

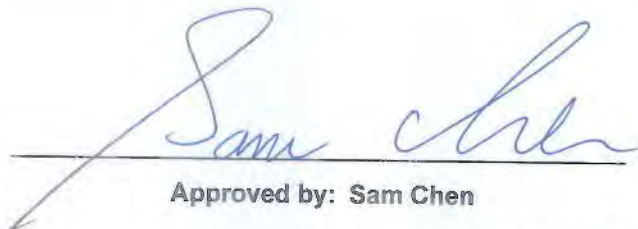


RADIO TEST REPORT

FCC ID : TLZ-CM467
Equipment : IEEE 802.11 a/b/g/n/ac and Bluetooth 5.0 Module
Brand Name : AzureWave
Model Name : AW-CM467-SUR, AW-CM467-USB,
AW-CM467-SUR-I, AW-CM467-USB-I
Applicant : AzureWave Technologies, Inc.
8F., No.94, Baozhong Rd. , Xindian Dist., New
Taipei City , Taiwan 231
Manufacturer : AzureWave Technologies, Inc.
8F., No.94, Baozhong Rd. , Xindian Dist., New
Taipei City , Taiwan 231
Standard : 47 CFR FCC Part 15.247

The product was received on Aug. 30, 2021, and testing was started from Sep. 11, 2021 and completed on Dec. 08, 2021. We, Sporton International Inc. Hsinchu Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. Hsinchu Laboratory, the test report shall not be reproduced except in full.



Approved by: Sam Chen

Sporton International Inc. Hsinchu Laboratory

No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)



Table of Contents

History of this test report.....	3
Summary of Test Result.....	4
1 General Description	5
1.1 Information.....	5
1.2 Applicable Standards	8
1.3 Testing Location Information	8
1.4 Measurement Uncertainty	9
2 Test Configuration of EUT.....	10
2.1 Test Channel Mode	10
2.2 The Worst Case Measurement Configuration.....	11
2.3 EUT Operation during Test	13
2.4 Accessories	13
2.5 Support Equipment.....	14
2.6 Test Setup Diagram	15
3 Transmitter Test Result	18
3.1 AC Power-line Conducted Emissions	18
3.2 DTS Bandwidth	20
3.3 Maximum Conducted Output Power	21
3.4 Power Spectral Density	24
3.5 Emissions in Non-restricted Frequency Bands	26
3.6 Emissions in Restricted Frequency Bands.....	27
4 Test Equipment and Calibration Data	31
Appendix A. Test Results of AC Power-line Conducted Emissions	
Appendix B. Test Results of DTS Bandwidth	
Appendix C. Test Results of Maximum Conducted Output Power	
Appendix D. Test Results of Power Spectral Density	
Appendix E. Test Results of Emissions in Non-restricted Frequency Bands	
Appendix F. Test Results of Emissions in Restricted Frequency Bands	
Appendix G. Test Results of Radiated Emission Co-location	
Appendix H. Test Photos	
Photographs of EUT v01	



History of this test report

[illegible]



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
1.1.2	15.203	Antenna Requirement	PASS	-
3.1	15.207	AC Power-line Conducted Emissions	PASS	-
3.2	15.247(a)	DTS Bandwidth	PASS	-
3.3	15.247(b)	Maximum Conducted Output Power	PASS	-
3.4	15.247(e)	Power Spectral Density	PASS	-
3.5	15.247(d)	Emissions in Non-restricted Frequency Bands	PASS	-
3.6	15.247(d)	Emissions in Restricted Frequency Bands	PASS	-

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Sam Chen

Report Producer: Penny Kao



1 General Description

1.1 Information

1.1.1 RF General Information

Frequency Range (MHz)	Bluetooth Mode	Ch. Frequency (MHz)	Channel Number
2400-2483.5	LE	2402-2480	0-39 [40]

Band	Mode	BWch (MHz)	Nant
2.4-2.4835GHz	BT-LE(1Mbps)	1.0	1TX

Note:

- ♦ Bluetooth LE uses a GFSK modulation.
- ♦ BWch is the nominal channel bandwidth.

1.1.2 Antenna Information

Ant.	Port	Brand	Model Name	Antenna Type	Connector	Gain (dBi)		Remark
						WLAN 2.4GHz / Bluetooth	WLAN 5GHz	
1	1	Nienyi	NYS4939	PCB	I-PEX	3.58	3.89	External
2	1	Genesis	650-10045-01	PCB	I-PEX	2.50	3.85	External
3	1	Lynwave	5-PP005737	PCB	I-PEX	4.20	3.60	Internal
4	1	Maglayers	MSA-4008-25GC1-A1	PIFA	I-PEX	2.98	5.16	External
5	1	Maglayers	MSA-4008-25GC1-A2	PIFA	I-PEX	2.98	5.16	External

Note 1: The above information was declared by manufacturer.

Note 2: The EUT has five antennas.

For AC power-line conducted emissions and radiated emission measurement, "Ant. 1", "Ant. 3" and "Ant.4" was tested and recorded in the report.

For conducted measurement, only the highest gain antenna "Ant. 3" for WLAN 2.4GHz/Bluetooth and "Ant.4" for WLAN 5GHz were selected to test and recorded in the report.

For 2.4GHz WLAN function

IEEE 802.11b/g/n mode (1TX/1RX):

Only Port 1 can be used as transmitting/receiving.

For 5GHz WLAN function

IEEE 802.11a/n/ac mode (1TX/1RX):

Only Port 1 can be used as transmitting/receiving.

For Bluetooth function (1TX/1RX):

Only Port 1 can be used as transmitting/receiving.

1.1.3 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) $\geq 1/T$
BT-LE(1Mbps)	0.626	2.03	391.25u	3k

Note:

- ♦ DC is Duty Cycle.
- ♦ DCF is Duty Cycle Factor.

1.1.4 EUT Operational Condition

EUT Power Type	From Host System			
Function	☒	Point-to-multipoint	☐	Point-to-point
Test Software Version	Terminal 6.04			
Support Mode	☒	LE 1M PHY: 1 Mb/s		
	☐	LE Coded PHY (S=2): 500 Kb/s		
	☐	LE Coded PHY (S=8): 125 Kb/s		
	☐	LE 2M PHY: 2 Mb/s		

Note: The above information was declared by manufacturer.

1.1.5 Table for Multiple Listing

The model names in the following table are all refer to the identical product.

EUT	Model Name	Interface	Equip Antenna	Description
1	AW-CM467-SUR	SDIO-UART	External or Internal Antenna	All the models are identical, the difference model for difference brand served as marketing strategy.
	AW-CM467-SUR-I			
2	AW-CM467-USB	USB-USB	External Antenna	All the models are identical, the difference model for difference brand served as marketing strategy.
	AW-CM467-USB-I			

Note 1: From the above models, model: AW-CM467-SUR (EUT 1) and AW-CM467-USB (EUT 2) was selected as representative model for the test and its data was recorded in this report.

Note 2: The above information was declared by manufacturer.



1.2 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR FCC Part 15.247
- ♦ ANSI C63.10-2013

The following reference test guidance is not within the scope of accreditation of TAF.

- ♦ FCC KDB 558074 D01 v05r02
- ♦ FCC KDB 414788 D01 v01r01

1.3 Testing Location Information

Testing Location Information	
Test Lab. : Sporton International Inc. Hsinchu Laboratory	
Hsinchu (TAF: 3787)	ADD: No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.) TEL: 886-3-656-9065 FAX: 886-3-656-9085 Test site Designation No. TW3787 with FCC. Conformity Assessment Body Identifier (CABID) TW3787 with ISED.

Test Condition	Test Site No.	Test Engineer	Test Environment (°C / %)	Test Date
RF Conducted	TH01-CB	Caster Chang	21.9-22.4 / 69-72	Sep. 18, 2021
Radiated (Below 1GHz)	03CH03-CB	Stim Sung	24.1-25.2 / 55-58	Sep. 11, 2021~ Dec. 08, 2021
	03CH05-CB		23.5-24.6 / 55-59	
Radiated (Above 1GHz)	03CH06-CB	Stim Sung	23.7-24.8 / 56-59	Sep. 11, 2021~ Dec. 08, 2021
Radiated (Emission Co-location)	03CH06-CB	Stim Sung	23.7-24.8 / 56-59	Sep. 11, 2021~ Dec. 08, 2021
AC Conduction	CO01-CB	Joe Chu	22~24 / 58~60	Nov. 29, 2021



1.4 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	2.0 dB	Confidence levels of 95%
Radiated Emission (9kHz ~ 30MHz)	4.2 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	5.5 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	4.7 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	4.2 dB	Confidence levels of 95%
Conducted Emission	2.5 dB	Confidence levels of 95%
Output Power Measurement	1.3 dB	Confidence levels of 95%
Power Density Measurement	2.5 dB	Confidence levels of 95%
Bandwidth Measurement	0.9%	Confidence levels of 95%



2 Test Configuration of EUT

2.1 Test Channel Mode

Mode	Power Setting
BT-LE(1Mbps)	-
2402MHz	Default
2440MHz	Default
2480MHz	Default

2.2 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
Tests Item	AC power-line conducted emissions
Condition	AC power-line conducted measurement for line and neutral Test Voltage: 120Vac / 60Hz
Operating Mode	Normal Link
1	EUT 2 + WLAN 2.4GHz + Bluetooth + Ant. 1
2	EUT 2 + WLAN 5GHz + Bluetooth + Ant. 1
Mode 1 has been evaluated to be the worst case among Mode 1~2, thus measurement for Mode 3 will follow this same test mode.	
3	EUT 1 + WLAN 2.4GHz + Bluetooth + Ant. 1
Mode 3 has been evaluated to be the worst case among Mode 1~3, thus measurement for Mode 4~5 will follow this same test mode.	
4	EUT 1 + WLAN 2.4GHz + Bluetooth + Ant. 4
5	EUT 1 + WLAN 5GHz + Bluetooth + Ant. 4
6	EUT 1 + WLAN 2.4GHz + Bluetooth + Ant. 3
7	EUT 1 + WLAN 5GHz + Bluetooth + Ant. 3
For operating mode 3 is the worst case and it was record in this test report.	

The Worst Case Mode for Following Conformance Tests	
Tests Item	DTS Bandwidth Maximum Conducted Output Power Power Spectral Density Emissions in Non-restricted Frequency Bands
Test Condition	Conducted measurement at transmit chains
Operating Mode	After verifying, the output power is the same with EUT 1 and EUT 2. Thus only EUT 2 was selected to execute all test.
1	EUT 2 + Ant. 3

The Worst Case Mode for Following Conformance Tests	
Tests Item	Emissions in Restricted Frequency Bands
Test Condition	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.
Operating Mode < 1GHz	CTX
	1. The EUT was performed at X axis, Y axis and Z axis position for Emissions in Restricted Frequency Bands above 1GHz test. The worst case was found is below. So the measurement will follow this same test configuration.
1	EUT 1 in X axis + WLAN 2.4GHz + Ant.3
2	EUT 1 in X axis + Bluetooth + Ant.3
3	EUT 2 in Y axis + WLAN 5GHz + Ant.1
4	EUT 1 in Y axis + WLAN 5GHz + Ant.1
5	EUT 2 in Y axis + WLAN 2.4GHz + Ant.1
6	EUT 2 in Y axis + Bluetooth + Ant.1
7	EUT 2 in Y axis + WLAN 2.4GHz + Ant.4
8	EUT 1 in Y axis + WLAN 2.4GHz + Ant.4
9	EUT 2 in Y axis + Bluetooth + Ant.4
10	EUT 1 in Y axis + Bluetooth + Ant.4
11	EUT 2 in Y axis + WLAN 5GHz + Ant.4
12	EUT 1 in Y axis + WLAN 5GHz + Ant.4
For operating mode 1 is the worst case and it was record in this test report.	
Operating Mode > 1GHz	CTX
	1. The EUT was performed at X axis, Y axis and Z axis position. 2. The antenna 1, antenna 4 was performed testing with EUT 1 and EUT 2. 3. The antenna 3 was performed testing. The worst case was found is below. So the measurement will follow this same test configuration.
1	EUT 1 in X axis + Ant.3
2	EUT 1 in Y axis + Ant.4

The Worst Case Mode for Following Conformance Tests	
Tests Item	Simultaneous Transmission Analysis - Radiated Emission Co-location
Test Condition	Radiated measurement
Operating Mode	Normal Link
	The EUT was performed at X axis, Y axis and Z axis position for Emissions in Restricted Frequency Bands above 1GHz test. The worst case was found is below. So the measurement will follow this same test configuration.
1	EUT 1 in X axis - WLAN 2.4GHz + Bluetooth + Ant.3
2	EUT 1 in X axis - WLAN 5GHz + Bluetooth + Ant.3
3	EUT 2 in Y axis - WLAN 2.4GHz + Bluetooth + Ant.4
4	EUT 2 in Y axis - WLAN 5GHz + Bluetooth + Ant.4
5	EUT 1 in Y axis - WLAN 2.4GHz + Bluetooth + Ant.4
6	EUT 1 in Y axis - WLAN 5GHz + Bluetooth + Ant.4
For operating mode 3 is the worst case and it was record in this test report.	
Refer to Appendix G for Radiated Emission Co-location.	

The Worst Case Mode for Following Conformance Tests	
Tests Item	Simultaneous Transmission Analysis - Co-location RF Exposure Evaluation
Operating Mode	
1	WLAN 2.4GHz with Ant.3 + Bluetooth with Ant.3
2	WLAN 5GHz with Ant.4 + Bluetooth with Ant.3
Refer to Sporton Test Report No.: FA181814 for Co-location RF Exposure Evaluation.	

2.3 EUT Operation during Test

For CTX Mode:

The EUT was programmed to be in continuously transmitting mode.

For Normal Link Mode:

During the test, the EUT operation to normal function.

2.4 Accessories

N/A



2.5 Support Equipment

For AC Conduction:

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
A	Fixture	AzureWave	9007-I12 CK77	N/A
B	NB	HP	3168NGW	N/A
C	Bluetooth Speaker	MARUS	MSK06C-RD	N/A
D	AP Router	ASUS	RP-N53	N/A
E	Mouse	Logitech	M-U0026	N/A
F	Earphone	SHYARO CHI	MIC-04	N/A

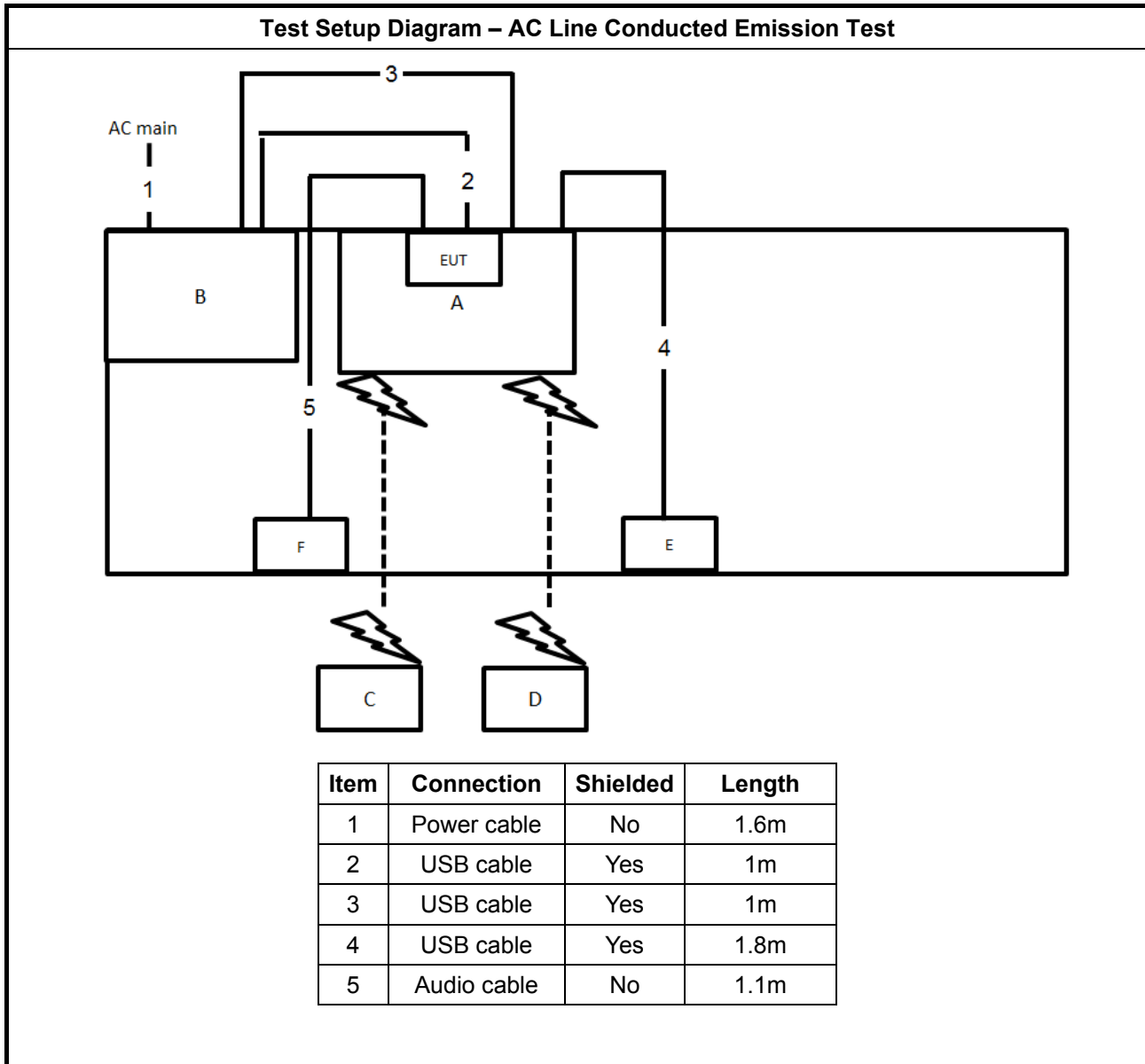
For Radiated below 1GHz, Radiated above 1GHz mode 1 and RF Conducted:

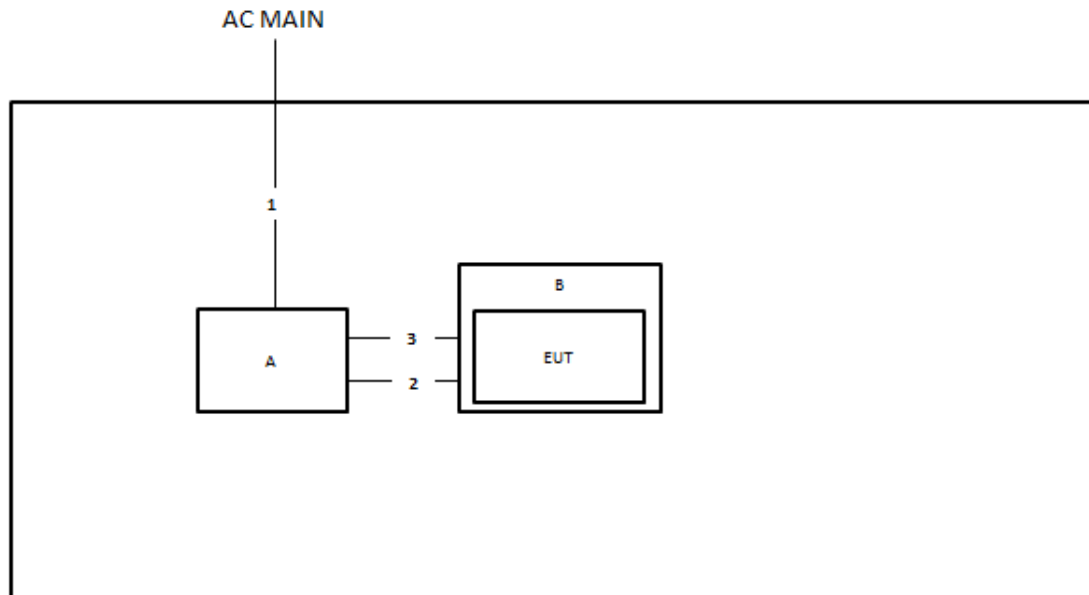
Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
A	Notebook	DELL	E4300	N/A
B	Fixture	AzureWare	2532 I1	N/A

For Radiated above 1GHz mode 2:

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
A	Notebook	DELL	E4300	N/A
B	Fixture	AzureWare	9007-I12 CK77	N/A

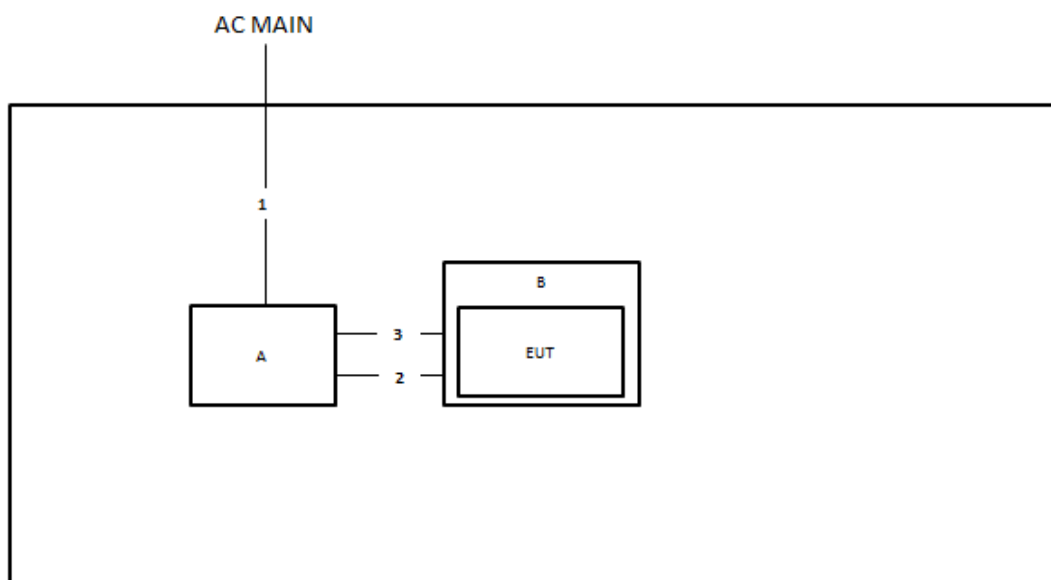
2.6 Test Setup Diagram



Test Setup Diagram - Radiated below 1GHz and Radiated above 1GHz mode 1


Item	Connection	Shielded	Length
1	Power cable	No	2.6m
2	USB cable	Yes	1m
3	USB cable	Yes	1.8m

Test Setup Diagram - Radiated above 1GHz mode 2



Item	Connection	Shielded	Length
1	Power cable	No	2.6m
2	USB cable	Yes	0.5m
3	USB cable	Yes	0.95m



3 Transmitter Test Result

3.1 AC Power-line Conducted Emissions

3.1.1 AC Power-line Conducted Emissions Limit

AC Power-line Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

Note 1: * Decreases with the logarithm of the frequency.

