



Date: 27 December 2022

**I.T.L. Product Testing Ltd.
FCC Part 15 Subpart C §15.247
Radio Test Report**

for

ArrowSpot Systems Ltd.

Equipment under test:


Ship Container Tracking Device

ArrowTrack DV

Tested by: 

M. Zohar

Approved by: I. Mansky

pp. I. Cohen: 

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Measurement/Technical Report for
ArrowSpot Systems Ltd.
Ship Container Tracking Device
ArrowTrack DV

FCC ID: 2ANZW-ARROWTRAKDVL

This report concerns: Original Grant

Equipment type: FCC: Digital Transmission System (DTS)

Limits used: 47CFR15 Section 15.247

Measurement procedure used: KDB 558074 D01 15.247 v05r02,
ANSI C63.10:2013

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1. General Information

1.1 Administrative Information

Manufacturer:	ArrowSpot Systems Ltd.
Manufacturer's Address:	P.O.B 164, Kfar Hess, Israel
Manufacturer's Representative:	Dany Klein
Equipment Under Test (E.U.T):	Ship Container Tracking Device
Equipment PMN:	ArrowTrack DV
Equipment Serial No.:	Not designated
Date of Receipt of E.U.T:	August 07, 2022
Start of Test:	August 07, 2022
End of Test:	August 17, 2022
Test Laboratory Location:	I.T.L (Product Testing) Ltd. 1 Bat Sheva St., Lod 7120101, Israel
Test Specifications:	FCC Part 15, Subpart C

1.2 List of Accreditations

The EMC laboratory of I.T.L. is accredited by the following bodies:

1. The American Association for Laboratory Accreditation (A2LA) (U.S.A.), Certificate No. 1152.01.
2. The Federal Communications Commission (FCC) (U.S.A.), FCC Designation No. IL1005.
3. Department of Innovation, Science and Economic Development (ISED) Canada, CAB identifier: IL1002

I.T.L. Product Testing Ltd. is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this test report have been determined in accordance with I.T.L.'s terms of accreditation unless stated otherwise in the report.



1.3 Product Description

The ArrowTrack DV (Dry Van) system comprises of an individual, self-sustained unit with a primary, non-rechargeable battery supply.

It is a complete Cellular GNSS RF wireless terminal installed on containers for sea shipping.

The E.U.T. enclosure has two versions: one with two holes (one on each side), and four holes (two on each side).

Type of Equipment			
<input checked="" type="checkbox"/>	Stand Alone (Equipment with/without its own control provisions)		
<input type="checkbox"/>	Combined (Equipment where radio part is fully integrated with another type of equipment)		
<input type="checkbox"/>	Plug in card (Equipment intended for a variety of host systems)		
Intended Use		Condition of use	
<input type="checkbox"/>	Fixed	Always of distance >2m from the people	
<input checked="" type="checkbox"/>	Mobile	Always of distance >20cm from the people(1m)	
<input type="checkbox"/>	Portable	Always of distance <20cm to human body	
Assigned frequency band		2400-2483.5 MHz	
Operational frequencies		2402-2480 MHz	
Maximum rated output power		At transmitter 50Ω RF output connector [dBm]	BLE- 7dBm
		Effective Radiated Power (for equipment without RF connector)	
Antenna Connection			
<input type="checkbox"/>	Unique Coupling	<input type="checkbox"/>	Standard Connection
<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	Integral
		<input checked="" type="checkbox"/>	With temporary RF connector
		<input type="checkbox"/>	Without temporary RF connector
Antenna Gain(peak)		-3.3dBi	
Operating channel bandwidth		1MHz	
Type of modulation		BLE	
Bit rate		1,2Mbps	
Maximum transmitter duty cycle		100%	
Transmitter power source			
<input type="checkbox"/>	AC	Nominal rated voltage	
<input type="checkbox"/>	DC	Nominal rated voltage	
<input checked="" type="checkbox"/>	Battery	Nominal rated voltage	3.6V

1.4 Test Methodology

Both conducted and radiated testing was performed according to the procedures in KDB 558074 D01 v05r02 and in ANSI C63.10: 2013. Radiated testing was performed at an antenna to EUT distance of three meters.



1.5 Test Facility

Emissions tests were performed at I.T.L.'s testing facility in Lod, Israel. I.T.L.'s EMC Laboratory is accredited by the A2LA, certificate No. 1152.01 and its FCC Designation Number is IL1005.

1.6 Measurement Uncertainty

Conducted Emission

Conducted Emission (CISPR 11, EN 55011, CISPR 22, EN 55022, ANSI C63.4)

0.15 – 30 MHz:

Expanded Uncertainty (95% Confidence, K=2):

± 3.44 dB

Radiated Emission

Radiated Emission (CISPR 11, EN 55011, CISPR 22, EN 55022, ANSI C63.4)
for open site:

30-1000MHz:

Expanded Uncertainty (95% Confidence, K=2):

± 4.96 dB

1 GHz to 6 GHz

Expanded Uncertainty (95% Confidence, K=2):

±5.19 dB

>6 GHz

Expanded Uncertainty (95% Confidence, K=2):

±5.51 dB



2. System Test Configuration

2.1 Justification

1. The E.U.T contains transceiver IEEE 802.15.1 standard (BLE)
2. For BLE - The unit was evaluated while transmitting at the low channel (2402MHz), the mid channel (2440MHz) and the high channel (2480MHz).
3. Conducted emission tests were performed with the E.U.T. antenna terminal connected by an RF cable to the Spectrum Analyzer through a 30dB external attenuator.
4. Final radiated emission tests were performed at installation position orientation, as defined by the customer.

2.2 EUT Exercise Software

No special exercise software was used.

2.3 Special Accessories

na

2.4 Equipment Modifications

Initially, the E.U.T failed the restricted bands, radiated spurious emission test, at a code power level of 6dBm. The E.U.T. passed the test after the customer reduced the code power level to -7dBm.

2.5 Configuration of Tested System

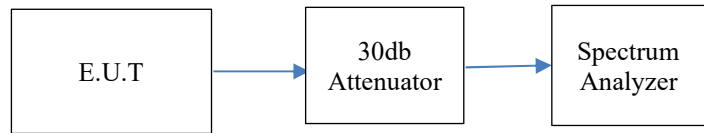


Figure 1. Configuration of Tested System Conducted



Figure 2. Configuration of Tested System Radiated



3. Test Setup Photos

See a separate file.



4. 6 dB Minimum Bandwidth

4.1 Test Specification

FCC Part 15, Subpart C, Section 247(a)(2)

4.2 Test Procedure

(Temperature (20°C)/ Humidity (67%RH))

The E.U.T operation mode and test set-up are as described in Section 2 of this report.

The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator and an appropriate coaxial cable (total loss=32.0 dB). Special attention was taken to prevent Spectrum Analyzer RF input overload.

The spectrum bandwidth of the E.U.T. at the point of 6 dB below maximum peak power was measured and recorded. The RBW was set to 100 kHz.

