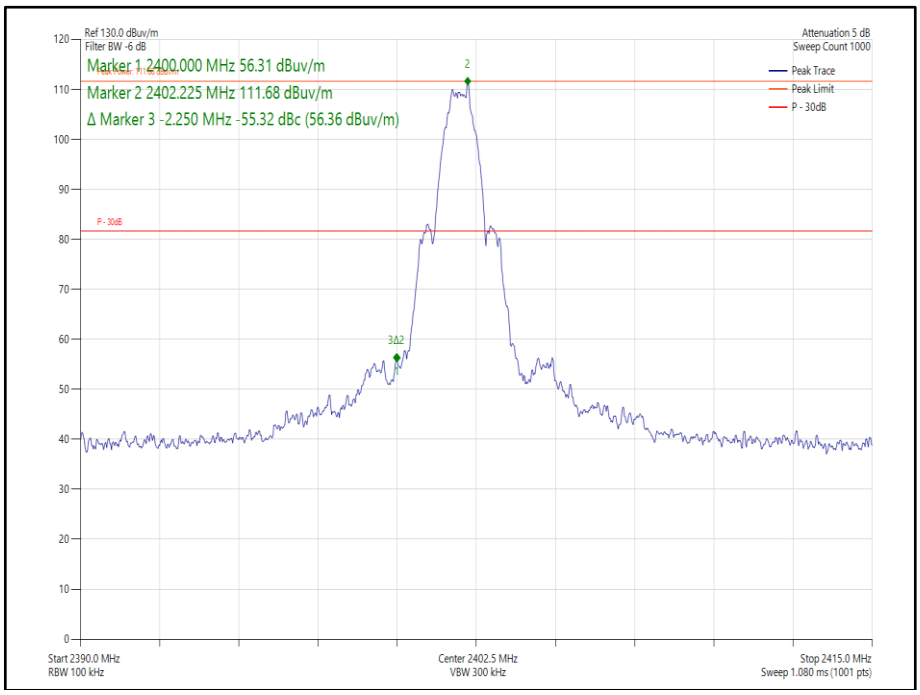

Figure 132 - CH0_1M_TX, 2402 MHz, Band Edge Frequency 2390 MHz

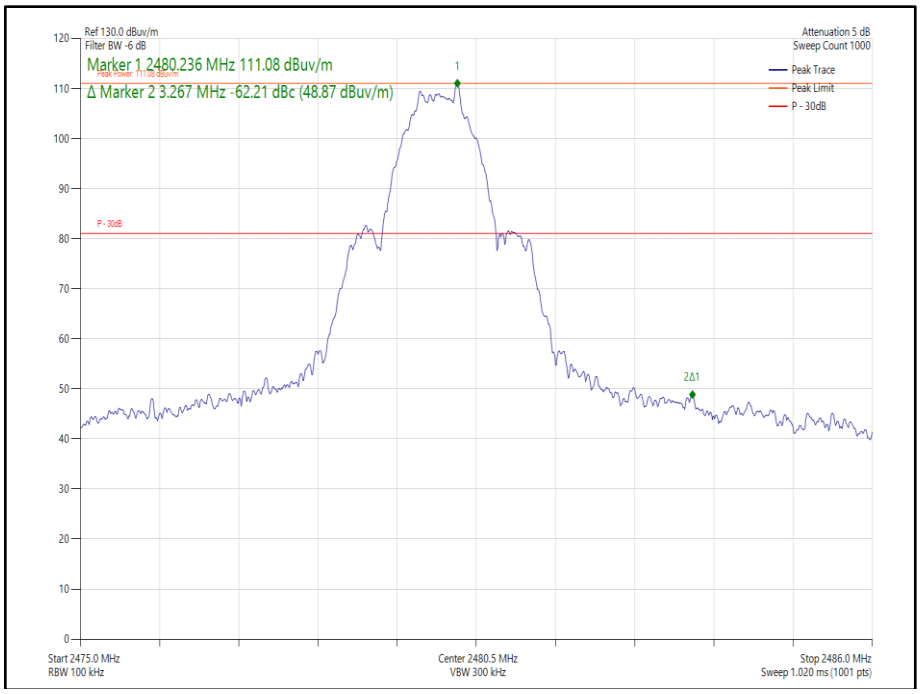

Figure 133 - CH39_1M_TX, 2480 MHz, Band Edge Frequency 2483.5 MHz

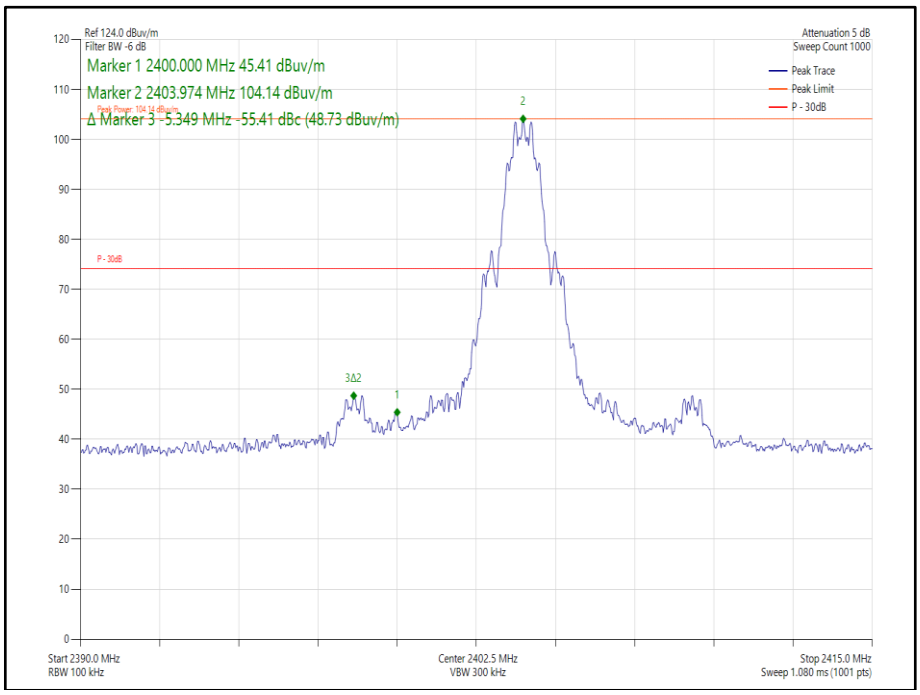

Figure 134 - CH1_125k_TX, 2404 MHz, Band Edge Frequency 2390 MHz

