Credence ID LLC

TEST REPORT

SCOPE OF WORK
FCC TESTING–CT3-CID-16-4G-011

REPORT NUMBER
230315012SZN-004

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TEST REPORT Intertek Report No.: 230315012SZN-004

RF TEST REPORT

Report No.	**: 230315012SZN-004**
Product	**: Rugged Handheld Device**
Model No.	**: CT3-CID-16-4G-011**
FCC ID	**: 2AMBZ-CT3-16-4G-011**

Applicant:	**Credence ID LLC** **2335 Broadway, Suite 100, Oakland, California, 94612, United States**
Test Method/ Standard:	**FCC Part 15 Subpart E;** **KDB 789033 D02 v02r01;** **KDB 662911 D01 v02r01;** **KDB 905462 D02 v02;** **ANSI C63.10-2013**
Test By:	**Intertek Testing Services Shenzhen Ltd. Longhua Branch** **101, 201, Building B, No. 308 Wuhe Avenue, Zhangkengjing Community, GuanHu Subdistrict, LongHua District, Shenzhen, P.R. China.**

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Date: 13 July 2023

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Summary of Tests

FCC Parts	Test	Section	Results
15.203	Antenna Requirement	1.3	Pass
15.407 a (1)/(3)	Maximum output power test	3	Pass
15.407 a (1)/(3)	Power Spectrum Density test	4	Pass
15.407 e	6dB Bandwidth	5	Pass
15.407 b, 15.205, 15.209	Radiated spurious emission test	6	Pass
15.207	AC line conducted emission test	7	Pass
15.407 g	Frequency Stability	8	Pass
15.407 h	DFS: Channel Closing Transmission Time	9.3	Not Applicable
15.407 h	DFS: Channel Move Time	9.3	Not Applicable
15.407 h	DFS: Non-Occupancy Period	9.3	Not Applicable

1. General information

1.1 Identification of the EUT

Product:	Rugged Handheld Device
Model No.:	CT3-CID-16-4G-011
Type of Device:	Master device
Nominal Channel Bandwidth:	802.11a/n-HT20(20MHz), 802.11n-HT40(40MHz), 802.11ac(20/40/80MHz)
Operating Frequency:	5150MHz~5250 MHz, 5725MHz~5850MHz
Channel Number:	4 channels for 5180 MHz ~ 5240 MHz (802.11 a/n20/ac-HT20); 2 channels for 5190 MHz ~ 5230 MHz (802.11 n40/ac-HT40); 1 channels for 5210 MHz (802.11ac-HT80); 5 channels for 5745 MHz ~ 5825 MHz (802.11a/n20/ac-HT20); 2 channels for 5755 MHz ~ 5795 MHz (802.11n40/ac-HT40); 1 channels for 5775 MHz (802.11ac-HT80);
Modulation:	802.11a: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)
Rated Power:	DC 5V/2.5A or DC 9V/1.5A by adapter
Test Date(s):	16 September 2021 to 4 November 2021
Note 1:	This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.
Note 2:	When determining the test conclusion, the Measurement Uncertainty of test has been considered.

1.2 Additional information about the EUT

The equipment under test (EUT) is a Rugged Handheld Device with Bluetooth 5.0 (dual-mode) function operating in 2402-2480MHz, 2.4G WIFI function operating in 2412-2462MHz and 5G WIFI function operating in 5150MHz~5250 MHz, 5725MHz~5850MHz. Only the worst data was reported in this report. For more detail information pls. refer to the user manual.

For more detail features, please refer to User's description as file name “descri.pdf”.

Related Submittal(s) Grants
This is an application for certification of U–NII device (5GHz Wi-Fi transmitter portion).
For the Bluetooth (EDR) function was tested and demonstrated in report 230315012SZN-001.
For the Bluetooth (BLE) function was tested and demonstrated in report 230315012SZN-002.
For the 2.4G WIFI function was tested and demonstrated in report 230315012SZN-003.
For the WCDMA/LTE function was tested and demonstrated in report 230315012SZN-005.
For the NFC function was tested and demonstrated in report 230315012SZN-006.
For the other function was tested and demonstrated in FCC SDoC report 230315012SZN-008.

1.3 Antenna description (15.203)

The EUT uses Integral Antenna which in accordance to Section 15.203 is considered sufficient to comply with the provisions of this section.

Antenna Gain:
1.89 dBi Max for 5150MHz~5250 MHz,
-0.91 dBi Max for 5725MHz~5850MHz.

1.4 Peripherals equipment

Description	Manufacturer	Remark
Power Adapter	(Provided by Applicant)	MODEL: HJ-FC001K7-UK INPUT: 100-240V~50/60Hz 0.6A OUTPUT: 5.0V⎓3.0A OR 9.0V⎓2.0A OR 12.0V⎓1.5A 18W
USB Cable	(Provided by Applicant)	shielded, 100cm

2. Test specifications

2.1 Test standard

The EUT was performed according to the procedures in FCC Part 15 E, Section15.203, 15.207, 15.209, 15.407 and ANSI C63.10/2013, method of measurement: KDB 789033.

The test of radiated measurements according to FCC Part15 Section 15.33(a) had been conducted and the field strength of this frequency band was all meet limit requirement, thus we evaluate the EUT pass the specified test.