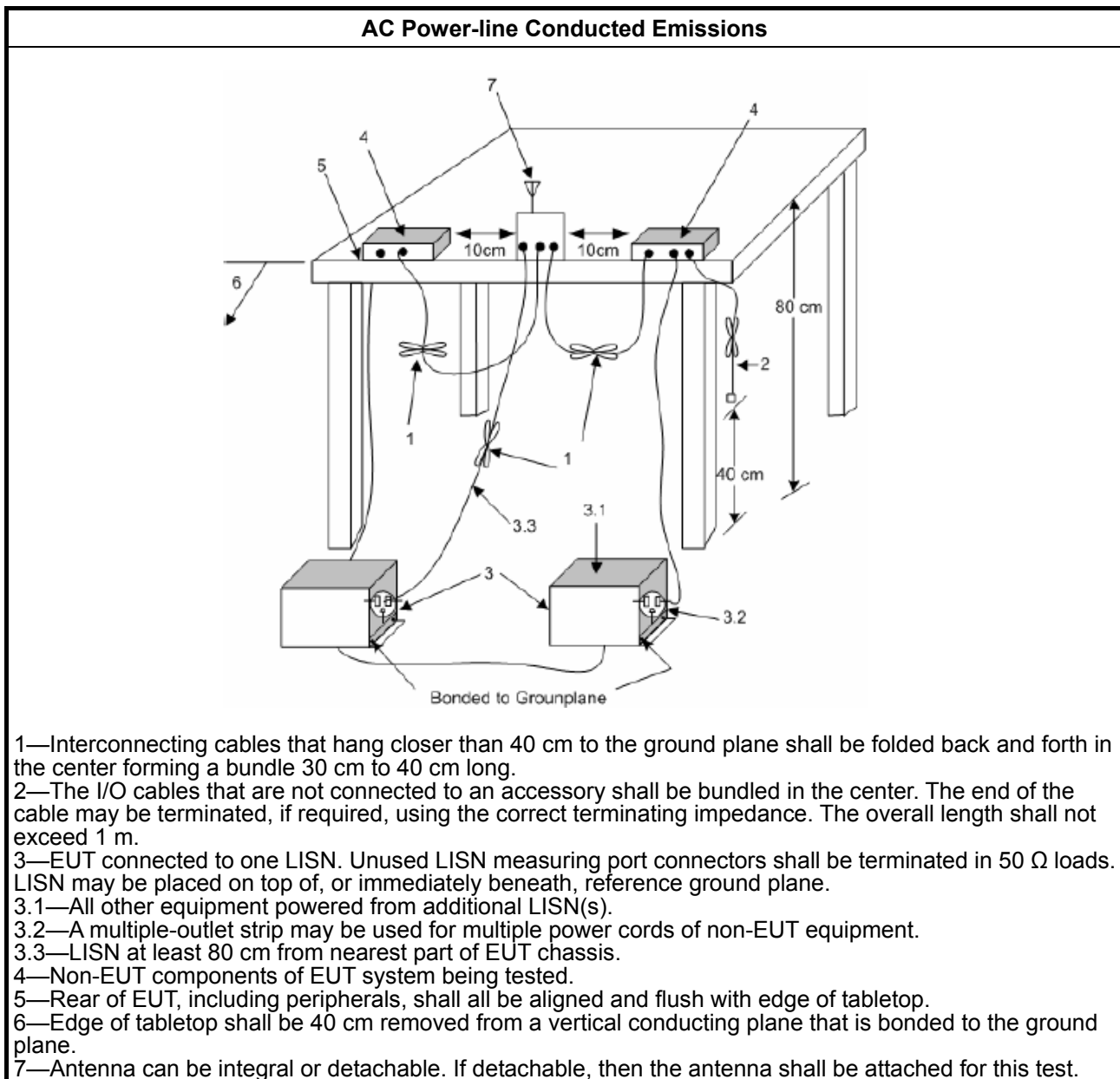
3.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

Test Method
▪ Refer as ANSI C63.10-2013, clause 6.2 for AC power-line conducted emissions.

3.1.4 Test Setup



1.1.1. Measurement Results Calculation

The measured Level is calculated using:

- Corrected Reading: LISN Factor (LISN) + Attenuator (AT/AUX) + Cable Loss (CL) + Read Level (Raw) = Level
- Margin = -Limit + Level

3.1.5 Test Result of AC Power-line Conducted Emissions

Refer as Appendix A

3.2 DTS Bandwidth

3.2.1 6dB Bandwidth Limit

6dB Bandwidth Limit
Systems using digital modulation techniques:
6 dB bandwidth $\geq$ 500 kHz.

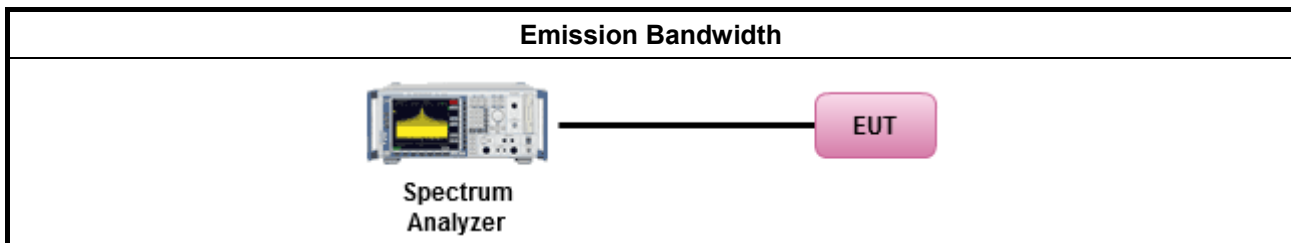
3.2.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.2.3 Test Procedures

Test Method
For the emission bandwidth shall be measured using one of the options below:
☒ Refer as FCC KDB 558074, clause 8.2 & C63.10 clause 11.8.1 Option 1 for 6 dB bandwidth measurement.
☐ Refer as FCC KDB 558074, clause 8.2 & C63.10 clause 11.8.2 Option 2 for 6 dB bandwidth measurement.
☐ Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.

3.2.4 Test Setup



3.2.5 Test Result of Emission Bandwidth

Refer as Appendix B

3.3 Maximum Conducted Output Power

3.3.1 Maximum Conducted Output Power Limit

Maximum Conducted Output Power Limit	
	▪ If $G_{TX} \leq 6$ dBi, then $P_{Out} \leq 30$ dBm (1 W)
	▪ Point-to-multipoint systems (P2M): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ dBm
	▪ Point-to-point systems (P2P): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
	▪ Smart antenna system (SAS):
	- Single beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
	- Overlap beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
	- Aggregate power on all beams: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3 + 8$ dB dBm
P_{Out} = maximum peak conducted output power or maximum conducted output power in dBm, G_{TX} = the maximum transmitting antenna directional gain in dBi.	

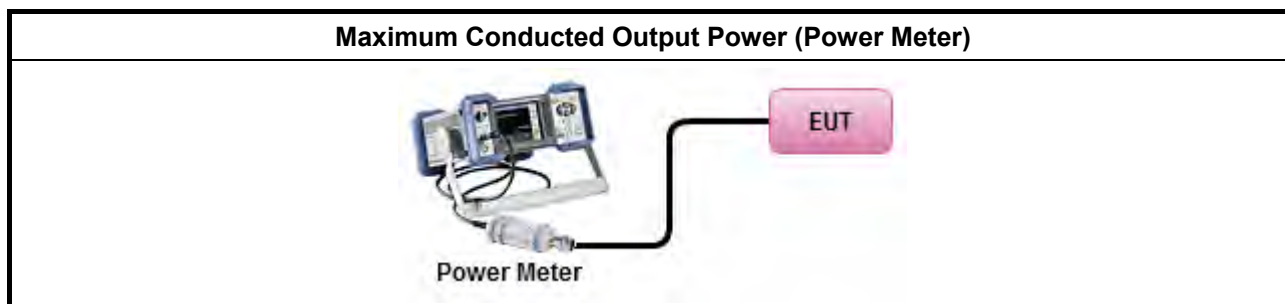
3.3.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.3.3 Test Procedures

Test Method	
Maximum Peak Conducted Output Power	
☐	Refer as FCC KDB 558074, clause 8.3.1.1 & C63.10 clause 11.9.1.1 (RBW ≥ EBW method).
☐	Refer as FCC KDB 558074, clause 8.3.1.3 & C63.10 clause 11.9.1.3 (peak power meter).
Maximum Conducted Output Power	
[duty cycle ≥ 98% or external video / power trigger]	
☐	Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.2 Method AVGSA-1.
☐	Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.3 Method AVGSA-1A. (alternative)
duty cycle < 98% and average over on/off periods with duty factor	
☐	Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.4 Method AVGSA-2.
☐	Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.5 Method AVGSA-2A (alternative)
☐	Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.6 Method AVGSA-3
☐	Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.7 Method AVGSA-3A (alternative)
Measurement using a power meter (PM)	
☐	Refer as FCC KDB 558074, clause 8.3.2.3 & C63.10 clause 11.9.2.3.1 Method AVGPM (using an RF average power meter).
☒	Refer as FCC KDB 558074, clause 8.3.2.3 & C63.10 clause 11.9.2.3.2 Method AVGPM-G (using an gate RF average power meter).
For conducted measurement.	
If the EUT supports multiple transmit chains using options given below: Refer as FCC KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them.	
If multiple transmit chains, EIRP calculation could be following as methods: $P_{total} = P_1 + P_2 + \dots + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = P_{total} + DG$	

3.3.4 Test Setup



3.3.5 Test Result of Maximum Conducted Output Power

Refer as Appendix C



3.4 Power Spectral Density

3.4.1 Power Spectral Density Limit

Power Spectral Density Limit
▪ Power Spectral Density (PSD) ≤ 8 dBm/3kHz

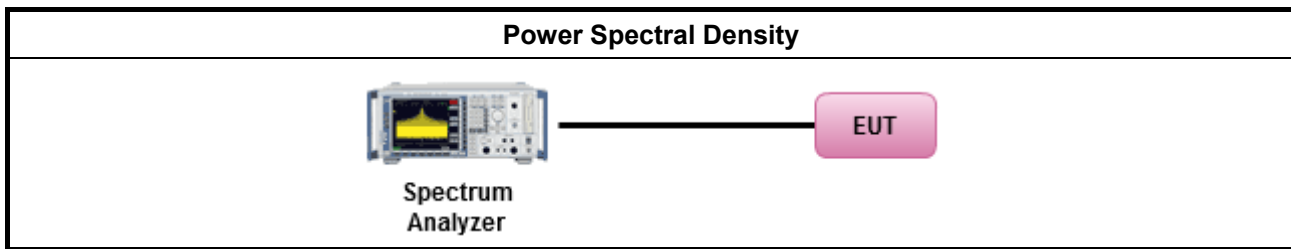
3.4.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.4.3 Test Procedures

Test Method	
▪ Peak power spectral density procedures that the same method as used to determine the conducted output power. If maximum peak conducted output power was measured to demonstrate compliance to the output power limit, then the peak PSD procedure below (Method PKPSD) shall be used. If maximum conducted output power was measured to demonstrate compliance to the output power limit, then one of the average PSD procedures shall be used, as applicable based on the following criteria (the peak PSD procedure is also an acceptable option).	
☒	Refer as FCC KDB 558074, clause 8.4 & C63.10 clause 11.10 Method Max. PSD. [duty cycle $\geq 98\%$ or external video / power trigger]
▪ For conducted measurement.	
▪ If The EUT supports multiple transmit chains using options given below:	
☐	Option 1: Measure and sum the spectra across the outputs. Refer as FCC KDB 662911, In-band power spectral density (PSD). Sample all transmit ports simultaneously using a spectrum analyzer for each transmit port. Where the trace bin-by-bin of each transmit port summing can be performed. (i.e., in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3, and so on up to the NTX output to obtain the value for the first frequency bin of the summed spectrum.). Add up the amplitude (power) values for the different transmit chains and use this as the new data trace.
☐	Option 2: Measure and sum spectral maxima across the outputs. With this technique, spectra are measured at each output of the device at the required resolution bandwidth. The maximum value (peak) of each spectrum is determined. These maximum values are then summed mathematically in linear power units across the outputs. These operations shall be performed separately over frequency spans that have different out-of-band or spurious emission limits,
☐	Option 3: Measure and add $10 \log(N)$ dB, where N is the number of transmit chains. Refer as FCC KDB 662911, In-band power spectral density (PSD). Performed at each transmit chains and each transmit chains shall be compared with the limit have been reduced with $10 \log(N)$. Or each transmit chains shall be add $10 \log(N)$ to compared with the limit.

3.4.4 Test Setup



3.4.5 Test Result of Power Spectral Density

Refer as Appendix D

3.5 Emissions in Non-restricted Frequency Bands

3.5.1 Emissions in Non-restricted Frequency Bands Limit

Un-restricted Band Emissions Limit	
RF output power procedure	Limit (dBc)
Peak output power procedure	20
Average output power procedure	30
Note 1: If the peak output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak PSD level. Note 2: If the average output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the power in any 100 kHz outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum measured in-band average PSD level.	

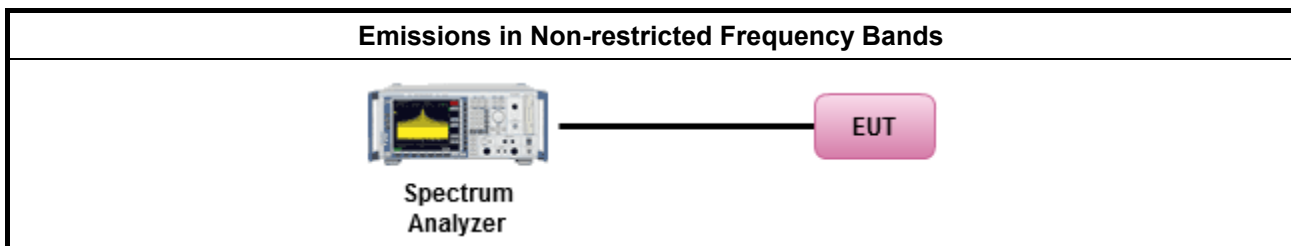
3.5.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.5.3 Test Procedures

Test Method
Refer as FCC KDB 558074, clause 8.5 for unwanted emissions into non-restricted bands.

3.5.4 Test Setup



3.5.5 Test Result of Emissions in Non-restricted Frequency Bands

Refer as Appendix E

3.6 Emissions in Restricted Frequency Bands

3.6.1 Emissions in Restricted Frequency Bands Limit

Restricted Band Emissions Limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB / decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.

Note 3: Using the distance of 1m during the test for above 18 GHz, and the test value to correct for the distance factor at 3m.

3.6.2 Measuring Instruments

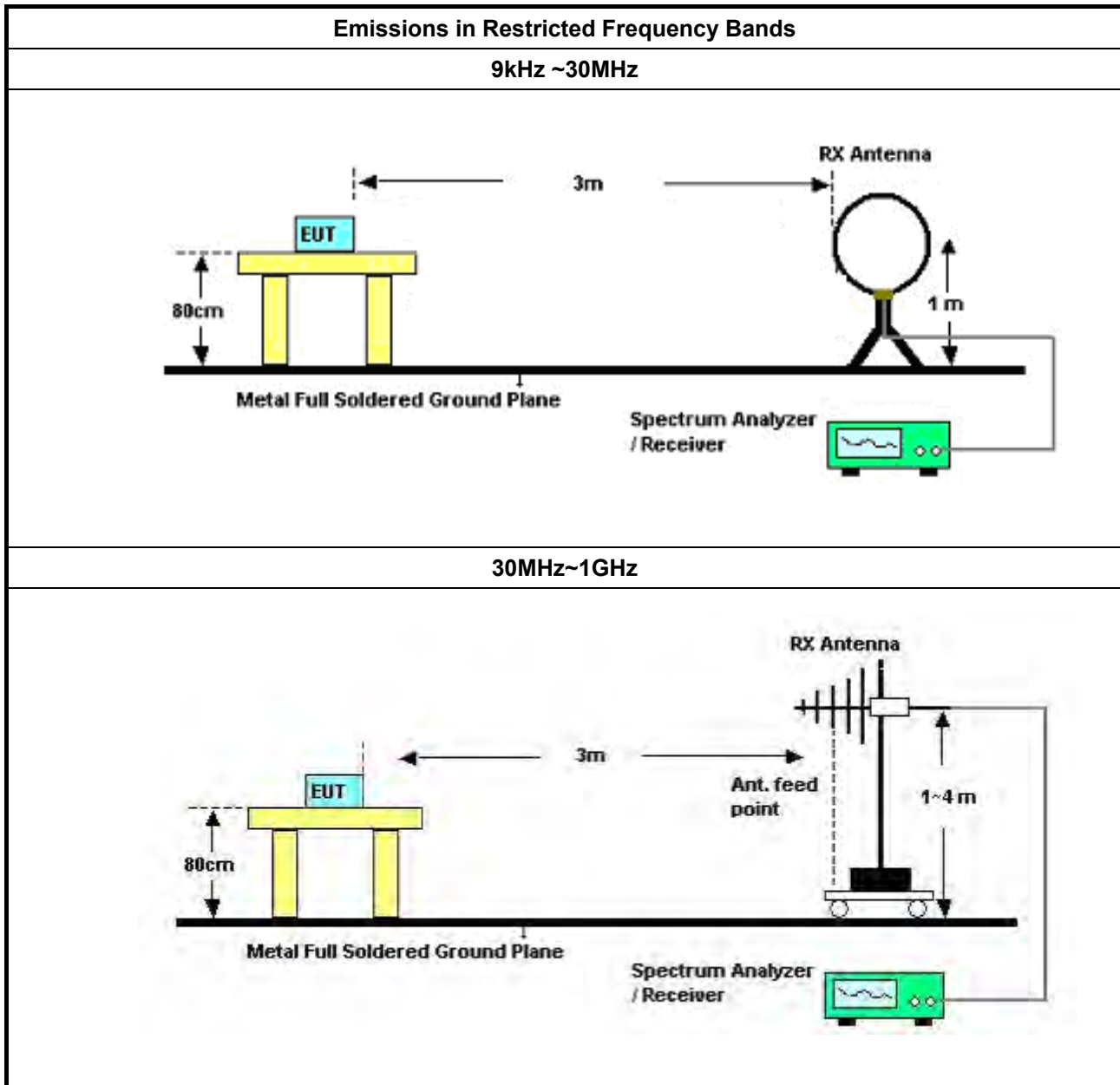
Refer a test equipment and calibration data table in this test report.