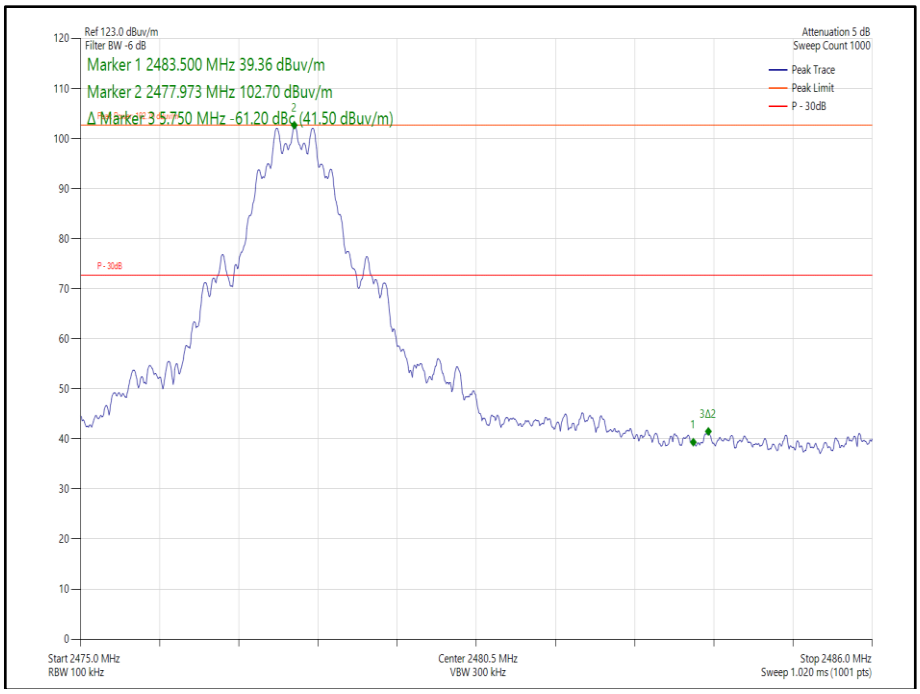

Figure 135 - CH38_125k_TX, 2478 MHz, Band Edge Frequency 2483.5 MHz

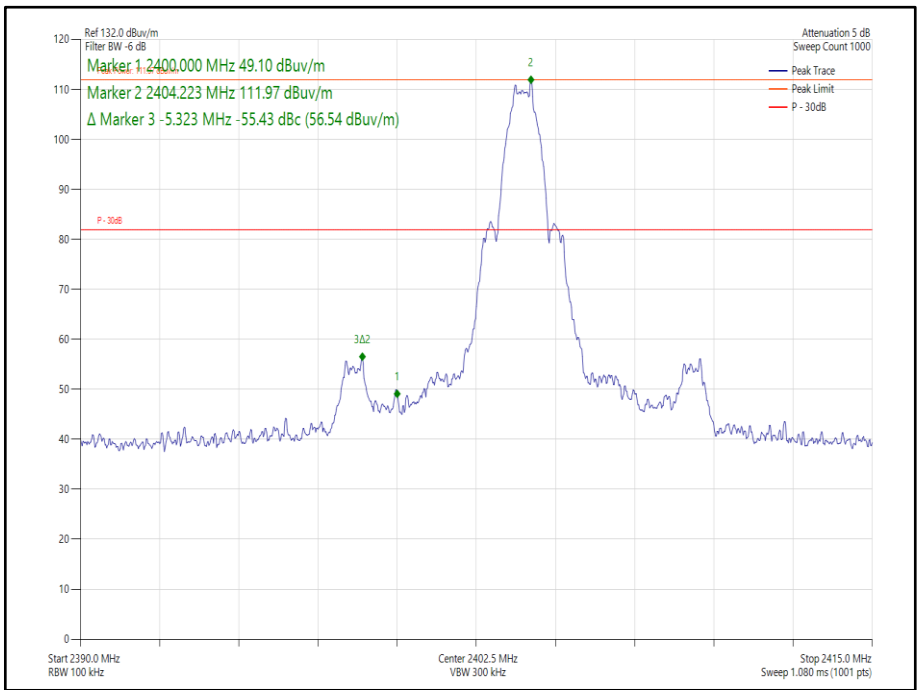

Figure 136 - CH1_1M_TX, 2404 MHz, Band Edge Frequency 2390 MHz

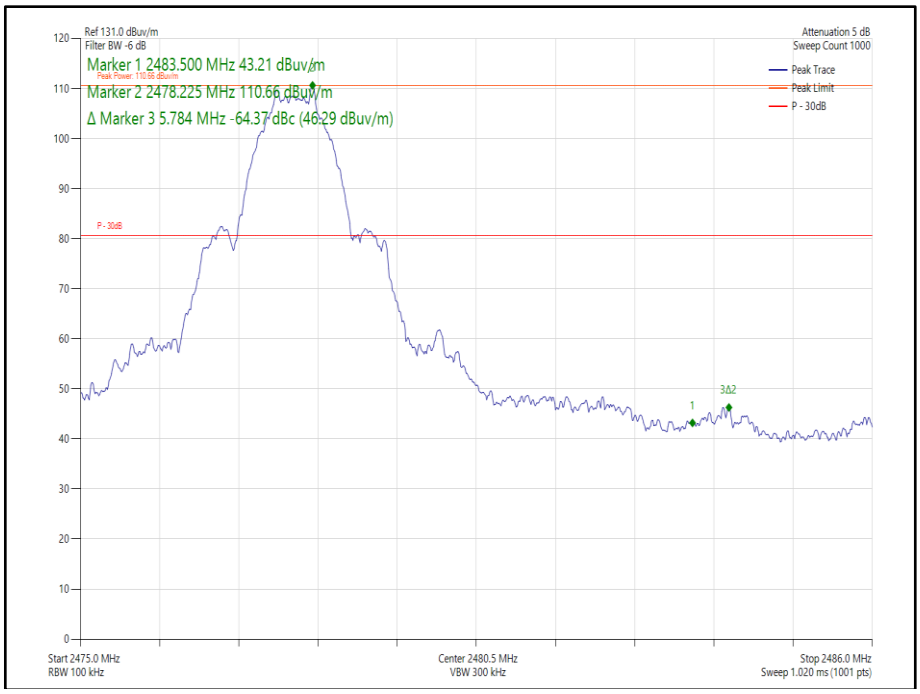

