THE STANDARDS INSTITUTION OF ISRAEL

Electronics & Telematics Laboratory

Test Report No. 7012318227

For Tag&Find Wireless Solutions Ltd.

Equipment Under Test:

Compact UNF RFID reader with BLE connectivity GearEye BLE transceiver

Model: GearEye-A4
FCC ID: 2AXUS-GRY4

From The Standards Institution
Of Israel
Industry Division
Electronics & Telematics Laboratory
EMC Branch

ANAB
ANSI National Accreditation Board
ACCREDITED
ISO/IEC 17025
TESTING LABORATORY

Certificate Number: AT-1359

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1. Applicant information

Applicant:	Tag&Find Wireless Solutions Ltd..
Address:	Golda Meir 21, Haifa, Israel.
Sample for test selected by:	The customer
The date of tests:	6, 12 August, 15 September 2020

Equipment under test information

Description of Equipment Under Test (EUT):	Compact UHF RFID reader with BLE connectivity GearEye BLE transceiver
Model:	GearEye-A4
Software version of radio unit:	GearEye-A4-2.3.1
Hardware version:	GearEye-A4
Manufactured by:	Tag&Find Wireless Solutions Ltd.

2. Test performance

Location:	SII EMC Section
Purpose of test:	Apparatus compliance verification in accordance with emission requirements
Test specifications:	47CFR part 15.247, 15.205, 15.207, 15.209 and part 1 §1.1310

This Test Report contains 31 pages and may be used only in full.	This Test Report applies only to the specimen tested and may not be applied to other specimens of the same product.

Normative References.

FCC 47 CFR Part 15, Subpart C	Radio Frequency Devices Subpart C – Intentional Radiators
ANSI C63.4: 2014	American National Standard for Method of Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI C63.10: 2013	American National Standard for Testing of Unlicensed Wireless Devices.

3. Summary of test:

The EUT was found to comply with requirements of: 47CFR Part 15, §§ 15.247, 15.205, 15.207, 15.209**.**

Transmitter characteristics	Subclause
Minimum 6 dB bandwidth	15.247(a)(2)
Maximum output power	15.247(b)(3)
Peak power spectral density	15.247(e)
Out of band spurious emissions radiated	15.205, 15.247(d)
Unwanted radiated emissions below 1 GHz	15.209
Conducted emissions on AC power line	15.207

Electronics & Telematics Laboratory

September 2020

Name: Eng. Yuri Rozenberg
Position: Head of EMC Branch.

Name: Michael Feldman.
Position: Test engineer.

Measurement uncertainty.

The test equipment was calibrated according to its recommended procedures and is within the manufacturer's published limit of error.
The laboratory calibrates its standards by a third party (traceable to NIST, USA) on a regular basis according to equipment manufacturer requirements.
In the following table the uncertainty calculation is given.

Test description	Calculated uncertainty U_{LAB}
Conducted measurements	
Frequency error	37.6 Hz
Spurious emission	± 2.98 dB
Radiated emissions	
Electric field strength in a SAR at 3 m distance 30 MHz – 1.0 GHz	±4.32 dB
Electric field strength in a FAR at 3 m distance 1.0 GHz – 18 GHz	± 4.47 dB
Substitution measurements	
In a FAR at 3 m distance 1.0 GHz – 18 GHz	± 3.41 dB

4. Equipment under test description.

*The applicant provided description.

4.1 General description

The GearEye transceiver (hereinafter: EUT) is tracking solution for organizes and locates items tagged with UHF RFID stickers. The device communicates with controlling mobile device like phone or tablet via BLE transceiver. EUT powered from Li-Ion 3.6VDC internal battery.

EUT technical characteristics

Transmitter technical characteristics:		Note
Assigned frequency band	2400 MHz – 2483.5 MHz	
Operating frequency range:	2402 MHz – 2480 MHz	
DTS transmitter:	BLE 5.0	
Types of modulation:	G-FSK	
Antenna information		
Type	Manufacturer/Model	Antenna gain, dBi
Printed on PCB's Flex	GearEye-A4	0.6

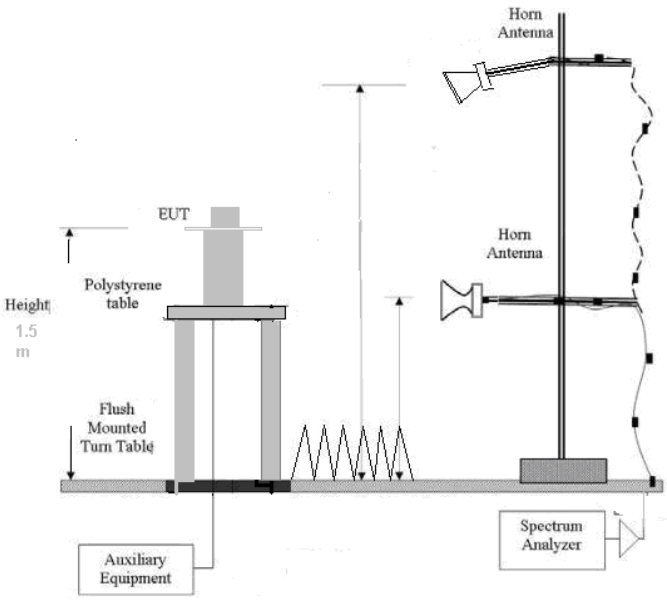


Fig.1. RE test setup above 1 GHz.

5. Test results

5.1 Transmitter characteristics

5.1.1 Transmitter 6 dB occupied bandwidth.

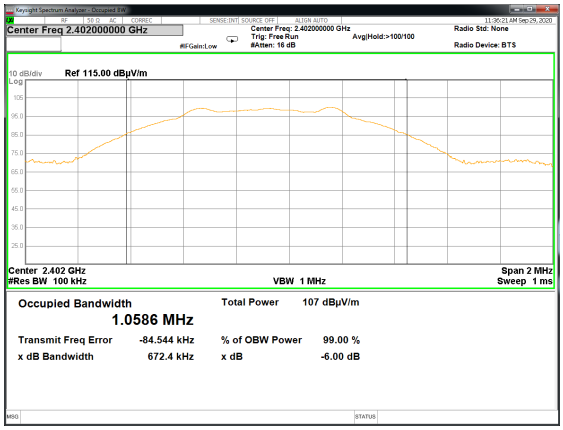
Method of measurement	**ANSI C63.10 subclause 11.8.2**	
Operating Frequency Range	**2402– 2480 MHz**	
Detector used	**Peak**	
Resolution bandwidth	**100 kHz**	
Video bandwidth	**> 3 x RBW.**	
Trace mode	**Max Hold.**	
Sweep time:	**Auto couple.**	
Ambient Temperature 22^0 C	**Relative Humidity 53%**	**Air Pressure 1010 hPa**

The minimum 6 dB occupied bandwidth shall be at least 500 kHz.

