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TESTING Cert No.1152.01

DATE: 14 November 2021

I.T.L. (PRODUCT TESTING) LTD.

FCC Radio Test Report

for

ImpacX.io Ltd.

Equipment under test:

Water Measurement Level Sensor Device

GX CAP1

Tested by: _____

M. Zohar

Approved by: _____

D. Shidlowsky

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Measurement/Technical Report for

ImpacX.io Ltd.

Water Measurement Level Sensor Device

GX CAP1

FCC ID: 2AZ2T-GXCAP1

This report concerns:	Original Grant: X Class I Change: Class II Change:
Equipment type:	FCC: (DTS) Digital Transmission System
Limits used:	47CFR15 Section 15.247

Measurement procedure used is KDB 558074 D01 v05r01, ANSI C63.10:2013

Application for Certification	Applicant for this device (different from "Prepared by"):
Prepared by:	
R. Ezrah	Amir Salhuv
ITL (Product Testing) Ltd., 1 Bat Sheva St., Lod 7116002	2 Bergman St., Rehovot, Park Hamada 7670503, Israel
Email: rame@itlglobal.org	Email: amir@impacx.io

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1. General Information

1.1 *Administrative Information*

Manufacturer:	ImpacX.io Ltd.
Manufacturer's Address:	2 Bergman St., Rehovot, Park Hamada 7670503, Israel Tel: +972-8373-0370
Manufacturer's Representative:	Amir Salhuv
Equipment Under Test (E.U.T.):	Water Measurement Level Sensor Device
Equipment Model No.:	GX CAP1
Equipment Serial No.:	Not designated
Date of Receipt of E.U.T:	July 28, 2021
Start of Test:	July 28, 2021
End of Test:	August 11, 2021
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. The Israel Ministry of the Environment (Israel), Registration No. 1104/01.
4. 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*

GX Cap 1 is a water measurement level sensor, located on bottle cap. The unit is battery-operated (rechargeable) and contain a non-approved 2.4 GHz BLE radio with PCB antenna. The unit has a charging port (magnetic) and can operate while being charged.
Water measurement is made by a Class 1 laser sensor. Unit has 21 LED display for user interface.

Working voltage	5.0 VDC battery operated
Mode of operation	Transceiver
Modulations	GFSK
Assigned Frequency Range	2400.0-2483.5MHz
Operating Frequency Range	2402.0-2480.0MHz
Transmit power(conducted)	~1.5dBm
Antenna Gain	+2.1dBi chip antenna
Modulation BW	2MHz
Bit rate (Mbit/s)	1,2,3

1.4 Test Methodology

Both conducted and radiated testing were performed according to the procedures in KDB 558074 D01 v05r01 and ANSI C63.10: 2013. Radiated testing was performed at an antenna to EUT distance of 3 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 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 a contains IEEE 802.15.1 standard radio (BLE).
2. For BLE - The unit was evaluated while transmitting at the low channel (2402 MHz), the mid channel (2440 MHz) and the high channel (2480 MHz).
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 after exploratory emission testing, that was performed in three orthogonal polarities, to determine the "worst case" radiation.
5. The results are shown on the table below.

Orientation	Frequency	2nd Harmonic	3rd Harmonic	Band Edge
	(MHz)	(dBuV/m)	(dBuV/m)	(dBuV/m)
X axis	2402.0	48.1	65.6	66.3
	2440.0	48.5	66.0	-
	2480.0	47.2	63.9	71.3
Y axis	2402.0	48.6	65.4	66.5
	2440.0	49.5	66.3	-
	2480.0	48.0	65.0	71.8
Z axis	2402.0	44.3	62.5	53.1
	2440.0	45.2	62.1	-
	2480.0	46.0	61.6	70.2

Figure 1. Screening Results, BLE mode

According to above results the worst case was the Y axis.

2.2 *E.U.T. Exercise Software*

No special exercise software was used.

2.3 *Special Accessories*

2.4 *Equipment Modifications*

No modifications were necessary in order to achieve compliance.