Figure 137 - CH38_1M_TX, 2478 MHz, Band Edge Frequency 2483.5 MHz

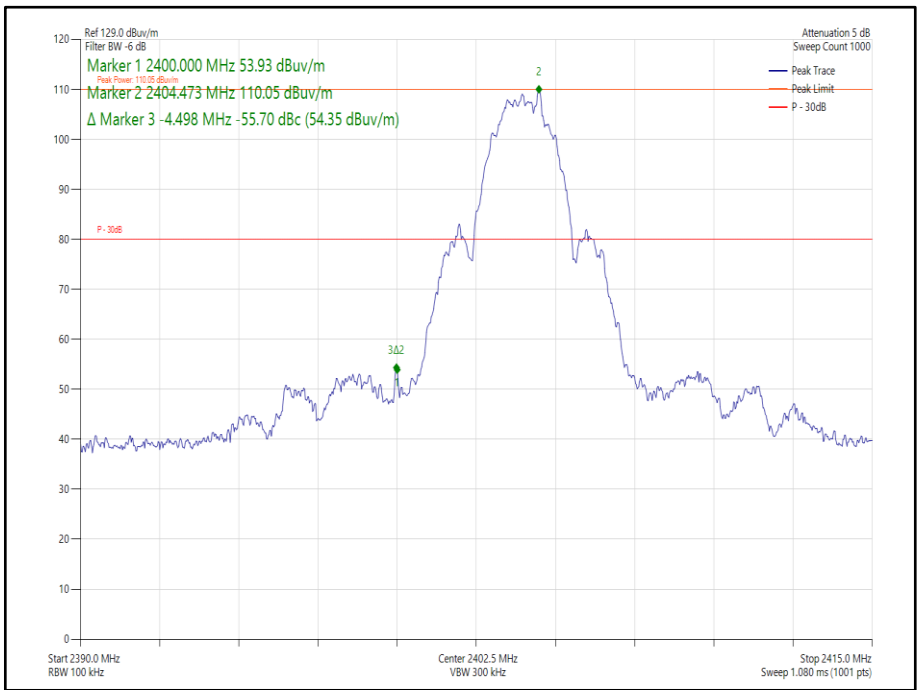

Figure 138 - CH1_2M_TX, 2404 MHz, Band Edge Frequency 2390 MHz

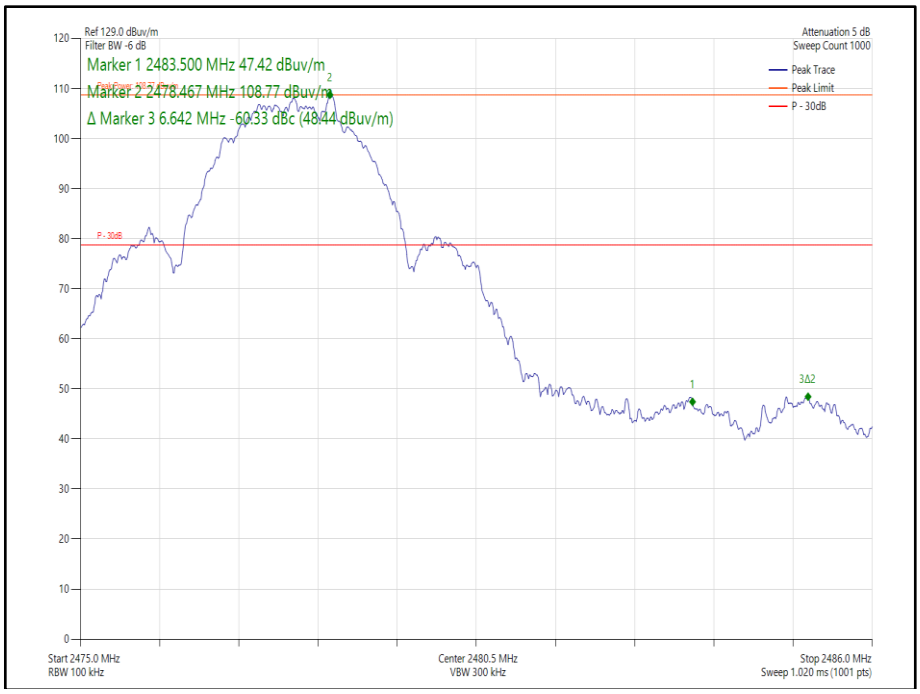

Figure 139 - CH38_2M_TX, 2478 MHz, Band Edge Frequency 2483.5 MHz

FCC 47 CFR Part 15, Limit Clause 15.247 (d)

