

FCC Test Report

For

IM21-PRT RFID Module

Version 2.0

Prepared By : Lavanya M

Report Revision History

REVISION HISTORY			
Date	Document Version	Revision Description	Author
22-10-2024	1.0	Initial Issue of Test Report	Lavanya M
08-11-2024	2.0	TCB Review Comments updated	Lavanya M

Laboratory CAB / registration no	FCC - 352470	ISED: IN0001	
Lab Report Number:	EMC 656-1		
Test Item Name or Nomenclature	IM21-PRT RFID Module		
Sample Identification:	Model No: IM21-PRT		
	Serial number: 22022476015		
	Hardware Version: 3010-9731-001, Rev A		
	Firmware version: 1.00.0006		
Requester name:	Jiang, Cindy		
Date of Receipt of Sample:	19-Aug-2024		
Condition of Sample on receipt:	Good		
Requester Address:	HONEYWELL INTERNATIONAL INC		
	9680 Old Bailes Rd, Fort Mill		
	South Carolina (SC) 29707, USA		
Testing Laboratory:	EMC LAB, Honeywell Technology Solutions Lab Pvt Ltd		
Address:	RMZ ECOWORLD INFRASTRUCTURE PVT. LTD.,		
	Survey # 19/2, Devarabisanahalli Village,		
	Varthur Hobli, Bangalore East Taluk, Bangalore – 560103		
Test Dates:	30-08-2024 to 27-Sep-2024		
Applicable Standard:	FCC Part 15 Subpart C 15.247, 15.207 RSS 247 Issue 3, RSS Gen Issue 5		
Test Results:	PASS		
FCC ID and IC	FCC ID: HD5-IM21	IC : 1693B-IM21	
Prepared By: Test Engineer Name: Lavanya M  Signature: Date: 08-11-2024			
Reviewed By (Name): Raju Jogadande  Signature: Date: 08-11-2024			
Authorized Signatory: Technical Manager Name: Gulshan Kumar  Signature: Date of Issue: 08-11-2024			
This Report relates to the above-mentioned test sample only. Without the approval of Lab manager, this report shall not be reproduced except in full.			

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Test Summary

Below is the summary of Test Results performed on IM21 RFID Module

Sl. No	Test	FCC	IC	Result
1	Maximum Conducted (Peak) Output Power	15.247 (b)(2)	RSS-247 issue 3, 5.4 (a)	PASS
2	Occupied Bandwidth (20dB)	15.247 (a) (1) (i)	RSS-247 issue 3, 5.1 (c)	PASS
3	Occupied Bandwidth (99 %)	15.247 (a) (1) (i)	RSS-247 issue 3, 5.1 (c)	PASS
4	Number of Hopping channels	15.247 (a) (1) (i)	RSS-247 issue 3, 5.1 (c)	PASS
5	Carrier Frequency Separation	15.247 (a) (1)	RSS-247 issue 3, 5.1 (b)	PASS
6	Time of Occupancy (Dwell Time)	15.247 (a) (1) (i)	RSS-247 issue 3, 5.1 (c)	PASS
7	Emissions in non-restricted frequency bands and Conducted Spurious Emission	15.247 (d)	RSS-247 issue 3, 5.5	PASS
8	Spurious Radiated Emissions, Band edge and Restricted Bands of Operation	15.247 (d) / (15.209 & 15.205)	RSS-GEN issue 5, Clause 8.9, 8.10	PASS
9	Conducted Emissions on Power Lines	FCC 15.207	RSS-Gen Issue 5,Section 8.8	PASS

Related Documents to this Report

All Documents mentioned below which are mentioned below are issued separately.

1. TEST SETUP PHOTOS
2. EUT EXTERNAL / INTERNAL PHOTOS
3. FCC LABEL AND LABEL LOCATION
4. BLOCK DIAGRAM
5. SCHEMATIC DIAGRAMS
6. BILL OF MATERIAL
7. USER MANUAL
8. MAXIMUM PERMISSIBLE EXPOSURE INFORMATION

Product Details

Product Function and Intended Use

IM21-PRT RFID module is a UHF RFID Module built to suit nearly any product but is especially suited for use in mobile computers and tablets, fixed position readers, handheld scanners, and diagnostic equipment. With an enhanced radio frequency (RF) design, the Honeywell IM21-PRT RFID module is one of the smallest and most cost-effective high-performance UHF reader modules available today with industry very good sensitivity which helps in long read & write range. Providing RF output power up to 1 Watt (30 dBm) and superior receiver performance, the IM21-PRT RFID Module offers exceptional flexibility for medium to long-range applications

RF Communication Details

OPERATING FREQUENCY RANGE	902MHz to 928MHz
COMMUNICATION PROTOCOL	RFID (Radio Frequency Identification Device)
PROTOCOL	EPC Class 1 Gen 2 Protocol , ISO 18000-6C
MODULATION TYPE	PR-ASK
DATA ENCODING	DRM (Dense Reader mode)
DATA RATE / READ RATE	~700 Tags / sec
NO. OF CHANNELS	50
CHANNEL SPACING	500KHz
TRANSMIT POWER	29dBm
MAXIMUM PEAK CONDUCTED POWER (MEASURED)	29.65dBm (maximum conducted power)
NO. OF ANTENNA PORTS	2
NO. OF ANTENNA'S /COUPLERS	6
MODE OF OPERATION	SISO mode only (either Antenna Port 1 or Antenna Port 2 at a time)

Antenna Details

Below is the list of UHF RFID couplers used along with IM21 RFID Module

Sl. No	Ant / Coupler	Make	Model	Max Gain (dBi)
1	PCB – RFID Coupler	Laird Technologies*	MAF95123-1 / 234-079-0600	-19.3
		Laird Technologies*	1-971140-001	-24.2
2		Unictron Technologies*	H2B1JH1A1H0200 / 710000068100	-23.0
3		Honeywell	LUPUS14V2	-14.0
4		Honeywell	LUPUS32	-27.2
5		Honeywell	CORVUS10	-20.5

*Custom design for Honeywell Products only.

Environment and Dimensions

SUPPLY VOLTAGE	2.4vdc to 5.2vdc
STORAGE	-40° to 70° C (-40° to 158° F), 25 °C to 60 °C, 0% to 95% relative humidity, noncondensing
OPERATING	-20° to 60° C (-4° to 140° F) 25 °C to 60 °C, 0% to 95% relative humidity, noncondensing
DIMENSIONS	50.85mm (L)x 30.43mm(W)x 7.18mm(H)

Input and Output Ports

Sl. No	Port Name	Port Type	Cable Length	Cable Type	Remarks / Observations
01	Power + Communication Port	+5VDC	<1m	USB cable	...

EUT Details and Operating Mode

Operating Mode

Transmission was enabled with highest possible duty cycle transmission on low, mid and high channel

Hardware and Software Versions

Version Details	
Hardware version : 3010-9731-001, Rev A	Software/Firmware version : 1.00.0006

Auxiliary Equipment & accessories

Test laptop, USB cable, DC Power Supply

Operating Frequency List

Allowed Frequency Band	Channel No.	Frequency (MHz)
Sub GHz Band 902-928MHz	1	902.75MHz
	:	:
	26	915.250MHz
	:	:
	50	927.250MHz

Operational Description

The module supports a full 1 Watt of output power, twice as much as many small form factor competitive modules. The IM21-PRT RFID Module is based on the latest RF technology to provide a superior read rate with low power consumption and low-voltage operation, helping to extend the battery life of mobile devices. The IM21-PRT RFID also supports a wide frequency range, 860-928 MHz, enabling the module to be certified in nearly any regulatory region

Test Methodology

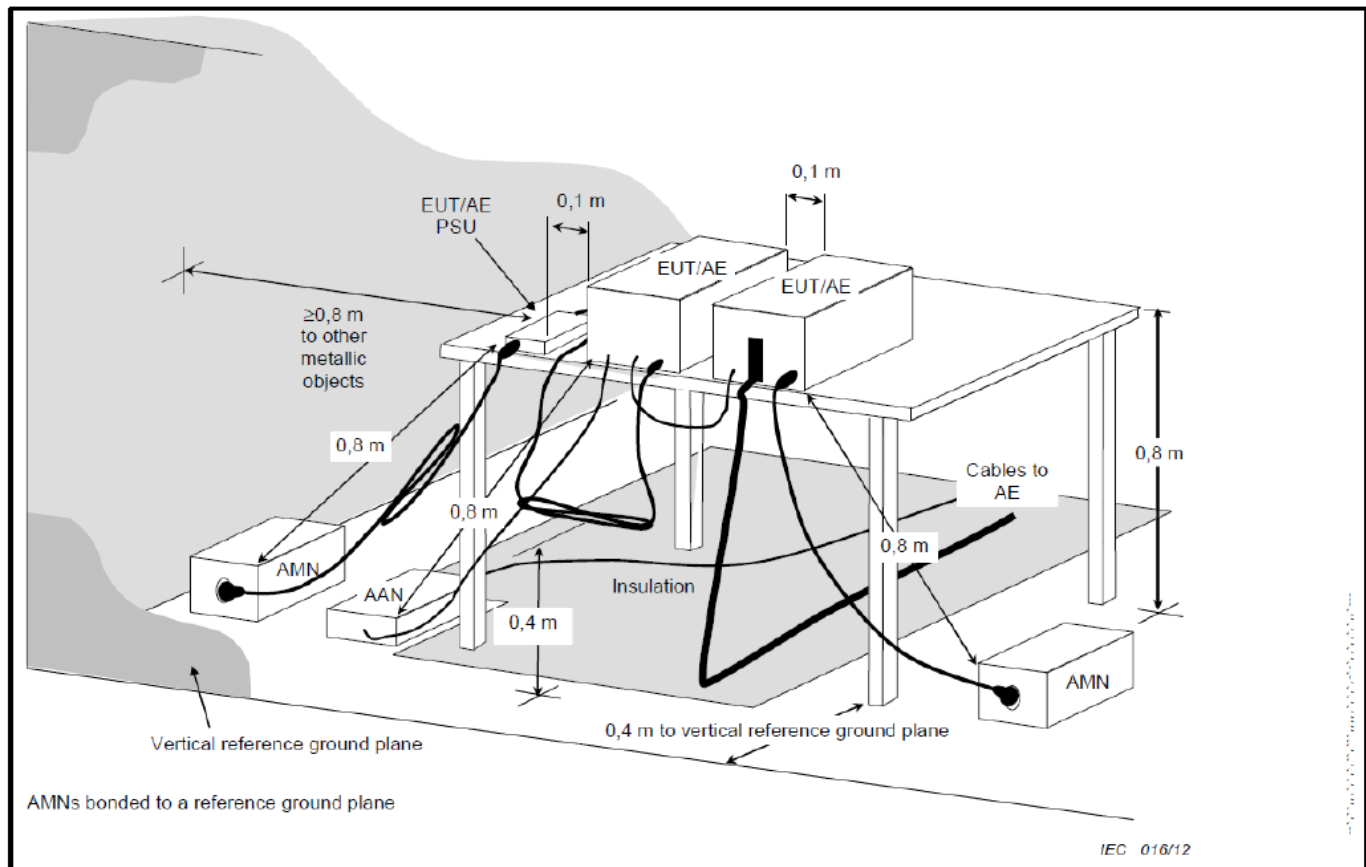
Conducted Spurious Emissions

Measured Conducted Emission levels of ac powerline conduct using the 50Ω LISN port (to which the EUT is connected). All emission voltage is made on each current-carrying conductor port (i.e. Line and Neutral) at the plug end of the EUT power cord using mating plugs and receptacles on the LISN. Equipment is tested with power cords that are normally supplied or recommended by the manufacturer and that have electrical and shielding characteristics that are the same as those cords normally supplied or recommended by the manufacturer.

The Device Under Test and Associated equipment are placed on the test table on the test table, raised 80cm above the reference ground plane. The vertical conducting plane is located 40cm to the rear of the device. AC Conducted emission measurement is made over frequency range from 150kHz to 30MHz, this measurement was performed with EUT powered with an AC to DC adaptor with 110V AC 60Hz supply

Test Setup and Configuration

Test Setup shall be made in accordance with below picture.



Radiated Emission Test

The radiated emission measurement was performed according to the procedures in ANSI C63.10-2013. The equipment under test (EUT) was placed at the middle of the 80 cm high turntable for below 1 GHz & 1.5 m height for above 1 GHz measurement.

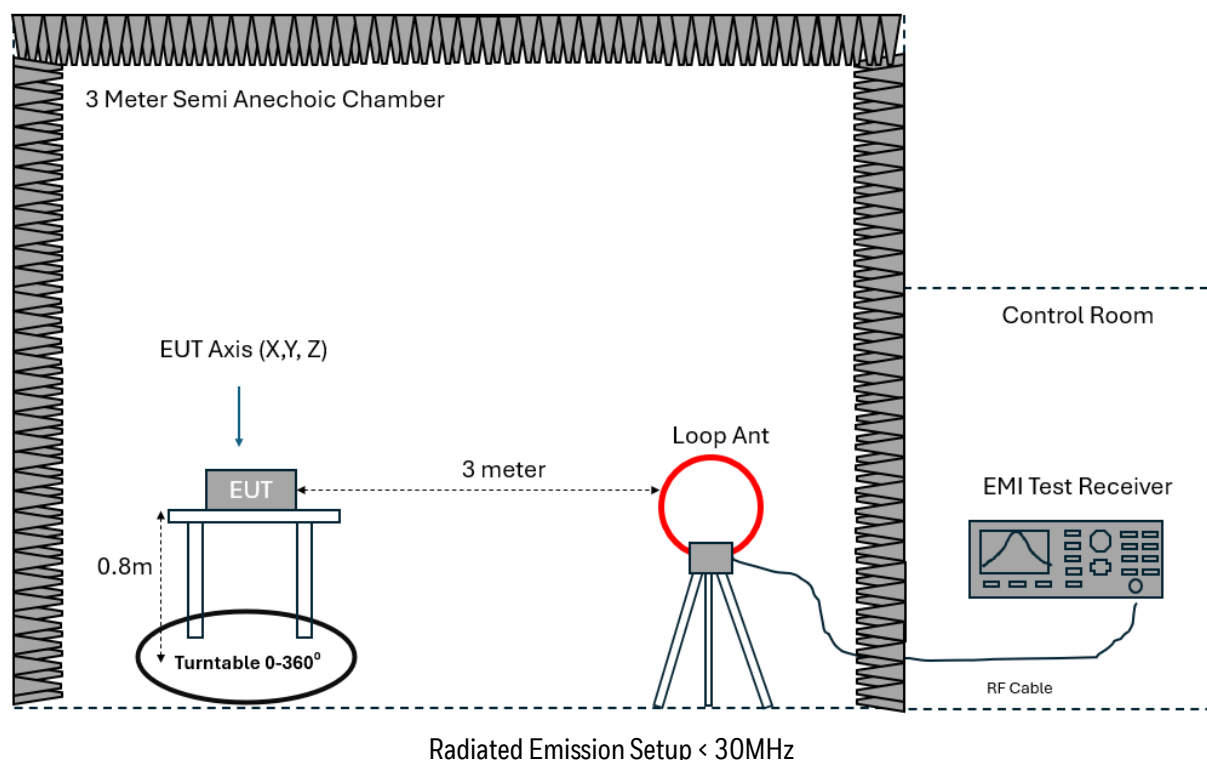
The EUT was kept at 3 meter away from the Measuring Antennas in a 3 meter semi anechoic chamber. The turntable was rotated from 0° - 360° for obtaining the maximum emission. The EUT was rotated around the X-, Y-, and Z-Axis and the results from worst case axes are recorded

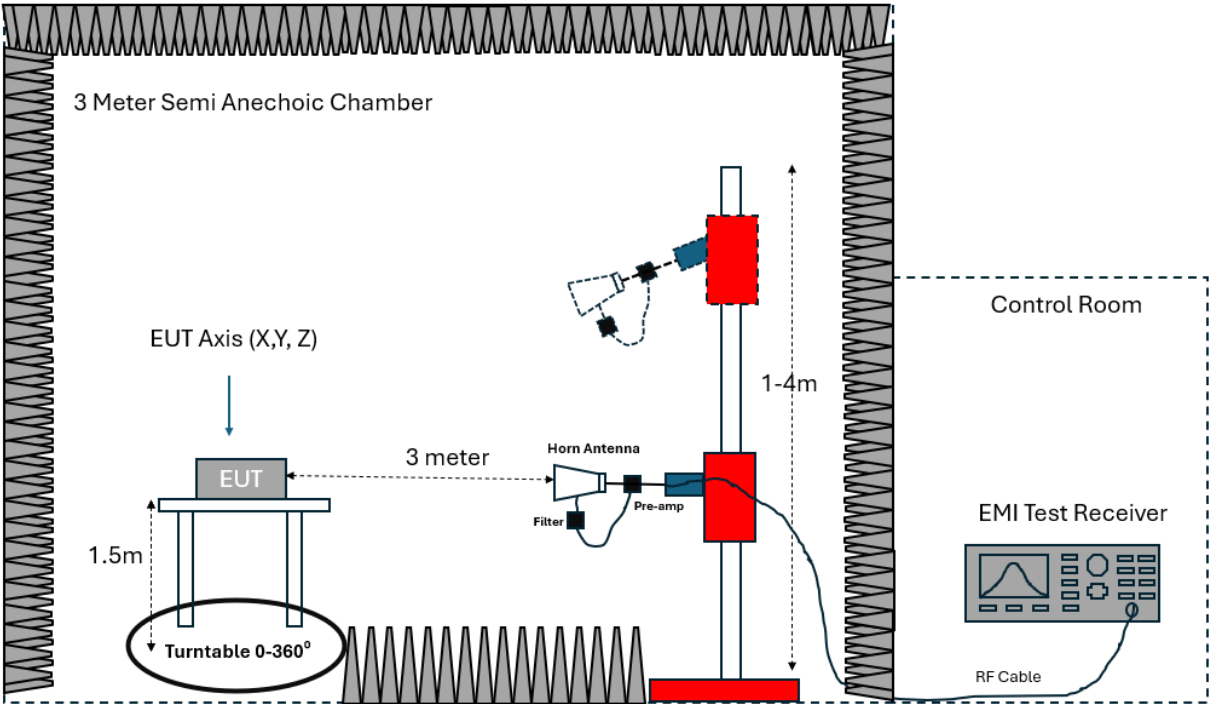
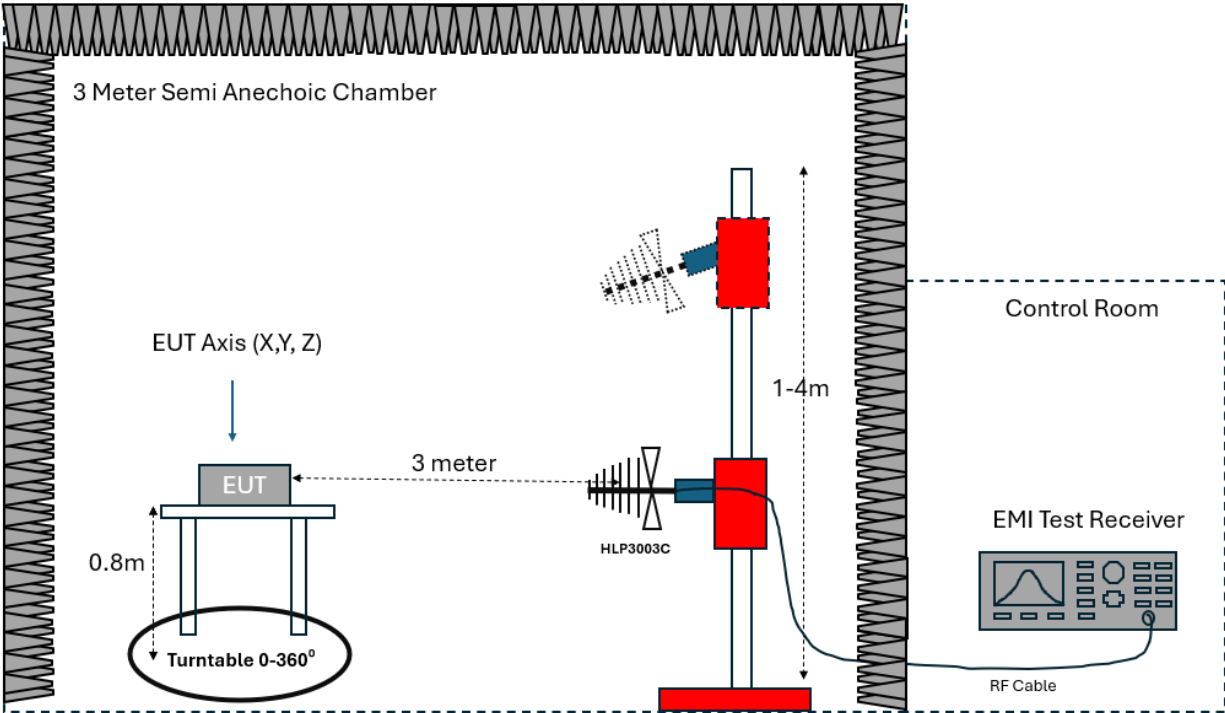
The height of the measuring antennas was scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Test is repeated until the maximum emissions were obtained.

The measurement above 1000 MHz was performed by Horn antenna, The measurement below 30 MHz was performed by loop antenna, Measurement from 30 MHz to 1GHz was performed by Biconical-log periodic antenna.

Test Setup Arrangements

Below are the details of EUT test setup done in 3 meter semi anechoic chamber.





Test Equipment Lists

Below is the list of equipment's used for testing.

Test Category	Item Name / Description	Make	Model	Sl. No	Cal Due Date
Radiated Spurious Emissions	3 meter Semi anechoic Chamber	ETS LINDGREN	DKE 6X7 DBL.DR	1625	30-Jan-2027
	EMI Test Receiver	R&S	ESU26	100229	03-Dec-2024
	Bi Log Antenna	TDK	HLP3003C	130524	12-Nov-2025
	Bi Log Antenna	TDK	HLP3003C	130525	26-July-2026
	Double Ridge Guide Horn Antenna	ETS LINDGREN	3117	00119022	08-Nov-2025
	Double Ridge Guide Horn Antenna	ETS LINDGREN	3117	00064055	24-July-2026
	Signal Conditioning unit	R&S	SCU-18F	180059	21-Mar-2025
	Signal Conditioning unit	R&S	SCU-18F	101074	23-Oct-2024
	Loop Antenna	ETS LINDGREN	6502	00201679	11-Nov-2025
	RE Cable 1 & 2	A.H Systems	SAC-26G-2 & SAC-26G-3	496 & 494	25-Mar-2025
	Notch / High Pass Filter	Wain Wright	WHKX1.5/15G-12ST	01	29-Jun-2026
Conducted Emission on AC port	EMI Test Receiver	R&S	ESW8	101246	10-Oct-2024
	2 Line LISN	R&S	ENV216	100019	22-Feb-2026
	Pulse Limiter	R&S	ESH3-Z2	100622	22-Mar-2026
	RF Cable - 40 GHz - 3Mtrs	Junflow	J12J102453-00	RF3-3M	25-Jun-2025
	RF Cable - 40 GHz - 3Mtrs	Junflow	J12J102453-00	RF2-3M	25-Jun-2025
Antenna Port (s) Conducted Test	Signal Analyzer	R&S	FSV3044	101263	27-Jun-2025
	RF Cable (N-Male to N-Male)	Huber+Suhner	1955326	2013507	26-Jun-2025
	RF Cable (N-Male to SMA-Male)	Junkosha	MWX221	2203S736	25-Jun-2025
	RF Cable - 40 GHz - 0.5Mtrs	Junflon	J12J102453-00	RF1-0.5M	25-Jun-2025
	RF Cable - 40 GHz - 3Mtrs	Junflow	J12J102453-00	RF3-3M	25-Jun-2025
	RF Cable - 40 GHz - 3Mtrs	Junflow	J12J102453-00	RF2-3M	25-Jun-2025
	Notch / High Pass Filter	Wain Wright	WHKX1.5/15G-12ST	01	29-Jun-2026
	Attenuator 20dB	Weinschel	F4M-20	M8648	29-Jun-2025
	Vector Signal Generator	R&S	SMM 100A	101741	30-Jun-2025
	Signal Generator(100KHz to 40GHz)	R&S	SMB 100A	183054	30-Jun-2025

Instrument Application / Software's

Sl No.	Test Type	Version Details
01	EMC32 Software for Radiated Spurious Emissions	Version 10.60.20
02	EMC32 Software for Conducted Emission test on AC mains	Version 10.60.20

Measurement Uncertainty (Uc)

Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of $k = 2$

SI No.	Parameter	Uncertainty Value
01	Occupied Channel Bandwidth	$\pm 5 \%$
02	RF output power, conducted	$\pm 1.4 \text{ dB}$
03	Power Spectral Density, conducted	$\pm 1.4 \text{ dB}$
04	Spurious / Unwanted Emissions, conducted	$\pm 3.0 \text{ dB}$
05	Radiated Spurious Emissions <1GHz	4.3 dB
06	Radiated Spurious Emission > 1GHz	5.5dB
07	Temperature	$\pm 3^\circ\text{C}$
08	Supply Voltages	$\pm 5 \%$

Decision rule applied.

SI No.	Decision rule applied
☒	Measurement Uncertainty is not accounted while reporting statement of conformity to specification / standard. (shared risk)
☐	Measurement uncertainty is accounted, and results reported as per ILAC-G8 guidelines

1. Maximum (Peak) Conducted Power

Test was performed on the antenna Port of EUT to evaluate the maximum Peak Output Power meets the specifications defined in the standard. Below are the details of the test.