The AC power conducted emissions was invested over the frequency range from 0.15 MHz to 30 MHz using a receiver bandwidth of 9 kHz (15.207 paragraph).

Radiated emissions were invested cover the frequency range from 9KHz to 30MHz using a receiver RBW of 9kHz, from 30 MHz to 1000 MHz using a receiver RBW of 120 kHz record QP reading, and the frequency over 1 GHz using a spectrum analyzer RBW of 1 MHz, VBW of 3MHz, Detector=Peak record for Peak reading, RBW of 1 MHz, VBW of 3MHz, Detector=RMS record for Average reading recorded on the report.

The EUT setup configurations please refer to the photo of radiated setup photos.pdf & conducted setup photos.pdf.

2.2 Operation mode

The EUT was supplied by and it was run in TX mode that was controlled by client provided RF testing program.

The EUT was transmitted continuously during the test. The worst case test result was showed in the report.

With individual verifying, the maximum output power was found at 6 Mbps data rate for 802.11a mode, 6.5 Mbps data rate for 802.11n-HT20 mode, 13.5 Mbps data rate for 802.11n-HT40 mode, 29.3Mbps data rate for 802.11ac. The final tests were executed under these conditions and recorded in this report individually.

2.3 EUT Exercising Software

The EUT exercise program (provided by client) used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The worst case configuration is used in all specified testing.

Table for Parameters of Test Software Setting
During testing, Channel & Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Testing Software: Nonsignaling operation platform

2.4 Special Accessories

USB cable (Shielded, Length 100cm)

3. Maximum Output Power test (FCC 15.407)

3.1 Operating environment

Temperature: 25 ℃
Relative Humidity: 55 %
Atmospheric Pressure: 1011 hPa

3.2 Test setup & procedure

The power output per FCC §15.407(a) was measured on the EUT using a 50 ohm SMA cable connected to Power Meter and the measurement method refer to 789033 D02. Power was read directly and cable loss correction (1.0dB) was added to the reading to obtain power at the EUT antenna terminals.

3.3 Limit

Operating Frequency (MHz)	Max Conducted TX Power	Max EIRP
5150~5250	30dBm (1W) for master device 24dBm (250mW) for client device	4W (36dBm) with 6dBi antenna
5250~5350	24dBm (250mW) or 11dBm+ 10logB*	1W (30dBm) with 6dBi antenna
5470~5725	24dBm (250mW) or 11dBm+ 10logB*	
5725~5850	30dBm (1W)	4W (36dBm) with 6dBi antenna

Remark: 1) *Where B is the 26dB emission Bandwidth in MHz.
2) The device was declared as Slave device.
3) Tx Power Reduction (dBm-by-dBi) required when antenna exceeds 6dBi.

3.4 Measured data of Maximum Output Power test results

Max Conducted TX Power
The more detail please refer to Appendix B1 of “230315012SZN-004_Appendix”.

Max EIRP
The more detail please refer to Appendix B2 of “230315012SZN-004_Appendix”.

4. Power Spectrum Density test (FCC 15.407)

4.1 Operating environment

Temperature:	25	℃
Relative Humidity:	50	%
Atmospheric Pressure:	1013	hPa

4.2 Test setup & procedure

Method of Measurement:

The power spectrum density per FCC §15.407(a) was measured from the antenna port of the EUT using a 50 ohm spectrum analyzer with the resolution bandwidth set at 1MHz/500KHz, the video bandwidth set at 3 MHz/2MHz (measurement method refer to KDB 789033 D02). Power spectrum density was read directly and cable loss reading to obtain power at the EUT antenna terminals.

4.3 Limit

Operating Frequency (MHz)	Max Conducted Power Spectral Density
5150~5250	*17dBm/MHz for master device
	11dBm/MHz for mobile/portable client device
5250~5350	11dBm/MHz
5470~5725	11dBm/MHz
5725~5850	30dBm/500KHz

Remark: 1) The device was declared as Slave device.
2) Tx Power Reduction (dBm-by-dBi) required when antenna exceeds 6dBi.

4.4 Measured data of Power Spectrum Density test results

The more detail please refer to “Appendix of 230315012SZN-004” Appendix C.

5. Minimum 6 dB RF Bandwidth (FCC 15.407)

5.1 Operating environment

Temperature:	25	℃
Relative Humidity:	50	%
Atmospheric Pressure:	1011	hPa

5.2 Test setup & procedure

The Minimum 6 dB RF Bandwidth per 789033 D02 was measured from the antenna port of the EUT using a 50 ohm spectrum analyzer with the resolution bandwidth set at 100KHz, and set the video bandwidth (VBW) ≥ 3 x RBW. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK output reading was taken, a DISPLAY line was drawn 6 dB lower than PEAK level. The 6dB bandwidth was determined from where the channel output spectrum intersected the display line.

For 26dB down Emission Bandwidth

The 26dB down Emission Bandwidth per 789033 D02 was measured from the antenna port of the EUT using a 50 ohm spectrum analyzer with the resolution bandwidth set RBW = approximately 1% of the emission bandwidth. Set the VBW > RBW, Detector = Peak, Trace mode = max hold (Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%).