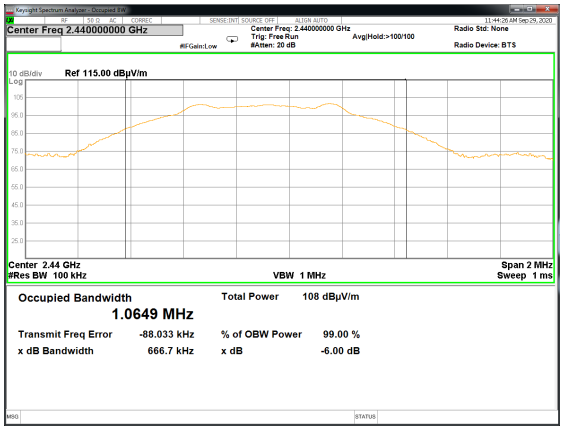
Carrier frequency, MHz	Measured 6 dB occupied bandwidth, kHz	6 dB occupied bandwidth limit, kHz	Reference to plot #
2402	672	500	1
2440	666	500	2
2480	658	500	3

TEST EQUIPMENT USED:

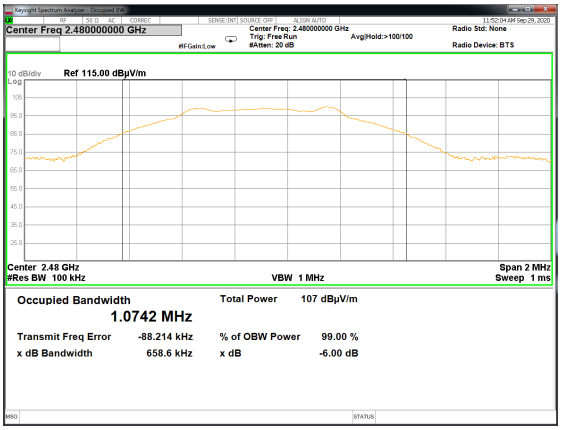
1	3	13				



Plot # 1. Carrier frequency – 2402 MHz



Plot # 2. Carrier frequency – 2440 MHz



Plot # 3. Carrier frequency – 2480 MHz

5.1.2 Maximum conducted output power test.

Method of measurement	**ANSI C63.10 subclause 11.9.2.2**	
Operating Frequency Range	**2402– 2480 MHz**	
Detector used	**RMS**	
Resolution bandwidth	**1 MHz**	
Video bandwidth	**3 x RBW.**	
Trace mode	**Max Hold.**	
Ambient Temperature 23^0 C	**Relative Humidity 53%**	**Air Pressure 1010 hPa**

For Digital Transmit System the peak conducted output power in the 2400 – 2483.5 MHz band shall not exceed 1W (30 dBm) with antennas gain that do not exceed 6 dBi.

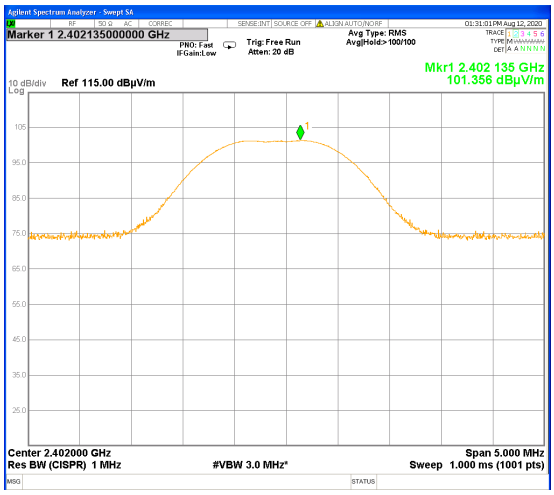
Carrier frequency, MHz	Field strength, dBµV/m	99% power OBW, MHz	**EIR power, dBm	*Conducted output power, dBm	Conducted power limit, dBm	Reference to plot #
2402	101.3	1.1	6.5	5.9	30	4
2440	102.9	1.1	8.1	7.5	30	5
2480	100.8	1.1	6.0	5.4	30	6

*The maximum conducted output power = EIR power – Antenna gain. Where antenna gain = 0.6 dBi.
**EIR power = (E Field strength (dBµV/m@3m) - 95.2) +10Log (99% OBW).

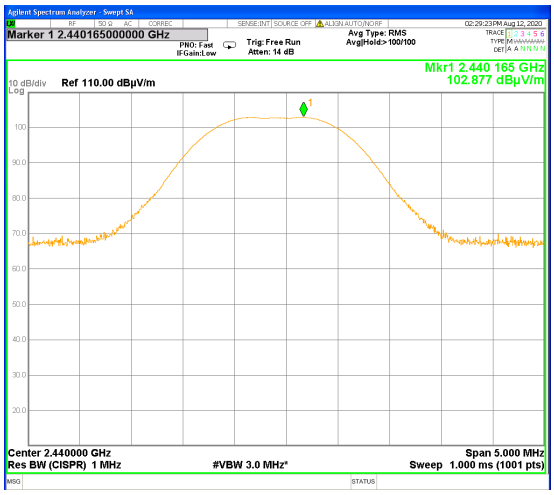
Measured field straight level was converted to EIRP level. The EIRP calculation provided after verification according to substitution test method. EUT was replaced by generator and substitution antenna. Result calculated from generator output level, substitution antenna gain and loss of connected cable was used for EIRP calculation.
Transmitter was operated in continuous transmit mode at bottom, middle and top of the 2402 – 2480 MHz frequency band and at maximum output power and maximum data bit rate.

TEST EQUIPMENT USED:

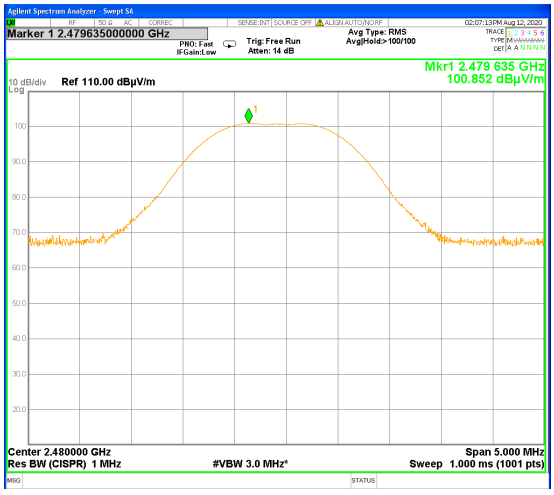
1	3	13				



Plot # 4. Carrier frequency – 2402 MHz



Plot # 5. Carrier frequency – 2440 MHz



Plot # 6. Carrier frequency – 2480 MHz

5.1.3 Power spectral density test

Method of measurement	**ANSI C63.10 subclause 11.10.2**	
Operating Frequency Range	**2402– 2480 MHz**	
Detector used	**RMS**	
Resolution bandwidth	**10 kHz**	
Video bandwidth	**>3 x RBW.**	
Trace mode	**Max Hold.**	
Ambient Temperature 23^0 C	**Relative Humidity 53%**	**Air Pressure 1010 hPa**