20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

ISED RSS-247, Limit Clause 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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 either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

2.6.7 Test Location and Test Equipment Used

This test was carried out in RF Chamber 11.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Test Receiver	Rohde & Schwarz	ESW44	5084	12	04-Nov-2024
Emissions Software	TUV SUD	EmX V3.2.0	5125	-	Software
3m Semi-Anechoic Chamber	Rainford	RF Chamber 11	5136	36	24-Nov-2024
Mast	Maturo	TAM 4.0-P	5158	-	TU
Mast and Turntable Controller	Maturo	Maturo NCD	5159	-	TU
Antenna (DRG, 1 GHz to 10.5 GHz)	Schwarzbeck	BBHA9120B	5215	12	09-Jul-2024
Pre-Amplifier (1 GHz to 26.5 GHz)	Agilent Technologies	8449B	5445	12	25-May-2024
Thermo-Hygro-Barometer	PCE Instruments	OCE-THB-40	5470	12	20-Apr-2024
Cable (K-Type to K-Type, 1 m)	Junkosha	MWX241-01000KMSKMS/A	5512	12	21-May-2024
Cable (SMA to SMA, 2 m)	Junkosha	MWX221-02000AMSAMS/A	5518	12	14-Apr-2024
Cable (N-Type to N-Type, 8 m)	Junkosha	MWX221-08000NMSNMS/B	5522	12	14-Apr-2024