General Information

EUT NOMENCLATURE	IM21-PRT RFID Module
MODEL NO.	IM21-PRT
SERIAL NO.	22022476015
TESTED BY	Lavanya M
TEST DATES	16-09-2024

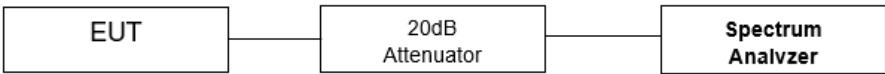
Test Conditions

TEST VOLTAGE	+5.0VDC
ENVIRONMENT COND.	Temperature : 23.2°C, Humidity : 64% RH
TEST CONFIGURATION	EUT Supplied with 5.0VDC from Laptop USB Port and Configured to Transmit continuously.
OPERATING MODE	Continuous Tx mode – Hopping Disabled Condition
DEVIATIONS FROM STD.	N/A

Test Specifications

TEST STANDARD	FCC part 15 Subpart C 15.247 (b)(2) / RSS-247 issue 2, 5.4 (a)
TEST SPECIFICATIONS	Section 9(b) in KDB 558074 D01 15.247 Measurement Guidance v05r02 & Subclause 7.8.5 of ANSI C63.10
TEST REQUIREMENT	Power ≤ 1 W (30 dBm) & e.i.r.p ≤ 4 W (36dBm)

Test Details

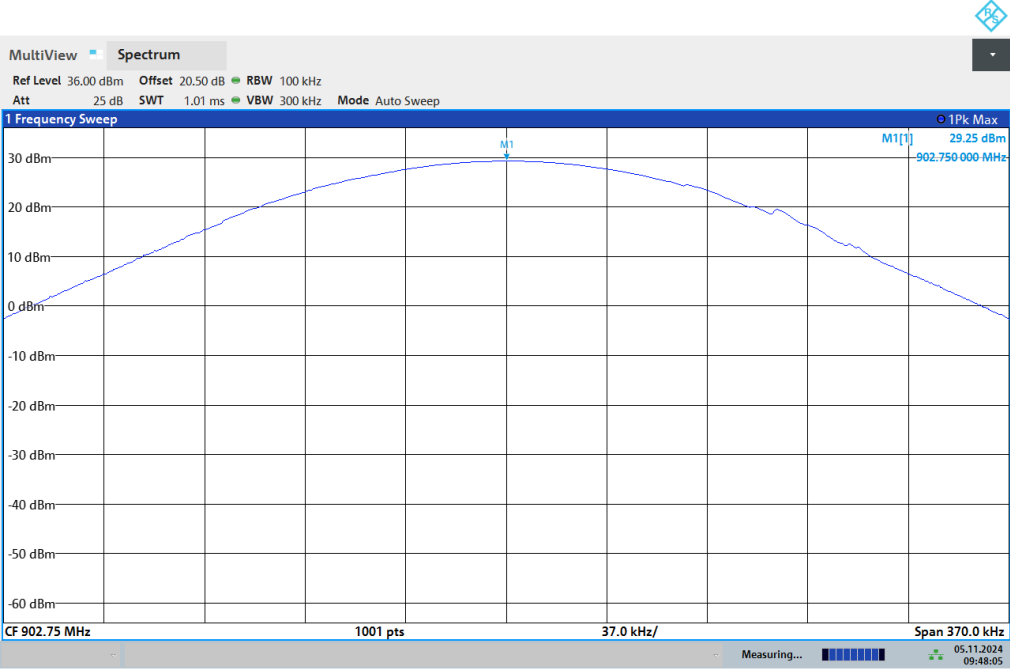
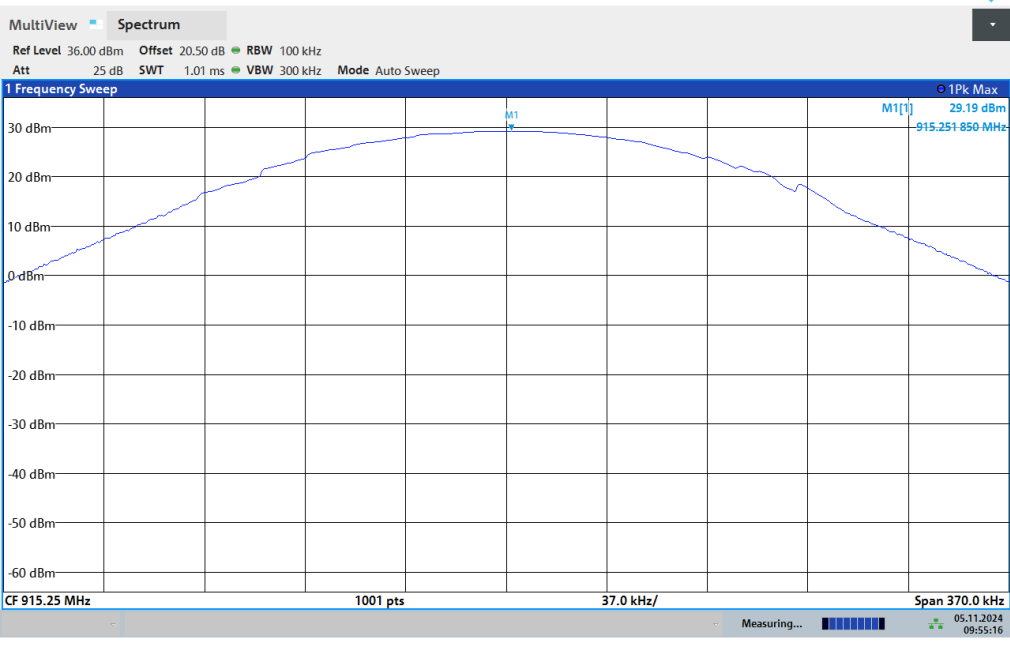
TEST METHOD	☒ Conducted ☐ Radiated	
TEST PORT	ANTENNA PORT (1 & 2)	
DETECTOR USED	Peak Detector – Max Hold	
TEST INSTR. BANDWIDTH	RBW : 100KHz (RBW > 20 dB bandwidth)	VBW :100KHz (VBW $\geq$ RBW)
TEST CONNECTION.	 <pre> graph LR EUT[EUT] --- Att[20dB Attenuator] Att --- SA[Spectrum Analyzer] </pre>	
RADIATED TEST PARAMETERS.	Measurement Distance	: N /A
	Antenna Height	: N/A
	Turntable rotation	: N/A
	Equipment Class	: N /A

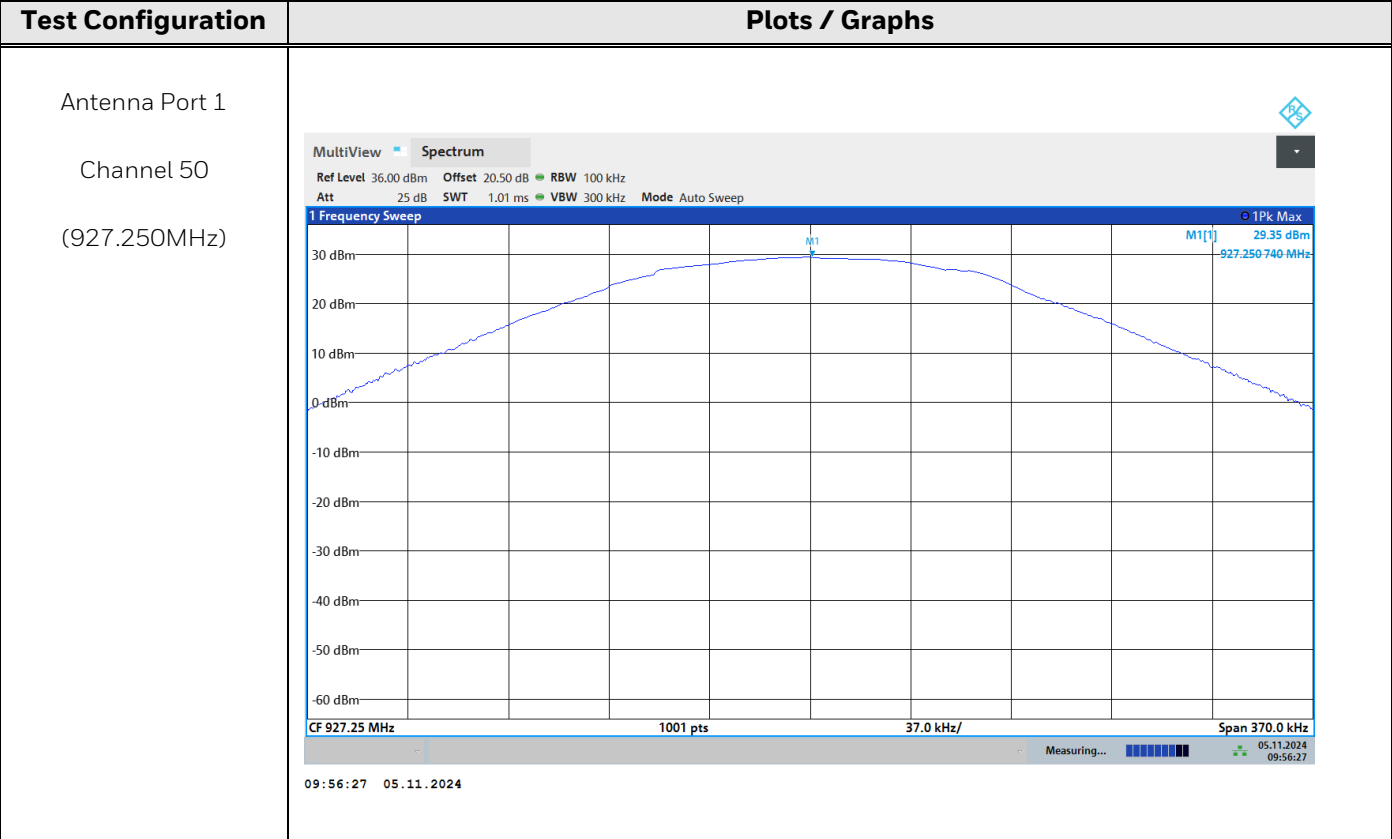
Test Results

Serial No	Antenna Port (1/2)	Channel No.	Channel Frequency MHz	Measured Conducted Peak Power (dBm)	Maximum (E.I.R.P) Limit (dBm)	Conducted Power Limit (dBm)	E.I.R.P Limit (dBm)	Test Results
1	Ant Port 1	CH01	902.750	29.25	15.65	30.0	36.0	PASS
2	Ant Port 1	CH26	915.250	29.19	15.25	30.0	36.0	PASS
3	Ant Port 1	CH50	927.250	29.35	15.37	30.0	36.0	PASS
4	Ant Port 2	CH01	902.750	29.09	15.53	30.0	36.0	PASS
5	Ant Port 2	CH26	915.250	29.25	15.32	30.0	36.0	PASS
6	Ant Port 2	CH50	927.250	29.29	15.42	30.0	36.0	PASS

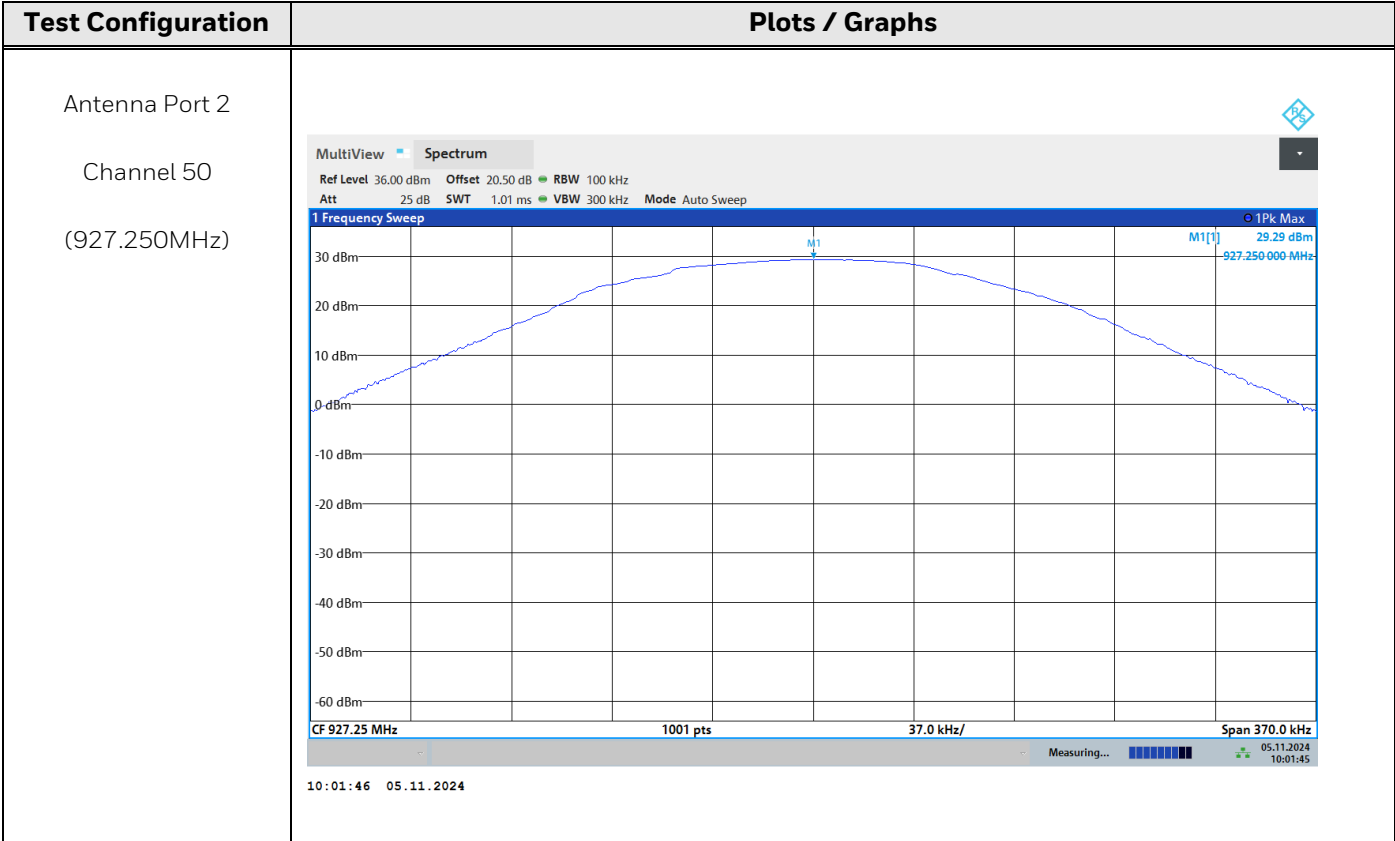
Notes and Observations

1. Above Test results are reported after including all the measurements losses.
2. Highest antenna Gain (dBi) is considered for the reported E.I.R.P results (LUPUS14V2)
3. Product do not support MIMO or simultaneous Transmissions of both antenna port. Only one antenna port can be selected for transmission at any point of time. The modules use internal RF switch to switch to either Port 1 or 2 (only SISO mode).
4. Product do not support additional beamforming Gain / Directional Gain. It uses single antenna or RF couplers. Gain Details of Antenna's & RF couplers are listed in page 7 of this report

Test Configuration	Plots / Graphs
Antenna Port 1 Channel 01 (902.750MHz)	 09:48:06 05.11.2024
Antenna Port 1 Channel 26 (915.250MHz)	 09:55:16 05.11.2024



Test Configuration	Plots / Graphs
Antenna Port 2 Channel 01 (902.750MHz)	MultiView Spectrum Ref Level 36.00 dBm Offset 20.50 dB RBW 100 kHz Att 25 dB SWT 1.01 ms VBW 300 kHz Mode Auto Sweep 1 Frequency Sweep 30 dBm 20 dBm 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm CF 902.75 MHz 1001 pts 37.0 kHz/ Span 370.0 kHz Measuring... 05.11.2024 10:06:57 10:06:58 05.11.2024
Antenna Port 2 Channel 26 (915.250MHz)	MultiView Spectrum Ref Level 36.00 dBm Offset 20.50 dB RBW 100 kHz Att 25 dB SWT 1.01 ms VBW 300 kHz Mode Auto Sweep 1 Frequency Sweep 30 dBm 20 dBm 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm CF 915.25 MHz 1001 pts 37.0 kHz/ Span 370.0 kHz Measuring... 05.11.2024 10:02:59 10:02:59 05.11.2024



2. Occupied Bandwidth (20dB)

The occupied bandwidth was measured as the width of the spectral envelope of the modulated signal, at an amplitude level reduced from a reference value by a ratio of 20dB. Below are the details of the test executed.

General Information

EUT NOMENCLATURE	IM21-PRT RFID Module
MODEL NO.	IM21-PRT
SERIAL NO.	22022476015
TESTED BY	Lavanya M
TEST DATES	16-09-2024

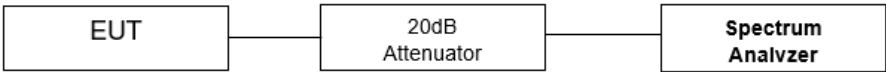
Test Conditions

TEST VOLTAGE	+5.0VDC
ENVIRONMENT COND.	Temperature : 23.5°C, Humidity : 66% RH
TEST CONFIGURATION	EUT Supplied with 5.0VDC from Laptop USB Port and Configured to Transmit continuously.
OPERATING MODE	Continuous Tx mode – Hopping Disabled Condition
DEVIATIONS FROM STD.	N/A

Test Specifications

TEST STANDARD	FCC part 15 Subpart C 15.247 (a) (1) (i) / RSS-247 issue 2, 5.1 (c)
TEST SPECIFICATIONS	Section 9(b) in KDB 558074 D01 15.247 Measurement Guidance v05r02 & Subclause 7.8.7 of ANSI C63.10
TEST REQUIREMENT	The minimum 20 dB bandwidth of the hopping channel is 250 kHz use at least 50 hopping frequencies

Test Details

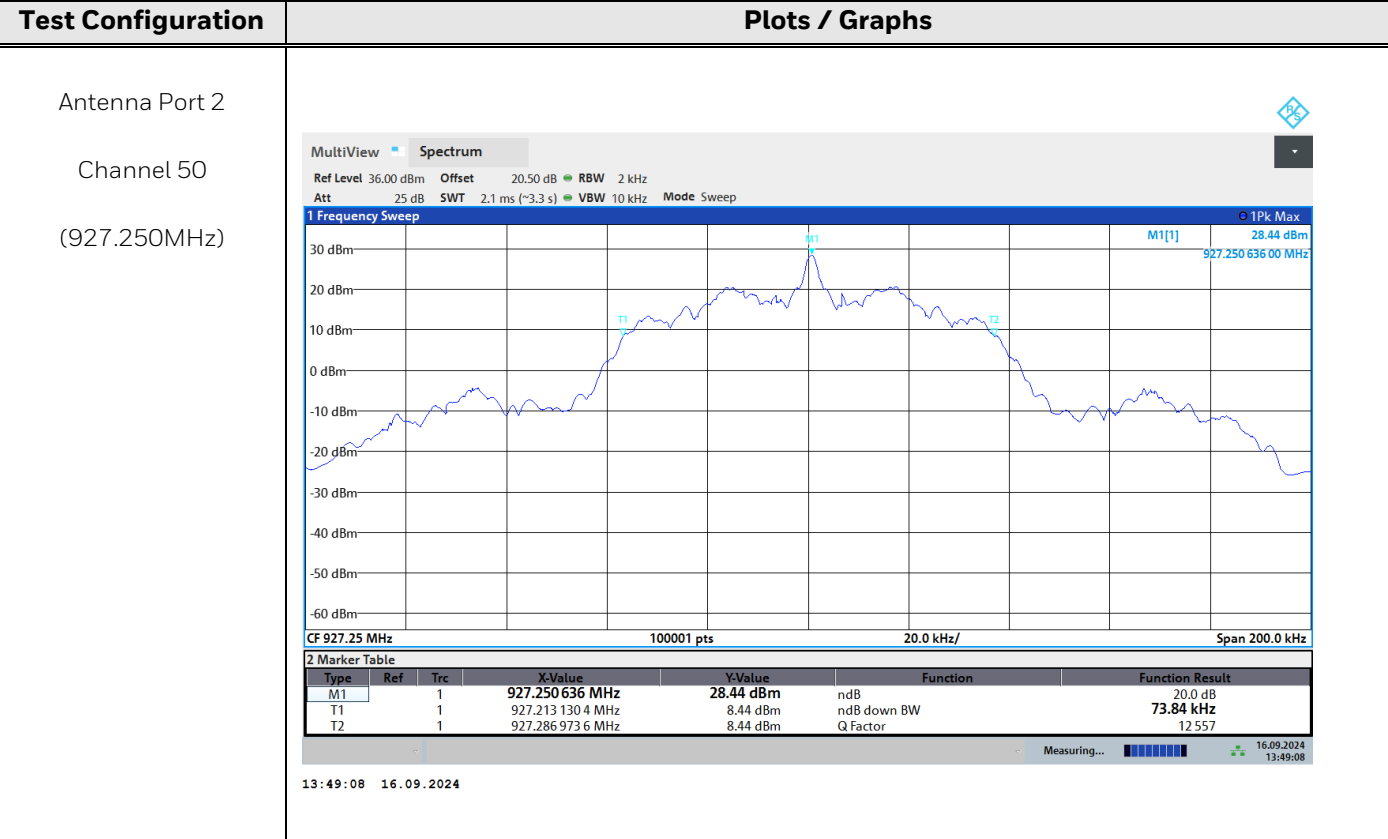
TEST METHOD	☒ Conducted ☐ Radiated	
TEST PORT	ANTENNA PORT (1 & 2)	
DETECTOR USED	Peak Detector – Max Hold	
TEST INSTR. BANDWIDTH	RBW : 2KHz (1% to 5% of the OBW)	VBW :10KHz (approximately three times RBW)
TEST CONNECTION.	 <pre> graph LR EUT[EUT] --- Attenuator[20dB Attenuator] Attenuator --- Analyzer[Spectrum Analyzer] </pre>	
RADIATED TEST PARAMETERS.	Measurement Distance	: N /A
	Antenna Height	: N/A
	Turntable rotation	: N/A
	Equipment Class	: N /A

Test Results

<i>Serial No</i>	<i>Antenna Port (1/2)</i>	<i>Channel No.</i>	<i>Channel Frequency (MHz)</i>	<i>20dB Bandwidth (KHz)</i>	<i>Maximum Limit (KHz)</i>	<i>Test Result</i>
1	Ant Port 1	CH01	902.750	73.62	250	PASS
2	Ant Port 1	CH26	915.250	72.91	250	PASS
3	Ant Port 1	CH50	927.250	73.34	250	PASS
4	Ant Port 2	CH01	902.750	73.60	250	PASS
5	Ant Port 2	CH26	915.250	72.91	250	PASS
6	Ant Port 2	CH50	927.250	73.84	250	PASS

Test Configuration	Plots / Graphs																												
Antenna Port 1 Channel 01 (902.750MHz)	MultiView Spectrum Ref Level 36.00 dBm Offset 20.50 dB RBW 2 kHz Att 25 dB SWT 2.1 ms (~3.3 s) VBW 10 kHz Mode Sweep 1 Frequency Sweep 30 dBm 20 dBm 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm CF 902.75 MHz 100001 pts 20.0 kHz/ Span 200.0 kHz 2 Marker Table <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td></td><td>902.750 612 MHz</td><td>28.72 dBm</td><td>ndB</td><td>20.0 dB</td></tr><tr><td>T1</td><td>1</td><td></td><td>902.713 844 4 MHz</td><td>8.72 dBm</td><td>ndB down BW</td><td>73.62 kHz</td></tr><tr><td>T2</td><td>1</td><td></td><td>902.787 459 6 MHz</td><td>8.72 dBm</td><td>Q Factor</td><td>12.263</td></tr></table> Measuring... 16.09.2024 13:53:39 13:53:40 16.09.2024	Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		902.750 612 MHz	28.72 dBm	ndB	20.0 dB	T1	1		902.713 844 4 MHz	8.72 dBm	ndB down BW	73.62 kHz	T2	1		902.787 459 6 MHz	8.72 dBm	Q Factor	12.263
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																							
M1	1		902.750 612 MHz	28.72 dBm	ndB	20.0 dB																							
T1	1		902.713 844 4 MHz	8.72 dBm	ndB down BW	73.62 kHz																							
T2	1		902.787 459 6 MHz	8.72 dBm	Q Factor	12.263																							
Antenna Port 1 Channel 26 (915.250MHz)	MultiView Spectrum Ref Level 36.00 dBm Offset 20.50 dB RBW 2 kHz Att 25 dB SWT 2.1 ms (~3.3 s) VBW 10 kHz Mode Sweep 1 Frequency Sweep 30 dBm 20 dBm 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm CF 915.25 MHz 100001 pts 20.0 kHz/ Span 200.0 kHz 2 Marker Table <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td></td><td>915.250 544 MHz</td><td>28.31 dBm</td><td>ndB</td><td>20.0 dB</td></tr><tr><td>T1</td><td>1</td><td></td><td>915.213 978 4 MHz</td><td>8.31 dBm</td><td>ndB down BW</td><td>72.91 kHz</td></tr><tr><td>T2</td><td>1</td><td></td><td>915.286 889 6 MHz</td><td>8.31 dBm</td><td>Q Factor</td><td>12.553</td></tr></table> Measuring... 16.09.2024 13:30:57 13:30:57 16.09.2024	Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		915.250 544 MHz	28.31 dBm	ndB	20.0 dB	T1	1		915.213 978 4 MHz	8.31 dBm	ndB down BW	72.91 kHz	T2	1		915.286 889 6 MHz	8.31 dBm	Q Factor	12.553
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																							
M1	1		915.250 544 MHz	28.31 dBm	ndB	20.0 dB																							
T1	1		915.213 978 4 MHz	8.31 dBm	ndB down BW	72.91 kHz																							
T2	1		915.286 889 6 MHz	8.31 dBm	Q Factor	12.553																							

Test Configuration	Plots / Graphs																												
Antenna Port 2 Channel 01 (902.750MHz)	MultiView Spectrum Ref Level 36.00 dBm Offset 20.50 dB RBW 2 kHz Att 25 dB SWT 2.1 ms (~3.3 s) VBW 10 kHz Mode Sweep 1 Frequency Sweep 30 dBm 20 dBm 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm CF 902.75 MHz100001 pts20.0 kHz/Span 200.0 kHz 2 Marker Table <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td></td><td>902.749 742 MHz</td><td>28.26 dBm</td><td>ndB</td><td>20.0 dB</td></tr><tr><td>T1</td><td>1</td><td></td><td>902.713 028 4 MHz</td><td>8.26 dBm</td><td>ndB down BW</td><td>73.60 kHz</td></tr><tr><td>T2</td><td>1</td><td></td><td>902.786 625 6 MHz</td><td>8.26 dBm</td><td>Q Factor</td><td>12.266</td></tr></table> Measuring...17.09.2024 06:33:46 06:33:47 17.09.2024	Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		902.749 742 MHz	28.26 dBm	ndB	20.0 dB	T1	1		902.713 028 4 MHz	8.26 dBm	ndB down BW	73.60 kHz	T2	1		902.786 625 6 MHz	8.26 dBm	Q Factor	12.266
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																							
M1	1		902.749 742 MHz	28.26 dBm	ndB	20.0 dB																							
T1	1		902.713 028 4 MHz	8.26 dBm	ndB down BW	73.60 kHz																							
T2	1		902.786 625 6 MHz	8.26 dBm	Q Factor	12.266																							
Antenna Port 2 Channel 26 (915.250MHz)	MultiView Spectrum Ref Level 36.00 dBm Offset 20.50 dB RBW 2 kHz Att 25 dB SWT 2.1 ms (~3.3 s) VBW 10 kHz Mode Sweep 1 Frequency Sweep 30 dBm 20 dBm 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm CF 915.25 MHz100001 pts20.0 kHz/Span 200.0 kHz 2 Marker Table <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td></td><td>915.250 544 MHz</td><td>28.31 dBm</td><td>ndB</td><td>20.0 dB</td></tr><tr><td>T1</td><td>1</td><td></td><td>915.213 978 4 MHz</td><td>8.31 dBm</td><td>ndB down BW</td><td>72.91 kHz</td></tr><tr><td>T2</td><td>1</td><td></td><td>915.286 889 6 MHz</td><td>8.31 dBm</td><td>Q Factor</td><td>12.553</td></tr></table> Measuring...16.09.2024 13:30:57 13:30:57 16.09.2024	Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		915.250 544 MHz	28.31 dBm	ndB	20.0 dB	T1	1		915.213 978 4 MHz	8.31 dBm	ndB down BW	72.91 kHz	T2	1		915.286 889 6 MHz	8.31 dBm	Q Factor	12.553
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																							
M1	1		915.250 544 MHz	28.31 dBm	ndB	20.0 dB																							
T1	1		915.213 978 4 MHz	8.31 dBm	ndB down BW	72.91 kHz																							
T2	1		915.286 889 6 MHz	8.31 dBm	Q Factor	12.553																							



3. Occupied Bandwidth (99%)

The 99% bandwidth was measured such that the power at lower and above its upper frequency limits is 0.5% of the total mean power of the given emission. Below are the details of the test executed.