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Carrier frequency, MHz	Field strength, dBµV/m	*EIR power, dBm	**Conducted PSD dBm	Conducted PSD limit, dBm/3 kHz	Reference to plot #
2402	90.8	-9.6	-9.0	8	7
2440	93.0	-7.4	-6.8	8	8
2480	90.3	-10.1	-9.5	8	9

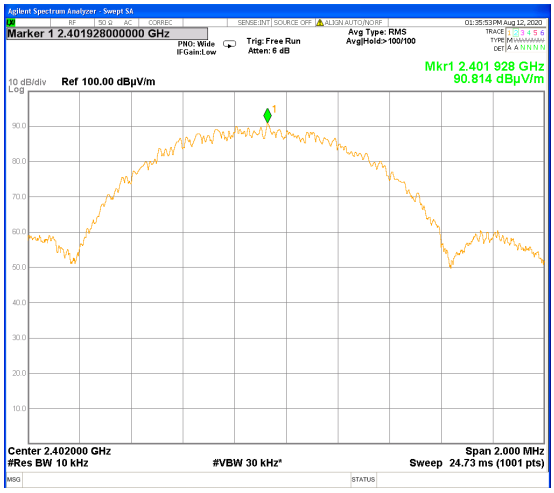
**The conducted to antenna PSD = EIR power – Antenna gain. Where antenna gain = 0.6 dBi.
*EIRP = E Field strength (dBµV/m@3m) - 95.2 + 10 Log (3 kHz RBW/ 10 kHz RBW).
Calculation of EIRP performed after verification by substitution method.

TEST SUMMARY

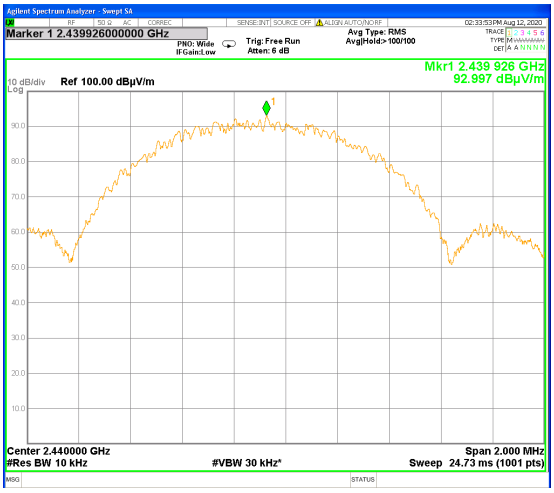
EUT maximum output power result is below PSD limit per 47 CFR 15.247 (e).
The EUT was found complies with standard requirement.

TEST EQUIPMENT USED:

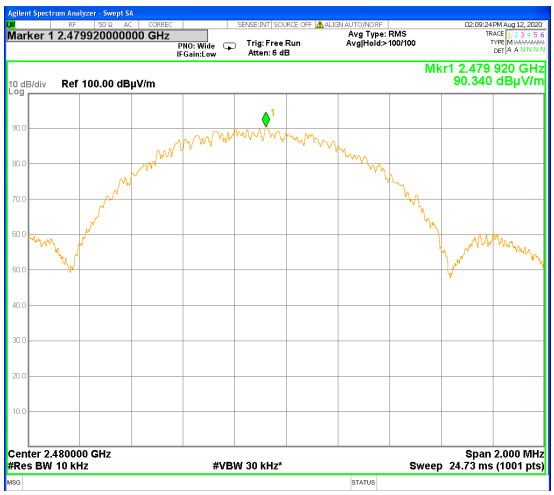
1	3	13				



Plot # 7. Carrier frequency – 2402 MHz



Plot # 8. Carrier frequency – 2440 MHz



Plot # 9. Carrier frequency – 2480 MHz

5.1.4 Radiated emissions test according to §§ 15.247(d), 15.205(a)

Method of measurement	**ANSI C63.10 sub clauses 11.11/ 11.12**	
Operating Frequency Range	**2402– 2480 MHz**	
Detector used:	**Trace 1 – Peak; Trace 2 - RMS**	
Resolution bandwidth	**100 kHz /1 MHz**	
Video bandwidth	**3x RBW.**	
Trace mode:	**Trace 1 – Max hold; Trace 2 – Power averaging.**	
Ambient Temperature 23^0 C	**Relative Humidity 53%**	**Air Pressure 1010 hPa**

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.
In addition, radiated emissions, which fall in the restricted bands, as, defined in Section 15.205(a) must also comply with the radiated emission limits specified in Section 15.209(a).

Carrier frequency 2402 MHz

Frequency, MHz	Radiated emissions, dBµV/m	Peak limit, dBµV/m	Avg limit, dBµV/m	Margin, dB	Note	Note	Reference to plot#
2353.8	50.7	74	-	>20	*RB	Detector peak	10
2373.3	38.8	-	54	14.2	RB	Detector average	10
2400.0	61.3	80.5	-	19.2	Band edge	Detector peak.	11
2500.0	50.3	74.0	-	>20	RB	Detector peak	12
2500.0	39.4	-	54	14.6	RB	Detector average	12
4803.3	56.4	74.0	-	7.6	RB	Detector peak	14
4804.0	47.0	-	54.0	7.0	RB	Detector average	14

*RB – restricted band

Carrier frequency 2440 MHz

Frequency, MHz	Radiated emissions, dBµV/m	Peak limit, dBµV/m	Avg limit, dBµV/m	Margin, dB	Note	Note	Reference to plot#
2227.4	49.6	74	-	>20	RB	Detector peak	17
2227.4	39.5	-	54	14.5	RB	Detector average	17
4880.1	56.1	74	-	17.9	RB	Detector peak	21
4879.9	46.5	-	54	7.5	RB	Detector average	21
10923.0	55.5	74	-	17.9	RB	Detector peak	22
10923.0	43.8	-	54	10.2	RB	Detector average	22

Carrier frequency 2480 MHz

Frequency, MHz	Radiated emissions, dBµV/m	Peak limit, dBµV/m	Avg limit, dBµV/m	Margin, dB	Note	Note	Reference to plot#
2373.3	49.3	74	-	>20	*RB	Detector peak	24
2373.3	38.7	-	54	15.3	RB	Detector average.	24
2483.8	52.2	74	-	>20	RB	Detector peak	26
2483.7	40.9	-	54	13.1	RB	Detector average	26
4960.3	52.4	74	-	>20	RB	Detector peak	28
4960.0	43.9	-	54	10.1	RB	Detector average	28

*RB – restricted band

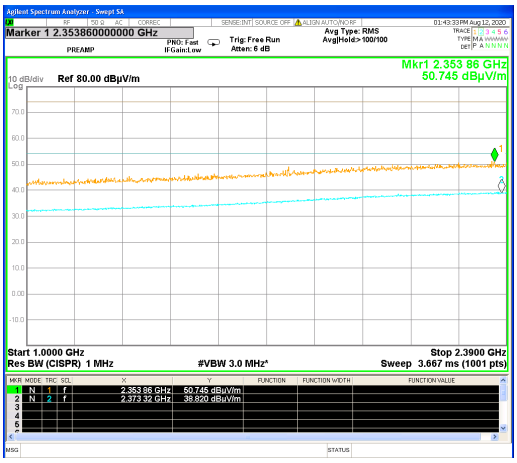
TEST SUMMARY

All emissions outside of the 2400 – 2483.5 MHz frequency band founded below 15.247(d) limits.