4.3 Test Limit

Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

4.4 Test Results

Protocol Type	Operation Frequency	Reading	Limit
	(MHz)	(kHz)	(kHz)
BLE	2402.0	681.0	>500.0
	2440.0	674.0	>500.0
	2480.0	673.0	>500.0

Figure 3 6 dB Minimum Bandwidth

JUDGEMENT: Passed

For additional information see *Figure 4* to *Figure 6*.

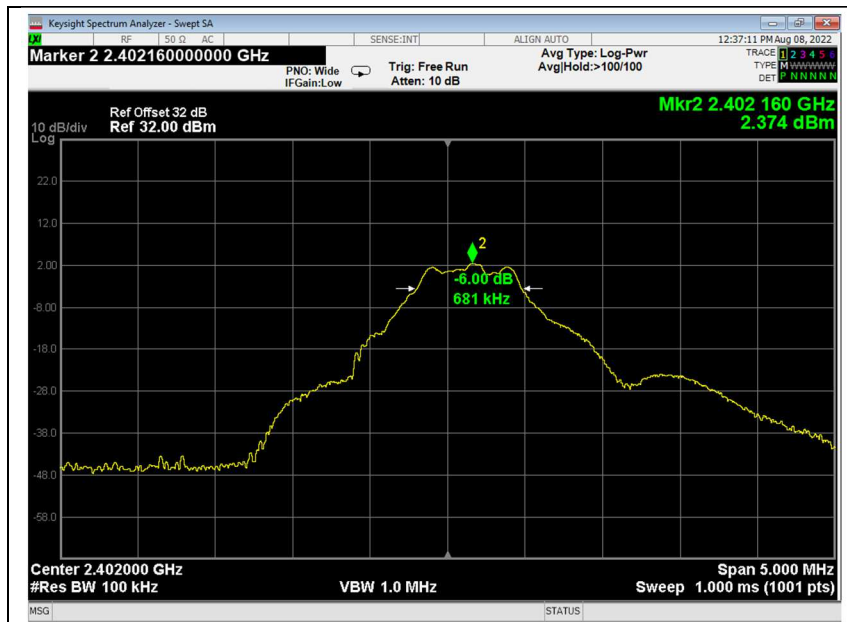


Figure 4. 2402.0 MHz, BLE

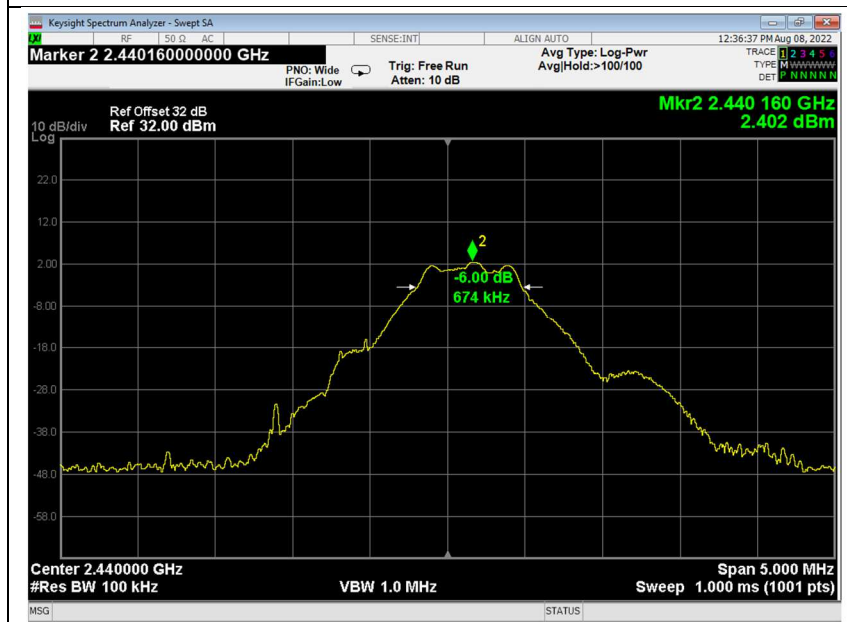


Figure 5. 2440.0 MHz, BLE

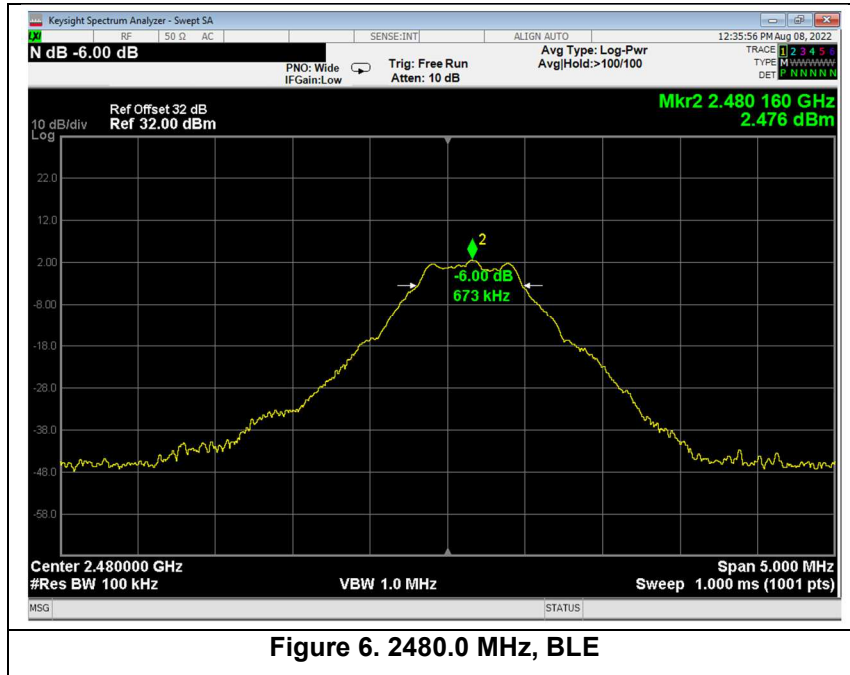


Figure 6. 2480.0 MHz, BLE

4.5 Test Equipment Used; 6dB Bandwidth

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
Signal Analyzer	Keysight	N9010A	my51170071	13-02-2022	13-02-2024
30dB Attenuator	MCL	BW-S30W5	533	May 16, 2022	May 16, 2023
RF Cable	Huber Suhner	Sucofelex	27502/4PEA	16-05-2022	16-05-2023

Figure 7 Test Equipment Used

5. Maximum Conducted Output Power

5.1 Test Specification

FCC, Part 15, Subpart C, Section 247(b)(3)

5.2 Test Procedure

(Temperature (20°C)/ Humidity (68%RH))

The E.U.T operation mode and test set-up are as described in Section 2 of this report. The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator and an appropriate coaxial cable (total loss=32.0 dB). Special attention was taken to prevent Spectrum Analyzer RF input overload.

5.3 Test Limit

The maximum peak conducted output power of the intentional radiator for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands, shall not exceed 1 Watt.

5.4 Test Results

Protocol Type	Operation Frequency	Power	Power	Limit	Margin
	(MHz)	(dBm)	(mW)	(mW)	(mW)
BLE	2402.0	-11.0	0.08	1000.0	-999.92
	2440.0	-10.7	0.08	1000.0	-999.92
	2480.0	-10.3	0.09	1000.0	-999.91

Figure 8 Maximum Peak Power Output

JUDGEMENT: Passed by ____ mW

For additional information see *Figure 9* to *Figure 11*.