For 99% Occupied Bandwidth

The 99% Occupied Bandwidth per 789033 D02 was measured from the antenna port of the EUT using a 50 ohm spectrum analyzer with the resolution bandwidth set center frequency to the nominal EUT channel center frequency, set span = 1.5 times to 5.0 times the OBW, set RBW = 1 % to 5 % of the OBW, set VBW ≥ 3x RBW, The 99% occupied bandwidth was determined from where the channel output spectrum intersected the display line.

5.3 Limit

Operating Frequency (MHz)	Minimum 6 dB RF Bandwidth Limit
5150~5250	N/A
5250~5350	N/A
5470~5725	N/A
5725~ 5850	≥500KHz

5.4 Measured data of 6dB down Emission Bandwidth test results

The more detail please refer to “Appendix of 230315012SZN-004” Appendix A3.

Note: 99% Occupied Bandwidth within the U-NII-1 band and 26dB Emission Bandwidth for reference. The more detail please refer to “Appendix of 230315012SZN-004” Appendix A2 and Appendix A1.

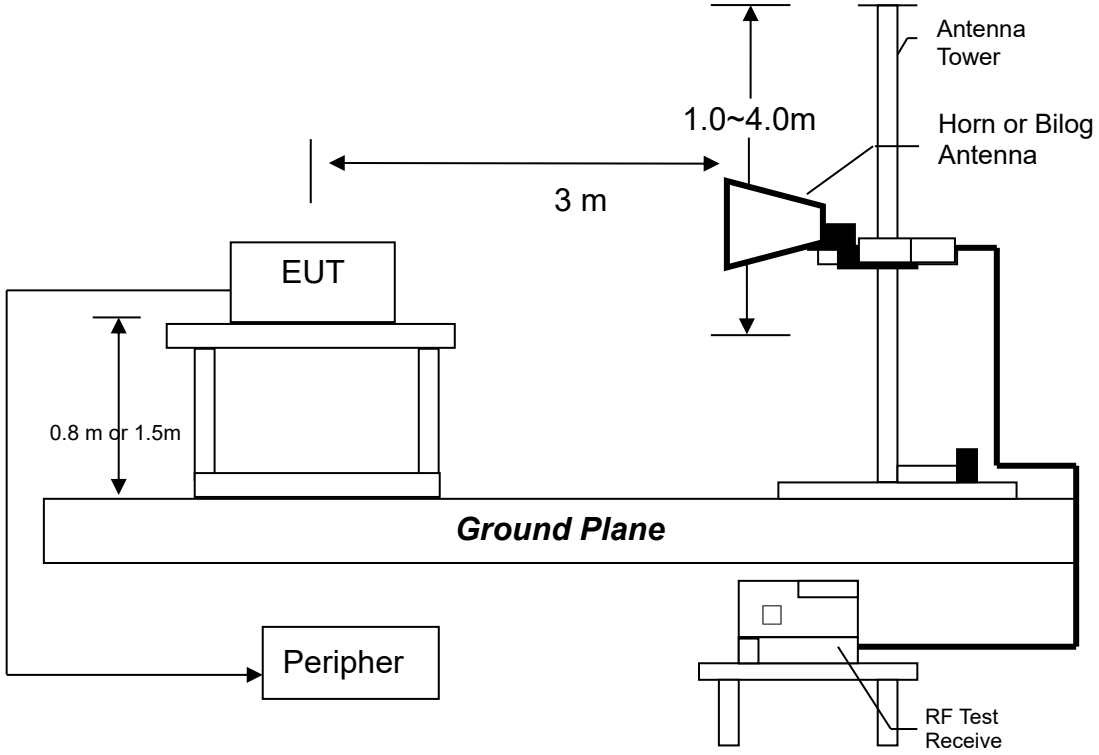
6. Radiated Emission test (FCC 15.205 & 15.209 & 15.407)

6.1 Operating environment

Temperature:	23	℃
Relative Humidity:	56	%
Atmospheric Pressure	1011	hPa

6.2 Test setup & procedure

The Diagram below shows the test setup, which is utilized to make these measurements.



Radiated emission measurements were performed from 9KHz to tenth harmonic or 40GHz.

The EUT for testing is arranged on a styrene turntable with the height of 0.8m up to 1GHz and 1.5m above 1GHz. If some peripherals apply to the EUT, the peripherals will be connected to EUT and the whole system. During the test, all cables were arranged to produce worst-case emissions. The signal is maximized through rotation. The height of antenna and polarization is changing constantly for exploring for maximum signal level. The height of antenna can be up to 4 meters and down to 1 meter.

The measurement for radiated emission will be done at the distance of three meters unless the signal level is too low to measure at that distance. In the case of the reading under noise floor, a pre-amplifier is used and/or the test is conducted at a closer distance. And then all readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance.

Testing settings (refer to KDB 789033 D02)
Peak Measurements below 1GHz
1, Analyzer center frequency was set to the frequency of the radiated spurious emission.
2, Span=encompass the entire emission
3, RBW=120KHz
4, Detector=Quasi-Peak
5, Trace was allowed to stabilize

Peak Measurements above 1GHz
1, Analyzer center frequency was set to the frequency of the radiated spurious emission.
2, Span=encompass the entire emission
3, RBW=1MHz
4, VBW=3MHz
4, Detector= Peak (Max-hold)
5, Trace was allowed to stabilize

Average Measurements above 1GHz
1, Analyzer center frequency was set to the frequency of the radiated spurious emission.
2, Span=encompass the entire emission
3, RBW=1MHz
4, VBW=3MHz
4, Detector= RMS (Max-hold)
5, Trace was allowed to stabilize

6.3 Limit

The spurious Emission shall test through the 10th harmonic or 40GHz (whichever is lower). In addition, 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).

