

Radio Test Report

Silicon Laboratories Finland Oy

Main Model: SiW917Y1GA
Series Model: SiW917Y1GN



In accordance with ETSI EN 300 328
(2.4 GHz Bluetooth Low Energy)

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COMMERCIAL-IN-CONFIDENCE

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SIGNATURE

NAME	JOB TITLE	RESPONSIBLE FOR	ISSUE DATE
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Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD document control rules.

EXECUTIVE SUMMARY

A sample of this product was tested and found to be compliant with ETSI EN 300 328: V2.2.2 (2019-07) for the tests detailed in section 1.3.



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1 Report Summary

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
1	First Issue	02-Sept-2024
2	Duty Cycle figure amendment	05-Sept-2024

Table 1

1.2 Introduction

Applicant	Silicon Laboratories Finland Oy
Manufacturer	Silicon Laboratories Finland Oy
Model Number(s)	Main Model: SiW917Y1GA Series Model: SiW917Y1GN
Serial Number(s)	Not Serialised (FAR-815415-005) BLE MAC address: D4:48:67:DD:D6:87 BLE MAC address: D4:48:67:DD:D7:30
Hardware Version(s)	1.0
Software Version(s)	Stack's "Connectivity Firmware" version 2.12.1.0.0.1
Number of Samples Tested	3
Test Specification/Issue/Date	ETSI EN 300 328: V2.2.2 (2019-07)
Order Number	PTP ~ 6000530772
Date	08-March-2024
Date of Receipt of EUT	20-May-2024
Start of Test	21-May-2024
Finish of Test	22-May-2024
Name of Engineer(s)	Pier-Angelo Lorusso, Thomas Biddlecombe and George Williams



1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with ETSI EN 300 328 is shown below.

Section	Specification Clause	Test Description	Result	Comments/Base Standard
Configuration and Mode: 2.4 GHz Bluetooth Low Energy - PCB Trace Antenna (SiW917Y1GA)				
2.1	4.3.2.9	Transmitter Unwanted Emissions in the Spurious Domain	Pass	
2.2	4.3.2.10	Receiver Spurious Emissions	Pass	
Configuration and Mode: 2.4 GHz Bluetooth Low Energy - ANT-2.4-CW-CT-SMA/RPS Antenna (SiW917Y1GN)				
2.1	4.3.2.9	Transmitter Unwanted Emissions in the Spurious Domain	Pass	
2.2	4.3.2.10	Receiver Spurious Emissions	Pass	
Configuration and Mode: 2.4 GHz Bluetooth Low Energy - Conducted Tests (SiW917Y1GN)				
2.3	4.3.2.2	RF Output Power	Pass	
2.4	4.3.2.3	Power Spectral Density	Pass	
2.5	4.3.2.7	Occupied Channel Bandwidth	Pass	
2.6	4.3.2.8	Transmitter Unwanted Emissions in the Out-of-Band Domain	Pass	
2.7	4.3.2.11	Receiver Blocking	Pass	

Table 2

Note: For conducted testing, antenna gain was taken as 2.80 dBi as per the ANT-2.4-CW-CT-SMA/RPS Antenna as this is the highest gain antenna.



1.4 Application Form

Equipment Description

Technical Description: <i>(Please provide a brief description of the intended use of the equipment)</i>	Bluetooth Low Energy (LE), and Wi-Fi 802.11b/g/n/ax wireless radio module
Manufacturer:	Silicon Laboratories Finland Oy
Model:	Main Model: SiW917Y1GA (with integral antenna) Series Model: SiW917Y1GN (with no integral antenna but RF pin)
Part Number:	
Hardware Version:	1.0
Software Version:	Stack's "Connectivity Firmware" version 2.12.1.0.0.1

Table 3

The type of Wideband Data Transmission Equipment

FHSS ☒	non-FHSS ☐
--	-----------------------------------

Table 4

In case of FHSS

In case of non-Adaptive FHSS equipment:	
The number of Hopping Frequencies:	Data mode: 37 Legacy Advertising mode: 3 Extended Advertising mode: 40
In case of Adaptive FHSS equipment:	
The maximum number of Hopping Frequencies:	
The minimum number of Hopping Frequencies:	
The (average) dwell Time:	

Table 5

Adaptive/non-adaptive Equipment

Non-adaptive Equipment	☒
Adaptive Equipment without the possibility to switch to a non-adaptive mode	☐
Adaptive Equipment which can also operate in a non-adaptive mode	☐

Table 6



In case of Adaptive Equipment

The maximum Channel Occupancy Time implemented by the equipment:		ms
The equipment has implemented an LBT mechanism		☐
In case of non-FHSS equipment:		
The equipment is Frame Based equipment		☐
The equipment is Load Based equipment		☐
The equipment can switch dynamically between Frame Based and Load Based equipment		☐
The CCA time implemented by the equipment:		μs
The equipment has implemented a DAA mechanism		☐
The equipment can operate in more than one adaptive mode		☐

Table 7

In case of Non-adaptive Equipment

The maximum RF Output Power (e.i.r.p.)	8	dBm
The maximum (corresponding) Duty Cycle	Legacy Adv: 34% Others: 98%	
Equipment with dynamic behaviour, that behaviour is described here. (e.g. the different combinations of duty cycle and corresponding power levels to be declared)		

Table 8

The worst case operational mode for each of the following tests

RF Output Power	LE2M
Power Spectral Density	LE1M LE125K
Duty cycle, Tx-Sequence, Tx-gap	N/A
Accumulated Transmit Time, Frequency Occupation & Hopping Sequence (only for FHSS equipment)	N/A
Hopping Frequency Separation (only for FHSS equipment)	N/A
Medium Utilisation:	N/A
Adaptivity:	N/A
Receiver Blocking:	LE2M LE1M LE125K
Nominal Channel Bandwidth	
Transmitter unwanted emissions in the OOB domain	
Transmitter unwanted emissions in the spurious domain	
Receiver spurious emissions	LE1M

Table 9



The different transmit operating modes (tick all that apply)

Operating mode 1: Single Antenna Equipment	☒
Equipment with only one antenna	☒
Equipment with two diversity antennas but only one antenna active at any moment in time	☐
Smart Antenna Systems with two or more antennas but operating in a (legacy) mode where only one antenna is used. (e.g. IEEE 802.11™ [i.3] legacy mode in smart antenna systems)	☐
Operating mode 2: Smart Antenna Systems - Multiple Antennas without beam forming	☐
Single spatial stream / Standard throughput / (e.g. IEEE 802.11™ [i.3] legacy mode)	☐
High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 1	☐
High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 2	☐
Operating mode 3: Smart Antenna Systems - Multiple Antennas with beam forming	☐
Single spatial stream / Standard throughput / (e.g. IEEE 802.11™ [i.3] legacy mode)	☐
High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 1	☐
High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 2	☐
NOTE: Add more lines if more channel bandwidths are supported.	

Table 10

In case of Smart Antenna Systems

The number of Receive chains:		
The number of Transmit chains:		
symmetrical power distribution	☐	
asymmetrical power distribution	☐	
In case of beam forming, the maximum (additional) beam forming gain:		dB
NOTE: The additional beam forming gain does not include the basic gain of a single antenna.		

Table 11

Operating Frequency Range(s) of the Equipment

Operating Frequency Range 1: (Data mode, 37 channels)	2404	MHz to	2478	MHz
Operating Frequency Range 2: (Legacy Advertisement mode, 3 channels)	2402	MHz to	2480	MHz
Operating Frequency Range 3: (Extended Advertisement mode, 40 channels)	2402	MHz to	2480	MHz
NOTE: Add more lines if more Frequency Ranges are supported.				

Table 12

Nominal Channel Bandwidth

Nominal Channel Bandwidth 1: (1MBaud-based bitrates: 1Mbps, and coded 125Kbps + 500Kbps)	1	MHz
Nominal Channel Bandwidth 2: (2MBaud-based bitrate: 2Mbps)	2	MHz
NOTE: Add more lines if more channel bandwidths are supported.		

Table 13

Type of Equipment (stand-alone, combined, plug-in radio device, etc.)



Stand-alone:		☐
Combined Equipment:		☐
Plug-in radio device:		☐
Other:	☒ Please specify:	Radio module meant for integration in host systems

Table 14

The normal and extreme operating conditions that apply to the equipment

Normal operating conditions (if applicable):					
Operating temperature:		25			°C
Other (please specify if applicable):					°C
Extreme operating conditions:					
Operating temperature:		Minimum	-40	°C to Maximum	+85 °C
Other (please specify if applicable):		Minimum		°C to Maximum	°C
Details provided are for the:					
Stand-alone equipment / Equipment under test (radio module)					☒
Combined equipment					☐
Test Jig / Host (PCB carrying the radio module)					☒

Table 15



The intended combination(s) of the radio equipment power settings and one or more antenna assemblies and their corresponding e.i.r.p levels

Antenna Type:			
Integral Antenna (information to be provided in case of conducted measurements)			☒
Antenna Gain:	2.26	dBi	
If applicable, additional beamforming gain (excluding basic antenna gain):		dB	
Temporary RF connector provided			☐
No temporary RF connector provided			☐
Dedicated Antennas (equipment with antenna connector or radio module with RF pin)			☒
Single power level with corresponding antenna(s)			☒
Multiple power settings and corresponding antenna(s)			☐
Number of different Power Levels:			
Power Level 1			dBm
Power Level 2			dBm
NOTES: - Add more lines in case the equipment has more power levels. - These power levels are conducted power levels (at antenna connector). - For each of the power levels, provide the intended antenna assemblies, their corresponding gains (G) and the resulting e.i.r.p. levels, also taking into account the beamforming gain (Y) if applicable.			
Power Level 1 (or single power level) of Dedicated Antennas			dBm
Number of antenna assemblies provided for this power level:			1
Assembly #	Gain (dBi)	e.i.r.p (dBm)	Part number or model number
1	2.80	Max: 9	Reference external antenna (not sold with radio module under scope) is manufactured by TE Connectivity Ltd. (previously Linx Technologies Inc.), and has model name of ANT-2.4-CW-CT-RPS
2			
3			
NOTE: Add more rows in case more antenna assemblies are supported for this power level.			
Power Level 2 of Dedicated Antennas			dBm
Number of antenna assemblies provided for this power level:			
Assembly #	Gain (dBi)	e.i.r.p (dBm)	Part number or model number
1			
2			
3			
NOTE: Add more rows in case more antenna assemblies are supported for this power level.			

Table 16



The nominal voltages of the stand-alone radio equipment or the nominal voltages of the combined equipment or test jig in case of plug-in devices

Details provided are for the:				
Stand-alone equipment / Equipment under test (radio module)				☒
Combined equipment				☐
Test Jig / Host (PCB carrying the radio module)				☐
Supply Voltage				
AC mains	☐	AC voltage:		V
DC	☒	DC voltage:	Nominal: 3.3 Min: 3.0 Max: 3.63	V
In case of DC, indicate the type of power source				
Internal Power Supply				☐
External Power Supply or AC/DC adapter				☐
Battery				☐
Other:	☒	Please specify:	Module under scope is partially internally regulated. Regulated DC supply is provided to the module by the host board (3.3V), or by an external power source during compliance testing in the lab when applicable	

Table 17

Describe the test modes available which can facilitate testing

--

Table 18

The equipment type (e.g. Bluetooth®, IEEE 802.11™ [i.3] IEEE 802.15.4™, proprietary, etc.)