2.5 *Configuration of Tested System*

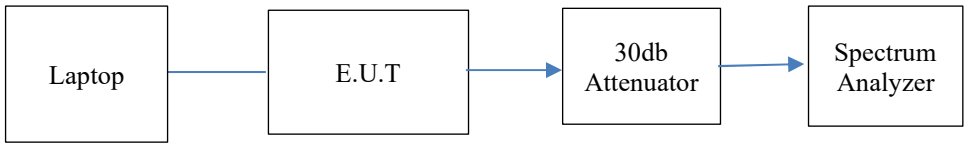

Figure 2. Configuration of Tested System - Conducted

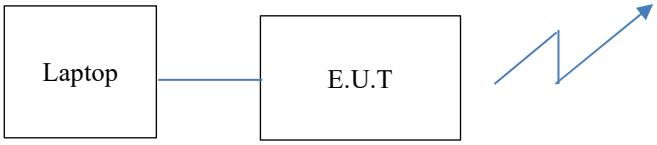

Figure 3. Configuration of Tested System - Radiated

3. Conducted and Radiated Measurement Test Setup Photos

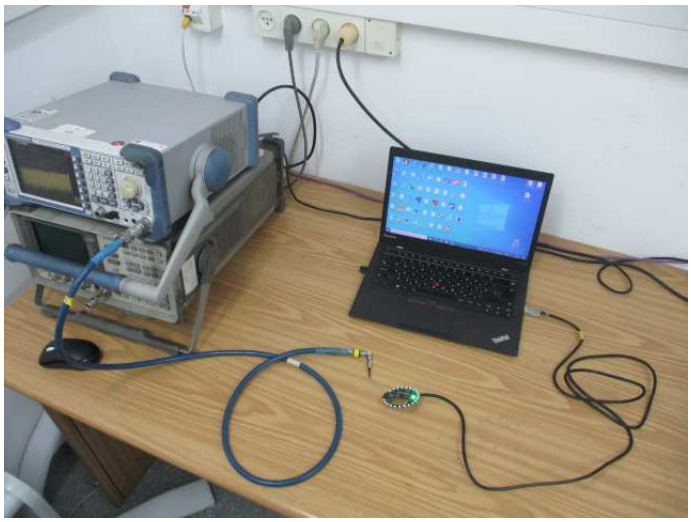

Figure 4. Conducted Emission Test

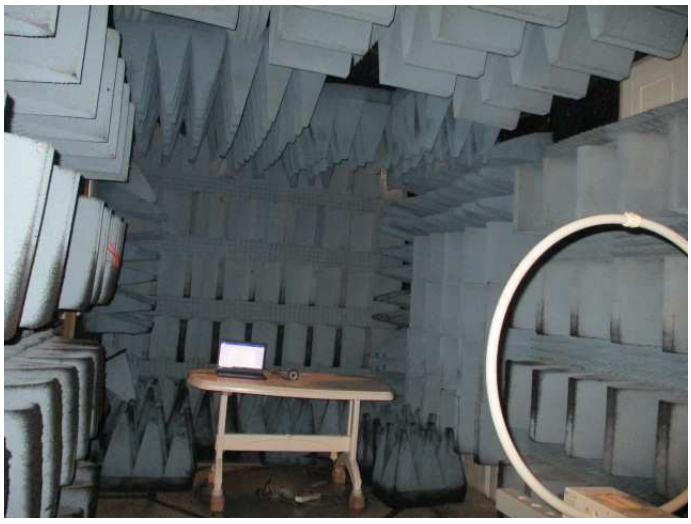

Figure 5. Radiated Emission Test, 0.009-30MHz

Figure 6. Radiated Emission Test, 30-200MHz

Figure 7. Radiated Emission Test, 200-1000MHz

Figure 8. Radiated Emission Test, 1-18GHz

Figure 9. Radiated Emission Test, 18-25GHz

4. 6 dB Minimum Bandwidth

4.1 *Test Specification*

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

4.2 *Test Procedure*

(Temperature (22°C)/ Humidity (61%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=31.5 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 (MHz)	Reading (kHz)	Limit (kHz)
BLE	2402.0	729.0	>500.0
	2440.0	729.0	>500.0
	2480.0	719.0	>500.0

Figure 10 6 dB Minimum Bandwidth

JUDGEMENT: Passed

For additional information see *Figure 11* to *Figure 13*.