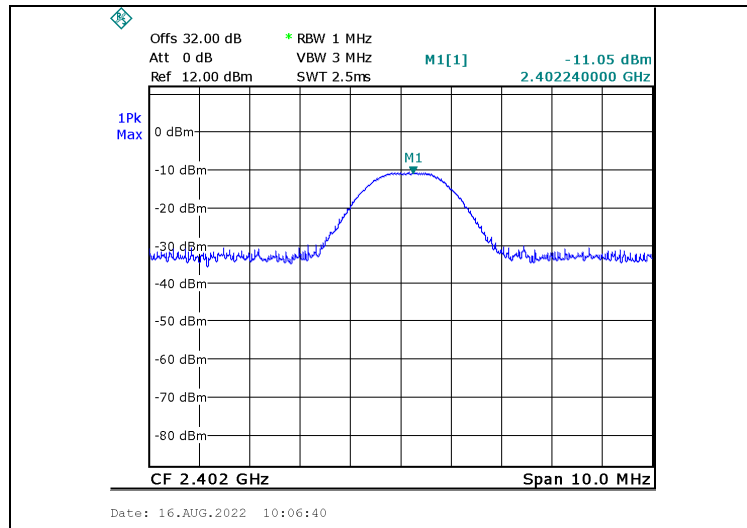


Figure 9. 2402.0 MHz, BLE

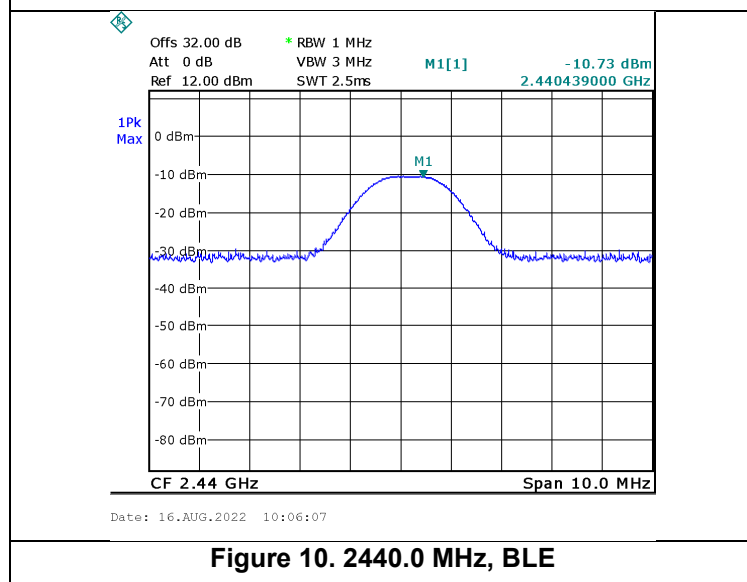
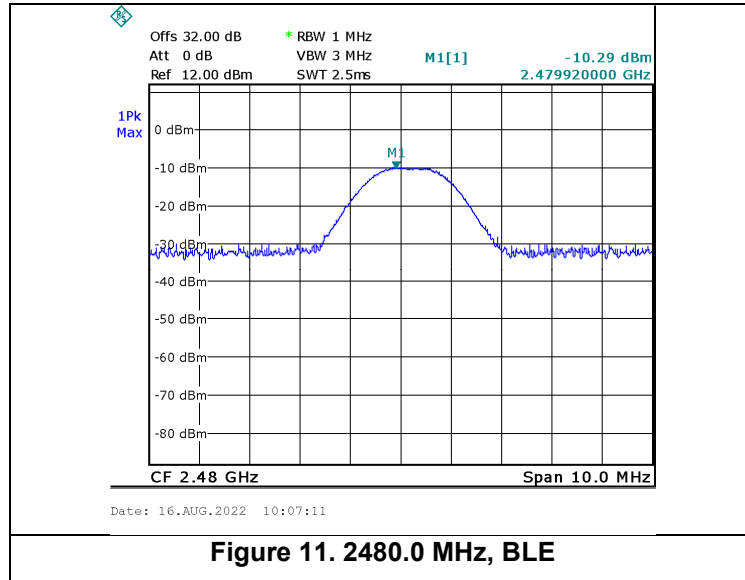


Figure 10. 2440.0 MHz, BLE



5.5 Test Equipment Used; Maximum Peak Power Output

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
Signal Analyzer	Keysight	N9010A	my51170071	13-02-2022	13-02-2024
30dB Attenuator	MCL	BW-S30W5	533	May 16, 2022	May 16, 2023
RF Cable	Huber Suhner	Sucoflex	27502/4PEA	16-05-2022	16-05-2023

Figure 12 Test Equipment Used

6. Band Edge Spectrum

6.1 Test Specification

FCC, Part 15, Subpart C, Section 247(d)

6.2 Test Procedure

(Temperature (20°C)/ Humidity (59%RH))

The E.U.T operation mode and test set-up are as described in Section 2 of this report. The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator and an appropriate coaxial cable (loss=32.0 dB). Special attention was taken to prevent Spectrum Analyzer RF input overload.

The RBW was set to 100 kHz.

6.3 Test Limit

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.

6.4 Test Results

Protocol Type	Operation Frequency	Band Edge Frequency	Spectrum Level	Limit	Margin
	(MHz)	(MHz)	(dBm)	(dBm)	(dB)
BLE	2402.0	2400.0	-44.5	-18.5	-26.0
	2480.0	2483.5	-45.6	-18.5	-27.1

Figure 13 Band Edge Spectrum

JUDGEMENT: Passed by -26.0 dB

For additional information see *Figure 14* and *Figure 15*.