Bluetooth Low Energy

Table 19

If applicable, the statistical analysis referred in clause 5.4.1 q)

N/A

Table 20

If applicable, the statistical analysis referred in clause 5.4.1 r)

N/A

Table 21



Geo-location capability supported by the equipment

Yes	☐
The geographical location determined by the equipment as defined in clause 4.3.1.13.2 or clause 4.3.2.12.2 is not accessible to the user.	☐
No	☒

Table 22

Configuration for testing (see clause 5.3.2.3 of ETSI EN 300 328 V2.2.2)

From all combinations of conducted power settings and intended antenna assembly(ies) specified in clause 5.4.1 m), specify the combination resulting in the highest e.i.r.p. for the radio equipment.				
Unless otherwise specified in ETSI EN 300 328, this power setting is to be used for testing against the requirements of ETSI EN 300 328. In case there is more than one such conducted power setting resulting in the same (highest) e.i.r.p. level, the highest power setting is to be used for testing. See also ETSI EN 300 328, clause 5.3.2.3.				
Highest overall e.i.r.p. value:			9	dBm
Corresponding Antenna assembly gain:	2.80	dBi	Antenna Assembly #:	1
Corresponding conducted power setting: (also the power level to be used for testing)	Nominal: 6	dBm	Listed as Power Setting #:	Index: 5

Table 23

Modulation

ITU Class(es) of emission:	1M00G1D / 2M00G1D			
Can the transmitter operate unmodulated?	Yes	☒	No	☐
Notes:	Module can transmit an unmodulated Carrier Wave (CW, Constant Tone Signal) only in Test Mode, for compliance testing in the lab			

Table 24

Duty Cycle

The transmitter is intended for:	
Continuous duty	☒
Intermittent duty	☐
Continuous operation possible for testing purposes	☒

Table 25



About the UUT

The equipment submitted are representative production models	☐
If not, the equipment submitted are pre-production models?	☒
If pre-production equipment are submitted, the final production equipment will be identical in all respects with the equipment tested	☒
If not, supply full details:	

Table 26

Additional items and/or supporting equipment provided

Spare batteries (e.g. for portable equipment)	☐
Battery charging device	☐
External Power Supply or AC/DC adapter	☐
Test Jig / Host (PCB carrying the radio module)	☒
RF test fixture (for equipment with integrated antennas)	☐
Combined equipment	☐
Manufacturer:	☐
Model:	☐
Model Name:	☐
User Manual	☒
Technical documentation (Handbook and circuit diagrams)	☒

Table 27

Cable Loss

Adapter Cable Loss (Conducted sample)	0.5	dB
--	-----	----

Table 28

Data in the tables above is provided by the Manufacturer.



1.5 Product Information

1.5.1 Technical Description

Bluetooth Low Energy (LE), and Wi-Fi 802.11b/g/n/ax wireless radio module.

1.6 Deviations from the Standard

No deviations from the applicable test standard were made during testing.

1.7 EUT Modification Record

The table below details modifications made to the EUT during the test programme.

The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
Model: SiW917Y1GA, Serial Number: BLE MAC address: D4:48:67:DD:D6:87			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: SiW917Y1GN, Serial Number: BLE MAC address: D4:48:67:DD:D7:30			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: SiW917Y1GN, Serial Number: Not Serialised (FAR-815415-005)			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 29

Note: The serial numbers used throughout this report are the MAC address of the equipment under test.



1.8 Test Location

TÜV SÜD conducted the following tests at our Octagon House Test Laboratory.

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: 2.4 GHz Bluetooth Low Energy - PCB Trace Antenna		
Transmitter Unwanted Emissions in the Spurious Domain	Pier-Angelo Lorusso	UKAS
Receiver Spurious Emissions	Pier-Angelo Lorusso	UKAS
Configuration and Mode: 2.4 GHz Bluetooth Low Energy - ANT-2.4-CW-CT-SMA/RPS Antenna		
Transmitter Unwanted Emissions in the Spurious Domain	Pier-Angelo Lorusso	UKAS
Receiver Spurious Emissions	Pier-Angelo Lorusso	UKAS
Configuration and Mode: 2.4 GHz Bluetooth Low Energy - Conducted Tests		
RF Output Power	Thomas Biddlecombe	UKAS
Power Spectral Density	Thomas Biddlecombe	UKAS
Occupied Channel Bandwidth	Thomas Biddlecombe	UKAS
Transmitter Unwanted Emissions in the Out-of-Band Domain	Thomas Biddlecombe	UKAS
Receiver Blocking	George Williams	UKAS

Table 30

Office Address:

TÜV SÜD
Octagon House
Concorde Way
Fareham
Hampshire
PO15 5RL
United Kingdom



2 Test Details

2.1 Transmitter Unwanted Emissions in the Spurious Domain

2.1.1 Specification Reference

ETSI EN 300 328, Clause 4.3.2.9

2.1.2 Equipment Under Test and Modification State

SiW917Y1GA, S/N: BLE MAC address: D4:48:67:DD:D6:87 - Modification State 0
SiW917Y1GN, S/N: BLE MAC address: D4:48:67:DD:D7:30 - Modification State 0

2.1.3 Date of Test

22-May-2024

2.1.4 Test Method

This test was performed in accordance with ETSI EN 300 328, clause 5.4.9.2.2.

The EUT was supplied with 3.3 VDC by means of a regulator residing in the host certification board, which was in turn being powered over the host certification board's USB connector.

According to the testing script (a TeraTerm Macro) provided by the manufacturer, a power index of 5 is configured for all PHYs and all Channels, which is limiting the max allowed conducted power out of the embedded radio chipset to nominal 6 dBm"

The plots show the characterisation of the EUT using a peak detector. Where emissions were detected, final measurements were taken using the method specified in ETSI EN 300 328, clause 5.4.9.2.1.3. Where these emissions are within 6 dB of the limit the final value is reported in the tables below.

2.1.5 Environmental Conditions

Ambient Temperature	21.9 - 23.5 °C
Relative Humidity	51.5 - 52.5 %



2.1.6 Test Results

2.4 GHz Bluetooth Low Energy - PCB Trace Antenna

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 31 - CH0_LE1M_TX_PCB ANT, 2402 MHz, 30 MHz to 12.75 GHz

*No emissions found within 6 dB of the limit.

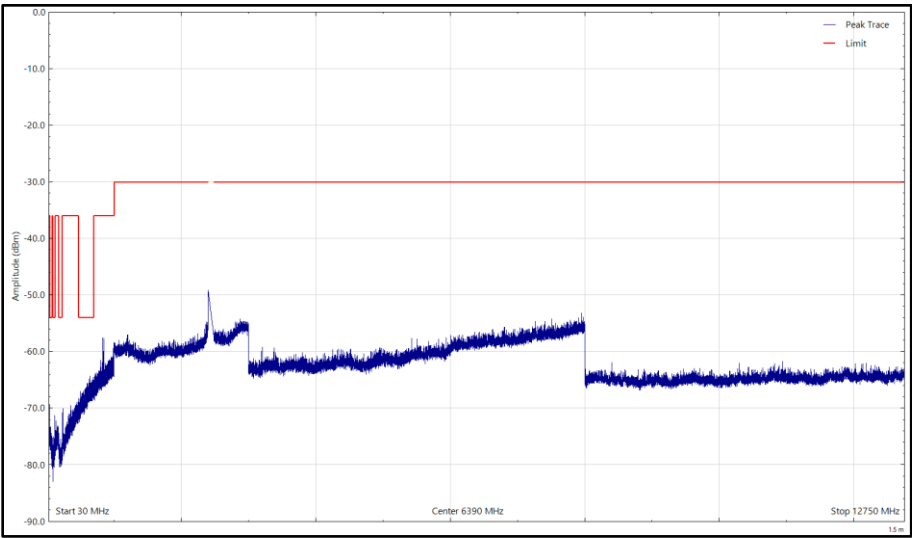


Figure 1 - CH0_LE1M_TX_PCB ANT, 2402 MHz, 30 MHz to 12.75 GHz, Horizontal (Peak)

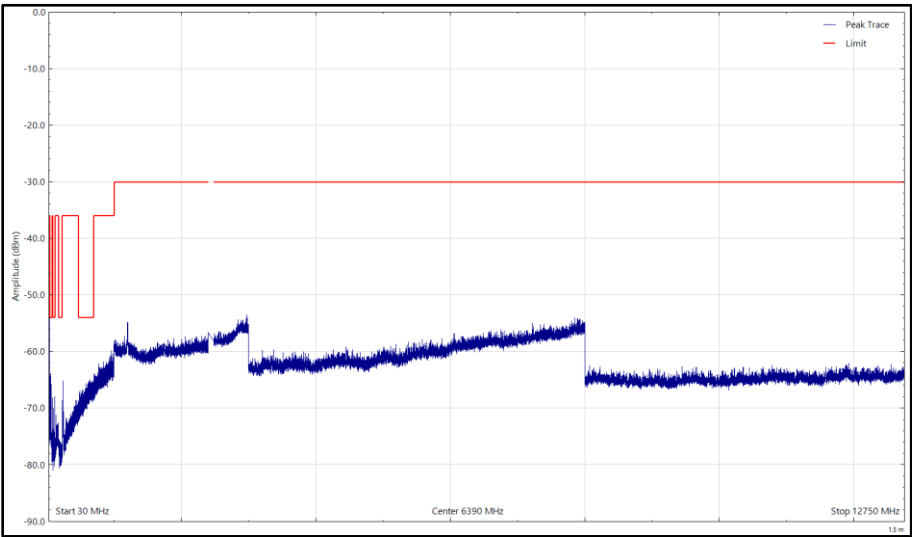


Figure 2 - CH0_LE1M_TX_PCB ANT, 2402 MHz, 30 MHz to 12.75 GHz, Vertical (Peak)



Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 32 - CH39_LE1M_TX_PCB ANT, 2480 MHz, 30 MHz to 12.75 GHz

*No emissions found within 6 dB of the limit.

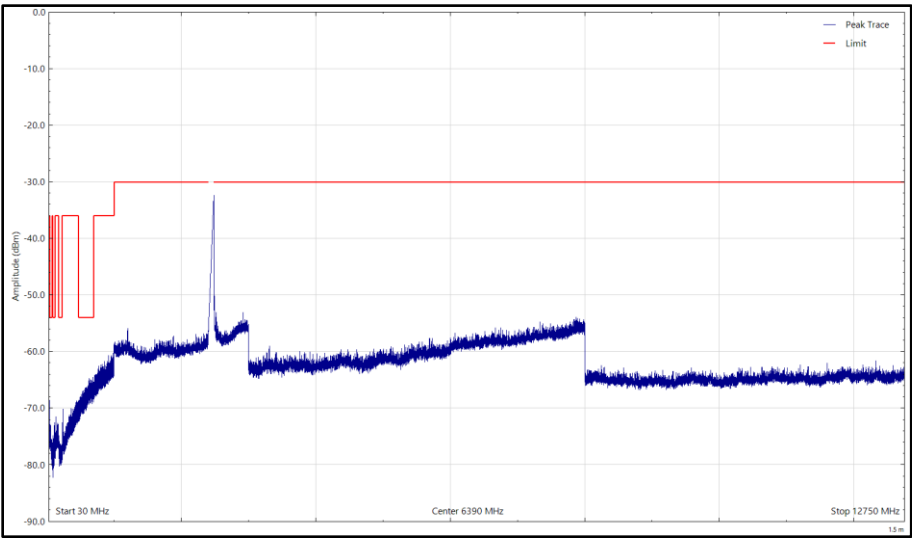


Figure 3 - CH39_LE1M_TX_PCB ANT, 2480 MHz, 30 MHz to 12.75 GHz, Horizontal (Peak)