Table 56

TU - Traceability Unscheduled

3 Photographs

3.1 Test Setup Photographs

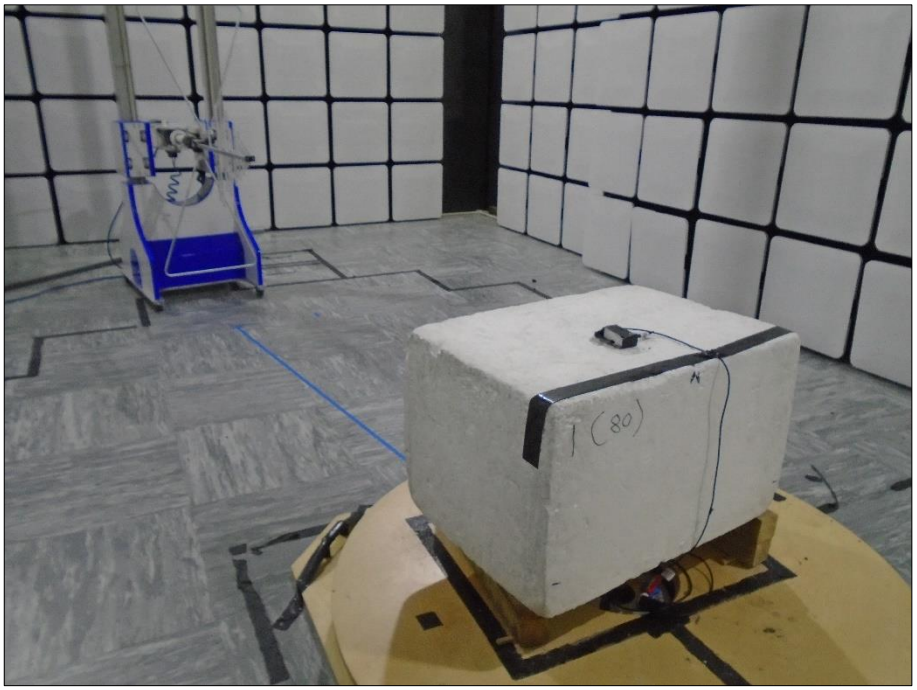

Figure 140 - Test Setup - 30 MHz to 1 GHz X Plane

Figure 141 - Test Setup - 30 MHz to 1 GHz Y Plane

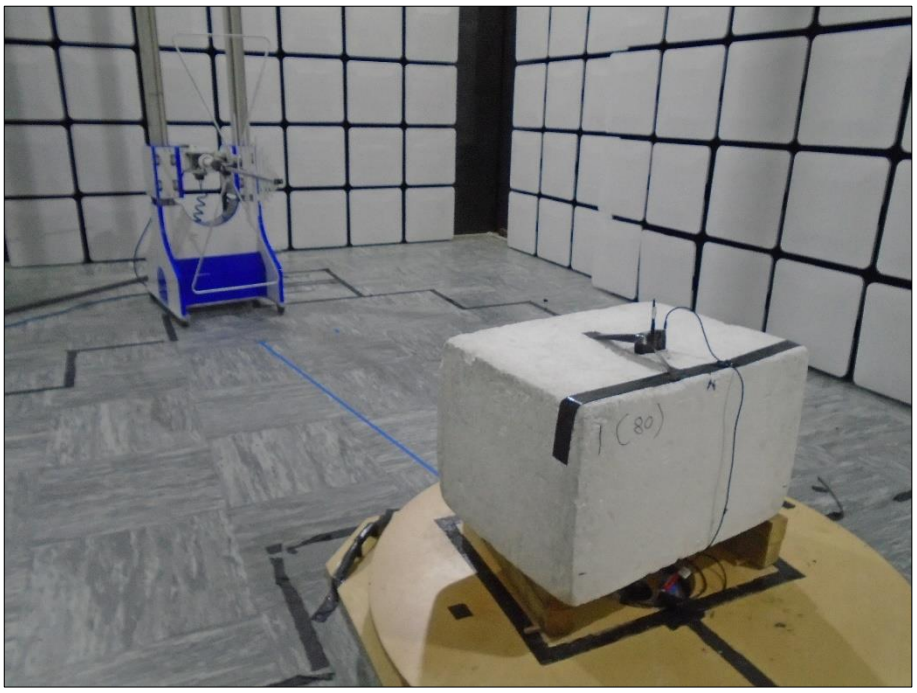

Figure 142 - Test Setup - 30 MHz to 1 GHz Z Plane

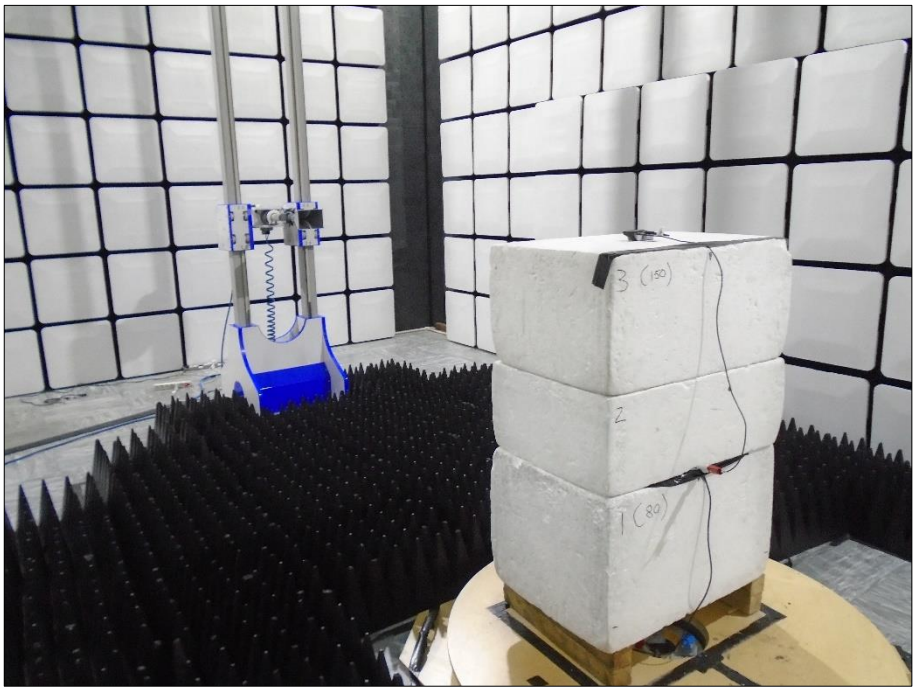

Figure 143 - Test Setup - 1 GHz to 18 GHz X Plane

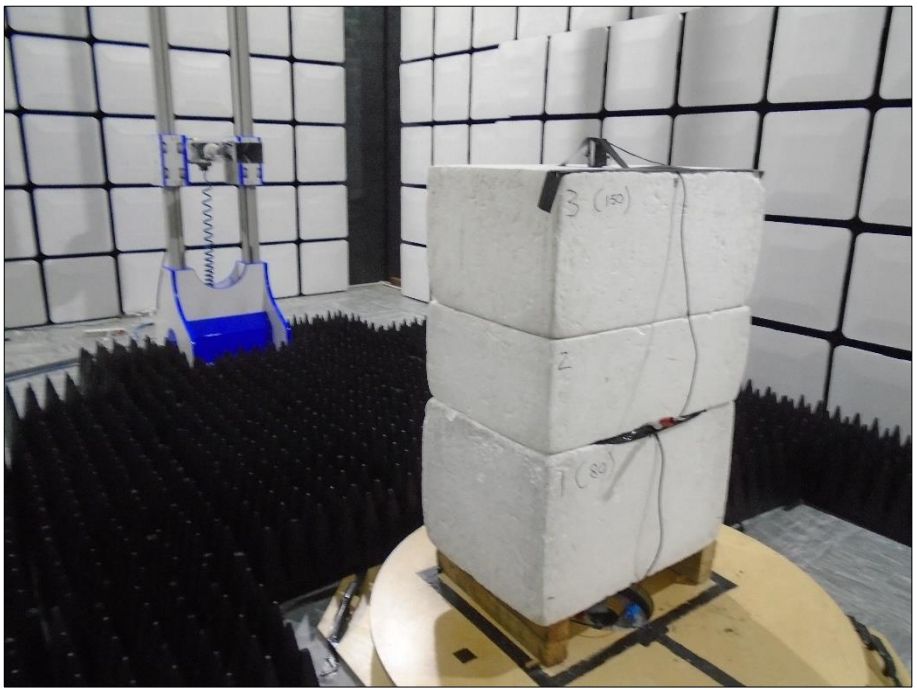

Figure 144 - Test Setup - 1 GHz to 18 GHz Y Plane

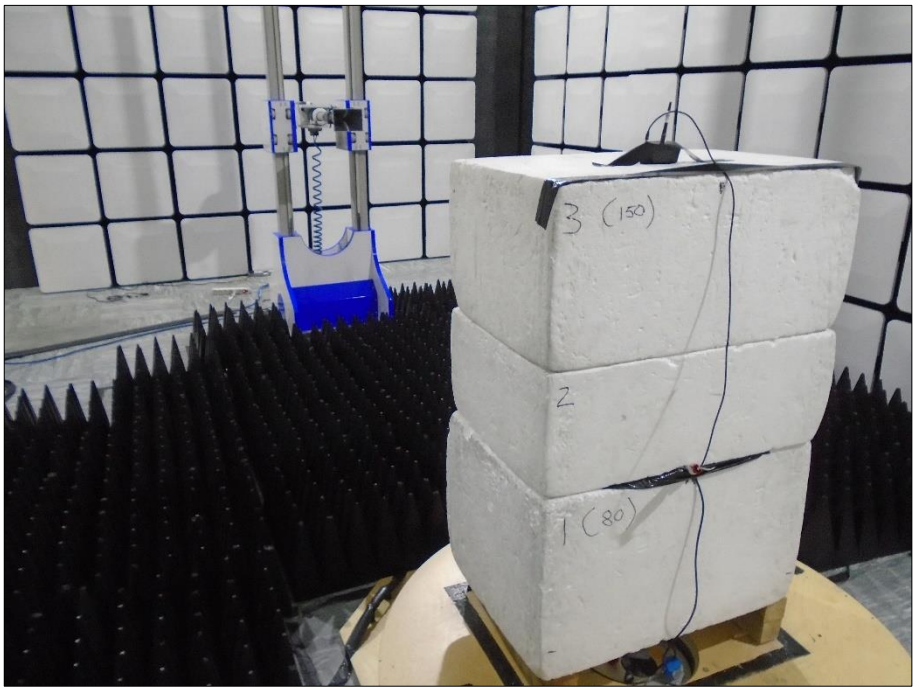

Figure 145 - Test Setup - 1 GHz to 18 GHz Z Plane

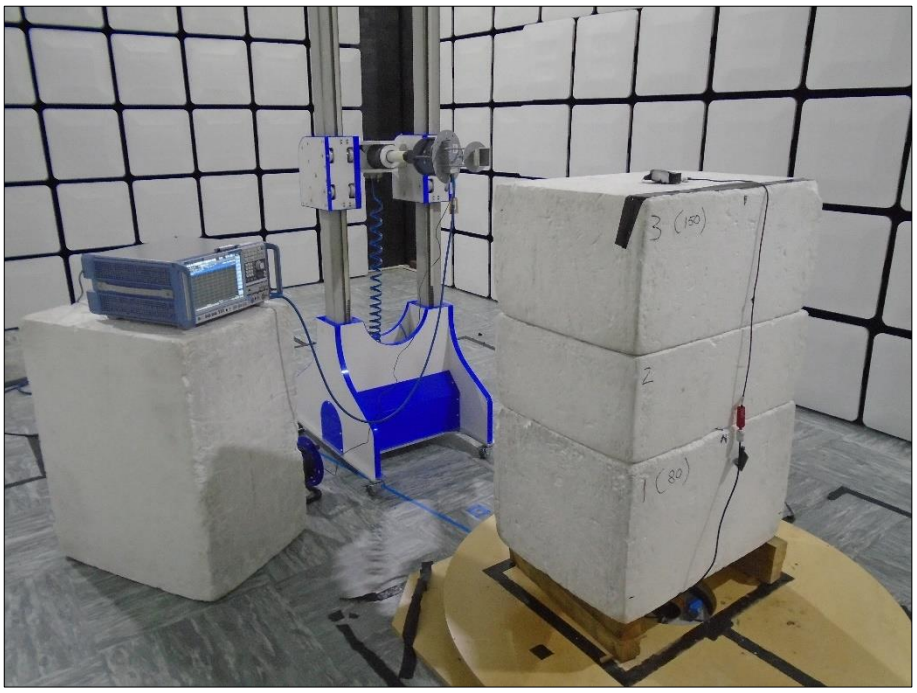

Figure 146 - Test Setup - 18 GHz to 25 GHz X Plane

Figure 147 - Test Setup - 18 GHz to 25 GHz Y Plane

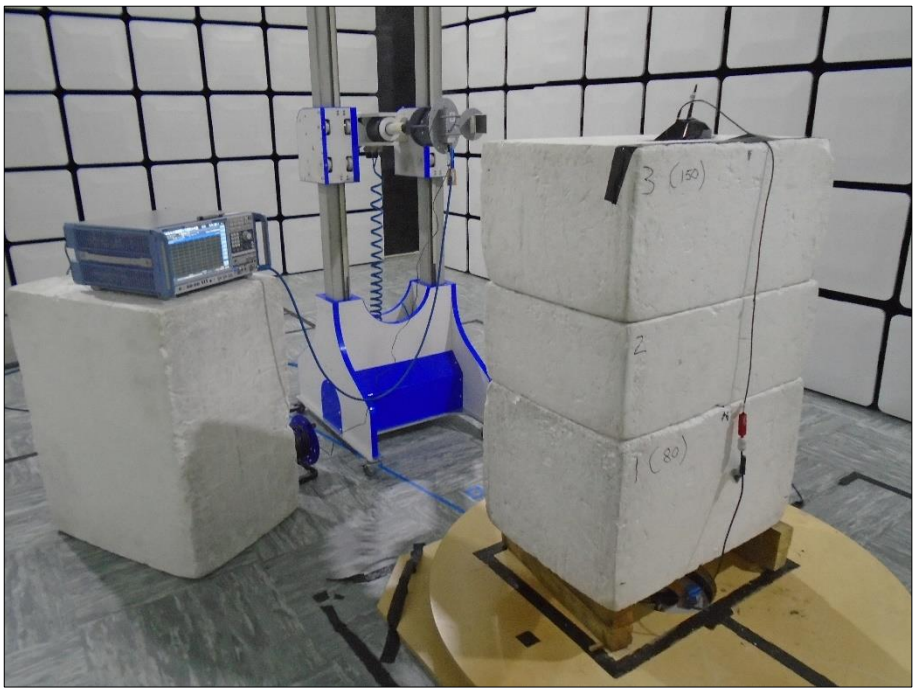

Figure 148 - Test Setup - 18 GHz to 25 GHz Z Plane

4 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

Test Name	Measurement Uncertainty
Spurious Radiated Emissions	30 MHz to 1 GHz: ± 5.2 dB 1 GHz to 40 GHz: ± 6.3 dB
Restricted Band Edges	30 MHz to 1 GHz: ± 5.2 dB 1 GHz to 40 GHz: ± 6.3 dB
Authorised Band Edges	30 MHz to 1 GHz: ± 5.2 dB 1 GHz to 40 GHz: ± 6.3 dB
Emission Bandwidth	± 447.29 kHz
Maximum Conducted Output Power	± 1.38 dB
Power Spectral Density	± 1.49 dB

Table 57

Measurement Uncertainty Decision Rule – Accuracy Method

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115:2021, Clause 4.4.3 (Procedure 2). The measurement results are directly compared with the test limit to determine conformance with the requirements of the standard.

Risk: The uncertainty of measurement about the measured result is negligible with regard to the final pass/fail decision. The measurement result can be directly compared with the test limit to determine conformance with the requirement (compare IEC Guide 115). The level of risk to falsely accept and falsely reject items is further described in ILAC-G8.