General Information

EUT NOMENCLATURE	IM21-PRT RFID Module
MODEL NO.	IM21-PRT
SERIAL NO.	22022476015
TESTED BY	Lavanya M
TEST DATES	16-09-2024

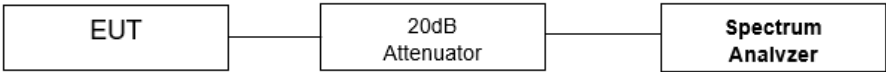
Test Conditions

TEST VOLTAGE	+5.0VDC
ENVIRONMENT COND.	Temperature : 24.2°C, Humidity : 64% RH
TEST CONFIGURATION	EUT Supplied with 5.0VDC from Laptop USB Port and Configured to Transmit continuously.
OPERATING MODE	Continuous Tx mode – Hopping Disabled Condition
DEVIATIONS FROM STD.	N/A

Test Specifications

TEST STANDARD	FCC part 15 Subpart C 15.247 (a) (1) (i) / RSS-247 issue 2, 5.1 (c)
TEST SPECIFICATIONS	Section 9(b) in KDB 558074 D01 15.247 Measurement Guidance v05r02 & Subclause 7.8.7 of ANSI C63.10
TEST REQUIREMENT	The minimum 99% Bandwidth of the hopping channel is 250 kHz use at least 50 hopping frequencies

Test Details

TEST METHOD	☒ Conducted ☐ Radiated	
TEST PORT	ANTENNA PORT (1 & 2)	
DETECTOR USED	Peak Detector – Max Hold	
TEST INSTR. BANDWIDTH	RBW : 2KHz (1% to 5% of the OBW)	VBW :10KHz (approximately three times RBW)
TEST CONNECTION.	 <pre> graph LR EUT[EUT] --- Attenuator[20dB Attenuator] Attenuator --- Analyzer[Spectrum Analyzer] </pre>	
RADIATED TEST PARAMETERS.	Measurement Distance	: N /A
	Antenna Height	: N/A
	Turntable rotation	: N/A
	Equipment Class	: N /A

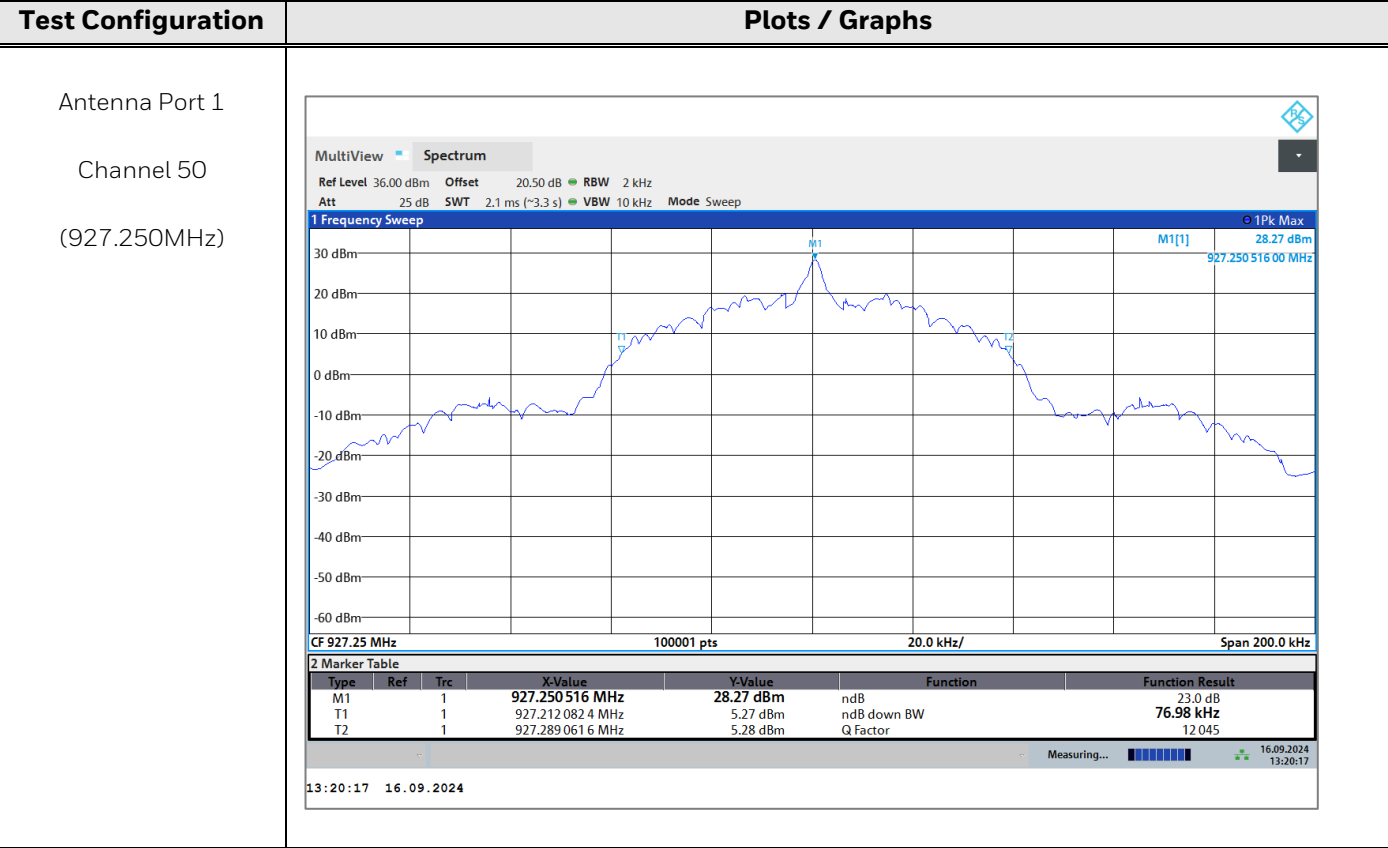
Test Results

Serial No	Antenna Port (1/2)	Channel No.	Channel Frequency (MHz)	99% Bandwidth (KHz)	Maximum Limit (KHz)	Test Result
1	Ant Port 1	CH01	902.750	77.61	250	PASS
2	Ant Port 1	CH26	915.250	77.01	250	PASS
3	Ant Port 1	CH50	927.250	76.98	250	PASS
4	Ant Port 2	CH01	902.750	77.31	250	PASS
5	Ant Port 2	CH26	915.250	77.35	250	PASS
6	Ant Port 2	CH50	927.250	77.07	250	PASS

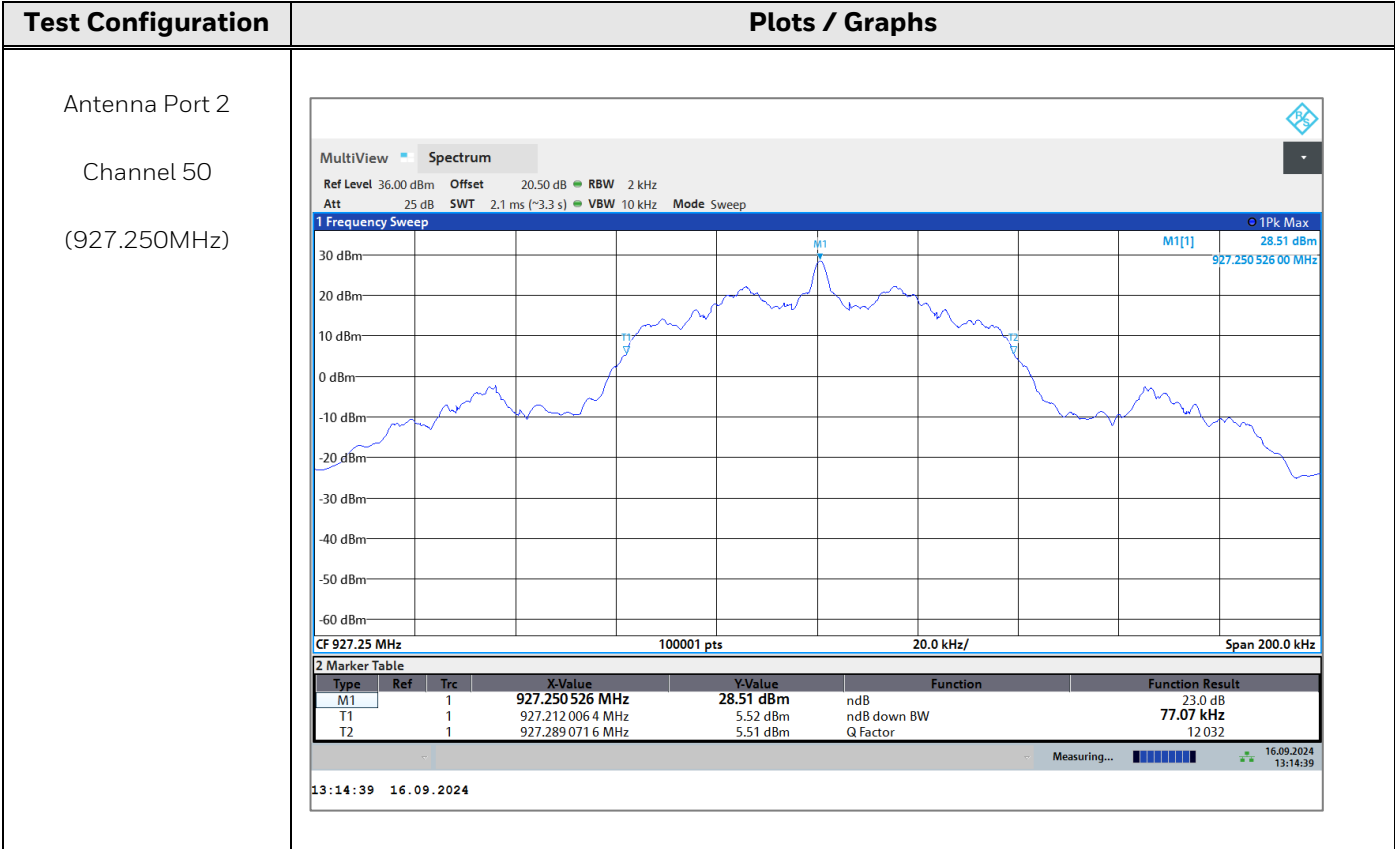
Note : The 99% bandwidth is measured such that the power at lower and above its upper frequency limits is 0.5% of the total mean power of the given emission. Below are the power calculations for reference purpose. Reference ANSI C63.10 (section 6.9.3 (g))

Ant Port	CH. No	Measured Power (dBm)			Power in (Watts)			% Power at T1, T2	
		Peak Power	Power at T1 - dBm	Power at T2 - dBm	Meas. Power - W	Power at T1 - Watts	Power at T2 - Watts	% power at T1	% Power at T2
1	1	27.56	4.56	4.57	0.570	0.00286	0.00286	0.50	0.50
1	26	28.31	5.31	5.31	0.678	0.00340	0.00340	0.50	0.50
1	50	28.27	5.27	5.28	0.671	0.00337	0.00337	0.50	0.50
2	1	28.65	5.65	5.66	0.733	0.00367	0.00368	0.50	0.50
2	26	28.57	5.58	5.57	0.719	0.00361	0.00361	0.50	0.50
2	50	28.51	5.52	5.51	0.710	0.00356	0.00356	0.50	0.50

Test Configuration	Plots / Graphs																												
Antenna Port 1 Channel 01 (902.750MHz)	MultiView Spectrum Ref Level 36.00 dBm Offset 20.50 dB RBW 2 kHz Att 25 dB SWT 2.1 ms (~3.3 s) VBW 10 kHz Mode Sweep 1 Frequency Sweep 30 dBm 20 dBm 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm CF 902.75 MHz 100001 pts 20.0 kHz/ Span 200.0 kHz 2 Marker Table <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td>1</td><td>902.749 91 MHz</td><td>27.56 dBm</td><td>ndB</td><td>23.0 dB</td></tr><tr><td>T1</td><td>1</td><td>1</td><td>902.711 712 4 MHz</td><td>4.56 dBm</td><td>ndB down BW</td><td>77.61 kHz</td></tr><tr><td>T2</td><td>1</td><td>1</td><td>902.789 319 6 MHz</td><td>4.57 dBm</td><td>Q Factor</td><td>11 632</td></tr></table> Measuring... 16.09.2024 13:22:25 13:22:25 16.09.2024	Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1	1	902.749 91 MHz	27.56 dBm	ndB	23.0 dB	T1	1	1	902.711 712 4 MHz	4.56 dBm	ndB down BW	77.61 kHz	T2	1	1	902.789 319 6 MHz	4.57 dBm	Q Factor	11 632
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																							
M1	1	1	902.749 91 MHz	27.56 dBm	ndB	23.0 dB																							
T1	1	1	902.711 712 4 MHz	4.56 dBm	ndB down BW	77.61 kHz																							
T2	1	1	902.789 319 6 MHz	4.57 dBm	Q Factor	11 632																							
Antenna Port 1 Channel 26 (915.250MHz)	MultiView Spectrum Ref Level 36.00 dBm Offset 20.50 dB RBW 2 kHz Att 25 dB SWT 2.1 ms (~3.3 s) VBW 10 kHz Mode Sweep 1 Frequency Sweep 30 dBm 20 dBm 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm CF 915.25 MHz 100001 pts 20.0 kHz/ Span 200.0 kHz 2 Marker Table <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td>1</td><td>915.250 56 MHz</td><td>28.31 dBm</td><td>ndB</td><td>23.0 dB</td></tr><tr><td>T1</td><td>1</td><td>1</td><td>915.212 136 4 MHz</td><td>5.31 dBm</td><td>ndB down BW</td><td>77.01 kHz</td></tr><tr><td>T2</td><td>1</td><td>1</td><td>915.289 147 6 MHz</td><td>5.31 dBm</td><td>Q Factor</td><td>11 885</td></tr></table> Measuring... 16.09.2024 13:17:49 13:17:50 16.09.2024	Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1	1	915.250 56 MHz	28.31 dBm	ndB	23.0 dB	T1	1	1	915.212 136 4 MHz	5.31 dBm	ndB down BW	77.01 kHz	T2	1	1	915.289 147 6 MHz	5.31 dBm	Q Factor	11 885
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																							
M1	1	1	915.250 56 MHz	28.31 dBm	ndB	23.0 dB																							
T1	1	1	915.212 136 4 MHz	5.31 dBm	ndB down BW	77.01 kHz																							
T2	1	1	915.289 147 6 MHz	5.31 dBm	Q Factor	11 885																							



Test Configuration	Plots / Graphs																												
Antenna Port 2 Channel 01 (902.750MHz)	MultiViewSpectrum Ref Level 36.00 dBmOffset 20.50 dB RBW 2 kHzAtt 25 dB SWT 2.1 ms (~3.3 s) VBW 10 kHz Mode Sweep 1 Frequency Sweep 30 dBm 20 dBm 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm CF 902.75 MHz 100001 pts 20.0 kHz/ Span 200.0 kHz 2 Marker Table <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td></td><td>902.750518 MHz</td><td>28.65 dBm</td><td>ndB</td><td>23.0 dB</td></tr><tr><td>T1</td><td>1</td><td></td><td>902.711984 4 MHz</td><td>5.65 dBm</td><td>ndB down BW</td><td>77.31 kHz</td></tr><tr><td>T2</td><td>1</td><td></td><td>902.789295 6 MHz</td><td>5.65 dBm</td><td>Q Factor</td><td>11.677</td></tr></table> Measuring...16.09.2024 13:11:57 13:11:57 16.09.2024	Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		902.750518 MHz	28.65 dBm	ndB	23.0 dB	T1	1		902.711984 4 MHz	5.65 dBm	ndB down BW	77.31 kHz	T2	1		902.789295 6 MHz	5.65 dBm	Q Factor	11.677
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																							
M1	1		902.750518 MHz	28.65 dBm	ndB	23.0 dB																							
T1	1		902.711984 4 MHz	5.65 dBm	ndB down BW	77.31 kHz																							
T2	1		902.789295 6 MHz	5.65 dBm	Q Factor	11.677																							
Antenna Port 2 Channel 26 (915.250MHz)	MultiViewSpectrum Ref Level 36.00 dBmOffset 20.50 dB RBW 2 kHzAtt 25 dB SWT 2.1 ms (~3.3 s) VBW 10 kHz Mode Sweep 1 Frequency Sweep 30 dBm 20 dBm 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm CF 915.25 MHz 100001 pts 20.0 kHz/ Span 200.0 kHz 2 Marker Table <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td></td><td>915.25056 MHz</td><td>28.57 dBm</td><td>ndB</td><td>23.0 dB</td></tr><tr><td>T1</td><td>1</td><td></td><td>915.211980 4 MHz</td><td>5.58 dBm</td><td>ndB down BW</td><td>77.35 kHz</td></tr><tr><td>T2</td><td>1</td><td></td><td>915.289325 6 MHz</td><td>5.57 dBm</td><td>Q Factor</td><td>11.833</td></tr></table> Measuring...16.09.2024 13:15:48 13:15:49 16.09.2024	Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		915.25056 MHz	28.57 dBm	ndB	23.0 dB	T1	1		915.211980 4 MHz	5.58 dBm	ndB down BW	77.35 kHz	T2	1		915.289325 6 MHz	5.57 dBm	Q Factor	11.833
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																							
M1	1		915.25056 MHz	28.57 dBm	ndB	23.0 dB																							
T1	1		915.211980 4 MHz	5.58 dBm	ndB down BW	77.35 kHz																							
T2	1		915.289325 6 MHz	5.57 dBm	Q Factor	11.833																							



4. Number of Hopping Frequencies

The number of Hopping frequencies EUT utilizes for communication was verified to the limits defined in standard. Below are the details of the test executed.

General Information

EUT NOMENCLATURE	IM21-PRT RFID Module
MODEL NO.	IM21-PRT
SERIAL NO.	22022476015
TESTED BY	Lavanya M
TEST DATES	16-09-2024

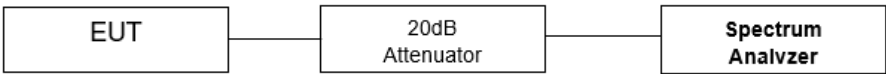
Test Conditions

TEST VOLTAGE	+5.0VDC
ENVIRONMENT COND.	Temperature : 24.5°C, Humidity : 62% RH
TEST CONFIGURATION	EUT Supplied with 5.0VDC from Laptop USB Port and Configured to Transmit continuously.
OPERATING MODE	Continuous Tx mode – Hopping Disabled Condition
DEVIATIONS FROM STD.	N/A

Test Specifications

TEST STANDARD	FCC part 15 Subpart C 15.247 (a) (1) (i) / RSS-247 issue 2, 5.1 (c)
TEST SPECIFICATIONS	Section 9(b) in KDB 558074 D01 15.247 Measurement Guidance v05r02 & Subclause 7.8.3 of ANSI C63.10
TEST REQUIREMENT	Frequency hopping systems operating in the band 902-928 MHz shall use at least 50 hopping channels if the minimum 20 dB bandwidth is less than 250 kHz

Test Details

TEST METHOD	☒ Conducted ☐ Radiated	
TEST PORT	ANTENNA PORT (1 & 2)	
DETECTOR USED	Peak Detector – Max Hold	
TEST INSTR. BANDWIDTH	RBW : 100KHz (< 30 % of channel spacing)	VBW 300KHz (VBW ≥ RBW)
TEST CONNECTION.	 <pre> graph LR EUT[EUT] --- Attenuator[20dB Attenuator] Attenuator --- Analyzer[Spectrum Analyzer] </pre>	
RADIATED TEST PARAMETERS.	Measurement Distance	: N /A
	Antenna Height	: N/A
	Turntable rotation	: N/A
	Equipment Class	: N /A

Test Results

<i>Serial No</i>	<i>Antenna Port (1/2)</i>	<i>No. of Hopping Frequencies (Measured)</i>	<i>No. of Hopping Frequencies (Limit)</i>	<i>Test Result</i>
1	Ant Port 1	50	≥ 50	PASS
2	Ant Port 2	50	≥ 50	PASS

Test Configuration	Plots / Graphs																												
Antenna Port 1 Total = 50 Channels	MultiView Spectrum Ref Level 36.00 dBm Offset 20.50 dB RBW 100 kHz Att 35 dB SWT 101 ms VBW 300 kHz Mode Sweep 1 Frequency Sweep 1Pk Max 2 Marker Table <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td>1</td><td>902.75 MHz</td><td>29.44 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td>1</td><td>915.25 MHz</td><td>29.30 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td>1</td><td>927.25 MHz</td><td>29.27 dBm</td><td></td><td></td></tr></table> Measuring... 17.09.2024 07:03:55 07:03:56 17.09.2024	Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1	1	902.75 MHz	29.44 dBm			M2	1	1	915.25 MHz	29.30 dBm			M3	1	1	927.25 MHz	29.27 dBm		
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																							
M1	1	1	902.75 MHz	29.44 dBm																									
M2	1	1	915.25 MHz	29.30 dBm																									
M3	1	1	927.25 MHz	29.27 dBm																									
Antenna Port 2 Total = 50 Channels	MultiView Spectrum Ref Level 36.00 dBm Offset 20.50 dB RBW 100 kHz Att 35 dB SWT 101 ms VBW 300 kHz Mode Sweep 1 Frequency Sweep 1Pk Max 2 Marker Table <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td>1</td><td>902.75 MHz</td><td>29.67 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td>1</td><td>915.25 MHz</td><td>29.66 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td>1</td><td>927.25 MHz</td><td>29.46 dBm</td><td></td><td></td></tr></table> Measuring... 17.09.2024 06:55:29 06:55:30 17.09.2024	Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1	1	902.75 MHz	29.67 dBm			M2	1	1	915.25 MHz	29.66 dBm			M3	1	1	927.25 MHz	29.46 dBm		
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																							
M1	1	1	902.75 MHz	29.67 dBm																									
M2	1	1	915.25 MHz	29.66 dBm																									
M3	1	1	927.25 MHz	29.46 dBm																									

5. Carrier Frequency Separation

The carrier frequencies that are hopping was verified for its separation as per the limits defined in the standard. Below are the details of the test executed.

General Information

EUT NOMENCLATURE	IM21-PRT RFID Module
MODEL NO.	IM21-PRT
SERIAL NO.	22022476015
TESTED BY	Lavanya M
TEST DATES	17-09-2024

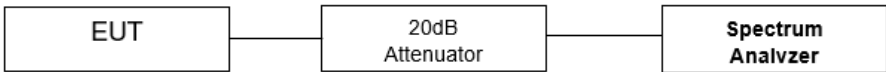
Test Conditions

TEST VOLTAGE	+5.0VDC
ENVIRONMENT COND.	Temperature : 24.2°C, Humidity : 64% RH
TEST CONFIGURATION	EUT Supplied with 5.0VDC from Laptop USB Port and Configured to Transmit continuously.
OPERATING MODE	Continuous Tx mode – Hopping Disabled Condition
DEVIATIONS FROM STD.	N/A

Test Specifications

TEST STANDARD	FCC part 15 Subpart C 15.247 (a) (1) / RSS-247 issue 2, 5.1 (b)
TEST SPECIFICATIONS	Section 9(b) in KDB 558074 D01 15.247 Measurement Guidance v05r02 & Subclause 7.8.2 of ANSI C63.10
TEST REQUIREMENT	Frequency hopping systems shall have hopping channel carrier frequency separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater.

Test Details

TEST METHOD	☒ Conducted ☐ Radiated	
TEST PORT	ANTENNA PORT (1 & 2)	
DETECTOR USED	Peak Detector – Max Hold	
TEST INSTR. BANDWIDTH	RBW : 100KHz (< 30 % of channel spacing)	VBW 300KHz (VBW ≥ RBW)
TEST CONNECTION.	 <pre> graph LR EUT[EUT] --- Att[20dB Attenuator] --- SA[Spectrum Analyzer] </pre>	
RADIATED TEST PARAMETERS.	Measurement Distance : N /A	
	Antenna Height : N/A	
	Turntable rotation : N/A	
	Equipment Class : N /A	

Test Results

<i>Serial No</i>	<i>Antenna Port (1/2)</i>	<i>Channel No.</i>	<i>Channel Frequency (MHz)</i>	<i>20dB Bandwidth (KHz)</i>	<i>Measured Carrier Frequency Separation (KHz)</i>	<i>Test Result</i>
1	Ant Port 1	CH01	902.750	73.62	500	PASS
2	Ant Port 1	CH26	915.250	72.91	500	PASS
3	Ant Port 1	CH50	927.250	73.34	500	PASS
4	Ant Port 2	CH01	902.750	73.60	500	PASS
5	Ant Port 2	CH26	915.250	72.91	500	PASS
6	Ant Port 2	CH50	927.250	73.84	500	PASS

Test Configuration	Plots / Graphs																												
Antenna Port 1	MultiViewSpectrum Ref Level 36.00 dBmOffset 20.50 dB RBW 100 kHz Att 40 dB SWT 1.01 ms VBW 300 kHz Mode Sweep Count 2/2 1 Frequency Sweep 30 dBm 20 dBm 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm CF 915.25 MHz 1001 pts 150.0 kHz/ Span 1.5 MHz 2 Marker Table <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td></td><td>1</td><td>915.25 MHz</td><td>29.47 dBm</td><td></td><td></td></tr><tr><td>D2</td><td>M1</td><td>1</td><td>-500.0 kHz</td><td>-0.31 dB</td><td></td><td></td></tr><tr><td>D3</td><td>M1</td><td>1</td><td>500.0 kHz</td><td>-0.16 dB</td><td></td><td></td></tr></table> Measuring...17.09.2024 10:25:40 10:25:40 17.09.2024	Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1		1	915.25 MHz	29.47 dBm			D2	M1	1	-500.0 kHz	-0.31 dB			D3	M1	1	500.0 kHz	-0.16 dB		
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																							
M1		1	915.25 MHz	29.47 dBm																									
D2	M1	1	-500.0 kHz	-0.31 dB																									
D3	M1	1	500.0 kHz	-0.16 dB																									
Antenna Port 2	MultiViewSpectrum Ref Level 36.00 dBmOffset 20.50 dB RBW 100 kHz Att 40 dB SWT 1.01 ms VBW 300 kHz Mode Sweep Count 2/2 1 Frequency Sweep 30 dBm 20 dBm 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm CF 915.25 MHz 1001 pts 150.0 kHz/ Span 1.5 MHz 2 Marker Table <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td></td><td>1</td><td>915.248 5 MHz</td><td>29.65 dBm</td><td></td><td></td></tr><tr><td>D2</td><td>M1</td><td>1</td><td>-500.0 kHz</td><td>-0.61 dB</td><td></td><td></td></tr><tr><td>D3</td><td>M1</td><td>1</td><td>500.0 kHz</td><td>-0.23 dB</td><td></td><td></td></tr></table> Measuring...17.09.2024 10:45:42 10:45:43 17.09.2024	Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1		1	915.248 5 MHz	29.65 dBm			D2	M1	1	-500.0 kHz	-0.61 dB			D3	M1	1	500.0 kHz	-0.23 dB		
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																							
M1		1	915.248 5 MHz	29.65 dBm																									
D2	M1	1	-500.0 kHz	-0.61 dB																									
D3	M1	1	500.0 kHz	-0.23 dB																									

6. Time of Occupancy

The EUT was verified for time of occupancy of any channel shall be below the specification defined in the standard. Below are the details of the test executed.