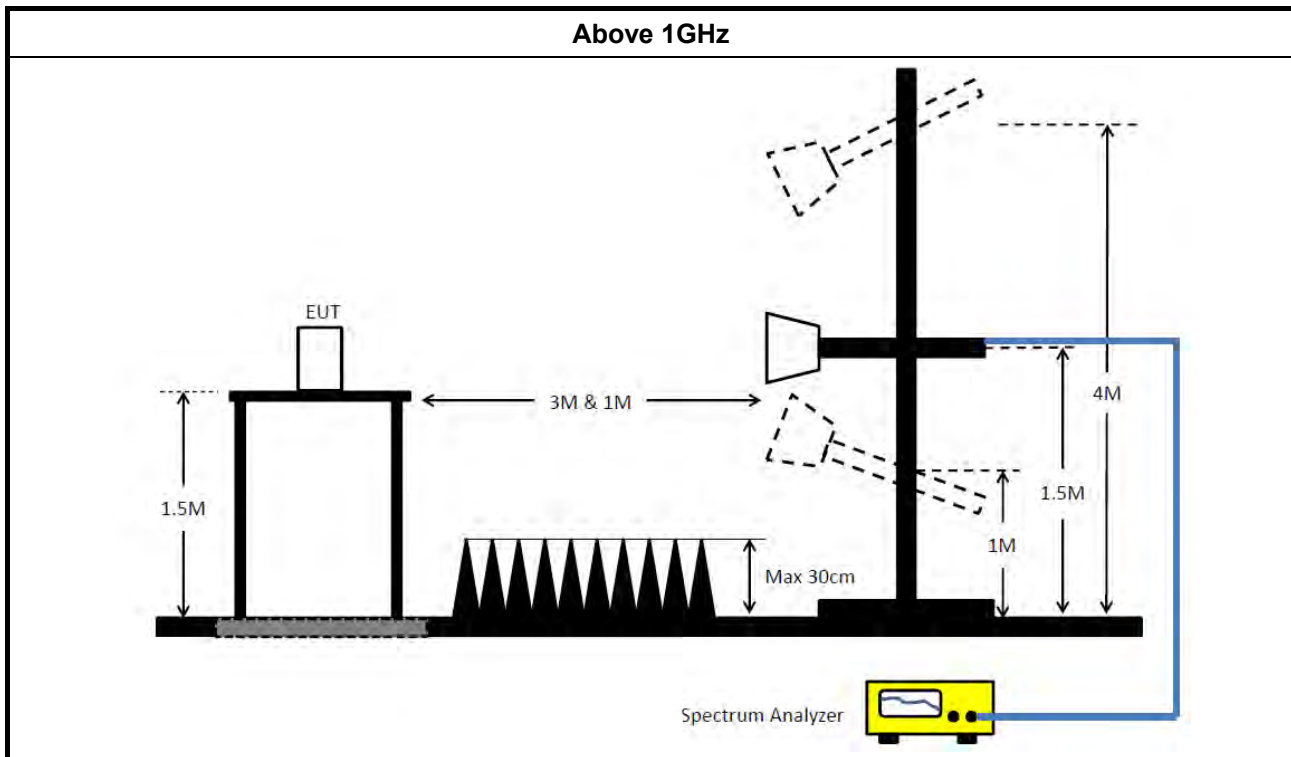


3.6.3 Test Procedures

Test Method	
The average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].	
Refer as ANSI C63.10, clause 6.10.3 band-edge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band.	
For the transmitter unwanted emissions shall be measured using following options below:	
	Refer as FCC KDB 558074, clause 8.6 for unwanted emissions into restricted bands.
	☐ Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.1(trace averaging for duty cycle $\geq 98\%$).
	☐ Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.2(trace averaging + duty factor).
	☒ Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.3(Reduced VBW $\geq 1/T$).
	☐ Refer as ANSI C63.10, clause 11.12.2.5.3 (Reduced VBW). VBW $\geq 1/T$, where T is pulse time.
	☐ Refer as ANSI C63.10, clause 7.5 average value of pulsed emissions.
	☒ Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.4 measurement procedure peak limit.
For the transmitter band-edge emissions shall be measured using following options below:	
	Refer as FCC KDB 558074 clause 8.7 & c63.10 clause 11.13.1, When the performing peak or average radiated measurements, emissions within 2 MHz of the authorized band edge may be measured using the marker-delta method described below.
	Refer as FCC KDB 558074, clause 8.7 (ANSI C63.10, clause 6.10.6) for marker-delta method for band-edge measurements.
	Refer as FCC KDB 558074, clause 8.7 for narrower resolution bandwidth (100kHz) using the band power and summing the spectral levels (i.e., 1 MHz).
	For conducted unwanted emissions into restricted bands (absolute emission limits). Devices with multiple transmit chains using options given below: (1) Measure and sum the spectra across the outputs or (2) Measure and add 10 log(N) dB
	For FCC KDB 662911 The methodology described here may overestimate array gain, thereby resulting in apparent failures to satisfy the out-of-band limits even if the device is actually compliant. In such cases, compliance may be demonstrated by performing radiated tests around the frequencies at which the apparent failures occurred.

3.6.4 Test Setup





3.6.5 Measurement Results Calculation

The measured Level is calculated using:

Corrected Reading: Antenna factor (AF) + Cable loss (CL) + Read level (Raw) - Preamp factor (PA)(if applicable) = Level.

3.6.6 Emissions in Restricted Frequency Bands (Below 30MHz)

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to KDB414788 Radiated Test Site, and the result came out very similar.

All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

The radiated emissions were investigated from 9 kHz or the lowest frequency generated within the device, up to the 10th harmonic or 40 GHz, whichever is appropriate.

3.6.7 Test Result of Emissions in Restricted Frequency Bands

Refer as Appendix F



4 Test Equipment and Calibration Data

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
EMI Receiver	Agilent	N9038A	My52260123	9kHz ~ 8.4GHz	Mar. 03, 2021	Mar. 02, 2022	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Jan. 06, 2021	Jan. 05, 2022	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Mar. 07, 2021	Mar. 06, 2022	Conduction (CO01-CB)
Pulse Limiter	Rohde&Schwarz	ESH3-Z2	100430	9kHz ~ 30MHz	Jan. 30, 2021	Jan. 29, 2022	Conduction (CO01-CB)
COND Cable	Woken	Cable	Low cable-CO01	9kHz ~ 30MHz	May 19, 2021	May 18, 2022	Conduction (CO01-CB)
Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conduction (CO01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Apr. 14, 2021	Apr. 13, 2022	Radiation (03CH03-CB)
3m Semi Anechoic Chamber NSA	TDK	SAC-3M	03CH03-CB	30 MHz ~ 1 GHz	Jan. 27, 2021	Jan. 26, 2022	Radiation (03CH03-CB)
Bilog Antenna with 6 dB attenuator	Schaffner & EMCI	CBL6112B & N-6-06	2928 & AT-N0608	20MHz ~ 2GHz	Feb. 22, 2021	Feb. 21, 2022	Radiation (03CH03-CB)
Pre-Amplifier	Agilent	8447D	2944A10259	9kHz ~ 1.3GHz	Jan. 11, 2021	Jan. 10, 2022	Radiation (03CH03-CB)
Spectrum Analyzer	R&S	FSP40	100019	9kHz ~ 40GHz	Jun. 04, 2021	Jun. 03, 2022	Radiation (03CH03-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	Jun. 21, 2021	Jun. 20, 2022	Radiation (03CH03-CB)
RF Cable-low	Woken	RG402	Low Cable-04+23	30MHz~1GHz	Oct. 05, 2020	Oct. 04, 2021	Radiation (03CH05-CB)
RF Cable-low	Woken	RG402	Low Cable-02+29	30MHz ~ 1GHz	Oct. 04, 2021	Oct. 03, 2022	Radiation (03CH03-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH03-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Apr. 14, 2021	Apr. 13, 2022	Radiation (03CH05-CB)
3m Semi Anechoic Chamber NSA	TDK	SAC-3M	03CH05-CB	30 MHz ~ 1 GHz	Aug. 09, 2021	Aug. 08, 2022	Radiation (03CH05-CB)
Bilog Antenna with 6dB Attenuator	TESEQ & EMCI	CBL 6112D & N-6-06	35236 & AT-N0610	30MHz ~ 2GHz	Mar. 26, 2021	Mar. 25, 2022	Radiation (03CH05-CB)
Pre-Amplifier	EMCI	EMC330N	980331	20MHz ~ 3GHz	Apr. 27, 2021	Apr. 26, 2022	Radiation (03CH05-CB)
Signal Analyzer	R&S	FSV40	101903	9kHz ~ 40GHz	Mar. 22, 2021	Mar. 21, 2022	Radiation (03CH05-CB)



Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	Jun. 21, 2021	Jun. 20, 2022	Radiation (03CH05-CB)
RF Cable-low	Woken	RG402	Low Cable-04+23	30MHz~1GHz	Oct. 05, 2020	Oct. 04, 2021	Radiation (03CH05-CB)
RF Cable-low	Woken	RG402	Low Cable-04+23	30MHz~1GHz	Oct. 04, 2021	Oct. 03, 2022	Radiation (03CH05-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH05-CB)
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH06-CB	1GHz ~18GHz 3m	Oct. 02, 2020	Oct. 01, 2021	Radiation (03CH06-CB)
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH06-CB	1GHz ~18GHz 3m	Oct. 01, 2021	Sep. 30, 2022	Radiation (03CH06-CB)
Horn Antenna	SCHWARZBECK	BBHA9120D	BBHA 9120D-1292	1GHz~18GHz	Aug. 04, 2021	Aug. 03, 2022	Radiation (03CH06-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Aug. 05, 2021	Aug. 04, 2022	Radiation (03CH06-CB)
Pre-Amplifier	Agilent	83017A	MY53270064	0.5GHz ~ 26.5GHz	May 06, 2021	May 05, 2022	Radiation (03CH06-CB)
Pre-Amplifier	MITEQ	TTA1840-35-HG	1864479	18GHz ~ 40GHz	Jul. 13, 2021	Jul. 12, 2022	Radiation (03CH06-CB)
Spectrum analyzer	R&S	FSP40	100080	9kHz~40GHz	Dec. 15, 2020	Dec. 14, 2021	Radiation (03CH06-CB)
RF Cable-high	Woken	RG402	High Cable-05	1GHz~18GHz	Oct. 05, 2020	Oct. 04, 2021	Radiation (03CH06-CB)
RF Cable-high	Woken	RG402	High Cable-05	1GHz~18GHz	Oct. 04, 2021	Oct. 03, 2022	Radiation (03CH06-CB)
RF Cable-high	Woken	RG402	High Cable-05+24	1GHz~18GHz	Oct. 05, 2020	Oct. 04, 2021	Radiation (03CH06-CB)
RF Cable-high	Woken	RG402	High Cable-05+24	1GHz~18GHz	Oct. 04, 2021	Oct. 03, 2022	Radiation (03CH06-CB)
RF Cable-high	Woken	RG402	High Cable-40G#1	18GHz ~ 40 GHz	Jul. 15, 2021	Jul. 14, 2022	Radiation (03CH06-CB)
RF Cable-high	Woken	RG402	High Cable-40G#2	18GHz ~ 40 GHz	Jul. 15, 2021	Jul. 14, 2022	Radiation (03CH06-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH06-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	May 21, 2021	May 20, 2022	Conducted (TH01-CB)



Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
RF Cable-high	Woken	RG402	High Cable-06	1 GHz – 26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-07	1 GHz –26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-08	1 GHz –26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-09	1 GHz –26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz –26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-30	1 GHz –26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH01-CB)
Power Sensor	Agilent	E9327A	US40442088	50MHz~18GHz	Feb. 23, 2021	Feb. 22, 2022	Conducted (TH01-CB)
Power Meter	Agilent	E4416A	GB41291199	50MHz~18GHz	Feb. 23, 2021	Feb. 22, 2022	Conducted (TH01-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conducted (TH01-CB)

Note: Calibration Interval of instruments listed above is one year.

NCR means Non-Calibration required.



Conducted Emissions at Powerline

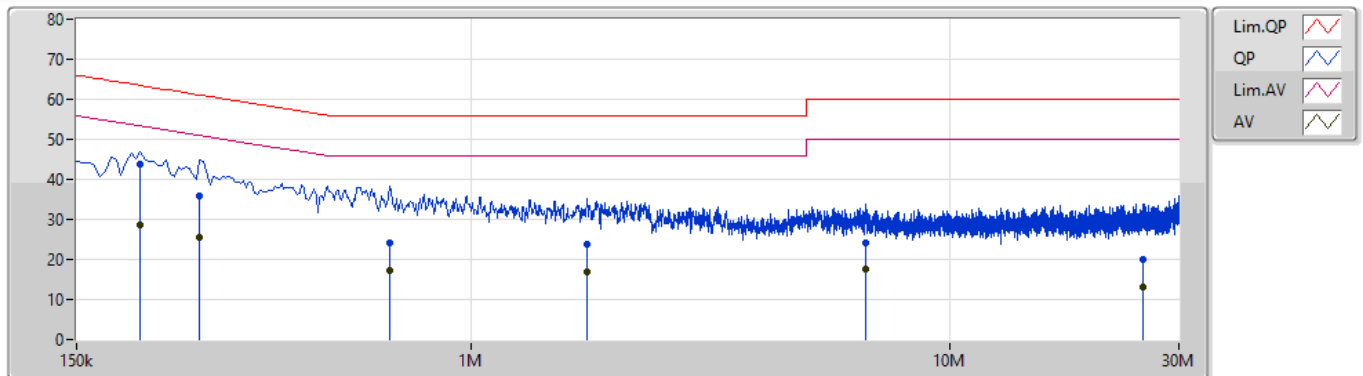
Appendix A

Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 3	Pass	QP	150k	52.95	66.00	-13.05	Neutral

Mode 3

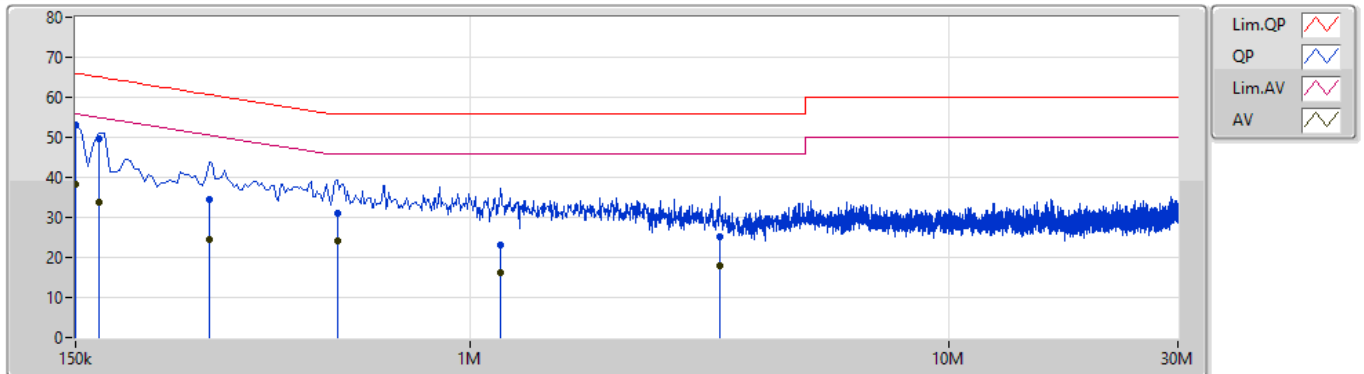
29/11/2021



Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition	Comment	Raw (dBuV)	LISN (dB)	CL (dB)	AT (dB)			
QP	204k	43.91	63.44	-19.53	9.89	Line	"Worst"	34.02	0.04	0.04	9.81			
AV	204k	28.52	53.44	-24.92	9.89	Line	-	18.63	0.04	0.04	9.81			
QP	271.5k	35.97	61.07	-25.10	9.89	Line	-	26.08	0.04	0.04	9.81			
AV	271.5k	25.55	51.07	-25.52	9.89	Line	-	15.66	0.04	0.04	9.81			
QP	676.5k	24.08	56.00	-31.92	9.92	Line	-	14.16	0.05	0.04	9.83			
AV	676.5k	17.15	46.00	-28.85	9.92	Line	-	7.23	0.05	0.04	9.83			
QP	1.748M	23.83	56.00	-32.17	9.96	Line	-	13.87	0.08	0.06	9.82			
AV	1.748M	16.83	46.00	-29.17	9.96	Line	-	6.87	0.08	0.06	9.82			
QP	6.666M	24.31	60.00	-35.69	10.21	Line	-	14.10	0.18	0.14	9.89			
AV	6.666M	17.49	50.00	-32.51	10.21	Line	-	7.28	0.18	0.14	9.89			
QP	25.323M	19.94	60.00	-40.06	10.65	Line	-	9.29	0.36	0.28	10.01			
AV	25.323M	13.18	50.00	-36.82	10.65	Line	-	2.53	0.36	0.28	10.01			

Mode 3

29/11/2021



Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition	Comment	Raw (dBuV)	LISN (dB)	CL (dB)	AT (dB)			
QP	150k	52.95	66.00	-13.05	9.88	Neutral	"Worst"	43.07	0.03	0.04	9.81			
AV	150k	38.19	56.00	-17.81	9.88	Neutral	-	28.31	0.03	0.04	9.81			
QP	168k	49.63	65.06	-15.43	9.88	Neutral	-	39.75	0.03	0.04	9.81			
AV	168k	33.85	55.06	-21.21	9.88	Neutral	-	23.97	0.03	0.04	9.81			
QP	285k	34.59	60.67	-26.08	9.89	Neutral	-	24.70	0.03	0.04	9.82			
AV	285k	24.59	50.67	-26.08	9.89	Neutral	-	14.70	0.03	0.04	9.82			
QP	528k	31.09	56.00	-24.91	9.90	Neutral	-	21.19	0.04	0.04	9.82			
AV	528k	24.04	46.00	-21.96	9.90	Neutral	-	14.14	0.04	0.04	9.82			
QP	1.158M	23.20	56.00	-32.80	9.93	Neutral	-	13.27	0.05	0.05	9.83			
AV	1.158M	16.19	46.00	-29.81	9.93	Neutral	-	6.26	0.05	0.05	9.83			
QP	3.314M	25.21	56.00	-30.79	10.06	Neutral	-	15.15	0.09	0.11	9.86			
AV	3.314M	17.90	46.00	-28.10	10.06	Neutral	-	7.84	0.09	0.11	9.86			



Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
2.4-2.4835GHz	-	-	-	-	-
BT-LE(1Mbps)	721.25k	1.048M	1M05F1D	705k	1.042M

Max-N dB = Maximum 6dB down bandwidth; Max-OBW = Maximum 99% occupied bandwidth;
Min-N dB = Minimum 6dB down bandwidth; Min-OBW = Minimum 99% occupied bandwidth