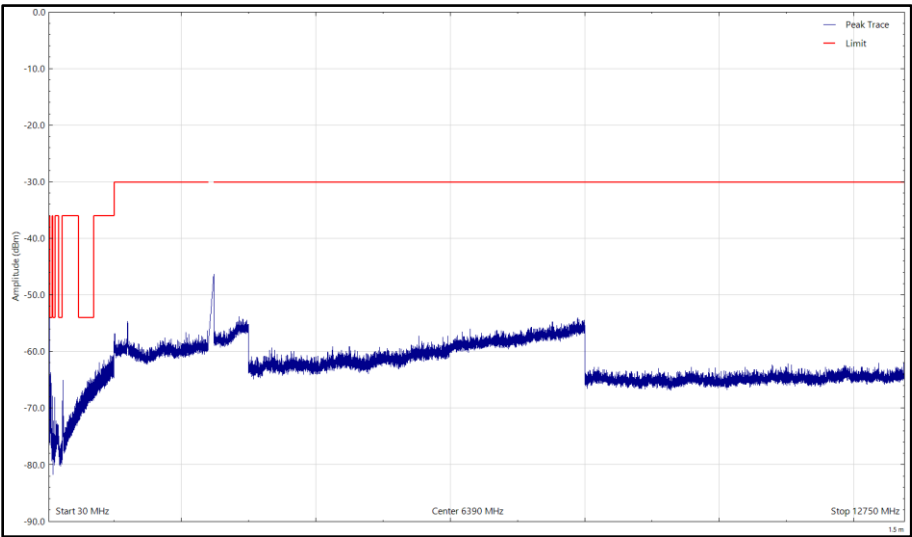


Figure 4 - CH39_LE1M_TX_PCB ANT, 2480 MHz, 30 MHz to 12.75 GHz, Vertical (Peak)

2.4 GHz Bluetooth Low Energy - ANT-2.4-CW-CT-SMA/RPS Antenna

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 33 - CH0_LE1M_TX_EXT ANT, 2402 MHz, 30 MHz to 12.75 GHz

*No emissions found within 6 dB of the limit.

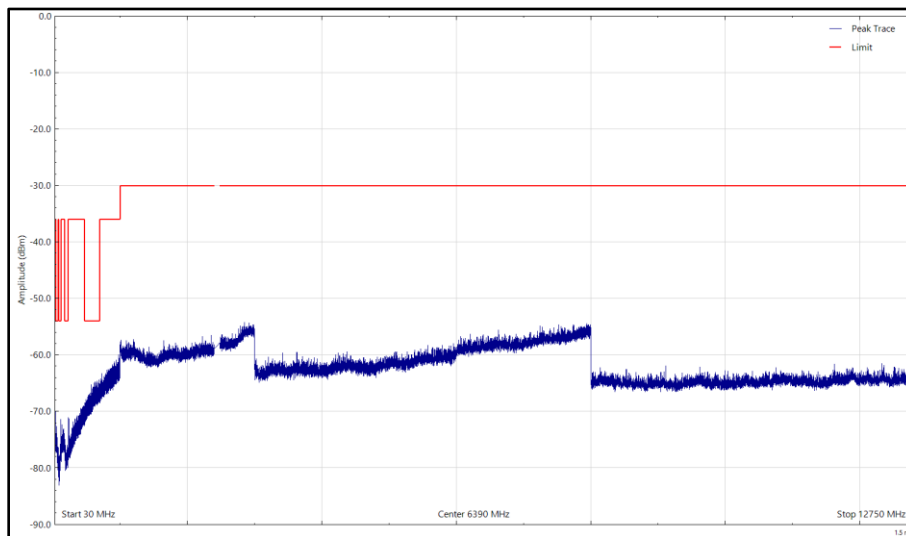


Figure 5 - CH0_LE1M_TX_EXT ANT, 2402 MHz, 30 MHz to 12.75 GHz, Horizontal (Peak)

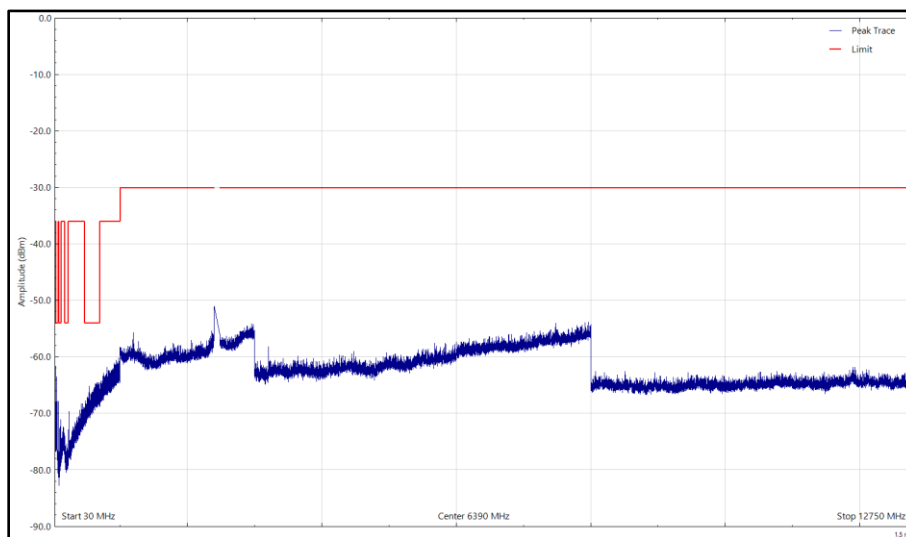


Figure 6 - CH0_LE1M_TX_EXT ANT, 2402 MHz, 30 MHz to 12.75 GHz, Vertical (Peak)



Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 34 - CH39_LE1M_TX_EXT ANT, 2480 MHz, 30 MHz to 12.75 GHz

*No emissions found within 6 dB of the limit.

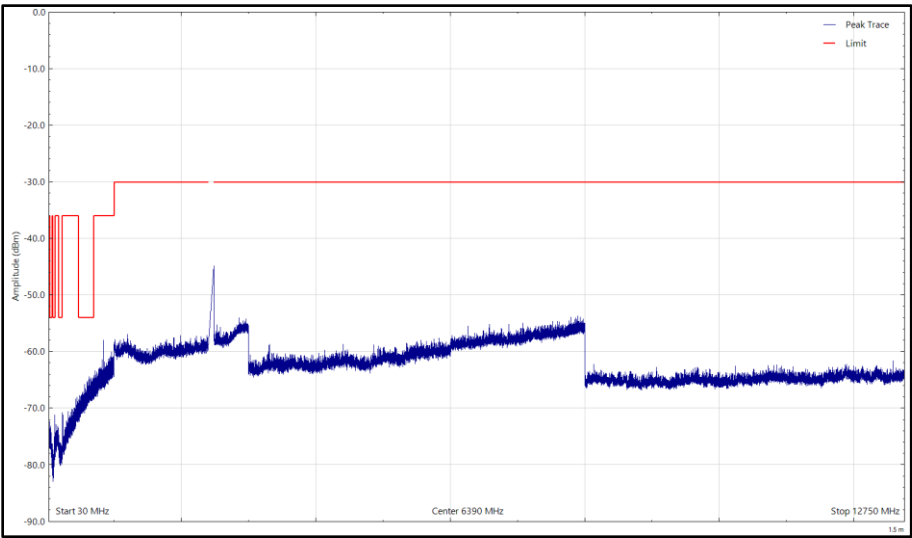


Figure 7 - CH39_LE1M_TX_EXT ANT, 2480 MHz, 30 MHz to 12.75 GHz, Horizontal (Peak)

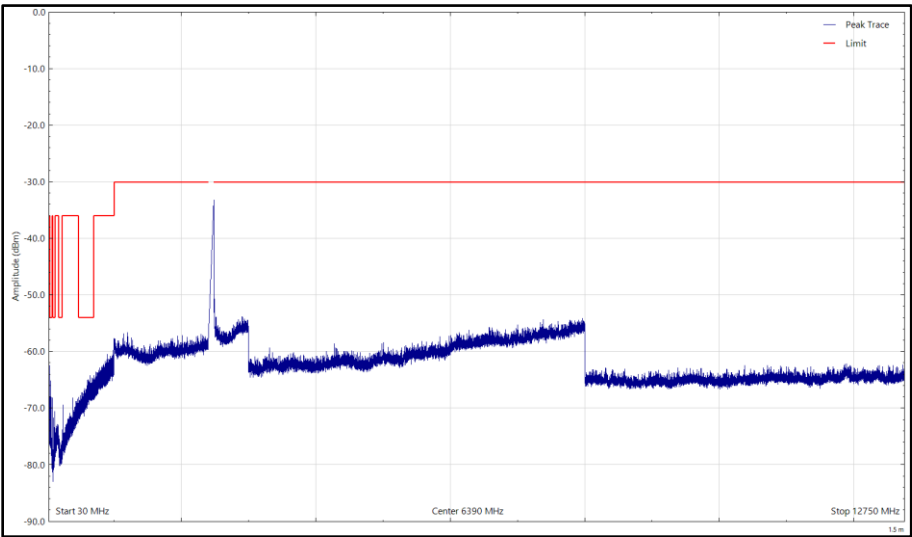


Figure 8 - CH39_LE1M_TX_EXT ANT, 2480 MHz, 30 MHz to 12.75 GHz, Vertical (Peak)



ETSI EN 300 328, Limit Clause 4.3.2.9.3

The transmitter unwanted emissions in the spurious domain shall not exceed the values given in the table below.

In case of equipment with antenna connectors, these limits apply to emissions at the antenna port (conducted). For emissions radiated by the cabinet or emissions radiated by integral antenna equipment (without antenna connectors), these limits are e.r.p. for emissions up to 1 GHz and as e.i.r.p. for emissions above 1 GHz.

Frequency Range	Maximum power e.r.p (≤ 1 GHz) e.i.r.p (> 1 GHz)	Bandwidth
30 MHz to 47 MHz	-36 dBm	100 kHz
47 MHz to 74 MHz	-54 dBm	100 kHz
74 MHz to 87.5 MHz	-36 dBm	100 kHz
87.5 MHz to 118 MHz	-54 dBm	100 kHz
118 MHz to 174 MHz	-36 dBm	100 kHz
174 MHz to 230 MHz	-54 dBm	100 kHz
230 MHz to 470 MHz	-36 dBm	100 kHz
470 MHz to 694 MHz	-54 dBm	100 kHz
694 MHz to 1 GHz	-36 dBm	100 kHz
1 GHz to 12.75 GHz	-30 dBm	1 MHz

Table 35



2.1.7 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
1 Metre SMA Cable	Rhophase	3PS-1801A-1000-3PS	4099	12	26-Jun-2024
4dB Attenuator	Pasternack	PE7047-4	4935	12	20-Jul-2024
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
Turntable	Maturo	TT 15WF	5160	-	TU
Antenna (DRG, 1 GHz to 10.5 GHz)	Schwarzbeck	BBHA9120B	5215	12	09-Jul-2024
3 GHz High pass filter	Wainwright	WHKX12-2580-3000-18000-80SS	5220	12	03-Apr-2025
HygroPalm	Rotronic	HP21	5358	12	21-Jun-2024
Pre-Amplifier (1 GHz to 26.5 GHz)	Agilent Technologies	8449B	5445	12	25-May-2024
7 GHz High pass Filter	Wainwright	WHKX12-5850-6800-18000-80SS	5550	12	30-May-2024
Pre-Amplifier (8 GHz to 18 GHz)	Wright Technologies	APS06-0061	5595	12	26-Oct-2024
Antenna (DRG, 7.5 GHz to 18 GHz)	Schwarzbeck	HWRD750	5610	12	15-Oct-2024
Cable (K-Type to K-Type, 2 m)	Junkosha	MWX241-02000KMSKMS/B	5934	12	18-Jun-2024
Cable (N to N 8m)	Junkosha	MWX221-08000NMSNMS/B	6330	12	17-Feb-2025
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9168	6635	24	13-Jun-2025
Programmable Power Supply	Iso-tech	IPS 2010	2437	-	-
RMS Multimeter	Fluke	179	4006	12	22-Mar 2025

Table 36

TU - Traceability Unscheduled



2.2 Receiver Spurious Emissions

2.2.1 Specification Reference

ETSI EN 300 328, Clause 4.3.2.10

2.2.2 Equipment Under Test and Modification State

SiW917Y1GA, S/N: BLE MAC address: D4:48:67:DD:D6:87 - Modification State 0
SiW917Y1GN, S/N: BLE MAC address: D4:48:67:DD:D7:30 - Modification State 0

2.2.3 Date of Test

22-May-2024

2.2.4 Test Method

This test was performed in accordance with ETSI EN 300 328, clause 5.4.10.2.2.