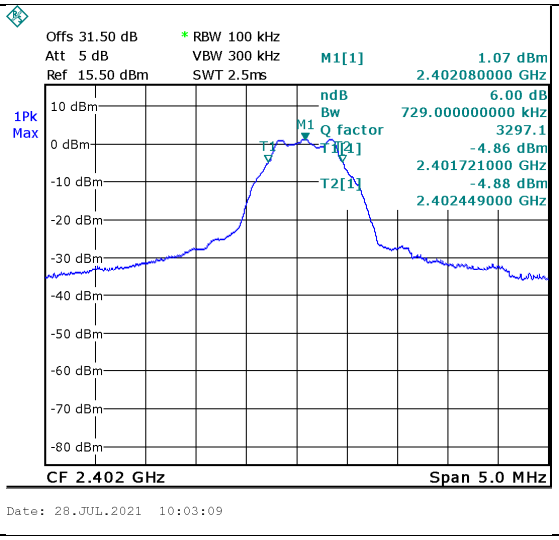

Figure 11. 2402.0 MHz, BLE

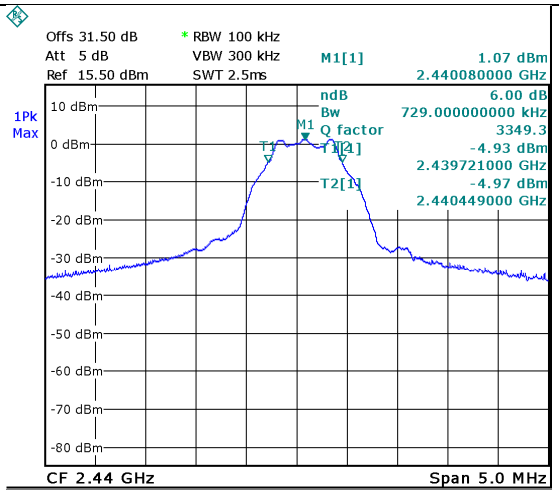

Figure 12. 2440.0 MHz, BLE

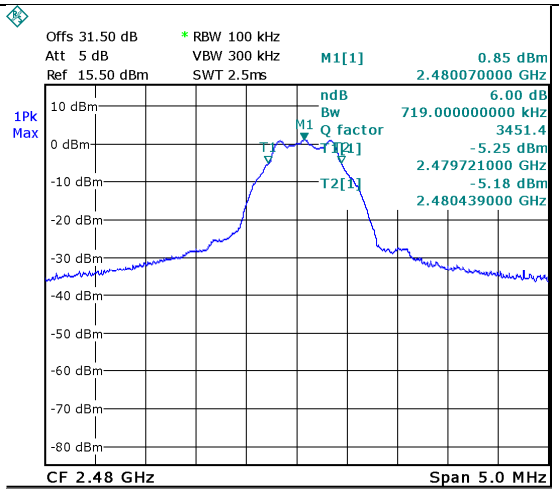

Figure 13. 2480.0 MHz, BLE

4.5 *Test Equipment Used; 6dB Bandwidth*

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
Spectrum Analyzer	R&S	FSL6	100194	February 23, 2021	February 23, 2022
30dB Attenuator	MCL	BW-S30W5	533	May 23, 2021	May 23, 2022
RF Cable	Telrad	RJ214	N/A	October 28, 2020	October 28, 2021

Figure 14 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 (22°C)/ Humidity (61%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=31.5 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: 1 Watt.

5.4 *Test Results*

Protocol Type	Operation Frequency	Power	Power	Limit	Margin
	(MHz)	(dBm)	(mW)	(mW)	(mW)
BLE	2402.0	1.9	1.5	1000.0	-998.5
	2440.0	1.8	1.5	1000.0	-998.5
	2480.0	1.6	1.4	1000.0	-998.6

Figure 15 Maximum Peak Power Output

JUDGEMENT: Passed by -998.5 mW

For additional information see Figure 16 to Figure 18.

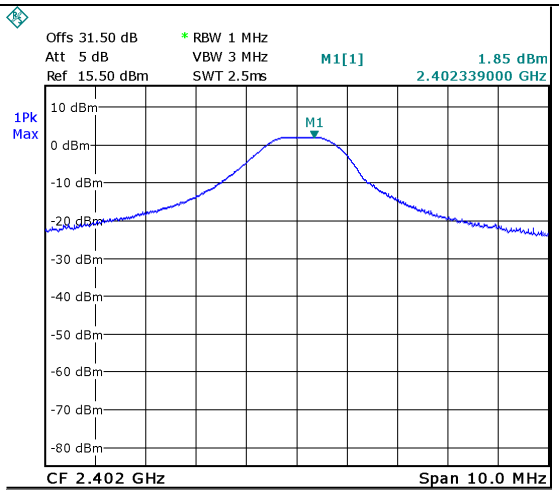

Figure 16. 2402.0 MHz, BLE

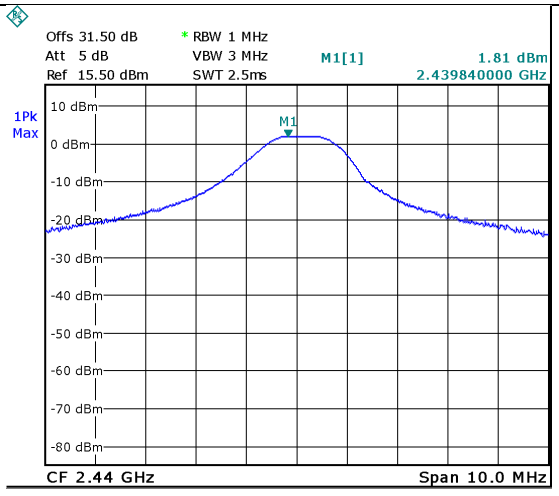

Figure 17. 2440.0 MHz, BLE

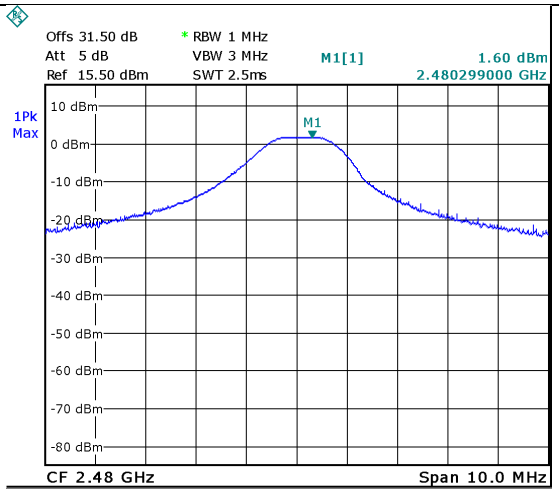

Figure 18. 2480.0 MHz, BLE

5.5 *Test Equipment Used; Maximum Peak Power Output*

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
Spectrum Analyzer	R&S	FSL6	100194	February 23, 2021	February 23, 2022
30dB Attenuator	MCL	BW-S30W5	533	May 23, 2021	May 23, 2022
RF Cable	Telrad	RJ214	N/A	October 28, 2020	October 28, 2021

Figure 19 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=31.5 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 (MHz)	Band Edge Frequency (MHz)	Spectrum Level (dBm)	Limit (dBm)	Margin (dB)
BLE	2402.0	2400.0	-33.3	-18.8	-14.5
	2480.0	2483.5	-37.3	-19.0	-18.3

Figure 20 Band Edge Spectrum

JUDGEMENT: Passed by -14.5 dB

For additional information see Figure 21 and Figure 22.