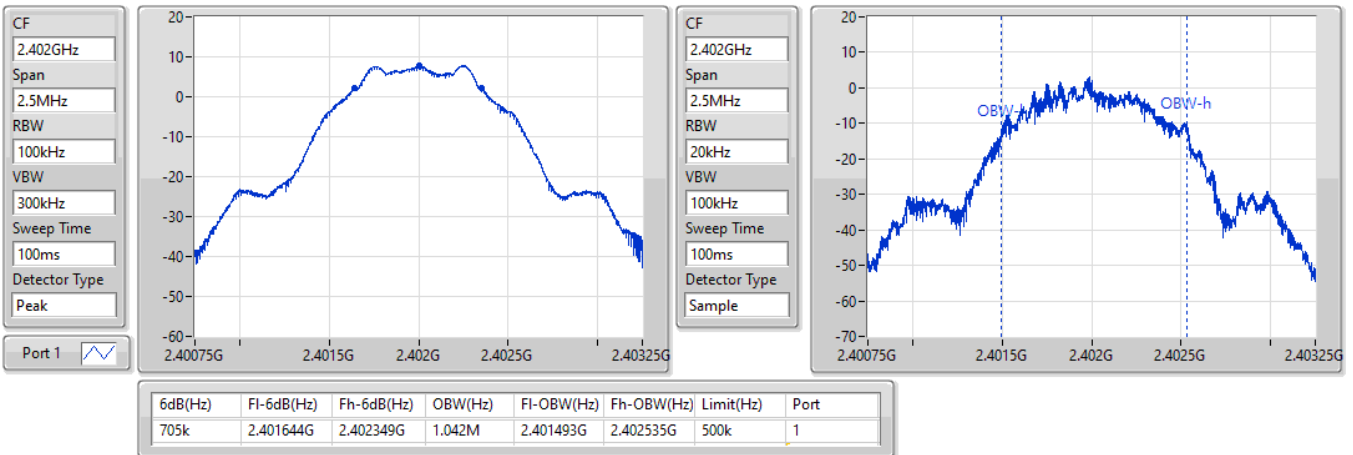
Result

Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	500k	705k	1.042M
2440MHz	Pass	500k	712.5k	1.042M
2480MHz	Pass	500k	721.25k	1.048M

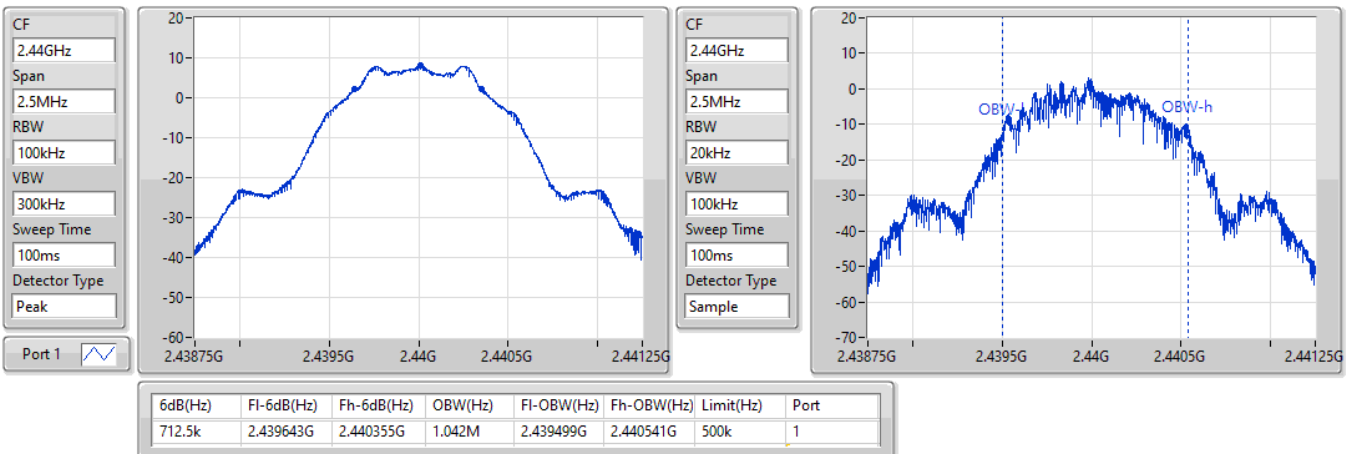
Port X-N dB = Port X 6dB down bandwidth;
Port X-OBW = Port X 99% occupied bandwidth

BT-LE(1Mbps)
2402MHz
EBW-DTS

18/09/2021

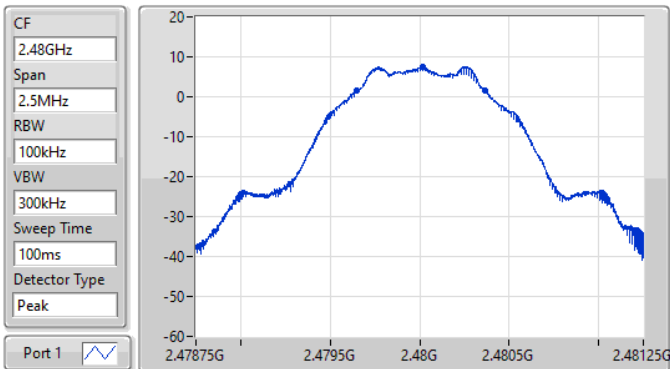

BT-LE(1Mbps)
2440MHz
EBW-DTS

18/09/2021



BT-LE(1Mbps)

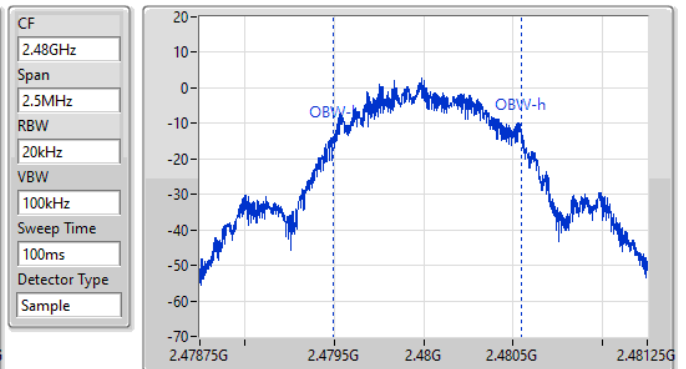
2480MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
721.25k	2.479646G	2.480368G	1.048M	2.479497G	2.480545G	500k	1

EBW-DTS

18/09/2021





Summary

Mode	Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-LE(1Mbps)	8.55	0.00716



Average Power-DTS

Appendix C

Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	4.20	8.37	30.00
2440MHz	Pass	4.20	8.55	30.00
2480MHz	Pass	4.20	8.11	30.00

DG = Directional Gain; Port X = Port X output power



Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
BT-LTE(1Mbps)	-5.94

RBW = 3kHz;

Result

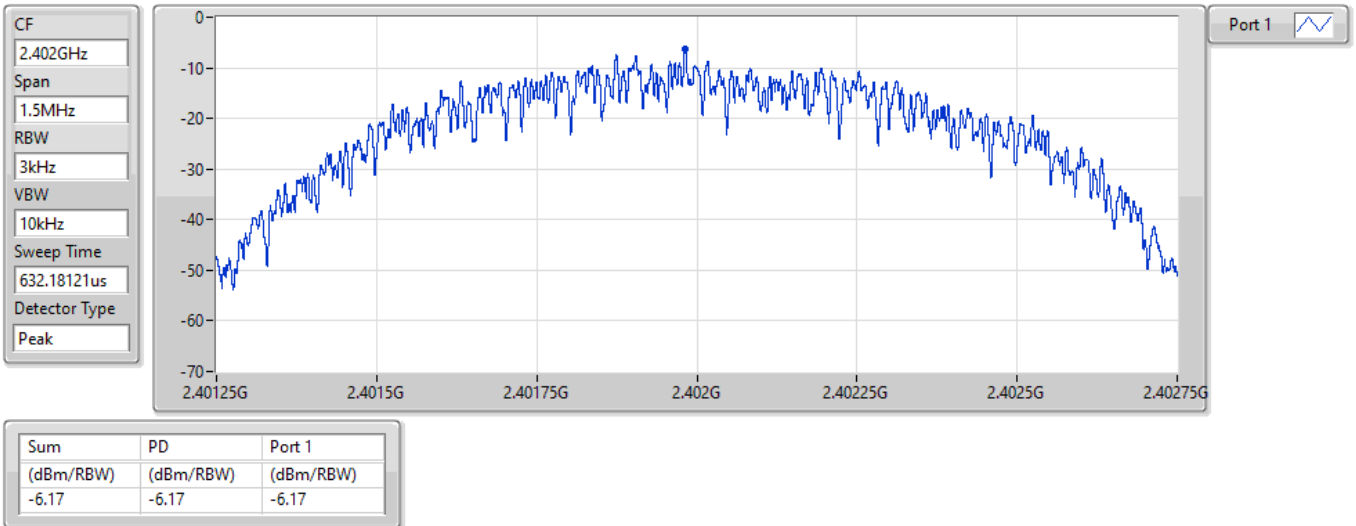
Mode	Result	Gain (dBi)	PD (dBm/RBW)	PD Limit (dBm/RBW)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	4.20	-6.17	8.00
2440MHz	Pass	4.20	-5.94	8.00
2480MHz	Pass	4.20	-6.48	8.00

DG = Directional Gain; RBW = 3kHz;
PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; Port X = Port X Power Density;

BT-LE(1Mbps)

2402MHz

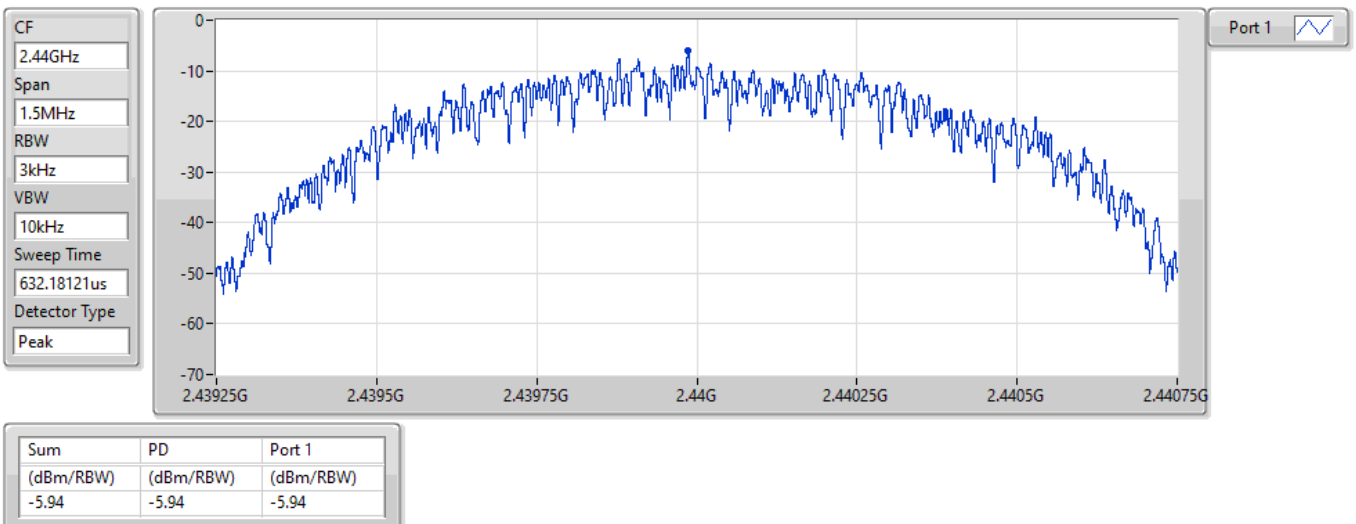
18/09/2021



BT-LE(1Mbps)

2440MHz

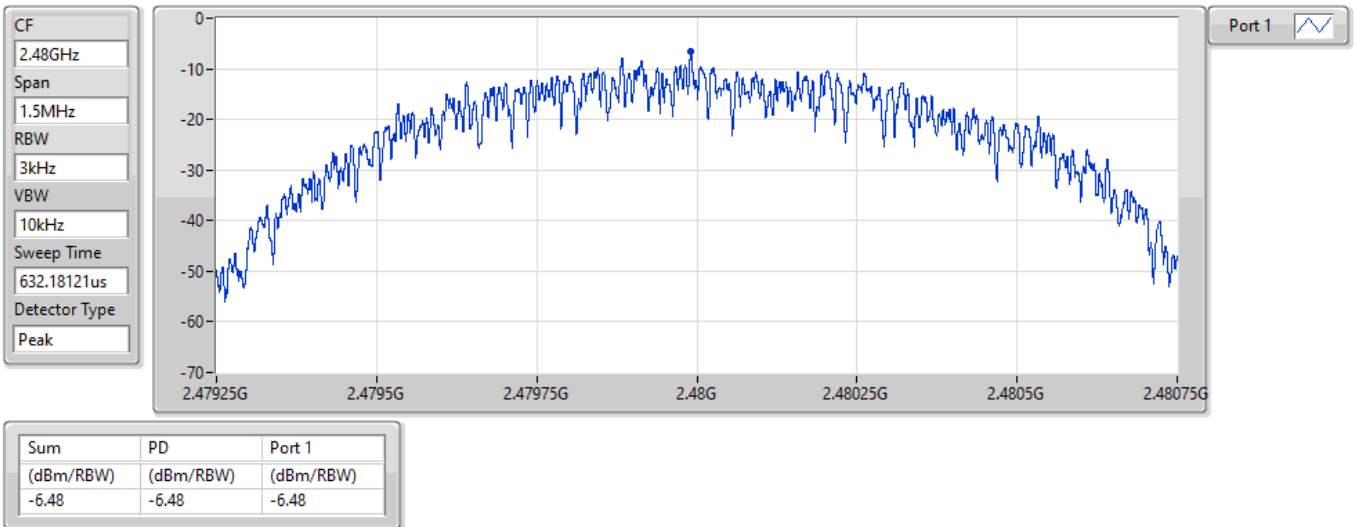
18/09/2021



BT-LE(1Mbps)

2480MHz

18/09/2021





Summary

Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BT+LE(1Mbps)	Pass	2.44G	7.96	-22.04	2.10828G	-52.73	2.39992G	-50.24	2.4G	-54.12	2.48504G	-50.71	24.74973G	-43.36	1

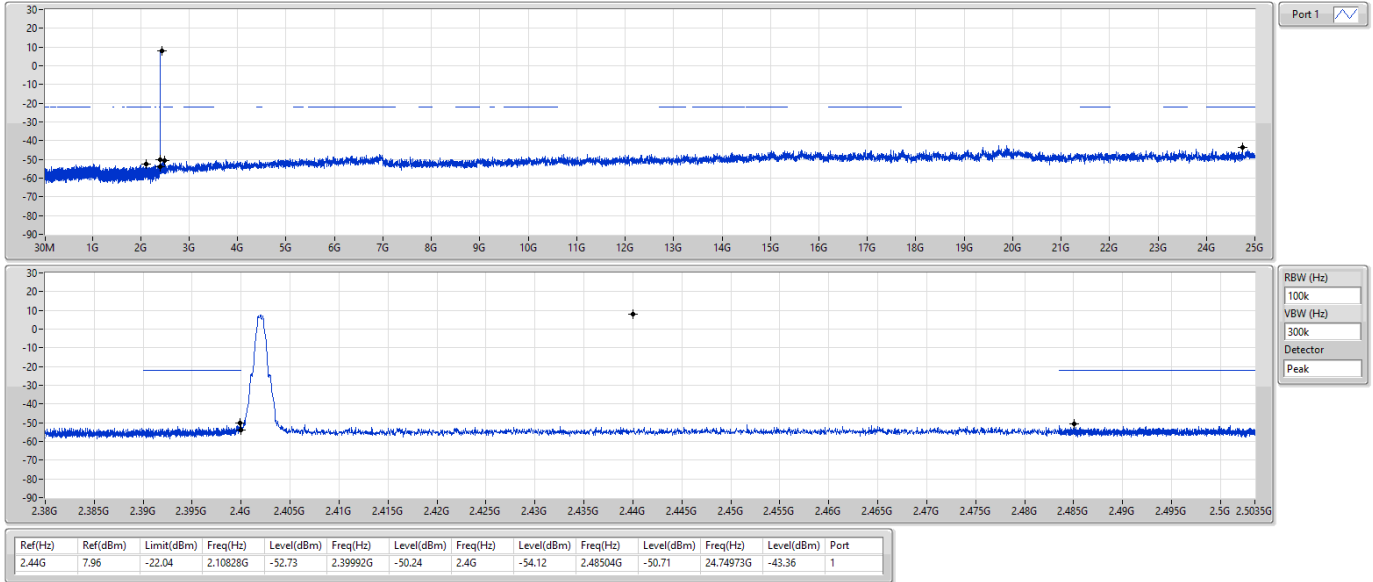
Result

Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	2.44G	7.96	-22.04	2.10828G	-52.73	2.39992G	-50.24	2.4G	-54.12	2.48504G	-50.71	24.74973G	-43.36	1
2440MHz	Pass	2.44G	7.96	-22.04	750.57M	-51.11	2.39873G	-52.27	2.4G	-55.29	2.49058G	-50.80	15.05373G	-43.11	1
2480MHz	Pass	2.44G	7.96	-22.04	936.22M	-51.79	2.39633G	-52.36	2.4G	-53.48	2.48847G	-51.55	15.27308G	-43.35	1

BT-LE(1Mbps)

CSEndB-DTS

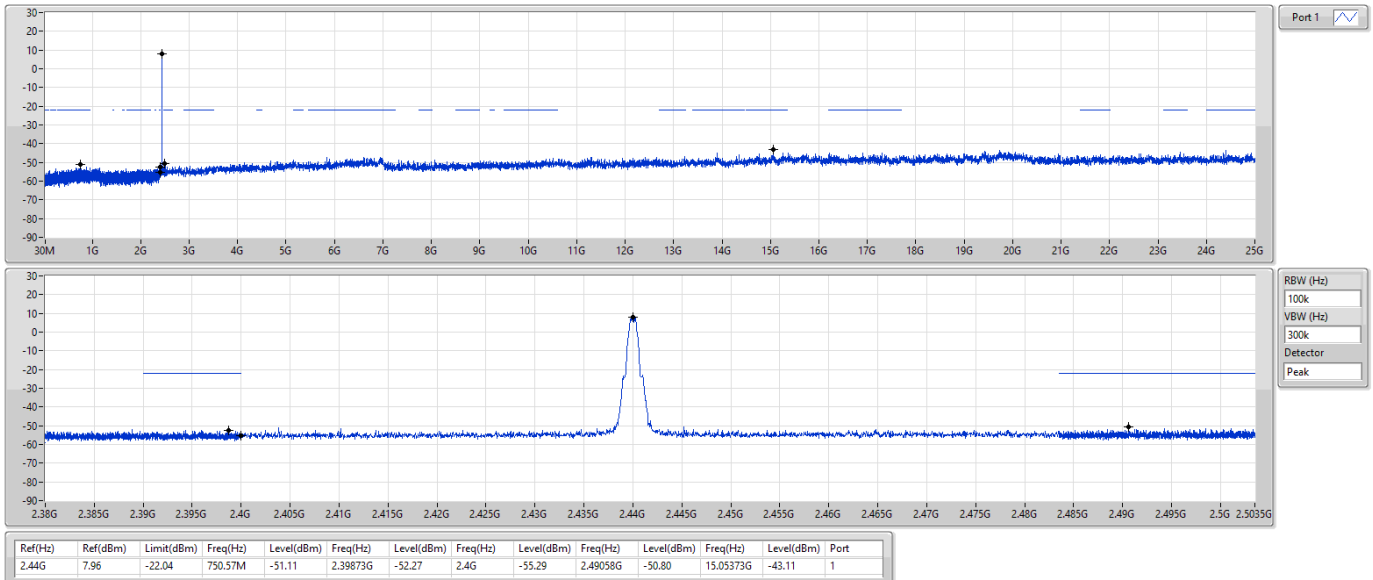
2402MHz



BT-LE(1Mbps)