Notes:

1, All emission out-side of the 5.15-5.35GHz & 5.47-5.725GHz band shall not exceed an EIRP of -27dBm/MHz (68.2dBuV/m, test distance: 3 meter), For the band 5.725-5.85GHz, all emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

2, The spectrum is measured from 9KHz to the 10th harmonic of the fundamental frequency of the transmitter using QP detector below 1GHz, above 1GHz, average & peak measurements were taken using for test. The worst-case emission are reported however emission whose levels were not within 20dB of the respective limited were not reported.

3, The test was performed on EUT under 802.11a/n-HT20/n-HT40/ac-HT20/HT40/HT80 continuously transmitting mode. Simultaneous transmitting was considered during the testing. All mode had been tested, but only the worst-case is recorded in the following graph and table.

6.3.1 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 + PD

Where FS = Field Strength in dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB
PD = Pulse Desensitization 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 + PD

Example
Assume a receiver reading of 62.0 dBμV 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 pulse desensitization factor of the spectrum analyzer was 0 dB. The net field strength for comparison to the appropriate emission limit is 32 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 62.0 dBμV
AF = 7.4 dB
CF = 1.6 dB
AG = 29.0 dB
PD = 0 dB
FS = 62 + 7.4 + 1.6 - 29 + 0 = 42 dBμV/m

Level in mV/m = Common Antilogarithm [(42 dBμV/m)/20] = 125.9 μV/m

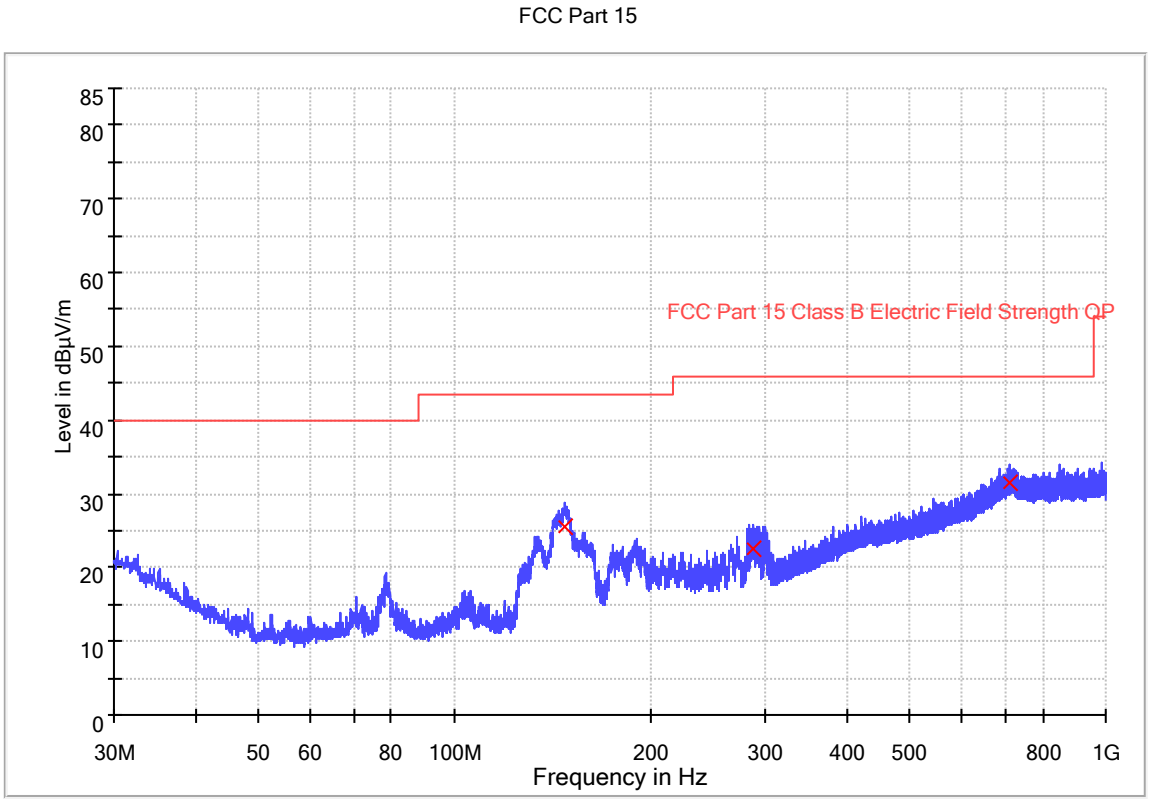
6.4 Radiated spurious emission test data

6.4.1 Measurement results: frequencies equal to or less than 1 GHz

Applicant: Credence ID LLC
Date of Test: 9 November 2021 Model: CT3-CID-16-4G-011
Worst Case Operating Mode: WIFI Link