ANNEX A

Maximum Conducted Output Power at Extreme Voltages

Measurements in this section were performed at the request of the manufacturer to show that the RF Output power remained compliant when subjected to the extreme voltage conditions stated by the manufacturer to provide evidence that the implementation is satisfactory to comply to the requirements of FCC 47 CFR 15.212.

Maximum Conducted Output Power

Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (b),
ISED RSS-247, Clause 5.4
ISED RSS-GEN, Clause 6.12

Equipment Under Test and Modification State

SiW917Y1GN, S/N: BLE MAC address: D4:48:67:DD:D7:30 - Modification State 0

Date of Test

22-May-2024

Test Method

The test was performed in accordance with ANSI C63.10 clause 11.9.1.2 Method PKPM1.

The EUT was supplied directly with a DC PSU.

Environmental Conditions

Ambient Temperature	22.7 °C
Relative Humidity	52.5 %

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (b)(3) RSS-247 5.4 d)	Test Method(s):	C63.10 11.9.1.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	BLE GFSK (LE 1M)	Duty Cycle (%):	84.5 (Data) 33.9 (Adv)
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	-	Peak Antenna Gain (dBi):	2.80
Supply Voltage:	3.00V	TX Mode:	Continuous Modulated Packet Bursts

Test Frequency (MHz)	Power Index	Maximum Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)
2402	16.00	15.52	30.00	-14.48
2404	16.00	15.39	30.00	-14.61
2440	16.00	15.71	30.00	-14.29
2478	16.00	15.90	30.00	-14.10
2480	16.00	15.98	30.00	-14.02

Table 58 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Power Index	Maximum Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
2402	16.00	15.52	30.00	-14.48	18.32	36.00	-17.68
2404	16.00	15.39	30.00	-14.61	18.19	36.00	-17.81
2440	16.00	15.71	30.00	-14.29	18.51	36.00	-17.49
2478	16.00	15.90	30.00	-14.10	18.70	36.00	-17.30
2480	16.00	15.98	30.00	-14.02	18.78	36.00	-17.22

