RF TEST REPORT

FCC / ISED

APPLICANT

Safetrust Inc

MODEL NAME

SA210

FCC ID

2ANI5SA210

ISED ID

23133-SA210

REPORT NUMBER

HA200902-STI-002-R03

TEST REPORT

Date of Issue
December 23, 2020

Test Site
Hyundai C-Tech, Inc. dba HCT America, Inc.
1726 Ringwood Ave, San Jose, CA 95131, USA

Applicant	Safetrust Inc
Applicant Address	8116 Mill Creek Rd, Fremont, CA 94539, U.S.A.
FCC ID	2ANI5SA210
ISED ID	23133-SA210
Model Name	SA210
EUT Type	SABRE Module
Modulation Type	DSSS/CCK, OFDM, GFSK
FCC Classification	Digital Transmission System (DTS)
FCC Rule Part(s)	Part 15.247, Part 15.209
ISED Rule Part(s)	RSS-247 Issue 2 (February 2017), RSS-Gen Issue 5 (April 2018)
Test Procedure	ANSI C63.10-2013, KDB 558074 D01 v05r02

The device bearing the trade name and model specified above, has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures required. The results of testing in this report apply only to the product which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Hyundai C-Tech, Inc. dba HCT America, Inc. certifies that no party to application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C 862

Tested By	**Reviewed By**
Billy Kim	Sunwoo Kim
Test Engineer	Technical Manager

REVISION HISTORY

The revision history for this document is shown in table.

TEST REPORT NO.	DATE	DESCRIPTION
HA200902-STI-002-R03	12/23/2020	Initial Issue

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Hyundai C-Tech, Inc. dba HCT America, Inc., 1726 Ringwood Avenue, San Jose, CA 95131, USA. TEL: +1-510-933-8848 FAX: +1-510-933-8849

1. GENERAL INFORMATION

EUT DESCRIPTION

Model	SA210
EUT Type	SABRE Module
Power Supply	DC 5.0 V
RF Specification	WIFI 2.4 GHz : IEEE 802.11b/g/n HT20 (SISO) Bluetooth LE MCU (1Mbps) : nRF52832 Bluetooth LE MESH (1Mbps) : nRF52832 Bluetooth LE RX (1Mbps) : nRF52811
Operating Environment	Indoor and outdoor
Operating Temperature	-20 °C ~ 50 °C

RF SPECIFICATION SUBJECT TO THE REPORT

Max. RF Output Power	WIFI 2.4 GHz	7.89 dBm (6.15 mW)
	BLE MCU 1M	-1.163 dBm (0.765 mW)
	BLE MESH 1M	-1.772 dBm (0.665 mW)
Modulation Type	DSSS/CCK : 802.11b OFDM : 802.11g/n (HT20) GFSK : Bluetooth LE	
Antenna Specification [1)]	Antenna Type : Chip Antenna Antenna Gain : 2.0 dBi (Peak Gain)	
Firmware Version [2)]	WIFI	1.0.XXX
	BLE	1.52.XXX
Hardware Version [2)]	V3	
Date(s) of Tests	Nov 1, 2020 ~ Dec 18, 2020	

Note :
1. Antenna information is based on the document provided by the applicant
2. Firmware and Hardware Version are as received by the applicant.

2. METHODOLOGY

FCC KDB 558074 D01 DTS Measurement Guidance v05r02 dated April 2nd, 2019 entitled "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) and the measurement procedure described in ANSI C63.10(Version : 2013) 'the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices'.

EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.407 under the FCC Rules Part 15 Subpart E. / RSS-Gen issue 5, RSS-247 issue 2.

GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2 of ANSI C63.10. (Version :2013) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane below 1GHz. Above 1GHz with 1.5m using absorbers between the EUT and receive antenna. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. Also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 8 of ANSI C63.10. (Version: 2013)

DESCRIPTION OF TEST MODES

The EUT has been tested at WIFI and BLE operating simultaneously. 'ESP RF Test Tool v.24' was used to control data rates, channels, output power level and to change between continuous TX and normal RX mode for WIFI. Tera term was used to control BLE data rate, channel, power setting.

3. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment's, which is traceable to recognized national standards. Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2017).

4. FACILITIES AND ACCREDITATIONS

FACILITIES

The SAC (Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at 1726 Ringwood Avenue, San Jose, California 95131, USA.
The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2014) and CISPR Publication 22.

Accredited Laboratory

A2LA has accredited

HYUNDAI C-TECH, INC. DBA HCT AMERICA, INC.

San Jose, CA

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated April 2017*).

Presented this 25th day of November 2019.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 4201.01
Valid to July 31, 2021

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

5. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203:
"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can 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."