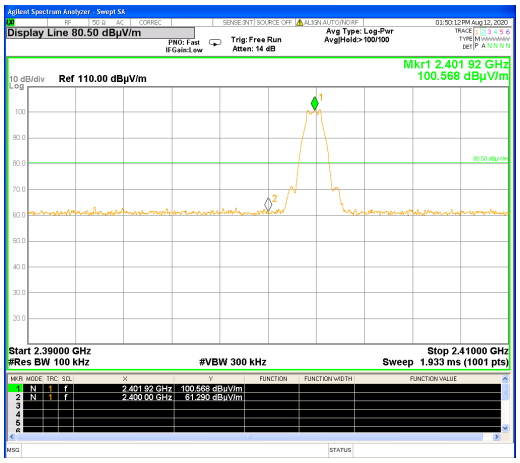
TEST EQUIPMENT USED:

1	3	4	10	13	14	

Carrier frequency – 2402 MHz.

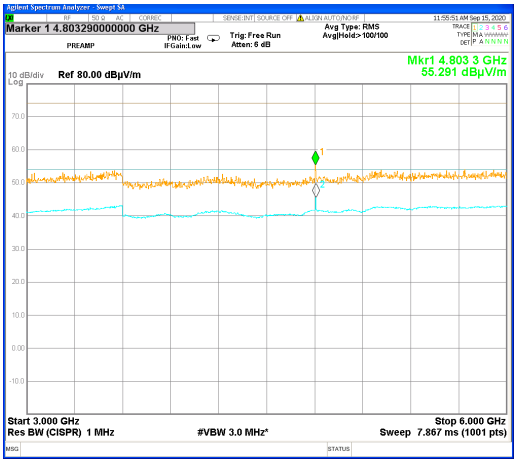


Plot # 10

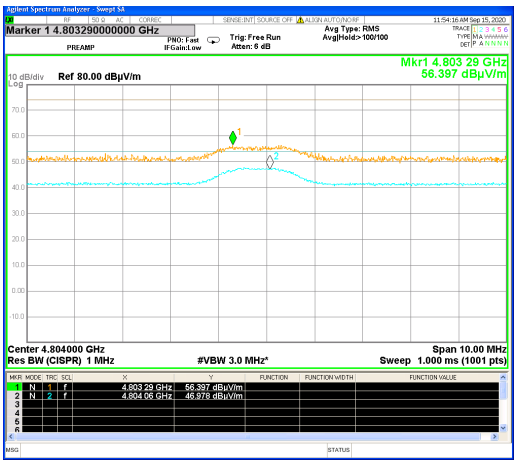


Plot # 11

Plot # 12

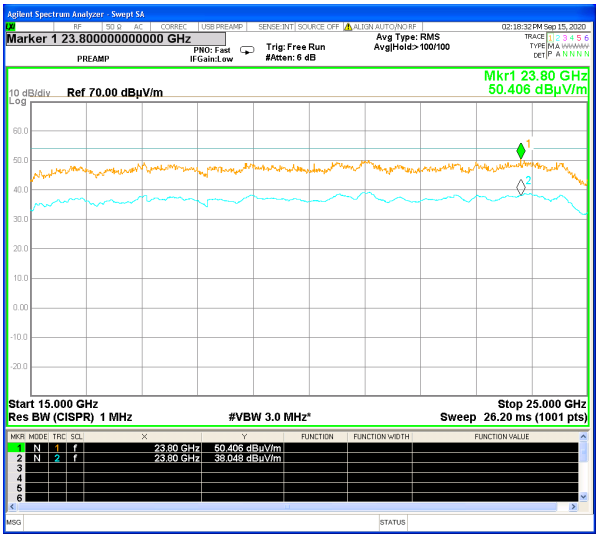


Plot # 13



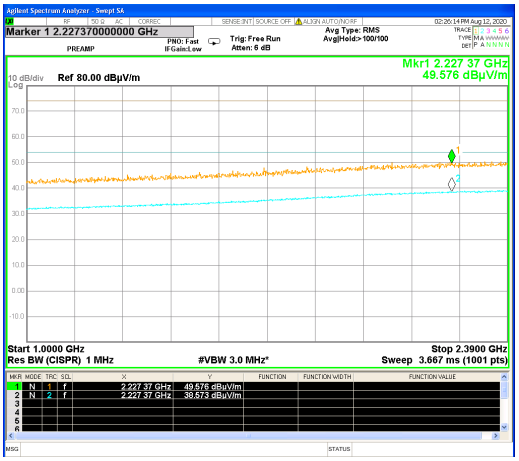
Plot # 14.

Plot # 15.

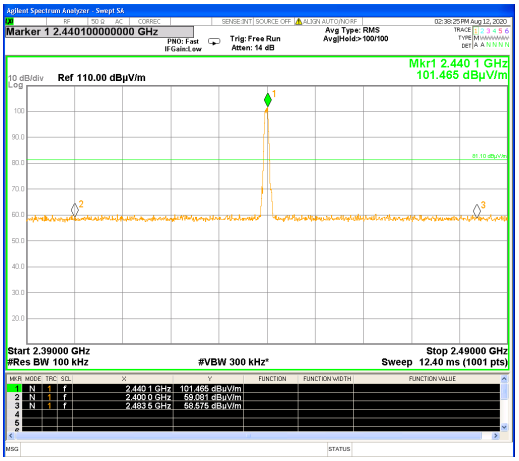

Agilent Spectrum Analyzer - Swept SA
Marker 1 23.800000000000 GHz
PREAMP
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 6 dB
Avg Type: RMS
Avg|Hold:>100/100
02:18:32 PM Sep 15, 2020
Mkr1 23.80 GHz
50.406 dBµV/m
10 dB/div
Ref 70.00 dBµV/m
Log
Start 15.000 GHz
Res BW (CISPR) 1 MHz
#VBW 3.0 MHz*
Stop 25.000 GHz
Sweep 26.20 ms (1001 pts)
1 N 1 f 23.80 GHz 50.406 dBµV/m
2 N 2 f 23.80 GHz 39.048 dBµV/m

Plot # 16.