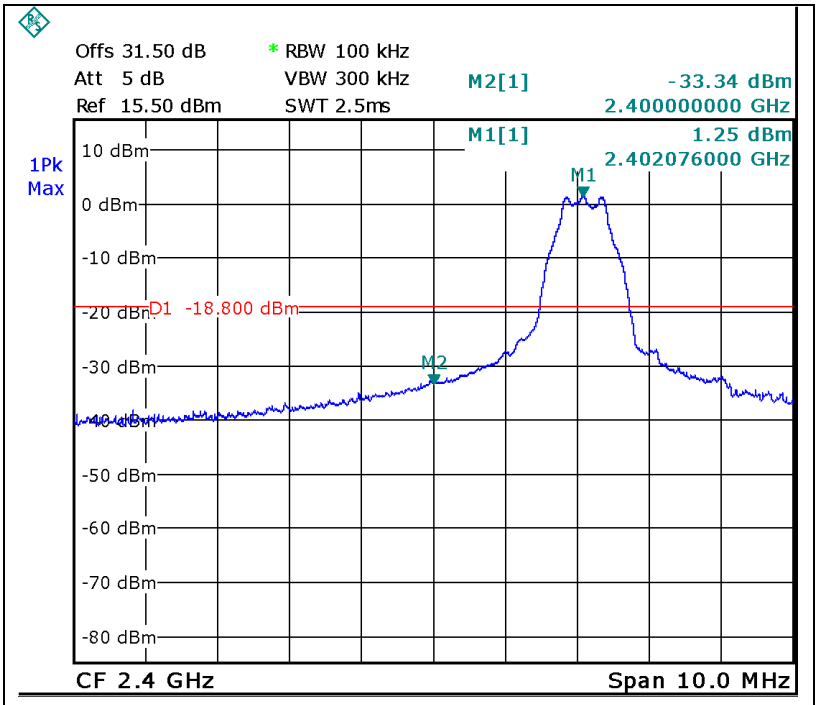

Figure 21. 2402.0 MHz, BLE

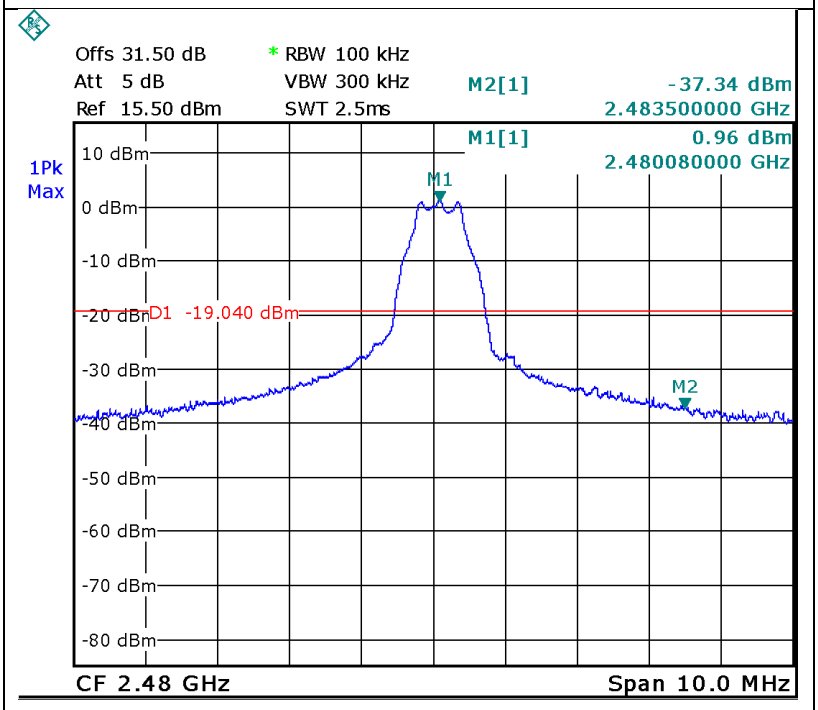

Figure 22. 2480.0 MHz, BLE

6.5 *Test Equipment Used; Band Edge*

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
Spectrum Analyzer	R&S	FSL6	100194	February 23, 2021	February 23, 2022
30dB Attenuator	MCL	BW-S30W5	533	May 23, 2021	May 23, 2022
RF Cable	Telrad	RJ214	N/A	October 28, 2020	October 28, 2021

Figure 23 Test Equipment Used

7. Transmitted Power Density

7.1 *Test Specification*

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

7.2 *Test Procedure*

(Temperature (22°C)/ Humidity (70%RH))

The E.U.T operation mode and test setup 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= 31.5dB). 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 (MHz)	PSD Reading (dBm)	Limit (dBm)	Margin (dB)
BLE	2402.0	-12.3	8.0	-20.3
	2440.0	-12.6	8.0	-20.6
	2480.0	-12.6	8.0	-20.6

Figure 24 Test Results

JUDGEMENT: Passed by _-20.3 dB

For additional information see Figure 25 to Figure 27.