The EUT was supplied with 3.3 VDC by means of a regulator residing in the host certification board, which was in turn being powered over the host certification board's USB connector.

The plots show the characterisation of the EUT using a peak detector. Where emissions were detected, final measurements were taken using the method specified in ETSI EN 300 328, clause 5.4.10.2.1.3. Where these emissions are within 6 dB of the limit the final RMS value is reported in the tables below.

2.2.5 Environmental Conditions

Ambient Temperature	21.9 - 23.5 °C
Relative Humidity	51.5 - 52.5 %

2.2.6 Test Results

2.4 GHz Bluetooth Low Energy - PCB Trace Antenna

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 37 - CH0_LE1M_RX_PCB ANT, 2402 MHz, 30 MHz to 12.75 GHz

*No emissions found within 6 dB of the limit.

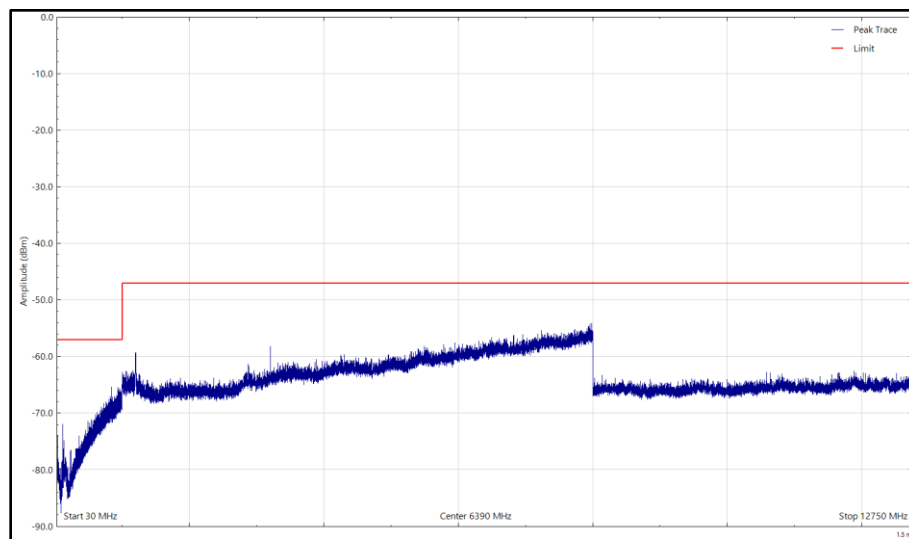


Figure 9 - CH0_LE1M_RX_PCB ANT, 2402 MHz, 30 MHz to 12.75 GHz, Horizontal (Peak)

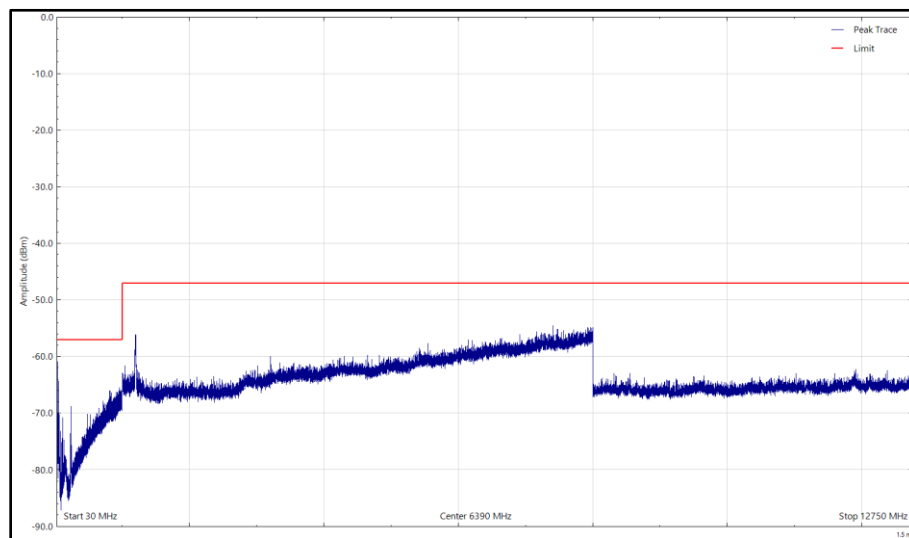


Figure 10 - CH0_LE1M_RX_PCB ANT, 2402 MHz, 30 MHz to 12.75 GHz, Vertical (Peak)



Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 38 - CH39_LE1M_RX_PCB ANT, 2480 MHz, 30 MHz to 12.75 GHz

*No emissions found within 6 dB of the limit.

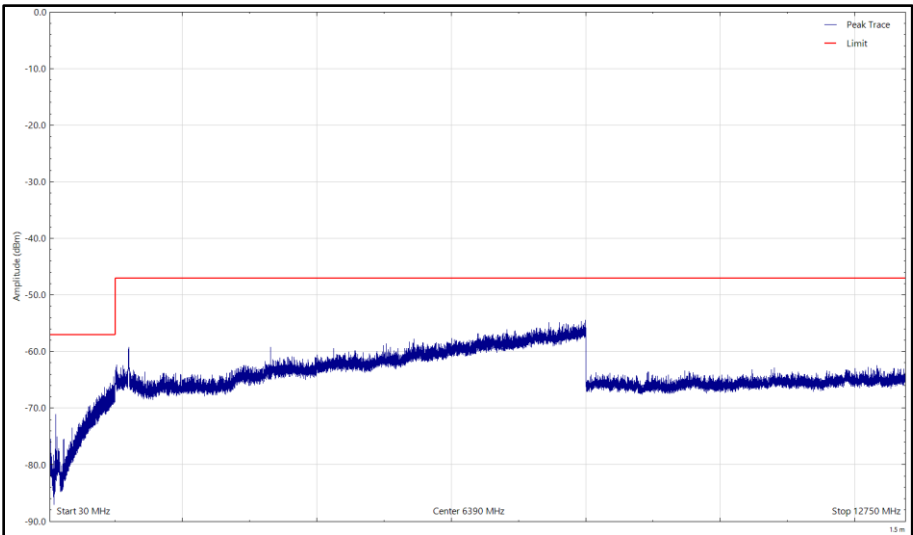


Figure 11 - CH39_LE1M_RX_PCB ANT, 2480 MHz, 30 MHz to 12.75 GHz, Horizontal (Peak)

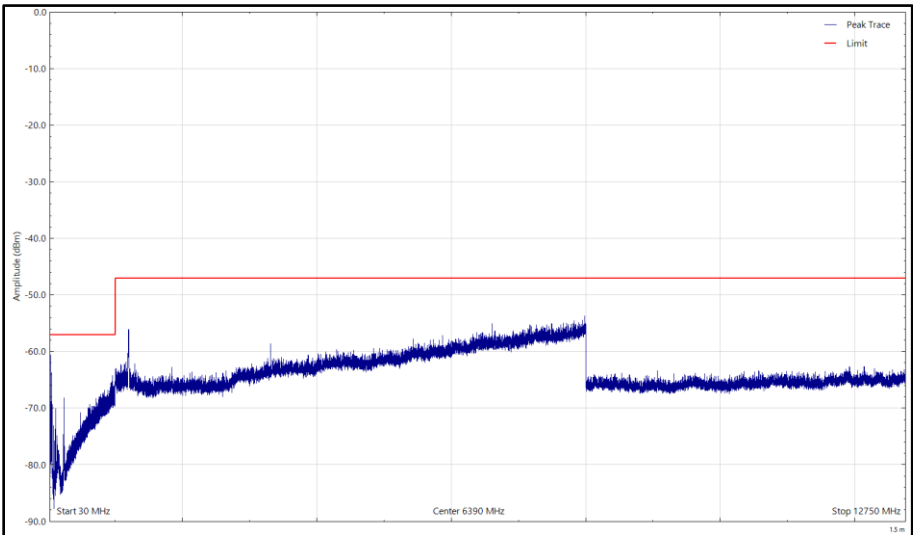


Figure 12 - CH39_LE1M_RX_PCB ANT, 2480 MHz, 30 MHz to 12.75 GHz, Vertical (Peak)



2.4 GHz Bluetooth Low Energy - ANT-2.4-CW-CT-SMA/RPS Antenna

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 39 - CH0_LE1M_RX_EXT ANT, 2402 MHz, 30 MHz to 12.75 GHz

*No emissions found within 6 dB of the limit.

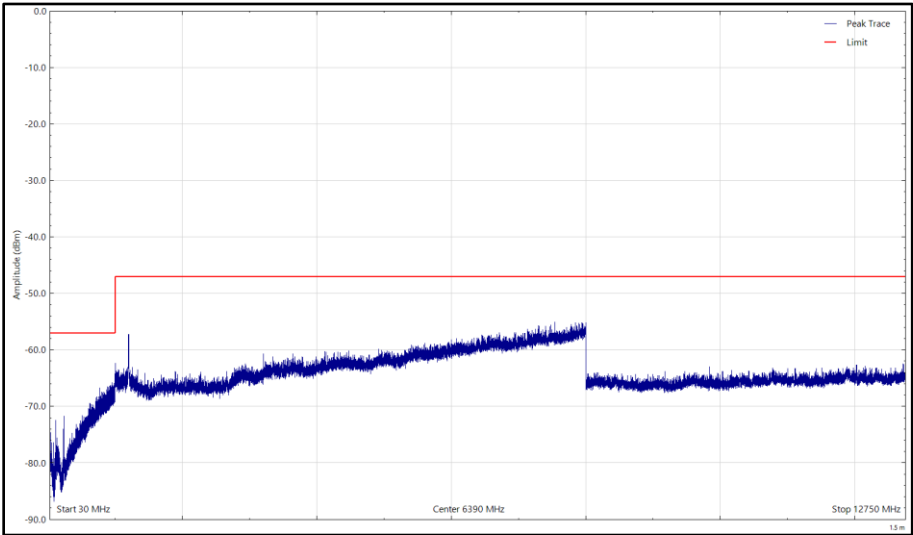


Figure 13 - CH0_LE1M_RX_EXT ANT, 2402 MHz, 30 MHz to 12.75 GHz, Horizontal (Peak)

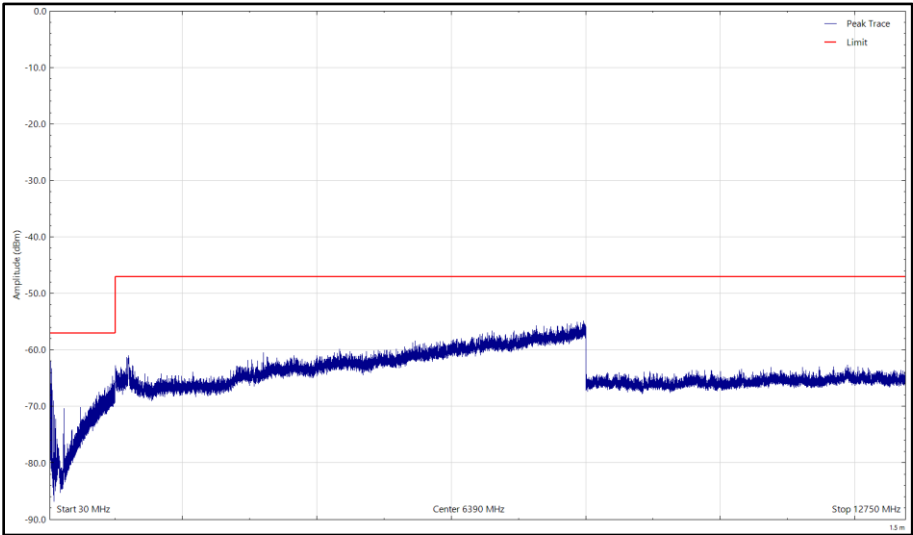


Figure 14 - CH0_LE1M_RX_EXT ANT, 2402 MHz, 30 MHz to 12.75 GHz, Vertical (Peak)



Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
*							

Table 40 - CH39_LE1M_RX_EXT ANT, 2480 MHz, 30 MHz to 12.75 GHz

*No emissions found within 6 dB of the limit.