Carrier frequency - 2440 MHz.



Plot # 17



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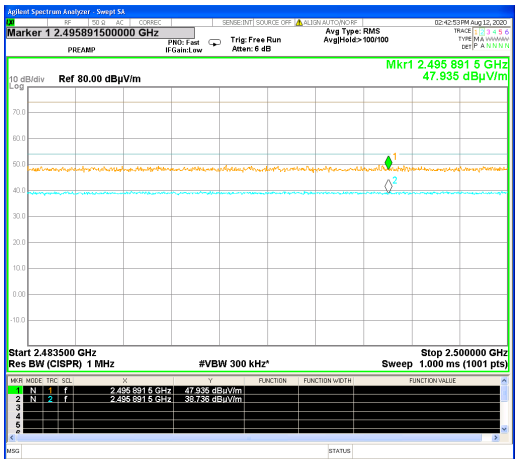

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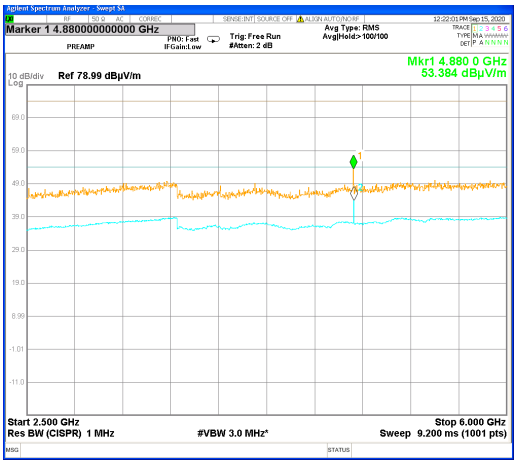
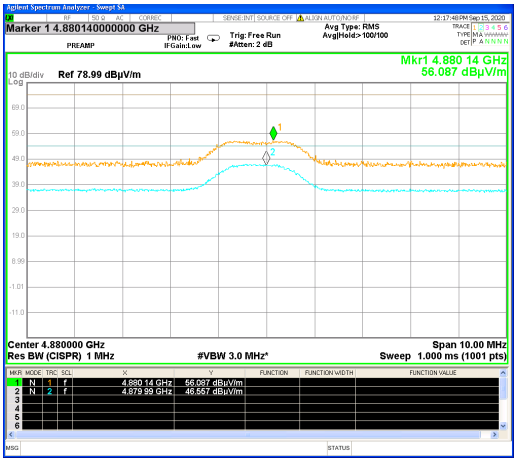
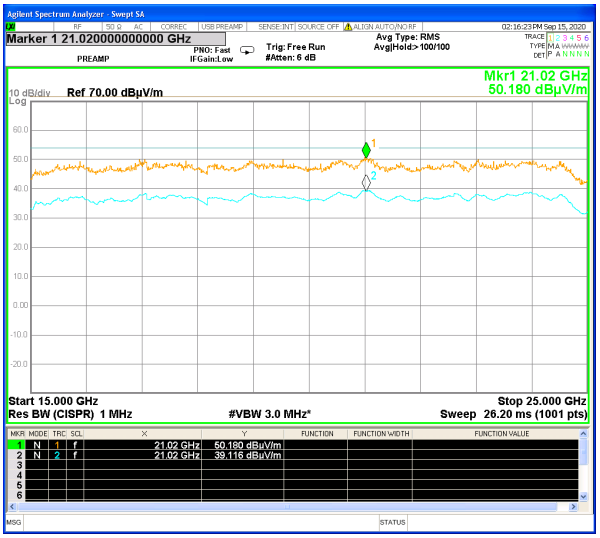


Plot # 20



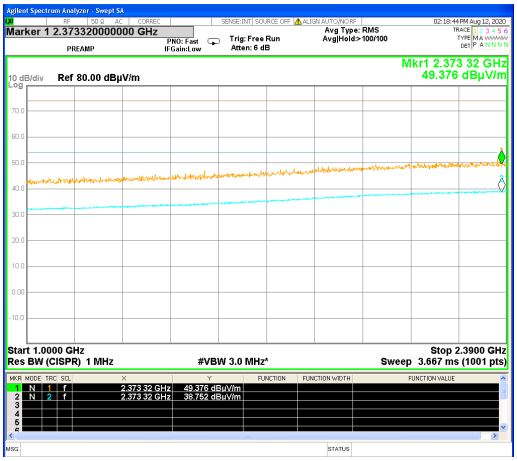
Plot # 21.

Plot # 22.

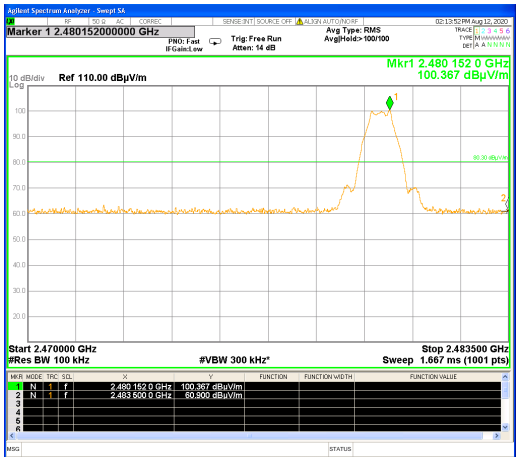

Agilent Spectrum Analyzer - Swept SA
Marker 1 21.020000000000 GHz
PREAMP
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 6 dB
Avg Type: RMS
Avg|Hold:>100/100
02:16:23 PM Sep 15, 2020
Mkr1 21.02 GHz
50.180 dBµV/m
10 dB/div
Ref 70.00 dBµV/m
Log
Start 15.000 GHz
Res BW (CISPR) 1 MHz
#VBW 3.0 MHz*
Stop 25.000 GHz
Sweep 26.20 ms (1001 pts)
1 N 1 f 21.02 GHz 50.180 dBµV/m
2 N 2 f 21.02 GHz 39.116 dBµV/m

Plot # 23.

Carrier frequency 2480 MHz.