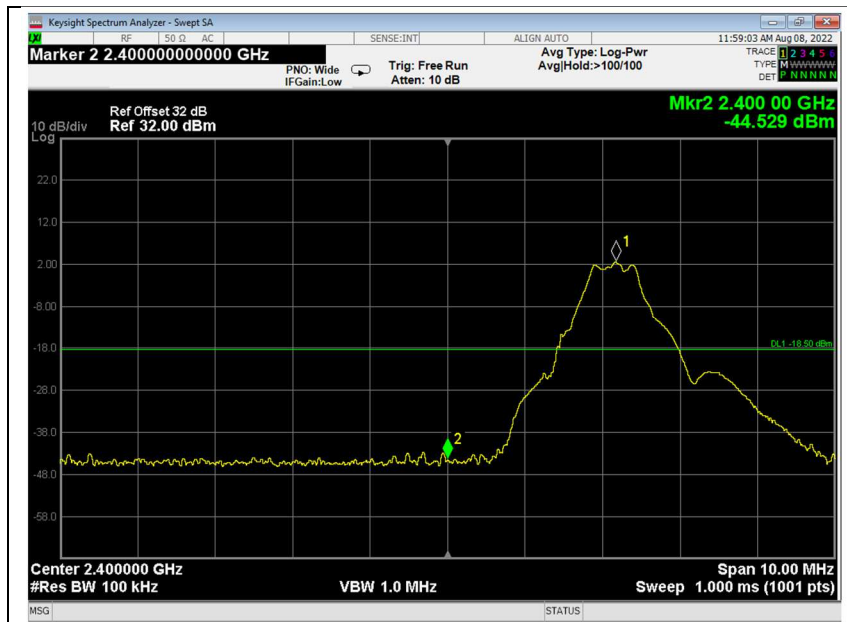


Figure 14. 2402.0 MHz, BLE

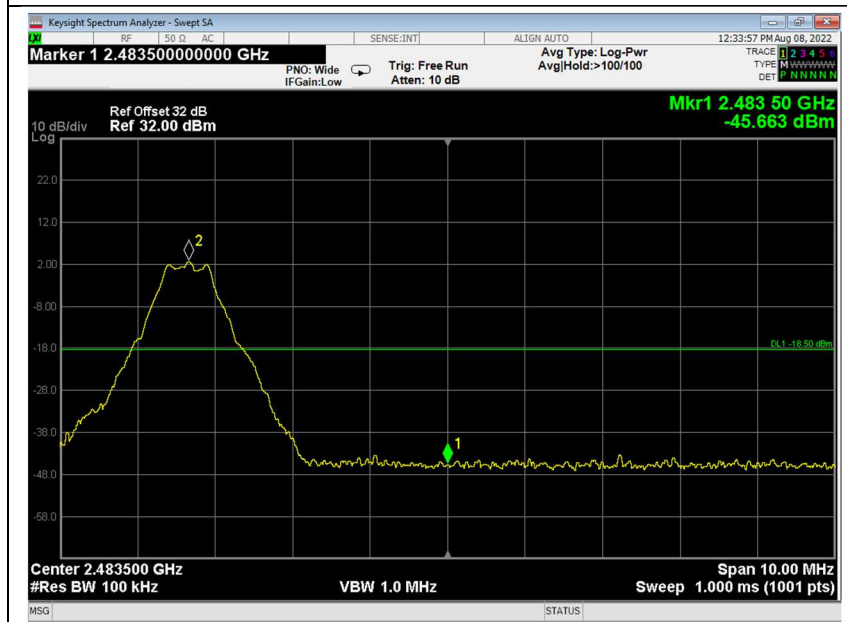


Figure 15. 2480.0 MHz, BLE



6.5 Test Equipment Used; Band Edge

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
Signal Analyzer	Keysight	N9010A	my51170071	13-02-2022	13-02-2024
30dB Attenuator	MCL	BW-S30W5	533	May 16, 2022	May 16, 2023
RF Cable	Huber Suhner	Sucofelex	27502/4PEA	16-05-2022	16-05-2023

Figure 16 Test Equipment Used



7. Transmitted Power Density

7.1 Test Specification

FCC, Part 15, Subpart C, Section 247(e)

RSS 247, Issue 2, Section 5.2(b)

7.2 Test Procedure

(Temperature (20°C)/ Humidity (66%RH))

The E.U.T operation mode and test set-up are as described in Section 2 of this report. The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator and an appropriate coaxial cable (total loss= 32.0dB). Special attention was taken to prevent Spectrum Analyzer RF input overload.

The spectrum analyzer was set to 3 kHz RBW.

7.3 Test Limit

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.

7.4 Test Results

Protocol Type	Operation Frequency	PSD Reading	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
BLE	2402.0	-12.5	8.0	-20.5
	2440.0	-12.4	8.0	-20.4
	2480.0	-12.4	8.0	-20.4

Figure 17 Test Results

JUDGEMENT: Passed by -20.4 dB

For additional information see *Figure 18* to *Figure 20*.