General Information

EUT NOMENCLATURE	IM21-PRT RFID Module
MODEL NO.	IM21-PRT
SERIAL NO.	22022476015
TESTED BY	Lavanya M
TEST DATES	30-08-2024

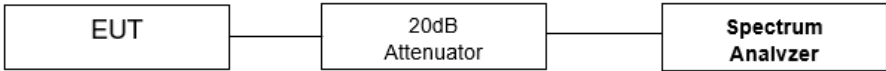
Test Conditions

TEST VOLTAGE	+5.0VDC
ENVIRONMENT COND.	Temperature : 24.9°C, Humidity : 66% RH
TEST CONFIGURATION	EUT Supplied with 5.0VDC from Laptop USB Port and Configured to Transmit continuously.
OPERATING MODE	Continuous Tx mode – Hopping Enabled Condition
DEVIATIONS FROM STD.	N/A

Test Specifications

TEST STANDARD	FCC part 15 Subpart C 15.247 (a) (1) (i) / RSS-247 issue 2, 5.1 (c)
TEST SPECIFICATIONS	Section 9(b) in KDB 558074 D01 15.247 Measurement Guidance v05r02 & Subclause 7.8.4 of ANSI C63.10
TEST REQUIREMENT	The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 20 seconds

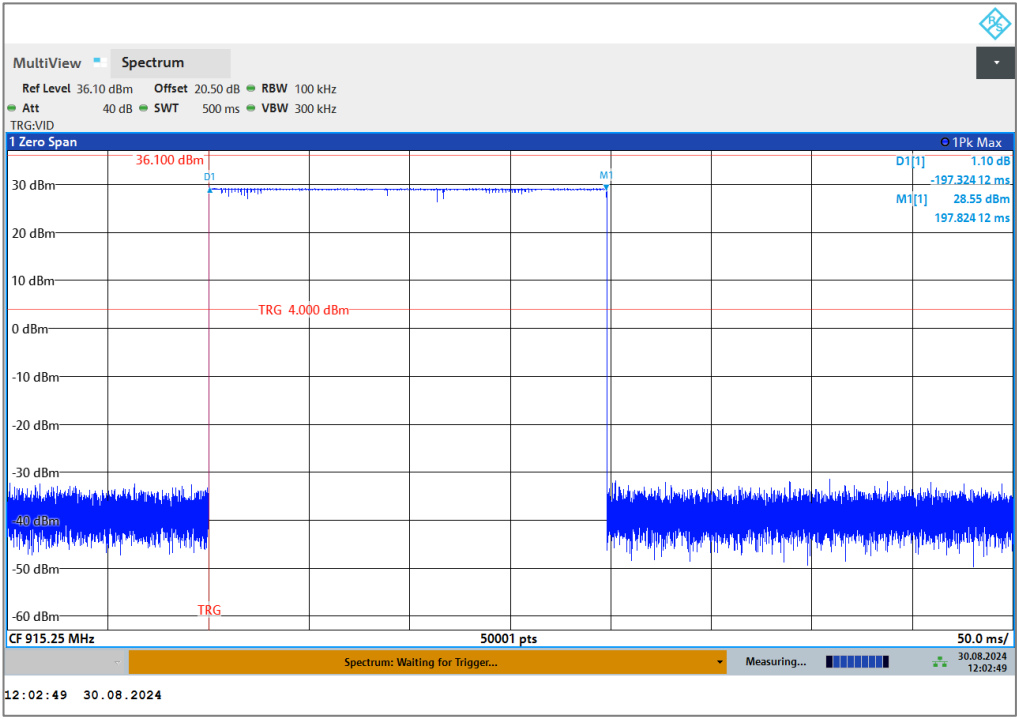
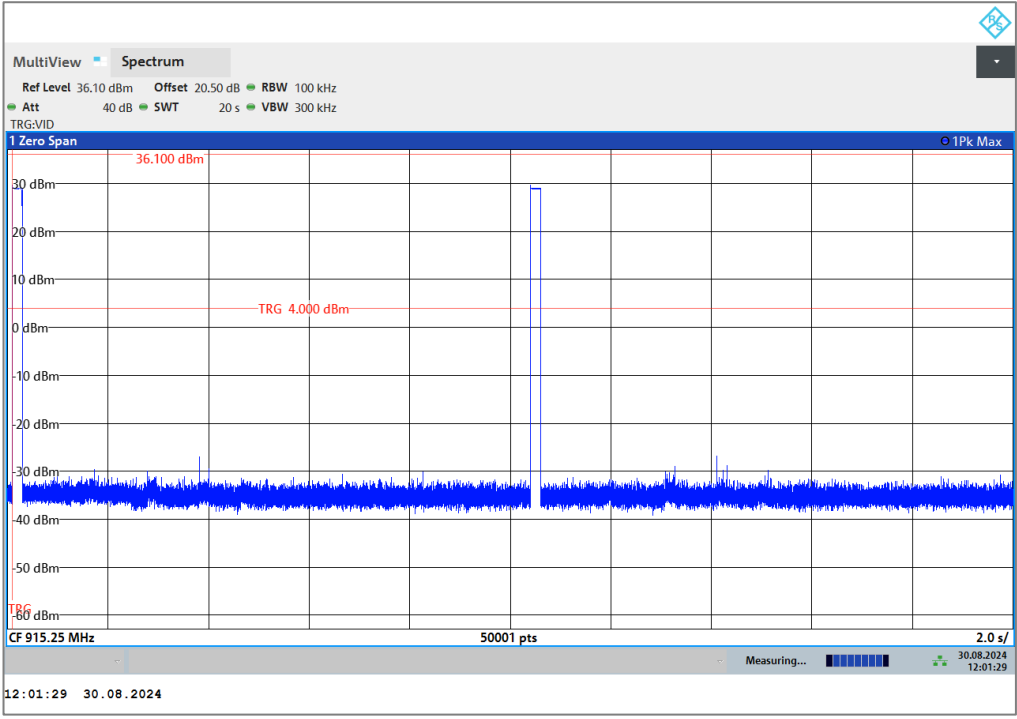
Test Details

TEST METHOD	☒ Conducted ☐ Radiated	
TEST PORT	ANTENNA PORT (1 & 2)	
DETECTOR USED	Peak Detector – Max Hold	
TEST INSTR. BANDWIDTH	RBW : 100KHz (> 1 / T)	VBW 300KHz
TEST CONNECTION.	 <pre> graph LR EUT[EUT] --- Attenuator[20dB Attenuator] Attenuator --- Analyzer[Spectrum Analyzer] </pre>	
RADIATED TEST PARAMETERS.	Measurement Distance	: N / A
	Antenna Height	: N / A
	Turntable rotation	: N / A
	Equipment Class	: N / A

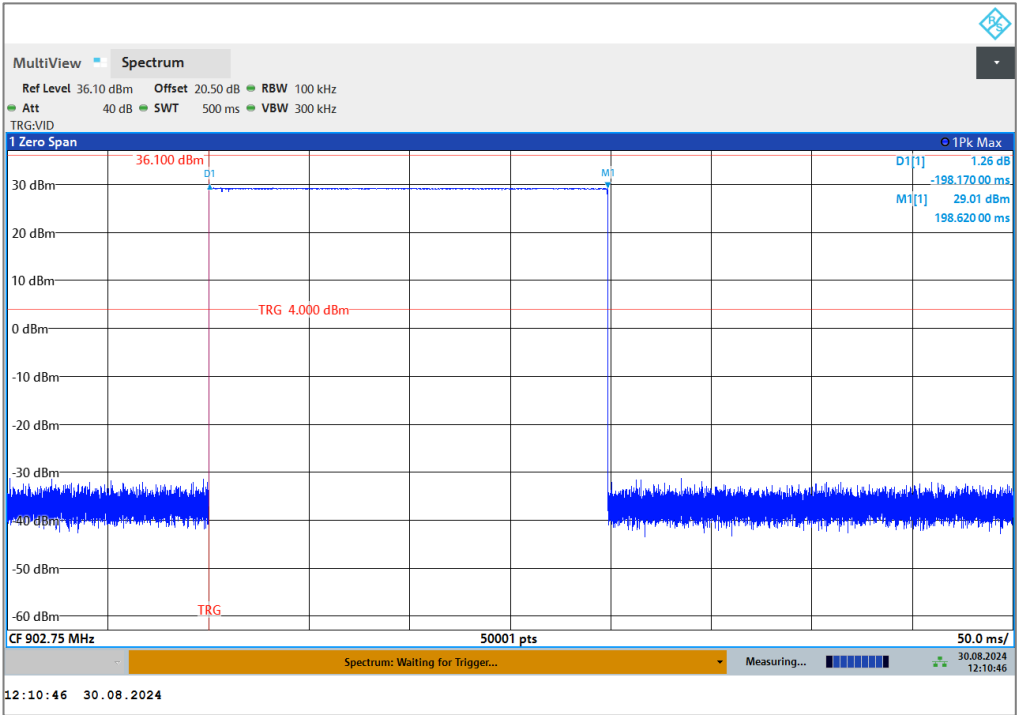
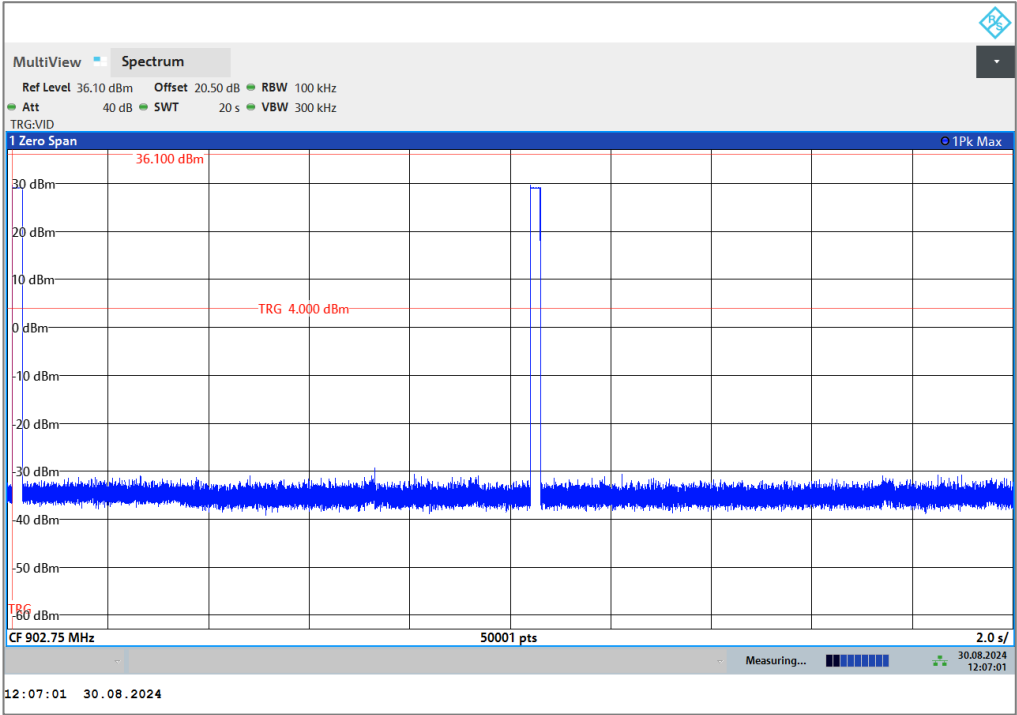
Test Results

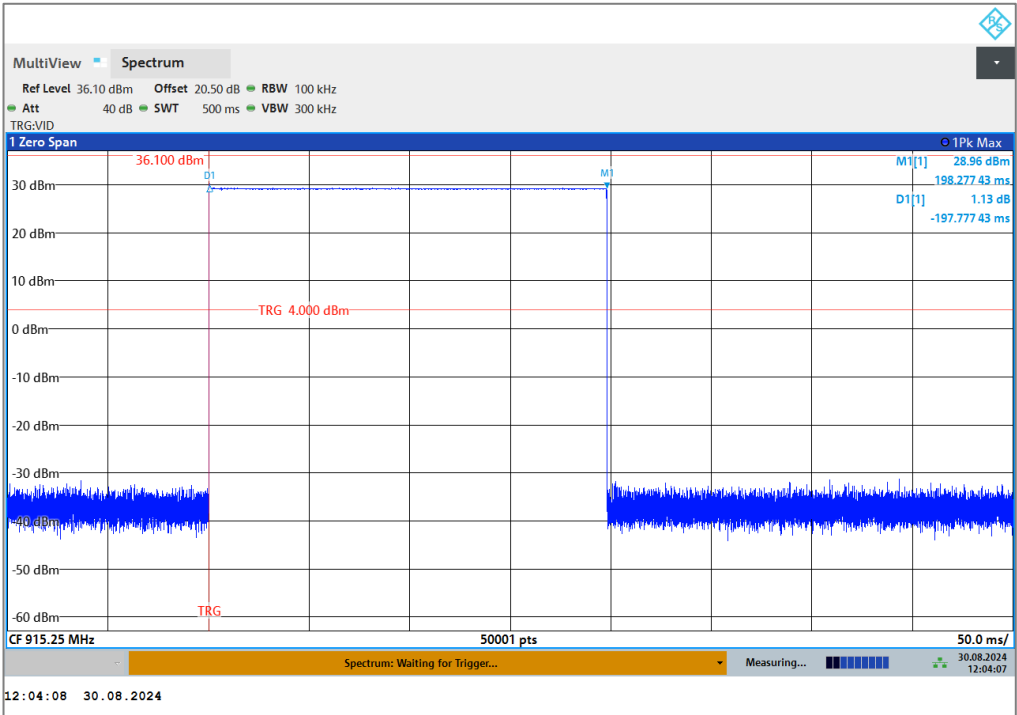
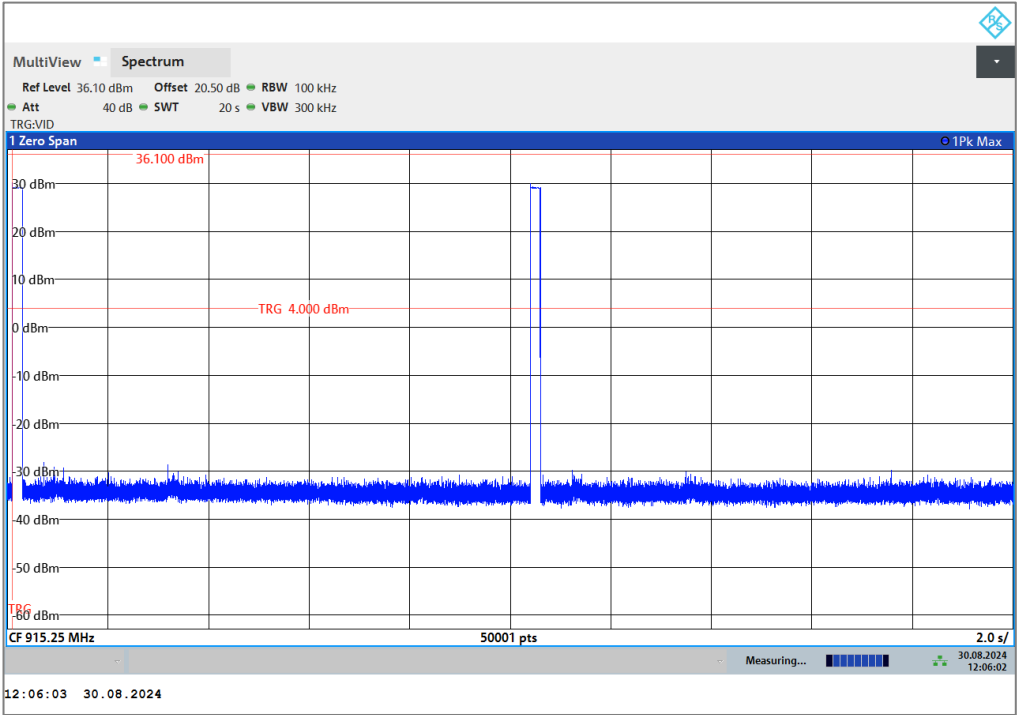
<i>Serial No</i>	<i>Antenna Port (1/2)</i>	<i>Channel No.</i>	<i>Channel Frequency (MHz)</i>	<i>Measured Single Time of Occupancy / Dwell Time (msec)</i>	<i>Total Time of Occupancy per 20sec period (msec)</i>	<i>Allowed Limit (ms) for 20sec period</i>	<i>Test Result</i>
1	Ant Port 1	CH01	902.750	197.64	395.28	400	PASS
2	Ant Port 1	CH26	915.250	197.32	394.64	400	PASS
3	Ant Port 1	CH50	927.250	198.41	396.81	400	PASS
4	Ant Port 2	CH01	902.750	198.17	396.34	400	PASS
5	Ant Port 2	CH26	915.250	198.27	396.54	400	PASS
6	Ant Port 2	CH50	927.250	198.29	396.58	400	PASS

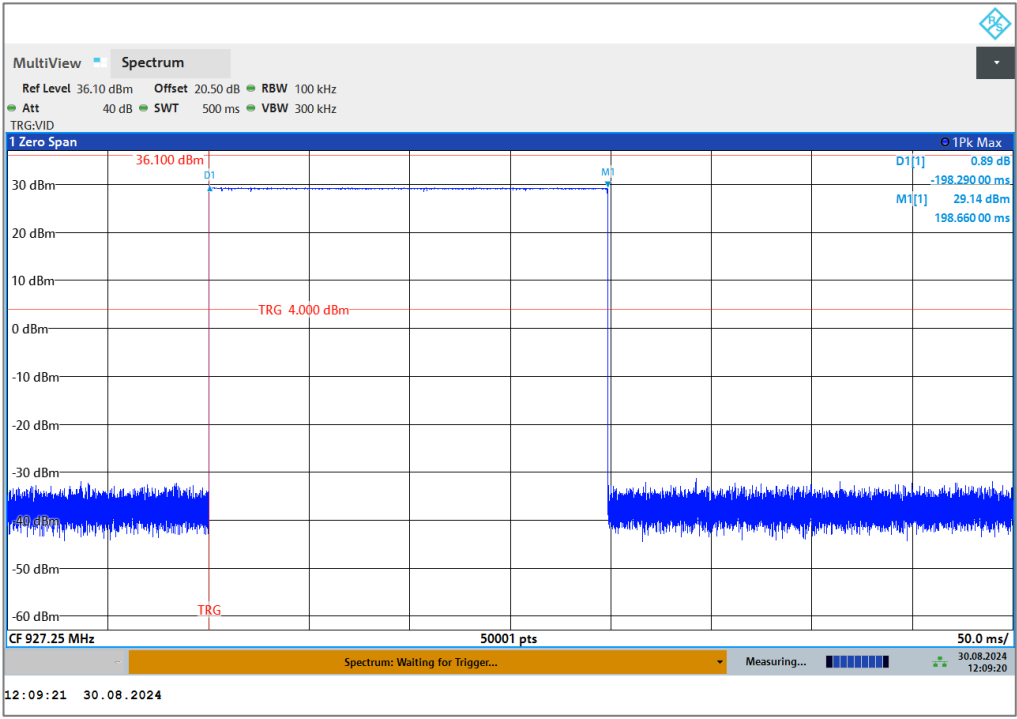
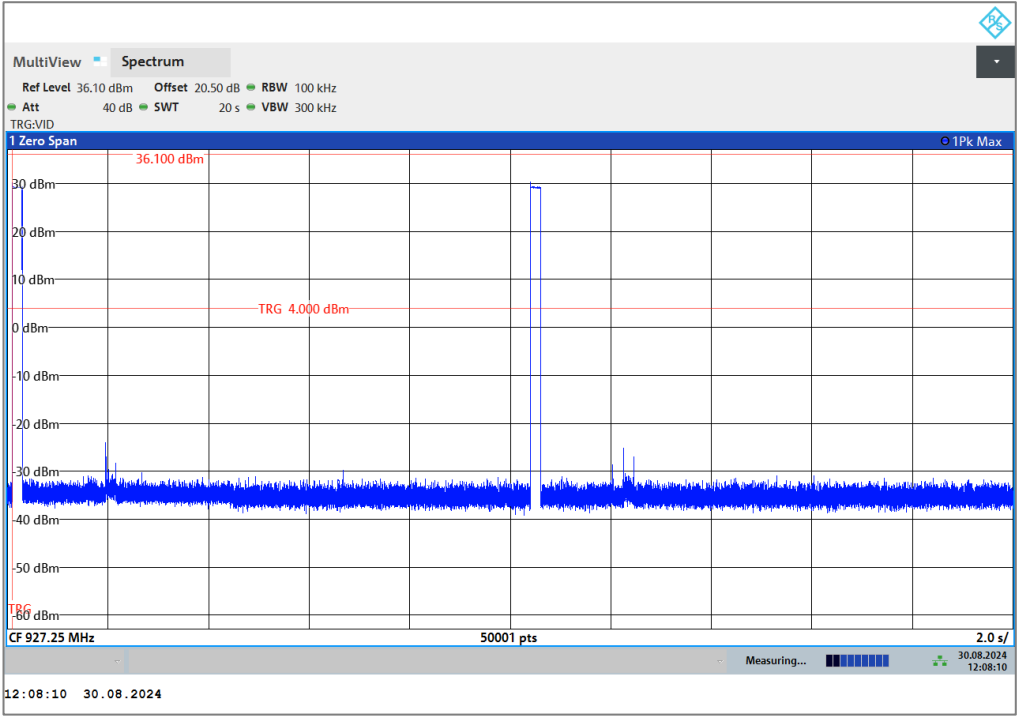
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Test Configuration	Plots / Graphs
Antenna Port 1 Channel No : 26 (915.250MHz) Single Time of Occupancy	 MultiView Spectrum Ref Level 36.10 dBm Offset 20.50 dB RBW 100 kHz Att 40 dB SWT 500 ms VBW 300 kHz TRG:VID 1 Zero Span 36.100 dBm TRG 4.000 dBm CF 915.25 MHz 50001 pts 50.0 ms/ Spectrum: Waiting for Trigger... Measuring... 30.08.2024 12:02:49 12:02:49 30.08.2024
Antenna Port 1 Channel No : 26 (915.250MHz) Time of Occupancy per 20sec Period	 MultiView Spectrum Ref Level 36.10 dBm Offset 20.50 dB RBW 100 kHz Att 40 dB SWT 20 s VBW 300 kHz TRG:VID 1 Zero Span 36.100 dBm TRG 4.000 dBm CF 915.25 MHz 50001 pts 2.0 s/ Measuring... 30.08.2024 12:01:29 12:01:29 30.08.2024

Test Configuration	Plots / Graphs
Antenna Port 1 Channel No : 50 (927.250MHz) Single Time of Occupancy	MultiView Spectrum Ref Level 36.10 dBm Offset 20.50 dB RBW 100 kHz Att 40 dB SWT 500 ms VBW 300 kHz TRG/VID 1 Zero Span 36.100 dBm TRG 4.000 dBm 1Pk Max D1[1] 1.18 dB M1[1] 29.04 dBm 198.730 73 ms CF 927.25 MHz 50001 pts 50.0 ms/ Spectrum: Waiting for Trigger... Measuring... 30.08.2024 12:15:33 12:15:33 30.08.2024
Antenna Port 1 Channel No : 50 (927.250MHz) Time of Occupancy per 20sec Period	MultiView Spectrum Ref Level 36.10 dBm Offset 20.50 dB RBW 100 kHz Att 40 dB SWT 20 s VBW 300 kHz TRG/VID 1 Zero Span 36.100 dBm TRG 4.000 dBm 1Pk Max M1[1] 29.96 dBm -90.800 ms CF 927.25 MHz 50001 pts 2.0 s/ Spectrum: Waiting for Trigger... Measuring... 30.08.2024 12:16:51 12:16:52 30.08.2024

Test Configuration	Plots / Graphs
Antenna Port 2 Channel No : 01 (902.750MHz) Single Time of Occupancy	 MultiView ☒ Spectrum Ref Level 36.10 dBm Offset 20.50 dB RBW 100 kHz Att 40 dB SWT 500 ms VBW 300 kHz TRG:VID 1 Zero Span 36.100 dBm TRG 4.000 dBm TRG CF 902.75 MHz 50001 pts 50.0 ms/ Spectrum: Waiting for Trigger... Measuring... 30.08.2024 12:10:46 12:10:46 30.08.2024
Antenna Port 2 Channel No : 01 (902.750MHz) Time of Occupancy per 20sec Period	 MultiView ☒ Spectrum Ref Level 36.10 dBm Offset 20.50 dB RBW 100 kHz Att 40 dB SWT 20 s VBW 300 kHz TRG:VID 1 Zero Span 36.100 dBm TRG 4.000 dBm TRG CF 902.75 MHz 50001 pts 2.0 s/ Measuring... 30.08.2024 12:07:01 12:07:01 30.08.2024

Test Configuration	Plots / Graphs
Antenna Port 2 Channel No : 26 (915.250MHz) Single Time of Occupancy	
Antenna Port 2 Channel No : 26 (915.250MHz) Time of Occupancy per 20sec Period	

Test Configuration	Plots / Graphs
Antenna Port 2 Channel No : 50 (927.250MHz) Single Time of Occupancy	 MultiView ☒ Spectrum Ref Level 36.10 dBm Offset 20.50 dB RBW 100 kHz Att 40 dB SWT 500 ms VBW 300 kHz TRG:VID 1 Zero Span 36.100 dBm TRG 4.000 dBm CF 927.25 MHz 50001 pts 50.0 ms/ Spectrum: Waiting for Trigger... Measuring... 30.08.2024 12:09:20 12:09:21 30.08.2024
Antenna Port 2 Channel No : 50 (927.250MHz) Time of Occupancy per 20sec Period	 MultiView ☒ Spectrum Ref Level 36.10 dBm Offset 20.50 dB RBW 100 kHz Att 40 dB SWT 20 s VBW 300 kHz TRG:VID 1 Zero Span 36.100 dBm TRG 4.000 dBm CF 927.25 MHz 50001 pts 2.0 s/ Measuring... 30.08.2024 12:08:10 12:08:10 30.08.2024

7. Band Edge Measurements

The conducted emissions were measured at the edge of allowed operating band (902MHz & 928MHz) and compared to the specification defined in the standard, below are the results.