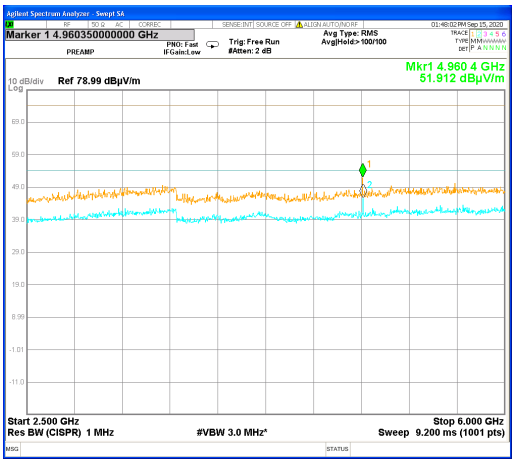


Plot # 24



Plot # 25

Plot # 26



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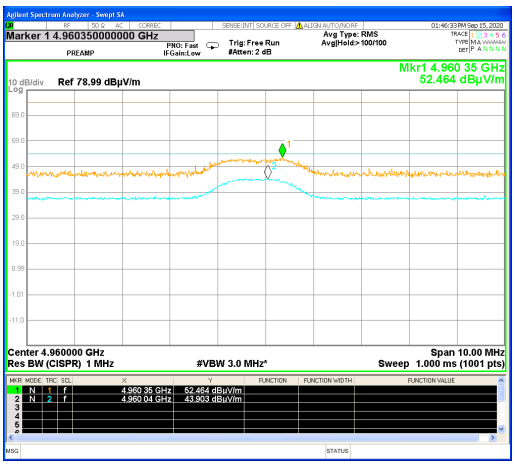
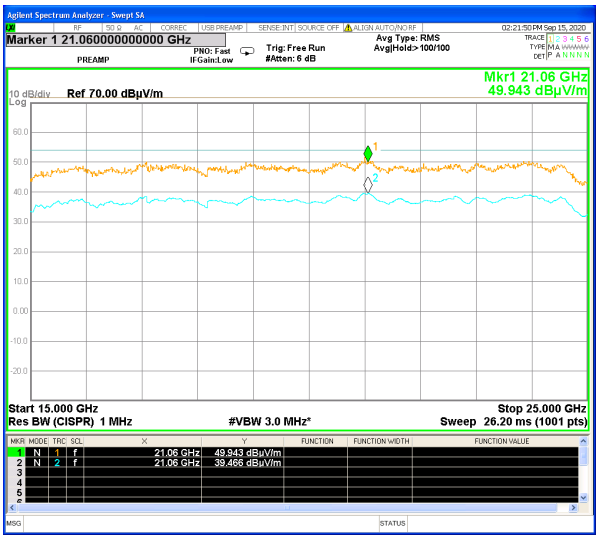


Plot # 28.

Plot # 29


Agilent Spectrum Analyzer - Swept SA
Marker 1 21.060000000000 GHz
PREAMP
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 6 dB
Avg Type: RMS
Avg|Hold:>100/100
02:21:50 PM Sep 15, 2020
Mkr1 21.06 GHz
49.943 dBµV/m
10 dB/div
Ref 70.00 dBµV/m
Log
Start 15.000 GHz
Res BW (CISPR) 1 MHz
#VBW 3.0 MHz*
Stop 25.000 GHz
Sweep 26.20 ms (1001 pts)
1 N 1 f 21.06 GHz 49.943 dBµV/m
2 N 2 f 21.06 GHz 39.466 dBµV/m

Plot # 30

5.1.5 Radiated emissions test according to § 15.209

Method of measurement	**ANSI C63.10 §6.5**	
Detectors used	**CISPR Quasi-Peak**	
Resolution bandwidth	**9 kHz/120 kHz**	
Video bandwidth	**>3 x RBW.**	
Trace mode	**Free run**	
Ambient Temperature 24^0 C	**Relative Humidity 53%**	**Air Pressure 1010 hPa**

TEST DESCRIPTION:

The measurements were performed at 3 m test distance in Anechoic chamber. The EUT was arranged on a polystyrene table 0.8 m height and placed on the turn - table.
The Active Loop antenna in 150 kHz to 30 MHz frequency band and Biconilog antenna in 30 MHz – 1.0 GHz frequency band were used. The emission level was maximized by initially rotating turntable through 360°, varying the antenna height between 1 m and 4 m, rerouting EUT cables and changing antenna polarization from vertical to horizontal.

Radiated emission test results.

Frequency (MHz)	Antenna polariz. V/H	Antenna Height m	Turn-table Angle (°)	Emission Level Note 1 dBμV/m	Limit @ 3m dBμV/m	Margin Note 2 dB	Results
811.1	V	1.0	249	35.0	46.0	11.0	Pass

Note 1:	Emission level = E Reading (dBμV) + Cable loss (dB) + Antenna Factor (dB/m). For Cable Loss and Antenna Factor refer to Appendix 2.
Note 2:	Margin (dB) = Limit (dBμV/m) – Emission level (dBμV/m)

REQUIREMENTS:

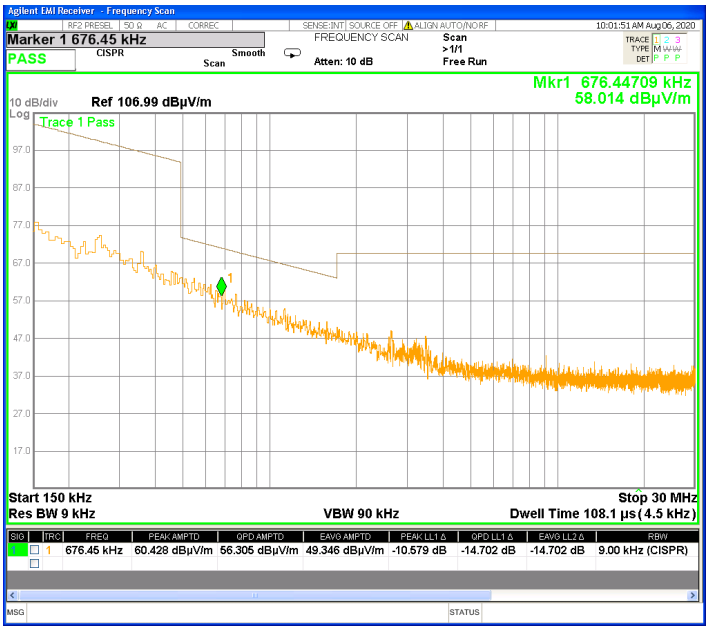
EUT radiated emission shall not exceed value required in section 15.209

TEST RESULT:

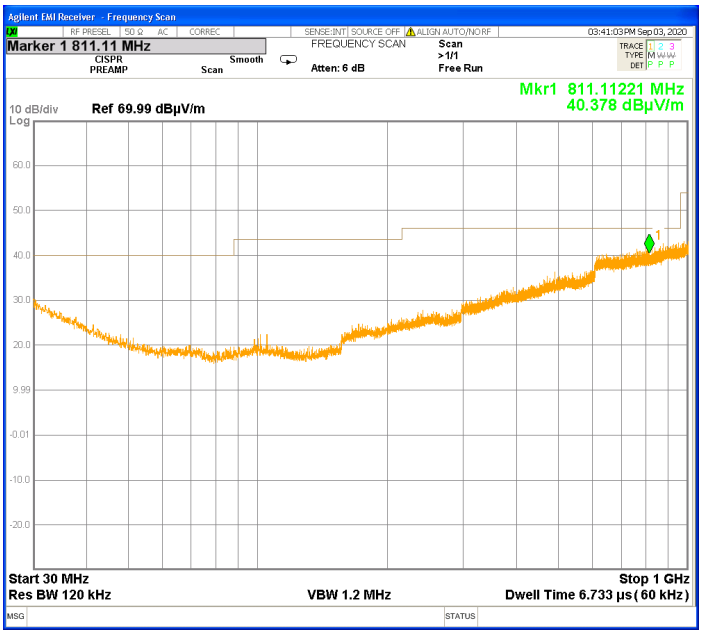
Test results presented in a table and in plots ## 31, 32.