Radiated Emissions

ANT Polarity: Horizontal



Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Polarization	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
147.855000	25.5	1000.0	120.000	H	16.2	18.0	43.5
286.953000	22.5	1000.0	120.000	H	20.2	23.5	46.0
709.485000	31.4	1000.0	120.000	H	32.0	14.6	46.0

NOTES:

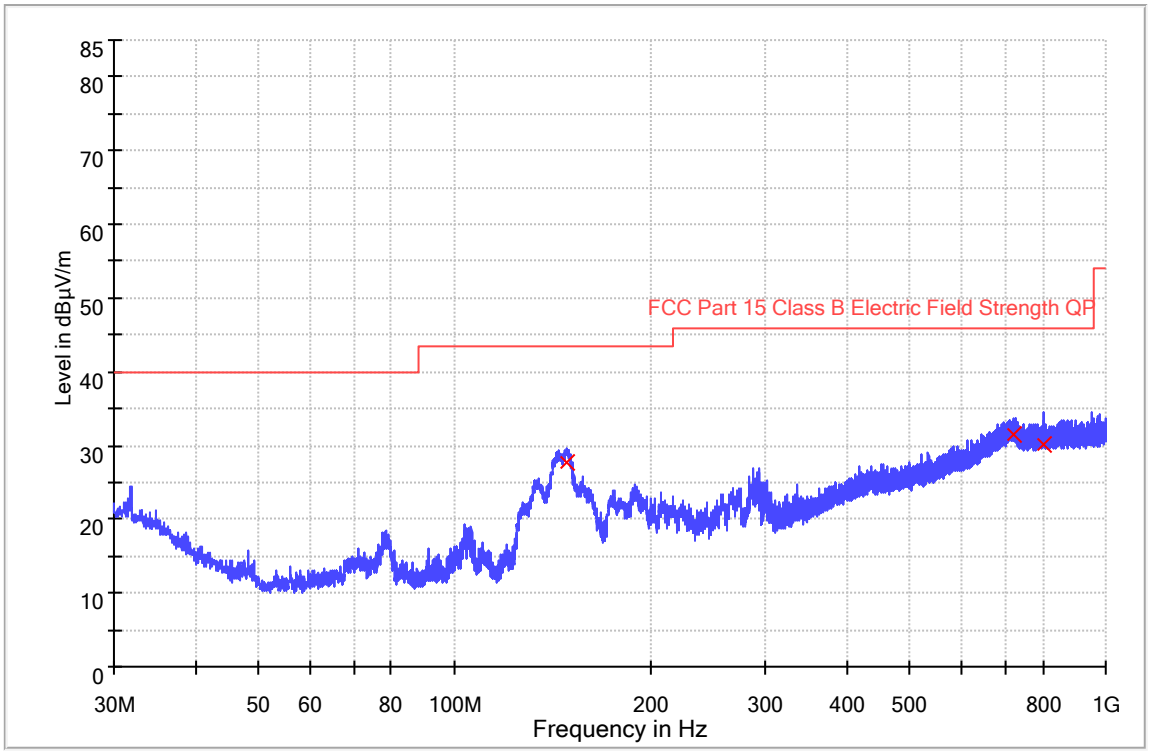
1. Quasi-Peak detector is used for frequency below 1GHz.
2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic 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.

Applicant: Credence ID LLC
Date of Test: 9 November 2021 Model: CT3-CID-16-4G-011
Worst Case Operating Mode: WIFI Link

Radiated Emissions

ANT Polarity: Vertical

FCC Part 15



Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Polarization	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
149.116000	27.6	1000.0	120.000	V	16.3	15.9	43.5
721.868667	31.5	1000.0	120.000	V	32.0	14.5	46.0
805.191667	30.1	1000.0	120.000	V	32.0	15.9	46.0

NOTES:

1. Quasi-Peak detector is used for frequency below 1GHz.
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.

6.4.2 Measurement results: frequency above 1GHz

The worst case occurred at 802.11n-HT40

Channel 38/27 Mbps

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	10380.000	49.6	36.3	38.9	52.2	68.2	-16.0
Horizontal	15570.000	41.5	34.7	41.0	47.8	68.2	-20.4

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	10380.000	43.4	36.3	38.9	46.0	54.0	-8.0
Horizontal	15570.000	36.8	34.7	41.0	43.1	54.0	-10.9

Channel 46/27Mbps

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	10460.000	45.6	36.3	38.9	48.2	68.2	-20.0
Horizontal	15690.000	42.4	34.7	41.0	48.7	68.2	-19.5

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	10460.000	41.2	36.3	38.9	43.8	54.0	-10.2
Horizontal	15690.000	38.0	34.7	41.0	44.3	54.0	-9.7

Channel 54/27Mbps

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	10540.000	46.9	36.3	38.9	49.5	68.2	-18.7
Horizontal	15810.000	40.5	34.7	41.0	46.8	68.2	-21.4

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	10540.000	41.8	36.3	38.9	44.4	54.0	-9.6
Horizontal	15810.000	37.9	34.7	41.0	44.2	54.0	-9.8

Channel 62/27Mbps

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	10620.000	47.4	36.3	38.9	50.0	68.2	-18.2
Horizontal	15930.000	44.0	34.7	41.0	50.3	68.2	-17.9

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	10620.000	41.8	36.3	38.9	44.4	54.0	-9.6
Horizontal	15930.000	39.2	34.7	41.0	45.5	54.0	-8.5