(1) The antenna of this E.U.T is permanently attached and there is no provision for connection to an external antenna.
(2) The E.U.T Complies with the requirement of §15.203

6. 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 indicate 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 (±dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	2.55
Radiated Disturbance (9 kHz ~ 30 MHz)	3.20
Radiated Disturbance (30 MHz ~ 1 GHz)	4.73
Radiated Disturbance (1 GHz ~ 18 GHz)	5.21
Radiated Disturbance (18 GHz ~ 40 GHz)	5.18

7. DESCRIPTION OF TESTS

7.1. RADIATED TEST

Radiated Emission Limits

FCC : 47 CFR § 15.209		
Frequency (MHz)	**Field Strength (uV/m)**	**Measurement Distance (m)**
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

ISED : RSS-GEN Section 8.9		
Frequency (MHz)	**Field Strength (uV/m)**	**Measurement Distance (m)**
0.009 – 0.490	6.37/F(kHz)	300
0.490 – 1.705	63.7/F(kHz)	30
1.705 – 30	0.08	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Receiver Radiated Emission Limits

ISED : RSS-GEN Section 7.3		
Frequency (MHz)	**Field Strength (uV/m)**	**Measurement Distance (m)**
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

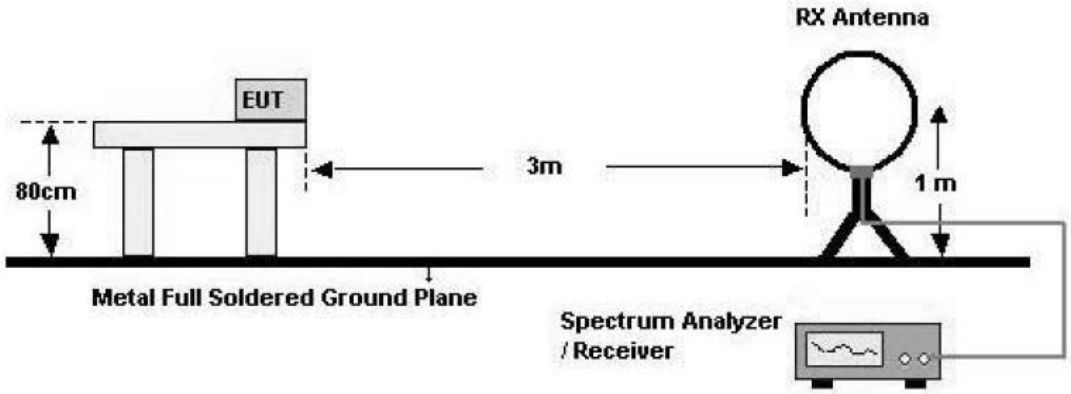
Restricted Bands of Operation

FCC : 47 CFR § 15.205(a)				
Frequency (MHz)	**Frequency (MHz)**	**Frequency (MHz)**	**Frequency (MHz)**	**Frequency (MHz)**
0.090 – 0.110	12.29-12.293	149.9 - 150.05	1660.0 - 1710.0	8025 – 8500
0.495 - 0.505	12.51975-12.52025	156.52475 - 156.52525	1718.8 - 1722.2	9000 – 9200
2.1735 – 2.1905	12.57675-12.57725	156.7 - 156.9	2200.0 - 2300.0	9300 – 9500
4.125 - 4.128	13.36-13.41	162.0125 - 167.17	2310.0 - 2390.0	10600 - 12700
4.17725-4.17775	16.42-16.423	167.72 - 173.2	2483.5 – 2500.0	13250 – 13400
4.20725-4.20775	16.69475-16.69525	240.0 - 285.0	2690.0 - 2900.0	14470 – 14500
6.215-6.218	16.80425-16.80475	322.0 - 335.4	3260.0 – 3267.0	15350 – 16200
6.26775-6.26825	25.5-25.67	399.9 - 410.0	3332.0 – 3339.0	17700 – 21400
6.31175-6.31225	37.5-38.25	608.0 - 614.0	3345.8 – 3358.0	22010 – 23120
8.291-8.294	73 - 74.6	960.0 - 1240.0	3600.0 – 4400.0	23600 – 24000
8.362-8.366	74.8 - 75.2	1300.0 - 1427.0	4500.0 – 5150.0	31200 – 31800
8.37625-8.38675	108 - 121.94	1435.0 - 1626.5	5350.0 – 5460.0	36430 – 36500
8.41425-8.41475	123 - 138	1645.5 - 1646.5	7250.0 – 7750.0	Above 38600