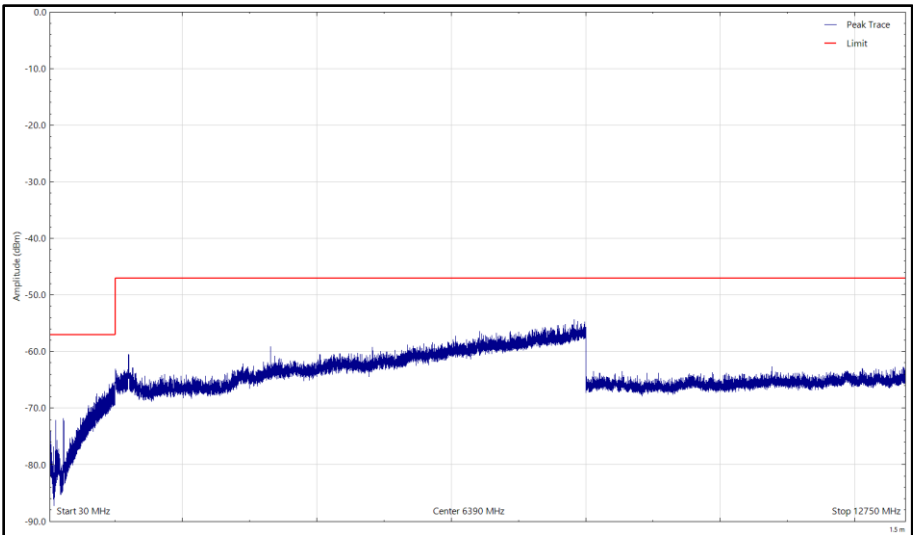


Figure 15 - CH39_LE1M_RX_EXT ANT, 2480 MHz, 30 MHz to 12.75 GHz, Horizontal (Peak)

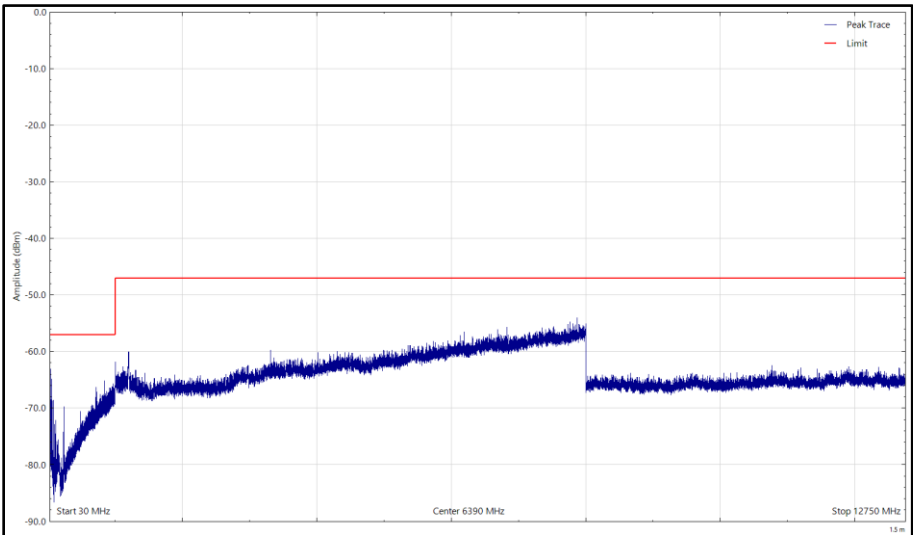


Figure 16 - CH39_LE1M_RX_EXT ANT, 2480 MHz, 30 MHz to 12.75 GHz, Vertical (Peak)



ETSI EN 300 328, Limit Clause 4.3.2.10.3

In case of non-FHSS equipment with antenna connectors, these limits apply to emissions at the antenna port (conducted). For emissions radiated by the cabinet or emissions radiated by integral antenna equipment (without antenna connectors), these limits are e.r.p. for emissions up to 1 GHz and e.i.r.p. for emissions above 1 GHz.

Frequency Range	Maximum Power	Measurement Bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 12.75 GHz	-47 dBm	1 MHz

Table 41



2.2.7 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
1 Metre SMA Cable	Rhophase	3PS-1801A-1000-3PS	4099	12	26-Jun-2024
4dB Attenuator	Pasternack	PE7047-4	4935	12	20-Jul-2024
Test Receiver	Rohde & Schwarz	ESW44	5084	12	31-Aug-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
Pre-Amplifier (8 GHz to 18 GHz)	Wright Technologies	APS06-0061	5595	12	26-Oct-2024
Antenna (DRG, 7.5 GHz to 18 GHz)	Schwarzbeck	HWRD750	5610	12	15-Oct-2024
Cable (K-Type to K-Type, 2 m)	Junkosha	MWX241-02000KMSKMS/B	5934	12	18-Jun-2024
Cable (N to N 8m)	Junkosha	MWX221-08000NMSNMS/B	6330	12	17-Feb-2025
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9168	6635	24	13-Jun-2025
Programmable Power Supply	Iso-tech	IPS 2010	2437	-	-
RMS Multimeter	Fluke	179	4006	12	22-Mar 2025
HygroPalm	Rotronic	HP21	5358	12	21-Jun-2024

Table 42

TU - Traceability Unscheduled



2.3 RF Output Power

2.3.1 Specification Reference

ETSI EN 300 328, Clause 4.3.2.2

2.3.2 Equipment Under Test and Modification State

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

2.3.3 Date of Test

21-May-2024

2.3.4 Test Method

This test was performed in accordance with ETSI EN 300 328, clause 5.4.2.2.1.2.

The EUT was supplied with 3.3 VDC directly with a DC PSU.

2.3.5 Environmental Conditions

Ambient Temperature	22.6 °C
Relative Humidity	54.8 %



2.3.6 Test Results

2.4 GHz Bluetooth Low Energy - Conducted Tests

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	4.3.2.2.3	Test Method(s):	5.4.2.2.1.2
Specification Limit:	20 dBm EIRP		

DUT Configuration			
Mode:	ETSI BLE GFSK (LE 1M)	Duty Cycle (%):	84.5 (Data) 33.9 (Adv)
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	-	Antenna Gain (dBi):	2.80
Supply Voltage:	3.30V	TX Mode:	Continuous Modulated Packet Bursts

Test Frequency (MHz)	Power Index	EIRP Output Power (dBm)		
		+25 °C	-40 °C	+85 °C
2402 (CH0)	5.00	7.20	6.29	7.85
2404 (CH1)	5.00	7.17	6.23	7.80
2440 (CH19)	5.00	7.98	6.37	8.67
2478 (CH38)	5.00	7.99	6.41	8.59
2480 (CH39)	5.00	8.14	6.49	8.67

Table 43 - RF Output Power Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	4.3.2.2.3	Test Method(s):	5.4.2.2.1.2
Specification Limit:	20 dBm EIRP		

DUT Configuration			
Mode:	ETSI BLE GFSK (LE 2M)	Duty Cycle (%):	42.5
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	-	Antenna Gain (dBi):	2.80
Supply Voltage:	3.30V	TX Mode:	Continuous Modulated Packet Bursts

Test Frequency (MHz)	Power Index	EIRP Output Power (dBm)		
		+25 °C	-40 °C	+85 °C
2404 (CH1)	5.00	8.01	6.20	8.77
2440 (CH19)	5.00	8.06	6.35	8.63
2478 (CH38)	5.00	8.09	6.44	8.61

Table 44 - RF Output Power Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	4.3.2.2.3	Test Method(s):	5.4.2.2.1.2
Specification Limit:	20 dBm EIRP		

DUT Configuration			
Mode:	ETSI BLE GFSK (LE 125k)	Duty Cycle (%):	96.7 (Data) 34.1 (Adv)
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	-	Antenna Gain (dBi):	2.80
Supply Voltage:	3.30V	TX Mode:	Continuous Modulated Packet Bursts

Test Frequency (MHz)	Power Index	EIRP Output Power (dBm)		
		+25 °C	-40 °C	+85 °C
2402 (CH0)	5.00	3.51	1.65	4.20
2404 (CH1)	5.00	7.94	6.11	8.60
2440 (CH19)	5.00	7.83	6.22	8.44
2478 (CH38)	5.00	7.81	6.28	8.38
2480 (CH39)	5.00	3.46	1.86	4.00

Table 45 - RF Output Power Results



ETSI EN 300 328, Limit Clause 4.3.2.2.3

The RF output power for non-FHSS equipment shall be equal to or less than 20 dBm.

NOTE: For Non-adaptive FHSS equipment, the manufacturer may have declared a reduced RF Output Power (see clause 5.4.1 m)) and associated Duty Cycle (see clause 5.4.1 e)) that will ensure that the equipment meets the requirement for the Medium Utilization (MU) factor further described in clause 4.3.2.5. This is verified by the conformance test referred to in clause 4.3.2.5.4.

For non-adaptive non-FHSS equipment, where the manufacturer has declared an RF output power of less than 20 dBm e.i.r.p., the RF output power shall be equal to or less than that declared value.

This limit shall apply for any combination of power level and intended antenna assembly.

2.3.7 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
Hygrometer	Rotronic	I-1000	3220	12	28-Nov-2024
GPSDR Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	14-Sep-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
Climatic Chamber	Weiss Technik	TempEvent T/180/40/3	5894	12	07-Jul-2024
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 46

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment



2.4 Power Spectral Density

2.4.1 Specification Reference

ETSI EN 300 328, Clause 4.3.2.3

2.4.2 Equipment Under Test and Modification State

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

2.4.3 Date of Test

21-May-2024

2.4.4 Test Method

This test was performed in accordance with ETSI EN 300 328, clause 5.4.3.2.1 (Option 1).

The EUT was supplied with 3.3 VDC directly with a DC PSU.