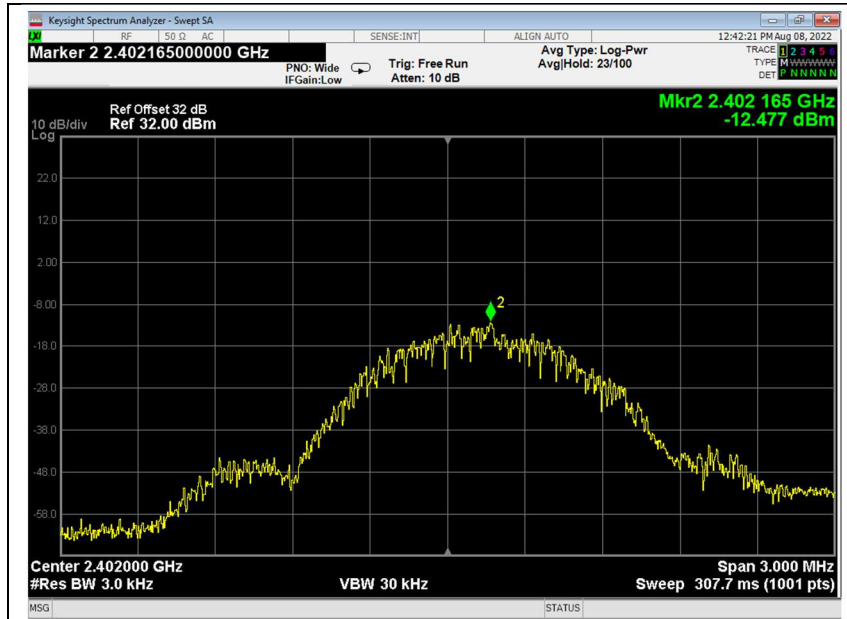


Figure 18. 2402.0 MHz, BLE

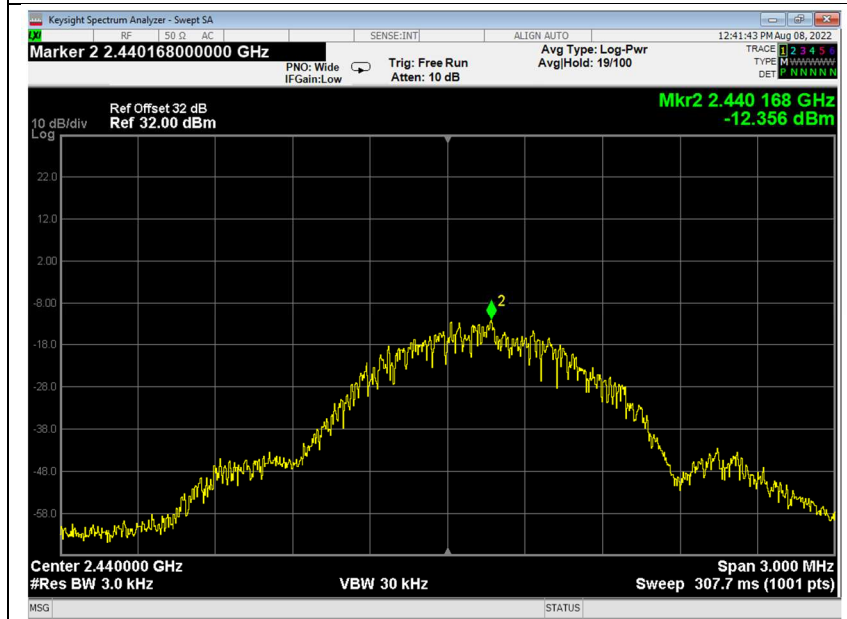
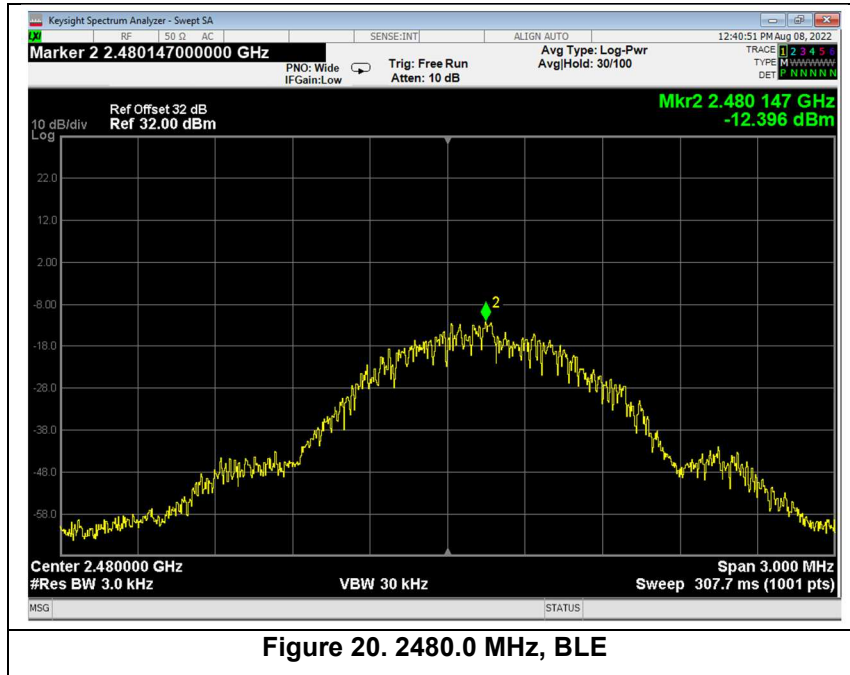


Figure 19. 2440.0 MHz, BLE



7.5 Test Equipment Used; Transmitted Power Density

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
Signal Analyzer	Keysight	N9010A	my51170071	13-02-2022	13-02-2024
30dB Attenuator	MCL	BW-S30W5	533	May 16, 2022	May 16, 2023
RF Cable	Huber Suhner	Sucofelex	27502/4PEA	16-05-2022	16-05-2023

Figure 21 Test Equipment Used



8. Occupied Bandwidth

8.1 Test Specification

FCC, Part 2, Sub part J, Section 2.1049

8.2 Test Procedure

(Temperature (20-°C)/ Humidity (59%RH))

The E.U.T. operation mode and test set-up are as described in Section 2 of this report. The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator and an appropriate coaxial cable (total loss= 32.0dB). Special attention was taken to prevent Spectrum Analyzer RF input overload.

The RBW set to the range of 1% to 5% of the OBW.

The span was set between 1.5 to 5 times of the OBW.

99% occupied bandwidth function was set on.

8.3 Test Limit

N/A

8.4 Test Results

Protocol Type	Operation Frequency	Reading
	(MHz)	(MHz)
BLE	2402.0	1.05
	2440.0	1.05
	2480.0	1.05

Figure 22. Bandwidth Test Results

JUDGEMENT: N/A

See additional information in Figure 23 to Figure 25.



Occupied Bandwidth

E.U.T Description Ship Container Tracking Device
Model Number ArrowTrack DV
Part Number: Not designated