TEST EQUIPMENT USED:

1	6	13	15			



Plot # 31. Investigation result in 0.15 – 30 MHz frequency range.



Plot # 32. Investigation result in 30 - 1000 MHz frequency range.

5.1.6 Conducted emissions test according to § 15.207

Method of measurement	ANSI 63.10 § 6.2	
Ambient Temperature 23^0 C	Relative Humidity 54%	Air Pressure 1010 hPa

Frequency, MHz	Class B equipment, dB (μV)	
	QP	AVRG
0.15 - 0.5	66 - 56*	56 - 46*
0.5 - 5	56	46
5 - 30	60	50

* Decreases linearly with the logarithm of the frequency.

TEST PROCEDURE

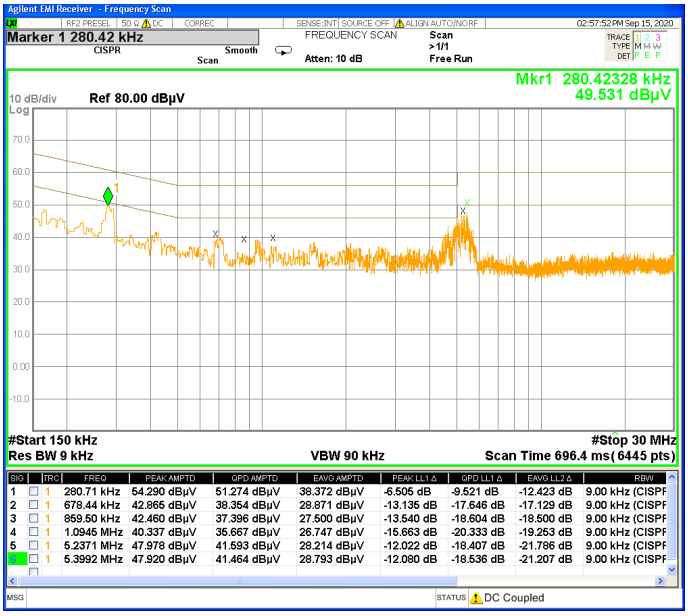
EUT was connected to 120VAC main via auxiliary 5VDC power supply.
The EUT was placed on a table in shielded room at a height 80 cm from floor and 40 cm from the vertical reference plane and at more than 80 cm from any other metal surfaces. The measurements were performed at mains terminals by means of LISN, connected to spectrum analyzer in the frequency range as referred to in the table above. The measurements were made with quasi-peak (CISPR) and average detectors. The position of the EUT cables was varied to determine maximum emission level.

TEST RESULTS:

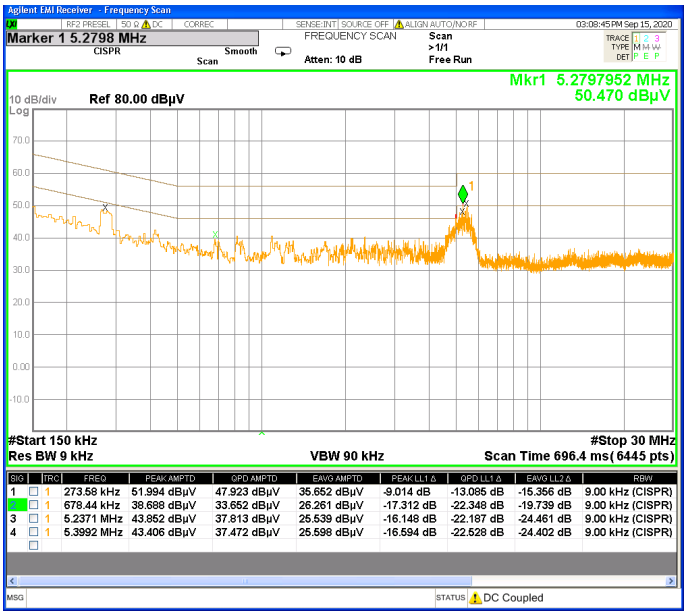
Test results present at plots # 33 for line Phase and # 34 for line Neutral.

TEST EQUIPMENT USED:

1	11	12				



Plot # 33. AC line conducted emissions test. Line Phase



Plot # 34. AC line conducted emissions test. Line Neutral

APPENDIX A Test equipment used.

Test equipment used

No	Description	Manufacturer information			Due Calibration date
		Name	Model	Serial No	
1	MXE EMI Receiver 20 Hz -26.5 GHz	Agilent	N9038A	SII 650114	June 2021
2	Cable RF 1m	Huber-Suhner	Sucoflex 104	21325/4PE	October 2020
3	Double Ridged Guide Antenna 0.75 – 18 GHz	ETS-Lindgren	3115	00143138	December 2020
4	Broadband Horn antenna 15 – 40 GHz	Schwarzbeck Mess-Electronik	BBHA 9170	9170-341	December 2020
5	Double Ridged Waveguide Horn Antenna 1 – 18 GHz	ETS-Lindgren	3117	00139055	December 2020
6	Antenna Biconilog 26 – 6000 MHz	ETS-Lindgren	31142D	0146490	December 2020
7	Spectrum analyzer 20 Hz-40 GHz	Rohde&Schwarz	ESU 40	100168	November 2020
8	MXG Signal Generator 100 KHz - 20 GHz	Agilent	N5183A	6501148	May 2021
9	Attenuator 3 dB DC – 12.4 GHz	HP	8491A	50469	October 2020
10	USB preamplifier 2 GHz – 50 GHz	Keysight	U7227F	MY55380004	January 2021
11	LISN 9 kHz – 30 MHz	FCC	LISN 250-32-4-16	SII5023	October 2020
12	Transient limiter 0.009-200 MHz	HP	11947A	3107105	August 2021
13	Cable RF 5m	Harbour Industries	Neoflex LLEF142	1802	July 2021
14	Cable RF 0.5m	Huber-Suhner	Multiflex 141	520201	October 2020
15	Active Loop antenna 1.0 kHz – 30 MHz	ETS-Lindgren	6507	00144641	December 2020

Cable Loss (Mast 6 m set cable.)