Table 59 - ISED Maximum Conducted (peak) Output Power Results

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (b)(3) RSS-247 5.4 d)	Test Method(s):	C63.10 11.9.1.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	BLE GFSK (LE 1M)	Duty Cycle (%):	84.5 (Data) 33.9 (Adv)
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	-	Peak Antenna Gain (dBi):	2.80
Supply Voltage:	3.63V	TX Mode:	Continuous Modulated Packet Bursts

Test Frequency (MHz)	Power Index	Maximum Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)
2402	16.00	15.88	30.00	-14.12
2404	16.00	15.69	30.00	-14.31
2440	16.00	15.98	30.00	-14.02
2478	16.00	16.21	30.00	-13.79
2480	16.00	16.35	30.00	-13.65

Table 60 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Power Index	Maximum Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
2402	16.00	15.88	30.00	-14.12	18.68	36.00	-17.32
2404	16.00	15.69	30.00	-14.31	18.49	36.00	-17.51
2440	16.00	15.98	30.00	-14.02	18.78	36.00	-17.22
2478	16.00	16.21	30.00	-13.79	19.01	36.00	-16.99
2480	16.00	16.35	30.00	-13.65	19.15	36.00	-16.85

Table 61 - ISED Maximum Conducted (peak) Output Power Results

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (b)(3) RSS-247 5.4 d)	Test Method(s):	C63.10 11.9.1.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	BLE GFSK (LE 2M)	Duty Cycle (%):	42.5
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	-	Peak Antenna Gain (dBi):	2.80
Supply Voltage:	3.00V	TX Mode:	Continuous Modulated Packet Bursts

Test Frequency (MHz)	Power Index	Maximum Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)
2404	16.00	14.74	30.00	-15.26
2440	16.00	15.05	30.00	-14.95
2478	16.00	15.23	30.00	-14.77

Table 62 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Power Index	Maximum Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
2404	16.00	14.74	30.00	-15.26	17.54	36.00	-18.46
2440	16.00	15.05	30.00	-14.95	17.85	36.00	-18.15
2478	16.00	15.23	30.00	-14.77	18.03	36.00	-17.97