CSEndB-DTS

2440MHz

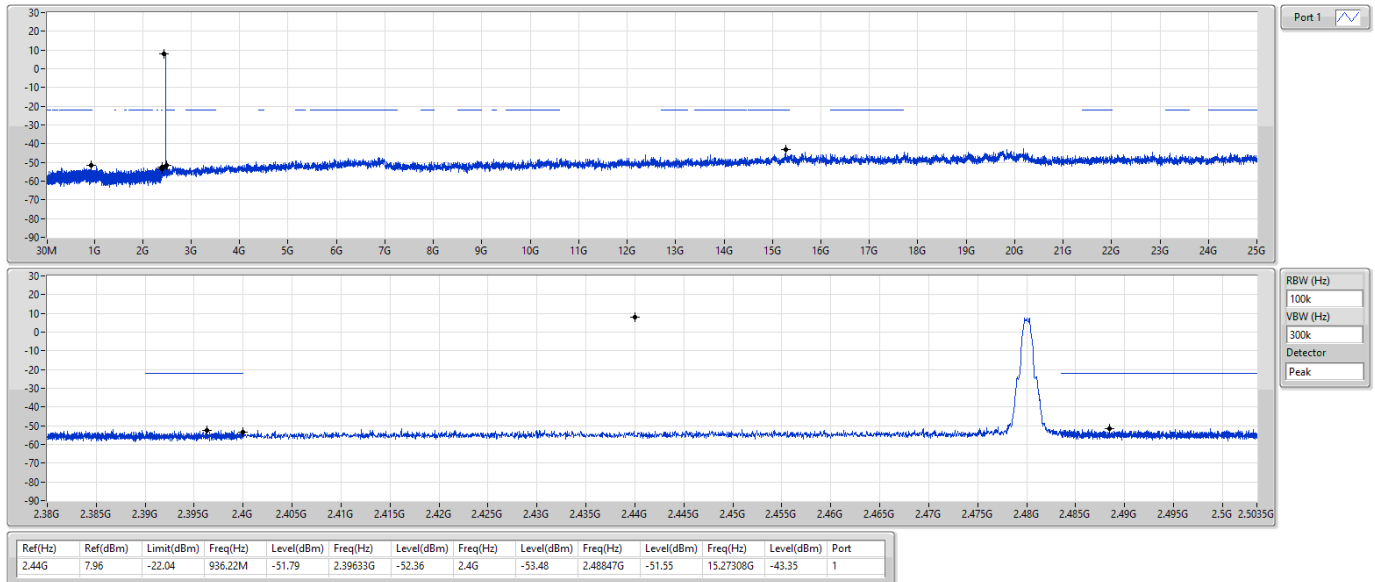


BT-LE(1Mbps)

CSEndB-DTS

2480MHz

18/09/2021





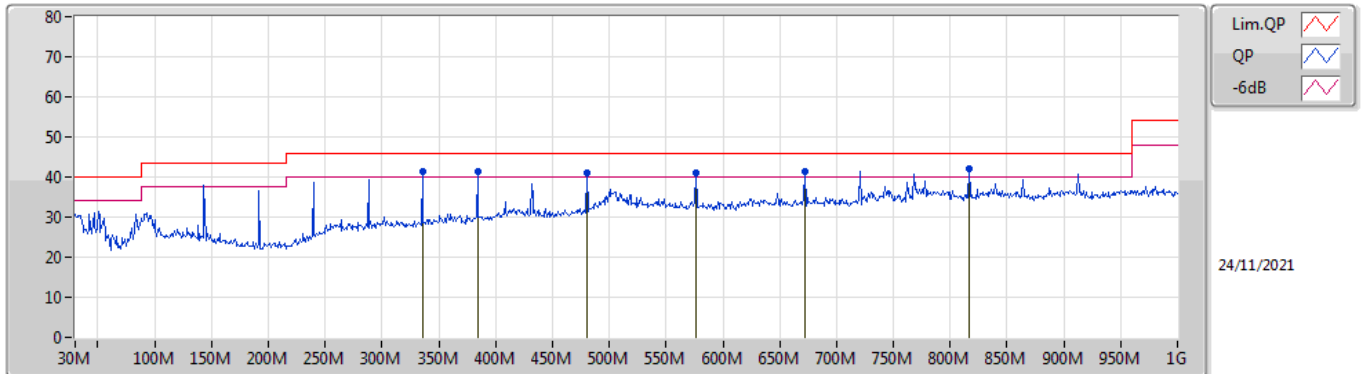
Radiated Emissions below 1GHz

Appendix F.1

Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 1	Pass	PK	240M	42.34	46.00	-3.66	Horizontal

Mode 1



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB/m)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV/m)	AF (dB/m)	CL (dB)	PA (dB)
PK	335.55M	41.49	46.00	-4.51	-6.07	3	Vertical	20	1.50	-	47.56	19.46	2.50	28.03
PK	384.05M	41.42	46.00	-4.58	-5.02	3	Vertical	321	1.50	-	46.44	20.74	2.70	28.46
PK	480.08M	41.13	46.00	-4.87	-3.41	3	Vertical	255	1.00	-	44.54	22.64	3.06	29.11
PK	576.11M	41.12	46.00	-4.88	-2.04	3	Vertical	68	1.00	-	43.16	24.11	3.20	29.35
PK	672.14M	41.49	46.00	-4.51	-1.34	3	Vertical	60	1.50	-	42.83	24.51	3.49	29.34
PK	816.67M	42.07	46.00	-3.93	-0.01	3	Vertical	143	1.25	"Worst"	42.08	25.20	3.80	29.01

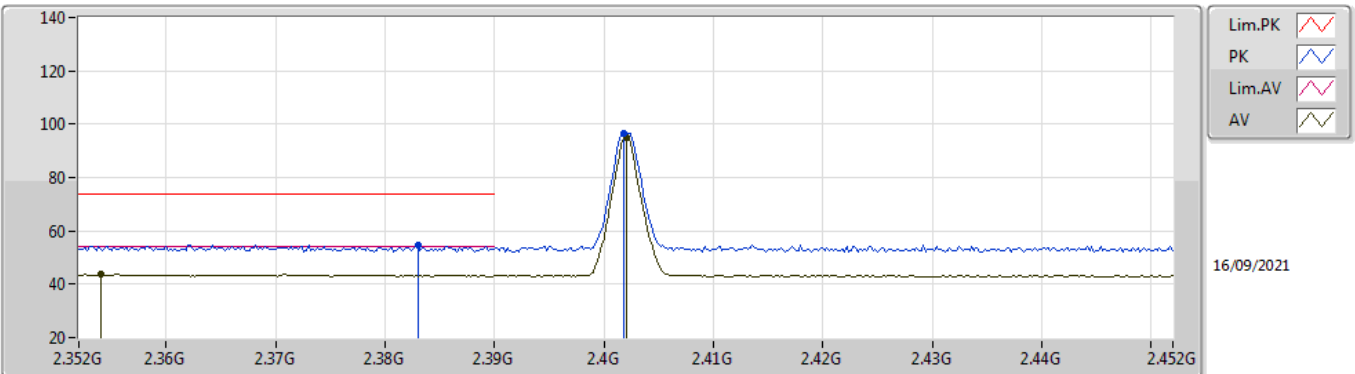


Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	AV	2.4835G	50.10	54.00	-3.90	3	Horizontal	30	1.00	-

BT-LE(1Mbps)

2402MHz_TX

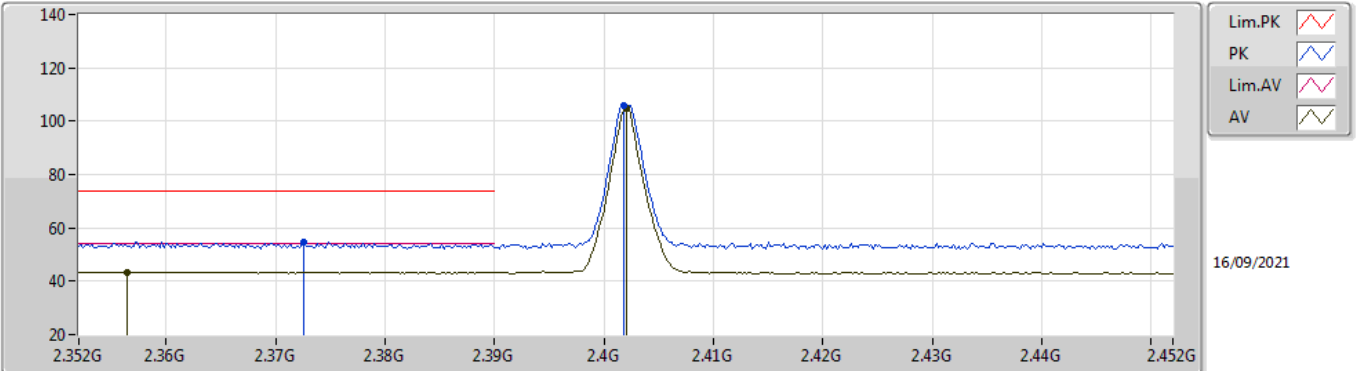


EUT X_1TX
Setting Default
06-F-R-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	2.383G	54.82	74.00	-19.18	24.21	3	Vertical	104	1.01	-	27.54	3.07	-	
AV	2.354G	43.76	54.00	-10.24	12.98	3	Vertical	104	1.01	-	27.77	3.01	-	
PK	2.4018G	96.56	Inf	-Inf	66.07	3	Vertical	104	1.01	-	27.39	3.10	-	
AV	2.402G	95.08	Inf	-Inf	64.59	3	Vertical	104	1.01	-	27.39	3.10	-	

BT-LE(1Mbps)

2402MHz_TX

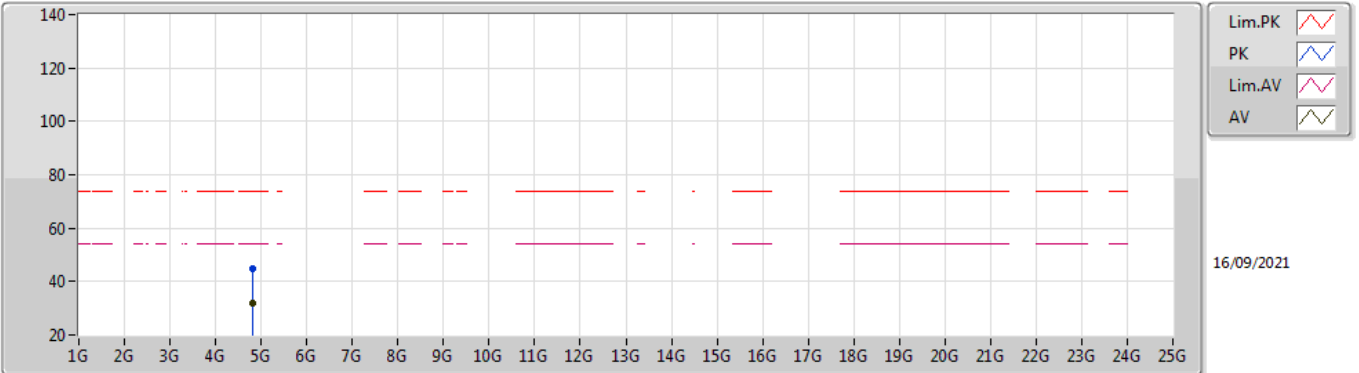


EUT X_1TX
Setting Default
06-F-R-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	2.3726G	54.70	74.00	-19.30	24.03	3	Horizontal	27	1.17	-	27.62	3.05	-	
AV	2.3564G	43.49	54.00	-10.51	12.73	3	Horizontal	27	1.17	-	27.75	3.01	-	
PK	2.4018G	106.10	Inf	-Inf	75.61	3	Horizontal	27	1.17	-	27.39	3.10	-	
AV	2.402G	104.61	Inf	-Inf	74.12	3	Horizontal	27	1.17	-	27.39	3.10	-	

BT-LE(1Mbps)

2402MHz_TX

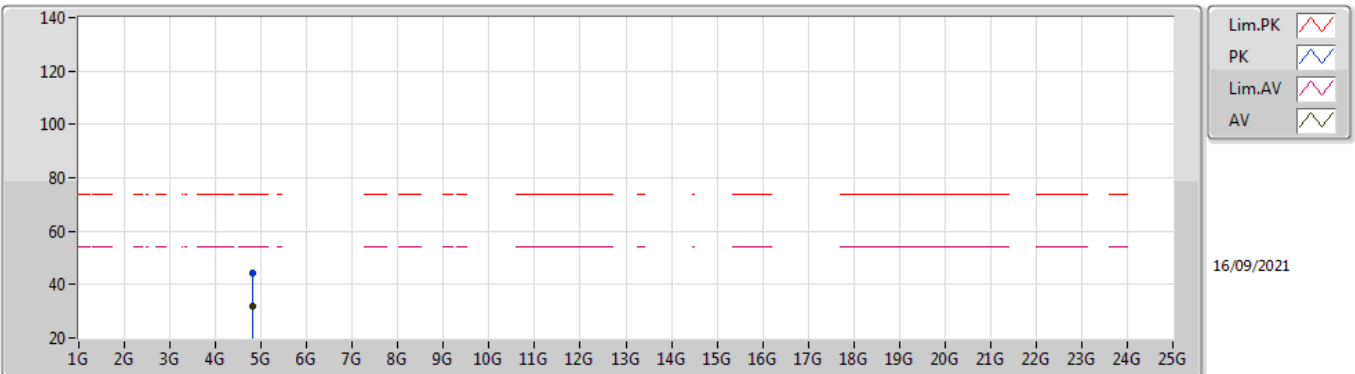


EUT X_1TX
Setting Default
06-F-R-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	4.8048G	44.73	74.00	-29.27	40.71	3	Vertical	183	2.23	-	31.09	5.00	32.07
AV	4.79998G	32.10	54.00	-21.90	28.08	3	Vertical	183	2.23	-	31.10	5.00	32.08

BT-LE(1Mbps)

2402MHz_TX

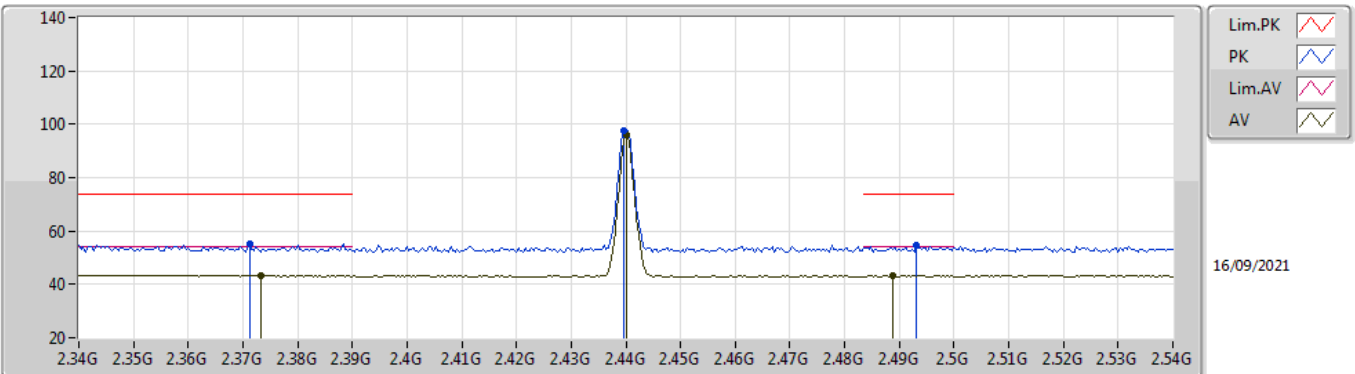


EUT X_1TX
Setting Default
06-F-R-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	4.8052G	44.53	74.00	-29.47	40.51	3	Horizontal	20	1.32	-	31.09	5.00	32.07
AV	4.80202G	31.97	54.00	-22.03	27.95	3	Horizontal	20	1.32	-	31.10	5.00	32.08

BT-LE(1Mbps)

2440MHz_TX

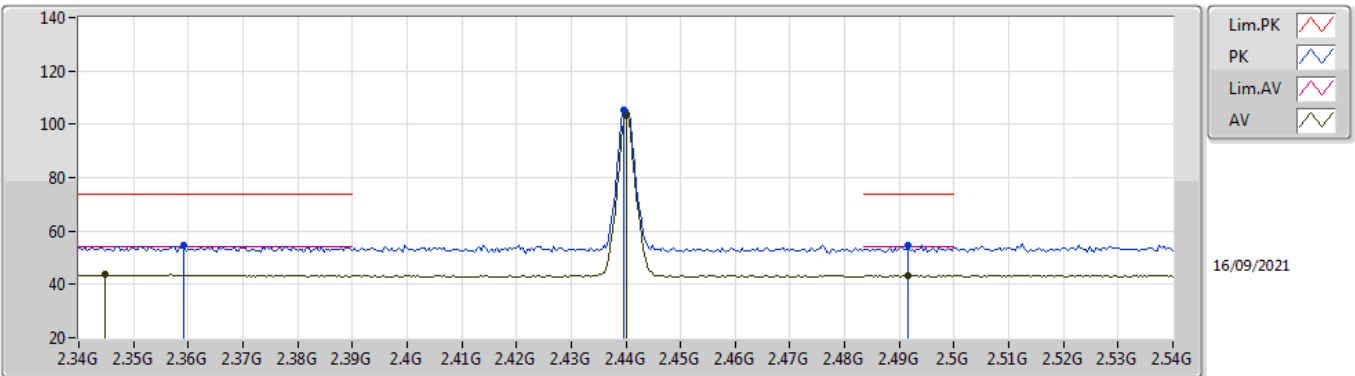


EUT_X1TX
Setting Default
06-F-R-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	2.3712G	55.25	74.00	-18.75	24.58	3	Vertical	103	1.13	-	27.63	3.04	-
AV	2.3732G	43.52	54.00	-10.48	12.86	3	Vertical	103	1.13	-	27.61	3.05	-
PK	2.4396G	97.76	Inf	-Inf	67.38	3	Vertical	103	1.13	-	27.24	3.14	-
AV	2.44G	96.28	Inf	-Inf	65.90	3	Vertical	103	1.13	-	27.24	3.14	-
PK	2.4932G	54.59	74.00	-19.41	24.11	3	Vertical	103	1.13	-	27.29	3.19	-
AV	2.4888G	43.43	54.00	-10.57	12.96	3	Vertical	103	1.13	-	27.28	3.19	-

BT-LE(1Mbps)

2440MHz_TX

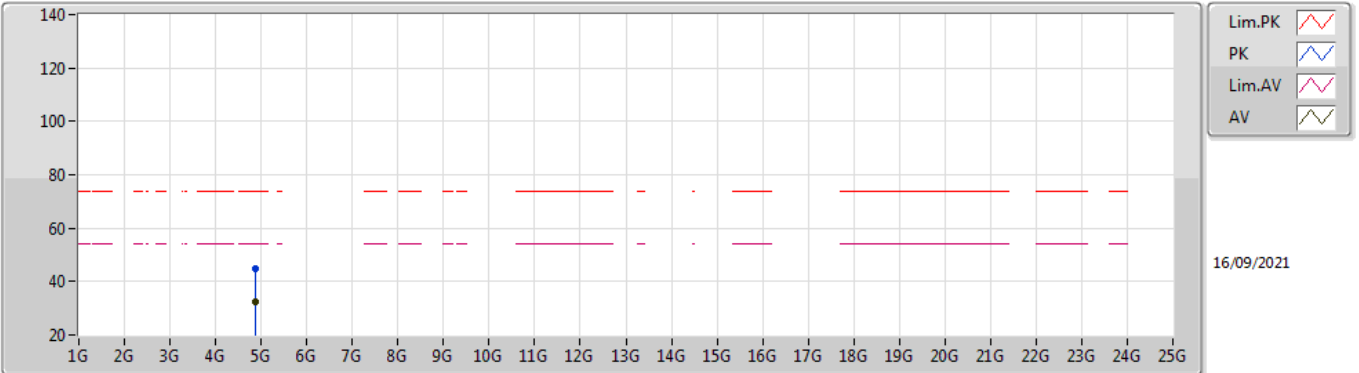


EUT_X1TX
Setting Default
06-F-R-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	2.3592G	54.52	74.00	-19.48	23.77	3	Horizontal	31	1.16	-	27.73	3.02	-	
AV	2.3448G	43.69	54.00	-10.31	12.88	3	Horizontal	31	1.16	-	27.82	2.99	-	
PK	2.4396G	105.47	Inf	-Inf	75.09	3	Horizontal	31	1.16	-	27.24	3.14	-	
AV	2.44G	103.85	Inf	-Inf	73.47	3	Horizontal	31	1.16	-	27.24	3.14	-	
PK	2.4916G	54.70	74.00	-19.30	24.23	3	Horizontal	31	1.16	-	27.28	3.19	-	
AV	2.4916G	43.36	54.00	-10.64	12.89	3	Horizontal	31	1.16	-	27.28	3.19	-	