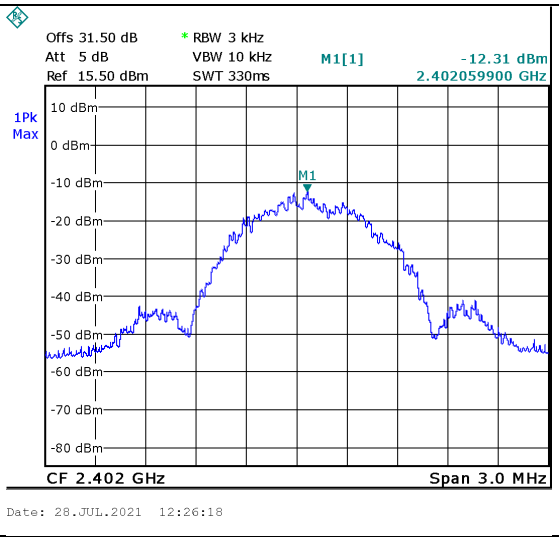

Figure 25. 2402.0 MHz, BLE

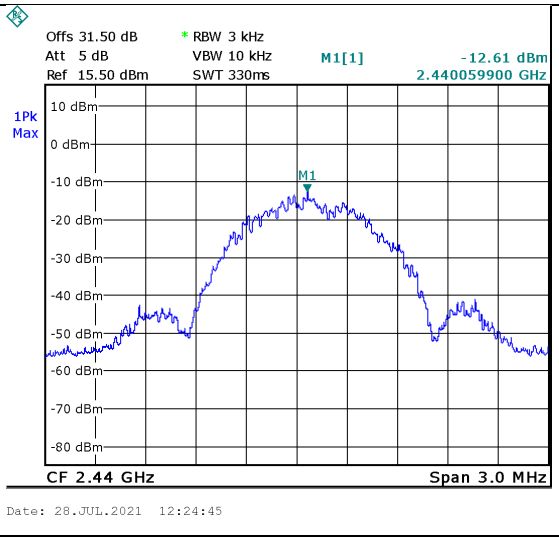

Figure 26. 2440.0 MHz, BLE

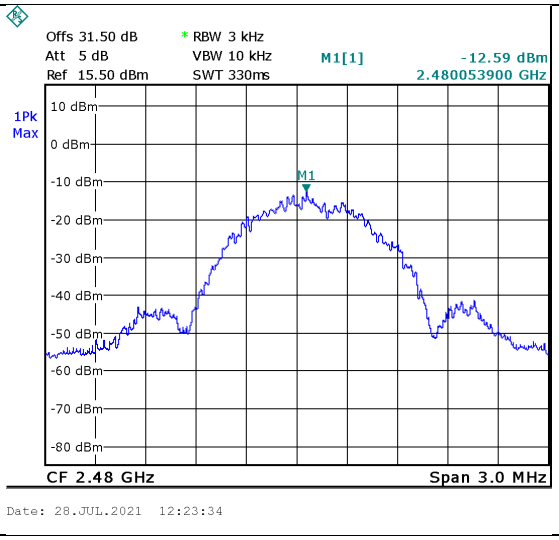

Figure 27. 2480.0 MHz, BLE

7.5 *Test Equipment Used; Transmitted Power Density*

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
Spectrum Analyzer	R&S	FSL6	100194	February 23, 2021	February 23, 2022
30dB Attenuator	MCL	BW-S30W5	533	May 23, 2021	May 23, 2022
RF Cable	Telrad	RJ214	N/A	October 28, 2020	October 28, 2021

Figure 28 Test Equipment Used

8. Occupied Bandwidth

8.1 *Test Specification*

FCC, Part 2, Sub part J, Section 2.1049

8.2 *Test Procedure*

(Temperature (22°C)/ Humidity (56%RH))
The E.U.T. operation mode and test setup 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= 31.5dB). 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 (MHz)	Reading (MHz)
BLE	2402.0	1.06
	2440.0	1.06
	2480.0	1.06

Figure 29. Bandwidth Test Results

JUDGEMENT: N/A

See additional information in Figure 30 to Figure 32.