Channel 102/27Mbps

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	11020.000	46.7	36.3	38.9	49.3	68.2	-18.9
Horizontal	16530.000	43.5	34.7	41.0	49.8	68.2	-18.4

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	11020.000	42.5	36.3	38.9	45.1	54.0	-8.9
Horizontal	16530.000	39.6	34.7	41.0	45.9	54.0	-8.1

Channel 110/27Mbps

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	11100.000	47.6	36.3	38.9	50.2	68.2	-18.0
Horizontal	16650.000	44.7	34.7	41.0	51.0	68.2	-17.2

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	11100.000	42.9	36.3	38.9	45.5	54.0	-8.5
Horizontal	16650.000	39.8	34.7	41.0	46.1	54.0	-7.9

Channel 134/27Mbps

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	11340.000	46.9	36.3	39.0	49.6	68.2	-18.6
Horizontal	17010.000	43.7	34.7	41.2	50.2	68.2	-18.0

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	11340.000	42.2	36.3	39.0	44.9	54.0	-9.1
Horizontal	17010.000	39.1	34.7	41.2	45.6	54.0	-8.4

Channel 151/27Mbps

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	11510.000	47.4	36.3	39.0	50.1	78.2	-28.1
Horizontal	17265.000	44.1	34.7	41.2	50.6	78.2	-27.6

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	11510.000	41.8	36.3	39.0	44.5	54.0	-9.5
Horizontal	17265.000	38.4	34.7	41.2	44.9	54.0	-9.1

Channel 159/27Mbps

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	11590.000	47.1	36.3	39.0	49.8	78.2	-28.4
Horizontal	17385.000	43.8	34.7	41.2	50.3	78.2	-27.9

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	11590.000	41.9	36.3	39.0	44.6	54.0	-9.4
Horizontal	17385.000	38.4	34.7	41.2	44.9	54.0	-9.1

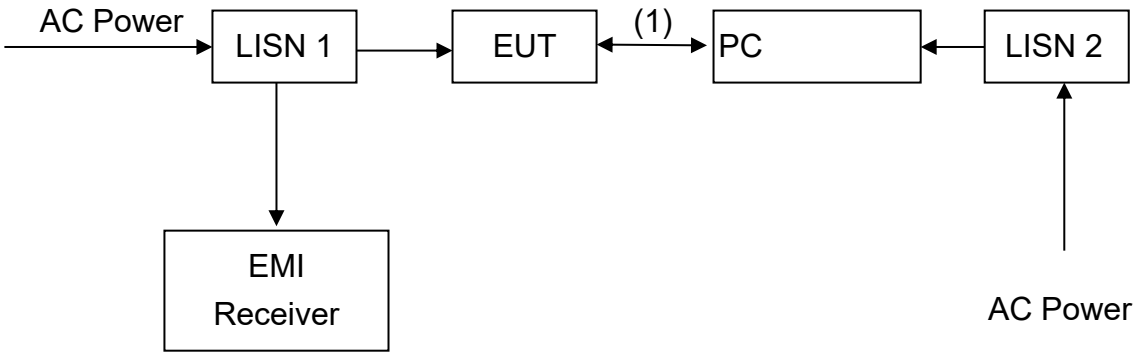
* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function. All unwanted emissions outside of the 5.15-5.35GHz & 5.47-5.725GHz & 5725-5850 bands are complied with the limit.

7. Power Line Conducted Emission test

7.1 Operating environment

Temperature:	23	℃
Relative Humidity:	55	%
Atmospheric Pressure	1011	hPa

7.2 Test setup & procedure



The EUT are connected to the main power through a line impedance stabilization network (LISN). This provides a 50 ohm/50 uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50 ohm/50 uH coupling impedance with 50 ohm termination.
Both sides (Line and Neutral) of AC line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10/2013 on conducted measurement.
The bandwidth of the field strength meter (R & S Test Receiver ESCI 30) is set at 9 kHz.