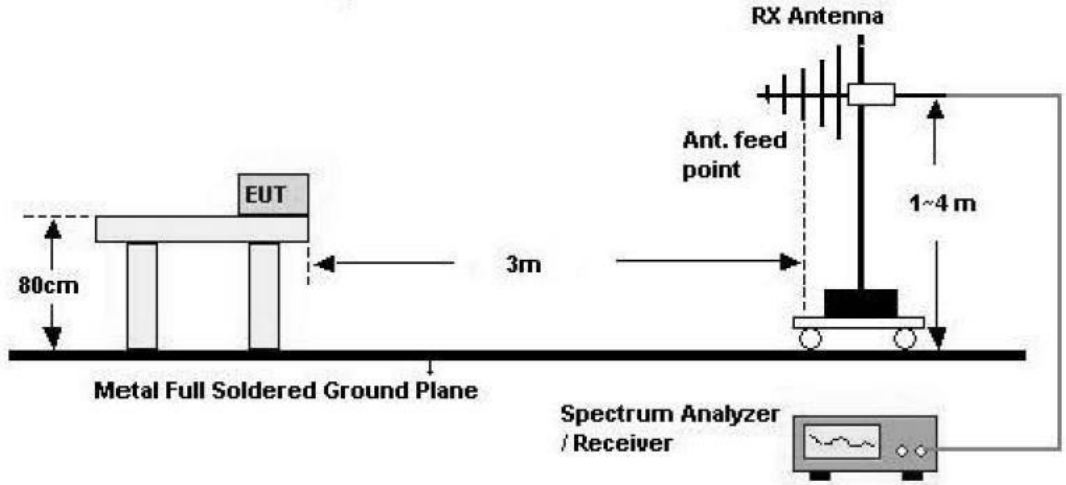
ISED : RSS-GEN Section 8.10				
Frequency (MHz)	**Frequency (MHz)**	**Frequency (MHz)**	**Frequency (MHz)**	**Frequency (MHz)**
0.090 - 0.110	8.37625 - 8.38675	108 – 138	1660 - 1710	8025 – 8500
0.495 - 0.505	8.41425 - 8.41475	149.9 - 150.05	1718.8 - 1722.2	9000 - 9200
2.1735 - 2.1905	12.29 - 12.293	156.52475 - 156.52525	2200 - 2300	9300 - 9500
3.020 - 3.026	12.51975 - 12.52025	156.7 - 156.9	2310 - 2390	10600 - 12700
4.125 - 4.128	12.57675 - 12.57725	162.0125 - 167.17	2483.5 - 2500	13250 – 13400
4.17725 - 4.17775	13.36 - 13.41	167.72 - 173.2	2655 - 2900	14470 – 14500
4.20725 - 4.20775	16.42 - 16.423	240 – 285	3260 – 3267	15350 – 16200
5.677 - 5.683	16.69475 - 16.69525	322 - 335.4	3332 - 3339	17700 – 21400
6.215 - 6.218	16.80425 - 16.80475	399.9 - 410	3345.8 - 3358	22010 – 23120
6.26775 - 6.26825	25.5 - 25.67	608 - 614	3500 - 4400	23600 – 24000
6.31175 - 6.31225	37.5 - 38.25	960 - 1427	4500 - 5150	31200 – 31800
8.291 - 8.294	73 - 74.6	1435 - 1626.5	5350 - 5460	36430 – 36500
8.362 - 8.366	74.8 - 75.2	1645.5 - 1646.5	7250 - 7750	Above 38600

Test Configuration

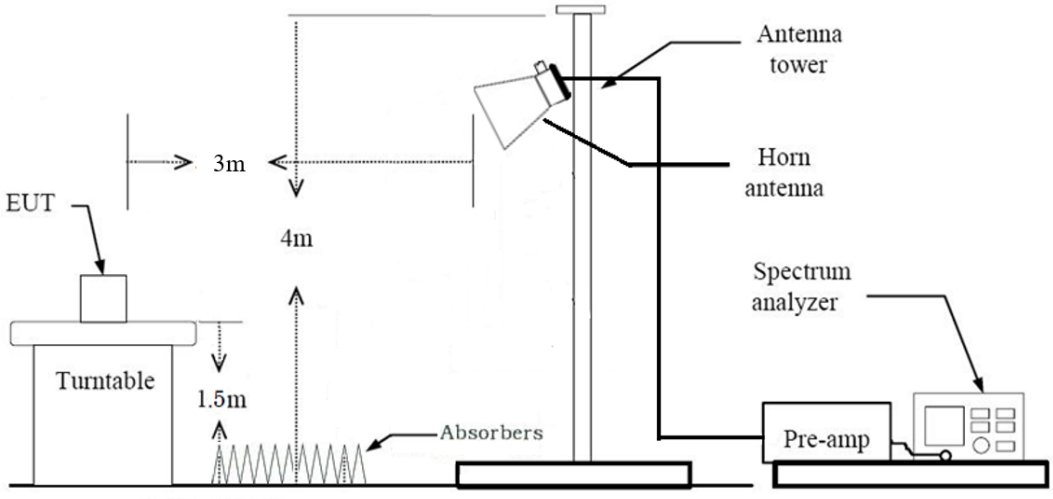
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



Test Procedure of Radiated spurious emissions (Below 30 MHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The loop antenna was placed at a location 3m from the EUT
3. The EUT is placed on a turntable, which is 0.8m above ground plane.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Distance Correction Factor (0.009 MHz – 0.490 MHz) = 40*log(3 m/300 m) = - 80 dB
   Measurement Distance: 3 m
7. Distance Correction Factor (0.490 MHz – 30 MHz) = 40*log(3 m/30 m) = - 40 dB
   Measurement Distance: 3 m
8. Spectrum Setting

   - Frequency Range = 9 kHz ~ 30 MHz
   - Detector = Peak
   - Trace = Max hold
   - RBW = 9 kHz
   - VBW ≥ 3*RBW

9. Total = Reading Value + Antenna Factor (A.F) + Cable Loss (C.L)
10. There is a comparison data both open-field test site and alternative test site – semi-Anechoic chamber according to 414788 D01. And the results are properly calibrated.

Test Procedure of Radiated spurious emissions (Below 1GHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The EUT is placed on a turntable, which is 0.8 m above ground plane.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
5. Spectrum Setting

(1) Measurement Type (Peak):

- Measured Frequency Range: 30 MHz – 1 GHz
- Detector = Peak
- Trace = Max hold
- RBW = 100 kHz
- VBW ≥ 3*RBW

(2) Measurement Type(Quasi-peak):

- Measured Frequency Range: 30 MHz – 1 GHz
- Detector = Quasi-Peak
- RBW = 120 kHz

In general, the method (1) is mainly used

6. Total = Reading Value + Antenna Factor (A.F) + Cable Loss (C.L)

Test Procedure of Radiated spurious emissions (Above 1 GHz)

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.
8. Spectrum Setting

(1) Measurement Type(Peak):
- Measured Frequency Range : 1 GHz – 25 GHz
- Detector = Peak
- Trace = Max hold
- RBW = 1 MHz
- VBW ≥ 3*RBW

(2) Measurement Type(Average): Duty cycle ≥ 98%
- Measured Frequency Range : 1 GHz – 25 GHz
- Detector = RMS
- Averaging type = power (*i.e.*, RMS)
- RBW = 1 MHz
- VBW ≥ 3*RBW
- Sweep time = auto.
- Trace mode = average (at least 100 traces).