Point	Frequency (MHz)	Cable Loss (dB)	Point	Frequency (MHz)	Cable Loss (dB)
1	30	0.3	21	1000	2.5
2	50	0.4	22	1100	2.6
3	100	0.6	23	1200	2.8
4	150	0.8	24	1300	2.9
5	200	1.0	25	1400	3.1
6	250	1.1	26	1500	3.2
7	300	1.2	27	1600	3.3
8	350	1.3	28	1700	3.5
9	400	1.5	29	1800	3.6
10	450	1.6	30	1900	3.7
11	500	1.7	31	2000	3.9
12	550	1.8	32	2100	4.0
13	600	1.9	33	2200	4.1
14	650	1.9	34	2300	4.2
15	700	2.0	35	2400	4.4
16	750	2.1	36	2500	4.6
17	800	2.1	37	2600	4.7
18	850	2.2	38	2700	4.8
19	900	2.3	39	2800	4.9
20	950	2.4	40	2900	5.0

Antenna factor
Biconilog Antenna, ETS-Lindgren mod. 31142D, S/N: 0146490 3 m calibration.

f / MHz	AF / dB/m	f / MHz	AF / dB/m	f / MHz	AF / dB/m
30	18.7	250	12.0	2750	31.0
35	15.7	300	13.8	3000	31.2
40	12.9	400	16.2	3250	32.7
45	10.6	500	18.6	3500	34.5
50	9.0	600	20.2	3750	34.3
60	7.3	700	21.8	4000	34.5
70	7.7	800	22.9	4250	35.3
80	8.2	900	24.1	4500	35.5
90	9.2	1000	24.8	4750	36.1
100	9.4	1250	26.9	5000	37.4
120	8.5	1500	30.2	5250	38.4
140	8.5	1750	28.5	5000	39.9
160	9.1	2000	28.9	5750	38.2
180	10.5	2250	29.8	6000	39.1
200	10.9	2500	32.5	-	-

Antenna Factor
Double Ridged Guide Antenna mfr ETS-Lindgren model 3115 1m calibration

Point	Frequency (MHz)	Antenna Factor (dB/m)
1	1000	23.7
2	1500	25.5
3	2000	28.5
4	2500	28.1
5	3000	29.6
6	3500	31.1
7	4000	32.5
8	4500	32.5
9	5000	33.5
10	5500	34.7
11	6000	36.1
12	6500	36.5
13	7000	37.3
14	7500	38.0
15	8000	37.3
16	8500	37.9
17	9000	38.1
18	9500	38.5
19	10000	38.7
20	10500	38.8
21	11000	38.6
22	11500	38.8
23	12000	38.9
24	12500	39.3
25	13000	40.2
26	13500	40.6
27	14000	40.6
28	14500	40.4
29	15000	39.6
30	15500	39.5
31	16000	39.8
32	16500	40.4
33	17000	41.3
34	17500	42.6
35	18000	43.2

Cable Loss
Type: Neoflex LLEF142; Ser.No.1802; 5 m length

Point	Frequency (GHz)	Cable Loss (dB)
0	0.0-1.0	1.3
1	1.0 – 3.0	2.4
2	3.0 – 5.0	3.2
3	5.0-7.0	4.0
4	7.0-9.0	4.4
5	9.0-10.0	4.7
6	10.0-12.0	5.2
7	12.0-14.0	5.9
8	14.0-16.0	6.1
9	16.2-18.00	6.6

Antenna Factor
Broadband Horn Antenna model BBHA 9170 1m calibration

Point	Frequency (GHz)	Antenna Factor (dB/m)
1	15.0	38.5
2	16.0	37.7
3	17.0	38.1
4	18.0	37.9
5	19.0	38.0
6	20.0	38.0
7	21.0	37.9
8	22.0	38.2
9	23.0	39.6
10	24.0	39.6
11	25.0	39.3
12	26.0	39.5
13	27.0	39.6
14	28.0	39.6
15	30.0	40.1
16	32.0	41.2
17	34.0	41.5
18	35.0	41.9
19	36.0	42.2
20	38.0	43.8
21	40.0	43.2

Antenna Factor
For Antenna Loop MFR ETS Lindgren, Type/Model 6507, S/N: 00144641

No.	Frequency MHz	Magnetic antenna factor, dBS/m	Electric antenna factor, dB/m
1	9	-21.5	30.0
2	10	-22.0	29.5
3	20	-27.7	23.8
4	50	-32.2	19.4
5	75	-33.0	18.5
6	100	-33.4	18.2
7	150	-33.6	17.9
8	250	-33.7	17.9
9	500	-33.8	17.8
10	750	-33.8	17.7
11	1000	-33.8	17.7
12	2000	-33.7	17.9
13	3000	-33.8	17.8
14	4000	-34.0	17.5
15	5000	-34.3	17.2
16	10000	-35.2	16.4
17	15000	-35.8	15.8
18	20000	-36.0	15.6
19	25000	-36.2	15.3
20	30000	-36.4	15.2

APPENDIX B Photo of the test setups.

Photo 1.

Photo 2.

Photo 3.

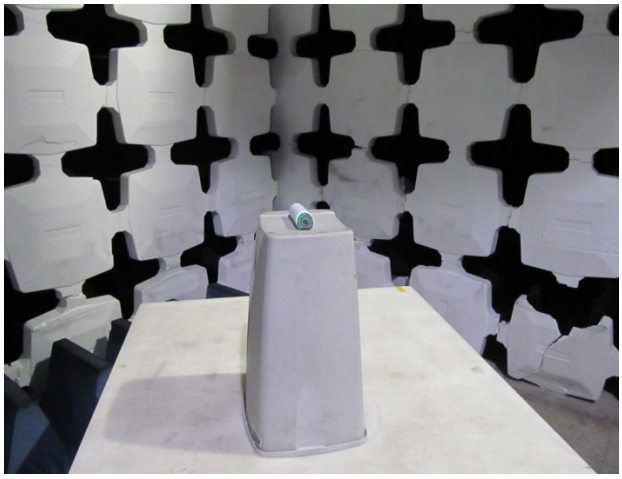


Photo 4.

APPENDIX C Abbreviations and acronyms.

The following abbreviations and acronyms are applicable to this test report:

AC	alternating current
cm	centimeter
dB	decibel
dBm	decibel referred to one milliwatt
dB(µV)	decibel referred to one microvolt
dB(µV/m)	decibel referred to one microvolt per meter
EBW	emission bandwidth.
EMC	electromagnetic compatibility
EUT	equipment under test
GHz	gigahertz
H	height
Hz	hertz
kHz	kilohertz
L	length
LNA	low noise amplifier
m	meter
Mbps	megabit per second
MHz	megahertz
NA	not applicable
OFDM	Orthogonal Frequency Division Multiple Access
PRBS	pseudo random binary sequence
QP	quasi-peak
RF	radio frequency
RE	radiated emission
SA	spectrum analyzer
rms	root mean square
W	width

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