&S Test-SW EMC32 for 4 positions of the turntable, two orthogonal positions of the EUT and both antenna polarizations. This procedure exceeds the requirement of the above standards to cover the 3 orthogonal axis of the EUT. A max peak detector is utilized during the exploratory measurement. The Test-SW creates an overall maximum trace for all 12 sweeps and saves the settings for each point of this trace. The maximum trace is part of the test report.
- The 10 highest emissions are selected with an automatic algorithm of EMC32 searching for peaks in the noise floor and ensuring that broadband signals are not selected multiple times.
- The maxima are then put through the final measurement and again maximized in a 90deg range of the turntable, fine search in frequency domain and height scan between 1m and 4m.
- The above procedure is repeated for all possible ways of power supply to EUT and for all supported modulations.
- In case there are no emissions above noise floor level only the maximum trace is reported as described above.
- The results are split up into up to 4 frequency ranges due to antenna bandwidth restrictions. A magnetic loop is used from 9 kHz to 30 MHz, a Biconilog antenna is used from 30 MHz to 1 GHz, and two different horn antennas are used to cover frequencies up to 40 GHz.

Radiated Emissions Test Setup below 30MHz Measurements





7.1.1 Sample Calculations for Field Strength Measurements

Field Strength is calculated from the Spectrum Analyzer/ Receiver readings, taking into account the following parameters:

1. Measured reading in dBµV
2. Cable Loss between the receiving antenna and SA in dB and
3. Antenna Factor in dB/m

All radiated measurement plots in this report are taken from a test SW that calculates the Field Strength based on the following equation:

FS (dBµV/m) = Measured Value on SA (dBµV) + Cable Loss (dB) + Antenna Factor (dB/m)

Example:

Frequency (MHz)	Measured SA (dBµV)	Cable Loss (dB)	Antenna Factor Correction (dB)	Field Strength Result (dBµV/m)
1000	80.5	3.5	14	98.0

8 Test Result Data

8.1 Radiated Transmitter Spurious Emissions and Restricted Bands

8.1.1 Measurement according to ANSI C63.10 (2013)

Spectrum Analyzer Settings:

- Frequency = 9 KHz – 30 MHz
- RBW = 9 KHz
- Detector: Peak

- Frequency = 30 MHz – 1 GHz
- Detector = Peak / Quasi-Peak
- RBW= 120 KHz (<1GHz)

- Radiated spurious emissions shall be measured for the transmit frequencies, transmit power, and data rate for the lowest, middle and highest channel in each frequency band of operation and for the highest gain antenna for each antenna type, and using the appropriate parameters and test requirements.
- The highest (or worst-case) data rate shall be recorded for each measurement.
- For testing frequencies below 30 MHz at distance other than the specified in the standard, the limit conversion is calculated by using the FCC materials for the ANSI 63 committee issued on January, 27 1991.

8.1.2 Limits:

FCC §15.225

- 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.

FCC §15.209 & RSS-210 / RSS-Gen 8.9

- Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency of emission (MHz)	Field strength (µV/m)	Measurement Distance (m)	Field strength @ 3m (dBµV/m)
0.009–0.490	2400/F(kHz) / ---------	300	-
0.490–1.705	24000/F(kHz) / --------	30	-
1.705–30.0	30 / (29.5)	30	-
30–88	100	3	40 dBµV/m
88–216	150	3	43.5 dBµV/m
216–960	200	3	46 dBµV/m
Above 960	500	3	54 dBµV/m

FCC §15.205 & RSS-Gen 8.10

- Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
[1]0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41			

- Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).
  *PEAK LIMIT= 74 dBµV/m
  *AVG. LIMIT= 54 dBµV/m

8.1.3 Test conditions and setup:

Ambient Temperature	EUT Set-Up #	EUT operating mode	Power Input
22° C	1	NFC + RFID	12 VDC