(3) Measurement Type(Average): Duty cycle < 98%, duty cycle variations are less than ±2%
- Measured Frequency Range : 1 GHz – 25 GHz
- Detector = RMS
- Averaging type = power (*i.e.*, RMS)
- RBW = 1 MHz
- VBW ≥ 3*RBW
- Sweep time = auto.
- Trace mode = average (at least 100 traces).
- Correction factor shall be added to the measurement results prior to comparing to the emission limit to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle.
- Duty Cycle Factor (dB) : Please refer to the please refer to section 9.1.

10. Measurement value only up to 6 maximum emissions noted or would be lesser if no specific emissions from the EUT are recorded (i.e.: margin > 20 dB from the applicable limit) and considered that is already beyond the background noise floor.

11. Sample Calculation

(1) Total (Peak) = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G)
(2) Total (Average, Duty ≥ 98%) = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G)
(3) Total (Average, Duty < 98%) = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G) + Duty Cycle Factor

Test Procedure of Radiated Restricted Band Edge

1. Radiated test is performed with hopping off.
2. The EUT is placed on a turntable, which is 1.5 m above ground plane.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
5. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.
8. Spectrum Setting

(1) Measurement Type(Peak):
- Measured Frequency Range : 2310 MHz – 2390 MHz / 2483.5 MHz – 2500 MHz
- Detector = Peak
- Trace = Max hold
- RBW = 1 MHz
- VBW ≥ 3*RBW

(2) Measurement Type(Average): Duty cycle ≥ 98%,
- Measured Frequency Range : 2310 MHz – 2390 MHz / 2483.5 MHz – 2500 MHz
- Detector = RMS
- Averaging type = power (*i.e.*, RMS)
- RBW = 1 MHz
- VBW ≥ 3*RBW
- Sweep time = auto.
- Trace mode = average (at least 100 traces).

(3) Measurement Type(Average): Duty cycle < 98%, duty cycle variations are less than ±2%
- Measured Frequency Range : 2310 MHz – 2390 MHz / 2483.5 MHz – 2500 MHz
- Detector = RMS
- Averaging type = power (*i.e.*, RMS)
- RBW = 1 MHz
- VBW ≥ 3*RBW
- Sweep time = auto.
- Trace mode = average (at least 100 traces).
- Correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle.
- Duty Cycle Factor (dB) : Please refer to the please refer to section 9.1.

9. Measurement value only up to 6 maximum emissions noted or would be lesser if no specific emissions from the EUT are recorded (i.e.: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

10. Sample Calculation

(1) Total (Peak) = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L)
(2) Total (Average, Duty ≥ 98%) = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G)
(3) Total (Average, Duty < 98%) = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G) + Duty Cycle Factor

TEST CONFIGURATION

WORST CASE TEST MODES

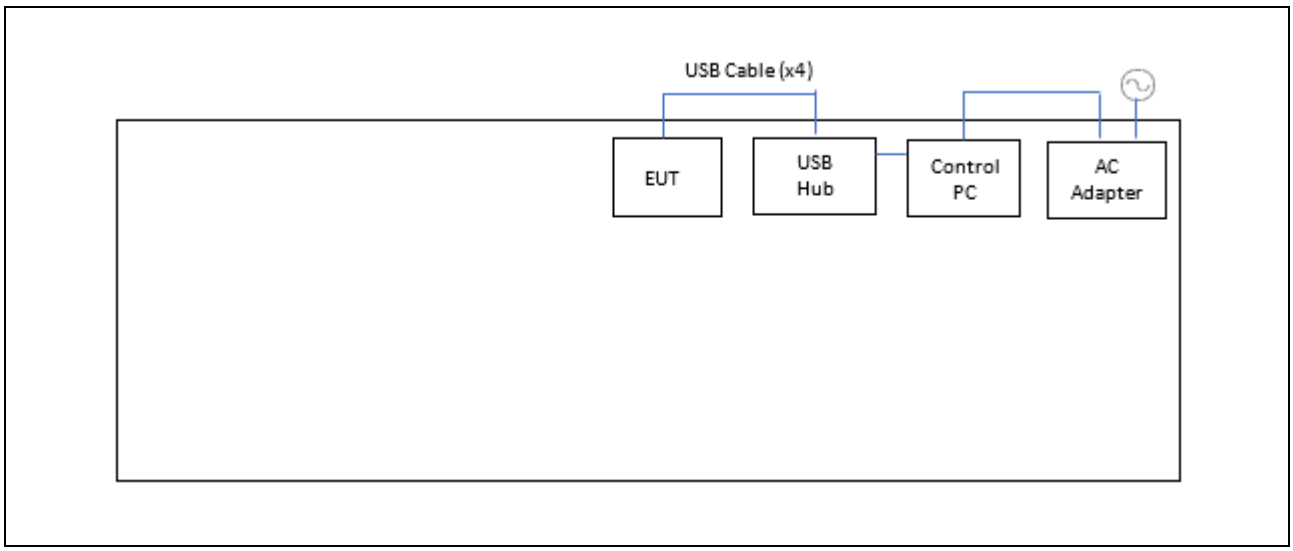
Test item	Modulation Mode	Frequency	Power Setting
Radiated Spurious emission	802.11b	2412 MHz	8 ATT
	BLE MCU 1M (52832)	2474 MHz	pos4dBm
	BLE MESH 1M (52832)	2460 MHz	pos4dBm