Occupied Bandwidth

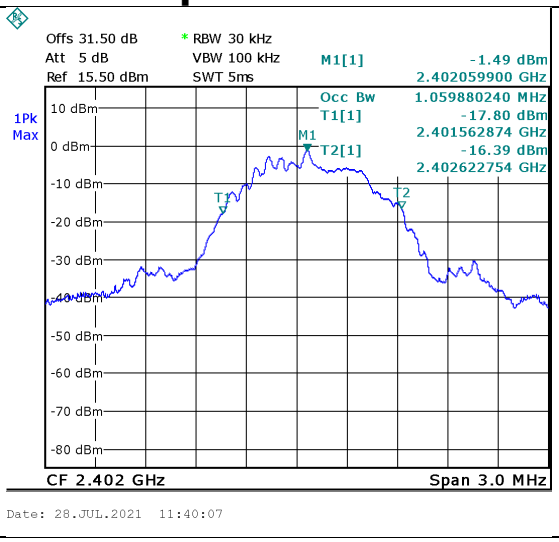

Figure 30. 2402.0 MHz, BLE

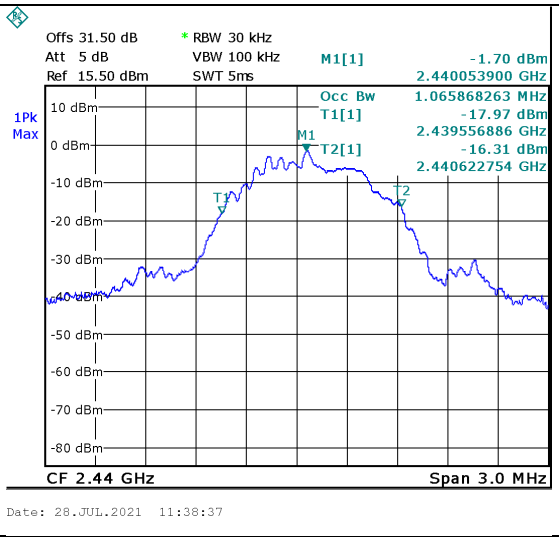

Figure 31. 2440.0 MHz, BLE

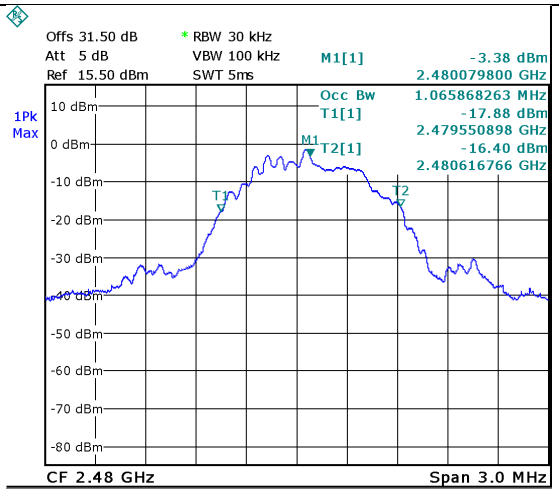

Figure 32. 2480.0 MHz, BLE

8.5 *Test Equipment Used; Bandwidth*

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
Spectrum Analyzer	R&S	FSL6	100194	February 23, 2021	February 23, 2022
30dB Attenuator	MCL	BW-S30W5	533	May 23, 2021	May 23, 2022
RF Cable	Telrad	RJ214	N/A	October 28, 2020	October 28, 2021

Figure 33 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 (°C)/ Humidity (%RH))
The E.U.T. operation mode and test setup 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 E.U.T. met the requirements of the F.C.C. Part 15, Subpart C, Section 247(d) specification.