8.1.4 Measurement result:

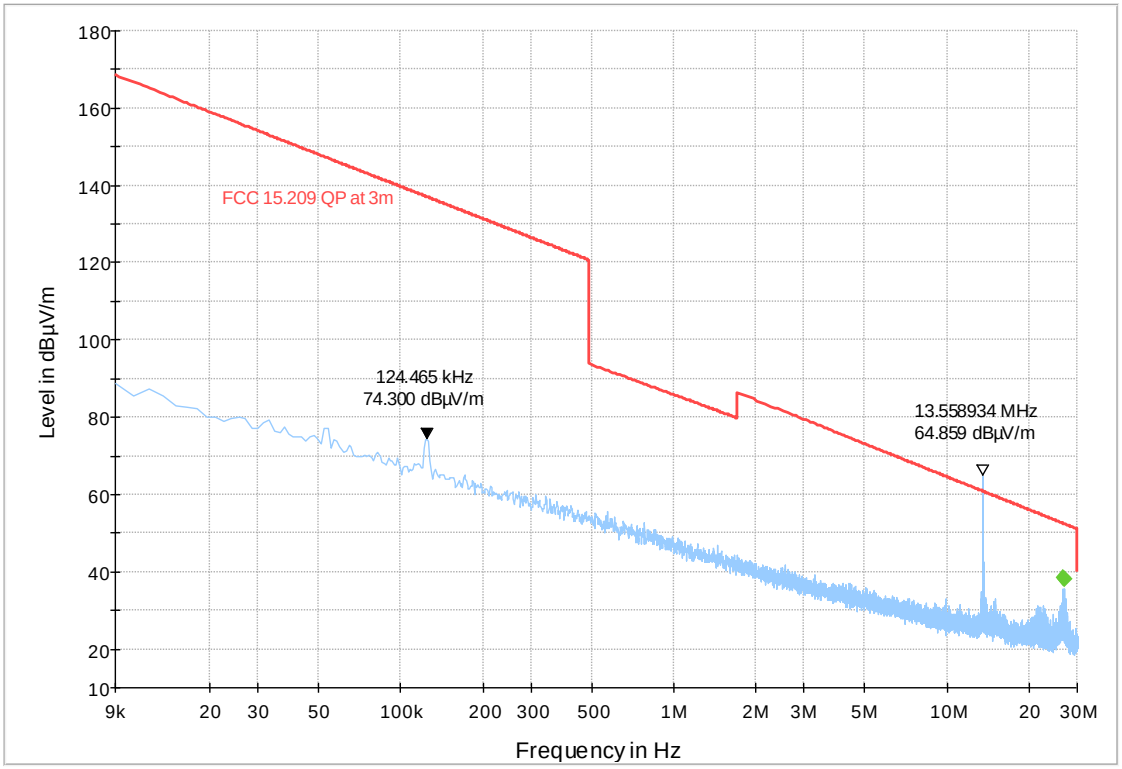
Plot #	Operating Mode	Scan Frequency	Limit	Result
1	NFC + RFID	9 kHz – 30 MHz	See section 8.1.2	Pass
2	NFC + RFID	30 MHz – 1 GHz	See section 8.1.2	Pass