General Information

EUT NOMENCLATURE	IM21-PRT RFID Module
MODEL NO.	IM21-PRT
SERIAL NO.	22022476015
TESTED BY	Lavanya M
TEST DATES	17-09-2024

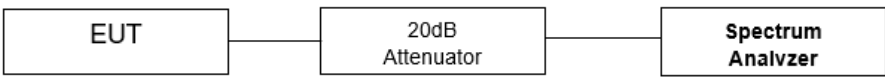
Test Conditions

TEST VOLTAGE	+5.0VDC
ENVIRONMENT COND.	Temperature : 23.2°C, Humidity : 64% RH
TEST CONFIGURATION	EUT Supplied with 5.0VDC from Laptop USB Port and Configured to Transmit Continuously.
OPERATING MODE	Continuous Tx mode – Hopping Disabled Condition & Hopping Enabled condition.
DEVIATIONS FROM STD.	N/A

Test Specifications

TEST STANDARD	FCC part 15 Subpart C 15.247 (d) / RSS-247 issue 2 clause 5.5
TEST SPECIFICATIONS	Section 9(b) in KDB 558074 D01 15.247 Measurement Guidance v05r02 & Subclause 7.8.8 of ANSI C63.10
TEST REQUIREMENT	In any 100kHz 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 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits

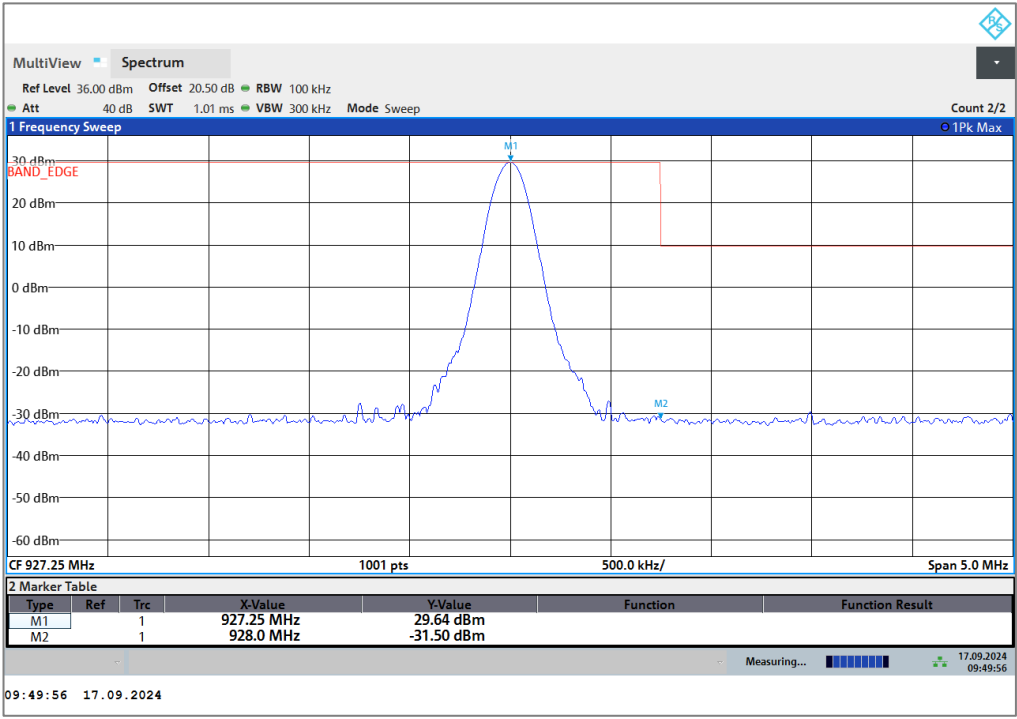
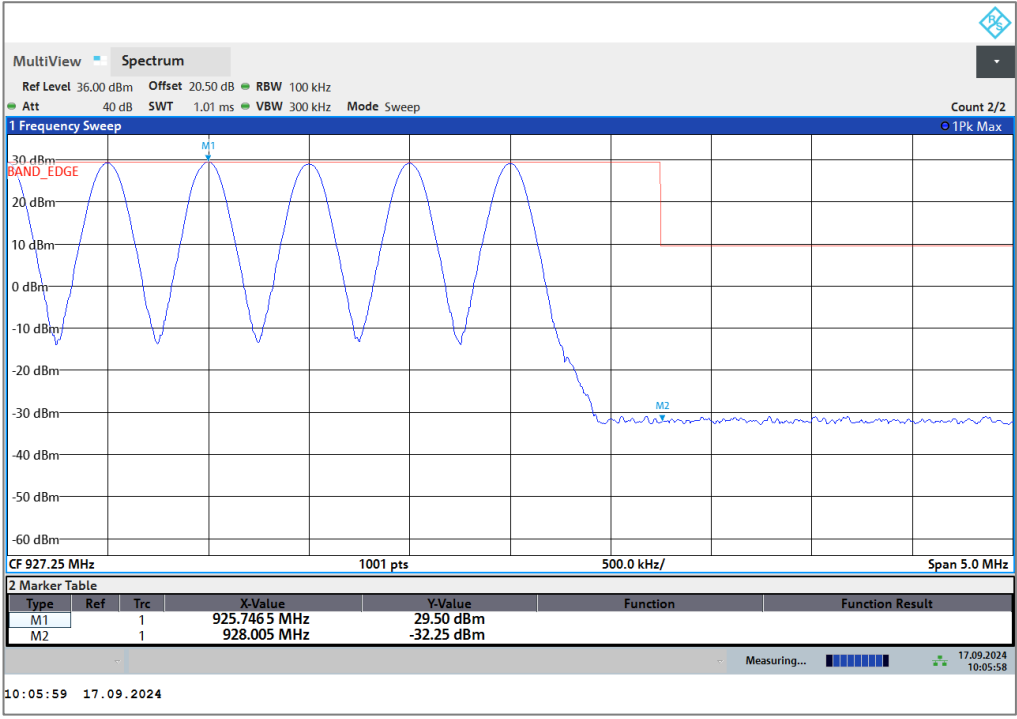
Test Details

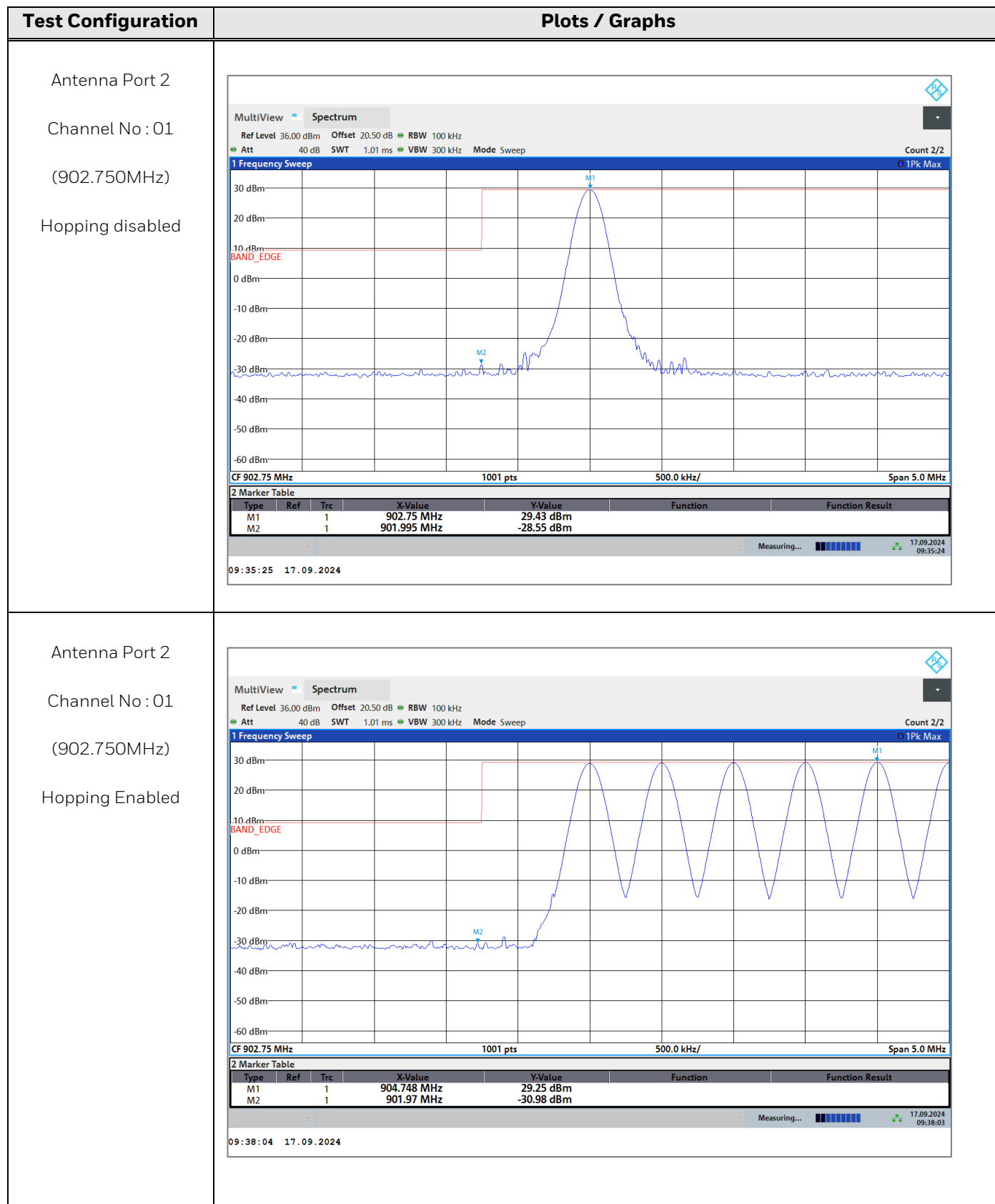
TEST METHOD	☒ Conducted ☒ Radiated	
TEST PORT	Antenna Port 1 & 2	
DETECTOR USED	Peak – Max Hold	
TEST INSTR. BANDWIDTH	RBW : 100KHz	VBW 300KHz
TEST CONNECTION.	 <pre> graph LR EUT[EUT] --- Att[20dB Attenuator] Att --- SA[Spectrum Analyzer] </pre>	
RADIATED TEST PARAMETERS.	Measurement Distance	: N /A
	Antenna Height	: N /A
	Turntable rotation	: N /A
	Equipment Class	: N /A

Test Results

Sl. No	Antenna Port	Channel No	Chanel Frequency (MHz)	Reference Value (B) (dBm)	Band Edge frequency (MHz)	Band Edge Level (A) (dBm)	Difference A-B (dBc)	Peak dBc Minimum Limit (dBc)	Result
Hopping Disabled									
01	Ant1	01	902.750	29.60	902.0	-27.68	-57.28	-20	PASS
02	Ant1	50	927.250	29.64	928.0	-31.50	-61.14	-20	PASS
03	Ant2	01	902.750	29.43	902.0	-28.55	-57.98	-20	PASS
04	Ant2	50	927.250	29.63	928.0	-31.62	-61.25	-20	PASS
Hopping Enabled									
01	Ant1	01	902.750	29.14	902.0	-32.24	-61.38	-20	PASS
02	Ant1	50	927.250	29.50	928.0	-32.25	-61.75	-20	PASS
03	Ant2	01	902.750	29.25	902.0	-30.98	-60.23	-20	PASS
04	Ant2	50	927.250	29.64	928.0	-32.15	-61.79	-20	PASS

Test Configuration	Plots / Graphs																					
Antenna Port 1 Channel No : 01 (902.750MHz) Hopping disabled	MultiView Spectrum Ref Level 36.00 dBm Offset 20.50 dB RBW 100 kHz Att 40 dB SWT 1.01 ms VBW 300 kHz Mode Sweep Count 2/2 1 Frequency Sweep 1Pk Max 2 Marker Table <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td></td><td>902.75 MHz</td><td>29.60 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>902.0 MHz</td><td>-27.68 dBm</td><td></td><td></td></tr></table> Measuring... 17.09.2024 09:28:28 09:28:29 17.09.2024	Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		902.75 MHz	29.60 dBm			M2	1		902.0 MHz	-27.68 dBm		
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																
M1	1		902.75 MHz	29.60 dBm																		
M2	1		902.0 MHz	-27.68 dBm																		
Antenna Port 1 Channel No : 01 (902.750MHz) Hopping Enabled	MultiView Spectrum Ref Level 36.00 dBm Offset 20.50 dB RBW 100 kHz Att 40 dB SWT 1.01 ms VBW 300 kHz Mode Sweep Count 2/2 1 Frequency Sweep 1Pk Max 2 Marker Table <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td></td><td>904.748 MHz</td><td>29.14 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>902.0 MHz</td><td>-32.24 dBm</td><td></td><td></td></tr></table> Measuring... 17.09.2024 09:42:14 09:42:14 17.09.2024	Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		904.748 MHz	29.14 dBm			M2	1		902.0 MHz	-32.24 dBm		
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																
M1	1		904.748 MHz	29.14 dBm																		
M2	1		902.0 MHz	-32.24 dBm																		

Test Configuration	Plots / Graphs
Antenna Port 1 Channel No : 50 (927.250MHz) Hopping disabled	 09:49:56 17.09.2024
Antenna Port 1 Channel No : 50 (927.250MHz) Hopping Enabled	 10:05:59 17.09.2024



Test Configuration	Plots / Graphs
Antenna Port 2 Channel No : 50 (927.250MHz) Hopping disabled	MultiView Spectrum Ref Level 36.00 dBm Offset 20.50 dB RBW 100 kHz Att 40 dB SWT 1.01 ms VBW 300 kHz Mode Sweep Count 2/2 1 Frequency Sweep 1Pk Max 30 dBm BAND_EDGE 20 dBm 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm CF 927.25 MHz 1001 pts 500.0 kHz/ Span 5.0 MHz Type Ref Trc X-Value Y-Value Function Function Result M1 1 927.25 MHz 29.63 dBm M2 1 928.0 MHz -31.62 dBm Measuring... 17.09.2024 10:14:37 10:14:38 17.09.2024
Antenna Port 2 Channel No : 50 (927.250MHz) Hopping Enabled	MultiView Spectrum Ref Level 36.00 dBm Offset 20.50 dB RBW 100 kHz Att 40 dB SWT 1.01 ms VBW 300 kHz Mode Sweep Count 2/2 1 Frequency Sweep 1Pk Max 30 dBm BAND_EDGE 20 dBm 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm CF 927.25 MHz 1001 pts 500.0 kHz/ Span 5.0 MHz Type Ref Trc X-Value Y-Value Function Function Result M1 1 926.246 MHz 29.64 dBm M2 1 928.01 MHz -32.15 dBm Measuring... 17.09.2024 10:10:05 10:10:05 17.09.2024

8. Emission in Non-Restricted Band & Conducted Spurious

The conducted spurious emissions were measured from 9KHz to 10GHz and compared to the specification defined in the standard, below are the results.

General Information

EUT NOMENCLATURE	IM21-PRT RFID Module
MODEL NO.	IM21-PRT
SERIAL NO.	22022476015
TESTED BY	Lavanya M
TEST DATES	30-08-2024

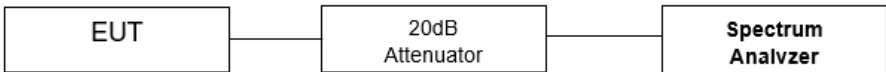
Test Conditions

TEST VOLTAGE	+5.0VDC
ENVIRONMENT COND.	Temperature : 23.2°C, Humidity : 64% RH
TEST CONFIGURATION	EUT Supplied with 5.0VDC from Laptop USB Port and Configured to Transmit Continuously.
OPERATING MODE	Continuous Tx mode – Hopping Disabled Condition
DEVIATIONS FROM STD.	N/A

Test Specifications

TEST STANDARD	FCC part 15 Subpart C 15.247 (d) / RSS-247 issue 2 clause 5.5
TEST SPECIFICATIONS	Section 9(b) in KDB 558074 D01 15.247 Measurement Guidance v05r02 & Subclause 7.8.8 of ANSI C63.10
TEST REQUIREMENT	In any 100kHz 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 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits

Test Details

TEST METHOD	☒ Conducted ☐ Radiated	
TEST PORT	ANTENNA PORT (1 & 2)	
DETECTOR USED	Peak Detector – Max Hold	
TEST INSTR. BANDWIDTH	RBW : 100KHz	VBW 300KHz (3 times RBW)
TEST CONNECTION.	 <pre> graph LR EUT[EUT] --- A[20dB Attenuator] --- SA[Spectrum Analyzer] </pre>	
RADIATED TEST PARAMETERS.	Measurement Distance	: N /A
	Antenna Height	: N/A
	Turntable rotation	: N/A
	Equipment Class	: N /A

Test Results – 9KHz to 30MHz

Test Configuration	Test Results / Graphs – 9KHz to 30MHz																																										
Antenna Port 1 Channel No : 01 (902.750MHz)	MultiView Spectrum Ref Level 20.50 dBm Offset 20.50 dB RBW 100 kHz Att 10 dB SWT 50.1 ms VBW 300 kHz Mode Sweep 1 Frequency Sweep 1Pk Max 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm CONDUCTED_SPURIOUS EMISSION 9.0 kHz 50001 pts 3.0 MHz/ 30.0 MHz 2 Marker Table <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td></td><td>9.0 kHz</td><td>-26.04 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>100.0 kHz</td><td>-37.66 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>1.0 MHz</td><td>-59.94 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>12.84286 MHz</td><td>-61.25 dBm</td><td></td><td></td></tr><tr><td>M5</td><td>1</td><td></td><td>27.987911 MHz</td><td>-59.10 dBm</td><td></td><td></td></tr></table> Measuring... 30.08.2024 10:31:10 10:31:10 30.08.2024	Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		9.0 kHz	-26.04 dBm			M2	1		100.0 kHz	-37.66 dBm			M3	1		1.0 MHz	-59.94 dBm			M4	1		12.84286 MHz	-61.25 dBm			M5	1		27.987911 MHz	-59.10 dBm		
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																																					
M1	1		9.0 kHz	-26.04 dBm																																							
M2	1		100.0 kHz	-37.66 dBm																																							
M3	1		1.0 MHz	-59.94 dBm																																							
M4	1		12.84286 MHz	-61.25 dBm																																							
M5	1		27.987911 MHz	-59.10 dBm																																							
Antenna Port 2 Channel No : 01 (902.750MHz)	MultiView Spectrum Ref Level 20.50 dBm Offset 20.50 dB RBW 100 kHz Att 10 dB SWT 50.1 ms VBW 300 kHz Mode Sweep 1 Frequency Sweep 1Pk Max 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm CONDUCTED_SPURIOUS EMISSION 9.0 kHz 50001 pts 3.0 MHz/ 30.0 MHz 2 Marker Table <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td></td><td>9.0 kHz</td><td>-25.97 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>100.0 kHz</td><td>-37.50 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>20.00659 MHz</td><td>-62.39 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>12.84346 MHz</td><td>-63.96 dBm</td><td></td><td></td></tr><tr><td>M5</td><td>1</td><td></td><td>30.0 MHz</td><td>-62.08 dBm</td><td></td><td></td></tr></table> Measuring... 30.08.2024 10:40:17 10:40:18 30.08.2024	Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		9.0 kHz	-25.97 dBm			M2	1		100.0 kHz	-37.50 dBm			M3	1		20.00659 MHz	-62.39 dBm			M4	1		12.84346 MHz	-63.96 dBm			M5	1		30.0 MHz	-62.08 dBm		
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																																					
M1	1		9.0 kHz	-25.97 dBm																																							
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M3	1		20.00659 MHz	-62.39 dBm																																							
M4	1		12.84346 MHz	-63.96 dBm																																							
M5	1		30.0 MHz	-62.08 dBm																																							

Test Configuration	Test Results / Graphs – 9KHz to 30MHz																																										
Antenna Port 1 Channel No : 26 (915.250MHz)	MultiViewSpectrum Ref Level 20.50 dBmOffset 20.50 dB RBW 100 kHzAtt 10 dB SWT 50.1 ms VBW 300 kHz Mode Sweep 1 Frequency Sweep1Pk Max 10 dBm 0 dBm CONDUCTED_SPURIOUS EMISSION 20 dBm 30 dBm 40 dBm 50 dBm 60 dBm 70 dBm 9.0 kHz 50001 pts 3.0 MHz/ 30.0 MHz 2 Marker Table <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td></td><td>9.0 kHz</td><td>-26.06 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>100.0 kHz</td><td>-37.65 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>20.00299 MHz</td><td>-61.79 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>12.84286 MHz</td><td>-61.93 dBm</td><td></td><td></td></tr><tr><td>M5</td><td>1</td><td></td><td>30.0 MHz</td><td>-61.05 dBm</td><td></td><td></td></tr></table> Measuring...30.08.202410:34:08 10:34:0930.08.2024	Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		9.0 kHz	-26.06 dBm			M2	1		100.0 kHz	-37.65 dBm			M3	1		20.00299 MHz	-61.79 dBm			M4	1		12.84286 MHz	-61.93 dBm			M5	1		30.0 MHz	-61.05 dBm		
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																																					
M1	1		9.0 kHz	-26.06 dBm																																							
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Antenna Port 2 Channel No : 26 (915.250MHz)	MultiViewSpectrum Ref Level 20.50 dBmOffset 20.50 dB RBW 100 kHzAtt 10 dB SWT 50.1 ms VBW 300 kHz Mode Sweep 1 Frequency Sweep1Pk Max 10 dBm 0 dBm CONDUCTED_SPURIOUS EMISSION 20 dBm 30 dBm 40 dBm 50 dBm 60 dBm 70 dBm 9.0 kHz 50001 pts 3.0 MHz/ 30.0 MHz 2 Marker Table <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td></td><td>9.0 kHz</td><td>-25.80 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>100.0 kHz</td><td>-37.45 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>20.00659 MHz</td><td>-63.31 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>12.84346 MHz</td><td>-63.02 dBm</td><td></td><td></td></tr><tr><td>M5</td><td>1</td><td></td><td>30.0 MHz</td><td>-61.48 dBm</td><td></td><td></td></tr></table> Measuring...30.08.202410:39:14 10:39:1530.08.2024	Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		9.0 kHz	-25.80 dBm			M2	1		100.0 kHz	-37.45 dBm			M3	1		20.00659 MHz	-63.31 dBm			M4	1		12.84346 MHz	-63.02 dBm			M5	1		30.0 MHz	-61.48 dBm		
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																																					
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M5	1		30.0 MHz	-61.48 dBm																																							

Test Configuration	Test Results / Graphs – 9KHz to 30MHz																																										
Antenna Port 1 Channel No : 50 (927.250MHz)	MultiView Spectrum Ref Level 20.50 dBm Offset 20.50 dB RBW 100 kHz Att 10 dB SWT 50.1 ms VBW 300 kHz Mode Sweep 1 Frequency Sweep 1Pk Max 10 dBm 0 dBm CONDUCTED_SPURIOUS EMISSION -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm 9.0 kHz 50001 pts 3.0 MHz/ 30.0 MHz 2 Marker Table <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td></td><td>9.0 kHz</td><td>-25.98 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>100.0 kHz</td><td>-37.49 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>20.006 59 MHz</td><td>-61.87 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>12.843 46 MHz</td><td>-62.10 dBm</td><td></td><td></td></tr><tr><td>M5</td><td>1</td><td></td><td>30.0 MHz</td><td>-61.36 dBm</td><td></td><td></td></tr></table> Measuring... 30.08.2024 10:35:18 10:35:19 30.08.2024	Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		9.0 kHz	-25.98 dBm			M2	1		100.0 kHz	-37.49 dBm			M3	1		20.006 59 MHz	-61.87 dBm			M4	1		12.843 46 MHz	-62.10 dBm			M5	1		30.0 MHz	-61.36 dBm		
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																																					
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Antenna Port 2 Channel No : 50 (927.250MHz)	MultiView Spectrum Ref Level 20.50 dBm Offset 20.50 dB RBW 100 kHz Att 10 dB SWT 50.1 ms VBW 300 kHz Mode Sweep 1 Frequency Sweep 1Pk Max 10 dBm 0 dBm CONDUCTED_SPURIOUS EMISSION -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm 9.0 kHz 50001 pts 3.0 MHz/ 30.0 MHz 2 Marker Table <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td></td><td>9.0 kHz</td><td>-26.04 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>100.0 kHz</td><td>-37.73 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>20.006 59 MHz</td><td>-61.31 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>12.843 46 MHz</td><td>-63.14 dBm</td><td></td><td></td></tr><tr><td>M5</td><td>1</td><td></td><td>30.0 MHz</td><td>-61.42 dBm</td><td></td><td></td></tr></table> Measuring... 30.08.2024 10:37:51 10:37:51 30.08.2024	Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		9.0 kHz	-26.04 dBm			M2	1		100.0 kHz	-37.73 dBm			M3	1		20.006 59 MHz	-61.31 dBm			M4	1		12.843 46 MHz	-63.14 dBm			M5	1		30.0 MHz	-61.42 dBm		
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																																					
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M3	1		20.006 59 MHz	-61.31 dBm																																							
M4	1		12.843 46 MHz	-63.14 dBm																																							
M5	1		30.0 MHz	-61.42 dBm																																							

Test Results – 30MHz to 1GHz

Test Configuration	Test Results / Graphs – 30MHz to 1GHz																																										
Antenna Port 1 Channel No : 01 (902.750MHz)	MultiView Spectrum Ref Level 33.00 dBm Offset 20.50 dB RBW 100 kHz Att 20 dB SWT 50.1 ms VBW 300 kHz Mode Sweep 1 Frequency Sweep 30 dBm 20 dBm 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm CONDUCTED_SPURIOUS EMISSION 30.0 MHz 50001 pts 97.0 MHz/ 1.0 GHz 2 Marker Table <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td></td><td>902.759 MHz</td><td>29.41 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>129.374 4 MHz</td><td>-52.51 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>360.661 8 MHz</td><td>-52.77 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>671.097 MHz</td><td>-53.21 dBm</td><td></td><td></td></tr><tr><td>M5</td><td>1</td><td></td><td>964.823 MHz</td><td>-52.38 dBm</td><td></td><td></td></tr></table> Measuring... 30.08.2024 10:56:35 10:56:35 30.08.2024	Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		902.759 MHz	29.41 dBm			M2	1		129.374 4 MHz	-52.51 dBm			M3	1		360.661 8 MHz	-52.77 dBm			M4	1		671.097 MHz	-53.21 dBm			M5	1		964.823 MHz	-52.38 dBm		
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																																					
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Antenna Port 2 Channel No : 01 (902.750MHz)	MultiView Spectrum Ref Level 33.00 dBm Offset 20.50 dB RBW 100 kHz Att 20 dB SWT 50.1 ms VBW 300 kHz Mode Sweep 1 Frequency Sweep 30 dBm 20 dBm 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm CONDUCTED_SPURIOUS EMISSION 30.0 MHz 50001 pts 97.0 MHz/ 1.0 GHz 2 Marker Table <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td></td><td>902.759 MHz</td><td>29.42 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>129.374 4 MHz</td><td>-50.16 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>360.661 8 MHz</td><td>-51.60 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>671.097 MHz</td><td>-51.39 dBm</td><td></td><td></td></tr><tr><td>M5</td><td>1</td><td></td><td>973.617 MHz</td><td>-50.89 dBm</td><td></td><td></td></tr></table> Measuring... 30.08.2024 10:50:23 10:50:24 30.08.2024	Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		902.759 MHz	29.42 dBm			M2	1		129.374 4 MHz	-50.16 dBm			M3	1		360.661 8 MHz	-51.60 dBm			M4	1		671.097 MHz	-51.39 dBm			M5	1		973.617 MHz	-50.89 dBm		
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																																					
M1	1		902.759 MHz	29.42 dBm																																							
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M4	1		671.097 MHz	-51.39 dBm																																							
M5	1		973.617 MHz	-50.89 dBm																																							

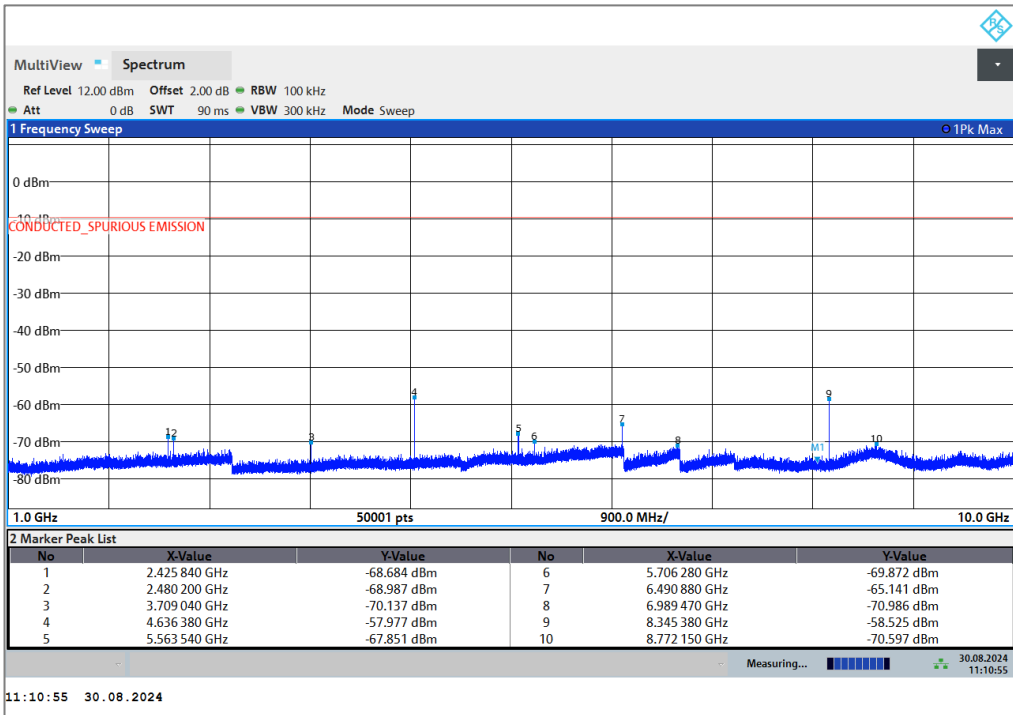
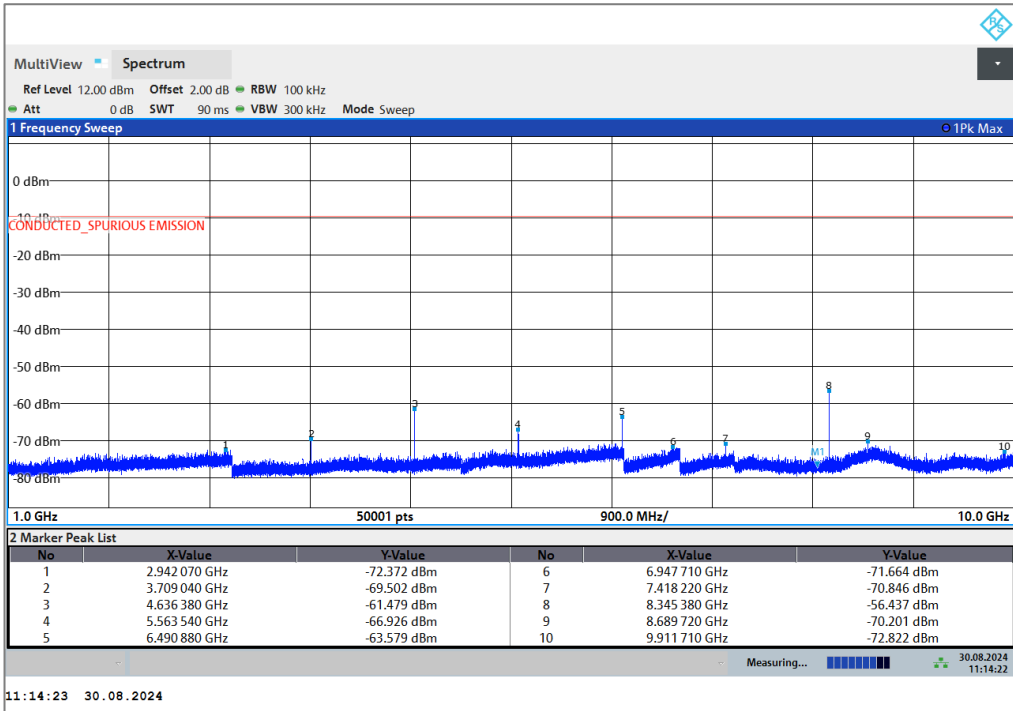
Test Configuration	Test Results / Graphs – 30MHz to 1GHz																																										
Antenna Port 1 Channel No : 26 (915.250MHz)	MultiView Spectrum Ref Level 33.00 dBm Offset 20.50 dB RBW 100 kHz Att 20 dB SWT 50.1 ms VBW 300 kHz Mode Sweep 1 Frequency Sweep 30 dBm 20 dBm 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm CONDUCTED_SPURIOUS EMISSION M2 M3 M4 M5 30.0 MHz50001 pts97.0 MHz/1.0 GHz 2 Marker Table <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td></td><td>915.253 MHz</td><td>29.28 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>129.374 4 MHz</td><td>-51.75 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>360.661 8 MHz</td><td>-52.80 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>671.097 MHz</td><td>-53.85 dBm</td><td></td><td></td></tr><tr><td>M5</td><td>1</td><td></td><td>964.823 MHz</td><td>-52.76 dBm</td><td></td><td></td></tr></table> Measuring... 30.08.2024 10:55:25 10:55:25 30.08.2024	Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		915.253 MHz	29.28 dBm			M2	1		129.374 4 MHz	-51.75 dBm			M3	1		360.661 8 MHz	-52.80 dBm			M4	1		671.097 MHz	-53.85 dBm			M5	1		964.823 MHz	-52.76 dBm		
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																																					
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Antenna Port 2 Channel No : 01 (915.250MHz)	MultiView Spectrum Ref Level 33.00 dBm Offset 20.50 dB RBW 100 kHz Att 20 dB SWT 50.1 ms VBW 300 kHz Mode Sweep 1 Frequency Sweep 30 dBm 20 dBm 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm CONDUCTED_SPURIOUS EMISSION M2 M3 M4 M5 30.0 MHz50001 pts97.0 MHz/1.0 GHz 2 Marker Table <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td></td><td>915.253 MHz</td><td>29.37 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>129.374 4 MHz</td><td>-50.32 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>360.661 8 MHz</td><td>-52.77 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>671.097 MHz</td><td>-50.62 dBm</td><td></td><td></td></tr><tr><td>M5</td><td>1</td><td></td><td>964.823 MHz</td><td>-51.24 dBm</td><td></td><td></td></tr></table> Measuring... 30.08.2024 10:51:54 10:51:54 30.08.2024	Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		915.253 MHz	29.37 dBm			M2	1		129.374 4 MHz	-50.32 dBm			M3	1		360.661 8 MHz	-52.77 dBm			M4	1		671.097 MHz	-50.62 dBm			M5	1		964.823 MHz	-51.24 dBm		
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M5	1		964.823 MHz	-51.24 dBm																																							