Note :

1. The selected channels are set as maximum power for each modes.
2. All three chipsets transmit simultaneously

TEST CONFIGURATION

Radiated Emission



LIST OF SUPPORT EQUIPMENT

Equipment Type	Model No.	Serial Number	Manufacturer	Qty	Note
Laptop	T450	TA181240	Lenovo	1	-
AC Adapter	ADLX65SDC2A	36200350	Delta	1	100-240 VAC, 1.5A 50-60Hz (20 VDC)
USB Hub (4 ports)	A7516	22UVLN6Z	Anker Technology	1	USB 3.0

Frequency Range : 9 kHz – 30MHz

Frequency (MHz)	Polarization	Reading (dBuV)	Corr.[1)] (dB)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement Type
0.032	90°	34.5	14.8	49.3	117.4	68.1	QP
0.033	180°	34.8	14.8	49.6	117.2	67.6	QP
22.120	90°	18.5	13.2	31.7	69.5	37.8	QP
22.121	180°	19.0	13.2	32.2	69.5	37.3	QP

Notes:

1. Correction Factor: Antenna Factor + Cable loss
2. The measurement distance is 3 meters.
   Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
   Limit line = Specific Limits (dBuV) + Distance extrapolation factor

Frequency Range : 30 MHz – 1 GHz

Frequency (MHz)	Polarization	Reading (dBuV)	Corr.[1)] (dB)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement Type
119.808	V	48.3	-6.8	41.5	43.5	2.0	QP
144.096	H	41.0	-7.5	33.5	43.5	10.0	QP
144.181	V	41.2	-7.5	33.7	43.5	9.8	QP
155.743	H	45.9	-8.3	37.6	43.5	5.9	QP
167.752	H	46.9	-8.7	38.2	43.5	5.3	QP
251.711	H	46.2	-8.7	37.5	46	8.5	QP
959.986	H	36.1	4.2	40.3	46	5.7	QP
959.993	V	37.5	4.2	41.7	46	4.3	QP

Notes:

1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain

Frequency Range : Above 1 GHz

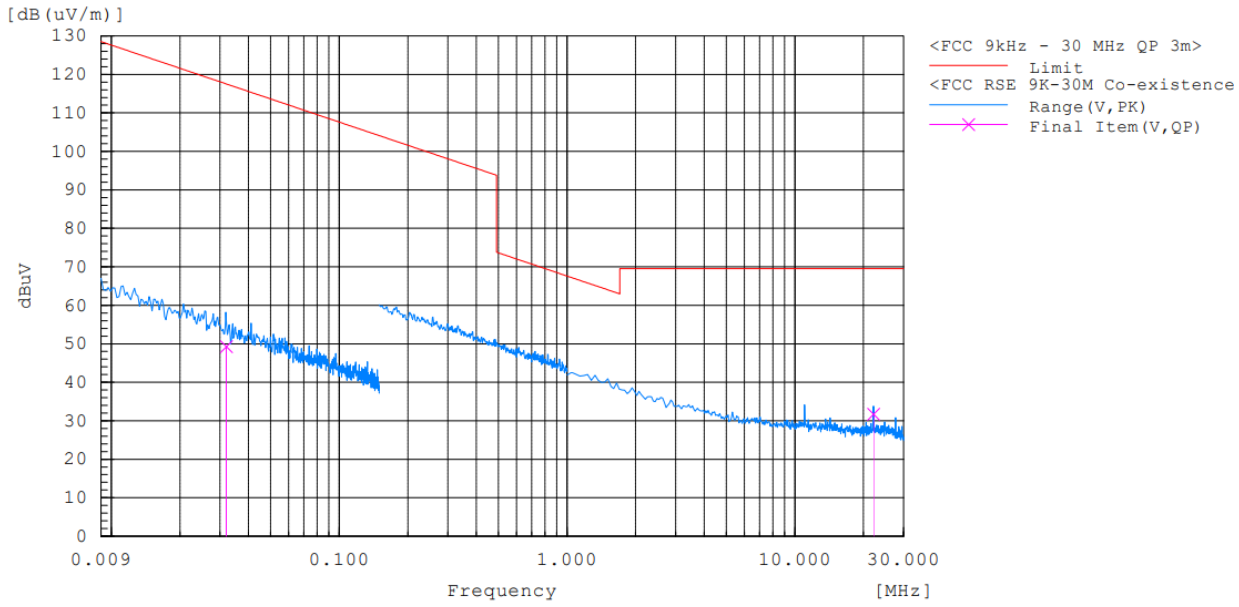
Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	Duty	AV	PK	AV	PK	AV	PK
1599.445	H	35.8	54.8	-14.2	-	21.6	40.6	54	74	32.4	33.4
1599.466	V	35.6	58.1	-14.2	-	21.4	43.9	54	74	32.6	30.1
2343.053	H	52.1	52.8	-11.7	-	40.4	41.1	54	74	13.6	32.9
2346.020	V	39.3	44.6	-11.7	3.15	30.8	32.9	54	74	23.3	41.1
2357.147	H	54.2	54.3	-11.7	-	42.5	42.6	54	74	11.5	31.4
2730.186	H	46.9	50.5	-10.7	-	36.2	39.8	54	74	17.8	34.2
4824.013	V	52.8	57.1	-6.3	3.15	49.7	50.8	54	74	4.4	23.2
4824.104	H	54.7	59.0	-6.3	3.15	51.6	52.7	54	74	2.5	21.3
4920.659	H	50.7	55.3	-5.9	-	44.8	49.4	54	74	9.2	24.6
4920.661	V	52.0	56.6	-5.9	-	46.1	50.7	54	74	7.9	23.3
7379.446	H	49.1	54.2	-0.1	-	49.0	54.1	54	74	5.0	19.9
7380.941	V	44.2	50.1	-0.1	-	44.1	50.0	54	74	9.9	24.0
7421.229	H	44.3	49.4	-0.1	-	44.2	49.3	54	74	9.8	24.7
7421.299	V	46.7	51.4	-0.1	-	46.6	51.3	54	74	7.4	22.7