For additional information see *Figure 34* to *Figure 36.*

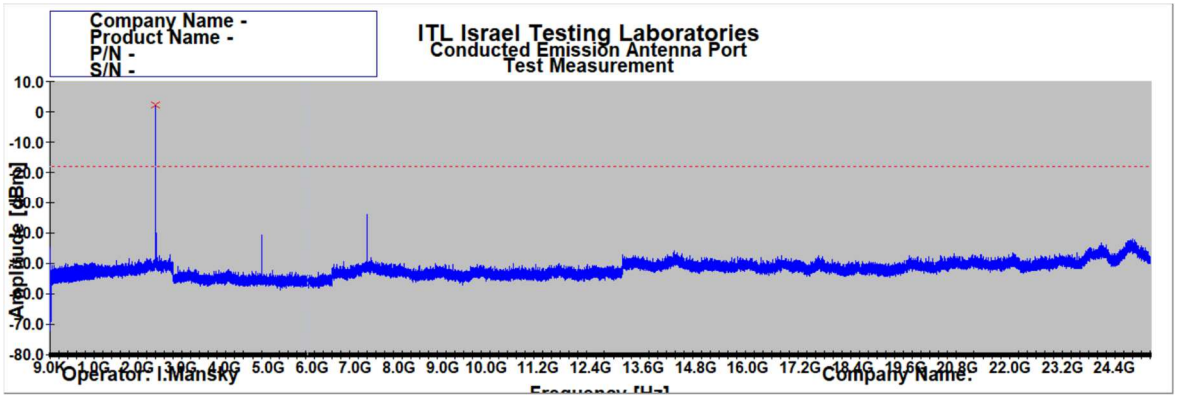

Figure 34 2402.0 MHz, BLE

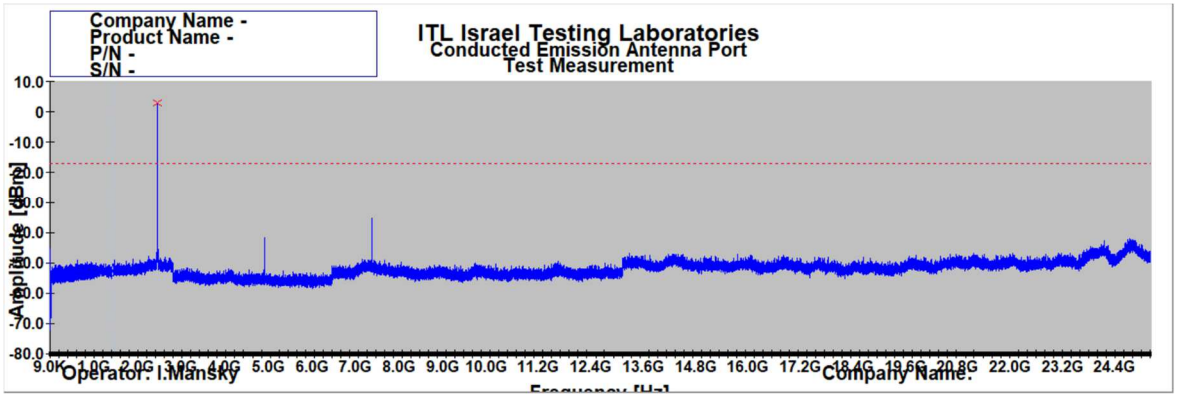

Figure 35 2440.0 MHz, BLE

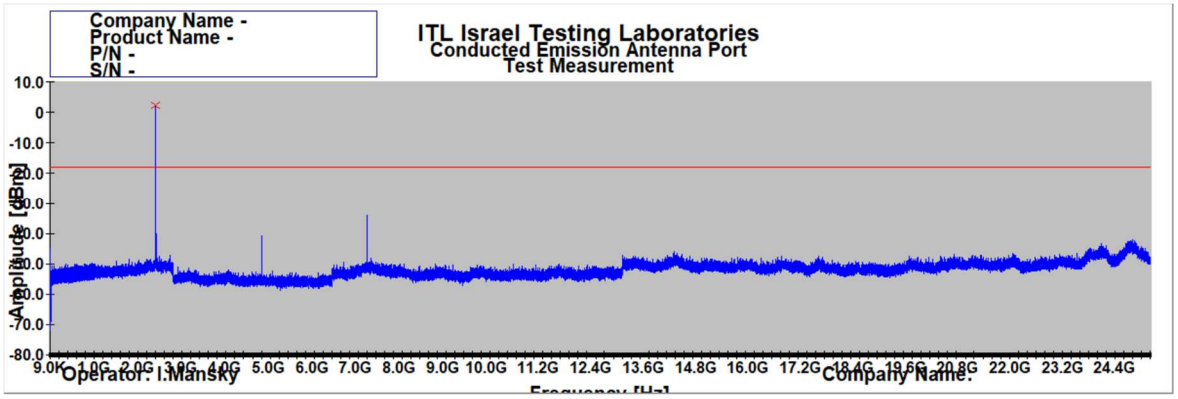

Figure 36 2480.0 MHz, BLE

Note: All peaks in plots are the fundamental transmission frequency.

9.5 *Test Instrumentation Used, Emission in Non Restricted Frequency Bands*

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
Spectrum Analyzer	R&S	FSL6	100194	February 23, 2021	February 23, 2022
30dB Attenuator	MCL	BW-S30W5	533	May 23, 2021	May 23, 2022
RF Cable	Telrad	RJ214	N/A	October 28, 2020	October 28, 2021

Figure 37 Test Equipment Used

10. Emissions 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 (23°C)/ Humidity (65%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.

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 38 FCC Table of Limits

10.4 *Test Results*

JUDGEMENT: Passed by 0.4 dB

For the operation frequency of 2402 MHz, the margin between the emission level and the specification limit is in the worst case -0.9 dB at the frequency of 7206.0 MHz, vertical polarization.

For the operation frequency of 2440.0 MHz, the margin between the emission level and the specification limit is in the worst case -1.0 dB at the frequency of 7320.0 MHz, vertical polarization.

For the operation frequency of 2480.0 MHz, the margin between the emission level and the specification limit is in the worst case -0.4 dB at the frequency of 2483.5.0 MHz, vertical polarization.

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 39.*

Radiated Emission

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

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	66.5	74.0	-7.5	45.4	54.0	-8.6
	2390.0	H	60.4	74.0	-13.6	41.9	54.0	-12.1
	7206.0	V	63.2	74.0	-10.8	53.1	54.0	-0.9
	7206.0	H	60.0	74.0	-14.0	50.5	54.0	-3.5
2440.0	4880.0	V	48.9	74.0	-25.1	-	54.0	-
	4880.0	H	47.8	74.0	-26.2	-	54.0	-
	7320.0	V	64.0	74.0	-10.0	53.0	54.0	-1.0
	7320.0	H	59.7	74.0	-14.3	50.0	54.0	-4.0
2480.0	7440.0	V	64.2	74.0	-9.8	53.5	54.0	-0.5
	7440.0	H	60.6	74.0	-13.4	50.6	54.0	-3.4
	2483.5	V	71.8	74.0	-2.2	53.6	54.0	-0.4
	2483.5	H	68.4	74.0	-5.6	49.2	54.0	-4.8