Test Configuration	Test Results / Graphs – 30MHz to 1GHz
Antenna Port 1 Channel No : 50 927.250MHz)	</

Test Results – 1GHz to 10GHz

Test Configuration	Test Results / Graphs – 1GHz to 10GHz																																				
Antenna Port 1 Channel No : 01 (902.750MHz)	MultiView Spectrum Ref Level 12.00 dBm Offset 2.00 dB RBW 100 kHz Att 0 dB SWT 90 ms VBW 300 kHz Mode Sweep 1 Frequency Sweep 1Pk Max 0 dBm CONDUCTED_SPURIOUS EMISSION -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm -80 dBm 1.0 GHz 50001 pts 900.0 MHz/ 10.0 GHz 2 Marker Peak List <table><tr><th>No</th><th>X-Value</th><th>Y-Value</th><th>No</th><th>X-Value</th><th>Y-Value</th></tr><tr><td>1</td><td>1.711 980 GHz</td><td>-67.882 dBm</td><td>6</td><td>6.319 340 GHz</td><td>-60.100 dBm</td></tr><tr><td>2</td><td>1.805 570 GHz</td><td>-62.097 dBm</td><td>7</td><td>6.946 630 GHz</td><td>-70.660 dBm</td></tr><tr><td>3</td><td>2.708 260 GHz</td><td>-65.187 dBm</td><td>8</td><td>8.124 890 GHz</td><td>-57.492 dBm</td></tr><tr><td>4</td><td>3.611 120 GHz</td><td>-67.593 dBm</td><td>9</td><td>8.787 630 GHz</td><td>-70.443 dBm</td></tr><tr><td>5</td><td>4.513 800 GHz</td><td>-66.355 dBm</td><td>10</td><td>9.027 570 GHz</td><td>-69.797 dBm</td></tr></table> Measuring... 30.08.2024 11:06:13 11:06:14 30.08.2024	No	X-Value	Y-Value	No	X-Value	Y-Value	1	1.711 980 GHz	-67.882 dBm	6	6.319 340 GHz	-60.100 dBm	2	1.805 570 GHz	-62.097 dBm	7	6.946 630 GHz	-70.660 dBm	3	2.708 260 GHz	-65.187 dBm	8	8.124 890 GHz	-57.492 dBm	4	3.611 120 GHz	-67.593 dBm	9	8.787 630 GHz	-70.443 dBm	5	4.513 800 GHz	-66.355 dBm	10	9.027 570 GHz	-69.797 dBm
No	X-Value	Y-Value	No	X-Value	Y-Value																																
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4	3.611 120 GHz	-67.593 dBm	9	8.787 630 GHz	-70.443 dBm																																
5	4.513 800 GHz	-66.355 dBm	10	9.027 570 GHz	-69.797 dBm																																
Antenna Port 2 Channel No : 01 (902.750MHz)	MultiView Spectrum Ref Level 12.00 dBm Offset 2.00 dB RBW 100 kHz Att 0 dB SWT 90 ms VBW 300 kHz Mode Sweep 1 Frequency Sweep 1Pk Max 0 dBm CONDUCTED_SPURIOUS EMISSION -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm -80 dBm 1.0 GHz 50001 pts 900.0 MHz/ 10.0 GHz 2 Marker Peak List <table><tr><th>No</th><th>X-Value</th><th>Y-Value</th><th>No</th><th>X-Value</th><th>Y-Value</th></tr><tr><td>1</td><td>1.805 570 GHz</td><td>-54.372 dBm</td><td>6</td><td>6.979 930 GHz</td><td>-70.545 dBm</td></tr><tr><td>2</td><td>2.708 260 GHz</td><td>-61.416 dBm</td><td>7</td><td>7.222 210 GHz</td><td>-72.075 dBm</td></tr><tr><td>3</td><td>4.513 800 GHz</td><td>-61.616 dBm</td><td>8</td><td>8.124 890 GHz</td><td>-60.321 dBm</td></tr><tr><td>4</td><td>5.416 660 GHz</td><td>-66.561 dBm</td><td>9</td><td>8.751 270 GHz</td><td>-70.800 dBm</td></tr><tr><td>5</td><td>6.319 340 GHz</td><td>-59.615 dBm</td><td>10</td><td>9.970 390 GHz</td><td>-72.201 dBm</td></tr></table> Measuring... 30.08.2024 11:17:11 11:17:11 30.08.2024	No	X-Value	Y-Value	No	X-Value	Y-Value	1	1.805 570 GHz	-54.372 dBm	6	6.979 930 GHz	-70.545 dBm	2	2.708 260 GHz	-61.416 dBm	7	7.222 210 GHz	-72.075 dBm	3	4.513 800 GHz	-61.616 dBm	8	8.124 890 GHz	-60.321 dBm	4	5.416 660 GHz	-66.561 dBm	9	8.751 270 GHz	-70.800 dBm	5	6.319 340 GHz	-59.615 dBm	10	9.970 390 GHz	-72.201 dBm
No	X-Value	Y-Value	No	X-Value	Y-Value																																
1	1.805 570 GHz	-54.372 dBm	6	6.979 930 GHz	-70.545 dBm																																
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5	6.319 340 GHz	-59.615 dBm	10	9.970 390 GHz	-72.201 dBm																																

Test Configuration	Test Results / Graphs – 1GHz to 10GHz																																				
Antenna Port 1 Channel No : 26 (915.250MHz)	MultiView Spectrum Ref Level 12.00 dBm Offset 2.00 dB RBW 100 kHz Att 0 dB SWT 90 ms VBW 300 kHz Mode Sweep 1 Frequency Sweep 0 dBm CONDUCTED_SPURIOUS EMISSION 1.0 GHz 50001 pts 900.0 MHz/ 10.0 GHz 2 Marker Peak List <table><tr><th>No</th><th>X-Value</th><th>Y-Value</th><th>No</th><th>X-Value</th><th>Y-Value</th></tr><tr><td>1</td><td>2.745 880 GHz</td><td>-70.663 dBm</td><td>6</td><td>6.406 820 GHz</td><td>-59.485 dBm</td></tr><tr><td>2</td><td>3.661 160 GHz</td><td>-67.028 dBm</td><td>7</td><td>6.991 270 GHz</td><td>-70.976 dBm</td></tr><tr><td>3</td><td>4.222 930 GHz</td><td>-72.888 dBm</td><td>8</td><td>7.322 100 GHz</td><td>-70.092 dBm</td></tr><tr><td>4</td><td>4.576 260 GHz</td><td>-63.512 dBm</td><td>9</td><td>8.237 390 GHz</td><td>-57.070 dBm</td></tr><tr><td>5</td><td>5.491 540 GHz</td><td>-69.713 dBm</td><td>10</td><td>8.871 690 GHz</td><td>-70.541 dBm</td></tr></table> Measuring... 30.08.2024 11:08:15 11:08:16 30.08.2024	No	X-Value	Y-Value	No	X-Value	Y-Value	1	2.745 880 GHz	-70.663 dBm	6	6.406 820 GHz	-59.485 dBm	2	3.661 160 GHz	-67.028 dBm	7	6.991 270 GHz	-70.976 dBm	3	4.222 930 GHz	-72.888 dBm	8	7.322 100 GHz	-70.092 dBm	4	4.576 260 GHz	-63.512 dBm	9	8.237 390 GHz	-57.070 dBm	5	5.491 540 GHz	-69.713 dBm	10	8.871 690 GHz	-70.541 dBm
No	X-Value	Y-Value	No	X-Value	Y-Value																																
1	2.745 880 GHz	-70.663 dBm	6	6.406 820 GHz	-59.485 dBm																																
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4	4.576 260 GHz	-63.512 dBm	9	8.237 390 GHz	-57.070 dBm																																
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Antenna Port 2 Channel No : 26 (915.250MHz)	MultiView Spectrum Ref Level 12.00 dBm Offset 2.00 dB RBW 100 kHz Att 0 dB SWT 90 ms VBW 300 kHz Mode Sweep 1 Frequency Sweep 0 dBm CONDUCTED_SPURIOUS EMISSION 1.0 GHz 50001 pts 900.0 MHz/ 10.0 GHz 2 Marker Peak List <table><tr><th>No</th><th>X-Value</th><th>Y-Value</th><th>No</th><th>X-Value</th><th>Y-Value</th></tr><tr><td>1</td><td>1.830 590 GHz</td><td>-63.610 dBm</td><td>6</td><td>6.406 820 GHz</td><td>-61.286 dBm</td></tr><tr><td>2</td><td>2.745 880 GHz</td><td>-67.515 dBm</td><td>7</td><td>6.977 950 GHz</td><td>-71.899 dBm</td></tr><tr><td>3</td><td>3.661 160 GHz</td><td>-70.365 dBm</td><td>8</td><td>7.322 100 GHz</td><td>-70.883 dBm</td></tr><tr><td>4</td><td>4.576 260 GHz</td><td>-61.557 dBm</td><td>9</td><td>8.237 390 GHz</td><td>-57.366 dBm</td></tr><tr><td>5</td><td>5.491 540 GHz</td><td>-69.941 dBm</td><td>10</td><td>8.747 500 GHz</td><td>-71.648 dBm</td></tr></table> Measuring... 30.08.2024 11:16:07 11:16:08 30.08.2024	No	X-Value	Y-Value	No	X-Value	Y-Value	1	1.830 590 GHz	-63.610 dBm	6	6.406 820 GHz	-61.286 dBm	2	2.745 880 GHz	-67.515 dBm	7	6.977 950 GHz	-71.899 dBm	3	3.661 160 GHz	-70.365 dBm	8	7.322 100 GHz	-70.883 dBm	4	4.576 260 GHz	-61.557 dBm	9	8.237 390 GHz	-57.366 dBm	5	5.491 540 GHz	-69.941 dBm	10	8.747 500 GHz	-71.648 dBm
No	X-Value	Y-Value	No	X-Value	Y-Value																																
1	1.830 590 GHz	-63.610 dBm	6	6.406 820 GHz	-61.286 dBm																																
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Test Configuration	Test Results / Graphs – 1GHz to 10GHz																																				
Antenna Port 1 Channel No : 26 (915.250MHz)	 <table><tr><th>No</th><th>X-Value</th><th>Y-Value</th><th>No</th><th>X-Value</th><th>Y-Value</th></tr><tr><td>1</td><td>2.425 840 GHz</td><td>-68.684 dBm</td><td>6</td><td>5.706 280 GHz</td><td>-69.872 dBm</td></tr><tr><td>2</td><td>2.480 200 GHz</td><td>-68.987 dBm</td><td>7</td><td>6.490 880 GHz</td><td>-65.141 dBm</td></tr><tr><td>3</td><td>3.709 040 GHz</td><td>-70.137 dBm</td><td>8</td><td>6.989 470 GHz</td><td>-70.986 dBm</td></tr><tr><td>4</td><td>4.636 380 GHz</td><td>-57.977 dBm</td><td>9</td><td>8.345 380 GHz</td><td>-58.525 dBm</td></tr><tr><td>5</td><td>5.563 540 GHz</td><td>-67.851 dBm</td><td>10</td><td>8.772 150 GHz</td><td>-70.597 dBm</td></tr></table> 11:10:55 30.08.2024	No	X-Value	Y-Value	No	X-Value	Y-Value	1	2.425 840 GHz	-68.684 dBm	6	5.706 280 GHz	-69.872 dBm	2	2.480 200 GHz	-68.987 dBm	7	6.490 880 GHz	-65.141 dBm	3	3.709 040 GHz	-70.137 dBm	8	6.989 470 GHz	-70.986 dBm	4	4.636 380 GHz	-57.977 dBm	9	8.345 380 GHz	-58.525 dBm	5	5.563 540 GHz	-67.851 dBm	10	8.772 150 GHz	-70.597 dBm
No	X-Value	Y-Value	No	X-Value	Y-Value																																
1	2.425 840 GHz	-68.684 dBm	6	5.706 280 GHz	-69.872 dBm																																
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5	5.563 540 GHz	-67.851 dBm	10	8.772 150 GHz	-70.597 dBm																																
Antenna Port 2 Channel No : 26 (915.250MHz)	 <table><tr><th>No</th><th>X-Value</th><th>Y-Value</th><th>No</th><th>X-Value</th><th>Y-Value</th></tr><tr><td>1</td><td>2.942 070 GHz</td><td>-72.372 dBm</td><td>6</td><td>6.947 710 GHz</td><td>-71.664 dBm</td></tr><tr><td>2</td><td>3.709 040 GHz</td><td>-69.502 dBm</td><td>7</td><td>7.418 220 GHz</td><td>-70.846 dBm</td></tr><tr><td>3</td><td>4.636 380 GHz</td><td>-61.479 dBm</td><td>8</td><td>8.345 380 GHz</td><td>-56.437 dBm</td></tr><tr><td>4</td><td>5.563 540 GHz</td><td>-66.926 dBm</td><td>9</td><td>8.689 720 GHz</td><td>-70.201 dBm</td></tr><tr><td>5</td><td>6.490 880 GHz</td><td>-63.579 dBm</td><td>10</td><td>9.911 710 GHz</td><td>-72.822 dBm</td></tr></table> 11:14:23 30.08.2024	No	X-Value	Y-Value	No	X-Value	Y-Value	1	2.942 070 GHz	-72.372 dBm	6	6.947 710 GHz	-71.664 dBm	2	3.709 040 GHz	-69.502 dBm	7	7.418 220 GHz	-70.846 dBm	3	4.636 380 GHz	-61.479 dBm	8	8.345 380 GHz	-56.437 dBm	4	5.563 540 GHz	-66.926 dBm	9	8.689 720 GHz	-70.201 dBm	5	6.490 880 GHz	-63.579 dBm	10	9.911 710 GHz	-72.822 dBm
No	X-Value	Y-Value	No	X-Value	Y-Value																																
1	2.942 070 GHz	-72.372 dBm	6	6.947 710 GHz	-71.664 dBm																																
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9. Spurious Radiated Emissions & Restricted Band of Operation

The conducted spurious emissions were measured from 9KHz to 10 GHz and compared to the specification defined in the standard, below are the results.

General Information

EUT NOMENCLATURE	IM21-PRT RFID Module
MODEL NO.	IM21-PRT
SERIAL NO.	22022476015
TESTED BY	Lavanya M
TEST DATES	18-09-2024 to 27-09-2024

Test Conditions

TEST VOLTAGE	+5.0VDC
ENVIRONMENT COND.	Temperature : 23.2°C, Humidity : 64% RH
TEST CONFIGURATION	EUT Supplied with 5.0VDC from Laptop USB Port and Configured to Transmit Continuously.
OPERATING MODE	Continuous Tx mode – Hopping Disabled Condition
DEVIATIONS FROM STD.	N/A

Test Specifications

TEST STANDARD	FCC part 15 Subpart C 15.247 (d) / (15.209 & 15.205) / RSS-GEN Clause 8.9, 8.10
TEST SPECIFICATIONS	ANSI C63.10
TEST REQUIREMENT	As per the Limits defined in next page.

Test Details

TEST METHOD	☐ Conducted ☒ Radiated			
TEST PORT	Antenna Port 2 (Worst case antenna Port from conducted results)			
ANTENNA DETAILS	1 circular Polarized Antenna, 6 RFID couplers			
DETECTOR USED	< 1GHz (Quasi Peak)		>1GHz (Peak & Average)	
TEST INSTR. BANDWIDTH	200Hz [9KHz to 150KHz]	9KHz [150KHz to 30MHz]	100KHz [30MHz to 1GHz]	1MHz [1GHz to 10GHz]
TEST CONNECTION.	The EUT was arranged in 3 meter Semi anechoic chamber as per the setup diagram.			
RADIATED TEST PARAMETERS.	Measurement Distance : 3-meter distance			
	Antenna Height : 1 to 4 meters with boresight antenna mast			
	Turntable rotation	: 0° to 360°	EUT Rotations	X, Y, Z
	Equipment Class : N /A			

Test Limits

Frequency (MHz)	Field strength ($\mu\text{V/m}$)	Field strength ($\text{dB}\mu\text{V/m}$)	Distance of Measurement (m)
0.009 – 0.490	2400/F(kHz)	48.50 – 13.80	300*
0.490 – 1.705	24000/F(kHz)	33.80 – 23.00	30*
1.705 -30	30	29.54	30*
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

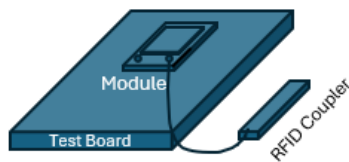
The limit shows in the table above of frequency range 0.009 – 0.490, 0.490 – 1.705 MHz and 1.705-30MHz is at 300-meter, 30 meter and 30-meter range respectively, which corresponds to 128.51 – 93.80, 73.80 – 62.96 and 69.54 $\text{dB}\mu\text{V/m}$ at 3m range by extrapolation calculation and the measurement of loop antenna.

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

Lower Limits applies at the transition frequencies.

Notes:

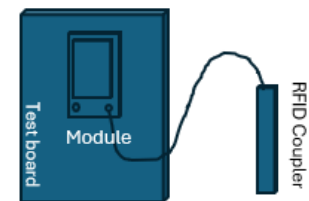
Initial exploration was done to know the placement of EUT that produces the maximum radiation by rotating the EUT is 3 different axes as shown below . At each axis, the EUT was rotated from 0°-360° and Antenna Height from 1m to 4m. Also, the test was performed on both Ant 1 and Ant 2 to know which port produces maximum radiations. The worst-case Antenna Port and EUT Axis results are reported.