Table 63 - ISED Maximum Conducted (peak) Output Power Results

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (b)(3) RSS-247 5.4 d)	Test Method(s):	C63.10 11.9.1.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	BLE GFSK (LE 2M)	Duty Cycle (%):	42.5
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	-	Peak Antenna Gain (dBi):	2.80
Supply Voltage:	3.63V	TX Mode:	Continuous Modulated Packet Bursts

Test Frequency (MHz)	Power Index	Maximum Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)
2404	16.00	15.91	30.00	-14.09
2440	16.00	16.19	30.00	-13.81
2478	16.00	16.40	30.00	-13.60

Table 64 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Power Index	Maximum Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
2404	16.00	15.91	30.00	-14.09	18.71	36.00	-17.29
2440	16.00	16.19	30.00	-13.81	18.99	36.00	-17.01
2478	16.00	16.40	30.00	-13.60	19.20	36.00	-16.80

Table 65 - ISED Maximum Conducted (peak) Output Power Results

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (b)(3) RSS-247 5.4 d)	Test Method(s):	C63.10 11.9.1.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	BLE GFSK (LE 125k)	Duty Cycle (%):	96.7 (Data) 34.1 (Adv)
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	-	Peak Antenna Gain (dBi):	2.80
Supply Voltage:	3.00V	TX Mode:	Continuous Modulated Packet Bursts

Test Frequency (MHz)	Power Index	Maximum Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)
2402	11.00	10.94	30.00	-19.06
2404	11.00	10.87	30.00	-19.13
2440	11.00	10.69	30.00	-19.31
2478	11.00	10.61	30.00	-19.39
2480	11.00	9.67	30.00	-20.33

Table 66 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Power Index	Maximum Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
2402	11.00	10.94	30.00	-19.06	13.74	36.00	-22.26
2404	11.00	10.87	30.00	-19.13	13.67	36.00	-22.33
2440	11.00	10.69	30.00	-19.31	13.49	36.00	-22.51
2478	11.00	10.61	30.00	-19.39	13.41	36.00	-22.59
2480	11.00	9.67	30.00	-20.33	12.47	36.00	-23.53

Table 67 - ISED Maximum Conducted (peak) Output Power Results

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	15.247 (b)(3) RSS-247 5.4 d)	Test Method(s):	C63.10 11.9.1.2
Additional Reference(s):	-		

DUT Configuration			
Mode:	BLE GFSK (LE 125k)	Duty Cycle (%):	96.7 (Data) 34.1 (Adv)
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	-	Peak Antenna Gain (dBi):	2.80
Supply Voltage:	3.63V	TX Mode:	Continuous Modulated Packet Bursts

Test Frequency (MHz)	Power Index	Maximum Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)
2402	11.00	11.37	30.00	-18.63
2404	11.00	11.15	30.00	-18.85
2440	11.00	10.99	30.00	-19.01
2478	11.00	10.88	30.00	-19.12
2480	11.00	9.99	30.00	-20.01

Table 68 - FCC Maximum Conducted (peak) Output Power Results

Test Frequency (MHz)	Power Index	Maximum Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
2402	11.00	11.37	30.00	-18.63	14.17	36.00	-21.83
2404	11.00	11.15	30.00	-18.85	13.95	36.00	-22.05
2440	11.00	10.99	30.00	-19.01	13.79	36.00	-22.21
2478	11.00	10.88	30.00	-19.12	13.68	36.00	-22.32
2480	11.00	9.99	30.00	-20.01	12.79	36.00	-23.21

Table 69 - ISED Maximum Conducted (peak) Output Power Results

FCC 47 CFR Part 15, Limit Clause 15.247 (b)(1)

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

ISED RSS-247, Limit Clause 5.4 (b)

For FHSs operating in the band 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1.0 W if the hopset uses 75 or more hopping channel; the maximum peak conducted output power shall not exceed 0.125 W if the hopset uses less than 75 hopping channel. The e.i.r.p. shall not exceed 4 W except as provided in section 5.4(e) of the specification.

FCC 47 CFR Part 15, Limit Clause 15.247 (b)(2)

For frequency hopping systems operating in the 902–928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels.

ISED RSS-247, Limit Clause 5.4 (a)

For FHSs operating in the band 902-928 MHz, the maximum peak conducted output power shall not exceed 1.0 W, and the e.i.r.p. shall not exceed 4 W if the hopset uses 50 or more hopping channels; the maximum peak conducted output power shall not exceed 0.25 W and the e.i.r.p. shall not exceed 1 W if the hopset uses less than 50 hopping channels.

FCC 47 CFR Part 15, Limit Clause 15.247 (b)(3)

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.

ISED RSS-247, Limit Clause 5.4 (d)

For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1 W. The e.i.r.p. shall not exceed 4 W, except as provided in section 5.4(e) of the specification.

Test Location and Test Equipment Used

This test was carried out in RF Laboratory 1.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
True RMS Multimeter	Fluke	79 Series III	411	12	12-Jan-2025
Multimeter	Fluke	75 Mk3	455	12	15-Dec-2024
Hygrometer	Rotronic	I-1000	3220	12	28-Nov-2024
USB Power Sensor	Boonton	RTP5008	5833	12	12-Jul-2024
Modular Power System Mainframe	Keysight Technologies	N6701C	5835	-	TU
DC Power Module 60V 20A 300W	Keysight Technologies	N6754A	5836	-	O/P Mon
Signal Conditioning Unit	TUV SUD	SPECTRUM_SCU001	6350	-	26-Jul-2024
SCU Cable Assembly SCU	TUV SUD	SPECTRUM_SCU_CA	6638	12	26-Jul-2024

Table 70

TU - Traceability Unscheduled
O/P Mon – Output Monitored using calibrated equipment