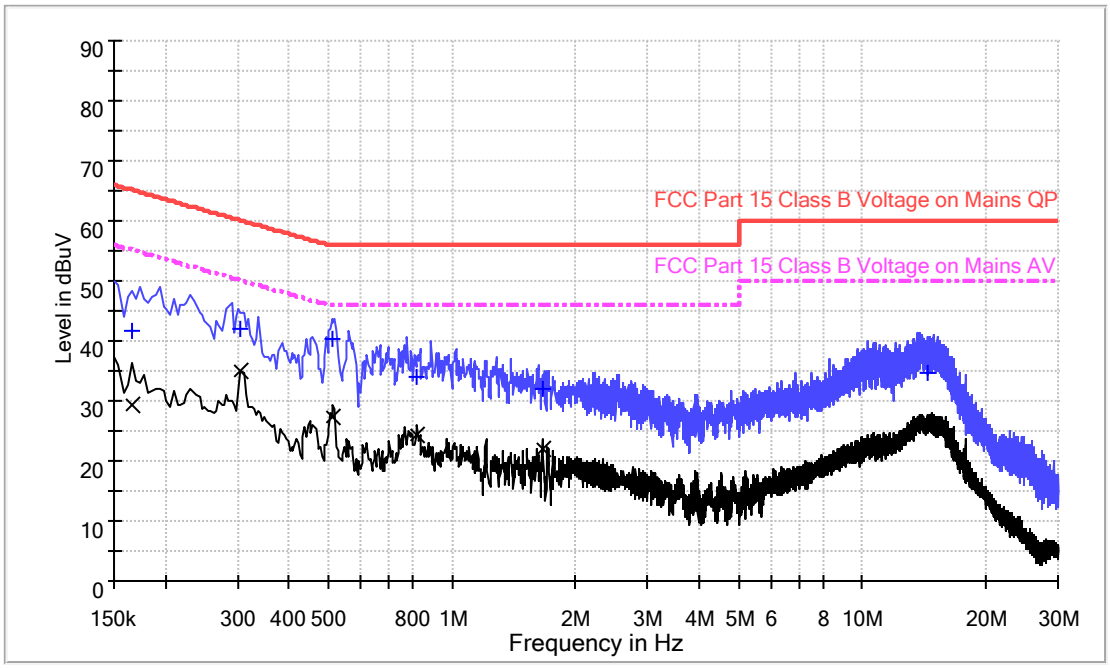
7.3 Limit

Frequency (MHz)	Conducted Limit (dBuV)	
	Q.P.	Ave.
0.15~0.50	66 – 56*	56 – 46*
0.50~5.00	56	46
5.00~30.0	60	50

*Decreases with the logarithm of the frequency.

7.4 Power Line Conducted Emission test data

Applicant: Credence ID LLC
Date of Test: 19 November 2021 Model: CT3-CID-16-4G-011
Worst Case Operating Mode: WIFI Link
Phase: Live



Result Table QP

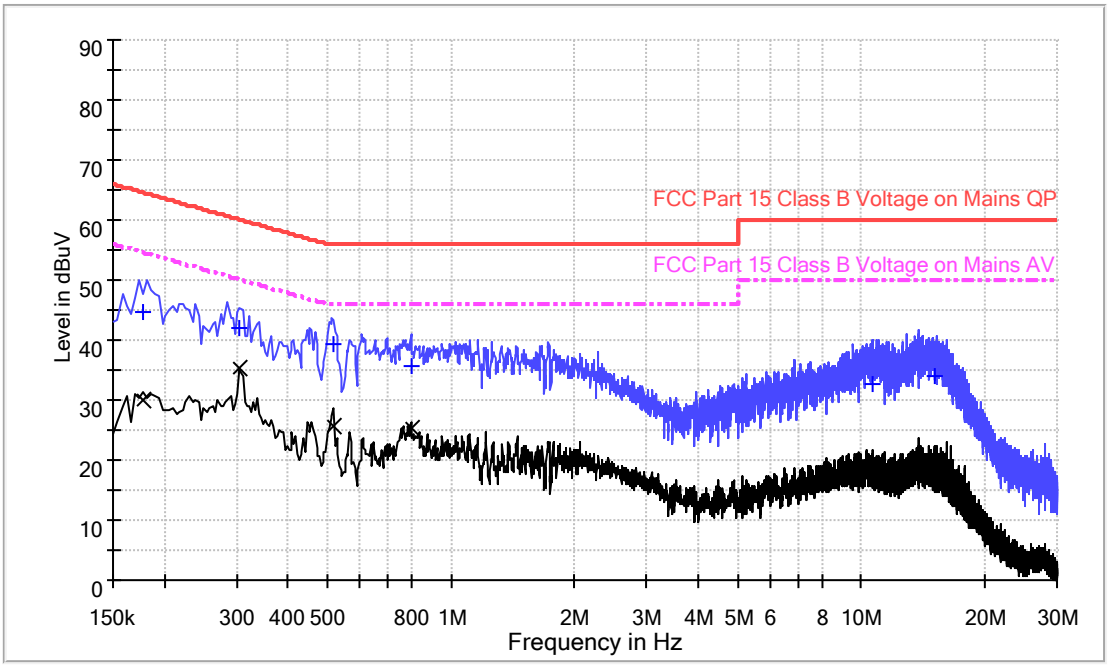
Frequency (MHz)	QuasiPeak (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.166000	41.7	L	9.6	23.5	65.2
0.306000	42.0	L	9.6	18.1	60.1
0.514000	40.4	L	9.6	15.6	56.0
0.822000	34.0	L	9.6	22.0	56.0
1.658000	31.9	L	9.6	24.1	56.0
14.506000	34.8	L	10.0	25.2	60.0

Result Table AV

Frequency (MHz)	Average (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.166000	29.2	L	9.6	26.0	55.2
0.306000	35.1	L	9.6	15.0	50.1
0.514000	27.4	L	9.6	18.6	46.0
0.822000	24.4	L	9.6	21.6	46.0
1.658000	21.9	L	9.6	24.1	46.0
14.506000	26.0	L	10.0	24.0	50.0

Remark:
1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Limit (dBuV) – Level (dBuV)

Applicant: Credence ID LLC
Date of Test: 19 November 2021
Model: CT3-CID-16-4G-011
Worst Case Operating Mode: WIFI Link
Phase: Neutral