X - Axis



Y - Axis



Z - Axis

Test Details – 9KHz to 30MHz

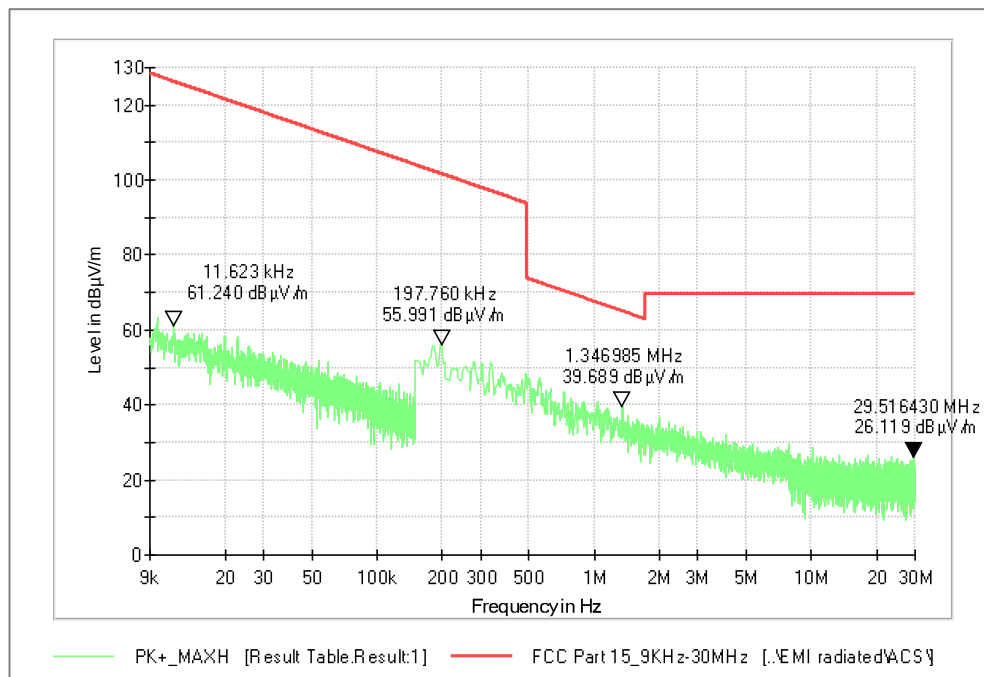
Test Results / Graphs – 9KHz to 30MHz

Ant Port : 2

Ant Type : LUPUS14V2

Channel 01 : 902.750MHz

Antenna Parallel to EUT

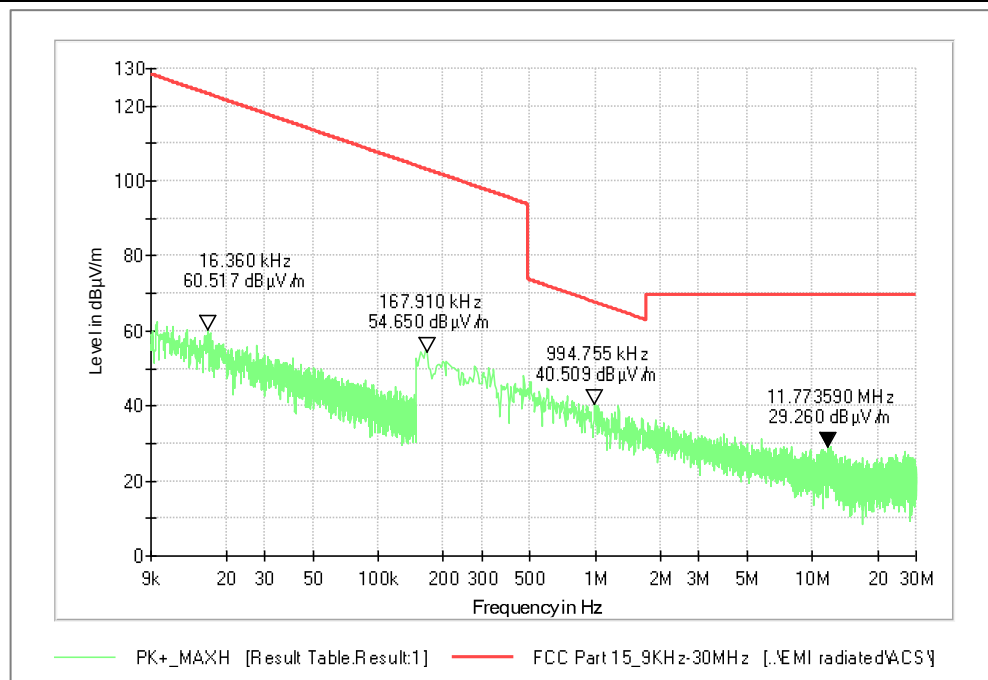


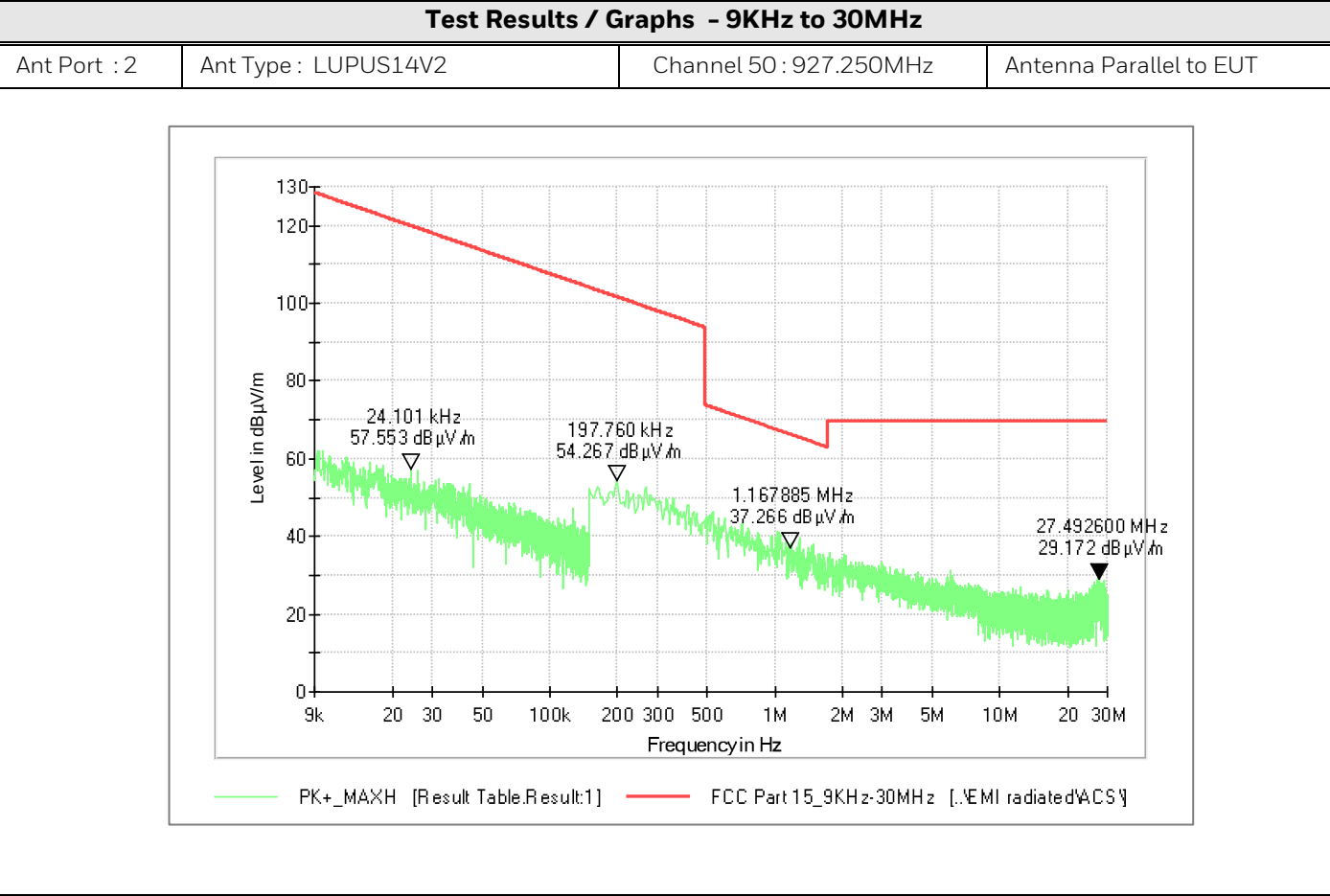
Ant Port : 2

Ant Type : LUPUS14V2

Channel 26 : 915.250MHz

Antenna Parallel to EUT





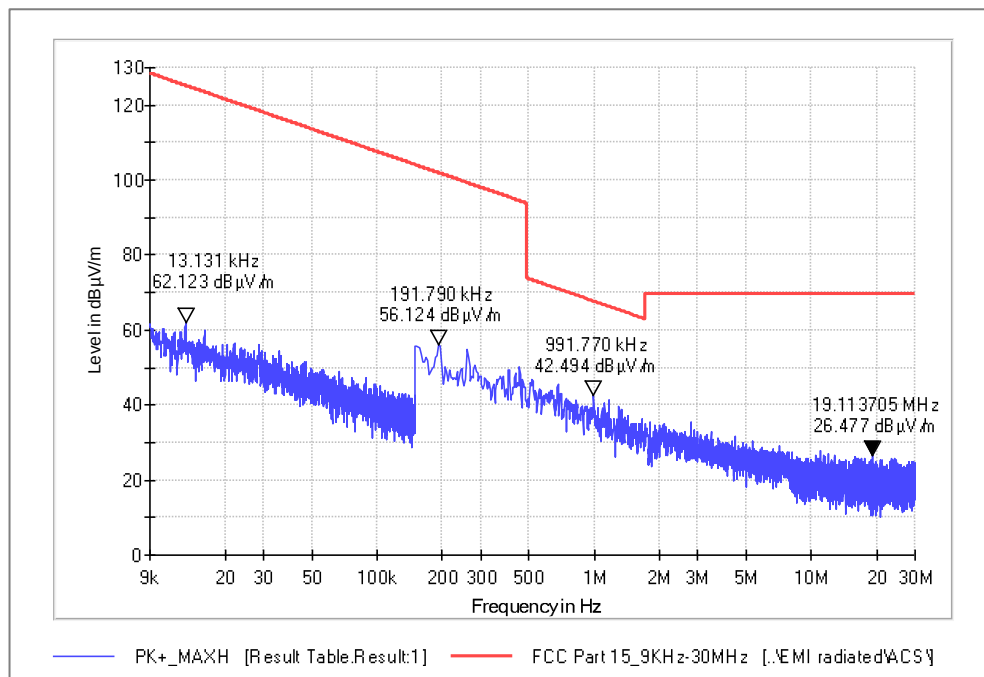
Test Results / Graphs - 9KHz to 30MHz

Ant Port : 2

Ant Type : LUPUS14V2

Channel 01 : 902.750MHz

Antenna Perpendicular to EUT

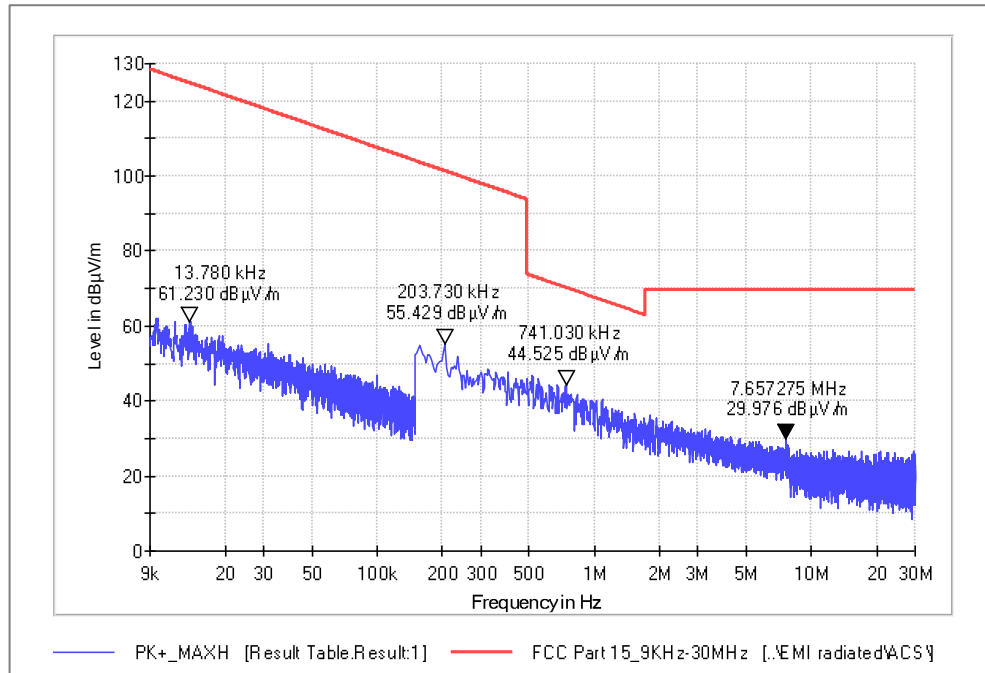


Ant Port : 2

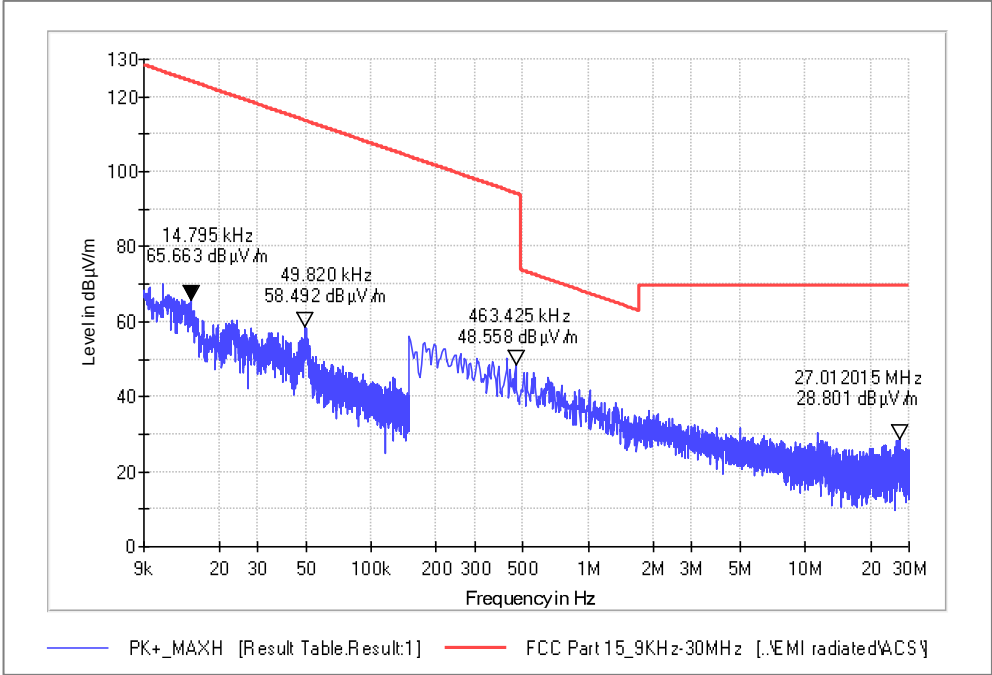
Ant Type : LUPUS14V2

Channel 26 : 915.250MHz

Antenna Perpendicular to EUT



Test Results / Graphs - 9KHz to 30MHz			
Ant Port : 2	Ant Type : LUPUS14V2	Channel 50 : 927.250MHz	Antenna Perpendicular to EUT



Test Details – 30MHz to 1GHz

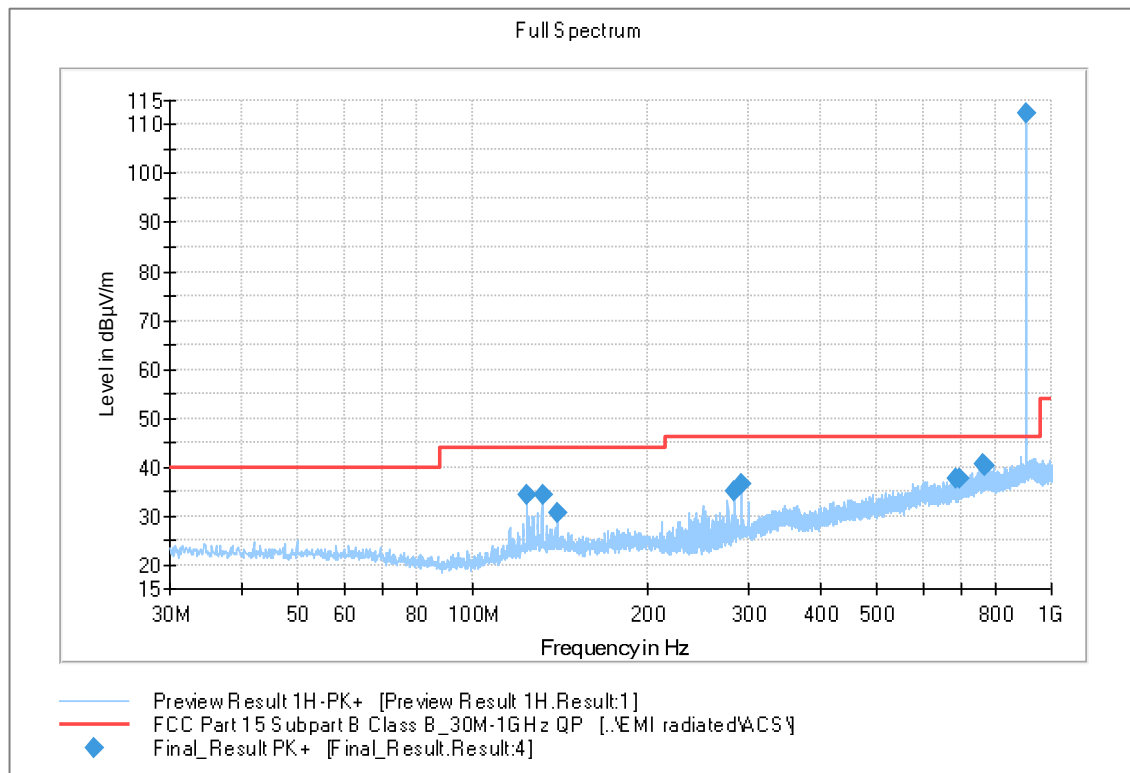
Test Results / Graphs – 30MHz to 1GHz

Ant Port : 2

Ant Type : LUPUS14V2

Channel 01 : 902.750MHz

Horizontal Polarization

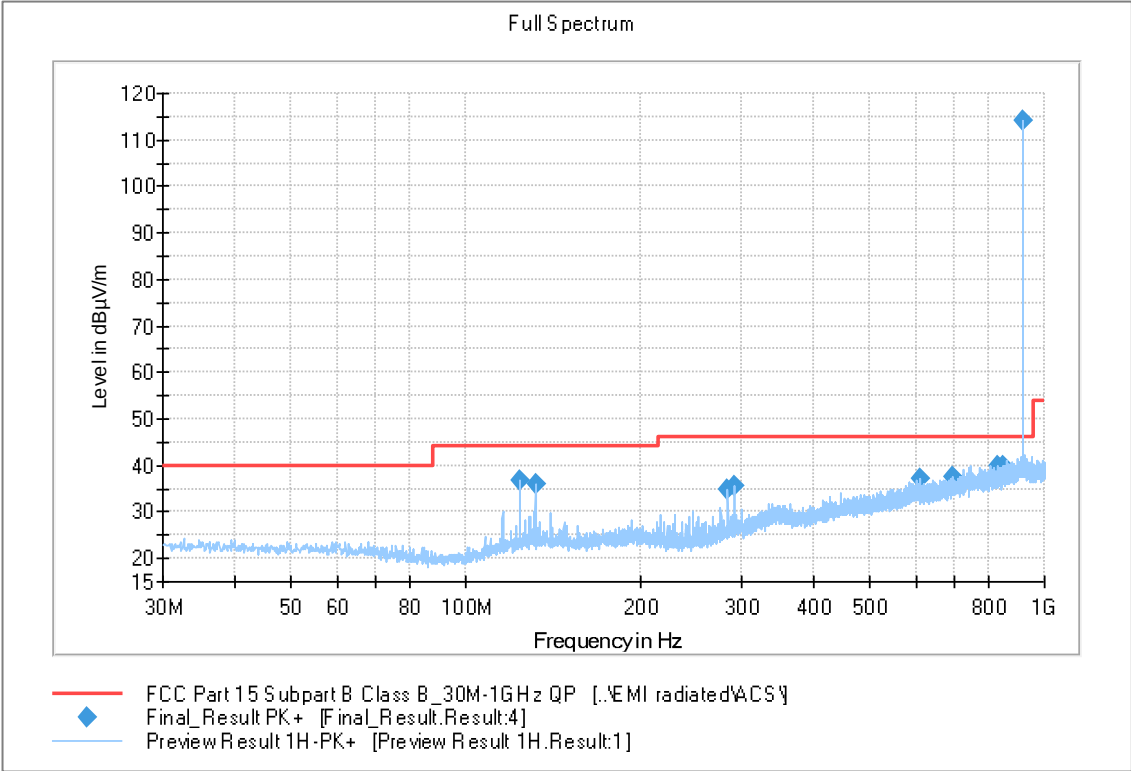


Frequency (MHz)	MaxPeak (dBµV/m)	QP Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Pol	Test Result
123.982222	34.26	44.00	9.74	1000.0	H	PASS
131.957778	34.42	44.00	9.58	1000.0	H	PASS
139.933333	30.65	44.00	13.35	1000.0	H	PASS
283.924444	35.18	46.00	10.82	1000.0	H	PASS
292.007778	36.38	46.00	9.62	1000.0	H	PASS
608.000000	33.80	46.00	12.2	1000	H	PASS
614.000000	34.10	46.00	11.9	1000	H	PASS
686.258889	37.52	46.00	8.48	1000.0	H	PASS
692.186667	37.77	46.00	8.23	1000.0	H	PASS
759.763333	40.40	46.00	5.60	1000.0	H	PASS
768.493333	40.28	46.00	5.72	1000.0	H	PASS
902.784444	112.51	46.00	***	1000.0	H	***
960.000000	40.12	46.00	5.88	1000.0	H	PASS

*** Fundamental Operating Frequency.

Test Results / Graphs - 30MHz to 1GHz

Ant Port : 2	Ant Type : LUPUS14V2	Channel 26: 915.250MHz	Horizontal Polarization
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Frequency (MHz)	MaxPeak (dBµV/m)	QP Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Pol	Test Result
123.982222	36.82	44.00	7.18	1000.0	H	PASS
131.957778	35.89	44.00	8.11	1000.0	H	PASS
284.032222	34.78	46.00	11.22	1000.0	H	PASS
292.007778	35.74	46.00	10.26	1000.0	H	PASS
608.000000	33.21	46.00	12.79	1000	H	PASS
614.000000	33.67	46.00	12.33	1000	H	PASS
692.941111	37.50	46.00	8.50	1000.0	H	PASS
831.651111	39.90	46.00	6.10	1000.0	H	PASS
849.865556	39.91	46.00	6.09	1000.0	H	PASS
915.286667	114.17	46.00	***	1000.0	H	***
960.000000	39.92	46.00	6.08	1000	H	PASS

*** Fundamental Operating Frequency.

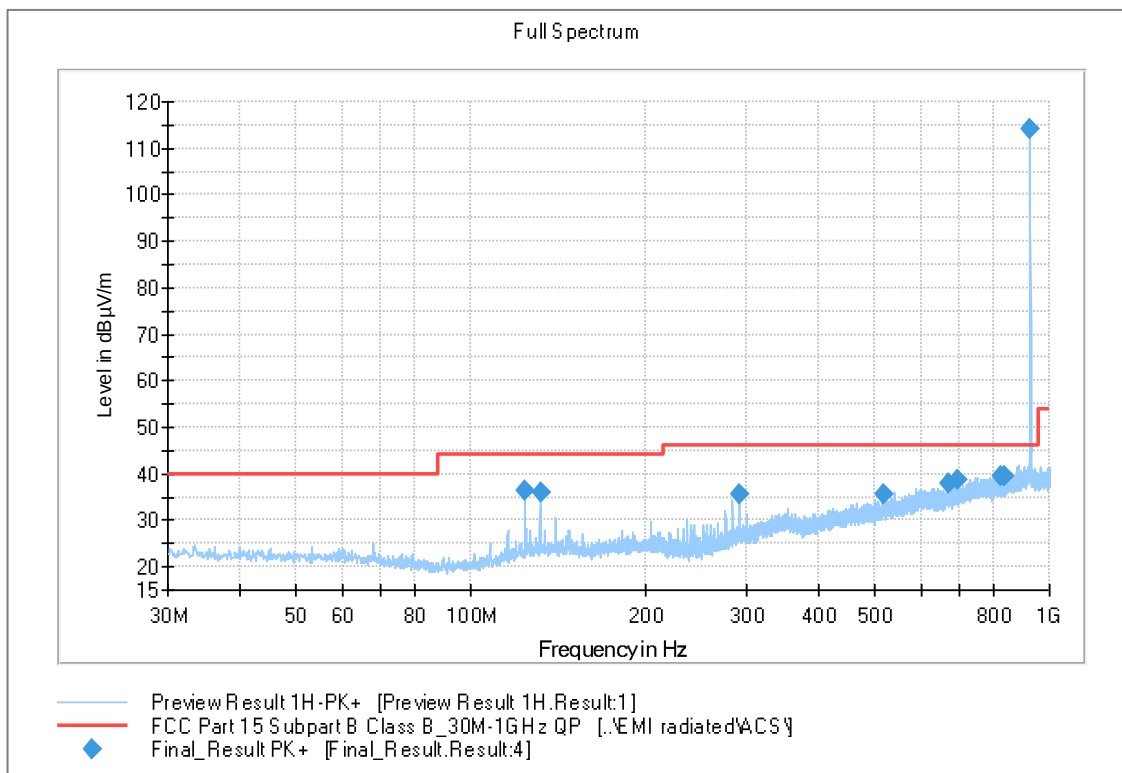
Test Results / Graphs - 30MHz to 1GHz

Ant Port : 2

Ant Type : LUPUS14V2

Channel 50: 927.250MHz

Horizontal Polarization

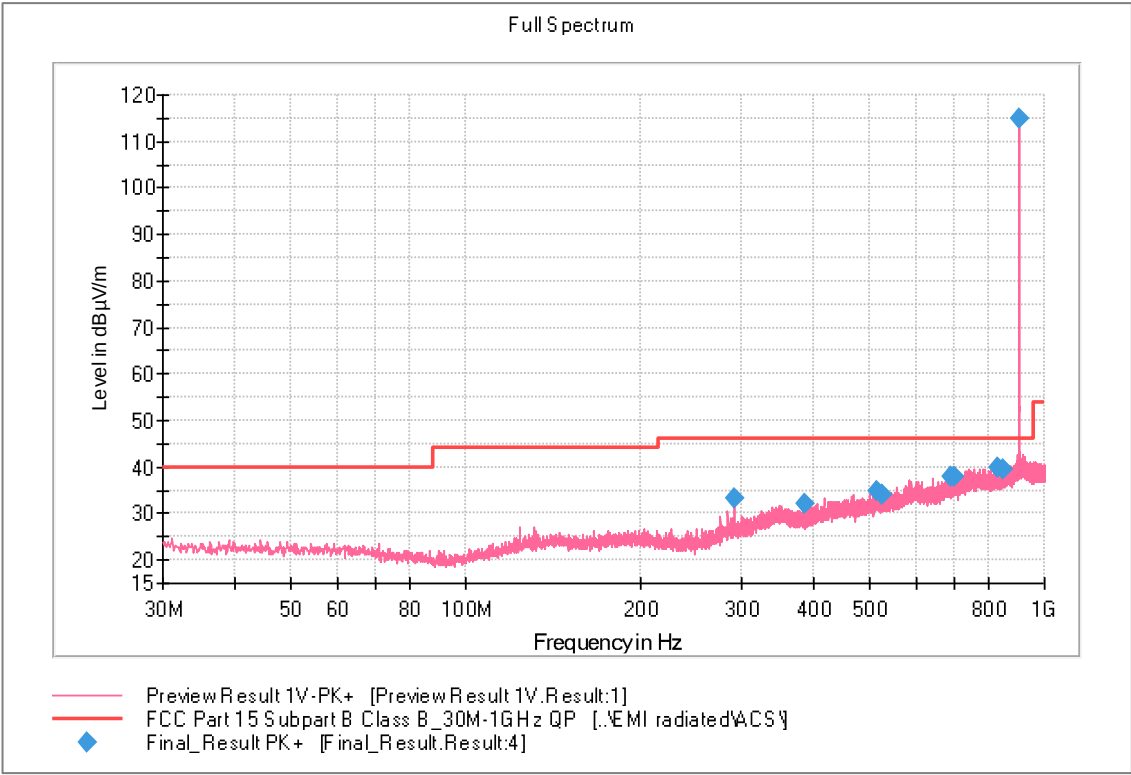


Frequency (MHz)	MaxPeak (dB μ V/m)	QP Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Pol	Test Result
123.982222	36.47	44.00	7.53	1000.0	H	PASS
131.957778	35.93	44.00	8.07	1000.0	H	PASS
292.007778	35.61	46.00	10.39	1000.0	H	PASS
516.401111	35.42	46.00	10.58	1000.0	H	PASS
608.000000	33.66	46.00	12.34	1000	H	PASS
614.000000	34.23	46.00	11.77	1000	H	PASS
667.721111	37.81	46.00	8.19	1000.0	H	PASS
695.204444	38.54	46.00	7.46	1000.0	H	PASS
826.908889	39.46	46.00	6.54	1000.0	H	PASS
837.902222	39.65	46.00	6.35	1000.0	H	PASS
927.357778	114.33	46.00	***	1000.0	H	***
960.000000	40.11	46.00	5.89	1000	H	PASS

*** Fundamental Operating Frequency.

Test Results / Graphs - 30MHz to 1GHz

Ant Port : 2	Ant Type : LUPUS14V2	Channel 01 : 902.750MHz	Vertical Polarization
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Frequency (MHz)	MaxPeak (dBµV/m)	QP Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Pol	Test Result
292.007778	33.20	46.00	12.80	1000.0	V	PASS
386.313333	32.05	46.00	13.95	1000.0	V	PASS
512.521111	34.70	46.00	11.30	1000.0	V	PASS
522.760000	34.22	46.00	11.78	1000.0	V	PASS
608.000000	32.92	46.00	13.08	1000	V	PASS
614.000000	33.67	46.00	12.33	1000	V	PASS
686.474444	37.87	46.00	8.13	1000.0	V	PASS
699.300000	37.82	46.00	8.18	1000.0	V	PASS
828.848889	39.79	46.00	6.21	1000.0	V	PASS
848.141111	39.69	46.00	6.31	1000.0	V	PASS
902.784444	114.89	46.00	***	1000.0	V	***
960.000000	39.23	46.00	6.77	1000	V	PASS

*** Fundamental Operating Frequency.

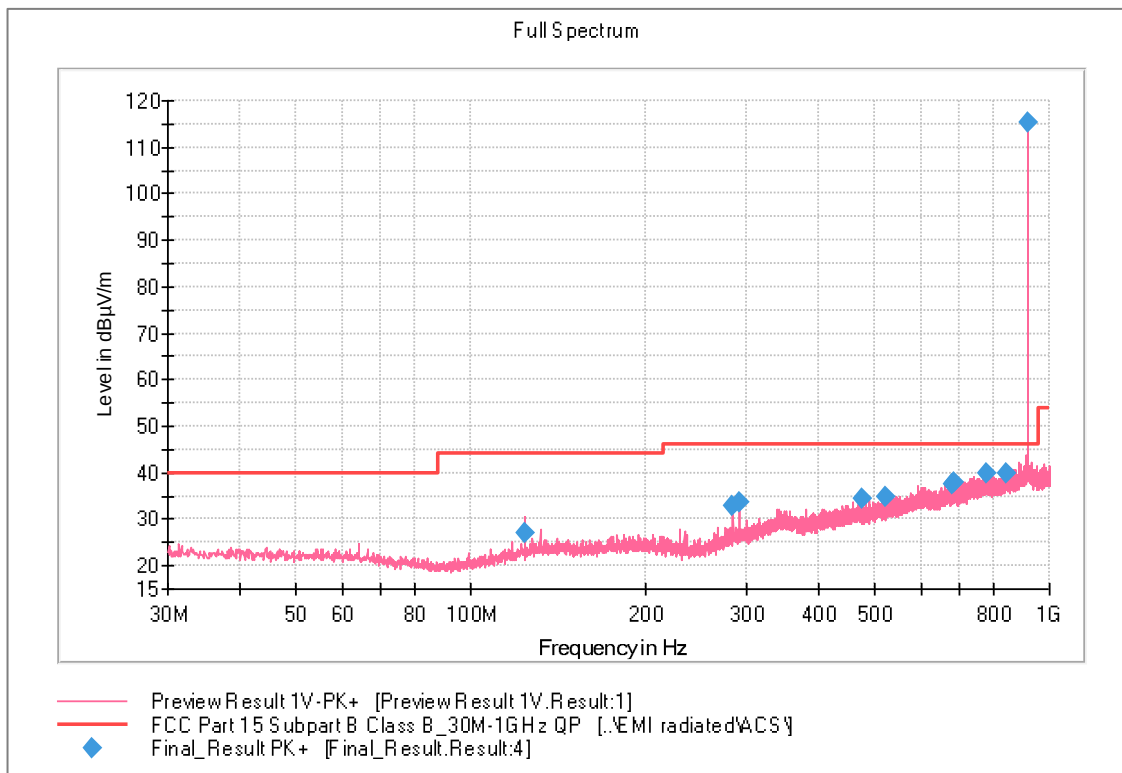
Test Results / Graphs - 30MHz to 1GHz

Ant Port : 2

Ant Type : LUPUS14V2

Channel 26: 915.250MHz

Vertical Polarization



Frequency (MHz)	MaxPeak (dBµV/m)	QP Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Pol	Test Result
123.874444	27.22	44.00	16.78	1000.0	V	PASS
284.032222	32.77	46.00	13.23	1000.0	V	PASS
292.007778	33.48	46.00	12.52	1000.0	V	PASS
472.966667	34.38	46.00	11.62	1000.0	V	PASS
518.880000	34.68	46.00	11.32	1000.0	V	PASS
608.000000	33.45	46.00	12.55	1000	V	PASS
614.000000	34.92	46.00	11.08	1000	V	PASS
679.253333	37.66	46.00	8.34	1000.0	V	PASS
683.780000	38.01	46.00	7.99	1000.0	V	PASS
779.594444	39.81	46.00	6.19	1000.0	V	PASS
839.303333	39.96	46.00	6.04	1000.0	V	PASS
915.286667	115.28	46.00	***	1000.0	V	***
960.000000	39.01	46.00	6.99	1000	V	PASS