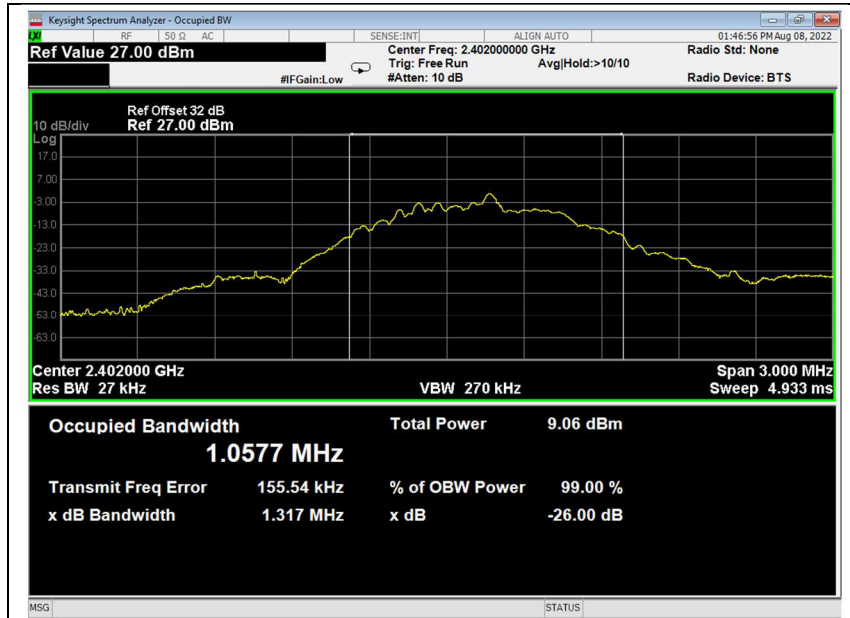


Figure 23. 2402.0 MHz, BLE

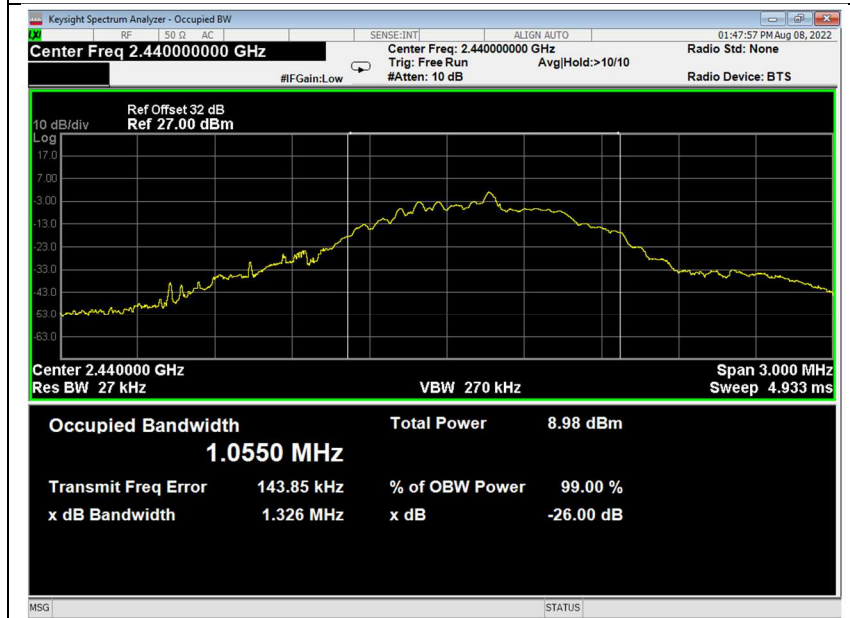


Figure 24. 2440.0 MHz, BLE

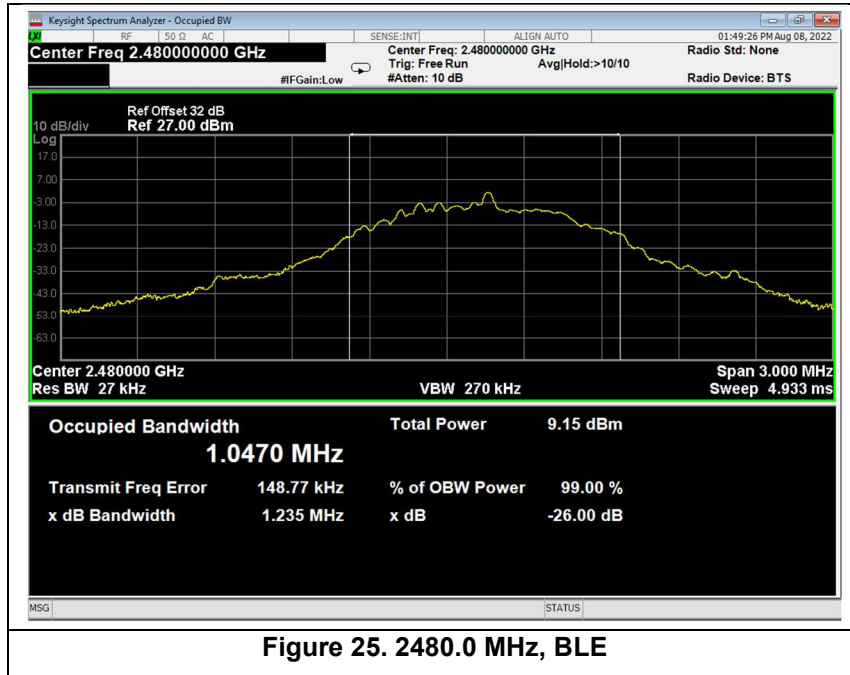


Figure 25. 2480.0 MHz, BLE

8.5 Test Equipment Used; Bandwidth

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
Signal Analyzer	Keysight	N9010A	my51170071	13-02-2022	13-02-2024
30dB Attenuator	MCL	BW-S30W5	533	May 16, 2022	May 16, 2023
RF Cable	Huber Suhner	Sucofelex	27502/4PEA	16-05-2022	16-05-2023

Figure 26 Test Equipment Used



9. Emissions in Non-Restricted Frequency Bands

9.1 Test Specification

FCC, Part 15, Subpart C, Section 247(d)

9.2 Test Procedure

(Temperature (20°C)/ Humidity (62%RH))

The E.U.T. operation mode and test set-up are as described in Section 2 of this report. The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator and an appropriate coaxial cable (max total loss=34.0 dB). Special attention was taken to prevent Spectrum Analyzer RF input overload. RBW was set to 100kHz, detector set to max peak and trace to “max hold”.

9.3 Test Limit

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.

9.4 Test Results

JUDGEMENT: Passed

The EUT met the requirements of the F.C.C. Part 15, Subpart C, Section 247(d) specification.

For additional information see *Figure 27* to *Figure 29*.

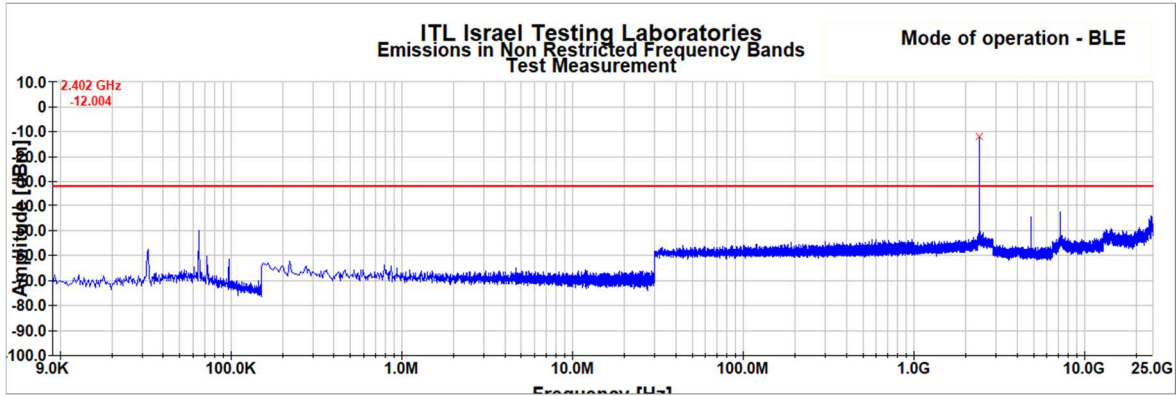


Figure 27 2402.0 MHz, BLE

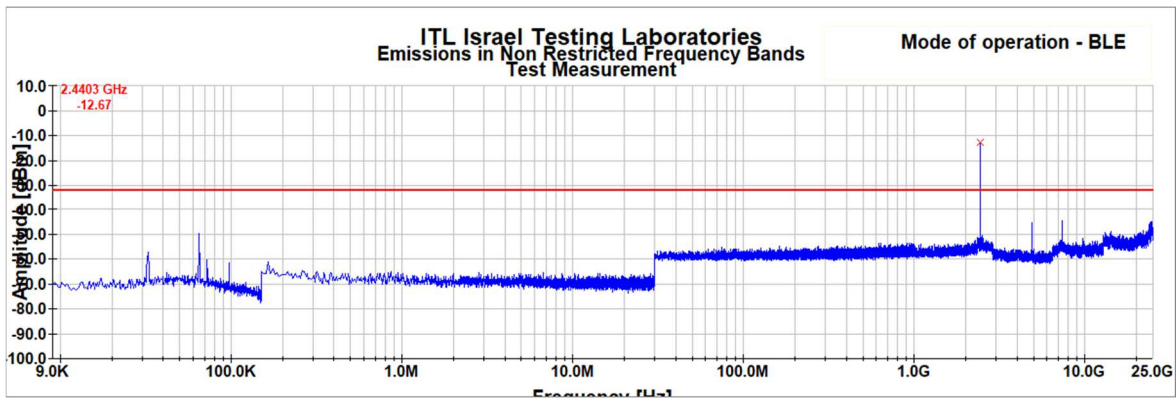


Figure 28 2440.0 MHz, BLE

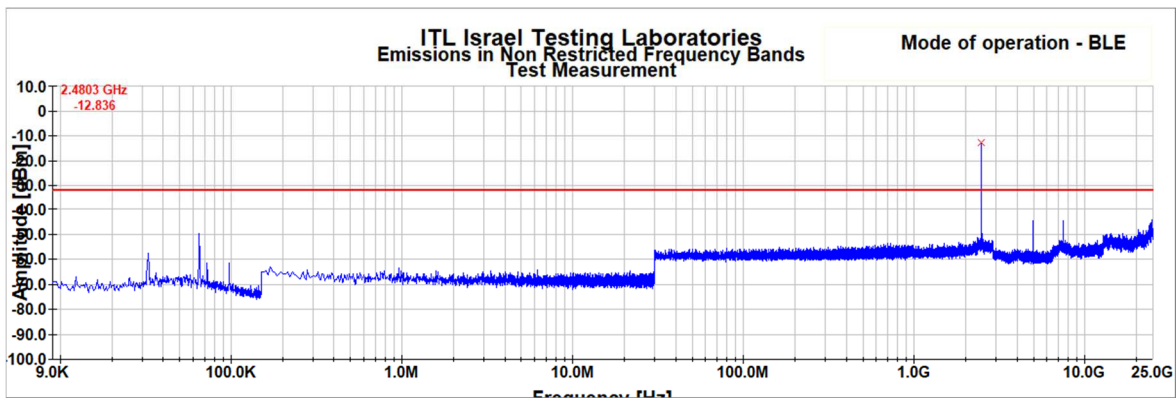


Figure 29 2480.0 MHz, BLE

Note: the limit exceeds peaks in plots are the fundamental transmission frequency.