BT-LE(1Mbps)

2440MHz_TX

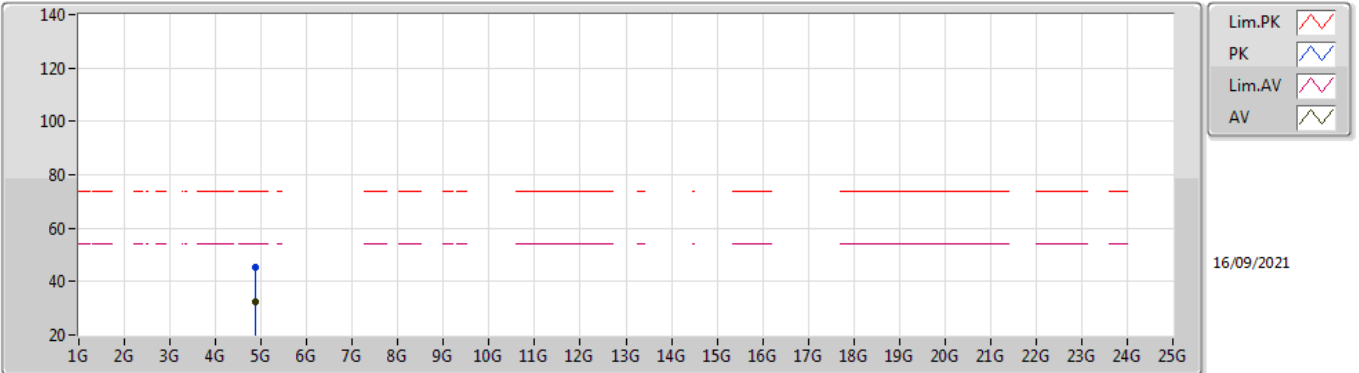


EUT X_1TX
Setting Default
06-F-R-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	4.88222G	44.81	74.00	-29.19	40.76	3	Vertical	2	1.74	-	31.06	5.00	32.01
AV	4.87946G	32.53	54.00	-21.47	28.48	3	Vertical	2	1.74	-	31.06	5.00	32.01

BT-LE(1Mbps)

2440MHz_TX

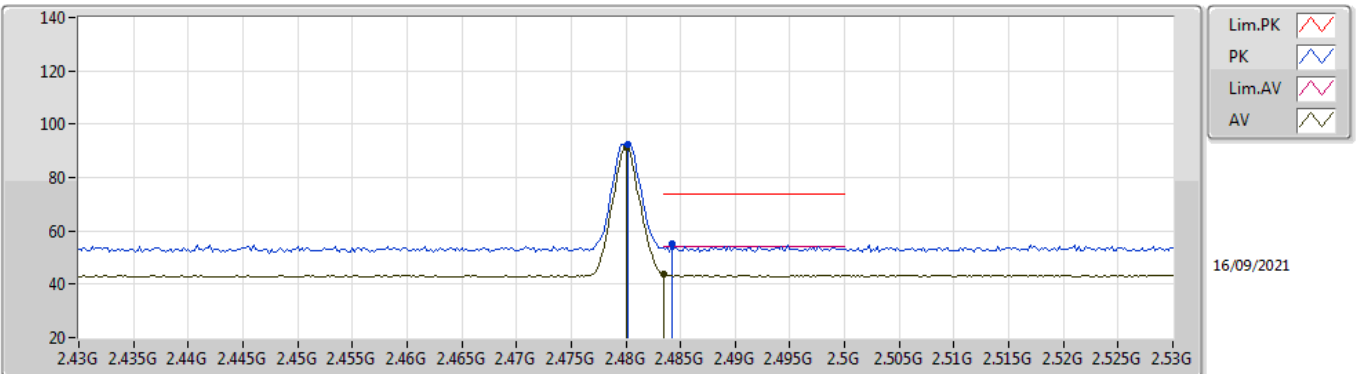


EUT X_1TX
Setting Default
06-F-R-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	4.88252G	45.11	74.00	-28.89	41.05	3	Horizontal	321	1.17	-	31.07	5.00	32.01	
AV	4.8782G	32.45	54.00	-21.55	28.40	3	Horizontal	321	1.17	-	31.06	5.00	32.01	

BT-LE(1Mbps)

2480MHz_TX

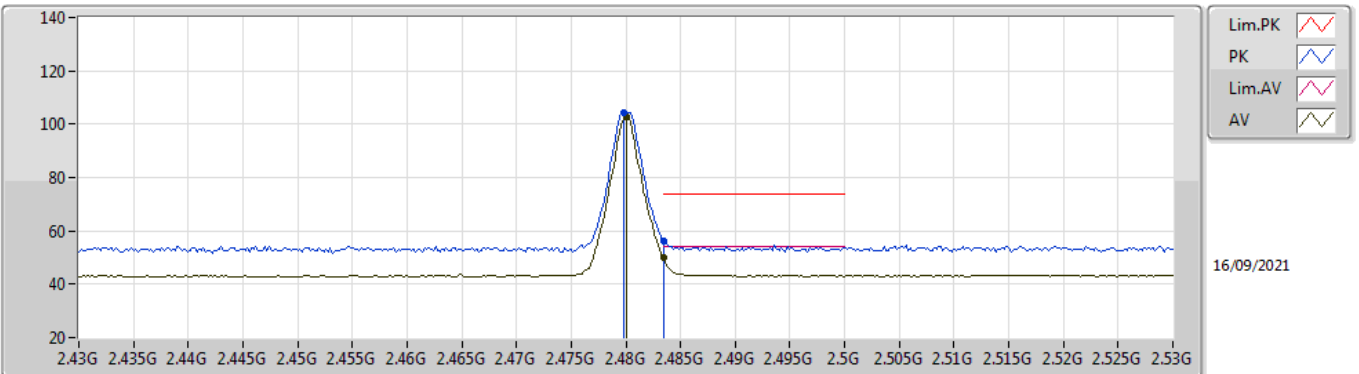


EUT X_1TX
Setting Default
06-F-R-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	2.4802G	92.58	Inf	-Inf	62.14	3	Vertical	135	1.67	-	27.26	3.18	-	
AV	2.48G	91.13	Inf	-Inf	60.69	3	Vertical	135	1.67	-	27.26	3.18	-	
PK	2.4842G	55.08	74.00	-18.92	24.63	3	Vertical	135	1.67	-	27.27	3.18	-	
AV	2.4835G	43.61	54.00	-10.39	13.16	3	Vertical	135	1.67	-	27.27	3.18	-	

BT-LE(1Mbps)

2480MHz_TX

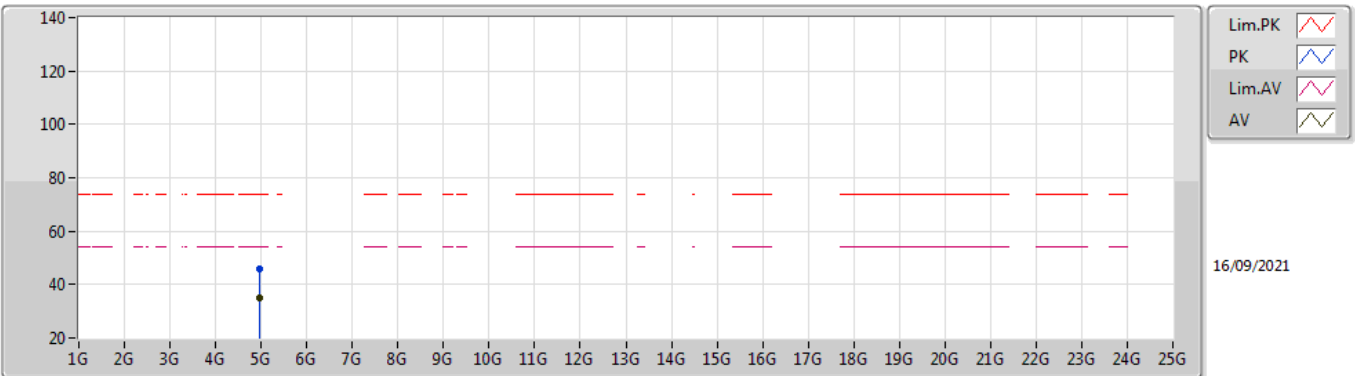


EUT X_1TX
Setting Default
06-F-R-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	2.4798G	104.50	Inf	-Inf	74.06	3	Horizontal	30	1.00	-	27.26	3.18	-	
AV	2.48G	103.00	Inf	-Inf	72.56	3	Horizontal	30	1.00	-	27.26	3.18	-	
PK	2.4835G	56.35	74.00	-17.65	25.90	3	Horizontal	30	1.00	-	27.27	3.18	-	
AV	2.4835G	50.10	54.00	-3.90	19.65	3	Horizontal	30	1.00	-	27.27	3.18	-	

BT-LE(1Mbps)

2480MHz_TX

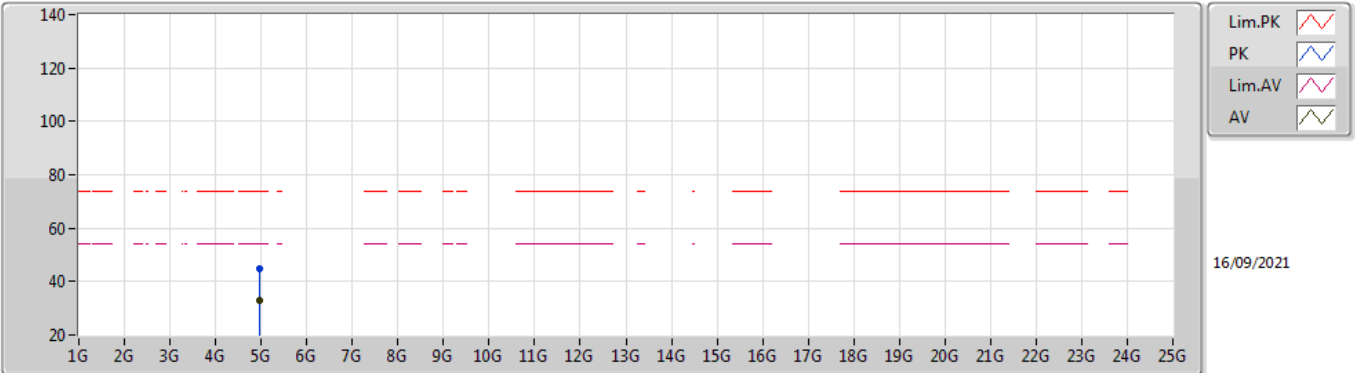


EUT X_1TX
Setting Default
06-F-R-5

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA	
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)	
PK	4.96042G	45.66	74.00	-28.34	41.30	3	Vertical	357	3.00	-	31.30	5.00	31.94	
AV	4.95962G	34.78	54.00	-19.22	30.42	3	Vertical	357	3.00	-	31.30	5.00	31.94	

BT-LE(1Mbps)

2480MHz_TX



EUT X_1TX
Setting Default
06-F-R-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	4.9652G	44.80	74.00	-29.20	40.44	3	Horizontal	262	2.07	-	31.30	5.00	31.94	
AV	4.9648G	32.93	54.00	-21.07	28.57	3	Horizontal	262	2.07	-	31.30	5.00	31.94	

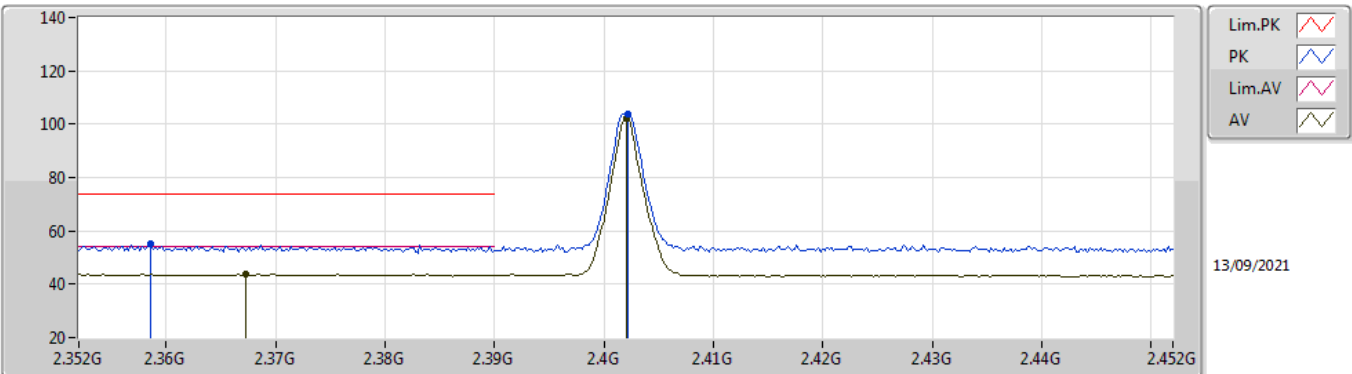


Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	AV	2.4835G	51.11	54.00	-2.89	3	Vertical	323	2.78	-

BT-LE(1Mbps)

2402MHz_TX

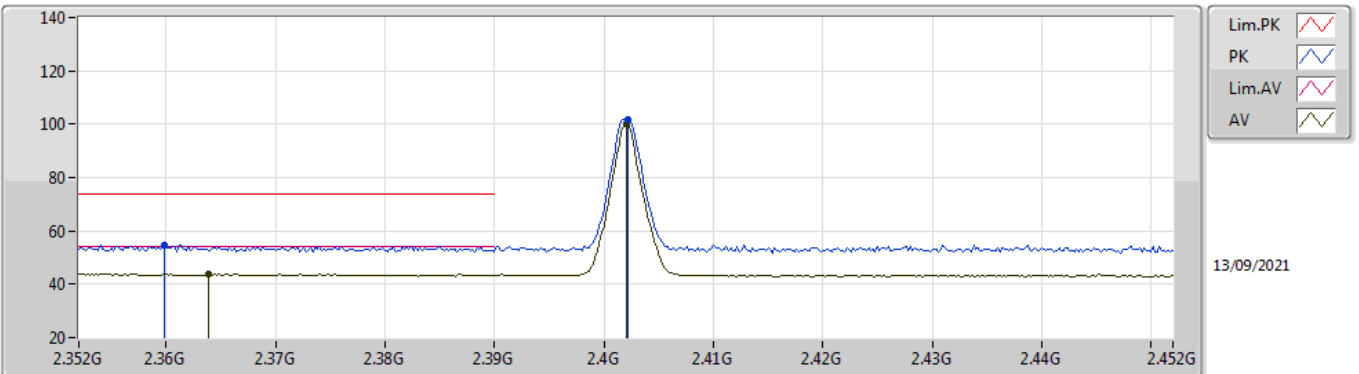


EUT V_1TX
Setting Default
06-F-R-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	2.3586G	55.20	74.00	-18.80	24.45	3	Vertical	62	1.27	-	27.73	3.02	-	
AV	2.3672G	43.74	54.00	-10.26	13.05	3	Vertical	62	1.27	-	27.66	3.03	-	
PK	2.4022G	103.70	Inf	-Inf	73.21	3	Vertical	62	1.27	-	27.39	3.10	-	
AV	2.402G	102.20	Inf	-Inf	71.71	3	Vertical	62	1.27	-	27.39	3.10	-	

BT-LE(1Mbps)

2402MHz_TX

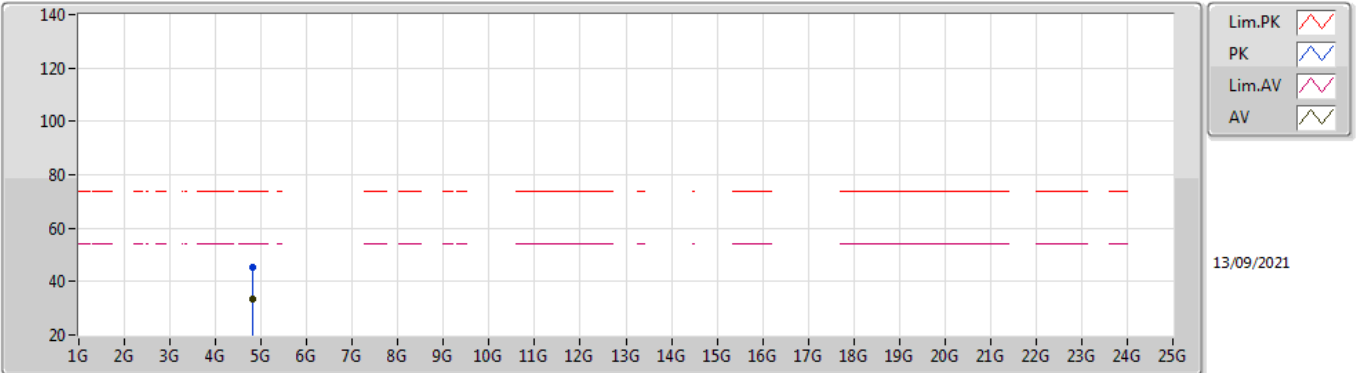


EUT V_1TX
Setting Default
06-F-R-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	2.3598G	54.74	74.00	-19.26	24.00	3	Horizontal	53	1.18	-	27.72	3.02	-	
AV	2.3638G	43.86	54.00	-10.14	13.14	3	Horizontal	53	1.18	-	27.69	3.03	-	
PK	2.4022G	101.53	Inf	-Inf	71.04	3	Horizontal	53	1.18	-	27.39	3.10	-	
AV	2.402G	100.05	Inf	-Inf	69.56	3	Horizontal	53	1.18	-	27.39	3.10	-	

BT-LE(1Mbps)

2402MHz_TX

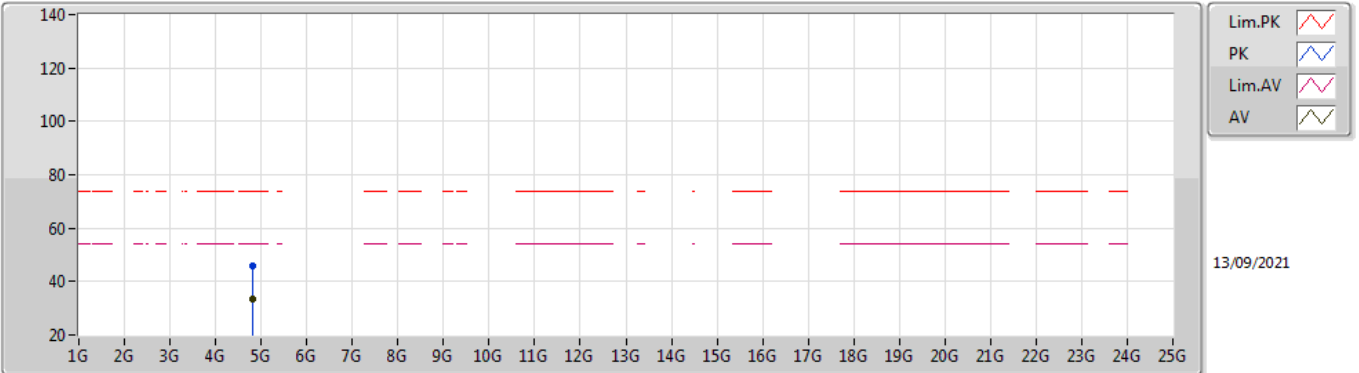


EUT V_1TX
Setting Default
06-F-R-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	4.8037G	45.60	74.00	-28.40	41.58	3	Vertical	89	2.14	-	31.09	5.00	32.07	
AV	4.80412G	33.43	54.00	-20.57	29.41	3	Vertical	89	2.14	-	31.09	5.00	32.07	