8.1.5 Measurement Plots:

Plot # 1 Radiated Emissions: 9 kHz – 30 MHz

Modulation: RFID + NFC

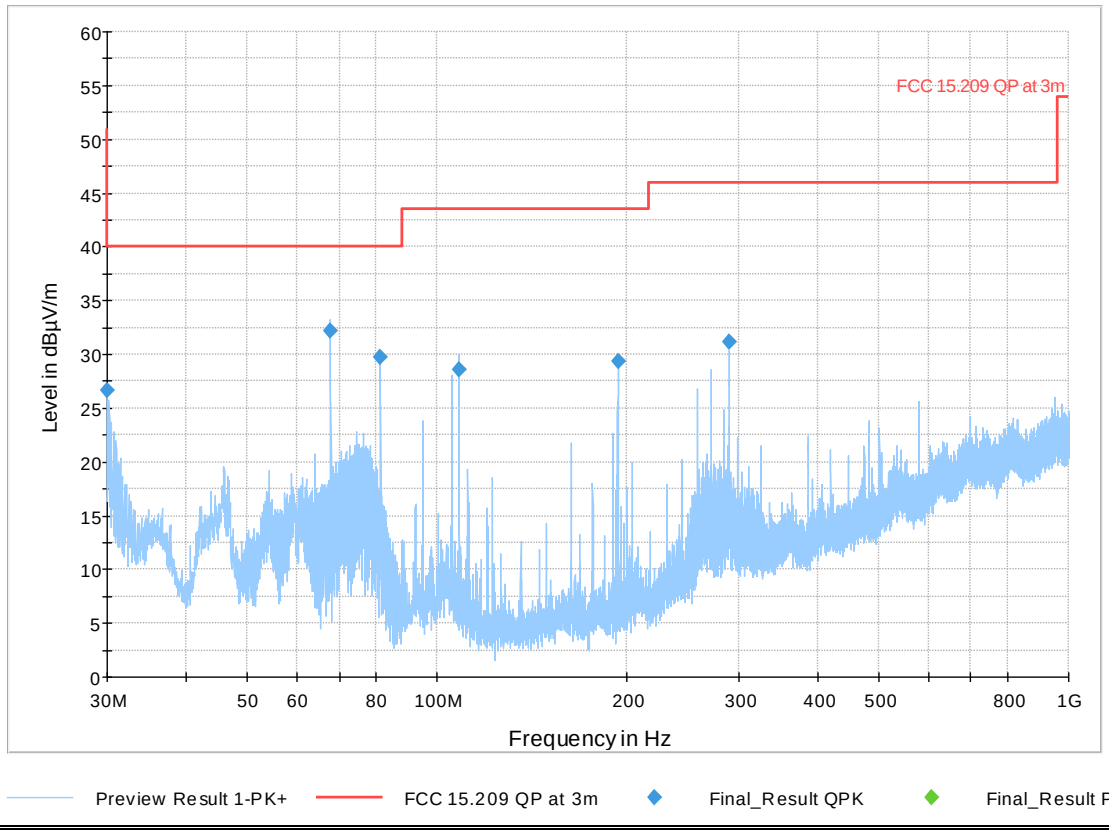
Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
26.746	---	38.31	52.45	14.15	500.0	9.000	140.0	H	128.0	16.3
26.996	---	37.93	52.34	14.41	500.0	9.000	140.0	H	16.0	16.3



Plot # 2 Radiated Emissions: 30 MHz – 1GHz

Modulation: BT LE + RFID + NFC | **Channel: Low**

Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
30.000	26.61	---	40.00	13.39	500.0	120.000	174.0	V	6.0	-13.9
67.798	32.21	---	40.00	7.79	500.0	120.000	174.0	V	243.0	-23.7
81.345	29.76	---	40.00	10.24	500.0	120.000	152.0	V	31.0	-23.2
108.473	28.59	---	43.50	14.91	500.0	120.000	163.0	V	169.0	-21.9
193.154	29.41	---	43.50	14.09	500.0	120.000	189.0	V	19.0	-21.0
289.701	31.14	---	46.02	14.88	500.0	120.000	198.0	V	265.0	-16.9



9 Test setup photos

Setup photos are included in supporting file name: "EMC_HANC1-005-20001_FCC_15.225_Setup_Photos.pdf"

10 Test Equipment And Ancillaries Used For Testing

Equipment Name/Type	Manufacturer	Model	Serial #	Calibration Cycle	Last Calibration Date
EMI Receiver/Analyzer	Rohde&Schwarz	ESU 40	100251	3 Years	7/16/2019
Loop antenna	ETS Lindgren	6507	161344	3 Years	10/26/2017
Biconlog Antenna	EMCO	3142E	166067	3 years	3/12/2020
Horn Antenna	EMCO	3115	35111	3 years	4/17/2019
Horn Antenna	ETS Lindgren	Horn 3117-PA	215984	3 years	1/26/2018
Compact Digital Barometer	Control Company	D4540001	130070752	3 Years	4/13/2020

Note: Equipment used meets the measurement uncertainty requirements as required per applicable standards for 95% confidence levels.
Calibration due dates, unless defined specifically, falls on the last day of the month. Items indicated "N/A" for cal status either do not specifically require calibration or is internally characterized before use.

11 History

Date	Template Revision	Changes to report	Prepared by	Approved by
2020-10-20	EMC_HANC1-005-20001_15.225_RFID_NFC	Initial Version	Kris Lazarov	Cindy Li
2020-12-04	EMC_HANC1-005-20001_15.225_RFID_NFC_REV1	Remove unused model and FCC ID KS200, Add complete evaluation for all requirements based on test data from module.	Kris Lazarov	Cindy Li

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