2.4.5 Environmental Conditions

Ambient Temperature	22.6 °C
Relative Humidity	54.8 %



2.4.6 Test Results

2.4 GHz Bluetooth Low Energy - Conducted Tests

Rated Output Power: 6.00

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	4.3.2.3.3	Test Method(s):	5.4.3.2.1 Option 1
Specification Limit:	10 dBm/MHz EIRP		

DUT Configuration			
Mode:	ETSI BLE GFSK (LE 1M)	Duty Cycle (%):	-
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	-	Antenna Gain (dBi):	2.80
Supply Voltage:	3.30V	TX Mode:	Continuous Modulated Packet Bursts

Test Frequency (MHz)	Power Index	Power Spectral Density (dBm/MHz EIRP)
2402 (CH0)	5.00	7.0
2404 (CH1)	5.00	7.0
2440 (CH19)	5.00	7.8
2478 (CH38)	5.00	7.8
2480 (CH39)	5.00	8.0

Table 47 - Power Spectral Density Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	4.3.2.3.3	Test Method(s):	5.4.3.2.1 Option 1
Specification Limit:	10 dBm/MHz EIRP		

DUT Configuration			
Mode:	ETSI BLE GFSK (LE 2M)	Duty Cycle (%):	-
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	-	Antenna Gain (dBi):	2.80
Supply Voltage:	3.30V	TX Mode:	Continuous Modulated Packet Bursts

Test Frequency (MHz)	Power Index	Power Spectral Density (dBm/MHz EIRP)
2404 (CH0)	5.00	6.3
2440 (CH19)	5.00	6.4
2478 (CH38)	5.00	6.4

Table 48 - Power Spectral Density Results



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	4.3.2.3.3	Test Method(s):	5.4.3.2.1 Option 1
Specification Limit:	10 dBm/MHz EIRP		

DUT Configuration			
Mode:	ETSI BLE GFSK (LE 125k)	Duty Cycle (%):	-
Antenna Configuration:	SISO	DCCF (dB):	-
Active Port(s):	-	Antenna Gain (dBi):	2.80
Supply Voltage:	3.30V	TX Mode:	Continuous Modulated Packet Bursts

Test Frequency (MHz)	Power Index	Power Spectral Density (dBm/MHz EIRP)
2402 (CH0)	5.00	3.3
2404 (CH1)	5.00	7.8
2440 (CH19)	5.00	7.7
2478 (CH38)	5.00	7.7
2480 (CH39)	5.00	3.4

Table 49 - Power Spectral Density Results



ETSI EN 300 328, Limit Clause 4.3.2.3.3

The maximum Power Spectral Density for non-FHSS equipment is 10 dBm per MHz.

2.4.7 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
Hygrometer	Rotronic	I-1000	3220	12	28-Nov-2024
GPSDR Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	14-Sep-2024
MXA Signal Analyser	Keysight Technologies	N9020B	5528	24	18-Sep-2025
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 50

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment



2.5 Occupied Channel Bandwidth

2.5.1 Specification Reference

ETSI EN 300 328, Clause 4.3.2.7

2.5.2 Equipment Under Test and Modification State

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

2.5.3 Date of Test

21-May-2024

2.5.4 Test Method

This test was performed in accordance with ETSI EN 300 328, clause 5.4.7.2.1.

The EUT was supplied with 3.3 VDC directly with a DC PSU.

2.5.5 Environmental Conditions

Ambient Temperature	22.6 °C
Relative Humidity	54.8 %



2.5.6 Test Results

2.4 GHz Bluetooth Low Energy - Conducted Tests

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	4.3.2.7.3	Test Method(s):	5.4.7.2.1
Specification Limit:	2400.0 MHz < f _L & f _H < 2483.5 MHz		

DUT Configuration			
Mode:	ETSI BLE GFSK (LE 1M)	Duty Cycle (%):	-
Antenna Configuration:	SISO	DCCF (dB):	-
Power Index:	5.00	Antenna Gain (dBi):	-
Supply Voltage:	3.30V	TX Mode:	Continuous Modulated Packet Bursts

Test Frequency (MHz)	99% Occupied Bandwidth (MHz)	99% OBW Markers (MHz)	
		f _L	f _H
2402 (CH0)	1.203	2401.397	2402.600
2404 (CH1)	1.203	2403.397	2404.600
2478 (CH38)	1.200	2477.397	2478.597
2480 (CH39)	1.200	2479.397	2480.597

Table 51 - 99% Occupied Bandwidth Results

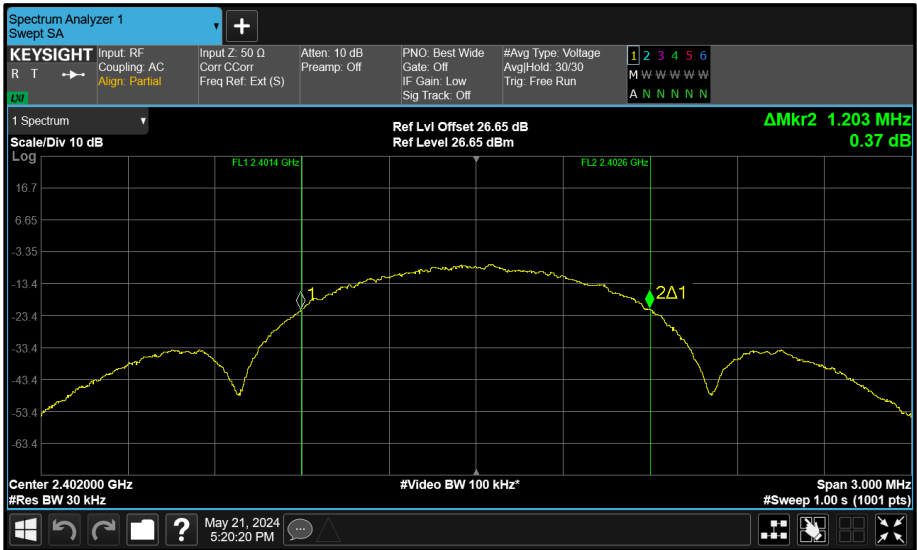


Figure 17 - 2402 MHz (CH0)

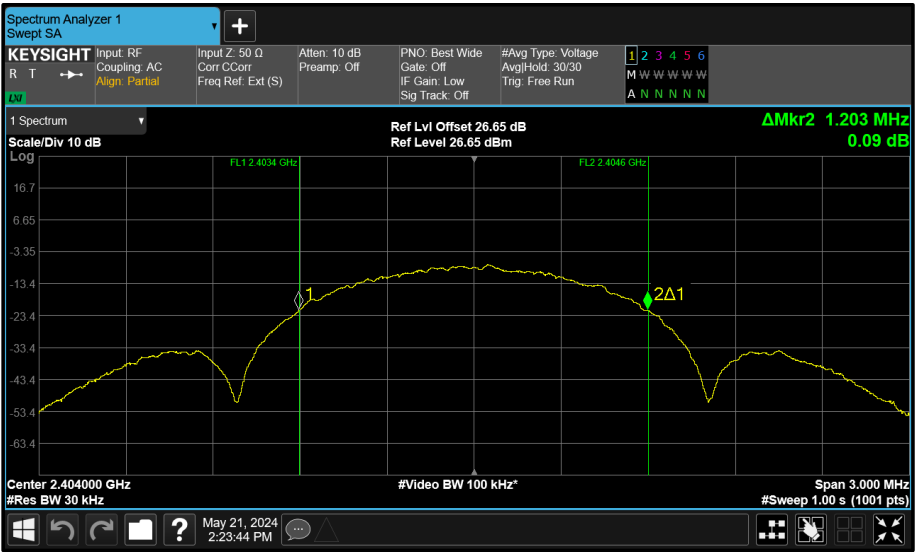


Figure 18 - 2404 MHz (CH1)

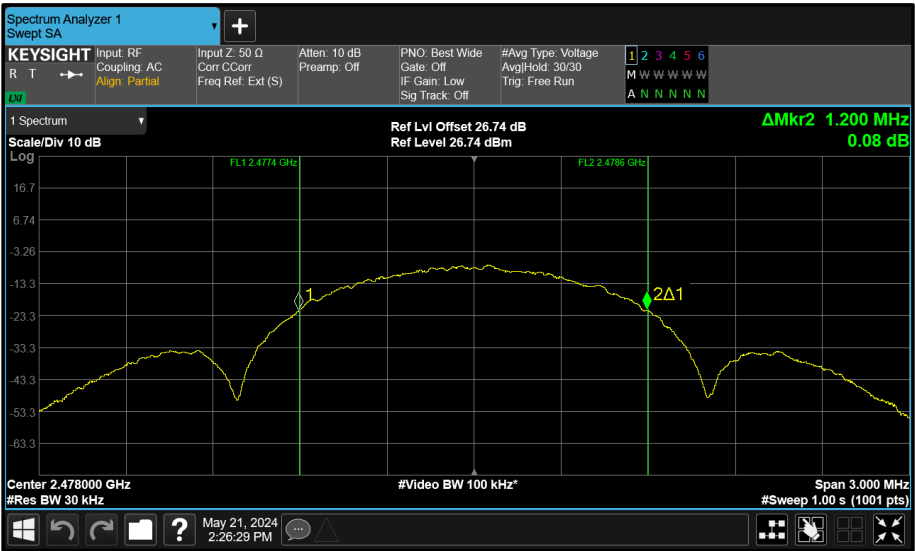


Figure 19 - 2478 MHz (CH38)

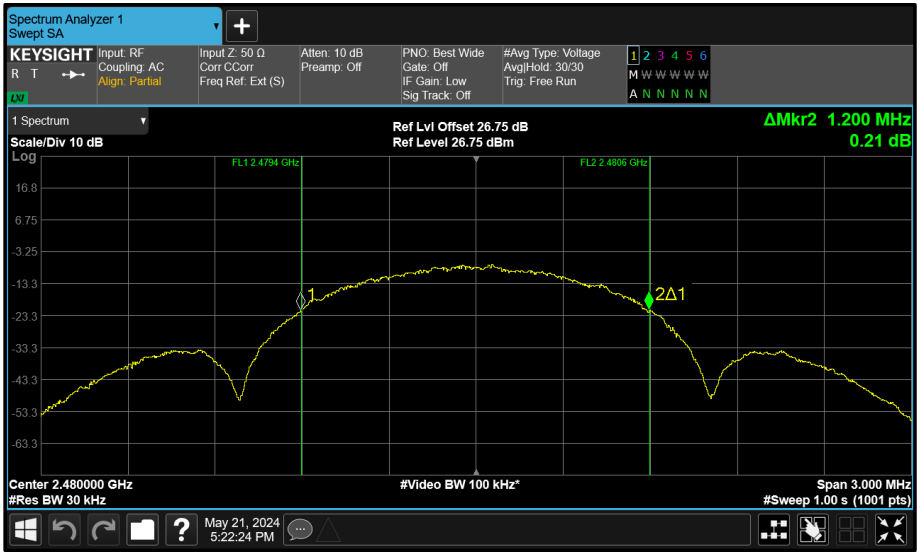


Figure 20 - 2480 MHz (CH39)

Test Frequency (MHz)	99% Occupied Bandwidth (MHz)	99% OBW Markers (MHz)	
		f _L	f _H
2404 (CH0)	2.415	2402.795	2405.210
2478 (CH36)	2.410	2476.795	2479.205

Spectrum Analyzer 1
Swept SA

KEYSIGHT Input: RF Coupling: AC Align: Partial
 R T $\rightarrow$ Input Z: 50 Ω Corr: C Corr Freq Ref: Ext (S) Atten: 10 dB Preamp: Off
 PNO: Best Wide Gate: Off IF Gain: Low Sig Track: Off #Avg Type: Voltage Avg/Hold: 30/30 Trng: Free Run

1 2 3 4 5 6
 M W W W W W
 A N N N N N

1 Spectrum
 Scale/Div 10 dB Log Ref Lvl Offset 26.65 dB Ref Level 26.65 dBm

ΔMkr2 2.415 MHz 0.33 dB

Center 2.404000 GHz #Res BW 51 kHz #Video BW 200 kHz* Span 5.000 MHz #Sweep 1.00 s (1001 pts)