Notes:

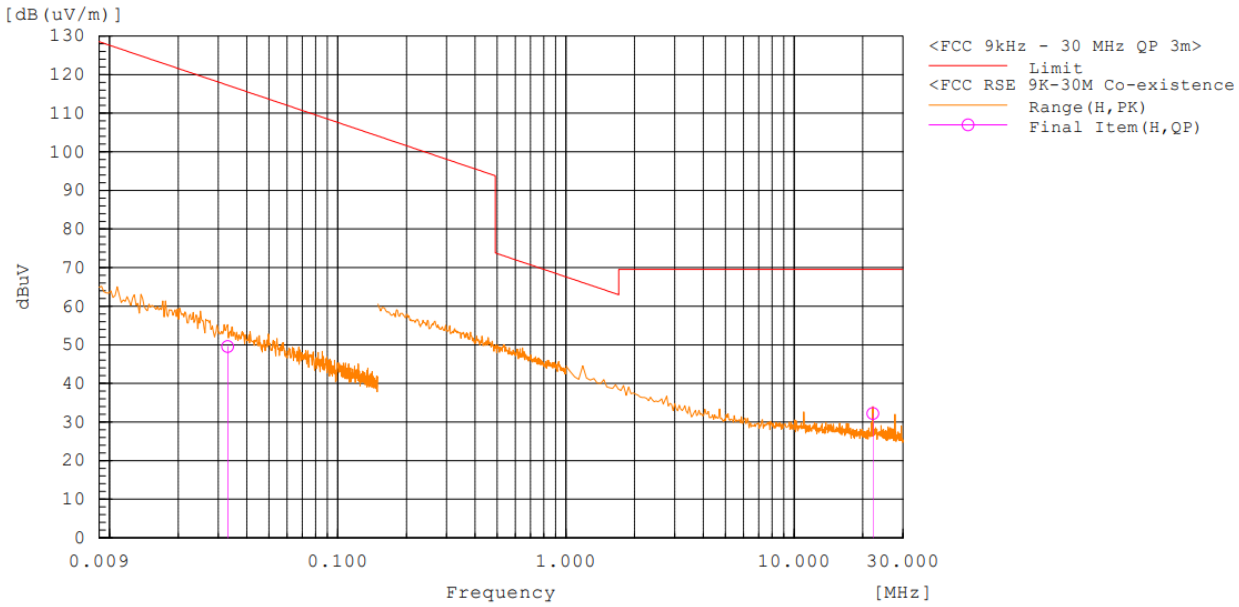
1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain
2. AV Level = Measured Power(dBm) + Correction Factor(dB) + Duty Cycle Factor(dB). Duty factor was applied for harmonic for WIFI. No duty applied for any harmonics for BLE since the duty cycle is set to 100% for BLE.

▣ TEST PLOTS

Radiated Spurious Emission 9 kHz – 30 MHz (Antenna Position 90°)



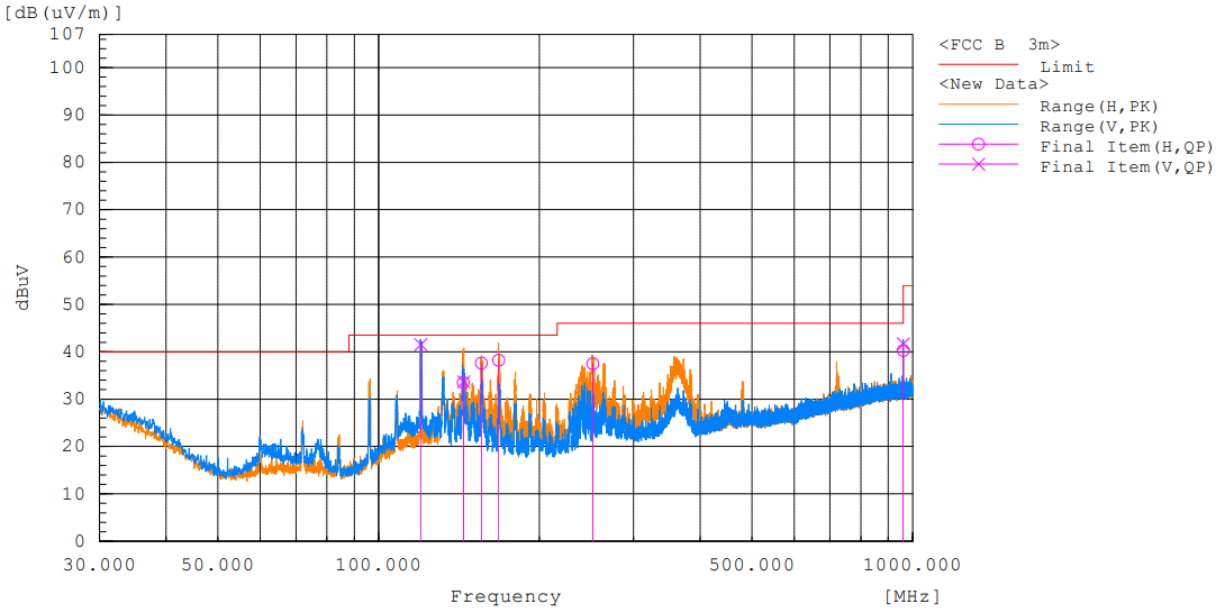
Radiated Spurious Emission 9 kHz – 30 MHz (Antenna Position 180°)