9.1 Test Instrumentation Used, Emission in Non Restricted Frequency Bands

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
Signal Analyzer	Keysight	N9010A	my51170071	13-02-2022	13-02-2024
30dB Attenuator	MCL	BW-S30W5	533	May 16, 2022	May 16, 2023
RF Cable	Huber Suhner	Sucofelex	27502/4PEA	16-05-2022	16-05-2023

Figure 30 Test Equipment Used



10. Radiated Emission in Restricted Frequency Bands

10.1 Test Specification

FCC Part 15, Subpart C, Sections 15.209, 15.205, 15.247(d)

10.2 Test Procedure

(Temperature (26°C)/ Humidity (62%RH))

The E.U.T. operation mode and test set-up are as described in Section 2 of this report.

For measurements between 0.009-30MHz:

The E.U.T was tested inside the shielded room and placed on a non-metallic table, 0.8 meters above the ground. The emissions were measured at a distance of 3 meters. The readings were maximized by the turntable azimuth between 0-360°, and the antenna polarization.

The frequency range 0.009MHz-30MHz was scanned.

For measurements between 30-1000MHz:

A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The emissions were measured at a distance of 3 meters. The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization. The frequency range 30MHz -1000MHz was scanned and the list of the highest emissions was verified and updated accordingly.

For measurements between 1GHz-25GHz:

The E.U.T was tested inside the shielded room and placed on a non-metallic table, 1.5 meters above the ground. The emissions were measured at a distance of 3 meters. The readings were maximized by the turntable azimuth between 0-360°, and the antenna polarization.

The frequency range 1GHz -25GHz was scanned.

Tests done for all “worst case”, each protocol type. The highest radiation describes in the tables below

The levels of the emissions within the frequency ranges of the restricted bands (Section 15.205 of FCC Part 15) were compared to the limits of the table in Section 15.209 (a), General Requirements.

10.3 FCC Test Limit

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)).

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement distance (meters)	Field Strength* (dBµV/m)	Field Strength* (dBµV/m)@3m
0.009-0.490	2400/F(kHz)	300	48.5-13.8	128.5-73.8
0.490-1.705	24000/F(kHz)	30	33.8-23.0	73.8-63.0
1.705-30.0	30	30	29.5	69.5
30-88	100	3	40.0	40.0
88-216	150	3	43.5	43.5
216-960	200	3	46.0	46.0
Above 960	500	3	54.0	54.0

*The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector, except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector. For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

Figure 31 FCC Table of Limits

10.4 Test Results

JUDGEMENT: Passed by -0.4 dB

The EUT met the requirements of the F.C.C. Part 15, Subpart C Sections 15.209, 15.205, 15.247(d) specifications.

The details of the highest emissions are given in *Figure 32*.



Radiated Emission in Restricted Frequency Bands

E.U.T Description Ship Container Tracking Device
Type ArrowTrack DV
Serial Number: Not designated

Specifications: FCC, Part 15, Subpart C, Sections 15.209, 15.205, 15.247(d)
RSS 247, Issue 2, Section 3.3; RSS Gen, Issue 5, Section 8.10

Antenna Polarization: Horizontal/Vertical Frequency Range: 9kHz to 25.0 GHz
Protocol Type: BLE Detector: Peak, Average

Operation Frequency	Freq.	Pol	Peak Reading	Peak Limit	Peak Margin	Average Reading	Average Limit	Average Margin
(MHz)	(MHz)	(H/V)	(dBμV/m)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
2402.0	2390.0	V	55.7	74.0	-18.3	48.5	54.0	-5.5
	2390.0	H	56.3	74.0	-17.7	49.3	54.0	-4.7
	7206.0	V	60.1	74.0	-13.9	53.1	54.0	-0.9
	7206.0	H	57.7	74.0	-16.3	47.0	54.0	-7.0
2440.0	4880.0	V	51.5	74.0	-22.5	41.4	54.0	-12.6
	4880.0	H	53.1	74.0	-20.9	43.7	54.0	-10.3
	7320.0	V	62.4	74.0	-11.6	53.5	54.0	-0.5
	7320.0	H	59.5	74.0	-14.5	51.2	54.0	-2.8
2480.0	7440.0	V	62.2	74.0	-11.8	53.6	54.0	-0.4
	7440.0	H	60.8	74.0	-13.2	51.5	54.0	-2.5
	2483.5	V	56.4	74.0	-17.6	48.7	54.0	-5.3
	2483.5	H	56.5	74.0	-17.5	49.0	54.0	-5.0

Figure 32. Radiated Emission Results

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

“Peak Amp” includes correction factor.

* “Correction Factor” = Antenna Factor + Cable Loss- Low Noise Amplifier Gain



10.5 Test Instrumentation Used; Emissions in Restricted Frequency Bands

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
EMI Receiver	R&S	ESCI7	100724	20-02-2022	20-02-2023
EMI Receiver	HP	8542E	3906A00276	22-02-2022	22-02-2023
RF Filter Section	HP	85420E	3705A00248	22-02-2022	22-02-2023
Spectrum Analyzer	HP	8593EM	3536A00120AD I	26-02-2019	26-02-2020
Active Loop Antenna	EMCO	6502	2950	05-07-2022	05-07-2023
Biconical Antenna	EMCO	3110B	9912-3337	18-01-2022	18-01-2024
Log Periodic Antenna	EMCO	3146	9505-4081	27-04-2021	27-04-2024
Horn Antenna	ETS	3115	29845	25-05-2021	25-05-2024
Horn Antenna	ARA	SWH-28	1007	02-11-2021	02-11-2024
Wideband RF Amplifier	OSR	N.A	N.A	16-05-2022	16-05-2023
RF Cable Chamber	Commscope ORS	0623 WBC-400	G020133	16-05-2022	16-05-2023
RF Cable Oats	EIM	RG214-11N(X2)		22-06-2022	22-06-2023
Filter Band Pass 4-20 GHz	Meuro	MFL04012 0H50	902252	16-05-2022	16-05-2023
Full Anechoic Civil Chamber	ETS	S81	SL 11643	NCR	NCR
Antenna Mast	ETS	2070-2	9608-1497	NCR	NCR
Turntable	ETS	2087	-	NCR	NCR
Mast & Table Controller	ETS/EMC O	2090	9608-1456	NCR	NCR

Figure 33 Test Equipment Used



11. Antenna Gain/Information

The antenna gain is -3.3dBi, type: integral.