Result Table QP

Frequency (MHz)	QuasiPeak (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.178000	44.5	N	9.5	20.1	64.6
0.306000	42.0	N	9.5	18.1	60.1
0.518000	39.4	N	9.5	16.6	56.0
0.798000	35.8	N	9.5	20.2	56.0
10.650000	32.7	N	9.7	27.3	60.0
15.062000	33.9	N	10.0	26.1	60.0

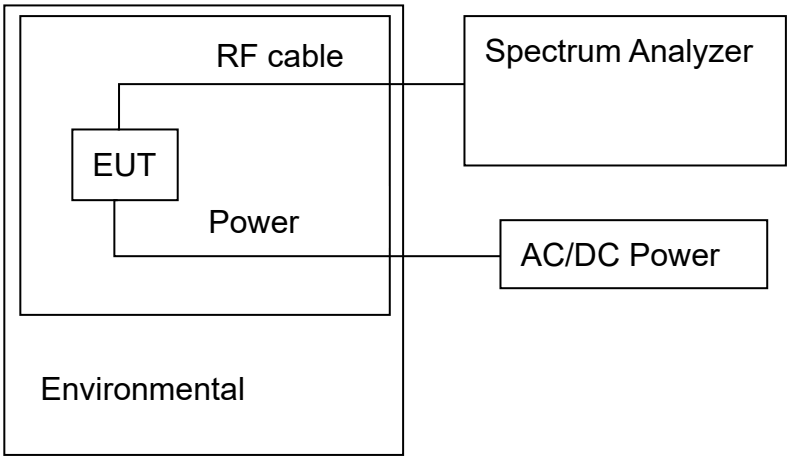
Result Table AV

Frequency (MHz)	Average (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.178000	30.0	N	9.5	24.6	54.6
0.306000	35.2	N	9.5	14.9	50.1
0.518000	25.7	N	9.5	20.3	46.0
0.798000	25.3	N	9.5	20.7	46.0
10.650000	18.3	N	9.7	31.7	50.0
15.062000	18.4	N	10.0	31.6	50.0

Remark:
1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Limit (dBuV) – Level (dBuV)

8. Frequency Stability Test

8.1 Test setup & procedure



Note1: The frequency stability is measured with the temperature variation range of -10˚C to +60˚C, and voltage supply variation range of 85% to 115% of nominal DC supply voltage.

Note2: To ensure emission at the band-edge is maintained within the authorized band, the frequency 802.11a/n-HT20/n-HT40/ac-HT20/HT40/HT80 channel 36, 48, 149, 165, 38, 46, 151, 159, 42, 58, 155 are selected to test and the worst case was reported.

8.2 Frequency Stability Test Data

20˚C is taken as temperature in normal condition (NT).

3.8 VDC is normal voltage (NV)

3.23 VDC is low voltage (LV)

4.37 VDC is high voltage (HV)

The more detail please refer to Appendix D of “230315012SZN-004_Appendix”.

Note: All emissions are maintained within the band of operation under all conditions of normal operation as specified in the user manual. It fulfills the requirement of 15.407(g).

Appendix A: Test equipment list

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
SZ182-02	RF Power Meter	Anritsu	ML2496A	1302005	2021-05-10	2022-05-10
SZ182-02-01	Power Sensor	Anritsu	MA2411B	1207429	2021-05-10	2022-05-10
SZ056-06	Signal Analyzer	R&S	FSV 40	101101	2020-12-22	2021-12-22
SZ062-10	RF Cable	Bedea	RG 58	--	2021-06-01	2021-12-01
SZ056-08	Signal Analyzer	R&S	FSV 40	101430	2020-12-22	2021-12-22
SZ185-03	EMI Receiver	R&S	ESR7	101975	2020-12-22	2021-12-22
SZ061-06	Active Loop Antenna	Electro-Metrics	EM-6876	217	2021-05-18	2023-05-18
SZ061-12	BiConiLog Antenna	ETS	3142E	00166158	2021-08-04	2024-08-04
SZ061-09	Double-Ridged Waveguide Horn Antenna	ETS	3115	00092347	2020-10-17	2022-10-17
SZ061-15	Double-Ridged Waveguide Horn Antenna	ETS	3116C-PA	00224718	2021-07-06	2024-07-06
SZ181-08	Microwave System Amplifier	Agilent	83017A	MY57280108	2021-08-04	2022-08-04
SZ188-05	Anechoic Chamber	ETS	FACT 3-2.0	CT001880-Q1391	2021-05-25	2024-05-25
SZ062-23	RF Cable	RADIALL	SF104PE	MY4262/4PE	2021-09-26	2022-09-26
SZ062-35	RF Cable	Rebes	A50-3.5M3.5M-8M	19100879	2021-09-26	2022-09-26
SZ067-04	Notch Filter	Micro-Tronics	BRM50702-02	015	2021-05-11	2022-05-11
SZ185-02	EMI Test Receiver	R&S	ESCI	100692	2021-07-12	2022-07-12
SZ187-01	Two-Line V-Network	R&S	ENV216	100072	2021-11-02	2022-11-02
SZ187-02	Two-Line V-Network	R&S	ENV216	100072	2021-05-12	2022-05-12
SZ188-03	Shielding Room	ETS	RFD-100	4100	2020-01-07	2023-01-07

Expanded uncertainty of radiated emission measurement is ±4.9 dB.

Expanded uncertainty of conducted emission measurement is ±3.6 dB.

********** End of Report**********