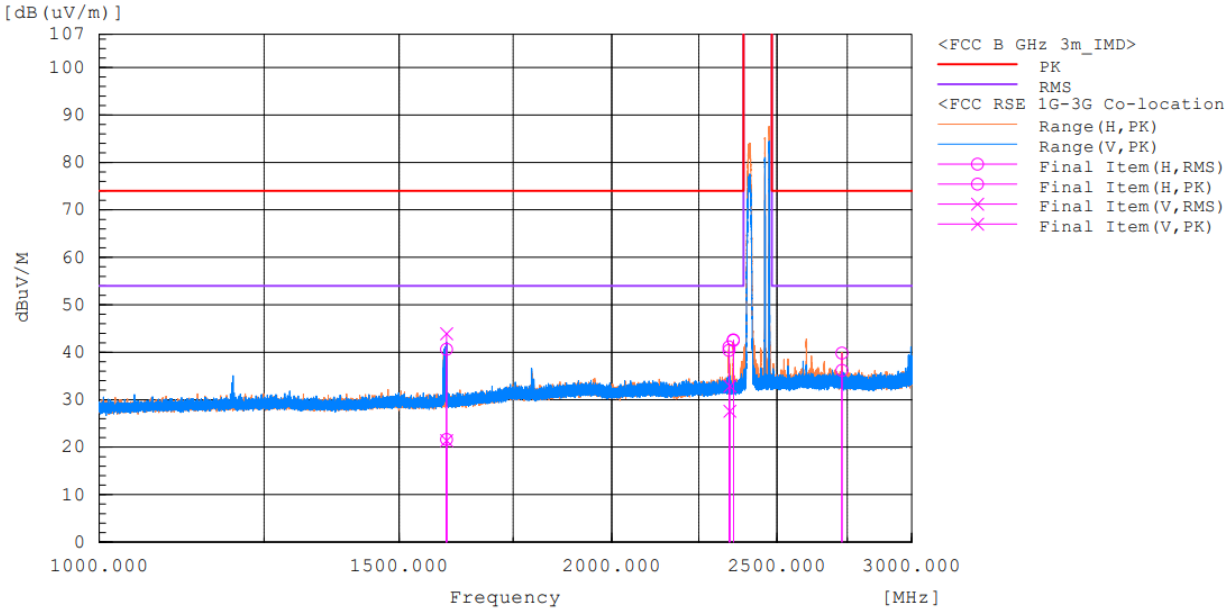
Note:
The worst-case plots are included in this report.

▣ TEST PLOTS

Radiated Spurious Emission 30 MHz – 1 GHz



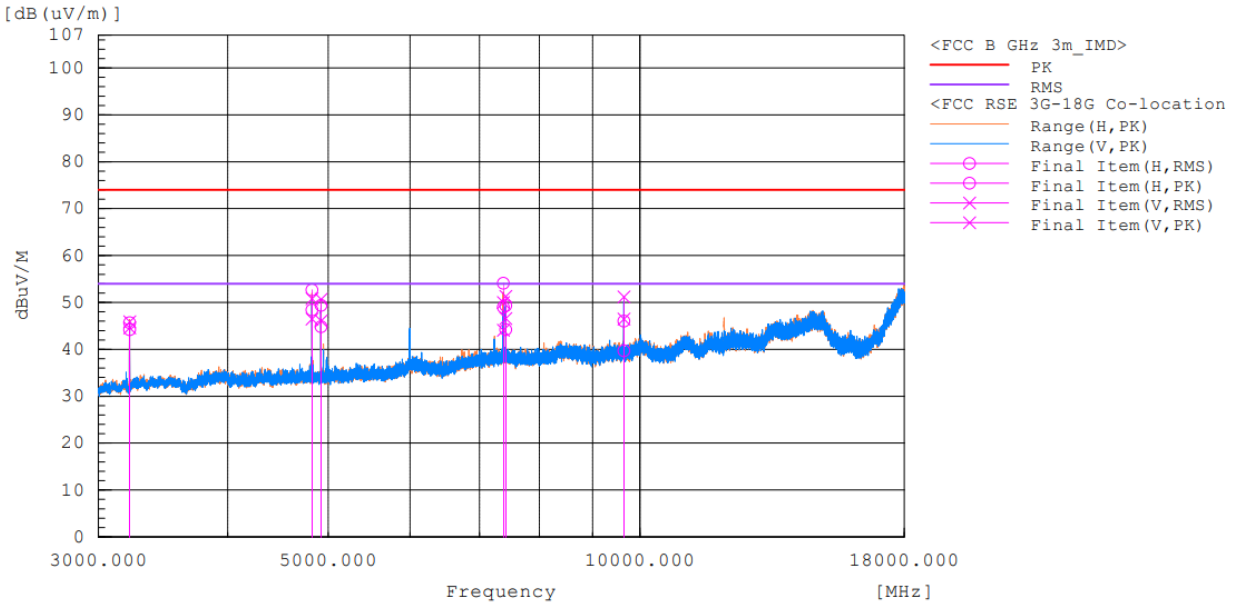
Radiated Spurious Emission 1 GHz - 3 GHz