*** Fundamental Operating Frequency.

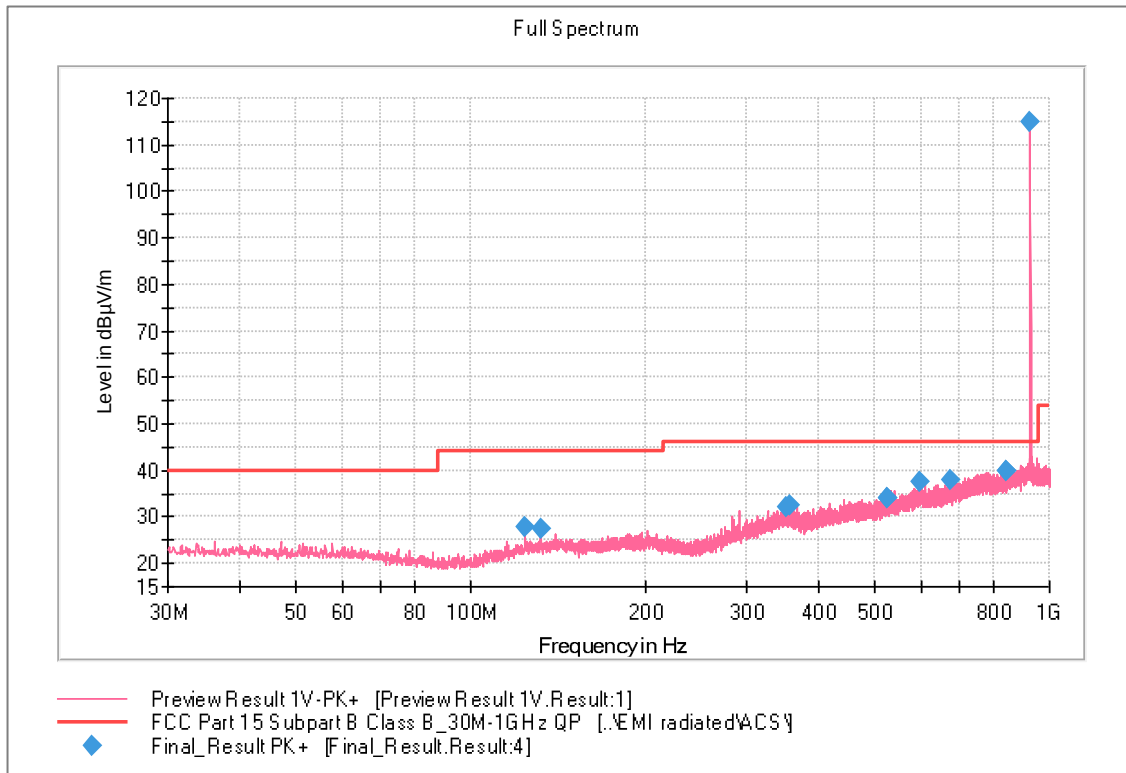
Test Results / Graphs - 30MHz to 1GHz

Ant Port : 2

Ant Type : LUPUS14V2

Channel 50: 927.250MHz

Vertical Polarization



Frequency (MHz)	MaxPeak (dBμV/m)	QP Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Pol	Test Result
123.982222	27.87	44.00	16.13	1000.0	V	PASS
131.957778	27.52	44.00	16.48	1000.0	V	PASS
351.393333	32.22	46.00	13.78	1000.0	V	PASS
355.812222	32.31	46.00	13.69	1000.0	V	PASS
523.406667	34.21	46.00	11.79	1000.0	V	PASS
524.376667	34.20	46.00	11.80	1000.0	V	PASS
597.988889	37.41	46.00	8.59	1000.0	V	PASS
608.000000	34.12	46.00	11.88	1000	V	PASS
614.000000	34.27	46.00	11.73	1000	V	PASS
674.618889	37.79	46.00	8.21	1000.0	V	PASS
840.812222	39.83	46.00	6.17	1000.0	V	PASS
842.321111	39.75	46.00	6.25	1000.0	V	PASS
927.357778	114.98	46.00	***	1000.0	V	***
960.000000	39.44	46.00	6.56	1000	V	PASS

*** Fundamental Operating Frequency.

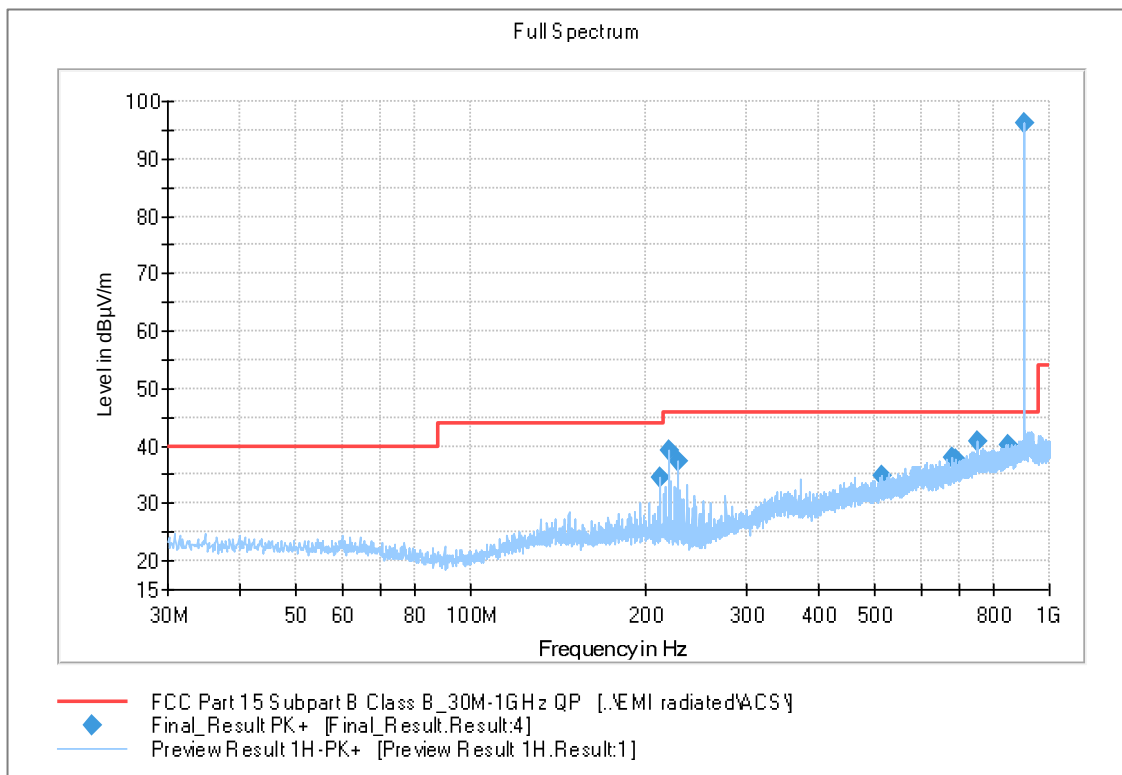
Test Results / Graphs - 30MHz to 1GHz

Ant Port : 2

Ant Type : LUPUS32

Channel 01 : 902.750MHz

Horizontal Polarization

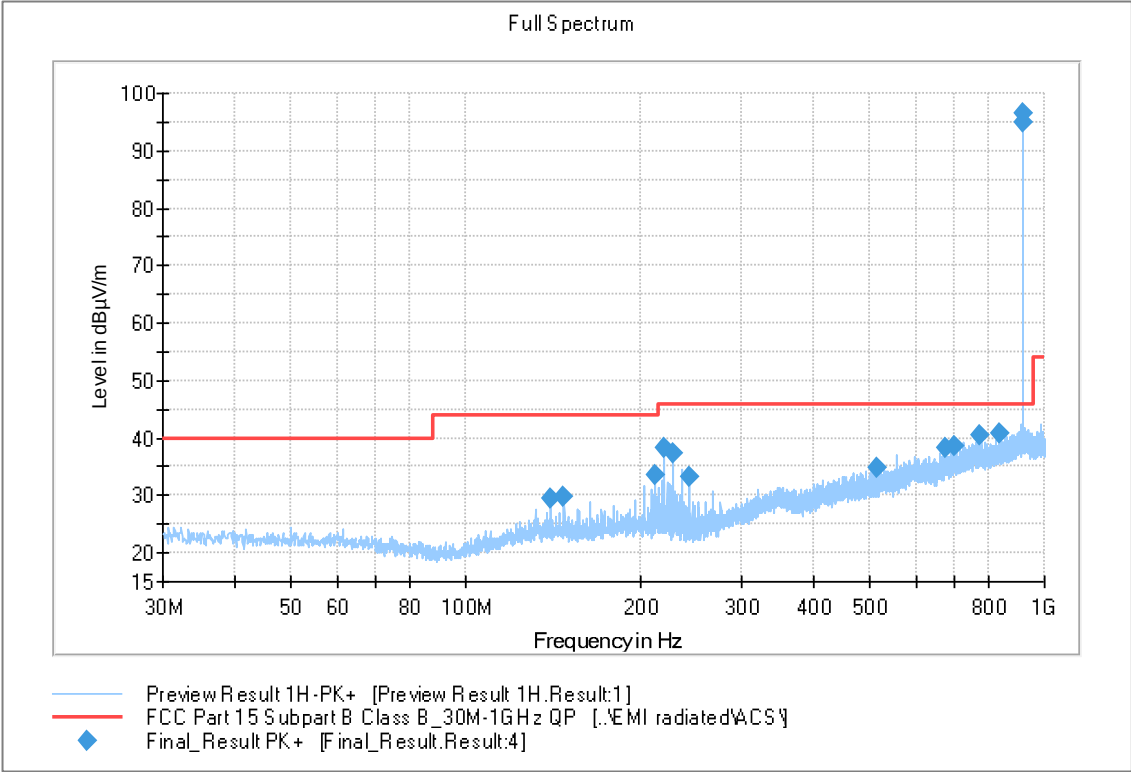


Frequency (MHz)	MaxPeak (dBµV/m)	QP Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Pol	Test Result
211.928889	34.63	44.00	9.37	1000.0	H	PASS
220.012222	39.35	46.00	6.65	1000.0	H	PASS
227.987778	37.40	46.00	8.60	1000.0	H	PASS
512.844444	34.88	46.00	11.12	1000.0	H	PASS
608.000000	34.89	46.00	11.11	1000	H	PASS
614.000000	34.45	46.00	11.55	1000	H	PASS
680.654444	37.84	46.00	8.16	1000.0	H	PASS
687.121111	37.75	46.00	8.25	1000.0	H	PASS
749.093333	40.83	46.00	5.17	1000.0	H	PASS
846.632222	40.31	46.00	5.69	1000.0	H	PASS
902.784444	96.09	46.00	***	1000.0	H	****
960.000000	40.01	46.00	5.99	1000	H	PASS

*** Fundamental Operating Frequency.

Test Results / Graphs - 30MHz to 1GHz

Ant Port : 2	Ant Type : LUPUS32	Channel 26: 915.250MHz	Horizontal Polarization
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Frequency (MHz)	MaxPeak (dBµV/m)	QP Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Pol	Test Result
139.933333	29.49	44.00	14.51	1000.0	H	PASS
147.908889	29.72	44.00	14.28	1000.0	H	PASS
211.928889	33.43	44.00	10.57	1000.0	H	PASS
220.012222	38.33	46.00	7.67	1000.0	H	PASS
227.987778	37.43	46.00	8.57	1000.0	H	PASS
243.938889	33.33	46.00	12.67	1000.0	H	PASS
511.551111	34.88	46.00	11.12	1000.0	H	PASS
608.000000	35.11	46.00	10.89	1000	H	PASS
614.000000	34.21	46.00	11.79	1000	H	PASS
675.588889	38.22	46.00	7.78	1000.0	H	PASS
697.898889	38.54	46.00	7.46	1000.0	H	PASS
769.894444	40.38	46.00	5.62	1000.0	H	PASS
833.375556	40.89	46.00	5.11	1000.0	H	PASS
915.286667	96.54	46.00	***	1000.0	H	***
960.000000	40.37	46.00	5.63	1000	H	PASS

*** Fundamental Operating Frequency.

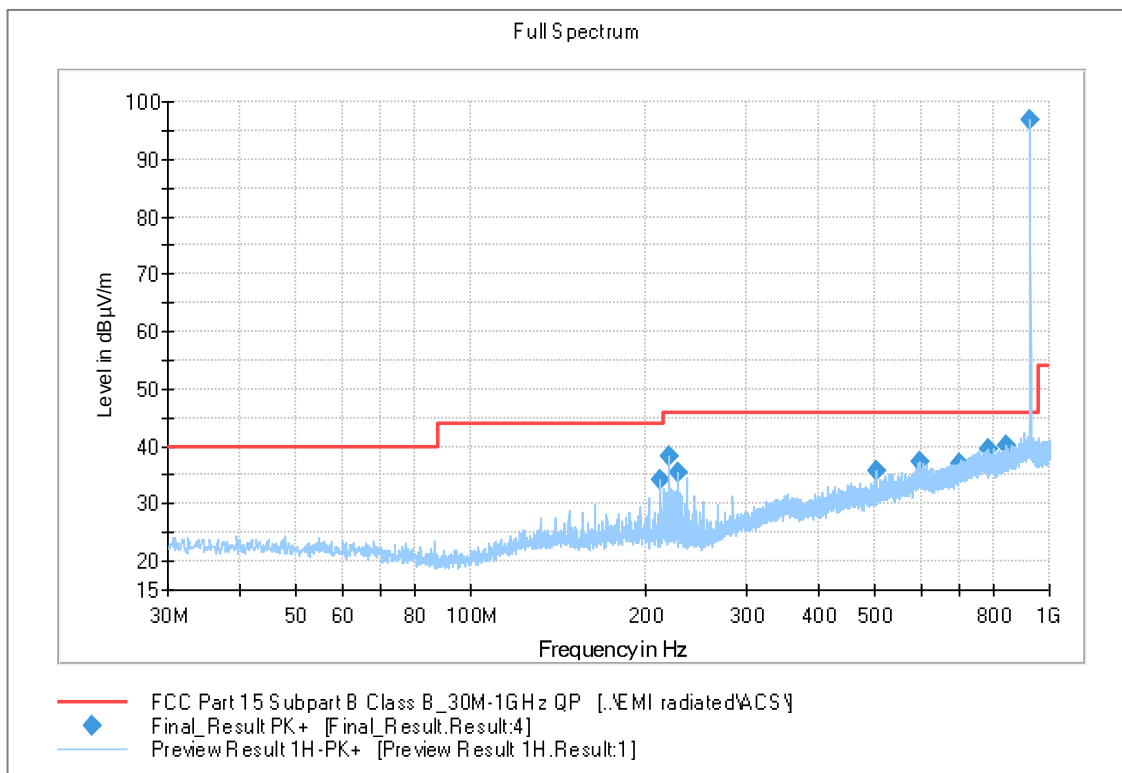
Test Results / Graphs - 30MHz to 1GHz

Ant Port : 2

Ant Type : LUPUS32

Channel 50: 927.250MHz

Horizontal Polarization



Frequency (MHz)	MaxPeak (dBµV/m)	QP Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Pol	Test Result
212.036667	34.10	44.00	9.90	1000.0	H	PASS
220.012222	38.17	46.00	7.83	1000.0	H	PASS
227.987778	35.55	46.00	10.45	1000.0	H	PASS
500.881111	35.89	46.00	10.11	1000.0	H	PASS
596.048889	37.45	46.00	8.55	1000.0	H	PASS
608.000000	36.12	46.00	9.88	1000	H	PASS
614.000000	35.55	46.00	10.45	1000	H	PASS
699.838889	36.99	46.00	9.01	1000.0	H	PASS
786.384444	39.49	46.00	6.51	1000.0	H	PASS
843.722222	40.09	46.00	5.91	1000.0	H	PASS
927.357778	96.82	46.00	***	1000.0	H	***
960.000000	41.06	46.00	4.94	1000	H	PASS

*** Fundamental Operating Frequency.

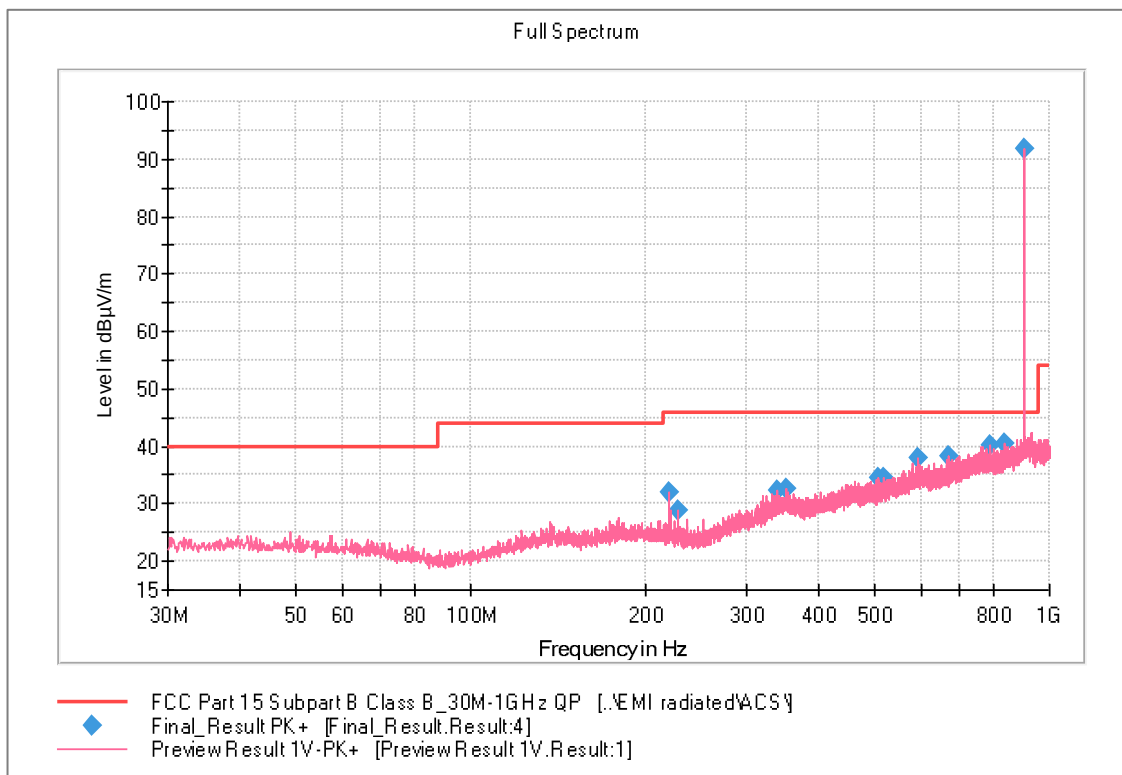
Test Results / Graphs - 30MHz to 1GHz

Ant Port : 2

Ant Type : LUPUS32

Channel 01 : 902.750MHz

Vertical Polarization



Frequency (MHz)	MaxPeak (dBµV/m)	QP Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Pol	Test Result
220.012222	32.03	46.00	13.97	1000.0	V	PASS
227.987778	28.73	46.00	17.27	1000.0	V	PASS
339.430000	32.38	46.00	13.62	1000.0	V	PASS
350.638889	32.51	46.00	13.49	1000.0	V	PASS
505.515556	34.43	46.00	11.57	1000.0	V	PASS
515.862222	34.37	46.00	11.63	1000.0	V	PASS
594.540000	38.11	46.00	7.89	1000.0	V	PASS
608.000000	35.93	46.00	10.07	1000	V	PASS
614.000000	34.56	46.00	11.44	1000	V	PASS
671.385556	38.38	46.00	7.62	1000.0	V	PASS
791.126667	40.27	46.00	5.73	1000.0	V	PASS
834.992222	40.35	46.00	5.65	1000.0	V	PASS
902.784444	91.86	46.00	***	1000.0	V	***
960.000000	40.02	46.00	5.98	1000	V	PASS

*** Fundamental Operating Frequency.

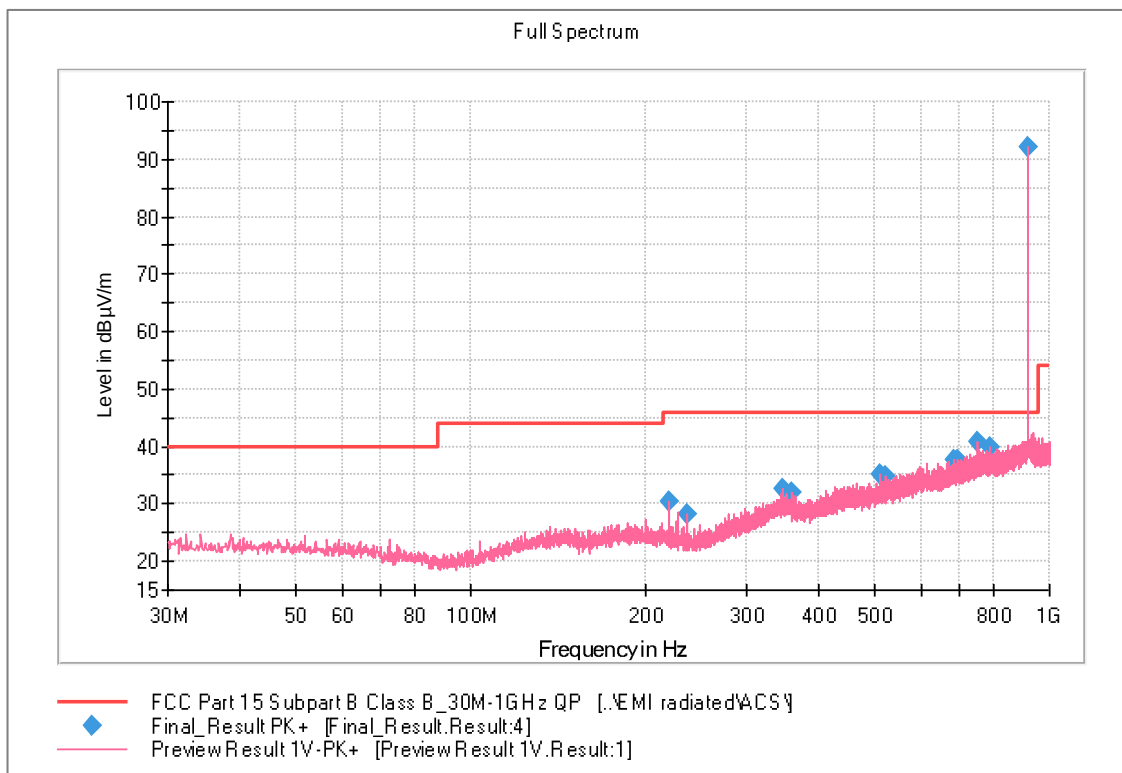
Test Results / Graphs - 30MHz to 1GHz

Ant Port : 2

Ant Type : LUPUS32

Channel 26: 915.250MHz

Vertical Polarization

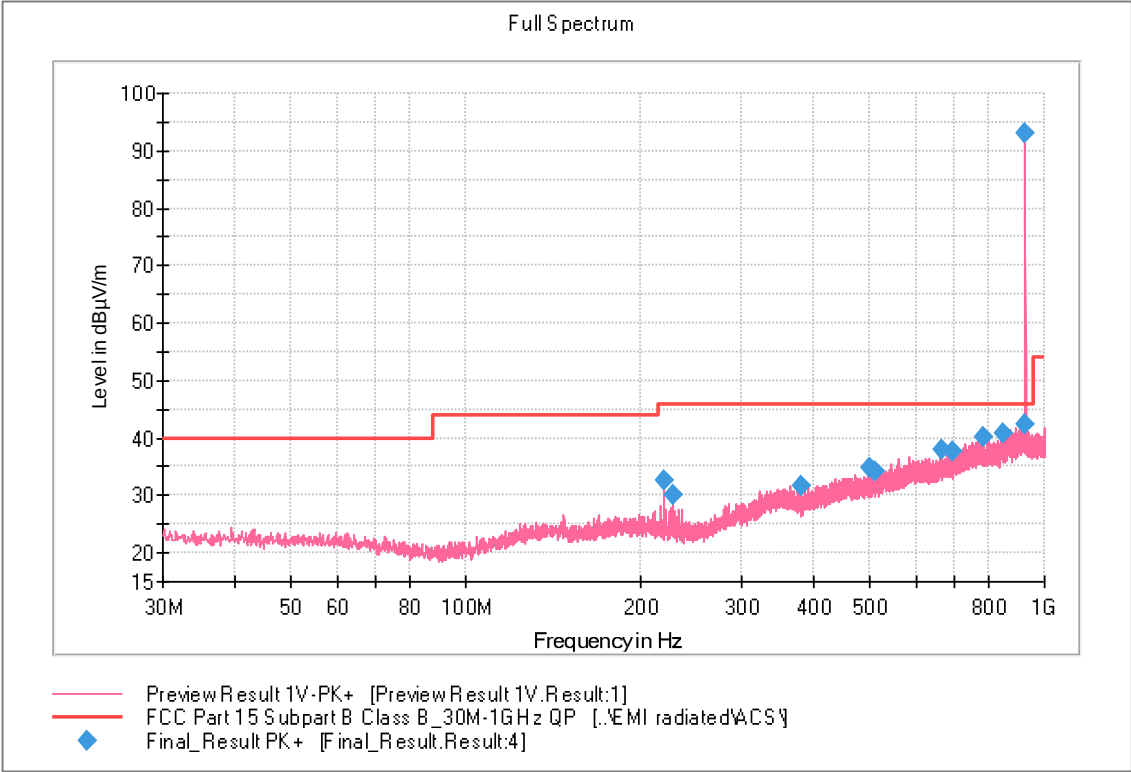


Frequency (MHz)	MaxPeak (dBμV/m)	QP Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Pol	Test Result
220.012222	30.30	46.00	15.70	1000.0	V	PASS
235.963333	28.28	46.00	17.72	1000.0	V	PASS
346.220000	32.52	46.00	13.48	1000.0	V	PASS
357.967778	32.03	46.00	13.97	1000.0	V	PASS
511.227778	35.01	46.00	10.99	1000.0	V	PASS
521.897778	34.73	46.00	11.27	1000.0	V	PASS
608.000000	36.12	46.00	9.88	1000	V	PASS
614.000000	35.56	46.00	10.44	1000	V	PASS
682.378889	37.79	46.00	8.21	1000.0	V	PASS
692.941111	37.76	46.00	8.24	1000.0	V	PASS
752.542222	40.67	46.00	5.33	1000.0	V	PASS
791.342222	39.96	46.00	6.04	1000.0	V	PASS
915.286667	92.07	46.00	***	1000.0	V	***
960.000000	40.23	46.00	5.77	1000	V	PASS

*** Fundamental Operating Frequency.

Test Results / Graphs - 30MHz to 1GHz

Ant Port : 2	Ant Type : LUPUS32	Channel 50: 927.250MHz	Vertical Polarization
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Frequency (MHz)	MaxPeak (dBµV/m)	QP Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Pol	Test Result
220.012222	32.69	46.00	13.31	1000.0	V	PASS
227.987778	30.02	46.00	15.98	1000.0	V	PASS
379.523333	31.68	46.00	14.32	1000.0	V	PASS
497.216667	34.77	46.00	11.23	1000.0	V	PASS
508.641111	34.20	46.00	11.80	1000.0	V	PASS
608.000000	35.29	46.00	10.71	1000	V	PASS
614.000000	34.32	46.00	11.68	1000	V	PASS
664.811111	37.97	46.00	8.03	1000.0	V	PASS
695.527778	37.75	46.00	8.25	1000.0	V	PASS
786.276667	40.34	46.00	5.66	1000.0	V	PASS
849.650000	40.81	46.00	5.19	1000.0	V	PASS
923.477778	42.54	46.00	3.46	1000.0	V	PASS
927.357778	93.22	46.00	***	1000.0	V	***
960.000000	40.03	46.00	5.97	1000	V	PASS

*** Fundamental Operating Frequency.