Figure 39. 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	February 23, 2021	February 23, 2022
EMI Receiver	HP	8542E	3906A00276	February 24, 2021	February 24, 2022
RF Filter Section	HP	85420E	3705A00248	February 24, 2021	February 24, 2022
Spectrum Analyzer	HP	8593EM	3536A00120ADI	February 22, 2021	February 22, 2022
Active Loop Antenna	EMCO	6502	9506-2950	May 03, 2021	May 03, 2022
Biconical Antenna	EMCO	3110B	9912-3337	April 27, 2021	April 27, 2023
Log Periodic Antenna	EMCO	3146	9505-4081	April 27, 2021	April 27, 2023
Horn Antenna	ETS	3115	29845	May 25, 2021	May 25, 2024
Microwave System Amplifier	HP	83006A	3104A00589	August 23, 2020	August 23, 2021
RF Cable Chamber	Commscope ORS	0623 WBC-400	G020132	May 25, 2021	May 25, 2022
RF Cable Oats	EIM	RG214-11N(X2)		August 04, 2020	August 04, 2021
Filter Band Pass 4-20 GHz	Meuro	MFL040120H50	902252	May 24, 2021	May 24, 2022
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/EMCO	2090	9608-1456	NCR	NCR

Figure 40 Test Equipment Used

11. Antenna Gain/Type

The antenna gain is +2.1 dBi. Type: integral.

12. RF Exposure/Safety

See separate document.

13. APPENDIX A - CORRECTION FACTORS

13.1 *For ITL #1911 OATS RF Cable*

Frequency (MHz)	Cable Loss (dB)		Frequency (MHz)	Cable Loss (dB)
1.0	0.5		450.00	5.83
10.00	1.0		500.00	6.33
20.00	1.34		550.00	6.67
30.00	1.5		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	8.5
300.00	4.5		900.00	8.83
350.00	5.17		950.00	8.84
400.00	5.5		1000.00	9.0

13.2 *For ITL #1840 Anechoic Chamber RF Cable*

Frequency (MHz)	Cable Loss (dB)		Frequency (MHz)	Cable Loss (dB)
1000.0	-1.4		10000.0	-6.0
1500.0	-1.7		10500.0	-6.2
2000.0	-2.0		11000.0	-6.2
2500.0	-2.3		11500.0	-6.0
3000.0	-2.6		12000.0	-6.0
3500.0	-2.8		12500.0	-6.1
4000.0	-3.1		13000.0	-6.3
4500.0	-3.3		13500.0	-6.5
5000.0	-3.6		14000.0	-6.7
5500.0	-3.7		14500.0	-7.0
6000.0	-4.0		15000.0	-7.3
6500.0	-4.4		15500.0	-7.5
7000.0	-4.7		16000.0	-7.6
7500.0	-4.8		16500.0	-8.0
8000.0	-5.0		17000.0	-8.0
8500.0	-5.1		17500.0	-8.1
9000.0	-5.6		18000.0	-8.2
9500.0	-5.8			

13.3 *For ITL # 1075 Active Loop Antenna*

Frequency (MHz)	MAF (dBs/m)	AF (dB/m)
0.01	-33.1	18.4
0.02	-37.2	14.3
0.03	-38.2	13.3
0.05	-39.8	11.7
0.1	-40.1	11.4
0.2	-40.3	11.2
0.3	-40.3	11.2
0.5	-40.3	11.2
0.7	-40.3	11.2
1	-40.1	11.4
2	-40.0	11.5
3	-40.0	11.5
4	-40.1	11.4
5	-40.2	11.3
6	-40.4	11.1
7	-40.4	11.1
8	-40.4	11.1
9	-40.5	11.0
10	-40.5	11.0
20	-41.5	10.0
30	-43.5	8.0

13.4 *For ITL #1356 Biconical Antenna*

Frequency (MHz)	AF (dB/m)
30	13.00
35	10.89
40	10.59
45	10.63
50	10.12
60	9.26
70	7.74
80	6.63
90	8.23
100	11.12
120	13.16
140	13.07
160	14.80
180	16.95
200	17.17

13.5 *For ITL # 1349 Log Periodic Antenna*

Frequency (MHz)	AF (dB/m)
200	11.58
250	12.04
300	14.76
400	15.55
500	17.85
600	18.66
700	20.87
800	21.15
900	22.32
1000	24.22

13.6 *For ITL # 1352 1-18 GHz Horn Antenna*

Frequency (MHz)	AF (dB/m)		Frequency (MHz)	AF (dB/m)
0.75	25		9.5	38
1.0	23.5		10.0	38.5
1.5	26.0		10.5	38.5
2.0	29.0		11.0	38.5
2.5	27.5		11.5	38.5
3.0	30.0		12.0	38.0
3.5	31.5		12.5	38.5
4.0	32.5		13.0	40.0
4.5	32.5		13.5	41.0
5.0	33.0		14.0	40.0
5.5	35.0		14.5	39.0
6.0	36.5		15.0	38.0
6.5	36.5		15.5	37.5
7.0	37.5		16.0	37.5
7.5	37.5		16.5	39.0
8.0	37.5		17.0	40.0
8.5	38.0		17.5	42.0
9.0	37.5		18.0	42.5

13.7 *For ITL # 1353 18-26.5 GHz Horn Antenna*

CALIBRATION DATA

3 m distance

Frequency MHZ	Measured antenna factor dB/m
18000	32.4
18500	32.0
19000	32.3
19500	32.4
20000	32.3
20500	32.8
21000	32.8
21500	32.7
22000	33.1
22500	33.0
23000	33.1
23500	33.8
24000	33.5
24500	33.5
25000	33.8
25500	33.9
26000	34.2
26500	34.7

[1] The antenna factor shall be added to receiver reading in dBµV to obtain field strength in dBµV/m.