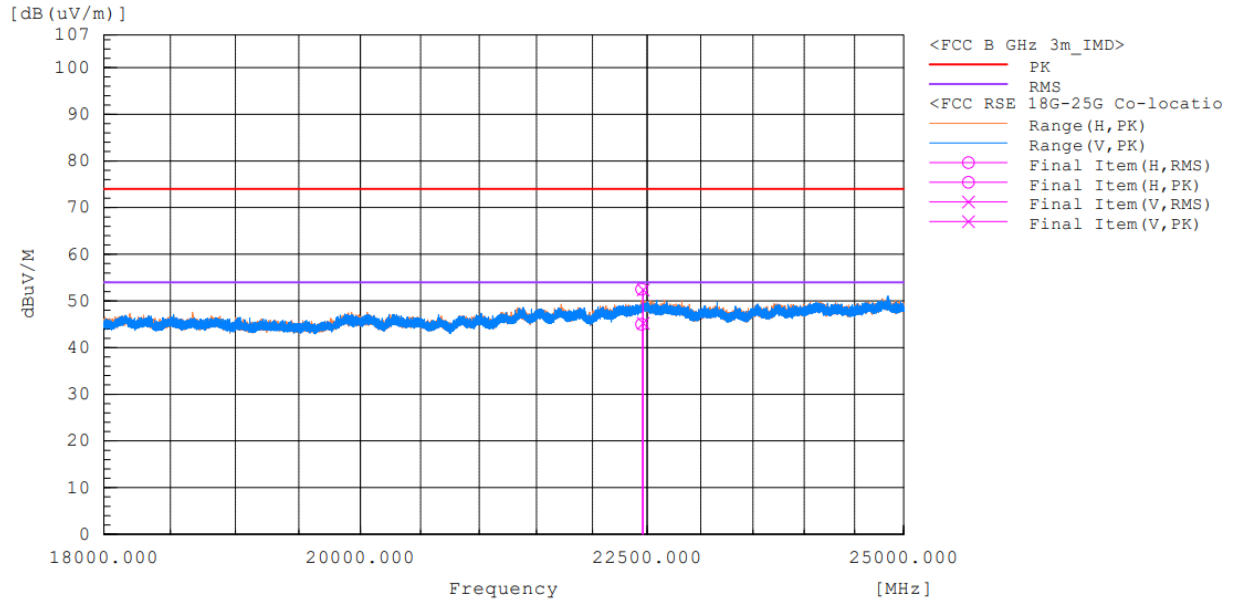
Note:
The worst-case plots are included in this report.

▣ TEST PLOTS

Radiated Spurious Emission 3 GHz - 18 GHz



Radiated Spurious Emission 18 GHz – 25 GHz



Note:
The worst-case plots are included in this report.

8. LIST OF TEST EQUIPMENT

No.	Instrument	Model No.	Calibration Due (mm/dd/yy)	Manufacture	Serial No.
☒	Signal Analyzer (20 Hz ~ 40.0 GHz)	ESU40	12/09/2021	Rohde & Schwarz	100529
☒	Signal Analyzer (10 Hz ~ 40.0 GHz)	FSV40	03/23/2021	Rohde & Schwarz	101424
☐	Signal Analyzer (10 Hz ~ 26.5 GHz)	N9020A	11/07/2021	Keysight	MY52091291
☒	BI-LOG Antenna (30 MHz ~ 1 GHz)	JB1	03/27/2021	Sunol	A061416
☐	Attenuator (20 dB, DC ~ 26.5 GHz)	8493C	12/07/2021	HP	09072
☐	Attenuator (10 dB, DC ~ 26.5 GHz)	CFAD261002	01/18/2021	CERNEX	H0044
☒	POWER AMP (1 GHz ~ 18 GHz)	PAM-118A	07/09/2021	Com-Power	18040074
☒	POWER AMP (0.3 GHz ~ 1 GHz)	8447D	08/06/2021	HP	2443A03587
☒	Horn Antenna (1 GHz ~ 18 GHz)	DRH-118	10/21/2022	Sunol	A070516
☒	Loop Antenna (0.009 ~ 30 MHz)	AL-130R	04/05/2021	Com-Power	121082
☒	Horn Antenna (18 GHz ~ 40 GHz)	DRH-1840	02/20/2021	Sunol	17120
☒	POWER AMP (18 GHz ~ 40 GHz)	CBL184050-45-01	02/04/2021	CERNEX, Inc.	43964
☒	High Pass Filter	WHK10-2520-3000-18000-40EF	01/18/2021	Wainwright	9
☒	EMI Test Receiver	ESR3	12/20/2020	Rohde & Schwarz	102363
☐	LISN	3816/2SH	01/19/2021	EMCO	00205729
☒	LISN	ENV216	01/19/2021	Rohde & Schwarz	101349

Note:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date

APPENDIX A. TEST SETUP PHOTOS

The setup photos are provided as a separate document

END OF TEST REPORT