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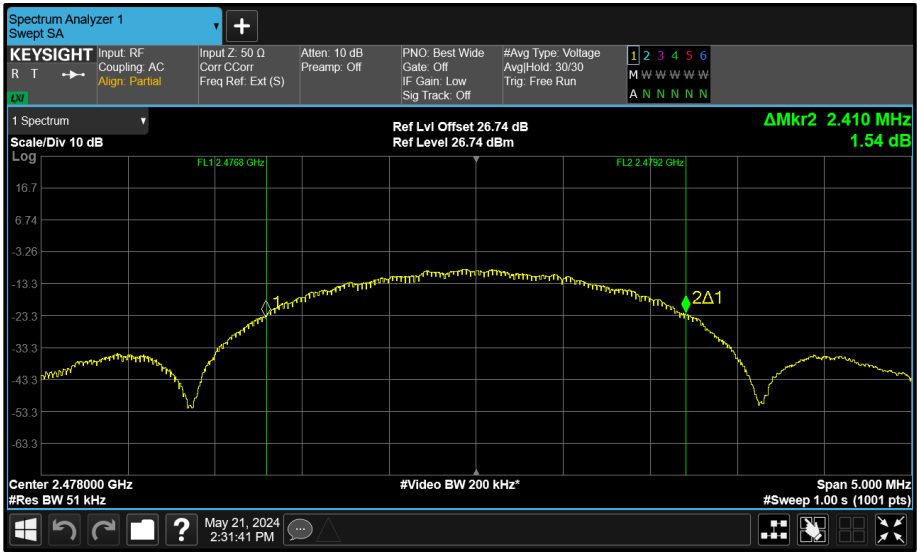


Figure 22 - 2478 MHz (CH38)



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	4.3.2.7.3	Test Method(s):	5.4.7.2.1
Specification Limit:	2400.0 MHz < f _L & f _H < 2483.5 MHz		

DUT Configuration			
Mode:	ETSI BLE GFSK (LE 125k)	Duty Cycle (%):	-
Antenna Configuration:	SISO	DCCF (dB):	-
Power Index:	5.00	Antenna Gain (dBi):	-
Supply Voltage:	3.30V	TX Mode:	Continuous Modulated Packet Bursts

Test Frequency (MHz)	99% Occupied Bandwidth (MHz)	99% OBW Markers (MHz)	
		f _L	f _H
2402 (CH0)	1.149	2401.421	2402.570
2404 (CH1)	1.149	2403.418	2404.567
2478 (CH38)	1.149	2477.418	2478.567
2480 (CH39)	1.149	2479.421	2480.570

Table 53 - 99% Occupied Bandwidth Results

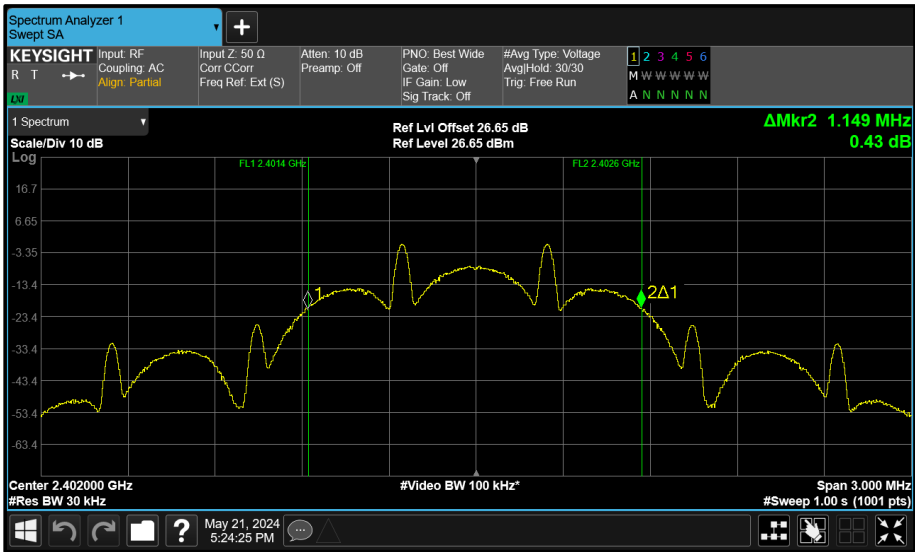
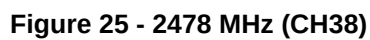
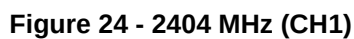


Figure 23 - 2402 MHz (CH0)



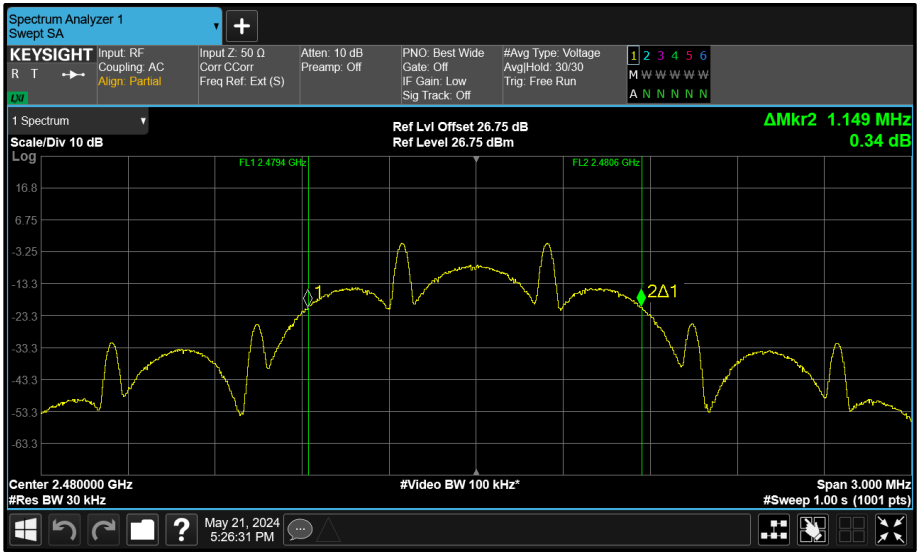


Figure 26 - 2480 MHz (CH39)



ETSI EN 300 328, Limit Clause 4.3.2.7.3

The Occupied Channel Bandwidth shall be within the band 2400 MHz to 2483.5 MHz.

In addition, for non-adaptive non-FHSS equipment with e.i.r.p. greater than 10 dBm, the Occupied Channel Bandwidth shall be equal to or less than 20 MHz.

2.5.7 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
Hygrometer	Rotronic	I-1000	3220	12	28-Nov-2024
GPSDR Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	14-Sep-2024
MXA Signal Analyser	Keysight Technologies	N9020B	5528	24	18-Sep-2025
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 54

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment



2.6 Transmitter Unwanted Emissions in the Out-of-Band Domain

2.6.1 Specification Reference

ETSI EN 300 328, Clause 4.3.2.8

2.6.2 Equipment Under Test and Modification State

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

2.6.3 Date of Test

21-May-2024

2.6.4 Test Method

This test was performed in accordance with ETSI EN 300 328, clause 5.4.8.2.1.

The EUT was supplied with 3.3 VDC directly with a DC PSU.

2.6.5 Environmental Conditions

Ambient Temperature	22.6 °C
Relative Humidity	54.8 %



2.6.6 Test Results

2.4 GHz Bluetooth Low Energy - Conducted Tests

Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	4.3.2.8.3	Test Method(s):	5.4.8.2.1

DUT Configuration			
Mode:	ETSI BLE GFSK (LE 1M)	Duty Cycle (%):	84.5 (Data) 33.9 (Adv)
Antenna Configuration:	SISO	DCCF (dB):	-
Power Index:	5.00	Antenna Gain (dBi):	2.80
Supply Voltage:	3.30V	TX Mode:	Continuous Modulated Packet Bursts

Maximum Measured Segment EIRP							
Mask		2404 (CH1)			2478 (CH38)		
Segment	EIRP Limit (dBm/MHz)	Frequency (MHz)	EIRP (dBm/MHz)	Margin (dB)	Frequency (MHz)	EIRP (dBm/MHz)	Margin (dB)
(2400 MHz - 2BW) to (2400 MHz - BW)	-20.0	2398.351	-51.9	-31.9	2398.094	-55.1	-35.1
(2400 MHz - BW) to 2400 MHz	-10.0	2399.500	-52.7	-42.7	2399.297	-55.0	-45.0
2483.5 MHz to (2483.5 MHz + BW)	-10.0	2484.000	-50.9	-40.9	2484.000	-50.2	-40.2
(2483.5 MHz + BW) to (2483.5 MHz + 2BW)	-20.0	2485.298	-55.0	-35.0	2485.203	-54.3	-34.3
Mask		2402 (CH0)			2480 (CH39)		
Segment	EIRP Limit (dBm/MHz)	Frequency (MHz)	EIRP (dBm/MHz)	Margin (dB)	Frequency (MHz)	EIRP (dBm/MHz)	Margin (dB)
(2400 MHz - 2BW) to (2400 MHz - BW)	-20.0	2398.351	-49.3	-29.3	2398.297	-51.3	-31.3
(2400 MHz - BW) to 2400 MHz	-10.0	2399.500	-47.6	-37.6	2399.500	-51.2	-41.2
2483.5 MHz to (2483.5 MHz + BW)	-10.0	2484.000	-47.0	-37.0	2484.000	-46.4	-36.4
(2483.5 MHz + BW) to (2483.5 MHz + 2BW)	-20.0	2485.298	-51.0	-31.0	2485.203	-50.3	-30.3

Table 55 - Transmitter unwanted emissions in the out-of-band domain



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	4.3.2.8.3	Test Method(s):	5.4.8.2.1

DUT Configuration			
Mode:	ETSI BLE GFSK (LE 2M)	Duty Cycle (%):	42.5
Antenna Configuration:	SISO	DCCF (dB):	-
Power Index:	5.00	Antenna Gain (dBi):	2.80
Supply Voltage:	3.30V	TX Mode:	Continuous Modulated Packet Bursts

Maximum Measured Segment EIRP							
Mask		2404 (CH1)			2478 (CH38)		
Segment	EIRP Limit (dBm/MHz)	Frequency (MHz)	EIRP (dBm/MHz)	Margin (dB)	Frequency (MHz)	EIRP (dBm/MHz)	Margin (dB)
(2400 MHz - 2BW) to (2400 MHz - BW)	-20.0	2398.300	-49.7	-29.7	2396.085	-52.2	-32.2
(2400 MHz - BW) to 2400 MHz	-10.0	2399.300	-49.5	-39.5	2398.085	-51.9	-41.9
2483.5 MHz to (2483.5 MHz + BW)	-10.0	2484.000	-48.1	-38.1	2484.000	-47.2	-37.2
(2483.5 MHz + BW) to (2483.5 MHz + 2BW)	-20.0	2485.400	-52.0	-32.0	2486.415	-51.3	-31.3

Table 56 - Transmitter unwanted emissions in the out-of-band domain



Test Configuration			
Frequency Range:	2400-2483.5 MHz	Band:	2.4 GHz
Limit Clause(s):	4.3.2.8.3	Test Method(s):	5.4.8.2.1

DUT Configuration			
Mode:	ETSI BLE GFSK (LE 125k)	Duty Cycle (%):	96.7 (Data) 34.1 (Adv)
Antenna Configuration:	SISO	DCCF (dB):	-
Power Index:	5.00	Antenna Gain (dBi):	2.80
Supply Voltage:	3.30V	TX Mode:	Continuous Modulated Packet Bursts