12. RF Exposure/Safety

See a separate document.



13. Appendix A - Correction Factors

13.1 ITL #1911: OATS RF Cable

Frequency (MHz)	Cable Loss (dB)	Frequency (MHz)	Cable Loss (dB)
1.00	0.50	450.00	5.83
10.00	1.00	500.00	6.33
20.00	1.34	550.00	6.67
30.00	1.50	600.00	6.83
50.00	1.83	650.00	7.17
100.00	2.67	700.00	7.66
150.00	3.17	750.00	7.83
200.00	3.83	800.00	8.16
250.00	4.17	850.00	8.50
300.00	4.50	900.00	8.83
350.00	5.17	950.00	8.84
400.00	5.50	1000.00	9.00

13.2 ITL #1840: Semi-Anechoic Chamber RF Cable

Frequency (MHz)	Cable Loss (dB)	Frequency (MHz)	Cable Loss (dB)
1,000.0	-1.40	10,000.0	-6.00
1,500.0	-1.70	10,500.0	-6.20
2,000.0	-2.00	11,000.0	-6.20
2,500.0	-2.30	11,500.0	-6.00
3,000.0	-2.60	12,000.0	-6.00
3,500.0	-2.80	12,500.0	-6.10
4,000.0	-3.10	13,000.0	-6.30
4,500.0	-3.30	13,500.0	-6.50
5,000.0	-3.60	14,000.0	-6.70
5,500.0	-3.70	14,500.0	-7.00
6,000.0	-4.00	15,000.0	-7.30
6,500.0	-4.40	15,500.0	-7.50
7,000.0	-4.7	16,000.0	-7.60
7,500.0	-4.80	16,500.0	-8.00
8,000.0	-5.00	17,000.0	-8.00
8,500.0	-5.10	17,500.0	-8.10
9,000.0	-5.60	18,000.0	-8.20
9,500.0	-5.80		

13.3 ITL # 1075: Active Loop Antenna

Frequency (MHz)	MAF (dBs/m)	AF (dB/m)	Frequency (MHz)	MAF (dBs/m)	AF (dB/m)
0.01	-33.10	18.40	3.00	-40.00	11.50
0.02	-37.20	14.30	4.00	-40.10	11.40
0.03	-38.20	13.30	5.00	-40.20	11.30
0.05	-39.80	11.70	6.00	-40.40	11.10
0.10	-40.10	11.40	7.00	-40.40	11.10



0.20	-40.30	11.20
0.30	-40.30	11.20
0.50	-40.30	11.20
0.70	-40.30	11.20
1.00	-40.10	11.40
2.00	-40.00	11.50

8.00	-40.40	11.10
9.00	-40.50	11.00
10.00	-40.50	11.00
20.00	-41.50	10.00
30.00	-43.50	8.00

13.4 ITL #1356: Biconical Antenna

Frequency (MHz)	AF (dB/m)	Frequency (MHz)	AF (dB/m)
30.00	13.00	90.00	8.23
35.00	10.89	100.00	11.12
40.00	10.59	120.00	13.16
45.00	10.63	140.00	13.07
50.00	10.12	160.00	14.80
60.00	9.26	180.00	16.95
70.00	7.74	200.00	17.17
80.00	6.63		

13.5 ITL # 1349: Log Periodic Antenna

Frequency (MHz)	AF (dB/m)
200.00	11.58
250.00	12.04
300.00	14.76
400.00	15.55
500.00	17.85
600.00	18.66
700.00	20.87
800.00	21.15
900.00	22.32
1000.00	24.22



13.6 ITL # 1352: 1-18 GHz Horn Antenna

Frequency (GHz)	AF (dB/m)	Frequency (GHz)	AF (dB/m)
0.75	25.00	9.50	38.00
1.00	23.50	10.00	38.50
1.50	26.00	10.50	38.50
2.00	29.00	11.00	38.50
2.50	27.50	11.50	38.50
3.00	30.00	12.00	38.00
3.50	31.50	12.50	38.50
4.00	32.50	13.00	40.00
4.50	32.50	13.50	41.00
5.00	33.00	14.00	40.00
5.50	35.00	14.50	39.00
6.00	36.50	15.00	38.00
6.50	36.50	15.50	37.50
7.00	37.50	16.00	37.50
7.50	37.50	16.50	39.00
8.00	37.50	17.00	40.00
8.50	38.00	17.50	42.00
9.00	37.50	18.00	42.50

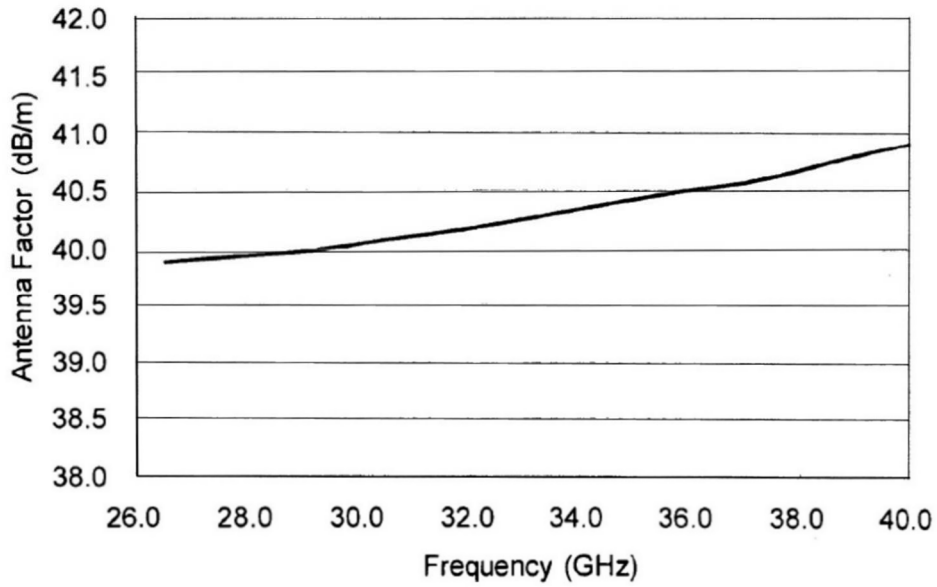
13.7 ITL # 1353: 18-26.5 GHz Horn Antenna

Frequency (MHz)	Measured antenna factor (dB/m) ¹	Frequency (MHz)	Measured antenna factor (dB/m) ¹
18,000.00	32.40	22,500.00	33.00
18,500.00	32.00	23,000.00	33.10
19,000.00	32.30	23,500.00	33.80
19,500.00	32.40	24,000.00	33.50
20,000.00	32.30	24,500.00	33.50
20,500.00	32.80	25,000.00	33.80
21,000.00	32.80	25,500.00	33.90
21,500.00	32.70	26,000.00	34.20
22,000.00	33.10	26,500.00	34.70

¹ The antenna factor shall be added to the receiver's reading in dBμV, to obtain field strength in dBμ V/m



13.8 ITL # 1777: 26.5-40 GHz Horn Antenna



End of Test Report