BT-LE(1Mbps)

2402MHz_TX

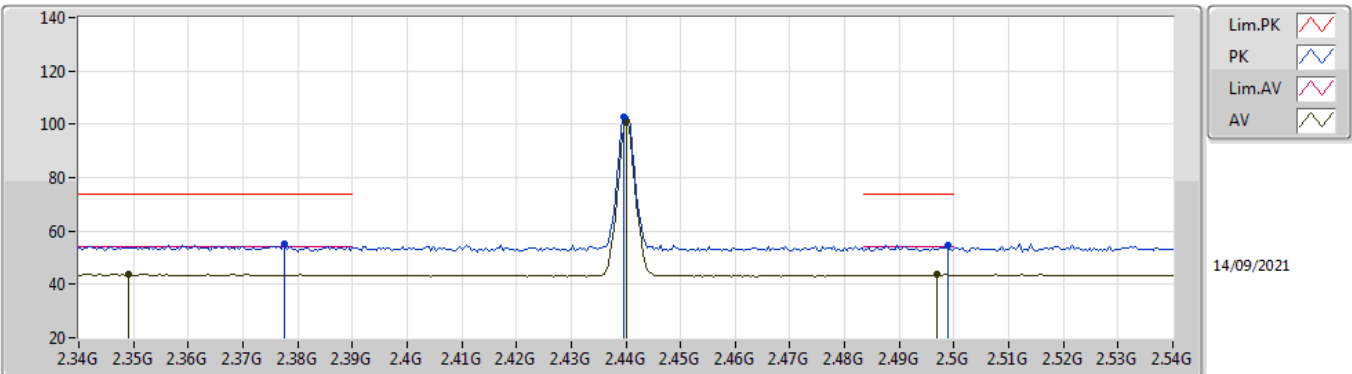


EUT V_1TX
Setting Default
06-F-R-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	4.80307G	45.79	74.00	-28.21	41.78	3	Horizontal	197	2.16	-	31.09	5.00	32.08	
AV	4.80406G	33.65	54.00	-20.35	29.63	3	Horizontal	197	2.16	-	31.09	5.00	32.07	

BT-LE(1Mbps)

2440MHz_TX

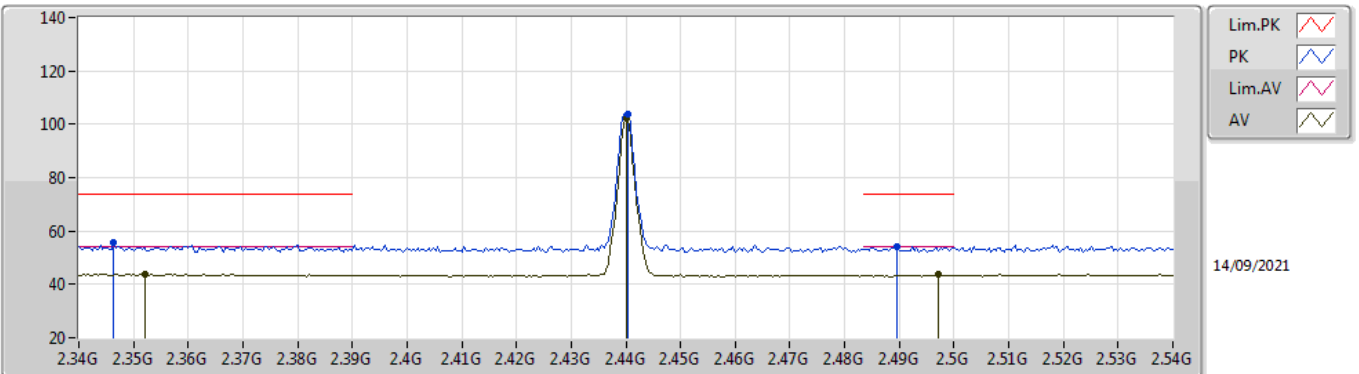


EUT V_1TX
Setting Default
06-F-R-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	2.3776G	55.42	74.00	-18.58	24.78	3	Vertical	0	2.54	-	27.58	3.06	-
AV	2.3492G	43.81	54.00	-10.19	13.01	3	Vertical	0	2.54	-	27.80	3.00	-
PK	2.4396G	102.63	Inf	-Inf	72.25	3	Vertical	0	2.54	-	27.24	3.14	-
AV	2.44G	101.10	Inf	-Inf	70.72	3	Vertical	0	2.54	-	27.24	3.14	-
PK	2.4988G	54.70	74.00	-19.30	24.20	3	Vertical	0	2.54	-	27.30	3.20	-
AV	2.4968G	43.60	54.00	-10.40	13.11	3	Vertical	0	2.54	-	27.29	3.20	-

BT-LE(1Mbps)

2440MHz_TX

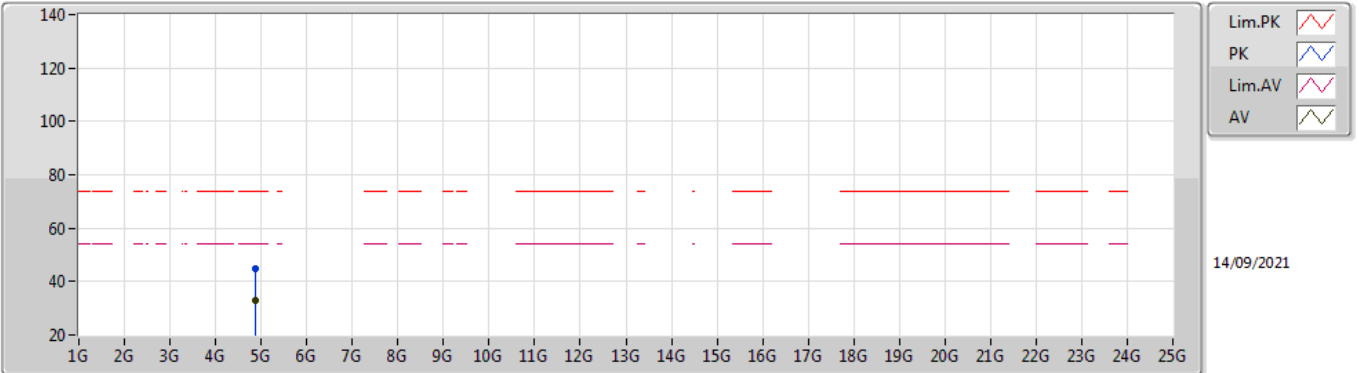


EUT V_1TX
Setting Default
06-F-R-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	2.3464G	55.44	74.00	-18.56	24.64	3	Horizontal	195	1.54	-	27.81	2.99	-
AV	2.352G	43.88	54.00	-10.12	13.10	3	Horizontal	195	1.54	-	27.78	3.00	-
PK	2.4404G	103.98	Inf	-Inf	73.60	3	Horizontal	195	1.54	-	27.24	3.14	-
AV	2.44G	102.35	Inf	-Inf	71.97	3	Horizontal	195	1.54	-	27.24	3.14	-
PK	2.4896G	53.95	74.00	-20.05	23.48	3	Horizontal	195	1.54	-	27.28	3.19	-
AV	2.4972G	43.55	54.00	-10.45	13.06	3	Horizontal	195	1.54	-	27.29	3.20	-

BT-LE(1Mbps)

2440MHz_TX

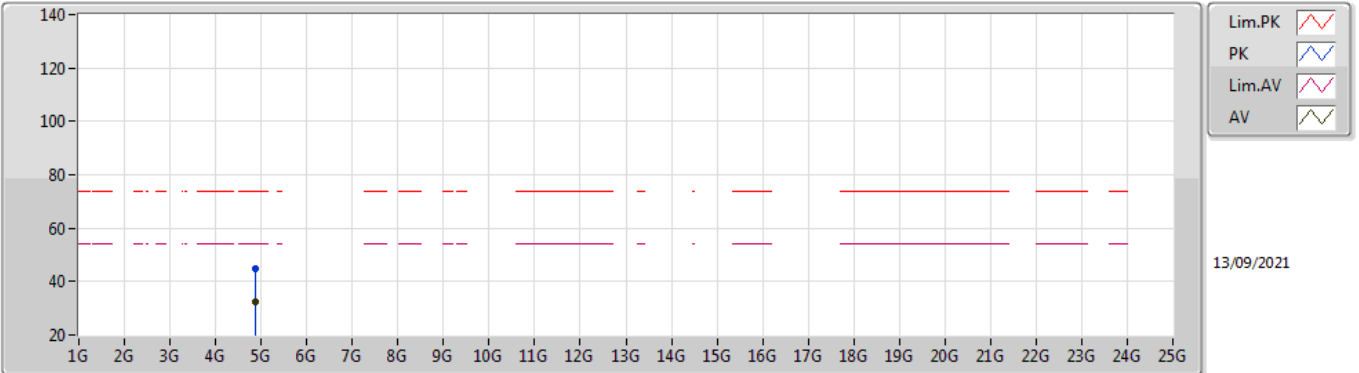


EUT V_1TX
Setting Default
06-F-R-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	4.88052G	44.83	74.00	-29.17	40.78	3	Vertical	0	1.80	-	31.06	5.00	32.01	
AV	4.87878G	32.68	54.00	-21.32	28.63	3	Vertical	0	1.80	-	31.06	5.00	32.01	

BT-LE(1Mbps)

2440MHz_TX

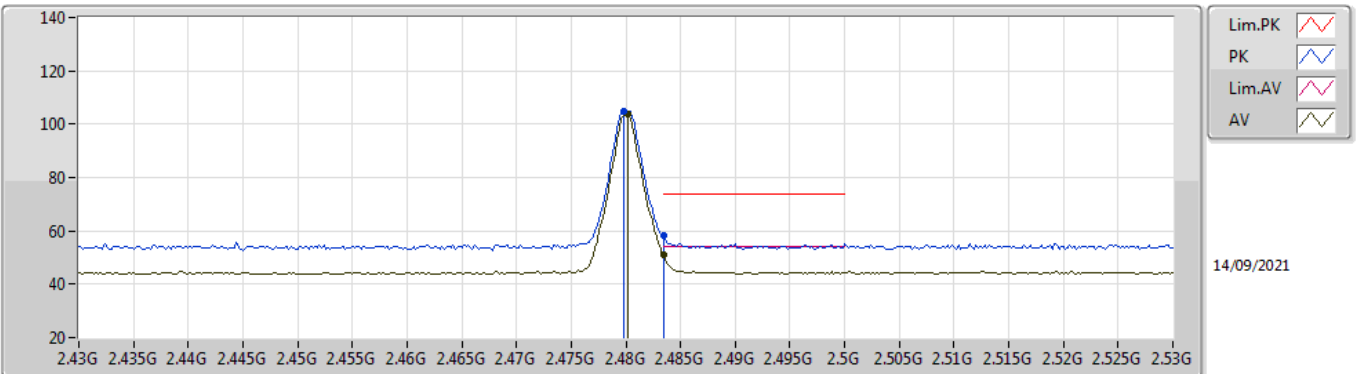


EUT V_1TX
Setting Default
06-F-R-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	4.8811G	44.93	74.00	-29.07	40.88	3	Horizontal	99	2.57	-	31.06	5.00	32.01	
AV	4.88037G	32.43	54.00	-21.57	28.38	3	Horizontal	99	2.57	-	31.06	5.00	32.01	

BT-LE(1Mbps)

2480MHz_TX

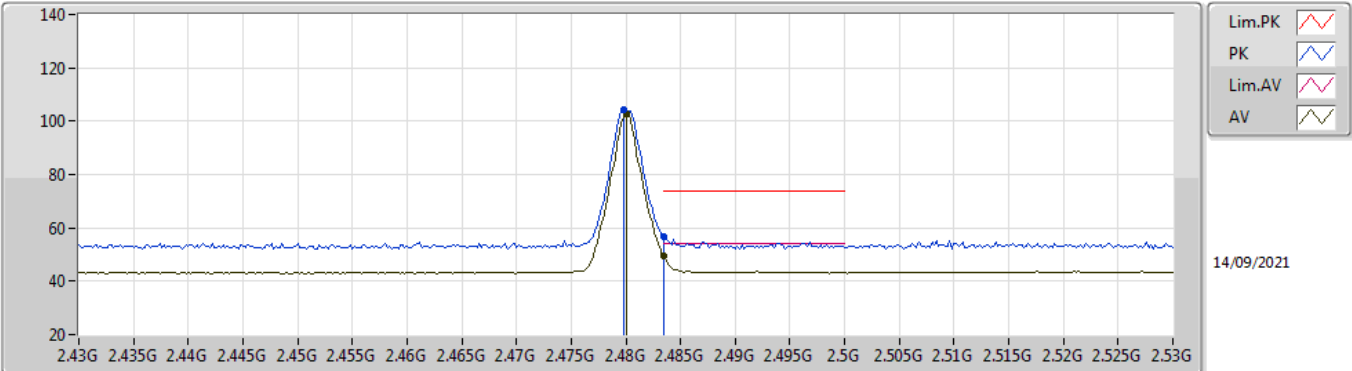


EUT V_1TX
Setting Default
06-F-R-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	2.4798G	104.78	Inf	-Inf	74.34	3	Vertical	323	2.78	-	27.26	3.18	-	
AV	2.4802G	103.69	Inf	-Inf	73.25	3	Vertical	323	2.78	-	27.26	3.18	-	
PK	2.4835G	58.02	74.00	-15.98	27.57	3	Vertical	323	2.78	-	27.27	3.18	-	
AV	2.4835G	51.11	54.00	-2.89	20.66	3	Vertical	323	2.78	-	27.27	3.18	-	

BT-LE(1Mbps)

2480MHz_TX

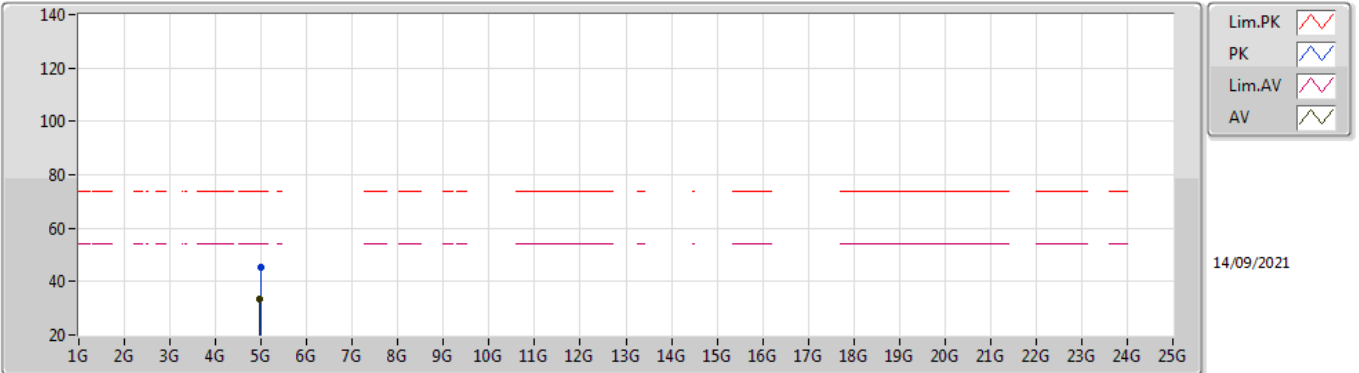


EUT V_1TX
Setting Default
06-F-R-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	2.4798G	104.06	Inf	-Inf	73.62	3	Horizontal	182	2.53	-	27.26	3.18	-
AV	2.48G	102.56	Inf	-Inf	72.12	3	Horizontal	182	2.53	-	27.26	3.18	-
PK	2.4835G	56.61	74.00	-17.39	26.16	3	Horizontal	182	2.53	-	27.27	3.18	-
AV	2.4835G	49.69	54.00	-4.31	19.24	3	Horizontal	182	2.53	-	27.27	3.18	-

BT-LE(1Mbps)

2480MHz_TX

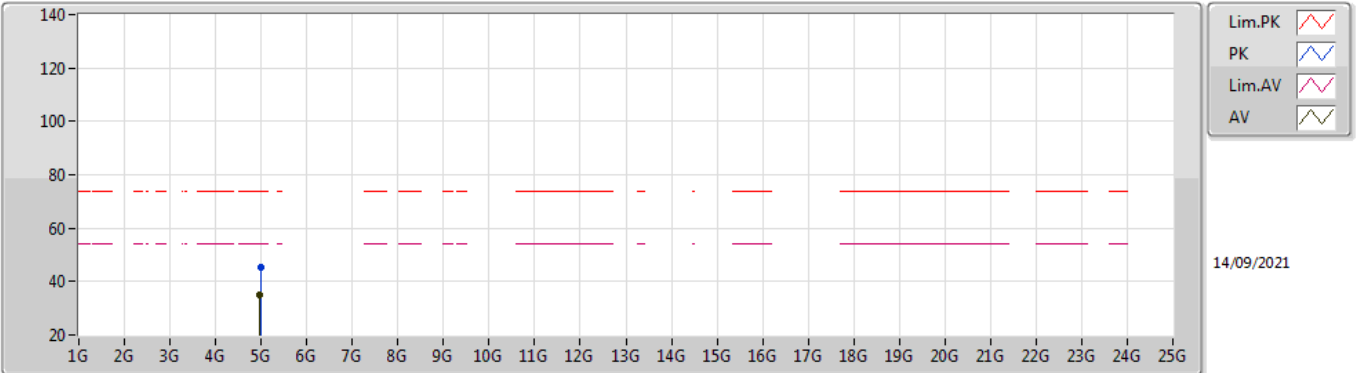


EUT V_1TX
Setting Default
06-F-R-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	4.998G	45.12	74.00	-28.88	40.73	3	Vertical	165	1.80	-	31.30	5.00	31.91	
AV	4.9602G	33.67	54.00	-20.33	29.31	3	Vertical	165	1.80	-	31.30	5.00	31.94	

BT-LE(1Mbps)

2480MHz_TX



EUT V_1TX
Setting Default
06-F-R-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	5.0058G	45.14	74.00	-28.86	40.73	3	Horizontal	157	1.80	-	31.32	5.00	31.91
AV	4.9598G	34.81	54.00	-19.19	30.45	3	Horizontal	157	1.80	-	31.30	5.00	31.94



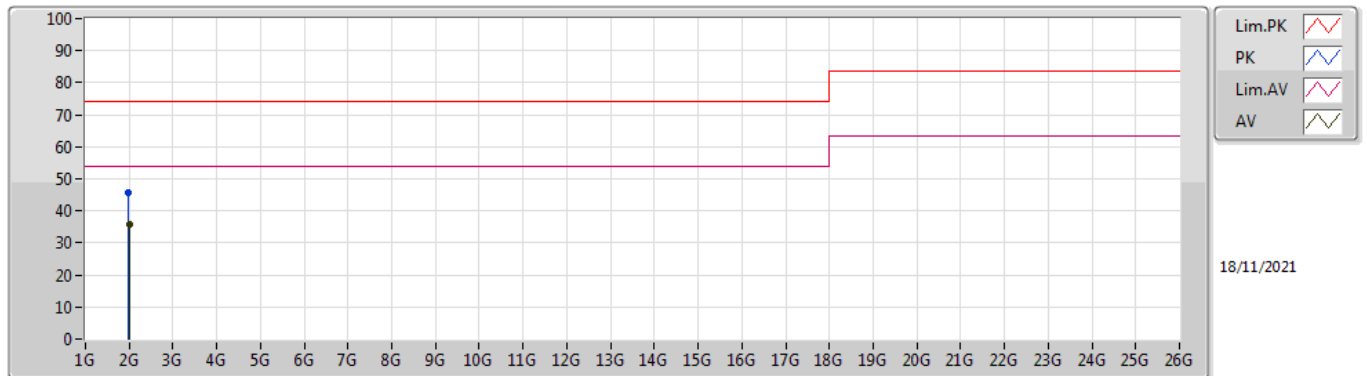
Radiated Emissions above 1GHz_ Co- location