Maximum Measured Segment EIRP							
Mask		2404 (CH1)			2478 (CH38)		
Segment	EIRP Limit (dBm/MHz)	Frequency (MHz)	EIRP (dBm/MHz)	Margin (dB)	Frequency (MHz)	EIRP (dBm/MHz)	Margin (dB)
(2400 MHz - 2BW) to (2400 MHz - BW)	-20.0	2397.090	-54.7	-34.7	2398.202	-55.7	-35.7
(2400 MHz - BW) to 2400 MHz	-10.0	2398.500	-51.2	-41.2	2399.351	-55.7	-45.7
2483.5 MHz to (2483.5 MHz + BW)	-10.0	2484.000	-51.6	-41.6	2484.000	-50.9	-40.9
(2483.5 MHz + BW) to (2483.5 MHz + 2BW)	-20.0	2486.410	-55.4	-35.4	2485.298	-54.8	-34.8
Mask		2402 (CH0)			2480 (CH39)		
Segment	EIRP Limit (dBm/MHz)	Frequency (MHz)	EIRP (dBm/MHz)	Margin (dB)	Frequency (MHz)	EIRP (dBm/MHz)	Margin (dB)
(2400 MHz - 2BW) to (2400 MHz - BW)	-20.0	2398.300	-51.9	-31.9	2398.202	-55.8	-35.8
(2400 MHz - BW) to 2400 MHz	-10.0	2399.500	-49.1	-39.1	2399.500	-55.9	-45.9
2483.5 MHz to (2483.5 MHz + BW)	-10.0	2484.000	-51.5	-41.5	2484.000	-50.4	-40.4
(2483.5 MHz + BW) to (2483.5 MHz + 2BW)	-20.0	2485.200	-55.7	-35.7	2485.298	-53.9	-33.9

Table 57 - Transmitter unwanted emissions in the out-of-band domain

ETSI EN 300 328, Limit Clause 4.3.2.8.3

The transmitter unwanted emissions in the out-of-band domain shall not exceed the values provided by the emission mask as shown below.

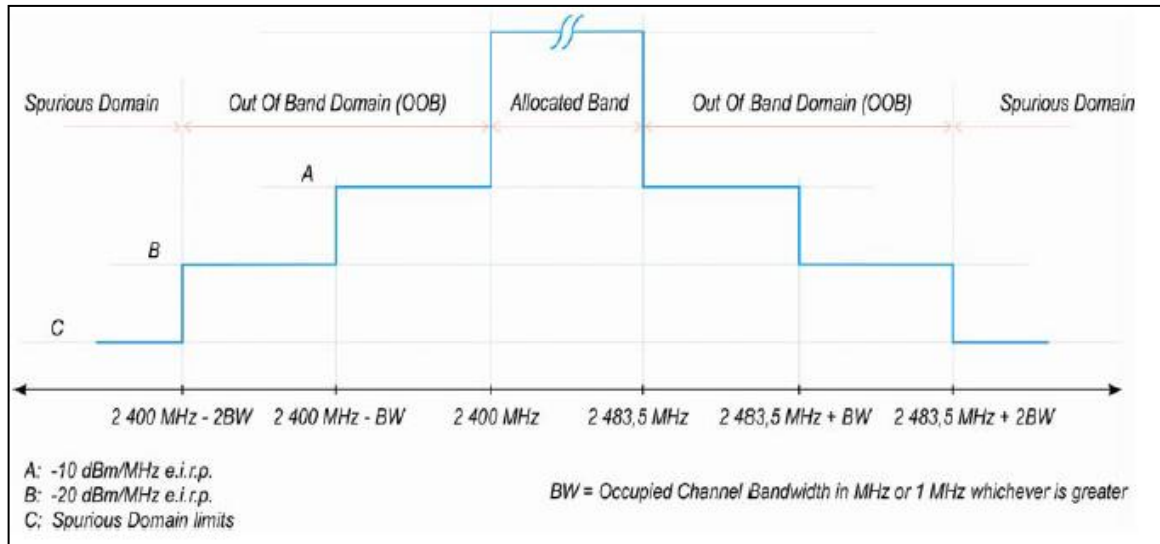


Figure 27 - OOB Emissions Limit

2.6.7 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
Hygrometer	Rotronic	I-1000	3220	12	28-Nov-2024
GPSDR Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	14-Sep-2024
MXA Signal Analyser	Keysight Technologies	N9020B	5528	24	18-Sep-2025
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 58

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment



2.7 Receiver Blocking

2.7.1 Specification Reference

ETSI EN 300 328, Clause 4.3.2.11

2.7.2 Equipment Under Test and Modification State

SiW917Y1GN, S/N: BLE MAC address: Not Serialised (FAR-815415-005) - Modification State 0

2.7.3 Date of Test

21-May-2024

2.7.4 Test Method

This test was performed in accordance with ETSI EN 300 328, Clause 5.4.11.2.

The EUT was supplied with 3.3 VDC directly with a DC PSU.

Due to the EUT worst case antenna assembly having a gain of 2.8 dBi, the limit for Wanted Signal Power and Unwanted Signal Power was increased by 2.8dB.

The EUT was set to Bluetooth Low Energy 1 Mbps on both 2402 MHz and 2480 MHz.

2.7.5 Environmental Conditions

Ambient Temperature	21.4 °C
Relative Humidity	36.8 %



2.7.6 Test Results

2.4 GHz Bluetooth Low Energy - Conducted Tests

Receiver Category: 2

Blocking Signal Frequency (MHz)	2402 MHz			2480 MHz		
	Wanted Signal Mean Power (dBm)*	Blocking Signal Power (dBm)*	Minimum Performance Criteria Met (Yes/No)	Wanted Signal Mean Power (dBm)*	Blocking Signal Power (dBm)*	Minimum Performance Criteria Met (Yes/No)
2380	-65.4	-9.37	Yes	-	-	Yes
2504	-	-	Yes	-65.4	-8.89	Yes
2300	-65.4	-5.82**	Yes	-	-	Yes
2584	-	-	Yes	-65.4	-7.54**	Yes

Table 59 - Blocking Results at Specification Level

*Corrected by the highest antenna gain in case of conducted measurements.

Remarks

Minimum performance criteria: The test laptop connected to the EUT via a serial connection (through a USB to UART cable) receives a report from the EUT that the PER is not equal to or greater than 10%.

**The unwanted signal level was unable to be adjusted higher with a stable RF output. However, compliance with the limit had been demonstrated at a lower output level.

ETSI EN 300 328, Limit Clause 4.3.2.11.4.3

Wanted Signal Mean Power from Companion Device (dBm) (see notes 1 and 3)	Blocking Signal Frequency (MHz)	Blocking Signal Power (dBm) (see note 3)	Type of Blocking Signal
(-139 dBm + 10 × Log ¹⁰ (OCBW) + 10 dB) or (-74 dBm + 10 dB) whichever is less (see note 2)	2380	-34	CW
	2504		
	2300		
	2584		
NOTE 1: OCBW is in Hz. NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to Pmin + 26 dB where Pmin is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal. NOTE 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.			

Table 60 - Blocking Level for Receiver Category 2 Equipment



2.7.7 Test Location and Test Equipment Used

This test was carried out in RF Laboratory 2.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Signal Generator: 10MHz to 20GHz	Rohde & Schwarz	SMR20	3475	12	29-Jun-2024
Vector Signal Generator	Rohde & Schwarz	SMU 200A	3493	12	02-Nov-2024
True RMS Multimeter	Fluke	179	4007	12	17-Nov-2024
Wideband Radio Communication Tester	Rohde & Schwarz	CMW 500	4143	12	10-Jul-2024
Quad Power Supply	Rohde & Schwarz	HMP4040	4955	-	O/P Mon
Power Splitter, 2 way	Mini-Circuits	ZN2PD2-63-S+	5239	-	O/P Mon
Cable (K Type 2m)	Junkosha	MWX241-02000KMS	5421	12	07-Mar-2025
Cable (SMA to SMA, 2 m)	Junkosha	MWX221-02000AMSAMS/A	5518	12	18-Apr-2025
EMI Test Receiver	Rohde & Schwarz	ESW44	5527	12	15-Jun-2024
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB 40	5605	12	07-Nov-2024
Cable (N to N, 2 m)	Junkosha	MWX221-02000AMSAMS/B	5725	6	03-Jun-2024
Cable (K Type 2m)	Junkosha	MWX241-02000KMSKMS/B	5936	12	21-May-2024
Cable (K Type 2m)	Junkosha	MWX241-02000KMSKMS/B	5938	12	21-May-2024
Test Coupling Network	TUV SUD	TUV_RxTest_001	6387	12	04-Sep-2024
Attenuator 5W 20dB DC-18GHz	Aaren	AT40A-4041-D18-20	6556	12	18-Jun-2024

Table 61

O/P Mon – Output Monitored using calibrated equipment

3 Photographs

3.1 Equipment Under Test (EUT)

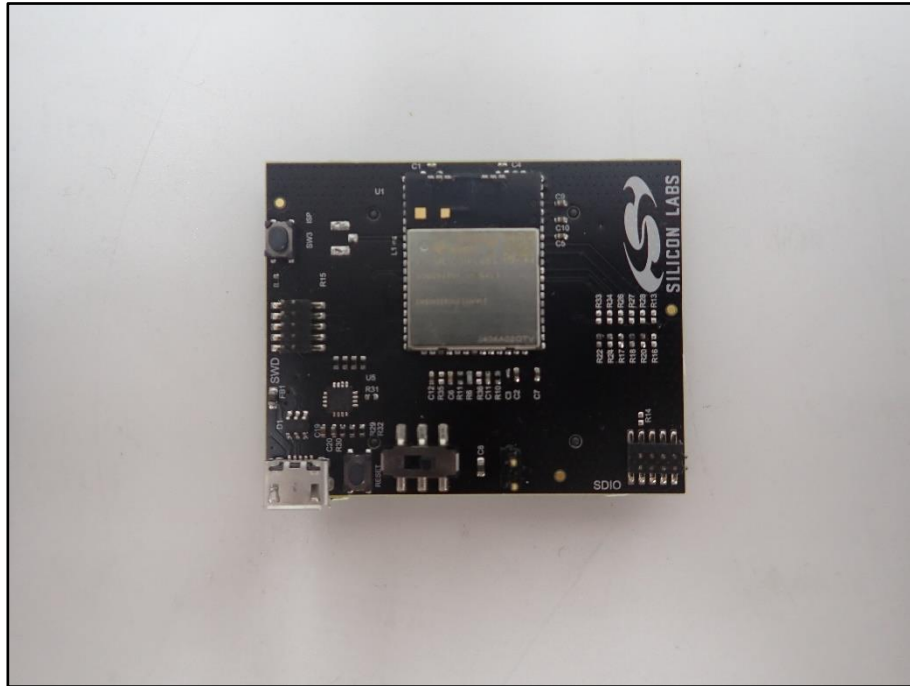


Figure 28 – EUT mounted on host certification board with integral antenna (SiW917Y1GA)



Figure 29 – EUT mounted on host certification board without integral antenna (SiW917Y1GN)



4 Measurement Uncertainty

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

Test Name	Measurement Uncertainty
Transmitter Unwanted Emissions in the Spurious Domain	Conducted: ± 2.5 dB Radiated: ± 3.08 dB
Receiver Spurious Emissions	Conducted: ± 2.5 dB Radiated: ± 3.08 dB
RF Output Power	± 1.38 dB
Power Spectral Density	± 1.49 dB
Occupied Channel Bandwidth	± 25.90 kHz
Transmitter Unwanted Emissions in the Out-of-Band Domain	± 2.5 dB
Receiver Blocking	± 1.96 dB

Table 62

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.