Appendix G

Summary

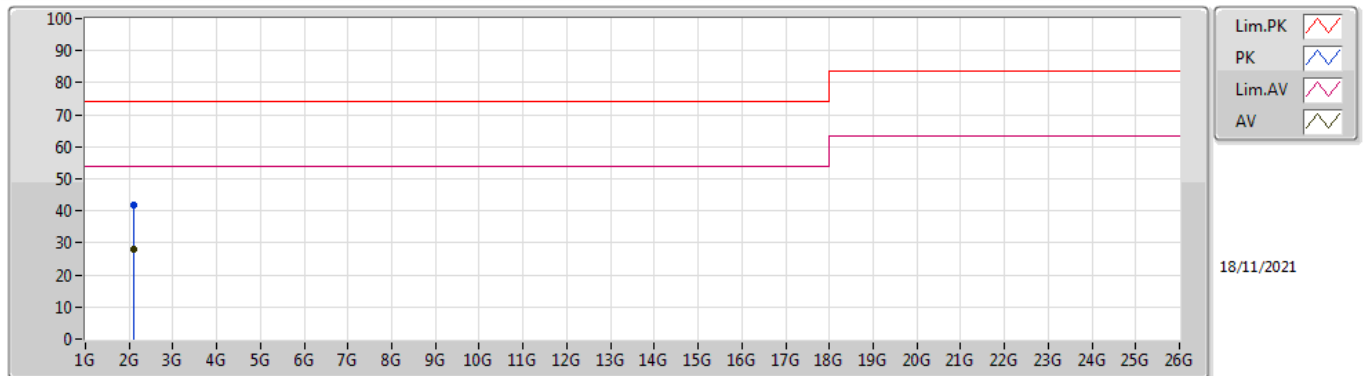
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 3	Pass	AV	1.9955G	35.64	54.00	-18.36	Vertical

Mode 3



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB/m)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV/m)	AF (dB/m)	CL (dB)	PA (dB)
PK	1.9655G	45.90	74.00	-28.10	-4.56	3	Vertical	122	2.16	-	50.46	25.96	3.48	34.00
AV	1.9955G	35.64	54.00	-18.36	-4.38	3	Vertical	122	2.16	"Worst"	40.02	26.08	3.50	33.96

Mode 3



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB/m)	(m)		(°)	(m)		(dBuV/m)	(dB/m)	(dB)	(dB)
PK	2.105G	41.75	74.00	-32.25	-3.46	3	Horizontal	95	2.11	-	45.21	26.85	3.60	33.91
AV	2.096G	28.10	54.00	-25.90	-3.55	3	Horizontal	95	2.11	"Worst"	31.65	26.76	3.60	33.91

1. Photographs of Conducted Emissions Test Configuration

Test Mode: Mode 3

FRONT VIEW



REAR VIEW



CLOSE-UP VIEW

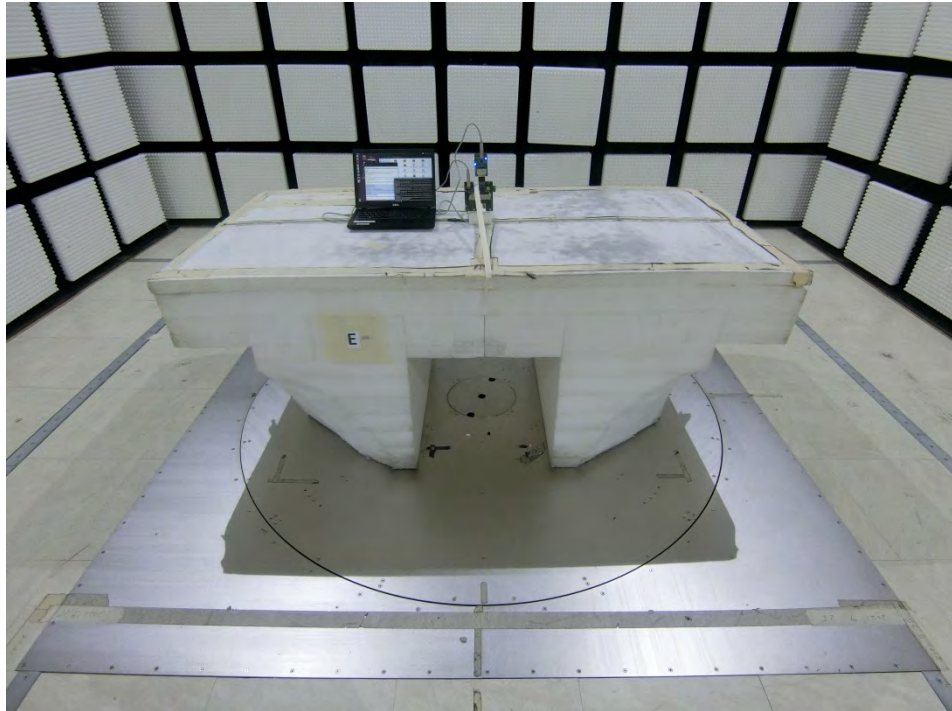


2. Photographs of Radiated Emissions Test Configuration

Test Configuration: 30MHz~1GHz

Test Mode: Mode 1

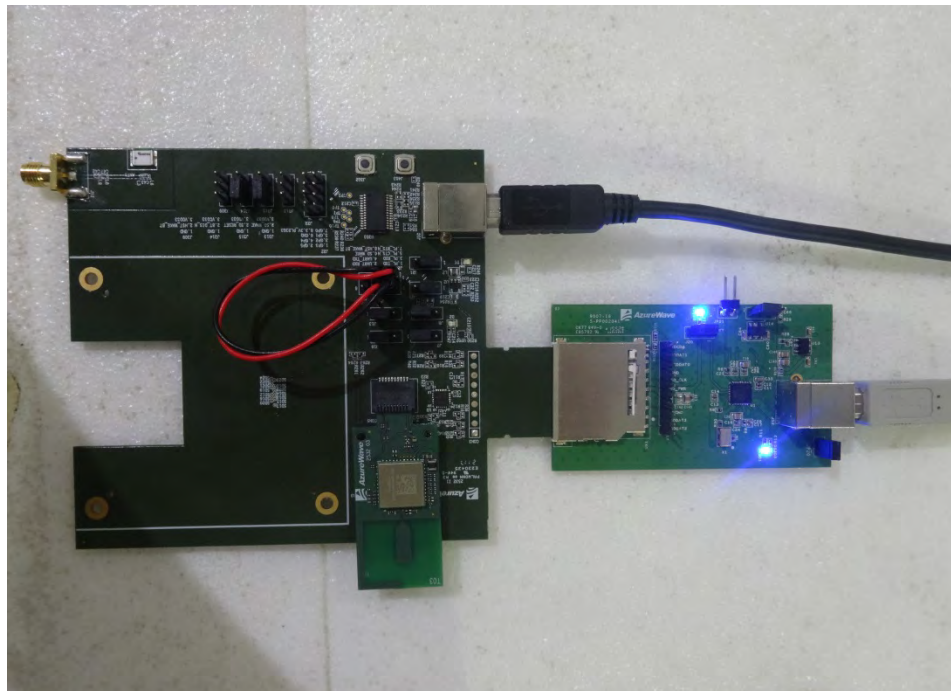
FRONT VIEW



REAR VIEW



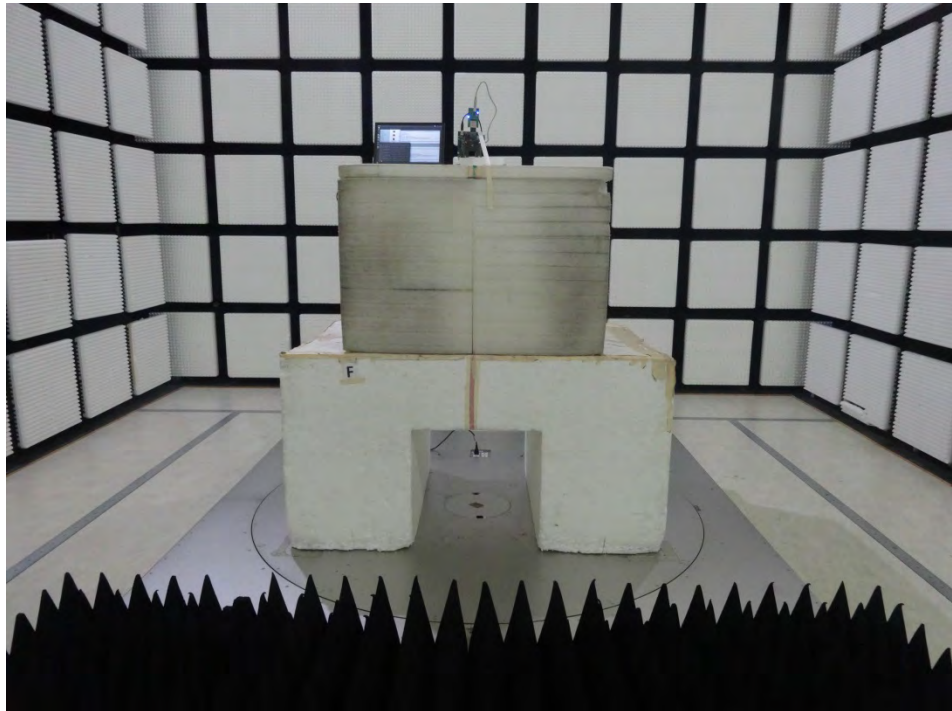
CLOSE-UP VIEW



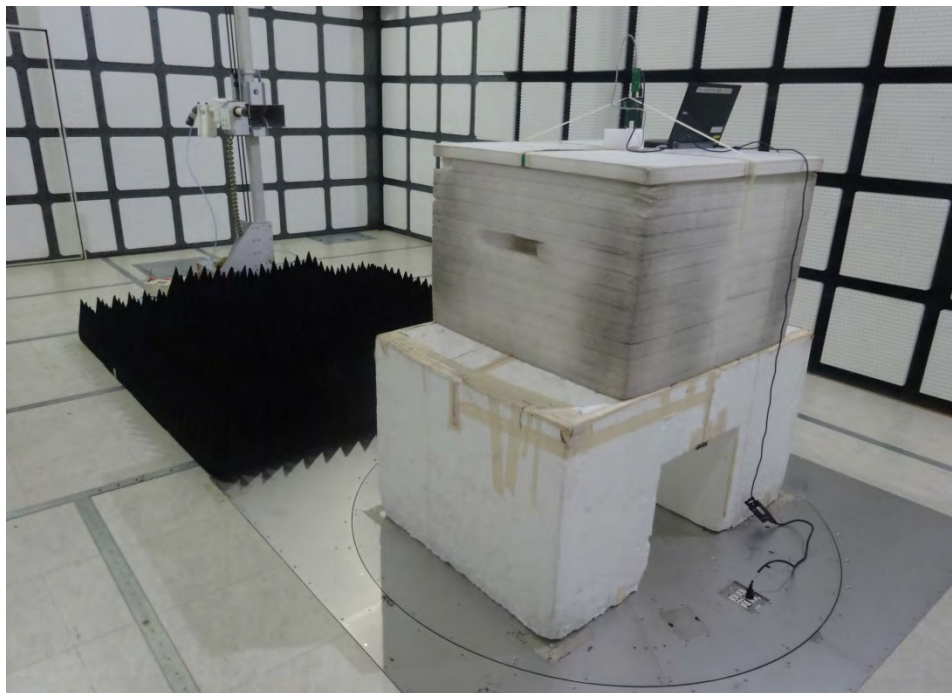
Test Configuration: Above 1GHz

Test Mode: Mode 1

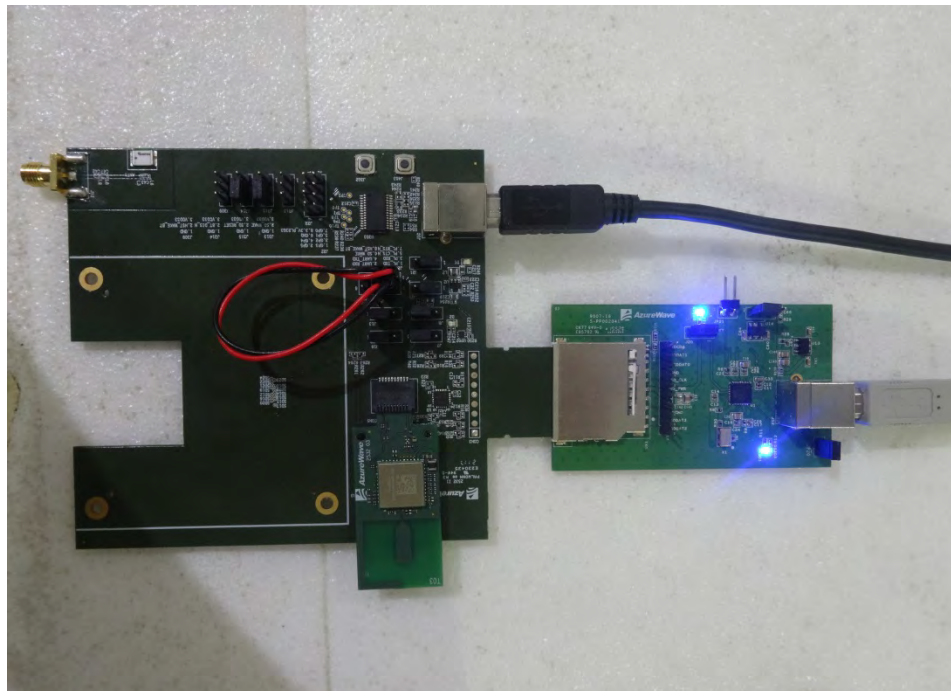
FRONT VIEW



REAR VIEW

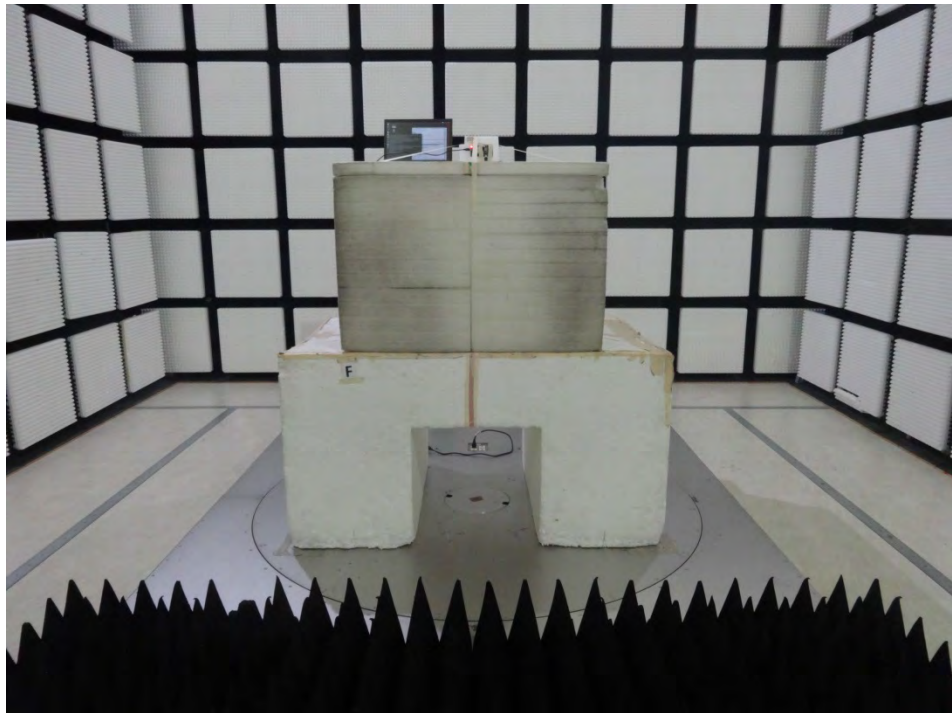


CLOSE-UP VIEW

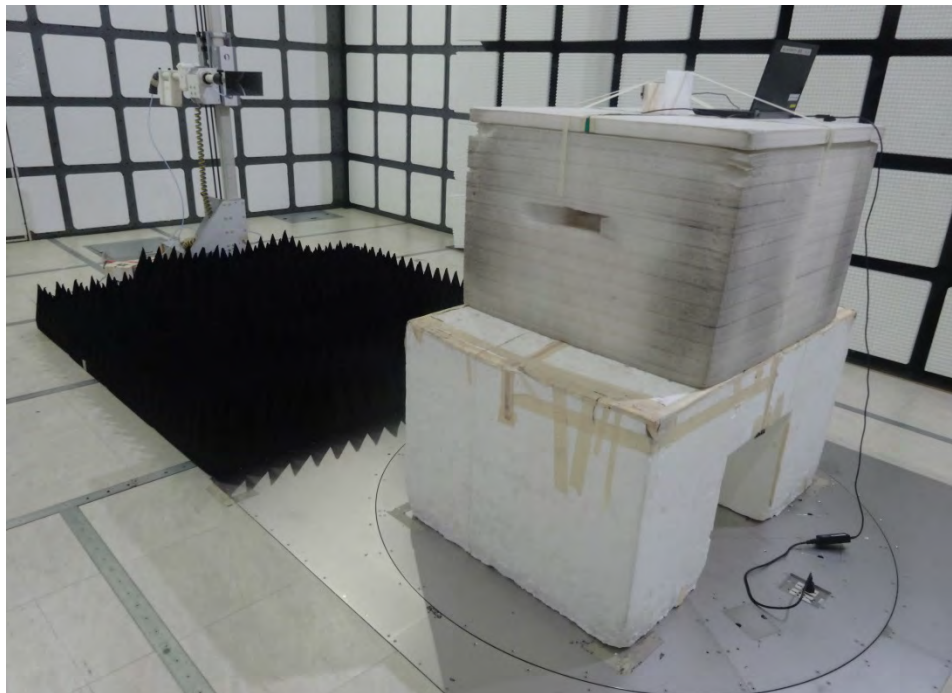


Test Mode: Mode 2

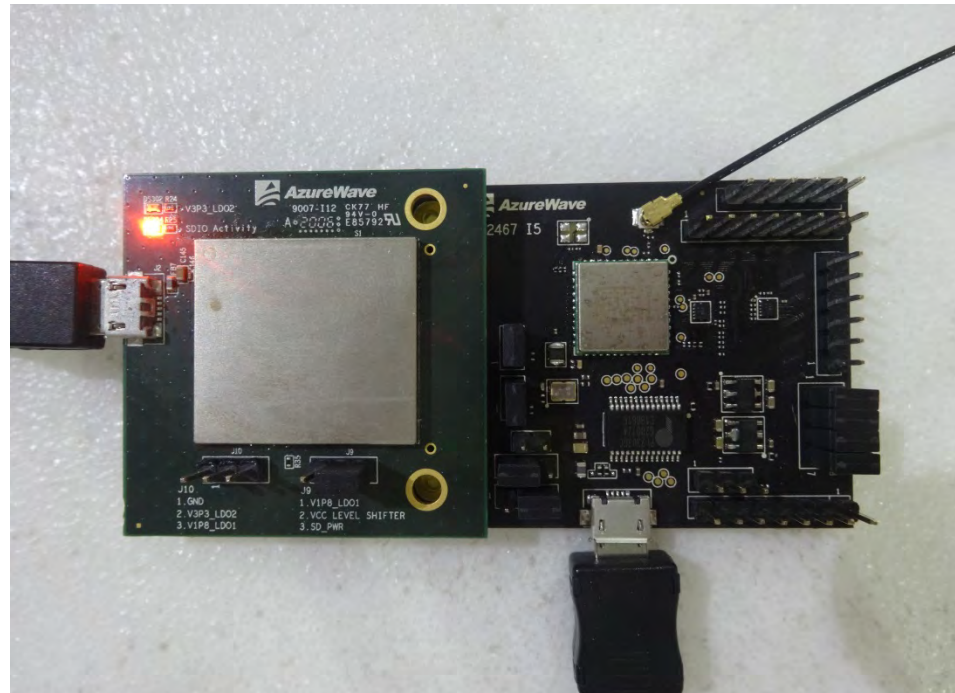
FRONT VIEW



REAR VIEW



CLOSE-UP VIEW



—THE END—